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Technical Memorandum

Prepared for: Newton County Water and Sewerage Authority

Project Title: NCWSA Admin Building Expansion

Project No.: 203000.040.041

Technical Memorandum

Subject: Building Expansion Stormwater Assessment

Date: April 30, 2026

To: Newton County Water and Sewerage Authority

From:

Copy to:

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Limitations:

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Executive Summary

This Technical Memorandum assesses whether the existing detention basin receiving stormwater runoff from the Project Site is adequately sized to accommodate the new additional impervious surface area associated with an expansion to the existing administrative building, as well as the associated increase to water quality volumes.

Section 1: Background and Scope

1.1 Previous Stormwater Management Report

A stormwater management report prepared by Precision Planning Inc. dated October 15, 2020 was prepared to assess the hydraulics and hydrology of the most recent site improvements, which included new parking lots, driving lanes, buildings, gravel open spaces, and detention basins. This report is hereafter referred to as the “Previous Report”.

Only the model data associated with Post-Development Detention Basin A is relevant for the purposes of this memorandum, since that condition now reflects the Project Site’s existing condition.

1.2 Scope and Limitations

This memorandum only assesses the hydrologic impacts associated with the proposed improvements, specifically that of an increase in SCS Curve Number (CN) due to increased impervious surface area, as well changes to water quality (WQ) and channel protection (CP) volumes.

Hydraulic impacts to subsurface stormwater pipes are not analyzed. The stormwater improvements and their drainage areas are described in Section 2.2 for additional context only.

Section 2: Proposed Improvements and Analysis

This section heavily references the Previous Report, specifically those sections of the report concerned with *Basin A*, which consists of the on-site and offsite areas draining Detention Basin A. As the proposed increase to impervious surface area is entirely contained within on-site Basin A and discharged to Detention Basin A, the following subsections assess impacts only to Detention Basin A and its associated water quality and channel protection volumes.

2.1 New Impervious Surface Area

The proposed improvements include an expansion to the existing administrative building, new concrete walkway, replaced asphalt pavement, and new open spaces (grass). The surface improvements are identified in Attachment 1 and summarized in Table 1. In summary, 3442 SF of impervious surface area (areas 2 and 3) is replaced (no net change to impervious surface area). 5140 SF of new impervious surface area and 1672 new pervious surface area is created, for a net result of **3468 SF new impervious surface area**. Curve numbers for pervious areas used in subsequent analysis are consistent with the Previous Report.



Table 1. Description of Proposed Surface Improvements				
Area ID/Description	Existing Surface	New Surface	Area (SF)	Notes
1 Building Expansion	Open Space (CN = 61)	Impervious (CN=98)	5140	
2 Replaced Concrete Walkway	Impervious (CN=98)	Impervious (CN=98)	1130	Replaced impervious area not considered new area.
3 Replaced Asphalt Pavement and Curb and Gutter	Impervious (CN=98)	Impervious (CN=98)	2312	Replaced impervious area not considered new area.
4 New Pervious Area	Impervious (CN=98)	Open Space (CN=61)	1672	

2.2 Drainage Areas and Stormwater Improvements

Drainage areas and proposed stormwater improvements are shown in Attachment 2. The new improvements are split into two separate Drainage Areas (DA) based on the point to which they discharge. Two new stormwater manholes (SMH-3 and SMH-4) are proposed to accommodate the building expansion.

DA 1 comprises the proposed roof area of the building expansion (5140 SF), which is entirely impervious (CN=98). The roof will be collected into a downspout and piped directly into the subsurface stormwater system. A new manhole, identified as “SMH-3”, will receive this roof runoff.

DA 2 comprises the proposed concrete sidewalk and pervious area (2802 SF), which has a weighted curve number of 63. This area will sheet flow to the existing catch basin identified as “CB-1”.

2.3 Hydrologic Analysis

HydraFlow was used to assess the impact generated by the change to Curve Number. All times of concentration, storage volumes, and methodologies used are identical to that of the Previous Report.

In Table 2 below the new composite CN of Basin A is determined. The 0.08-acre change represents the 3468 SF of new impervious surface area created by the proposed improvements, as discussed in Section 2.1.

Table 2. Onsite Basin 'A' to Detention Basin 'A' - Composite CN Comparison					
Model	Cover Type	Area (ac)	CN	Total Area	Composite CN
Existing Areas (Previous Model)	Impervious	1.59	98	5.87	69
	Open Space, HSG B	2.55	61		
	Woods, HSG B	1.73	55		
Proposed Areas (New Model)	Impervious	1.67 (+0.08)	98	5.87	70 (+1)
	Open Space, HSG B	2.47 (-0.08)	61		
	Woods, HSG B	1.73 (+0)	55		

The previous model determined the peak discharge and total storage used by Basin A by combining the hydrograph outputs of *Offsite to Basin 'A'* and *Onsite Basin 'A' to Detention Basin A*. *Offsite Basin A* is unchanged by the proposed improvements, so the new peak discharges and total storage used by Basin A associated with each recurrence interval can be determined by combining the unchanged offsite hydrographs with new onsite hydrographs using the increased composite CN from Table 2. This combined hydrograph is then routed to Detention Basin A (configured identically as the Previous Report) to generate new peak discharges and max stage elevations. The results of this analysis are provided in Table 3. Complete hydrograph reports are included under Attachment C.

Table 3. Discharge and Stage Elevation Comparison					
Return Frequency	Peak Discharge (cfs)			Max Stage Elevation (ft)	
	Pre-Developed	As-Built (Existing)	Proposed	Existing	Proposed
1-year	16.53	10.31	10.67	673.77	673.79
2-year	22.84	16.75	17.19	674.07	674.09
5-year	34.62	27.93	28.44	674.54	674.56
10-year	45.33	37.19	37.75	674.97	675.00
25-year	61.45	54.26	54.97	675.47	675.49
50-year	74.90	63.95	64.38	675.91	675.94
100-year	89.44	70.36	70.69	676.46	676.49

2.4 Stormwater Pond Design Analysis

This section evaluates the design of the stormwater pond “Extended Dry Detention Basin A” regarding water quality, channel protection, and the design of the outlet control structure (OCS), as it is impacted by the proposed increase to impervious surface area with respect to the requirements of the GSMM.

2.4.1 Total Water Quality Volume - GSMM Stormwater Quality Development Review Tool

The total WQv requirement using a Stormwater Pond is that which achieves 80% TSS (total suspended solids) removal for 24-hour storms at 1-year, 2-year, 25-year, and 100-year return intervals. The Previous Report WQv of 7,512 cubic feet was determined using the GSMM Stormwater Quality Development Review Tool, and a WQv of 7,778 cubic feet was provided.

Using the new and existing surface areas from Table 2, the Stormwater Quality Site Development Tool was updated for the proposed building expansion. This provides a required Target Water Quality Volume of **7,826 cubic feet**. See Attachment D for the updated results of the Stormwater Quality Site Development Tool.

The new target WQv of 7,826 cubic feet is slightly greater (48 cubic feet, or 1%) than the previously provided WQv of 7,778 cubic feet. While it would be possible to increase the provided WQv by 1% by raising the existing orifice 0.10” or regrading part of the pond, the construction feasibility of such an effort (including temporary dewatering, disturbance, and confined space operations) is impractical for such a negligible quantity.

2.4.2 Sediment Forebay Volume

The forebay is a separate cell of the stormwater pond, 4-6 feet deep, sized to contain 0.1 inches per impervious acre of contributing drainage area (GSMM, Vol 2., pg. 352). The Previous Report, using an impervious acreage of 1.59 ac, indicates the forebay requires a volume of 577 cubic feet (Precision Planning, pp. 23). The proposed increase in impervious area to 1.67 ac would require a volume of 606 cubic feet.

Given that the existing forebay was designed to store a volume of 768 cubic feet, it is adequately sized to provide pretreatment for the proposed increase to impervious surface area.

2.4.3 Micropool Extended Detention (ED) Volume

Required micropool ED volume for a wet pond is 25-30% of the total WQv (GSMM, Vol 2, pg. 357). The upper value of 30% is used in this design.

The existing design places the invert of the water quality outfall at 671.00', below which a micropool volume of 2,488 cubic feet is provided (Precision Planning, pg. 23). With a new target WQv of 7,826 cubic feet, the required micropool volume is 2,348 cubic feet ($0.30 * 7,826$). As this is less than the available volume below the water quality outlet orifice, the micropool is adequately sized to retain the additional runoff volume introduced by the proposed increase in surface impervious surface area.

2.5 Channel Protection Analysis

The channel protection orifice is sized and positioned to control the release of the channel protection volume (CPv), which is the stage-storage volume in the pond above the water quality volume (WQv), such that the 1-year 24-hour storm runoff volume is released over 24 hours (extended detention).

The Previous Report determined a CPv requirement of 10,930 cubic feet and designed the orifice to provide a CPv of 11,596 cubic feet (Precision Planning, pg. 24). The new CPv requirement is affected by a change in curve number (CN) and is calculated using the same methodology as the Previous Report under Attachment E. The result of this calculation is a CPv requirement of **11,604 cubic feet**. This is 8 cubic feet greater than the provided CPv of 11,596 cubic feet. However, it is noted that the Previous Report did not subtract the pretreatment volume from the channel protection volume, which is allowed under the GSMM (GSMM Vol 2, Pg. 356, step 4). As such, the actual CPv is 10,836 cubic feet (11,604 minus 768 cubic feet), which is less than the provided CPv of 11,596 cubic feet. The pond and orifice is therefore adequately sized to retain the additional runoff volume introduced by the proposed increase in impervious surface area.

Section 3: Summary and Conclusion

Based on the results of this analysis, changes to peak discharge, pond stage elevation, and water quality volumes due to the 3,468 SF increase in impervious surface area are negligibly small.

The average increase to peak discharge from the 36" outfall pipe across all return frequencies is 0.48 cfs, with the greatest increase of 0.71 cfs associated with the 25-year 24-hour storm event.

The average increase to pond stage elevation across all return frequencies is 0.024' or 0.29". The greatest increase of 0.03' or 0.36" is associated with the 10, 50, and 100-year 24-hour storm events.

Given that all proposed stage elevations remain below 677', with the top-of-slope of the pond at 678', a minimum freeboard of 12" is maintained under all conditions. Required water quality volumes for pretreatment, micropool extended detention, and channel protection are increased, but each remains less than the provided volume of the existing condition. In conclusion, Detention Basin A is adequately sized to accommodate the increase to flowrates associated with this proposed building expansion.

References

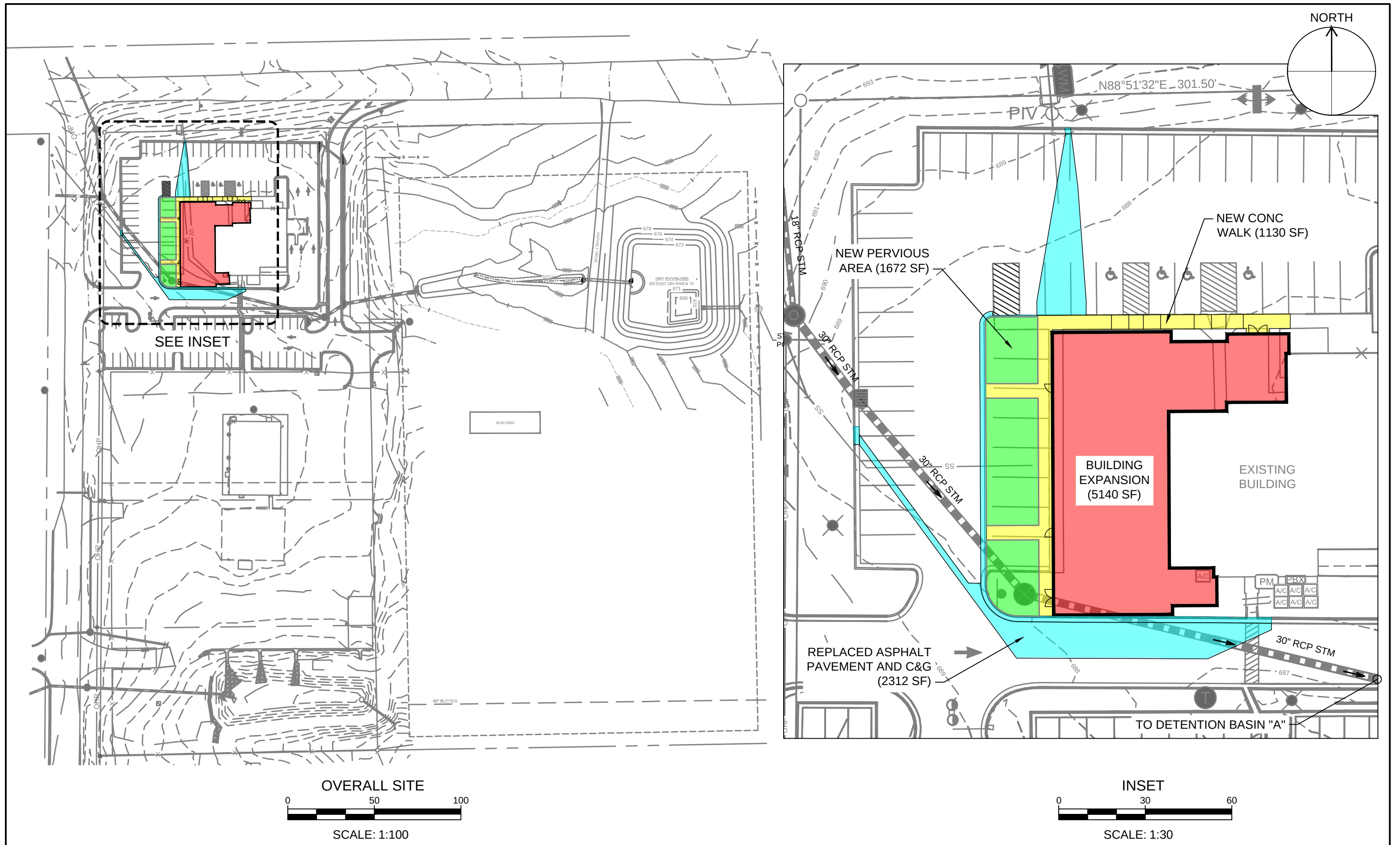
Precision Planning Inc., *Stormwater Management Report for NCWSA*, dated October 15, 2020.

Atlanta Regional Commission, *Georgia Stormwater Management Manual*, 2016 edition.



Attachment A: Figure 1

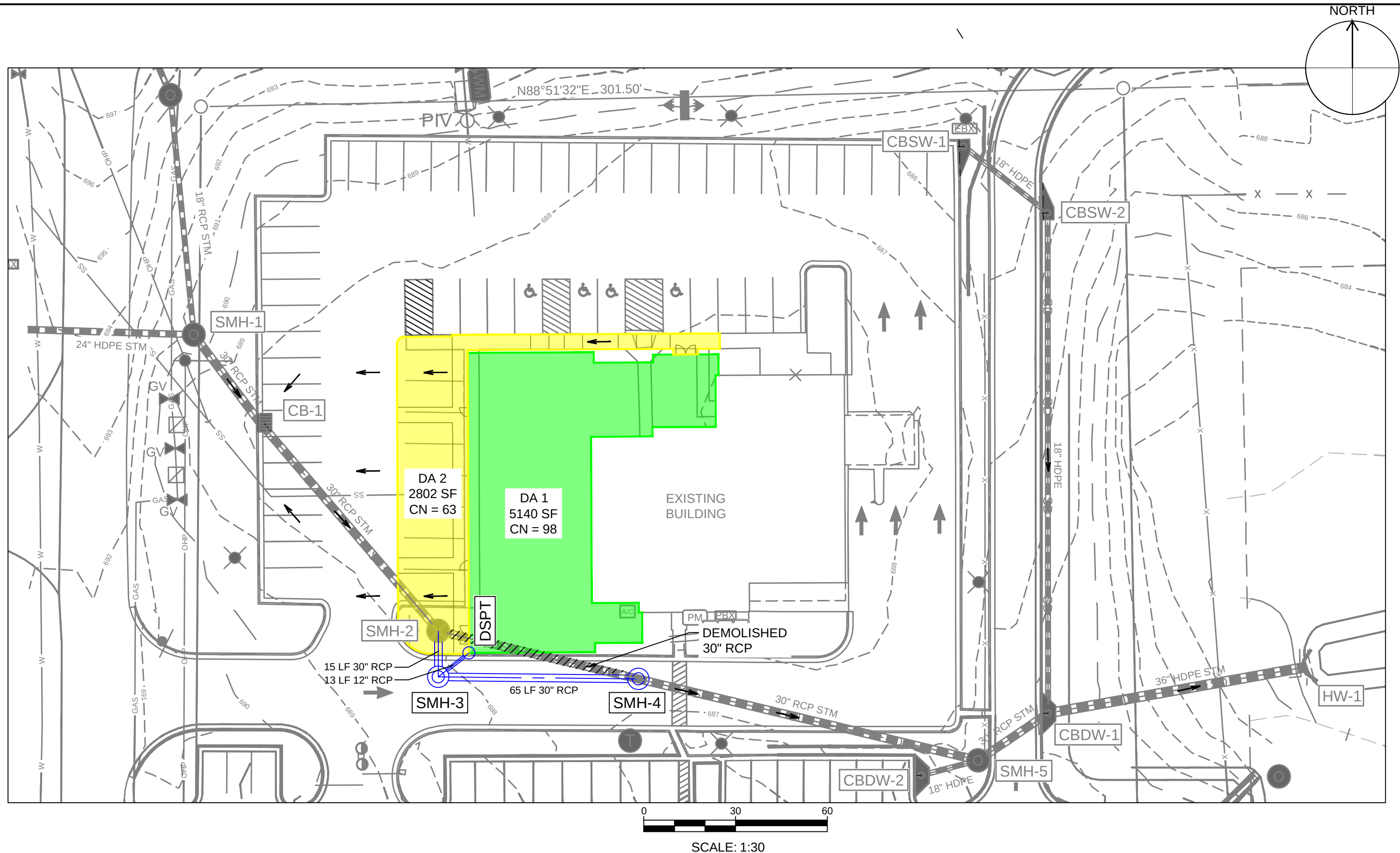




NCWSA | Stormwater Technical Memorandum
OVERALL SITE IMPROVEMENTS

Attachment B: Figure 2





Attachment C: HydraFlow Hydrographs



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

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	7.174	2	720	17,214	-----	-----	-----	ONSITE BASIN A - EXISTING
2	SCS Runoff	7.694	2	720	18,268	-----	-----	-----	ONSITE BASIN A - PROPOSED
3	SCS Runoff	12.54	2	726	42,028	-----	-----	-----	OFFSITE BASIN A
4	Combine	17.97	2	722	59,242	1, 3	-----	-----	TOTAL TO DETENTION BASIN A - E
5	Combine	18.41	2	722	60,296	2, 3,	-----	-----	TOTAL TO DETENTION BASIN A - P
6	Reservoir	10.31	2	734	58,828	4	673.77	22,068	Detention Basin A - EX
7	Reservoir	10.67	2	734	59,882	5	673.79	22,234	Detention Basin A - PR
HYDROLOGY-REVISED.gpw					Return Period: 1 Year			Thursday, 04 / 9 / 2026	

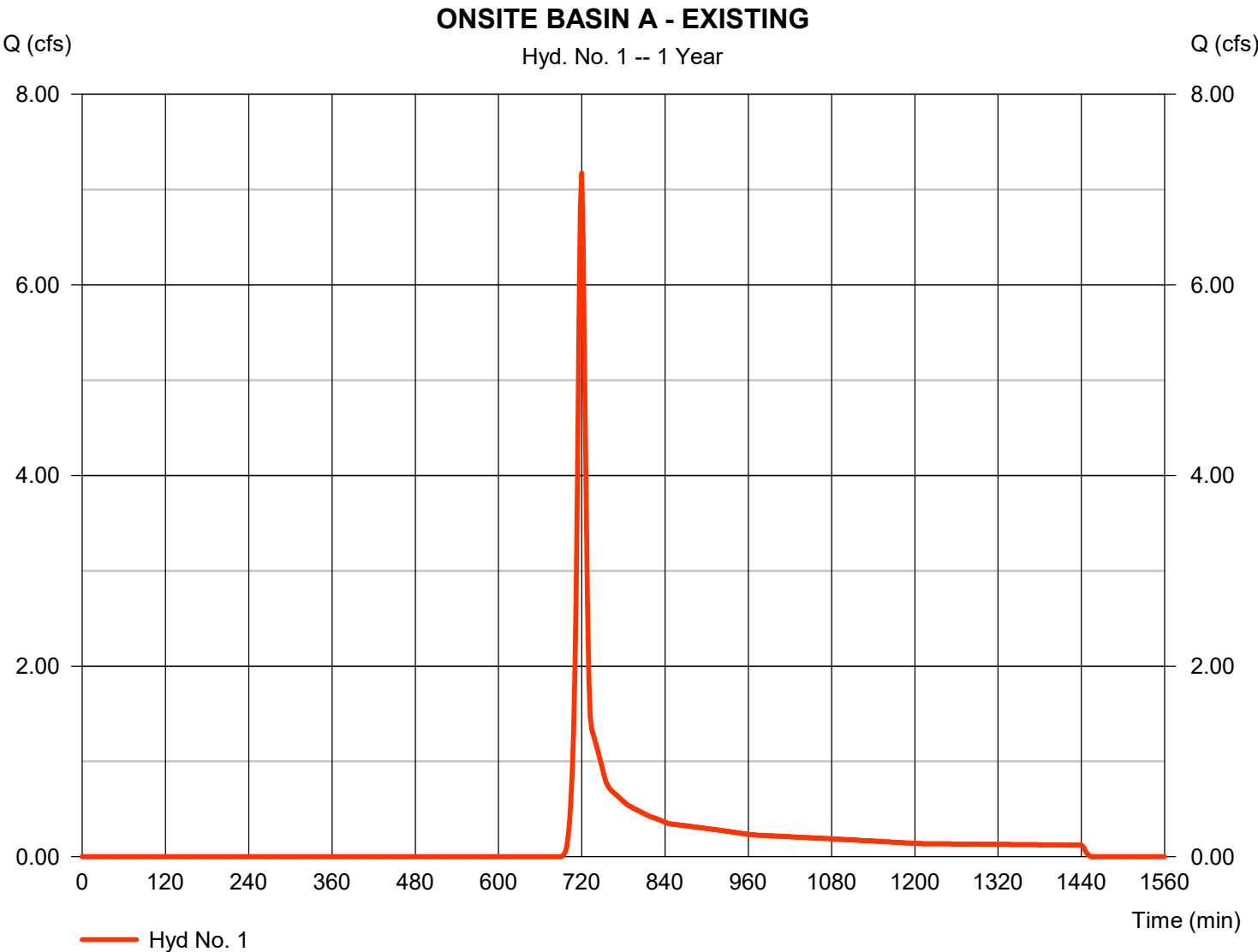
Hydrograph Report

Hyd. No. 1

ONSITE BASIN A - EXISTING

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.174 cfs
Storm frequency	=	1 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	17,214 cuft
Drainage area	=	5.870 ac	Curve number	=	69*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.50 min
Total precip.	=	3.25 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.590 x 98) + (2.550 x 61) + (1.730 x 55)] / 5.870



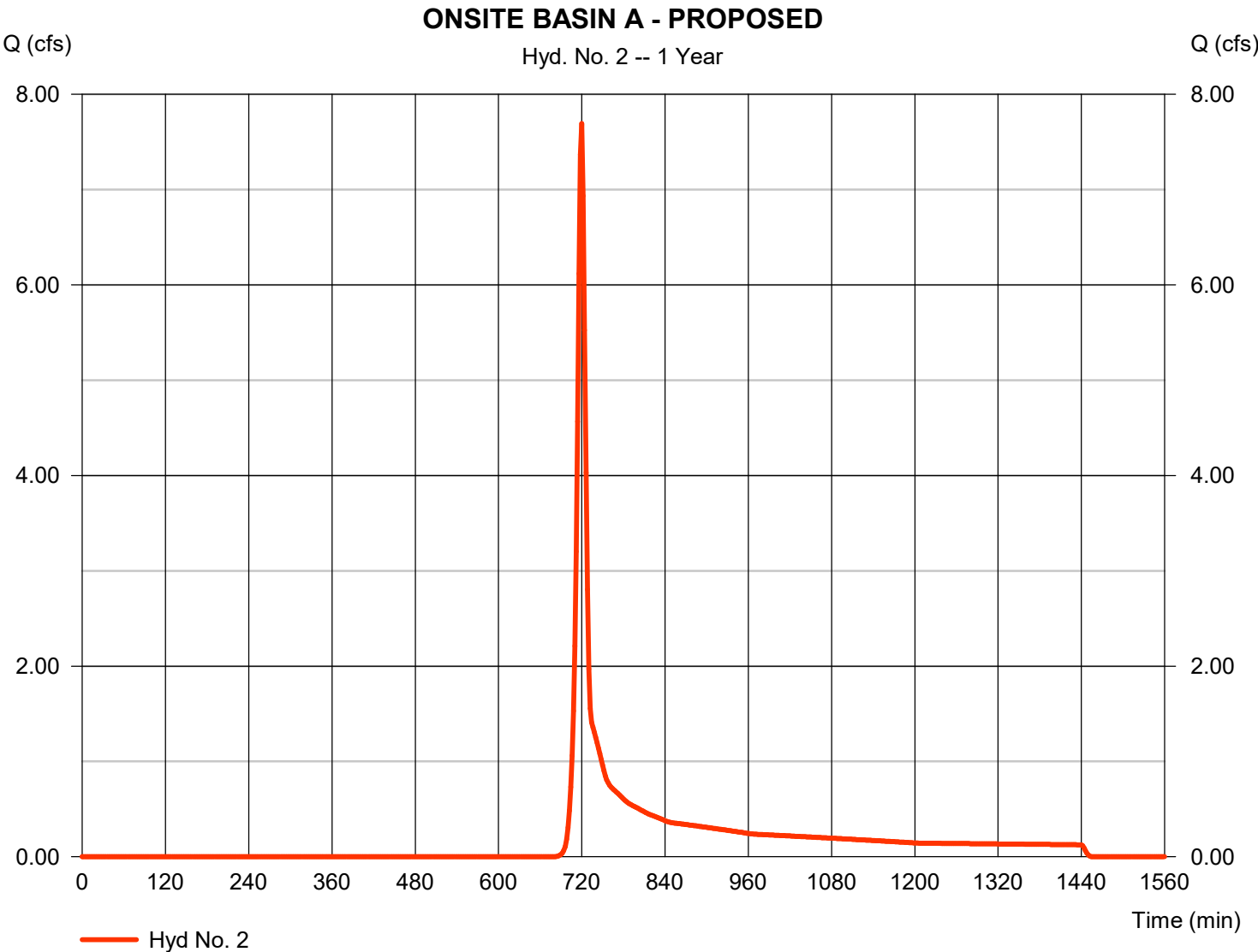
Hydrograph Report

Hyd. No. 2

ONSITE BASIN A - PROPOSED

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.694 cfs
Storm frequency	=	1 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	18,268 cuft
Drainage area	=	5.870 ac	Curve number	=	70*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.50 min
Total precip.	=	3.25 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.670 x 98) + (2.470 x 61) + (1.730 x 55)] / 5.870

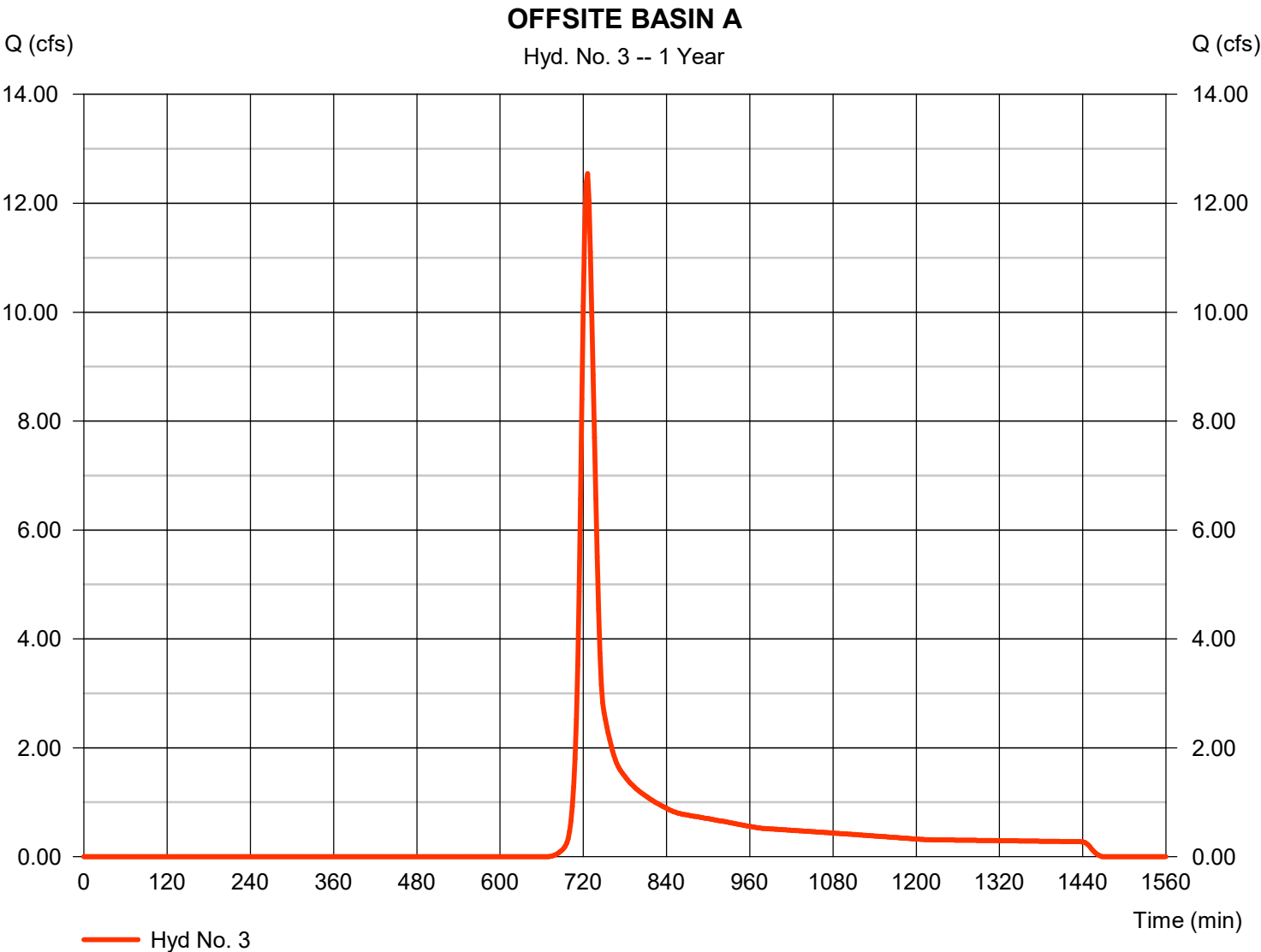


Hydrograph Report

Hyd. No. 3

OFFSITE BASIN A

Hydrograph type	=	SCS Runoff	Peak discharge	=	12.54 cfs
Storm frequency	=	1 yrs	Time to peak	=	726 min
Time interval	=	2 min	Hyd. volume	=	42,028 cuft
Drainage area	=	12.050 ac	Curve number	=	72
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	17.70 min
Total precip.	=	3.25 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

