Bryant ALE Addition

Stormwater Management Report

City of Bryant, Saline County, Arkansas

Original Submittal:
July 9, 2025

MINTON ENGINEERING, INC.
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Cabot, AR 72023
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I. Pre-Development Conditions

This property is located at the southwest corner of Wilkerson & Reynolds Roads. The site is developed and is currently occupied by the Bryant Schools ALE program. The site has two drainage areas and is split almost in half draining east and west.

II. Post-Development Conditions

This project will construct a 3,500 SF addition on the west side of the existing building along Wilkerson Road. The drainage patters for this property will remain the same except for an additional 0.11 acres of hard surface added to the west drainage area.

III. Design Considerations

The detention for this project was designed using the rational method. The pre-development flow and post development flow were determined by the attached calculations are summarized below. The calculations were compiled using Autodesk Hydraflow, information used is attached to this report.

Only Drainage Area 1 is shown in the Summary Table, there were no changes to Drainage Area 2.

Summary Table:

Description	Pre-Dev DA 1	Post-Dev DA 1	Difference
2-Year Storm	2.49 cfs	2.81 cfs	+0.32
5-Year Storm	2.90 cfs	3.28 cfs	+0.38
10-Year Storm	3.21 cfs	3.63 cfs	+0.42
25-Year Storm	3.67 cfs	4.15 cfs	+0.48
50-Year Storm	4.04 cfs	4.56 cfs	+0.52
100-Year Storm	4.40 cfs	4.98 cfs	+0.58

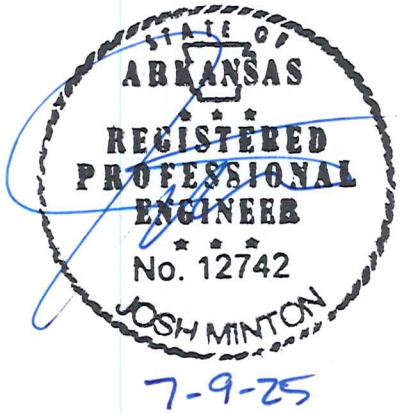
IV. Conclusion

This development will add less than 0.6 cfs to the west drainage area for the 100-year storm. We feel this minor increase will be mitigated by the storm water running through approximately 250' of school property before reaching the residential area to the west. The drainage will run through a wooded area as well as a garden maintained by the school district.

Please consider this report and let me know if any additional information is required.

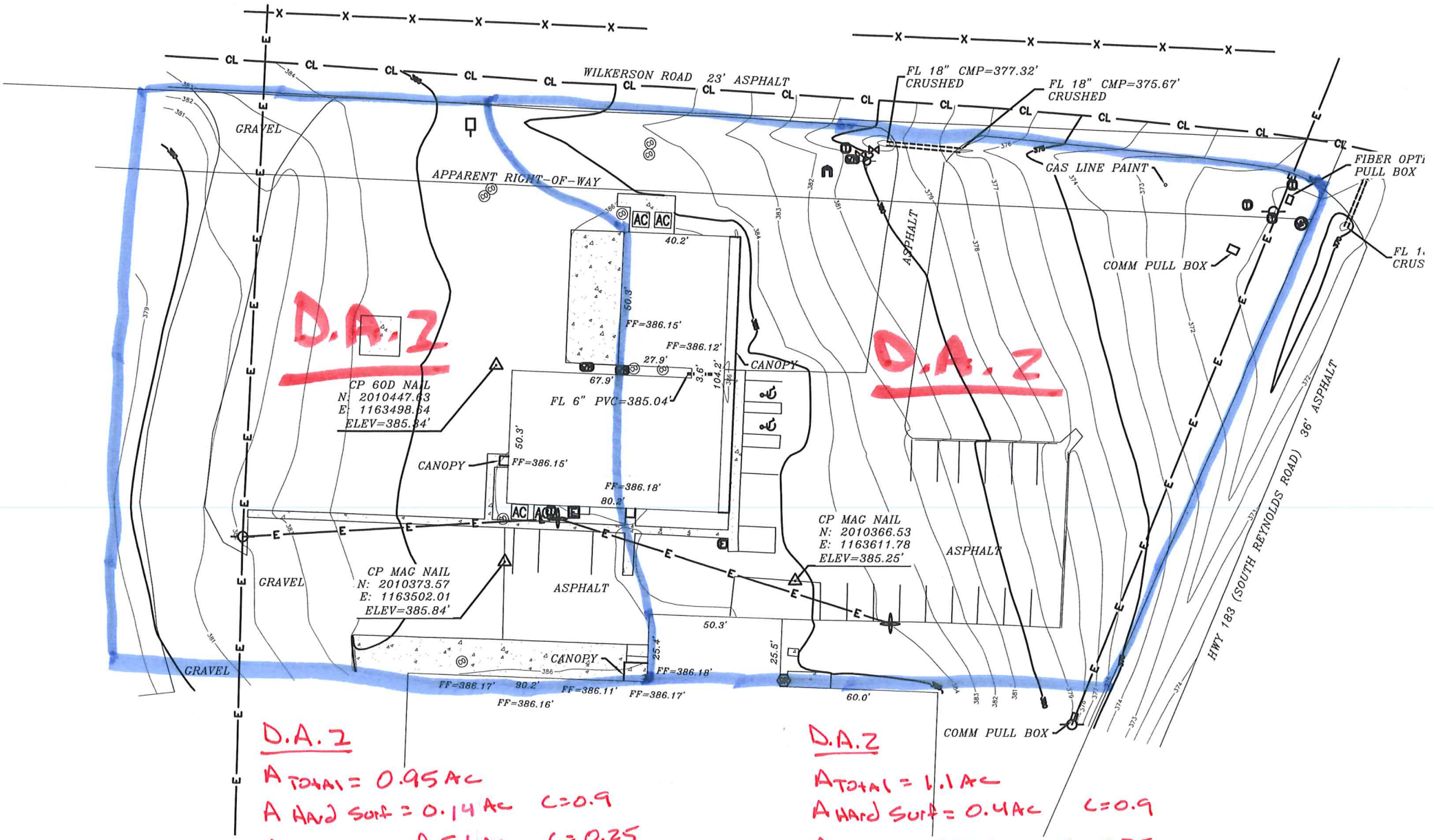
Sincerely,

Josh Minton, PE



HYDRAULIC CALCULATIONS

Pre-Dev. Drainage Worksheet



D.A.2

$A_{TOTAL} = 0.95\ Ac$

$A_{Hard\ Surf} = 0.14\ Ac \quad C = 0.9$

$A_{Grass} = 0.51\ Ac \quad C = 0.25$

$A_{Gravel} = 0.3\ Ac \quad C = 0.6$

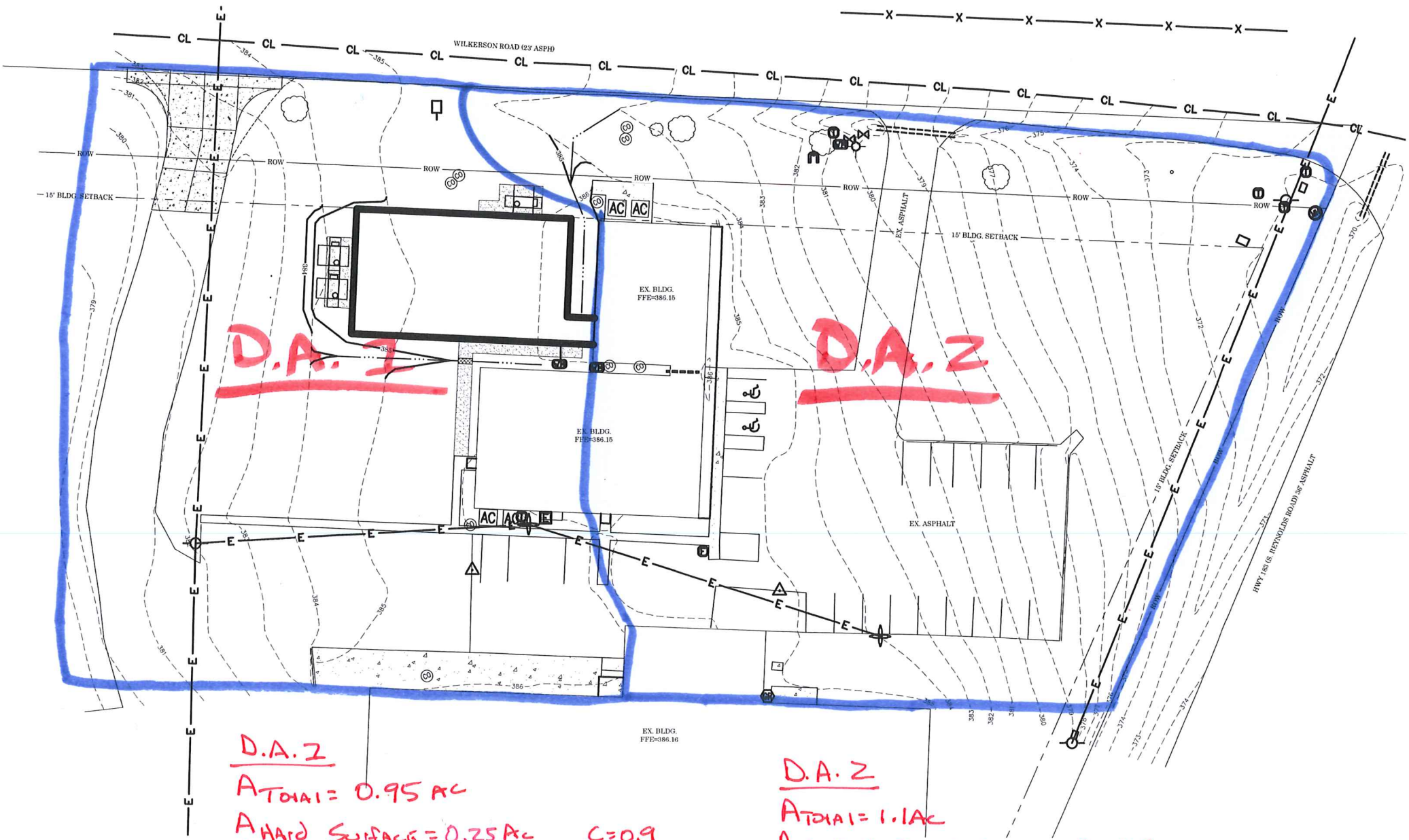
D.A.2

$A_{TOTAL} = 1.1\ Ac$

$A_{Hard\ Surf} = 0.4\ Ac \quad C = 0.9$

$A_{Grass} = 0.7\ Ac \quad C = 0.25$

Post-Dev. Drainage Worksheet



D.A. 1

$A_{TOTAL} = 0.95$ Ac

$A_{Hard\ Surface} = 0.25$ Ac $C = 0.9$

$A_{green} = 0.43$ Ac $C = 0.25$

$A_{gravel} = 0.27$ Ac $C = 0.6$

D.A. 2

$A_{TOTAL} = 1.1$ Ac

$A_{Hard\ Surf} = 0.4$ Ac $C = 0.9$

$A_{green} = 0.7$ Ac $C = 0.25$

Watershed Model Schematic

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	2.489	1	5	747	------	------	------	Pre-Dev DA 1
2	Rational	3.070	1	5	921	------	------	------	Pre-Dev DA 2
3	Rational	2.814	1	5	844	------	------	------	Post-Dev DA 1
4	Rational	3.070	1	5	921	------	------	------	Post-Dev DA 2

