Macro Stormwater Management Study
Little Platte River Watershed

Collins Ridge

814 Missouri Highway 92
Smithville, Missouri, 64089

Prepared On:
March 10, 2026

Prepared For:
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Methodology

The analytical and design criteria used in the study conform to those of "Division V - Section 5600 – Storm Drainage Systems and Facilities" of the Kansas City Metropolitan Chapter of the American Public Works Association's "Standard Specifications and Design Criteria" dated December 2025 and all supplements to the APWA Section 5600. Based on these criteria, allowable discharge from the development is based on limiting 100- year (1%), 10-year (10%), and 2-Year (50%) post peak development discharge rates and to no more than existing discharge from the site for each respective storm. The following approved methods were used in this report:

- Hydraflow Hydrographs Extension for AutoCAD Civil 3D 2023
- NRCS TR-55 Unit Hydrograph Method
- 2-, 10-, and 100-Year Return Frequency
- 24 hr. Storm Precipitation Depths (NOAA Atlas 14)
- 24 hr. Custom Rainfall Distribution for Smithville, Missouri
- ARC Type II Moisture Conditions
- Runoff Curve Numbers per NRCS TR-55
- APWA 5600 for Time of Concentration and Travel Time

Table 1. Rainfall Depths

STORM	PERCENT	RAINFALL DEPTH (in.)
2 Year	50%	3.54
10 Year	10%	5.31
100 Year	1%	8.50

General Information

The proposed residential and commercial development of Collins Ridge is bounded the Smithville School Complex on the west, Missouri Highway 92 on the south, farmland on the east and Liberty Street on the north. The proposed development plan will consist of 260 single family homes on approximately 100 acres, 2 commercial lots on 5 acres and 117 townhomes on 20 acres. The site is located within the Little Platte River watershed. See the Appendix for a diagram of the site.

Existing Conditions Analysis

The existing site is open space and farmland with a creek and a pond. The site has five outfalls all along the eastern edge of the site. We have included approximately 212 acres of offsite drainage in our analysis.

Curve Numbers

The land use designation for the site under existing conditions is Open Space – Good Condition. Based on the land use designation and the information obtained from the NRCS Web Soil Survey, the curve numbers specified in Table 2 have been used to develop a composite curve number for the sub basins which are noted in the hydrograph reports in the Appendix.

Soil Classification

Soil classifications published by the United States Department of Agriculture/Natural Resources Conservation Service (USDA/NRCS) indicate the existing site is made up of seven soil types:

10120 Sharpsburg silt loam, 2 to 5 percent slopes, HSG C

10122 Sharpsburg silt loam, 5 to 9 percent slopes, eroded, HSG C

10123 Sharpsburg silt loam, 9 to 14 percent slopes, eroded, HSG C

10132 Sibley Silt loam, 2 to 5 percent slopes, HSG C

10133 Sibley Silt loam, 5 to 9 percent slopes, HSG C

10142 Snead-Roack outcrop complex, 5 to 14 percent slopes, HSG D

30024 Armster loam, 9 to 14 percent slopes, eroded, HSG C

**See Appendix for a detailed soil report of the proposed development.

Table 2: Curves Numbers based on Land Use and HSG

HSG	LAND USE	CURVE NUMBER
C	Open Spaces, Lawns - Good Condition	74
D	Open Spaces, Lawns - Good Condition	80
C/D	Offsite Areas	80*

*Off site areas have been assumed to be 80.

Times of Concentration

Runoff from sub basins reaches their corresponding outfall locations via a combination of sheet flow and shallow concentrated flow. The LAG method was used to calculate the Times of Concentration.

The results from the existing conditions model have been provided in the Appendix. A summary of the analysis and results has been provided in Table 3.

Table 3. Existing Conditions Outfall Summary

OUTFALL	Q_2 (CFS)	Q_{10} (CFS)	Q_{100} (CFS)
OUTFALL 1	24.19	48.81	96.53
OUTFALL 2	110.39	218.97	427.92
OUTFALL 3 (NE)	11.48	24.13	49.33
OUTFALL 4	241.77	480.22	939.47
OUTFALL 5 (SE)	10.84	22.77	46.56

Proposed Conditions Analysis

The proposed sub basins have been analyzed under proposed conditions with six dry detention basins designed to capture the runoff. The existing pond will remain and will be redesigned with the final design. The site will be developed with storm sewers to capture the runoff and carry the stormwater to the basins.

Curve Numbers

Based on the land use designation and the information obtained from the NRCS Web Soil Survey, the curve numbers specified in Table 2 have been used to develop a composite curve number for the sub basins which are noted in the hydrograph reports in the Appendix.

Table 4: Curves Numbers based on Land Use and HSG

HSG	LAND USE	CURVE NUMBER
C	Residential, ¼ acre	83
C	Residential, ¼ acre	90
C	Commercial	94
C	Open Spaces, Lawns - Good Condition	74
D	Open Spaces, Lawns - Good Condition	80
D	Residential, ¼ acre	87

Times of Concentration

Runoff from sub basins reaches their corresponding outfall locations via a combination of sheet flow, shallow concentrated flow and channel flow. The LAG method was used to calculate the Times of Concentration. Refer to Table 5 for a summary of the sub basins under proposed conditions with detention.

Table 5. Proposed Conditions Hydrology Summary

OUTFALL	Q_2 (CFS)	Q_{10} (CFS)	Q_{100} (CFS)
OUTFALL 1 (Unchanged)	24.19	48.81	96.53
OUTFALL 2 (North 1, 2 + Offsite)	121.84	233.62	444.35
OUTFALL 3 (DETENTION 6)	3.60	5.48	7.67
OUTFALL 4 (DET 1, 2, 3, 5 + Creek)	43.94	73.51	123.01
OUTFALL 5 (DET 4 + South 3)	12.43	17.25	46.32

Identification of Downstream Drainage Issues

To date we are not aware of any drainage issues with the downstream flow. There are no

current downstream flooding issues. The proposed project will increase impervious areas, therefore, to ensure no adverse impact is anticipated in the downstream drainage system, we are proposing to provide detention basins. The existing pond will be regraded and designed as a wet detention basin once the future use of unplatted area is determined.

Preliminary Onsite Drainage System

See Appendix A for the existing and proposed drainage boundaries. The site will be graded to allow runoff to be contained within the storm sewers to flow to the proposed detention basin. A summary of existing and proposed discharge rates and volumes are included in Table 6, Section D.

Drainage Computations

See the appendix for drainage computations for the 2-year, 10-year and 100-year Storm design flows for the proposed site and for each downstream outfall. A summary of existing and proposed discharge rates of the combined outfalls is included in Table 6, Section D.

Flood Control Detention

The proposed project does increase the runoff from the site, yet that runoff will be captured within the proposed storm sewers and detention area. The new storm sewer systems will be diverted to the new detention basins located throughout the development. The design of the detention area for the commercial lots as well as the North 1 sub basin will be completed with final design. All outfalls have lower flows in the developed condition than in the existing condition except for outfall 4, which will be remedied at the time of construction with the Micro Storm Study completed with that phase.

Table 6: Allowable/Existing and Proposed Rates

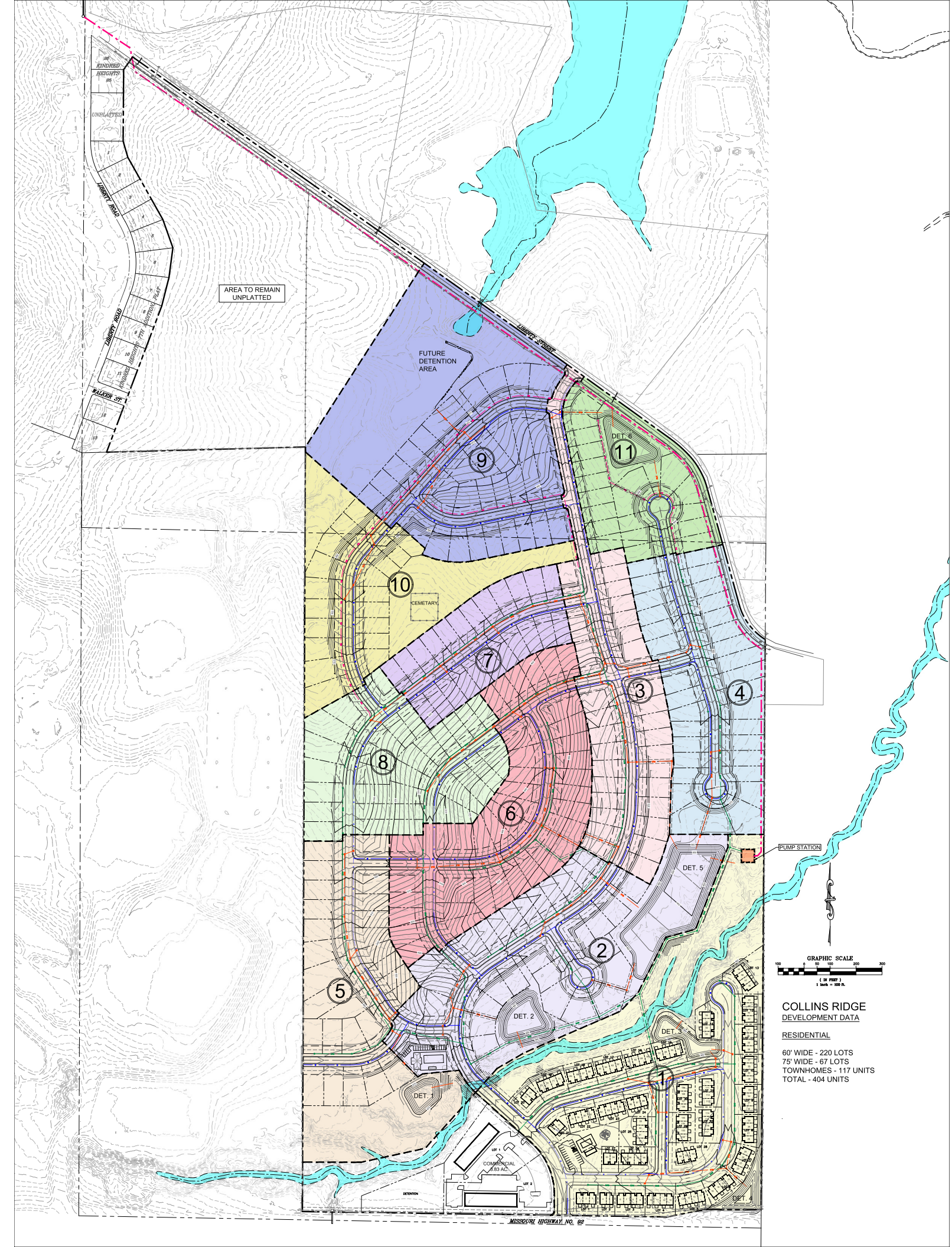
COMBINED OUTFALLS	Q_2 (CFS)	Q_{10} (CFS)	Q_{100} (CFS)
PROPOSED TOTAL	193.09	353.63	676.74
EXISTING TOTAL	307.66	619.12	1226.15

Conclusions and Recommendations

The proposed Collins Ridge development will not cause an increase in peak discharge after the proposed improvements are made to the site.

The proposed development project meets or exceeds all the required stormwater management criteria set forth by the city of Smithville, Missouri. Based on this information, RL Buford and Associates Engineering, LLC recommends approval of this Stormwater Management Study for Collins Ridge. If you have any questions, please do not hesitate to contact us.

Appendix

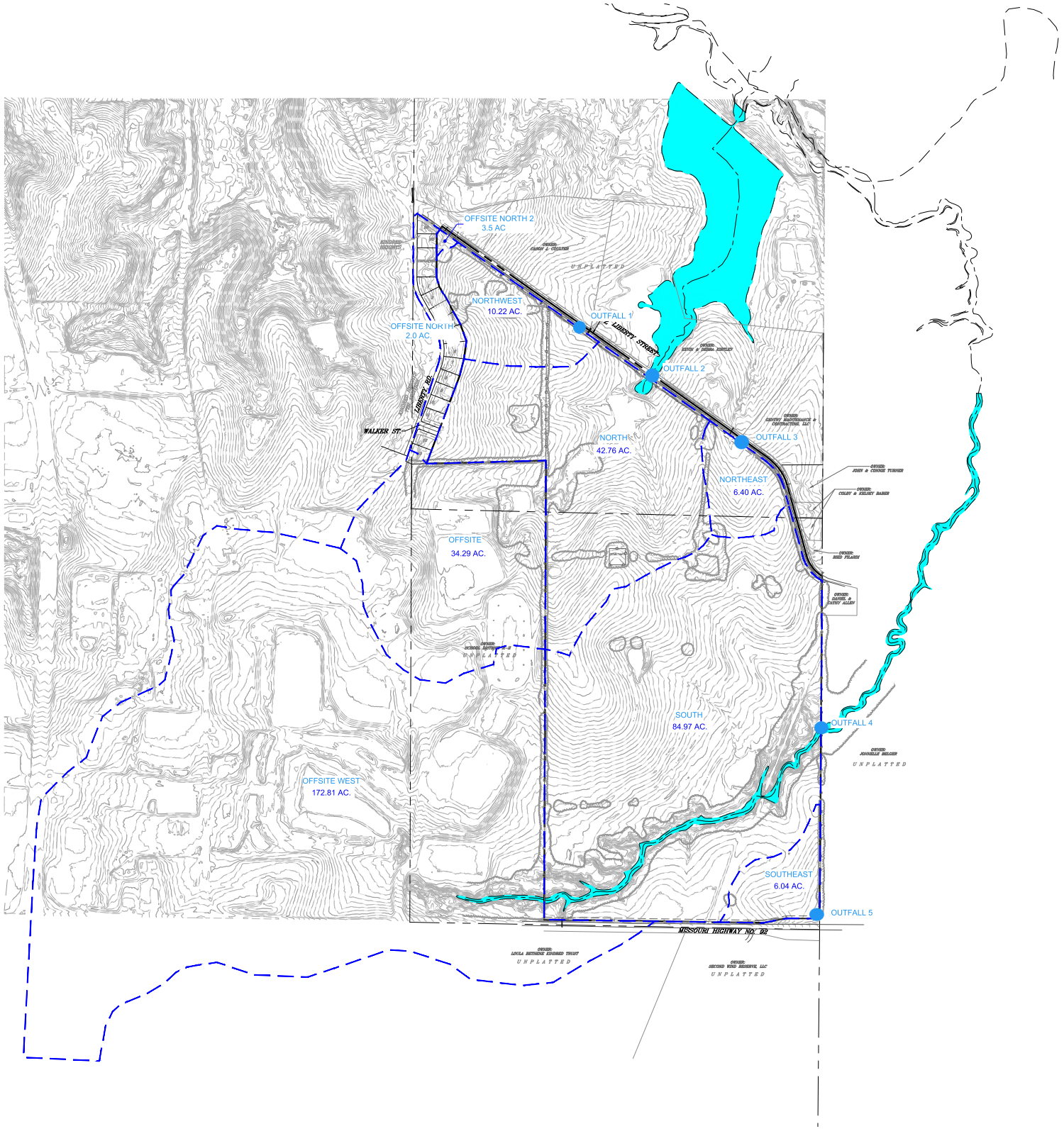


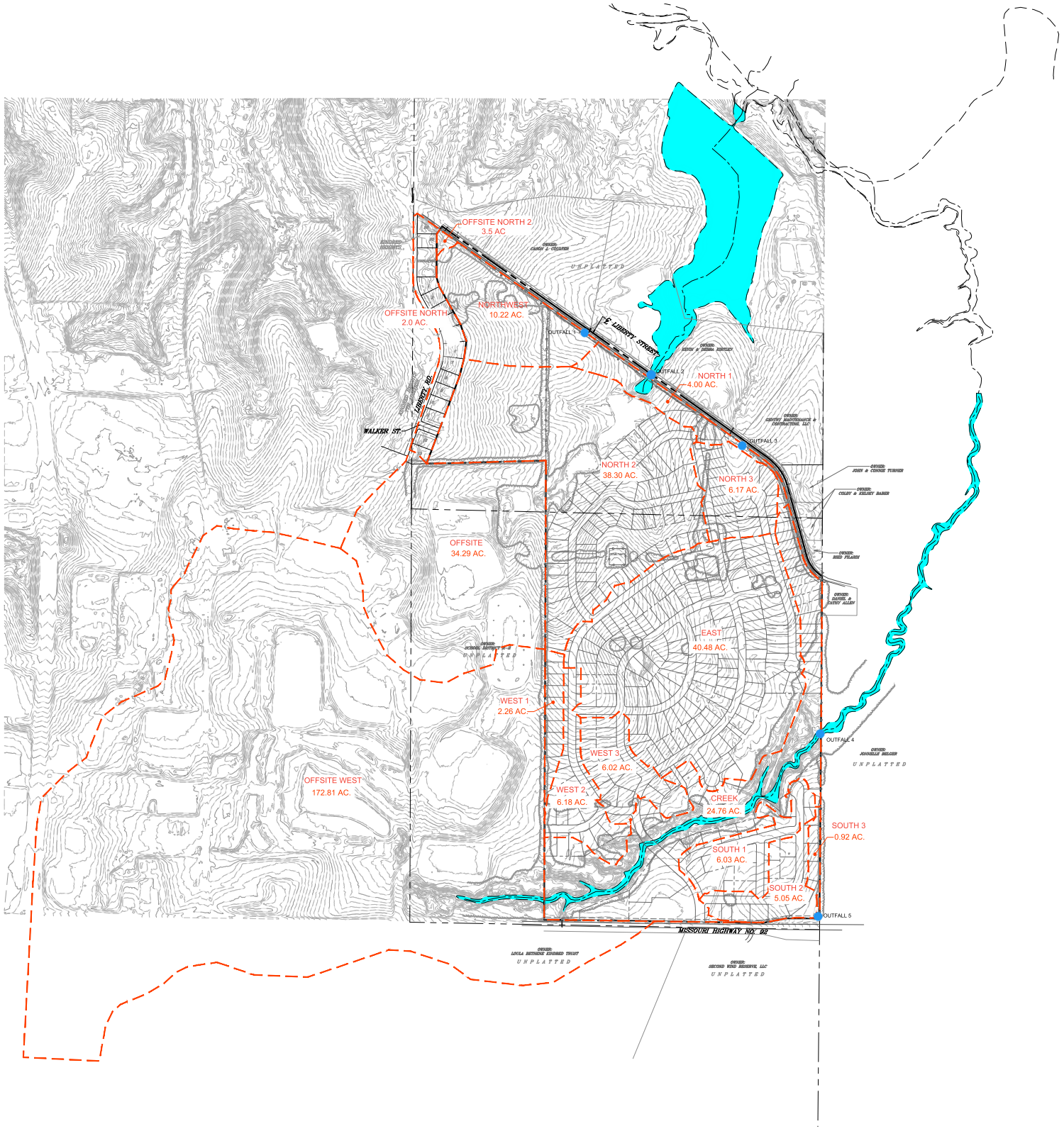
COLLINS RIDGE

DEVELOPMENT DATA

RESIDENTIAL

60' WIDE - 220 LOTS
75' WIDE - 67 LOTS
TOWNHOMES - 117 UNITS
TOTAL - 404 UNITS


OFFSITE NORTH 2
3.5 AC.
NORTHWEST
10.22 AC.
OFFSITE NORTH
2.0 AC.
OUTFALL 1
E. LIBERTY STREET
OUTFALL 2
LIBERTY RD
WALKER ST.
NORTH
42.76 AC.
OUTFALL 3
NORTHEAST
6.40 AC.
OFFSITE
34.29 AC.
SOUTH
84.97 AC.
OUTFALL 4
OFFSITE WEST
172.81 AC.
SOUTHEAST
6.04 AC.
OUTFALL 5
MISSOURI HIGHWAY NO. 32
UNPLATTED
UNPLATTED
UNPLATTED
UNPLATTED


OFFSITE NORTH 2
3.5 AC.
OFFSITE NORTH
2.0 AC.
NORTHWEST
10.22 AC.
E LIBERTY STREET
LIBERTY RD
WALKER ST.
OUTFALL 1
OUTFALL 2
OUTFALL 3
NORTH 1
4.00 AC.
NORTH 2
38.30 AC.
NORTH 3
6.17 AC.
OFFSITE
34.29 AC.
EAST
40.48 AC.
WEST 1
2.26 AC.
WEST 3
6.02 AC.
WEST 2
6.18 AC.
OFFSITE WEST
172.81 AC.
CREEK
24.76 AC.
SOUTH 3
0.92 AC.
SOUTH 1
6.03 AC.
SOUTH 2
5.05 AC.
OUTFALL 4
OUTFALL 5
MISSOURI HIGHWAY NO. 92
UNPLATTED
UNPLATTED
UNPLATTED
UNPLATTED

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

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	SCS Runoff	------	-------	191.06	-------	-------	367.18	-------	-------	702.31	OFFSITE WEST
2	SCS Runoff	------	-------	71.95	-------	-------	136.73	-------	-------	258.19	OFFSITE
3	SCS Runoff	------	-------	4.779	-------	-------	8.653	-------	-------	15.76	OFFSITE NORTH
4	SCS Runoff	------	-------	8.363	-------	-------	15.14	-------	-------	27.58	OFFSITE NORTH 2
5	SCS Runoff	------	-------	15.85	-------	-------	33.67	-------	-------	68.95	EXISTING NORTHWEST
6	SCS Runoff	------	-------	46.50	-------	-------	97.73	-------	-------	199.65	EXISTING NORTH
7	SCS Runoff	------	-------	11.48	-------	-------	24.13	-------	-------	49.33	EXISTING NORTHEAST
8	SCS Runoff	------	-------	56.98	-------	-------	123.67	-------	-------	257.19	EXISTING SOUTH
9	SCS Runoff	------	-------	10.84	-------	-------	22.77	-------	-------	46.56	SOUTHEAST
10	Combine	4, 5,	-------	24.19	-------	-------	48.81	-------	-------	96.53	OUTFALL 1
11	Combine	2, 3, 6,	-------	110.39	-------	-------	218.97	-------	-------	427.92	OUTFALL 2
12	Combine	1, 8,	-------	241.77	-------	-------	480.22	-------	-------	939.47	OUTFALL 4
13	SCS Runoff	------	-------	57.36	-------	-------	110.13	-------	-------	209.81	NORTH 1
14	SCS Runoff	------	-------	8.628	-------	-------	17.62	-------	-------	35.63	NORTH 2
15	SCS Runoff	------	-------	11.95	-------	-------	22.13	-------	-------	41.02	NORTH 3
16	SCS Runoff	------	-------	69.39	-------	-------	126.81	-------	-------	232.74	EAST
17	SCS Runoff	------	-------	7.190	-------	-------	12.89	-------	-------	23.29	WEST 1
18	SCS Runoff	------	-------	14.77	-------	-------	26.74	-------	-------	48.70	WEST 2
19	SCS Runoff	------	-------	18.07	-------	-------	32.54	-------	-------	59.00	WEST 3
20	SCS Runoff	------	-------	19.94	-------	-------	39.89	-------	-------	78.40	CREEK
21	SCS Runoff	------	-------	18.58	-------	-------	30.45	-------	-------	51.57	SOUTH 1
22	SCS Runoff	------	-------	17.77	-------	-------	29.10	-------	-------	49.24	SOUTH 2
23	SCS Runoff	------	-------	3.723	-------	-------	6.065	-------	-------	10.22	SOUTH 3
24	Reservoir	18	-------	4.953	-------	-------	6.917	-------	-------	9.121	Detention 1
25	Reservoir	19	-------	3.654	-------	-------	5.479	-------	-------	7.600	Detention 2
26	Reservoir	21	-------	10.01	-------	-------	13.10	-------	-------	16.81	Detention 3
27	Reservoir	22	-------	10.88	-------	-------	16.33	-------	-------	43.50	Detention 4
28	Reservoir	16	-------	8.923	-------	-------	10.54	-------	-------	12.65	Detention 5
29	Reservoir	15	-------	3.600	-------	-------	5.482	-------	-------	7.669	Detention 6
30	Combine	2, 13, 14,	-------	121.84	-------	-------	233.62	-------	-------	444.35	Developed Outfall 2
31	Combine	20, 24, 25, 26, 28,	-------	43.94	-------	-------	73.51	-------	-------	123.01	Developed Outfall 4
32	Combine	23, 27,	-------	12.43	-------	-------	17.25	-------	-------	46.32	Developed Outfall 5
33	Combine	7, 9, 10, 11, 12,	-------	307.66	-------	-------	619.12	-------	-------	1226.15	EXISTING TOTAL
34	Combine	10, 17, 29, 30, 31, 32,	-------	193.09	-------	-------	353.63	-------	-------	676.74	DEVELOPED TOTAL

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

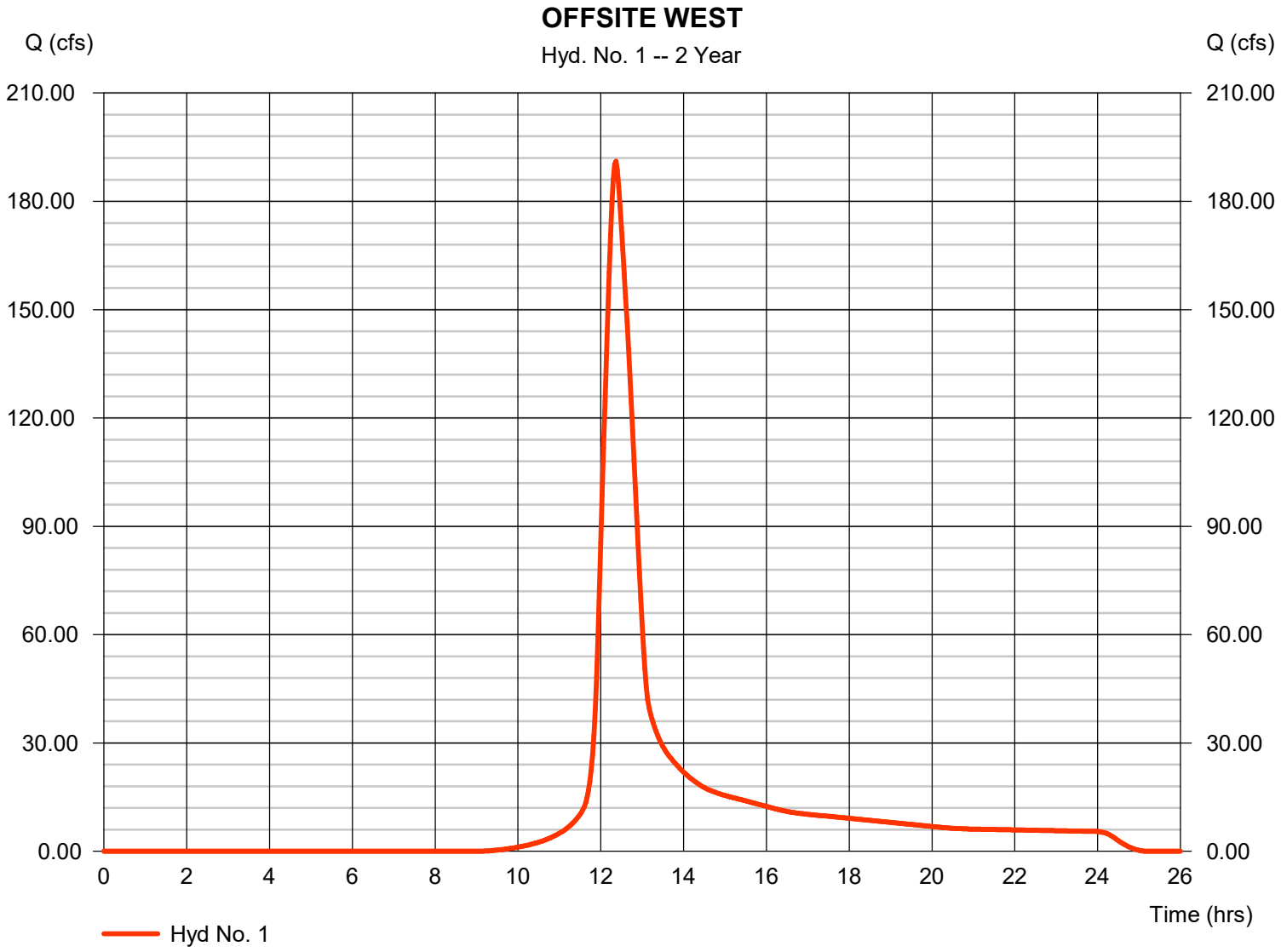
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	191.06	2	742	1,037,093	------	------	------	OFFSITE WEST
2	SCS Runoff	71.95	2	722	202,449	------	------	------	OFFSITE
3	SCS Runoff	4.779	2	722	13,394	------	------	------	OFFSITE NORTH
4	SCS Runoff	8.363	2	722	23,440	------	------	------	OFFSITE NORTH 2
5	SCS Runoff	15.85	2	724	45,850	------	------	------	EXISTING NORTHWEST
6	SCS Runoff	46.50	2	734	209,051	------	------	------	EXISTING NORTH
7	SCS Runoff	11.48	2	722	30,369	------	------	------	EXISTING NORTHEAST
8	SCS Runoff	56.98	2	750	390,978	------	------	------	EXISTING SOUTH
9	SCS Runoff	10.84	2	722	28,661	------	------	------	SOUTHEAST
10	Combine	24.19	2	722	69,290	4, 5,	------	------	OUTFALL 1
11	Combine	110.39	2	724	424,895	2, 3, 6,	------	------	OUTFALL 2
12	Combine	241.77	2	742	1,428,071	1, 8,	------	------	OUTFALL 4
13	SCS Runoff	57.36	2	732	231,922	------	------	------	NORTH 1
14	SCS Runoff	8.628	2	718	17,255	------	------	------	NORTH 2
15	SCS Runoff	11.95	2	726	41,392	------	------	------	NORTH 3
16	SCS Runoff	69.39	2	730	278,053	------	------	------	EAST
17	SCS Runoff	7.190	2	716	14,553	------	------	------	WEST 1
18	SCS Runoff	14.77	2	722	41,389	------	------	------	WEST 2
19	SCS Runoff	18.07	2	718	41,351	------	------	------	WEST 3
20	SCS Runoff	19.94	2	752	138,223	------	------	------	CREEK
21	SCS Runoff	18.58	2	722	53,043	------	------	------	SOUTH 1
22	SCS Runoff	17.77	2	720	46,985	------	------	------	SOUTH 2
23	SCS Runoff	3.723	2	716	7,782	------	------	------	SOUTH 3
24	Reservoir	4.953	2	736	41,382	18	864.38	13,930	Detention 1
25	Reservoir	3.654	2	730	41,337	19	857.44	17,207	Detention 2
26	Reservoir	10.01	2	732	53,040	21	856.25	12,347	Detention 3
27	Reservoir	10.88	2	728	46,984	22	852.57	8,410	Detention 4
28	Reservoir	8.923	2	782	278,047	16	852.11	126,299	Detention 5
29	Reservoir	3.600	2	748	41,379	15	873.41	16,306	Detention 6
30	Combine	121.84	2	724	451,627	2, 13, 14,	------	------	Developed Outfall 2
31	Combine	43.94	2	748	552,030	20, 24, 25,	------	------	Developed Outfall 4
32	Combine	12.43	2	720	54,765	26, 28, 23, 27,	------	------	Developed Outfall 5
33	Combine	307.66	2	734	1,981,286	7, 9, 10,	------	------	EXISTING TOTAL
34	Combine	193.09	2	724	1,183,643	11, 12, 10, 17, 29, 30, 31, 32,	------	------	DEVELOPED TOTAL

Hydrograph Report

Hyd. No. 1

OFFSITE WEST

Hydrograph type	=	SCS Runoff	Peak discharge	=	191.06 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.37 hrs
Time interval	=	2 min	Hyd. volume	=	1,037,093 cuft
Drainage area	=	172.810 ac	Curve number	=	80
Basin Slope	=	3.0 %	Hydraulic length	=	3142 ft
Tc method	=	LAG	Time of conc. (Tc)	=	45.90 min
Total precip.	=	3.54 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

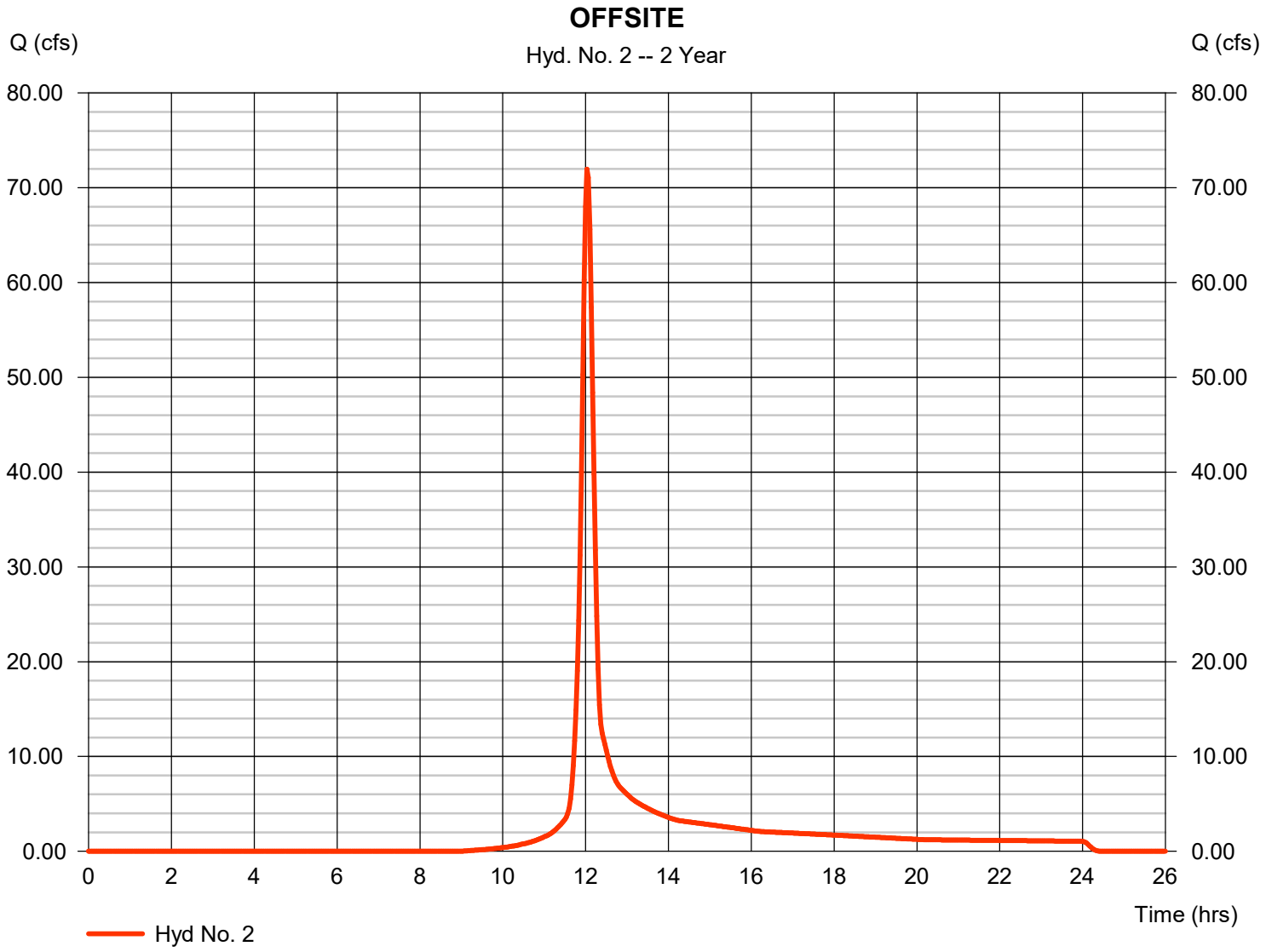


Hydrograph Report

Hyd. No. 2

OFFSITE

Hydrograph type	=	SCS Runoff	Peak discharge	=	71.95 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	202,449 cuft
Drainage area	=	34.290 ac	Curve number	=	80
Basin Slope	=	5.7 %	Hydraulic length	=	1200 ft
Tc method	=	LAG	Time of conc. (Tc)	=	15.40 min
Total precip.	=	3.54 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

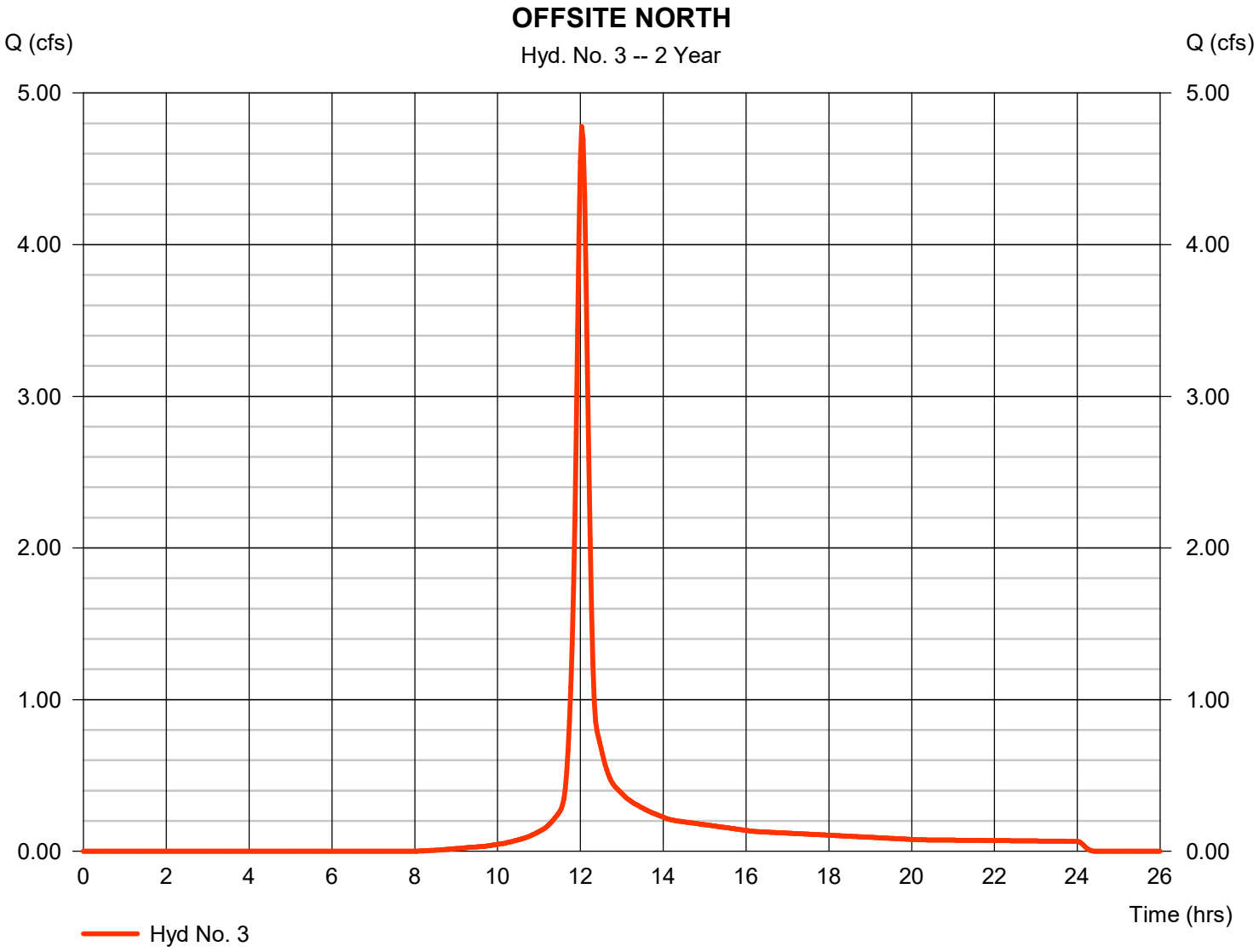


Hydrograph Report

Hyd. No. 3

OFFSITE NORTH

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.779 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	13,394 cuft
Drainage area	=	2.000 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.00 min
Total precip.	=	3.54 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

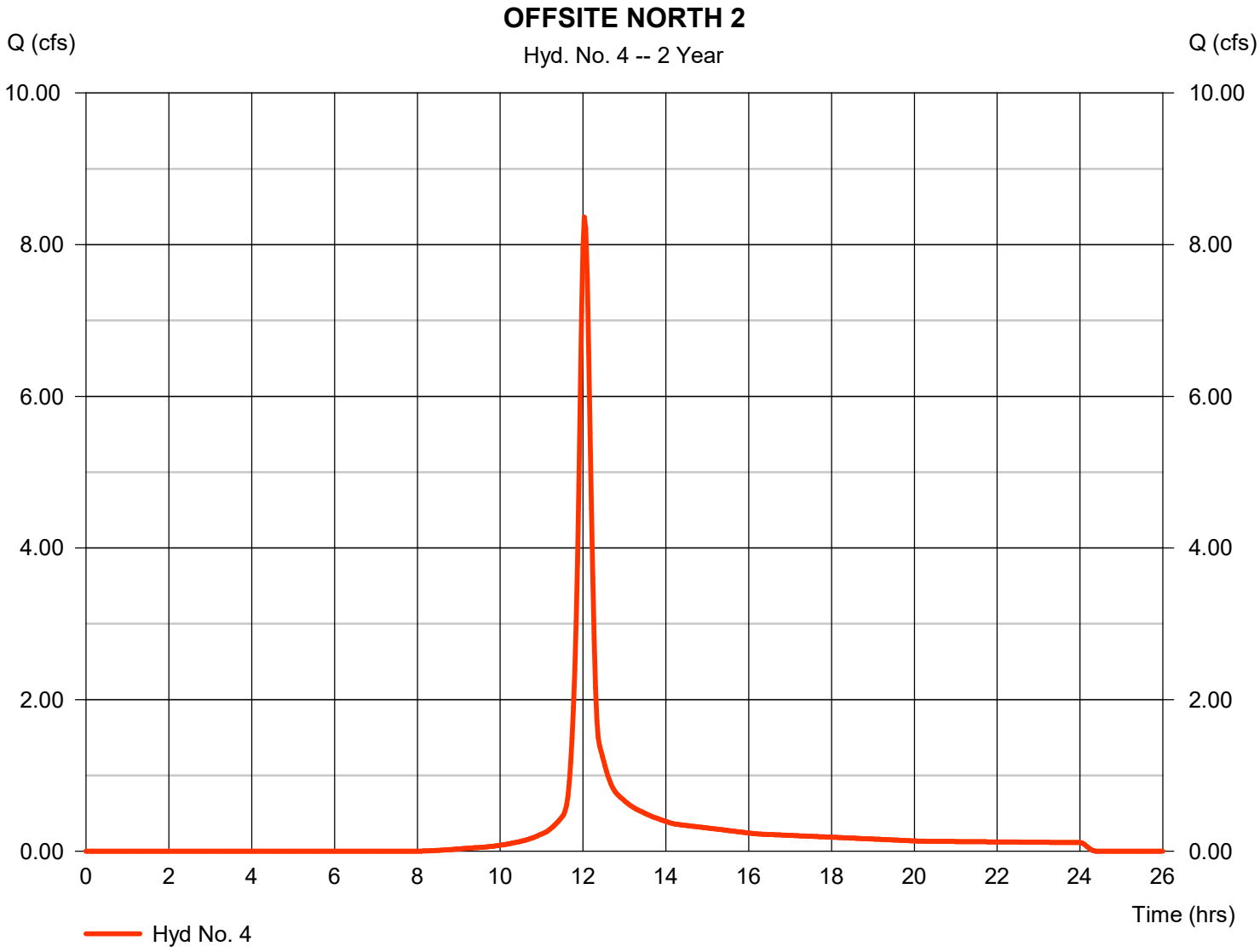


Hydrograph Report

Hyd. No. 4

OFFSITE NORTH 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.363 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	23,440 cuft
Drainage area	=	3.500 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.00 min
Total precip.	=	3.54 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

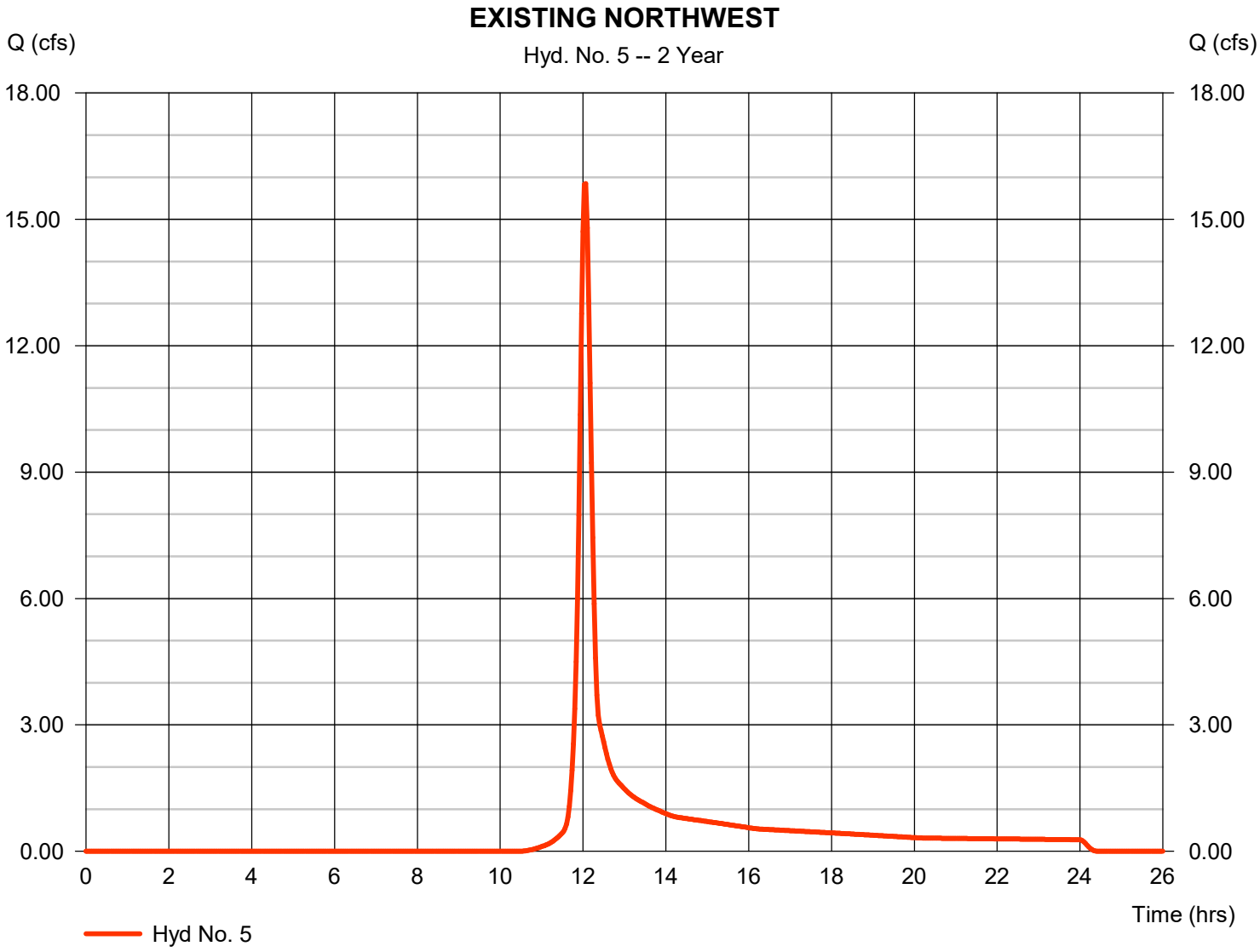


Hydrograph Report

Hyd. No. 5

EXISTING NORTHWEST

Hydrograph type	= SCS Runoff	Peak discharge	= 15.85 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 45,850 cuft
Drainage area	= 10.220 ac	Curve number	= 74
Basin Slope	= 5.6 %	Hydraulic length	= 851 ft
Tc method	= LAG	Time of conc. (Tc)	= 14.10 min
Total precip.	= 3.54 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

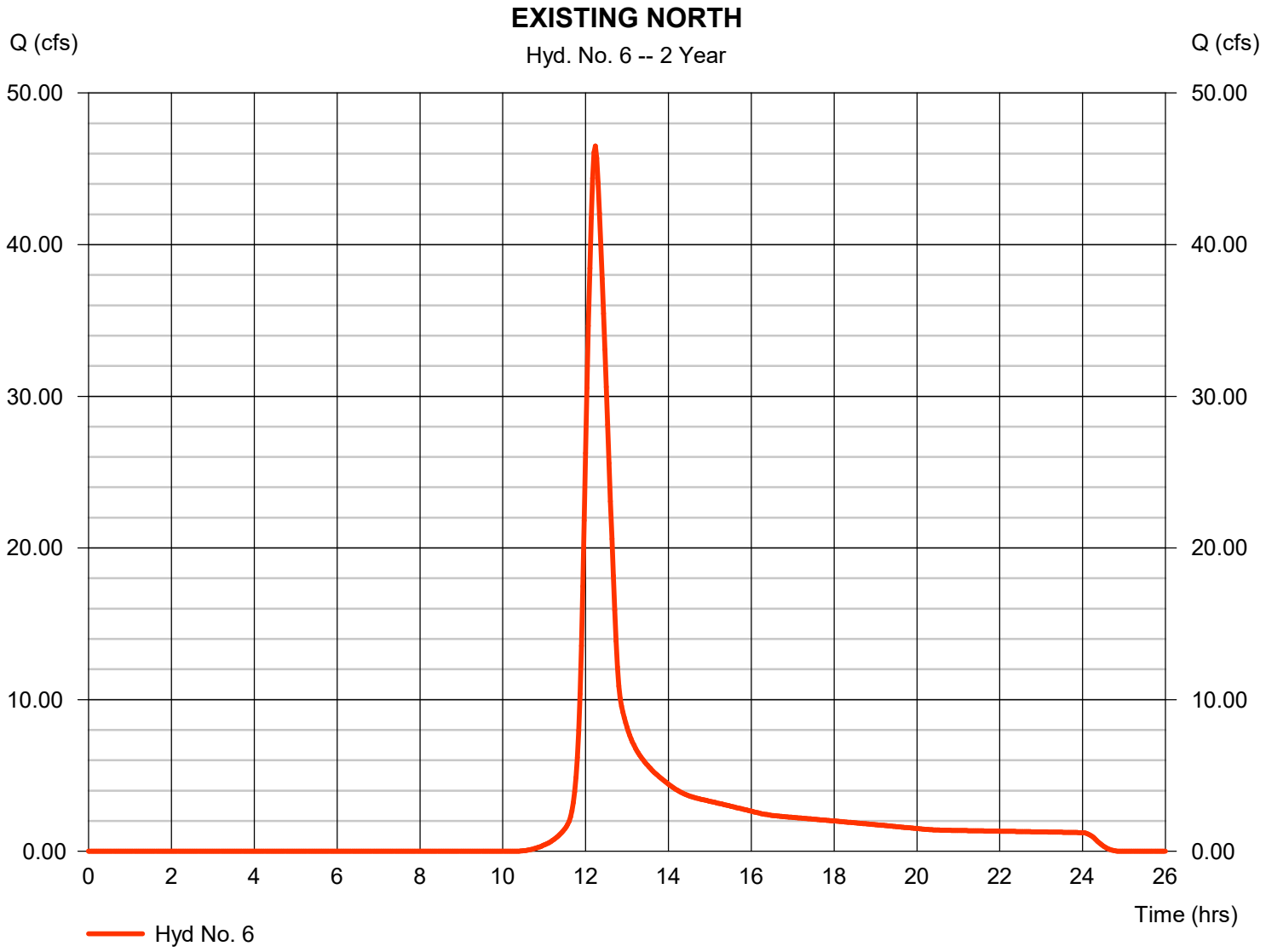


Hydrograph Report

Hyd. No. 6

EXISTING NORTH

Hydrograph type	=	SCS Runoff	Peak discharge	=	46.50 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.23 hrs
Time interval	=	2 min	Hyd. volume	=	209,051 cuft
Drainage area	=	42.760 ac	Curve number	=	75
Basin Slope	=	4.3 %	Hydraulic length	=	1944 ft
Tc method	=	LAG	Time of conc. (Tc)	=	30.30 min
Total precip.	=	3.54 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

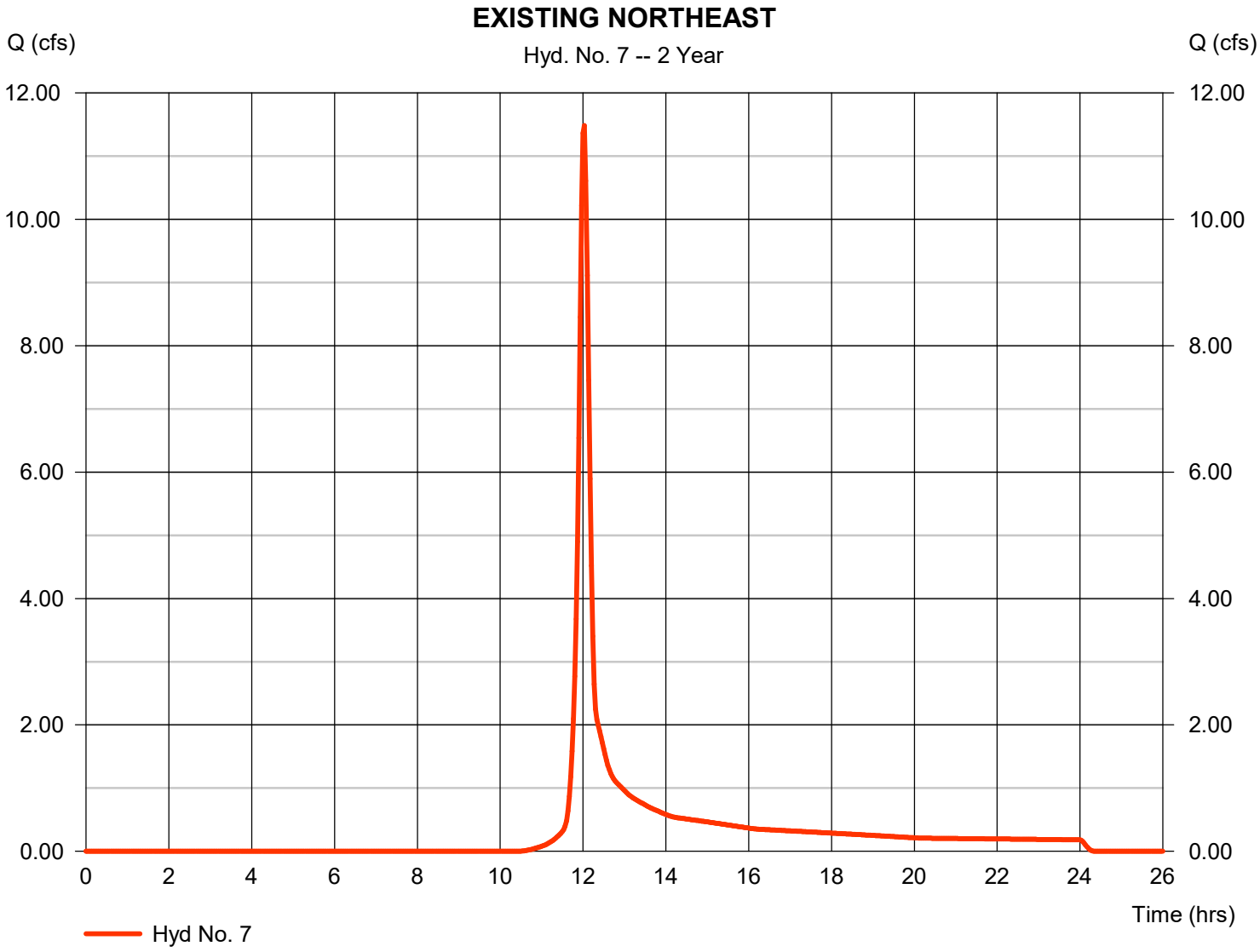


Hydrograph Report

Hyd. No. 7

EXISTING NORTHEAST

Hydrograph type	=	SCS Runoff	Peak discharge	=	11.48 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	30,369 cuft
Drainage area	=	6.400 ac	Curve number	=	74
Basin Slope	=	4.6 %	Hydraulic length	=	647 ft
Tc method	=	LAG	Time of conc. (Tc)	=	12.50 min
Total precip.	=	3.54 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