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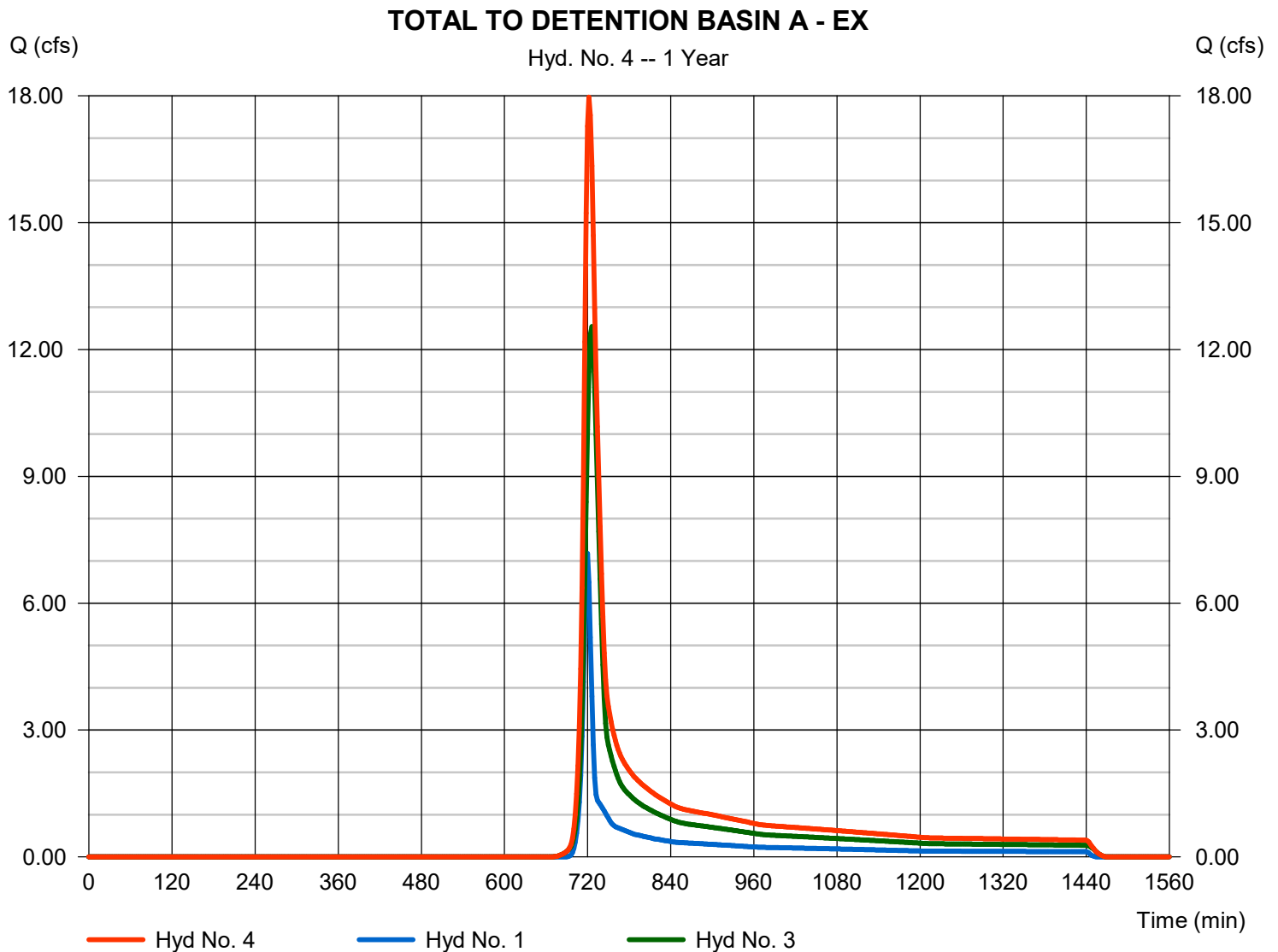
Thursday, 04 / 9 / 2026

Hyd. No. 4

TOTAL TO DETENTION BASIN A - EX

Hydrograph type = Combine
Storm frequency = 1 yrs
Time interval = 2 min
Inflow hyds. = 1, 3

Peak discharge = 17.97 cfs
Time to peak = 722 min
Hyd. volume = 59,242 cuft
Contrib. drain. area = 17.920 ac

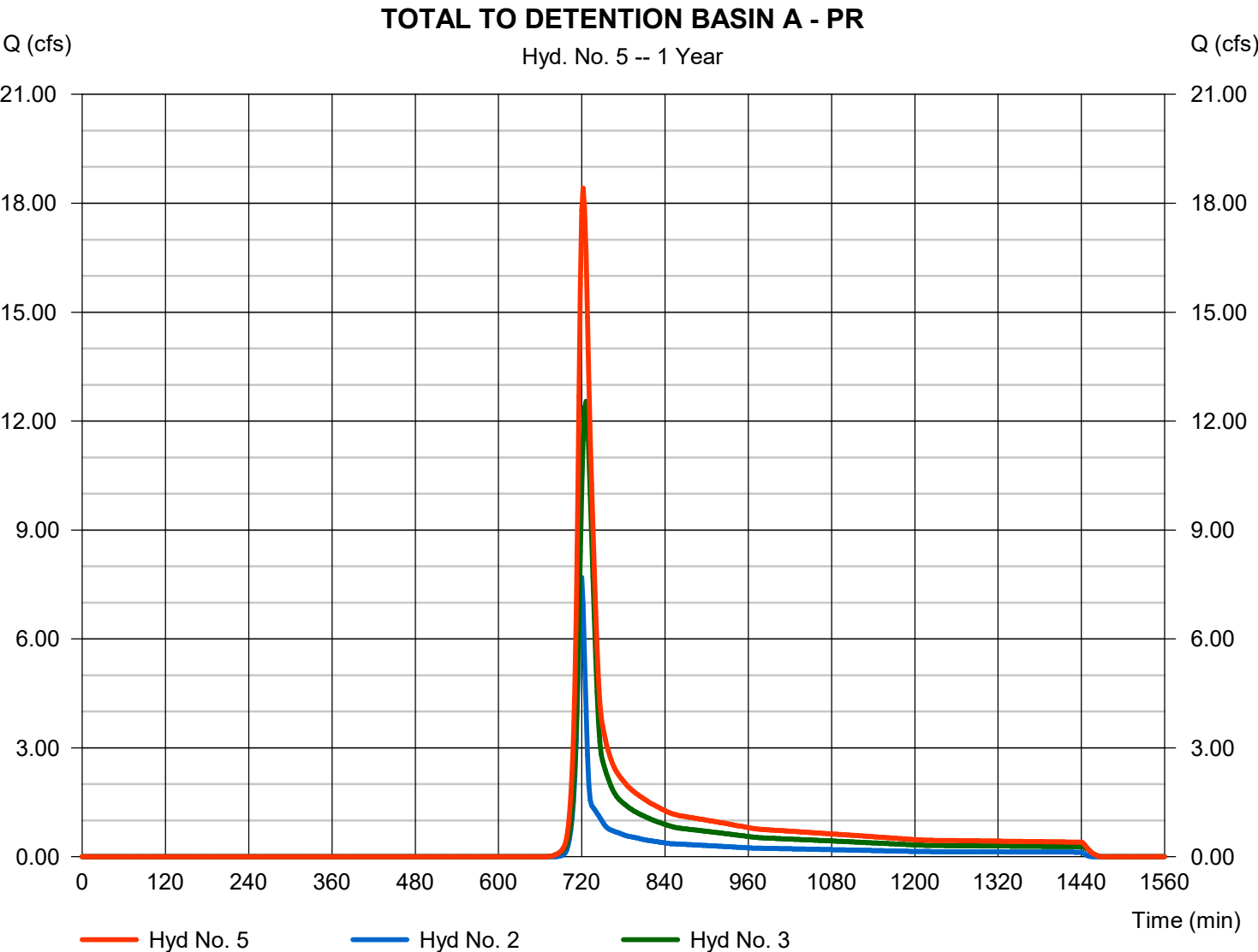


Hydrograph Report

Hyd. No. 5

TOTAL TO DETENTION BASIN A - PR

Hydrograph type	= Combine	Peak discharge	= 18.41 cfs
Storm frequency	= 1 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 60,296 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 17.920 ac



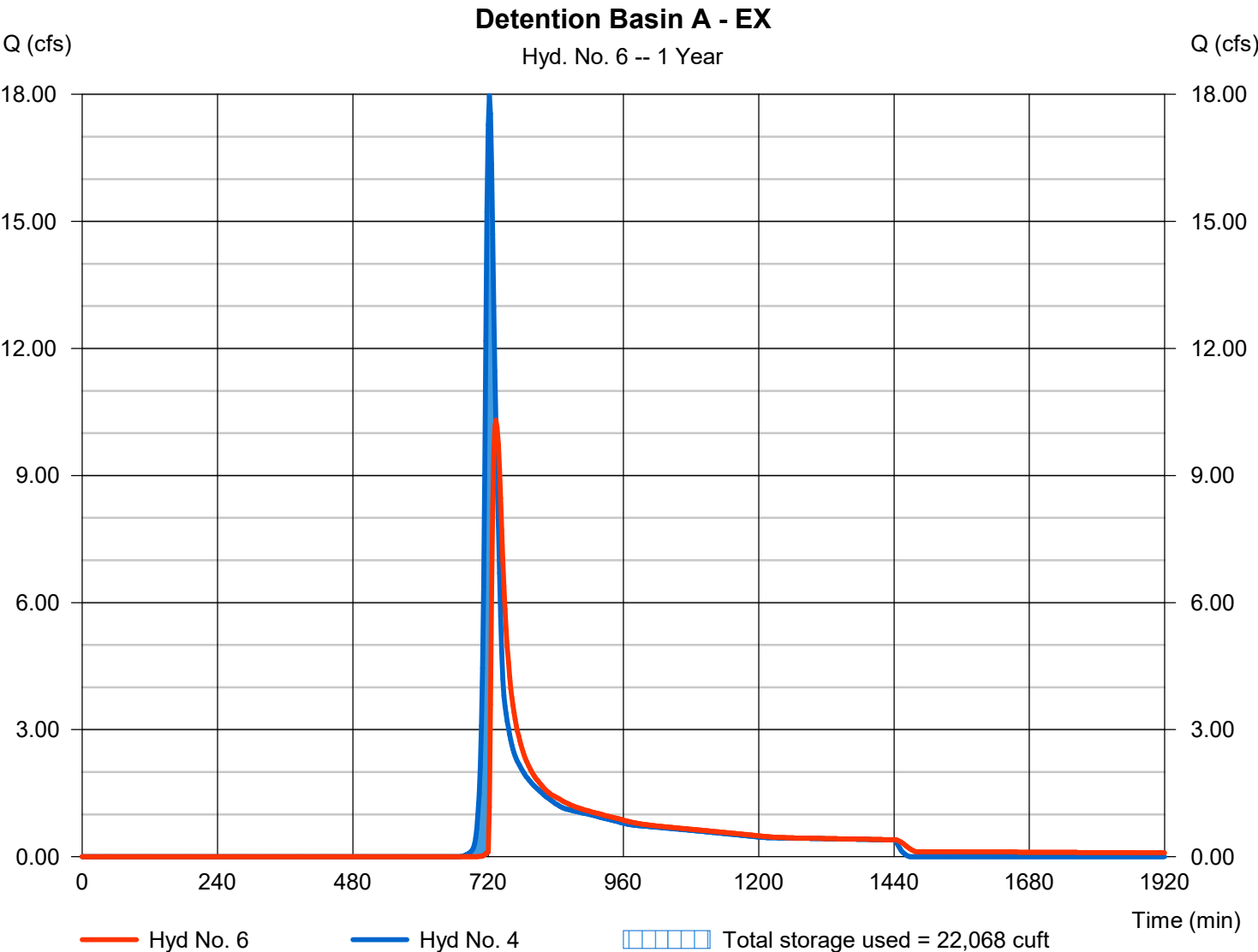
Hydrograph Report

Hyd. No. 6

Detention Basin A - EX

Hydrograph type	= Reservoir	Peak discharge	= 10.31 cfs
Storm frequency	= 1 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 58,828 cuft
Inflow hyd. No.	= 4 - TOTAL TO DETENTION BASIN A - EX	Basin Elevation	= 673.77 ft
Reservoir name	= Detention Basin A	Max. Storage	= 22,068 cuft

Storage Indication method used. Wet pond routing start elevation = 672.00 ft.



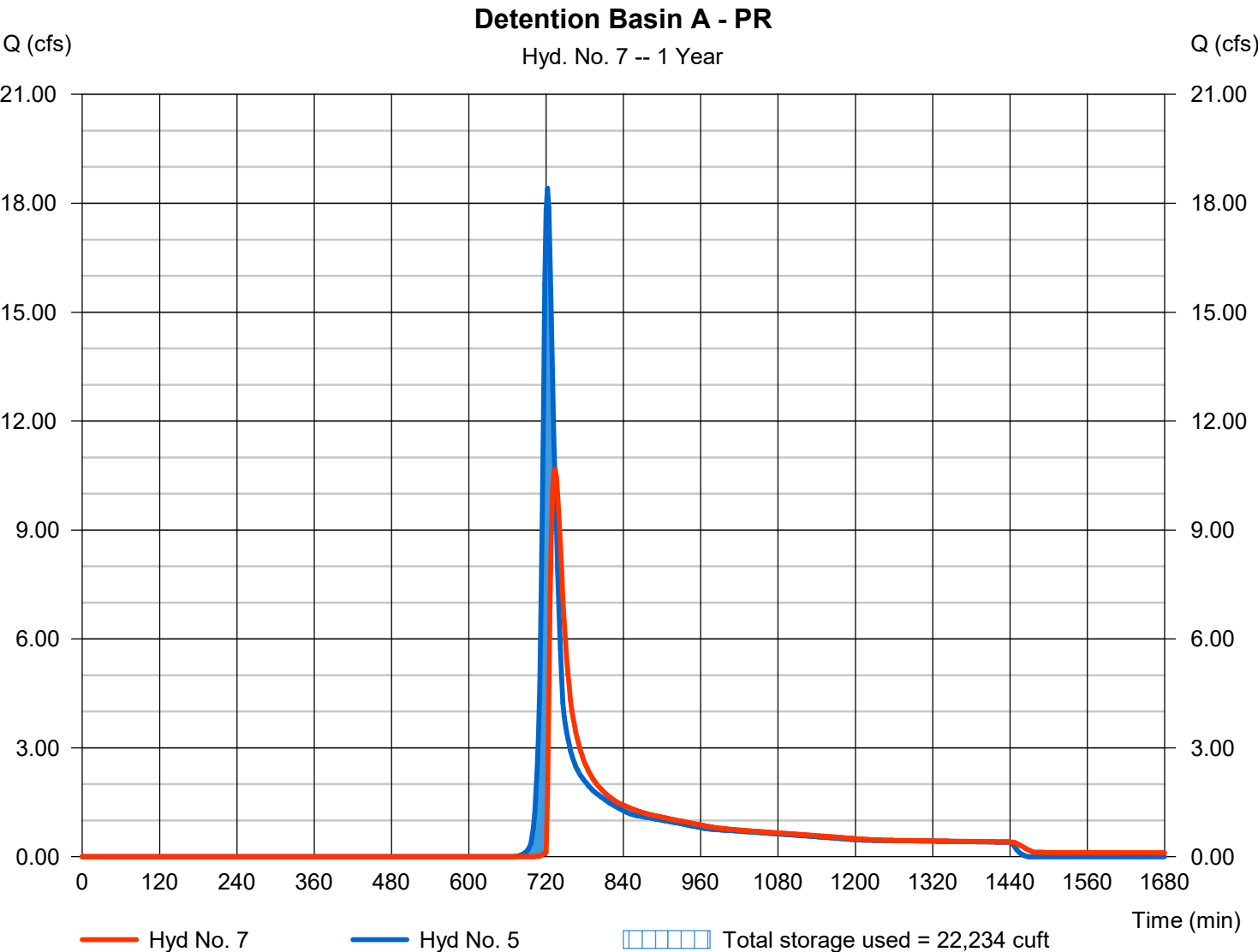
Hydrograph Report

Hyd. No. 7

Detention Basin A - PR

Hydrograph type	= Reservoir	Peak discharge	= 10.67 cfs
Storm frequency	= 1 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 59,882 cuft
Inflow hyd. No.	= 5 - TOTAL TO DETENTION BASIN A	Basin Elevation	= 673.79 ft
Reservoir name	= Detention Basin A	Max. Storage	= 22,234 cuft

Storage Indication method used. Wet pond routing start elevation = 672.00 ft.



Hydrograph Summary Report

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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	9.854	2	720	23,059	-----	-----	-----	ONSITE BASIN A - EXISTING
2	SCS Runoff	10.44	2	720	24,294	-----	-----	-----	ONSITE BASIN A - PROPOSED
3	SCS Runoff	16.88	2	726	55,136	-----	-----	-----	OFFSITE BASIN A
4	Combine	24.53	2	722	78,194	1, 3	-----	-----	TOTAL TO DETENTION BASIN A - E
5	Combine	25.03	2	722	79,429	2, 3,	-----	-----	TOTAL TO DETENTION BASIN A - P
6	Reservoir	16.75	2	730	77,779	4	674.07	24,772	Detention Basin A - EX
7	Reservoir	17.19	2	730	79,014	5	674.09	24,976	Detention Basin A - PR
HYDROLOGY-REVISED.gpw					Return Period: 2 Year			Thursday, 04 / 9 / 2026	

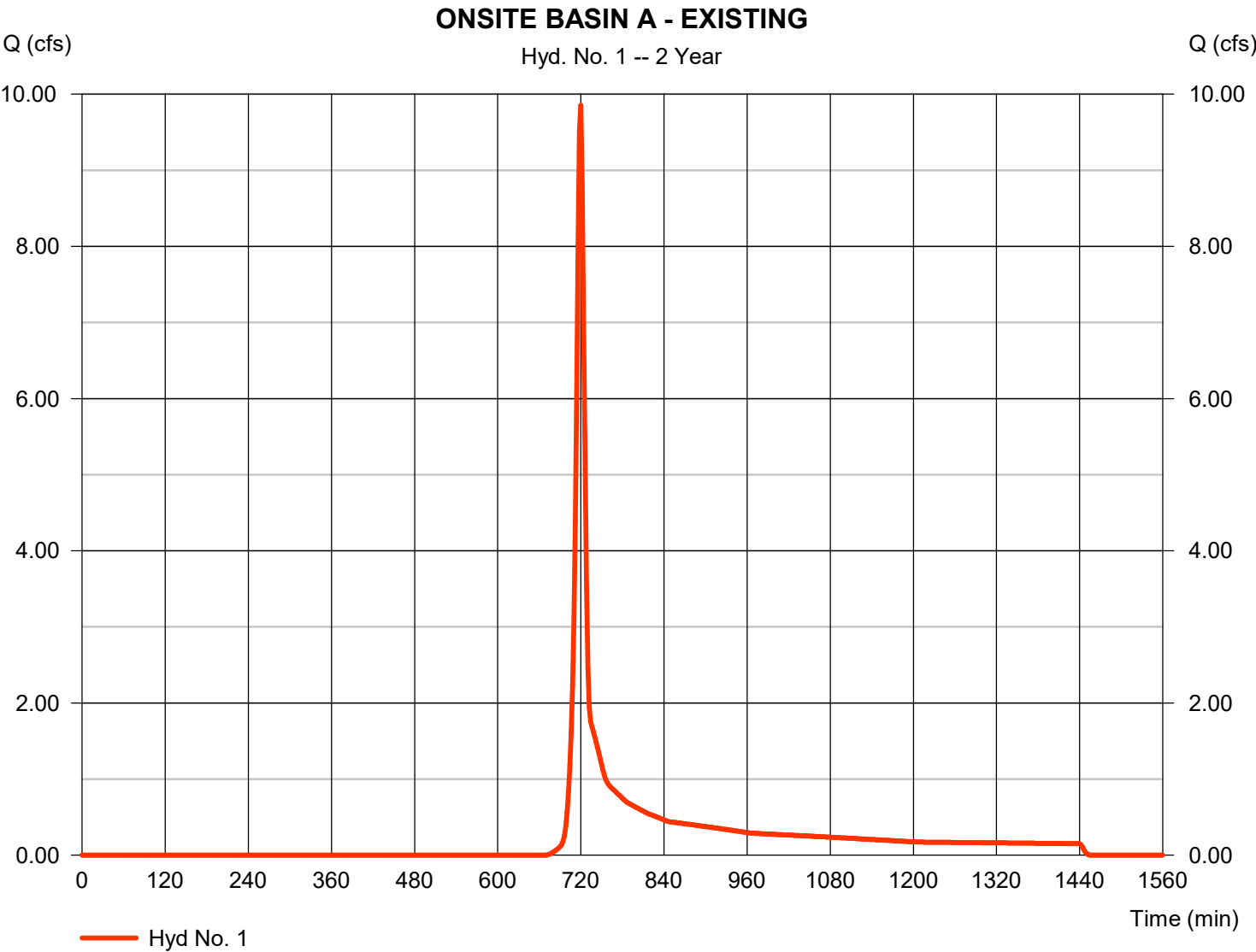
Hydrograph Report

Hyd. No. 1

ONSITE BASIN A - EXISTING

Hydrograph type	=	SCS Runoff	Peak discharge	=	9.854 cfs
Storm frequency	=	2 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	23,059 cuft
Drainage area	=	5.870 ac	Curve number	=	69*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.50 min
Total precip.	=	3.71 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.590 x 98) + (2.550 x 61) + (1.730 x 55)] / 5.870



Hydrograph Report

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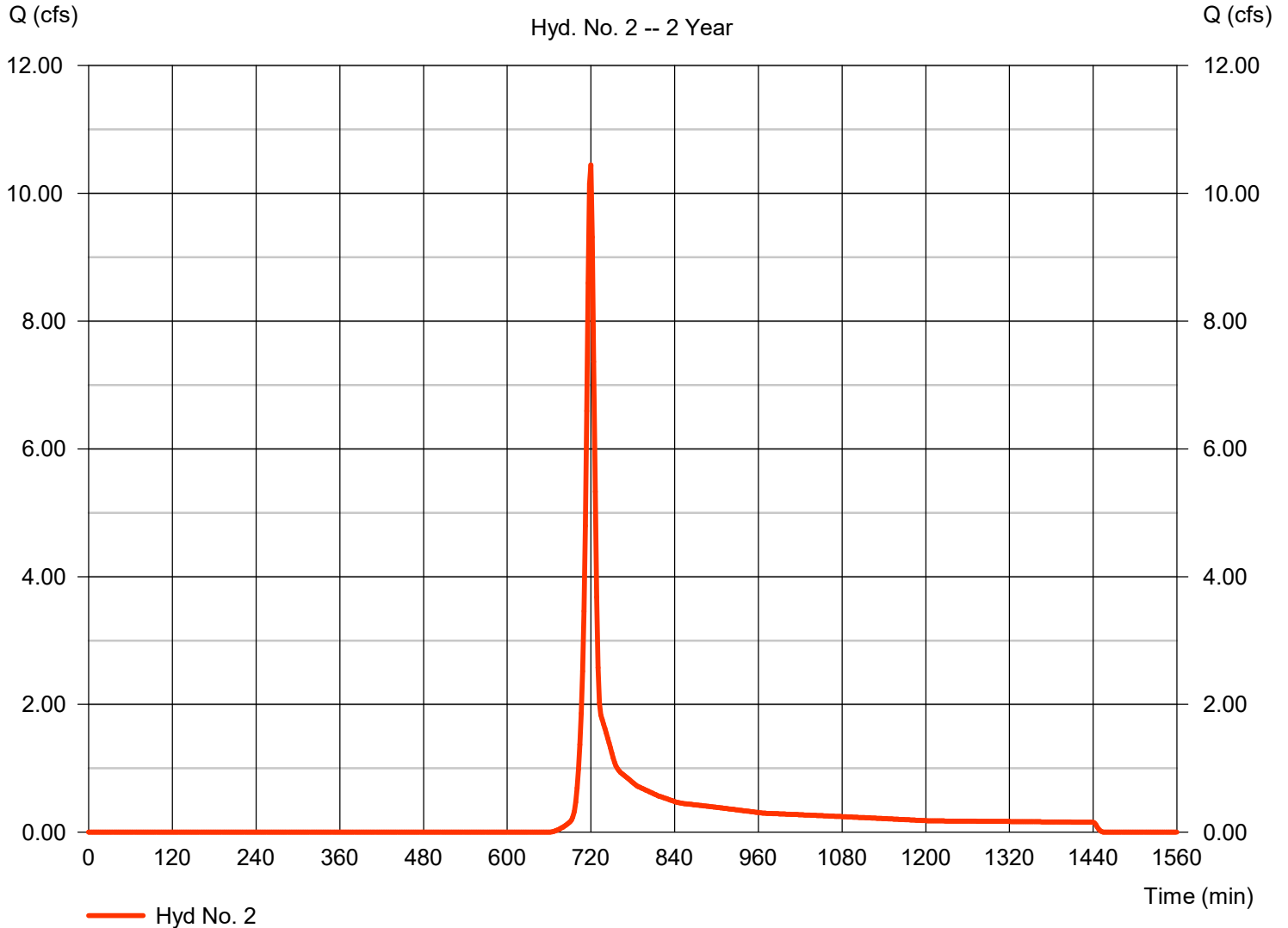
Hyd. No. 2

ONSITE BASIN A - PROPOSED

Hydrograph type	= SCS Runoff	Peak discharge	= 10.44 cfs
Storm frequency	= 2 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 24,294 cuft
Drainage area	= 5.870 ac	Curve number	= 70*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.50 min
Total precip.	= 3.71 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(1.670 \times 98) + (2.470 \times 61) + (1.730 \times 55)] / 5.870$

