Stormwater &
Water Quality Calculations

Center Grove Wellness Center
Johnson County, Indiana

Prepared: 8-8-2022

Prepared By:

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Section 1: Stormwater Calculations Summary

Introduction & Pre-Developed Conditions

The Center Grove Wellness Center site is located on the west side of Morgantown Road adjacent to the existing Center Grove Highschool at 2836 S Morgantown Road in Johnson County, IN. See Exhibit 1 for the project Location Map

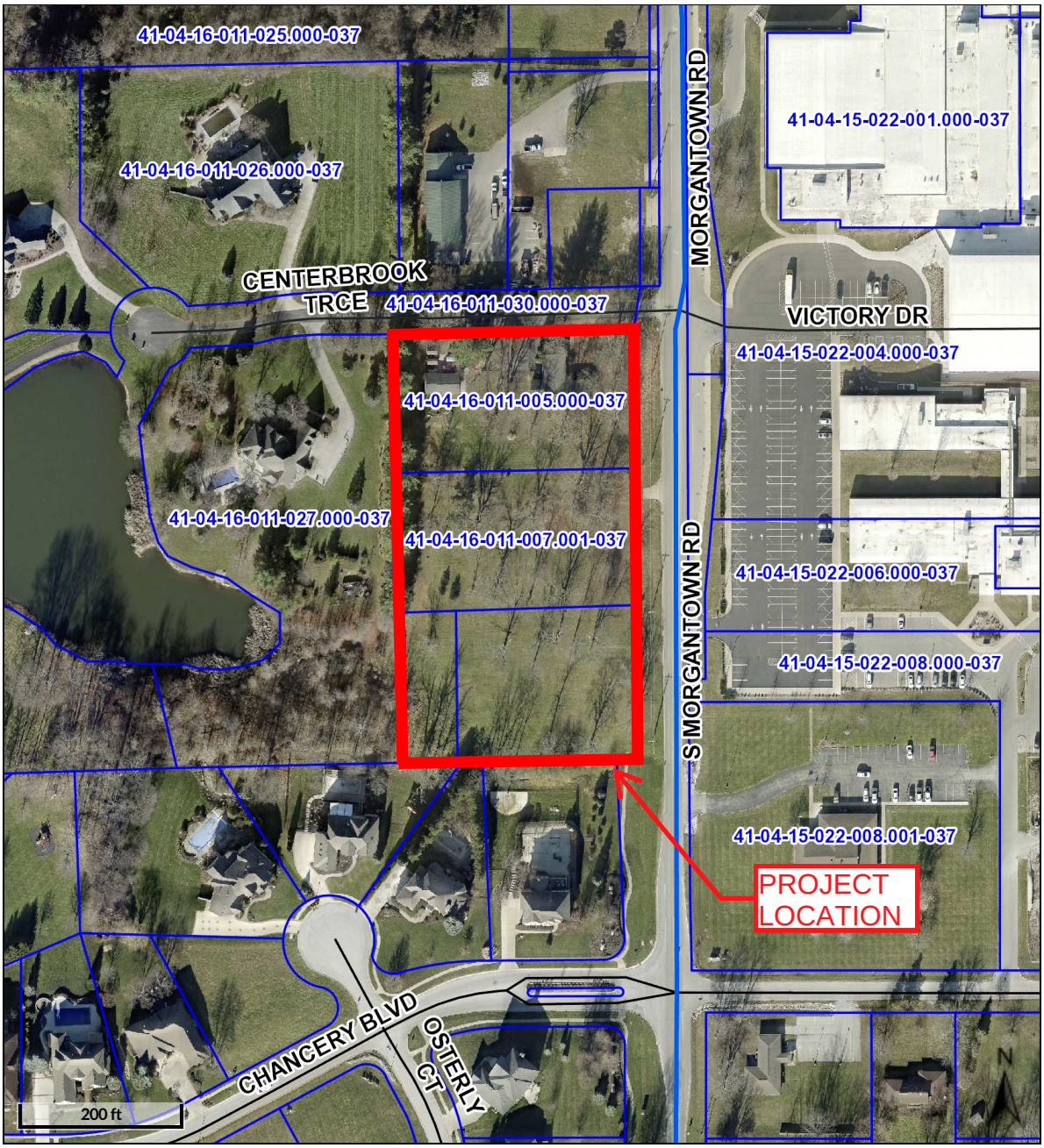
The existing site primarily consists of open grass lawn area, as there were three residential homes that previously existed on the site that have since been demolished. The entire project area is approximately 3.34 acres and is zoned Residential R-1. Based on the existing topography, the pre-developed site consists of one onsite drainage basin. Within the area delineated as Existing Basin 1, runoff sheet flows to the southwest corner of the site to a swale that then drains to a wet pond just west of the project site (see Exhibit 2: Pre-Developed Conditions). Per the FEMA Flood Insurance Rate Map Number 18081C0105D with an effective date of August 2, 2007, the subject properties are within Zone X, areas determined to be outside the 0.2% annual chance floodplain.

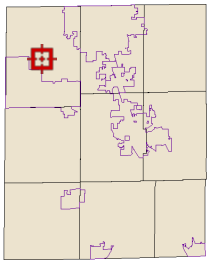
Post-Development Conditions

This project includes the construction of a ±6,600 square foot wellness center building, curbs, sidewalks, parking areas, and driveways. An onsite storm sewer network will collect and treat runoff for both quantity and quality. Stormwater quantity and quality requirements will be met via a proposed dry detention basin at the southwest corner of the site. Runoff will outlet from the detention outlet structure to the existing swale adjacent to the pond following existing drainage patterns. The storm sewer and dry pond were also designed to accommodate a potential building expansion or future building just south of the proposed wellness center. The dry basin was designed to serve the Post-Developed Basin 1 area with a curve number of 83 (See Exhibit 3: Post Developed Conditions).

Beacon™ Johnson County, IN

Exhibit 1 - Project Location Map





Legend

- Cities
- Parcels

Roads

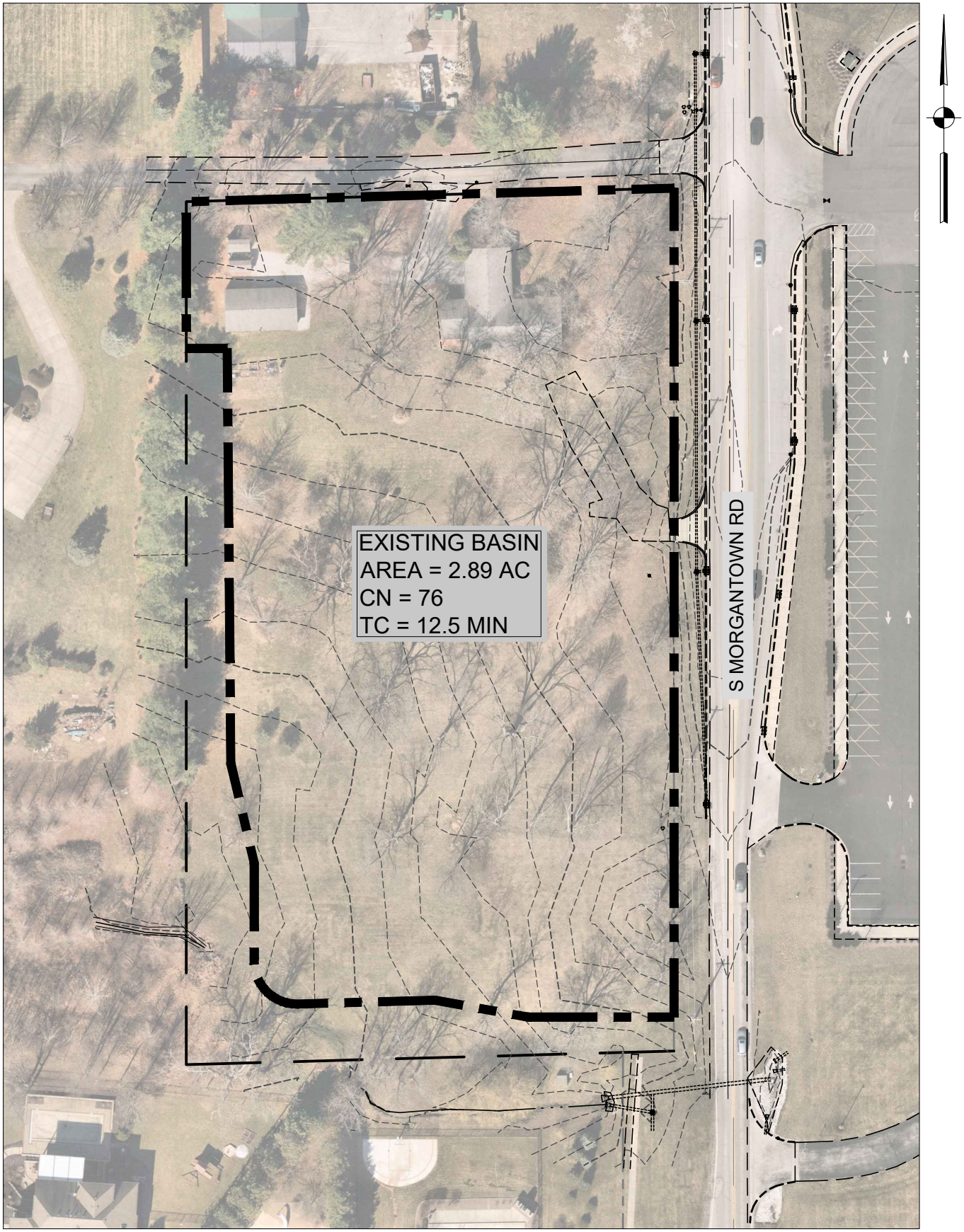
- ACCESS RAMP
- HIGHWAY
- INTERSTATE
- LOCAL
- MAJOR ARTERIAL
- MAJOR COLLECTOR
- MINOR ARTERIAL
- MINOR COLLECTOR
- PRIVATE ROAD

Date created: 8/8/2022
Last Data Uploaded: 8/2/2022 8:33:06 PM

Developed by Schneider GEOSPATIAL

CENTER GROVE WELLNESS CENTER

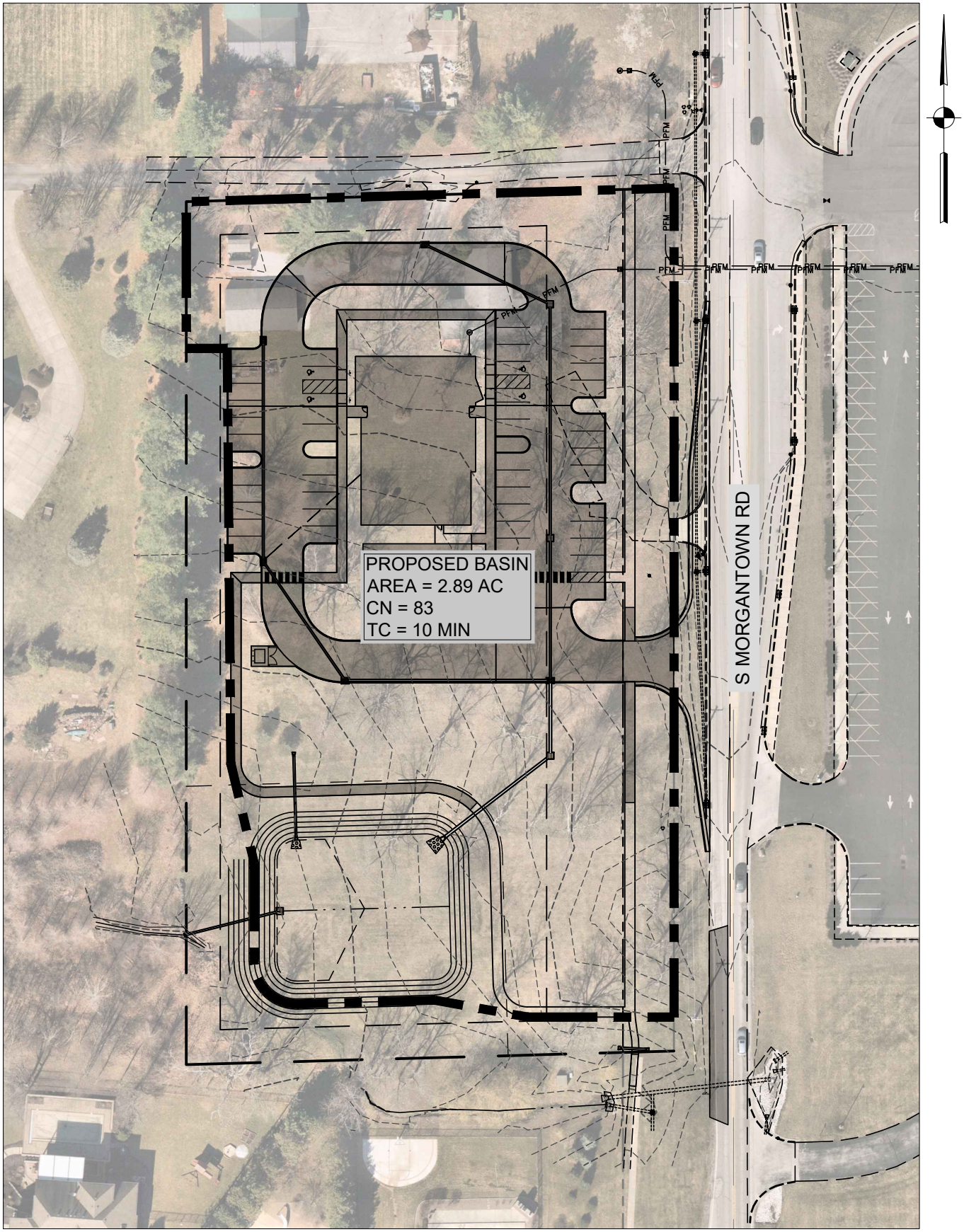
EXHIBIT 2 - PRE-DEVELOPED CONDITIONS



SCALE: 1" = 80'

CENTER GROVE WELLNESS CENTER

EXHIBIT 3 - POST-DEVELOPED CONDITIONS



SCALE: 1" = 80'

Section 2: Hydrologic Modeling Calculations

All drainage calculations were completed and modeled using AutoCAD Hydraflow. The SCS Curvilinear method utilizing the Huff rainfall distribution was used to calculate the hydrographs. The TR-55 Method was used to calculate times of concentration. Curve numbers were computed based on the applicable land use and the percentage by area of each hydrologic soil type obtained from the USGS Soil Web Survey. The soil map and the rating of the existing soils is included in this section.

Soil Hydrologic Group Percentage Calculations

Table 1 **Pre-Development Soil Hydrologic Group Percentage Calculations**		
Soil Type	**Hydrologic Group – C (acres)**	**Hydrologic Group – D (acres)**
Crosby Urban land Miami Silt Loam Complex	71%	29%

Table 2 **Pre-Development Curve Number Calculation**			
Soil Type	**Hydrologic Group – C**	**Hydrologic Group – D**	**Weighted CN**
Grass (Good Condition)	74 (71%)	80 (29%)	76

Table 3 **Post-Development Curve Number Calculation**				
Soil Type	**Area**	**Hydrologic Group – C**	**Hydrologic Group – D**	**Weighted CN**
Grass (Good Condition)	2.28 Acres	74 (71%)	80 (29%)	76
Impervious	1.06 Acres	98	98	98
			Total Weighted CN (3.34 acres)	**83**

Hydrologic Modeling Runoff Summary

The Johnson County Subdivision Control Ordinance requires a detention design that adheres to the following release rates:

$Q_{10p} = Q_{2e}$

$Q_{100p} = Q_{10e}$

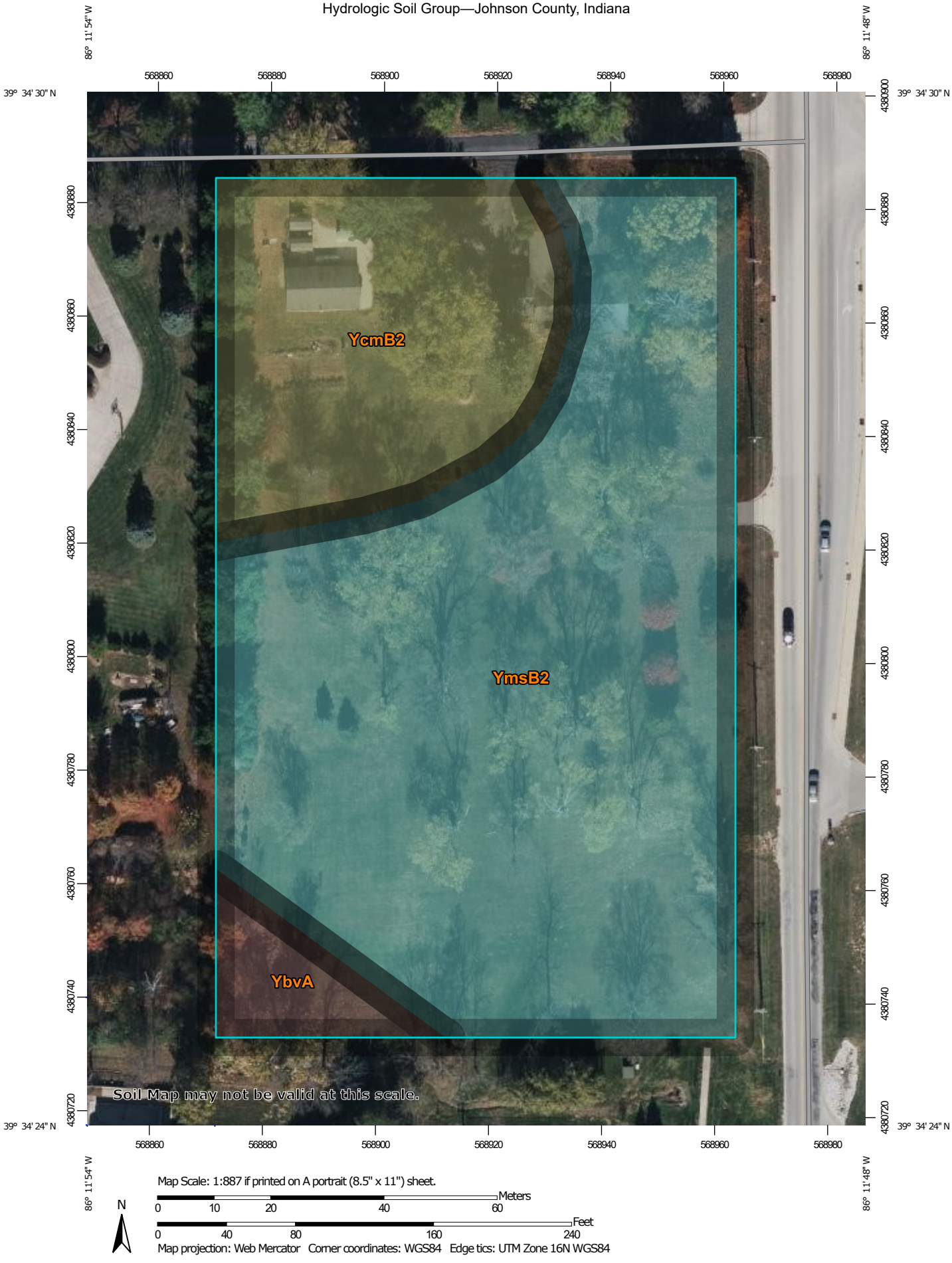
where:
Q_{2e} = 2-year discharge rate for the existing condition
Q_{10p} = 10-year discharge rate for the proposed (developed) condition
Q_{10e} = 10-year discharge rate for the existing condition
Q_{100p} = 100-year discharge rate for the proposed (developed) condition

There are grass areas on the west and south sides of the property perimeter that, due to the topography and existing flow patterns, cannot be captured and routed to the pond without significant impacts to existing buffer vegetation. To account for this, the area used to determine the allowable release rates was therefore reduced to include only areas of disturbance which will be routed through the dry basin. It should be noted that all impervious area proposed will be routed through the detention facility. The 2-year, and 10-year storm events are calculated at durations of 1, 2, 3, 6, 12, and 24 hours to identify the critical storm event which is to be used for the respective limiting pre-development rates. Table 4 summarizes the peak runoff rates (cfs) resulting from hydrologic modeling for pre-development conditions. All hydrographs can be found in Section 4 of this report.

Table 4
Pre-Development Hydrograph Peak Runoff Rate Summary

	Storm Duration					
	1 Hour	2 Hours	3 Hours	6 Hours	12 Hours	24 Hours
2	**3.24**	1.83	1.26	0.66	0.49	0.39
10	**9.60**	5.37	3.66	1.89	1.32	0.85

Allowable Discharge Rates
In accordance with the release rates summarized in table 4 for Existing Basin 1, the allowable discharge rates are as follows:
Q_{10p} = 3.24 cfs
Q_{100p} = 9.60 cfs



Map Scale: 1:887 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 10 20 40 60

Feet
0 40 80 160 240

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

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 1:15,800.

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: Johnson County, Indiana
Survey Area Data: Version 29, Sep 8, 2021

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

Date(s) aerial images were photographed: Oct 22, 2020—Nov 12, 2020

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
YbvA	Brookston silty clay loam-Urban land complex, 0 to 2 percent slopes	B/D	0.1	4.3%
YcmB2	Crosby-Urban land-Miami silt loams complex, 2 to 4 percent slopes, eroded	C/D	0.8	24.5%
YmsB2	Miami silt loam-Urban land complex, 2 to 6 percent slopes, eroded	C	2.5	71.1%
Totals for Area of Interest			**3.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Section 3: Water Quality Calculations

Water quality requirements for the project will be met via the onsite dry detention basin. The Subdivision Control Ordinance requires a detention system designed to detain, for over 24 hours after peak runoff, at least 20% of the runoff from either a 1 ¼" inch storm or 0.5" inches of direct runoff, whichever is greater. Per the hydrograph report included in this section, the total volume generated from the 1 ¼" storm is 2,644 cft, and 20% would equate to 611 cft of water quality volume. The 0.5" of direct runoff results in 5,245 cft of storage, which is the controlling volume. The minimum 2" orifice size was used at the bottom of pond elevation, and the hydrograph report shows that the pond is still storing runoff at the 26.6-hour mark 24 hours after the peak at 2.6 hours.

Section 4: Detention Calculations

Stormwater detention is addressed by detaining the critical 10-year post-development peak runoff rate to the critical 2-year pre-development peak runoff and detaining the critical 100-year post-development peak runoff rate to the critical 10-year pre-development peak rate associated with the existing onsite basin. The release rate and storage curve hydrographs can be found in Appendix A.

Allowable Discharge Rate

Q_{10p} = 3.24 cfs
Q_{100p} = 9.60 cfs

Outlet Structure Summary (see Appendix A: Reservoir and Routing Data, Outlet Structure Reports)

In order to meet the allowable release rates, the proposed outlet structure will utilize a 2" and a 5.25" diameter orifice. The high flows will outlet via the inlet structure R-4215-C casting. The actual release rates and water surface elevations associated with this outlet structure are included below.

Routed Storm Hydrographs (see Appendix A: Reservoir and Routing Data, Storage Indication Hydrographs for both orifice sizes)

- Peak 10 Year Post-Development Discharge Rate = **3.16 cfs** < 3.24 cfs (allowable)
- Peak 100 Year Post-Development Discharge Rate = **4.53 cfs** < 9.61 cfs (allowable)
  Peak Water Surface Elev. = **760.53** (Inv. of emergency spillway)

All post-development storms are discharged at a flowrate at or below their respective allowable discharge rates. All post-development storms produce a peak water surface elevation below the emergency spillway elevation.

Emergency Scenario

An emergency spillway shall be constructed on the west end of the detention basin and shall be designed to pass 1.25*Q_{100} in the event the detention outlet structure becomes plugged and/or overwhelmed. The total flow through the spillway was calculated using the peak 100-year flow from post-developed basin at 22.9 cfs and multiplied by 1.25 resulting in a 28.63 cfs minimum flow rate to be used for the spillway design. The design summary for the emergency spillway is included in this section. The maximum depth is 0.33' for a maximum water surface elevation of 760.86. The top of bank is 762.00 which provides a total of 1.14' of freeboard.

TIME OF CONCENTRATION or TRAVEL TIME WORKSHEET

Project: 6009 S Emerson Ave

Designer: CDM **Date:** 6/2/2021

Str. No.: EX BASIN 1

Sheet Flow

1. **Surface Description**	GRASS							
2. **Manning's Roughness Coeff., (n)**	0.160							
3. **Flow Length, (L) **total L<= 100 ft**	100.00	ft.			ft.			ft.
4. **Two-yr 24-hr Rainfall, (P2)**	2.64	in.			in.			in.
5. **Land Slope, (s)**	0.0190	ft./ft.			ft./ft.			ft./ft.
6. **Travel Time, (Tt)** **(Tt = [0.007(nL)^0.8]/[P2^0.5*s^0.4])**	0.193	hr	+		hr	+		hr

Shallow Concentrated Flow

7. **Surface Description (paved or unpaved)**	**GRASS**								
8. **Flow Length, (L)**	594.00	ft.			ft.			ft.	
9. **Watercourse Slope, (s)**	0.0190	ft./ft.			ft./ft.			ft./ft.	
10. **Average Velocity, (V)** **(Vp = 20.683(s)^0.5)** **(Vup = 16.393(s)^0.5)**	2.851	ft./s		0.000	ft./s		0.000	ft./s	**Watershed or Subarea Tc or Tt =** **0.251 hr** **or** **15.07 min**
11. **Travel Time, (Tt)** **(Tt = L/3600V)**	0.058	hr	+	0.000	hr	+	0.000	hr	

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

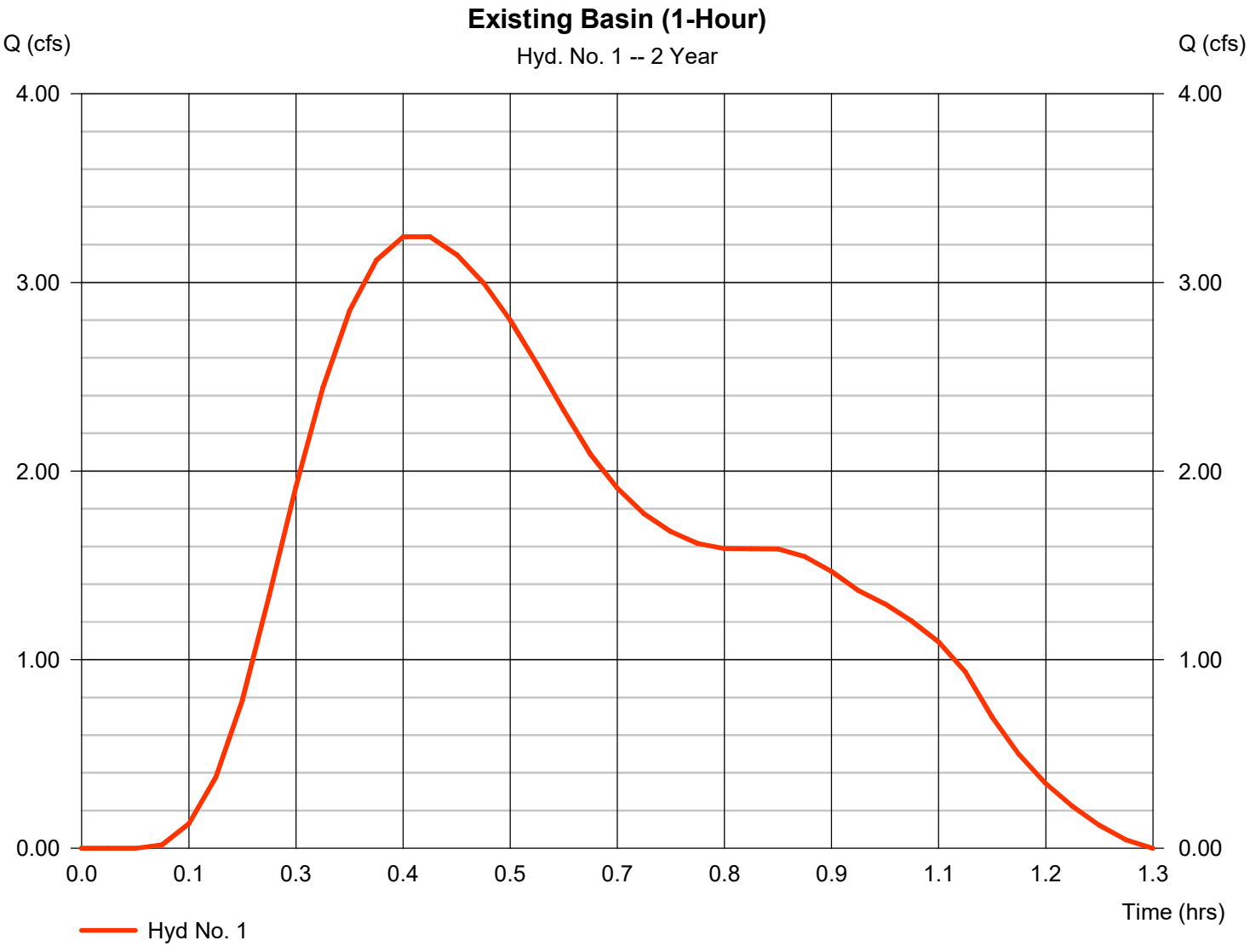
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	3.242	2	26	6,955	------	------	------	Existing Basin (1-Hour)
2	SCS Runoff	1.833	2	36	6,993	------	------	------	Existing Basin (2-Hour)
3	SCS Runoff	1.263	2	50	6,995	------	------	------	Existing Basin (3-Hour)
4	SCS Runoff	0.661	2	92	6,995	------	------	------	Existing Basin (6-Hour)
5	SCS Runoff	0.485	2	324	6,996	------	------	------	Existing Basin (12-Hour)
6	SCS Runoff	0.338	2	936	6,996	------	------	------	Existing Basin (24-Hour)
8	SCS Runoff	5.310	2	22	10,707	------	------	------	Proposed Basin (1-Hour)
9	SCS Runoff	2.969	2	34	10,771	------	------	------	Proposed Basin (2-Hour)
10	SCS Runoff	2.034	2	46	10,770	------	------	------	Proposed Basin (3-Hour)
11	SCS Runoff	1.034	2	90	10,771	------	------	------	Proposed Basin (6-Hour)
12	SCS Runoff	0.741	2	324	10,773	------	------	------	Proposed Basin (12-Hour)
13	SCS Runoff	0.483	2	936	10,773	------	------	------	Proposed Basin (24-Hour)
15	Reservoir	0.794	2	68	10,684	8	758.60	9,330	Detained 1-Hour
16	Reservoir	0.597	2	126	10,747	9	758.53	8,675	Detained 2-Hour
17	Reservoir	0.463	2	164	10,747	10	758.47	8,169	Detained 3-Hour
18	Reservoir	0.283	2	314	10,747	11	758.38	7,330	Detained 6-Hour
19	Reservoir	0.198	2	552	10,749	12	758.32	6,770	Detained 12-Hour
20	Reservoir	0.127	2	1300	10,750	13	758.23	5,958	Detained 24-Hour
22	SCS Runoff	0.873	2	722	2,644	------	------	------	Water Quality Storm
23	SCS Runoff	3.436	3	81	5,231	------	------	------	0.5IN Direct Runoff
24	Reservoir	0.102	3	156	5,208	23	758.09	4,755	Water Quality Detained

Hydrograph Report

Hyd. No. 1

Existing Basin (1-Hour)

Hydrograph type	= SCS Runoff	Peak discharge	= 3.242 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.43 hrs
Time interval	= 2 min	Hyd. volume	= 6,955 cuft
Drainage area	= 2.890 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.50 min
Total precip.	= 2.42 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

