DRAINAGE CALCULATIONS, HYDRAULICS & HYDROLOGY REPORT

393 Butlertown Road
Montville, CT

April 21, 2025
REVISED APRIL 28, 2025

Green Site Design, LLC

DRAINAGE HYDRAULICS AND HYDROLOGY REPORT

393 Butlertown Road
Montville, CT

EXISTING CONDITIONS

The site is approximately 2.175 acres in area and is shown on the Existing Survey Plan (Sheet 1 of the site plans). The site has access onto Butlertown Road. There are no wetlands on the site.

PROPOSED DEVELOPMENT

This project is a modification of the previous approved site plan. The modification includes temporary sedimentation basins, in accordance with the 2024 CT Guidelines for Soil Erosion & Sedimentation Control, which will ultimately become a permanent water quality basin in accordance with the Connecticut the 2024 Stormwater Quality Manual (Manual).

EXISTING AND PROPOSED HYDRAULICS

The stormwater management system has been designed to provide for zero increase in peak stormwater discharge from the site. The project has been designed to actually result in a decrease in the peak stormwater rates leaving the project site. The proposed stormwater water quality basin will provide treatment of the runoff from the proposed site and the 5,000 gallon Oil/Water separator will provide pre-treatment.

The Proposed Drainage Area contains the proposed development for the entire 2.175 aces of the site. The stormwater runoff from proposed development will be treated by the proposed water quality basin. The basin has been modelled to assume that the basin will be a dry basin at elevation 234 the onset of the storm event.

Both the existing and the proposed conditions for the development site have been analyzed for the 2-year, 10-year, 25-year, 50-year, and 100 year design storms using the SCS model and the NOAA Type D rainfall distribution, which is included in the calculations.

Drainage Area 1

	2 Year	10 Year	25 Year	50 Year	100 Year
Existing	2.987 cfs	6.035 cfs	8.059 cfs	9.574 cfs	11.22 cfs
Proposed	2.079 cfs	3.880 cfs	5.304 cfs	6.292 cfs	7.107 cfs

EROSION & SEDIMENTATION CONTROL

The 2024 CT Guidelines for Soil Erosion & Sedimentation Control applies to the construction phase of the project. A detailed erosion and sediment control plan has been provided in the site development plans. The proposed stormwater water quality basin has been designed to function as sedimentation trap during stabilization. In addition, a temporary sedimentation trap is proposed along the frontage of the site, to collect the runoff from the front section of the site, which would miss the stormwater basin. This additional sediment trap has been included in the calculations.

The first calculation required by the Guidelines is for the sediment storage volume (SSV). The sediment storage volume is the calculation for one year of predicted sediment load. The required SSV calculation for the temporary sediment trap is shown below.

Drainage Area

SSV = A(134CY/Acre)

A = 2.2 ACRE

SSV = 294.8 CY = **7,960 CF**

The second calculation required by the Guidelines is for wet storage volume (WSV). The wet storage volume is the volume in the basin that is located below the bottom of the riprap for the level spreader outlet of the basin. The volume of the wet storage is required to be half of the required SSV. The required wet storage volume is shown below along with the dry storage volumes (DSV).

The required and provided storage for the temporary sediment trap within the water quality basin, assuming the temporary trap is only excavated down to elevation 234:

Drainage Areas

Approximately half of the runoff from the site will go to the temporary sediment trap #1, along Butlertown Road and the other half will go the temporary sediment trap #2, within the Water Quality Basin. As the site grading progresses this will change at times, therefore both sediment traps have been over sized.

Sedimentation Trap #1

1,990 CF of Wet Storage Volume Required	2,774 CF Provided
1,990 CF of Dry Storage Volume Required	4,406 CF Provided
3,980 CF of Sediment Storage Volume Required	7,180 CF Total Provided

Sedimentation Trap #2

1,990 CF of Wet Storage Volume Required	5,951 CF Provided
1,990 CF of Dry Storage Volume Required	20,537 CF Provided
3,980 CF of Sediment Storage Volume Required	26,488 CF Total Provided

CONNECTICUT STORMWATER QUALITY MANUAL

The Connecticut 2024 Stormwater Quality Manual (Manual) applies to the post construction phase, for the operation of the facility. The temporary sediment trap has been designed to function as a water quality basin after the site is stabilized. The basin

meets the criteria of the Connecticut Stormwater Quality Manual for a Water Quality Basin.

Drainage Area 1

WQV = (1.3")(R)(A)/12

A = 2.2 Acre

R = 0.05 + 0.009(I)

I = 1.4 Acres / 2.2 Acres = 0.64 (64%)

R = 0.63

WQV = 0.150 Ac-Ft = 6,540 CF (Required)

4,531 CF (Provided in Water Quality Basin between elevation 234 and 235.5)

5,548 CF (Provided in Water Quality Basin between elevation 228 and 234)

Total WQV = 10,079 CF

The Manual calls for 6 inches of freeboard for the 10 year storm event and 3 inches of freeboard for the 100 year storm event. We have provided over a foot of freeboard for the 100 year storm event.

Once development of the site is completed, there will be a decrease in volume and runoff from the site. The temporary sedimentation basin provides ample wet and dry storage volume to meet and exceed the requirements of the 2024 CT Guidelines for Soil & Sedimentation Control, as well as the 2024 CT Guidelines for Soil & Sedimentation Control. Likewise, the Water Quality Basin meets and exceeds the post construction requirements of the Connecticut 2024 Stormwater Quality Manual.

DRAINAGE LEVEL SPREADER AT OUTLET FROM WATER QUALITY BASIN:

The attached drainage calculations shows that for a 25 year design storm, the rip rap level spreader will have a peak flow of 5.304 cfs (the Manual calls for a maximum of

3 FT/Sec for the 10 year storm, we are using the 25 year storm event) and a depth of 0.31 feet, providing over 6 inches of free board in the swale. The calculations also show a velocity of 1.61 ft/sec.

FLOWS TO THE OIL SEPARATOR

The drainage manhole outlet culverts have been designed so that the entire 2 year storm event will go to the oil separator, via 12 inch culverts. The 18 inch culverts from the manholes to the basin will receive flows for all storms greater then the 2 year storm events. See the attached culvert report for Flows from the manholes to the Oil Separator.

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

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	2.987	1	729	10,518	------	------	------	Existing Area
2	SCS Runoff	5.324	1	729	19,002	------	------	------	Proposed Area
3	Reservoir	2.079	1	739	14,449	2	236.47	8,220	Water Quality Basin
5	Rational	2.899	1	5	3,044	------	------	------	Flows to Southern Manhole
6	Rational	2.899	1	5	3,044	------	------	------	Flows to Northern Manhole

Hydrograph Report

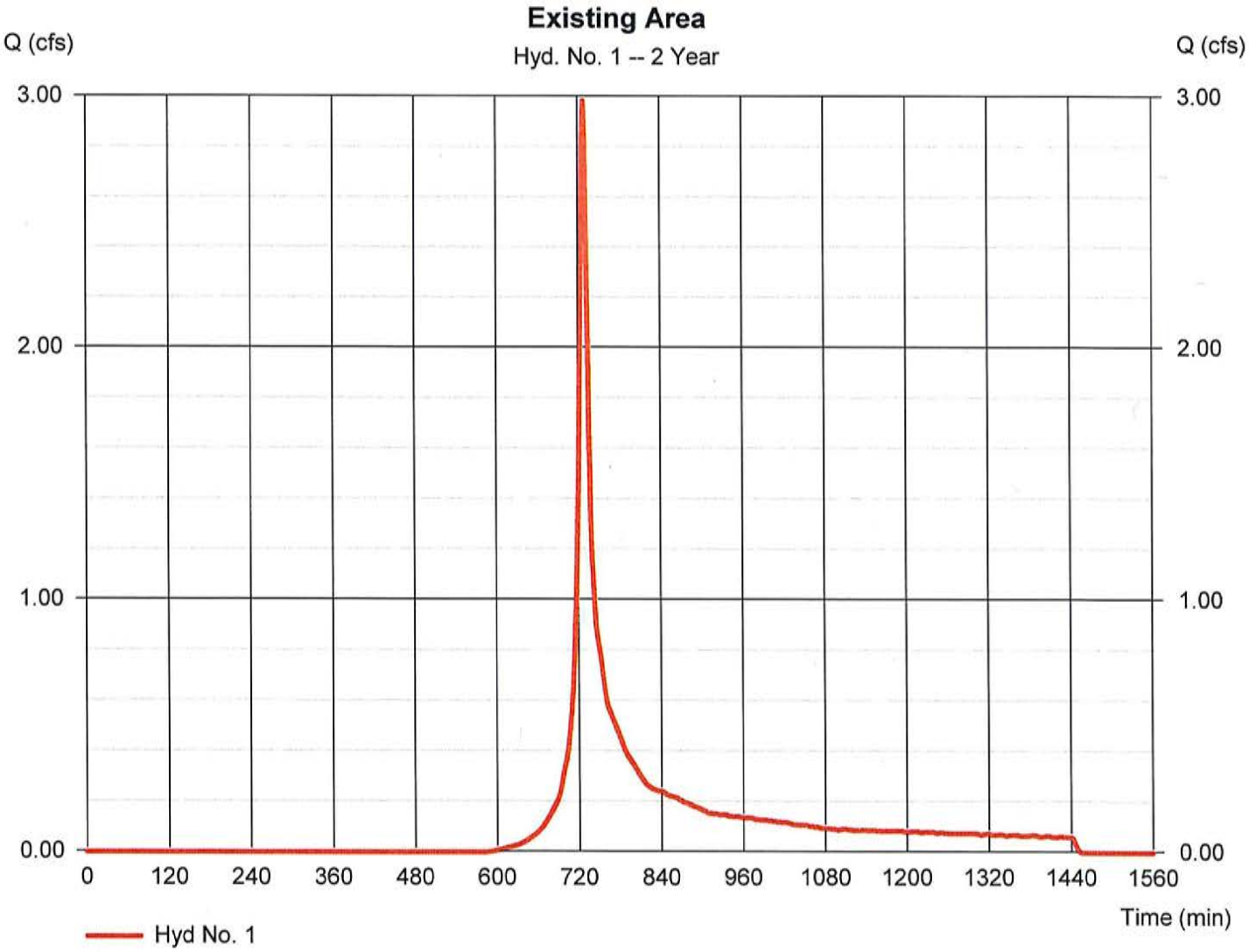
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025 Thursday, 05 / 1 / 2025

Hyd. No. 1

Existing Area

Hydrograph type	= SCS Runoff	Peak discharge	= 2.987 cfs
Storm frequency	= 2 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 10,518 cuft
Drainage area	= 2.180 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.45 in	Distribution	= Custom
Storm duration	= NOAA Type D Distribution 1 rainfall	Shape factor	= 484

* Composite (Area/CN) = [(0.400 x 98) + (1.300 x 69)] / 2.180



Hydrograph Report

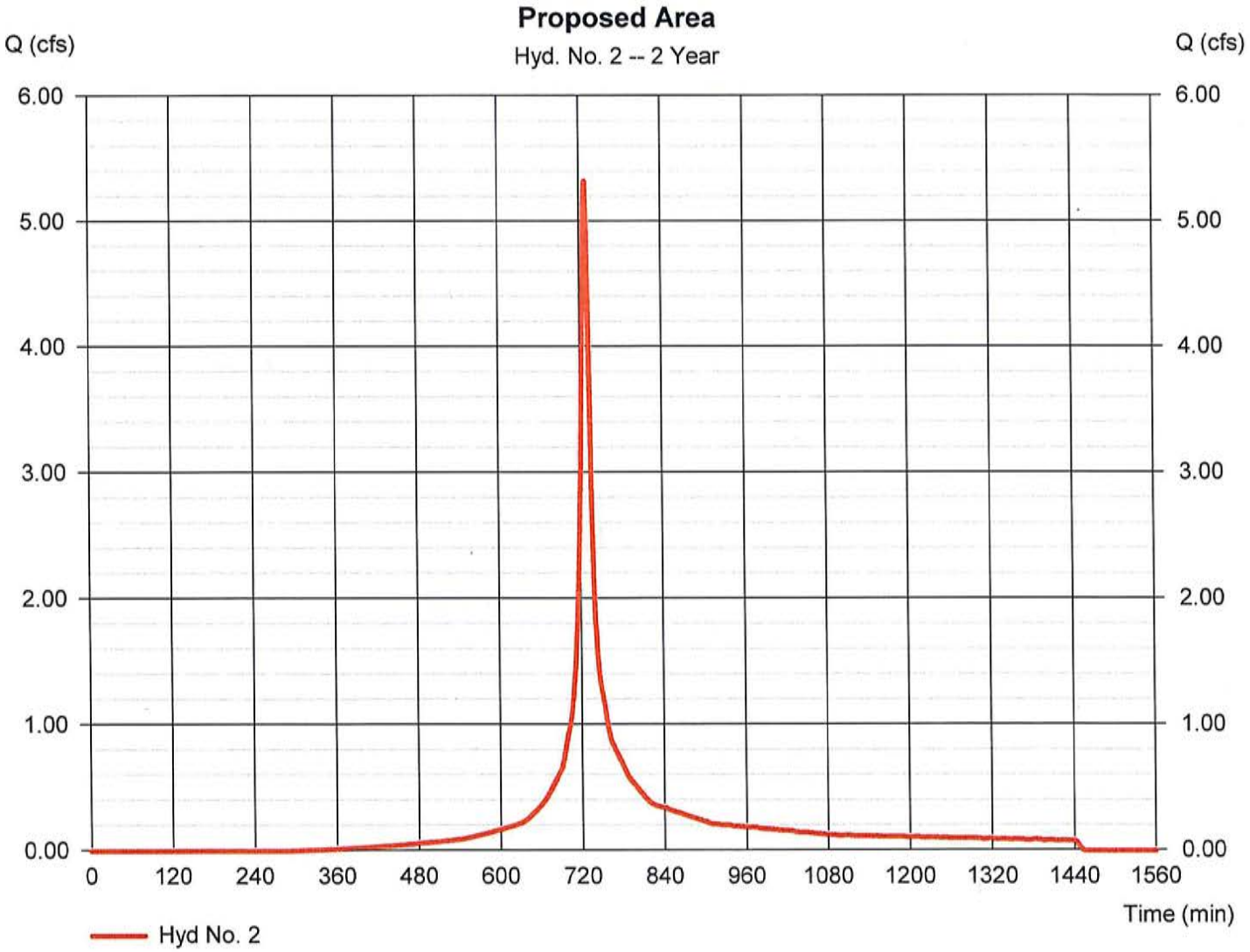
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025 — Thursday, 05 / 1 / 2025