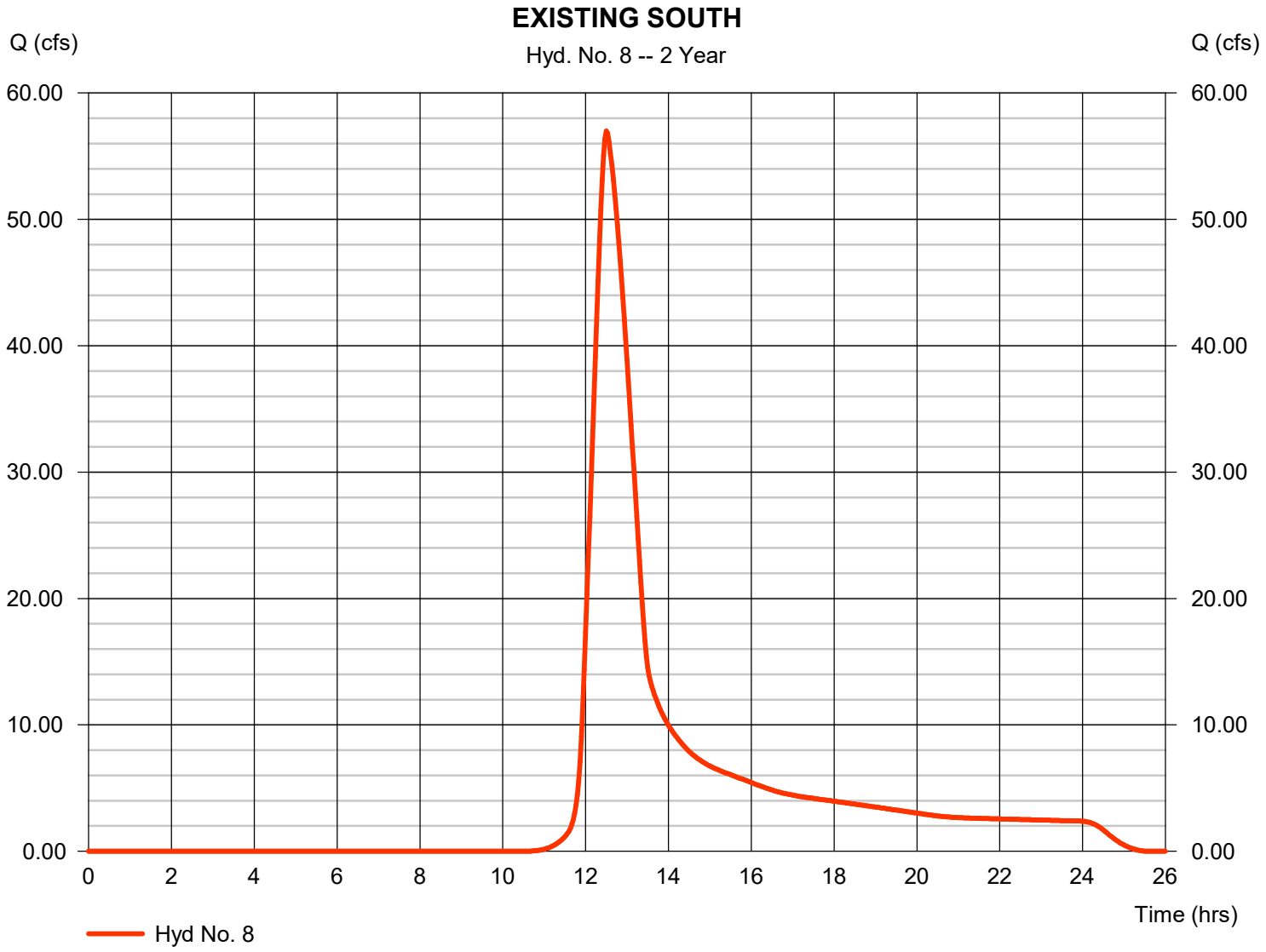


Hydrograph Report

Hyd. No. 8

EXISTING SOUTH

Hydrograph type	=	SCS Runoff	Peak discharge	=	56.98 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.50 hrs
Time interval	=	2 min	Hyd. volume	=	390,978 cuft
Drainage area	=	84.970 ac	Curve number	=	74
Basin Slope	=	2.8 %	Hydraulic length	=	3309 ft
Tc method	=	LAG	Time of conc. (Tc)	=	59.20 min
Total precip.	=	3.54 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

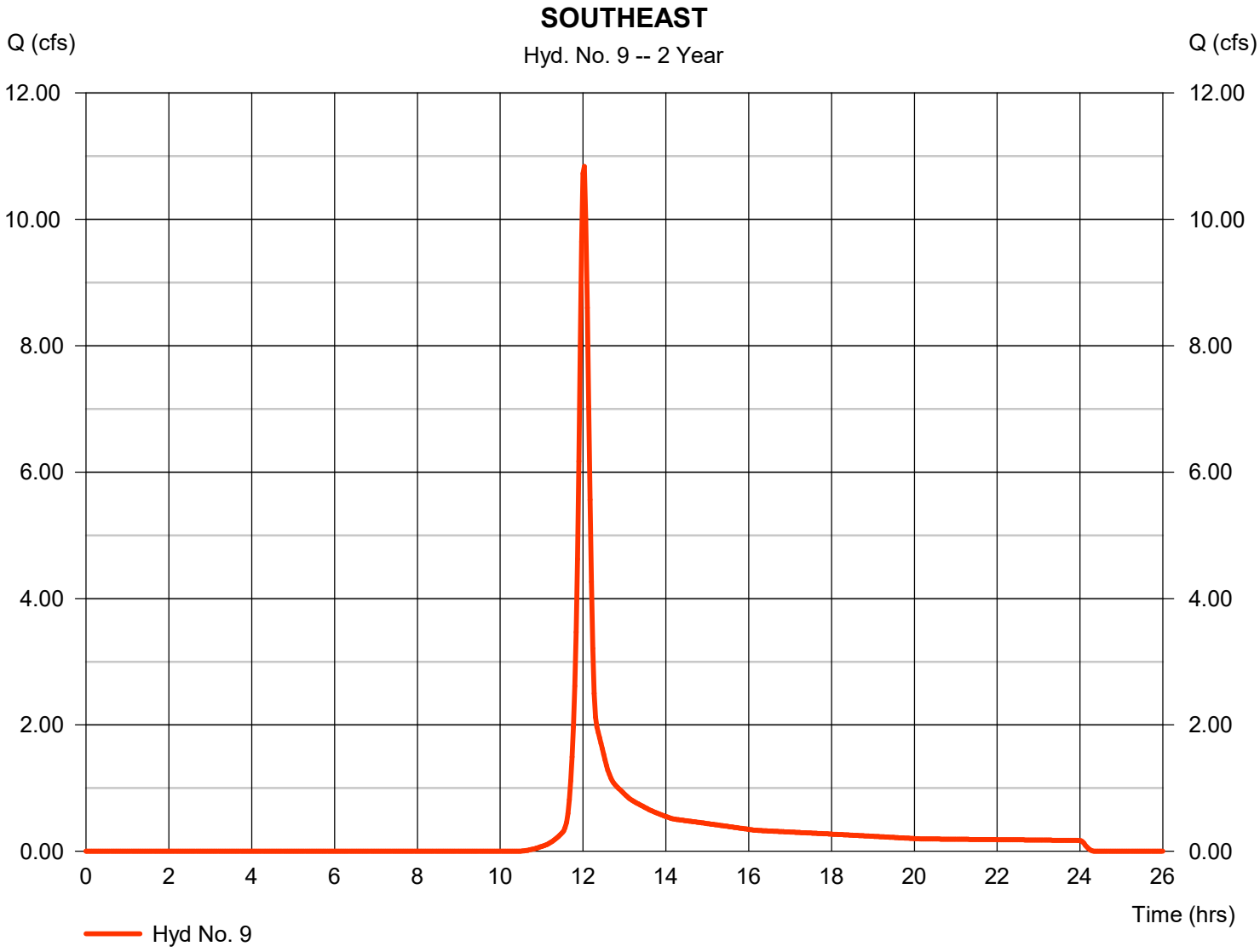


Hydrograph Report

Hyd. No. 9

SOUTHEAST

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.84 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	28,661 cuft
Drainage area	=	6.040 ac	Curve number	=	74
Basin Slope	=	4.2 %	Hydraulic length	=	519 ft
Tc method	=	LAG	Time of conc. (Tc)	=	10.90 min
Total precip.	=	3.54 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

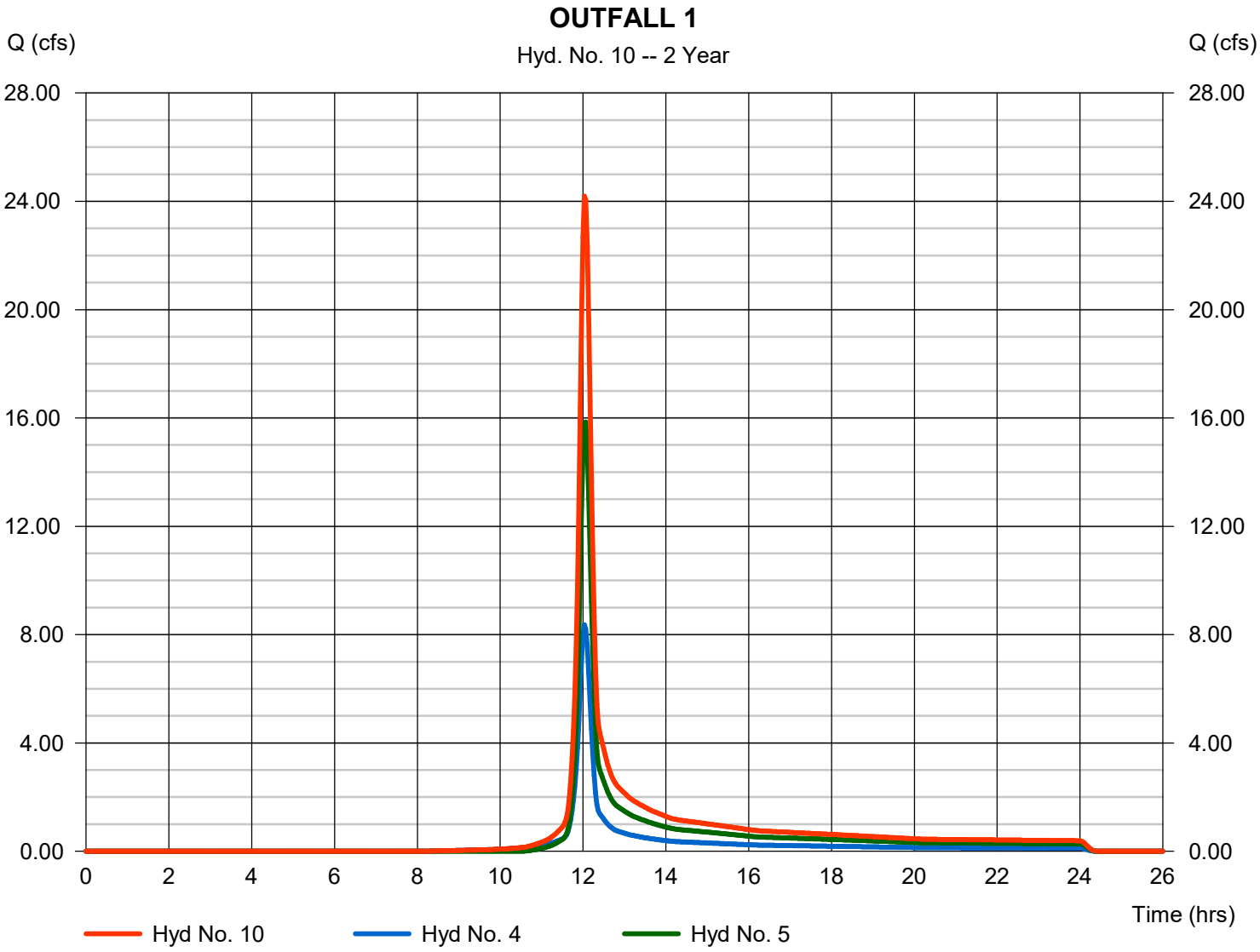


Hydrograph Report

Hyd. No. 10

OUTFALL 1

Hydrograph type	= Combine	Peak discharge	= 24.19 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 69,290 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 13.720 ac

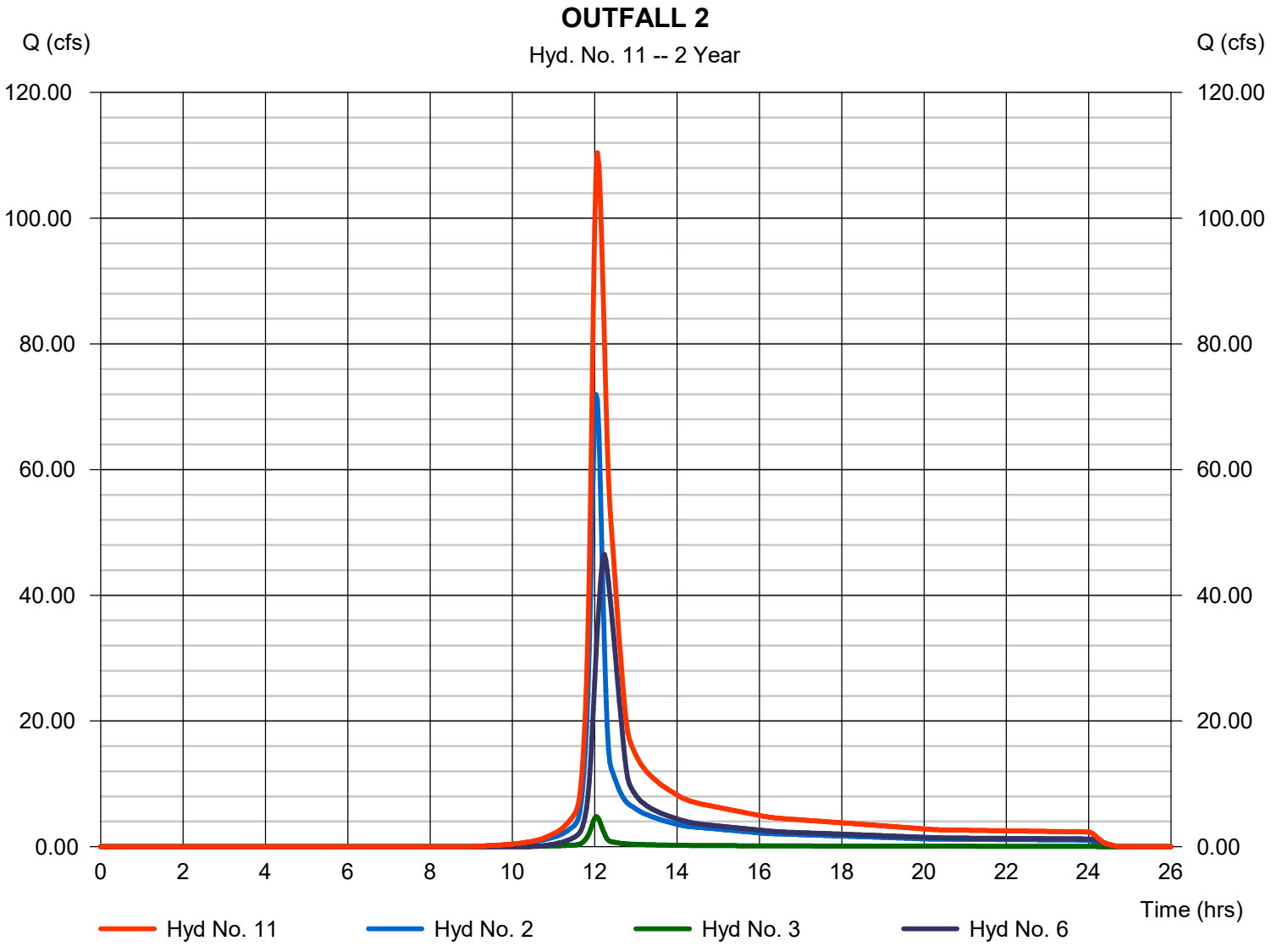


Hydrograph Report

Hyd. No. 11

OUTFALL 2

Hydrograph type	= Combine	Peak discharge	= 110.39 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 424,895 cuft
Inflow hyds.	= 2, 3, 6	Contrib. drain. area	= 79.050 ac

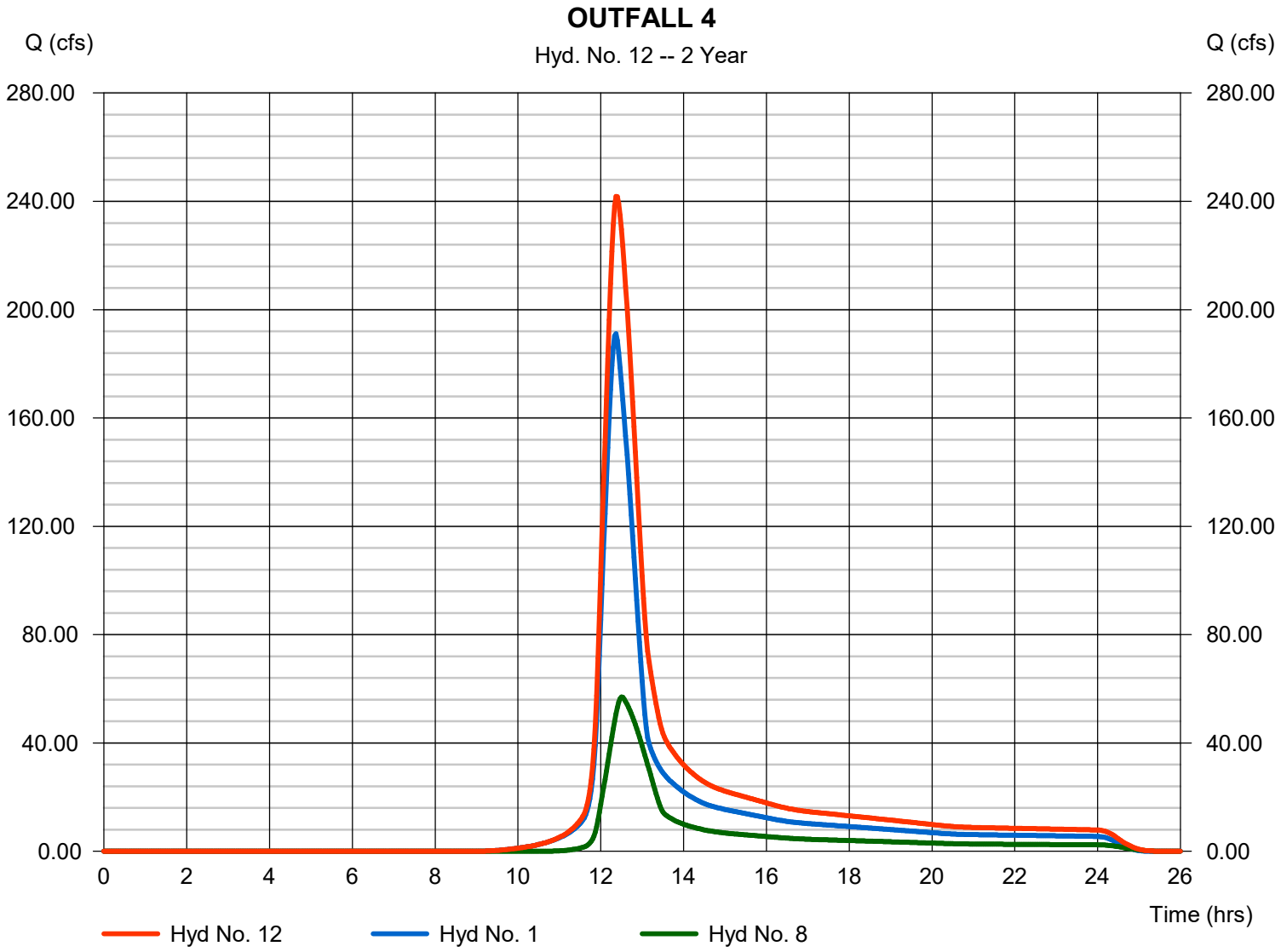


Hydrograph Report

Hyd. No. 12

OUTFALL 4

Hydrograph type	= Combine	Peak discharge	= 241.77 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 1,428,071 cuft
Inflow hyds.	= 1, 8	Contrib. drain. area	= 257.780 ac



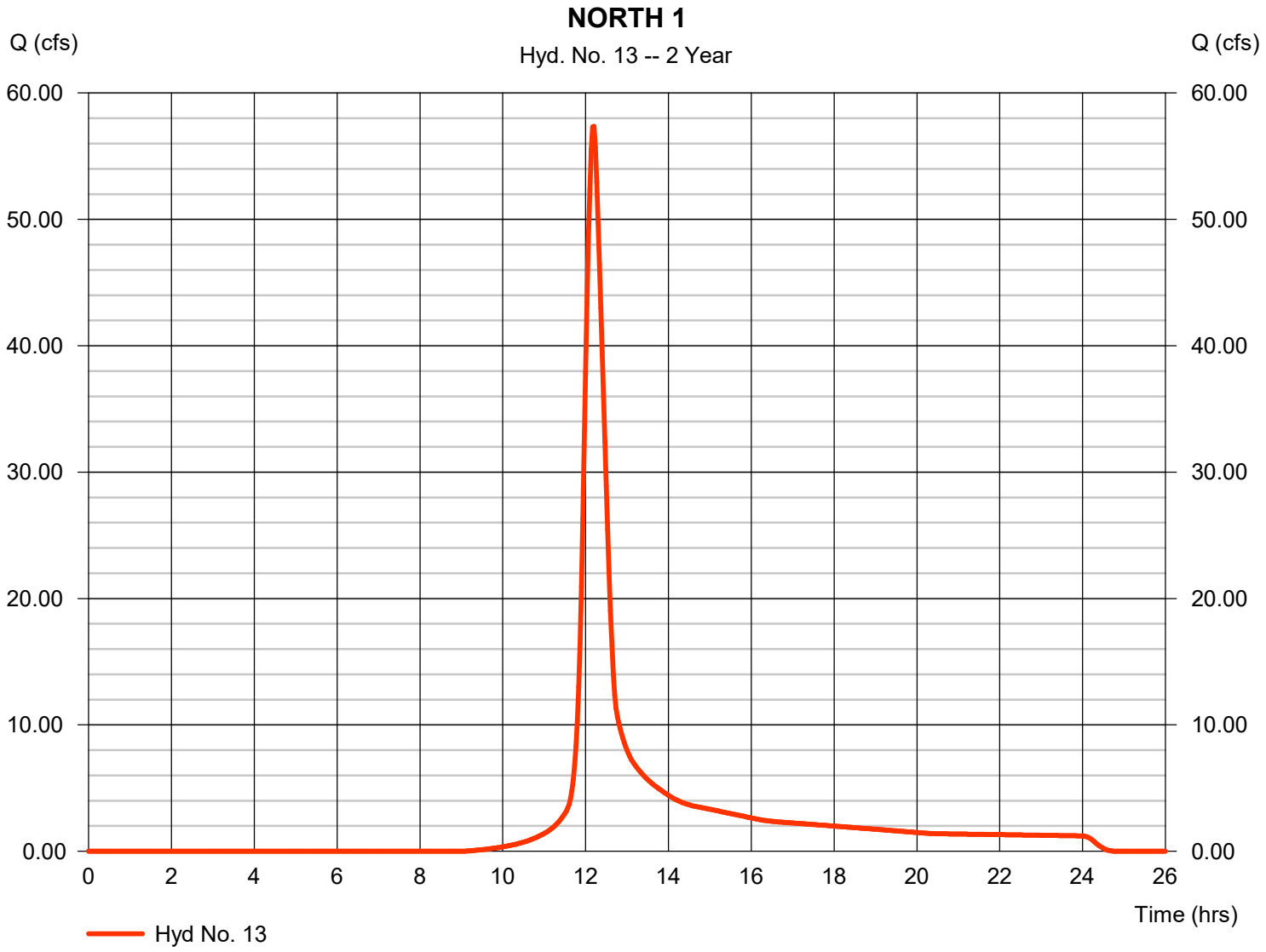
Hydrograph Report

Hyd. No. 13

NORTH 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	57.36 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.20 hrs
Time interval	=	2 min	Hyd. volume	=	231,922 cuft
Drainage area	=	38.300 ac	Curve number	=	80*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	3.54 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(18.170 x 77) + (20.130 x 83)] / 38.300

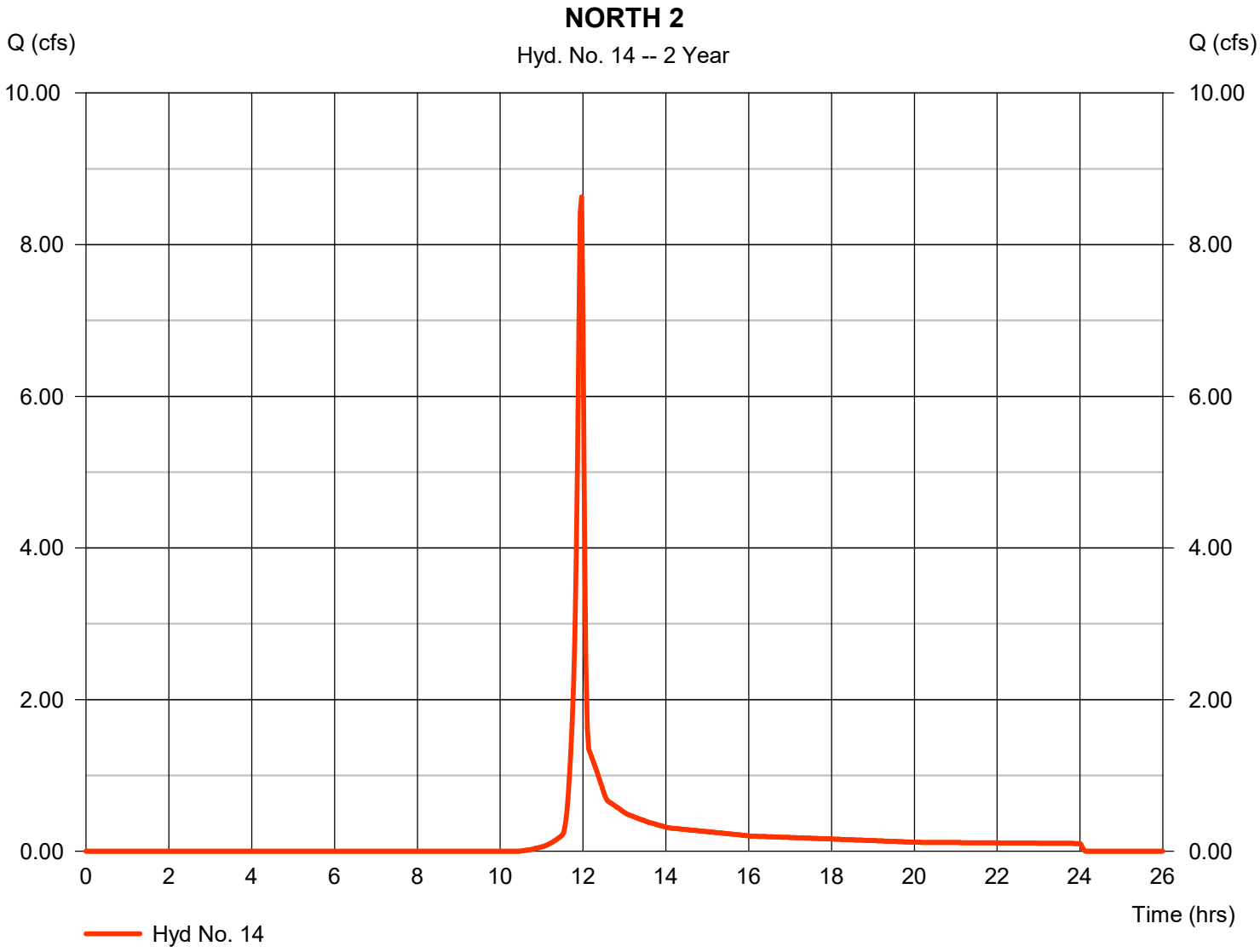


Hydrograph Report

Hyd. No. 14

NORTH 2

Hydrograph type	= SCS Runoff	Peak discharge	= 8.628 cfs
Storm frequency	= 2 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 17,255 cuft
Drainage area	= 4.000 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.54 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

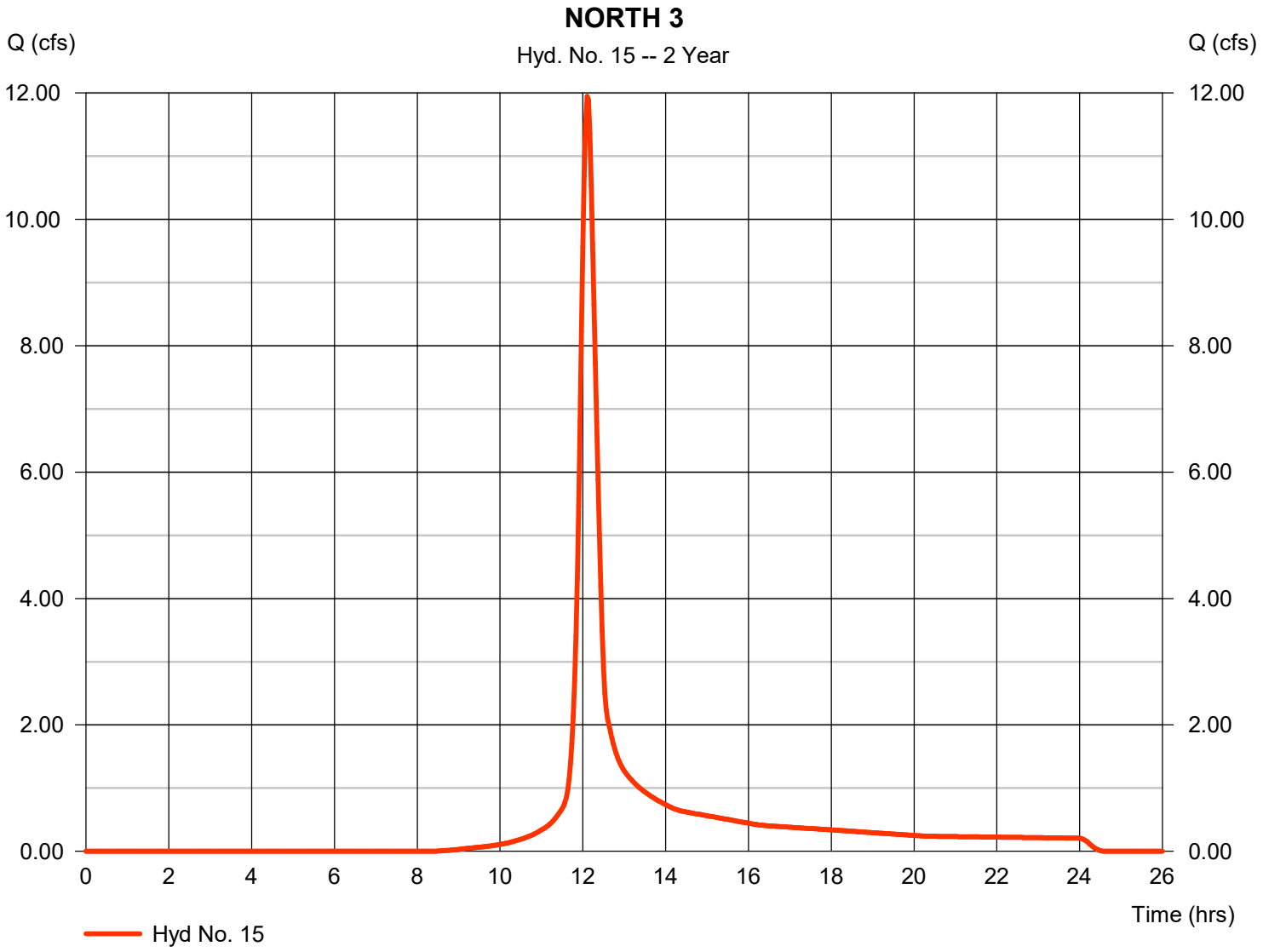


Hydrograph Report

Hyd. No. 15

NORTH 3

Hydrograph type	=	SCS Runoff	Peak discharge	=	11.95 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	41,392 cuft
Drainage area	=	6.170 ac	Curve number	=	82
Basin Slope	=	1.3 %	Hydraulic length	=	785 ft
Tc method	=	LAG	Time of conc. (Tc)	=	21.50 min
Total precip.	=	3.54 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

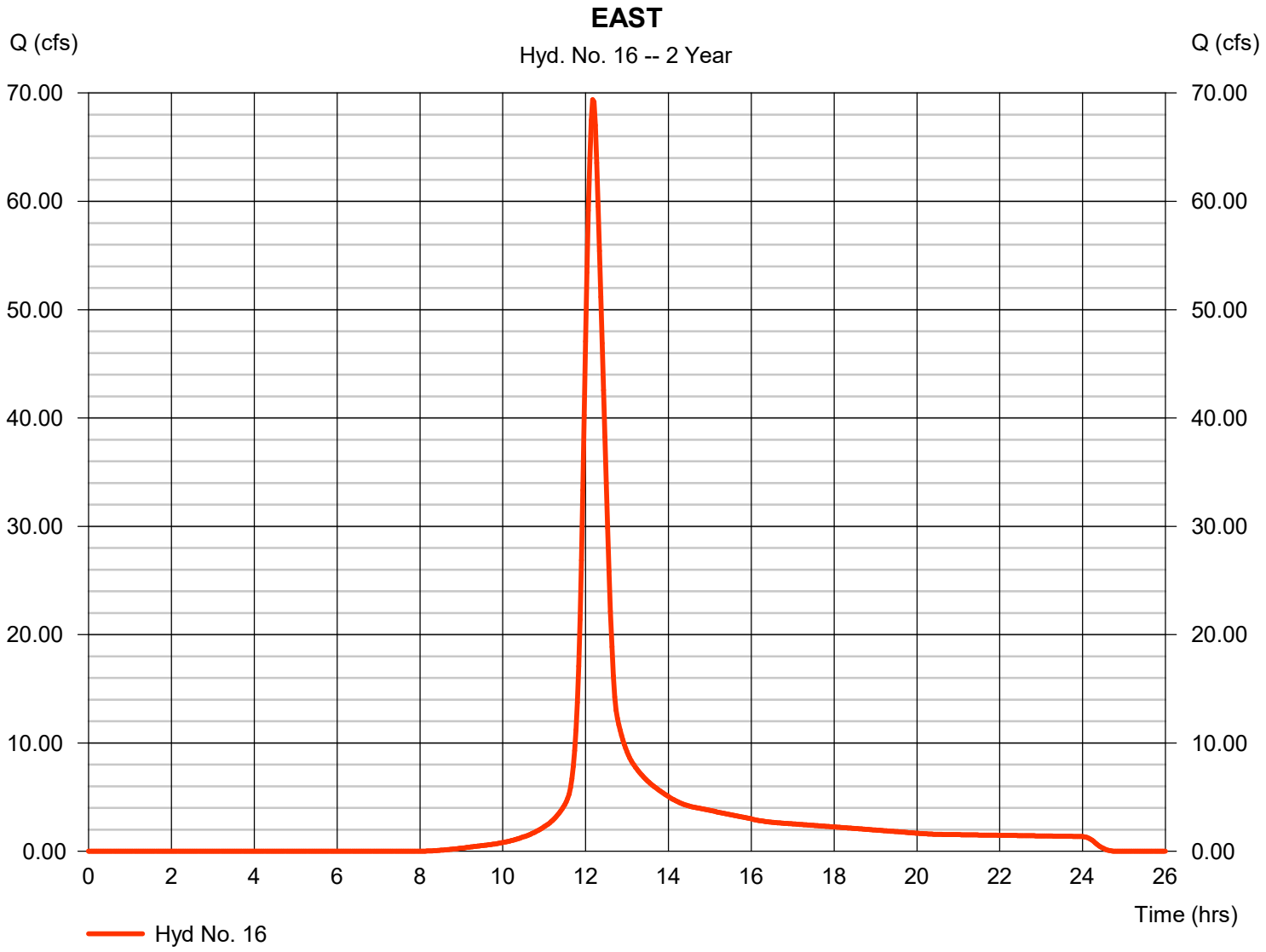


Hydrograph Report

Hyd. No. 16

EAST

Hydrograph type	=	SCS Runoff	Peak discharge	=	69.39 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.17 hrs
Time interval	=	2 min	Hyd. volume	=	278,053 cuft
Drainage area	=	40.480 ac	Curve number	=	83
Basin Slope	=	3.1 %	Hydraulic length	=	2131 ft
Tc method	=	LAG	Time of conc. (Tc)	=	30.00 min
Total precip.	=	3.54 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

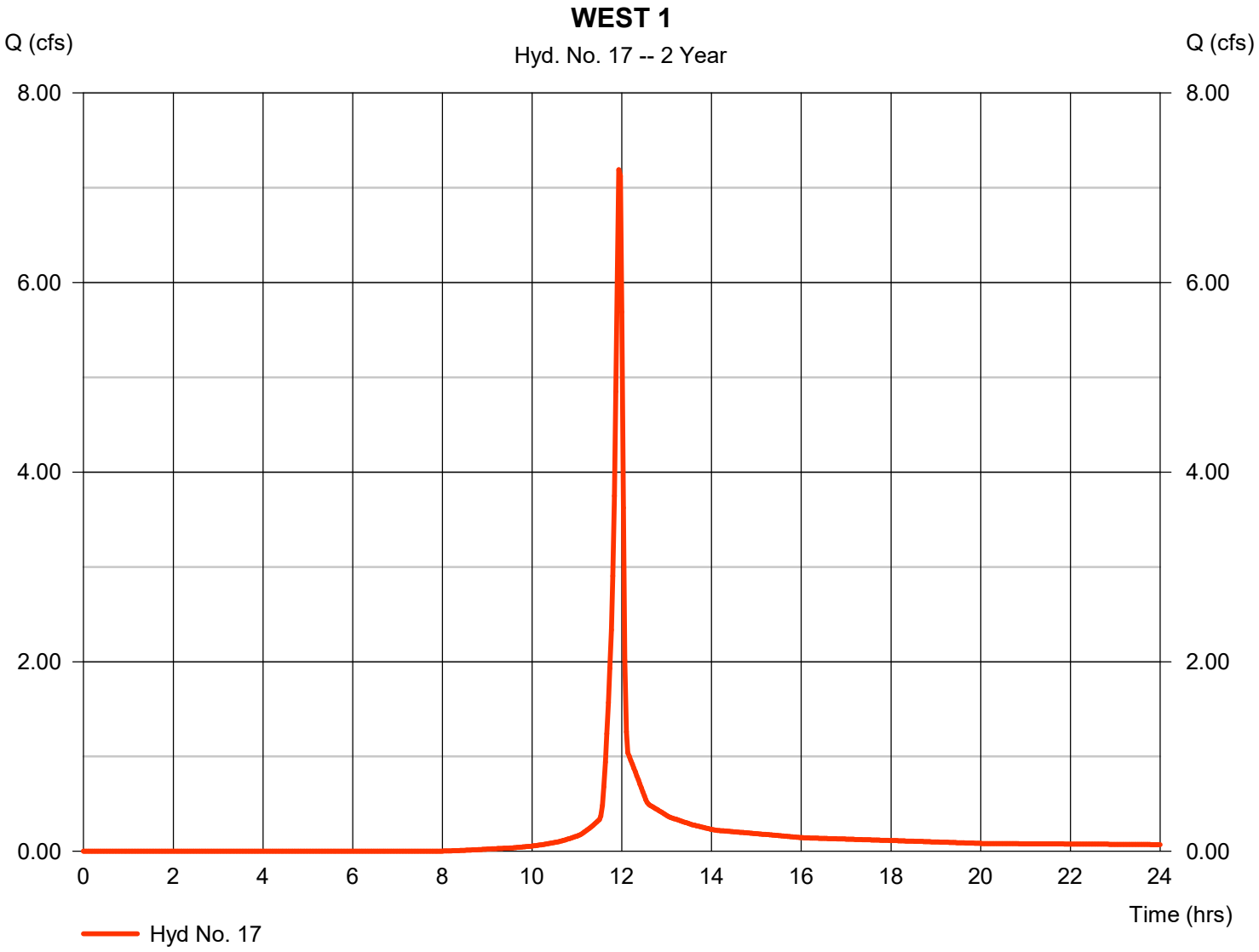


Hydrograph Report

Hyd. No. 17

WEST 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.190 cfs
Storm frequency	=	2 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	14,553 cuft
Drainage area	=	2.260 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.54 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

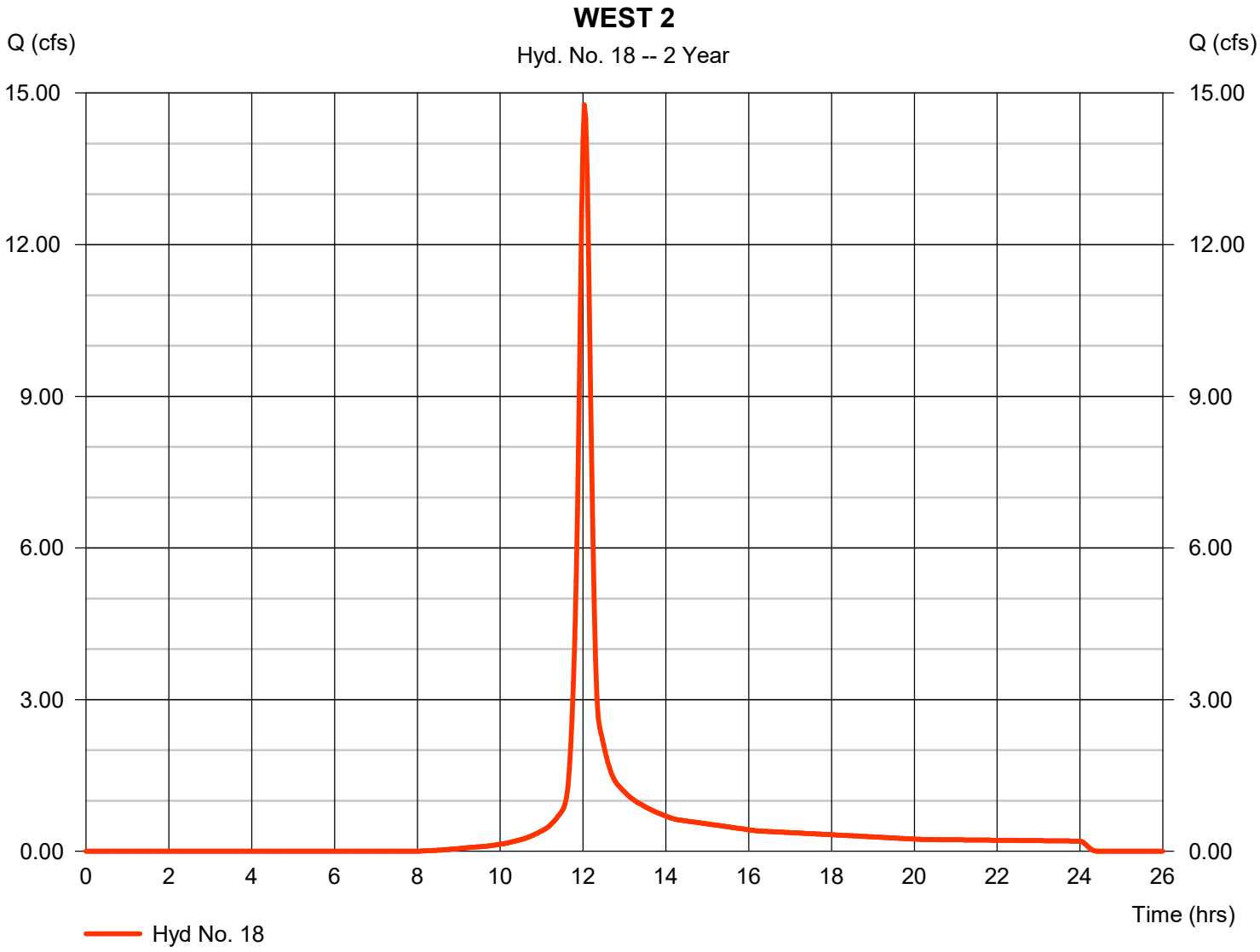


Hydrograph Report

Hyd. No. 18

WEST 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	14.77 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	41,389 cuft
Drainage area	=	6.180 ac	Curve number	=	83
Basin Slope	=	5.4 %	Hydraulic length	=	1187 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.20 min
Total precip.	=	3.54 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

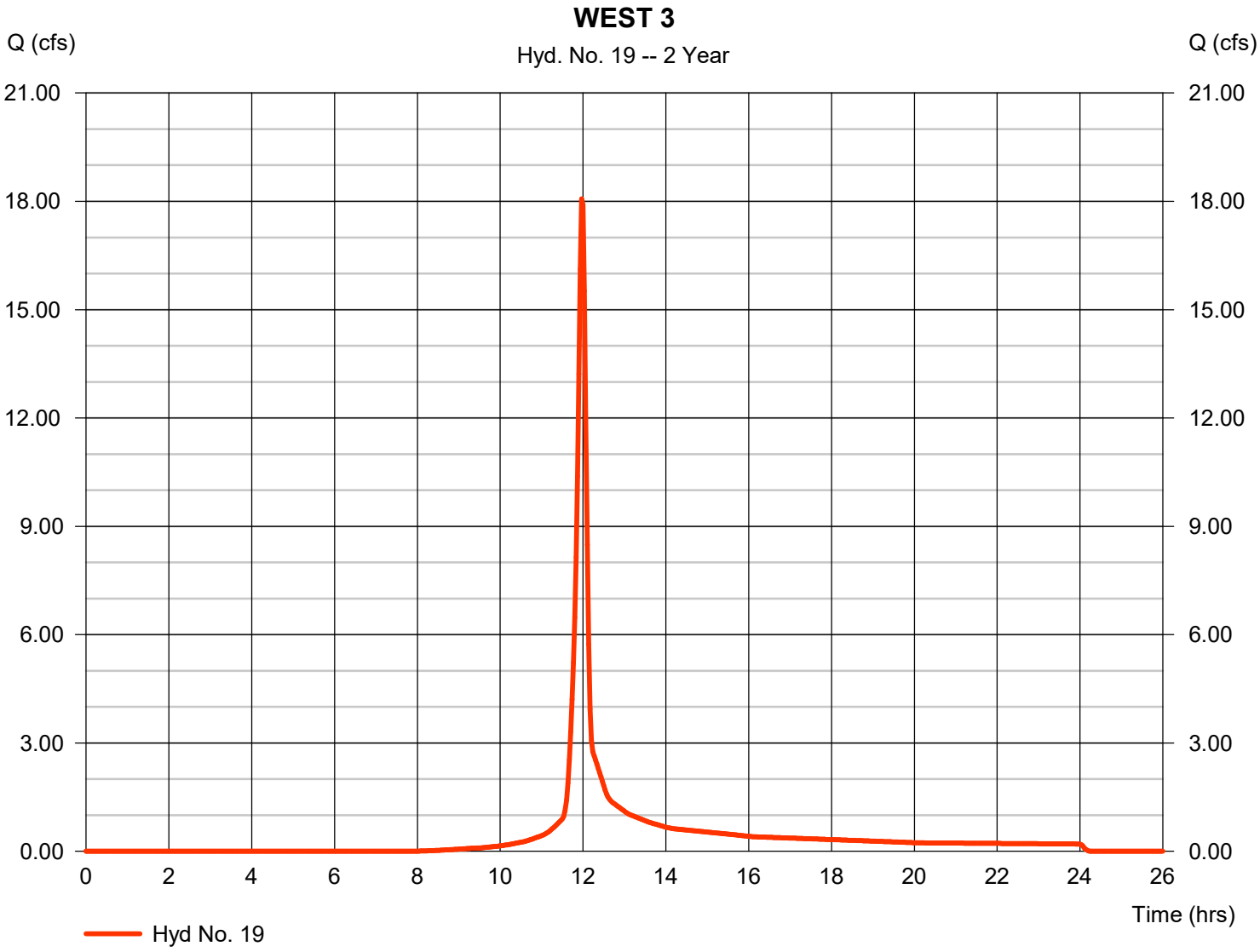


Hydrograph Report

Hyd. No. 19

WEST 3

Hydrograph type	=	SCS Runoff	Peak discharge	=	18.07 cfs
Storm frequency	=	2 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	41,351 cuft
Drainage area	=	6.020 ac	Curve number	=	83
Basin Slope	=	6.2 %	Hydraulic length	=	806 ft
Tc method	=	LAG	Time of conc. (Tc)	=	9.70 min
Total precip.	=	3.54 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



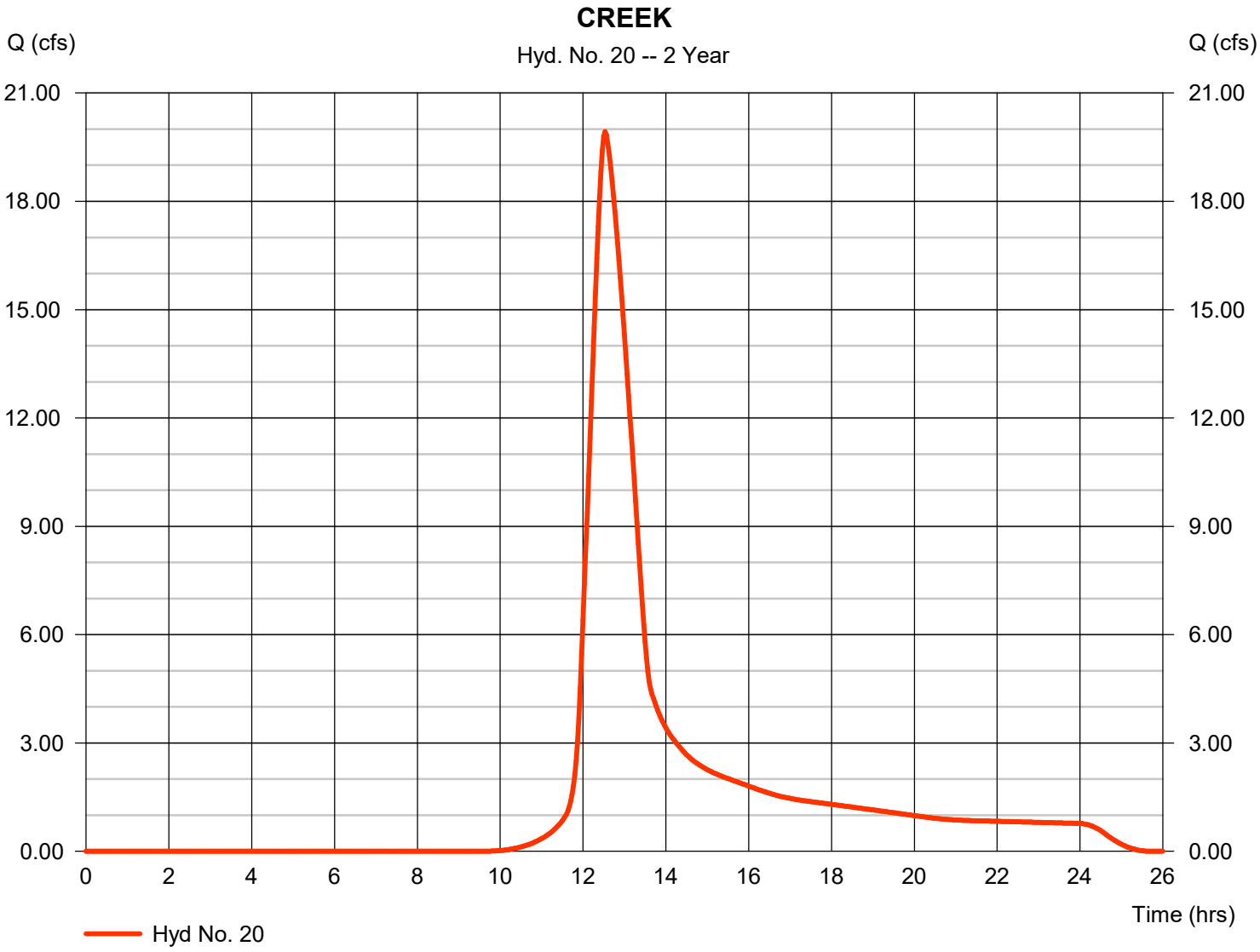
Hydrograph Report

Hyd. No. 20

CREEK

Hydrograph type	=	SCS Runoff	Peak discharge	=	19.94 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.53 hrs
Time interval	=	2 min	Hyd. volume	=	138,223 cuft
Drainage area	=	24.760 ac	Curve number	=	78*
Basin Slope	=	1.6 %	Hydraulic length	=	2986 ft
Tc method	=	LAG	Time of conc. (Tc)	=	64.20 min
Total precip.	=	3.54 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(4.400 x 94) + (20.360 x 74)] / 24.760

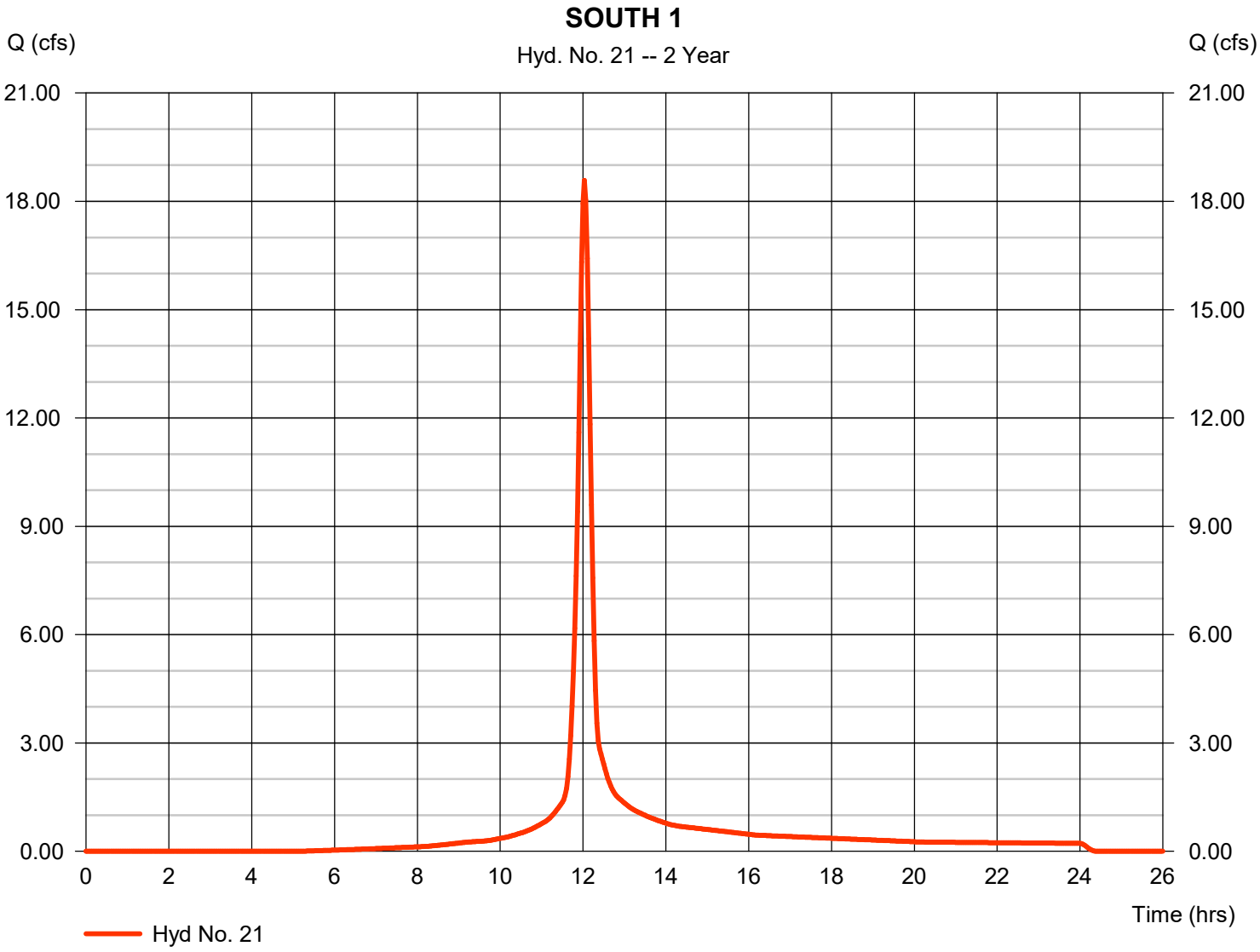


Hydrograph Report

Hyd. No. 21

SOUTH 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	18.58 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	53,043 cuft
Drainage area	=	6.030 ac	Curve number	=	90
Basin Slope	=	1.3 %	Hydraulic length	=	780 ft
Tc method	=	LAG	Time of conc. (Tc)	=	16.00 min
Total precip.	=	3.54 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

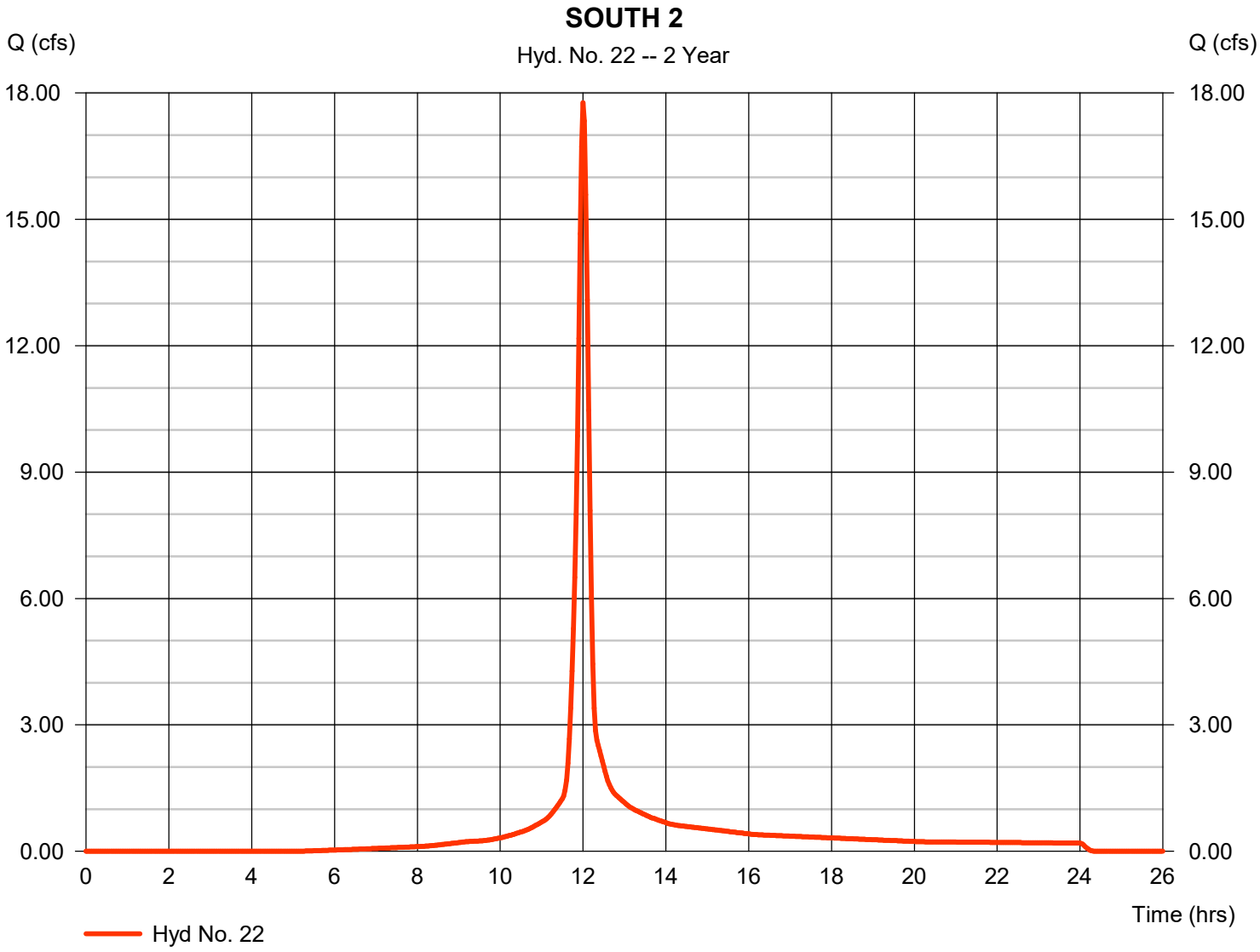


Hydrograph Report

Hyd. No. 22

SOUTH 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	17.77 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	46,985 cuft
Drainage area	=	5.050 ac	Curve number	=	90
Basin Slope	=	2.2 %	Hydraulic length	=	717 ft
Tc method	=	LAG	Time of conc. (Tc)	=	11.50 min
Total precip.	=	3.54 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

