MIDLAND ROAD SUBDIVISION

BRYANT, AR

DRAINAGE REPORT

FOR
City of Bryant, Saline County, AR

April 2023

Owner & Developer: HAVEN'S DEVELOPMENT, LLC
Address: 2615 N. Prickett Road, Suite 5, Bryant AR 72022

By:

HOPE
CONSULTING
ENGINEERS • SURVEYORS

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Narrative & Summary

PROJECT TITLE

Midland Road Subdivision

PROJECT PROPERTY OWNER

Havens Development, LLC

Address: 2615 N. Prickett Road, Suite 5, Bryant AR 72022

PROJECT LOCATION

Midland Road, Bryant, AR

PROJECT DESCRIPTION

The proposed sub divisional development is on Midland Road, Bryant, AR 72002. Total development site area is 49.13 acres.

DRAINAGE ANALYSIS

On Site Drainage- Rational method was used to determine the existing and proposed flows from proposed site. There will be three detention ponds to detain water from this development. Detailed drainage calculations considering the future expected development has been conducted to determine the required detention pond and culvert dimensions. Summary of the calculations are below:

North-West Detention Pond

- Pond is situated on the north-west side of the property.
- Pre-development area 23.93 acres.
- Post-development area 29.93 acres.
- Pre-development runoff coefficient Area-1 0.47.
- Post-development runoff coefficient Area- 0.67.
- Pond has a bottom area of 0.24 acres with bottom elevation of 358.00'.
- One 36'' RCP with 0.5% slope is proposed for outflow culverts.

Peak flows for Pre and post development phase of onsite area have been tabulated below-

	Pre-development	Post-dev. Without detention	Post-dev. With detention
	Peak Flow (cfs)	Peak Flow (cfs)	Peak Flow (cfs)
2-Year	39.37	71.11	28.79
5-Year	43.42	79.06	32.35
10-Year	51.95	91.38	37.12
25-Year	59.77	104.47	41.61
50-Year	68.17	118.84	44.71
100-Year	72.76	126.02	46.70

South-West Detention Pond

- Pond is situated on the north-east side of the property.
- Pre-development area 15.44 acres.
- Post-development area 15.44 acres.
- Pre-development runoff coefficient 0.47.
- Post-development runoff coefficient 0.67.
- Pond has a bottom area of 0.15 acres with bottom elevation of 350.50'.
- One 24'' RCP with 0.5% slope is proposed for outflow culverts.

Peak flows for Pre and post development phase of onsite area have been tabulated below-

	Pre-development	Post-dev. Without detention	Post-dev. With detention
	Peak Flow (cfs)	Peak Flow (cfs)	Peak Flow (cfs)
2-Year	27.54	51.22	12.42
5-Year	30.41	57.50	13.85
10-Year	36.00	65.13	15.14
25-Year	41.33	74.24	21.08
50-Year	47.13	84.11	29.93
100-Year	50.16	89.52	33.52

South-East Detention Pond

- Pond is situated on the south-east side of the property.
- Pre-development area 23.57 acres.
- Post-development area 23.57 acres.
- Pre-development runoff coefficient 0.47.
- Post-development runoff coefficient 0.53.
- Pond has a bottom area of 0.15 acres with bottom elevation of 346.50'.
- Two 24'' RCP with 0.5% slope is proposed for outflow culverts.

Peak flows for Pre and post development phase of onsite area have been tabulated below-

	Pre-development	Post-dev. Without detention	Post-dev. With detention
	Peak Flow (cfs)	Peak Flow (cfs)	Peak Flow (cfs)
2-Year	36.03	40.63	31.29
5-Year	39.74	44.82	34.49
10-Year	47.96	54.08	41.03
25-Year	55.30	62.36	46.37
50-Year	63.03	71.07	50.53
100-Year	67.50	76.12	53.00

CONCLUSION

From the onsite drainage calculation, it is seen that there is decrease in flow for all storm events due to the proposed detention ponds.

Hydrograph Summary Report

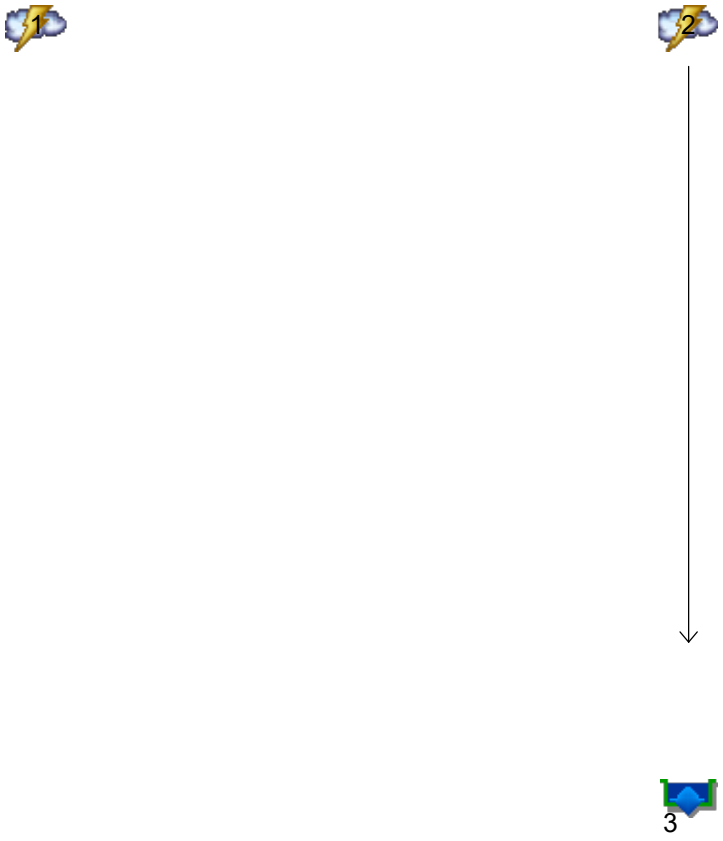
NORTHWEST POND

SOUTHWEST POND

SOUTHEAST POND

SOUTHWEST POND

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	Rational	Pre. Development
2	Rational	Post Development
3	Reservoir	Pond

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

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	Rational	27.54	1	17	28,095	------	------	------	Pre. Development
2	Rational	51.22	1	9	27,659	------	------	------	Post Development
3	Reservoir	12.42	1	16	24,253	2	353.22	21,932	Pond

Hydrograph Report

Hyd. No. 1

Pre. Development

Hydrograph type	=	Rational	Peak discharge	=	27.54 cfs
Storm frequency	=	2 yrs	Time to peak	=	0.28 hrs
Time interval	=	1 min	Hyd. volume	=	28,095 cuft
Drainage area	=	15.440 ac	Runoff coeff.	=	0.47
Intensity	=	3.796 in/hr	Tc by User	=	17.00 min
IDF Curve	=	Bryant 50.IDF	Asc/Rec limb fact	=	1/1



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

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	Rational	30.41	1	17	31,020	------	------	------	Pre. Development
2	Rational	57.50	1	9	31,050	------	------	------	Post Development
3	Reservoir	13.85	1	16	27,645	2	353.48	24,474	Pond

Hydrograph Report

Hyd. No. 1

Pre. Development

Hydrograph type	=	Rational	Peak discharge	=	30.41 cfs
Storm frequency	=	5 yrs	Time to peak	=	0.28 hrs
Time interval	=	1 min	Hyd. volume	=	31,020 cuft
Drainage area	=	15.440 ac	Runoff coeff.	=	0.47
Intensity	=	4.191 in/hr	Tc by User	=	17.00 min
IDF Curve	=	Bryant 50.IDF	Asc/Rec limb fact	=	1/1



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

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	Rational	36.00	1	17	36,718	------	------	------	Pre. Development
2	Rational	65.13	1	9	35,168	------	------	------	Post Development
3	Reservoir	15.14	1	16	31,762	2	353.79	27,663	Pond

Hydrograph Report

Hyd. No. 1

Pre. Development

Hydrograph type	=	Rational	Peak discharge	=	36.00 cfs
Storm frequency	=	10 yrs	Time to peak	=	0.28 hrs
Time interval	=	1 min	Hyd. volume	=	36,718 cuft
Drainage area	=	15.440 ac	Runoff coeff.	=	0.47
Intensity	=	4.961 in/hr	Tc by User	=	17.00 min
IDF Curve	=	Bryant 50.IDF	Asc/Rec limb fact	=	1/1



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

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	Rational	41.33	1	17	42,154	------	------	------	Pre. Development
2	Rational	74.24	1	9	40,091	------	------	------	Post Development
3	Reservoir	21.08	1	15	36,686	2	354.11	31,066	Pond

Hydrograph Report

Hyd. No. 1

Pre. Development

Hydrograph type	=	Rational	Peak discharge	=	41.33 cfs
Storm frequency	=	25 yrs	Time to peak	=	0.28 hrs
Time interval	=	1 min	Hyd. volume	=	42,154 cuft
Drainage area	=	15.440 ac	Runoff coeff.	=	0.47
Intensity	=	5.695 in/hr	Tc by User	=	17.00 min
IDF Curve	=	Bryant 50.IDF	Asc/Rec limb fact	=	1/1



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

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	Rational	47.13	1	17	48,074	------	------	------	Pre. Development
2	Rational	84.11	1	9	45,417	------	------	------	Post Development
3	Reservoir	29.93	1	15	42,012	2	354.34	33,670	Pond

Hydrograph Report

Hyd. No. 1

Pre. Development

Hydrograph type	=	Rational	Peak discharge	=	47.13 cfs
Storm frequency	=	50 yrs	Time to peak	=	0.28 hrs
Time interval	=	1 min	Hyd. volume	=	48,074 cuft
Drainage area	=	15.440 ac	Runoff coeff.	=	0.47
Intensity	=	6.495 in/hr	Tc by User	=	17.00 min
IDF Curve	=	Bryant 50.IDF	Asc/Rec limb fact	=	1/1



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

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	Rational	50.16	1	17	51,159	------	------	------	Pre. Development
2	Rational	89.15	1	9	48,142	------	------	------	Post Development
3	Reservoir	33.52	1	15	44,737	2	354.46	34,985	Pond

Hydrograph Report

Hyd. No. 1

Pre. Development

Hydrograph type	=	Rational	Peak discharge	=	50.16 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.28 hrs
Time interval	=	1 min	Hyd. volume	=	51,159 cuft
Drainage area	=	15.440 ac	Runoff coeff.	=	0.47
Intensity	=	6.912 in/hr	Tc by User	=	17.00 min
IDF Curve	=	Bryant 50.IDF	Asc/Rec limb fact	=	1/1



Multi-Hydrograph Plot

Hyd. No. 1

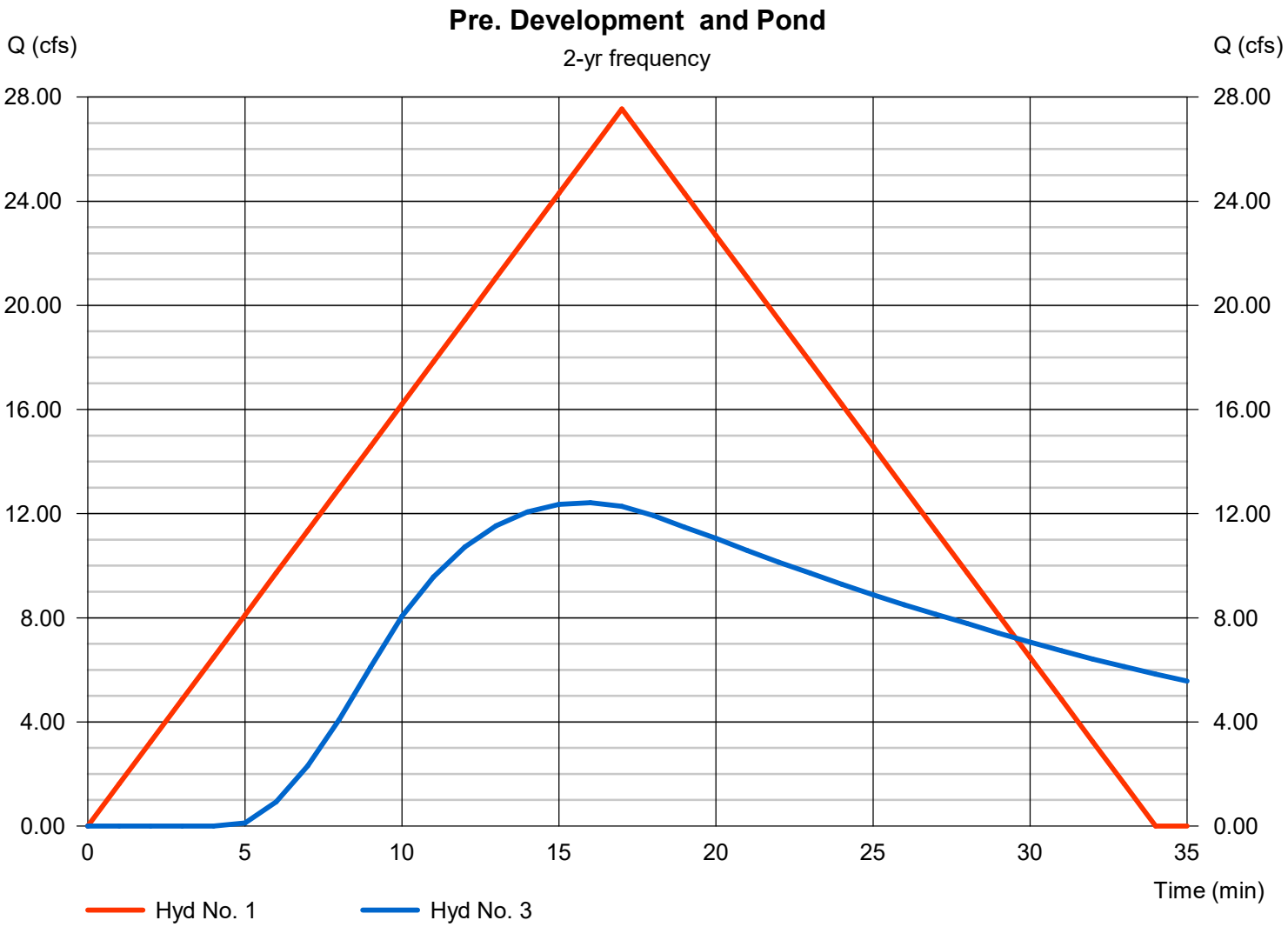
Pre. Development

Hydrograph type	=	Rational
Peak discharge	=	27.54 cfs
Time to peak	=	17 min
Hyd. Volume	=	28,095 cuft

Hyd. No. 3

Pond

Hydrograph type	=	Reservoir
Peak discharge	=	12.42 cfs
Time to peak	=	16 min
Hyd. Volume	=	24,253 cuft



Multi-Hydrograph Plot

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No. 1

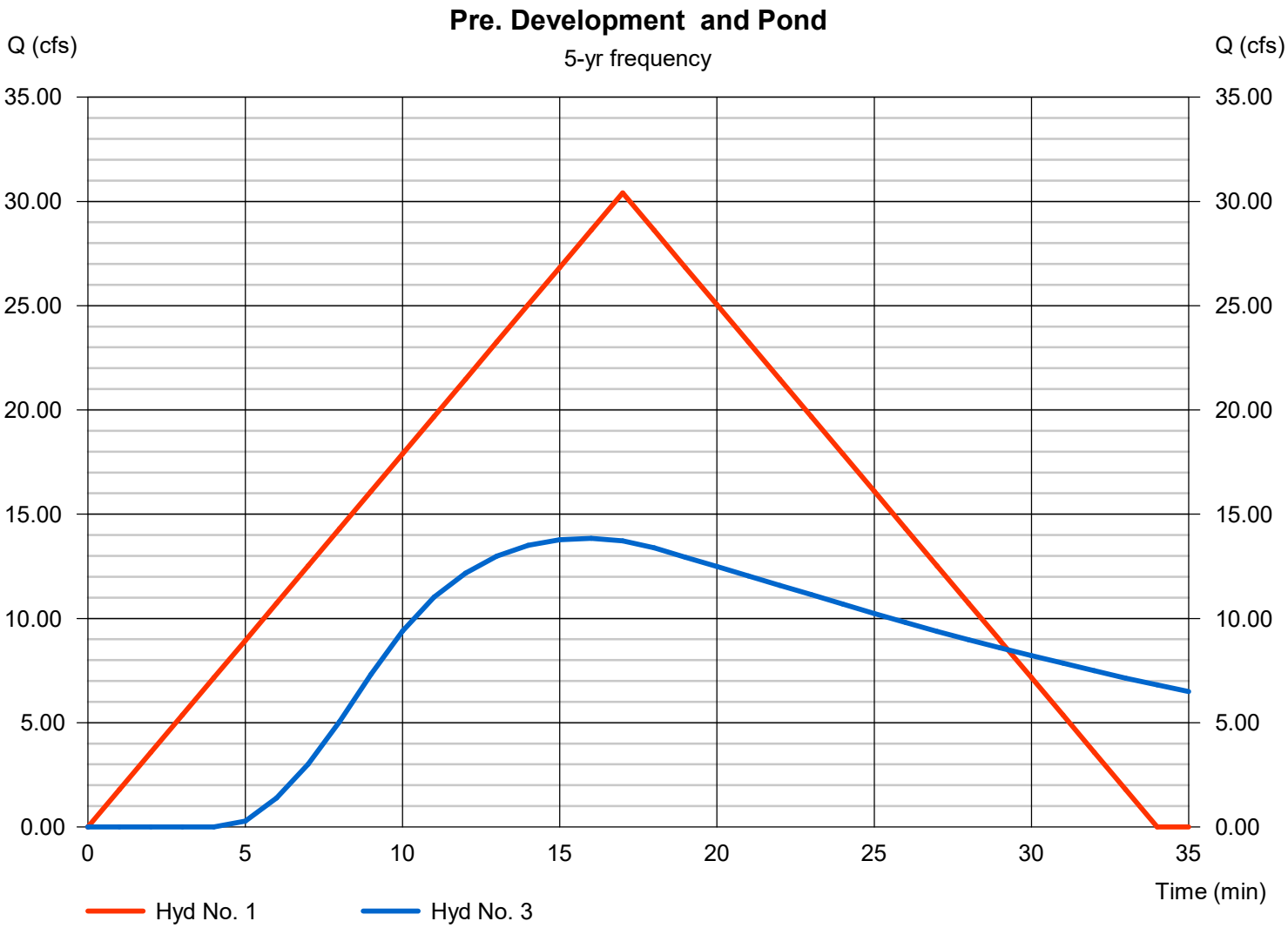
Pre. Development

Hydrograph type	=	Rational
Peak discharge	=	30.41 cfs
Time to peak	=	17 min
Hyd. Volume	=	31,020 cuft

