

SITE ENGINEERING DESIGN REPORT

For The Proposed:

Resubdivision Development

Located At:

174-176 Bouton Street
Norwalk, Connecticut 06854
Job # 2568

Prepared On:

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Revised:

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Prepared For:

Bouton Development, LLC

Prepared By:



Stephen Santacroce, P.E.

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INTRODUCTION

Rose Tiso & Co. has prepared this report to provide an analysis of the stormwater drainage, utility design, and soil erosion control impacts associated with the proposed resubdivision development at 174 through 176 Bouton Street in Norwalk, Connecticut. The design is in compliance with applicable City of Norwalk codes and regulations as well as other applicable state and federal requirements and regulations.

The project area consists of three separate properties currently, with a total project area of approximately 0.75 acres. The three properties will be sub-divided into five separate lots, labeled Lots 1-5. The properties are bounded by residential properties to the north and south, City of Norwalk property to the west, and Bouton Street to the East.

The majority of the stormwater runoff associated with the proposed construction will be conveyed by the proposed drainage system. While the proposed construction results in minor increases in peak runoff quantities for the overall site, the increase will be mitigated after passing through the proposed drainage system and underground detention. Overall this project results in a net reduction of overall rate of stormwater runoff for the property when compared to existing conditions.

The proposed stormwater quality measures were designed in accordance with the City of Norwalk DPW Stormwater Management Manual of June 2017, as well as the “2004 Connecticut Stormwater Quality Manual,” published by The Connecticut Department of Energy and Environmental Protection. The stormwater quality measures provided as part of the proposed development will result in an enhancement to the stormwater discharge from the site.

The proposed plans for soil erosion and sediment control have been developed in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, prepared by the Connecticut Council on Soil and Water Conservation in cooperation with the Connecticut Department of Environmental Protection.

STORMWATER MANAGEMENT

The stormwater management plan and design for the proposed development is intended to be in compliance with the City of Norwalk stormwater management regulations, the 2004 Connecticut Stormwater Quality Manual and the 2000 Connecticut Department of Transportation Drainage Manual, while taking prevailing site conditions and practical considerations into account. The proposed stormwater system has been designed to reduce proposed stormwater runoff quantities to below existing runoff quantities for up to the 100-year storm event for the entire site.

METHODOLOGY

The stormwater runoff analysis for both the pre- and post-development conditions were performed using the software package Civil 3D 2015 Hydroflow Hydrograph Extension. This software uses a computer implementation of the SCS – TR-55 methodology to compute volumes and rates of runoff. The watershed area, rainfall depths and intensity, curve number and time of concentration are factors that influence the computed results.

Rainfall depths for this property were used for calculating the volumes and rates of runoff for this particular project. The depths were taken from the NOAA Atlas 14 documents (City of Norwalk) and are listed in Table 1 below.

Table 1: Rainfall Data

Return Period	24-hr Rainfall Depth (in)
2-year	3.49
10-year	5.34
25-year	6.49
50-year	7.35
100-year	8.26

Hydraflow Hydrographs Extension automatically computes the rainfall intensity from its own IDF curves when the rainfall intensity data is provided.

EXISTING HYDROLOGY

Currently, the property located at 176 Bouton Street is developed with an existing single family home and paved driveway. The balance of the project site is generally comprised of pervious wooded areas with light underbrush. The site consists of steep slopes with some rock outcroppings, with a maximum elevation of approximately 100 feet, and a minimum elevation of approximately 58 feet. The runoff from the site currently travels in an easterly direction via sheet flow and discharges onto Bouton Street, where it enters the storm drainage system located in Bouton Street.

For stormwater design and analysis purposes, the overall drainage area for the site was divided according to each lot area. The five lots are similar in overall slope, have similar time of concentrations, and similar proposed conditions. Therefore, Lot 1 was used for stormwater design and analysis, since it is the lot with the largest contributing area and the largest amount of proposed impervious area. This will provide a conservative design of the required stormwater drainage facilities for the remaining four lots.

Existing Lot 1 has a contributing area of approximately 7,500 square feet, or 0.17 acres. The area includes wooded, steeply sloping areas adjacent to the southern property line of the proposed project. Runoff from Lot 1 travels east towards Bouton Street and into the existing town system. Characteristics of these drainage areas are summarized in Table 2, below.

Table 2: Existing Drainage Area Characteristics

Drainage Area	Area (Acres)	Curve Number (CN)	Time of Concentration
Lot 1 Existing	0.17	61	8.8

Peak rates of storm water runoff, for the 2-year, 10-year, 25-year, 50-year, and 100-year events have been calculated for the existing site (See Table 3 below). The supporting calculations are included as Appendix A. These existing flows will later be compared to post-development flows as a means of assessing the impact of the proposed project on surrounding infrastructures.

Table 3: Existing Peak Flows

Drainage Area	Peak Flow (cfs)				
	2-yr	10-yr	25-yr	50-yr	100-yr
Lot 1 Existing	0.074	0.264	0.407	0.523	0.651

PROPOSED HYDROLOGY

The proposed project will maintain similar patterns to that of the existing conditions, and will attenuate runoff from proposed roofs, grassy areas, and driveways prior to discharge off-site. Proposed Lot 1 has a contributing area of approximately 0.17 acres. Runoff from this area travels overland into a proposed stormwater system consisting of a trench drain and underground stormwater detention. The stormwater detention has been designed to reduce the flows from the overall site from the existing condition for up to the 100-year storm event. The system will then discharge to the existing storm drainage system in Bouton Street. Characteristics of these drainage areas are summarized in Table 4, below.

Table 4: Proposed Drainage Area Characteristics

Drainage Area	Area (Acres)	Curve Number (CN)	Time of Concentration
Lot 1 Proposed	0.17	76	6.5

Proposed peak flows for all analyzed storms are summarized in Table 5. Calculations for the proposed hydrology can be found in Appendix A.

Table 5: Proposed Peak Flows

Drainage Area	Peak Flow (cfs)				
	2-yr	10-yr	25-yr	50-yr	100-yr
Lot 1 Proposed	0.00	0.00	0.20	0.40	0.63

In addition, the proposed underground stormwater chambers have been designed to detain the water quality volume of the runoff associated with the development. The water quality volume is the amount of stormwater runoff from any given storm that should be captured and treated in order to remove a majority of the stormwater pollutants on an average annual basis. According to the 2004 Connecticut

Stormwater Quality Manual, the recommended water quality volume, which results in the capture and treatment of the entire runoff volume for 90 percent of the average annual storm event, is equivalent to the runoff associated with the first one-inch of rainfall.

See Table 6 below for a comparison of the overall PDA vs. EDA. Calculations for the proposed hydrology can be found in Appendix A.

Table 6: Peak Flow Comparison

Drainage Area	Peak Flow (cfs)				
	2-yr	10-yr	25-yr	50-yr	100-yr
Lot 1 Existing	0.07	0.26	0.41	0.52	0.65
Lot 1 Proposed	0.00	0.00	0.20	0.40	0.63
Reduction	100%	100%	51.2%	23.1%	3.1%

OPERATION AND MAINTENANCE

The owner of the property shall be responsible for the operation and maintenance of the storm water system. Trench drain and catch basin inspection and maintenance: units are to be inspected every 6-months and sump vacuumed if sediment depth is greater than 18 inches. Oil accumulation is typically much less than sediment, however, removal of oil and sediment during the same service is recommended. Remove floatables first, and then remove remaining volume. Gallery inspection and maintenance: galleries are to be inspected every 12-months and vacuumed if sediment depth is greater than 12 inches.

STORMWATER BEST MANAGEMENT PRACTICES

Several stormwater BMP’s were included in the design of the proposed stormwater management system. These include underground stormwater detention and infiltration systems, grass lined swales, and catch basins or trench drains with 2’ sumps. These stormwater quality measures will result in an enhancement to the stormwater discharge from the site.

STORMWATER CONCLUSION

For analysis of the entire project site, the lot with the largest contributing area and the most amount of proposed impervious area was used for the stormwater management design of each lot. The proposed development results in an increase in impervious area of approximately 3,000 square feet or less for each lot. Stormwater systems have been designed to detain the water quality volume associated with the proposed development, as well as to provide attenuation for the peak discharge rate for the 2-, 10-, 25-, 50-, and 100-year storm events.

PROPOSED UTILITIES

A sanitary sewer main extension is being proposed as part of this project. The existing main currently ends at a manhole approximately 78 feet to the north of the site, in front of 172 Bouton Street. An extension within Bouton Street of approximately 330 feet of 8" PVC gravity line is being proposed, as well as two sanitary manholes in front of the project site. The flow from each property into the sanitary main is calculated as follows:

Using the technical standards of the Connecticut Public Health Code, the estimated sewage flow is 150 gallons per day per bedroom:

$$\begin{aligned} 150 \times 3 &= 450 \text{ gallons per day average flow} \\ \text{Average Flow} &= 0.31 \text{ g.p.m.} \\ \text{Peak flow estimate} &= 0.31 \times 3 \text{ (peaking factor)} \\ &= 0.93 \text{ g.p.m. Peak} \end{aligned}$$

Other Utilities

All proposed utilities to the site will be through underground utility connections. Electrical service will be from existing aboveground electric on Bouton Street, water service will be from existing water main in Bouton Street.

SOIL EROSION AND SEDIMENT CONTROL

The plan for soil erosion and sediment control prepared for the proposed development has been developed in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, prepared by the Connecticut Council on Soil and Water Conservation in cooperation with the Connecticut Department of Environmental Protection.

The soil erosion and sediment control measures that will be proposed as part of this project include geotextile silt fences, construction entrances, and inlet protection for existing and proposed drainage features.

For more details regarding layout and design of the soil erosion and sediment control measures implemented as part of this project see plan sheet SP-3 of the project documents.