Hyd. No. 2

Proposed Area

Hydrograph type	= SCS Runoff	Peak discharge	= 5.324 cfs
Storm frequency	= 2 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 19,002 cuft
Drainage area	= 2.180 ac	Curve number	= 90*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.45 in	Distribution	= Custom
Storm duration	= NOAA Type D Distribution 1 rainfalls	Shape factor	= 484

* Composite (Area/CN) = [(1.600 x 98) + (0.580 x 69)] / 2.180



Hydrograph Report

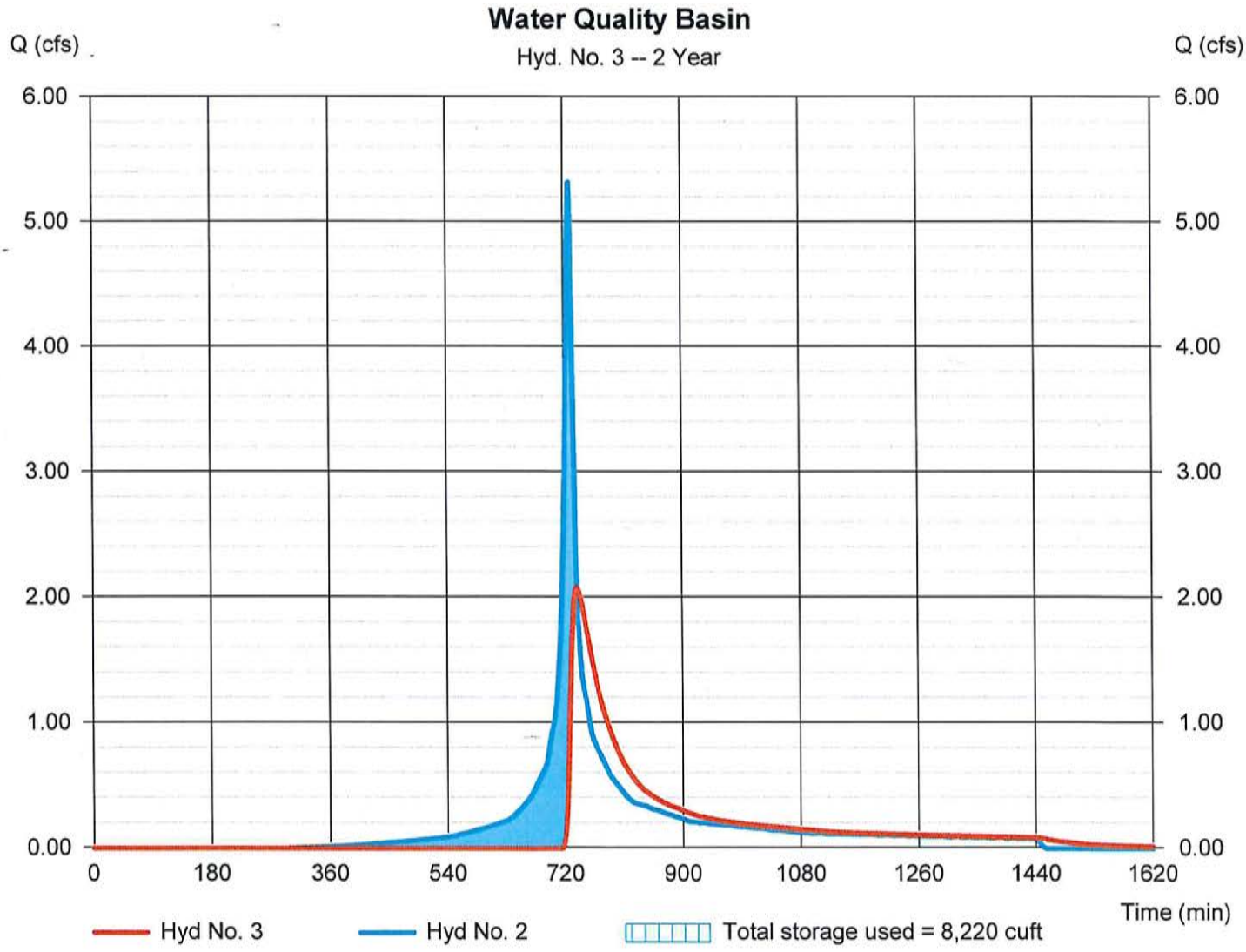
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025 Thursday, 05 / 1 / 2025

Hyd. No. 3

Water Quality Basin

Hydrograph type	= Reservoir	Peak discharge	= 2.079 cfs
Storm frequency	= 2 yrs	Time to peak	= 739 min
Time interval	= 1 min	Hyd. volume	= 14,449 cuft
Inflow hyd. No.	= 2 - Proposed Area	Max. Elevation	= 236.47 ft
Reservoir name	= Pond 1	Max. Storage	= 8,220 cuft

Storage Indication method used.



Hydrograph Report

Hyd. No. 5

Flows to Southern Manhole

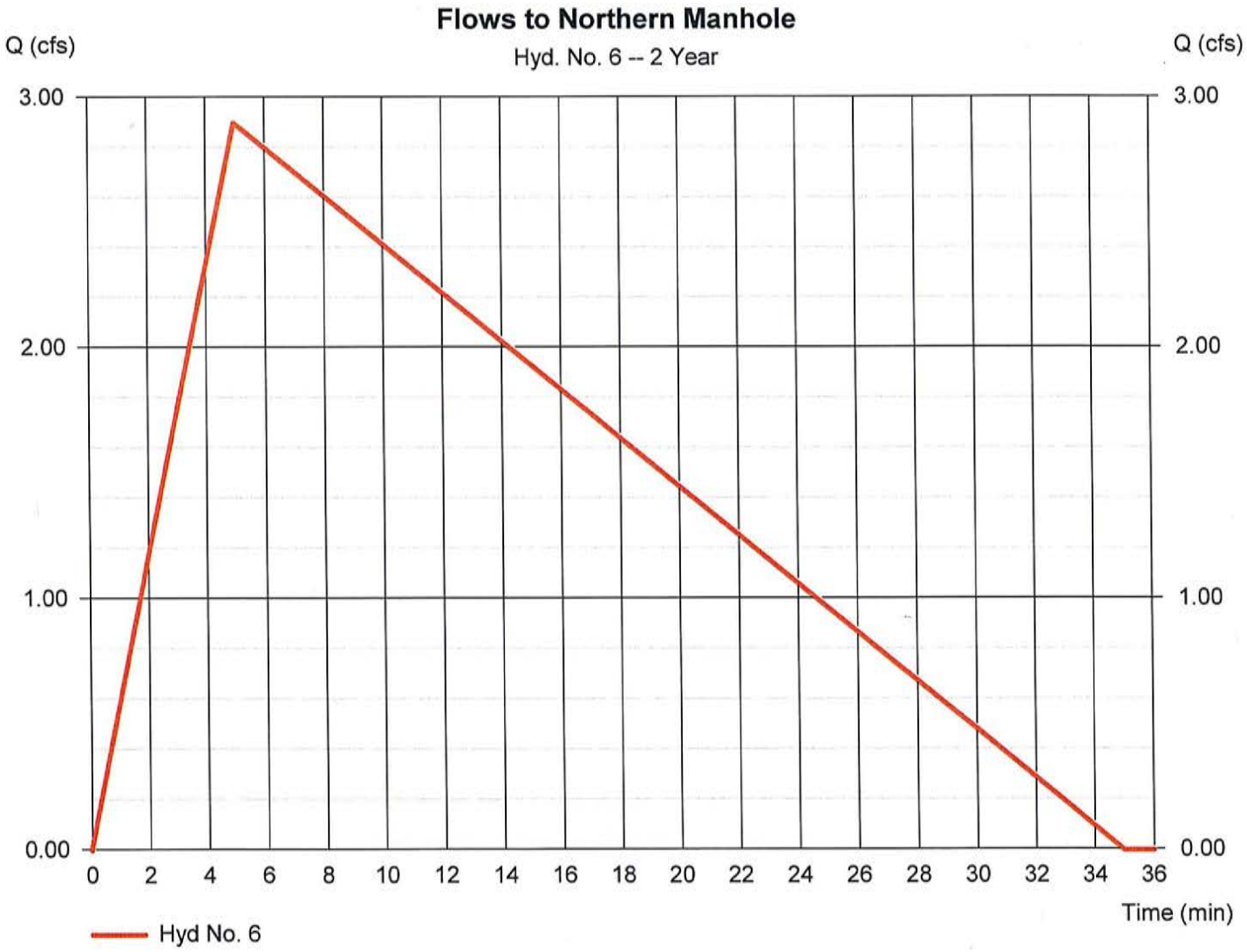
Hydrograph type	= Rational	Peak discharge	= 2.899 cfs
Storm frequency	= 2 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 3,044 cuft
Drainage area	= 0.800 ac	Runoff coeff.	= 0.75
Intensity	= 4.832 in/hr	Tc by User	= 5.00 min
IDF Curve	= GSD-60 NOAA.IDF	Asc/Rec limb fact	= 1/6

Hydrograph Report

Hyd. No. 6

Flows to Northern Manhole

Hydrograph type	= Rational	Peak discharge	= 2.899 cfs
Storm frequency	= 2 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 3,044 cuft
Drainage area	= 0.800 ac	Runoff coeff.	= 0.75
Intensity	= 4.832 in/hr	Tc by User	= 5.00 min
IDF Curve	= GSD-60 NOAA.IDF	Asc/Rec limb fact	= 1/6



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

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	6.035	1	729	20,981	------	------	------	Existing Area
2	SCS Runoff	8.648	1	729	31,744	------	------	------	Proposed Area
3	Reservoir	3.880	1	738	27,192	2	237.30	11,855	Water Quality Basin
5	Rational	4.342	1	5	4,559	------	------	------	Flows to Southern Manhole
6	Rational	4.342	1	5	4,559	------	------	------	Flows to Northern Manhole

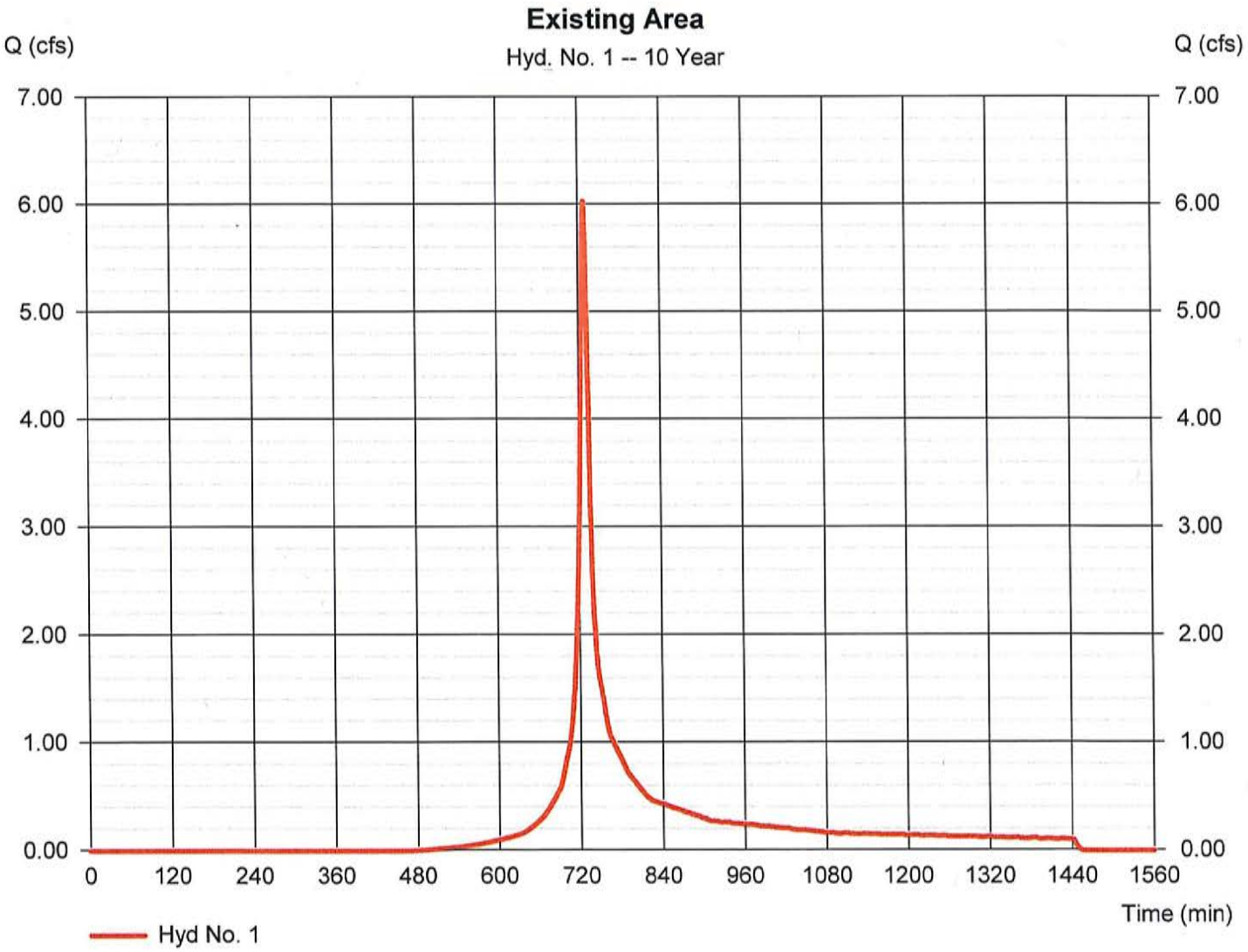
Hydrograph Report

Hyd. No. 1

Existing Area

Hydrograph type	= SCS Runoff	Peak discharge	= 6.035 cfs
Storm frequency	= 10 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 20,981 cuft
Drainage area	= 2.180 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.14 in	Distribution	= Custom
Storm duration	= NOAA Type D Distribution 1 rainfall	Shape factor	= 484