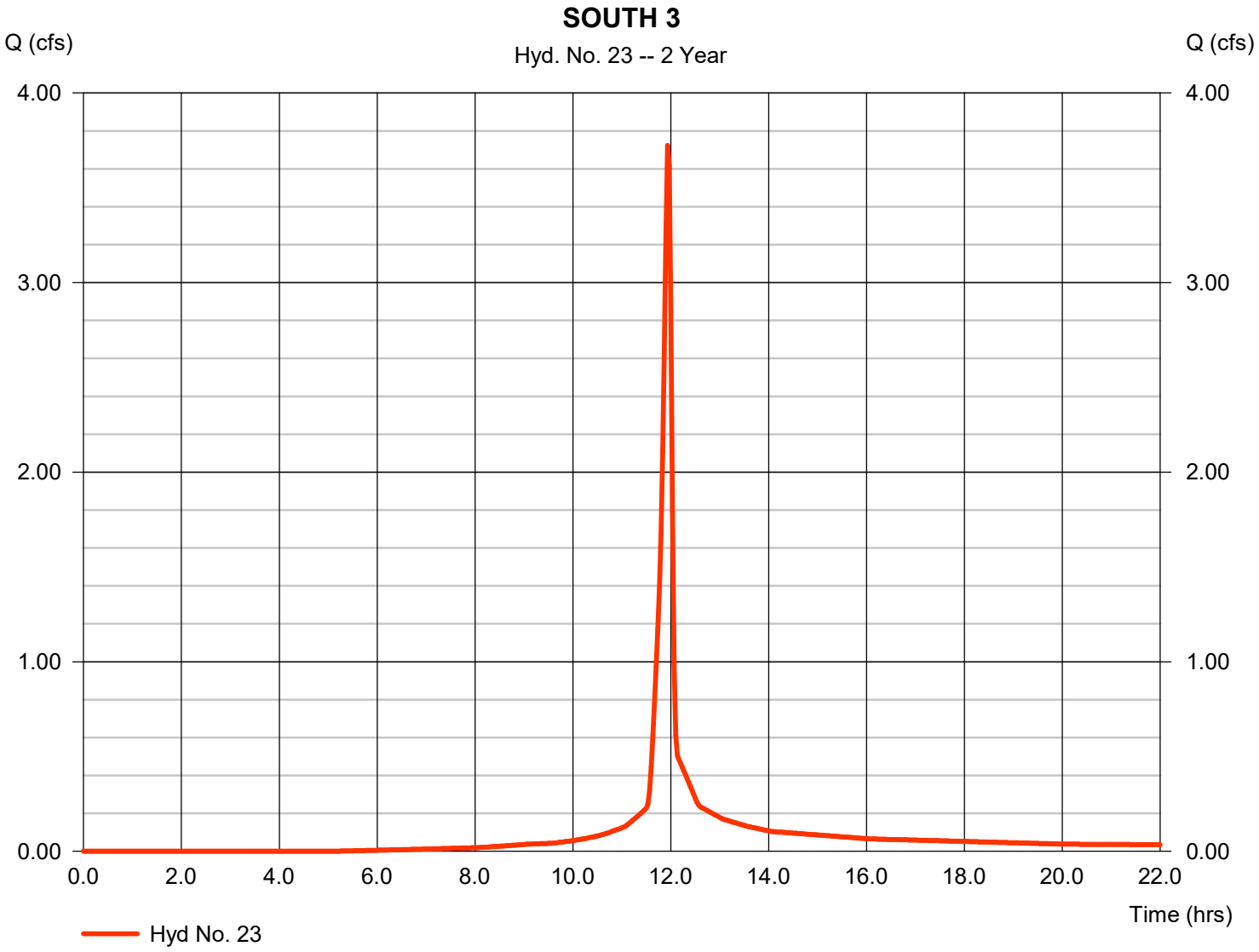


Hydrograph Report

Hyd. No. 23

SOUTH 3

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.723 cfs
Storm frequency	=	2 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	7,782 cuft
Drainage area	=	0.920 ac	Curve number	=	90
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.54 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



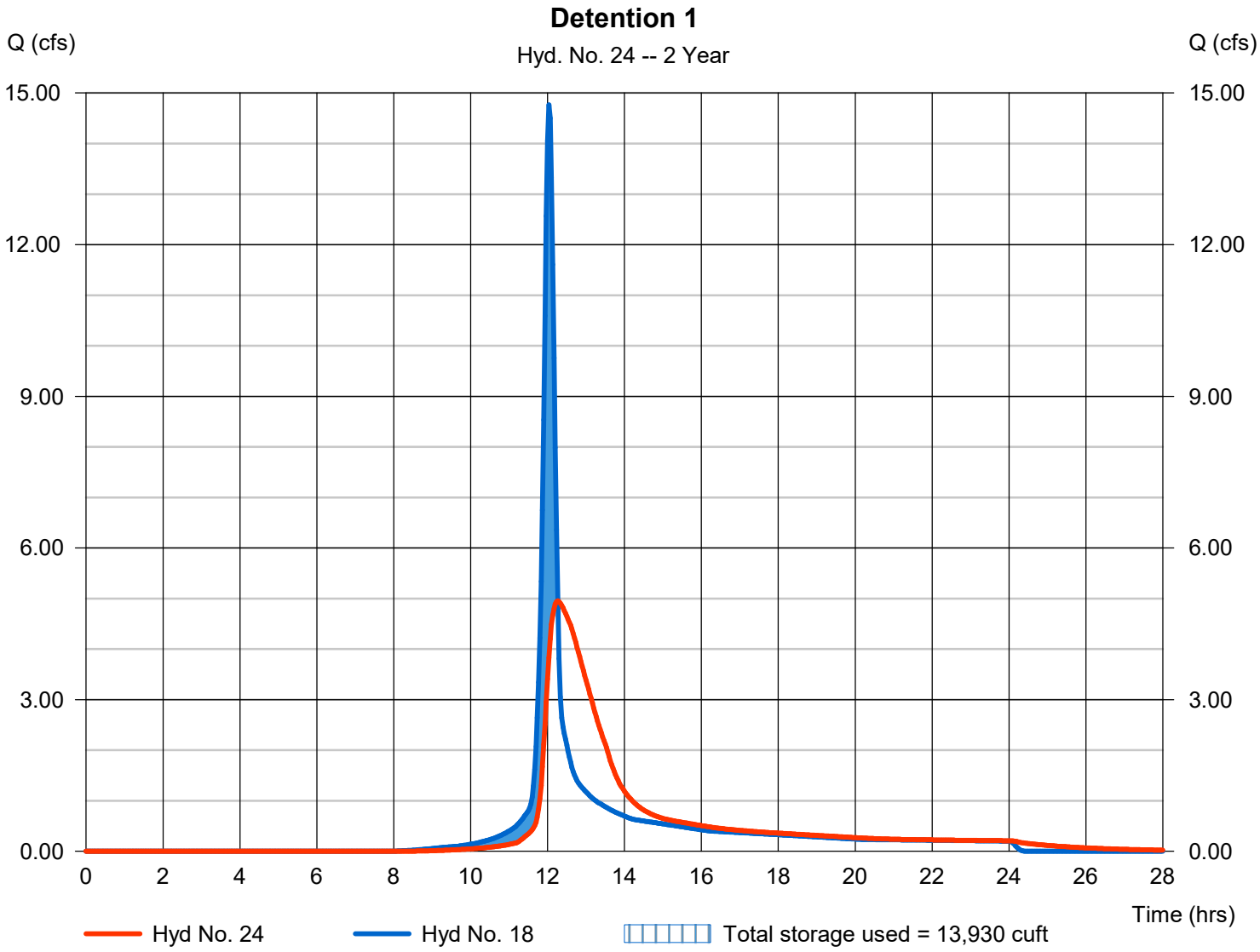
Hydrograph Report

Hyd. No. 24

Detention 1

Hydrograph type	=	Reservoir	Peak discharge	=	4.953 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.27 hrs
Time interval	=	2 min	Hyd. volume	=	41,382 cuft
Inflow hyd. No.	=	18 - WEST 2	Max. Elevation	=	864.38 ft
Reservoir name	=	Detention 1	Max. Storage	=	13,930 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - Detention 1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 862.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	862.00	4,678	0	0
2.00	864.00	6,451	11,081	11,081
4.00	866.00	8,451	14,856	25,936
6.00	868.00	10,677	19,083	45,019
8.00	870.00	13,129	23,761	68,780

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	0.00	0.00	0.00
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 862.00	0.00	0.00	0.00
Length (ft)	= 50.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

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

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

TW Elev. (ft) = 0.00

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

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	862.00	0.00	---	---	---	---	---	---	---	---	---	0.000
2.00	11,081	864.00	4.42 oc	---	---	---	---	---	---	---	---	---	4.420
4.00	25,936	866.00	6.75 oc	---	---	---	---	---	---	---	---	---	6.752
6.00	45,019	868.00	8.46 oc	---	---	---	---	---	---	---	---	---	8.464
8.00	68,780	870.00	9.88 oc	---	---	---	---	---	---	---	---	---	9.884

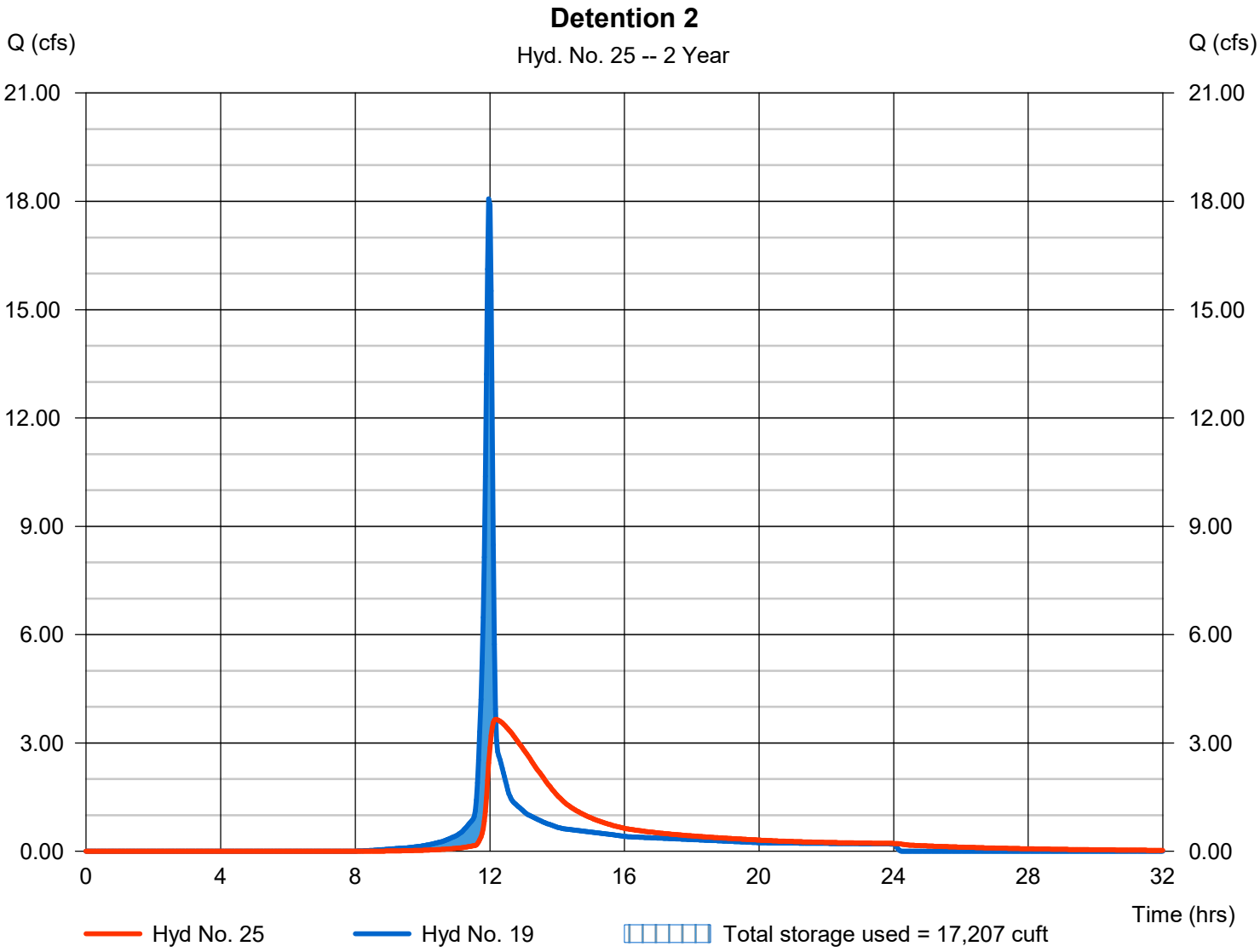
Hydrograph Report

Hyd. No. 25

Detention 2

Hydrograph type	=	Reservoir	Peak discharge	=	3.654 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.17 hrs
Time interval	=	2 min	Hyd. volume	=	41,337 cuft
Inflow hyd. No.	=	19 - WEST 3	Max. Elevation	=	857.44 ft
Reservoir name	=	Detention 2	Max. Storage	=	17,207 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - Detention 2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 856.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	856.00	10,656	0	0
2.00	858.00	13,373	23,975	23,975
4.00	860.00	16,288	29,610	53,585
6.00	862.00	19,429	35,667	89,253
8.00	864.00	22,796	42,176	131,429

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	0.00	0.00	0.00
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 856.00	0.00	0.00	0.00
Length (ft)	= 50.00	0.00	0.00	0.00
Slope (%)	= 2.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

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

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

TW Elev. (ft) = 0.00

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

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	856.00	0.00	---	---	---	---	---	---	---	---	---	0.000
2.00	23,975	858.00	4.63 ic	---	---	---	---	---	---	---	---	---	4.631
4.00	53,585	860.00	7.07 ic	---	---	---	---	---	---	---	---	---	7.074
6.00	89,253	862.00	8.84 oc	---	---	---	---	---	---	---	---	---	8.840
8.00	131,429	864.00	10.21 oc	---	---	---	---	---	---	---	---	---	10.21

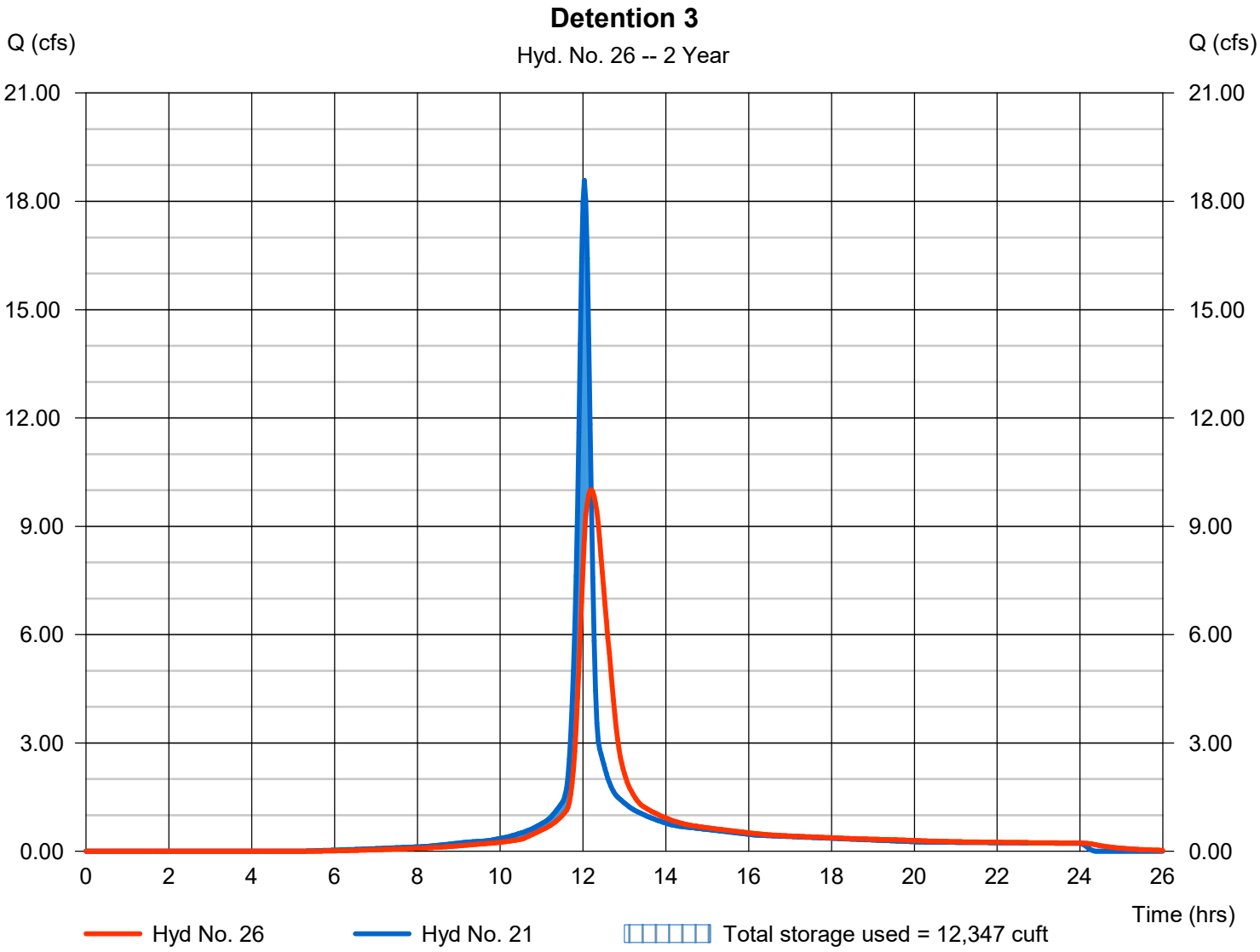
Hydrograph Report

Hyd. No. 26

Detention 3

Hydrograph type	=	Reservoir	Peak discharge	=	10.01 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.20 hrs
Time interval	=	2 min	Hyd. volume	=	53,040 cuft
Inflow hyd. No.	=	21 - SOUTH 1	Max. Elevation	=	856.25 ft
Reservoir name	=	Detention 3	Max. Storage	=	12,347 cuft

Storage Indication method used.



Pond Report

Pond No. 3 - Detention 3

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 854.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	854.00	3,515	0	0
2.00	856.00	6,833	10,165	10,165
4.00	858.00	10,532	17,230	27,395
6.00	860.00	14,456	24,882	52,277

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	0.00	0.00	0.00
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 2	0	0	0
Invert El. (ft)	= 854.00	0.00	0.00	0.00
Length (ft)	= 50.00	0.00	0.00	0.00
Slope (%)	= 2.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

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

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

TW Elev. (ft) = 0.00

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

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	854.00	0.00	---	---	---	---	---	---	---	---	---	0.000
2.00	10,165	856.00	9.26 ic	---	---	---	---	---	---	---	---	---	9.262
4.00	27,395	858.00	14.15 ic	---	---	---	---	---	---	---	---	---	14.15
6.00	52,277	860.00	17.68 oc	---	---	---	---	---	---	---	---	---	17.68

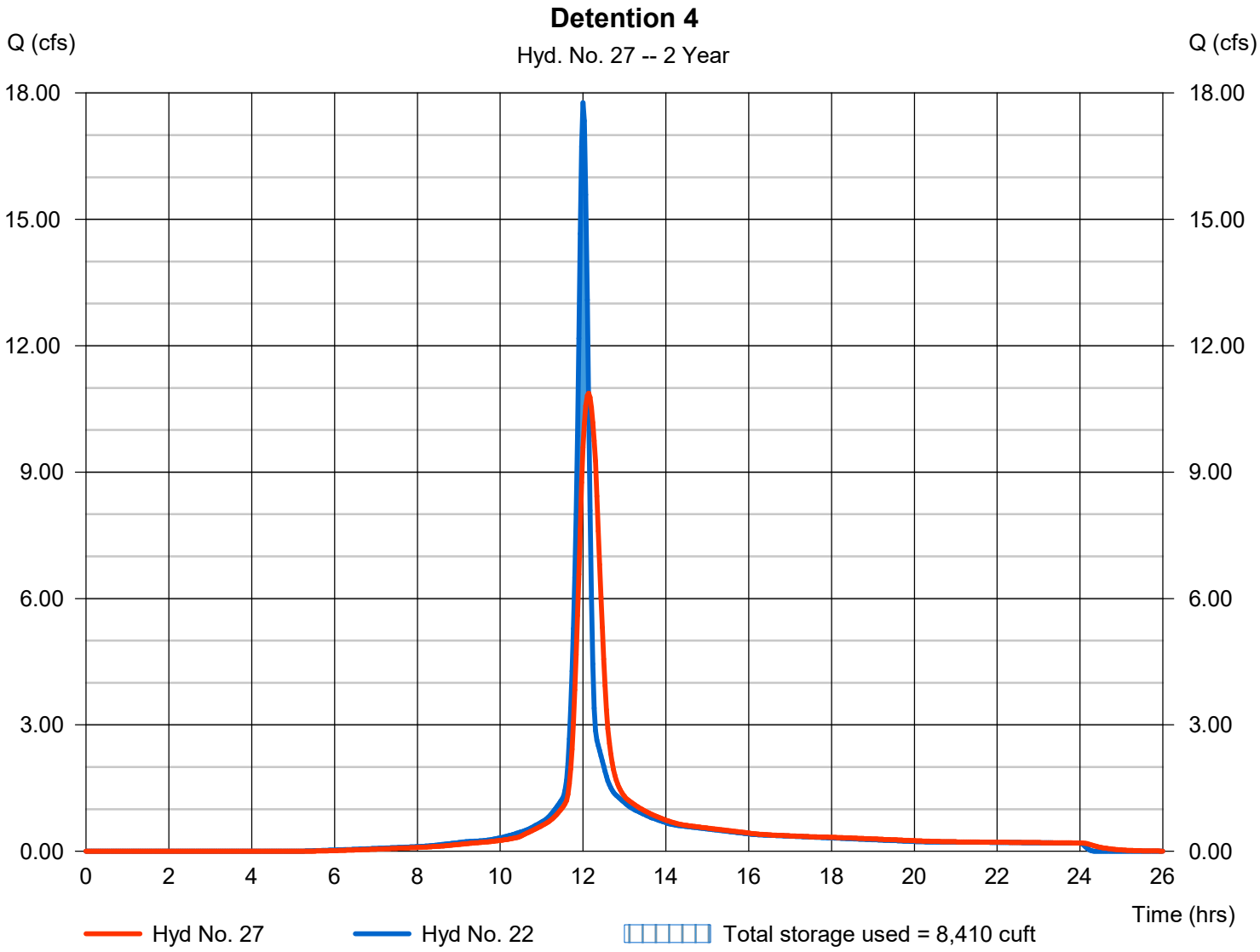
Hydrograph Report

Hyd. No. 27

Detention 4

Hydrograph type	=	Reservoir	Peak discharge	=	10.88 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.13 hrs
Time interval	=	2 min	Hyd. volume	=	46,984 cuft
Inflow hyd. No.	=	22 - SOUTH 2	Max. Elevation	=	852.57 ft
Reservoir name	=	Detention 4	Max. Storage	=	8,410 cuft

Storage Indication method used.



Pond Report

Pond No. 4 - Detention 4

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 850.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	850.00	2,057	0	0
2.00	852.00	3,715	5,690	5,690
4.00	854.00	5,929	9,557	15,248
6.00	856.00	8,616	14,460	29,708

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	0.00	0.00	0.00
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 2	0	0	0
Invert El. (ft)	= 850.00	0.00	0.00	0.00
Length (ft)	= 50.00	0.00	0.00	0.00
Slope (%)	= 2.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	0.00	0.00	0.00
Crest El. (ft)	= 854.00	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

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

TW Elev. (ft) = 0.00

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

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	850.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.00	5,690	852.00	9.26 ic	---	---	---	0.00	---	---	---	---	---	9.262
4.00	15,248	854.00	14.15 ic	---	---	---	0.00	---	---	---	---	---	14.15
6.00	29,708	856.00	17.68 oc	---	---	---	88.25	---	---	---	---	---	105.93

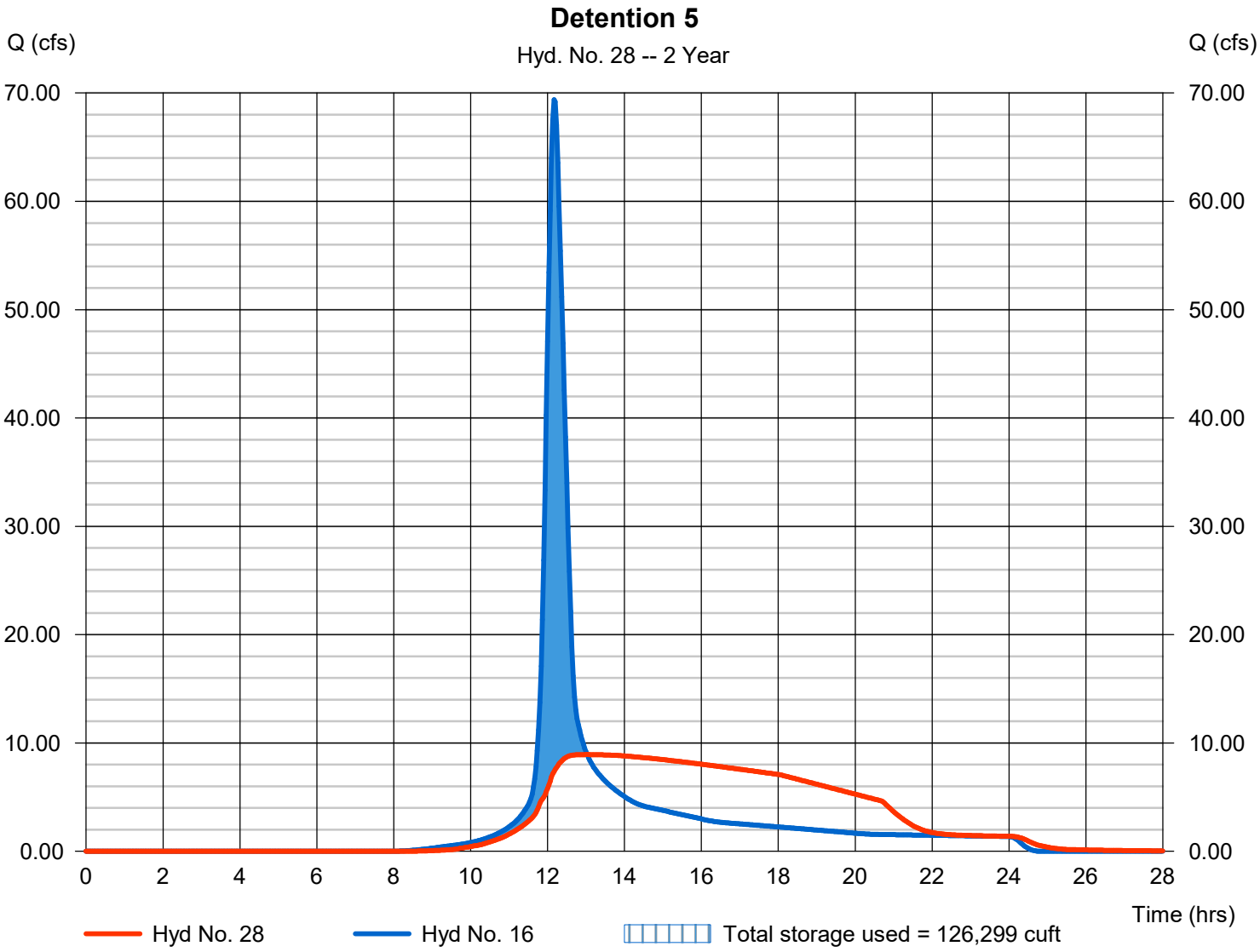
Hydrograph Report

Hyd. No. 28

Detention 5

Hydrograph type	=	Reservoir	Peak discharge	=	8.923 cfs
Storm frequency	=	2 yrs	Time to peak	=	13.03 hrs
Time interval	=	2 min	Hyd. volume	=	278,047 cuft
Inflow hyd. No.	=	16 - EAST	Max. Elevation	=	852.11 ft
Reservoir name	=	Detention 5	Max. Storage	=	126,299 cuft

Storage Indication method used.



Pond Report

Pond No. 5 - Detention 5

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 846.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	846.00	492	0	0
2.00	848.00	11,784	9,788	9,788
4.00	850.00	27,726	38,386	48,175
6.00	852.00	45,142	72,157	120,332
8.00	854.00	61,001	105,735	226,067
10.00	856.00	76,177	136,884	362,951
12.00	858.00	84,512	160,601	523,551
14.00	860.00	93,073	177,499	701,050

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	0.00	0.00	0.00
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 846.00	0.00	0.00	0.00
Length (ft)	= 50.00	0.00	0.00	0.00
Slope (%)	= 2.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

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

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

TW Elev. (ft) = 0.00

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

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	846.00	0.00	---	---	---	---	---	---	---	---	---	0.000
2.00	9,788	848.00	4.63 ic	---	---	---	---	---	---	---	---	---	4.631
4.00	48,175	850.00	7.07 ic	---	---	---	---	---	---	---	---	---	7.074
6.00	120,332	852.00	8.84 oc	---	---	---	---	---	---	---	---	---	8.840
8.00	226,067	854.00	10.21 oc	---	---	---	---	---	---	---	---	---	10.21
10.00	362,951	856.00	11.41 oc	---	---	---	---	---	---	---	---	---	11.41
12.00	523,551	858.00	12.50 oc	---	---	---	---	---	---	---	---	---	12.50
14.00	701,050	860.00	13.50 oc	---	---	---	---	---	---	---	---	---	13.50

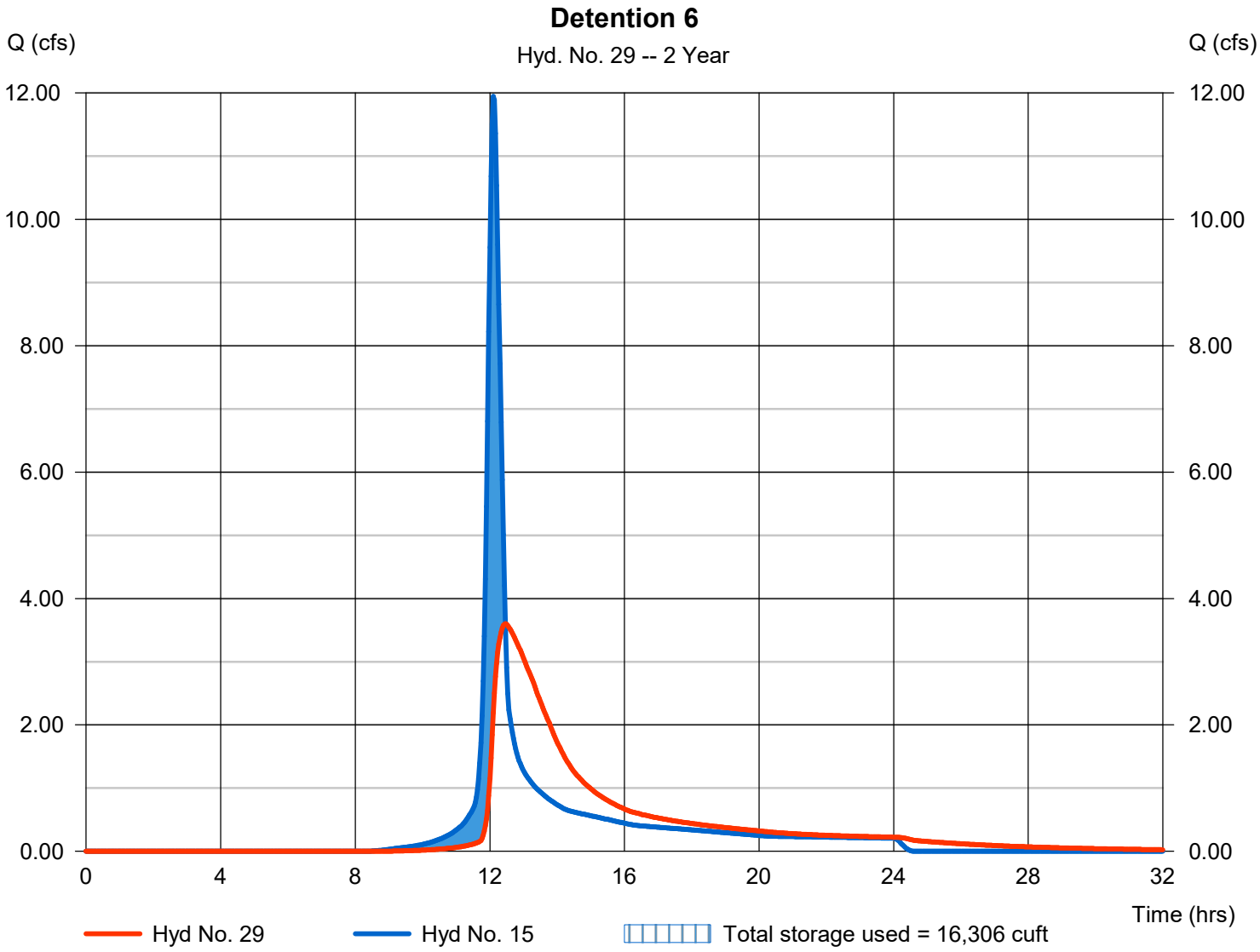
Hydrograph Report

Hyd. No. 29

Detention 6

Hydrograph type	=	Reservoir	Peak discharge	=	3.600 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.47 hrs
Time interval	=	2 min	Hyd. volume	=	41,379 cuft
Inflow hyd. No.	=	15 - NORTH 3	Max. Elevation	=	873.41 ft
Reservoir name	=	Detention 6	Max. Storage	=	16,306 cuft

Storage Indication method used.



Pond Report

Pond No. 6 - Detention 6

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 872.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	872.00	10,110	0	0
2.00	874.00	13,143	23,184	23,184
4.00	876.00	16,425	29,504	52,689
6.00	878.00	19,932	36,297	88,985
8.00	880.00	23,665	43,539	132,525

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	0.00	0.00	0.00
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 872.00	0.00	0.00	0.00
Length (ft)	= 50.00	0.00	0.00	0.00
Slope (%)	= 2.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

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

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

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

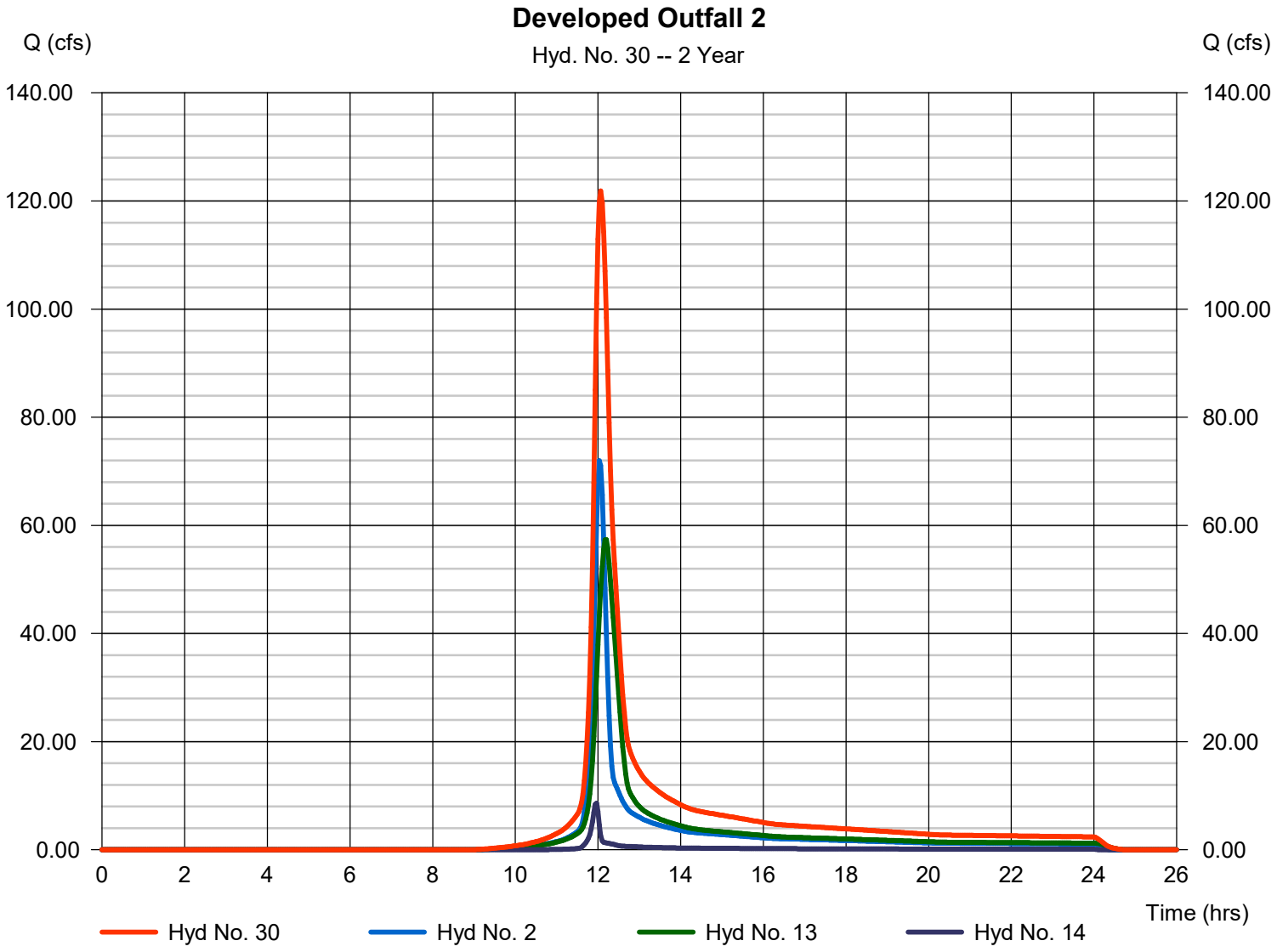
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	872.00	0.00	---	---	---	---	---	---	---	---	---	0.000
2.00	23,184	874.00	4.63 ic	---	---	---	---	---	---	---	---	---	4.631
4.00	52,689	876.00	7.07 ic	---	---	---	---	---	---	---	---	---	7.074
6.00	88,985	878.00	8.84 oc	---	---	---	---	---	---	---	---	---	8.840
8.00	132,525	880.00	10.21 oc	---	---	---	---	---	---	---	---	---	10.21

Hydrograph Report

Hyd. No. 30

Developed Outfall 2

Hydrograph type	= Combine	Peak discharge	= 121.84 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 451,627 cuft
Inflow hyds.	= 2, 13, 14	Contrib. drain. area	= 76.590 ac

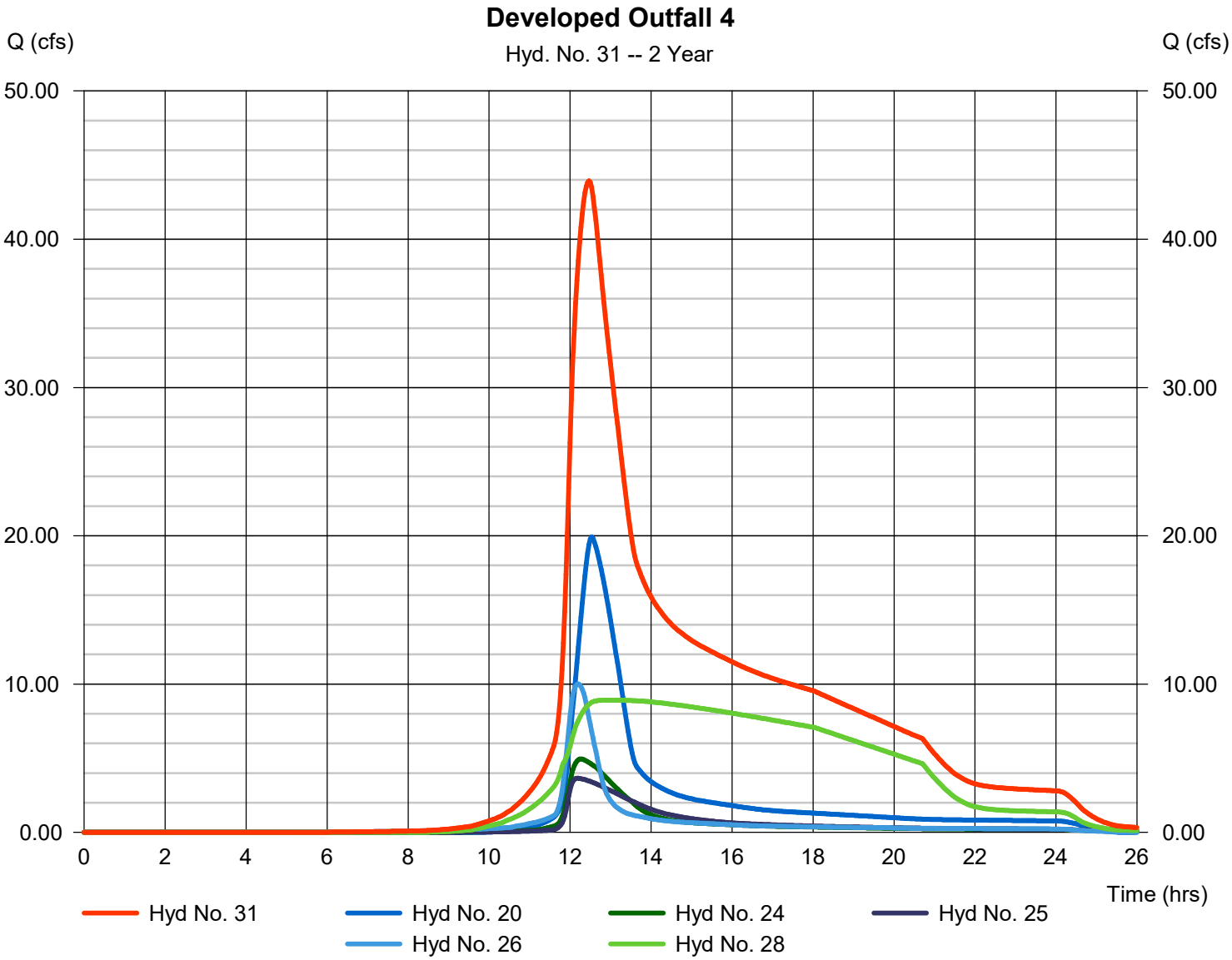


Hydrograph Report

Hyd. No. 31

Developed Outfall 4

Hydrograph type	= Combine	Peak discharge	= 43.94 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.47 hrs
Time interval	= 2 min	Hyd. volume	= 552,030 cuft
Inflow hyds.	= 20, 24, 25, 26, 28	Contrib. drain. area	= 24.760 ac

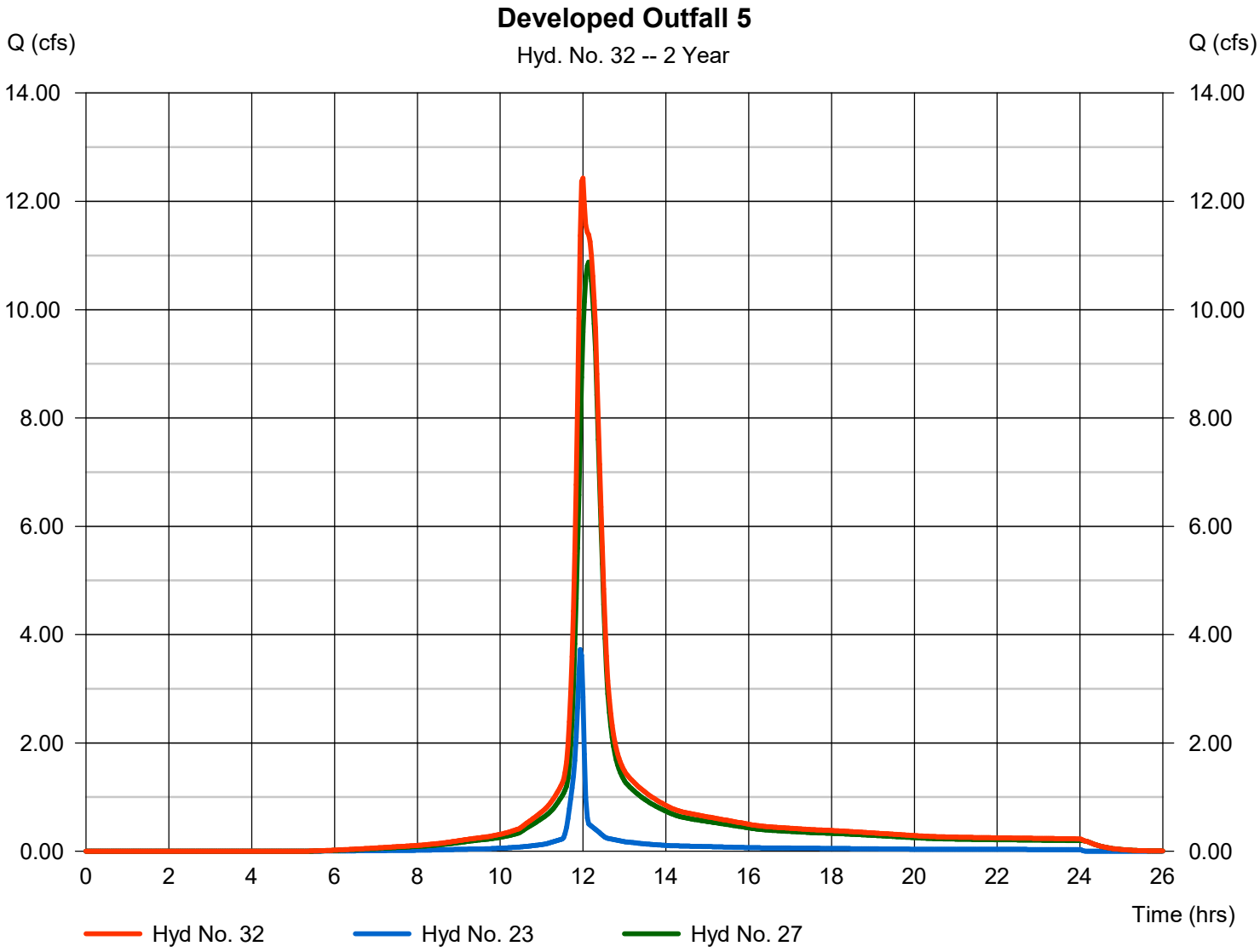


Hydrograph Report

Hyd. No. 32

Developed Outfall 5

Hydrograph type	= Combine	Peak discharge	= 12.43 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 54,765 cuft
Inflow hyds.	= 23, 27	Contrib. drain. area	= 0.920 ac

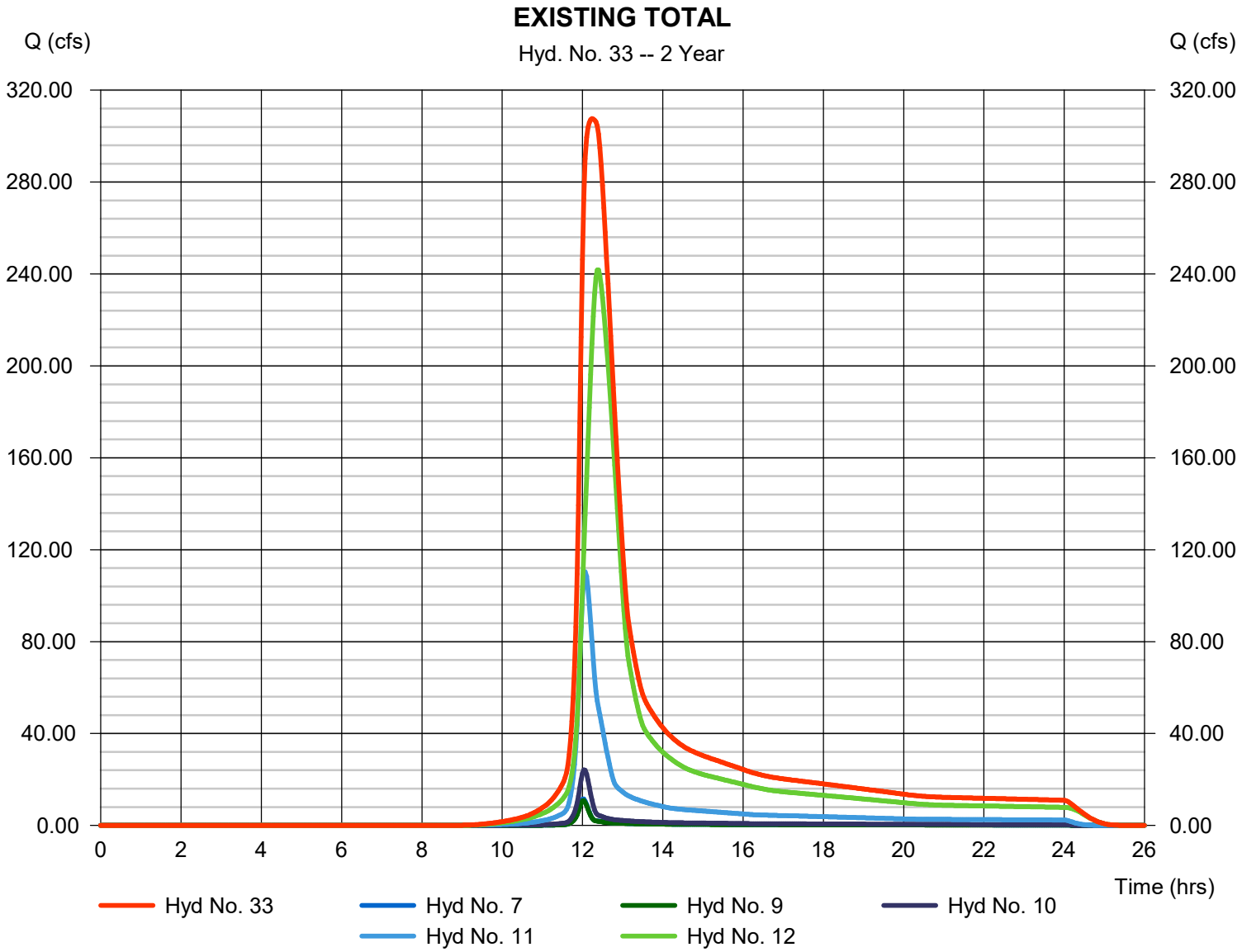


Hydrograph Report

Hyd. No. 33

EXISTING TOTAL

Hydrograph type	=	Combine	Peak discharge	=	307.66 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.23 hrs
Time interval	=	2 min	Hyd. volume	=	1,981,286 cuft
Inflow hyds.	=	7, 9, 10, 11, 12	Contrib. drain. area	=	12.440 ac

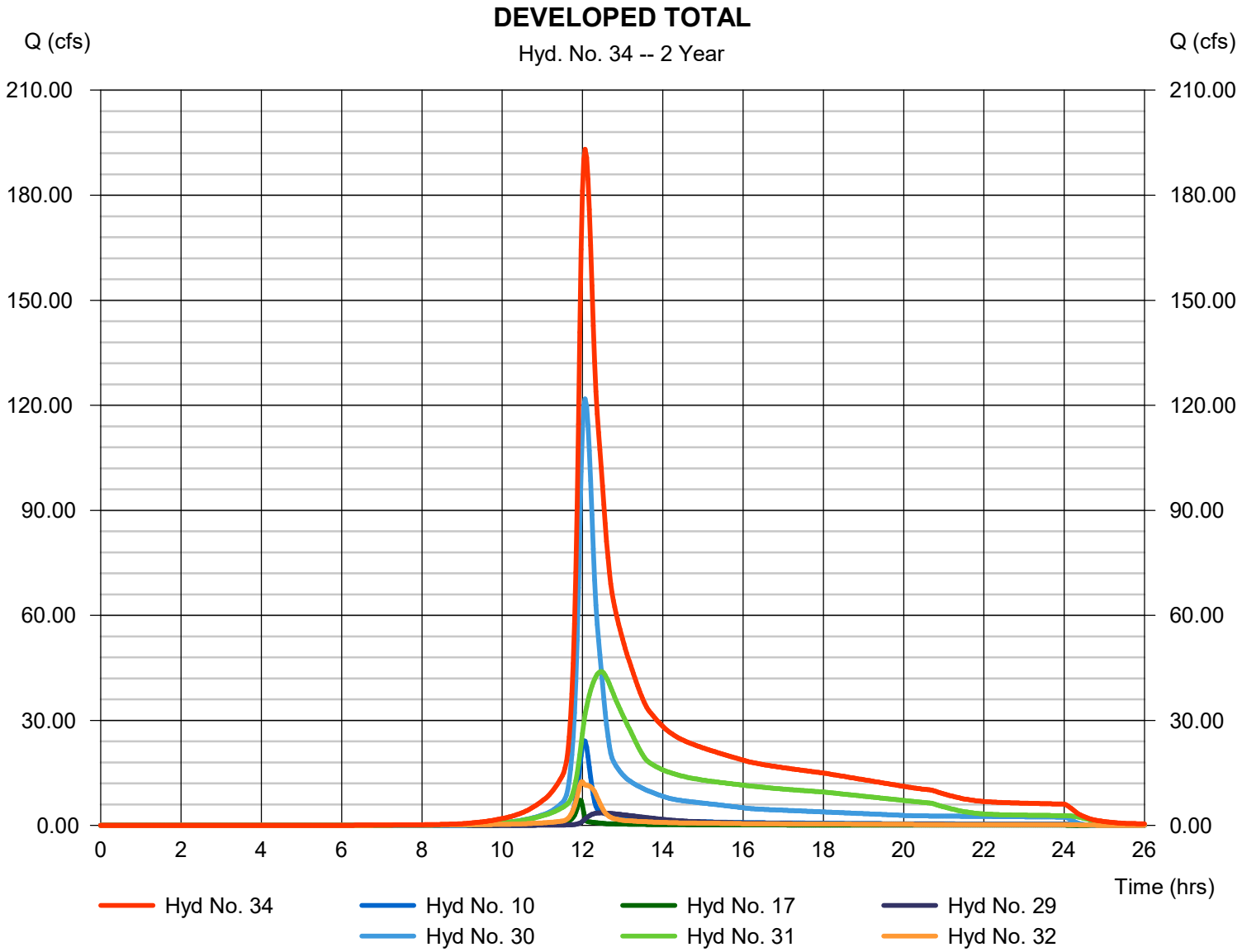


Hydrograph Report

Hyd. No. 34

DEVELOPED TOTAL

Hydrograph type	= Combine	Peak discharge	= 193.09 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 1,183,643 cuft
Inflow hyds.	= 10, 17, 29, 30, 31, 32	Contrib. drain. area	= 2.260 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

