PREDEVELOPMENT

Volume 2 of 3
Vol. 1: pages 1-33
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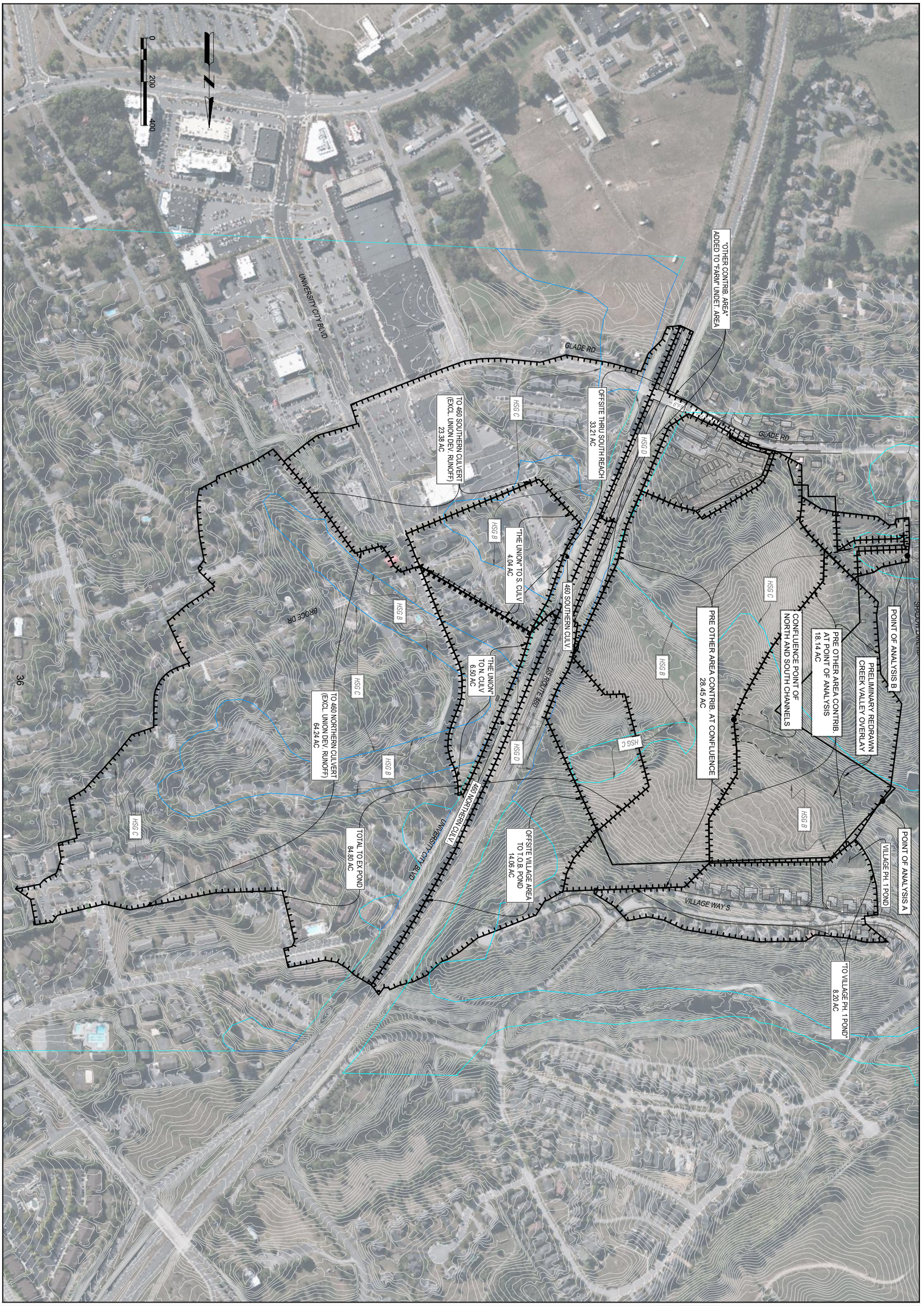
Point of Analysis A

Z:\PROJECTS\CARY HOPPER\2023046704CL - GLADE SPRING CROSSING\EDEN - GLADE SPRING\CAD\PRELIM PLAT CAD\DRAINAGE-PP PREDEV.DWG
11/1/2023 1:34:28 PM

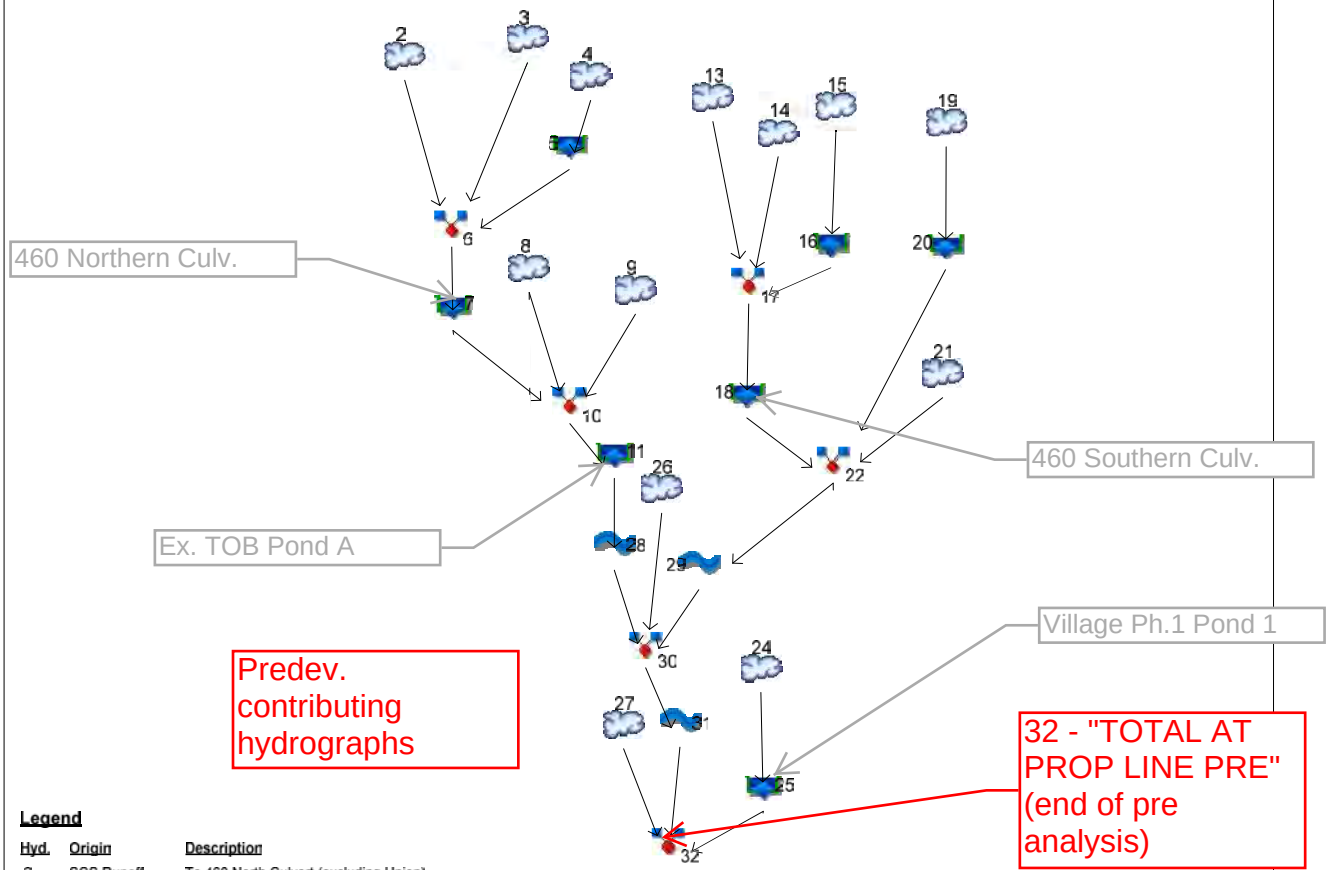


Sheet No. 1 of 1	Drawn By: MSF	PROPOSED DEVELOPMENT OF GLADE SPRING CROSSING ZONED PLANNED RESIDENTIAL - ORDINANCE 2007 PROPERTY OF GLADE SPRING CROSSING, LLC TM# 225-(A)-3, 225-(A)-4, & 224-(A)-57; 45.0976 AC. TOWN OF BLACKSBURG - PRICES FORK DISTRICT MONTGOMERY COUNTY, VIRGINIA	NOT FOR CONSTRUCTION PREDEVELOPMENT OFFSITE CONTRIBUTING DRAINAGE AREAS PRELIMINARY
D1	Checked By: ---		
	Date: 11/01/2023		
	Scale: AS SHOWN		

No.	Revision Issue	Date

WK DICKSON
community infrastructure consultants
1700 KRAFT DRIVE, SUITE 2350
BLACKSBURG, VIRGINIA 24060
VOICE 540-617-0870

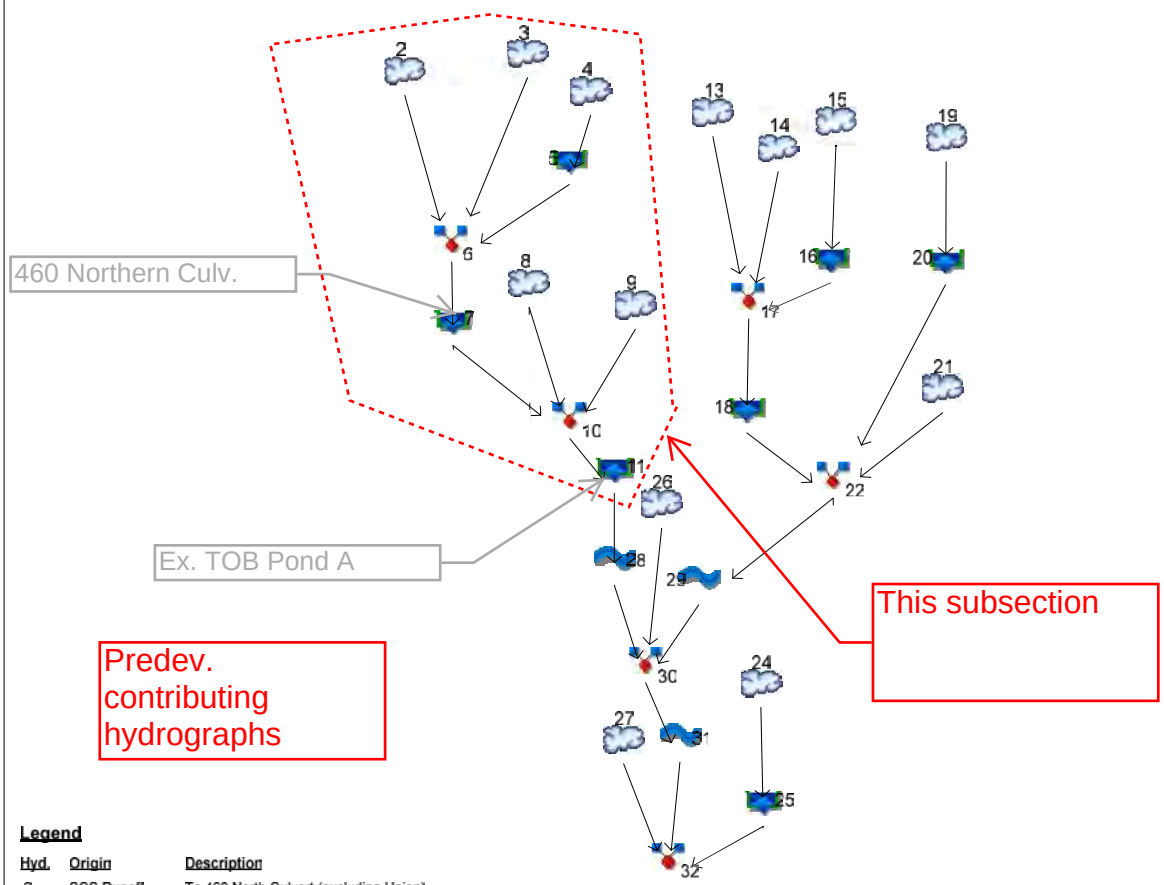
Watershed Model Schematic



Legend

Hyd.	Origin	Description
2	SCS Runoff	To 460 North Culvert (excluding Union)
3	SCS Runoff	Union Bypass To 460 N Culvert
4	SCS Runoff	Union North Detention inflow
5	Reservoir	Union N. Basin Out
6	Combine	Total To 460 North Culvert
7	Reservoir	460 North Culvert Out
8	SCS Runoff	Offsite Village Area to Ex TOB Pond
9	SCS Runoff	Predev Onsite To TOB Pond
10	Combine	Predev Total To Ex TOB Pond
11	Reservoir	Predev Ex.TOB Pond Out
13	SCS Runoff	To 460 South Culvert (excluding Union)
14	SCS Runoff	Union Bypass To 460 S Culvert
15	SCS Runoff	Union South Basin Inflow
16	Reservoir	Union S. Basin Out
17	Combine	Total To 460 South Culvert
18	Reservoir	460 South Culvert Out
19	SCS Runoff	The Farm Basin Inflow
20	Reservoir	The Farm Det. Out
21	SCS Runoff	Undet. Farm and other contrib. offsite
22	Combine	Total Offsite thru Southern Reach
24	SCS Runoff	To Village Ph1 Pond 1
25	Reservoir	Village Ph1 Pond 1 Out
26	SCS Runoff	PRE OTHER AREA CONTRIB. AT CONFLUENCE
27	SCS Runoff	PRE OTHER AREA CONTRIB. AT POA
28	Reach	Ex. TOB Pond outfall routed to confluence
29	Reach	South Offsite Routed to Confluence
30	Combine	PRE COMBINED AT CONFLUENCE
31	Reach	COMBINED ROUTED TO PROPERTY LINE
32	Combine	TOTAL AT PROP LINE PRE

Watershed Model Schematic



Legend

Hyd.	Origin	Description
2	SCS Runoff	To 460 North Culvert (excluding Union)
3	SCS Runoff	Union Bypass To 460 N Culvert
4	SCS Runoff	Union North Detention inflow
5	Reservoir	Union N. Basin Out
6	Combine	Total To 460 North Culvert
7	Reservoir	460 North Culvert Out
8	SCS Runoff	Offsite Village Area to Ex TOB Pond
9	SCS Runoff	Predev Onsite To TOB Pond
10	Combine	Predev Total To Ex TOB Pond
11	Reservoir	Predev Ex.TOB Pond Out
13	SCS Runoff	To 460 South Culvert (excluding Union)
14	SCS Runoff	Union Bypass To 460 S Culvert
15	SCS Runoff	Union South Basin Inflow
16	Reservoir	Union S. Basin Out
17	Combine	Total To 460 South Culvert
18	Reservoir	460 South Culvert Out
19	SCS Runoff	The Farm Basin Inflow
20	Reservoir	The Farm Det. Out
21	SCS Runoff	Undet. Farm and other contrib. offsite
22	Combine	Total Offsite thru Southern Reach
24	SCS Runoff	To Village Ph1 Pond 1
25	Reservoir	Village Ph1 Pond 1 Out
26	SCS Runoff	PRE OTHER AREA CONTRIB. AT CONFLUENCE
27	SCS Runoff	PRE OTHER AREA CONTRIB. AT POA
28	Reach	Ex. TOB Pond outfall routed to confluence
29	Reach	South Offsite Routed to Confluence
30	Combine	PRE COMBINED AT CONFLUENCE
31	Reach	COMBINED ROUTED TO PROPERTY LINE
32	Combine	TOTAL AT PROP LINE PRE

Drainage Area Runoff and Time of Concentration

Drainage Area: **To 460 northern culvert crossing (excl. Union)**

PREDEVELOPMENT

Composite Curve Number (CN)						**Notes:**
	Hydrologic Soil Group	Land Cover	CN	Area, A (ac.)	CN*A	
CN_1	-	Impervious	98	22.09	2164.39	
CN_2	B	Managed Turf	61	7.75	472.64	
CN_3	C	Managed Turf	74	31.99	2367.60	
CN_4	D	Managed Turf	80	0.07	5.41	
CN_5	B	Brush (Good)	48	0.00	0.00	
CN_6	C	Brush (Good)	65	0.00	0.00	
CN_7	D	Brush (Good)	73	2.34	171.16	
CN_8					0.00	
CN_9					0.00	
CN_{10}					0.00	
			Total	**64.24**	**5181.21**	
				Composite CN =	**81**	

Time of Concentration, T_c						
2 yr. Precip. (in.) =			2.73			
Flow Segment	Flow Regime	Land Cover	Length (ft)	Roughness Coeff., n	Slope (ft/ft)	Travel Time, T_t (min.)
1	Sheet Flow	Grass	100	0.24	0.022	14.9
2	Shallow Conc.	Unpaved	452		0.086	1.6
3	Channel	Concrete	244	0.013	0.029	0.5
4	Channel	30" Concrete Pipe	1238	0.013	0.028	2.4
5						
6						
7						
8						
9						
10						
					Total Time of Concentration, T_c (min.) =	**19.3**

Runoff			
	1 Yr.	10 Yr.	100 Yr.
Precipitation (in.), P	2.26	4.06	6.44
Composite CN	81	81	81
Storage (in.) S=1000/CN-10	2.35	2.35	2.35
Initial abstraction (in.), I_a=0.2S	0.47	0.47	0.47
Runoff depth (in.), $Q=(P-0.2S)^2/[(P-I_a)+S]$	0.78	2.17	4.29
Runoff volume (ac-ft), RV = Q/12*A	4.15	11.63	22.95
Flow rate (cfs), q_{peak} from hydrograph	55.43	161.91	

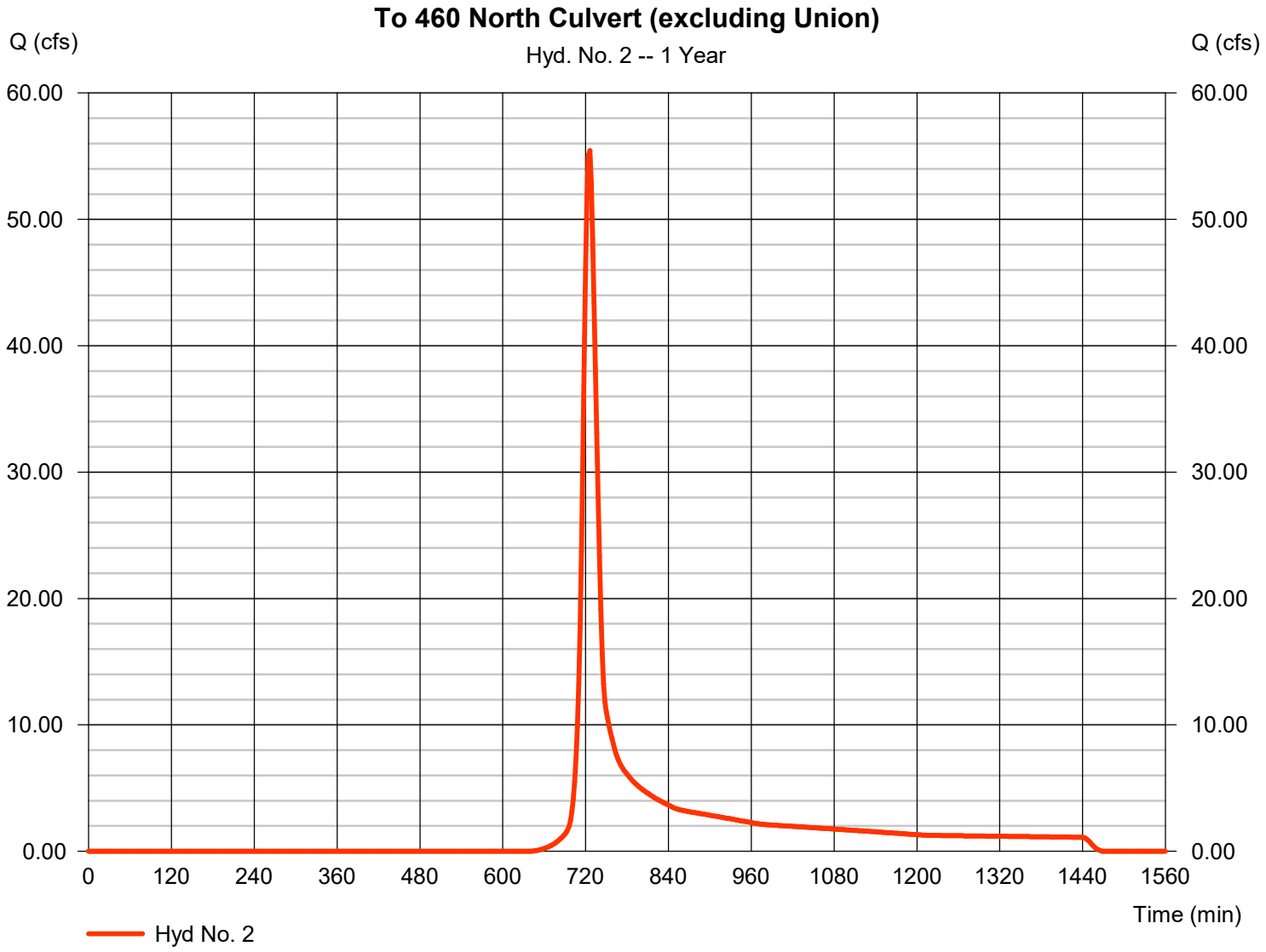
Hydrograph Number: 2

Hydrograph Report

Hyd. No. 2

To 460 North Culvert (excluding Union)

Hydrograph type	=	SCS Runoff	Peak discharge	=	55.43 cfs
Storm frequency	=	1 yrs	Time to peak	=	726 min
Time interval	=	2 min	Hyd. volume	=	180,801 cuft
Drainage area	=	64.240 ac	Curve number	=	81
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	19.30 min
Total precip.	=	2.26 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

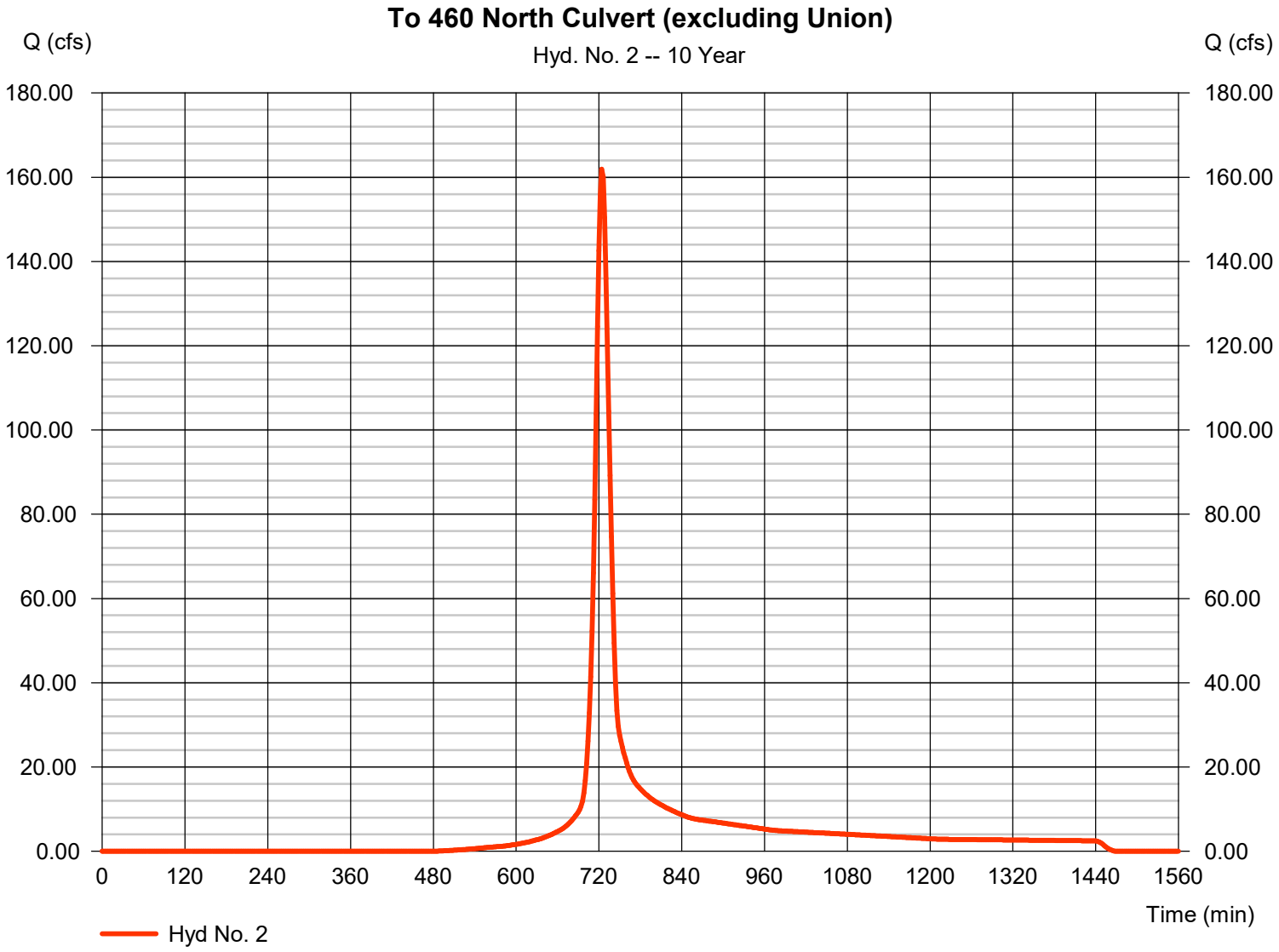


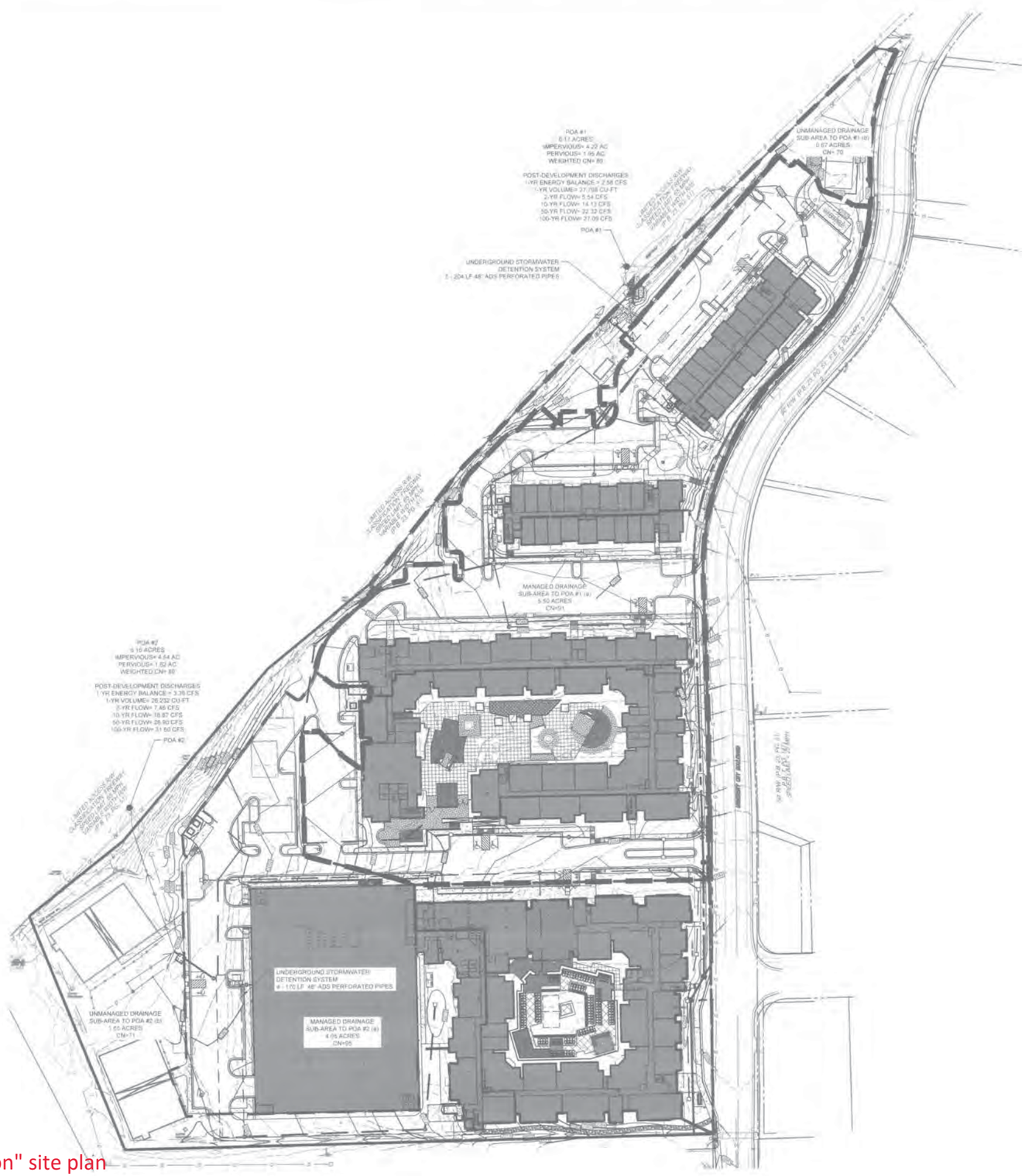
Hydrograph Report

Hyd. No. 2

To 460 North Culvert (excluding Union)

Hydrograph type	= SCS Runoff	Peak discharge	= 161.91 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 506,496 cuft
Drainage area	= 64.240 ac	Curve number	= 81
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 19.30 min
Total precip.	= 4.06 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484





Source: 1001 UCB "The Union" site plan

Not to scale

NOT FOR CONSTRUCTION

Pennoni
Firm License # - 1297
PENNONI ASSOCIATES INC.
5430 Wade Park Boulevard, #106
Raleigh, NC 27607
T 919.929.1173 F 919.493.6548

ALL DIMENSIONS MUST BE VERIFIED BY CONTRACTOR AND OWNER MUST BE NOTIFIED OF ANY DISCREPANCIES BEFORE PROCEEDING WITH WORK

COMMONWEALTH OF VIRGINIA
JUSTIN J. BROWN
Lic. No. 60879
PROFESSIONAL ENGINEER

1001 UCB SITE PLANS
1001 UNIVERSITY CITY BOULEVARD
BLACKSBURG, VIRGINIA 24060

POST-DEVELOPMENT WATERSHED PLAN

GEDR BLACKSBURG, LLC
521 MOREHEAD STREET, SUITE 400
CHARLOTTE, NC 28202

7	08/25/2020	KNB	Per Site Plan Administrative Comments
6	07/08/2020	KNB	Site Plan Amendment and HFC Revs
5	06/17/2020	KNB	Final Arch. coordination and alt. stormwater design
4	04/08/2020	KNB	Per Town Comments
3	03/05/2020	CSB	Per HFC Town and VDOT comments
2	12/20/2019	CSB	Per VDOT comments
NO.	DATE	BY	REVISIONS

PROJECT	TNHSE19001
DATE	2019-07-26
DRAWING SCALE	1"=50'
DRAWN BY	CSB
APPROVED BY	JJB

CS9202

SHEET D.2 OF 4

SP-S-1053a

WORKSHEET FOR SCS HYDROLOGIC PARAMETERS

Site Conditions:		Existing	**Project:** Sturbridge Apartments
	X	Proposed	**Subarea Number:** 1b Bypass - No Detention
Off-Site Land Use:		Existing	**By:** Justin Brown
	X	Proposed	**Date:** 4/13/2020

RUNOFF CURVE NUMBER

Soil Group	Land Use or Zoning		Area (acres)	RCN	RCN x Area
B	On-Site	Impervious	0.00	98	0.098
B	On-Site	Open Space	0.25	61	15.25
C	On-Site	Impervious	0.00	98	0
C	On-Site	Open Space	0.42	74	31.08
D	On-Site	Impervious	0.00	80	0
D	On-Site	Open Space	0.00	80	0

Total Area 0.67 ac 0.001 sq. mi **Weighted RCN =** 69

Notes:
Time of Concentration = 8.28 minutes (See Attached)

TR 55 Worksheet: Time of Concentration (Tc) **PROJECT: TNHSE19001** **PN: (Post-DEVELOPMENT: POA#1 (b))**

	1	2	3	4	5	6	6	
Sheet Flow								
Surface description (Table 3-1)	Dense Grasses							
Manning's roughness coeff., n (Table 3-1)	0.24							
Flow length, L (total L < 100 ft) ..... ft	100.00							
Two-year 24-hour rainfall, P2..... in	2.74							
Land slope, S ..... ft/ft	0.1500							
$T_t = (0.007\ (nL)^{0.8})/(P_2^{0.5} s^{0.4})$ ..... hr	0.11	0.00	0.00	0.00	0.00	0.00	0.00	
Shallow Concetrated Flow								
Surface description (paved=1 or unpaved=0)	0	0	0	0	0	0	0	
Flow length, L ..... ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Watercourse slope, S ..... ft/ft	0.0180	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	
Average velocity, V ..... ft/s	-	-	-	-	-	-	-	
Unpaved $V = 16.1345\ (s)^{0.5}$	2.16	1.61	1.61	1.61	1.61	1.61	1.61	
Paved $V = 20.3282\ (s)^{0.5}$								
$T_t = L/3600V$ ..... hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Channel Flow	**CHANNEL**							
Cross sectional flow area, A ..... ft^2	3.00							
Wetted perimeter, Pw..... ft	6.00							
Hydraulic radius, r = A/Pw.....ft	0.50	0.00	0.00	0.00	0.00	0.00	0.00	
Channel slope, s..... ft/ft	0.068							
Manning's roughness coefficient, n.....	0.070	0.035	0.069	0.013	0.013	0.013	0.013	
Velocity, $V=(1.49/n)R^{2/3}s^{1/2}$ ..... ft	3.50	0.00	0.00	0.00	0.00	0.00	0.00	
Flow length, L ..... ft	293.0							
$T_t = L/3600V$ ..... hr	**0.023**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	
Sub Basin Tc = $T_{sheetflow}+T_{shallow\ concentrated}+T_{channel}$ =	0.14 hr	0.00 hr	0.00 hr	0.00 hr	0.00 hr	0.00 hr	0.00 hr	
Sub Basin Tc = $T_{sheetflow}+T_{shallow\ concentrated}+T_{channel}$ =	8.28 min	0.00 min	0.00 min	0.00 min	0.00 min	0.00 min	0.00 min	**8.28 min**

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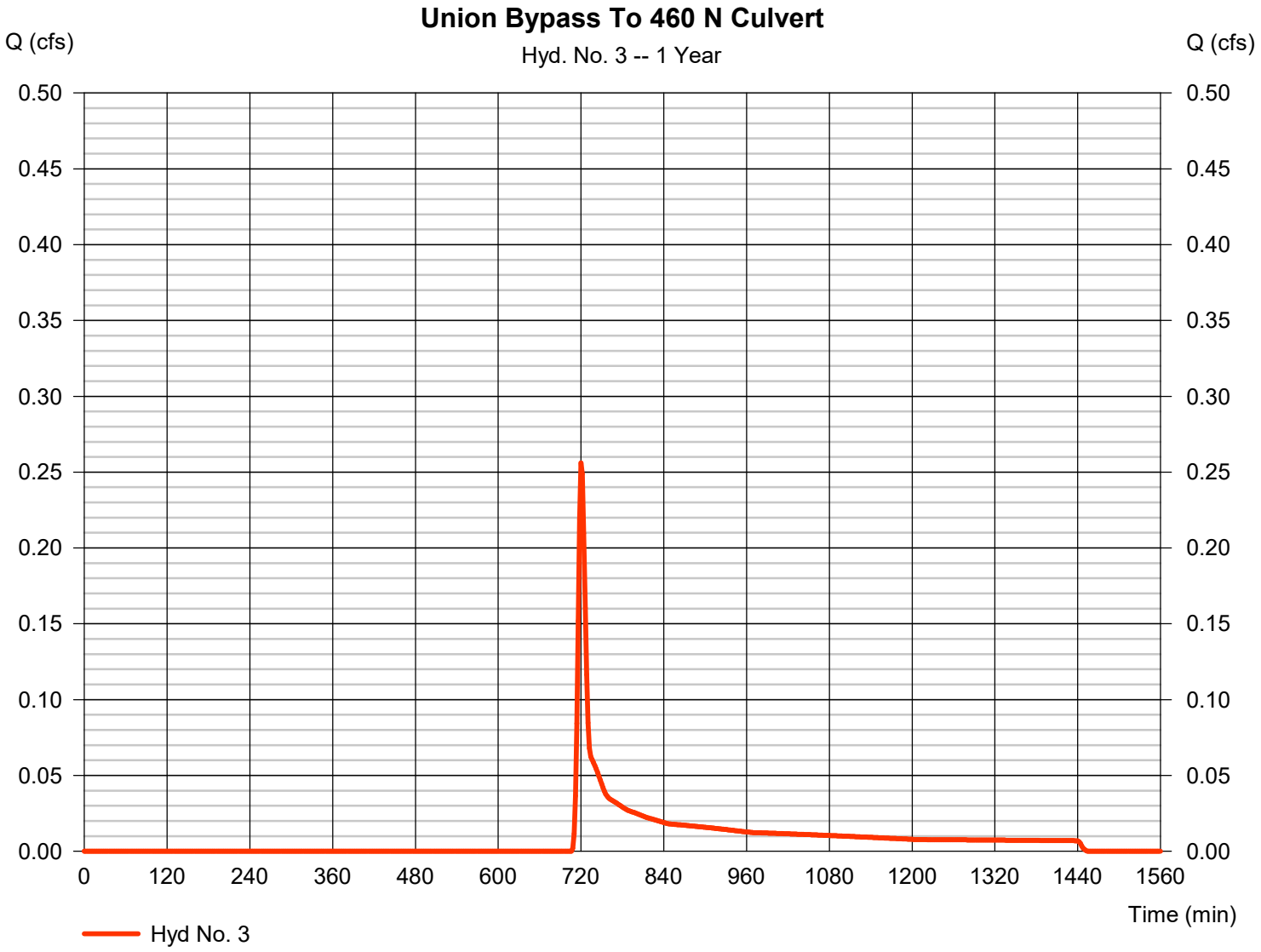
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 3

Union Bypass To 460 N Culvert

Hydrograph type	= SCS Runoff	Peak discharge	= 0.256 cfs
Storm frequency	= 1 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 770 cuft
Drainage area	= 0.670 ac	Curve number	= 69
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.30 min
Total precip.	= 2.26 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

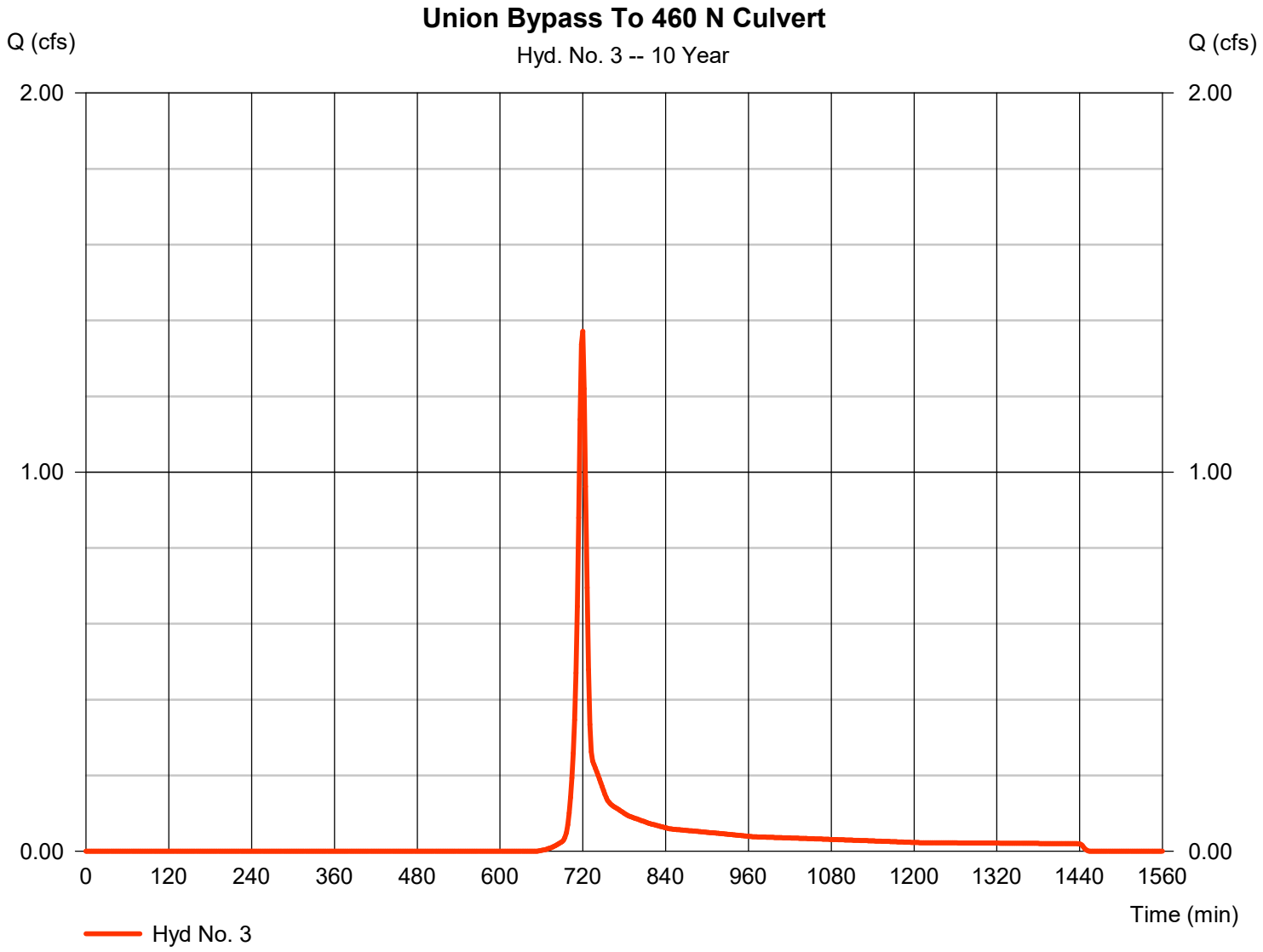


Hydrograph Report

Hyd. No. 3

Union Bypass To 460 N Culvert

Hydrograph type	= SCS Runoff	Peak discharge	= 1.371 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 3,176 cuft
Drainage area	= 0.670 ac	Curve number	= 69
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.30 min
Total precip.	= 4.06 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



WORKSHEET FOR SCS HYDROLOGIC PARAMETERS

Site Conditions:		Existing	**Project:** Sturbridge Apartments
	X	Proposed	**Subarea Number:** 1a Detention
Off-Site Land Use:		Existing	**By:** Justin Brown
	X	Proposed	**Date:** 4/13/2020

RUNOFF CURVE NUMBER

Soil Group	Land Use or Zoning		Area (acres)	RCN	RCN x Area
B	On-Site	Impervious	1.54	98	150.92
B	On-Site	Open Space	0.45	61	27.45
C	On-Site	Impervious	2.76	98	270.48
C	On-Site	Open Space	1.08	74	79.55
D	On-Site	Impervious	0.00	80	0
D	On-Site	Open Space	0.00	80	0

Total Area 5.83 ac 0.009 sq. mi **Weighted RCN =** 91

Notes:
Time of Concentration = 13.63 minutes (See Attached)

TR 55 Worksheet: Time of Concentration (Tc) **PROJECT: TNHSE19001** **PN: (Post-DEVELOPMENT: POA#1 (a))**

	1	2	3	4	5	6	6	
Sheet Flow								
Surface description (Table 3-1)	Dense Grasses							
Manning's roughness coeff., n (Table 3-1)	0.24							
Flow length, L (total L < 100 ft) ..... ft	100.00							
Two-year 24-hour rainfall, P2..... in	2.74							
Land slope, S ..... ft/ft	0.0880							
$T_t = (0.007 (nL)^{0.8})/(P_2^{0.5} s^{0.4})$ ..... hr	0.14	0.00	0.00	0.00	0.00	0.00	0.00	
Shallow Concetrated Flow								
Surface description (paved=1 or unpaved=0)	0	1	0	0	0	0	0	
Flow length, L ..... ft	155.0	190.0	0.0	0.0	0.0	0.0	0.0	
Watercourse slope, S ..... ft/ft	0.0840	0.0210	0.0100	0.0100	0.0100	0.0100	0.0100	
Average velocity, V ..... ft/s	-	-	-	-	-	-	-	
Unpaved $V = 16.1345 (s)^{0.5}$	4.68		1.61	1.61	1.61	1.61	1.61	
Paved $V = 20.3282 (s)^{0.5}$		2.95						
$T_t = L/3600V$ ..... hr	0.01	0.02	0.00	0.00	0.00	0.00	0.00	
Channel Flow	**CHANNEL**							
Cross sectional flow area, A ..... ft^2	3.10							
Wetted perimeter, Pw..... ft	6.30							
Hydraulic radius, r = A/Pw.....ft	0.49	0.00	0.00	0.00	0.00	0.00	0.00	
Channel slope, s..... ft/ft	0.010							
Manning's roughness coefficient, n.....	0.045	0.035	0.069	0.013	0.013	0.013	0.013	
Velocity, $V=(1.49/n)R^{2/3}s^{1/2}$ ..... ft	2.06	0.00	0.00	0.00	0.00	0.00	0.00	
Flow length, L ..... ft	431.0							
$T_t = L/3600V$ ..... hr	**0.058**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	
Sub Basin Tc = $T_{sheetflow}+T_{shallow\ concentrated}+T_{channel}$ =	0.21 hr	0.02 hr	0.00 hr	0.00 hr	0.00 hr	0.00 hr	0.00 hr	
Sub Basin Tc = $T_{sheetflow}+T_{shallow\ concentrated}+T_{channel}$ =	12.56 min	1.07 min	0.00 min	0.00 min	0.00 min	0.00 min	0.00 min	**13.63 min**

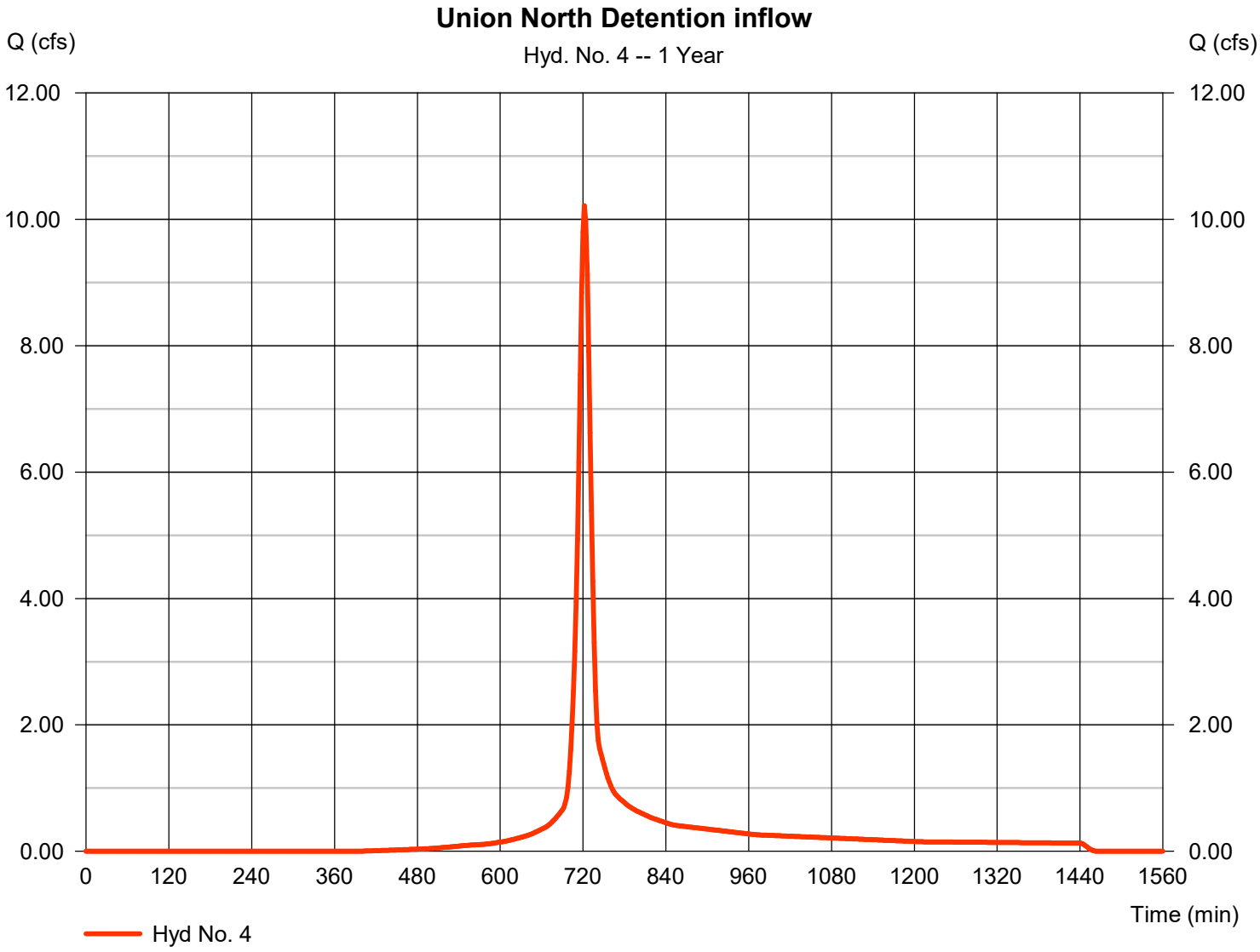
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 4

Union North Detention inflow

Hydrograph type	= SCS Runoff	Peak discharge	= 10.22 cfs
Storm frequency	= 1 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 28,759 cuft
Drainage area	= 5.830 ac	Curve number	= 91
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.60 min
Total precip.	= 2.26 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



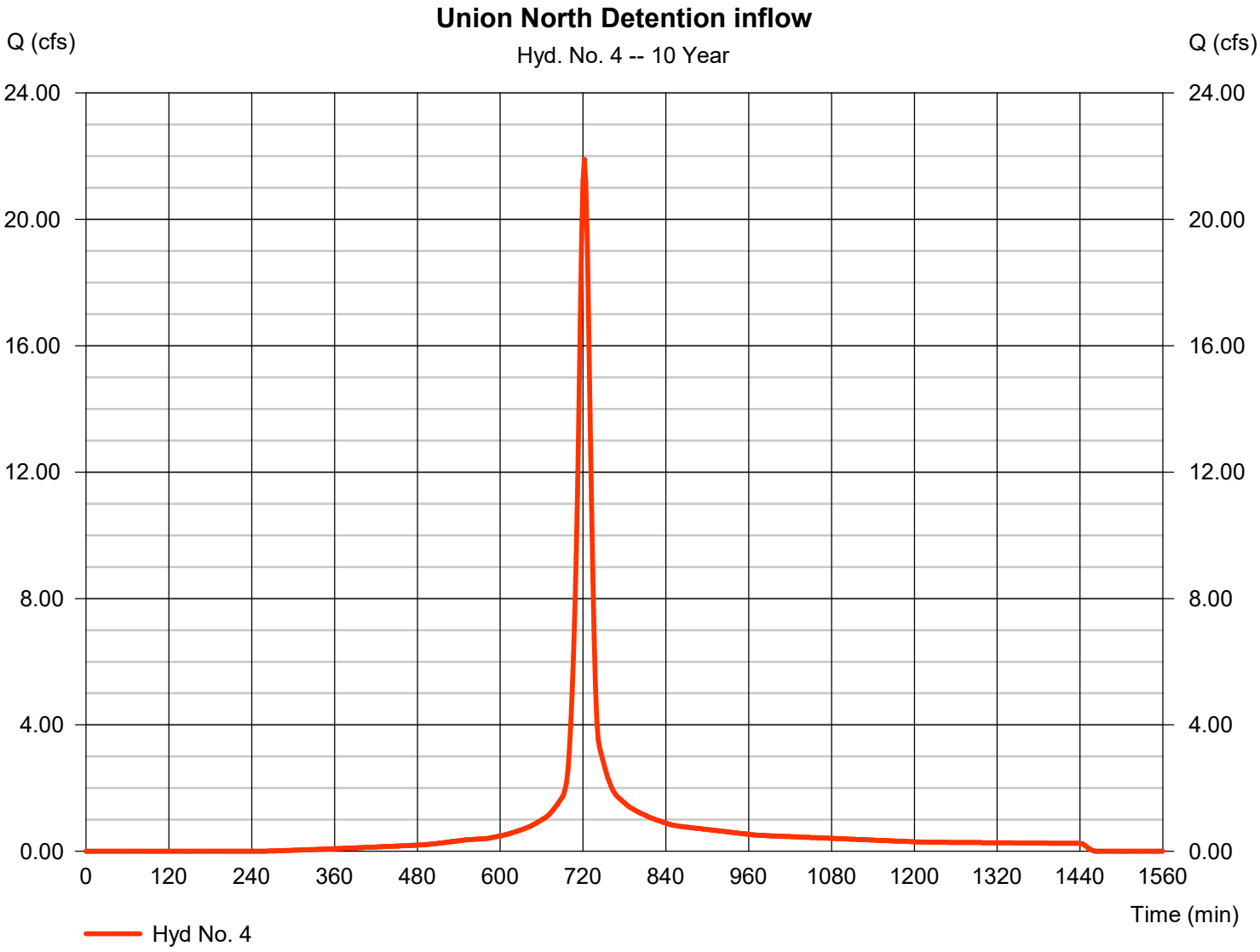
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 4

Union North Detention inflow

Hydrograph type	= SCS Runoff	Peak discharge	= 21.90 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 63,445 cuft
Drainage area	= 5.830 ac	Curve number	= 91
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.60 min
Total precip.	= 4.06 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Pond Report

Pond No. 10 - Union North Underground Det.