* Composite (Area/CN) = [(0.400 x 98) + (1.300 x 69)] / 2.180



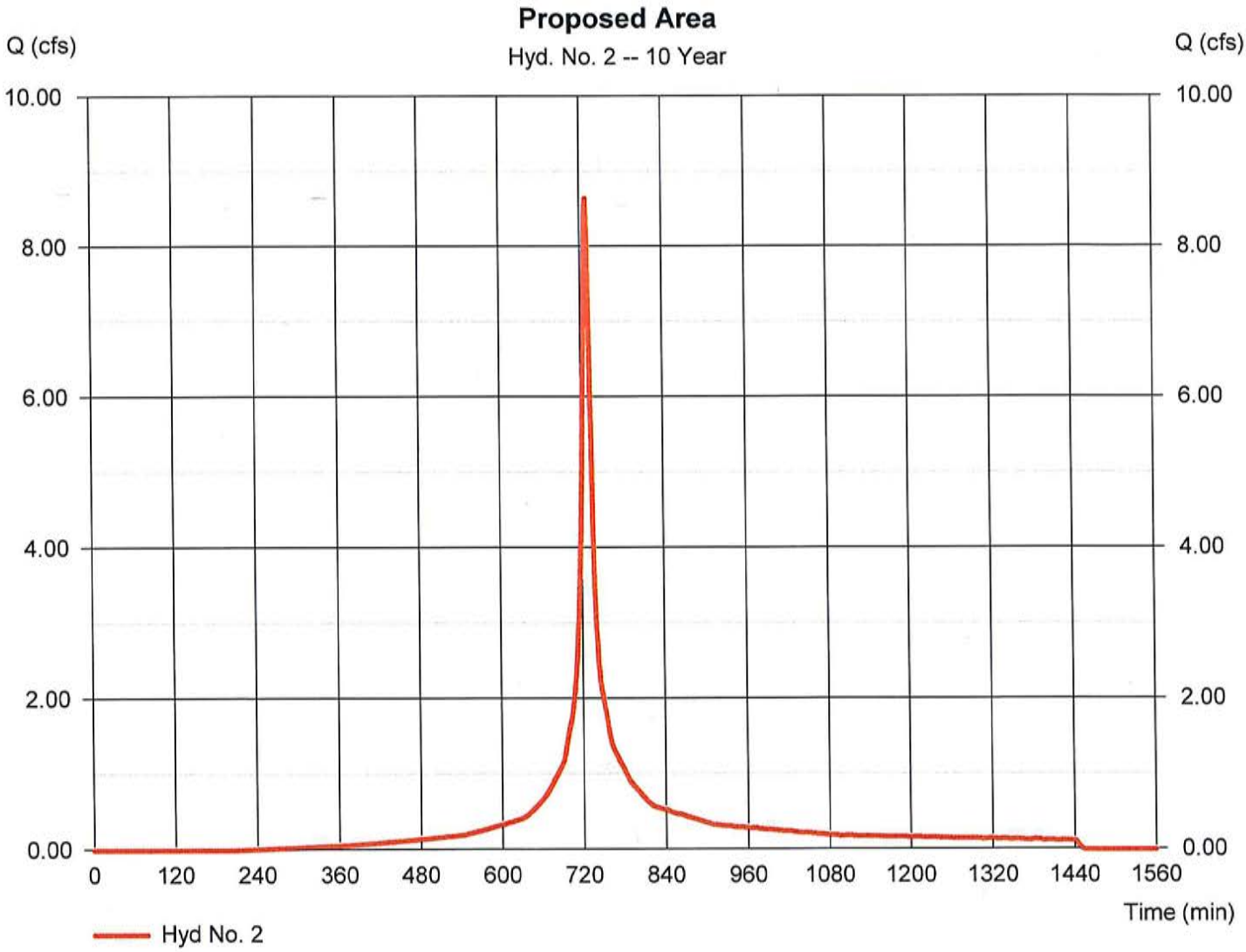
Hydrograph Report

Hyd. No. 2

Proposed Area

Hydrograph type	= SCS Runoff	Peak discharge	= 8.648 cfs
Storm frequency	= 10 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 31,744 cuft
Drainage area	= 2.180 ac	Curve number	= 90*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.14 in	Distribution	= Custom
Storm duration	= NOAA Type D Distribution 1 minutes	Shape factor	= 484

* Composite (Area/CN) = [(1.600 x 98) + (0.580 x 69)] / 2.180



Hydrograph Report

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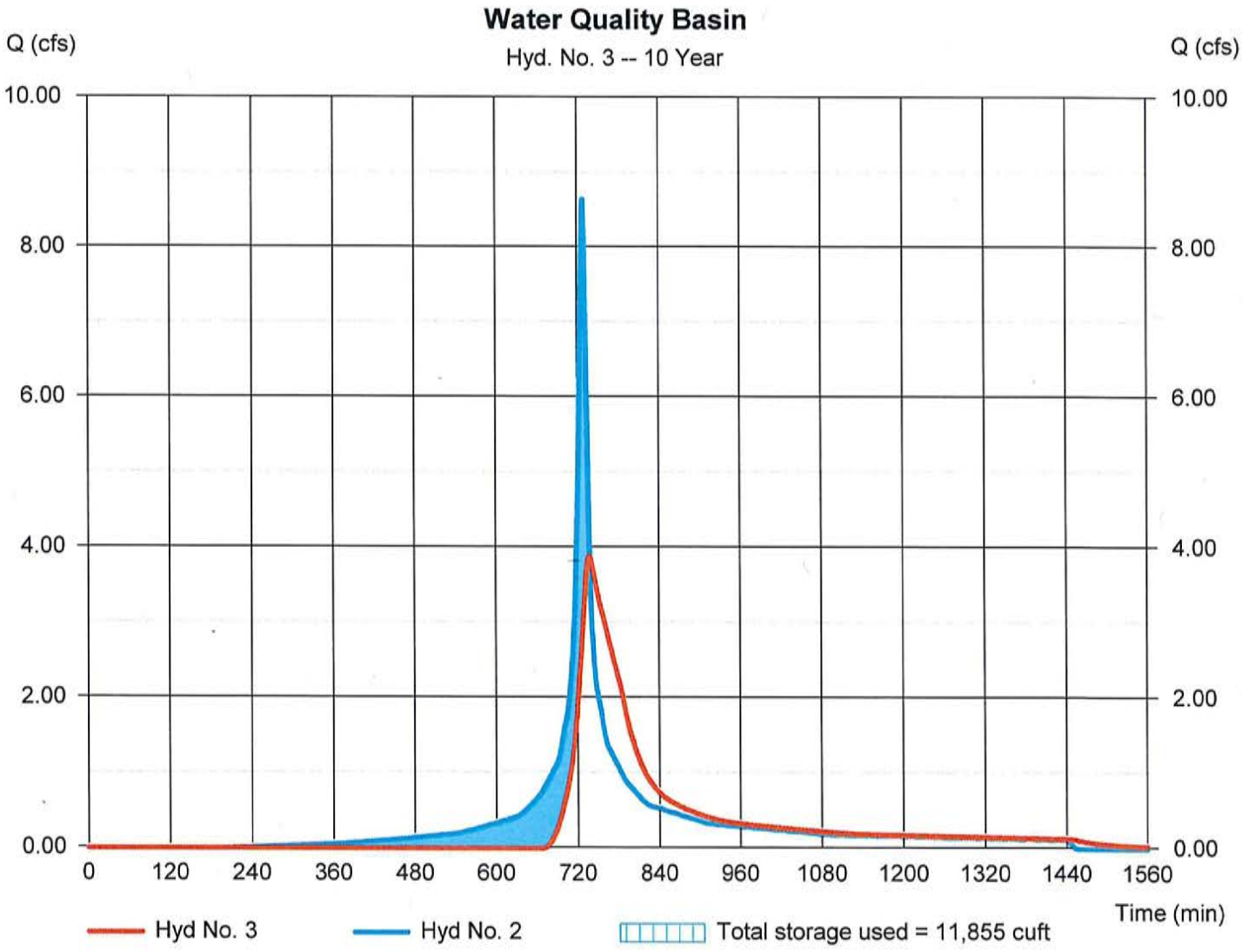
Hyd. No. 3

Water Quality Basin

Hydrograph type	= Reservoir	Peak discharge	= 3.880 cfs
Storm frequency	= 10 yrs	Time to peak	= 738 min
Time interval	= 1 min	Hyd. volume	= 27,192 cuft
Inflow hyd. No.	= 2 - Proposed Area	Max. Elevation	= 237.30 ft
Reservoir name	= Pond 1	Max. Storage	= 11,855 cuft

Storage Indication method used.

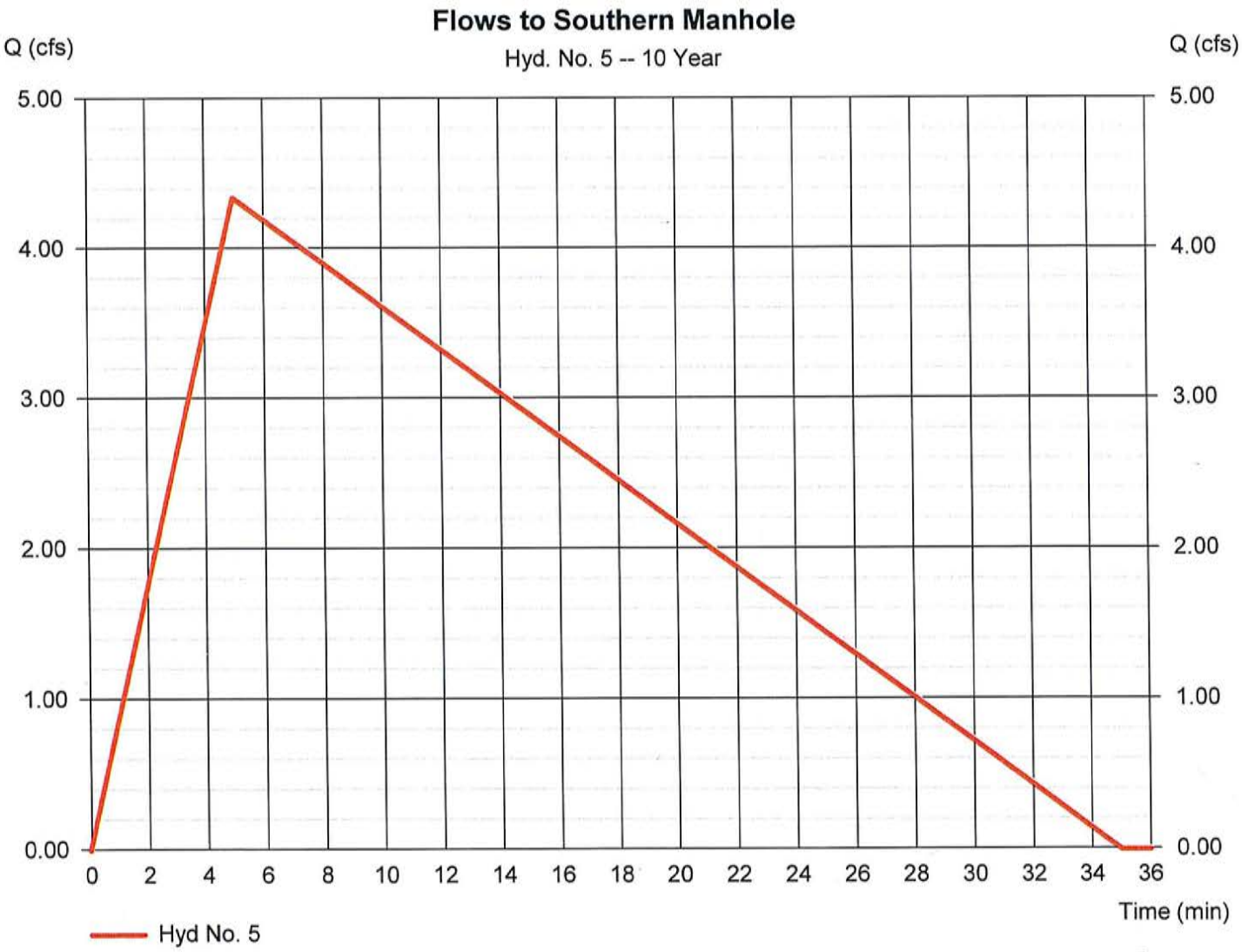


Hydrograph Report

Hyd. No. 5

Flows to Southern Manhole

Hydrograph type	= Rational	Peak discharge	= 4.342 cfs
Storm frequency	= 10 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 4,559 cuft
Drainage area	= 0.800 ac	Runoff coeff.	= 0.75
Intensity	= 7.237 in/hr	Tc by User	= 5.00 min
IDF Curve	= GSD-60 NOAA.IDF	Asc/Rec limb fact	= 1/6