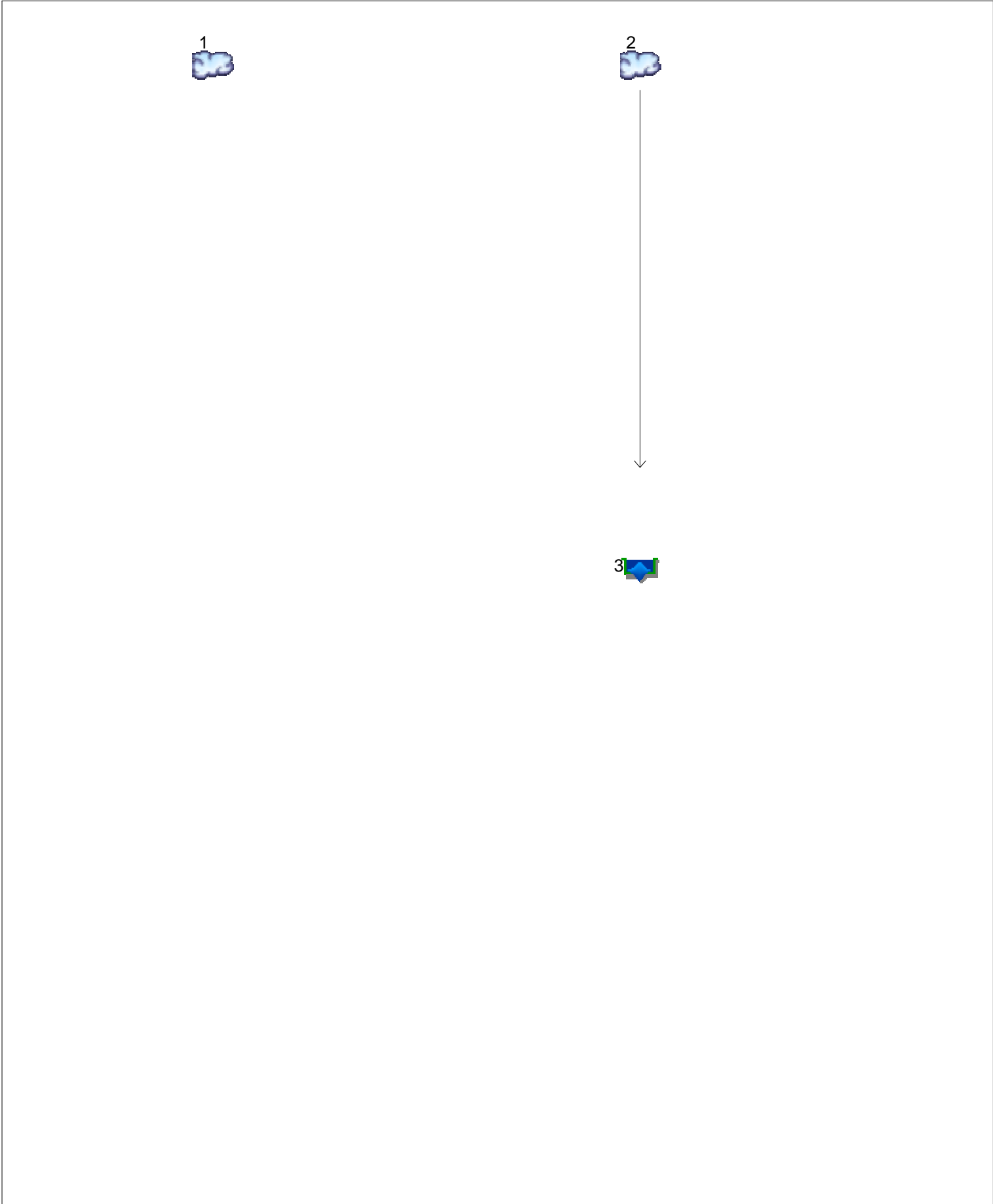
APPENDIX A
HYDROLOGY

Existing Site Stage Hydrographs
Proposed Site Stage Hydrographs

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Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020



Hydrograph Return Period Recap

Hydroflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	-----	-----	0.074	-----	-----	0.264	0.407	0.523	0.651	EDA-1
2	SCS Runoff	-----	-----	0.275	-----	-----	0.582	0.785	0.939	1.103	PDA-1
3	Reservoir	2	-----	0.000	-----	-----	0.000	0.200	0.399	0.634	4x4 conc chambers

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description	
1	SCS Runoff	0.074	1	729	351	-----	-----	-----	EDA-1	
2	SCS Runoff	0.275	1	725	864	-----	-----	-----	PDA-1	
3	Reservoir	0.000	1	n/a	0	2	53.98	244	4x4 conc chambers	
2568-lot 1-100-YR.gpw					Return Period: 2 Year			Tuesday, 06 / 22 / 2021		

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

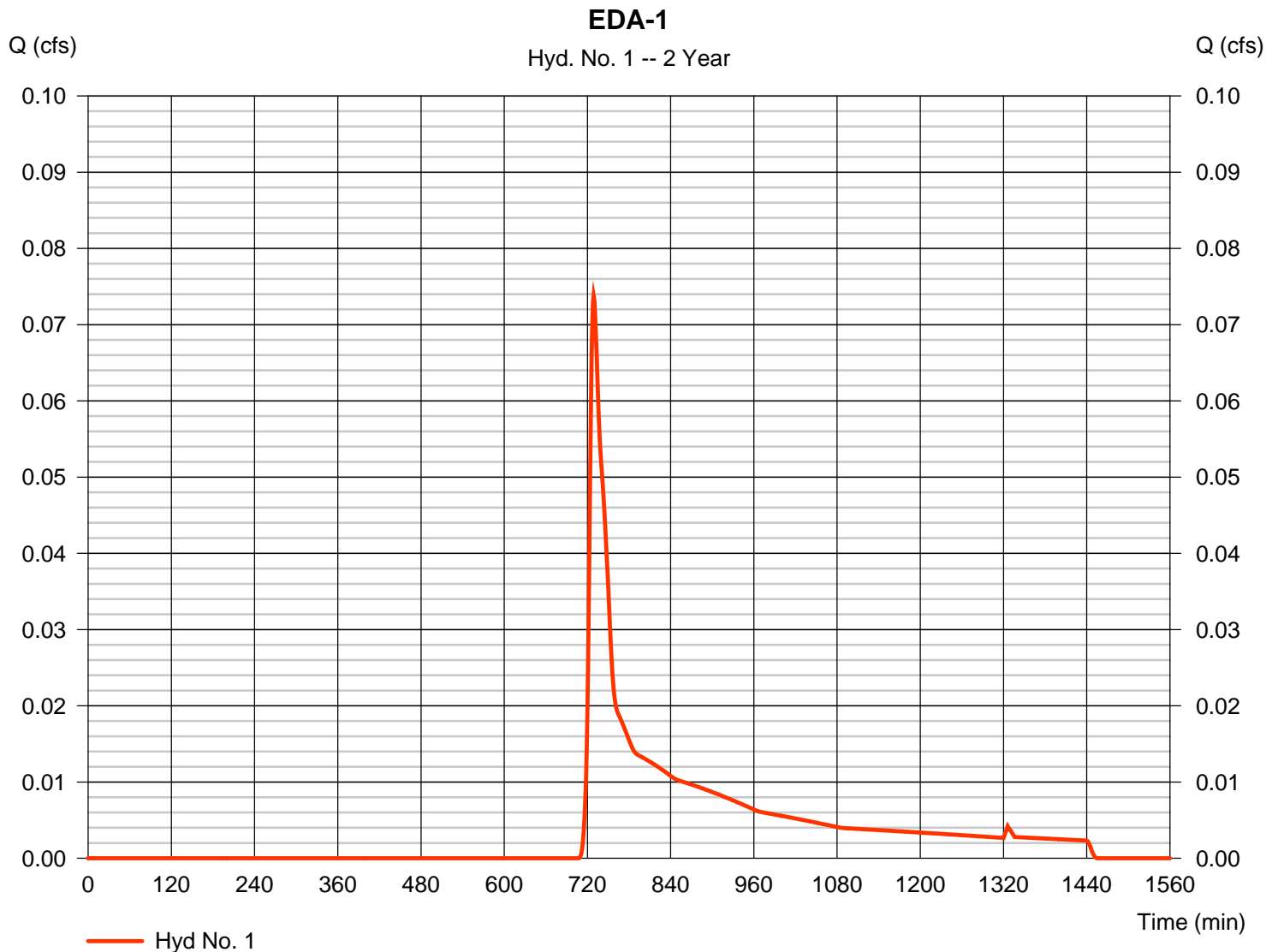
Tuesday, 06 / 22 / 2021

Hyd. No. 1

EDA-1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.074 cfs
Storm frequency	= 2 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 351 cuft
Drainage area	= 0.170 ac	Curve number	= 61*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.80 min
Total precip.	= 3.49 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = + (0.170 x 61) / 0.170