Pond Data

UG Chambers -Invert elev. = 2041.00 ft, Rise x Span = 4.00 x 4.00 ft, Barrel Len = 204.00 ft, No. Barrels = 5, Slope = 0.50%, Headers = Yes
Encasement -Invert elev. = 2040.50 ft, Width = 6.50 ft, Height = 5.50 ft, Voids = 40.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	2040.50	n/a	0	0
0.65	2041.15	n/a	613	613
1.30	2041.80	n/a	2,016	2,629
1.96	2042.46	n/a	2,971	5,600
2.61	2043.11	n/a	3,384	8,985
3.26	2043.76	n/a	3,509	12,493
3.91	2044.41	n/a	3,432	15,925
4.56	2045.06	n/a	3,103	19,028
5.22	2045.72	n/a	2,379	21,407
5.87	2046.37	n/a	1,893	23,300
6.52	2047.02	n/a	1,840	25,140

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 30.00	7.00	5.00	0.00
Span (in)	= 30.00	8.25	72.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 2041.00	2041.00	2043.50	0.00
Length (ft)	= 30.00	0.00	0.00	0.00
Slope (%)	= 2.00	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	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 18.85	0.33	0.00	0.00
Crest El. (ft)	= 2047.52	2045.20	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	---	---
Multi-Stage	= Yes	Yes	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).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	2040.50	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.07	61	2040.56	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.13	123	2040.63	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.20	184	2040.70	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.26	245	2040.76	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.33	307	2040.83	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.39	368	2040.89	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.46	429	2040.96	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.52	491	2041.02	0.00 ic	0.00 ic	0.00	---	0.00	0.00	---	---	---	---	0.003
0.59	552	2041.09	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.038
0.65	613	2041.15	0.10 ic	0.10 ic	0.00	---	0.00	0.00	---	---	---	---	0.098
0.72	815	2041.22	0.18 ic	0.18 ic	0.00	---	0.00	0.00	---	---	---	---	0.180
0.78	1,017	2041.28	0.29 ic	0.28 ic	0.00	---	0.00	0.00	---	---	---	---	0.277
0.85	1,218	2041.35	0.39 ic	0.39 ic	0.00	---	0.00	0.00	---	---	---	---	0.391
0.91	1,420	2041.41	0.52 ic	0.52 ic	0.00	---	0.00	0.00	---	---	---	---	0.517
0.98	1,621	2041.48	0.66 ic	0.66 ic	0.00	---	0.00	0.00	---	---	---	---	0.663
1.04	1,823	2041.54	0.84 ic	0.81 ic	0.00	---	0.00	0.00	---	---	---	---	0.812
1.11	2,025	2041.61	0.97 ic	0.95 ic	0.00	---	0.00	0.00	---	---	---	---	0.950
1.17	2,226	2041.67	1.04 ic	1.04 ic	0.00	---	0.00	0.00	---	---	---	---	1.044
1.24	2,428	2041.74	1.13 ic	1.12 ic	0.00	---	0.00	0.00	---	---	---	---	1.125
1.30	2,629	2041.80	1.21 ic	1.21 ic	0.00	---	0.00	0.00	---	---	---	---	1.206
1.37	2,926	2041.87	1.29 ic	1.29 ic	0.00	---	0.00	0.00	---	---	---	---	1.285
1.43	3,224	2041.93	1.37 ic	1.36 ic	0.00	---	0.00	0.00	---	---	---	---	1.360
1.50	3,521	2042.00	1.46 ic	1.43 ic	0.00	---	0.00	0.00	---	---	---	---	1.427
1.56	3,818	2042.06	1.55 ic	1.49 ic	0.00	---	0.00	0.00	---	---	---	---	1.491
1.63	4,115	2042.13	1.56 ic	1.56 ic	0.00	---	0.00	0.00	---	---	---	---	1.564
1.70	4,412	2042.19	1.65 ic	1.63 ic	0.00	---	0.00	0.00	---	---	---	---	1.628
1.76	4,709	2042.26	1.76 ic	1.68 ic	0.00	---	0.00	0.00	---	---	---	---	1.684
1.83	5,006	2042.32	1.76 ic	1.75 ic	0.00	---	0.00	0.00	---	---	---	---	1.755
1.89	5,303	2042.39	1.86 ic	1.81 ic	0.00	---	0.00	0.00	---	---	---	---	1.807
1.96	5,600	2042.46	1.87 ic	1.87 ic	0.00	---	0.00	0.00	---	---	---	---	1.869
2.02	5,939	2042.52	1.97 ic	1.92 ic	0.00	---	0.00	0.00	---	---	---	---	1.921

Continues on next page...

Union North Underground Det.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
2.09	6,277	2042.59	1.98 ic	1.98 ic	0.00	---	0.00	0.00	---	---	---	---	1.980
2.15	6,616	2042.65	2.09 ic	2.03 ic	0.00	---	0.00	0.00	---	---	---	---	2.029
2.22	6,954	2042.72	2.09 ic	2.09 ic	0.00	---	0.00	0.00	---	---	---	---	2.088
2.28	7,292	2042.78	2.21 ic	2.13 ic	0.00	---	0.00	0.00	---	---	---	---	2.131
2.35	7,631	2042.85	2.21 ic	2.19 ic	0.00	---	0.00	0.00	---	---	---	---	2.188
2.41	7,969	2042.91	2.23 ic	2.23 ic	0.00	---	0.00	0.00	---	---	---	---	2.232
2.48	8,308	2042.98	2.33 ic	2.28 ic	0.00	---	0.00	0.00	---	---	---	---	2.283
2.54	8,646	2043.04	2.33 ic	2.33 ic	0.00	---	0.00	0.00	---	---	---	---	2.334
2.61	8,985	2043.11	2.46 ic	2.37 ic	0.00	---	0.00	0.00	---	---	---	---	2.374
2.67	9,335	2043.17	2.46 ic	2.42 ic	0.00	---	0.00	0.00	---	---	---	---	2.424
2.74	9,686	2043.24	2.47 ic	2.47 ic	0.00	---	0.00	0.00	---	---	---	---	2.470
2.80	10,037	2043.30	2.59 ic	2.51 ic	0.00	---	0.00	0.00	---	---	---	---	2.510
2.87	10,388	2043.37	2.59 ic	2.56 ic	0.00	---	0.00	0.00	---	---	---	---	2.558
2.93	10,739	2043.43	2.60 ic	2.60 ic	0.00	---	0.00	0.00	---	---	---	---	2.602
3.00	11,090	2043.50	2.73 ic	2.64 ic	0.00	---	0.00	0.00	---	---	---	---	2.639
3.06	11,441	2043.56	3.02 ic	2.66 ic	0.33 ic	---	0.00	0.00	---	---	---	---	2.994
3.13	11,791	2043.63	3.64 ic	2.66 ic	0.95 ic	---	0.00	0.00	---	---	---	---	3.610
3.19	12,142	2043.69	4.52 ic	2.64 ic	1.76 ic	---	0.00	0.00	---	---	---	---	4.394
3.26	12,493	2043.76	5.33 ic	2.62 ic	2.71 ic	---	0.00	0.00	---	---	---	---	5.333
3.33	12,836	2043.82	6.39 ic	2.60 ic	3.79 ic	---	0.00	0.00	---	---	---	---	6.393
3.39	13,180	2043.89	7.56 ic	2.58 ic	4.98 ic	---	0.00	0.00	---	---	---	---	7.562
3.46	13,523	2043.96	8.55 ic	2.57 ic	5.99 ic	---	0.00	0.00	---	---	---	---	8.554
3.52	13,866	2044.02	9.31 ic	2.58 ic	6.73 ic	---	0.00	0.00	---	---	---	---	9.305
3.59	14,209	2044.09	10.06 ic	2.59 ic	7.40 ic	---	0.00	0.00	---	---	---	---	9.985
3.65	14,552	2044.15	10.61 ic	2.60 ic	8.01 ic	---	0.00	0.00	---	---	---	---	10.61
3.72	14,896	2044.22	11.19 ic	2.62 ic	8.58 ic	---	0.00	0.00	---	---	---	---	11.19
3.78	15,239	2044.28	11.75 ic	2.63 ic	9.11 ic	---	0.00	0.00	---	---	---	---	11.75
3.85	15,582	2044.35	12.27 ic	2.66 ic	9.62 ic	---	0.00	0.00	---	---	---	---	12.27
3.91	15,925	2044.41	12.79 ic	2.68 ic	10.10 ic	---	0.00	0.00	---	---	---	---	12.78
3.98	16,236	2044.48	13.35 ic	2.70 ic	10.55 ic	---	0.00	0.00	---	---	---	---	13.25
4.04	16,546	2044.54	13.91 ic	2.72 ic	10.99 ic	---	0.00	0.00	---	---	---	---	13.71
4.11	16,856	2044.61	14.19 ic	2.75 ic	11.41 ic	---	0.00	0.00	---	---	---	---	14.16
4.17	17,166	2044.67	14.74 ic	2.77 ic	11.82 ic	---	0.00	0.00	---	---	---	---	14.59
4.24	17,477	2044.74	15.02 ic	2.80 ic	12.21 ic	---	0.00	0.00	---	---	---	---	15.01
4.30	17,787	2044.80	15.57 ic	2.82 ic	12.59 ic	---	0.00	0.00	---	---	---	---	15.41
4.37	18,097	2044.87	15.85 ic	2.85 ic	12.96 ic	---	0.00	0.00	---	---	---	---	15.81
4.43	18,408	2044.93	16.19 ic	2.87 ic	13.32 ic	---	0.00	0.00	---	---	---	---	16.19
4.50	18,718	2045.00	16.66 ic	2.90 ic	13.67 ic	---	0.00	0.00	---	---	---	---	16.57
4.56	19,028	2045.06	16.94 ic	2.93 ic	14.02 ic	---	0.00	0.00	---	---	---	---	16.94
4.63	19,266	2045.13	17.46 ic	2.95 ic	14.35 ic	---	0.00	0.00	---	---	---	---	17.30
4.69	19,504	2045.19	17.72 ic	2.98 ic	14.67 ic	---	0.00	0.00	---	---	---	---	17.65
4.76	19,742	2045.26	18.01 ic	3.00 ic	14.99 ic	---	0.00	0.02	---	---	---	---	18.01
4.82	19,980	2045.32	18.50 ic	3.03 ic	15.30 ic	---	0.00	0.05	---	---	---	---	18.38
4.89	20,218	2045.39	18.76 ic	3.05 ic	15.61 ic	---	0.00	0.09	---	---	---	---	18.76
4.96	20,456	2045.45	19.24 ic	3.07 ic	15.91 ic	---	0.00	0.14	---	---	---	---	19.13
5.02	20,694	2045.52	19.50 ic	3.10 ic	16.20 ic	---	0.00	0.20	---	---	---	---	19.50
5.09	20,932	2045.58	20.01 oc	3.11 ic	16.49 ic	---	0.00	0.26	---	---	---	---	19.87
5.15	21,169	2045.65	20.30 oc	3.13 ic	16.78 ic	---	0.00	0.33	---	---	---	---	20.24
5.22	21,407	2045.72	20.71 oc	3.15 ic	17.06 ic	---	0.00	0.41	---	---	---	---	20.61
5.28	21,597	2045.78	21.08 oc	3.16 ic	17.33 ic	---	0.00	0.49	---	---	---	---	20.98
5.35	21,786	2045.85	21.42 oc	3.17 ic	17.60 ic	---	0.00	0.57	---	---	---	---	21.34
5.41	21,975	2045.91	21.72 oc	3.19 ic	17.87 ic	---	0.00	0.66	---	---	---	---	21.71
5.48	22,164	2045.98	22.15 oc	3.19 ic	18.13 ic	---	0.00	0.75	---	---	---	---	22.07
5.54	22,354	2046.04	22.48 oc	3.19 ic	18.39 ic	---	0.00	0.85	---	---	---	---	22.43
5.61	22,543	2046.11	22.80 oc	3.19 ic	18.64 ic	---	0.00	0.95	---	---	---	---	22.79
5.67	22,732	2046.17	23.10 oc	3.15 ic	18.89 ic	---	0.00	1.05	---	---	---	---	23.10
5.74	22,921	2046.24	23.48 oc	3.18 ic	19.14 ic	---	0.00	1.16	---	---	---	---	23.48
5.80	23,111	2046.30	23.87 oc	3.20 ic	19.39 ic	---	0.00	1.27	---	---	---	---	23.86
5.87	23,300	2046.37	24.25 oc	3.23 ic	19.63 ic	---	0.00	1.39	---	---	---	---	24.25
5.93	23,484	2046.43	24.63 oc	3.25 ic	19.87 ic	---	0.00	1.51	---	---	---	---	24.63
6.00	23,668	2046.50	25.01 oc	3.28 ic	20.11 ic	---	0.00	1.63	---	---	---	---	25.01
6.06	23,852	2046.56	25.39 oc	3.30 ic	20.34 ic	---	0.00	1.75	---	---	---	---	25.39
6.13	24,036	2046.63	25.78 oc	3.33 ic	20.57 ic	---	0.00	1.88	---	---	---	---	25.78
6.19	24,220	2046.69	26.16 oc	3.35 ic	20.80 ic	---	0.00	2.01	---	---	---	---	26.16
6.26	24,404	2046.76	26.54 oc	3.37 ic	21.03 ic	---	0.00	2.14	---	---	---	---	26.54
6.32	24,588	2046.82	26.86 oc	3.40 ic	21.19 ic	---	0.00	2.28	---	---	---	---	26.86
6.39	24,772	2046.89	27.18 oc	3.42 ic	21.34 ic	---	0.00	2.41	---	---	---	---	27.18
6.45	24,956	2046.95	27.50 oc	3.45 ic	21.50 ic	---	0.00	2.55	---	---	---	---	27.50
6.52	25,140	2047.02	27.82 oc	3.47 ic	21.65 ic	---	0.00	2.70	---	---	---	---	27.82

...End

Hydrograph Report

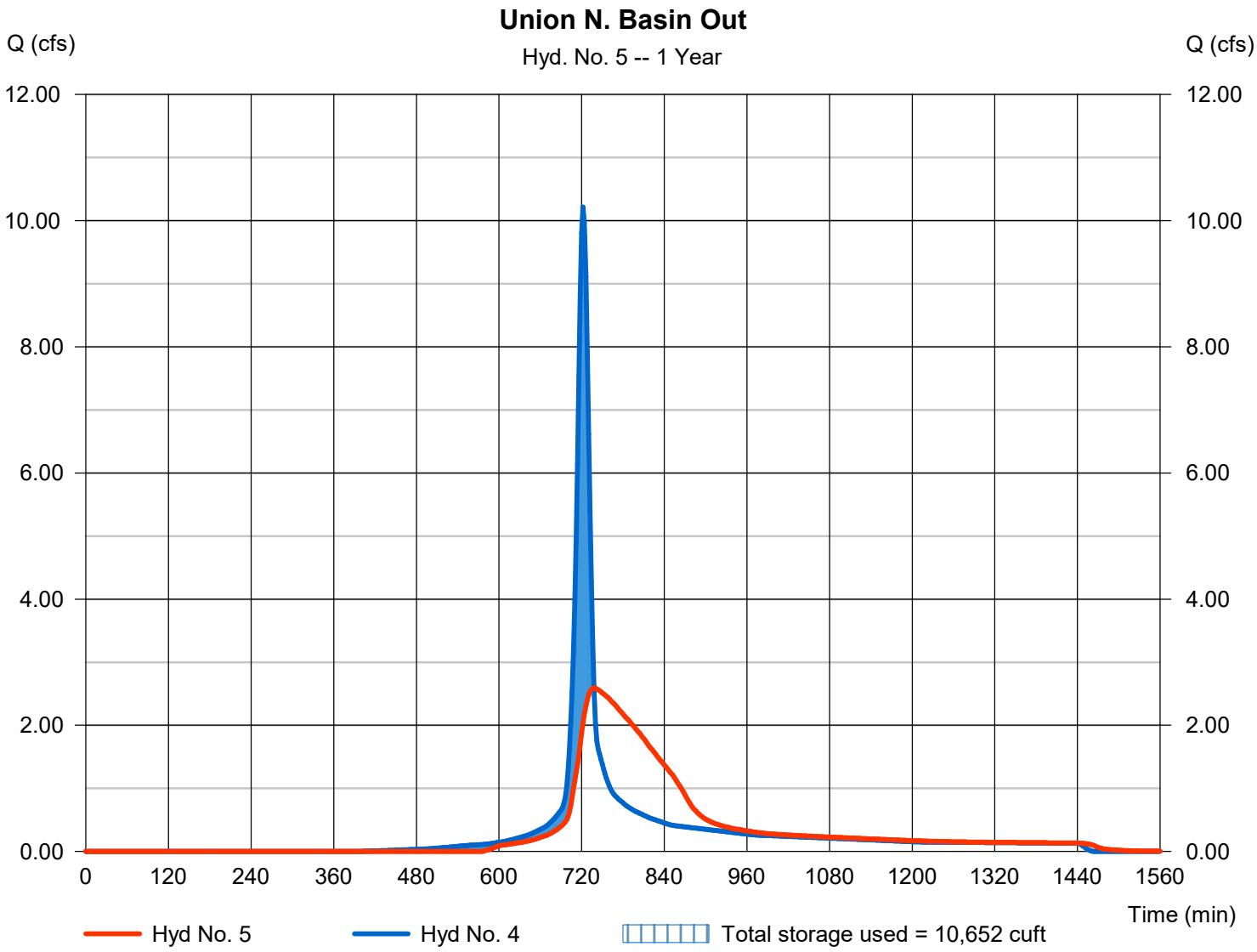
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 5

Union N. Basin Out

Hydrograph type	=	Reservoir	Peak discharge	=	2.591 cfs
Storm frequency	=	1 yrs	Time to peak	=	738 min
Time interval	=	2 min	Hyd. volume	=	28,310 cuft
Inflow hyd. No.	=	4 - Union North Detention inflow	Max. Elevation	=	2043.42 ft
Reservoir name	=	Union North Underground Det.	Max. Storage	=	10,652 cuft

Storage Indication method used.



Hydrograph Report

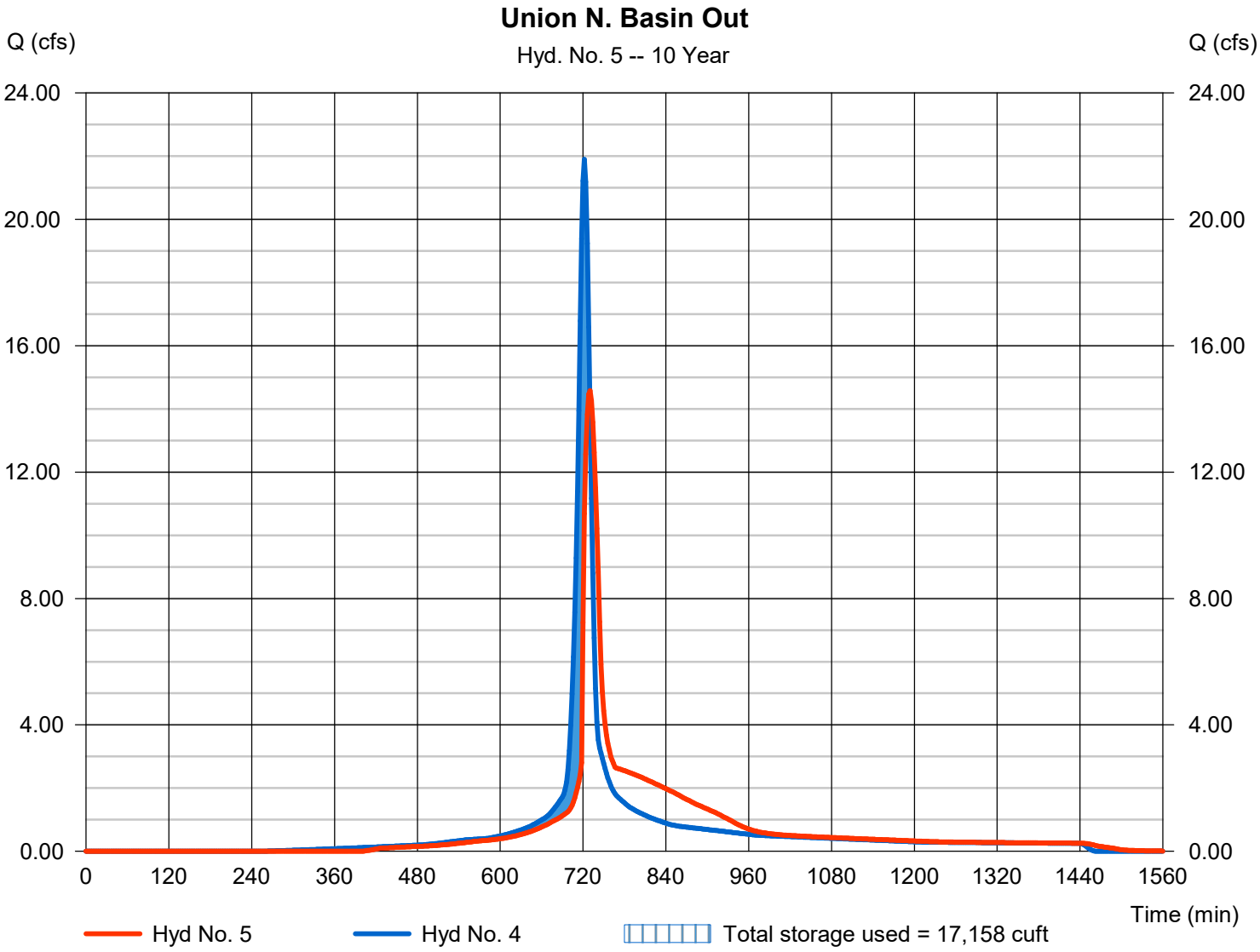
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 5

Union N. Basin Out

Hydrograph type	=	Reservoir	Peak discharge	=	14.58 cfs
Storm frequency	=	10 yrs	Time to peak	=	730 min
Time interval	=	2 min	Hyd. volume	=	62,997 cuft
Inflow hyd. No.	=	4 - Union North Detention inflow	Max. Elevation	=	2044.67 ft
Reservoir name	=	Union North Underground Det.	Max. Storage	=	17,158 cuft

Storage Indication method used.

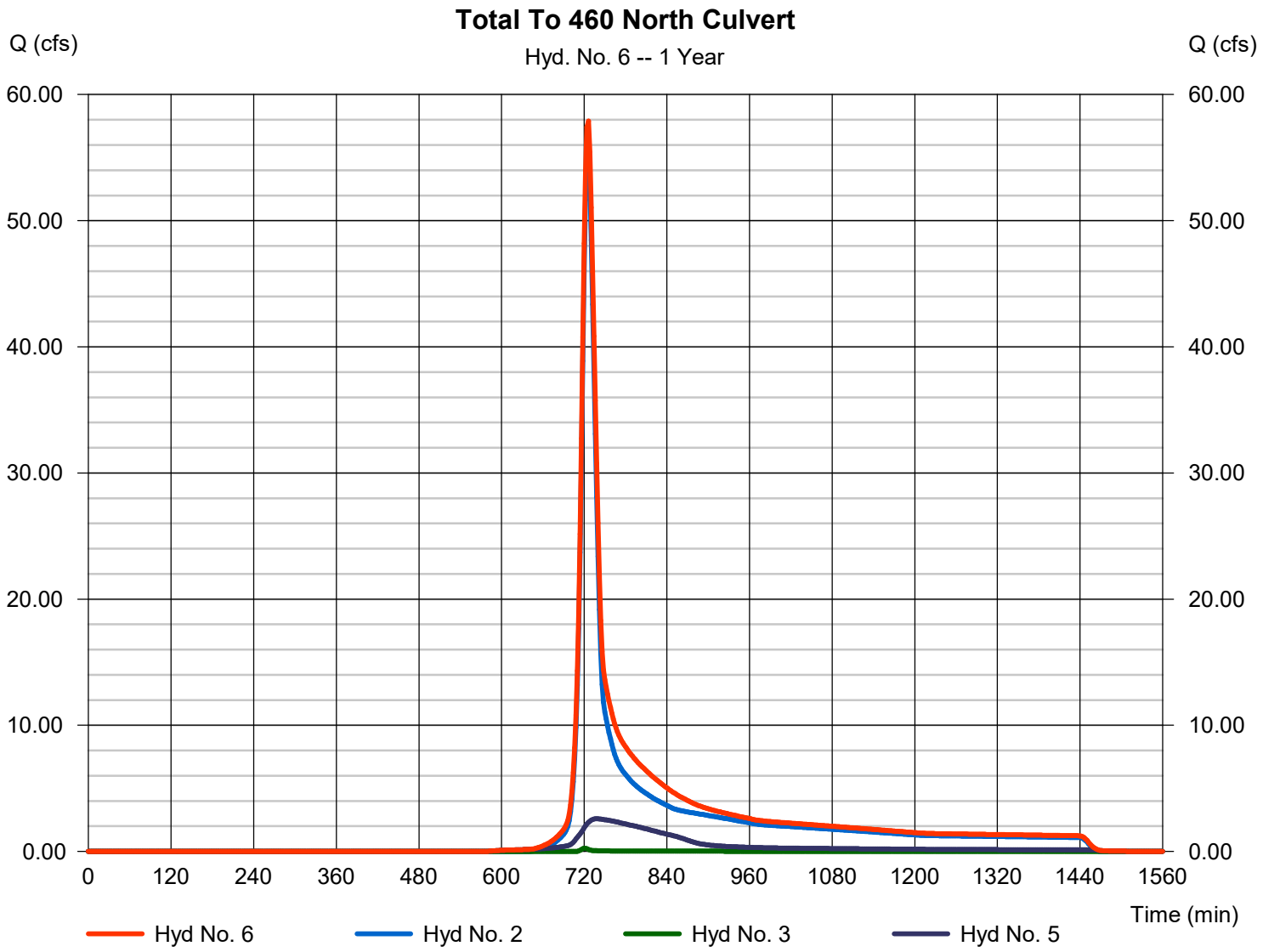


Hydrograph Report

Hyd. No. 6

Total To 460 North Culvert

Hydrograph type	= Combine	Peak discharge	= 57.90 cfs
Storm frequency	= 1 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 209,881 cuft
Inflow hyds.	= 2, 3, 5	Contrib. drain. area	= 64.910 ac

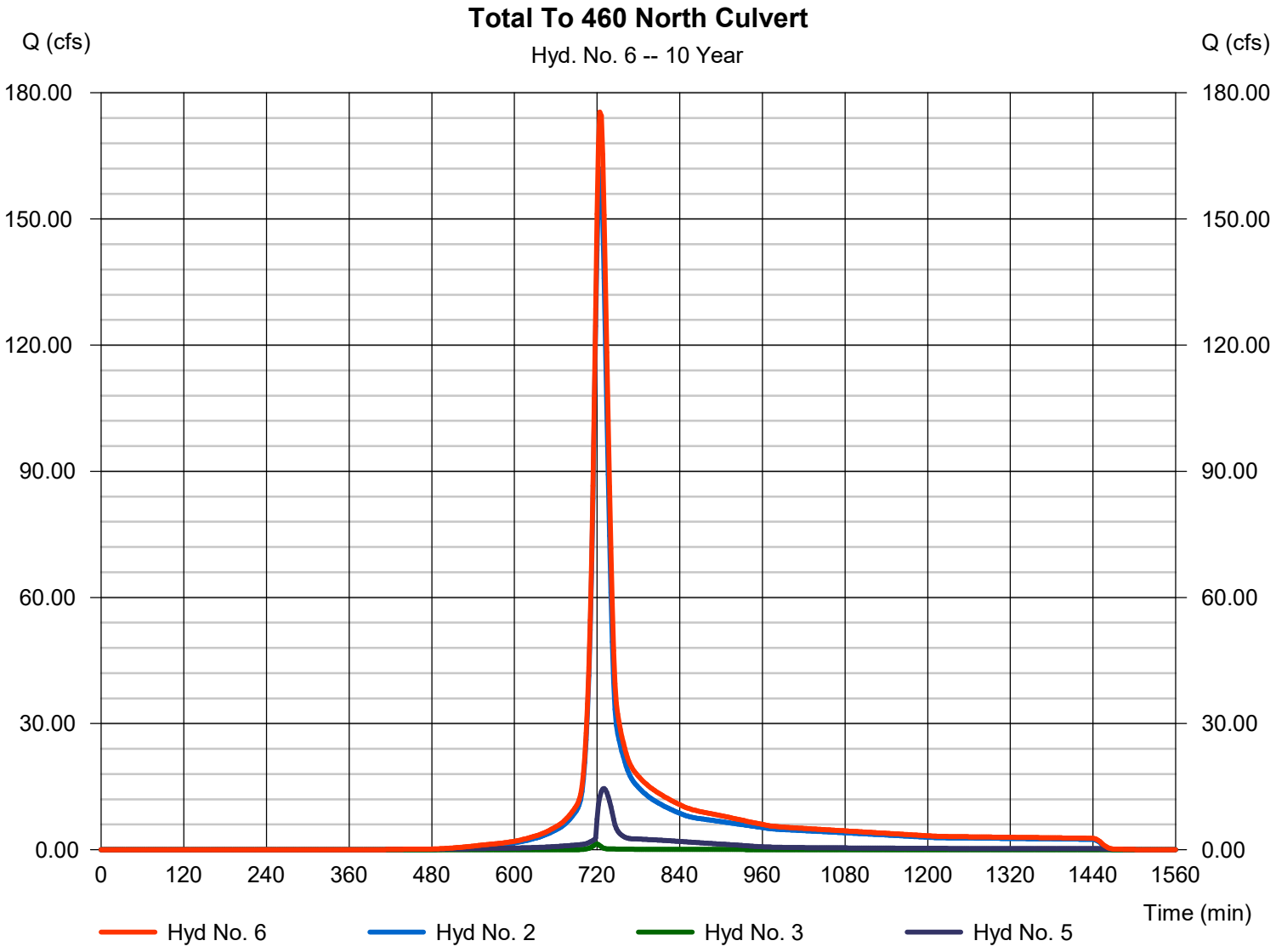


Hydrograph Report

Hyd. No. 6

Total To 460 North Culvert

Hydrograph type	= Combine	Peak discharge	= 175.44 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 572,669 cuft
Inflow hyds.	= 2, 3, 5	Contrib. drain. area	= 64.910 ac



Pond Report

Pond No. 8 - 460 North Culvert HW Storage

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 2033.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	2033.00	00	0	0
2.00	2035.00	271	271	271
3.00	2036.00	997	634	905
4.00	2037.00	1,787	1,392	2,297
5.00	2038.00	3,429	2,608	4,905
6.00	2039.00	4,748	4,089	8,994
7.00	2040.00	7,034	5,891	14,885
8.00	2041.00	8,939	7,987	22,871
9.00	2042.00	11,317	10,128	32,999
10.00	2043.00	13,359	12,338	45,337
11.00	2044.00	15,556	14,458	59,795
12.00	2045.00	18,050	16,803	76,598

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 48.00	0.00	0.00	0.00
Span (in)	= 48.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 2033.10	0.00	0.00	0.00
Length (ft)	= 160.50	0.00	0.00	0.00
Slope (%)	= 2.69	0.00	0.00	n/a
N-Value	= .024	.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)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	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).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	2033.00	0.00	---	---	---	---	---	---	---	---	---	0.000
0.20	27	2033.20	0.09 ic	---	---	---	---	---	---	---	---	---	0.091
0.40	54	2033.40	0.80 ic	---	---	---	---	---	---	---	---	---	0.804
0.60	81	2033.60	2.19 ic	---	---	---	---	---	---	---	---	---	2.195
0.80	108	2033.80	4.22 ic	---	---	---	---	---	---	---	---	---	4.217
1.00	136	2034.00	6.86 ic	---	---	---	---	---	---	---	---	---	6.857
1.20	163	2034.20	10.03 ic	---	---	---	---	---	---	---	---	---	10.03
1.40	190	2034.40	13.78 ic	---	---	---	---	---	---	---	---	---	13.78
1.60	217	2034.60	17.99 ic	---	---	---	---	---	---	---	---	---	17.99
1.80	244	2034.80	22.63 ic	---	---	---	---	---	---	---	---	---	22.63
2.00	271	2035.00	27.66 ic	---	---	---	---	---	---	---	---	---	27.66
2.10	334	2035.10	30.31 ic	---	---	---	---	---	---	---	---	---	30.31
2.20	398	2035.20	32.98 ic	---	---	---	---	---	---	---	---	---	32.98
2.30	461	2035.30	35.78 ic	---	---	---	---	---	---	---	---	---	35.78
2.40	525	2035.40	38.63 ic	---	---	---	---	---	---	---	---	---	38.63
2.50	588	2035.50	41.58 ic	---	---	---	---	---	---	---	---	---	41.58
2.60	651	2035.60	44.49 ic	---	---	---	---	---	---	---	---	---	44.49
2.70	715	2035.70	47.47 ic	---	---	---	---	---	---	---	---	---	47.47
2.80	778	2035.80	50.51 ic	---	---	---	---	---	---	---	---	---	50.51
2.90	842	2035.90	53.53 ic	---	---	---	---	---	---	---	---	---	53.53
3.00	905	2036.00	56.62 ic	---	---	---	---	---	---	---	---	---	56.62
3.10	1,044	2036.10	59.65 ic	---	---	---	---	---	---	---	---	---	59.65
3.20	1,183	2036.20	62.66 ic	---	---	---	---	---	---	---	---	---	62.66
3.30	1,323	2036.30	65.66 ic	---	---	---	---	---	---	---	---	---	65.66
3.40	1,462	2036.40	68.61 ic	---	---	---	---	---	---	---	---	---	68.61
3.50	1,601	2036.50	71.49 ic	---	---	---	---	---	---	---	---	---	71.49
3.60	1,740	2036.60	74.27 ic	---	---	---	---	---	---	---	---	---	74.27
3.70	1,879	2036.70	76.97 ic	---	---	---	---	---	---	---	---	---	76.97
3.80	2,019	2036.80	79.50 ic	---	---	---	---	---	---	---	---	---	79.50
3.90	2,158	2036.90	81.85 ic	---	---	---	---	---	---	---	---	---	81.85
4.00	2,297	2037.00	83.93 ic	---	---	---	---	---	---	---	---	---	83.93

Continues on next page...

460 North Culvert HW Storage

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
4.10	2,558	2037.10	85.56 ic	---	---	---	---	---	---	---	---	---	85.56
4.20	2,819	2037.20	87.67 ic	---	---	---	---	---	---	---	---	---	87.67
4.30	3,079	2037.30	89.74 ic	---	---	---	---	---	---	---	---	---	89.74
4.40	3,340	2037.40	91.75 ic	---	---	---	---	---	---	---	---	---	91.75
4.50	3,601	2037.50	93.73 ic	---	---	---	---	---	---	---	---	---	93.73
4.60	3,862	2037.60	95.66 ic	---	---	---	---	---	---	---	---	---	95.66
4.70	4,123	2037.70	97.55 ic	---	---	---	---	---	---	---	---	---	97.55
4.80	4,383	2037.80	99.41 ic	---	---	---	---	---	---	---	---	---	99.41
4.90	4,644	2037.90	101.24 ic	---	---	---	---	---	---	---	---	---	101.24
5.00	4,905	2038.00	103.03 ic	---	---	---	---	---	---	---	---	---	103.03
5.10	5,314	2038.10	104.79 ic	---	---	---	---	---	---	---	---	---	104.79
5.20	5,723	2038.20	106.52 ic	---	---	---	---	---	---	---	---	---	106.52
5.30	6,132	2038.30	108.23 ic	---	---	---	---	---	---	---	---	---	108.23
5.40	6,540	2038.40	109.90 ic	---	---	---	---	---	---	---	---	---	109.90
5.50	6,949	2038.50	111.56 ic	---	---	---	---	---	---	---	---	---	111.56
5.60	7,358	2038.60	113.18 ic	---	---	---	---	---	---	---	---	---	113.18
5.70	7,767	2038.70	114.79 ic	---	---	---	---	---	---	---	---	---	114.79
5.80	8,176	2038.80	116.37 ic	---	---	---	---	---	---	---	---	---	116.37
5.90	8,585	2038.90	117.94 ic	---	---	---	---	---	---	---	---	---	117.94
6.00	8,994	2039.00	119.48 ic	---	---	---	---	---	---	---	---	---	119.48
6.10	9,583	2039.10	121.00 ic	---	---	---	---	---	---	---	---	---	121.00
6.20	10,172	2039.20	122.50 ic	---	---	---	---	---	---	---	---	---	122.50
6.30	10,761	2039.30	123.99 ic	---	---	---	---	---	---	---	---	---	123.99
6.40	11,350	2039.40	125.45 ic	---	---	---	---	---	---	---	---	---	125.45
6.50	11,939	2039.50	126.90 ic	---	---	---	---	---	---	---	---	---	126.90
6.60	12,528	2039.60	128.34 ic	---	---	---	---	---	---	---	---	---	128.34
6.70	13,117	2039.70	129.69 oc	---	---	---	---	---	---	---	---	---	129.69
6.80	13,706	2039.80	130.63 oc	---	---	---	---	---	---	---	---	---	130.63
6.90	14,295	2039.90	131.55 oc	---	---	---	---	---	---	---	---	---	131.55
7.00	14,885	2040.00	132.47 oc	---	---	---	---	---	---	---	---	---	132.47
7.10	15,683	2040.10	133.39 oc	---	---	---	---	---	---	---	---	---	133.39
7.20	16,482	2040.20	134.30 oc	---	---	---	---	---	---	---	---	---	134.30
7.30	17,280	2040.30	135.20 oc	---	---	---	---	---	---	---	---	---	135.20
7.40	18,079	2040.40	136.10 oc	---	---	---	---	---	---	---	---	---	136.10
7.50	18,878	2040.50	136.99 oc	---	---	---	---	---	---	---	---	---	136.99
7.60	19,676	2040.60	137.87 oc	---	---	---	---	---	---	---	---	---	137.87
7.70	20,475	2040.70	138.75 oc	---	---	---	---	---	---	---	---	---	138.75
7.80	21,274	2040.80	139.62 oc	---	---	---	---	---	---	---	---	---	139.62
7.90	22,072	2040.90	140.49 oc	---	---	---	---	---	---	---	---	---	140.49
8.00	22,871	2041.00	141.35 oc	---	---	---	---	---	---	---	---	---	141.35
8.10	23,884	2041.10	142.21 oc	---	---	---	---	---	---	---	---	---	142.21
8.20	24,897	2041.20	143.06 oc	---	---	---	---	---	---	---	---	---	143.06
8.30	25,909	2041.30	143.91 oc	---	---	---	---	---	---	---	---	---	143.91
8.40	26,922	2041.40	144.75 oc	---	---	---	---	---	---	---	---	---	144.75
8.50	27,935	2041.50	145.59 oc	---	---	---	---	---	---	---	---	---	145.59
8.60	28,948	2041.60	146.42 oc	---	---	---	---	---	---	---	---	---	146.42
8.70	29,961	2041.70	147.25 oc	---	---	---	---	---	---	---	---	---	147.25
8.80	30,973	2041.80	148.07 oc	---	---	---	---	---	---	---	---	---	148.07
8.90	31,986	2041.90	148.89 oc	---	---	---	---	---	---	---	---	---	148.89
9.00	32,999	2042.00	149.71 oc	---	---	---	---	---	---	---	---	---	149.71
9.10	34,233	2042.10	150.52 oc	---	---	---	---	---	---	---	---	---	150.52
9.20	35,467	2042.20	151.32 oc	---	---	---	---	---	---	---	---	---	151.32
9.30	36,700	2042.30	152.12 oc	---	---	---	---	---	---	---	---	---	152.12
9.40	37,934	2042.40	152.92 oc	---	---	---	---	---	---	---	---	---	152.92
9.50	39,168	2042.50	153.71 oc	---	---	---	---	---	---	---	---	---	153.71
9.60	40,402	2042.60	154.50 oc	---	---	---	---	---	---	---	---	---	154.50
9.70	41,636	2042.70	155.29 oc	---	---	---	---	---	---	---	---	---	155.29
9.80	42,869	2042.80	156.07 oc	---	---	---	---	---	---	---	---	---	156.07
9.90	44,103	2042.90	156.85 oc	---	---	---	---	---	---	---	---	---	156.85
10.00	45,337	2043.00	157.62 oc	---	---	---	---	---	---	---	---	---	157.62
10.10	46,783	2043.10	158.39 oc	---	---	---	---	---	---	---	---	---	158.39
10.20	48,229	2043.20	159.15 oc	---	---	---	---	---	---	---	---	---	159.15
10.30	49,674	2043.30	159.92 oc	---	---	---	---	---	---	---	---	---	159.92
10.40	51,120	2043.40	160.67 oc	---	---	---	---	---	---	---	---	---	160.67
10.50	52,566	2043.50	161.43 oc	---	---	---	---	---	---	---	---	---	161.43
10.60	54,012	2043.60	162.18 oc	---	---	---	---	---	---	---	---	---	162.18
10.70	55,457	2043.70	162.93 oc	---	---	---	---	---	---	---	---	---	162.93
10.80	56,903	2043.80	163.67 oc	---	---	---	---	---	---	---	---	---	163.67
10.90	58,349	2043.90	164.41 oc	---	---	---	---	---	---	---	---	---	164.41
11.00	59,795	2044.00	165.15 oc	---	---	---	---	---	---	---	---	---	165.15
11.10	61,475	2044.10	165.89 oc	---	---	---	---	---	---	---	---	---	165.89
11.20	63,155	2044.20	166.62 oc	---	---	---	---	---	---	---	---	---	166.62

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460 North Culvert HW Storage

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
11.30	64,835	2044.30	167.35 oc	---	---	---	---	---	---	---	---	---	167.35
11.40	66,516	2044.40	168.07 oc	---	---	---	---	---	---	---	---	---	168.07
11.50	68,196	2044.50	168.79 oc	---	---	---	---	---	---	---	---	---	168.79
11.60	69,876	2044.60	169.51 oc	---	---	---	---	---	---	---	---	---	169.51
11.70	71,557	2044.70	170.23 oc	---	---	---	---	---	---	---	---	---	170.23
11.80	73,237	2044.80	170.94 oc	---	---	---	---	---	---	---	---	---	170.94
11.90	74,917	2044.90	171.65 oc	---	---	---	---	---	---	---	---	---	171.65
12.00	76,598	2045.00	172.36 oc	---	---	---	---	---	---	---	---	---	172.36

...End

Hydrograph Report

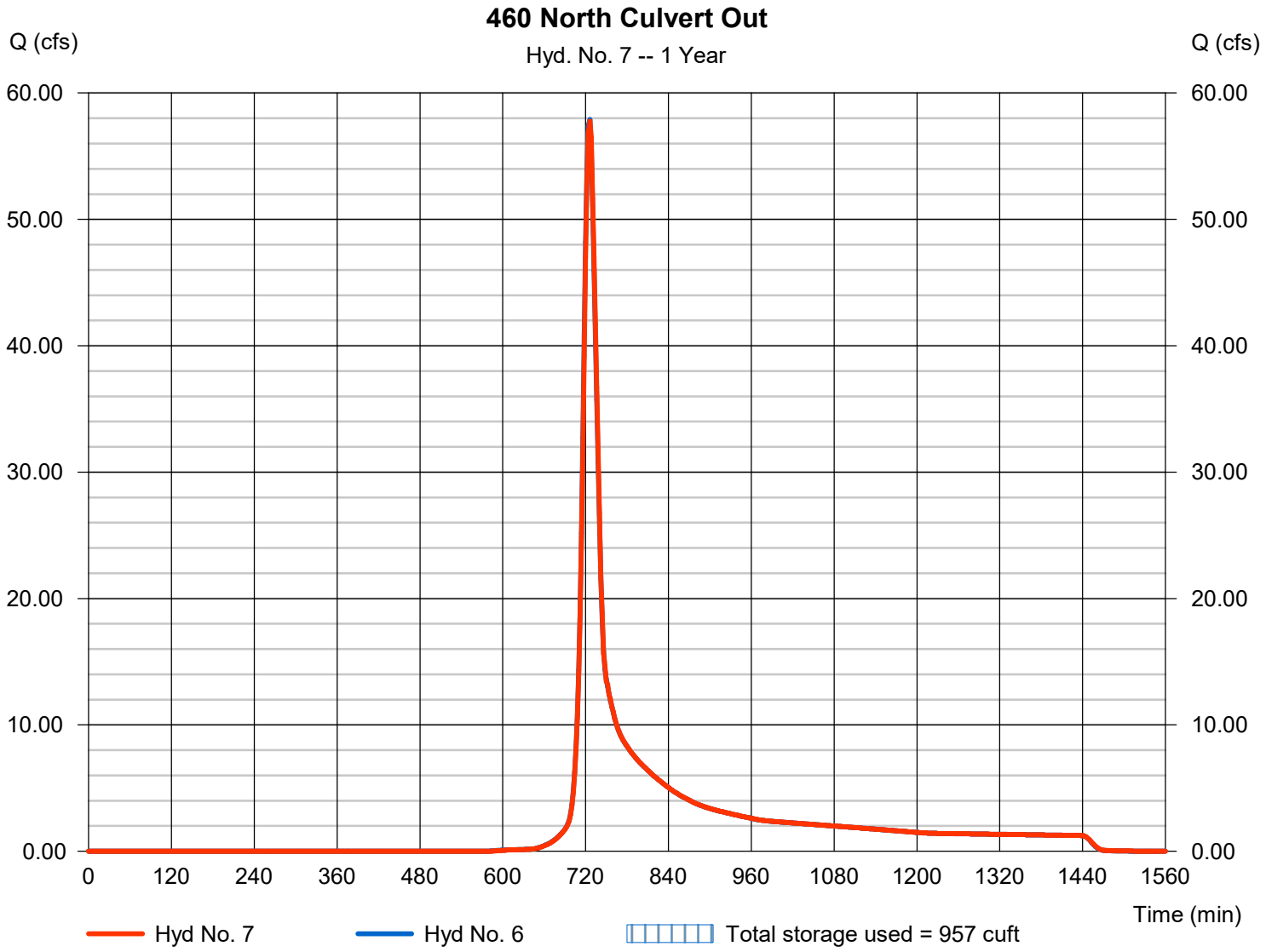
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 7

460 North Culvert Out

Hydrograph type	=	Reservoir	Peak discharge	=	57.76 cfs
Storm frequency	=	1 yrs	Time to peak	=	726 min
Time interval	=	2 min	Hyd. volume	=	209,881 cuft
Inflow hyd. No.	=	6 - Total To 460 North Culvert	Max. Elevation	=	2036.04 ft
Reservoir name	=	460 North Culvert HW Storage	Max. Storage	=	957 cuft

Storage Indication method used.



