Waterside on Seneca – Watkins Glen

Stormwater Pollution Prevention Plan

Volume II: Hydrologic Calculations

Prepared For:
Waterside on Seneca Inc
1605 LBJ Freeway,
Dallas, TX 75234

Prepared By:
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8836 State Route 434
Apalachin, NY 13732

LDG No. 13649-001

November 2024

TABLE OF CONTENTS

PROJECT LOCATION MAP

Larson Design Group
8836 STATE ROUTE 434
APALACHIN, NY 13732
(607)-444-9010

WATERSIDE ON SENECA – WATKINS GLEN

VICINITY MAP

Date: 08/12/2024

Project No.: 13649-001

Sheet No.: 1 of 1

DOWNSTREAM ANALYSIS CALCULATIONS

DOWNSTREAM ANALYSIS - CANAL

Canal Drainage Area (see streamstats attached)

Total Area:	76,800 acres (120 square miles)
Pre-Development Impervious Area:	6,213.12 acres
Proposed Impervious Area:	+7.18 acres
Post-Development Impervious Area:	6,220.30 acres

Table 1 summarizes resulting peak discharge rates from the overall canal watershed.

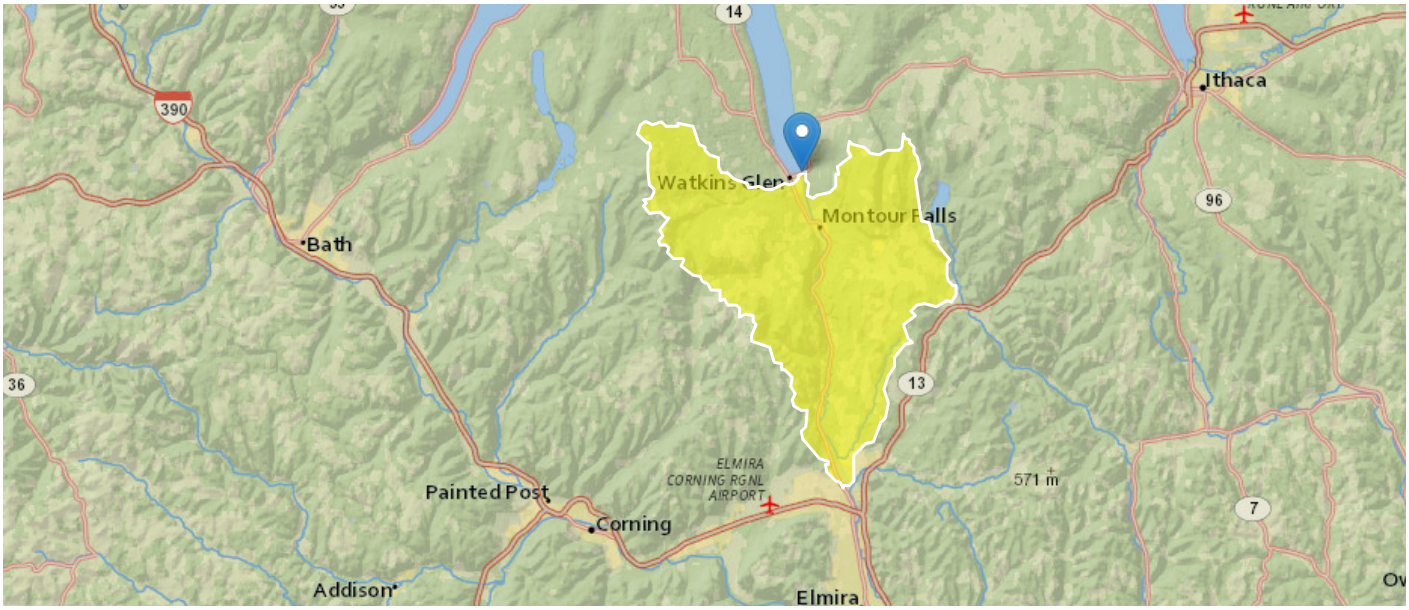
TABLE 1. HYDROLOGIC MODELING RESULTS

	Runoff Volume (cubic-feet)			Peak Rate of Runoff (cfs)		
	1-yr	10-yr	100-yr	1-yr	10-yr	100-yr
Pre-Developed						
Canal	**4,316,173**	**109,749,600**	**356,867,712**	**135.66**	**40,139.83**	**173,784.20**
Post-Developed						
Canal + Development	4,316,228	109,750,992	356,872,192	135.66	40,140.36	173,786.50
Difference	***(+55)***	***(+1,392)***	***(+4,480)***	***0***	***(+0.53)***	***(+2.30)***
Percent Increase (%)	**0.0013**	**0.0013**	**0.0013**	**0**	**0.0013**	**0.0013**

A Downstream Analysis of the Canal was performed and included in Volume II. A Downstream Analysis allows for the Overbank (10-year) and Extreme (100-year) flood requirements to be waived if the site meets the requirements. A Downstream Analysis can be conducted using the 10% rule, meaning the analysis should extend from the point of discharge downstream to the point on the stream where the site represents 10% of the total drainage area. The Analysis is computed modeling the pre-development and post-development peak flows and velocities for design storms (e.g., 10-year and 100-year), at all downstream confluences with first order or higher streams up to and including the point where the 10% rule is met. In the particular case of this project, in a meeting between Larson Design Group and NYSDEC on 8/20/24, NYSDEC clarified that due to the large size of the canal watershed (approximately 120 square miles) that the design could compare the pre- to post-development increases from the site with the overall drainage area flows. As long as the increases were minor, then no further actions were required. In the case of this site, the peak rates of runoff and the runoff volumes will increase by approximately 0.0013% for the canal drainage area see Table 1 above. Therefore, the Downstream Analysis parameters are met, and controls are not required for the 10- and 100-year storm events.

Waterside on Seneca - Canal StreamStats Report

Region ID: NY
Workspace ID: NY20240927120751492000
Clicked Point (Latitude, Longitude): 42.38369, -76.86269
Time: 2024-09-27 08:08:11 -0400



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLOPCM	Mean basin slope determined by summing lengths of all contours in basin mulitplying by contour interval and dividing product by drainage area	596	feet per mi
CENTROIDX	Basin centroid horizontal (x) location in state plane coordinates	347093.2	meters
CENTROIDY	Basin centroid vertical (y) location in state plane units	4686536.7	meters
CONTOUR	Total length of all elevation contours in drainage area in miles	713.94	miles
CSL1085LO	10-85 slope of lower half of main channel in feet per mile.	31.3	feet per mi
CSL1085UP	10-85 slope of upper half of main channel in feet per mile.	59.8	feet per mi
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known	39.9	feet per mi
DRNAREA	Area that drains to a point on a stream	120	square miles
EL1200	Percentage of basin at or above 1200 ft elevation	55.6	percent
FOREST	Percentage of area covered by forest	65.3	percent
JULAVPRE	Mean July Precipitation	3.6	inches
JUNAVPRE	Mean June Precipitation	4.16	inches
JUNMAXTMP	Maximum June Temperature, in degrees F	76.1	degrees F
LAGFACTOR	Lag Factor as defined in SIR 2006-5112	0.58	dimensionless
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	6.29	percent

Parameter Code	Parameter Description	Value	Unit
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	1.18	percent
LENGTH	Length along the main channel from the measuring location extended to the basin divide	25.5	miles
MAR	Mean annual runoff for the period of record in inches	13.4	inches
MAYAVPRE	Mean May Precipitation	3.22	inches
MXSNO	50th percentile of seasonal maximum snow depth from Northeast Regional Climate Center atlas by Cember and Wilks, 1993	11.1	inches
OUTLETX	Basin outlet horizontal (x) location in state plane coordinates	346665	feet
OUTLETY	Basin outlet vertical (y) location in state plane coordinates	4694055	feet
PRECIP	Mean Annual Precipitation	32.6	inches
PRJUNAUG00	Basin average mean precip for June to August from PRISM 1971-2000	11.1	inches
SLOPERATIO	Ratio of main channel slope to basin slope as defined in SIR 2006-5112	0.0669	dimensionless
SSURGOA	Percentage of area of Hydrologic Soil Type A from SSURGO	9.67	percent
SSURGOB	Percentage of area of Hydrologic Soil Type B from SSURGO	18.5	percent
STORAGE	Percentage of area of storage (lakes ponds reservoirs wetlands)	1.23	percent

Peak-Flow Statistics

Peak-Flow Statistics Parameters [2006 Full Region 5]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	120	square miles	1.7	4773
CSL10_85	Stream Slope 10 and 85 Method	39.9	feet per mi	2.76	222.55
PRECIP	Mean Annual Precipitation	32.6	inches	31.64	49.79

Peak-Flow Statistics Flow Report [2006 Full Region 5]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	SE	ASEp	Equiv. Yrs.
80-percent AEP flood	2410	ft^3/s	38.5	38.5	2.2
66.7-percent AEP flood	3020	ft^3/s	38	38	1.9
50-percent AEP flood	3890	ft^3/s	37.4	37.4	2
20-percent AEP flood	6560	ft^3/s	36.3	36.3	3.4
10-percent AEP flood	8680	ft^3/s	36.1	36.1	4.9
4-percent AEP flood	11700	ft^3/s	36.7	36.7	7
2-percent AEP flood	14300	ft^3/s	37.5	37.5	8.5
1-percent AEP flood	17000	ft^3/s	38.7	38.7	9.7
0.5-percent AEP flood	19800	ft^3/s	40.2	40.2	10.8
0.2-percent AEP flood	24100	ft^3/s	42.6	42.6	11.8

Peak-Flow Statistics Citations

Lumia, Richard, Freehafer, D.A., and Smith, M.J.,2006, Magnitude and Frequency of Floods in New York: U.S. Geological Survey Scientific Investigations Report 2006–5112, 152 p. (http://pubs.usgs.gov/sir/2006/5112/)

Bankfull Statistics

Bankfull Statistics Parameters [97.0 Percent (117 square miles) Bankfull Region 6 SIR2009 5144]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	120	square miles	1.02	290

Bankfull Statistics Parameters [3.0 Percent (3.04 square miles) Bankfull Region 7 SIR2009 5144]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	120	square miles	1.07	349

Bankfull Statistics Parameters [Appalachian Highlands D Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	120	square miles	0.07722	940.1535

Bankfull Statistics Parameters [Appalachian Plateaus P Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	120	square miles	0.081081	536.995602

Bankfull Statistics Parameters [USA Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	120	square miles	0.07722	59927.7393

Bankfull Statistics Flow Report [97.0 Percent (117 square miles) Bankfull Region 6 SIR2009 5144]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	PIL	PIU
Bankfull Area	419	ft^2	152	1150
Bankfull Depth	3.34	ft	1.31	8.55
Bankfull Streamflow	2700	ft^3/s	444	16400
Bankfull Width	126	ft	46.6	341

Bankfull Statistics Flow Report [3.0 Percent (3.04 square miles) Bankfull Region 7 SIR2009 5144]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	PIL	PIU
Bankfull Area	368	ft^2	141	957
Bankfull Depth	3.81	ft	1.35	10.8
Bankfull Streamflow	1450	ft^3/s	226	9320
Bankfull Width	96.8	ft	35.9	261

Bankfull Statistics Flow Report [Appalachian Highlands D Bieger 2015]

Statistic	Value	Unit
Bieger_D_channel_width	111	ft
Bieger_D_channel_depth	4.43	ft
Bieger_D_channel_cross_sectional_area	502	ft^2

Bankfull Statistics Flow Report [Appalachian Plateaus P Bieger 2015]

Statistic	Value	Unit
Bieger_P_channel_width	123	ft
Bieger_P_channel_depth	4.51	ft
Bieger_P_channel_cross_sectional_area	550	ft^2

Bankfull Statistics Flow Report [USA Bieger 2015]

Statistic	Value	Unit
Bieger_USA_channel_width	66.8	ft
Bieger_USA_channel_depth	3.34	ft
Bieger_USA_channel_cross_sectional_area	227	ft^2

Bankfull Statistics Flow Report [Area-Averaged]

Statistic	Value	Unit
Bankfull Area	417	ft^2
Bankfull Depth	3.35	ft
Bankfull Streamflow	2660	ft^3/s
Bankfull Width	125	ft
Bieger_D_channel_width	111	ft
Bieger_D_channel_depth	4.43	ft
Bieger_D_channel_cross_sectional_area	502	ft^2
Bieger_P_channel_width	123	ft
Bieger_P_channel_depth	4.51	ft
Bieger_P_channel_cross_sectional_area	550	ft^2
Bieger_USA_channel_width	66.8	ft
Bieger_USA_channel_depth	3.34	ft
Bieger_USA_channel_cross_sectional_area	227	ft^2

Bankfull Statistics Citations

Mulvihill, C.I., Baldigo, B.P., Miller, S.J. , and DeKoskie, Douglas,2009, Bankfull Discharge and Channel Characteristics of Streams in New York State: U.S. Geological Survey Scientific Investigations Report 2009-5144, 51 p. (http://pubs.usgs.gov/sir/2009/5144/)

Bieger, Katrin; Rathjens, Hendrik; Allen, Peter M.; and Arnold, Jeffrey G.,2015, Development and Evaluation of Bankfull Hydraulic Geometry Relationships for the Physiographic Regions of the United States, Publications from USDA-ARS / UNL Faculty, 17p. (https://digitalcommons.unl.edu/usdaarsfacpub/1515?utm_source=digitalcommons.unl.edu%2Fusdaarsfacpub%2F1515&utm_medium=PDF&utm_campaign=PDFCoverPages)

Flow-Duration Statistics

Flow-Duration Statistics Parameters [Statewide duration flows excl LongIsl 2014 5220]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	120	square miles	3.14	4780
JUNAVPRE	Mean June Precipitation	4.16	inches	3.59	5.33
CENTROIDX	CENTROIDX	347093.2	meters	166000	658000
CENTROIDY	CENTROIDY	4686536.7	meters	4560000	4920000
CSL1085LO	10-85 slope of lower half of main channel	31.3	feet per mi	1.56	152
LENGTH	Main Channel Length	25.5	miles	0.88	305
MAR	Mean Annual Runoff in inches	13.4	inches	11.6	37.4
SSURGOB	SSURGO Percent Hydrologic Soil Type B	18.5	percent	1.14	65.7
JULAVPRE	Mean July Precipitation	3.6	inches	3.2	5.26
MAYAVPRE	Mean May Precipitation	3.22	inches	3.15	5.68
PRJUNAUG00	Basin average mean precip for June to August	11.1	inches	10.5	15.5
JUNMAXTMP	Maximum June Temperature	76.1	degrees F	68.8	78.8
SSURGOA	SSURGO Percent Hydrologic Soil Type A	9.67	percent	0.62	51.2
EL1200	Percentage of Basin Above 1200 ft	55.6	percent	0	100

Flow-Duration Statistics Flow Report [Statewide duration flows excl LongIsl 2014 5220]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	ASEp
0.01 Percent Duration	6490	ft^3/s	23
1 Percent Duration	865	ft^3/s	14
5 Percent Duration	415	ft^3/s	8.8
10 Percent Duration	276	ft^3/s	7.3
15 Percent Duration	203	ft^3/s	6.6
20 Percent Duration	160	ft^3/s	7
25 Percent Duration	129	ft^3/s	7.2
35 Percent Duration	89.7	ft^3/s	8.7
50 Percent Duration	56	ft^3/s	11
65 Percent Duration	34.7	ft^3/s	14
75 Percent Duration	27.6	ft^3/s	22
80 Percent Duration	22.2	ft^3/s	26
85 Percent Duration	17.7	ft^3/s	31
90 Percent Duration	14	ft^3/s	38
95 Percent Duration	10.3	ft^3/s	49
99 Percent Duration	6.36	ft^3/s	92
99.99 Percent Duration	4.34	ft^3/s	93

Flow-Duration Statistics Citations

Gazoorian, C.L.,2015, Estimation of unaltered daily mean streamflow at ungaged streams of New York, excluding Long Island, water years 1961–2010: U.S. Geological Survey Scientific Investigations Report 2014–5220, 29 p. (https://pubs.usgs.gov/sir/2014/5220/)

Maximum Probable Flood Statistics

Maximum Probable Flood Statistics Parameters [41.0 Percent (48.6 square miles) Crippen Bue Region 4]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	120	square miles	0.1	10000

Maximum Probable Flood Statistics Parameters [59.0 Percent (71.2 square miles) Crippen Bue Region 6]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	120	square miles	0.1	10000

Maximum Probable Flood Statistics Flow Report [41.0 Percent (48.6 square miles) Crippen Bue Region 4]

Statistic	Value	Unit
Maximum Flood Crippen Bue Regional	96300	ft^3/s

Maximum Probable Flood Statistics Flow Report [59.0 Percent (71.2 square miles) Crippen Bue Region 6]

Statistic	Value	Unit
Maximum Flood Crippen Bue Regional	172000	ft^3/s

Maximum Probable Flood Statistics Flow Report [Area-Averaged]

Statistic	Value	Unit
Maximum Flood Crippen Bue Regional	141000	ft^3/s

Maximum Probable Flood Statistics Citations

Crippen, J.R. and Bue, Conrad D.1977, Maximum Floodflows in the Conterminous United States, Geological Survey Water-Supply Paper 1887, 52p. (https://pubs.usgs.gov/wsp/1887/report.pdf)

Application Version: 4.24.0
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)							Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	135.66	-------	-------	-------	40139.83	-------	-------	173784.23	PRE-CANAL
2	SCS Runoff	------	135.66	-------	-------	-------	40140.36	-------	-------	173786.50	POST-CANAL+DEVELOPMENT

Hydrograph Report

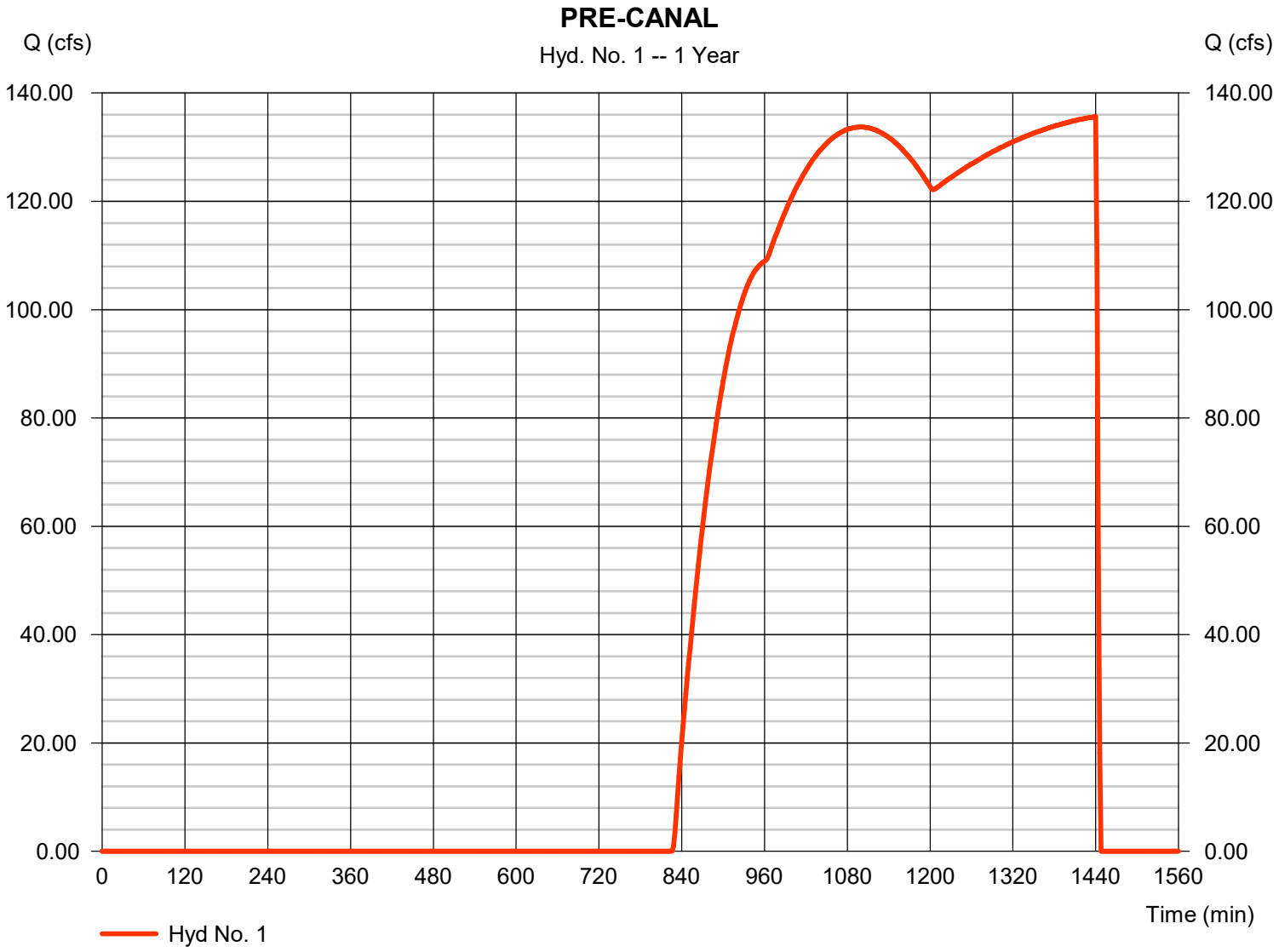
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Saturday, 10 / 19 / 2024

Hyd. No. 1

PRE-CANAL

Hydrograph type	=	SCS Runoff	Peak discharge	=	135.66 cfs
Storm frequency	=	1 yrs	Time to peak	=	1440 min
Time interval	=	2 min	Hyd. volume	=	4,316,173 cuft
Drainage area	=	76799.000 ac	Curve number	=	56*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	1.94 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(20436.000 x 58) + (6213.000 x 98) + (50150.000 x 50)] / 76799.000



Hydrograph Report

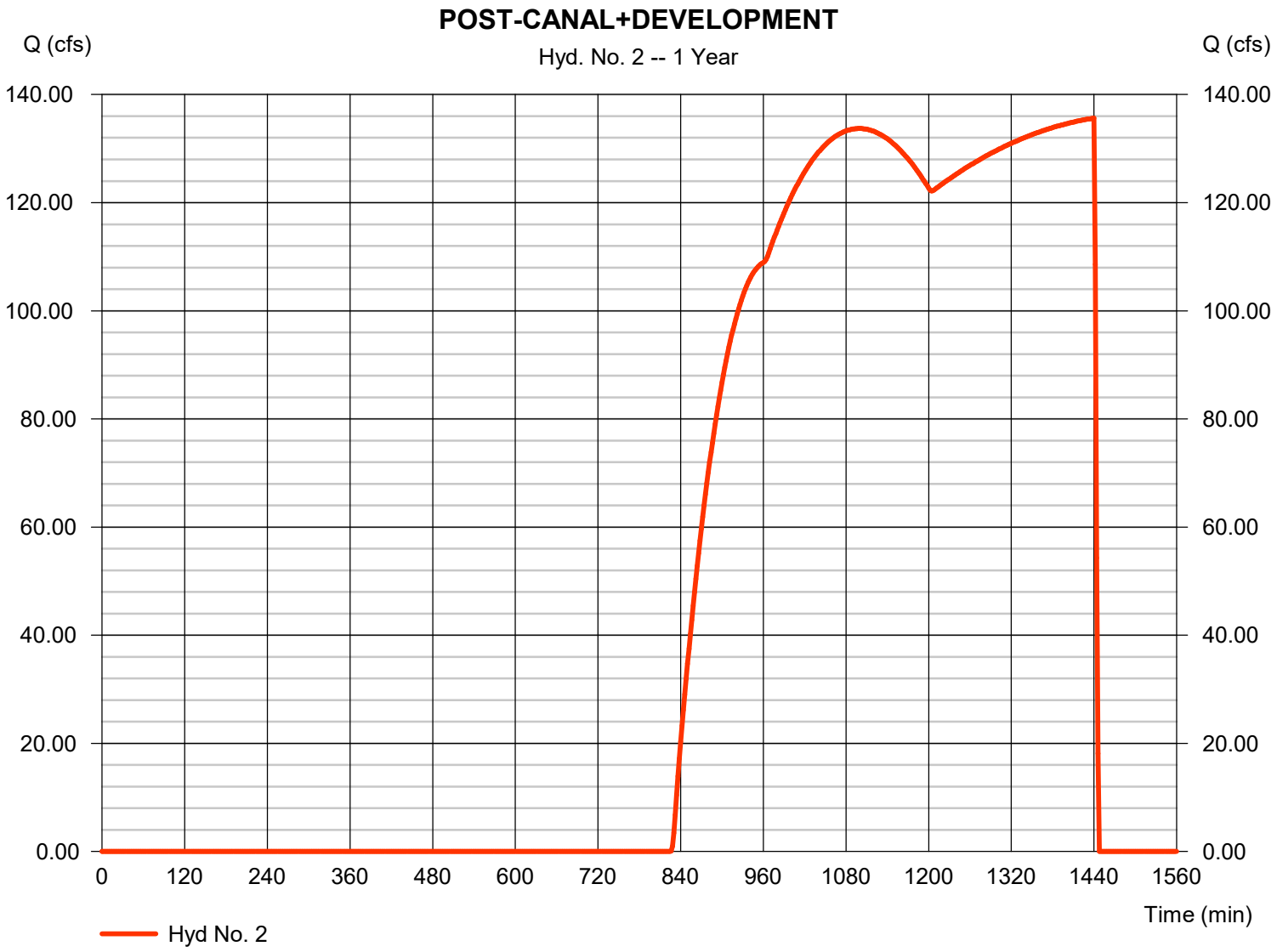
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Saturday, 10 / 19 / 2024

Hyd. No. 2

POST-CANAL+DEVELOPMENT

Hydrograph type	=	SCS Runoff	Peak discharge	=	135.66 cfs
Storm frequency	=	1 yrs	Time to peak	=	1440 min
Time interval	=	2 min	Hyd. volume	=	4,316,228 cuft
Drainage area	=	76800.000 ac	Curve number	=	56*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	1.94 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(20430.000 x 58) + (6220.000 x 98) + (50150.000 x 50)] / 76800.000



Hydrograph Report

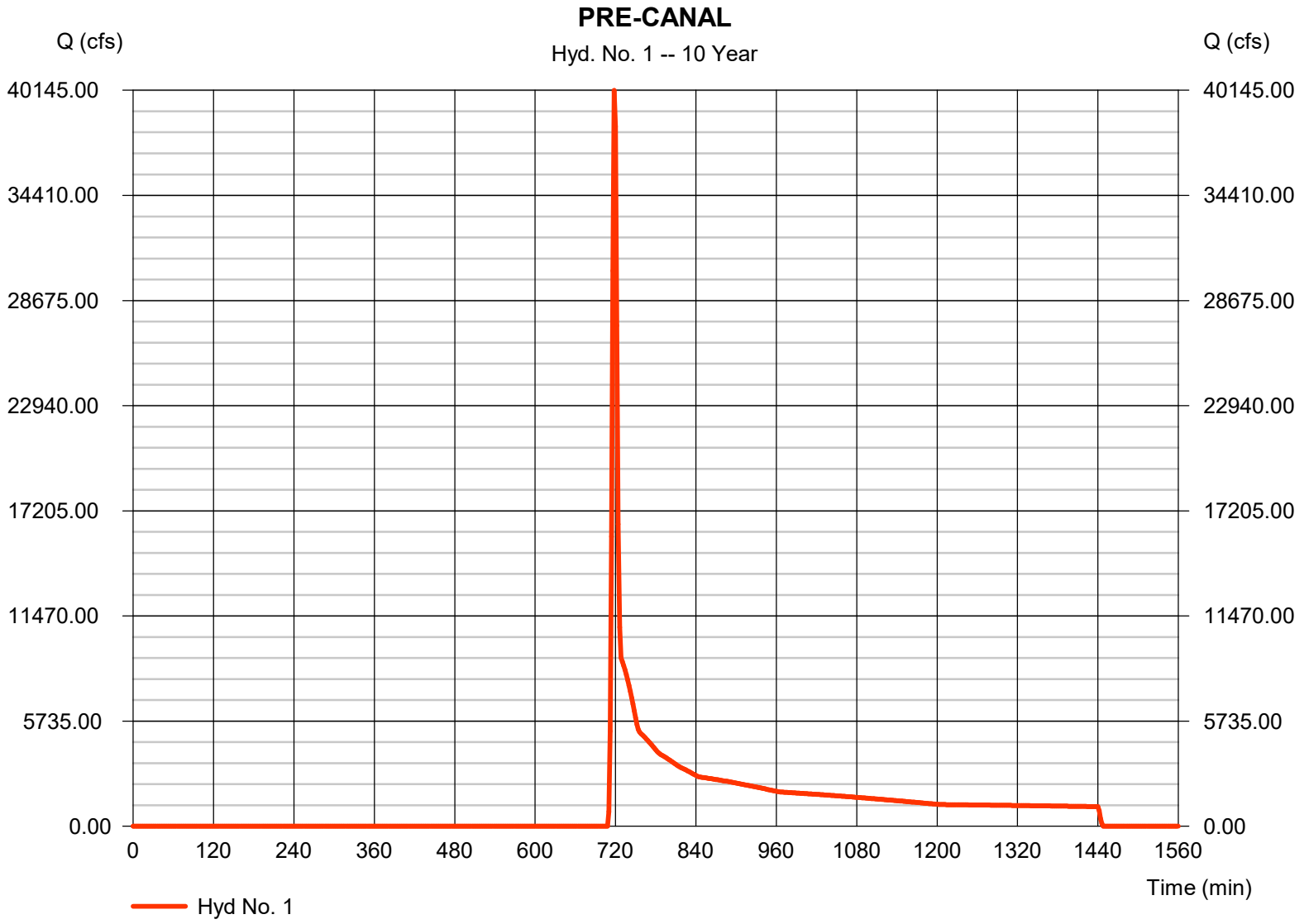
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 — Saturday, 10 / 19 / 2024

Hyd. No. 1

PRE-CANAL

Hydrograph type	= SCS Runoff	Peak discharge	= 40139.83 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 109,749,552 cuft
Drainage area	= 76799.000 ac	Curve number	= 56*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.61 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(20436.000 x 58) + (6213.000 x 98) + (50150.000 x 50)] / 76799.000



Hydrograph Report

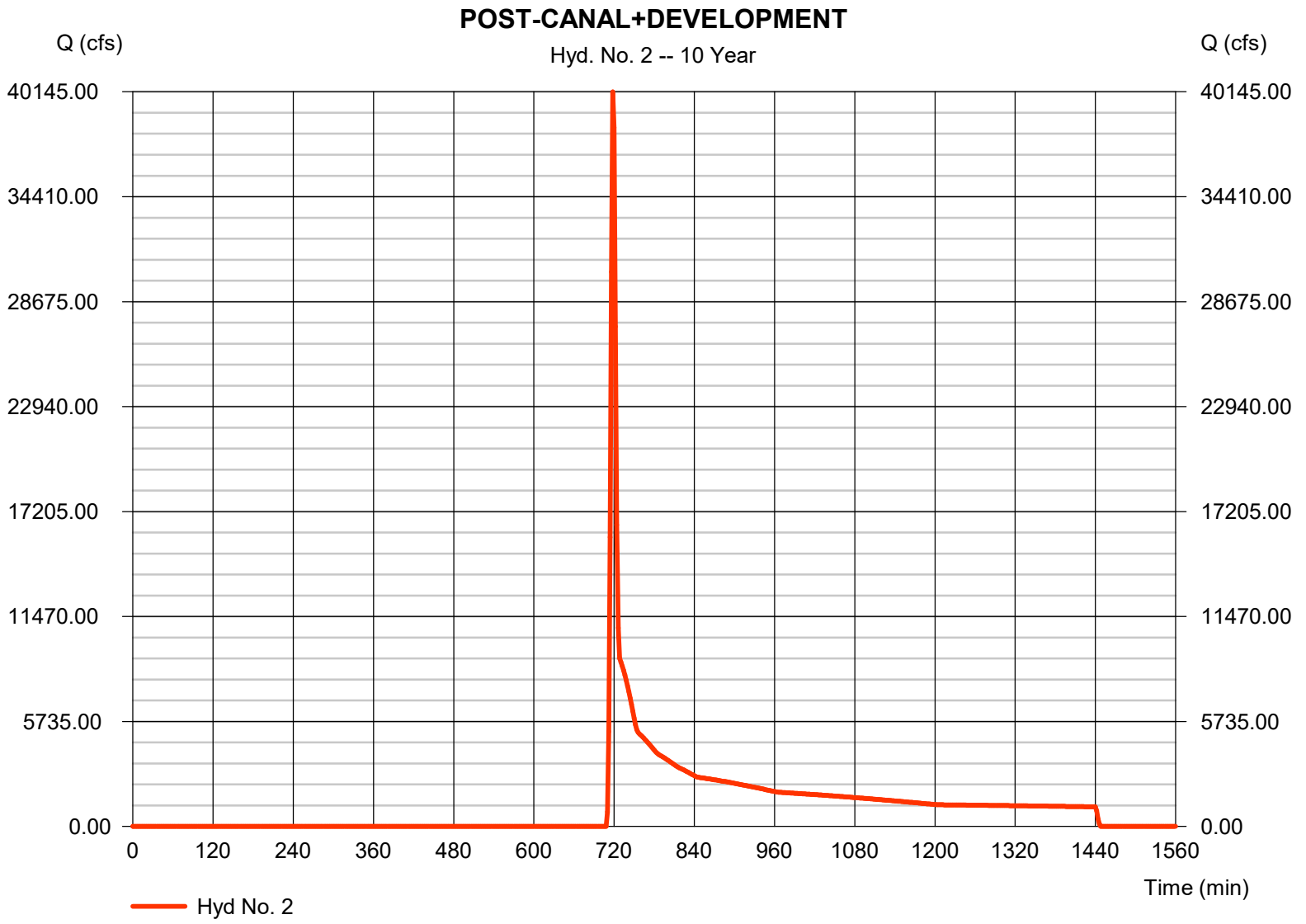
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Saturday, 10 / 19 / 2024

Hyd. No. 2

POST-CANAL+DEVELOPMENT

Hydrograph type	=	SCS Runoff	Peak discharge	=	40140.36 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	109,750,992 cuft
Drainage area	=	76800.000 ac	Curve number	=	56*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.61 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(20430.000 x 58) + (6220.000 x 98) + (50150.000 x 50)] / 76800.000



Hydrograph Report

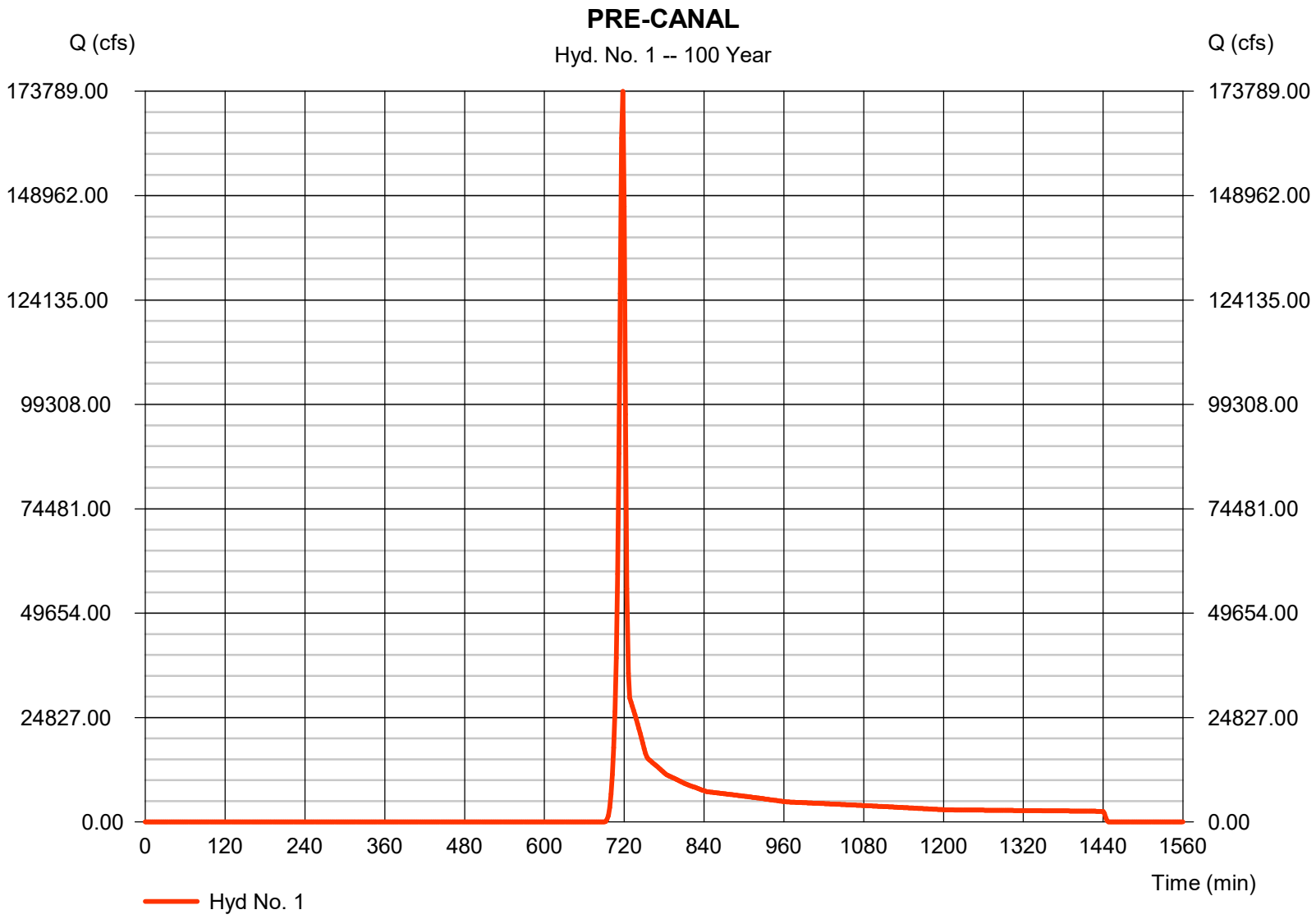
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 — Saturday, 10 / 19 / 2024

Hyd. No. 1

PRE-CANAL

Hydrograph type	=	SCS Runoff	Peak discharge	=	173784.23 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	356,867,712 cuft
Drainage area	=	76799.000 ac	Curve number	=	56*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(20436.000 x 58) + (6213.000 x 98) + (50150.000 x 50)] / 76799.000



Hydrograph Report

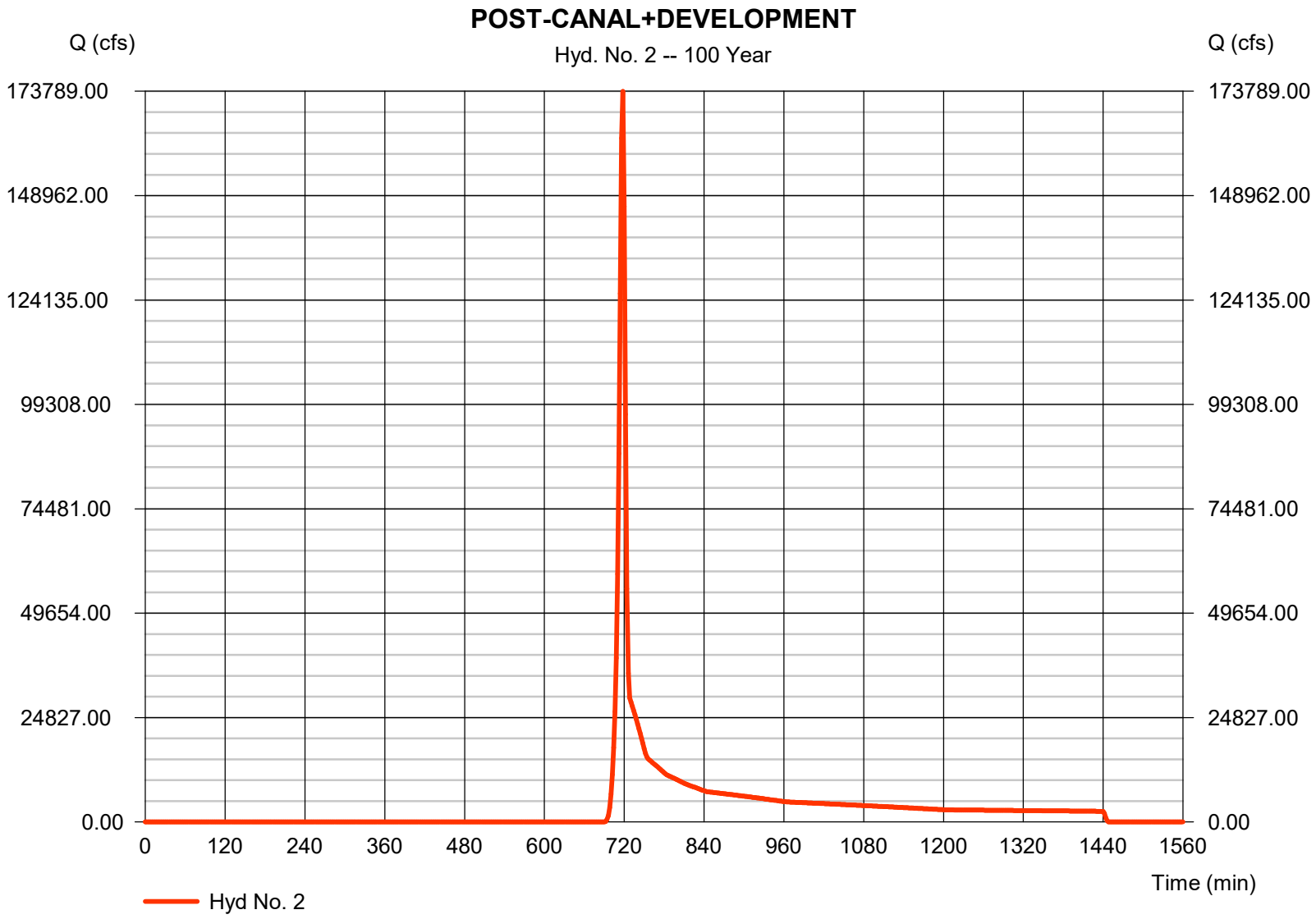
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Saturday, 10 / 19 / 2024

Hyd. No. 2

POST-CANAL+DEVELOPMENT

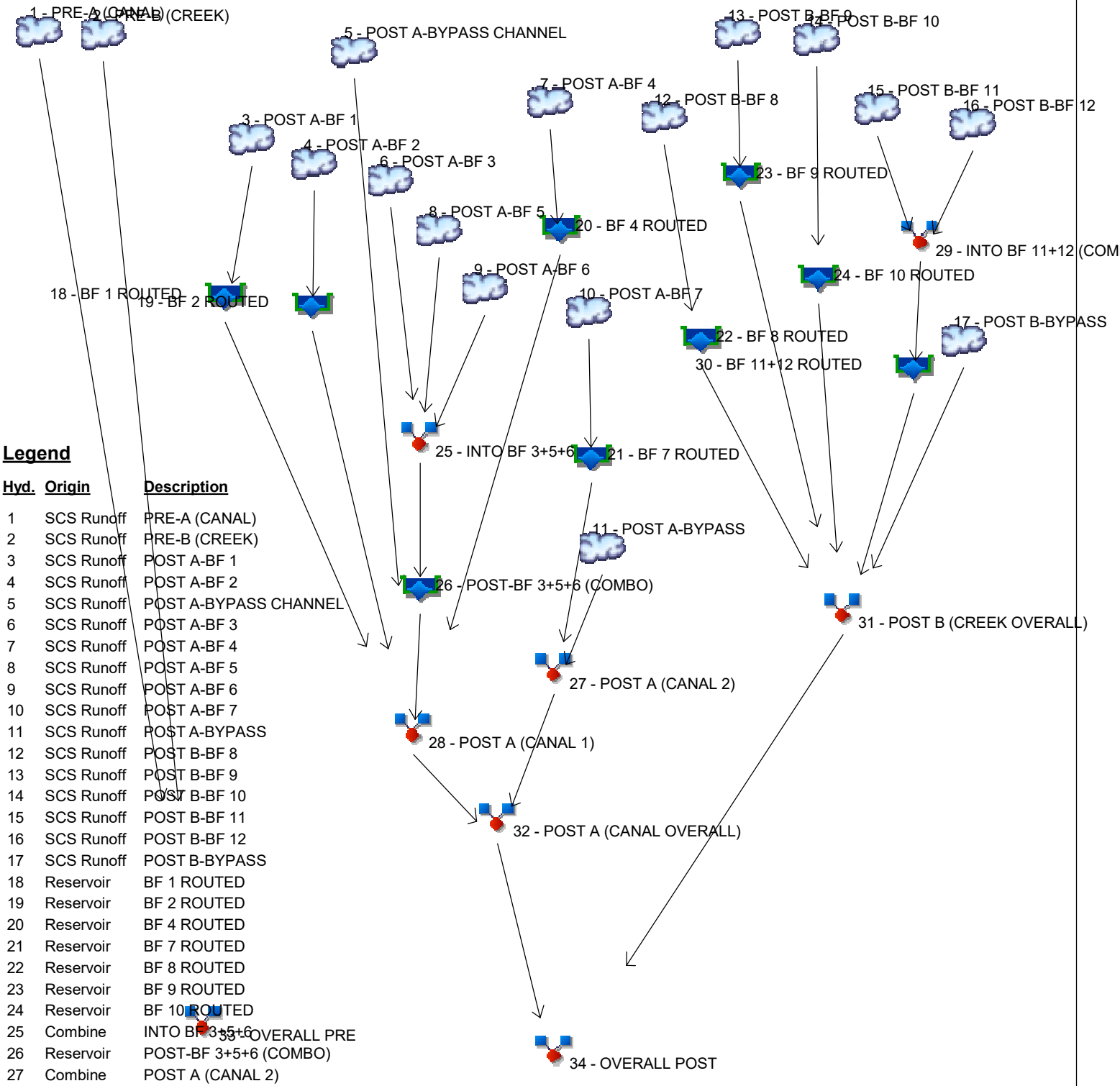
Hydrograph type	=	SCS Runoff	Peak discharge	=	173786.50 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	356,872,192 cuft
Drainage area	=	76800.000 ac	Curve number	=	56*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(20430.000 x 58) + (6220.000 x 98) + (50150.000 x 50)] / 76800.000



HYDROGRAPH CALCULATIONS

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	PRE-A (CANAL)
2	SCS Runoff	PRE-B (CREEK)
3	SCS Runoff	POST A-BF 1
4	SCS Runoff	POST A-BF 2
5	SCS Runoff	POST A-BYPASS CHANNEL
6	SCS Runoff	POST A-BF 3
7	SCS Runoff	POST A-BF 4
8	SCS Runoff	POST A-BF 5
9	SCS Runoff	POST A-BF 6
10	SCS Runoff	POST A-BF 7
11	SCS Runoff	POST A-BYPASS
12	SCS Runoff	POST B-BF 8
13	SCS Runoff	POST B-BF 9
14	SCS Runoff	POST B-BF 10
15	SCS Runoff	POST B-BF 11
16	SCS Runoff	POST B-BF 12
17	SCS Runoff	POST B-BYPASS
18	Reservoir	BF 1 ROUTED
19	Reservoir	BF 2 ROUTED
20	Reservoir	BF 4 ROUTED
21	Reservoir	BF 7 ROUTED
22	Reservoir	BF 8 ROUTED
23	Reservoir	BF 9 ROUTED
24	Reservoir	BF 10 ROUTED
25	Combine	INTO BF 3+5+6
26	Reservoir	POST-BF 3+5+6 (COMBO)
27	Combine	POST A (CANAL 2)
28	Combine	POST A (CANAL 1)
29	Combine	INTO BF 11+12 (COMBINED)
30	Reservoir	BF 11+12 ROUTED
31	Combine	POST B (CREEK OVERALL)
32	Combine	POST A (CANAL OVERALL)
33	Combine	OVERALL PRE
34	Combine	OVERALL POST

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	3.330	-------	-------	-------	11.96	-------	-------	23.94	PRE-A (CANAL)
2	SCS Runoff	------	6.167	-------	-------	-------	22.44	-------	-------	45.25	PRE-B (CREEK)
3	SCS Runoff	------	0.929	-------	-------	-------	2.198	-------	-------	3.714	POST A-BF 1
4	SCS Runoff	------	0.771	-------	-------	-------	1.825	-------	-------	3.083	POST A-BF 2
5	SCS Runoff	------	0.631	-------	-------	-------	1.493	-------	-------	2.522	POST A-BYPASS CHANNEL
6	SCS Runoff	------	1.121	-------	-------	-------	2.739	-------	-------	4.688	POST A-BF 3
7	SCS Runoff	------	0.893	-------	-------	-------	2.047	-------	-------	3.415	POST A-BF 4
8	SCS Runoff	------	2.225	-------	-------	-------	5.786	-------	-------	10.18	POST A-BF 5
9	SCS Runoff	------	1.300	-------	-------	-------	2.889	-------	-------	4.761	POST A-BF 6
10	SCS Runoff	------	1.379	-------	-------	-------	3.064	-------	-------	5.049	POST A-BF 7
11	SCS Runoff	------	0.804	-------	-------	-------	2.031	-------	-------	3.524	POST A-BYPASS
12	SCS Runoff	------	0.867	-------	-------	-------	1.926	-------	-------	3.174	POST B-BF 8
13	SCS Runoff	------	0.959	-------	-------	-------	2.421	-------	-------	4.201	POST B-BF 9
14	SCS Runoff	------	3.464	-------	-------	-------	8.748	-------	-------	15.18	POST B-BF 10
15	SCS Runoff	------	2.455	-------	-------	-------	5.807	-------	-------	9.810	POST B-BF 11
16	SCS Runoff	------	7.005	-------	-------	-------	17.69	-------	-------	30.70	POST B-BF 12
17	SCS Runoff	------	0.739	-------	-------	-------	2.540	-------	-------	5.050	POST B-BYPASS
18	Reservoir	3	0.018	-------	-------	-------	1.760	-------	-------	3.498	BF 1 ROUTED
19	Reservoir	4	0.050	-------	-------	-------	1.767	-------	-------	3.014	BF 2 ROUTED
20	Reservoir	7	0.431	-------	-------	-------	1.999	-------	-------	3.344	BF 4 ROUTED
21	Reservoir	10	0.079	-------	-------	-------	2.635	-------	-------	4.691	BF 7 ROUTED
22	Reservoir	12	0.037	-------	-------	-------	1.856	-------	-------	3.094	BF 8 ROUTED
23	Reservoir	13	0.407	-------	-------	-------	2.369	-------	-------	4.119	BF 9 ROUTED
24	Reservoir	14	2.805	-------	-------	-------	8.199	-------	-------	11.07	BF 10 ROUTED
25	Combine	6, 8, 9,	4.634	-------	-------	-------	11.41	-------	-------	19.63	INTO BF 3+5+6
26	Reservoir	25	0.393	-------	-------	-------	6.450	-------	-------	13.45	POST-BF 3+5+6 (COMBO)
27	Combine	11, 21,	0.804	-------	-------	-------	4.613	-------	-------	8.094	POST A (CANAL 2)
28	Combine	5, 18, 19, 20, 26,	0.808	-------	-------	-------	12.60	-------	-------	24.71	POST A (CANAL 1)
29	Combine	15, 16,	9.458	-------	-------	-------	23.50	-------	-------	40.50	INTO BF 11+12 (COMBINED)
30	Reservoir	29	0.704	-------	-------	-------	9.798	-------	-------	18.04	BF 11+12 ROUTED
31	Combine	17, 22, 23, 24, 30	4.144	-------	-------	-------	21.91	-------	-------	40.81	POST B (CREEK OVERALL)
32	Combine	27, 28,	1.455	-------	-------	-------	16.87	-------	-------	32.81	POST A (CANAL OVERALL)
33	Combine	1, 2,	8.876	-------	-------	-------	32.99	-------	-------	66.24	OVERALL PRE
34	Combine	31, 32,	5.600	-------	-------	-------	38.72	-------	-------	73.62	OVERALL POST

Hydrograph Report

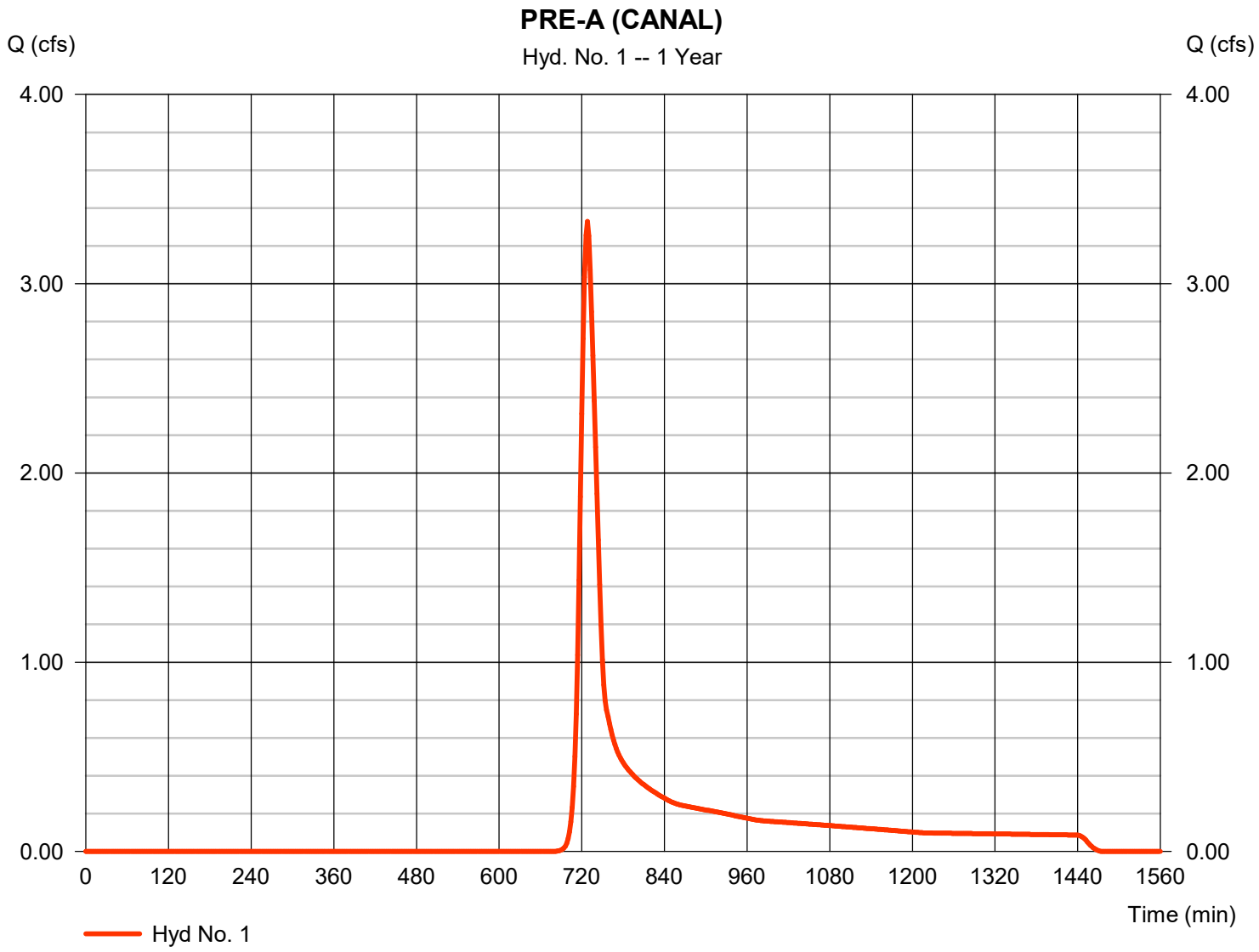
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 1

PRE-A (CANAL)

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.330 cfs
Storm frequency	=	1 yrs	Time to peak	=	728 min
Time interval	=	2 min	Hyd. volume	=	12,717 cuft
Drainage area	=	6.540 ac	Curve number	=	80*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	20.54 min
Total precip.	=	1.94 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(4.814 x 78) + (0.170 x 98) + (0.736 x 91) + (0.817 x 77)] / 6.540



TR55 Tc Worksheet

Hyd. No. 1

PRE-A (CANAL)

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 2.35		0.00		0.00		
Land slope (%)	= 0.50		0.00		0.00		
Travel Time (min)	**= 19.91**	**+**	**0.00**	**+**	**0.00**	**=**	**19.91**
Shallow Concentrated Flow							
Flow length (ft)	= 111.00		0.00		0.00		
Watercourse slope (%)	= 3.24		0.00		0.00		
Surface description	= Unpaved		Unpaved		Unpaved		
Average velocity (ft/s)	=2.90		0.00		0.00		
Travel Time (min)	**= 0.64**	**+**	**0.00**	**+**	**0.00**	**=**	**0.64**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 20.54 min

Hydrograph Report

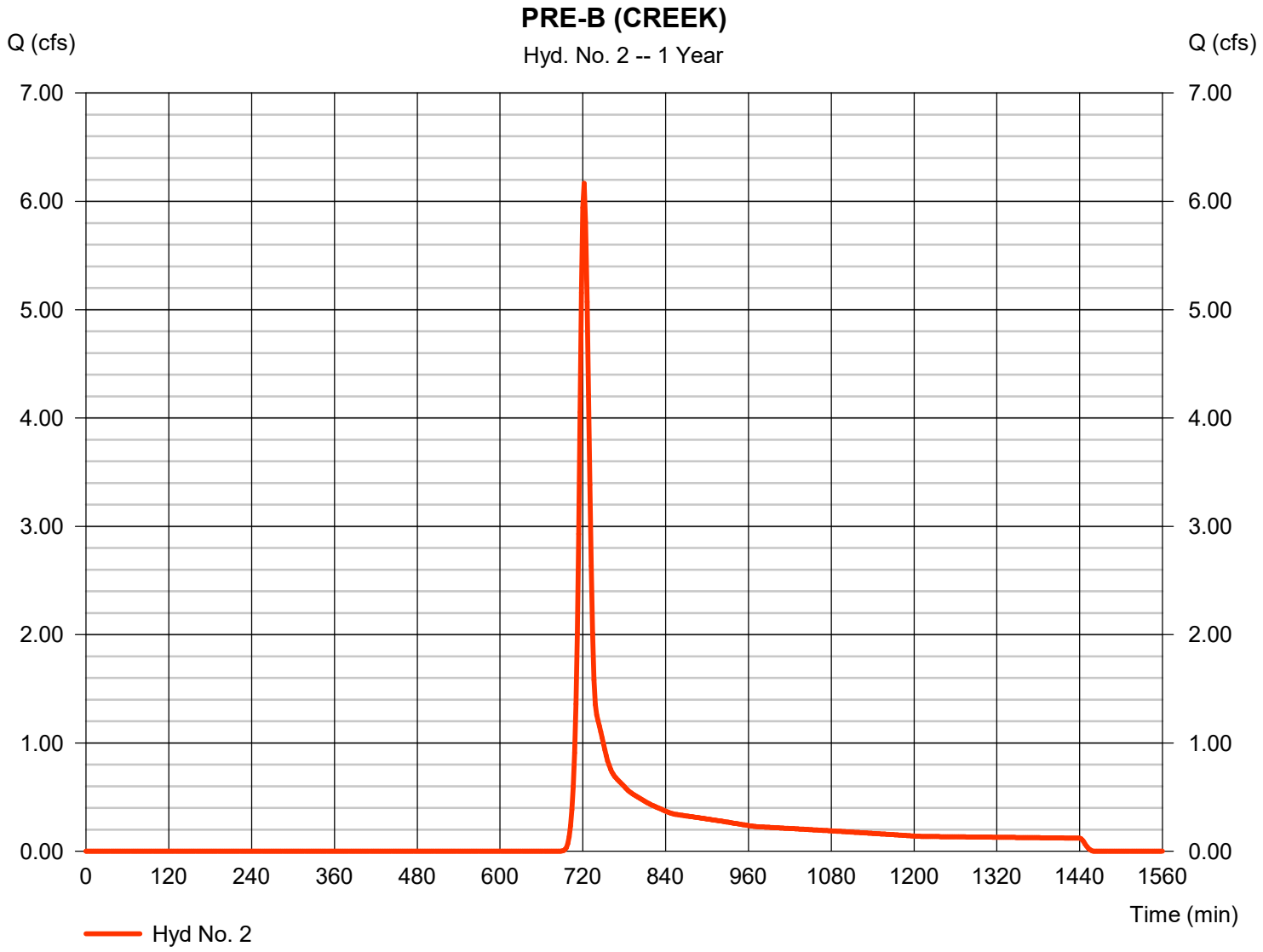
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 2

PRE-B (CREEK)

Hydrograph type	= SCS Runoff	Peak discharge	= 6.167 cfs
Storm frequency	= 1 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 17,254 cuft
Drainage area	= 9.450 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.20 min
Total precip.	= 1.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(6.529 x 78) + (0.007 x 98) + (0.985 x 91) + (1.926 x 77)] / 9.450



TR55 Tc Worksheet

Hyd. No. 2

PRE-B (CREEK)

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 2.35		0.00		0.00		
Land slope (%)	= 4.00		0.00		0.00		
Travel Time (min)	**= 8.66**	**+**	**0.00**	**+**	**0.00**	**=**	**8.66**
Shallow Concentrated Flow							
Flow length (ft)	= 228.00		0.00		0.00		
Watercourse slope (%)	= 0.44		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=1.07		0.00		0.00		
Travel Time (min)	**= 3.55**	**+**	**0.00**	**+**	**0.00**	**=**	**3.55**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 12.20 min

Hydrograph Report

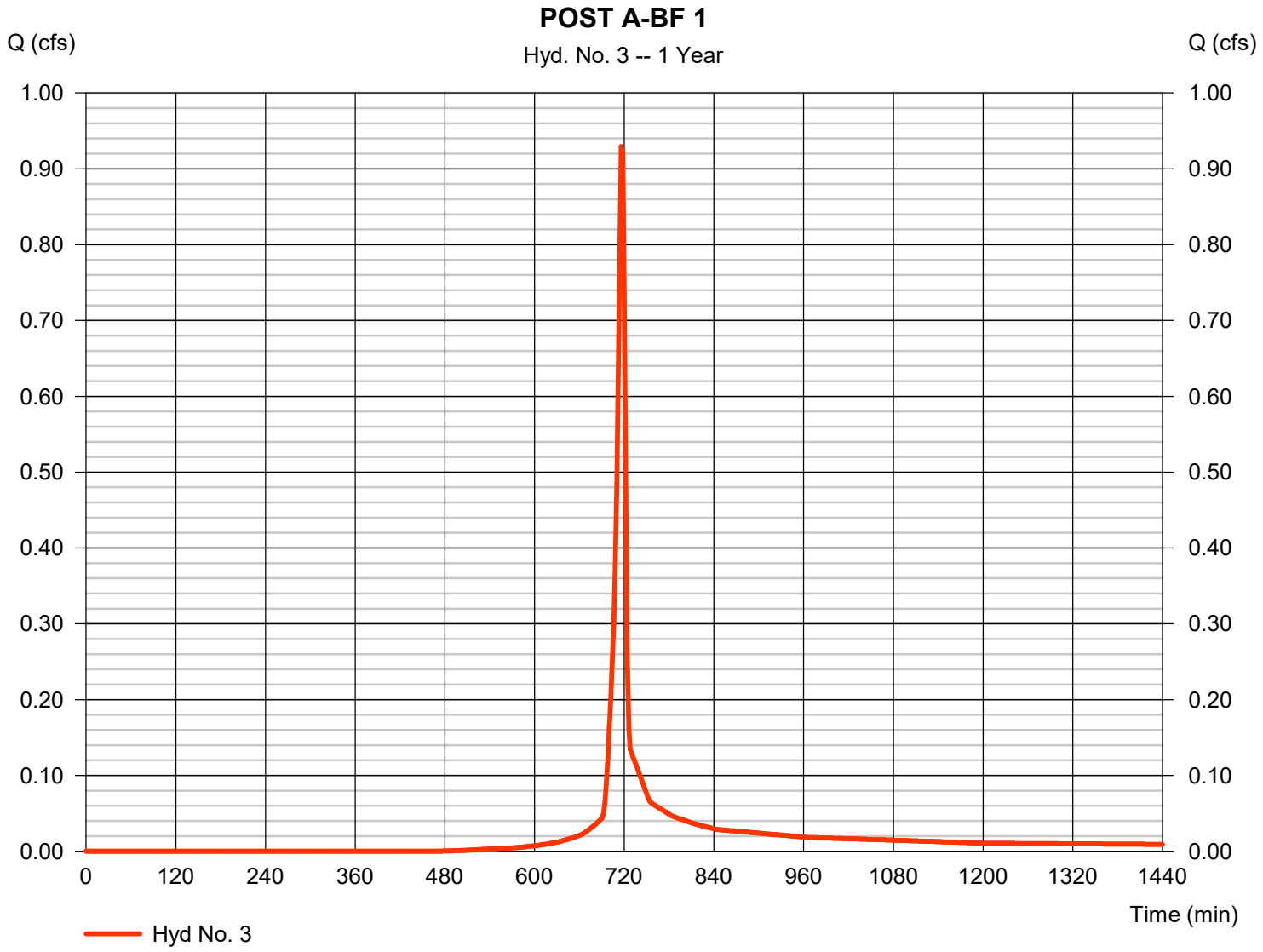
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 3

POST A-BF 1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.929 cfs
Storm frequency	= 1 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 1,881 cuft
Drainage area	= 0.530 ac	Curve number	= 90*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.240 x 80) + (0.180 x 98) + (0.110 x 98)] / 0.530



Hydrograph Report

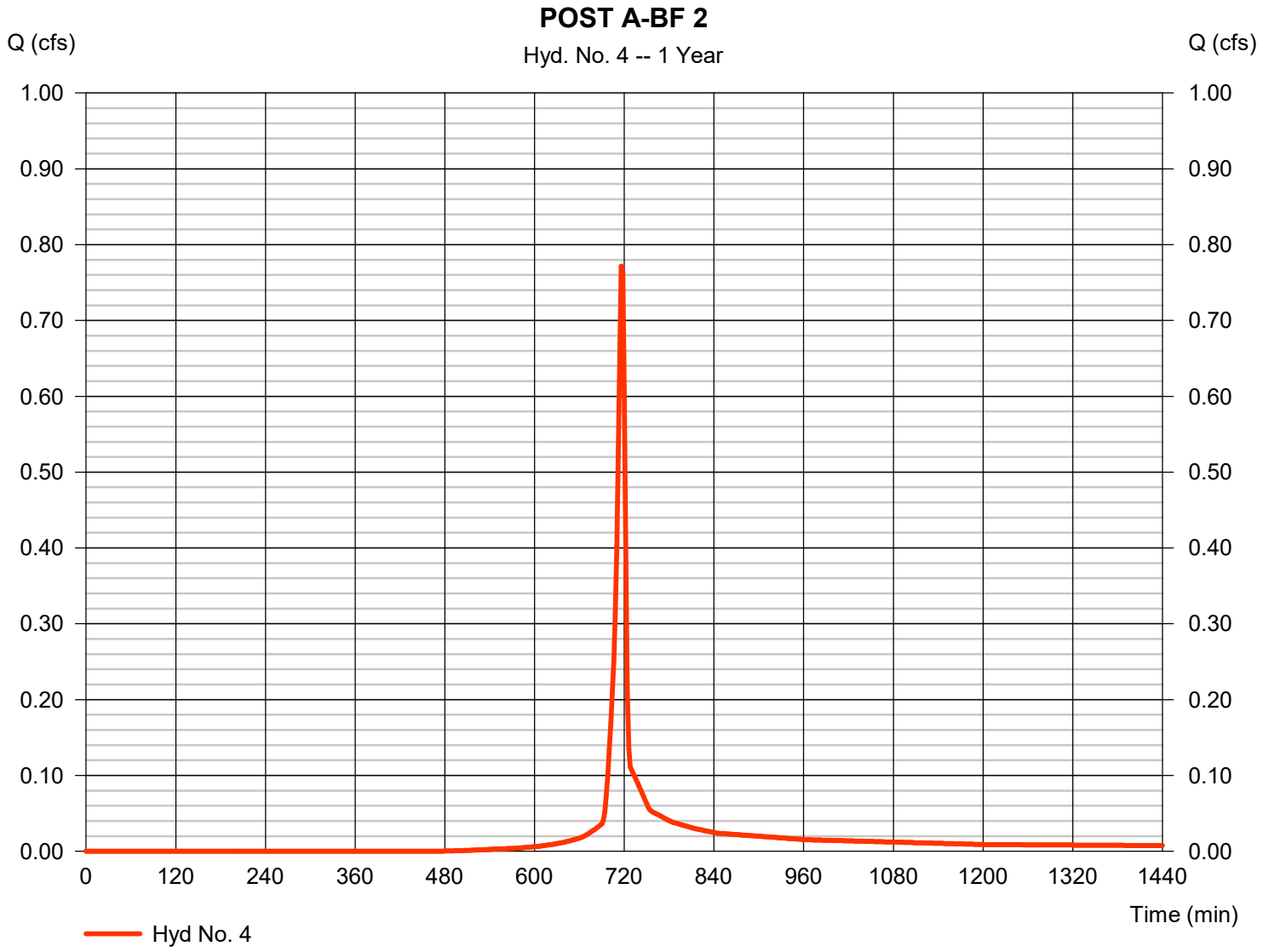
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 4

POST A-BF 2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.771 cfs
Storm frequency	= 1 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 1,562 cuft
Drainage area	= 0.440 ac	Curve number	= 90*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.200 x 80) + (0.120 x 98) + (0.120 x 98)] / 0.440



Hydrograph Report

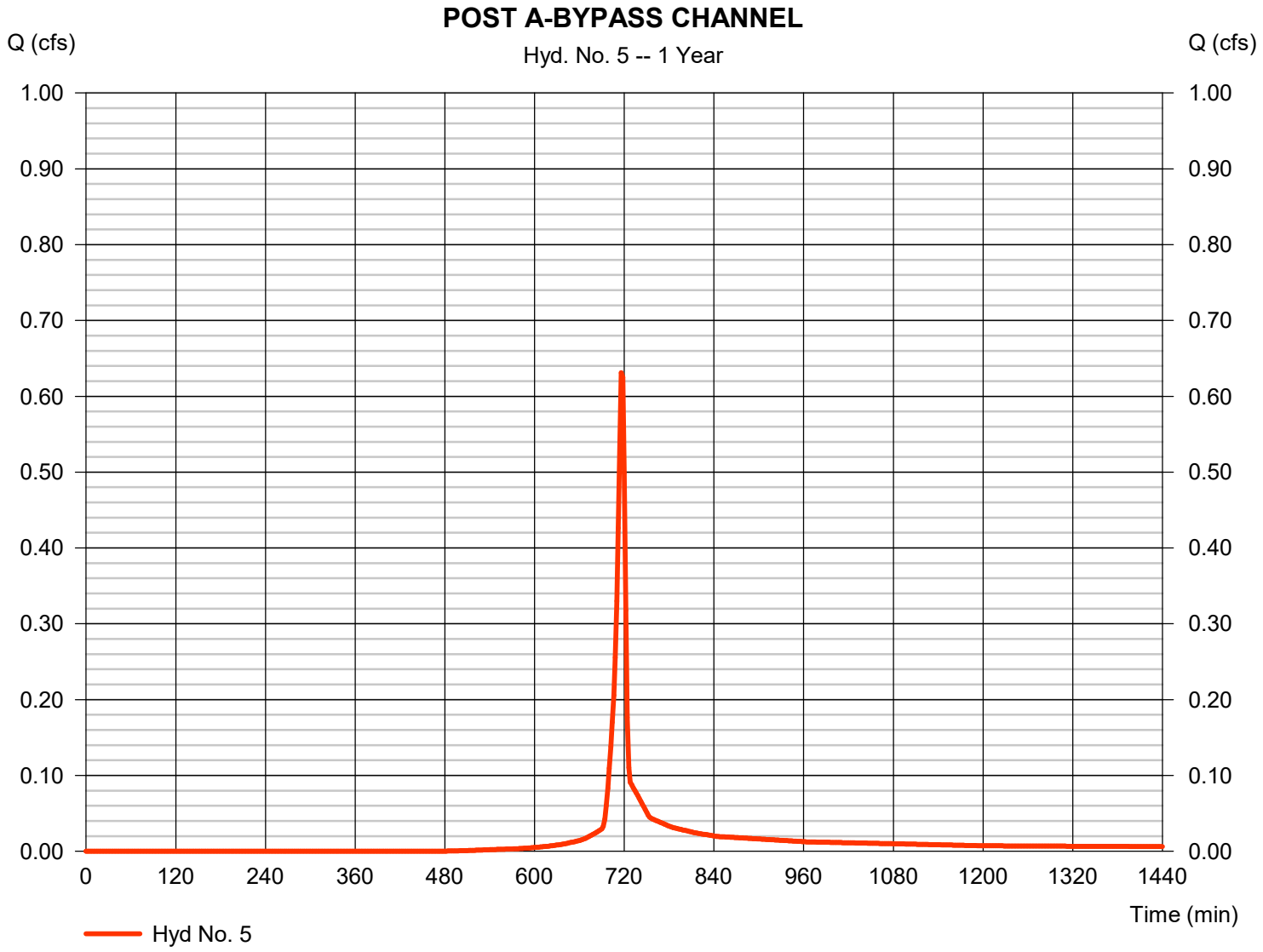
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 5

POST A-BYPASS CHANNEL

Hydrograph type	= SCS Runoff	Peak discharge	= 0.631 cfs
Storm frequency	= 1 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 1,278 cuft
Drainage area	= 0.360 ac	Curve number	= 90*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.151 x 80) + (0.070 x 98) + (0.140 x 98)] / 0.360



Hydrograph Report

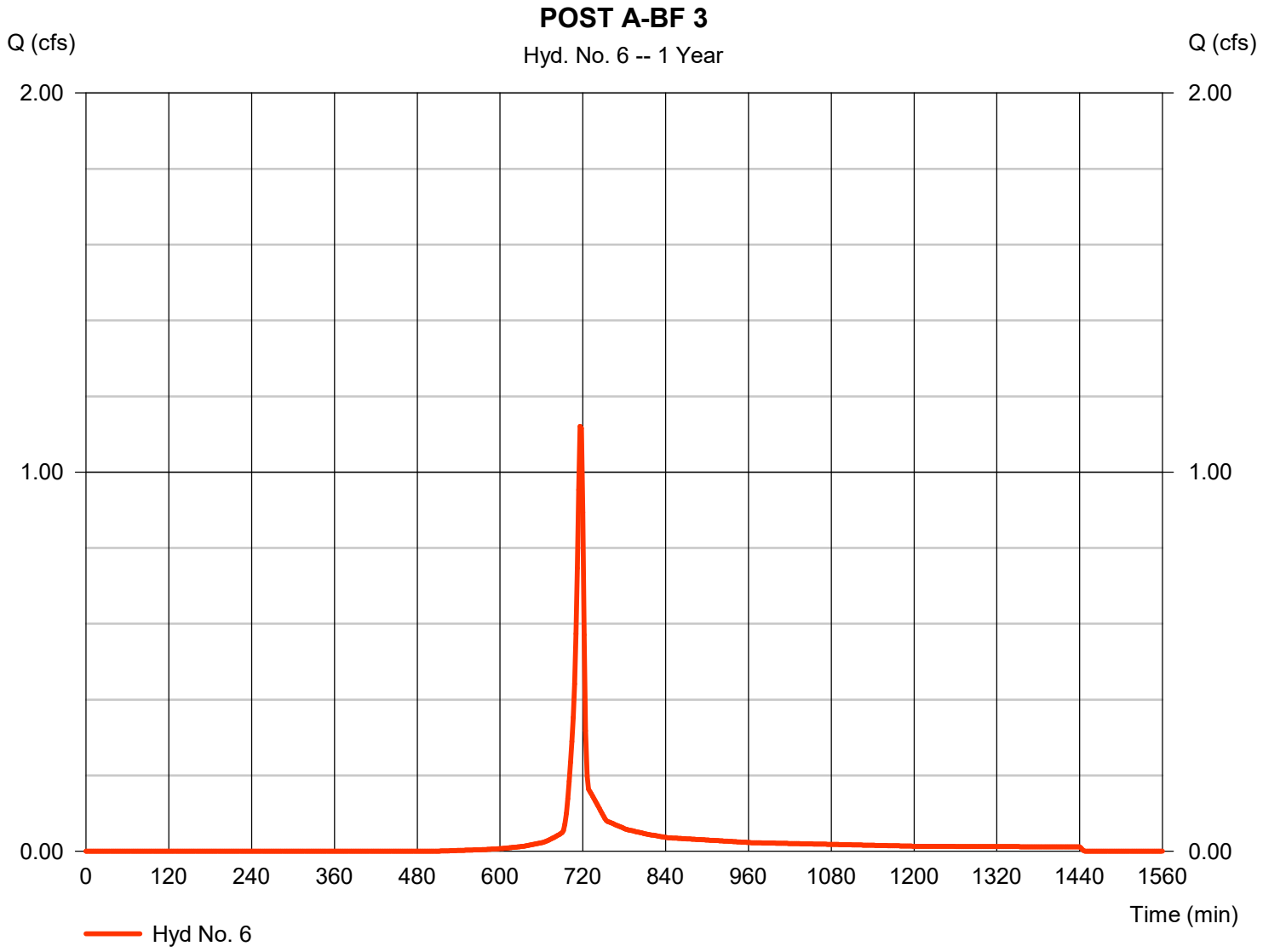
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 6

POST A-BF 3

Hydrograph type	= SCS Runoff	Peak discharge	= 1.121 cfs
Storm frequency	= 1 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 2,264 cuft
Drainage area	= 0.680 ac	Curve number	= 89*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.326 x 80) + (0.110 x 98) + (0.240 x 98)] / 0.680



Hydrograph Report

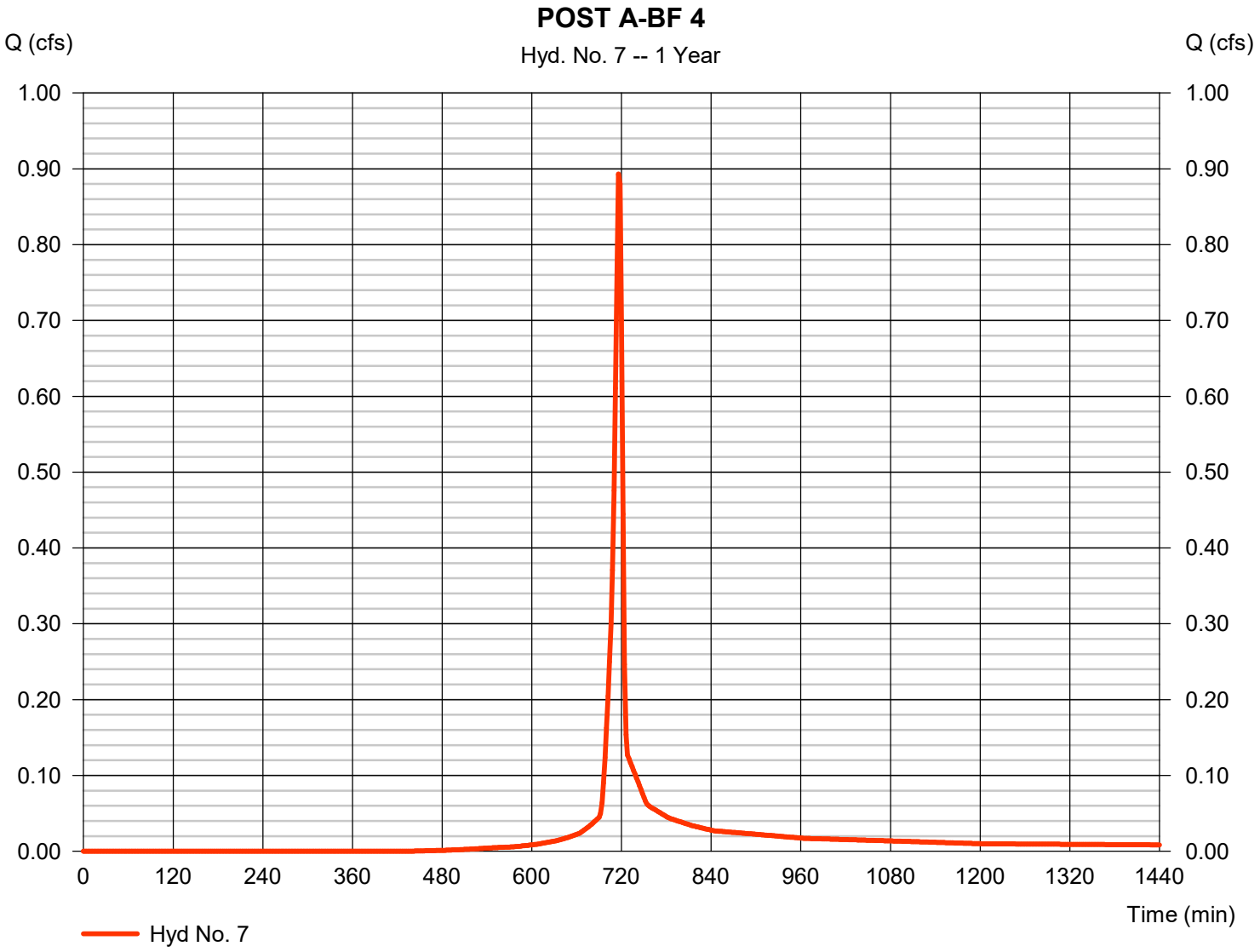
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 7

POST A-BF 4

Hydrograph type	= SCS Runoff	Peak discharge	= 0.893 cfs
Storm frequency	= 1 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 1,815 cuft
Drainage area	= 0.480 ac	Curve number	= 91*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.190 x 80) + (0.080 x 98) + (0.210 x 98)] / 0.480



Hydrograph Report

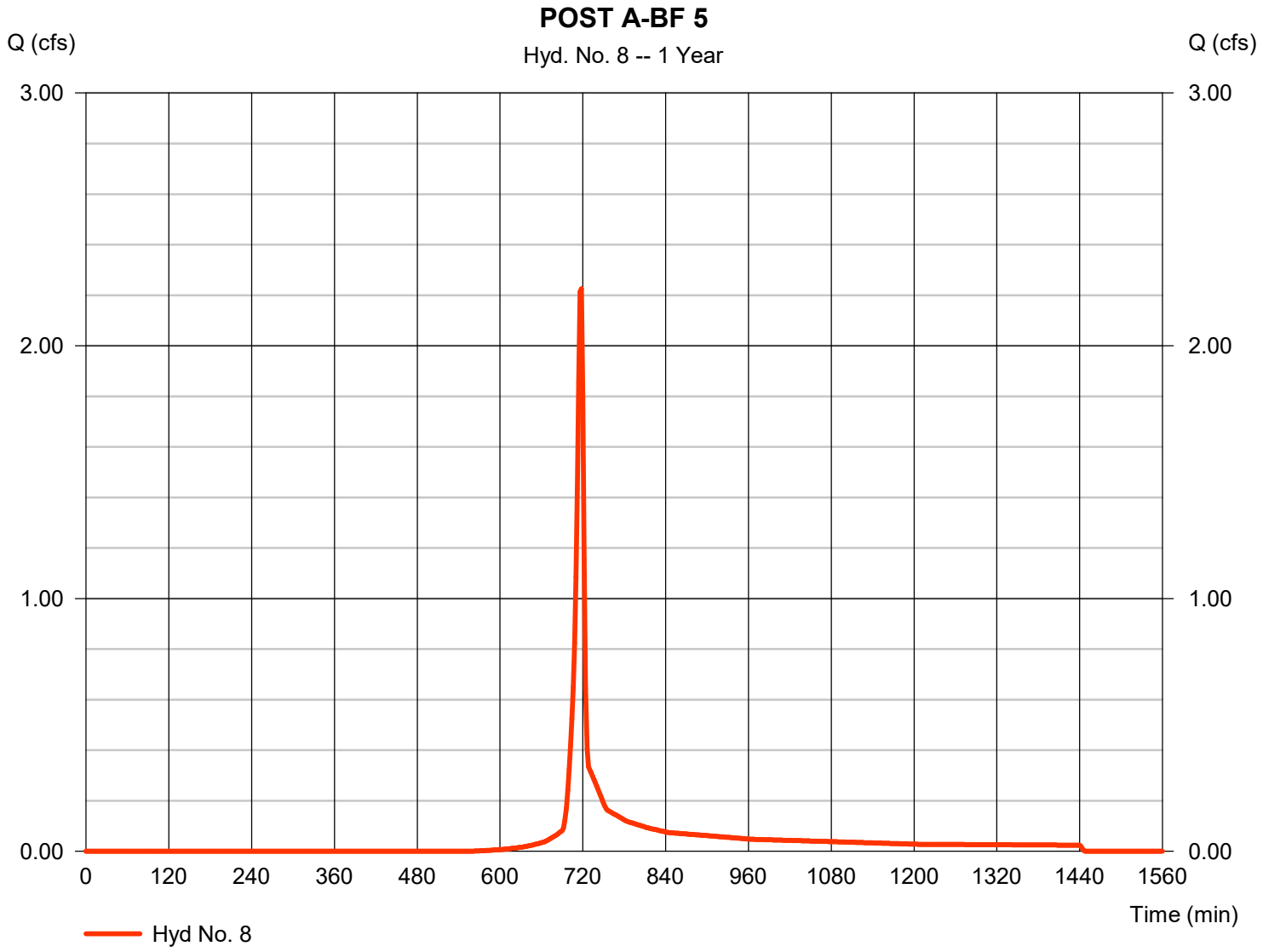
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 8

POST A-BF 5

Hydrograph type	= SCS Runoff	Peak discharge	= 2.225 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 4,473 cuft
Drainage area	= 1.530 ac	Curve number	= 87*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.913 x 80) + (0.220 x 98) + (0.400 x 98)] / 1.530



Hydrograph Report

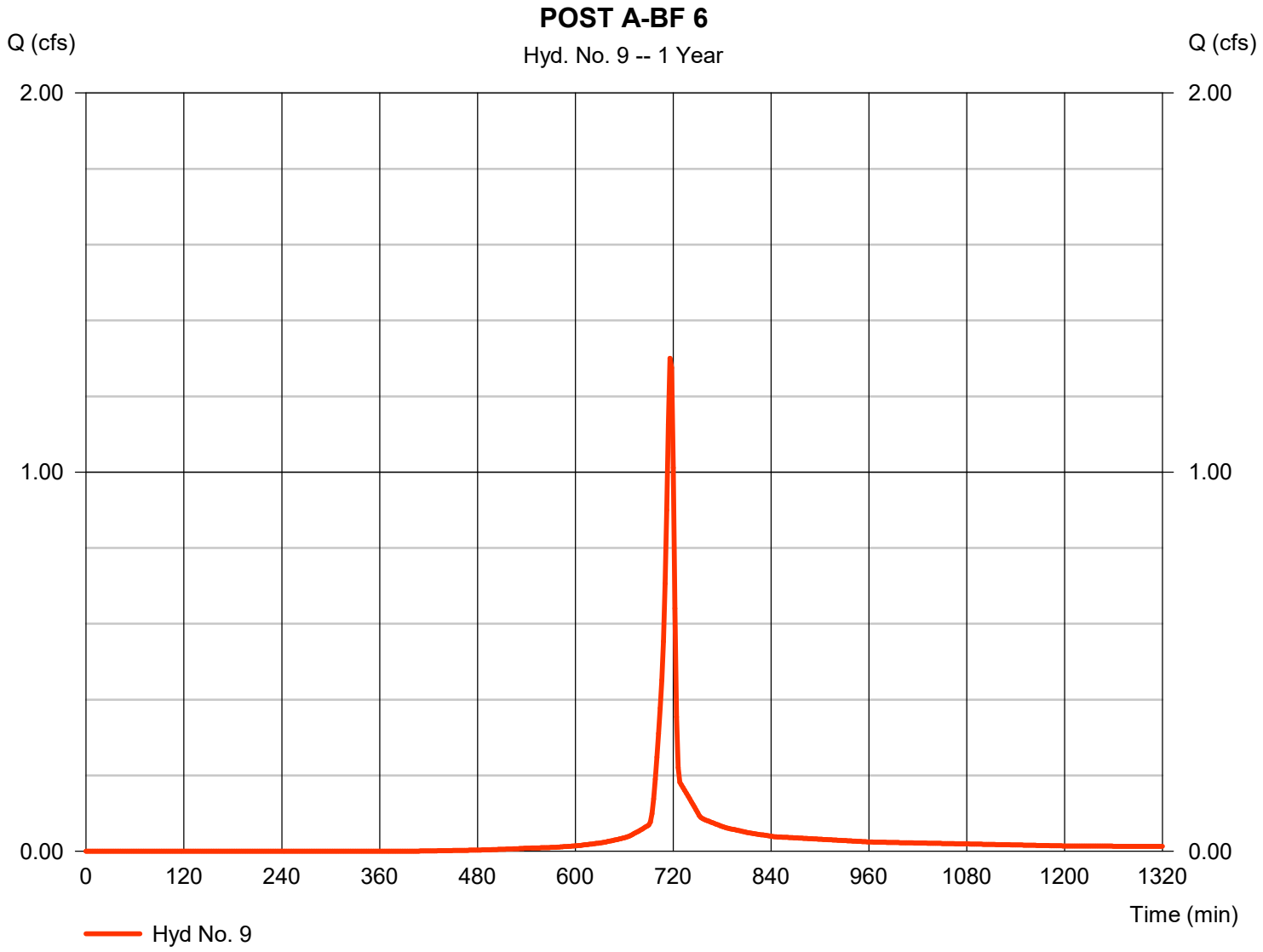
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 9

POST A-BF 6

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.300 cfs
Storm frequency	=	1 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	2,658 cuft
Drainage area	=	0.660 ac	Curve number	=	92*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	1.94 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.230 x 80) + (0.210 x 98) + (0.220 x 98)] / 0.660