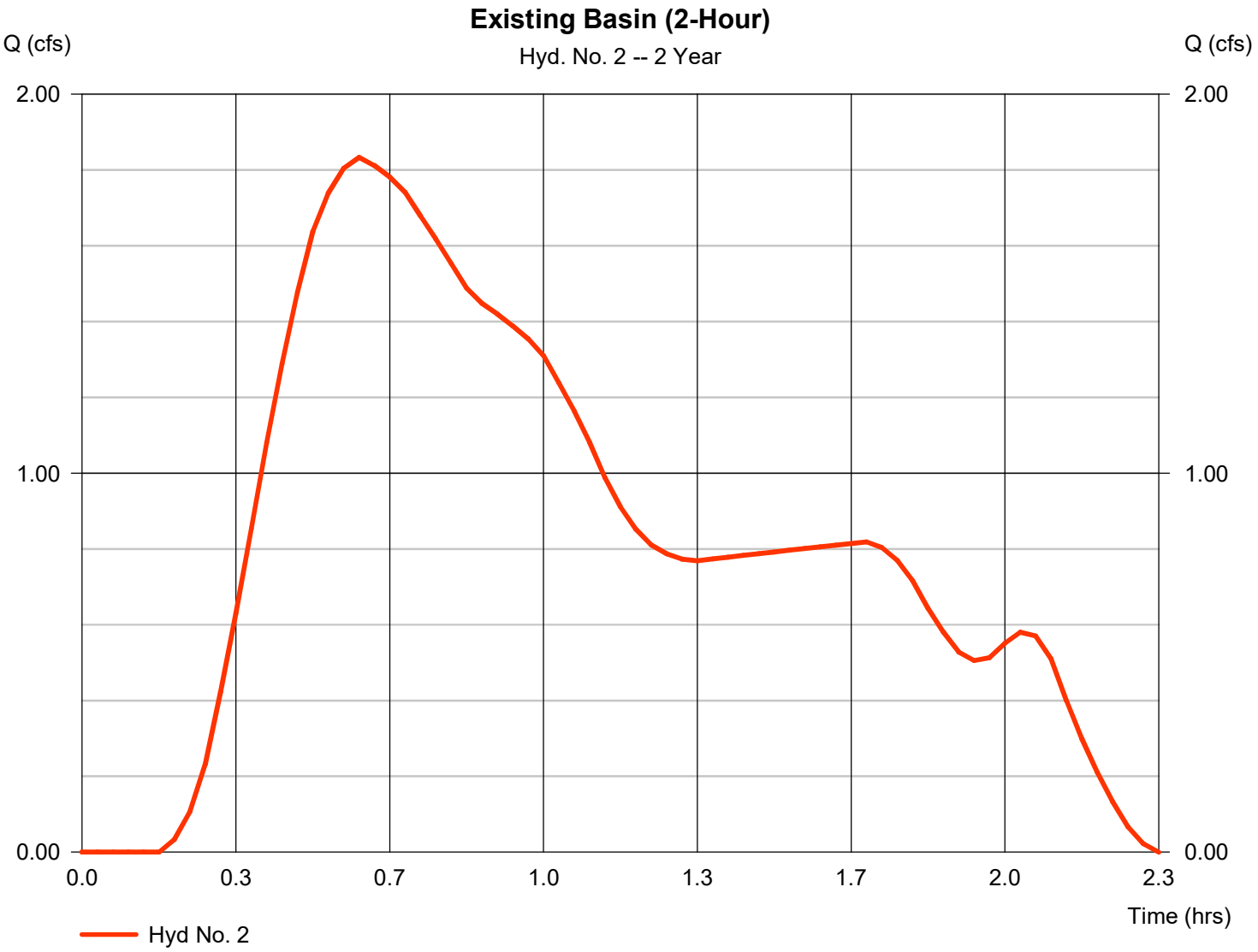


Hydrograph Report

Hyd. No. 2

Existing Basin (2-Hour)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.833 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.60 hrs
Time interval	= 2 min	Hyd. volume	= 6,993 cuft
Drainage area	= 2.890 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.50 min
Total precip.	= 2.42 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

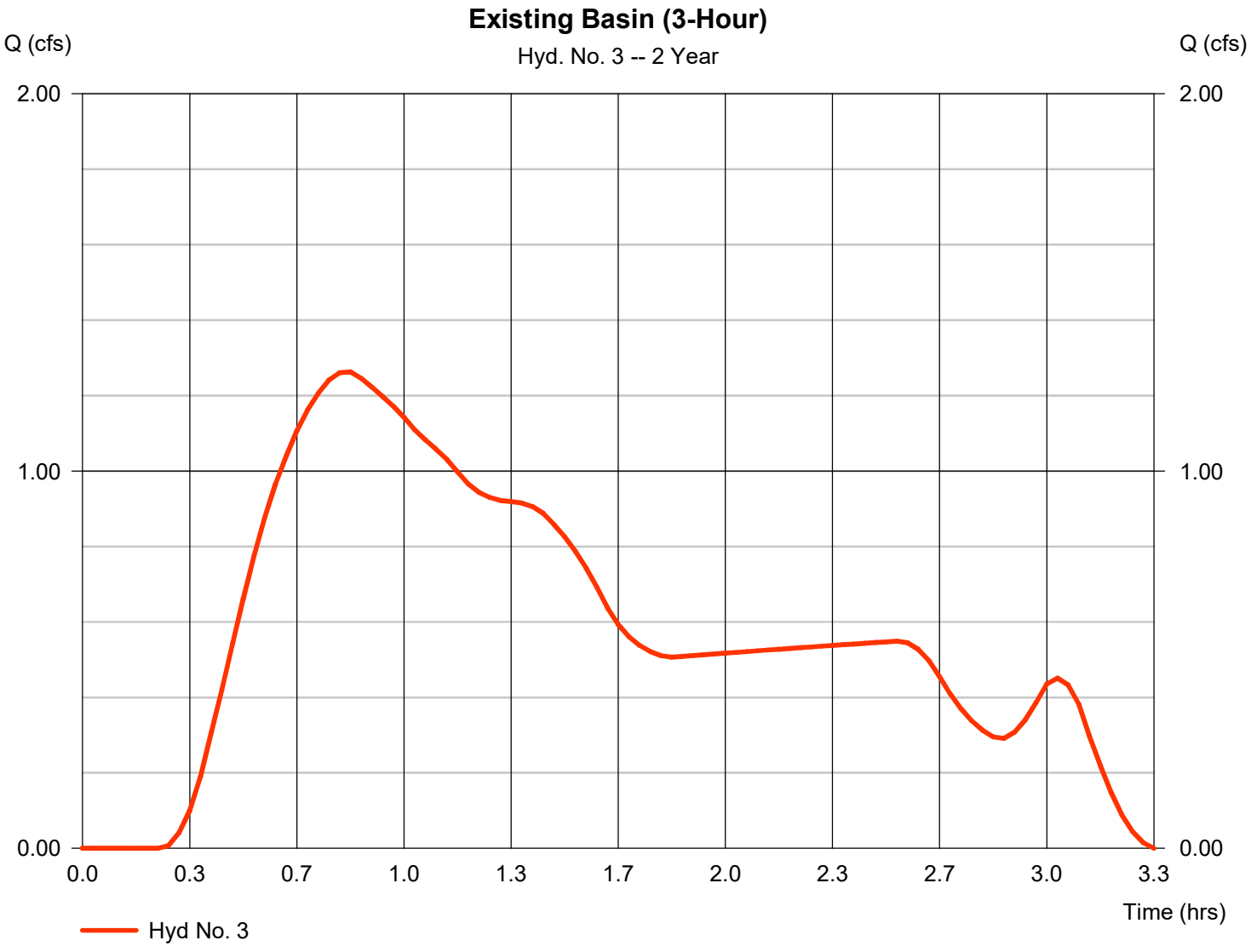


Hydrograph Report

Hyd. No. 3

Existing Basin (3-Hour)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.263 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.83 hrs
Time interval	= 2 min	Hyd. volume	= 6,995 cuft
Drainage area	= 2.890 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.50 min
Total precip.	= 2.42 in	Distribution	= Huff-1st
Storm duration	= 3.00 hrs	Shape factor	= 484

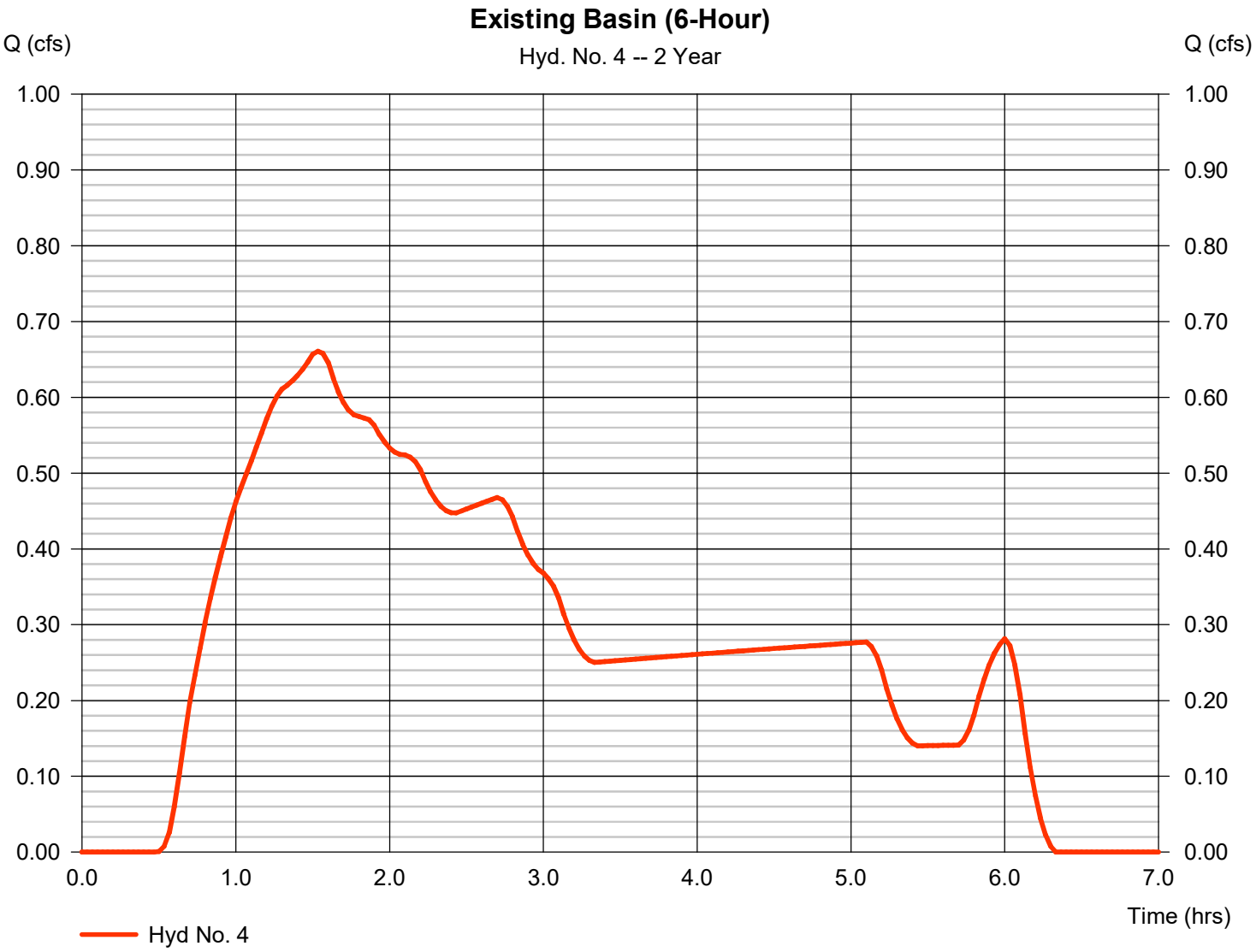


Hydrograph Report

Hyd. No. 4

Existing Basin (6-Hour)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.661 cfs
Storm frequency	= 2 yrs	Time to peak	= 1.53 hrs
Time interval	= 2 min	Hyd. volume	= 6,995 cuft
Drainage area	= 2.890 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.50 min
Total precip.	= 2.42 in	Distribution	= Huff-1st
Storm duration	= 6.00 hrs	Shape factor	= 484

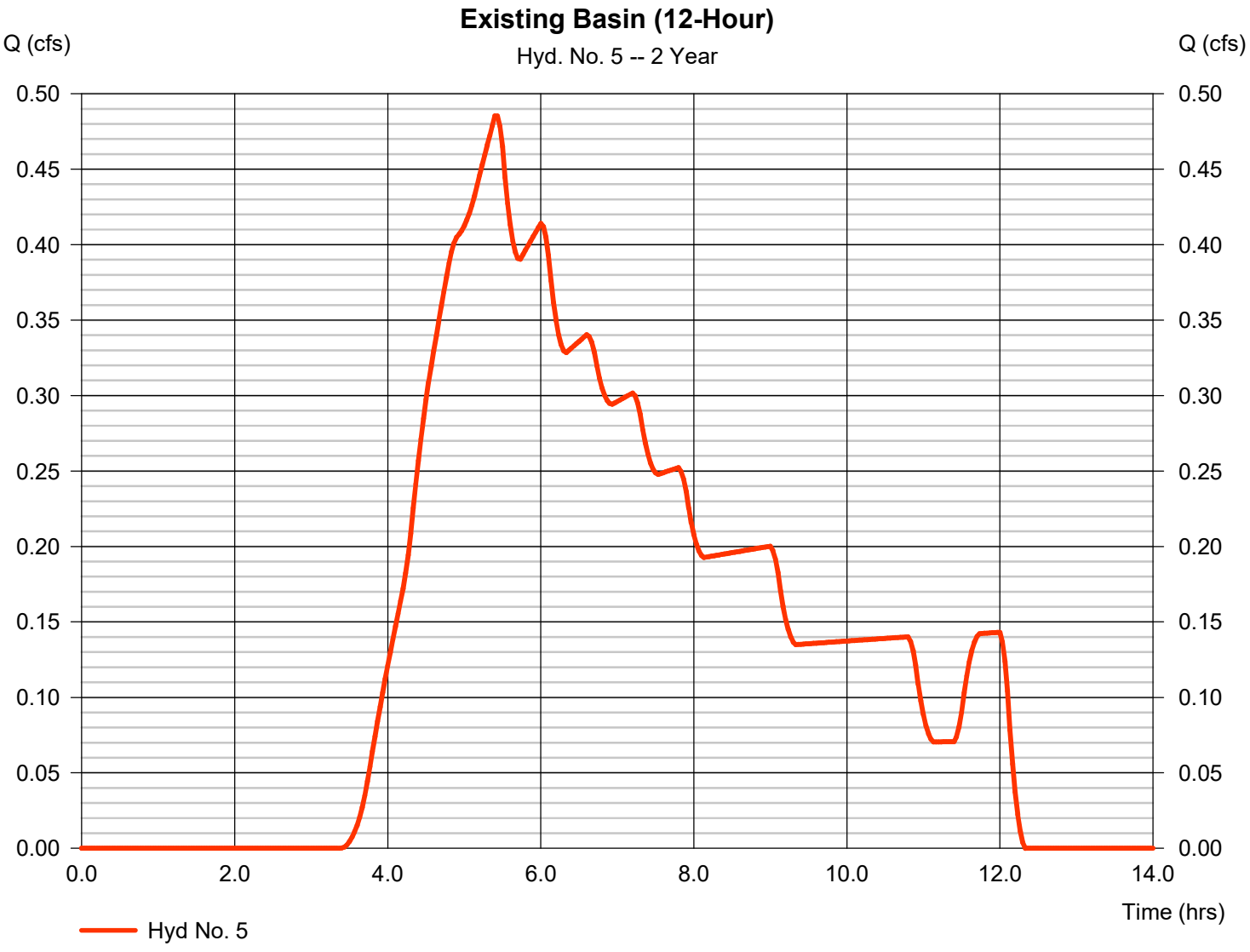


Hydrograph Report

Hyd. No. 5

Existing Basin (12-Hour)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.485 cfs
Storm frequency	= 2 yrs	Time to peak	= 5.40 hrs
Time interval	= 2 min	Hyd. volume	= 6,996 cuft
Drainage area	= 2.890 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.50 min
Total precip.	= 2.42 in	Distribution	= Huff-2nd
Storm duration	= 12.00 hrs	Shape factor	= 484

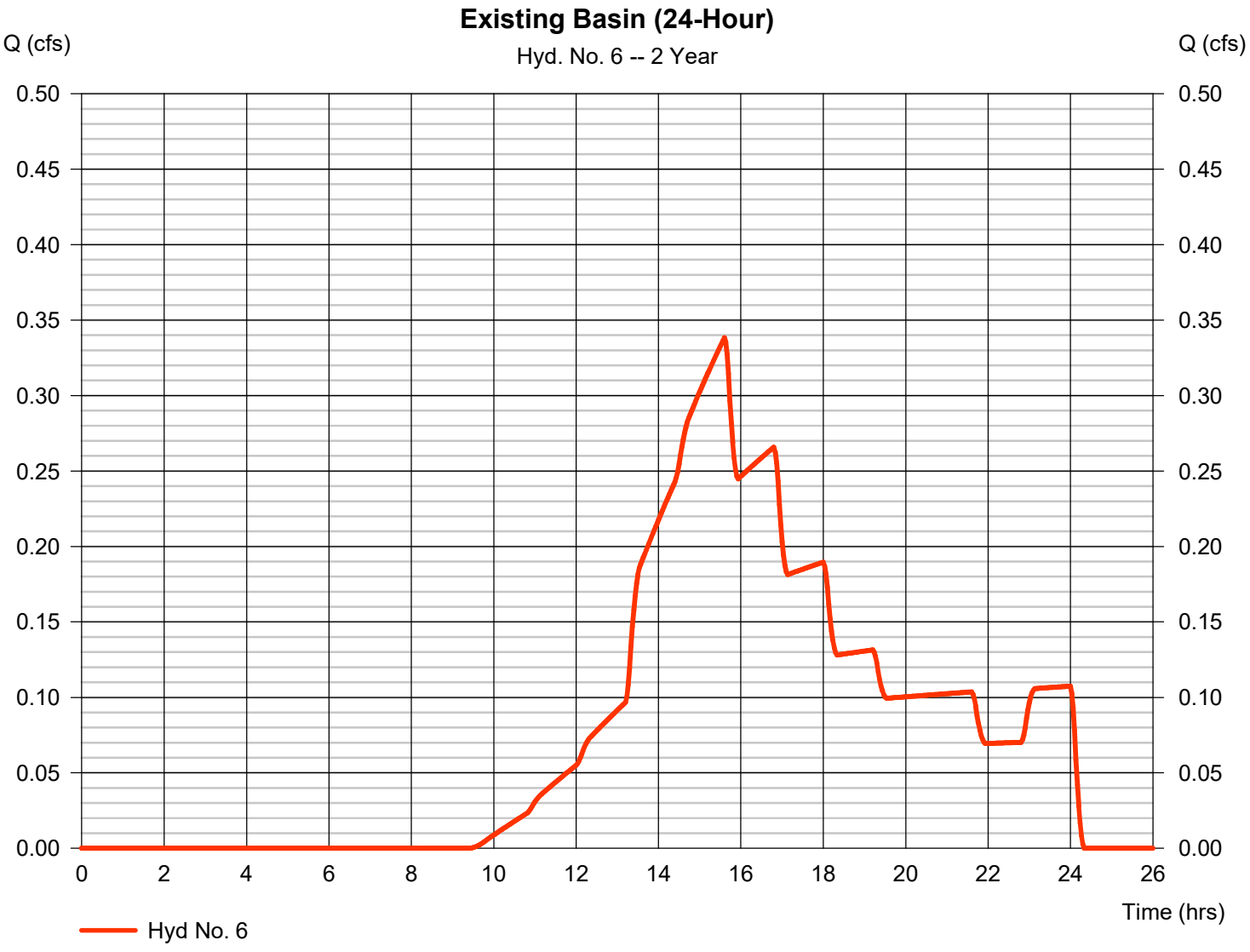


Hydrograph Report

Hyd. No. 6

Existing Basin (24-Hour)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.338 cfs
Storm frequency	=	2 yrs	Time to peak	=	15.60 hrs
Time interval	=	2 min	Hyd. volume	=	6,996 cuft
Drainage area	=	2.890 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.50 min
Total precip.	=	2.42 in	Distribution	=	Huff-3rd
Storm duration	=	24.00 hrs	Shape factor	=	484

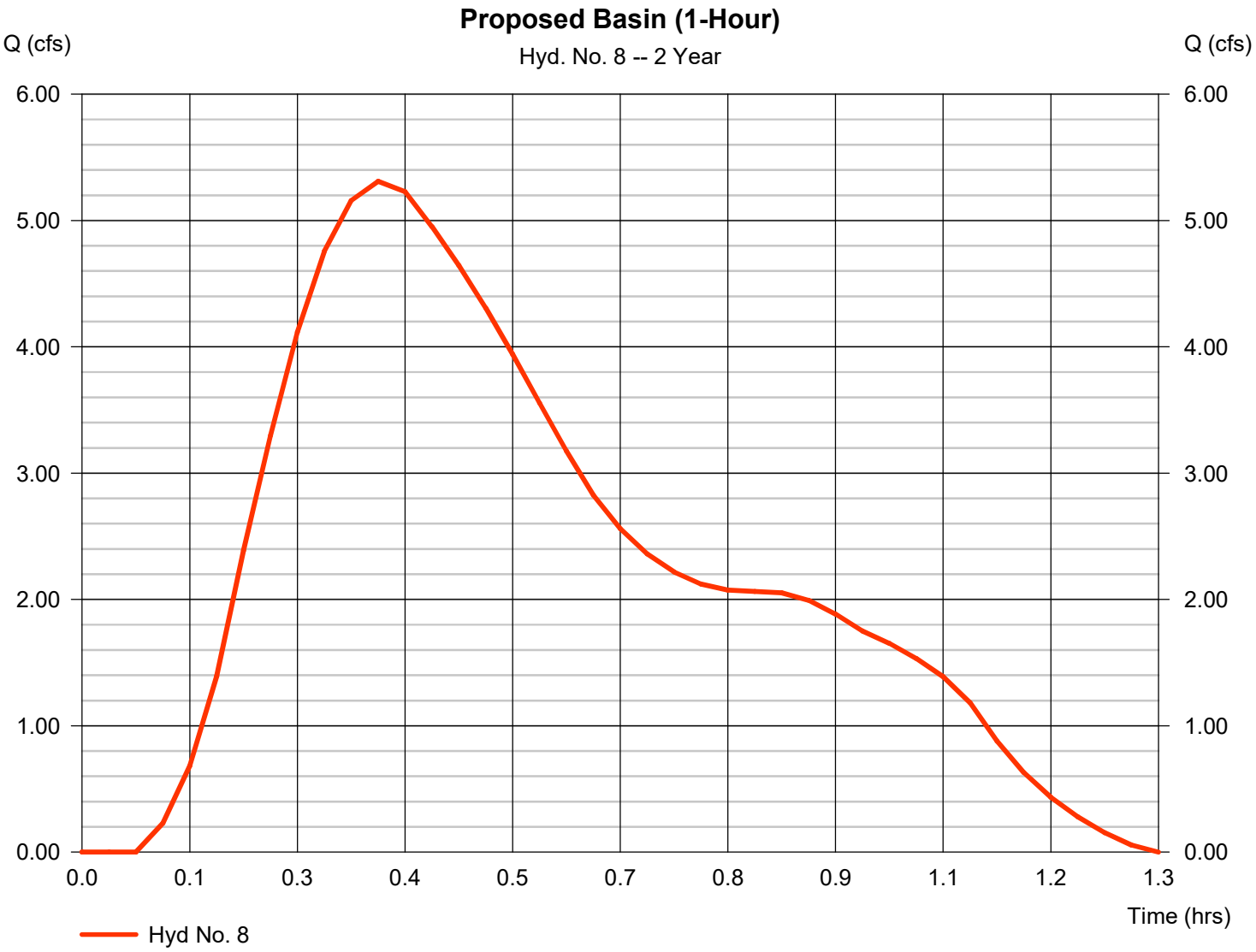


Hydrograph Report

Hyd. No. 8

Proposed Basin (1-Hour)

Hydrograph type	= SCS Runoff	Peak discharge	= 5.310 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.37 hrs
Time interval	= 2 min	Hyd. volume	= 10,707 cuft
Drainage area	= 2.890 ac	Curve number	= 83
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 2.42 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

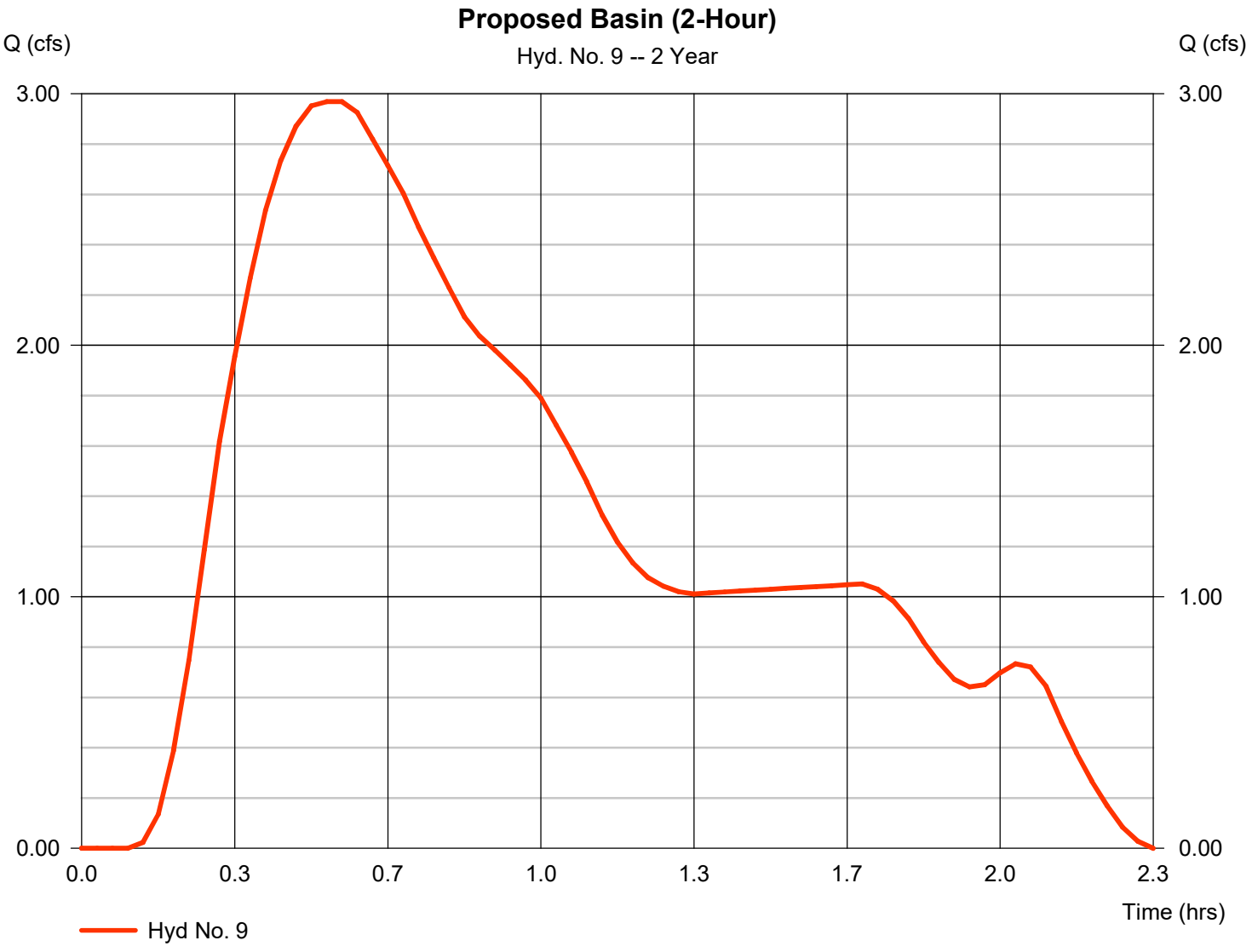


Hydrograph Report

Hyd. No. 9

Proposed Basin (2-Hour)

Hydrograph type	= SCS Runoff	Peak discharge	= 2.969 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.57 hrs
Time interval	= 2 min	Hyd. volume	= 10,771 cuft
Drainage area	= 2.890 ac	Curve number	= 83
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 2.42 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

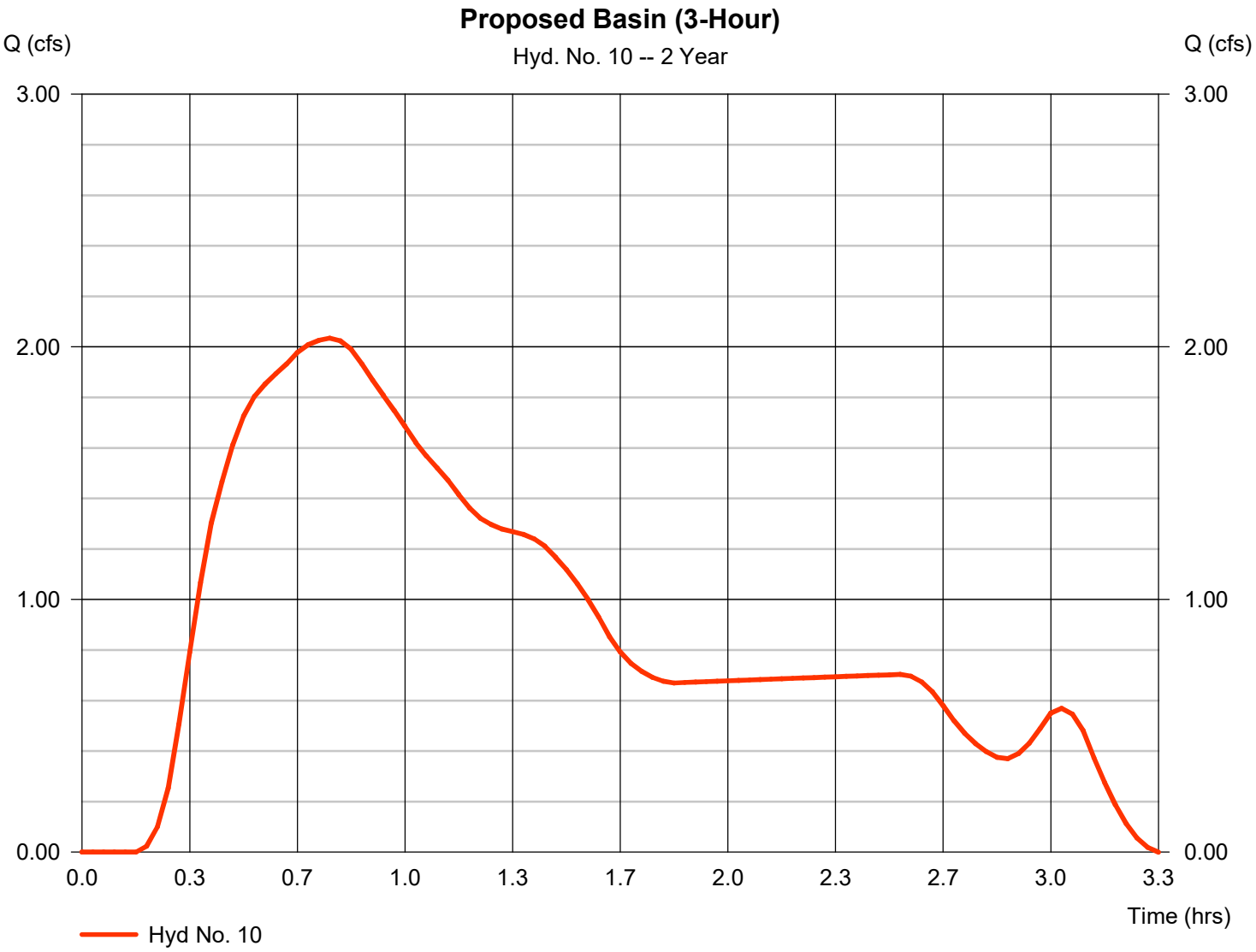


Hydrograph Report

Hyd. No. 10

Proposed Basin (3-Hour)

Hydrograph type	= SCS Runoff	Peak discharge	= 2.034 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.77 hrs
Time interval	= 2 min	Hyd. volume	= 10,770 cuft
Drainage area	= 2.890 ac	Curve number	= 83
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 2.42 in	Distribution	= Huff-1st
Storm duration	= 3.00 hrs	Shape factor	= 484

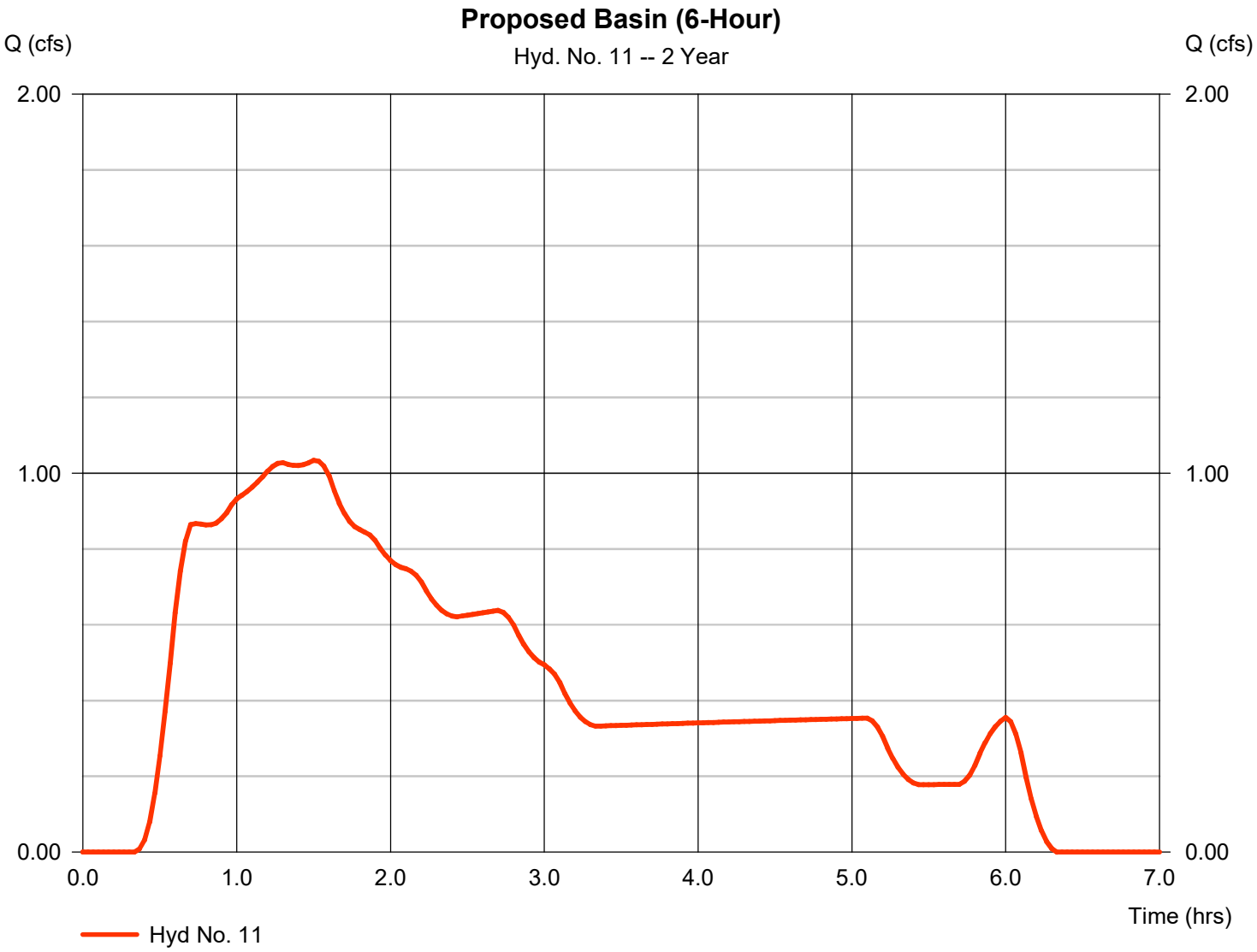


Hydrograph Report

Hyd. No. 11

Proposed Basin (6-Hour)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.034 cfs
Storm frequency	=	2 yrs	Time to peak	=	1.50 hrs
Time interval	=	2 min	Hyd. volume	=	10,771 cuft
Drainage area	=	2.890 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	2.42 in	Distribution	=	Huff-1st
Storm duration	=	6.00 hrs	Shape factor	=	484

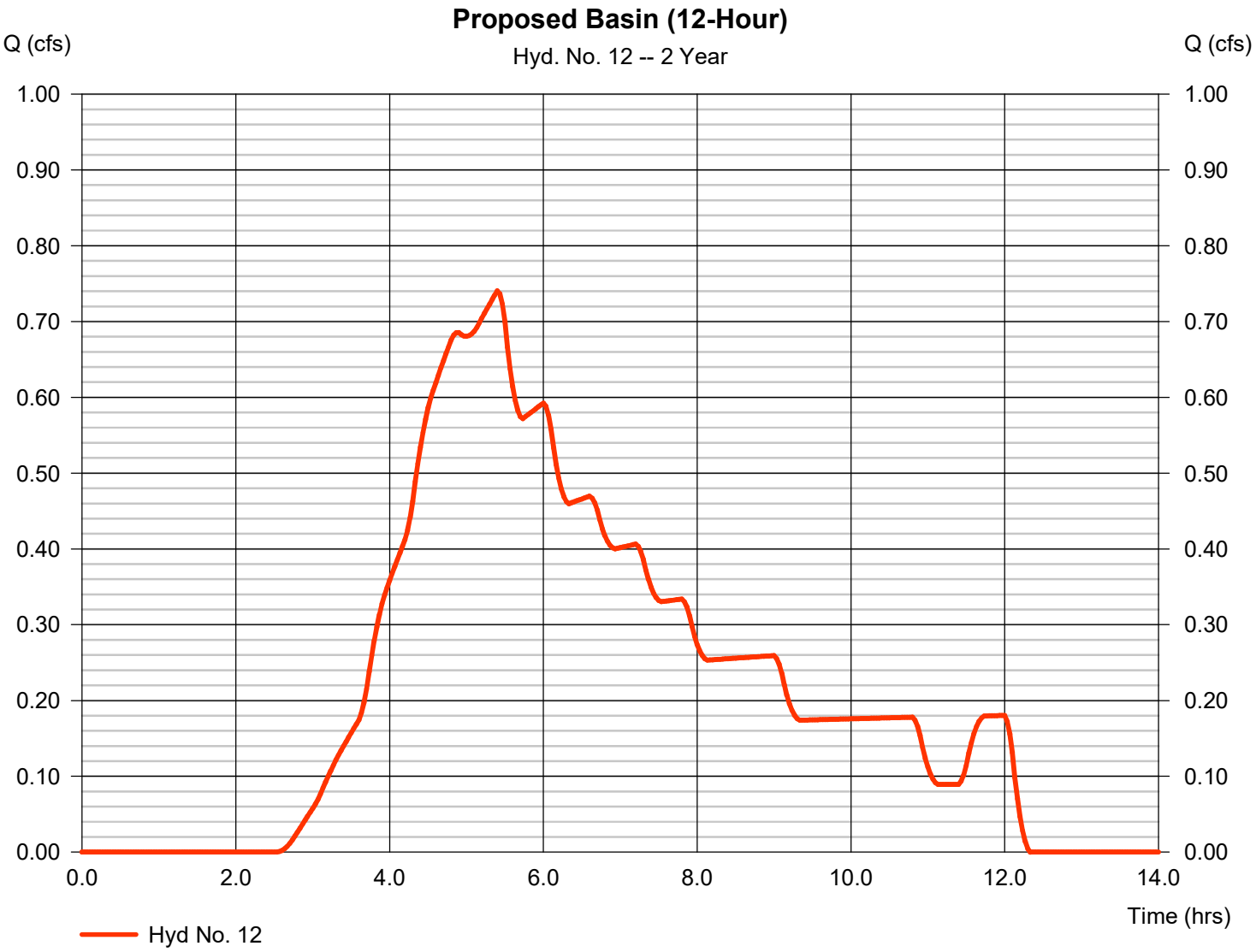


Hydrograph Report

Hyd. No. 12

Proposed Basin (12-Hour)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.741 cfs
Storm frequency	=	2 yrs	Time to peak	=	5.40 hrs
Time interval	=	2 min	Hyd. volume	=	10,773 cuft
Drainage area	=	2.890 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	2.42 in	Distribution	=	Huff-2nd
Storm duration	=	12.00 hrs	Shape factor	=	484

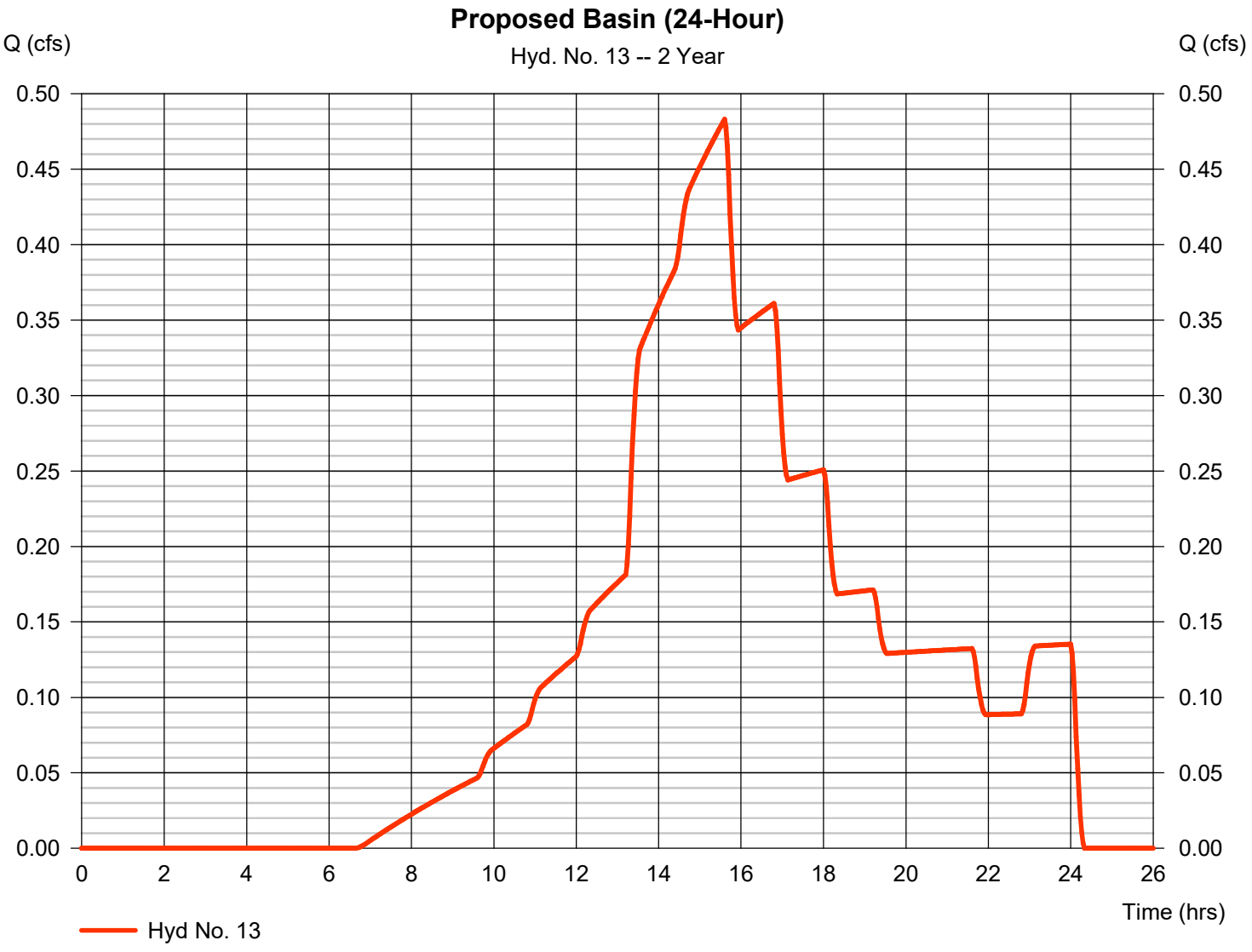


Hydrograph Report

Hyd. No. 13

Proposed Basin (24-Hour)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.483 cfs
Storm frequency	=	2 yrs	Time to peak	=	15.60 hrs
Time interval	=	2 min	Hyd. volume	=	10,773 cuft
Drainage area	=	2.890 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	2.42 in	Distribution	=	Huff-3rd
Storm duration	=	24.00 hrs	Shape factor	=	484



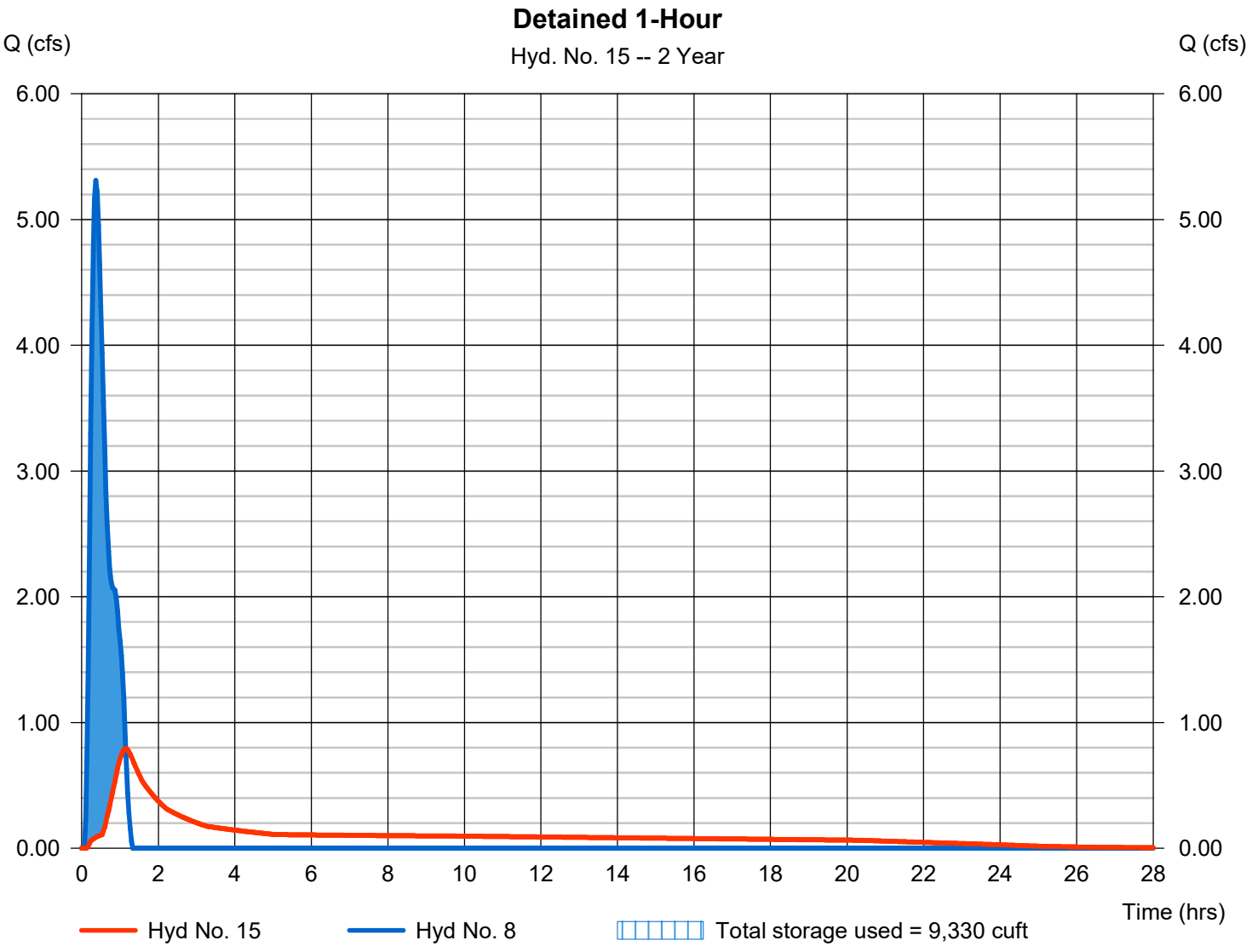
Hydrograph Report

Hyd. No. 15

Detained 1-Hour

Hydrograph type	=	Reservoir	Peak discharge	=	0.794 cfs
Storm frequency	=	2 yrs	Time to peak	=	1.13 hrs
Time interval	=	2 min	Hyd. volume	=	10,684 cuft
Inflow hyd. No.	=	8 - Proposed Basin (1-Hour)	Max. Elevation	=	758.60 ft
Reservoir name	=	Dry Pond	Max. Storage	=	9,330 cuft

Storage Indication method used.



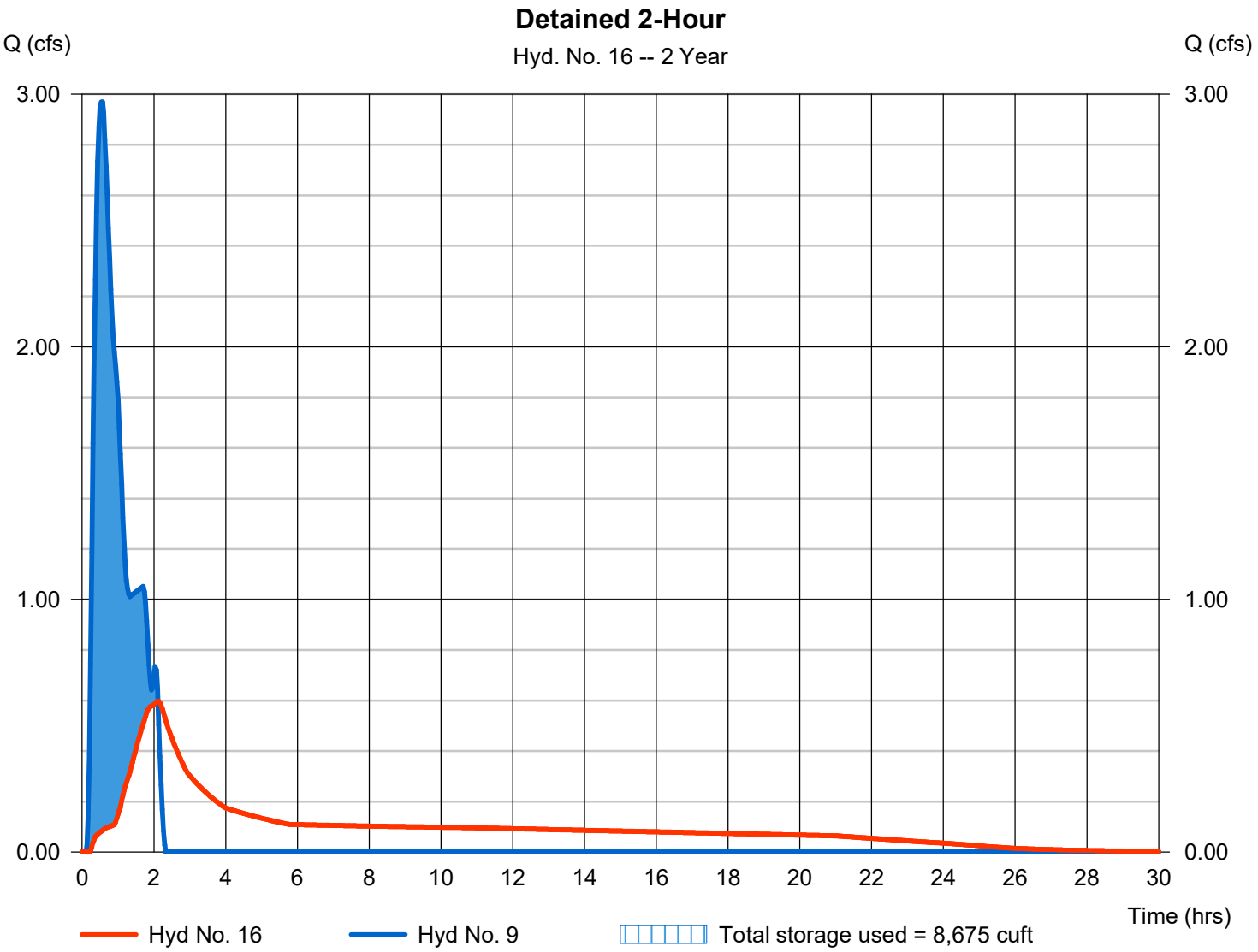
Hydrograph Report

Hyd. No. 16

Detained 2-Hour

Hydrograph type	=	Reservoir	Peak discharge	=	0.597 cfs
Storm frequency	=	2 yrs	Time to peak	=	2.10 hrs
Time interval	=	2 min	Hyd. volume	=	10,747 cuft
Inflow hyd. No.	=	9 - Proposed Basin (2-Hour)	Max. Elevation	=	758.53 ft
Reservoir name	=	Dry Pond	Max. Storage	=	8,675 cuft

Storage Indication method used.



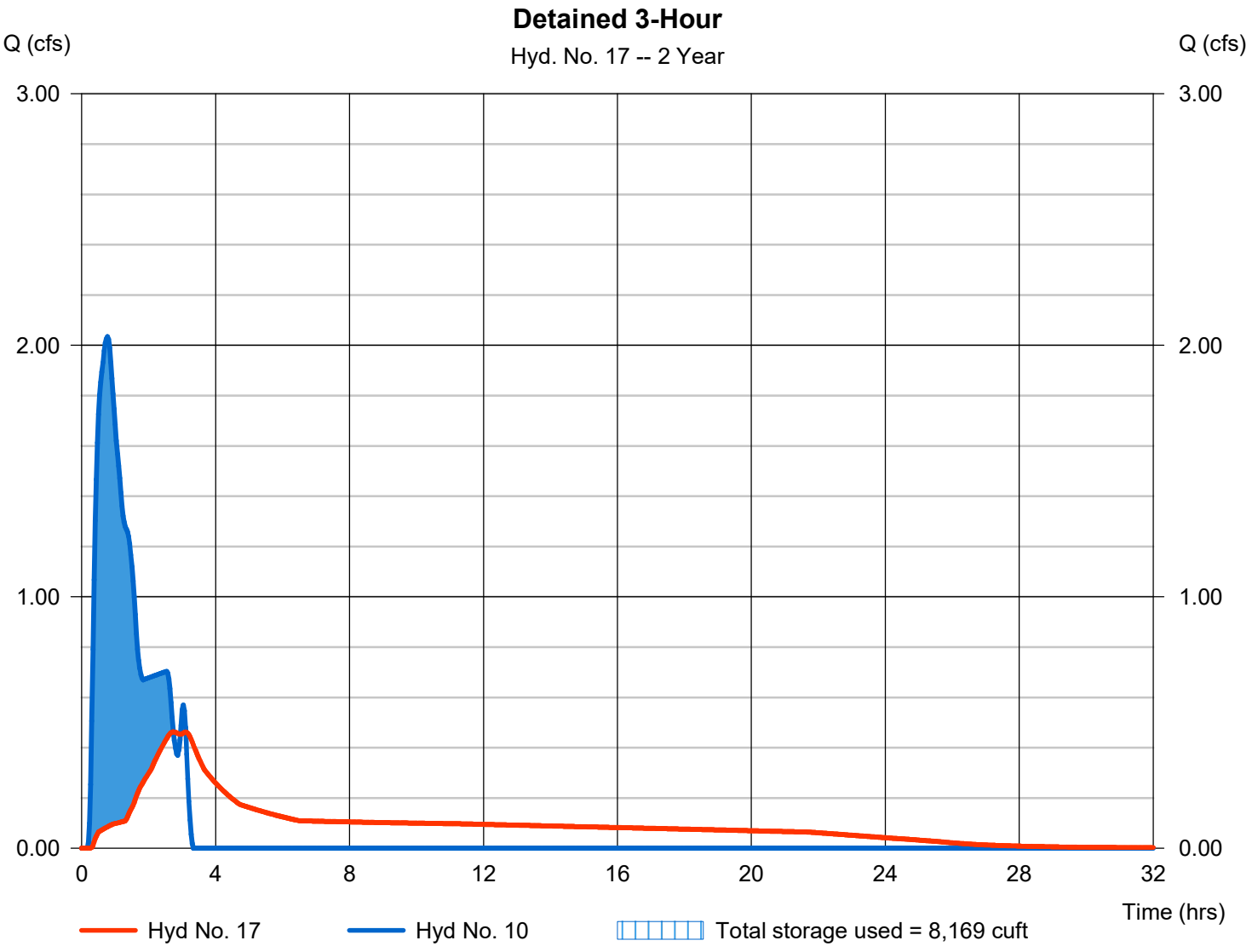
Hydrograph Report

Hyd. No. 17

Detained 3-Hour

Hydrograph type	=	Reservoir	Peak discharge	=	0.463 cfs
Storm frequency	=	2 yrs	Time to peak	=	2.73 hrs
Time interval	=	2 min	Hyd. volume	=	10,747 cuft
Inflow hyd. No.	=	10 - Proposed Basin (3-Hour)	Max. Elevation	=	758.47 ft
Reservoir name	=	Dry Pond	Max. Storage	=	8,169 cuft

Storage Indication method used.



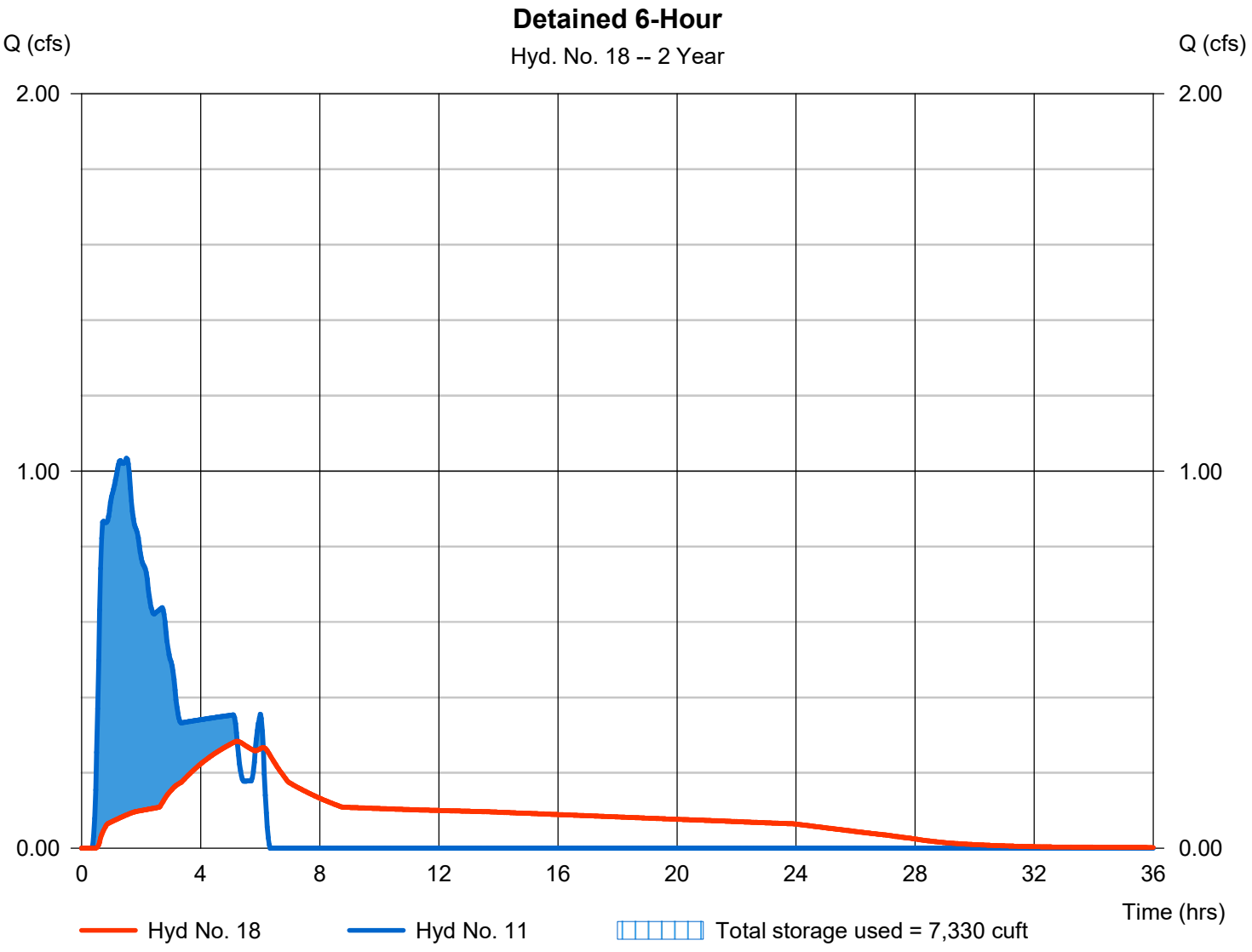
Hydrograph Report

Hyd. No. 18

Detained 6-Hour

Hydrograph type	=	Reservoir	Peak discharge	=	0.283 cfs
Storm frequency	=	2 yrs	Time to peak	=	5.23 hrs
Time interval	=	2 min	Hyd. volume	=	10,747 cuft
Inflow hyd. No.	=	11 - Proposed Basin (6-Hour)	Max. Elevation	=	758.38 ft
Reservoir name	=	Dry Pond	Max. Storage	=	7,330 cuft

Storage Indication method used.