Hydrograph Report

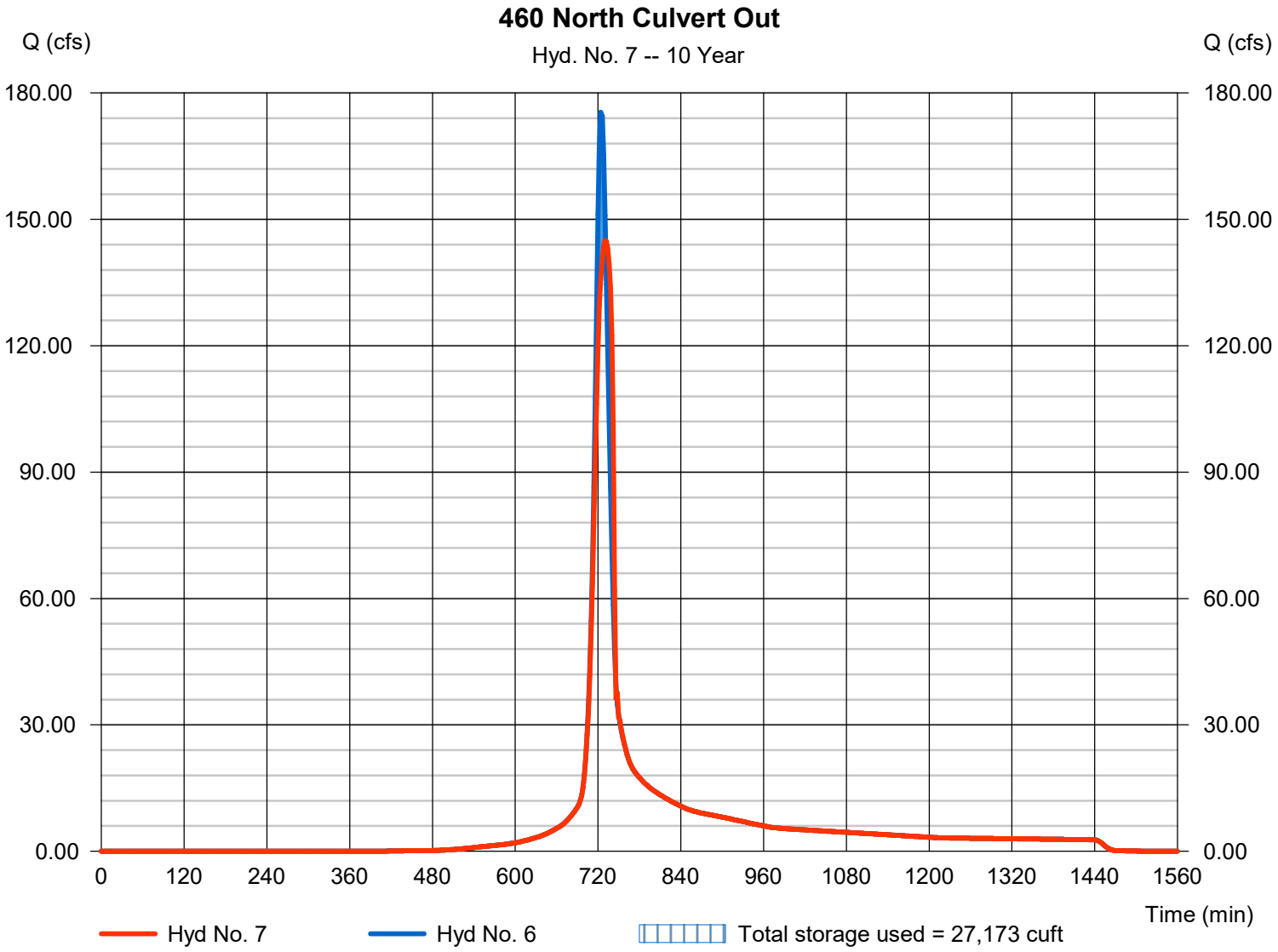
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 7

460 North Culvert Out

Hydrograph type	=	Reservoir	Peak discharge	=	144.96 cfs
Storm frequency	=	10 yrs	Time to peak	=	730 min
Time interval	=	2 min	Hyd. volume	=	572,669 cuft
Inflow hyd. No.	=	6 - Total To 460 North Culvert	Max. Elevation	=	2041.43 ft
Reservoir name	=	460 North Culvert HW Storage	Max. Storage	=	27,173 cuft

Storage Indication method used.



Drainage Area Runoff and Time of Concentration

Drainage Area: **Offsite Village area to Ex TOB Pond**

PREDEVELOPMENT

Composite Curve Number (CN)						Notes:
	Hydrologic Soil Group	Land Cover	CN	Area, A (ac.)	CN*A	
CN_1	-	Impervious	98	2.26	221.76	
CN_2	B	Managed Turf	61	0.47	28.64	
CN_3	C	Managed Turf	74	0.75	55.57	
CN_4	D	Managed Turf	80	2.35	188.06	
CN_5	B	Brush (Good)	48	2.59	124.15	Includes adjacent 460 runoff
CN_6	C	Brush (Good)	65	3.37	219.10	
CN_7	D	Brush (Good)	73	2.27	165.87	
CN_8					0.00	
CN_9					0.00	
CN_{10}					0.00	
				Total	**14.06**	**1003.15**
					Composite CN =	**71**

Time of Concentration, T_c						
2 yr. Precip. (in.) =			2.73			
Flow Segment	Flow Regime	Land Cover	Length (ft)	Roughness Coeff., n	Slope (ft/ft)	Travel Time, T_t (min.)
1	Sheet Flow	Grass	100	0.24	0.07	9.4
2	Shallow Conc.	Unpaved	40		0.35	0.1
3	Channel	Grass	1234	0.03	0.032	4.3
4						
5						
6						
7						
8						
9						
10						
					Total Time of Concentration, T_c (min.) =	**13.7**

Runoff			
	1 Yr.	10 Yr.	100 Yr.
Precipitation (in.), P	2.26	4.06	6.44
Composite CN	71	71	71
Storage (in.) S=1000/CN-10	4.08	4.08	4.08
Initial abstraction (in.), I_a=0.2S	0.82	0.82	0.82
Runoff depth (in.), $Q=(P-0.2S)^2/[(P-I_a)+S]$	0.38	1.44	3.26
Runoff volume (ac-ft), RV = Q/12*A	0.44	1.68	3.82
Flow rate (cfs), q_{peak} from hydrograph	5.15	24.66	

Hydrograph Number: 8

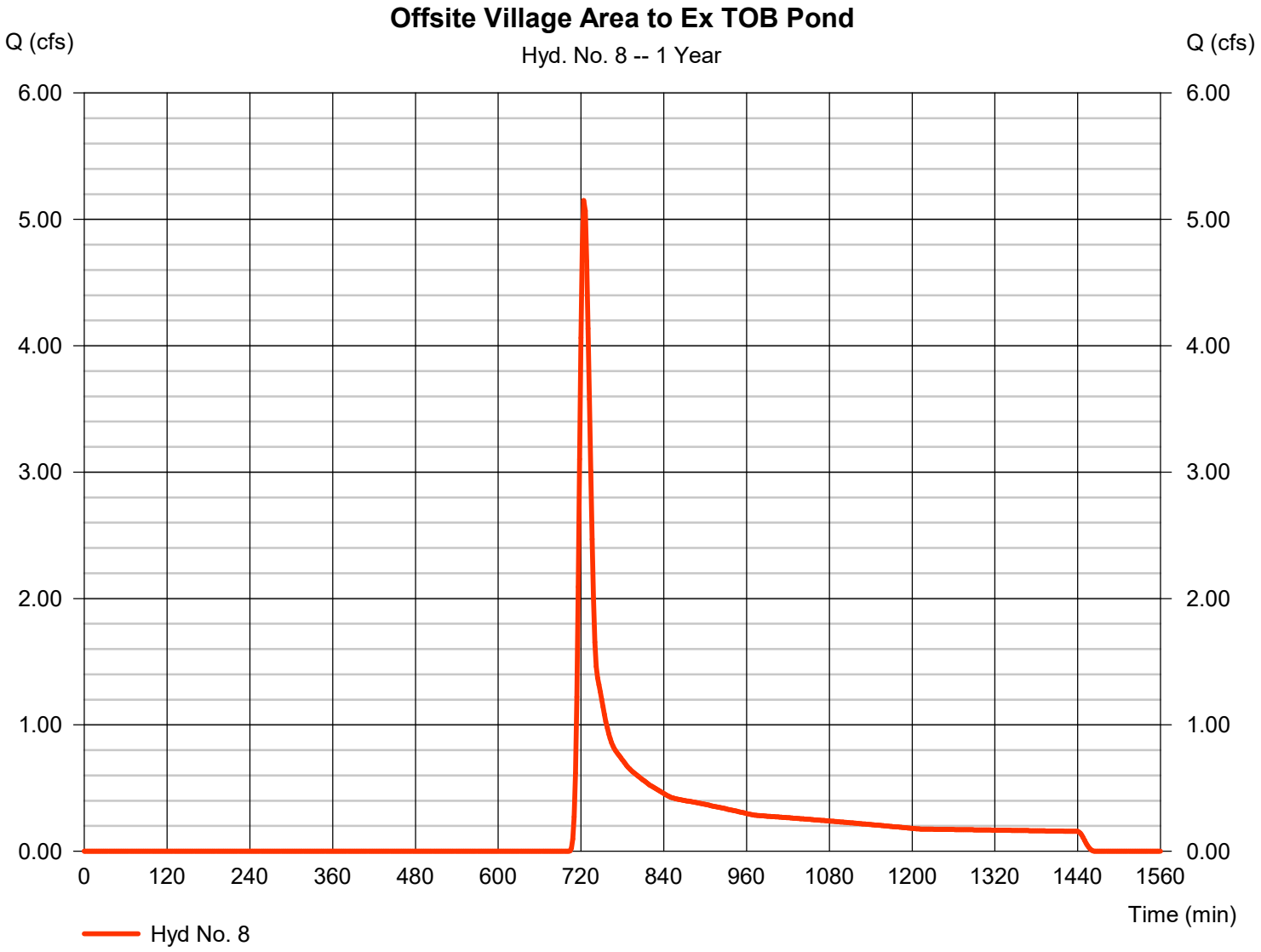
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 8

Offsite Village Area to Ex TOB Pond

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.148 cfs
Storm frequency	=	1 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	18,745 cuft
Drainage area	=	14.060 ac	Curve number	=	71
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	13.70 min
Total precip.	=	2.26 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



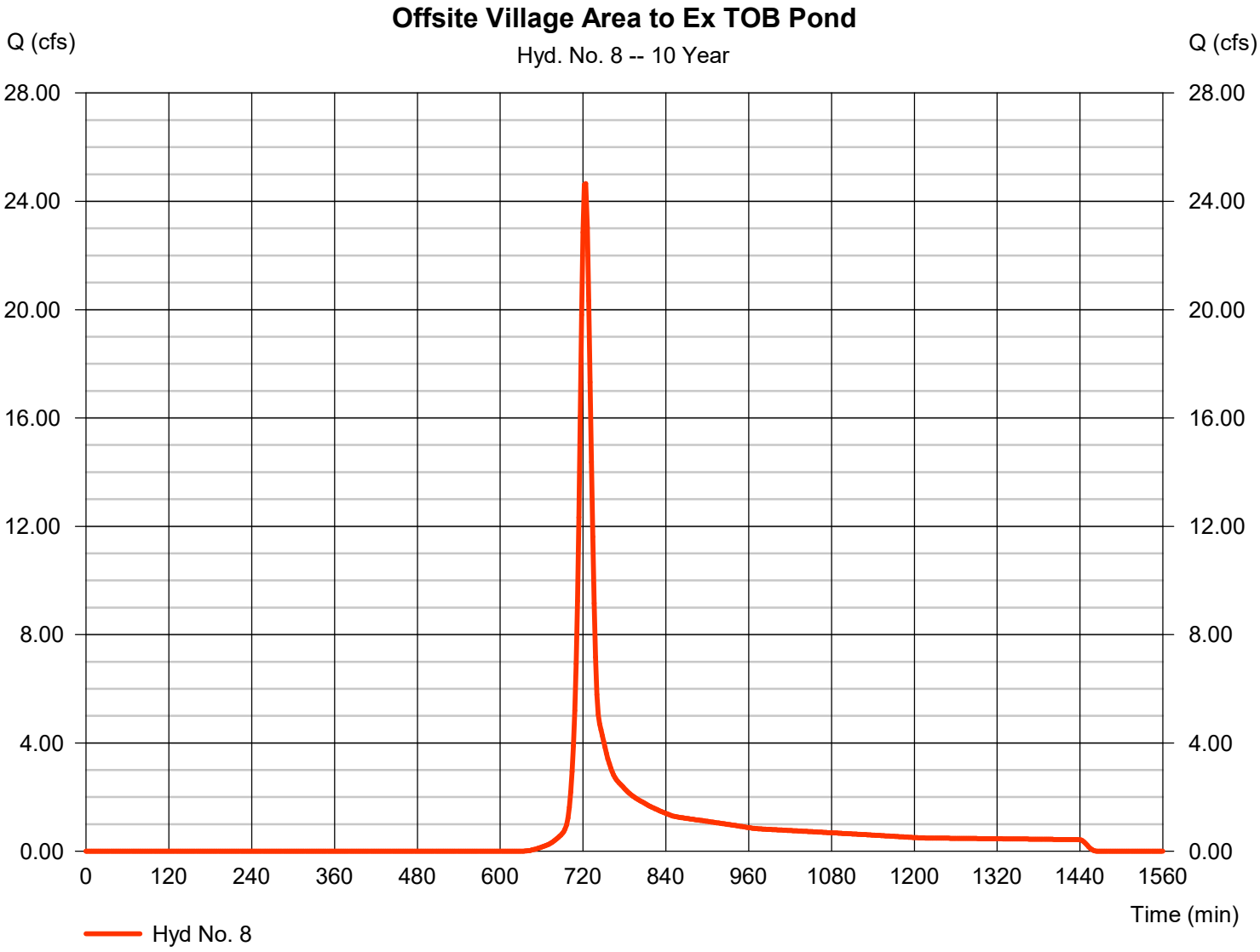
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 8

Offsite Village Area to Ex TOB Pond

Hydrograph type	= SCS Runoff	Peak discharge	= 24.66 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 71,426 cuft
Drainage area	= 14.060 ac	Curve number	= 71
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.70 min
Total precip.	= 4.06 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Drainage Area Runoff and Time of Concentration

Drainage Area: **Onsite flow into Ex. TOB Pond**

PREDEVELOPMENT

Composite Curve Number (CN)						Notes:
	Hydrologic Soil Group	Land Cover	CN	Area, A (ac.)	CN*A	
CN_1	-	Impervious	98	0.00	0.00	
CN_2	B	Open Space (Good)	61	3.64	221.94	
CN_3	C	Open Space (Good)	74	1.04	77.04	
CN_4					0.00	
CN_5					0.00	
CN_6					0.00	
CN_7					0.00	
CN_8					0.00	
CN_9					0.00	
CN_{10}					0.00	
			Total	**4.68**	**298.98**	
				Composite CN =	**64**	

Time of Concentration, T_c						
2 yr. Precip. (in.) =			2.73			
Flow Segment	Flow Regime	Land Cover	Length (ft)	Roughness Coeff., n	Slope (ft/ft)	Travel Time, T_t (min.)
1	Sheet Flow	Grass	100	0.24	0.05	10.7
2	Shallow Conc.	Unpaved	380		0.105	1.2
3	Channel	Grass	240	0.03	0.021	1.2
4						
5						
6						
7						
8						
9						
10						
				Total Time of Concentration, T_c (min.) =		**13.2**

Runoff			
	1 Yr.	10 Yr.	100 Yr.
Precipitation (in.), P	2.26	4.06	6.44
Composite CN	64	64	64
Storage (in.) S=1000/CN-10	5.63	5.63	5.63
Initial abstraction (in.), I_a=0.2S	1.13	1.13	1.13
Runoff depth (in.), $Q=(P-0.2S)^2/[(P-I_a)+S]$	0.19	1.01	2.58
Runoff volume (ac-ft), RV = Q/12*A	0.07	0.39	1.01
Flow rate (cfs), q_{peak} from hydrograph	0.56	6.28	

Hydrograph Number: 9

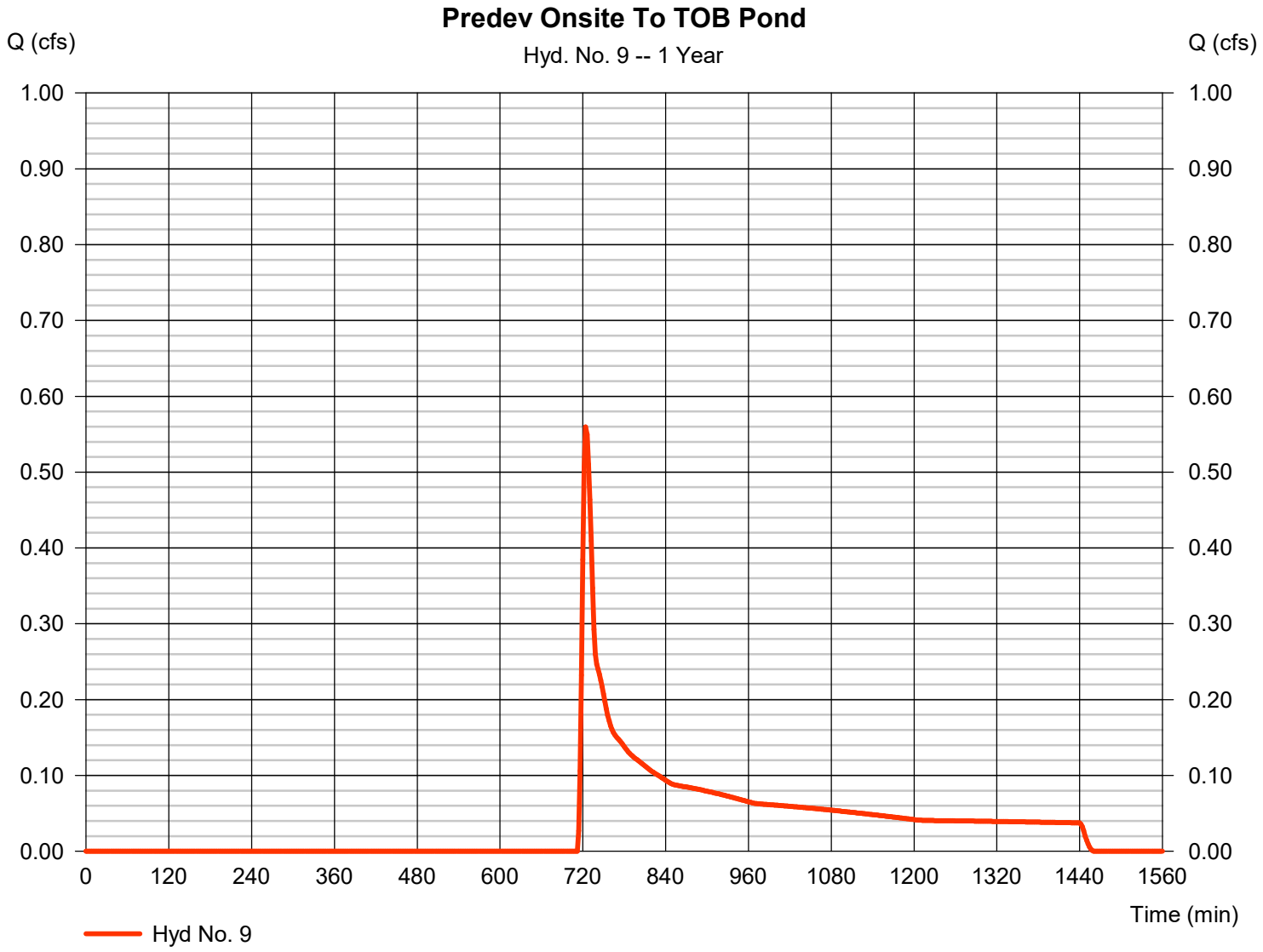
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Tuesday, 11 / 1 / 2022

Hyd. No. 9

Predev Onsite To TOB Pond

Hydrograph type	= SCS Runoff	Peak discharge	= 0.559 cfs
Storm frequency	= 1 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 3,334 cuft
Drainage area	= 4.680 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.20 min
Total precip.	= 2.26 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



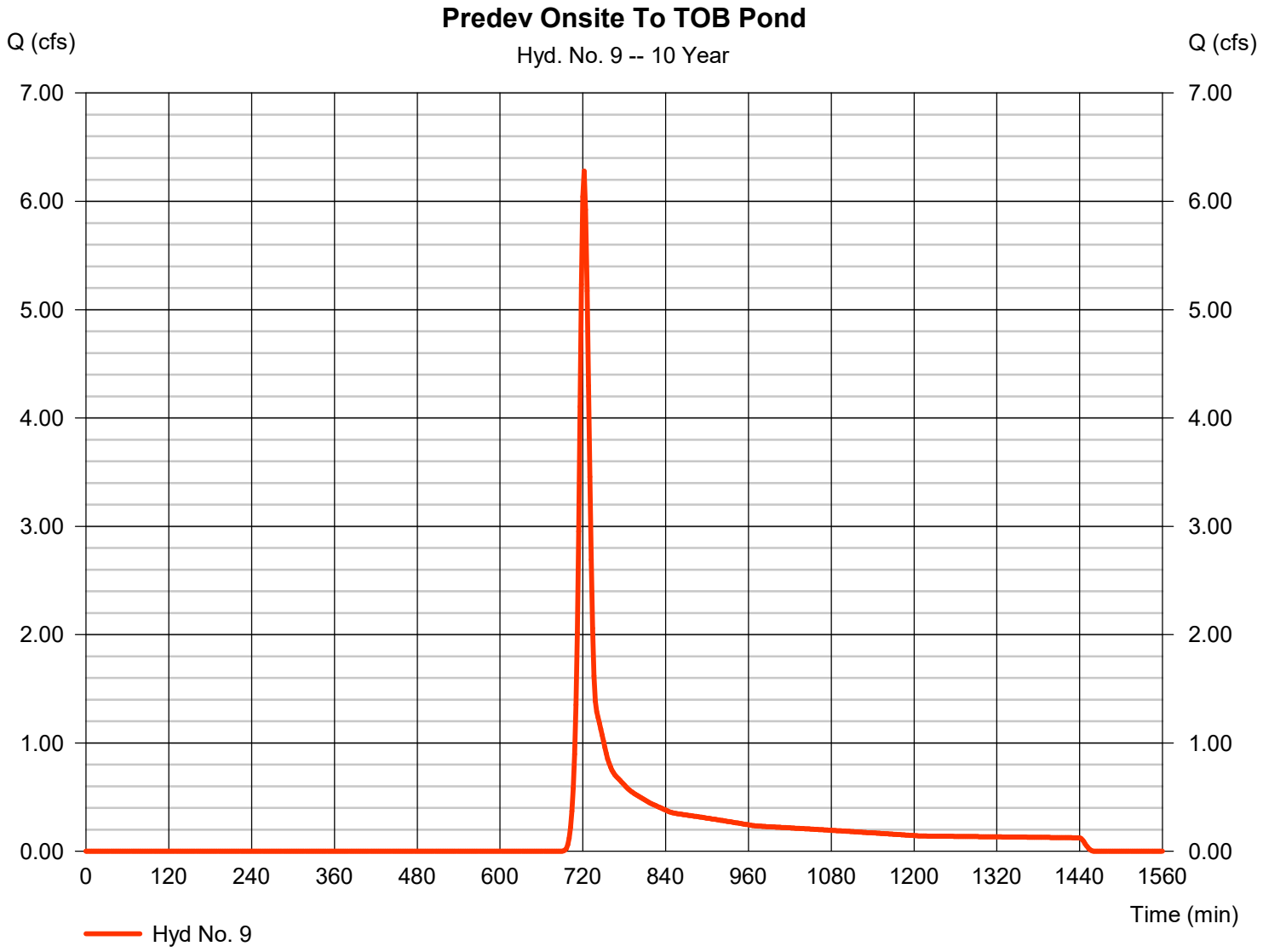
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Tuesday, 11 / 1 / 2022

Hyd. No. 9

Predev Onsite To TOB Pond

Hydrograph type	= SCS Runoff	Peak discharge	= 6.280 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 17,630 cuft
Drainage area	= 4.680 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.20 min
Total precip.	= 4.06 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

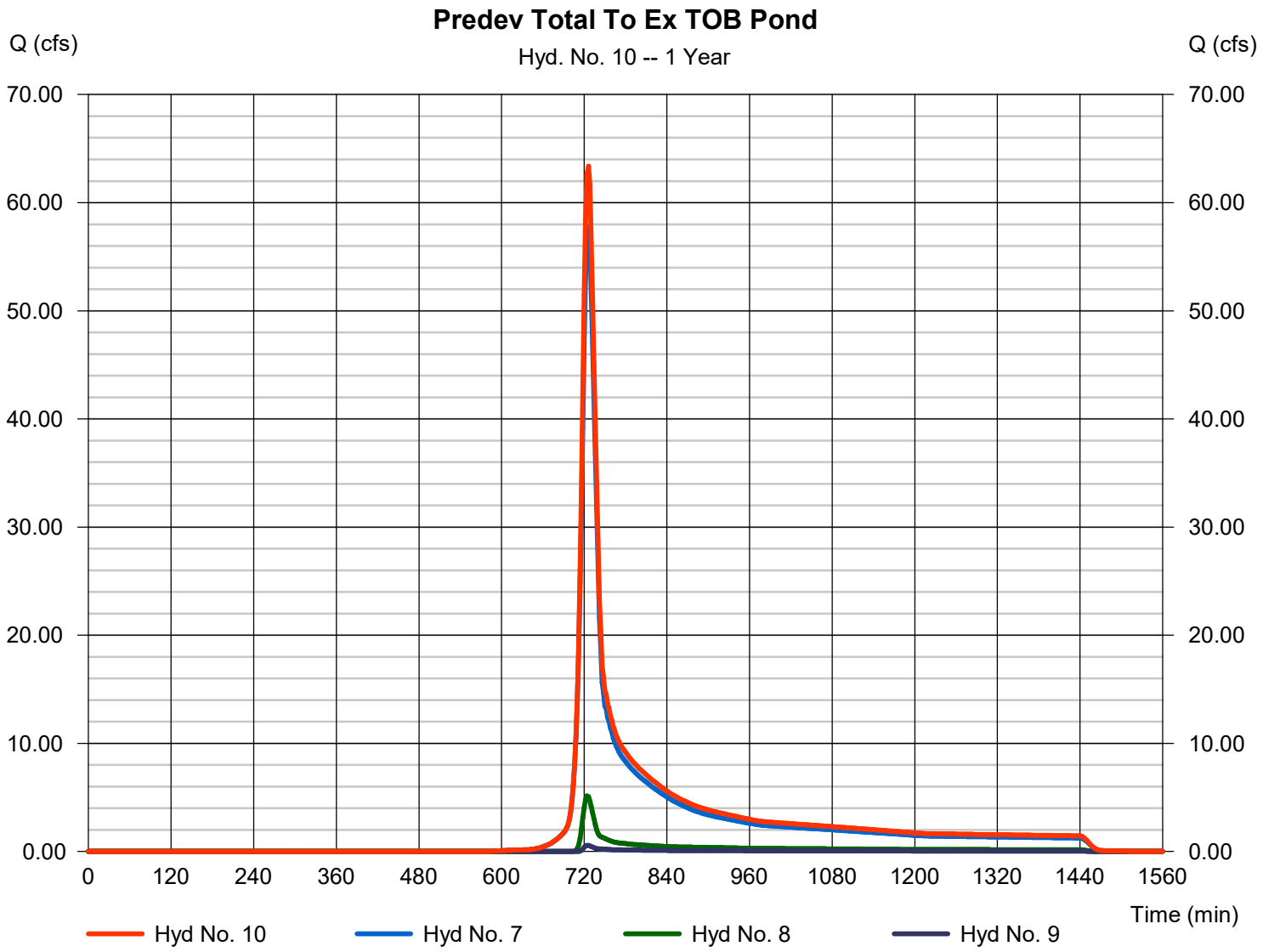


Hydrograph Report

Hyd. No. 10

Predev Total To Ex TOB Pond

Hydrograph type	= Combine	Peak discharge	= 63.37 cfs
Storm frequency	= 1 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 231,959 cuft
Inflow hyds.	= 7, 8, 9	Contrib. drain. area	= 18.740 ac



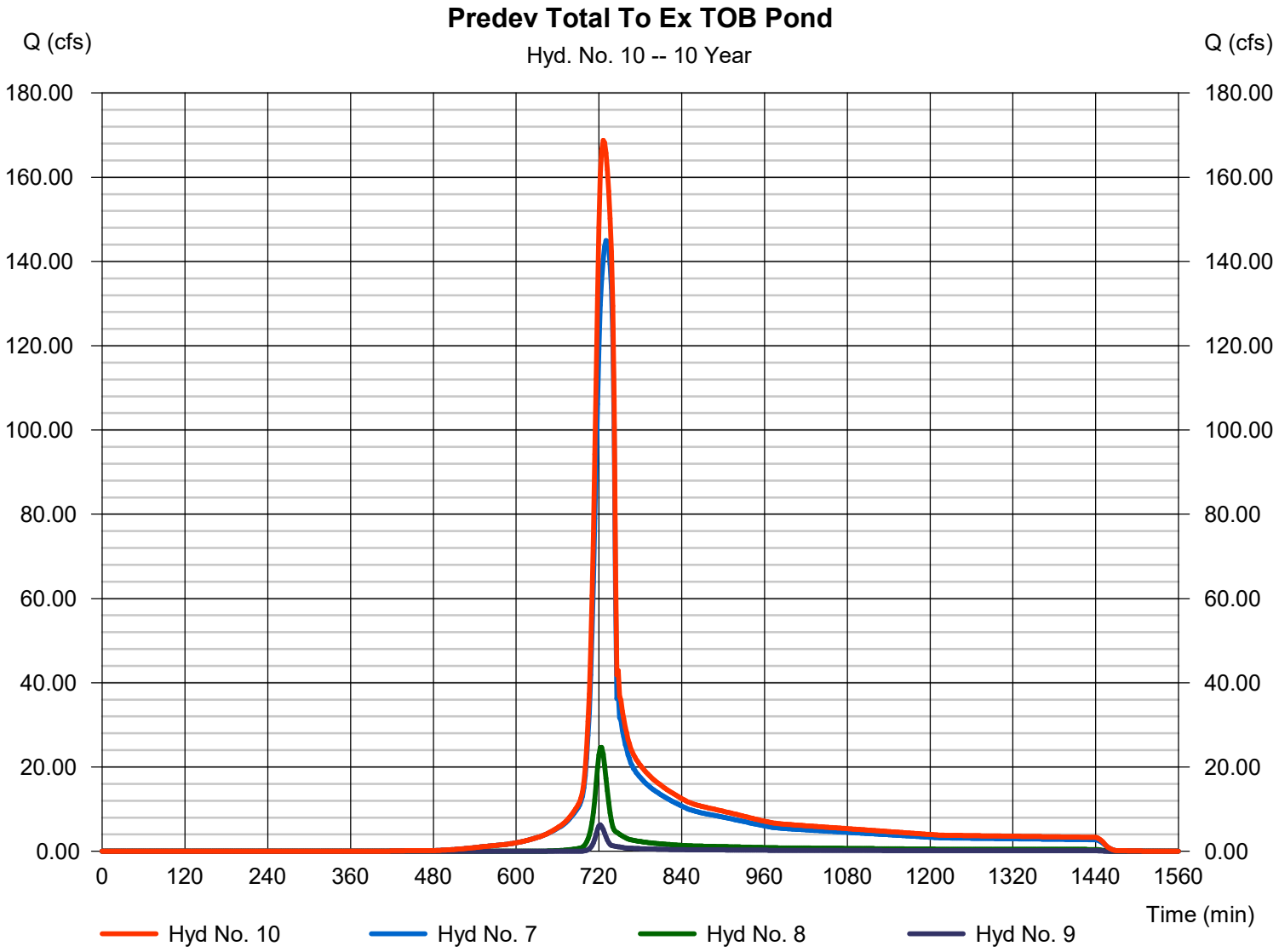
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 10

Predev Total To Ex TOB Pond

Hydrograph type	= Combine	Peak discharge	= 168.79 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 661,724 cuft
Inflow hyds.	= 7, 8, 9	Contrib. drain. area	= 18.740 ac



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Pond No. 6 - Ex. TOB Pond A

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 2018.40 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	2018.40	00	0	0
0.60	2019.00	40	8	8
1.60	2020.00	600	265	273
2.60	2021.00	2,410	1,404	1,677
3.60	2022.00	5,600	3,894	5,571
3.70	2022.10	6,095	585	6,156
3.80	2022.20	6,590	634	6,790
3.90	2022.30	7,085	683	7,473
4.00	2022.40	7,580	733	8,206
4.10	2022.50	8,075	783	8,989
4.20	2022.60	8,570	832	9,821
4.30	2022.70	9,065	882	10,703
4.40	2022.80	9,560	931	11,634
4.50	2022.90	10,055	981	12,614
4.60	2023.00	10,550	1,030	13,644
5.60	2024.00	12,758	11,635	25,279
7.60	2026.00	26,128	38,092	63,371
9.60	2028.00	37,922	63,679	127,050
11.60	2030.00	56,606	93,897	220,947
13.60	2032.00	83,164	138,907	359,854
15.60	2034.00	102,699	185,501	545,355

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 21.00	1.70	0.00	0.00
Span (in)	= 21.00	1.70	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 2018.30	2018.50	0.00	0.00
Length (ft)	= 125.00	0.50	0.00	0.00
Slope (%)	= 1.00	1.00	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)	= 9.42	40.00	0.00	0.00
Crest El. (ft)	= 2022.70	2032.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
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).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	2018.40	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
0.06	1	2018.46	0.06 ic	0.00	---	---	0.00	0.00	---	---	---	---	0.000
0.12	2	2018.52	0.06 ic	0.00 ic	---	---	0.00	0.00	---	---	---	---	0.001
0.18	2	2018.58	0.06 ic	0.01 ic	---	---	0.00	0.00	---	---	---	---	0.009
0.24	3	2018.64	0.06 ic	0.02 ic	---	---	0.00	0.00	---	---	---	---	0.020
0.30	4	2018.70	0.06 ic	0.03 ic	---	---	0.00	0.00	---	---	---	---	0.027
0.36	5	2018.76	0.06 ic	0.03 ic	---	---	0.00	0.00	---	---	---	---	0.033
0.42	6	2018.82	0.06 ic	0.04 ic	---	---	0.00	0.00	---	---	---	---	0.038
0.48	6	2018.88	0.06 ic	0.04 ic	---	---	0.00	0.00	---	---	---	---	0.042
0.54	7	2018.94	0.06 ic	0.05 ic	---	---	0.00	0.00	---	---	---	---	0.046
0.60	8	2019.00	0.06 ic	0.05 ic	---	---	0.00	0.00	---	---	---	---	0.050
0.70	34	2019.10	0.06 ic	0.06 ic	---	---	0.00	0.00	---	---	---	---	0.055
0.80	61	2019.20	0.06 ic	0.06 ic	---	---	0.00	0.00	---	---	---	---	0.060
0.90	87	2019.30	0.07 ic	0.06 ic	---	---	0.00	0.00	---	---	---	---	0.065
1.00	114	2019.40	0.08 ic	0.07 ic	---	---	0.00	0.00	---	---	---	---	0.069
1.10	140	2019.50	0.08 ic	0.07 ic	---	---	0.00	0.00	---	---	---	---	0.073
1.20	167	2019.60	0.08 ic	0.08 ic	---	---	0.00	0.00	---	---	---	---	0.077
1.30	193	2019.70	0.08 ic	0.08 ic	---	---	0.00	0.00	---	---	---	---	0.081
1.40	220	2019.80	0.08 ic	0.08 ic	---	---	0.00	0.00	---	---	---	---	0.084
1.50	246	2019.90	0.09 ic	0.09 ic	---	---	0.00	0.00	---	---	---	---	0.087
1.60	273	2020.00	0.09 ic	0.09 ic	---	---	0.00	0.00	---	---	---	---	0.091
1.70	413	2020.10	0.09 ic	0.09 ic	---	---	0.00	0.00	---	---	---	---	0.094

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Ex. TOB Pond

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.80	554	2020.20	0.10 ic	0.10 ic	---	---	0.00	0.00	---	---	---	---	0.097
1.90	694	2020.30	0.11 ic	0.10 ic	---	---	0.00	0.00	---	---	---	---	0.100
2.00	835	2020.40	0.11 ic	0.10 ic	---	---	0.00	0.00	---	---	---	---	0.103
2.10	975	2020.50	0.11 ic	0.11 ic	---	---	0.00	0.00	---	---	---	---	0.105
2.20	1,115	2020.60	0.11 ic	0.11 ic	---	---	0.00	0.00	---	---	---	---	0.108
2.30	1,256	2020.70	0.12 ic	0.11 ic	---	---	0.00	0.00	---	---	---	---	0.111
2.40	1,396	2020.80	0.12 ic	0.11 ic	---	---	0.00	0.00	---	---	---	---	0.113
2.50	1,537	2020.90	0.12 ic	0.12 ic	---	---	0.00	0.00	---	---	---	---	0.116
2.60	1,677	2021.00	0.12 ic	0.12 ic	---	---	0.00	0.00	---	---	---	---	0.118
2.70	2,066	2021.10	0.12 ic	0.12 ic	---	---	0.00	0.00	---	---	---	---	0.121
2.80	2,456	2021.20	0.13 ic	0.12 ic	---	---	0.00	0.00	---	---	---	---	0.123
2.90	2,845	2021.30	0.13 ic	0.13 ic	---	---	0.00	0.00	---	---	---	---	0.125
3.00	3,235	2021.40	0.13 ic	0.13 ic	---	---	0.00	0.00	---	---	---	---	0.128
3.10	3,624	2021.50	0.13 ic	0.13 ic	---	---	0.00	0.00	---	---	---	---	0.130
3.20	4,013	2021.60	0.13 ic	0.13 ic	---	---	0.00	0.00	---	---	---	---	0.132
3.30	4,403	2021.70	0.14 ic	0.13 ic	---	---	0.00	0.00	---	---	---	---	0.134
3.40	4,792	2021.80	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.136
3.50	5,182	2021.90	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.138
3.60	5,571	2022.00	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.141
3.61	5,630	2022.01	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.141
3.62	5,688	2022.02	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.141
3.63	5,747	2022.03	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.141
3.64	5,805	2022.04	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.141
3.65	5,863	2022.05	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.142
3.66	5,922	2022.06	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.142
3.67	5,980	2022.07	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.142
3.68	6,039	2022.08	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.142
3.69	6,097	2022.09	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.142
3.70	6,156	2022.10	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.143
3.71	6,219	2022.11	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.143
3.72	6,283	2022.12	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.143
3.73	6,346	2022.13	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.143
3.74	6,409	2022.14	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.143
3.75	6,473	2022.15	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.144
3.76	6,536	2022.16	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.144
3.77	6,600	2022.17	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.144
3.78	6,663	2022.18	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.144
3.79	6,727	2022.19	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.144
3.80	6,790	2022.20	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.145
3.81	6,858	2022.21	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.145
3.82	6,927	2022.22	0.14 ic	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.145
3.83	6,995	2022.23	0.15 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.145
3.84	7,063	2022.24	0.15 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.145
3.85	7,132	2022.25	0.15 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.146
3.86	7,200	2022.26	0.15 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.146
3.87	7,268	2022.27	0.15 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.146
3.88	7,337	2022.28	0.15 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.146
3.89	7,405	2022.29	0.15 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.146
3.90	7,473	2022.30	0.15 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.147
3.91	7,547	2022.31	0.15 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.147
3.92	7,620	2022.32	0.15 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.147
3.93	7,693	2022.33	0.15 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.147
3.94	7,767	2022.34	0.15 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.147
3.95	7,840	2022.35	0.15 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.148
3.96	7,913	2022.36	0.15 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.148
3.97	7,986	2022.37	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.148
3.98	8,060	2022.38	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.148
3.99	8,133	2022.39	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.148
4.00	8,206	2022.40	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.148
4.01	8,285	2022.41	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.149
4.02	8,363	2022.42	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.149
4.03	8,441	2022.43	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.149
4.04	8,519	2022.44	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.149
4.05	8,598	2022.45	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.149
4.06	8,676	2022.46	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.150
4.07	8,754	2022.47	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.150
4.08	8,832	2022.48	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.150
4.09	8,911	2022.49	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.150
4.10	8,989	2022.50	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.150
4.11	9,072	2022.51	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.151
4.12	9,155	2022.52	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.151
4.13	9,239	2022.53	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.151

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Ex. TOB Pond

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
4.14	9,322	2022.54	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.151
4.15	9,405	2022.55	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.151
4.16	9,488	2022.56	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.152
4.17	9,571	2022.57	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.152
4.18	9,655	2022.58	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.152
4.19	9,738	2022.59	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.152
4.20	9,821	2022.60	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.152
4.21	9,909	2022.61	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.153
4.22	9,997	2022.62	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.153
4.23	10,085	2022.63	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.153
4.24	10,174	2022.64	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.153
4.25	10,262	2022.65	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.153
4.26	10,350	2022.66	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.153
4.27	10,438	2022.67	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.154
4.28	10,526	2022.68	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.154
4.29	10,614	2022.69	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.154
4.30	10,703	2022.70	0.16 ic	0.15 ic	---	---	0.00	0.00	---	---	---	---	0.154
4.31	10,796	2022.71	0.19 ic	0.15 ic	---	---	0.03	0.00	---	---	---	---	0.186
4.32	10,889	2022.72	0.25 ic	0.15 ic	---	---	0.09	0.00	---	---	---	---	0.244
4.33	10,982	2022.73	0.32 ic	0.15 ic	---	---	0.16	0.00	---	---	---	---	0.319
4.34	11,075	2022.74	0.43 ic	0.15 ic	---	---	0.25	0.00	---	---	---	---	0.407
4.35	11,168	2022.75	0.53 ic	0.15 ic	---	---	0.35	0.00	---	---	---	---	0.507
4.36	11,261	2022.76	0.64 ic	0.15 ic	---	---	0.46	0.00	---	---	---	---	0.617
4.37	11,354	2022.77	0.76 ic	0.15 ic	---	---	0.58	0.00	---	---	---	---	0.737
4.38	11,447	2022.78	0.87 ic	0.15 ic	---	---	0.71	0.00	---	---	---	---	0.866
4.39	11,540	2022.79	1.01 ic	0.15 ic	---	---	0.85	0.00	---	---	---	---	1.003
4.40	11,634	2022.80	1.18 ic	0.15 ic	---	---	0.99	0.00	---	---	---	---	1.146
4.41	11,732	2022.81	1.30 ic	0.15 ic	---	---	1.15	0.00	---	---	---	---	1.298
4.42	11,830	2022.82	1.49 ic	0.15 ic	---	---	1.31	0.00	---	---	---	---	1.458
4.43	11,928	2022.83	1.63 ic	0.15 ic	---	---	1.47	0.00	---	---	---	---	1.624
4.44	12,026	2022.84	1.80 ic	0.15 ic	---	---	1.65	0.00	---	---	---	---	1.797
4.45	12,124	2022.85	2.01 ic	0.15 ic	---	---	1.83	0.00	---	---	---	---	1.976
4.46	12,222	2022.86	2.17 ic	0.15 ic	---	---	2.01	0.00	---	---	---	---	2.161
4.47	12,320	2022.87	2.35 ic	0.15 ic	---	---	2.20	0.00	---	---	---	---	2.352
4.48	12,418	2022.88	2.61 ic	0.15 ic	---	---	2.40	0.00	---	---	---	---	2.549
4.49	12,516	2022.89	2.79 ic	0.15 ic	---	---	2.60	0.00	---	---	---	---	2.751
4.50	12,614	2022.90	2.99 ic	0.15 ic	---	---	2.81	0.00	---	---	---	---	2.956
4.51	12,717	2022.91	3.18 ic	0.15 ic	---	---	3.02	0.00	---	---	---	---	3.169
4.52	12,820	2022.92	3.39 ic	0.15 ic	---	---	3.24	0.00	---	---	---	---	3.387
4.53	12,923	2022.93	3.61 ic	0.15 ic	---	---	3.46	0.00	---	---	---	---	3.610
4.54	13,026	2022.94	3.91 ic	0.15 ic	---	---	3.69	0.00	---	---	---	---	3.838
4.55	13,129	2022.95	4.12 ic	0.15 ic	---	---	3.92	0.00	---	---	---	---	4.071
4.56	13,232	2022.96	4.34 ic	0.15 ic	---	---	4.16	0.00	---	---	---	---	4.308
4.57	13,335	2022.97	4.57 ic	0.15 ic	---	---	4.40	0.00	---	---	---	---	4.551
4.58	13,438	2022.98	4.80 ic	0.15 ic	---	---	4.65	0.00	---	---	---	---	4.797
4.59	13,541	2022.99	5.05 ic	0.15 ic	---	---	4.90	0.00	---	---	---	---	5.048
4.60	13,644	2023.00	5.36 ic	0.14 ic	---	---	5.16	0.00	---	---	---	---	5.301
4.70	14,808	2023.10	8.09 ic	0.14 ic	---	---	7.94	0.00	---	---	---	---	8.077
4.80	15,971	2023.20	11.22 ic	0.13 ic	---	---	11.09	0.00	---	---	---	---	11.22
4.90	17,135	2023.30	14.70 ic	0.12 ic	---	---	14.58	0.00	---	---	---	---	14.70
5.00	18,298	2023.40	18.46 oc	0.09 ic	---	---	18.37	0.00	---	---	---	---	18.46
5.10	19,462	2023.50	21.38 oc	0.06 ic	---	---	21.32 s	0.00	---	---	---	---	21.38
5.20	20,625	2023.60	22.11 oc	0.05 ic	---	---	22.06 s	0.00	---	---	---	---	22.11
5.30	21,789	2023.70	22.63 oc	0.04 ic	---	---	22.58 s	0.00	---	---	---	---	22.63
5.40	22,952	2023.80	23.04 oc	0.04 ic	---	---	23.00 s	0.00	---	---	---	---	23.04
5.50	24,116	2023.90	23.40 oc	0.03 ic	---	---	23.36 s	0.00	---	---	---	---	23.40
5.60	25,279	2024.00	23.72 oc	0.03 ic	---	---	23.69 s	0.00	---	---	---	---	23.72
5.80	29,088	2024.20	24.29 oc	0.02 ic	---	---	24.27 s	0.00	---	---	---	---	24.29
6.00	32,898	2024.40	24.81 oc	0.02 ic	---	---	24.79 s	0.00	---	---	---	---	24.81
6.20	36,707	2024.60	25.30 oc	0.02 ic	---	---	25.27 s	0.00	---	---	---	---	25.29
6.40	40,516	2024.80	25.77 oc	0.02 ic	---	---	25.74 s	0.00	---	---	---	---	25.76
6.60	44,325	2025.00	26.22 oc	0.01 ic	---	---	26.19 s	0.00	---	---	---	---	26.20
6.80	48,134	2025.20	26.65 oc	0.01 ic	---	---	26.64 s	0.00	---	---	---	---	26.65
7.00	51,944	2025.40	27.08 oc	0.01 ic	---	---	27.03 s	0.00	---	---	---	---	27.05
7.20	55,753	2025.60	27.49 oc	0.01 ic	---	---	27.46 s	0.00	---	---	---	---	27.47
7.40	59,562	2025.80	27.90 oc	0.01 ic	---	---	27.85 s	0.00	---	---	---	---	27.86
7.60	63,371	2026.00	28.31 oc	0.01 ic	---	---	28.27 s	0.00	---	---	---	---	28.28
7.80	69,739	2026.20	28.70 oc	0.01 ic	---	---	28.64 s	0.00	---	---	---	---	28.65
8.00	76,107	2026.40	29.09 oc	0.01 ic	---	---	29.03 s	0.00	---	---	---	---	29.04
8.20	82,475	2026.60	29.47 oc	0.01 ic	---	---	29.42 s	0.00	---	---	---	---	29.42
8.40	88,843	2026.80	29.85 oc	0.01 ic	---	---	29.80 s	0.00	---	---	---	---	29.81
8.60	95,210	2027.00	30.22 oc	0.01 ic	---	---	30.18 s	0.00	---	---	---	---	30.19

Continues on next page...