Hyd. No. 3

Pond

Hydrograph type	=	Reservoir
Peak discharge	=	13.85 cfs
Time to peak	=	16 min
Hyd. Volume	=	27,645 cuft



Multi-Hydrograph Plot

Hyd. No. 1

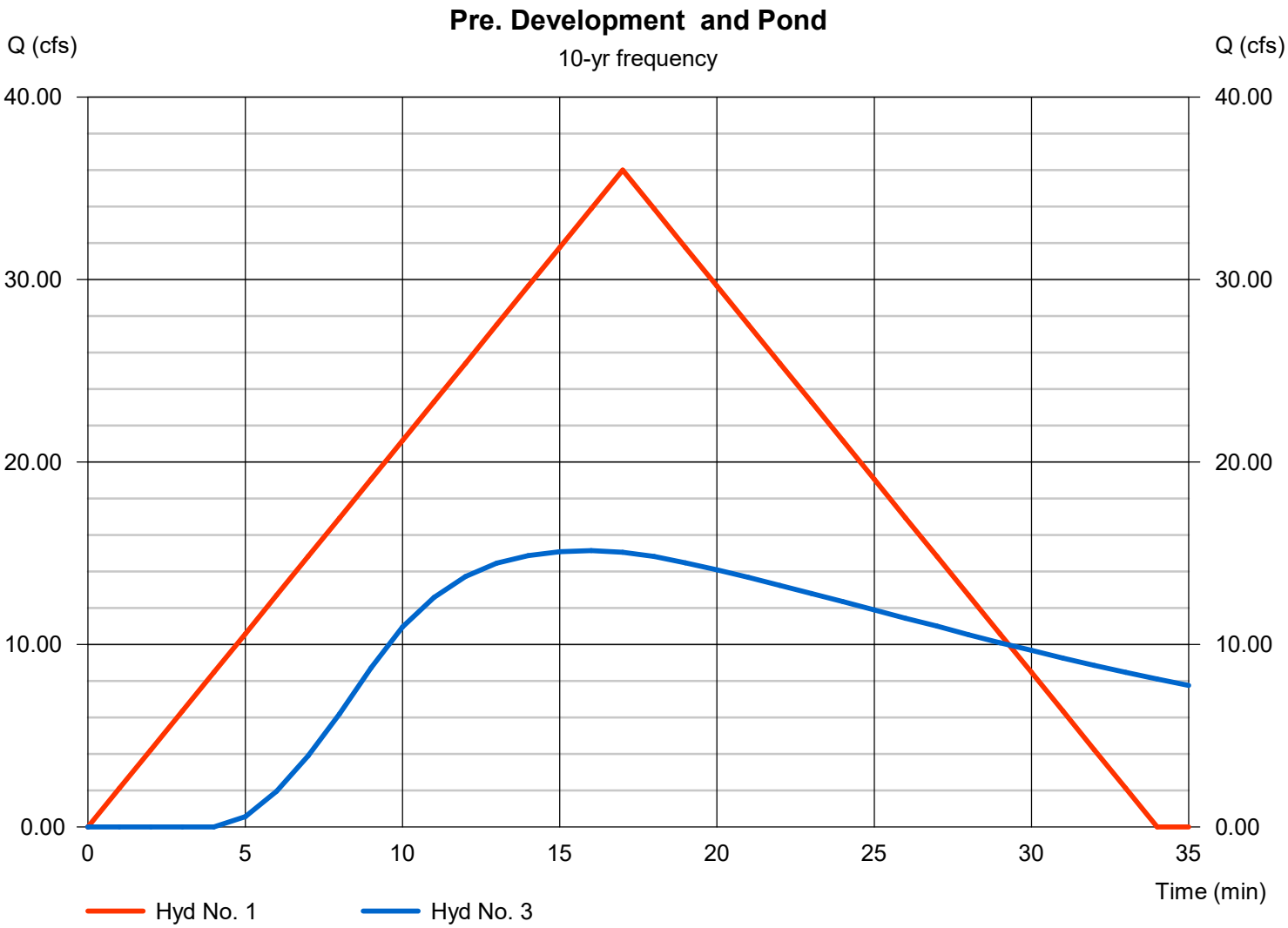
Pre. Development

Hydrograph type	=	Rational
Peak discharge	=	36.00 cfs
Time to peak	=	17 min
Hyd. Volume	=	36,718 cuft

Hyd. No. 3

Pond

Hydrograph type	=	Reservoir
Peak discharge	=	15.14 cfs
Time to peak	=	16 min
Hyd. Volume	=	31,762 cuft



Multi-Hydrograph Plot

Hyd. No. 1

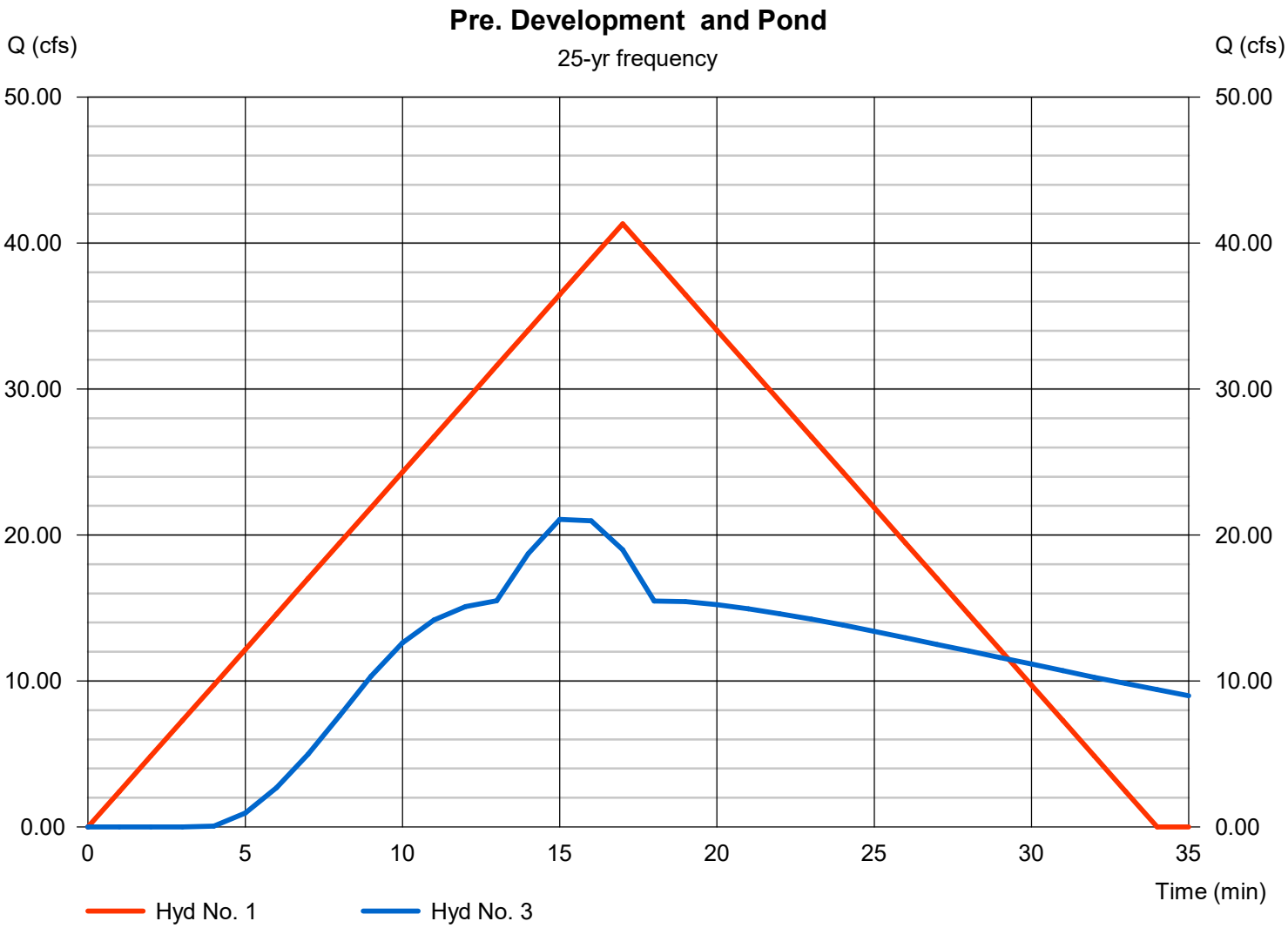
Pre. Development

Hydrograph type	=	Rational
Peak discharge	=	41.33 cfs
Time to peak	=	17 min
Hyd. Volume	=	42,154 cuft

Hyd. No. 3

Pond

Hydrograph type	=	Reservoir
Peak discharge	=	21.08 cfs
Time to peak	=	15 min
Hyd. Volume	=	36,686 cuft



Multi-Hydrograph Plot

Hyd. No. 1

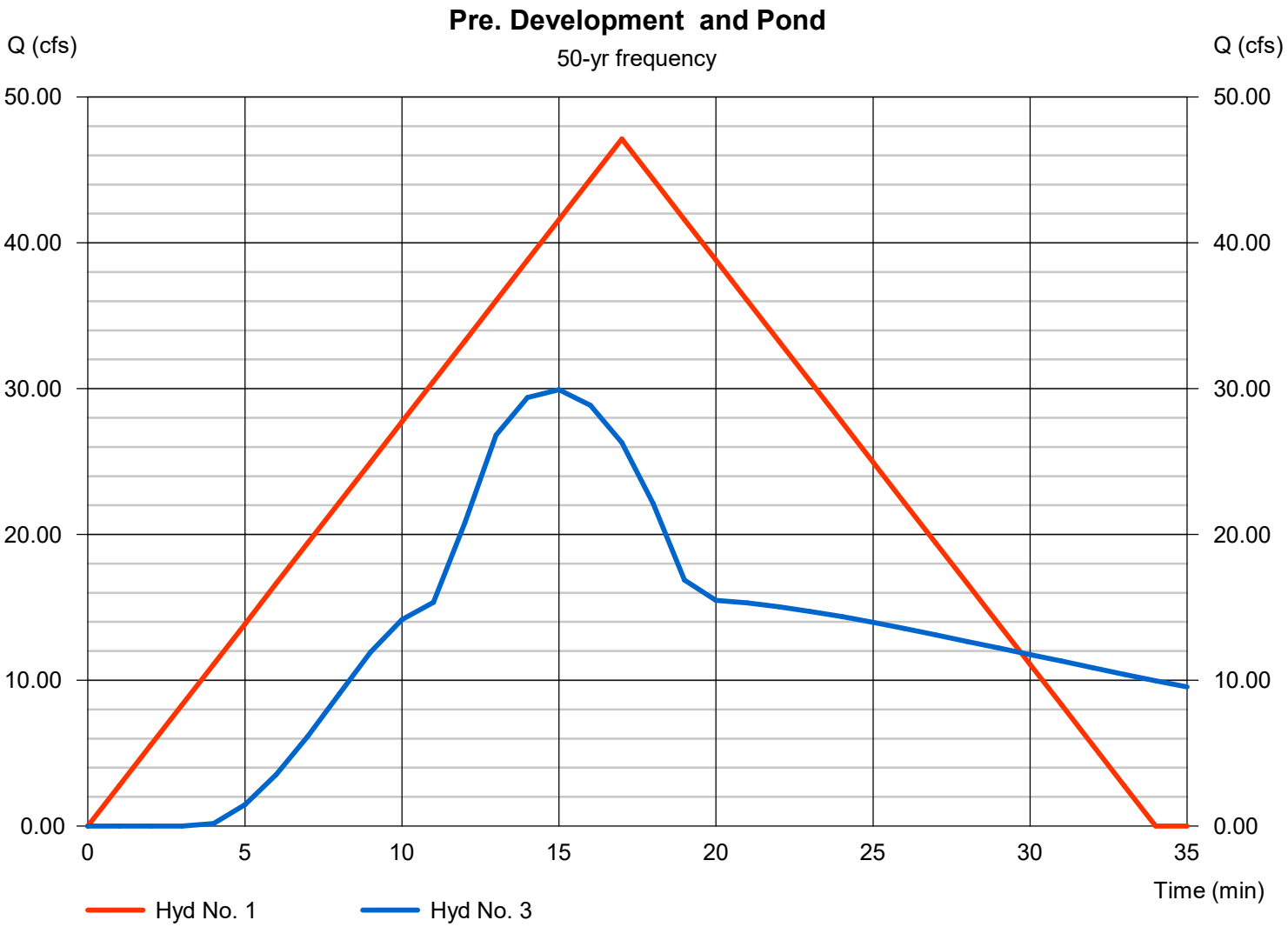
Pre. Development

Hydrograph type	=	Rational
Peak discharge	=	47.13 cfs
Time to peak	=	17 min
Hyd. Volume	=	48,074 cuft

Hyd. No. 3

Pond

Hydrograph type	=	Reservoir
Peak discharge	=	29.93 cfs
Time to peak	=	15 min
Hyd. Volume	=	42,012 cuft



Multi-Hydrograph Plot

Hyd. No. 1

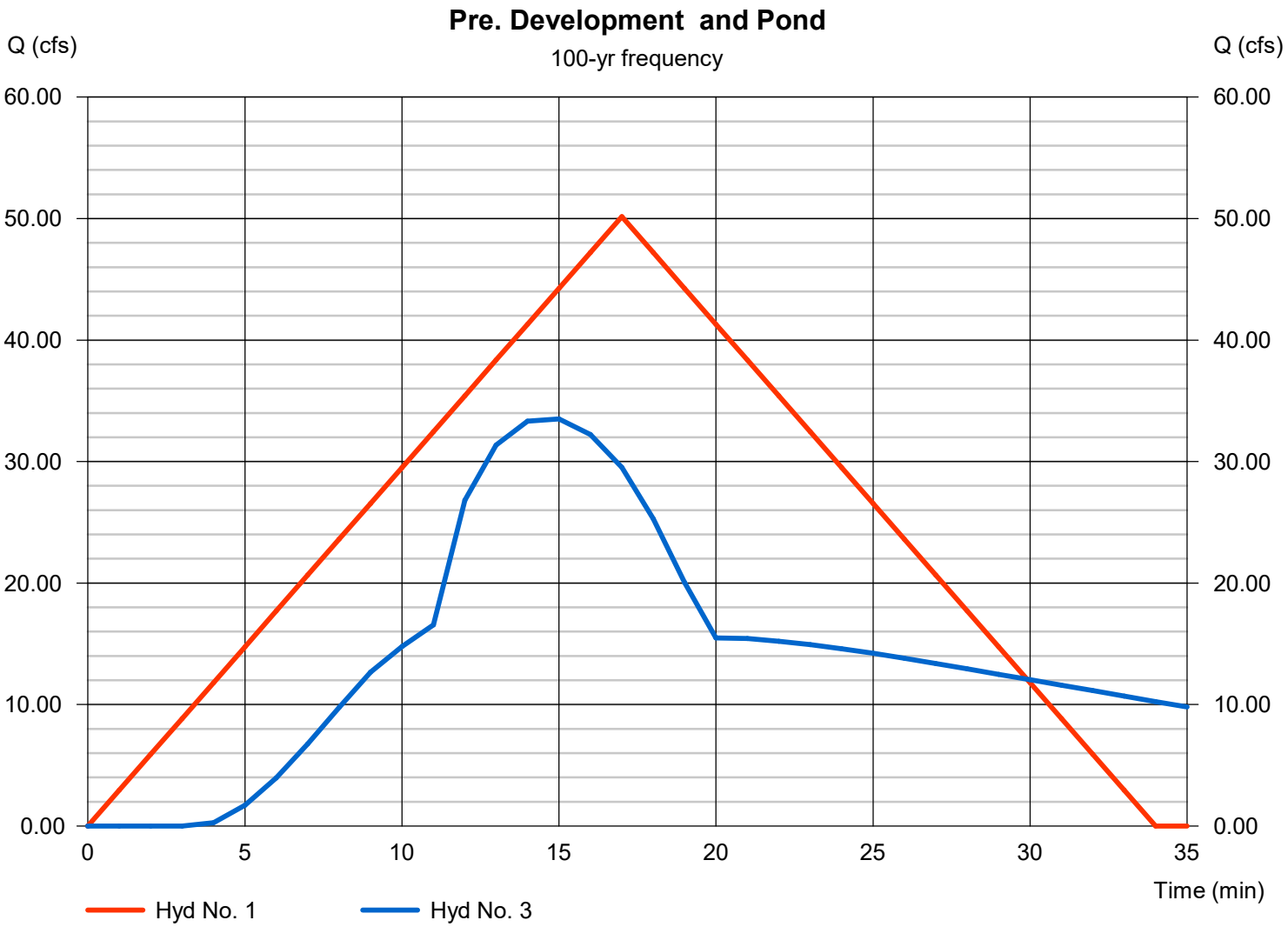
Pre. Development

Hydrograph type	=	Rational
Peak discharge	=	50.16 cfs
Time to peak	=	17 min
Hyd. Volume	=	51,159 cuft