Hydrograph Report

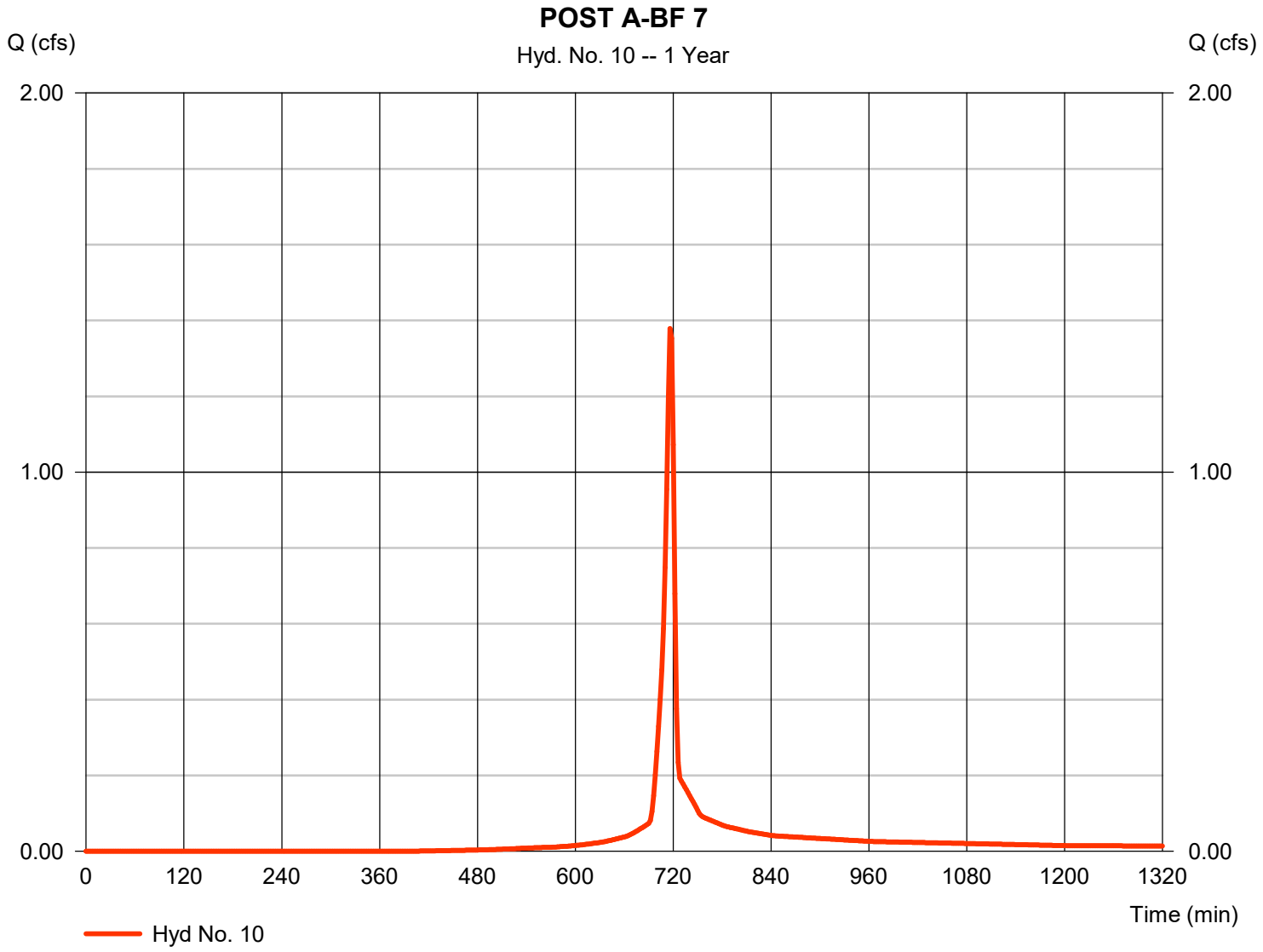
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 10

POST A-BF 7

Hydrograph type	= SCS Runoff	Peak discharge	= 1.379 cfs
Storm frequency	= 1 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 2,819 cuft
Drainage area	= 0.700 ac	Curve number	= 92*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.250 x 80) + (0.440 x 98) + (0.010 x 98)] / 0.700



Hydrograph Report

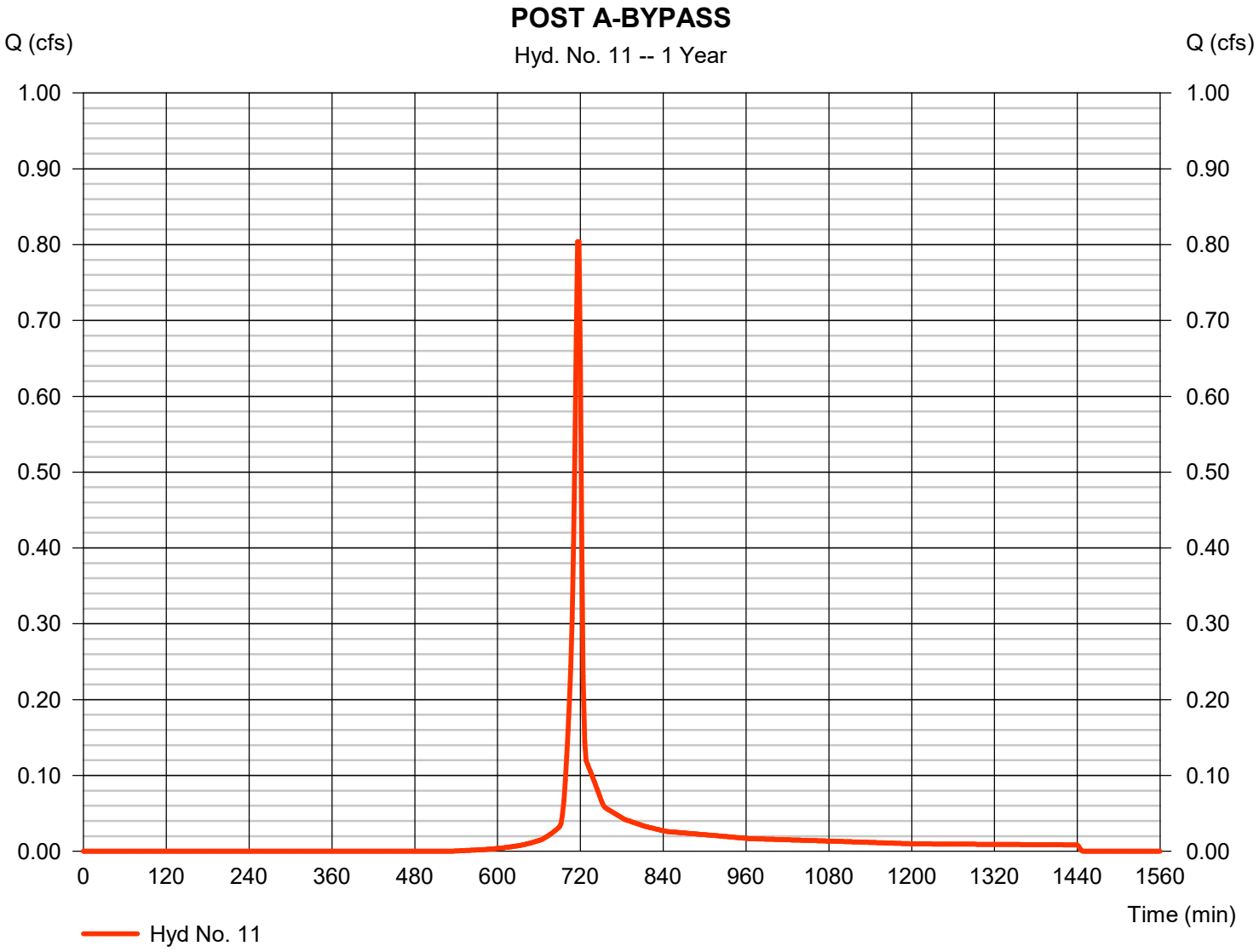
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 11

POST A-BYPASS

Hydrograph type	= SCS Runoff	Peak discharge	= 0.804 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 1,623 cuft
Drainage area	= 0.520 ac	Curve number	= 88*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.300 x 80) + (0.220 x 98)] / 0.520



Hydrograph Report

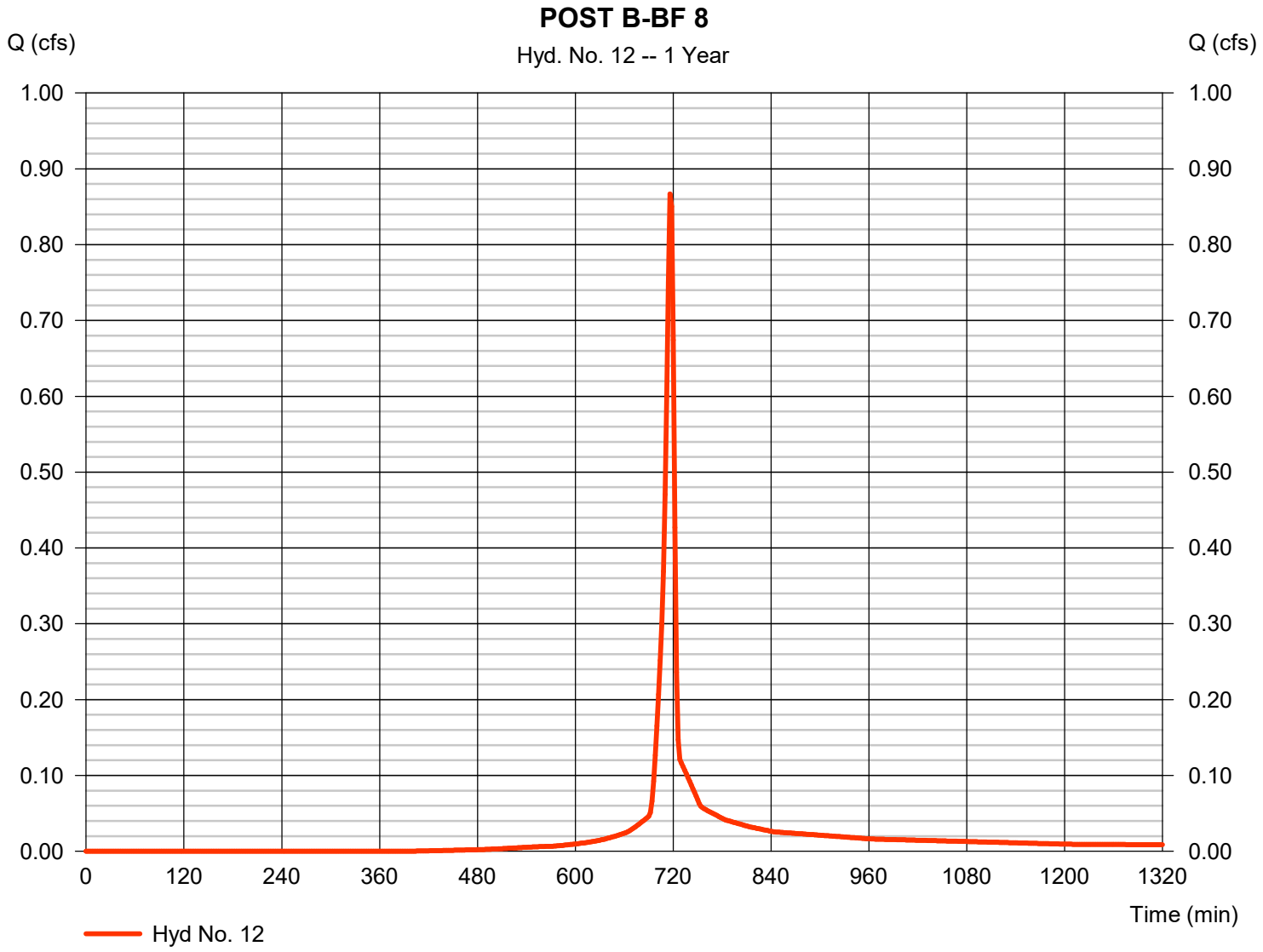
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 12

POST B-BF 8

Hydrograph type	= SCS Runoff	Peak discharge	= 0.867 cfs
Storm frequency	= 1 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 1,772 cuft
Drainage area	= 0.440 ac	Curve number	= 92*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.140 x 80) + (0.300 x 98)] / 0.440



Hydrograph Report

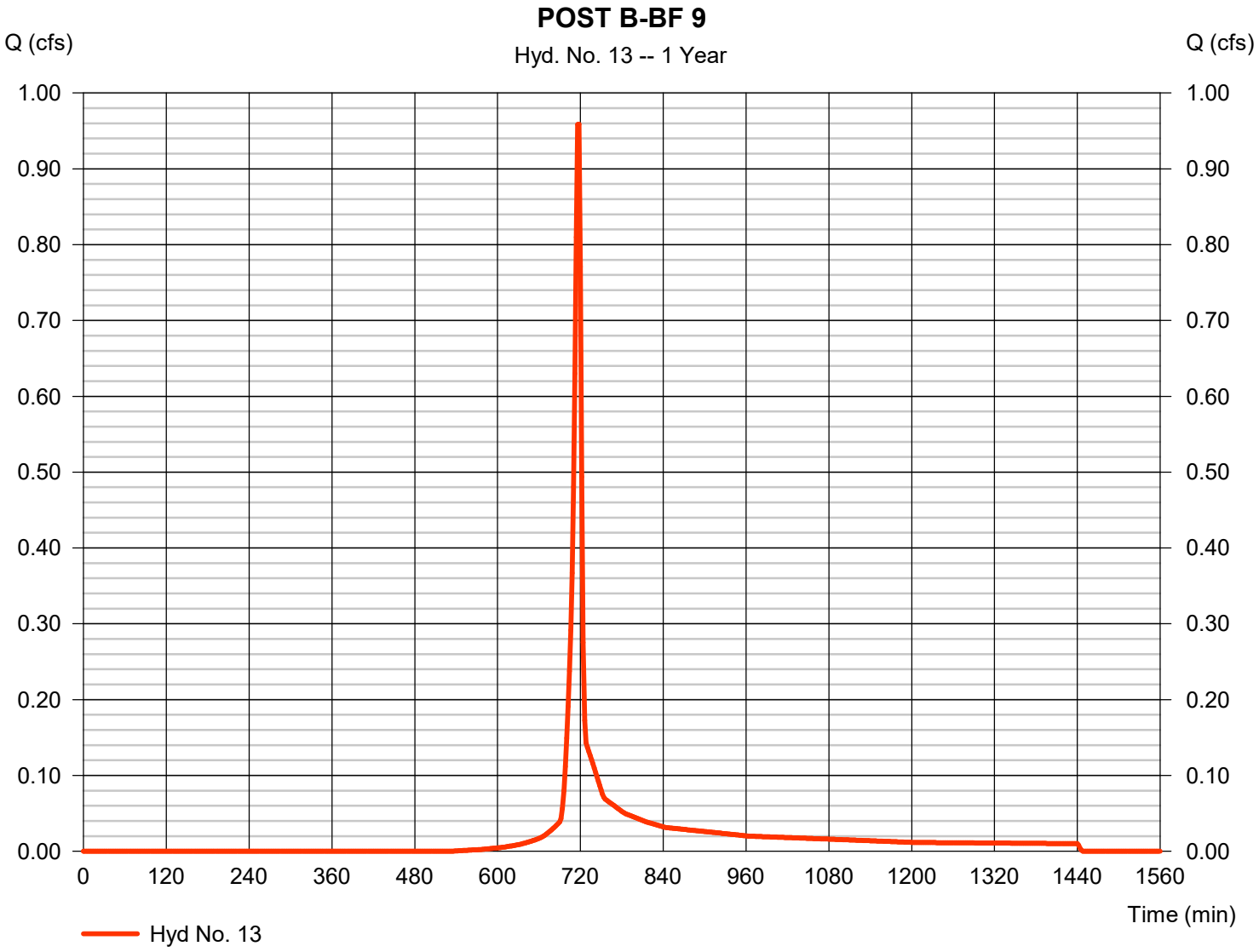
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 13

POST B-BF 9

Hydrograph type	= SCS Runoff	Peak discharge	= 0.959 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 1,935 cuft
Drainage area	= 0.620 ac	Curve number	= 88*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.330 x 80) + (0.290 x 98)] / 0.620



Hydrograph Report

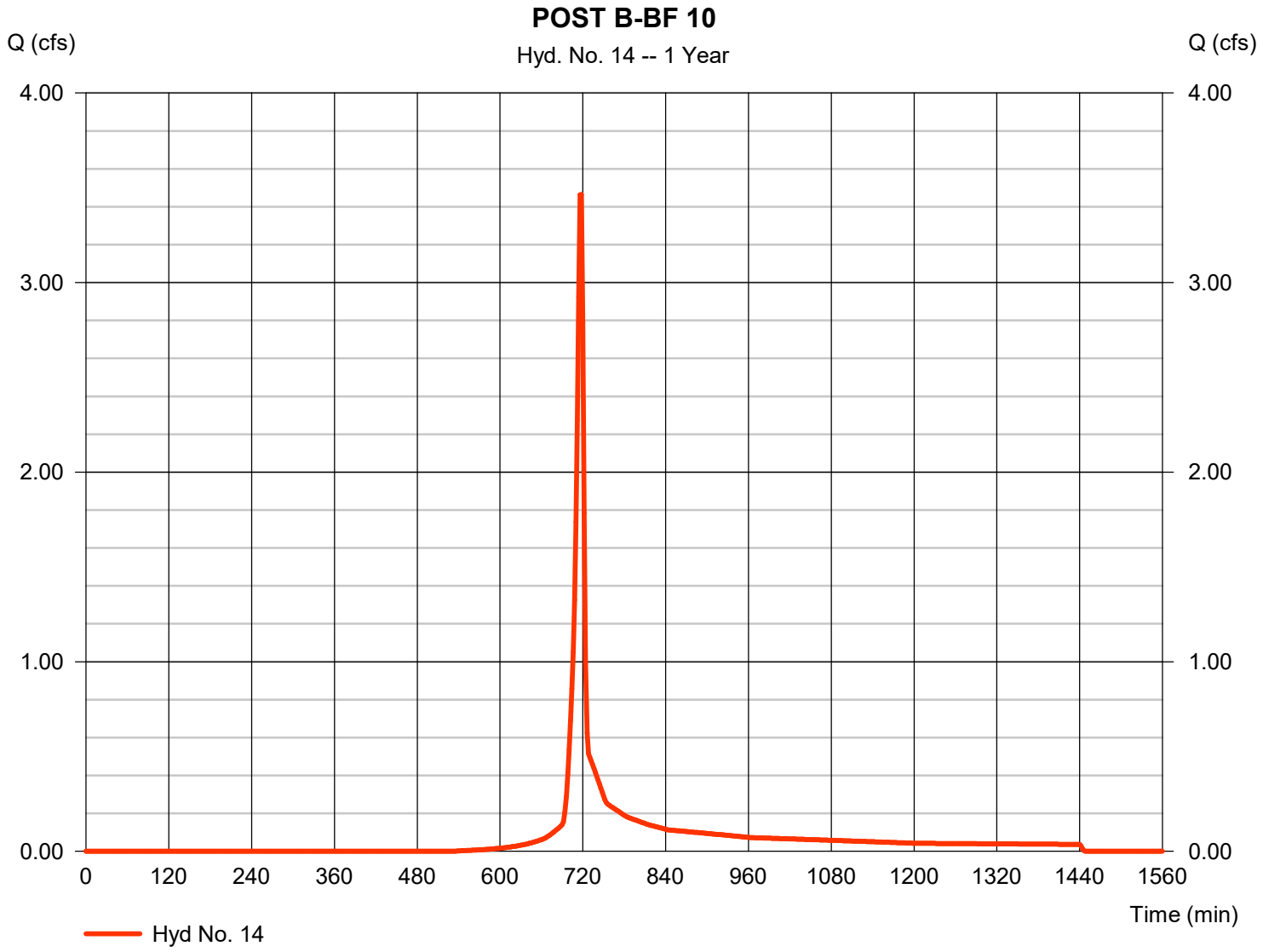
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 14

POST B-BF 10

Hydrograph type	= SCS Runoff	Peak discharge	= 3.464 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 6,991 cuft
Drainage area	= 2.240 ac	Curve number	= 88*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(1.240 x 80) + (0.500 x 98) + (0.500 x 98)] / 2.240



Hydrograph Report

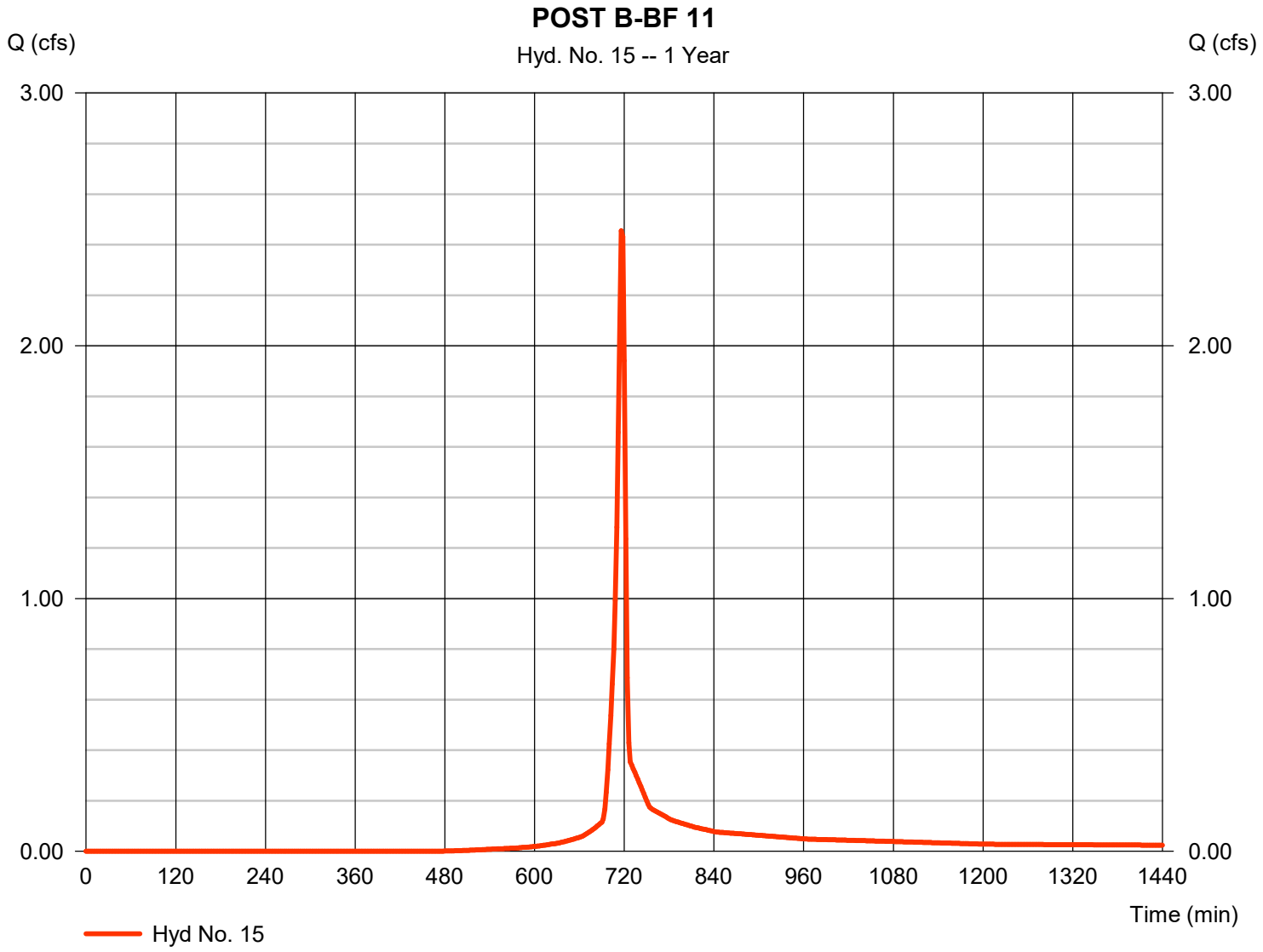
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 15

POST B-BF 11

Hydrograph type	= SCS Runoff	Peak discharge	= 2.455 cfs
Storm frequency	= 1 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 4,970 cuft
Drainage area	= 1.400 ac	Curve number	= 90*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.630 x 80) + (0.240 x 98) + (0.530 x 98)] / 1.400



Hydrograph Report

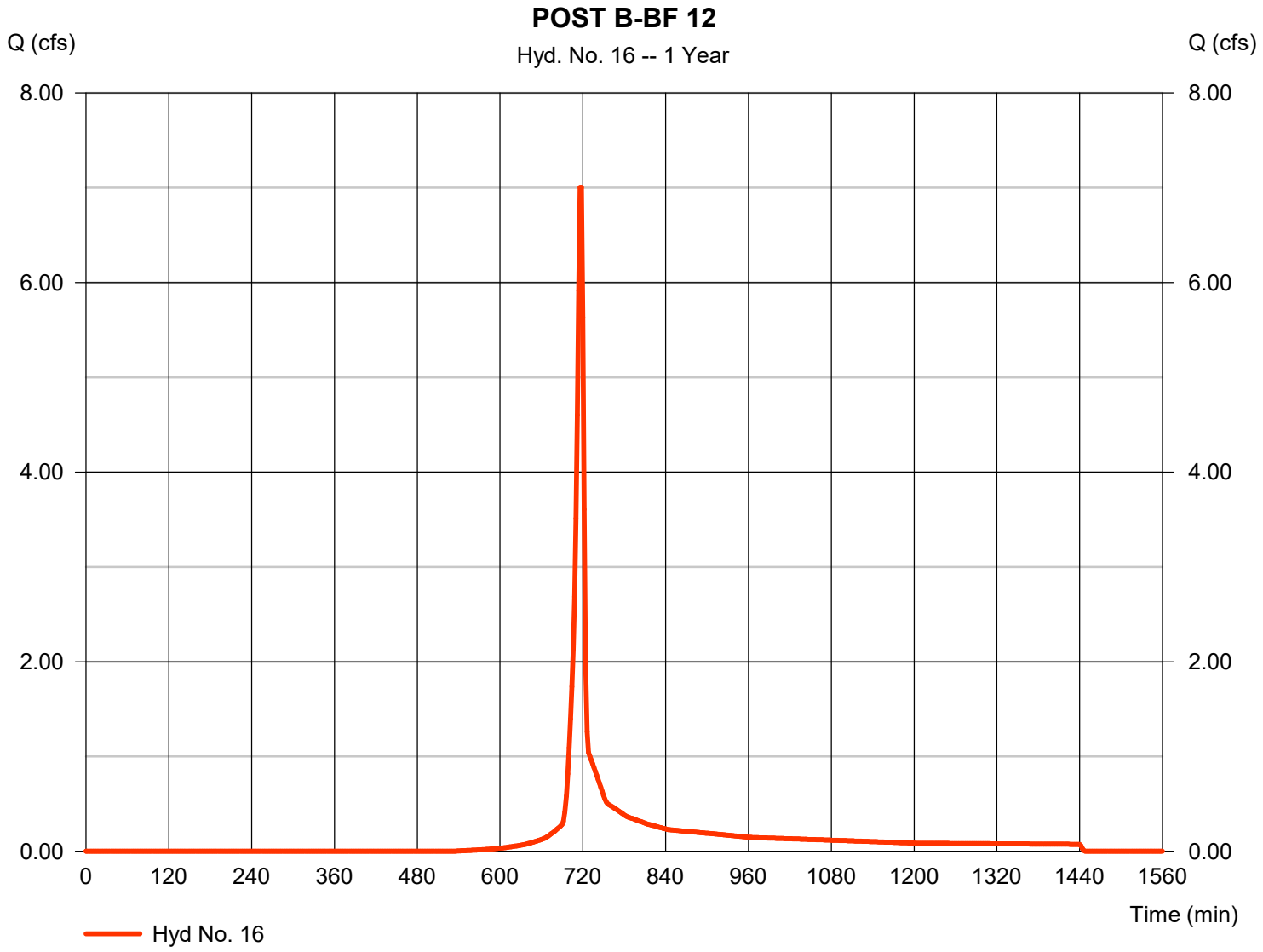
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 16

POST B-BF 12

Hydrograph type	= SCS Runoff	Peak discharge	= 7.005 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 14,139 cuft
Drainage area	= 4.530 ac	Curve number	= 88*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(1.960 x 80) + (0.850 x 98) + (1.200 x 98) + (0.520 x 77)] / 4.530



Hydrograph Report

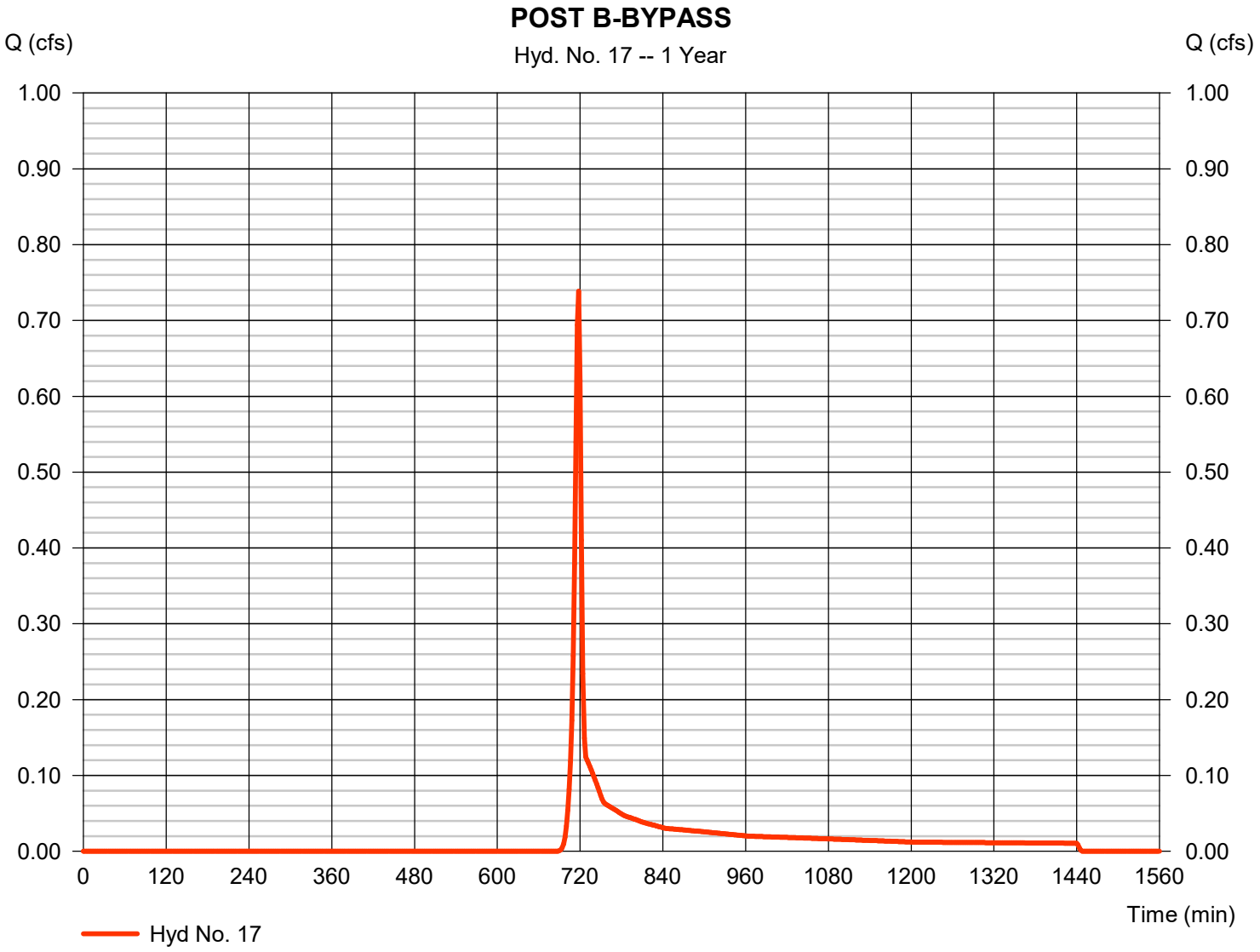
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 17

POST B-BYPASS

Hydrograph type	= SCS Runoff	Peak discharge	= 0.739 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 1,510 cuft
Drainage area	= 0.910 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.160 x 80) + (0.140 x 80) + (0.020 x 98) + (0.010 x 91) + (0.580 x 77)] / 0.910



Hydrograph Report

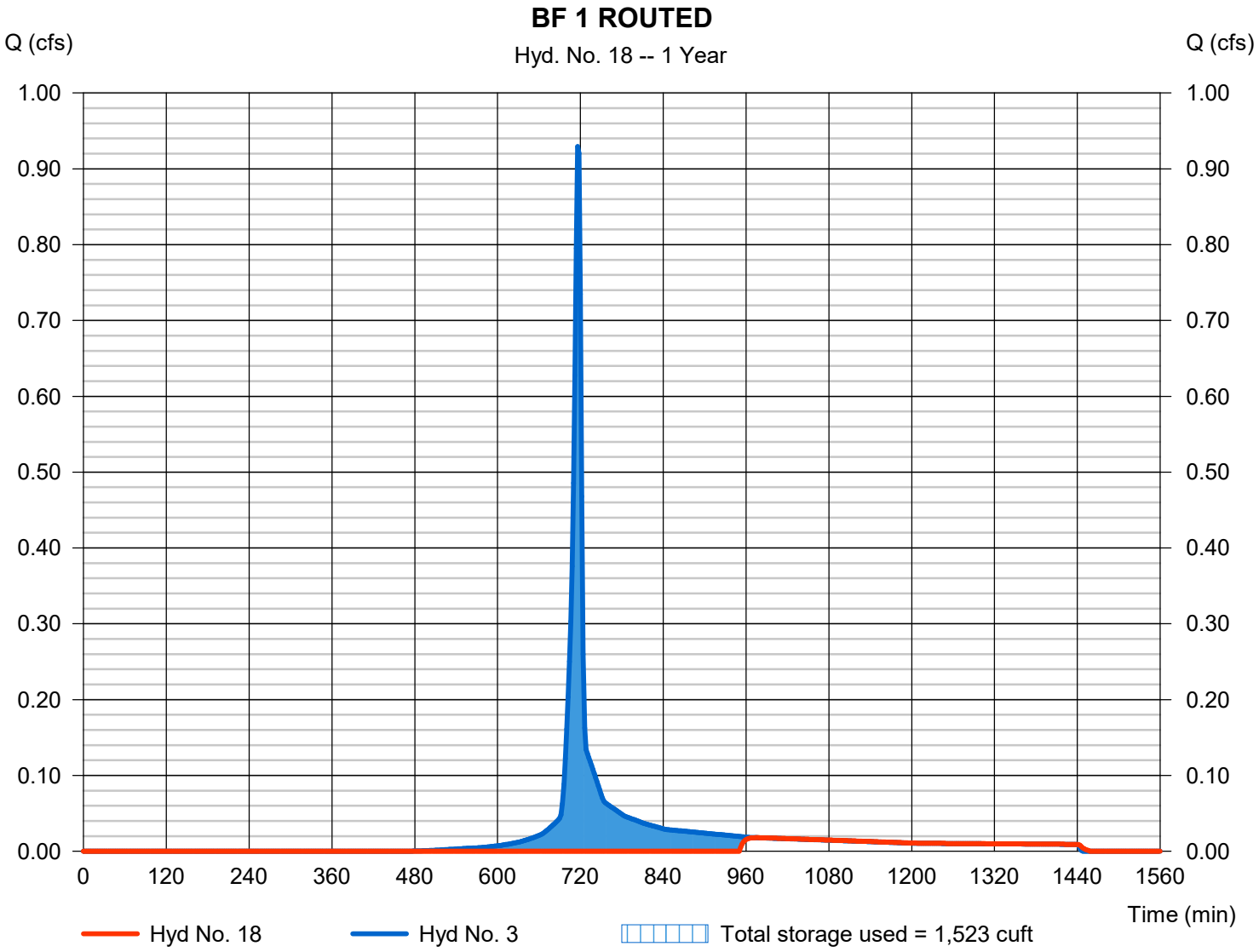
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 18

BF 1 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	0.018 cfs
Storm frequency	=	1 yrs	Time to peak	=	976 min
Time interval	=	2 min	Hyd. volume	=	364 cuft
Inflow hyd. No.	=	3 - POST A-BF 1	Max. Elevation	=	449.05 ft
Reservoir name	=	BIORETENTION FILTER 1	Max. Storage	=	1,523 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Pond No. 1 - BIORETENTION FILTER 1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 448.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	448.50	2,559	0	0
0.50	449.00	2,898	1,363	1,363
1.00	449.00	3,251	1,536	2,899
1.50	450.00	3,618	1,716	4,616

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	0.00	0.00	0.00
Span (in)	= 15.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 444.79	0.00	0.00	0.00
Length (ft)	= 28.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

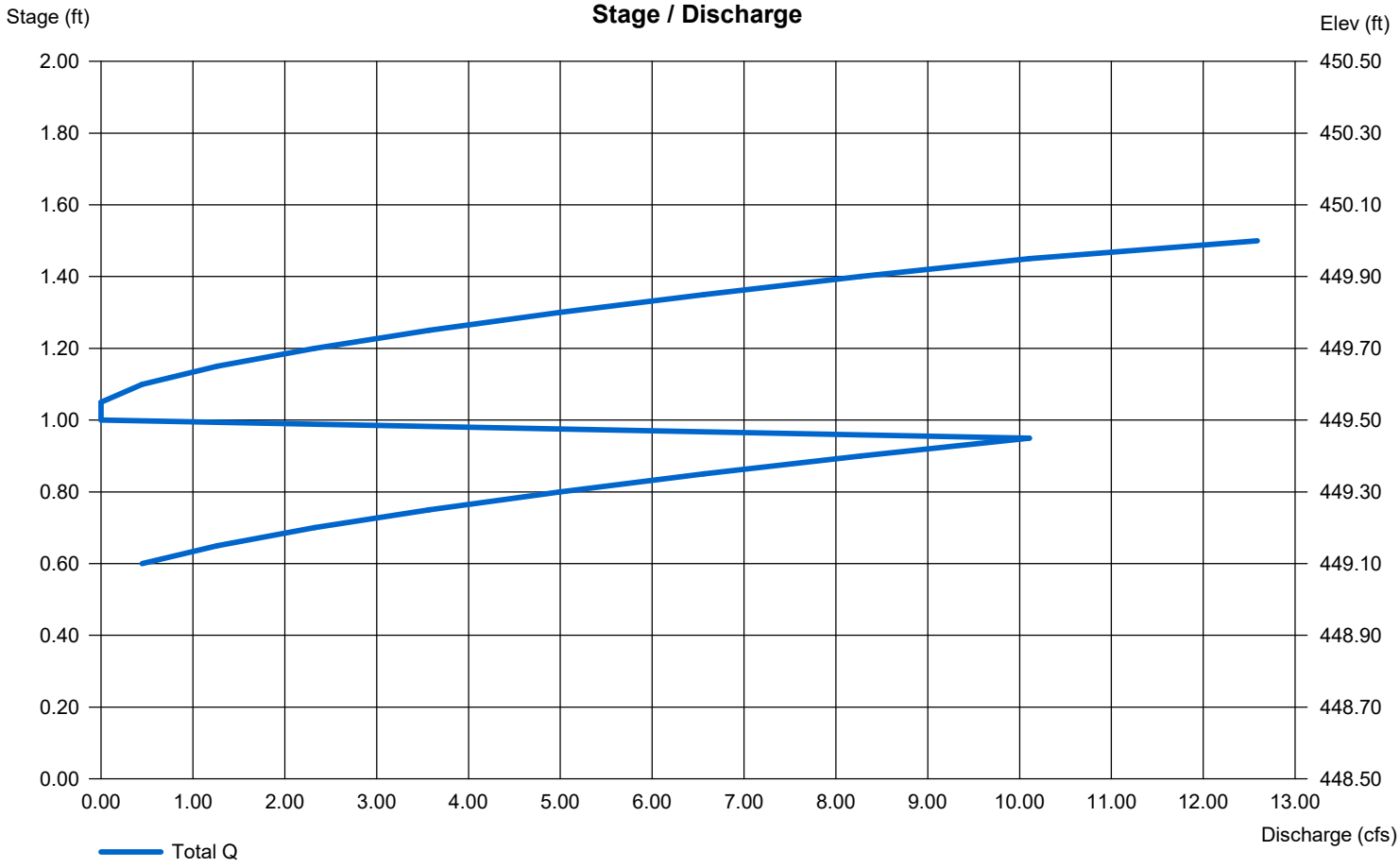
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	Inactive	0.00	0.00
Crest El. (ft)	= 449.05	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

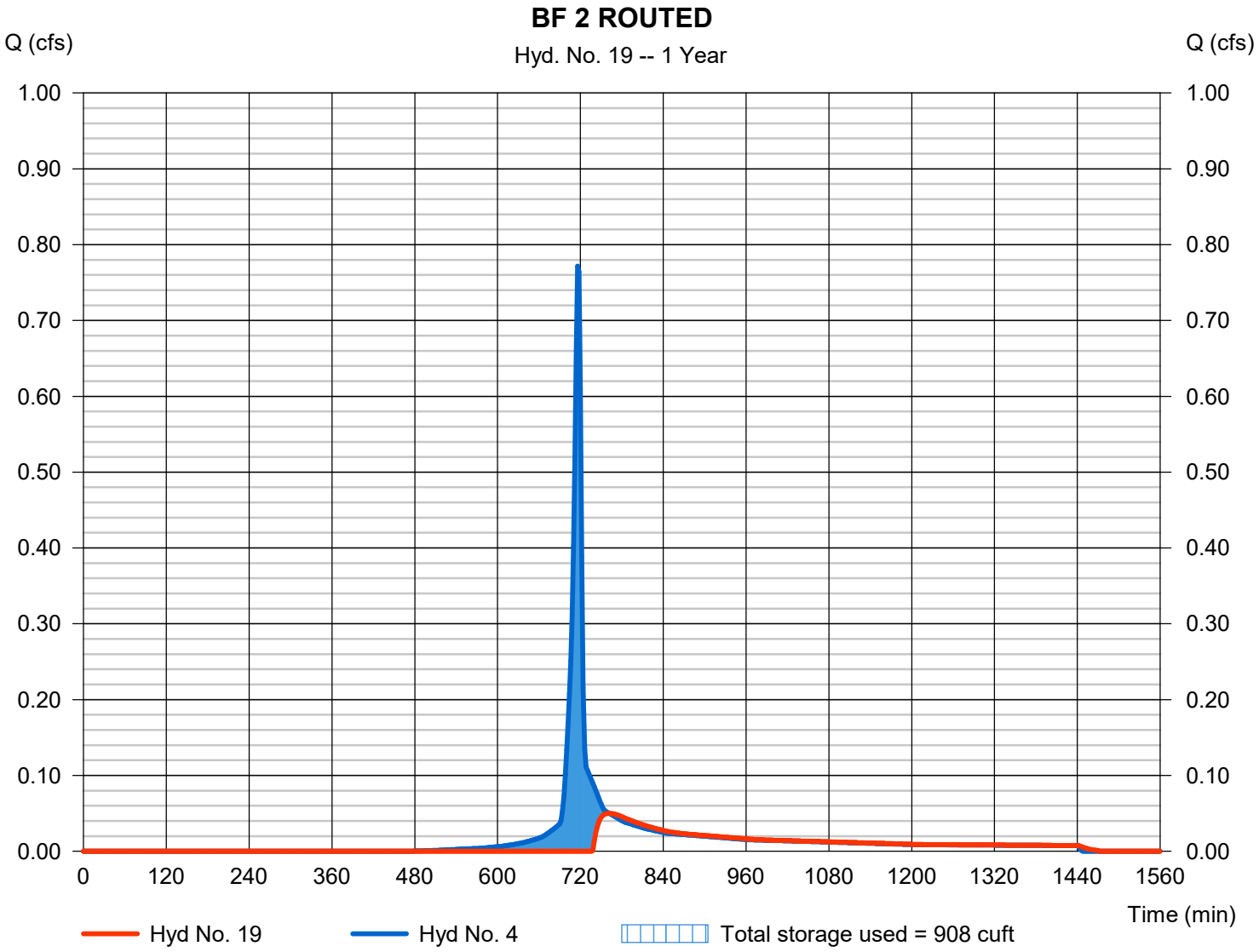
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 19

BF 2 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	0.050 cfs
Storm frequency	=	1 yrs	Time to peak	=	762 min
Time interval	=	2 min	Hyd. volume	=	693 cuft
Inflow hyd. No.	=	4 - POST A-BF 2	Max. Elevation	=	449.07 ft
Reservoir name	=	BIORETENTION FILTER 2	Max. Storage	=	908 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Pond No. 2 - BIORETENTION FILTER 2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 448.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	448.50	1,445	0	0
0.50	449.00	1,673	779	779
1.00	449.50	1,916	896	1,675
1.50	450.00	2,172	1,021	2,696

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	0.00	0.00	0.00
Span (in)	= 15.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 445.05	0.00	0.00	0.00
Length (ft)	= 54.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

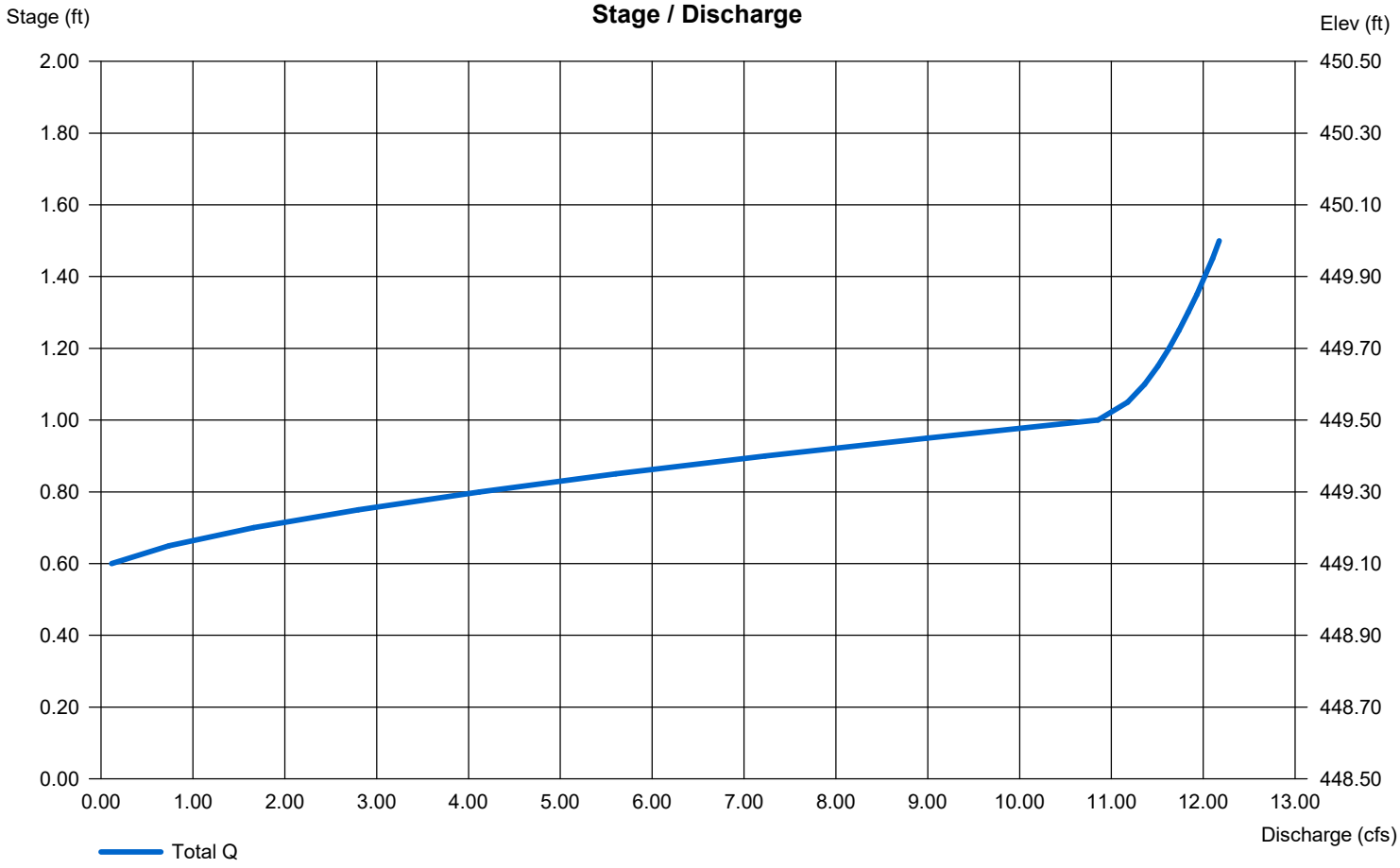
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	Inactive	0.00	0.00
Crest El. (ft)	= 449.08	0.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

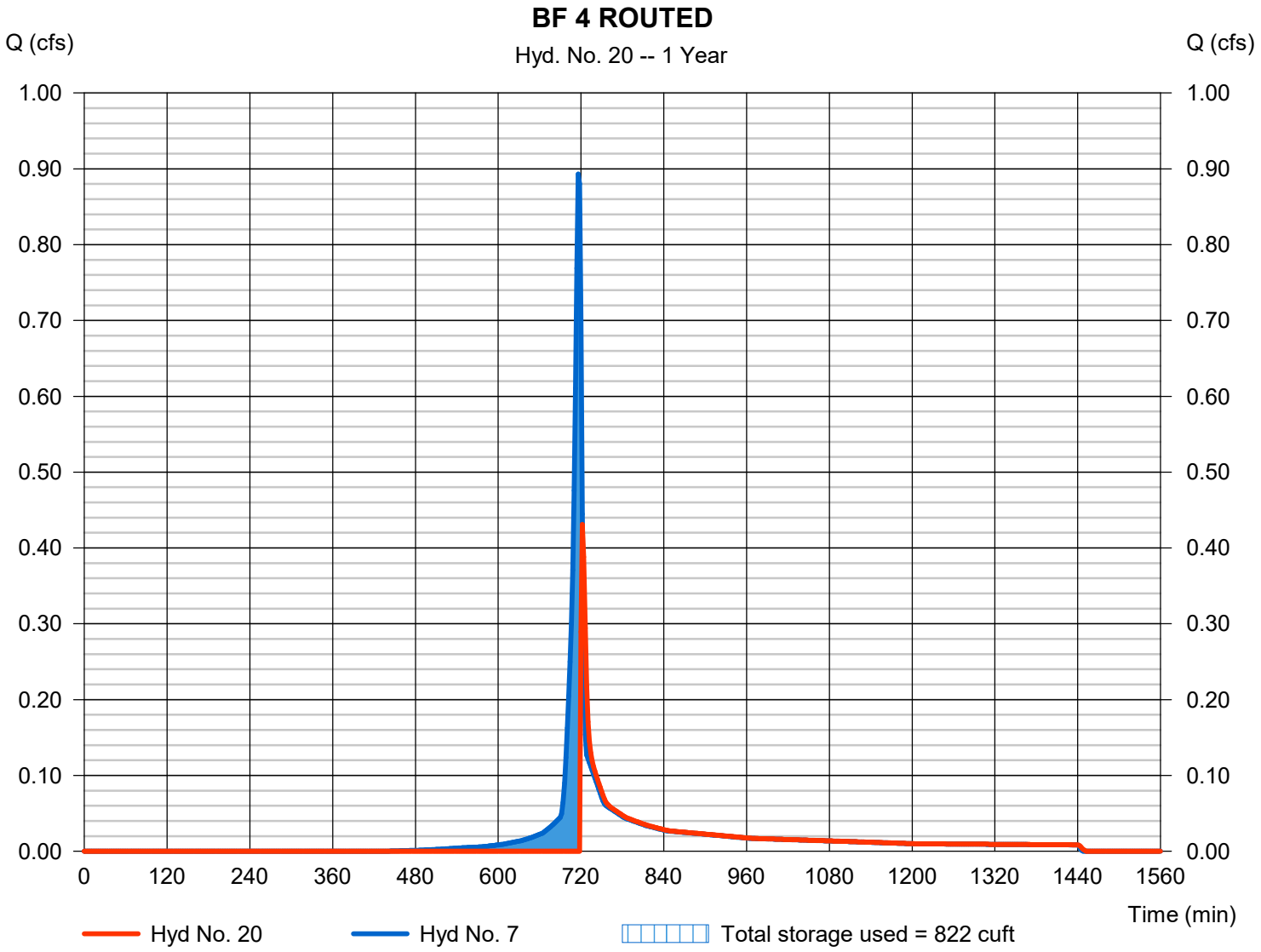
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 20

BF 4 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	0.431 cfs
Storm frequency	=	1 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	1,070 cuft
Inflow hyd. No.	=	7 - POST A-BF 4	Max. Elevation	=	449.60 ft
Reservoir name	=	BIORETENTION FILTER 4	Max. Storage	=	822 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Pond No. 4 - BIORETENTION FILTER 4

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 449.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	449.00	1,196	0	0
0.50	449.50	1,467	665	665
1.00	450.00	1,753	804	1,468
1.50	450.50	2,051	950	2,418

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	0.00	0.00	0.00
Span (in)	= 15.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 445.23	0.00	0.00	0.00
Length (ft)	= 72.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

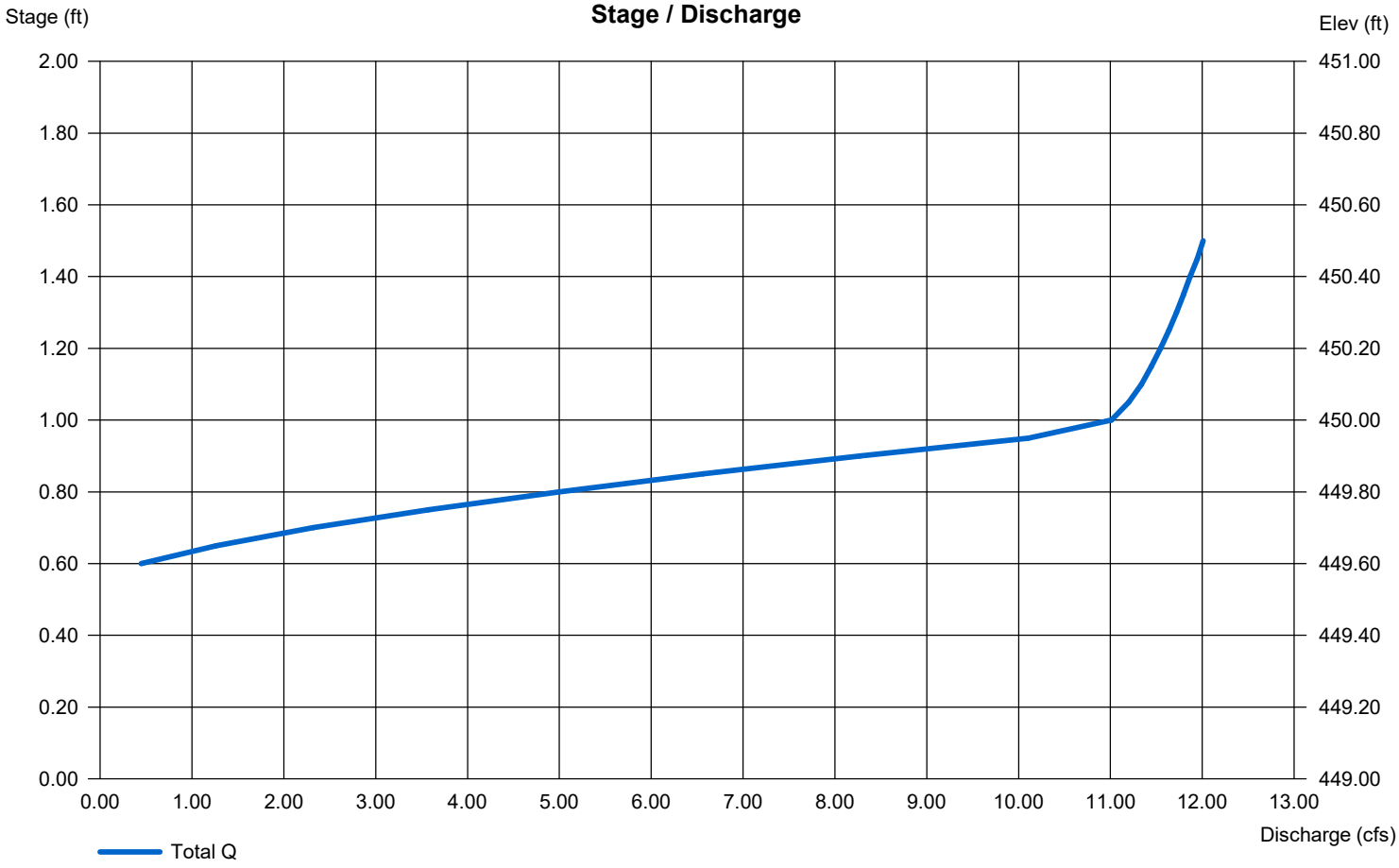
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	0.00	0.00	0.00
Crest El. (ft)	= 449.55	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

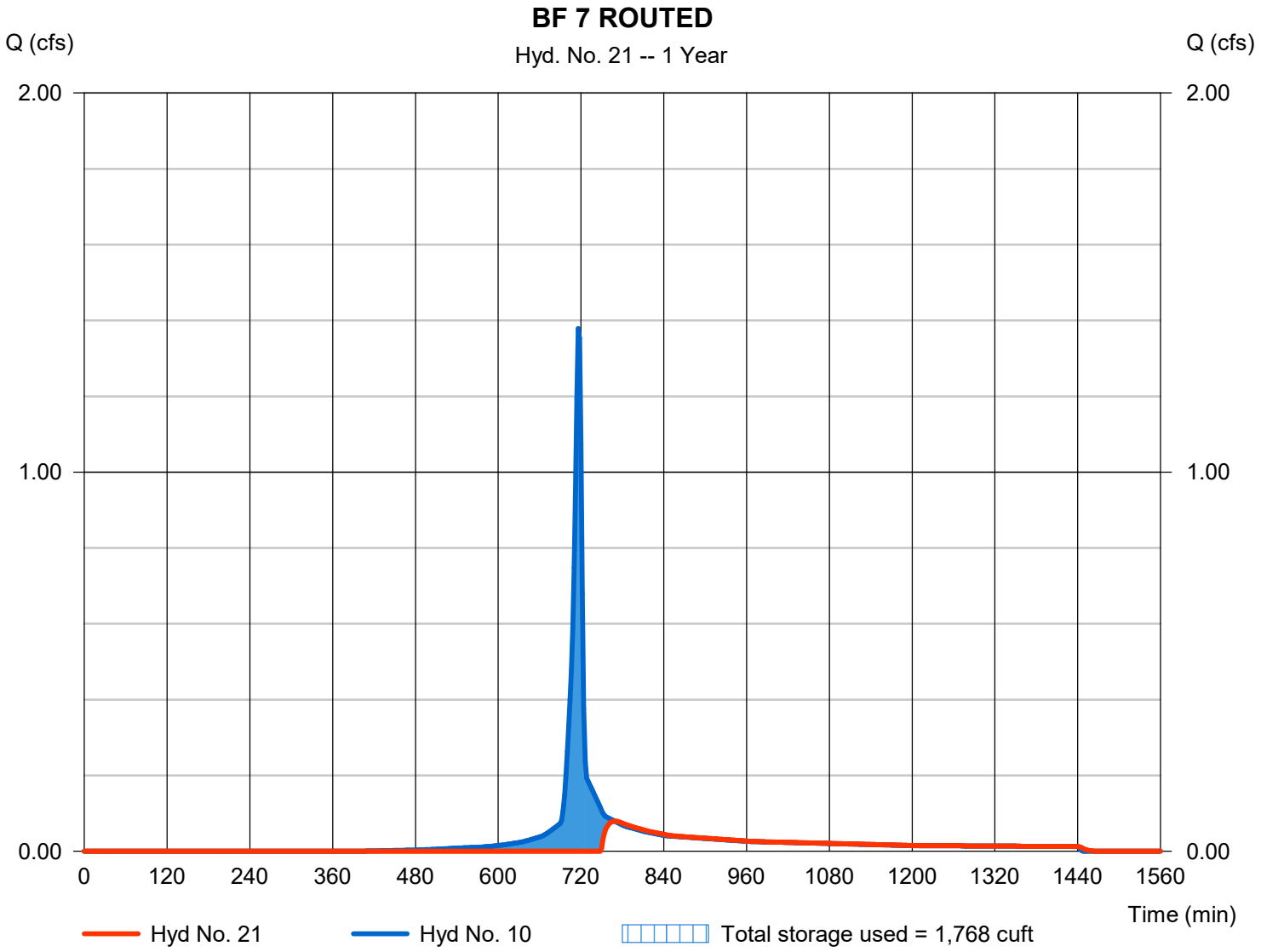
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 21

BF 7 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	0.079 cfs
Storm frequency	=	1 yrs	Time to peak	=	768 min
Time interval	=	2 min	Hyd. volume	=	1,085 cuft
Inflow hyd. No.	=	10 - POST A-BF 7	Max. Elevation	=	449.51 ft
Reservoir name	=	BIORETENTION FILTER 7	Max. Storage	=	1,768 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Pond No. 7 - BIORETENTION FILTER 7

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 449.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	449.00	3,257	0	0
0.50	449.50	3,681	1,733	1,733
1.00	450.00	4,118	1,949	3,682
1.50	450.50	4,569	2,171	5,852

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	0.00	0.00	0.00
Span (in)	= 15.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 445.30	0.00	0.00	0.00
Length (ft)	= 79.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

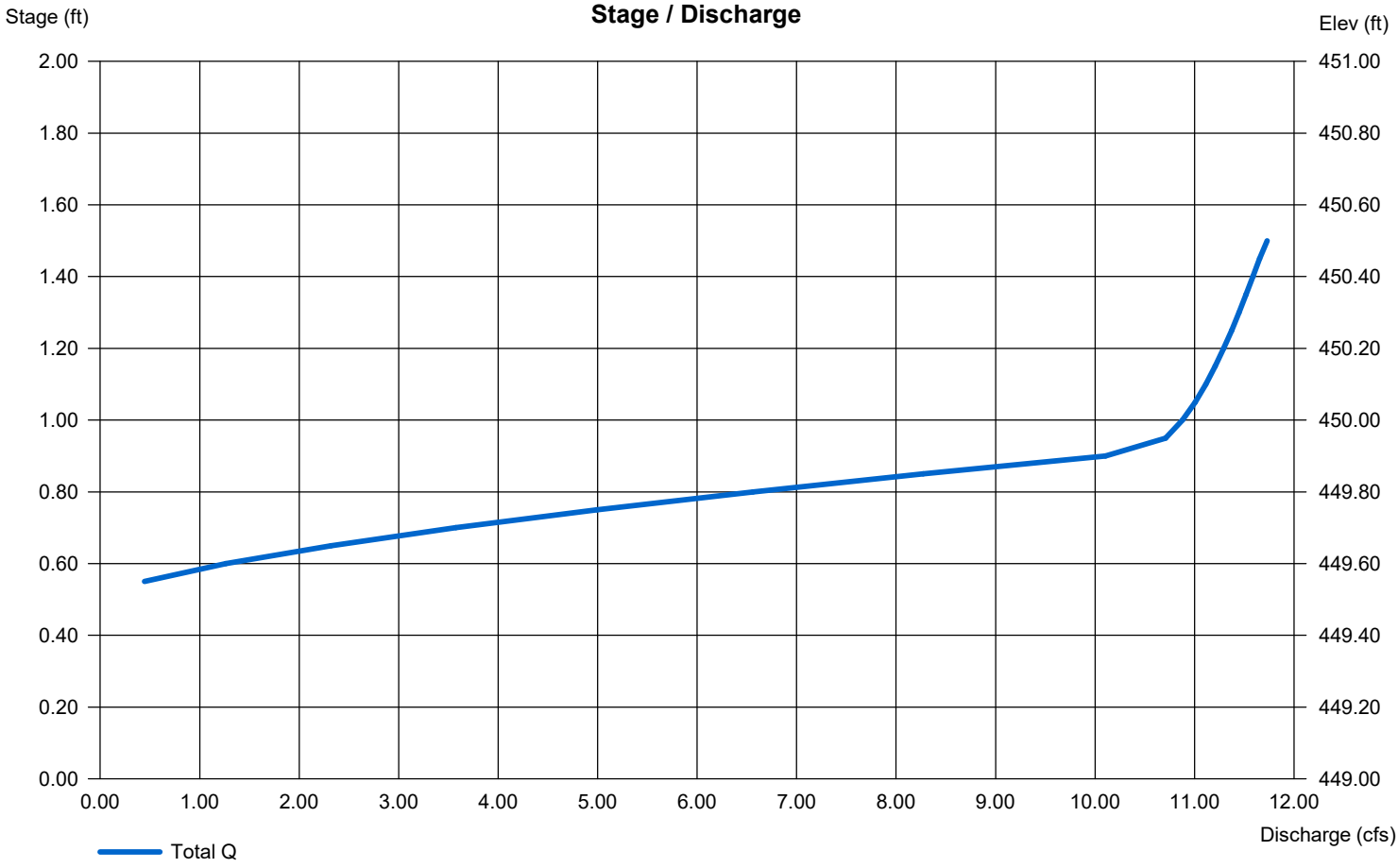
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	0.00	0.00	0.00
Crest El. (ft)	= 449.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

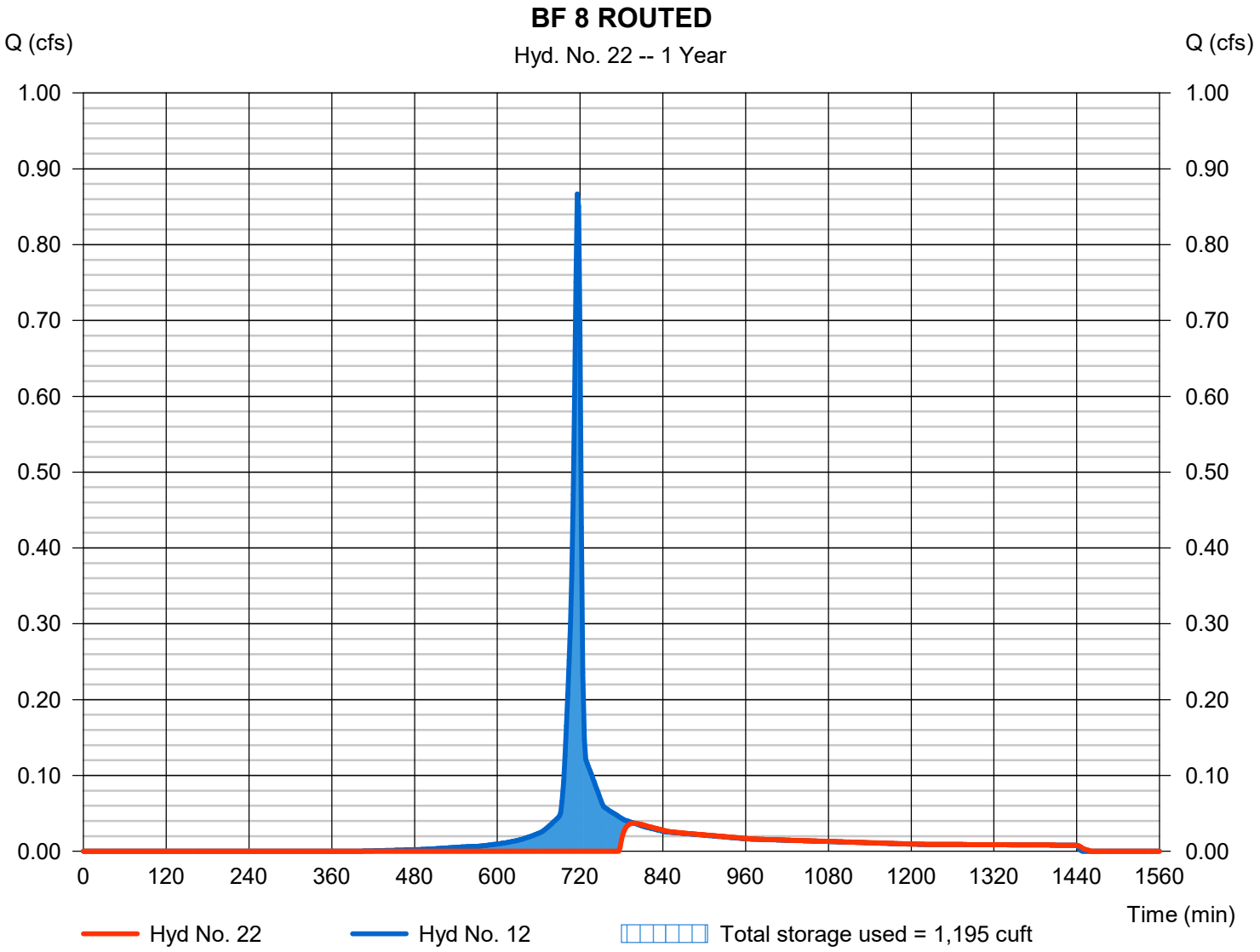
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 22

BF 8 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	0.037 cfs
Storm frequency	=	1 yrs	Time to peak	=	798 min
Time interval	=	2 min	Hyd. volume	=	592 cuft
Inflow hyd. No.	=	12 - POST B-BF 8	Max. Elevation	=	449.06 ft
Reservoir name	=	BIORETENTION FILTER 8	Max. Storage	=	1,195 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Pond No. 8 - BIORETENTION FILTER 8

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 448.25 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	448.25	1,158	0	0
0.50	448.75	1,521	668	668
1.00	449.25	1,898	853	1,521
1.75	450.00	2,490	1,640	3,161

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	0.00	0.00	0.00
Span (in)	= 15.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 444.79	0.00	0.00	0.00
Length (ft)	= 28.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

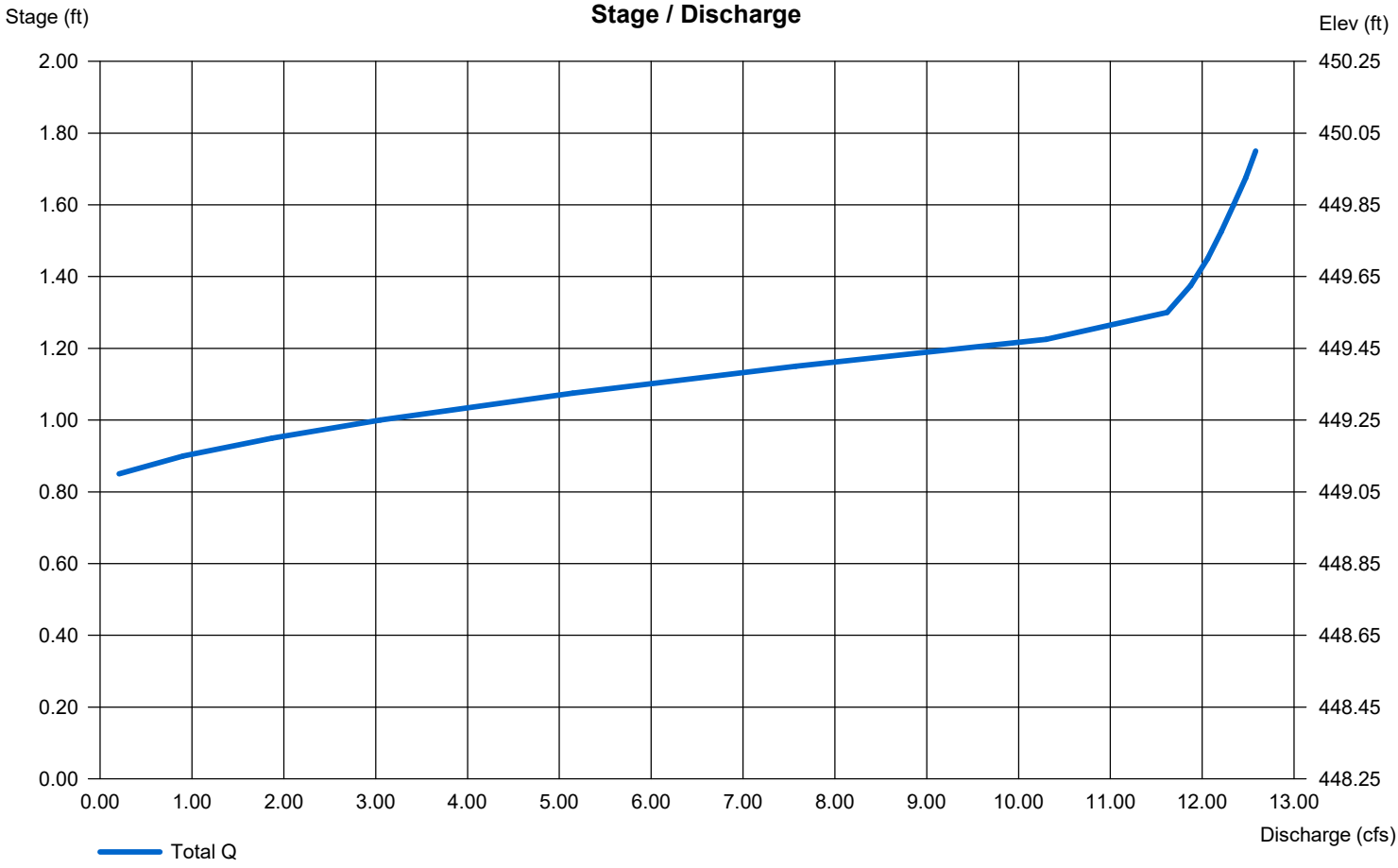
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	0.00	0.00	0.00
Crest El. (ft)	= 449.07	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

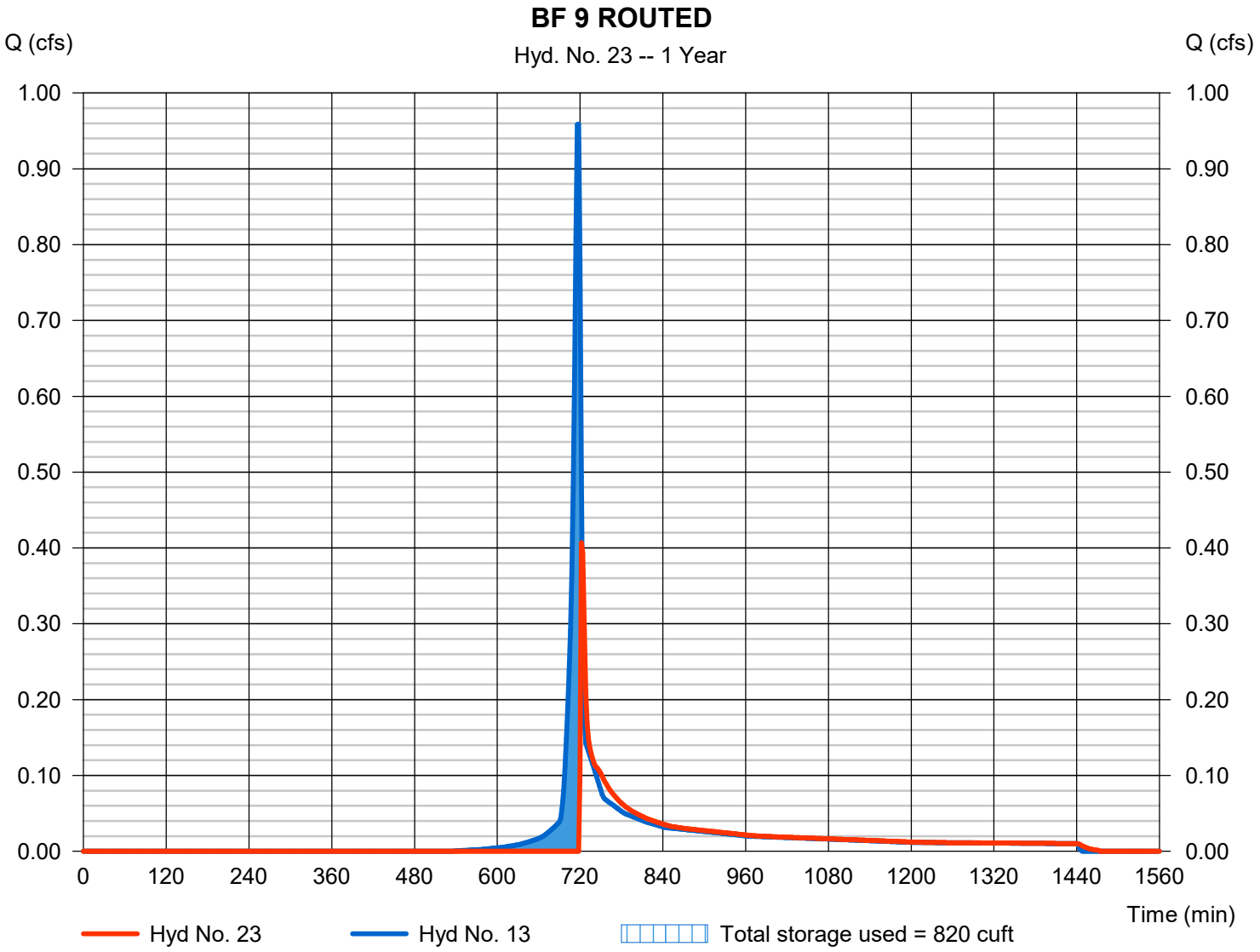
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 23

BF 9 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	0.407 cfs
Storm frequency	=	1 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	1,243 cuft
Inflow hyd. No.	=	13 - POST B-BF 9	Max. Elevation	=	449.07 ft
Reservoir name	=	BIORETENTION FILTER 9	Max. Storage	=	820 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Pond No. 9 - BIORETENTION FILTER 9

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 448.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	448.50	1,203	0	0
0.50	449.00	1,570	691	691
1.00	449.50	1,959	880	1,572
1.50	450.00	2,347	1,075	2,646

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	0.00	0.00	0.00
Span (in)	= 15.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 444.92	0.00	0.00	0.00
Length (ft)	= 41.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

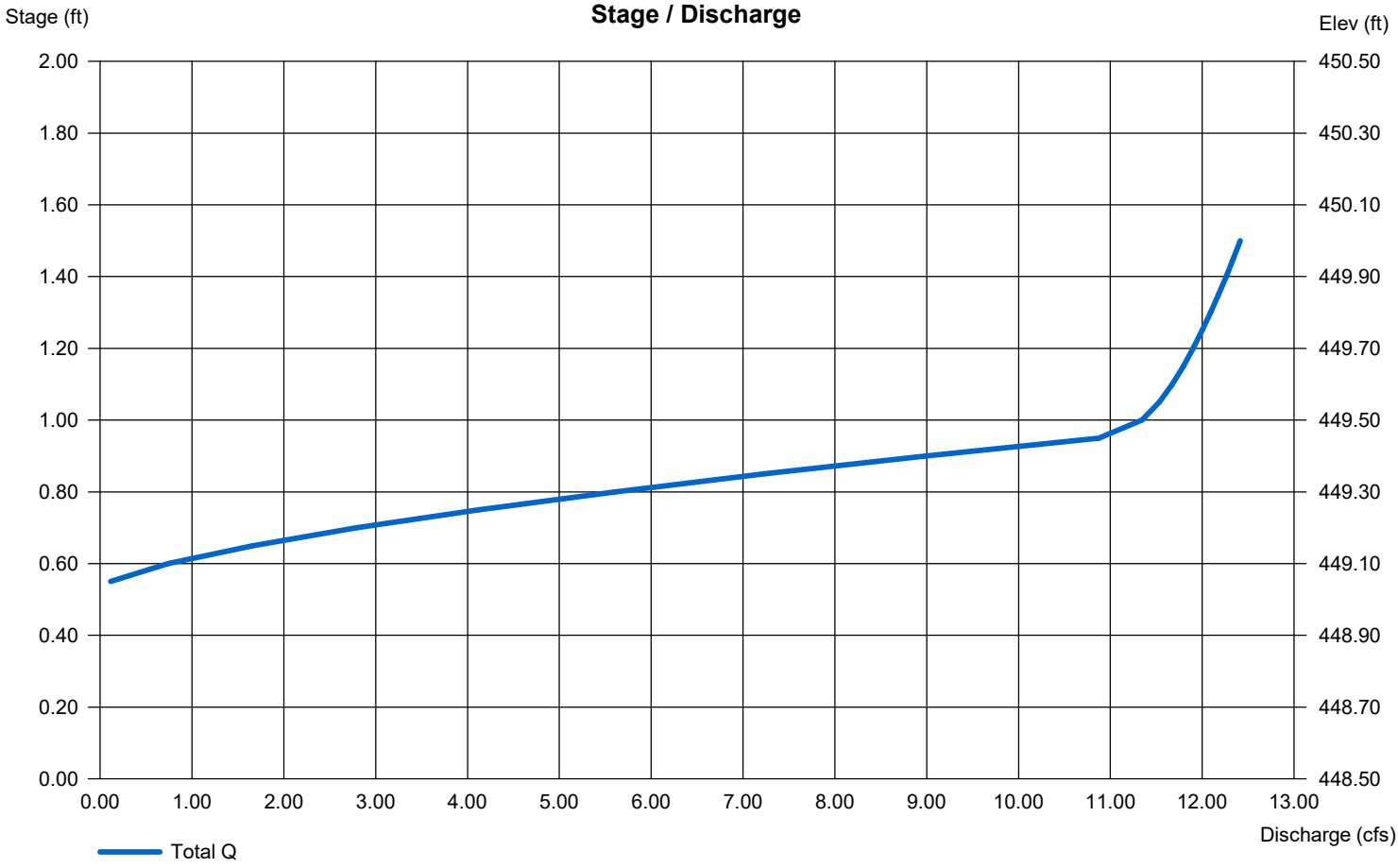
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	0.00	0.00	0.00
Crest El. (ft)	= 449.03	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

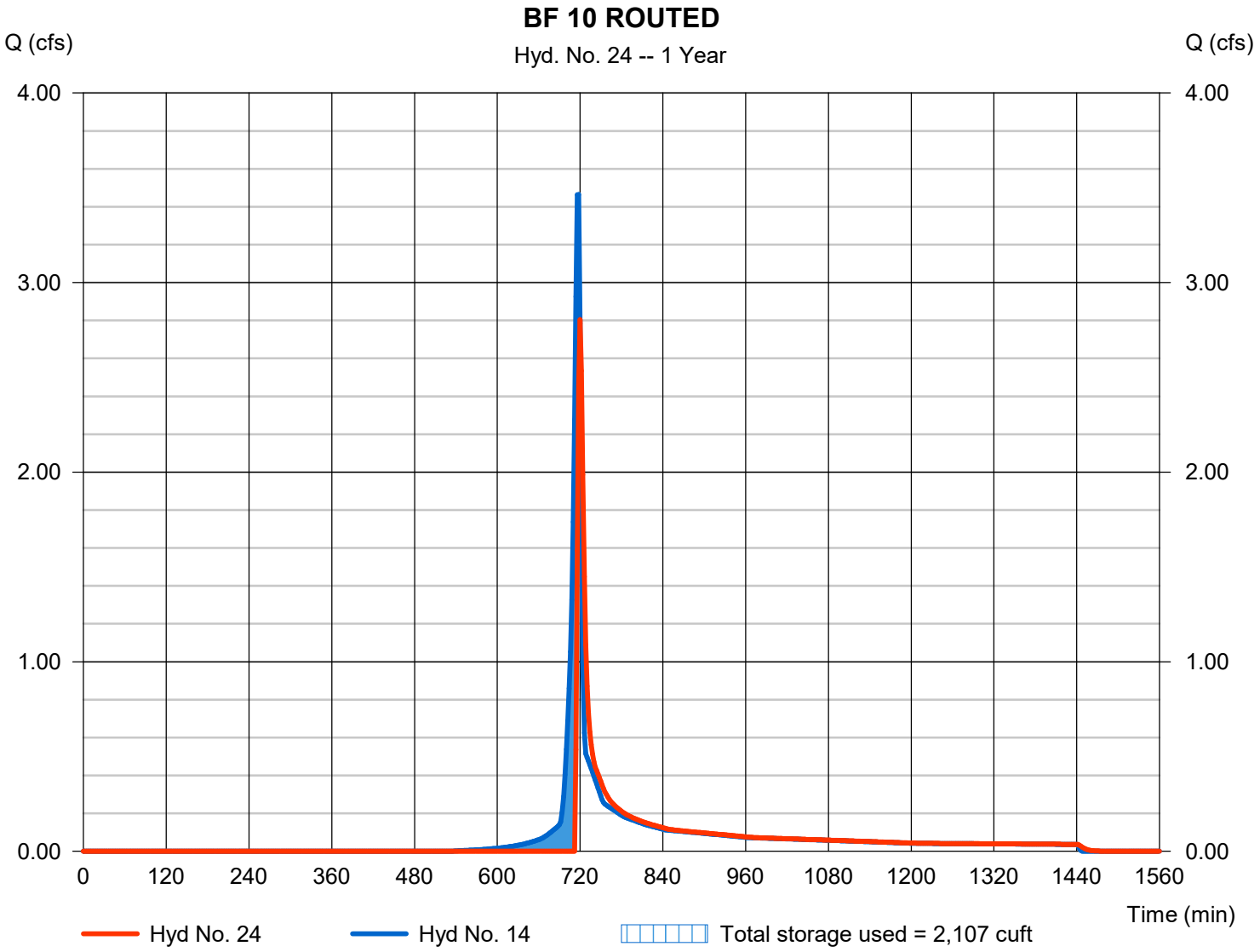
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 24

BF 10 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	2.805 cfs
Storm frequency	=	1 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	5,610 cuft
Inflow hyd. No.	=	14 - POST B-BF 10	Max. Elevation	=	449.27 ft
Reservoir name	=	BIORETENTION FILTER 10	Max. Storage	=	2,107 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Pond No. 10 - BIORETENTION FILTER 10

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 448.75 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	448.75	3,651	0	0
0.25	449.00	3,969	952	952
0.75	449.50	4,615	2,144	3,096
1.25	450.00	5,275	2,470	5,566
1.75	450.50	5,950	2,804	8,371

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	Inactive	0.00	0.00
Span (in)	= 15.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 445.21	0.00	0.00	0.00
Length (ft)	= 70.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

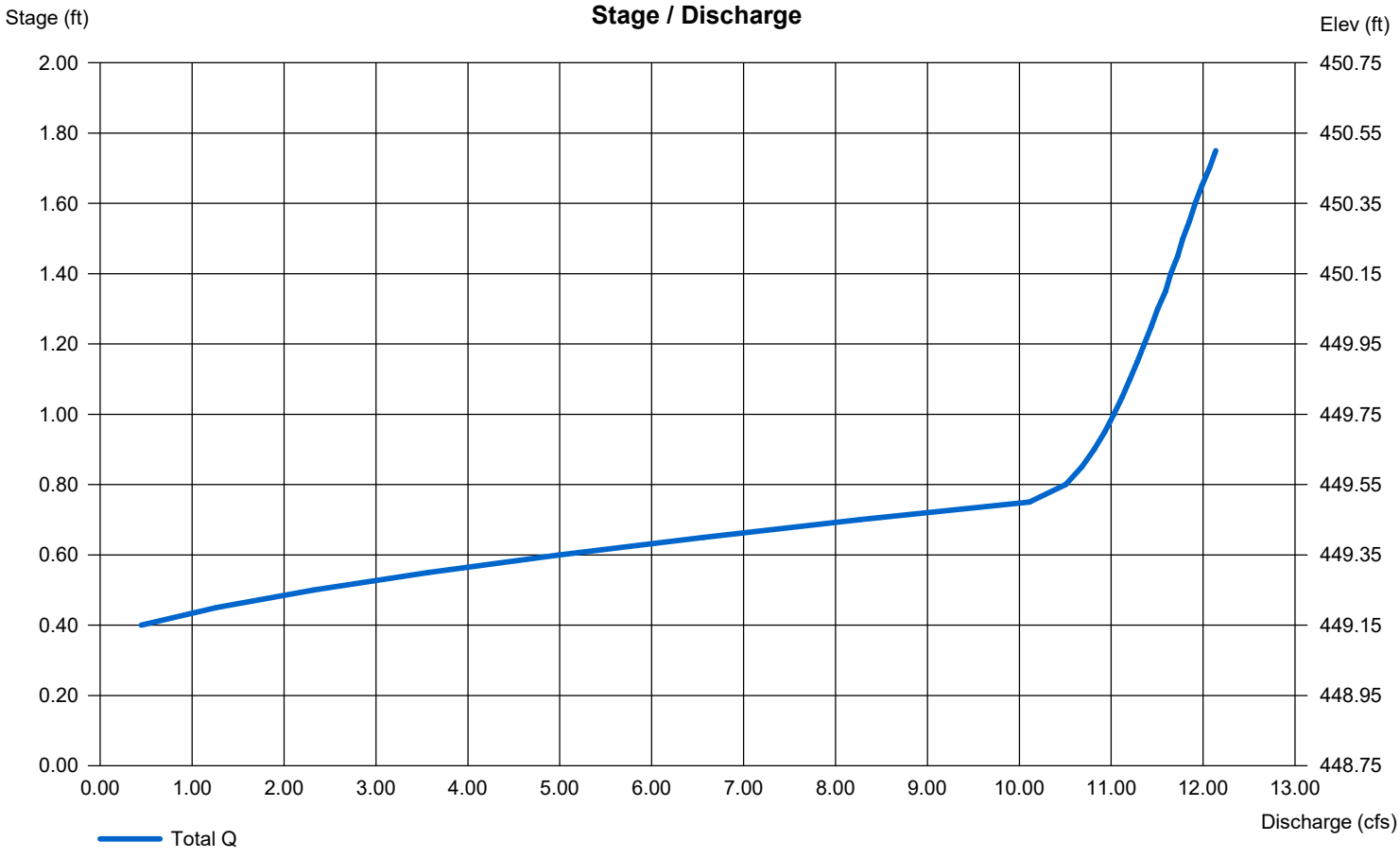
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	0.00	0.00	0.00
Crest El. (ft)	= 449.10	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