ONSITE BASIN A - PROPOSED

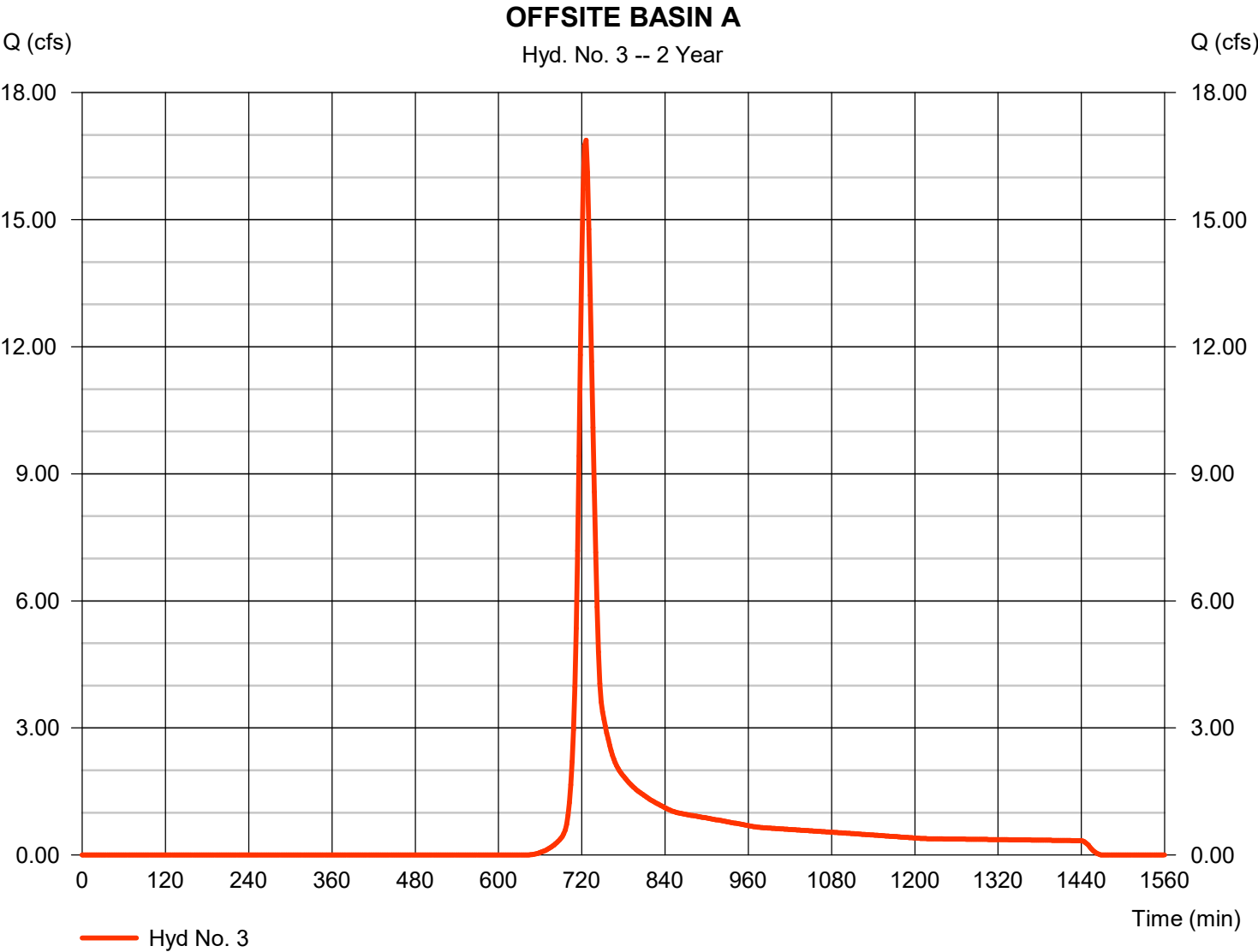


Hydrograph Report

Hyd. No. 3

OFFSITE BASIN A

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.88 cfs
Storm frequency	=	2 yrs	Time to peak	=	726 min
Time interval	=	2 min	Hyd. volume	=	55,136 cuft
Drainage area	=	12.050 ac	Curve number	=	72
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	17.70 min
Total precip.	=	3.71 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

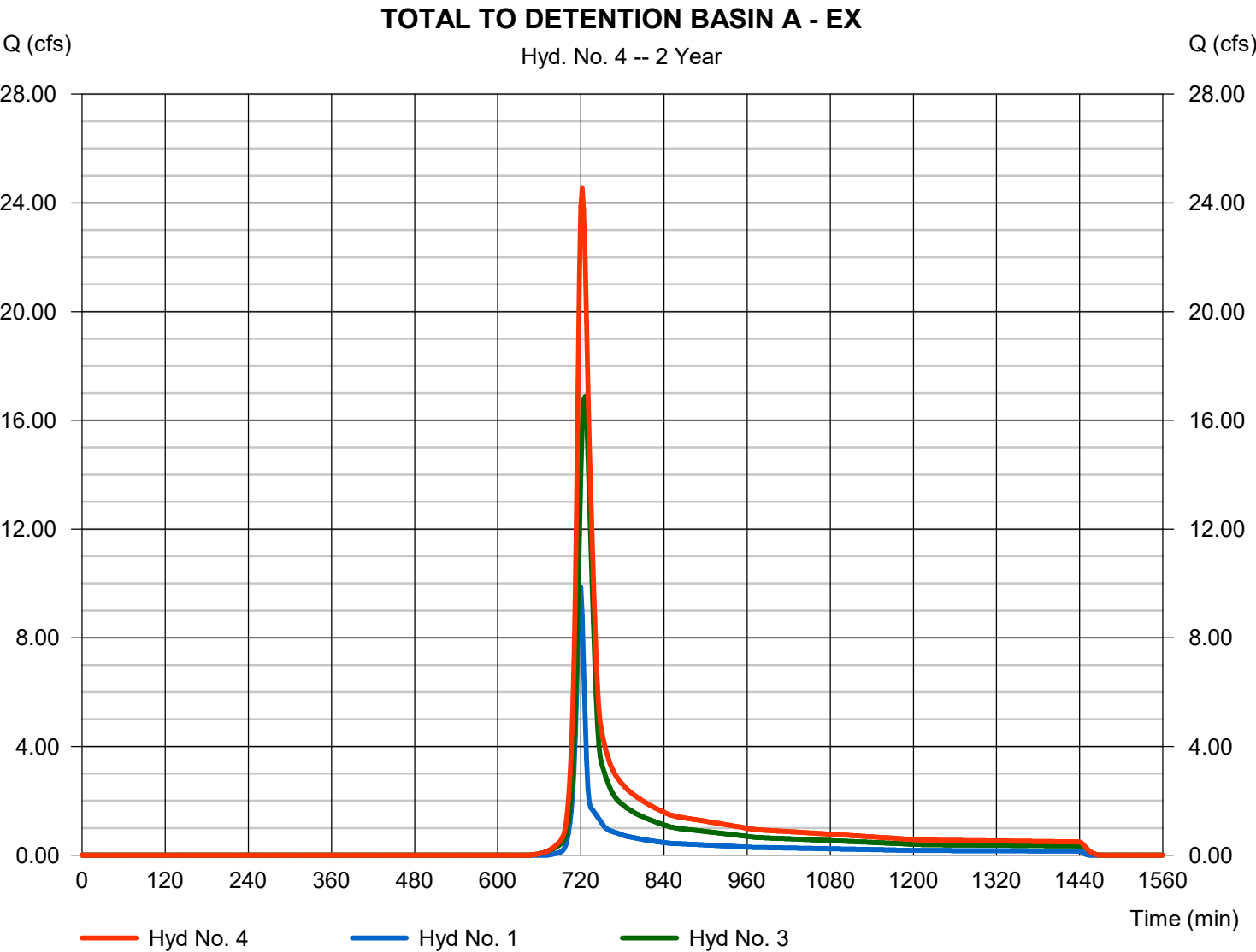


Hydrograph Report

Hyd. No. 4

TOTAL TO DETENTION BASIN A - EX

Hydrograph type	= Combine	Peak discharge	= 24.53 cfs
Storm frequency	= 2 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 78,194 cuft
Inflow hyds.	= 1, 3	Contrib. drain. area	= 17.920 ac

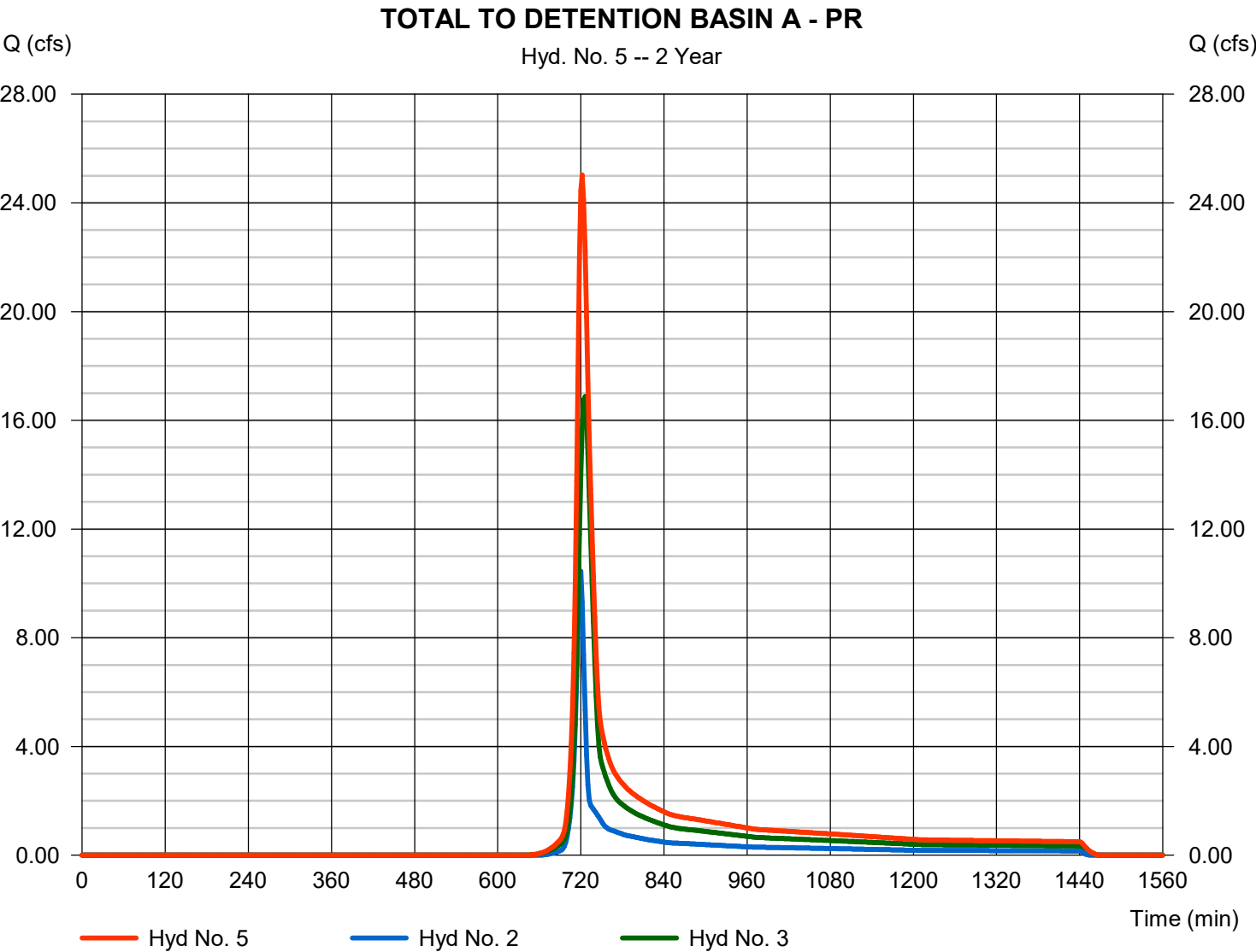


Hydrograph Report

Hyd. No. 5

TOTAL TO DETENTION BASIN A - PR

Hydrograph type	= Combine	Peak discharge	= 25.03 cfs
Storm frequency	= 2 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 79,429 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 17.920 ac



Hydrograph Report

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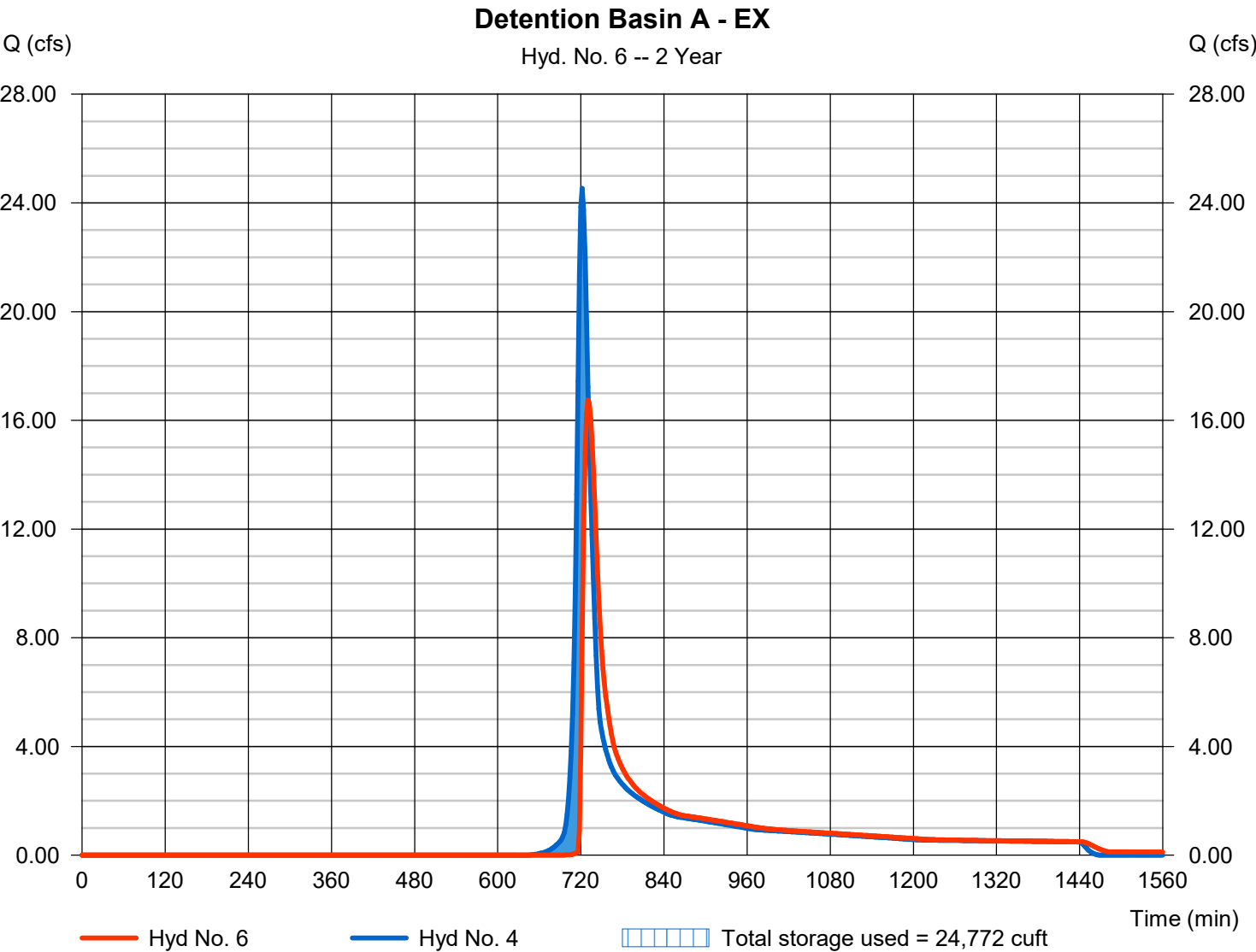
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Hyd. No. 6

Detention Basin A - EX

Hydrograph type	= Reservoir	Peak discharge	= 16.75 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 77,779 cuft
Inflow hyd. No.	= 4 - TOTAL TO DETENTION BASIN A - EX	Basin Elevation	= 674.07 ft
Reservoir name	= Detention Basin A	Max. Storage	= 24,772 cuft

Storage Indication method used. Wet pond routing start elevation = 672.00 ft.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

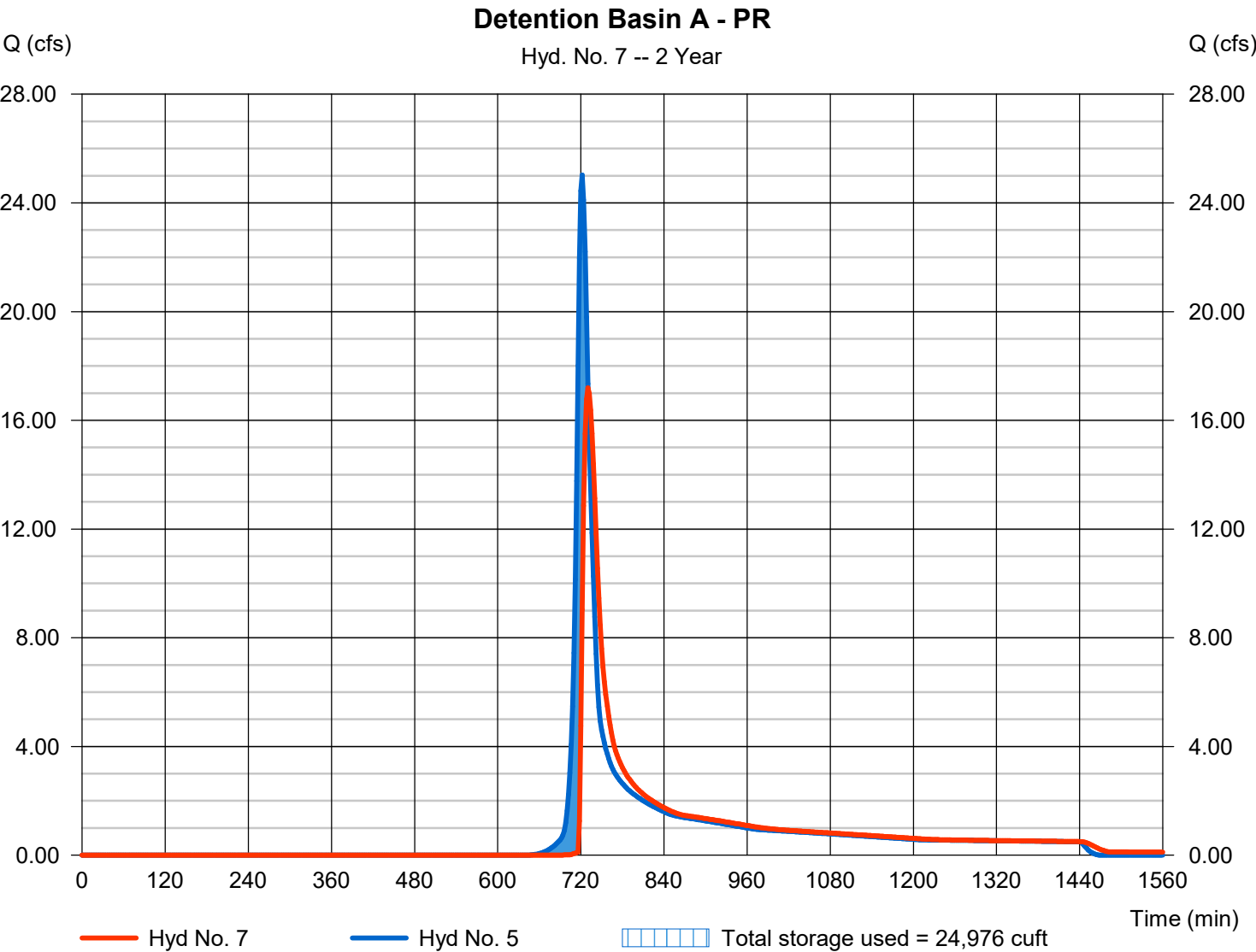
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Hyd. No. 7

Detention Basin A - PR

Hydrograph type	= Reservoir	Peak discharge	= 17.19 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 79,014 cuft
Inflow hyd. No.	= 5 - TOTAL TO DETENTION BASIN A - PR	Basin Elevation	= 674.09 ft
Reservoir name	= Detention Basin A	Max. Storage	= 24,976 cuft

Storage Indication method used. Wet pond routing start elevation = 672.00 ft.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

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	14.85	2	720	34,145	-----	-----	-----	ONSITE BASIN A - EXISTING
2	SCS Runoff	15.54	2	720	35,664	-----	-----	-----	ONSITE BASIN A - PROPOSED
3	SCS Runoff	24.90	2	724	79,625	-----	-----	-----	OFFSITE BASIN A
4	Combine	36.73	2	722	113,770	1, 3	-----	-----	TOTAL TO DETENTION BASIN A - E
5	Combine	37.31	2	722	115,289	2, 3,	-----	-----	TOTAL TO DETENTION BASIN A - P
6	Reservoir	27.93	2	728	113,354	4	674.54	29,833	Detention Basin A - EX
7	Reservoir	28.44	2	728	114,873	5	674.56	30,086	Detention Basin A - PR
HYDROLOGY-REVISED.gpw					Return Period: 5 Year			Thursday, 04 / 9 / 2026	

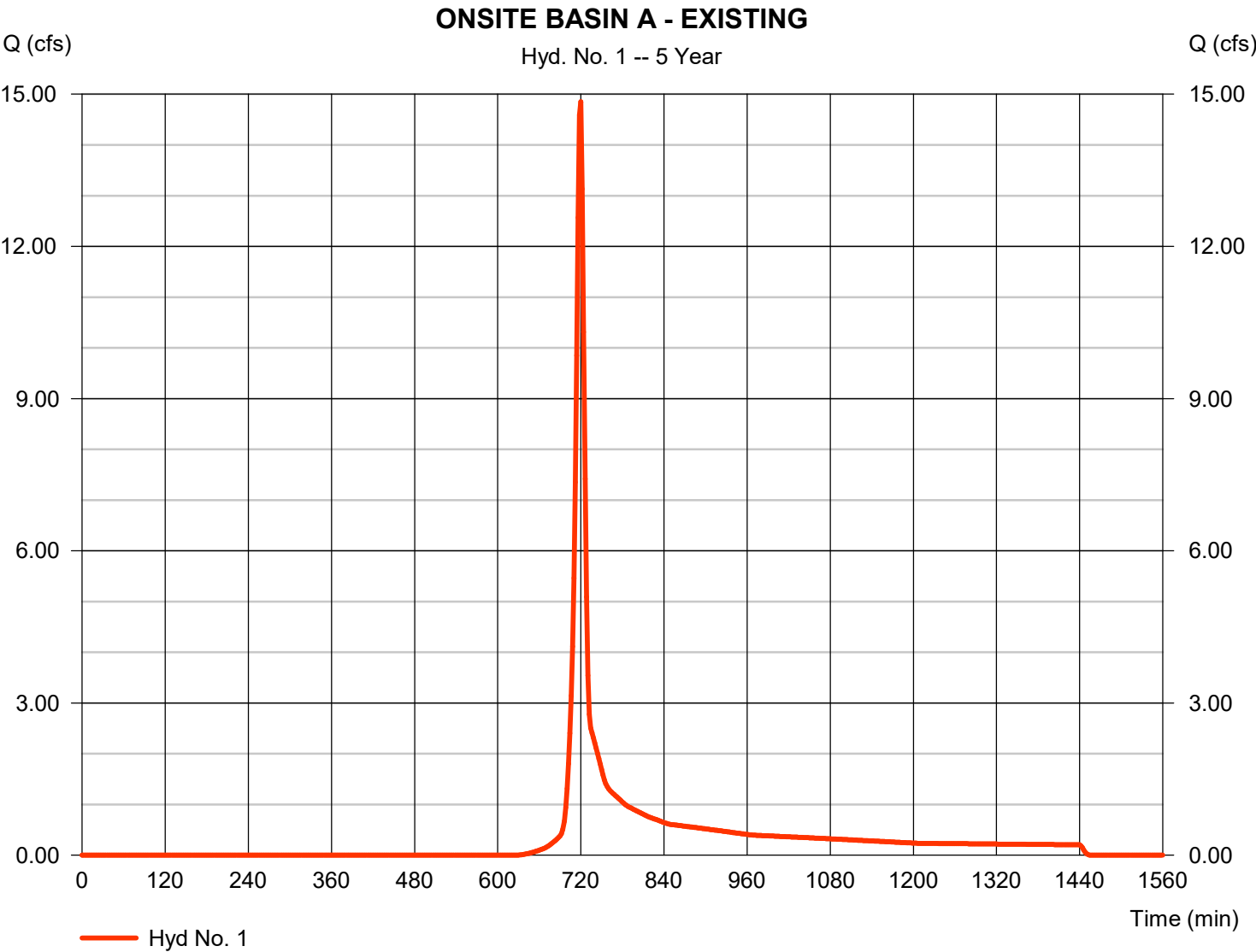
Hydrograph Report

Hyd. No. 1

ONSITE BASIN A - EXISTING

Hydrograph type	=	SCS Runoff	Peak discharge	=	14.85 cfs
Storm frequency	=	5 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	34,145 cuft
Drainage area	=	5.870 ac	Curve number	=	69*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.50 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.590 x 98) + (2.550 x 61) + (1.730 x 55)] / 5.870



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

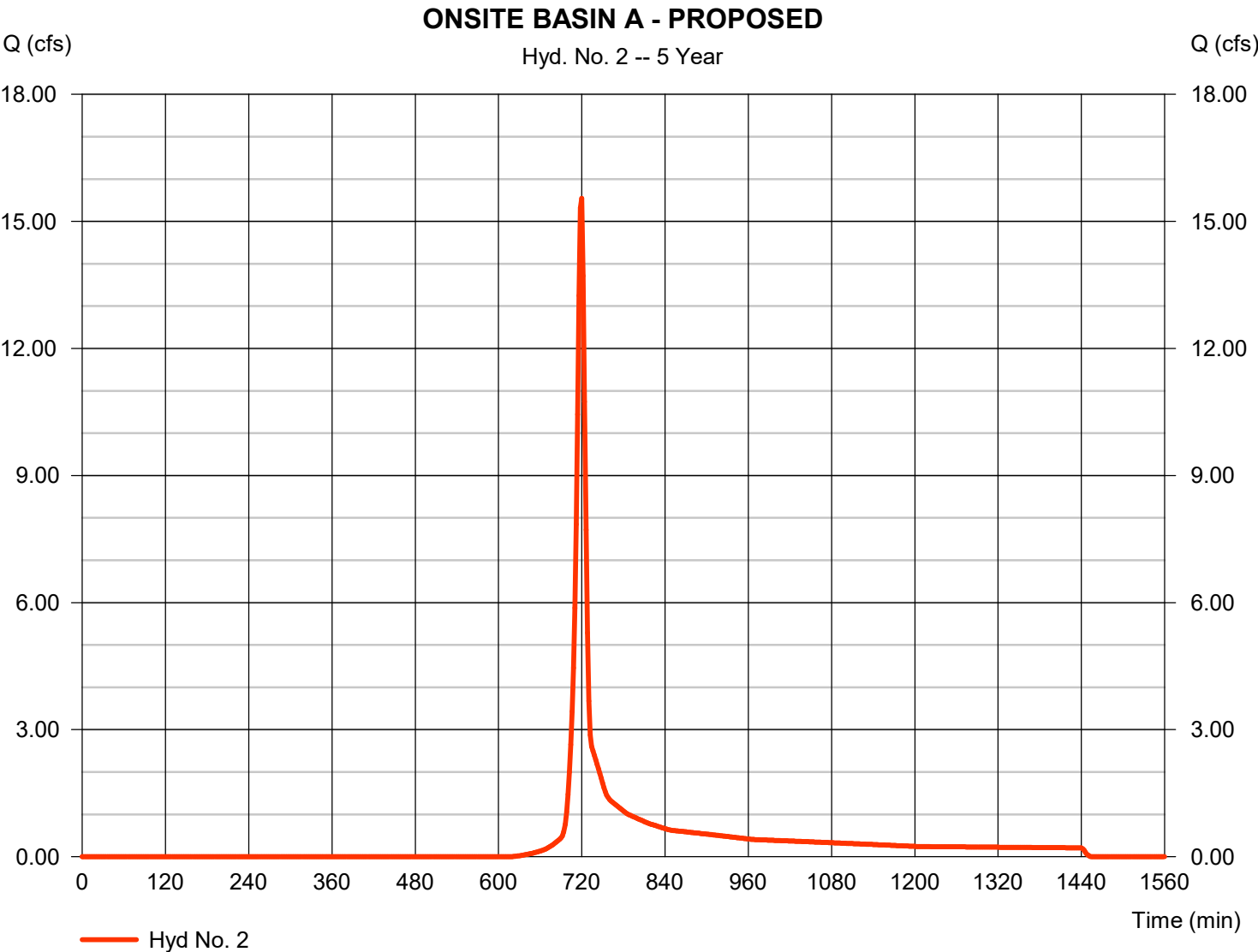
Thursday, 04 / 9 / 2026

Hyd. No. 2

ONSITE BASIN A - PROPOSED

Hydrograph type	=	SCS Runoff	Peak discharge	=	15.54 cfs
Storm frequency	=	5 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	35,664 cuft
Drainage area	=	5.870 ac	Curve number	=	70*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.50 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.670 x 98) + (2.470 x 61) + (1.730 x 55)] / 5.870



Hydrograph Report

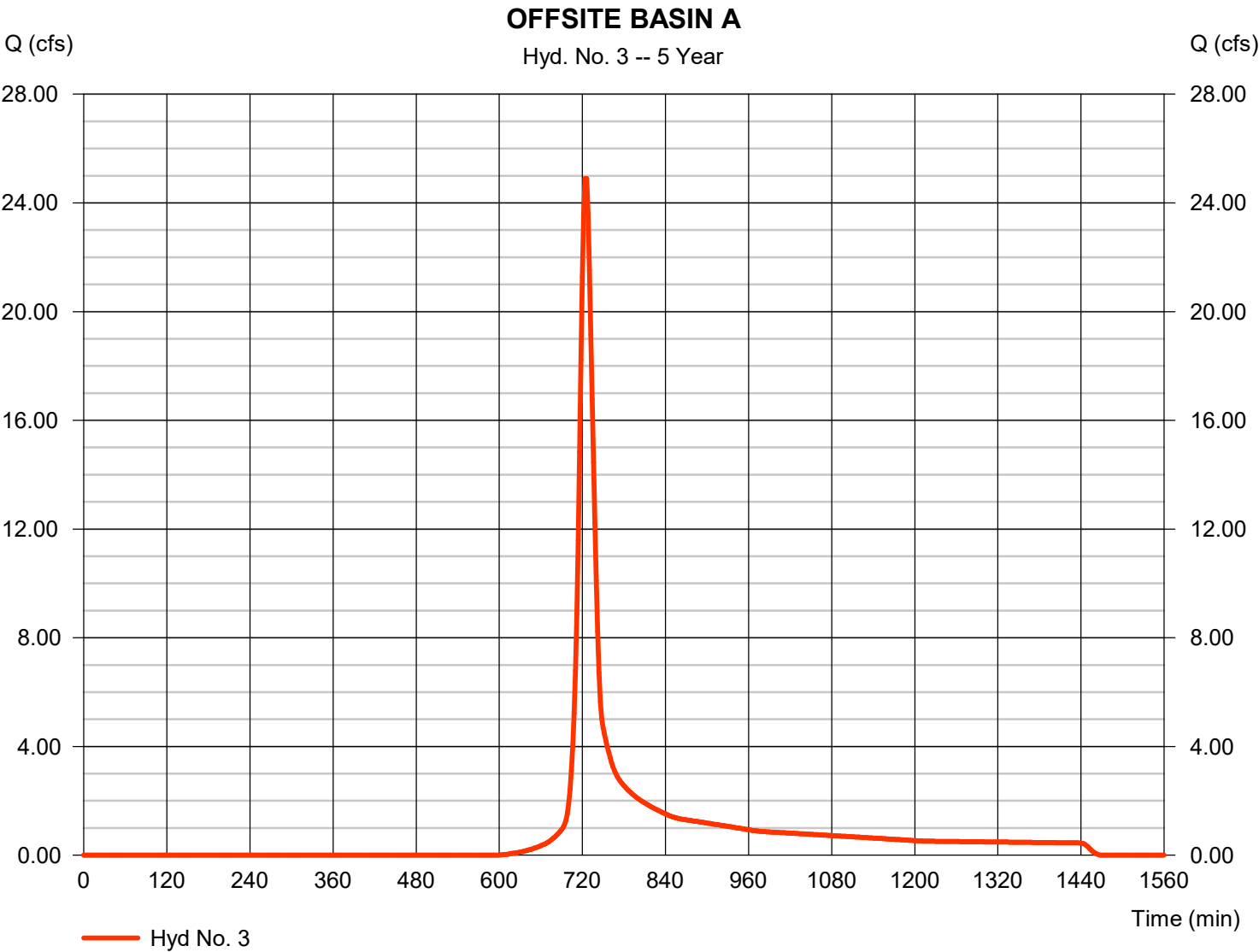
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Thursday, 04 / 9 / 2026