Ex. TOB Pond

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
8.80	101,578	2027.20	30.59 oc	0.01 ic	---	---	30.50 s	0.00	---	---	---	---	30.51
9.00	107,946	2027.40	30.96 oc	0.01 ic	---	---	30.90 s	0.00	---	---	---	---	30.91
9.20	114,314	2027.60	31.32 oc	0.01 ic	---	---	31.17 s	0.00	---	---	---	---	31.18
9.40	120,682	2027.80	31.67 oc	0.01 ic	---	---	31.62 s	0.00	---	---	---	---	31.63
9.60	127,050	2028.00	32.02 oc	0.01 ic	---	---	31.96 s	0.00	---	---	---	---	31.97
9.80	136,440	2028.20	32.37 oc	0.01 ic	---	---	32.19 s	0.00	---	---	---	---	32.19
10.00	145,829	2028.40	32.71 oc	0.01 ic	---	---	32.46 s	0.00	---	---	---	---	32.47
10.20	155,219	2028.60	33.05 oc	0.01 ic	---	---	32.96 s	0.00	---	---	---	---	32.96
10.40	164,609	2028.80	33.39 oc	0.00 ic	---	---	33.30 s	0.00	---	---	---	---	33.30
10.60	173,998	2029.00	33.72 oc	0.00 ic	---	---	33.53 s	0.00	---	---	---	---	33.53
10.80	183,388	2029.20	34.05 oc	0.00 ic	---	---	34.01 s	0.00	---	---	---	---	34.01
11.00	192,778	2029.40	34.38 oc	0.00 ic	---	---	34.12 s	0.00	---	---	---	---	34.13
11.20	202,167	2029.60	34.70 oc	0.00 ic	---	---	34.44 s	0.00	---	---	---	---	34.44
11.40	211,557	2029.80	35.02 oc	0.00 ic	---	---	34.67 s	0.00	---	---	---	---	34.68
11.60	220,947	2030.00	35.34 oc	0.00 ic	---	---	34.87 s	0.00	---	---	---	---	34.88
11.80	234,838	2030.20	35.65 oc	0.00 ic	---	---	35.43 s	0.00	---	---	---	---	35.44
12.00	248,728	2030.40	35.96 oc	0.00 ic	---	---	35.96 s	0.00	---	---	---	---	35.96
12.20	262,619	2030.60	36.27 oc	0.00 ic	---	---	35.86 s	0.00	---	---	---	---	35.87
12.40	276,510	2030.80	36.58 oc	0.00 ic	---	---	36.27 s	0.00	---	---	---	---	36.27
12.60	290,400	2031.00	36.88 oc	0.00 ic	---	---	36.63 s	0.00	---	---	---	---	36.63
12.80	304,291	2031.20	37.18 oc	0.00 ic	---	---	37.10 s	0.00	---	---	---	---	37.10
13.00	318,182	2031.40	37.48 oc	0.00 ic	---	---	37.37 s	0.00	---	---	---	---	37.37
13.20	332,073	2031.60	37.78 oc	0.00 ic	---	---	37.57 s	0.00	---	---	---	---	37.58
13.40	345,963	2031.80	38.07 oc	0.00 ic	---	---	37.73 s	0.00	---	---	---	---	37.73
13.60	359,854	2032.00	38.37 oc	0.00 ic	---	---	37.71 s	0.00	---	---	---	---	37.71
13.80	378,404	2032.20	38.66 oc	0.00 ic	---	---	38.61 s	9.30	---	---	---	---	47.91
14.00	396,954	2032.40	38.94 oc	0.00 ic	---	---	38.82 s	26.30	---	---	---	---	65.12
14.20	415,504	2032.60	39.23 oc	0.00 ic	---	---	38.74 s	48.32	---	---	---	---	87.06
14.40	434,055	2032.80	39.51 oc	0.00 ic	---	---	38.58 s	74.39	---	---	---	---	112.97
14.60	452,605	2033.00	39.79 oc	0.00 ic	---	---	39.43 s	103.96	---	---	---	---	143.40
14.80	471,155	2033.20	40.07 oc	0.00 ic	---	---	39.17 s	136.66	---	---	---	---	175.83
15.00	489,705	2033.40	40.35 oc	0.00 ic	---	---	40.00 s	172.21	---	---	---	---	212.22
15.20	508,255	2033.60	40.63 oc	0.00 ic	---	---	39.60 s	210.40	---	---	---	---	250.01
15.40	526,805	2033.80	40.90 oc	0.00 ic	---	---	40.42 s	251.06	---	---	---	---	291.49
15.60	545,355	2034.00	41.17 oc	0.00 ic	---	---	41.07 s	294.16	---	---	---	---	335.23

...End

Hydrograph Report

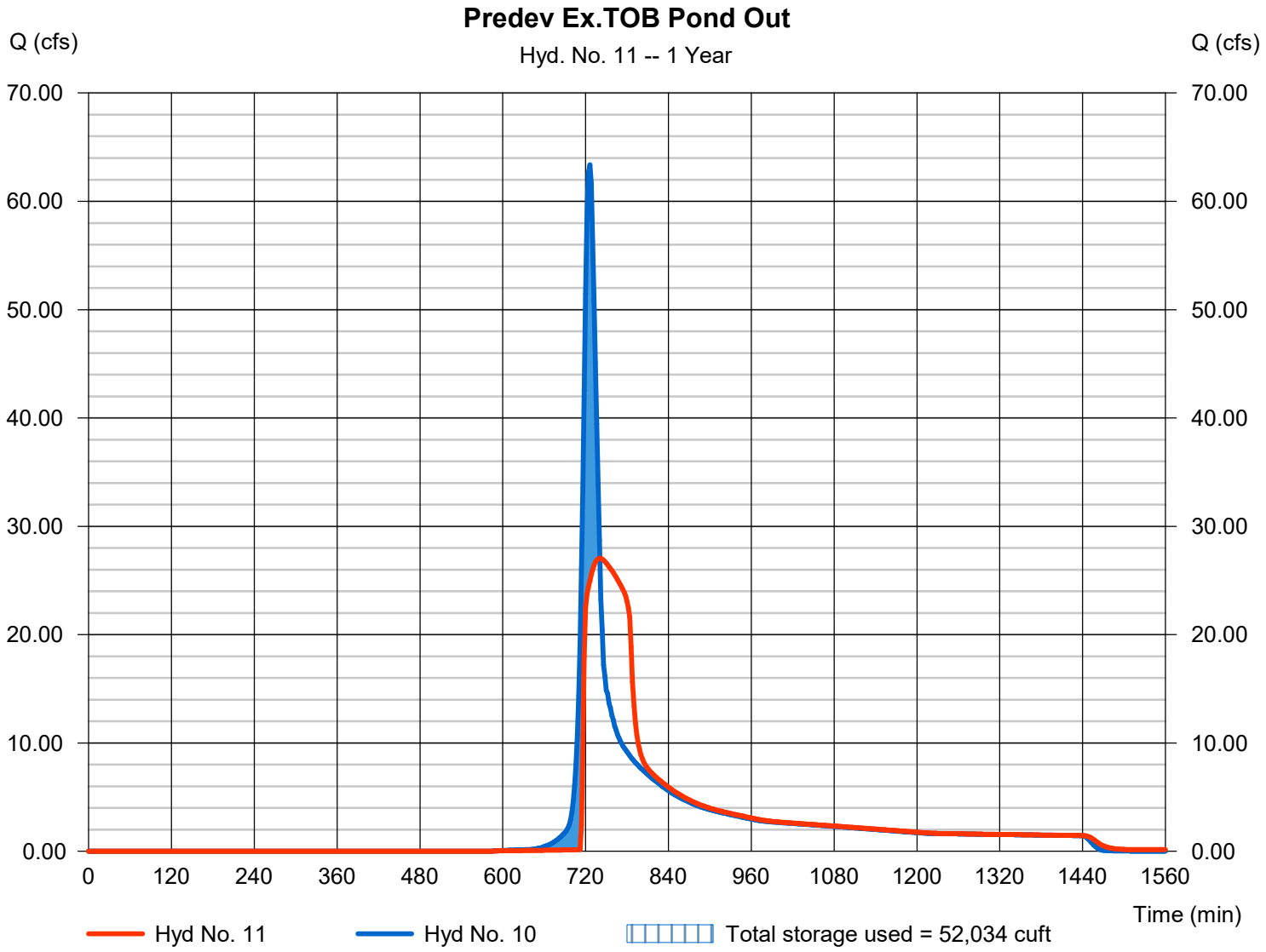
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 11

Predev Ex.TOB Pond Out

Hydrograph type	=	Reservoir	Peak discharge	=	27.06 cfs
Storm frequency	=	1 yrs	Time to peak	=	740 min
Time interval	=	2 min	Hyd. volume	=	231,958 cuft
Inflow hyd. No.	=	10 - Predev Total To Ex TOB Pond	Max. Elevation	=	2025.41 ft
Reservoir name	=	Ex. TOB Pond	Max. Storage	=	52,034 cuft

Storage Indication method used.



Hydrograph Report

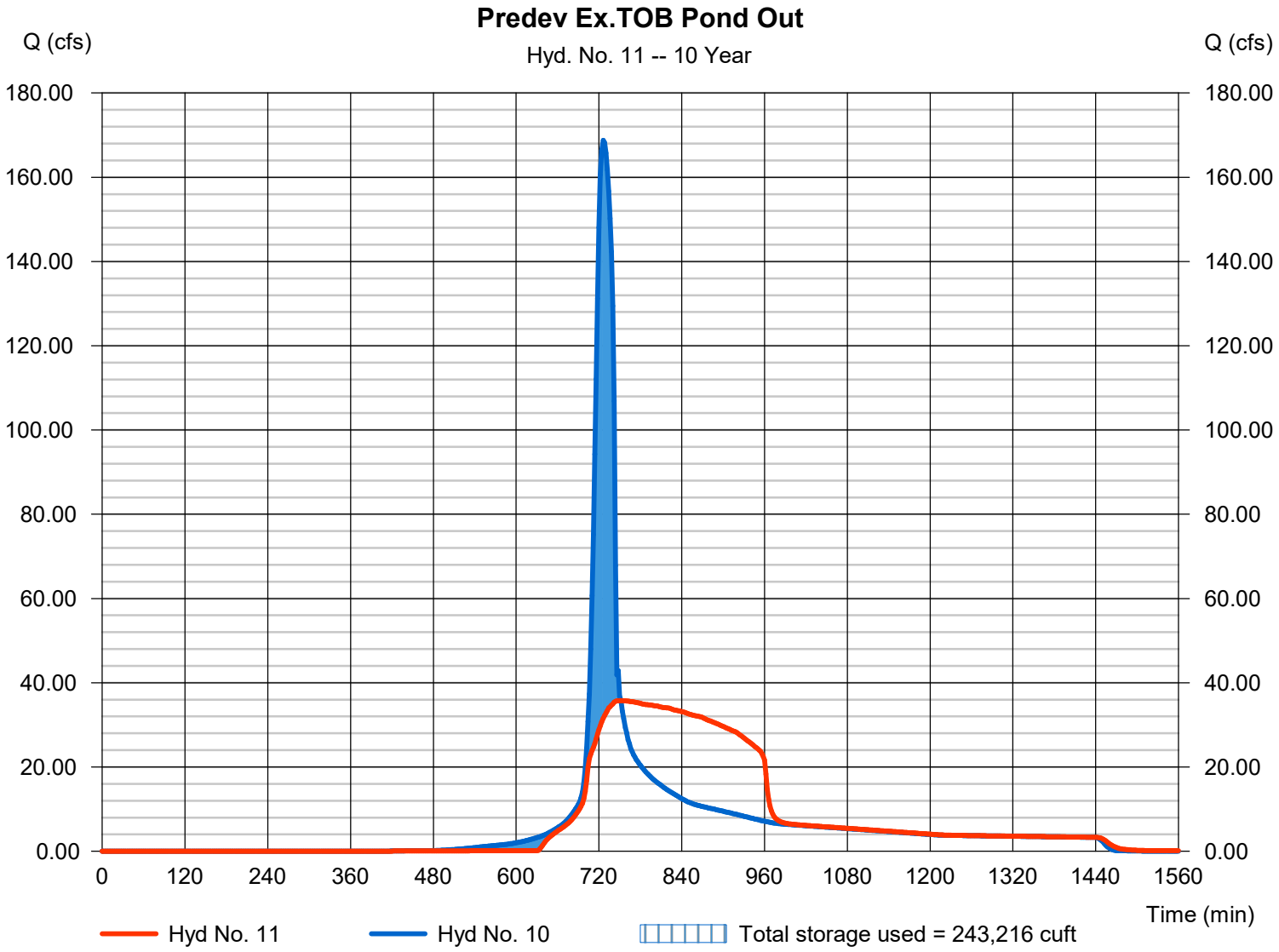
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 11

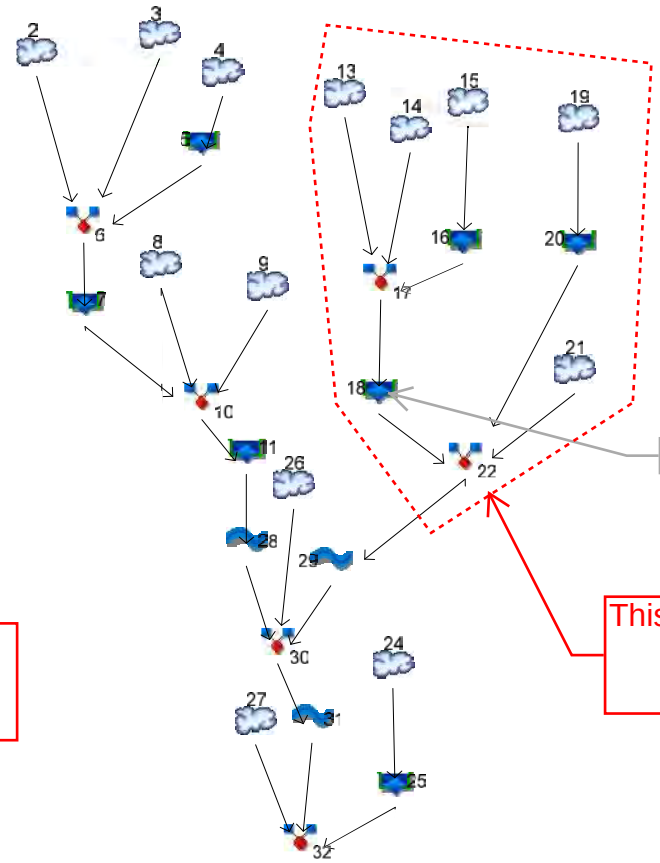
Predev Ex.TOB Pond Out

Hydrograph type	=	Reservoir	Peak discharge	=	35.75 cfs
Storm frequency	=	10 yrs	Time to peak	=	752 min
Time interval	=	2 min	Hyd. volume	=	661,723 cuft
Inflow hyd. No.	=	10 - Predev Total To Ex TOB Pond	Max. Elevation	=	2030.32 ft
Reservoir name	=	Ex. TOB Pond	Max. Storage	=	243,216 cuft

Storage Indication method used.



Watershed Model Schematic



Legend

Hyd.	Origin	Description
2	SCS Runoff	To 460 North Culvert (excluding Union)
3	SCS Runoff	Union Bypass To 460 N Culvert
4	SCS Runoff	Union North Detention inflow
5	Reservoir	Union N. Basin Out
6	Combine	Total To 460 North Culvert
7	Reservoir	460 North Culvert Out
8	SCS Runoff	Offsite Village Area to Ex TOB Pond
9	SCS Runoff	Predev Onsite To TOB Pond
10	Combine	Predev Total To Ex TOB Pond
11	Reservoir	Predev Ex.TOB Pond Out
13	SCS Runoff	To 460 South Culvert (excluding Union)
14	SCS Runoff	Union Bypass To 460 S Culvert
15	SCS Runoff	Union South Basin Inflow
16	Reservoir	Union S. Basin Out
17	Combine	Total To 460 South Culvert
18	Reservoir	460 South Culvert Out
19	SCS Runoff	The Farm Basin Inflow
20	Reservoir	The Farm Det. Out
21	SCS Runoff	Undet. Farm and other contrib. offsite
22	Combine	Total Offsite thru Southern Reach
24	SCS Runoff	To Village Ph1 Pond 1
25	Reservoir	Village Ph1 Pond 1 Out
26	SCS Runoff	PRE OTHER AREA CONTRIB. AT CONFLUENCE
27	SCS Runoff	PRE OTHER AREA CONTRIB. AT POA
28	Reach	Ex. TOB Pond outfall routed to confluence
29	Reach	South Offsite Routed to Confluence
30	Combine	PRE COMBINED AT CONFLUENCE
31	Reach	COMBINED ROUTED TO PROPERTY LINE
32	Combine	TOTAL AT PROP LINE PRE

Drainage Area Runoff and Time of Concentration

Drainage Area: **To 460 south culvert crossing (excludes Union area)**

PREDEVELOPMENT

Composite Curve Number (CN)						**Notes:**
	Hydrologic Soil Group	Land Cover	CN	Area, A (ac.)	CN*A	
CN_1	-	Impervious	98	14.92	1461.92	
CN_2	B	Managed Turf	61	0.53	32.46	
CN_3	C	Managed Turf	74	5.55	410.68	
CN_4	B	Brush (Good)	48	0.72	34.62	
CN_5	C	Brush (Good)	65	1.66	107.68	
CN_6					0.00	
CN_7					0.00	
CN_8					0.00	
CN_9					0.00	
CN_{10}					0.00	
				Total	**23.38**	**2047.36**	
					Composite CN =	**88**	

Time of Concentration, T_c						
		2 yr. Precip. (in.) =	2.73			
Flow Segment	Flow Regime	Land Cover	Length (ft)	Roughness Coeff., n	Slope (ft/ft)	Travel Time, T_t (min.)
1	Sheet Flow	Paved	100	0.011	0.030	1.1
2	Shallow Conc.	Paved	131		0.023	0.7
3	Channel	Curb	101	0.011	0.005	0.4
4	Channel	Pipe 30"	394	0.011	0.010	0.9
5	Channel	Grass	865	0.03	0.044	3.1
6						
7						
8						
9						
10						
					Total Time of Concentration, T_c (min.) =	**6.2**

Runoff			
	1 Yr.	10 Yr.	100 Yr.
Precipitation (in.), P	2.26	4.06	6.44
Composite CN	88	88	88
Storage (in.) S=1000/CN-10	1.36	1.36	1.36
Initial abstraction (in.), I_a=0.2S	0.27	0.27	0.27
Runoff depth (in.), $Q=(P-0.2S)^2/[(P-I_a)+S]$	1.18	2.78	5.05
Runoff volume (ac-ft), RV = Q/12*A	2.30	5.42	9.84
Flow rate (cfs), q_{peak} from hydrograph	46.38	106.50	

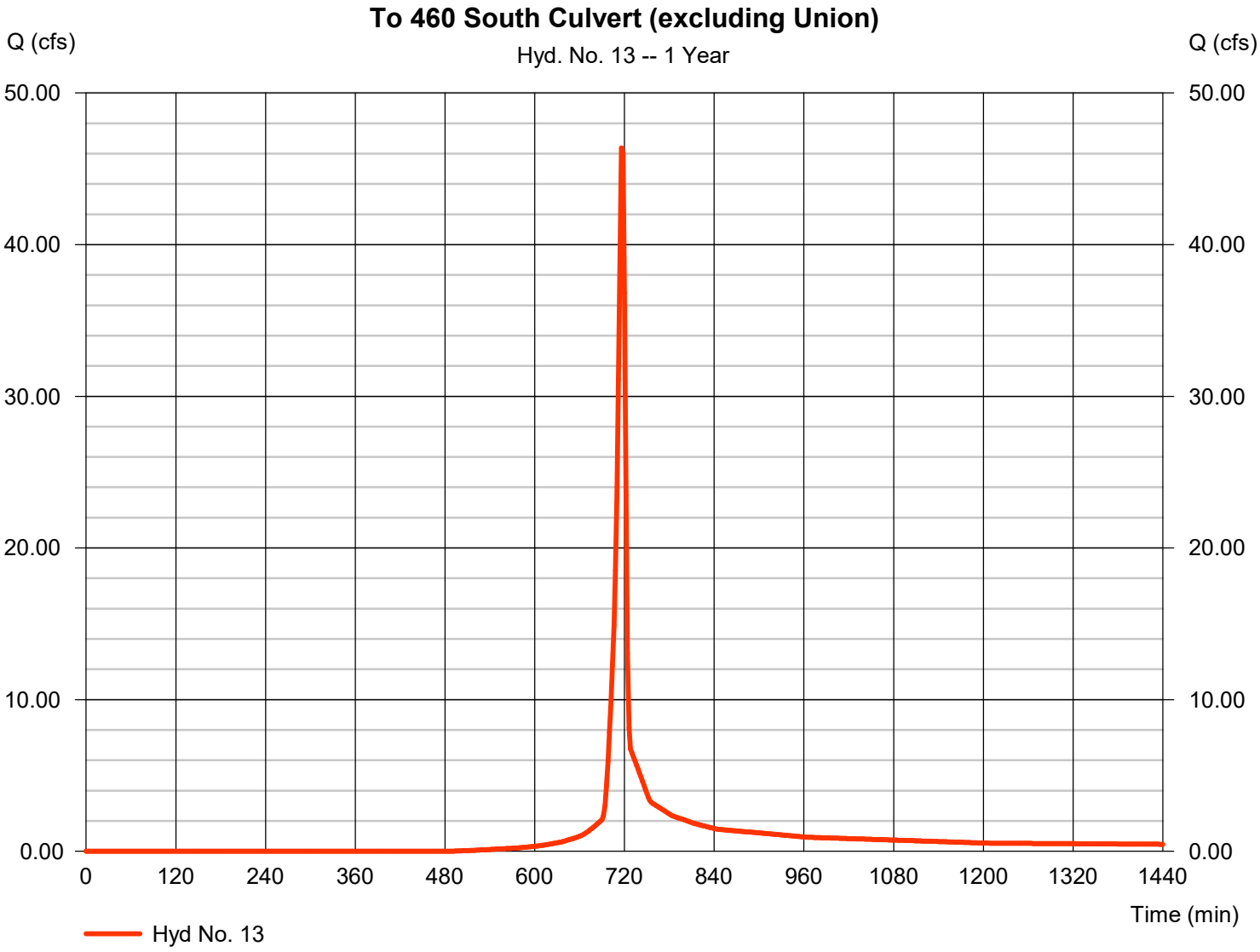
Hydrograph Number: 13

Hydrograph Report

Hyd. No. 13

To 460 South Culvert (excluding Union)

Hydrograph type	= SCS Runoff	Peak discharge	= 46.38 cfs
Storm frequency	= 1 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 93,772 cuft
Drainage area	= 23.380 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.20 min
Total precip.	= 2.26 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

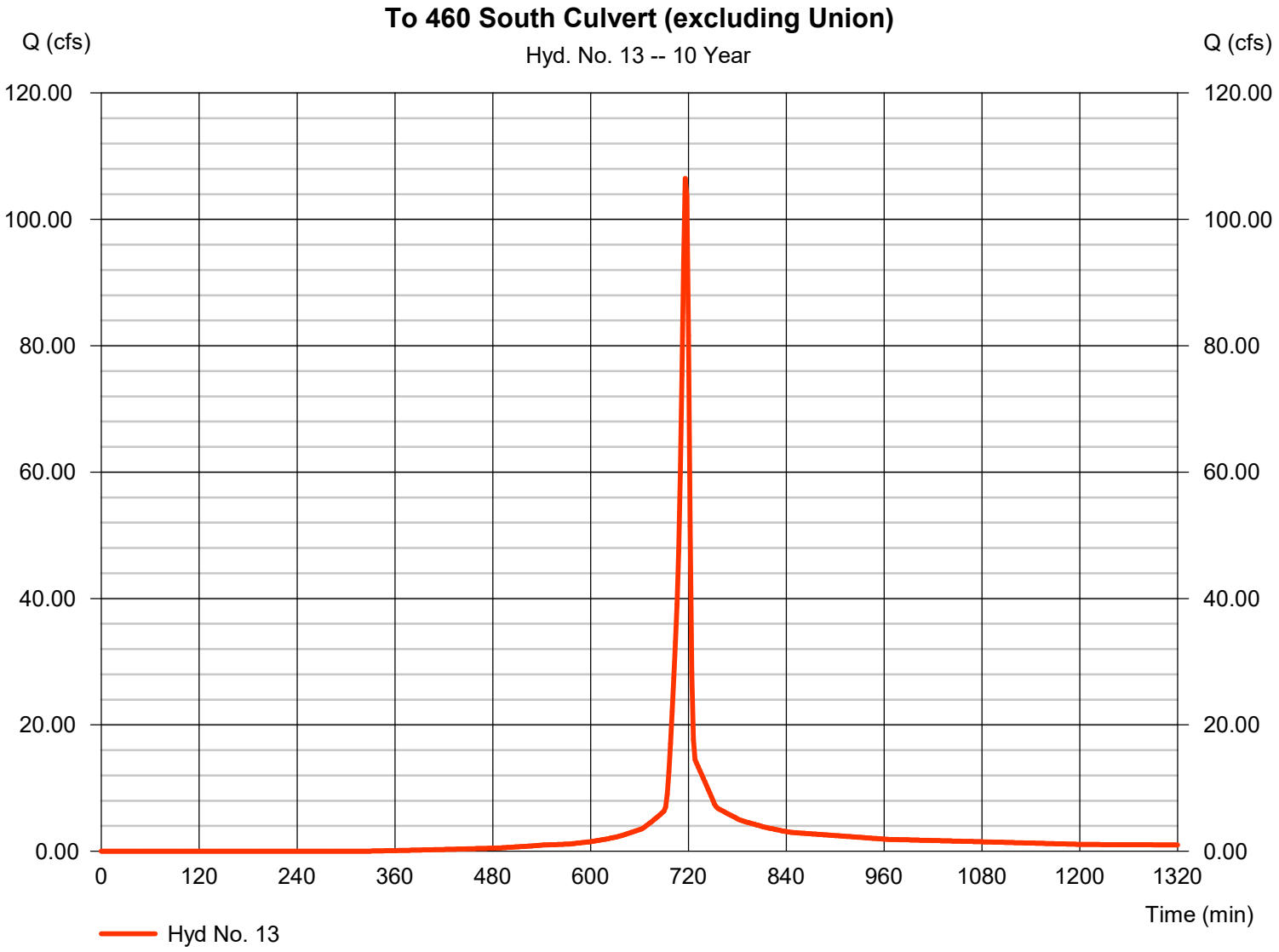


Hydrograph Report

Hyd. No. 13

To 460 South Culvert (excluding Union)

Hydrograph type	= SCS Runoff	Peak discharge	= 106.50 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 221,560 cuft
Drainage area	= 23.380 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.20 min
Total precip.	= 4.06 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



WORKSHEET FOR SCS HYDROLOGIC PARAMETERS

Site Conditions:		Existing	**Project:** Sturbridge Apartments
	X	Proposed	**Subarea Number:** 2b - No Detention - Bypass
Off-Site Land Use:		Existing	**By:** Justin Brown
	X	Proposed	**Date:** 4/13/2020

RUNOFF CURVE NUMBER

Soil Group	Land Use or Zoning		Area (acres)	RCN	RCN x Area
B	On-Site	Impervious	0.43	98	42.14
B	On-Site	Open Space	1.14	61	69.54
C	On-Site	Impervious	0.00	98	0
C	On-Site	Open Space	0.08	74	5.92

Total Area 1.65 ac 0.003 sq. mi **Weighted RCN =** 71

Notes:
Time of Concentration = 18.39 minutes (See Attached)

TR 55 Worksheet: Time of Concentration (Tc) **PROJECT: TNHSE19001** **PN: (Post-DEVELOPMENT: POI#2 (b))**

	1	2	3	4	5	6	6	
Sheet Flow								
Surface description (Table 3-1)	Dense Grass							
Manning's roughness coeff., n (Table 3-1)	0.24							
Flow length, L (total L < 100 ft) ..... ft	100.00							
Two-year 24-hour rainfall, P2..... in	2.74							
Land slope, S ..... ft/ft	0.0300							
$T_t = (0.007 (nL)^{0.8})/(P_2^{0.5} s^{0.4})$ ..... hr	0.22	0.00	0.00	0.00	0.00	0.00	0.00	
Shallow Concetrated Flow								
Surface description (paved=1 or unpaved=0)	0	0	0	0	0	0	0	
Flow length, L ..... ft	223.0	0.0	0.0	0.0	0.0	0.0	0.0	
Watercourse slope, S ..... ft/ft	0.0540	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	
Average velocity, V ..... ft/s	-	-	-	-	-	-	-	
Unpaved $V = 16.1345 (s)^{0.5}$	3.75	1.61	1.61	1.61	1.61	1.61	1.61	
Paved $V = 20.3282 (s)^{0.5}$								
$T_t = L/3600V$ ..... hr	0.02	0.00	0.00	0.00	0.00	0.00	0.00	
Channel Flow	**CHANNEL**							
Cross sectional flow area, A ..... ft^2	3.00	1.20	3.10					
Wetted perimeter, Pw..... ft	6.00	4.00	6.28					
Hydraulic radius, r = A/Pw.....ft	0.50	0.30	0.49	0.00	0.00	0.00	0.00	
Channel slope, s..... ft/ft	0.050	0.033	0.010					
Manning's roughness coefficient, n.....	0.011	0.035	0.069	0.013	0.013	0.013	0.013	
Velocity, $V=(1.49/n)R^{2/3}s^{1/2}$ ..... ft	19.08	3.47	1.35	0.00	0.00	0.00	0.00	
Flow length, L ..... ft	227.0	223.0	244.0					
$T_t = L/3600V$ ..... hr	**0.003**	**0.018**	**0.050**	**0.000**	**0.000**	**0.000**	**0.000**	
Sub Basin Tc = $T_{sheetflow}+T_{shallow\ concentrated}+T_{channel}$ =	0.24 hr	0.02 hr	0.05 hr	0.00 hr	0.00 hr	0.00 hr	0.00 hr	
Sub Basin Tc = $T_{sheetflow}+T_{shallow\ concentrated}+T_{channel}$ =	14.30 min	1.07 min	3.02 min	0.00 min	0.00 min	0.00 min	0.00 min	**18.39 min**

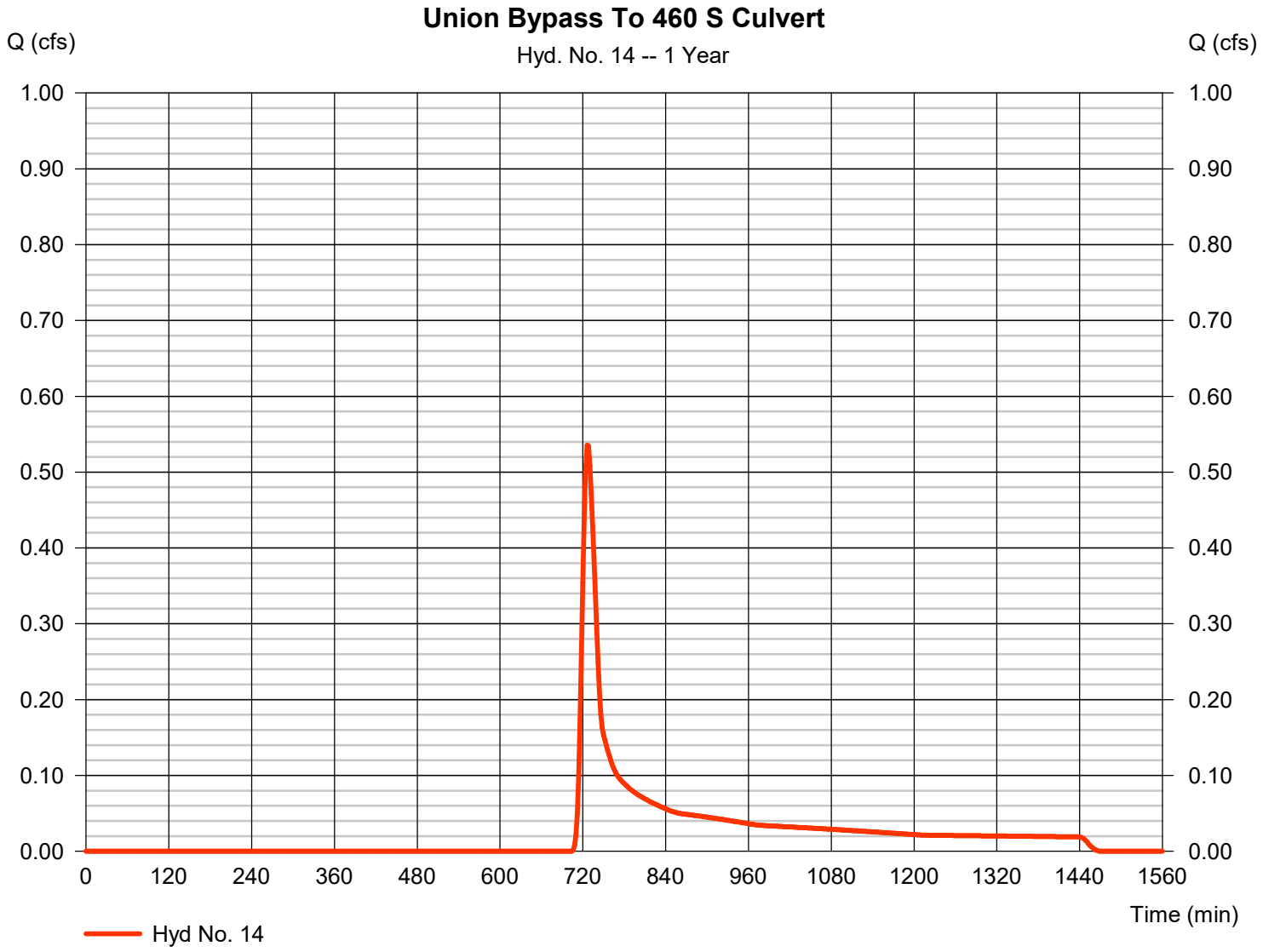
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 14

Union Bypass To 460 S Culvert

Hydrograph type	= SCS Runoff	Peak discharge	= 0.535 cfs
Storm frequency	= 1 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 2,256 cuft
Drainage area	= 1.650 ac	Curve number	= 71
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.40 min
Total precip.	= 2.26 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



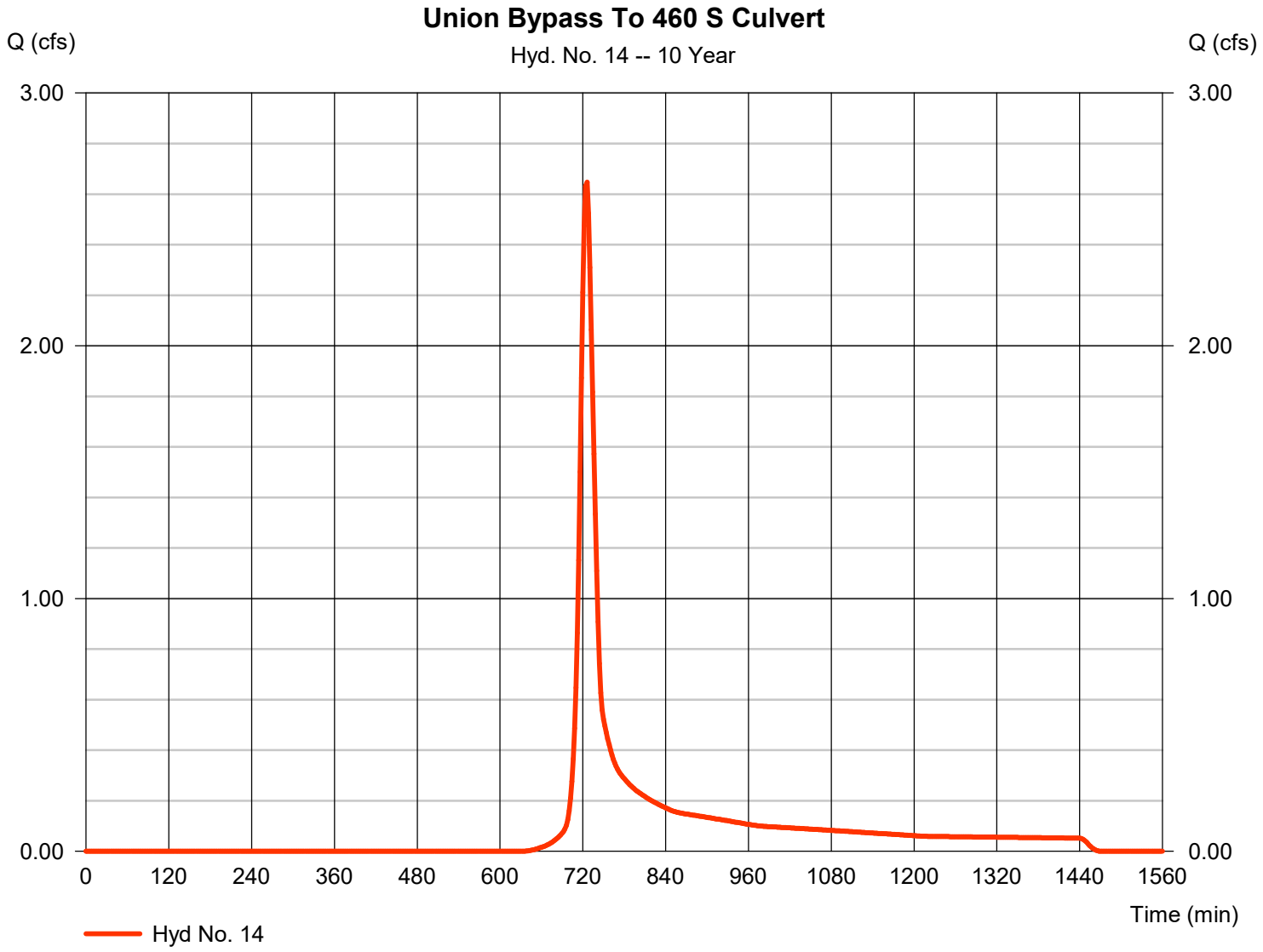
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 14

Union Bypass To 460 S Culvert

Hydrograph type	= SCS Runoff	Peak discharge	= 2.647 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 8,597 cuft
Drainage area	= 1.650 ac	Curve number	= 71
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.40 min
Total precip.	= 4.06 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



WORKSHEET FOR SCS HYDROLOGIC PARAMETERS

Site Conditions:		Existing	**Project:** Sturbridge Apartments
	X	Proposed	**Subarea Number:** 2a Detention
Off-Site Land Use:		Existing	**By:** Justin Brown
	X	Proposed	**Date:** 4/13/2020

RUNOFF CURVE NUMBER

Soil Group	Land Use or Zoning		Area (acres)	RCN	RCN x Area
B	On-Site	Impervious	2.12	98	207.76
B	On-Site	Open Space	0.13	61	7.93
C	On-Site	Impervious	1.31	98	128.38
C	On-Site	Open Space	0.16	74	11.84

Total Area 3.72 ac 0.006 sq. mi **Weighted RCN =** 96

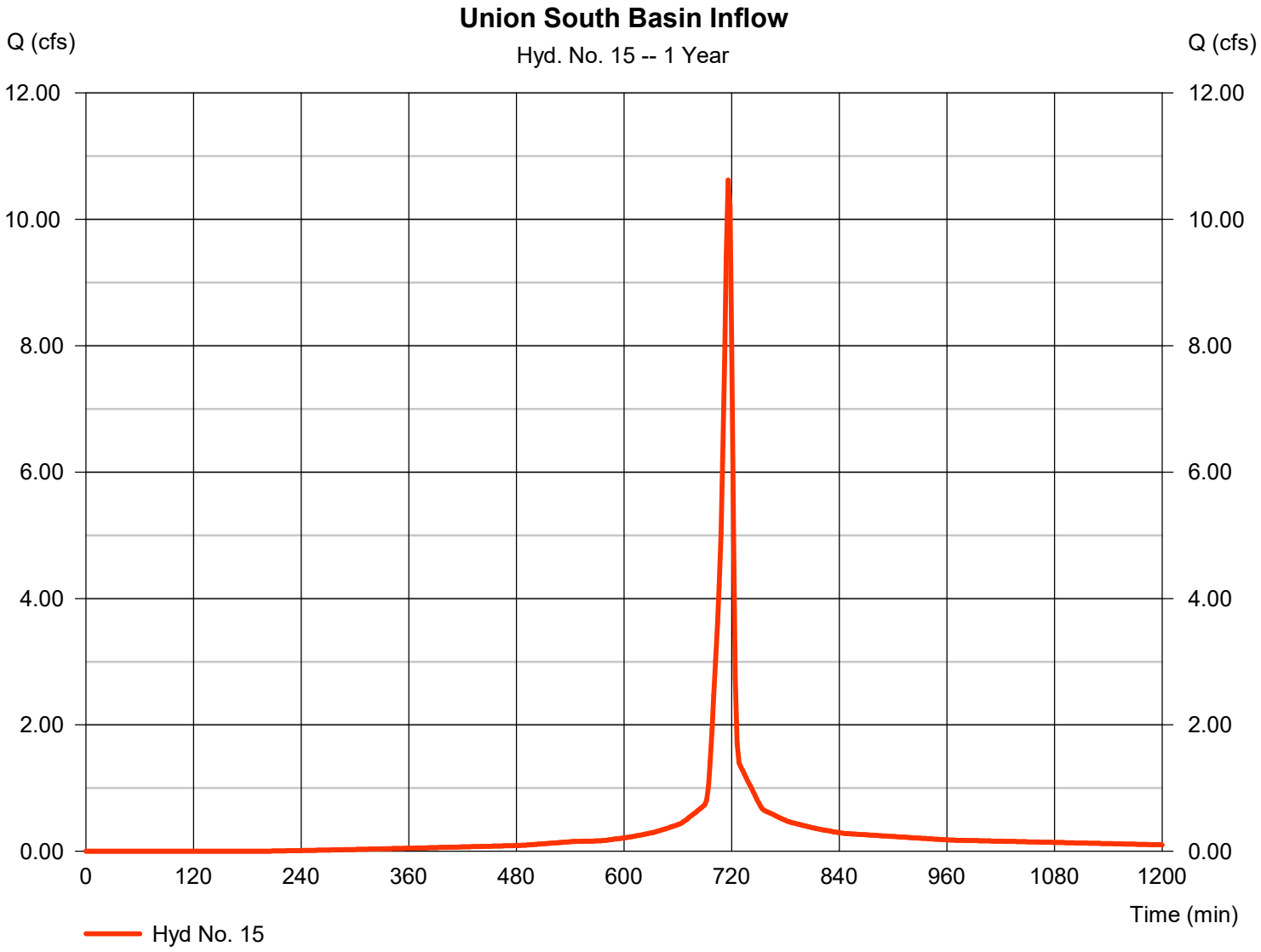
Notes:
Time of Concentration = 5 minutes (Assumed)

Hydrograph Report

Hyd. No. 15

Union South Basin Inflow

Hydrograph type	= SCS Runoff	Peak discharge	= 10.62 cfs
Storm frequency	= 1 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 23,128 cuft
Drainage area	= 3.720 ac	Curve number	= 96
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.26 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

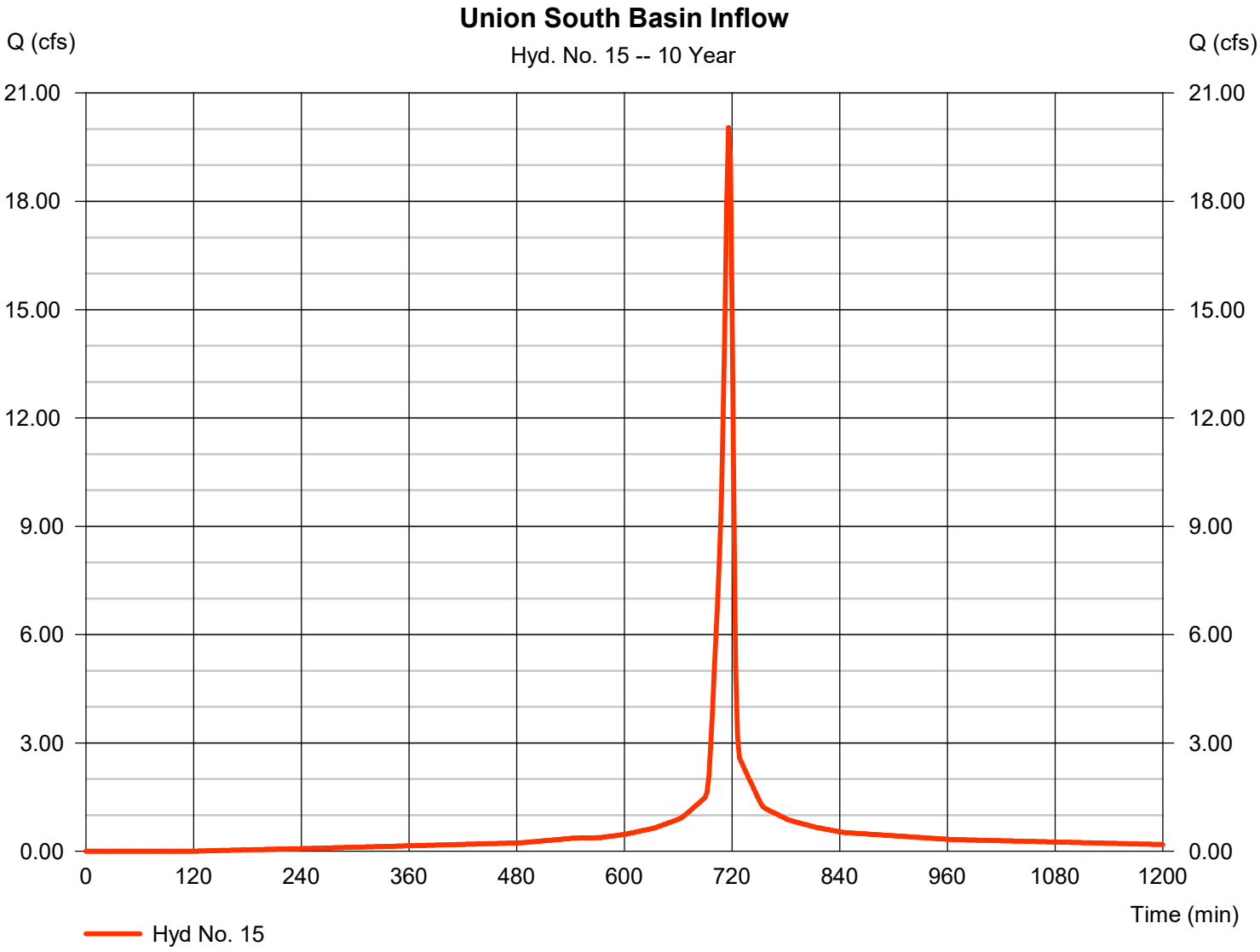


Hydrograph Report

Hyd. No. 15

Union South Basin Inflow

Hydrograph type	= SCS Runoff	Peak discharge	= 20.05 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 45,569 cuft
Drainage area	= 3.720 ac	Curve number	= 96
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.06 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Pond Report

Pond No. 11 - Union South Underground Det.