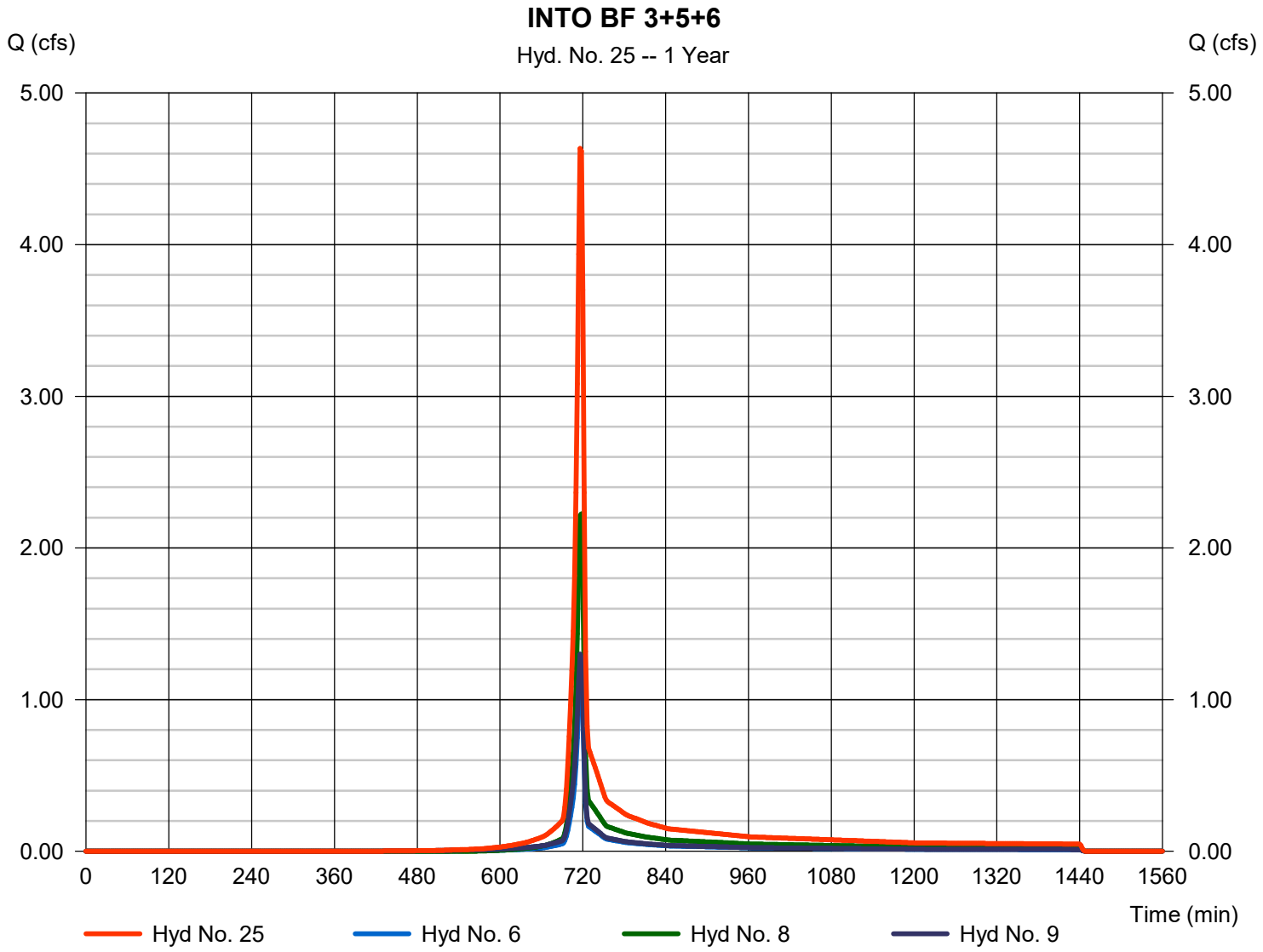
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 25

INTO BF 3+5+6

Hydrograph type	= Combine	Peak discharge	= 4.634 cfs
Storm frequency	= 1 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 9,395 cuft
Inflow hyds.	= 6, 8, 9	Contrib. drain. area	= 2.870 ac



Hydrograph Report

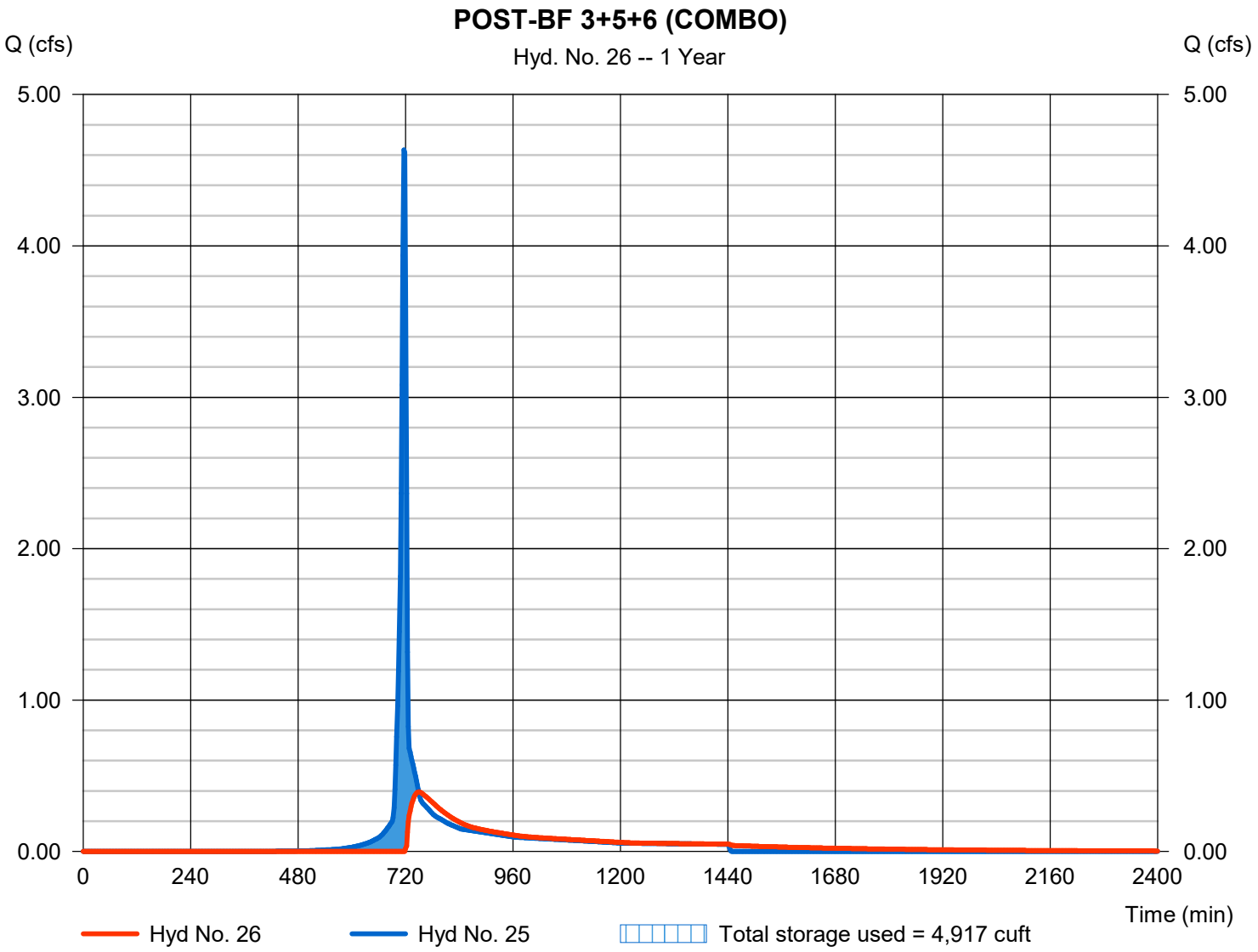
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 26

POST-BF 3+5+6 (COMBO)

Hydrograph type	=	Reservoir	Peak discharge	=	0.393 cfs
Storm frequency	=	1 yrs	Time to peak	=	750 min
Time interval	=	2 min	Hyd. volume	=	5,890 cuft
Inflow hyd. No.	=	25 - INTO BF 3+5+6	Max. Elevation	=	448.78 ft
Reservoir name	=	BIORETENTION FILTERS 3+5+6 COMBINED	Max. Storage	=	4,917 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Pond No. 13 - BIORETENTION FILTERS 3+5+6 COMBINED

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 448.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	448.50	16,497	0	0
0.50	449.00	18,354	8,708	8,708
1.00	449.50	20,253	9,647	18,355
1.50	450.00	22,195	10,607	28,962

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	0.00	0.00	0.00
Span (in)	= 24.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 444.73	0.00	0.00	0.00
Length (ft)	= 58.00	0.00	0.00	0.00
Slope (%)	= 0.81	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

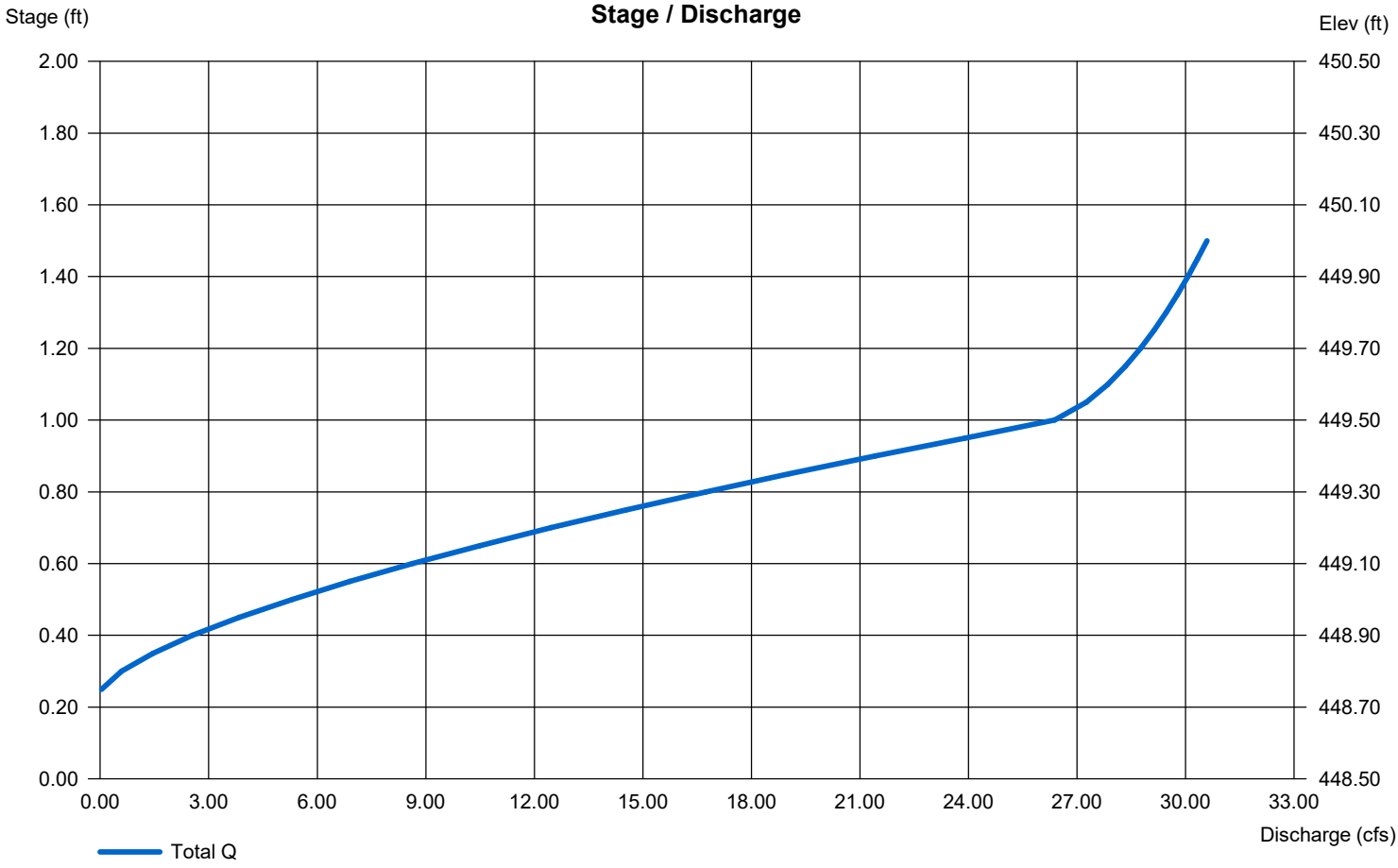
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	0.00	0.00	0.00
Crest El. (ft)	= 448.74	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



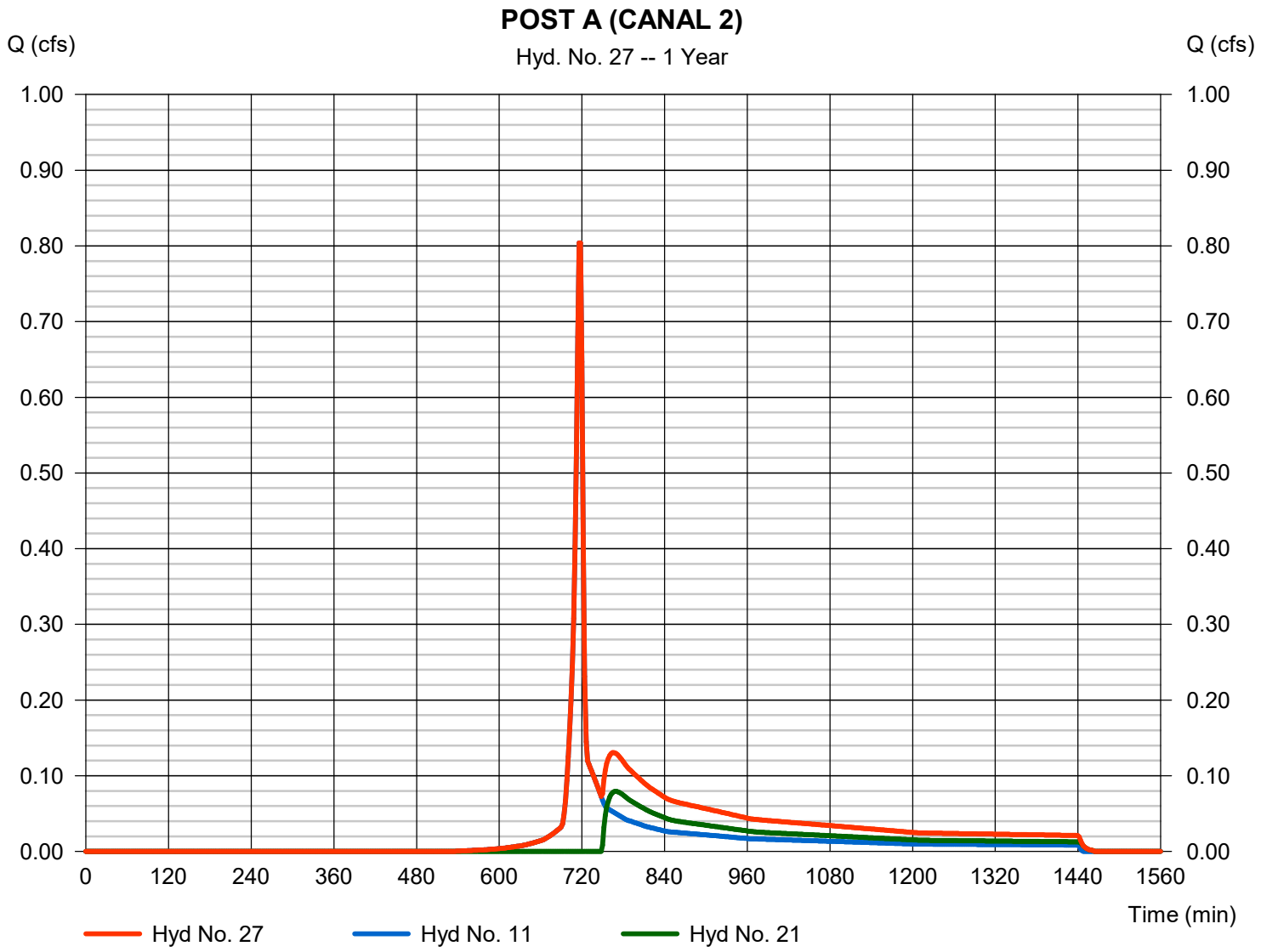
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 27

POST A (CANAL 2)

Hydrograph type	= Combine	Peak discharge	= 0.804 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 2,708 cuft
Inflow hyds.	= 11, 21	Contrib. drain. area	= 0.520 ac



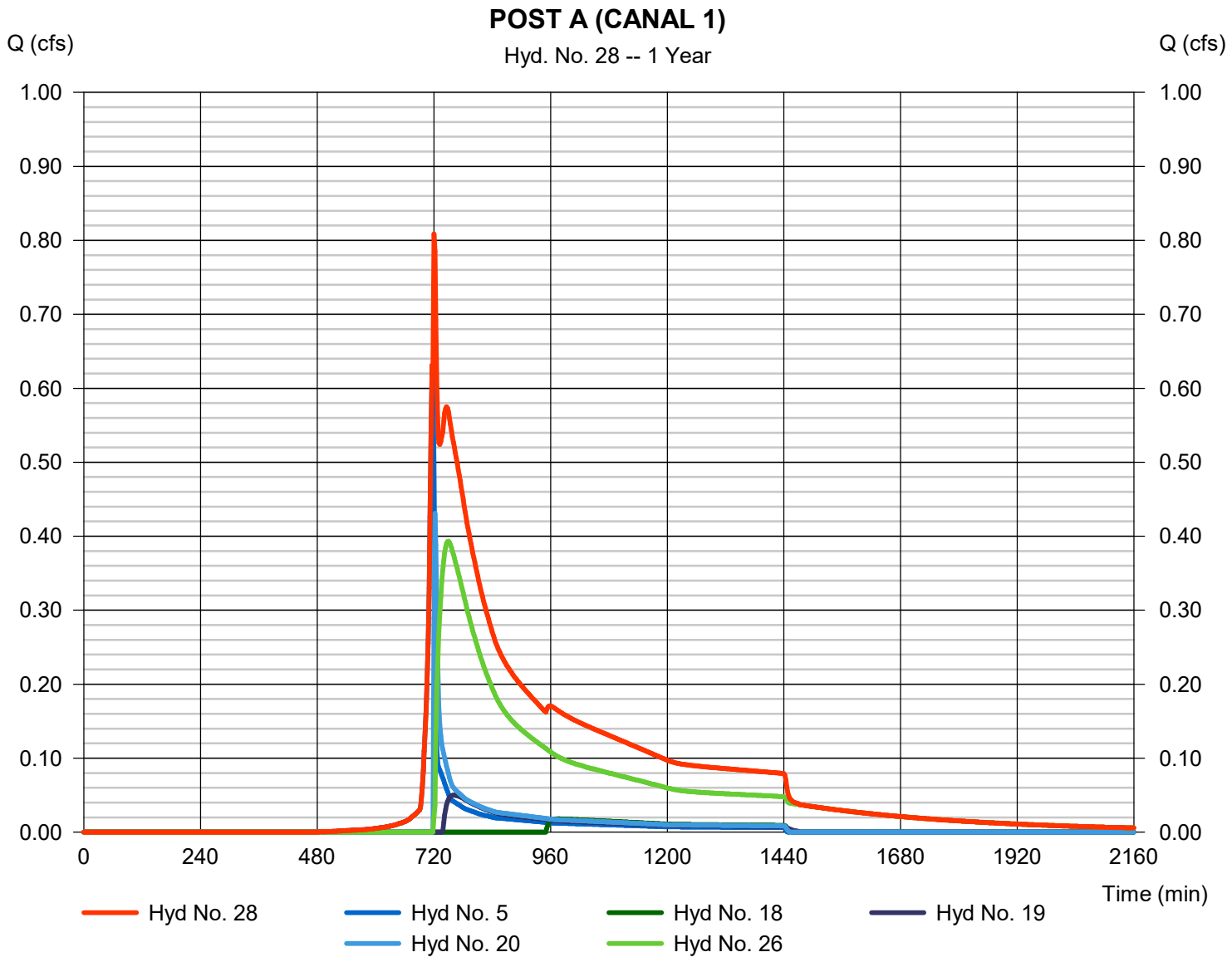
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 28

POST A (CANAL 1)

Hydrograph type	= Combine	Peak discharge	= 0.808 cfs
Storm frequency	= 1 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 9,295 cuft
Inflow hyds.	= 5, 18, 19, 20, 26	Contrib. drain. area	= 0.360 ac

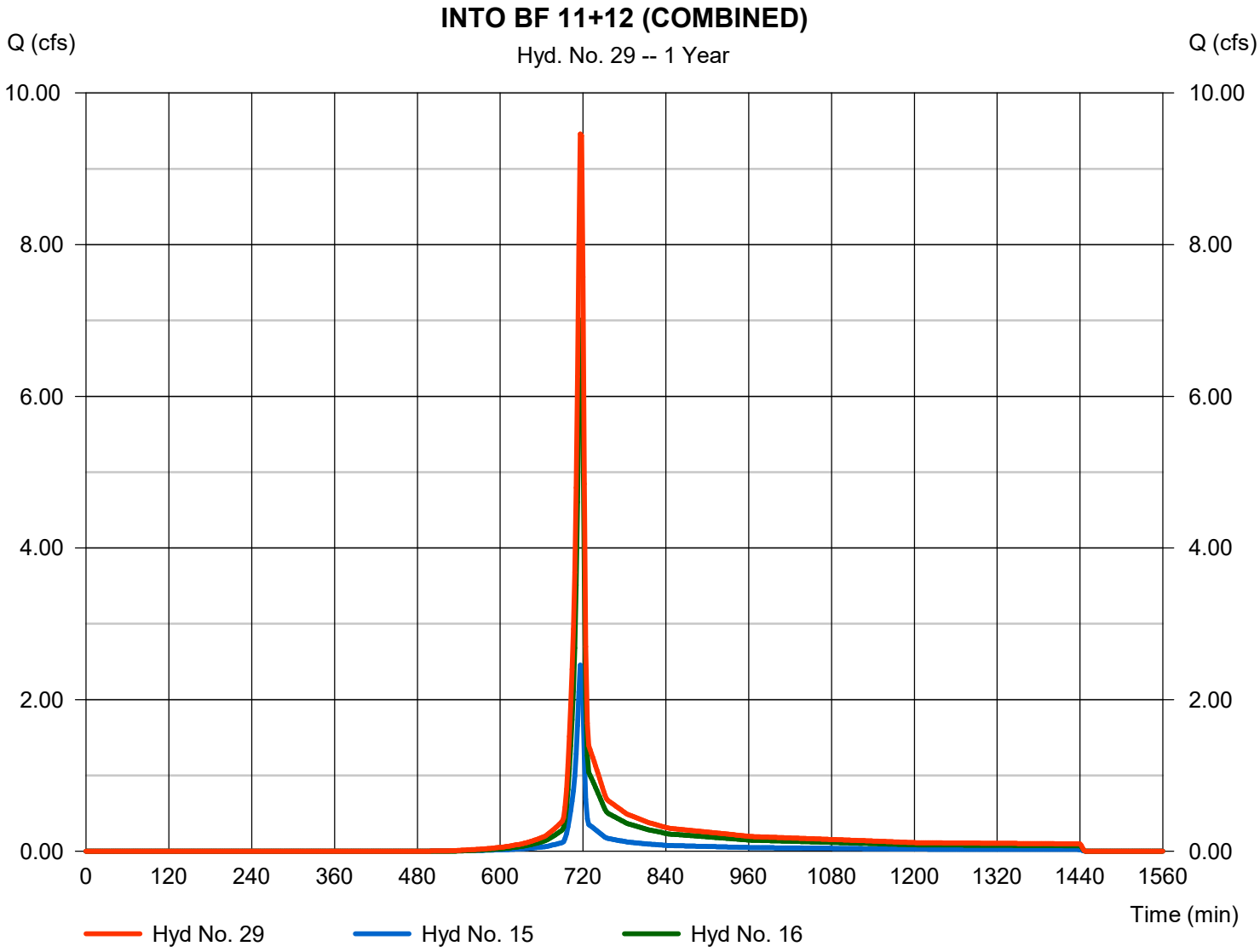


Hydrograph Report

Hyd. No. 29

INTO BF 11+12 (COMBINED)

Hydrograph type	= Combine	Peak discharge	= 9.458 cfs
Storm frequency	= 1 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 19,109 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 5.930 ac



Hydrograph Report

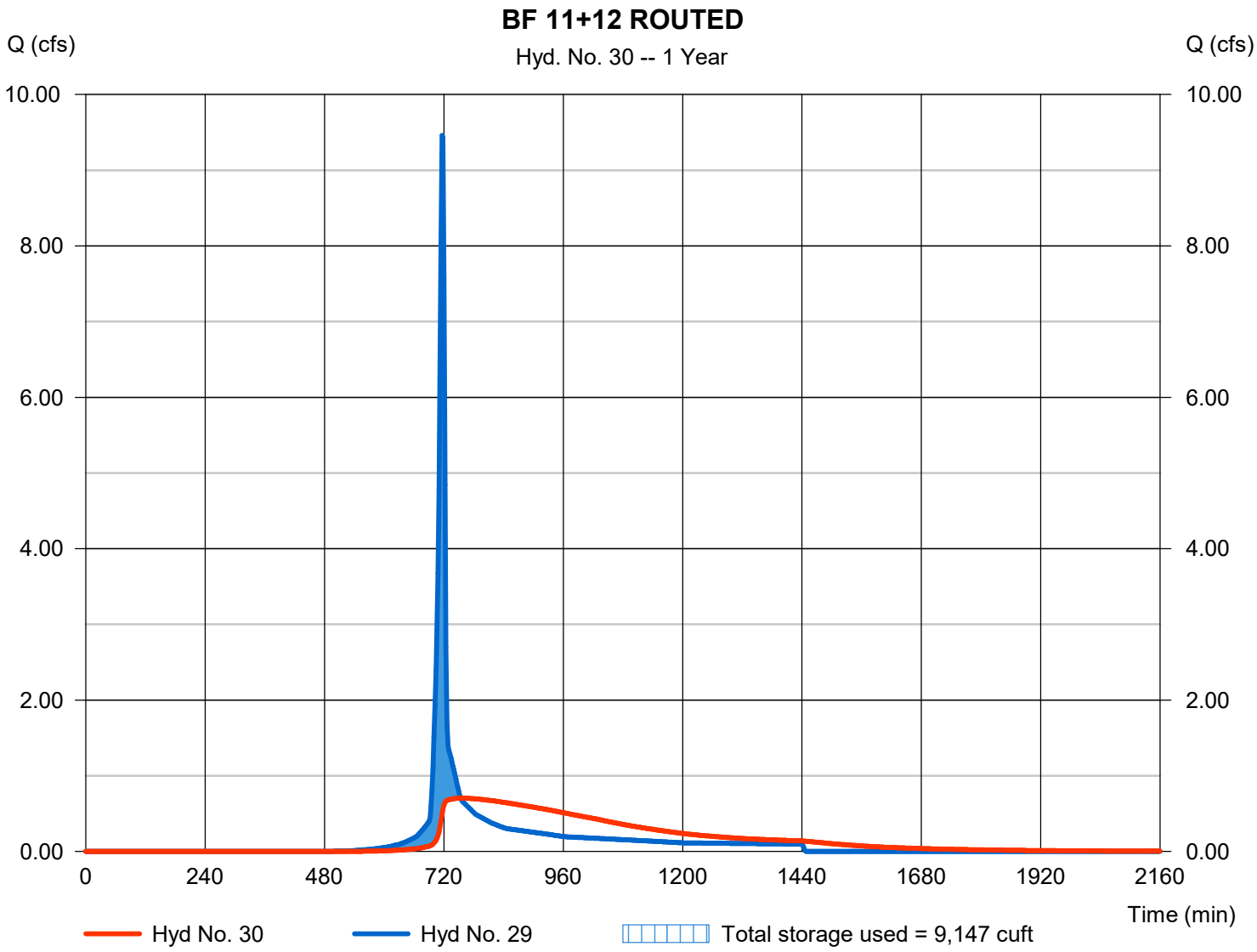
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 30

BF 11+12 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	0.704 cfs
Storm frequency	=	1 yrs	Time to peak	=	754 min
Time interval	=	2 min	Hyd. volume	=	19,097 cuft
Inflow hyd. No.	=	29 - INTO BF 11+12 (COMBINED)	Max. Elevation	=	449.70 ft
Reservoir name	=	BIORETENTION FILTERS 11+12 COMBINED	Max. Storage	=	9,147 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Pond No. 14 - BIORETENTION FILTERS 11+12 COMBINED

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 449.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	449.00	12,165	0	0
0.50	449.50	13,193	6,337	6,337
1.00	450.00	14,248	6,858	13,195
1.50	450.50	15,332	7,393	20,588
2.00	451.00	16,444	7,942	28,529
2.50	451.50	17,584	8,505	37,034
3.00	452.00	18,753	9,082	46,116

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	6.00	0.00	0.00
Span (in)	= 18.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 445.42	448.90	0.00	0.00
Length (ft)	= 91.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

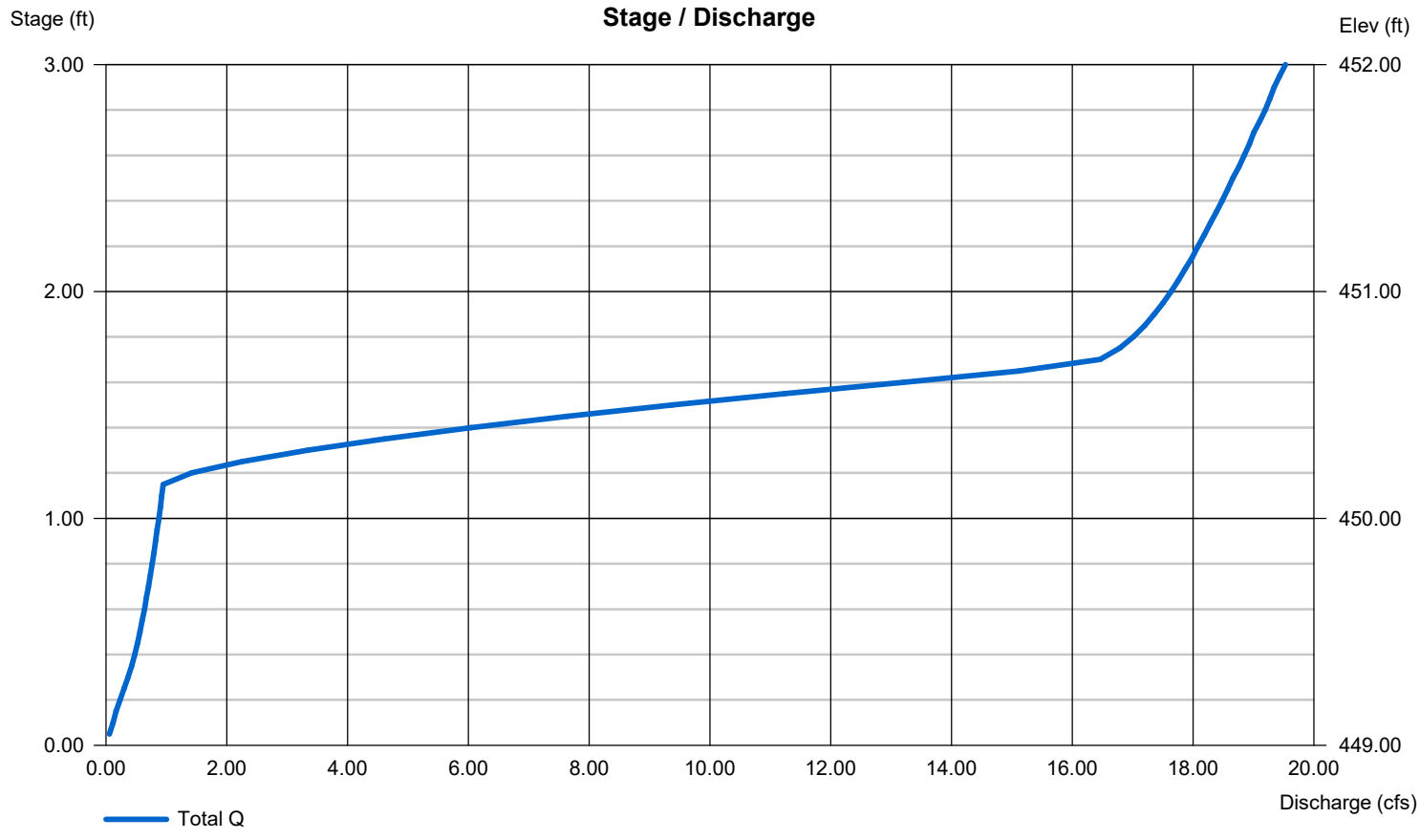
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	0.00	0.00	0.00
Crest El. (ft)	= 450.15	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



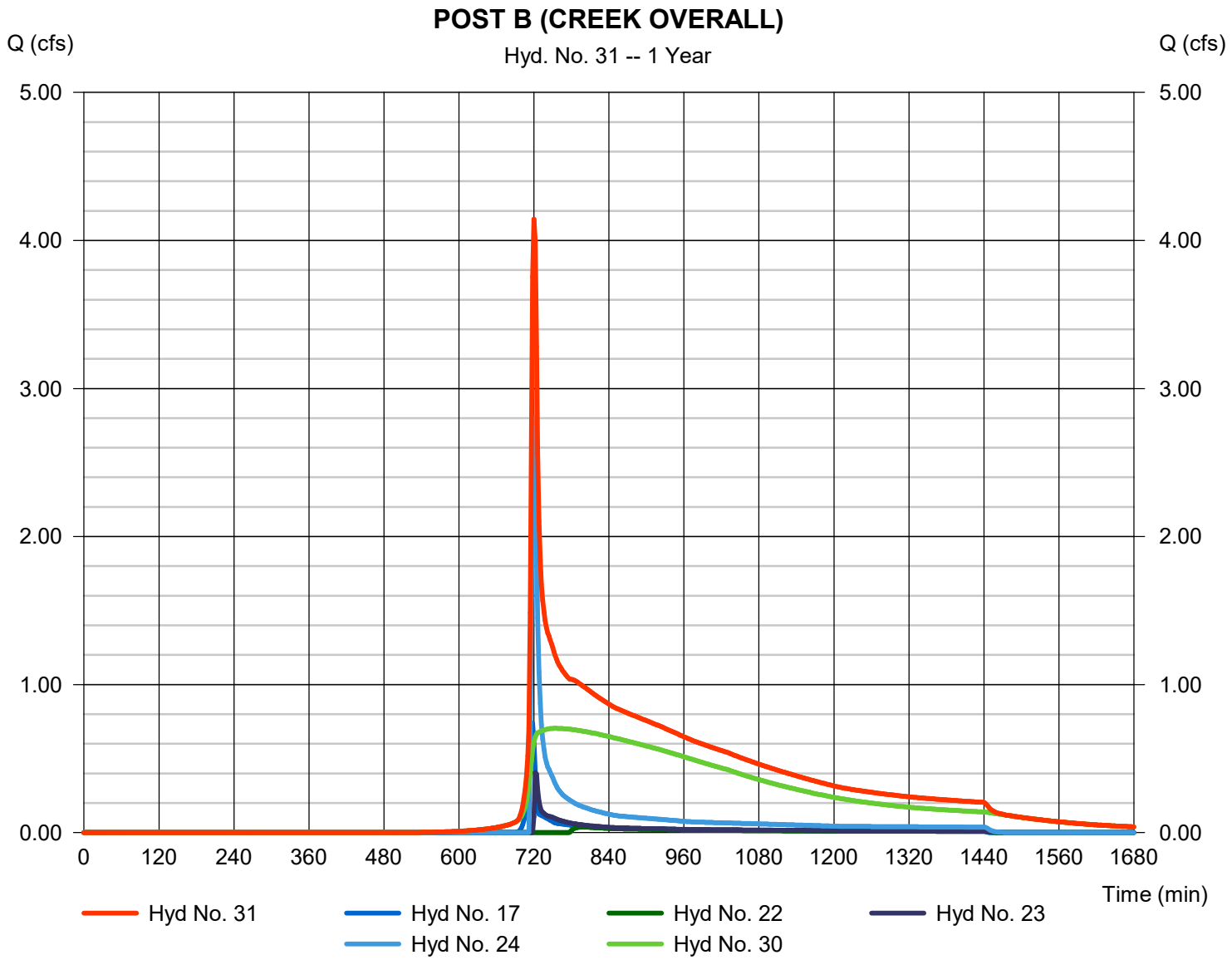
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 31

POST B (CREEK OVERALL)

Hydrograph type	=	Combine	Peak discharge	=	4.144 cfs
Storm frequency	=	1 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	28,053 cuft
Inflow hyds.	=	17, 22, 23, 24, 30	Contrib. drain. area	=	0.910 ac



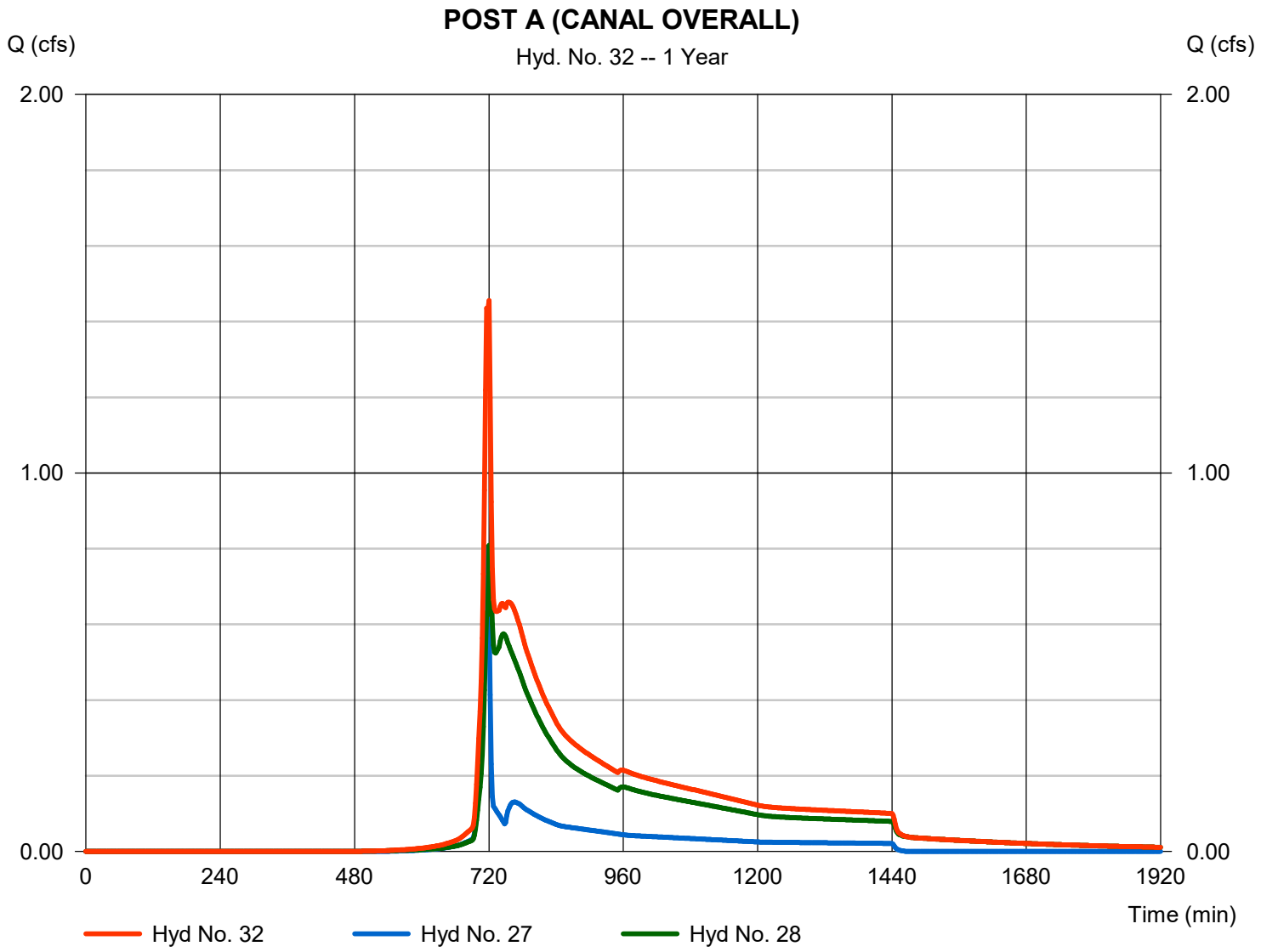
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 32

POST A (CANAL OVERALL)

Hydrograph type	= Combine	Peak discharge	= 1.455 cfs
Storm frequency	= 1 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 12,003 cuft
Inflow hyds.	= 27, 28	Contrib. drain. area	= 0.000 ac



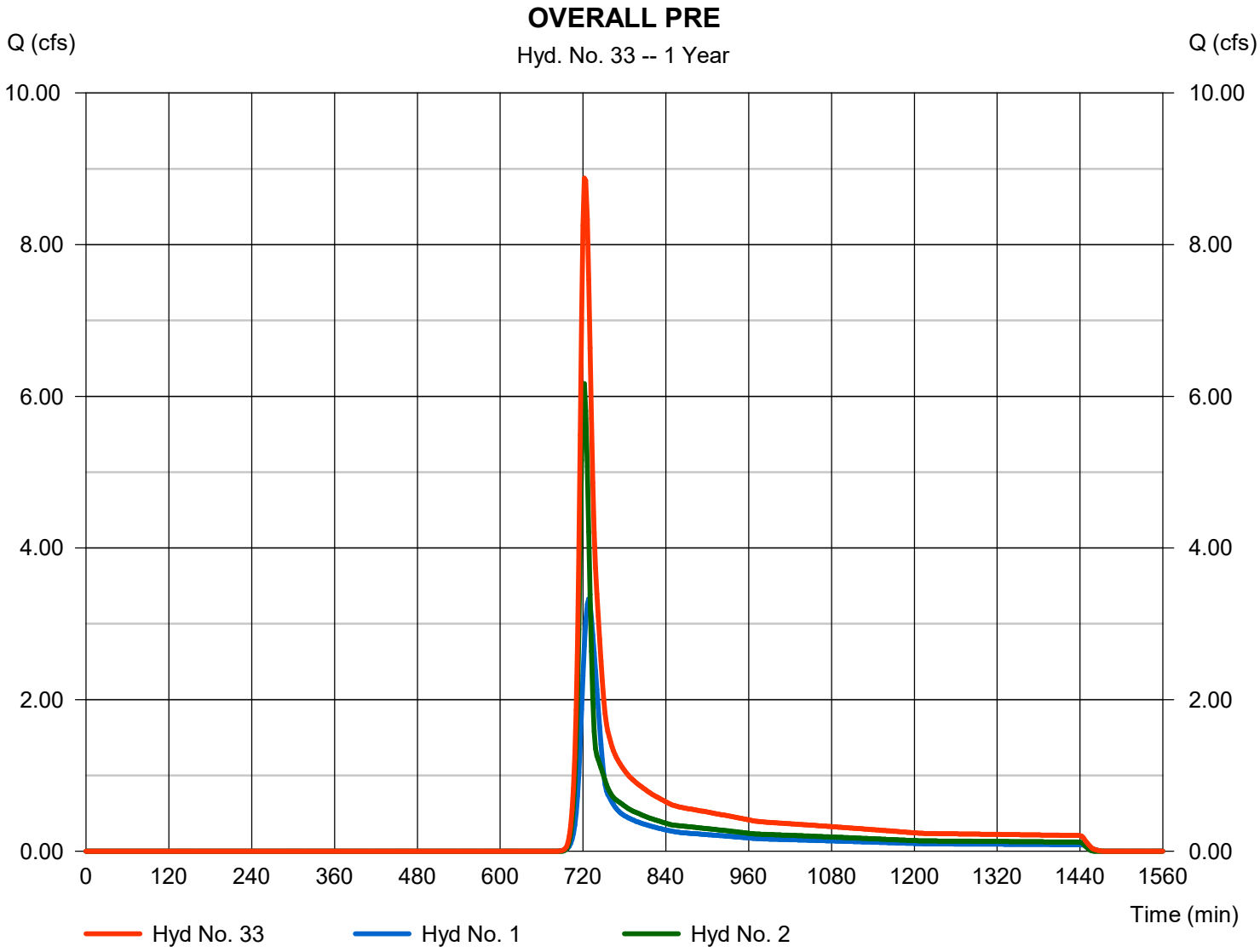
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 33

OVERALL PRE

Hydrograph type	= Combine	Peak discharge	= 8.876 cfs
Storm frequency	= 1 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 29,972 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 15.990 ac



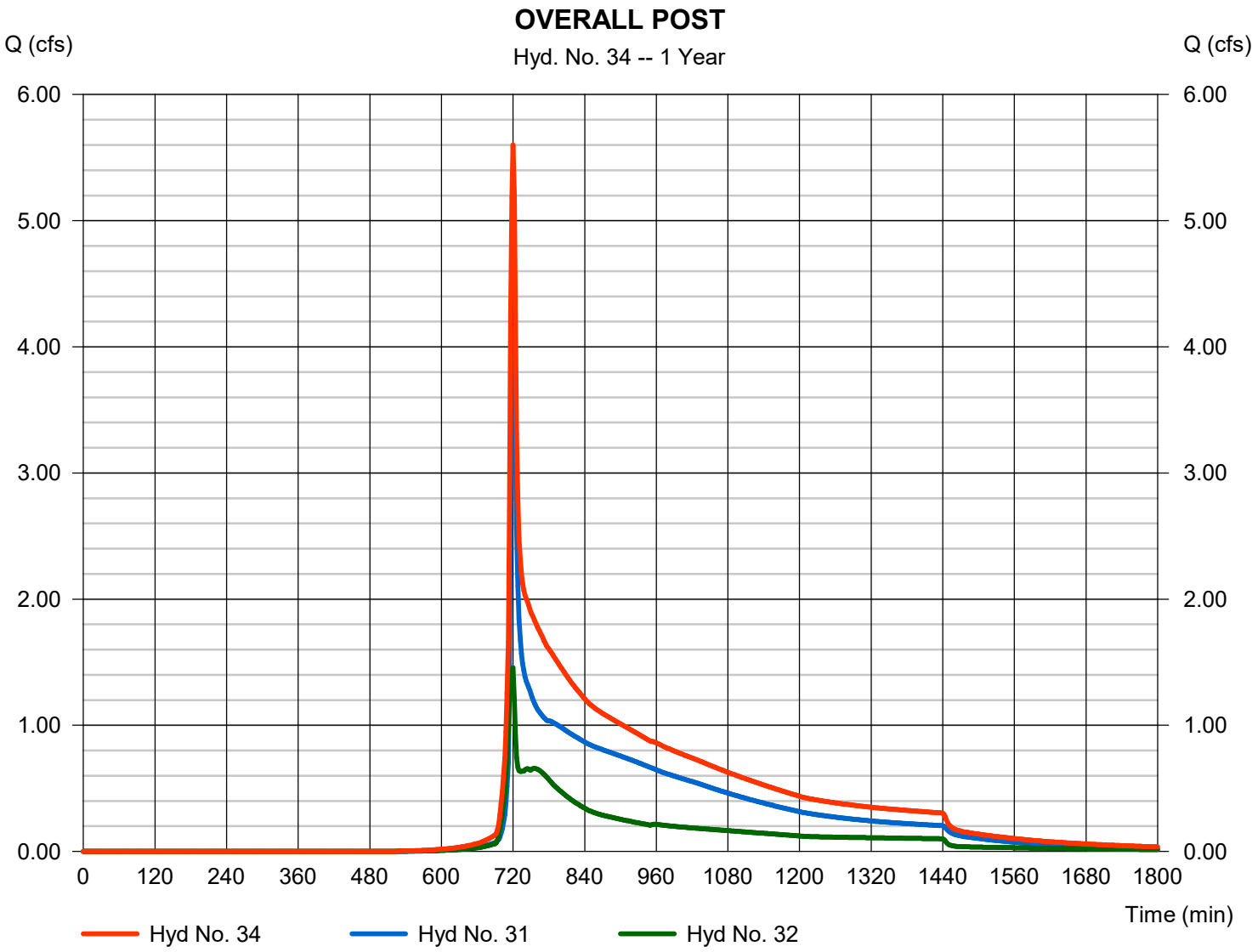
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 34

OVERALL POST

Hydrograph type	= Combine	Peak discharge	= 5.600 cfs
Storm frequency	= 1 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 40,056 cuft
Inflow hyds.	= 31, 32	Contrib. drain. area	= 0.000 ac



Hydrograph Report

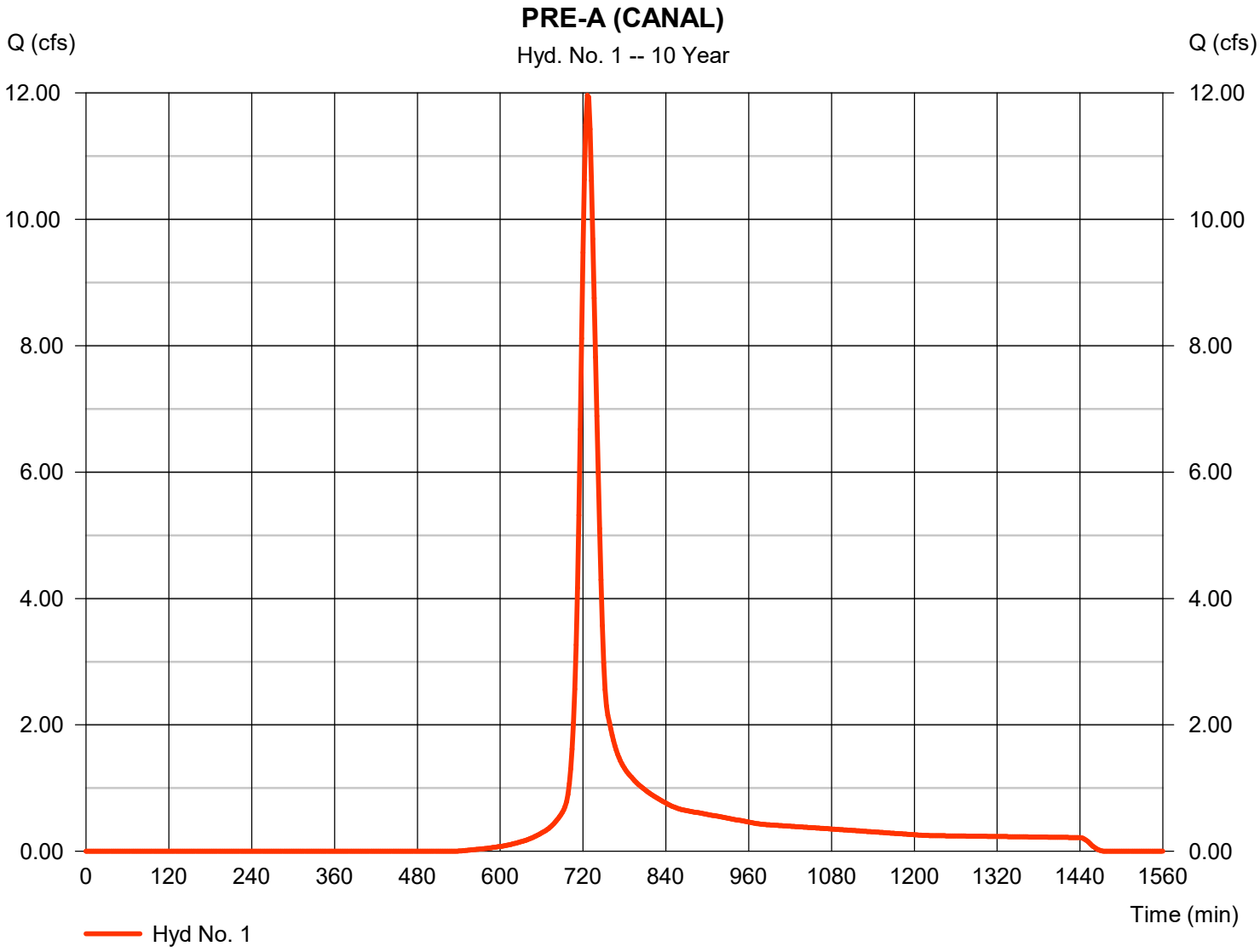
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 1

PRE-A (CANAL)

Hydrograph type	= SCS Runoff	Peak discharge	= 11.96 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 41,661 cuft
Drainage area	= 6.540 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 20.54 min
Total precip.	= 3.61 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(4.814 x 78) + (0.170 x 98) + (0.736 x 91) + (0.817 x 77)] / 6.540



Hydrograph Report

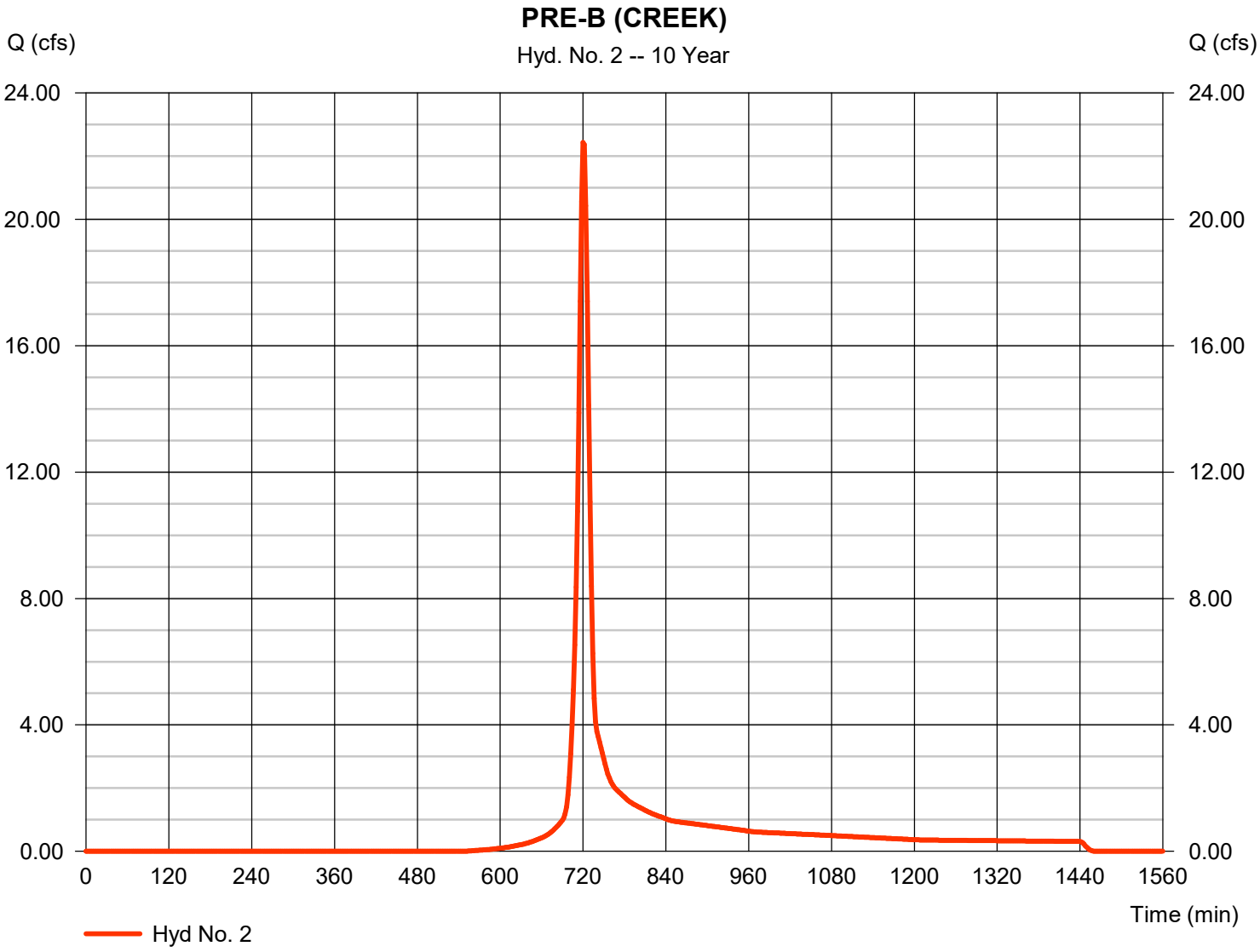
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 2

PRE-B (CREEK)

Hydrograph type	= SCS Runoff	Peak discharge	= 22.44 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 58,437 cuft
Drainage area	= 9.450 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.20 min
Total precip.	= 3.61 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(6.529 x 78) + (0.007 x 98) + (0.985 x 91) + (1.926 x 77)] / 9.450



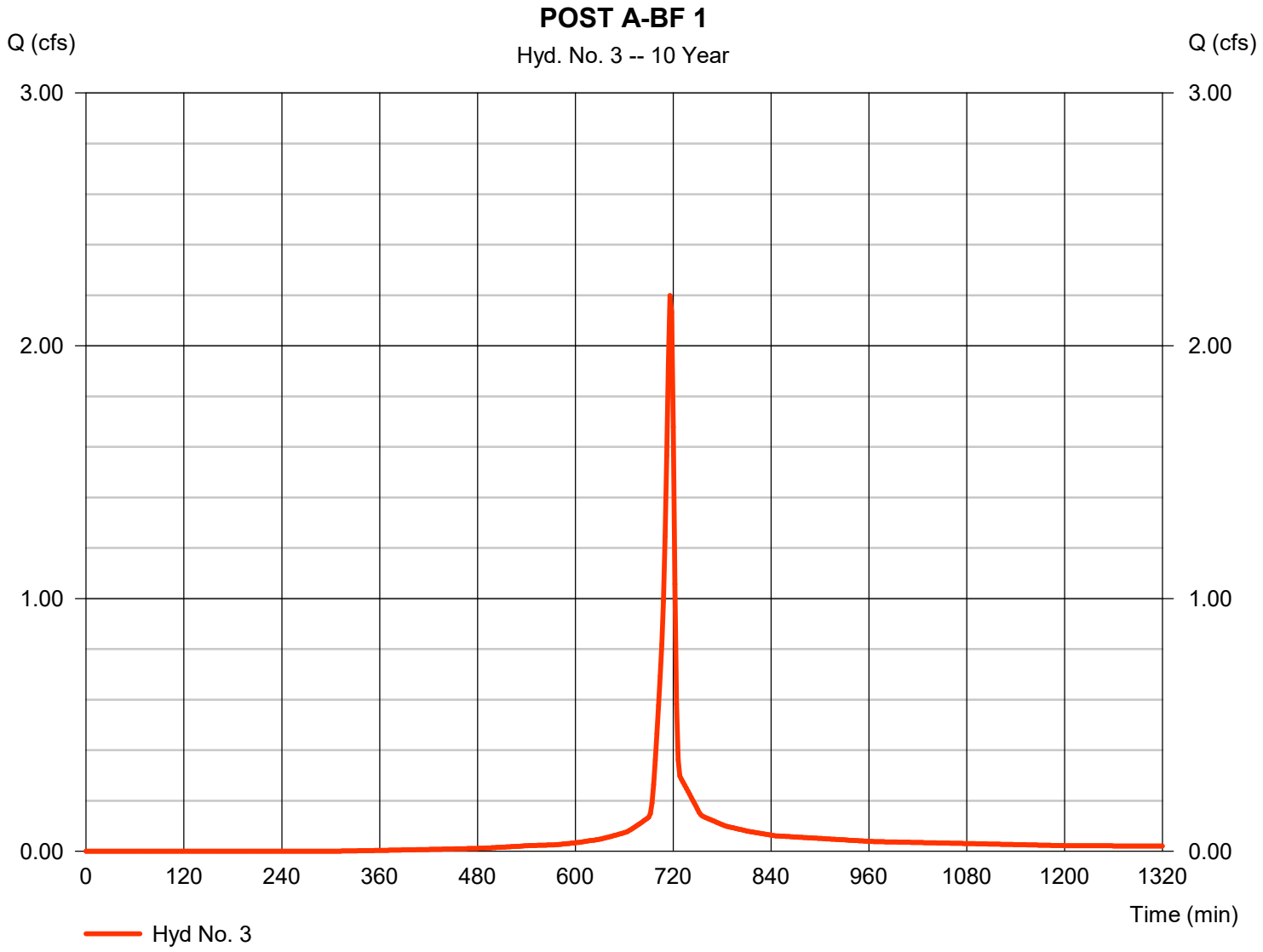
Hydrograph Report

Hyd. No. 3

POST A-BF 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.198 cfs
Storm frequency	=	10 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	4,601 cuft
Drainage area	=	0.530 ac	Curve number	=	90*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.61 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.240 x 80) + (0.180 x 98) + (0.110 x 98)] / 0.530



Hydrograph Report

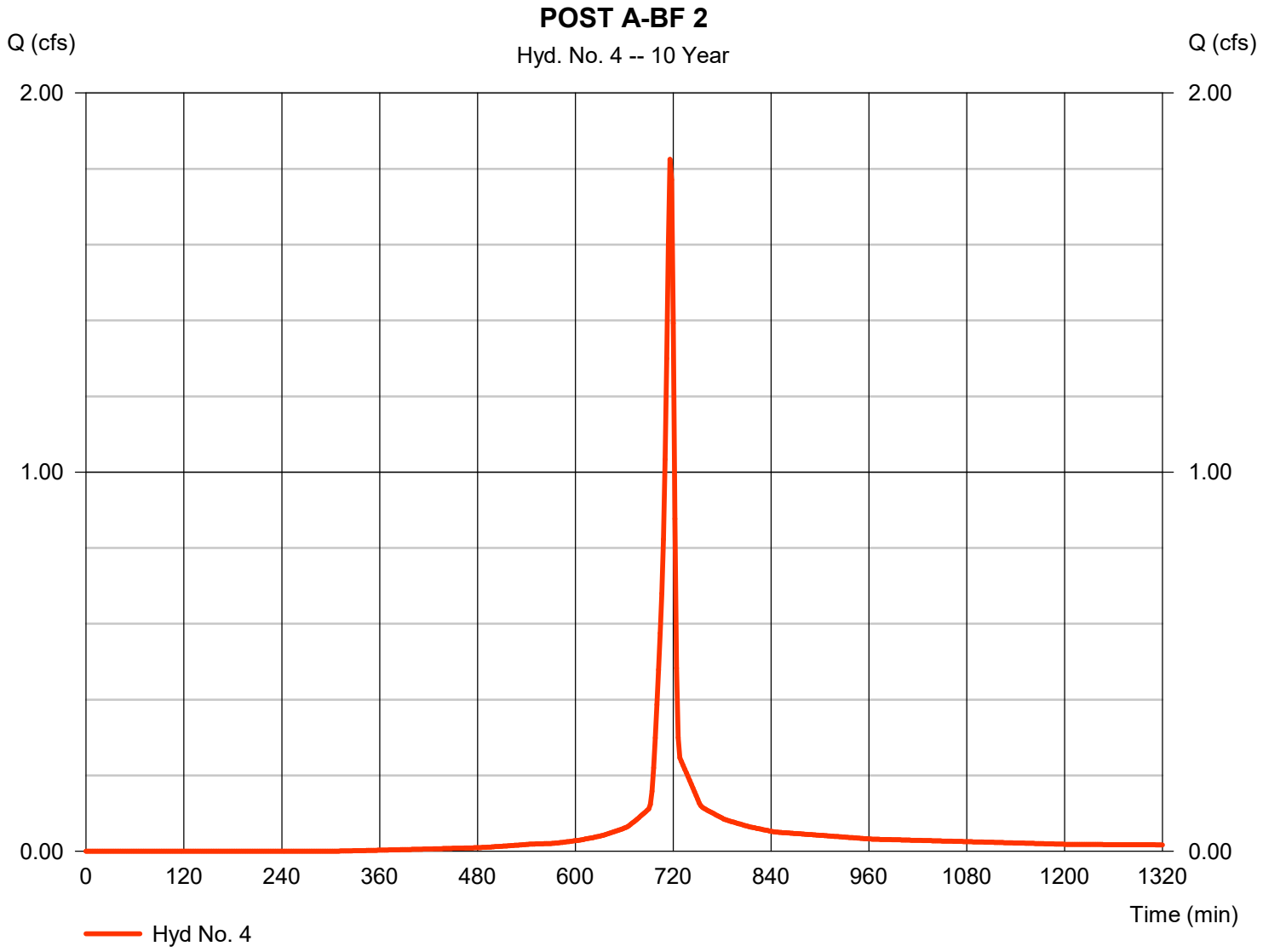
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 4

POST A-BF 2

Hydrograph type	= SCS Runoff	Peak discharge	= 1.825 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 3,820 cuft
Drainage area	= 0.440 ac	Curve number	= 90*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.61 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.200 x 80) + (0.120 x 98) + (0.120 x 98)] / 0.440



Hydrograph Report

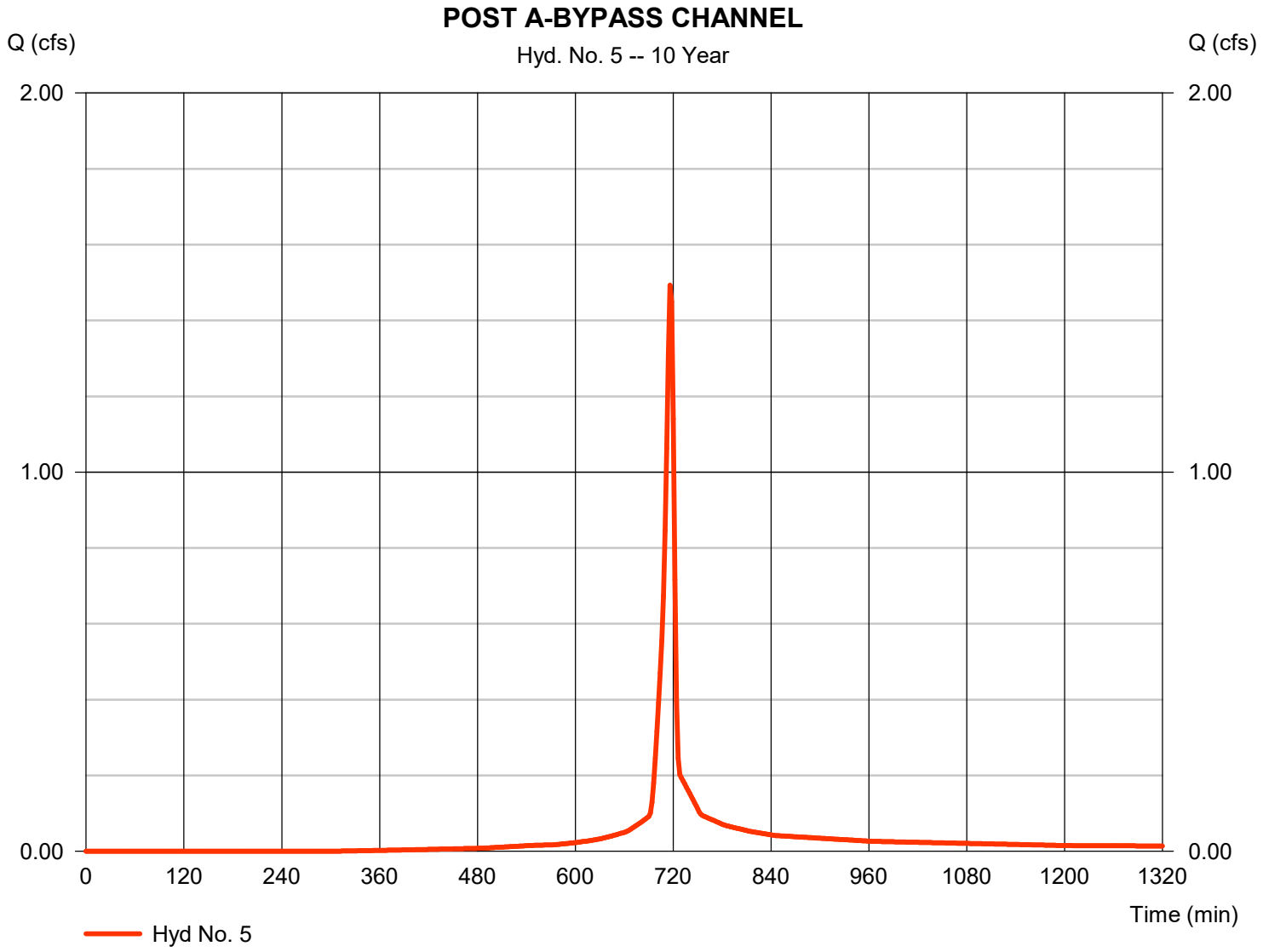
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 5

POST A-BYPASS CHANNEL

Hydrograph type	= SCS Runoff	Peak discharge	= 1.493 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 3,125 cuft
Drainage area	= 0.360 ac	Curve number	= 90*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.61 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.151 x 80) + (0.070 x 98) + (0.140 x 98)] / 0.360



Hydrograph Report

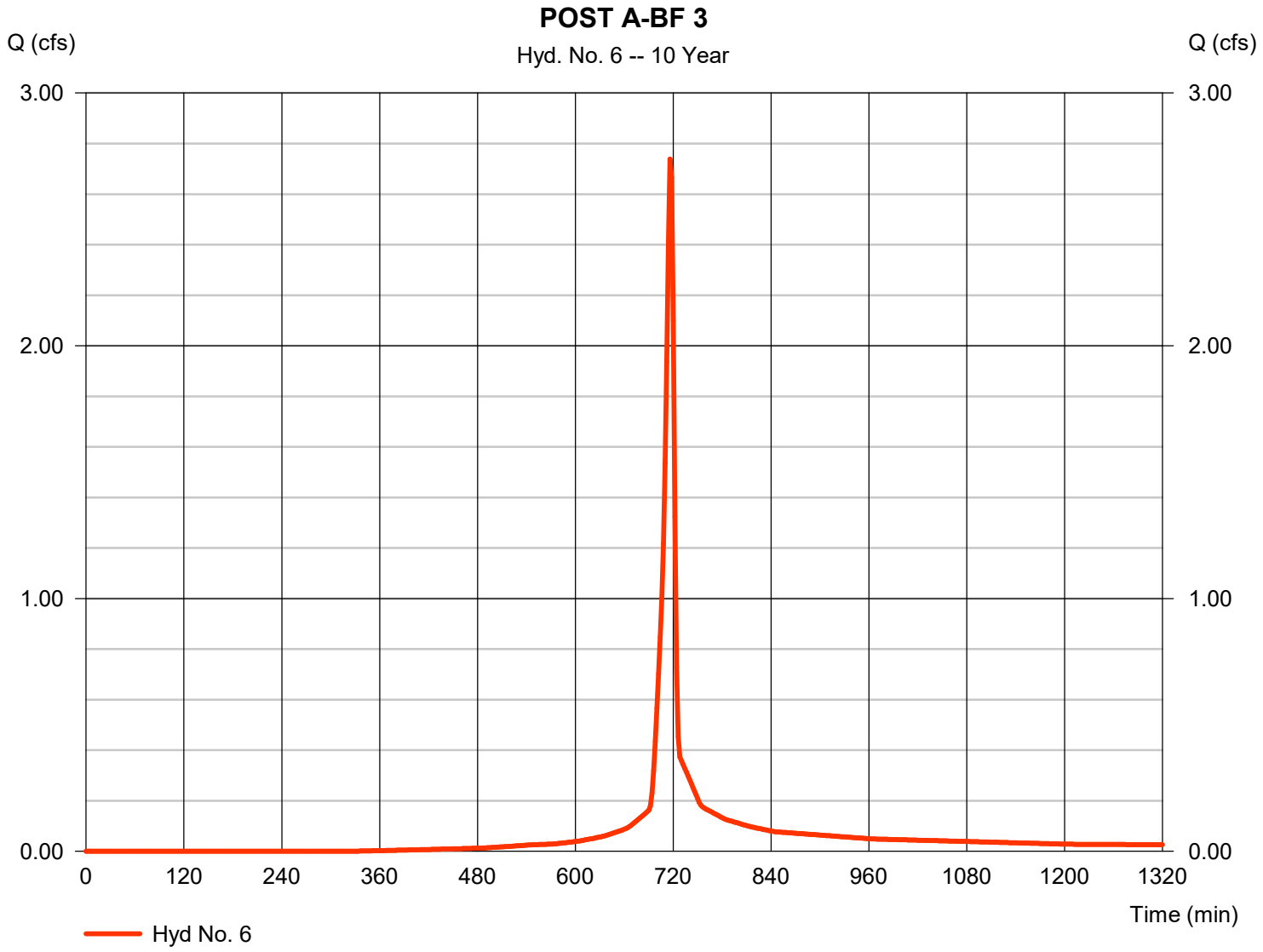
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 6

POST A-BF 3

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.739 cfs
Storm frequency	=	10 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	5,690 cuft
Drainage area	=	0.680 ac	Curve number	=	89*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.61 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.326 x 80) + (0.110 x 98) + (0.240 x 98)] / 0.680



Hydrograph Report

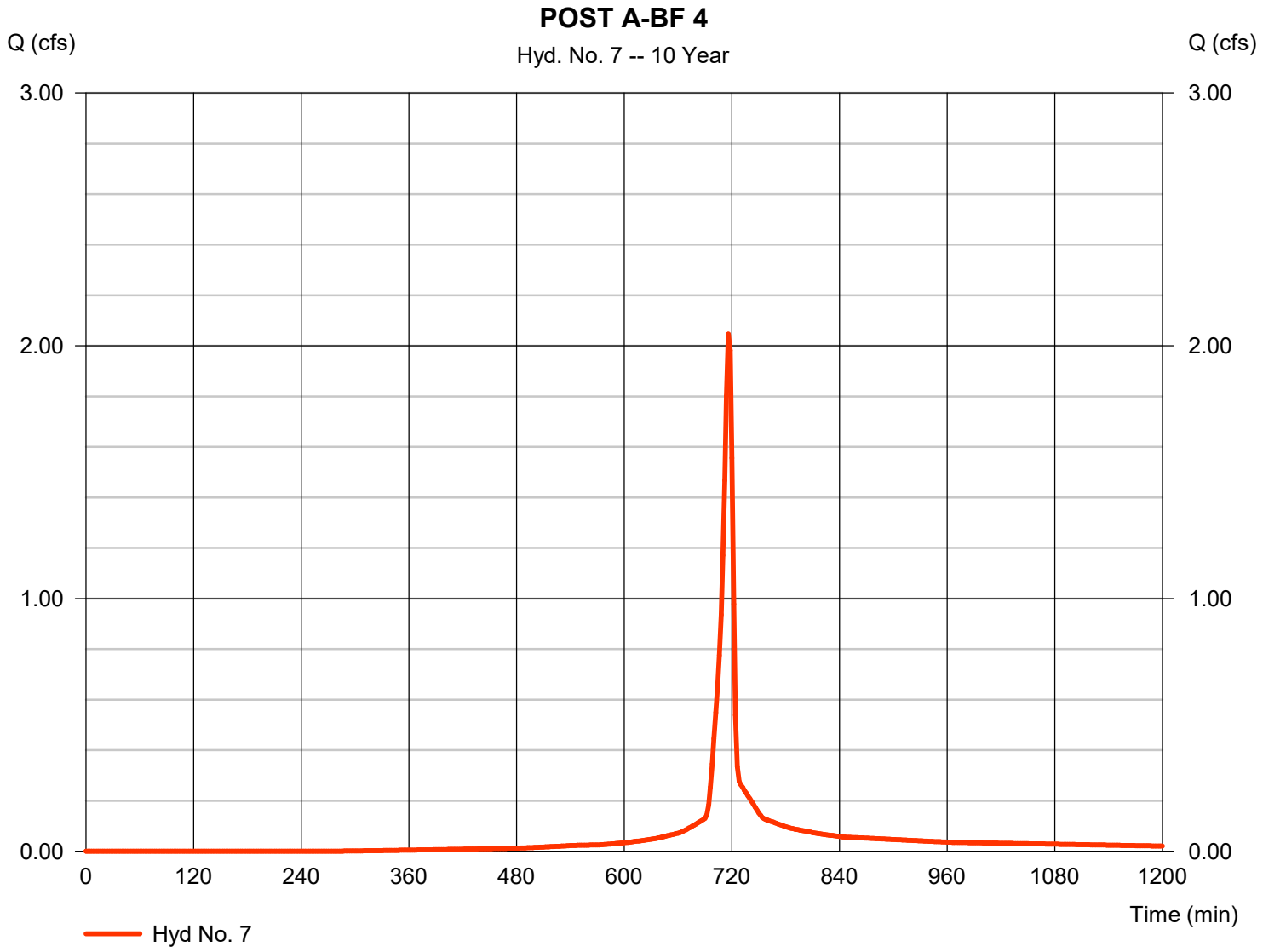
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 7

POST A-BF 4

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.047 cfs
Storm frequency	=	10 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	4,321 cuft
Drainage area	=	0.480 ac	Curve number	=	91*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.61 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.190 x 80) + (0.080 x 98) + (0.210 x 98)] / 0.480



Hydrograph Report

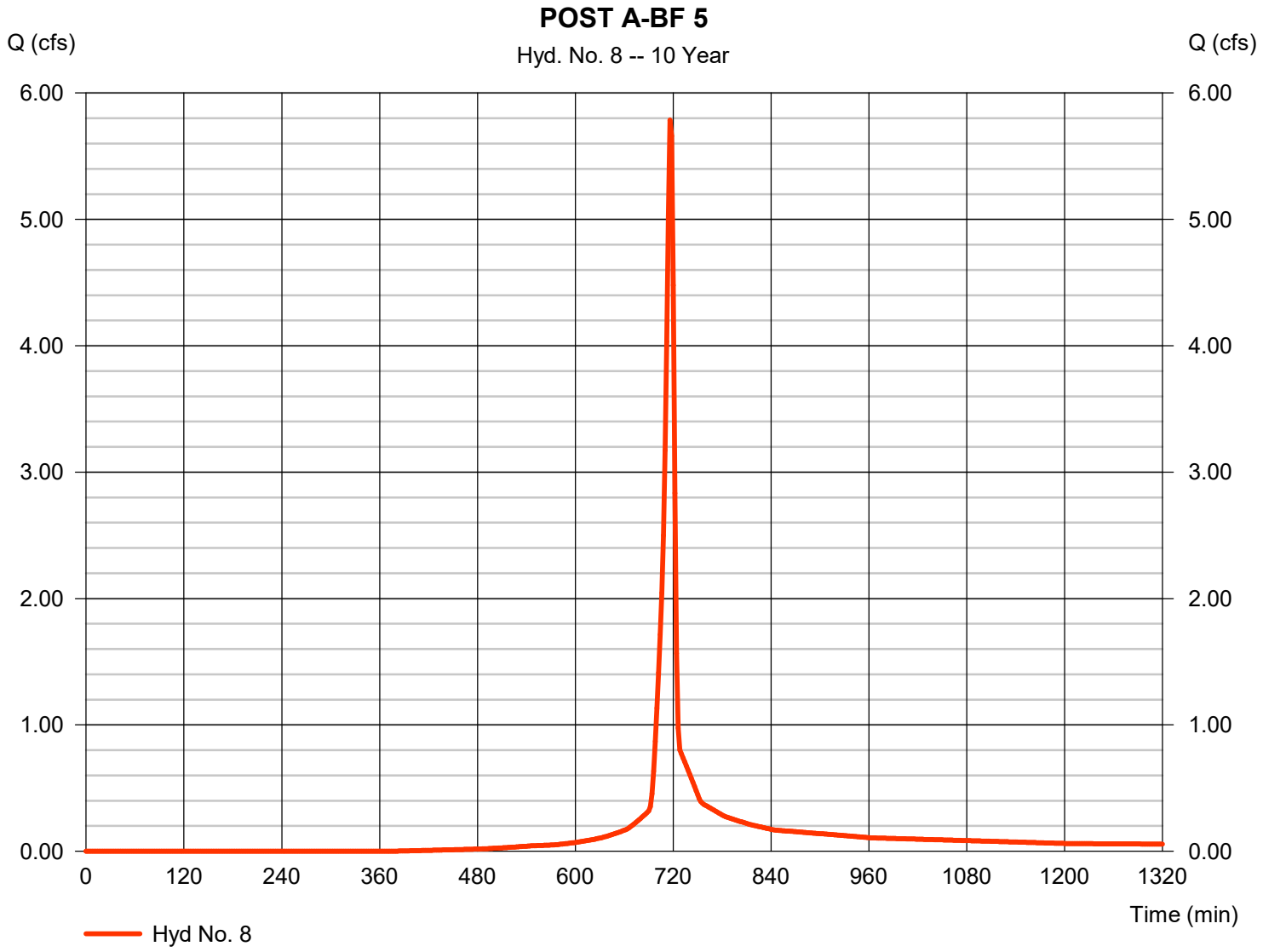
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 8

POST A-BF 5

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.786 cfs
Storm frequency	=	10 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	11,879 cuft
Drainage area	=	1.530 ac	Curve number	=	87*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.61 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.913 x 80) + (0.220 x 98) + (0.400 x 98)] / 1.530



Hydrograph Report

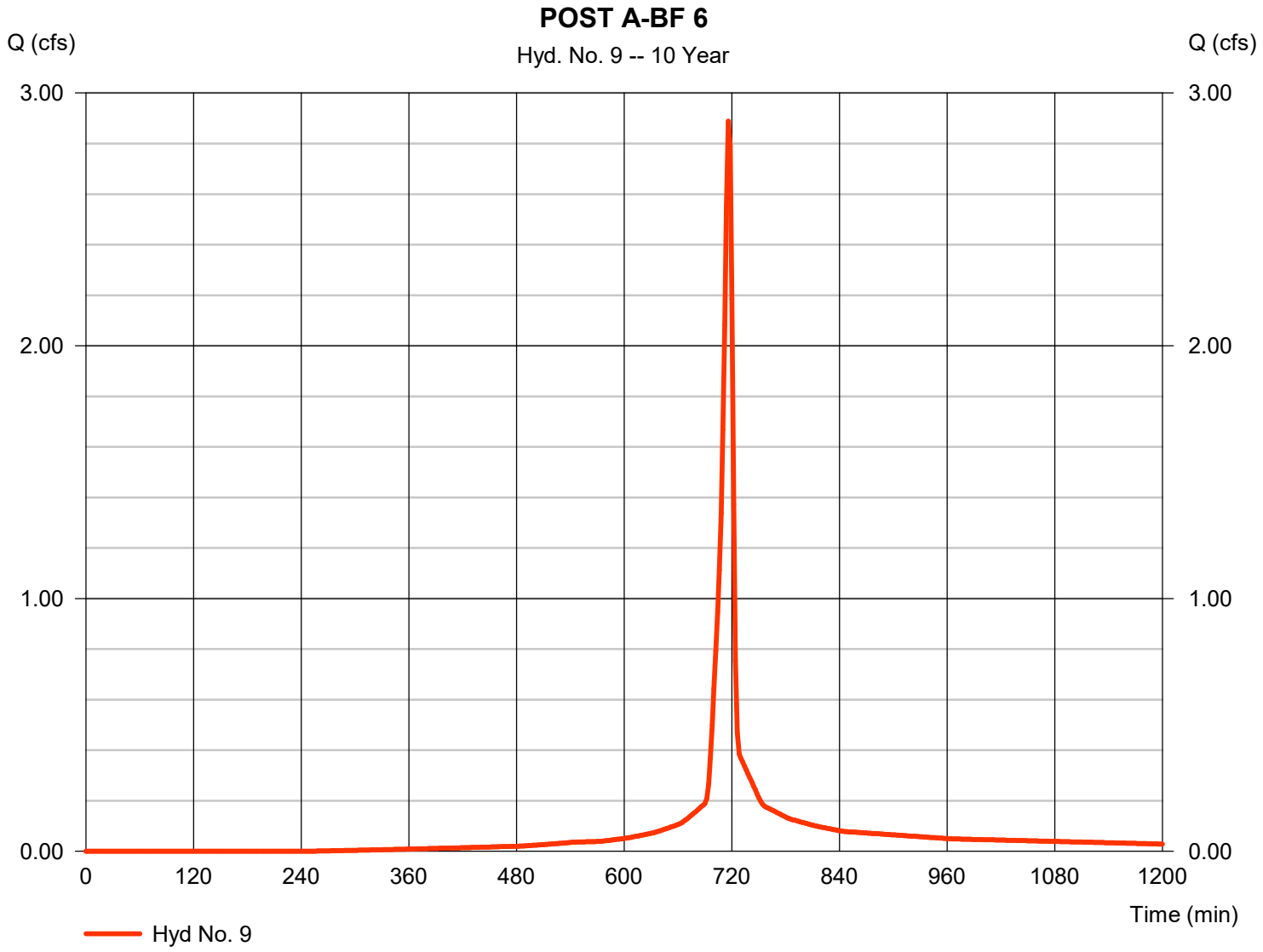
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 9

POST A-BF 6

Hydrograph type	= SCS Runoff	Peak discharge	= 2.889 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 6,159 cuft
Drainage area	= 0.660 ac	Curve number	= 92*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.61 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.230 x 80) + (0.210 x 98) + (0.220 x 98)] / 0.660



Hydrograph Report

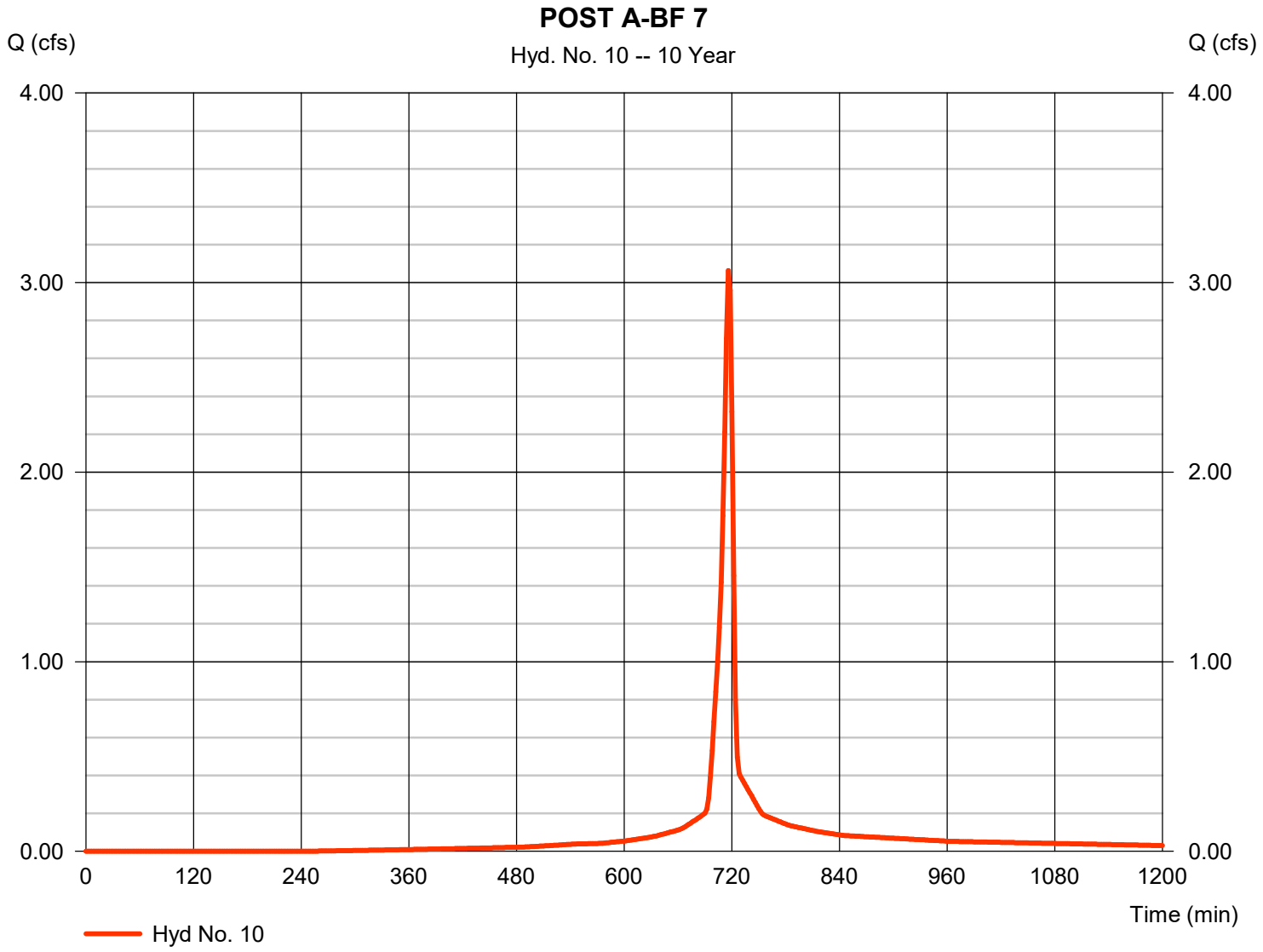
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 10

POST A-BF 7

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.064 cfs
Storm frequency	=	10 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	6,532 cuft
Drainage area	=	0.700 ac	Curve number	=	92*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.61 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.250 x 80) + (0.440 x 98) + (0.010 x 98)] / 0.700



Hydrograph Report

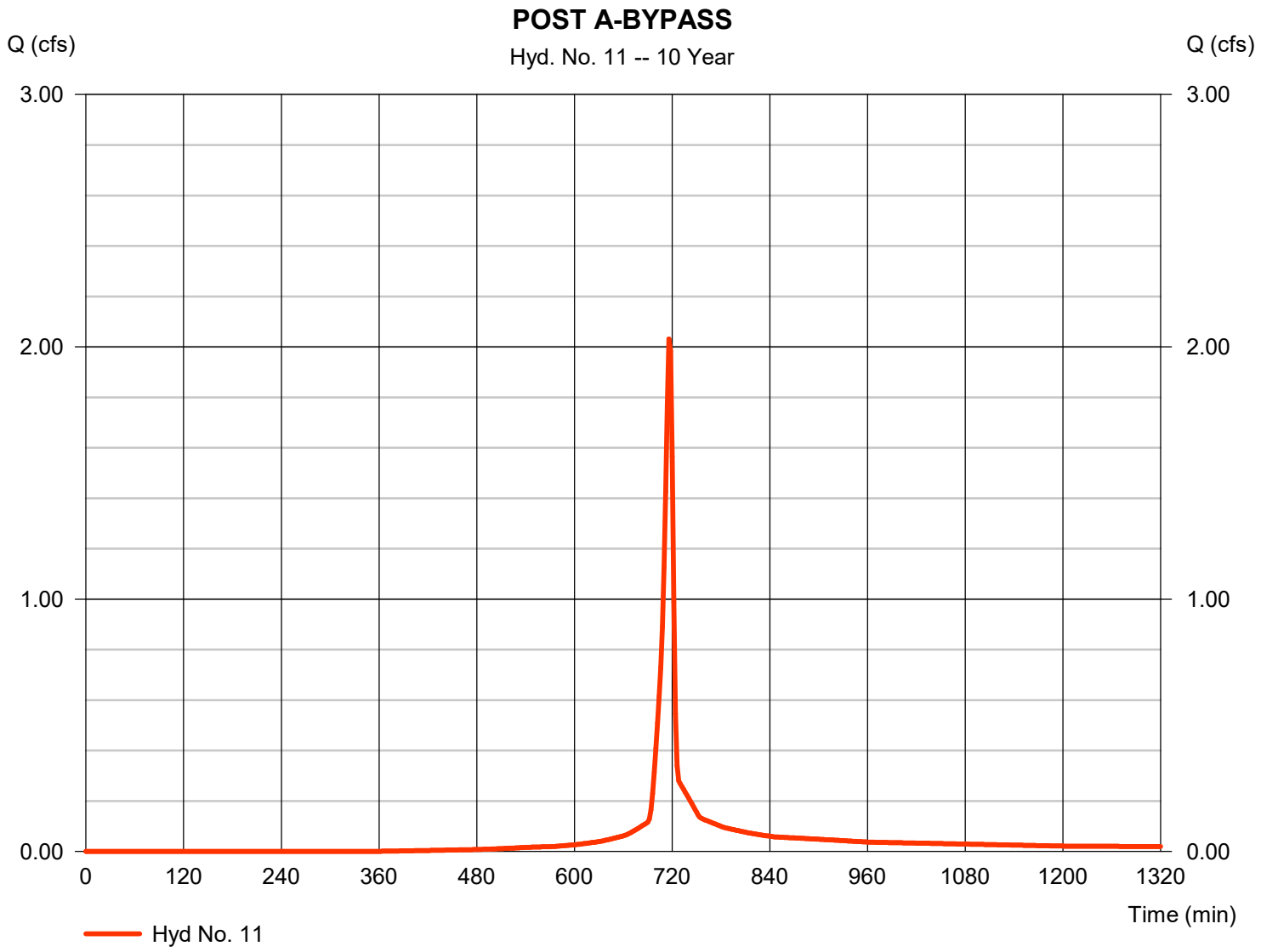
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 11