Hyd. No. 3

OFFSITE BASIN A

Hydrograph type	= SCS Runoff	Peak discharge	= 24.90 cfs
Storm frequency	= 5 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 79,625 cuft
Drainage area	= 12.050 ac	Curve number	= 72
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.70 min
Total precip.	= 4.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

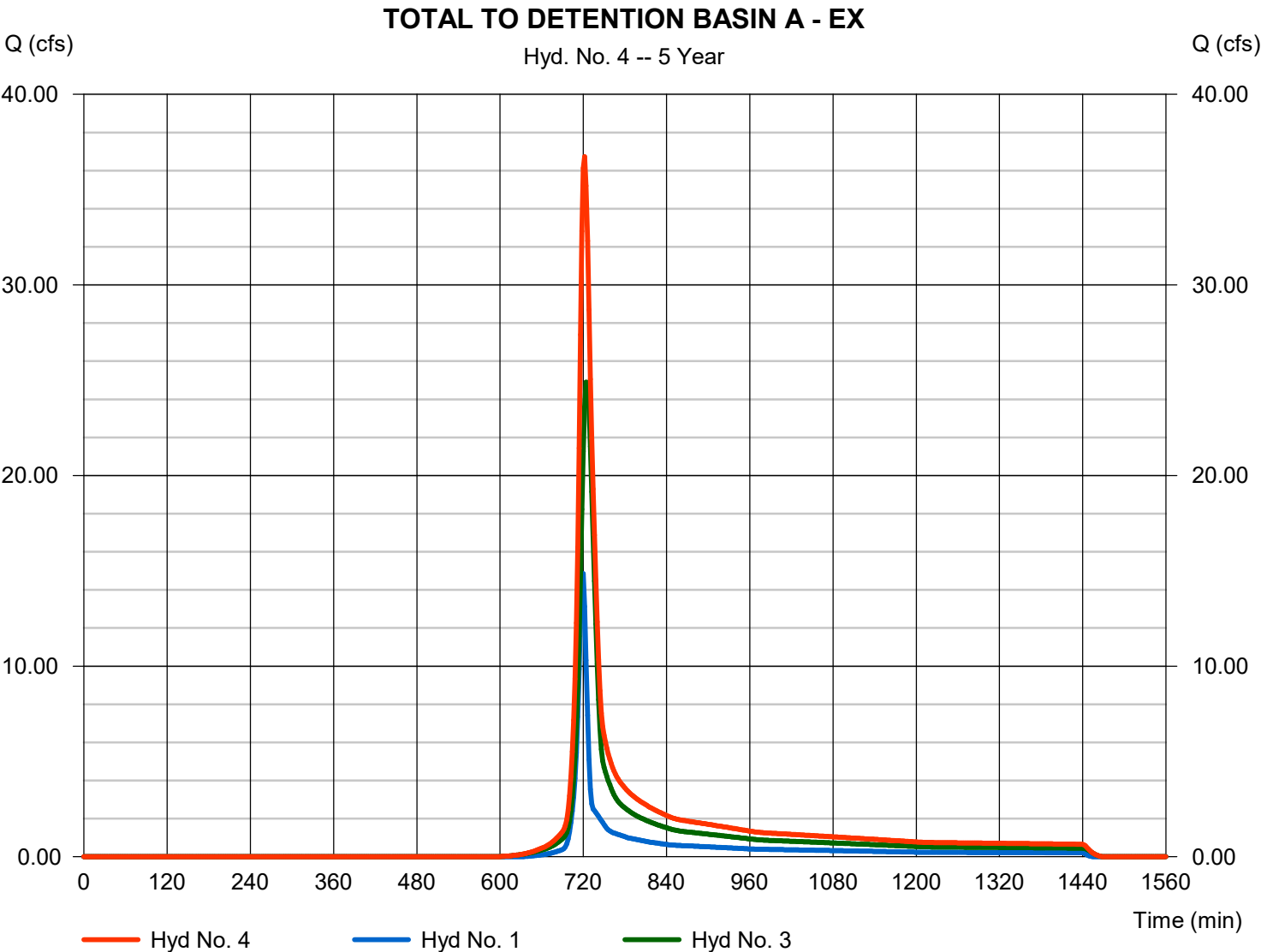
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Thursday, 04 / 9 / 2026

Hyd. No. 4

TOTAL TO DETENTION BASIN A - EX

Hydrograph type	= Combine	Peak discharge	= 36.73 cfs
Storm frequency	= 5 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 113,770 cuft
Inflow hyds.	= 1, 3	Contrib. drain. area	= 17.920 ac

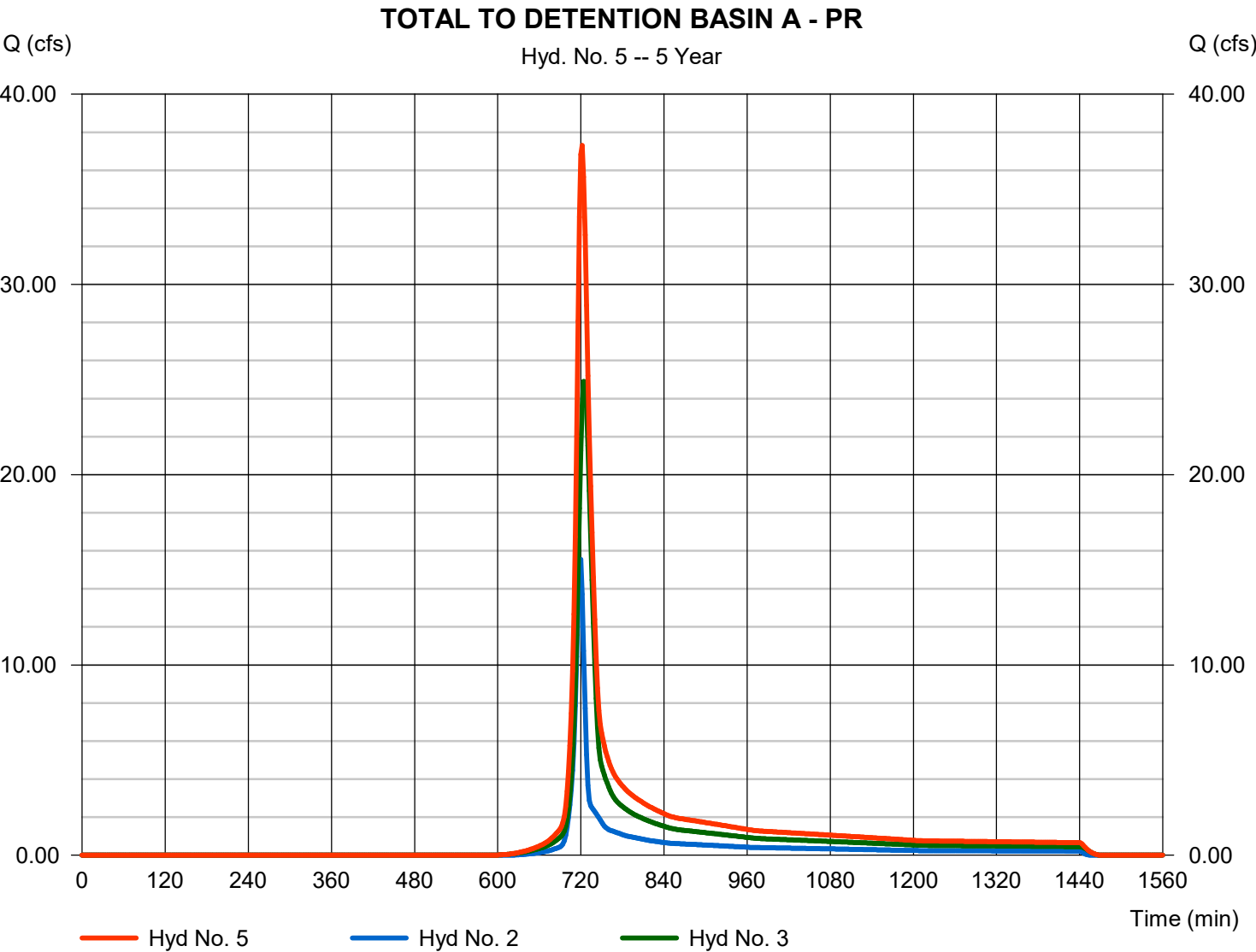


Hydrograph Report

Hyd. No. 5

TOTAL TO DETENTION BASIN A - PR

Hydrograph type	= Combine	Peak discharge	= 37.31 cfs
Storm frequency	= 5 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 115,289 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 17.920 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

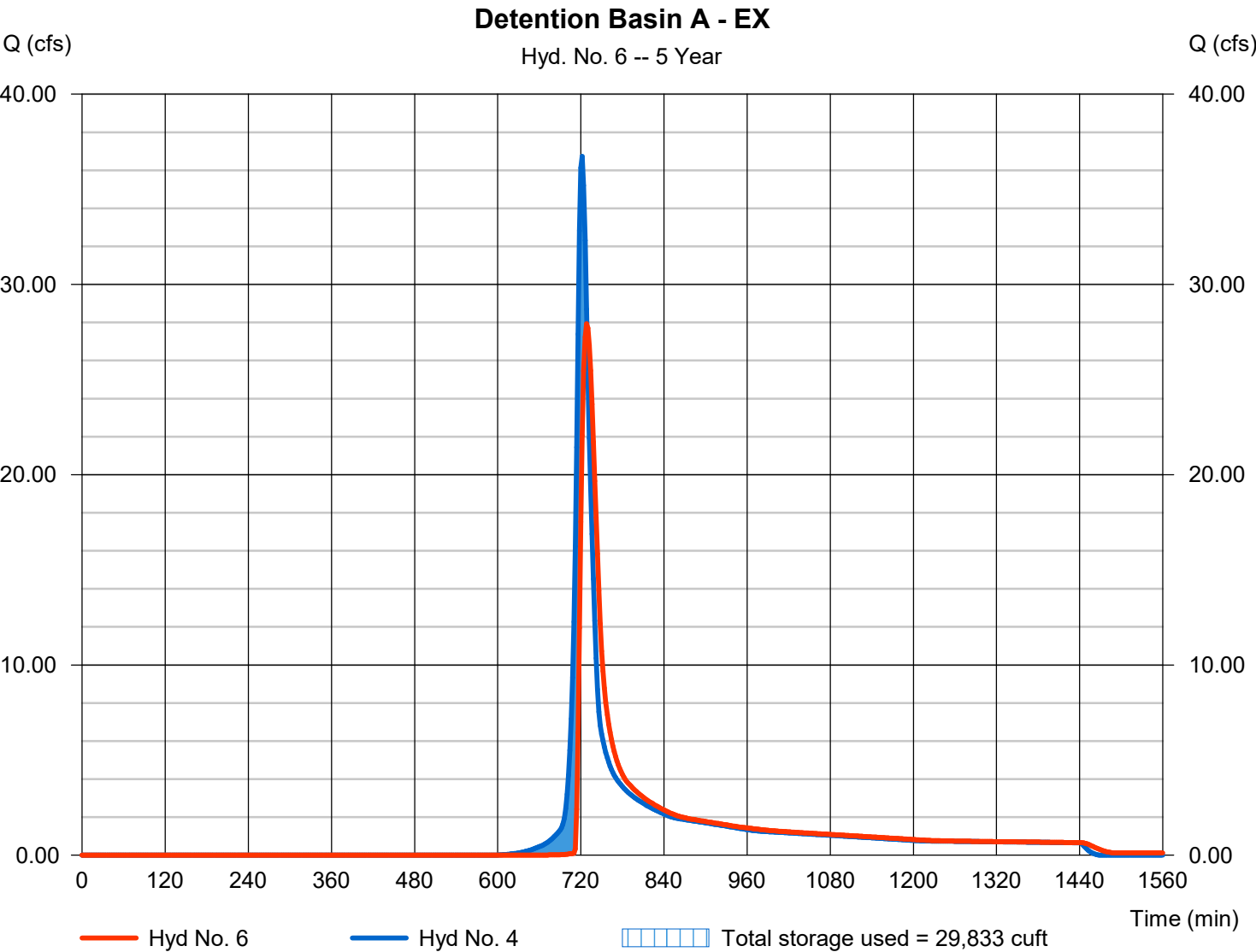
Thursday, 04 / 9 / 2026

Hyd. No. 6

Detention Basin A - EX

Hydrograph type	= Reservoir	Peak discharge	= 27.93 cfs
Storm frequency	= 5 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 113,354 cuft
Inflow hyd. No.	= 4 - TOTAL TO DETENTION BASIN A - EX	Basin Elevation	= 674.54 ft
Reservoir name	= Detention Basin A	Max. Storage	= 29,833 cuft

Storage Indication method used. Wet pond routing start elevation = 672.00 ft.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

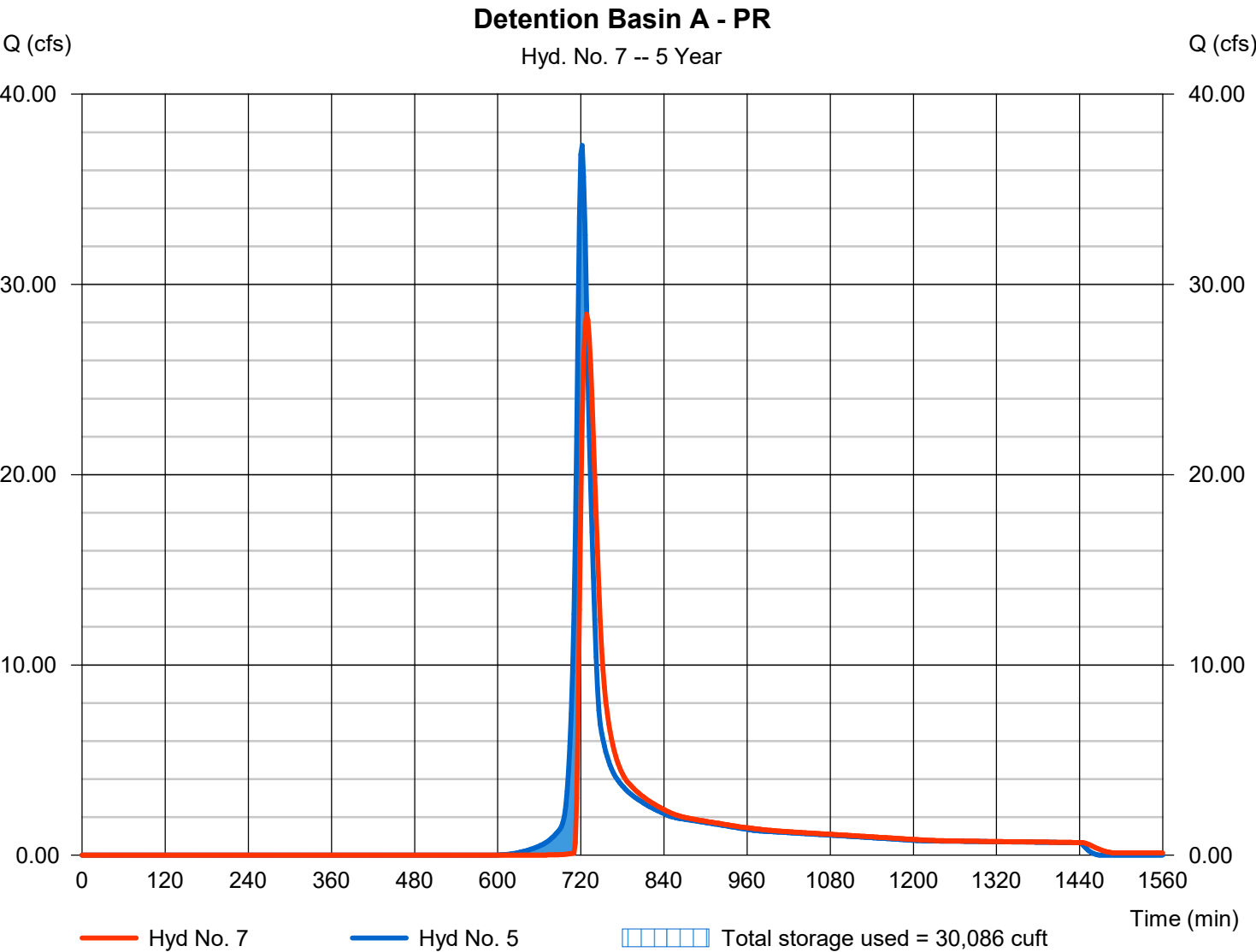
Thursday, 04 / 9 / 2026

Hyd. No. 7

Detention Basin A - PR

Hydrograph type	= Reservoir	Peak discharge	= 28.44 cfs
Storm frequency	= 5 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 114,873 cuft
Inflow hyd. No.	= 5 - TOTAL TO DETENTION BASIN A - PR	Max. Elevation	= 674.56 ft
Reservoir name	= Detention Basin A	Max. Storage	= 30,086 cuft

Storage Indication method used. Wet pond routing start elevation = 672.00 ft.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	19.37	2	720	44,359	-----	-----	-----	ONSITE BASIN A - EXISTING
2	SCS Runoff	20.14	2	720	46,094	-----	-----	-----	ONSITE BASIN A - PROPOSED
3	SCS Runoff	32.25	2	724	101,900	-----	-----	-----	OFFSITE BASIN A
4	Combine	47.76	2	722	146,259	1, 3	-----	-----	TOTAL TO DETENTION BASIN A - E
5	Combine	48.39	2	722	147,994	2, 3,	-----	-----	TOTAL TO DETENTION BASIN A - P
6	Reservoir	37.19	2	728	145,842	4	674.97	34,563	Detention Basin A - EX
7	Reservoir	37.75	2	728	147,577	5	675.00	34,827	Detention Basin A - PR
HYDROLOGY-REVISED.gpw					Return Period: 10 Year			Thursday, 04 / 9 / 2026	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

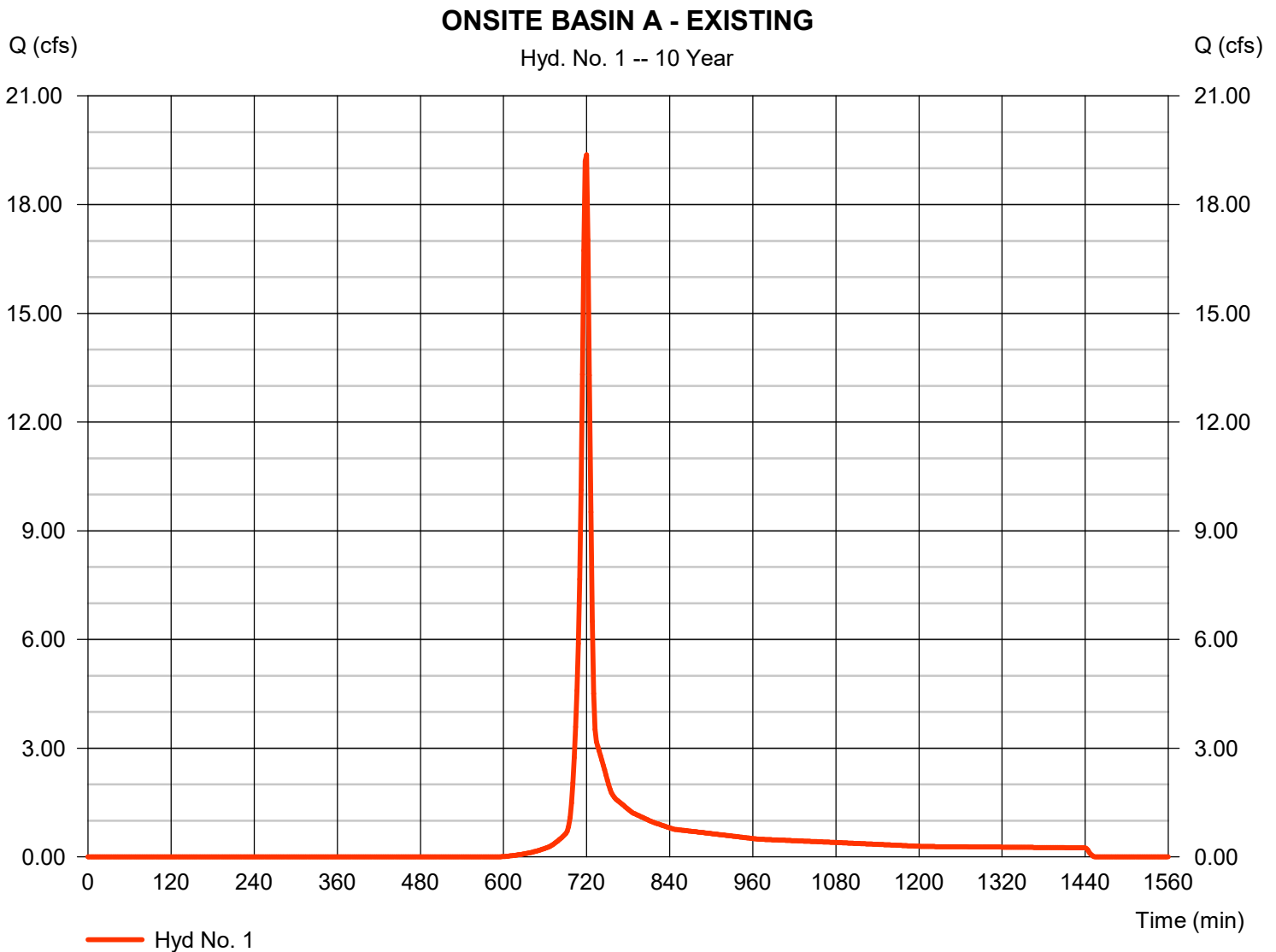
Thursday, 04 / 9 / 2026

Hyd. No. 1

ONSITE BASIN A - EXISTING

Hydrograph type	= SCS Runoff	Peak discharge	= 19.37 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 44,359 cuft
Drainage area	= 5.870 ac	Curve number	= 69*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.50 min
Total precip.	= 5.17 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(1.590 \times 98) + (2.550 \times 61) + (1.730 \times 55)] / 5.870$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

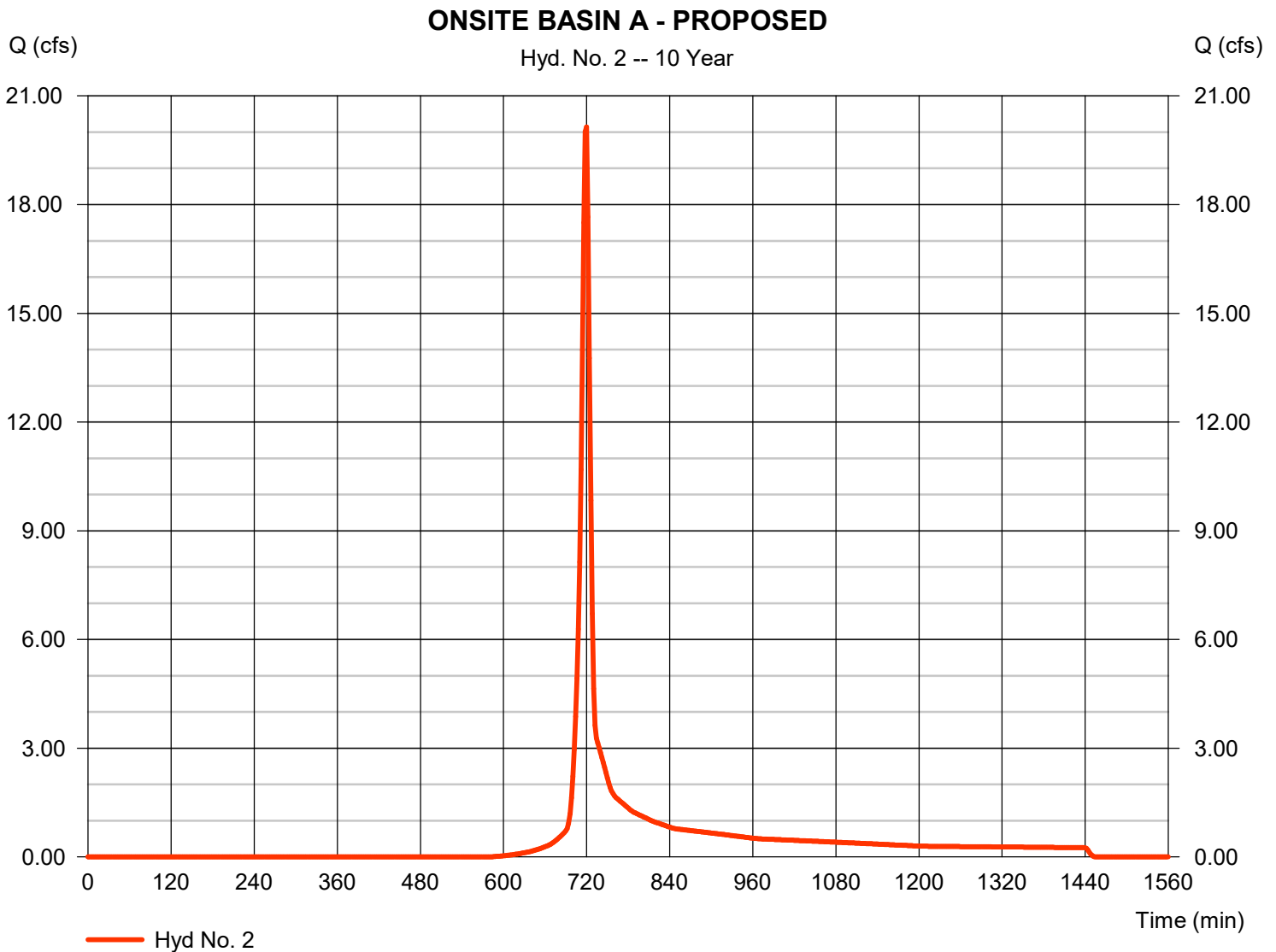
Thursday, 04 / 9 / 2026

Hyd. No. 2

ONSITE BASIN A - PROPOSED

Hydrograph type	= SCS Runoff	Peak discharge	= 20.14 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 46,094 cuft
Drainage area	= 5.870 ac	Curve number	= 70*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.50 min
Total precip.	= 5.17 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(1.670 \times 98) + (2.470 \times 61) + (1.730 \times 55)] / 5.870$