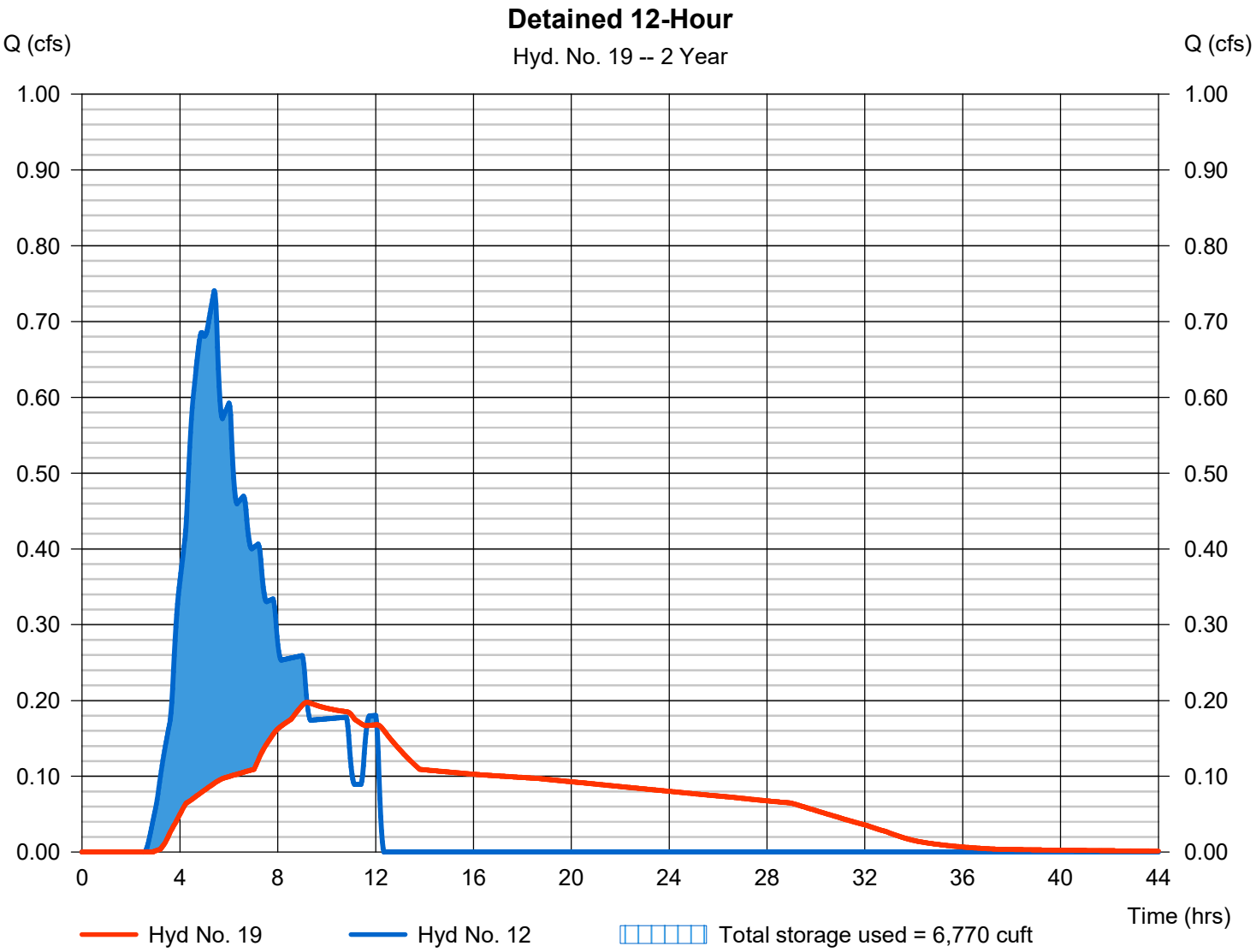
Hydrograph Report

Hyd. No. 19

Detained 12-Hour

Hydrograph type	=	Reservoir	Peak discharge	=	0.198 cfs
Storm frequency	=	2 yrs	Time to peak	=	9.20 hrs
Time interval	=	2 min	Hyd. volume	=	10,749 cuft
Inflow hyd. No.	=	12 - Proposed Basin (12-Hour)	Max. Elevation	=	758.32 ft
Reservoir name	=	Dry Pond	Max. Storage	=	6,770 cuft

Storage Indication method used.



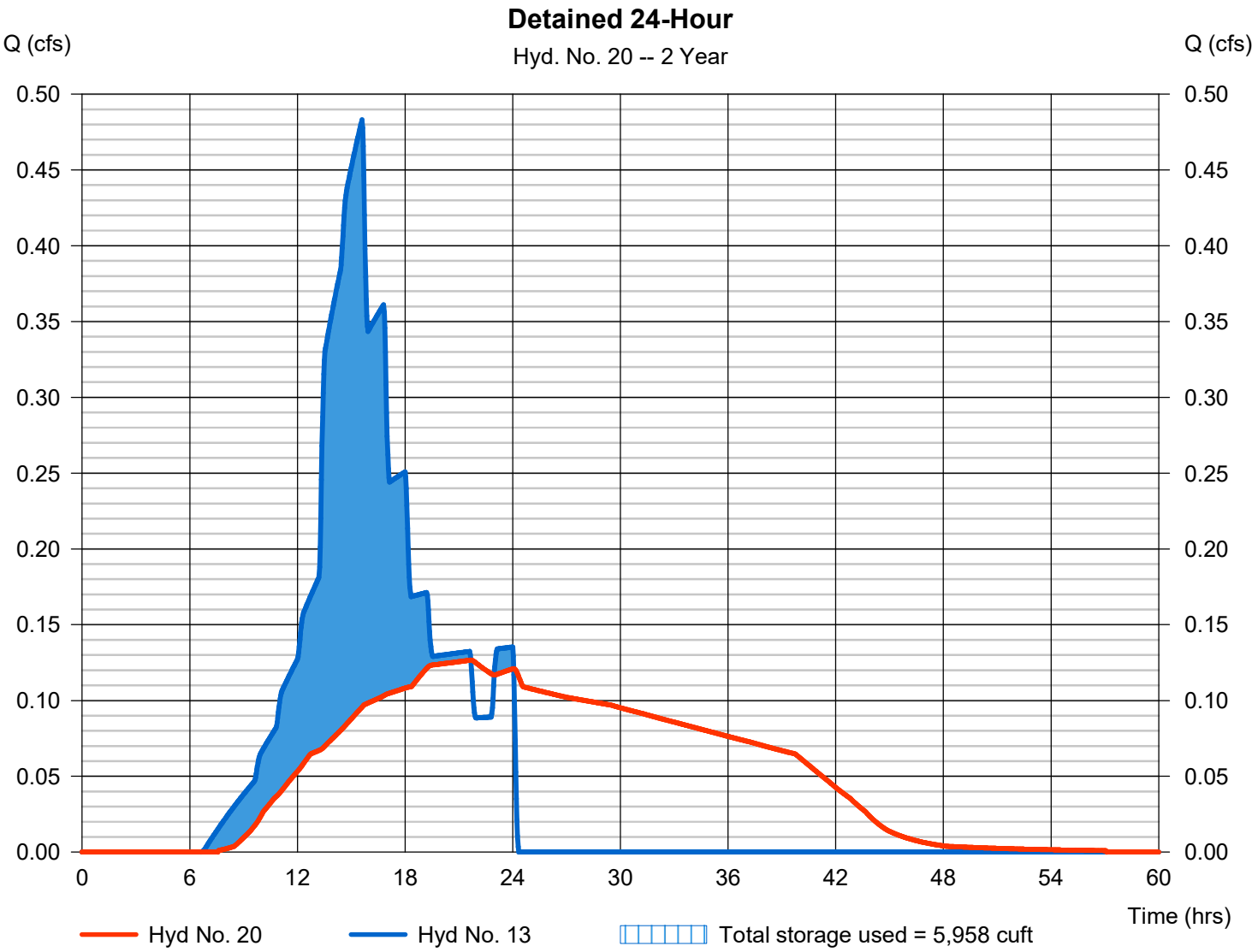
Hydrograph Report

Hyd. No. 20

Detained 24-Hour

Hydrograph type	=	Reservoir	Peak discharge	=	0.127 cfs
Storm frequency	=	2 yrs	Time to peak	=	21.67 hrs
Time interval	=	2 min	Hyd. volume	=	10,750 cuft
Inflow hyd. No.	=	13 - Proposed Basin (24-Hour)	Max. Elevation	=	758.23 ft
Reservoir name	=	Dry Pond	Max. Storage	=	5,958 cuft

Storage Indication method used.

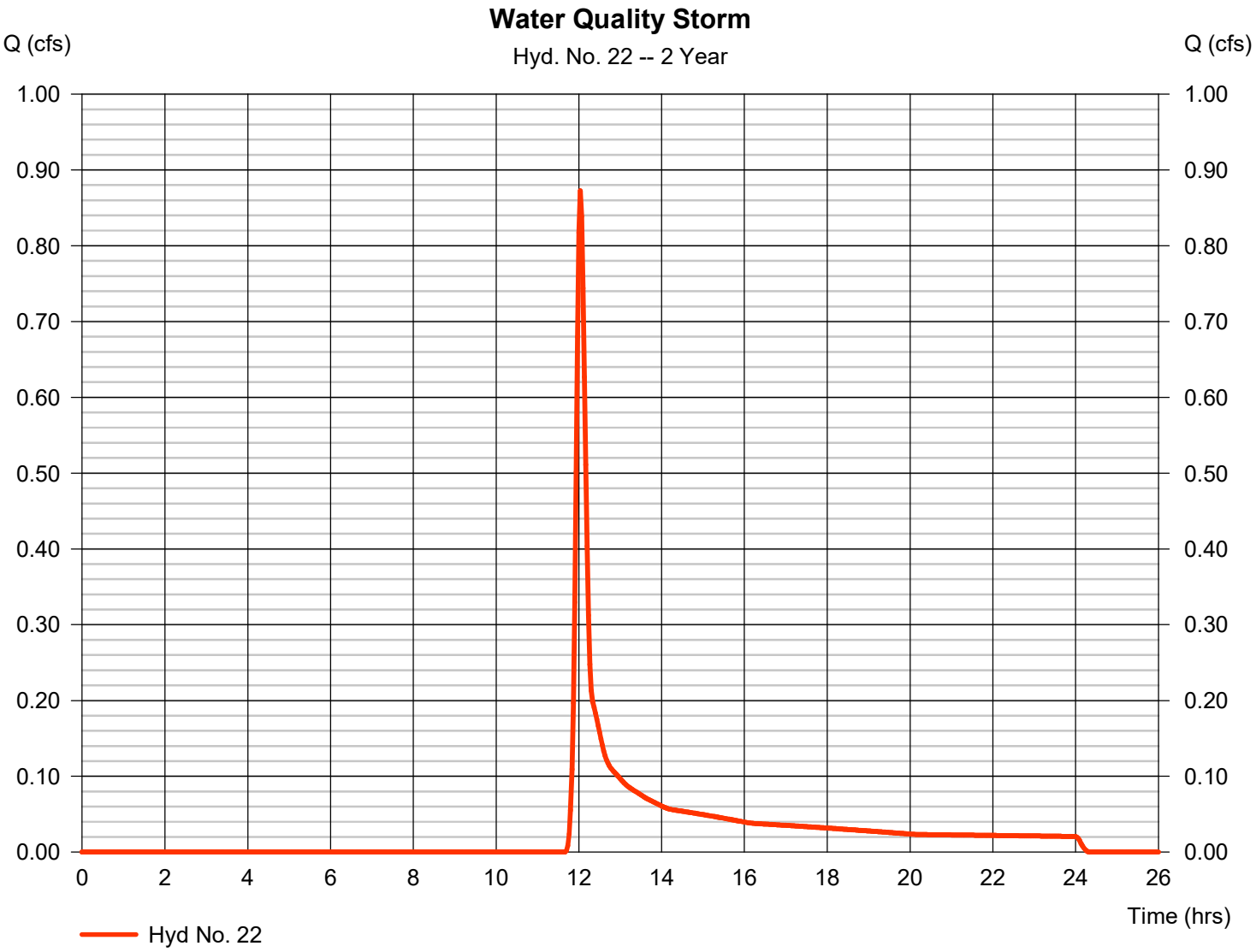


Hydrograph Report

Hyd. No. 22

Water Quality Storm

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.873 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	2,644 cuft
Drainage area	=	2.890 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	1.25 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

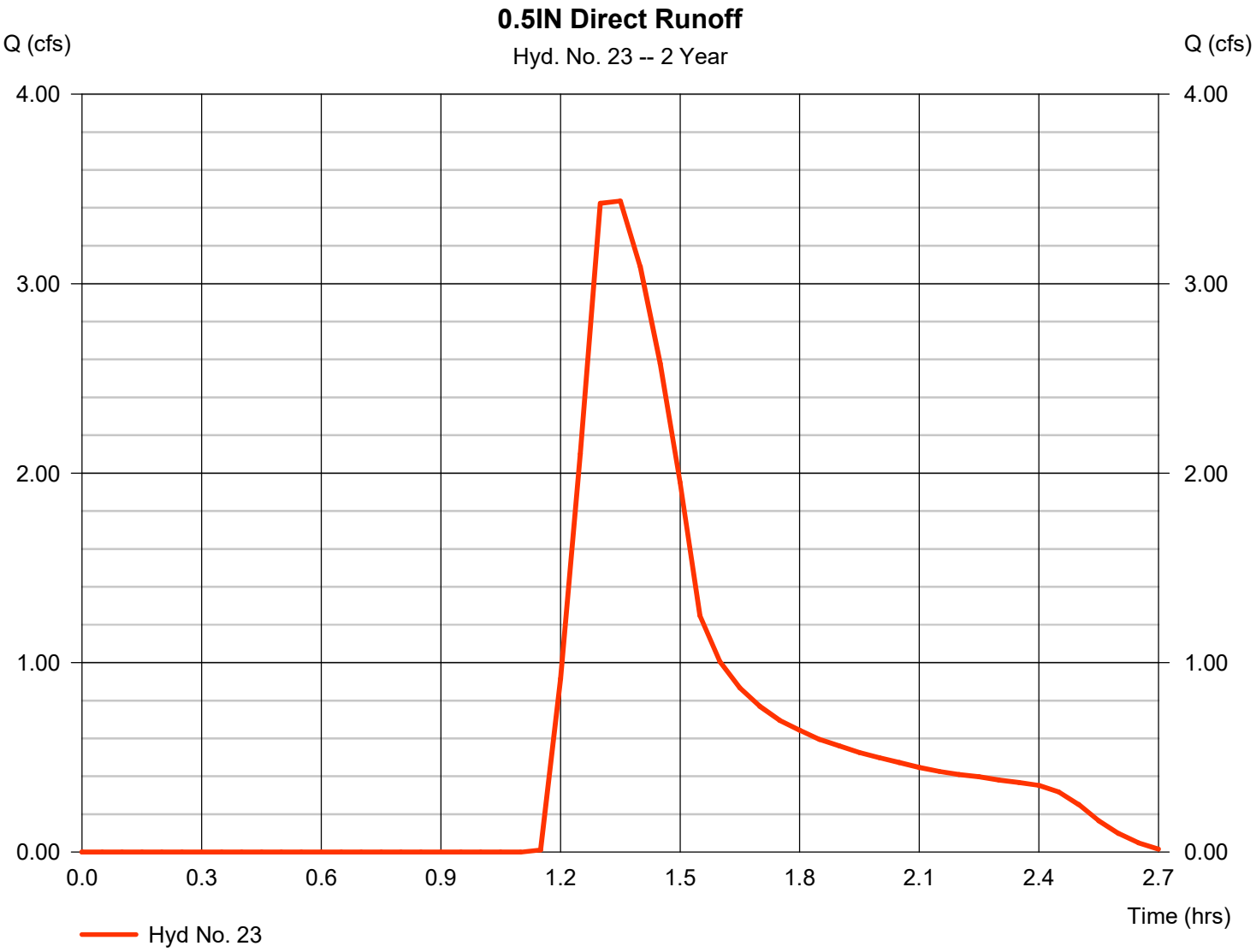


Hydrograph Report

Hyd. No. 23

0.5IN Direct Runoff

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.436 cfs
Storm frequency	=	2 yrs	Time to peak	=	1.35 hrs
Time interval	=	3 min	Hyd. volume	=	5,231 cuft
Drainage area	=	2.890 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	1.70 in	Distribution	=	Custom
Storm duration	=	Sample.cds	Shape factor	=	484



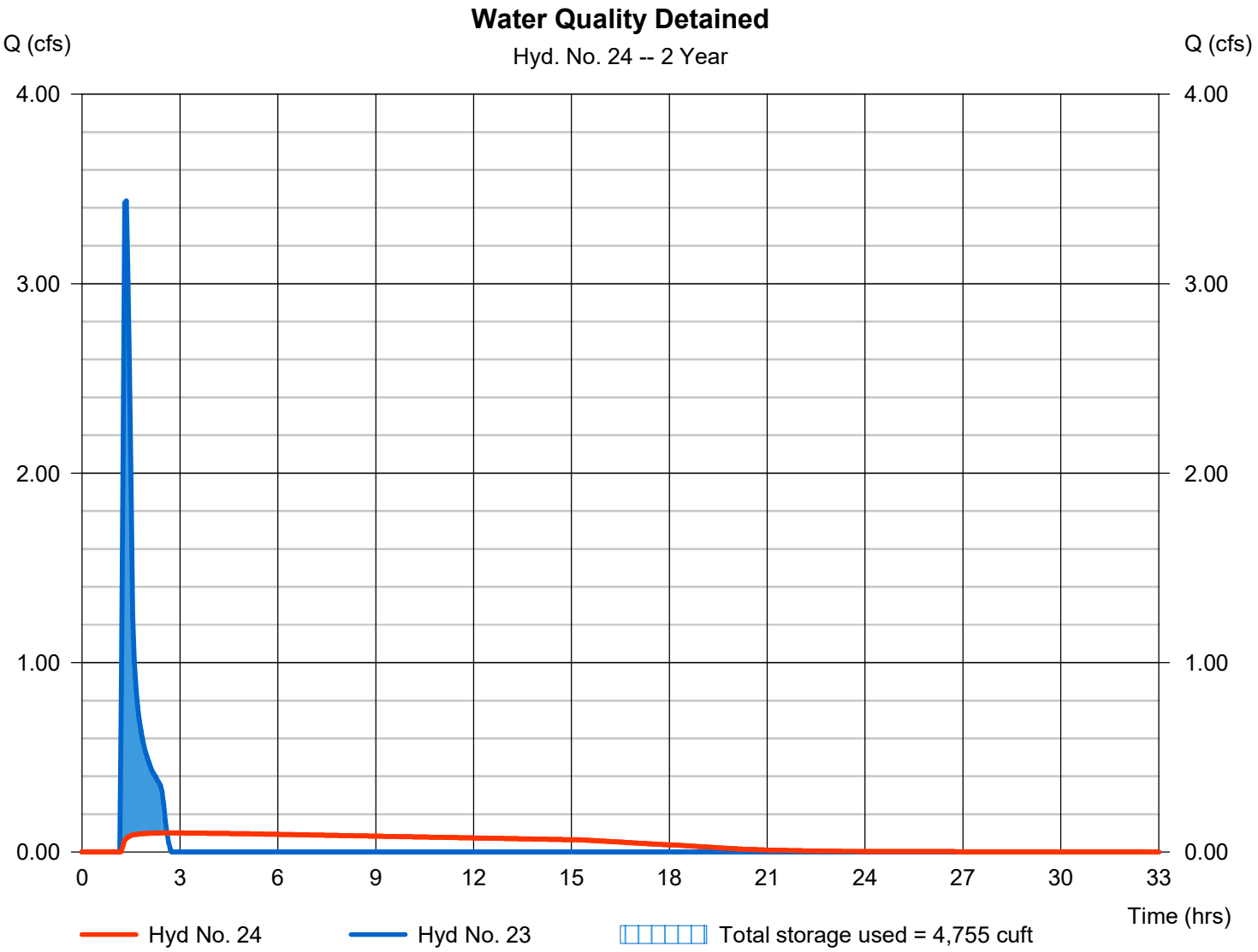
Hydrograph Report

Hyd. No. 24

Water Quality Detained

Hydrograph type	=	Reservoir	Peak discharge	=	0.102 cfs
Storm frequency	=	2 yrs	Time to peak	=	2.60 hrs
Time interval	=	3 min	Hyd. volume	=	5,208 cuft
Inflow hyd. No.	=	23 - 0.5IN Direct Runoff	Max. Elevation	=	758.09 ft
Reservoir name	=	Dry Pond	Max. Storage	=	4,755 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

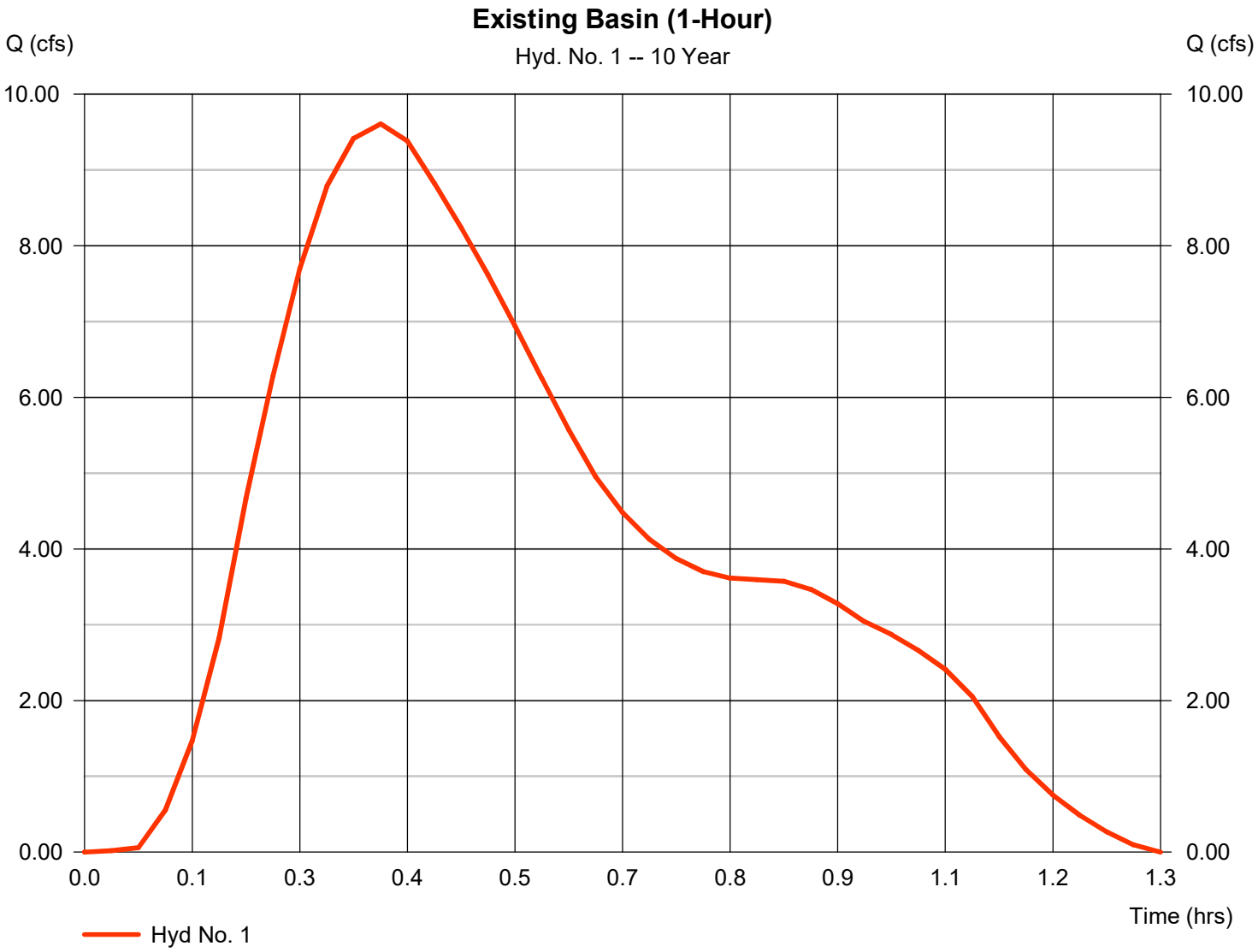
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	9.607	2	22	19,214	------	------	------	Existing Basin (1-Hour)
2	SCS Runoff	5.369	2	30	19,306	------	------	------	Existing Basin (2-Hour)
3	SCS Runoff	3.658	2	46	19,297	------	------	------	Existing Basin (3-Hour)
4	SCS Runoff	1.854	2	78	19,306	------	------	------	Existing Basin (6-Hour)
5	SCS Runoff	1.319	2	324	19,307	------	------	------	Existing Basin (12-Hour)
6	SCS Runoff	0.853	2	936	19,307	------	------	------	Existing Basin (24-Hour)
8	SCS Runoff	13.24	2	20	25,297	------	------	------	Proposed Basin (1-Hour)
9	SCS Runoff	7.456	2	26	25,295	------	------	------	Proposed Basin (2-Hour)
10	SCS Runoff	5.082	2	28	25,295	------	------	------	Proposed Basin (3-Hour)
11	SCS Runoff	2.918	2	40	25,295	------	------	------	Proposed Basin (6-Hour)
12	SCS Runoff	1.663	2	324	25,297	------	------	------	Proposed Basin (12-Hour)
13	SCS Runoff	1.037	2	936	25,297	------	------	------	Proposed Basin (24-Hour)
15	Reservoir	3.160	2	60	25,274	8	759.43	17,418	Detained 1-Hour
16	Reservoir	2.492	2	70	25,271	9	759.12	14,239	Detained 2-Hour
17	Reservoir	2.132	2	92	25,271	10	759.00	12,927	Detained 3-Hour
18	Reservoir	1.346	2	140	25,271	11	758.77	10,906	Detained 6-Hour
19	Reservoir	1.067	2	372	25,274	12	758.69	10,139	Detained 12-Hour
20	Reservoir	0.794	2	948	25,274	13	758.60	9,329	Detained 24-Hour
22	SCS Runoff	0.873	2	722	2,644	------	------	------	Water Quality Storm
23	SCS Runoff	3.436	3	81	5,231	------	------	------	0.5IN Direct Runoff
24	Reservoir	0.102	3	156	5,208	23	758.09	4,755	Water Quality Detained

Hydrograph Report

Hyd. No. 1

Existing Basin (1-Hour)

Hydrograph type	= SCS Runoff	Peak discharge	= 9.607 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.37 hrs
Time interval	= 2 min	Hyd. volume	= 19,214 cuft
Drainage area	= 2.890 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.50 min
Total precip.	= 4.06 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

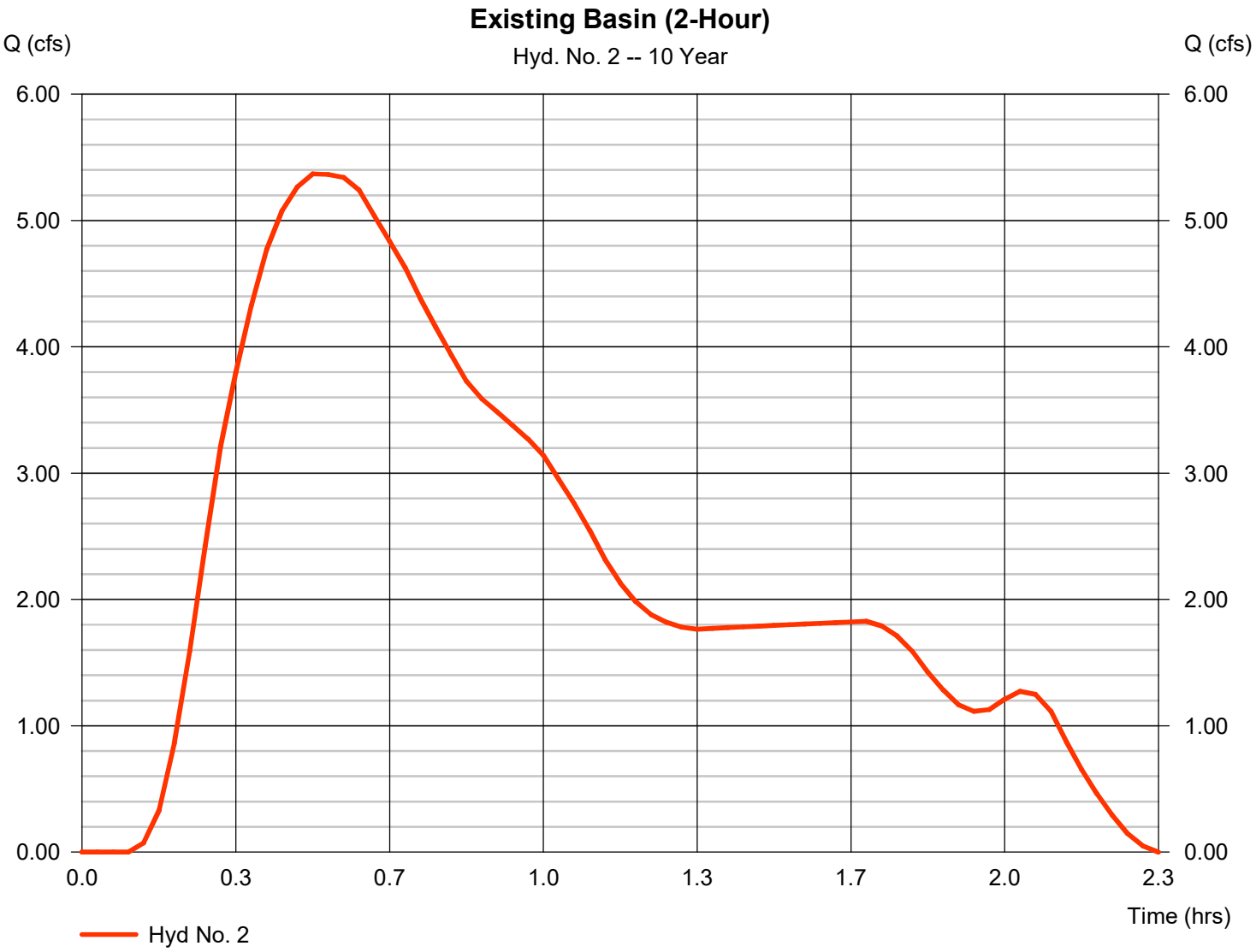


Hydrograph Report

Hyd. No. 2

Existing Basin (2-Hour)

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.369 cfs
Storm frequency	=	10 yrs	Time to peak	=	0.50 hrs
Time interval	=	2 min	Hyd. volume	=	19,306 cuft
Drainage area	=	2.890 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.50 min
Total precip.	=	4.06 in	Distribution	=	Huff-1st
Storm duration	=	2.00 hrs	Shape factor	=	484

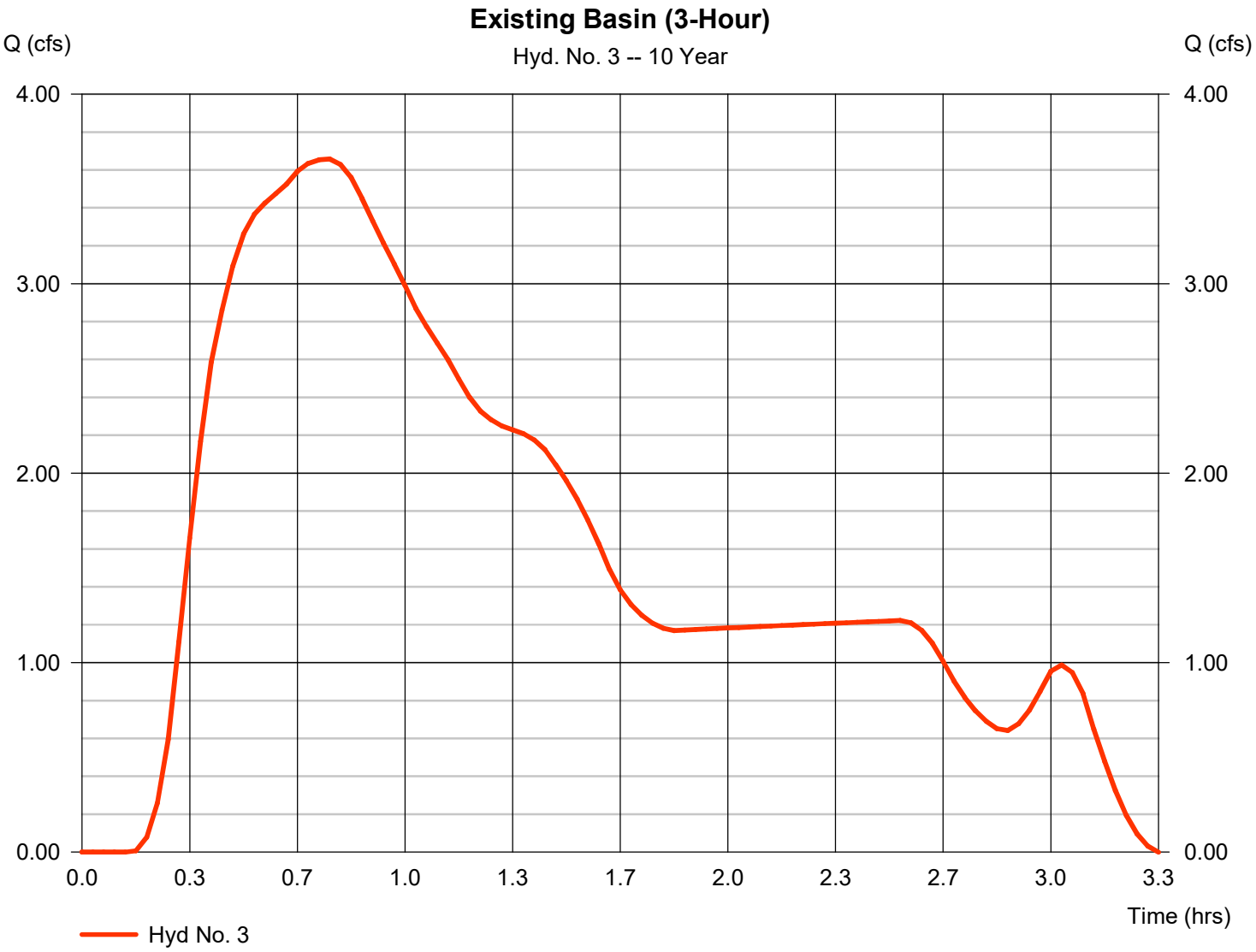


Hydrograph Report

Hyd. No. 3

Existing Basin (3-Hour)