POST A-BYPASS

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.031 cfs
Storm frequency	=	10 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	4,193 cuft
Drainage area	=	0.520 ac	Curve number	=	88*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.61 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.300 x 80) + (0.220 x 98)] / 0.520



Hydrograph Report

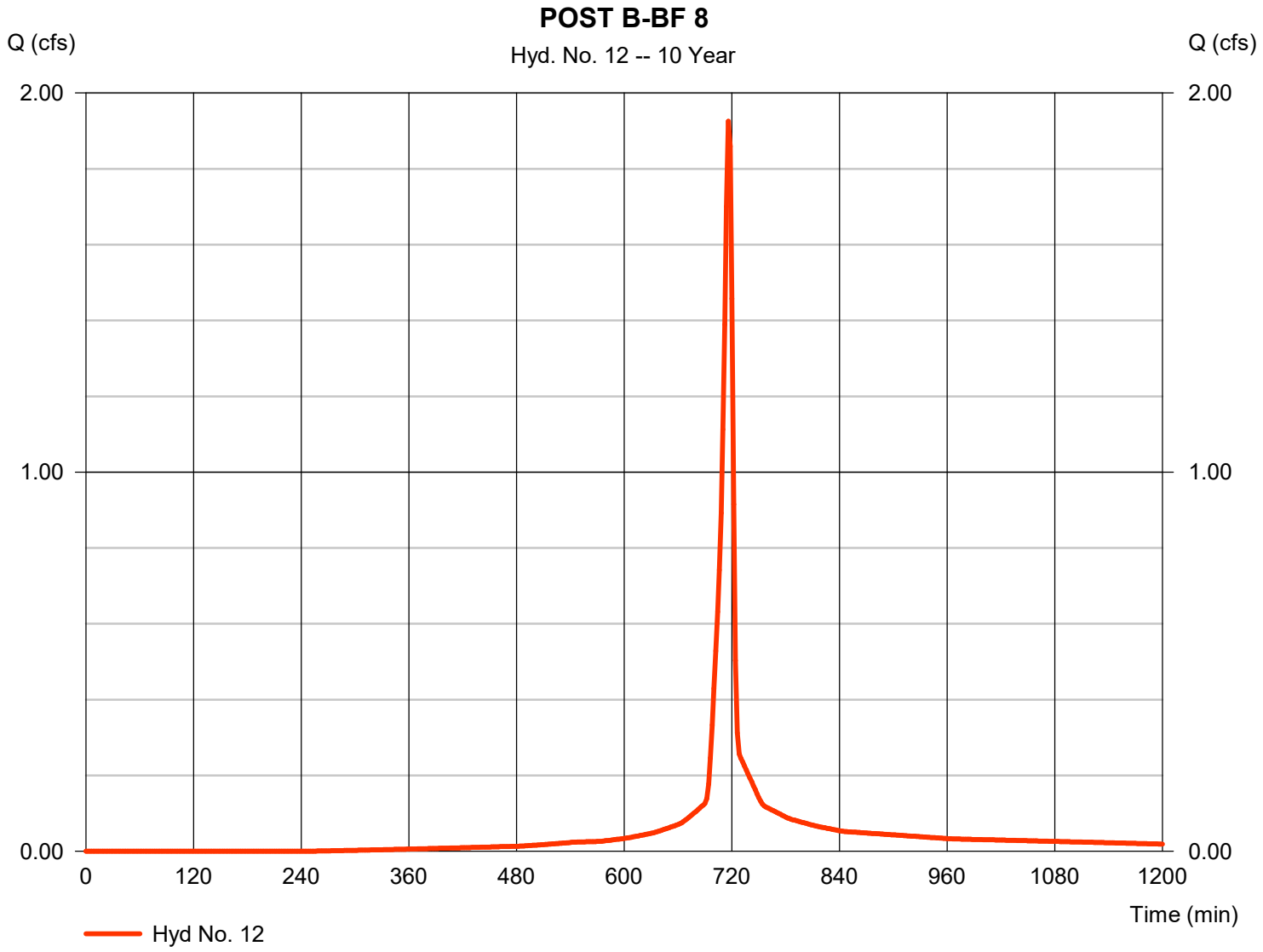
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 12

POST B-BF 8

Hydrograph type	= SCS Runoff	Peak discharge	= 1.926 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 4,106 cuft
Drainage area	= 0.440 ac	Curve number	= 92*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.61 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.140 x 80) + (0.300 x 98)] / 0.440



Hydrograph Report

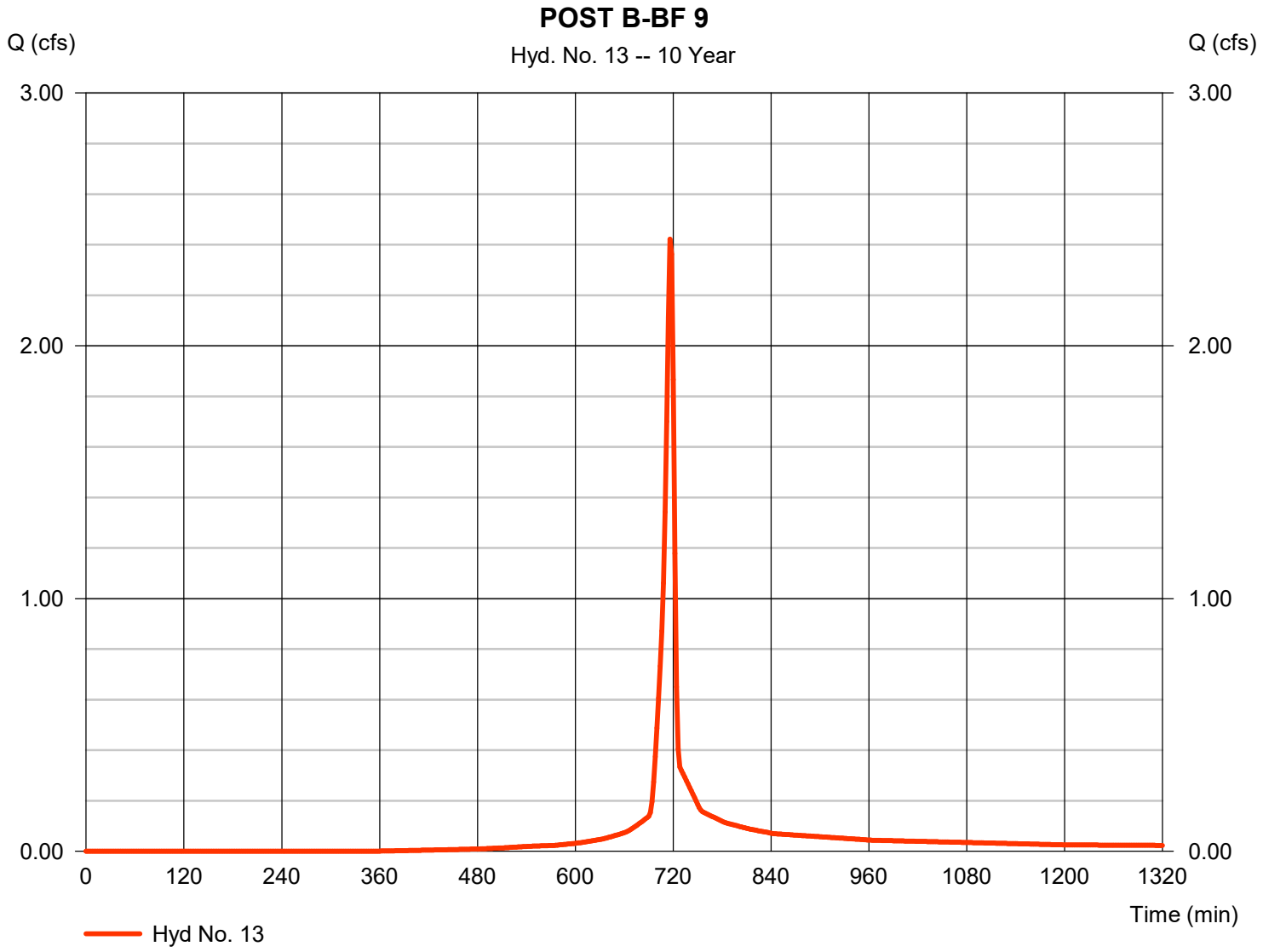
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 13

POST B-BF 9

Hydrograph type	= SCS Runoff	Peak discharge	= 2.421 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 4,999 cuft
Drainage area	= 0.620 ac	Curve number	= 88*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.61 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.330 x 80) + (0.290 x 98)] / 0.620



Hydrograph Report

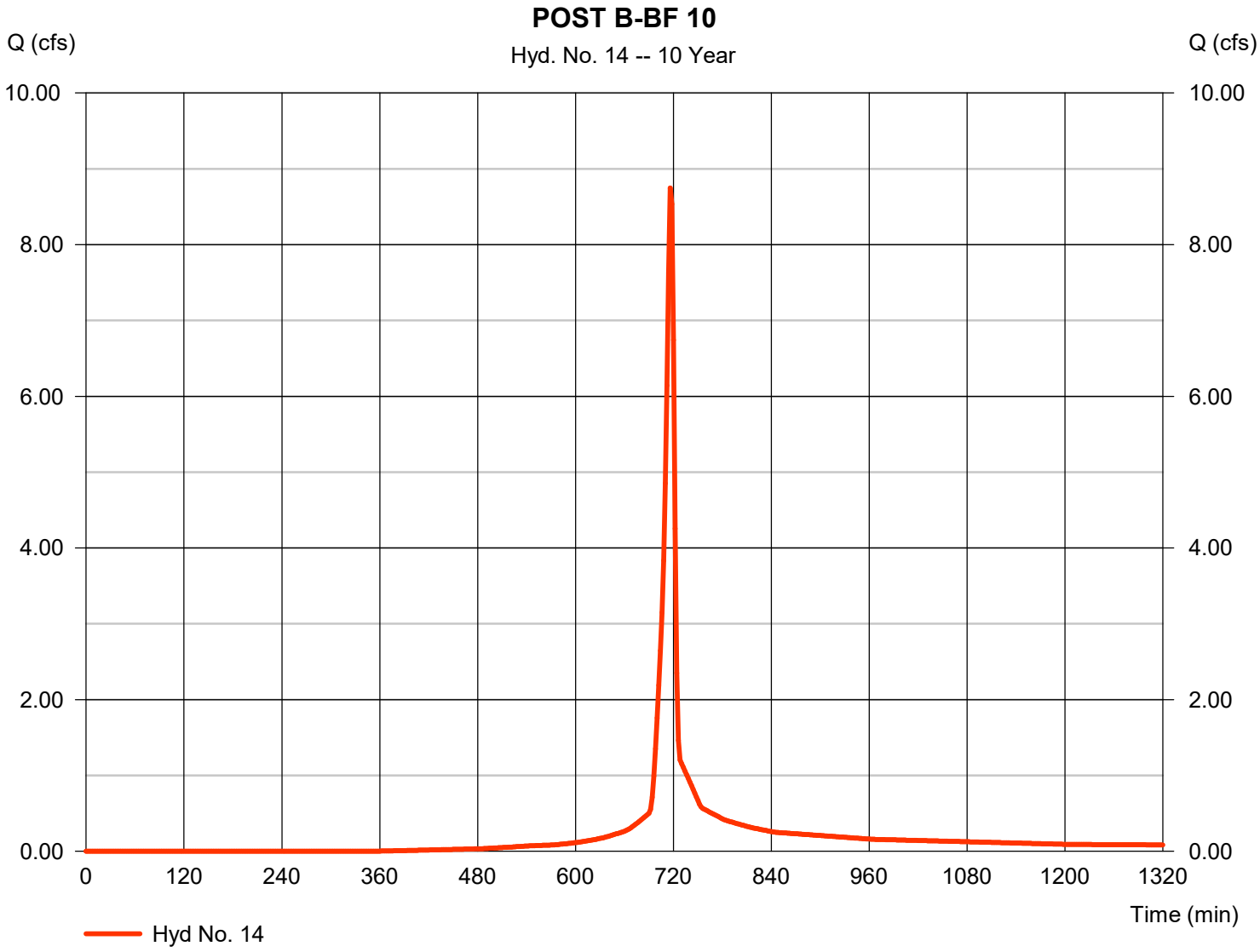
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 14

POST B-BF 10

Hydrograph type	= SCS Runoff	Peak discharge	= 8.748 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 18,060 cuft
Drainage area	= 2.240 ac	Curve number	= 88*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.61 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(1.240 x 80) + (0.500 x 98) + (0.500 x 98)] / 2.240



Hydrograph Report

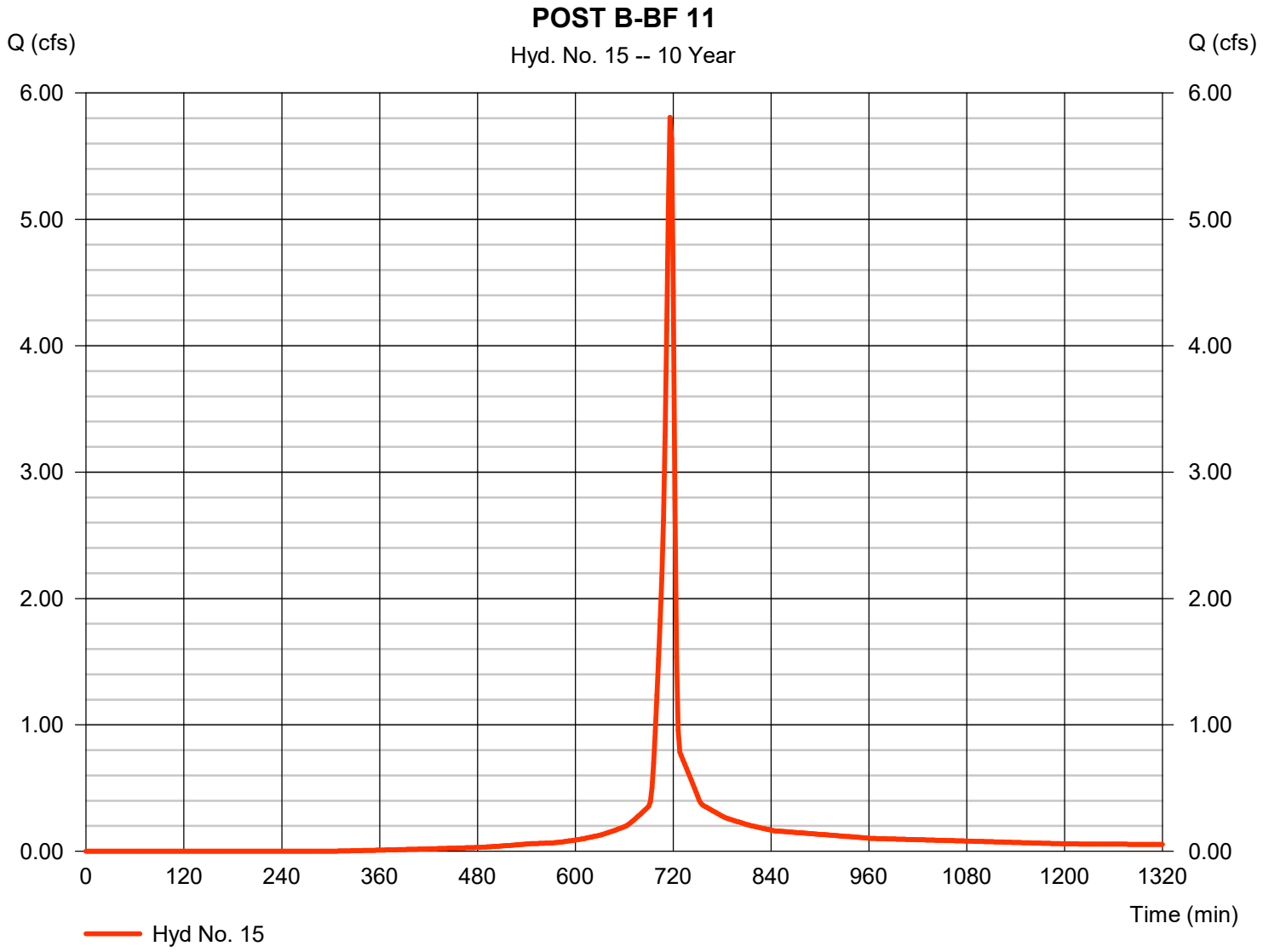
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 15

POST B-BF 11

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.807 cfs
Storm frequency	=	10 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	12,154 cuft
Drainage area	=	1.400 ac	Curve number	=	90*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.61 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.630 x 80) + (0.240 x 98) + (0.530 x 98)] / 1.400



Hydrograph Report

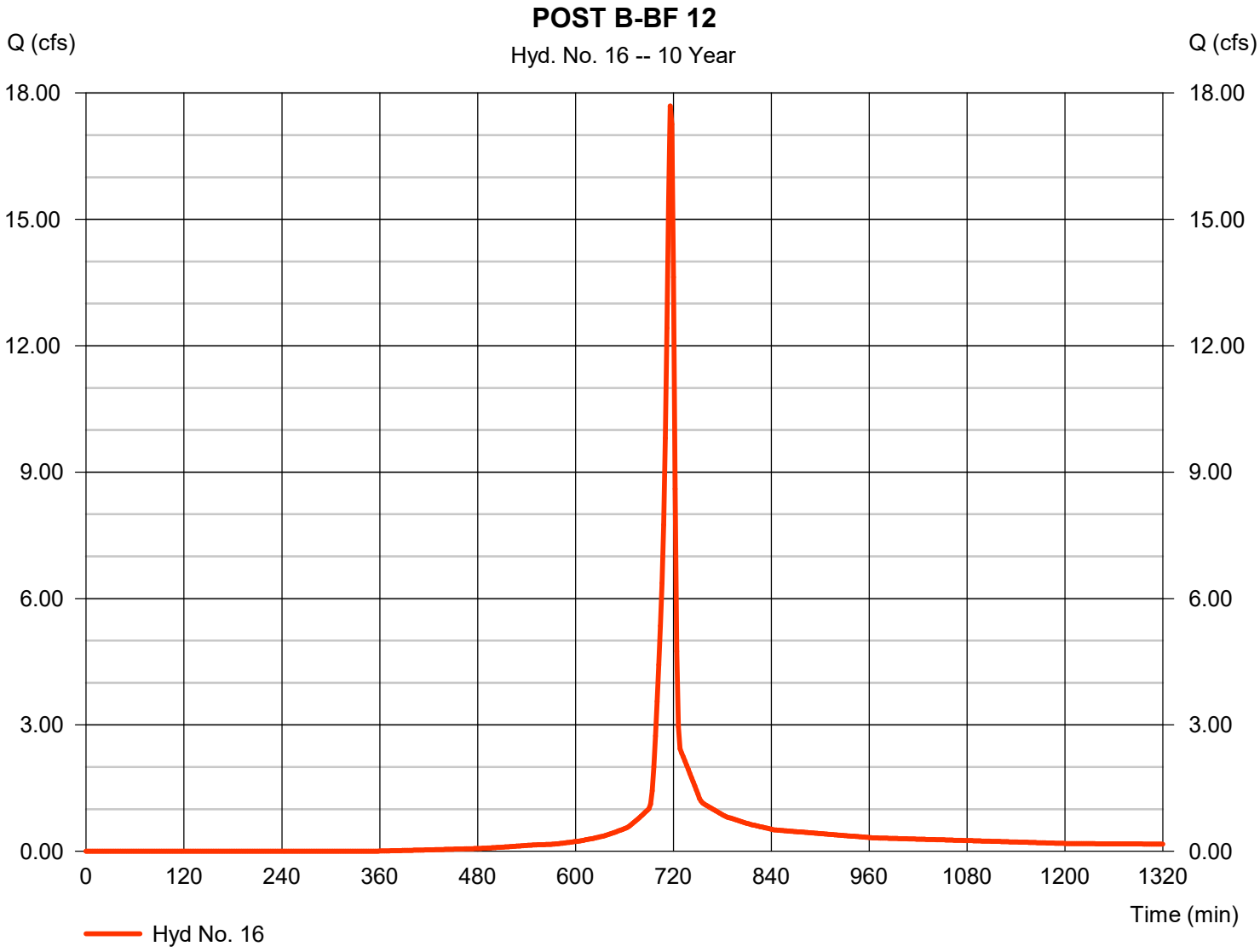
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 16

POST B-BF 12

Hydrograph type	=	SCS Runoff	Peak discharge	=	17.69 cfs
Storm frequency	=	10 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	36,524 cuft
Drainage area	=	4.530 ac	Curve number	=	88*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.61 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.960 x 80) + (0.850 x 98) + (1.200 x 98) + (0.520 x 77)] / 4.530



Hydrograph Report

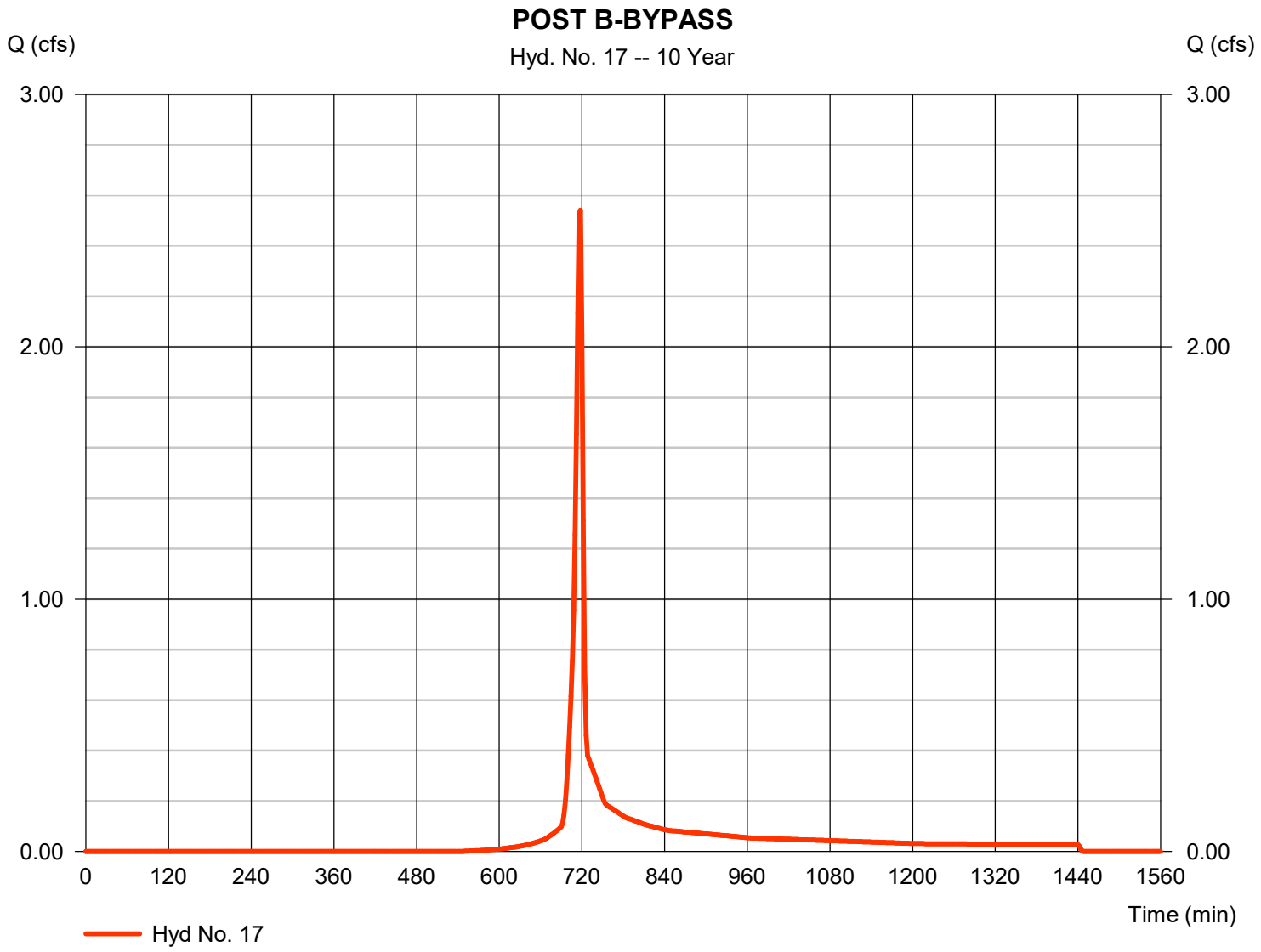
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 17

POST B-BYPASS

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.540 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	5,116 cuft
Drainage area	=	0.910 ac	Curve number	=	79*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.61 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.160 x 80) + (0.140 x 80) + (0.020 x 98) + (0.010 x 91) + (0.580 x 77)] / 0.910



Hydrograph Report

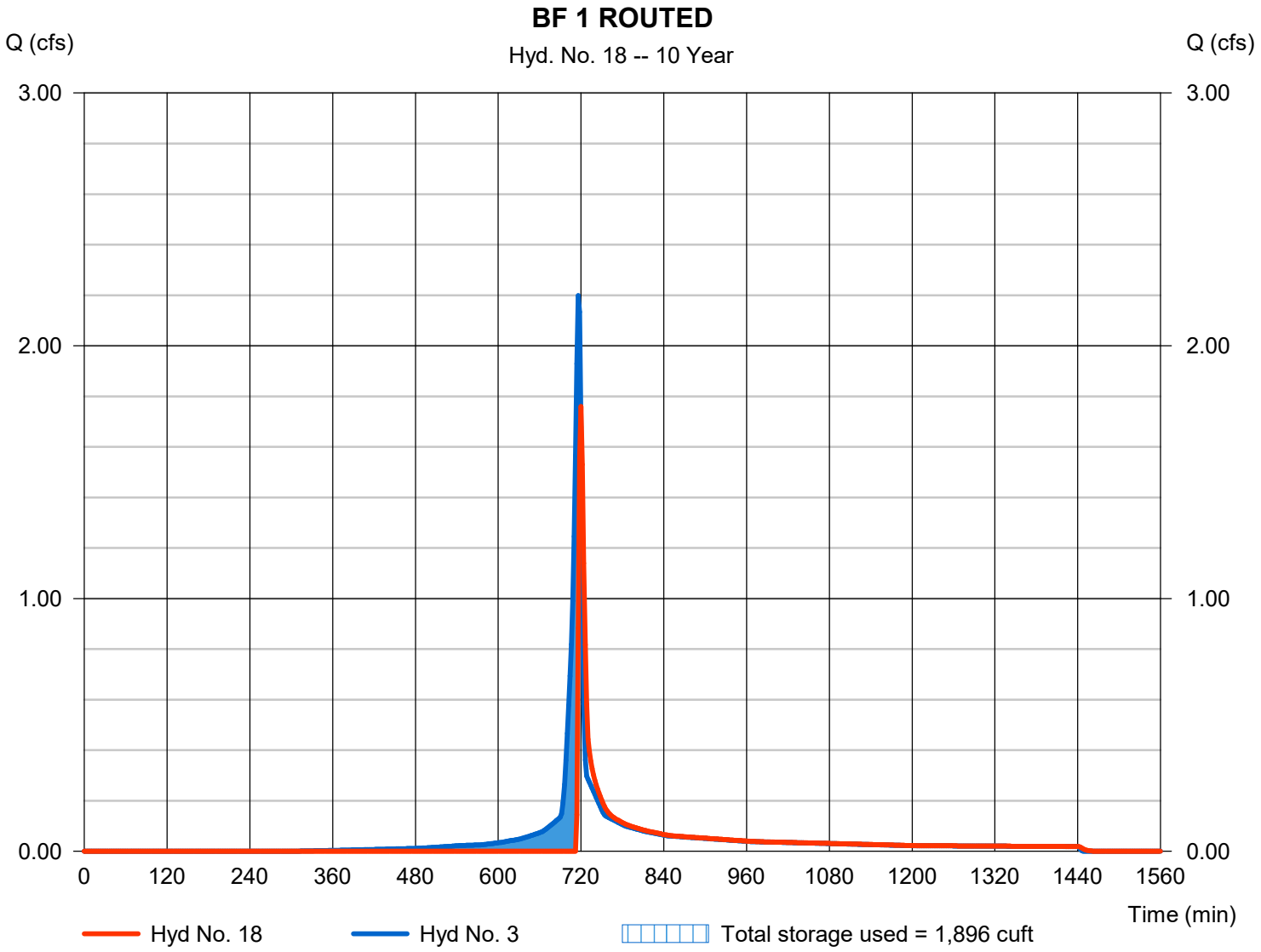
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 18

BF 1 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	1.760 cfs
Storm frequency	=	10 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	3,084 cuft
Inflow hyd. No.	=	3 - POST A-BF 1	Max. Elevation	=	449.17 ft
Reservoir name	=	BIORETENTION FILTER 1	Max. Storage	=	1,896 cuft

Storage Indication method used.



Hydrograph Report

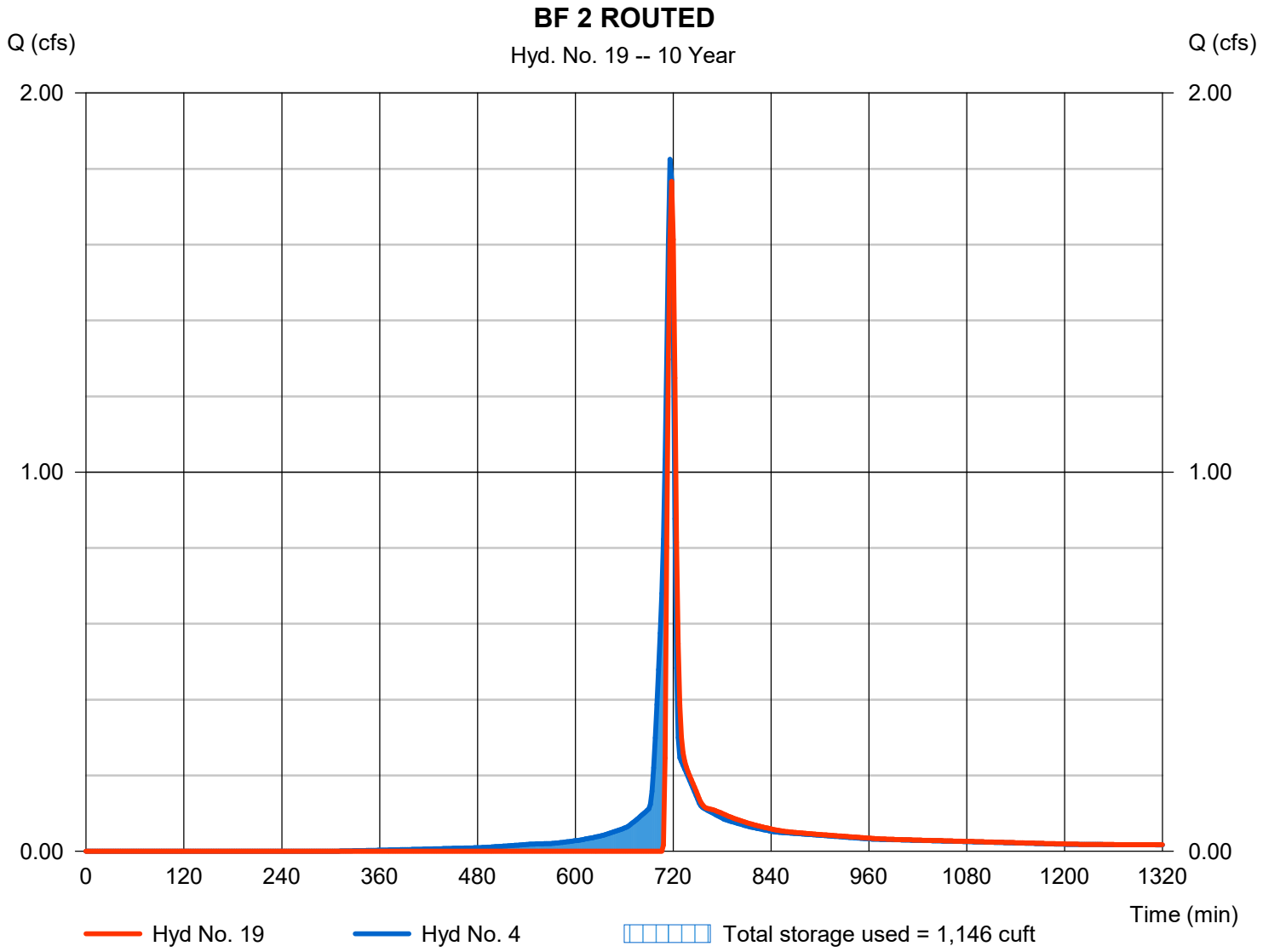
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 19

BF 2 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	1.767 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	2,951 cuft
Inflow hyd. No.	=	4 - POST A-BF 2	Max. Elevation	=	449.20 ft
Reservoir name	=	BIORETENTION FILTER 2	Max. Storage	=	1,146 cuft

Storage Indication method used.



Hydrograph Report

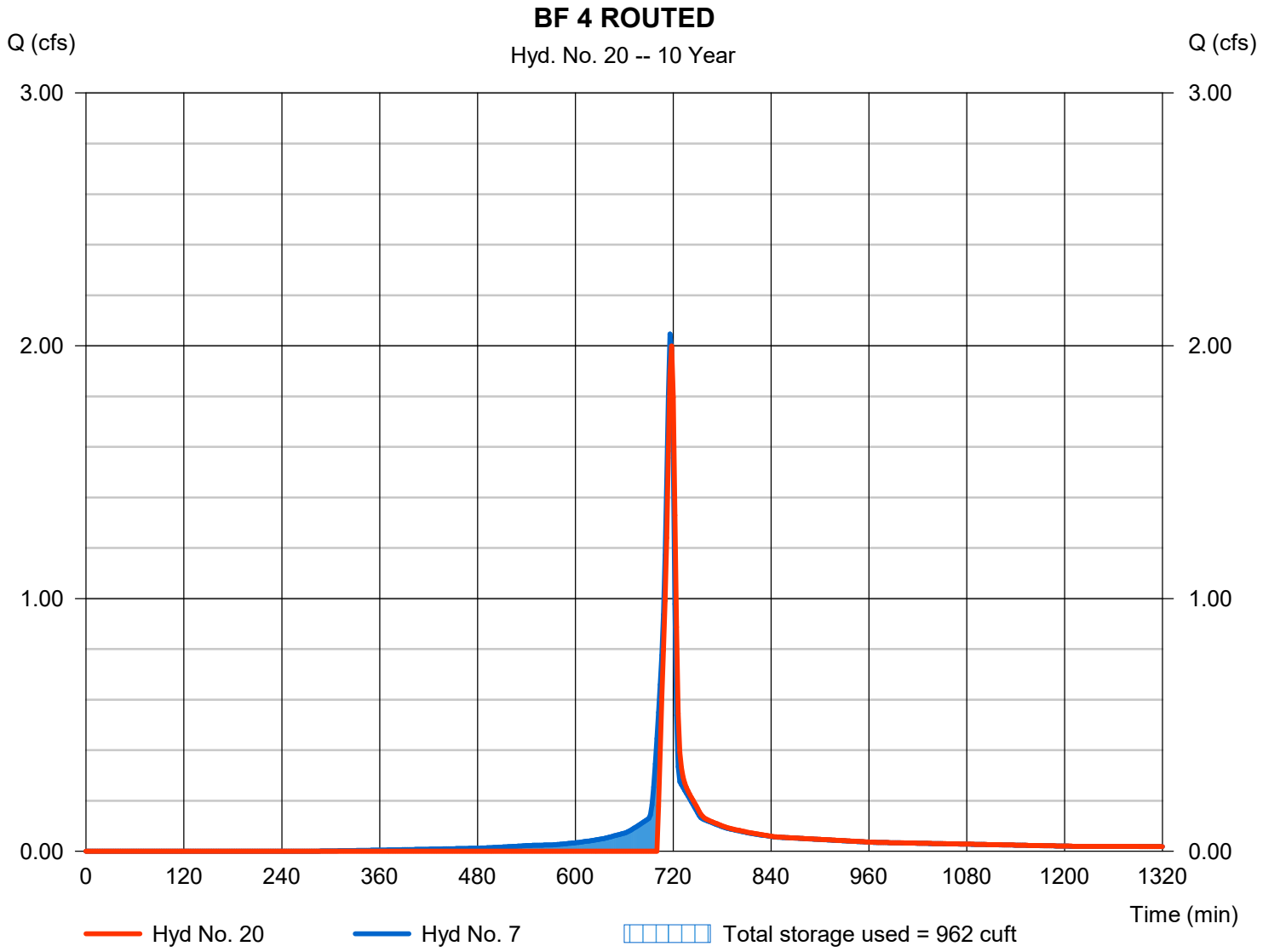
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 20

BF 4 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	1.999 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	3,576 cuft
Inflow hyd. No.	=	7 - POST A-BF 4	Max. Elevation	=	449.68 ft
Reservoir name	=	BIORETENTION FILTER 4	Max. Storage	=	962 cuft

Storage Indication method used.



Hydrograph Report

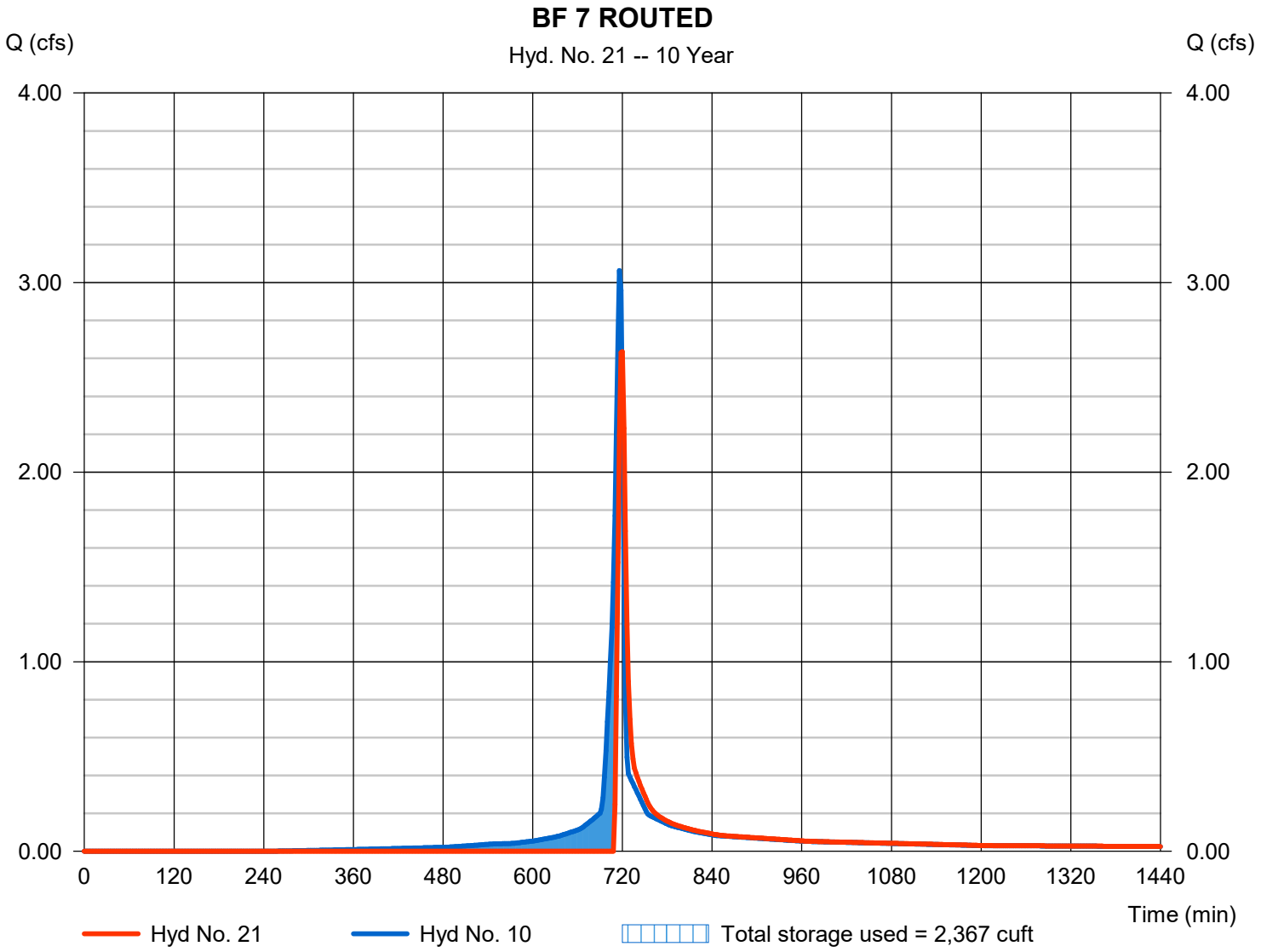
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 21

BF 7 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	2.635 cfs
Storm frequency	=	10 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	4,799 cuft
Inflow hyd. No.	=	10 - POST A-BF 7	Max. Elevation	=	449.66 ft
Reservoir name	=	BIORETENTION FILTER 7	Max. Storage	=	2,367 cuft

Storage Indication method used.



Hydrograph Report

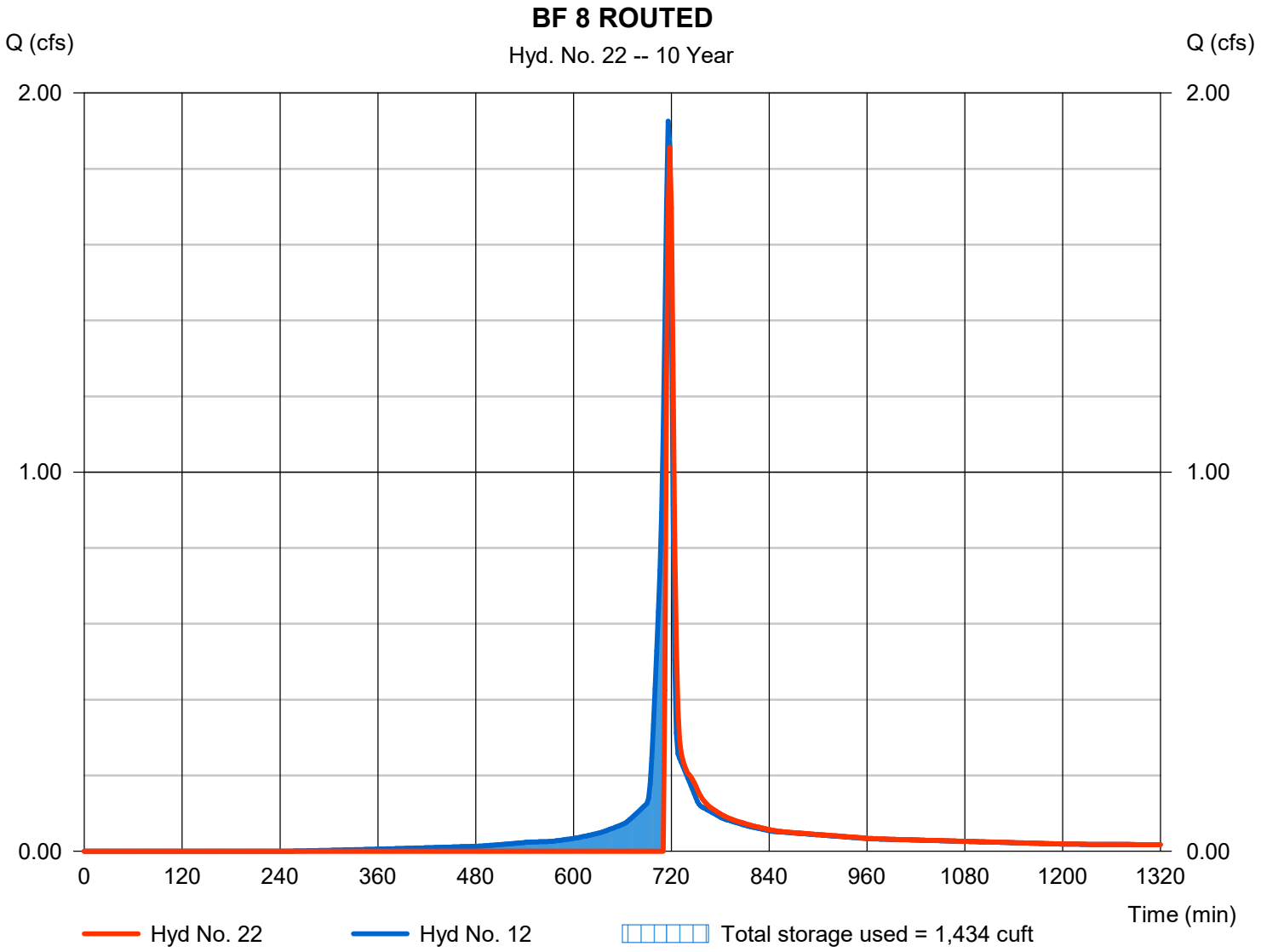
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 22

BF 8 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	1.856 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	2,926 cuft
Inflow hyd. No.	=	12 - POST B-BF 8	Max. Elevation	=	449.20 ft
Reservoir name	=	BIORETENTION FILTER 8	Max. Storage	=	1,434 cuft

Storage Indication method used.



Hydrograph Report

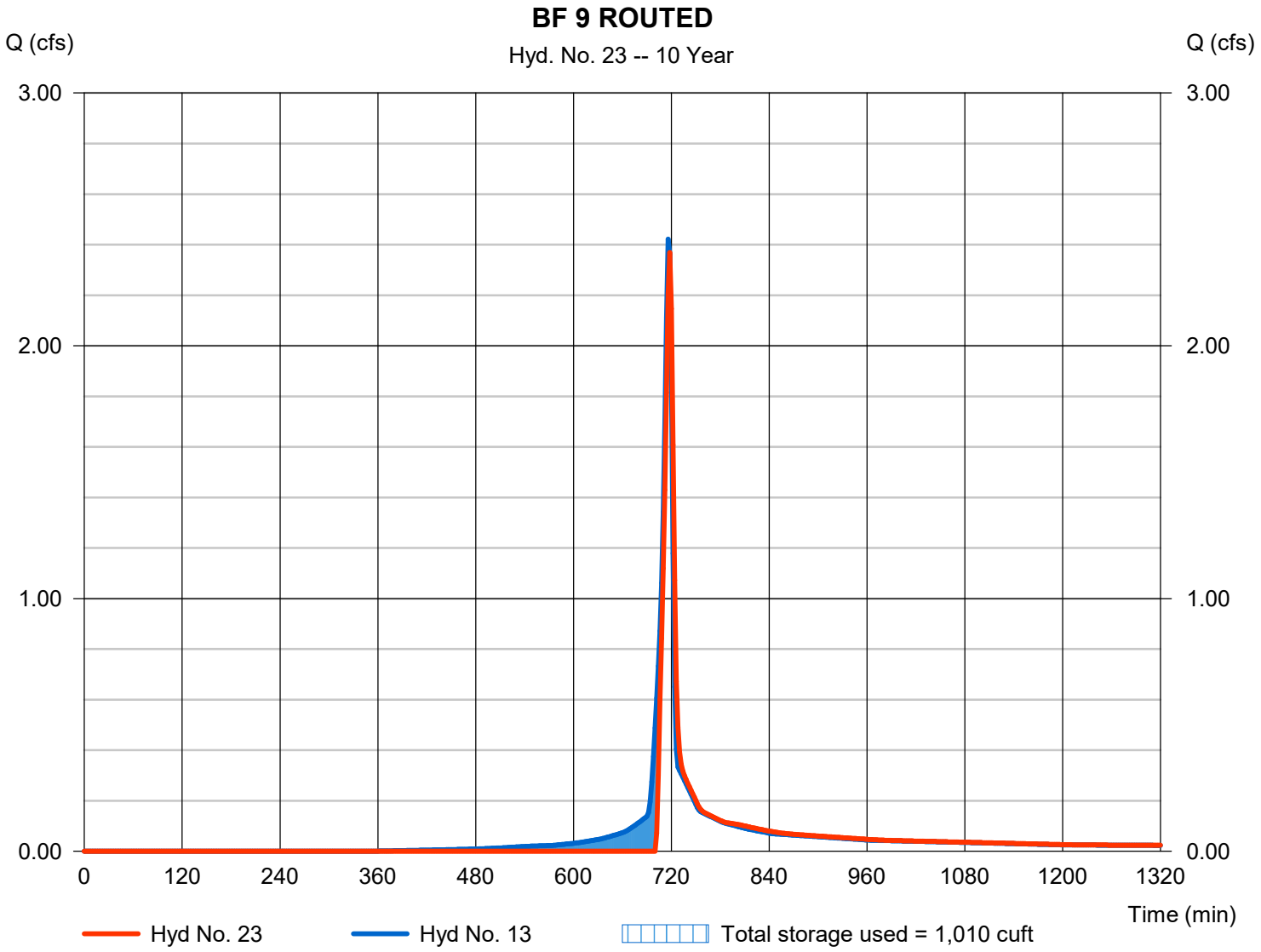
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 23

BF 9 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	2.369 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	4,307 cuft
Inflow hyd. No.	=	13 - POST B-BF 9	Max. Elevation	=	449.18 ft
Reservoir name	=	BIORETENTION FILTER 9	Max. Storage	=	1,010 cuft

Storage Indication method used.



Hydrograph Report

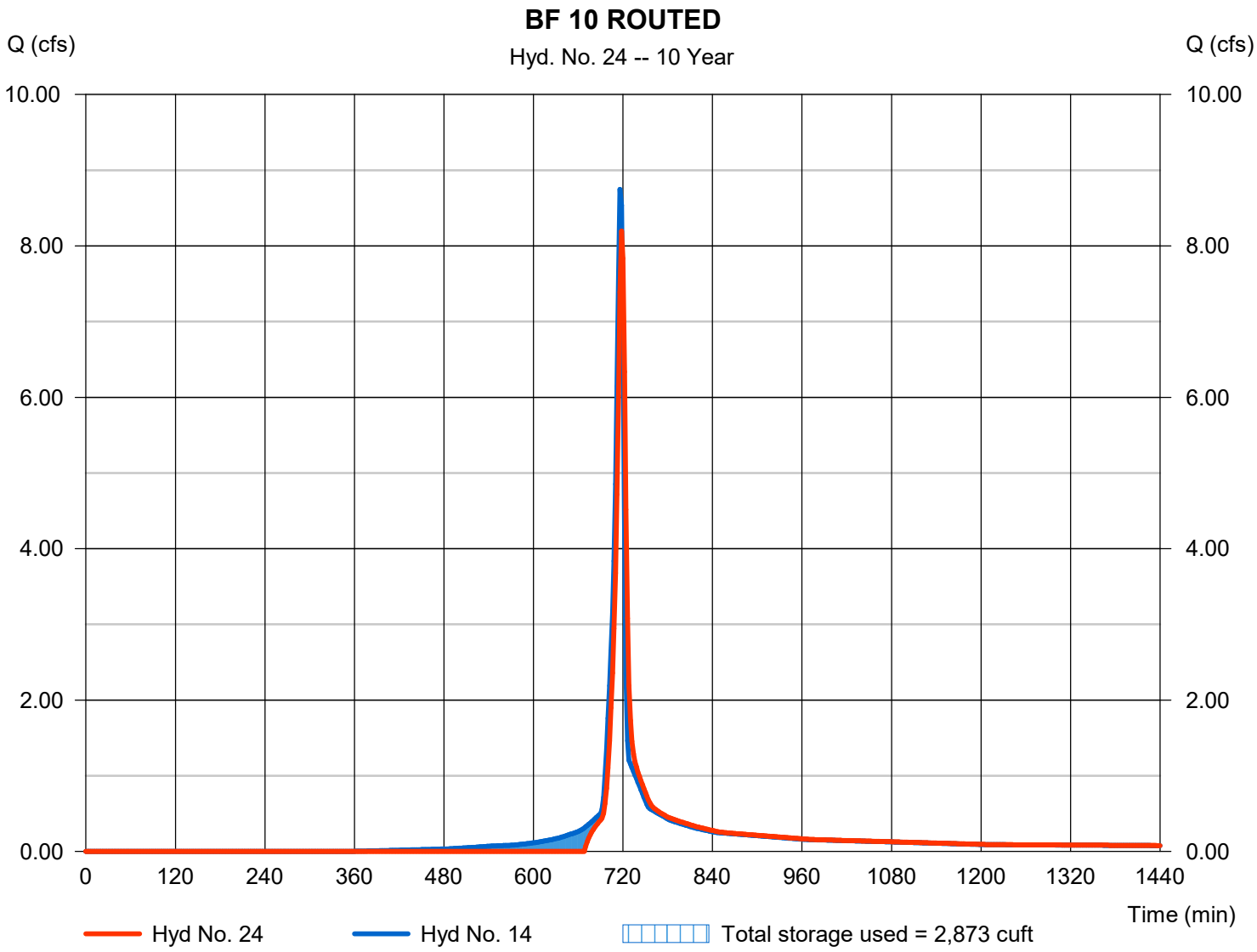
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 24

BF 10 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	8.199 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	16,679 cuft
Inflow hyd. No.	=	14 - POST B-BF 10	Max. Elevation	=	449.45 ft
Reservoir name	=	BIORETENTION FILTER 10	Max. Storage	=	2,873 cuft

Storage Indication method used.



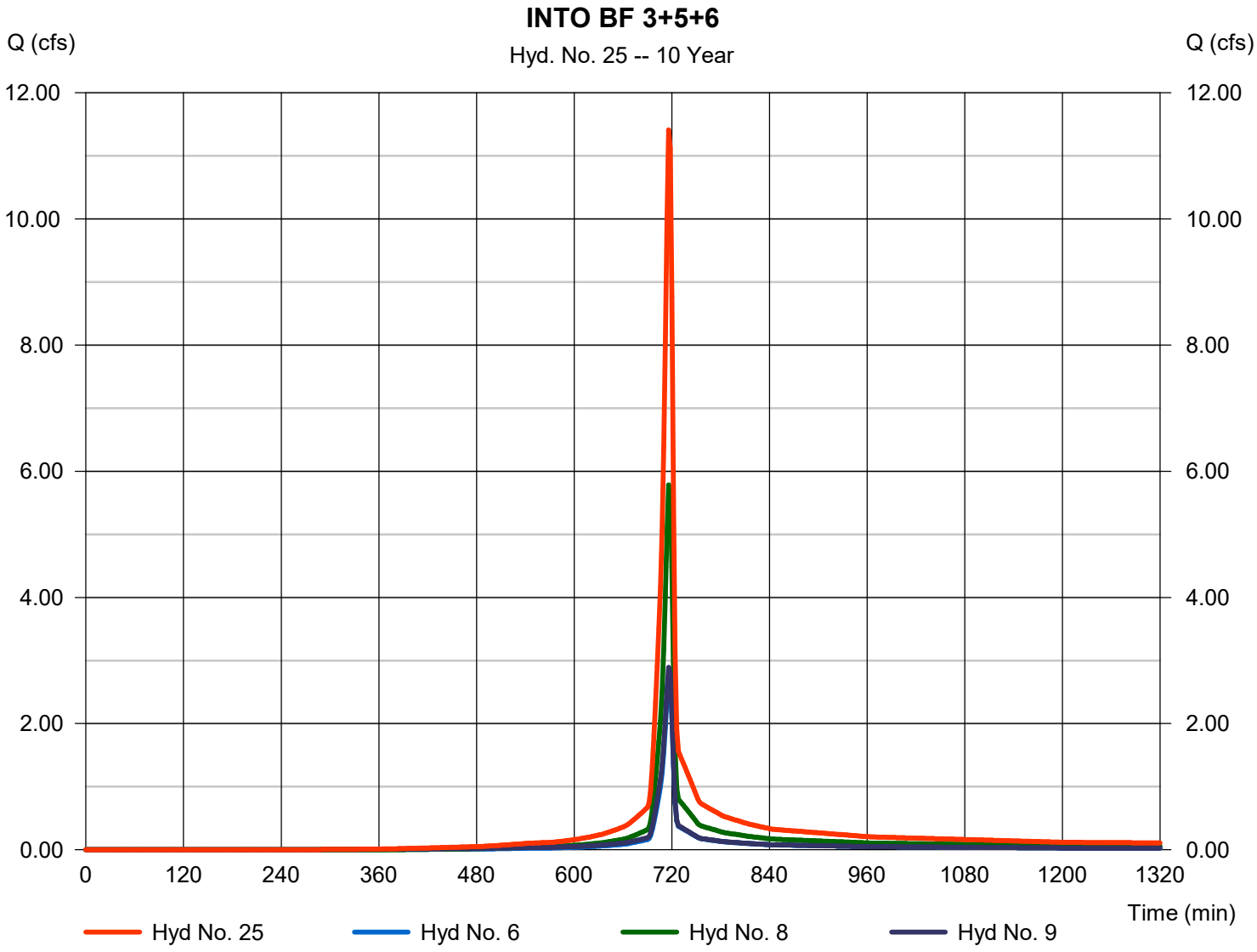
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 25

INTO BF 3+5+6

Hydrograph type	= Combine	Peak discharge	= 11.41 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 23,729 cuft
Inflow hyds.	= 6, 8, 9	Contrib. drain. area	= 2.870 ac



Hydrograph Report

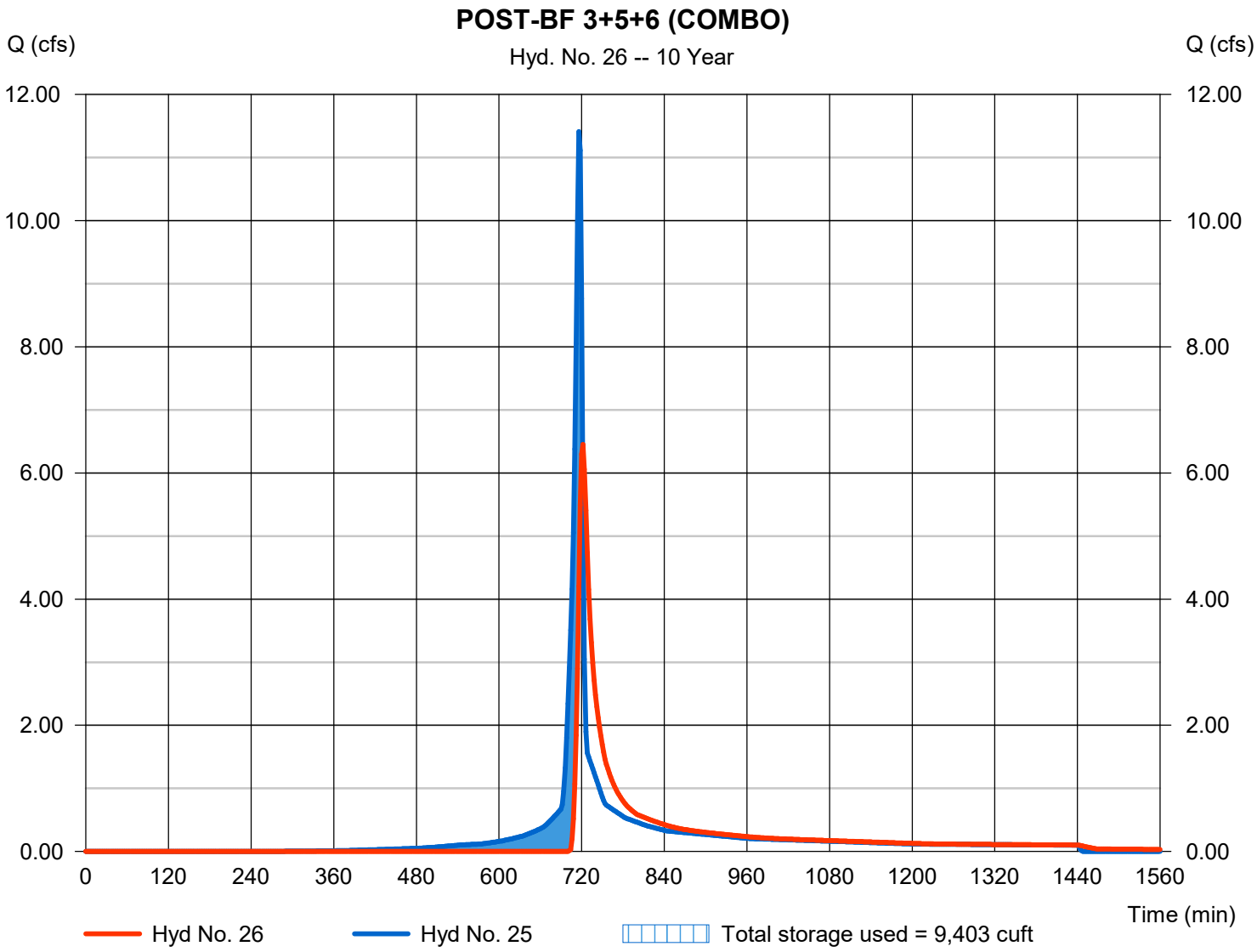
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 26

POST-BF 3+5+6 (COMBO)

Hydrograph type	=	Reservoir	Peak discharge	=	6.450 cfs
Storm frequency	=	10 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	20,224 cuft
Inflow hyd. No.	=	25 - INTO BF 3+5+6	Max. Elevation	=	449.04 ft
Reservoir name	=	BIORETENTION FILTERS 3+5+6 COMBINED	Max. Storage	=	9,403 cuft

Storage Indication method used.



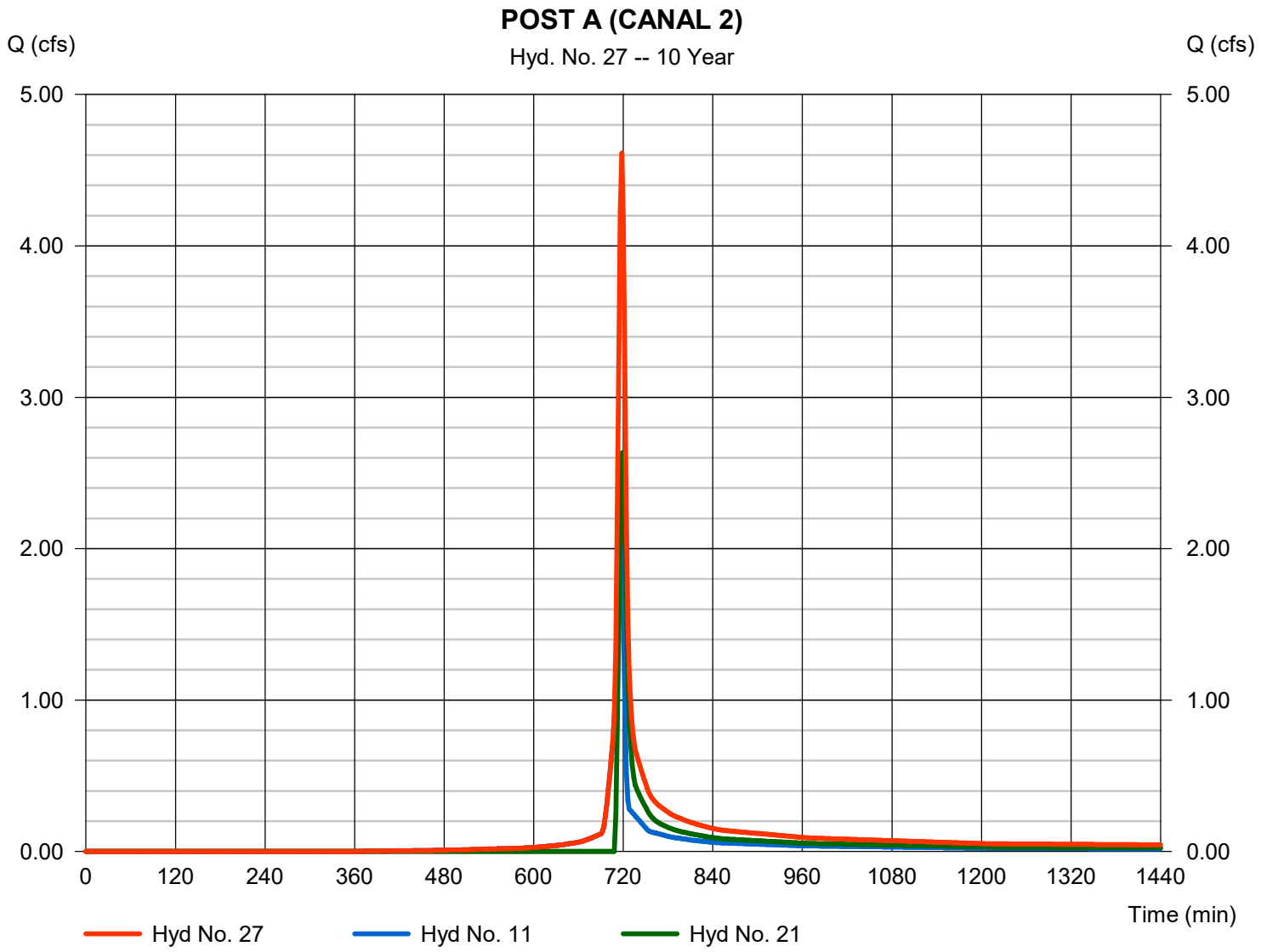
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 27

POST A (CANAL 2)

Hydrograph type	= Combine	Peak discharge	= 4.613 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 8,991 cuft
Inflow hyds.	= 11, 21	Contrib. drain. area	= 0.520 ac



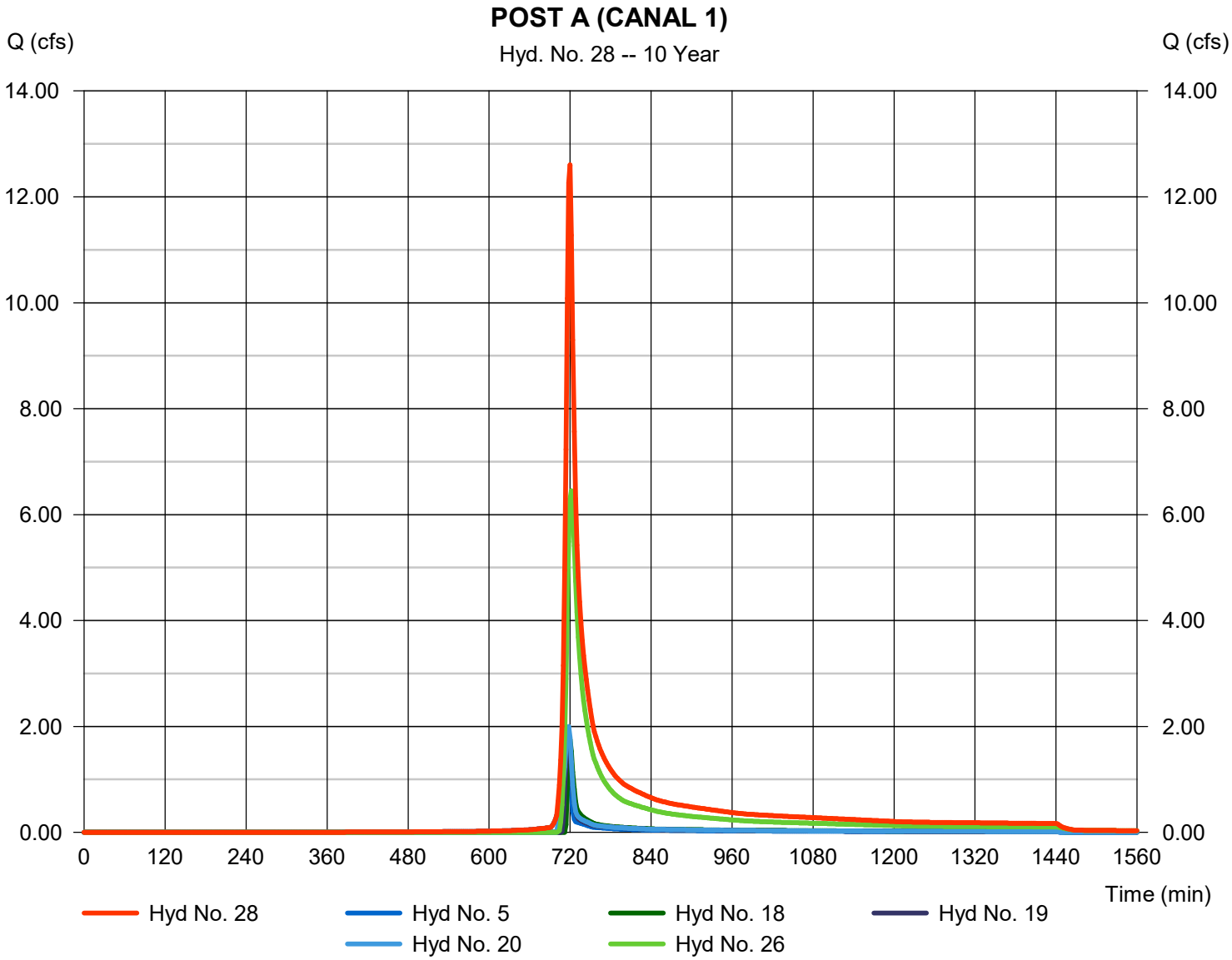
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 28

POST A (CANAL 1)

Hydrograph type	= Combine	Peak discharge	= 12.60 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 32,960 cuft
Inflow hyds.	= 5, 18, 19, 20, 26	Contrib. drain. area	= 0.360 ac



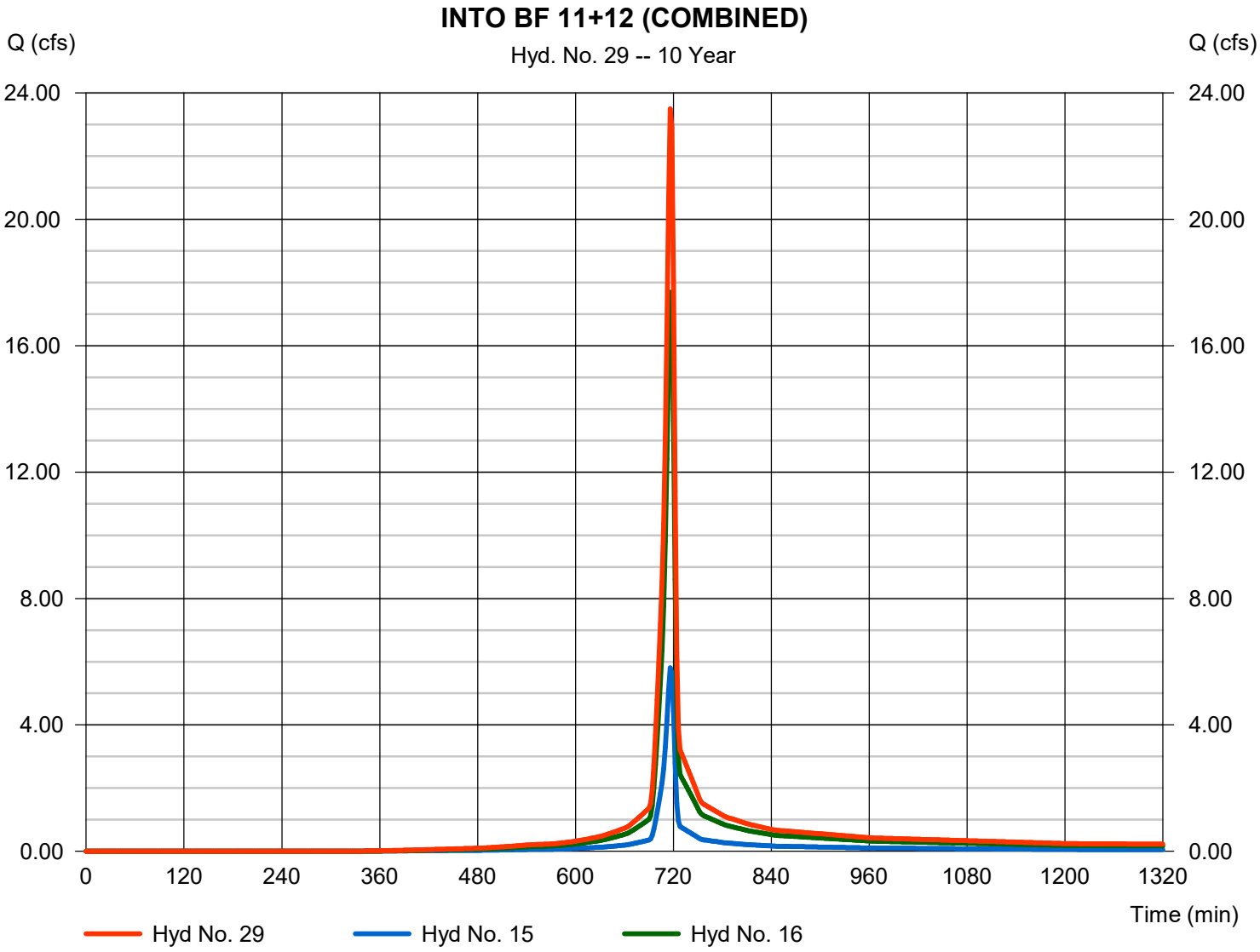
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 29

INTO BF 11+12 (COMBINED)

Hydrograph type	= Combine	Peak discharge	= 23.50 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 48,678 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 5.930 ac



Hydrograph Report

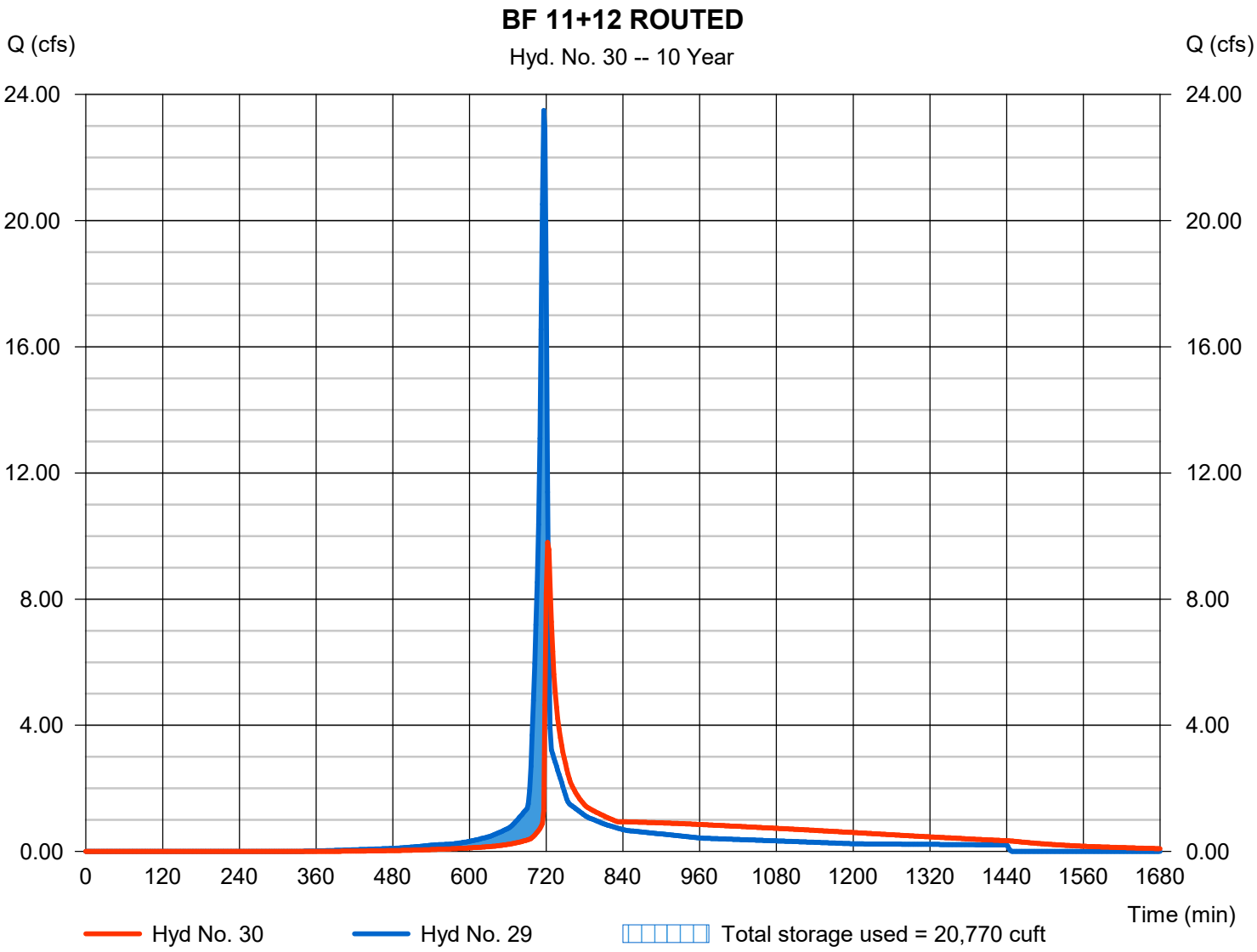
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 30

BF 11+12 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	9.798 cfs
Storm frequency	=	10 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	48,666 cuft
Inflow hyd. No.	=	29 - INTO BF 11+12 (COMBINED)	Max. Elevation	=	450.51 ft
Reservoir name	=	BIORETENTION FILTERS 11+12 COMBINED	Max. Storage	=	20,770 cuft

Storage Indication method used.



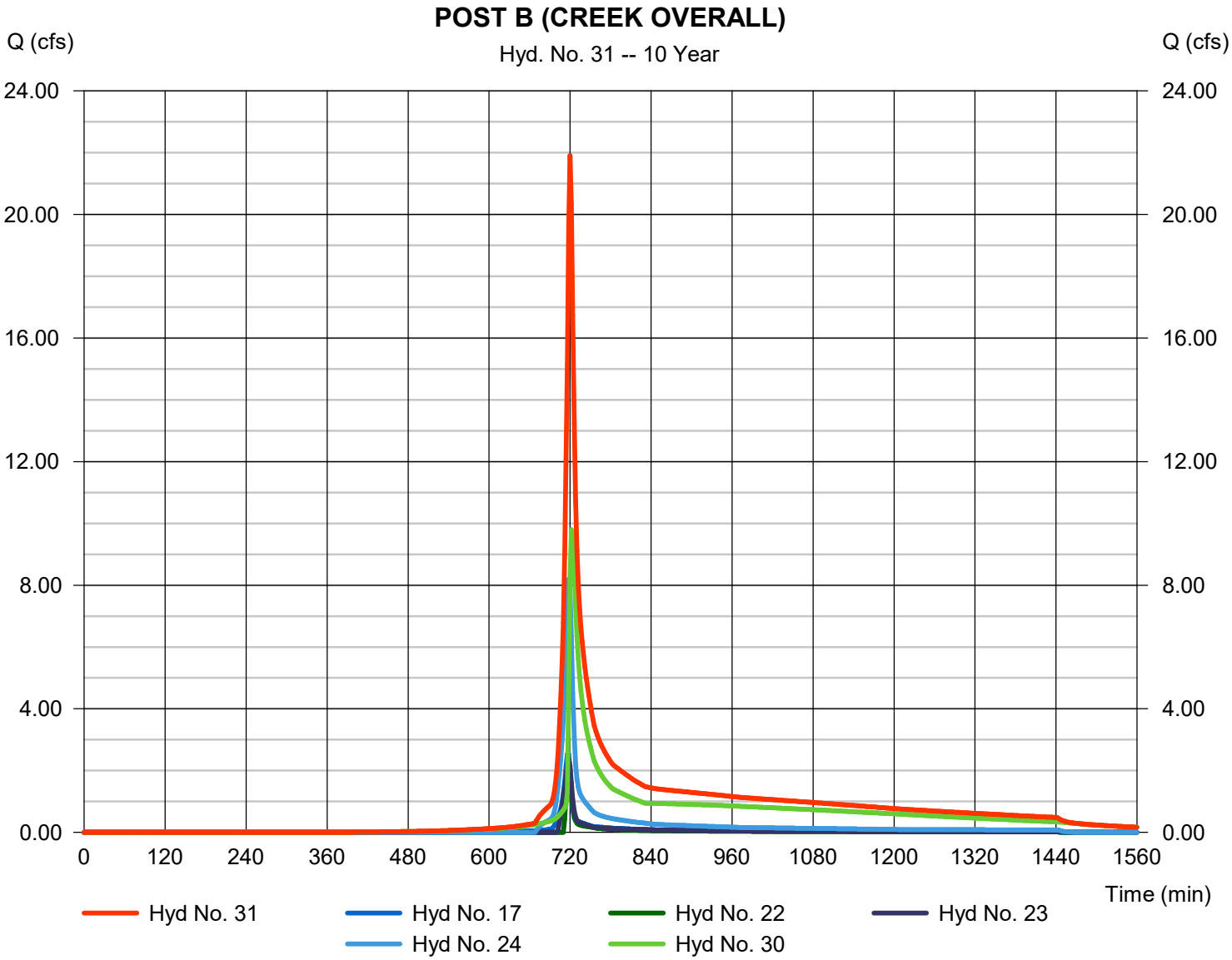
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 31

POST B (CREEK OVERALL)

Hydrograph type	= Combine	Peak discharge	= 21.91 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 77,694 cuft
Inflow hyds.	= 17, 22, 23, 24, 30	Contrib. drain. area	= 0.910 ac



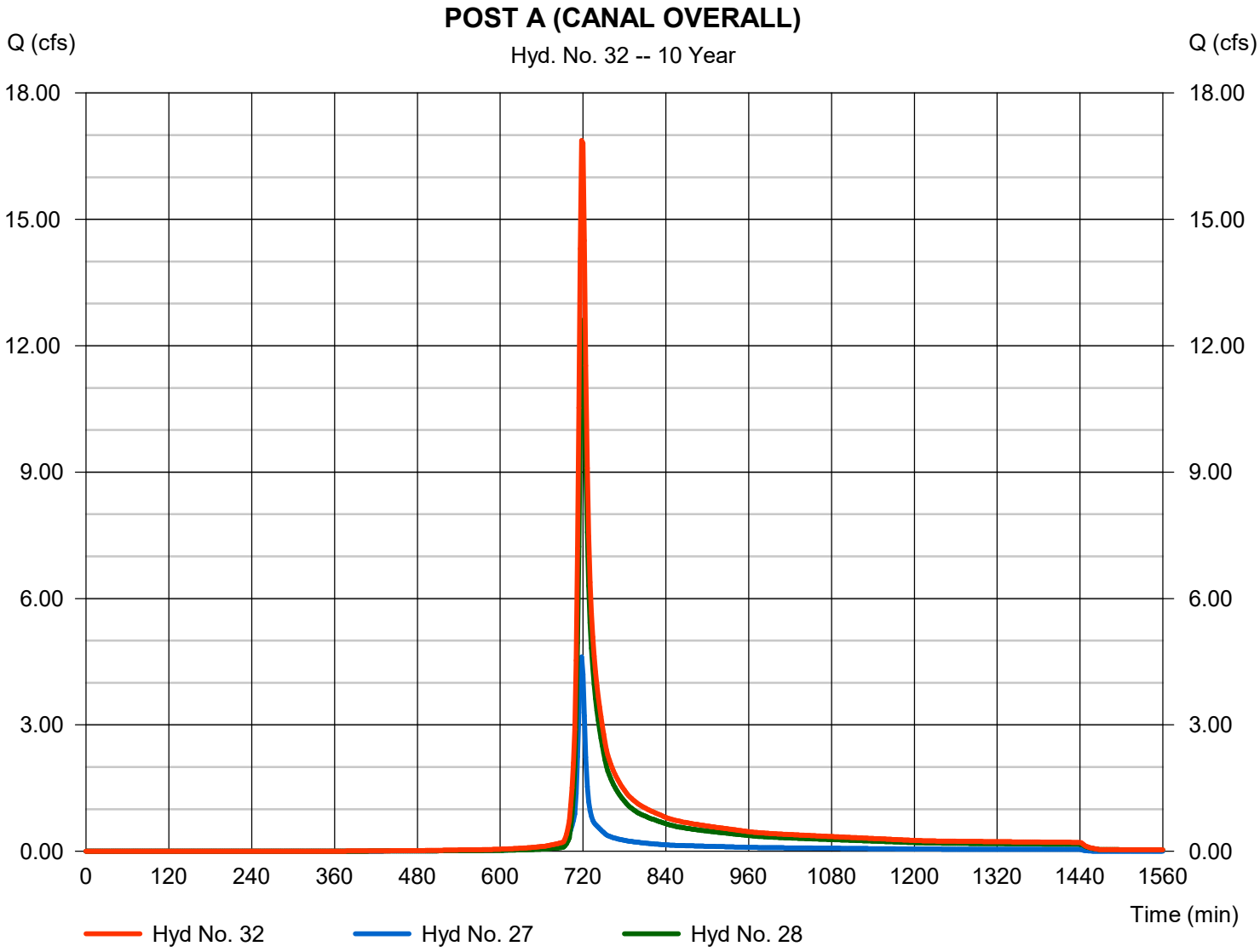
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 32

POST A (CANAL OVERALL)

Hydrograph type	= Combine	Peak discharge	= 16.87 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 41,952 cuft
Inflow hyds.	= 27, 28	Contrib. drain. area	= 0.000 ac



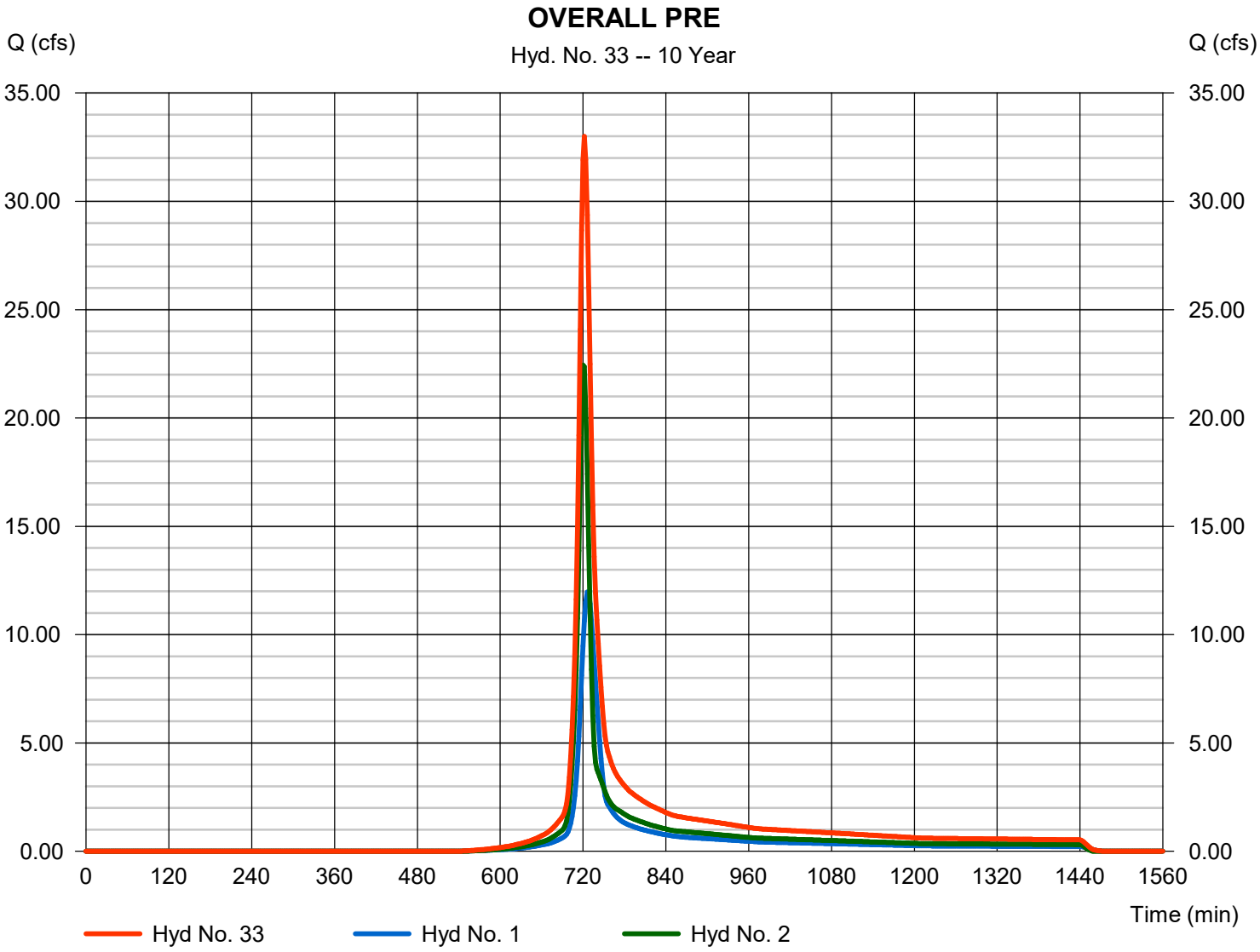
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 33

OVERALL PRE

Hydrograph type	=	Combine	Peak discharge	=	32.99 cfs
Storm frequency	=	10 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	100,098 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	15.990 ac



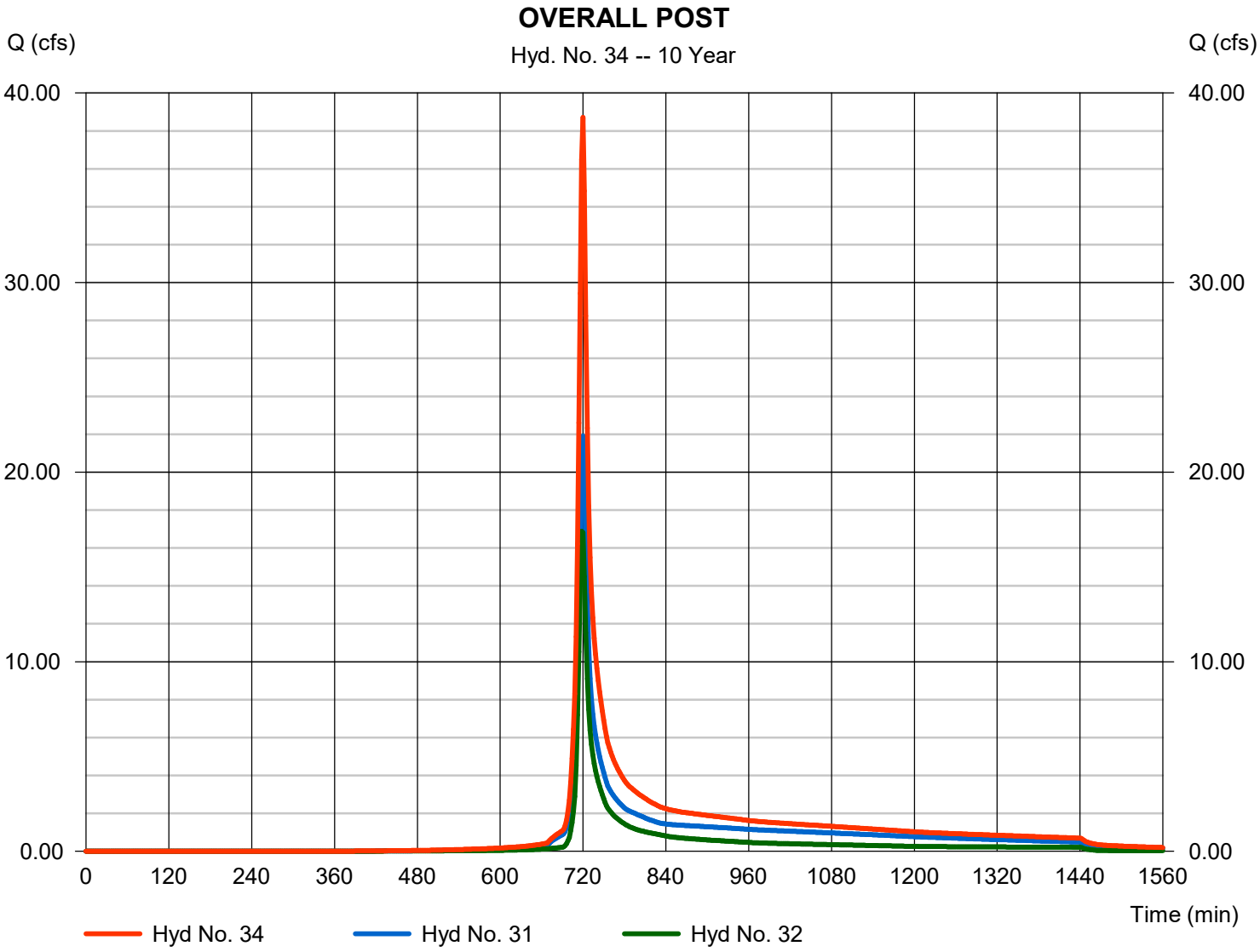
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 34

OVERALL POST

Hydrograph type	= Combine	Peak discharge	= 38.72 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 119,646 cuft
Inflow hyds.	= 31, 32	Contrib. drain. area	= 0.000 ac



Hydrograph Report

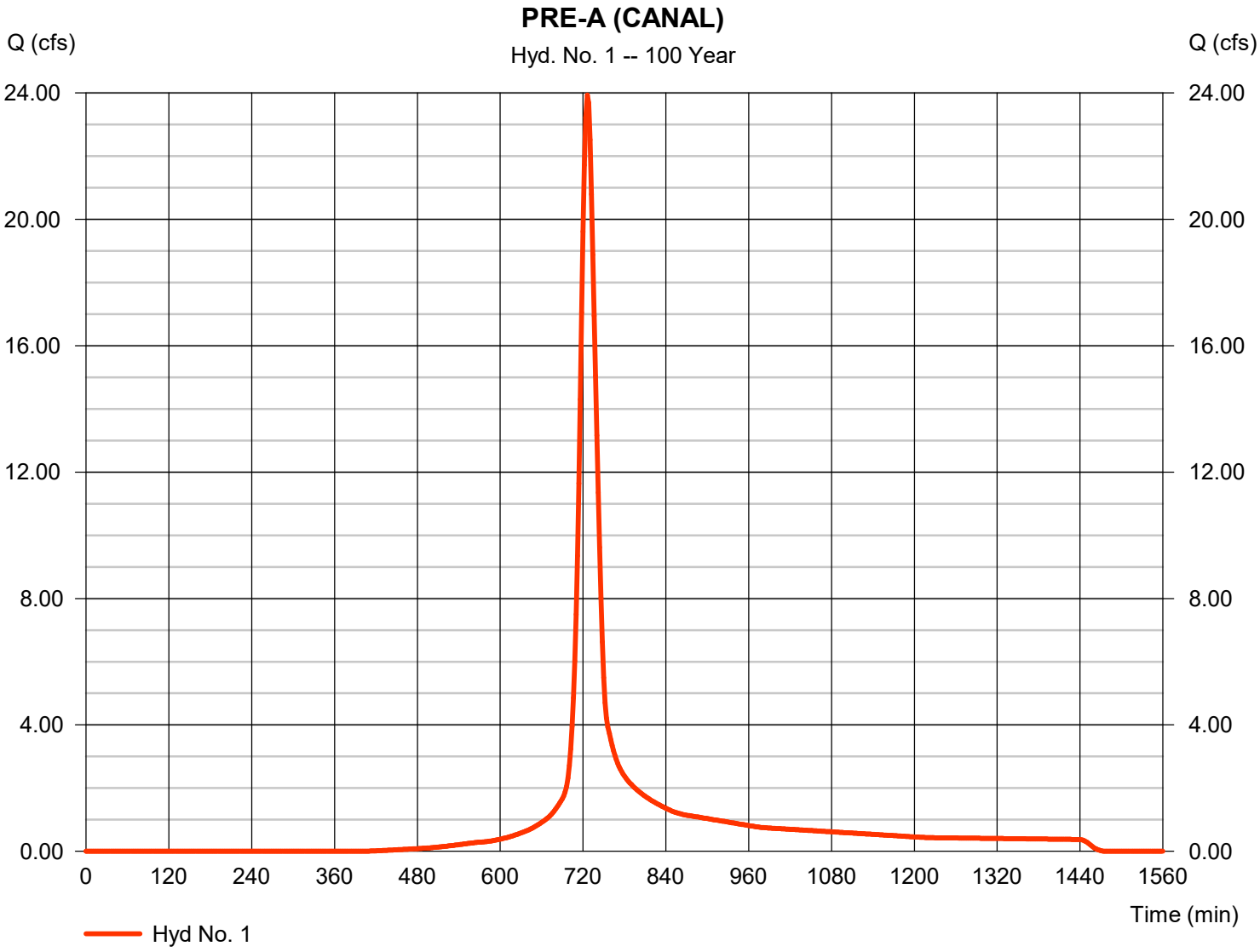
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 1

PRE-A (CANAL)

Hydrograph type	= SCS Runoff	Peak discharge	= 23.94 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 82,699 cuft
Drainage area	= 6.540 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 20.54 min
Total precip.	= 5.60 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(4.814 x 78) + (0.170 x 98) + (0.736 x 91) + (0.817 x 77)] / 6.540



Hydrograph Report

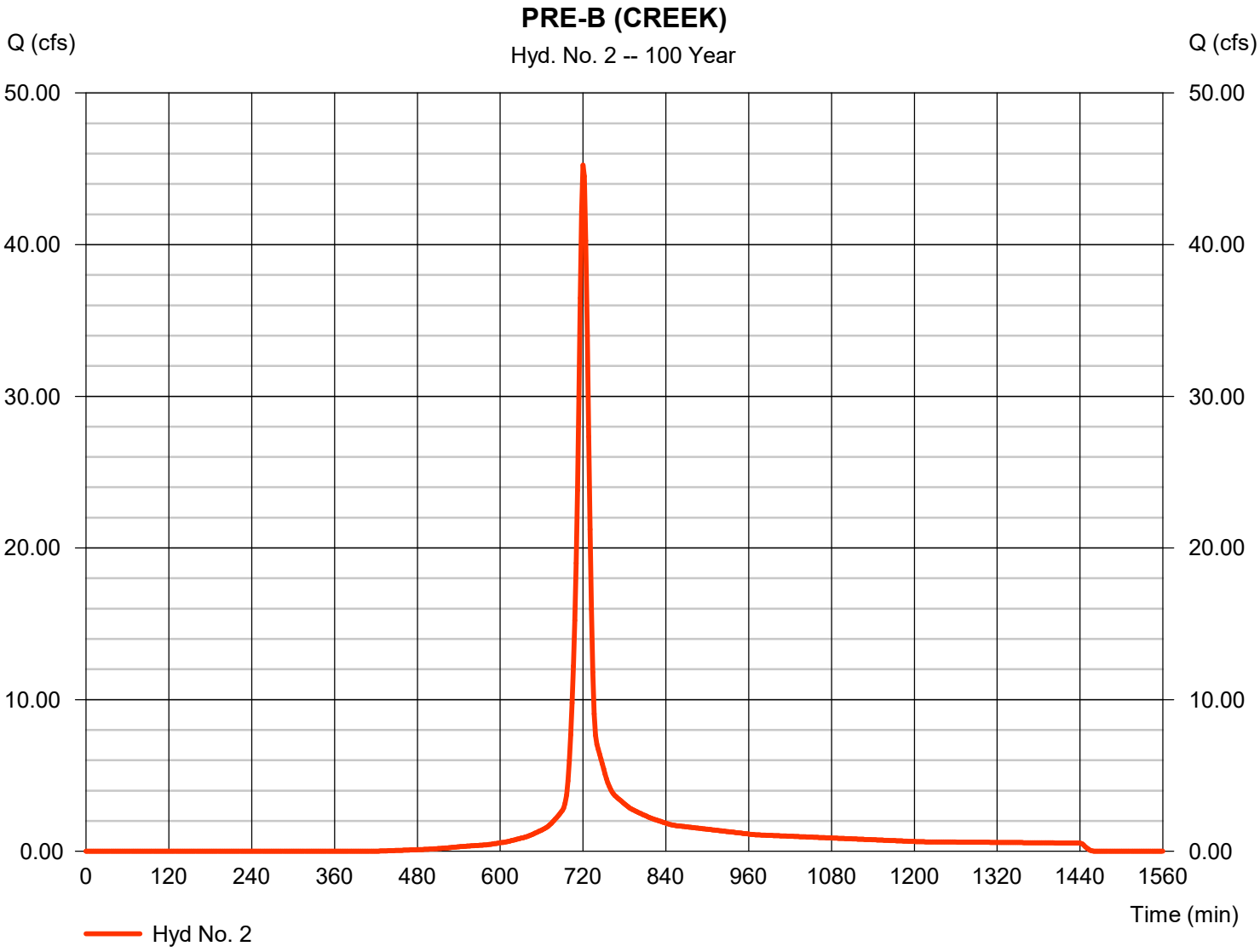
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 2

PRE-B (CREEK)

Hydrograph type	= SCS Runoff	Peak discharge	= 45.25 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 117,611 cuft
Drainage area	= 9.450 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.20 min
Total precip.	= 5.60 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(6.529 x 78) + (0.007 x 98) + (0.985 x 91) + (1.926 x 77)] / 9.450



Hydrograph Report

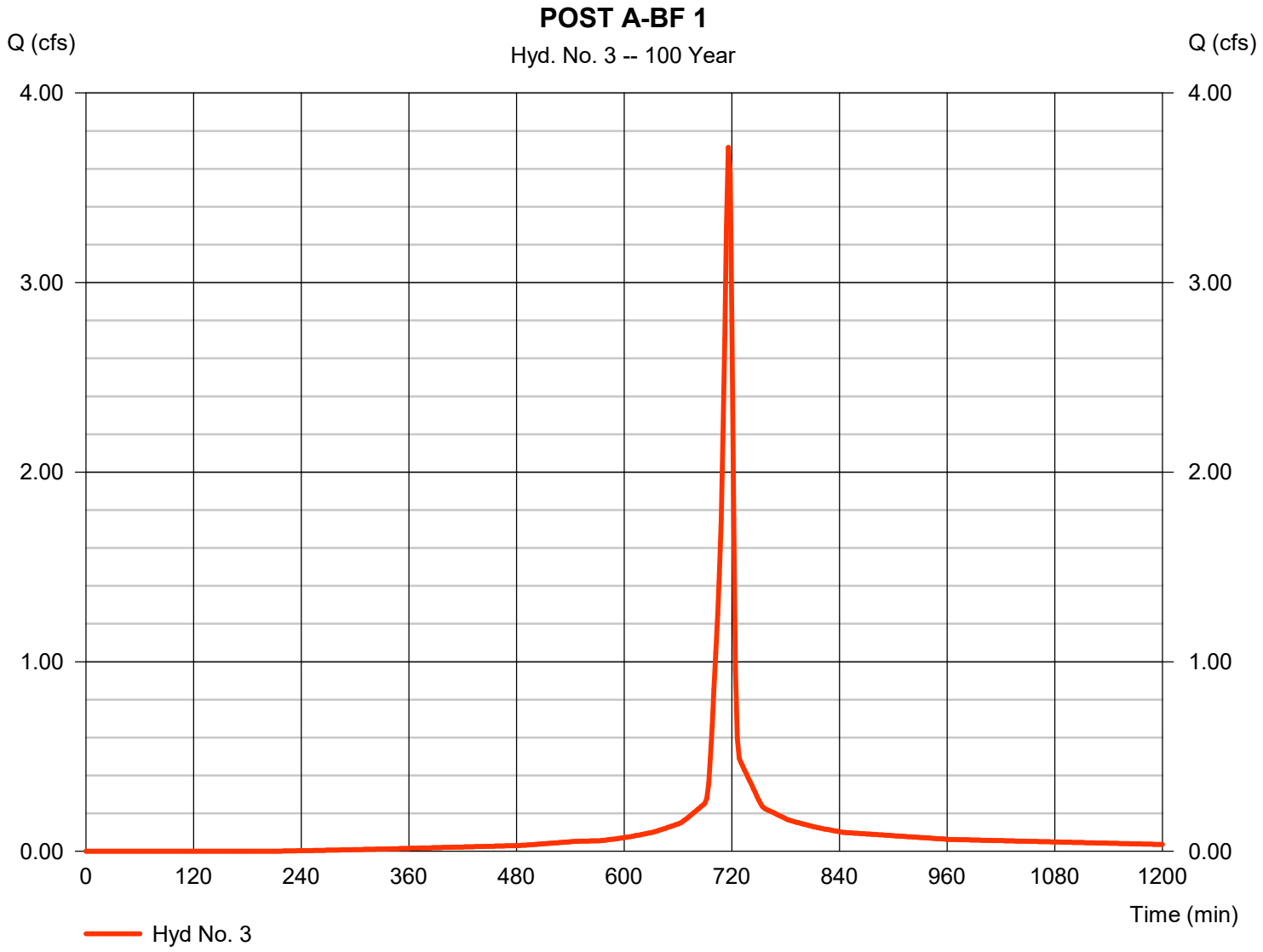
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 3

POST A-BF 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.714 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	8,039 cuft
Drainage area	=	0.530 ac	Curve number	=	90*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.240 x 80) + (0.180 x 98) + (0.110 x 98)] / 0.530



Hydrograph Report

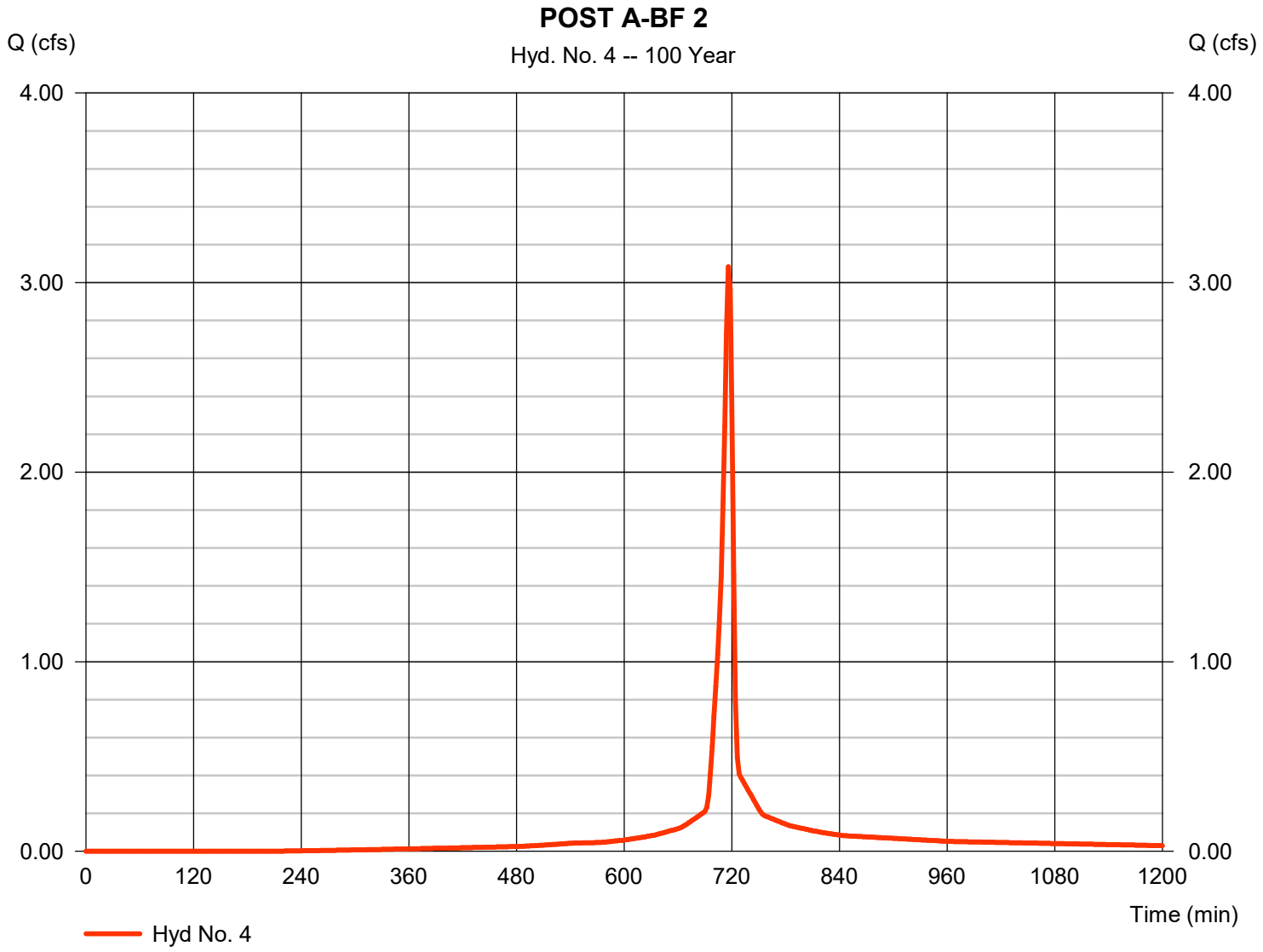
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 4

POST A-BF 2

Hydrograph type	= SCS Runoff	Peak discharge	= 3.083 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 6,674 cuft
Drainage area	= 0.440 ac	Curve number	= 90*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.60 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.200 x 80) + (0.120 x 98) + (0.120 x 98)] / 0.440



Hydrograph Report

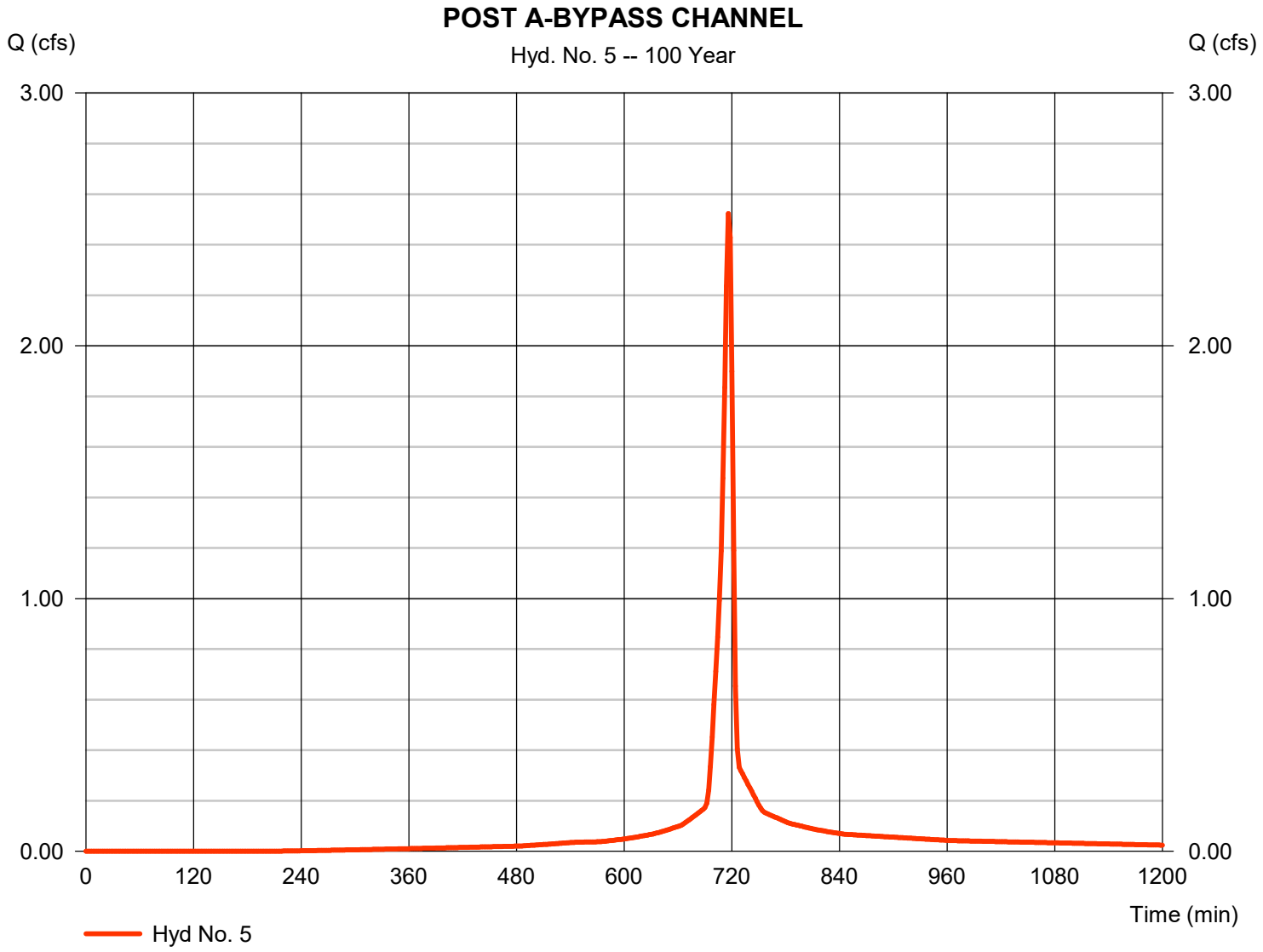
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 5

POST A-BYPASS CHANNEL

Hydrograph type	= SCS Runoff	Peak discharge	= 2.522 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 5,460 cuft
Drainage area	= 0.360 ac	Curve number	= 90*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.60 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.151 x 80) + (0.070 x 98) + (0.140 x 98)] / 0.360



Hydrograph Report

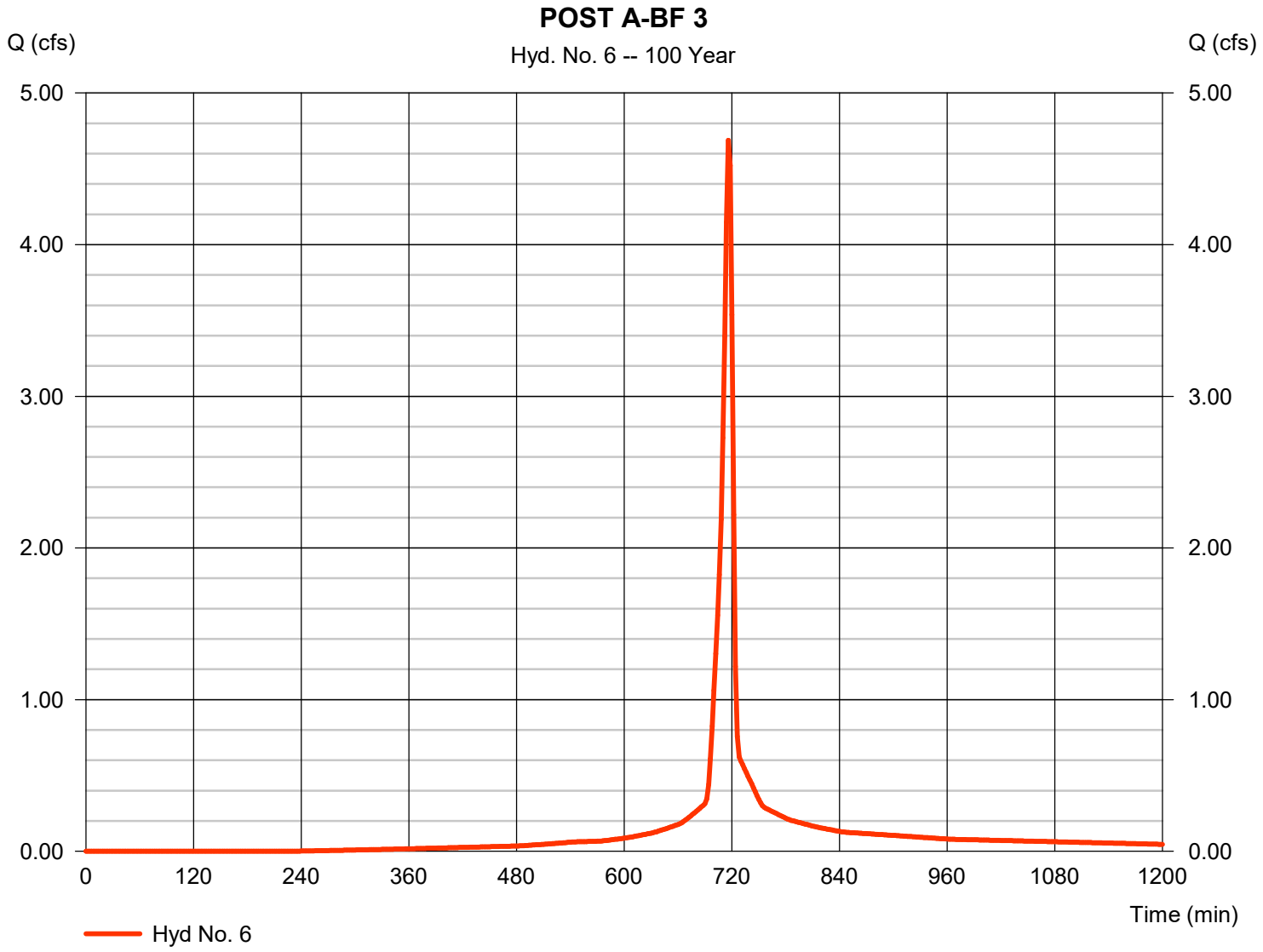
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 6

POST A-BF 3

Hydrograph type	= SCS Runoff	Peak discharge	= 4.688 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 10,063 cuft
Drainage area	= 0.680 ac	Curve number	= 89*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.60 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.326 x 80) + (0.110 x 98) + (0.240 x 98)] / 0.680



Hydrograph Report

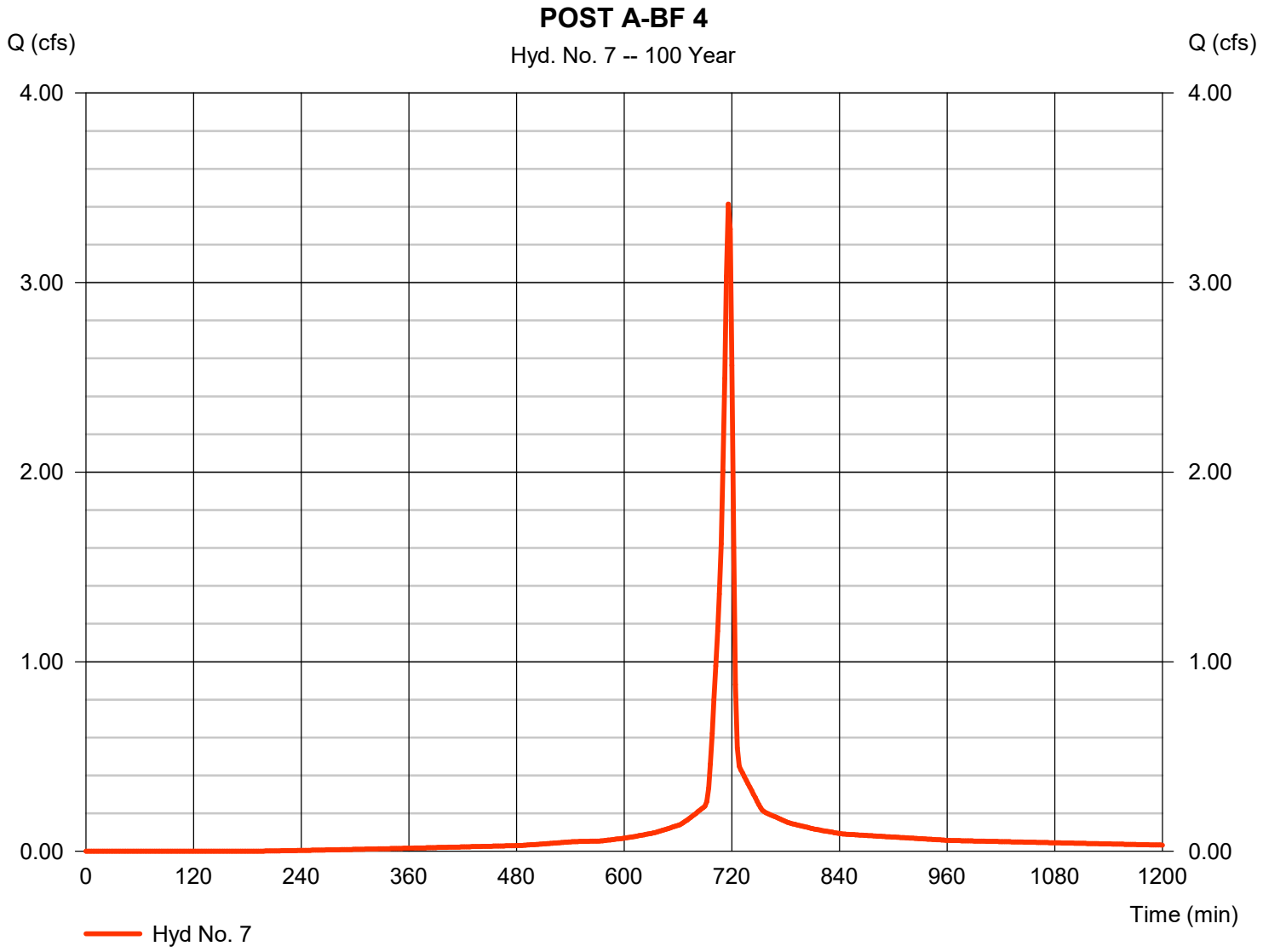
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 7

POST A-BF 4

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.415 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	7,459 cuft
Drainage area	=	0.480 ac	Curve number	=	91*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.190 x 80) + (0.080 x 98) + (0.210 x 98)] / 0.480



Hydrograph Report

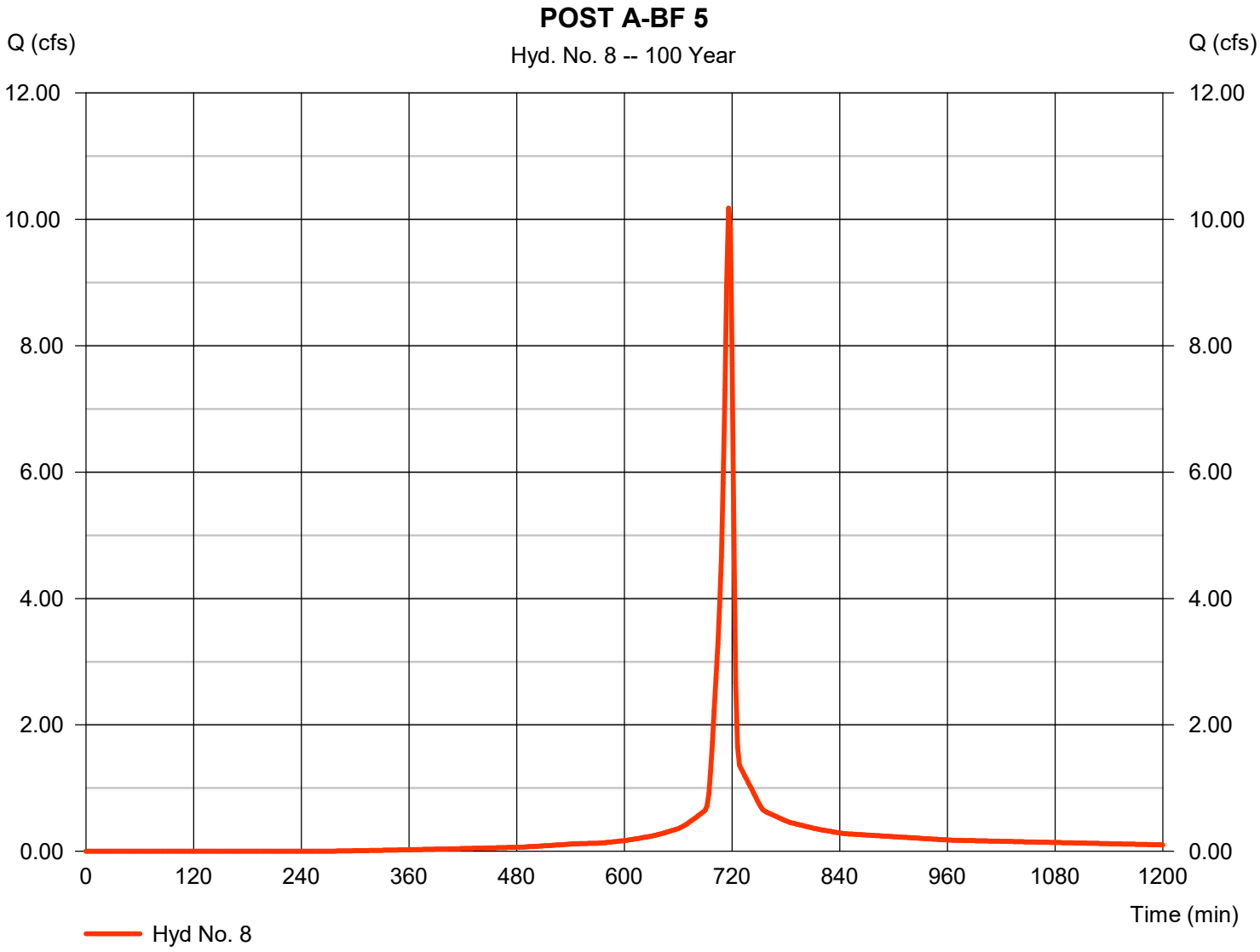
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 8

POST A-BF 5

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.18 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	21,532 cuft
Drainage area	=	1.530 ac	Curve number	=	87*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.913 x 80) + (0.220 x 98) + (0.400 x 98)] / 1.530



Hydrograph Report

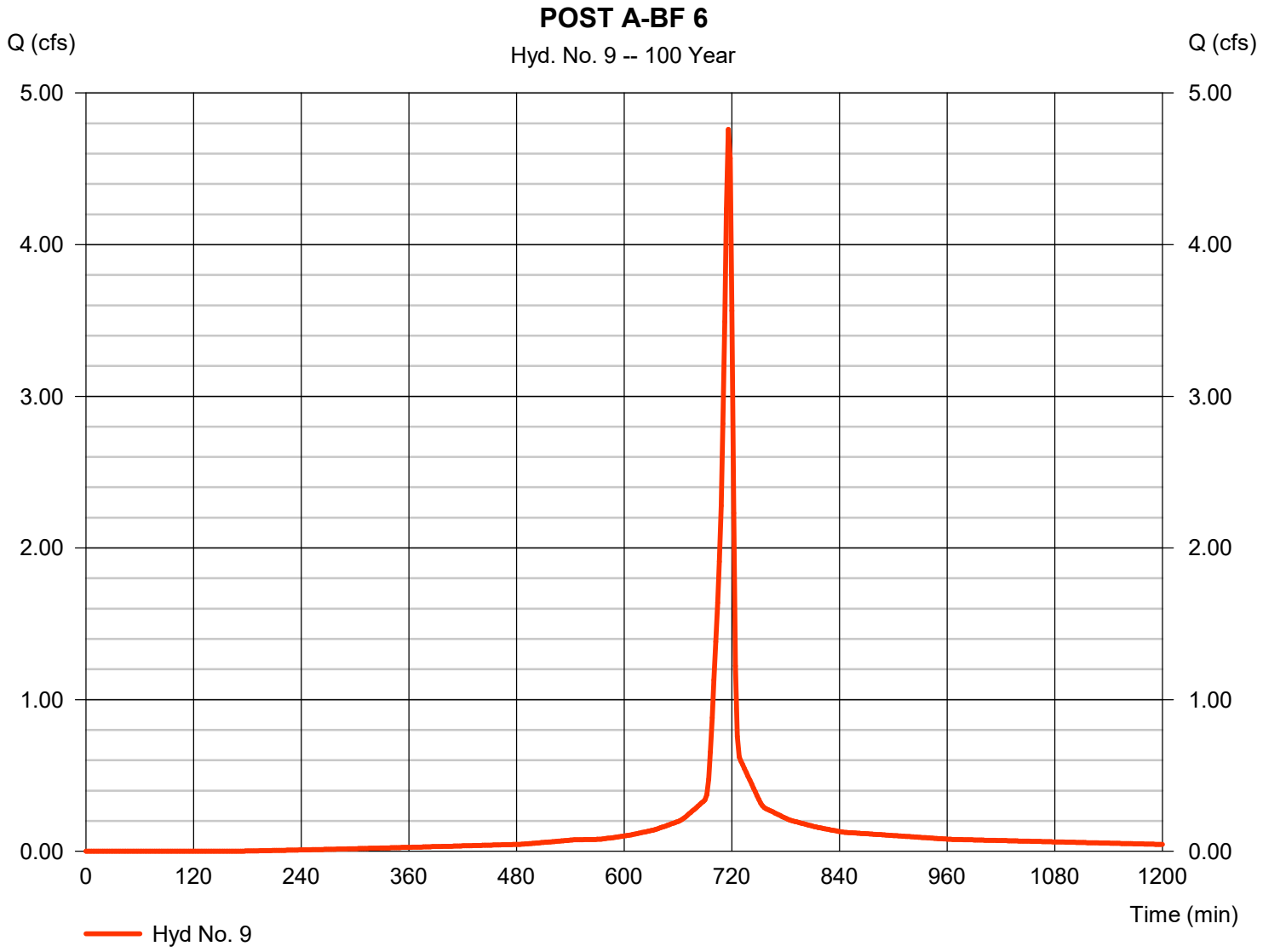
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 9

POST A-BF 6

Hydrograph type	= SCS Runoff	Peak discharge	= 4.761 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 10,504 cuft
Drainage area	= 0.660 ac	Curve number	= 92*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.60 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.230 x 80) + (0.210 x 98) + (0.220 x 98)] / 0.660



Hydrograph Report

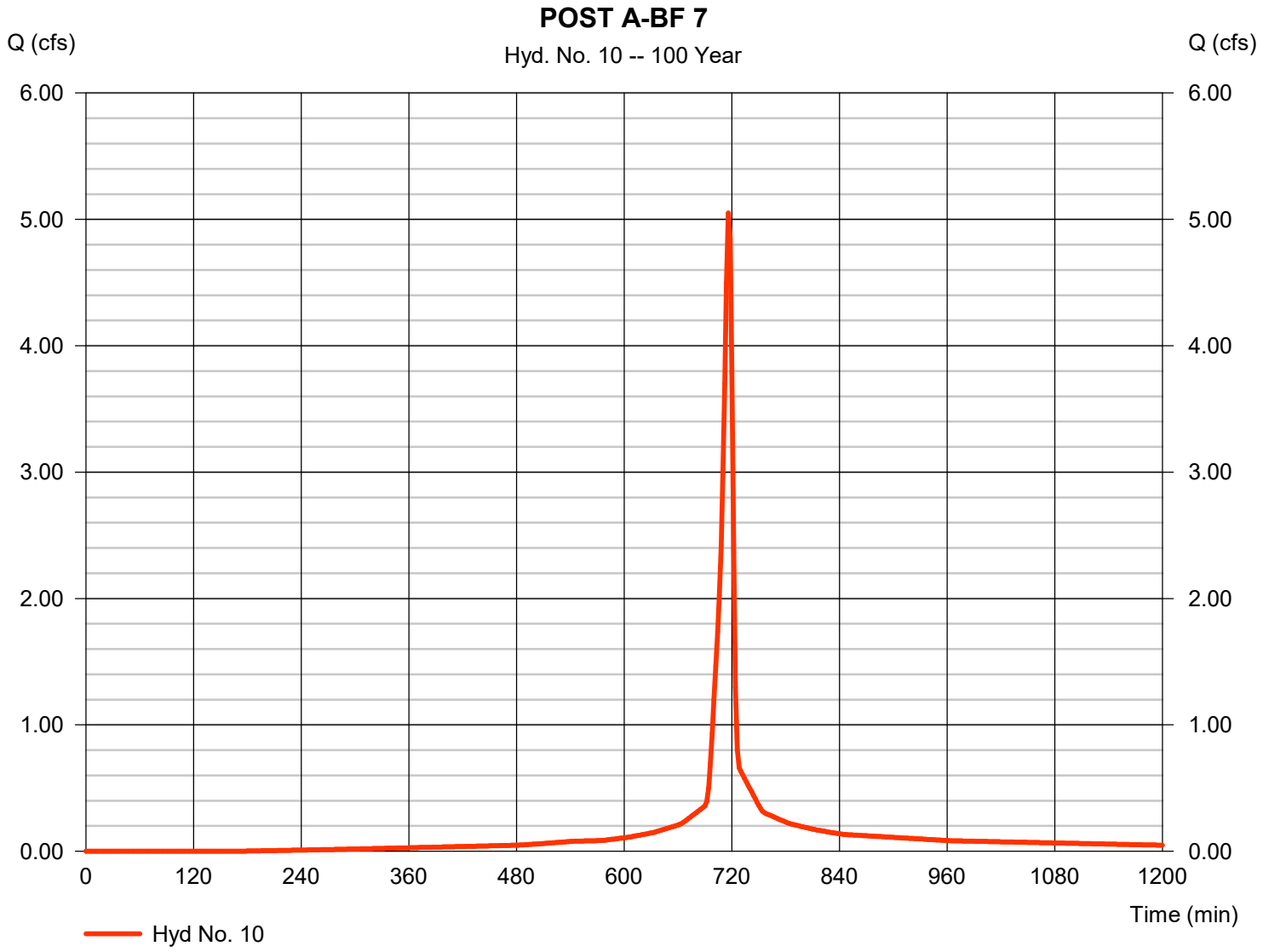
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 10

POST A-BF 7

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.049 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	11,141 cuft
Drainage area	=	0.700 ac	Curve number	=	92*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.250 x 80) + (0.440 x 98) + (0.010 x 98)] / 0.700



Hydrograph Report

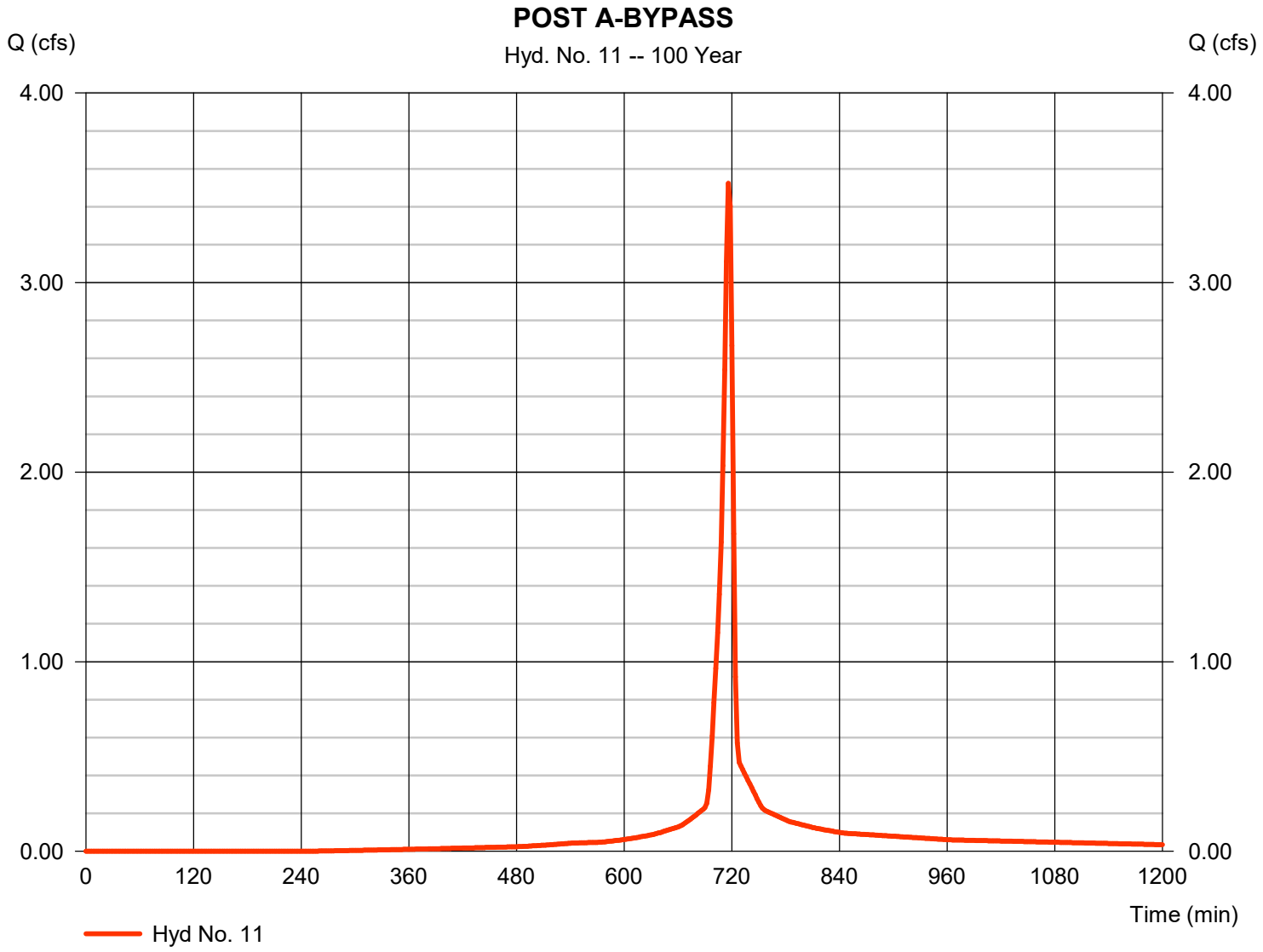
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 11

POST A-BYPASS

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.524 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	7,506 cuft
Drainage area	=	0.520 ac	Curve number	=	88*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.300 x 80) + (0.220 x 98)] / 0.520



Hydrograph Report

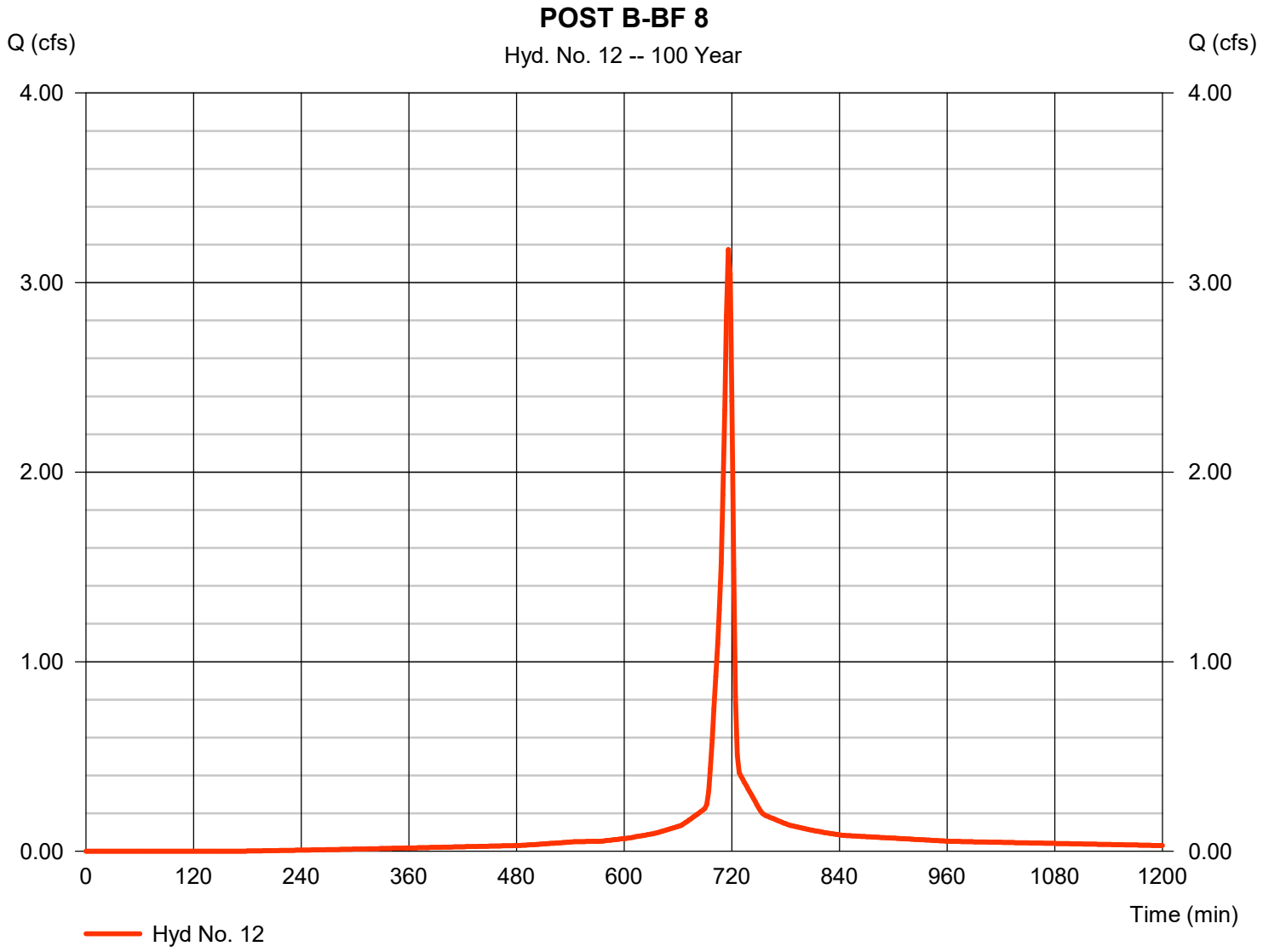
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 12

POST B-BF 8

Hydrograph type	= SCS Runoff	Peak discharge	= 3.174 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 7,003 cuft
Drainage area	= 0.440 ac	Curve number	= 92*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.60 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.140 x 80) + (0.300 x 98)] / 0.440



Hydrograph Report

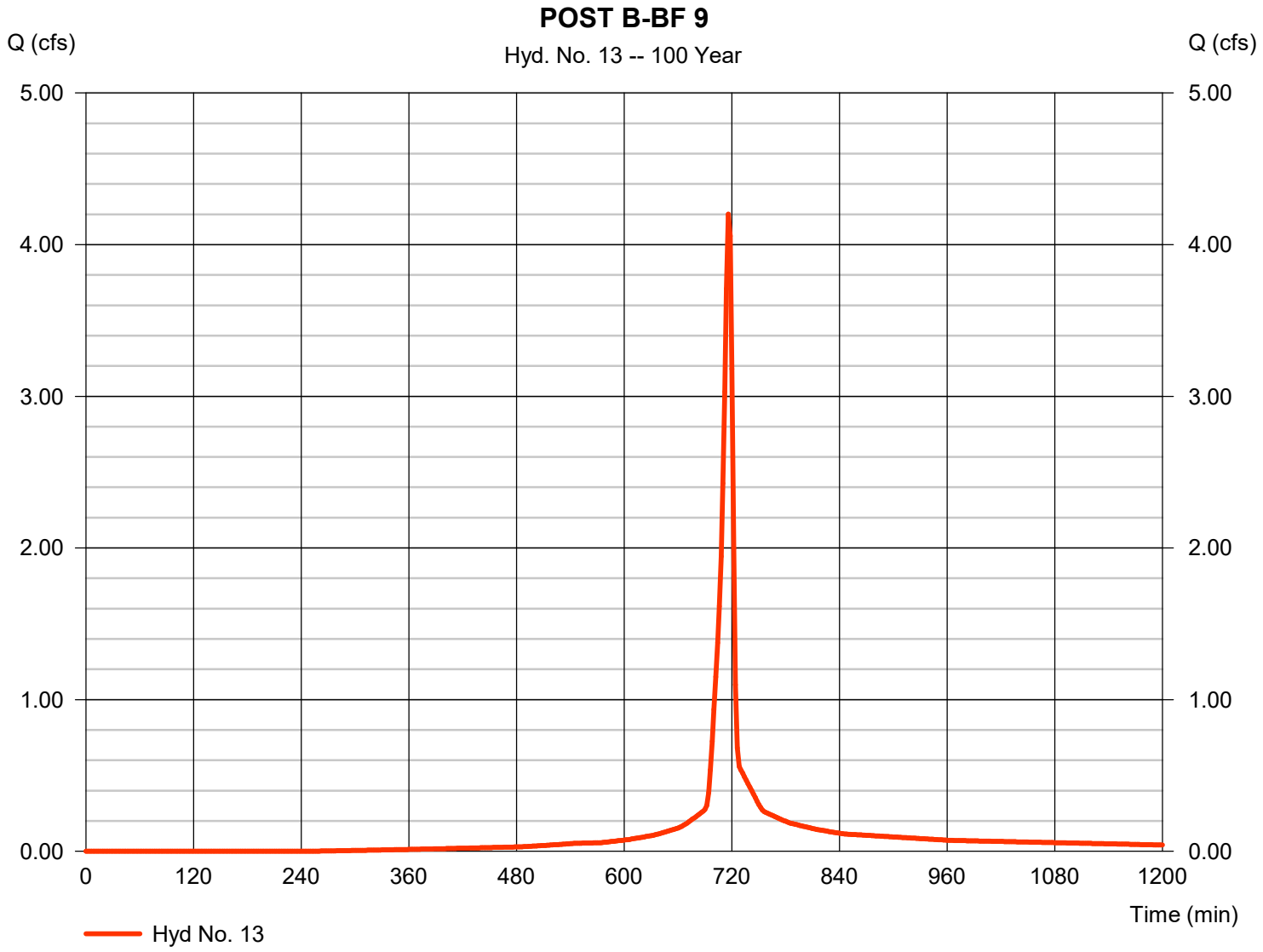
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 13

POST B-BF 9

Hydrograph type	= SCS Runoff	Peak discharge	= 4.201 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 8,949 cuft
Drainage area	= 0.620 ac	Curve number	= 88*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.60 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.330 x 80) + (0.290 x 98)] / 0.620



Hydrograph Report

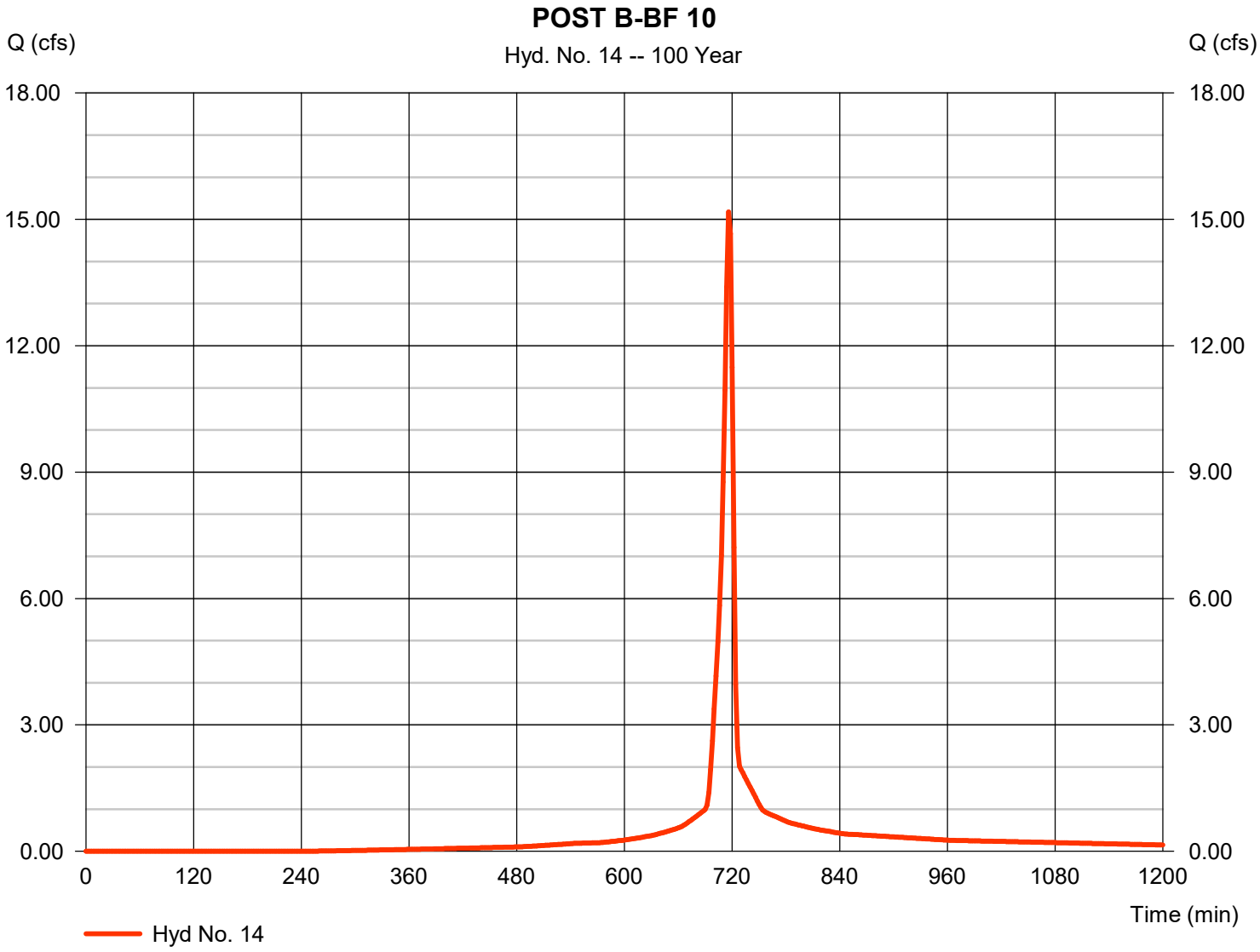
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 14

POST B-BF 10

Hydrograph type	= SCS Runoff	Peak discharge	= 15.18 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 32,333 cuft
Drainage area	= 2.240 ac	Curve number	= 88*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.60 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(1.240 x 80) + (0.500 x 98) + (0.500 x 98)] / 2.240



Hydrograph Report

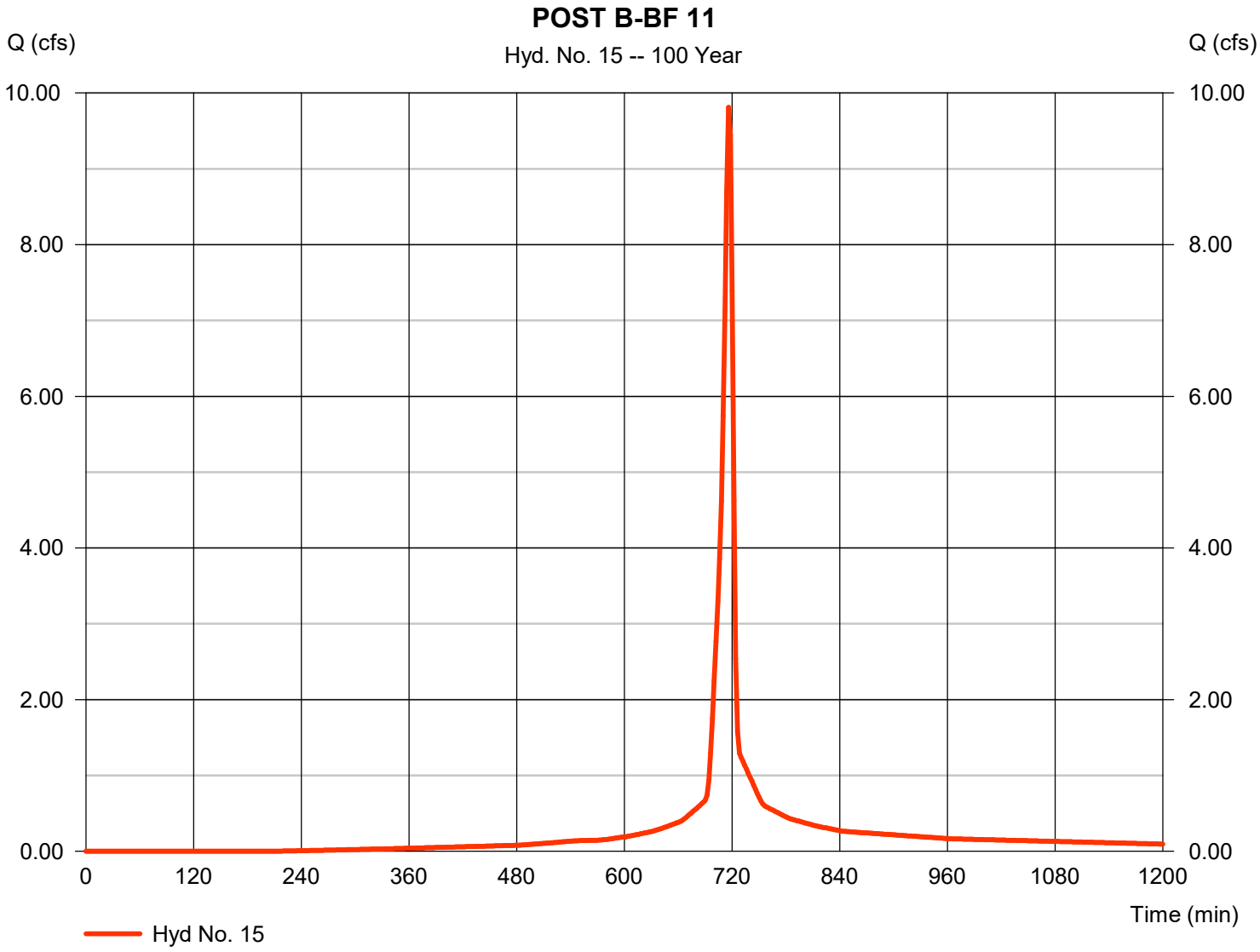
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 15

POST B-BF 11

Hydrograph type	= SCS Runoff	Peak discharge	= 9.810 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 21,234 cuft
Drainage area	= 1.400 ac	Curve number	= 90*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.60 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.630 x 80) + (0.240 x 98) + (0.530 x 98)] / 1.400



Hydrograph Report

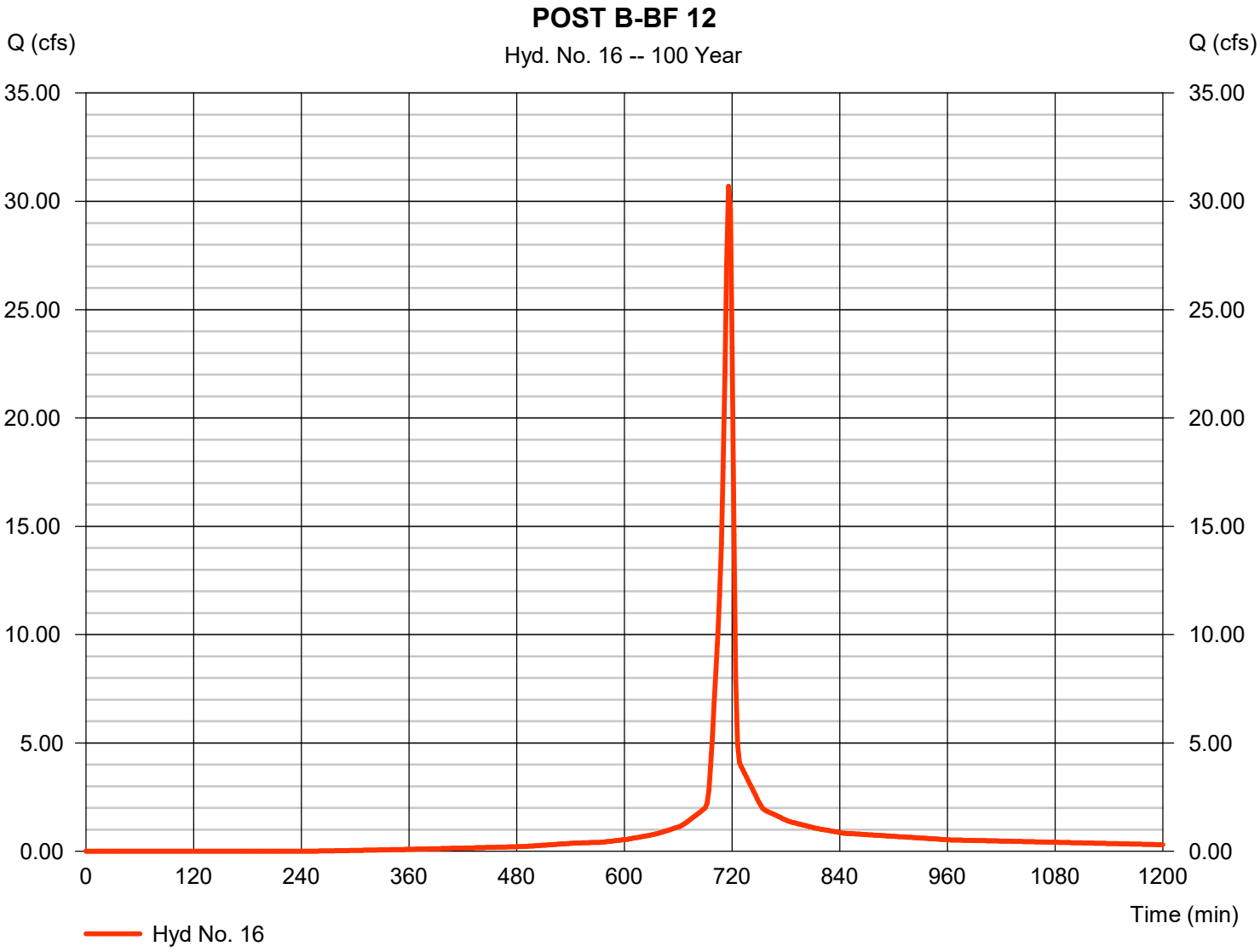
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 16

POST B-BF 12

Hydrograph type	=	SCS Runoff	Peak discharge	=	30.70 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	65,388 cuft
Drainage area	=	4.530 ac	Curve number	=	88*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.960 x 80) + (0.850 x 98) + (1.200 x 98) + (0.520 x 77)] / 4.530



Hydrograph Report

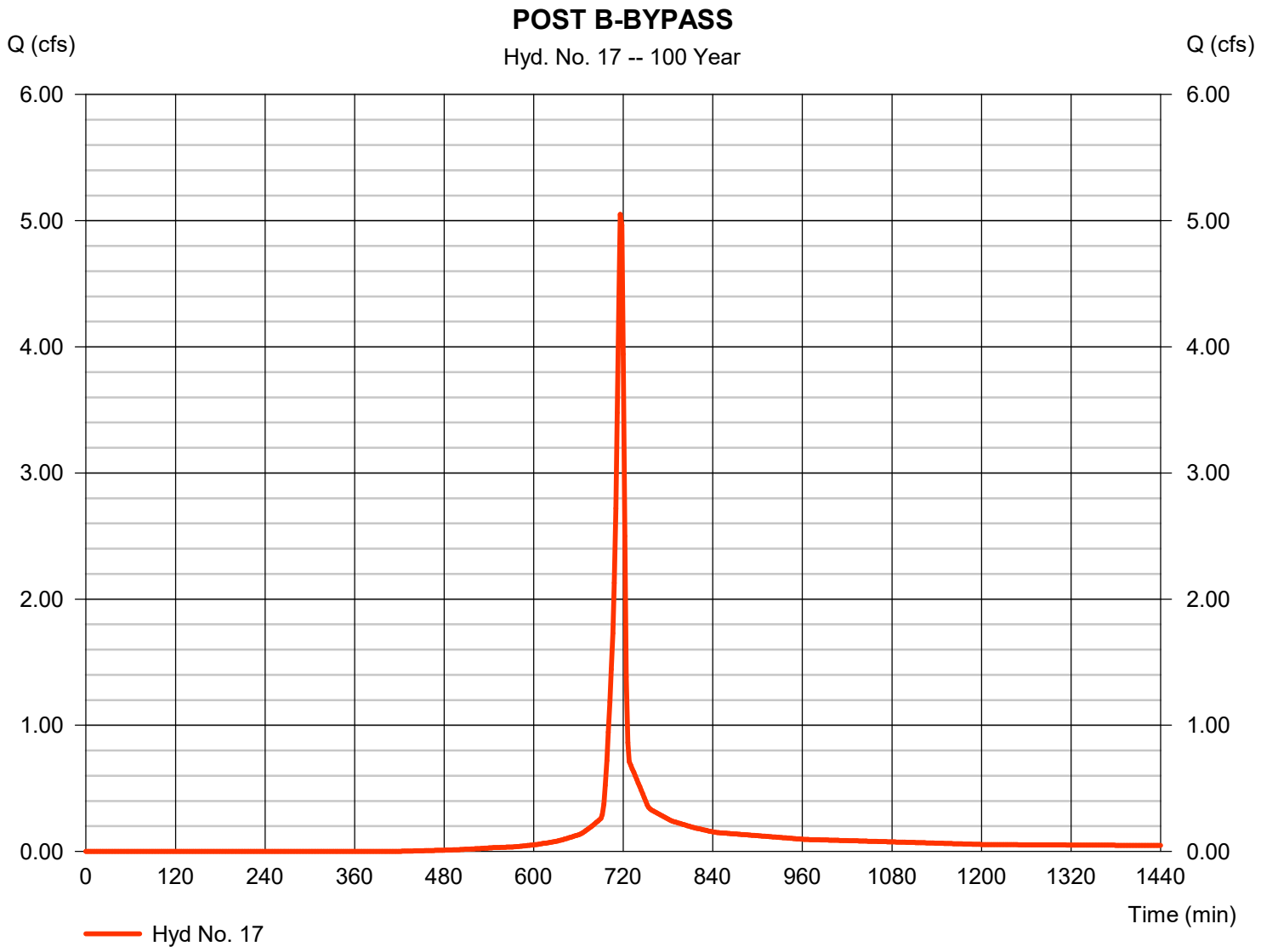
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 17

POST B-BYPASS

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.050 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	10,296 cuft
Drainage area	=	0.910 ac	Curve number	=	79*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.160 x 80) + (0.140 x 80) + (0.020 x 98) + (0.010 x 91) + (0.580 x 77)] / 0.910



Hydrograph Report

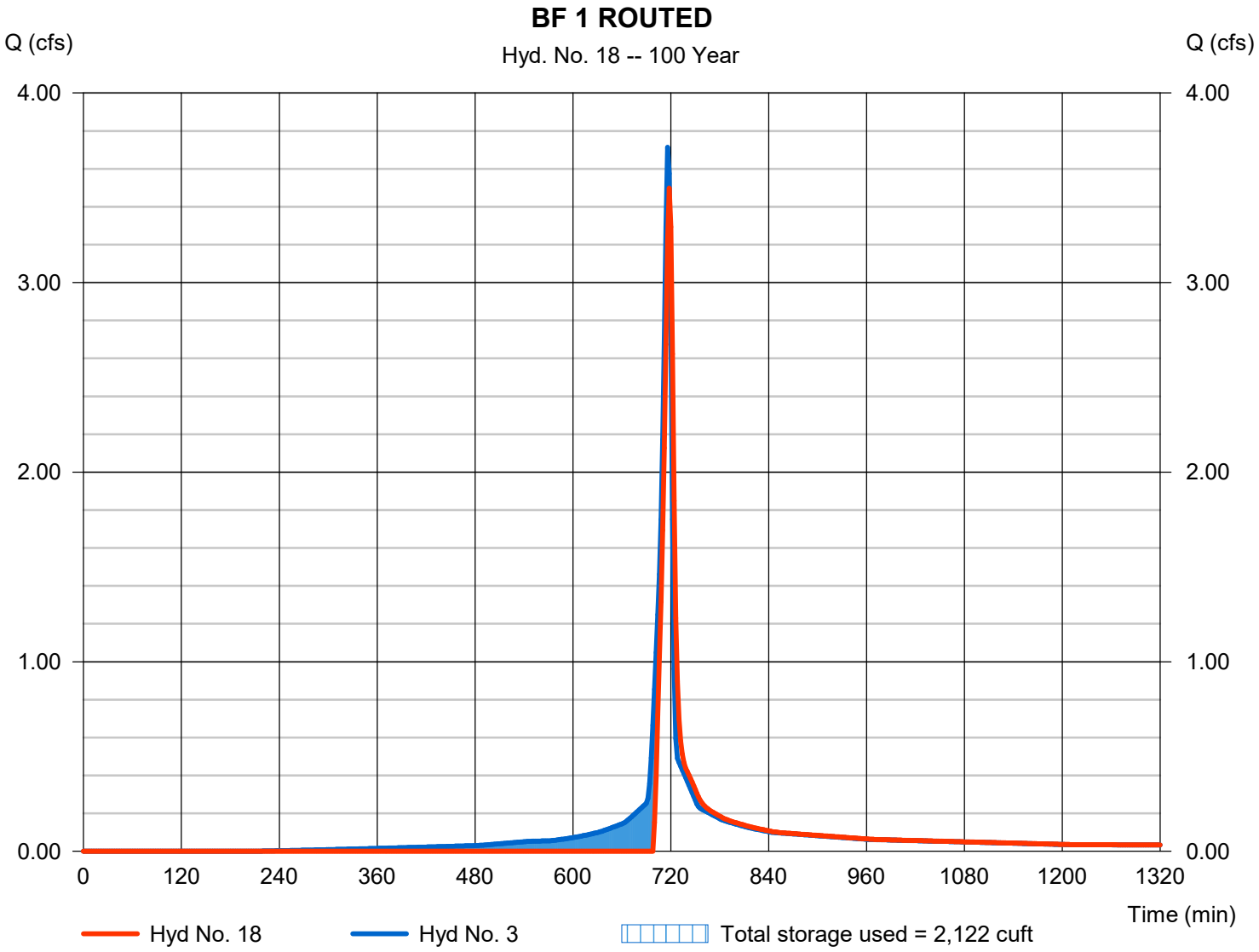
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 18

BF 1 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	3.498 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	6,522 cuft
Inflow hyd. No.	=	3 - POST A-BF 1	Max. Elevation	=	449.25 ft
Reservoir name	=	BIORETENTION FILTER 1	Max. Storage	=	2,122 cuft

Storage Indication method used.



Hydrograph Report

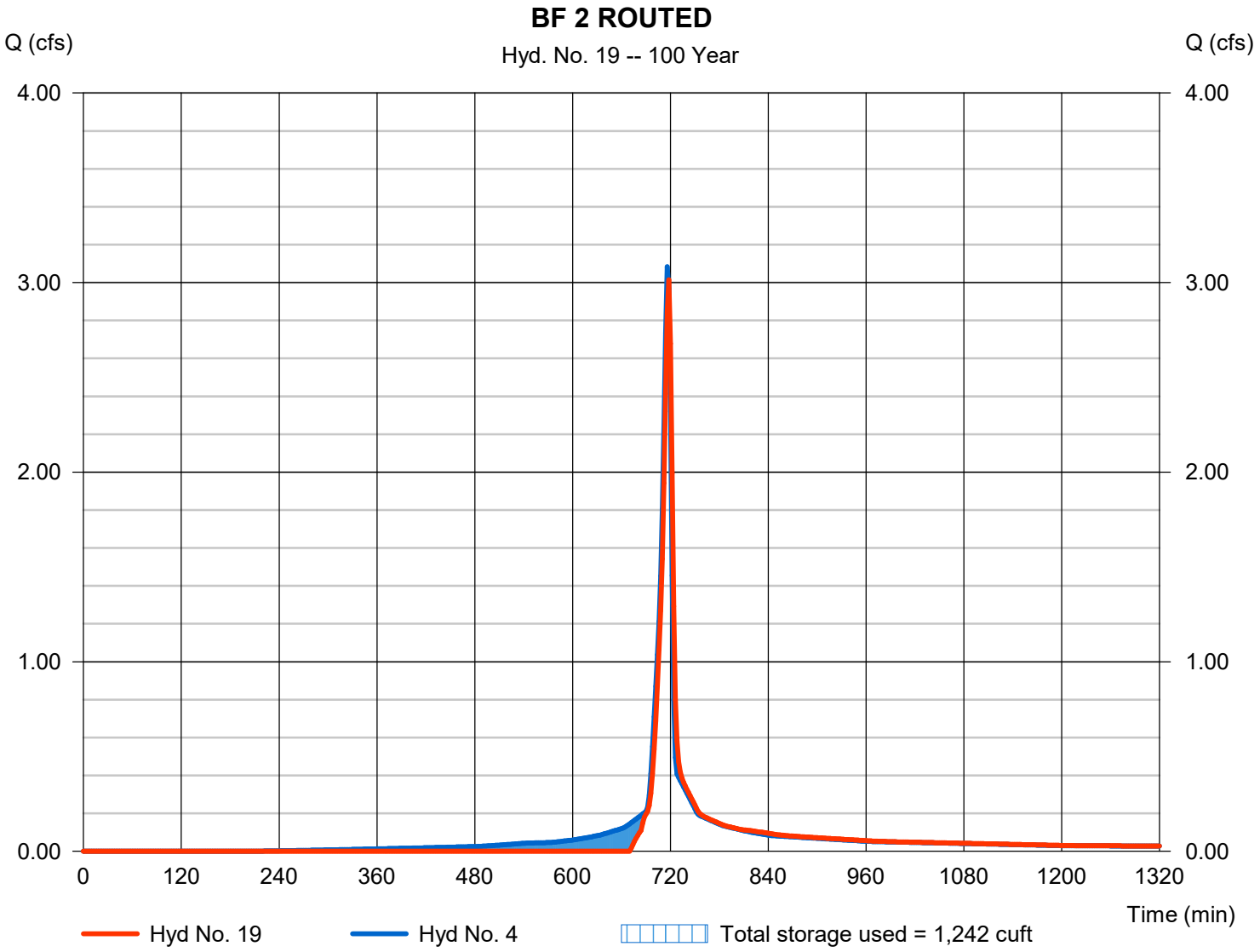
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 19

BF 2 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	3.014 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	5,805 cuft
Inflow hyd. No.	=	4 - POST A-BF 2	Max. Elevation	=	449.26 ft
Reservoir name	=	BIORETENTION FILTER 2	Max. Storage	=	1,242 cuft

Storage Indication method used.



Hydrograph Report

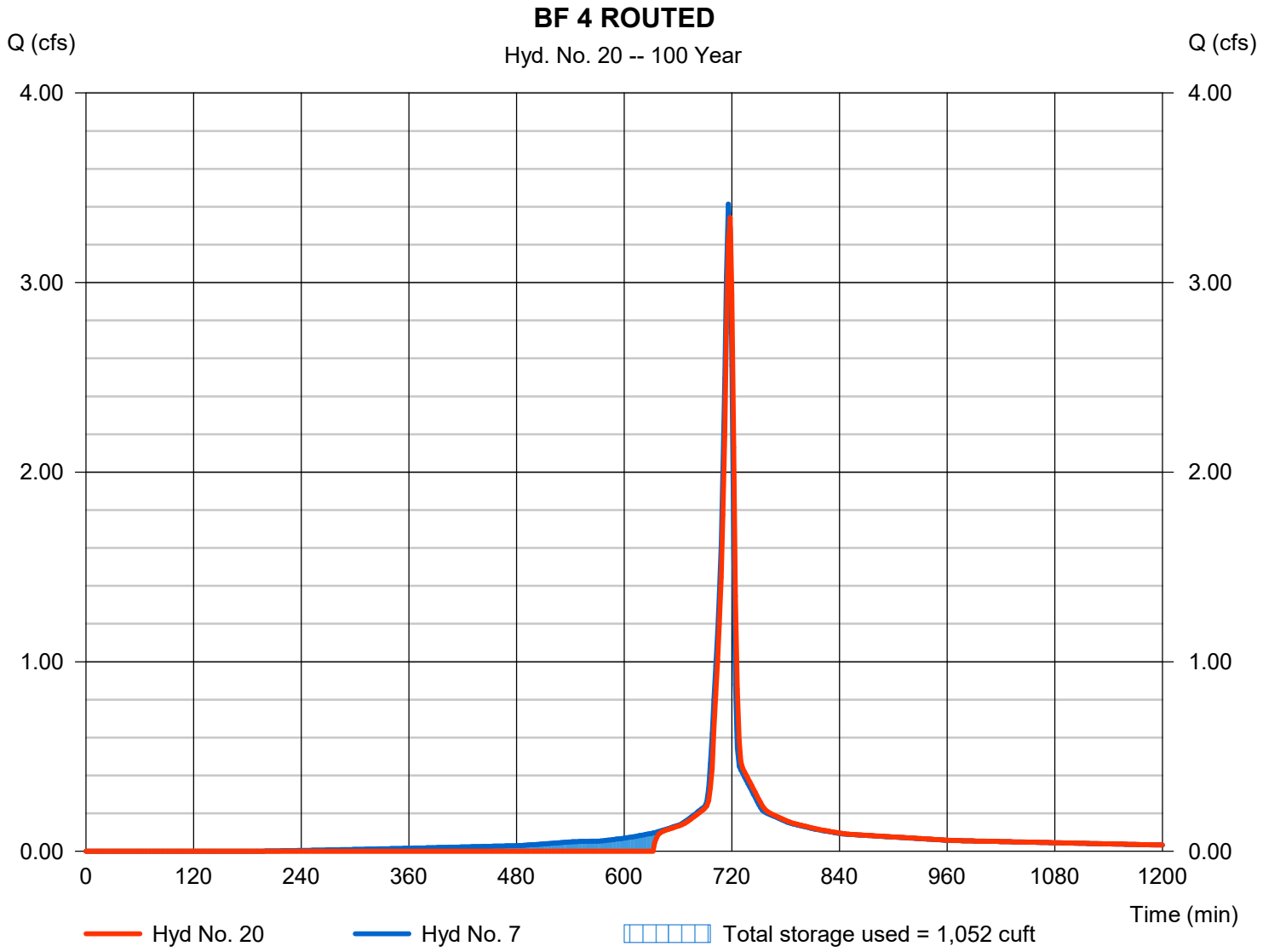
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 20

BF 4 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	3.344 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	6,714 cuft
Inflow hyd. No.	=	7 - POST A-BF 4	Max. Elevation	=	449.74 ft
Reservoir name	=	BIORETENTION FILTER 4	Max. Storage	=	1,052 cuft

Storage Indication method used.



Hydrograph Report

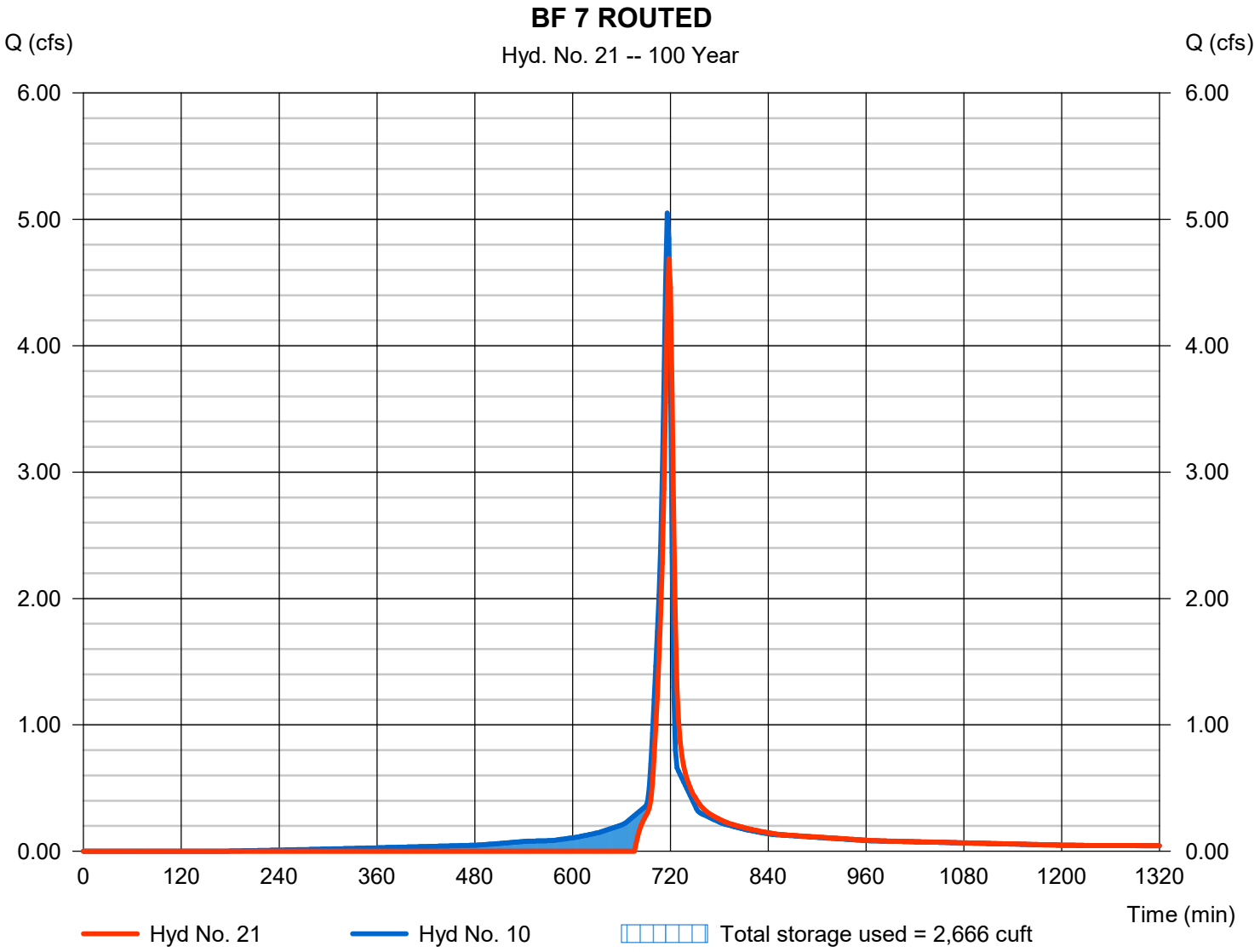
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 21

BF 7 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	4.691 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	9,407 cuft
Inflow hyd. No.	=	10 - POST A-BF 7	Max. Elevation	=	449.74 ft
Reservoir name	=	BIORETENTION FILTER 7	Max. Storage	=	2,666 cuft

Storage Indication method used.



Hydrograph Report

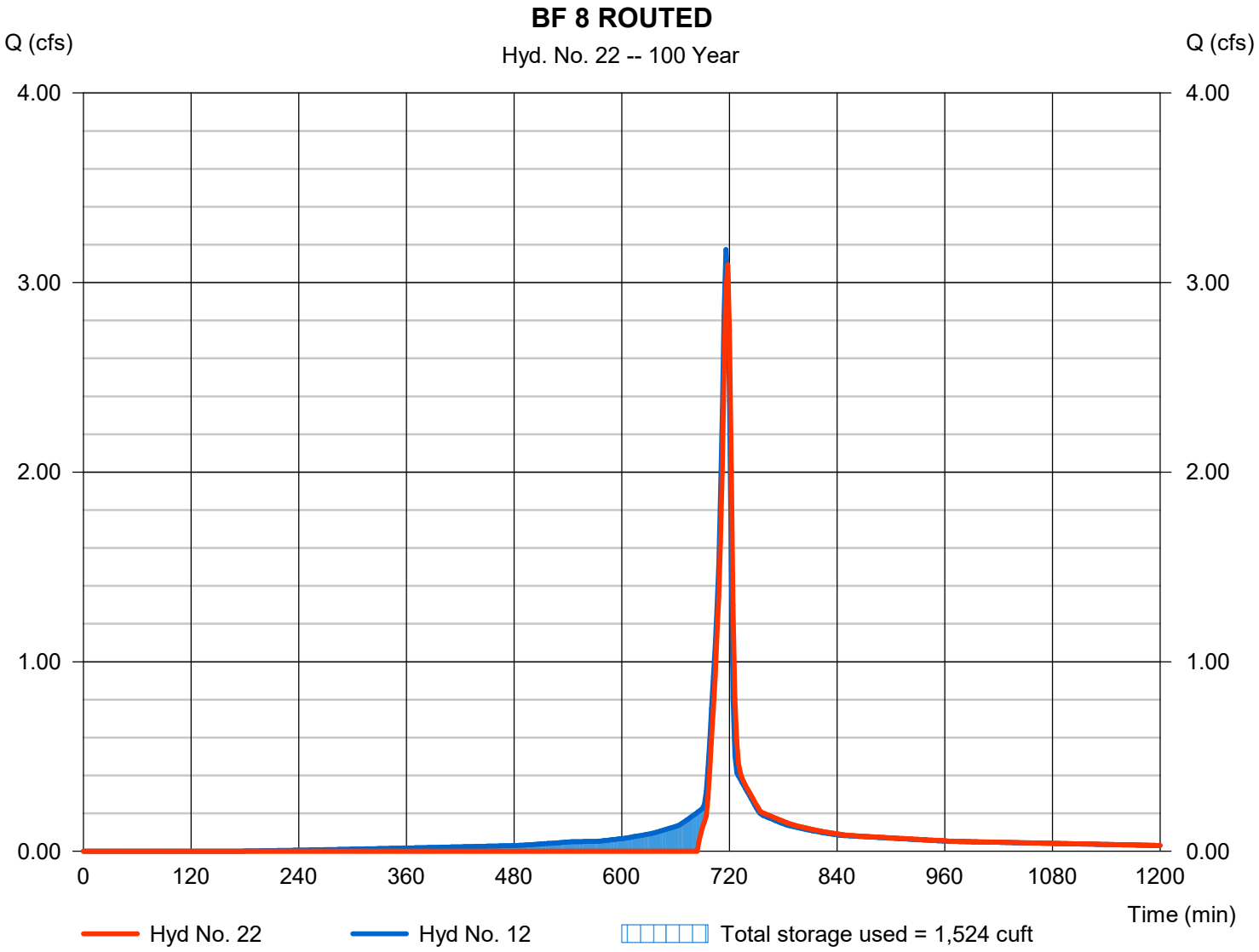
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 22

BF 8 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	3.094 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	5,823 cuft
Inflow hyd. No.	=	12 - POST B-BF 8	Max. Elevation	=	449.25 ft
Reservoir name	=	BIORETENTION FILTER 8	Max. Storage	=	1,524 cuft

Storage Indication method used.



Hydrograph Report

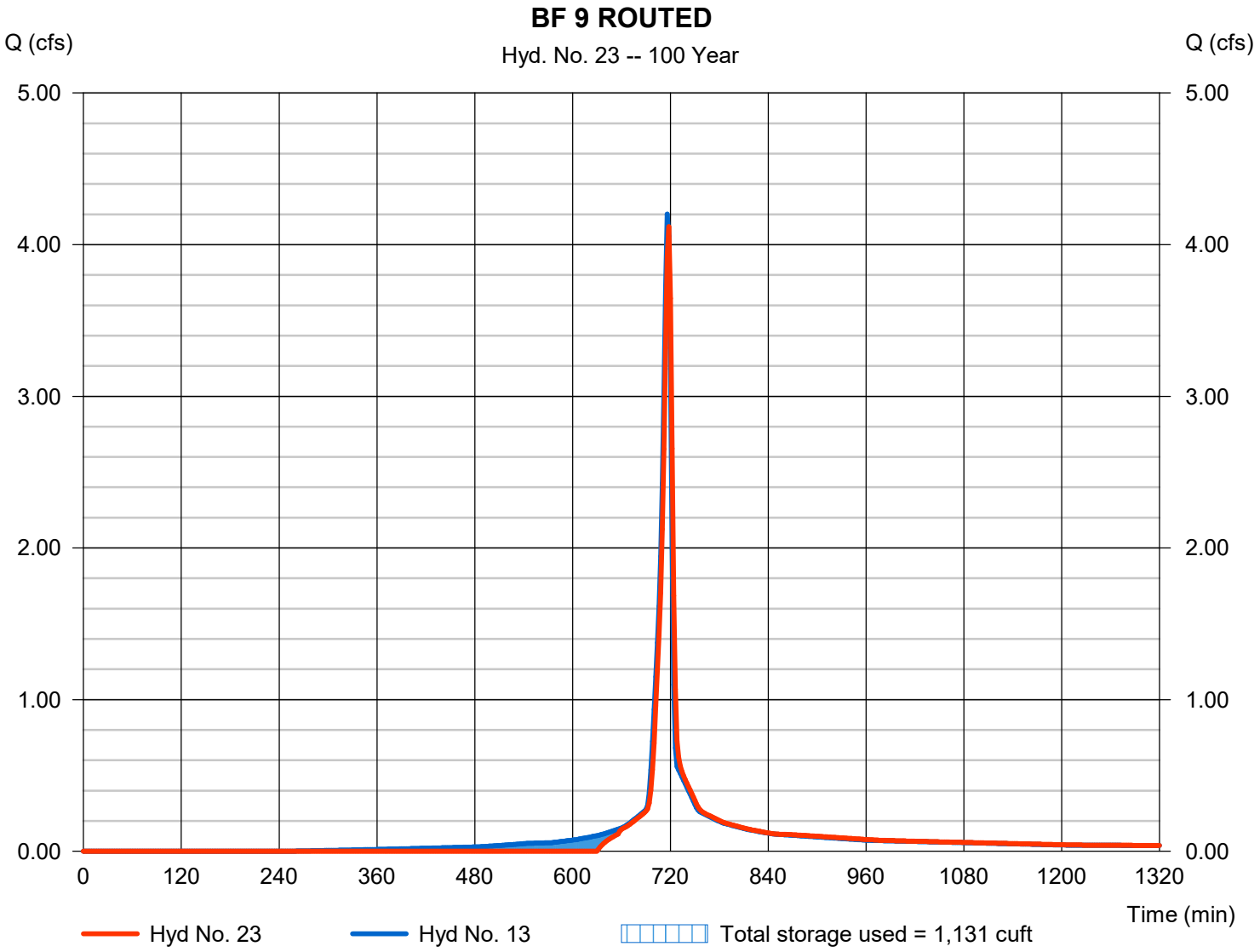
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 23

BF 9 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	4.119 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	8,257 cuft
Inflow hyd. No.	=	13 - POST B-BF 9	Max. Elevation	=	449.25 ft
Reservoir name	=	BIORETENTION FILTER 9	Max. Storage	=	1,131 cuft

Storage Indication method used.



Hydrograph Report

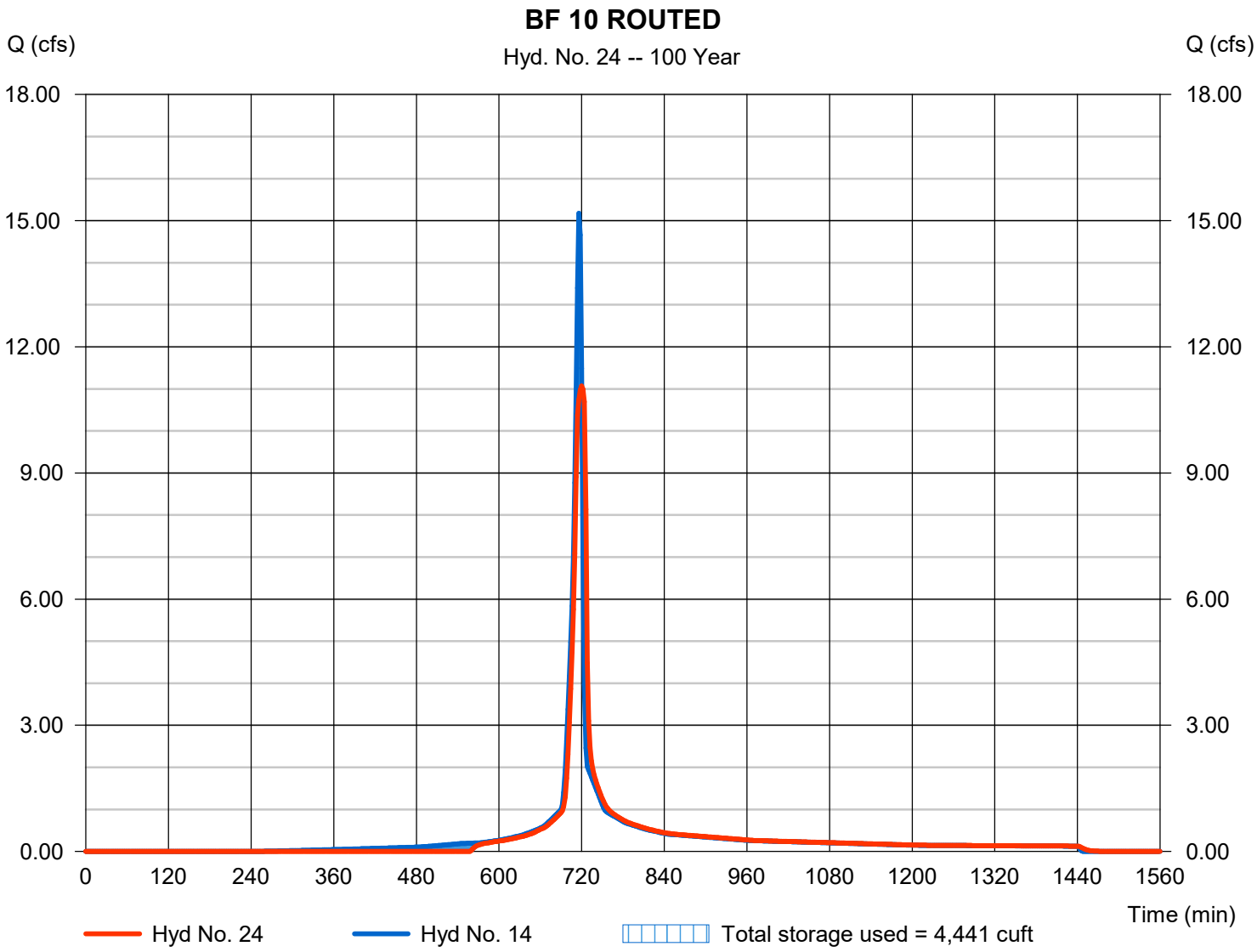
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 24

BF 10 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	11.07 cfs
Storm frequency	=	100 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	30,952 cuft
Inflow hyd. No.	=	14 - POST B-BF 10	Max. Elevation	=	449.77 ft
Reservoir name	=	BIORETENTION FILTER 10	Max. Storage	=	4,441 cuft

Storage Indication method used.



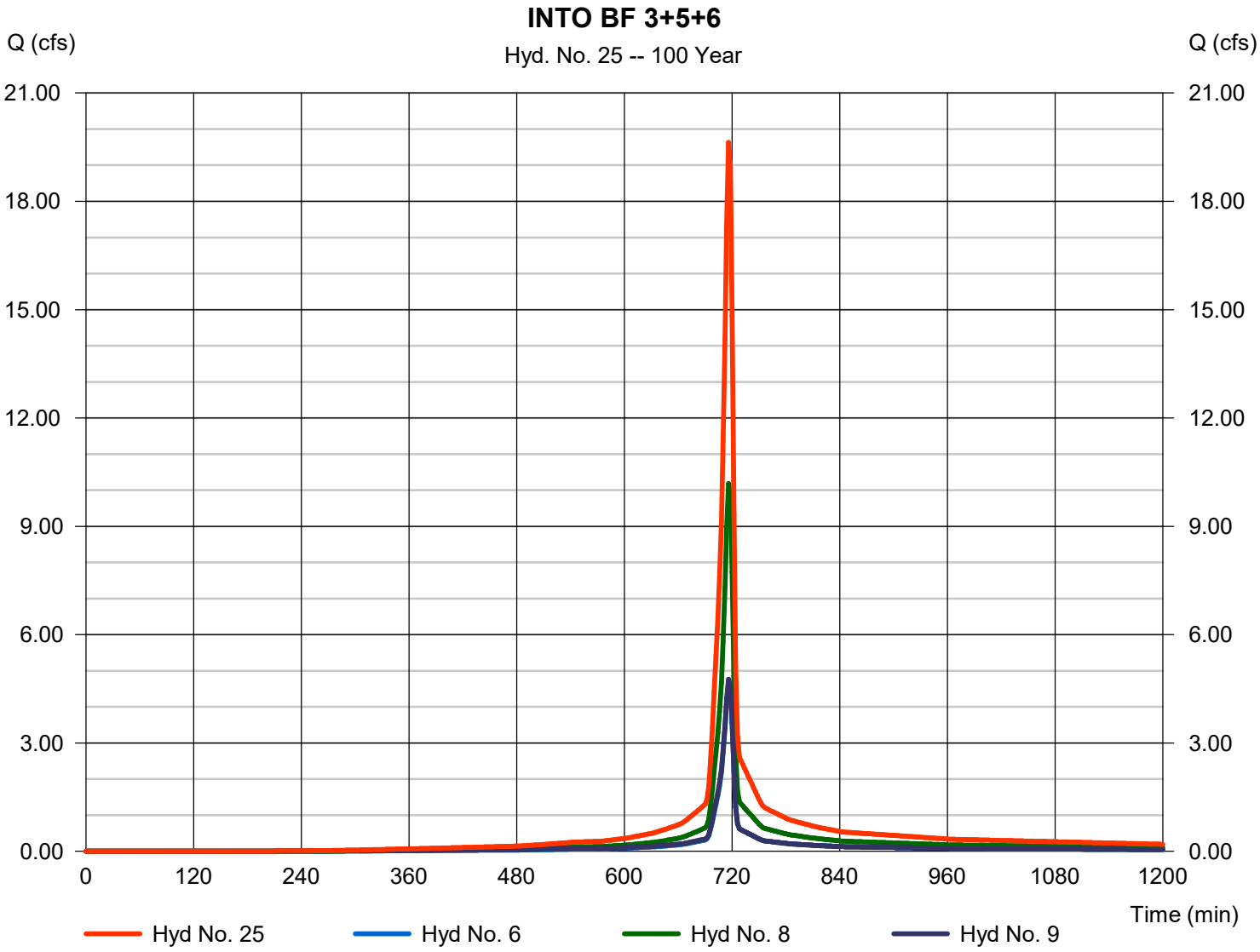
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 25

INTO BF 3+5+6

Hydrograph type	= Combine	Peak discharge	= 19.63 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 42,100 cuft
Inflow hyds.	= 6, 8, 9	Contrib. drain. area	= 2.870 ac



Hydrograph Report

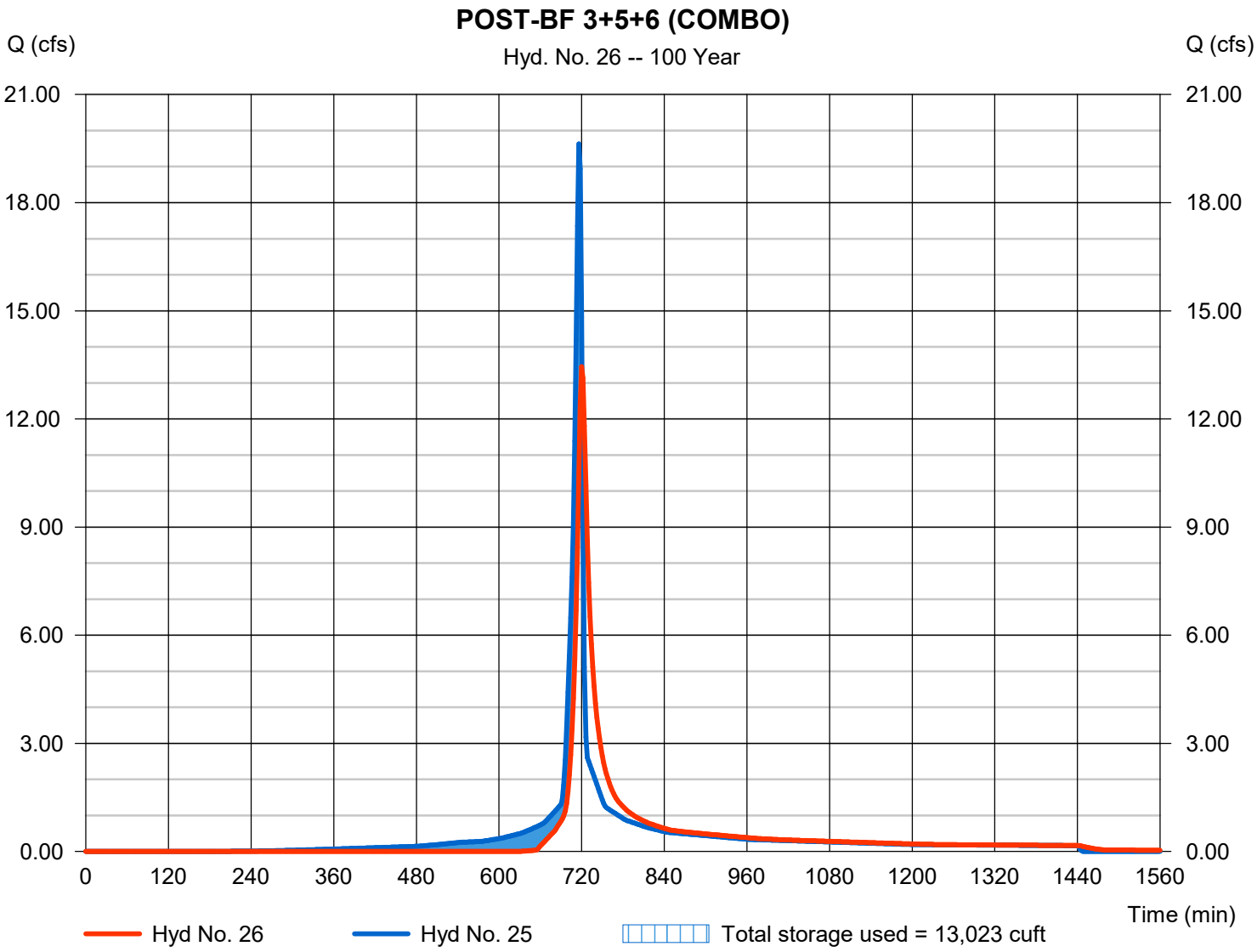
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 26

POST-BF 3+5+6 (COMBO)

Hydrograph type	=	Reservoir	Peak discharge	=	13.45 cfs
Storm frequency	=	100 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	38,595 cuft
Inflow hyd. No.	=	25 - INTO BF 3+5+6	Max. Elevation	=	449.22 ft
Reservoir name	=	BIORETENTION FILTERS 3+5+6 COMBINED	Max. Storage	=	13,023 cuft

Storage Indication method used.



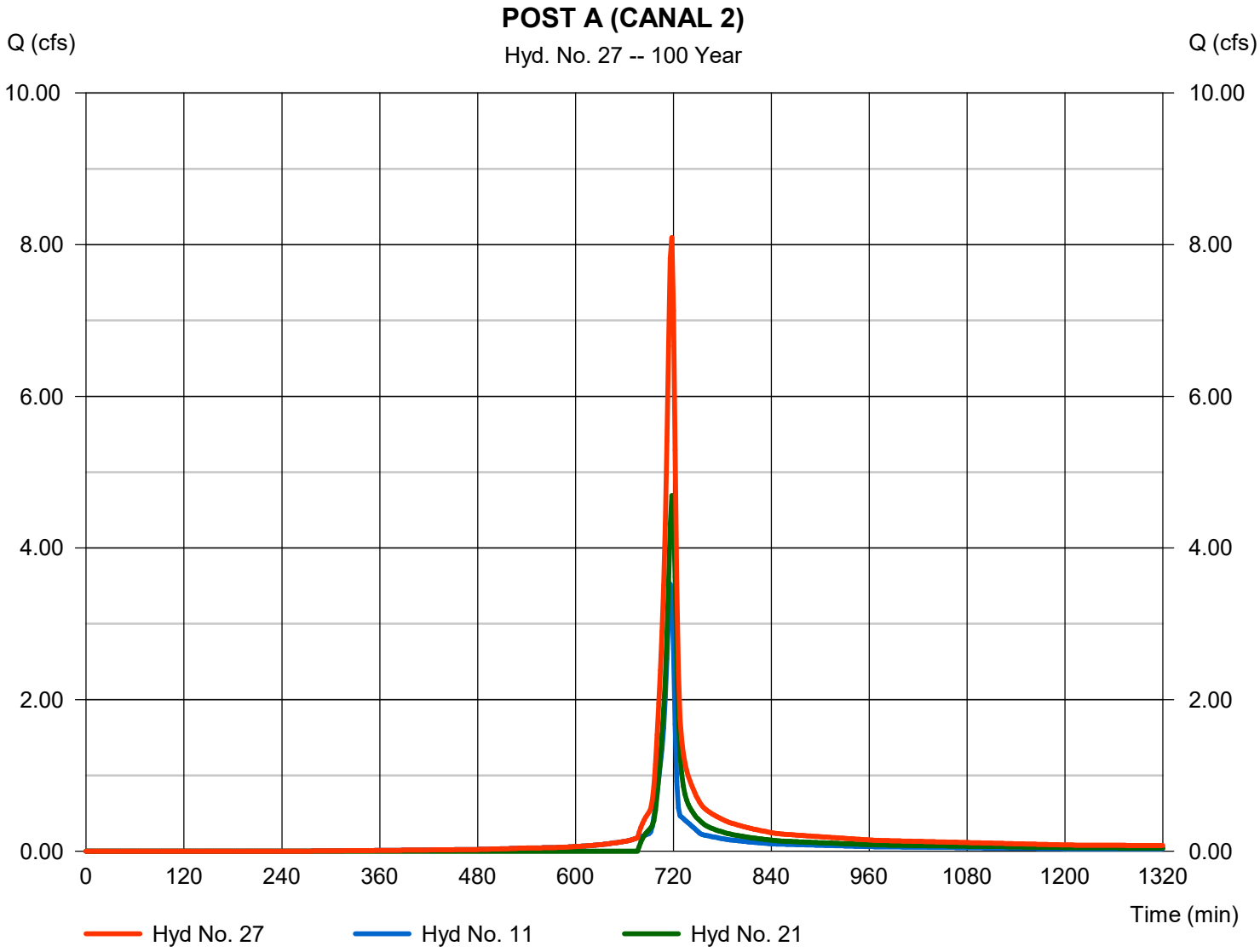
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 27

POST A (CANAL 2)

Hydrograph type	=	Combine	Peak discharge	=	8.094 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	16,913 cuft
Inflow hyds.	=	11, 21	Contrib. drain. area	=	0.520 ac



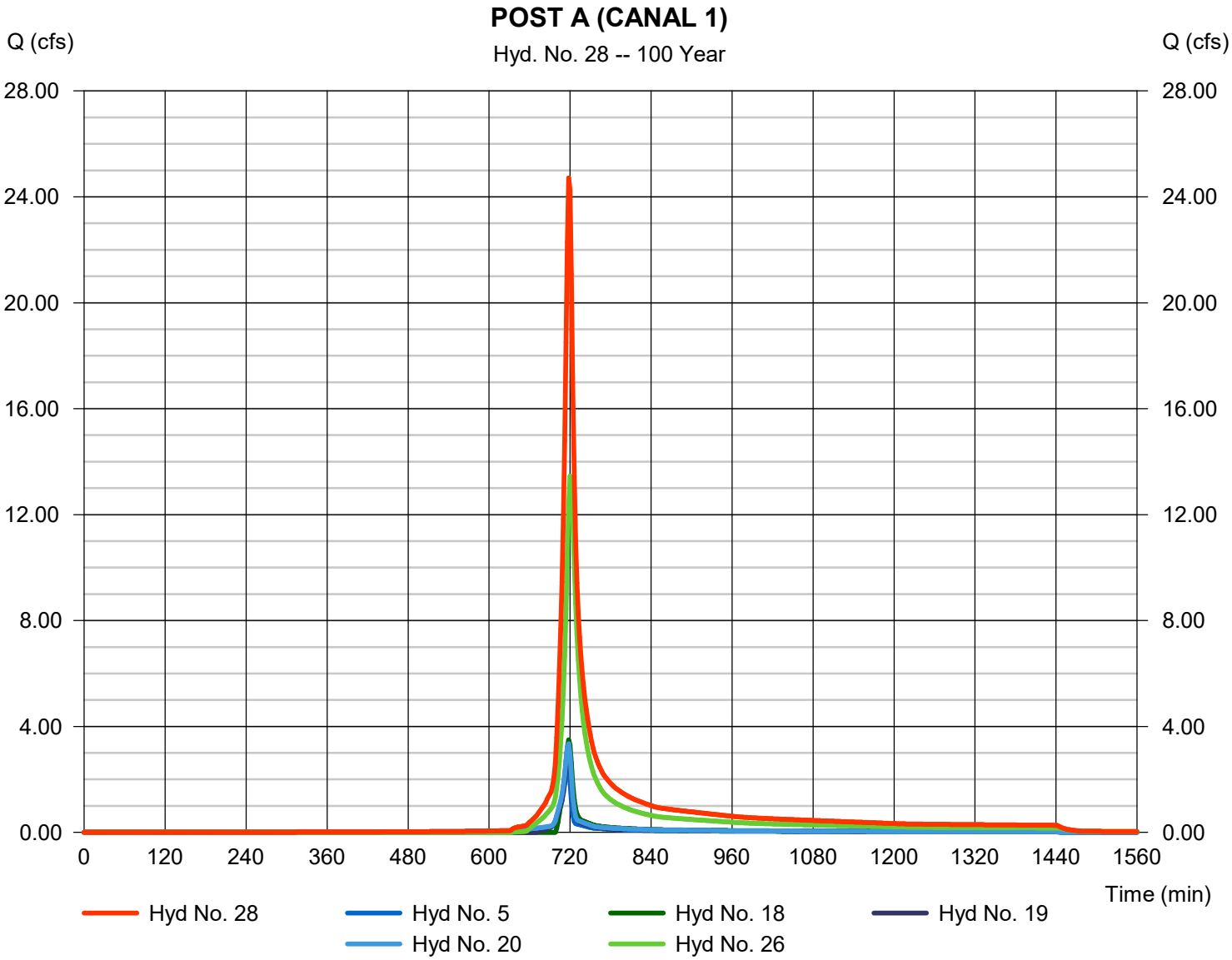
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 28

POST A (CANAL 1)

Hydrograph type	= Combine	Peak discharge	= 24.71 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 63,095 cuft
Inflow hyds.	= 5, 18, 19, 20, 26	Contrib. drain. area	= 0.360 ac



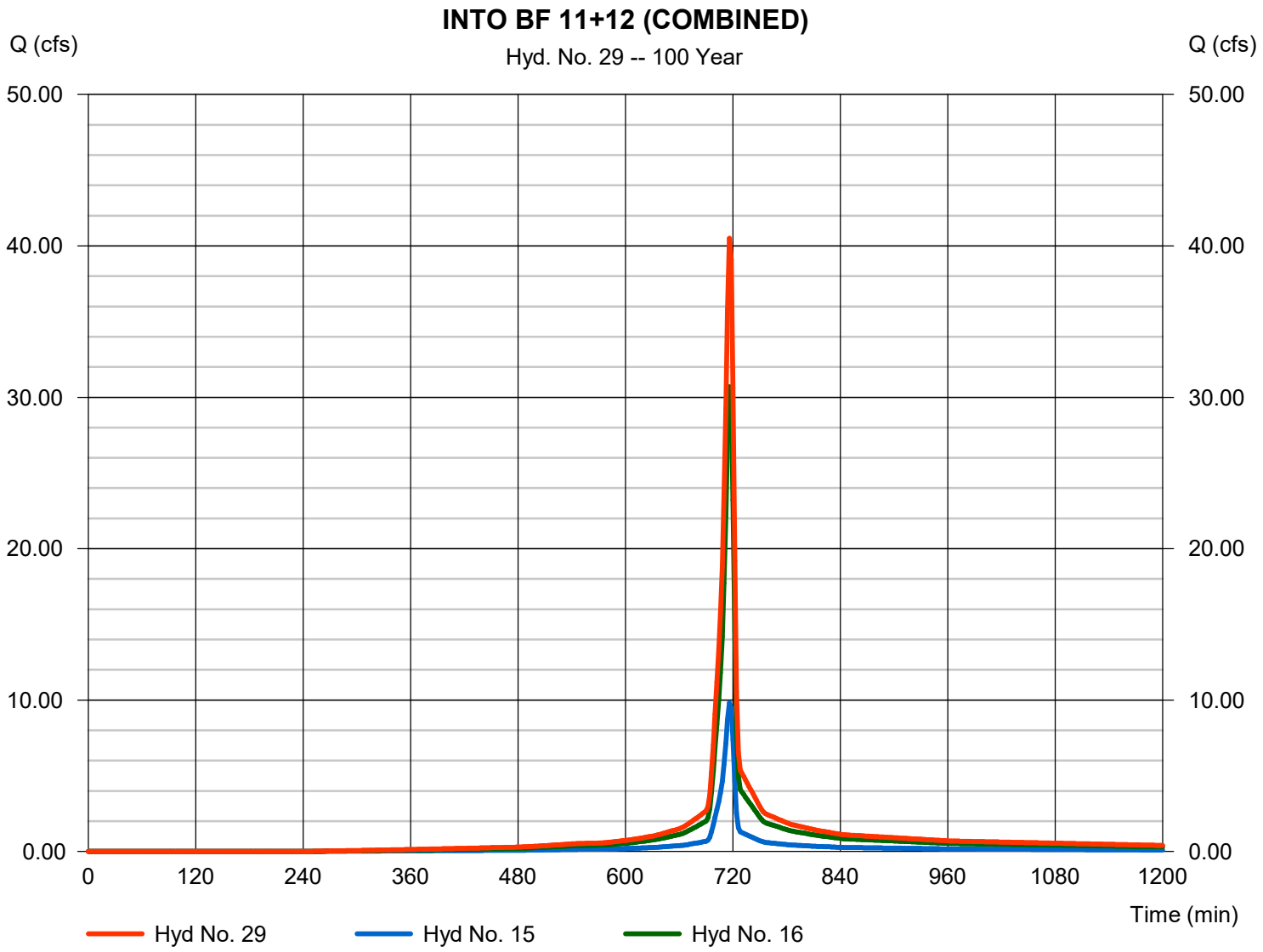
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 29

INTO BF 11+12 (COMBINED)

Hydrograph type	=	Combine	Peak discharge	=	40.50 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	86,623 cuft
Inflow hyds.	=	15, 16	Contrib. drain. area	=	5.930 ac



Hydrograph Report

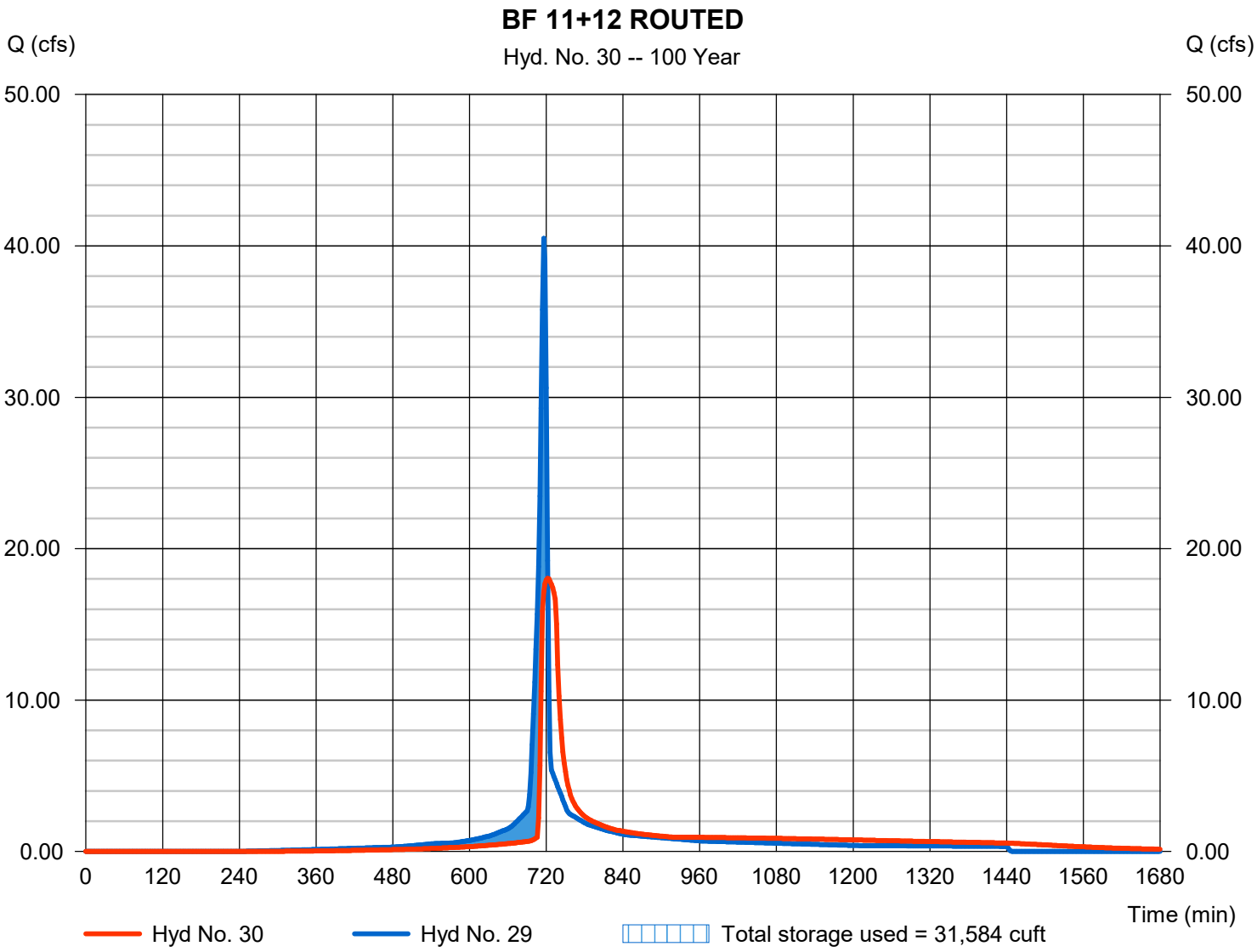
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 30

BF 11+12 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	18.04 cfs
Storm frequency	=	100 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	86,611 cuft
Inflow hyd. No.	=	29 - INTO BF 11+12 (COMBINED)	Max. Elevation	=	451.18 ft
Reservoir name	=	BIORETENTION FILTERS 11+12 COMBINED	Max. Storage	=	31,584 cuft

Storage Indication method used.



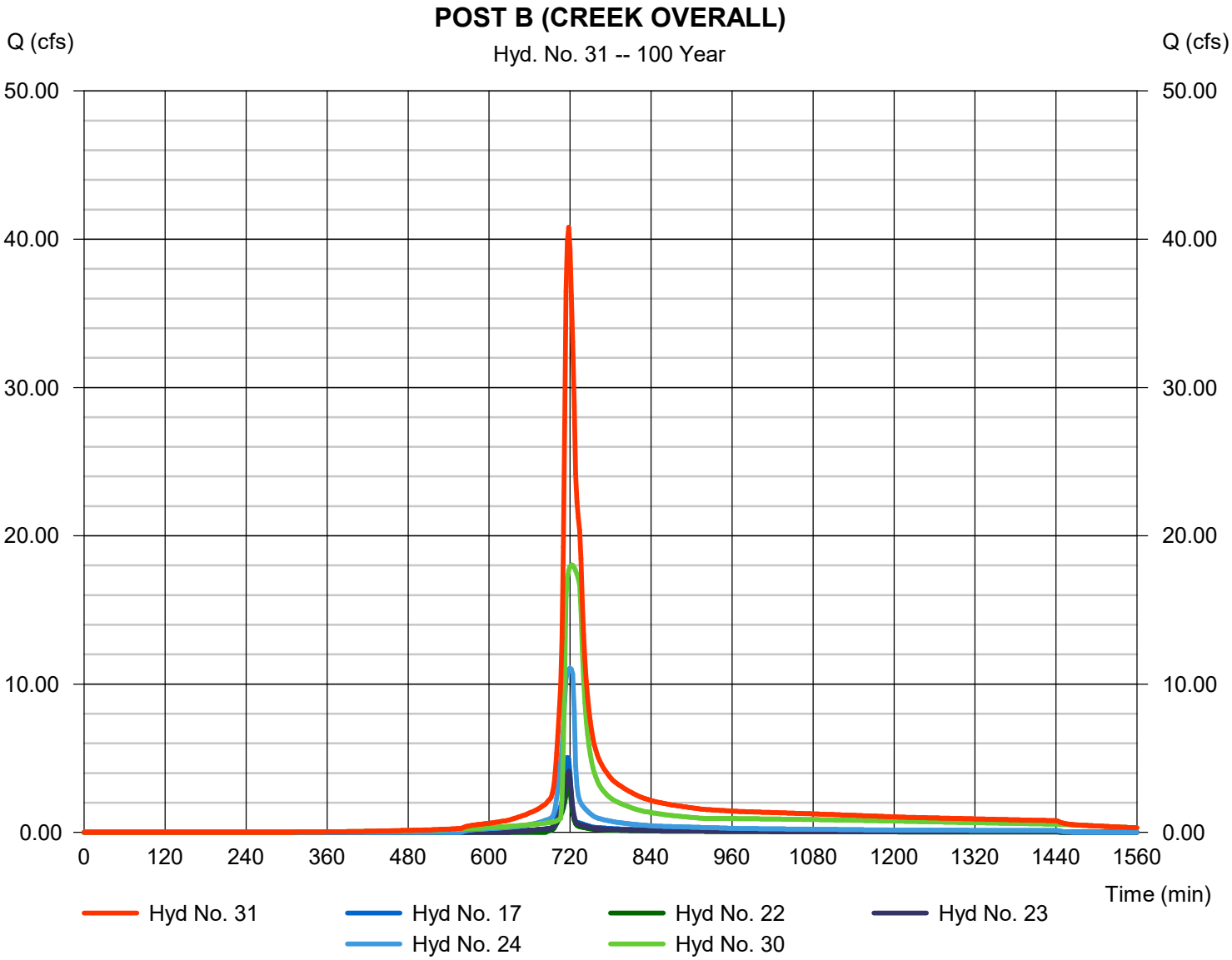
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 31

POST B (CREEK OVERALL)

Hydrograph type	= Combine	Peak discharge	= 40.81 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 141,939 cuft
Inflow hyds.	= 17, 22, 23, 24, 30	Contrib. drain. area	= 0.910 ac



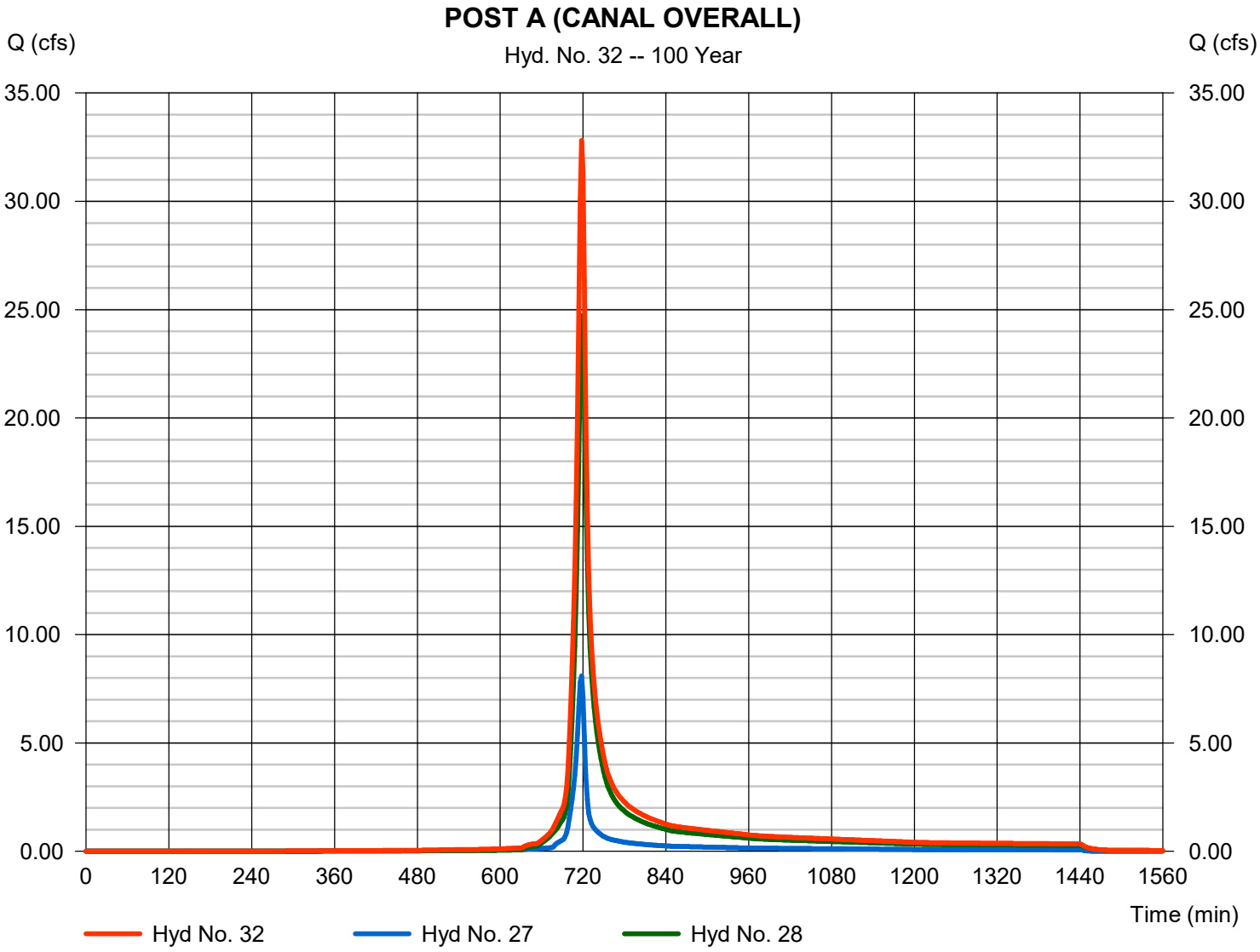
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 32

POST A (CANAL OVERALL)

Hydrograph type	= Combine	Peak discharge	= 32.81 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 80,008 cuft
Inflow hyds.	= 27, 28	Contrib. drain. area	= 0.000 ac



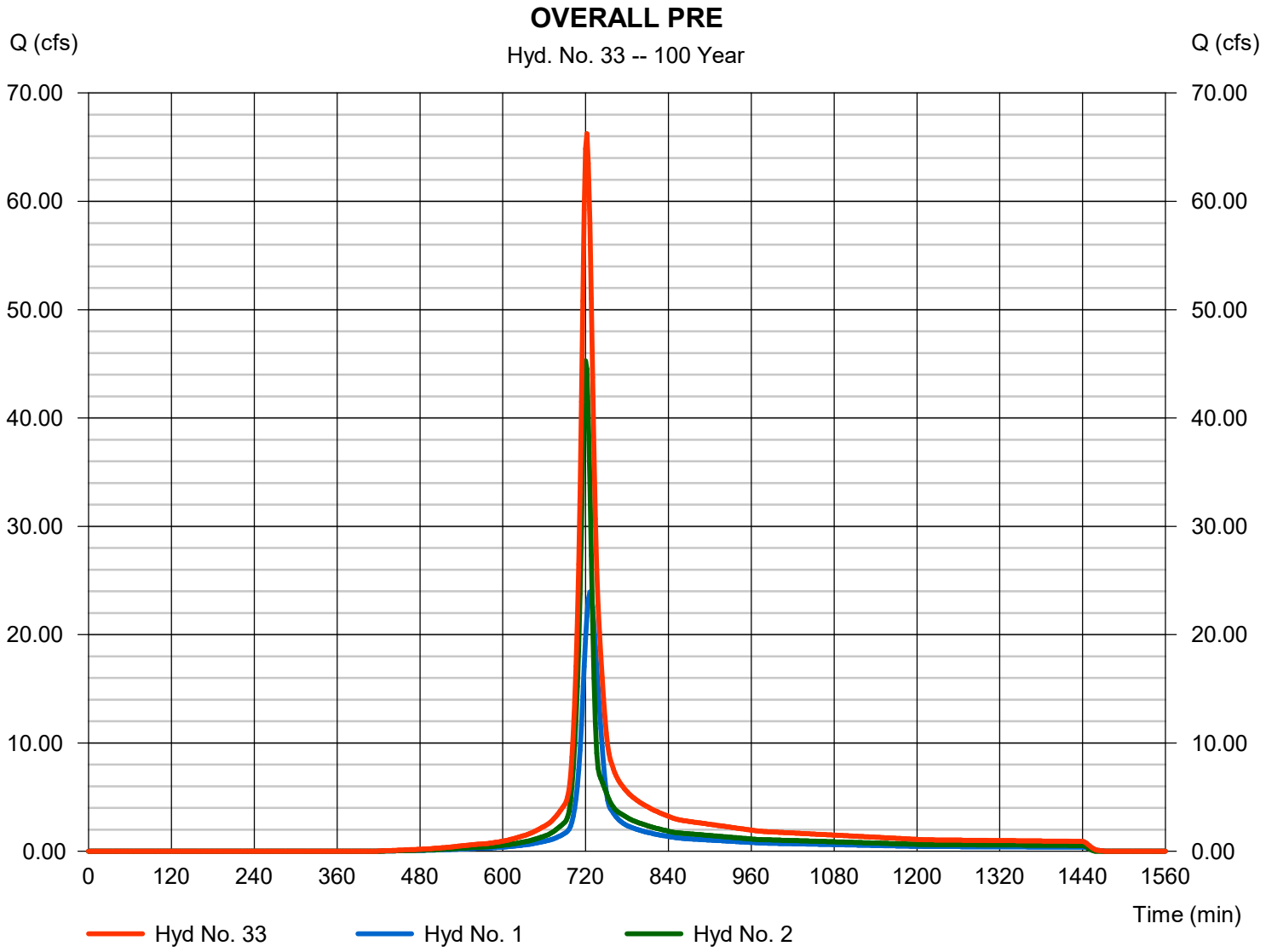
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 33

OVERALL PRE

Hydrograph type	=	Combine	Peak discharge	=	66.24 cfs
Storm frequency	=	100 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	200,310 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	15.990 ac



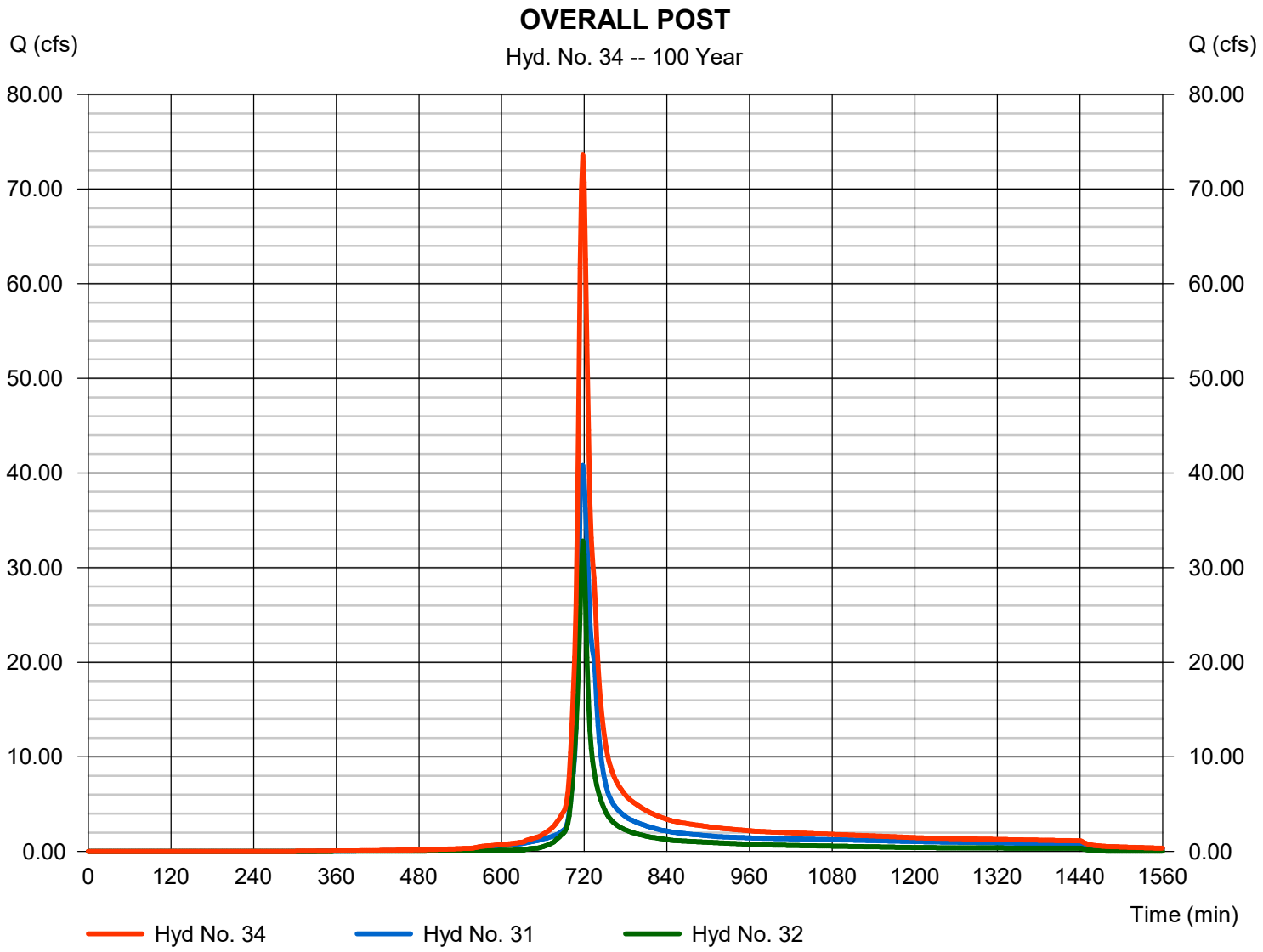
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Monday, 11 / 4 / 2024

Hyd. No. 34

OVERALL POST

Hydrograph type	= Combine	Peak discharge	= 73.62 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 221,947 cuft
Inflow hyds.	= 31, 32	Contrib. drain. area	= 0.000 ac



ADDITIONAL CALCULATIONS

Water Quality Volume

*WQv = P * Rv * A / 12*
*Where: Rv = (0.05+0.009 * I) (min 0.20)*

	Redevelopment *(Redeveloped Impervious Area)*	New Development *(New Development - Redeveloped Impervious)*
Impervious Cover (acres):	0.551	6.889
Drainage Area (acres):	0.551	14.209
Imperviousness, I (%):	100%	48.5%
WQ Storm, P (in):	1.0	1.0
Rv:	0.95	0.49
WQ Volume Required (acre-feet):	0.044	0.576
WQ Volume Required (cubic feet):	1,900	25,085
Total WQ Volume Required (acre-feet):	0.587	
(25% of Redevelopment WQv and 100% of New Development WQv)		
Total WQ Volume Required (cubic feet):	25,560	
Provided WQv [Sum of WQv from all practices] (acre-feet):	0.589	
Provided WQv [Sum of WQv from all practices] (cubic feet):	25,675	**> WQv Req'd, OK**

Runoff Reduction Calculations

RRv = (P) (Rv) (Ai) / 12*
Where: Ai = (S) (Aic)

Impervious Cover (acres), Aic:	0.55	
WQ Storm, P:	1.0	
HSG Reduction Factor, S:	0.2	
Impervious Cover targeted for RRv, Ai:	0.11	
Rv*:	0.95	
Minimum RRv (acre-feet):	0.009	
Minimum RRv (cubic feet):	380	
Provided RRv [100% of WQv from all practices] (acre-feet)*:	0.589	
Provided RRv [100% of WQv from all practices] (cubic feet)*:	25,674	**> Min. RRv Req'd, OK**

Bioretention Filter Design 1

Water Quality Volume

*WQv = P * Rv * A / 12*
*Where: Rv = (0.05+0.009 * I)*

Impervious Cover (acres):	0.29
Drainage Area (acres):	0.52
Imperviousness, I (%):	56%
WQ Storm, P (in):	1.00
Rv:	0.55
WQ Volume Required (acre-feet):	0.024
WQ Volume Required (cubic feet):	1,040

Bioretention Filter Sizing

SA = WQv d/[k*(d+h)*t)]*

WQv (cf):	1,040	
Depth of Filter Media, d, (ft):	2.50	
Coefficient of Permability, k, (ft/day):	1.00	
Average Height of Water above Filter Bed, h, (ft):	0.275	
Filter Bed Drain Time, t, (days):	2	
Surface Area Required, SA, (sf):	468	
Surface Area Provided, (sf):	2,559	**> Req'd, OK**

Bioretention Filter Design 2

Water Quality Volume

*WQv = P * Rv * A / 12*
*Where: Rv = (0.05+0.009 * I)*

Impervious Cover (acres):	0.23
Drainage Area (acres):	0.42
Imperviousness, I (%):	55%
WQ Storm, P (in):	1.00
Rv:	0.55
WQ Volume Required (acre-feet):	0.019
WQ Volume Required (cubic feet):	825

Bioretention Filter Sizing

SA = WQv d/[k*(d+h)*t)]*

WQv (cf):	825	
Depth of Filter Media, d, (ft):	2.50	
Coefficient of Permability, k, (ft/day):	1.00	
Average Height of Water above Filter Bed, h, (ft):	0.29	
Filter Bed Drain Time, t, (days):	2	
Surface Area Required, SA, (sf):	370	
Surface Area Provided, (sf):	1,445	**> Req'd, OK**

Bioretention Filter Design 3

Water Quality Volume

*WQv = P * Rv * A / 12*
*Where: Rv = (0.05+0.009 * I)*

Impervious Cover (acres):	0.35
Drainage Area (acres):	0.68
Imperviousness, I (%):	52%
WQ Storm, P (in):	1.00
Rv:	0.52
WQ Volume Required (acre-feet):	0.029
WQ Volume Required (cubic feet):	1,265

Bioretention Filter Sizing

SA = WQv d/[k*(d+h)*t)]*

WQv (cf):	1,265	
Depth of Filter Media, d, (ft):	2.50	
Coefficient of Permability, k, (ft/day):	1.00	
Average Height of Water above Filter Bed, h, (ft):	0.125	
Filter Bed Drain Time, t, (days):	2	
Surface Area Required, SA, (sf):	602	
Surface Area Provided, (sf):	2,135	**> Req'd, OK**

Bioretention Filter Design 4

Water Quality Volume

*WQv = P * Rv * A / 12*
*Where: Rv = (0.05+0.009 * I)*

Impervious Cover (acres):	0.29
Drainage Area (acres):	0.46
Imperviousness, I (%):	62%
WQ Storm, P (in):	1.00
Rv:	0.61
WQ Volume Required (acre-feet):	0.024
WQ Volume Required (cubic feet):	1,030

Bioretention Filter Sizing

SA = WQv d/[k*(d+h)*t)]*

WQv (cf):	1,030	
Depth of Filter Media, d, (ft):	2.50	
Coefficient of Permability, k, (ft/day):	1.00	
Average Height of Water above Filter Bed, h, (ft):	0.275	
Filter Bed Drain Time, t, (days):	2	
Surface Area Required, SA, (sf):	464	
Surface Area Provided, (sf):	1,195	**> Req'd, OK**

Bioretention Filter Design 5

Water Quality Volume

*WQv = P * Rv * A / 12*
*Where: Rv = (0.05+0.009 * I)*

Impervious Cover (acres):	0.62
Drainage Area (acres):	1.53
Imperviousness, I (%):	40%
WQ Storm, P (in):	1.00
Rv:	0.41
WQ Volume Required (acre-feet):	0.053
WQ Volume Required (cubic feet):	2,305

Bioretention Filter Sizing

SA = WQv d/[k*(d+h)*t)]*

WQv (cf):	2,305
Depth of Filter Media, d, (ft):	2.50
Coefficient of Permability, k, (ft/day):	1.00
Average Height of Water above Filter Bed, h, (ft):	0.125
Filter Bed Drain Time, t, (days):	2
Surface Area Required, SA, (sf):	1,098
Surface Area Provided, (sf):	12,393 **> Req'd, OK**

Bioretention Filter Design 6

Water Quality Volume

*WQv = P * Rv * A / 12*
*Where: Rv = (0.05+0.009 * I)*

Impervious Cover (acres):	0.43
Drainage Area (acres):	0.66
Imperviousness, I (%):	65%
WQ Storm, P (in):	1.00
Rv:	0.63
WQ Volume Required (acre-feet):	0.035
WQ Volume Required (cubic feet):	1,525

Bioretention Filter Sizing

SA = WQv d/[k*(d+h)*t)]*

WQv (cf):	1,525	
Depth of Filter Media, d, (ft):	2.50	
Coefficient of Permability, k, (ft/day):	1.00	
Average Height of Water above Filter Bed, h, (ft):	0.125	
Filter Bed Drain Time, t, (days):	2	
Surface Area Required, SA, (sf):	726	
Surface Area Provided, (sf):	1,968	**> Req'd, OK**

Bioretention Filter Design 7

Water Quality Volume

*WQv = P * Rv * A / 12*
*Where: Rv = (0.05+0.009 * I)*

Impervious Cover (acres):	0.45
Drainage Area (acres):	0.70
Imperviousness, I (%):	64%
WQ Storm, P (in):	1.00
Rv:	0.63
WQ Volume Required (acre-feet):	0.037
WQ Volume Required (cubic feet):	1,595

Bioretention Filter Sizing

SA = WQv d/[k*(d+h)*t)]*

WQv (cf):	1,595	
Depth of Filter Media, d, (ft):	2.50	
Coefficient of Permability, k, (ft/day):	1.00	
Average Height of Water above Filter Bed, h, (ft):	0.25	
Filter Bed Drain Time, t, (days):	2	
Surface Area Required, SA, (sf):	725	
Surface Area Provided, (sf):	3,257	**> Req'd, OK**

Bioretention Filter Design 8

Water Quality Volume

*WQv = P * Rv * A / 12*
*Where: Rv = (0.05+0.009 * I)*

Impervious Cover (acres):	0.30
Drainage Area (acres):	0.44
Imperviousness, I (%):	68%
WQ Storm, P (in):	1.00
Rv:	0.66
WQ Volume Required (acre-feet):	0.024
WQ Volume Required (cubic feet):	1,060

Bioretention Filter Sizing

SA = WQv d/[k*(d+h)*t)]*

WQv (cf):	1,060	
Depth of Filter Media, d, (ft):	2.50	
Coefficient of Permability, k, (ft/day):	1.00	
Average Height of Water above Filter Bed, h, (ft):	0.41	
Filter Bed Drain Time, t, (days):	2	
Surface Area Required, SA, (sf):	455	
Surface Area Provided, (sf):	1,158	**> Req'd, OK**

Bioretention Filter Design 9

Water Quality Volume

*WQv = P * Rv * A / 12*
*Where: Rv = (0.05+0.009 * I)*

Impervious Cover (acres):	0.29
Drainage Area (acres):	0.62
Imperviousness, I (%):	47%
WQ Storm, P (in):	1.00
Rv:	0.47
WQ Volume Required (acre-feet):	0.024
WQ Volume Required (cubic feet):	1,060

Bioretention Filter Sizing

SA = WQv d/[k*(d+h)*t)]*

WQv (cf):	1,060	
Depth of Filter Media, d, (ft):	2.50	
Coefficient of Permability, k, (ft/day):	1.00	
Average Height of Water above Filter Bed, h, (ft):	0.265	
Filter Bed Drain Time, t, (days):	2	
Surface Area Required, SA, (sf):	479	
Surface Area Provided, (sf):	1,203	**> Req'd, OK**

Bioretention Filter Design 10

Water Quality Volume

*WQv = P * Rv * A / 12*
*Where: Rv = (0.05+0.009 * I)*

Impervious Cover (acres):	1.00
Drainage Area (acres):	2.24
Imperviousness, I (%):	45%
WQ Storm, P (in):	1.00
Rv:	0.45
WQ Volume Required (acre-feet):	0.084
WQ Volume Required (cubic feet):	3,675

Bioretention Filter Sizing

SA = WQv d/[k*(d+h)*t)]*

WQv (cf):	3,675	
Depth of Filter Media, d, (ft):	2.50	
Coefficient of Permability, k, (ft/day):	1.00	
Average Height of Water above Filter Bed, h, (ft):	0.175	
Filter Bed Drain Time, t, (days):	2	
Surface Area Required, SA, (sf):	1,717	
Surface Area Provided, (sf):	4,525	**> Req'd, OK**

Bioretention Filter Design 11

Water Quality Volume

*WQv = P * Rv * A / 12*
*Where: Rv = (0.05+0.009 * I)*

Impervious Cover (acres):	0.77
Drainage Area (acres):	1.40
Imperviousness, I (%):	55%
WQ Storm, P (in):	1.00
Rv:	0.55
WQ Volume Required (acre-feet):	0.064
WQ Volume Required (cubic feet):	2,770

Bioretention Filter Sizing

SA = WQv d/[k*(d+h)*t)]*

WQv (cf):	2,770	
Depth of Filter Media, d, (ft):	2.50	
Coefficient of Permability, k, (ft/day):	1.00	
Average Height of Water above Filter Bed, h, (ft):	0.58	
Filter Bed Drain Time, t, (days):	2	
Surface Area Required, SA, (sf):	1,124	
Surface Area Provided, (sf):	3,348	**> Req'd, OK**

Bioretention Filter Design 12

Water Quality Volume

*WQv = P * Rv * A / 12*
*Where: Rv = (0.05+0.009 * I)*

Impervious Cover (acres):	2.05
Drainage Area (acres):	4.53
Imperviousness, I (%):	45%
WQ Storm, P (in):	1.00
Rv:	0.46
WQ Volume Required (acre-feet):	0.173
WQ Volume Required (cubic feet):	7,520

Bioretention Filter Sizing

SA = WQv d/[k*(d+h)*t)]*

WQv (cf):	7,520	
Depth of Filter Media, d, (ft):	2.50	
Coefficient of Permability, k, (ft/day):	1.00	
Average Height of Water above Filter Bed, h, (ft):	0.58	
Filter Bed Drain Time, t, (days):	2	
Surface Area Required, SA, (sf):	3,052	
Surface Area Provided, (sf):	8,817	**> Req'd, OK**

SOIL INFORMATION

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Schuyler County, New York

Waterside on Seneca

June 19, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:4,930 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
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: Schuyler County, New York
Survey Area Data: Version 20, Sep 6, 2023

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

Date(s) aerial images were photographed: Apr 1, 2020—Oct 1, 2020

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
Ce	Castile gravelly silt loam	7.1	10.1%
CnA	Chenango gravelly silt loam, 0 to 3 percent slopes	0.2	0.3%
CoB	Chenango channery silt loam, fan, 0 to 8 percent slopes	1.6	2.2%
Te	Teel silt loam	26.1	37.4%
W	Water	4.6	6.6%
Wk	Wallkill silt loam	4.2	6.0%
Wy	Wayland soils complex, non-calcareous substratum, 0 to 3 percent slopes, frequently flooded	26.2	37.4%
Totals for Area of Interest		**70.0**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not

mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Schuyler County, New York

Ce—Castile gravelly silt loam

Map Unit Setting

National map unit symbol: 9wjz
Elevation: 160 to 1,970 feet
Mean annual precipitation: 32 to 40 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 160 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Castile and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Castile

Setting

Landform: Terraces, valley trains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from sandstone, shale, and siltstone

Typical profile

H1 - 0 to 11 inches: gravelly silt loam
H2 - 11 to 35 inches: very gravelly loam
H3 - 35 to 50 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A/D
Ecological site: F140XY022NY - Moist Outwash
Hydric soil rating: No

Minor Components

Howard

Percent of map unit: 5 percent
Hydric soil rating: No

Red hook
Percent of map unit: 5 percent
Hydric soil rating: No

Philo
Percent of map unit: 5 percent
Hydric soil rating: No

Chenango
Percent of map unit: 5 percent
Hydric soil rating: No

CnA—Chenango gravelly silt loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 9wk1
Elevation: 600 to 1,800 feet
Mean annual precipitation: 32 to 40 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 160 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Chenango and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chenango

Setting
Landform: Terraces, valley trains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from sandstone, shale, and siltstone

Typical profile
H1 - 0 to 9 inches: gravelly silt loam
H2 - 9 to 37 inches: very gravelly loam
H3 - 37 to 50 inches: very gravelly sand

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F140XY021NY - Dry Outwash
Hydric soil rating: No

Minor Components

Castile

Percent of map unit: 5 percent
Hydric soil rating: No

Philo

Percent of map unit: 5 percent
Hydric soil rating: No

Unnamed soils

Percent of map unit: 5 percent
Hydric soil rating: No

Valois

Percent of map unit: 5 percent
Hydric soil rating: No

Howard

Percent of map unit: 5 percent
Hydric soil rating: No

CoB—Chenango channery silt loam, fan, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9wk3
Elevation: 160 to 1,970 feet
Mean annual precipitation: 32 to 40 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 160 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Chenango, fan, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chenango, Fan

Setting

Landform: Alluvial fans

Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from sandstone, shale, and siltstone

Typical profile

H1 - 0 to 8 inches: channery silt loam
H2 - 8 to 32 inches: very channery loam
H3 - 32 to 50 inches: very gravelly sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F140XY021NY - Dry Outwash
Hydric soil rating: No

Minor Components

Philo

Percent of map unit: 5 percent
Hydric soil rating: No

Castile

Percent of map unit: 5 percent
Hydric soil rating: No

Howard

Percent of map unit: 5 percent
Hydric soil rating: No

Teel

Percent of map unit: 5 percent
Hydric soil rating: No

Te—Teel silt loam

Map Unit Setting

National map unit symbol: 9wm0
Elevation: 600 to 1,800 feet
Mean annual precipitation: 32 to 40 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 160 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Teel and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Teel

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Silty alluvium

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 44 inches: silt loam
H3 - 44 to 50 inches: loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water supply, 0 to 60 inches: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: F101XY002NY - Low Floodplain
Hydric soil rating: No

Minor Components

Philo
Percent of map unit: 5 percent
Hydric soil rating: No

Wayland
Percent of map unit: 5 percent
Landform: Flood plains
Hydric soil rating: Yes

Howard
Percent of map unit: 5 percent
Hydric soil rating: No

Udifluvents
Percent of map unit: 5 percent
Hydric soil rating: No

W—Water

Map Unit Setting
National map unit symbol: 9wmf
Mean annual precipitation: 32 to 40 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition
Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Wk—Wallkill silt loam

Map Unit Setting
National map unit symbol: 9wmh
Elevation: 160 to 1,970 feet
Mean annual precipitation: 32 to 40 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition
Wallkill and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wallkill

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loamy alluvium over organic material

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 18 inches: silt loam
2O - 18 to 38 inches: muck
3C - 38 to 50 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 1 percent
Available water supply, 0 to 60 inches: Very high (about 13.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F140XY015NY - Wet Low Floodplain
Hydric soil rating: Yes

Minor Components

Udifluvents

Percent of map unit: 5 percent
Hydric soil rating: No

Fluvaquents

Percent of map unit: 5 percent
Landform: Flood plains
Hydric soil rating: Yes

Wayland

Percent of map unit: 5 percent
Landform: Flood plains
Hydric soil rating: Yes

Atkins

Percent of map unit: 5 percent
Landform: Flood plains
Hydric soil rating: Yes

Wy—Wayland soils complex, non-calcareous substratum, 0 to 3 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2srgt
Elevation: 160 to 1,970 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Wayland and similar soils: 60 percent
Wayland, very poorly drained, and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wayland

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty and clayey alluvium derived from interbedded sedimentary rock

Typical profile

Ap - 0 to 9 inches: silt loam
Bg - 9 to 21 inches: silt loam
Cg1 - 21 to 28 inches: silt loam
Cg2 - 28 to 47 inches: silt loam
Cg3 - 47 to 54 inches: silt loam
Cg4 - 54 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 13.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F101XY003NY - Low Floodplain Depression
Hydric soil rating: Yes

Description of Wayland, Very Poorly Drained

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Silty and clayey alluvium derived from interbedded sedimentary rock

Typical profile

A - 0 to 9 inches: mucky silt loam
Bg - 9 to 21 inches: silt loam
Cg1 - 21 to 28 inches: silt loam
Cg2 - 28 to 47 inches: silt loam
Cg3 - 47 to 54 inches: silt loam
Cg4 - 54 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 13.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F101XY003NY - Low Floodplain Depression
Hydric soil rating: Yes

Minor Components

Holderton

Percent of map unit: 10 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Custom Soil Resource Report
Map—Hydrologic Soil Group

Map Scale: 1:4,930 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
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Water Features
- Streams and Canals

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- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

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- Aerial Photography

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Table—Hydrologic Soil Group

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Te	Teel silt loam	B/D	26.1	37.4%
W	Water		4.6	6.6%
Wk	Wallkill silt loam	B/D	4.2	6.0%
Wy	Wayland soils complex, non-calcareous substratum, 0 to 3 percent slopes, frequently flooded	B/D	26.2	37.4%
Totals for Area of Interest			**70.0**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Report of Geotechnical Exploration

Waterside on Seneca
Watkins Glen, Schuyler County, New York

PREPARED FOR:

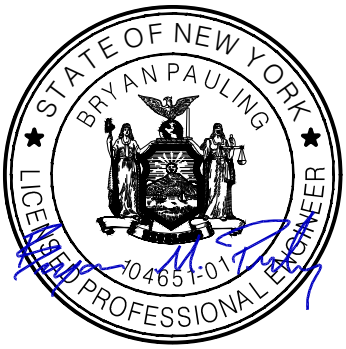
Mr. Dave Wilcox
Liberty Bankers Life Insurance Co.
1605 LBJ Freeway, Suite 700
Dallas, TX 75234

PREPARED BY:

Larson Design Group
3000 Westinghouse Drive
Suite 400
Cranberry, PA 16066

LDG Project No. 13649-001

July 2024



07/22/2024

July 22, 2024

Mr. Dave Wilcox
Liberty Bankers Life Insurance Co.
1605 LBJ Freeway, Suite 700
Dallas, TX 75234

Re: Report of Geotechnical Exploration
Waterside on Seneca
Watkins Glen, Schuyler County, NY
LDG Project No. 13649-001

Dear Mr. Wilcox:

As requested, Larson Design Group (LDG) has completed a geotechnical exploration for the subject project. The exploration was performed to assess the subsurface conditions within the project area and to evaluate the suitability of the site for the proposed construction.

We appreciate the opportunity to serve as your geotechnical consultant during this phase of the project, and we look forward to working with you during construction. If you have any questions regarding this report, or if we may be of further service, please do not hesitate to contact us.

Sincerely,

Larson Design Group

Matthew R. Baird
Senior Geologist

Bryan M. Pauling, P.E.
Director - Energy

Enclosure

TABLE OF CONTENTS

Report of Geotechnical Exploration

Waterside on Seneca
Watkins Glen, Schuyler County, New York
LDG Project No. 13649-001

SITE AND PROJECT DESCRIPTION

Larson Design Group (LDG) is pleased to submit the findings of the subsurface investigation for the proposed residential and commercial development, known as Waterside on Seneca. The proposed residential subdivision is to be developed south of East 4th Street (NYS Route 414) in Watkins Glen, Schuyler County, New York. The project site is located on the south end of Seneca Lake, is bordered by the Glen Creek/Barge Canal to the east, Glen Creek to the south, a railway track to the west, and a Walmart Supercenter and East 4th Street to the north. The site is currently undeveloped and contains brine wells and associated access roads that are currently owned and operated by Cargill Salt. The parcel is relatively flat with no notable slope with existing grades at the site varying from El. 449' to El. 458'. The water level in the canal east of the site is approximately El. 450'. Refer to Figure A-1, General Site Vicinity, located in Appendix A, for additional information regarding the project location.

We understand that the proposed residential subdivision will include sixty-two (62) single family units with associated parking, a restaurant, and a walking trail. The subdivision will have a footprint of approximately 650,000 square feet. Site access is being provided off East 4th Street. Loading information was not provided but typical foundations for similar structures are shallow spread or mat foundations for column loads and strip foundations for the wall loads. Based on the provided *Conceptual Site Plan* developed by Hunt Engineers, we have assumed that the following features will require geotechnical design:

- Foundations for sixty-two (62) townhomes with slab-on-grade construction.
- The foundation for a restaurant with slab-on-grade construction.
- Asphalt pavement design for the roadway and parking.

GEOLOGIC SETTING

Based on our review of the *Geologic Map of New York*, published in 1970 and the *Surficial Geologic Map of New York*, published in 1986 by the New York State Museum and Science Service, the project site is underlain by alluvium, or lacustrine deposited silts and clays. Alluvium, which typically consists of unconsolidated sand, gravel, silt, and clay, is generally described as sediment transported and deposited by moving water in a non-marine environment.

The alluvium and lacustrine deposits at the site are underlain by the Genesee Group and Tully Limestone of the Upper Devonian Period (359 to 419 mya). The Genesee Group is described in the abovementioned publication as mostly non-marine, cyclic sequences of mainly shales and limestones, with greater concentrations of siltstone present near Seneca Lake. The Genesee Group extends from the base of the Sonyea Group to the top of the Tully Limestone. It includes the West River Shale, Ithaca, Genundewa Limestone, Renwick Shale, Sherburne Flagstone, Geneseo Shale, North Evans Limestone, and the Geneseo Shale members and the Penn Yan Formation. Please see Figures A-3 and A-3A for additional information regarding the surficial and bedrock geology of the project location.

According to coal mine mapping provided by the NYS Department of Environmental Conservation (NYSDEC), the project site does not appear to have been undermined. According to Cargill, Inc., they currently operate four (4) brine wells on the property. The locations of the wells are included in the New York State Department of Environmental Conservation (NYSDEC) eMaps in Figures A-5, and A-5A.

SUBSURFACE EXPLORATION

The subsurface exploration was conducted at the subject site from April 2 through April 9, 2024. Fourteen (14) borings were advanced at strategic locations throughout the project site. Borehole layout and existing ground elevations for the borehole locations were selected by LDG. Figure A-2 in Appendix A depicts the approximate locations of the test borings drilled for the project. The results of the field exploration are contained in Appendix B.

SUBSURFACE CONDITIONS

Detailed information and descriptions of the materials, as well as any groundwater levels encountered in the borings, are contained in Appendix B on the boring logs. Please refer to Figures B-1 and B-2, also in Appendix B, for additional information regarding the material descriptions. The test boring logs were developed by visually classifying the samples obtained during the exploration. The various substrata revealed by the borings are briefly described below.

Topsoil: Topsoil was encountered in borings B-1, B-4, and B-7. The topsoil ranged in thickness from approximately 0.1 to 0.3 feet. The average topsoil thickness was measured to be 2 inches.

Fill Soils/Dredge Spoils: Fill soils were encountered in each of the fourteen (14) borings and consisted predominantly of dredged spoil material from the adjacent canal. The fill consisted predominantly of sands and silts that ranged from 2.0 feet in borings B-8. B-9 and B-10 to 8 feet in boring B-11. In B-6 however, the fill layer was classified as a clay with ancillary amounts of sand, this layer extended to a depth of 2 feet. Fill averaged 3.4 feet in thickness across the site.

Standard Penetration Test (SPT) N-values obtained within the coarse sandy soils indicated an overall very loose to dense relative density (N-values ranging from 3 to 32). Cohesive materials (clay and silt) indicated a very soft to medium stiff consistency (N-values ranging from 2 to 8). The fill materials were damp to moist at the time of testing.

Fine Sand & Silt (Lacustrine Deposits): Glacial lake or lacustrine soils were encountered beneath the upper fill soils/dredge spoils. Lacustrine or lake derived sediment is a general term used to describe detrital deposits produced by or inhabiting a lake or lakes. Lacustrine are soil deposits produced by the rise and fall of inhabiting lakes, in this case, Seneca Lake. The term typically applies to lake deposits of recent time. Each boring encountered layers of fine to medium-grained sand and silt with varying quantities of clay and gravel below the fill/dredge spoil layers. Elastic silts were encountered at varying depths within borings B-3, B-10, and B-12. Laboratory classified, lean clays were encountered at varying depths in borings B-10, B-13 and B-14. A few organic silt layers were encountered in boring B-4, B-6, B-8 and B-9.

Standard Penetration Test (SPT) N-values obtained within these soils generally indicated a very loose to medium dense relative density in the granular coarser-grained soils and a very soft to medium stiff consistency in the finer-grained soils. Generally, the larger N-values were encountered near the surface

and then decreased with increasing depth. In many of the borings the split-spoon sampler was being advanced by the weight of the rods or hammer alone, yielding N-values of 0 from the weight of the rods (WOR) or weight of the hammer (WOH).

The lacustrine deposits extended to depths ranging from approximately 25 feet in most of the borings to 101 feet in boring B-12. Although the borings were terminated at depths ranging from 25 to 101 feet, based on the depositional environment, and historic geological studies in similar areas of the Finger Lakes suggest that these deposits can range from 50 feet to over 150 feet in thickness. The lacustrine deposits were damp to wet at the time of sampling.

Groundwater: Groundwater levels were checked both during and after drilling operations. A static groundwater level in the borings during drilling was encountered at a depth of approximately 3.1 feet in B-9, 5 feet in B-3, 6 feet in B-1, B-2, B-7, and B-8, 6.5 feet in B-4, 10 feet in B-5, B-6, and B-14, and at a depth of 18 feet in B-10, B-11, B-12, and B-13. Groundwater level readings after the drilling ranged from the ground surface in B-3 to 11.1 feet in B-11. Additional water level information can be found on the boring logs in Appendix B. It is emphasized that fluctuations in true groundwater levels normally occur due to variations in seasonal and climatic conditions.

LABORATORY TESTING

Laboratory testing was conducted on select soil samples obtained from the test borings. Data from these tests were used to classify the soils based on the Unified Soil Classification System (USCS) and establish geotechnical design parameters. Detailed test results are presented in Appendix C, *Laboratory Results*. A summary of the test results is presented below.

Natural Moisture Content (ASTM D 2216): Natural water content tests were performed on samples in which classification and/or strength tests were performed. Each sample was visually classified in the laboratory. Natural water contents are tabulated at sample depth on the boring logs.

Atterberg Limits (ASTM D 4318): Atterberg limit tests are classification tests that determine the liquid limit and plastic limit of the soil fraction finer than the No. 40 sieve. The Atterberg limits are approximate water contents at which the soil tested behaves in a specified manner. The liquid limit is determined by measuring, in a standard device, the water content and number of blows required to close a specific width groove cut in a remolded soil sample a specified length. The plastic limit is determined by measuring the water content when threads of soil 1/8-inch in diameter begin to crumble. The plasticity index, defined as the difference between the liquid and plastic limits, indicates the degree of plasticity or the magnitude of the water content over which the soil remains plastic. Liquid limit and plasticity index values are tabulated at sample depth on the boring logs.

Sieve Analysis (ASTM D 422): Grain size characteristics of the natural soils were investigated by the determination of the percent of soil passing the No. 4, 40 and 200 sieves. These tests were performed by washing or sieving material through the respective sieves. The results are tabulated at sample depth on the boring logs for the percent passing the No. 200 sieve.

Standard Test Methods for Laboratory Compaction (ASTM D 698): These test methods cover laboratory compaction methods used to determine the relationship between molding water content and dry unit weight of soils (compaction curve) compacted in a 4 or 6-in. (101.6 or 152.4-mm) diameter mold with a 5.50-lbf (24.5-N) rammer dropped from a height of 12.0 in. (305 mm) producing a compactive effort of 12 400 ft-lbf/ft^3 (600 kN-m/m^3).

Strata Descriptions: Descriptions of strata made in the field at the time the borings were drilled were modified in accordance with results of laboratory tests and visual examination. All recovered soil samples were classified in general accordance with ASTM D 2487 and described as recommended in ASTM D 2488. Rock strata were classified in general accordance with "Rock Classification and Description", Chapter 1, Section 5, NAVFAC DM-72. Classification of soils and finalized descriptions of both rock and soil strata are shown on the boring logs.

Detailed test results are presented in Appendix C, *Laboratory Testing*. A summary of the laboratory test results is presented below.

Test Type	Test Results
Natural Moisture Content	19.0 to **50.8**% (Avg.: 30.6%)
Atterberg Limits: Liquid Limit Plasticity Index	 28 to 45 (Avg.: 36) 4 to 16 (Avg.: 10)
Percent Passing No. 200 Sieve	51.8 to 93.3% (Avg.: 76.4%)
USCS Soil Classification	ML, CL
Standard Proctor: Optimum Moisture Content, % Maximum Dry Density, pcf	 11.3 116.0

Corrosivity (Chemical)Testing

Corrosion testing was conducted on in-situ soils to characterize the materials within the subsurface locations from a corrosive environment perspective. Soil chemical testing was performed on one sample. Soil samples were collected from several jar samples from B-9 and were tested for pH (at 25 degrees Celsius), chloride (Cl), sulfate content (SO_4) and percent moisture. The results from the chemical testing are summarized below:

Boring Location/ Depth (ft.)	Material Type	Sample Number	Minimum Resistivity (Ohm-cm)	pH (Standard Units)	Chlorides (ppm)	Sulfates (ppm)
B-9 / 4 - 8	Lean Clay (Glacial Lake Deposit)	S-3 & S-4	-	7.94	3.35	51.2
Recommended Limits for Corrosive Materials (FHWA)			<2000	>5.5	<100	<200

For structural elements according to the Federal Highway Administration (FHWA), a site is considered to be corrosive if one of more of the following conditions exist for the representative soil and/or water samples taken at the site: Chloride concentration is 100 ppm or greater, sulfate concentration is 200 ppm or greater, or the pH is 5.5 or less. Based on the chloride and sulfate concentrations and the above standard, chloride content is not considered to be corrosive. The laboratory results have been evaluated in accordance with criteria established by the FWHA, the American Concrete Institute (ACI) and the National Association of Corrosion Engineers. The test results on near surface jar samples indicated that the tested soils have a **low corrosive potential** when in contact with ferrous materials. If desired, a corrosion engineer can be contacted to review these results in order to provide specific recommendations for corrosion protection as well as appropriate recommendations for other types of buried metal structures.

Corrosion testing also included determination of the concentrations of water-soluble sulfates present in the tested soil samples in accordance with AASHTO T290, Standard Method of Test for Determining Water-Soluble Sulfate Ion Content. Our laboratory test results indicated that the tested soils contained less than the recommended 200 ppm of water-soluble sulfates. Based on the International Building Code (IBC), concrete that may be exposed to sulfate containing soils shall comply with the provisions of ACI 318, Section 4.3. Therefore, according to the ACI 318, the tested samples fall into an Exposure Class of S0 and S1 or a **negligible exposure to sulfate corrosivity** can be expected for concrete placed in contact with the tested on-site soils. No special sulfate resistant cement is considered necessary for concrete which will be in contact with the tested on-site soils. Additional details regarding the chemical testing are provided in Appendix C and summarized in the table above.

DISCUSSION

Based on the results of the subsurface exploration, the project site is underlain by depths greater than 100 feet of glacial lake or lacustrine deposits. Due to the very loose and very soft nature of the lacustrine soils encountered in the borings, potential design issues on the project are apparent:

- Excessive settlement of the structures due to soft elastic silt, compressible clay and loose sand.
- High groundwater table being problematic during and after construction.
- The side walls of excavations, particularly deeper excavations, may be impacted by loose site soils. Recommendations regarding excavations are provided in this report. As there are no permanent cut slopes on the project, these conditions will be temporary during construction.
- Differential or uneven settlement of the structure foundations. Recommendations regarding excavations/over-excavation are provided in this report.

Considering the very loose and very soft nature of the natural soils, it is our opinion that excessive total and differential settlements would be realized if foundations and slabs for the structures bear directly on the natural soils without some type of soil improvement. LDG has considered the economic and construction merits of several alternatives that would result in either improvement of the bearing conditions or utilization of alternate foundation types. Any soil improvement technique that does not involve complete removal and replacement of the soft natural soils will present inherent risks for future settlement. Considering the depth of the soft soils, it is not economically feasible to remove and replace the soils entirely. However, if some risk of future settlement can be tolerated, the fill can be partially overexcavated and replaced to help improve bearing conditions and reduce settlements. We recommend that an overexcavation of at least two (2) feet below foundation bearing elevation be performed within the entire structure footprints and extending at least 10 feet beyond its perimeter. The exposed subgrade at the overexcavation level should then be thoroughly densified and proof-rolled to help identify soft, unstable areas. Any yielding areas that are identified should then be backfilled with new controlled fill or coarse crushed gravel (i.e. NYSDOT No. 304 stone) that is placed and compacted in strict accordance with the compaction criteria outlined in this report. The foundation type for the structures could then include a rigid mat foundation bearing on new controlled fill or coarse crushed gravel. Prior to backfilling, drains should be installed at the base of the excavation to provide an outlet for groundwater that may tend to accumulate.

Although this measure will help reduce the amount of total and differential settlement, there is still potential for settlement to occur. Unfortunately, the high groundwater and inconsistency and density within the natural soils precludes reliable estimation of the amount and rate of settlement that could be expected. As such, it would be prudent to include mechanisms within the structures that will allow adjustments to be made as settlement occurs or that will accommodate movement and reduce the damage caused by the movement. These mechanisms can include adjustable shims on support columns, more frequent and strategically located control joints with slabs and flexible utility connections.

As noted, the natural subsoils at the site consist of thick glacial deposits and lake derived soils comprised of sands, silts, and clays. Excavation and replacement with controlled structural fill will be required to achieve planned grades. Care should be taken to keep the design grades well above the thick, soft silts present below an elevation of 432.0 feet MSL on the northern side of the lot (B-1 through B-10) and at elevation 450.0 on the southwest side of the lot (B-11 through B-14). These thick, soft silts and loose sands were also noted in other borings at various depths. Laboratory testing indicates that moisture contents exceeding the plastic limits in four out of the six tested samples. An average natural moisture of 30.6% will prove difficult in drying soils during construction. The moist, lean clays and elastic silts will create numerous difficulties during construction if/when exposed in the excavations. Although very loose and very soft natural soils were encountered near the surface throughout the site, the majority of these soils are sands, which will settle immediately upon loading with heavy construction equipment. Proof-rolling operations will densify the near-surface soils throughout any areas if fill is required to achieve design grades.

DESIGN RECOMMENDATIONS

The geotechnical engineering evaluation of the site and subsurface conditions at the property are based on our site observations, the data obtained from the subsurface exploration, laboratory testing, and our understanding of the project information as presented in this report. If the site or building design is modified, it should be determined if additional geotechnical information is required such that specific design and construction recommendations can be provided for the final conditions.

If our understanding of the project is incorrect, please contact us so that we can review our findings. Also, the discovery of any site or subsurface conditions during construction that deviate from the information detailed herein should be reported to us for our evaluation.

Rigid Mat Foundations

Provided that the recommendations contained in this report are strictly maintained, it is our opinion that the structures can be supported by shallow mat foundations that are designed and constructed to bear on new controlled fill or coarse crushed gravel. Rigid mat foundations tend to be more forgiving and can bridge isolated pockets of softer soils without excessive differential settlement.

Due to the depositional nature of the on-site soils, very soft and/or very loose materials were prevalent in every boring, therefore, some removal of the natural soils will be necessary. A minimum over-excavation of two (2) feet below bearing elevation is recommended for the planned townhomes and restaurant. With this modification, the proposed building areas should be overexcavated a minimum of two (2) feet below the anticipated bottom of mat elevations and backfilled with suitable structural fill material or coarse crushed gravel after the bottom of the excavations are thoroughly densified, followed by proof-rolling to determine if firm, stable conditions have been achieved. The overexcavation should encompass the building footprints and 10 feet beyond its perimeter. If areas of unsuitable materials are encountered at the bottom of the minimum recommended overexcavation, those areas should be removed, and the overexcavation should be backfilled with structural fill or coarse crushed gravel. A geosynthetic stabilization fabric should be placed in the base of the overexcavation prior to placement of controlled, compacted fill to the bearing grade. Structural fill for this option could consist of crusher run aggregate, placed in 6-inch lifts after the base of the excavation is compacted. The crushed gravel should be placed according to the structural fill recommendations provided in the Construction Recommendations section of this report. All mats-on-grade should bear on a minimum 6-inch-thick layer of crushed, clean stone to serve as a leveling surface. If a vapor barrier is used it should be located between the 6-inch-thick layer of crushed, clean stone and the natural soils.

Bearing capacity was calculated using Terzaghi's equation and a factor of safety of 3 assuming a permanent shallow spread foundation depth of four (4) feet below both existing and proposed grades. For rigid mat foundations bearing on new fill or coarse gravel, it is our opinion that the foundations can be proportioned utilizing a maximum allowable bearing pressure of 1,500 psf. Once a firm subgrade is achieved, a modulus of subgrade reaction of 100 pounds per square inch per inch (psi/in) can be utilized for design. The mats can be proportioned utilizing a maximum allowable bearing pressure of 1,500 psf. The allowable bearing pressure should include dead load plus sustained live loads. Mats should be turned down four (4) feet below final grade for frost protection if they are not protected by a frost or load bearing wall to this depth. Exterior footings should bear at a depth of at least four (4) feet below final outside grade for protection from damage due to frost. Interior foundations in heated areas can be founded a nominal distance below the slab, provided that appropriate bearing material is present at this depth.

Construction joints should be designed in the foundations and any masonry walls to allow for some adjustment from potential differential settlements. Proper joint installation should be specified and maintained throughout construction of all floor slabs. Joints should be installed in the floor slabs in accordance with the guidelines specified by the Portland Cement Association (PCA) or American Concrete

Institute (ACI). Additional expansion and control joints should be designed in any masonry/concrete portions of the structures to allow for any movements that may occur.

Settlement Considerations

Maximum loads for the structures were not provided but are assumed to be light to moderate. The settlement was calculated based on assumed loading and previous similar projects and our knowledge of the soils at the site. Based on well compacted controlled fill over the natural soils and the assumed bearing pressures of 1,500 psf, it was estimated that the settlement would be greater than one and a half (1 ½) inches. Due to the depositional nature of the site soils, the differential settlement is estimated to be as much as one (1) inch.

With the depth of the loose sand and the anticipated structure loads there are no foundation options which will eliminate risk completely within a reasonable cost, therefore recommendations have been provided herein to help manage the risk of damage due to differential and total settlement. Although consideration was given to alternate foundations due to the depth and nature of the site soils, and the type of construction these options were not further developed. If the degree of settlement is unacceptable for the structures, or if the owner finds the amount of settlement to be unacceptable, LDG would recommend the use of a soil improvement system such as wick drains, vacuum consolidation or deep soil mixing for the support of the structures. Although technically acceptable, these systems are anticipated to be more costly than the recommended overexcavation and replacement and not warranted for the proposed construction. LDG can provide contact information for various contractors and assist in developing project specifications and evaluating designs for this system.

Lateral Earth Parameters

Foundations will need to be designed to resist lateral forces as described above. Any below-grade walls or retaining structures required as part of the project will be subject to lateral earth pressures. The on-site soils encountered in the borings consisted primarily of clay, silt and sand. We recommend that the lateral soil loads presented below be used in design. Samples of any materials to be utilized as structural backfill materials should be tested to determine the appropriate Unified Soil Classification and corresponding active pressure. Materials containing pyritic sulfur, coal or carbonaceous shale should not be used as backfill behind below-grade walls. The pressure data presented in the following table are based on the 2012 International Building Code (IBC). Unit weights of the classified materials have been estimated. Pressure values are based on an assumed level backfill slope, and they do not include superimposed surcharge loads. Depending on the slope inclinations specified behind retaining structures, adjustments to the lateral earth pressure values presented herein will be required. In addition, the pressure values are given for moist soil conditions. Submerged or saturated soil pressures should include the buoyant unit weight of the soil plus the hydrostatic loads.

Material Type	Dry Unit Weight (pcf)	Saturated Unit Weight (pcf)	Angle of Internal Friction (Degrees)	Active Earth Pressure Coefficient (ka)	Passive Earth Pressure Coefficient (kp)	At-Rest Earth Pressure Coefficient (ko)
Old Fill	100	105	28	0.53	0.36	2.77
New Fill	120	130	30	0.47	0.31	3.25
Sand/Silty Sand	110	120	27	0.36	2.77	0.53
Silt and Clay	105	115	25	0.41	2.46	0.58

The coefficient of sliding friction at the base of the foundation will be dependent on the material present. We recommend that a coefficient of sliding friction of 0.30 be utilized for design of structures bearing in soil.

It is recommended that backfill of all retaining structures include a minimum 18-inch-wide zone of granular, free-draining material, such as ASTM No. 57 aggregate, that is placed directly behind the wall to provide optimum wall drainage. The drainage stone should be separated from the retained soil utilizing a non-woven filter fabric. The filter fabric will help prevent migration of soil fines into the drainage stone, which can clog the stone and inhibit drainage. In addition, it is recommended that a foundation drain, consisting of both perforated and non-perforated, rigid (Schedule 40 PVC or greater) collector pipe, be placed near the base of the below-grade walls, or incorporated as part of the foundation drain systems for the structures, to outlet water which may accumulate. Such drainage precautions will help reduce the potential for development of temporary perched water levels (due to infiltration) and the associated increase in hydrostatic pressures.

Seismic Site Classification

The project site was classified using the procedure according to the 2018 IBC, Section 1613 - Earthquake Loads - Site Ground Motion. This building code establishes the criteria for project site evaluation. Section 1613 and Section 20.4 of the American Society of Civil Engineers (ASCE) 7-16 defines the parameters for determining the seismic site class based on N-values. The seismic site class may be determined by calculating an average N-value of subsurface materials to a depth of 100 feet. For the determination, the N-values recorded in test borings are used for overburden soil, and then, typically, all materials below the depth that auger refusal or hard rock is encountered are assigned an N-value of 100 (not encountered at this site). Based on the results of the test borings, the site has an average N-value of 6. Using the calculated N-value along with knowledge of the site geologic setting, we recommend that Seismic Site Class E, *Soft Soil Profile*, be utilized for seismic considerations. Based on the above referenced IBC 2018 and ASCE7-16, the parameters in the following table are characteristic of the site for use in seismic design purposes.

Seismic Design Criteria: Seismic Coefficients & Spectral Response Parameters	Values
Risk Category	II
Seismic Site Class	E
Mapped Spectral Response Acceleration at 0.2-second Period, S_S	0.12
Mapped Spectral Response Acceleration at 1.0-second Period, S_1	0.044

Based on information provided by the United States Geological Survey (USGS) seismic hazard data (2008) and earthquake epicenters in and near New York, the project site is not located near any fault lines or in an active seismic area thus the risk of seismic activity is very low. Additional earthquake chronology mapping provided by the USGS indicates that at least two earthquakes between magnitudes of 1.7 (2013) to 3.2 (2001) have been recorded within 25 miles of the project site between 1914 and June 26, 2023.

Liquefaction Potential

Soil liquefaction or earthquake liquefaction is a state of soil particles suspension caused by a complete loss of shear strength when the effective stress drops down to zero. Soil liquefaction normally occurs under water-saturated conditions in soils such as sand in which the strength is purely frictional. Primary factors that cause liquefaction are moderate to strong ground shaking (seismic source), relatively clean, loose granular soils (primarily poorly graded sands and silty sands), and saturated soil conditions (shallow groundwater). Due to the increasing overburden pressure with depth, liquefaction of granular soils is generally limited to the upper 50 feet of a soil profile.

Based on results from the test borings, published regional geologic information, and the probable maximum strength of an earthquake in this region of Schuyler County, it is our opinion that liquefaction potential for the on-site soils during seismic activity is low.

Pavement Design Recommendations

For flexible pavement design, a California Bearing Ratio (CBR) of 2 is recommended for existing site conditions. For rigid pavement design, we assumed a modulus of subgrade reaction, “k”, equal to 100 pci. These values were based on our experience with similar site soils. The soil subgrade should be crowned or properly sloped to provide drainage of base coarse aggregate. Specific pavement designs can be provided upon request and receipt of specific design criteria. Our generalized recommended pavement sections for the project are tabulated below.

Recommended Flexible Pavement Sections		
Material	**Standard Duty (in.)**	**Heavy Duty (in.)**
Wearing	1.5	1.5
Base Course	3.0	4.5
Granular Subbase	9.0	12.0

In areas of heavy truck or equipment access, heavier pavement sections may be warranted.

Recommended Rigid (Concrete) Pavement Section	
Material	**k = 100 pci**
Heavy Duty Rigid 10-yr.	5.5” Concrete (4,000 psi) #4’s @ 12” c-c, E.W. 18” x ⅝” dowels @ 12” c-c 4.0” Granular Subbase

All exterior rigid pavements, including truck aprons, sidewalks, and curb/gutter, should be constructed with Type IA Portland cement. Structural fill under all exterior slabs shall be graded between 3/8” and No. 200 sieve and compacted to no less than 95% of the Standard Proctor as determined by ASTM D698.

Drainage ditches and/or inlets should be designed for the pavement areas to maintain drainage and divert runoff away from the pavement subgrade. The final subgrade should be properly sloped or crowned.

Static groundwater at shallow depths is a concern on this site, therefore adequate sub-drainage of the pavement section should be incorporated into the design to maintain long-term performance. Edge drains, “finger” drains, or shallow subsurface interceptor drains, should be provided beneath large areas of pavement to capture and remove water which may accumulate in the pavement subbase. These drains should be routed to discharge into appropriate stormwater basins or drop inlets. The spacing of the drains can be determined after grading plans have been developed further.

CONSTRUCTION RECOMMENDATIONS

Site Preparation

Initial preparation of the site for construction should include installation of sediment and erosion control measures and any upslope diversion ditching or berms that are required. Preparation should include removal of all debris, trees, brush, root mass, stumps, topsoil, boulders, and any other deleterious material from within the area to be developed.

Surface and Groundwater Control

Proper drainage of the site is of the utmost importance both during and after construction operations. A static groundwater level was encountered within the near-surface soils. Groundwater was first encountered as shallow as 3.1 feet and as deep as 18 feet. The elevation of the groundwater correlated closely to the pool elevation of the adjacent Barge Canal to the east. Due to the depositional nature of the natural site soils, seepage across the site is expected to be problematic as the water tends to follow the sand and coarser-grained particle seams. Therefore, it will be necessary to install underdrains throughout the site during construction. In addition, it is strongly recommended that foundation drains be installed around each of the structures planned at the site.

It will be of primary importance to maintain positive drainage across the site during construction activities, as the site soils can become unstable when saturated. Traffic should be limited on site when wet weather conditions prevail to prevent pumping and rutting of the soils. Carefully planned and sequenced site development will enable exposed areas of the site to dry following precipitation events, allowing for more efficient construction operations.

Site grades should encourage positive drainage across the site. Surface water runoff should be prevented from flowing over the face of the excavations and fills. Diversion ditches should be constructed to convey surface water runoff away from earthwork activities and direct it to proper stormwater inlets. The ditches should be protected from excessive erosion through the use of riprap, erosion control matting, or vegetation. Final grades should be provided with positive gradients away from the foundations to provide rapid removal of surface water runoff to an adjacent discharge point. This will reduce the potential for ponding water adjacent to foundations. Downspouts from gutters should be conveyed into a closed conduit discharging away from the planned structures and into appropriate collection devices.

The contractor shall make their own assessment of temporary dewatering needs based upon the limited subsurface groundwater information presented in this report. Although soil sampling was continuous down to ten (10) feet, soil and groundwater conditions may vary between sampling intervals. The typical primary strategy for addressing perched groundwater seeping into excavation is pumping from a trench and sump pits with sump pumps. Pumping wells or a vacuum system could also be used to address the high groundwater. These methods are often only effective during the initial depletion of the perched water and may be quickly ineffective at addressing accumulation of water from general precipitation events.

Rigid Mat Foundations

Excavation limits should be compacted following material excavation to densify loose or otherwise disturbed materials present in the base of the excavations. Boulders encountered during foundation excavations should be removed and replaced with controlled, compacted fill. Care should be used in performing excavations to observe potential loose or soft conditions which may become unstable during excavations. Side slopes should be adjusted according to provide stable excavations.

Foundation excavations should be observed by a qualified geotechnical engineer, or his/her representative, prior to concrete placement to verify that materials capable of providing the recommended bearing capacity are present. If pockets of high plasticity or soft clay are present in the excavations, the geotechnical engineer should be contacted to provide additional recommendations, which could consist of over-

excavation and backfill with a more suitable material. The materials exposed in the foundation excavations will be susceptible to softening and/or degradation if exposed to precipitation or surface water runoff. Consequently, foundation concrete should be placed in the excavations as soon as possible once the excavations have been observed. Once the mats have been constructed, we recommend that the perimeters of the foundations be backfilled with compacted soil fill to prevent ponding.

Site Excavations

Site excavations should be observed for the presence of seeps/springs as well as unsuitable and unstable soils. Additional drains may be required to handle the seeps/springs. Unsuitable and/or unstable soils that are not accounted for in this report should be discussed with the Engineer.

It is anticipated that the majority of the on-site soils can be effectively excavated with conventional earth-moving equipment such as excavators and dozers. Auger refusal was not realized at the site, however, isolated cobbles or boulders may be encountered.

Excavated materials should not be stockpiled and construction equipment should not be positioned beside open excavations, since the added load may cause a sudden collapse of the excavation side walls. The design and construction of all excavations should comply with applicable local, state and federal safety regulations, including the current requirements of the Occupational Safety and Health Administration (OSHA). In no case should slope height, slope inclination or excavation depth exceed those specified by OSHA or any other regulatory agencies or local authorities having jurisdiction at the construction site.

Subgrade Preparation

All areas that a planned to receive fill placement should be cleared and grubbed. After excavation and before initiating fill placement, the subgrade surface should be proof-rolled with appropriately loaded rubber-tired rock truck and/or visually evaluated to locate any soft spots or areas of excessive “pumping, rutting or movement.” Any such areas should be over-excavated to a firm subgrade and should be replaced with new, controlled fill material. The Engineer should be contacted if excessive over-excavation is required.

Structural Fill Material

Fill required to attain design grades should be placed as controlled, compacted fill. Satisfactory fill includes well-graded, fine to coarse crushed gravel or crushed stone. The stone should conform to NYSDOT 703-02 for coarse aggregate requirements and NYSDOT 703-4 No. 3 stone gradation. Other approved fill included engineer-approved off-site borrow material (residual soils, soil/rock mixtures and/or soft weathered rock). The fill should be free of trash, wood, topsoil, organics, coal and coal mine refuse, pyritic material containing greater than 0.1 percent by weight of pyritic sulfur, frozen material and pieces of rock greater than 6 inches in any dimension. Fill placement and compaction materials classified as MH, CH, OH, OL or Pt, based on the USCS are not considered suitable for use as fill. Fill should be tested and approved prior to placement and compaction.

Reuse of On-Site Soils

It is our opinion that the existing on-site soils may be selectively reused as compacted, structural fill, provided it is within a suitable moisture range to achieve proper compaction, and is free of deleterious material and oversized particles, such as cobbles and boulders. Provided that the deleterious materials (organics, wood, etc.) are removed and properly disposed of, old fill materials can be moisture conditioned and utilized for general fill in landscaped areas. Reused materials must be placed at moisture contents suitable for compaction purposes and be compacted to the densities recommended below.

Fill Placement and Compaction

Before initiating fill placement, the subgrade surface should be proof-rolled with appropriate rubber-tired construction equipment such as a heavily loaded rock truck and visually evaluated to locate any soft spots or areas of excessive “pumping.” Any such areas should be over-excavated to a firm subgrade and should be replaced with new, properly compacted controlled fill material. The engineer should be contacted if excessive over-excavation is required. Fill placed on sloping areas will require bonding benches or “notching,” as appropriate.

During placement, moisten or aerate each layer of fill, as necessary, to obtain the required compaction. Fill should not be placed on surfaces that are muddy or frozen or have not been approved by prior testing and/or proof-rolling. Free water should be prevented from appearing on the surface during or subsequent to compaction.

Soil material which is removed because it is too wet to permit proper compaction may be stockpiled, or spread and allowed to dry. Drying can be facilitated by disking, harrowing, or by pulverizing until the moisture content is reduced to an acceptable level. When the soil is too dry, water may be uniformly applied to the subgrade surface or to the layer to be compacted.

Fill material compacted by heavy compaction equipment should be placed in loose layers having a 9-inch maximum thickness. Fill compacted with lightweight equipment, such as hand-operated tampers or walk-behind rollers, should be placed in loose layers not exceeding four (4) inches in thickness. The compaction equipment utilized should be suitable for the type of material being compacted. Vibratory, smooth-drum rollers are best suited to coarse-grained materials, while pad (often referred to as sheepsfoot) rollers are appropriate for fine-grained soils.

Fill required within the structure footprint and ten (10) feet beyond its perimeter, should be compacted to at least 98 percent of the laboratory maximum dry density as determined by the standard Proctor method (ASTM D698). Uniformly graded granular materials, such as ASTM No. 57 aggregate, should be compacted to at least 85 percent of its relative density, as determined by ASTM D4253 and D4254 test methods. Fill for general site grading outside structure areas, including paving areas should be compacted to at least 95 percent of the maximum standard Proctor dry density. The placement moisture content of all fill should be within ±3 percentage points of the optimum moisture content as determined by ASTM D698 testing procedures. Fill placement should be observed and tested to verify that the fill areas are constructed as recommended in this report.

Pavement Construction

Fill material required to achieve subgrade levels within pavement areas should be placed as controlled, compacted fill. The upper one (1) foot of soil subgrade should be compacted to at least 100 percent of the maximum dry density as determined by ASTM D 698, while all fill below this level should be compacted to at least 95 percent of maximum dry density. The moisture content of the fill should be controlled to within ±3 percentage points of the optimum as determined by ASTM D 698.

All subgrade areas approved during rough grading should be re-evaluated prior to placement of the base stone. Any wet and/or unstable soils present at the subgrade level during fine grading operations should be either scarified, aerated and re-compacted or should be removed and replaced with suitable fill material. Any unsuitable subgrade soils should be corrected immediately prior to placement of base stone and pavement material. It will be very important that the final soil subgrade be properly sloped or crowned to promote drainage of surface water from precipitation. In addition, both the base stone and pavement section be placed immediately after acceptable subgrade conditions have been achieved due to the potential for subgrade softening from adverse weather conditions. Heavy construction traffic should be limited from traveling across approved final subgrade areas that have been exposed to precipitation in order to help maintain a stable subgrade prior to pavement construction. All base stone and asphaltic concrete placement and testing should be performed in accordance with NYDOT criteria.

Quality Assurance and Control

We recommend that a licensed geotechnical engineer be retained to monitor the construction activities to verify that the field conditions are consistent with the findings of our investigation. If significant variations are encountered, we should be notified. The geotechnical engineer should provide personnel full and/or part time to:

1. Observe and verify proof-rolling of original subgrade and over-excavations, as necessary, prior to initial fill or backfill placement.
2. Monitor and test material compaction during fill construction. Field density tests should be performed in accordance with ASTM D6938 (nuclear method). At least three (3) field density tests should be performed for each lift or at a frequency determined by the geotechnical engineer to be sufficient for the size of the fill area to verify the required soil compaction.
3. Examine foundation subgrade bearing levels to confirm compliance with our recommendations and verify that adequate support is available.
4. Conduct concrete testing for structural and site concrete.

LIMITATIONS

This report has been prepared by Larson Design Group for the exclusive use of Liberty Bankers Life Insurance Co. and their design team for specific application to the planned construction. Work on the project has been carried out in accordance with reasonable and acceptable engineering practices. No other warranty, either express or implied, is applicable to this project.

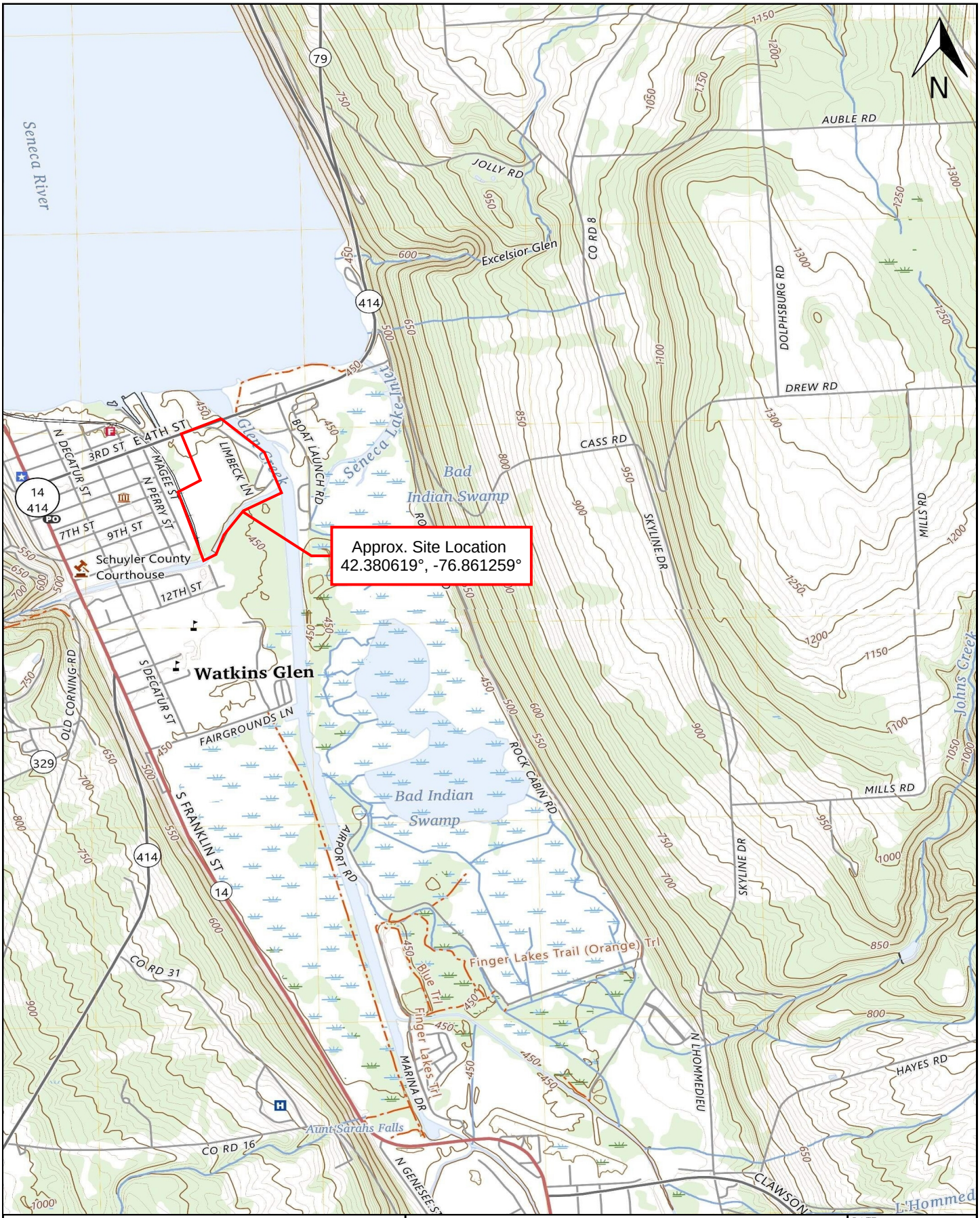
The conclusions and recommendations contained in this report are based, in part, upon our field observations and data obtained from the test borings drilled at the site. The nature and extent of variations

may not become evident until construction. If variations then appear evident, it may be necessary to reevaluate the recommendations presented herein.

It is suggested that a licensed geotechnical engineer be retained to provide continuous engineering and testing services during the earthwork and foundation construction phases of the work. This is to observe compliance with design concepts and specifications, and to facilitate design changes in the event that subsurface conditions differ from those anticipated prior to construction.

Appendix A

Figures



Larson Design Group
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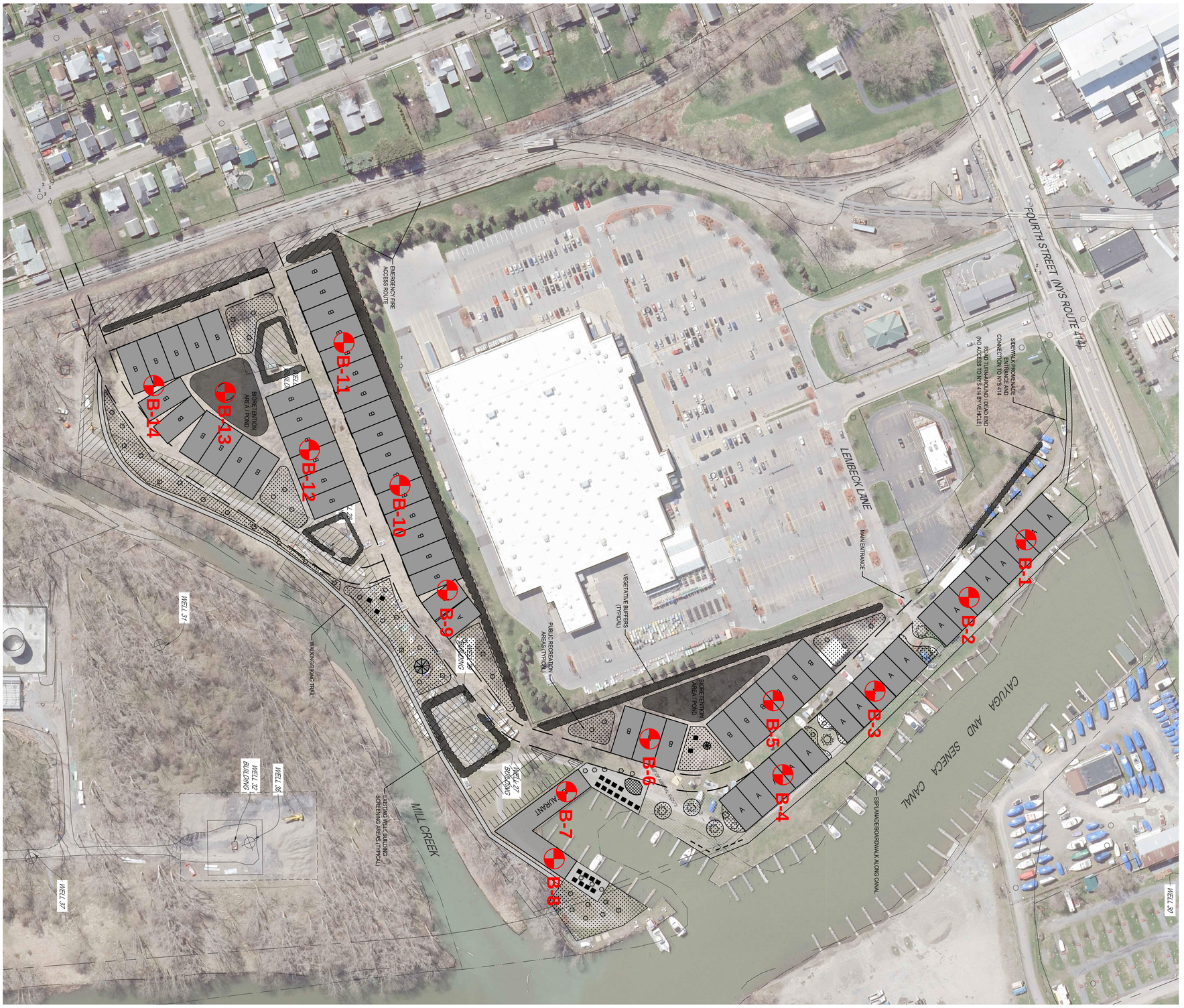
GENERAL SITE VICINITY
Waterside on Seneca Development
Watkins Glen, Schuyler County, NY
BURDETT USGS QUADRANGLE

DATE:	3/11/2024
SHEET NO.:	FIGURE A-1
PROJECT NO.:	13649-001
SCALE:	NTS



N

0 37.5 75 150 225

SCALE IN FEET

SCALE 1" = 75'

FIGURE A-2

PROJECT NO: 138949.001

BORING LOCATION PLAN

SOUTH SENECA MARINA DEVELOPMENT

DAVE WILCOX

157 LEMBECK LANE, WATKINS GLEN, NY 14891

Larson Design Group

#	DATE:	DESCRIPTION OF REVISION:	BY:

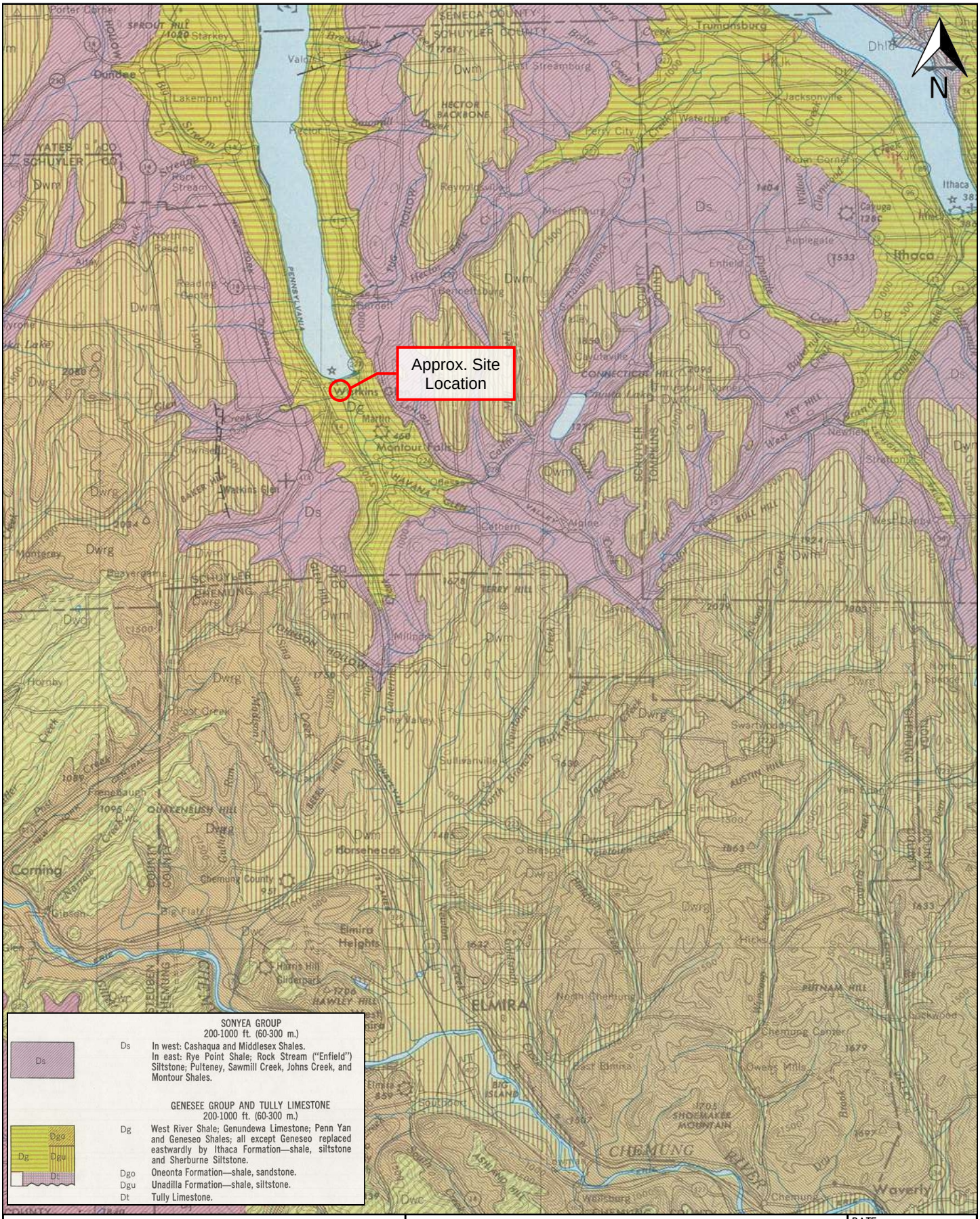
"IT IS A VIOLATION OF THE LAW FOR ANY PERSON TO MAKE UNAUTHORIZED ALTERATIONS OR ADDITIONS TO PLANS BEARING A LICENSED ENGINEER'S, ARCHITECT'S OR SURVEYOR'S SEAL."

SCALE: AS SHOWN

DATE:

CHECKED BY:

DRAWN BY:



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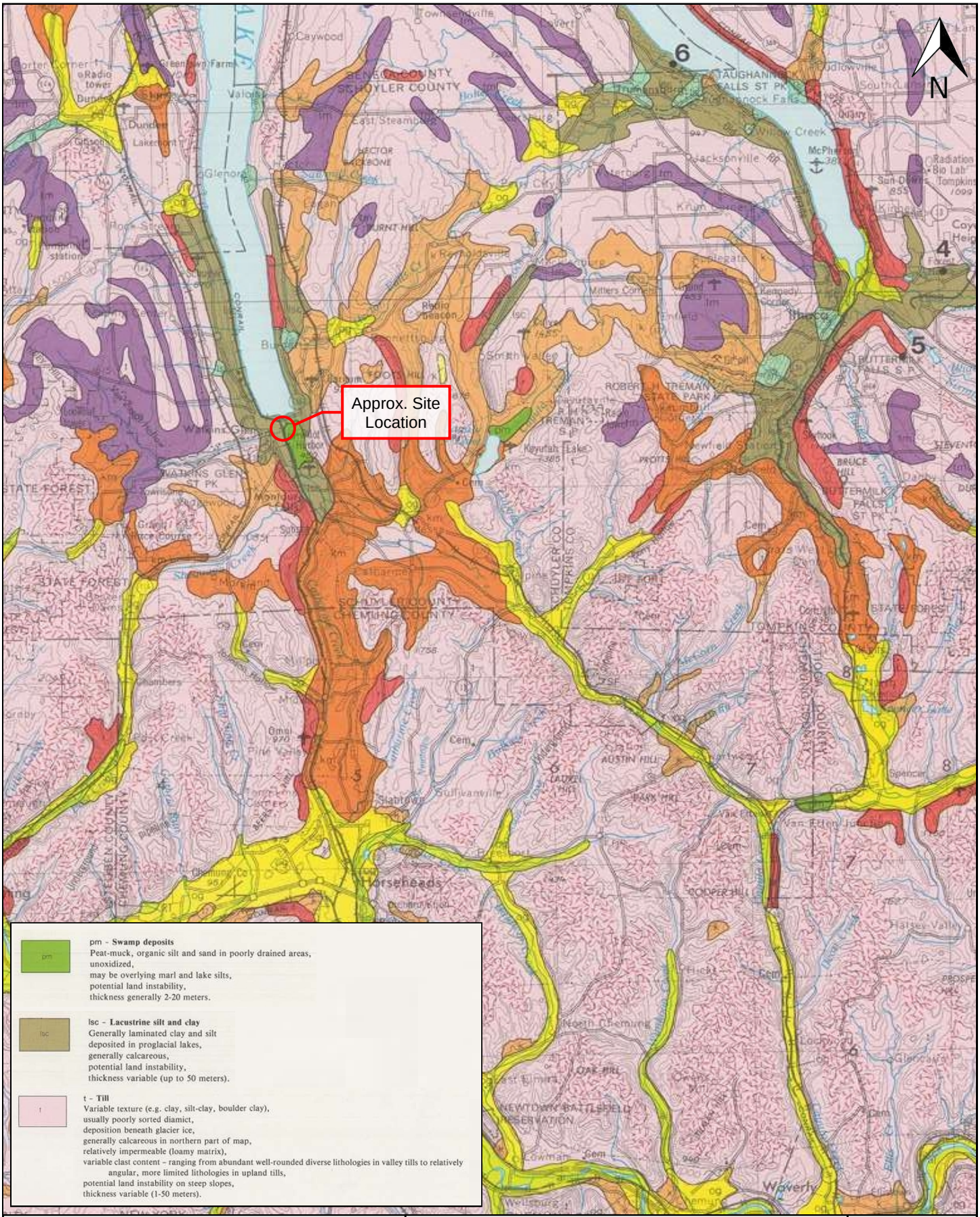
BEDROCK GEOLOGIC MAP
Waterside on Seneca Development
Watkins Glen, Schuyler County, New York
GEOLOGIC MAP OF NEW YORK, 1970

DATE:	3/12/2024
SHEET NO.:	FIGURE A-3
PROJECT NO.:	13649-001
SCALE:	NTS



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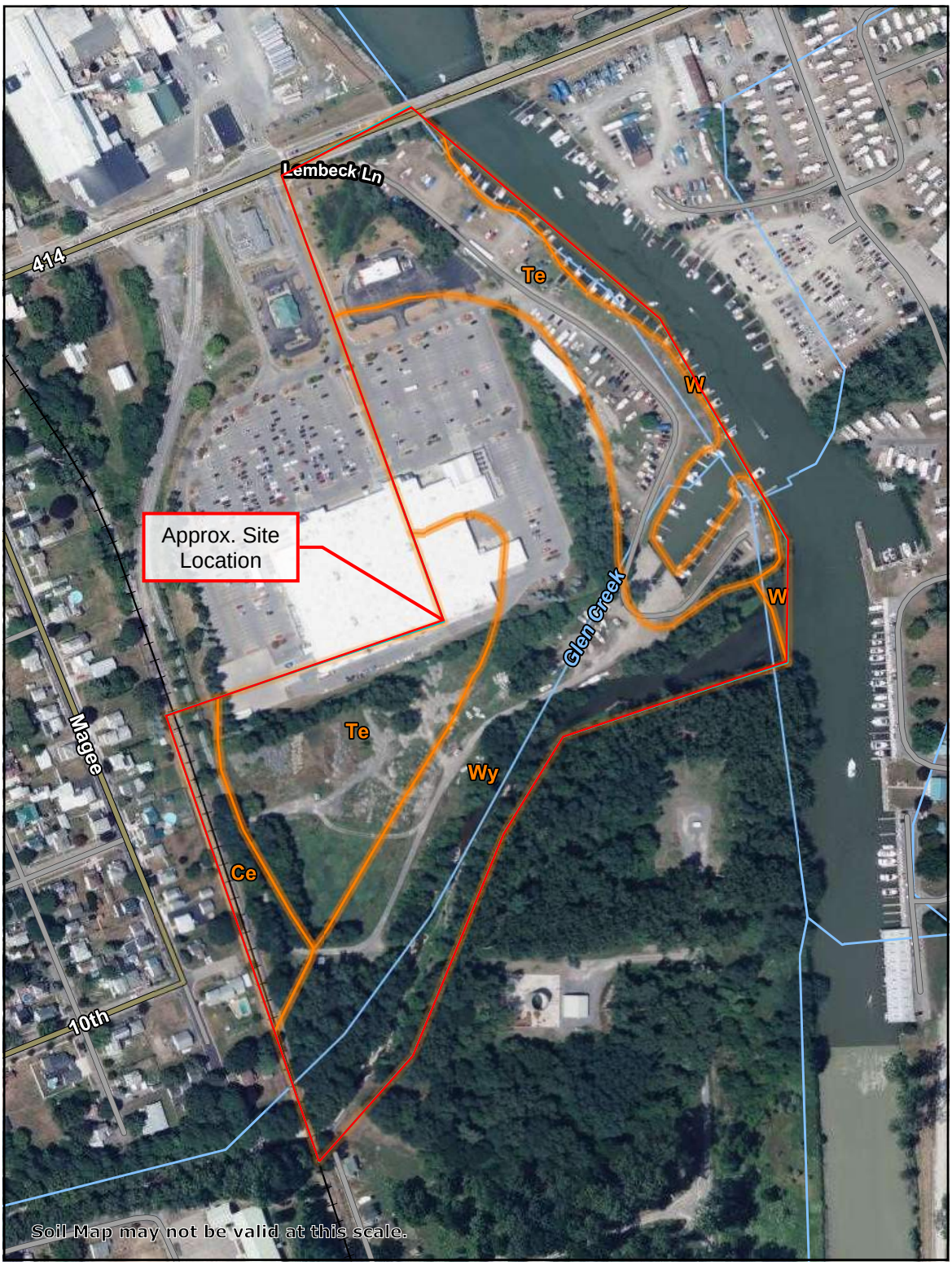
SURFICIAL GEOLOGIC MAP
Waterside on Seneca Development
Watkins Glen, Schuyler County, New York
SURFICIAL GEOLOGIC MAP OF NEW YORK,
FINGER LAKES SHEET, 1986

DATE:	3/12/2024
SHEET NO.:	FIGURE A-3A
PROJECT NO.:	13649-001
SCALE:	NTS

Custom Soil Resource Report
Soil Map



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USDA SOILS MAP
Waterside on Seneca Development
Watkins Glen, Schuyler County, New York
Custom Soils Resource Report for Schuyler County

DATE:	3/12/2024
SHEET NO.:	FIGURE A-4
PROJECT NO.:	13649-001
SCALE:	1:4,340

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Schuyler County, New York

March 11, 2024

Custom Soil Resource Report
Soil Map

Map Scale: 1:4,340 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
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: Schuyler County, New York
Survey Area Data: Version 20, Sep 6, 2023

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

Date(s) aerial images were photographed: Apr 1, 2020—Oct 1, 2020

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
Ce	Castile gravelly silt loam	1.7	4.8%
Te	Teel silt loam	15.1	42.4%
W	Water	1.8	4.9%
Wy	Wayland soils complex, non-calcareous substratum, 0 to 3 percent slopes, frequently flooded	17.0	47.8%
Totals for Area of Interest		**35.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate

pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Schuyler County, New York

Ce—Castile gravelly silt loam

Map Unit Setting

National map unit symbol: 9wjz
Elevation: 160 to 1,970 feet
Mean annual precipitation: 32 to 40 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 160 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Castile and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Castile

Setting

Landform: Terraces, valley trains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from sandstone, shale, and siltstone

Typical profile

H1 - 0 to 11 inches: gravelly silt loam
H2 - 11 to 35 inches: very gravelly loam
H3 - 35 to 50 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A/D
Ecological site: F140XY022NY - Moist Outwash
Hydric soil rating: No

Minor Components

Howard

Percent of map unit: 5 percent
Hydric soil rating: No

Red hook
Percent of map unit: 5 percent
Hydric soil rating: No

Philo
Percent of map unit: 5 percent
Hydric soil rating: No

Chenango
Percent of map unit: 5 percent
Hydric soil rating: No

Te—Teel silt loam

Map Unit Setting

National map unit symbol: 9wm0
Elevation: 600 to 1,800 feet
Mean annual precipitation: 32 to 40 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 160 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Teel and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Teel

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Silty alluvium

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 44 inches: silt loam
H3 - 44 to 50 inches: loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: Occasional
Frequency of ponding: None

Calcium carbonate, maximum content: 1 percent
Available water supply, 0 to 60 inches: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: F101XY002NY - Low Floodplain
Hydric soil rating: No

Minor Components

Philo

Percent of map unit: 5 percent
Hydric soil rating: No

Wayland

Percent of map unit: 5 percent
Landform: Flood plains
Hydric soil rating: Yes

Howard

Percent of map unit: 5 percent
Hydric soil rating: No

Udifluvents

Percent of map unit: 5 percent
Hydric soil rating: No

W—Water

Map Unit Setting

National map unit symbol: 9wmf
Mean annual precipitation: 32 to 40 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Wy—Wayland soils complex, non-calcareous substratum, 0 to 3 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2srgt
Elevation: 160 to 1,970 feet

Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Wayland and similar soils: 60 percent
Wayland, very poorly drained, and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wayland

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty and clayey alluvium derived from interbedded sedimentary rock

Typical profile

Ap - 0 to 9 inches: silt loam
Bg - 9 to 21 inches: silt loam
Cg1 - 21 to 28 inches: silt loam
Cg2 - 28 to 47 inches: silt loam
Cg3 - 47 to 54 inches: silt loam
Cg4 - 54 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 13.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F101XY003NY - Low Floodplain Depression
Hydric soil rating: Yes

Description of Wayland, Very Poorly Drained

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave

Parent material: Silty and clayey alluvium derived from interbedded sedimentary rock

Typical profile

A - 0 to 9 inches: mucky silt loam
Bg - 9 to 21 inches: silt loam
Cg1 - 21 to 28 inches: silt loam
Cg2 - 28 to 47 inches: silt loam
Cg3 - 47 to 54 inches: silt loam
Cg4 - 54 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 13.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F101XY003NY - Low Floodplain Depression
Hydric soil rating: Yes

Minor Components

Holderton

Percent of map unit: 10 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Larson Design Group
3000 Westinghouse Drive
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(877) 323-6603

NYSDEC Info Locator
Waterside on Seneca Development
Watkins Glen, Schuyler County, NY
New York State Department of Environmental Conservation (NYSDEC) DECinfo Locator

DATE:	3/12/2024
SHEET NO.:	FIGURE A-5
PROJECT NO.:	13649-001
SCALE:	NTS

Larson Design Group
3000 Westinghouse Drive
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NYSDEC Mines and Wells
Waterside on Seneca Development
Watkins Glen, Schuyler County, NY
New York State Department of Environmental Conservation (NYSDEC) Mines and Wells

DATE:	3/12/2024
SHEET NO.:	FIGURE A-5A
PROJECT NO.:	13649-001
SCALE:	NTS

Appendix B

Field Exploration

Geotechnical engineering personnel were present full-time to direct the drill crew, log recovered samples and observe groundwater conditions. The borings were drilled by Nothnagle utilizing an CME LC-55 turbo rotary auger track-mounted drill rig. Samples of natural soil and rock were procured using a split-barrel sampler while performing Standard Penetration Tests (ASTM D 1586). The results of these tests (N-values) are commonly interpreted to provide an index to strength, consistency or relative density of the sampled material and their ability to support foundations. Sampler refusal occurs when the split-barrel sampler is advanced 6-inches or less with 50 blows of the hammer.

Groundwater levels were checked both during and after drilling operations. Groundwater levels encountered during the auger drilling operations are recorded on the individual logs. Groundwater levels indicated after drilling operations that utilize water are not considered representative of true groundwater levels, due to the introduction of water into the borehole during drilling. It is emphasized that groundwater levels typically vary and are dependent upon climatic conditions and other environmental factors.

It is also emphasized that the lines shown on the boring logs are estimates of the changes in material. Actual changes may be gradual and vary from those indicated on the logs, and the subsurface conditions between the borings may differ from those depicted on the logs. The boreholes were backfilled with auger cuttings upon completion of drilling. A key to identification of the recovered soil and rock samples is provided as Figures B-1 and B-2 following this page. Samples were transported to our office for temporary storage and additional analysis. The samples will be discarded after a period of 60 days unless other arrangements are made.

KEY TO IDENTIFICATION OF SOIL AND WEATHERED ROCK SAMPLES

LDG GEOTECHNICAL SERVICES

Descriptor Sequence	
1	Color
2	Primary Component
3	Fractions
4	Moisture
5	Descriptors
6	Plasticity
7	Consistency/ Relative Density
8	Deposition Type

1. Color	
Gray	Tan
Brown	Black
Orange	Red
Green	Yellow
Purple	Blue
Modifiers	
Light	Lighter side of color range
Dark	Darker side of color range
Mottled	Irregularly marked with spots of different colors
Banded	Alternating shades or colors

2. Primary Component	
Component	Grain Size
Boulders	≥ 12 inches
Cobbles	3 to 12 inches
Coarse Gravel	1 to 3 inches
Medium Gravel	$^{3}/_{8}$ to 1 inch
Fine Gravel	$^{5}/_{64}$ to $^{3}/_{8}$ inch
Coarse Sand	#40 to #10
Fine Sand	#200 to #40
Silt/Clay	≤ #200

3. Fractions	
And	≥ 35%
Some	20 to 35%
Little	10 to 20%
Trace	< 10%

4. Moisture	
Dry	Dry to touch
Damp	Slightly moist
Moist	No visible free water
Wet	Visible free water

5. Descriptors	
Fissile	Splits easily along closely spaced parallel planes
Hackly	Jagged or irregular fracture planes
Slickenside	Polished and striated surface that results from friction along a fault plane
Laminated	Alternating thin layers of varying material or colors less than ¼" thick
Lensed	Inclusion of small pockets of different soils
Saprolitic	Completely weathered rock that retains the appearance of the original rock structure but has only a trace of the original bond strength
Micaceous	Containing mica minerals
Varved	Laminated sediment consisting of alternating layers of fine sand and silt or clay deposited in still water

6. Plasticity of Fine-Grained Soils

Fine-Grained Component	Plasticity	Estimated Plasticity Index (PI)	Smallest Thread Diameter	Thread Characteristics	Dilatancy
Predominately Silt (Silt ↑ More Silt ↑)	Non-Plastic	0 - 2%	Ball cracks	Dries rapidly; a 1/8-inch thread cannot be rolled at any water content	Moist ball sheds water when shaken giving a glossy appearance
	Low Plastic	3 - 10%	$^{1}/_{8}$ to $^{1}/_{4}$ inch	Feels powdery when drying out during rolling; thread can barely be rolled	Moist ball retains water or sheds water slowly when shaken
Predominately Clay (More Clay ↓ Clay)	Medium Plastic	> 10 - 20%	$^{1}/_{16}$ inch	Thread cannot be rerolled after reaching plastic limit	
	Highly Plastic	> 20%	$^{1}/_{32}$ inch	Thread can be rerolled after reaching plastic limit	Moist ball retains water when shaken

7a. Relative Density of Granular Coarse-Grained Soils	
Descriptor	N-Value
Very Loose	≤ 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	≥ 50

7b. Consistency of Fine-Grained Soils		
Descriptor	Pocket Penetrometer (tons/ft^2)	N-Value
Very Soft	≤ 0.25	≤ 2
Soft	≥ 0.25 - 0.5	3 - 4
Medium	> 0.5 - 1.0	5 - 8
Stiff	> 1.0 - 2.0	9 - 15
Very Stiff	> 2.0 - 4.0	16 - 30
Hard	> 4	≥ 31

8. Type of Deposit	
Aeolian	Sediment deposited by wind
Alluvium	Sediment deposited by moving water
Colluvium	Sediment deposited by gravity
Glacial Outwash	Sediment deposited by glacial meltwater; commonly sand and gravel
Glacial Till	Unsorted sediment deposited by glacier
Glacial Lake Deposit	Sediment deposited in glacial lake; commonly silt and clay
Residuum	Insoluble material remaining from weathered rock
Weathered Bedrock	Bedrock that has been weathered
Fill	Manmade deposit

FIGURE B-1

KEY TO IDENTIFICATION OF HARD ROCK SAMPLES

LDG
GEOTECHNICAL SERVICES

Descriptor Sequence	
1	Color
2	Rock Type
3	Interbedding
4	Descriptors
5	Weathering
6	Fracturing
7	Dip
8	Hardness

1. Color	
Gray	Tan
Brown	Black
Orange	Red
Green	Yellow
Purple	Blue
Modifiers	
Light	Lighter side of color range
Dark	Darker side of color range
Mottled	Irregularly marked with spots of different colors
Banded	Alternating shades or colors

2. Rock Type	
Common Regional Rocks	
Sandstone	Siltstone
Mudstone	Shale
Coal	Claystone
Limestone	Dolostone

3. Interbedding/Fractions	
And	≥ 50%
Some	15 to 40%
Few	0 to 15%

4. Descriptors	
Argillaceous	Pertaining to a sedimentary rock which contains an appreciable amount of clay
Calcareous	Containing calcium carbonate; when applied to a rock name, it implies that as much as 50% of the rock is calcium carbonate
Carbonaceous	A rock rich in carbon
Cross Bedded	Original depositional layering is inclined
Ferruginous	A rock having a red or rusty color due to the presence of ferric oxide
Fissile	Splits easily along closely spaced parallel planes
Fossiliferous	Containing fossils
Hackly	Jagged or irregular fracture planes
Micaceous	Containing mica minerals
Nodule	A small rounded mass of a mineral or mineral aggregate different in composition from the enclosing rock
Pyritic	Containing the mineral pyrite (also known as "fool's gold")
Slickenside	Polished and striated surface that results from friction along a fault plane
Vein	An epigenetic mineral filling of a fault or other fracture
Vuggy	Containing voids usually lined with crystals of a different mineral composition from the enclosing rock

5. Degree of Weathering	
Descriptor	**Criteria**
Fresh	No visible sign of weathering, discoloration, or oxidation
Slightly Weathered	Slight weathering, discoloration, or oxidation **impacting <20% of rock mass**
Weathered	Significant weathering, discoloration, or oxidation **impacting 20 to 60% of rock mass**
Highly Weathered	Major weathering, discoloration, or oxidation **impacting >60% of rock mass**

6. Degree of Fracturing	
Descriptor	**Spacing**
Very Broken	≤ 2 inches
Broken	2 to 8 inches
Blocky	8 inches to 2 feet
Slightly Fractured	2 to 6 feet

7. Dip of Bed or Fracturing	
Dip/Fracture Planes	**Degrees**
Flat	< 5°
Shallow	5 to 15°
Moderate	15 to 30°
Steep	30 to 45°
Very Steep	45 to 60°
Sheer	> 60°

8. Rock Hardness	
Descriptor	**Test Criteria for Hand Specimen**
Very Soft	Scratched by a wood dowel or fingernail
Soft	Scratched by a piece of copper, but not scratched by a wood dowel or fingernail
Medium Hard	Scratched by a common steel nail, but not scratched by a piece of copper
Hard	Scratched by a pocket knife, but not scratched by a common steel nail
Very Hard	Not scratched by a pocket knife

FIGURE B-2

Larson Design Group

BORING NUMBER B-1

CLIENT Waterside on Seneca, Inc
PROJECT NAME Waterside on Seneca Development
PROJECT NUMBER 13649-001
PROJECT LOCATION Watkins Glenn, Schuyler County, NY
DATE STARTED 4/2/24 **COMPLETED** 4/2/24
GROUND ELEVATION 450 ft **HOLE SIZE** 6 inches
DRILLING CONTRACTOR Nothnagle Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD HSA, SPT Sampling
AT TIME OF DRILLING 6.00 ft / Elev 444.00 ft
LOGGED BY MRB **CHECKED BY** MDB
AT END OF DRILLING ---
NOTES
AFTER DRILLING 3.80 ft / Elev 446.20 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	GRAPHIC LOG	MATERIAL DESCRIPTION	
0						
	SPT S-1	63	5-6-12-11 (18)		0.3 **TOPSOIL**	449.8
					Grayish-brown, medium grained **SAND**, little coarse gravel, damp, medium dense, **fill**	
	SPT S-2	58	7-2-2-3 (4)		2.5	447.5
					Brownish-gray, sandy **SILT**, trace gravel, damp, soft, **glacial lake deposit**	
5	SPT S-3	50	1-2-2-3 (4)		6.0	444.0
	SPT S-4	63	13-12-8-7 (20)		Brown, medium grained and coarse **SAND**, little river gravel, rounded, wet, medium dense, **glacial lake deposit**	
	SPT S-5	33	5-7-7-9 (14)			
10					10.0	440.0
	SPT S-6	67	10-8-5-4 (13)		Grayish-brown, coarse **SAND** and fine **GRAVEL**, wet, medium dense, **glacial lake deposit**	
					13.0	437.0
	SPT S-7	25	4-2-4-5 (6)		Gray, fine grained silty **SAND**, wet, loose to very loose, **glacial lake deposit**	
15						
20	SPT S-8	54	0-2-2-5 (4)			
	SPT S-9	88	0-1-1-1 (2)			
25					25.0	425.0

Bottom of borehole at 25.0 feet.

Larson Design Group

BORING NUMBER B-2

CLIENT Waterside on Seneca, Inc
PROJECT NAME Waterside on Seneca Development
PROJECT NUMBER 13649-001
PROJECT LOCATION Watkins Glenn, Schuyler County, NY
DATE STARTED 4/2/24 **COMPLETED** 4/2/24
GROUND ELEVATION 450 ft **HOLE SIZE** 6 inches
DRILLING CONTRACTOR Nothnagle Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD HSA, SPT Sampling
▽ **AT TIME OF DRILLING** 6.00 ft / Elev 444.00 ft
LOGGED BY MRB **CHECKED BY** MDB
AT END OF DRILLING ---
NOTES
▼ **AFTER DRILLING** 3.60 ft / Elev 446.40 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	GRAPHIC LOG	MATERIAL DESCRIPTION	
0	SPT S-1	50	4-6-8-5 (14)		Brown, medium and coarse grained **SAND**, little limestone gravel, damp, medium dense, **fill**	
					2.5	447.5
	SPT S-2	54	3-3-3-2 (6)		Dark gray, silty **SAND**, little gravel, moist, loose, **glacial lake deposit** ▼	
5	SPT S-3	54	2-2-2-2 (4)		5.0	445.0
	SPT S-4	100	0-0-2-4 (2)		Light gray, sandy **SILT**, moist to wet, soft to very soft, **glacial lake deposit** ▽	
					8.0	442.0
10	SPT S-5	50	4-5-6-6 (11)		Grayish-brown, medium grained **SAND** and fine to medium grained **GRAVEL**, trace silt, wet, medium dense, **glacial lake deposit**	
	SPT S-6	54	9-7-6-6 (13)		- Coarse sand in S-6	
					13.0	437.0
15	SPT S-7	50	5-4-4-5 (8)		Gray, silty **SAND**, wet, loose to very loose, **glacial lake deposit**	
20	SPT S-8	63	0-1-1-2 (2)			
25	SPT S-9	92	0-0-1-2 (1)		25.0	425.0
					Bottom of borehole at 25.0 feet.	

Larson Design Group

BORING NUMBER B-3

CLIENT Waterside on Seneca, Inc
PROJECT NAME Waterside on Seneca Development
PROJECT NUMBER 13649-001
PROJECT LOCATION Watkins Glenn, Schuyler County, NY
DATE STARTED 4/3/24 **COMPLETED** 4/3/24
GROUND ELEVATION 449 ft **HOLE SIZE** 6 inches
DRILLING CONTRACTOR Nothnagle Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD HSA, SPT Sampling
▽ **AT TIME OF DRILLING** 5.00 ft / Elev 444.00 ft
LOGGED BY MRB **CHECKED BY** MDB
AT END OF DRILLING ---
NOTES
▽ **AFTER DRILLING** 0.00 ft / Elev 449.00 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	GRAPHIC LOG	MATERIAL DESCRIPTION	
0					▽	
	SPT S-1	79	10-21-11-7 (32)		Brown and gray, medium grained **SAND** and fine gravel, trace silt, moist, dense to loose, **fill**	
	SPT S-2	17	8-5-3-3 (8)		3.0	446.0
5	SPT S-3	83	1-2-1-2 (3)		Gray to medium brown **SILT**, little organics, little sand, trace gravel, moist to wet, soft, **glacial lake deposit** ▽	
	SPT S-4	71	1-2-2-8 (4)		8.0	441.0
10	SPT S-5	29	1-3-4-4 (7)		Gray, medium grained **SAND**, little silt, trace fine gravel, wet, loose, **glacial lake deposit**	
	SPT S-6	46	4-5-3-3 (8)		13.0	436.0
15	SPT S-7	50	2-2-2-3 (4)		Gray silty **SAND**, trace rounded gravel, wet, very loose, **glacial lake deposit**	
					18.0	431.0
20	SPT S-8	63	0-1-1-1 (2)		Gray elastic **SILT**, some sand, wet, very soft, **glacial lake deposit**	
25	SPT S-9	100	0-0-0-0 (0)			
					28.0	421.0
30	SPT S-10	100	0-0-0-0 (0)		Light gray elastic **SILT**, little sand, trace marine shells, wet, very soft, **glacial lake deposit**	
35	SPT S-11	100	0-0-0-0 (0)			

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BORING NUMBER B-3

CLIENT Waterside on Seneca, Inc
PROJECT NAME Waterside on Seneca Development
PROJECT NUMBER 13649-001
PROJECT LOCATION Watkins Glenn, Schuyler County, NY

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	GRAPHIC LOG	MATERIAL DESCRIPTION	
35					Light gray elastic **SILT**, little sand, trace marine shells, wet, very soft, **glacial lake deposit** *(continued)*	
	SPT S-12	83	0-1-3-4 (4)		- Wood fragments encountered in S-12	
39.0						410.0
40					Gray silty **SAND**, wet, very loose, **glacial lake deposit**	
45	SPT S-13	100	0-0-0-0 (0)			
50	SPT S-14	100	0-0-0-0 (0)			
50.0						399.0

Bottom of borehole at 50.0 feet.

Larson Design Group

BORING NUMBER B-4

CLIENT Waterside on Seneca, Inc
PROJECT NAME Waterside on Seneca Development
PROJECT NUMBER 13649-001
PROJECT LOCATION Watkins Glenn, Schuyler County, NY
DATE STARTED 4/2/24 **COMPLETED** 4/2/24
GROUND ELEVATION 450 ft **HOLE SIZE** 6 inches
DRILLING CONTRACTOR Nothnagle Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD HSA, SPT Sampling
▽ **AT TIME OF DRILLING** 6.50 ft / Elev 443.50 ft
LOGGED BY MRB **CHECKED BY** MDB
AT END OF DRILLING ---
NOTES
▼ **AFTER DRILLING** 5.00 ft / Elev 445.00 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	GRAPHIC LOG	MATERIAL DESCRIPTION	
0						
	SPT S-1	50	2-6-6-5 (12)		0.2 **TOPSOIL**	449.8
					Light and medium brown, medium and coarse grained **SAND**, little rounded and subangular gravel, moist to damp, medium dense to loose, **fill**	
	SPT S-2	25	5-2-1-3 (3)		2.5 Medium brown **SAND** and river gravel, trace silt, damp, very loose, **glacial lake deposit**	447.5
					4.0	446.0
5	SPT S-3	88	2-2-2-3 (4)		5.0 Dark gray **SILT**, some organics, trace sand, damp, soft, **glacial lake deposit** ▽	445.0
	SPT S-4	100	2-2-2-2 (4)		Light gray **SILT**, little sand, moist to wet, soft, **glacial lake deposit** ▽	
					8.0	442.0
10	SPT S-5	58	4-3-3-3 (6)		Gray **SAND**, little silt, wet, loose to medium dense, **glacial lake deposit**	
	SPT S-6	100	0-7-10-10 (17)		12.5	437.5
	SPT S-7	100	0-3-3-5 (6)		Gray silty **SAND**, wet, loose to very loose, **glacial lake deposit**	
15						
20	SPT S-8	100	0-0-1-1 (1)		19.0	431.0
					Gray sandy **SILT**, trace organics, wet, very soft, **glacial lake deposit**	
25	SPT S-9	100	0-0-0-0 (0)		25.0	425.0
					Bottom of borehole at 25.0 feet.	

Larson Design Group

BORING NUMBER B-5

CLIENT Waterside on Seneca, Inc
PROJECT NAME Waterside on Seneca Development
PROJECT NUMBER 13649-001
PROJECT LOCATION Watkins Glenn, Schuyler County, NY
DATE STARTED 4/3/24 **COMPLETED** 4/3/24
GROUND ELEVATION 449 ft **HOLE SIZE** 6 inches
DRILLING CONTRACTOR Nothnagle Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD HSA, SPT Sampling
▽ **AT TIME OF DRILLING** 10.00 ft / Elev 439.00 ft
LOGGED BY MRB **CHECKED BY** MDB
AT END OF DRILLING ---
NOTES
▼ **AFTER DRILLING** 4.50 ft / Elev 444.50 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	GRAPHIC LOG	MATERIAL DESCRIPTION	
0	SPT S-1	25	3-2-2-2 (4)		Brown, medium grained **SAND** and coarse **GRAVEL**, trace silt, trace organics, damp, very loose, **fill**	
					2.5	446.5
	SPT S-2	21	2-1-1-2 (2)		Gray sandy **SILT**, trace rounded gravel, moist, very soft, **glacial lake deposit**	
5	SPT S-3	0	0-1-1-2 (2)		▼	
	SPT S-4	54	1-2-1-2 (3)			
	SPT S-5	21	1-1-2-3 (3)			
10					- Little gravel in S-5	
					10.0 ▽	439.0
	SPT S-6	100	1-1-1-1 (2)		Gray, coarse to medium grained **SAND**, trace to little silt, trace organics, wet, very loose, **glacial lake deposit**	
					13.6	435.4
15	SPT S-7	54	0-1-1-3 (2)		Gray sandy **SILT**, trace organics, wet, very soft, **glacial lake deposit**	
20	SPT S-8	58	0-0-1-2 (1)			
25	SPT S-9	100	0-0-0-0 (0)		- No organics in S-9	
					25.0	424.0
					Bottom of borehole at 25.0 feet.	

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BORING NUMBER B-6

CLIENT Waterside on Seneca, Inc
PROJECT NAME Waterside on Seneca Development
PROJECT NUMBER 13649-001
PROJECT LOCATION Watkins Glenn, Schuyler County, NY
DATE STARTED 4/3/24 **COMPLETED** 4/3/24
GROUND ELEVATION 452 ft **HOLE SIZE** 6 inches
DRILLING CONTRACTOR Nothnagle Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD HSA, SPT Sampling
▽ **AT TIME OF DRILLING** 10.00 ft / Elev 442.00 ft
LOGGED BY MRB **CHECKED BY** MDB
AT END OF DRILLING ---
NOTES
▼ **AFTER DRILLING** 6.00 ft / Elev 446.00 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	GRAPHIC LOG	MATERIAL DESCRIPTION	
0						
	SPT S-1	58	0-4-4-4 (8)		Brown gravelly **CLAY**, little sand, trace organics, moist, medium stiff, **fill**	
					2.0	450.0
	SPT S-2	100	3-3-3-3 (6)		Gray **SILT**, some sand, trace gravel, moist, medium stiff to soft, **glacial lake deposit**	
5	SPT S-3	100	1-1-2-3 (3)		4.7	447.3
					5.6 Dark brown organic **SILT**, some organics, trace sand, damp, very stiff, **glacial lake deposit**	446.4
	SPT S-4	100	2-2-2-2 (4)		▼ Light gray sandy **SILT**, trace gravel, moist, very soft, **glacial lake deposit**	
	SPT S-5	29	1-1-1-1 (2)			
10					10.0 ▽	442.0
	SPT S-6	100	2-3-3-3 (6)		Gray medium grained **SAND**, trace silt, wet, loose, **glacial lake deposit**	
					13.0	439.0
	SPT S-7	88	3-3-5-7 (8)		Gray fine silty **SAND**, loose, wet, **glacial lake deposit**	
15						
20	SPT S-8	100	0-1-2-2 (3)			
25	SPT S-9	100	0-0-0-1 (0)		25.0	427.0

Bottom of borehole at 25.0 feet.

Larson Design Group

BORING NUMBER B-7

CLIENT Waterside on Seneca, Inc
PROJECT NAME Waterside on Seneca Development
PROJECT NUMBER 13649-001
PROJECT LOCATION Watkins Glenn, Schuyler County, NY
DATE STARTED 4/4/24 **COMPLETED** 4/4/24
GROUND ELEVATION 450 ft **HOLE SIZE** 6 inches
DRILLING CONTRACTOR Nothnagle Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD HSA, SPT Sampling
▽ **AT TIME OF DRILLING** 6.00 ft / Elev 444.00 ft
LOGGED BY MRB **CHECKED BY** MDB
AT END OF DRILLING ---
NOTES
▼ **AFTER DRILLING** 4.50 ft / Elev 445.50 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	GRAPHIC LOG	MATERIAL DESCRIPTION	
0						
	SPT S-1	25	2-4-6-4 (10)		0.1 **TOPSOIL**	449.9
	SPT S-2	13	1-2-1-2 (3)		Brown, medium grained **SAND**, little gravel, trace silt, trace organics, moist, loose to very loose, **fill**	
					4.0	446.0
5	SPT S-3	83	0-1-1-3 (2)		▼ Brown **SILT**, little sand, trace organics and roots, damp, very soft, **glacial lake deposit**	
					6.0 ▽	444.0
	SPT S-4	38	1-3-3-5 (6)		Brown to gray silty **SAND**, trace fine rounded gravel, wet, loose, **glacial lake deposit**	
10	SPT S-5	71	1-3-3-5 (6)			
	SPT S-6	100	5-6-8-11 (14)		- Trace organics encountered in S-5 & S-6	
					13.0	437.0
15	SPT S-7	83	1-3-5-5 (8)		Gray fine **SAND**, little to some silt, wet, loose to very loose, **glacial lake deposit**	
20	SPT S-8	100	0-0-1-2 (1)			
25	SPT S-9	100	0-0-0-0 (0)		25.0	425.0

Bottom of borehole at 25.0 feet.

Larson Design Group

BORING NUMBER B-8

CLIENT Waterside on Seneca, Inc
PROJECT NAME Waterside on Seneca Development
PROJECT NUMBER 13649-001
PROJECT LOCATION Watkins Glenn, Schuyler County, NY
DATE STARTED 4/4/24 **COMPLETED** 4/4/24
GROUND ELEVATION 452 ft **HOLE SIZE** 6 inches
DRILLING CONTRACTOR Nothnagle Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD HSA, SPT Sampling
▽ **AT TIME OF DRILLING** 6.00 ft / Elev 446.00 ft
LOGGED BY MRB **CHECKED BY** MDB
AT END OF DRILLING ---
NOTES
▼ **AFTER DRILLING** 4.00 ft / Elev 448.00 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	GRAPHIC LOG	MATERIAL DESCRIPTION	
0						
	SPT S-1	21	1-1-2-2 (3)		Brown and gray fine **SAND**, little gravel, trace organics, damp, very loose, **fill**	
					2.0	450.0
	SPT S-2	100	2-2-3-4 (5)		Orange and brown **SILT**, little sand, trace gravel, damp, medium stiff, **glacial lake deposit**	
					3.2	448.8
					▼ Dark brown organic **SILT**, little sand, trace roots, damp, soft, **glacial lake deposit**	
					4.4	447.6
5	SPT S-3	63	1-3-4-4 (7)		Brown to gray fine **SAND**, little gravel, little silt, moist to wet, loose, **glacial lake deposit**	
	SPT S-4	42	1-2-5-7 (7)		▽	
					8.0	444.0
10	SPT S-5	67	4-5-7-8 (12)		Gray silty **SAND**, trace rounded gravel, trace organics, wet, medium dense, **glacial lake deposit**	
	SPT S-6	100	5-5-7-9 (12)			
					13.0	439.0
15	SPT S-7	88	6-8-8-7 (16)		Gray fine **SAND**, little silt, wet, medium dense to very loose, **glacial lake deposit**	
20	SPT S-8	92	0-0-1-3 (1)			
25	SPT S-9	79	0-0-0-0 (0)		25.0	427.0

Bottom of borehole at 25.0 feet.

Larson Design Group

BORING NUMBER B-9

CLIENT Waterside on Seneca, Inc
PROJECT NAME Waterside on Seneca Development
PROJECT NUMBER 13649-001
PROJECT LOCATION Watkins Glenn, Schuyler County, NY
DATE STARTED 4/4/24 **COMPLETED** 4/4/24
GROUND ELEVATION 455 ft **HOLE SIZE** 6 inches
DRILLING CONTRACTOR Nothnagle Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD HSA, SPT Sampling
AT TIME OF DRILLING 3.10 ft / Elev 451.90 ft
LOGGED BY MRB **CHECKED BY** MDB
AT END OF DRILLING ---
NOTES Bulk sample collected from 0.0-4.0 feet.
AFTER DRILLING 2.80 ft / Elev 452.20 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	
0							
	SPT S-1	88	0-1-1-2 (2)			Brown **SILT**, little clay, little sand, trace organics, damp, very soft to medium stiff, **fill**	
						2.0	453.0
	SPT S-2	67	3-3-3-3 (6)			Brown **SILT**, some sand, trace rounded gravel, damp, very soft to medium stiff, **glacial lake deposit**	
						4.0	451.0
5	SPT S-3	100	1-1-2-3 (3)			Light brown to orange and gray, lean **CLAY**, trace organics and wood fragments, damp, soft, **glacial lake deposit**	
	SPT S-4	83	2-4-3-4 (7)	PP = 1.0 tsf		8.0	447.0
10	SPT S-5	88	0-0-0-3 (0)	PP = 0.25 tsf		Dark brown **SILT** and **ORGANICS**, little clay, wet, very soft, **glacial lake deposit**	
						10.0	445.0
	SPT S-6	67	1-2-4-7 (6)			Gray fine and medium grained **SAND**, little silt, little gravel, wet, loose, **glacial lake deposit**	
						13.0	442.0
15	SPT S-7	33	2-3-3-4 (6)			Brown fine and medium grained **SAND**, some gravel, little silt, wet, loose, **glacial lake deposit**	
20	SPT S-8	25	4-3-2-4 (5)			23.0	432.0
						Gray silty **SAND**, trace organics, wet, very soft, **glacial lake deposit**	
25	SPT S-9	63	0-1-1-1 (2)			25.0	430.0

Bottom of borehole at 25.0 feet.

Larson Design Group

BORING NUMBER B-10

CLIENT Waterside on Seneca, Inc
PROJECT NAME Waterside on Seneca Development
PROJECT NUMBER 13649-001
PROJECT LOCATION Watkins Glenn, Schuyler County, NY
DATE STARTED 4/4/24 **COMPLETED** 4/4/24
GROUND ELEVATION 456 ft **HOLE SIZE** 6 inches
DRILLING CONTRACTOR Nothnagle Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD HSA, SPT Sampling
AT TIME OF DRILLING 18.00 ft / Elev 438.00 ft
LOGGED BY MRB **CHECKED BY** MDB
AT END OF DRILLING ---
NOTES Bulk sample collected from 0.0-10.0 feet. Shelby tube collected from 4.0-6.0 feet.
AFTER DRILLING 2.80 ft / Elev 453.20 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	
0	SPT S-1	29	5-6-4-4 (10)			Brown and gray **SAND** and medium to coarse **LIMESTONE GRAVEL**, trace organics, damp, loose, **fill**	
						2.0	454.0
	SPT S-2	25	4-3-3-4 (6)			Brown, medium grained **SAND**, little clay, trace rounded gravel, moist, loose, **glacial lake deposit**	
						4.0	452.0
5	SPT S-3	79	3-2-2-3 (4)	PP = 1.2 tsf		Light brown, orange, and gray, lean **CLAY**, trace sand, damp, soft to medium stiff, **glacial lake deposit**	
	SPT S-4	100	3-3-2-3 (5)	PP = 1.0 tsf			
10	SPT S-5	4	0-0-1-2 (1)			10.0	446.0
	SPT S-6	63	0-0-2-3 (2)	PP = 0.2 tsf		Brown and gray, elastic **SILT**, little organics, trace sand, trace gravel, moist, very soft, **glacial lake deposit**	
15	SPT S-7	21	0-0-0-1 (0)			- No organics encountered in S-7	
						18.0	438.0
20	SPT S-8	25	3-2-3-4 (5)			Brown, fine and medium grained **SAND**, some rounded gravel, wet, loose, **glacial lake deposit**	
						23.8	432.2
25	SPT S-9	67	1-2-1-2 (3)			Gray silty **SAND**, trace organics, wet, very loose, **glacial lake deposit**	
						25.0	431.0

Bottom of borehole at 25.0 feet.

Larson Design Group

BORING NUMBER B-11

CLIENT Waterside on Seneca, Inc
PROJECT NAME Waterside on Seneca Development
PROJECT NUMBER 13649-001
PROJECT LOCATION Watkins Glenn, Schuyler County, NY
DATE STARTED 4/5/24 **COMPLETED** 4/5/24
GROUND ELEVATION 461 ft **HOLE SIZE** 6 inches
DRILLING CONTRACTOR Nothnagle Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD HSA, SPT Sampling
▽ **AT TIME OF DRILLING** 18.00 ft / Elev 443.00 ft
LOGGED BY MRB **CHECKED BY** MDB
AT END OF DRILLING ---
NOTES
▼ **AFTER DRILLING** 11.10 ft / Elev 449.90 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	
0	SPT S-1	54	2-2-3-2 (5)			Brown and dark brown, medium grained **SAND**, little gravel, little clay, trace organics, damp, loose, **fill**	
						1.5	459.5
	SPT S-2	58	2-3-3-2 (6)			Brown sandy **SILT**, little clay, trace rounded gravel, trace organics, damp, medium stiff, **fill**	
						4.0	457.0
5	SPT S-3	38	7-5-5-6 (10)			Brown, medium grained **SAND** and **GRAVEL**, trace carbonaceous shale gravel, trace organics, trace geofabric, damp to moist, loose, **fill**	
	SPT S-4	29	4-5-5-6 (10)			8.0	453.0
10	SPT S-5	100	2-2-2-4 (4)	PP = .4 tsf		Gray to brown **SILT**, little sand, little clay, moist, soft, **glacial lake deposit**	
	SPT S-6	29	8-8-4-2 (12)	PP = .1 tsf		▼ - Trace gravel ecountered in S-6	
						13.0	448.0
15	SPT S-7	75	0-0-4-8 (4)	PP = .5 tsf		Dark brown **SILT**, little clay, moist, soft, **glacial lake deposit**	
						18.0 ▽	443.0
20	SPT S-8	29	0-2-4-5 (6)			Brown, medium grained **SAND** and **GRAVEL**, rounded, little to trace clay, wet, loose to medium dense, **glacial lake deposit**	
25	SPT S-9	54	14-9-6-9 (15)			28.0	433.0
30	SPT S-10	29	5-4-3-4 (7)			Brown, medium **SAND**, some fine gravel, little silt, wet, loose, **glacial lake deposit**	
						33.0	428.0
35	SPT S-11	75	2-1-3-4 (4)			Gray fine **SAND**, some silt, trace wood fragments and marine shells, wet, very loose, **glacial lake deposit**	

Larson Design Group

BORING NUMBER B-11

CLIENT Waterside on Seneca, Inc
PROJECT NAME Waterside on Seneca Development
PROJECT NUMBER 13649-001
PROJECT LOCATION Watkins Glenn, Schuyler County, NY

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION
35						Gray fine **SAND**, some silt, trace wood fragments and marine shells, wet, very loose, **glacial lake deposit** *(continued)*
40	SPT S-12	100	0-2-1-3 (3)			40.0 421.0
						Bottom of borehole at 40.0 feet.

Larson Design Group

BORING NUMBER B-12

CLIENT Waterside on Seneca, Inc
PROJECT NAME Waterside on Seneca Development
PROJECT NUMBER 13649-001
PROJECT LOCATION Watkins Glenn, Schuyler County, NY
DATE STARTED 4/9/24 **COMPLETED** 4/9/24
GROUND ELEVATION 458 ft **HOLE SIZE** 6 inches
DRILLING CONTRACTOR Nothnagle Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD HSA, SPT Sampling
▽ **AT TIME OF DRILLING** 18.00 ft / Elev 440.00 ft
LOGGED BY MRB **CHECKED BY** MDB
AT END OF DRILLING ---
NOTES
AFTER DRILLING N/A

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	
0							
	SPT S-1	50	1-3-3-3 (6)			Brown **SAND**, some limestone gravel, trace clay, trace organics, damp, very loose, **fill**	
						1.5	456.5
	SPT S-2	33	3-3-5-6 (8)			Brown **SAND**, some rounded gravel, well graded, moist, loose, **fill**	
						4.0	454.0
5	SPT S-3	92	7-3-5-5 (8)			Dark brown **SAND**, some silt, trace organics, damp, loose, **fill**	
						5.3	452.7
	SPT S-4	100	6-5-5-5 (10)	PP = 1.2 tsf		Mottled light brown, orange, and gray, lean **CLAY**, damp, medium stiff, **glacial lake deposit**	
10	SPT S-5	38	1-2-2-3 (4)	PP = 0.6 tsf		- Soft and moist in S-5	
	SPT S-6	100	3-1-2-2 (3)	PP = 0.5 tsf		11.3	446.7
						Dark gray elastic **SILT**, trace clay, trace organics, damp to moist, soft to very soft, **glacial lake deposit**	
15	SPT S-7	79	1-1-1-2 (2)				
						18.0 ▽	440.0
20	SPT S-8	38	4-7-8-7 (15)			Brown, medium grained **SAND** and well-graded **GRAVEL**, wet, medium dense to very loose, **glacial lake deposit**	
						24.0	434.0
25	SPT S-9	71	1-1-2-2 (3)			Gray **SAND**, fine, some silt, wet, very loose, **glacial lake deposit**	
						28.0	430.0
30	SPT S-10	46	1-2-1-2 (3)			Gray **SAND**, fine, little silt, trace wood fragments, wet, very loose, **glacial lake deposit**	
						33.0	425.0
35	SPT S-11	63	3-1-2-2 (3)			Gray sandy **CLAY**, little silt, trace organics, trace gravel, wet, soft, **glacial lake deposit**	

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Larson Design Group

BORING NUMBER B-12

CLIENT Waterside on Seneca, Inc
PROJECT NAME Waterside on Seneca Development
PROJECT NUMBER 13649-001
PROJECT LOCATION Watkins Glenn, Schuyler County, NY

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION
35						Gray sandy **CLAY**, little silt, trace organics, trace gravel, wet, soft, **glacial lake deposit** *(continued)*
40	SPT S-12	100	0-0-0-0 (0)	PP = 0.2 tsf		- No organics, very soft in S-12
45	SPT S-13	100	0-0-0-0 (0)	PP = 0 tsf		
						48.0 410.0
50	SPT S-14	100	0-0-0-0 (0)			Gray silty **SAND**, fine, wet, medium dense, **glacial lake deposit**
55						
60						
65						
						68.0 390.0
70	SPT S-15	100	2-5-5-10 (10)	PP = 0.7 tsf		Gray silty **SAND**, trace organics, wet, very loose, **glacial lake deposit**
						- Running sands were encountered from 68 to 73 feet
						73.0 385.0
75	SPT S-16	100	0-1-2-4 (3)	PP = 0.5 tsf		Gray sandy **SILT**, wet, soft, **glacial lake deposit**

Larson Design Group

BORING NUMBER B-12

CLIENT Waterside on Seneca, Inc
PROJECT NAME Waterside on Seneca Development
PROJECT NUMBER 13649-001
PROJECT LOCATION Watkins Glenn, Schuyler County, NY

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION
75						Gray sandy **SILT**, wet, soft, **glacial lake deposit** *(continued)*
						78.0 380.0
80	SPT S-17	100	0-0-0-0 (0)	PP = 0.5 tsf		Gray **ELASTIC SILT**, some sand, wet, very soft, **glacial lake deposit**
85						- Augered down to 99.0 feet to sample
90						
95						
100	SPT S-18	100	0-0-0-0 (0)	PP = 0.4 tsf		
						101.0 357.0

Bottom of borehole at 101.0 feet.

Larson Design Group

BORING NUMBER B-13

CLIENT Waterside on Seneca, Inc
PROJECT NAME Waterside on Seneca Development
PROJECT NUMBER 13649-001
PROJECT LOCATION Watkins Glenn, Schuyler County, NY
DATE STARTED 4/5/24 **COMPLETED** 4/5/24
GROUND ELEVATION 457 ft **HOLE SIZE** 6 inches
DRILLING CONTRACTOR Nothnagle Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD HSA, SPT Sampling
▽ **AT TIME OF DRILLING** 18.00 ft / Elev 439.00 ft
LOGGED BY MRB **CHECKED BY** MDB
AT END OF DRILLING ---
NOTES
AFTER DRILLING N/A

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	
0	SPT S-1	50	3-2-2-3 (4)	PP = 0.9 tsf		Dark brown **SILT** and **ORGANICS**, little sand, trace gravel, damp, soft, **fill**	
	SPT S-2	83	3-3-3-3 (6)	PP = 1.5 tsf		3.0	454.0
						Light brown, orange, and gray **SILT**, some sand, little clay, moist, medium stiff, **fill**	
5	SPT S-3	100	1-2-2-3 (4)	PP = 0.5 tsf		4.5	452.5
	SPT S-4	79	3-3-3-3 (6)			Mottled light brown, orange, and gray, lean **CLAY**, trace sand, moist, soft to medium stiff, **glacial lake deposit**	
						8.0	449.0
	SPT S-5	33	0-0-1-2 (1)			Dark brown to gray, lean **CLAY**, little sand, moist, very soft, **glacial lake deposit**	
10	SPT S-6	63	0-1-1-2 (2)	PP = 0.3 tsf			
	SPT S-7	46	0-2-4-2 (6)	PP = 0.3 tsf		- Trace sand, medium stiff in S-7	
15							
						18.0 ▽	439.0
	SPT S-8	21	14-7-6-6 (13)			Brown, medium grained **SAND** and **GRAVEL**, rounded, well graded, wet, medium dense, **glacial lake deposit**	
20							
						23.0	434.0
	SPT S-9	63	7-6-8-14 (14)			Brown, medium grained **SAND**, trace rounded poorly-graded gravel, wet, medium dense, **glacial lake deposit**	
25						25.0	432.0

Bottom of borehole at 25.0 feet.

Larson Design Group

BORING NUMBER B-14

CLIENT Waterside on Seneca, Inc
PROJECT NAME Waterside on Seneca Development
PROJECT NUMBER 13649-001
PROJECT LOCATION Watkins Glenn, Schuyler County, NY
DATE STARTED 4/5/24 **COMPLETED** 4/5/24
GROUND ELEVATION 458 ft **HOLE SIZE** 6 inches
DRILLING CONTRACTOR Nothnagle Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD HSA, SPT Sampling
▽ **AT TIME OF DRILLING** 10.00 ft / Elev 448.00 ft
LOGGED BY MRB **CHECKED BY** MDB
AT END OF DRILLING ---
NOTES
▼ **AFTER DRILLING** 8.00 ft / Elev 450.00 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	
0							
	SPT S-1	88	0-1-1-2 (2)			Dark brown **SILT** and **ORGANICS**, little sand, damp, very soft, **fill**	
						1.6	456.4
	SPT S-2	54	2-2-3-4 (5)			Orange and light brown **SILT**, little clay, trace sand, damp, medium stiff, **fill**	
						4.5	453.5
5	SPT S-3	92	1-1-1-1 (2)	PP = 0.8 tsf		Light brown to gray, lean **CLAY**, little sand, moist to wet, very soft to medium stiff, **glacial lake deposit**	
	SPT S-4	88	3-3-3-4 (6)	PP = 0.9 tsf		▼	
	SPT S-5	100	0-0-3-4 (3)	PP = 0.9 tsf		- Soft in S-5 & S-6	
10	SPT S-6	79	2-2-2-3 (4)	PP = 1 tsf		▽	
	SPT S-7	100	0-0-0-3 (0)	PP = .1 tsf			
15							
						18.0	440.0
	SPT S-8	25	9-8-10-10 (18)			Brown, medium grained **SAND** and **GRAVEL**, coarse, little silt, wet, medium dense, **glacial lake deposit**	
20							
						23.0	435.0
	SPT S-9	63	10-6-12-18 (18)			Brown, medium grained **SAND**, little rounded poorly-graded gravel, wet, medium dense, **glacial lake deposit**	
25						25.0	433.0

Bottom of borehole at 25.0 feet.

Appendix C

Laboratory Test Results

The soil samples obtained from the test borings were visually classified in the field by geotechnical engineering personnel from Larson Design Group. The recovered samples were further evaluated by laboratory testing conducted by Geotechnics, Inc. Laboratory soils tests were conducted in accordance with applicable American Society of Testing and Materials (ASTM) Standards as listed below:

1. Moisture content tests were performed in accordance with ASTM D 2216, “Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.”

2. Atterberg Limits tests, consisting of the liquid limit, plastic limit and plasticity index, were performed in accordance with ASTM D 4318, “Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.”

3. Sieve analyses with washed No. 200 sieve tests were performed in accordance with ASTM D 422, “Standard Test Method for Particle-Size Analysis of Soils.”

4. Standard proctor density testing was conducted in accordance with ASTM D698, “Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).”

5. Soil pH testing in accordance with EPA Method 9045D, “Soil and Waste pH.”

6. Soluble chloride and soluble sulfate of soils in accordance with EPA Method 9056, “Determination of Inorganic Anions by Ion Chromatography.”

A summary and details of the laboratory test results are included on the following pages of this appendix.

Larson Design Group

LABORATORY DATA SUMMARY

Waterside on Seneca

Watkins Glen, Schuyler County, New York

13649-001

BORING	SAMPLE	DEPTH (FT)	SAMPLE TYPE	NATURAL MOISTURE (%)	ATTERBERG LIMITS			GRADATION			USCS SOIL CLASS.	PROCTOR	
					LL	PL	PI	% GRAVEL	% SAND	% FINES		MAX DD (PSF)	OPT M (%)
B-1	S-2 & S-3	2.0 - 6.0	SS	19.0	28	24	4	8.2	40.0	51.8	ML		
B-3	S-3 & S-4	4.0 - 8.0	SS	**50.8**	38	29	9	8.9	10.0	81.1	ML		
B-6	S-4 & S-5	6.0 - 10.0	SS	24.2	34	26	8	6.5	27.4	66.1	ML		
B-7	S-3	4.0 - 6.0	SS	35.9	45	29	16	9.9	12.8	77.3	ML		
B-9 & B-10	BS-1	0.0 - 6.0	Bulk	22.2								116.0	11.3
B-10	S-3 - S-5	4.0 - 10.0	SS	29.8	37	23	14	0.1	6.6	93.3	CL		
B-14	S-4 - S-7	6.0 - 15.0	SS	32.0	32	21	11	0.1	11.1	88.8	CL		

Sample Type Key:
SS - Split Spoon Sample
Bulk - Sample Collected from Auger Cuttings
UD - Undisturbed Sample

Figure C-1

May 22, 2024

Project No. 2024-298-001

Matt Baird
Larson Design Group
3000 Westinghouse Dr., Suite 400
Cranberry, PA 16066

Transmittal
Laboratory Test Results
Waterside on Seneca 13649-001

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was transmitted to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens that were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectfully submitted,
Geotechnics, Inc.

Nathan Melaro
Director of Operations

We understand that you have a choice in your laboratory services and we thank you for choosing Geotechnics.