Pond Data

UG Chambers -Invert elev. = 2052.00 ft, Rise x Span = 4.00 x 4.00 ft, Barrel Len = 140.00 ft, No. Barrels = 4, Slope = 0.50%, Headers = Yes
Encasement -Invert elev. = 2051.50 ft, Width = 6.50 ft, Height = 5.50 ft, Voids = 40.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	2051.50	n/a	0	0
0.62	2052.12	n/a	462	462
1.24	2052.74	n/a	1,212	1,674
1.86	2053.36	n/a	1,655	3,329
2.48	2053.98	n/a	1,832	5,161
3.10	2054.60	n/a	1,888	7,049
3.72	2055.22	n/a	1,850	8,899
4.34	2055.84	n/a	1,703	10,602
4.96	2056.46	n/a	1,328	11,930
5.58	2057.08	n/a	1,009	12,939
6.20	2057.70	n/a	987	13,925

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	8.50	4.88	0.00
Span (in)	= 24.00	7.00	72.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 2051.50	2051.50	2054.55	0.00
Length (ft)	= 25.00	0.50	0.50	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	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 18.85	0.73	0.00	0.00
Crest El. (ft)	= 2058.71	2056.10	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	---	---
Multi-Stage	= Yes	Yes	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).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	2051.50	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.06	46	2051.56	0.02 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.018
0.12	92	2051.62	0.06 ic	0.06 ic	0.00	---	0.00	0.00	---	---	---	---	0.059
0.19	139	2051.69	0.12 ic	0.12 ic	0.00	---	0.00	0.00	---	---	---	---	0.119
0.25	185	2051.75	0.20 ic	0.19 ic	0.00	---	0.00	0.00	---	---	---	---	0.191
0.31	231	2051.81	0.29 ic	0.28 ic	0.00	---	0.00	0.00	---	---	---	---	0.276
0.37	277	2051.87	0.38 ic	0.38 ic	0.00	---	0.00	0.00	---	---	---	---	0.378
0.43	324	2051.93	0.48 ic	0.48 ic	0.00	---	0.00	0.00	---	---	---	---	0.483
0.50	370	2052.00	0.60 ic	0.60 ic	0.00	---	0.00	0.00	---	---	---	---	0.602
0.56	416	2052.06	0.73 ic	0.73 ic	0.00	---	0.00	0.00	---	---	---	---	0.734
0.62	462	2052.12	0.89 ic	0.86 ic	0.00	---	0.00	0.00	---	---	---	---	0.863
0.68	584	2052.18	1.01 ic	1.01 ic	0.00	---	0.00	0.00	---	---	---	---	1.010
0.74	705	2052.24	1.13 ic	1.12 ic	0.00	---	0.00	0.00	---	---	---	---	1.124
0.81	826	2052.31	1.20 ic	1.20 ic	0.00	---	0.00	0.00	---	---	---	---	1.201
0.87	947	2052.37	1.27 ic	1.27 ic	0.00	---	0.00	0.00	---	---	---	---	1.274
0.93	1,068	2052.43	1.35 ic	1.35 ic	0.00	---	0.00	0.00	---	---	---	---	1.346
0.99	1,189	2052.49	1.42 ic	1.42 ic	0.00	---	0.00	0.00	---	---	---	---	1.418
1.05	1,311	2052.55	1.49 ic	1.49 ic	0.00	---	0.00	0.00	---	---	---	---	1.489
1.12	1,432	2052.62	1.56 ic	1.56 ic	0.00	---	0.00	0.00	---	---	---	---	1.556
1.18	1,553	2052.68	1.64 ic	1.62 ic	0.00	---	0.00	0.00	---	---	---	---	1.616
1.24	1,674	2052.74	1.73 ic	1.67 ic	0.00	---	0.00	0.00	---	---	---	---	1.674
1.30	1,840	2052.80	1.74 ic	1.74 ic	0.00	---	0.00	0.00	---	---	---	---	1.738
1.36	2,005	2052.86	1.81 ic	1.80 ic	0.00	---	0.00	0.00	---	---	---	---	1.799
1.43	2,171	2052.93	1.90 ic	1.85 ic	0.00	---	0.00	0.00	---	---	---	---	1.851
1.49	2,336	2052.99	1.91 ic	1.91 ic	0.00	---	0.00	0.00	---	---	---	---	1.910
1.55	2,502	2053.05	1.99 ic	1.97 ic	0.00	---	0.00	0.00	---	---	---	---	1.965
1.61	2,667	2053.11	2.01 ic	2.01 ic	0.00	---	0.00	0.00	---	---	---	---	2.014
1.67	2,833	2053.17	2.08 ic	2.07 ic	0.00	---	0.00	0.00	---	---	---	---	2.073
1.74	2,998	2053.24	2.18 ic	2.12 ic	0.00	---	0.00	0.00	---	---	---	---	2.118
1.80	3,164	2053.30	2.18 ic	2.18 ic	0.00	---	0.00	0.00	---	---	---	---	2.175
1.86	3,329	2053.36	2.28 ic	2.22 ic	0.00	---	0.00	0.00	---	---	---	---	2.218
1.92	3,513	2053.42	2.28 ic	2.27 ic	0.00	---	0.00	0.00	---	---	---	---	2.273

Continues on next page...

Union South Underground Det.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.98	3,696	2053.48	2.38 ic	2.31 ic	0.00	---	0.00	0.00	---	---	---	---	2.313
2.05	3,879	2053.55	2.38 ic	2.37 ic	0.00	---	0.00	0.00	---	---	---	---	2.366
2.11	4,062	2053.61	2.41 ic	2.41 ic	0.00	---	0.00	0.00	---	---	---	---	2.405
2.17	4,245	2053.67	2.48 ic	2.46 ic	0.00	---	0.00	0.00	---	---	---	---	2.456
2.23	4,428	2053.73	2.50 ic	2.50 ic	0.00	---	0.00	0.00	---	---	---	---	2.498
2.29	4,612	2053.79	2.59 ic	2.54 ic	0.00	---	0.00	0.00	---	---	---	---	2.542
2.36	4,795	2053.86	2.59 ic	2.59 ic	0.00	---	0.00	0.00	---	---	---	---	2.589
2.42	4,978	2053.92	2.70 ic	2.63 ic	0.00	---	0.00	0.00	---	---	---	---	2.626
2.48	5,161	2053.98	2.70 ic	2.67 ic	0.00	---	0.00	0.00	---	---	---	---	2.672
2.54	5,350	2054.04	2.71 ic	2.71 ic	0.00	---	0.00	0.00	---	---	---	---	2.712
2.60	5,539	2054.10	2.81 ic	2.75 ic	0.00	---	0.00	0.00	---	---	---	---	2.752
2.67	5,728	2054.17	2.81 ic	2.80 ic	0.00	---	0.00	0.00	---	---	---	---	2.796
2.73	5,916	2054.23	2.83 ic	2.83 ic	0.00	---	0.00	0.00	---	---	---	---	2.831
2.79	6,105	2054.29	2.92 ic	2.87 ic	0.00	---	0.00	0.00	---	---	---	---	2.872
2.85	6,294	2054.35	2.92 ic	2.91 ic	0.00	---	0.00	0.00	---	---	---	---	2.915
2.91	6,483	2054.41	2.95 ic	2.95 ic	0.00	---	0.00	0.00	---	---	---	---	2.947
2.98	6,672	2054.48	3.03 ic	2.99 ic	0.00	---	0.00	0.00	---	---	---	---	2.988
3.04	6,860	2054.54	3.03 ic	3.03 ic	0.00	---	0.00	0.00	---	---	---	---	3.028
3.10	7,049	2054.60	3.32 oc	3.04 ic	0.23 ic	---	0.00	0.00	---	---	---	---	3.268
3.16	7,234	2054.66	3.80 oc	3.03 ic	0.77 ic	---	0.00	0.00	---	---	---	---	3.796
3.22	7,419	2054.72	4.49 oc	3.00 ic	1.48 ic	---	0.00	0.00	---	---	---	---	4.482
3.29	7,604	2054.79	5.38 oc	2.95 ic	2.34 ic	---	0.00	0.00	---	---	---	---	5.289
3.35	7,789	2054.85	6.24 oc	2.89 ic	3.32 ic	---	0.00	0.00	---	---	---	---	6.218
3.41	7,974	2054.91	7.28 oc	2.81 ic	4.41 ic	---	0.00	0.00	---	---	---	---	7.227
3.47	8,159	2054.97	8.26 oc	2.72 ic	5.50 ic	---	0.00	0.00	---	---	---	---	8.217
3.53	8,344	2055.03	8.91 oc	2.66 ic	6.23 ic	---	0.00	0.00	---	---	---	---	8.883
3.60	8,529	2055.10	9.42 oc	2.54 ic	6.88 ic	---	0.00	0.00	---	---	---	---	9.423
3.66	8,714	2055.16	10.01 oc	2.53 ic	7.48 ic	---	0.00	0.00	---	---	---	---	10.01
3.72	8,899	2055.22	10.58 oc	2.56 ic	8.03 ic	---	0.00	0.00	---	---	---	---	10.58
3.78	9,069	2055.28	11.12 oc	2.58 ic	8.54 ic	---	0.00	0.00	---	---	---	---	11.12
3.84	9,240	2055.34	11.63 oc	2.60 ic	9.03 ic	---	0.00	0.00	---	---	---	---	11.63
3.91	9,410	2055.41	12.11 oc	2.62 ic	9.49 ic	---	0.00	0.00	---	---	---	---	12.11
3.97	9,580	2055.47	12.58 oc	2.65 ic	9.93 ic	---	0.00	0.00	---	---	---	---	12.58
4.03	9,751	2055.53	13.02 oc	2.67 ic	10.35 ic	---	0.00	0.00	---	---	---	---	13.02
4.09	9,921	2055.59	13.45 oc	2.69 ic	10.76 ic	---	0.00	0.00	---	---	---	---	13.45
4.15	10,091	2055.65	13.86 oc	2.71 ic	11.15 ic	---	0.00	0.00	---	---	---	---	13.86
4.22	10,262	2055.72	14.26 oc	2.73 ic	11.53 ic	---	0.00	0.00	---	---	---	---	14.26
4.28	10,432	2055.78	14.65 oc	2.75 ic	11.89 ic	---	0.00	0.00	---	---	---	---	14.65
4.34	10,602	2055.84	15.03 oc	2.78 ic	12.25 ic	---	0.00	0.00	---	---	---	---	15.02
4.40	10,735	2055.90	15.39 oc	2.80 ic	12.59 ic	---	0.00	0.00	---	---	---	---	15.39
4.46	10,868	2055.96	15.75 oc	2.82 ic	12.93 ic	---	0.00	0.00	---	---	---	---	15.75
4.53	11,001	2056.03	16.10 oc	2.84 ic	13.25 ic	---	0.00	0.00	---	---	---	---	16.10
4.59	11,133	2056.09	16.44 oc	2.86 ic	13.57 ic	---	0.00	0.00	---	---	---	---	16.44
4.65	11,266	2056.15	16.79 oc	2.88 ic	13.88 ic	---	0.00	0.03	---	---	---	---	16.79
4.71	11,399	2056.21	17.18 oc	2.90 ic	14.19 ic	---	0.00	0.09	---	---	---	---	17.18
4.77	11,532	2056.27	17.58 oc	2.91 ic	14.49 ic	---	0.00	0.18	---	---	---	---	17.58
4.84	11,664	2056.34	17.99 oc	2.93 ic	14.78 ic	---	0.00	0.28	---	---	---	---	17.99
4.90	11,797	2056.40	18.40 oc	2.94 ic	15.07 ic	---	0.00	0.40	---	---	---	---	18.40
4.96	11,930	2056.46	18.82 oc	2.95 ic	15.35 ic	---	0.00	0.52	---	---	---	---	18.82
5.02	12,031	2056.52	19.25 oc	2.96 ic	15.62 ic	---	0.00	0.67	---	---	---	---	19.25
5.08	12,132	2056.58	19.69 oc	2.97 ic	15.90 ic	---	0.00	0.82	---	---	---	---	19.69
5.15	12,233	2056.65	20.12 oc	2.98 ic	16.16 ic	---	0.00	0.98	---	---	---	---	20.12
5.21	12,333	2056.71	20.57 oc	2.99 ic	16.43 ic	---	0.00	1.15	---	---	---	---	20.56
5.27	12,434	2056.77	21.01 oc	2.99 ic	16.68 ic	---	0.00	1.33	---	---	---	---	21.01
5.33	12,535	2056.83	21.46 oc	3.00 ic	16.94 ic	---	0.00	1.52	---	---	---	---	21.46
5.39	12,636	2056.89	21.91 oc	3.00 ic	17.19 ic	---	0.00	1.72	---	---	---	---	21.91
5.46	12,737	2056.96	22.36 ic	3.00 ic	17.44 ic	---	0.00	1.93	---	---	---	---	22.36
5.52	12,838	2057.02	22.76 ic	2.99 ic	17.64 ic	---	0.00	2.14	---	---	---	---	22.76
5.58	12,939	2057.08	23.02 ic	2.99 ic	17.67 ic	---	0.00	2.36	---	---	---	---	23.02
5.64	13,037	2057.14	23.29 ic	3.00 ic	17.71 ic	---	0.00	2.59	---	---	---	---	23.29
5.70	13,136	2057.20	23.56 ic	3.00 ic	17.73 ic	---	0.00	2.82	---	---	---	---	23.56
5.77	13,235	2057.27	23.83 ic	3.01 ic	17.76 ic	---	0.00	3.06	---	---	---	---	23.83
5.83	13,333	2057.33	24.10 ic	3.01 ic	17.78 ic	---	0.00	3.31	---	---	---	---	24.10
5.89	13,432	2057.39	24.37 ic	3.01 ic	17.79 ic	---	0.00	3.56	---	---	---	---	24.37
5.95	13,531	2057.45	24.64 ic	3.02 ic	17.81 ic	---	0.00	3.82	---	---	---	---	24.64
6.01	13,629	2057.51	24.92 ic	3.02 ic	17.82 ic	---	0.00	4.09	---	---	---	---	24.92
6.08	13,728	2057.58	25.20 ic	3.02 ic	17.82 ic	---	0.00	4.36	---	---	---	---	25.20
6.14	13,827	2057.64	25.48 ic	3.02 ic	17.82 ic	---	0.00	4.64	---	---	---	---	25.48
6.20	13,925	2057.70	25.76 ic	3.02 ic	17.82 ic	---	0.00	4.92	---	---	---	---	25.75

...End

Hydrograph Report

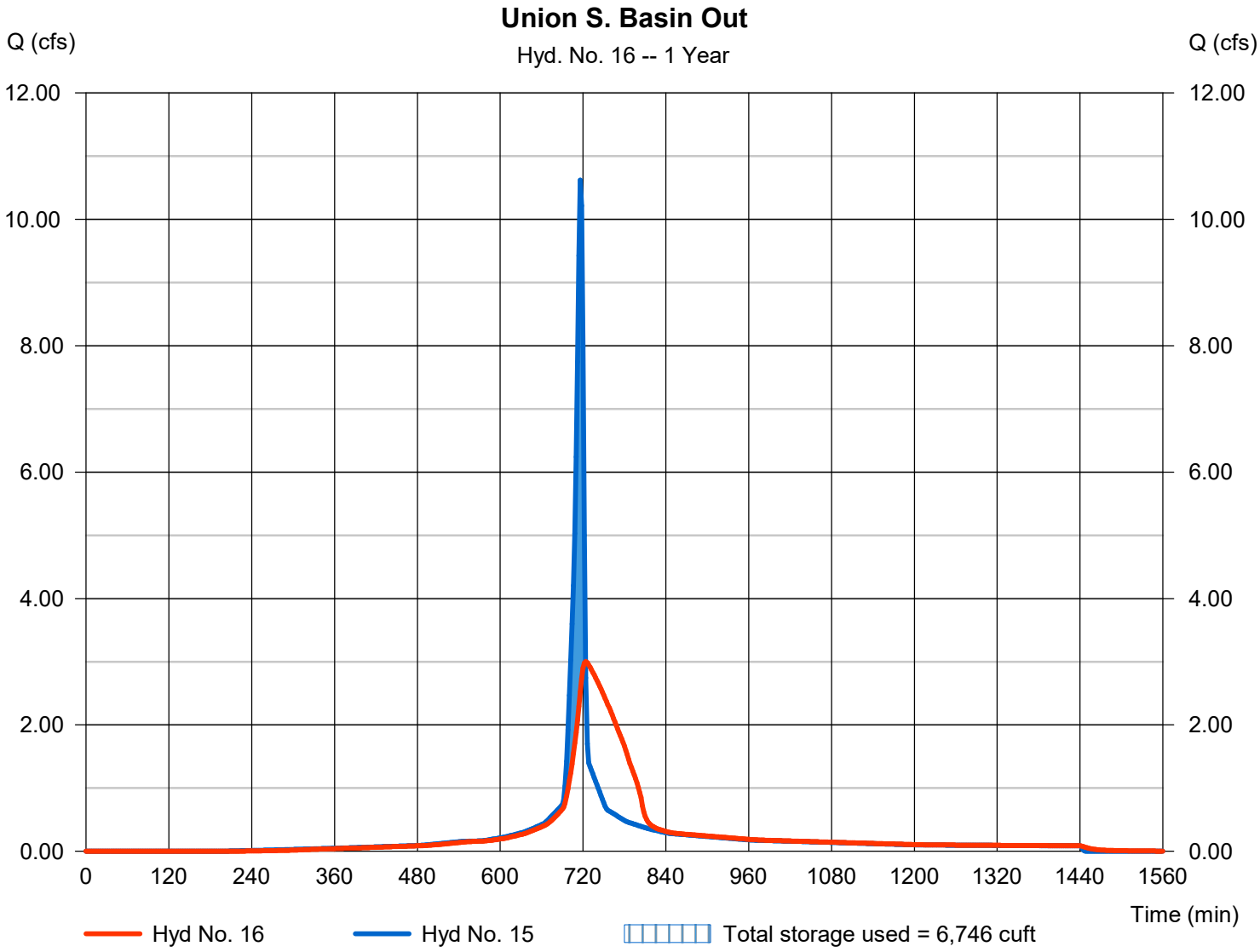
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 16

Union S. Basin Out

Hydrograph type	=	Reservoir	Peak discharge	=	3.004 cfs
Storm frequency	=	1 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	23,126 cuft
Inflow hyd. No.	=	15 - Union South Basin Inflow	Max. Elevation	=	2054.50 ft
Reservoir name	=	Union South Underground Det	Max. Storage	=	6,746 cuft

Storage Indication method used.



Hydrograph Report

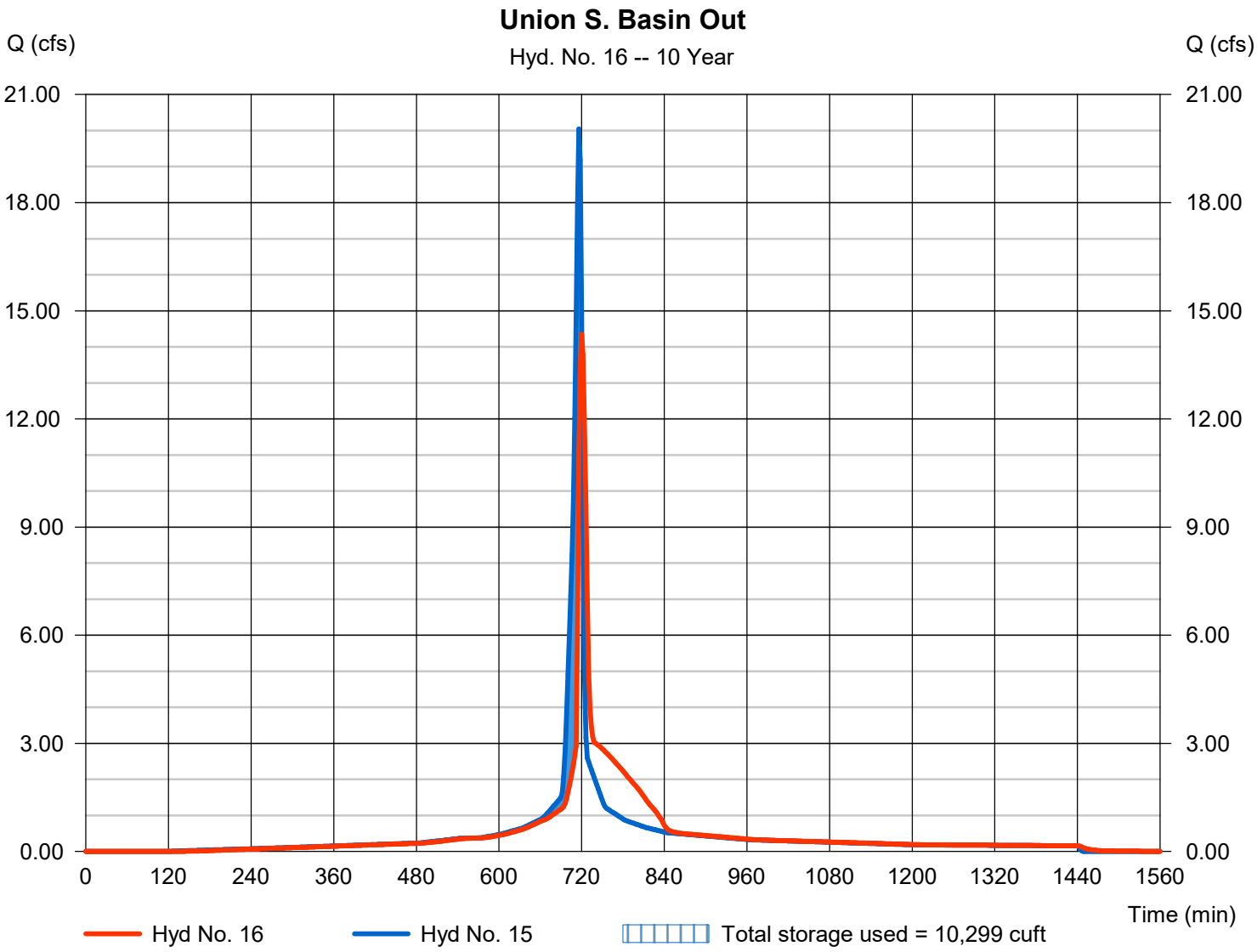
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 16

Union S. Basin Out

Hydrograph type	= Reservoir	Peak discharge	= 14.35 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 45,566 cuft
Inflow hyd. No.	= 15 - Union South Basin Inflow	Max. Elevation	= 2055.73 ft
Reservoir name	= Union South Underground Det	Max. Storage	= 10,299 cuft

Storage Indication method used.



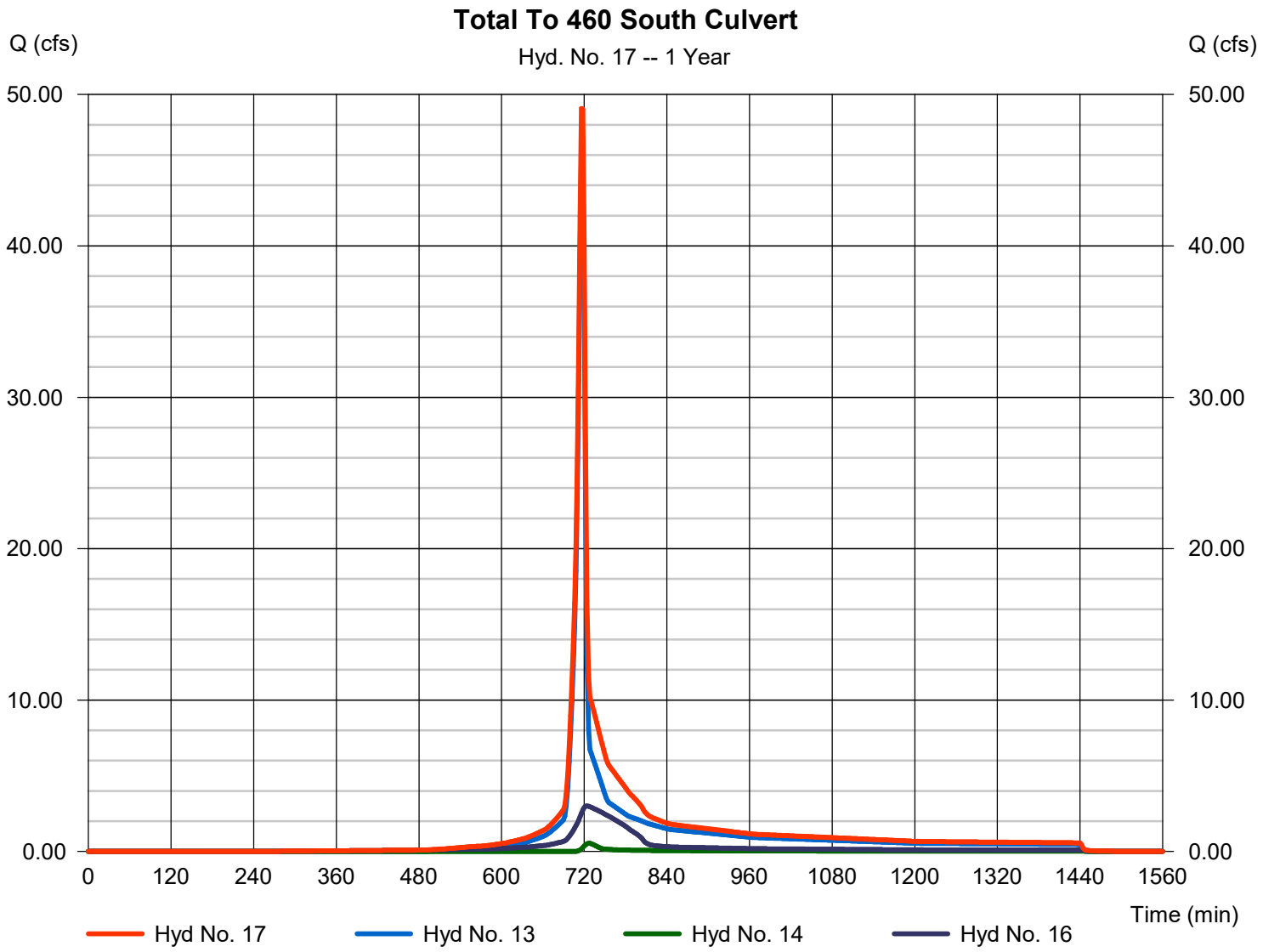
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 17

Total To 460 South Culvert

Hydrograph type	= Combine	Peak discharge	= 49.07 cfs
Storm frequency	= 1 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 119,154 cuft
Inflow hyds.	= 13, 14, 16	Contrib. drain. area	= 25.030 ac

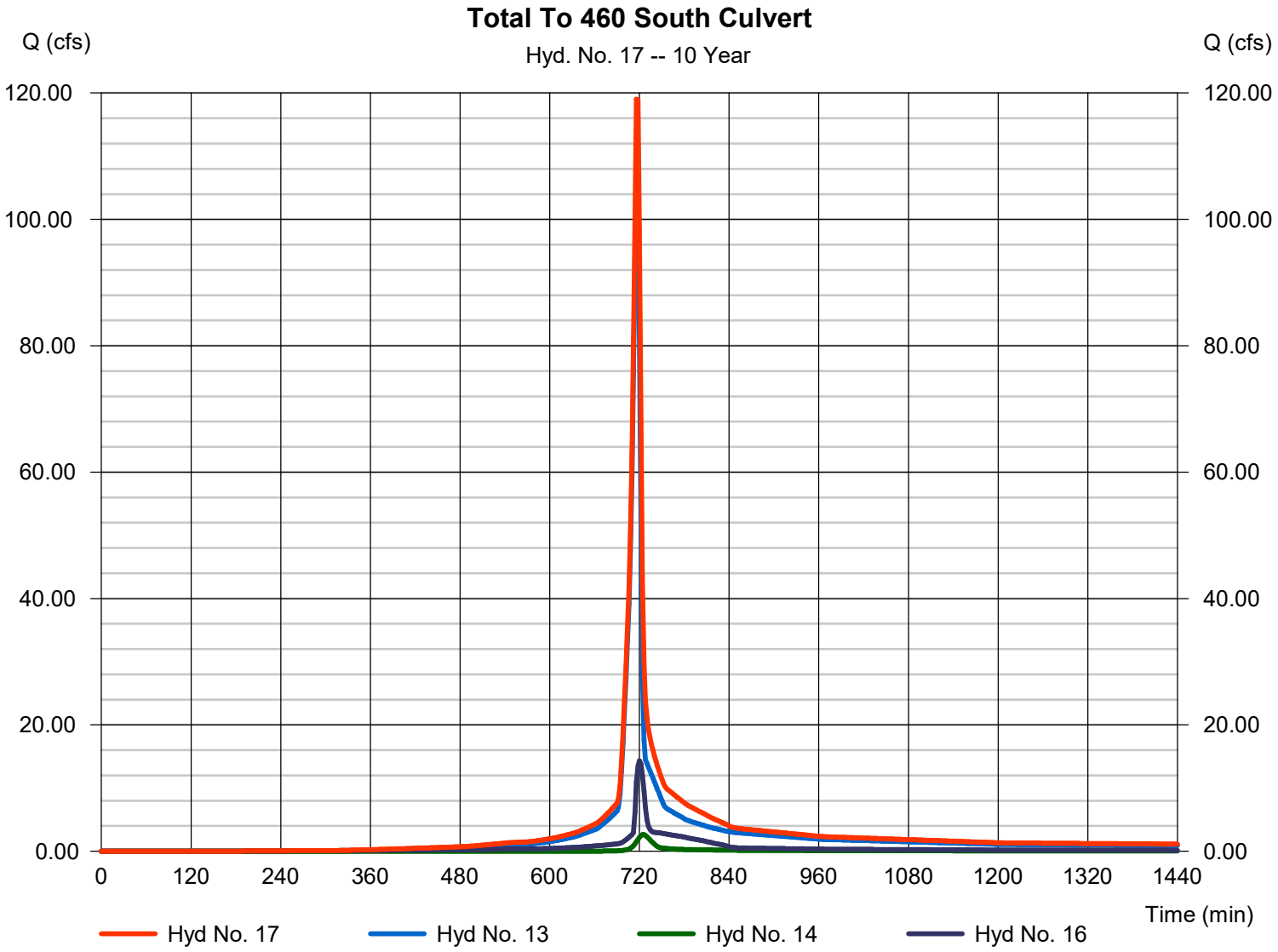


Hydrograph Report

Hyd. No. 17

Total To 460 South Culvert

Hydrograph type	= Combine	Peak discharge	= 119.01 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 275,723 cuft
Inflow hyds.	= 13, 14, 16	Contrib. drain. area	= 25.030 ac



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Pond No. 9 - 460 South Culvert HW Storage

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 2038.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	2038.00	00	0	0
2.00	2040.00	4,884	4,884	4,884
4.00	2042.00	7,175	12,059	16,943
6.00	2044.00	9,534	16,709	33,652
8.00	2046.00	12,012	21,546	55,198
10.00	2048.00	14,742	26,754	81,952
12.00	2050.00	17,943	32,685	114,637

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 36.00	0.00	0.00	0.00
Span (in)	= 36.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 2038.00	0.00	0.00	0.00
Length (ft)	= 203.10	0.00	0.00	0.00
Slope (%)	= 2.92	0.00	0.00	n/a
N-Value	= .024	.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)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	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).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	2038.00	0.00	---	---	---	---	---	---	---	---	---	0.000
0.20	488	2038.20	0.31 ic	---	---	---	---	---	---	---	---	---	0.309
0.40	977	2038.40	1.21 ic	---	---	---	---	---	---	---	---	---	1.207
0.60	1,465	2038.60	2.66 ic	---	---	---	---	---	---	---	---	---	2.662
0.80	1,954	2038.80	4.61 ic	---	---	---	---	---	---	---	---	---	4.610
1.00	2,442	2039.00	7.03 ic	---	---	---	---	---	---	---	---	---	7.030
1.20	2,930	2039.20	9.85 ic	---	---	---	---	---	---	---	---	---	9.852
1.40	3,419	2039.40	13.04 ic	---	---	---	---	---	---	---	---	---	13.04
1.60	3,907	2039.60	16.53 ic	---	---	---	---	---	---	---	---	---	16.53
1.80	4,396	2039.80	20.25 ic	---	---	---	---	---	---	---	---	---	20.25
2.00	4,884	2040.00	24.12 ic	---	---	---	---	---	---	---	---	---	24.12
2.20	6,090	2040.20	28.08 ic	---	---	---	---	---	---	---	---	---	28.08
2.40	7,296	2040.40	31.98 ic	---	---	---	---	---	---	---	---	---	31.98
2.60	8,502	2040.60	35.75 ic	---	---	---	---	---	---	---	---	---	35.75
2.80	9,708	2040.80	39.12 ic	---	---	---	---	---	---	---	---	---	39.12
3.00	10,914	2041.00	41.68 ic	---	---	---	---	---	---	---	---	---	41.68
3.20	12,119	2041.20	44.37 ic	---	---	---	---	---	---	---	---	---	44.37
3.40	13,325	2041.40	46.91 ic	---	---	---	---	---	---	---	---	---	46.91
3.60	14,531	2041.60	49.32 ic	---	---	---	---	---	---	---	---	---	49.32
3.80	15,737	2041.80	51.61 ic	---	---	---	---	---	---	---	---	---	51.61
4.00	16,943	2042.00	53.81 ic	---	---	---	---	---	---	---	---	---	53.81
4.20	18,614	2042.20	55.92 ic	---	---	---	---	---	---	---	---	---	55.92
4.40	20,285	2042.40	57.95 ic	---	---	---	---	---	---	---	---	---	57.95
4.60	21,956	2042.60	59.92 ic	---	---	---	---	---	---	---	---	---	59.92
4.80	23,627	2042.80	61.82 ic	---	---	---	---	---	---	---	---	---	61.82
5.00	25,298	2043.00	62.77 oc	---	---	---	---	---	---	---	---	---	62.77
5.20	26,968	2043.20	63.56 oc	---	---	---	---	---	---	---	---	---	63.56
5.40	28,639	2043.40	64.33 oc	---	---	---	---	---	---	---	---	---	64.33
5.60	30,310	2043.60	65.10 oc	---	---	---	---	---	---	---	---	---	65.10
5.80	31,981	2043.80	65.86 oc	---	---	---	---	---	---	---	---	---	65.86
6.00	33,652	2044.00	66.61 oc	---	---	---	---	---	---	---	---	---	66.61
6.20	35,807	2044.20	67.35 oc	---	---	---	---	---	---	---	---	---	67.35
6.40	37,961	2044.40	68.09 oc	---	---	---	---	---	---	---	---	---	68.09
6.60	40,116	2044.60	68.81 oc	---	---	---	---	---	---	---	---	---	68.81
6.80	42,270	2044.80	69.53 oc	---	---	---	---	---	---	---	---	---	69.53
7.00	44,425	2045.00	70.24 oc	---	---	---	---	---	---	---	---	---	70.24

Continues on next page...

460 South Culvert HW Storage

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
7.20	46,580	2045.20	70.95 oc	---	---	---	---	---	---	---	---	---	70.95
7.40	48,734	2045.40	71.64 oc	---	---	---	---	---	---	---	---	---	71.64
7.60	50,889	2045.60	72.33 oc	---	---	---	---	---	---	---	---	---	72.33
7.80	53,043	2045.80	73.02 oc	---	---	---	---	---	---	---	---	---	73.02
8.00	55,198	2046.00	73.69 oc	---	---	---	---	---	---	---	---	---	73.69
8.20	57,873	2046.20	74.36 oc	---	---	---	---	---	---	---	---	---	74.36
8.40	60,549	2046.40	75.03 oc	---	---	---	---	---	---	---	---	---	75.03
8.60	63,224	2046.60	75.69 oc	---	---	---	---	---	---	---	---	---	75.69
8.80	65,900	2046.80	76.34 oc	---	---	---	---	---	---	---	---	---	76.34
9.00	68,575	2047.00	76.99 oc	---	---	---	---	---	---	---	---	---	76.99
9.20	71,250	2047.20	77.63 oc	---	---	---	---	---	---	---	---	---	77.63
9.40	73,926	2047.40	78.27 oc	---	---	---	---	---	---	---	---	---	78.27
9.60	76,601	2047.60	78.90 oc	---	---	---	---	---	---	---	---	---	78.90
9.80	79,277	2047.80	79.53 oc	---	---	---	---	---	---	---	---	---	79.53
10.00	81,952	2048.00	80.15 oc	---	---	---	---	---	---	---	---	---	80.15
10.20	85,221	2048.20	80.77 oc	---	---	---	---	---	---	---	---	---	80.77
10.40	88,489	2048.40	81.38 oc	---	---	---	---	---	---	---	---	---	81.38
10.60	91,758	2048.60	81.99 oc	---	---	---	---	---	---	---	---	---	81.99
10.80	95,026	2048.80	82.60 oc	---	---	---	---	---	---	---	---	---	82.60
11.00	98,295	2049.00	83.19 oc	---	---	---	---	---	---	---	---	---	83.19
11.20	101,563	2049.20	83.79 oc	---	---	---	---	---	---	---	---	---	83.79
11.40	104,832	2049.40	84.38 oc	---	---	---	---	---	---	---	---	---	84.38
11.60	108,100	2049.60	84.97 oc	---	---	---	---	---	---	---	---	---	84.97
11.80	111,369	2049.80	85.55 oc	---	---	---	---	---	---	---	---	---	85.55
12.00	114,637	2050.00	86.13 oc	---	---	---	---	---	---	---	---	---	86.13

...End

Hydrograph Report

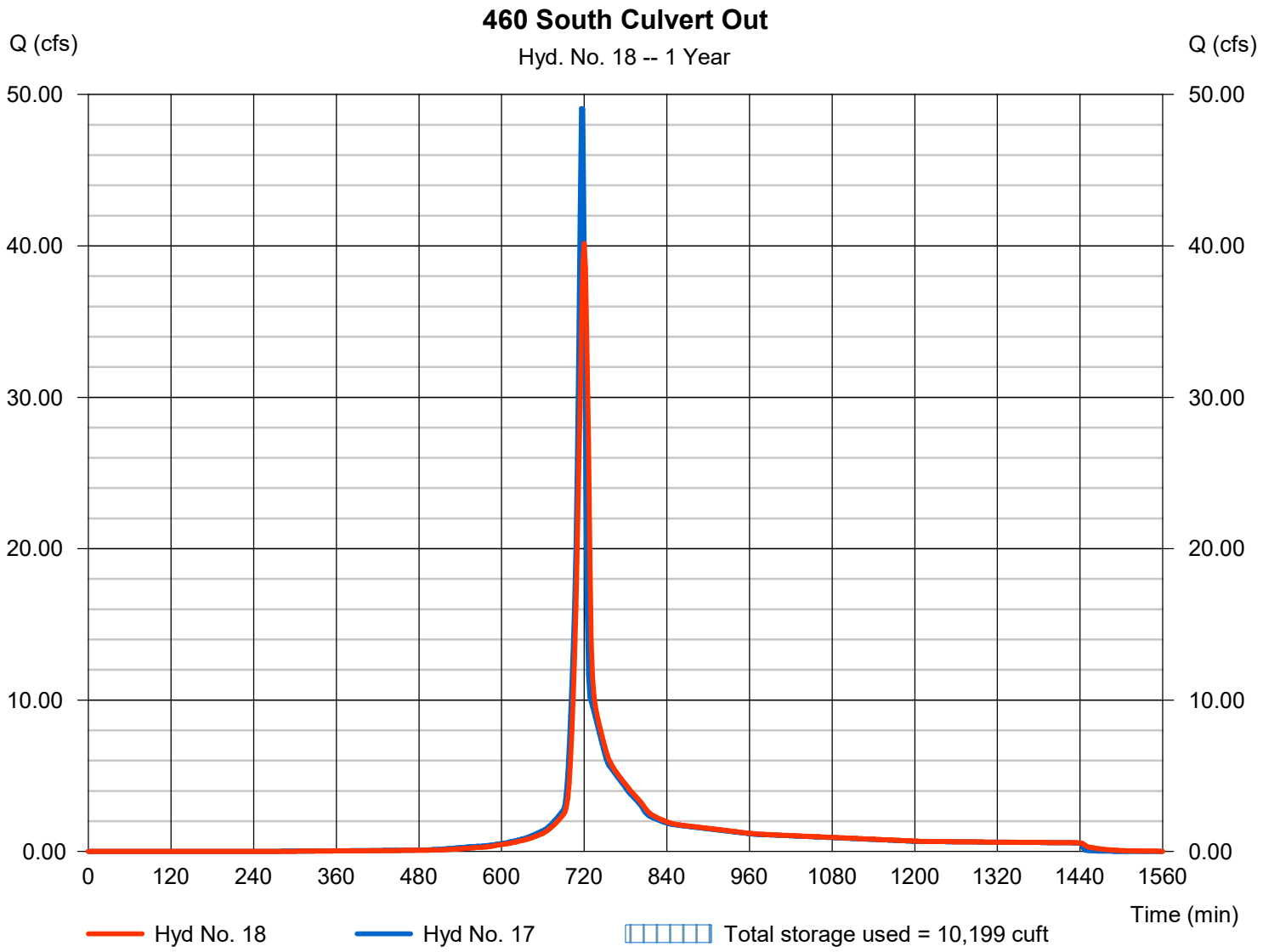
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 18

460 South Culvert Out

Hydrograph type	= Reservoir	Peak discharge	= 40.17 cfs
Storm frequency	= 1 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 119,153 cuft
Inflow hyd. No.	= 17 - Total To 460 South Culvert	Max. Elevation	= 2040.88 ft
Reservoir name	= 460 South Culvert HW Storage	Max. Storage	= 10,199 cuft

Storage Indication method used.



Hydrograph Report

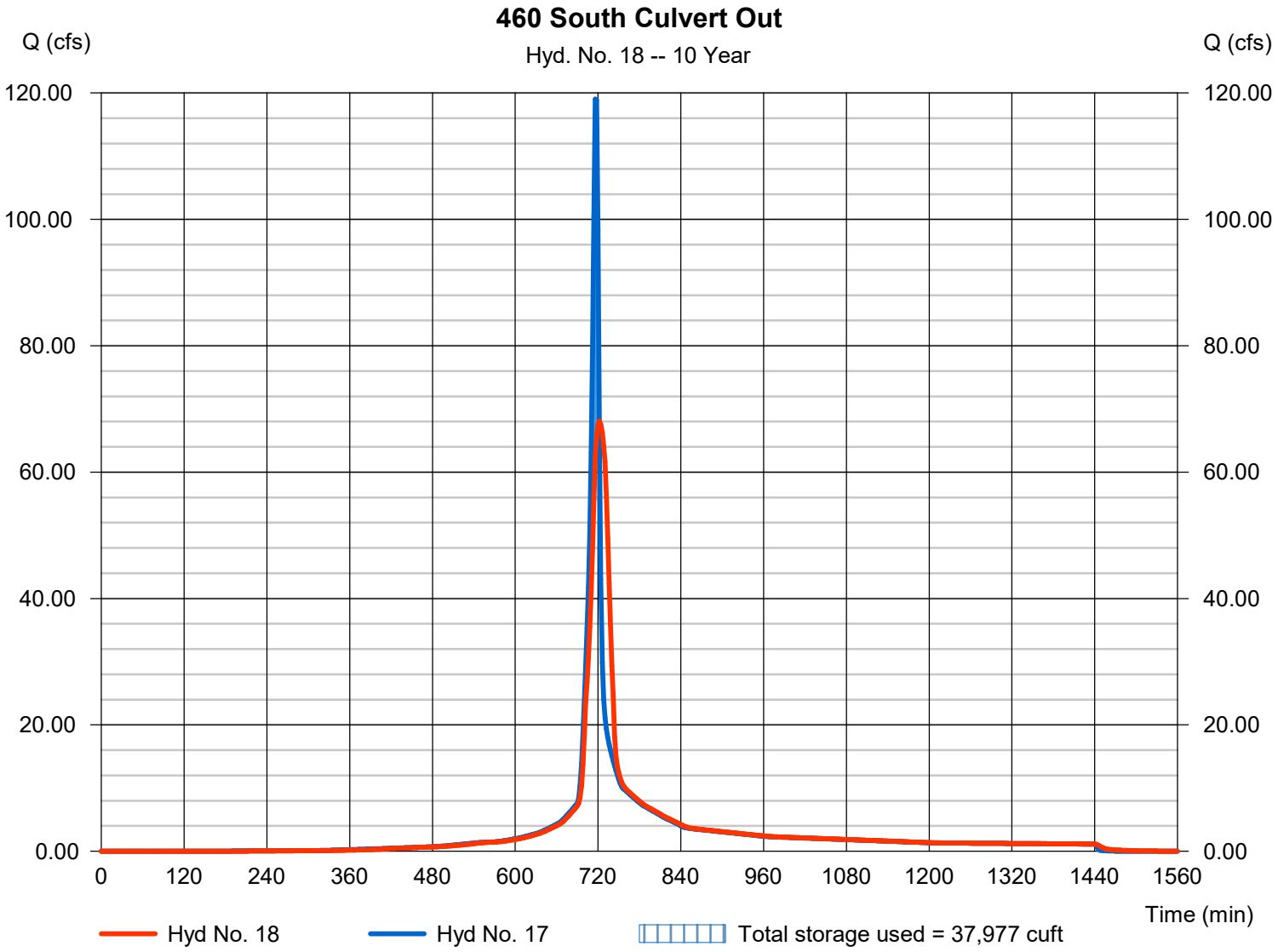
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 18

460 South Culvert Out

Hydrograph type	=	Reservoir	Peak discharge	=	68.09 cfs
Storm frequency	=	10 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	275,721 cuft
Inflow hyd. No.	=	17 - Total To 460 South Culvert	Max. Elevation	=	2044.40 ft
Reservoir name	=	460 South Culvert HW Storage	Max. Storage	=	37,977 cuft

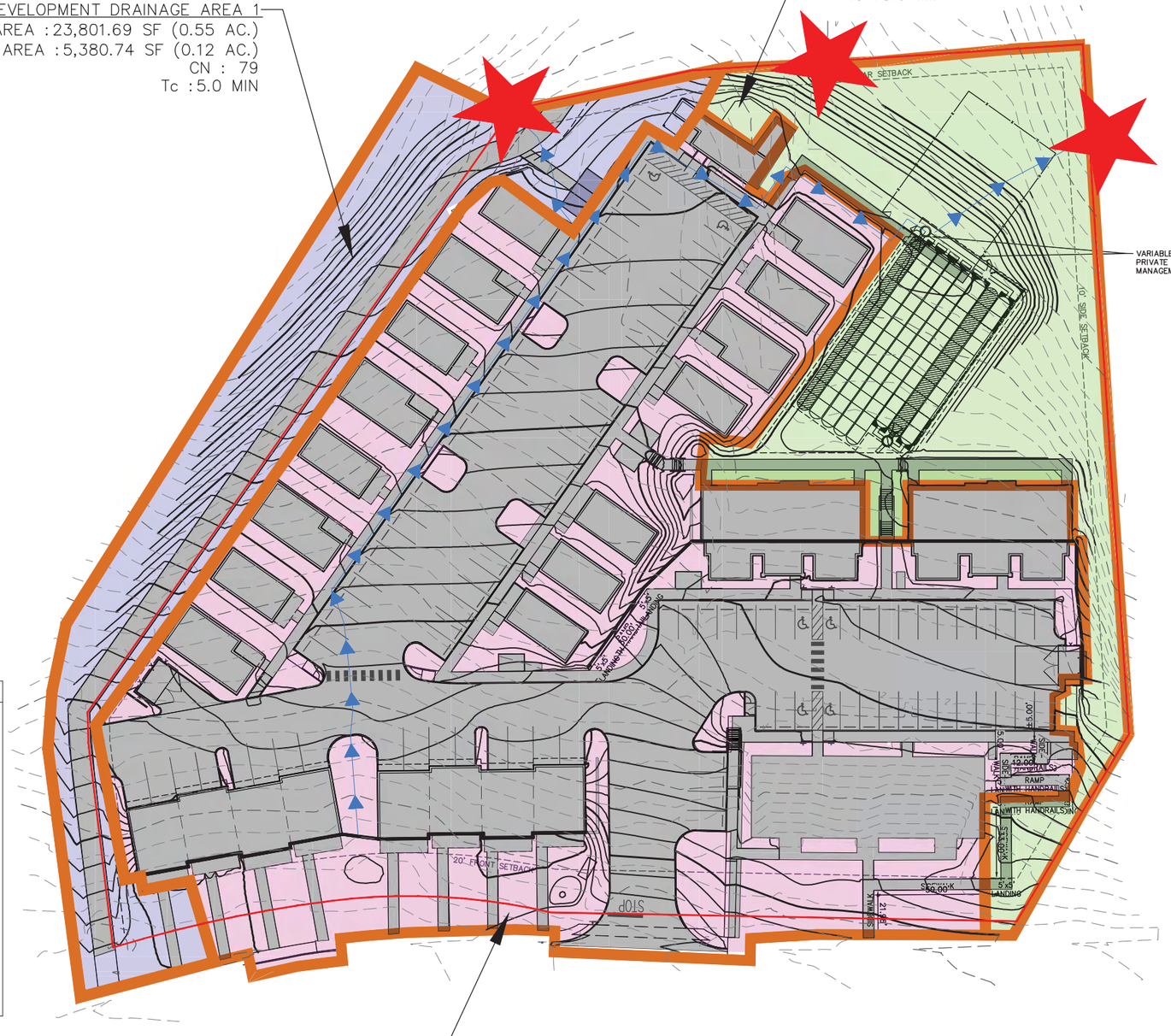
Storage Indication method used.



POST–DEVELOPMENT DRAINAGE AREA 1
TOTAL AREA : 23,801.69 SF (0.55 AC.)
IMPERVIOUS AREA : 5,380.74 SF (0.12 AC.)
CN : 79
Tc : 5.0 MIN

POST–DEVELOPMENT DRAINAGE AREA 3
TOTAL AREA : 33,629.01 SF (0.77 AC.)
IMPERVIOUS AREA : 2,101.43 SF (0.05 AC.)
CN : 75
Tc : 8.6 MIN

Note: DA 1 and 3 (which do not contribute to the underground detention) have been combined for the purpose of this document. See hydrograph 21, "The Farm Undetained Total". DA 2 is equal to hydrograph 19, "The Farm Basin Inflow".