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.658 cfs
Storm frequency	=	10 yrs	Time to peak	=	0.77 hrs
Time interval	=	2 min	Hyd. volume	=	19,297 cuft
Drainage area	=	2.890 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.50 min
Total precip.	=	4.06 in	Distribution	=	Huff-1st
Storm duration	=	3.00 hrs	Shape factor	=	484

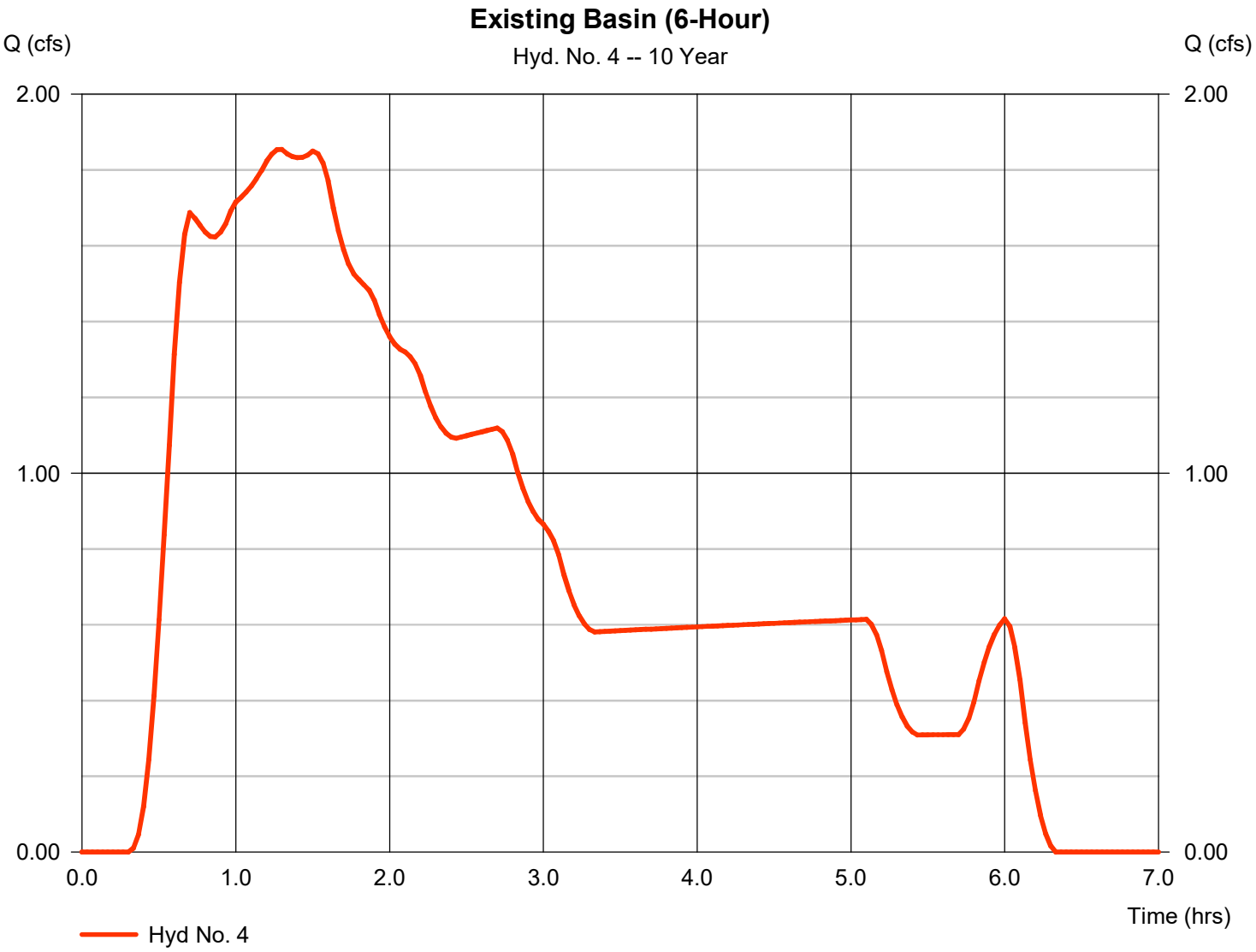


Hydrograph Report

Hyd. No. 4

Existing Basin (6-Hour)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.854 cfs
Storm frequency	=	10 yrs	Time to peak	=	1.30 hrs
Time interval	=	2 min	Hyd. volume	=	19,306 cuft
Drainage area	=	2.890 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.50 min
Total precip.	=	4.06 in	Distribution	=	Huff-1st
Storm duration	=	6.00 hrs	Shape factor	=	484

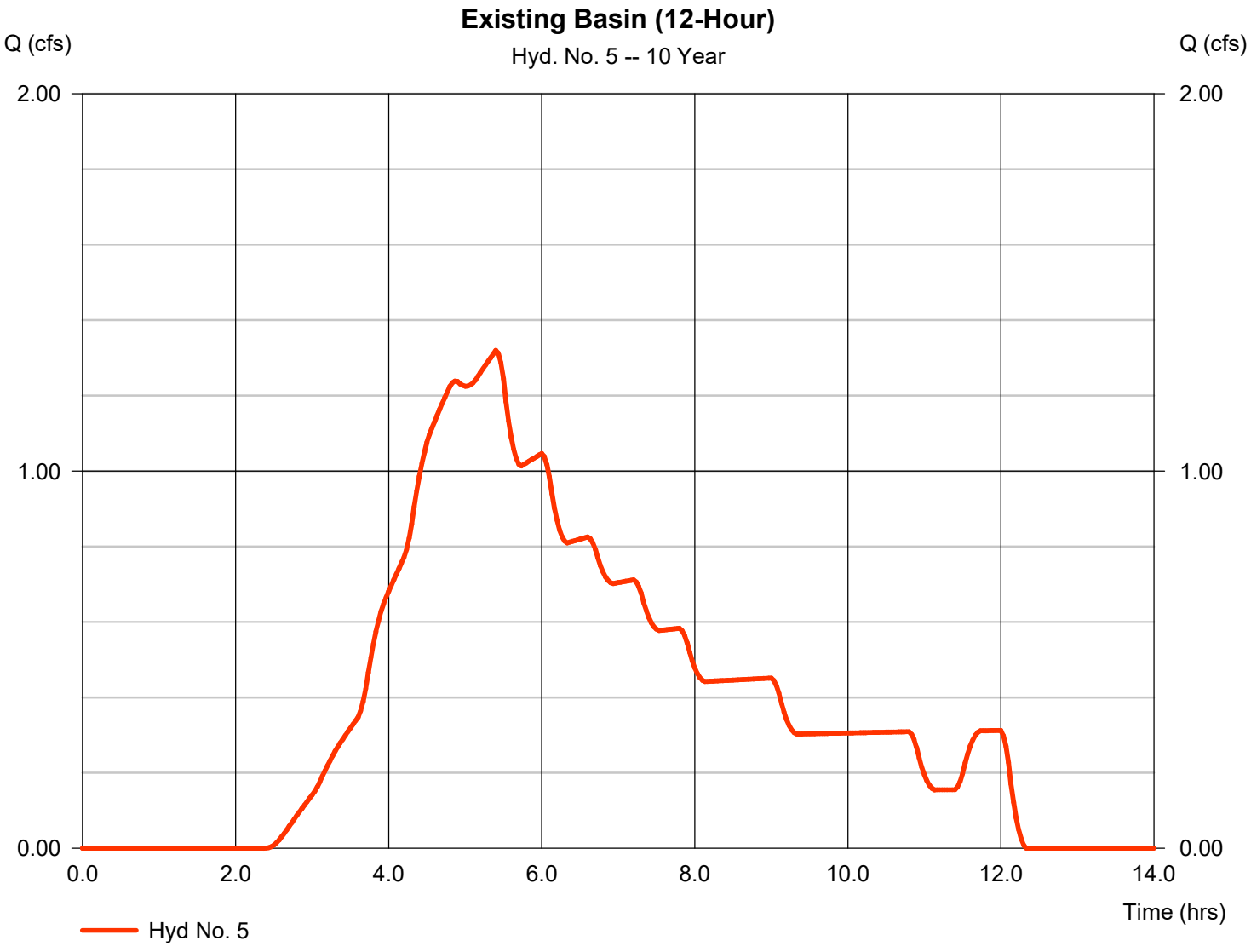


Hydrograph Report

Hyd. No. 5

Existing Basin (12-Hour)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.319 cfs
Storm frequency	=	10 yrs	Time to peak	=	5.40 hrs
Time interval	=	2 min	Hyd. volume	=	19,307 cuft
Drainage area	=	2.890 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.50 min
Total precip.	=	4.06 in	Distribution	=	Huff-2nd
Storm duration	=	12.00 hrs	Shape factor	=	484

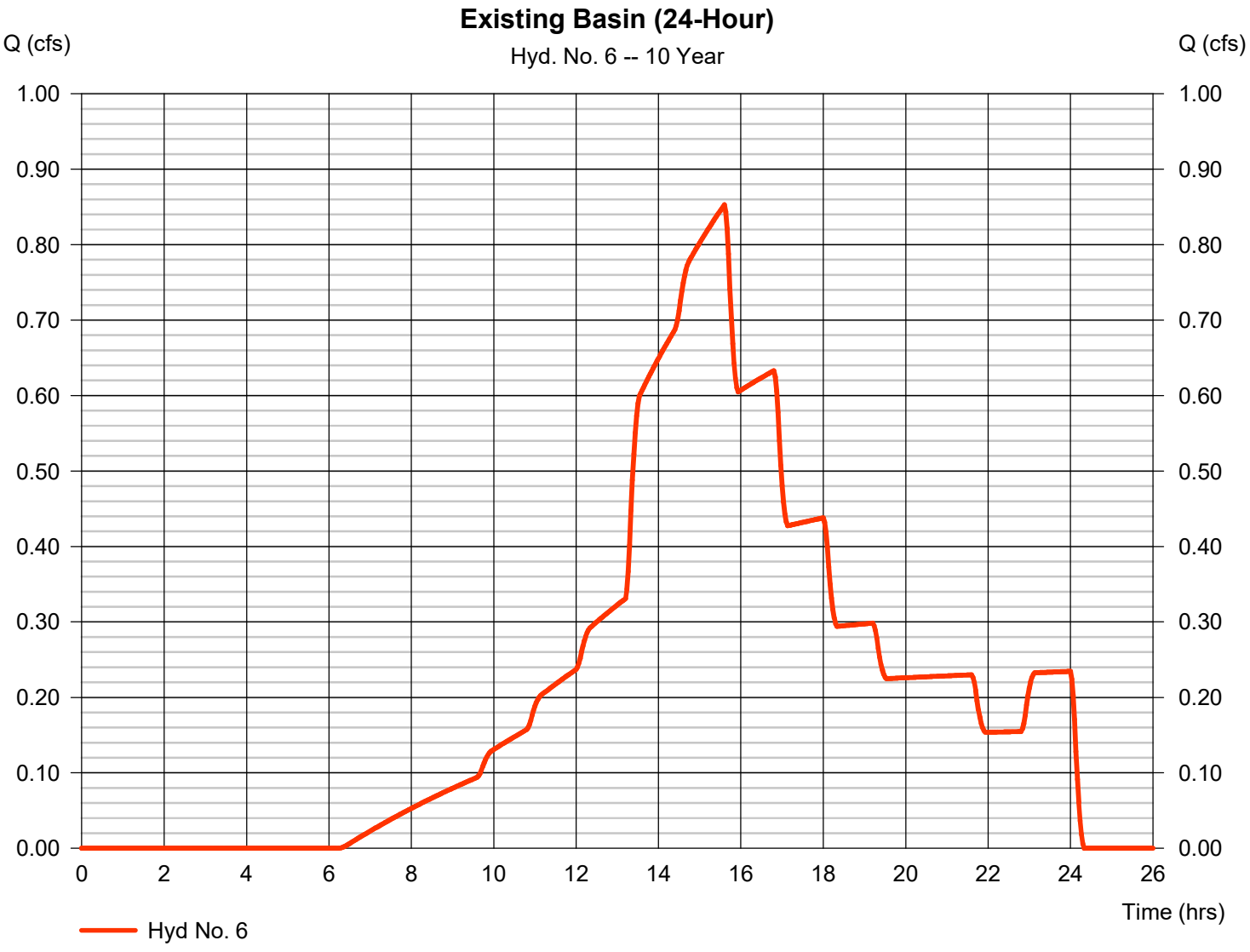


Hydrograph Report

Hyd. No. 6

Existing Basin (24-Hour)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.853 cfs
Storm frequency	=	10 yrs	Time to peak	=	15.60 hrs
Time interval	=	2 min	Hyd. volume	=	19,307 cuft
Drainage area	=	2.890 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.50 min
Total precip.	=	4.06 in	Distribution	=	Huff-3rd
Storm duration	=	24.00 hrs	Shape factor	=	484

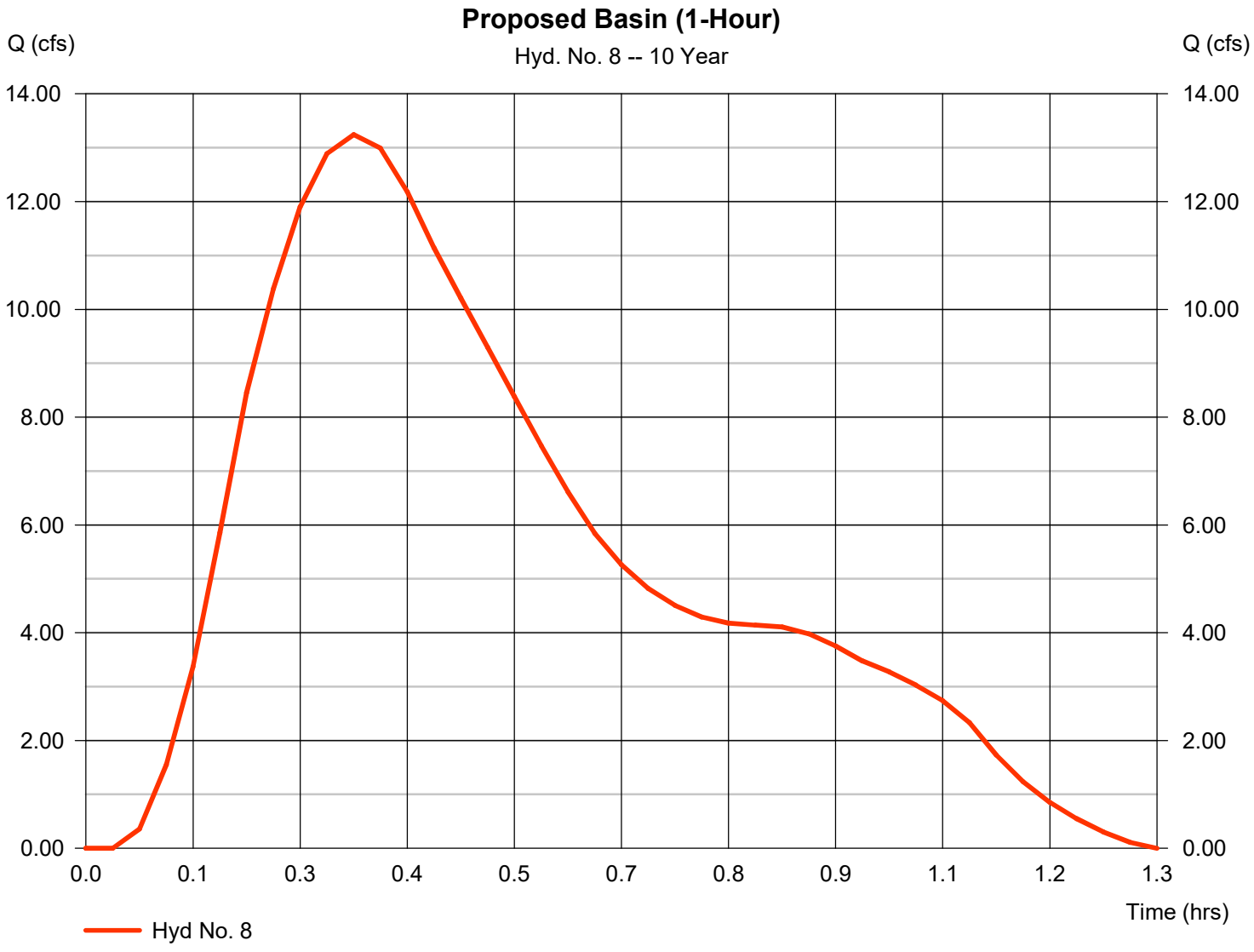


Hydrograph Report

Hyd. No. 8

Proposed Basin (1-Hour)

Hydrograph type	= SCS Runoff	Peak discharge	= 13.24 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.33 hrs
Time interval	= 2 min	Hyd. volume	= 25,297 cuft
Drainage area	= 2.890 ac	Curve number	= 83
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 4.06 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

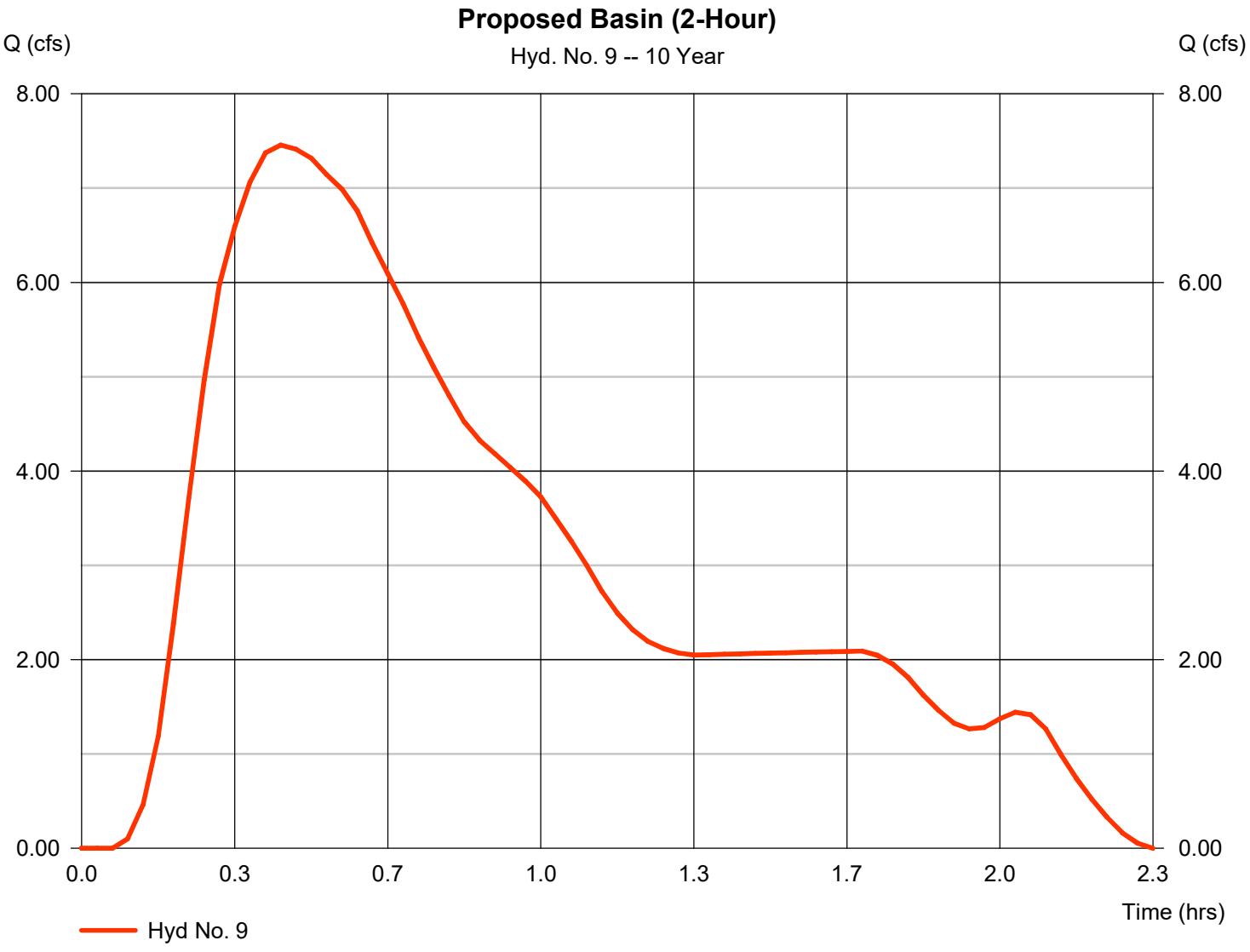


Hydrograph Report

Hyd. No. 9

Proposed Basin (2-Hour)

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.456 cfs
Storm frequency	=	10 yrs	Time to peak	=	0.43 hrs
Time interval	=	2 min	Hyd. volume	=	25,295 cuft
Drainage area	=	2.890 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	4.06 in	Distribution	=	Huff-1st
Storm duration	=	2.00 hrs	Shape factor	=	484

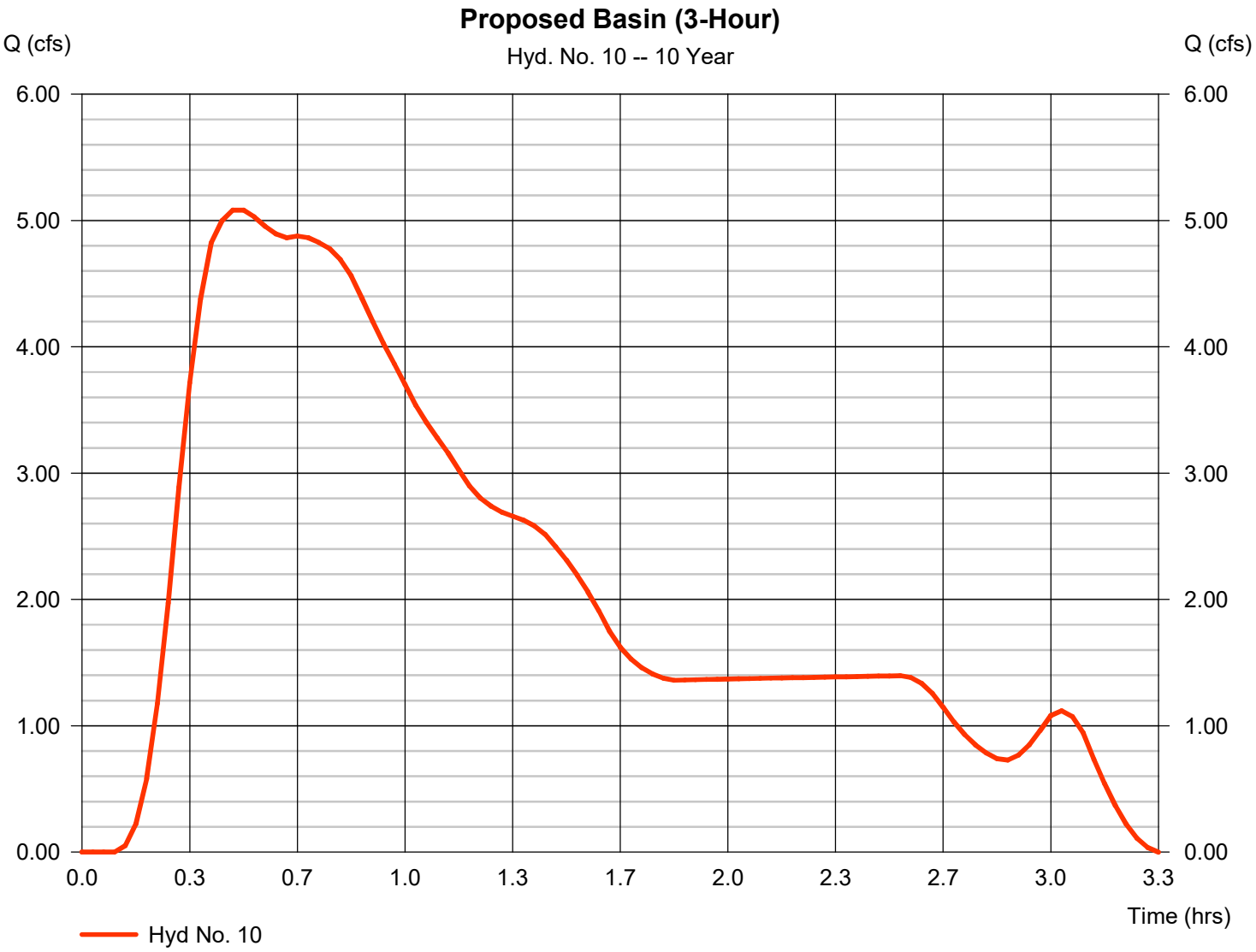


Hydrograph Report

Hyd. No. 10

Proposed Basin (3-Hour)

Hydrograph type	= SCS Runoff	Peak discharge	= 5.082 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.47 hrs
Time interval	= 2 min	Hyd. volume	= 25,295 cuft
Drainage area	= 2.890 ac	Curve number	= 83
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 4.06 in	Distribution	= Huff-1st
Storm duration	= 3.00 hrs	Shape factor	= 484

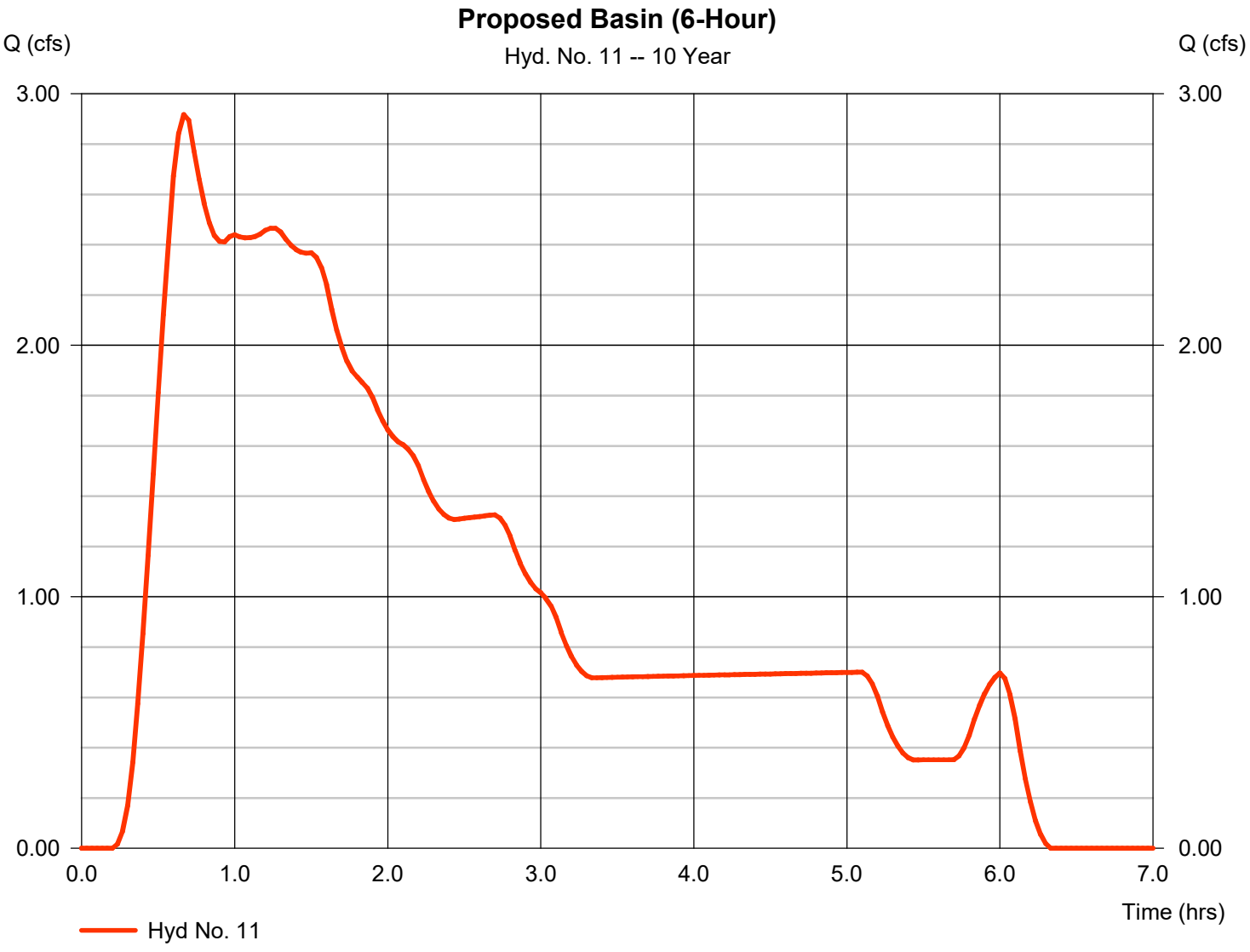


Hydrograph Report

Hyd. No. 11

Proposed Basin (6-Hour)

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.918 cfs
Storm frequency	=	10 yrs	Time to peak	=	0.67 hrs
Time interval	=	2 min	Hyd. volume	=	25,295 cuft
Drainage area	=	2.890 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	4.06 in	Distribution	=	Huff-1st
Storm duration	=	6.00 hrs	Shape factor	=	484