Hyd. No. 3

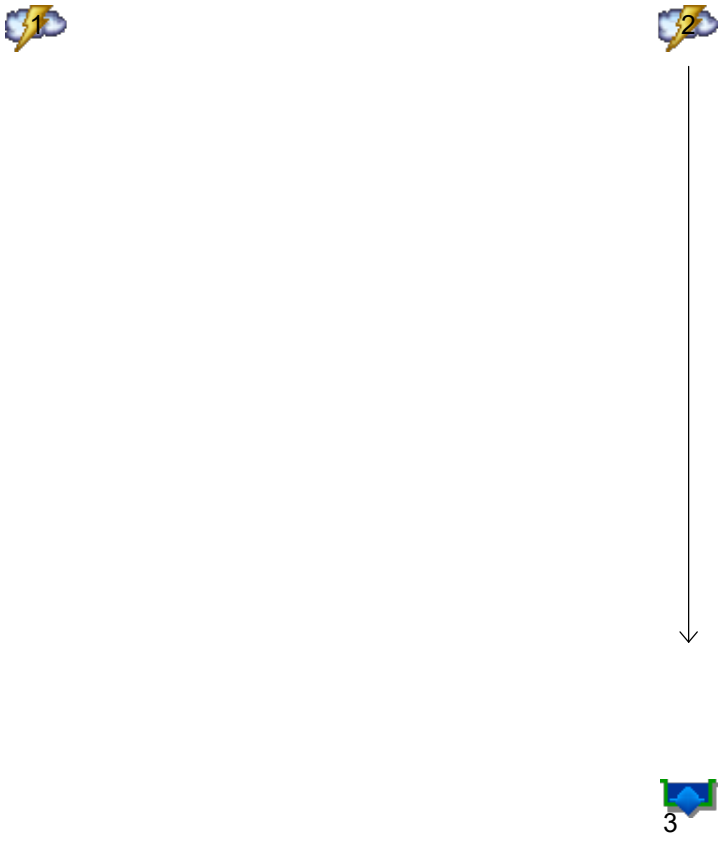
Pond

Hydrograph type	=	Reservoir
Peak discharge	=	33.52 cfs
Time to peak	=	15 min
Hyd. Volume	=	44,737 cuft



SOUTHEAST POND

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	Rational	Pre. Deve.
2	Rational	Post Deve.
3	Reservoir	Pond

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

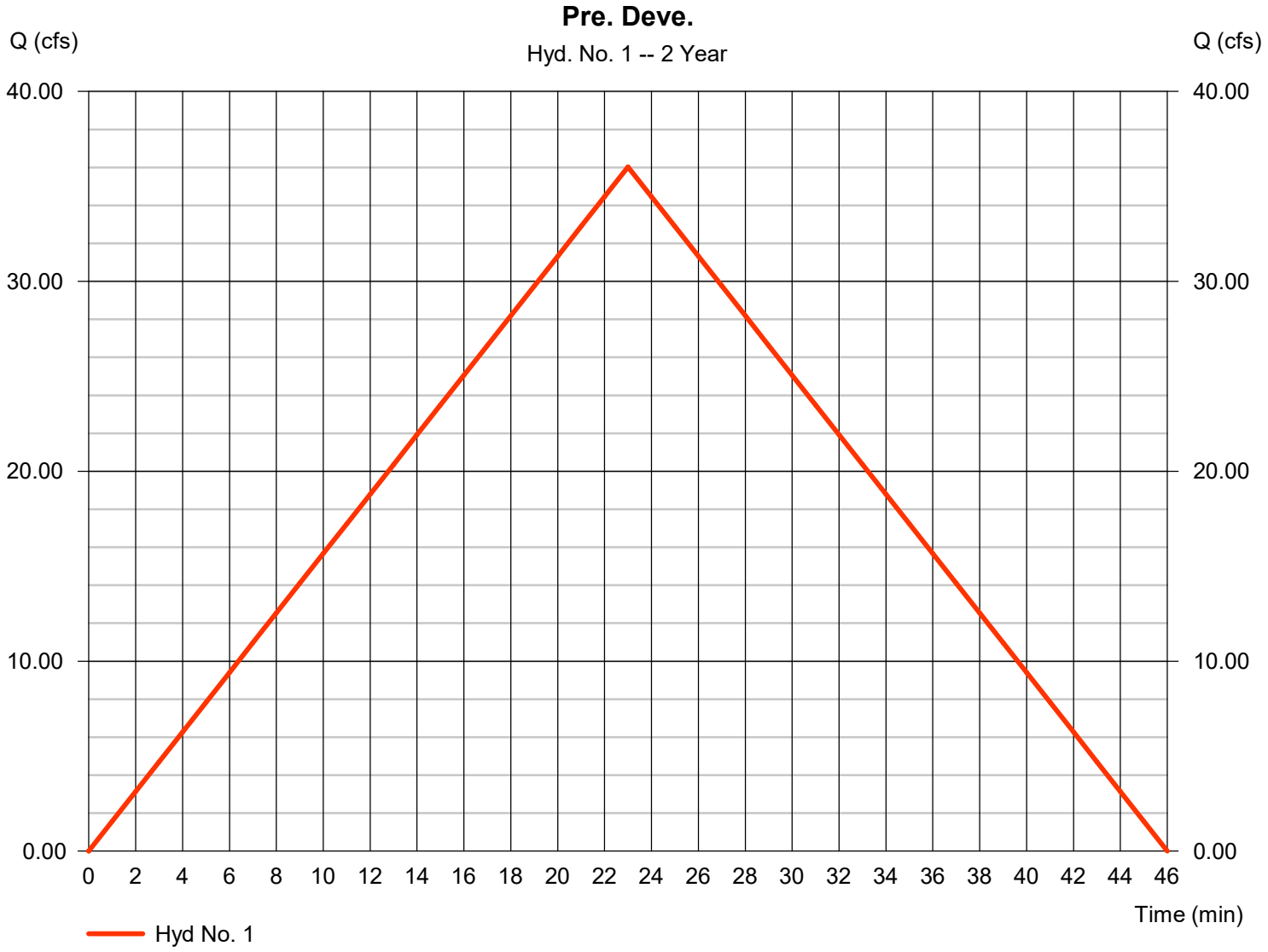
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	36.03	1	23	49,717	------	------	------	Pre. Deve.
2	Rational	40.63	1	23	56,064	------	------	------	Post Deve.
3	Reservoir	31.29	1	28	56,053	2	349.07	20,214	Pond

Hydrograph Report

Hyd. No. 1

Pre. Deve.

Hydrograph type	=	Rational	Peak discharge	=	36.03 cfs
Storm frequency	=	2 yrs	Time to peak	=	23 min
Time interval	=	1 min	Hyd. volume	=	49,717 cuft
Drainage area	=	23.570 ac	Runoff coeff.	=	0.47
Intensity	=	3.252 in/hr	Tc by User	=	23.00 min
IDF Curve	=	Bryant 50.IDF	Asc/Rec limb fact	=	1/1



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

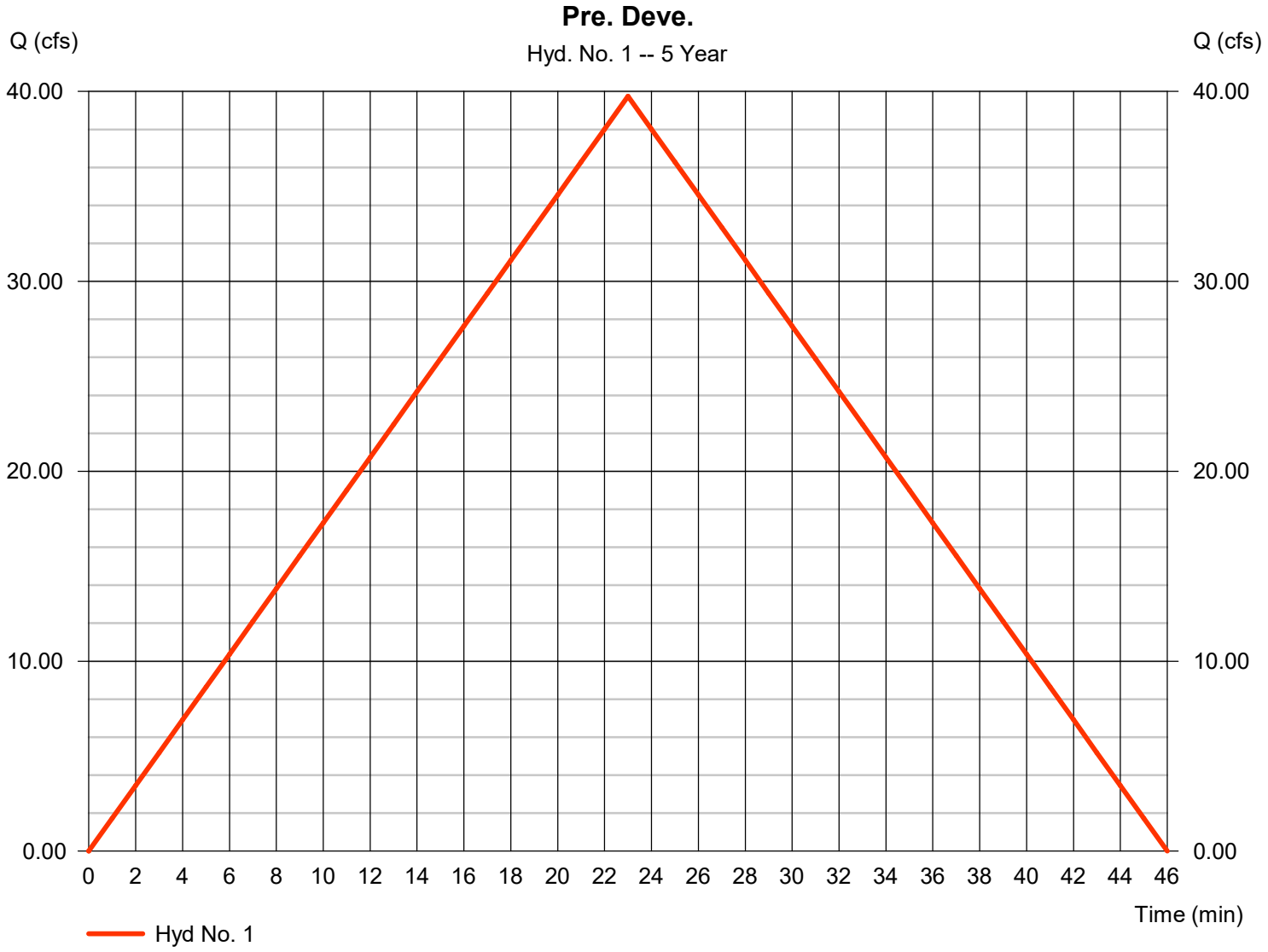
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	39.74	1	23	54,845	------	------	------	Pre. Deve.
2	Rational	44.82	1	23	61,846	------	------	------	Post Deve.
3	Reservoir	34.49	1	28	61,836	2	349.22	21,633	Pond

Hydrograph Report

Hyd. No. 1

Pre. Deve.

Hydrograph type	=	Rational	Peak discharge	=	39.74 cfs
Storm frequency	=	5 yrs	Time to peak	=	23 min
Time interval	=	1 min	Hyd. volume	=	54,845 cuft
Drainage area	=	23.570 ac	Runoff coeff.	=	0.47
Intensity	=	3.588 in/hr	Tc by User	=	23.00 min
IDF Curve	=	Bryant 50.IDF	Asc/Rec limb fact	=	1/1



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

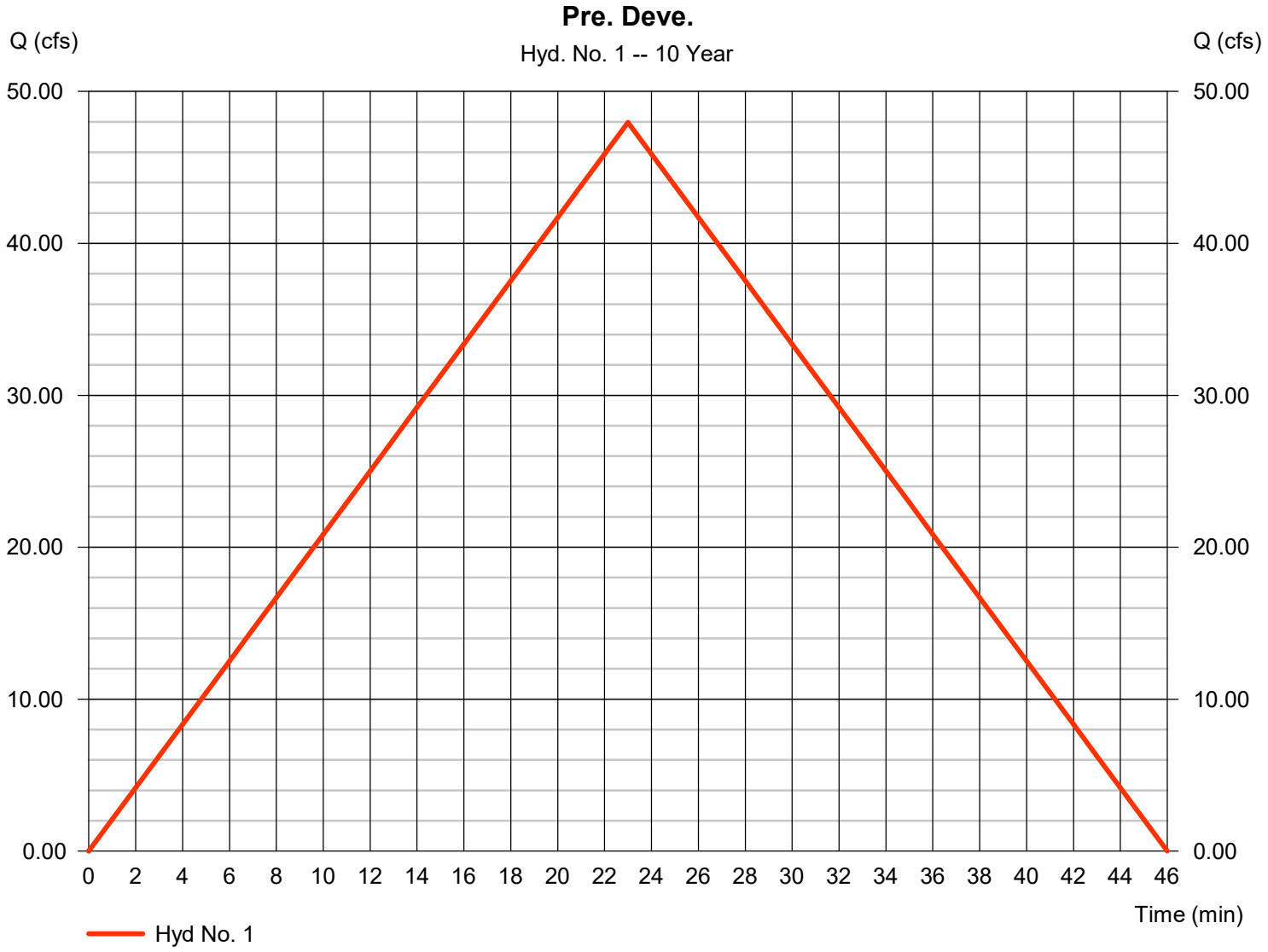
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	47.96	1	23	66,187	------	------	------	Pre. Deve.
2	Rational	54.08	1	23	74,637	------	------	------	Post Deve.
3	Reservoir	41.03	1	29	74,626	2	349.57	25,013	Pond

Hydrograph Report

Hyd. No. 1

Pre. Deve.

Hydrograph type	=	Rational	Peak discharge	=	47.96 cfs
Storm frequency	=	10 yrs	Time to peak	=	23 min
Time interval	=	1 min	Hyd. volume	=	66,187 cuft
Drainage area	=	23.570 ac	Runoff coeff.	=	0.47
Intensity	=	4.330 in/hr	Tc by User	=	23.00 min
IDF Curve	=	Bryant 50.IDF	Asc/Rec limb fact	=	1/1



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

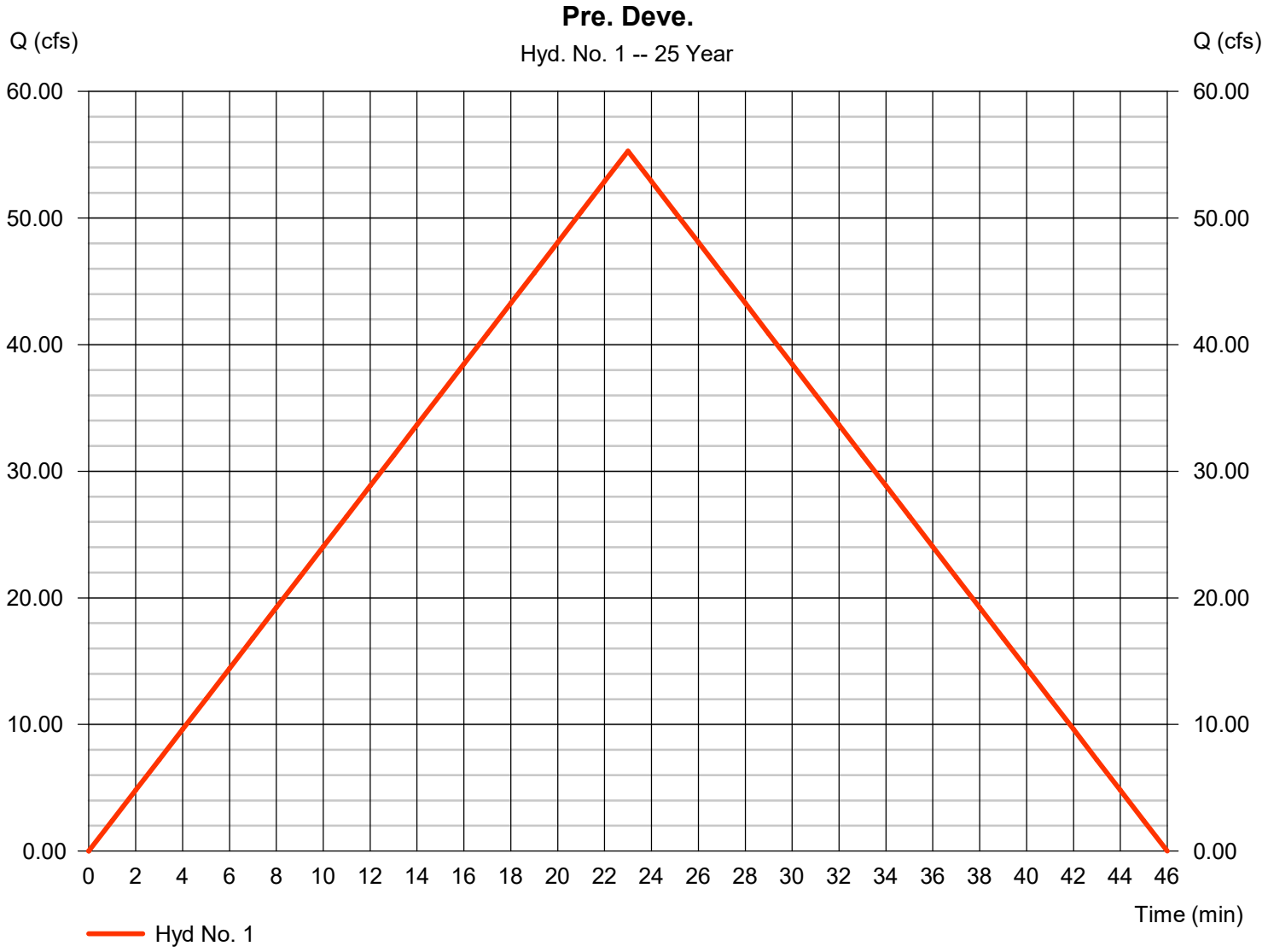
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	55.30	1	23	76,312	------	------	------	Pre. Deve.
2	Rational	62.36	1	23	86,054	------	------	------	Post Deve.
3	Reservoir	46.37	1	29	86,043	2	349.90	28,366	Pond

Hydrograph Report

Hyd. No. 1

Pre. Deve.

Hydrograph type	=	Rational	Peak discharge	=	55.30 cfs
Storm frequency	=	25 yrs	Time to peak	=	23 min
Time interval	=	1 min	Hyd. volume	=	76,312 cuft
Drainage area	=	23.570 ac	Runoff coeff.	=	0.47
Intensity	=	4.992 in/hr	Tc by User	=	23.00 min
IDF Curve	=	Bryant 50.IDF	Asc/Rec limb fact	=	1/1



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

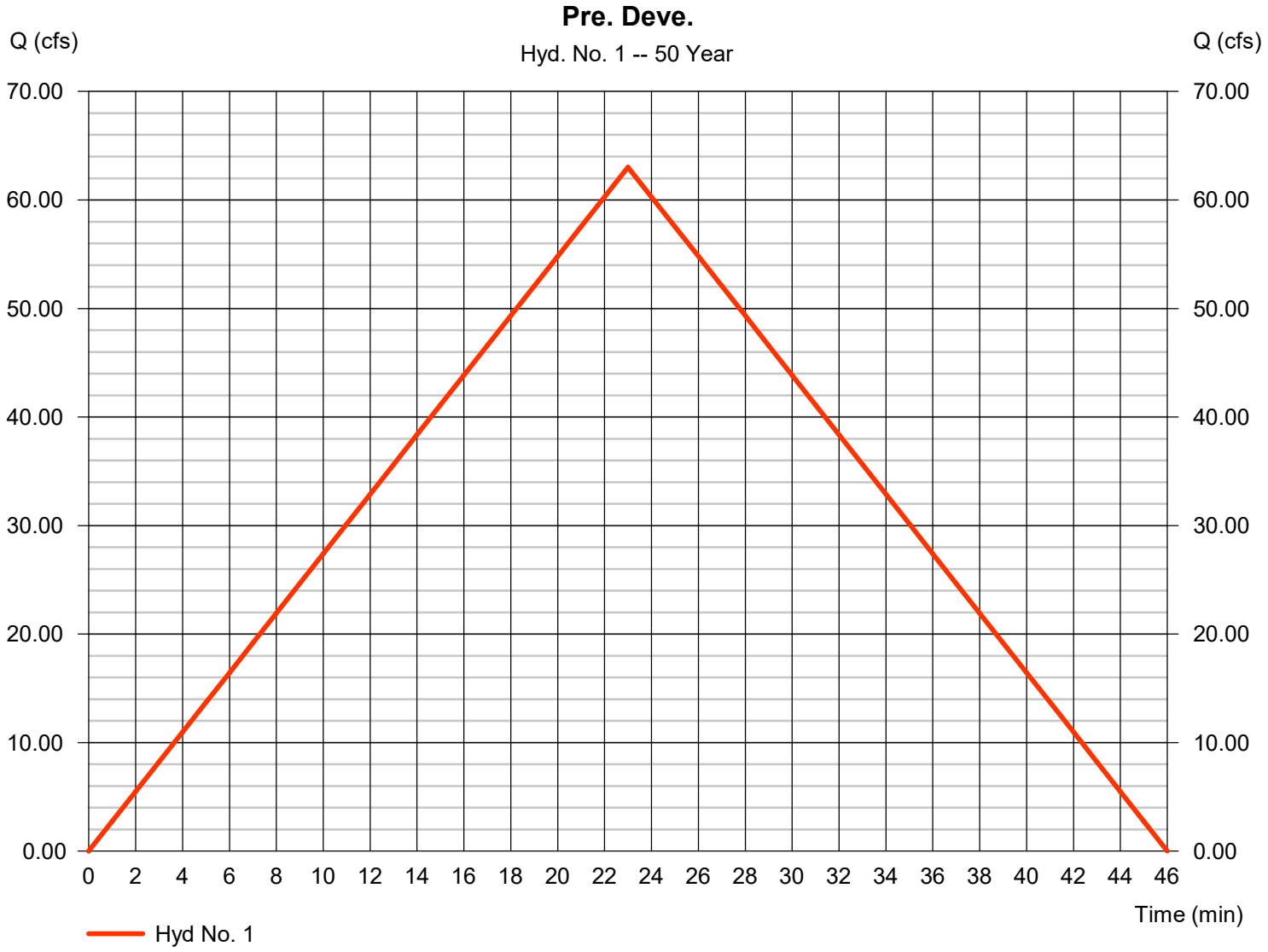
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	63.03	1	23	86,979	------	------	------	Pre. Deve.
2	Rational	71.07	1	23	98,082	------	------	------	Post Deve.
3	Reservoir	50.53	1	30	98,072	2	350.29	32,440	Pond

Hydrograph Report

Hyd. No. 1

Pre. Deve.

Hydrograph type	=	Rational	Peak discharge	=	63.03 cfs
Storm frequency	=	50 yrs	Time to peak	=	23 min
Time interval	=	1 min	Hyd. volume	=	86,979 cuft
Drainage area	=	23.570 ac	Runoff coeff.	=	0.47
Intensity	=	5.690 in/hr	Tc by User	=	23.00 min
IDF Curve	=	Bryant 50.IDF	Asc/Rec limb fact	=	1/1



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

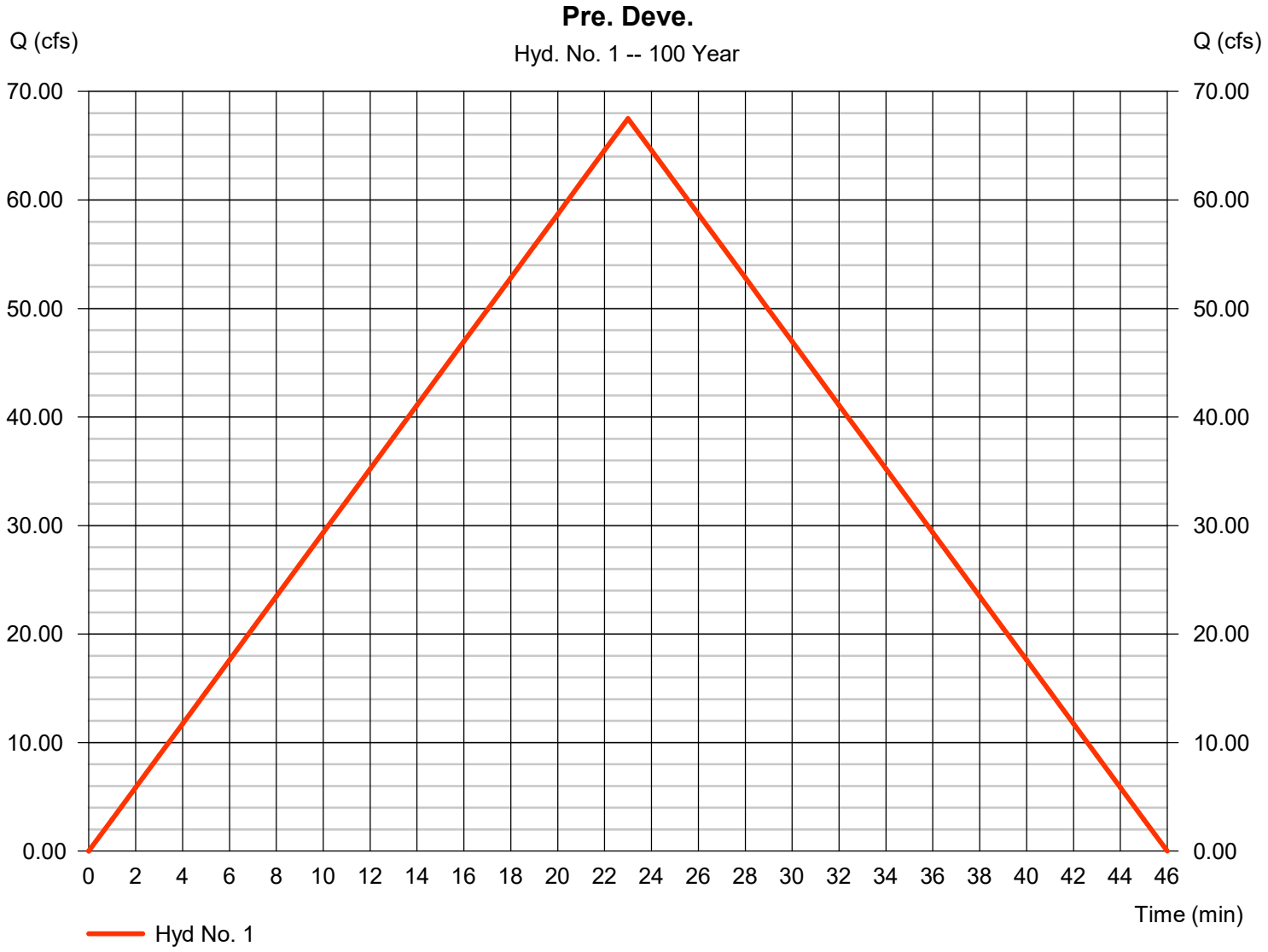
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	67.50	1	23	93,152	------	------	------	Pre. Deve.
2	Rational	76.12	1	23	105,043	------	------	------	Post Deve.
3	Reservoir	53.00	1	30	105,033	2	350.54	35,114	Pond

Hydrograph Report

Hyd. No. 1

Pre. Deve.

Hydrograph type	=	Rational	Peak discharge	=	67.50 cfs
Storm frequency	=	100 yrs	Time to peak	=	23 min
Time interval	=	1 min	Hyd. volume	=	93,152 cuft
Drainage area	=	23.570 ac	Runoff coeff.	=	0.47
Intensity	=	6.093 in/hr	Tc by User	=	23.00 min
IDF Curve	=	Bryant 50.IDF	Asc/Rec limb fact	=	1/1



Multi-Hydrograph Plot

Hyd. No. 1

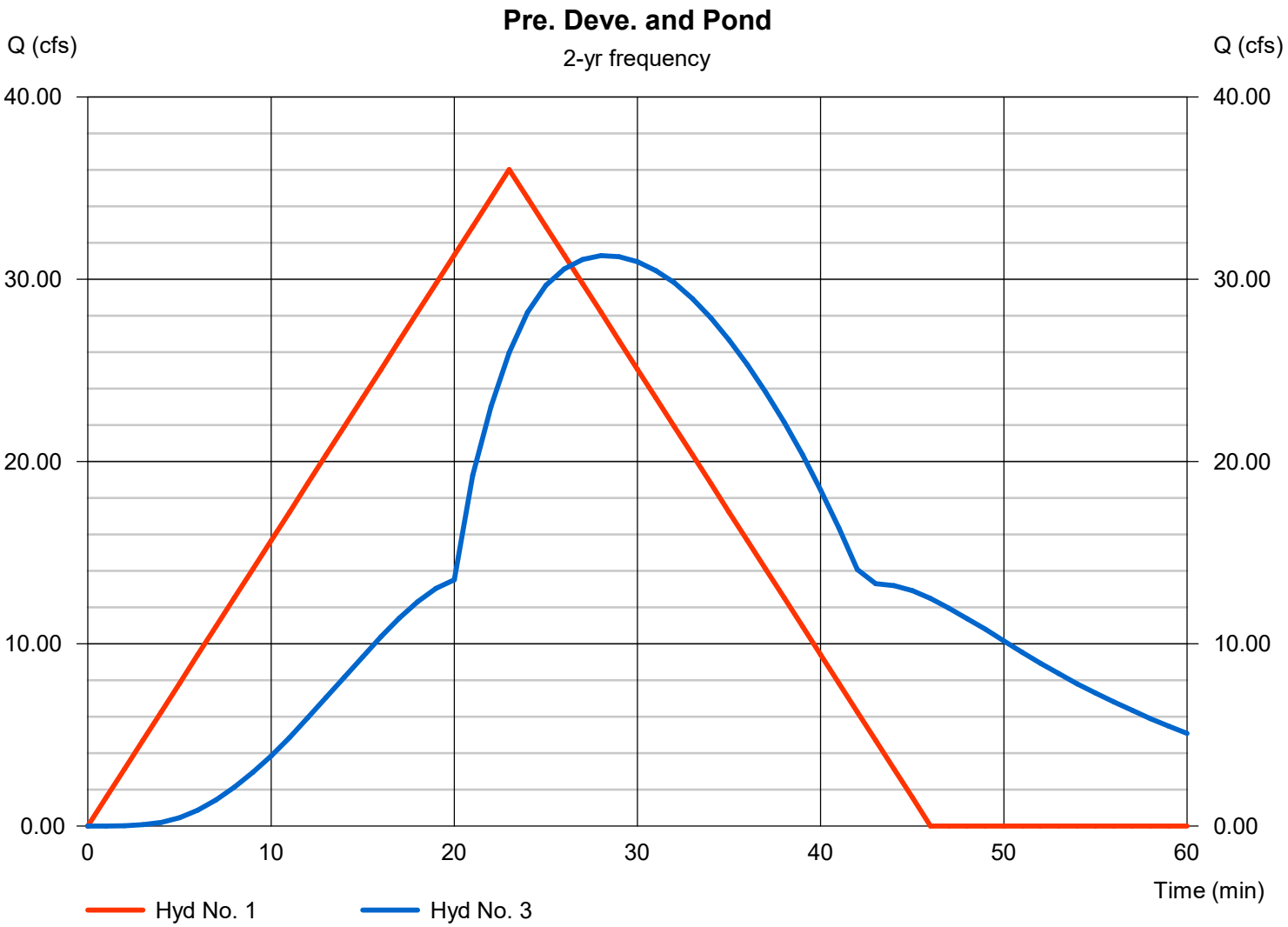
Pre. Deve.