Hydrograph Report

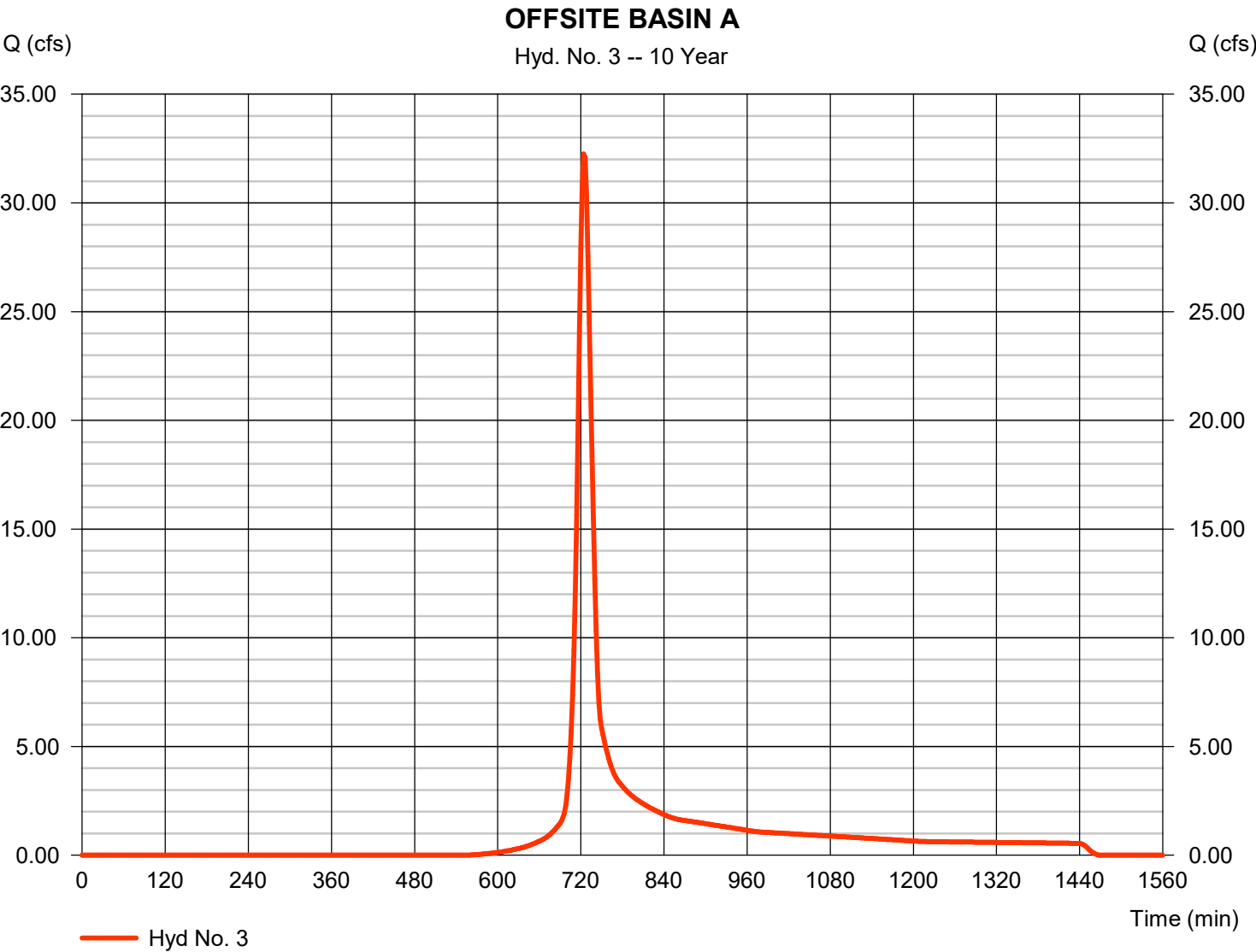
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Thursday, 04 / 9 / 2026

Hyd. No. 3

OFFSITE BASIN A

Hydrograph type	= SCS Runoff	Peak discharge	= 32.25 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 101,900 cuft
Drainage area	= 12.050 ac	Curve number	= 72
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.70 min
Total precip.	= 5.17 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

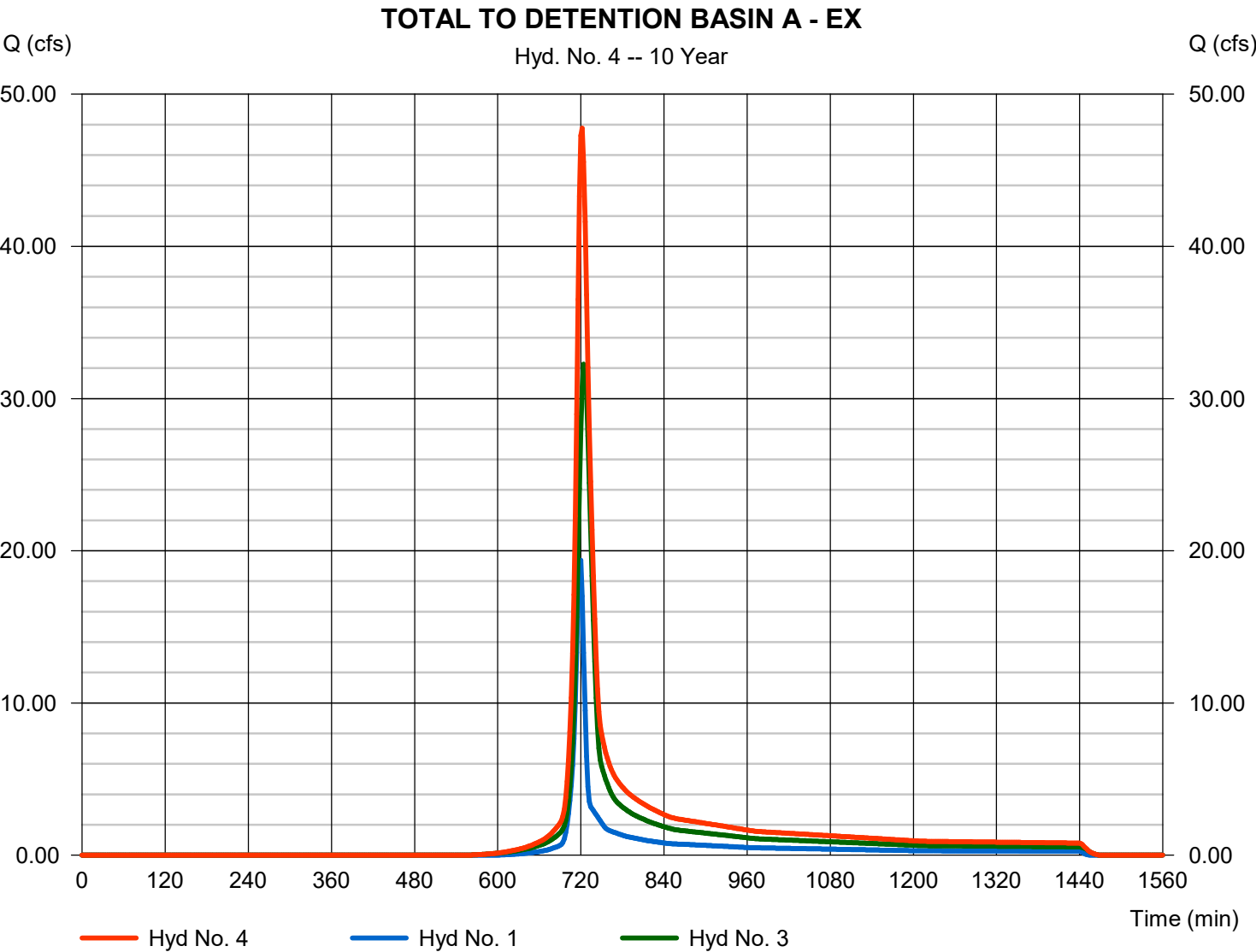


Hydrograph Report

Hyd. No. 4

TOTAL TO DETENTION BASIN A - EX

Hydrograph type	= Combine	Peak discharge	= 47.76 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 146,259 cuft
Inflow hyds.	= 1, 3	Contrib. drain. area	= 17.920 ac

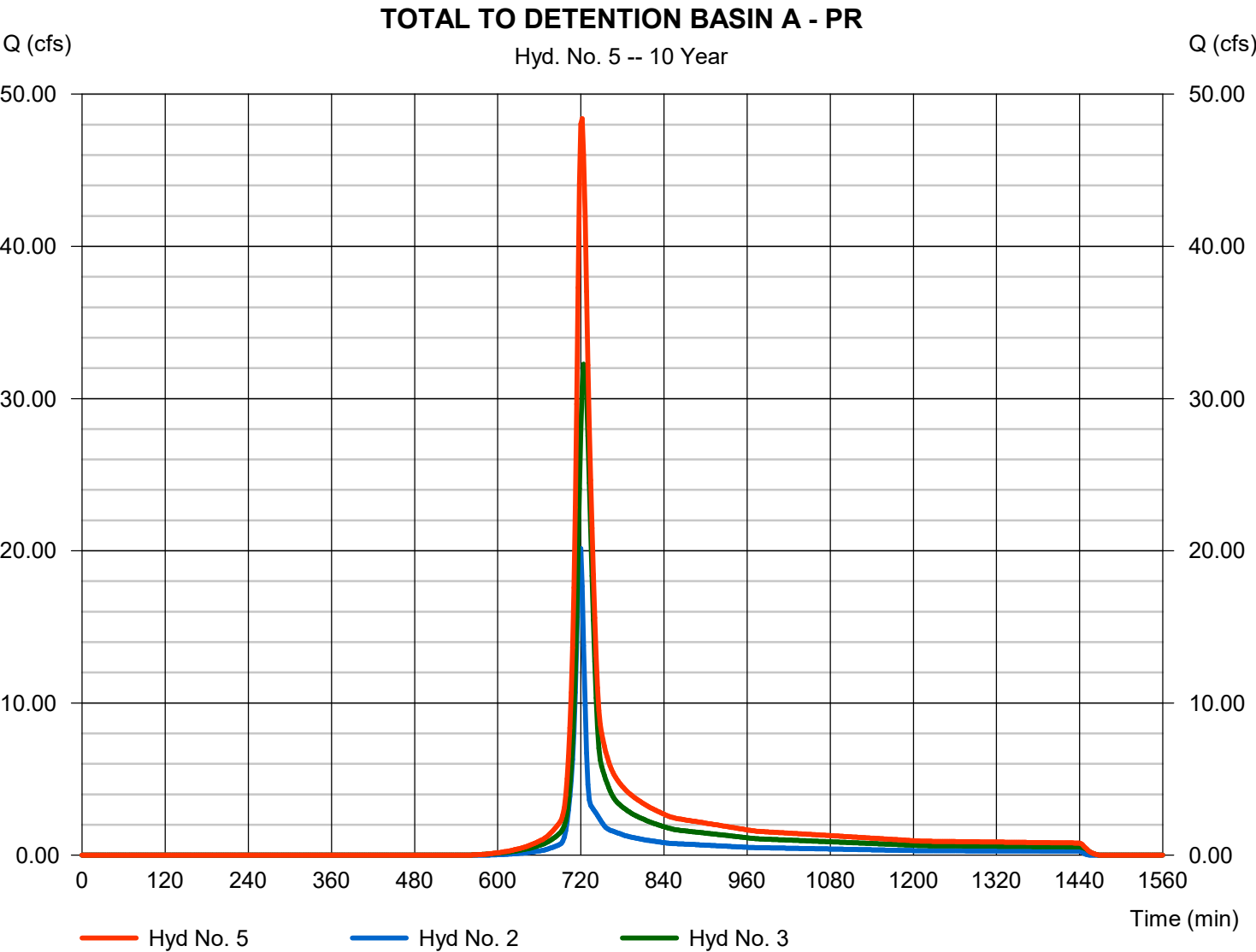


Hydrograph Report

Hyd. No. 5

TOTAL TO DETENTION BASIN A - PR

Hydrograph type	= Combine	Peak discharge	= 48.39 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 147,994 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 17.920 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

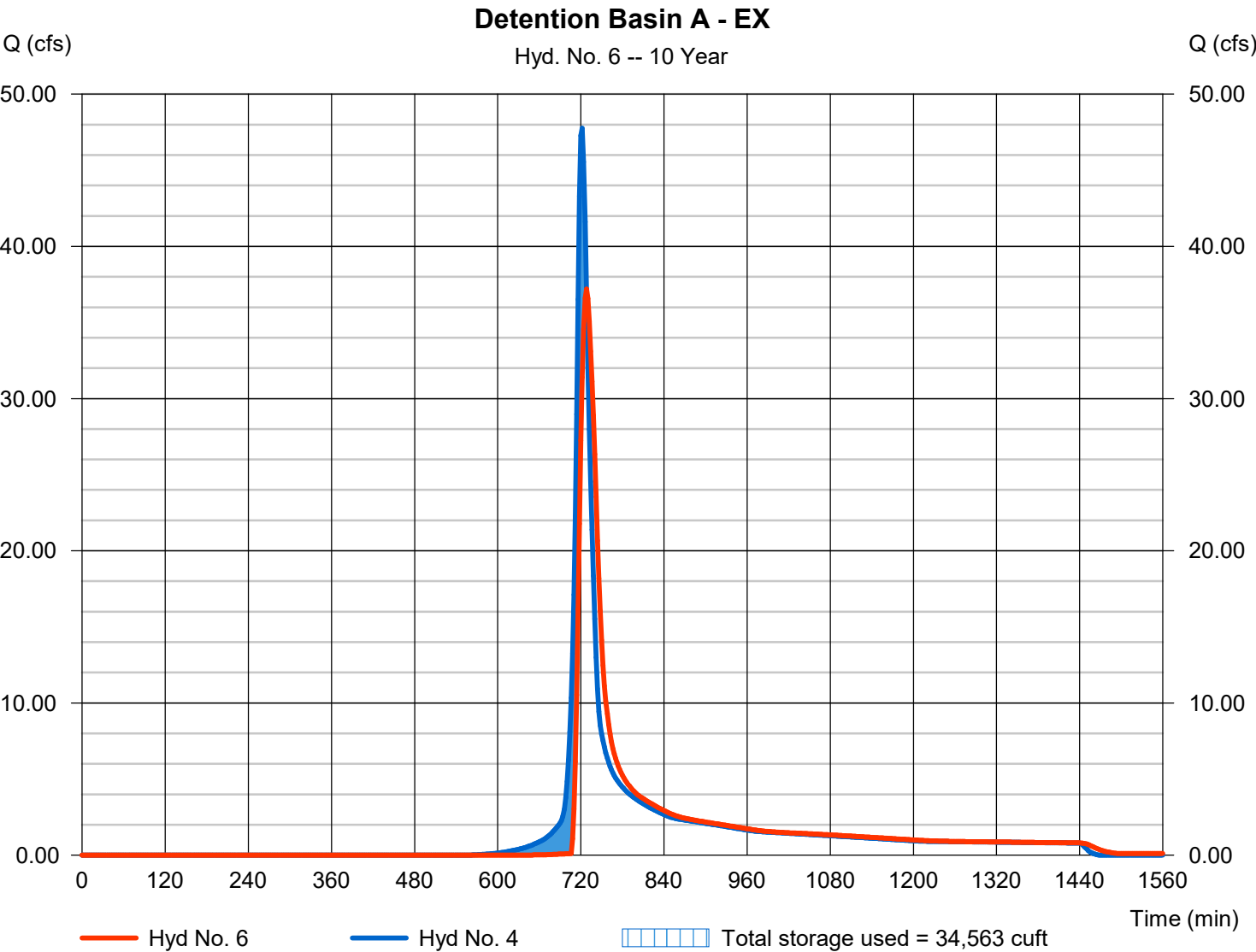
Thursday, 04 / 9 / 2026

Hyd. No. 6

Detention Basin A - EX

Hydrograph type	= Reservoir	Peak discharge	= 37.19 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 145,842 cuft
Inflow hyd. No.	= 4 - TOTAL TO DETENTION BASIN A - EX	Basin Elevation	= 674.97 ft
Reservoir name	= Detention Basin A	Max. Storage	= 34,563 cuft

Storage Indication method used. Wet pond routing start elevation = 672.00 ft.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

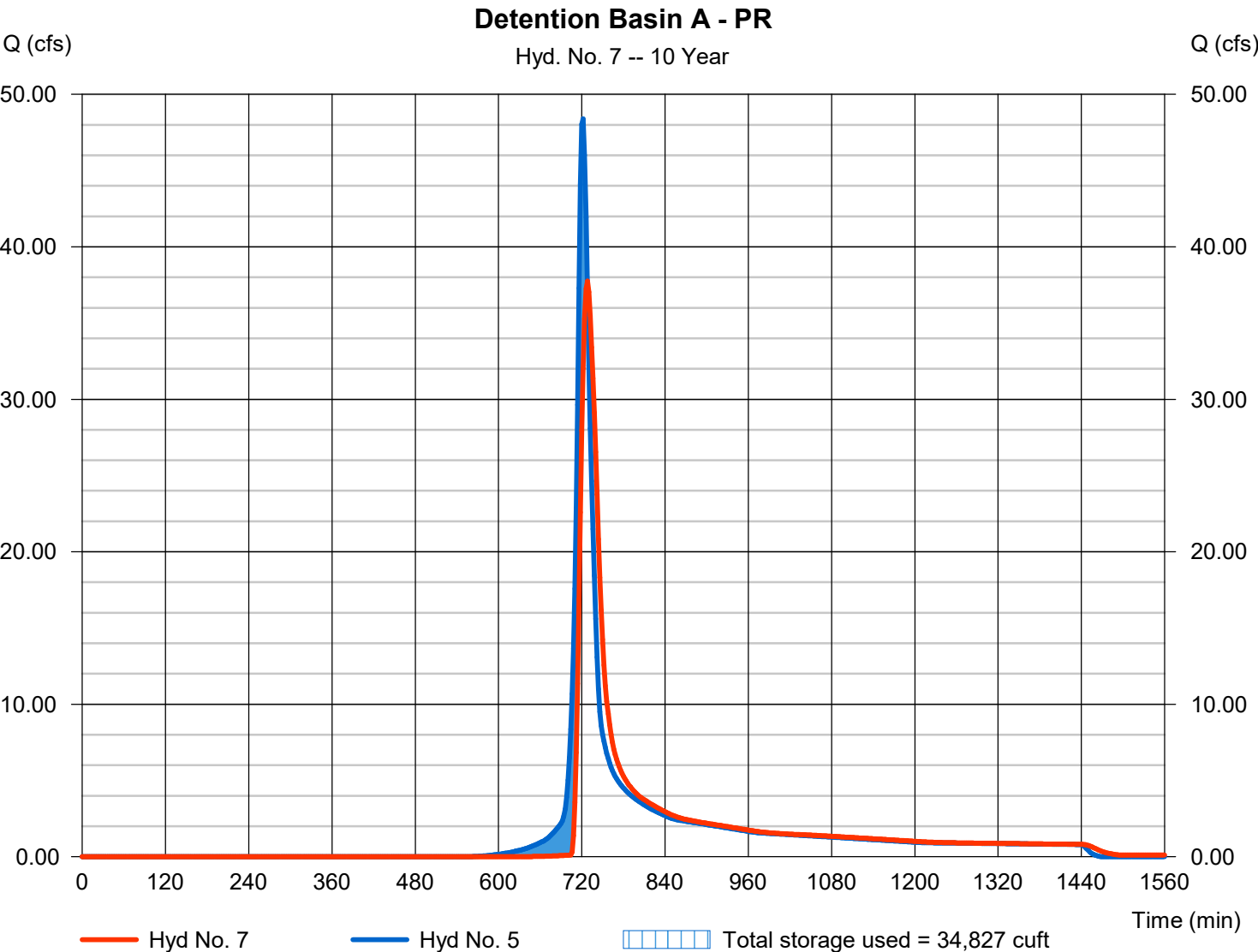
Thursday, 04 / 9 / 2026

Hyd. No. 7

Detention Basin A - PR

Hydrograph type	= Reservoir	Peak discharge	= 37.75 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 147,577 cuft
Inflow hyd. No.	= 5 - TOTAL TO DETENTION BASIN A - PR	Basin Elevation	= 675.00 ft
Reservoir name	= Detention Basin A	Max. Storage	= 34,827 cuft

Storage Indication method used. Wet pond routing start elevation = 672.00 ft.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

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	26.17	2	720	59,970	-----	-----	-----	ONSITE BASIN A - EXISTING
2	SCS Runoff	27.07	2	718	61,979	-----	-----	-----	ONSITE BASIN A - PROPOSED
3	SCS Runoff	43.26	2	724	135,593	-----	-----	-----	OFFSITE BASIN A
4	Combine	64.30	2	722	195,563	1, 3	-----	-----	TOTAL TO DETENTION BASIN A - E
5	Combine	65.00	2	722	197,572	2, 3,	-----	-----	TOTAL TO DETENTION BASIN A - P
6	Reservoir	54.26	2	726	195,144	4	675.47	39,963	Detention Basin A - EX
7	Reservoir	54.97	2	726	197,153	5	675.49	40,185	Detention Basin A - PR
HYDROLOGY-REVISED.gpw					Return Period: 25 Year			Thursday, 04 / 9 / 2026	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

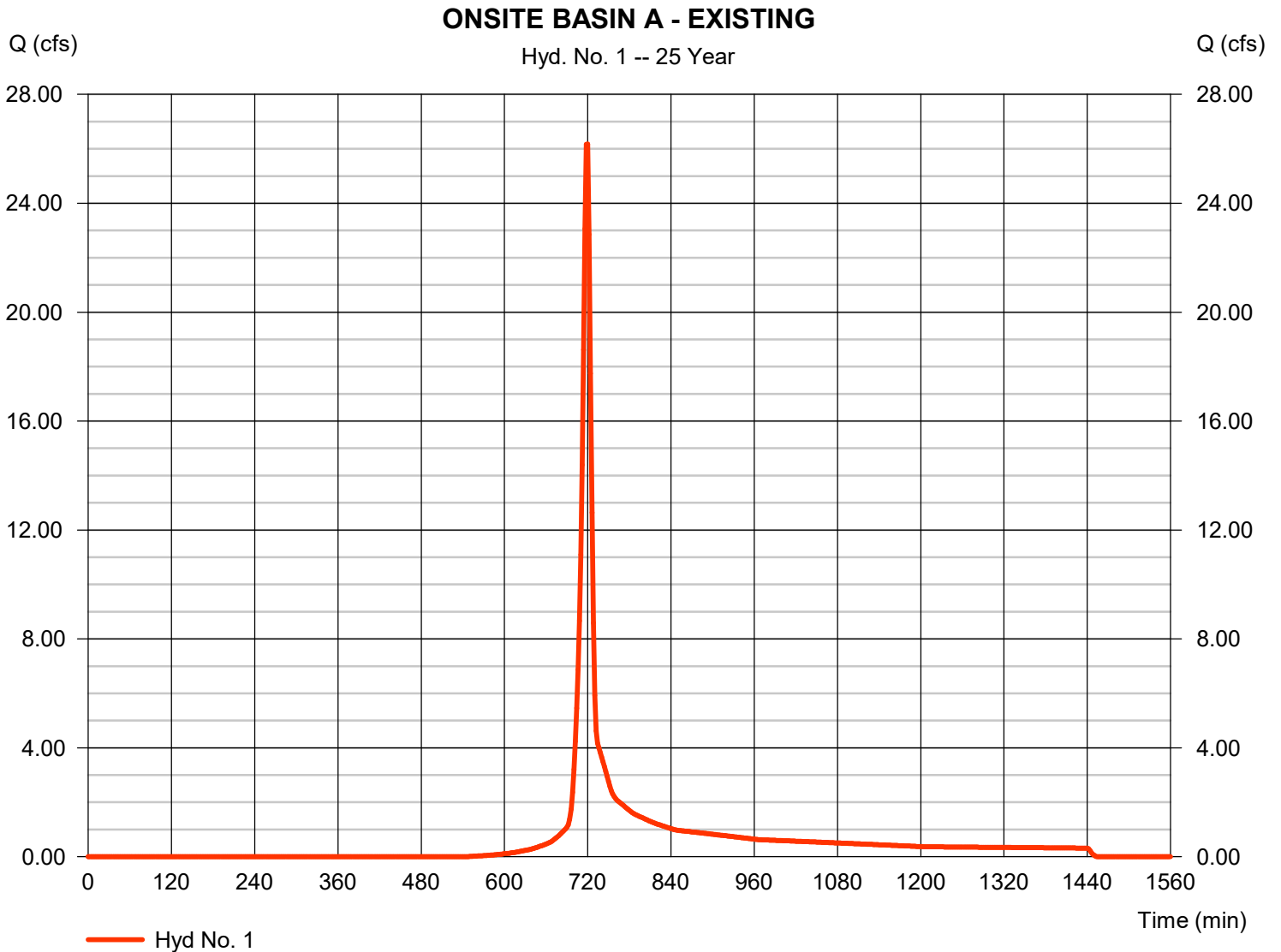
Thursday, 04 / 9 / 2026

Hyd. No. 1

ONSITE BASIN A - EXISTING

Hydrograph type	=	SCS Runoff	Peak discharge	=	26.17 cfs
Storm frequency	=	25 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	59,970 cuft
Drainage area	=	5.870 ac	Curve number	=	69*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.50 min
Total precip.	=	6.13 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = $[(1.590 \times 98) + (2.550 \times 61) + (1.730 \times 55)] / 5.870$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

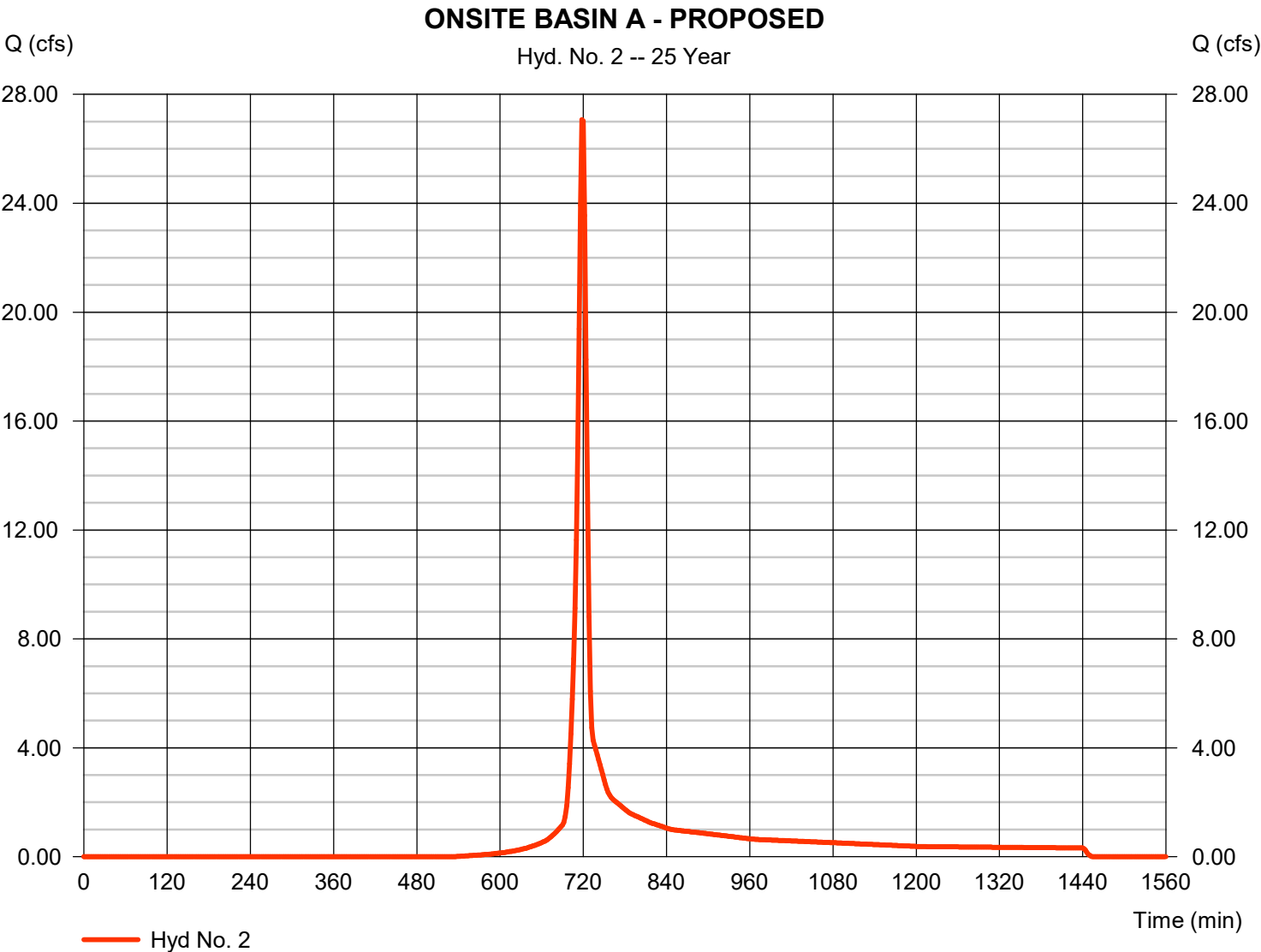
Thursday, 04 / 9 / 2026

Hyd. No. 2

ONSITE BASIN A - PROPOSED

Hydrograph type	=	SCS Runoff	Peak discharge	=	27.07 cfs
Storm frequency	=	25 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	61,979 cuft
Drainage area	=	5.870 ac	Curve number	=	70*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.50 min
Total precip.	=	6.13 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.670 x 98) + (2.470 x 61) + (1.730 x 55)] / 5.870