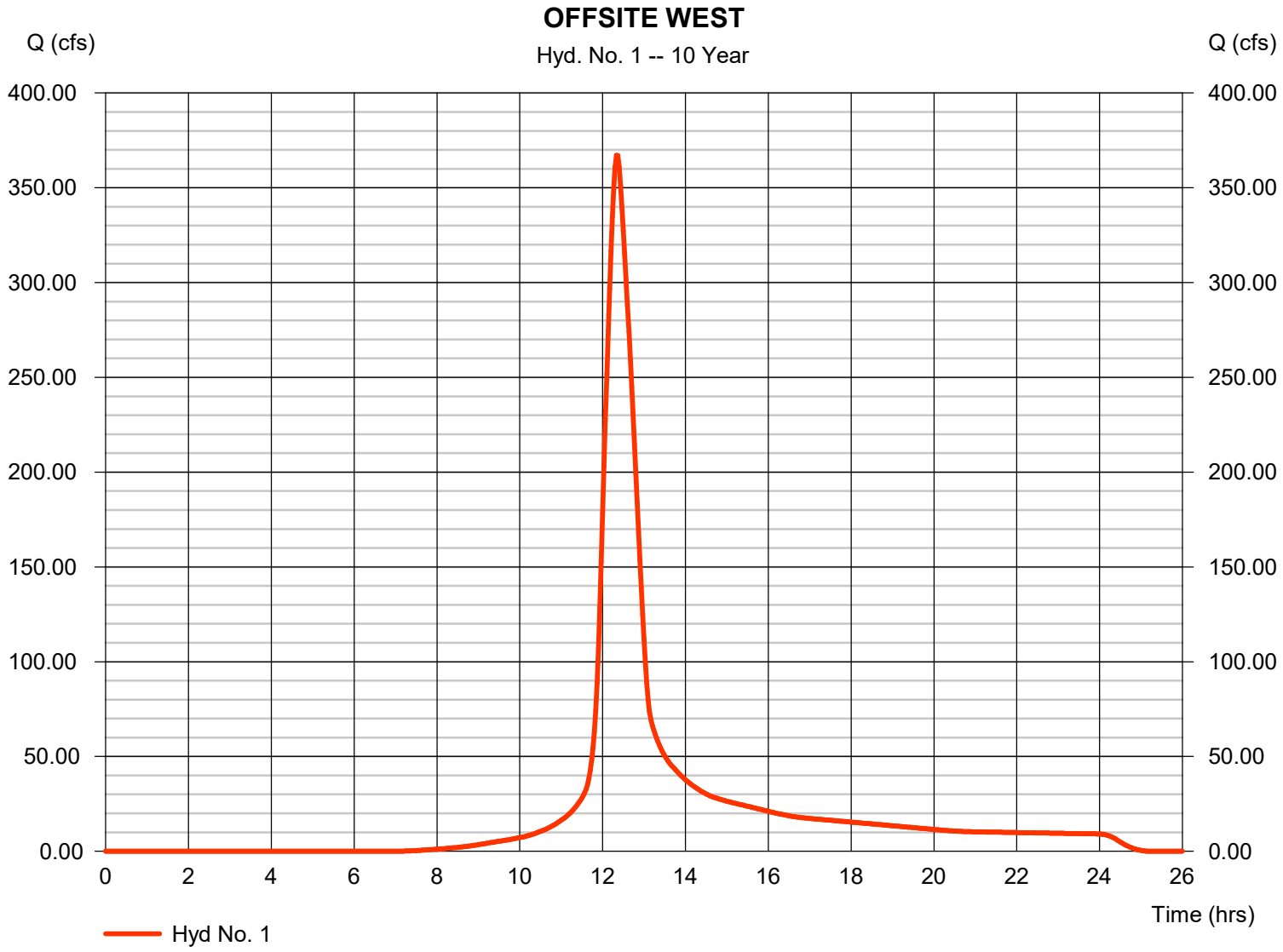
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	367.18	2	740	1,967,674	------	------	------	OFFSITE WEST
2	SCS Runoff	136.73	2	722	384,106	------	------	------	OFFSITE
3	SCS Runoff	8.653	2	722	24,463	------	------	------	OFFSITE NORTH
4	SCS Runoff	15.14	2	722	42,810	------	------	------	OFFSITE NORTH 2
5	SCS Runoff	33.67	2	722	94,549	------	------	------	EXISTING NORTHWEST
6	SCS Runoff	97.73	2	734	424,793	------	------	------	EXISTING NORTH
7	SCS Runoff	24.13	2	720	62,624	------	------	------	EXISTING NORTHEAST
8	SCS Runoff	123.67	2	750	806,242	------	------	------	EXISTING SOUTH
9	SCS Runoff	22.77	2	720	59,102	------	------	------	SOUTHEAST
10	Combine	48.81	2	722	137,358	4, 5,	------	------	OUTFALL 1
11	Combine	218.97	2	724	833,362	2, 3, 6,	------	------	OUTFALL 2
12	Combine	480.22	2	742	2,773,914	1, 8,	------	------	OUTFALL 4
13	SCS Runoff	110.13	2	730	440,026	------	------	------	NORTH 1
14	SCS Runoff	17.62	2	716	35,582	------	------	------	NORTH 2
15	SCS Runoff	22.13	2	726	76,547	------	------	------	NORTH 3
16	SCS Runoff	126.81	2	730	507,819	------	------	------	EAST
17	SCS Runoff	12.89	2	716	26,580	------	------	------	WEST 1
18	SCS Runoff	26.74	2	722	75,589	------	------	------	WEST 2
19	SCS Runoff	32.54	2	718	75,521	------	------	------	WEST 3
20	SCS Runoff	39.89	2	752	269,310	------	------	------	CREEK
21	SCS Runoff	30.45	2	722	89,119	------	------	------	SOUTH 1
22	SCS Runoff	29.10	2	720	78,941	------	------	------	SOUTH 2
23	SCS Runoff	6.065	2	716	13,074	------	------	------	SOUTH 3
24	Reservoir	6.917	2	738	75,583	18	866.17	27,590	Detention 1
25	Reservoir	5.479	2	732	75,507	19	858.60	32,855	Detention 2
26	Reservoir	13.10	2	734	89,116	21	857.50	23,092	Detention 3
27	Reservoir	16.33	2	728	78,939	22	854.14	16,238	Detention 4
28	Reservoir	10.54	2	814	507,813	16	854.52	261,938	Detention 5
29	Reservoir	5.482	2	750	76,534	15	874.60	32,065	Detention 6
30	Combine	233.62	2	724	859,715	2, 13, 14,	------	------	Developed Outfall 2
31	Combine	73.51	2	750	1,017,330	20, 24, 25,	------	------	Developed Outfall 4
32	Combine	17.25	2	718	92,014	26, 28, 23, 27,	------	------	Developed Outfall 5
33	Combine	619.12	2	732	3,866,364	7, 9, 10,	------	------	EXISTING TOTAL
34	Combine	353.63	2	724	2,209,529	11, 12, 10, 17, 29, 30, 31, 32,	------	------	DEVELOPED TOTAL

Hydrograph Report

Hyd. No. 1

OFFSITE WEST

Hydrograph type	=	SCS Runoff	Peak discharge	=	367.18 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.33 hrs
Time interval	=	2 min	Hyd. volume	=	1,967,674 cuft
Drainage area	=	172.810 ac	Curve number	=	80
Basin Slope	=	3.0 %	Hydraulic length	=	3142 ft
Tc method	=	LAG	Time of conc. (Tc)	=	45.90 min
Total precip.	=	5.31 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

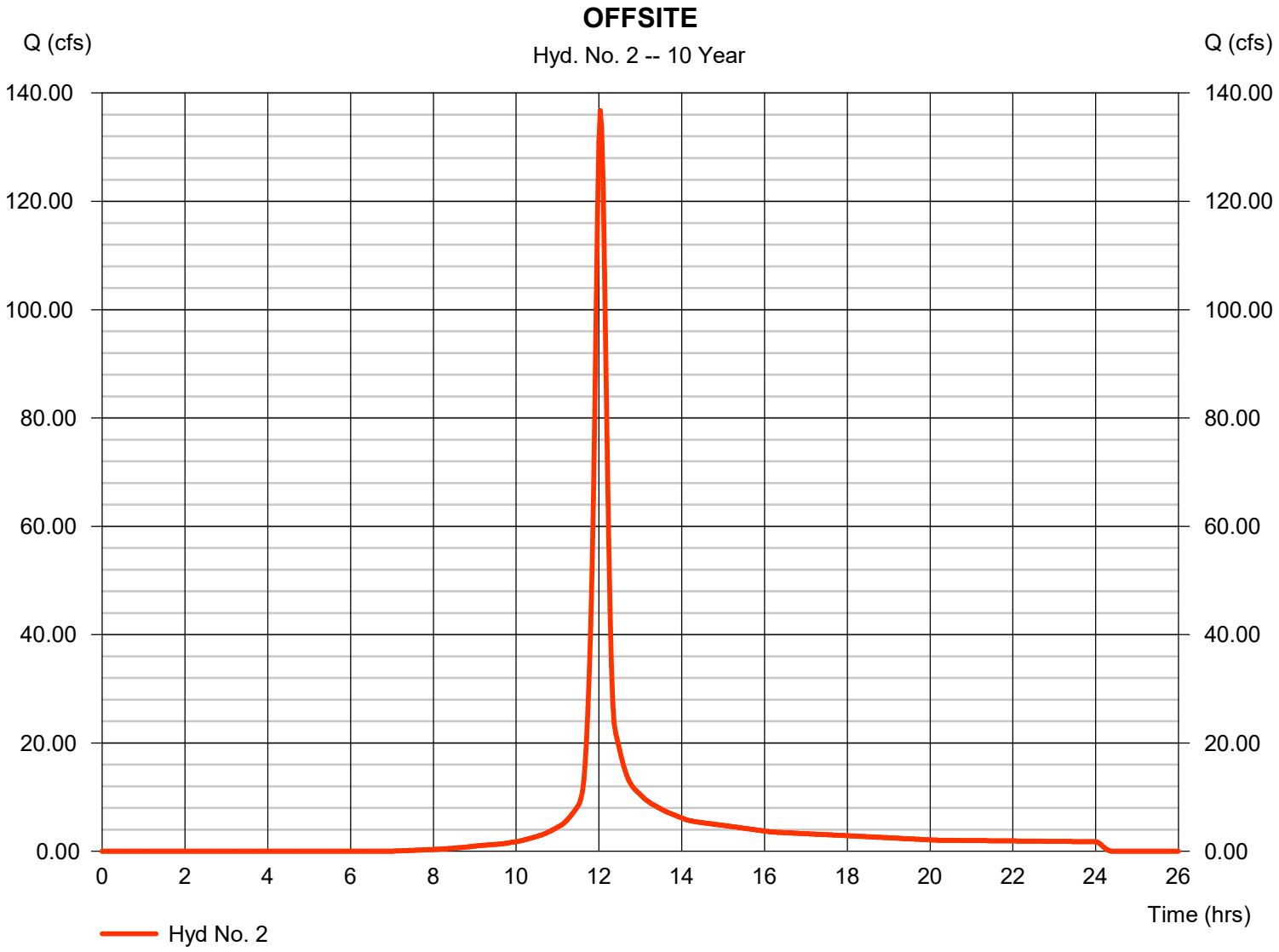


Hydrograph Report

Hyd. No. 2

OFFSITE

Hydrograph type	=	SCS Runoff	Peak discharge	=	136.73 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	384,106 cuft
Drainage area	=	34.290 ac	Curve number	=	80
Basin Slope	=	5.7 %	Hydraulic length	=	1200 ft
Tc method	=	LAG	Time of conc. (Tc)	=	15.40 min
Total precip.	=	5.31 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

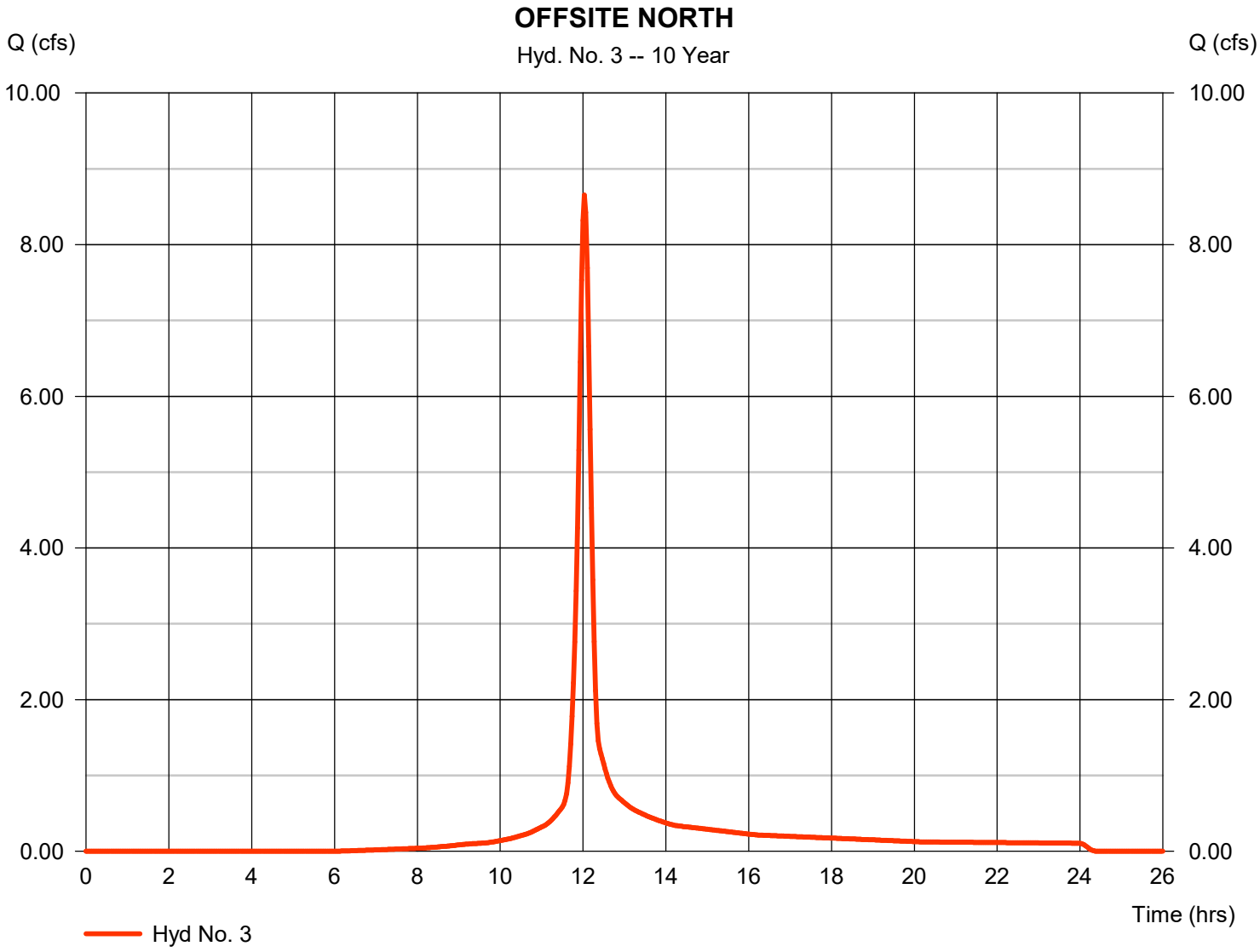


Hydrograph Report

Hyd. No. 3

OFFSITE NORTH

Hydrograph type	= SCS Runoff	Peak discharge	= 8.653 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 24,463 cuft
Drainage area	= 2.000 ac	Curve number	= 83
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.00 min
Total precip.	= 5.31 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

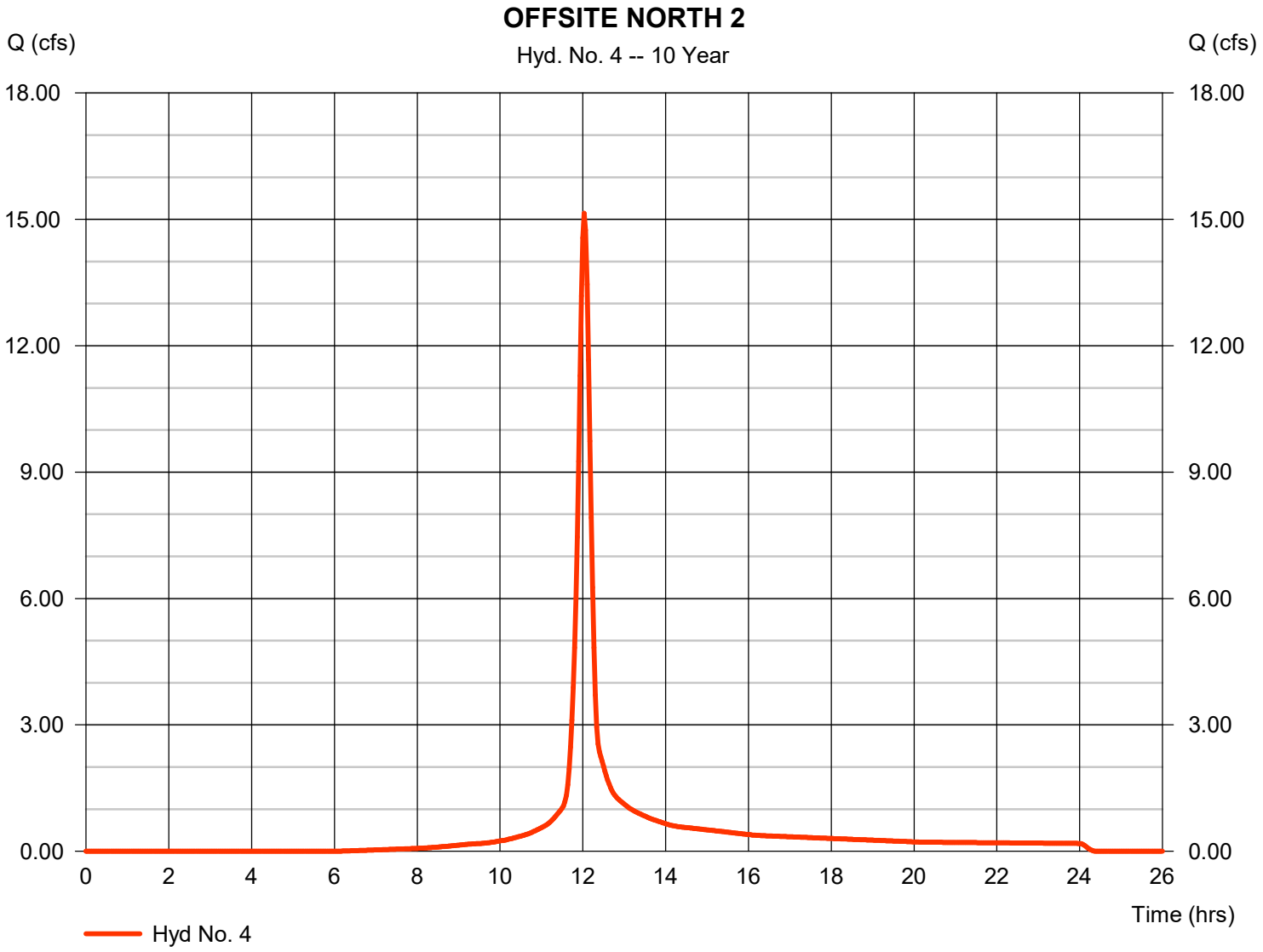


Hydrograph Report

Hyd. No. 4

OFFSITE NORTH 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	15.14 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	42,810 cuft
Drainage area	=	3.500 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.00 min
Total precip.	=	5.31 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

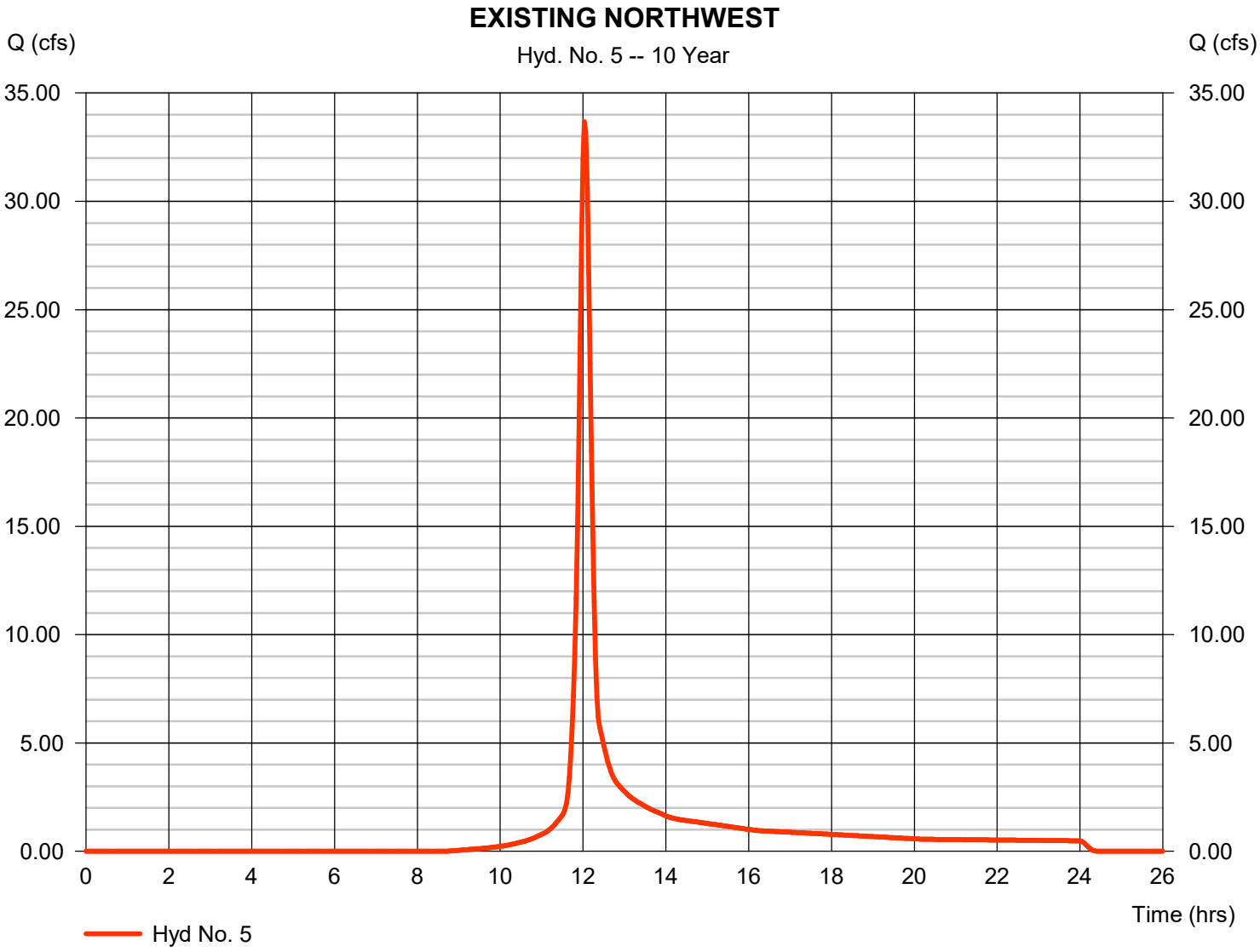


Hydrograph Report

Hyd. No. 5

EXISTING NORTHWEST

Hydrograph type	=	SCS Runoff	Peak discharge	=	33.67 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	94,549 cuft
Drainage area	=	10.220 ac	Curve number	=	74
Basin Slope	=	5.6 %	Hydraulic length	=	851 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.10 min
Total precip.	=	5.31 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

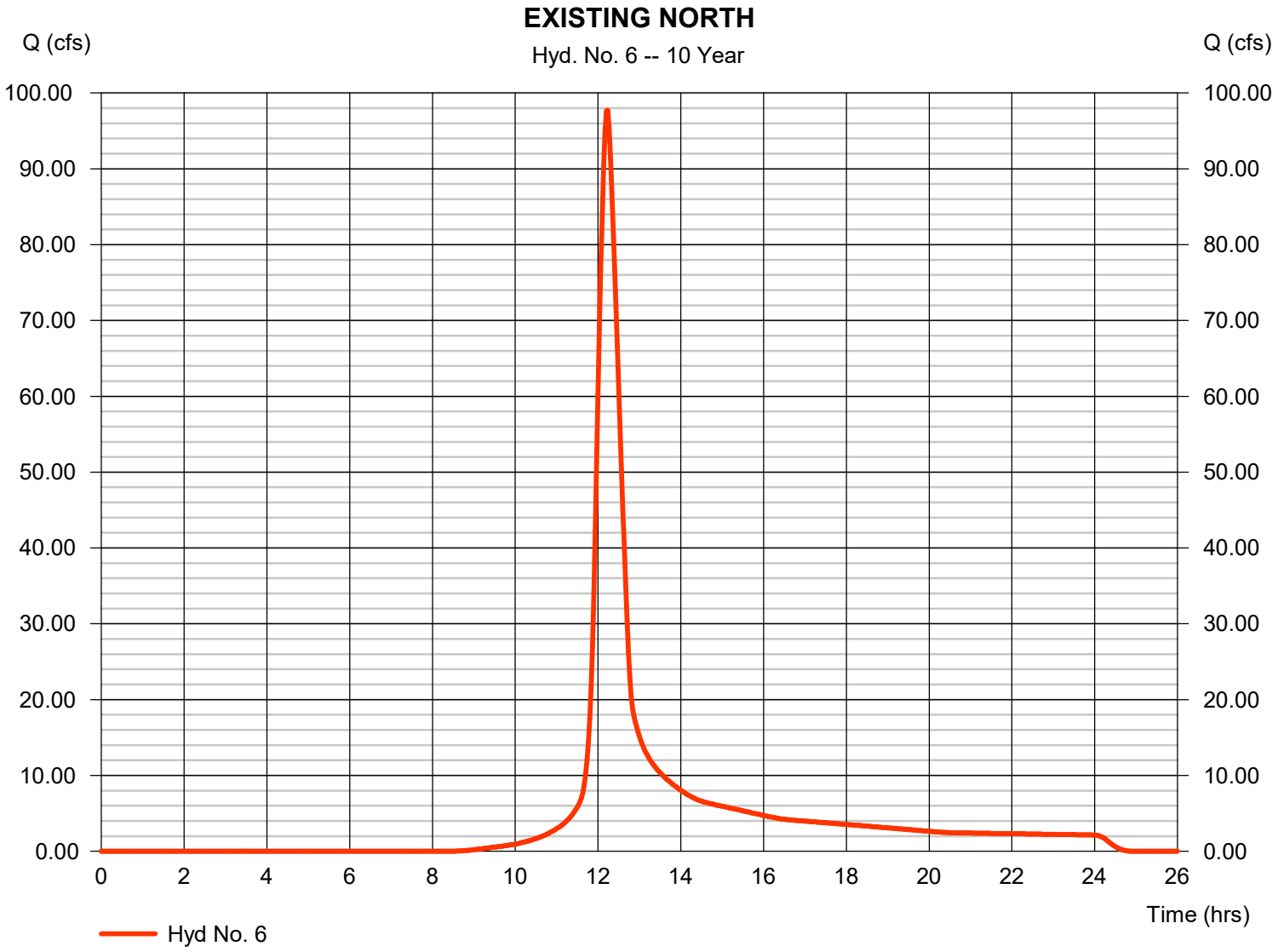


Hydrograph Report

Hyd. No. 6

EXISTING NORTH

Hydrograph type	=	SCS Runoff	Peak discharge	=	97.73 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.23 hrs
Time interval	=	2 min	Hyd. volume	=	424,793 cuft
Drainage area	=	42.760 ac	Curve number	=	75
Basin Slope	=	4.3 %	Hydraulic length	=	1944 ft
Tc method	=	LAG	Time of conc. (Tc)	=	30.30 min
Total precip.	=	5.31 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

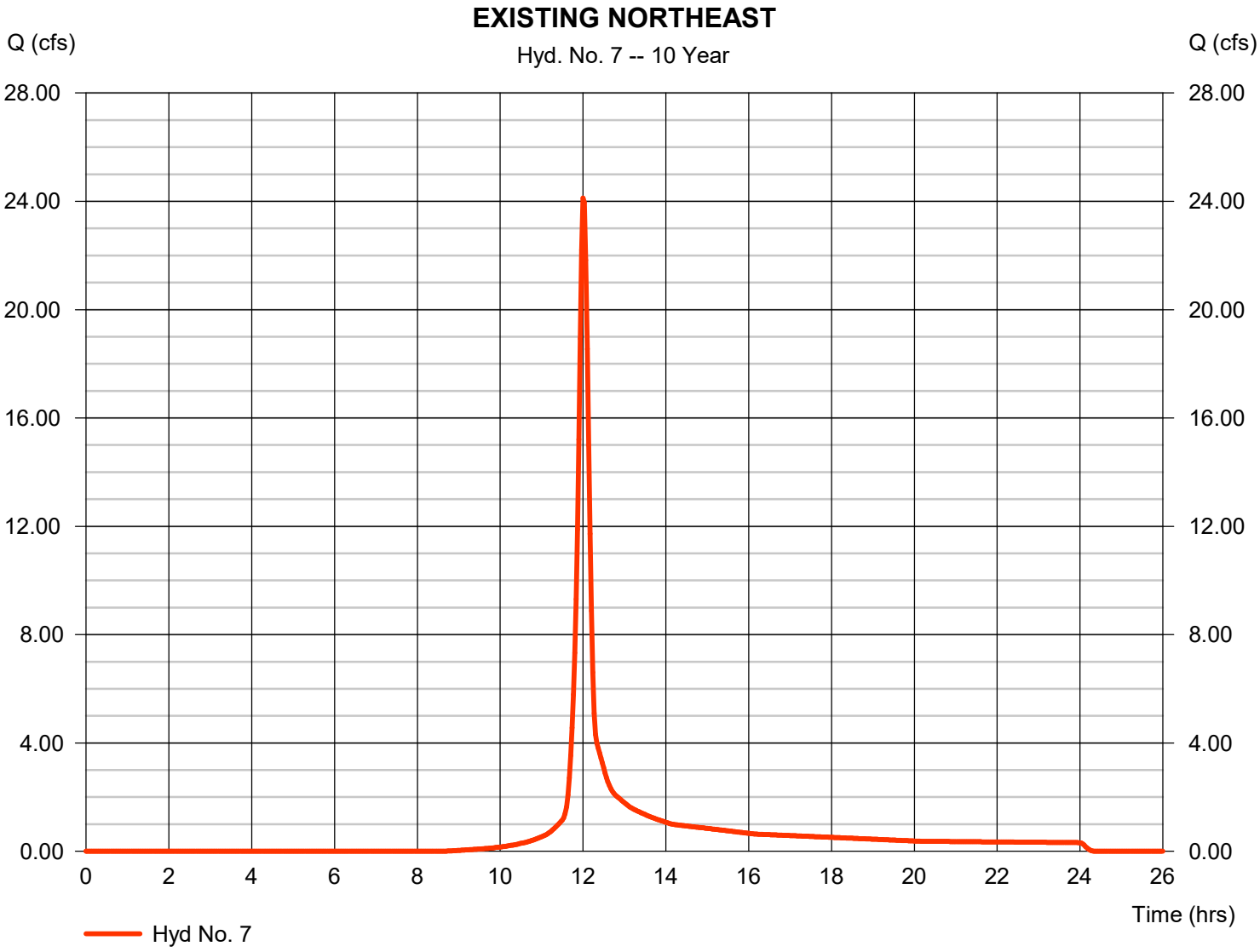


Hydrograph Report

Hyd. No. 7

EXISTING NORTHEAST

Hydrograph type	= SCS Runoff	Peak discharge	= 24.13 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 62,624 cuft
Drainage area	= 6.400 ac	Curve number	= 74
Basin Slope	= 4.6 %	Hydraulic length	= 647 ft
Tc method	= LAG	Time of conc. (Tc)	= 12.50 min
Total precip.	= 5.31 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

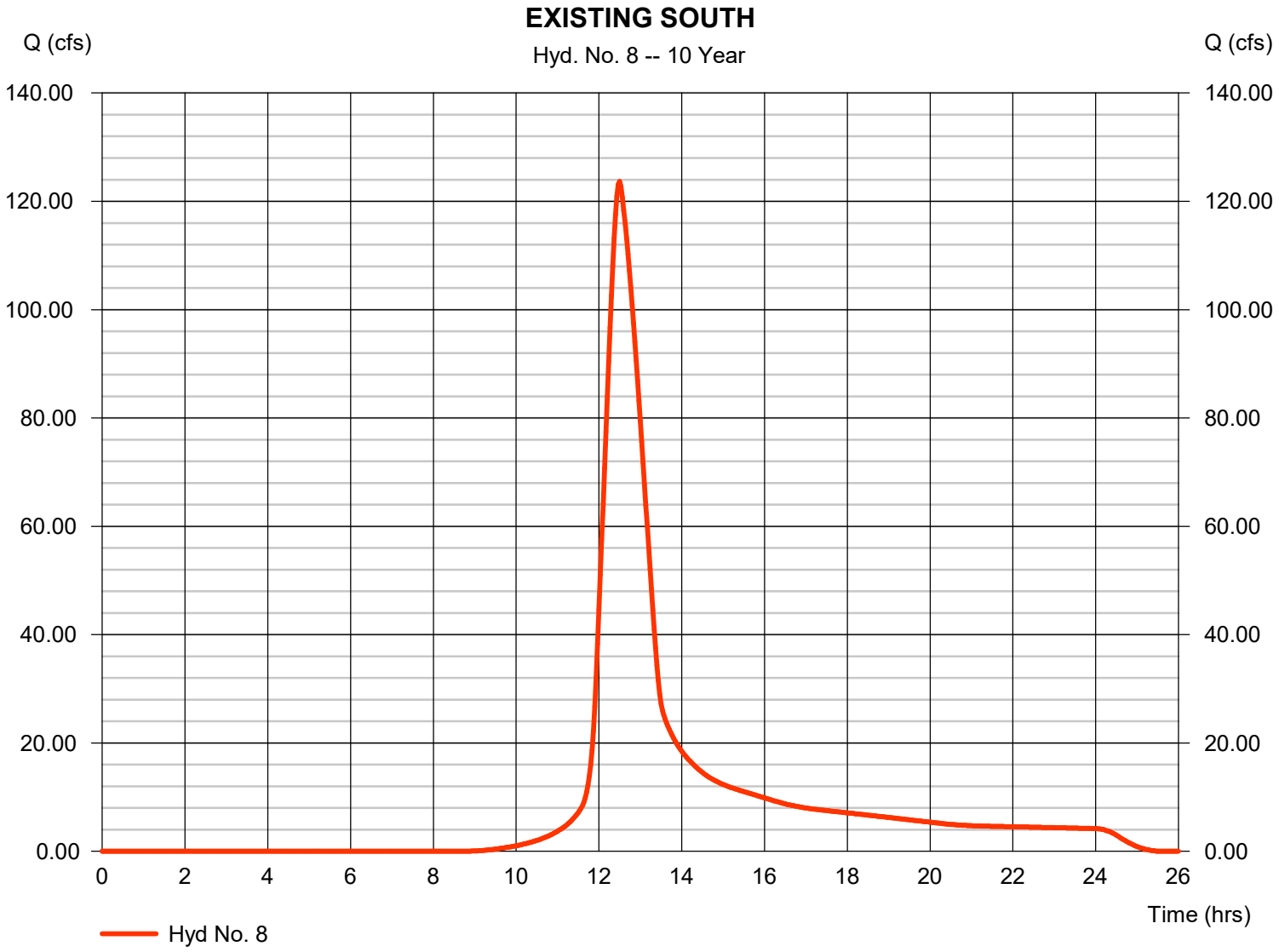


Hydrograph Report

Hyd. No. 8

EXISTING SOUTH

Hydrograph type	=	SCS Runoff	Peak discharge	=	123.67 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.50 hrs
Time interval	=	2 min	Hyd. volume	=	806,242 cuft
Drainage area	=	84.970 ac	Curve number	=	74
Basin Slope	=	2.8 %	Hydraulic length	=	3309 ft
Tc method	=	LAG	Time of conc. (Tc)	=	59.20 min
Total precip.	=	5.31 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

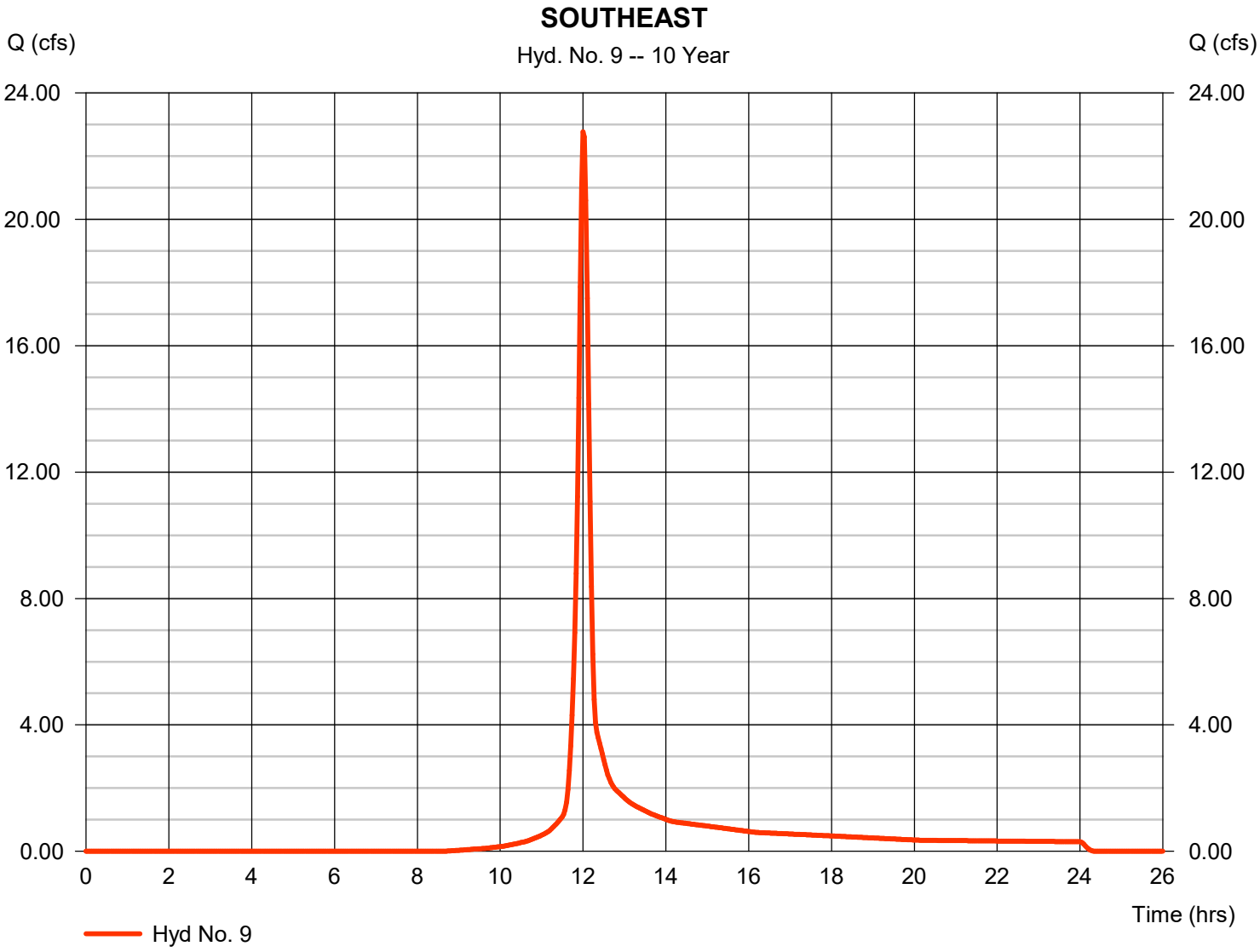


Hydrograph Report

Hyd. No. 9

SOUTHEAST

Hydrograph type	=	SCS Runoff	Peak discharge	=	22.77 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	59,102 cuft
Drainage area	=	6.040 ac	Curve number	=	74
Basin Slope	=	4.2 %	Hydraulic length	=	519 ft
Tc method	=	LAG	Time of conc. (Tc)	=	10.90 min
Total precip.	=	5.31 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

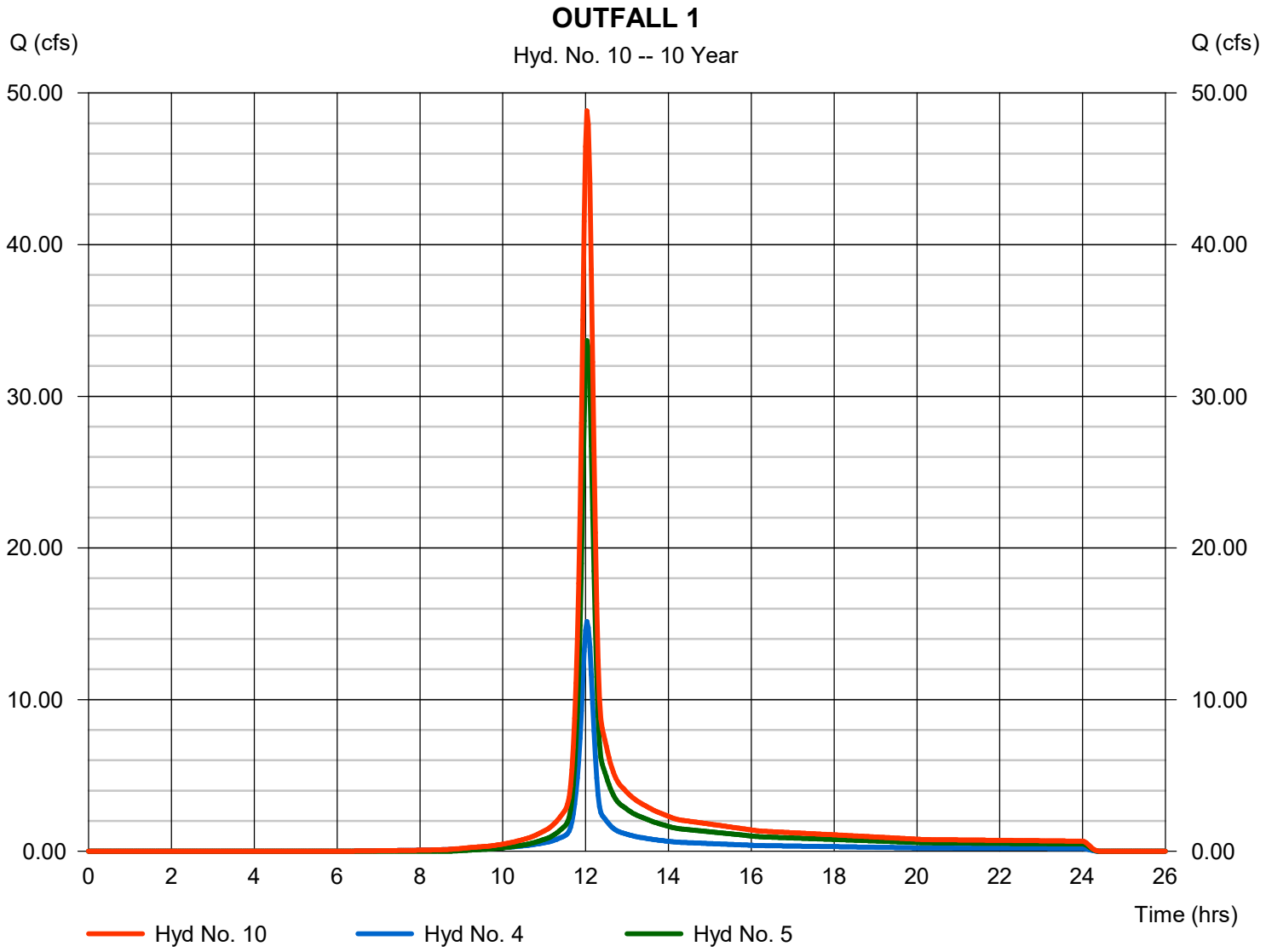


Hydrograph Report

Hyd. No. 10

OUTFALL 1

Hydrograph type	= Combine	Peak discharge	= 48.81 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 137,358 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 13.720 ac

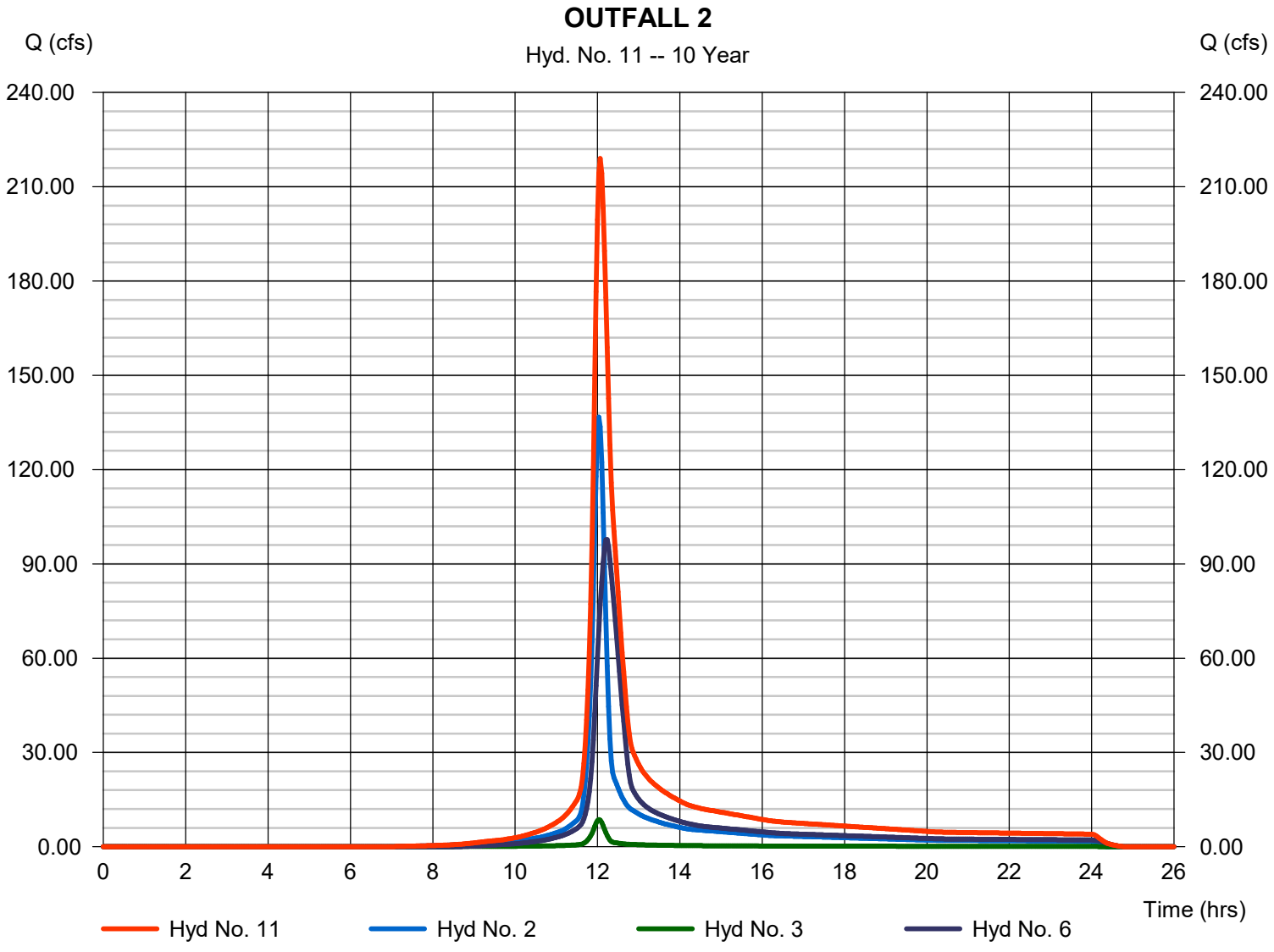


Hydrograph Report

Hyd. No. 11

OUTFALL 2

Hydrograph type	= Combine	Peak discharge	= 218.97 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 833,362 cuft
Inflow hyds.	= 2, 3, 6	Contrib. drain. area	= 79.050 ac

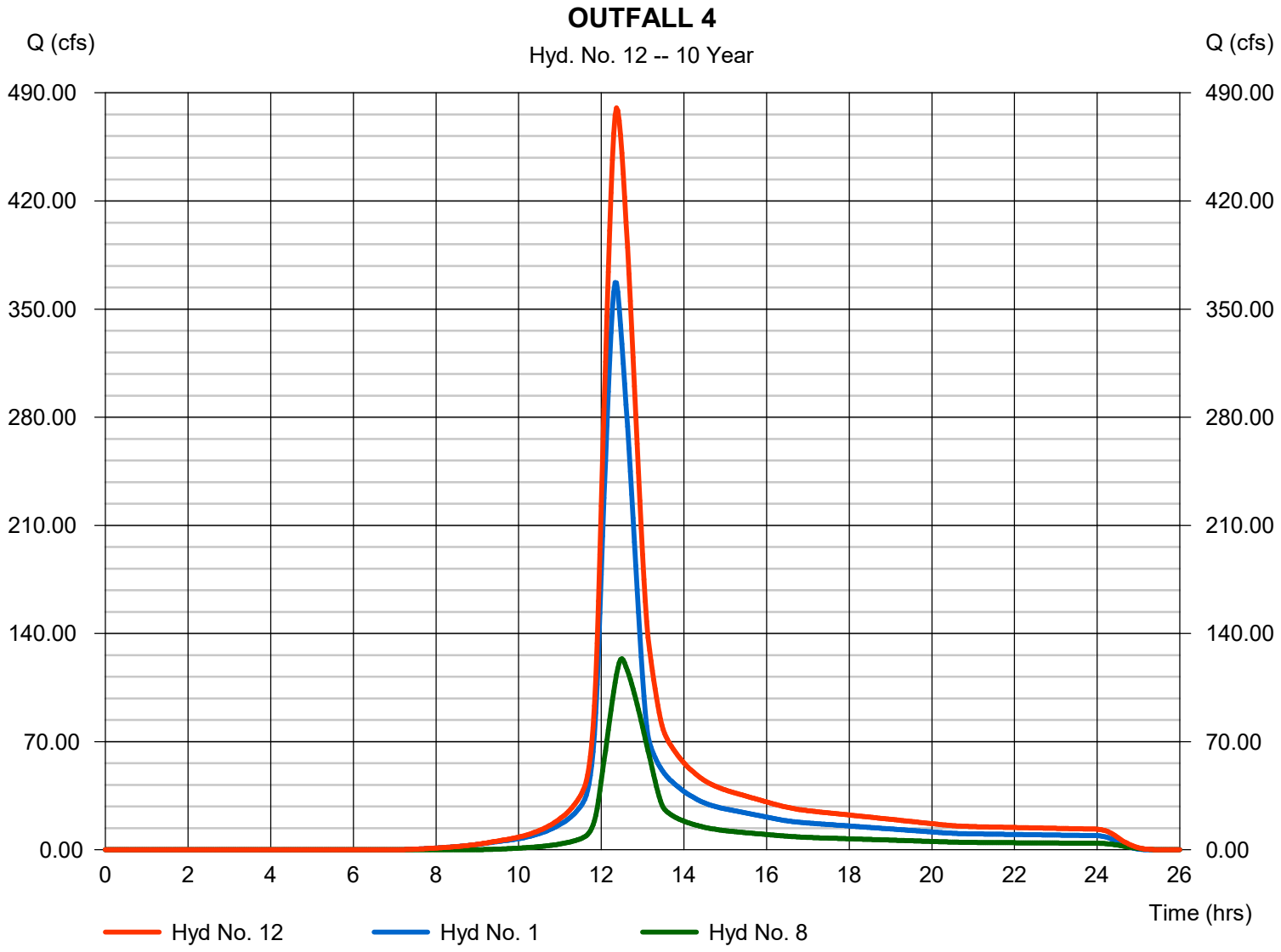


Hydrograph Report

Hyd. No. 12

OUTFALL 4

Hydrograph type	= Combine	Peak discharge	= 480.22 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 2,773,914 cuft
Inflow hyds.	= 1, 8	Contrib. drain. area	= 257.780 ac



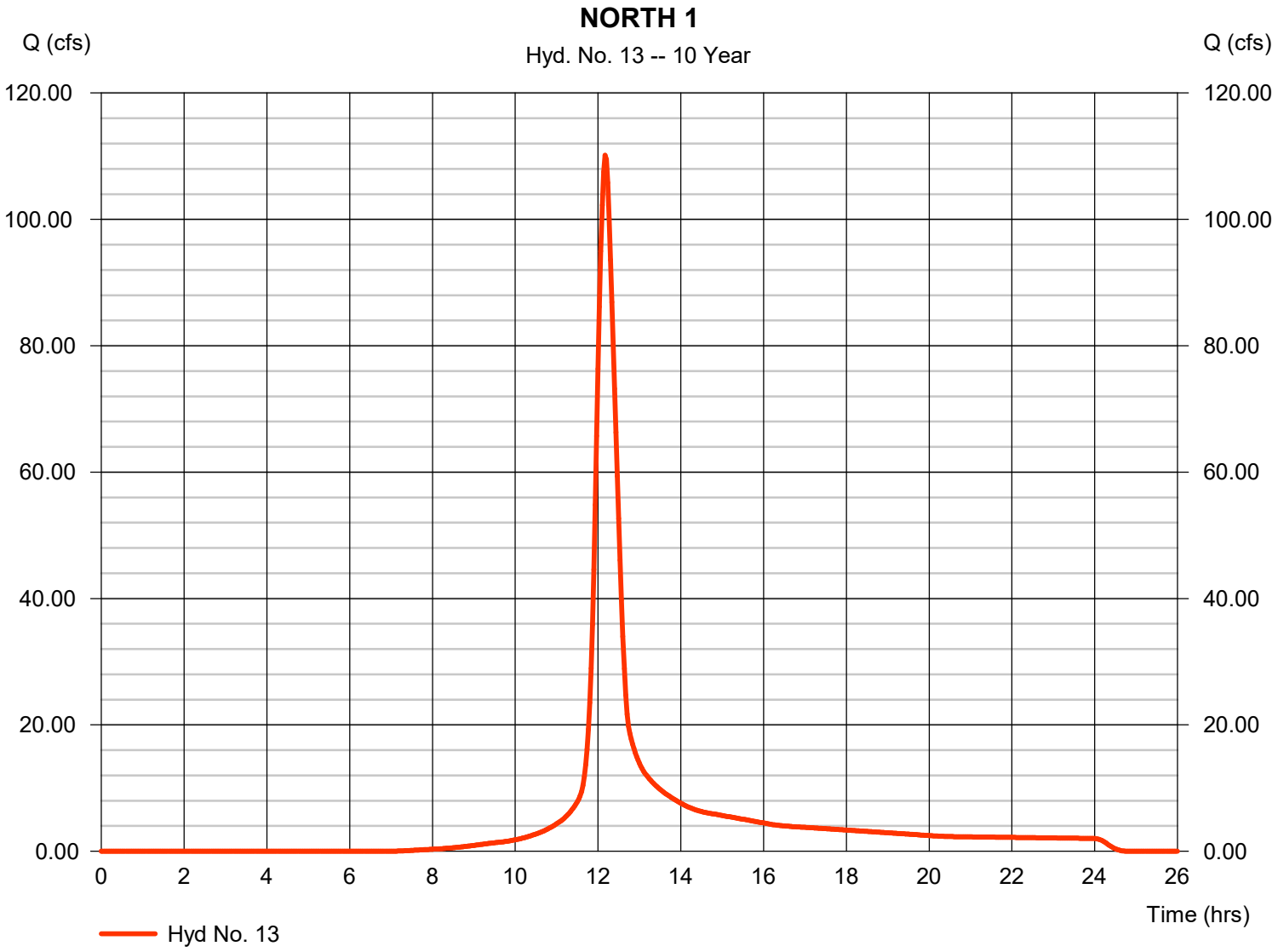
Hydrograph Report

Hyd. No. 13

NORTH 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	110.13 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.17 hrs
Time interval	=	2 min	Hyd. volume	=	440,026 cuft
Drainage area	=	38.300 ac	Curve number	=	80*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	5.31 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(18.170 x 77) + (20.130 x 83)] / 38.300

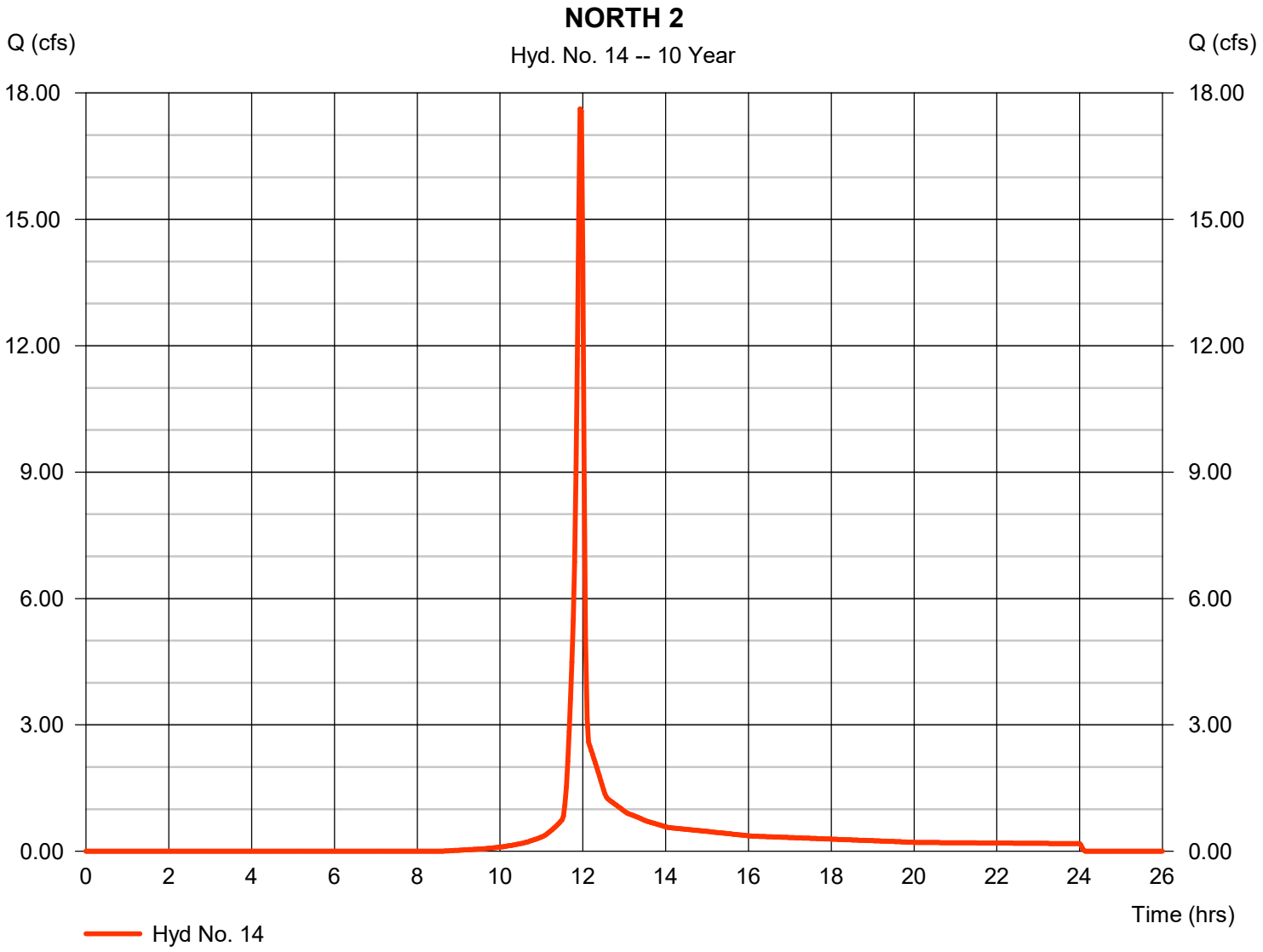


Hydrograph Report

Hyd. No. 14

NORTH 2

Hydrograph type	= SCS Runoff	Peak discharge	= 17.62 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 35,582 cuft
Drainage area	= 4.000 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.31 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