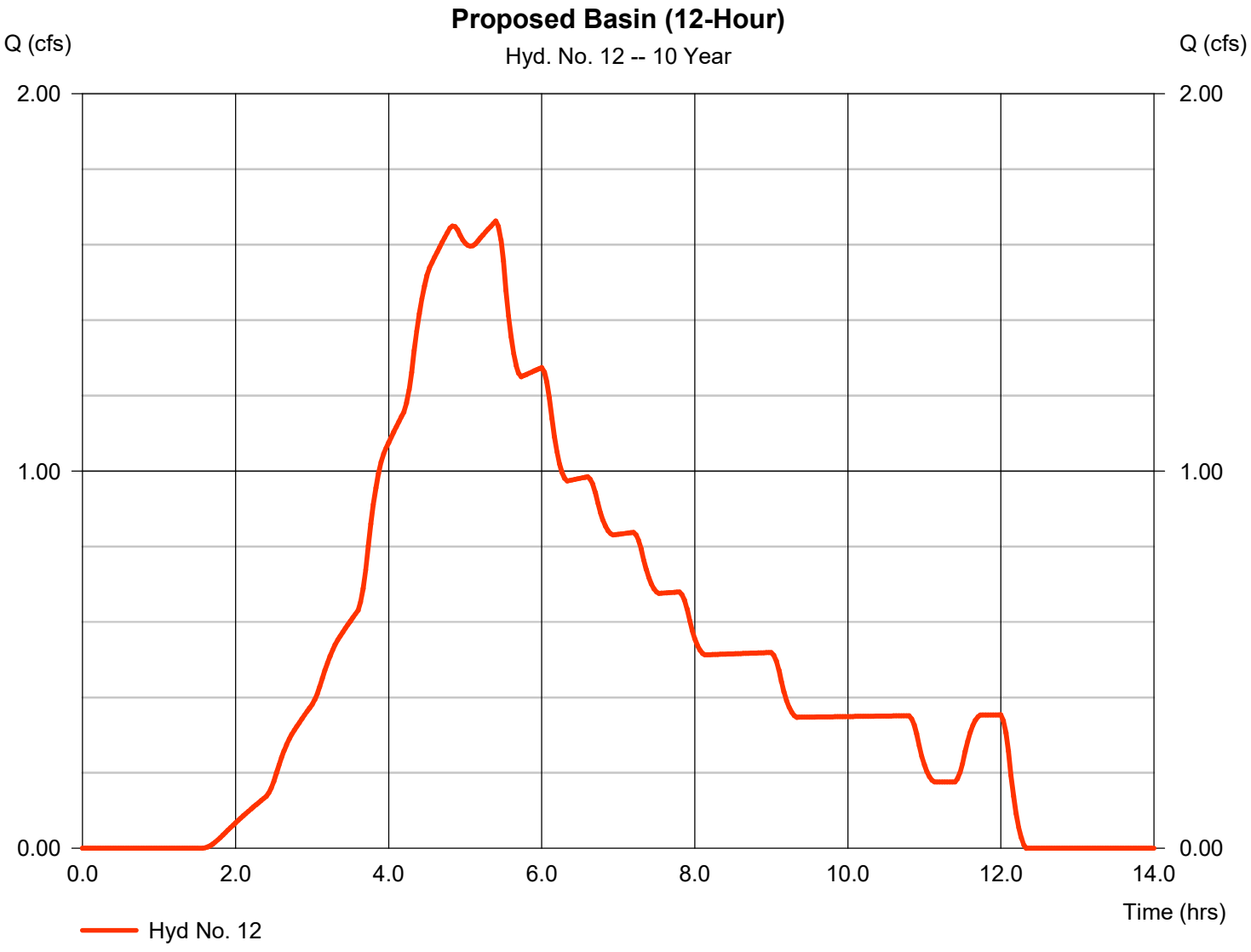


Hydrograph Report

Hyd. No. 12

Proposed Basin (12-Hour)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.663 cfs
Storm frequency	=	10 yrs	Time to peak	=	5.40 hrs
Time interval	=	2 min	Hyd. volume	=	25,297 cuft
Drainage area	=	2.890 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	4.06 in	Distribution	=	Huff-2nd
Storm duration	=	12.00 hrs	Shape factor	=	484



Hydrograph Report

Hyd. No. 13

Proposed Basin (24-Hour)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.037 cfs
Storm frequency	=	10 yrs	Time to peak	=	15.60 hrs
Time interval	=	2 min	Hyd. volume	=	25,297 cuft
Drainage area	=	2.890 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	4.06 in	Distribution	=	Huff-3rd
Storm duration	=	24.00 hrs	Shape factor	=	484

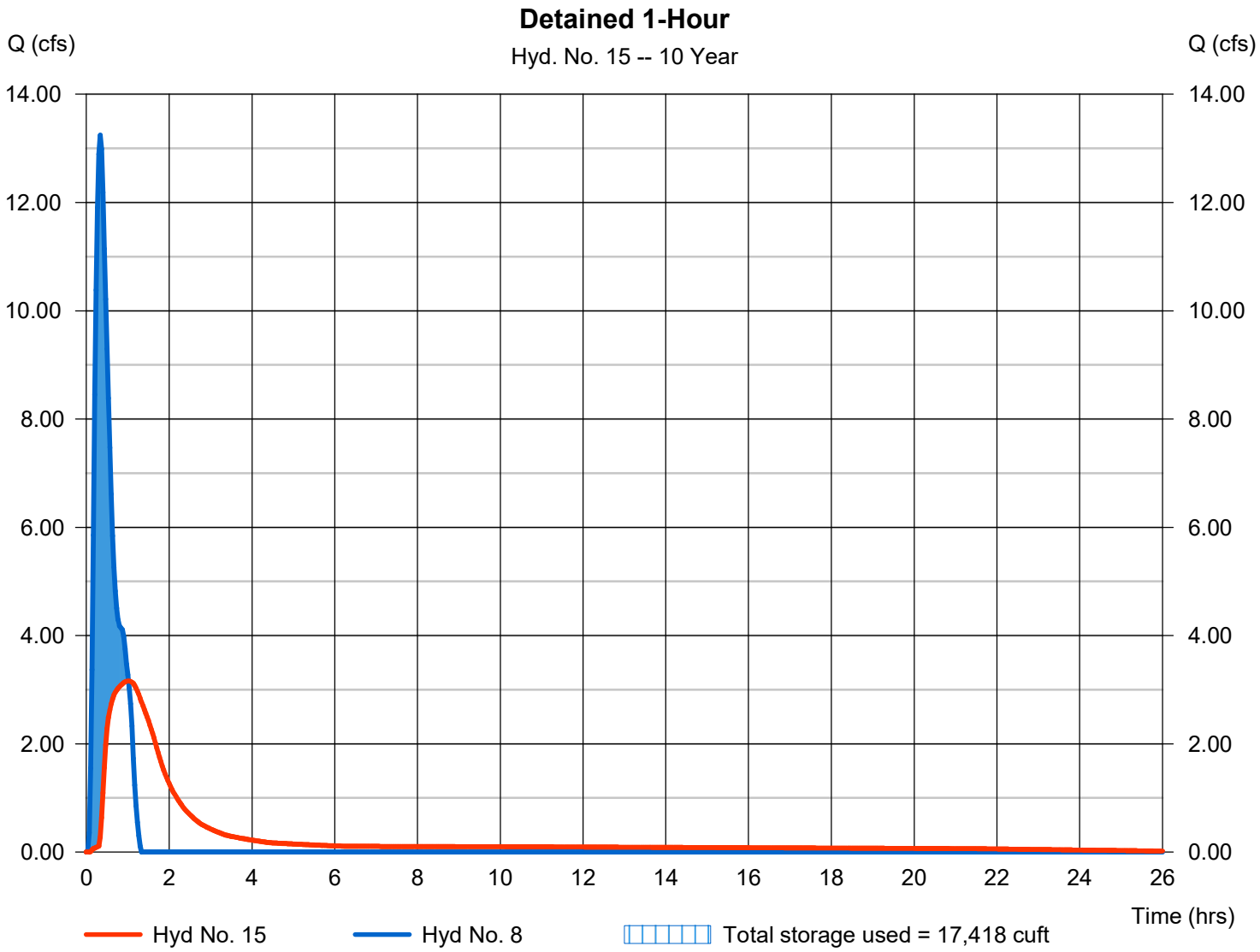
Hydrograph Report

Hyd. No. 15

Detained 1-Hour

Hydrograph type	=	Reservoir	Peak discharge	=	3.160 cfs
Storm frequency	=	10 yrs	Time to peak	=	1.00 hrs
Time interval	=	2 min	Hyd. volume	=	25,274 cuft
Inflow hyd. No.	=	8 - Proposed Basin (1-Hour)	Max. Elevation	=	759.43 ft
Reservoir name	=	Dry Pond	Max. Storage	=	17,418 cuft

Storage Indication method used.



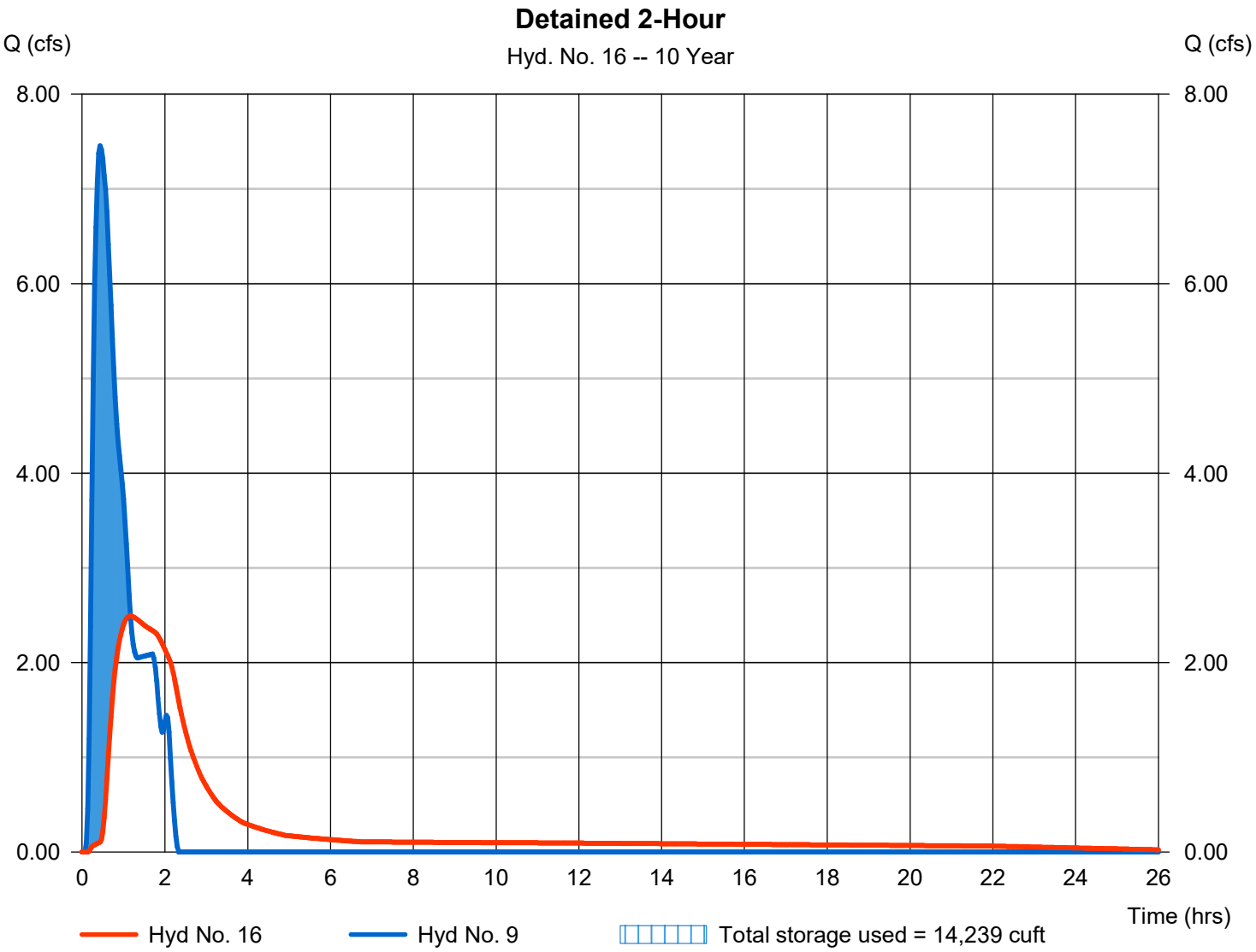
Hydrograph Report

Hyd. No. 16

Detained 2-Hour

Hydrograph type	=	Reservoir	Peak discharge	=	2.492 cfs
Storm frequency	=	10 yrs	Time to peak	=	1.17 hrs
Time interval	=	2 min	Hyd. volume	=	25,271 cuft
Inflow hyd. No.	=	9 - Proposed Basin (2-Hour)	Max. Elevation	=	759.12 ft
Reservoir name	=	Dry Pond	Max. Storage	=	14,239 cuft

Storage Indication method used.



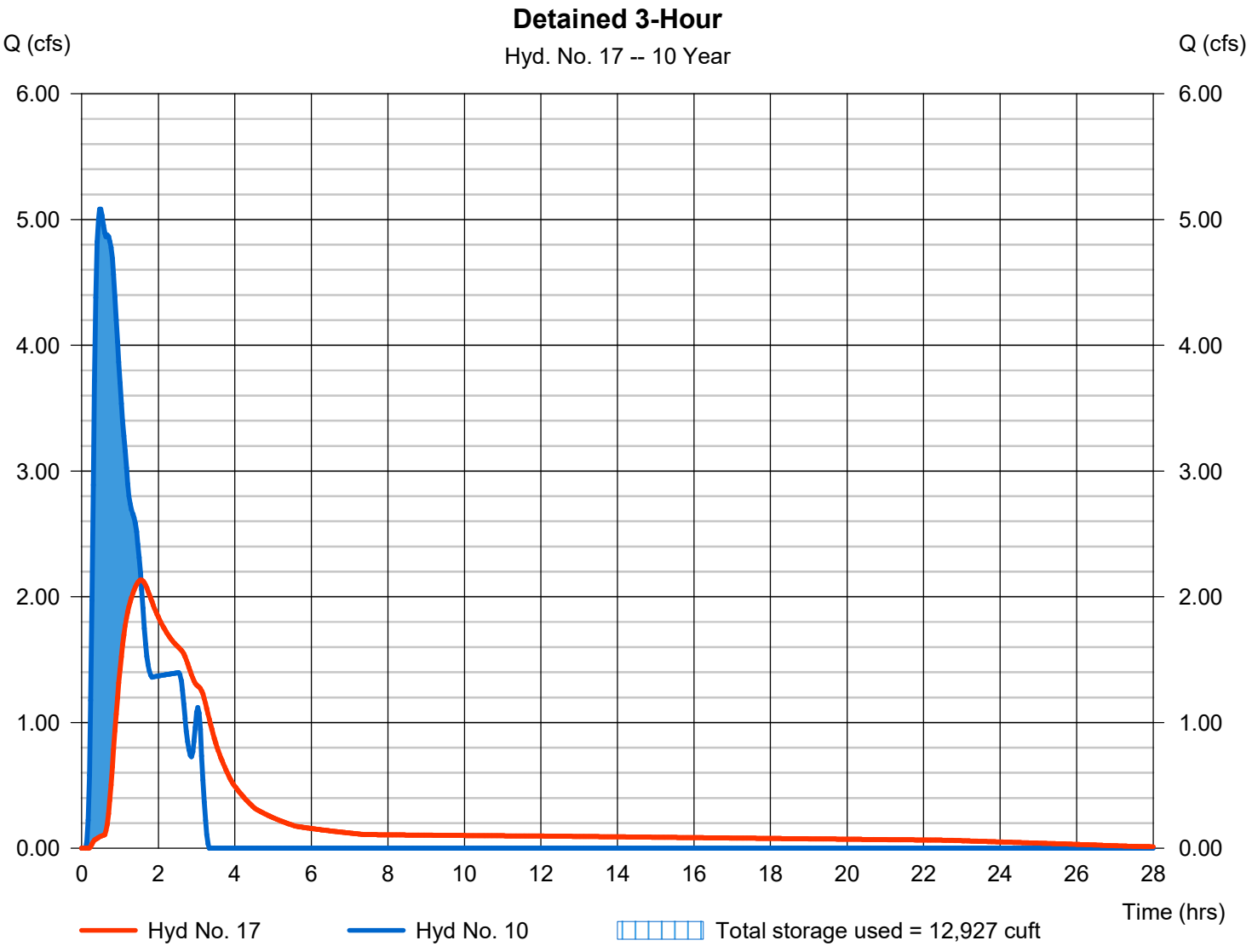
Hydrograph Report

Hyd. No. 17

Detained 3-Hour

Hydrograph type	=	Reservoir	Peak discharge	=	2.132 cfs
Storm frequency	=	10 yrs	Time to peak	=	1.53 hrs
Time interval	=	2 min	Hyd. volume	=	25,271 cuft
Inflow hyd. No.	=	10 - Proposed Basin (3-Hour)	Max. Elevation	=	759.00 ft
Reservoir name	=	Dry Pond	Max. Storage	=	12,927 cuft

Storage Indication method used.



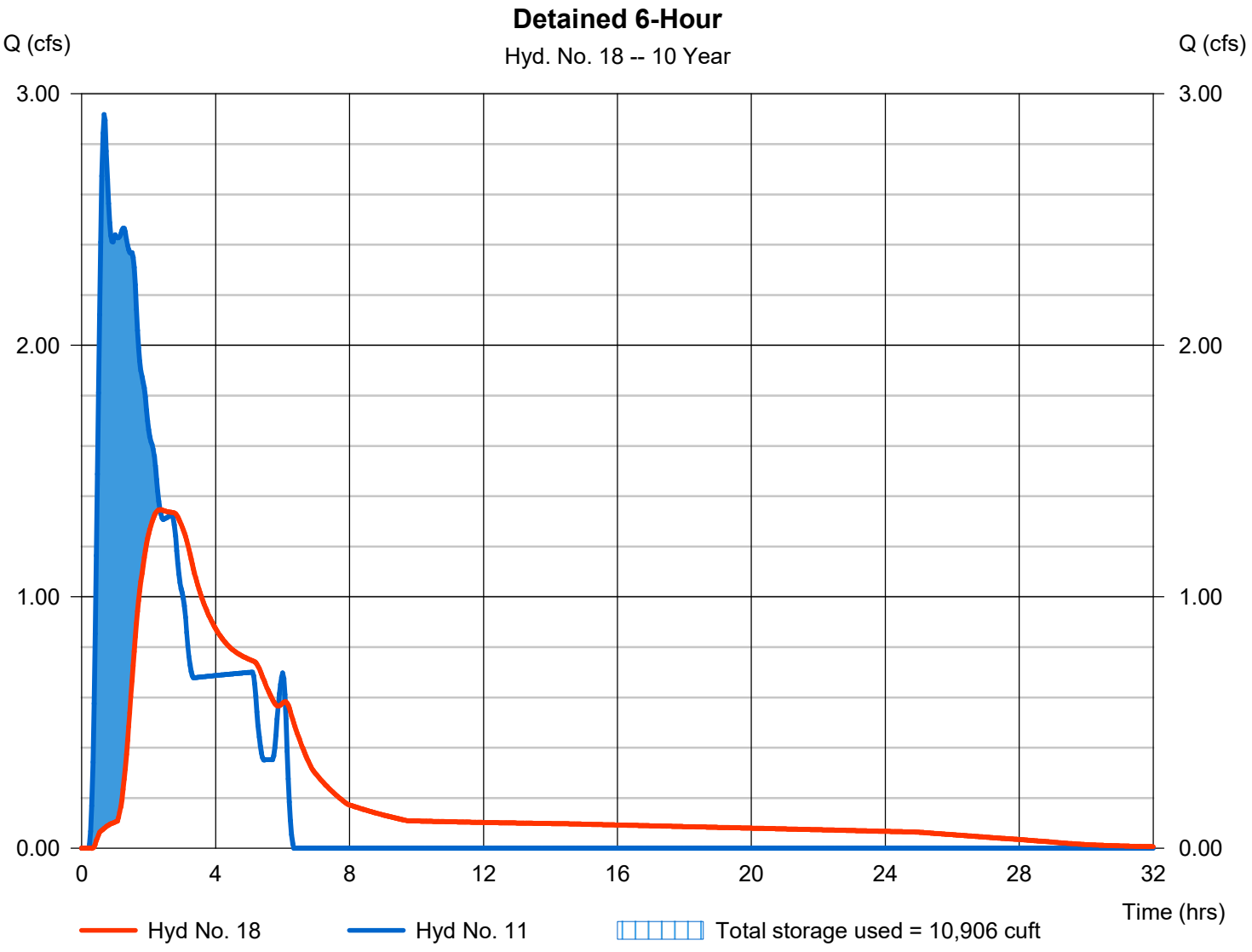
Hydrograph Report

Hyd. No. 18

Detained 6-Hour

Hydrograph type	=	Reservoir	Peak discharge	=	1.346 cfs
Storm frequency	=	10 yrs	Time to peak	=	2.33 hrs
Time interval	=	2 min	Hyd. volume	=	25,271 cuft
Inflow hyd. No.	=	11 - Proposed Basin (6-Hour)	Max. Elevation	=	758.77 ft
Reservoir name	=	Dry Pond	Max. Storage	=	10,906 cuft

Storage Indication method used.



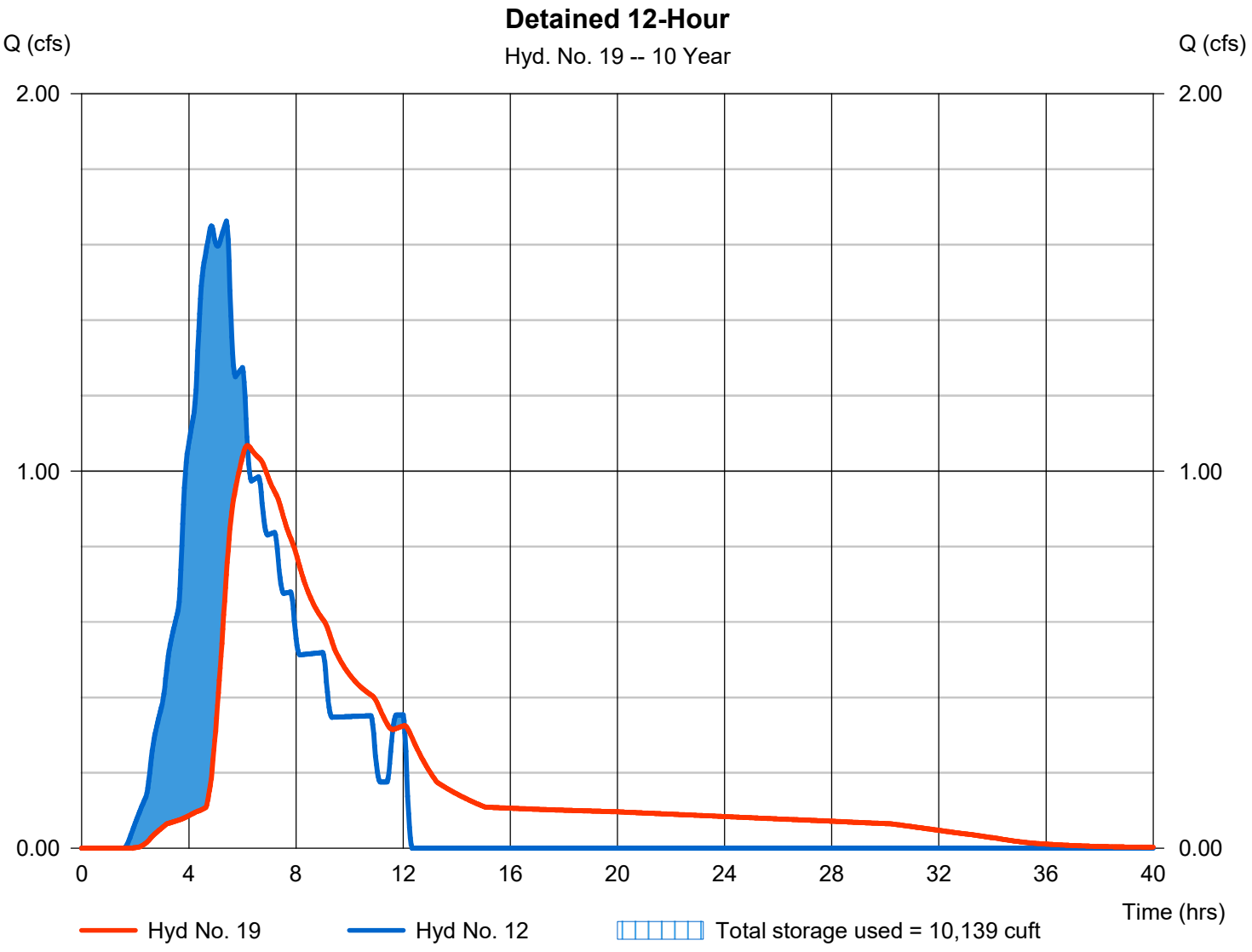
Hydrograph Report

Hyd. No. 19

Detained 12-Hour

Hydrograph type	=	Reservoir	Peak discharge	=	1.067 cfs
Storm frequency	=	10 yrs	Time to peak	=	6.20 hrs
Time interval	=	2 min	Hyd. volume	=	25,274 cuft
Inflow hyd. No.	=	12 - Proposed Basin (12-Hour)	Max. Elevation	=	758.69 ft
Reservoir name	=	Dry Pond	Max. Storage	=	10,139 cuft

Storage Indication method used.



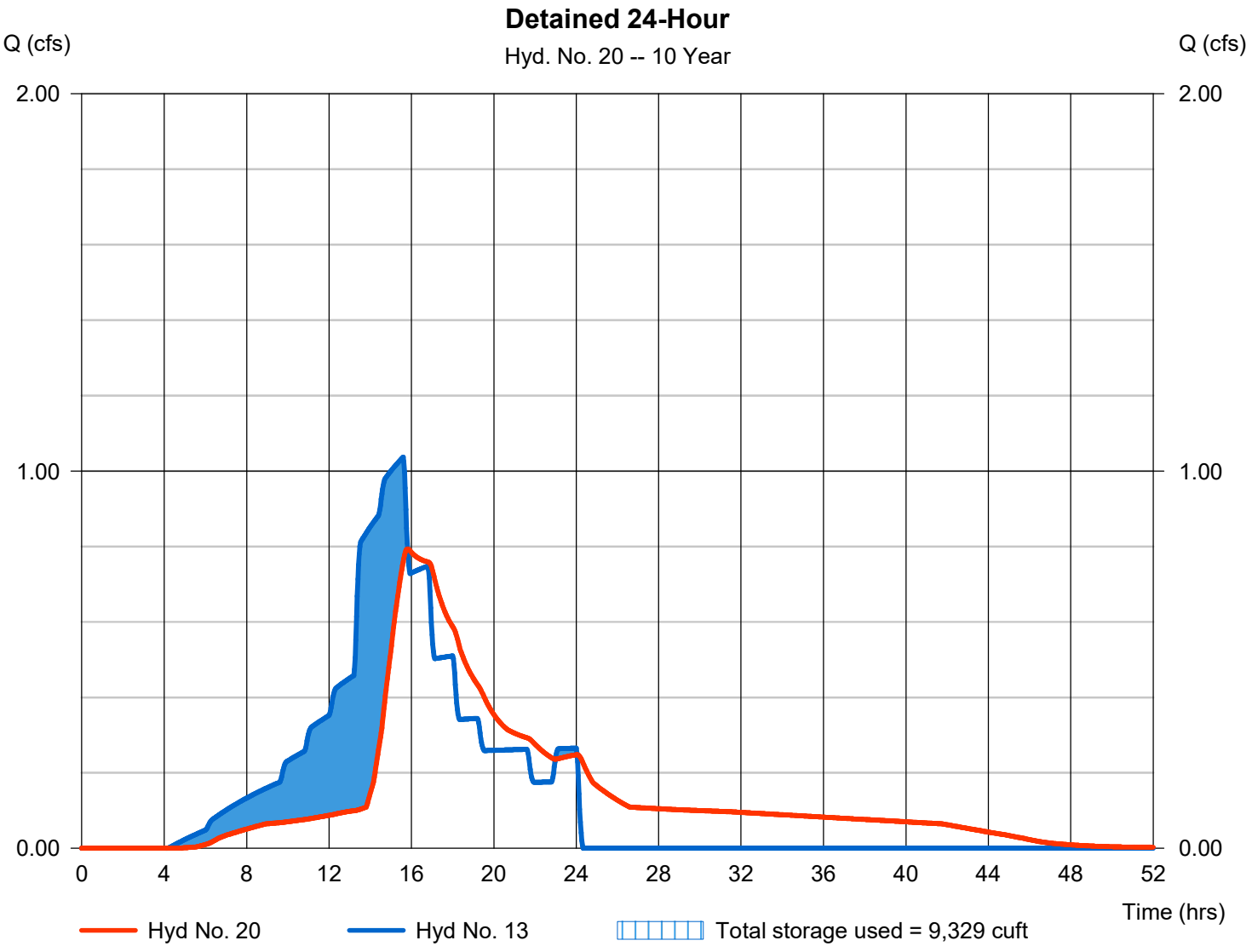
Hydrograph Report

Hyd. No. 20

Detained 24-Hour

Hydrograph type	=	Reservoir	Peak discharge	=	0.794 cfs
Storm frequency	=	10 yrs	Time to peak	=	15.80 hrs
Time interval	=	2 min	Hyd. volume	=	25,274 cuft
Inflow hyd. No.	=	13 - Proposed Basin (24-Hour)	Max. Elevation	=	758.60 ft
Reservoir name	=	Dry Pond	Max. Storage	=	9,329 cuft

Storage Indication method used.