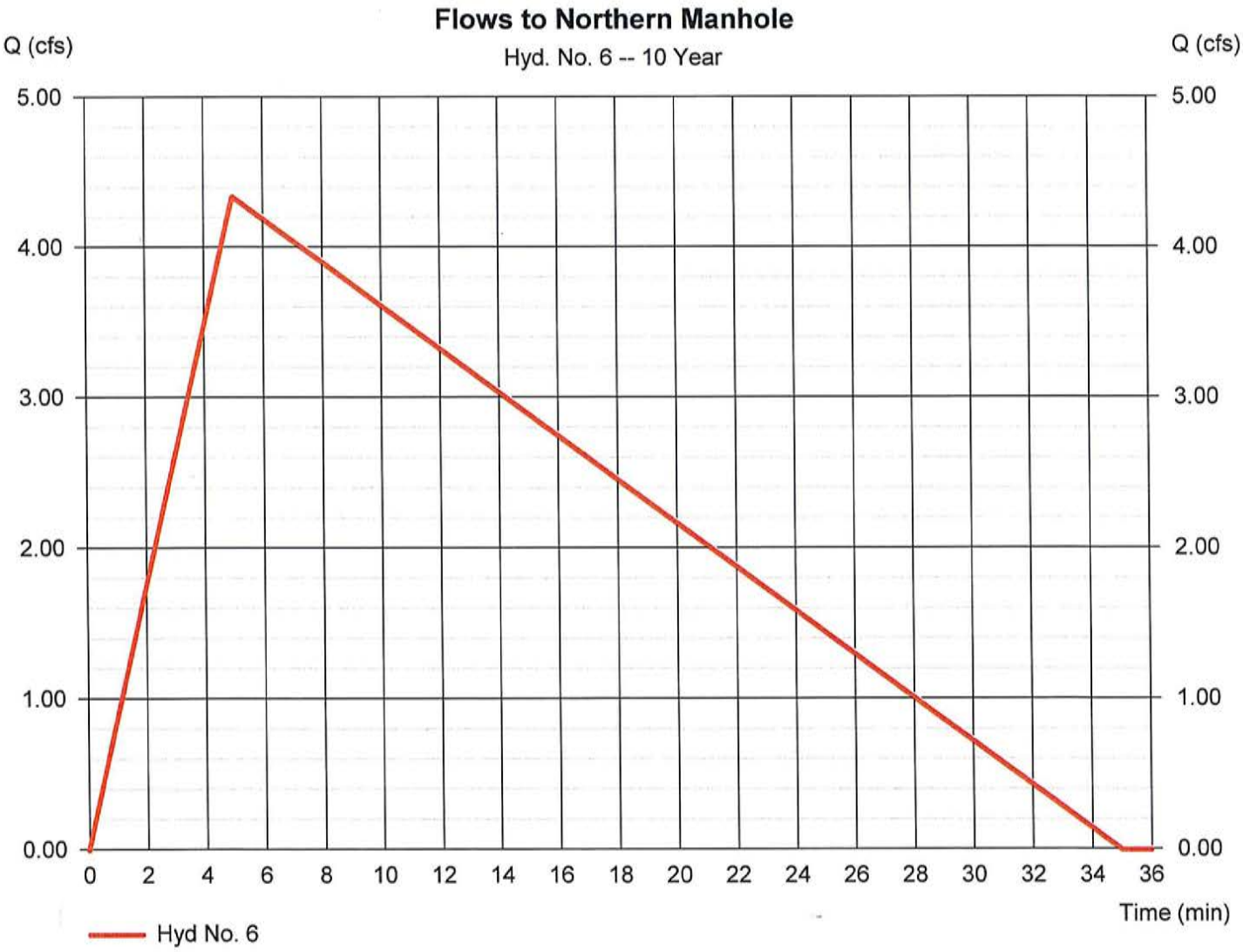


Hydrograph Report

Hyd. No. 6

Flows to Northern Manhole

Hydrograph type	= Rational	Peak discharge	= 4.342 cfs
Storm frequency	= 10 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 4,559 cuft
Drainage area	= 0.800 ac	Runoff coeff.	= 0.75
Intensity	= 7.237 in/hr	Tc by User	= 5.00 min
IDF Curve	= GSD-60 NOAA.IDF	Asc/Rec limb fact	= 1/6



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

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	8.059	1	729	28,119	------	------	------	Existing Area
2	SCS Runoff	10.72	1	728	39,890	------	------	------	Proposed Area
3	Reservoir	5.304	1	737	35,337	2	237.65	13,514	Water Quality Basin
5	Rational	5.227	1	5	5,489	------	------	------	Flows to Southern Manhole
6	Rational	5.227	1	5	5,489	------	------	------	Flows to Northern Manhole

Hydrograph Report

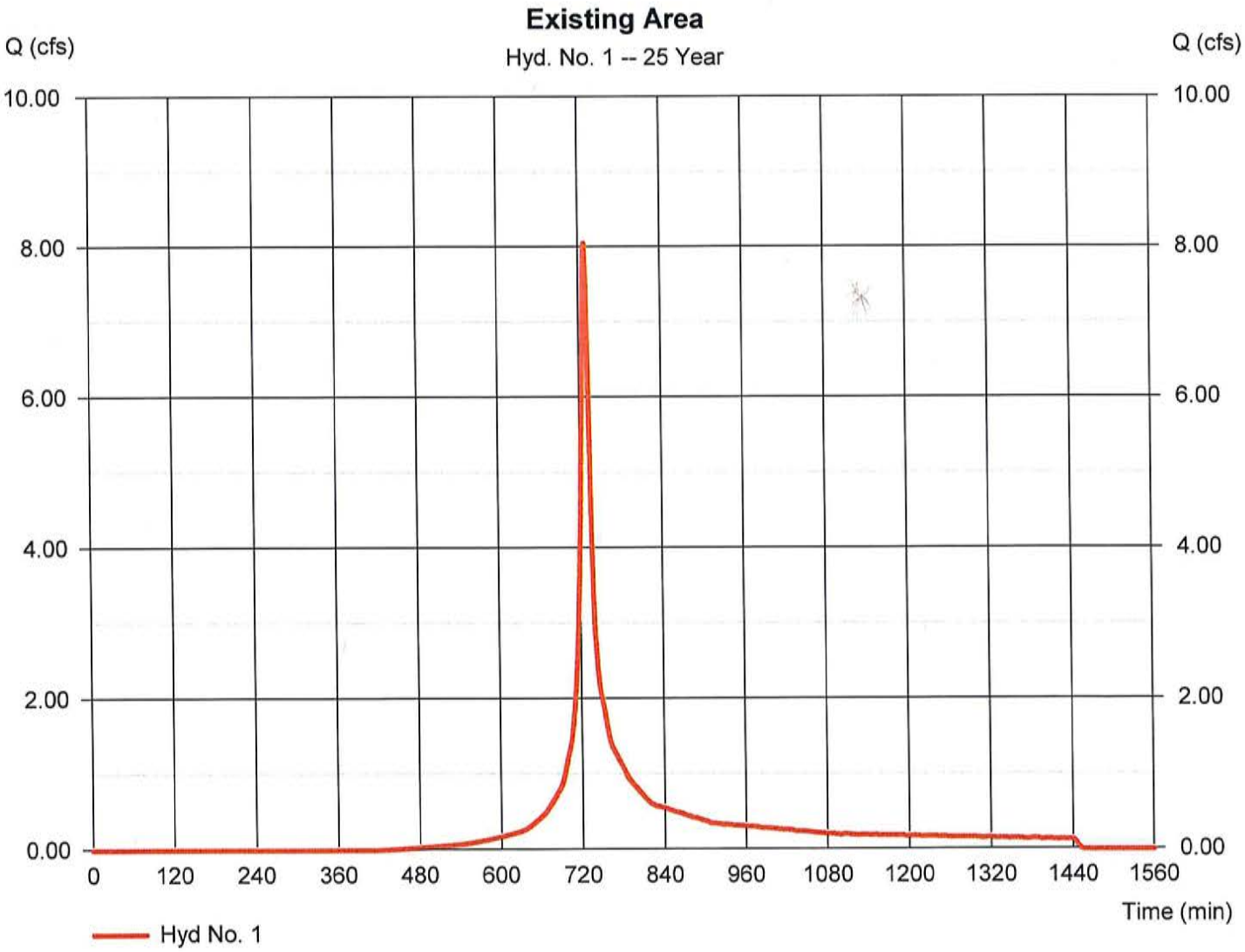
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025 — Thursday, 05 / 1 / 2025

Hyd. No. 1

Existing Area

Hydrograph type	= SCS Runoff	Peak discharge	= 8.059 cfs
Storm frequency	= 25 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 28,119 cuft
Drainage area	= 2.180 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.20 in	Distribution	= Custom
Storm duration	= NOAA Type D Distribution 1 rainfall	Shape factor	= 484

* Composite (Area/CN) = [(0.400 x 98) + (1.300 x 69)] / 2.180



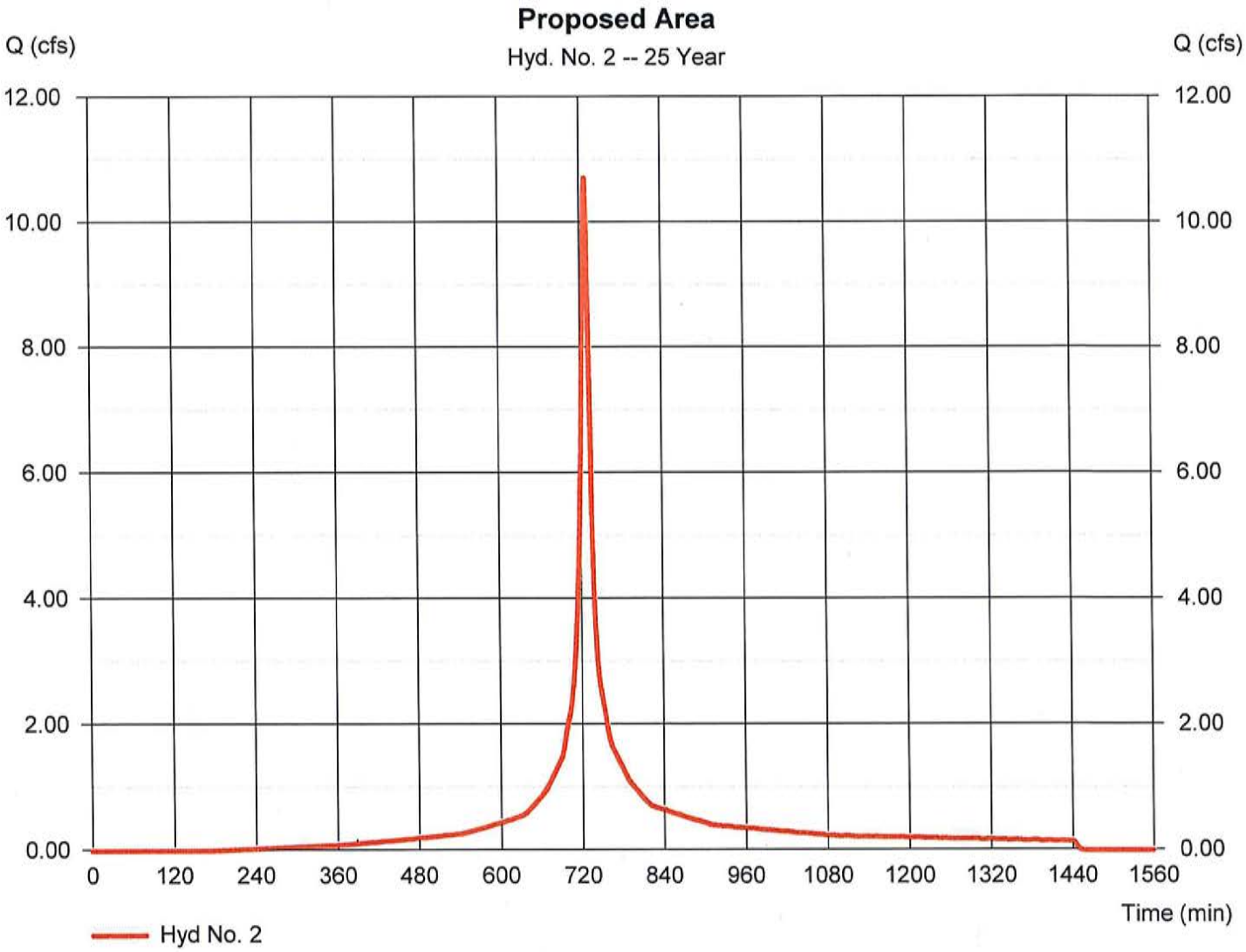
Hydrograph Report

Hyd. No. 2

Proposed Area

Hydrograph type	= SCS Runoff	Peak discharge	= 10.72 cfs
Storm frequency	= 25 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 39,890 cuft
Drainage area	= 2.180 ac	Curve number	= 90*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.20 in	Distribution	= Custom
Storm duration	= NOAA Type D Distribution 1 modified	Shape factor	= 484