Hydrograph type	=	Rational
Peak discharge	=	36.03 cfs
Time to peak	=	23 min
Hyd. Volume	=	49,717 cuft

Hyd. No. 3

Pond

Hydrograph type	=	Reservoir
Peak discharge	=	31.29 cfs
Time to peak	=	28 min
Hyd. Volume	=	56,053 cuft



Multi-Hydrograph Plot

Hyd. No. 1

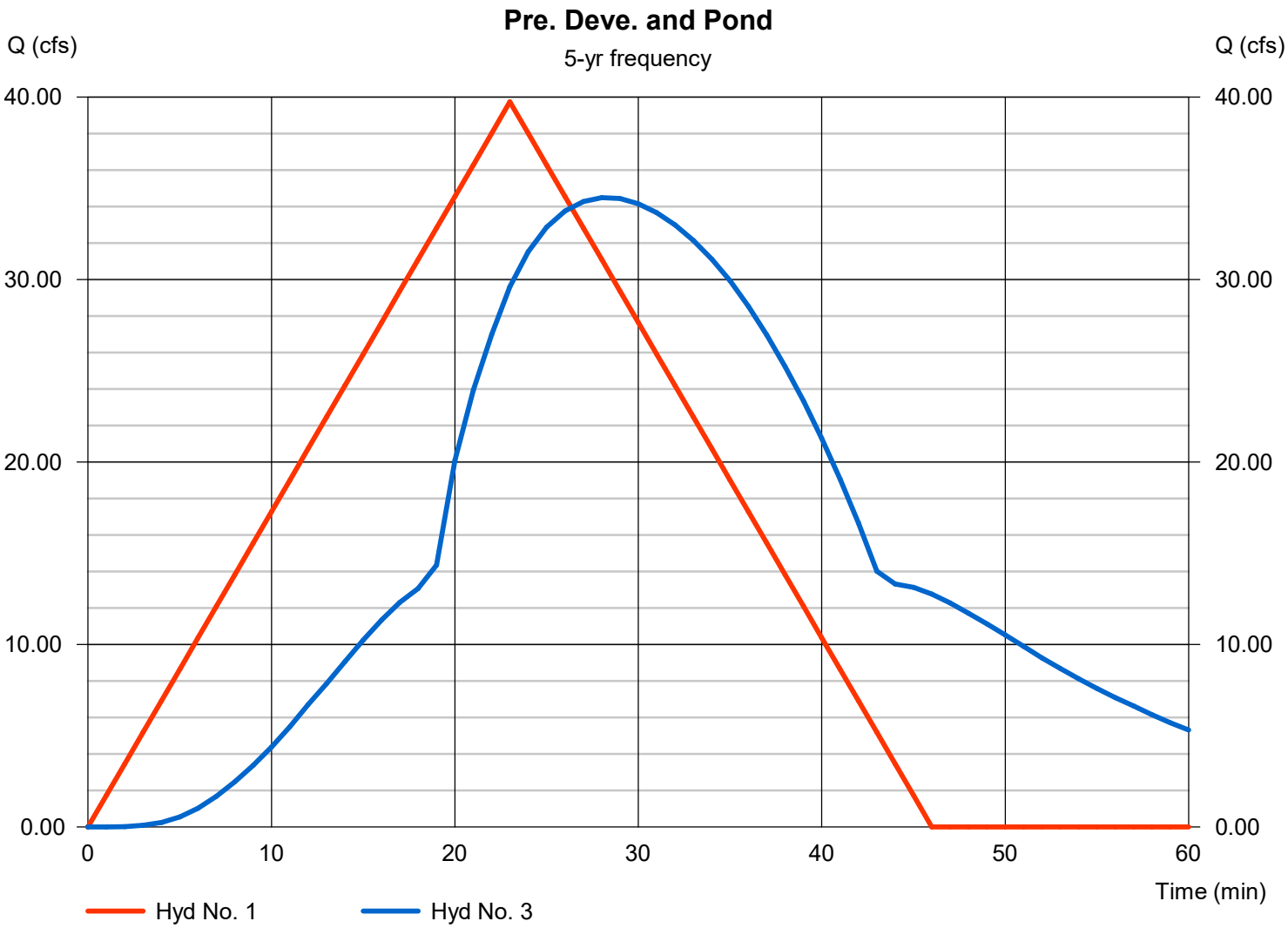
Pre. Deve.

Hydrograph type	=	Rational
Peak discharge	=	39.74 cfs
Time to peak	=	23 min
Hyd. Volume	=	54,845 cuft

Hyd. No. 3

Pond

Hydrograph type	=	Reservoir
Peak discharge	=	34.49 cfs
Time to peak	=	28 min
Hyd. Volume	=	61,836 cuft



Multi-Hydrograph Plot

Hyd. No. 1

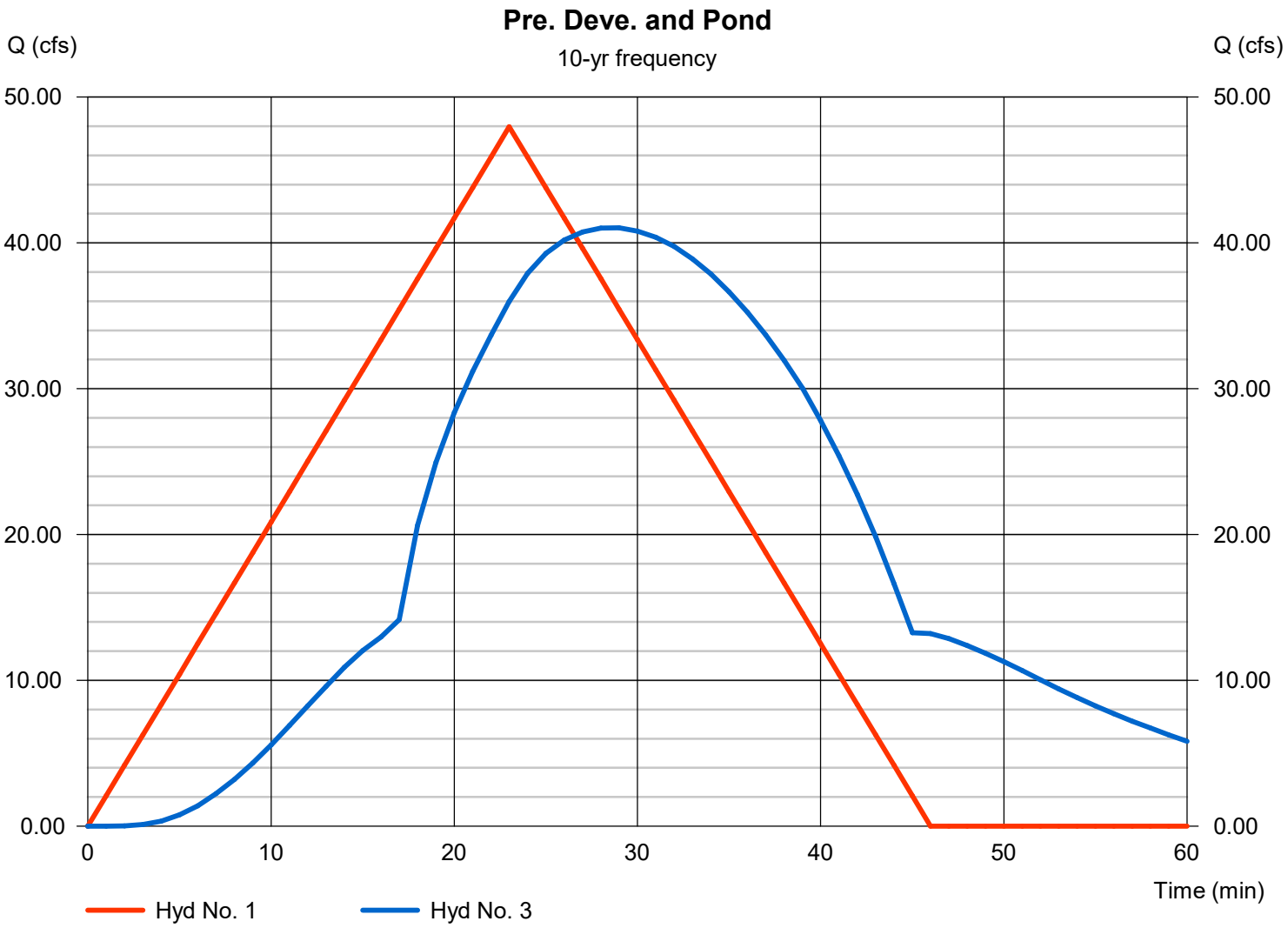
Pre. Deve.

Hydrograph type	=	Rational
Peak discharge	=	47.96 cfs
Time to peak	=	23 min
Hyd. Volume	=	66,187 cuft

Hyd. No. 3

Pond

Hydrograph type	=	Reservoir
Peak discharge	=	41.03 cfs
Time to peak	=	29 min
Hyd. Volume	=	74,626 cuft



Multi-Hydrograph Plot

Hyd. No. 1

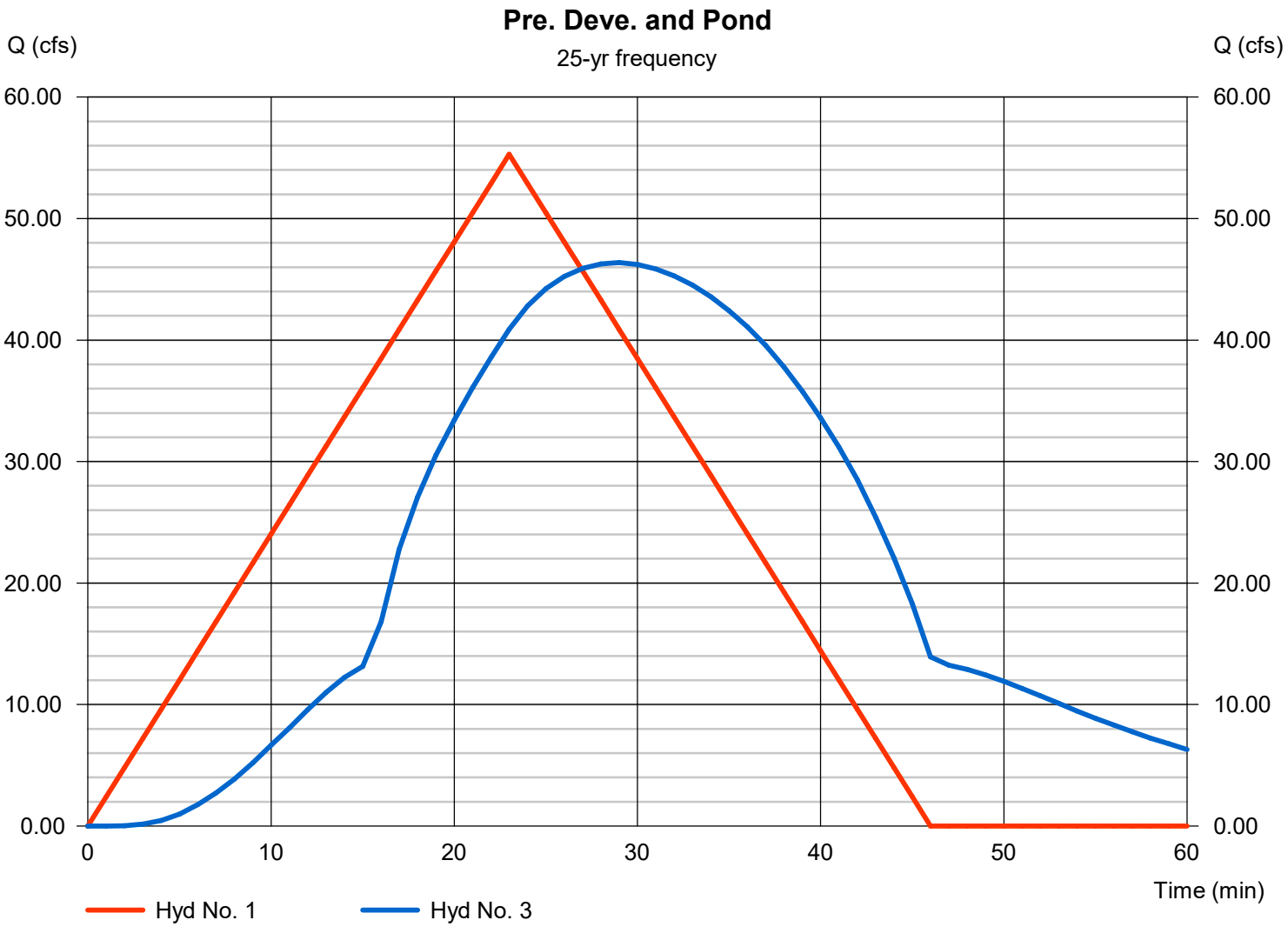
Pre. Deve.

Hydrograph type	=	Rational
Peak discharge	=	55.30 cfs
Time to peak	=	23 min
Hyd. Volume	=	76,312 cuft

Hyd. No. 3

Pond

Hydrograph type	=	Reservoir
Peak discharge	=	46.37 cfs
Time to peak	=	29 min
Hyd. Volume	=	86,043 cuft



Multi-Hydrograph Plot

Hyd. No. 1

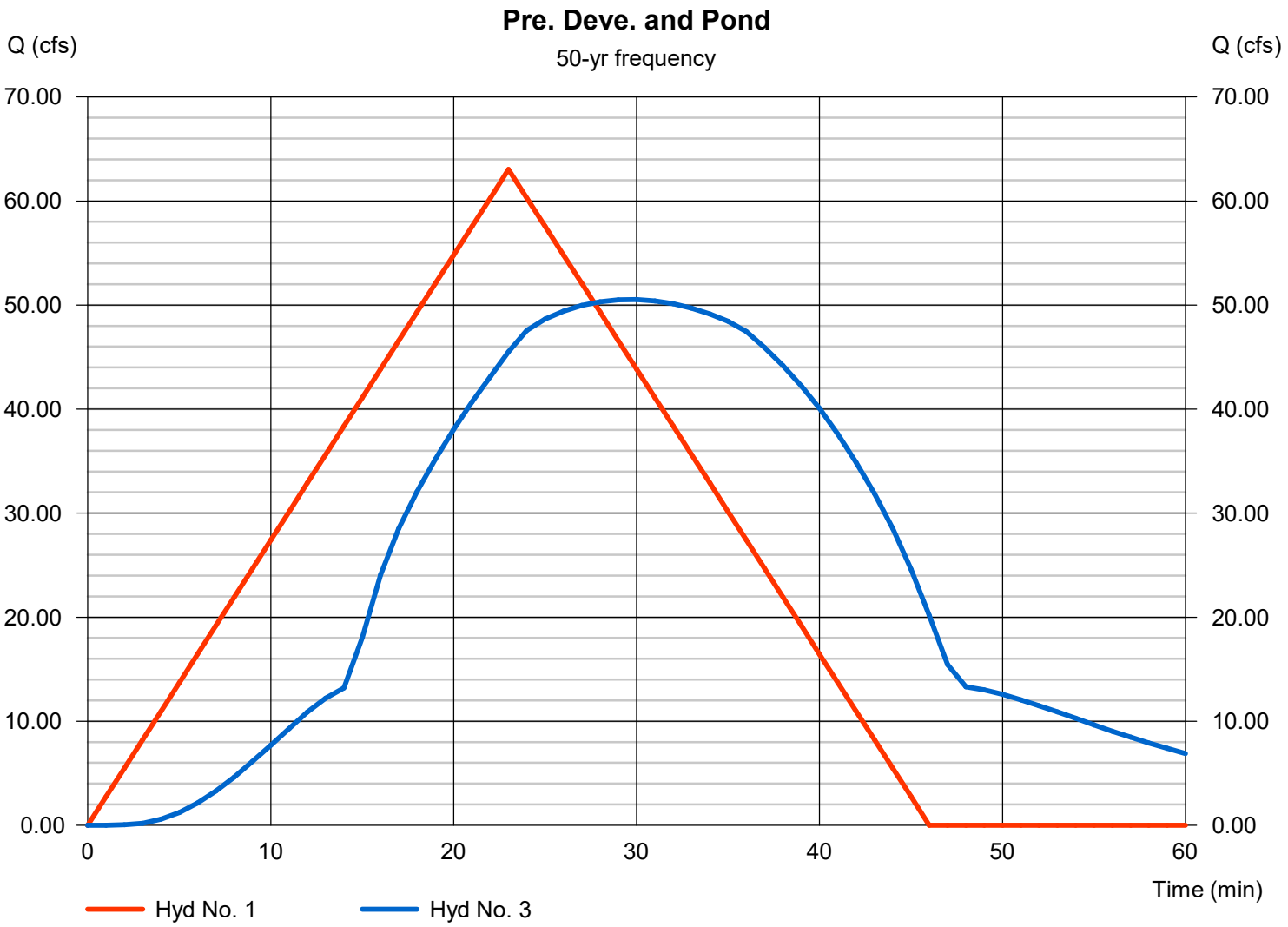
Pre. Deve.

Hydrograph type	=	Rational
Peak discharge	=	63.03 cfs
Time to peak	=	23 min
Hyd. Volume	=	86,979 cuft

Hyd. No. 3

Pond

Hydrograph type	=	Reservoir
Peak discharge	=	50.53 cfs
Time to peak	=	30 min
Hyd. Volume	=	98,072 cuft



Multi-Hydrograph Plot

Hyd. No. 1

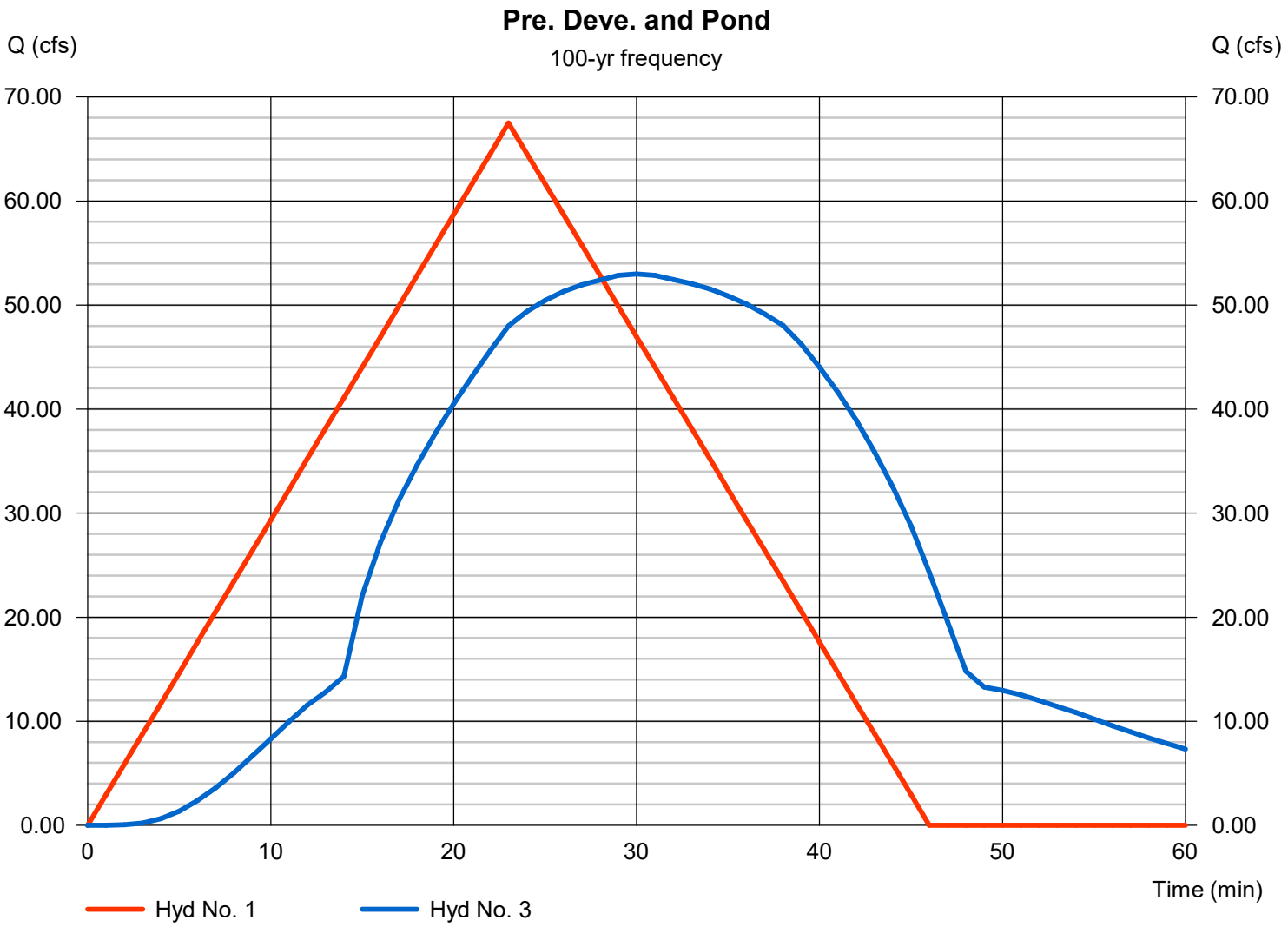
Pre. Deve.

Hydrograph type	=	Rational
Peak discharge	=	67.50 cfs
Time to peak	=	23 min
Hyd. Volume	=	93,152 cuft

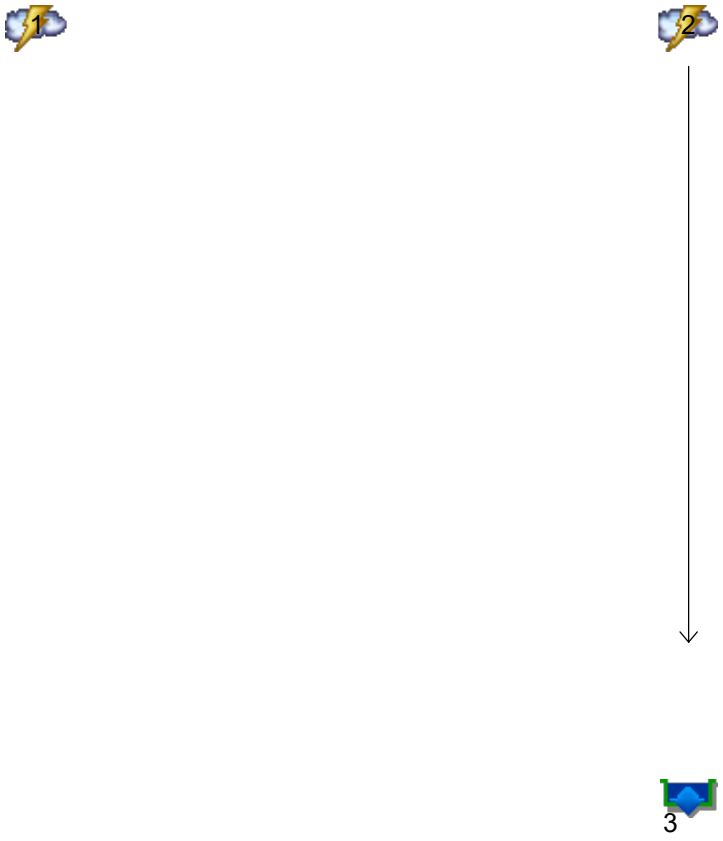
Hyd. No. 3

Pond

Hydrograph type	=	Reservoir
Peak discharge	=	53.00 cfs
Time to peak	=	30 min
Hyd. Volume	=	105,033 cuft



Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	Rational	Pre. Deve.
2	Rational	Post Deve.
3	Reservoir	Pond

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

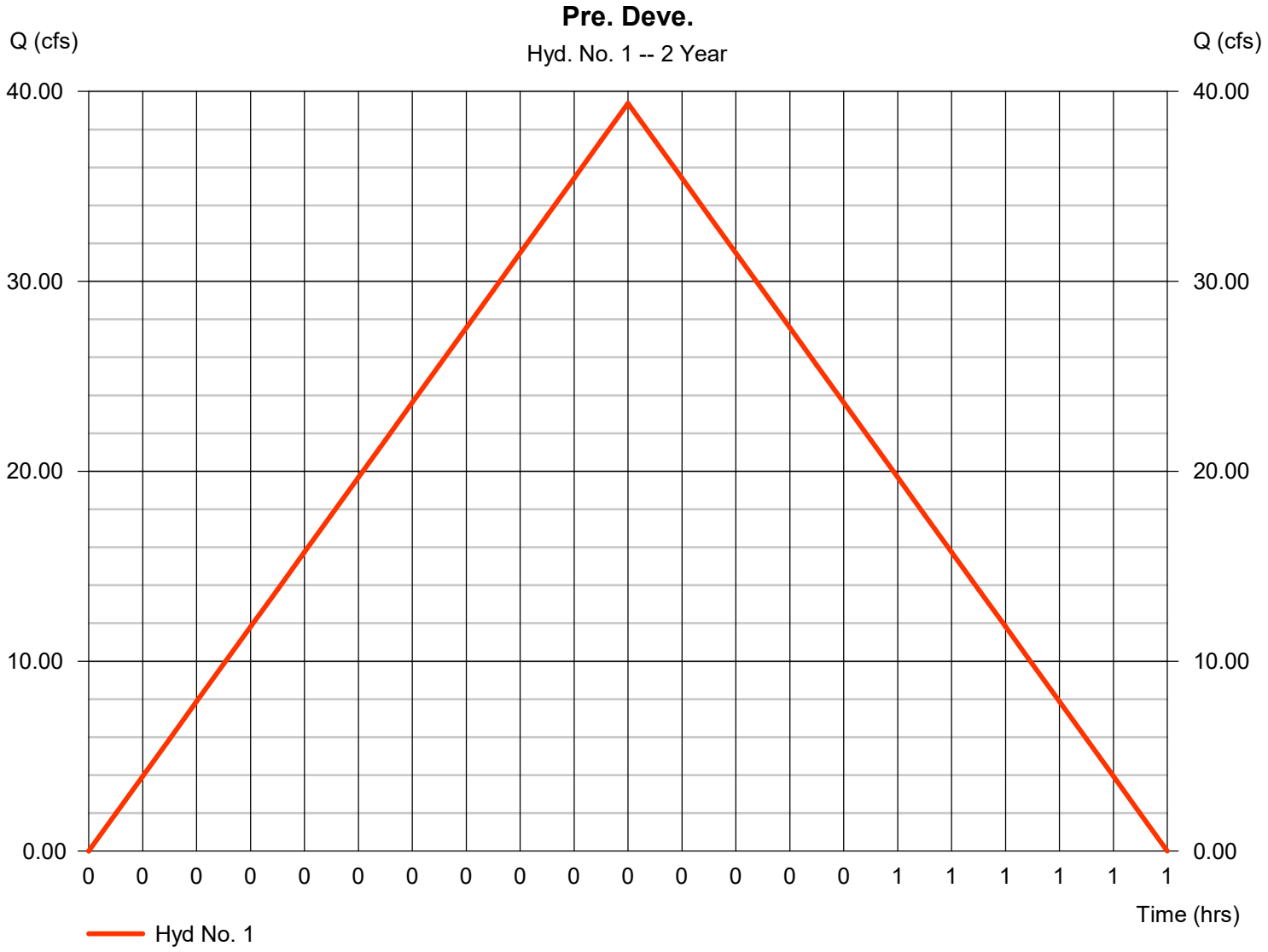
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	39.37	1	20	47,246	------	------	------	Pre. Deve.
2	Rational	71.11	1	12	51,201	------	------	------	Post Deve.
3	Reservoir	28.79	1	19	51,181	2	361.30	33,860	Pond

Hydrograph Report

Hyd. No. 1

Pre. Deve.

Hydrograph type	=	Rational	Peak discharge	=	39.37 cfs
Storm frequency	=	2 yrs	Time to peak	=	0.33 hrs
Time interval	=	1 min	Hyd. volume	=	47,246 cuft
Drainage area	=	23.930 ac	Runoff coeff.	=	0.47
Intensity	=	3.501 in/hr	Tc by User	=	20.00 min
IDF Curve	=	Bryant 50.IDF	Asc/Rec limb fact	=	1/1



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

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	Rational	43.42	1	20	52,106	------	------	------	Pre. Deve.
2	Rational	79.06	1	12	56,926	------	------	------	Post Deve.
3	Reservoir	32.35	1	19	56,907	2	361.55	37,081	Pond

Hydrograph Report

Hyd. No. 1

Pre. Deve.

Hydrograph type	=	Rational	Peak discharge	=	43.42 cfs
Storm frequency	=	5 yrs	Time to peak	=	0.33 hrs
Time interval	=	1 min	Hyd. volume	=	52,106 cuft
Drainage area	=	23.930 ac	Runoff coeff.	=	0.47
Intensity	=	3.861 in/hr	Tc by User	=	20.00 min
IDF Curve	=	Bryant 50.IDF	Asc/Rec limb fact	=	1/1



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

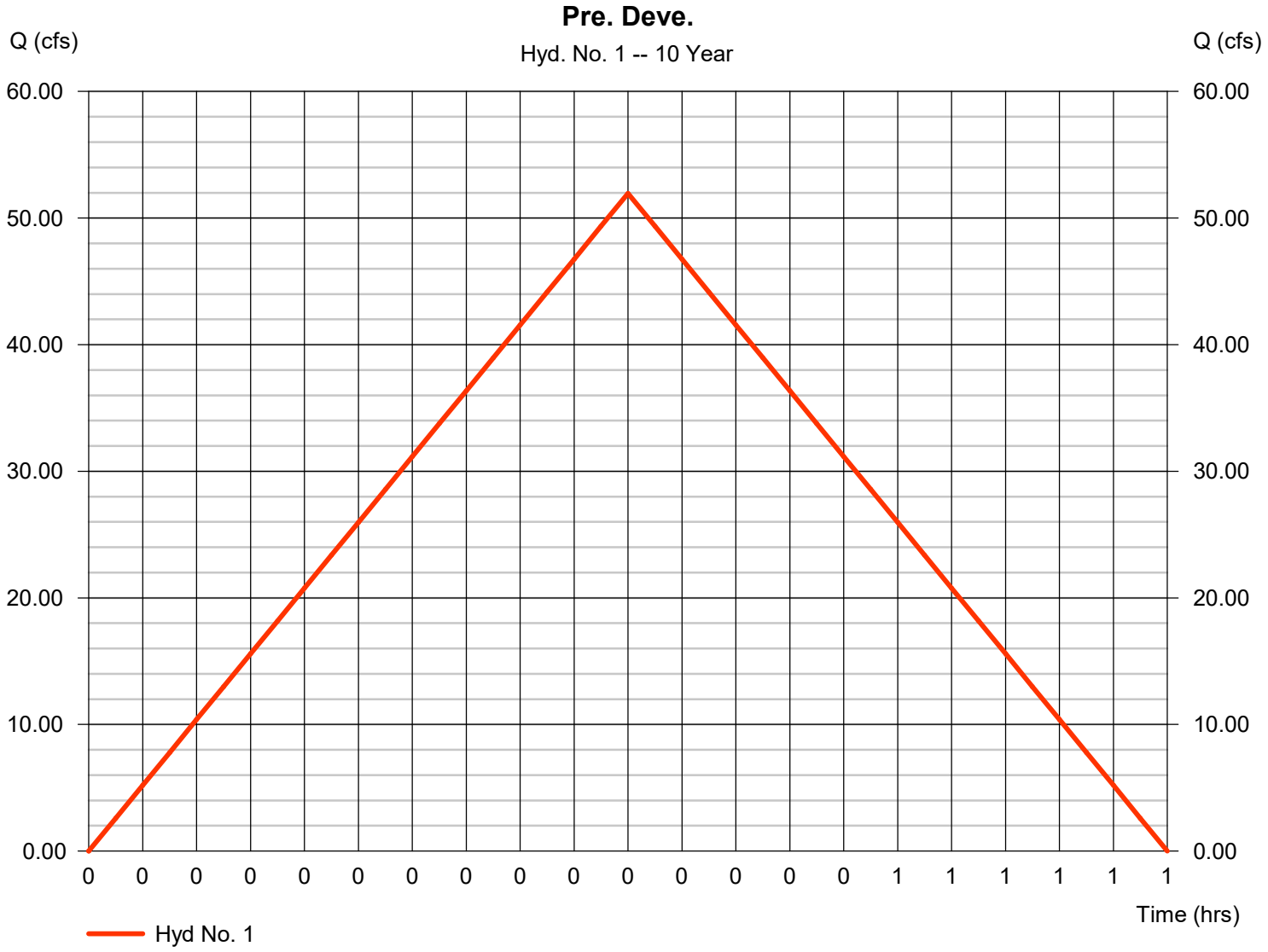
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	51.95	1	20	62,335	------	------	------	Pre. Deve.
2	Rational	91.38	1	12	65,796	------	------	------	Post Deve.
3	Reservoir	37.12	1	19	65,777	2	361.95	42,289	Pond

Hydrograph Report

Hyd. No. 1

Pre. Deve.

Hydrograph type	=	Rational	Peak discharge	=	51.95 cfs
Storm frequency	=	10 yrs	Time to peak	=	0.33 hrs
Time interval	=	1 min	Hyd. volume	=	62,335 cuft
Drainage area	=	23.930 ac	Runoff coeff.	=	0.47
Intensity	=	4.619 in/hr	Tc by User	=	20.00 min
IDF Curve	=	Bryant 50.IDF	Asc/Rec limb fact	=	1/1



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

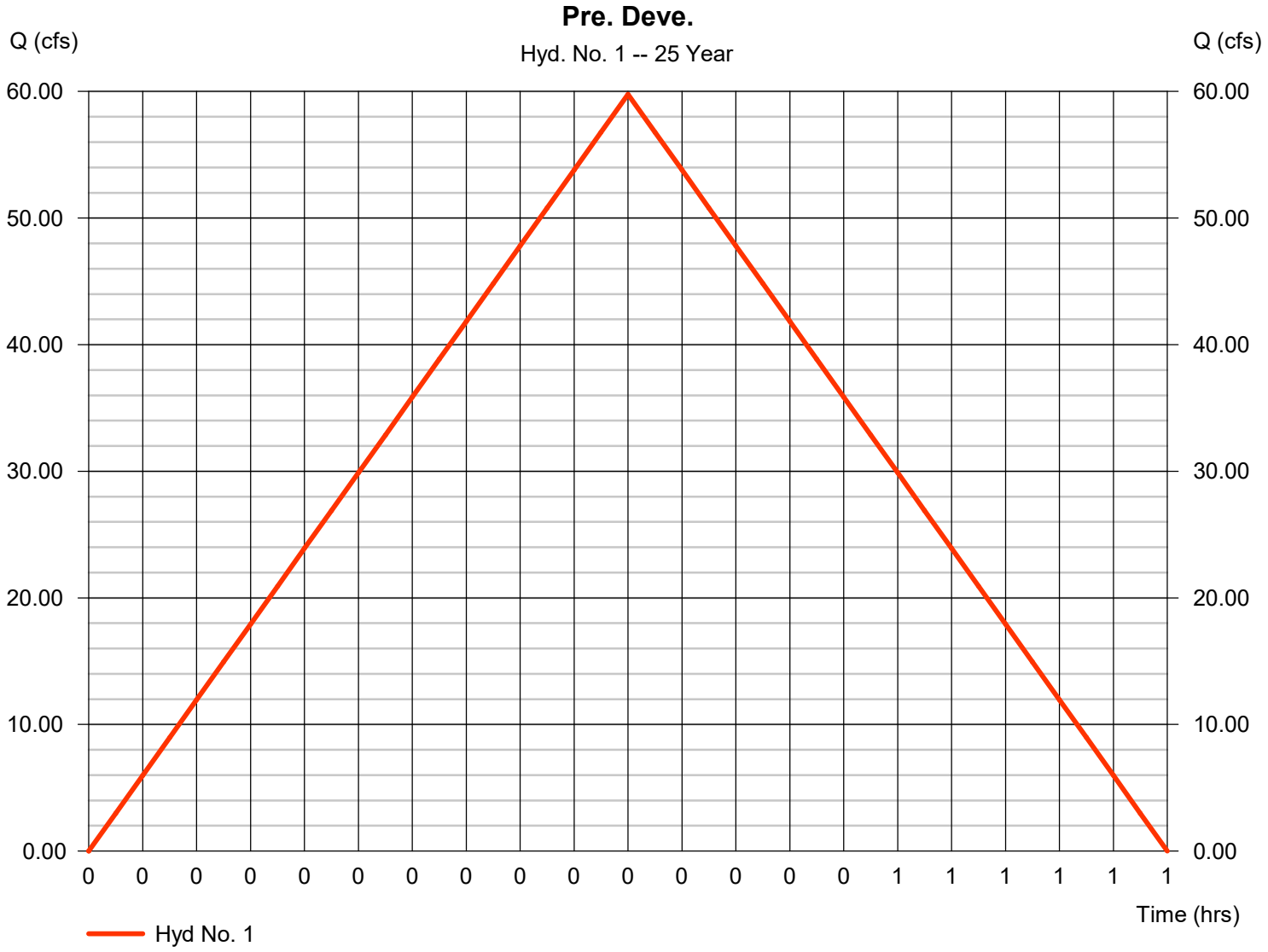
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	59.77	1	20	71,722	------	------	------	Pre. Deve.
2	Rational	104.47	1	12	75,221	------	------	------	Post Deve.
3	Reservoir	41.61	1	19	75,202	2	362.36	48,028	Pond

Hydrograph Report

Hyd. No. 1

Pre. Deve.

Hydrograph type	=	Rational	Peak discharge	=	59.77 cfs
Storm frequency	=	25 yrs	Time to peak	=	0.33 hrs
Time interval	=	1 min	Hyd. volume	=	71,722 cuft
Drainage area	=	23.930 ac	Runoff coeff.	=	0.47
Intensity	=	5.314 in/hr	Tc by User	=	20.00 min
IDF Curve	=	Bryant 50.IDF	Asc/Rec limb fact	=	1/1



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

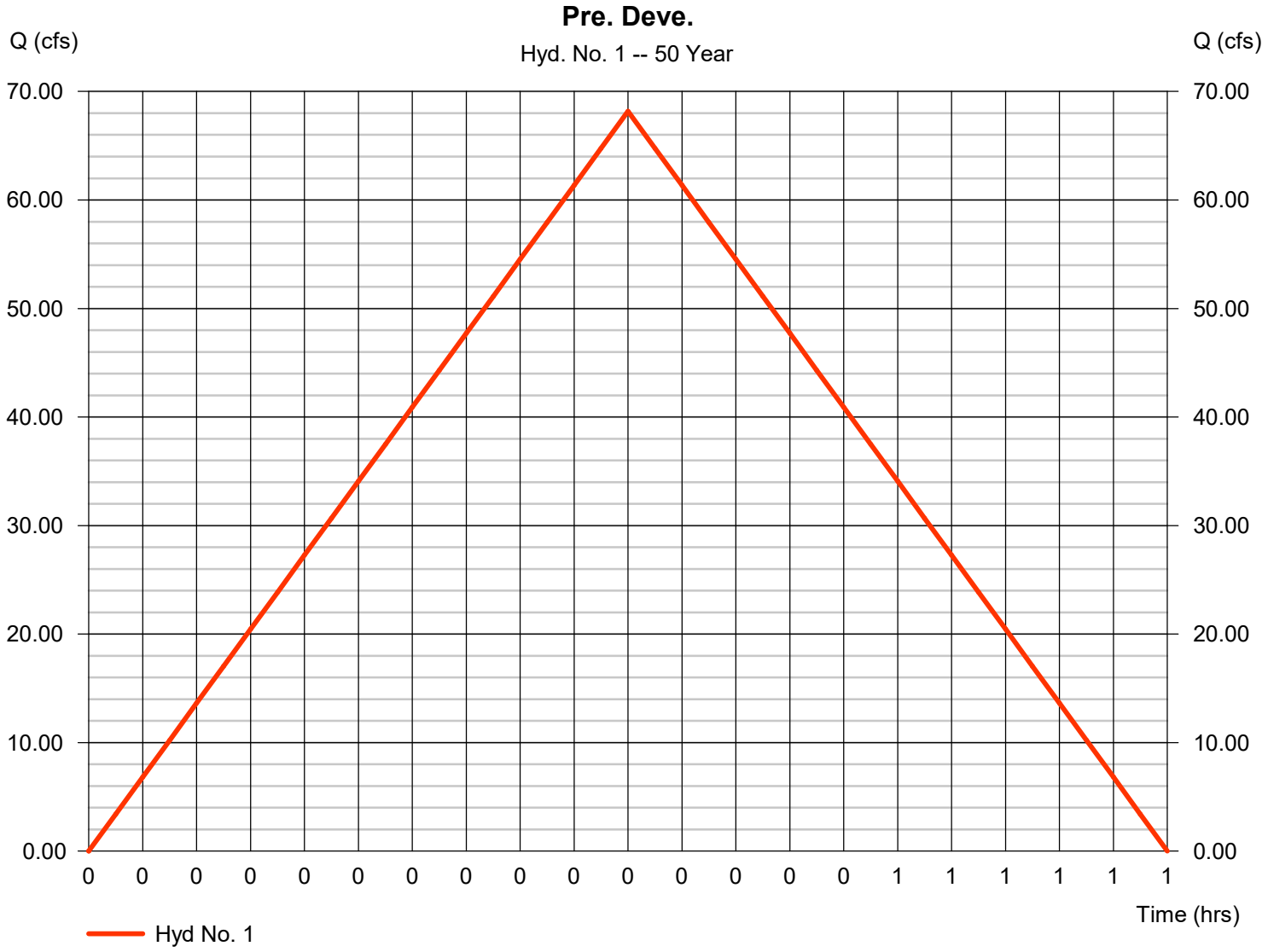
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	68.17	1	20	81,798	------	------	------	Pre. Deve.
2	Rational	118.84	1	12	85,564	------	------	------	Post Deve.
3	Reservoir	44.71	1	19	85,545	2	362.83	54,763	Pond

Hydrograph Report

Hyd. No. 1

Pre. Deve.

Hydrograph type	=	Rational	Peak discharge	=	68.17 cfs
Storm frequency	=	50 yrs	Time to peak	=	0.33 hrs
Time interval	=	1 min	Hyd. volume	=	81,798 cuft
Drainage area	=	23.930 ac	Runoff coeff.	=	0.47
Intensity	=	6.061 in/hr	Tc by User	=	20.00 min
IDF Curve	=	Bryant 50.IDF	Asc/Rec limb fact	=	1/1



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

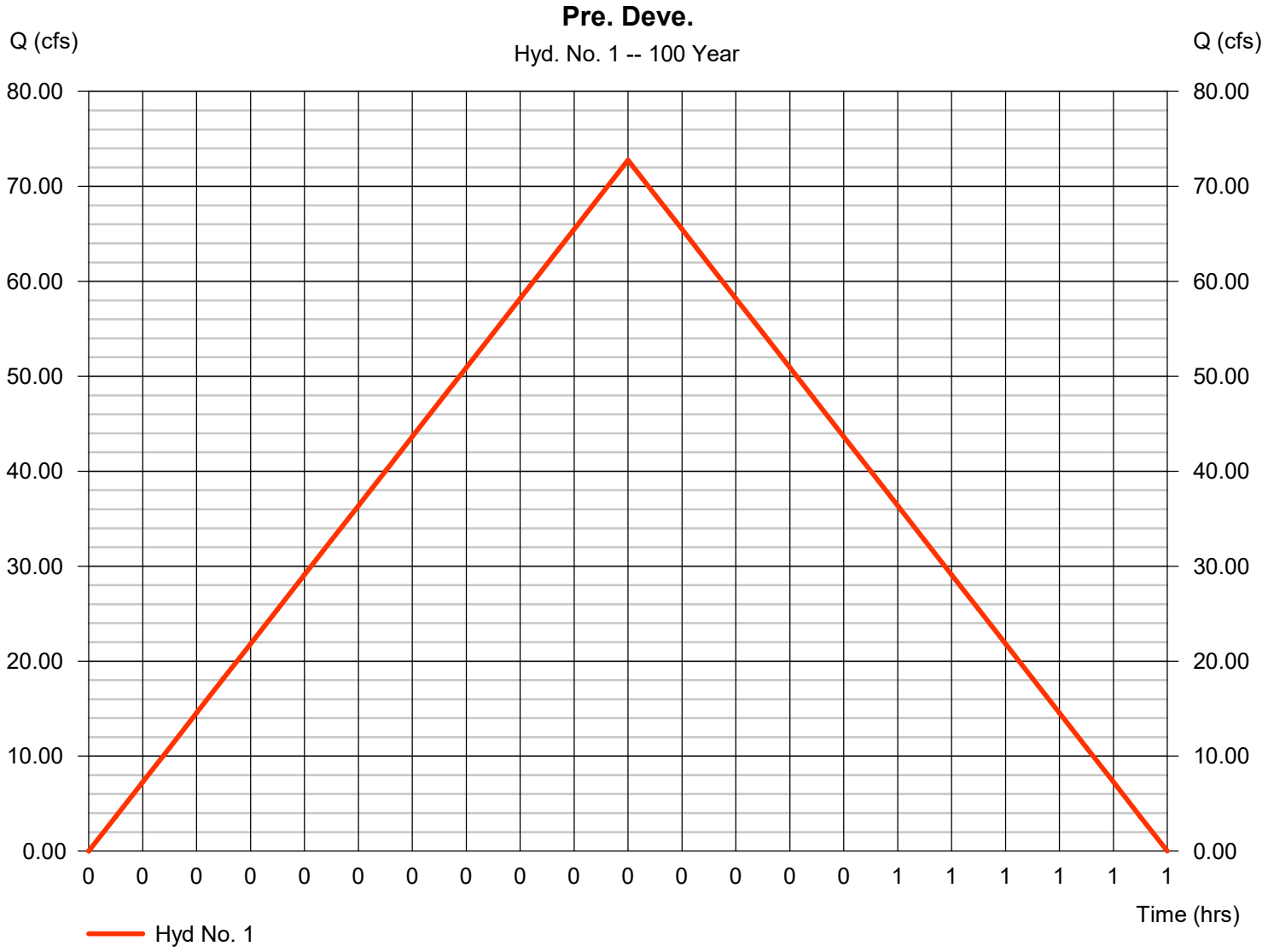
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	72.76	1	20	87,311	------	------	------	Pre. Deve.
2	Rational	126.02	1	12	90,735	------	------	------	Post Deve.
3	Reservoir	46.70	1	20	90,716	2	363.06	58,317	Pond

Hydrograph Report

Hyd. No. 1

Pre. Deve.

Hydrograph type	=	Rational	Peak discharge	=	72.76 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.33 hrs
Time interval	=	1 min	Hyd. volume	=	87,311 cuft
Drainage area	=	23.930 ac	Runoff coeff.	=	0.47
Intensity	=	6.469 in/hr	Tc by User	=	20.00 min
IDF Curve	=	Bryant 50.IDF	Asc/Rec limb fact	=	1/1



Multi-Hydrograph Plot

Hyd. No. 1

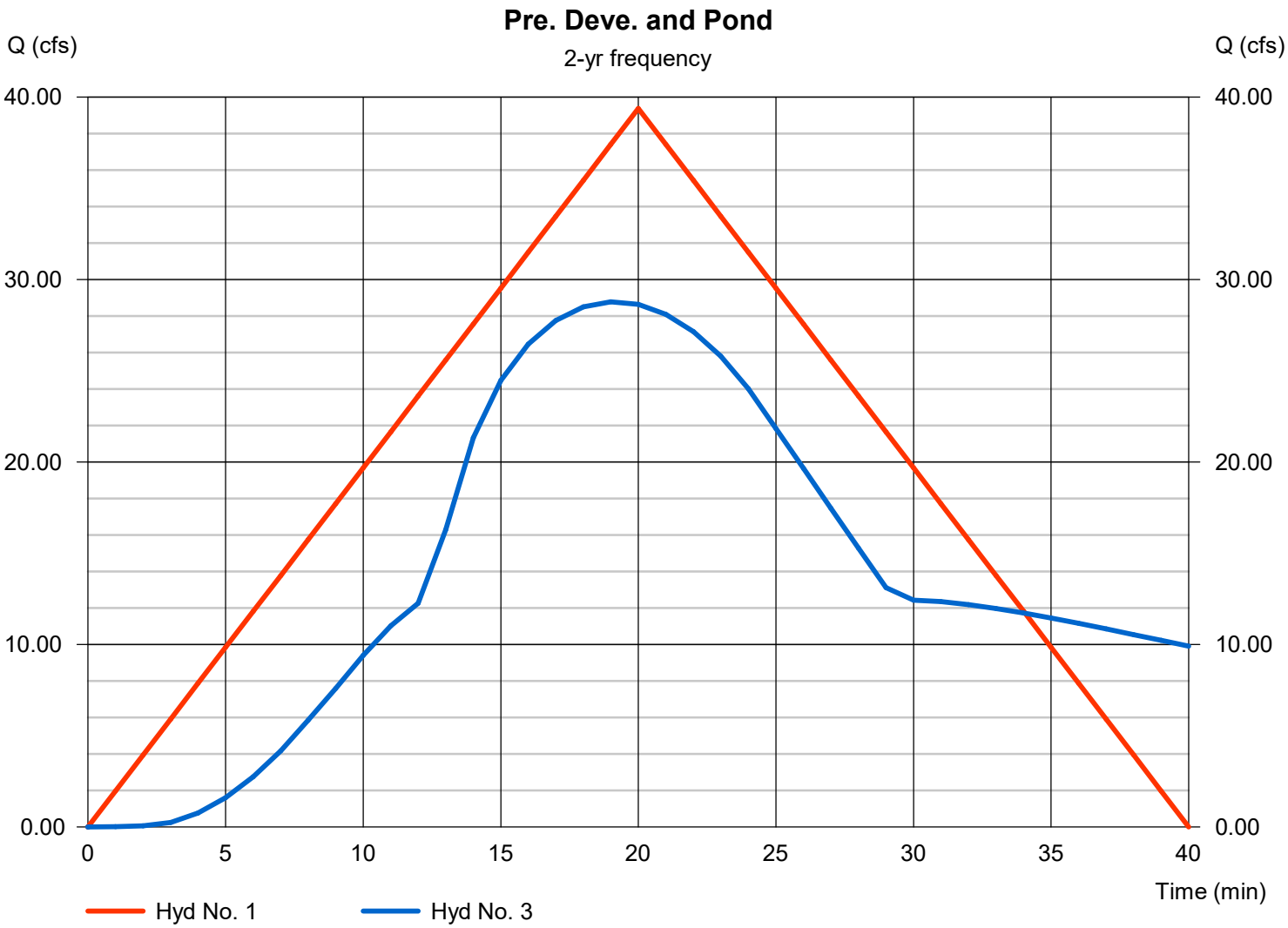
Pre. Deve.

Hydrograph type	=	Rational
Peak discharge	=	39.37 cfs
Time to peak	=	20 min
Hyd. Volume	=	47,246 cuft

Hyd. No. 3

Pond

Hydrograph type	=	Reservoir
Peak discharge	=	28.79 cfs
Time to peak	=	19 min
Hyd. Volume	=	51,181 cuft



Multi-Hydrograph Plot

Hyd. No. 1

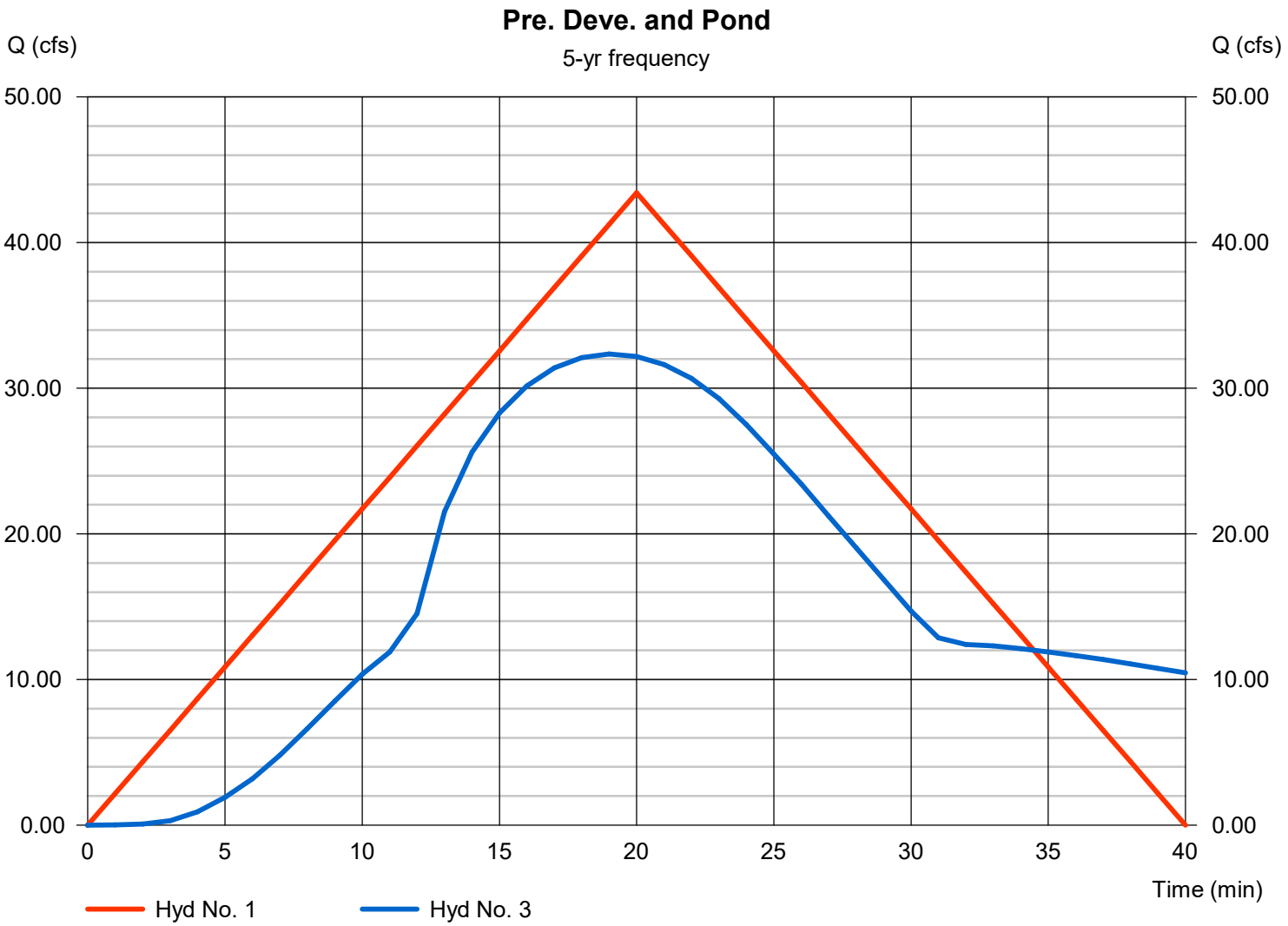
Pre. Deve.

Hydrograph type	=	Rational
Peak discharge	=	43.42 cfs
Time to peak	=	20 min
Hyd. Volume	=	52,106 cuft

Hyd. No. 3

Pond

Hydrograph type	=	Reservoir
Peak discharge	=	32.35 cfs
Time to peak	=	19 min
Hyd. Volume	=	56,907 cuft



Multi-Hydrograph Plot

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No. 1

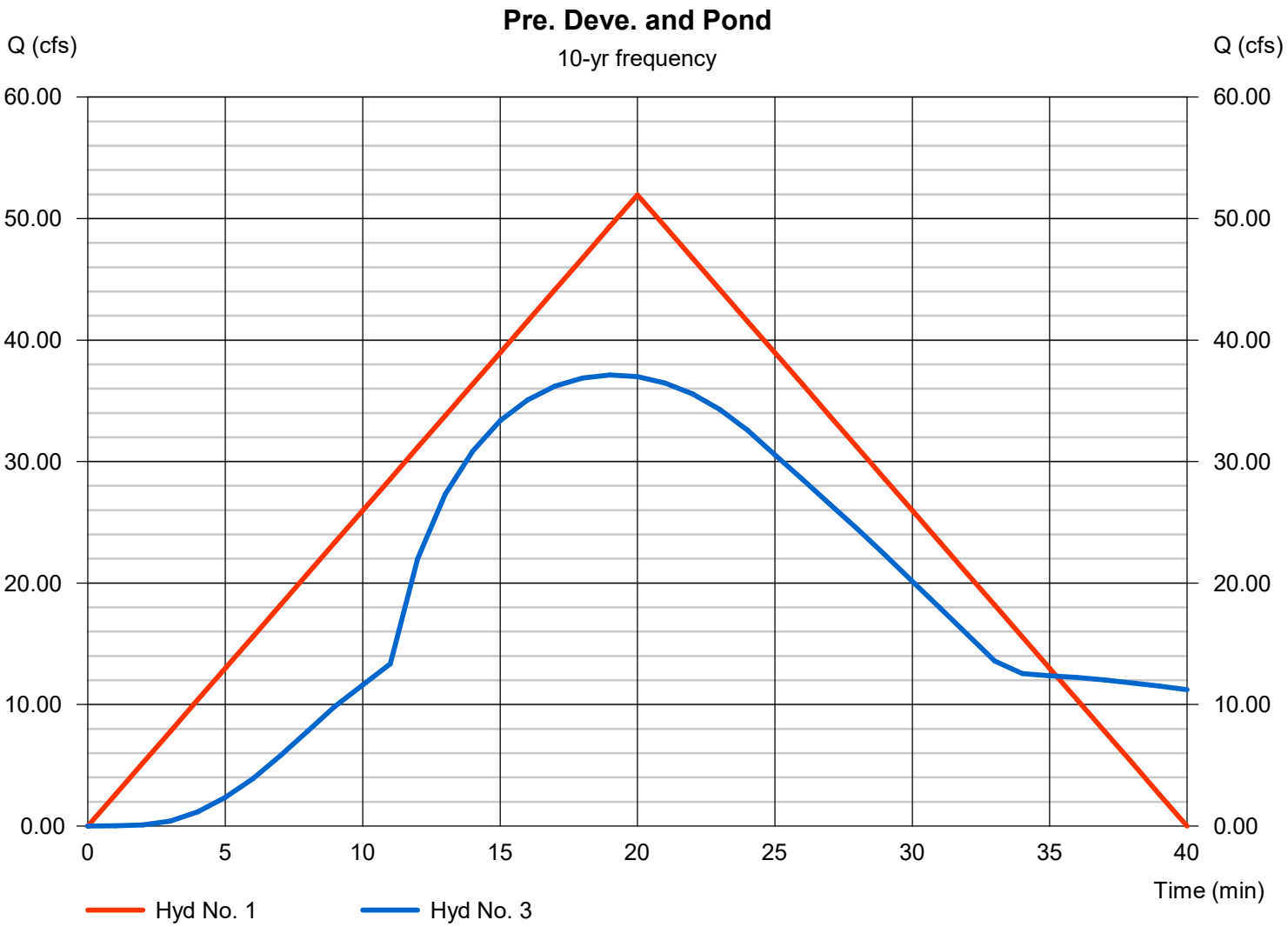
Pre. Deve.

Hydrograph type	=	Rational
Peak discharge	=	51.95 cfs
Time to peak	=	20 min
Hyd. Volume	=	62,335 cuft

Hyd. No. 3

Pond

Hydrograph type	=	Reservoir
Peak discharge	=	37.12 cfs
Time to peak	=	19 min
Hyd. Volume	=	65,777 cuft



Multi-Hydrograph Plot

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No. 1

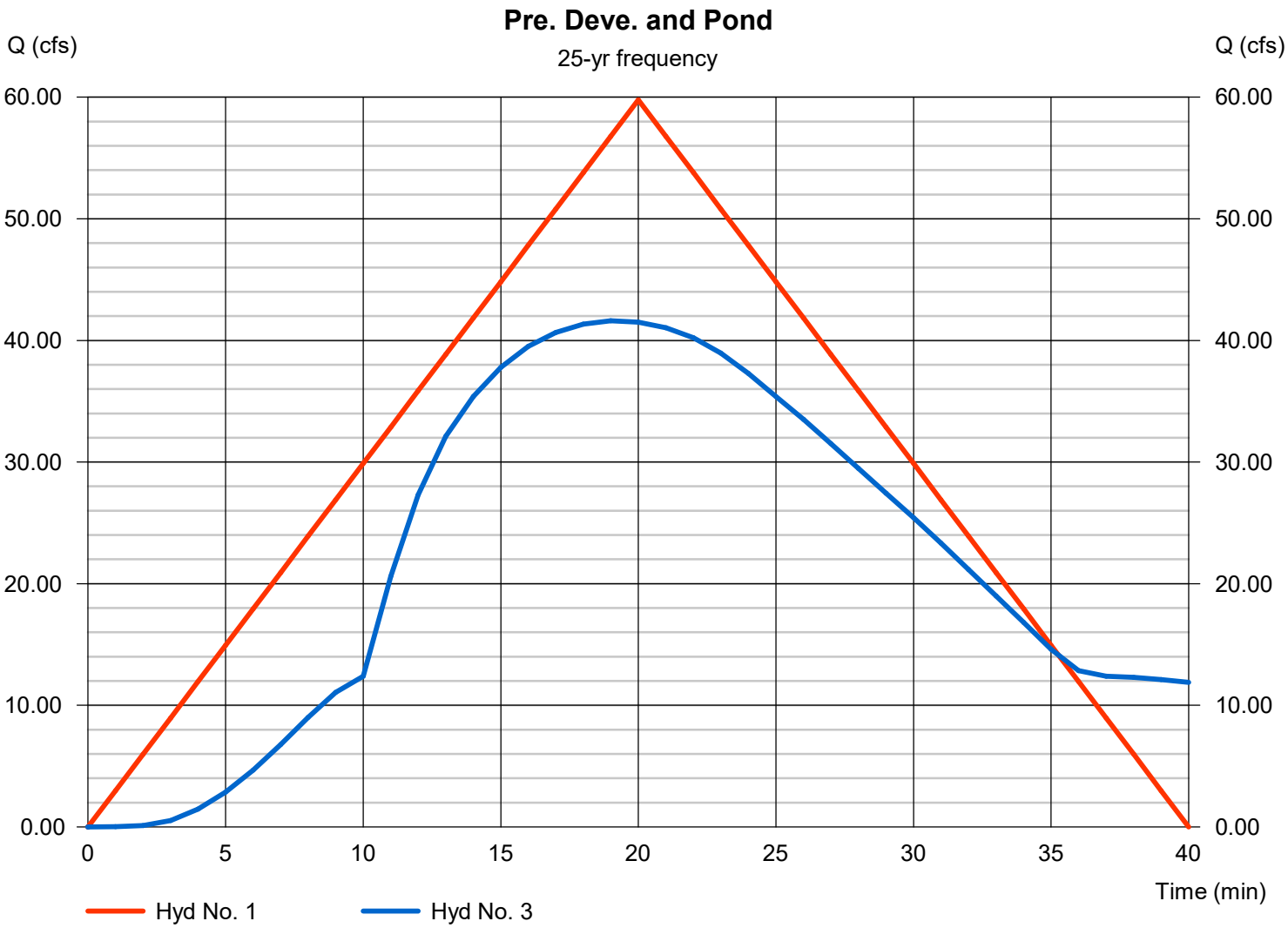
Pre. Deve.

Hydrograph type	=	Rational
Peak discharge	=	59.77 cfs
Time to peak	=	20 min
Hyd. Volume	=	71,722 cuft

Hyd. No. 3

Pond

Hydrograph type	=	Reservoir
Peak discharge	=	41.61 cfs
Time to peak	=	19 min
Hyd. Volume	=	75,202 cuft



Multi-Hydrograph Plot

Hyd. No. 1

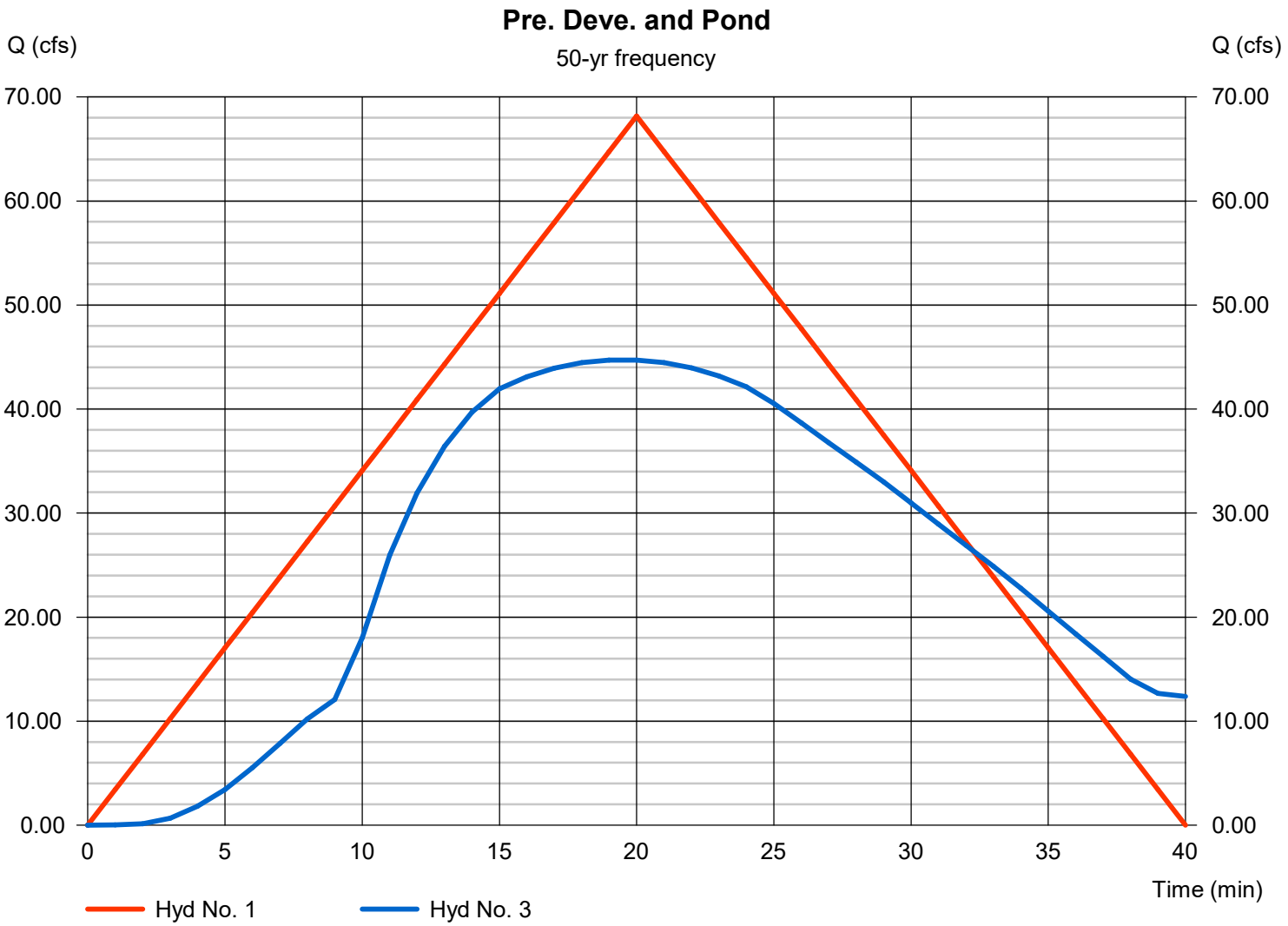
Pre. Deve.

Hydrograph type	=	Rational
Peak discharge	=	68.17 cfs
Time to peak	=	20 min
Hyd. Volume	=	81,798 cuft

Hyd. No. 3

Pond

Hydrograph type	=	Reservoir
Peak discharge	=	44.71 cfs
Time to peak	=	19 min
Hyd. Volume	=	85,545 cuft



Multi-Hydrograph Plot

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No. 1

Pre. Deve.

Hydrograph type	=	Rational
Peak discharge	=	72.76 cfs
Time to peak	=	20 min
Hyd. Volume	=	87,311 cuft

Hyd. No. 3

Pond

Hydrograph type	=	Reservoir
Peak discharge	=	46.70 cfs
Time to peak	=	20 min
Hyd. Volume	=	90,716 cuft