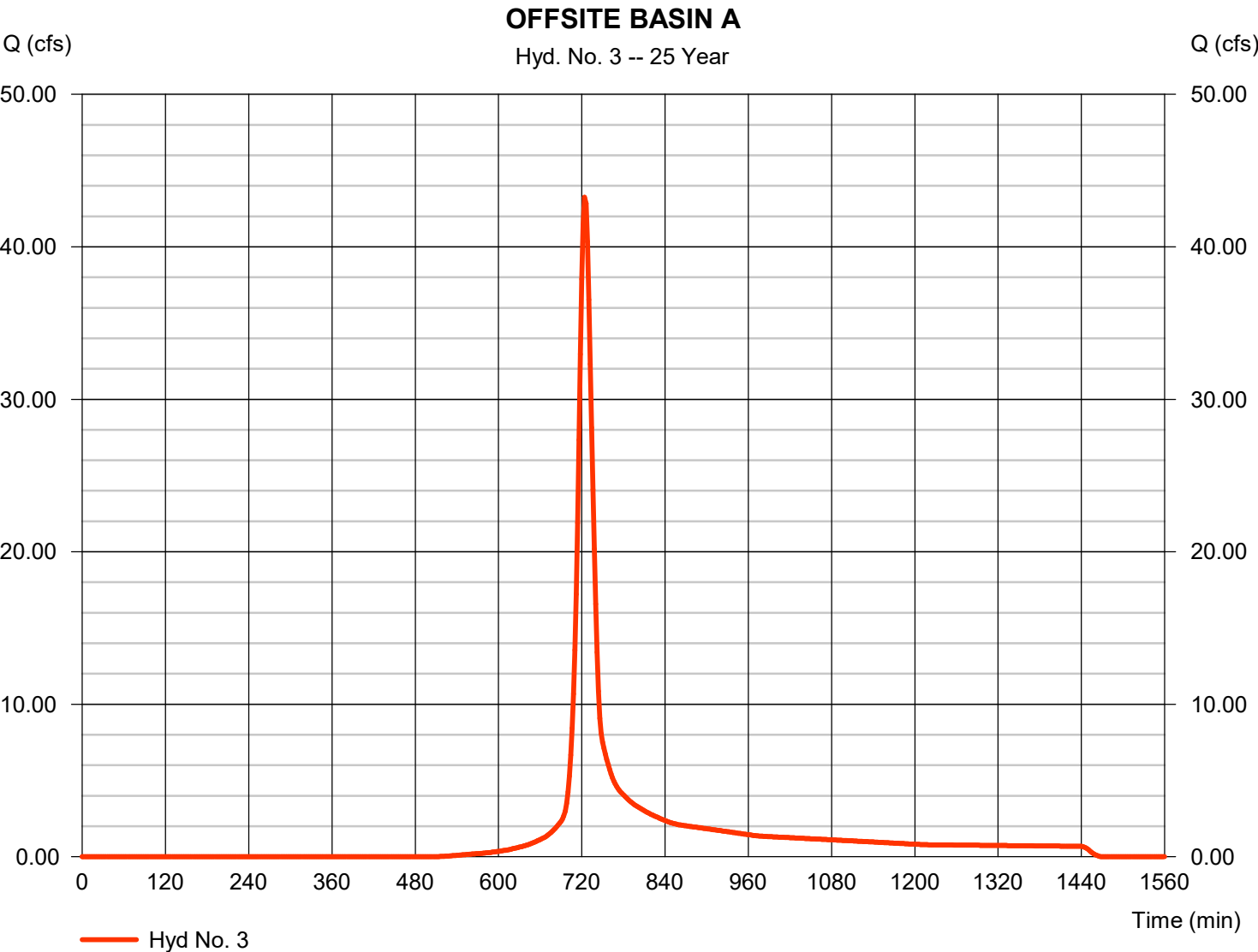


Hydrograph Report

Hyd. No. 3

OFFSITE BASIN A

Hydrograph type	=	SCS Runoff	Peak discharge	=	43.26 cfs
Storm frequency	=	25 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	135,593 cuft
Drainage area	=	12.050 ac	Curve number	=	72
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	17.70 min
Total precip.	=	6.13 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

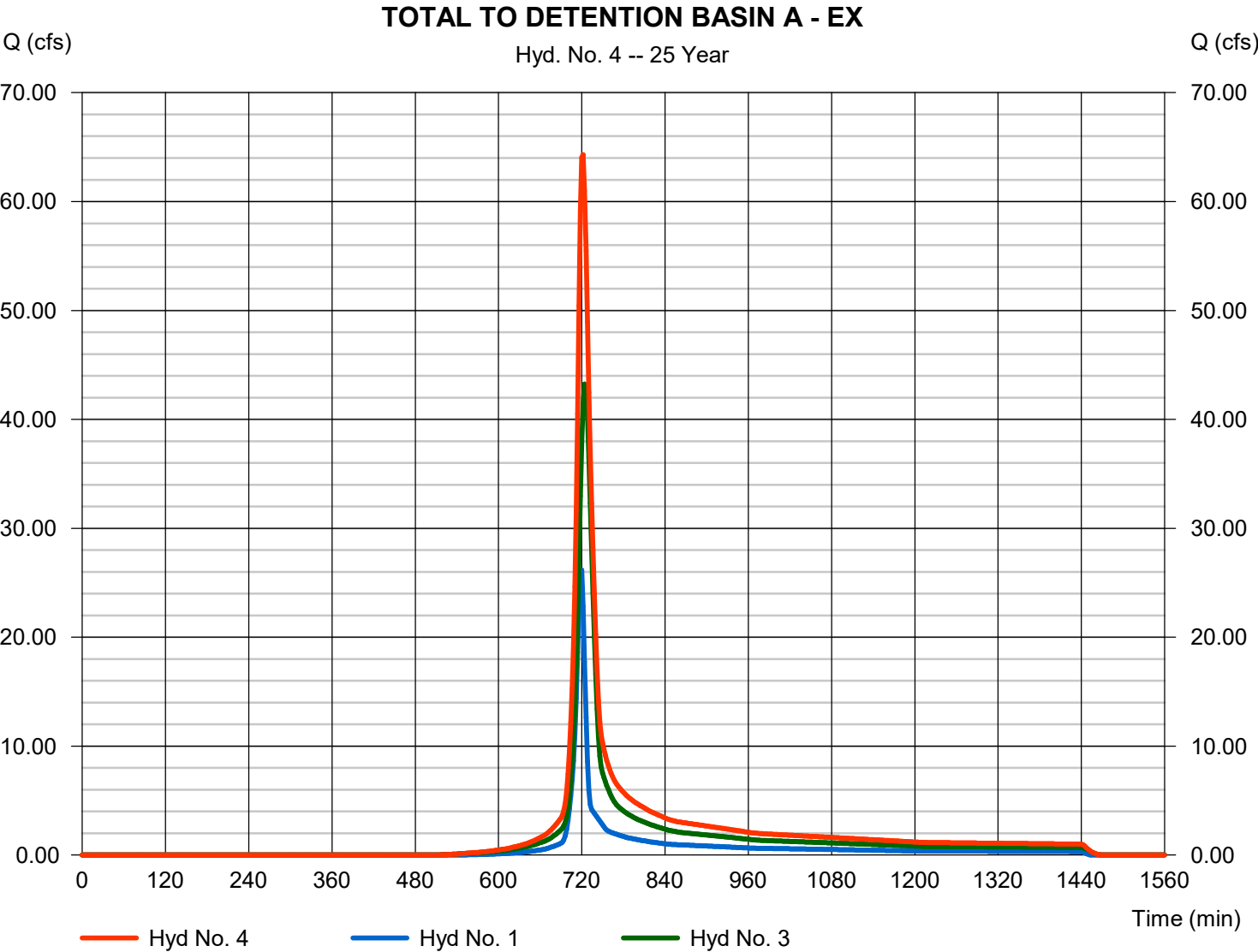


Hydrograph Report

Hyd. No. 4

TOTAL TO DETENTION BASIN A - EX

Hydrograph type	= Combine	Peak discharge	= 64.30 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 195,563 cuft
Inflow hyds.	= 1, 3	Contrib. drain. area	= 17.920 ac

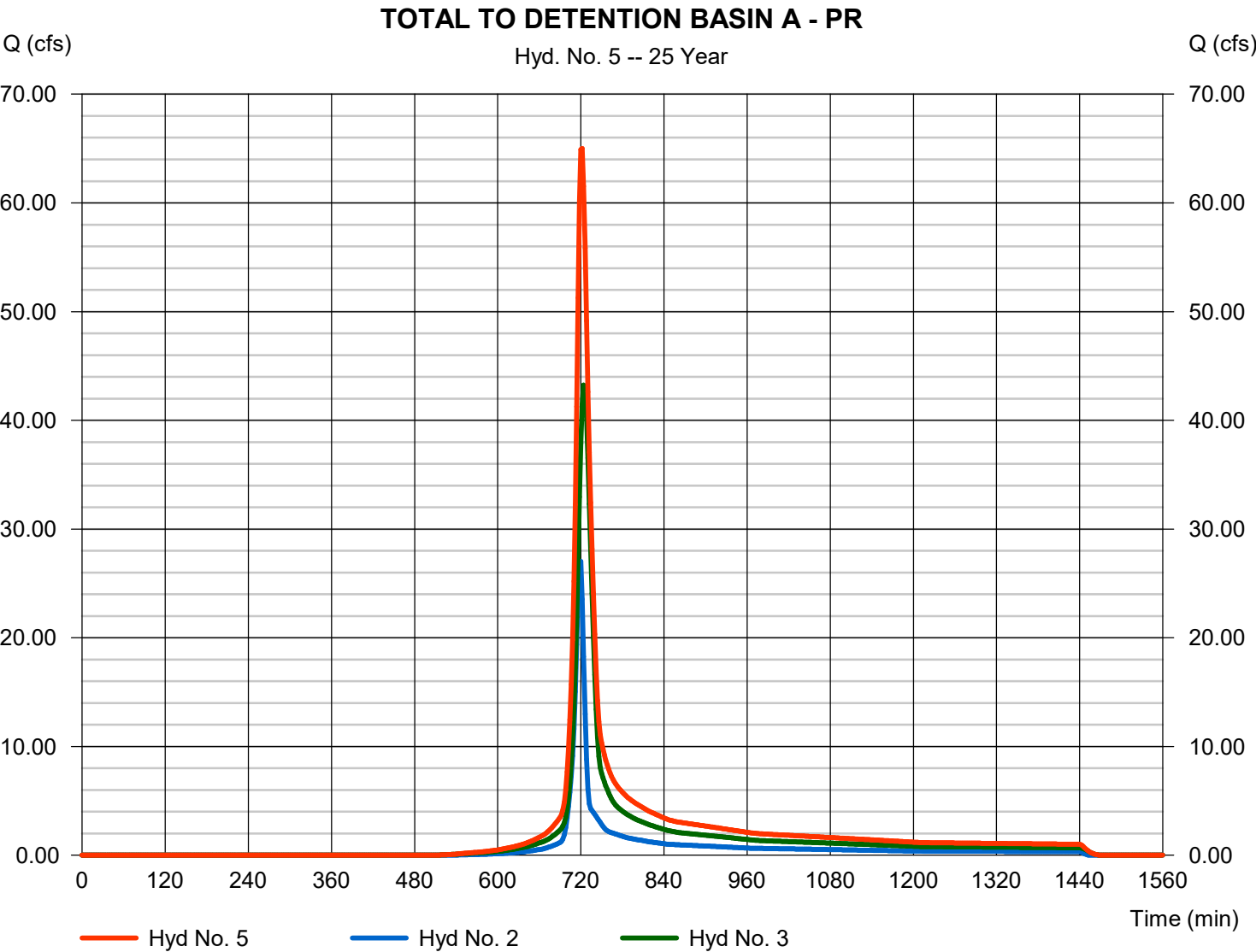


Hydrograph Report

Hyd. No. 5

TOTAL TO DETENTION BASIN A - PR

Hydrograph type	= Combine	Peak discharge	= 65.00 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 197,572 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 17.920 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

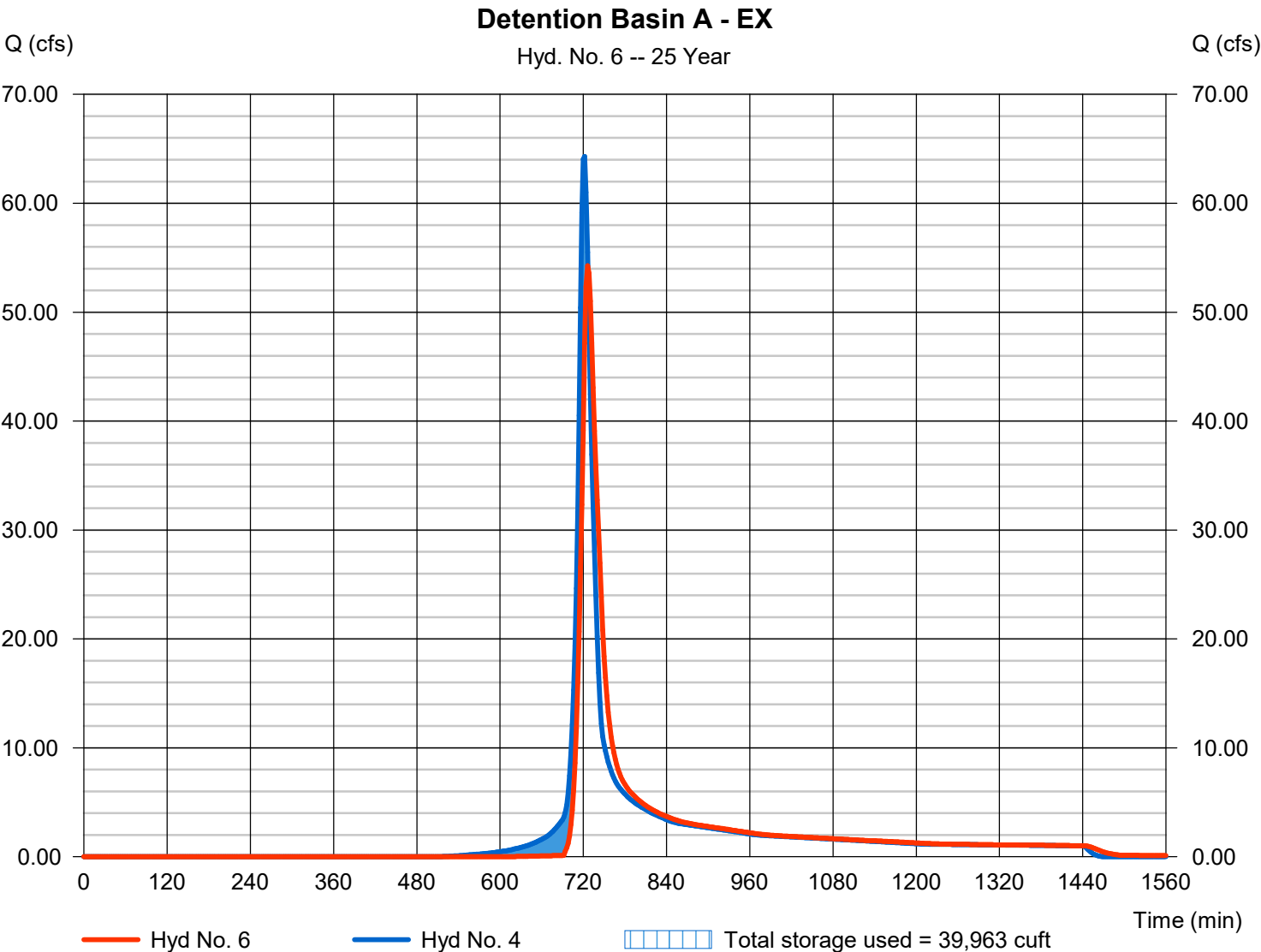
Thursday, 04 / 9 / 2026

Hyd. No. 6

Detention Basin A - EX

Hydrograph type	= Reservoir	Peak discharge	= 54.26 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 195,144 cuft
Inflow hyd. No.	= 4 - TOTAL TO DETENTION BASIN A - EX	Basin Elevation	= 675.47 ft
Reservoir name	= Detention Basin A	Max. Storage	= 39,963 cuft

Storage Indication method used. Wet pond routing start elevation = 672.00 ft.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

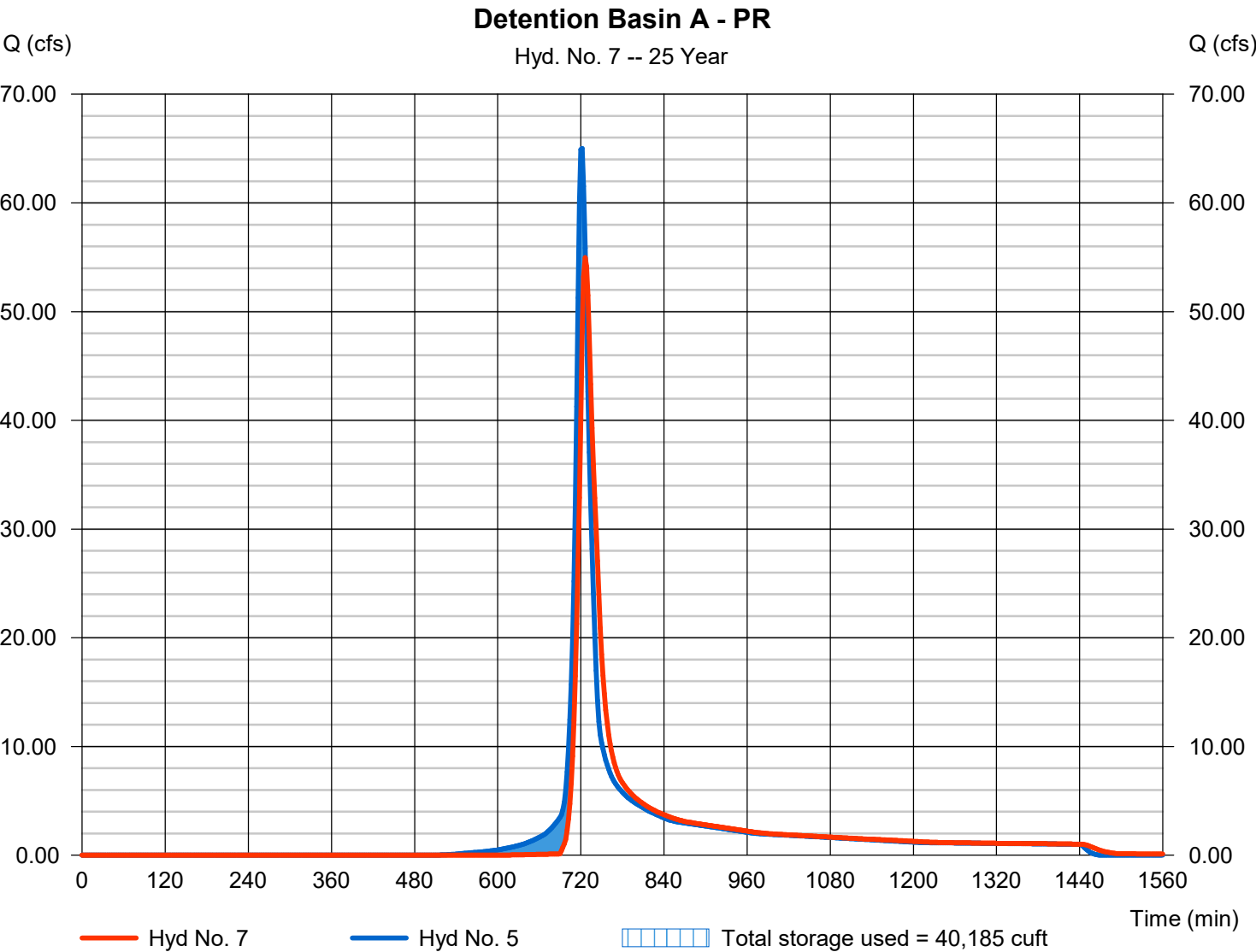
Thursday, 04 / 9 / 2026

Hyd. No. 7

Detention Basin A - PR

Hydrograph type	= Reservoir	Peak discharge	= 54.97 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 197,153 cuft
Inflow hyd. No.	= 5 - TOTAL TO DETENTION BASIN A - PR	Basin Elevation	= 675.49 ft
Reservoir name	= Detention Basin A	Max. Storage	= 40,185 cuft

Storage Indication method used. Wet pond routing start elevation = 672.00 ft.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

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	31.97	2	718	73,132	-----	-----	-----	ONSITE BASIN A - EXISTING
2	SCS Runoff	32.93	2	718	75,334	-----	-----	-----	ONSITE BASIN A - PROPOSED
3	SCS Runoff	52.37	2	724	163,768	-----	-----	-----	OFFSITE BASIN A
4	Combine	78.01	2	722	236,900	1, 3	-----	-----	TOTAL TO DETENTION BASIN A - E
5	Combine	78.89	2	720	239,102	2, 3,	-----	-----	TOTAL TO DETENTION BASIN A - P
6	Reservoir	63.95	2	726	236,481	4	675.91	44,615	Detention Basin A - EX
7	Reservoir	64.38	2	726	238,682	5	675.94	44,949	Detention Basin A - PR
HYDROLOGY-REVISED.gpw					Return Period: 50 Year			Thursday, 04 / 9 / 2026	

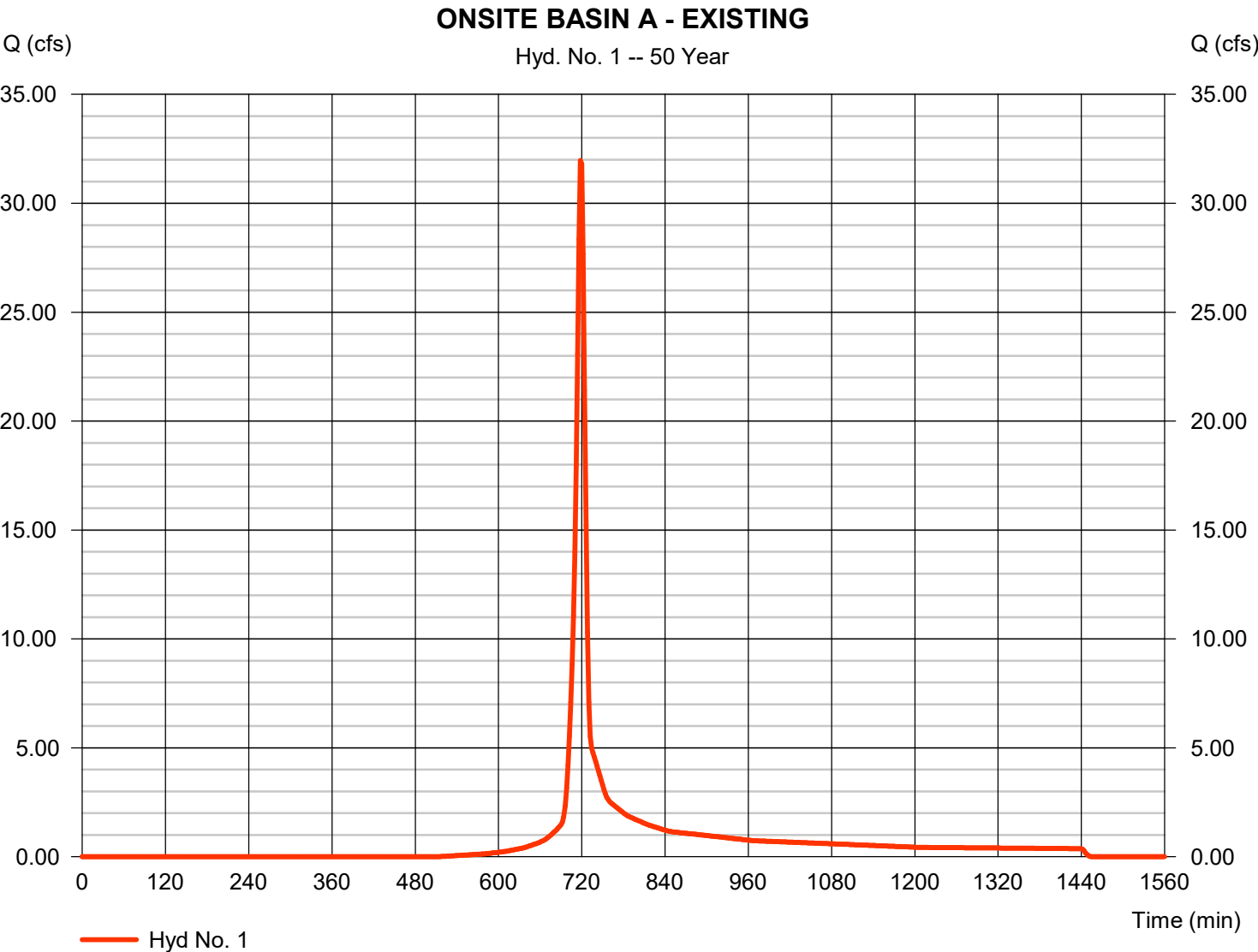
Hydrograph Report

Hyd. No. 1

ONSITE BASIN A - EXISTING

Hydrograph type	=	SCS Runoff	Peak discharge	=	31.97 cfs
Storm frequency	=	50 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	73,132 cuft
Drainage area	=	5.870 ac	Curve number	=	69*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.50 min
Total precip.	=	6.90 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.590 x 98) + (2.550 x 61) + (1.730 x 55)] / 5.870



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Thursday, 04 / 9 / 2026

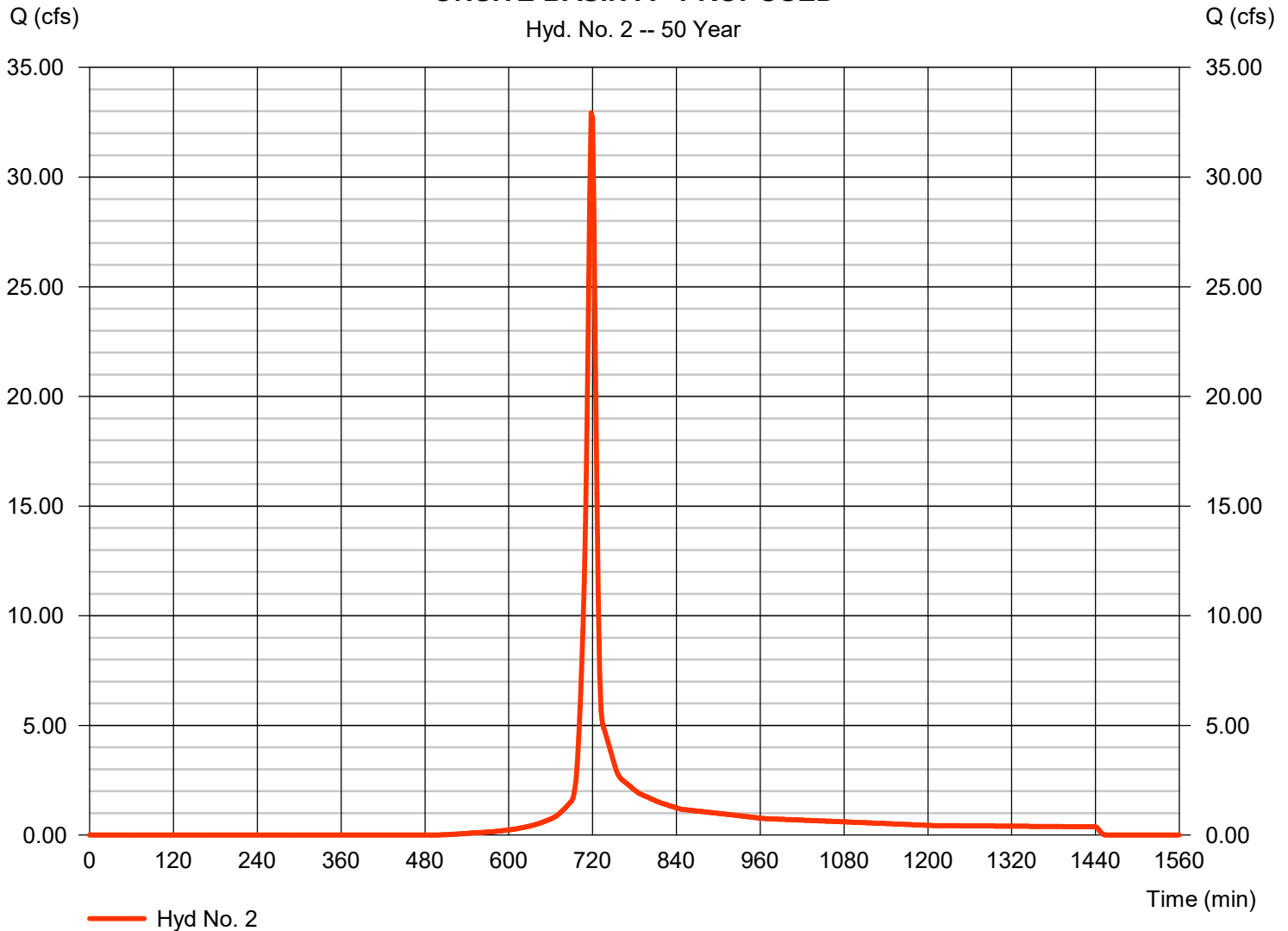
Hyd. No. 2

ONSITE BASIN A - PROPOSED

Hydrograph type	= SCS Runoff	Peak discharge	= 32.93 cfs
Storm frequency	= 50 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 75,334 cuft
Drainage area	= 5.870 ac	Curve number	= 70*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.50 min
Total precip.	= 6.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(1.670 \times 98) + (2.470 \times 61) + (1.730 \times 55)] / 5.870$