* Composite (Area/CN) = [(1.600 x 98) + (0.580 x 69)] / 2.180



Hydrograph Report

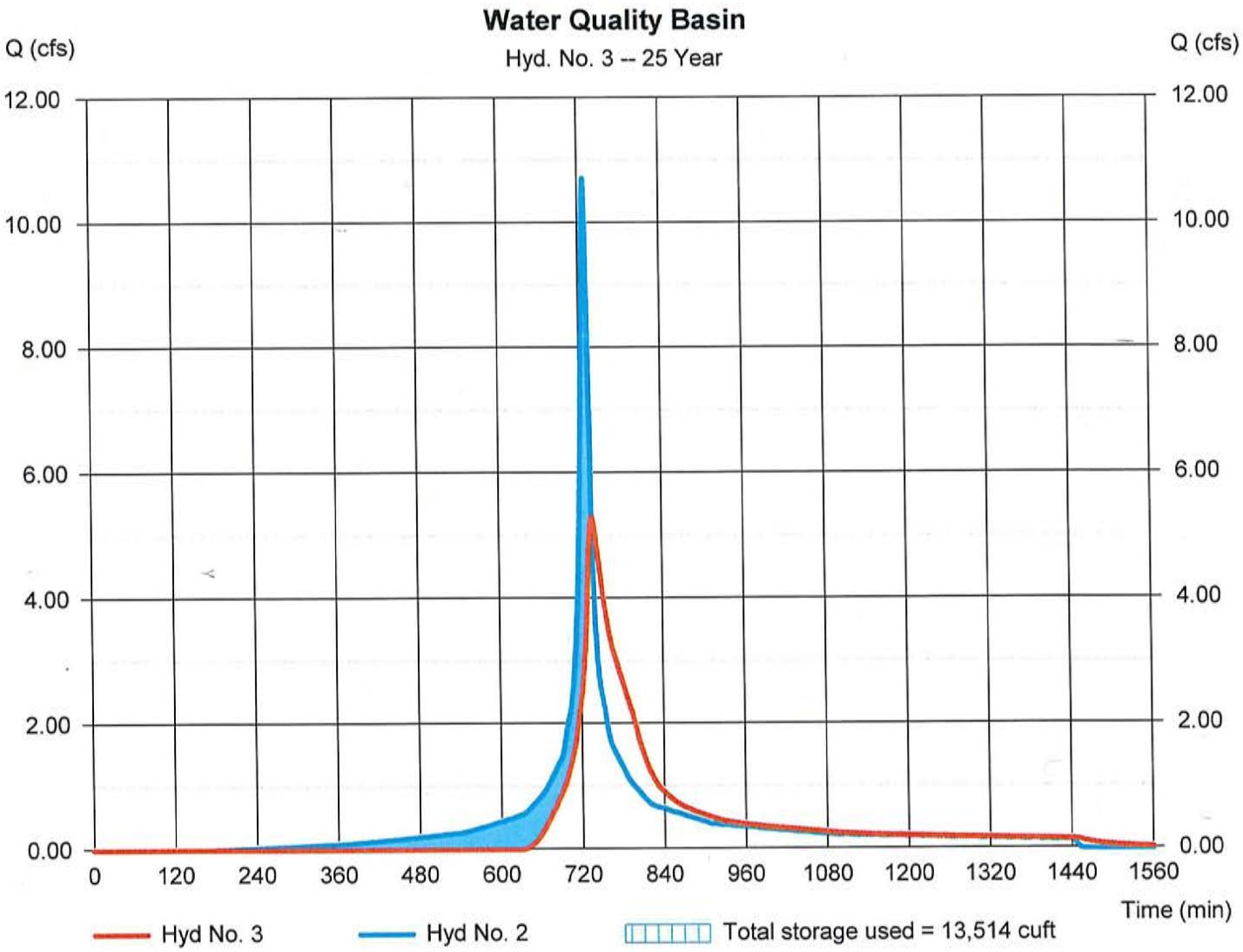
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025 — Thursday, 05 / 1 / 2025

Hyd. No. 3

Water Quality Basin

Hydrograph type	= Reservoir	Peak discharge	= 5.304 cfs
Storm frequency	= 25 yrs	Time to peak	= 737 min
Time interval	= 1 min	Hyd. volume	= 35,337 cuft
Inflow hyd. No.	= 2 - Proposed Area	Max. Elevation	= 237.65 ft
Reservoir name	= Pond 1	Max. Storage	= 13,514 cuft

Storage Indication method used.

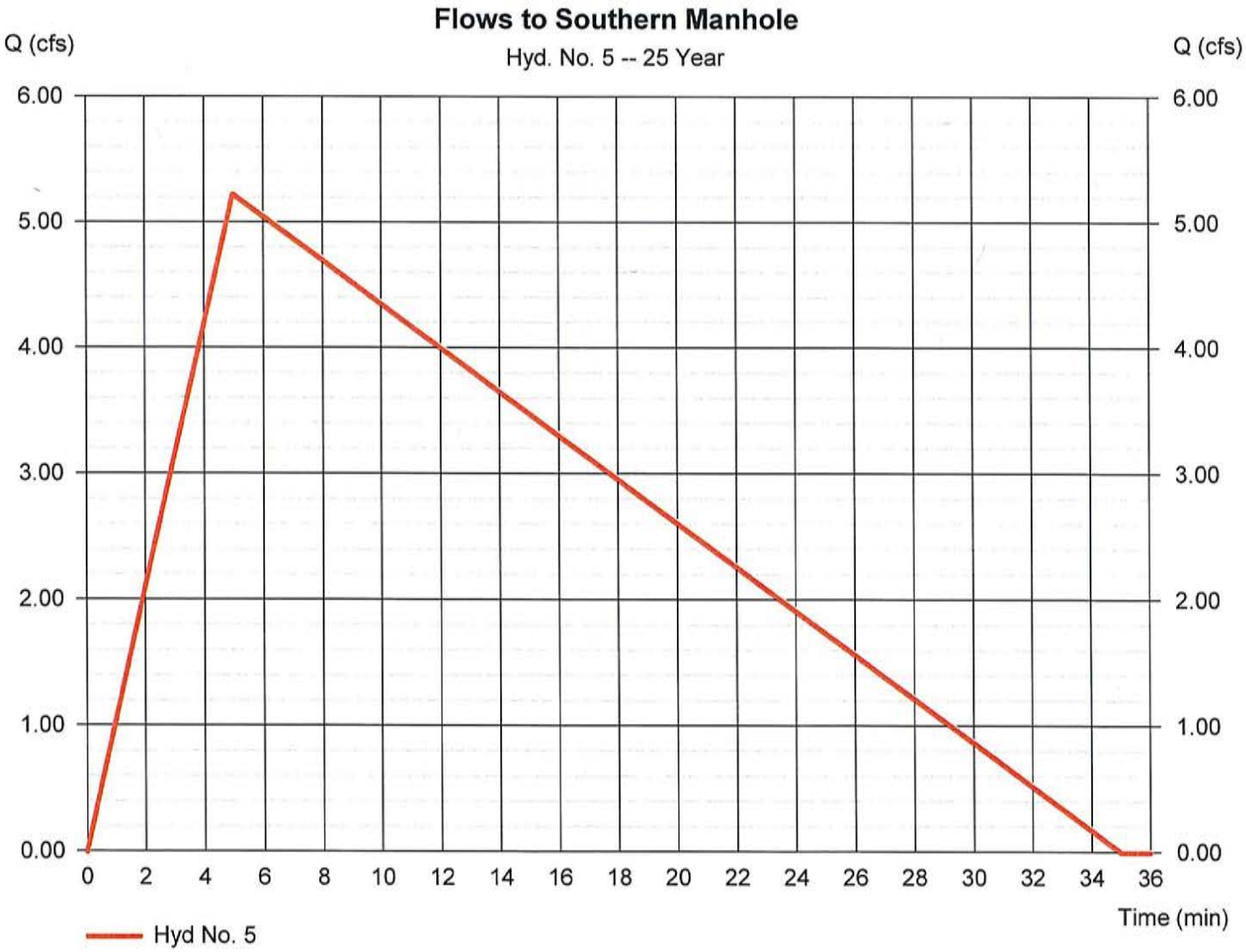


Hydrograph Report

Hyd. No. 5

Flows to Southern Manhole

Hydrograph type	= Rational	Peak discharge	= 5.227 cfs
Storm frequency	= 25 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 5,489 cuft
Drainage area	= 0.800 ac	Runoff coeff.	= 0.75
Intensity	= 8.712 in/hr	Tc by User	= 5.00 min
IDF Curve	= GSD-60 NOAA.IDF	Asc/Rec limb fact	= 1/6



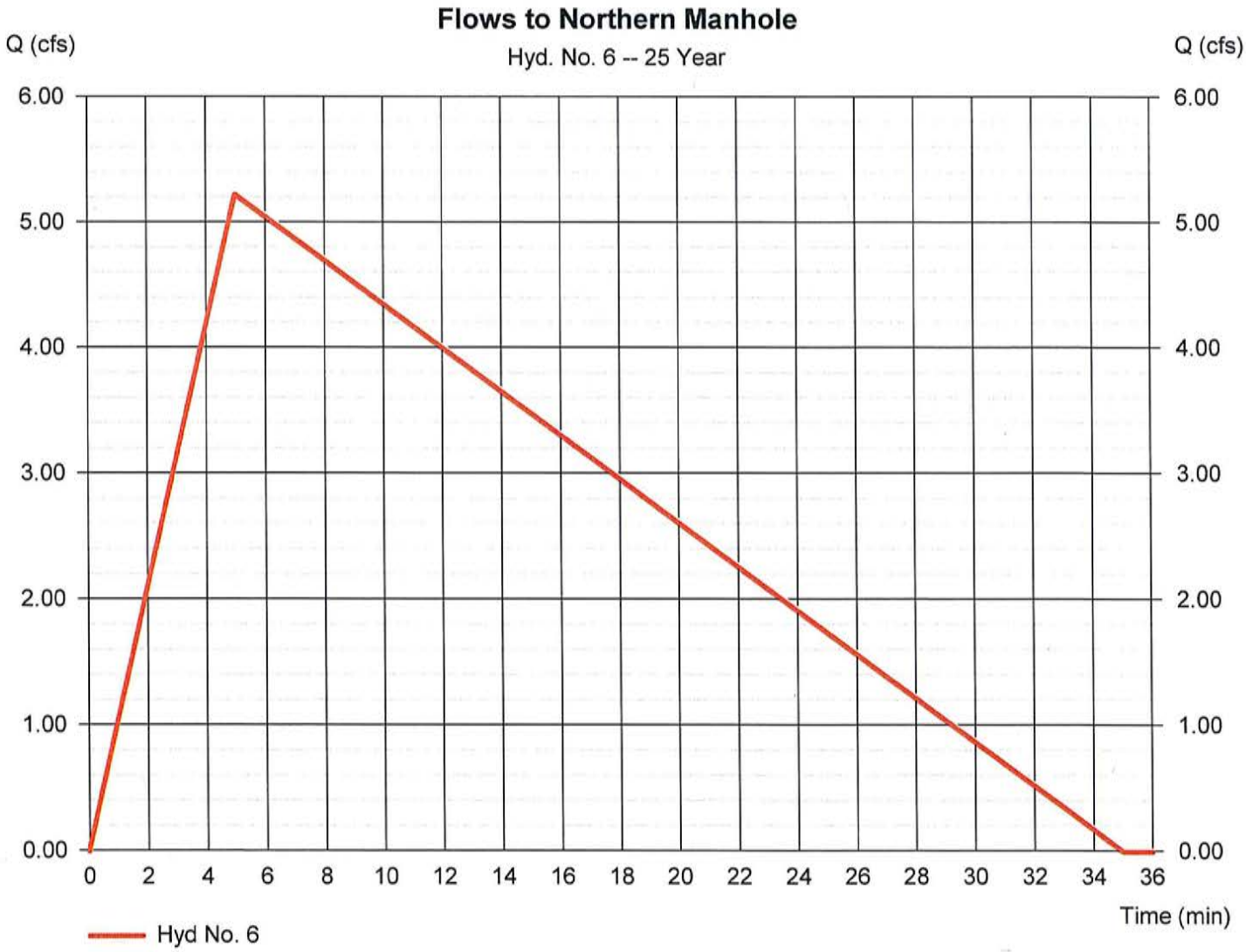
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025 Thursday, 05 / 1 / 2025

Hyd. No. 6

Flows to Northern Manhole

Hydrograph type	= Rational	Peak discharge	= 5.227 cfs
Storm frequency	= 25 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 5,489 cuft
Drainage area	= 0.800 ac	Runoff coeff.	= 0.75
Intensity	= 8.712 in/hr	Tc by User	= 5.00 min
IDF Curve	= GSD-60 NOAA.IDF	Asc/Rec limb fact	= 1/6



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

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	9.574	1	729	33,549	------	------	------	Existing Area
2	SCS Runoff	12.24	1	728	45,926	------	------	------	Proposed Area
3	Reservoir	6.292	1	737	41,373	2	237.88	14,624	Water Quality Basin
5	Rational	5.889	1	5	6,184	------	------	------	Flows to Southern Manhole
6	Rational	5.889	1	5	6,184	------	------	------	Flows to Northern Manhole

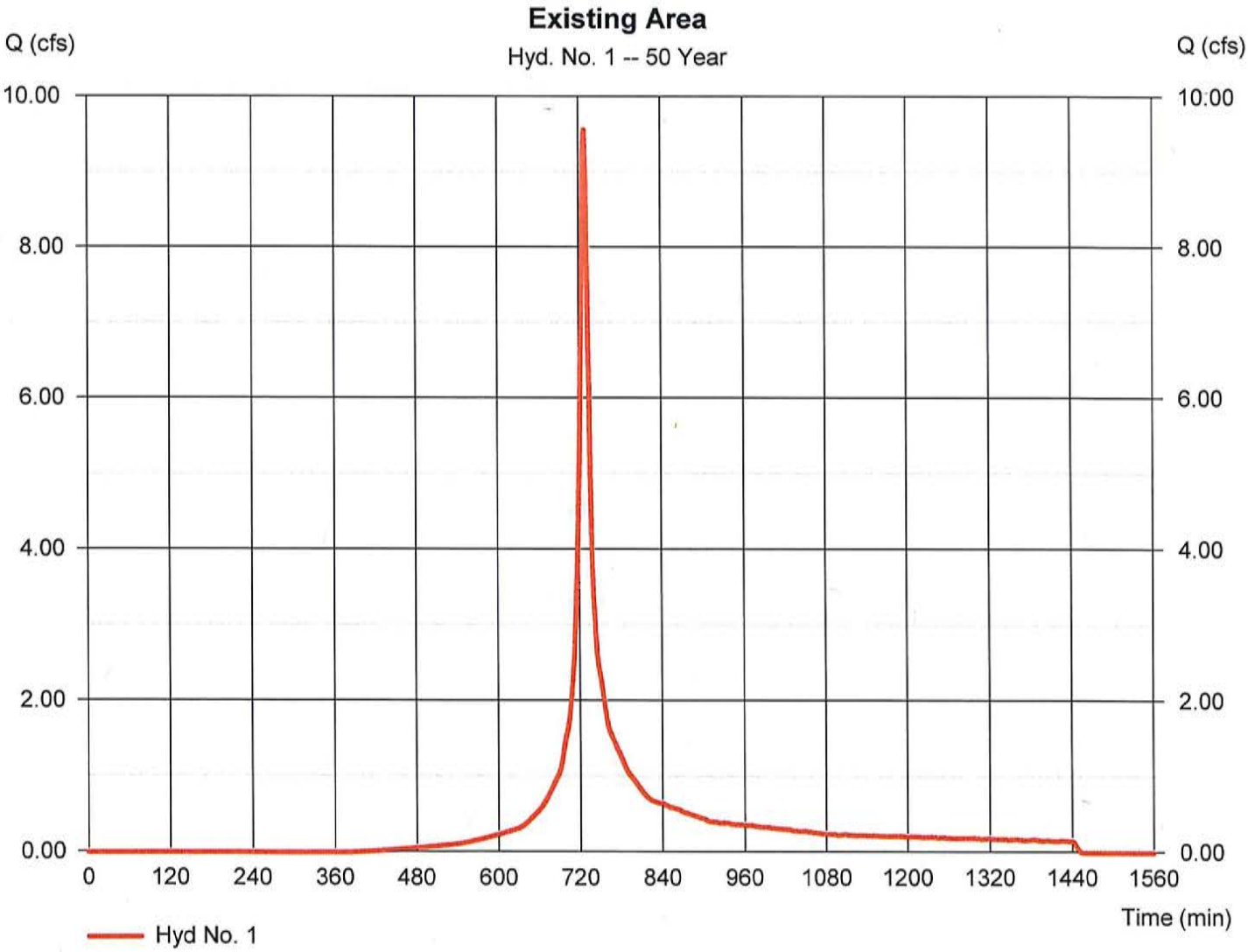
Hydrograph Report

Hyd. No. 1

Existing Area

Hydrograph type	= SCS Runoff	Peak discharge	= 9.574 cfs
Storm frequency	= 50 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 33,549 cuft
Drainage area	= 2.180 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.98 in	Distribution	= Custom
Storm duration	= NOAA Type D Distribution 1 rainfall	Shape factor	= 484

* Composite (Area/CN) = [(0.400 x 98) + (1.300 x 69)] / 2.180



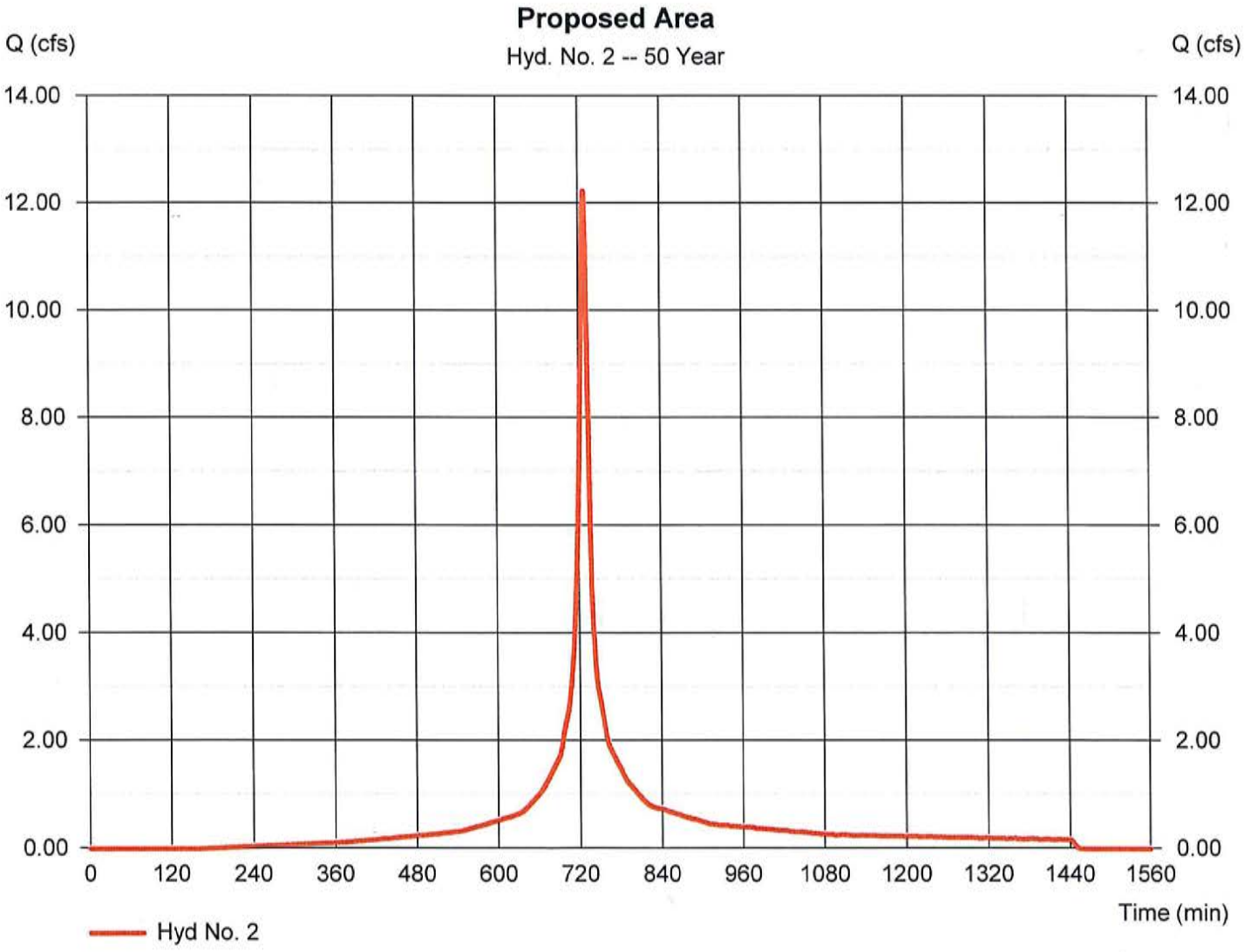
Hydrograph Report

Hyd. No. 2

Proposed Area

Hydrograph type	= SCS Runoff	Peak discharge	= 12.24 cfs
Storm frequency	= 50 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 45,926 cuft
Drainage area	= 2.180 ac	Curve number	= 90*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.98 in	Distribution	= Custom
Storm duration	= NOAA Type D Distribution 1 minutes	Shape factor	= 484

* Composite (Area/CN) = [(1.600 x 98) + (0.580 x 69)] / 2.180



Hydrograph Report

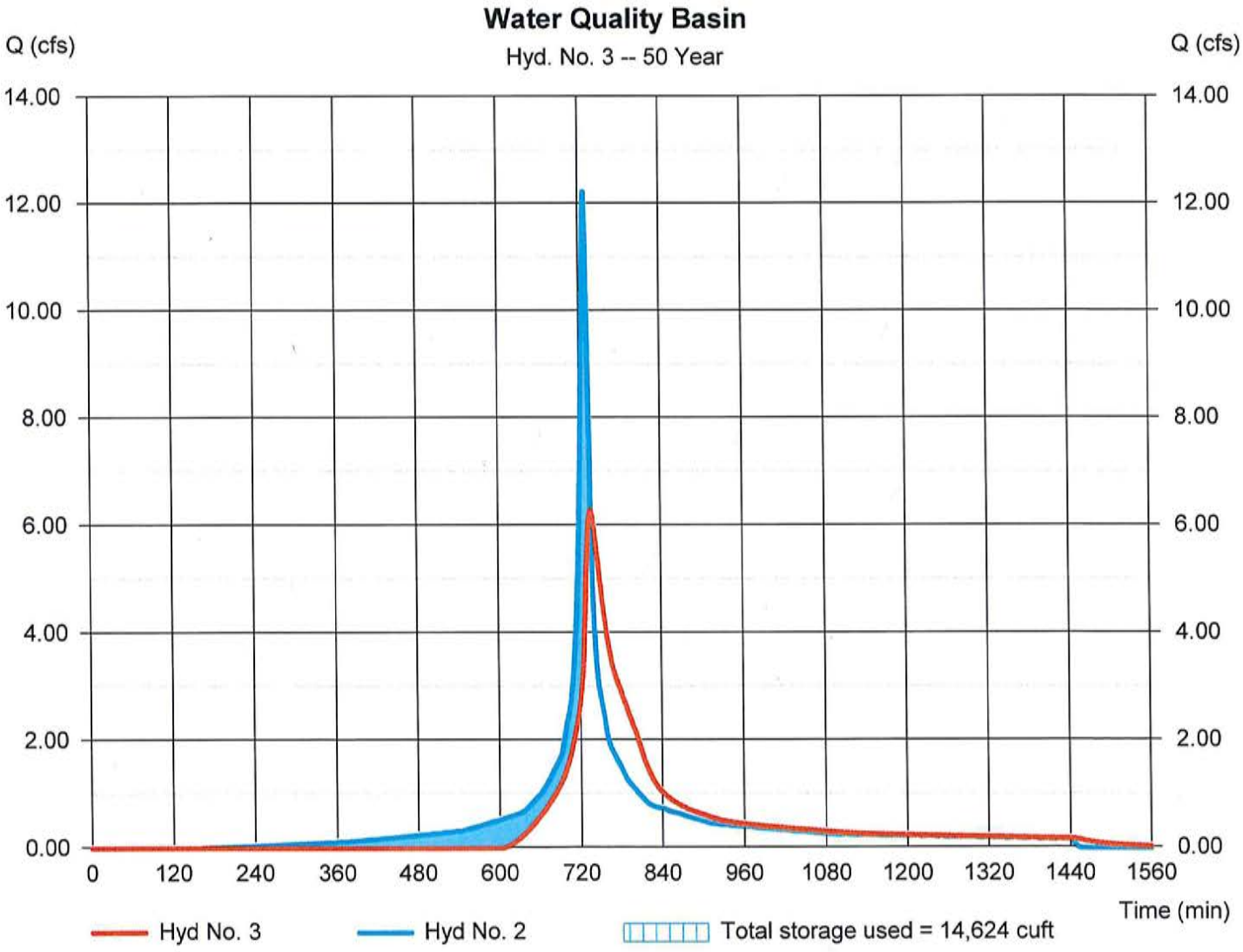
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025 Thursday, 05 / 1 / 2025

Hyd. No. 3

Water Quality Basin

Hydrograph type	= Reservoir	Peak discharge	= 6.292 cfs
Storm frequency	= 50 yrs	Time to peak	= 737 min
Time interval	= 1 min	Hyd. volume	= 41,373 cuft
Inflow hyd. No.	= 2 - Proposed Area	Max. Elevation	= 237.88 ft
Reservoir name	= Pond 1	Max. Storage	= 14,624 cuft

Storage Indication method used.



Hydrograph Report

Hyd. No. 5

Flows to Southern Manhole

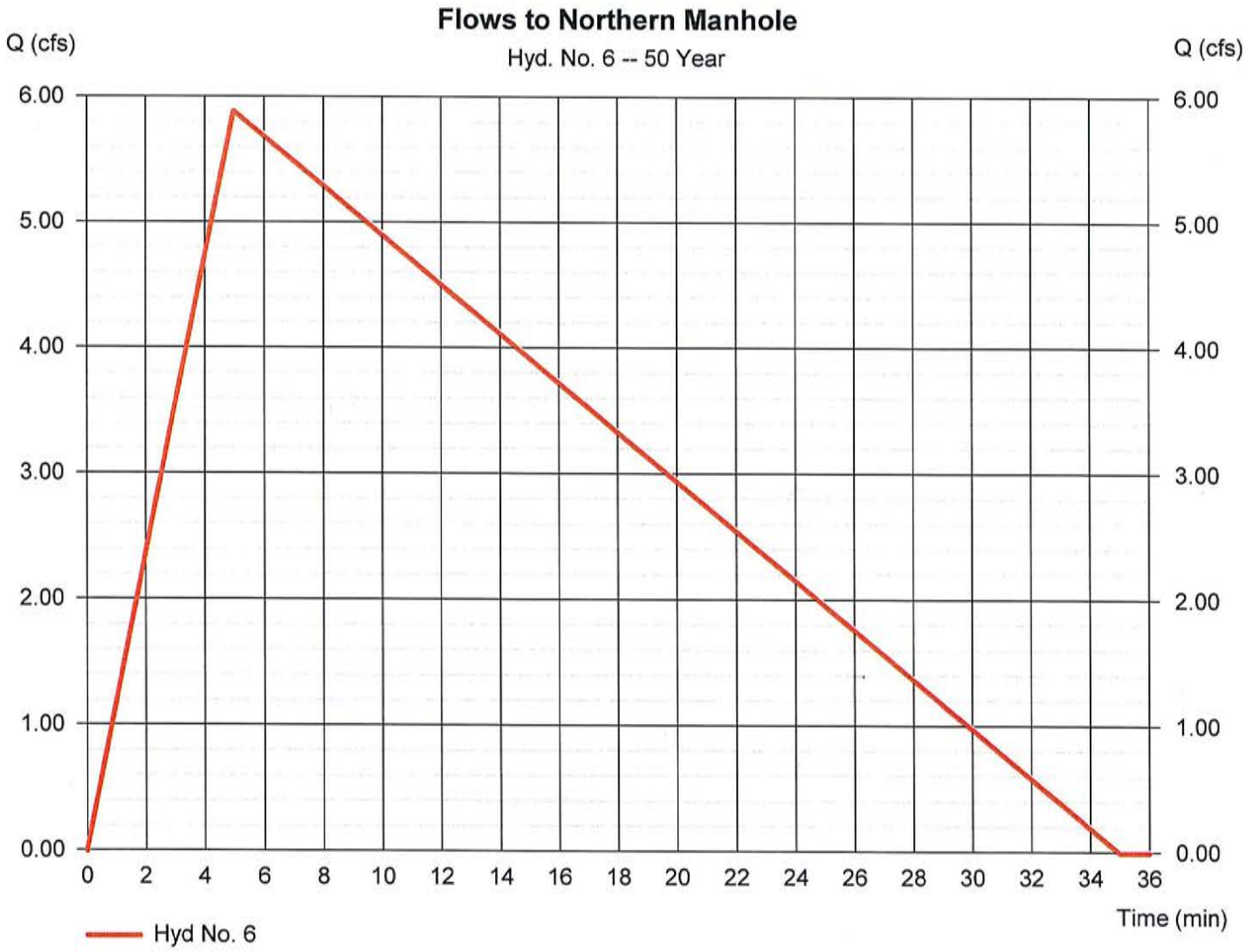
Hydrograph type	= Rational	Peak discharge	= 5.889 cfs
Storm frequency	= 50 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 6,184 cuft
Drainage area	= 0.800 ac	Runoff coeff.	= 0.75
Intensity	= 9.816 in/hr	Tc by User	= 5.00 min
IDF Curve	= GSD-60 NOAA.IDF	Asc/Rec limb fact	= 1/6

Hydrograph Report

Hyd. No. 6

Flows to Northern Manhole

Hydrograph type	= Rational	Peak discharge	= 5.889 cfs
Storm frequency	= 50 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 6,184 cuft
Drainage area	= 0.800 ac	Runoff coeff.	= 0.75
Intensity	= 9.816 in/hr	Tc by User	= 5.00 min
IDF Curve	= GSD-60 NOAA.IDF	Asc/Rec limb fact	= 1/6



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

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	11.22	1	729	39,523	------	------	------	Existing Area
2	SCS Runoff	13.87	1	728	52,453	------	------	------	Proposed Area
3	Reservoir	7.107	1	737	47,901	2	238.12	15,845	Water Quality Basin
5	Rational	6.600	1	5	6,930	------	------	------	Flows to Southern Manhole
6	Rational	6.600	1	5	6,930	------	------	------	Flows to Northern Manhole

Hydrograph Report

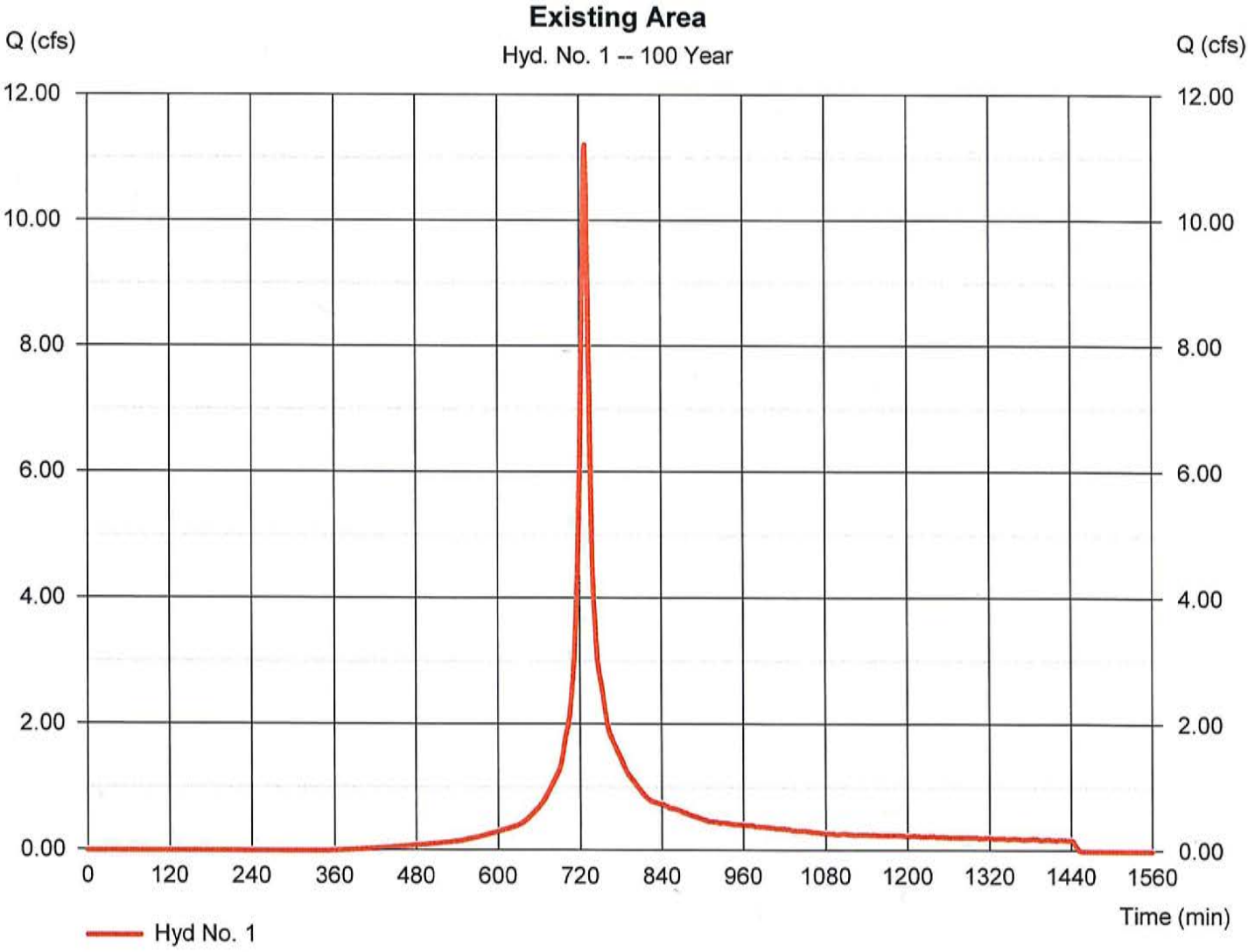
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025 Thursday, 05 / 1 / 2025

Hyd. No. 1

Existing Area

Hydrograph type	= SCS Runoff	Peak discharge	= 11.22 cfs
Storm frequency	= 100 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 39,523 cuft
Drainage area	= 2.180 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 7.82 in	Distribution	= Custom
Storm duration	= NOAA Type D Distribution 1 rainfall	Shape factor	= 484

* Composite (Area/CN) = [(0.400 x 98) + (1.300 x 69)] / 2.180



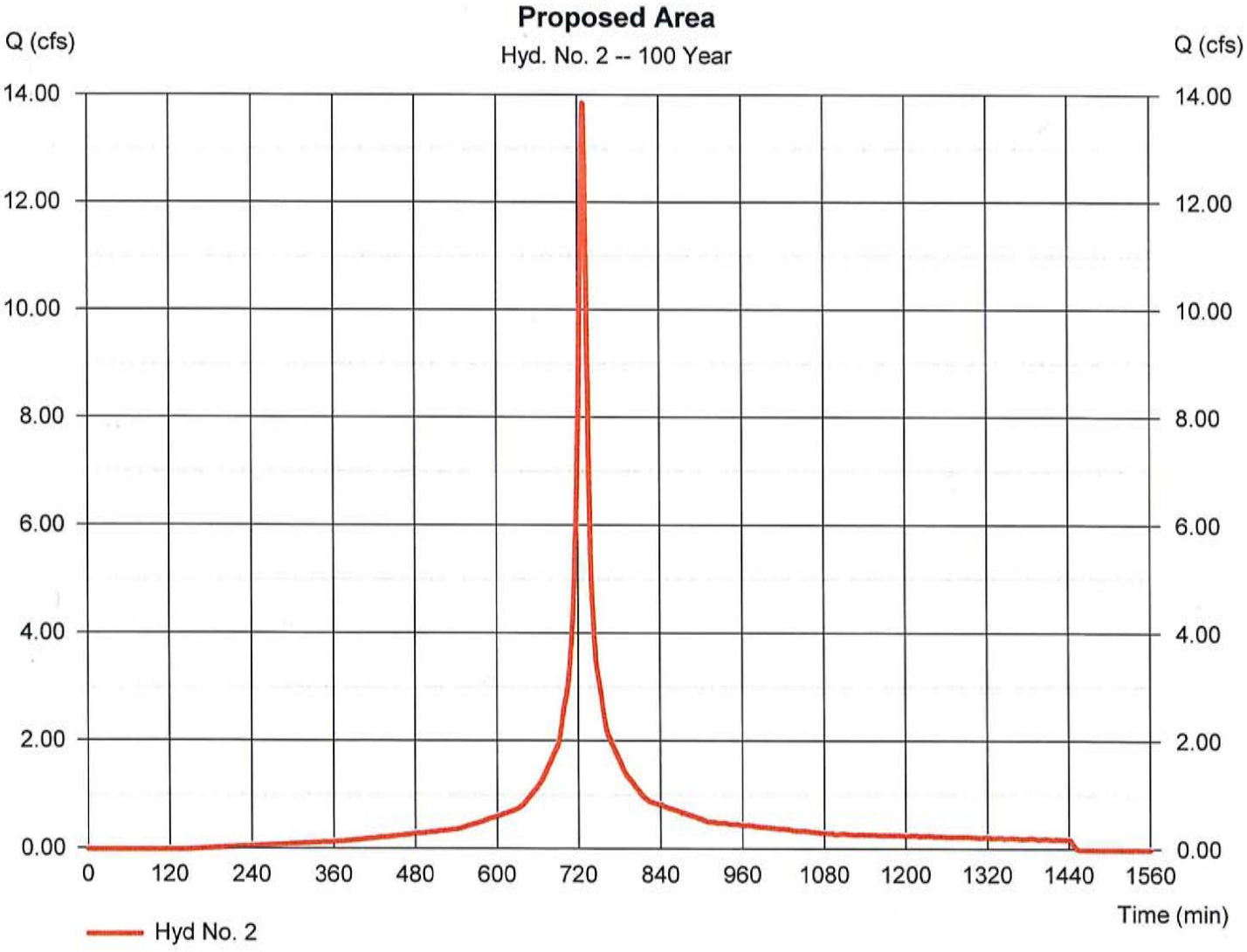
Hydrograph Report

Hyd. No. 2

Proposed Area

Hydrograph type	= SCS Runoff	Peak discharge	= 13.87 cfs
Storm frequency	= 100 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 52,453 cuft
Drainage area	= 2.180 ac	Curve number	= 90*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 7.82 in	Distribution	= Custom
Storm duration	= NOAA Type D Distribution 1 rainfalls	Shape factor	= 484

* Composite (Area/CN) = [(1.600 x 98) + (0.580 x 69)] / 2.180



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

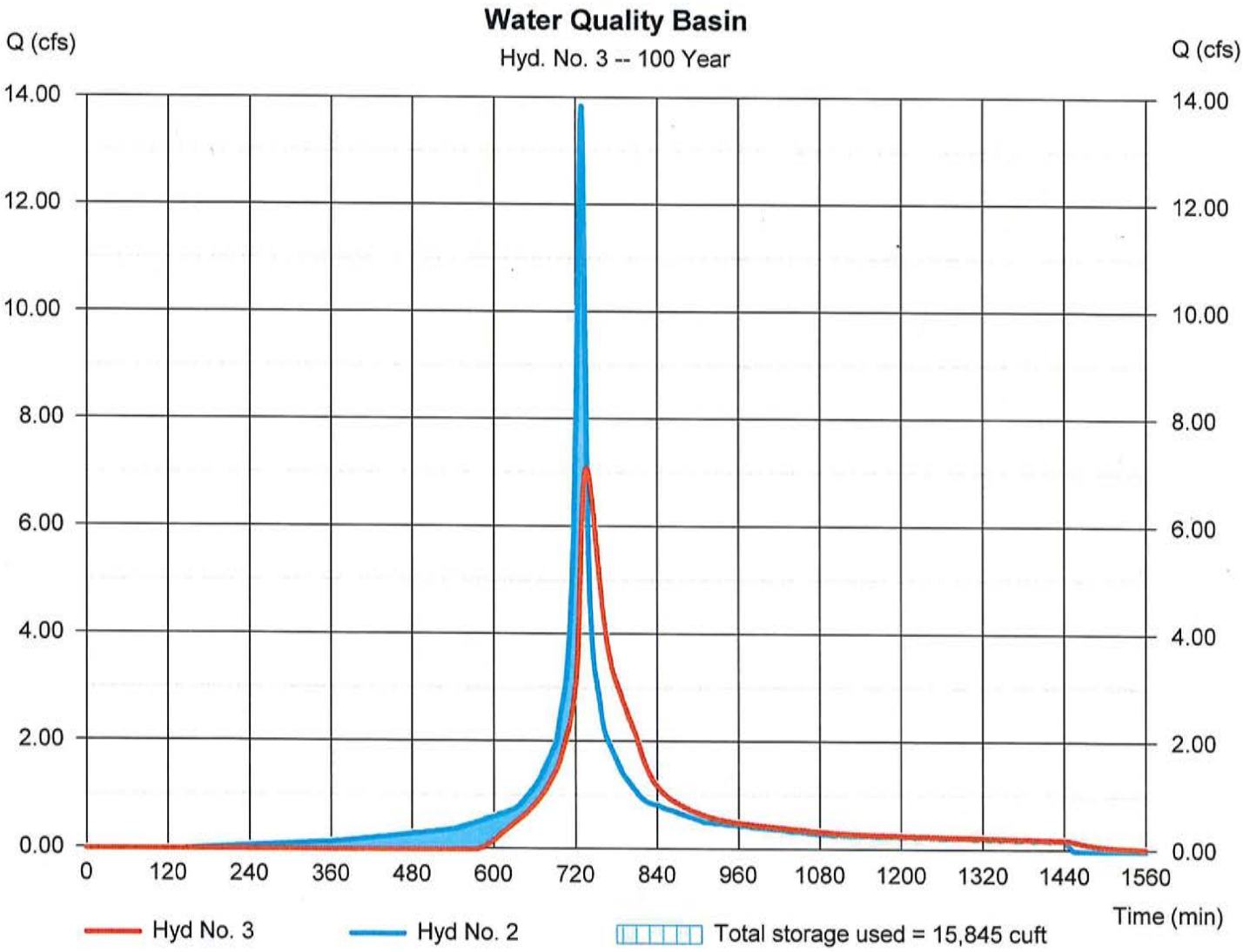
Thursday, 05 / 1 / 2025

Hyd. No. 3

Water Quality Basin

Hydrograph type	= Reservoir	Peak discharge	= 7.107 cfs
Storm frequency	= 100 yrs	Time to peak	= 737 min
Time interval	= 1 min	Hyd. volume	= 47,901 cuft
Inflow hyd. No.	= 2 - Proposed Area	Max. Elevation	= 238.12 ft
Reservoir name	= Pond 1	Max. Storage	= 15,845 cuft

Storage Indication method used.



Hydrograph Report

Hyd. No. 5

Flows to Southern Manhole

Hydrograph type	= Rational	Peak discharge	= 6.600 cfs
Storm frequency	= 100 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 6,930 cuft
Drainage area	= 0.800 ac	Runoff coeff.	= 0.75
Intensity	= 10.999 in/hr	Tc by User	= 5.00 min
IDF Curve	= GSD-60 NOAA.IDF	Asc/Rec limb fact	= 1/6

Hydrograph Report

Hyd. No. 6

Flows to Northern Manhole

Hydrograph type	= Rational	Peak discharge	= 6.600 cfs
Storm frequency	= 100 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 6,930 cuft
Drainage area	= 0.800 ac	Runoff coeff.	= 0.75
Intensity	= 10.999 in/hr	Tc by User	= 5.00 min
IDF Curve	= GSD-60 NOAA.IDF	Asc/Rec limb fact	= 1/6

Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025 — Wednesday, 04 / 30 / 2025

Pond No. 1 - Pond 1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 234.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	234.00	2,475	0	0
0.50	234.50	2,840	1,328	1,328
1.00	235.00	3,205	1,510	2,838
1.50	235.50	3,570	1,693	4,531
2.00	236.00	3,810	1,844	6,375
2.50	236.50	4,113	1,980	8,355
3.00	237.00	4,416	2,132	10,487
3.50	237.50	4,719	2,283	12,770
4.00	238.00	5,025	2,435	15,205
4.50	238.50	5,333	2,589	17,794
5.00	239.00	5,642	2,743	20,537
5.50	239.50	5,951	2,898	23,435
6.00	240.00	6,263	3,053	26,488

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	12.00	12.00	0.00
Span (in)	= 18.00	12.00	12.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 235.50	235.50	237.00	0.00
Length (ft)	= 150.00	1.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

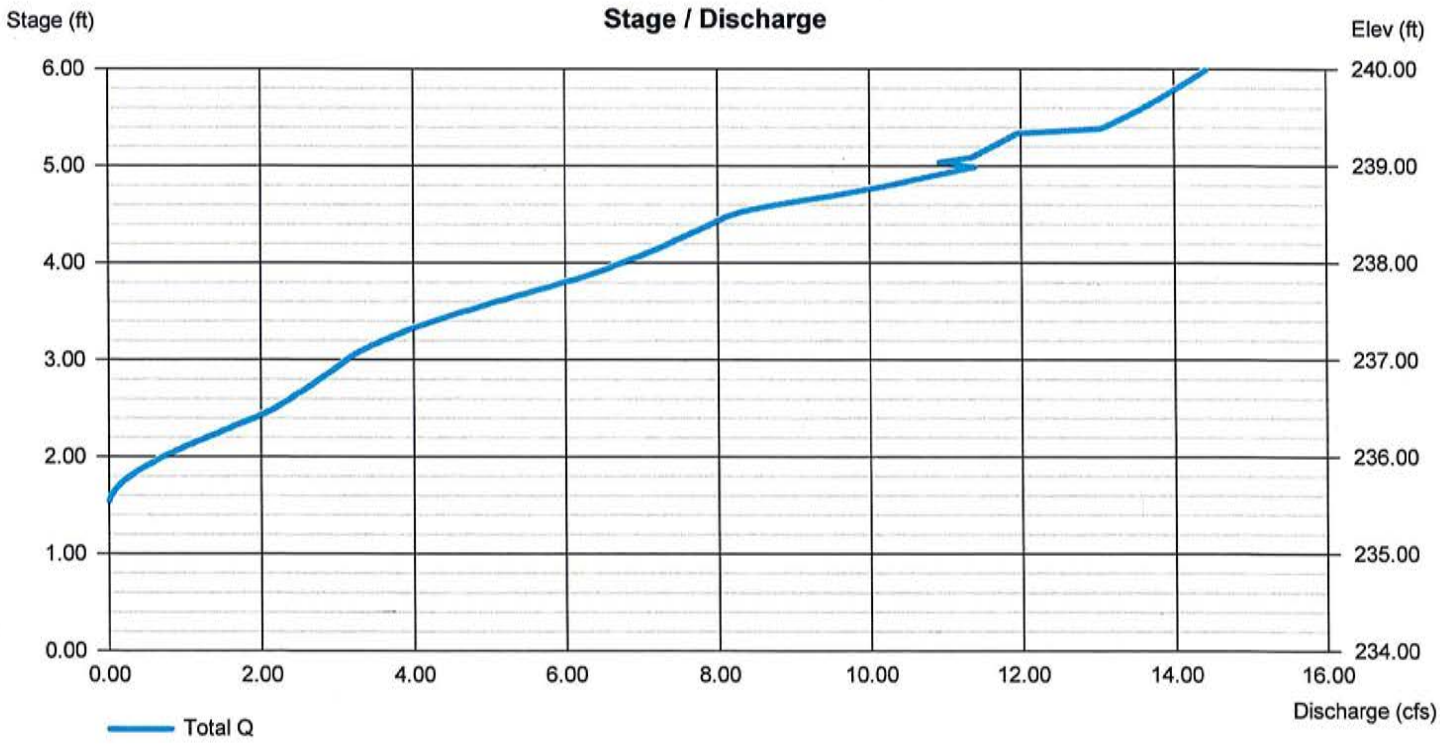
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.00	0.00	0.00	0.00
Crest El. (ft)	= 238.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

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

TW Elev. (ft) = 0.00

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



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Apr 30 2025

Rip Rap Level Spreader at Butlertown Road

Trapezoidal

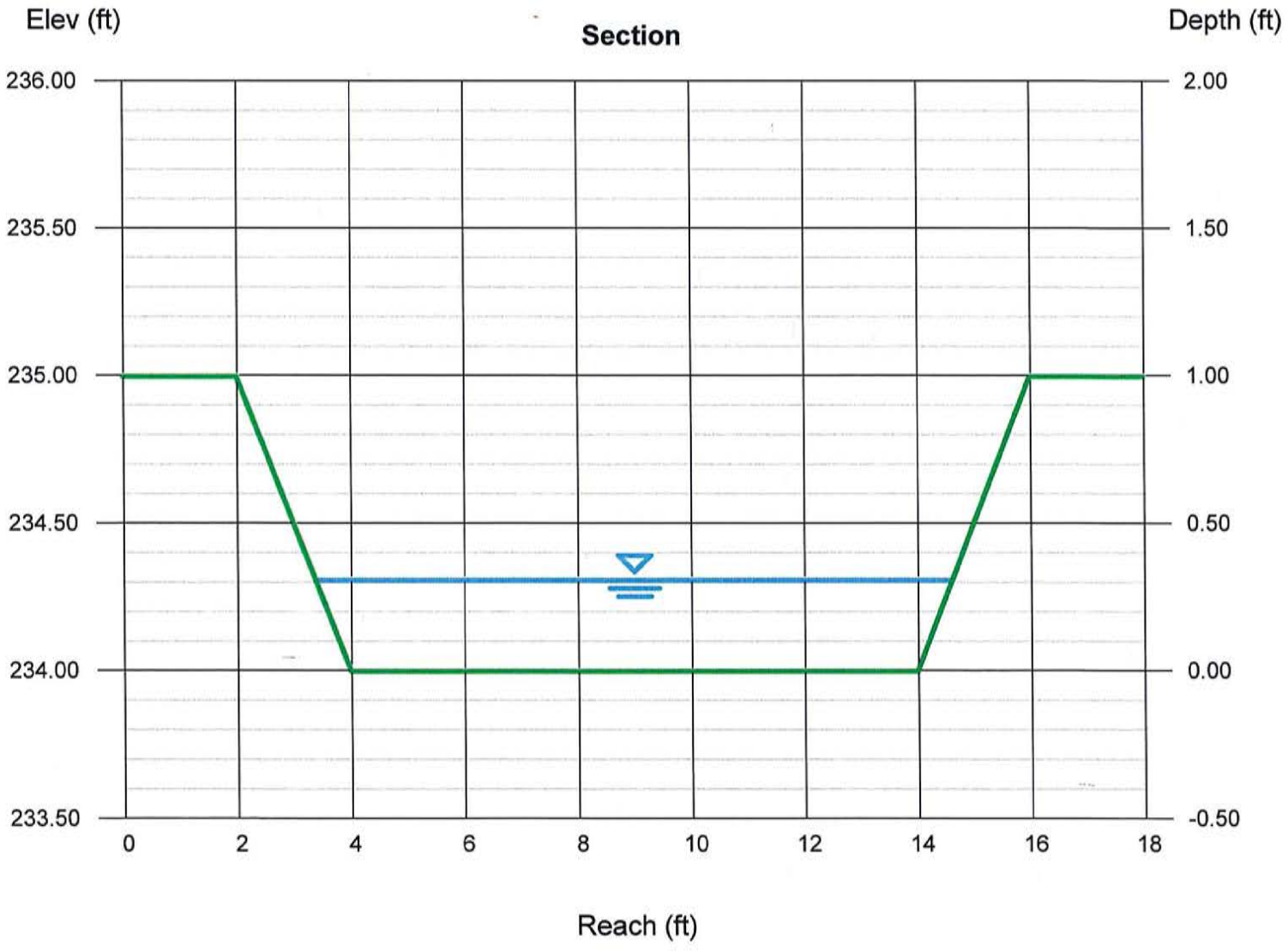
Bottom Width (ft)	= 10.00
Side Slopes (z:1)	= 2.00, 2.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 234.00
Slope (%)	= 1.00
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 5.30

Highlighted

Depth (ft)	= 0.31
Q (cfs)	= 5.300
Area (sqft)	= 3.29
Velocity (ft/s)	= 1.61
Wetted Perim (ft)	= 11.39
Crit Depth, Yc (ft)	= 0.21
Top Width (ft)	= 11.24
EGL (ft)	= 0.35



CLA ENGINEERS, INC.
Civil • Structural • Survey
317 Main Street
NORWICH, CONNECTICUT 06360
(860) 886-1966
FAX 886-9165

PROJECT NAME: _____

PROJECT NO: _____ SHEET NO. _____ OF _____

BY: _____ DATE _____

SCALE: _____

RIPRAP SPLASH PAD INTO WATER QUALITY BASIN:

$Q_{25} = 10.72$ CFS

$$L = \frac{1.7Q}{D^{3/2}} + 8D = \frac{1.7(10.72)}{1.5^{3/2}} + 8(1.5) = 22 \text{ LF}$$

$$W = 3D + 0.4L = 13.3 \text{ FT}$$

$$d_{50} = \left(\frac{0.02}{TW}\right)\left(\frac{Q}{D}\right)^{4/3} = \left(\frac{0.02}{0.5(1.5)}\right)\left(\frac{10.72}{1.5}\right)^{4/3} = 0.37 \text{ FT}$$

$$= 4.44 \text{ INCH}$$

USE INTERMEDIATE RIPRAP

Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, May 1 2025

Flow from Manhole to Oil Separator - 2 year storm event

Invert Elev Dn (ft)	= 231.90
Pipe Length (ft)	= 4.00
Slope (%)	= 3.00
Invert Elev Up (ft)	= 232.02
Rise (in)	= 12.0
Shape	= Circular
Span (in)	= 12.0
No. Barrels	= 1
n-Value	= 0.012
Culvert Type	= Circular Concrete
Culvert Entrance	= Square edge w/headwall (C)
Coeff. K,M,c,Y,k	= 0.0098, 2, 0.0398, 0.67, 0.5

Embankment

Top Elevation (ft)	= 239.50
Top Width (ft)	= 3.00
Crest Width (ft)	= 0.00

Calculations

Qmin (cfs)	= 2.90
Qmax (cfs)	= 2.90
Tailwater Elev (ft)	= (dc+D)/2

Highlighted

Qtotal (cfs)	= 2.90
Qpipe (cfs)	= 2.90
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 4.02
Veloc Up (ft/s)	= 4.72
HGL Dn (ft)	= 232.76
HGL Up (ft)	= 232.75
Hw Elev (ft)	= 233.22
Hw/D (ft)	= 1.20
Flow Regime	= Inlet Control