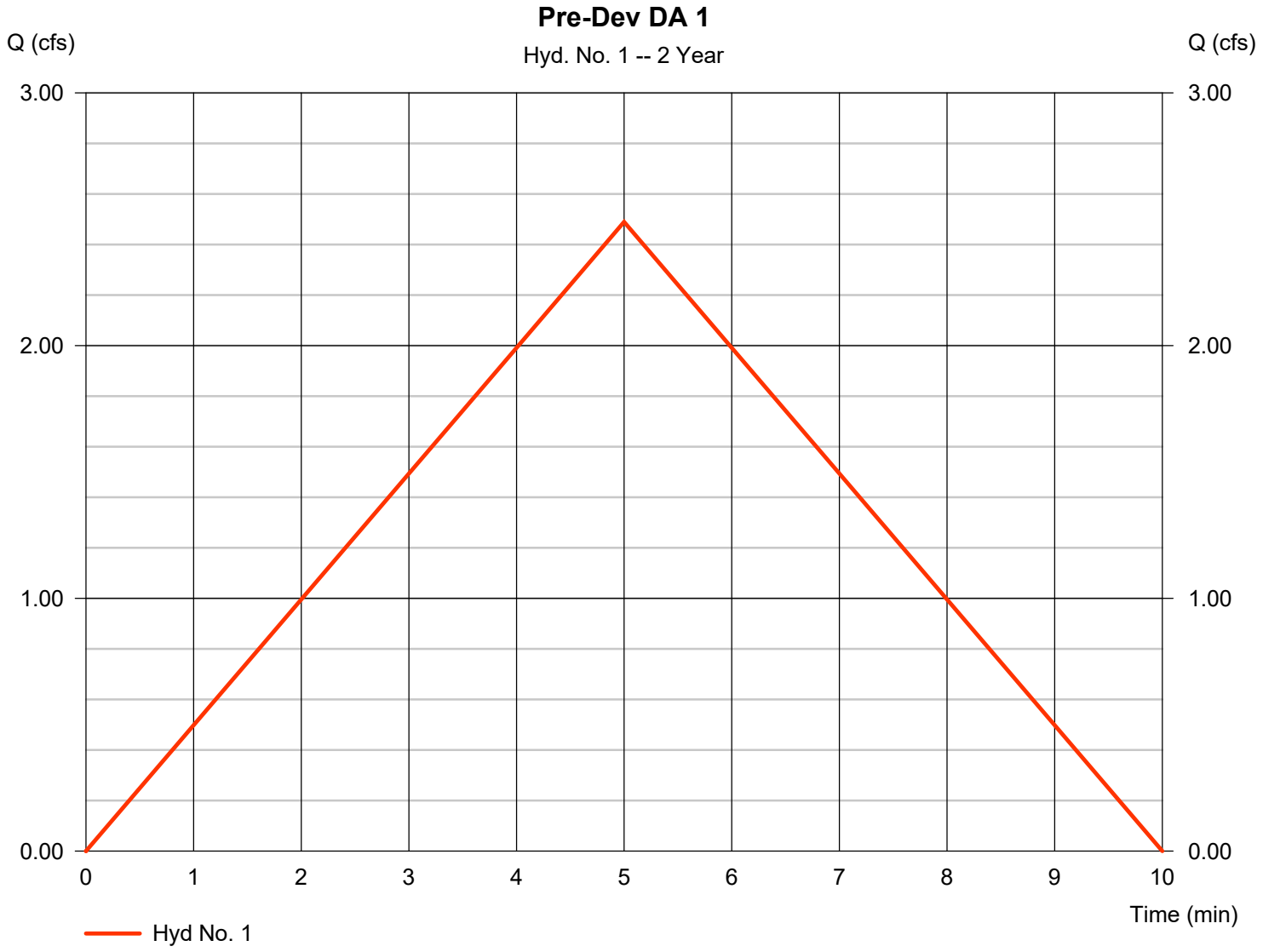
Hydrograph Report

Hyd. No. 1

Pre-Dev DA 1

Hydrograph type	=	Rational	Peak discharge	=	2.489 cfs
Storm frequency	=	2 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	747 cuft
Drainage area	=	0.950 ac	Runoff coeff.	=	0.46*
Intensity	=	5.697 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.140 x 0.90) + (0.510 x 0.25) + (0.300 x 0.60)] / 0.950



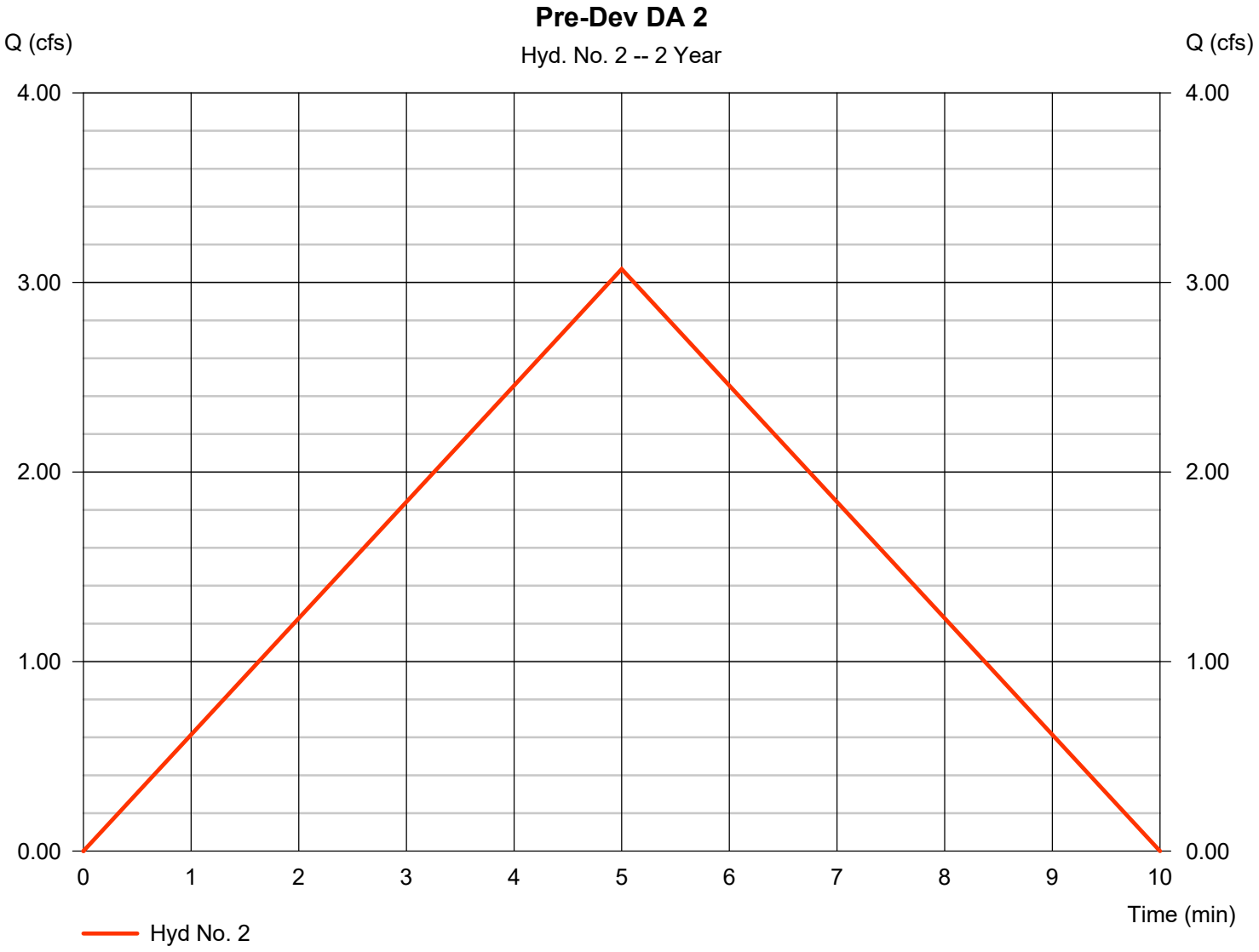
Hydrograph Report

Hyd. No. 2

Pre-Dev DA 2

Hydrograph type	=	Rational	Peak discharge	=	3.070 cfs
Storm frequency	=	2 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	921 cuft
Drainage area	=	1.100 ac	Runoff coeff.	=	0.49*
Intensity	=	5.697 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.400 x 0.90) + (0.700 x 0.25)] / 1.100



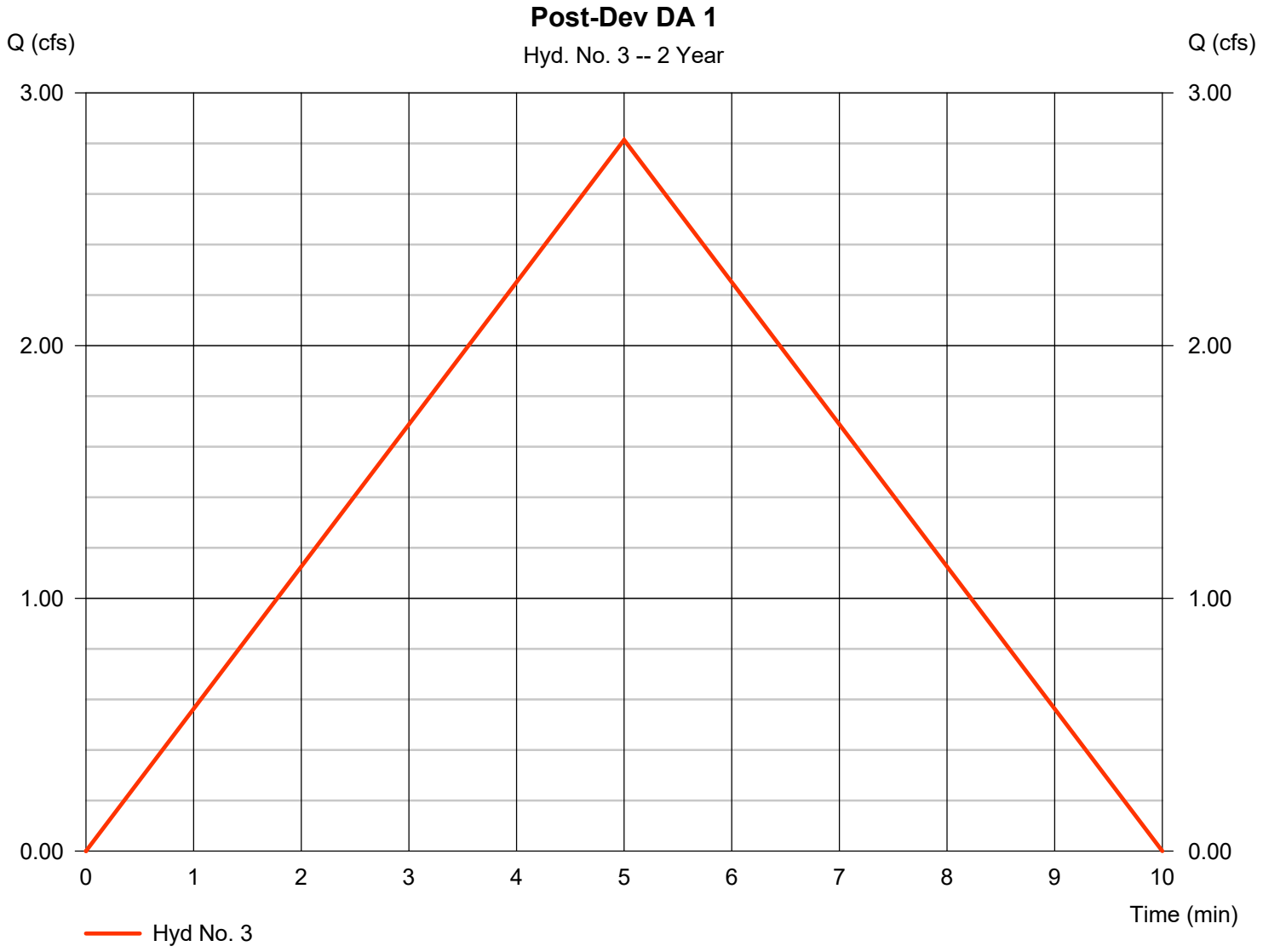
Hydrograph Report

Hyd. No. 3

Post-Dev DA 1

Hydrograph type	=	Rational	Peak discharge	=	2.814 cfs
Storm frequency	=	2 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	844 cuft
Drainage area	=	0.950 ac	Runoff coeff.	=	0.52*
Intensity	=	5.697 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.250 x 0.90) + (0.430 x 0.25) + (0.270 x 0.60)] / 0.950