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MOISTURE CONTENT

ASTM D 2216-19

Client: Larson Design Group
Client Reference: Waterside on Seneca 13649-001
Project No.: 2024-298-001

Lab ID:	001	002	003	004	007
Boring No.:	B-1	B-3	B-6	B-7	B-10
Depth (ft):	2-6'	4-8'	6-10'	4-6'	4-10'
Sample No.:	S-2 & S-3	S-3 & S-4	S-4 & S-5	S-3	S-3 to S-5
Tare Number	71	45	57	51	44
Wt. of Tare & Wet Sample (g)	36.68	37.15	54.30	24.09	41.66
Wt. of Tare & Dry Sample (g)	31.33	25.72	44.33	18.56	32.82
Weight of Tare (g)	3.14	3.22	3.19	3.17	3.20
Weight of Water (g)	5.35	11.43	9.97	5.53	8.84
Weight of Dry Sample (g)	28.19	22.50	41.14	15.39	29.62
Water Content (%)	**19.0**	**50.8**	**24.2**	**35.9**	**29.8**

Lab ID	008
Boring No.	B-14
Depth (ft)	6-15'
Sample No.	S-4 to S-7
Tare Number	80
Wt. of Tare & Wet Sample (g)	96.46
Wt. of Tare & Dry Sample (g)	73.90
Weight of Tare (g)	3.30
Weight of Water (g)	22.56
Weight of Dry Sample (g)	70.60
Water Content (%)	**32.0**

Notes :

Tested By JW *Date* 4/22/24 *Checked By* NJM *Date* 4/23/24

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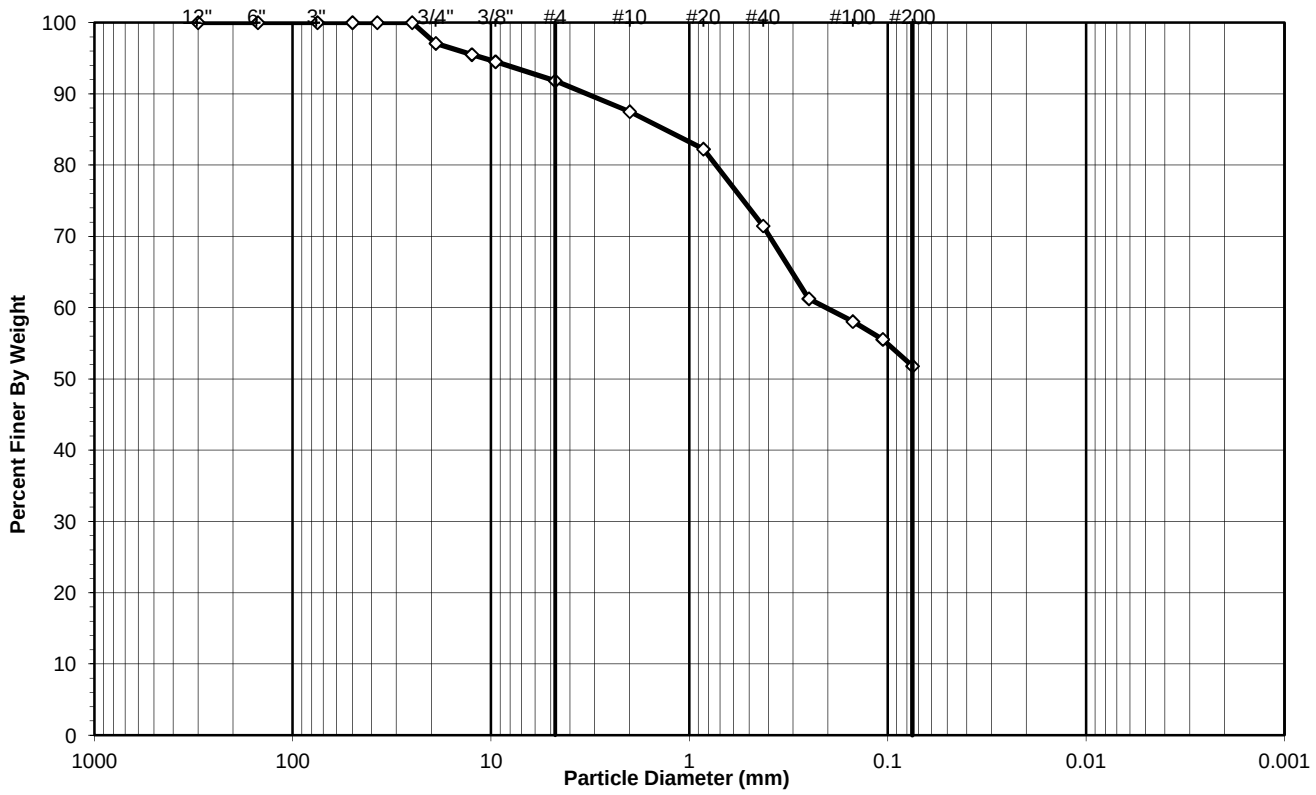
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client:	Larson Design Group	Boring No.:	B-1
Client Reference:	Waterside on Seneca 13649-001	Depth (ft):	2.0-6.0'
Project No.:	2024-298-001	Sample No.:	S-2 & S-3
Lab ID:	2024-298-001-001	Soil Color:	Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



Sieve Size		Percentage (%)
Greater than #4	***Gravel***	**8.17**
#4 to #200	***Sand***	**40.03**
Finer than #200	***Silt & Clay***	**51.81**

USCS Symbol:
ML, TESTED

USCS Classification:
SANDY SILT

Tested By DF Date 4/26/24 Checked By BRB Date 4/26/24

DCN: CT-S73T, DATE 2/25/22, REV. 1

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WASH SIEVE ANALYSIS

ASTM D6913-17

Client:	Larson Design Group	Boring No.:	B-1
Client Reference:	Waterside on Seneca 13649-001	Depth (ft):	2.0-6.0'
Project No.:	2024-298-001	Sample No.:	S-2 & S-3
Lab ID:	2024-298-001-001	Soil Color:	Brown

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	2024	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	504.01	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	504.01	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	145.27	Weight of Tare (g):	NA
Weight of Water (g):	0.00	Weight of Water (g):	NA
Weight of Dry Soil (g):	358.74	Weight of Dry Soil (g):	NA
Moisture Content (%):	**0.0**	**Moisture Content (%):**	**0.0**

Dry Weight of Sample (g):	NA	Total Dry Weight of Sample (g):	358.74
Tare No. (Sub-Specimen)	2024	Wet Weight of +3/4" Sample (g):	10.45
Wt. of Tare & Wet Sub-Specimen (g):	504.01	Dry Weight of + 3/4" Sample (g):	10.45
Weight of Tare (g):	145.27	Dry Weight of - 3/4" Sample (g):	348.29
Sub-Specimen Wet Weight (g):	358.74	Dry Weight -3/4" +3/8" Sample (g):	9.21
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	339.08
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100**
6"	150	0.00		0.00	0.00	100.00	**100**
3"	75	0.00		0.00	0.00	100.00	**100**
2"	50	0.00	(*)	0.00	0.00	100.00	**100**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100**
1"	25	0.00		0.00	0.00	100.00	**100**
3/4"	19	10.45		2.91	2.91	97.09	**97**
1/2"	12.5	5.63	(**)	1.57	4.48	95.52	**96**
3/8"	9.5	3.58		1.00	5.48	94.52	**95**
#4	4.75	9.64		2.69	8.17	91.83	**92**
#10	2	15.51		4.32	12.49	87.51	**88**
#20	0.85	18.86	(**)	5.26	17.75	82.25	**82**
#40	0.425	38.69		10.78	28.53	71.47	**71**
#60	0.25	36.64		10.21	38.75	61.25	**61**
#100	0.15	11.48		3.20	41.95	58.05	**58**
#140	0.106	8.98		2.50	44.45	55.55	**56**
#200	0.075	13.43		3.74	48.19	51.81	**52**
Pan	-	185.85		51.81	100.00	-	**-**

Notes : *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*
*(**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen*

Tested By	DF	Date	4/26/24	Checked By	BRB	Date	4/26/24

DCN: CT-S73T, DATE 2/25/22, REV. 1

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ATTERBERG LIMITS

ASTM D 4318-17

Client:	Larson Design Group	Boring No.:	B-1
Client Reference:	Waterside on Seneca 13649-001	Depth (ft):	2-6'
Project No.:	2024-298-001	Sample No.:	S-2 & S-3
Lab ID:	2024-298-001-001	Soil Description:	BROWN SILT

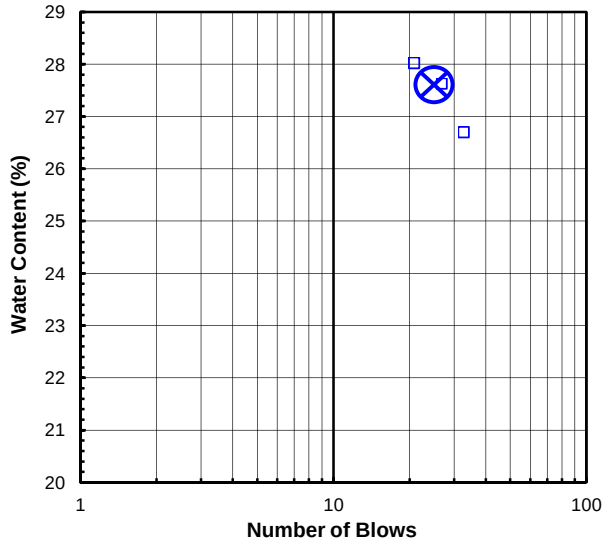
Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus #40 sieve material, Air dried)

As Received Moisture Content ASTM D2216-19		**Liquid Limit Test** 1	2	3	M
Tare Number:	71	300	649	126	U
Wt. of Tare & Wet Sample (g):	36.68	44.53	39.72	39.90	L
Wt. of Tare & Dry Sample (g):	31.33	40.29	35.36	35.43	T
Weight of Tare (g):	3.14	24.40	19.57	19.47	I
Weight of Water (g):	5.4	4.2	4.4	4.5	P
Weight of Dry Sample (g):	28.2	15.9	15.8	16.0	O
Was As Received MC Preserved:	**Yes**				I
Moisture Content (%):	**19.0**	**26.7**	**27.6**	**28.0**	N
Number of Blows:		**33**	**27**	**21**	T

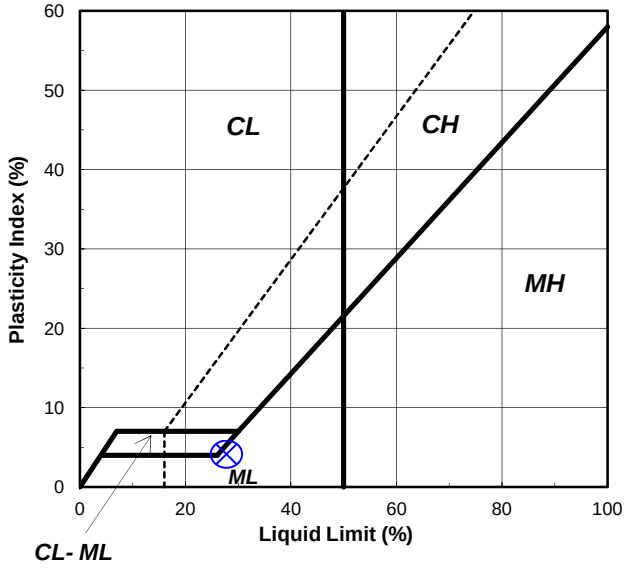
Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	143	301	
Wt. of Tare & Wet Sample (g):	26.25	24.82	
Wt. of Tare & Dry Sample (g):	25.03	23.65	
Weight of Tare (g):	19.96	18.70	
Weight of Water (g):	1.2	1.2	
Weight of Dry Sample (g):	5.1	5.0	
Moisture Content (%):	**24.1**	**23.6**	**0.4**
Note: The acceptable range of the two Moisture Contents is ±			0.84

Test Results	
Liquid Limit (%):	**28**
Plastic Limit (%):	**24**
Plasticity Index (%):	**4**
USCS Symbol:	**ML**

Flow Curve



Plasticity Chart



Tested By FS *Date* 4/24/24 *Checked By* JLK *Date* 4/25/24

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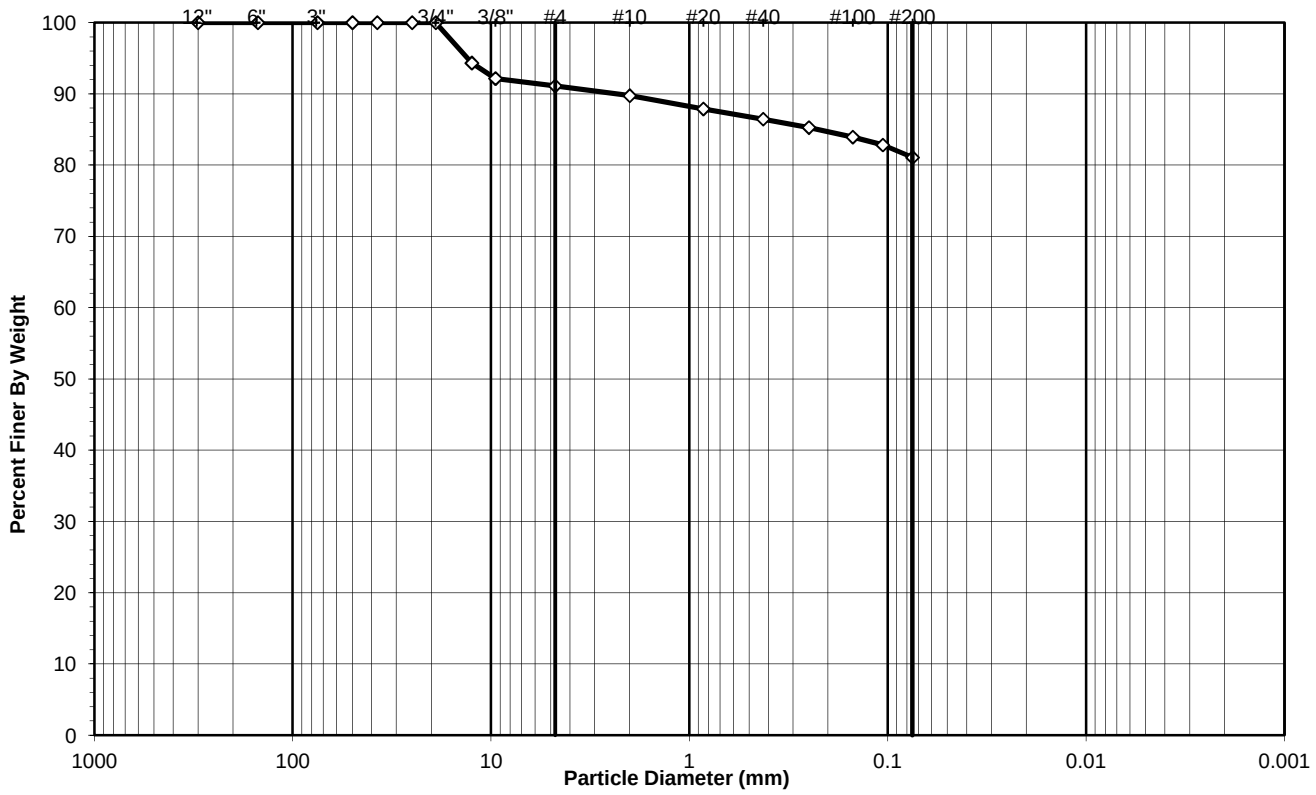
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client:	Larson Design Group	Boring No.:	B-3
Client Reference:	Waterside on Seneca 13649-001	Depth (ft):	4.0-8.0'
Project No.:	2024-298-001	Sample No.:	S-3 & S-4
Lab ID:	2024-298-001-002	Soil Color:	Gray

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



Sieve Size		Percentage (%)
Greater than #4	***Gravel***	**8.88**
#4 to #200	***Sand***	**10.03**
Finer than #200	***Silt & Clay***	**81.09**

USCS Symbol:
ML, TESTED

USCS Classification:
SILT WITH SAND

Tested By DF Date 4/26/24 Checked By BRB Date 4/26/24

DCN: CT-S73T, DATE 2/25/22, REV. 1

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WASH SIEVE ANALYSIS

ASTM D6913-17

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Client:	Larson Design Group	Boring No.:	B-3
Client Reference:	Waterside on Seneca 13649-001	Depth (ft):	4.0-8.0'
Project No.:	2024-298-001	Sample No.:	S-3 & S-4
Lab ID:	2024-298-001-002	Soil Color:	Gray

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	1479	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	418.17	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	418.17	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	145.70	Weight of Tare (g):	NA
Weight of Water (g):	0.00	Weight of Water (g):	NA
Weight of Dry Soil (g):	272.47	Weight of Dry Soil (g):	NA
Moisture Content (%):	**0.0**	**Moisture Content (%):**	**0.0**

Dry Weight of Sample (g):	NA	Total Dry Weight of Sample (g):	272.47
Tare No. (Sub-Specimen)	1479	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	418.17	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	145.70	Dry Weight of - 3/4" Sample (g):	272.47
Sub-Specimen Wet Weight (g):	272.47	Dry Weight -3/4" +3/8" Sample (g):	21.37
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	251.10
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100**
6"	150	0.00		0.00	0.00	100.00	**100**
3"	75	0.00		0.00	0.00	100.00	**100**
2"	50	0.00	(*)	0.00	0.00	100.00	**100**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100**
1"	25	0.00		0.00	0.00	100.00	**100**
3/4"	19	0.00		0.00	0.00	100.00	**100**
1/2"	12.5	15.44	(**)	5.67	5.67	94.33	**94**
3/8"	9.5	5.93		2.18	7.84	92.16	**92**
#4	4.75	2.82		1.03	8.88	91.12	**91**
#10	2	3.73		1.37	10.25	89.75	**90**
#20	0.85	5.07	(**)	1.86	12.11	87.89	**88**
#40	0.425	3.91		1.44	13.54	86.46	**86**
#60	0.25	3.21		1.18	14.72	85.28	**85**
#100	0.15	3.65		1.34	16.06	83.94	**84**
#140	0.106	3.03		1.11	17.17	82.83	**83**
#200	0.075	4.74		1.74	18.91	81.09	**81**
Pan	-	220.94		81.09	100.00	-	**-**

Notes : *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*
*(**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen*

Tested By DF Date 4/26/24 Checked By BRB Date 4/26/24

DCN: CT-S73T, DATE 2/25/22, REV. 1

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ATTERBERG LIMITS

ASTM D 4318-17

Client:	Larson Design Group	Boring No.:	B-3
Client Reference:	Waterside on Seneca 13649-001	Depth (ft):	4-8'
Project No.:	2024-298-001	Sample No.:	S-3 & S-4
Lab ID:	2024-298-001-002	Soil Description:	BROWN SILT

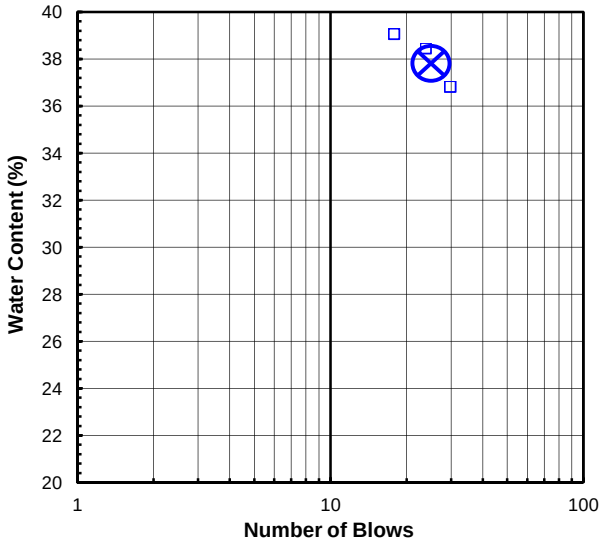
Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus #40 sieve material, Air dried)

As Received Moisture Content		Liquid Limit Test			
ASTM D2216-19		1	2	3	M
Tare Number:	45	237	543	1236	U
Wt. of Tare & Wet Sample (g):	37.15	38.96	39.36	40.73	L
Wt. of Tare & Dry Sample (g):	25.72	33.53	33.79	35.06	T
Weight of Tare (g):	3.22	18.77	19.29	20.53	I
Weight of Water (g):	11.4	5.4	5.6	5.7	P
Weight of Dry Sample (g):	22.5	14.8	14.5	14.5	O
Was As Received MC Preserved:	**Yes**				I
Moisture Content (%):	**50.8**	**36.8**	**38.4**	**39.0**	N
Number of Blows:		**30**	**24**	**18**	T

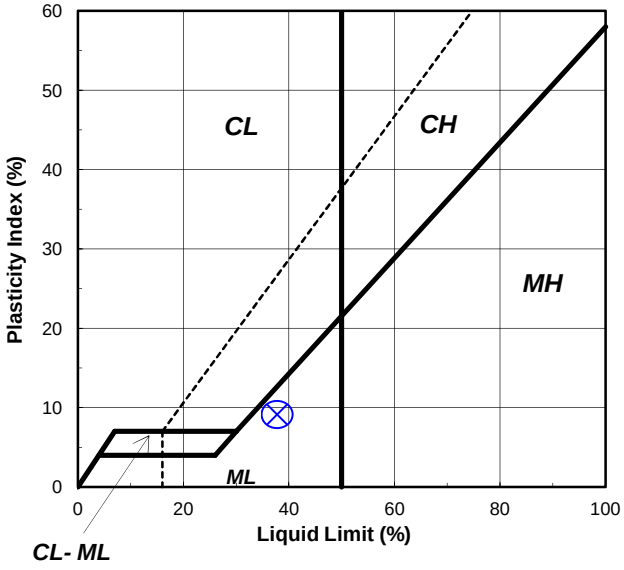
Plastic Limit Test	1	2	Range
Tare Number:	167	257	
Wt. of Tare & Wet Sample (g):	24.39	25.81	
Wt. of Tare & Dry Sample (g):	22.95	24.37	
Weight of Tare (g):	18.05	19.50	
Weight of Water (g):	1.4	1.4	
Weight of Dry Sample (g):	4.9	4.9	
Moisture Content (%):	**29.4**	**29.6**	**-0.2**
Note: The acceptable range of the two Moisture Contents is ±			0.84

Test Results	
Liquid Limit (%):	**38**
Plastic Limit (%):	**29**
Plasticity Index (%):	**9**
USCS Symbol:	**ML**

Flow Curve



Plasticity Chart



Tested By FS *Date* 4/24/24 *Checked By* JLK *Date* 4/25/24

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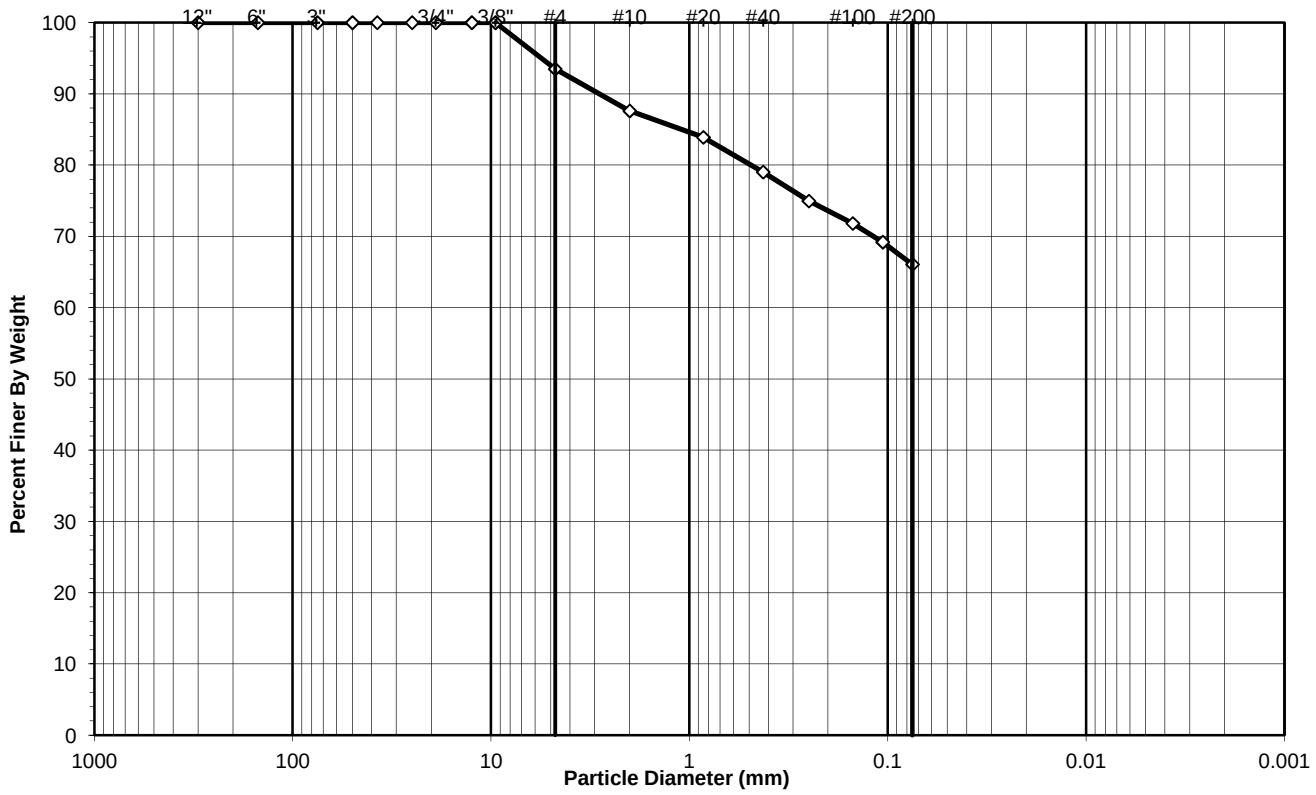
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client:	Larson Design Group	Boring No.:	B-6
Client Reference:	Waterside on Seneca 13649-001	Depth (ft):	6.0-10.0'
Project No.:	2024-298-001	Sample No.:	S-4 & S-5
Lab ID:	2024-298-001-003	Soil Color:	Gray

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



Sieve Size		Percentage (%)
Greater than #4	***Gravel***	**6.51**
#4 to #200	***Sand***	**27.42**
Finer than #200	***Silt & Clay***	**66.08**

USCS Symbol:
ML, TESTED

USCS Classification:
SANDY SILT

Tested By DF Date 4/26/24 Checked By BRB Date 4/26/24

DCN: CT-S73T, DATE 2/25/22, REV. 1

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WASH SIEVE ANALYSIS

ASTM D6913-17

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Client:	Larson Design Group	Boring No.:	B-6
Client Reference:	Waterside on Seneca 13649-001	Depth (ft):	6.0-10.0'
Project No.:	2024-298-001	Sample No.:	S-4 & S-5
Lab ID:	2024-298-001-003	Soil Color:	Gray

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	1438	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	424.41	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	424.41	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	143.93	Weight of Tare (g):	NA
Weight of Water (g):	0.00	Weight of Water (g):	NA
Weight of Dry Soil (g):	280.48	Weight of Dry Soil (g):	NA
Moisture Content (%):	**0.0**	**Moisture Content (%):**	**0.0**

Dry Weight of Sample (g):	NA	Total Dry Weight of Sample (g):	280.48
Tare No. (Sub-Specimen)	1438	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	424.41	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	143.93	Dry Weight of - 3/4" Sample (g):	280.48
Sub-Specimen Wet Weight (g):	280.48	Dry Weight -3/4" +3/8" Sample (g):	0.00
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	280.48
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100**
6"	150	0.00		0.00	0.00	100.00	**100**
3"	75	0.00		0.00	0.00	100.00	**100**
2"	50	0.00	(*)	0.00	0.00	100.00	**100**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100**
1"	25	0.00		0.00	0.00	100.00	**100**
3/4"	19	0.00		0.00	0.00	100.00	**100**
1/2"	12.5	0.00	(**)	0.00	0.00	100.00	**100**
3/8"	9.5	0.00		0.00	0.00	100.00	**100**
#4	4.75	18.25		6.51	6.51	93.49	**93**
#10	2	16.50		5.88	12.39	87.61	**88**
#20	0.85	10.40	(**)	3.71	16.10	83.90	**84**
#40	0.425	13.66		4.87	20.97	79.03	**79**
#60	0.25	11.39		4.06	25.03	74.97	**75**
#100	0.15	8.83		3.15	28.18	71.82	**72**
#140	0.106	7.35		2.62	30.80	69.20	**69**
#200	0.075	8.77		3.13	33.92	66.08	**66**
Pan	-	185.33		66.08	100.00	-	**-**

Notes : *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*
*(**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen*

Tested By	DF	Date	4/26/24	Checked By	BRB	Date	4/26/24

DCN: CT-S73T, DATE 2/25/22, REV. 1

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ATTERBERG LIMITS

ASTM D 4318-17

Client:	Larson Design Group	Boring No.:	B-6
Client Reference:	Waterside on Seneca 13649-001	Depth (ft):	6-10'
Project No.:	2024-298-001	Sample No.:	S-4 & S-5
Lab ID:	2024-298-001-003	Soil Description:	BROWN SILT

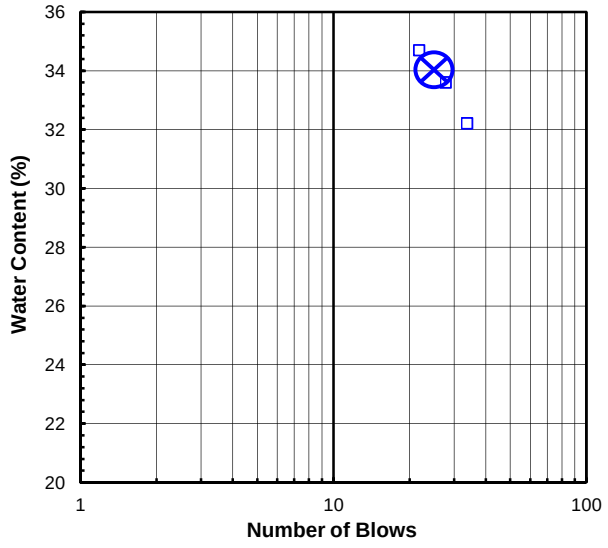
Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus #40 sieve material, Air dried)

As Received Moisture Content		Liquid Limit Test			
ASTM D2216-19		1	2	3	M
Tare Number:	57	186	147	166	U
Wt. of Tare & Wet Sample (g):	54.30	38.74	40.51	39.56	L
Wt. of Tare & Dry Sample (g):	44.33	33.81	35.38	34.36	T
Weight of Tare (g):	3.19	18.49	20.10	19.36	I
Weight of Water (g):	10.0	4.9	5.1	5.2	P
Weight of Dry Sample (g):	41.1	15.3	15.3	15.0	O
Was As Received MC Preserved:	**Yes**				I
Moisture Content (%):	**24.2**	**32.2**	**33.6**	**34.7**	N
Number of Blows:		**34**	**28**	**22**	T

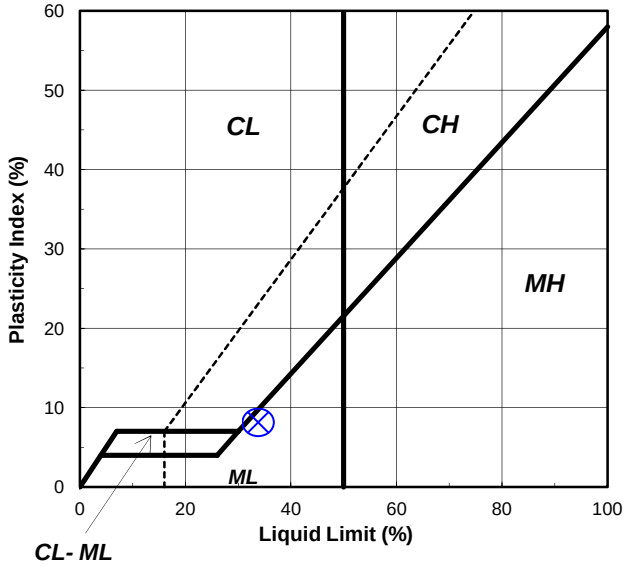
Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	305	190	
Wt. of Tare & Wet Sample (g):	25.21	24.36	
Wt. of Tare & Dry Sample (g):	23.96	23.08	
Weight of Tare (g):	19.04	18.08	
Weight of Water (g):	1.3	1.3	
Weight of Dry Sample (g):	4.9	5.0	
Moisture Content (%):	**25.4**	**25.6**	**-0.2**
Note: The acceptable range of the two Moisture Contents is ±			0.84

Test Results	
Liquid Limit (%):	**34**
Plastic Limit (%):	**26**
Plasticity Index (%):	**8**
USCS Symbol:	**ML**

Flow Curve



Plasticity Chart



Tested By FS *Date* 4/24/24 *Checked By* JLK *Date* 4/25/24

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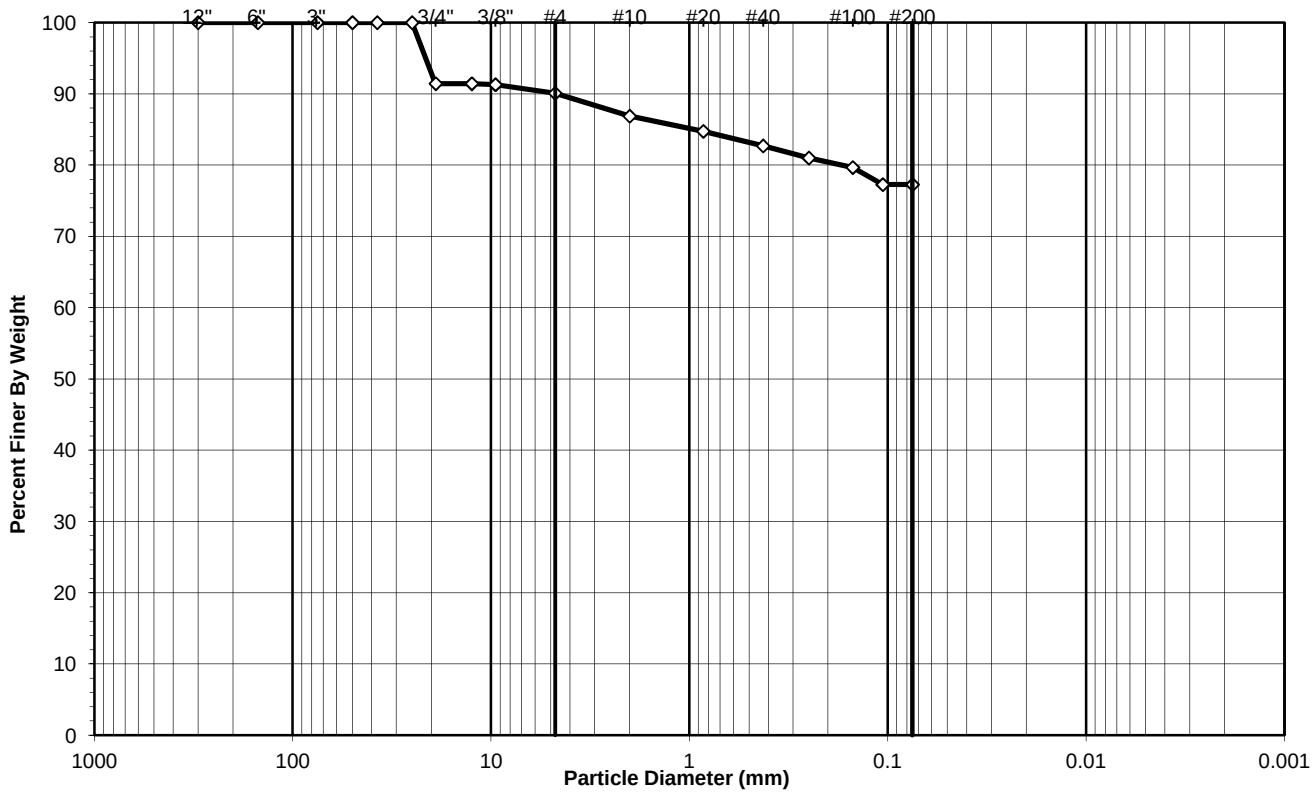
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client:	Larson Design Group	Boring No.:	B-7
Client Reference:	Waterside on Seneca 13649-001	Depth (ft):	4.0-6.0'
Project No.:	2024-298-001	Sample No.:	S-3
Lab ID:	2024-298-001-004	Soil Color:	Gray

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



Sieve Size		Percentage (%)
Greater than #4	***Gravel***	**9.91**
#4 to #200	***Sand***	**12.81**
Finer than #200	***Silt & Clay***	**77.28**

USCS Symbol:
ML, TESTED

USCS Classification:
SILT WITH SAND

Tested By DF Date 4/26/24 Checked By BRB Date 4/26/24

DCN: CT-S73T, DATE 2/25/22, REV. 1

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WASH SIEVE ANALYSIS

ASTM D6913-17

Client:	Larson Design Group	Boring No.:	B-7
Client Reference:	Waterside on Seneca 13649-001	Depth (ft):	4.0-6.0'
Project No.:	2024-298-001	Sample No.:	S-3
Lab ID:	2024-298-001-004	Soil Color:	Gray

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	1450	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	281.39	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	281.39	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	144.49	Weight of Tare (g):	NA
Weight of Water (g):	0.00	Weight of Water (g):	NA
Weight of Dry Soil (g):	136.90	Weight of Dry Soil (g):	NA
Moisture Content (%):	**0.0**	**Moisture Content (%):**	**0.0**

Dry Weight of Sample (g):	NA	Total Dry Weight of Sample (g):	136.90
Tare No. (Sub-Specimen)	1450	Wet Weight of +3/4" Sample (g):	11.73
Wt. of Tare & Wet Sub-Specimen (g):	281.39	Dry Weight of + 3/4" Sample (g):	11.73
Weight of Tare (g):	144.49	Dry Weight of - 3/4" Sample (g):	125.17
Sub-Specimen Wet Weight (g):	136.90	Dry Weight -3/4" +3/8" Sample (g):	0.19
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	124.98
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100**
6"	150	0.00		0.00	0.00	100.00	**100**
3"	75	0.00		0.00	0.00	100.00	**100**
2"	50	0.00	(*)	0.00	0.00	100.00	**100**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100**
1"	25	0.00		0.00	0.00	100.00	**100**
3/4"	19	11.73		8.57	8.57	91.43	**91**
1/2"	12.5	0.00	(**)	0.00	8.57	91.43	**91**
3/8"	9.5	0.19		0.14	8.71	91.29	**91**
#4	4.75	1.65		1.21	9.91	90.09	**90**
#10	2	4.39		3.21	13.12	86.88	**87**
#20	0.85	2.92	(**)	2.13	15.25	84.75	**85**
#40	0.425	2.80		2.05	17.30	82.70	**83**
#60	0.25	2.32		1.69	18.99	81.01	**81**
#100	0.15	1.83		1.34	20.33	79.67	**80**
#140	0.106	3.28		2.40	22.72	77.28	**77**
#200	0.075	0.00		0.00	22.72	77.28	**77**
Pan	-	105.79		77.28	100.00	-	**-**

Notes : *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*
*(**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen*

Tested By	DF	Date	4/26/24	Checked By	BRB	Date	4/26/24

DCN: CT-S73T, DATE 2/25/22, REV. 1

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ATTERBERG LIMITS

ASTM D 4318-17

Client:	Larson Design Group	Boring No.:	B-7
Client Reference:	Waterside on Seneca 13649-001	Depth (ft):	4-6'
Project No.:	2024-298-001	Sample No.:	S-3
Lab ID:	2024-298-001-004	Soil Description:	GRAY SILT

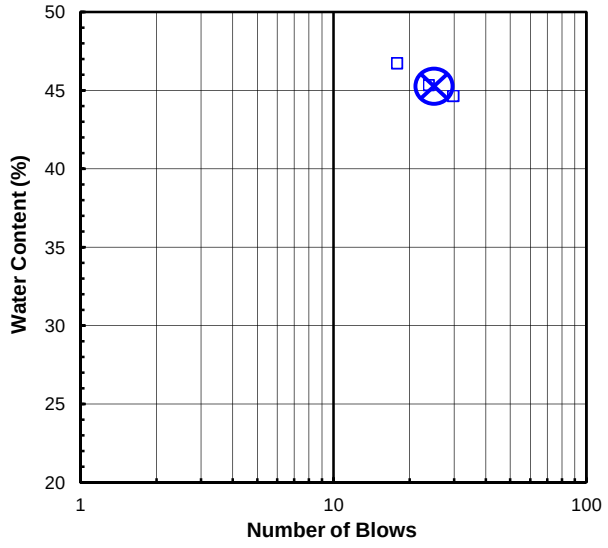
***Note: The* USCS symbol used with this test refers only to the minus No. 40** (Minus #40 sieve material, Air dried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

As Received Moisture Content		Liquid Limit Test			
ASTM D2216-19		1	2	3	M
Tare Number:	51	297	217	346	U
Wt. of Tare & Wet Sample (g):	24.09	43.73	38.93	40.80	L
Wt. of Tare & Dry Sample (g):	18.56	37.51	32.61	34.35	T
Weight of Tare (g):	3.17	23.56	18.65	20.53	I
Weight of Water (g):	5.5	6.2	6.3	6.5	P
Weight of Dry Sample (g):	15.4	14.0	14.0	13.8	O
Was As Received MC Preserved:	**Yes**				I
Moisture Content (%):	**35.9**	**44.6**	**45.3**	**46.7**	N
Number of Blows:		**30**	**24**	**18**	T

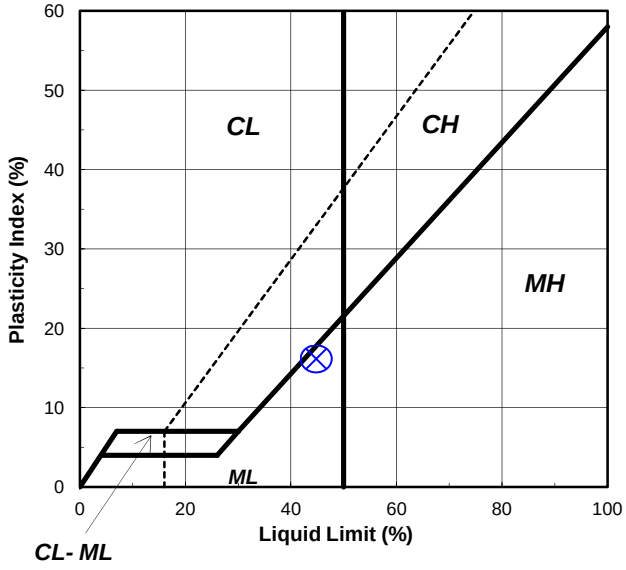
Plastic Limit Test	1	2	Range
Tare Number:	523	500	
Wt. of Tare & Wet Sample (g):	25.46	25.69	
Wt. of Tare & Dry Sample (g):	24.08	24.26	
Weight of Tare (g):	19.36	19.42	
Weight of Water (g):	1.4	1.4	
Weight of Dry Sample (g):	4.7	4.8	
Moisture Content (%):	**29.2**	**29.5**	**-0.3**
Note: The acceptable range of the two Moisture Contents is ±			0.84

Test Results	
Liquid Limit (%):	**45**
Plastic Limit (%):	**29**
Plasticity Index (%):	**16**
USCS Symbol:	**ML**

Flow Curve



Plasticity Chart



Tested By FS *Date* 4/24/24 *Checked By* JLK *Date* 4/25/24

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MOISTURE - DENSITY RELATIONSHIP

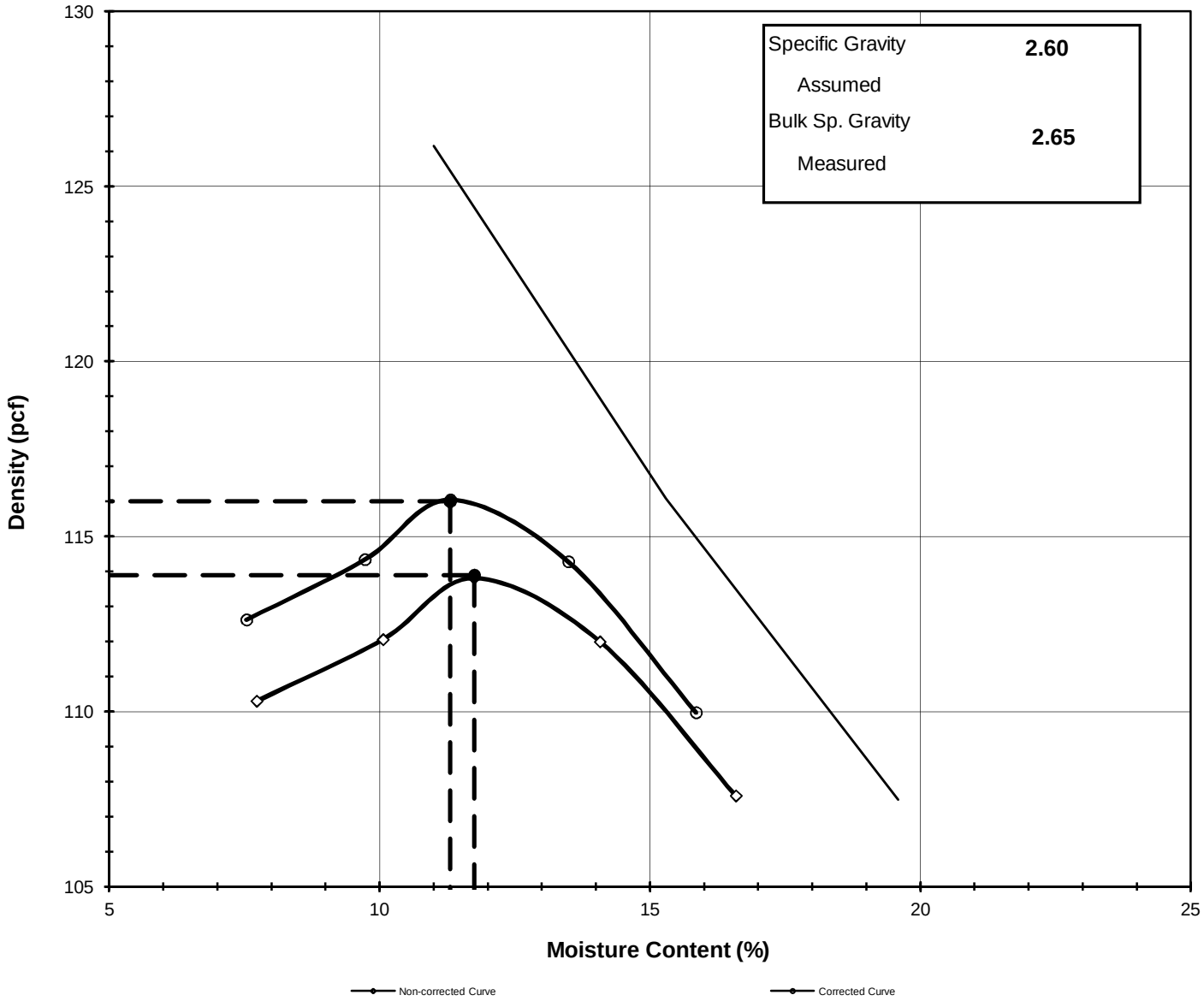
(Corrected for Oversize Particles)

ASTM D 4718-15, D 698-12e2 (SOP-S12,S39)

Client:	Larson Design Group	Boring No.:	B-9 & B-10
Client Reference:	Waterside on Seneca 13649-001	Depth (ft):	0.0-6.0'
Project No.:	2024-298-001	Sample No.:	BS-1
Lab ID:	2024-298-001-005	Test Method	STANDARD

Visual Description: Brown Sandy Clay with Rock

Optimum Moisture Content (%):	**11.8**	**Corrected Moisture Content (%):**	**11.3**
Maximum Dry Density (pcf):	**113.9**	**Corrected Dry Density (pcf):**	**116.0**



Tested By *MLF* *Date* *4/29/24* *Checked By* *JLK* *Date* 5/1/24

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MOISTURE - DENSITY RELATIONSHIP

(Corrected for Oversize Particles) *ASTM D 4718-15, D698-12e2 (SOP-S12,S39)*

Client:	Larson Design Group	Boring No.:	B-9 & B-10
Client Reference:	Waterside on Seneca 13649-001	Depth (ft):	0.0-6.0'
Project No.:	2024-298-001	Sample No.:	BS-1
Lab ID:	2024-298-001-005		

Visual Description: Brown Sandy Clay with Rock

Total Weight of the Sample (g):	NA
As Received Water Content (%):	NA
Assumed Specific Gravity	2.60

Percent Retained on 3/4" (Dry):	6.19
Percent Retained on 3/8" (Dry):	NA
Percent Retained on #4 (Dry):	NA
Oversize Material:	Not included
Procedure Used:	C

TestType:	**STANDARD**
Rammer Weight (lb):	5.5
Rammer Drop (in):	12
Rammer Type:	MECHANICAL
Machine ID:	G441
Mold ID:	G1775
Mold diameter (in):	6"
Weight of the Mold (g):	5635
Volume Of the Mold (cm^3):	2130

Mold/Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Weight of Mold & Wet Sample (g):	9691	9845	9976	9996	9917
Weight of Mold (g):	5635	5635	5635	5635	5635
Weight of Wet Sample (g):	4056	4210	4341	4361	4282
Mold Volume (cm^3):	2130	2130	2130	2130	2130

Moisture Content/Density

Tare Number:	447	415	476	416	426
Weight of Tare & Wet Sample (g):	457.37	455.13	456.68	456.68	456.90
Weight of Tare & Dry Sample (g):	431.55	422.40	418.99	412.46	404.94
Weight of Tare (g):	97.46	97.11	98.14	98.26	91.74
Weight of Water (g):	25.82	32.73	37.69	44.22	51.96
Weight of Dry Sample (g):	334.09	325.29	320.85	314.20	313.20

Wet Density (g/cm^3):	1.90	1.98	2.04	2.05	2.01
Wet Density (pcf):	118.8	123.3	127.2	127.8	125.4
Moisture Content (%):	**7.7**	**10.1**	**11.7**	**14.1**	**16.6**
Dry Density (pcf):	**110.3**	**112.1**	**113.8**	**112.0**	**107.6**

Zero Air Voids

Moisture Content (%):		11.0	15.3	19.6	
Dry Unit Weight (pcf):		126.2	116.1	107.5	

Calculated Oversize Corrected Moisture & Density

Moisture Content (%):	**7.5**	**9.7**	**11.3**	**13.5**	**15.9**
Dry Density (pcf):	**112.6**	**114.3**	**116.0**	**114.3**	**110.0**

Tested By MLF *Date* 4/29/24 *Checked By* JLK *Date* 5/1/24

DCN:CT-S39 DATE: 4/21/23, Revision 16

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Correction of Unit Weight and Water Content for Soils Containing Oversize Particles by Specific Gravity

ASTM D4718/D4718M-15

Client:	Larson Design Group	Boring No.:	B-9 & B-10
Client Reference:	Waterside on Seneca 13649-001	Depth (ft):	0.0-6.0'
Project No.:	2024-298-001	Sample No.:	BS-1
Lab ID:	2024-298-001-005		

Visual Description: Brown Sandy Clay with Rock

Total Dry Weight of Sample (g): 36108.0

FINE PORTION		***COARSE PORTION***	
Total Wet Weight of - 3/4" Portion (g):	39823.0	Total Wet Weight of + 3/4" Portion (g):	2339.0
Total Dry Weight of - 3/4" Portion (g):	33873.5	Total Dry Weight of + 3/4" Portion (g):	2234.5
Percent - 3/4" By Dry Weight (%):	93.81	Percent + 3/4" By Dry Weight (%):	6.19

MOISTURE CONTENT OF -3/4" PORTION		***MOISTURE CONTENT OF +3/4" PORTION***	
Tare Number:	3400	Tare Number:	4022
Weight of Tare & Wet Sample (g):	264.37	Weight of Tare & Wet Sample (g):	411.15
Weight of Tare & Dry Sample (g):	226.07	Weight of Tare & Dry Sample (g):	393.14
Weight of Tare (g):	8.01	Weight of Tare (g):	8.01
Weight of Water (g):	38.30	Weight of Water (g):	18.01
Weight of Dry Sample (g):	218.06	Weight of Dry Sample (g):	385.13
Moisture Content (%):	17.56	**Moisture Content (%):**	4.68

SPECIFIC GRAVITY DETERMINATION

Weight of Basket in Air (g):	1030.7
Weight of Saturated Surface Dry Sample & Basket in Air (g):	2181.4
Weight of Saturated Surface Dry Sample in Air (g):	1150.7
Weight of Basket in Water (g):	896.4
Weight of Saturated Sample & Basket in Water (g):	1619.3
Weight of Saturated Sample in Water (g):	722.9
Tare No.:	1514
Weight of Tare and Dried Sample (g):	1280.8
Weight of Tare (g):	146.2
Weight of Dried Soil (g):	1134.6

Bulk Specific Gravity (+3/4"): 2.65

Tested By DF *Date* 4/23/24 *Checked By* JLK *Date* 5/22/24

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CHLORIDE ION CONTENT IN SOILS

AASHTO T 291 - 94 (2018) (*Method B*)

Client:	Larson Design Group	Boring No.:	B-9
Client Reference:	Waterside on Seneca 13649-001	Depth (ft):	4.0-8.0'
Project No.:	2024-298-001	Sample No.:	S-3 & S-4
Lab ID:	2024-298-001-006	Description:	Brown Soil

(- # 10 Sieve material)

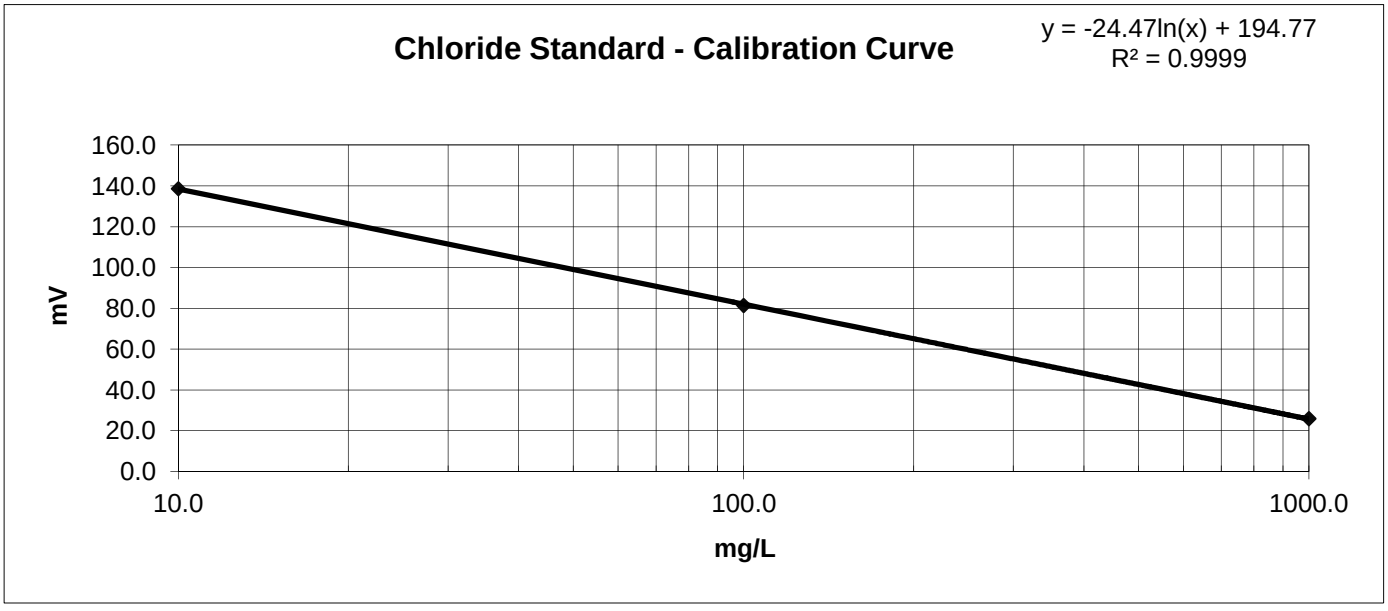
CHLORIDE STANDARD: CALIBRATION CURVE

STANDARD		MILLIVOLTS (mV)
10.0	mg/L	138.7
100.0	mg/L	81.5
1000.0	mg/L	26.0

MEASUREMENT OF CHLORIDES

		CONCENTRATION (mg/L)	CONCENTRATION (mg/kg)
Sample Weight (g):	100.0		
Water added to Sample (ml):	100.0		
Size of Sample Aliquot (ml):	25.0		
Sample Reading (mV):	165.2	3.35	3.35

Notes: 1) Samples and standards were buffered by the addition of an equal volume of the 0.2 M KNO_3 solution (1:1 volume).
2) Samples were dried for a minimum of 12 hours at 110 $^{+}/_{-}$ 5^{o}C.



Notes:

Tested By	JAM	Date	5/21/24	Checked By	JLK	Date	5/22/24

DCN: CT-S63A DATE: 6/2/14 REVISION: 1

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pH OF SOILS

AASHTO T 289-91 (2013)

Client:	Larson Design Group
Client Reference:	Waterside on Seneca 13649-001
Project No.:	2024-298-001

Lab ID:	006
Boring No.:	B-9
Depth (ft):	4.0-8.0'
Sample No.:	S-3 & S-4
Drying Tare No.:	695
Testing Tare No.:	H
Temperature (^{o}C):	23.2
pH of Sample:	**7.94**

Meter Calibration
(as used each day)

Buffer pH	Meter Reading	Meter Model
4.00	4.01	ORION 720A
7.00	7.01	
10.00	10.02	

Tested By JAM Date 5/20/24 Checked By JLK Date 5/21/24

 DCN: CT-S36B DATE 6/5/14 REVISION: 1

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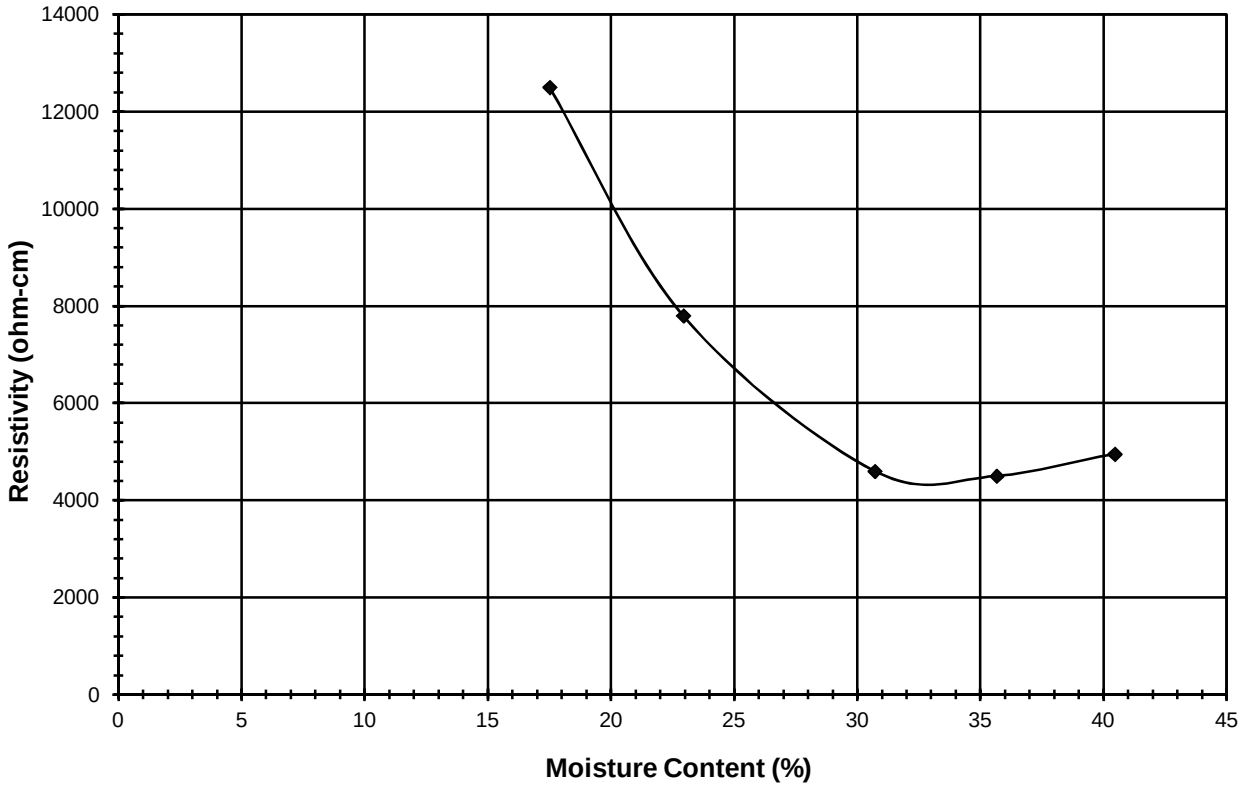
Minimum Resistivity

AASHTO T288-12

Client:	Larson Design Group	Boring No.:	B-9
Client Reference:	Waterside on Seneca 13649-001	Depth (ft):	4.0-8.0'
Project No.:	2024-298-001	Sample No.:	S-3 & S-4
Lab ID:	2024-298-001-006	Visual Description:	Brown Soil
		(- #10 Sieve material)	

Tare No.:	437	2	1106	408	473
Tare & Wet Specimen (g):	22.14	28.06	27.96	35.02	36.21
Tare & Dry Specimen (g):	20.93	26.45	25.58	31.39	31.97
Tare Weight (g):	14.02	19.43	17.83	21.21	21.49
Moisture Content (%):	**17.5**	**22.9**	**30.7**	**35.7**	**40.5**
Resistance (ohm):	**12500**	**7800**	**4600**	**4500**	**4950**
Resistivity (ohm-cm):	**12500**	**7800**	**4600**	**4500**	**4950**

Note: The ratio of Miller Box area versus distance between electrodes is equal to 1.



Soil Class	*Corrosion Resistance*	*Specific Resistivity (ohm-cm)*
1	Excellent	10,000 - 6,000
2	Good	6,000 - 4,500
3	Fair	4,500 - 2,000
4	Bad	2,000 - 0

Tested By JAM *Date* 5/15/24 *Checked By* JLK *Date* 5/16/24

DCN: CT-S56, DATE: 4/23/04, REVISION: 1

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Water-Soluble Sulfate Ion Content in Soil

AASHTO T 290-95 (2020)

Client:	Larson Design Group	Boring No.:	B-9
Client Reference:	Waterside on Seneca 13649-001	Depth (ft):	4.0-8.0'
Project No.:	2024-298-001	Sample No.:	S-3 & S-4
Lab ID:	2024-298-001-006	Soil Description:	Brown Soil

Sulfate Standard - Calibration Curve Spectrophotometer Readings

Sulfate Ion Concentrations (mg/L)

0.0	4.0	10.0	20.0	30.0	40.0	60.0	80.0	100.0

Spectrophotometer Readings (FAU)

Underrange	Underrange	7	20	42	63	112	163	243

Measurement of Barium Chloride Turbidity

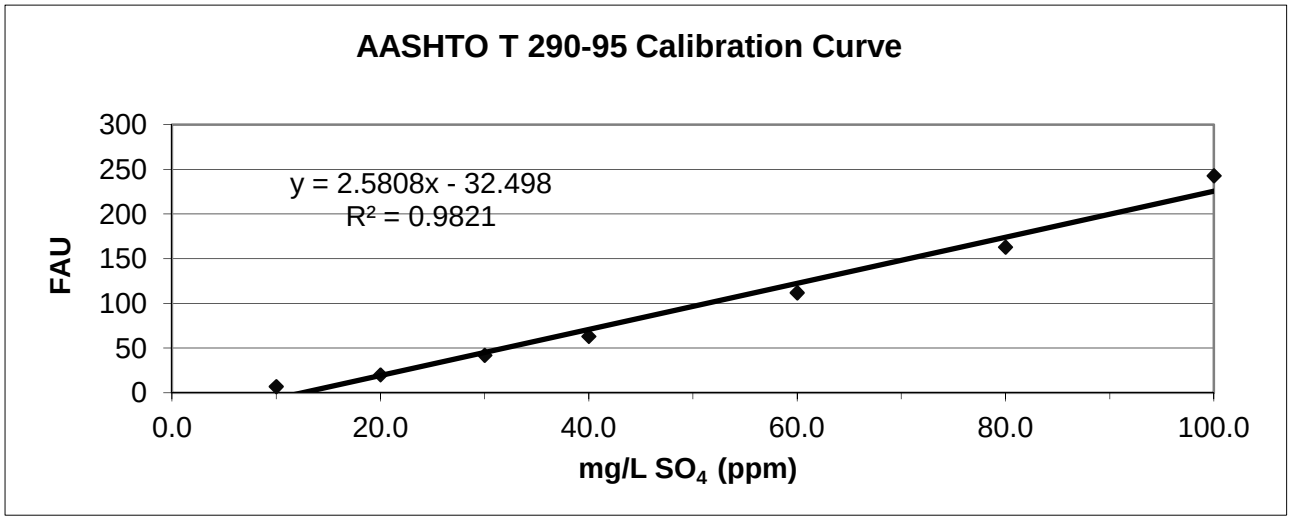
(Sample contains 5.0 mL NaCl solution and 0.3 g $BaCl_2 \cdot 2H_2O$)

Sample Weight (g):	100.0
Water added to Sample (mL):	300.0
Size of Sample Aliquot (mL):	50.0
Sample Reading (FAU):	11
Sample Diluted:	No
Sulfate Solution Added (ml):	0

Sample Moisture Content

Tare Number:	1699
Weight of Tare & Wet Sample (g):	193.38
Weight of Tare & Dry Sample (g):	191.99
Weight of Tare (g):	83.16
Weight of Water (g):	1.39
Weight of Dry Sample (g):	108.83
Moisture Content (%):	1.28

Sample Sulfate Ion Concentration:	16.85	**mg/L SO_4 (ppm)**
Sample Sulfate Ion Content:	50.6	**mg/Kg SO_4 (not corrected for moisture)**
Sample Sulfate Ion Content:	51.2	**mg/Kg SO4 (corrected for moisture)**



Tested by: JAM Date: 5/21/24 Checked by: JLK Date: 5/22/24

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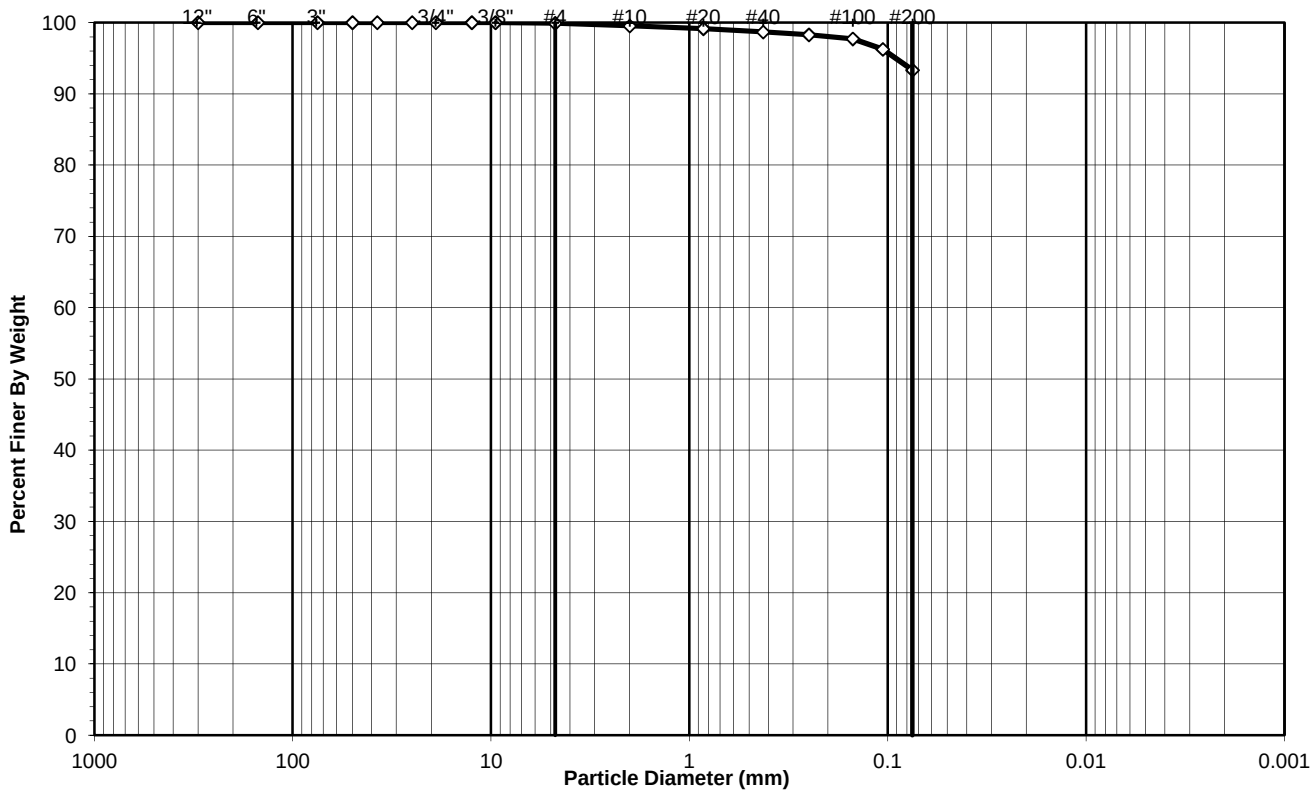
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client:	Larson Design Group	Boring No.:	B-10
Client Reference:	Waterside on Seneca 13649-001	Depth (ft):	4.0-10.0'
Project No.:	2024-298-001	Sample No.:	S-3 to S-5
Lab ID:	2024-298-001-007	Soil Color:	Brown & Gray

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



Sieve Size		Percentage (%)
Greater than #4	***Gravel***	**0.10**
#4 to #200	***Sand***	**6.57**
Finer than #200	***Silt & Clay***	**93.34**

USCS Symbol:
CL, TESTED

USCS Classification:
LEAN CLAY

Tested By DF Date 4/25/24 Checked By BRB Date 4/26/24

DCN: CT-S73T, DATE 2/25/22, REV. 1

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WASH SIEVE ANALYSIS

ASTM D6913-17

Client:	Larson Design Group	Boring No.:	B-10
Client Reference:	Waterside on Seneca 13649-001	Depth (ft):	4.0-10.0'
Project No.:	2024-298-001	Sample No.:	S-3 to S-5
Lab ID:	2024-298-001-007	Soil Color:	Brown & Gray

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	2031	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	437.67	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	437.67	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	146.92	Weight of Tare (g):	NA
Weight of Water (g):	0.00	Weight of Water (g):	NA
Weight of Dry Soil (g):	290.75	Weight of Dry Soil (g):	NA
Moisture Content (%):	**0.0**	**Moisture Content (%):**	**0.0**

Dry Weight of Sample (g):	NA	Total Dry Weight of Sample (g):	290.75
Tare No. (Sub-Specimen)	2031	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	437.67	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	146.92	Dry Weight of - 3/4" Sample (g):	290.75
Sub-Specimen Wet Weight (g):	290.75	Dry Weight -3/4" +3/8" Sample (g):	0.00
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	290.75
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100.0**
6"	150	0.00		0.00	0.00	100.00	**100.0**
3"	75	0.00		0.00	0.00	100.00	**100.0**
2"	50	0.00	(*)	0.00	0.00	100.00	**100.0**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100.0**
1"	25	0.00		0.00	0.00	100.00	**100.0**
3/4"	19	0.00		0.00	0.00	100.00	**100.0**
1/2"	12.5	0.00	(**)	0.00	0.00	100.00	**100.0**
3/8"	9.5	0.00		0.00	0.00	100.00	**100.0**
#4	4.75	0.28		0.10	0.10	99.90	**99.9**
#10	2	1.07		0.37	0.46	99.54	**99.5**
#20	0.85	1.11	(**)	0.38	0.85	99.15	**99.2**
#40	0.425	1.37		0.47	1.32	98.68	**98.7**
#60	0.25	1.14		0.39	1.71	98.29	**98.3**
#100	0.15	1.66		0.57	2.28	97.72	**97.7**
#140	0.106	4.25		1.46	3.74	96.26	**96.3**
#200	0.075	8.49		2.92	6.66	93.34	**93.3**
Pan	-	271.38		93.34	100.00	-	**-**

Notes : *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*
*(**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen*

Tested By DF Date 4/25/24 Checked By BRB Date 4/26/24

DCN: CT-S73T, DATE 2/25/22, REV. 1

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ATTERBERG LIMITS

ASTM D 4318-17

Client:	Larson Design Group	Boring No.:	B-10
Client Reference:	Waterside on Seneca 13649-001	Depth (ft):	4.0-10.0'
Project No.:	2024-298-001	Sample No.:	S-3 to S-5
Lab ID:	2024-298-001-007	Soil Description:	BROWN/GRAY LEAN CLAY

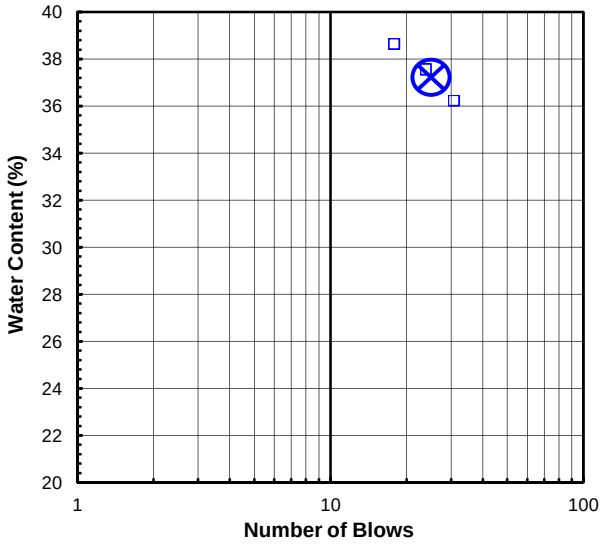
Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus #40 sieve material, Air dried)

As Received Moisture Content ASTM D2216-19		**Liquid Limit Test** 1	2	3	M
Tare Number:	44	617	543	217	U
Wt. of Tare & Wet Sample (g):	41.66	39.67	39.52	38.97	L
Wt. of Tare & Dry Sample (g):	32.82	34.32	34.00	33.31	T
Weight of Tare (g):	3.20	19.54	19.29	18.65	I
Weight of Water (g):	8.8	5.4	5.5	5.7	P
Weight of Dry Sample (g):	29.6	14.8	14.7	14.7	O
Was As Received MC Preserved:	**Yes**				I
Moisture Content (%):	**29.8**	**36.2**	**37.5**	**38.6**	N
Number of Blows:		**31**	**24**	**18**	T

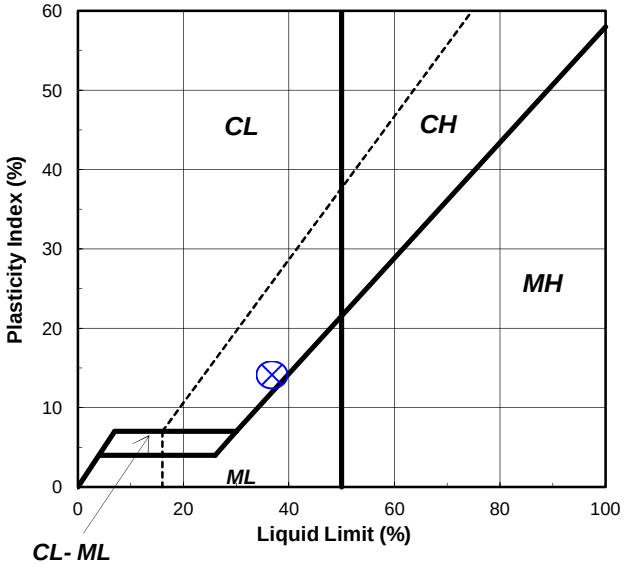
Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	257	190	
Wt. of Tare & Wet Sample (g):	25.86	24.46	
Wt. of Tare & Dry Sample (g):	24.68	23.27	
Weight of Tare (g):	19.50	18.08	
Weight of Water (g):	1.2	1.2	
Weight of Dry Sample (g):	5.2	5.2	
Moisture Content (%):	**22.8**	**22.9**	**-0.1**
Note: The acceptable range of the two Moisture Contents is ±			1.12

Test Results	
Liquid Limit (%):	**37**
Plastic Limit (%):	**23**
Plasticity Index (%):	**14**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By FS *Date* 4/23/24 *Checked By* KC *Date* 4/25/24

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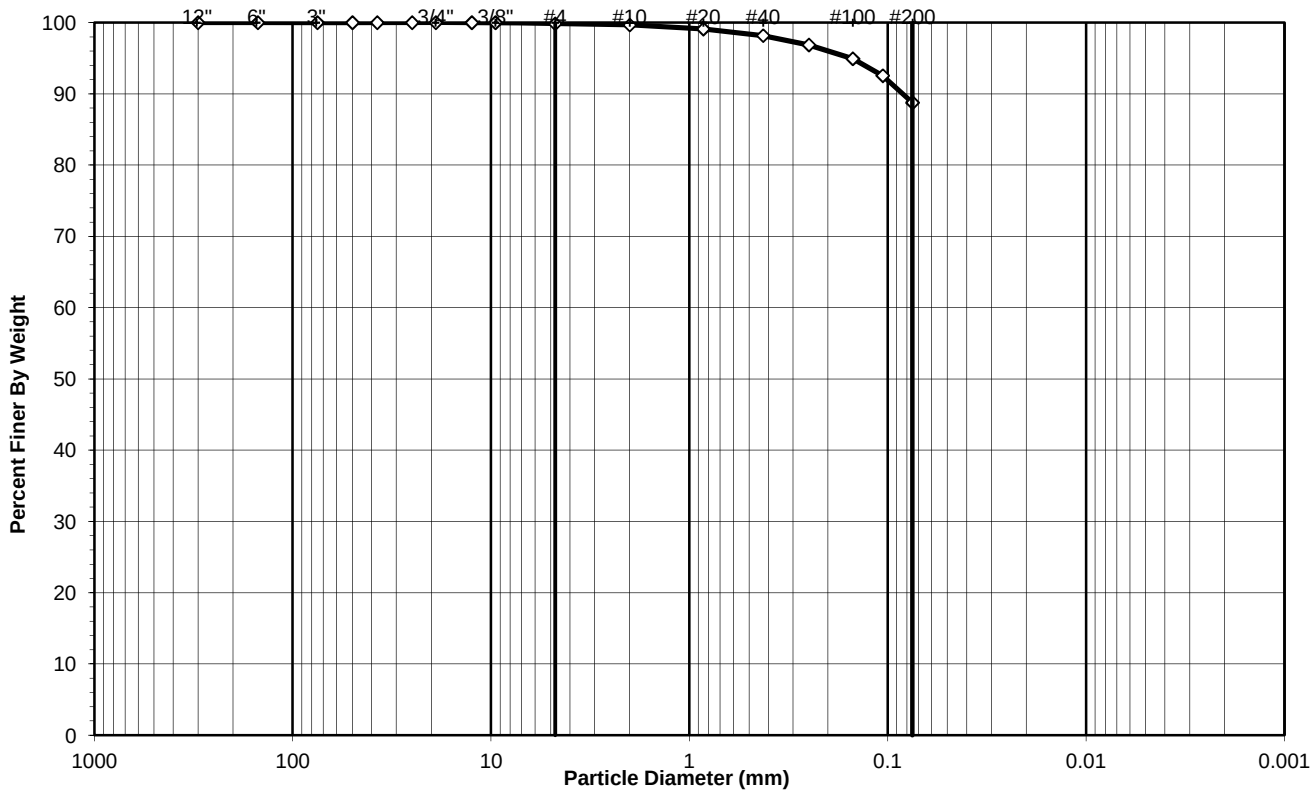
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client:	Larson Design Group	Boring No.:	B-14
Client Reference:	Waterside on Seneca 13649-001	Depth (ft):	6.0-15.0'
Project No.:	2024-298-001	Sample No.:	S-4 to S-7
Lab ID:	2024-298-001-008	Soil Color:	Brown & Gray

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



Sieve Size		Percentage (%)
Greater than #4	***Gravel***	**0.15**
#4 to #200	***Sand***	**11.07**
Finer than #200	***Silt & Clay***	**88.78**

USCS Symbol:
CL, TESTED

USCS Classification:
LEAN CLAY

Tested By DF Date 4/25/24 Checked By BRB Date 4/26/24

DCN: CT-S73T, DATE 2/25/22, REV. 1

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WASH SIEVE ANALYSIS

ASTM D6913-17

Client:	Larson Design Group	Boring No.:	B-14
Client Reference:	Waterside on Seneca 13649-001	Depth (ft):	6.0-15.0'
Project No.:	2024-298-001	Sample No.:	S-4 to S-7
Lab ID:	2024-298-001-008	Soil Color:	Brown & Gray

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	1442	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	687.91	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	687.91	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	145.08	Weight of Tare (g):	NA
Weight of Water (g):	0.00	Weight of Water (g):	NA
Weight of Dry Soil (g):	542.83	Weight of Dry Soil (g):	NA
Moisture Content (%):	**0.0**	**Moisture Content (%):**	**0.0**

Dry Weight of Sample (g):	NA	Total Dry Weight of Sample (g):	542.83
Tare No. (Sub-Specimen)	1442	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	687.91	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	145.08	Dry Weight of - 3/4" Sample (g):	542.83
Sub-Specimen Wet Weight (g):	542.83	Dry Weight -3/4" +3/8" Sample (g):	0.00
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	542.83
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100.0**
6"	150	0.00		0.00	0.00	100.00	**100.0**
3"	75	0.00		0.00	0.00	100.00	**100.0**
2"	50	0.00	(*)	0.00	0.00	100.00	**100.0**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100.0**
1"	25	0.00		0.00	0.00	100.00	**100.0**
3/4"	19	0.00		0.00	0.00	100.00	**100.0**
1/2"	12.5	0.00	(**)	0.00	0.00	100.00	**100.0**
3/8"	9.5	0.00		0.00	0.00	100.00	**100.0**
#4	4.75	0.82		0.15	0.15	99.85	**99.8**
#10	2	0.98		0.18	0.33	99.67	**99.7**
#20	0.85	3.04	(**)	0.56	0.89	99.11	**99.1**
#40	0.425	5.04		0.93	1.82	98.18	**98.2**
#60	0.25	7.10		1.31	3.13	96.87	**96.9**
#100	0.15	10.54		1.94	5.07	94.93	**94.9**
#140	0.106	12.90		2.38	7.45	92.55	**92.6**
#200	0.075	20.50		3.78	11.22	88.78	**88.8**
Pan	-	481.91		88.78	100.00	-	**-**

Notes : *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*
*(**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen*

Tested By DF Date 4/25/24 Checked By BRB Date 4/26/24

DCN: CT-S73T, DATE 2/25/22, REV. 1

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ATTERBERG LIMITS

ASTM D 4318-17

Client:	Larson Design Group	Boring No.:	B-14
Client Reference:	Waterside on Seneca 13649-001	Depth (ft):	6.0-15.0'
Project No.:	2024-298-001	Sample No.:	S-4 to S-7
Lab ID:	2024-298-001-008	Soil Description:	BROWN/GRAY LEAN CLAY

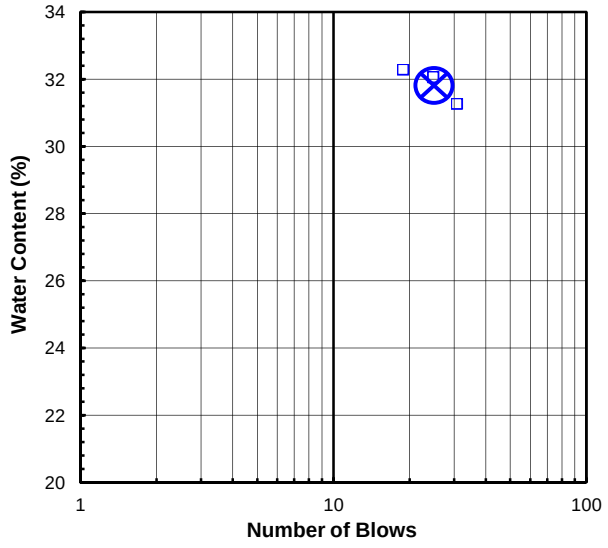
Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus #40 sieve material, Air dried)

As Received Moisture Content		Liquid Limit Test			
ASTM D2216-19		1	2	3	M
Tare Number:	80	186	147	166	U
Wt. of Tare & Wet Sample (g):	96.46	38.78	40.46	39.57	L
Wt. of Tare & Dry Sample (g):	73.90	33.95	35.52	34.64	T
Weight of Tare (g):	3.30	18.49	20.10	19.36	I
Weight of Water (g):	22.6	4.8	4.9	4.9	P
Weight of Dry Sample (g):	70.6	15.5	15.4	15.3	O
Was As Received MC Preserved:	**Yes**				I
Moisture Content (%):	**32.0**	**31.2**	**32.0**	**32.3**	N
Number of Blows:		**31**	**25**	**19**	T

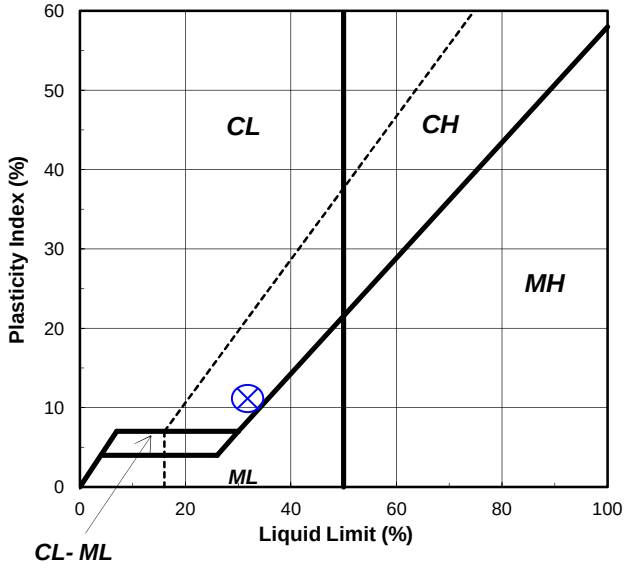
Plastic Limit Test	1	2	Range
Tare Number:	191	603	
Wt. of Tare & Wet Sample (g):	23.64	25.02	
Wt. of Tare & Dry Sample (g):	22.60	23.93	
Weight of Tare (g):	17.56	18.81	
Weight of Water (g):	1.0	1.1	
Weight of Dry Sample (g):	5.0	5.1	
Moisture Content (%):	**20.6**	**21.3**	**-0.7**
Note: The acceptable range of the two Moisture Contents is ±			1.12

Test Results	
Liquid Limit (%):	**32**
Plastic Limit (%):	**21**
Plasticity Index (%):	**11**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



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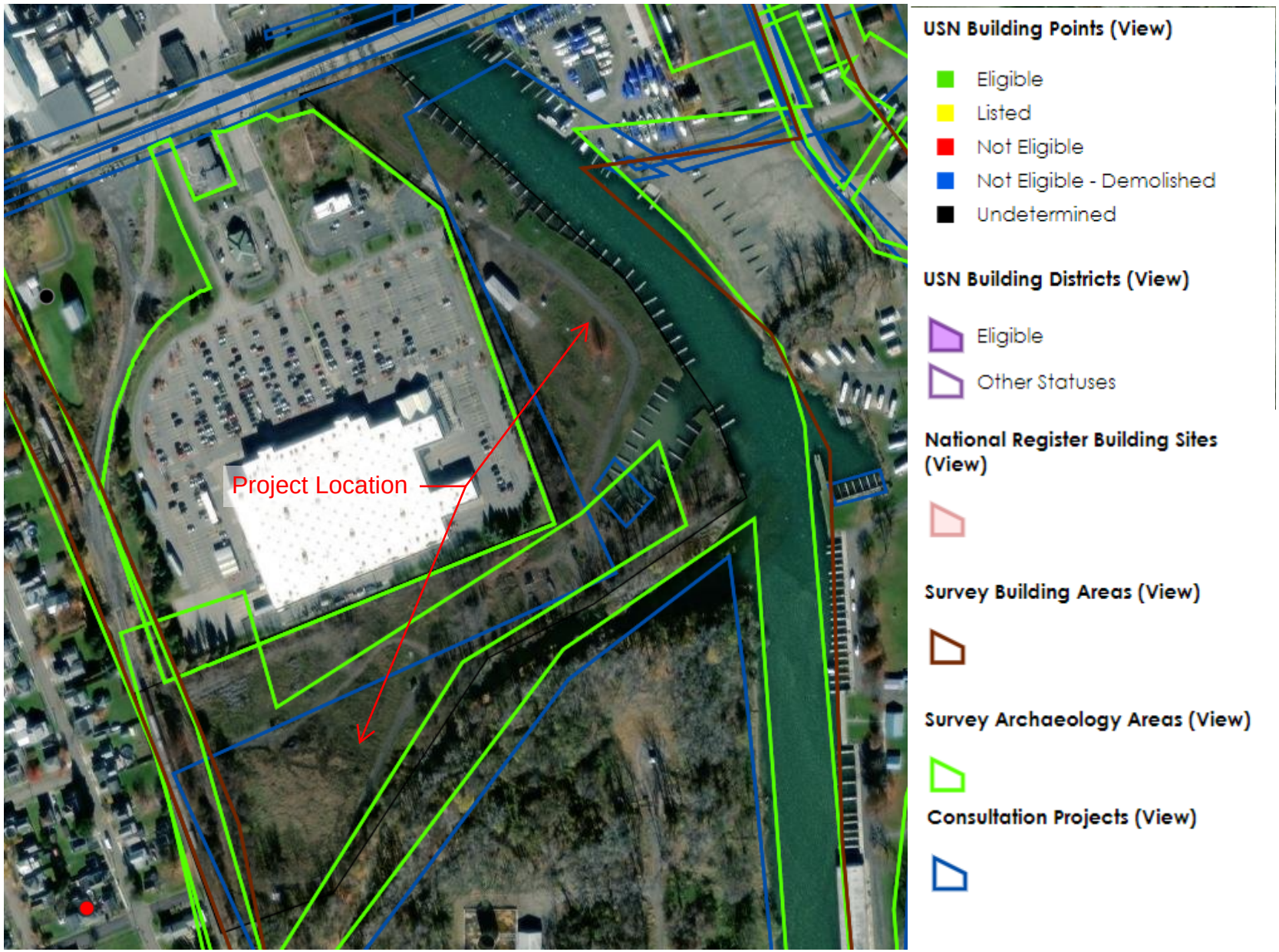
NYS HISTORIC PRESERVATION

NYS Cultural Resource Information System (CRIS) Map



WETLAND VICINITY MAPS

State Wetlands Map - Waterside on Seneca, Watkins Glen

August 12, 2024

1:9,028

0 0.07 0.15 0.3 mi

0 0.13 0.25 0.5 km

New York State, Maxar, Esri, HERE, Garmin, iPC

NYS Department of Environmental Conservation
Not a legal document

U.S. Fish and Wildlife Service
National Wetlands Inventory

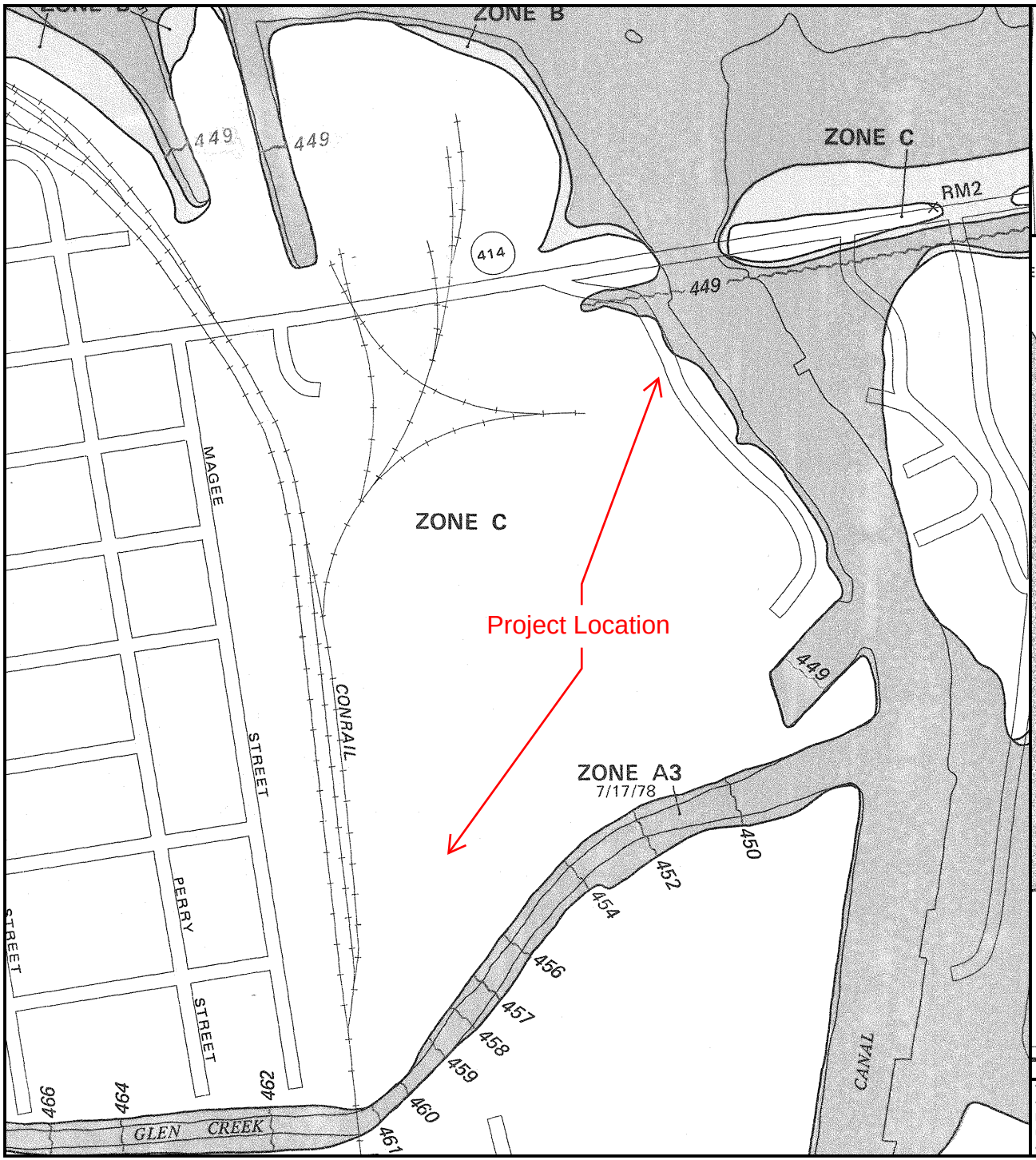
Waterside on Seneca

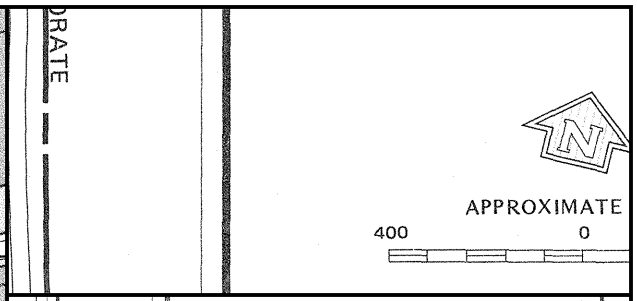
August 11, 2024

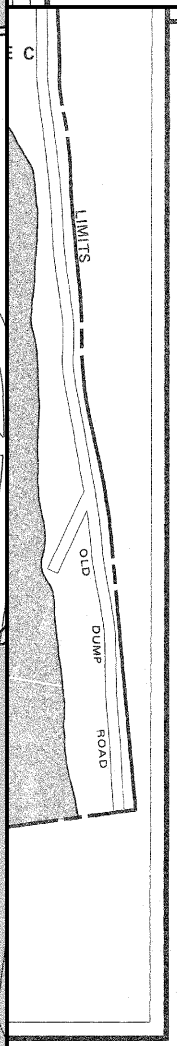
Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

FLOOD PLAIN MAPS







NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

VILLAGE OF
WATKINS GLEN,
NEW YORK
SCHUYLER COUNTY

COMMUNITY-PANEL NUMBER
360750 0001 B

PAGE 1 OF 1

EFFECTIVE
JULY 17, 1978

U.S. DEPARTMENT OF HOUSING
AND URBAN DEVELOPMENT
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