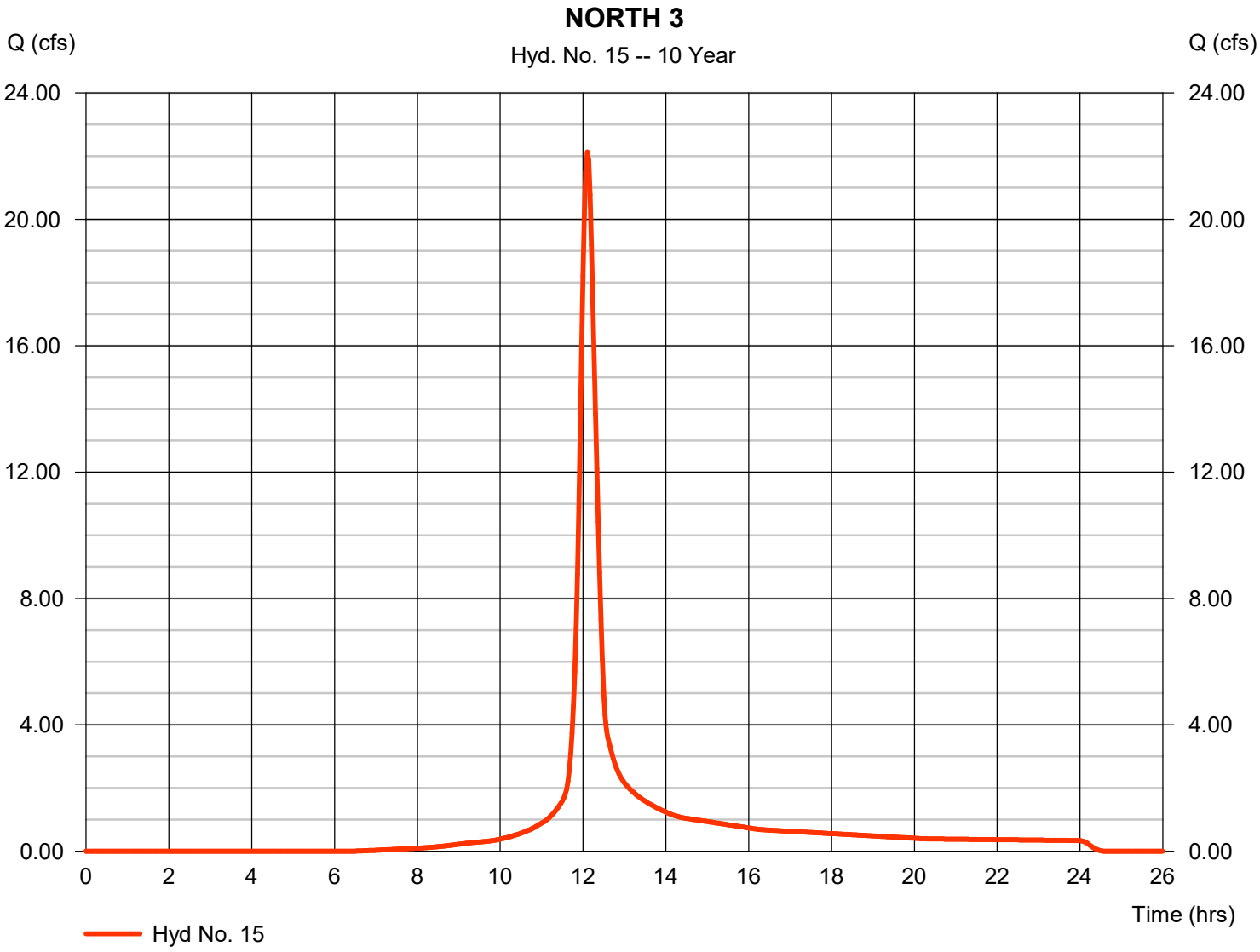


Hydrograph Report

Hyd. No. 15

NORTH 3

Hydrograph type	= SCS Runoff	Peak discharge	= 22.13 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 76,547 cuft
Drainage area	= 6.170 ac	Curve number	= 82
Basin Slope	= 1.3 %	Hydraulic length	= 785 ft
Tc method	= LAG	Time of conc. (Tc)	= 21.50 min
Total precip.	= 5.31 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

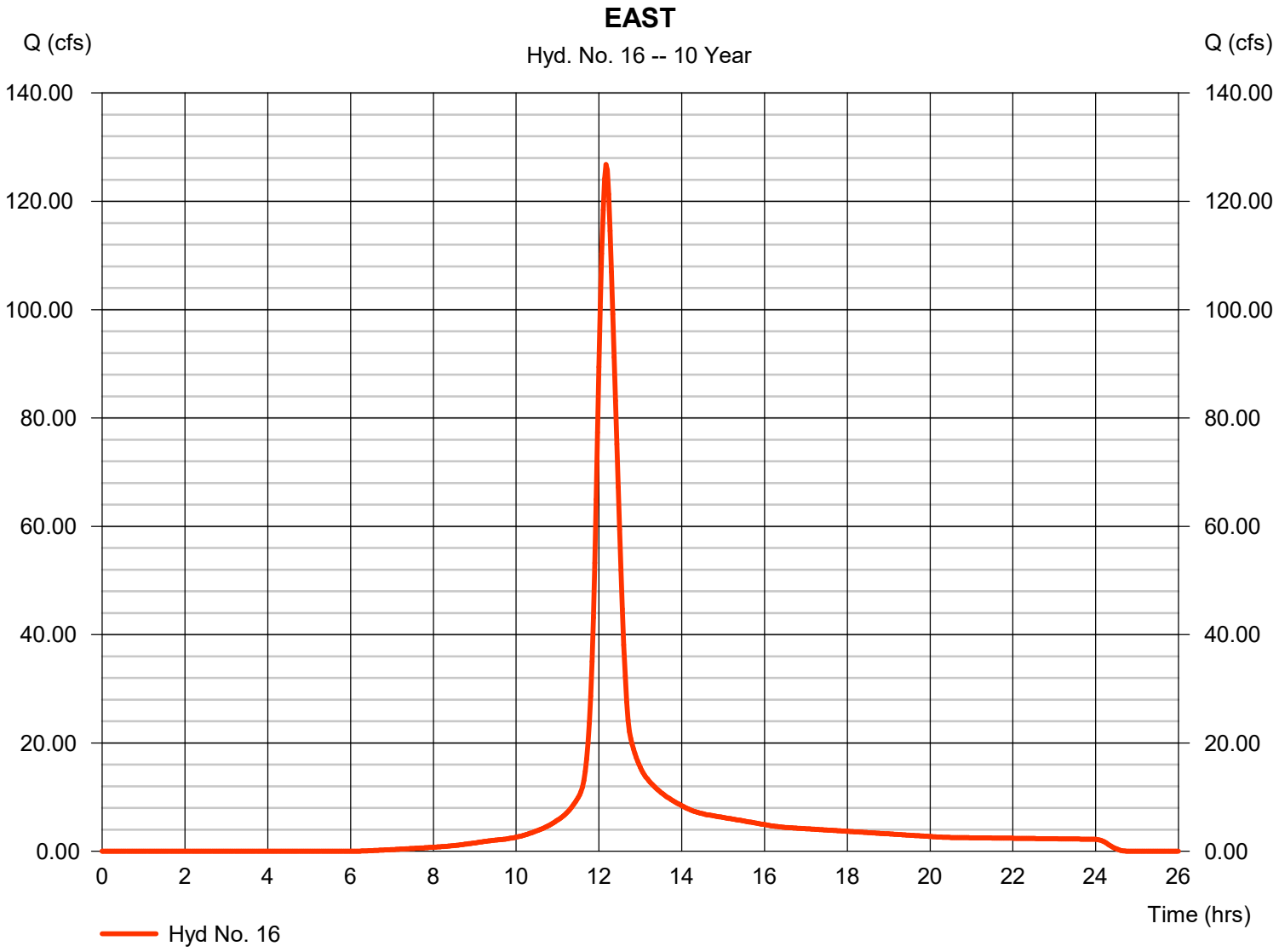


Hydrograph Report

Hyd. No. 16

EAST

Hydrograph type	=	SCS Runoff	Peak discharge	=	126.81 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.17 hrs
Time interval	=	2 min	Hyd. volume	=	507,819 cuft
Drainage area	=	40.480 ac	Curve number	=	83
Basin Slope	=	3.1 %	Hydraulic length	=	2131 ft
Tc method	=	LAG	Time of conc. (Tc)	=	30.00 min
Total precip.	=	5.31 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

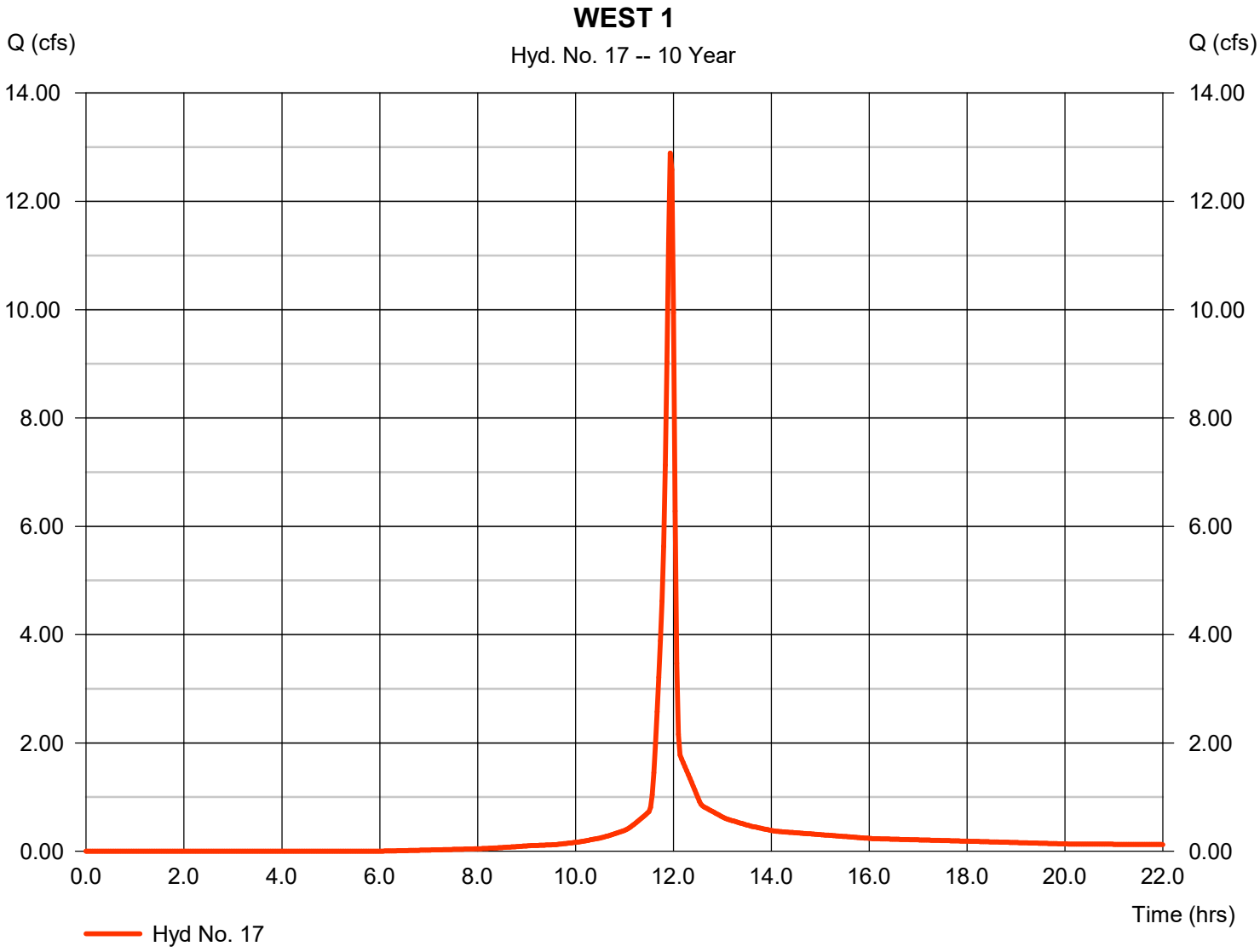


Hydrograph Report

Hyd. No. 17

WEST 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	12.89 cfs
Storm frequency	=	10 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	26,580 cuft
Drainage area	=	2.260 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.31 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

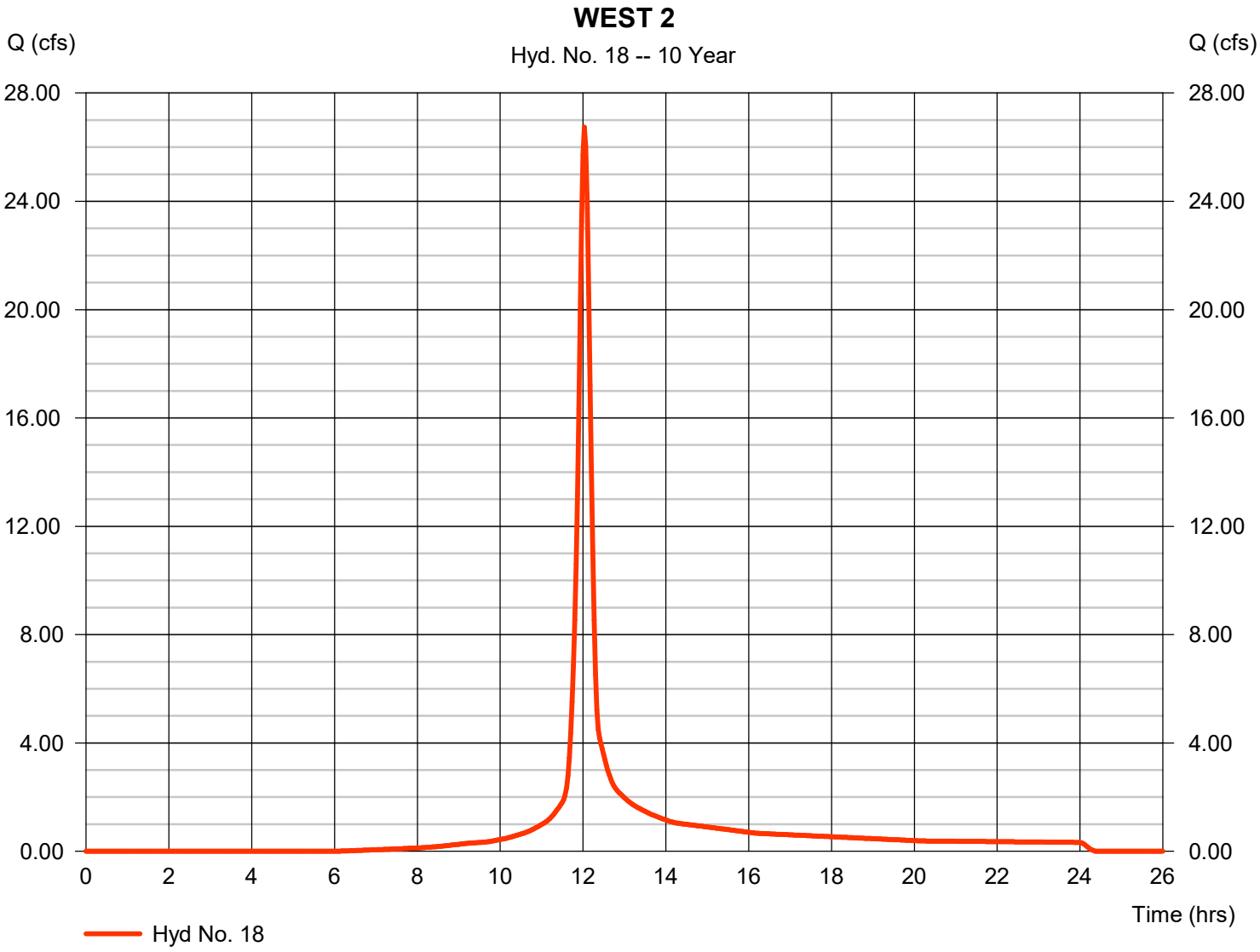


Hydrograph Report

Hyd. No. 18

WEST 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	26.74 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	75,589 cuft
Drainage area	=	6.180 ac	Curve number	=	83
Basin Slope	=	5.4 %	Hydraulic length	=	1187 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.20 min
Total precip.	=	5.31 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

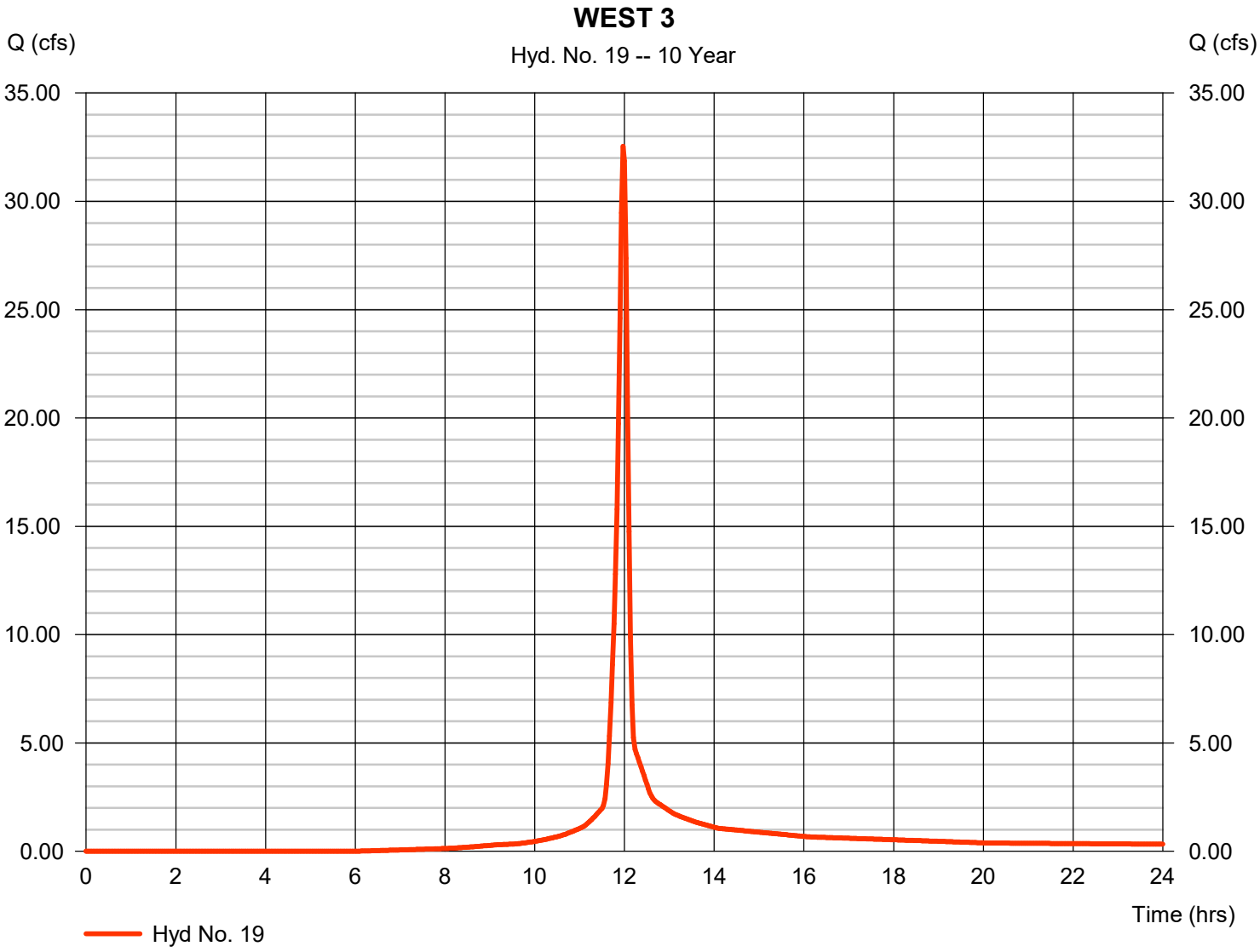


Hydrograph Report

Hyd. No. 19

WEST 3

Hydrograph type	=	SCS Runoff	Peak discharge	=	32.54 cfs
Storm frequency	=	10 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	75,521 cuft
Drainage area	=	6.020 ac	Curve number	=	83
Basin Slope	=	6.2 %	Hydraulic length	=	806 ft
Tc method	=	LAG	Time of conc. (Tc)	=	9.70 min
Total precip.	=	5.31 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



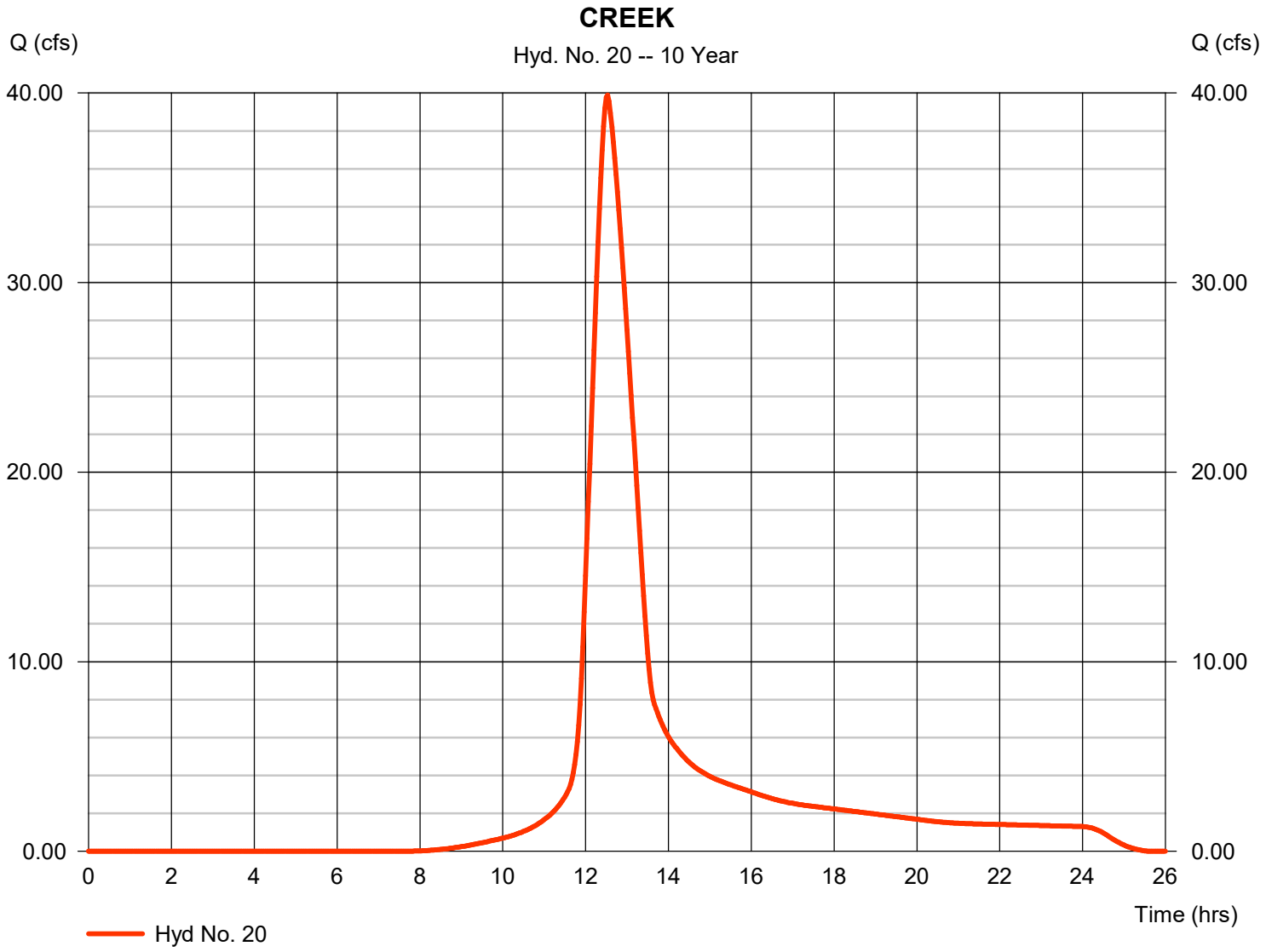
Hydrograph Report

Hyd. No. 20

CREEK

Hydrograph type	=	SCS Runoff	Peak discharge	=	39.89 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.53 hrs
Time interval	=	2 min	Hyd. volume	=	269,310 cuft
Drainage area	=	24.760 ac	Curve number	=	78*
Basin Slope	=	1.6 %	Hydraulic length	=	2986 ft
Tc method	=	LAG	Time of conc. (Tc)	=	64.20 min
Total precip.	=	5.31 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(4.400 x 94) + (20.360 x 74)] / 24.760

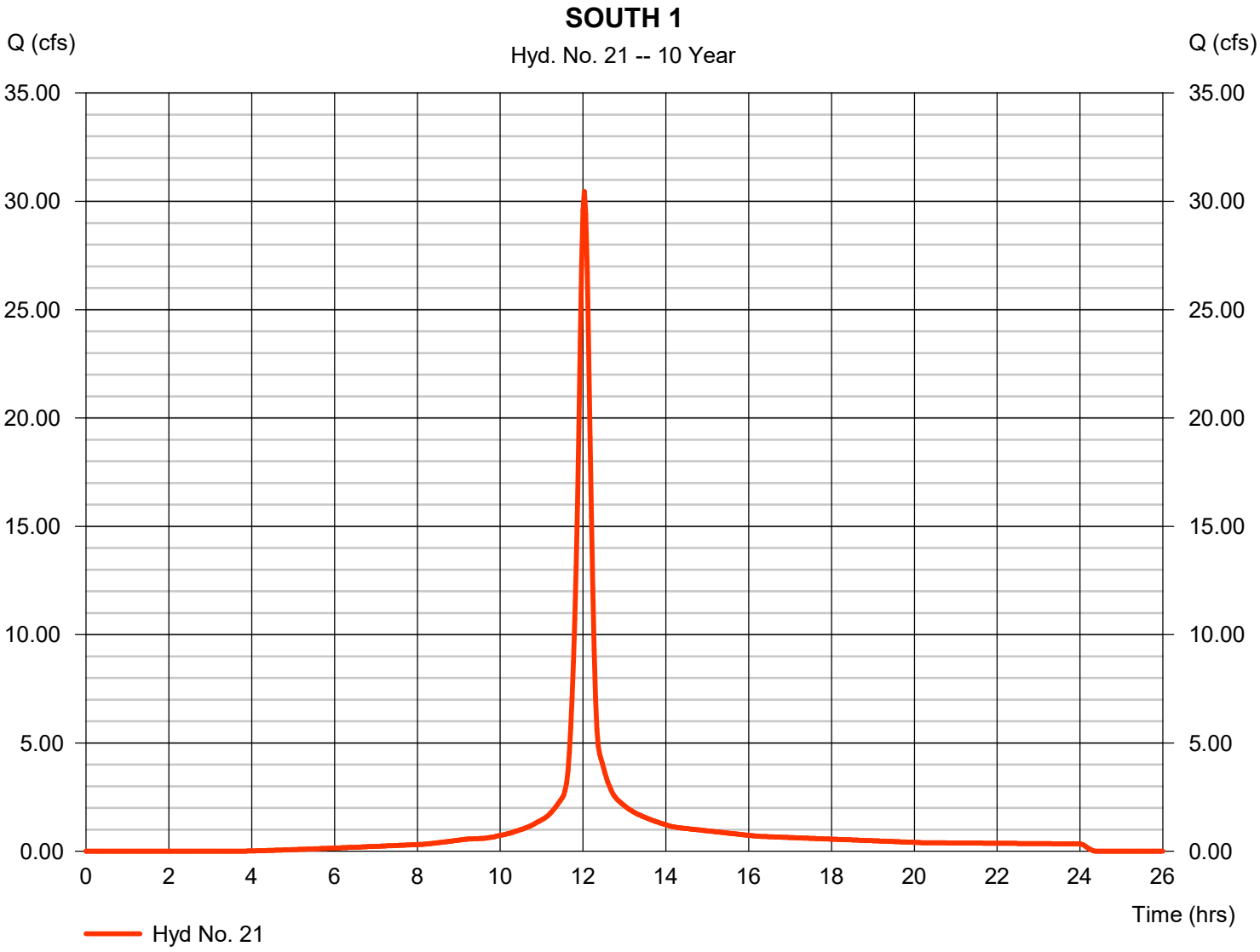


Hydrograph Report

Hyd. No. 21

SOUTH 1

Hydrograph type	= SCS Runoff	Peak discharge	= 30.45 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 89,119 cuft
Drainage area	= 6.030 ac	Curve number	= 90
Basin Slope	= 1.3 %	Hydraulic length	= 780 ft
Tc method	= LAG	Time of conc. (Tc)	= 16.00 min
Total precip.	= 5.31 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

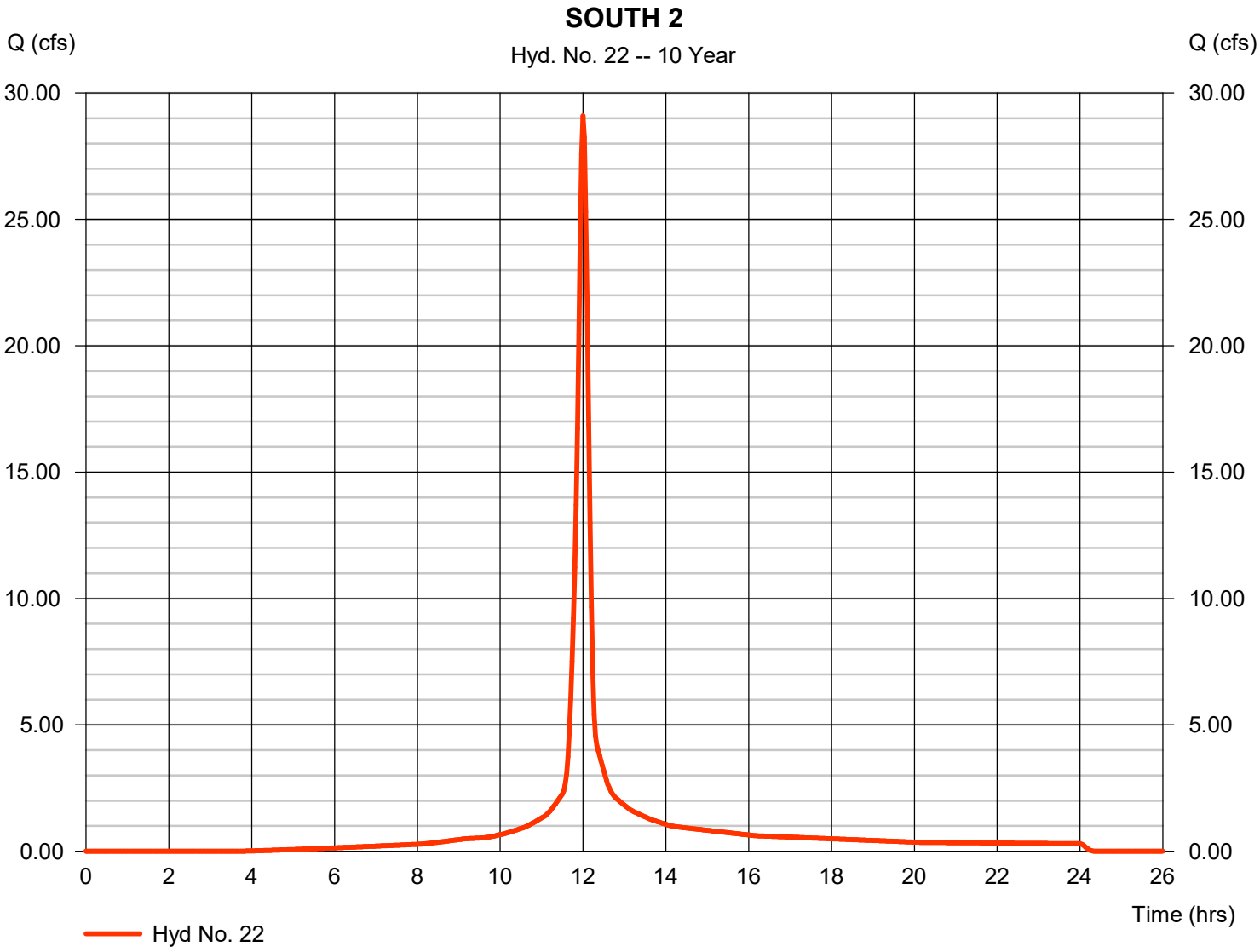


Hydrograph Report

Hyd. No. 22

SOUTH 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	29.10 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	78,941 cuft
Drainage area	=	5.050 ac	Curve number	=	90
Basin Slope	=	2.2 %	Hydraulic length	=	717 ft
Tc method	=	LAG	Time of conc. (Tc)	=	11.50 min
Total precip.	=	5.31 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

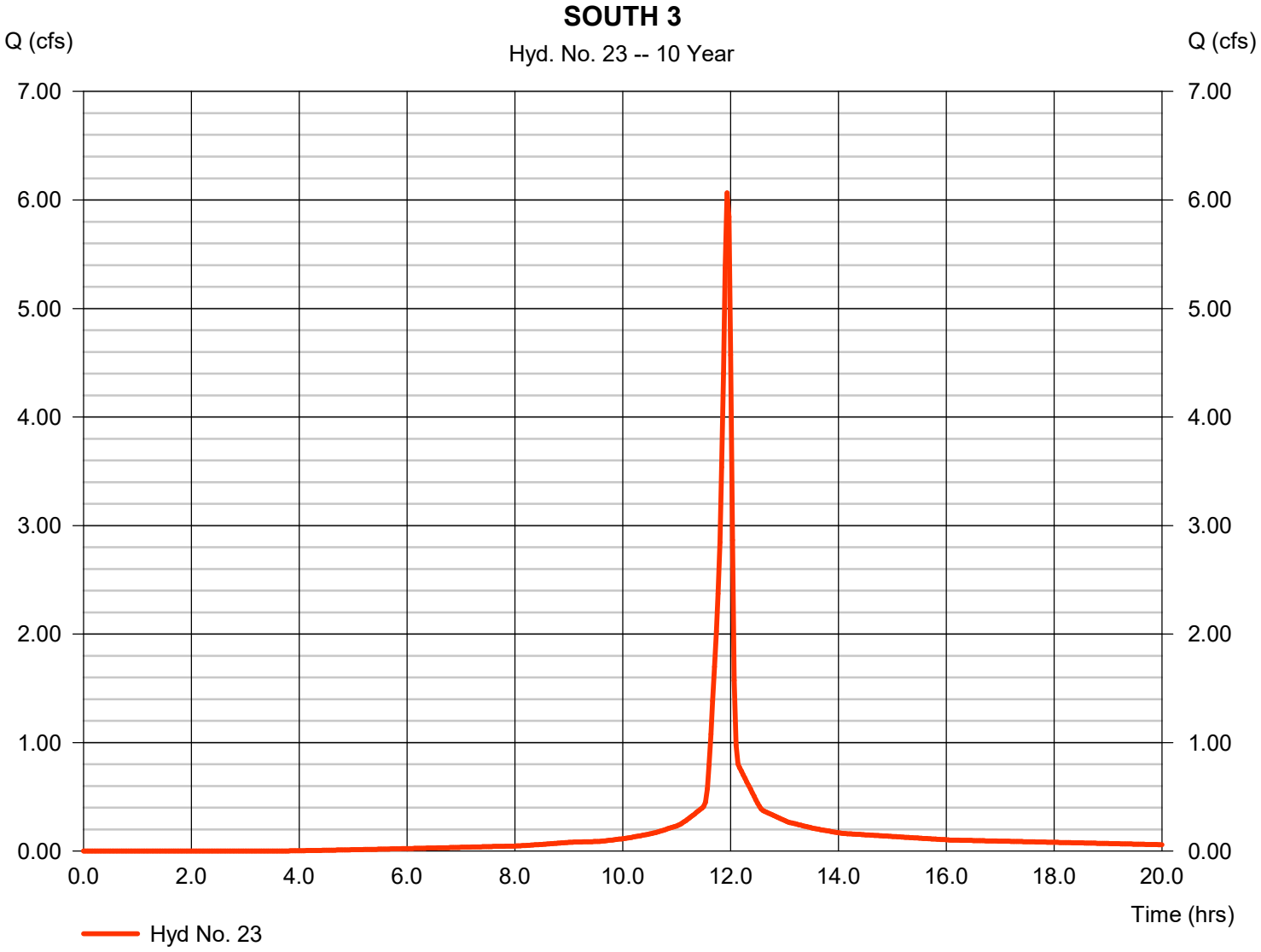


Hydrograph Report

Hyd. No. 23

SOUTH 3

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.065 cfs
Storm frequency	=	10 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	13,074 cuft
Drainage area	=	0.920 ac	Curve number	=	90
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.31 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



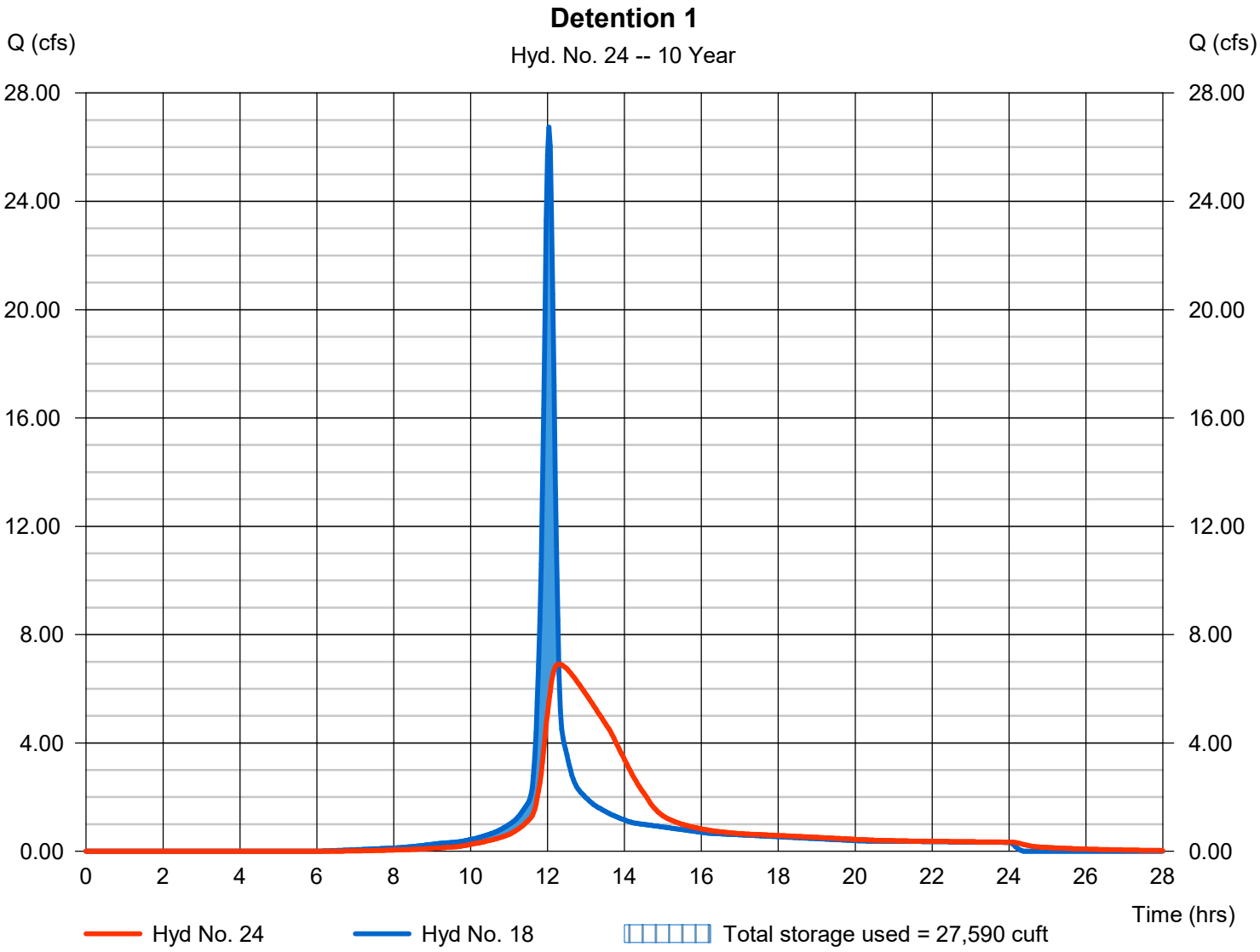
Hydrograph Report

Hyd. No. 24

Detention 1

Hydrograph type	=	Reservoir	Peak discharge	=	6.917 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.30 hrs
Time interval	=	2 min	Hyd. volume	=	75,583 cuft
Inflow hyd. No.	=	18 - WEST 2	Max. Elevation	=	866.17 ft
Reservoir name	=	Detention 1	Max. Storage	=	27,590 cuft

Storage Indication method used.



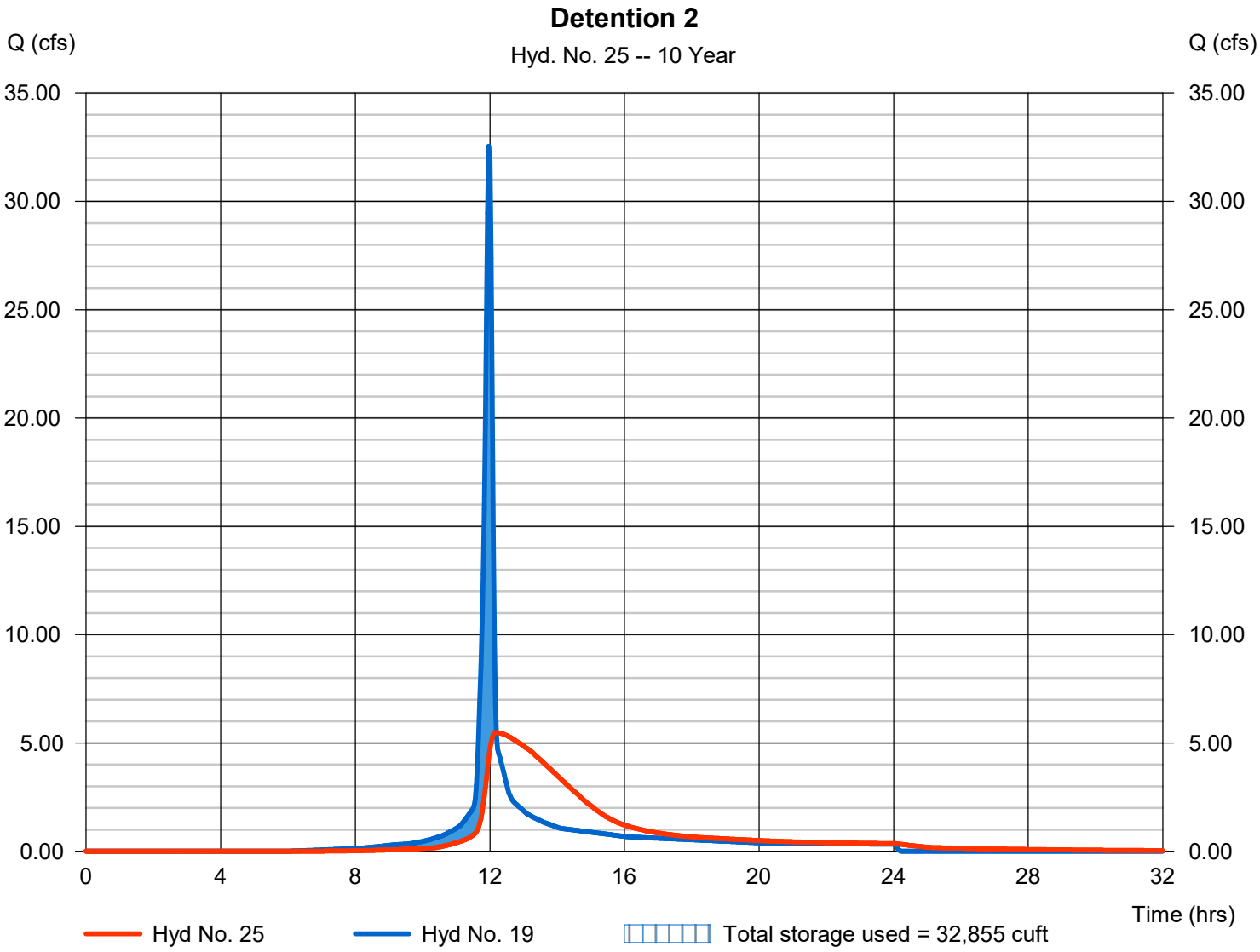
Hydrograph Report

Hyd. No. 25

Detention 2

Hydrograph type	=	Reservoir	Peak discharge	=	5.479 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.20 hrs
Time interval	=	2 min	Hyd. volume	=	75,507 cuft
Inflow hyd. No.	=	19 - WEST 3	Max. Elevation	=	858.60 ft
Reservoir name	=	Detention 2	Max. Storage	=	32,855 cuft

Storage Indication method used.



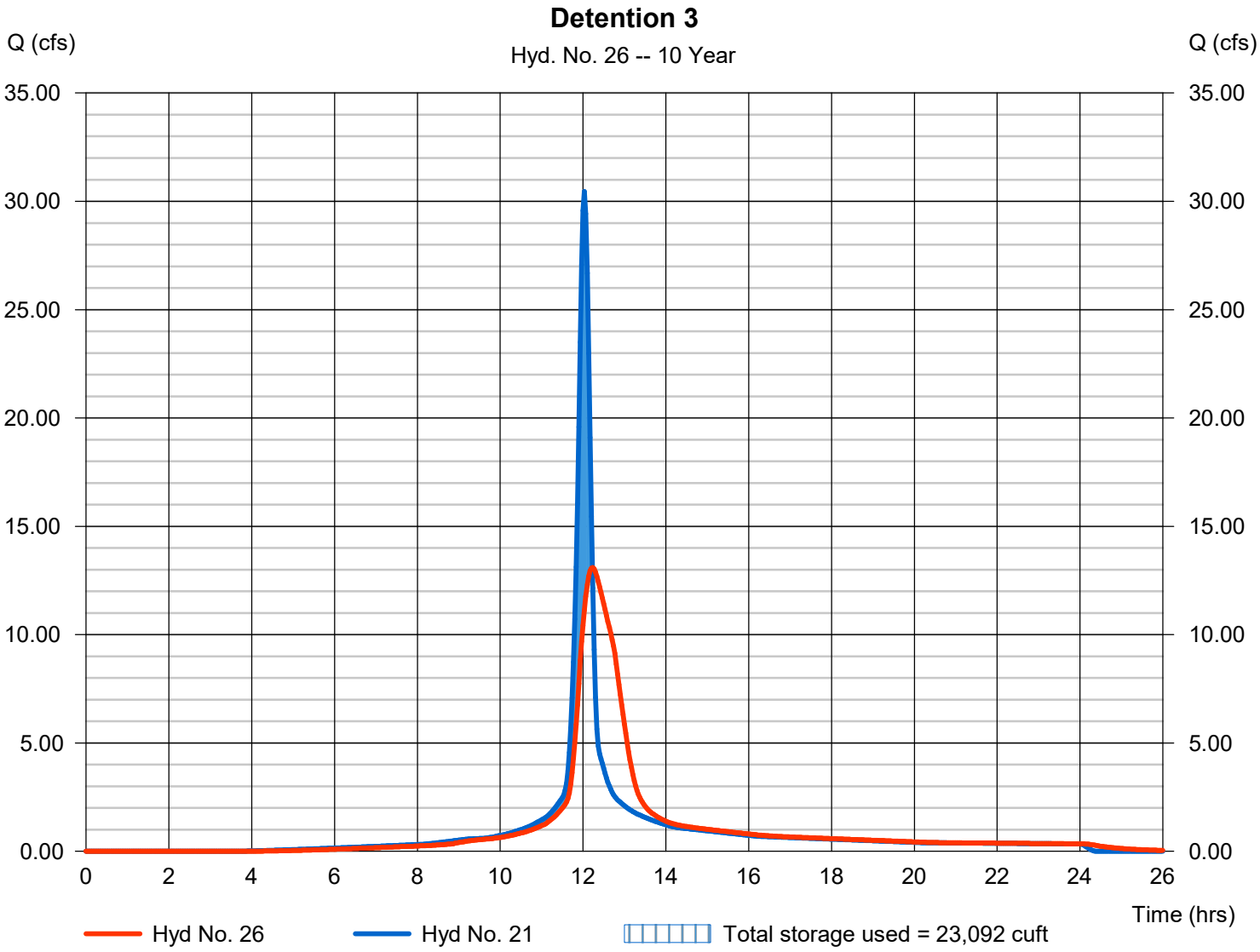
Hydrograph Report

Hyd. No. 26

Detention 3

Hydrograph type	=	Reservoir	Peak discharge	=	13.10 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.23 hrs
Time interval	=	2 min	Hyd. volume	=	89,116 cuft
Inflow hyd. No.	=	21 - SOUTH 1	Max. Elevation	=	857.50 ft
Reservoir name	=	Detention 3	Max. Storage	=	23,092 cuft

Storage Indication method used.



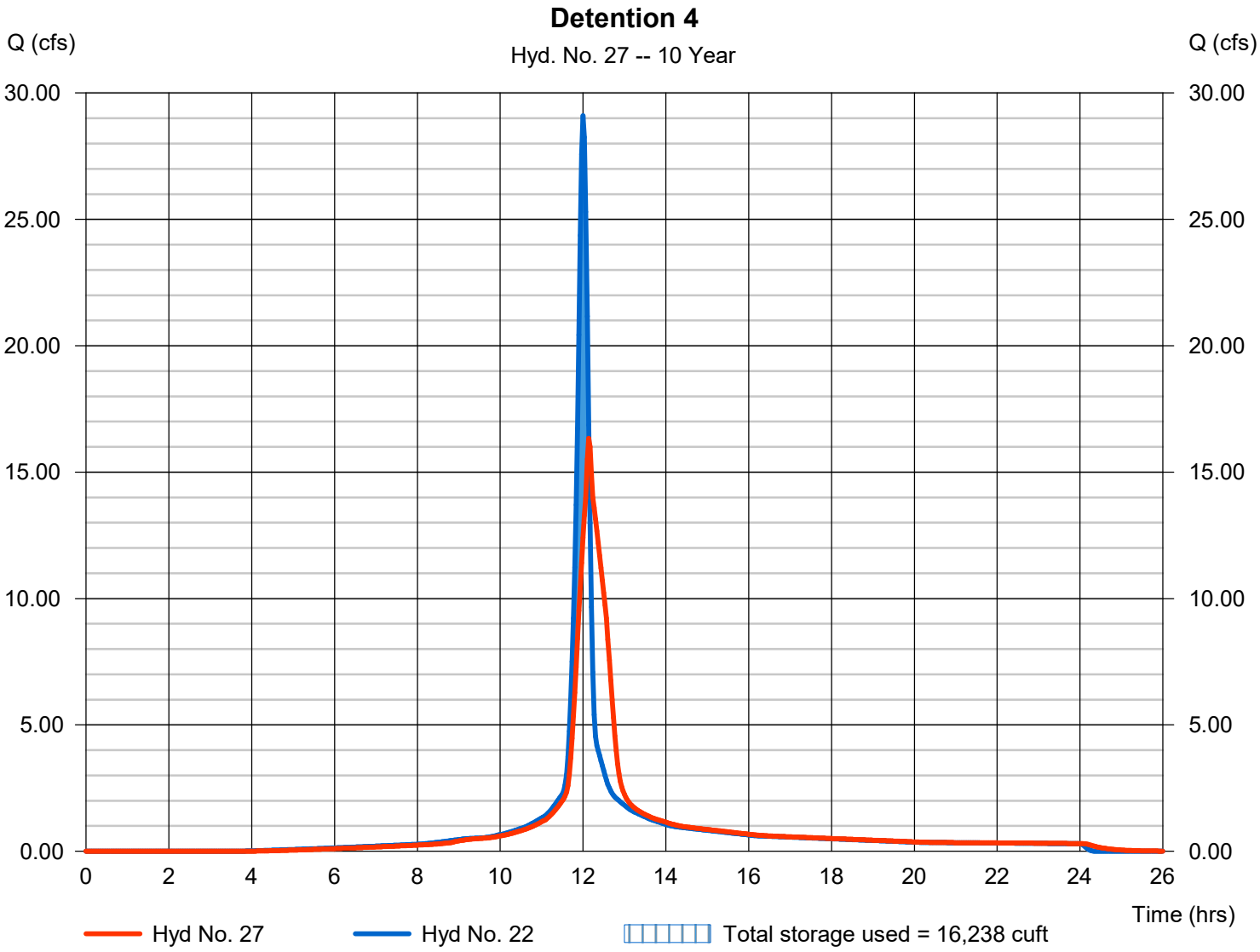
Hydrograph Report

Hyd. No. 27

Detention 4

Hydrograph type	=	Reservoir	Peak discharge	=	16.33 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.13 hrs
Time interval	=	2 min	Hyd. volume	=	78,939 cuft
Inflow hyd. No.	=	22 - SOUTH 2	Max. Elevation	=	854.14 ft
Reservoir name	=	Detention 4	Max. Storage	=	16,238 cuft

Storage Indication method used.



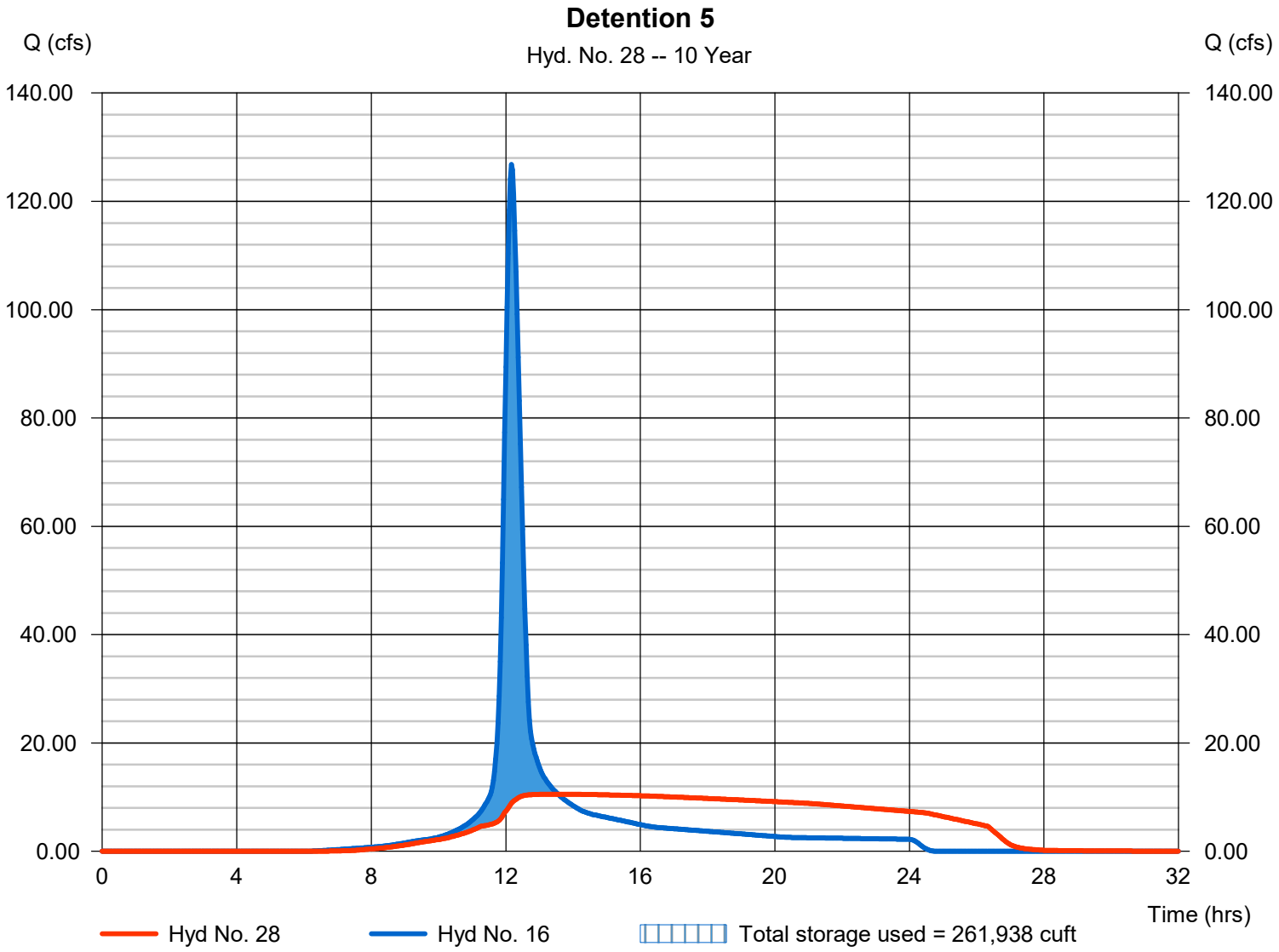
Hydrograph Report

Hyd. No. 28

Detention 5

Hydrograph type	=	Reservoir	Peak discharge	=	10.54 cfs
Storm frequency	=	10 yrs	Time to peak	=	13.57 hrs
Time interval	=	2 min	Hyd. volume	=	507,813 cuft
Inflow hyd. No.	=	16 - EAST	Max. Elevation	=	854.52 ft
Reservoir name	=	Detention 5	Max. Storage	=	261,938 cuft

Storage Indication method used.



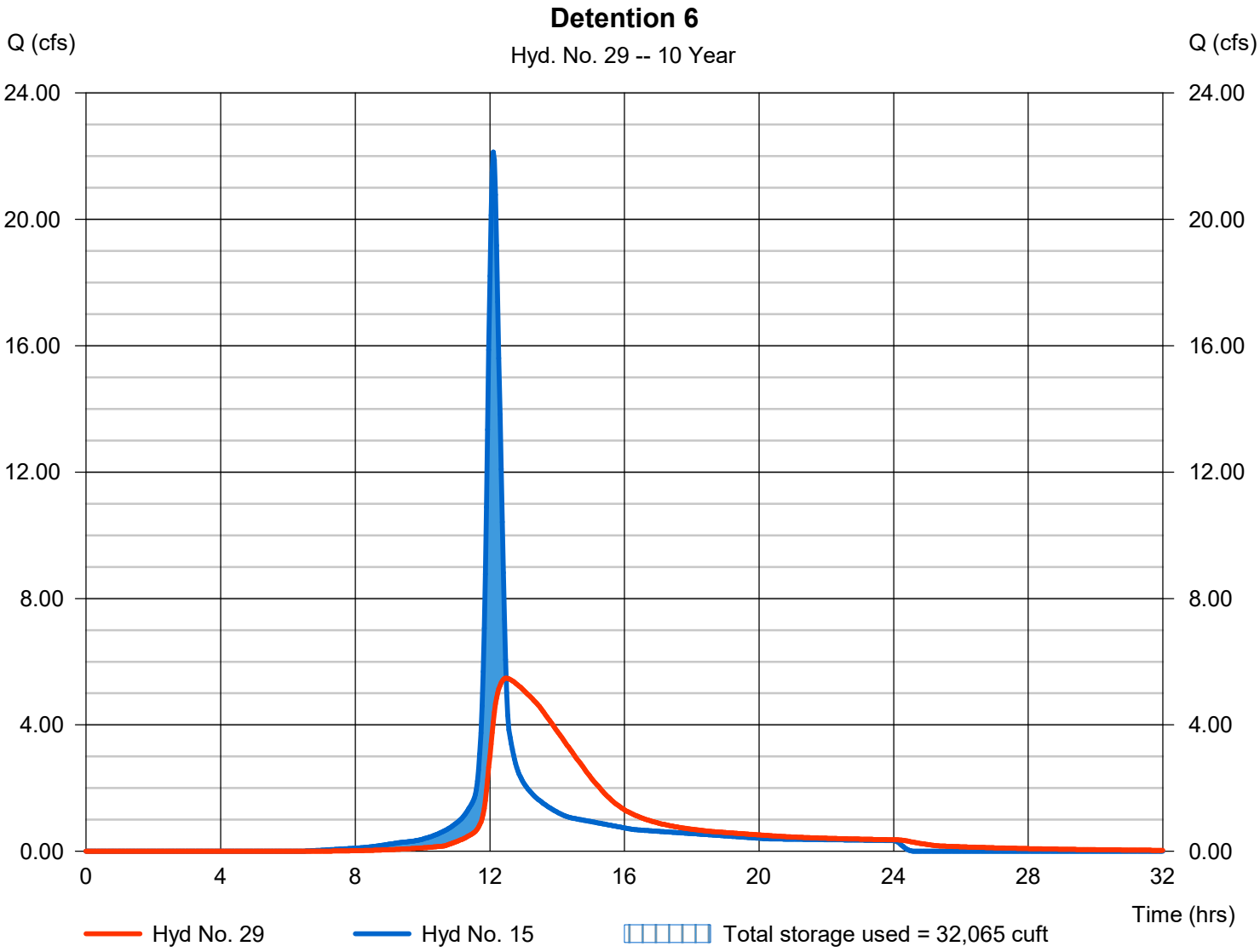
Hydrograph Report

Hyd. No. 29

Detention 6

Hydrograph type	=	Reservoir	Peak discharge	=	5.482 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.50 hrs
Time interval	=	2 min	Hyd. volume	=	76,534 cuft
Inflow hyd. No.	=	15 - NORTH 3	Max. Elevation	=	874.60 ft
Reservoir name	=	Detention 6	Max. Storage	=	32,065 cuft

Storage Indication method used.