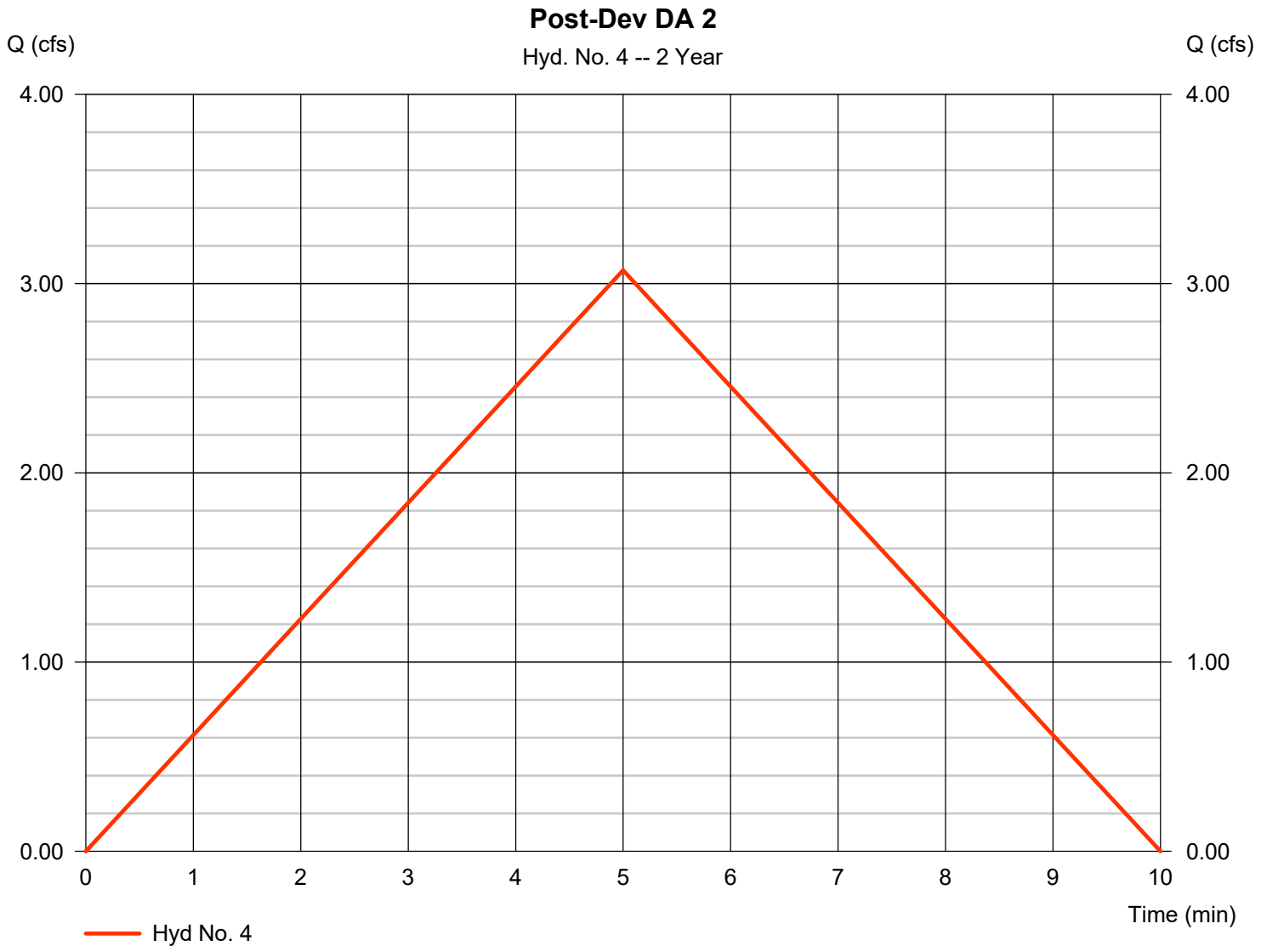
Hydrograph Report

Hyd. No. 4

Post-Dev DA 2

Hydrograph type	=	Rational	Peak discharge	=	3.070 cfs
Storm frequency	=	2 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	921 cuft
Drainage area	=	1.100 ac	Runoff coeff.	=	0.49*
Intensity	=	5.697 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.400 x 0.90) + (0.700 x 0.25)] / 1.100



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	2.902	1	5	871	------	------	------	Pre-Dev DA 1
2	Rational	3.580	1	5	1,074	------	------	------	Pre-Dev DA 2
3	Rational	3.281	1	5	984	------	------	------	Post-Dev DA 1
4	Rational	3.580	1	5	1,074	------	------	------	Post-Dev DA 2

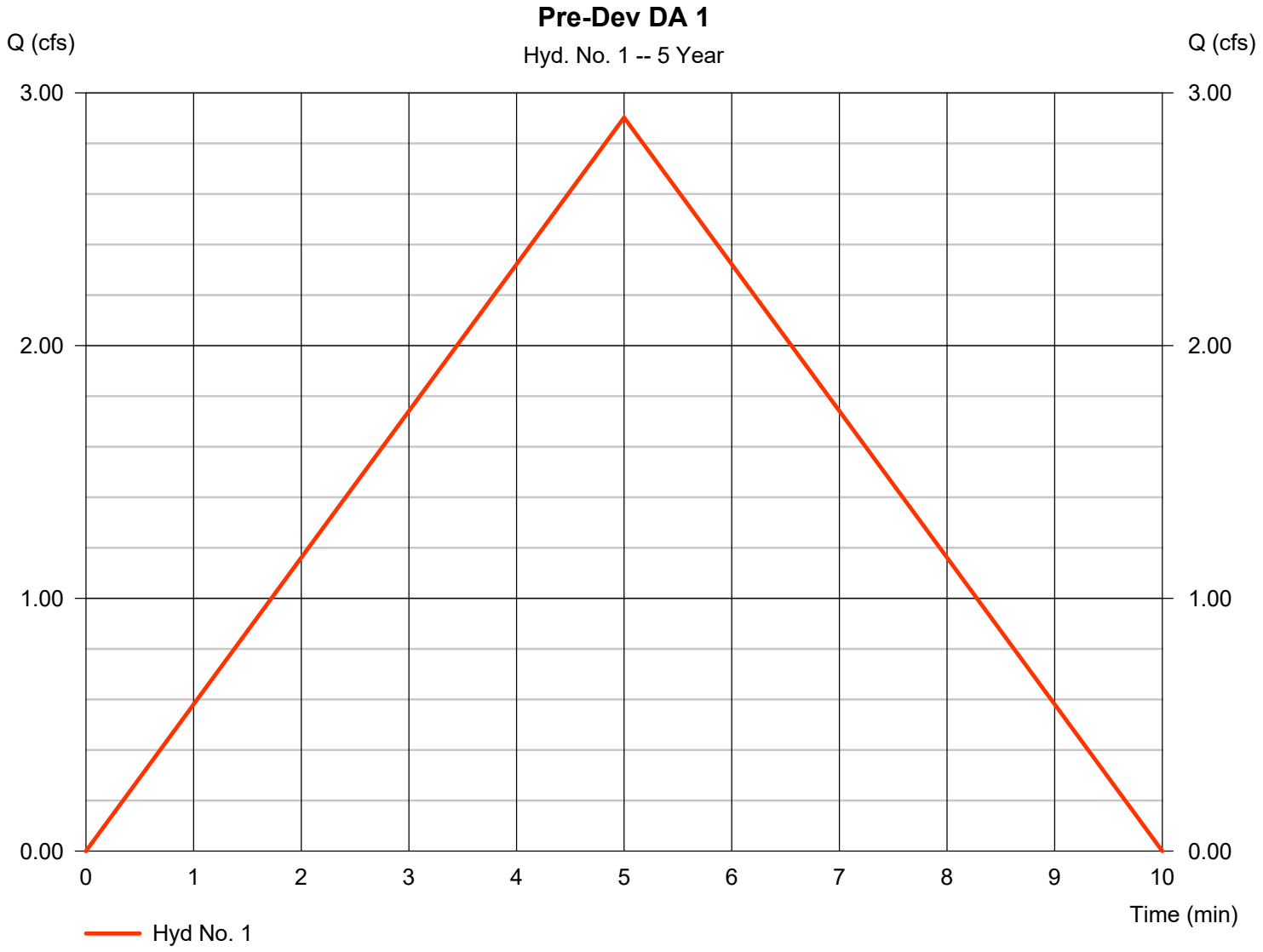
Hydrograph Report

Hyd. No. 1

Pre-Dev DA 1

Hydrograph type	=	Rational	Peak discharge	=	2.902 cfs
Storm frequency	=	5 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	871 cuft
Drainage area	=	0.950 ac	Runoff coeff.	=	0.46*
Intensity	=	6.642 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.140 x 0.90) + (0.510 x 0.25) + (0.300 x 0.60)] / 0.950