LEGEND
- DRAINAGE AREA 1
- DRAINAGE AREA 2
- DRAINAGE AREA 3
- IMPERVIOUS AREA
- DRAINAGE AREA BOUNDARY
- SOILS MAP BOUNDARY
- TIME OF CONCENTRATION
- ANALYSIS POINT
- EXISTING PROPERTY LINE

POST–DEVELOPMENT DRAINAGE AREA 2
TOTAL AREA : 116,460.25 SF (2.67 AC.)
IMPERVIOUS AREA : 81,654.01 SF (1.87 AC.)
CN : 91
Tc : 5.8 MIN

Source: "The Farm" SWM calcs rev. 3/11/21

GRID NORTH

30 0 30 60
GRAPHIC SCALE FEET
CONTOUR INTERVAL = 1 FT.

GAY AND NEEL, INC.
ENGINEERING ◆ LAND PLANNING ◆ SURVEYING
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Web: www.gayandneel.com

POST-DEVELOPMENT DA MAP

THE FARM

TOWN OF BLACKSBURG, VIRGINIA

REVISIONS

NO.	COMMENTS	DATE

PROJECT TEAM

PIC	TREVOR M. KIMZEY, PE
PM	MATT P. TOMLINSON, PE
DESIGN	STC, ADS, MBL

ISSUE DATE: 02/01/2021

GNI JOB NO.: 1108.7

SHEET TITLE: POST-DEVELOPMENT DA MAP

SHEET NUMBER: 1 OF 1

Drainage Area Runoff and Time of Concentration

Precipitation Data	
Return Frequency	P (in.)
1 Yr.	2.26
2 Yr.	2.73
10 Yr.	4.06
100 Yr.	6.44

Drainage Area: **"The Farm" Drainage Areas**

Undetained areas total

Composite Curve Number (CN)

	CN	Area (Ac.)	CN*A
CN_1	79	0.55	43.45
CN_2	75	0.77	57.75
CN_3			0.00
CN_4			0.00
CN_5			0.00
Total	-	**1.32**	**101.20**
		Composite CN =	**77**

Time of Concentration, T_c

Flow Segment	Flow Regime	Land Cover	Length (ft)	Roughness Coeff., n	Slope (ft/ft)	Travel Time, T_t (min.)
1						
2						
3						
4						
5						
6	Other Tt					8.6
					Total Time of Concentration, T_c (min.)	**8.6**

Runoff

	1 Yr.	10 Yr.	100 Yr.
Composite CN	77	77	77
Storage (in.) S=1000/CN-10	2.99	2.99	2.99
Initial abstraction (in.), I_a=0.2S	0.60	0.60	0.60
Runoff depth (in.), $Q=(P-0.2S)^2/[(P-I_a)+S]$	0.59	1.86	3.87
Runoff volume (ac-ft), RV = Q/12*A	0.07	0.20	0.43
Flow rate (cfs), q_{peak} from hydrograph	1.20	3.89	

Hydrograph No.: Contributes to 21

Notes: See "The Farm" calcs by others. CN1=DA1 post weighted CN, CN2=DA3 post weighted CN

Area to "The Farm" detention

Composite Curve Number (CN)

	CN	Area (Ac.)	CN*A
CN_1	91	2.67	242.97
CN_2			0.00
CN_3			0.00
CN_4			0.00
CN_5			0.00
Total	-	**2.67**	**242.97**
		Composite CN =	**91**

Time of Concentration, T_c

Flow Segment	Flow Regime	Land Cover	Length (ft)	Roughness Coeff., n	Slope (ft/ft)	Travel Time, T_t (min.)
1						
2						
3						
4						
5						
6	Other Tt					5.8
					Total Time of Concentration, T_c (min.)	**5.8**

Runoff

	1 Yr.	10 Yr.	100 Yr.
VRRM CN*	91	91	91
Storage (in.) S=1000/CN-10	0.99	0.99	0.99
Initial abstraction (in.), I_a=0.2S	0.20	0.20	0.20
Runoff depth (in.), $Q=(P-0.2S)^2/[(P-I_a)+S]$	1.39	3.07	5.39
Runoff volume (ac-ft), RV = Q/12*A	0.31	0.68	1.20
Flow rate (cfs), q_{peak} from hydrograph	6.19	13.12	

*If different from Composite CN, runoff reduction BMPs are utilized

Hydrograph No.: 19

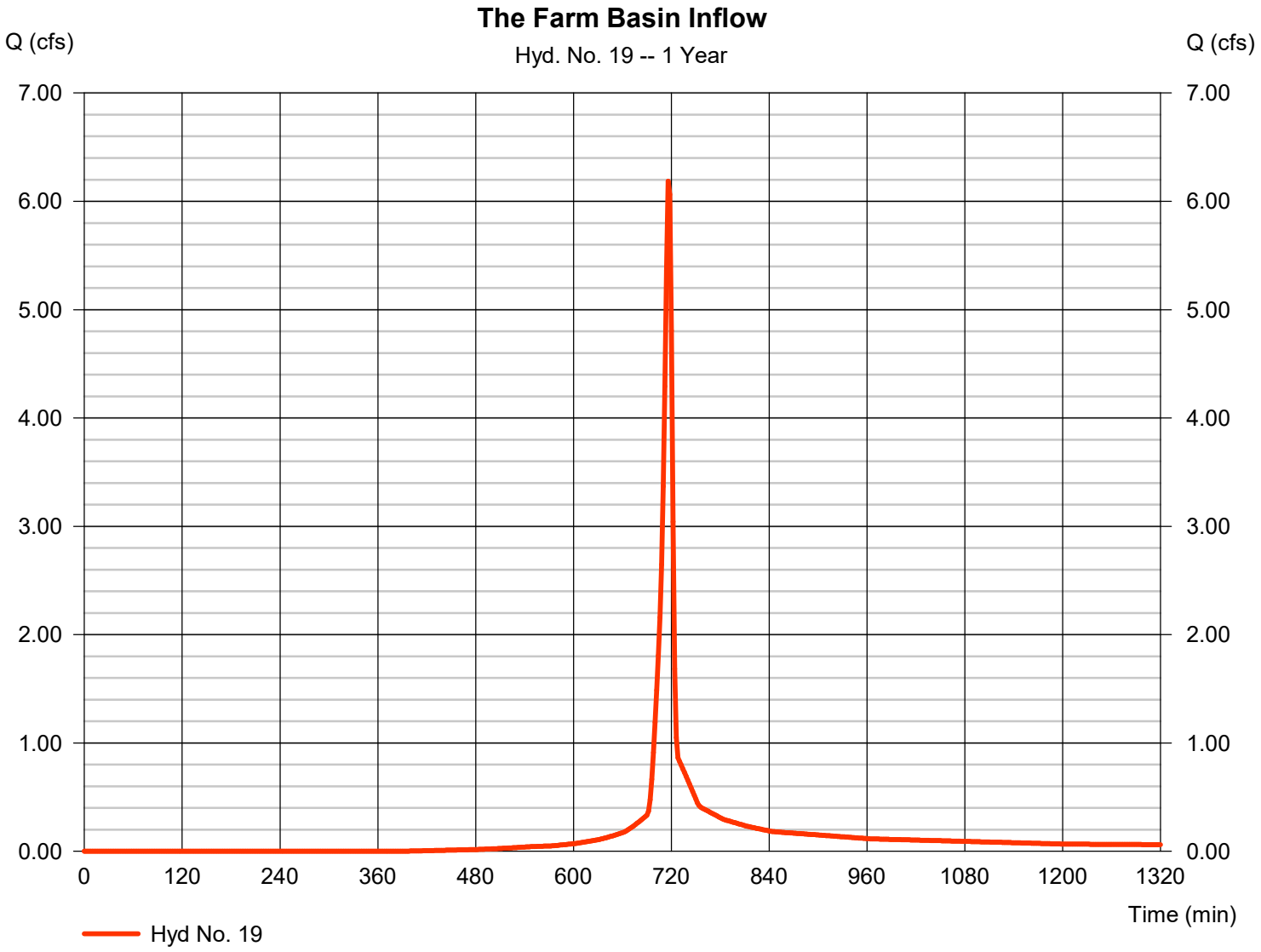
Notes: See "The Farm" calcs by others. CN1=DA3 post weighted CN

Hydrograph Report

Hyd. No. 19

The Farm Basin Inflow

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.187 cfs
Storm frequency	=	1 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	12,664 cuft
Drainage area	=	2.670 ac	Curve number	=	91
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.80 min
Total precip.	=	2.26 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



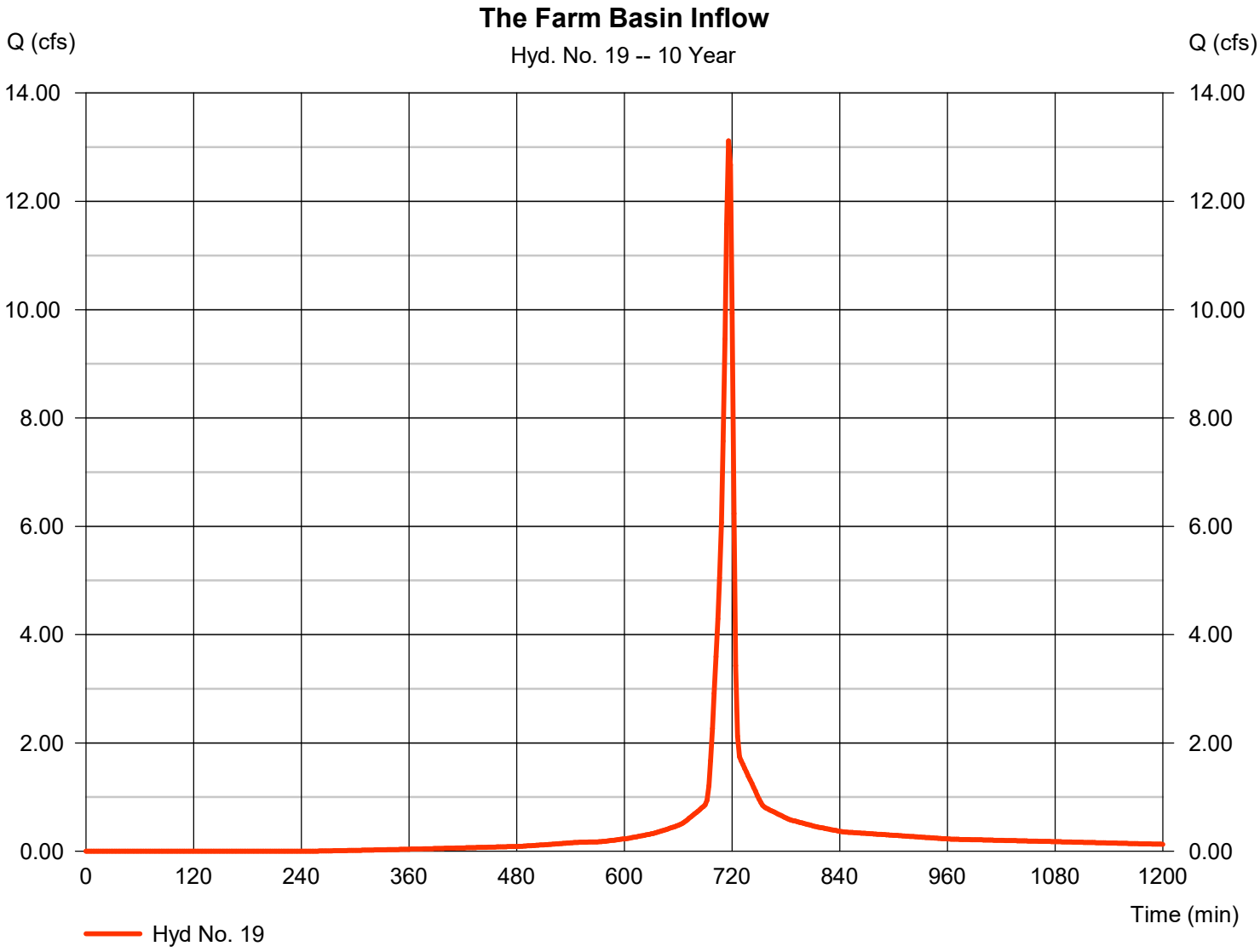
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 19

The Farm Basin Inflow

Hydrograph type	= SCS Runoff	Peak discharge	= 13.12 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 27,939 cuft
Drainage area	= 2.670 ac	Curve number	= 91
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.80 min
Total precip.	= 4.06 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Pond Report

Pond No. 12 - The Farm Underground Det

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	2080.85	n/a	0	0
0.05	2080.90	n/a	126	126
0.24	2081.09	n/a	428	554
0.41	2081.26	n/a	406	960
0.69	2081.54	n/a	632	1,592
0.96	2081.81	n/a	1,180	2,772
1.53	2082.38	n/a	2,806	5,578
2.21	2083.06	n/a	3,199	8,777
2.63	2083.48	n/a	1,937	10,714
2.82	2083.67	n/a	835	11,549
3.40	2084.25	n/a	2,383	13,932
3.97	2084.82	n/a	2,068	16,000
4.40	2085.25	n/a	2,390	18,390
5.50	2086.35	n/a	1,362	19,752

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	1.00	5.00	0.00
Span (in)	= 15.00	1.00	5.00	0.00
No. Barrels	= 1	1	2	0
Invert El. (ft)	= 2080.85	2080.85	2083.85	0.00
Length (ft)	= 120.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.70	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 3.93	30.00	0.00	0.00
Crest El. (ft)	= 2085.25	2086.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Broad	---	---
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).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	2080.85	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.00	13	2080.85	0.00 ic	0.00 ic	0.00	---	0.00	0.00	---	---	---	---	0.000
0.01	25	2080.86	0.00 ic	0.00 ic	0.00	---	0.00	0.00	---	---	---	---	0.000
0.01	38	2080.86	0.00 ic	0.00 ic	0.00	---	0.00	0.00	---	---	---	---	0.000
0.02	50	2080.87	0.00 ic	0.00 ic	0.00	---	0.00	0.00	---	---	---	---	0.001
0.03	63	2080.88	0.00 ic	0.00 ic	0.00	---	0.00	0.00	---	---	---	---	0.001
0.03	76	2080.88	0.00 ic	0.00 ic	0.00	---	0.00	0.00	---	---	---	---	0.001
0.04	88	2080.88	0.00 ic	0.00 ic	0.00	---	0.00	0.00	---	---	---	---	0.001
0.04	101	2080.89	0.00 ic	0.00 ic	0.00	---	0.00	0.00	---	---	---	---	0.002
0.04	113	2080.89	0.00 ic	0.00 ic	0.00	---	0.00	0.00	---	---	---	---	0.002
0.05	126	2080.90	0.00 ic	0.00 ic	0.00	---	0.00	0.00	---	---	---	---	0.003
0.07	169	2080.92	0.00 ic	0.00 ic	0.00	---	0.00	0.00	---	---	---	---	0.004
0.09	212	2080.94	0.01 ic	0.01 ic	0.00	---	0.00	0.00	---	---	---	---	0.006
0.11	254	2080.96	0.01 ic	0.01 ic	0.00	---	0.00	0.00	---	---	---	---	0.007
0.13	297	2080.98	0.01 ic	0.01 ic	0.00	---	0.00	0.00	---	---	---	---	0.008
0.14	340	2081.00	0.01 ic	0.01 ic	0.00	---	0.00	0.00	---	---	---	---	0.008
0.16	383	2081.01	0.01 ic	0.01 ic	0.00	---	0.00	0.00	---	---	---	---	0.009
0.18	426	2081.03	0.01 ic	0.01 ic	0.00	---	0.00	0.00	---	---	---	---	0.010
0.20	468	2081.05	0.01 ic	0.01 ic	0.00	---	0.00	0.00	---	---	---	---	0.011
0.22	511	2081.07	0.01 ic	0.01 ic	0.00	---	0.00	0.00	---	---	---	---	0.011
0.24	554	2081.09	0.01 ic	0.01 ic	0.00	---	0.00	0.00	---	---	---	---	0.012
0.26	595	2081.11	0.01 ic	0.01 ic	0.00	---	0.00	0.00	---	---	---	---	0.012
0.27	635	2081.12	0.01 ic	0.01 ic	0.00	---	0.00	0.00	---	---	---	---	0.013
0.29	676	2081.14	0.01 ic	0.01 ic	0.00	---	0.00	0.00	---	---	---	---	0.013
0.31	716	2081.16	0.01 ic	0.01 ic	0.00	---	0.00	0.00	---	---	---	---	0.013
0.32	757	2081.18	0.01 ic	0.01 ic	0.00	---	0.00	0.00	---	---	---	---	0.014
0.34	798	2081.19	0.01 ic	0.01 ic	0.00	---	0.00	0.00	---	---	---	---	0.014
0.36	838	2081.21	0.01 ic	0.01 ic	0.00	---	0.00	0.00	---	---	---	---	0.015
0.38	879	2081.23	0.02 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.015
0.39	919	2081.24	0.02 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.015

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Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.41	960	2081.26	0.02 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.016
0.44	1,023	2081.29	0.02 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.016
0.47	1,086	2081.32	0.02 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.017
0.49	1,150	2081.34	0.02 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.017
0.52	1,213	2081.37	0.02 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.018
0.55	1,276	2081.40	0.02 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.018
0.58	1,339	2081.43	0.02 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.019
0.61	1,402	2081.46	0.02 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.020
0.63	1,466	2081.49	0.02 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.020
0.66	1,529	2081.51	0.02 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.020
0.69	1,592	2081.54	0.02 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.021
0.72	1,710	2081.57	0.02 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.021
0.74	1,828	2081.59	0.02 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.022
0.77	1,946	2081.62	0.02 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.022
0.80	2,064	2081.65	0.02 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.023
0.82	2,182	2081.68	0.02 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.023
0.85	2,300	2081.70	0.02 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.023
0.88	2,418	2081.73	0.03 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.024
0.91	2,536	2081.76	0.03 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.024
0.93	2,654	2081.78	0.03 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.024
0.96	2,772	2081.81	0.03 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.025
1.02	3,053	2081.87	0.03 ic	0.03 ic	0.00	---	0.00	0.00	---	---	---	---	0.026
1.07	3,333	2081.92	0.03 ic	0.03 ic	0.00	---	0.00	0.00	---	---	---	---	0.026
1.13	3,614	2081.98	0.03 ic	0.03 ic	0.00	---	0.00	0.00	---	---	---	---	0.027
1.19	3,894	2082.04	0.03 ic	0.03 ic	0.00	---	0.00	0.00	---	---	---	---	0.028
1.25	4,175	2082.09	0.03 ic	0.03 ic	0.00	---	0.00	0.00	---	---	---	---	0.028
1.30	4,456	2082.15	0.03 ic	0.03 ic	0.00	---	0.00	0.00	---	---	---	---	0.029
1.36	4,736	2082.21	0.03 ic	0.03 ic	0.00	---	0.00	0.00	---	---	---	---	0.030
1.42	5,017	2082.26	0.03 ic	0.03 ic	0.00	---	0.00	0.00	---	---	---	---	0.030
1.47	5,297	2082.32	0.03 ic	0.03 ic	0.00	---	0.00	0.00	---	---	---	---	0.031
1.53	5,578	2082.38	0.03 ic	0.03 ic	0.00	---	0.00	0.00	---	---	---	---	0.032
1.60	5,898	2082.45	0.03 ic	0.03 ic	0.00	---	0.00	0.00	---	---	---	---	0.032
1.67	6,218	2082.52	0.03 ic	0.03 ic	0.00	---	0.00	0.00	---	---	---	---	0.033
1.73	6,538	2082.58	0.03 ic	0.03 ic	0.00	---	0.00	0.00	---	---	---	---	0.034
1.80	6,858	2082.65	0.03 ic	0.03 ic	0.00	---	0.00	0.00	---	---	---	---	0.035
1.87	7,178	2082.72	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.035
1.94	7,497	2082.79	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.036
2.01	7,817	2082.86	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.036
2.07	8,137	2082.93	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.037
2.14	8,457	2082.99	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.038
2.21	8,777	2083.06	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.038
2.25	8,971	2083.10	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.039
2.29	9,164	2083.14	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.039
2.34	9,358	2083.19	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.039
2.38	9,552	2083.23	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.040
2.42	9,746	2083.27	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.040
2.46	9,939	2083.31	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.041
2.50	10,133	2083.35	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.041
2.55	10,327	2083.40	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.041
2.59	10,520	2083.44	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.042
2.63	10,714	2083.48	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.042
2.65	10,798	2083.50	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.042
2.67	10,881	2083.52	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.042
2.69	10,965	2083.54	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.042
2.71	11,048	2083.56	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.043
2.72	11,132	2083.57	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.043
2.74	11,215	2083.59	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.043
2.76	11,299	2083.61	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.043
2.78	11,382	2083.63	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.043
2.80	11,466	2083.65	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.043
2.82	11,549	2083.67	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.043
2.88	11,787	2083.73	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.044
2.94	12,026	2083.79	0.05 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.044
2.99	12,264	2083.84	0.05 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.045
3.05	12,502	2083.90	0.07 ic	0.05 ic	0.02 ic	---	0.00	0.00	---	---	---	---	0.061
3.11	12,741	2083.96	0.12 ic	0.05 ic	0.07 ic	---	0.00	0.00	---	---	---	---	0.111
3.17	12,979	2084.02	0.20 ic	0.05 ic	0.15 ic	---	0.00	0.00	---	---	---	---	0.191
3.23	13,217	2084.08	0.30 ic	0.05 ic	0.25 ic	---	0.00	0.00	---	---	---	---	0.293
3.28	13,455	2084.14	0.41 ic	0.05 ic	0.36 ic	---	0.00	0.00	---	---	---	---	0.407
3.34	13,694	2084.19	0.53 ic	0.05 ic	0.48 ic	---	0.00	0.00	---	---	---	---	0.525
3.40	13,932	2084.25	0.63 ic	0.05 ic	0.58 ic	---	0.00	0.00	---	---	---	---	0.626
3.46	14,139	2084.31	0.72 ic	0.05 ic	0.65 ic	---	0.00	0.00	---	---	---	---	0.701

Continues on next page...

The Farm Underground Det

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
3.51	14,346	2084.36	0.79 ic	0.05 ic	0.73 ic	---	0.00	0.00	---	---	---	---	0.772
3.57	14,552	2084.42	0.86 ic	0.05 ic	0.79 ic	---	0.00	0.00	---	---	---	---	0.837
3.63	14,759	2084.48	0.90 ic	0.05 ic	0.85 ic	---	0.00	0.00	---	---	---	---	0.898
3.68	14,966	2084.53	0.97 ic	0.05 ic	0.91 ic	---	0.00	0.00	---	---	---	---	0.953
3.74	15,173	2084.59	1.01 ic	0.05 ic	0.96 ic	---	0.00	0.00	---	---	---	---	1.006
3.80	15,380	2084.65	1.06 ic	0.05 ic	1.01 ic	---	0.00	0.00	---	---	---	---	1.056
3.86	15,586	2084.71	1.10 ic	0.05 ic	1.06 ic	---	0.00	0.00	---	---	---	---	1.104
3.91	15,793	2084.76	1.18 ic	0.05 ic	1.10 ic	---	0.00	0.00	---	---	---	---	1.150
3.97	16,000	2084.82	1.22 ic	0.05 ic	1.15 ic	---	0.00	0.00	---	---	---	---	1.195
4.01	16,239	2084.86	1.23 ic	0.05 ic	1.18 ic	---	0.00	0.00	---	---	---	---	1.227
4.06	16,478	2084.91	1.27 ic	0.05 ic	1.21 ic	---	0.00	0.00	---	---	---	---	1.258
4.10	16,717	2084.95	1.31 ic	0.05 ic	1.24 ic	---	0.00	0.00	---	---	---	---	1.289
4.14	16,956	2084.99	1.32 ic	0.05 ic	1.27 ic	---	0.00	0.00	---	---	---	---	1.319
4.19	17,195	2085.03	1.36 ic	0.05 ic	1.30 ic	---	0.00	0.00	---	---	---	---	1.348
4.23	17,434	2085.08	1.41 ic	0.05 ic	1.33 ic	---	0.00	0.00	---	---	---	---	1.376
4.27	17,673	2085.12	1.41 ic	0.05 ic	1.35 ic	---	0.00	0.00	---	---	---	---	1.404
4.31	17,912	2085.16	1.45 ic	0.05 ic	1.38 ic	---	0.00	0.00	---	---	---	---	1.432
4.36	18,151	2085.21	1.46 ic	0.05 ic	1.41 ic	---	0.00	0.00	---	---	---	---	1.458
4.40	18,390	2085.25	1.50 ic	0.05 ic	1.43 ic	---	0.00	0.00	---	---	---	---	1.485
4.51	18,526	2085.36	2.03 ic	0.05 ic	1.50 ic	---	0.48	0.00	---	---	---	---	2.028
4.62	18,662	2085.47	2.98 ic	0.05 ic	1.56 ic	---	1.35	0.00	---	---	---	---	2.961
4.73	18,799	2085.58	4.17 ic	0.05 ic	1.62 ic	---	2.48	0.00	---	---	---	---	4.152
4.84	18,935	2085.69	5.54 oc	0.04 ic	1.68 ic	---	3.82	0.00	---	---	---	---	5.535
4.95	19,071	2085.80	5.63 oc	0.04 ic	1.73 ic	---	3.85 ic	0.00	---	---	---	---	5.626
5.06	19,207	2085.91	6.05 oc	0.04 ic	1.79 ic	---	4.22 ic	0.00	---	---	---	---	6.045
5.17	19,343	2086.02	6.43 oc	0.04 ic	1.84 ic	---	4.56 ic	0.30	---	---	---	---	6.739
5.28	19,480	2086.13	6.77 oc	0.04 ic	1.86 ic	---	4.87 ic	4.74	---	---	---	---	11.51
5.39	19,616	2086.24	7.04 oc	0.04 ic	1.84 ic	---	5.17 ic	11.82	---	---	---	---	18.86
5.50	19,752	2086.35	7.29 oc	0.04 ic	1.81 ic	---	5.44 ic	20.69	---	---	---	---	27.99

...End

Hydrograph Report

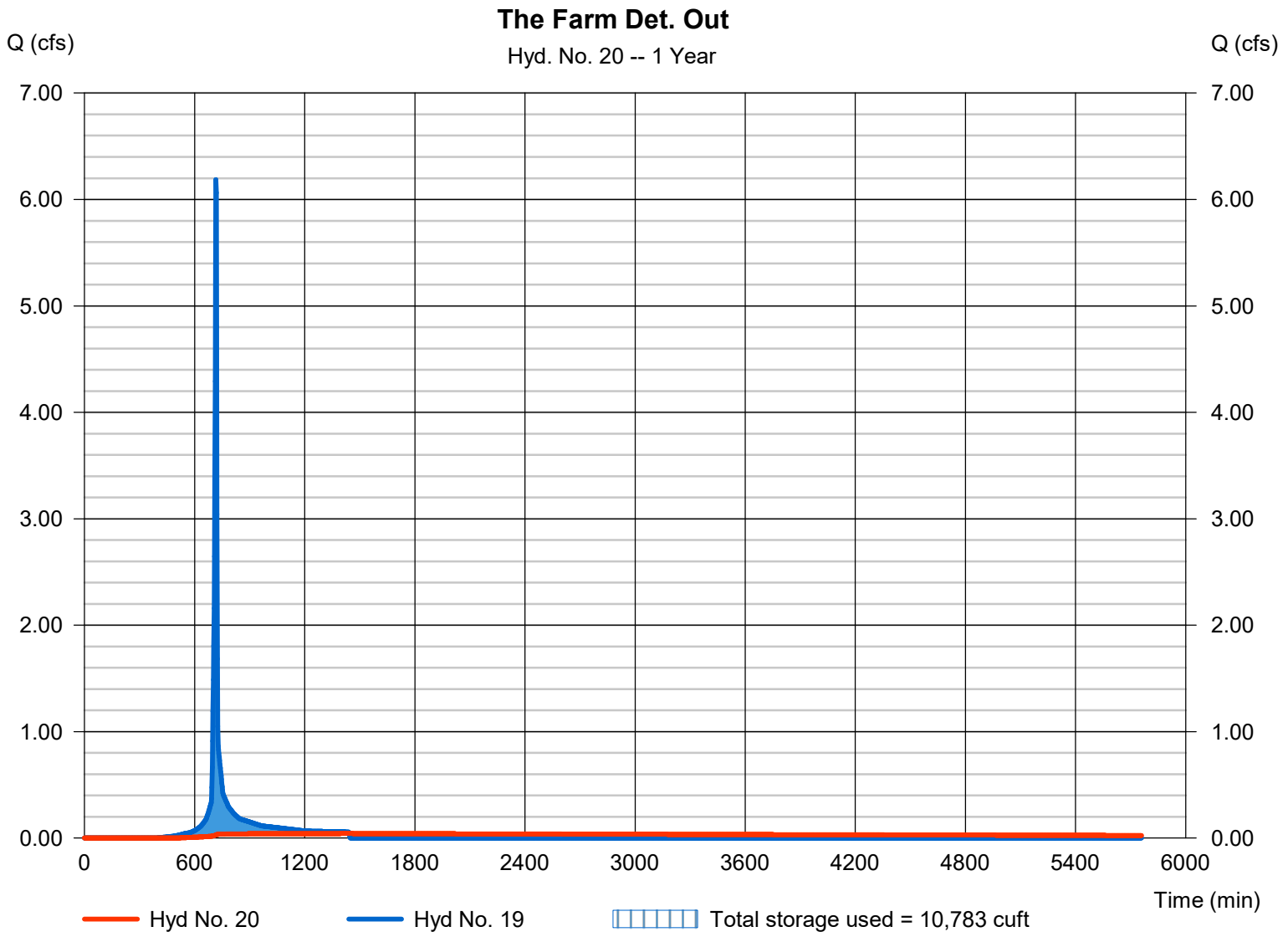
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Tuesday, 11 / 1 / 2022

Hyd. No. 20

The Farm Det. Out

Hydrograph type	=	Reservoir	Peak discharge	=	0.042 cfs
Storm frequency	=	1 yrs	Time to peak	=	1442 min
Time interval	=	2 min	Hyd. volume	=	10,338 cuft
Inflow hyd. No.	=	19 - The Farm Basin Inflow	Max. Elevation	=	2083.50 ft
Reservoir name	=	The Farm Underground Det	Max. Storage	=	10,783 cuft

Storage Indication method used.



Hydrograph Report

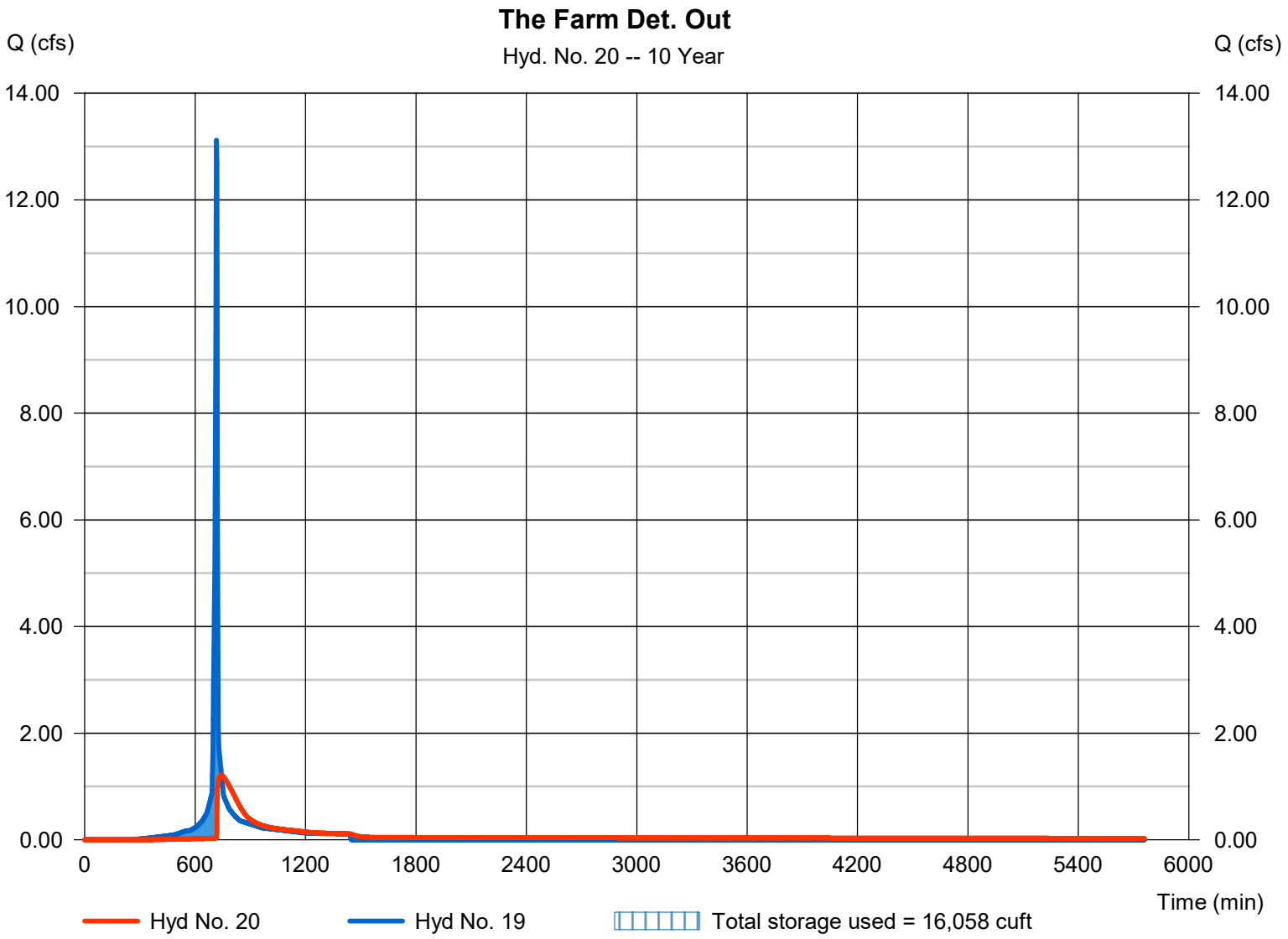
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Tuesday, 11 / 1 / 2022

Hyd. No. 20

The Farm Det. Out

Hydrograph type	=	Reservoir	Peak discharge	=	1.203 cfs
Storm frequency	=	10 yrs	Time to peak	=	744 min
Time interval	=	2 min	Hyd. volume	=	24,576 cuft
Inflow hyd. No.	=	19 - The Farm Basin Inflow	Max. Elevation	=	2084.83 ft
Reservoir name	=	The Farm Underground Det	Max. Storage	=	16,058 cuft

Storage Indication method used.



Drainage Area Runoff and Time of Concentration

Precipitation Data	
Return Frequency	P (in.)
1 Yr.	2.26
2 Yr.	2.73
10 Yr.	4.06
100 Yr.	6.44

Drainage Area: **"The Farm" Drainage Areas**

Undetained areas total

Composite Curve Number (CN)

	CN	Area (Ac.)	CN*A
CN_1	79	0.55	43.45
CN_2	75	0.77	57.75
CN_3			0.00
CN_4			0.00
CN_5			0.00
Total	-	**1.32**	**101.20**
		Composite CN =	**77**

Time of Concentration, T_c

Flow Segment	Flow Regime	Land Cover	Length (ft)	Roughness Coeff., n	Slope (ft/ft)	Travel Time, T_t (min.)
1						
2						
3						
4						
5						
6	Other Tt					8.6
					Total Time of Concentration, T_c (min.)	**8.6**

Runoff

	1 Yr.	10 Yr.	100 Yr.
Composite CN	77	77	77
Storage (in.) S=1000/CN-10	2.99	2.99	2.99
Initial abstraction (in.), I_a=0.2S	0.60	0.60	0.60
Runoff depth (in.), $Q=(P-0.2S)^2/[(P-I_a)+S]$	0.59	1.86	3.87
Runoff volume (ac-ft), RV = Q/12*A	0.07	0.20	0.43
Flow rate (cfs), q_{peak} from hydrograph	1.20	3.89	

Hydrograph No.: Contributes to 21

Notes: See "The Farm" calcs by others. CN1=DA1 post weighted CN, CN2=DA3 post weighted CN

Area to "The Farm" detention

Composite Curve Number (CN)

	CN	Area (Ac.)	CN*A
CN_1	91	2.67	242.97
CN_2			0.00
CN_3			0.00
CN_4			0.00
CN_5			0.00
Total	-	**2.67**	**242.97**
		Composite CN =	**91**

Time of Concentration, T_c

Flow Segment	Flow Regime	Land Cover	Length (ft)	Roughness Coeff., n	Slope (ft/ft)	Travel Time, T_t (min.)
1						
2						
3						
4						
5						
6	Other Tt					5.8
					Total Time of Concentration, T_c (min.)	**5.8**

Runoff

	1 Yr.	10 Yr.	100 Yr.
VRRM CN*	91	91	91
Storage (in.) S=1000/CN-10	0.99	0.99	0.99
Initial abstraction (in.), I_a=0.2S	0.20	0.20	0.20
Runoff depth (in.), $Q=(P-0.2S)^2/[(P-I_a)+S]$	1.39	3.07	5.39
Runoff volume (ac-ft), RV = Q/12*A	0.31	0.68	1.20
Flow rate (cfs), q_{peak} from hydrograph	6.19	13.12	

*If different from Composite CN, runoff reduction BMPs are utilized

Hydrograph No.: 19

Notes: See "The Farm" calcs by others. CN1=DA3 post weighted CN

Drainage Area Runoff and Time of Concentration

Drainage Area: **Undetained Farm and other contrib. offsite flows**

PRE & POST

Composite Curve Number (CN)						**Notes:**
	Hydrologic Soil Group	Land Cover	CN	Area, A (ac.)	CN*A	
CN_1	N/A	"Farm" DA1 post CN	79	0.55	43.45	-CN1 and CN2 are pulled from "The Farm" SWM plan. "The Farm" DA1 and DA3 are undetained by the development. DA2 is accounted for elsewhere and routed through "The Farm's" SWM improvements. -Remaining CNs are measured areas from offsite areas, incl. 460 and its median.
CN_2	N/A	"Farm" DA3 post CN	75	0.77	57.75	
CN_3	D	Imperv.	98	1.25	122.30	
CN_4	D	Open space	80	0.72	57.59	
CN_5	D	Brush (good)	73	1.53	111.33	
CN_6	C	Imperv.	98	0.28	27.15	
CN_7					0.00	
CN_8					0.00	
CN_9					0.00	
CN_{10}					0.00	
				Total	**5.09**	**419.57**	
				Composite CN =		**82**	

Time of Concentration, T_c						
2 yr. Precip. (in.) =			2.73			
Flow Segment	Flow Regime	Land Cover	Length (ft)	Roughness Coeff., n	Slope (ft/ft)	Travel Time, T_t (min.)
1	Other Tt	Farm Tc				8.6
2						
3						
4						
5						
6						
7						
8						
9						
10						
					Total Time of Concentration, T_c (min.) =	**8.6**

Runoff			
	1 Yr.	10 Yr.	100 Yr.
Precipitation (in.), P	2.26	4.06	6.44
Composite CN	82	82	82
Storage (in.) S=1000/CN-10	2.20	2.20	2.20
Initial abstraction (in.), I_a=0.2S	0.44	0.44	0.44
Runoff depth (in.), $Q=(P-0.2S)^2/[(P-I_a)+S]$	0.83	2.25	4.39
Runoff volume (ac-ft), RV = Q/12*A	0.35	0.96	1.86
Flow rate (cfs), q_{peak} from hydrograph	6.64	18.18	34.74

Hydrograph Number: 21

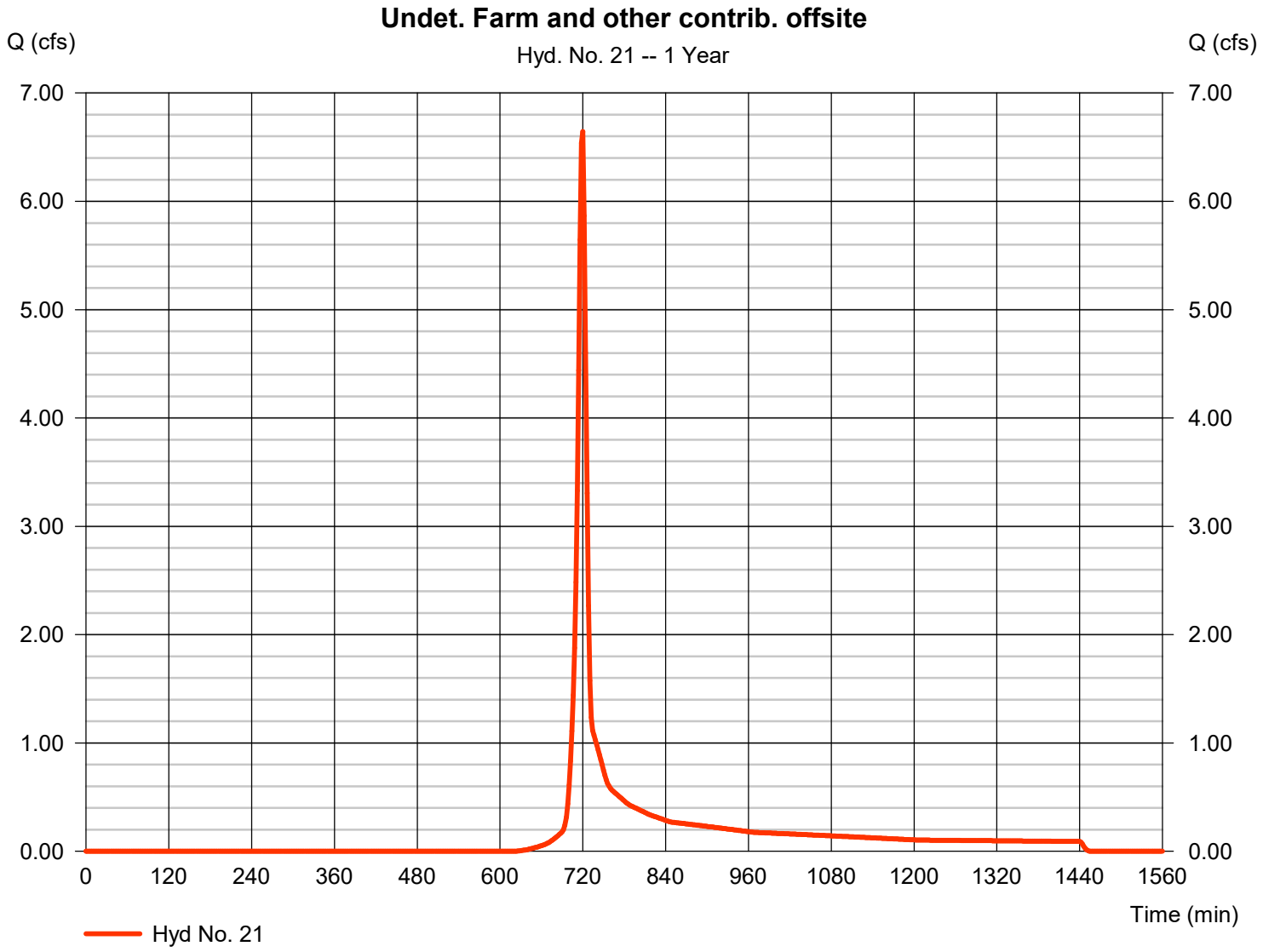
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Tuesday, 11 / 1 / 2022

Hyd. No. 21

Undet. Farm and other contrib. offsite

Hydrograph type	= SCS Runoff	Peak discharge	= 6.643 cfs
Storm frequency	= 1 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 15,256 cuft
Drainage area	= 5.090 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.60 min
Total precip.	= 2.26 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

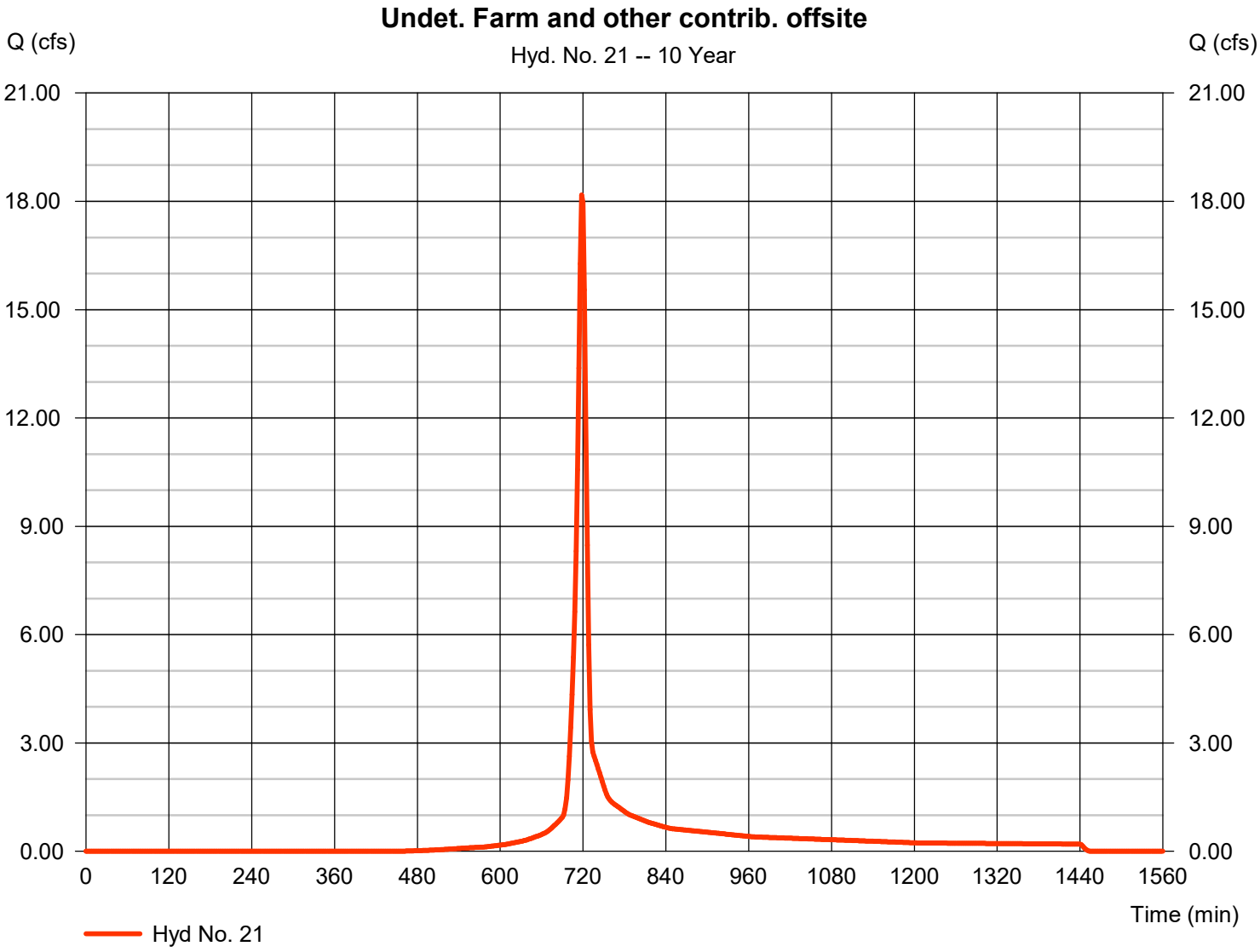


Hydrograph Report

Hyd. No. 21

Undet. Farm and other contrib. offsite

Hydrograph type	= SCS Runoff	Peak discharge	= 18.18 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 41,653 cuft
Drainage area	= 5.090 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.60 min
Total precip.	= 4.06 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