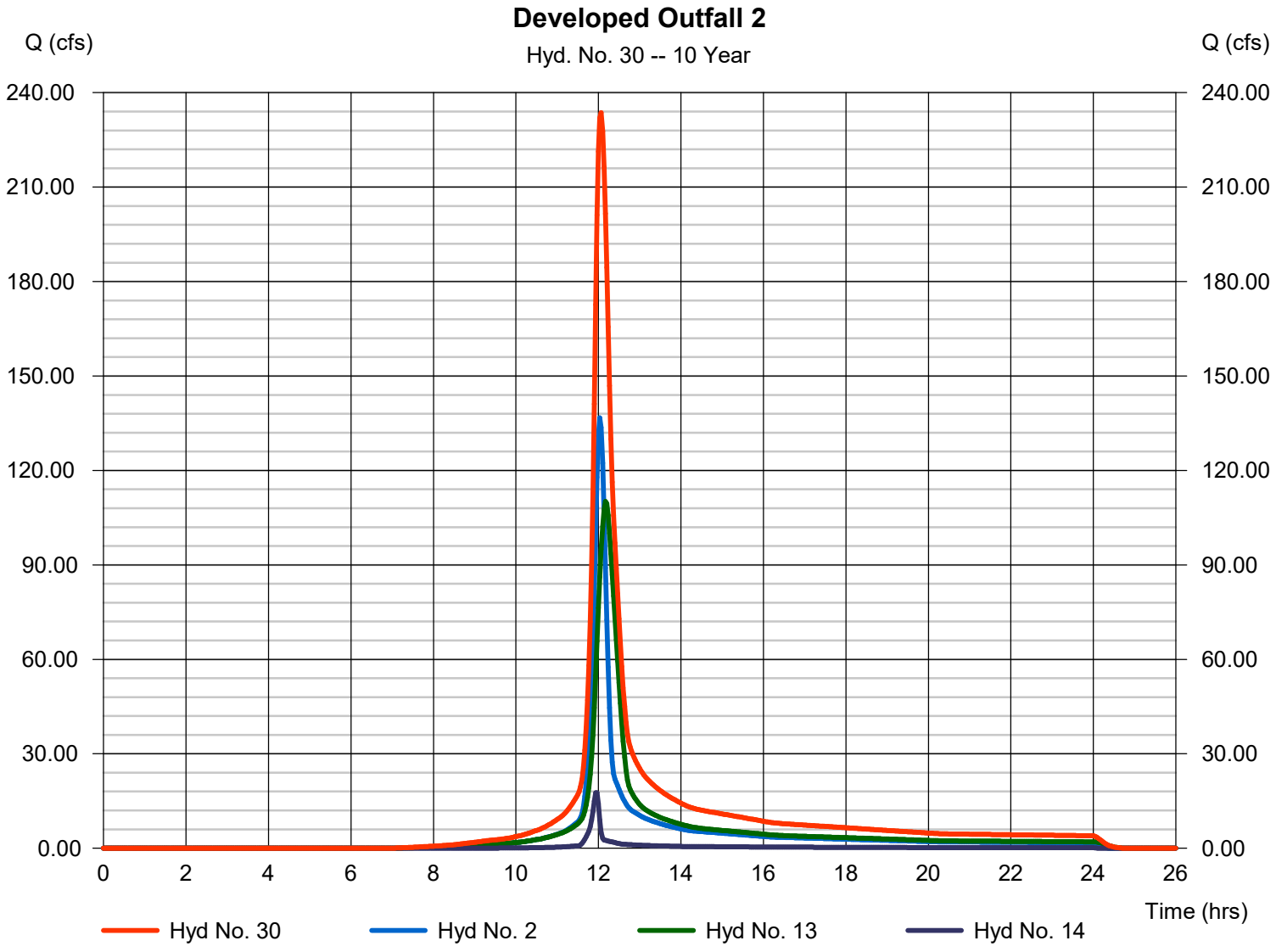


Hydrograph Report

Hyd. No. 30

Developed Outfall 2

Hydrograph type	= Combine	Peak discharge	= 233.62 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 859,715 cuft
Inflow hyds.	= 2, 13, 14	Contrib. drain. area	= 76.590 ac

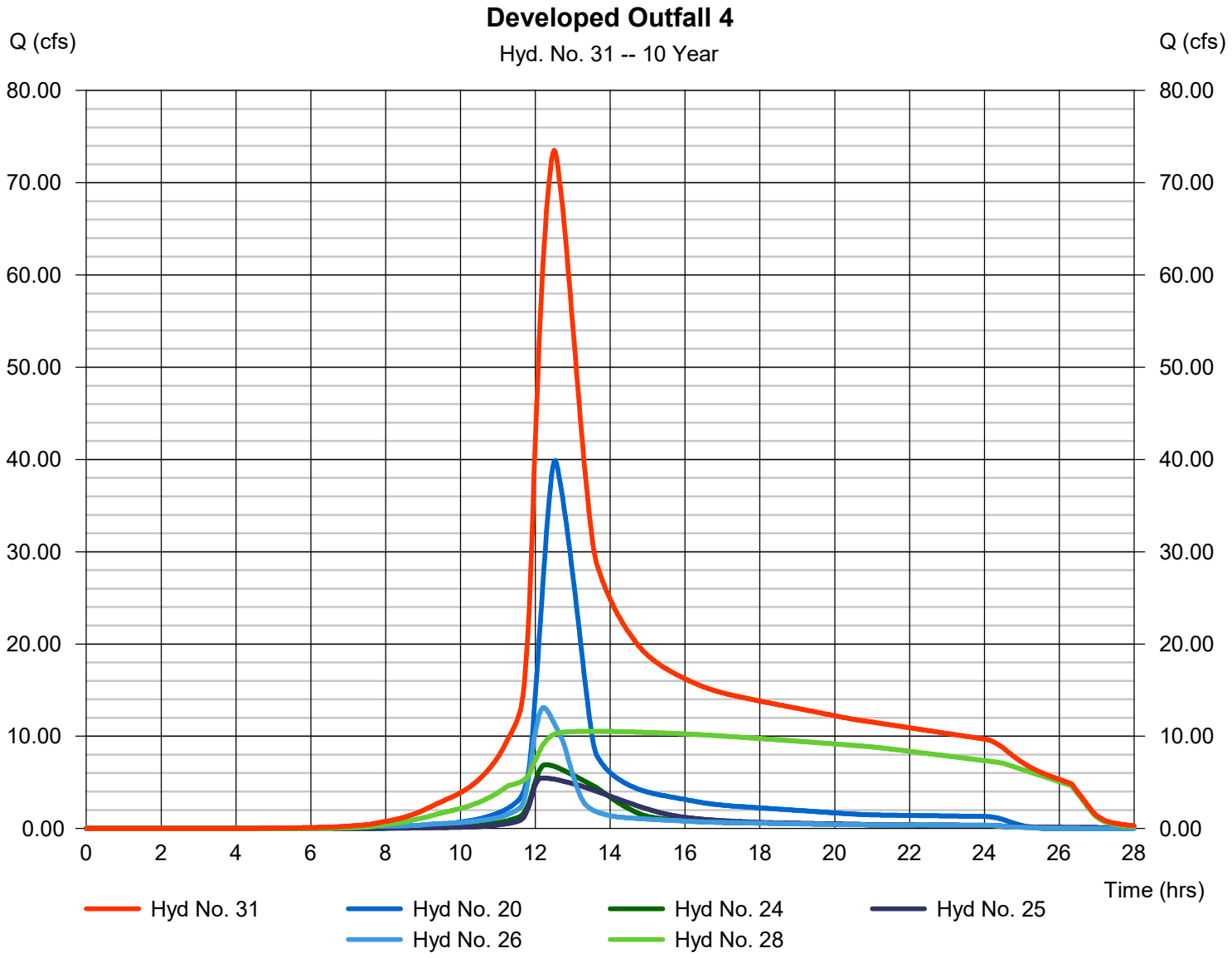


Hydrograph Report

Hyd. No. 31

Developed Outfall 4

Hydrograph type	= Combine	Peak discharge	= 73.51 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.50 hrs
Time interval	= 2 min	Hyd. volume	= 1,017,330 cuft
Inflow hyds.	= 20, 24, 25, 26, 28	Contrib. drain. area	= 24.760 ac

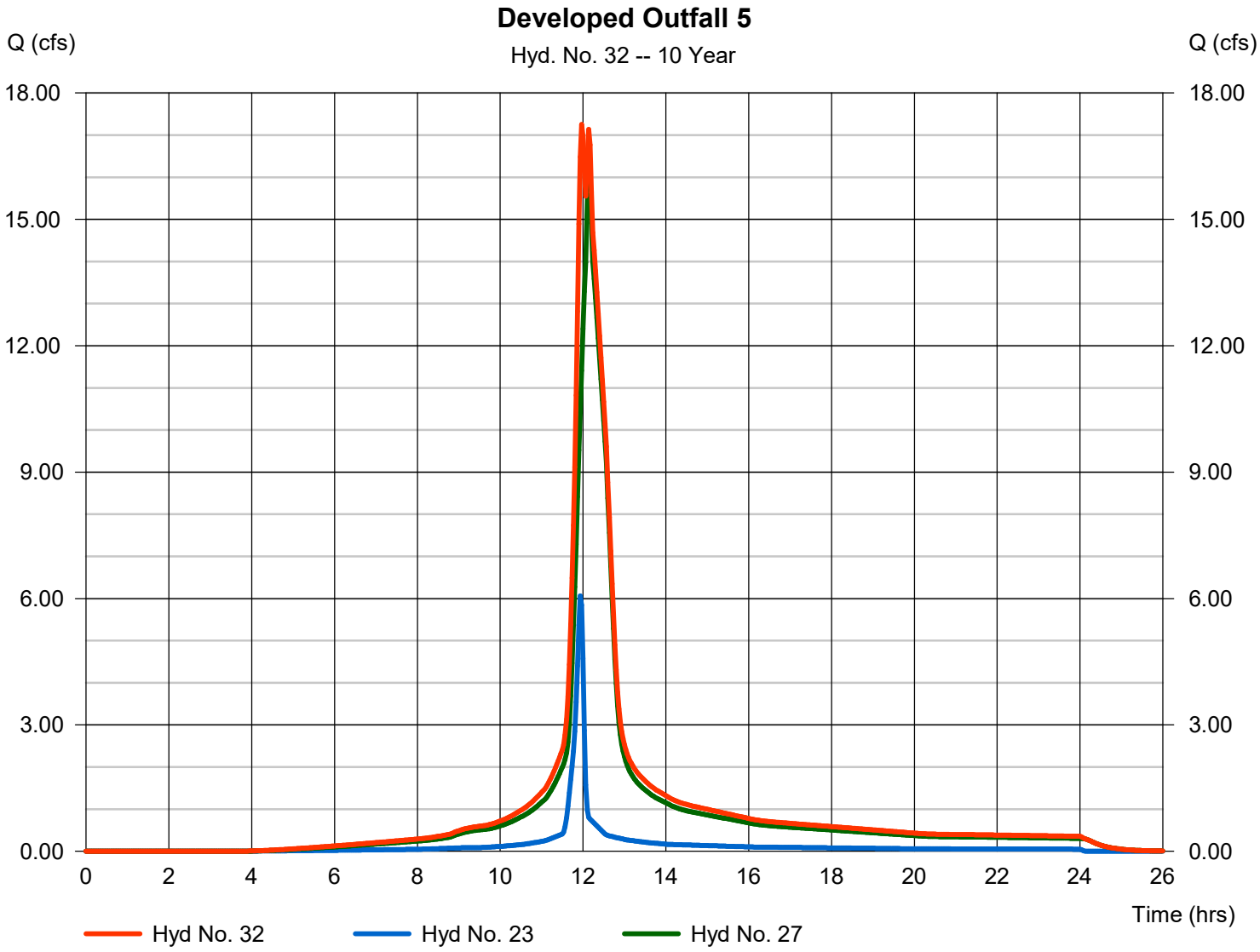


Hydrograph Report

Hyd. No. 32

Developed Outfall 5

Hydrograph type	= Combine	Peak discharge	= 17.25 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 92,014 cuft
Inflow hyds.	= 23, 27	Contrib. drain. area	= 0.920 ac

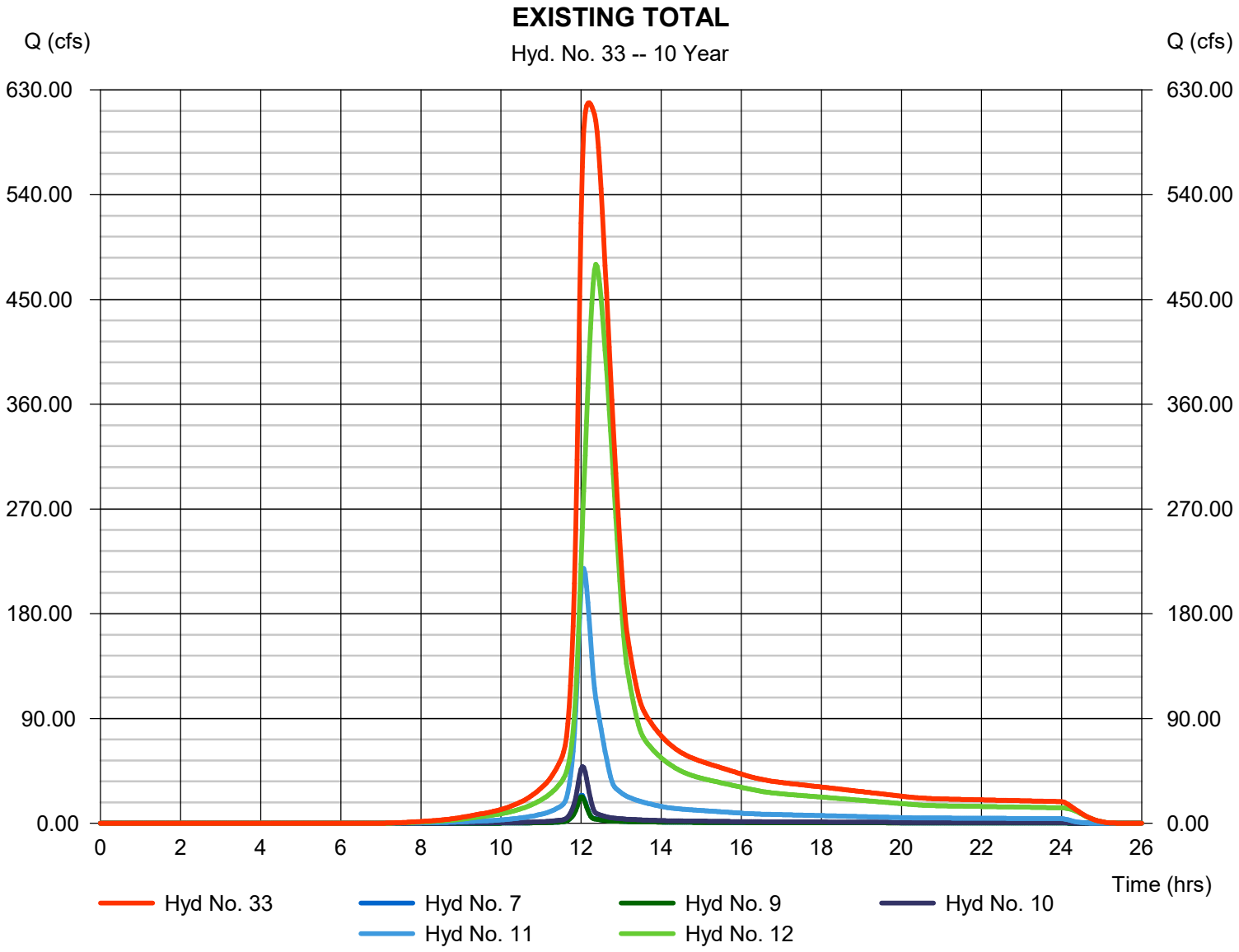


Hydrograph Report

Hyd. No. 33

EXISTING TOTAL

Hydrograph type	= Combine	Peak discharge	= 619.12 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.20 hrs
Time interval	= 2 min	Hyd. volume	= 3,866,364 cuft
Inflow hyds.	= 7, 9, 10, 11, 12	Contrib. drain. area	= 12.440 ac

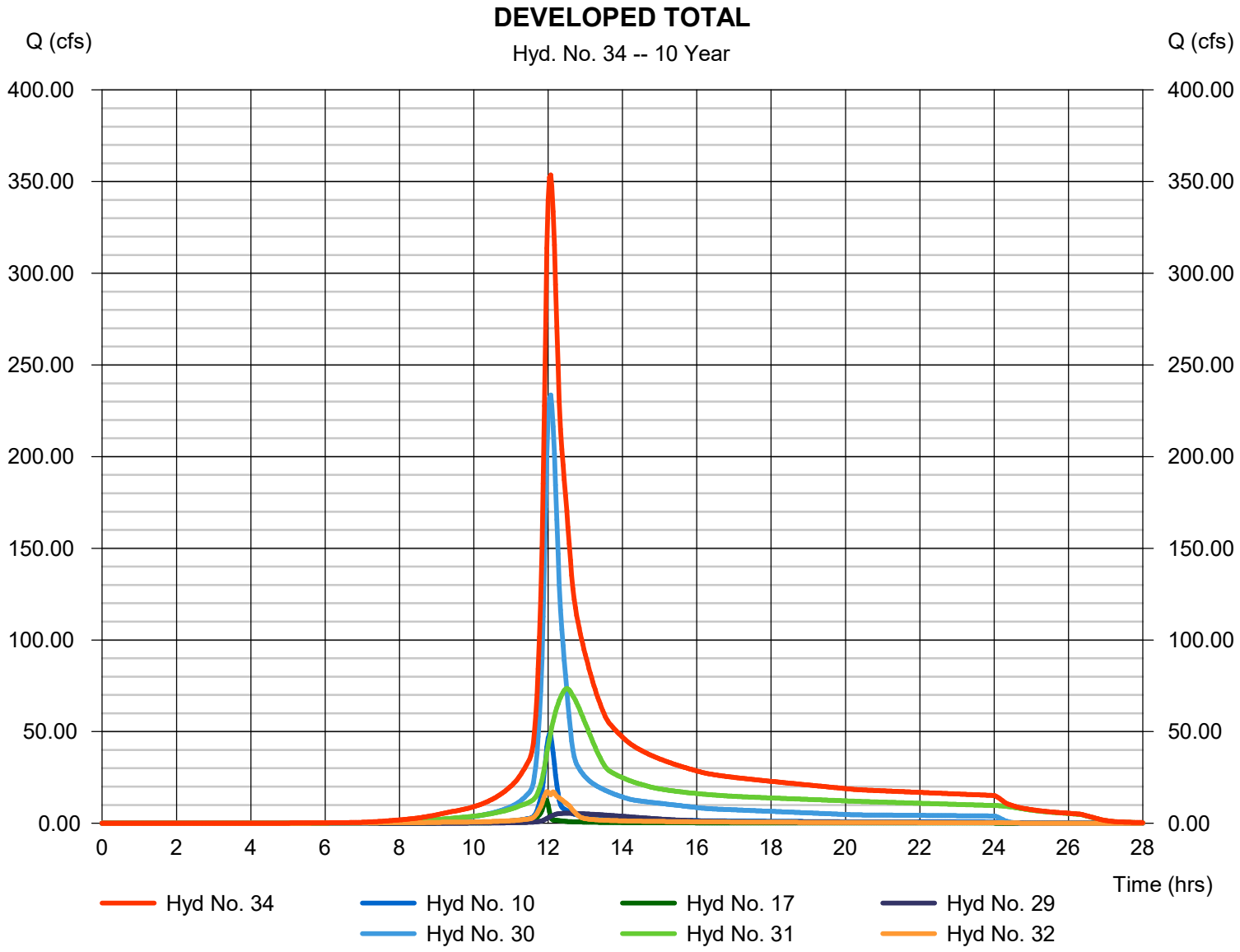


Hydrograph Report

Hyd. No. 34

DEVELOPED TOTAL

Hydrograph type	= Combine	Peak discharge	= 353.63 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 2,209,529 cuft
Inflow hyds.	= 10, 17, 29, 30, 31, 32	Contrib. drain. area	= 2.260 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

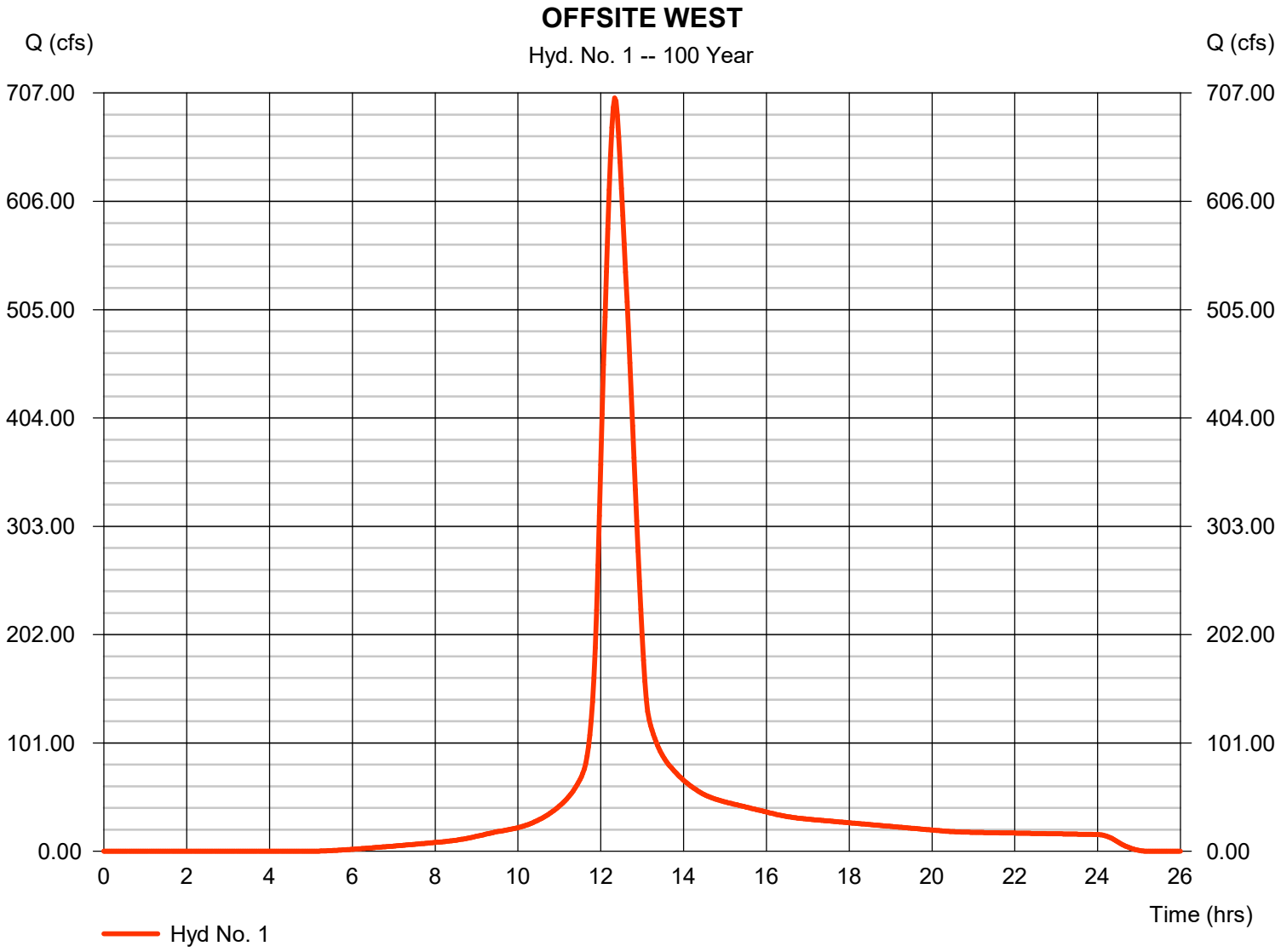
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	702.31	2	740	3,789,405	------	------	------	OFFSITE WEST
2	SCS Runoff	258.19	2	722	739,723	------	------	------	OFFSITE
3	SCS Runoff	15.76	2	722	45,698	------	------	------	OFFSITE NORTH
4	SCS Runoff	27.58	2	722	79,972	------	------	------	OFFSITE NORTH 2
5	SCS Runoff	68.95	2	722	194,427	------	------	------	EXISTING NORTHWEST
6	SCS Runoff	199.65	2	732	863,593	------	------	------	EXISTING NORTH
7	SCS Runoff	49.33	2	720	128,779	------	------	------	EXISTING NORTHEAST
8	SCS Runoff	257.19	2	750	1,657,930	------	------	------	EXISTING SOUTH
9	SCS Runoff	46.56	2	720	121,535	------	------	------	SOUTHEAST
10	Combine	96.53	2	722	274,399	4, 5,	------	------	OUTFALL 1
11	Combine	427.92	2	724	1,649,014	2, 3, 6,	------	------	OUTFALL 2
12	Combine	939.47	2	742	5,447,334	1, 8,	------	------	OUTFALL 4
13	SCS Runoff	209.81	2	730	847,415	------	------	------	NORTH 1
14	SCS Runoff	35.63	2	716	73,170	------	------	------	NORTH 2
15	SCS Runoff	41.02	2	726	144,435	------	------	------	NORTH 3
16	SCS Runoff	232.74	2	730	948,652	------	------	------	EAST
17	SCS Runoff	23.29	2	716	49,653	------	------	------	WEST 1
18	SCS Runoff	48.70	2	722	141,208	------	------	------	WEST 2
19	SCS Runoff	59.00	2	718	141,079	------	------	------	WEST 3
20	SCS Runoff	78.40	2	750	529,700	------	------	------	CREEK
21	SCS Runoff	51.57	2	722	155,755	------	------	------	SOUTH 1
22	SCS Runoff	49.24	2	720	137,967	------	------	------	SOUTH 2
23	SCS Runoff	10.22	2	716	22,850	------	------	------	SOUTH 3
24	Reservoir	9.121	2	740	141,202	18	868.89	55,564	Detention 1
25	Reservoir	7.600	2	738	141,065	19	860.54	63,217	Detention 2
26	Reservoir	16.81	2	736	155,752	21	859.44	45,333	Detention 3
27	Reservoir	43.50	2	724	137,965	22	854.92	21,891	Detention 4
28	Reservoir	12.65	2	858	948,647	16	858.29	548,900	Detention 5
29	Reservoir	7.669	2	752	144,421	15	876.61	63,828	Detention 6
30	Combine	444.35	2	724	1,660,309	2, 13, 14,	------	------	Developed Outfall 2
31	Combine	123.01	2	750	1,916,364	20, 24, 25,	------	------	Developed Outfall 4
32	Combine	46.32	2	722	160,815	26, 28, 23, 27,	------	------	Developed Outfall 5
33	Combine	1226.15	2	730	7,621,056	7, 9, 10,	------	------	EXISTING TOTAL
34	Combine	676.74	2	722	4,205,968	11, 12, 10, 17, 29, 30, 31, 32,	------	------	DEVELOPED TOTAL

Hydrograph Report

Hyd. No. 1

OFFSITE WEST

Hydrograph type	=	SCS Runoff	Peak discharge	=	702.31 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.33 hrs
Time interval	=	2 min	Hyd. volume	=	3,789,405 cuft
Drainage area	=	172.810 ac	Curve number	=	80
Basin Slope	=	3.0 %	Hydraulic length	=	3142 ft
Tc method	=	LAG	Time of conc. (Tc)	=	45.90 min
Total precip.	=	8.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

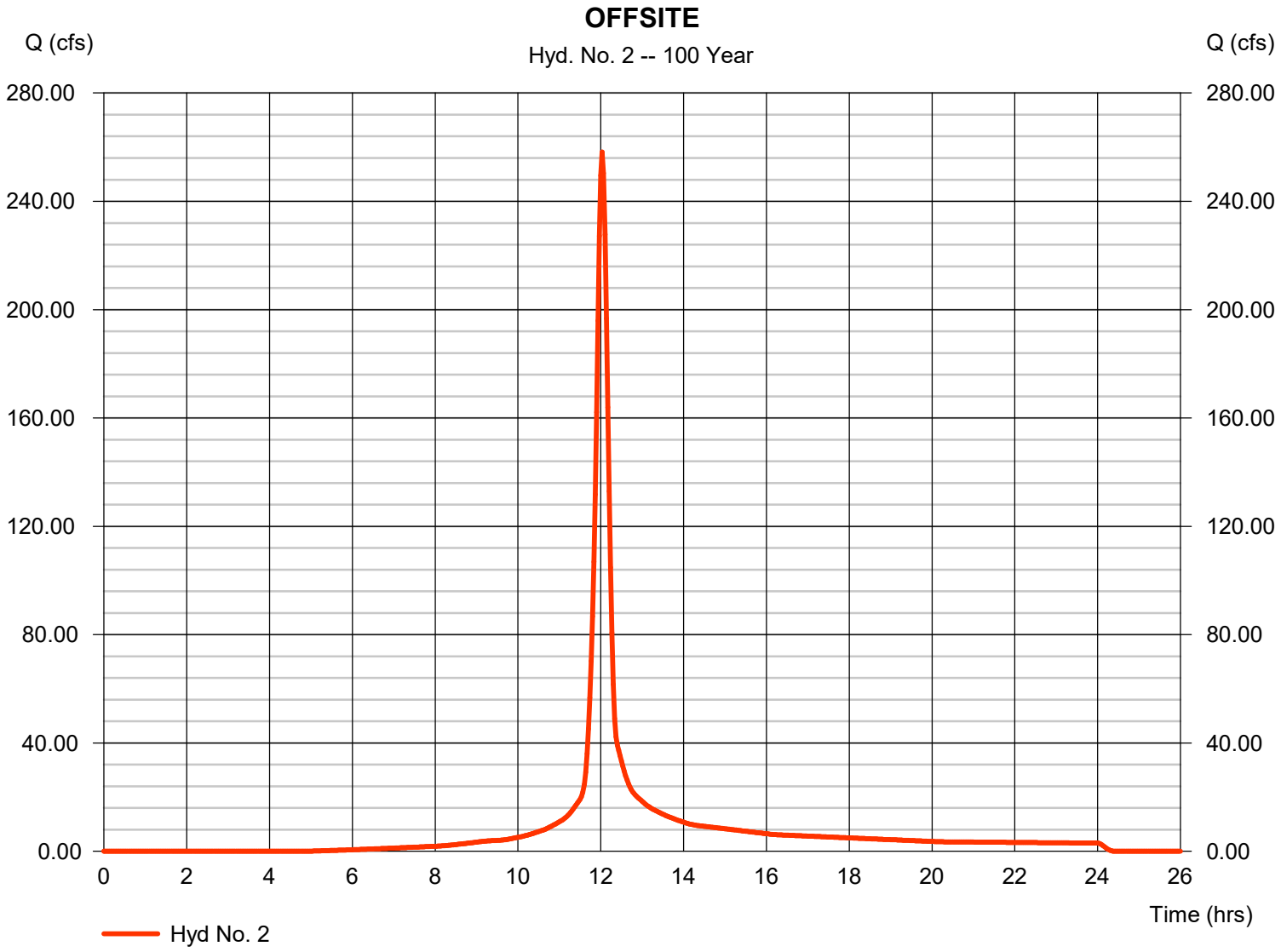


Hydrograph Report

Hyd. No. 2

OFFSITE

Hydrograph type	=	SCS Runoff	Peak discharge	=	258.19 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	739,723 cuft
Drainage area	=	34.290 ac	Curve number	=	80
Basin Slope	=	5.7 %	Hydraulic length	=	1200 ft
Tc method	=	LAG	Time of conc. (Tc)	=	15.40 min
Total precip.	=	8.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

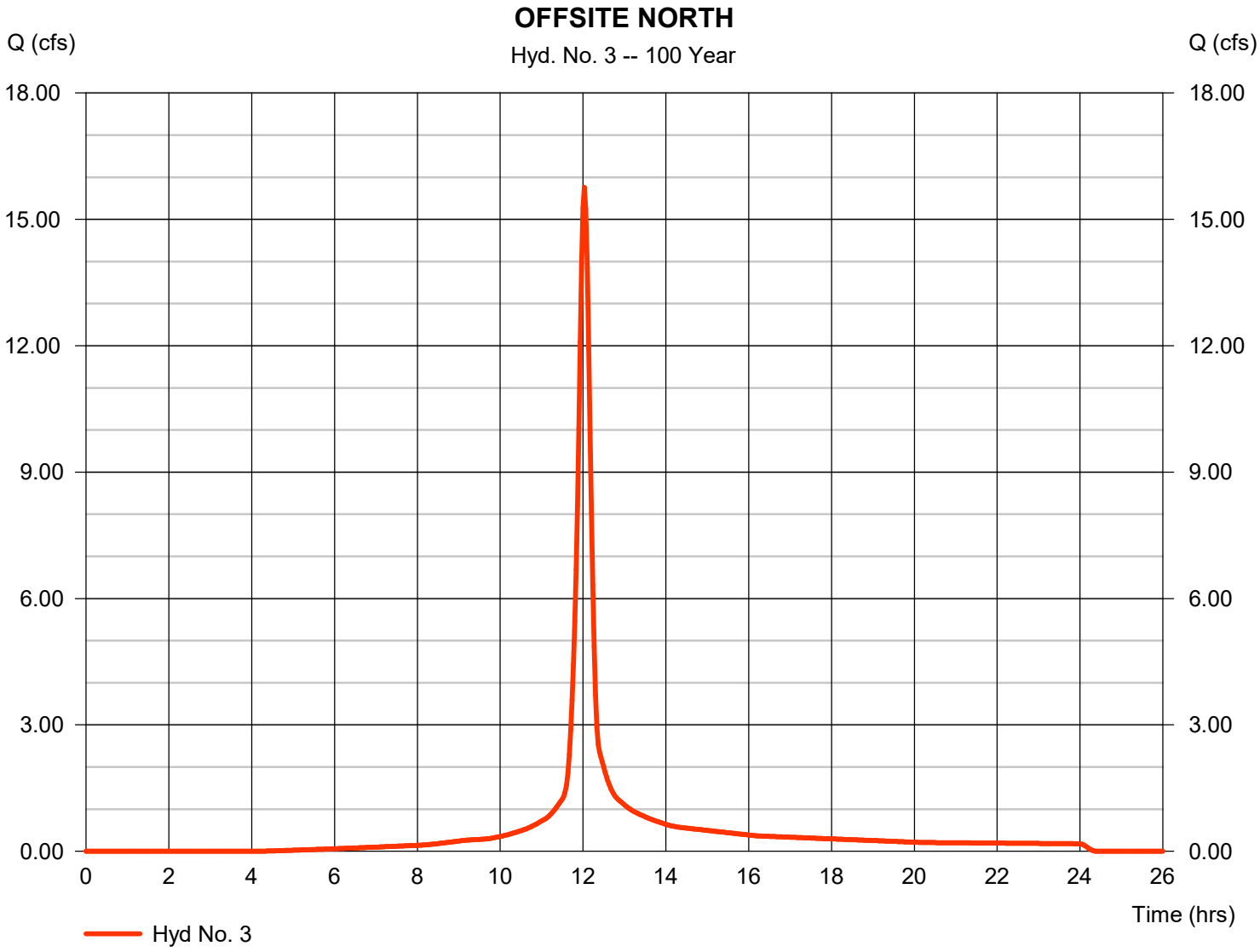


Hydrograph Report

Hyd. No. 3

OFFSITE NORTH

Hydrograph type	=	SCS Runoff	Peak discharge	=	15.76 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	45,698 cuft
Drainage area	=	2.000 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.00 min
Total precip.	=	8.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

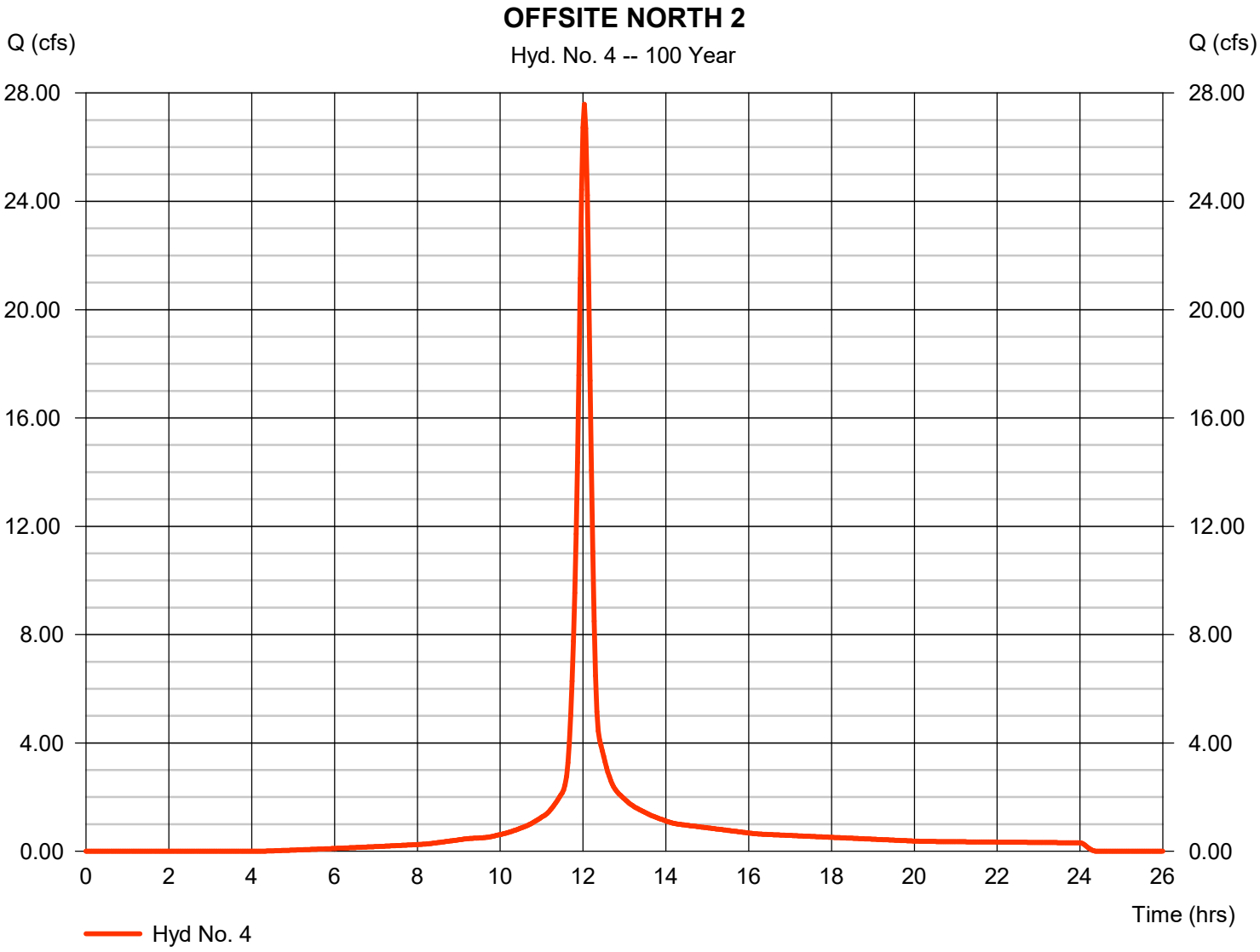


Hydrograph Report

Hyd. No. 4

OFFSITE NORTH 2

Hydrograph type	= SCS Runoff	Peak discharge	= 27.58 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 79,972 cuft
Drainage area	= 3.500 ac	Curve number	= 83
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.00 min
Total precip.	= 8.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

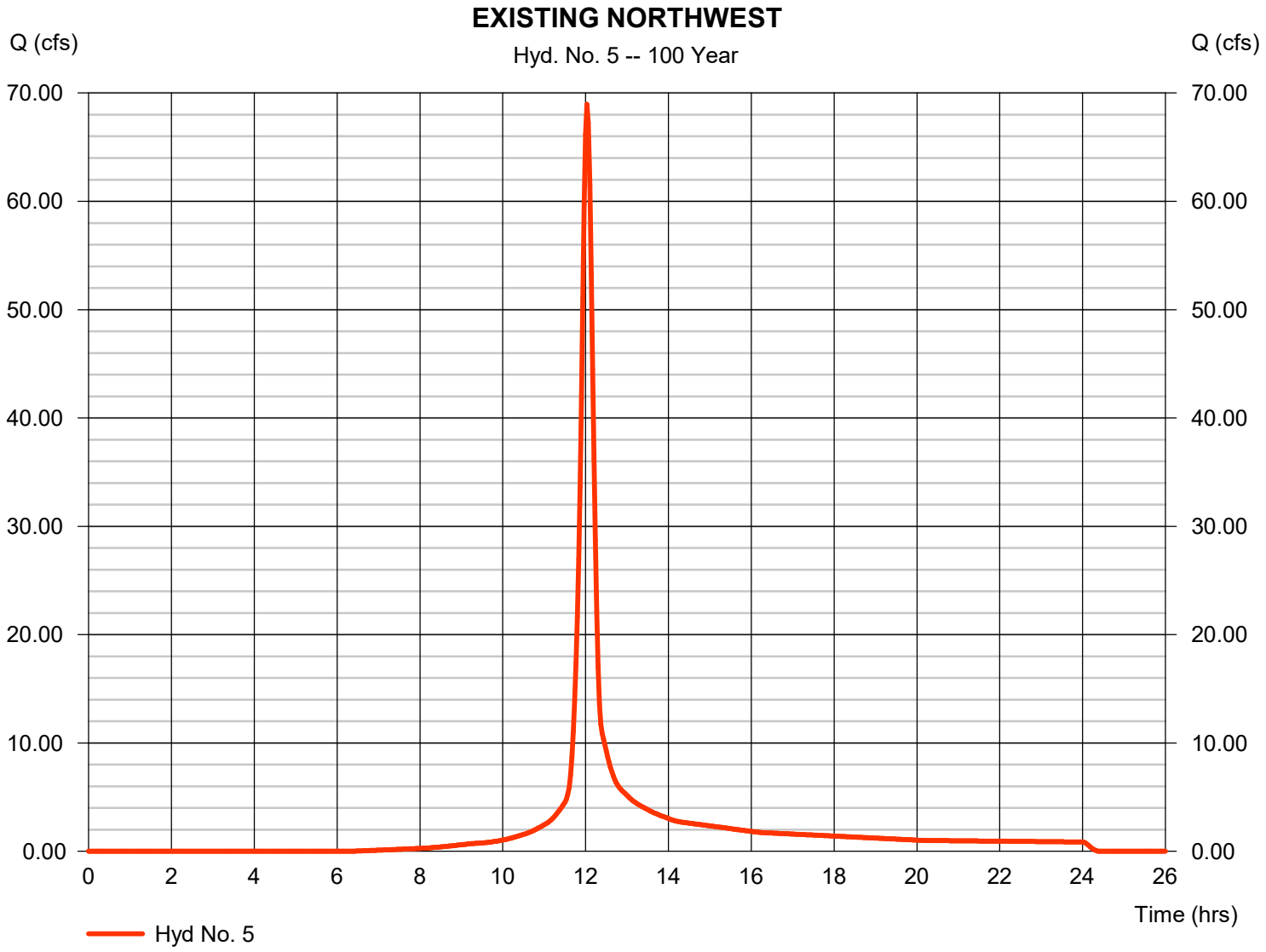


Hydrograph Report

Hyd. No. 5

EXISTING NORTHWEST

Hydrograph type	=	SCS Runoff	Peak discharge	=	68.95 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	194,427 cuft
Drainage area	=	10.220 ac	Curve number	=	74
Basin Slope	=	5.6 %	Hydraulic length	=	851 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.10 min
Total precip.	=	8.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

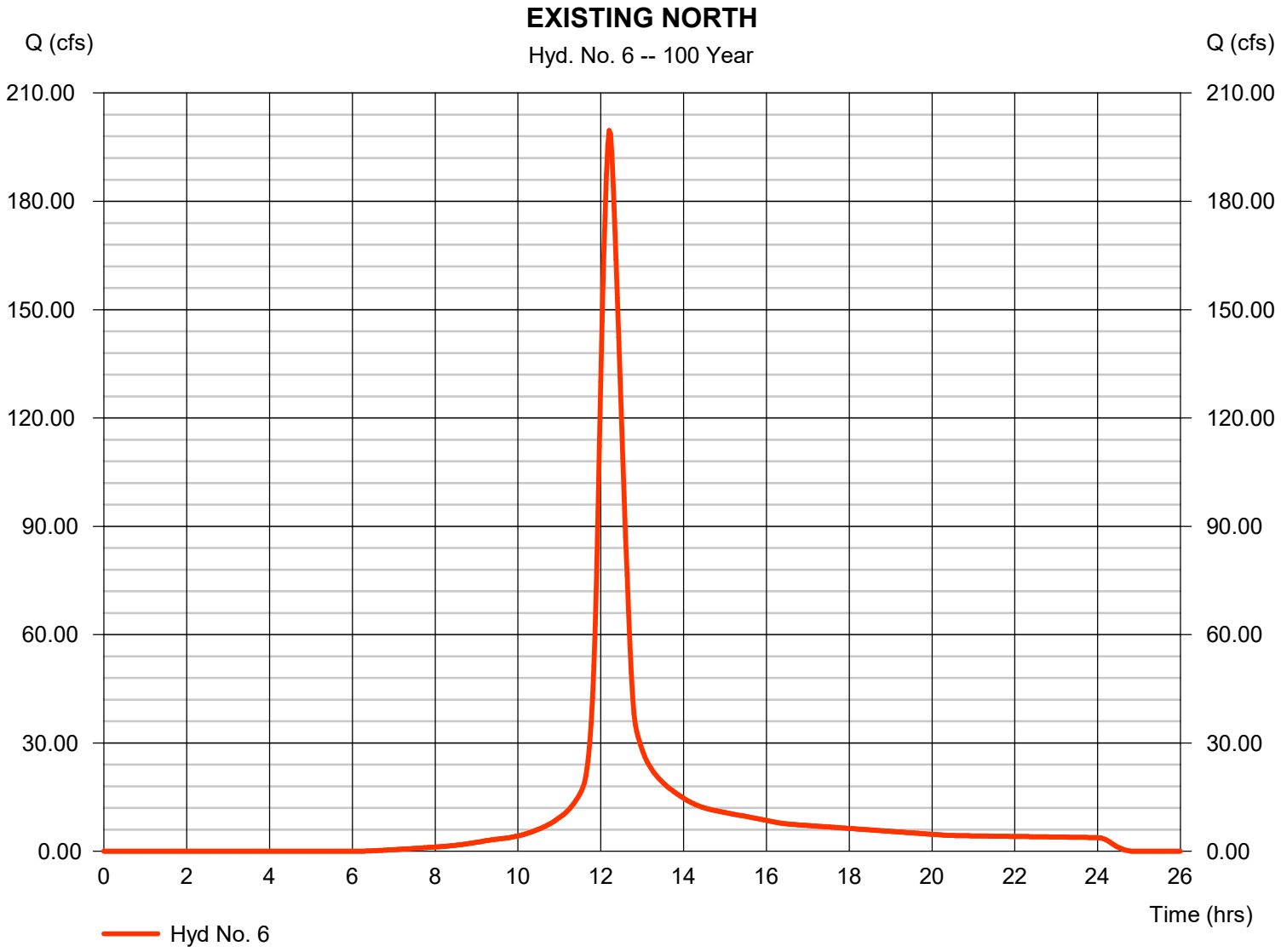


Hydrograph Report

Hyd. No. 6

EXISTING NORTH

Hydrograph type	=	SCS Runoff	Peak discharge	=	199.65 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.20 hrs
Time interval	=	2 min	Hyd. volume	=	863,593 cuft
Drainage area	=	42.760 ac	Curve number	=	75
Basin Slope	=	4.3 %	Hydraulic length	=	1944 ft
Tc method	=	LAG	Time of conc. (Tc)	=	30.30 min
Total precip.	=	8.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

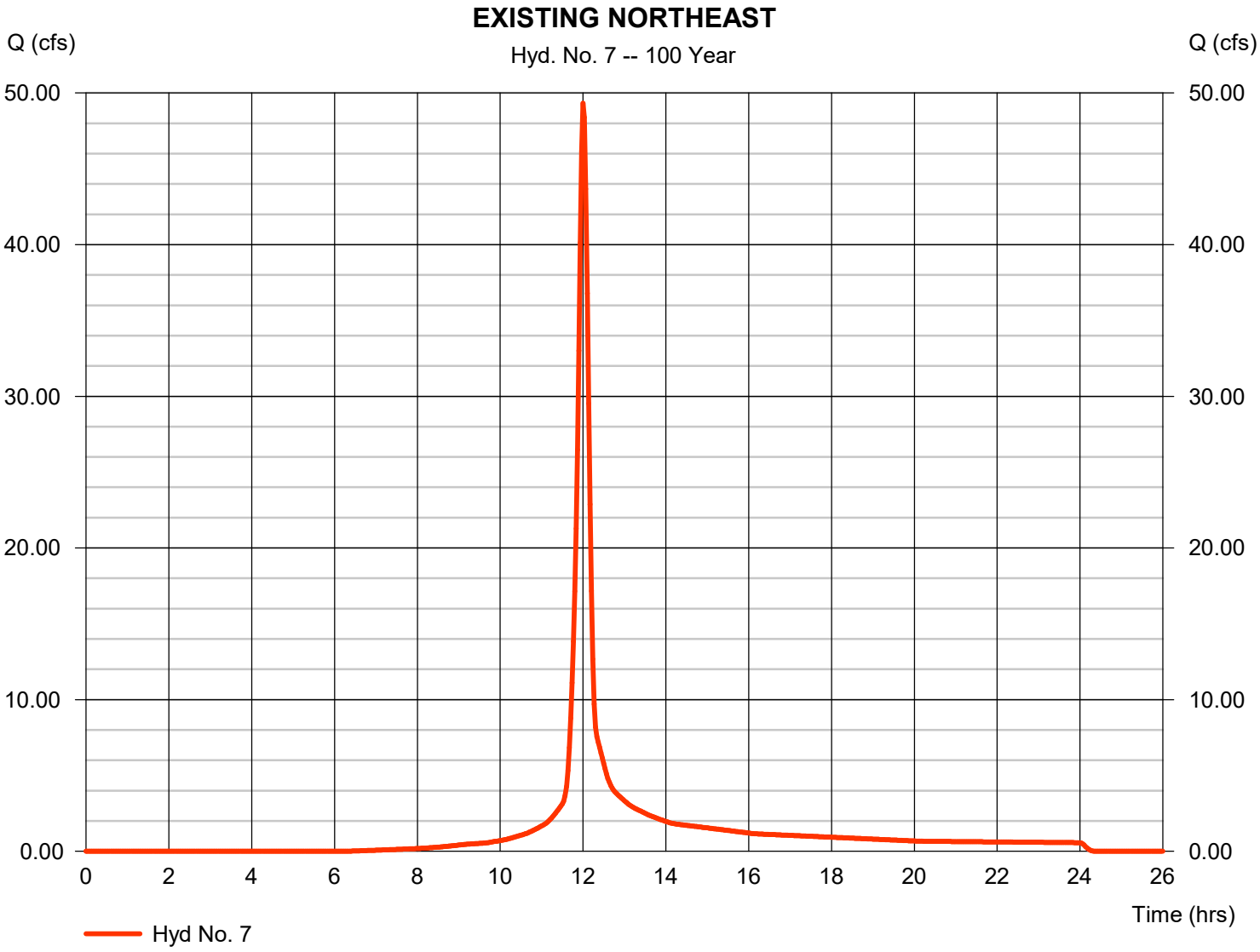


Hydrograph Report

Hyd. No. 7

EXISTING NORTHEAST

Hydrograph type	=	SCS Runoff	Peak discharge	=	49.33 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	128,779 cuft
Drainage area	=	6.400 ac	Curve number	=	74
Basin Slope	=	4.6 %	Hydraulic length	=	647 ft
Tc method	=	LAG	Time of conc. (Tc)	=	12.50 min
Total precip.	=	8.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

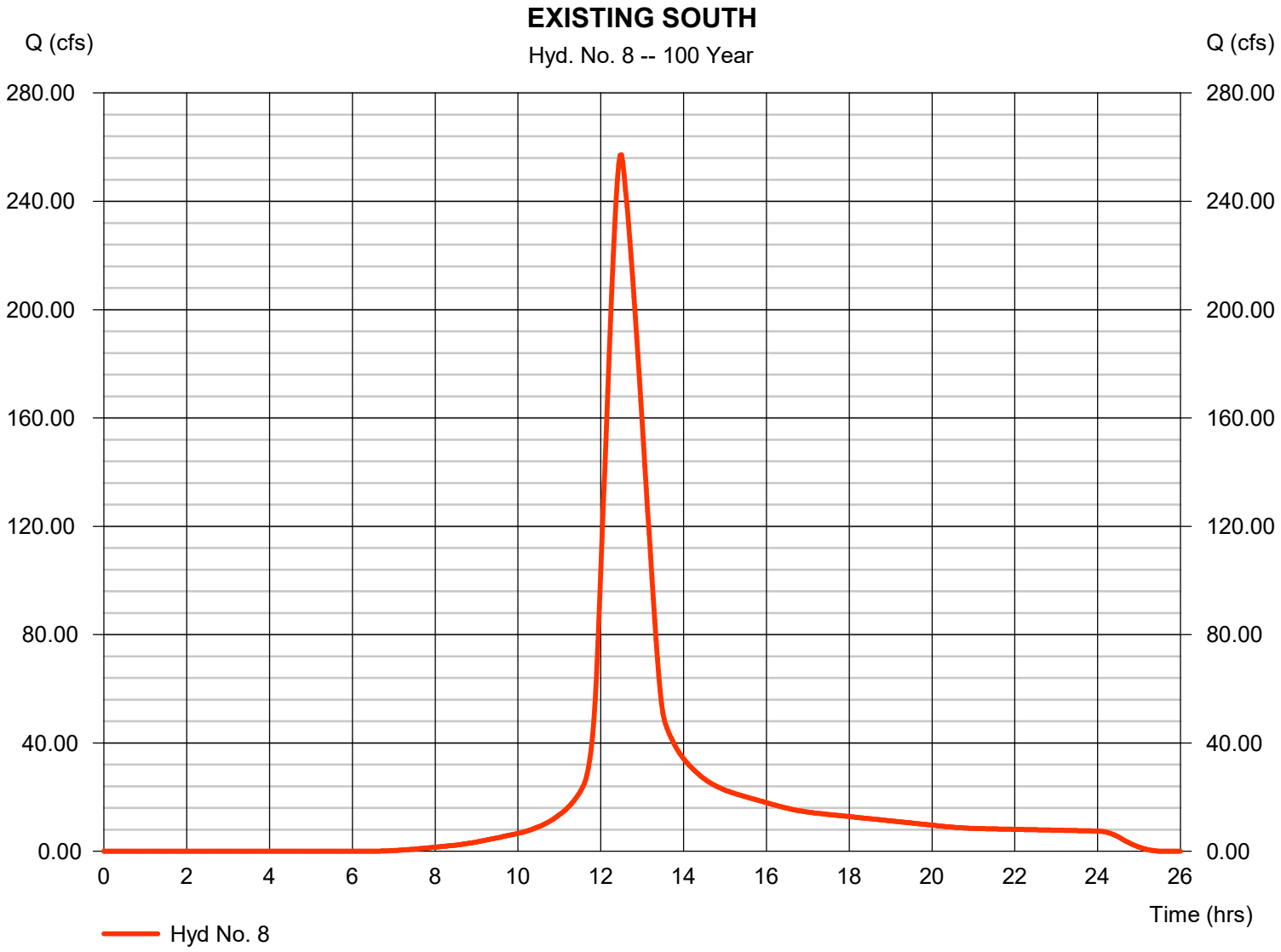


Hydrograph Report

Hyd. No. 8

EXISTING SOUTH

Hydrograph type	=	SCS Runoff	Peak discharge	=	257.19 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.50 hrs
Time interval	=	2 min	Hyd. volume	=	1,657,930 cuft
Drainage area	=	84.970 ac	Curve number	=	74
Basin Slope	=	2.8 %	Hydraulic length	=	3309 ft
Tc method	=	LAG	Time of conc. (Tc)	=	59.20 min
Total precip.	=	8.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