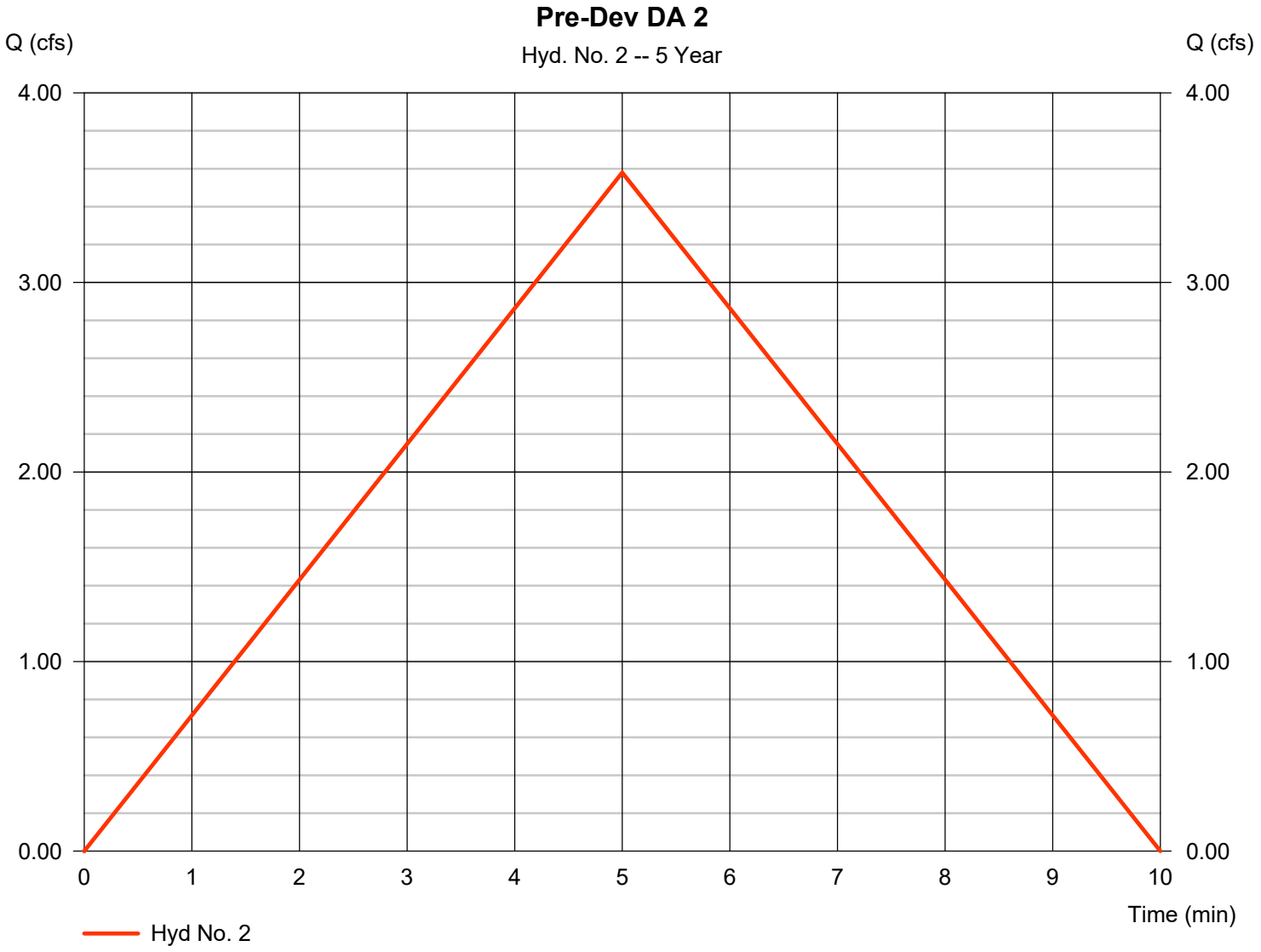
Hydrograph Report

Hyd. No. 2

Pre-Dev DA 2

Hydrograph type	=	Rational	Peak discharge	=	3.580 cfs
Storm frequency	=	5 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,074 cuft
Drainage area	=	1.100 ac	Runoff coeff.	=	0.49*
Intensity	=	6.642 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.400 x 0.90) + (0.700 x 0.25)] / 1.100



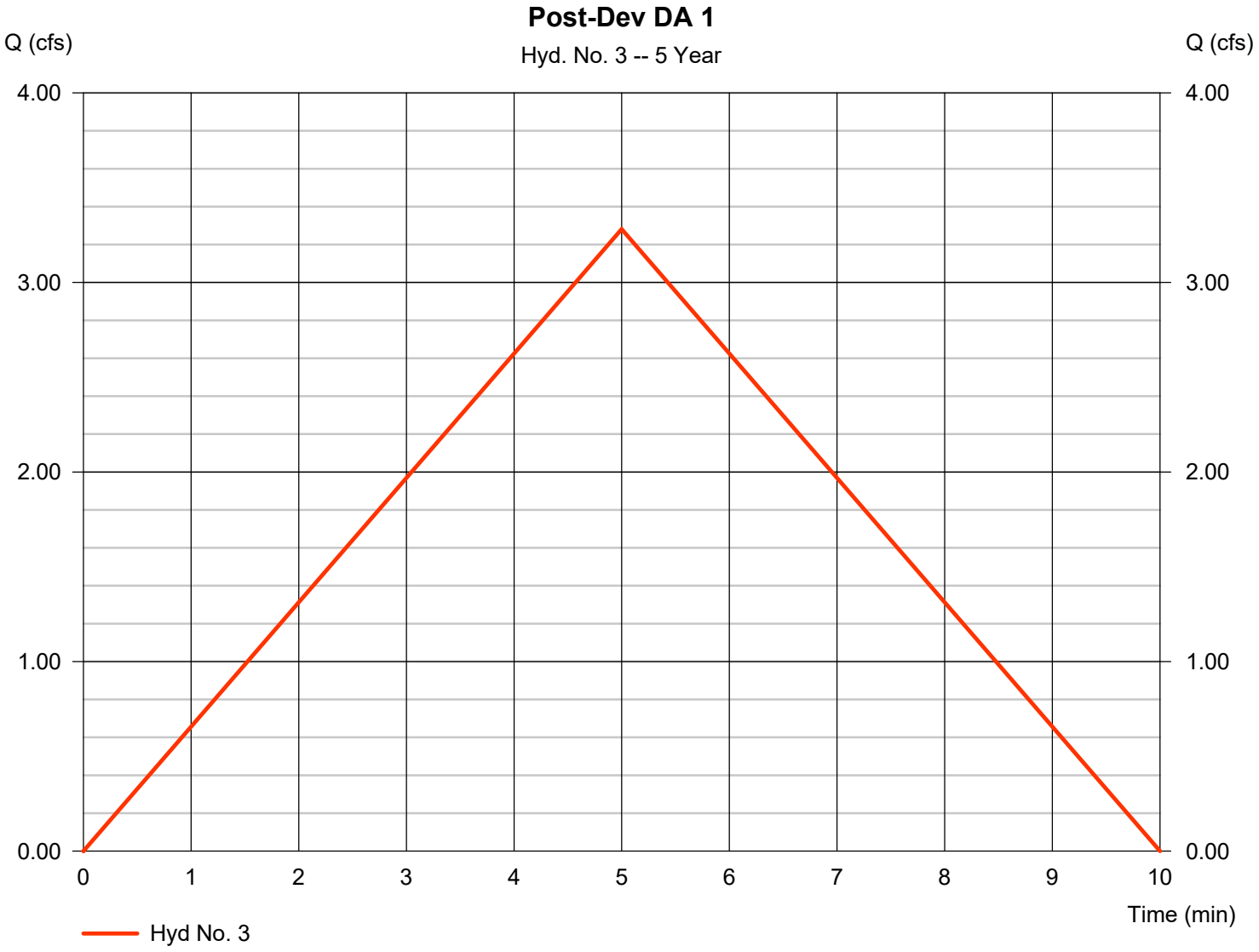
Hydrograph Report

Hyd. No. 3

Post-Dev DA 1

Hydrograph type	=	Rational	Peak discharge	=	3.281 cfs
Storm frequency	=	5 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	984 cuft
Drainage area	=	0.950 ac	Runoff coeff.	=	0.52*
Intensity	=	6.642 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.250 x 0.90) + (0.430 x 0.25) + (0.270 x 0.60)] / 0.950



Hydrograph Report

Hyd. No. 4

Post-Dev DA 2

Hydrograph type	=	Rational	Peak discharge	=	3.580 cfs
Storm frequency	=	5 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,074 cuft
Drainage area	=	1.100 ac	Runoff coeff.	=	0.49*
Intensity	=	6.642 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.400 x 0.90) + (0.700 x 0.25)] / 1.100

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	3.212	1	5	964	------	------	------	Pre-Dev DA 1
2	Rational	3.962	1	5	1,189	------	------	------	Pre-Dev DA 2
3	Rational	3.632	1	5	1,089	------	------	------	Post-Dev DA 1
4	Rational	3.962	1	5	1,189	------	------	------	Post-Dev DA 2

Hydrograph Report

Hyd. No. 1

Pre-Dev DA 1

Hydrograph type	=	Rational	Peak discharge	=	3.212 cfs
Storm frequency	=	10 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	964 cuft
Drainage area	=	0.950 ac	Runoff coeff.	=	0.46*
Intensity	=	7.351 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.140 x 0.90) + (0.510 x 0.25) + (0.300 x 0.60)] / 0.950

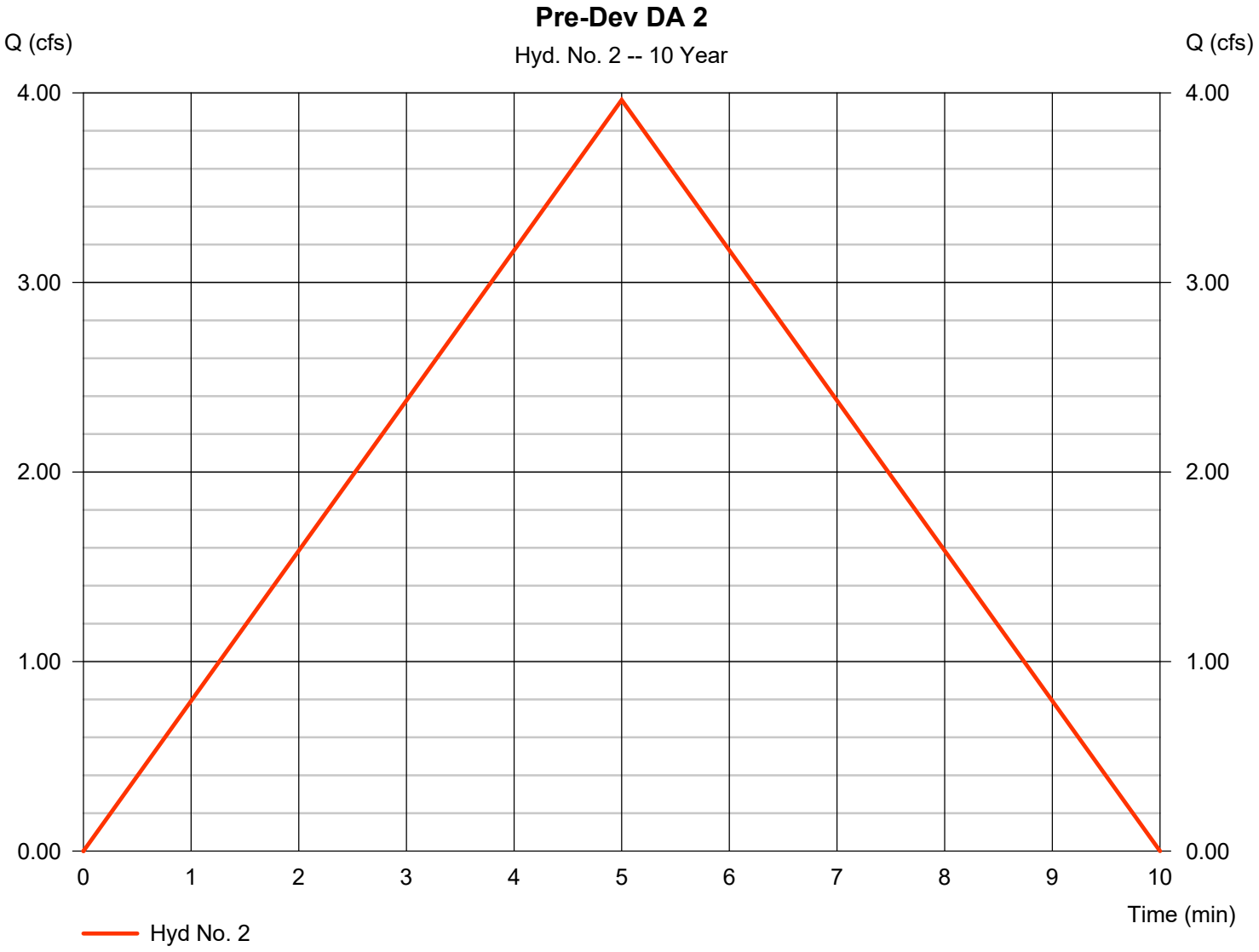
Hydrograph Report

Hyd. No. 2

Pre-Dev DA 2

Hydrograph type	=	Rational	Peak discharge	=	3.962 cfs
Storm frequency	=	10 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,189 cuft
Drainage area	=	1.100 ac	Runoff coeff.	=	0.49*
Intensity	=	7.351 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.400 x 0.90) + (0.700 x 0.25)] / 1.100