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

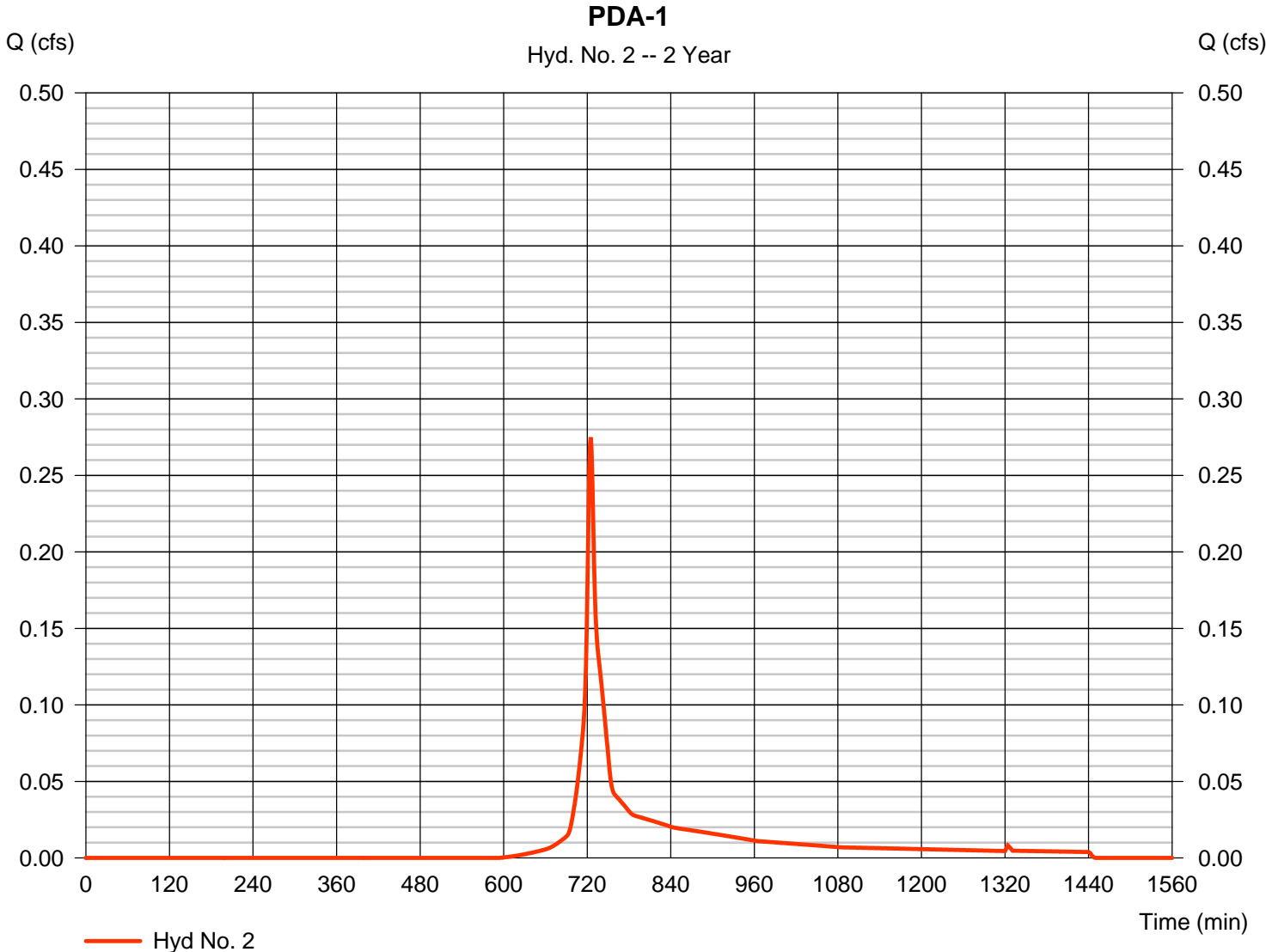
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Hyd. No. 2

PDA-1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.275 cfs
Storm frequency	= 2 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 864 cuft
Drainage area	= 0.170 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.50 min
Total precip.	= 3.49 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.100 x 61) + (0.070 x 98)] / 0.170



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

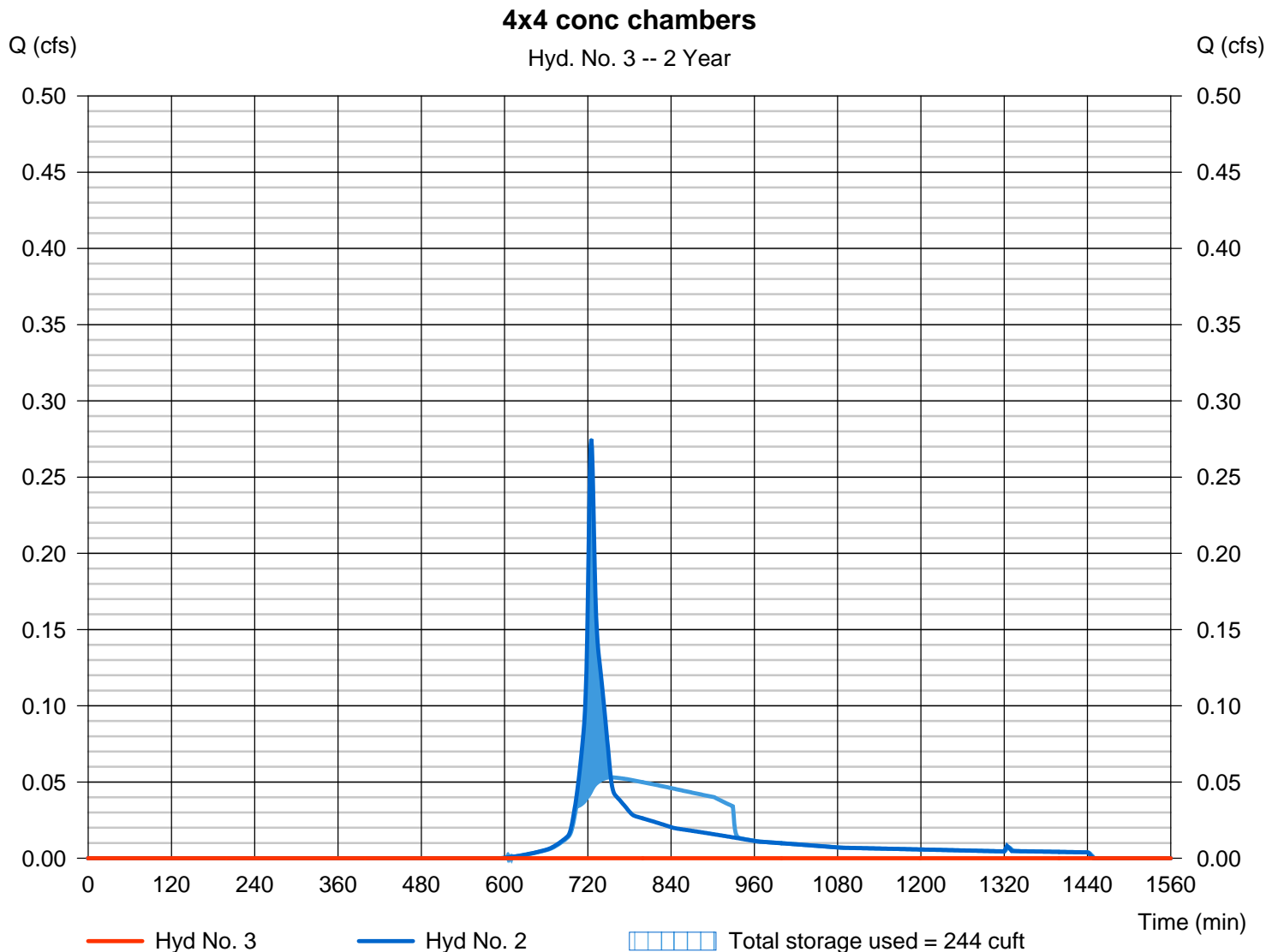
Tuesday, 06 / 22 / 2021

Hyd. No. 3

4x4 conc chambers

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= n/a
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 2 - PDA-1	Max. Elevation	= 53.98 ft
Reservoir name	= 4x4 conc chambers	Max. Storage	= 244 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond No. 1 - 4x4 conc chambers

Pond Data

UG Chambers -Invert elev. = 53.00 ft, Rise x Span = 4.00 x 4.00 ft, Barrel Len = 48.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No
Encasement -Invert elev. = 52.50 ft, Width = 5.00 ft, Height = 5.00 ft, Voids = 33.33%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	52.50	n/a	0	0
0.50	53.00	n/a	40	40
1.00	53.50	n/a	104	144
1.50	54.00	n/a	104	248
2.00	54.50	n/a	104	352
2.50	55.00	n/a	104	456
3.00	55.50	n/a	104	560
3.50	56.00	n/a	104	664
4.00	56.50	n/a	104	768
4.50	57.00	n/a	104	872
5.00	57.50	n/a	40	912

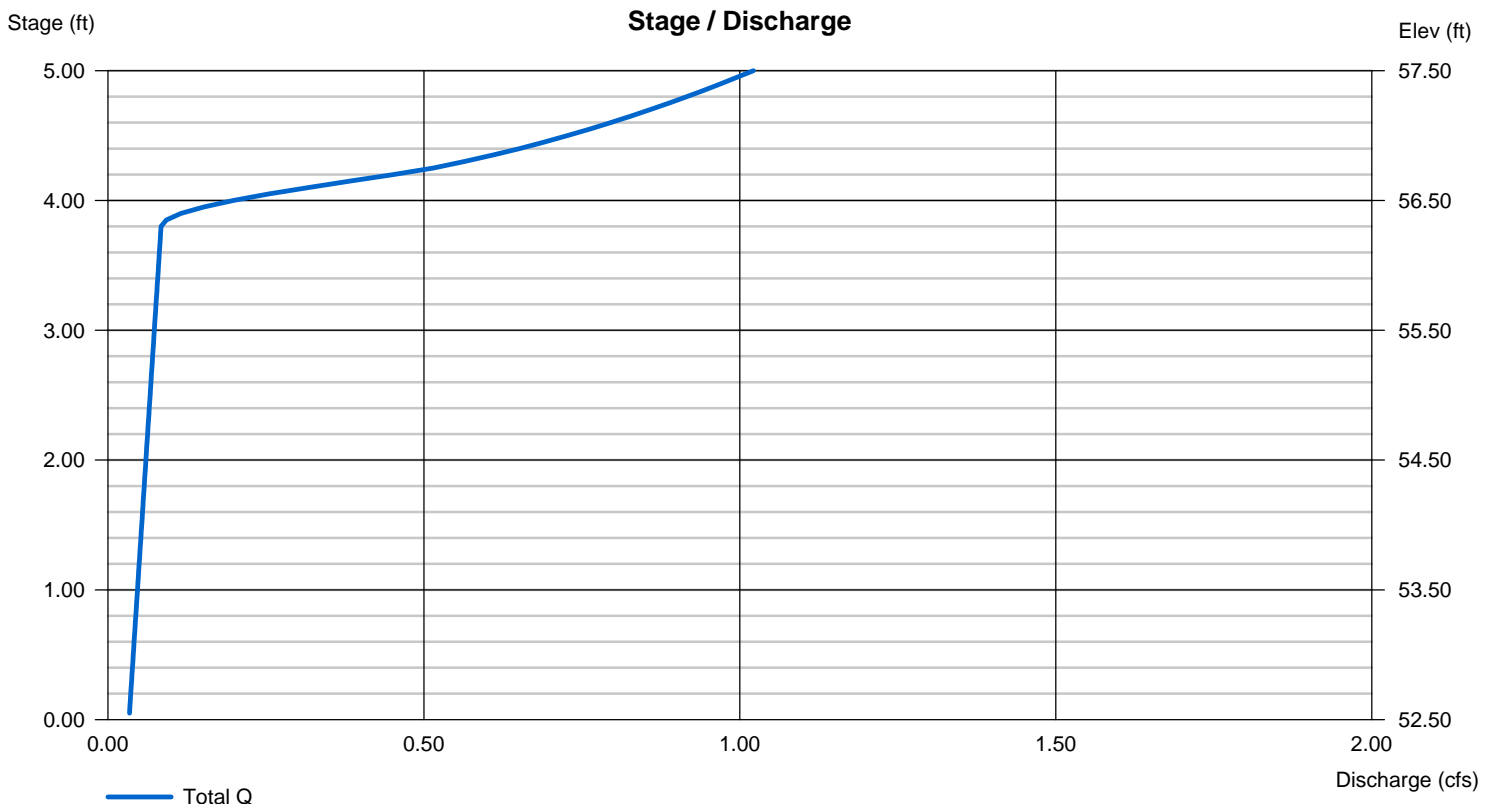
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	6.00	0.00	0.00
Span (in)	= 0.00	6.00	0.00	0.00
No. Barrels	= 0	1	0	0
Invert El. (ft)	= 0.00	56.30	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	Inactive	0.00	0.00
Crest El. (ft)	= 0.00	92.70	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	Rect	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 6.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

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



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description	
1	SCS Runoff	0.264	1	728	974	-----	-----	-----	EDA-1	
2	SCS Runoff	0.582	1	725	1,793	-----	-----	-----	PDA-1	
3	Reservoir	0.000	1	n/a	0	2	55.91	646	4x4 conc chambers	
2568-lot 1-100-YR.gpw					Return Period: 10 Year			Tuesday, 06 / 22 / 2021		

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

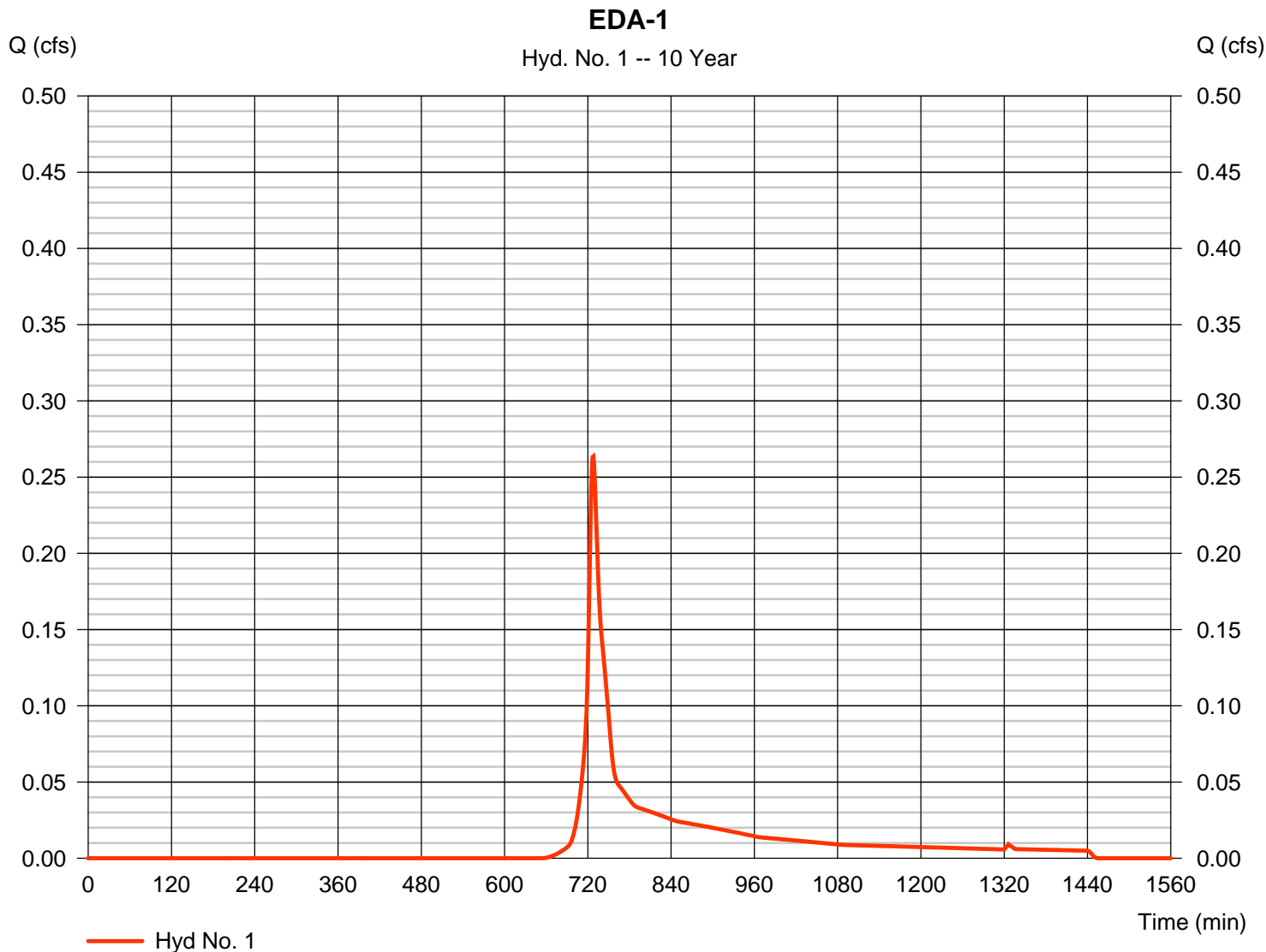
Tuesday, 06 / 22 / 2021

Hyd. No. 1

EDA-1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.264 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 974 cuft
Drainage area	= 0.170 ac	Curve number	= 61*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.80 min
Total precip.	= 5.34 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = + (0.170 x 61) / 0.170



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

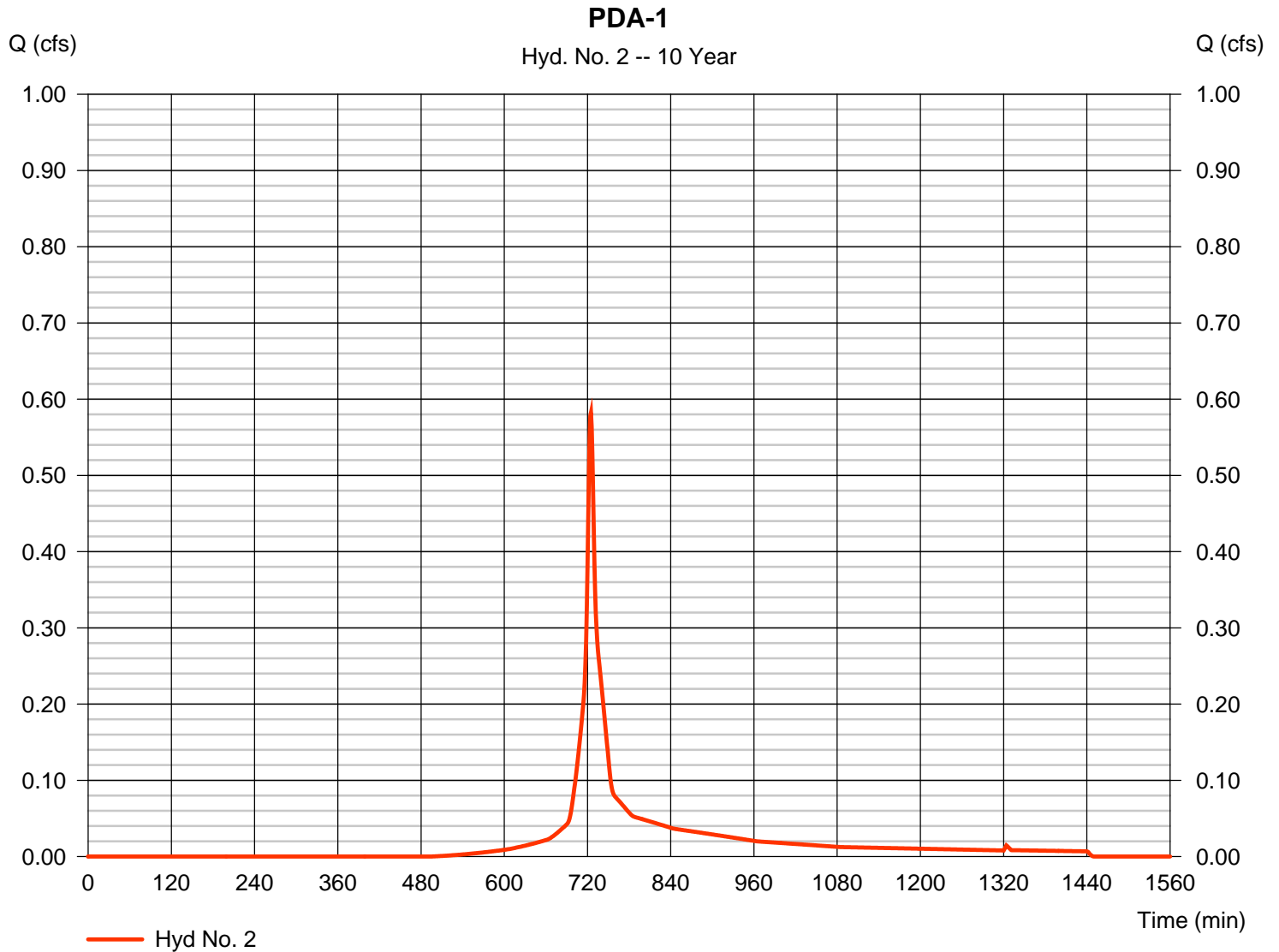
Tuesday, 06 / 22 / 2021

Hyd. No. 2

PDA-1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.582 cfs
Storm frequency	= 10 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 1,793 cuft
Drainage area	= 0.170 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.50 min
Total precip.	= 5.34 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.100 x 61) + (0.070 x 98)] / 0.170



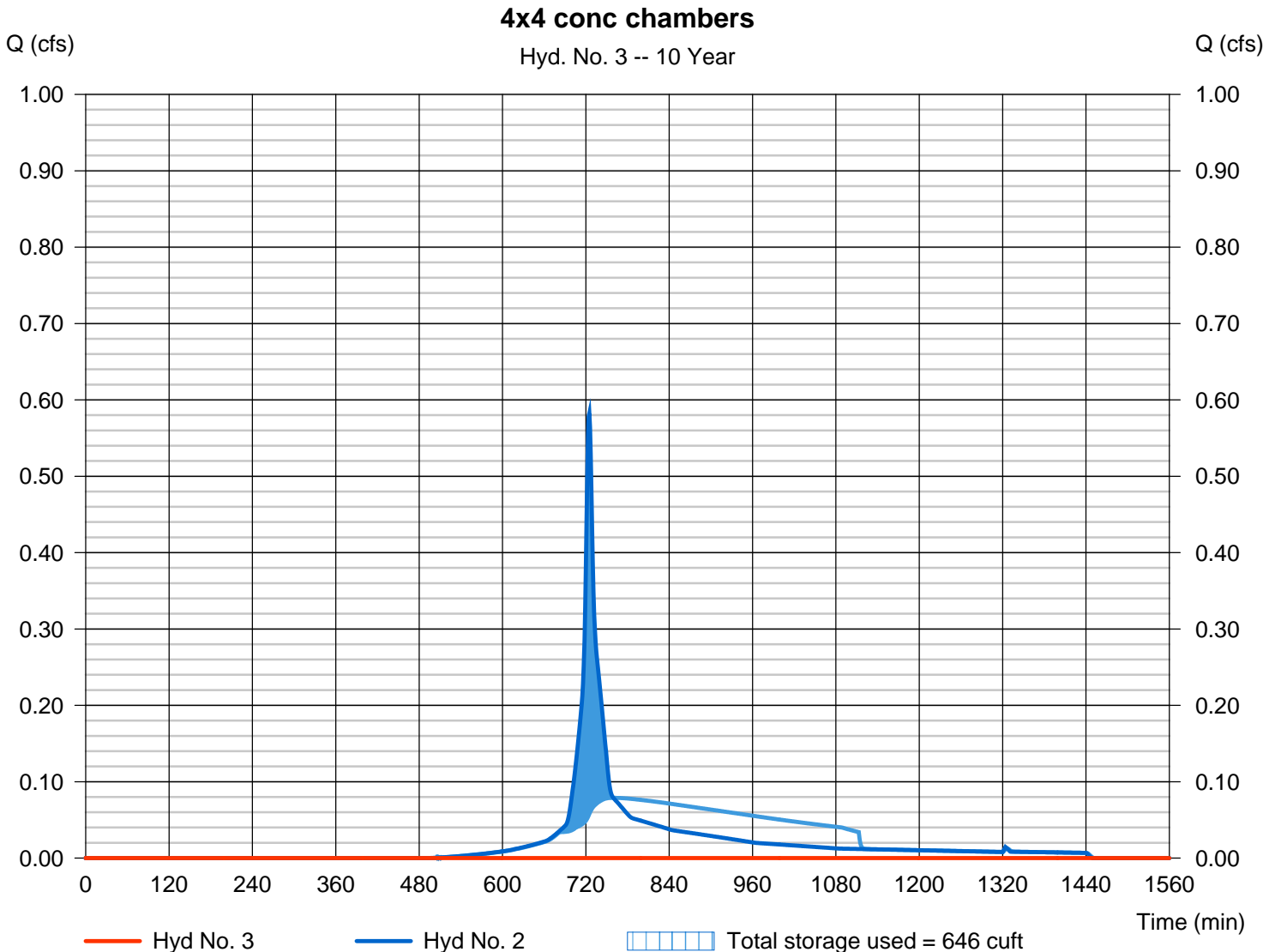
Hydrograph Report

Hyd. No. 3

4x4 conc chambers

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 10 yrs	Time to peak	= n/a
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 2 - PDA-1	Max. Elevation	= 55.91 ft
Reservoir name	= 4x4 conc chambers	Max. Storage	= 646 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description	
1	SCS Runoff	0.407	1	727	1,444	-----	-----	-----	EDA-1	
2	SCS Runoff	0.785	1	725	2,422	-----	-----	-----	PDA-1	
3	Reservoir	0.200	1	741	215	2	56.58	784	4x4 conc chambers	
2568-lot 1-100-YR.gpw					Return Period: 25 Year			Tuesday, 06 / 22 / 2021		

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

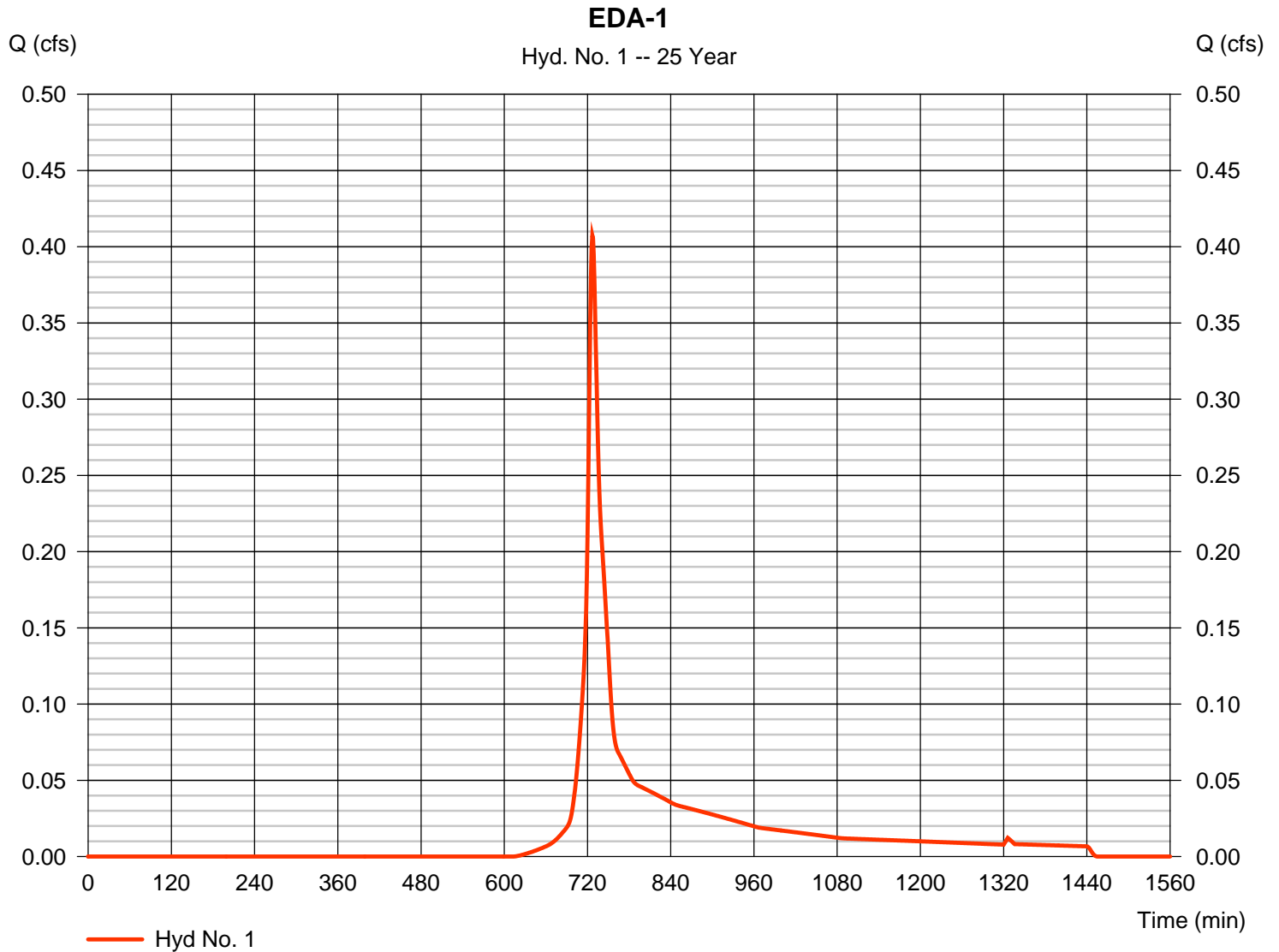
Tuesday, 06 / 22 / 2021

Hyd. No. 1

EDA-1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.407 cfs
Storm frequency	= 25 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 1,444 cuft
Drainage area	= 0.170 ac	Curve number	= 61*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.80 min
Total precip.	= 6.49 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = + (0.170 x 61) / 0.170



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

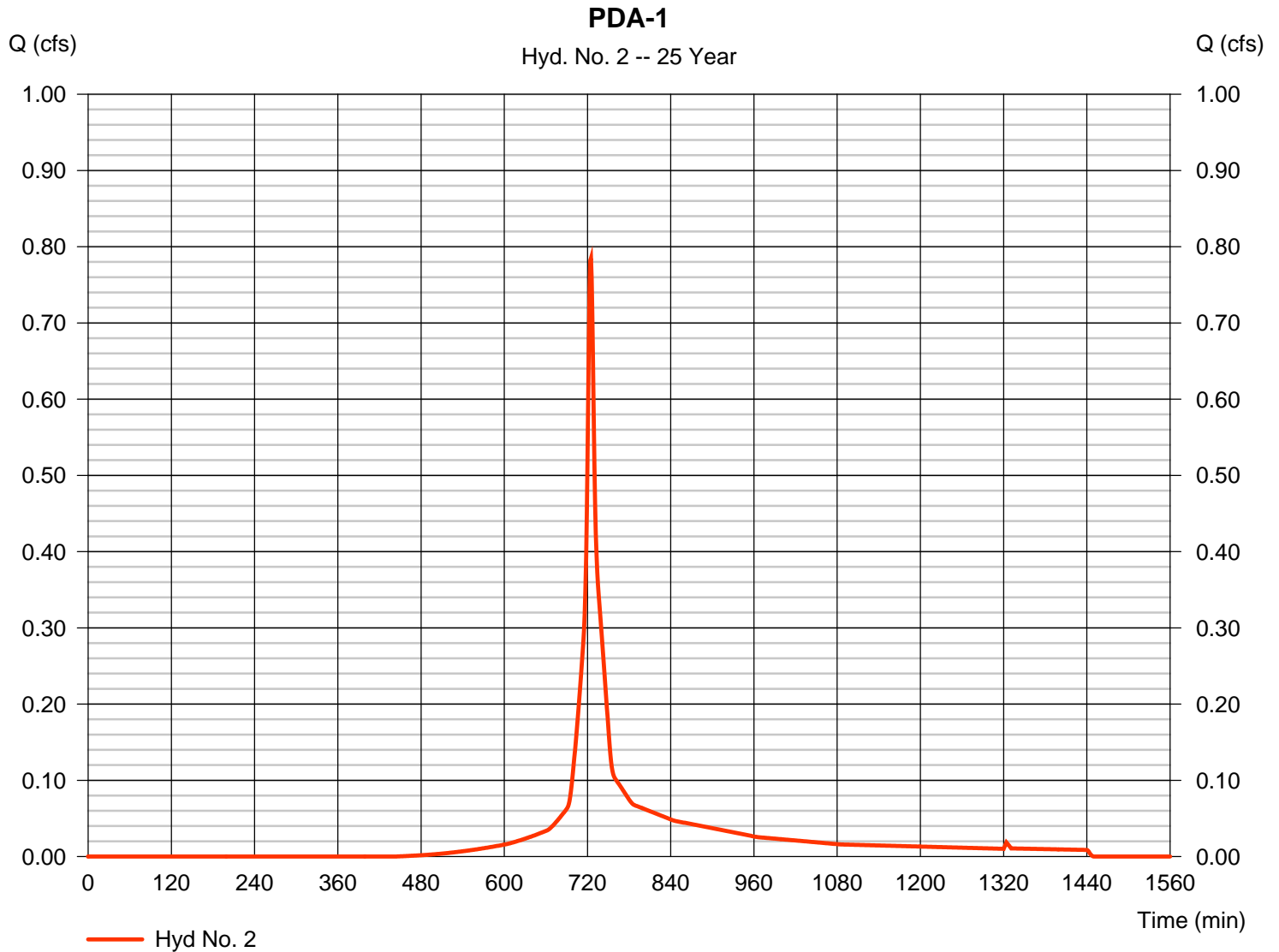
Tuesday, 06 / 22 / 2021

Hyd. No. 2

PDA-1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.785 cfs
Storm frequency	= 25 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 2,422 cuft
Drainage area	= 0.170 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.50 min
Total precip.	= 6.49 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.100 x 61) + (0.070 x 98)] / 0.170



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

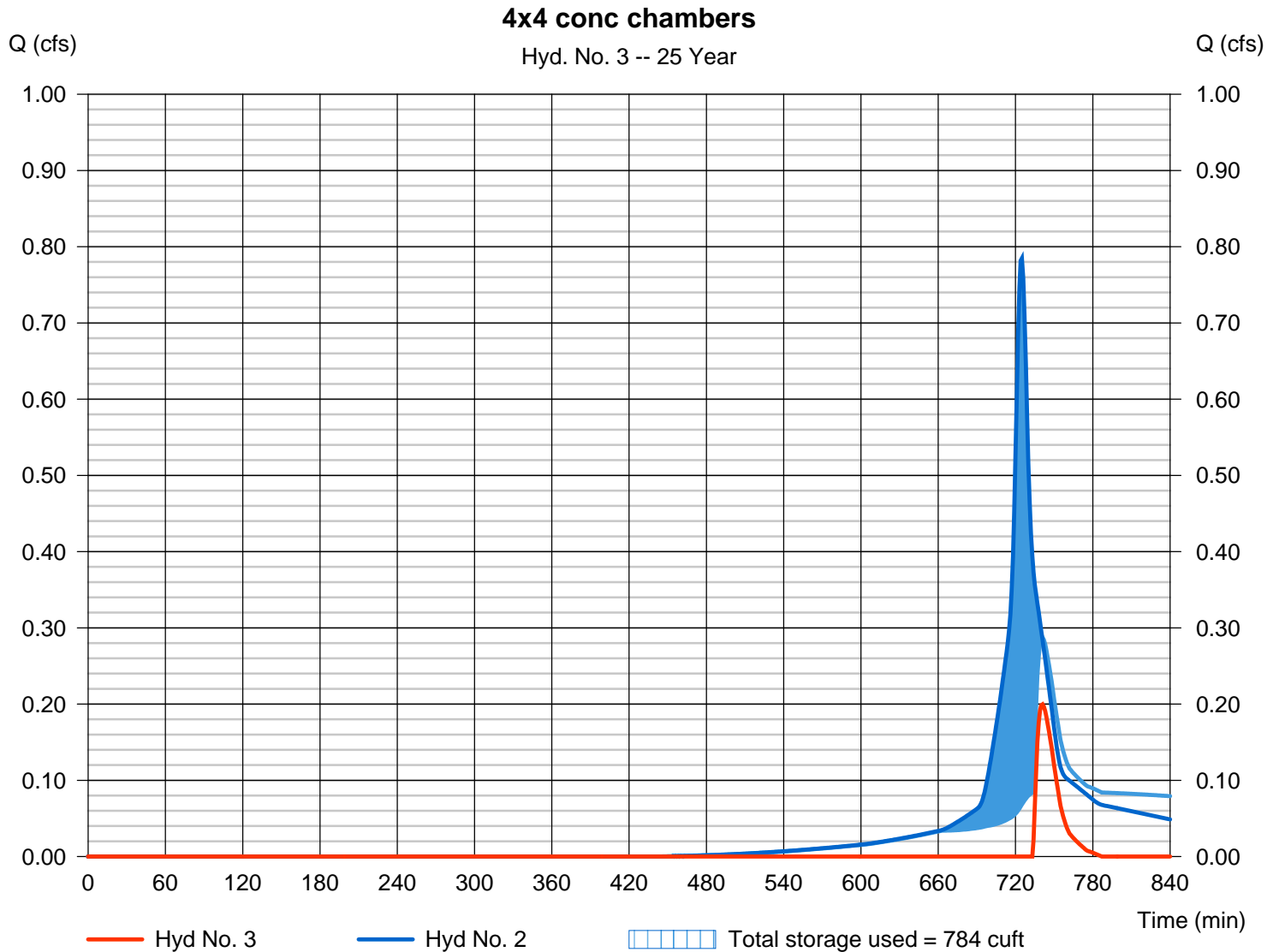
Tuesday, 06 / 22 / 2021

Hyd. No. 3

4x4 conc chambers

Hydrograph type	= Reservoir	Peak discharge	= 0.200 cfs
Storm frequency	= 25 yrs	Time to peak	= 741 min
Time interval	= 1 min	Hyd. volume	= 215 cuft
Inflow hyd. No.	= 2 - PDA-1	Max. Elevation	= 56.58 ft
Reservoir name	= 4x4 conc chambers	Max. Storage	= 784 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description	
1	SCS Runoff	0.523	1	727	1,825	-----	-----	-----	EDA-1	
2	SCS Runoff	0.939	1	725	2,908	-----	-----	-----	PDA-1	
3	Reservoir	0.399	1	732	480	2	56.73	816	4x4 conc chambers	
2568-lot 1-100-YR.gpw					Return Period: 50 Year			Tuesday, 06 / 22 / 2021		