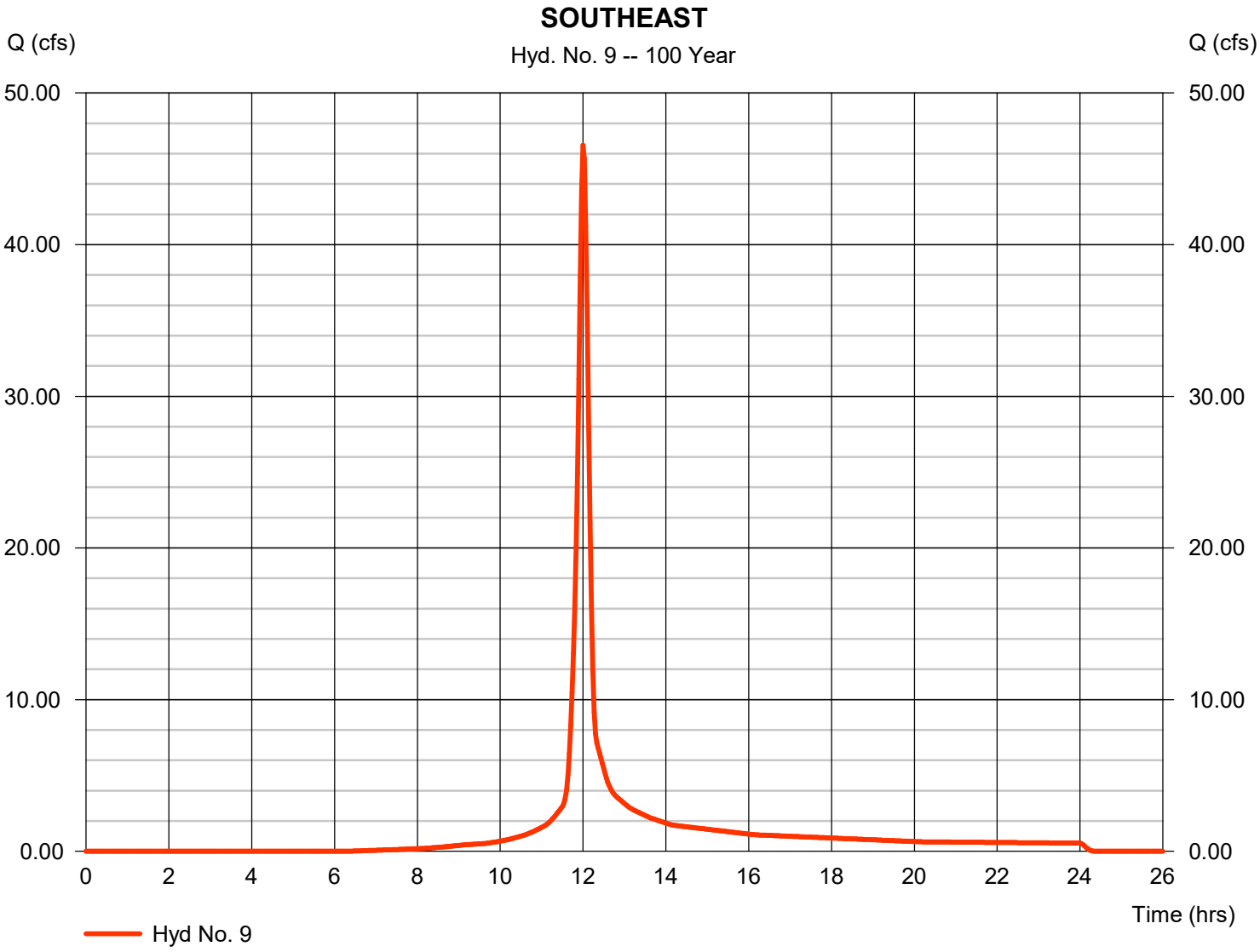


Hydrograph Report

Hyd. No. 9

SOUTHEAST

Hydrograph type	=	SCS Runoff	Peak discharge	=	46.56 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	121,535 cuft
Drainage area	=	6.040 ac	Curve number	=	74
Basin Slope	=	4.2 %	Hydraulic length	=	519 ft
Tc method	=	LAG	Time of conc. (Tc)	=	10.90 min
Total precip.	=	8.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

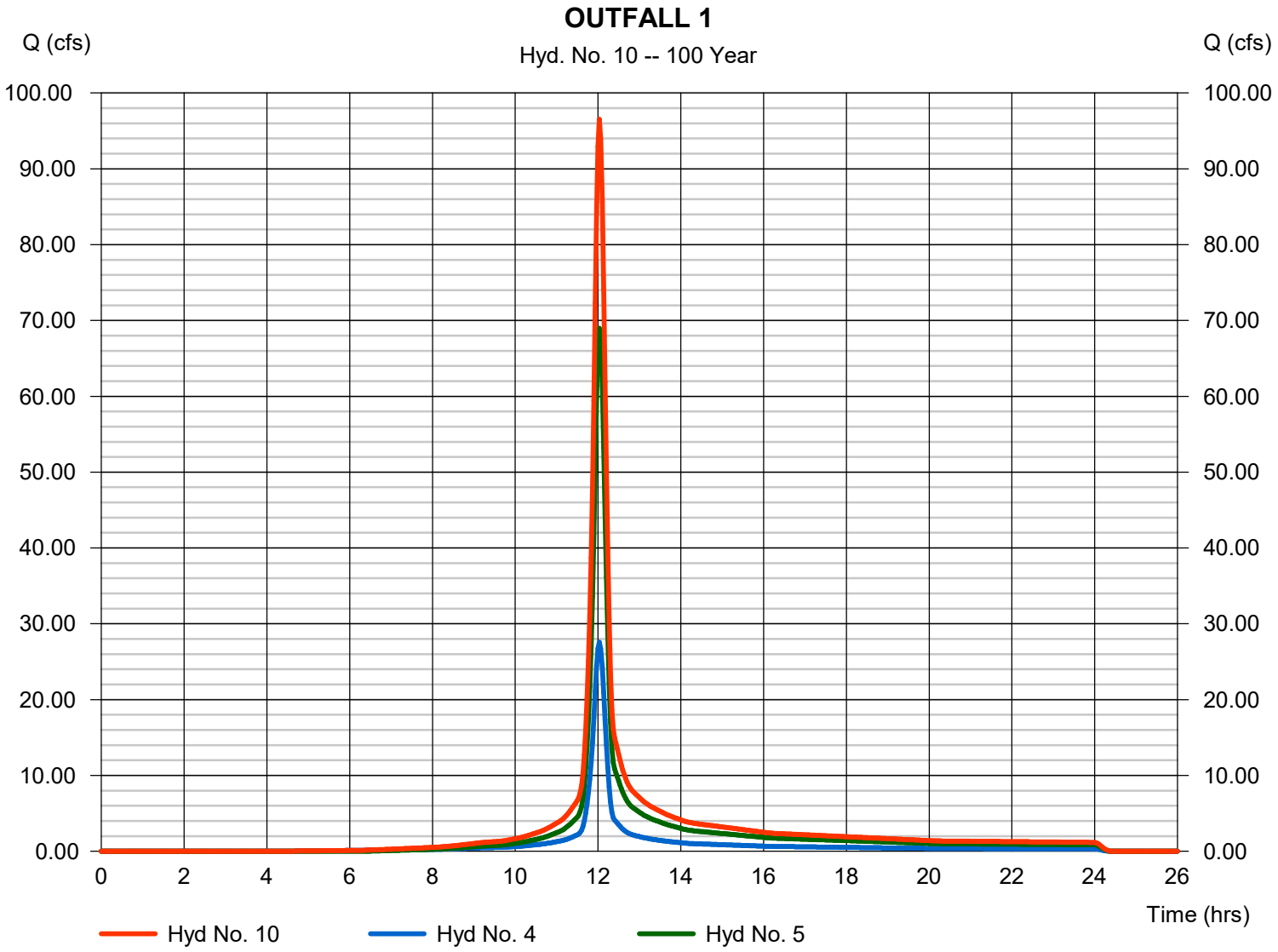


Hydrograph Report

Hyd. No. 10

OUTFALL 1

Hydrograph type	= Combine	Peak discharge	= 96.53 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 274,399 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 13.720 ac

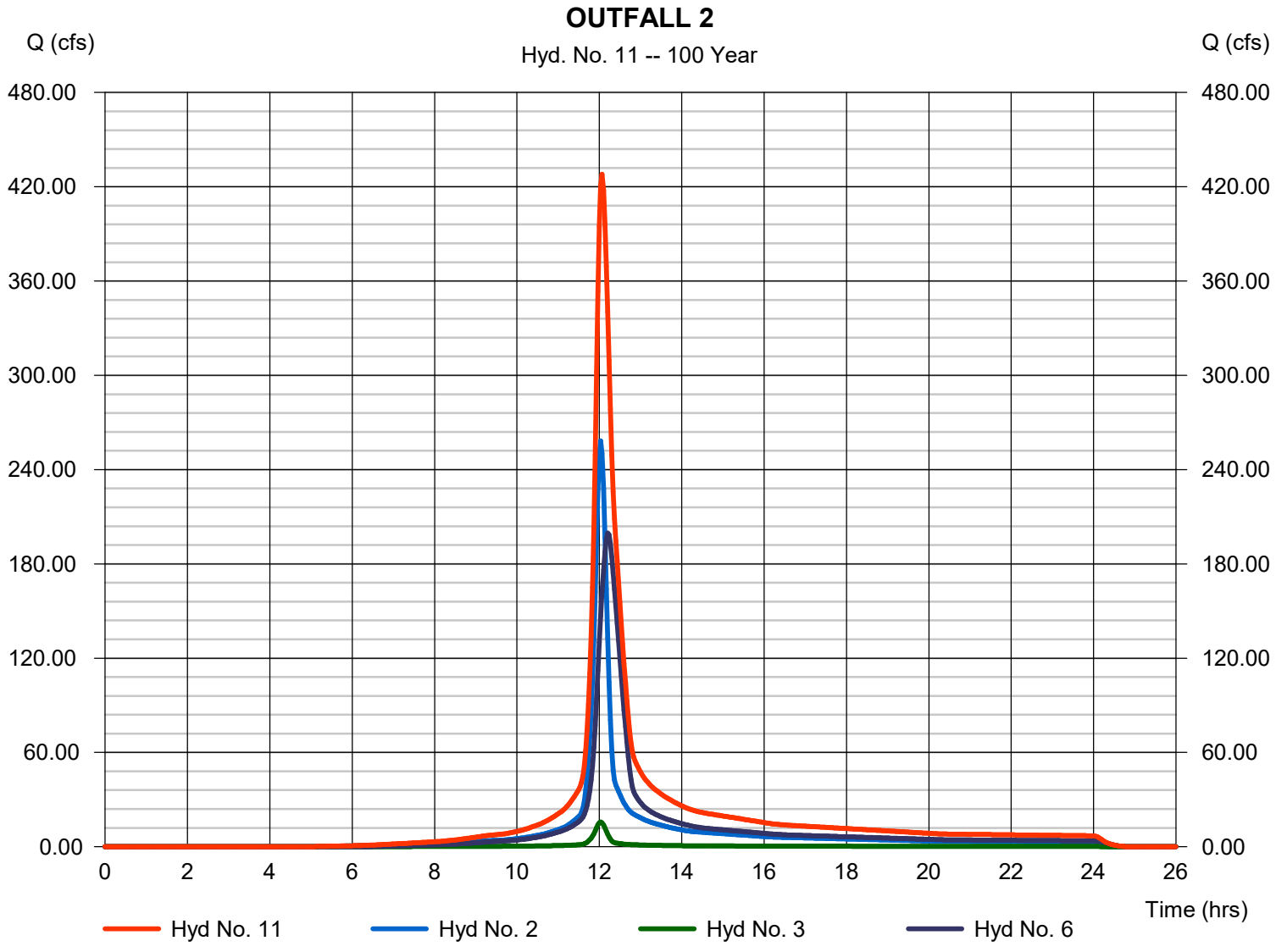


Hydrograph Report

Hyd. No. 11

OUTFALL 2

Hydrograph type	=	Combine	Peak discharge	=	427.92 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	1,649,014 cuft
Inflow hyds.	=	2, 3, 6	Contrib. drain. area	=	79.050 ac

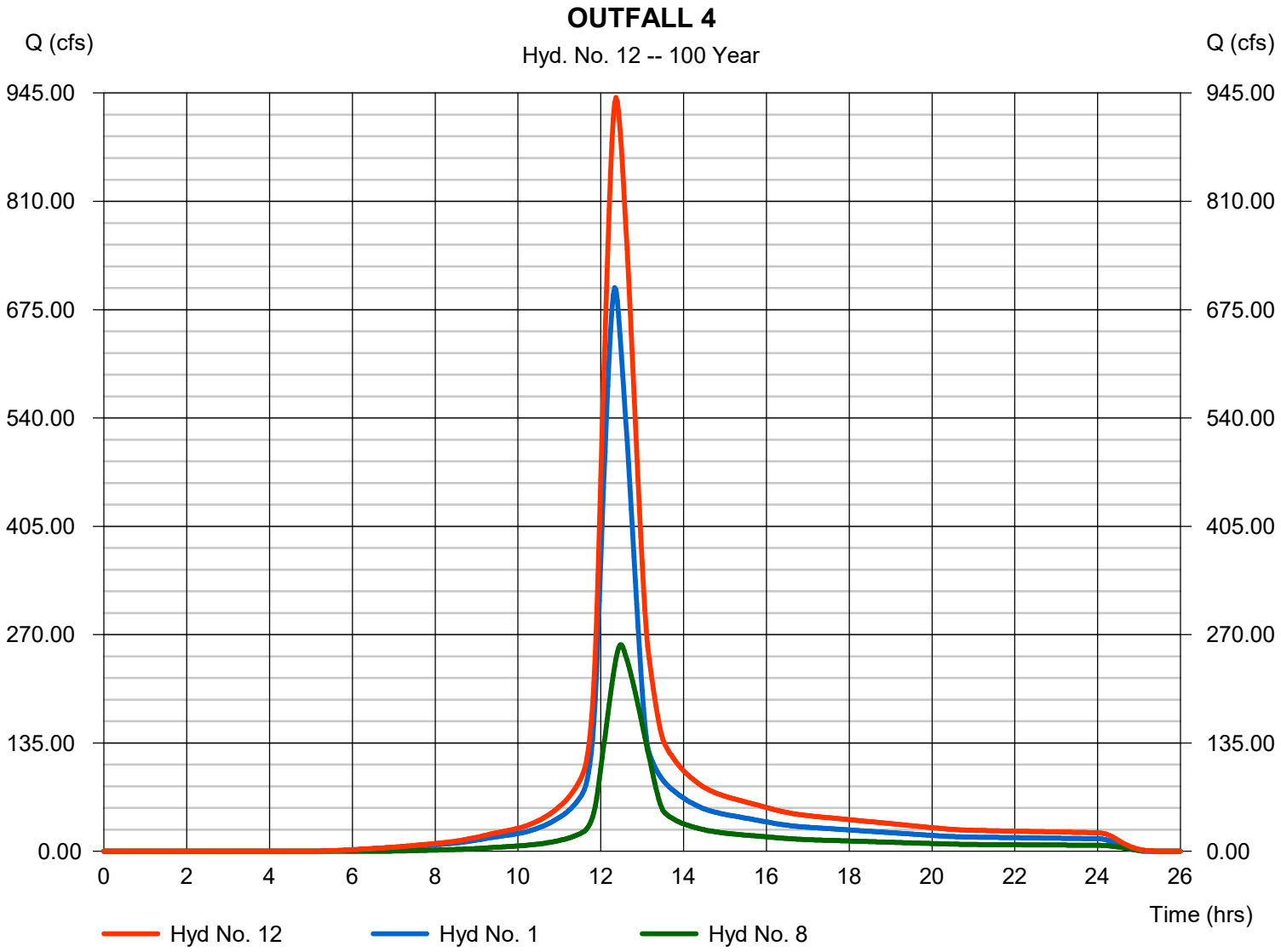


Hydrograph Report

Hyd. No. 12

OUTFALL 4

Hydrograph type	= Combine	Peak discharge	= 939.47 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 5,447,334 cuft
Inflow hyds.	= 1, 8	Contrib. drain. area	= 257.780 ac



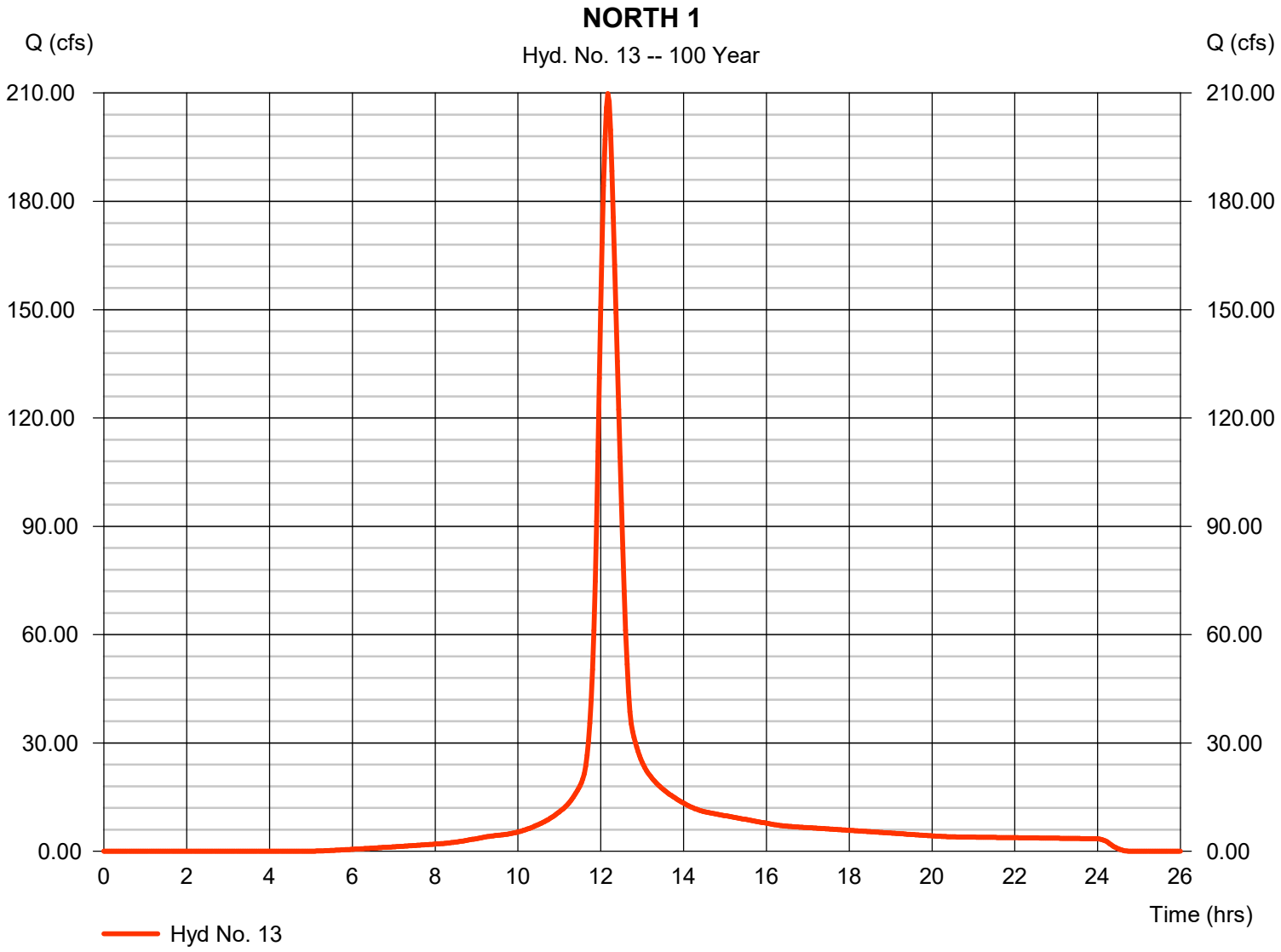
Hydrograph Report

Hyd. No. 13

NORTH 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	209.81 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.17 hrs
Time interval	=	2 min	Hyd. volume	=	847,415 cuft
Drainage area	=	38.300 ac	Curve number	=	80*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	30.00 min
Total precip.	=	8.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(18.170 x 77) + (20.130 x 83)] / 38.300

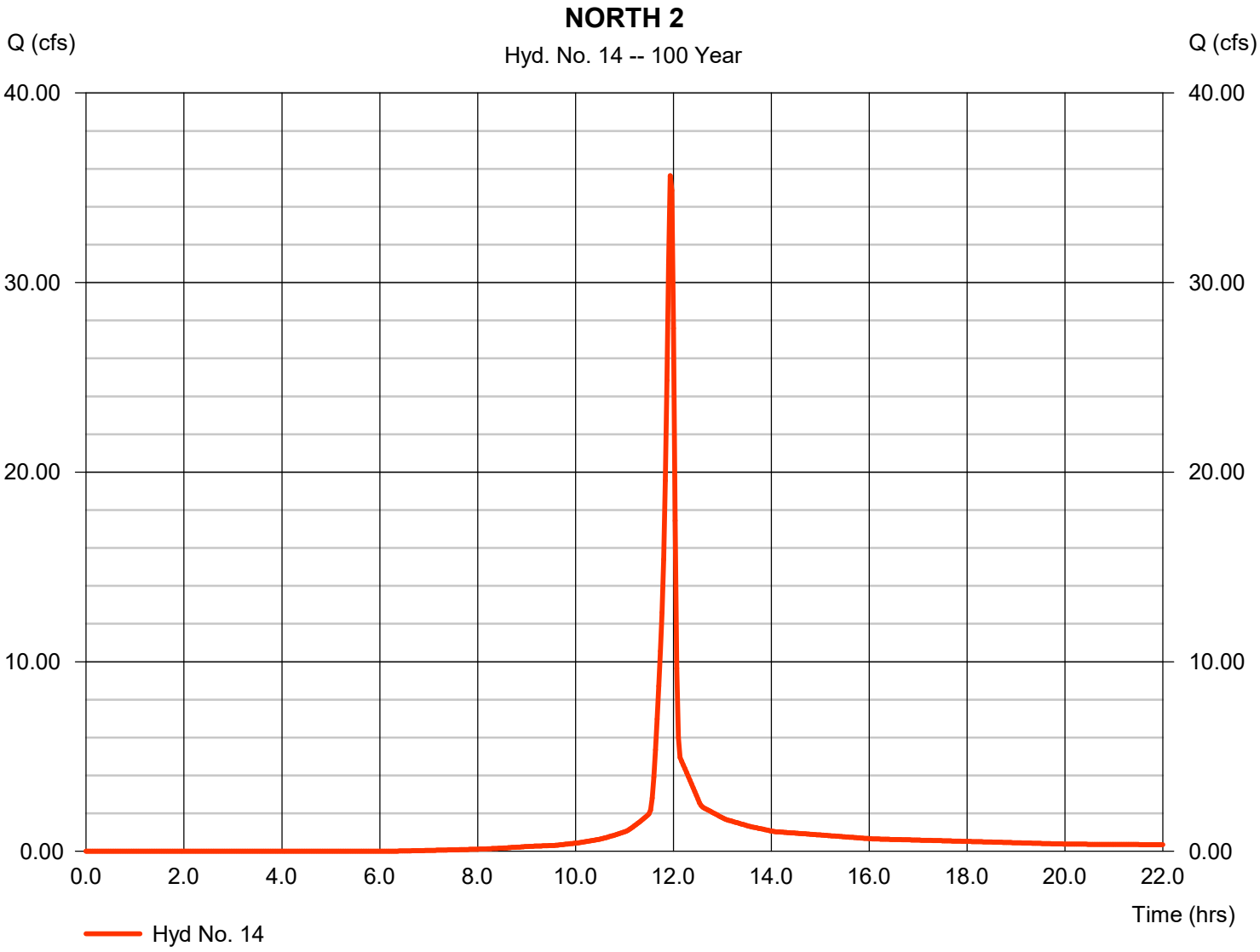


Hydrograph Report

Hyd. No. 14

NORTH 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	35.63 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	73,170 cuft
Drainage area	=	4.000 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	8.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

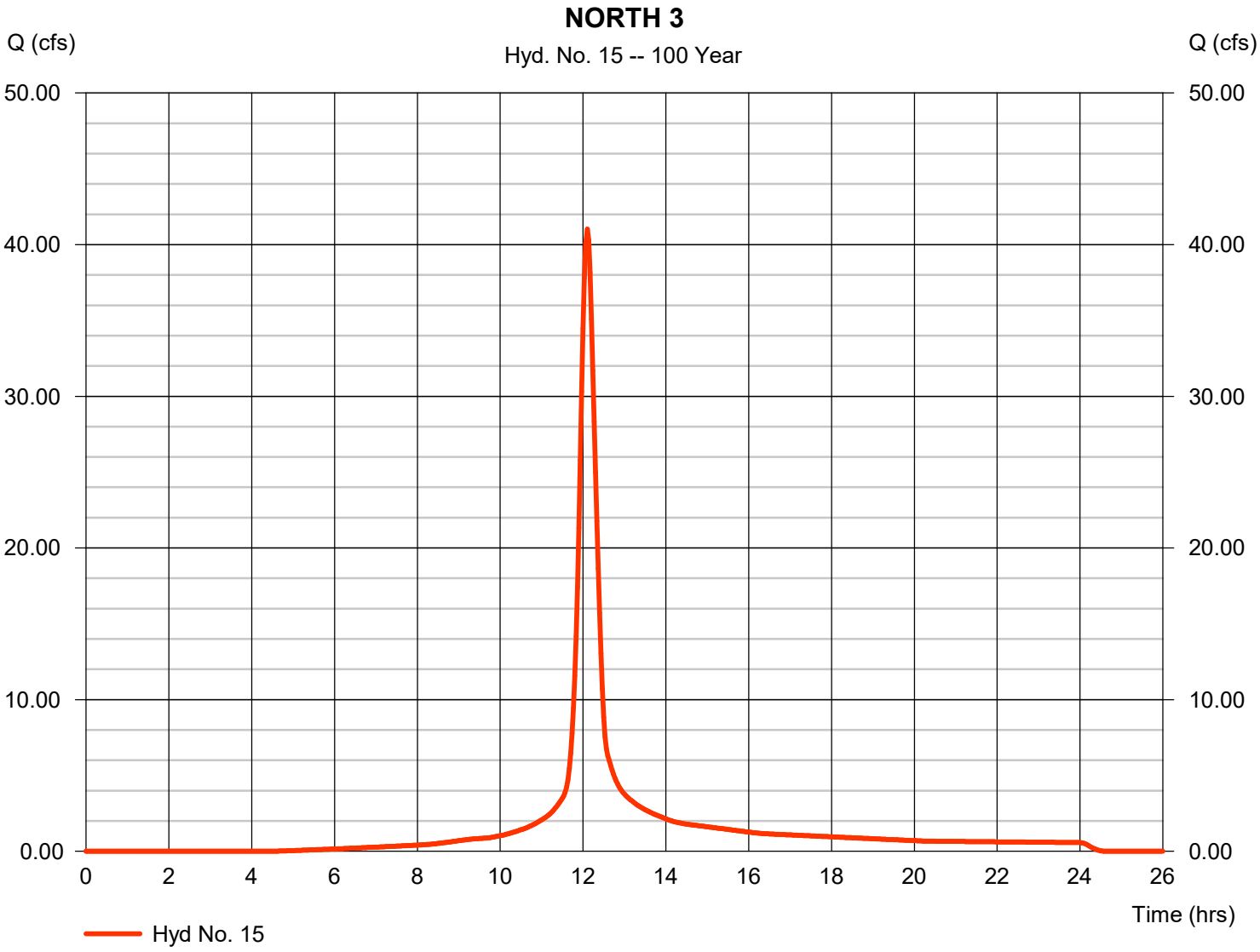


Hydrograph Report

Hyd. No. 15

NORTH 3

Hydrograph type	=	SCS Runoff	Peak discharge	=	41.02 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	144,435 cuft
Drainage area	=	6.170 ac	Curve number	=	82
Basin Slope	=	1.3 %	Hydraulic length	=	785 ft
Tc method	=	LAG	Time of conc. (Tc)	=	21.50 min
Total precip.	=	8.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

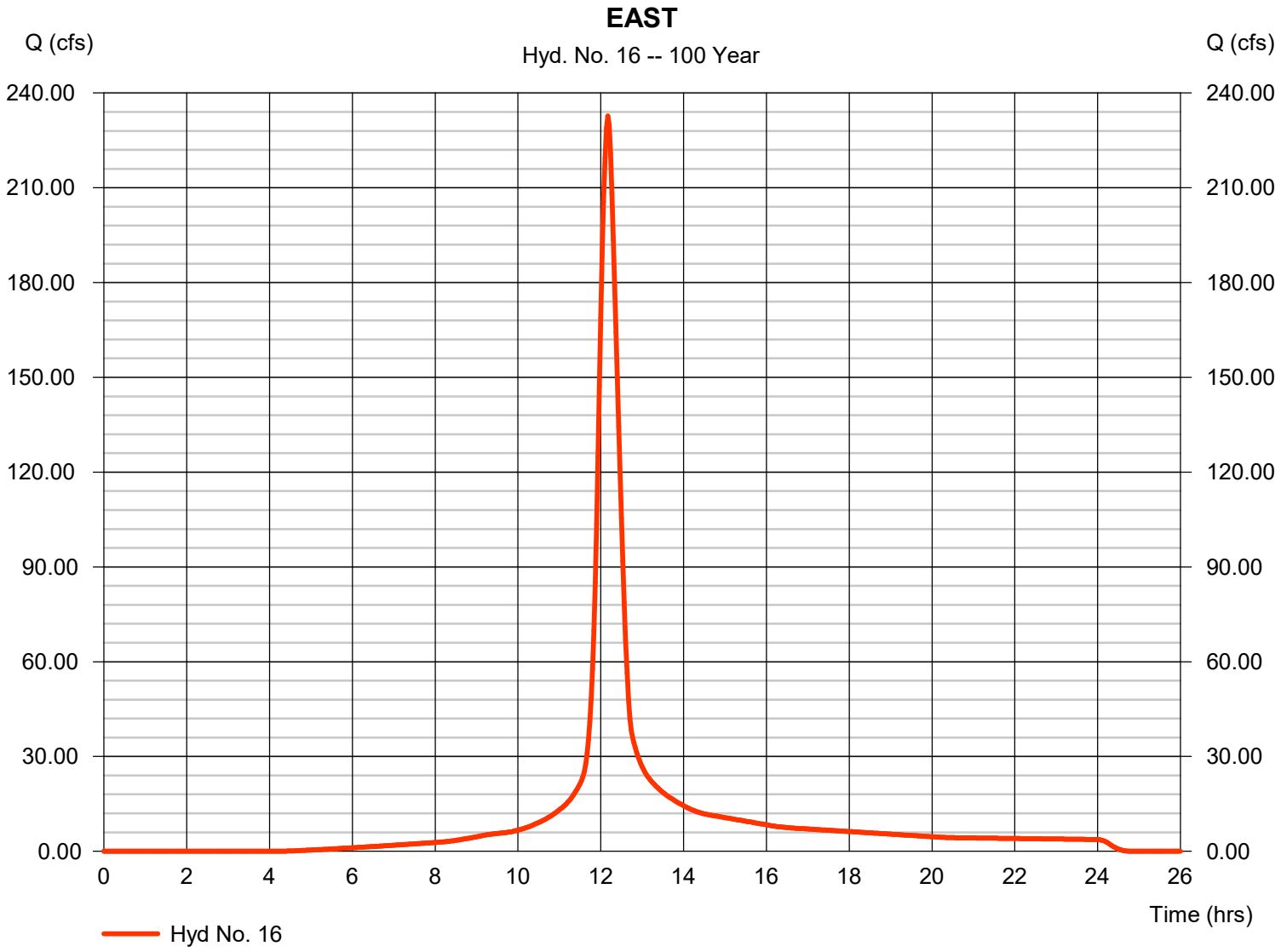


Hydrograph Report

Hyd. No. 16

EAST

Hydrograph type	=	SCS Runoff	Peak discharge	=	232.74 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.17 hrs
Time interval	=	2 min	Hyd. volume	=	948,652 cuft
Drainage area	=	40.480 ac	Curve number	=	83
Basin Slope	=	3.1 %	Hydraulic length	=	2131 ft
Tc method	=	LAG	Time of conc. (Tc)	=	30.00 min
Total precip.	=	8.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

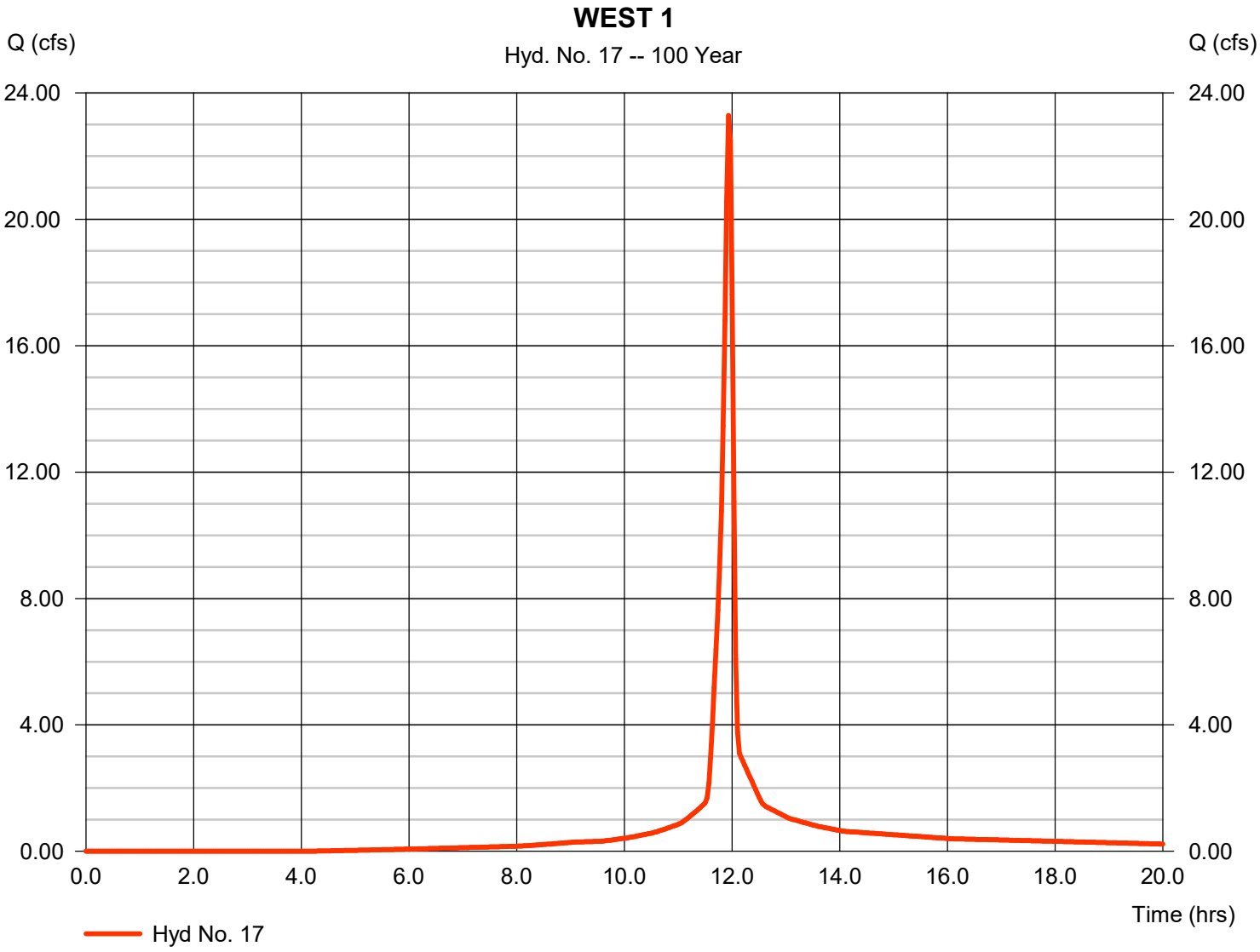


Hydrograph Report

Hyd. No. 17

WEST 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	23.29 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	49,653 cuft
Drainage area	=	2.260 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	8.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

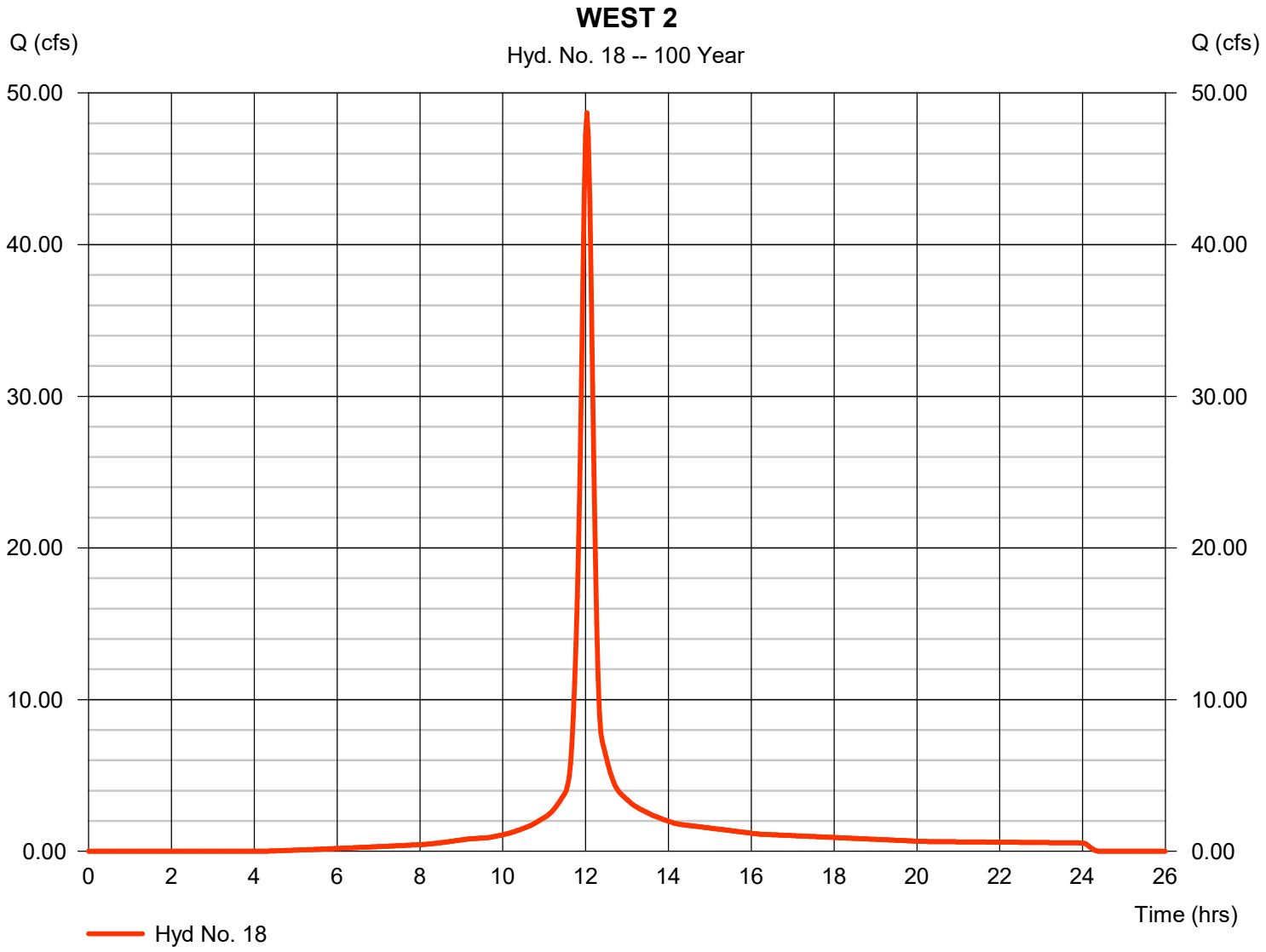


Hydrograph Report

Hyd. No. 18

WEST 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	48.70 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	141,208 cuft
Drainage area	=	6.180 ac	Curve number	=	83
Basin Slope	=	5.4 %	Hydraulic length	=	1187 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.20 min
Total precip.	=	8.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

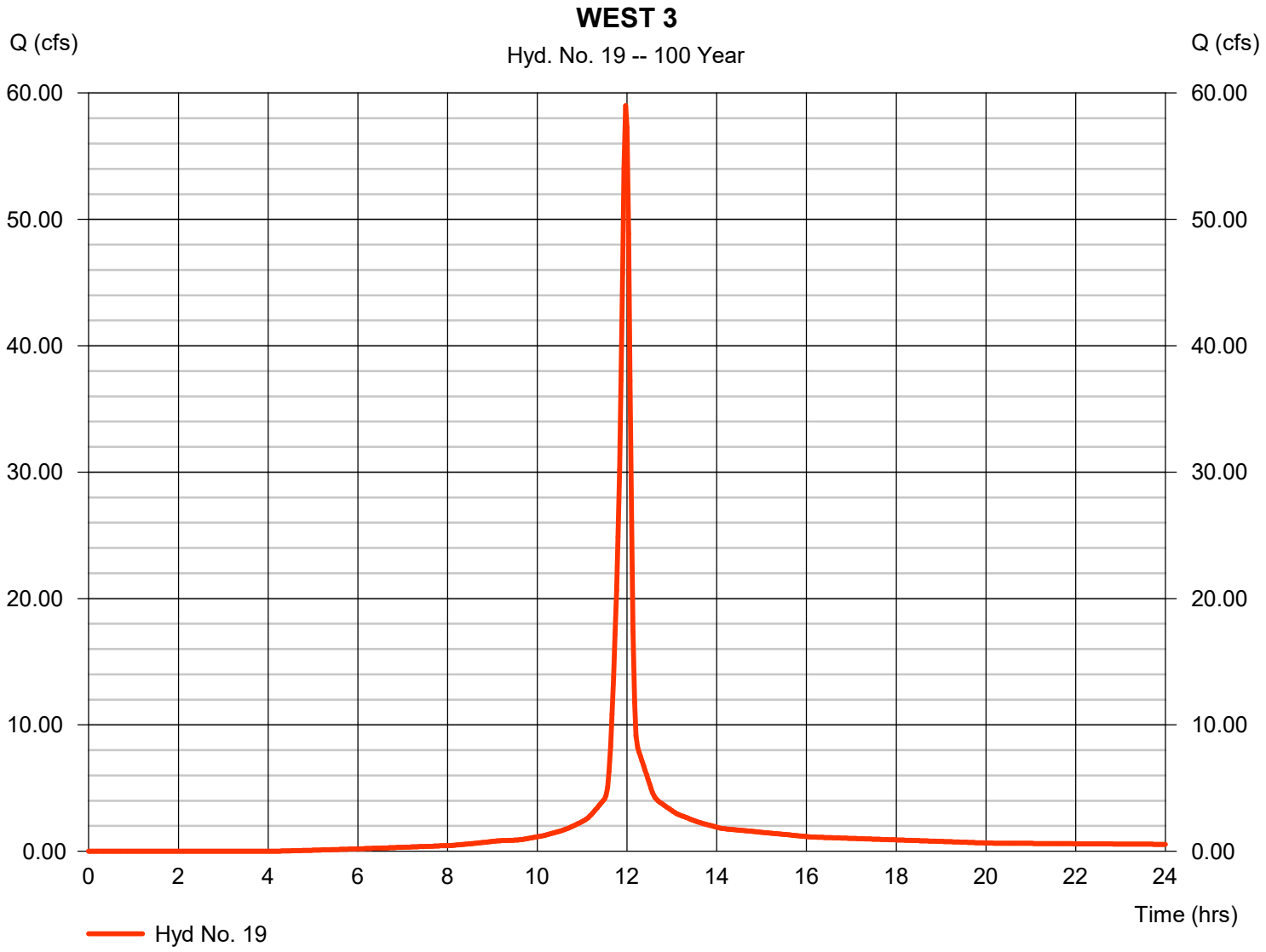


Hydrograph Report

Hyd. No. 19

WEST 3

Hydrograph type	=	SCS Runoff	Peak discharge	=	59.00 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	141,079 cuft
Drainage area	=	6.020 ac	Curve number	=	83
Basin Slope	=	6.2 %	Hydraulic length	=	806 ft
Tc method	=	LAG	Time of conc. (Tc)	=	9.70 min
Total precip.	=	8.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



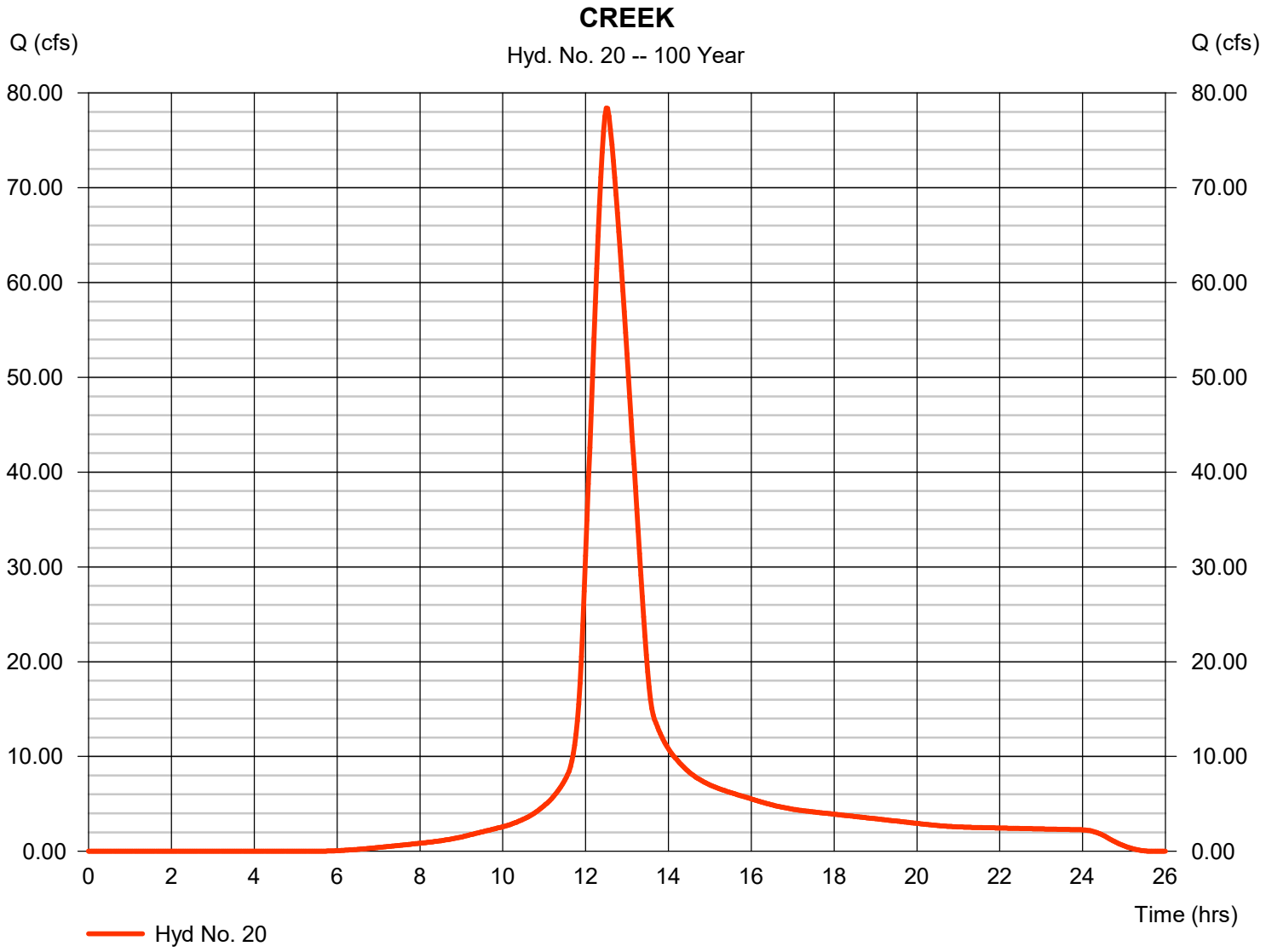
Hydrograph Report

Hyd. No. 20

CREEK

Hydrograph type	=	SCS Runoff	Peak discharge	=	78.40 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.50 hrs
Time interval	=	2 min	Hyd. volume	=	529,700 cuft
Drainage area	=	24.760 ac	Curve number	=	78*
Basin Slope	=	1.6 %	Hydraulic length	=	2986 ft
Tc method	=	LAG	Time of conc. (Tc)	=	64.20 min
Total precip.	=	8.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(4.400 x 94) + (20.360 x 74)] / 24.760

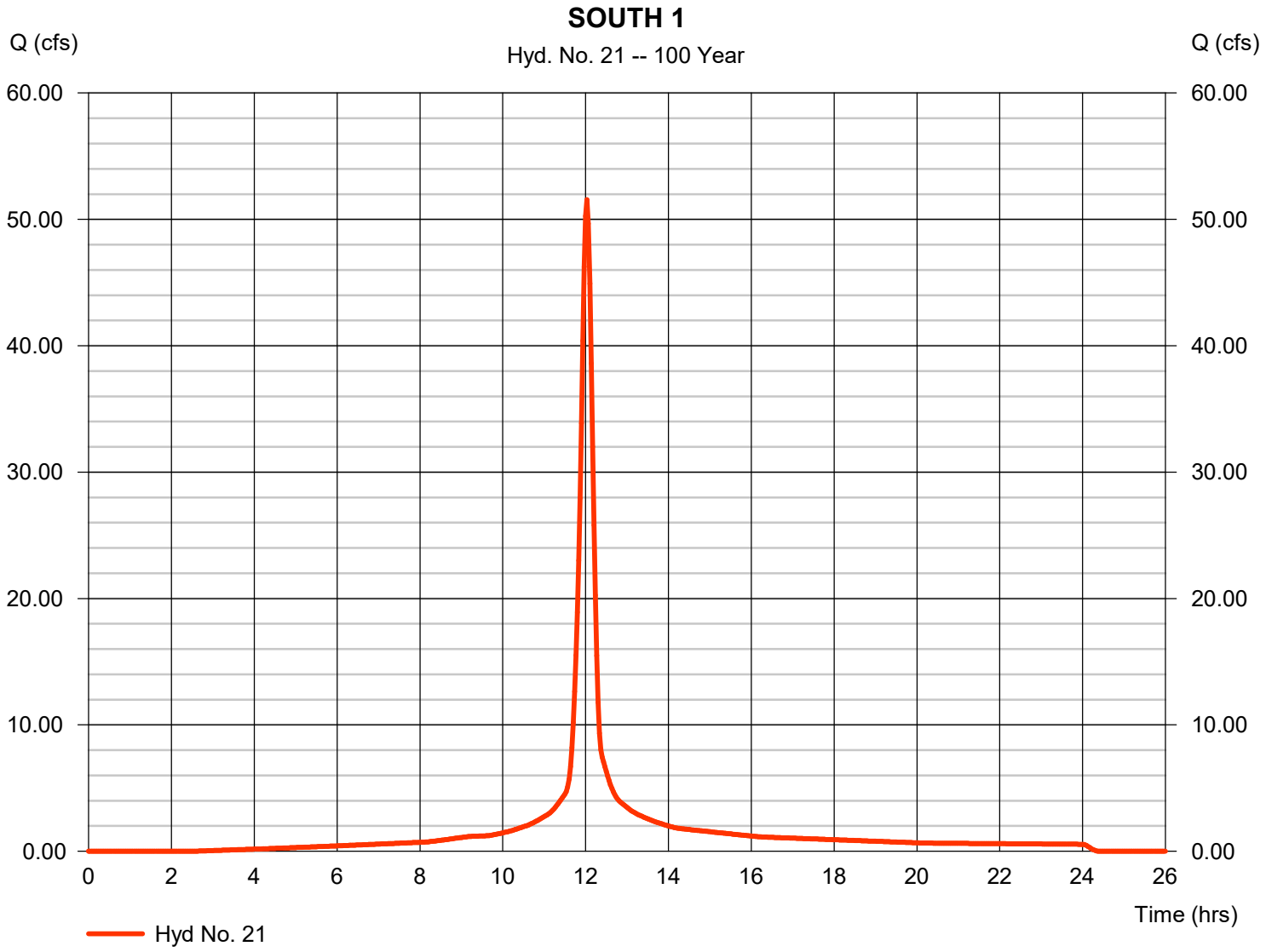


Hydrograph Report

Hyd. No. 21

SOUTH 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	51.57 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	155,755 cuft
Drainage area	=	6.030 ac	Curve number	=	90
Basin Slope	=	1.3 %	Hydraulic length	=	780 ft
Tc method	=	LAG	Time of conc. (Tc)	=	16.00 min
Total precip.	=	8.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

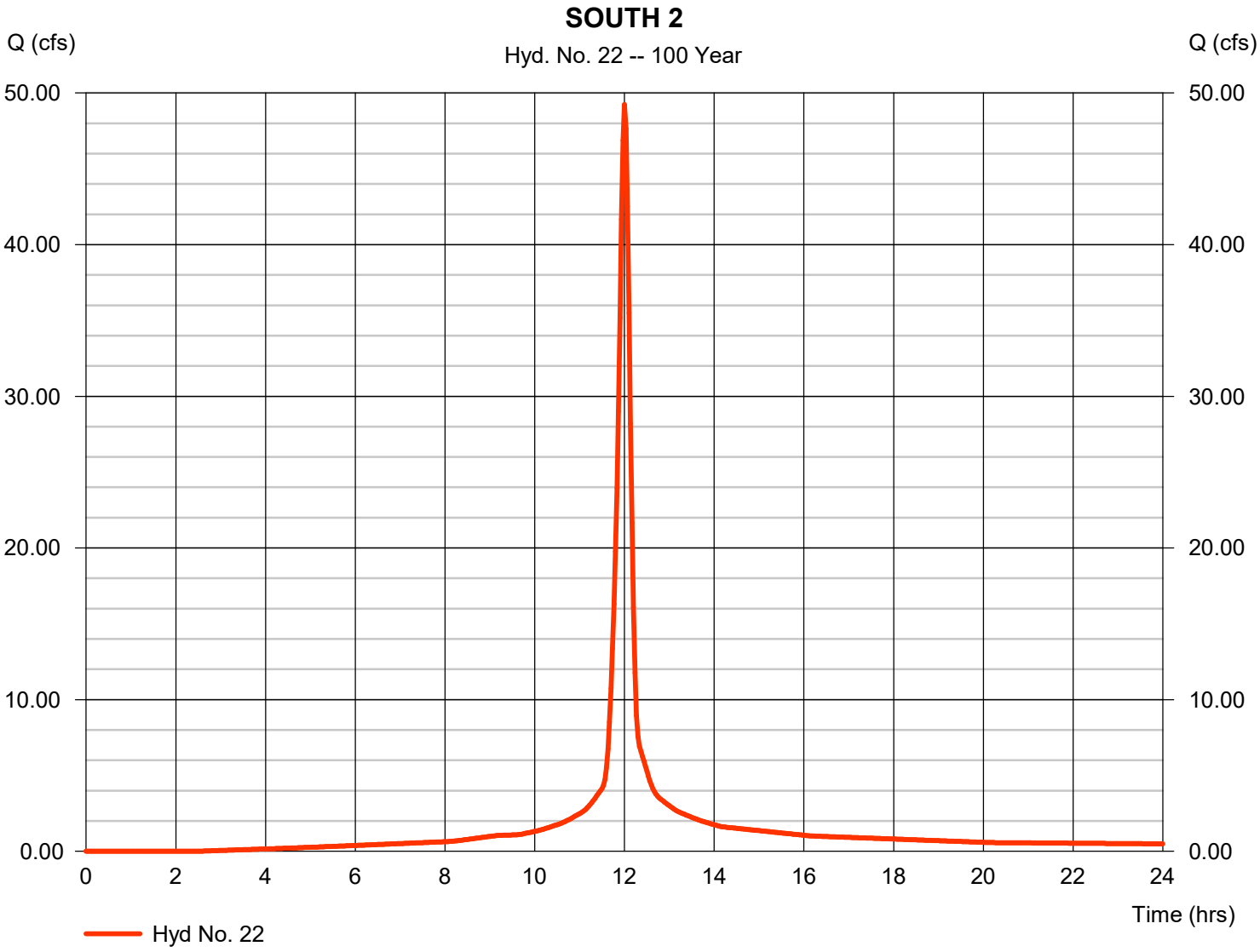


Hydrograph Report

Hyd. No. 22

SOUTH 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	49.24 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	137,967 cuft
Drainage area	=	5.050 ac	Curve number	=	90
Basin Slope	=	2.2 %	Hydraulic length	=	717 ft
Tc method	=	LAG	Time of conc. (Tc)	=	11.50 min
Total precip.	=	8.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

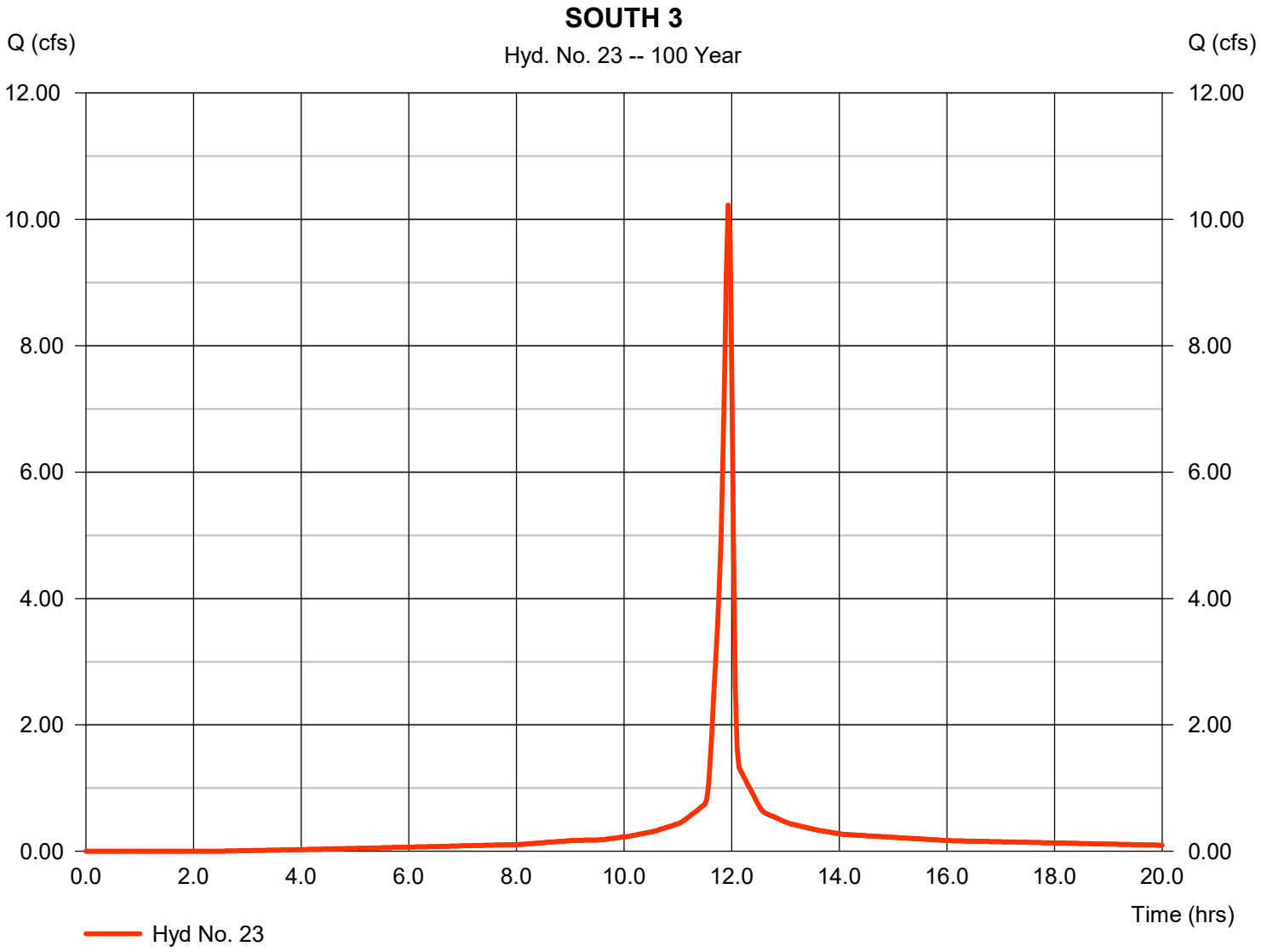


Hydrograph Report

Hyd. No. 23

SOUTH 3

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.22 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	22,850 cuft
Drainage area	=	0.920 ac	Curve number	=	90
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	8.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



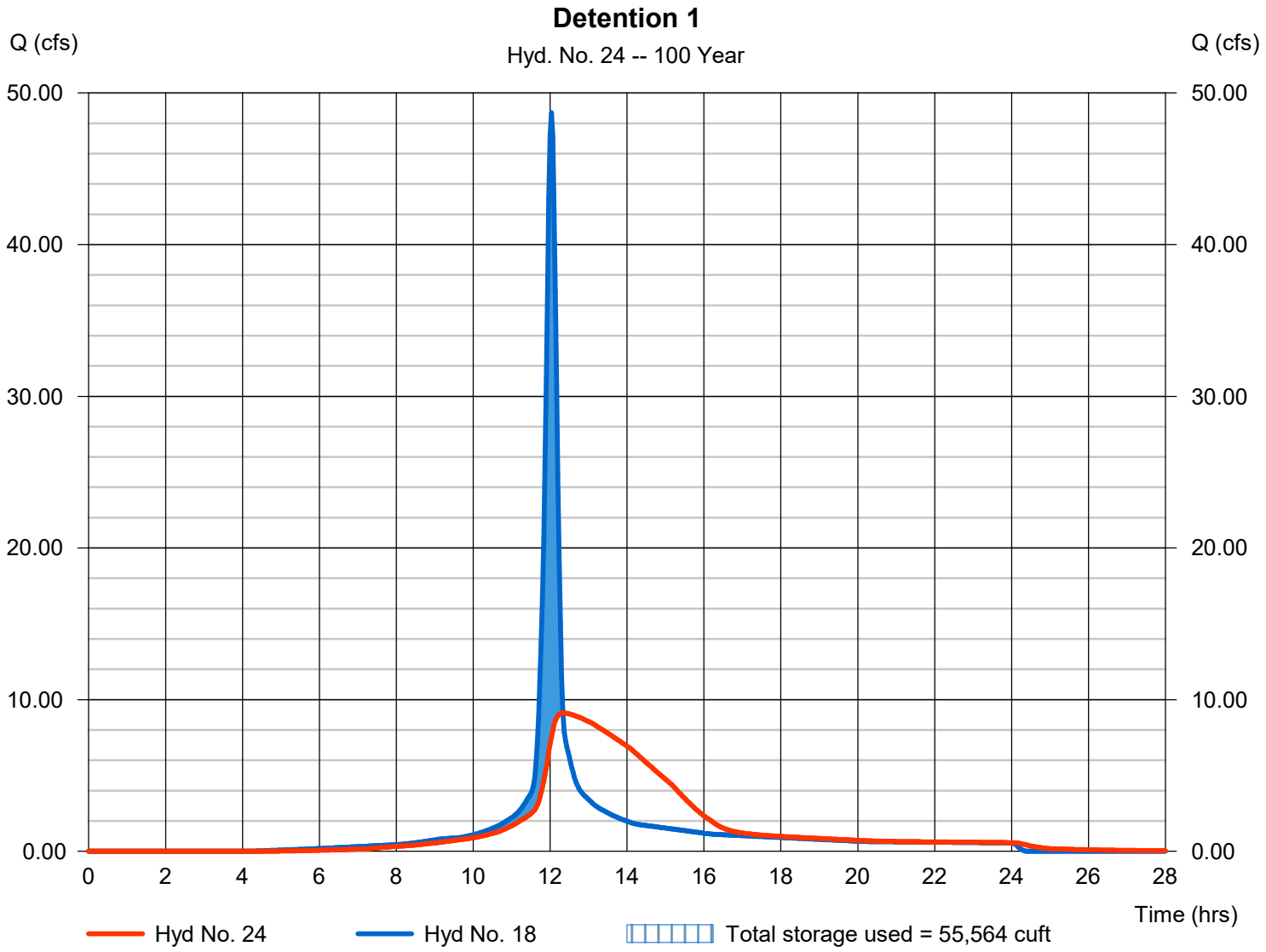
Hydrograph Report

Hyd. No. 24

Detention 1

Hydrograph type	=	Reservoir	Peak discharge	=	9.121 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.33 hrs
Time interval	=	2 min	Hyd. volume	=	141,202 cuft
Inflow hyd. No.	=	18 - WEST 2	Max. Elevation	=	868.89 ft
Reservoir name	=	Detention 1	Max. Storage	=	55,564 cuft

Storage Indication method used.