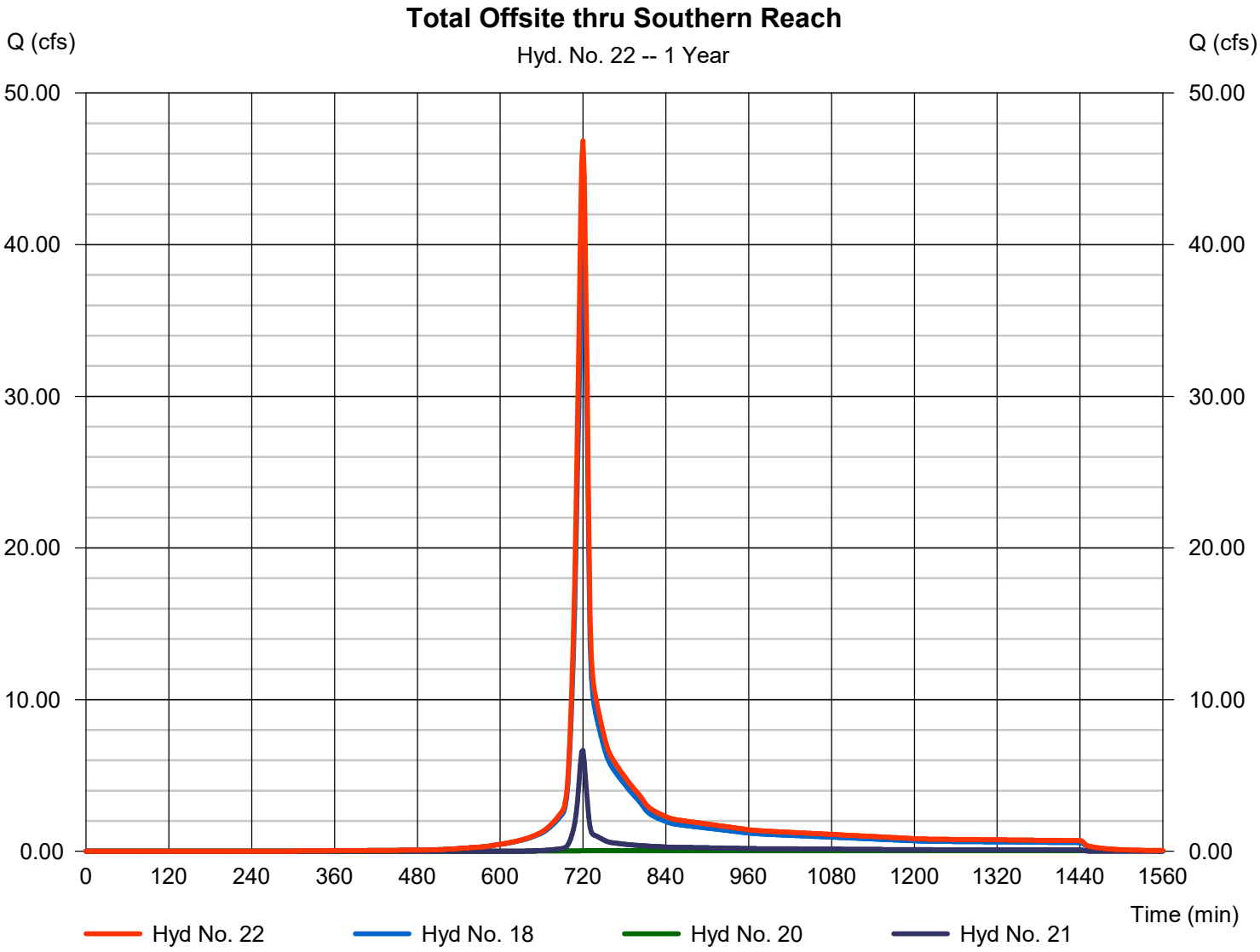


Hydrograph Report

Hyd. No. 22

Total Offsite thru Southern Reach

Hydrograph type	= Combine	Peak discharge	= 46.84 cfs
Storm frequency	= 1 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 144,746 cuft
Inflow hyds.	= 18, 20, 21	Contrib. drain. area	= 5.090 ac



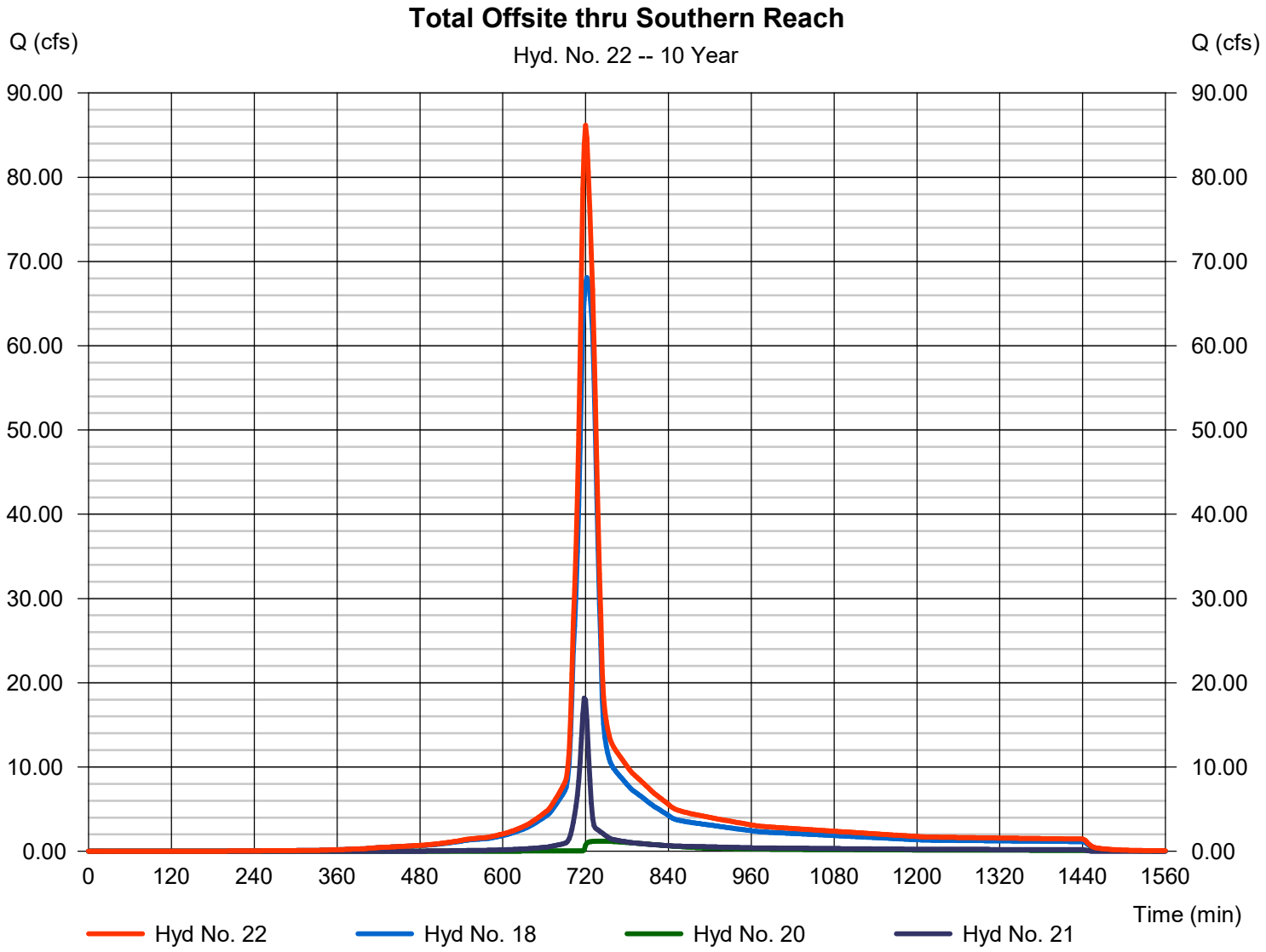
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Tuesday, 11 / 1 / 2022

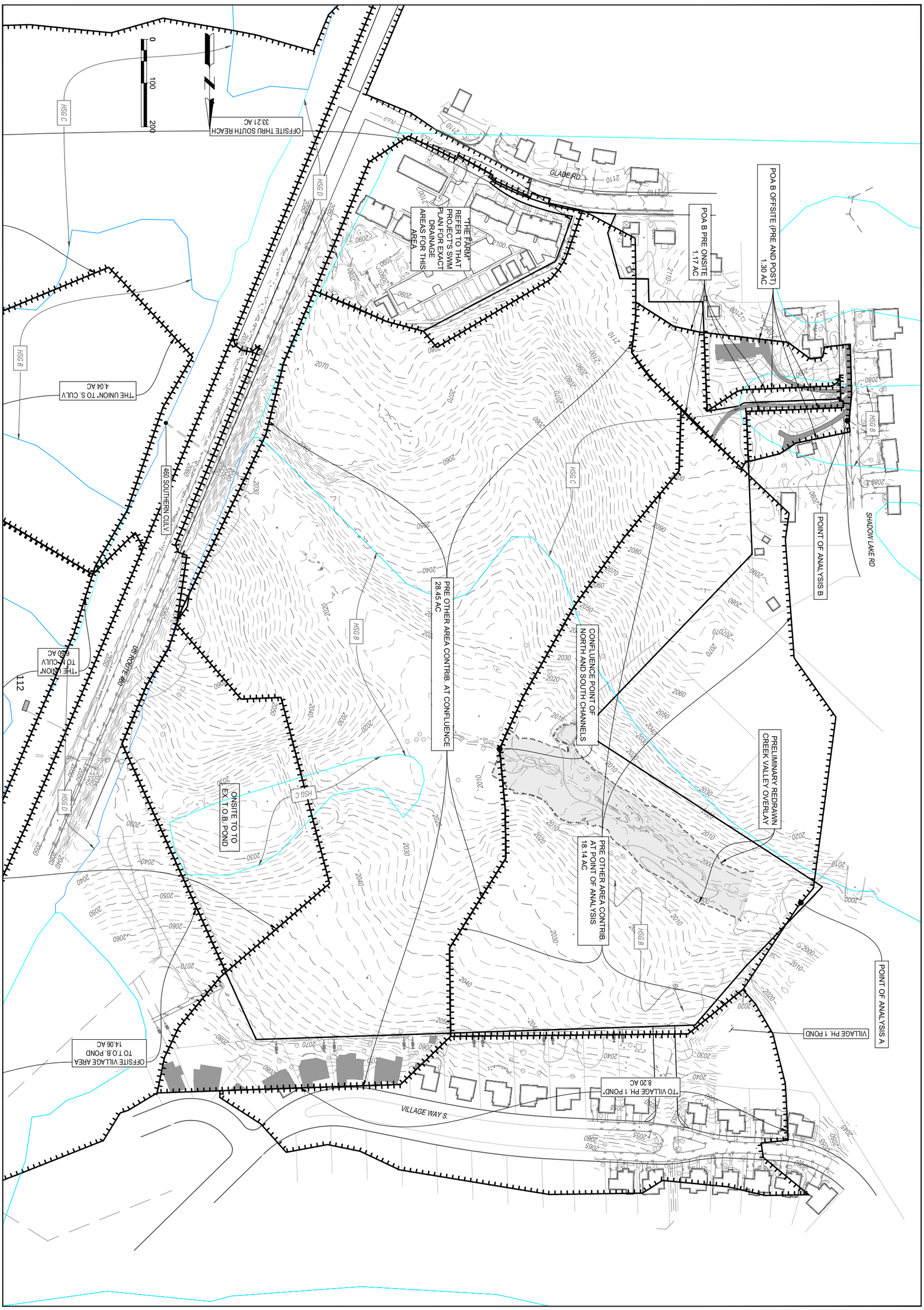
Hyd. No. 22

Total Offsite thru Southern Reach

Hydrograph type	= Combine	Peak discharge	= 86.16 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 341,950 cuft
Inflow hyds.	= 18, 20, 21	Contrib. drain. area	= 5.090 ac



Z:\PROJECTS\CARY HOPPER\2023046704CL - GLADE SPRING CROSSING\EDEN - GLADE SPRING\CAD\PRELIM PLAT CAD\DRAINAGE-PP PREDEV.DWG
10/31/2023 7:58:49 PM



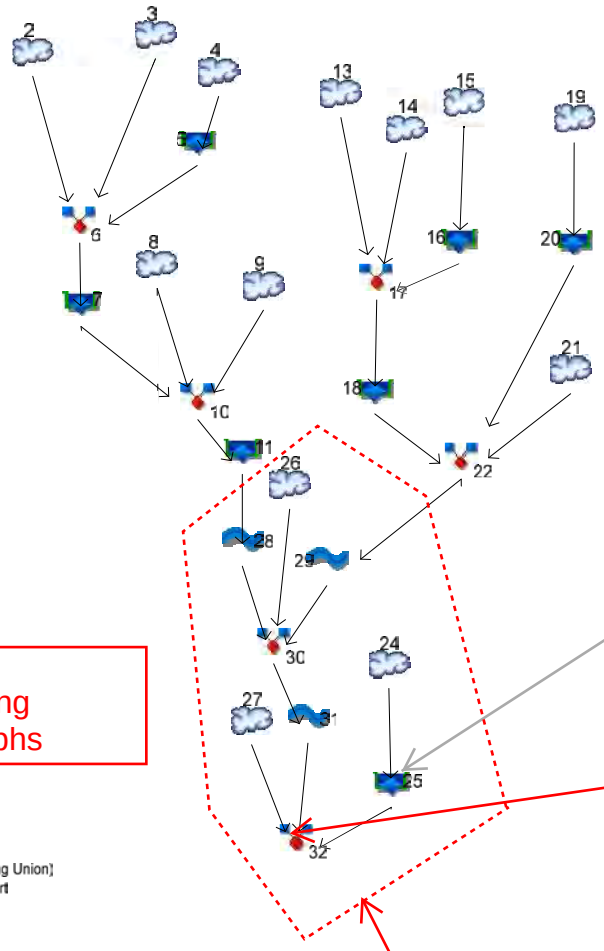
Sheet No. 1 of 1	Checked By: ---	Drawn By: MSF	PROPOSED DEVELOPMENT OF GLADE SPRING CROSSING ZONED PLANNED RESIDENTIAL - ORDINANCE 2007 PROPERTY OF GLADE SPRING CROSSING, LLC TM# 225-(A)-3, 225-(A)-4, & 224-(A)-57; 45.0976 AC. TOWN OF BLACKSBURG - PRICES FORK DISTRICT MONTGOMERY COUNTY, VIRGINIA
D2	Date: 10/24/2023	Scale: AS SHOWN	PREDEVELOPMENT ONSITE DRAINAGE AREAS

PRELIMINARY

No.	Revision Issue	Date

WK DICKSON
community infrastructure consultants
1700 KRAFT DRIVE, SUITE 2350
BLACKSBURG, VIRGINIA 24060
VOICE 540-617-0870

Watershed Model Schematic



Predev. contributing hydrographs

Village Ph.1 Pond 1

32 - "TOTAL AT PROP LINE PRE" (end of pre analysis)

This subsection

Legend

Hyd.	Origin	Description
2	SCS Runoff	To 460 North Culvert (excluding Union)
3	SCS Runoff	Union Bypass To 460 N Culvert
4	SCS Runoff	Union North Detention inflow
5	Reservoir	Union N. Basin Out
6	Combine	Total To 460 North Culvert
7	Reservoir	460 North Culvert Out
8	SCS Runoff	Offsite Village Area to Ex TOB Pond
9	SCS Runoff	Predev Onsite To TOB Pond
10	Combine	Predev Total To Ex TOB Pond
11	Reservoir	Predev Ex.TOB Pond Out
13	SCS Runoff	To 460 South Culvert (excluding Union)
14	SCS Runoff	Union Bypass To 460 S Culvert
15	SCS Runoff	Union South Basin Inflow
16	Reservoir	Union S. Basin Out
17	Combine	Total To 460 South Culvert
18	Reservoir	460 South Culvert Out
19	SCS Runoff	The Farm Basin Inflow
20	Reservoir	The Farm Det. Out
21	SCS Runoff	Undet. Farm and other contrib. offsite
22	Combine	Total Offsite thru Southern Reach
24	SCS Runoff	To Village Ph1 Pond 1
25	Reservoir	Village Ph1 Pond 1 Out
26	SCS Runoff	PRE OTHER AREA CONTRIB. AT CONFLUENCE
27	SCS Runoff	PRE OTHER AREA CONTRIB. AT POA
28	Reach	Ex. TOB Pond outfall routed to confluence
29	Reach	South Offsite Routed to Confluence
30	Combine	PRE COMBINED AT CONFLUENCE
31	Reach	COMBINED ROUTED TO PROPERTY LINE
32	Combine	TOTAL AT PROP LINE PRE

Drainage Area Runoff and Time of Concentration

Drainage Area: **PRE OTHER AREA CONTRIB. AT CONFLUENCE**
PREDEVELOPMENT

Composite Curve Number (CN)						**Notes:**
	Hydrologic Soil Group	Land Cover	CN	Area, A (ac.)	CN*A	
CN_1	B	Open space	61	16.39	999.91	"Other area" contributing at the confluence of the north and south channels. Comprises onsite and offsite areas downstream from detention measures.
CN_2	C	Open space	74	12.04	890.69	
CN_3	B	Imperv. (measured)	98	0.00	0.00	
CN_4	C	Imperv. (measured)	98	0.00	0.00	
CN_5	B	Woods (good)	55	0.00	0.00	
CN_6	C	Woods (good)	70	0.00	0.00	
CN_7					0.00	
CN_8					0.00	
CN_9					0.00	
CN_{10}					0.00	
				Total	**28.43**	**1890.59**
				Composite CN =		**67**

Time of Concentration, T_c						
2 yr. Precip. (in.) =			2.73			
Flow Segment	Flow Regime	Land Cover	Length (ft)	Roughness Coeff., n	Slope (ft/ft)	Travel Time, T_t (min.)
1	Sheet Flow	Grass	100	0.24	0.05	10.7
2	Shallow Conc.	Grass	1100		0.091	3.8
3						
4						
5						
6						
7						
8						
9						
10						
					Total Time of Concentration, T_c (min.) =	**14.5**

Runoff			
	1 Yr.	10 Yr.	100 Yr.
Precipitation (in.), P	2.26	4.06	6.44
Composite CN	67	67	67
Storage (in.) S=1000/CN-10	4.93	4.93	4.93
Initial abstraction (in.), I_a=0.2S	0.99	0.99	0.99
Runoff depth (in.), $Q=(P-0.2S)^2/[(P-I_a)+S]$	0.26	1.18	2.87
Runoff volume (ac-ft), RV = Q/12*A	0.62	2.80	6.79
Flow rate (cfs), q_{peak} from hydrograph	5.61	39.92	102.14

Hydrograph Number: 26

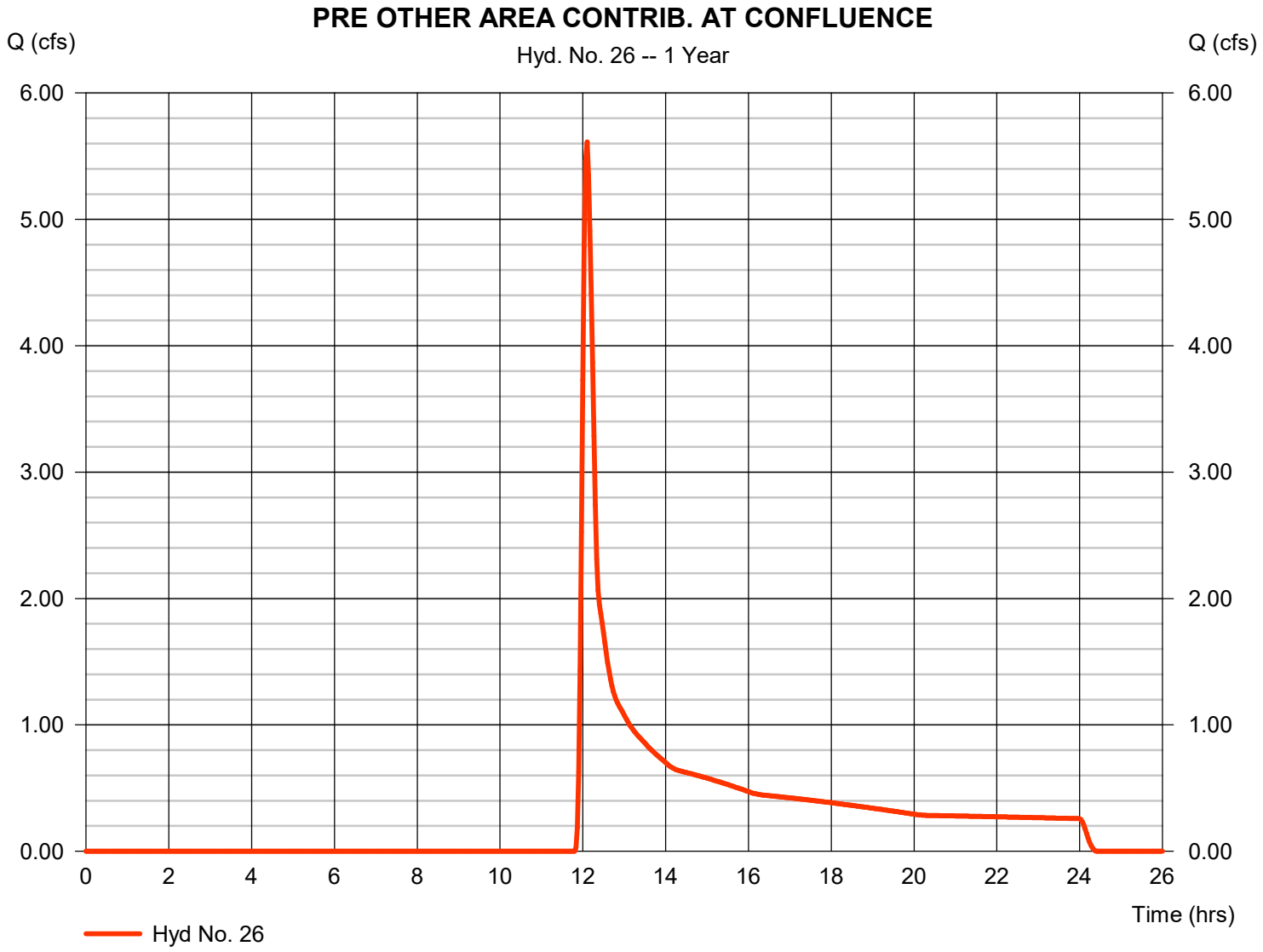
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Wednesday, 11 / 2 / 2022

Hyd. No. 26

PRE OTHER AREA CONTRIB. AT CONFLUENCE

Hydrograph type	= SCS Runoff	Peak discharge	= 5.612 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 26,375 cuft
Drainage area	= 28.430 ac	Curve number	= 67
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 14.50 min
Total precip.	= 2.26 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



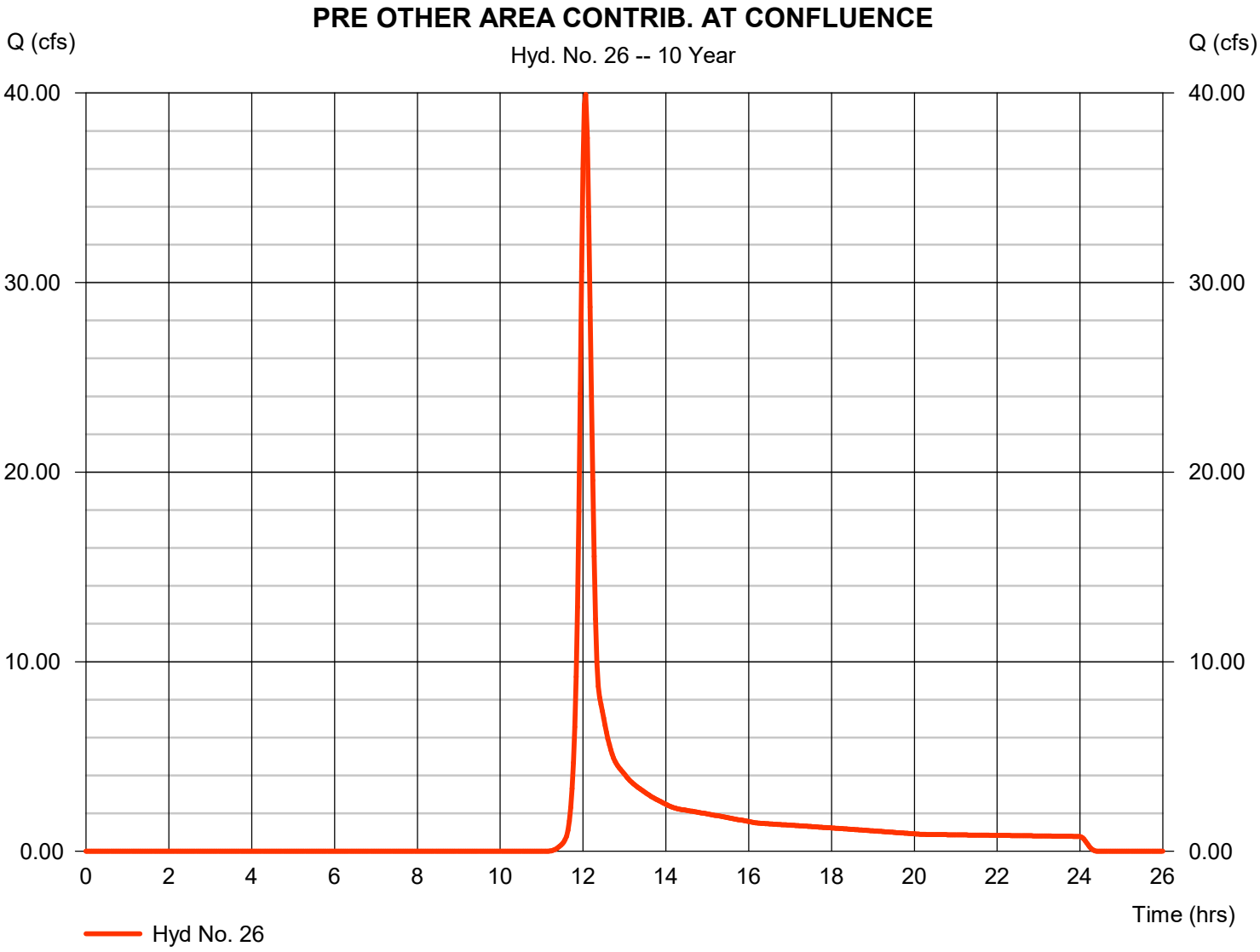
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Wednesday, 11 / 2 / 2022

Hyd. No. 26

PRE OTHER AREA CONTRIB. AT CONFLUENCE

Hydrograph type	= SCS Runoff	Peak discharge	= 39.92 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 118,919 cuft
Drainage area	= 28.430 ac	Curve number	= 67
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 14.50 min
Total precip.	= 4.06 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

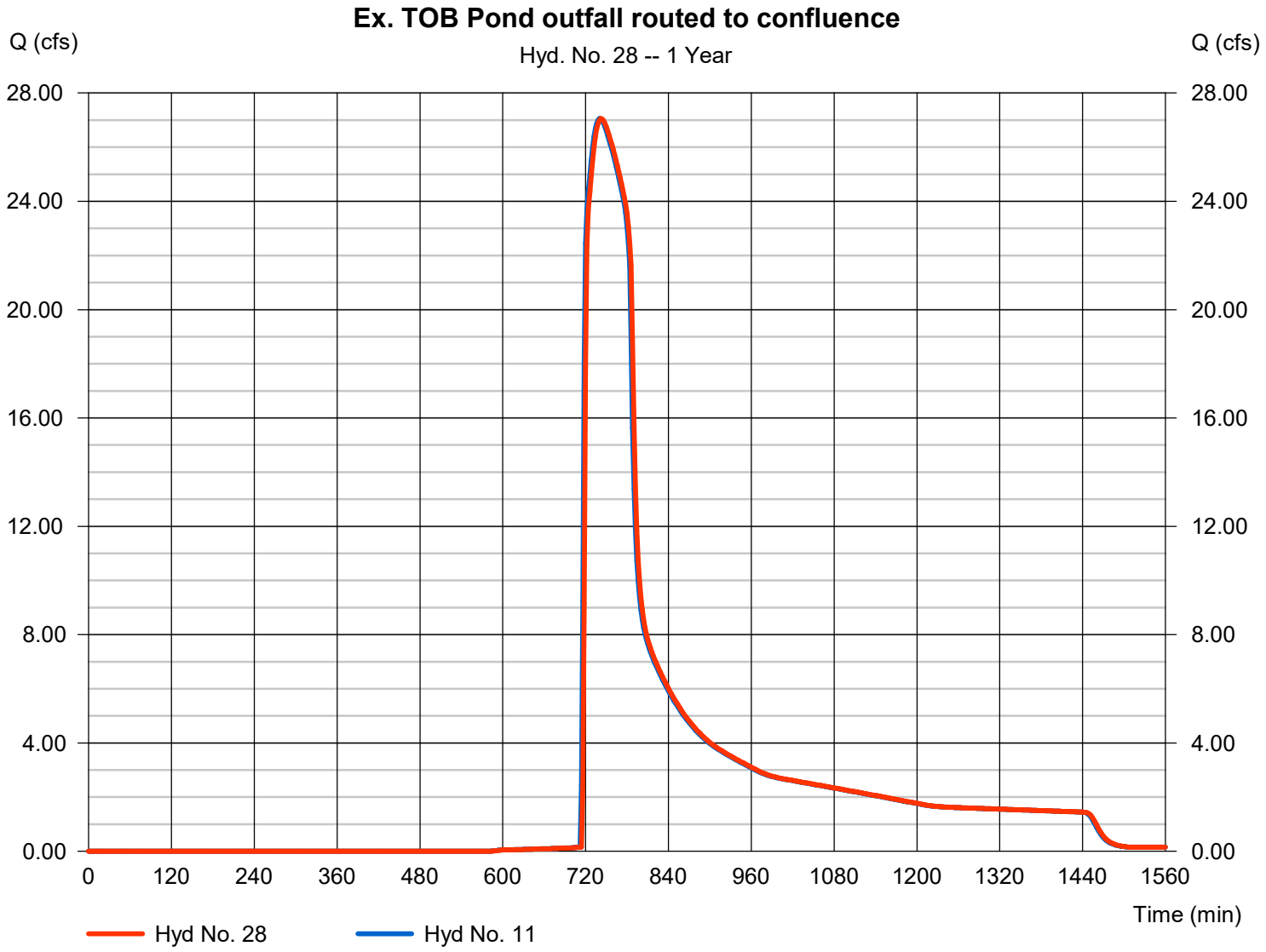
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 28

Ex. TOB Pond outfall routed to confluence

Hydrograph type	=	Reach	Peak discharge	=	27.06 cfs
Storm frequency	=	1 yrs	Time to peak	=	742 min
Time interval	=	2 min	Hyd. volume	=	231,957 cuft
Inflow hyd. No.	=	11 - Predev Ex.TOB Pond Out	Section type	=	Triangular
Reach length	=	436.0 ft	Channel slope	=	2.0 %
Manning's n	=	0.030	Bottom width	=	0.0 ft
Side slope	=	3.0:1	Max. depth	=	0.0 ft
Rating curve x	=	3.074	Rating curve m	=	1.333
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.9855

Modified Att-Kin routing method used.



Hydrograph Report

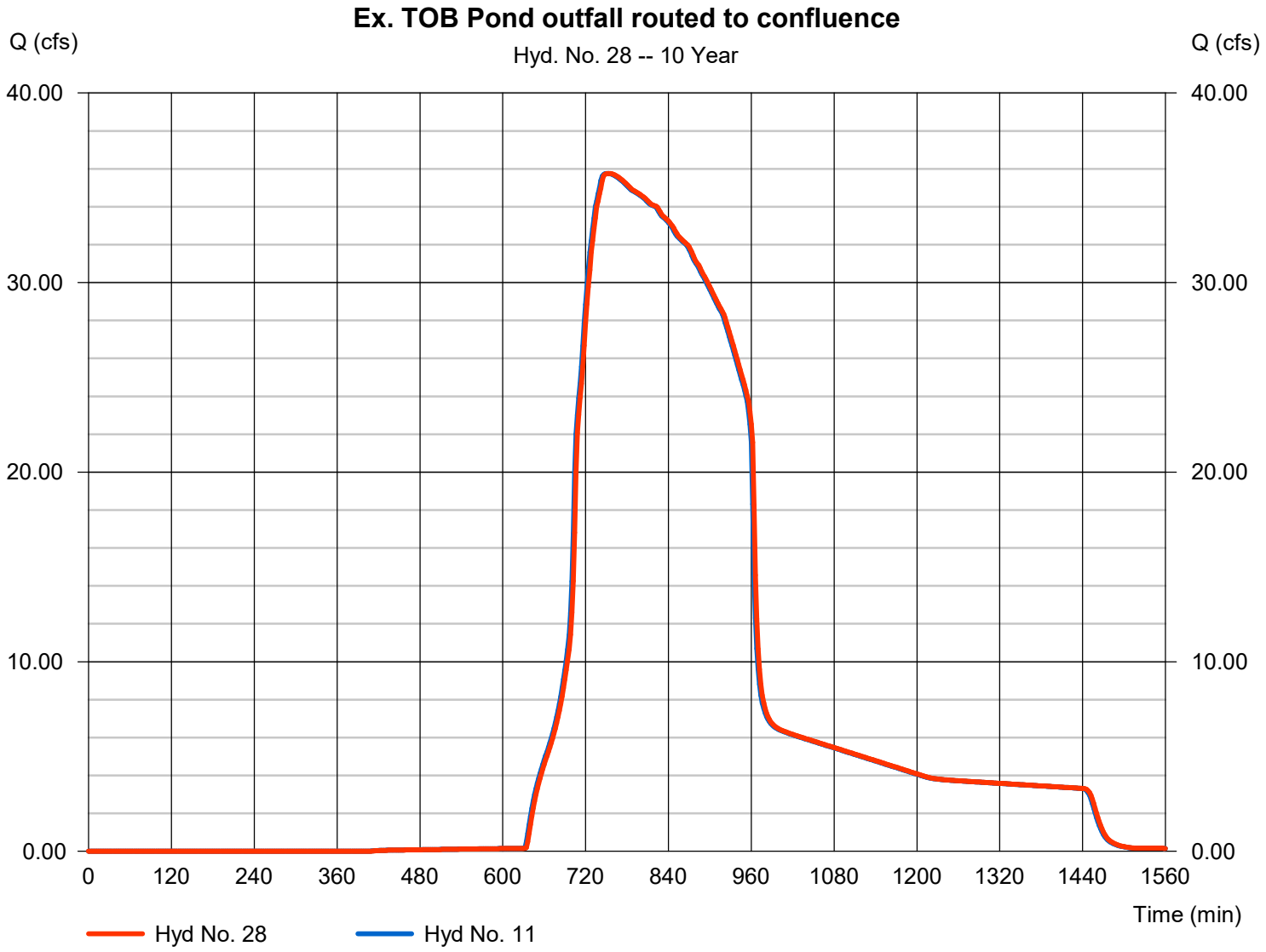
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 28

Ex. TOB Pond outfall routed to confluence

Hydrograph type	=	Reach	Peak discharge	=	35.75 cfs
Storm frequency	=	10 yrs	Time to peak	=	754 min
Time interval	=	2 min	Hyd. volume	=	661,722 cuft
Inflow hyd. No.	=	11 - Predev Ex.TOB Pond Out	Section type	=	Triangular
Reach length	=	436.0 ft	Channel slope	=	2.0 %
Manning's n	=	0.030	Bottom width	=	0.0 ft
Side slope	=	3.0:1	Max. depth	=	0.0 ft
Rating curve x	=	3.074	Rating curve m	=	1.333
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	1.0203

Modified Att-Kin routing method used.



Hydrograph Report

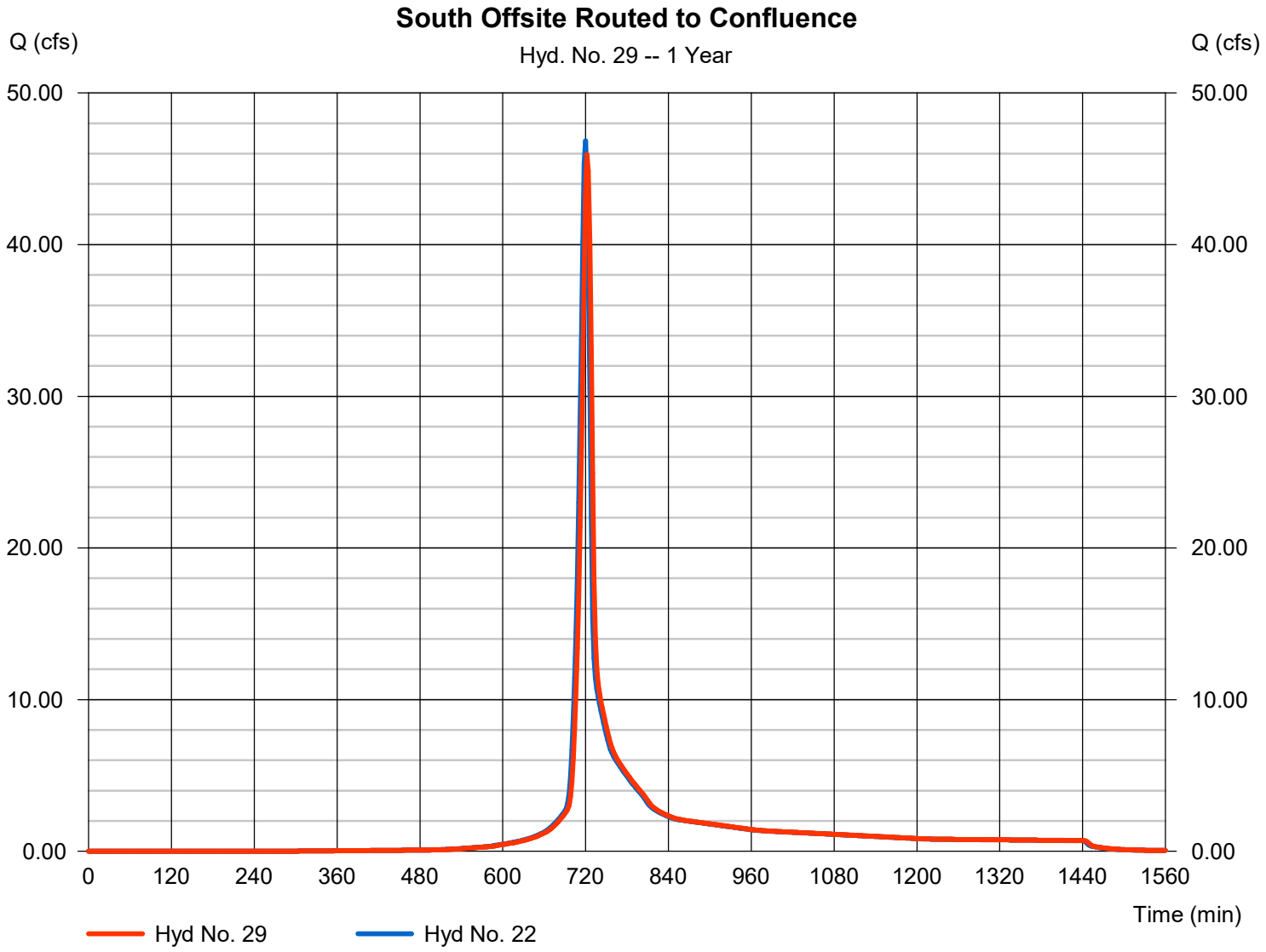
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Tuesday, 11 / 1 / 2022

Hyd. No. 29

South Offsite Routed to Confluence

Hydrograph type	= Reach	Peak discharge	= 45.94 cfs
Storm frequency	= 1 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 144,743 cuft
Inflow hyd. No.	= 22 - Total Offsite thru Southern Reach	Section type	= Triangular
Reach length	= 877.0 ft	Channel slope	= 2.3 %
Manning's n	= 0.030	Bottom width	= 0.0 ft
Side slope	= 3.0:1	Max. depth	= 0.0 ft
Rating curve x	= 3.296	Rating curve m	= 1.333
Ave. velocity	= 6.40 ft/s	Routing coeff.	= 0.7372

Modified Att-Kin routing method used.



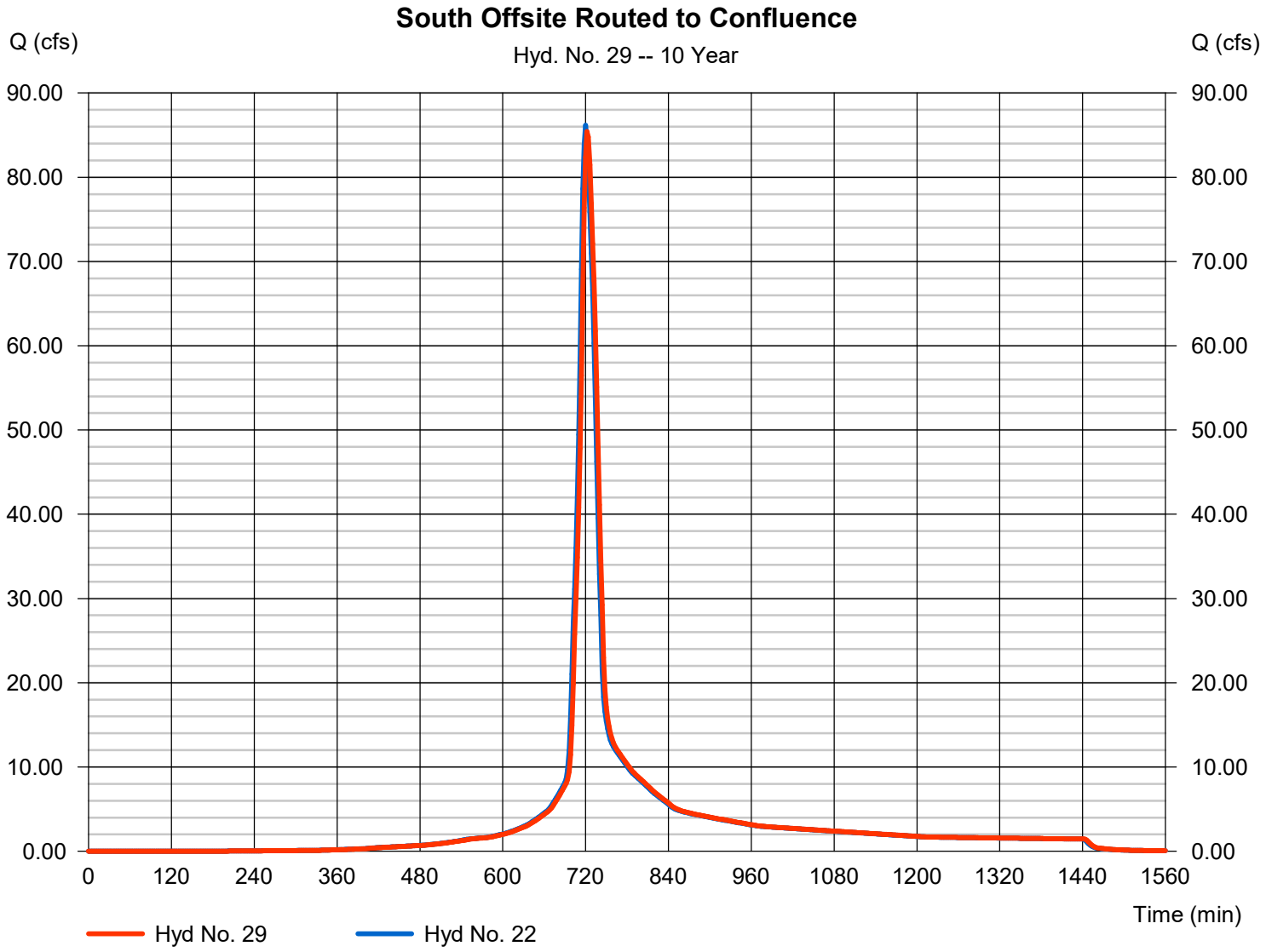
Hydrograph Report

Hyd. No. 29

South Offsite Routed to Confluence

Hydrograph type	= Reach	Peak discharge	= 85.44 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 341,946 cuft
Inflow hyd. No.	= 22 - Total Offsite thru Southern Reach	Section type	= Triangular
Reach length	= 877.0 ft	Channel slope	= 2.3 %
Manning's n	= 0.030	Bottom width	= 0.0 ft
Side slope	= 3.0:1	Max. depth	= 0.0 ft
Rating curve x	= 3.296	Rating curve m	= 1.333
Ave. velocity	= 7.45 ft/s	Routing coeff.	= 0.8094

Modified Att-Kin routing method used.