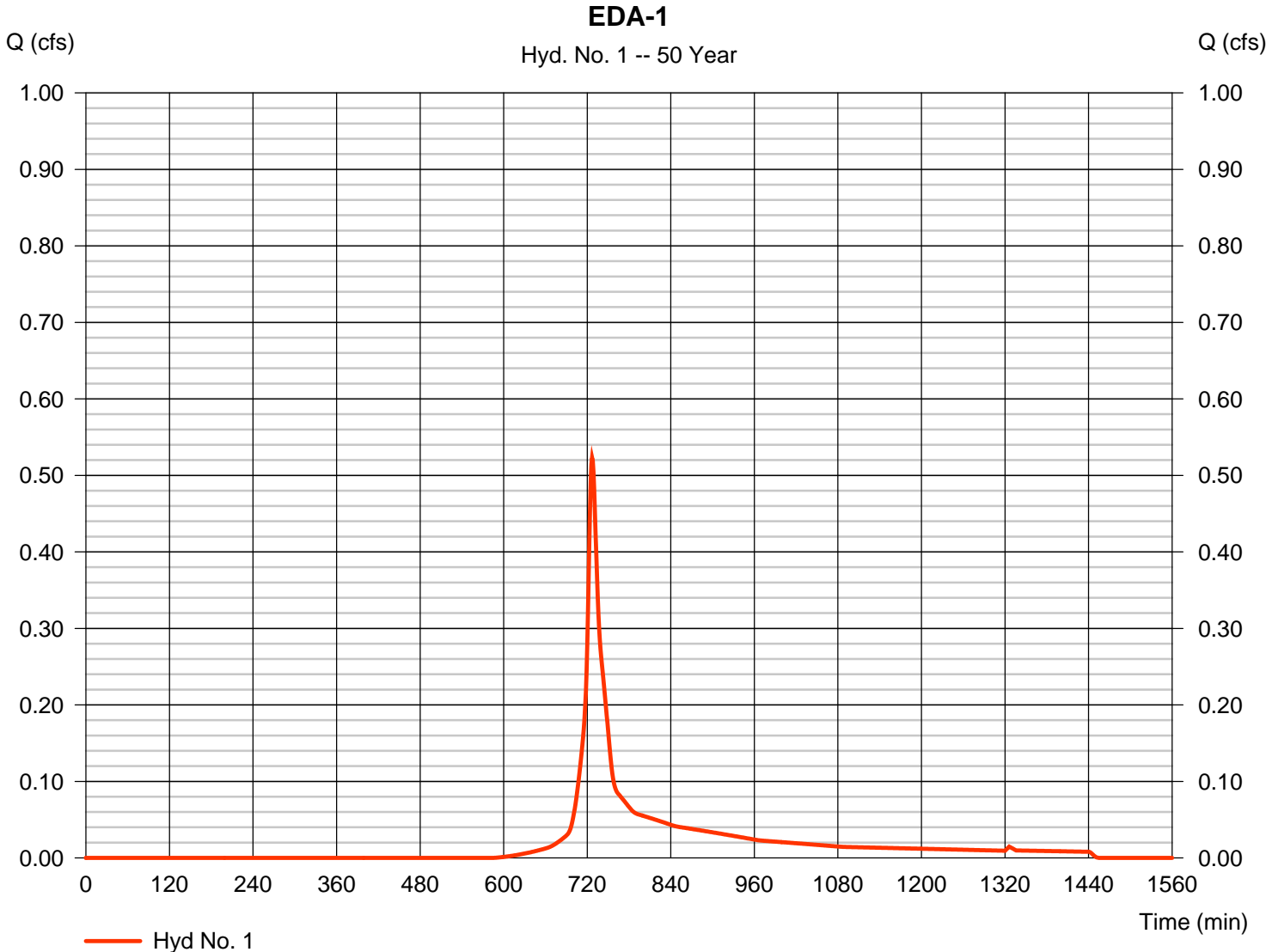
Hydrograph Report

Hyd. No. 1

EDA-1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.523 cfs
Storm frequency	= 50 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 1,825 cuft
Drainage area	= 0.170 ac	Curve number	= 61*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.80 min
Total precip.	= 7.35 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = + (0.170 x 61) / 0.170



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

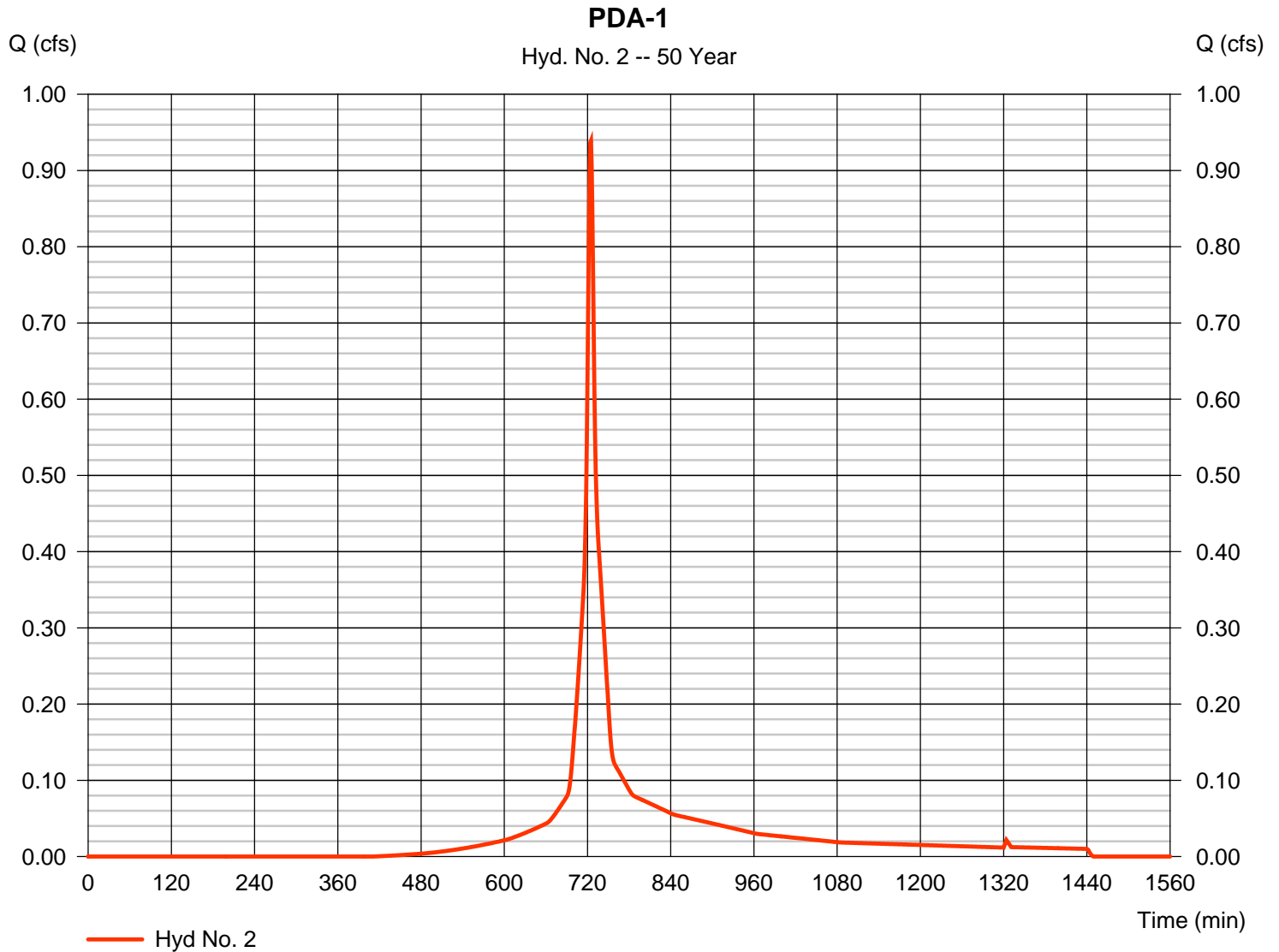
Tuesday, 06 / 22 / 2021

Hyd. No. 2

PDA-1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.939 cfs
Storm frequency	= 50 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 2,908 cuft
Drainage area	= 0.170 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.50 min
Total precip.	= 7.35 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.100 x 61) + (0.070 x 98)] / 0.170



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

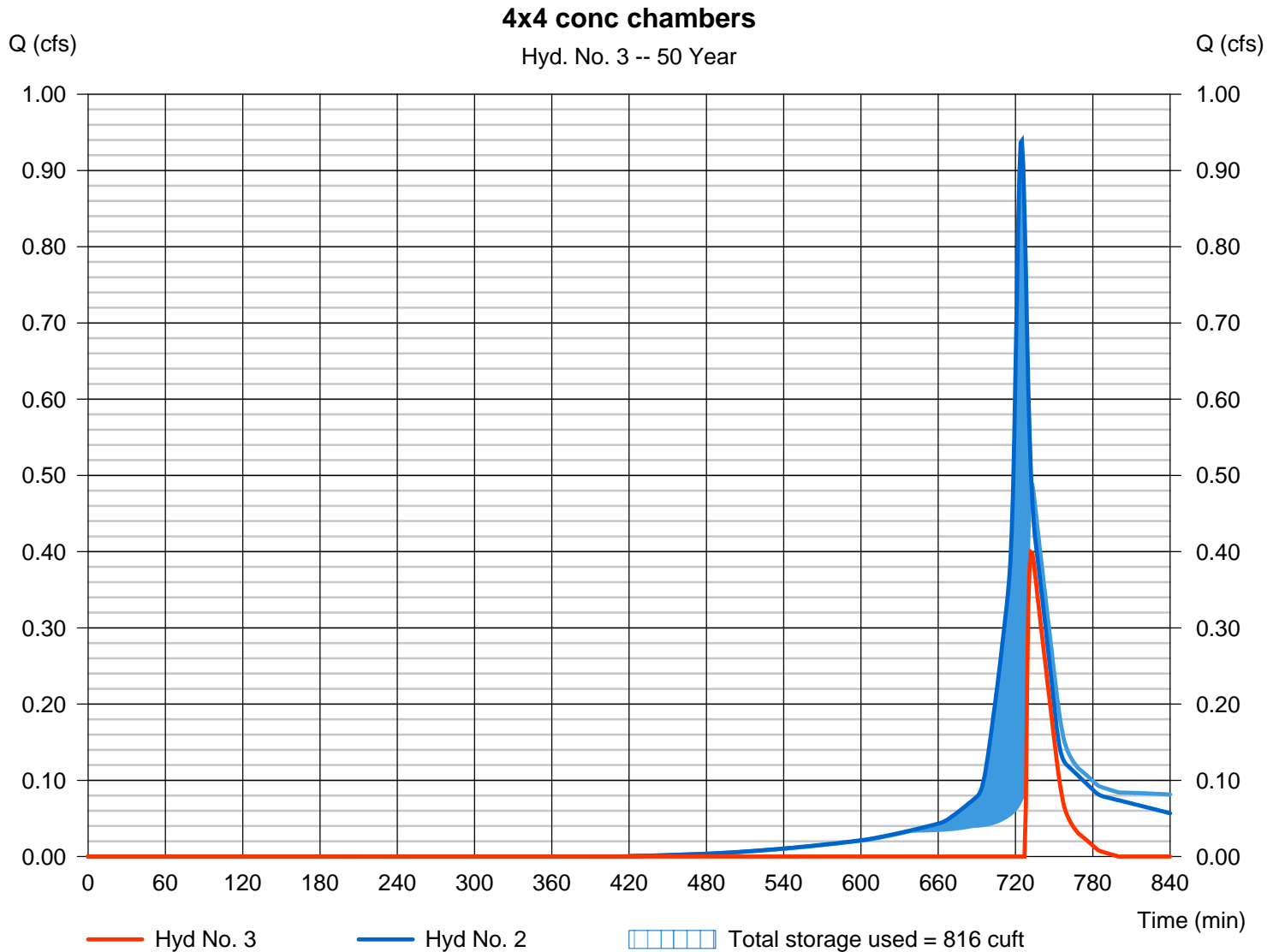
Tuesday, 06 / 22 / 2021

Hyd. No. 3

4x4 conc chambers

Hydrograph type	= Reservoir	Peak discharge	= 0.399 cfs
Storm frequency	= 50 yrs	Time to peak	= 732 min
Time interval	= 1 min	Hyd. volume	= 480 cuft
Inflow hyd. No.	= 2 - PDA-1	Max. Elevation	= 56.73 ft
Reservoir name	= 4x4 conc chambers	Max. Storage	= 816 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description	
1	SCS Runoff	0.651	1	727	2,249	-----	-----	-----	EDA-1	
2	SCS Runoff	1.103	1	725	3,433	-----	-----	-----	PDA-1	
3	Reservoir	0.634	1	730	785	2	57.00	872	4x4 conc chambers	
2568-lot 1-100-YR.gpw					Return Period: 100 Year			Tuesday, 06 / 22 / 2021		