ONSITE BASIN A - PROPOSED



Hydrograph Report

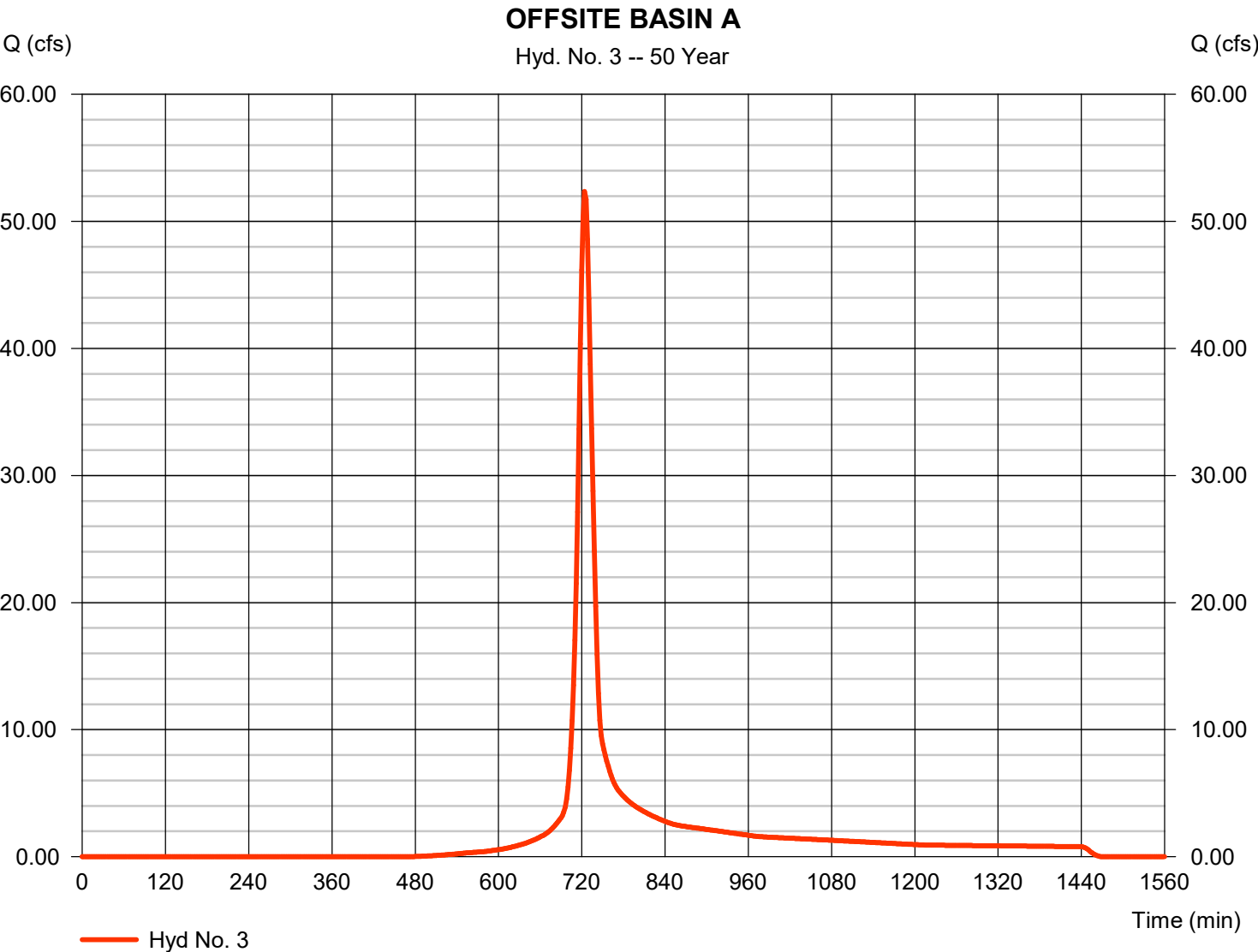
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Thursday, 04 / 9 / 2026

Hyd. No. 3

OFFSITE BASIN A

Hydrograph type	= SCS Runoff	Peak discharge	= 52.37 cfs
Storm frequency	= 50 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 163,768 cuft
Drainage area	= 12.050 ac	Curve number	= 72
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.70 min
Total precip.	= 6.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

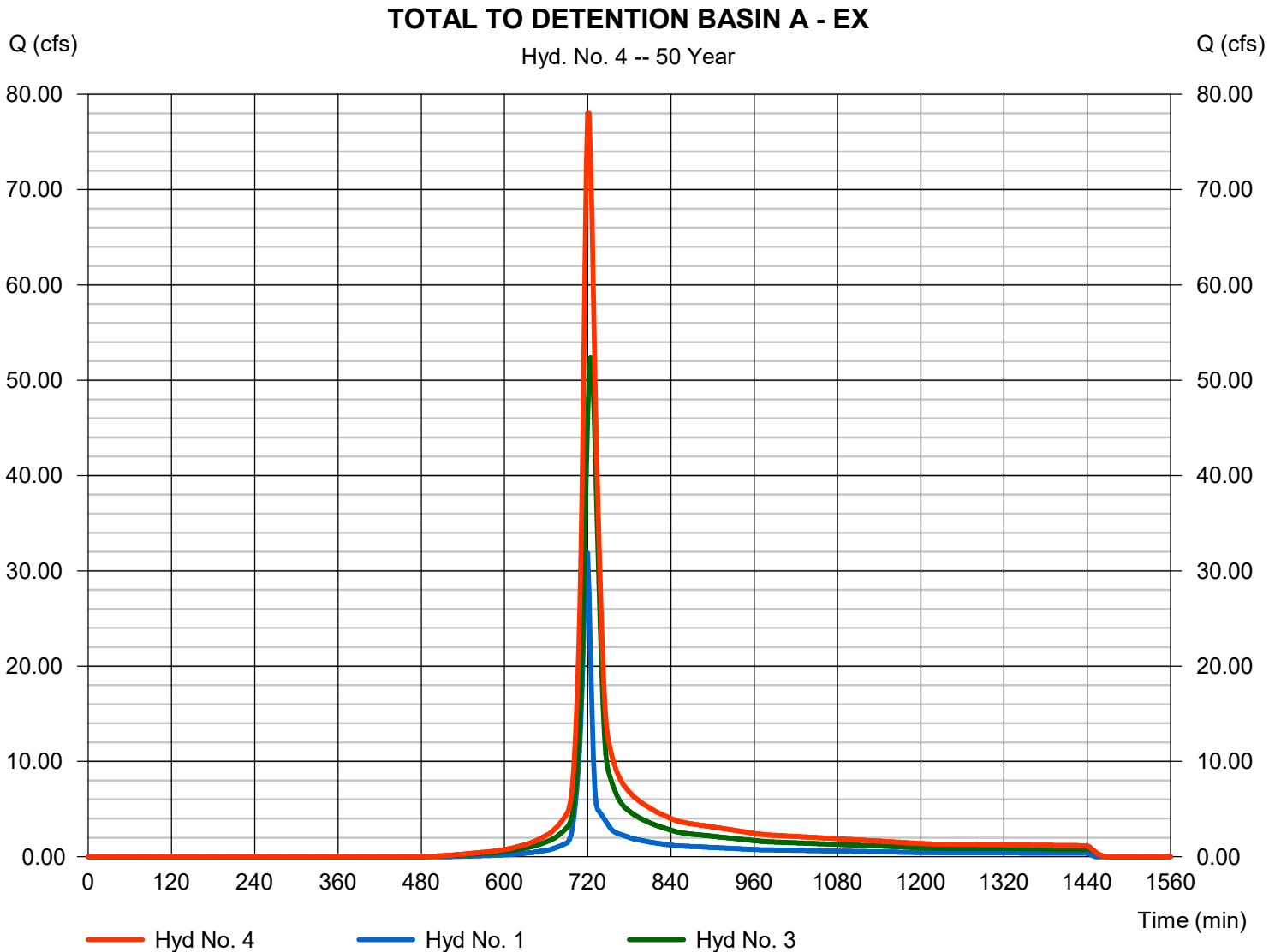
Thursday, 04 / 9 / 2026

Hyd. No. 4

TOTAL TO DETENTION BASIN A - EX

Hydrograph type = Combine
Storm frequency = 50 yrs
Time interval = 2 min
Inflow hyds. = 1, 3

Peak discharge = 78.01 cfs
Time to peak = 722 min
Hyd. volume = 236,900 cuft
Contrib. drain. area = 17.920 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

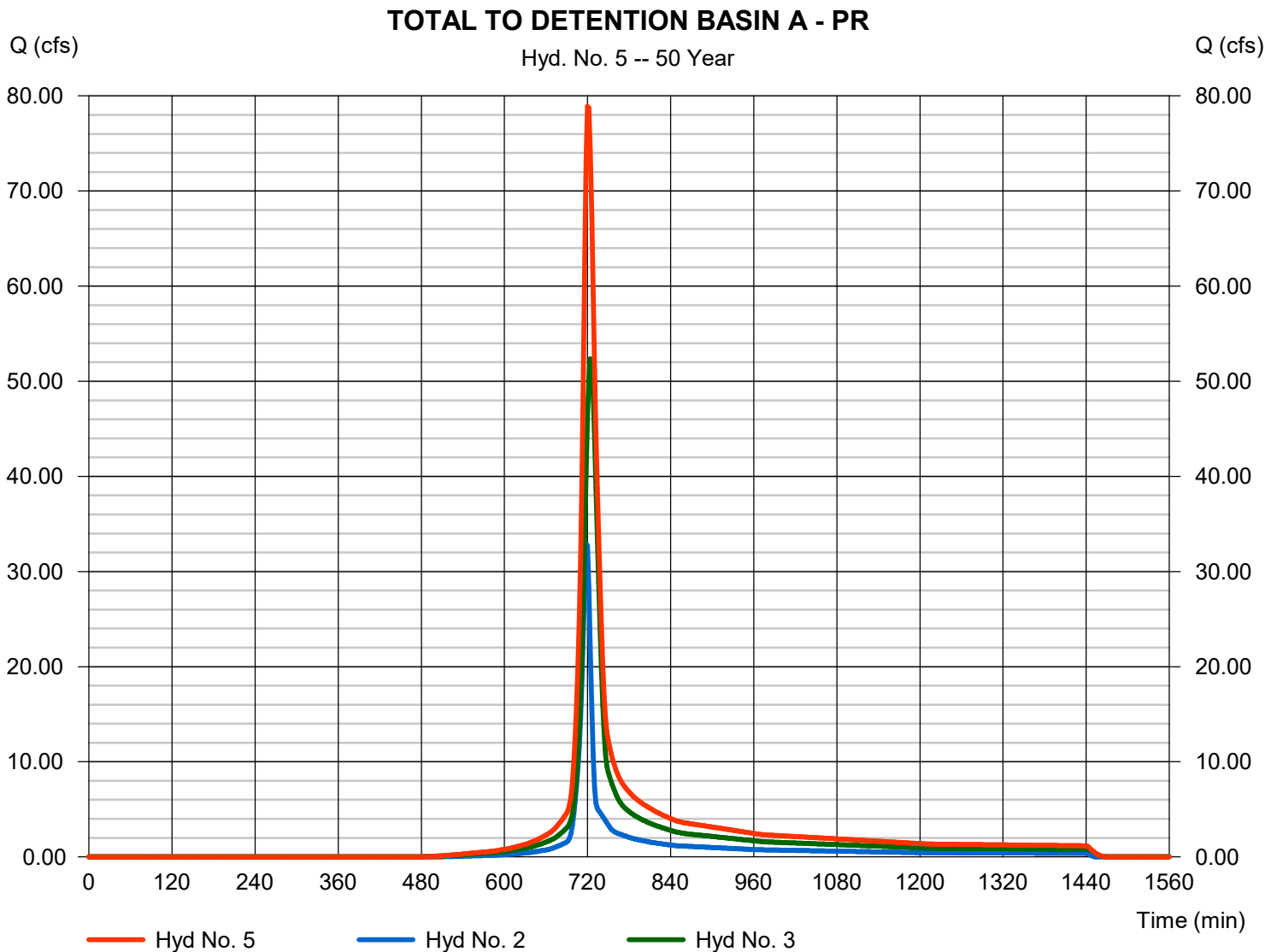
Thursday, 04 / 9 / 2026

Hyd. No. 5

TOTAL TO DETENTION BASIN A - PR

Hydrograph type = Combine
Storm frequency = 50 yrs
Time interval = 2 min
Inflow hyds. = 2, 3

Peak discharge = 78.89 cfs
Time to peak = 720 min
Hyd. volume = 239,102 cuft
Contrib. drain. area = 17.920 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

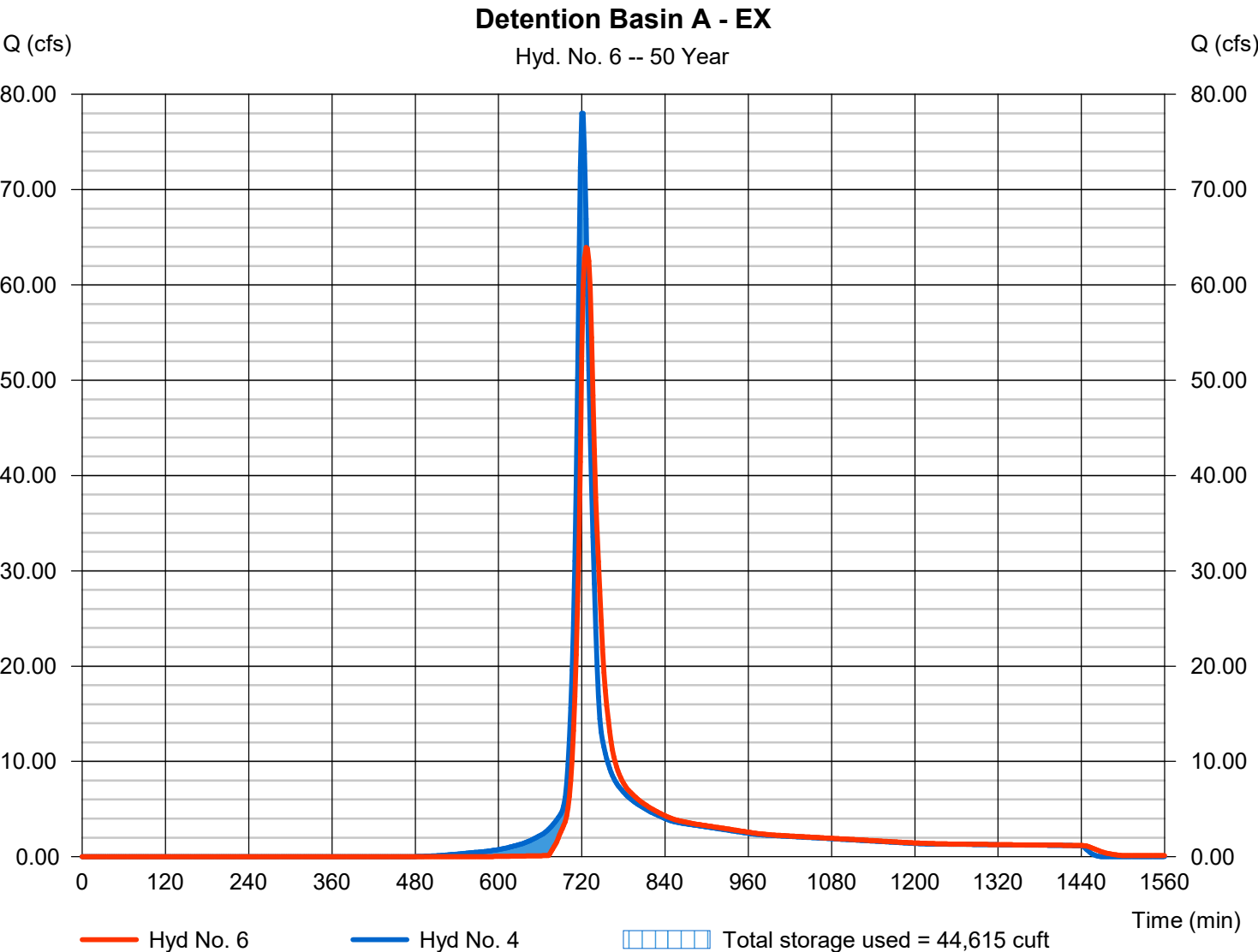
Thursday, 04 / 9 / 2026

Hyd. No. 6

Detention Basin A - EX

Hydrograph type	= Reservoir	Peak discharge	= 63.95 cfs
Storm frequency	= 50 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 236,481 cuft
Inflow hyd. No.	= 4 - TOTAL TO DETENTION BASIN A - EX	Basin Elevation	= 675.91 ft
Reservoir name	= Detention Basin A	Max. Storage	= 44,615 cuft

Storage Indication method used. Wet pond routing start elevation = 672.00 ft.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

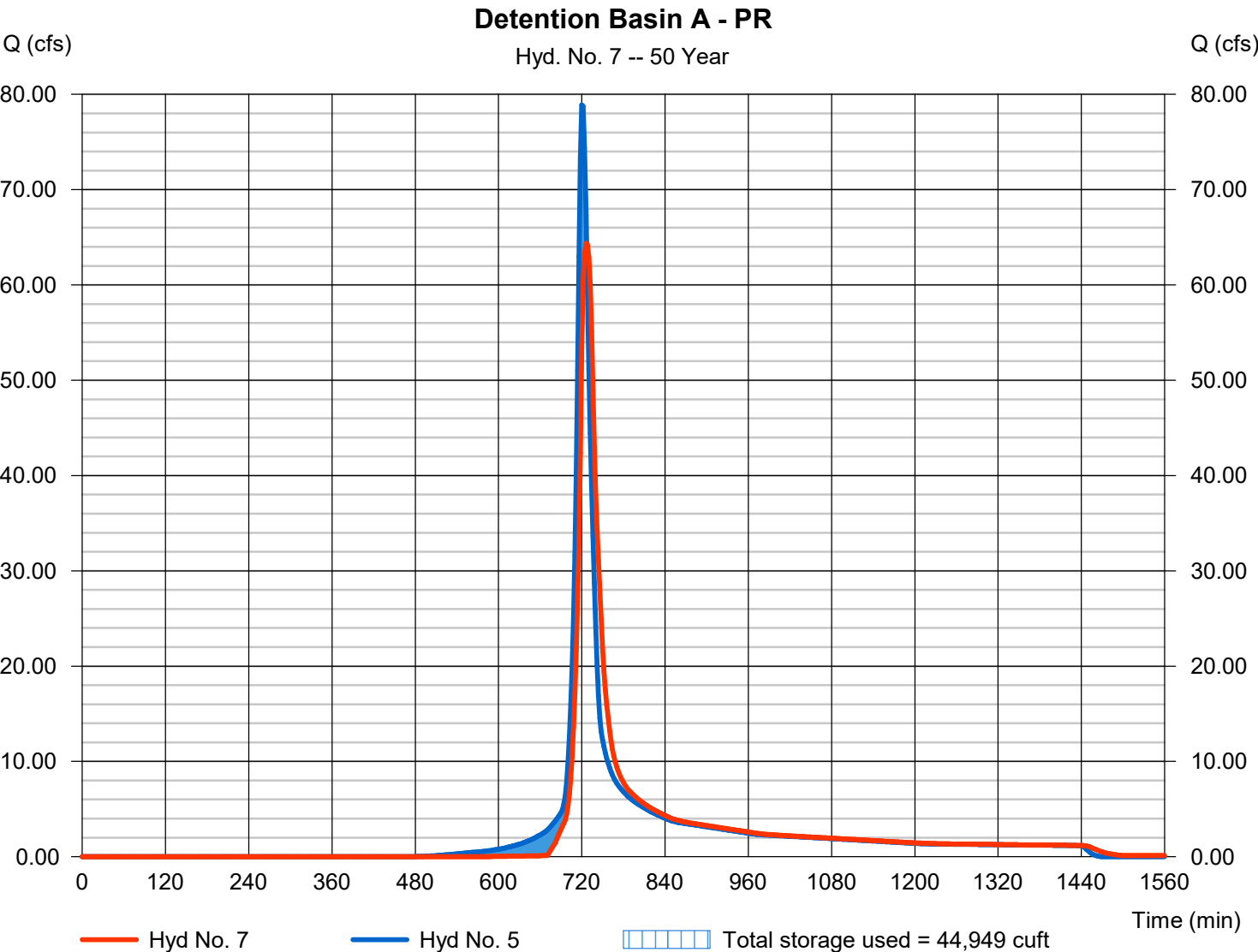
Thursday, 04 / 9 / 2026

Hyd. No. 7

Detention Basin A - PR

Hydrograph type	= Reservoir	Peak discharge	= 64.38 cfs
Storm frequency	= 50 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 238,682 cuft
Inflow hyd. No.	= 5 - TOTAL TO DETENTION BASIN A - PR	Basin Elevation	= 675.94 ft
Reservoir name	= Detention Basin A	Max. Storage	= 44,949 cuft

Storage Indication method used. Wet pond routing start elevation = 672.00 ft.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

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	38.13	2	718	87,275	-----	-----	-----	ONSITE BASIN A - EXISTING
2	SCS Runoff	39.15	2	718	89,656	-----	-----	-----	ONSITE BASIN A - PROPOSED
3	SCS Runoff	62.01	2	724	193,872	-----	-----	-----	OFFSITE BASIN A
4	Combine	92.79	2	720	281,147	1, 3	-----	-----	TOTAL TO DETENTION BASIN A - E
5	Combine	93.73	2	720	283,528	2, 3,	-----	-----	TOTAL TO DETENTION BASIN A - P
6	Reservoir	70.36	2	728	280,727	4	676.46	51,747	Detention Basin A - EX
7	Reservoir	70.69	2	728	283,108	5	676.49	52,191	Detention Basin A - PR
HYDROLOGY-REVISED.gpw					Return Period: 100 Year			Thursday, 04 / 9 / 2026	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

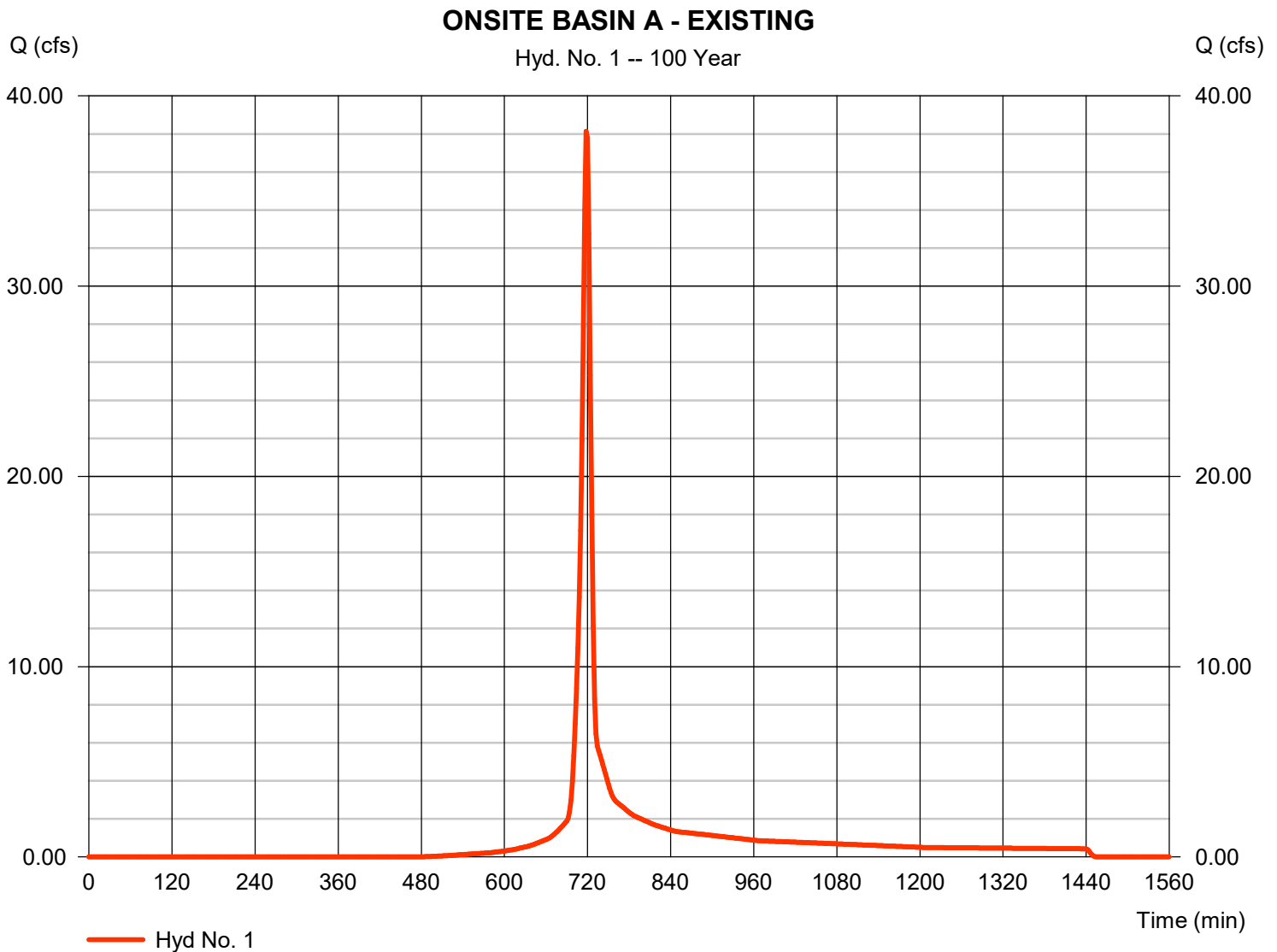
Thursday, 04 / 9 / 2026

Hyd. No. 1

ONSITE BASIN A - EXISTING

Hydrograph type	=	SCS Runoff	Peak discharge	=	38.13 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	87,275 cuft
Drainage area	=	5.870 ac	Curve number	=	69*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.50 min
Total precip.	=	7.70 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = $[(1.590 \times 98) + (2.550 \times 61) + (1.730 \times 55)] / 5.870$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Thursday, 04 / 9 / 2026

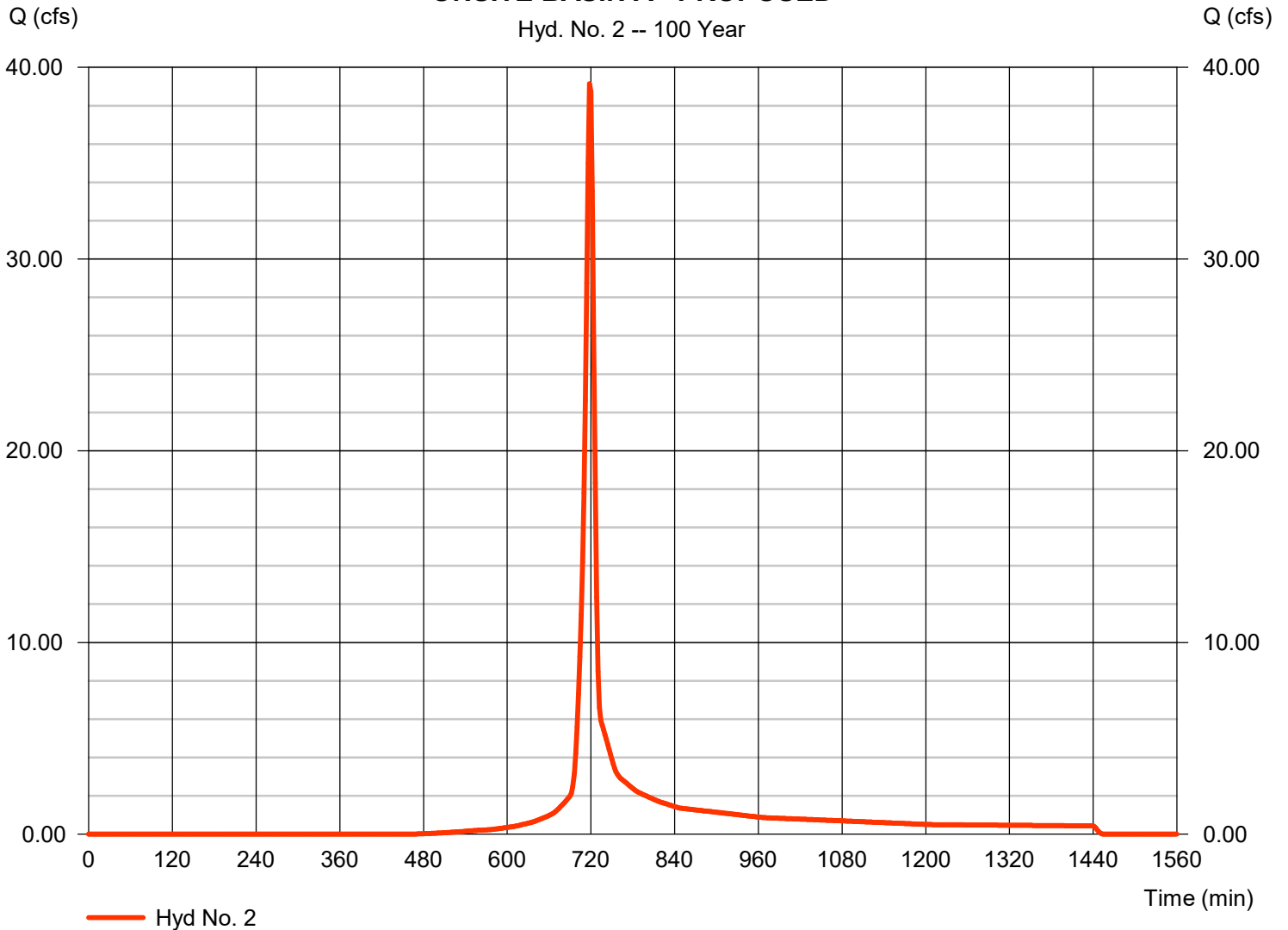
Hyd. No. 2

ONSITE BASIN A - PROPOSED

Hydrograph type	= SCS Runoff	Peak discharge	= 39.15 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 89,656 cuft
Drainage area	= 5.870 ac	Curve number	= 70*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.50 min
Total precip.	= 7.70 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(1.670 \times 98) + (2.470 \times 61) + (1.730 \times 55)] / 5.870$