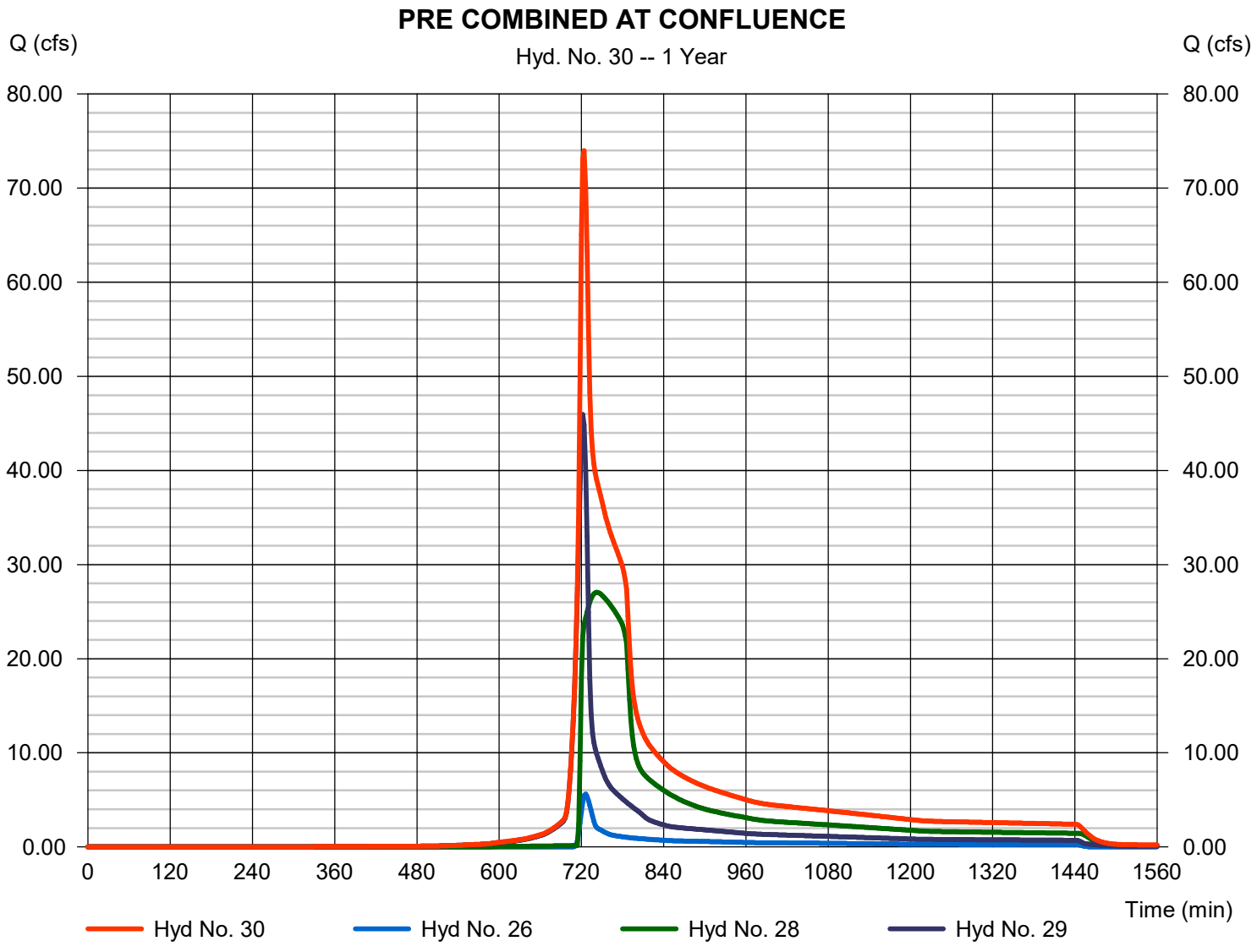


Hydrograph Report

Hyd. No. 30

PRE COMBINED AT CONFLUENCE

Hydrograph type	= Combine	Peak discharge	= 73.96 cfs
Storm frequency	= 1 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 403,075 cuft
Inflow hyds.	= 26, 28, 29	Contrib. drain. area	= 28.430 ac

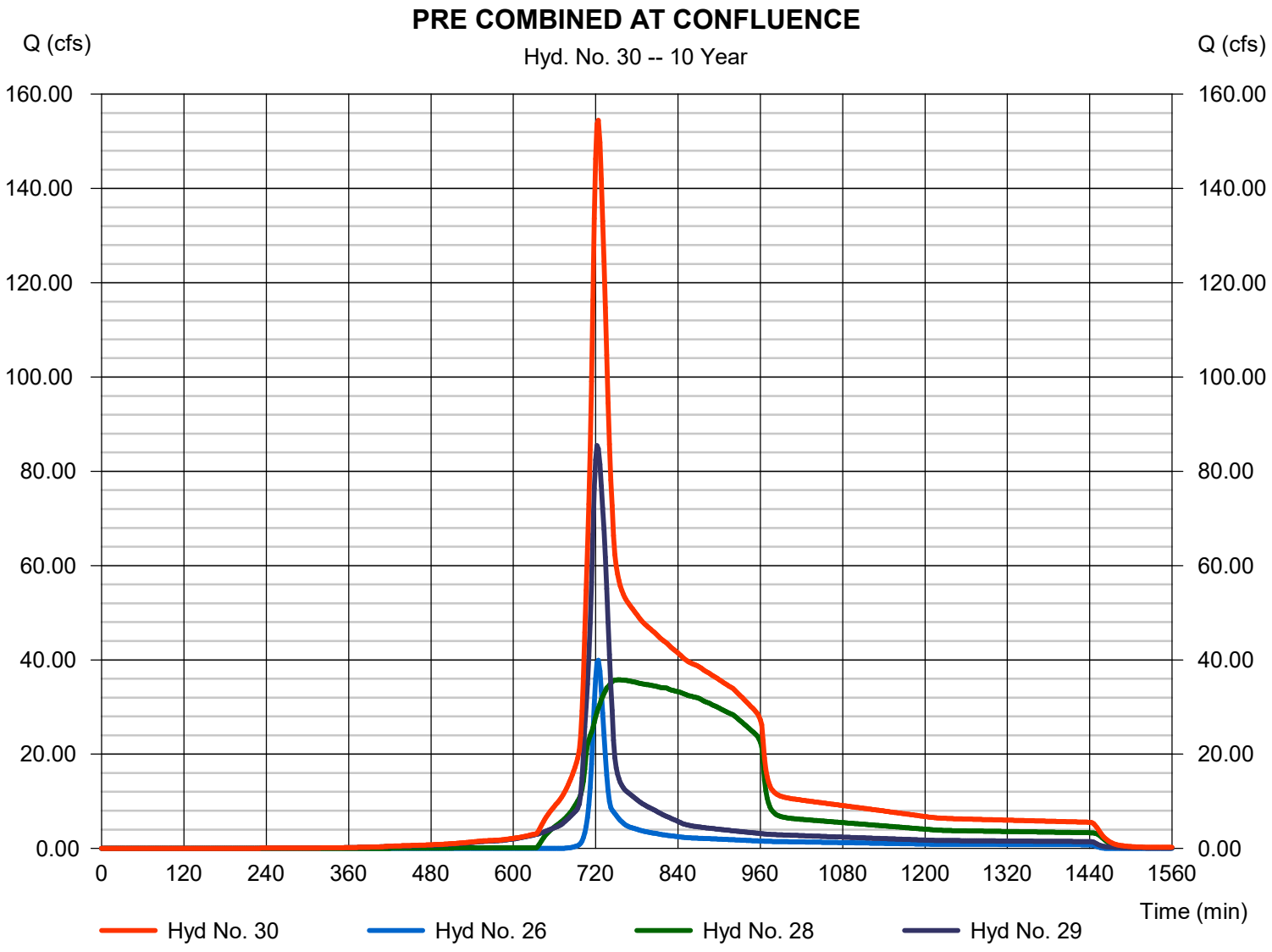


Hydrograph Report

Hyd. No. 30

PRE COMBINED AT CONFLUENCE

Hydrograph type	= Combine	Peak discharge	= 154.45 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 1,122,588 cuft
Inflow hyds.	= 26, 28, 29	Contrib. drain. area	= 28.430 ac



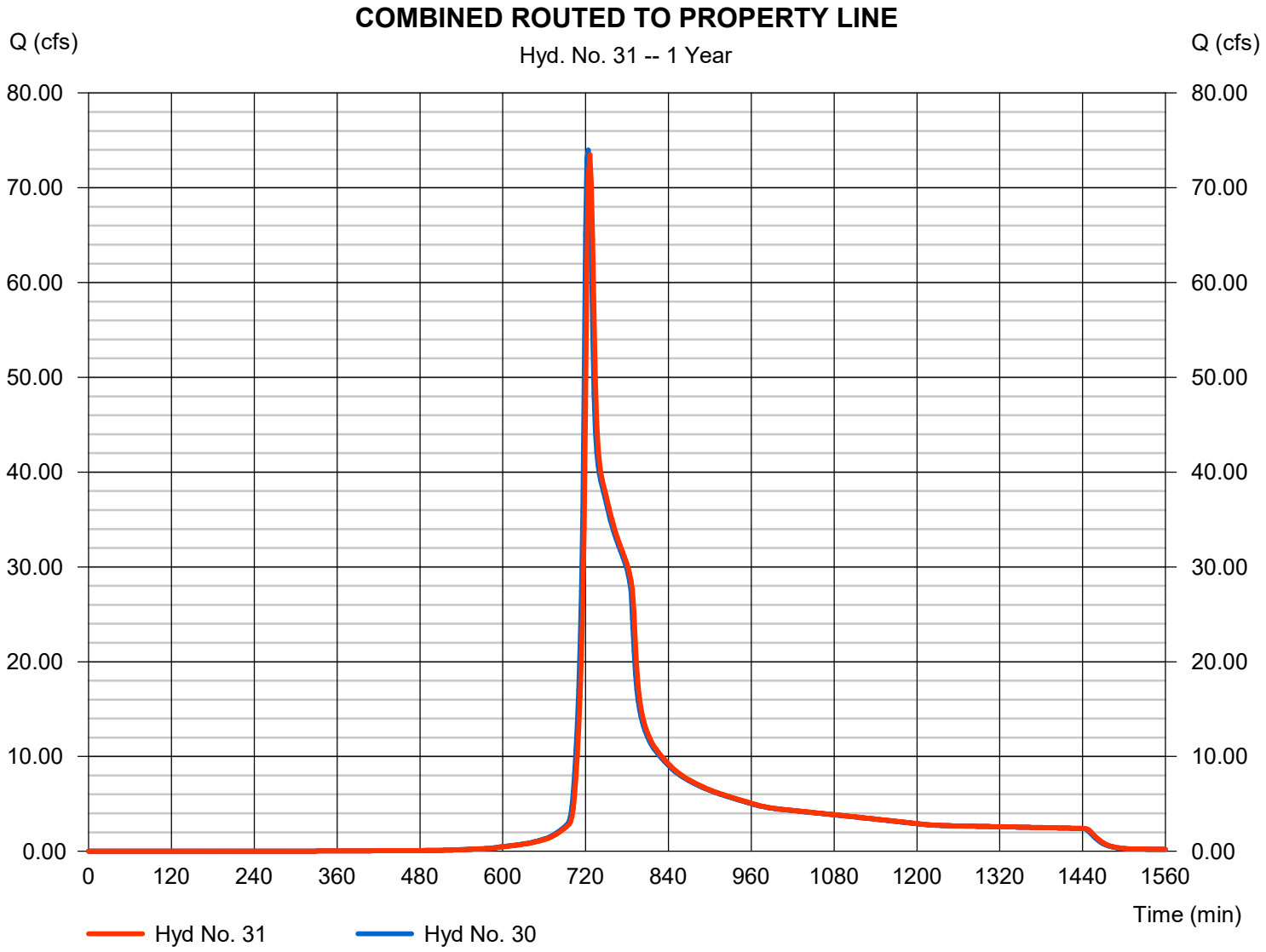
Hydrograph Report

Hyd. No. 31

COMBINED ROUTED TO PROPERTY LINE

Hydrograph type	=	Reach	Peak discharge	=	73.47 cfs
Storm frequency	=	1 yrs	Time to peak	=	726 min
Time interval	=	2 min	Hyd. volume	=	403,072 cuft
Inflow hyd. No.	=	30 - PRE COMBINED AT CONFLUENCE	Section type	=	Triangular
Reach length	=	775.0 ft	Channel slope	=	2.0 %
Manning's n	=	0.030	Bottom width	=	0.0 ft
Side slope	=	3.0:1	Max. depth	=	0.0 ft
Rating curve x	=	3.074	Rating curve m	=	1.333
Ave. velocity	=	6.81 ft/s	Routing coeff.	=	0.8254

Modified Att-Kin routing method used.



Hydrograph Report

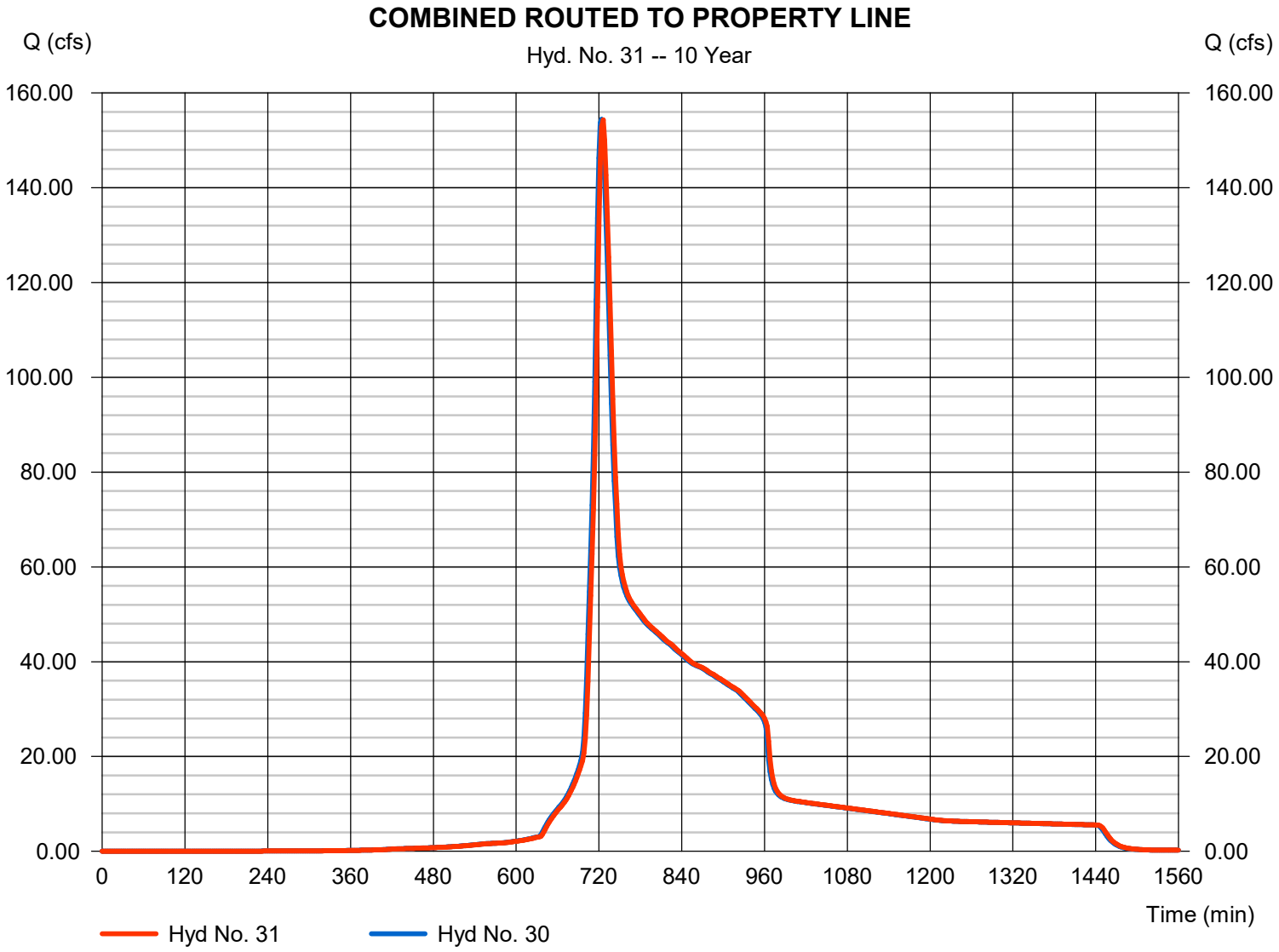
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Tuesday, 11 / 1 / 2022

Hyd. No. 31

COMBINED ROUTED TO PROPERTY LINE

Hydrograph type	=	Reach	Peak discharge	=	154.33 cfs
Storm frequency	=	10 yrs	Time to peak	=	726 min
Time interval	=	2 min	Hyd. volume	=	1,122,586 cuft
Inflow hyd. No.	=	30 - PRE COMBINED AT CONFLUENCE	Section type	=	Triangular
Reach length	=	775.0 ft	Channel slope	=	2.0 %
Manning's n	=	0.030	Bottom width	=	0.0 ft
Side slope	=	3.0:1	Max. depth	=	0.0 ft
Rating curve x	=	3.074	Rating curve m	=	1.333
Ave. velocity	=	8.18 ft/s	Routing coeff.	=	0.9158

Modified Att-Kin routing method used.



Drainage Area Runoff and Time of Concentration

Drainage Area: **PRE OTHER AREA CONTRIB. AT POA**
PREDEVELOPMENT

Composite Curve Number (CN)						Notes:
	Hydrologic Soil Group	Land Cover	CN	Area, A (ac.)	CN*A	"Other area" contributing to the point of analysis. Comprises onsite and offsite areas downstream from detention measures.
CN_1	B	Open space	61	8.08	492.75	
CN_2	C	Open space	74	2.84	210.02	
CN_3	B	Imperv. (measured)	98	0.00	0.00	
CN_4	C	Imperv. (measured)	98		0.00	
CN_5	B	Woods (good)	55	2.34	128.48	
CN_6	C	Woods (good)	70	4.89	342.25	
CN_7					0.00	
CN_8					0.00	
CN_9					0.00	
CN_{10}					0.00	
			Total	**18.14**	**1173.50**	
				Composite CN =	**65**	

Time of Concentration, T_c						
2 yr. Precip. (in.) =			2.73			
Flow Segment	Flow Regime	Land Cover	Length (ft)	Roughness Coeff., n	Slope (ft/ft)	Travel Time, T_t (min.)
1	Sheet Flow	Grass	100	0.24	0.05	10.7
2	Shallow Conc.	Grass	1100		0.091	3.8
3	Channel	Grass	834	0.03	0.019	3.7
4						
5						
6						
7						
8						
9						
10						
					Total Time of Concentration, T_c (min.) =	**18.2**

Runoff			
	1 Yr.	10 Yr.	100 Yr.
Precipitation (in.), P	2.26	4.06	6.44
Composite CN	65	65	65
Storage (in.) S=1000/CN-10	5.38	5.38	5.38
Initial abstraction (in.), I_a=0.2S	1.08	1.08	1.08
Runoff depth (in.), $Q=(P-0.2S)^2/[(P-I_a)+S]$	0.21	1.06	2.68
Runoff volume (ac-ft), RV = Q/12*A	0.32	1.61	4.05
Flow rate (cfs), q_{peak} from hydrograph	2.10	20.29	55.29

Hydrograph Number: 27

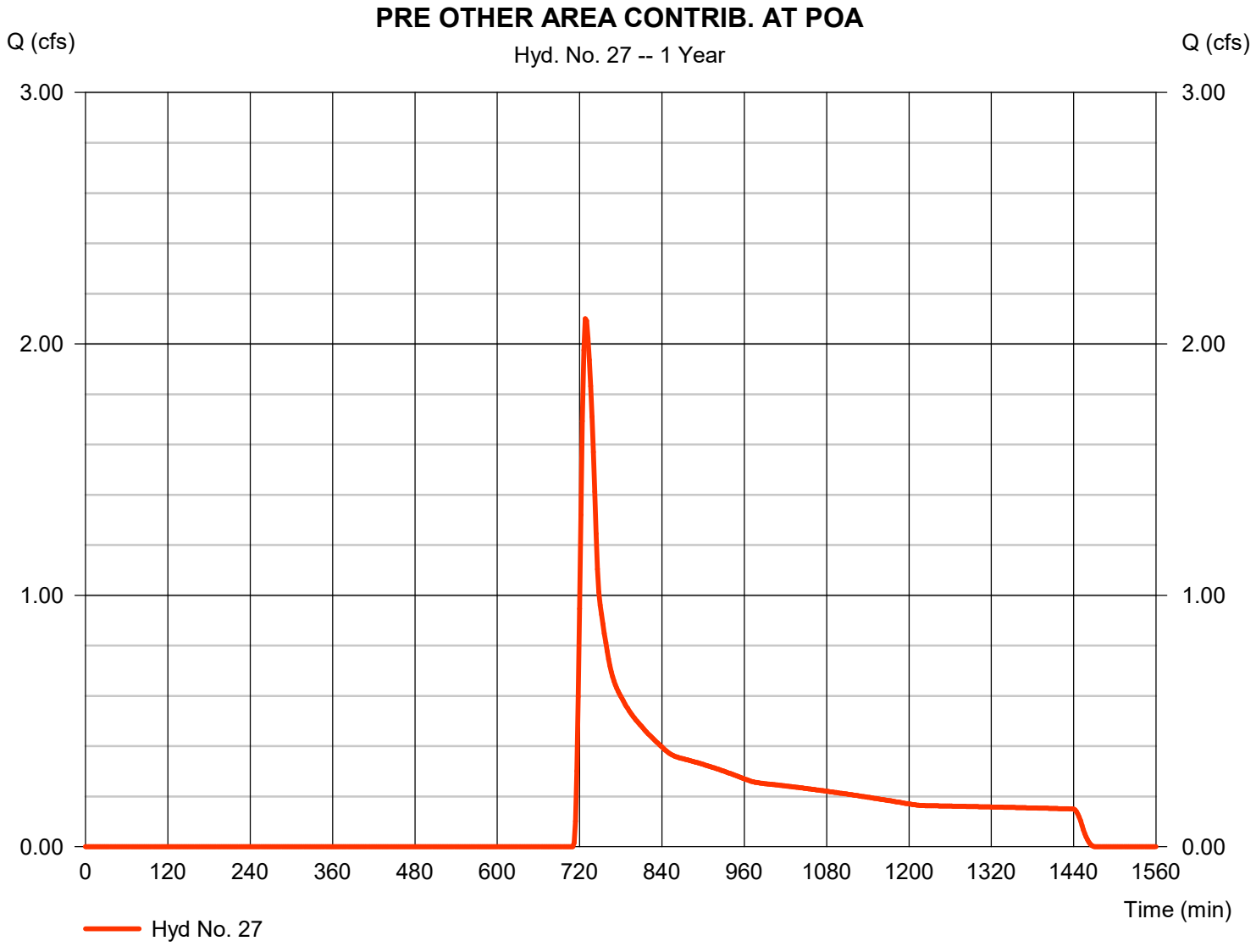
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Tuesday, 11 / 1 / 2022

Hyd. No. 27

PRE OTHER AREA CONTRIB. AT POA

Hydrograph type	= SCS Runoff	Peak discharge	= 2.100 cfs
Storm frequency	= 1 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 14,030 cuft
Drainage area	= 18.140 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.20 min
Total precip.	= 2.26 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



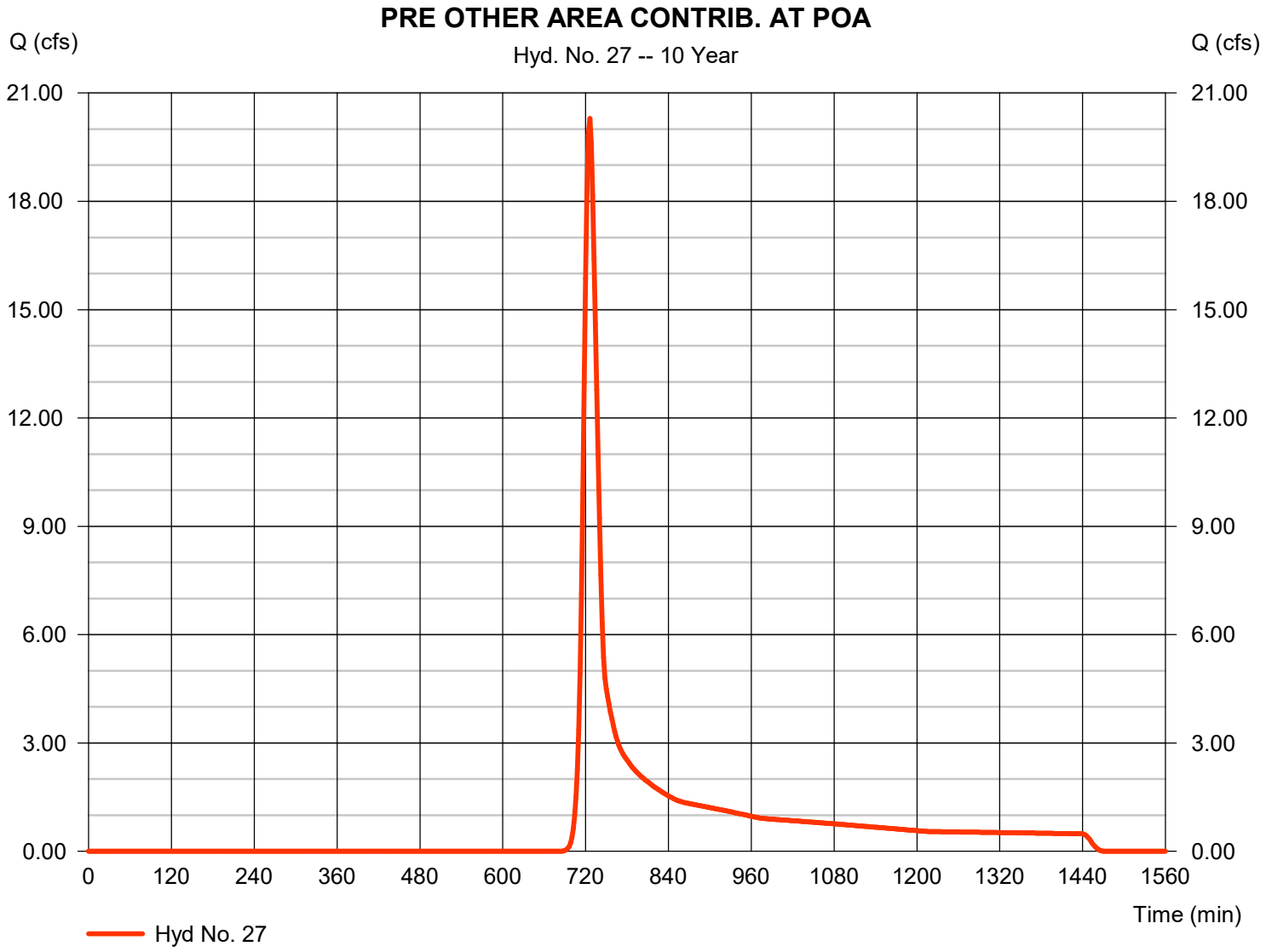
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Tuesday, 11 / 1 / 2022

Hyd. No. 27

PRE OTHER AREA CONTRIB. AT POA

Hydrograph type	= SCS Runoff	Peak discharge	= 20.29 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 70,027 cuft
Drainage area	= 18.140 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.20 min
Total precip.	= 4.06 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Drainage Area Runoff and Time of Concentration

Precipitation Data	
Return Frequency	P (in.)
1 Yr.	2.26
2 Yr.	2.73
10 Yr.	4.06
100 Yr.	6.44

Drainage Area: **To Village Phase 1 Pond**

Predev.

Composite Curve Number (CN)

	CN	Area (Ac.)	CN*A
CN_1	75	8.20	615.26
CN_2			0.00
CN_3			0.00
CN_4			0.00
CN_5			0.00
Total	-	**8.20**	**615.26**
		Composite CN =	**75**

Time of Concentration, T_c

Flow Segment	Flow Regime	Land Cover	Length (ft)	Roughness Coeff., n	Slope (ft/ft)	Travel Time, T_t (min.)
1	Sheet Flow	Grass	100	0.24	0.087	8.6
2	Shallow Conc.	Unpaved	120		0.16	0.3
3	Channel	Grass	478	0.03	0.042	1.7
4						
5						
6						
				Total Time of Concentration, T_c (min.)		**10.6**

Runoff

	1 Yr.	10 Yr.	100 Yr.
Composite CN	75	75	75
Storage (in.) S=1000/CN-10	3.33	3.33	3.33
Initial abstraction (in.), I_a=0.2S	0.67	0.67	0.67
Runoff depth (in.), $Q=(P-0.2S)^2/[(P-I_a)+S]$	0.52	1.71	3.66
Runoff volume (ac-ft), RV = Q/12*A	0.35	1.17	2.50
Flow rate (cfs), q_{peak} from hydrograph	5.51	20.07	

Hydrograph No.: 24

Notes: B soil, 1/4 ac lots CN: 75. Composite CN from Village Ph. 1 calcs: 74

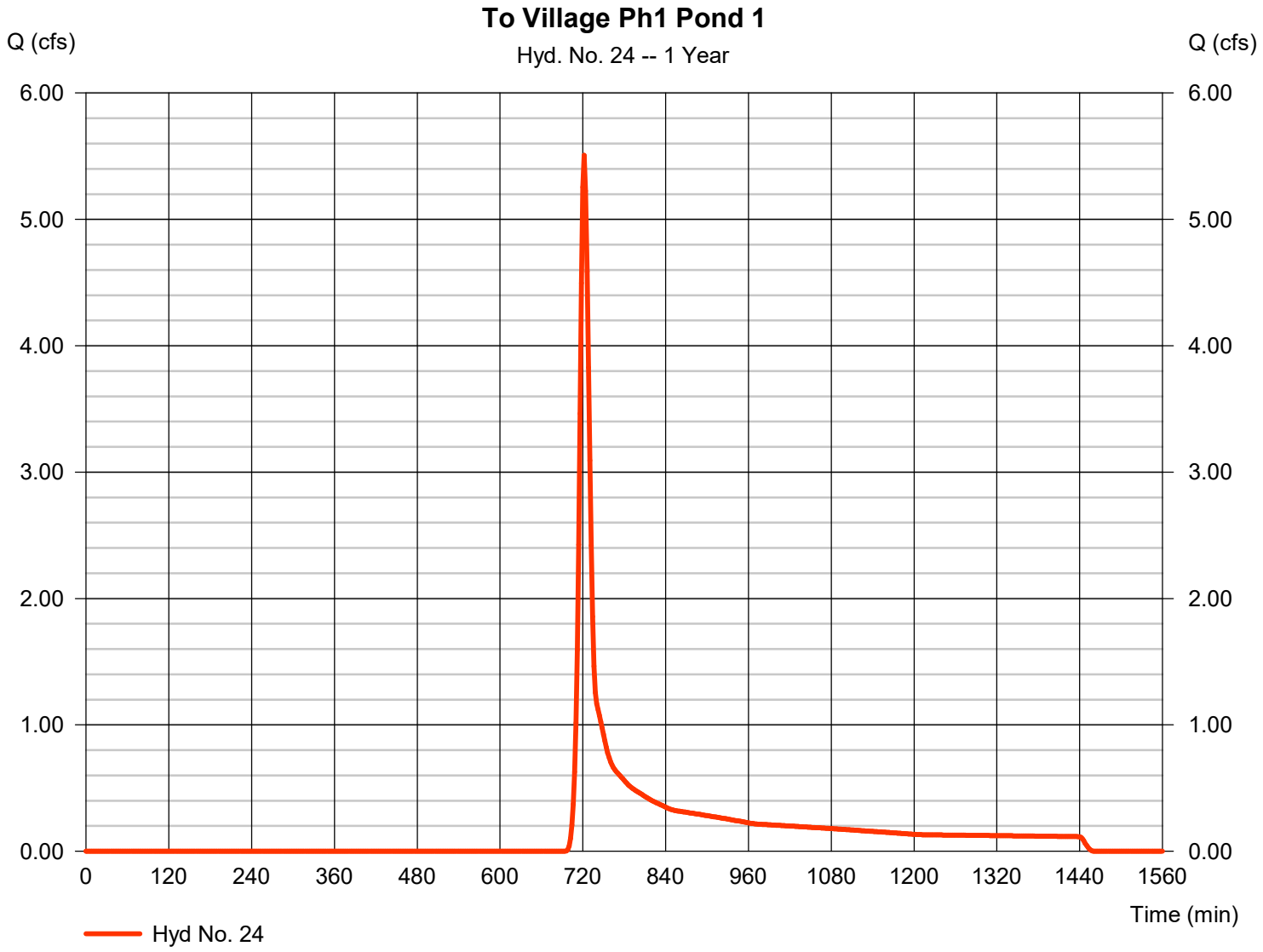
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 24

To Village Ph1 Pond 1

Hydrograph type	= SCS Runoff	Peak discharge	= 5.507 cfs
Storm frequency	= 1 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 15,818 cuft
Drainage area	= 8.200 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.60 min
Total precip.	= 2.26 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



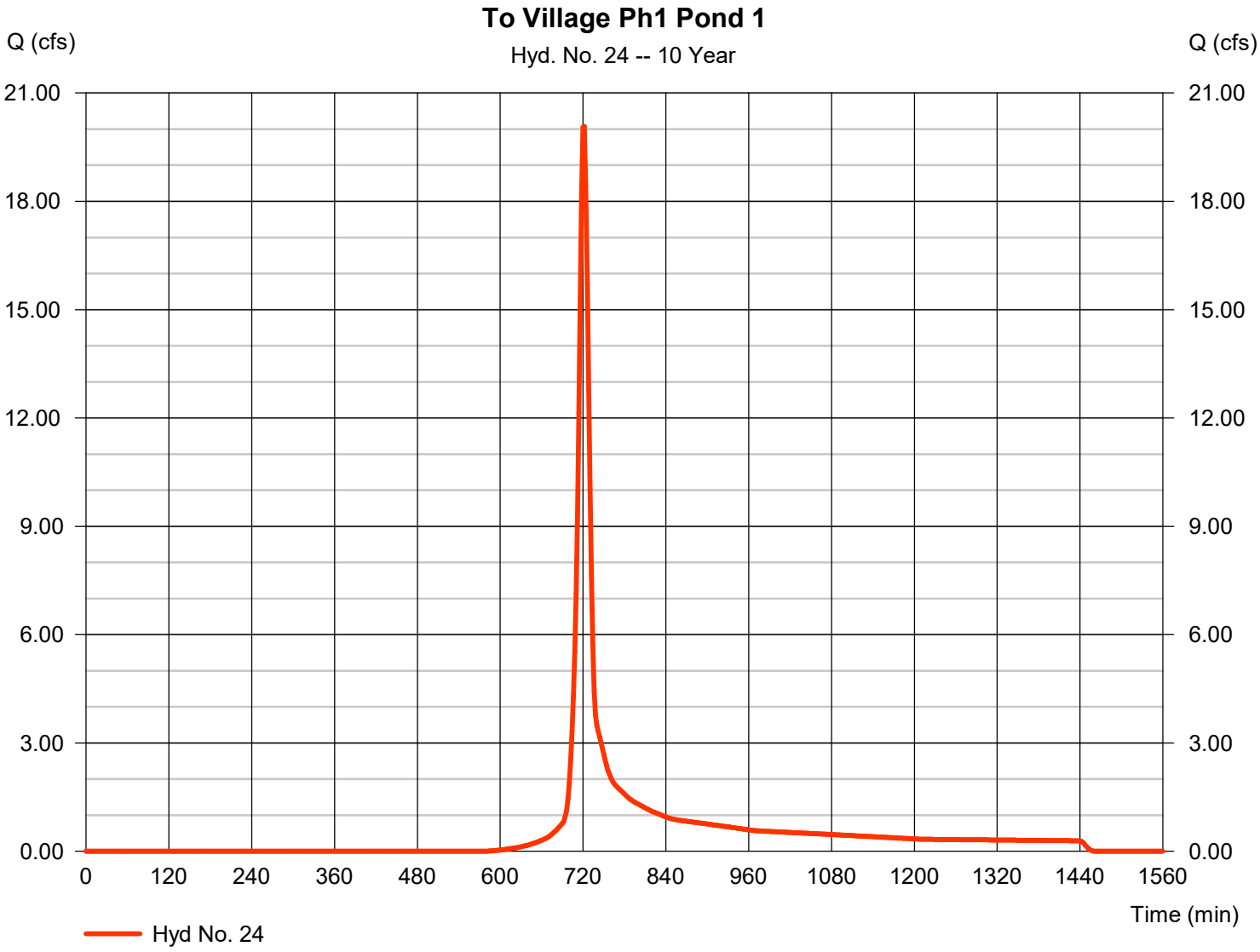
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 24

To Village Ph1 Pond 1

Hydrograph type	= SCS Runoff	Peak discharge	= 20.07 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 52,546 cuft
Drainage area	= 8.200 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.60 min
Total precip.	= 4.06 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Pond No. 7 - Ex. Village Ph.1 Pond 1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 2020.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	2020.00	8,930	0	0
2.00	2022.00	11,435	20,311	20,311
4.00	2024.00	14,161	25,545	45,856
6.00	2026.00	17,119	31,230	77,086
6.40	2026.40	17,672	6,957	84,044

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	8.00	0.00	0.00
Span (in)	= 15.00	8.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 2020.00	2021.00	0.00	0.00
Length (ft)	= 60.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .012	.012	.013	n/a
Orifice Coeff.	= 0.60	0.55	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 3.50	20.00	0.00	0.00
Crest El. (ft)	= 2024.50	2025.50	0.00	0.00
Weir Coeff.	= 0.90	2.50	3.33	3.33
Weir Type	= 1	Broad	---	---
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).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	2020.00	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
0.20	2,031	2020.20	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
0.40	4,062	2020.40	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
0.60	6,093	2020.60	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
0.80	8,125	2020.80	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
1.00	10,156	2021.00	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
1.20	12,187	2021.20	0.13 ic	0.12 ic	---	---	0.00	0.00	---	---	---	---	0.124
1.40	14,218	2021.40	0.43 ic	0.43 ic	---	---	0.00	0.00	---	---	---	---	0.433
1.60	16,249	2021.60	0.80 ic	0.80 ic	---	---	0.00	0.00	---	---	---	---	0.800
1.80	18,280	2021.80	1.05 ic	1.05 ic	---	---	0.00	0.00	---	---	---	---	1.052
2.00	20,311	2022.00	1.29 ic	1.26 ic	---	---	0.00	0.00	---	---	---	---	1.258
2.20	22,866	2022.20	1.46 ic	1.43 ic	---	---	0.00	0.00	---	---	---	---	1.434
2.40	25,420	2022.40	1.59 ic	1.59 ic	---	---	0.00	0.00	---	---	---	---	1.591
2.60	27,975	2022.60	1.73 ic	1.73 ic	---	---	0.00	0.00	---	---	---	---	1.734
2.80	30,529	2022.80	1.87 ic	1.87 ic	---	---	0.00	0.00	---	---	---	---	1.866
3.00	33,084	2023.00	2.02 ic	1.99 ic	---	---	0.00	0.00	---	---	---	---	1.989
3.20	35,638	2023.20	2.11 ic	2.10 ic	---	---	0.00	0.00	---	---	---	---	2.105
3.40	38,193	2023.40	2.21 ic	2.21 ic	---	---	0.00	0.00	---	---	---	---	2.214
3.60	40,747	2023.60	2.32 ic	2.32 ic	---	---	0.00	0.00	---	---	---	---	2.319
3.80	43,302	2023.80	2.42 ic	2.42 ic	---	---	0.00	0.00	---	---	---	---	2.419
4.00	45,856	2024.00	2.52 ic	2.52 ic	---	---	0.00	0.00	---	---	---	---	2.516
4.20	48,979	2024.20	2.61 ic	2.61 ic	---	---	0.00	0.00	---	---	---	---	2.608
4.40	52,102	2024.40	2.70 ic	2.70 ic	---	---	0.00	0.00	---	---	---	---	2.698
4.60	55,225	2024.60	2.90 ic	2.78 ic	---	---	0.10	0.00	---	---	---	---	2.884
4.80	58,348	2024.80	3.40 ic	2.87 ic	---	---	0.52	0.00	---	---	---	---	3.385
5.00	61,471	2025.00	4.07 ic	2.95 ic	---	---	1.11	0.00	---	---	---	---	4.063
5.20	64,594	2025.20	4.87 oc	3.03 ic	---	---	1.84	0.00	---	---	---	---	4.873
5.40	67,717	2025.40	5.71 ic	3.02 ic	---	---	2.69	0.00	---	---	---	---	5.707
5.60	70,840	2025.60	6.61 ic	2.97 ic	---	---	3.63	1.57	---	---	---	---	8.177
5.80	73,963	2025.80	7.56 ic	2.90 ic	---	---	4.67	8.20	---	---	---	---	15.76
6.00	77,086	2026.00	8.57 ic	2.79 ic	---	---	5.79	17.68	---	---	---	---	26.25
6.04	77,782	2026.04	8.78 ic	2.76 ic	---	---	6.02	19.84	---	---	---	---	28.62
6.08	78,478	2026.08	8.99 ic	2.73 ic	---	---	6.26	22.09	---	---	---	---	31.08
6.12	79,174	2026.12	9.20 ic	2.70 ic	---	---	6.50	24.42	---	---	---	---	33.61
6.16	79,869	2026.16	9.41 ic	2.67 ic	---	---	6.74	26.82	---	---	---	---	36.23
6.20	80,565	2026.20	9.38 ic	2.69 ic	---	---	5.37 ic	29.30	---	---	---	---	37.35
6.24	81,261	2026.24	9.36 ic	2.71 ic	---	---	5.43 ic	31.84	---	---	---	---	39.99
6.28	81,957	2026.28	9.34 ic	2.74 ic	---	---	5.49 ic	34.46	---	---	---	---	42.69

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Ex. Village Ph.1 Pond 1

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
6.32	82,652	2026.32	9.32 ic	2.76 ic	---	---	5.55 ic	37.15	---	---	---	---	45.46
6.36	83,348	2026.36	9.30 ic	2.78 ic	---	---	5.61 ic	39.90	---	---	---	---	48.30
6.40	84,044	2026.40	9.28 ic	2.80 ic	---	---	5.67 ic	42.69	---	---	---	---	51.17

...End

Hydrograph Report

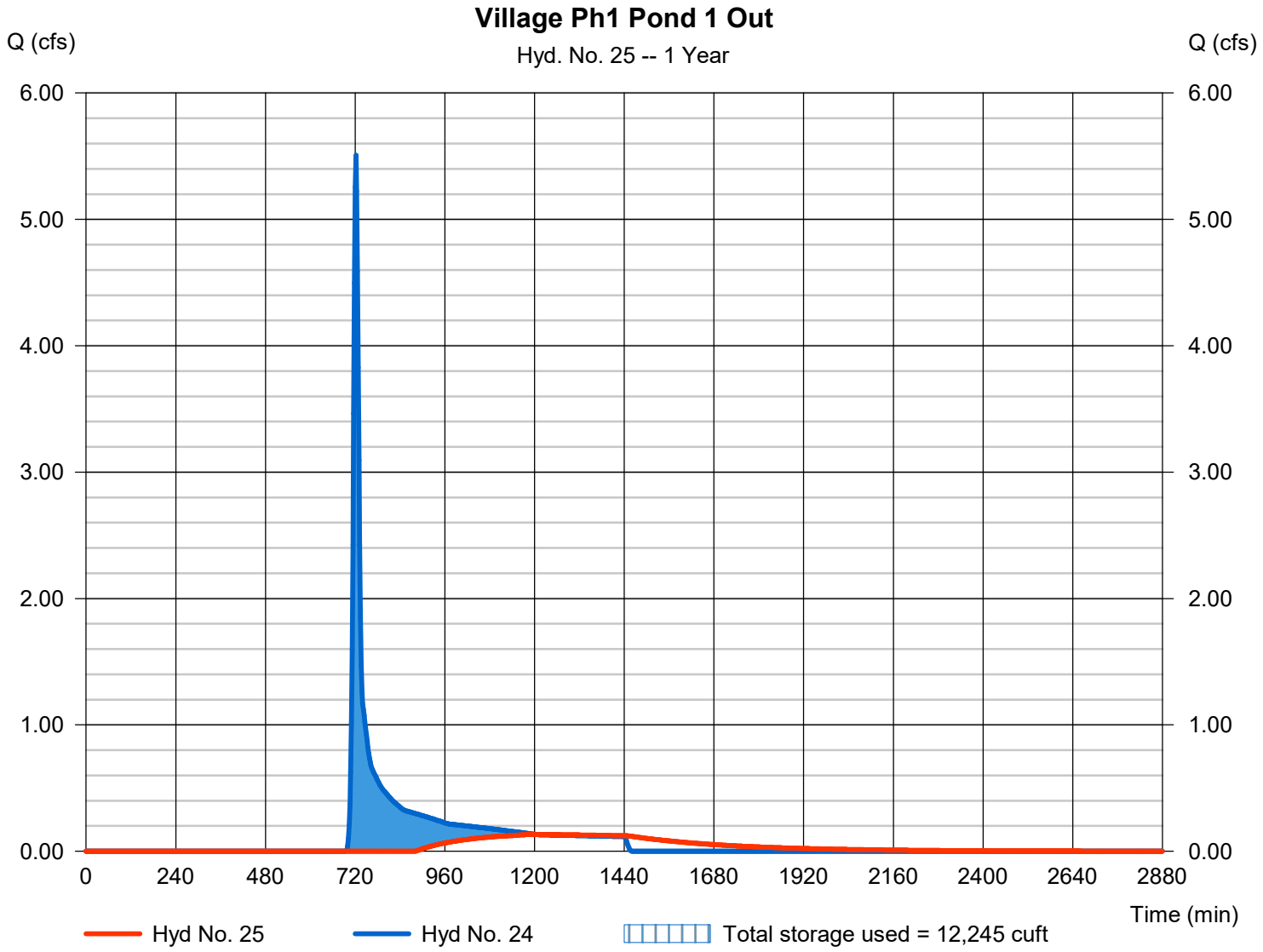
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 25

Village Ph1 Pond 1 Out

Hydrograph type	= Reservoir	Peak discharge	= 0.132 cfs
Storm frequency	= 1 yrs	Time to peak	= 1204 min
Time interval	= 2 min	Hyd. volume	= 5,646 cuft
Inflow hyd. No.	= 24 - To Village Ph1 Pond 1	Max. Elevation	= 2021.21 ft
Reservoir name	= Ex. Village Ph.1 Pond 1	Max. Storage	= 12,245 cuft

Storage Indication method used.



Hydrograph Report

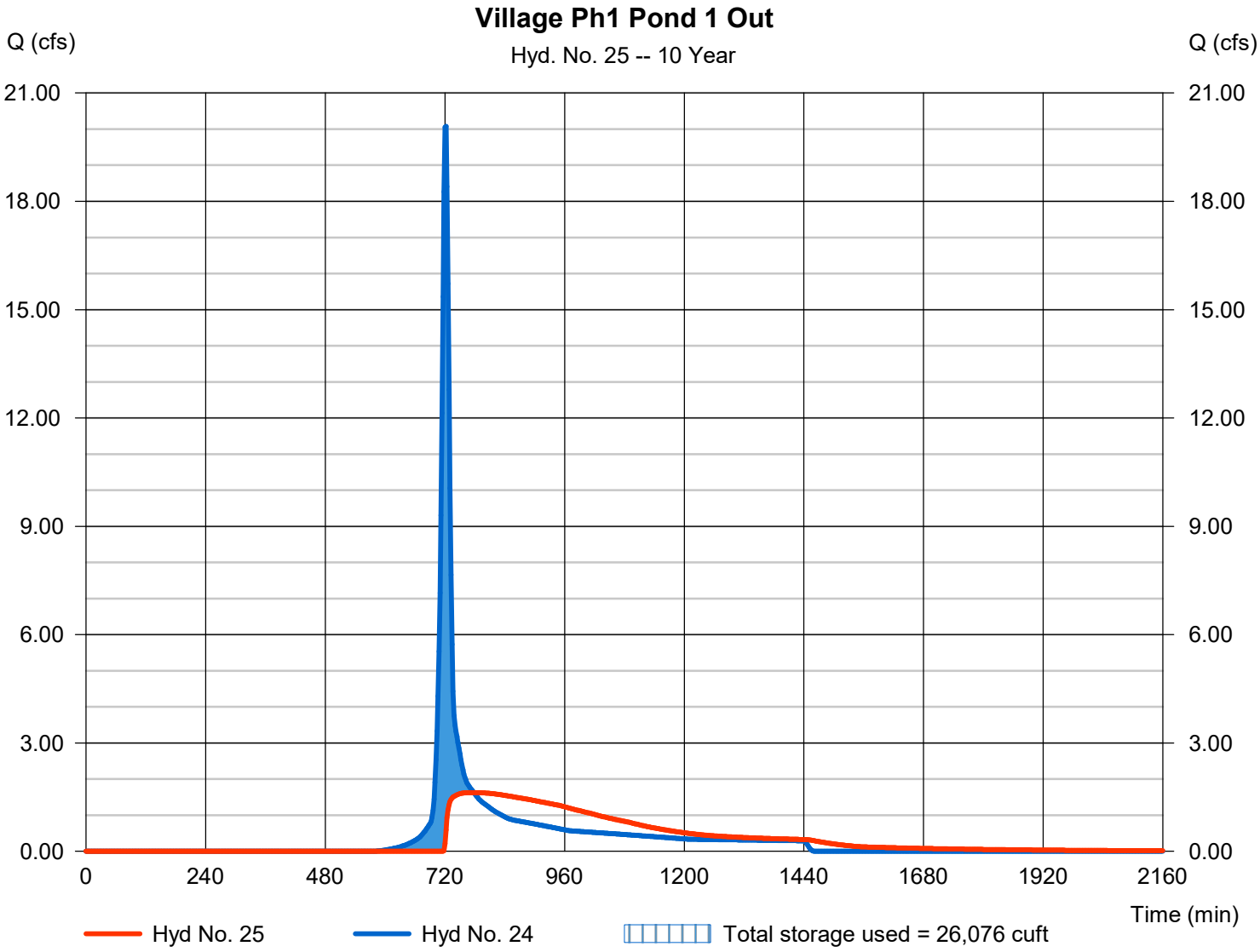
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Friday, 04 / 29 / 2022

Hyd. No. 25

Village Ph1 Pond 1 Out

Hydrograph type	= Reservoir	Peak discharge	= 1.628 cfs
Storm frequency	= 10 yrs	Time to peak	= 778 min
Time interval	= 2 min	Hyd. volume	= 42,374 cuft
Inflow hyd. No.	= 24 - To Village Ph1 Pond 1	Max. Elevation	= 2022.45 ft
Reservoir name	= Ex. Village Ph.1 Pond 1	Max. Storage	= 26,076 cuft

Storage Indication method used.

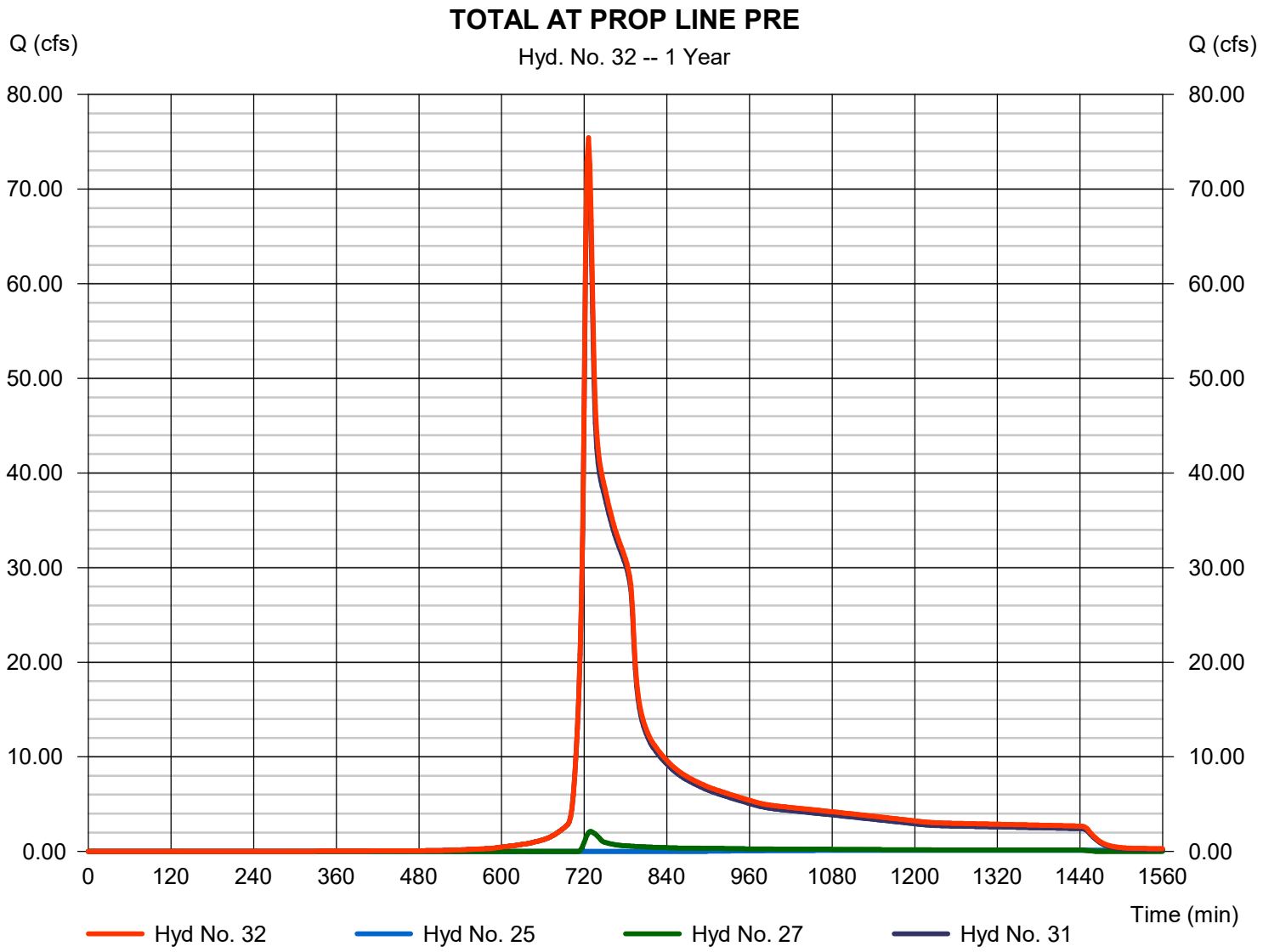


Hydrograph Report

Hyd. No. 32

TOTAL AT PROP LINE PRE

Hydrograph type	= Combine	Peak discharge	= 75.45 cfs
Storm frequency	= 1 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 422,747 cuft
Inflow hyds.	= 25, 27, 31	Contrib. drain. area	= 18.140 ac



Hydrograph Report

Hyd. No. 32

TOTAL AT PROP LINE PRE

Hydrograph type	= Combine	Peak discharge	= 175.77 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 1,234,986 cuft
Inflow hyds.	= 25, 27, 31	Contrib. drain. area	= 18.140 ac