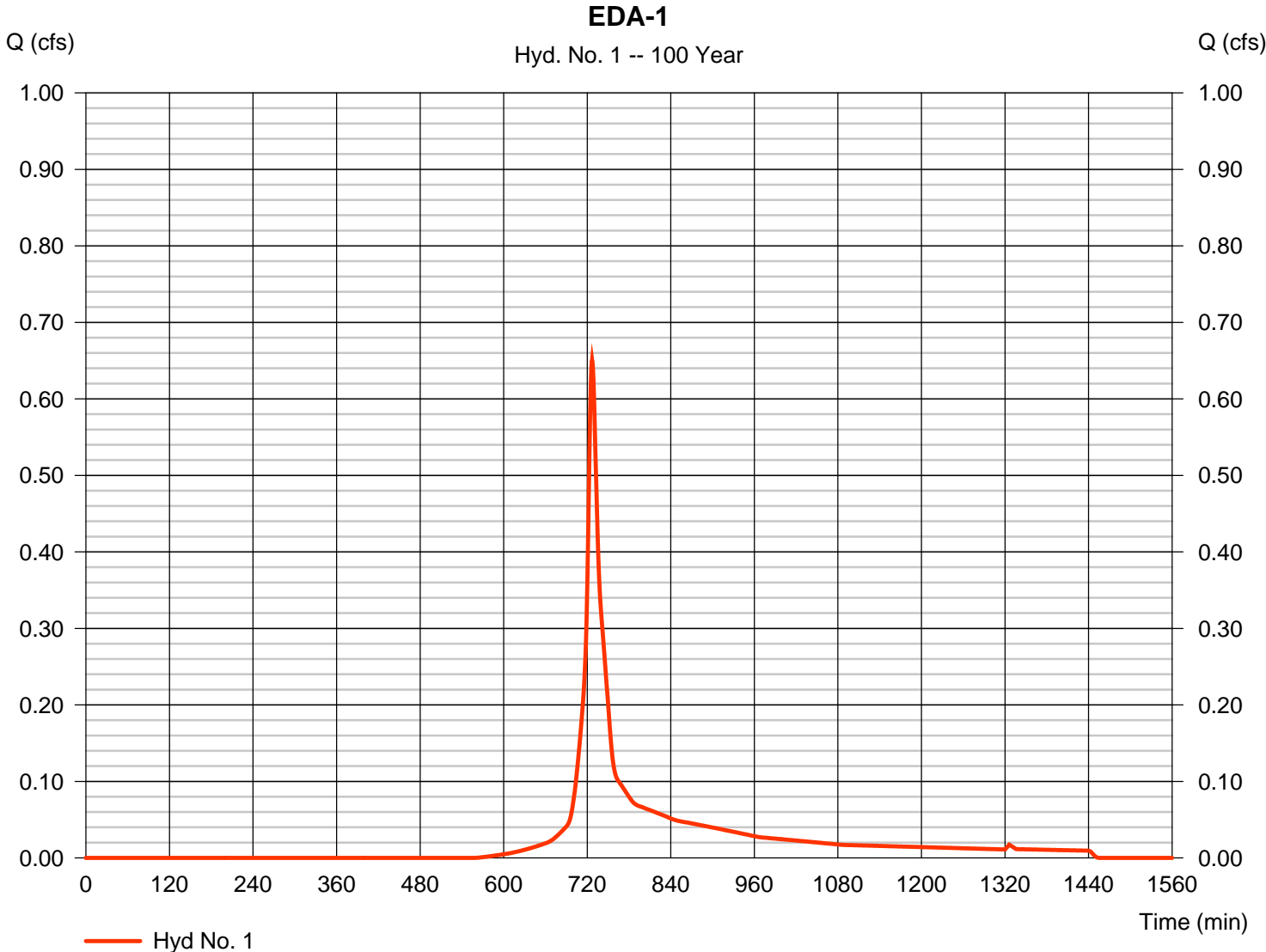
Hydrograph Report

Hyd. No. 1

EDA-1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.651 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 2,249 cuft
Drainage area	= 0.170 ac	Curve number	= 61*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.80 min
Total precip.	= 8.26 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = + (0.170 x 61) / 0.170



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

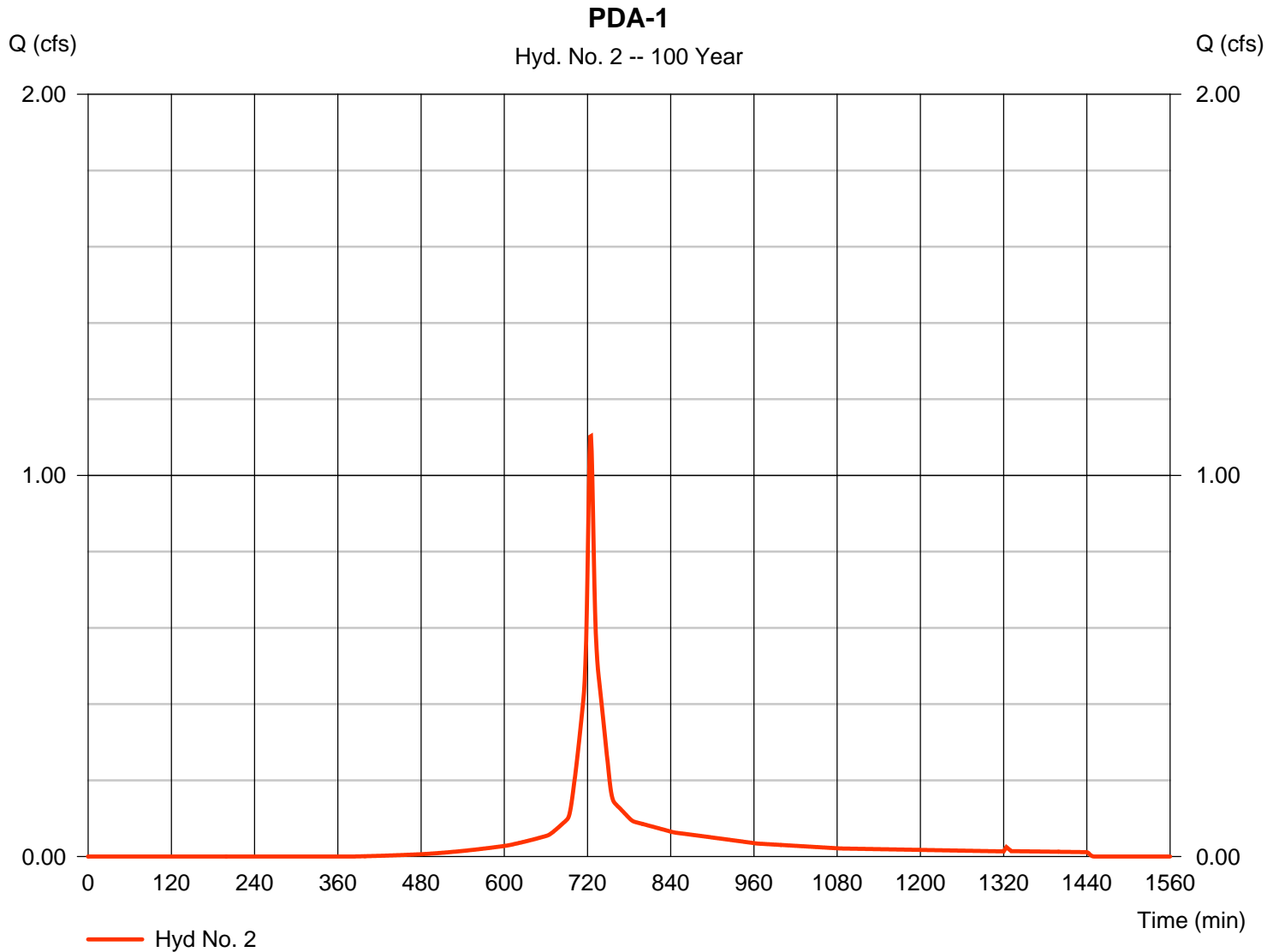
Tuesday, 06 / 22 / 2021

Hyd. No. 2

PDA-1

Hydrograph type	= SCS Runoff	Peak discharge	= 1.103 cfs
Storm frequency	= 100 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 3,433 cuft
Drainage area	= 0.170 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.50 min
Total precip.	= 8.26 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.100 x 61) + (0.070 x 98)] / 0.170



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Tuesday, 06 / 22 / 2021

Hyd. No. 3

4x4 conc chambers

Hydrograph type	= Reservoir	Peak discharge	= 0.634 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 1 min	Hyd. volume	= 785 cuft
Inflow hyd. No.	= 2 - PDA-1	Max. Elevation	= 57.00 ft
Reservoir name	= 4x4 conc chambers	Max. Storage	= 872 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