Hydrograph Report

Hyd. No. 3

Post-Dev DA 1

Hydrograph type	=	Rational	Peak discharge	=	3.632 cfs
Storm frequency	=	10 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,089 cuft
Drainage area	=	0.950 ac	Runoff coeff.	=	0.52*
Intensity	=	7.351 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.250 x 0.90) + (0.430 x 0.25) + (0.270 x 0.60)] / 0.950

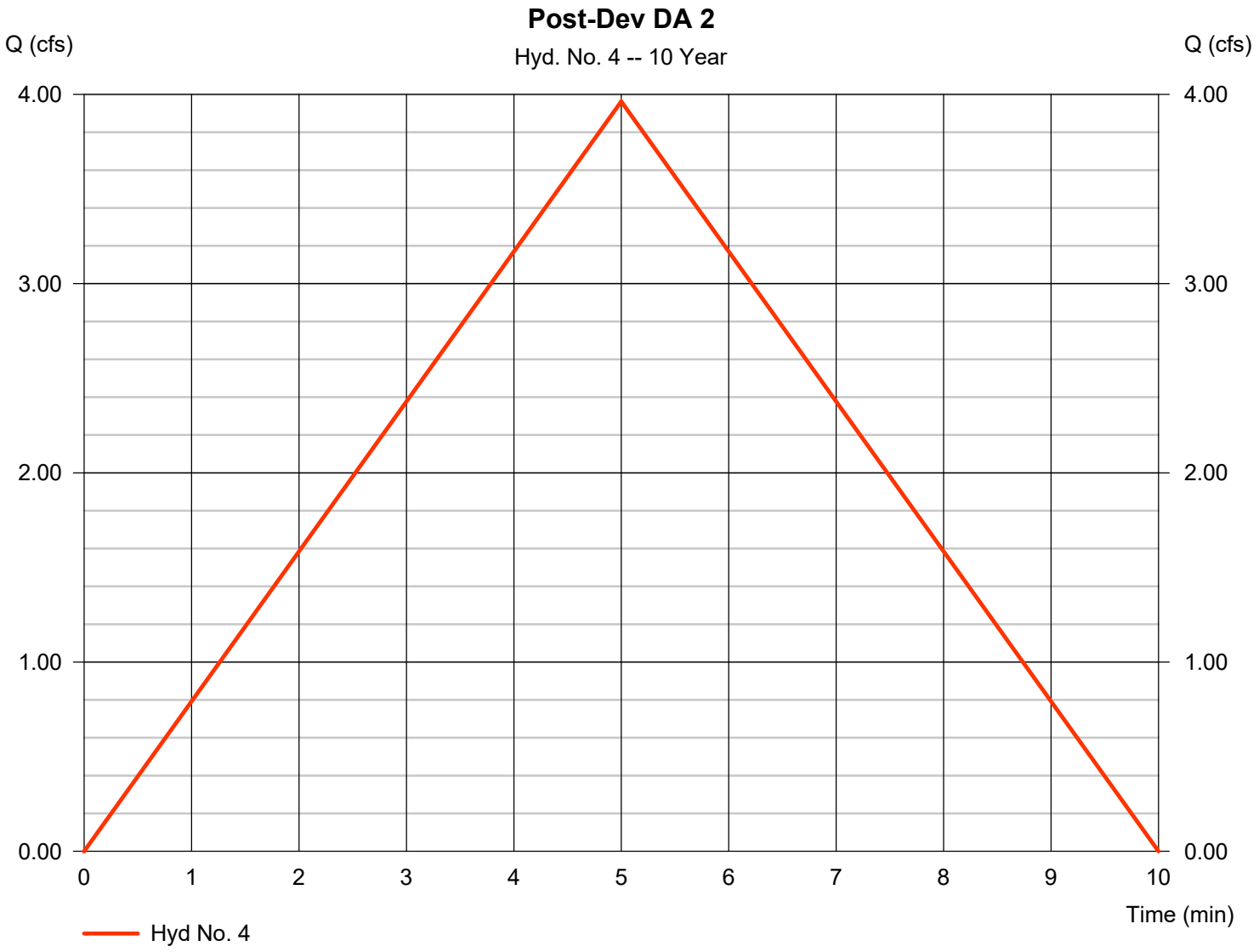
Hydrograph Report

Hyd. No. 4

Post-Dev DA 2

Hydrograph type	=	Rational	Peak discharge	=	3.962 cfs
Storm frequency	=	10 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,189 cuft
Drainage area	=	1.100 ac	Runoff coeff.	=	0.49*
Intensity	=	7.351 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.400 x 0.90) + (0.700 x 0.25)] / 1.100



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	3.674	1	5	1,102	------	------	------	Pre-Dev DA 1
2	Rational	4.531	1	5	1,359	------	------	------	Pre-Dev DA 2
3	Rational	4.153	1	5	1,246	------	------	------	Post-Dev DA 1
4	Rational	4.531	1	5	1,359	------	------	------	Post-Dev DA 2

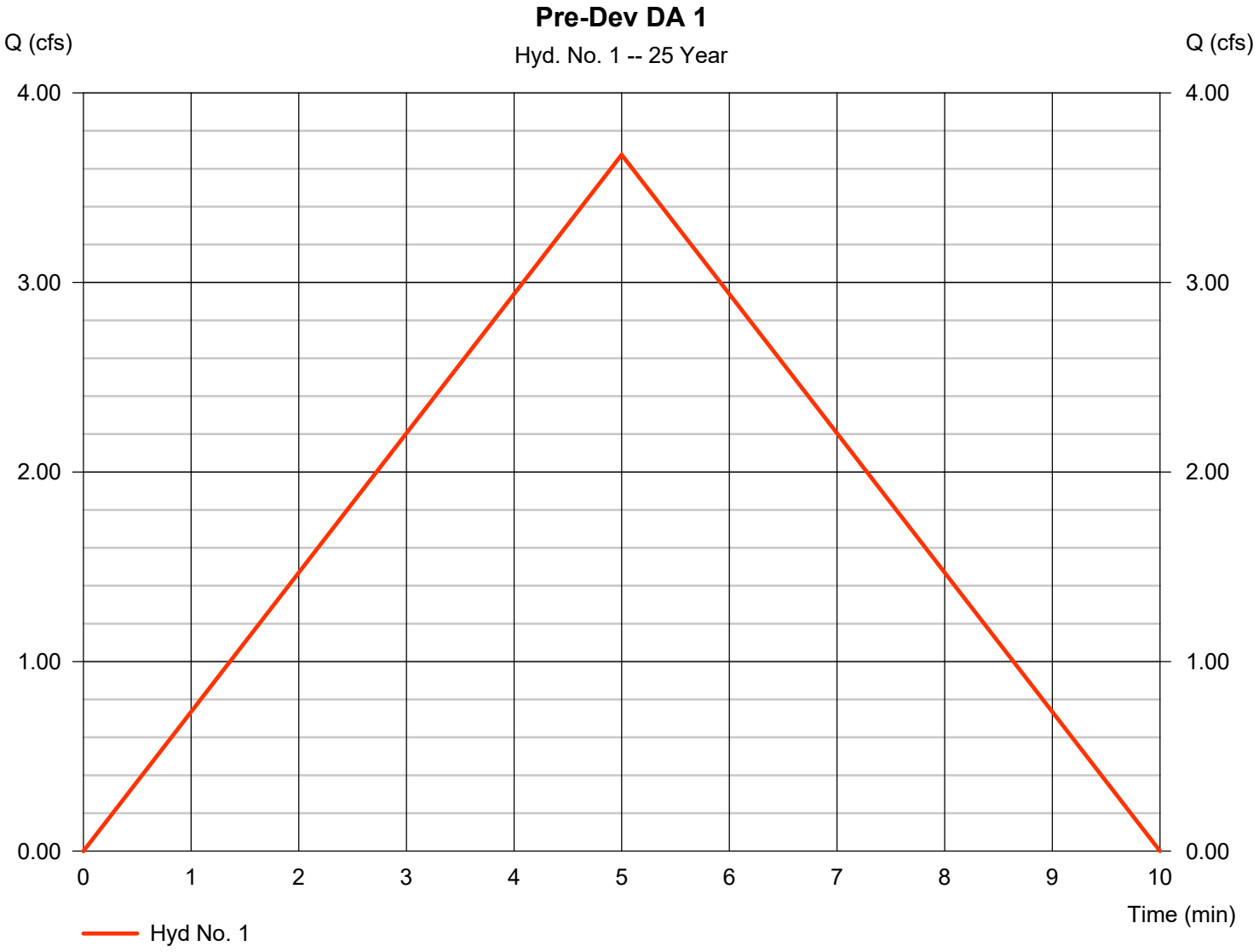
Hydrograph Report

Hyd. No. 1

Pre-Dev DA 1

Hydrograph type	=	Rational	Peak discharge	=	3.674 cfs
Storm frequency	=	25 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,102 cuft
Drainage area	=	0.950 ac	Runoff coeff.	=	0.46*
Intensity	=	8.406 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.140 x 0.90) + (0.510 x 0.25) + (0.300 x 0.60)] / 0.950



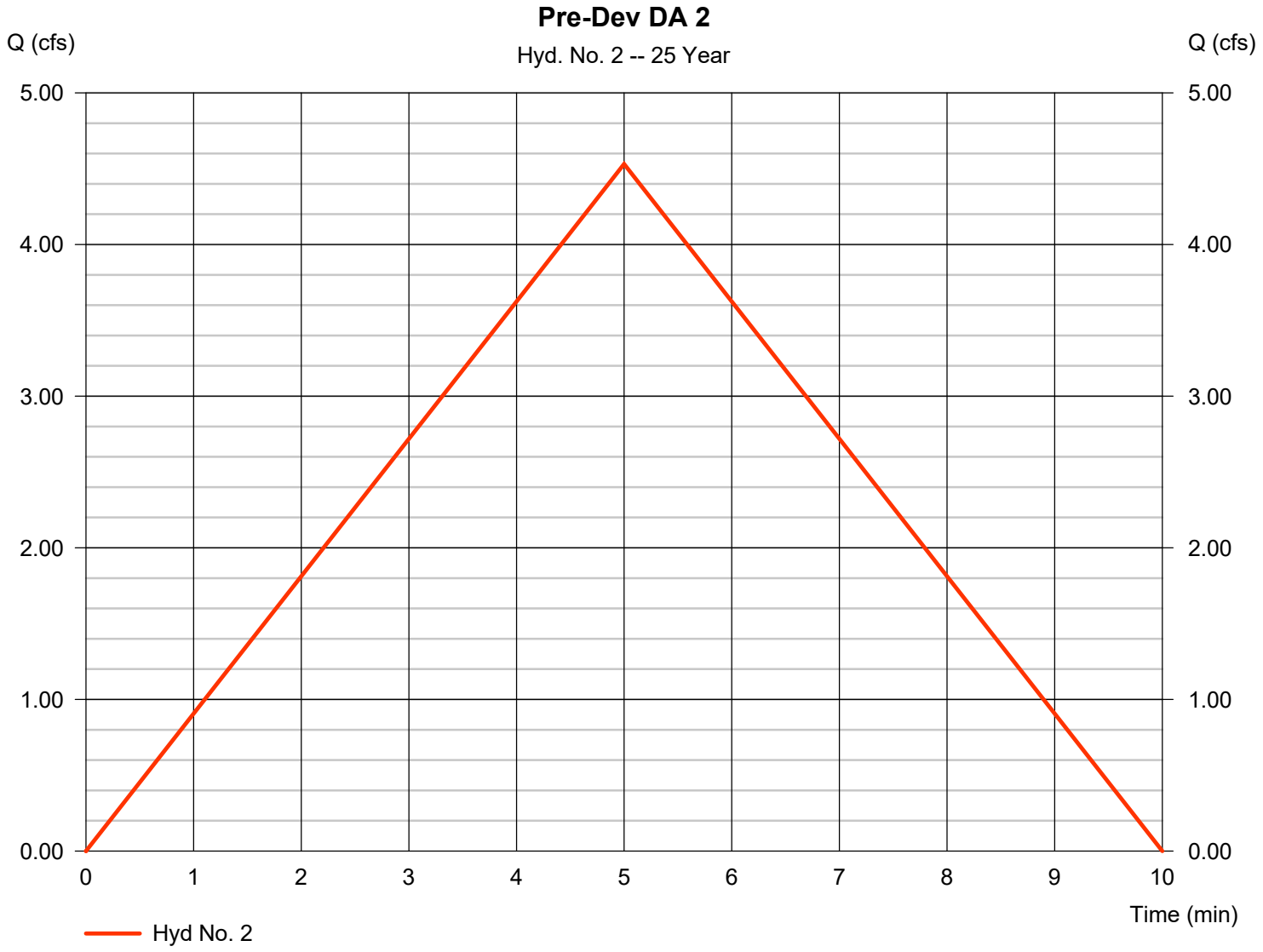
Hydrograph Report

Hyd. No. 2

Pre-Dev DA 2

Hydrograph type	=	Rational	Peak discharge	=	4.531 cfs
Storm frequency	=	25 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,359 cuft
Drainage area	=	1.100 ac	Runoff coeff.	=	0.49*
Intensity	=	8.406 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.400 x 0.90) + (0.700 x 0.25)] / 1.100



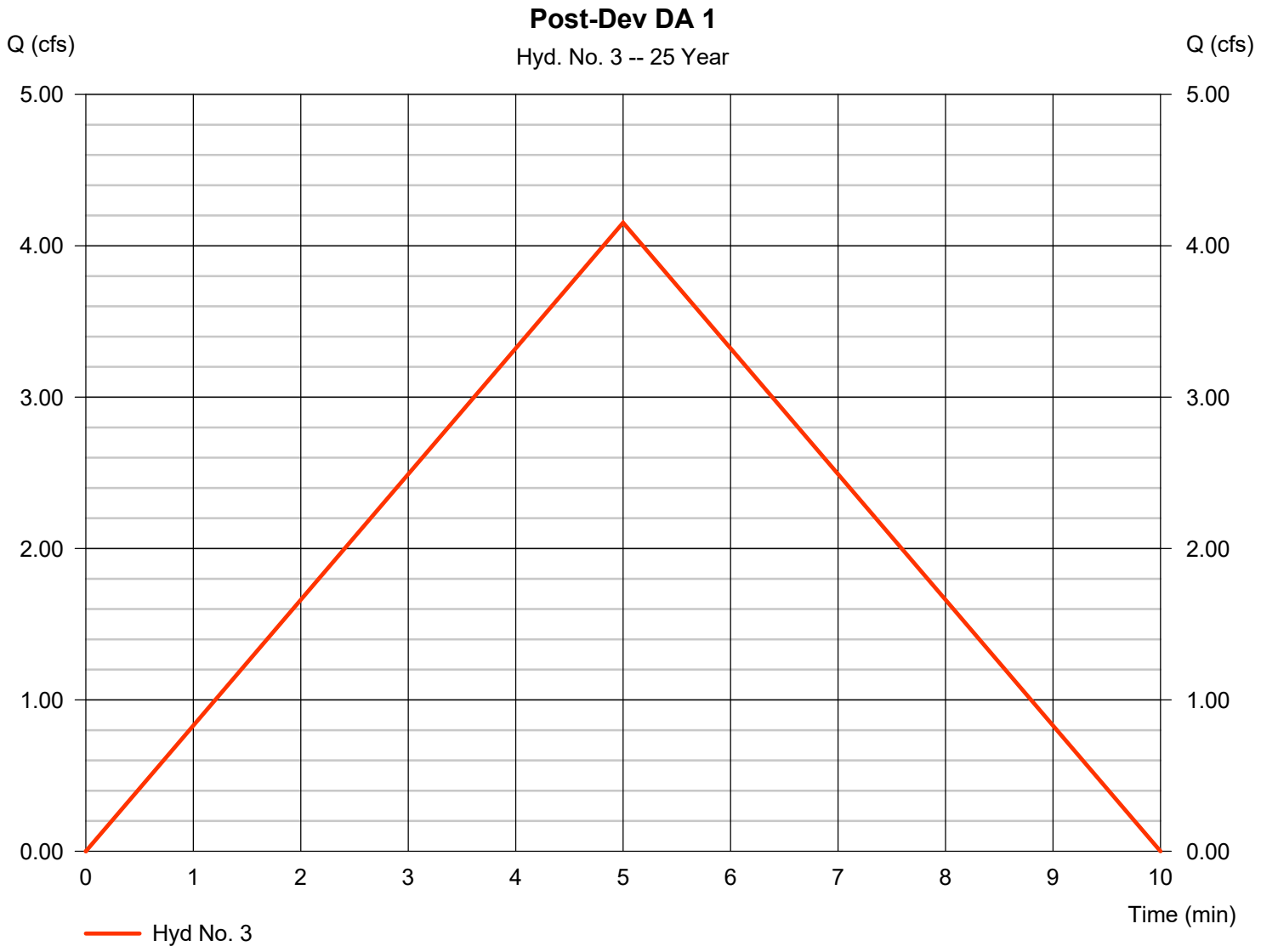
Hydrograph Report

Hyd. No. 3

Post-Dev DA 1

Hydrograph type	=	Rational	Peak discharge	=	4.153 cfs
Storm frequency	=	25 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,246 cuft
Drainage area	=	0.950 ac	Runoff coeff.	=	0.52*
Intensity	=	8.406 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.250 x 0.90) + (0.430 x 0.25) + (0.270 x 0.60)] / 0.950



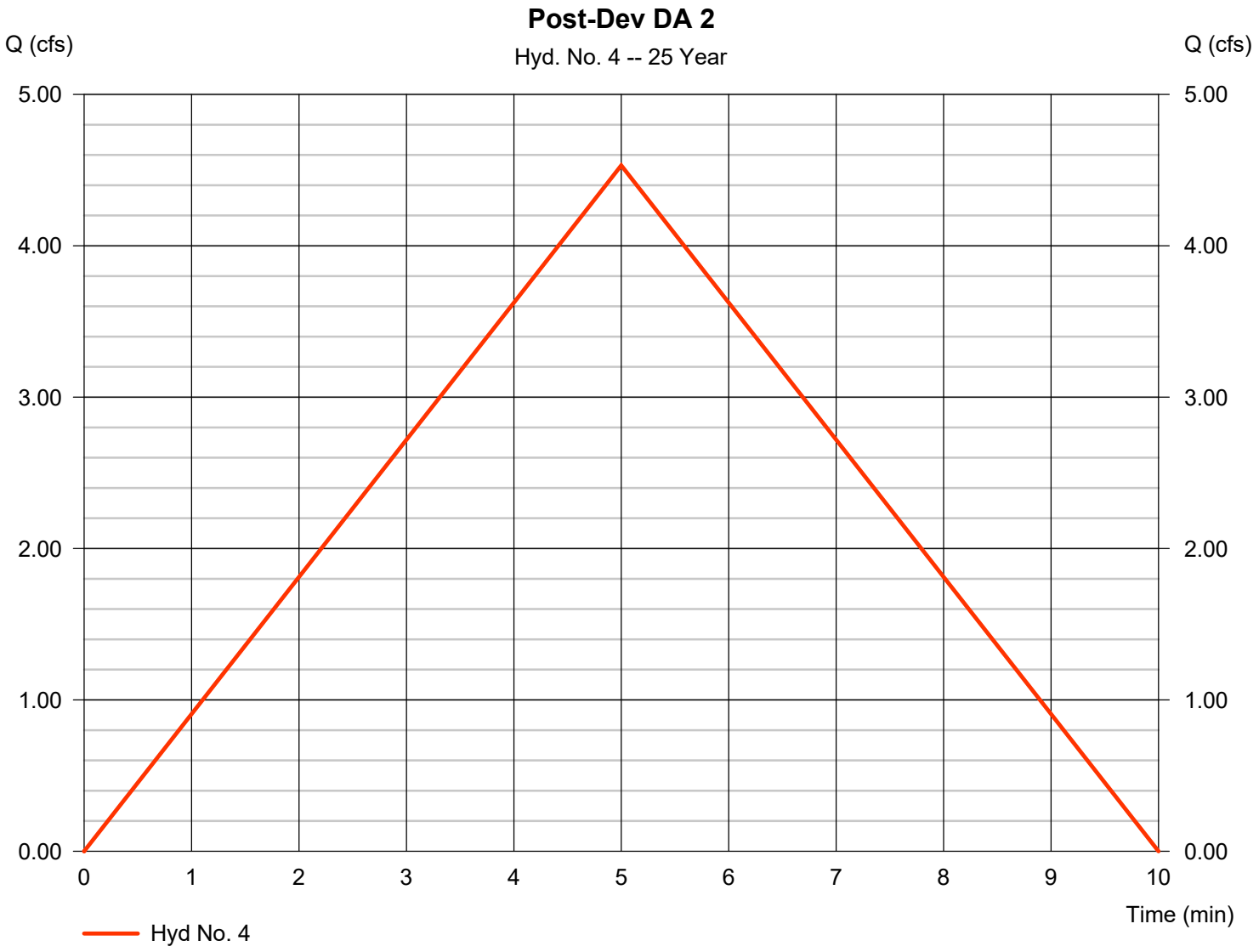
Hydrograph Report

Hyd. No. 4

Post-Dev DA 2

Hydrograph type	=	Rational	Peak discharge	=	4.531 cfs
Storm frequency	=	25 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,359 cuft
Drainage area	=	1.100 ac	Runoff coeff.	=	0.49*
Intensity	=	8.406 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.400 x 0.90) + (0.700 x 0.25)] / 1.100



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	4.038	1	5	1,211	------	------	------	Pre-Dev DA 1
2	Rational	4.980	1	5	1,494	------	------	------	Pre-Dev DA 2
3	Rational	4.564	1	5	1,369	------	------	------	Post-Dev DA 1
4	Rational	4.980	1	5	1,494	------	------	------	Post-Dev DA 2

Hydrograph Report

Hyd. No. 1

Pre-Dev DA 1

Hydrograph type	=	Rational	Peak discharge	=	4.038 cfs
Storm frequency	=	50 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,211 cuft
Drainage area	=	0.950 ac	Runoff coeff.	=	0.46*
Intensity	=	9.240 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.140 x 0.90) + (0.510 x 0.25) + (0.300 x 0.60)] / 0.950

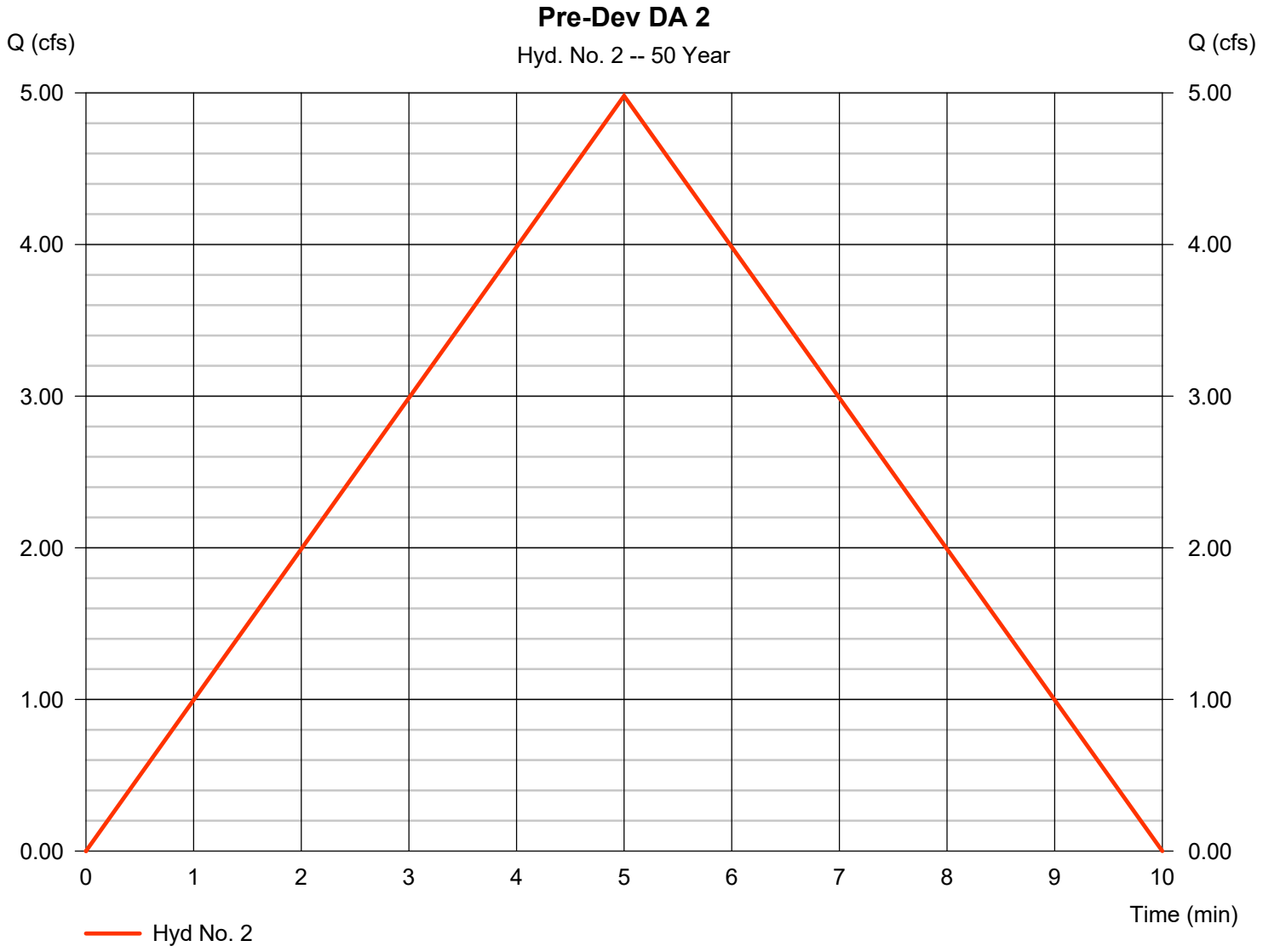
Hydrograph Report

Hyd. No. 2

Pre-Dev DA 2

Hydrograph type	=	Rational	Peak discharge	=	4.980 cfs
Storm frequency	=	50 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,494 cuft
Drainage area	=	1.100 ac	Runoff coeff.	=	0.49*
Intensity	=	9.240 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.400 x 0.90) + (0.700 x 0.25)] / 1.100



Hydrograph Report

Hyd. No. 3

Post-Dev DA 1

Hydrograph type	=	Rational	Peak discharge	=	4.564 cfs
Storm frequency	=	50 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,369 cuft
Drainage area	=	0.950 ac	Runoff coeff.	=	0.52*
Intensity	=	9.240 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.250 x 0.90) + (0.430 x 0.25) + (0.270 x 0.60)] / 0.950

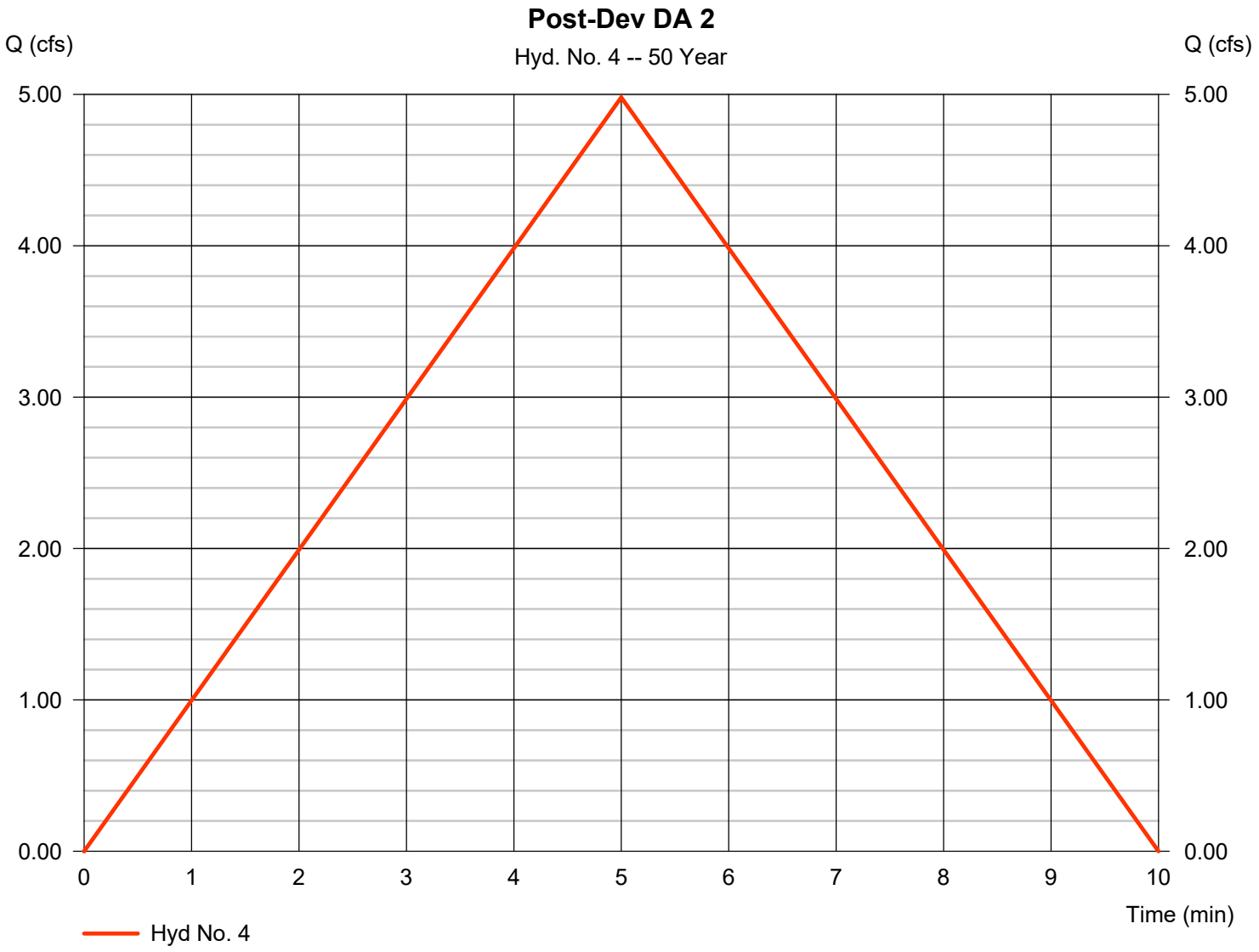
Hydrograph Report

Hyd. No. 4

Post-Dev DA 2

Hydrograph type	=	Rational	Peak discharge	=	4.980 cfs
Storm frequency	=	50 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,494 cuft
Drainage area	=	1.100 ac	Runoff coeff.	=	0.49*
Intensity	=	9.240 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.400 x 0.90) + (0.700 x 0.25)] / 1.100



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	4.403	1	5	1,321	------	------	------	Pre-Dev DA 1
2	Rational	5.431	1	5	1,629	------	------	------	Pre-Dev DA 2
3	Rational	4.977	1	5	1,493	------	------	------	Post-Dev DA 1
4	Rational	5.431	1	5	1,629	------	------	------	Post-Dev DA 2