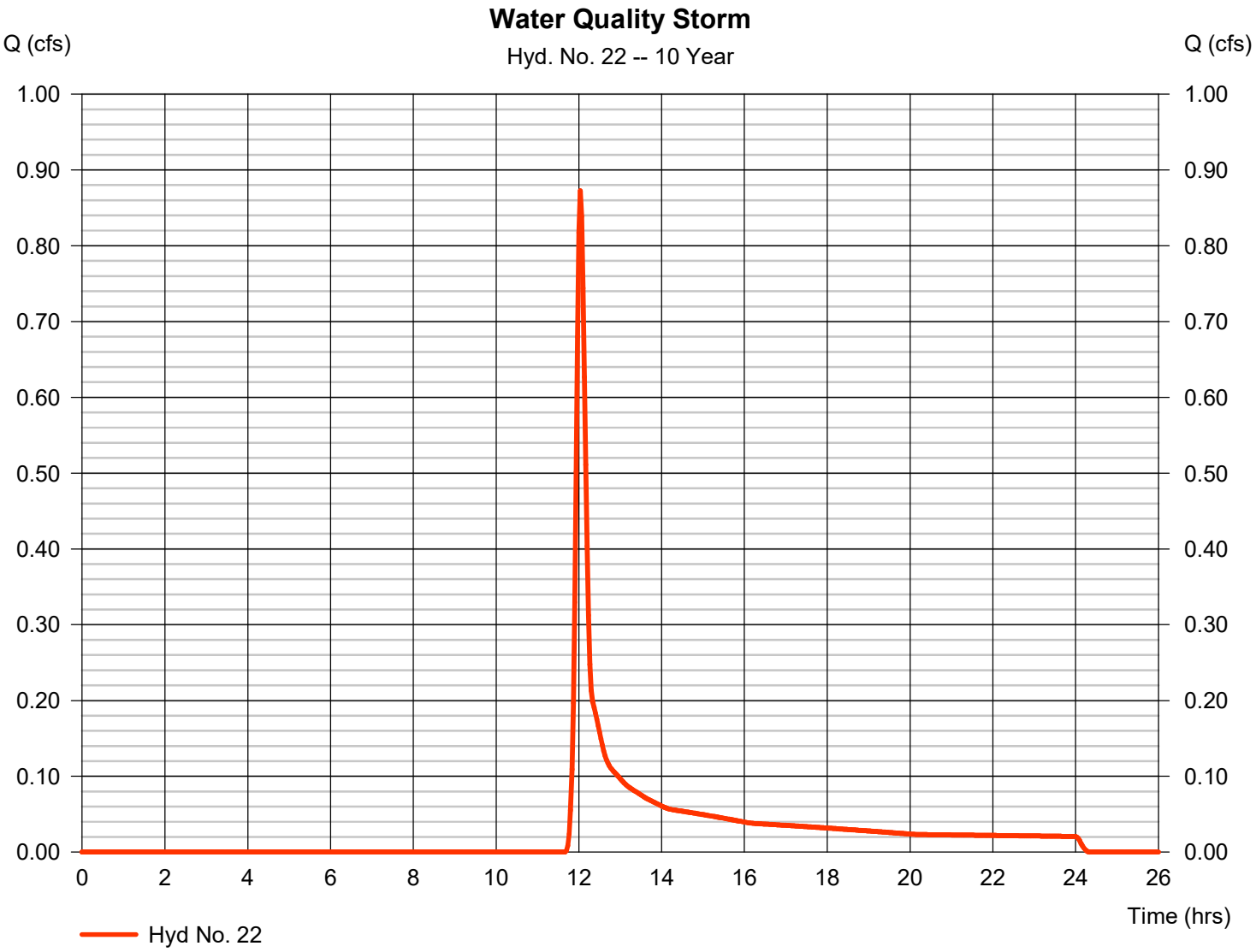


Hydrograph Report

Hyd. No. 22

Water Quality Storm

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.873 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	2,644 cuft
Drainage area	=	2.890 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	1.25 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

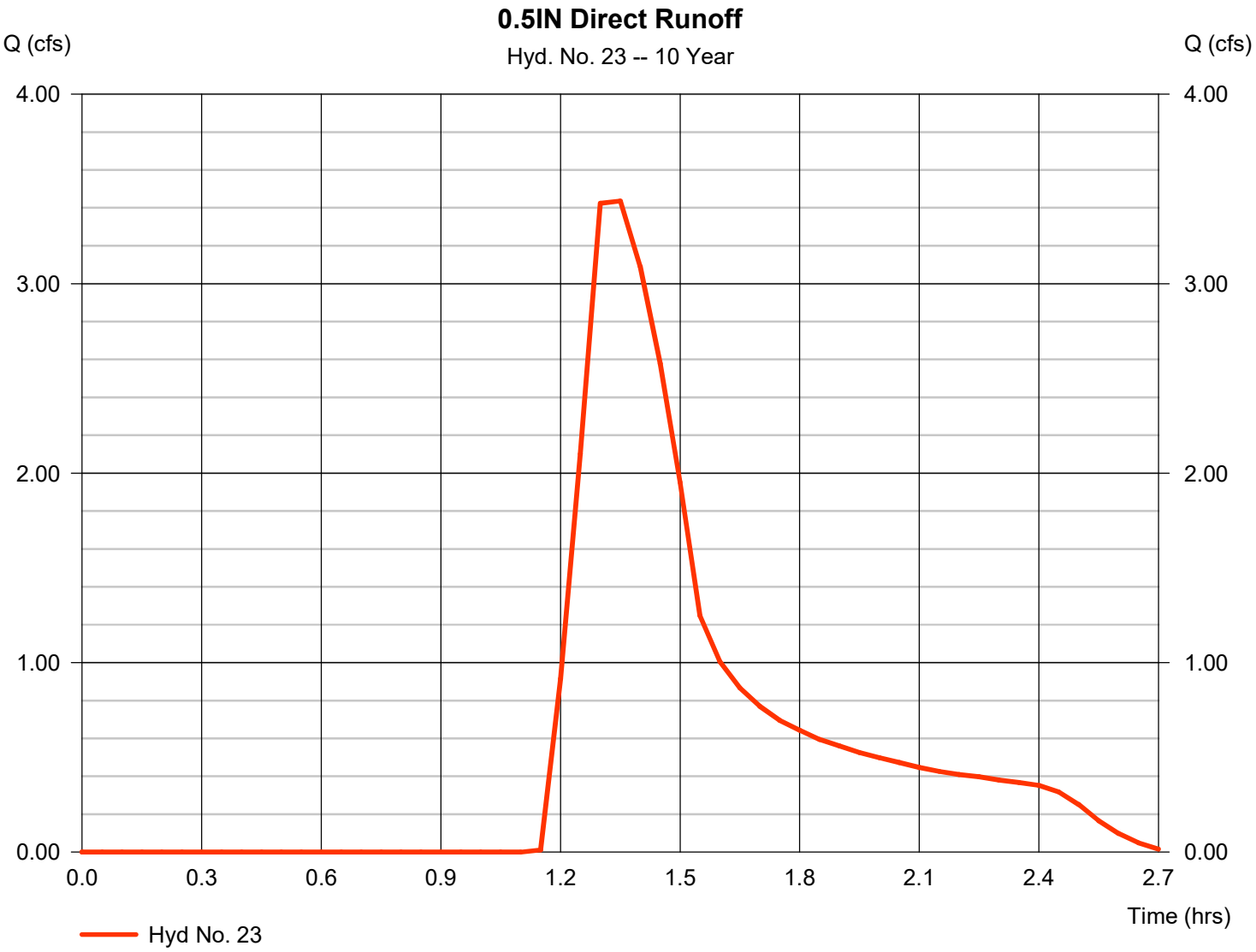


Hydrograph Report

Hyd. No. 23

0.5IN Direct Runoff

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.436 cfs
Storm frequency	=	10 yrs	Time to peak	=	1.35 hrs
Time interval	=	3 min	Hyd. volume	=	5,231 cuft
Drainage area	=	2.890 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	1.70 in	Distribution	=	Custom
Storm duration	=	Sample.cds	Shape factor	=	484



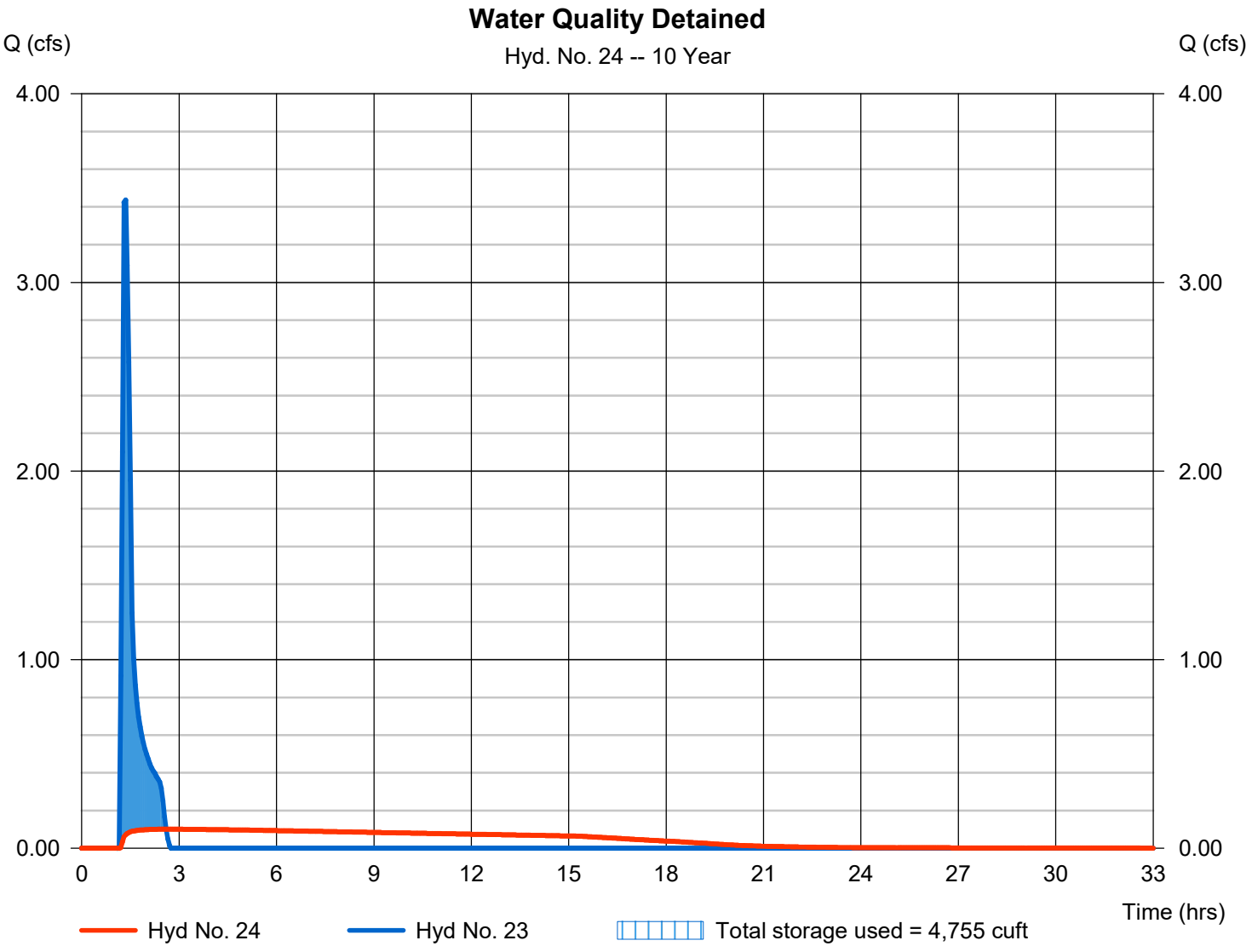
Hydrograph Report

Hyd. No. 24

Water Quality Detained

Hydrograph type	=	Reservoir	Peak discharge	=	0.102 cfs
Storm frequency	=	10 yrs	Time to peak	=	2.60 hrs
Time interval	=	3 min	Hyd. volume	=	5,208 cuft
Inflow hyd. No.	=	23 - 0.5IN Direct Runoff	Max. Elevation	=	758.09 ft
Reservoir name	=	Dry Pond	Max. Storage	=	4,755 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

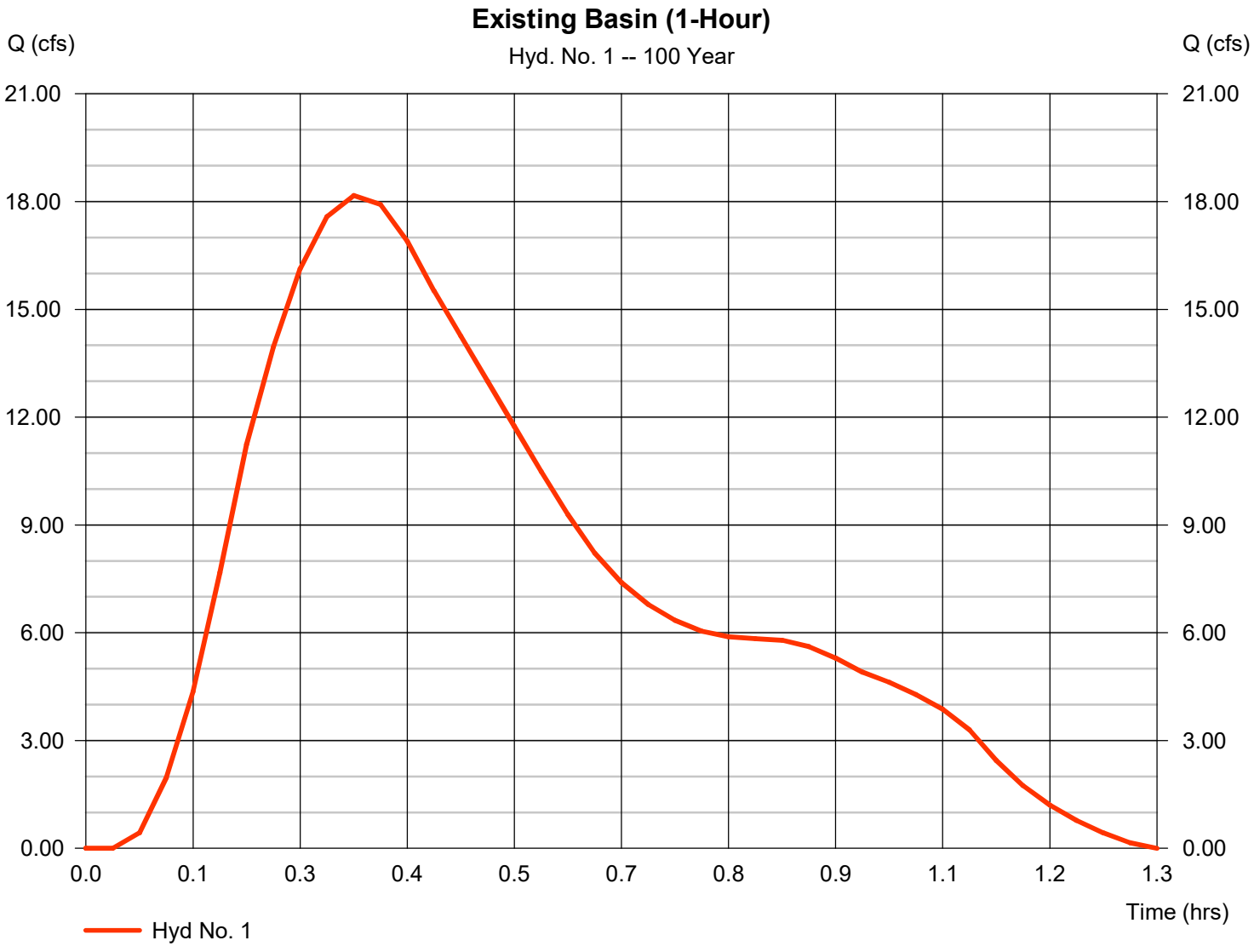
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	18.17	2	20	34,986	------	------	------	Existing Basin (1-Hour)
2	SCS Runoff	10.18	2	26	34,986	------	------	------	Existing Basin (2-Hour)
3	SCS Runoff	6.887	2	30	34,986	------	------	------	Existing Basin (3-Hour)
4	SCS Runoff	3.891	2	40	34,986	------	------	------	Existing Basin (6-Hour)
5	SCS Runoff	2.316	2	324	34,986	------	------	------	Existing Basin (12-Hour)
6	SCS Runoff	1.452	2	936	34,986	------	------	------	Existing Basin (24-Hour)
8	SCS Runoff	22.90	2	20	42,559	------	------	------	Proposed Basin (1-Hour)
9	SCS Runoff	13.36	2	24	42,559	------	------	------	Proposed Basin (2-Hour)
10	SCS Runoff	9.579	2	26	42,559	------	------	------	Proposed Basin (3-Hour)
11	SCS Runoff	5.617	2	40	42,559	------	------	------	Proposed Basin (6-Hour)
12	SCS Runoff	2.759	2	290	42,558	------	------	------	Proposed Basin (12-Hour)
13	SCS Runoff	1.646	2	936	42,559	------	------	------	Proposed Basin (24-Hour)
15	Reservoir	4.527	2	62	42,535	8	760.53	29,567	Detained 1-Hour
16	Reservoir	4.068	2	68	42,535	9	759.97	23,017	Detained 2-Hour
17	Reservoir	3.602	2	90	42,535	10	759.67	19,900	Detained 3-Hour
18	Reservoir	2.672	2	120	42,535	11	759.20	15,057	Detained 6-Hour
19	Reservoir	2.207	2	336	42,535	12	759.02	13,179	Detained 12-Hour
20	Reservoir	1.534	2	942	42,535	13	758.83	11,395	Detained 24-Hour
22	SCS Runoff	0.873	2	722	2,644	------	------	------	Water Quality Storm
23	SCS Runoff	3.436	3	81	5,231	------	------	------	0.5IN Direct Runoff
24	Reservoir	0.102	3	156	5,208	23	758.09	4,755	Water Quality Detained

Hydrograph Report

Hyd. No. 1

Existing Basin (1-Hour)

Hydrograph type	= SCS Runoff	Peak discharge	= 18.17 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.33 hrs
Time interval	= 2 min	Hyd. volume	= 34,986 cuft
Drainage area	= 2.890 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.50 min
Total precip.	= 5.83 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

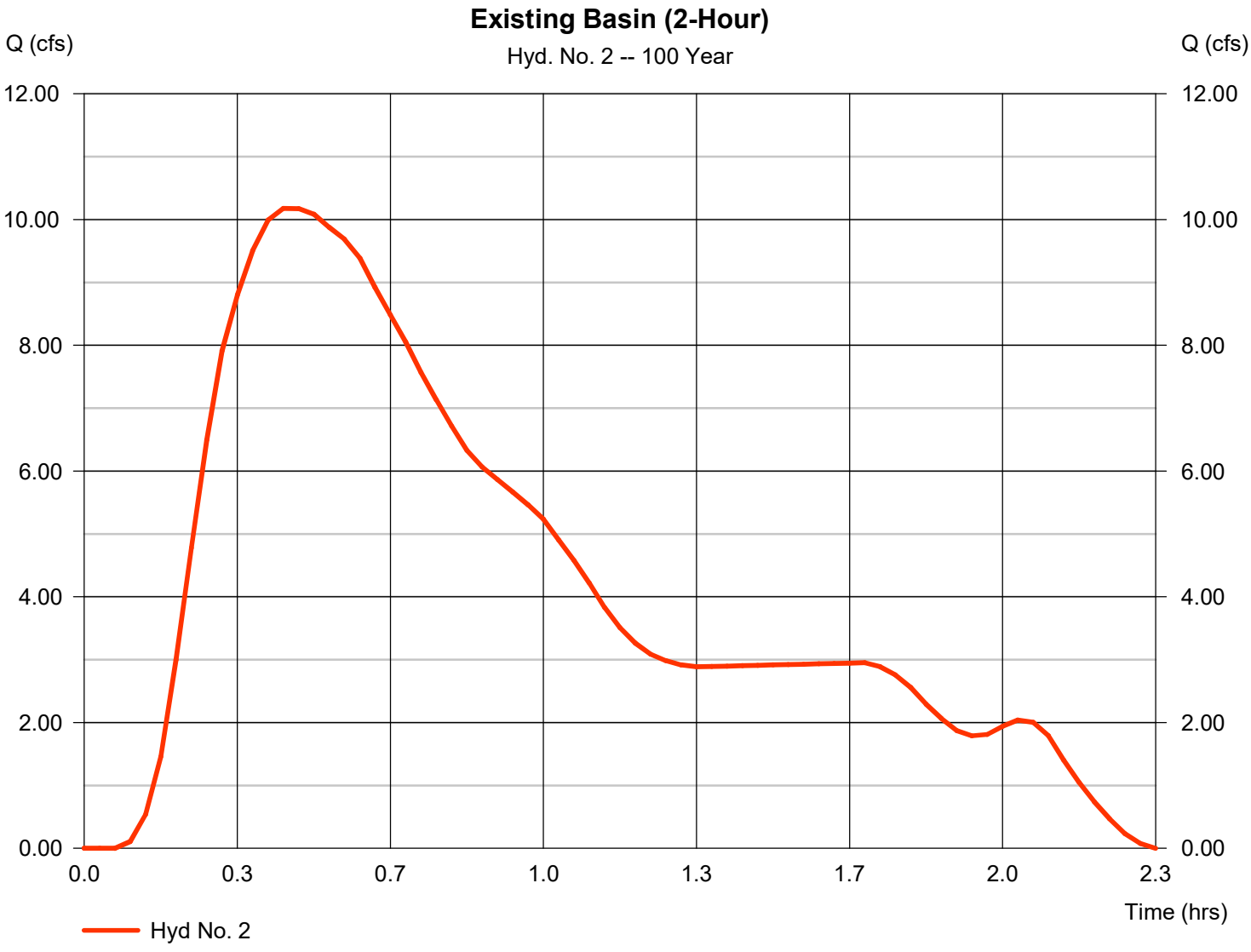


Hydrograph Report

Hyd. No. 2

Existing Basin (2-Hour)

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.18 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.43 hrs
Time interval	=	2 min	Hyd. volume	=	34,986 cuft
Drainage area	=	2.890 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.50 min
Total precip.	=	5.83 in	Distribution	=	Huff-1st
Storm duration	=	2.00 hrs	Shape factor	=	484

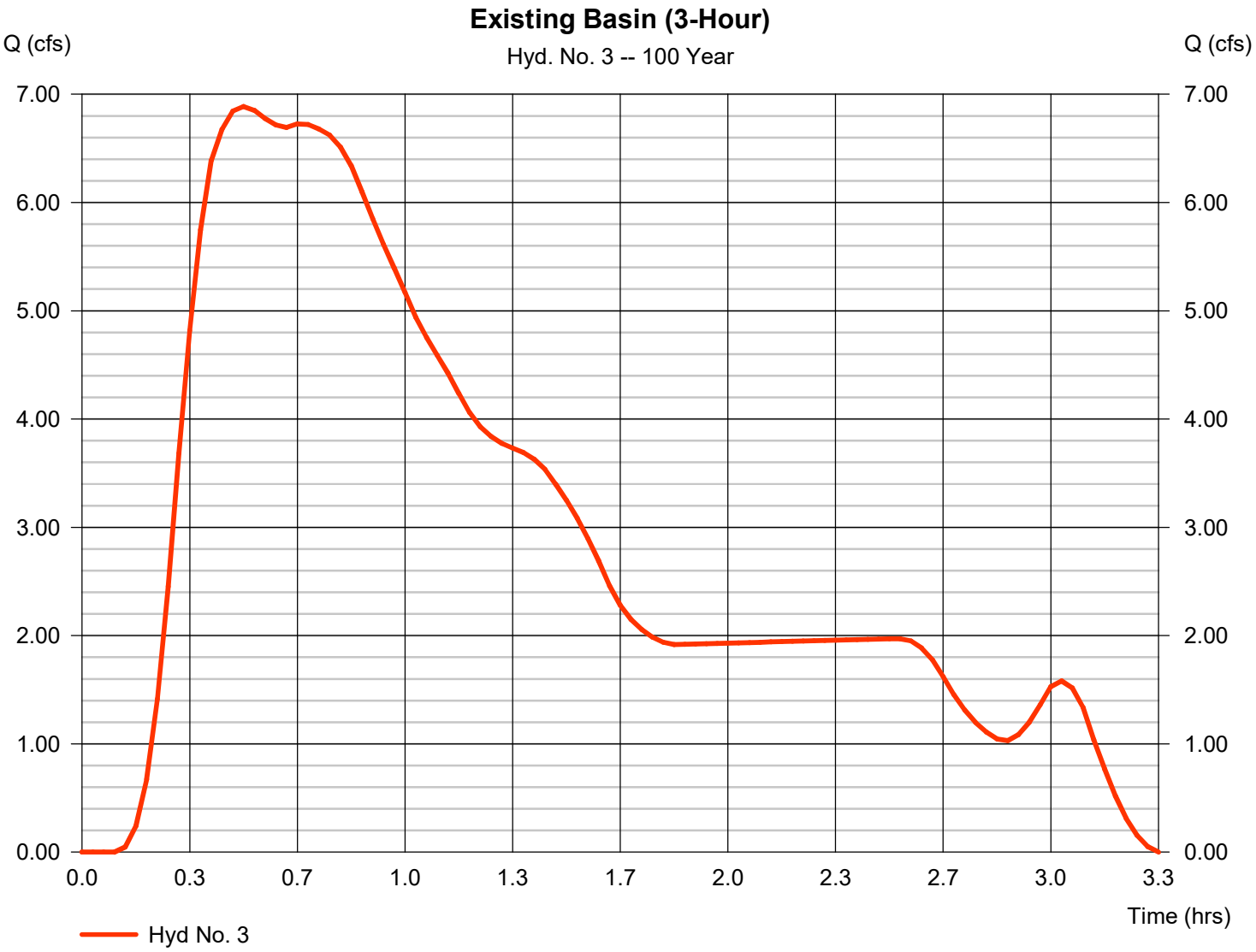


Hydrograph Report

Hyd. No. 3

Existing Basin (3-Hour)

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.887 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.50 hrs
Time interval	=	2 min	Hyd. volume	=	34,986 cuft
Drainage area	=	2.890 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.50 min
Total precip.	=	5.83 in	Distribution	=	Huff-1st
Storm duration	=	3.00 hrs	Shape factor	=	484

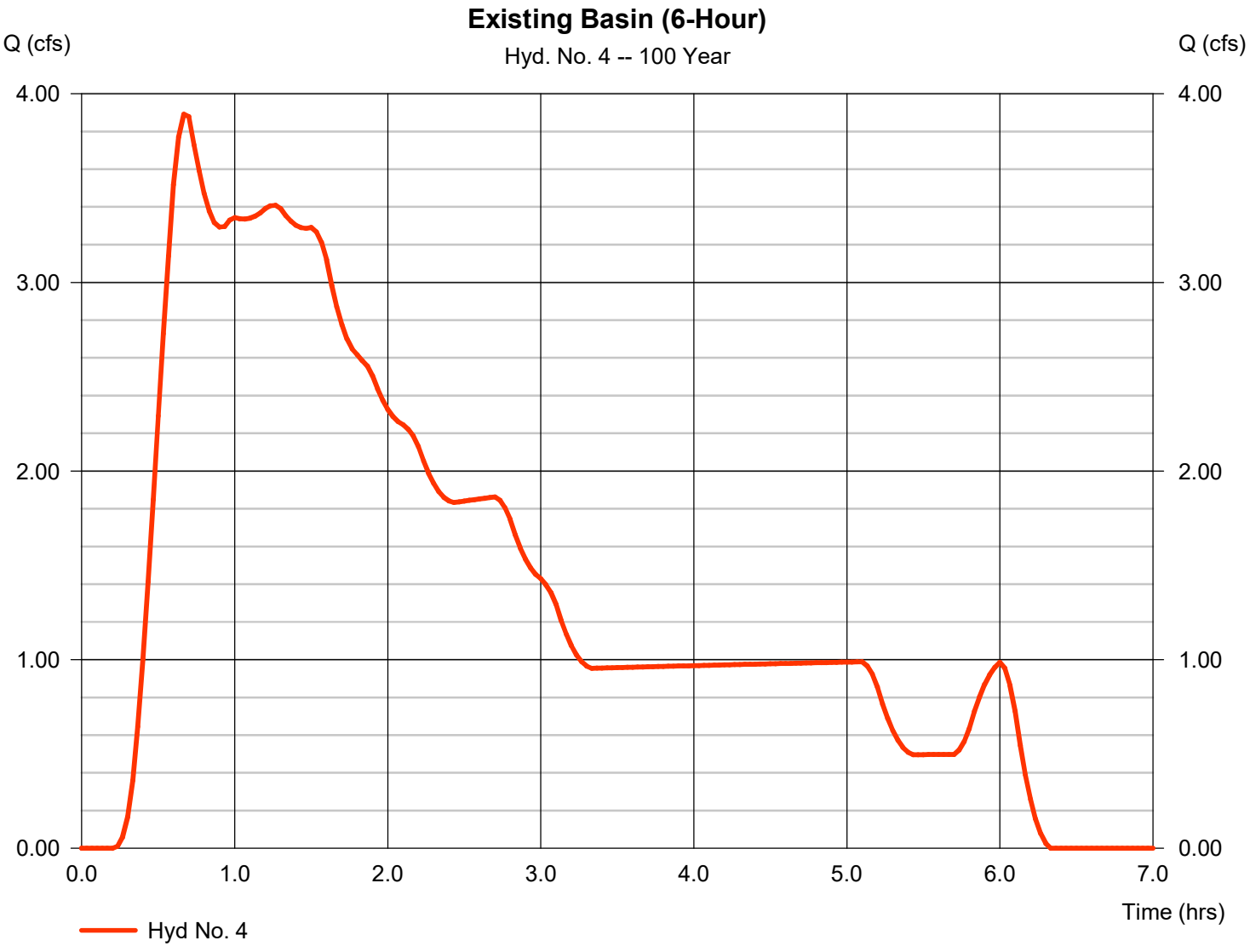


Hydrograph Report

Hyd. No. 4

Existing Basin (6-Hour)

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.891 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.67 hrs
Time interval	=	2 min	Hyd. volume	=	34,986 cuft
Drainage area	=	2.890 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.50 min
Total precip.	=	5.83 in	Distribution	=	Huff-1st
Storm duration	=	6.00 hrs	Shape factor	=	484

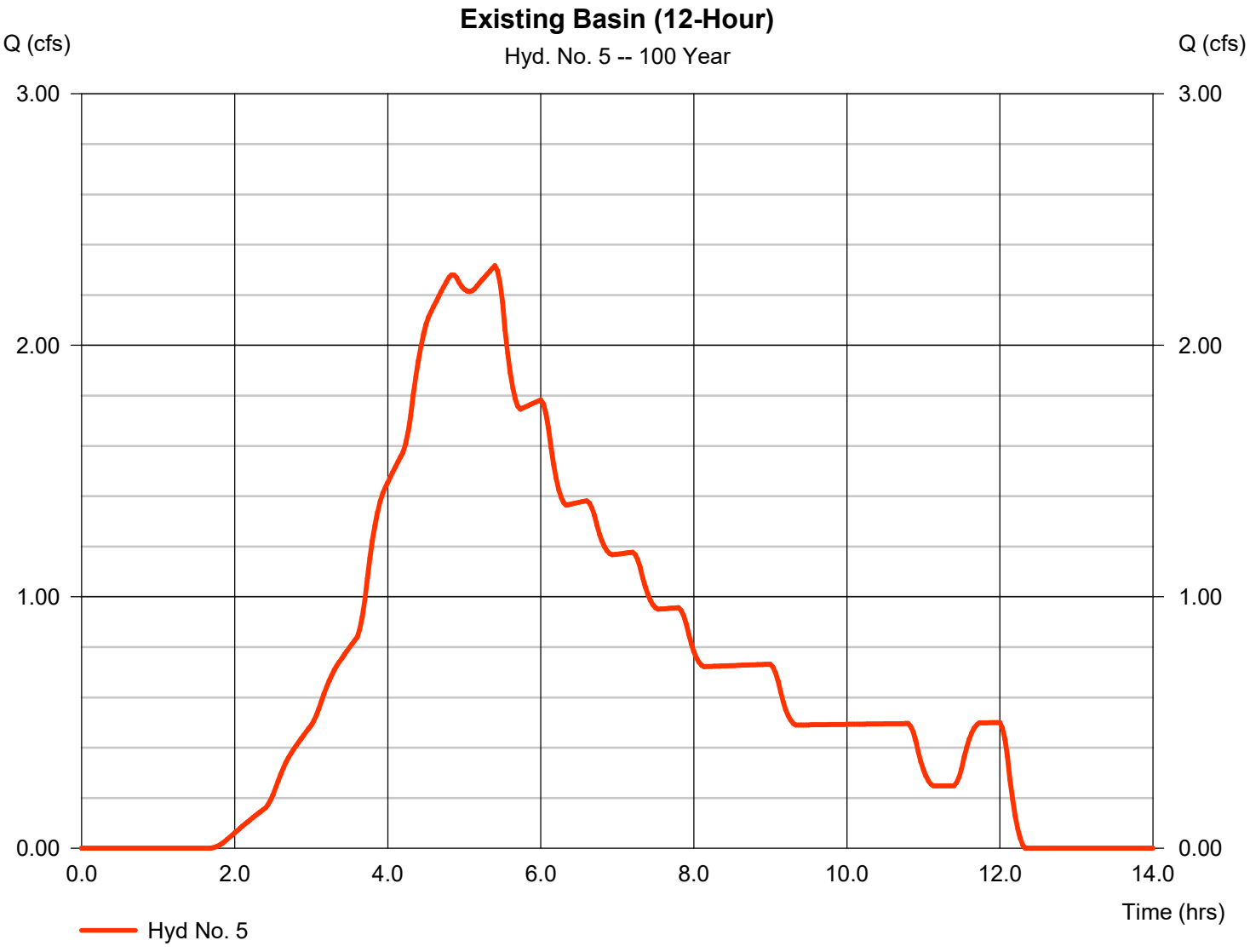


Hydrograph Report

Hyd. No. 5

Existing Basin (12-Hour)

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.316 cfs
Storm frequency	=	100 yrs	Time to peak	=	5.40 hrs
Time interval	=	2 min	Hyd. volume	=	34,986 cuft
Drainage area	=	2.890 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.50 min
Total precip.	=	5.83 in	Distribution	=	Huff-2nd
Storm duration	=	12.00 hrs	Shape factor	=	484