ONSITE BASIN A - PROPOSED



Hydrograph Report

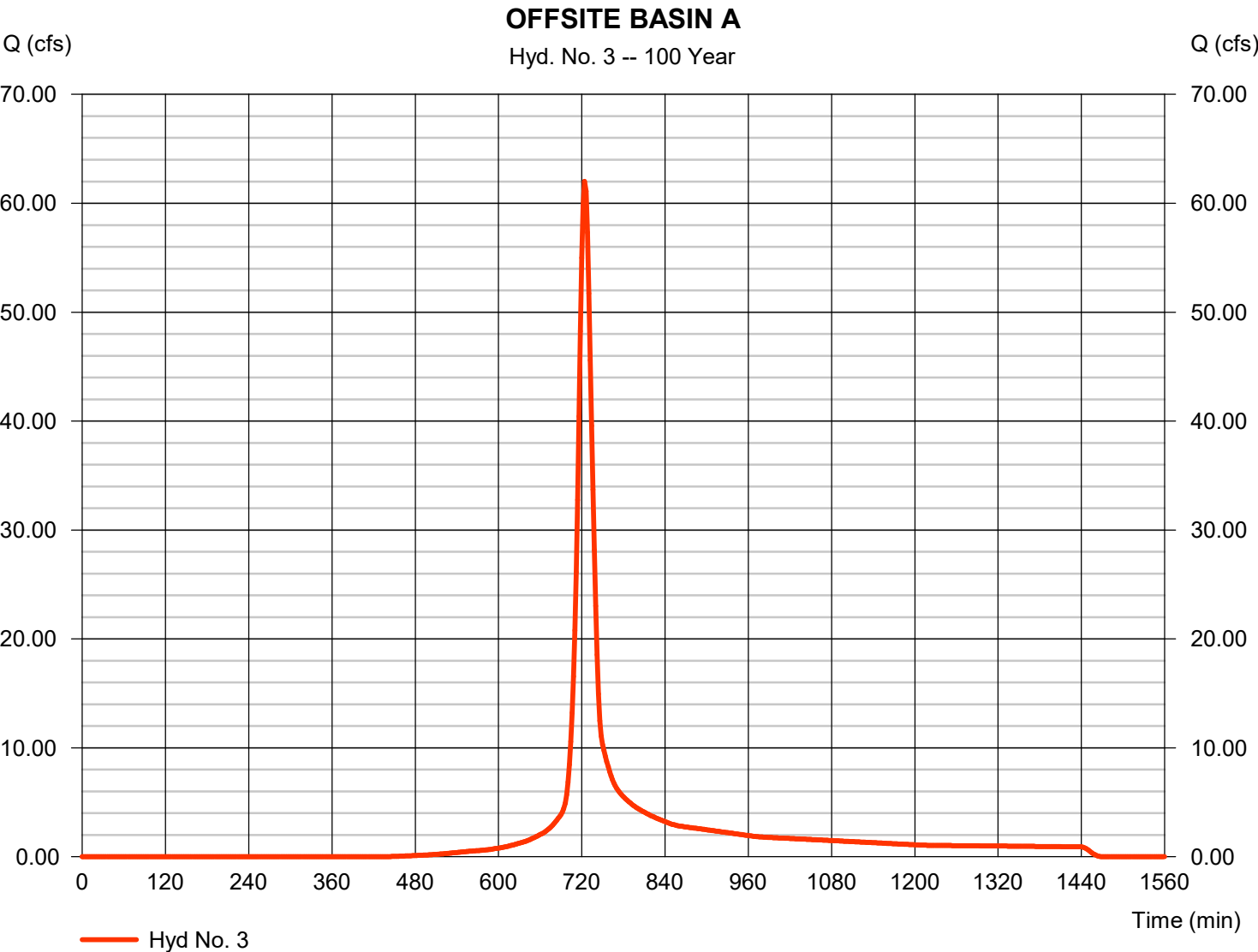
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

Thursday, 04 / 9 / 2026

Hyd. No. 3

OFFSITE BASIN A

Hydrograph type	= SCS Runoff	Peak discharge	= 62.01 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 193,872 cuft
Drainage area	= 12.050 ac	Curve number	= 72
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.70 min
Total precip.	= 7.70 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

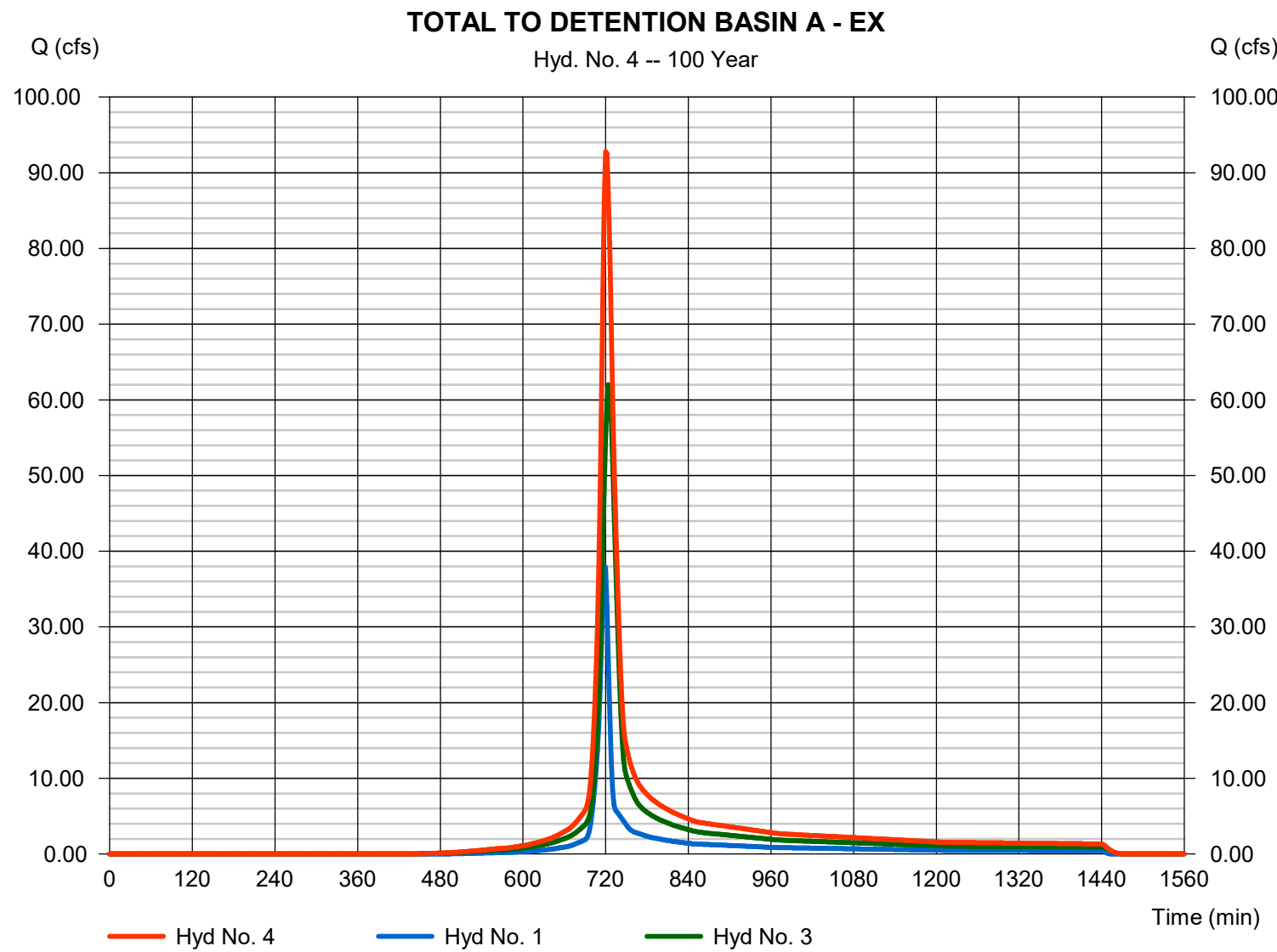


Hydrograph Report

Hyd. No. 4

TOTAL TO DETENTION BASIN A - EX

Hydrograph type	= Combine	Peak discharge	= 92.79 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 281,147 cuft
Inflow hyds.	= 1, 3	Contrib. drain. area	= 17.920 ac

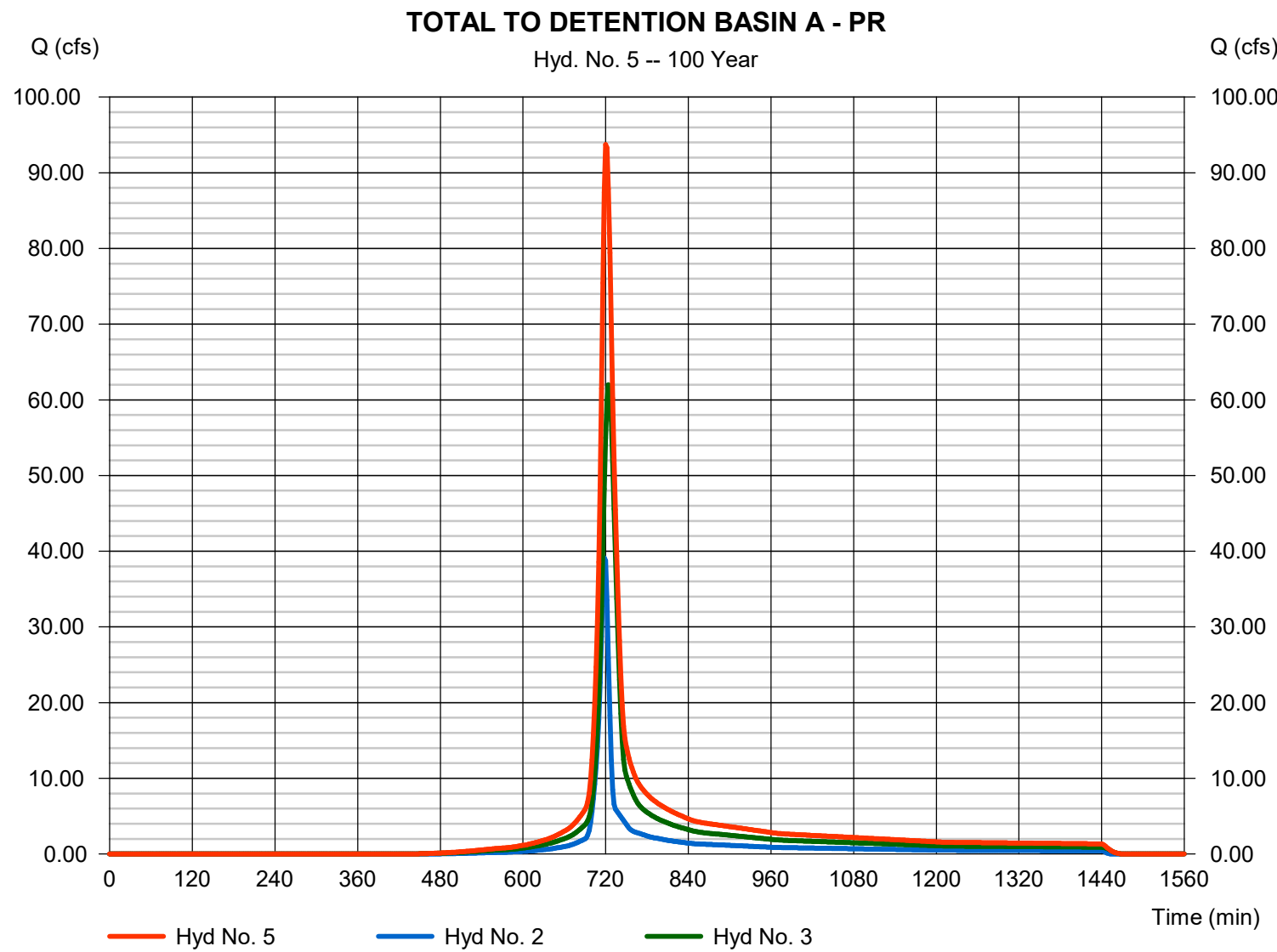


Hydrograph Report

Hyd. No. 5

TOTAL TO DETENTION BASIN A - PR

Hydrograph type	= Combine	Peak discharge	= 93.73 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 283,528 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 17.920 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

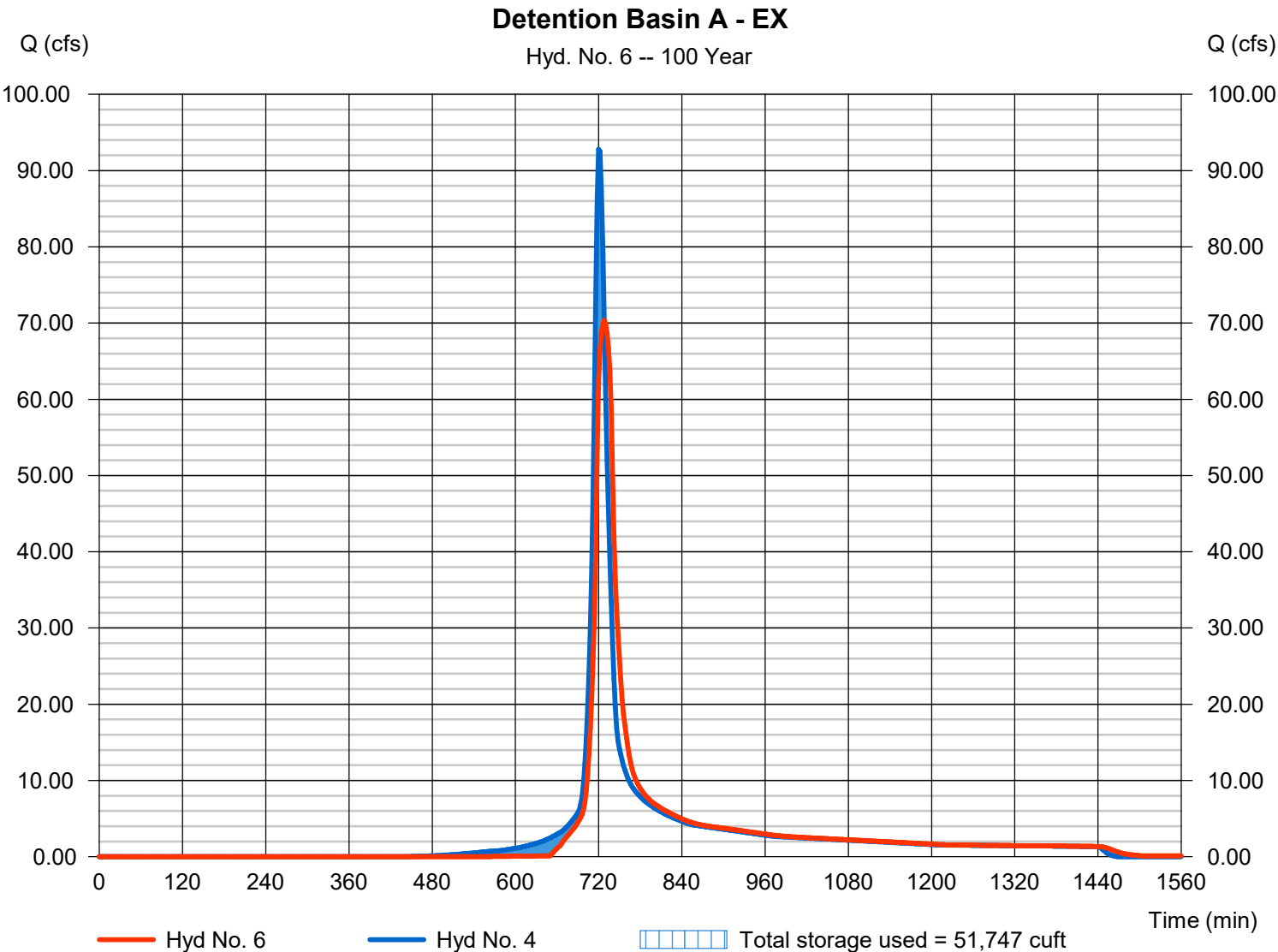
Thursday, 04 / 9 / 2026

Hyd. No. 6

Detention Basin A - EX

Hydrograph type	= Reservoir	Peak discharge	= 70.36 cfs
Storm frequency	= 100 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 280,727 cuft
Inflow hyd. No.	= 4 - TOTAL TO DETENTION BASIN A - EX	Max. Elevation	= 676.46 ft
Reservoir name	= Detention Basin A	Max. Storage	= 51,747 cuft

Storage Indication method used. Wet pond routing start elevation = 672.00 ft.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2026

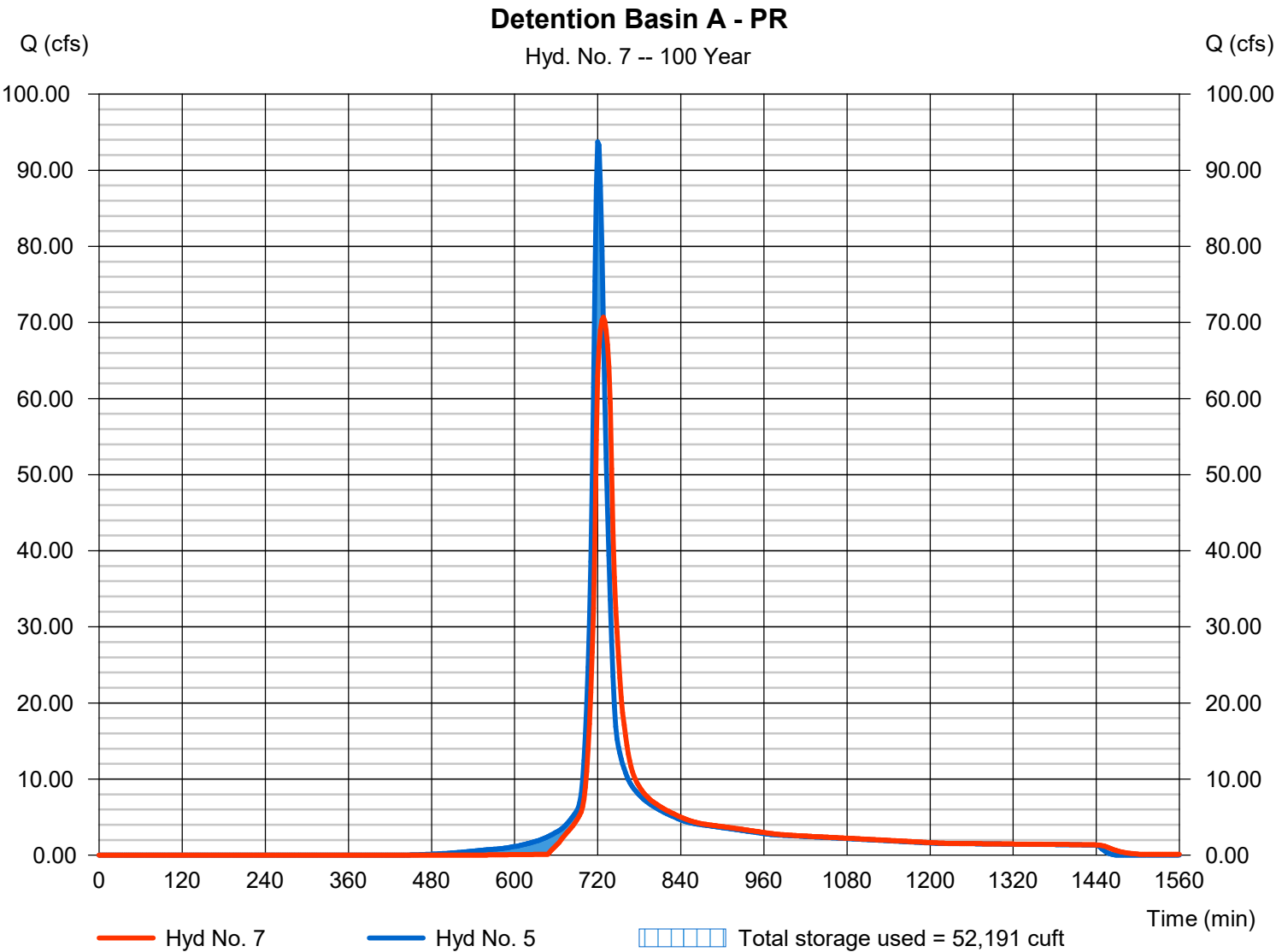
Thursday, 04 / 9 / 2026

Hyd. No. 7

Detention Basin A - PR

Hydrograph type	= Reservoir	Peak discharge	= 70.69 cfs
Storm frequency	= 100 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 283,108 cuft
Inflow hyd. No.	= 5 - TOTAL TO DETENTION BASIN A - PR	Basin Elevation	= 676.49 ft
Reservoir name	= Detention Basin A	Max. Storage	= 52,191 cuft

Storage Indication method used. Wet pond routing start elevation = 672.00 ft.



Attachment D: GSMM Site Development Review Tool



Georgia Stormwater Management Manual

Stormwater Quality Site Development Review Tool, v2.2

Development Name: NCWSA BLDG. EXPANSION
Drainage Basin Name: BASIN A

data input cells
calculation cells
constant values

Site Data

Indicate Pre-Development Land Cover and Runoff Curve Numbers in the Site's Disturbed Area

Cover Type	HSG* A (acres)	CN	HSG B (acres)	CN	HSG C (acres)	CN	HSG D (acres)	CN	Total	% Cover
Impervious		98	1.59	98		98		98	1.59	27%
Open space - Good condition (grass cover > 75%)		39	2.55	61		74		80	2.55	43%
Woods - Good Condition		30	1.73	55		70		77	1.73	29%
Select a land cover type...		0		0		0		0	0.00	0%
Select a land cover type...		0		0		0		0	0.00	0%
Local Jurisdiction Input									0.00	0%
Other									0.00	0%
Total	0.00		5.87		0.00		0.00		5.87	100%

*HSG = hydrologic soil group

Impervious (ac) 1.59
Weighted CN 69
Potential Max Soil Retention, S_{pre} (in) 4.44

Indicate Post-Development Land Cover and Runoff Curve Numbers in the Site's Disturbed Area

Cover Type	HSG A (acres)	CN	HSG B (acres)	CN	HSG C (acres)	CN	HSG D (acres)	CN	Total	% Cover
Impervious		98	1.67	98		98		98	1.67	28%
Open space - Good condition (grass cover > 75%)		39	2.47	61		74		80	2.47	42%
Woods - Good Condition		30	1.73	55		70		77	1.73	29%
Select a land cover type...		0		0		0		0	0.00	0%
Select a land cover type...		0		0		0		0	0.00	0%
Local Jurisdiction Input									0.00	0%
Other									0.00	0%
Total	0.00		5.87		0.00		0.00		5.87	100%

Impervious (ac) 1.67
Rv 0.31
Weighted CN 70
Potential Max Soil Retention, S_{post} (in) 4.34

Conservation Area Credits

Scenario 1: Natural Conservation Area *See the GSMM Volume 2, Section 2.3.3.3 for more information.

☐ Check the box if a portion of the post-developed area is protected by a conservation easement or equivalent form of protection.

Area (ac) of development protected by a conservation easement or equivalent form of protection. **Note: The green cell will unlock if the Scenario 1 box above is checked**

Scenario 3: Soil Restoration *See the GSMM Volume 2, Section 4.23 for more information.

☐ Check the box if a portion of the post-developed area employs soil restoration and is protected by a conservation easement or equivalent form of protection.

Area (ac) of development with restored soils and protected by a conservation easement or equivalent form of protection. **Note: The green cell will unlock if the Scenario 3 box above is checked**

Scenario 2: Site Reforestation/Revegetation *See the GSMM Volume 2, Section 4.22 for more information.

☐ Check the box if a portion of the post-developed area employs site reforestation/revegetation and is protected by a conservation easement or equivalent form of protection.

Area (ac) of development reforested/revegetated and protected by a conservation easement or equivalent form of protection. **Note: The green cell will unlock if the Scenario 2 box above is checked**

Scenario 4: Site Reforestation/Revegetation & Soil Restoration *See the GSMM Volume 2, Section 4.22 and 4.23 for more information.

☐ Check the box if the same portion of the post-developed area employs site reforestation/revegetation and soil restoration, and is protected by a conservation easement or equivalent form of protection.

Area (ac) with restored soils in a reforested & revegetated area and protected by a conservation easement or equivalent form of protection. **Note: The green cell will unlock if the Scenario 4 box above is checked**

Total Conservation Area Credit (acres) 0.00

Georgia Stormwater Management Manual

Stormwater Quality Site Development Review Tool, v2.2

Development Name: NCWSA BLDG. EXPANSION

Drainage Basin Name: BASIN A

data input cells

calculation cells

constant values

Water Quality Goals

Target Runoff Reduction Storm (in)1.00

Total Site Area for Water Quality Volume (acres)5.87

Target Runoff Reduction Volume (cf)6,521

Target Water Quality Volume (cf)7,826

Select BMPs for Runoff Reduction and Water Quality

		Area Draining to Each BMP			Storage Volume Provided by BMP (cf)	RR Conveyance Volume Provided by BMP (cf)	Down-stream BMP	Runoff Reduction Calculations						WQ Calculations	
		On-site Pervious Area (acres)	On-site Impervious Area (acres)	Offsite Area (acres)				RR Volume from Direct Drainage (cf)	RR Volume from Upstream Practices (cf)	Total RR Volume Received by BMP (cf)	Runoff Reduction %	RR Achieved (cf)	Remaining RR Volume (cf)	WQ _v from Direct Drainage (cf)	Effective TSS Removal %
BMP 1	Stormwater Pond	4.20	1.67	12.05	72,157			6,521	0	6,521	0%	0	6,521	7,826	80%
BMP 2	Select a BMP...							0	0	0	N/A	0	0	0	N/A
BMP 3	Select a BMP...							0	0	0	N/A	0	0	0	N/A
BMP 4	Select a BMP...							0	0	0	N/A	0	0	0	N/A
BMP 5	Select a BMP...							0	0	0	N/A	0	0	0	N/A
BMP 6	Select a BMP...							0	0	0	N/A	0	0	0	N/A
BMP 7	Select a BMP...							0	0	0	N/A	0	0	0	N/A
BMP 8	Select a BMP...							0	0	0	N/A	0	0	0	N/A
BMP 9	Select a BMP...							0	0	0	N/A	0	0	0	N/A
BMP 10	Select a BMP...							0	0	0	N/A	0	0	0	N/A
	TOTAL	4.20	1.67	12.05				6,521				0			
	UNTREATED AREA (acres)	0.00	0.00											7,826	

Target Runoff Reduction Volume (cf)	6,521
Target Achieved?	No
Remaining Runoff Reduction Volume (cf)	6,521

Target Water Quality Volume (cf)	7,826
% TSS Removal Achieved	80%
Target Achieved?	Yes!
Remaining TSS Removal %	0%

Georgia Stormwater Management Manual

Stormwater Quality Site Development Review Tool, v2.2

Development Name: NCWSA BLDG. EXPANSION

Drainage Basin Name: BASIN A

data input cells

calculation cells

constant values

Channel and Flood Protection Calculations

	1-yr, 24-hr storm	2-yr, 24-hr storm	25-yr, 24-hr storm	100-yr, 24-hr storm
Target Rainfall Event (in)	3.25	3.71	6.13	7.70
	1-yr, 24-hr storm	2-yr, 24-hr storm	25-yr, 24-hr storm	100-yr, 24-hr storm
Pre-Development Runoff Volume (in)	0.82	1.10	2.84	4.12
Post Development Runoff Volume (in) with no BMPs	0.85	1.13	2.89	4.18
Post-Development Runoff Volume (in) with BMPs	0.85	1.13	2.89	4.18
Adjusted CN	70	70	70	70

*See Stormwater Management Standards to Determine Detention Requirements.

Comments

Attachment E: Water Quality Calculations



WATER QUALITY FOR STORMWATER DETENTION PONDS

Brown AND Caldwell

CALCULATIONS

Project No: 203000
Project Name: NCWSA Admin. Bldg Expansion
Designed By: Phillip Davis / Natalie Ibarluzea
Checked By: Kimberly Devendorf

WATER QUALITY SIZING

ON-SITE DRAINAGE	5.87	acres	=	255697	S.F.
IMPERVIOUS AREA	1.67	acres	=	28.4%	IMP.

WATER QUALITY VOLUME (c.f.)

Rv	=	Volumetric Runoff	$0.050 + (0.009 * I\%)$	0.306	
WQv	=	Water Quality Volume	$1.2 * \text{Area}(\text{ft}^2) * Rv / 12 \text{ in/ft}$	7,826	ft ³
WQd	=	WQv Peak Discharge	$WQv / (24 \text{ hr} * 3600 \text{ sec/hr})$	0.0906	ft ³ /sec

SIZE PRETREATMENT AND PERMANENT POOL

REQ. PRETREATMENT:	FOREBAY	0.1 in/acre	606	cf	Req.
PROV. PRETREATMENT:			768	cf	Prov.

REQ. PER. POOL TYPE: MICROPOOL ED 30% of WQv 2,348 cf Req.

CHANNEL PROTECTION VOLUMES

24-hr 1-yr Precipitation (P) 3.25 inches
Adjusted Curve Number (CN) 70
Area 255697 SF

S	Soil Retention	4.286		
Ia	Initial Abstraction	0.857		
Ia/P	Ratio	0.264		
Qu	Unit Peak Discharge	500	csn/in	
Qd	Direct Runoff	0.857	in	
qo/qi	Ratio qo/qi	0.035	unitless	
Vs/Vr		0.635	unitless	
CPv	CP Volume Req'd	11604	cf	Req.
CPd	CP 24-hr Peak Discharge	0.134	cfs	

Equations Used	S	=	Soil Retention	(1000/CN)-10
	Ia	=	Initial Abstraction	(200/CN)-2
	Ia/P	=	Ratio	
	Qu	=	Unit Peak discharge	From Chapter 3 (GaSWMM Vol 2)
	Qd	=	Direct Runoff	(P-Ia) ² / (P-Ia)+S
	q _o /q _i	=	Ratio q _o /q _i	12.03 Q _u ^{-0.9406}
	V _s /V _r	=	0.683-1.43(q _o /q _i) + 1.64(q _o /q _i) ² -0.804 (q _o /q _i) ³	
	CPv	=	CP Volume Req'd	V _s /V _r * Area _(sf) * Q _d / 12
	CPd	=	CP 24-hr Peak Discharge	CPv / 86400