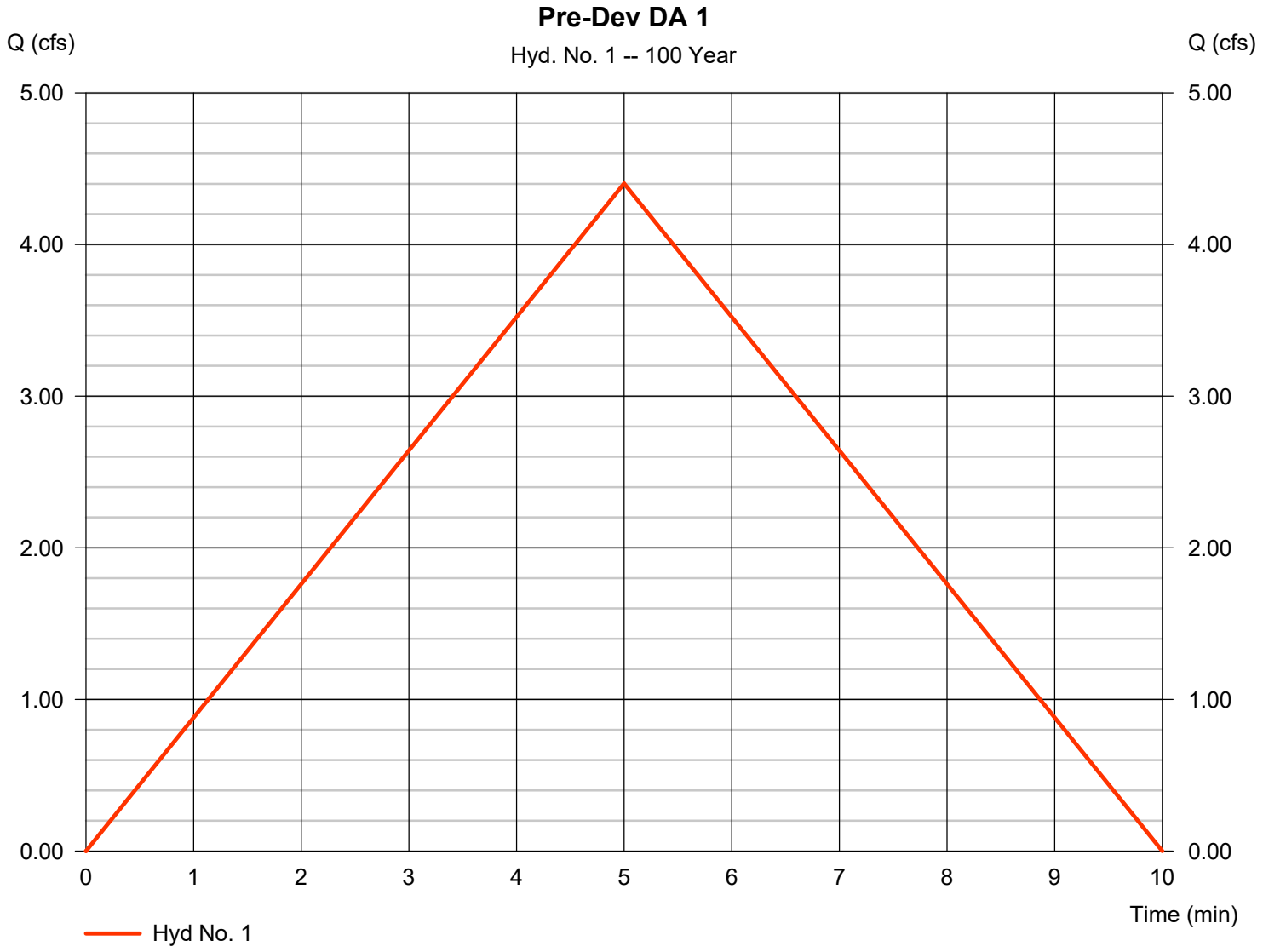
Hydrograph Report

Hyd. No. 1

Pre-Dev DA 1

Hydrograph type	=	Rational	Peak discharge	=	4.403 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,321 cuft
Drainage area	=	0.950 ac	Runoff coeff.	=	0.46*
Intensity	=	10.075 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.140 x 0.90) + (0.510 x 0.25) + (0.300 x 0.60)] / 0.950



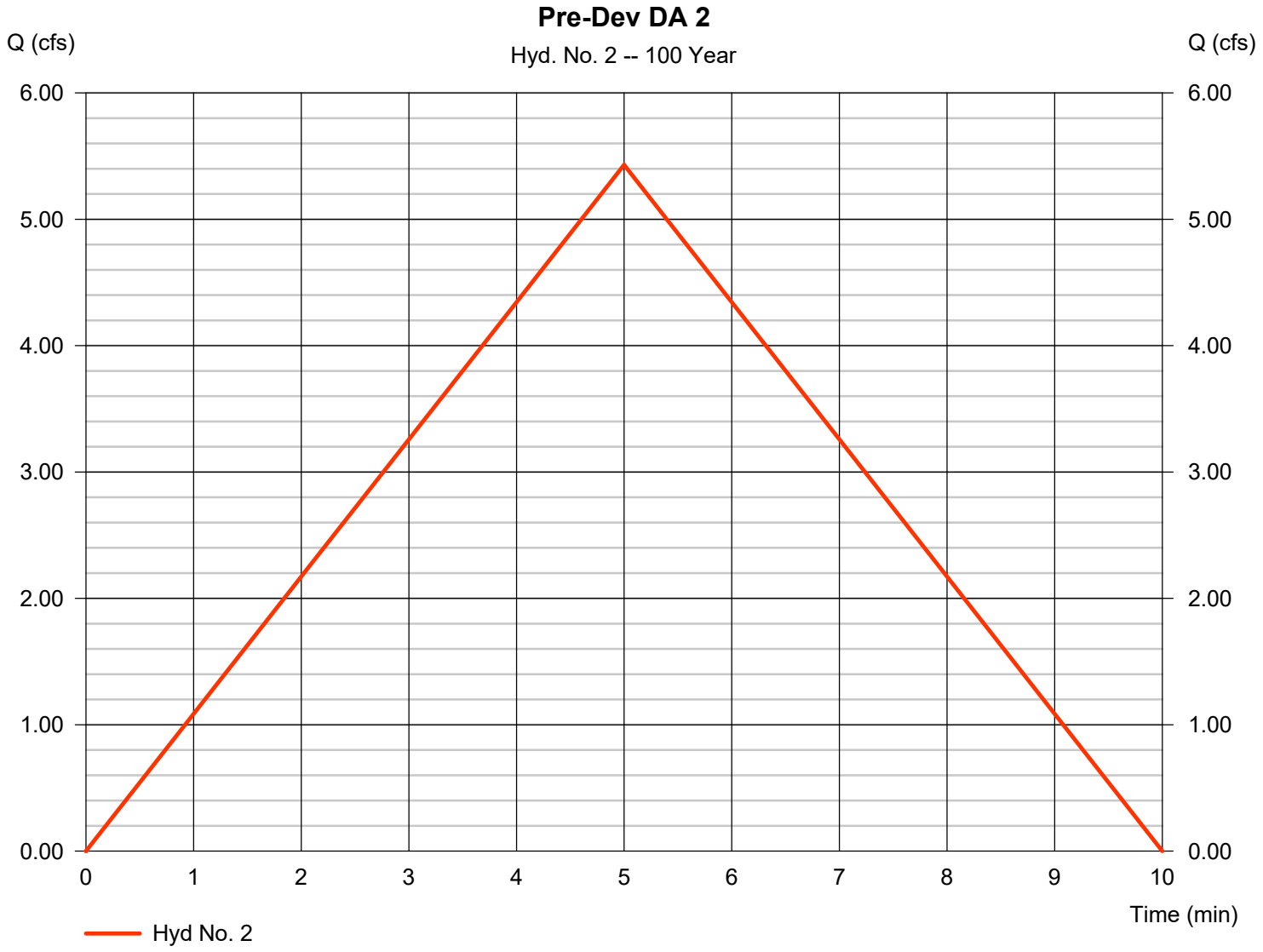
Hydrograph Report

Hyd. No. 2

Pre-Dev DA 2

Hydrograph type	=	Rational	Peak discharge	=	5.431 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,629 cuft
Drainage area	=	1.100 ac	Runoff coeff.	=	0.49*
Intensity	=	10.075 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.400 x 0.90) + (0.700 x 0.25)] / 1.100



Hydrograph Report

Hyd. No. 3

Post-Dev DA 1

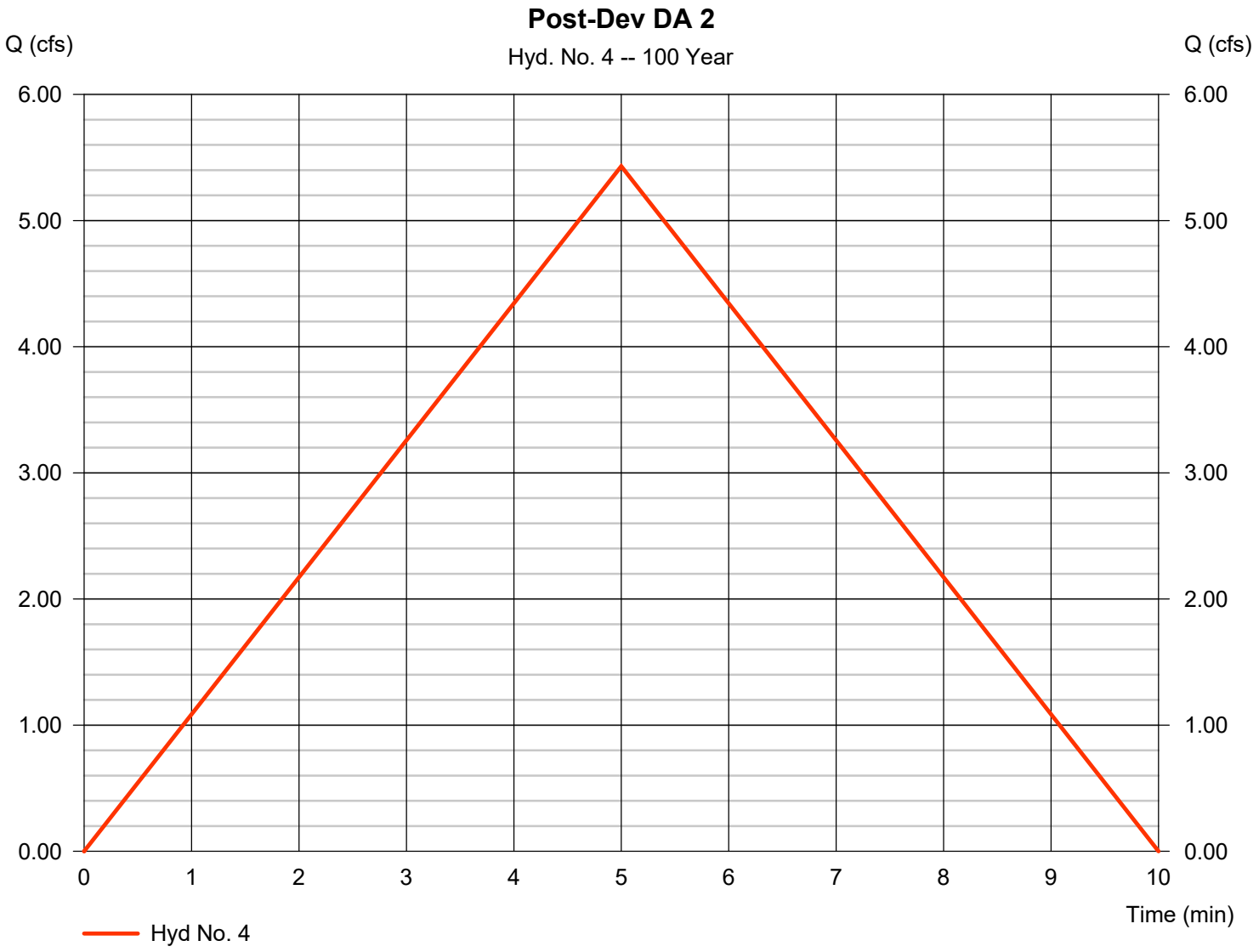
Hydrograph type	=	Rational	Peak discharge	=	4.977 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,493 cuft
Drainage area	=	0.950 ac	Runoff coeff.	=	0.52*
Intensity	=	10.075 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.250 x 0.90) + (0.430 x 0.25) + (0.270 x 0.60)] / 0.950

Hydrograph Report

Hyd. No. 4

Post-Dev DA 2

Hydrograph type	=	Rational	Peak discharge	=	5.431 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,629 cuft
Drainage area	=	1.100 ac	Runoff coeff.	=	0.49*
Intensity	=	10.075 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Pulaski County.IDF	Asc/Rec limb fact	=	1/1

* Composite (Area/C) = [(0.400 x 0.90) + (0.700 x 0.25)] / 1.100