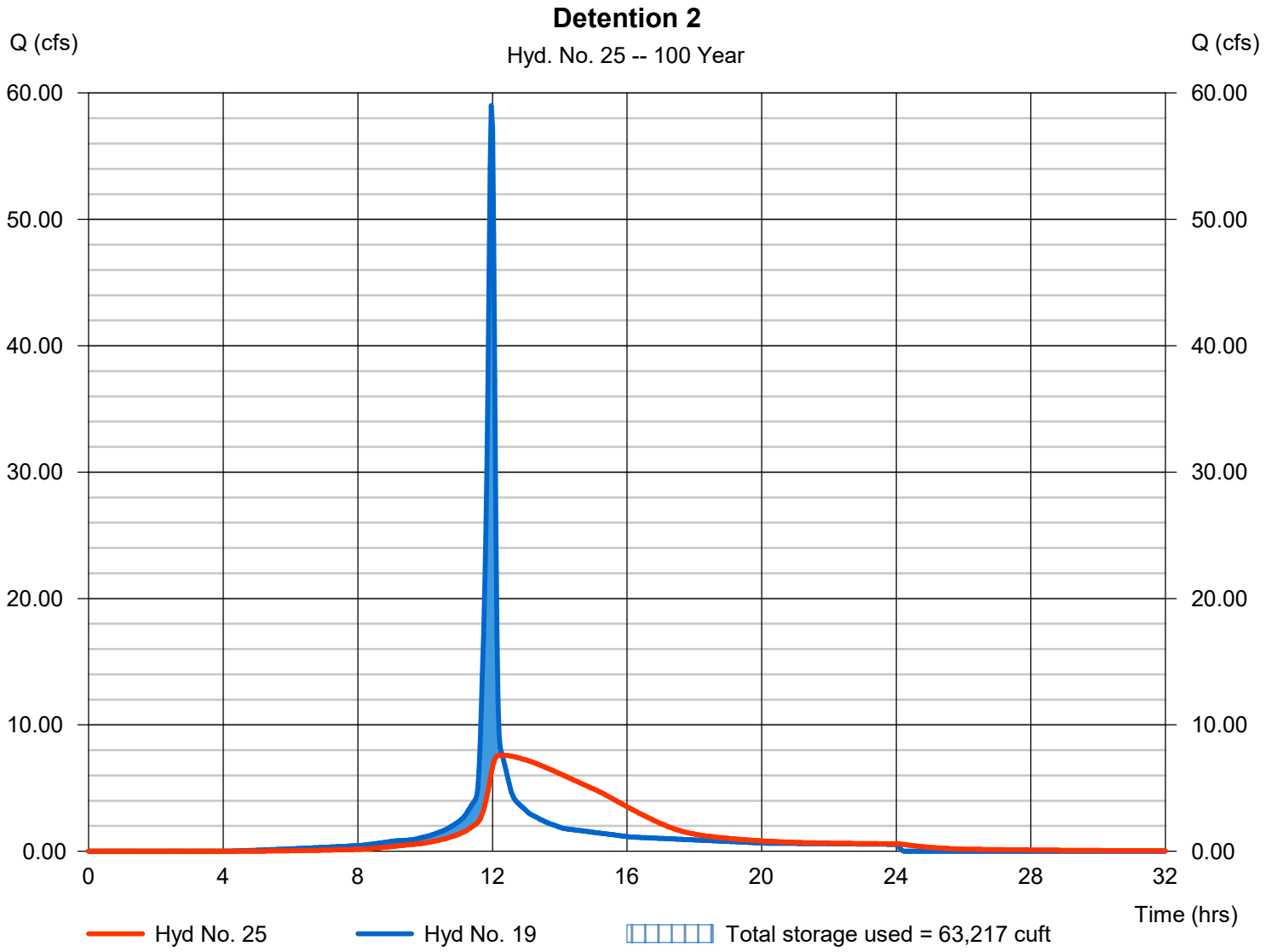
Hydrograph Report

Hyd. No. 25

Detention 2

Hydrograph type	=	Reservoir	Peak discharge	=	7.600 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.30 hrs
Time interval	=	2 min	Hyd. volume	=	141,065 cuft
Inflow hyd. No.	=	19 - WEST 3	Max. Elevation	=	860.54 ft
Reservoir name	=	Detention 2	Max. Storage	=	63,217 cuft

Storage Indication method used.



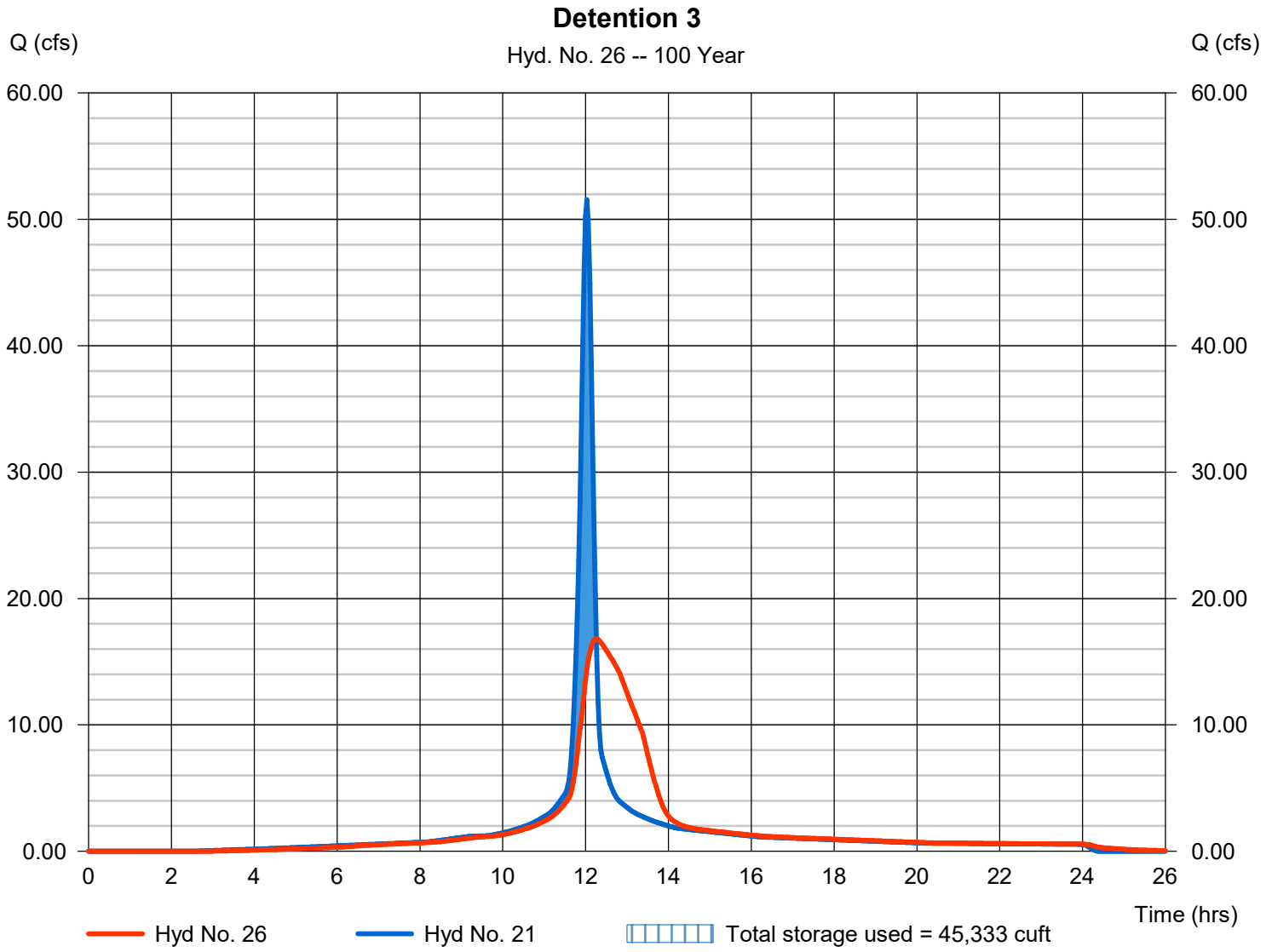
Hydrograph Report

Hyd. No. 26

Detention 3

Hydrograph type	=	Reservoir	Peak discharge	=	16.81 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.27 hrs
Time interval	=	2 min	Hyd. volume	=	155,752 cuft
Inflow hyd. No.	=	21 - SOUTH 1	Max. Elevation	=	859.44 ft
Reservoir name	=	Detention 3	Max. Storage	=	45,333 cuft

Storage Indication method used.



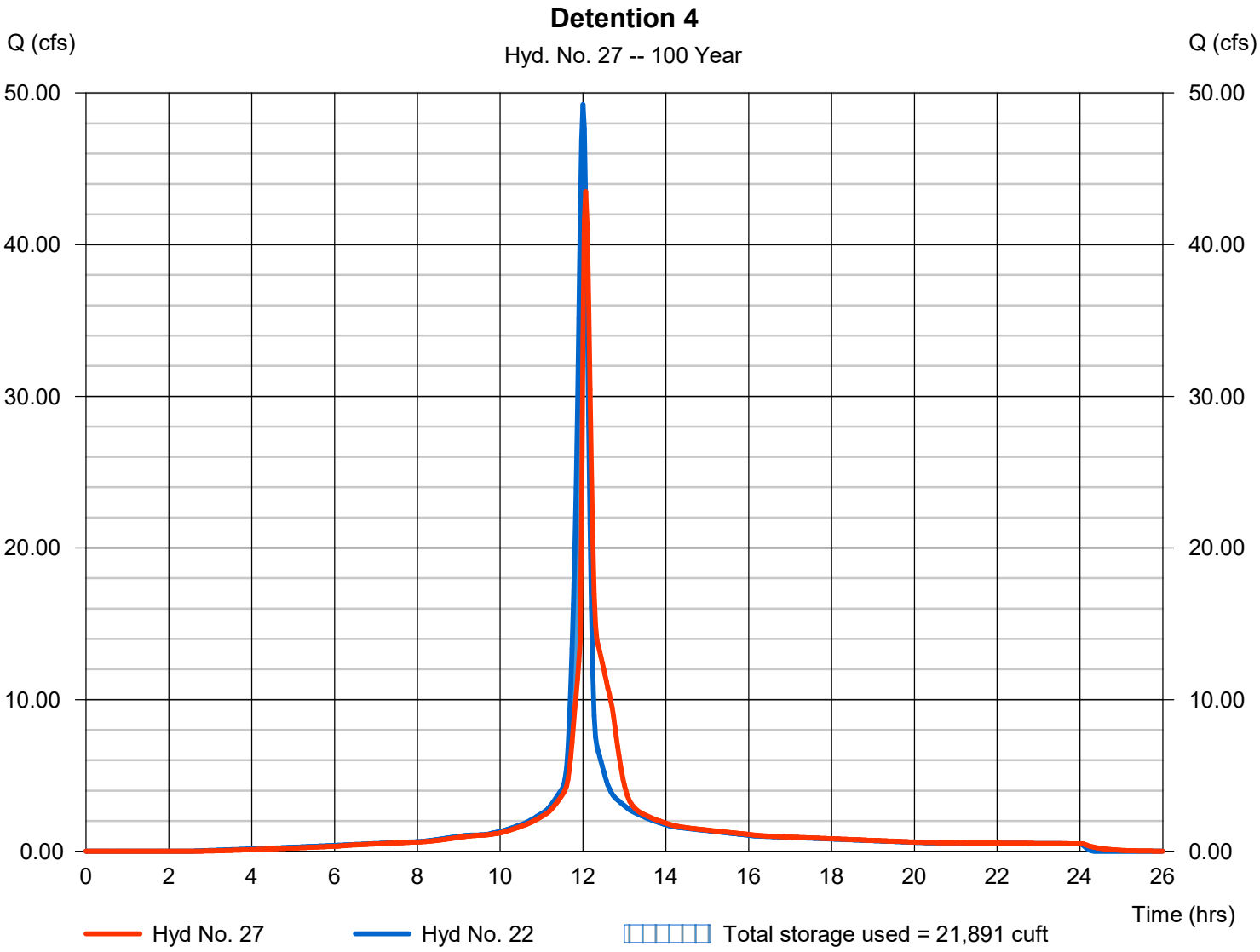
Hydrograph Report

Hyd. No. 27

Detention 4

Hydrograph type	=	Reservoir	Peak discharge	=	43.50 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	137,965 cuft
Inflow hyd. No.	=	22 - SOUTH 2	Max. Elevation	=	854.92 ft
Reservoir name	=	Detention 4	Max. Storage	=	21,891 cuft

Storage Indication method used.



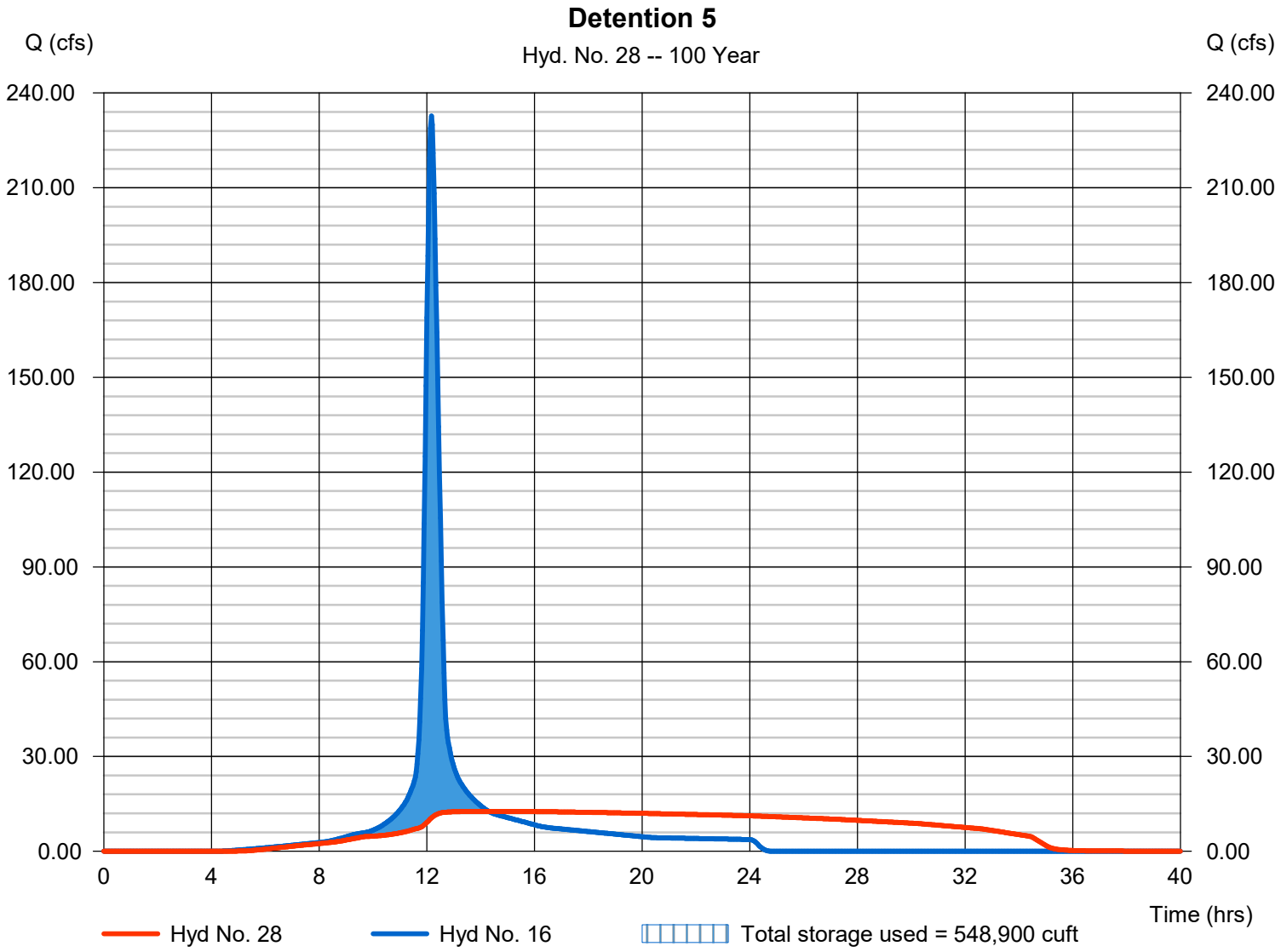
Hydrograph Report

Hyd. No. 28

Detention 5

Hydrograph type	=	Reservoir	Peak discharge	=	12.65 cfs
Storm frequency	=	100 yrs	Time to peak	=	14.30 hrs
Time interval	=	2 min	Hyd. volume	=	948,647 cuft
Inflow hyd. No.	=	16 - EAST	Max. Elevation	=	858.29 ft
Reservoir name	=	Detention 5	Max. Storage	=	548,900 cuft

Storage Indication method used.



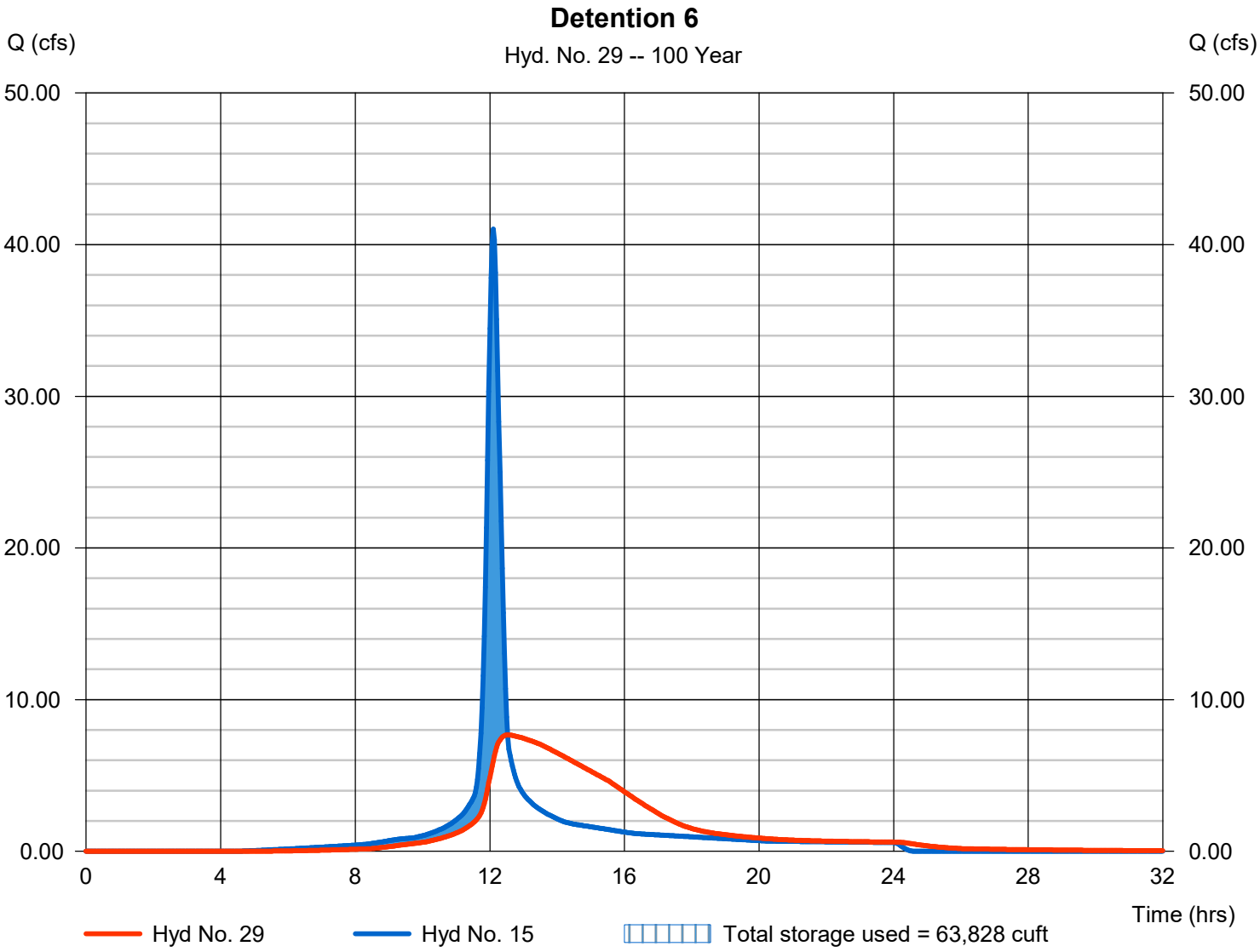
Hydrograph Report

Hyd. No. 29

Detention 6

Hydrograph type	=	Reservoir	Peak discharge	=	7.669 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.53 hrs
Time interval	=	2 min	Hyd. volume	=	144,421 cuft
Inflow hyd. No.	=	15 - NORTH 3	Max. Elevation	=	876.61 ft
Reservoir name	=	Detention 6	Max. Storage	=	63,828 cuft

Storage Indication method used.

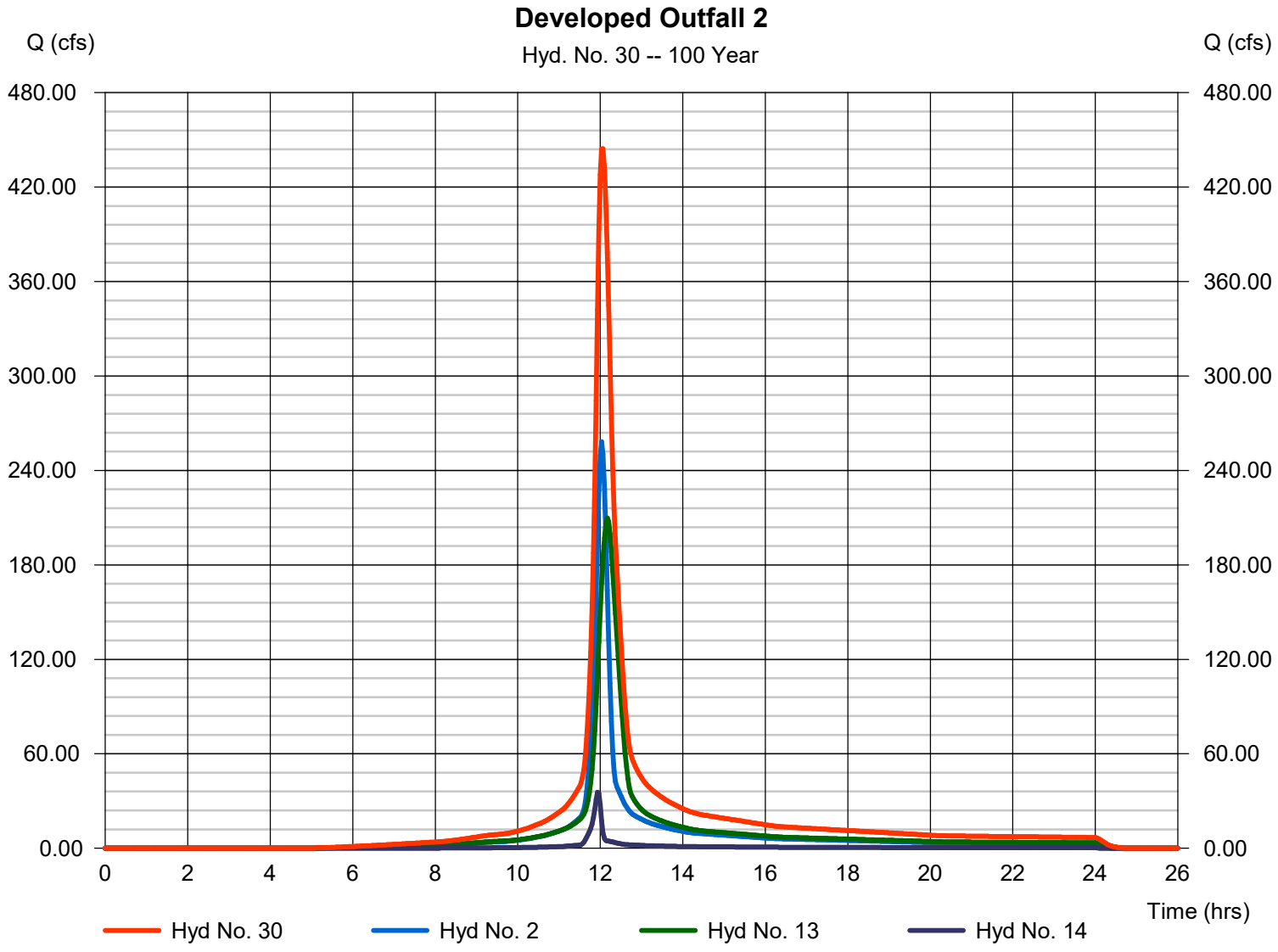


Hydrograph Report

Hyd. No. 30

Developed Outfall 2

Hydrograph type	= Combine	Peak discharge	= 444.35 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 1,660,309 cuft
Inflow hyds.	= 2, 13, 14	Contrib. drain. area	= 76.590 ac

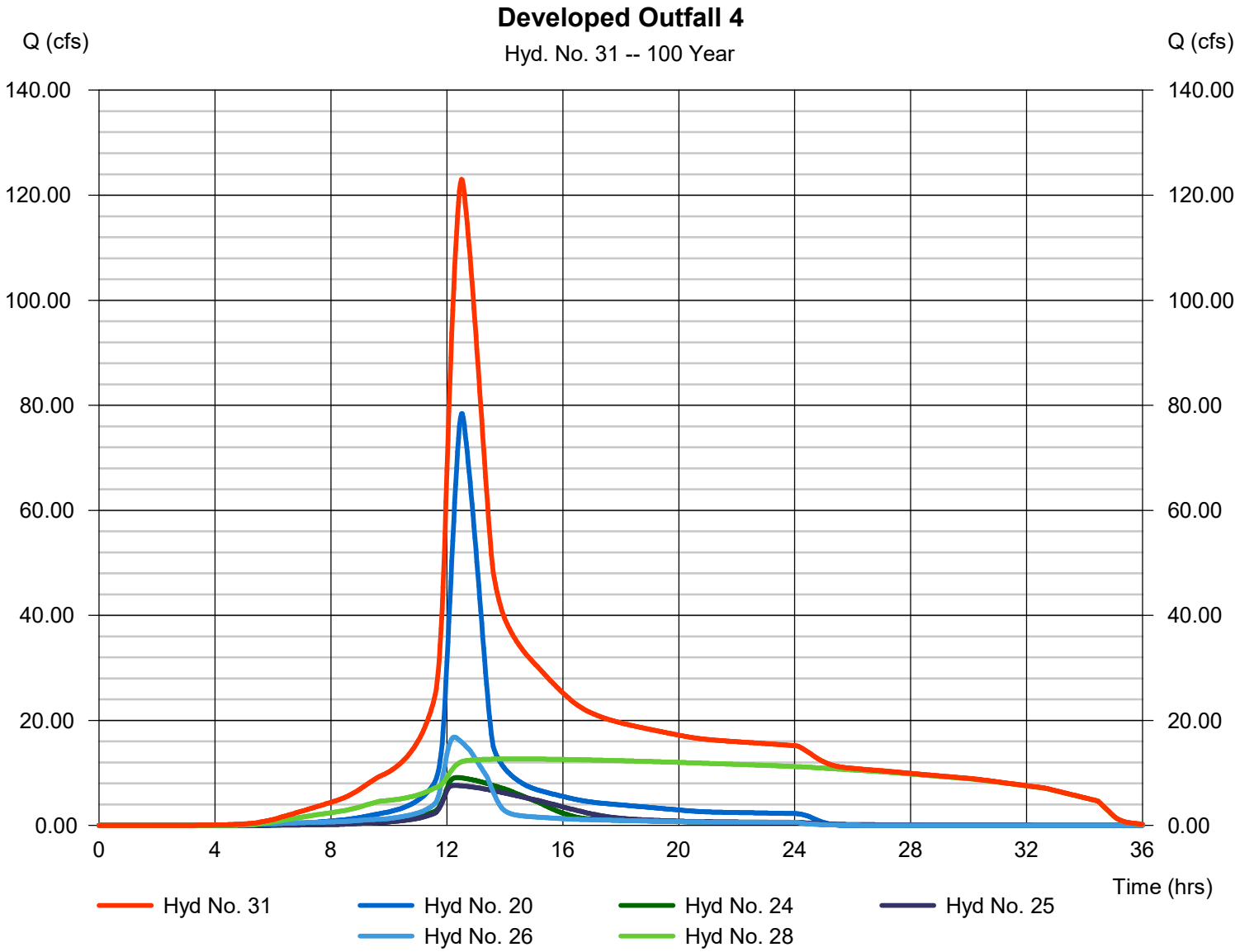


Hydrograph Report

Hyd. No. 31

Developed Outfall 4

Hydrograph type	= Combine	Peak discharge	= 123.01 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.50 hrs
Time interval	= 2 min	Hyd. volume	= 1,916,364 cuft
Inflow hyds.	= 20, 24, 25, 26, 28	Contrib. drain. area	= 24.760 ac

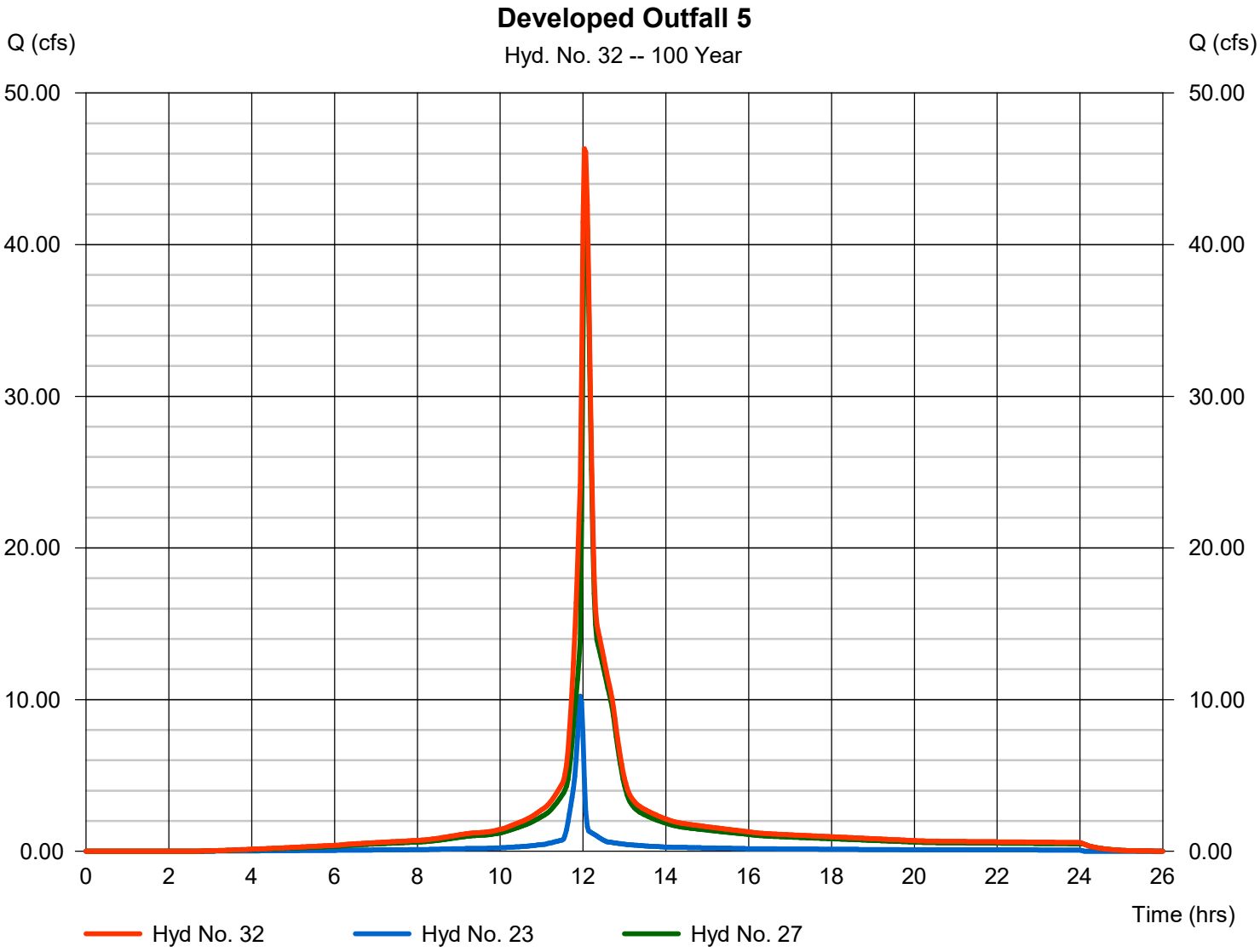


Hydrograph Report

Hyd. No. 32

Developed Outfall 5

Hydrograph type	= Combine	Peak discharge	= 46.32 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 160,815 cuft
Inflow hyds.	= 23, 27	Contrib. drain. area	= 0.920 ac

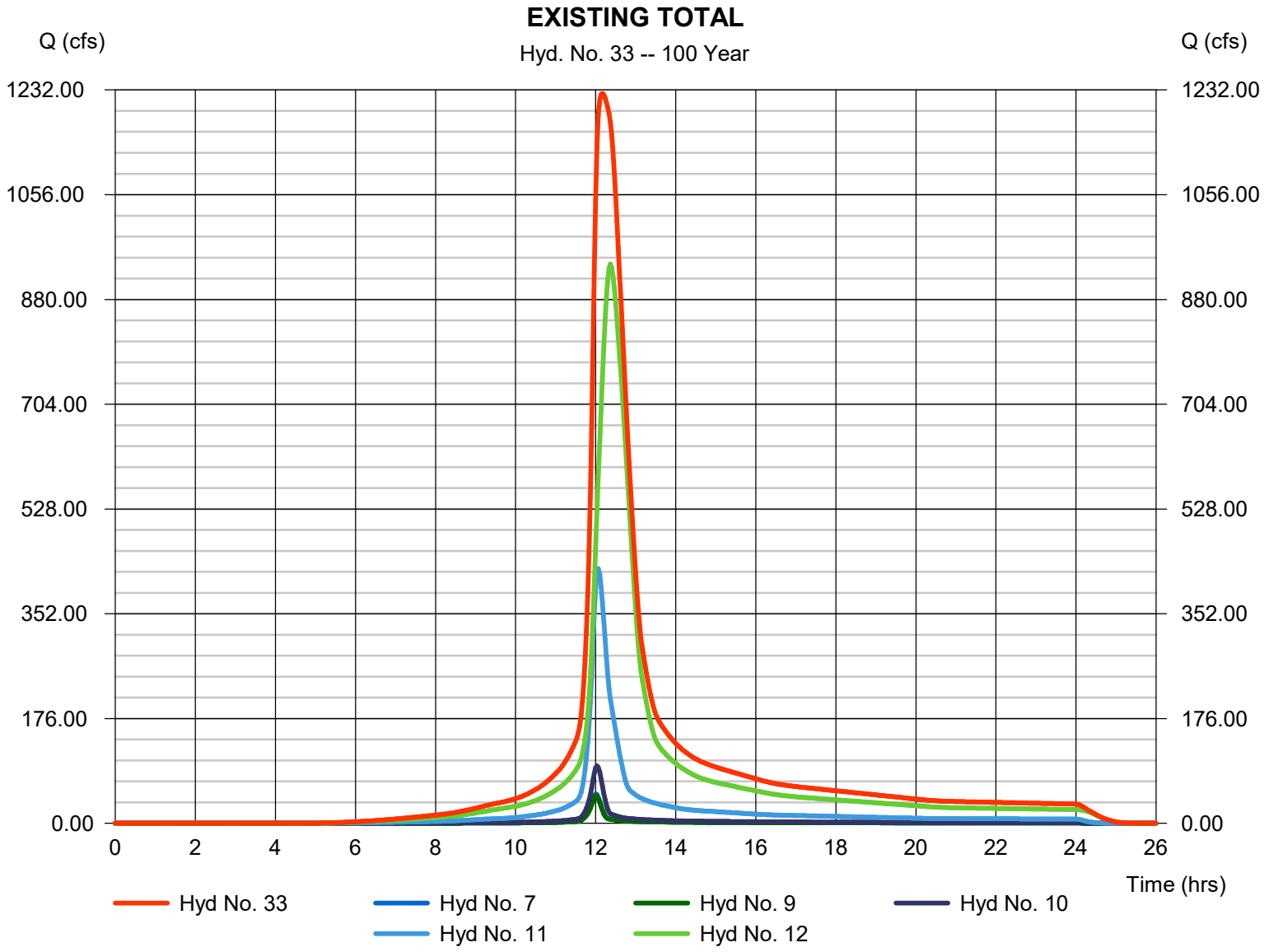


Hydrograph Report

Hyd. No. 33

EXISTING TOTAL

Hydrograph type	= Combine	Peak discharge	= 1226.15 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.17 hrs
Time interval	= 2 min	Hyd. volume	= 7,621,056 cuft
Inflow hyds.	= 7, 9, 10, 11, 12	Contrib. drain. area	= 12.440 ac

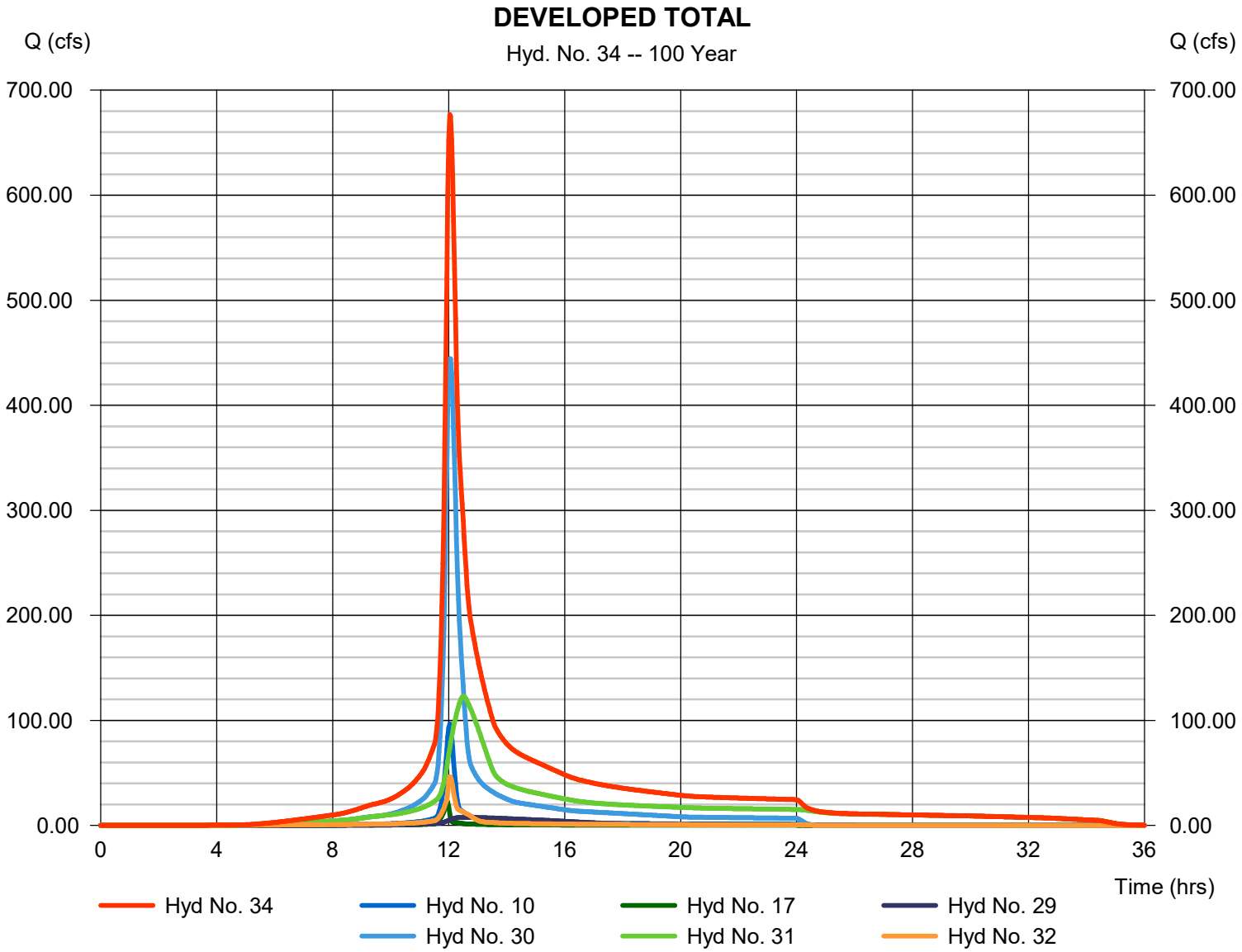


Hydrograph Report

Hyd. No. 34

DEVELOPED TOTAL

Hydrograph type	= Combine	Peak discharge	= 676.74 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 4,205,968 cuft
Inflow hyds.	= 10, 17, 29, 30, 31, 32	Contrib. drain. area	= 2.260 ac



United States Department of Agriculture

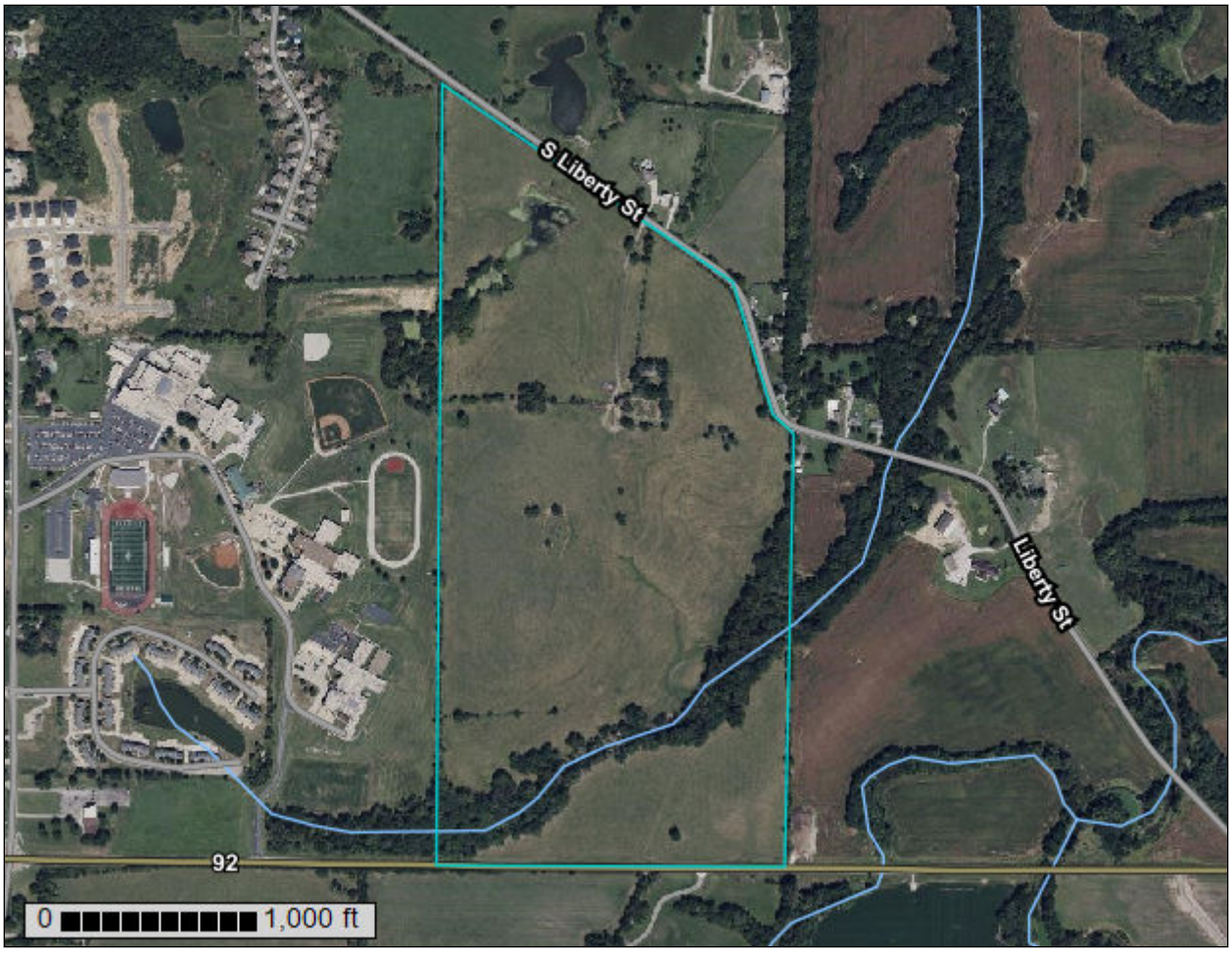
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Clay County, Missouri

Collins Ridge



March 3, 2026

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:7,070 if printed on A portrait (8.5" x 11") sheet.

N

0 100 200 400 600 Meters

0 300 600 1200 1800 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clay County, Missouri
Survey Area Data: Version 27, Sep 3, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 30, 2022—Sep 16, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
10120	Sharpsburg silt loam, 2 to 5 percent slopes	18.4	13.6%
10122	Sharpsburg silt loam, 5 to 9 percent slopes, eroded	70.7	52.3%
10123	Sharpsburg silt loam, 9 to 14 percent slopes, eroded	5.6	4.1%
10132	Sibley silt loam, 2 to 5 percent slopes	4.7	3.5%
10133	Sibley silt loam, 5 to 9 percent slopes	9.6	7.1%
10142	Snead-Rock outcrop complex, 5 to 14 percent slopes	0.5	0.3%
30024	Armster loam, 9 to 14 percent slopes, eroded	25.8	19.1%
Totals for Area of Interest		**135.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit

descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Clay County, Missouri

10120—Sharpsburg silt loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2yy7v
Landscape: Uplands
Elevation: 1,000 to 1,300 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 177 to 220 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Sharpsburg and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sharpsburg

Setting

Landscape: Uplands
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 6 inches: silt loam
A - 6 to 16 inches: silty clay loam
Bt1 - 16 to 22 inches: silty clay loam
Bt2 - 22 to 46 inches: silty clay loam
BC - 46 to 58 inches: silty clay loam
C - 58 to 79 inches: silty clay loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 45 to 50 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C
Ecological site: R109XY002MO - Loess Upland Prairie

Hydric soil rating: No

Minor Components

Higginsville, eroded

Percent of map unit: 5 percent
Landscape: Uplands
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R109XY002MO - Loess Upland Prairie
Hydric soil rating: No

Sibley

Percent of map unit: 5 percent
Landscape: Uplands
Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R109XY002MO - Loess Upland Prairie
Hydric soil rating: No

10122—Sharpsburg silt loam, 5 to 9 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2yy7x
Landscape: Uplands
Elevation: 1,000 to 1,300 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 177 to 220 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Sharpsburg, eroded, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sharpsburg, Eroded

Setting

Landscape: Uplands
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex

Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 6 inches: silt loam
A - 6 to 8 inches: silty clay loam
Bt1 - 8 to 18 inches: silty clay loam
Bt2 - 18 to 46 inches: silty clay loam
BC - 46 to 58 inches: silty clay loam
C - 58 to 79 inches: silty clay loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 45 to 50 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Minor Components

Higginsville, eroded

Percent of map unit: 5 percent
Landscape: Uplands
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R109XY002MO - Loess Upland Prairie
Hydric soil rating: No

10123—Sharpsburg silt loam, 9 to 14 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2yy7t
Landscape: Uplands
Elevation: 1,000 to 1,300 feet
Mean annual precipitation: 33 to 41 inches

Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 177 to 220 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Sharpsburg, eroded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sharpsburg, Eroded

Setting

Landscape: Uplands
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 6 inches: silt loam
A - 6 to 10 inches: silty clay loam
Bt1 - 10 to 18 inches: silty clay loam
Bt2 - 18 to 40 inches: silty clay loam
BC - 40 to 48 inches: silty clay loam
C - 48 to 79 inches: silty clay loam

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 31 to 50 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Minor Components

Armster, eroded

Percent of map unit: 5 percent
Landscape: Uplands
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex

Across-slope shape: Convex
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Higginsville, eroded

Percent of map unit: 5 percent
Landscape: Uplands
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

10132—Sibley silt loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2ql0d
Landscape: Hills
Elevation: 760 to 1,440 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 49 to 55 degrees F
Frost-free period: 155 to 220 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Sibley and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sibley

Setting

Landscape: Hills
Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess

Typical profile

Ap1 - 0 to 11 inches: silt loam
Ap2 - 11 to 18 inches: silt loam
Bt - 18 to 49 inches: silty clay loam
C - 49 to 72 inches: silty clay loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

Minor Components

Higginsville, eroded

Percent of map unit: 3 percent
Landscape: Uplands
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R109XY002MO - Loess Upland Prairie
Hydric soil rating: No

Macksburg

Percent of map unit: 2 percent
Landscape: Uplands
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R108XD860IA - Loess Upland Prairie
Hydric soil rating: No

10133—Sibley silt loam, 5 to 9 percent slopes

Map Unit Setting

National map unit symbol: 2ql0f
Landscape: Hills
Elevation: 710 to 1,470 feet
Mean annual precipitation: 31 to 47 inches
Mean annual air temperature: 48 to 55 degrees F
Frost-free period: 175 to 220 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Sibley and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sibley

Setting

Landscape: Hills
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess

Typical profile

Ap1 - 0 to 11 inches: silt loam
Ap2 - 11 to 18 inches: silt loam
Bt - 18 to 49 inches: silty clay loam
C - 49 to 72 inches: silty clay loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

Minor Components

Higginsville, eroded

Percent of map unit: 3 percent
Landscape: Uplands
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R109XY002MO - Loess Upland Prairie
Hydric soil rating: No

Knox

Percent of map unit: 2 percent
Landscape: Uplands
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, summit, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F107XB004MO - Deep Loess Protected Backslope Woodland, R107XB003MO - Deep Loess Exposed Backslope Savanna
Hydric soil rating: No

10142—Snead-Rock outcrop complex, 5 to 14 percent slopes

Map Unit Setting

National map unit symbol: 2zccq
Landscape: Till plains
Elevation: 720 to 1,120 feet
Mean annual precipitation: 37 to 41 inches
Mean annual air temperature: 52 to 55 degrees F
Frost-free period: 175 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

Snead and similar soils: 65 percent
Rock outcrop: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Snead

Setting

Landscape: Till plains
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from limestone and shale

Typical profile

A - 0 to 10 inches: flaggy silty clay loam
Bw - 10 to 20 inches: silty clay
BC - 20 to 24 inches: silty clay
C - 24 to 35 inches: silty clay
Cr - 35 to 45 inches: bedrock

Properties and qualities

Slope: 5 to 14 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock

Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 24 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R109XY010MO - Interbedded Sedimentary Upland Savanna
Hydric soil rating: No

Description of Rock Outcrop

Typical profile
R - 0 to 79 inches: bedrock

Properties and qualities
Slope: 5 to 14 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Minor Components

Sampsel
Percent of map unit: 5 percent
Landscape: Hills
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Concave
Ecological site: R109XY010MO - Interbedded Sedimentary Upland Savanna
Hydric soil rating: Yes

Armster, eroded
Percent of map unit: 4 percent
Landscape: Hills
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R109XY046MO - Till Upland Savanna
Hydric soil rating: No

Ladoga, eroded

Percent of map unit: 4 percent
Landscape: Dissected till plains
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R109XY002MO - Loess Upland Prairie
Hydric soil rating: No

Kennebec, occasionally flooded

Percent of map unit: 2 percent
Landscape: Hills
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R109XY028MO - Loamy Upland Drainageway Savanna
Hydric soil rating: No

30024—Armster loam, 9 to 14 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2qmw0
Landscape: Hills
Elevation: 550 to 1,100 feet
Mean annual precipitation: 35 to 41 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 177 to 209 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Armster and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Armster

Setting

Landscape: Hills
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Pedisediment over till

Typical profile

Ap - 0 to 10 inches: loam
2Bt - 10 to 47 inches: clay loam
2C - 47 to 70 inches: loam

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 36 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R109XY046MO - Till Upland Savanna
Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf