STORMWATER MANAGEMENT PLAN

PROPOSED WAREHOUSE STORAGE

SITE PLAN

100 POWDERED METAL DRIVE

NORTH HAVEN, CONNECTICUT

Submitted To:

Prepared by:

CARDINAL
ENGINEERING ASSOCIATES

OCTOBER 22, 2020

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INTRODUCTION

Existing Conditions:

This project is located at 100 Powdered Metal Drive in North Haven, Connecticut, in an industrial zone (IG 80). The area being subdivided is the easterly portion of the lot and has a size of 2.31 acres. The lot is sloped from north to south with average grades generally between 3-4%. Existing vegetative cover consists of a mixture of sparse grasses and weeds. Two test pits were dug to approx. 6' deep which represents the bottom of the 18" perf. filter underdrain. The existing soils are generally fine sand with some silt as you move to the south, (refer to soil permeability test results for additional information). The Muddy river is located approximately 700 feet from the southeasterly lot corner. The site is located within the Muddy River Watershed well toward the bottom. According to the FEMA website the project is located in zone X, "area of minimal flood hazard".

The lot was re-subdivided in 2018 and a concept plan for new warehouses was created but never followed through with. Currently the lot is being used by the property owner for storage of materials including dirt piles and broken concrete piles. A third test pit was dug by the land owner, finding fine sand to 12' below the surface in the northerly half of the lot.

Proposed Conditions:

The proposed project consists of constructing two 10,000 square foot warehouses, a bituminous driveway and parking lot up to the faces of the buildings. The paved areas will be sloped to inlets so that all run-off in contact with pavement will be collected and treated. Perimeter slopes and all areas not being paved will be treated with 4" of topsoil and seeded. Additional improvements include sewer and water services, 6' chain link perimeter fence, irrigation, street trees and miscellaneous decorative trees adjacent the parking area.

BMP's – Design Intent:

The goal of the stormwater management plan is to collect and treat the WQV (first 1" of rainfall) and to mitigate any increase in peak flows and total volume. The sub-surface soil conditions on-site are ideally suited for infiltration and filtering the stormwater runoff. As the water flows through the soil, sediment particles and attached pollutants, as well as some soluble pollutants are removed through physical straining and adsorption. The drainage system is sized to collect and treat the WQV and the run-off from a 2-year storm event. An additional benefit of the drainage design will be groundwater recharge.

Pre and post development flows were computed using the rational method. Infiltration and underground storage are being utilized to attenuate peak flow rates and achieve water quality

goals. This approach will provide excellent renovation of the WQV as outlined in the 2004 CT Stormwater Quality Manual. The drainage outlet at the southeast corner of the property is designed to avoid point discharge and concentrated flow by discharging the stormwater into a 48' long leaching galley surrounded by stone. This system will spread out the discharge and eliminate the potential for erosion on adjacent property and will leave the site as sheet flow similar to the way stormwater leaves the site in a pre-developed condition. Refer to the table below for a summary of pre and post development peak flow rates.

Summary of Pre and Post Development – Peak Flows			
Storm Frequency	**Pre-development cfs**	**Post-development cfs**	**Net Change cfs**
2-Year	**2.61**	**0.64**	**-1.97**
5-Year	**-**	**-**	**-**
10-Year	**3.73**	**1.22**	**-2.51**
25-Year	**4.45**	**2.56**	**-1.89**
50-Year	**5.00**	**3.72**	**-1.28**
100-Year	**5.57**	**4.73**	**-0.84**

North Haven Site Plan WQV and Filter Underdrain Worksheet

FILTER UNDERDRAIN

WQV= 5656.72 CF

15" Filter Drain length 1304.613

	Area		Unit Vol.	
3'x3' box	9	CF	3.109375	w/ voids
15" pipe	1.226563	CF	1.226563	

	Area		Unit Vol.	
4'x4' box	16	CF	5.6935	w/ voids
18" pipe	1.76625	CF	1.76625	

18" Filter Drain length= 758.2989

WATER QUALITY VOLUME

PROPOSED LOT CONDITION

WQV=(P)(R)(A)/12

Where WQV = Water Quality Volume, acre ft

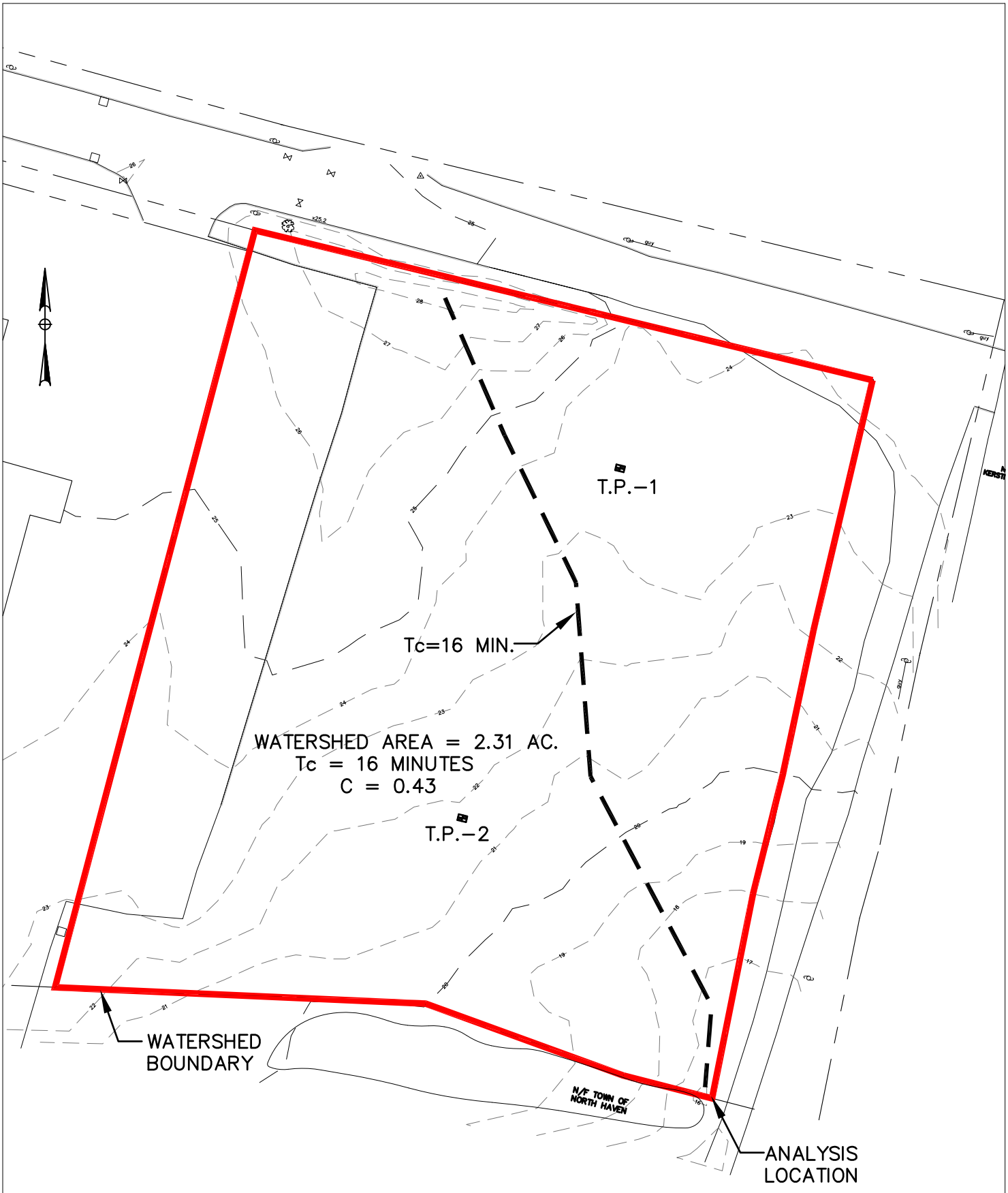
R = Volumetric Runoff Coefficient = 0.05+0.009(I)

I = Percent of Impervious Cover (%)

A = Site Areas, acres

P = design precipitation, inches (1" for water quality storm)

A =	2.31	acres	
I =	69.4	%	
R =	0.6746		
P =	1	inch	
WQV =	0.130	acre ft	5656.723

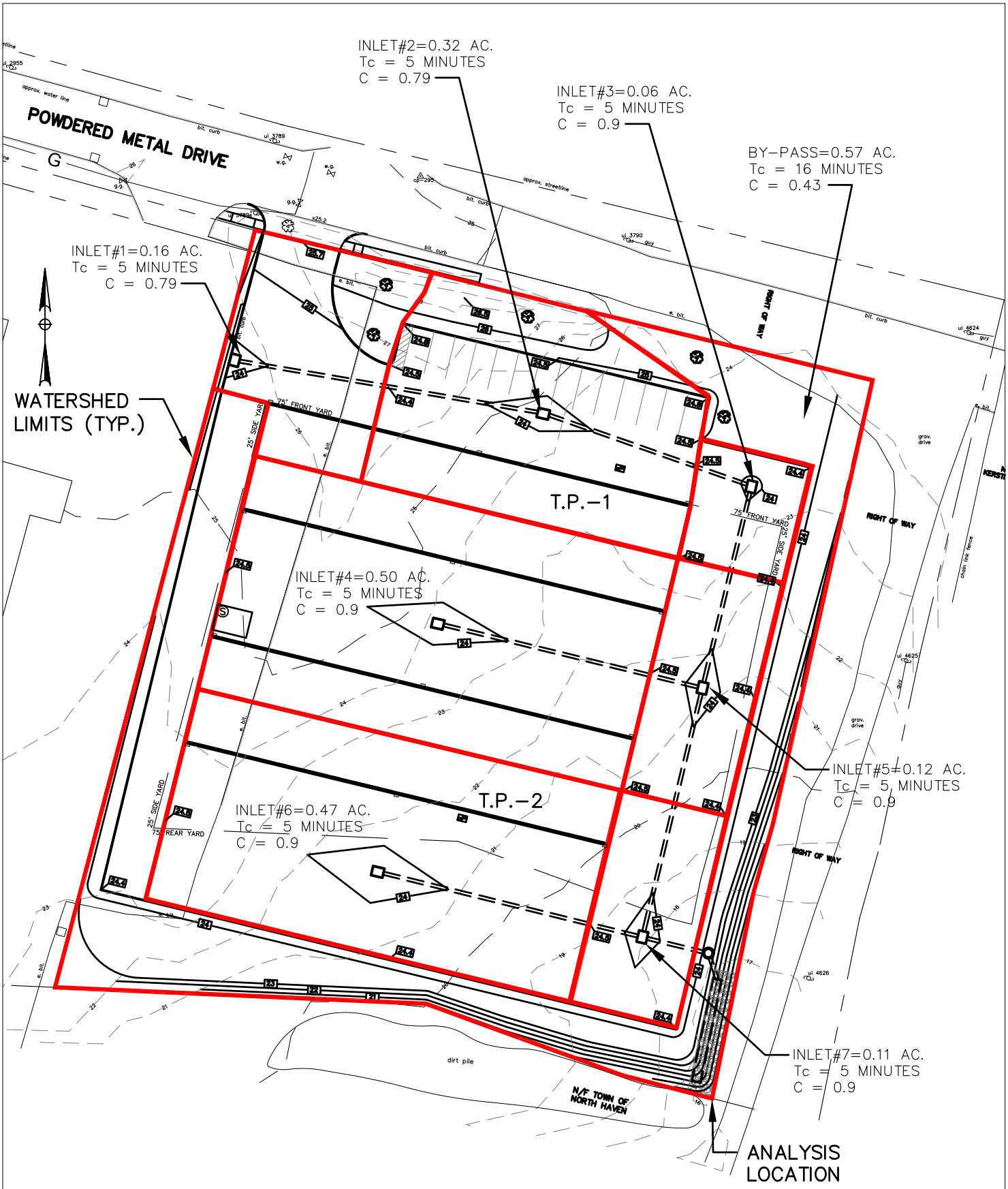


PLAN

SCALE: 1"=50'

PROJECT TITLE: 100 POWDERED METAL DRIVE		
DRAWING TITLE: PRE-DEVELOPMENT WATERSHED AREA PLAN		
DRAFTER: MVC	DATE: 10/20/2020	DRAWING NUMBER: SK-1

CARDINAL ENGINEERING ASSOCIATES
3 Colony Street I Meriden, CT 06451 I 203-238-1969



PLAN

SCALE: 1"=50'

PROJECT TITLE: 100 POWDERED METAL DRIVE		
DRAWING TITLE: POST DEVELOPMENT WATERSHED AREA PLAN		
DRAFTER: MVC	DATE: 10/20/2020	DRAWING NUMBER: SK-1

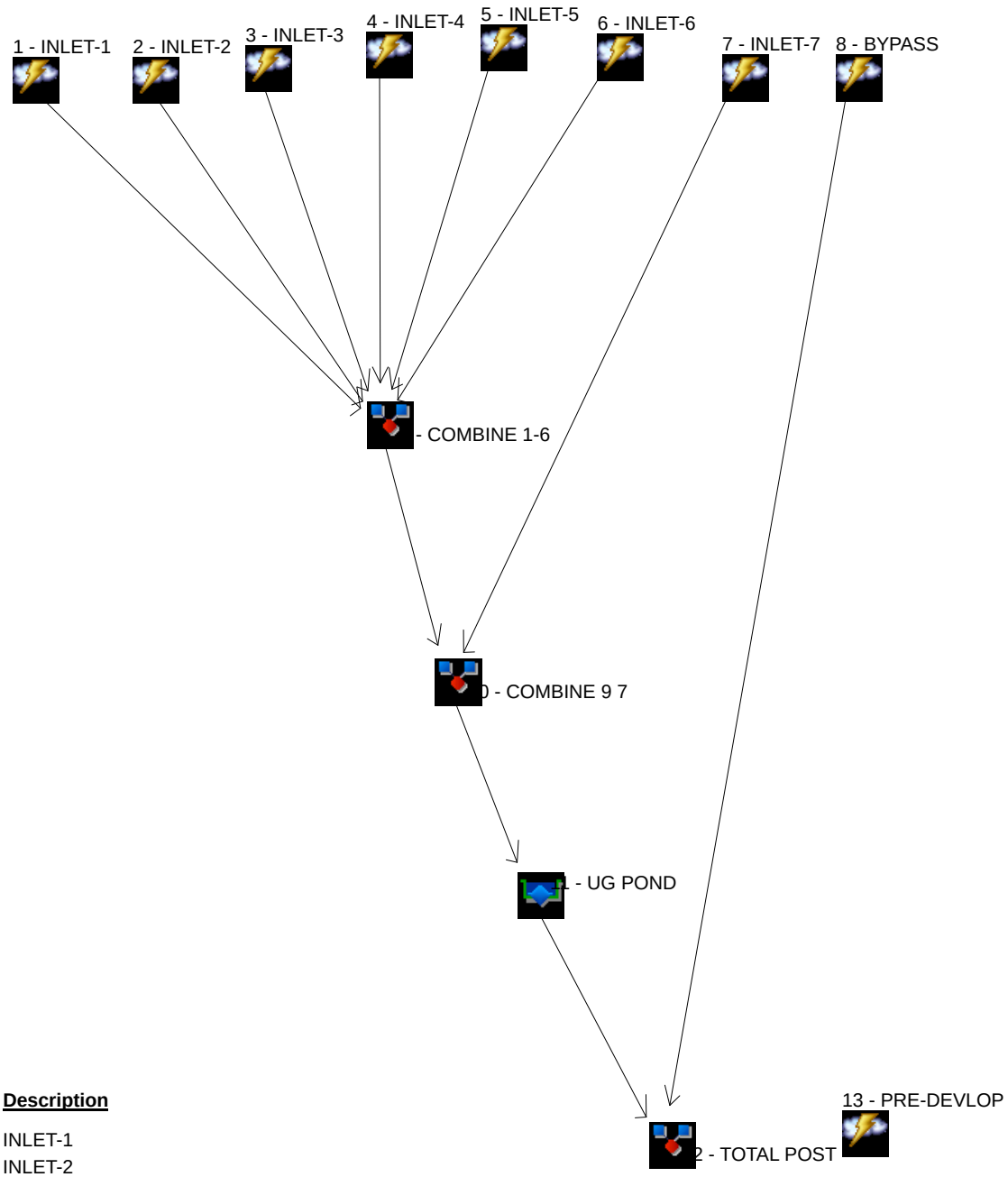
CARDINAL ENGINEERING ASSOCIATES
3 Colony Street | Meriden, CT 06451 | 203-238-1969

Hydraflow Table of Contents

VER 2009 CHECK.gpw

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066



Legend

Hyd.	Origin	Description
1	Rational	INLET-1
2	Rational	INLET-2
3	Rational	INLET-3
4	Rational	INLET-4
5	Rational	INLET-5
6	Rational	INLET-6
7	Rational	INLET-7
8	Rational	BYPASS
9	Combine	COMBINE 1-6
10	Combine	COMBINE 9 7
11	Reservoir	UG POND
12	Combine	TOTAL POST
13	Rational	PRE-DEVLOP

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	Rational	------	-------	0.546	-------	-------	0.773	0.908	1.015	1.106	INLET-1
2	Rational	------	-------	1.091	-------	-------	1.546	1.815	2.030	2.213	INLET-2
3	Rational	------	-------	0.233	-------	-------	0.330	0.388	0.434	0.473	INLET-3
4	Rational	------	-------	1.943	-------	-------	2.752	3.231	3.614	3.939	INLET-4
5	Rational	------	-------	0.466	-------	-------	0.660	0.776	0.867	0.945	INLET-5
6	Rational	------	-------	1.826	-------	-------	2.587	3.038	3.398	3.703	INLET-6
7	Rational	------	-------	0.427	-------	-------	0.605	0.711	0.795	0.867	INLET-7
8	Rational	------	-------	0.643	-------	-------	0.921	1.098	1.233	1.373	BYPASS
9	Combine	1, 2, 3,	-------	6.106	-------	-------	8.648	10.16	11.36	12.38	COMBINE 1-6
10	Combine	4, 5, 6, 7, 9	-------	6.533	-------	-------	9.253	10.87	12.15	13.25	COMBINE 9 7
11	Reservoir	10	-------	0.000	-------	-------	0.325	1.603	2.720	3.612	UG POND
12	Combine	8, 11	-------	0.643	-------	-------	1.216	2.564	3.722	4.728	TOTAL POST
13	Rational	------	-------	2.605	-------	-------	3.731	4.451	4.997	5.565	PRE-DEVLOP

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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	0.546	1	5	287	------	------	------	INLET-1
2	Rational	1.091	1	5	573	------	------	------	INLET-2
3	Rational	0.233	1	5	122	------	------	------	INLET-3
4	Rational	1.943	1	5	1,020	------	------	------	INLET-4
5	Rational	0.466	1	5	245	------	------	------	INLET-5
6	Rational	1.826	1	5	959	------	------	------	INLET-6
7	Rational	0.427	1	5	224	------	------	------	INLET-7
8	Rational	0.643	1	16	1,080	------	------	------	BYPASS
9	Combine	6.106	1	5	3,114	1, 2, 3,	------	------	COMBINE 1-6
10	Combine	6.533	1	5	3,332	4, 5, 6, 7, 9	------	------	COMBINE 9 7
11	Reservoir	0.000	1	n/a	0	10	19.38	2,631	UG POND
12	Combine	0.643	1	16	1,080	8, 11	------	------	TOTAL POST
13	Rational	2.605	1	16	4,376	------	------	------	PRE-DEVLOP

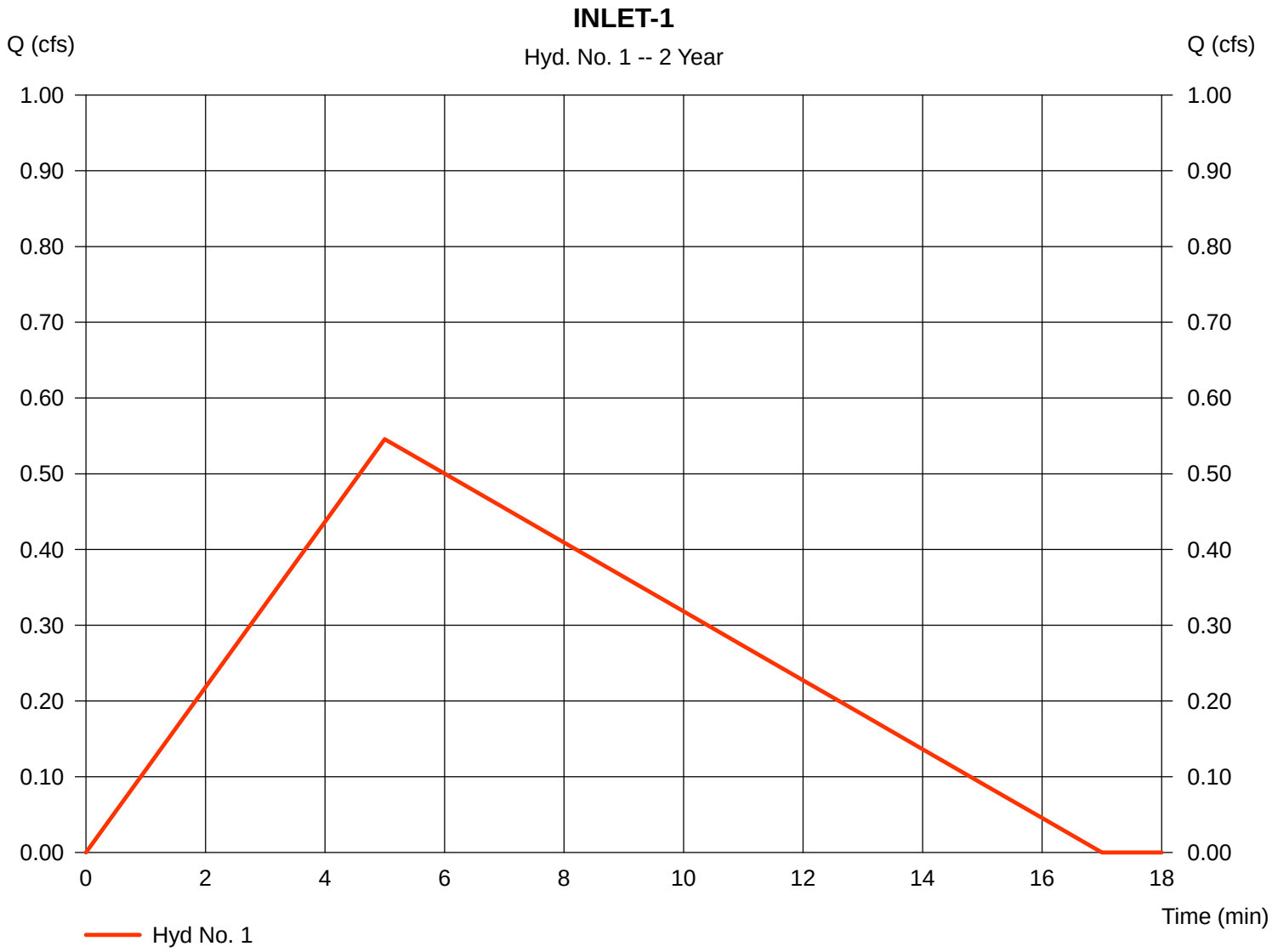
Hydrograph Report

Hyd. No. 1

INLET-1

Hydrograph type	=	Rational	Peak discharge	=	0.546 cfs
Storm frequency	=	2 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	287 cuft
Drainage area	=	0.160 ac	Runoff coeff.	=	0.79*
Intensity	=	4.317 in/hr	Tc by User	=	5.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5

* Composite (Area/C) = [(0.030 x 0.30) + (0.130 x 0.90)] / 0.160



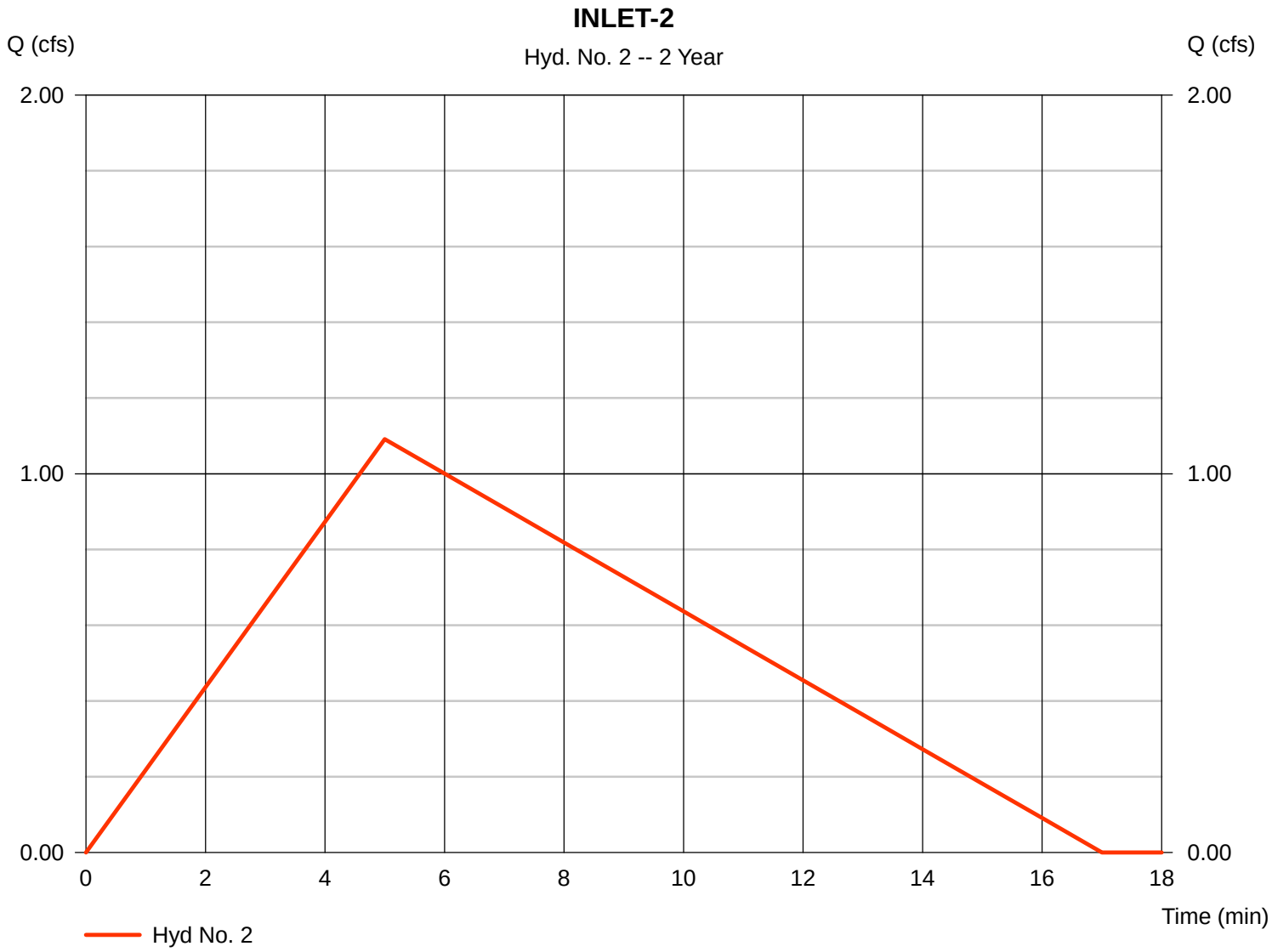
Hydrograph Report

Hyd. No. 2

INLET-2

Hydrograph type	=	Rational	Peak discharge	=	1.091 cfs
Storm frequency	=	2 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	573 cuft
Drainage area	=	0.320 ac	Runoff coeff.	=	0.79*
Intensity	=	4.317 in/hr	Tc by User	=	5.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5

* Composite (Area/C) = [(0.060 x 0.30) + (0.260 x 0.90)] / 0.320

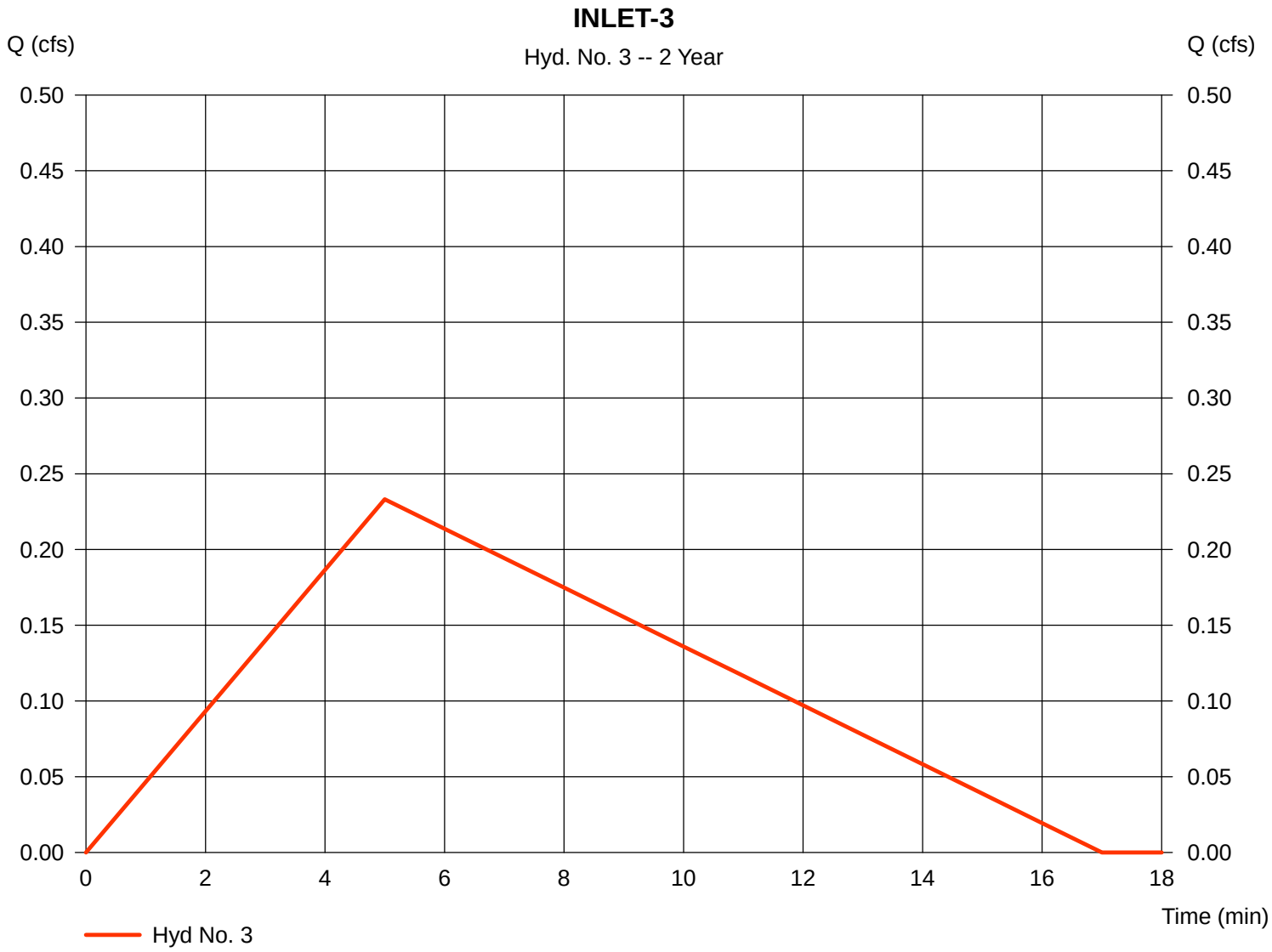


Hydrograph Report

Hyd. No. 3

INLET-3

Hydrograph type	=	Rational	Peak discharge	=	0.233 cfs
Storm frequency	=	2 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	122 cuft
Drainage area	=	0.060 ac	Runoff coeff.	=	0.9
Intensity	=	4.317 in/hr	Tc by User	=	5.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5

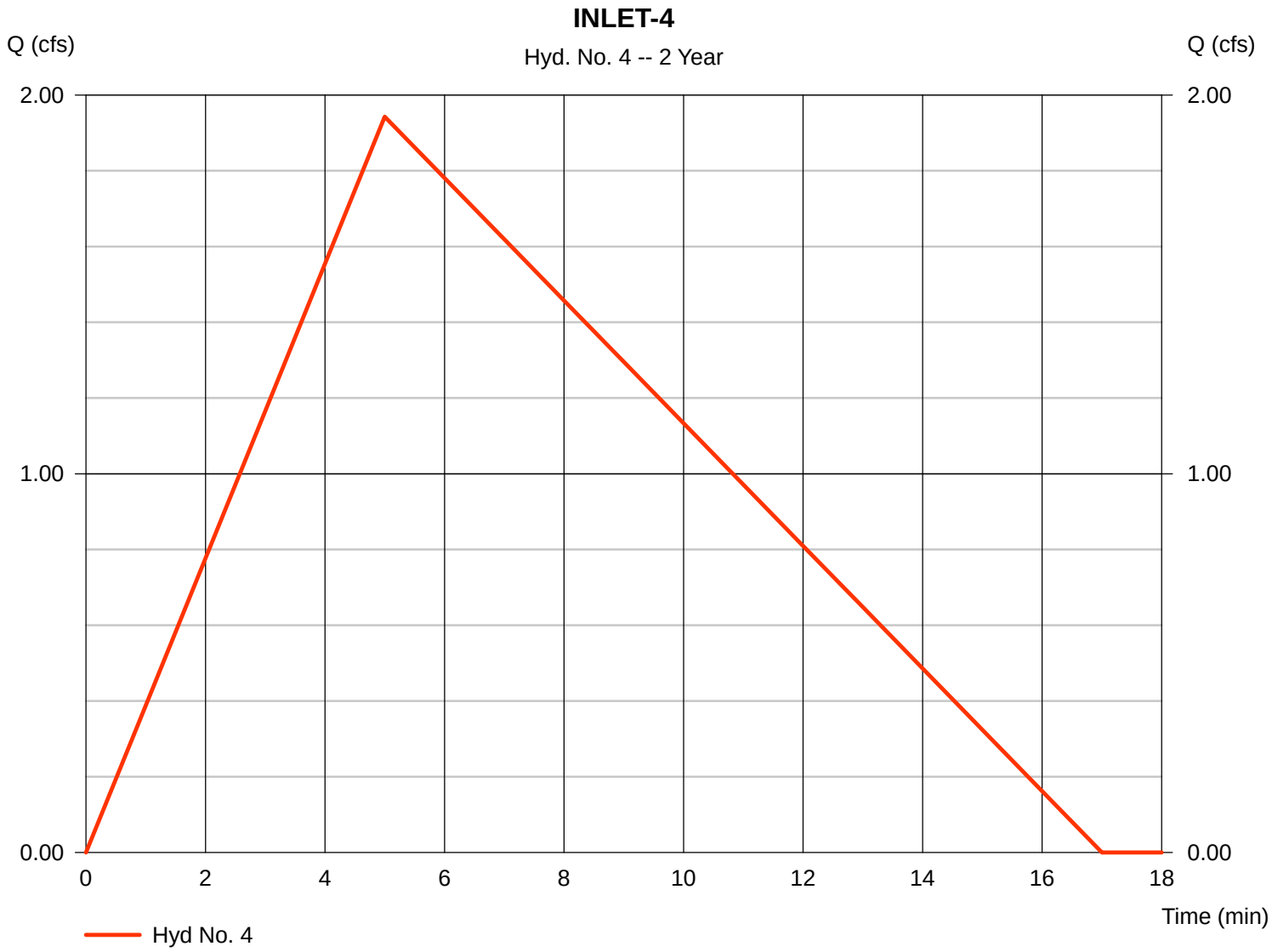


Hydrograph Report

Hyd. No. 4

INLET-4

Hydrograph type	=	Rational	Peak discharge	=	1.943 cfs
Storm frequency	=	2 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,020 cuft
Drainage area	=	0.500 ac	Runoff coeff.	=	0.9
Intensity	=	4.317 in/hr	Tc by User	=	5.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5

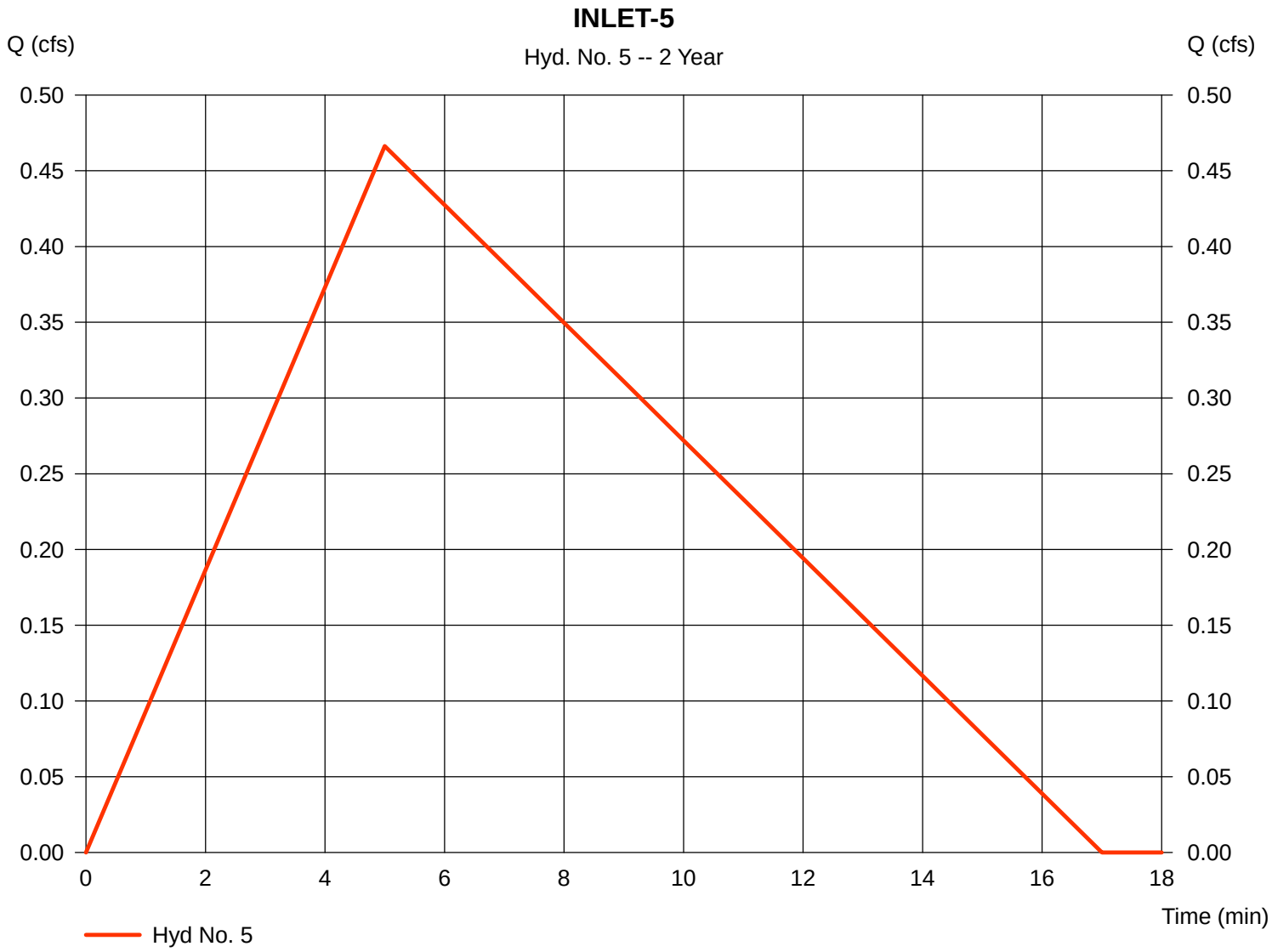


Hydrograph Report

Hyd. No. 5

INLET-5

Hydrograph type	=	Rational	Peak discharge	=	0.466 cfs
Storm frequency	=	2 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	245 cuft
Drainage area	=	0.120 ac	Runoff coeff.	=	0.9
Intensity	=	4.317 in/hr	Tc by User	=	5.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5

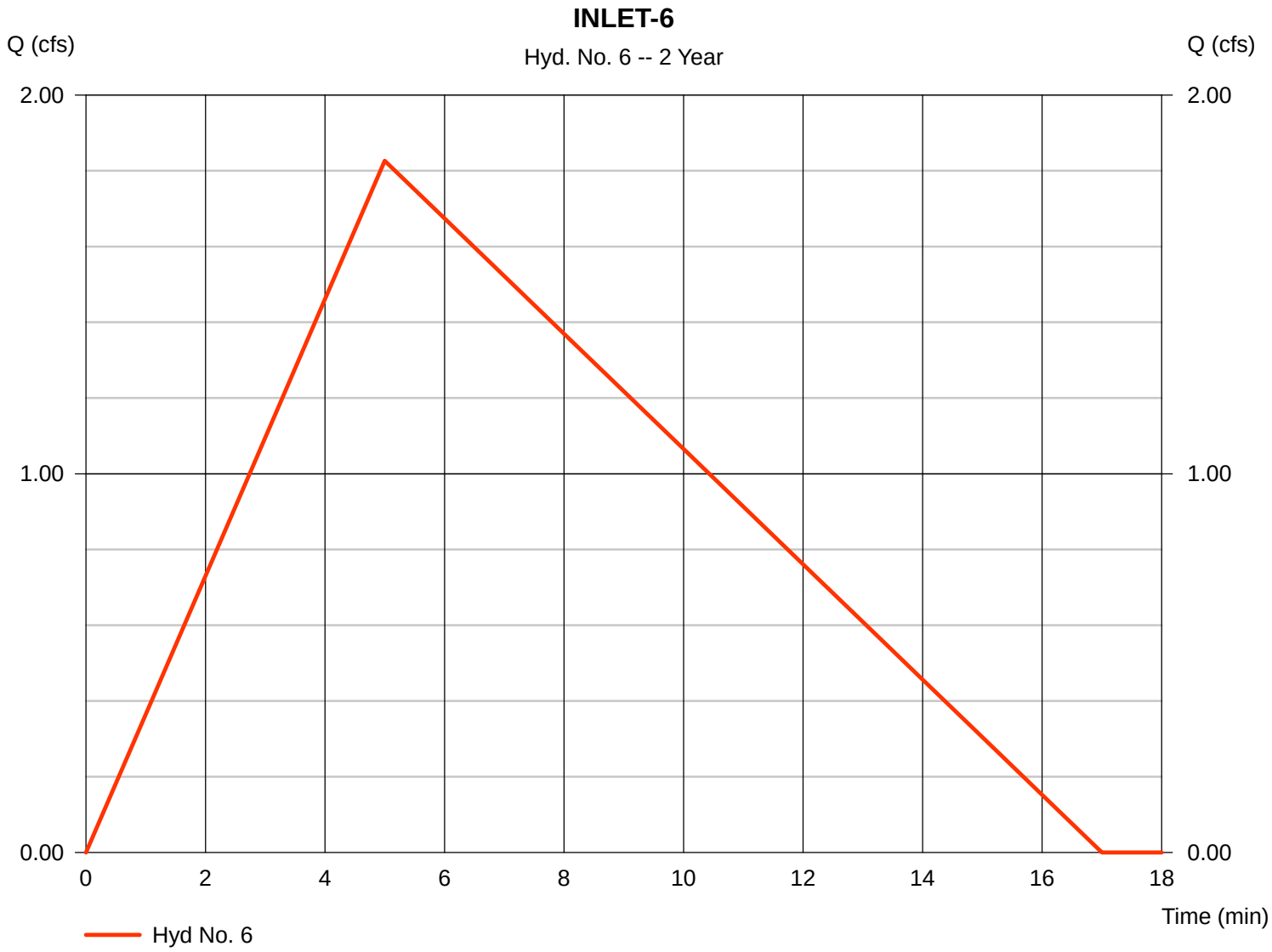


Hydrograph Report

Hyd. No. 6

INLET-6

Hydrograph type	=	Rational	Peak discharge	=	1.826 cfs
Storm frequency	=	2 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	959 cuft
Drainage area	=	0.470 ac	Runoff coeff.	=	0.9
Intensity	=	4.317 in/hr	Tc by User	=	5.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5

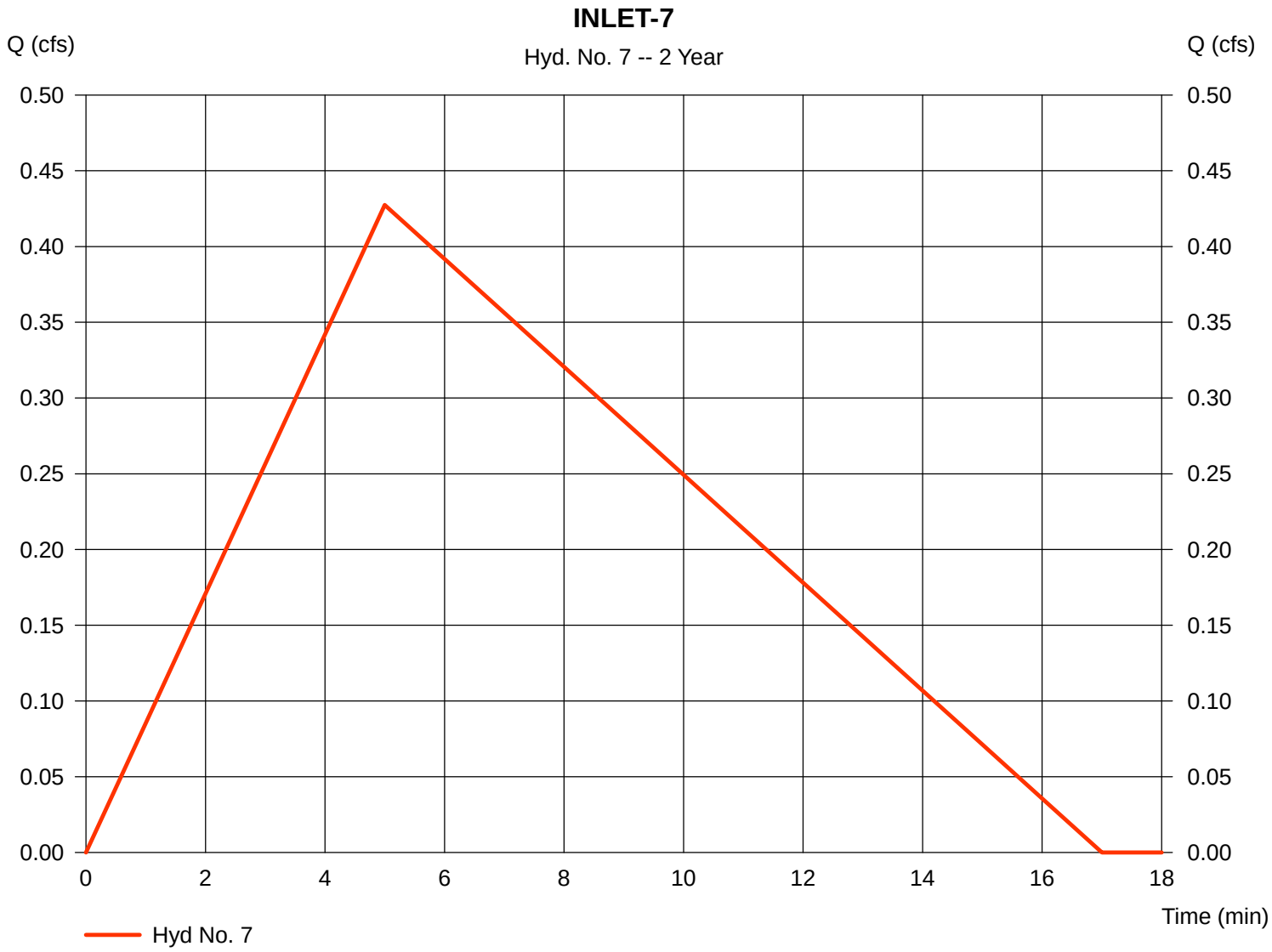


Hydrograph Report

Hyd. No. 7

INLET-7

Hydrograph type	=	Rational	Peak discharge	=	0.427 cfs
Storm frequency	=	2 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	224 cuft
Drainage area	=	0.110 ac	Runoff coeff.	=	0.9
Intensity	=	4.317 in/hr	Tc by User	=	5.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5



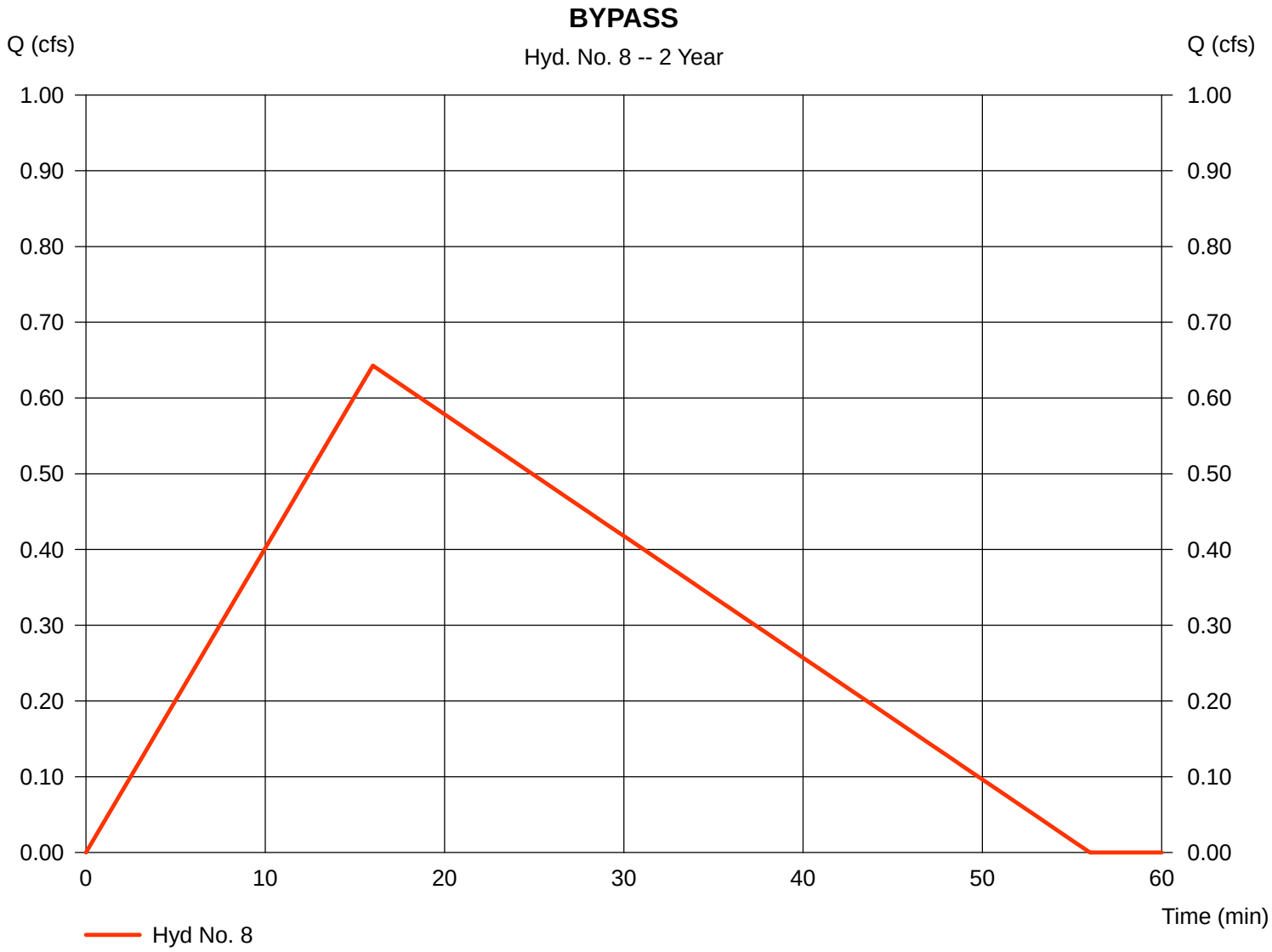
Hydrograph Report

Hyd. No. 8

BYPASS

Hydrograph type	=	Rational	Peak discharge	=	0.643 cfs
Storm frequency	=	2 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	1,080 cuft
Drainage area	=	0.570 ac	Runoff coeff.	=	0.43*
Intensity	=	2.622 in/hr	Tc by User	=	16.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5

* Composite (Area/C) = [(0.450 x 0.30) + (0.120 x 0.90)] / 0.570

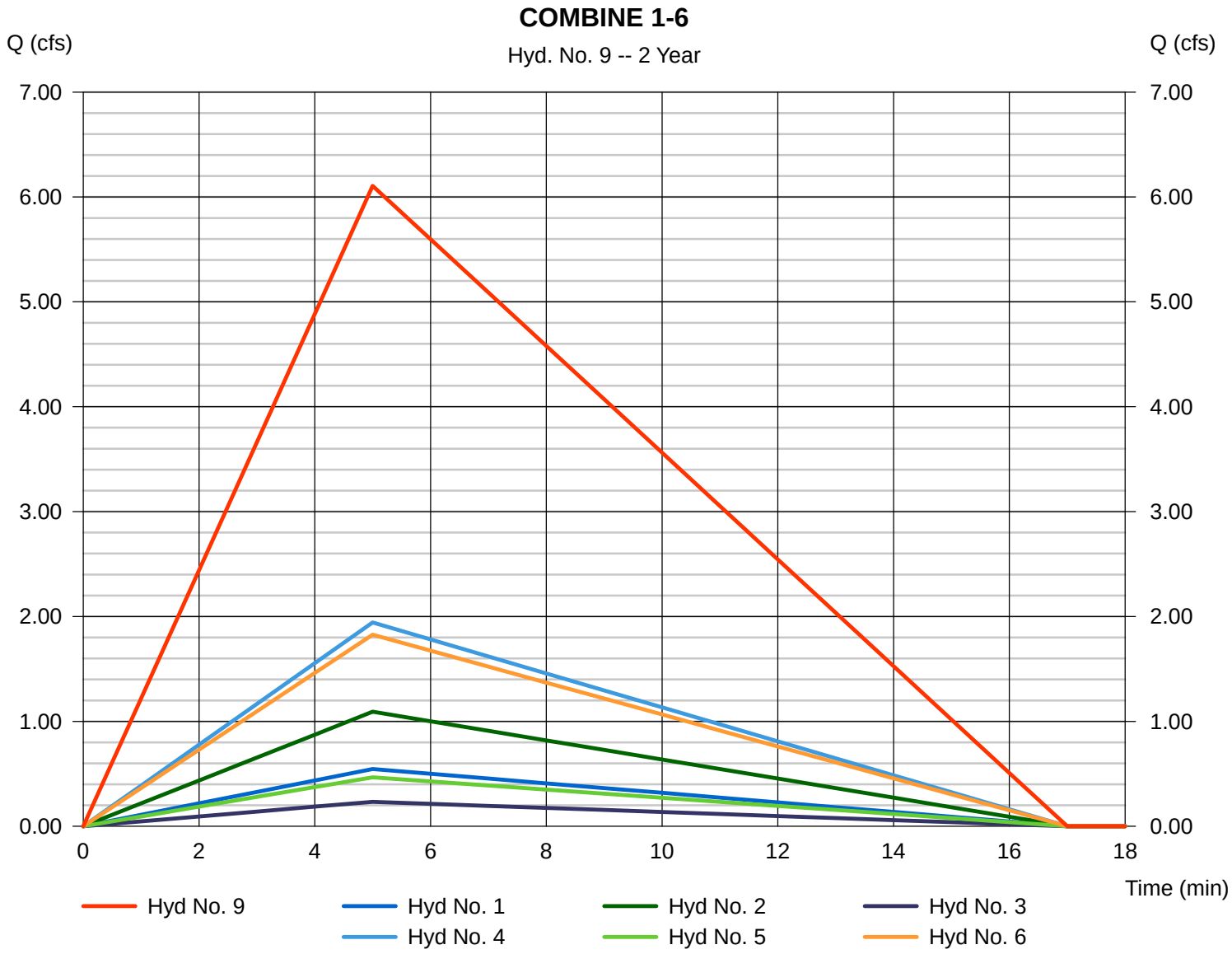


Hydrograph Report

Hyd. No. 9

COMBINE 1-6

Hydrograph type	=	Combine	Peak discharge	=	6.106 cfs
Storm frequency	=	2 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	3,114 cuft
Inflow hyds.	=	1, 2, 3, 4, 5, 6	Contrib. drain. area	=	1.630 ac

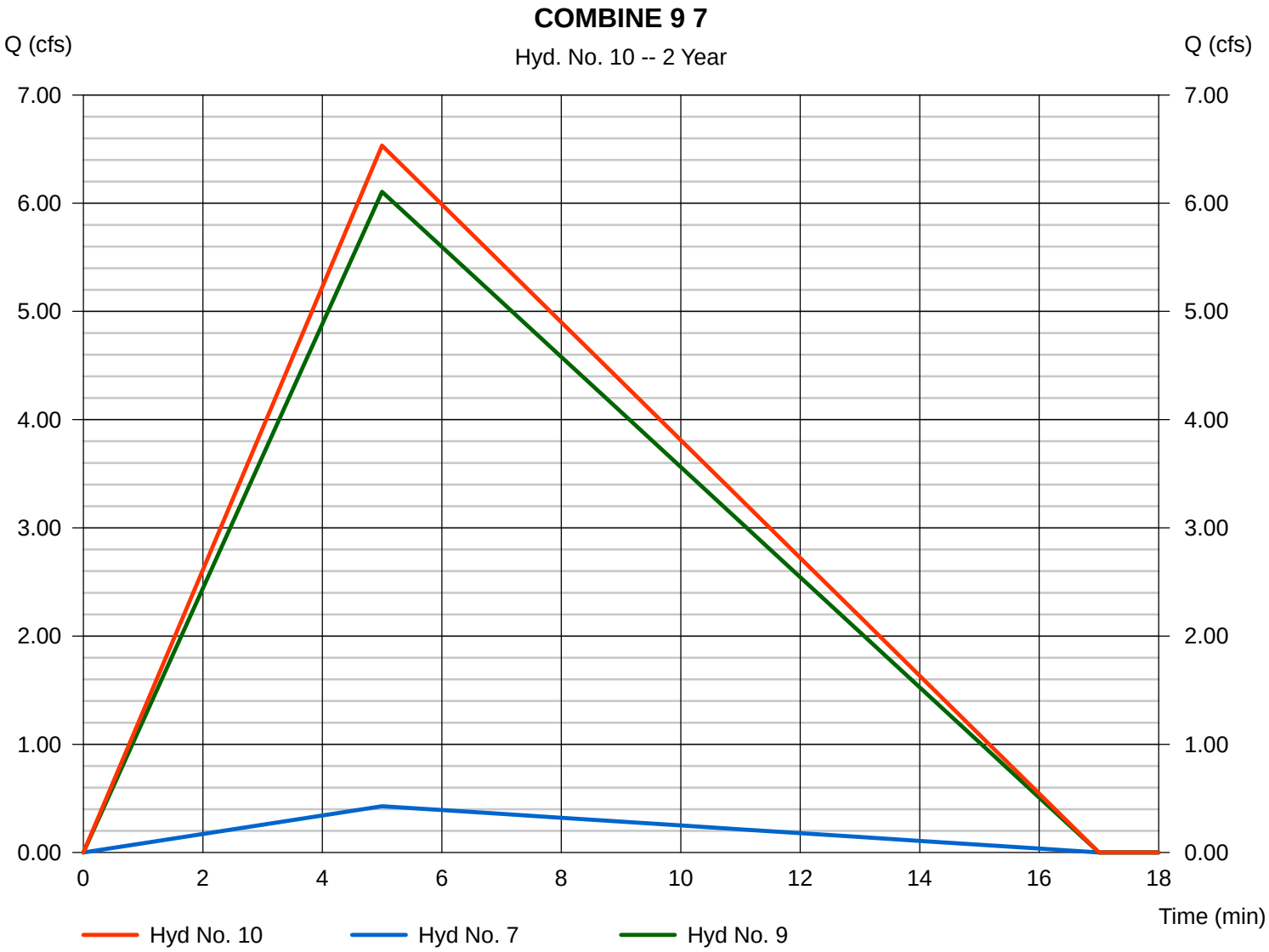


Hydrograph Report

Hyd. No. 10

COMBINE 9 7

Hydrograph type	=	Combine	Peak discharge	=	6.533 cfs
Storm frequency	=	2 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	3,332 cuft
Inflow hyds.	=	7, 9	Contrib. drain. area	=	0.110 ac



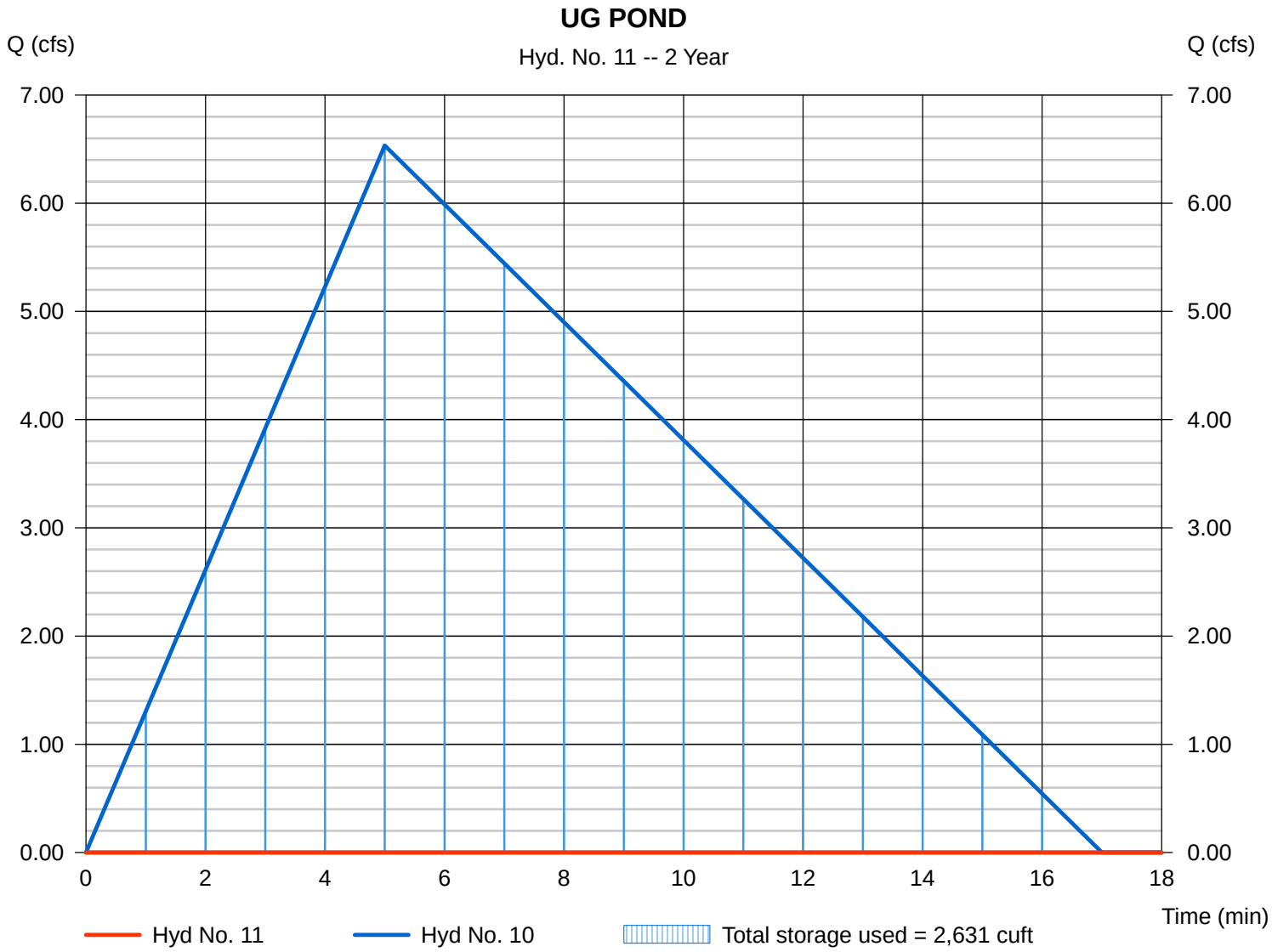
Hydrograph Report

Hyd. No. 11

UG POND

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	10 - COMBINE 9 7	Max. Elevation	=	19.38 ft
Reservoir name	=	UG POND	Max. Storage	=	2,631 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Pond No. 1 - UG POND

Pond Data

UG Chambers - Invert elev. = 17.50 ft, Rise x Span = 4.00 x 4.00 ft, Barrel Len = 350.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	17.50	n/a	0	0
0.40	17.90	n/a	560	560
0.80	18.30	n/a	560	1,120
1.20	18.70	n/a	560	1,680
1.60	19.10	n/a	560	2,240
2.00	19.50	n/a	560	2,801
2.40	19.90	n/a	560	3,361
2.80	20.30	n/a	560	3,921
3.20	20.70	n/a	560	4,481
3.60	21.10	n/a	560	5,041
4.00	21.50	n/a	560	5,601

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	18.00	0.00	0.00
Span (in)	= 18.00	18.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 20.00	18.00	0.00	0.00
Length (ft)	= 30.00	1.00	0.00	0.00
Slope (%)	= 1.67	0.00	0.00	n/a
N-Value	= .012	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.00	0.00	0.00	0.00
Crest El. (ft)	= 23.75	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Riser	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 15.000 (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).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	17.50	0.00	0.00	---	---	0.00	---	---	---	0.000	---	0.000
0.04	56	17.54	0.00	0.00	---	---	0.00	---	---	---	0.496	---	0.496
0.08	112	17.58	0.00	0.00	---	---	0.00	---	---	---	0.506	---	0.506
0.12	168	17.62	0.00	0.00	---	---	0.00	---	---	---	0.515	---	0.515
0.16	224	17.66	0.00	0.00	---	---	0.00	---	---	---	0.525	---	0.525
0.20	280	17.70	0.00	0.00	---	---	0.00	---	---	---	0.535	---	0.535
0.24	336	17.74	0.00	0.00	---	---	0.00	---	---	---	0.545	---	0.545
0.28	392	17.78	0.00	0.00	---	---	0.00	---	---	---	0.554	---	0.554
0.32	448	17.82	0.00	0.00	---	---	0.00	---	---	---	0.564	---	0.564
0.36	504	17.86	0.00	0.00	---	---	0.00	---	---	---	0.574	---	0.574
0.40	560	17.90	0.00	0.00	---	---	0.00	---	---	---	0.583	---	0.583
0.44	616	17.94	0.00	0.00	---	---	0.00	---	---	---	0.593	---	0.593
0.48	672	17.98	0.00	0.00	---	---	0.00	---	---	---	0.603	---	0.603
0.52	728	18.02	0.00	0.00 ic	---	---	0.00	---	---	---	0.613	---	0.613
0.56	784	18.06	0.00	0.00 ic	---	---	0.00	---	---	---	0.622	---	0.622
0.60	840	18.10	0.00	0.00 ic	---	---	0.00	---	---	---	0.632	---	0.632
0.64	896	18.14	0.00	0.00 ic	---	---	0.00	---	---	---	0.642	---	0.642
0.68	952	18.18	0.00	0.00 ic	---	---	0.00	---	---	---	0.652	---	0.652
0.72	1,008	18.22	0.00	0.00 ic	---	---	0.00	---	---	---	0.661	---	0.661
0.76	1,064	18.26	0.00	0.00 ic	---	---	0.00	---	---	---	0.671	---	0.671
0.80	1,120	18.30	0.00	0.01 ic	---	---	0.00	---	---	---	0.681	---	0.681
0.84	1,176	18.34	0.00	0.01 ic	---	---	0.00	---	---	---	0.690	---	0.690
0.88	1,232	18.38	0.00	0.02 ic	---	---	0.00	---	---	---	0.700	---	0.700
0.92	1,288	18.42	0.00	0.02 ic	---	---	0.00	---	---	---	0.710	---	0.710
0.96	1,344	18.46	0.00	0.02 ic	---	---	0.00	---	---	---	0.720	---	0.720
1.00	1,400	18.50	0.00	0.02 ic	---	---	0.00	---	---	---	0.729	---	0.729
1.04	1,456	18.54	0.00	0.03 ic	---	---	0.00	---	---	---	0.739	---	0.739
1.08	1,512	18.58	0.00	0.03 ic	---	---	0.00	---	---	---	0.749	---	0.749
1.12	1,568	18.62	0.00	0.03 ic	---	---	0.00	---	---	---	0.758	---	0.758
1.16	1,624	18.66	0.00	0.04 ic	---	---	0.00	---	---	---	0.768	---	0.768
1.20	1,680	18.70	0.00	0.04 ic	---	---	0.00	---	---	---	0.778	---	0.778
1.24	1,736	18.74	0.00	0.04 ic	---	---	0.00	---	---	---	0.788	---	0.788
1.28	1,792	18.78	0.00	0.04 ic	---	---	0.00	---	---	---	0.797	---	0.797
1.32	1,848	18.82	0.00	0.04 ic	---	---	0.00	---	---	---	0.807	---	0.807

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UG POND

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.36	1,904	18.86	0.00	0.05 ic	---	---	0.00	---	---	---	0.817	---	0.817
1.40	1,960	18.90	0.00	0.05 ic	---	---	0.00	---	---	---	0.827	---	0.827
1.44	2,016	18.94	0.00	0.05 ic	---	---	0.00	---	---	---	0.836	---	0.836
1.48	2,072	18.98	0.00	0.05 ic	---	---	0.00	---	---	---	0.846	---	0.846
1.52	2,128	19.02	0.00	0.06 ic	---	---	0.00	---	---	---	0.856	---	0.856
1.56	2,184	19.06	0.00	0.06 ic	---	---	0.00	---	---	---	0.865	---	0.865
1.60	2,240	19.10	0.00	0.06 ic	---	---	0.00	---	---	---	0.875	---	0.875
1.64	2,296	19.14	0.00	0.06 ic	---	---	0.00	---	---	---	0.885	---	0.885
1.68	2,352	19.18	0.00	0.06 ic	---	---	0.00	---	---	---	0.895	---	0.895
1.72	2,408	19.22	0.00	0.06 ic	---	---	0.00	---	---	---	0.904	---	0.904
1.76	2,464	19.26	0.00	0.07 ic	---	---	0.00	---	---	---	0.914	---	0.914
1.80	2,521	19.30	0.00	0.07 ic	---	---	0.00	---	---	---	0.924	---	0.924
1.84	2,577	19.34	0.00	0.07 ic	---	---	0.00	---	---	---	0.934	---	0.934
1.88	2,633	19.38	0.00	0.07 ic	---	---	0.00	---	---	---	0.943	---	0.943
1.92	2,689	19.42	0.00	0.07 ic	---	---	0.00	---	---	---	0.953	---	0.953
1.96	2,745	19.46	0.00	0.07 ic	---	---	0.00	---	---	---	0.963	---	0.963
2.00	2,801	19.50	0.00	0.07 ic	---	---	0.00	---	---	---	0.972	---	0.972
2.04	2,857	19.54	0.00	0.07 ic	---	---	0.00	---	---	---	0.982	---	0.982
2.08	2,913	19.58	0.00	0.07 ic	---	---	0.00	---	---	---	0.992	---	0.992
2.12	2,969	19.62	0.00	0.07 ic	---	---	0.00	---	---	---	1.002	---	1.002
2.16	3,025	19.66	0.00	0.07 ic	---	---	0.00	---	---	---	1.011	---	1.011
2.20	3,081	19.70	0.00	0.07 ic	---	---	0.00	---	---	---	1.021	---	1.021
2.24	3,137	19.74	0.00	0.07 ic	---	---	0.00	---	---	---	1.031	---	1.031
2.28	3,193	19.78	0.00	0.07 ic	---	---	0.00	---	---	---	1.040	---	1.040
2.32	3,249	19.82	0.00	0.07 ic	---	---	0.00	---	---	---	1.050	---	1.050
2.36	3,305	19.86	0.00	0.07 ic	---	---	0.00	---	---	---	1.060	---	1.060
2.40	3,361	19.90	0.00	0.06 ic	---	---	0.00	---	---	---	1.070	---	1.070
2.44	3,417	19.94	0.00	0.06 ic	---	---	0.00	---	---	---	1.079	---	1.079
2.48	3,473	19.98	0.00	0.06 ic	---	---	0.00	---	---	---	1.089	---	1.089
2.52	3,529	20.02	0.00 ic	0.00 ic	---	---	0.00	---	---	---	1.099	---	1.101
2.56	3,585	20.06	0.02 ic	0.00	---	---	0.00	---	---	---	1.109	---	1.129
2.60	3,641	20.10	0.06 ic	0.00	---	---	0.00	---	---	---	1.118	---	1.176
2.64	3,697	20.14	0.11 ic	0.00	---	---	0.00	---	---	---	1.128	---	1.237
2.68	3,753	20.18	0.18 ic	0.00	---	---	0.00	---	---	---	1.138	---	1.322
2.72	3,809	20.22	0.27 ic	0.00	---	---	0.00	---	---	---	1.147	---	1.418
2.76	3,865	20.26	0.36 ic	0.00	---	---	0.00	---	---	---	1.157	---	1.519
2.80	3,921	20.30	0.49 ic	0.00	---	---	0.00	---	---	---	1.167	---	1.657
2.84	3,977	20.34	0.62 ic	0.00	---	---	0.00	---	---	---	1.177	---	1.794
2.88	4,033	20.38	0.76 ic	0.00	---	---	0.00	---	---	---	1.186	---	1.949
2.92	4,089	20.42	0.89 ic	0.00	---	---	0.00	---	---	---	1.196	---	2.090
2.96	4,145	20.46	1.07 ic	0.00	---	---	0.00	---	---	---	1.206	---	2.277
3.00	4,201	20.50	1.27 ic	0.00	---	---	0.00	---	---	---	1.216	---	2.481
3.04	4,257	20.54	1.44 ic	0.00	---	---	0.00	---	---	---	1.225	---	2.661
3.08	4,313	20.58	1.66 ic	0.00	---	---	0.00	---	---	---	1.235	---	2.895
3.12	4,369	20.62	1.85 ic	0.00	---	---	0.00	---	---	---	1.245	---	3.097
3.16	4,425	20.66	2.10 ic	0.00	---	---	0.00	---	---	---	1.254	---	3.358
3.20	4,481	20.70	2.32 ic	0.00	---	---	0.00	---	---	---	1.264	---	3.580
3.24	4,537	20.74	2.59 ic	0.00	---	---	0.00	---	---	---	1.274	---	3.862
3.28	4,593	20.78	2.82 ic	0.00	---	---	0.00	---	---	---	1.284	---	4.100
3.32	4,649	20.82	3.05 ic	0.00	---	---	0.00	---	---	---	1.293	---	4.343
3.36	4,705	20.86	3.34 ic	0.00	---	---	0.00	---	---	---	1.303	---	4.646
3.40	4,761	20.90	3.59 ic	0.00	---	---	0.00	---	---	---	1.313	---	4.898
3.44	4,817	20.94	3.89 ic	0.00	---	---	0.00	---	---	---	1.322	---	5.208
3.48	4,873	20.98	4.13 ic	0.00	---	---	0.00	---	---	---	1.332	---	5.463
3.52	4,929	21.02	4.43 ic	0.00	---	---	0.00	---	---	---	1.342	---	5.771
3.56	4,985	21.06	4.72 ic	0.00	---	---	0.00	---	---	---	1.352	---	6.076
3.60	5,041	21.10	4.96 ic	0.00	---	---	0.00	---	---	---	1.361	---	6.325
3.64	5,097	21.14	5.25 ic	0.00	---	---	0.00	---	---	---	1.371	---	6.618
3.68	5,153	21.18	5.52 ic	0.00	---	---	0.00	---	---	---	1.381	---	6.902
3.72	5,209	21.22	5.82 ic	0.00	---	---	0.00	---	---	---	1.391	---	7.214
3.76	5,265	21.26	6.07 ic	0.00	---	---	0.00	---	---	---	1.400	---	7.471
3.80	5,321	21.30	6.33 ic	0.00	---	---	0.00	---	---	---	1.410	---	7.745
3.84	5,377	21.34	6.58 ic	0.00	---	---	0.00	---	---	---	1.420	---	7.996
3.88	5,433	21.38	6.81 ic	0.00	---	---	0.00	---	---	---	1.429	---	8.243
3.92	5,489	21.42	7.03 ic	0.00	---	---	0.00	---	---	---	1.439	---	8.471
3.96	5,545	21.46	7.22 ic	0.00	---	---	0.00	---	---	---	1.449	---	8.672
4.00	5,601	21.50	7.17 oc	0.00	---	---	0.00	---	---	---	1.459	---	8.624

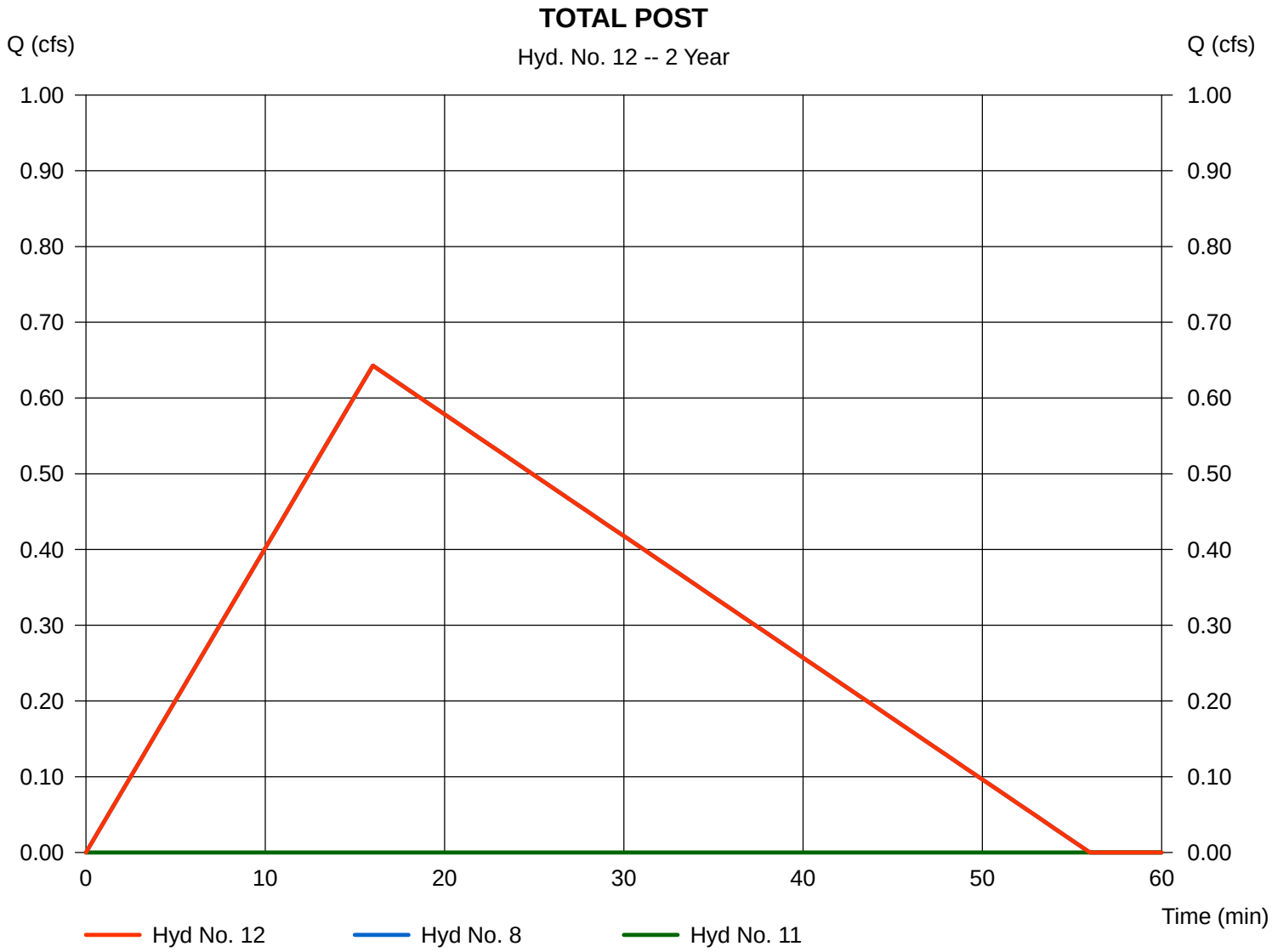
...End

Hydrograph Report

Hyd. No. 12

TOTAL POST

Hydrograph type	=	Combine	Peak discharge	=	0.643 cfs
Storm frequency	=	2 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	1,080 cuft
Inflow hyds.	=	8, 11	Contrib. drain. area	=	0.570 ac



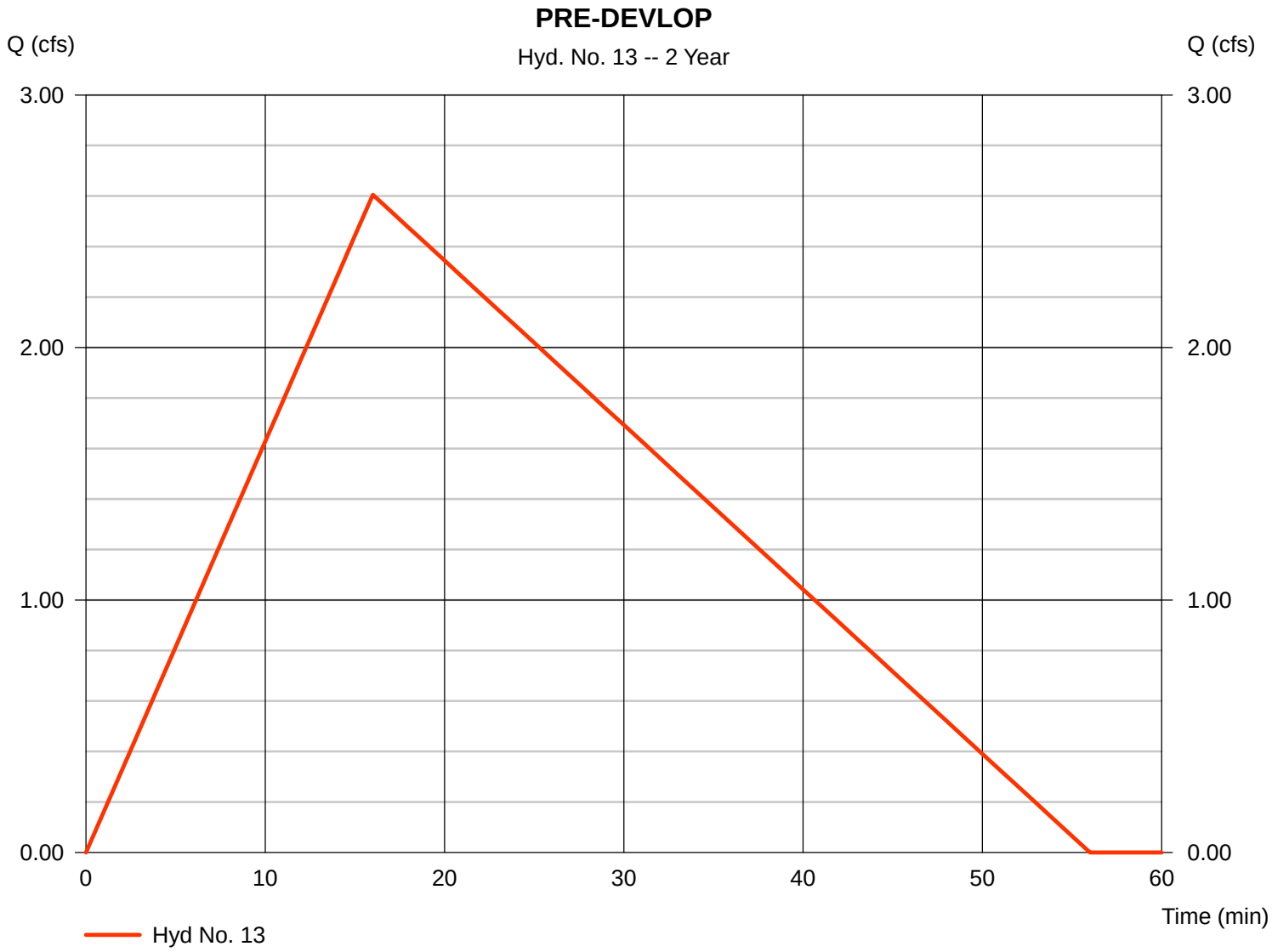
Hydrograph Report

Hyd. No. 13

PRE-DEVLOP

Hydrograph type	=	Rational	Peak discharge	=	2.605 cfs
Storm frequency	=	2 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	4,376 cuft
Drainage area	=	2.310 ac	Runoff coeff.	=	0.43*
Intensity	=	2.622 in/hr	Tc by User	=	16.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5

* Composite (Area/C) = [(1.820 x 0.30) + (0.490 x 0.90)] / 2.310



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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	0.773	1	5	406	------	------	------	INLET-1
2	Rational	1.546	1	5	812	------	------	------	INLET-2
3	Rational	0.330	1	5	173	------	------	------	INLET-3
4	Rational	2.752	1	5	1,445	------	------	------	INLET-4
5	Rational	0.660	1	5	347	------	------	------	INLET-5
6	Rational	2.587	1	5	1,358	------	------	------	INLET-6
7	Rational	0.605	1	5	318	------	------	------	INLET-7
8	Rational	0.921	1	16	1,547	------	------	------	BYPASS
9	Combine	8.648	1	5	4,410	1, 2, 3,	------	------	COMBINE 1-6
10	Combine	9.253	1	5	4,719	4, 5, 6, 7, 9	------	------	COMBINE 9 7
11	Reservoir	0.325	1	15	86	10	20.25	3,842	UG POND
12	Combine	1.216	1	16	1,633	8, 11	------	------	TOTAL POST
13	Rational	3.731	1	16	6,269	------	------	------	PRE-DEVLOP

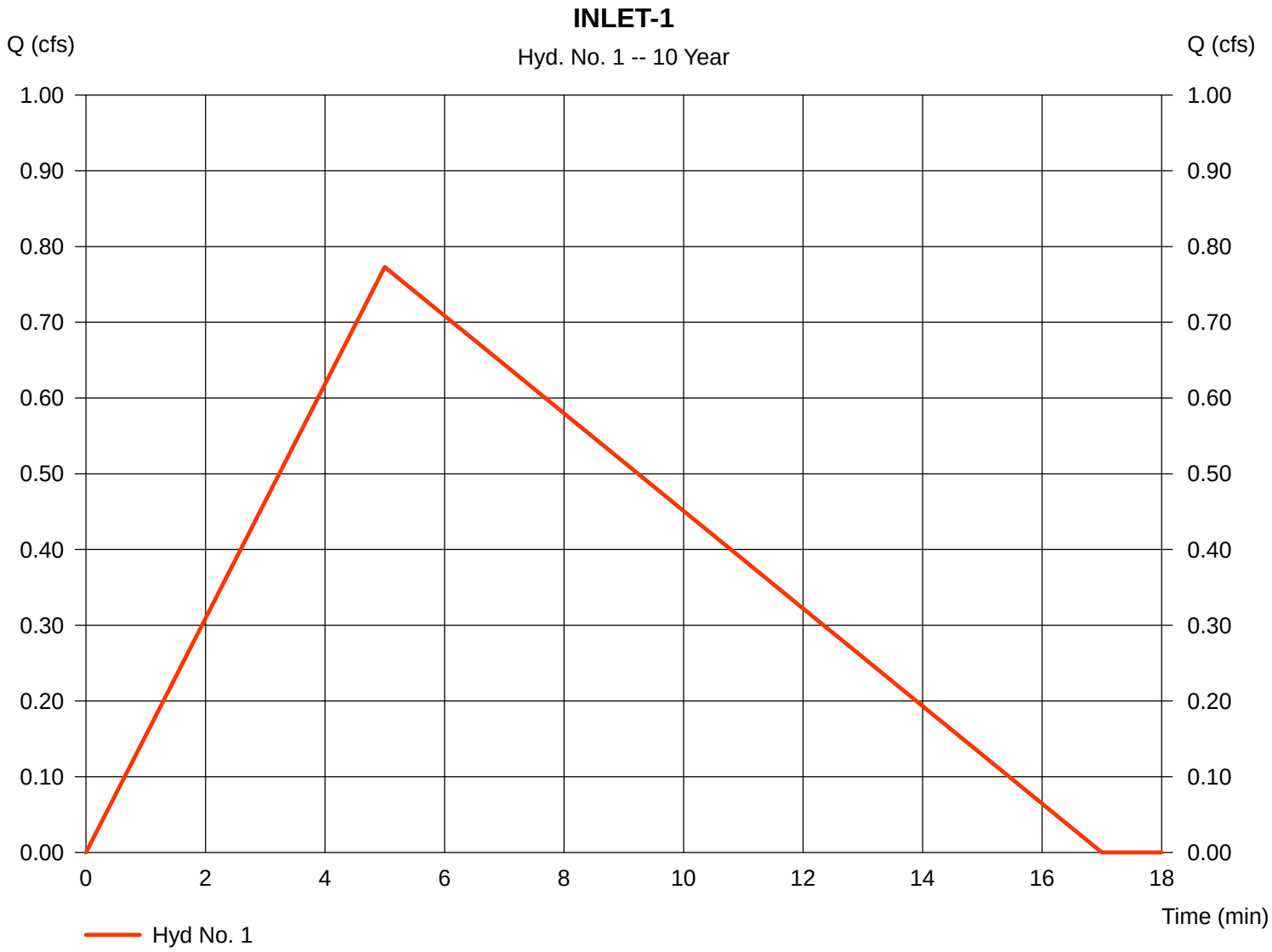
Hydrograph Report

Hyd. No. 1

INLET-1

Hydrograph type	=	Rational	Peak discharge	=	0.773 cfs
Storm frequency	=	10 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	406 cuft
Drainage area	=	0.160 ac	Runoff coeff.	=	0.79*
Intensity	=	6.115 in/hr	Tc by User	=	5.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5

* Composite (Area/C) = [(0.030 x 0.30) + (0.130 x 0.90)] / 0.160



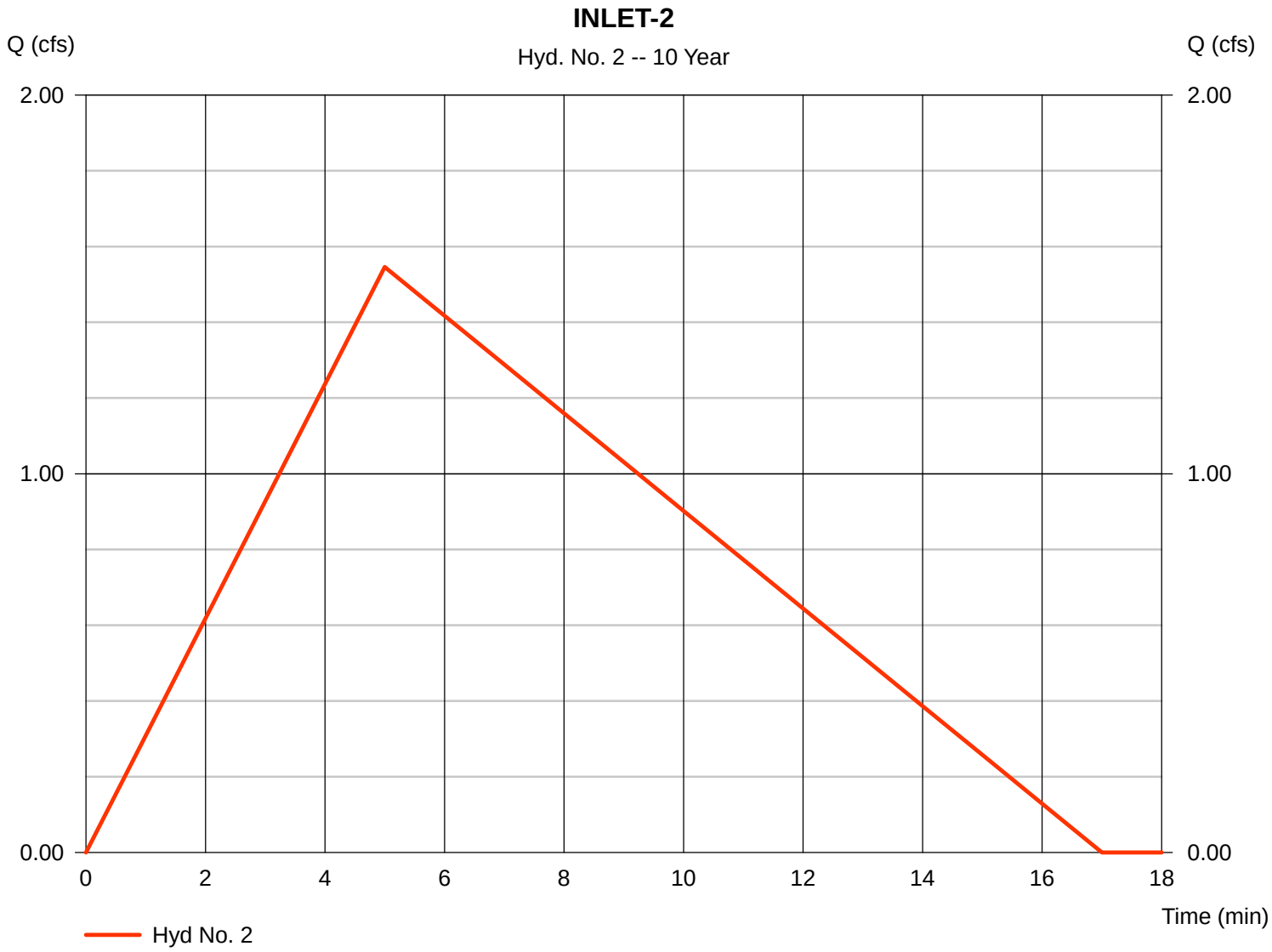
Hydrograph Report

Hyd. No. 2

INLET-2

Hydrograph type	=	Rational	Peak discharge	=	1.546 cfs
Storm frequency	=	10 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	812 cuft
Drainage area	=	0.320 ac	Runoff coeff.	=	0.79*
Intensity	=	6.115 in/hr	Tc by User	=	5.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5

* Composite (Area/C) = [(0.060 x 0.30) + (0.260 x 0.90)] / 0.320

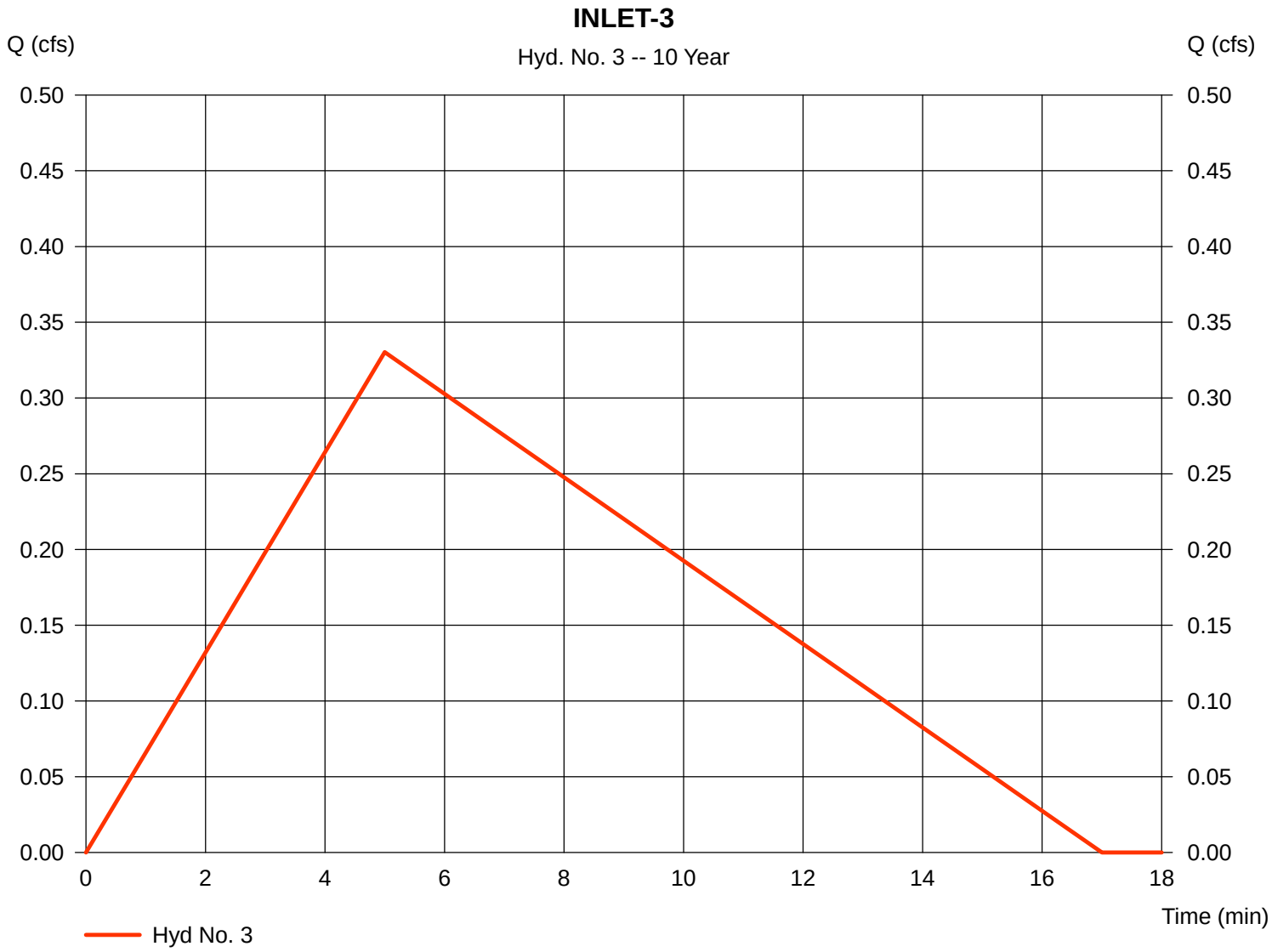


Hydrograph Report

Hyd. No. 3

INLET-3

Hydrograph type	=	Rational	Peak discharge	=	0.330 cfs
Storm frequency	=	10 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	173 cuft
Drainage area	=	0.060 ac	Runoff coeff.	=	0.9
Intensity	=	6.115 in/hr	Tc by User	=	5.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5

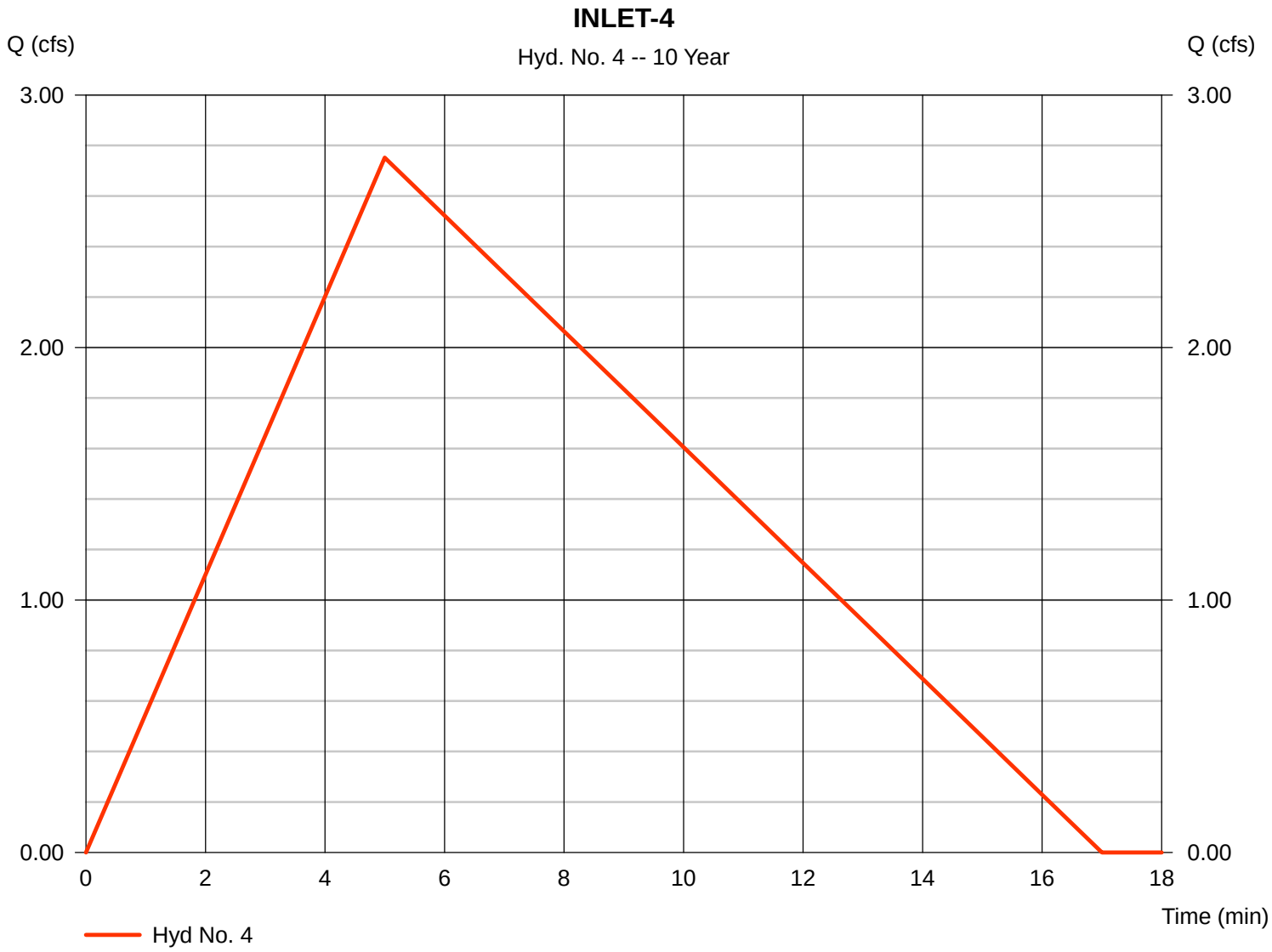


Hydrograph Report

Hyd. No. 4

INLET-4

Hydrograph type	=	Rational	Peak discharge	=	2.752 cfs
Storm frequency	=	10 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,445 cuft
Drainage area	=	0.500 ac	Runoff coeff.	=	0.9
Intensity	=	6.115 in/hr	Tc by User	=	5.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5

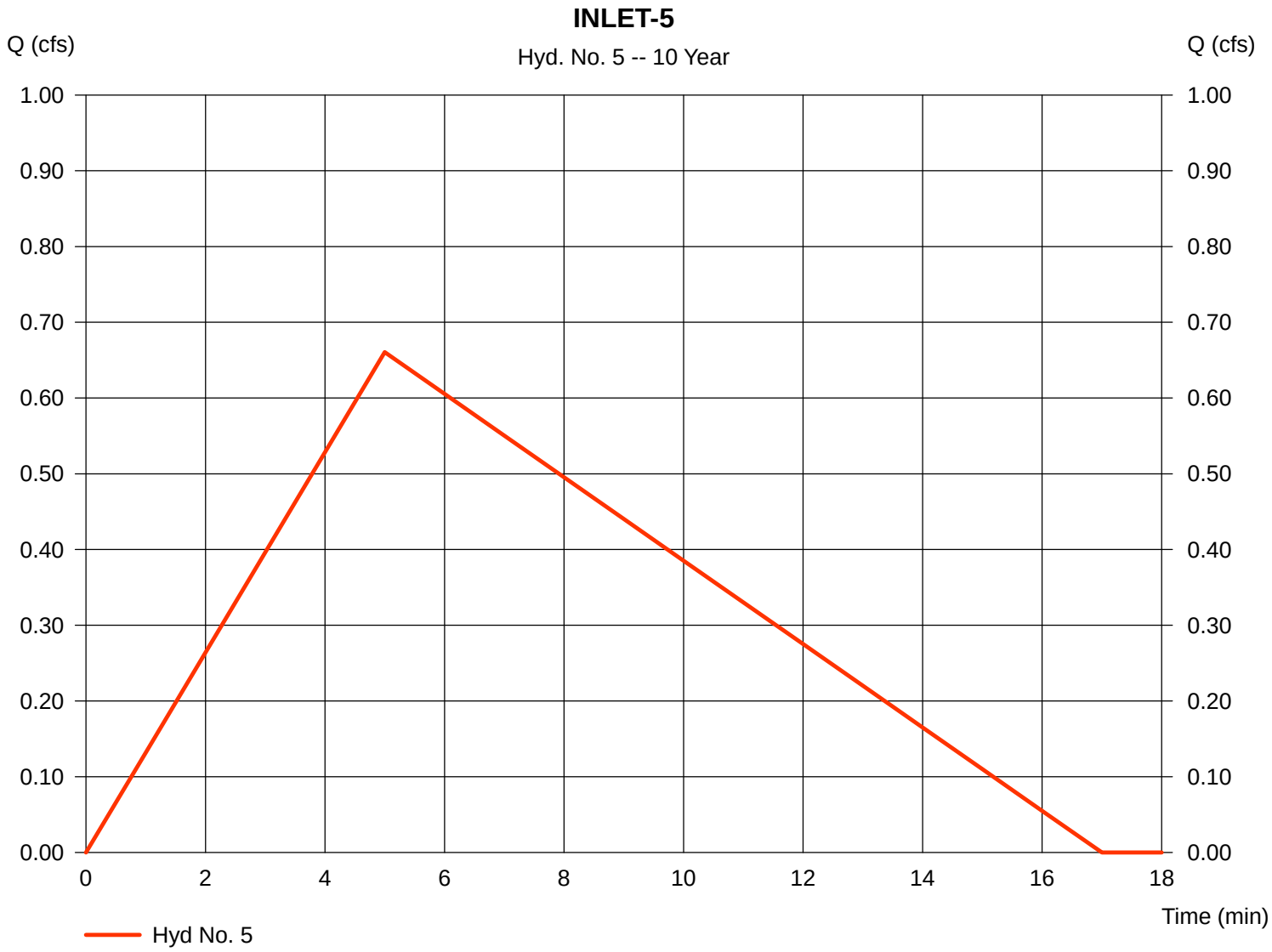


Hydrograph Report

Hyd. No. 5

INLET-5

Hydrograph type	=	Rational	Peak discharge	=	0.660 cfs
Storm frequency	=	10 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	347 cuft
Drainage area	=	0.120 ac	Runoff coeff.	=	0.9
Intensity	=	6.115 in/hr	Tc by User	=	5.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5

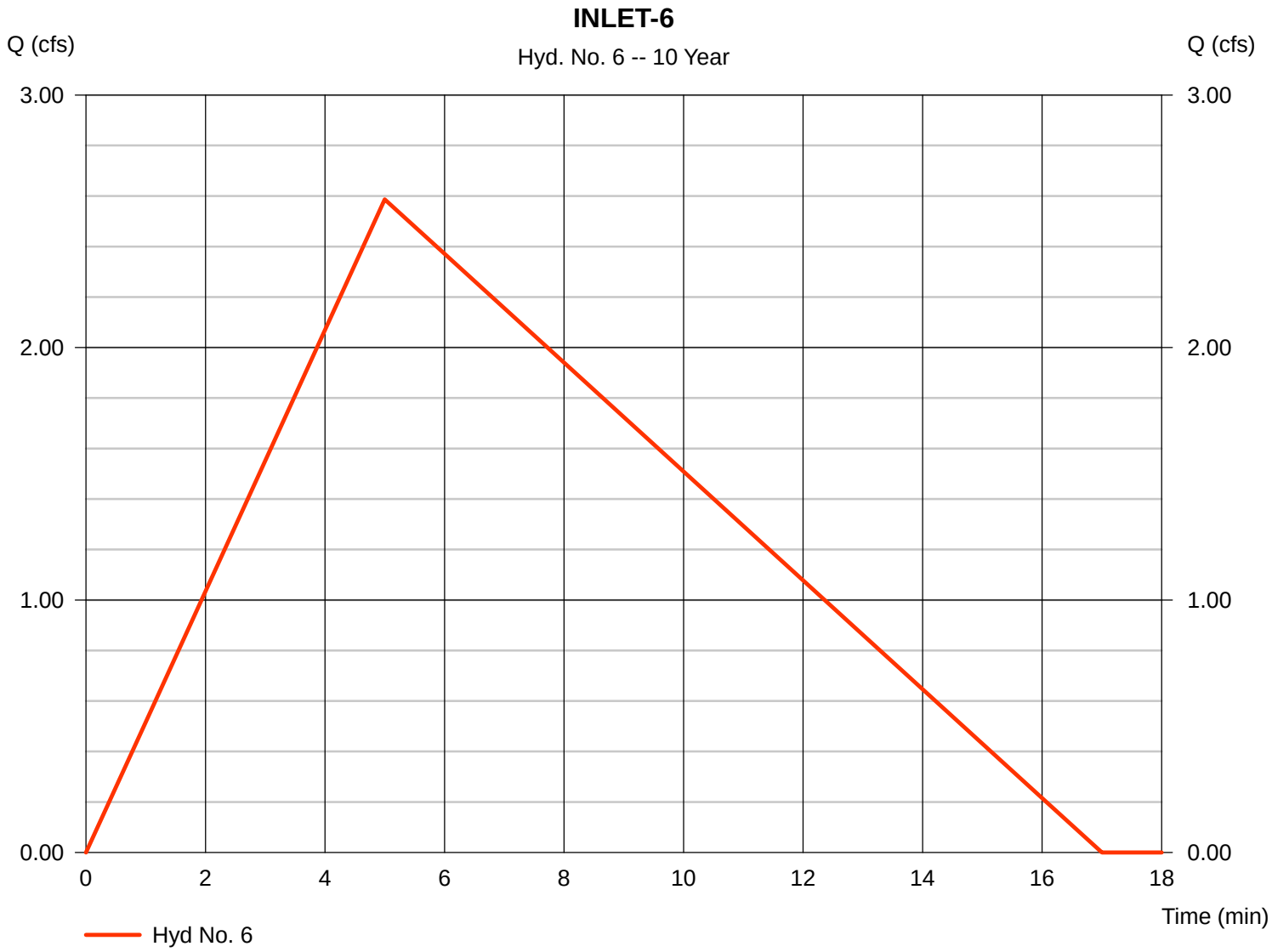


Hydrograph Report

Hyd. No. 6

INLET-6

Hydrograph type	=	Rational	Peak discharge	=	2.587 cfs
Storm frequency	=	10 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,358 cuft
Drainage area	=	0.470 ac	Runoff coeff.	=	0.9
Intensity	=	6.115 in/hr	Tc by User	=	5.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5

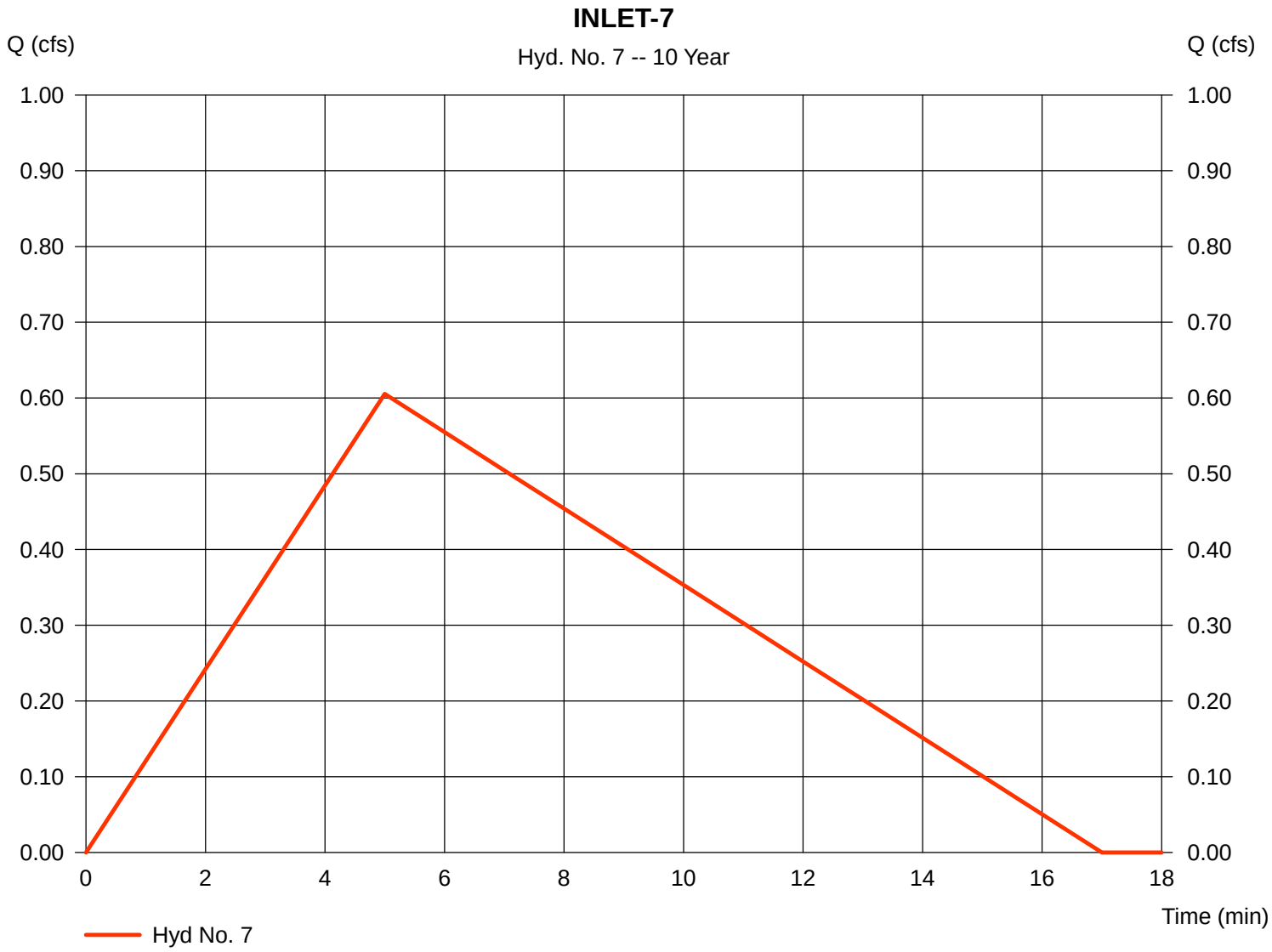


Hydrograph Report

Hyd. No. 7

INLET-7

Hydrograph type	=	Rational	Peak discharge	=	0.605 cfs
Storm frequency	=	10 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	318 cuft
Drainage area	=	0.110 ac	Runoff coeff.	=	0.9
Intensity	=	6.115 in/hr	Tc by User	=	5.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5



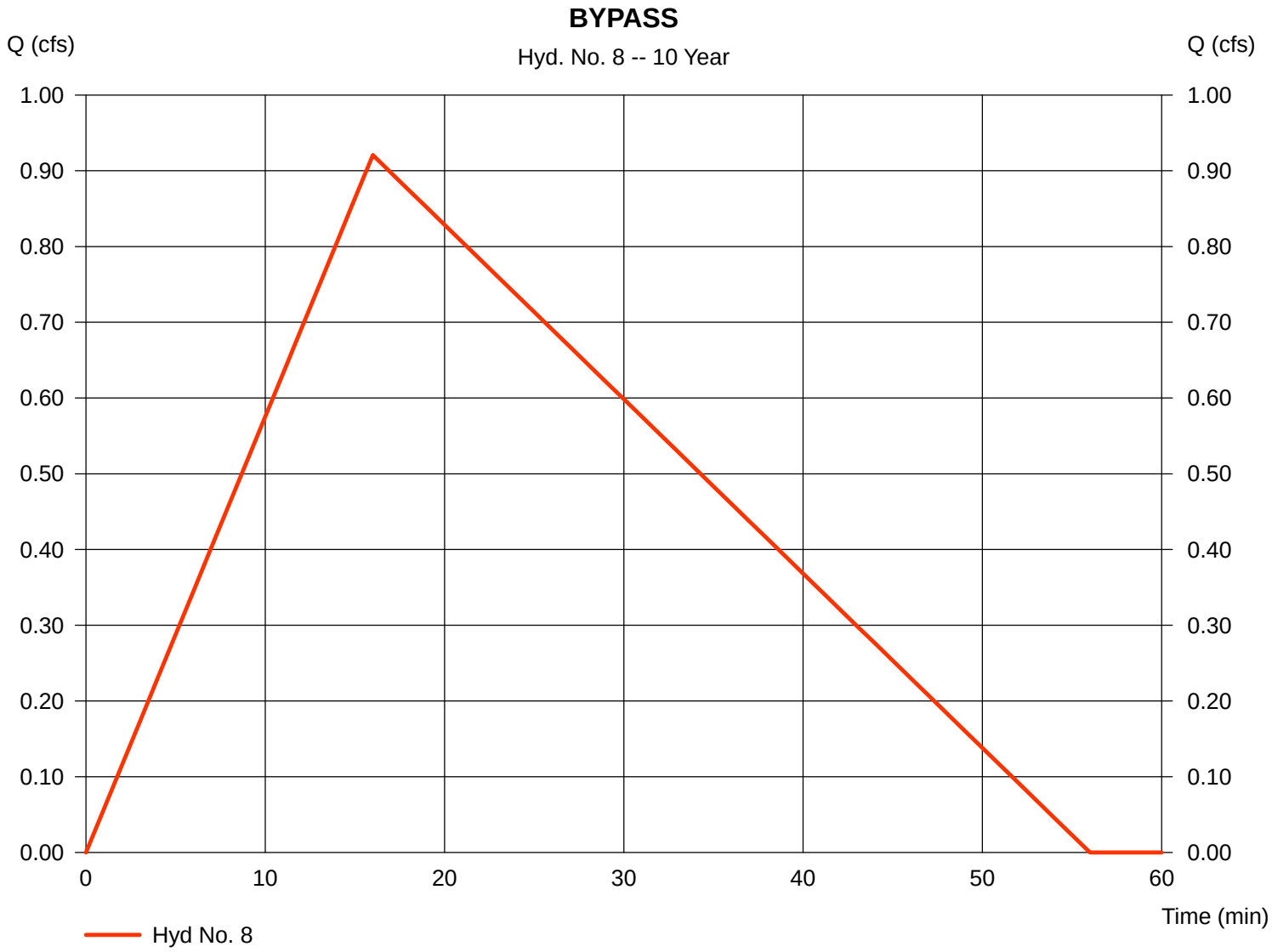
Hydrograph Report

Hyd. No. 8

BYPASS

Hydrograph type	=	Rational	Peak discharge	=	0.921 cfs
Storm frequency	=	10 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	1,547 cuft
Drainage area	=	0.570 ac	Runoff coeff.	=	0.43*
Intensity	=	3.756 in/hr	Tc by User	=	16.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5

* Composite (Area/C) = [(0.450 x 0.30) + (0.120 x 0.90)] / 0.570

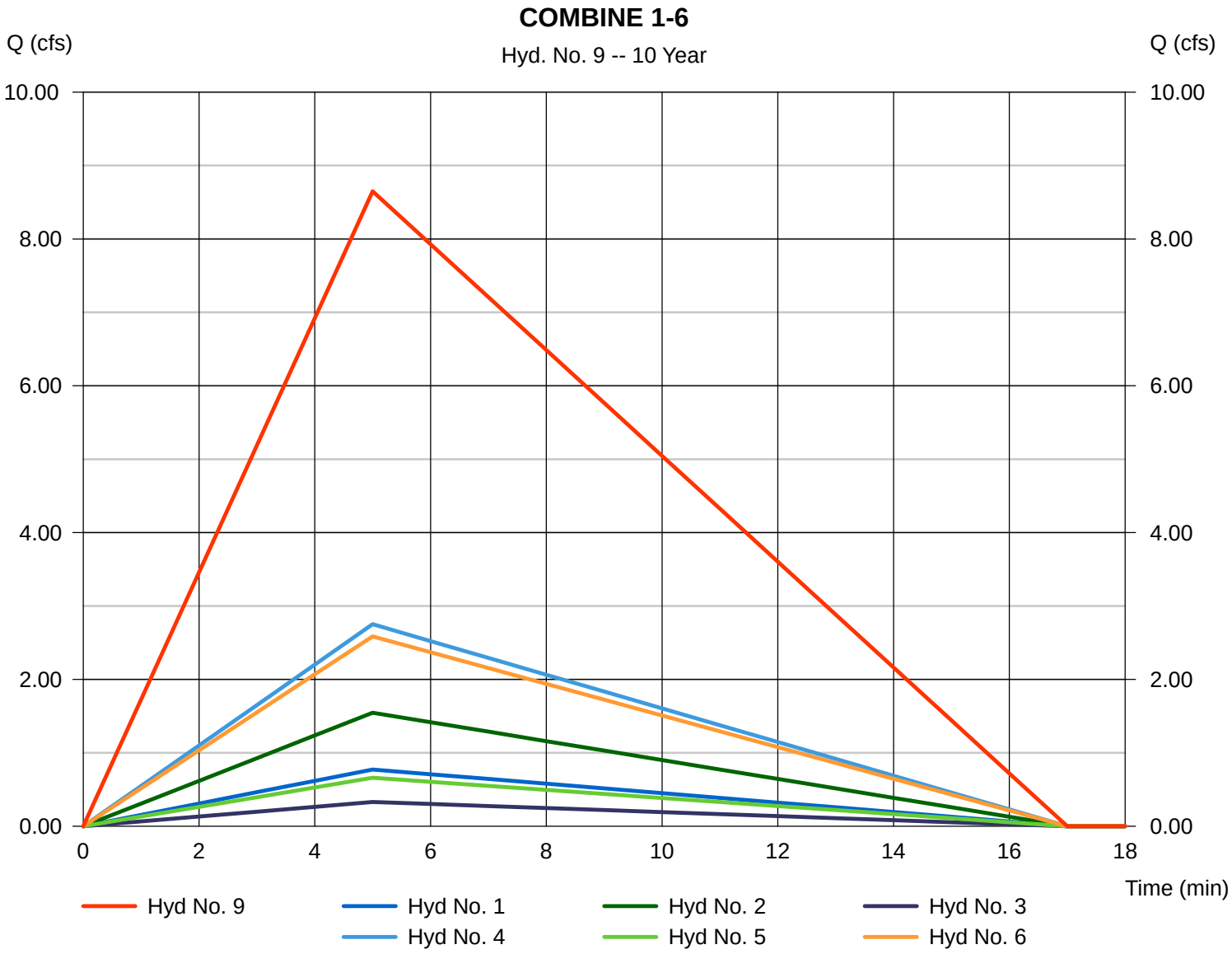


Hydrograph Report

Hyd. No. 9

COMBINE 1-6

Hydrograph type	=	Combine	Peak discharge	=	8.648 cfs
Storm frequency	=	10 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	4,410 cuft
Inflow hyds.	=	1, 2, 3, 4, 5, 6	Contrib. drain. area	=	1.630 ac

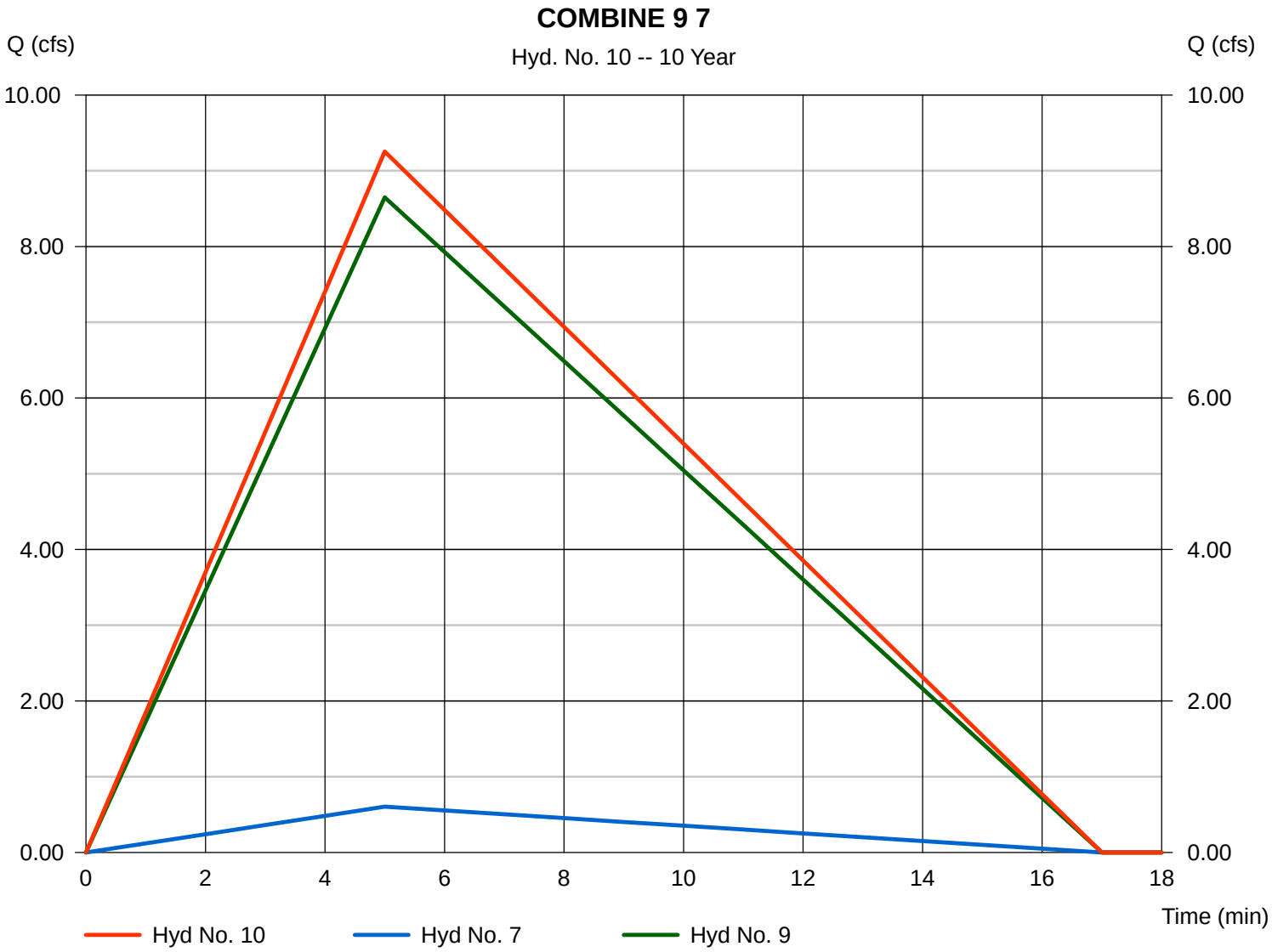


Hydrograph Report

Hyd. No. 10

COMBINE 9 7

Hydrograph type	=	Combine	Peak discharge	=	9.253 cfs
Storm frequency	=	10 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	4,719 cuft
Inflow hyds.	=	7, 9	Contrib. drain. area	=	0.110 ac



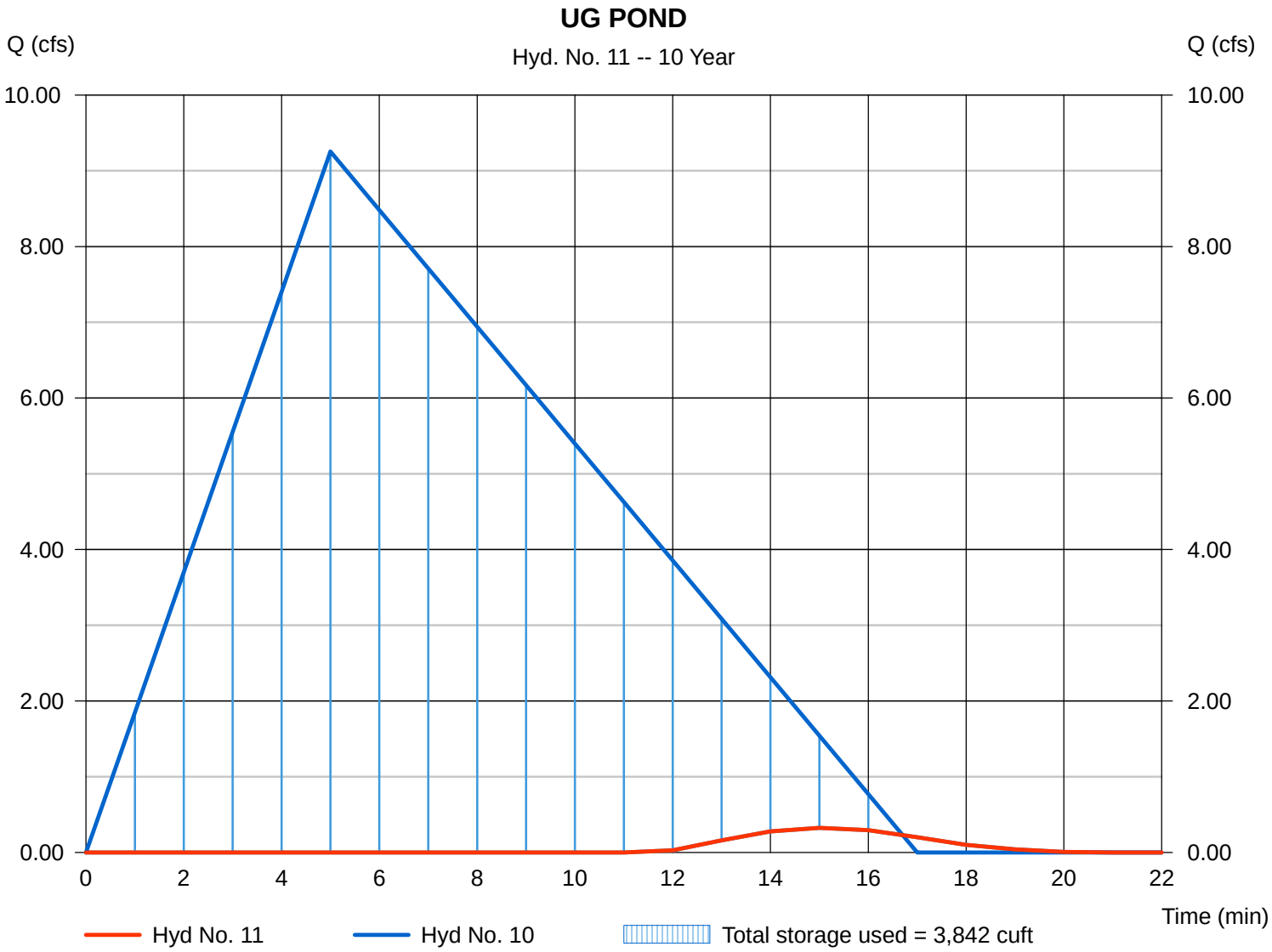
Hydrograph Report

Hyd. No. 11

UG POND

Hydrograph type	=	Reservoir	Peak discharge	=	0.325 cfs
Storm frequency	=	10 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	86 cuft
Inflow hyd. No.	=	10 - COMBINE 9 7	Max. Elevation	=	20.25 ft
Reservoir name	=	UG POND	Max. Storage	=	3,842 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

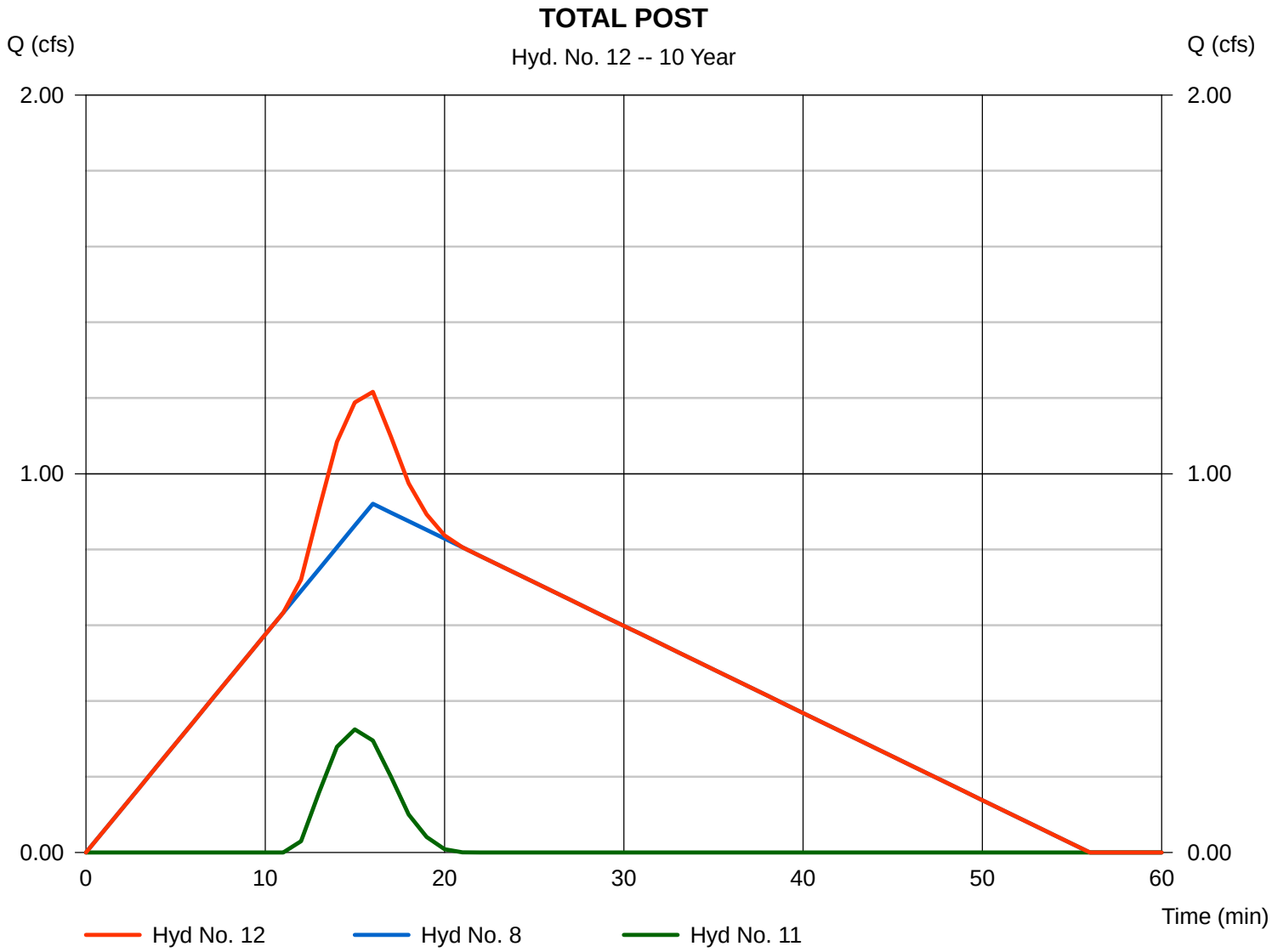


Hydrograph Report

Hyd. No. 12

TOTAL POST

Hydrograph type	=	Combine	Peak discharge	=	1.216 cfs
Storm frequency	=	10 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	1,633 cuft
Inflow hyds.	=	8, 11	Contrib. drain. area	=	0.570 ac



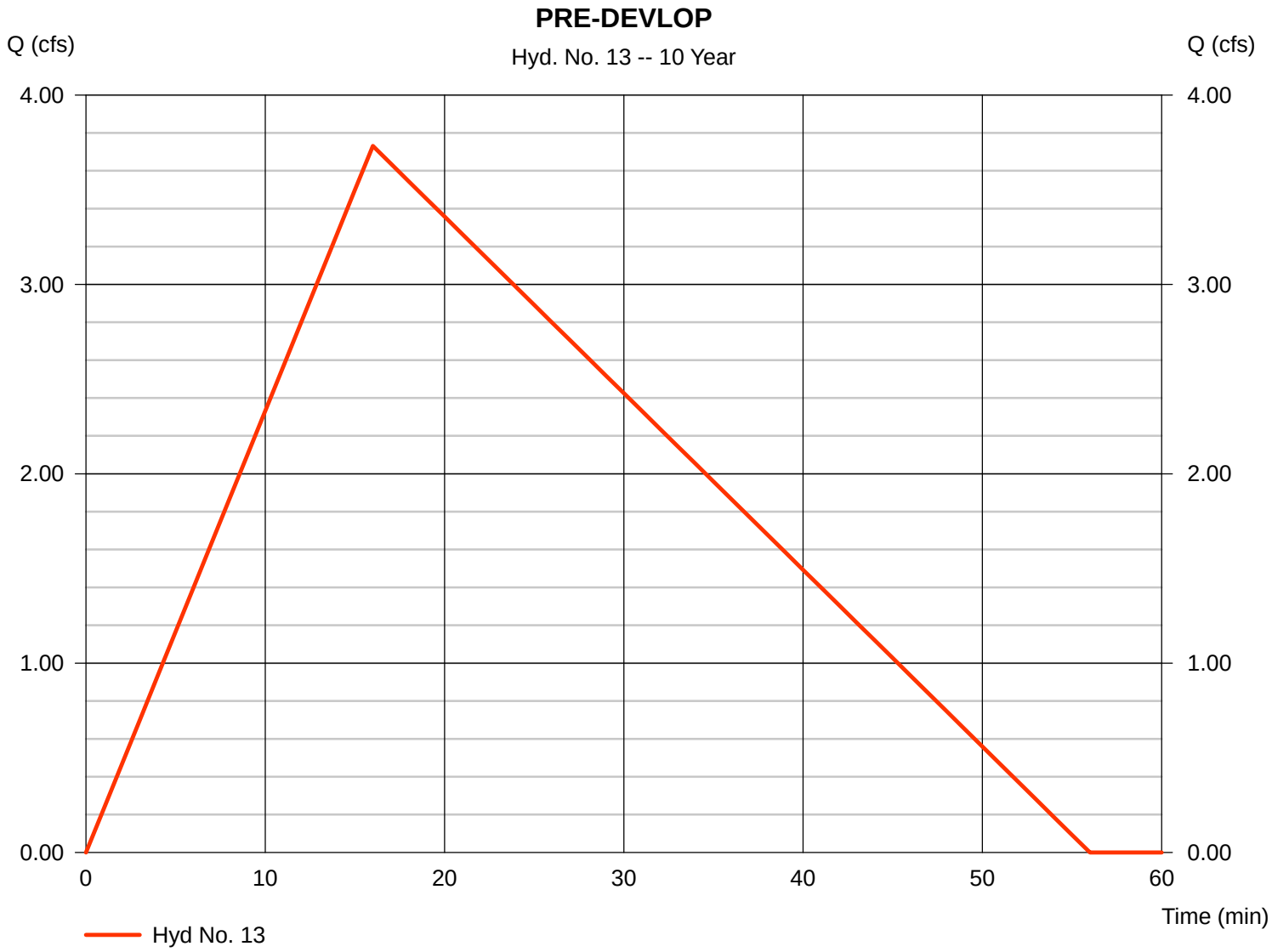
Hydrograph Report

Hyd. No. 13

PRE-DEVLOP

Hydrograph type	=	Rational	Peak discharge	=	3.731 cfs
Storm frequency	=	10 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	6,269 cuft
Drainage area	=	2.310 ac	Runoff coeff.	=	0.43*
Intensity	=	3.756 in/hr	Tc by User	=	16.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5

* Composite (Area/C) = [(1.820 x 0.30) + (0.490 x 0.90)] / 2.310



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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	1.106	1	5	581	------	------	------	INLET-1
2	Rational	2.213	1	5	1,162	------	------	------	INLET-2
3	Rational	0.473	1	5	248	------	------	------	INLET-3
4	Rational	3.939	1	5	2,068	------	------	------	INLET-4
5	Rational	0.945	1	5	496	------	------	------	INLET-5
6	Rational	3.703	1	5	1,944	------	------	------	INLET-6
7	Rational	0.867	1	5	455	------	------	------	INLET-7
8	Rational	1.373	1	16	2,307	------	------	------	BYPASS
9	Combine	12.38	1	5	6,313	1, 2, 3,	------	------	COMBINE 1-6
10	Combine	13.25	1	5	6,755	4, 5, 6, 7, 9	------	------	COMBINE 9 7
11	Reservoir	3.612	1	13	1,642	10	20.91	4,766	UG POND
12	Combine	4.728	1	13	3,949	8, 11	------	------	TOTAL POST
13	Rational	5.565	1	16	9,349	------	------	------	PRE-DEVLOP

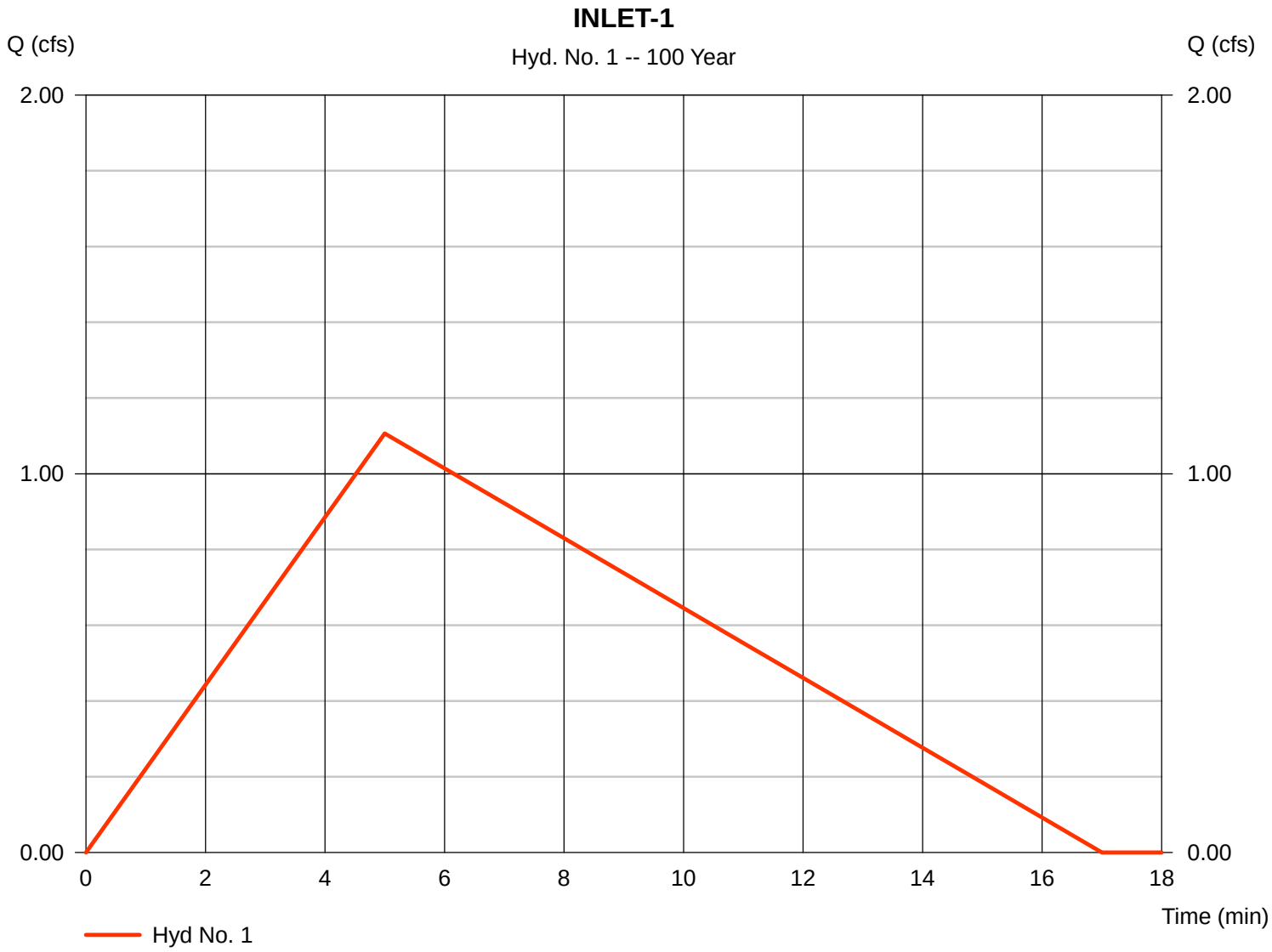
Hydrograph Report

Hyd. No. 1

INLET-1

Hydrograph type	=	Rational	Peak discharge	=	1.106 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	581 cuft
Drainage area	=	0.160 ac	Runoff coeff.	=	0.79*
Intensity	=	8.753 in/hr	Tc by User	=	5.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5

* Composite (Area/C) = [(0.030 x 0.30) + (0.130 x 0.90)] / 0.160



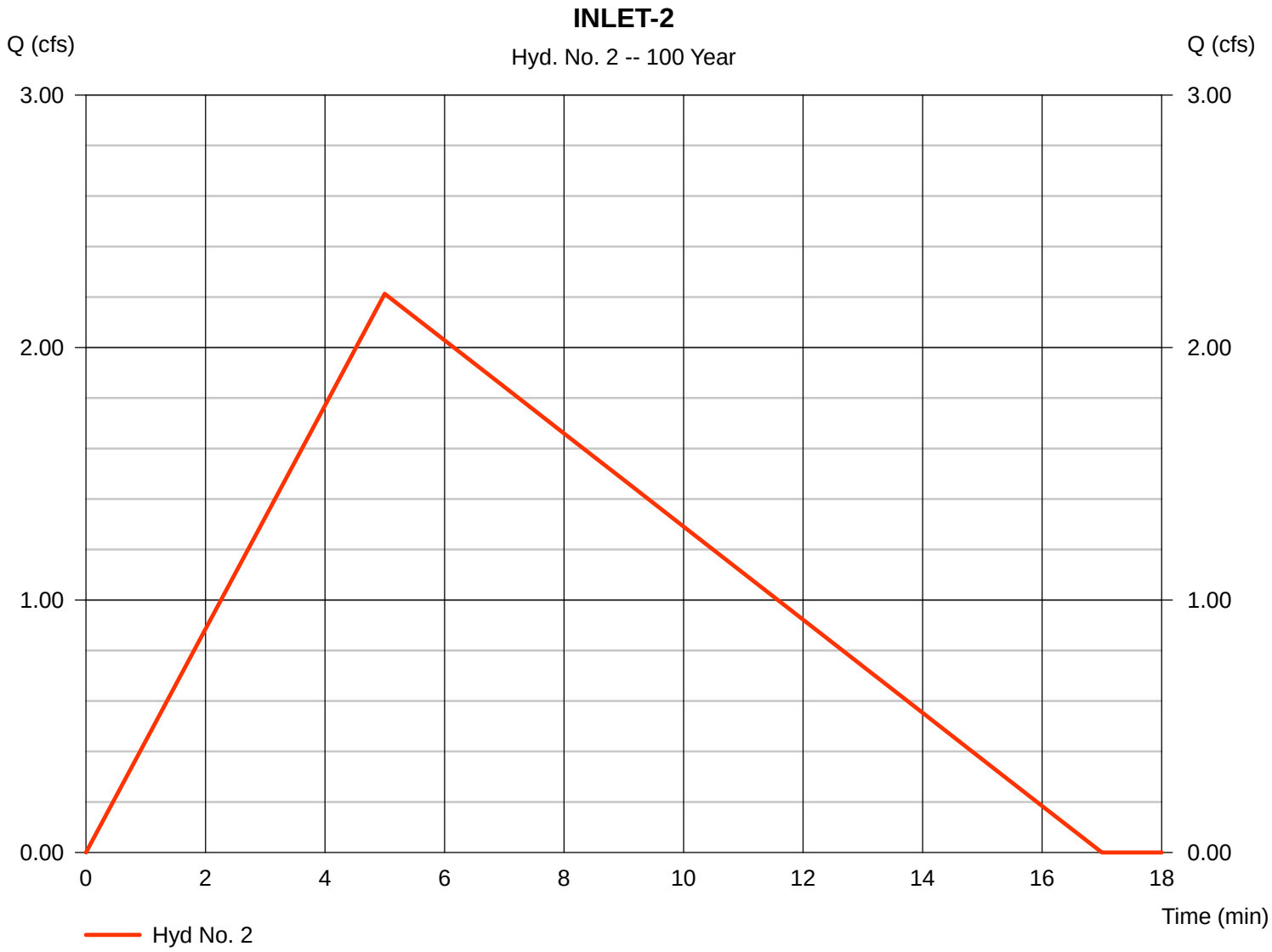
Hydrograph Report

Hyd. No. 2

INLET-2

Hydrograph type	=	Rational	Peak discharge	=	2.213 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,162 cuft
Drainage area	=	0.320 ac	Runoff coeff.	=	0.79*
Intensity	=	8.753 in/hr	Tc by User	=	5.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5

* Composite (Area/C) = [(0.060 x 0.30) + (0.260 x 0.90)] / 0.320

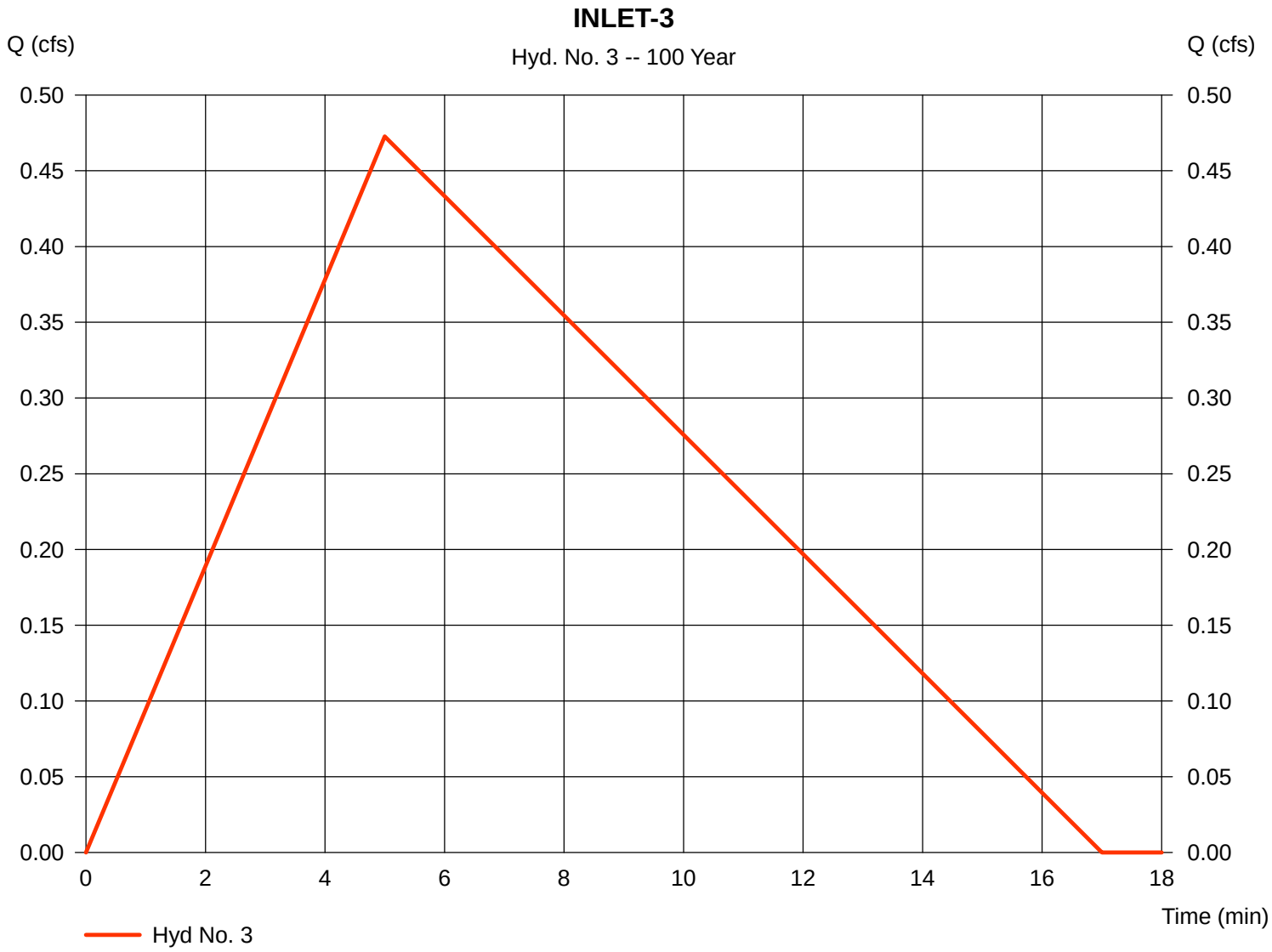


Hydrograph Report

Hyd. No. 3

INLET-3

Hydrograph type	=	Rational	Peak discharge	=	0.473 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	248 cuft
Drainage area	=	0.060 ac	Runoff coeff.	=	0.9
Intensity	=	8.753 in/hr	Tc by User	=	5.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5

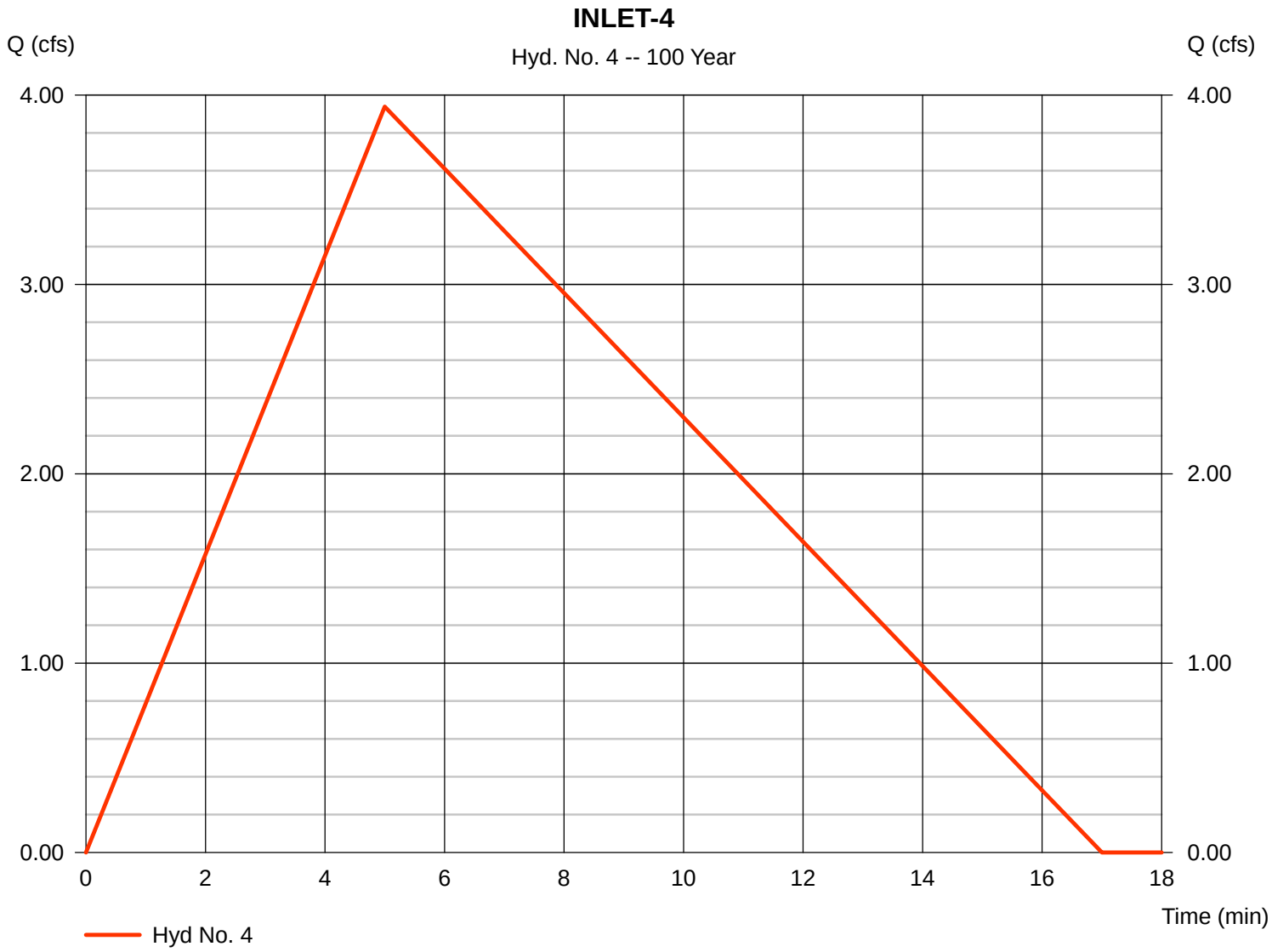


Hydrograph Report

Hyd. No. 4

INLET-4

Hydrograph type	=	Rational	Peak discharge	=	3.939 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	2,068 cuft
Drainage area	=	0.500 ac	Runoff coeff.	=	0.9
Intensity	=	8.753 in/hr	Tc by User	=	5.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5

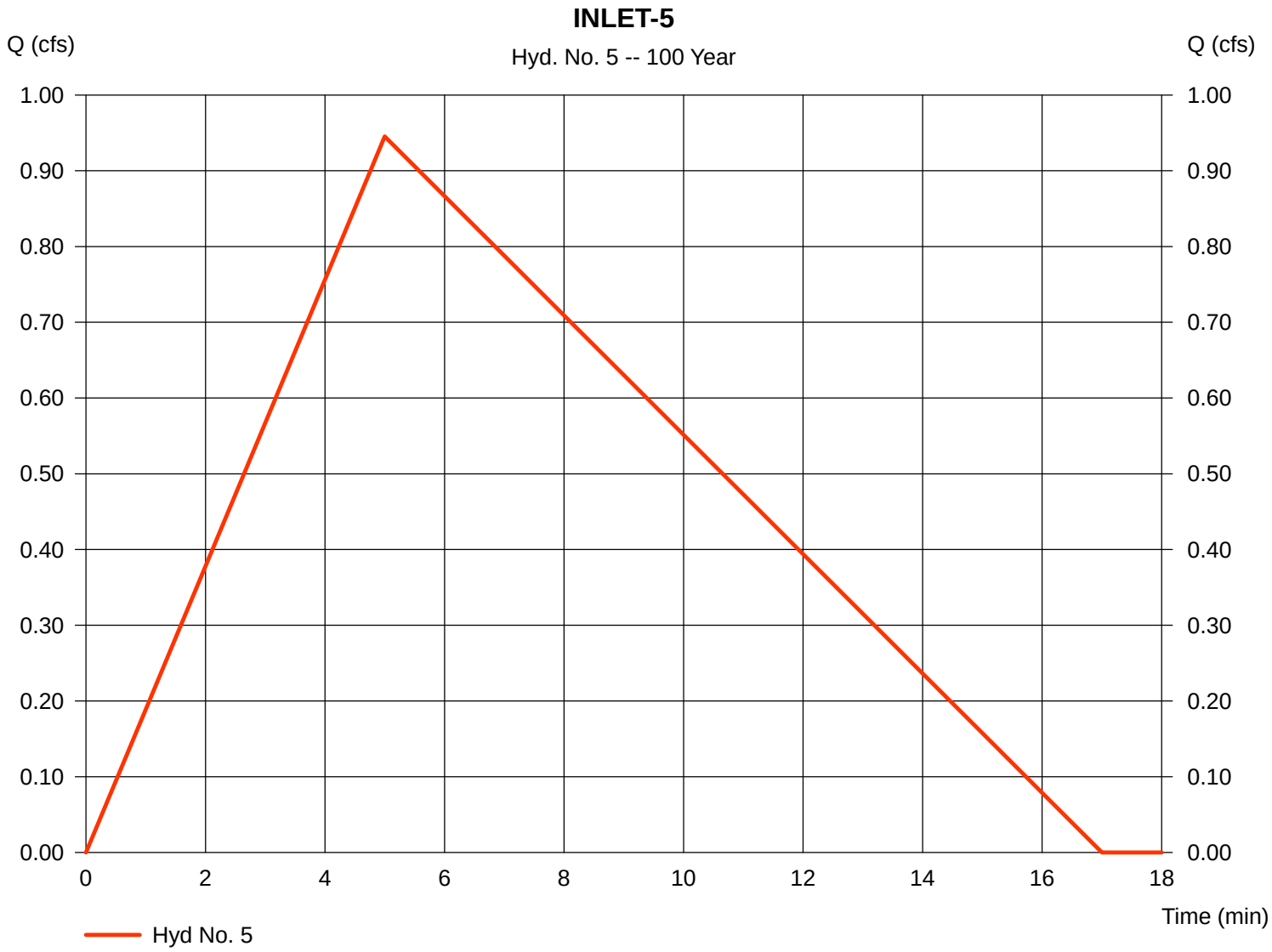


Hydrograph Report

Hyd. No. 5

INLET-5

Hydrograph type	=	Rational	Peak discharge	=	0.945 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	496 cuft
Drainage area	=	0.120 ac	Runoff coeff.	=	0.9
Intensity	=	8.753 in/hr	Tc by User	=	5.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5

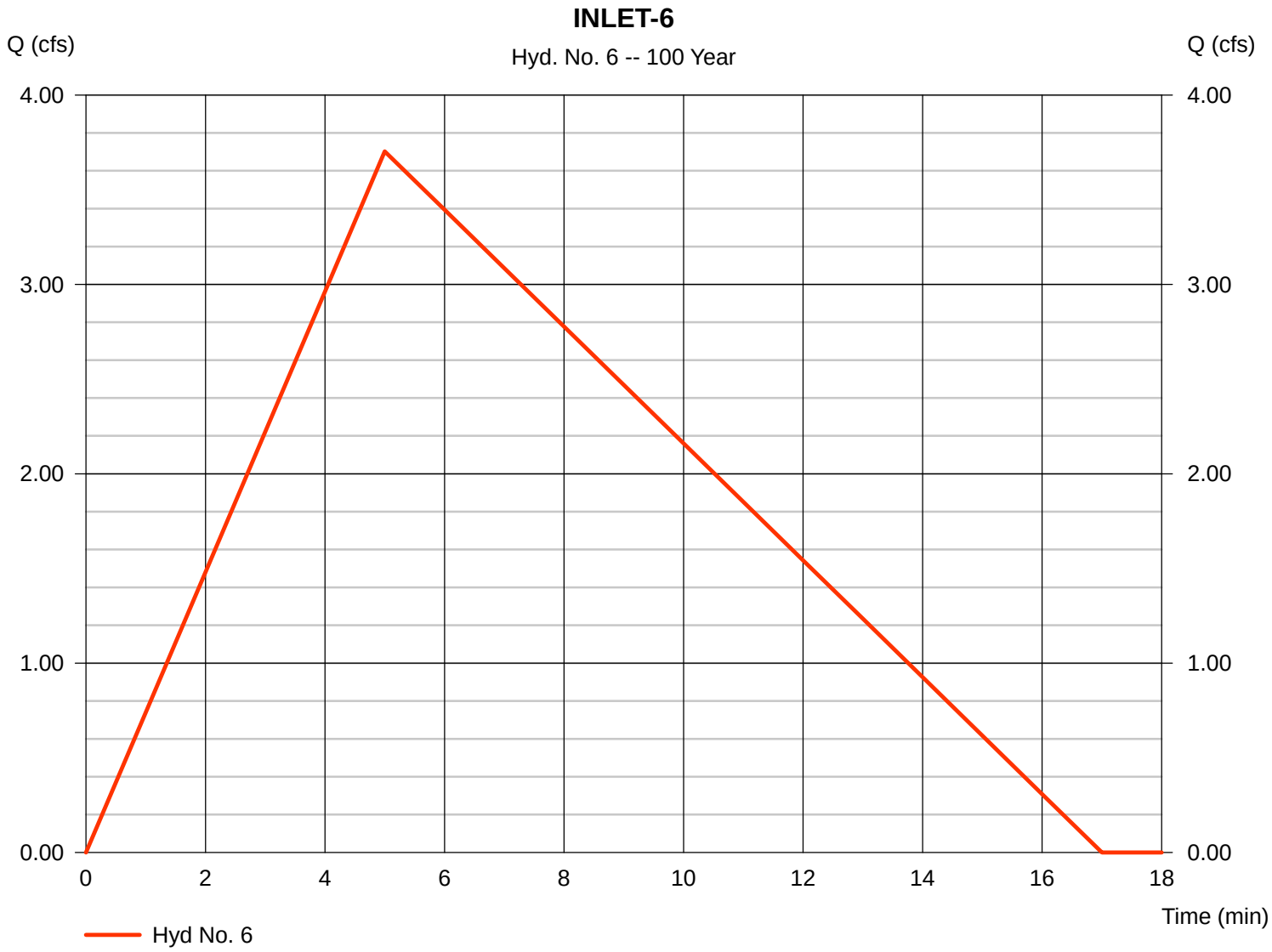


Hydrograph Report

Hyd. No. 6

INLET-6

Hydrograph type	=	Rational	Peak discharge	=	3.703 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	1,944 cuft
Drainage area	=	0.470 ac	Runoff coeff.	=	0.9
Intensity	=	8.753 in/hr	Tc by User	=	5.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5

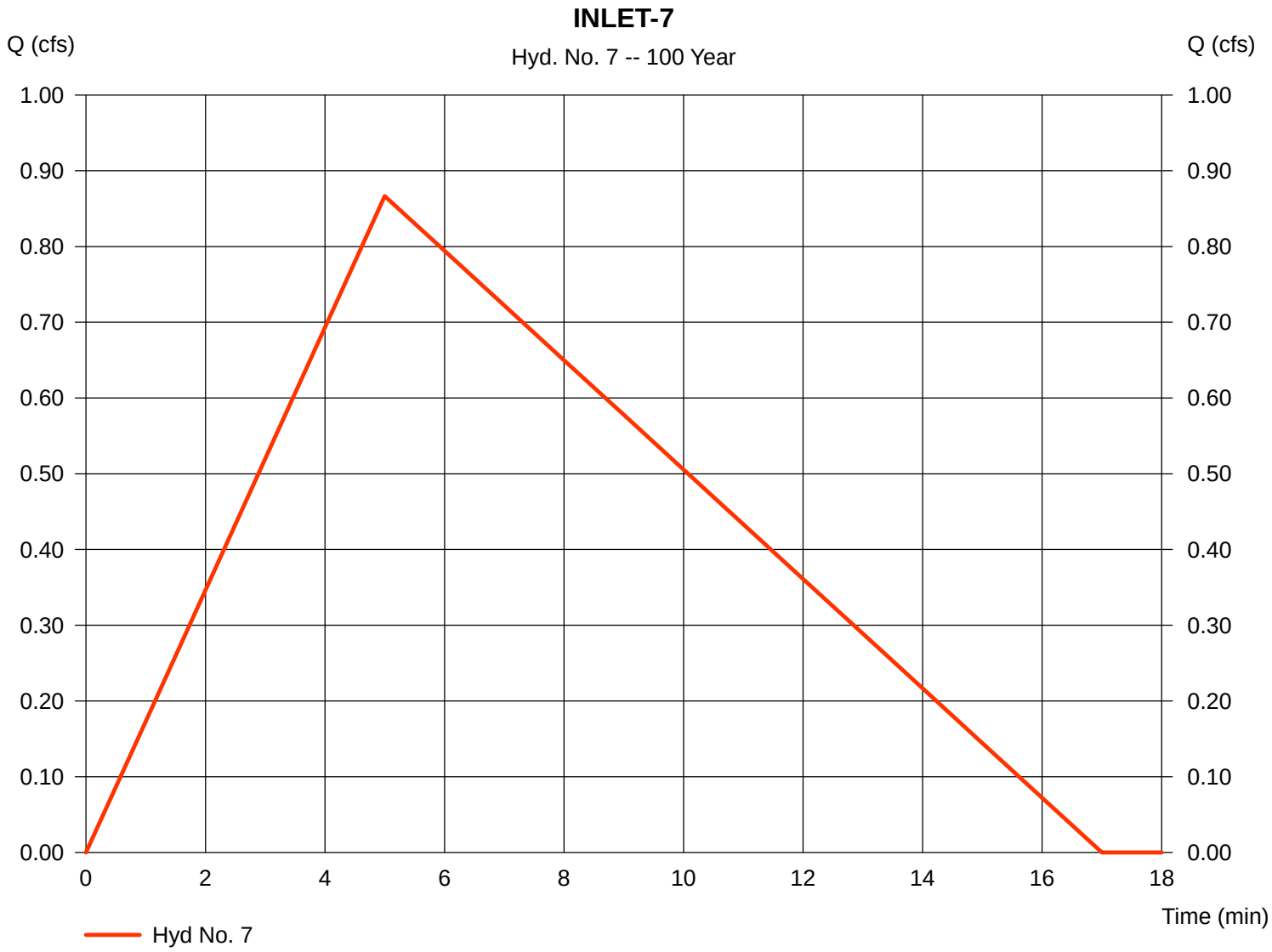


Hydrograph Report

Hyd. No. 7

INLET-7

Hydrograph type	=	Rational	Peak discharge	=	0.867 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	455 cuft
Drainage area	=	0.110 ac	Runoff coeff.	=	0.9
Intensity	=	8.753 in/hr	Tc by User	=	5.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5



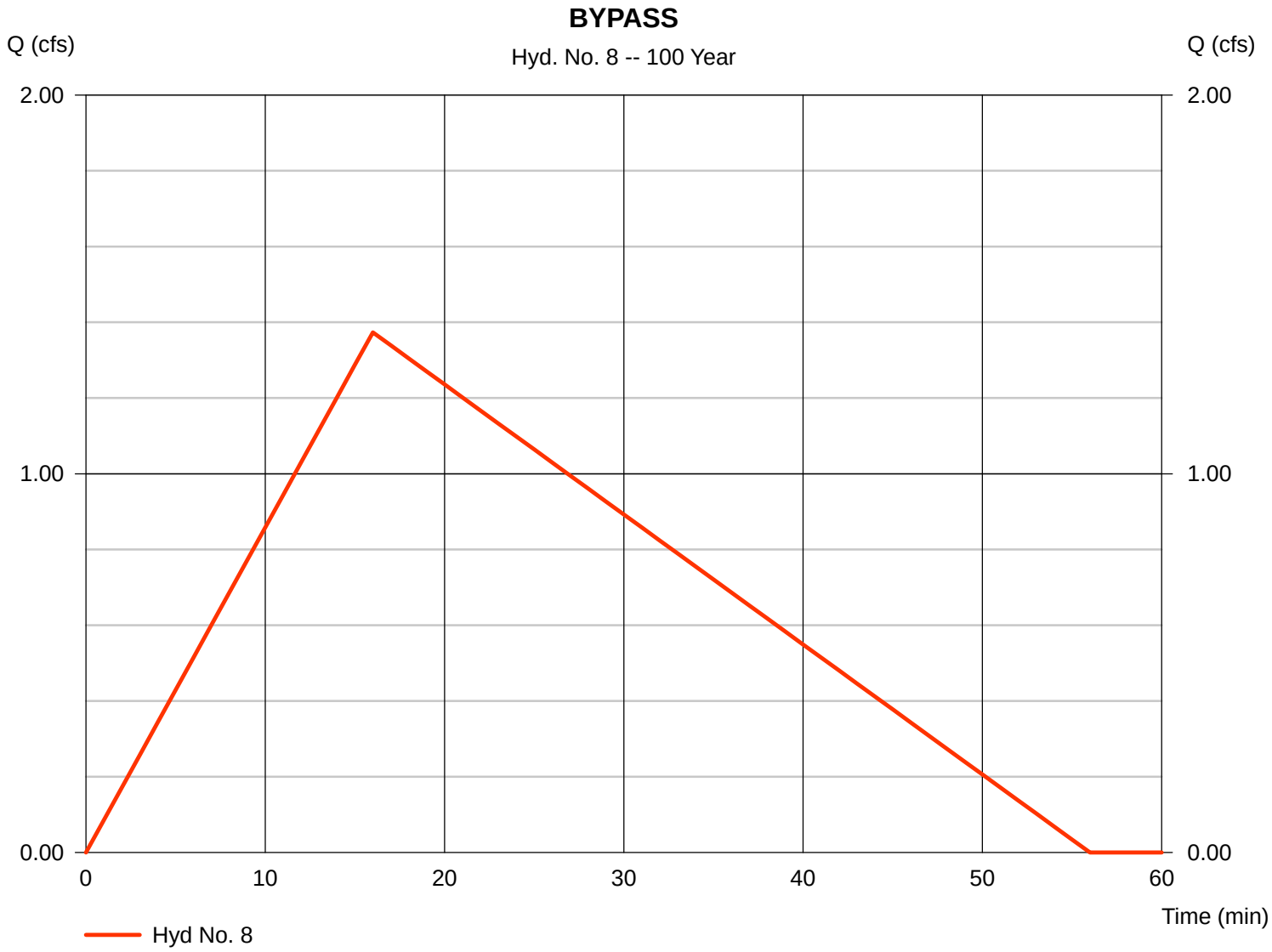
Hydrograph Report

Hyd. No. 8

BYPASS

Hydrograph type	=	Rational	Peak discharge	=	1.373 cfs
Storm frequency	=	100 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	2,307 cuft
Drainage area	=	0.570 ac	Runoff coeff.	=	0.43*
Intensity	=	5.603 in/hr	Tc by User	=	16.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5

* Composite (Area/C) = [(0.450 x 0.30) + (0.120 x 0.90)] / 0.570

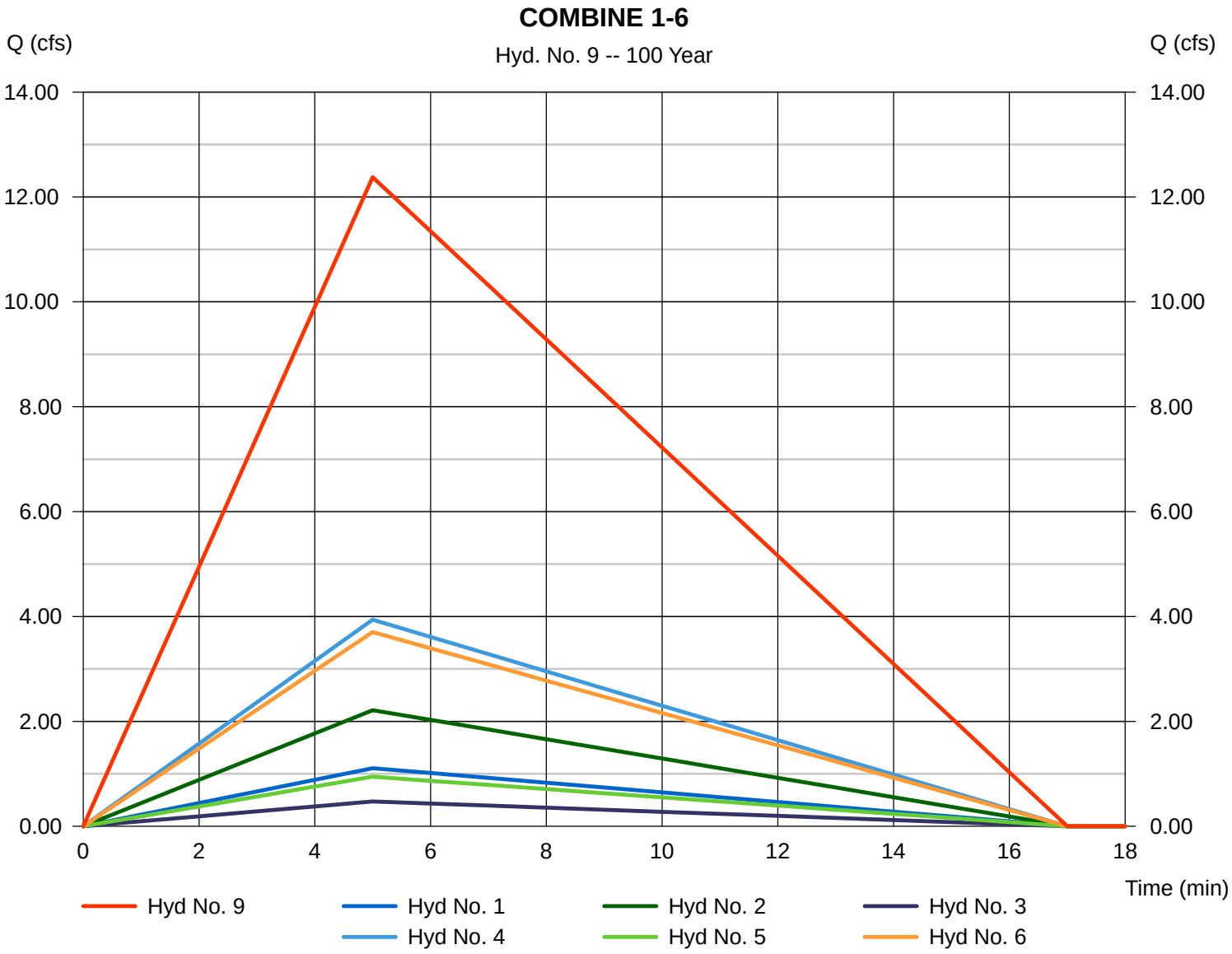


Hydrograph Report

Hyd. No. 9

COMBINE 1-6

Hydrograph type	=	Combine	Peak discharge	=	12.38 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	6,313 cuft
Inflow hyds.	=	1, 2, 3, 4, 5, 6	Contrib. drain. area	=	1.630 ac

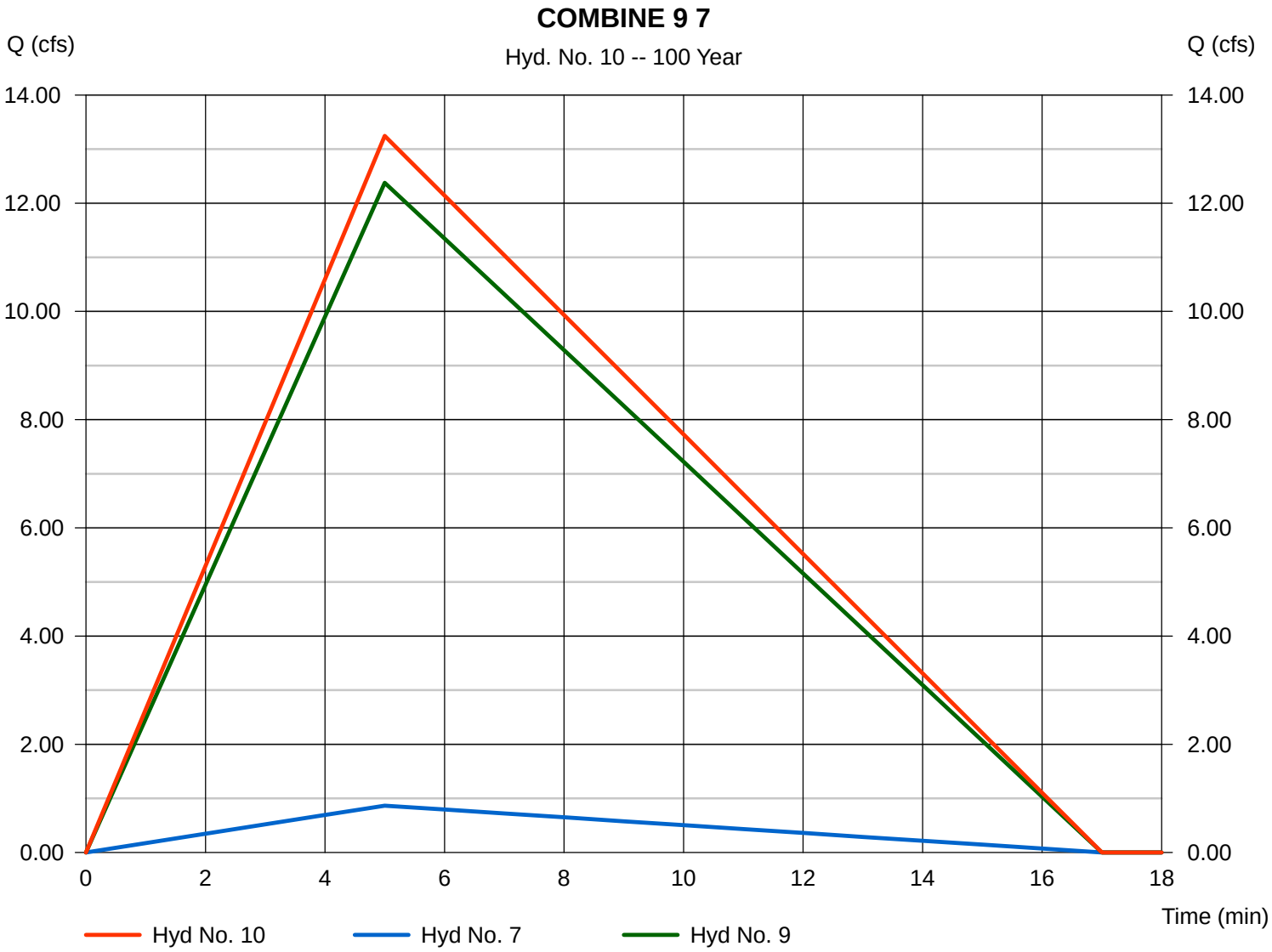


Hydrograph Report

Hyd. No. 10

COMBINE 9 7

Hydrograph type	=	Combine	Peak discharge	=	13.25 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	6,755 cuft
Inflow hyds.	=	7, 9	Contrib. drain. area	=	0.110 ac



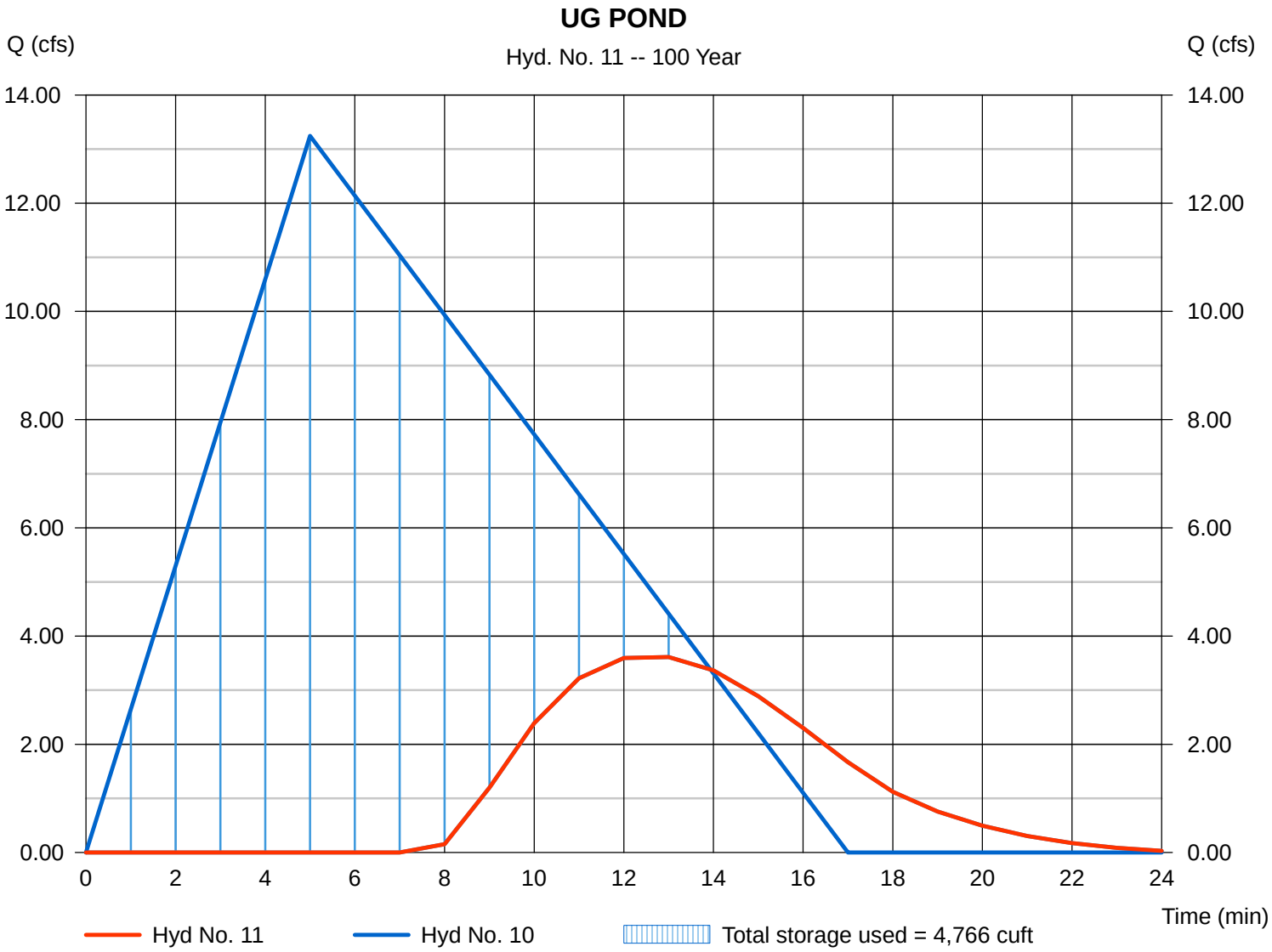
Hydrograph Report

Hyd. No. 11

UG POND

Hydrograph type	=	Reservoir	Peak discharge	=	3.612 cfs
Storm frequency	=	100 yrs	Time to peak	=	13 min
Time interval	=	1 min	Hyd. volume	=	1,642 cuft
Inflow hyd. No.	=	10 - COMBINE 9 7	Max. Elevation	=	20.91 ft
Reservoir name	=	UG POND	Max. Storage	=	4,766 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

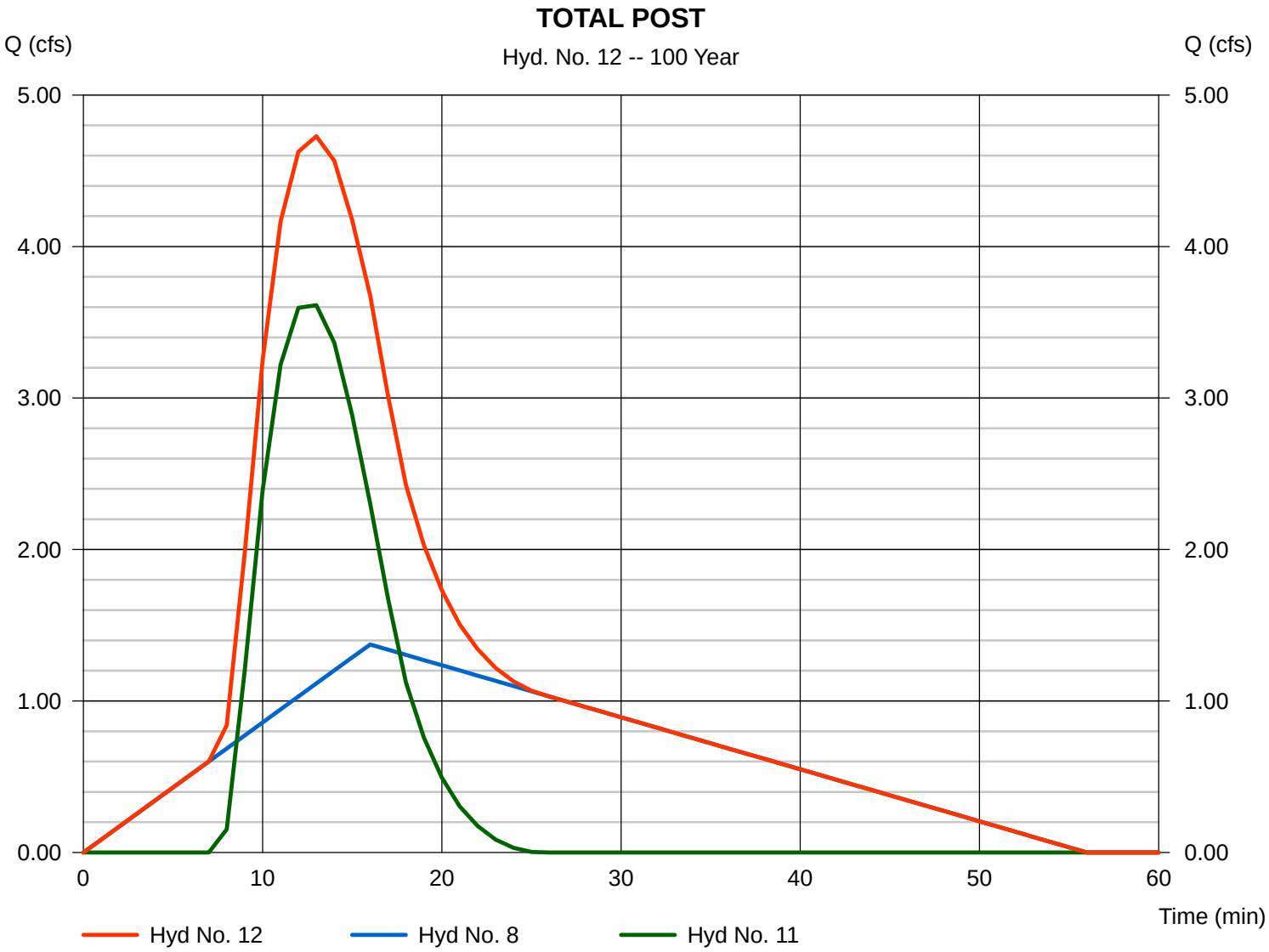


Hydrograph Report

Hyd. No. 12

TOTAL POST

Hydrograph type	=	Combine	Peak discharge	=	4.728 cfs
Storm frequency	=	100 yrs	Time to peak	=	13 min
Time interval	=	1 min	Hyd. volume	=	3,949 cuft
Inflow hyds.	=	8, 11	Contrib. drain. area	=	0.570 ac



Hydrograph Report

Hyd. No. 13

PRE-DEVLOP

Hydrograph type	=	Rational	Peak discharge	=	5.565 cfs
Storm frequency	=	100 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	9,349 cuft
Drainage area	=	2.310 ac	Runoff coeff.	=	0.43*
Intensity	=	5.603 in/hr	Tc by User	=	16.00 min
IDF Curve	=	CONNDOT2.IDF	Asc/Rec limb fact	=	1/2.5

* Composite (Area/C) = [(1.820 x 0.30) + (0.490 x 0.90)] / 2.310