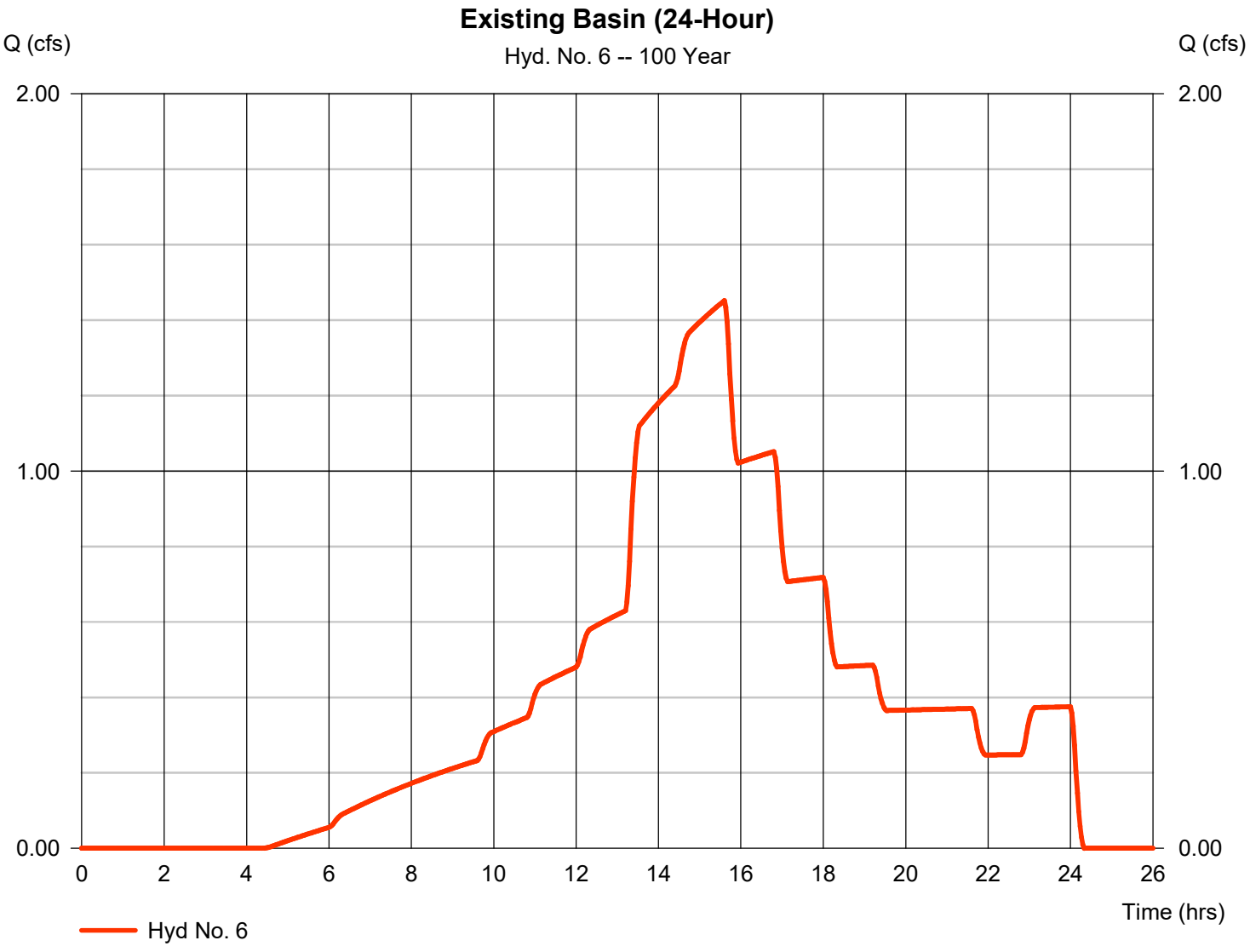


Hydrograph Report

Hyd. No. 6

Existing Basin (24-Hour)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.452 cfs
Storm frequency	=	100 yrs	Time to peak	=	15.60 hrs
Time interval	=	2 min	Hyd. volume	=	34,986 cuft
Drainage area	=	2.890 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.50 min
Total precip.	=	5.83 in	Distribution	=	Huff-3rd
Storm duration	=	24.00 hrs	Shape factor	=	484

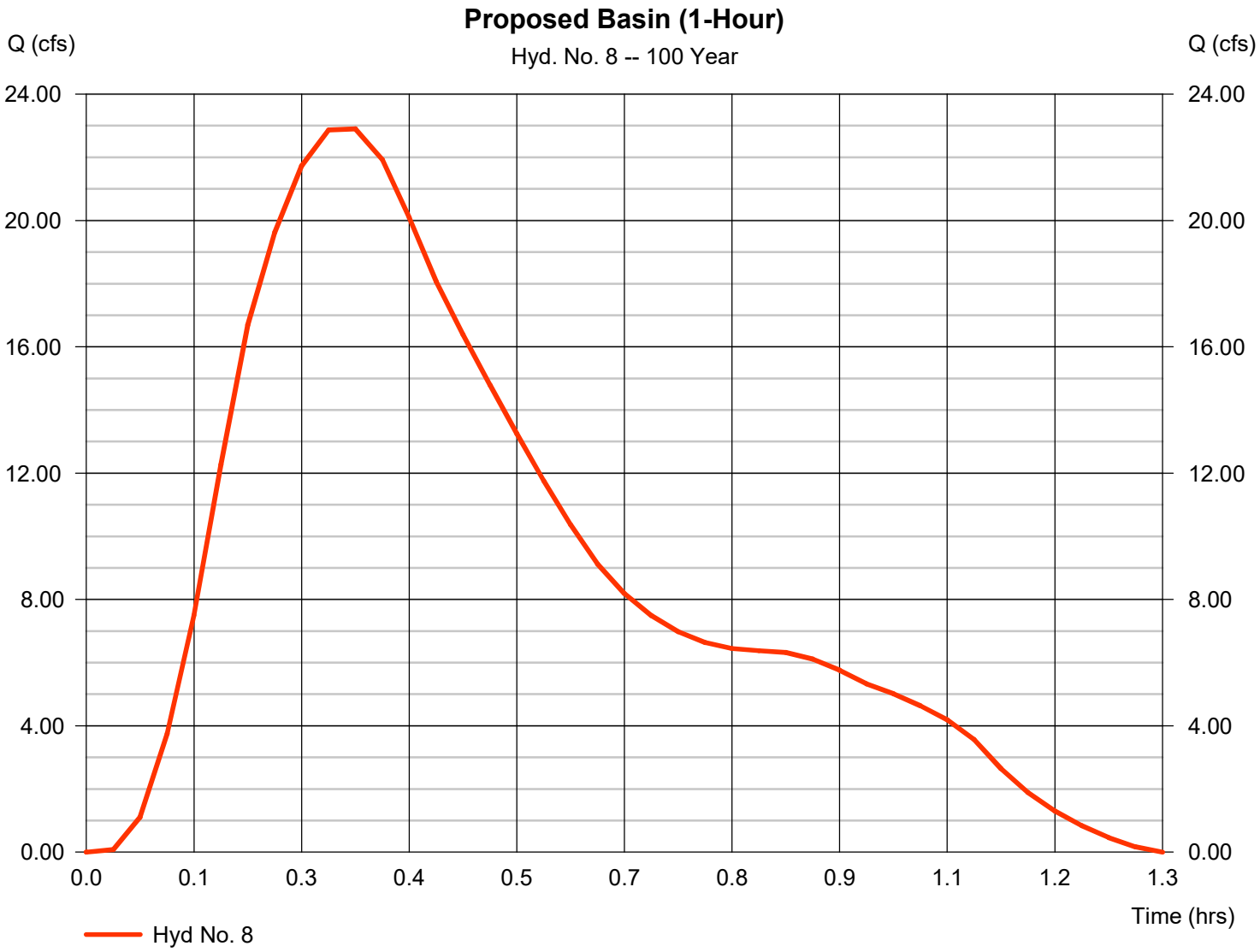


Hydrograph Report

Hyd. No. 8

Proposed Basin (1-Hour)

Hydrograph type	= SCS Runoff	Peak discharge	= 22.90 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.33 hrs
Time interval	= 2 min	Hyd. volume	= 42,559 cuft
Drainage area	= 2.890 ac	Curve number	= 83
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.83 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

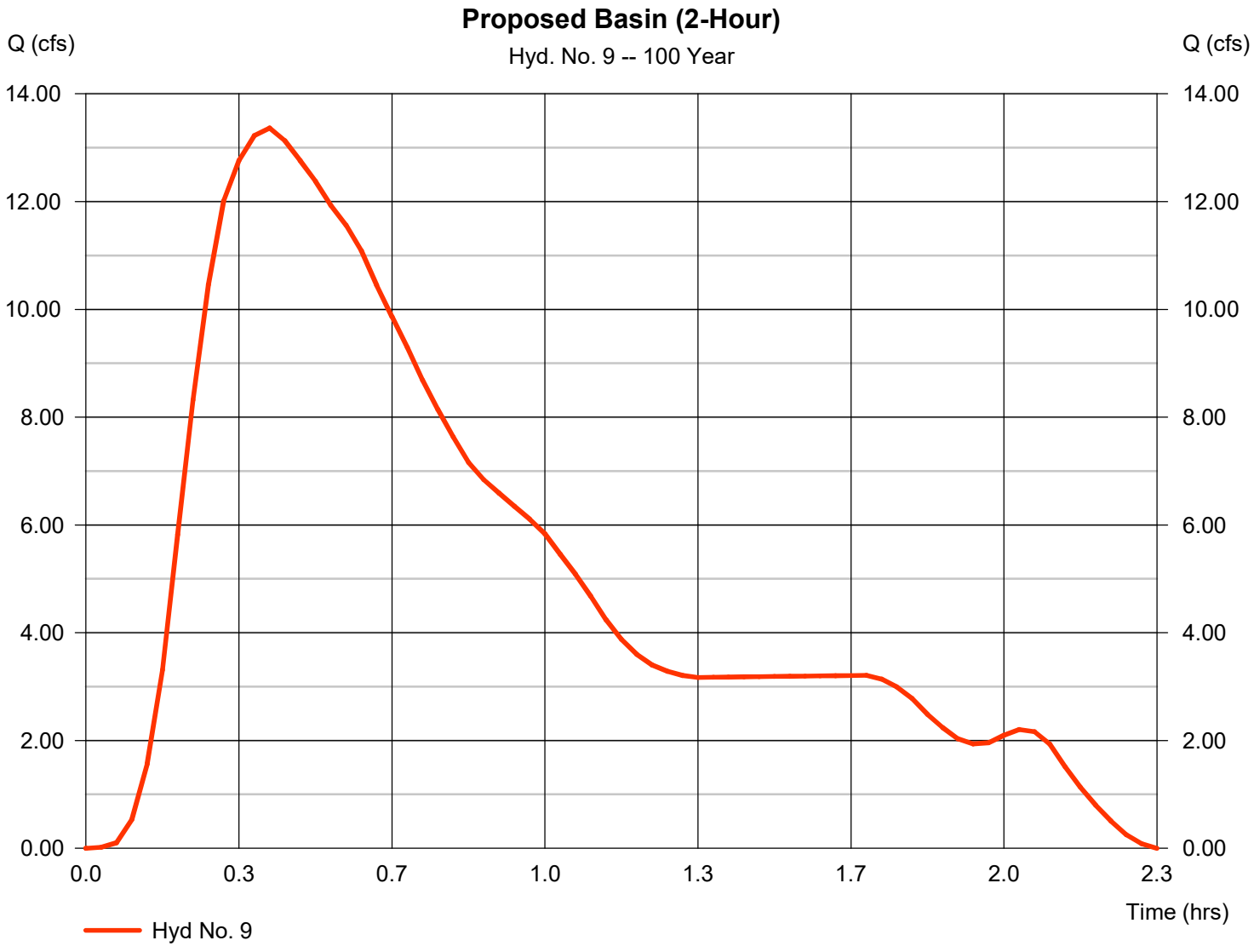


Hydrograph Report

Hyd. No. 9

Proposed Basin (2-Hour)

Hydrograph type	= SCS Runoff	Peak discharge	= 13.36 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.40 hrs
Time interval	= 2 min	Hyd. volume	= 42,559 cuft
Drainage area	= 2.890 ac	Curve number	= 83
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.83 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

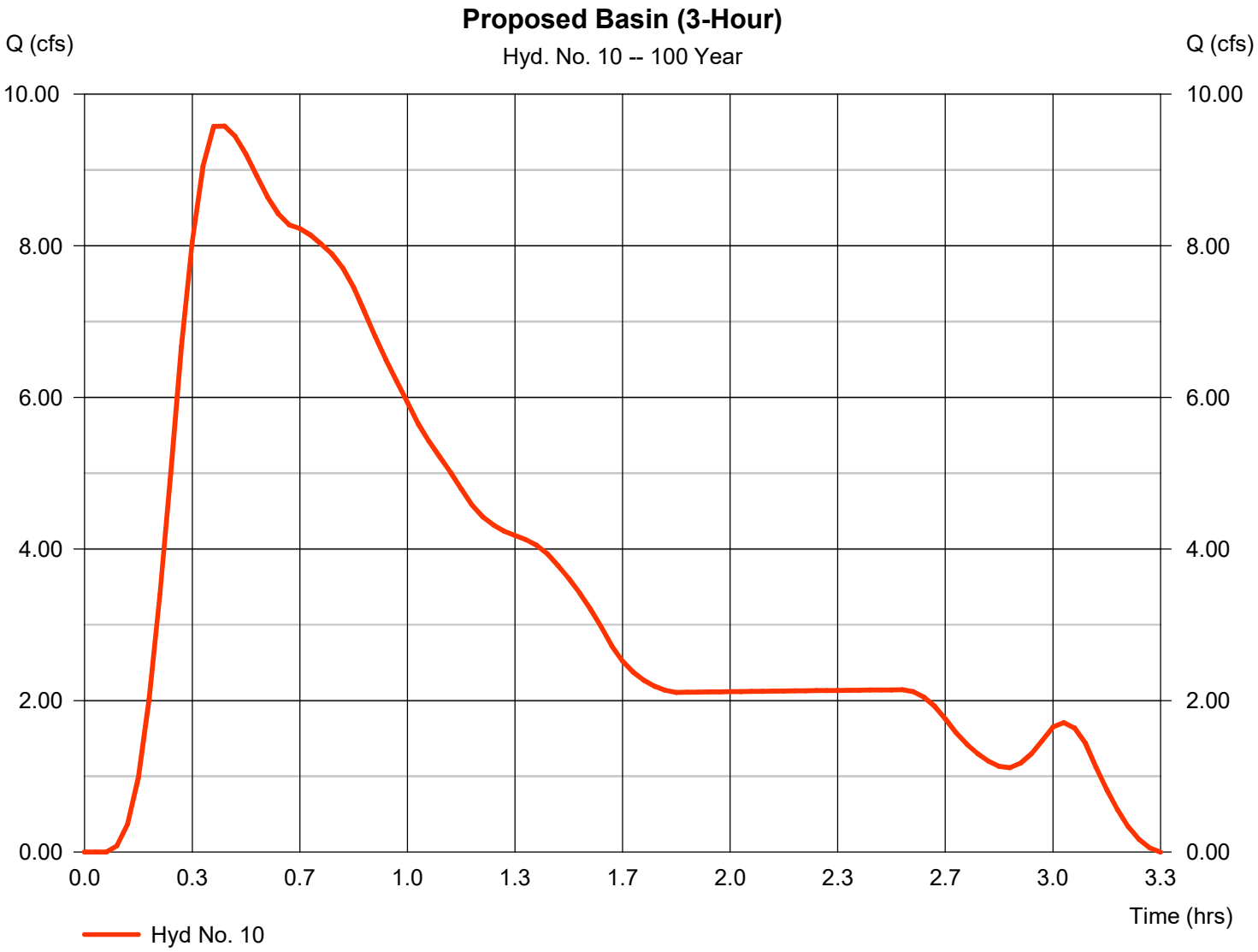


Hydrograph Report

Hyd. No. 10

Proposed Basin (3-Hour)

Hydrograph type	=	SCS Runoff	Peak discharge	=	9.579 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.43 hrs
Time interval	=	2 min	Hyd. volume	=	42,559 cuft
Drainage area	=	2.890 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	5.83 in	Distribution	=	Huff-1st
Storm duration	=	3.00 hrs	Shape factor	=	484

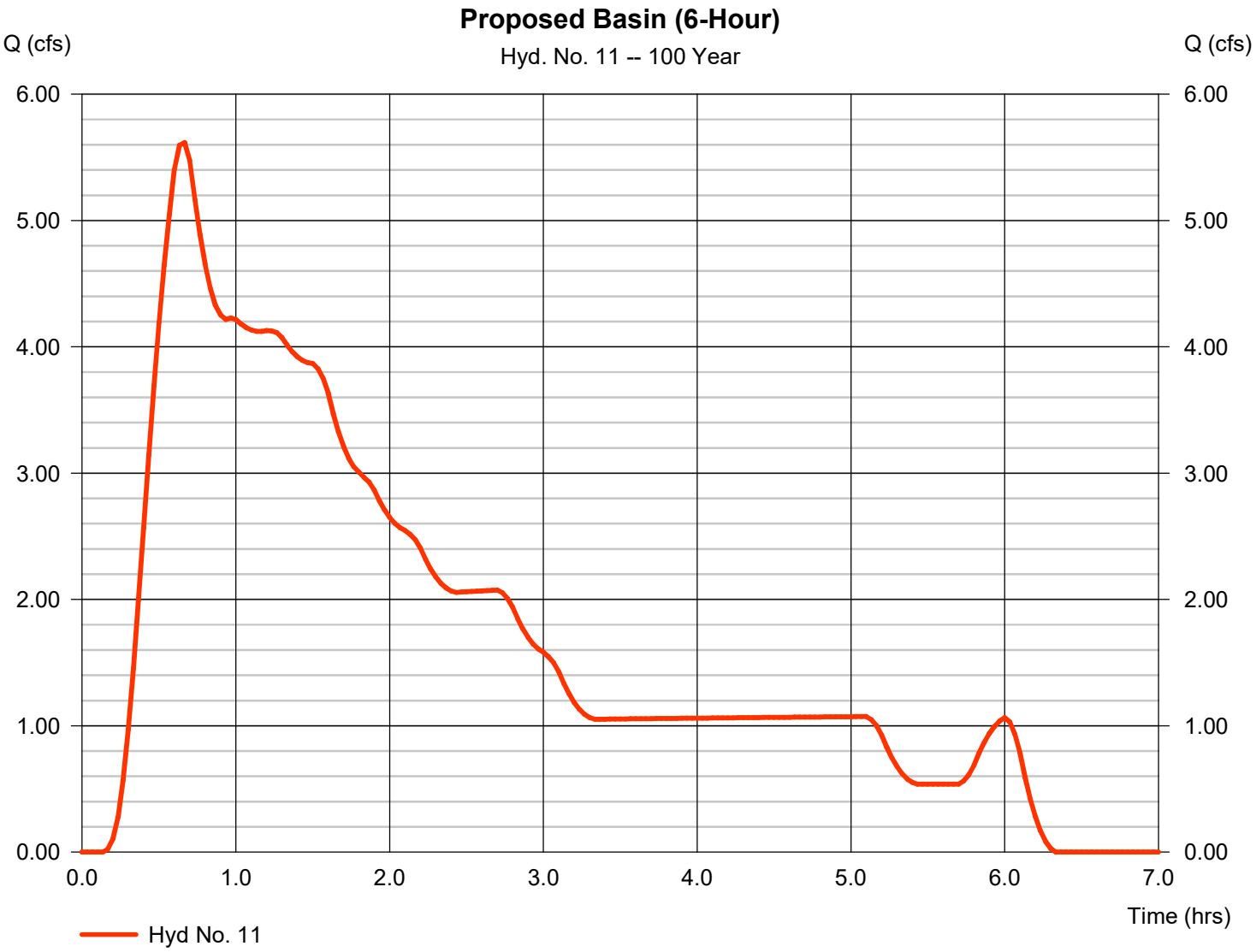


Hydrograph Report

Hyd. No. 11

Proposed Basin (6-Hour)

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.617 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.67 hrs
Time interval	=	2 min	Hyd. volume	=	42,559 cuft
Drainage area	=	2.890 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	5.83 in	Distribution	=	Huff-1st
Storm duration	=	6.00 hrs	Shape factor	=	484

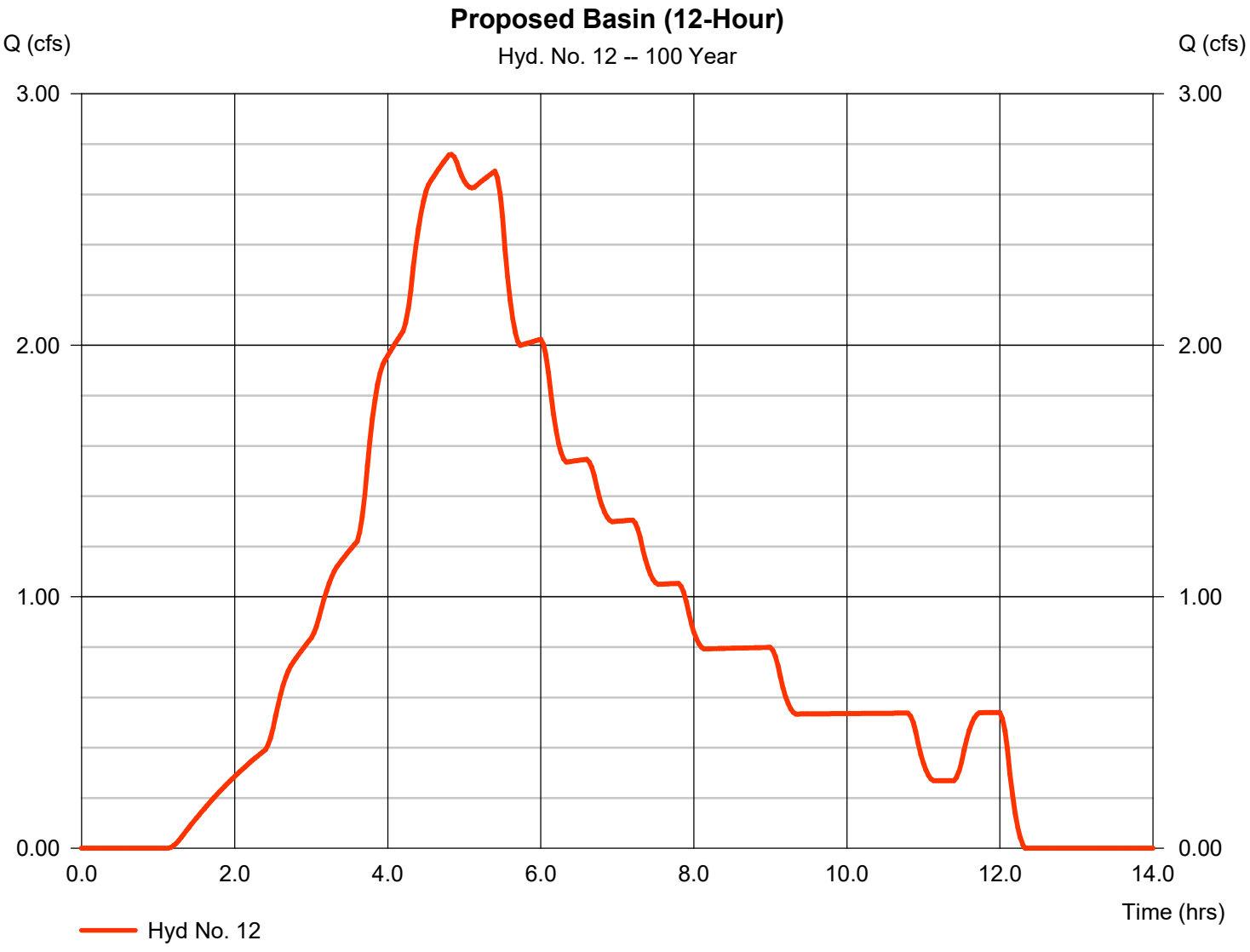


Hydrograph Report

Hyd. No. 12

Proposed Basin (12-Hour)

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.759 cfs
Storm frequency	=	100 yrs	Time to peak	=	4.83 hrs
Time interval	=	2 min	Hyd. volume	=	42,558 cuft
Drainage area	=	2.890 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	5.83 in	Distribution	=	Huff-2nd
Storm duration	=	12.00 hrs	Shape factor	=	484

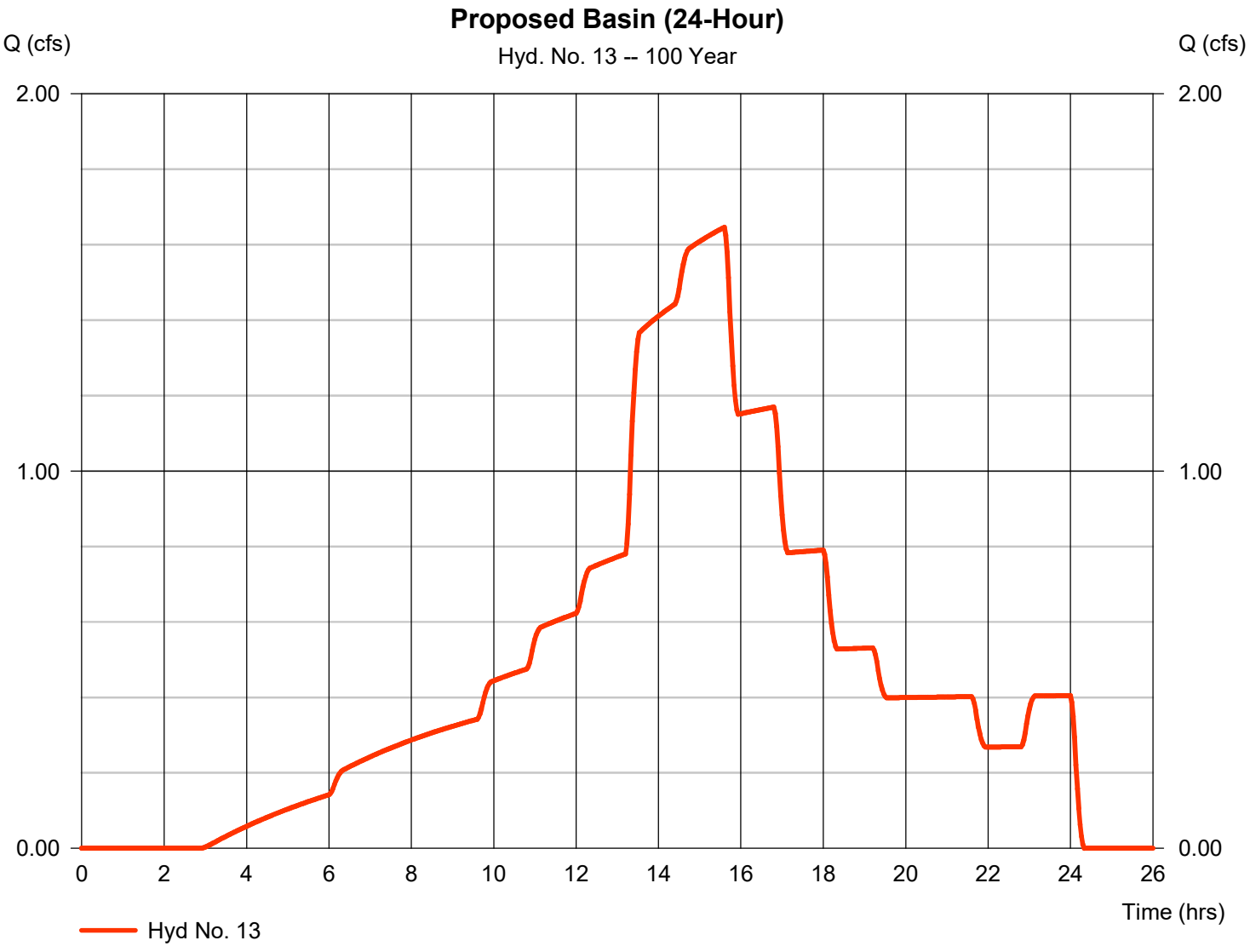


Hydrograph Report

Hyd. No. 13

Proposed Basin (24-Hour)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.646 cfs
Storm frequency	=	100 yrs	Time to peak	=	15.60 hrs
Time interval	=	2 min	Hyd. volume	=	42,559 cuft
Drainage area	=	2.890 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	5.83 in	Distribution	=	Huff-3rd
Storm duration	=	24.00 hrs	Shape factor	=	484



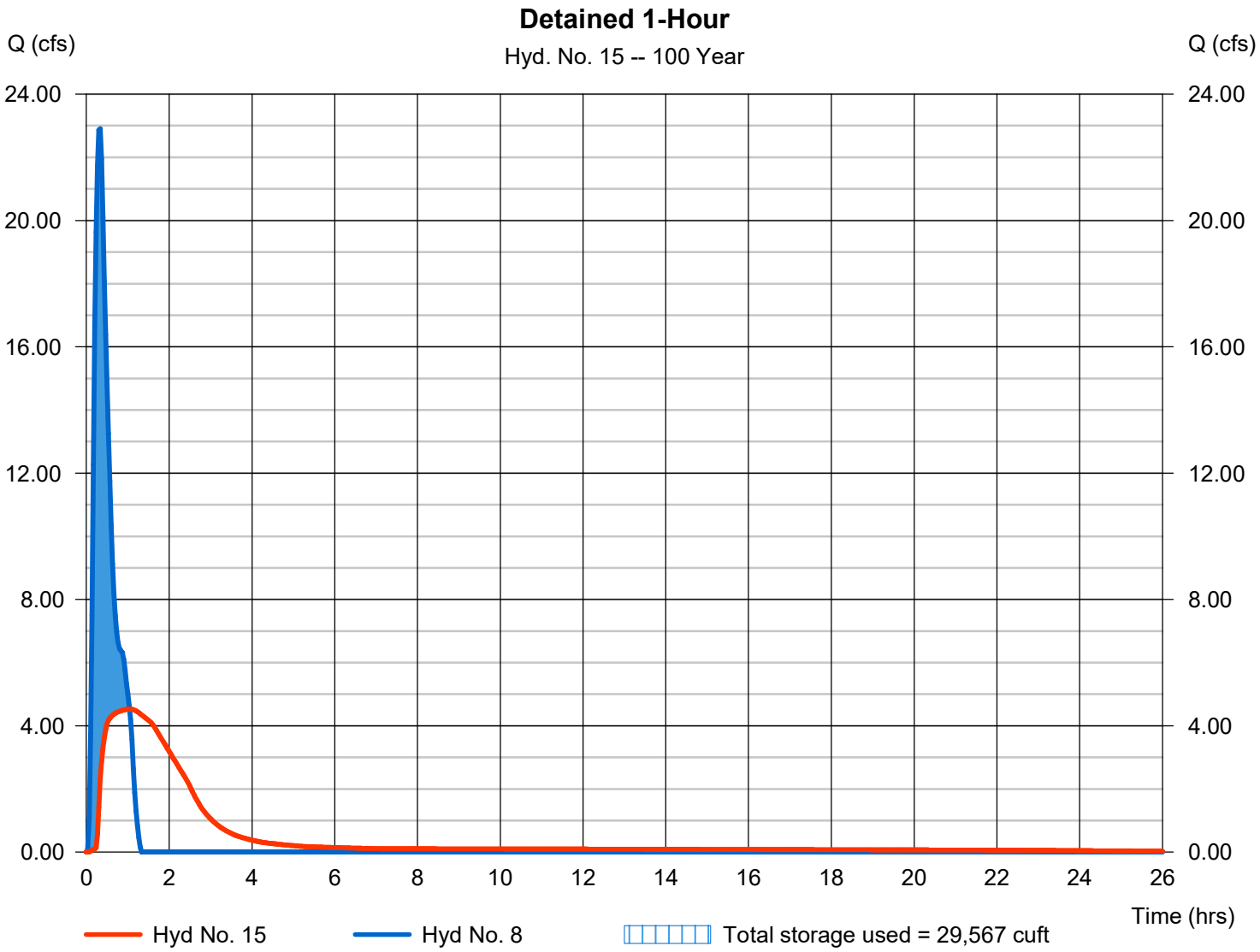
Hydrograph Report

Hyd. No. 15

Detained 1-Hour

Hydrograph type	=	Reservoir	Peak discharge	=	4.527 cfs
Storm frequency	=	100 yrs	Time to peak	=	1.03 hrs
Time interval	=	2 min	Hyd. volume	=	42,535 cuft
Inflow hyd. No.	=	8 - Proposed Basin (1-Hour)	Max. Elevation	=	760.53 ft
Reservoir name	=	Dry Pond	Max. Storage	=	29,567 cuft

Storage Indication method used.



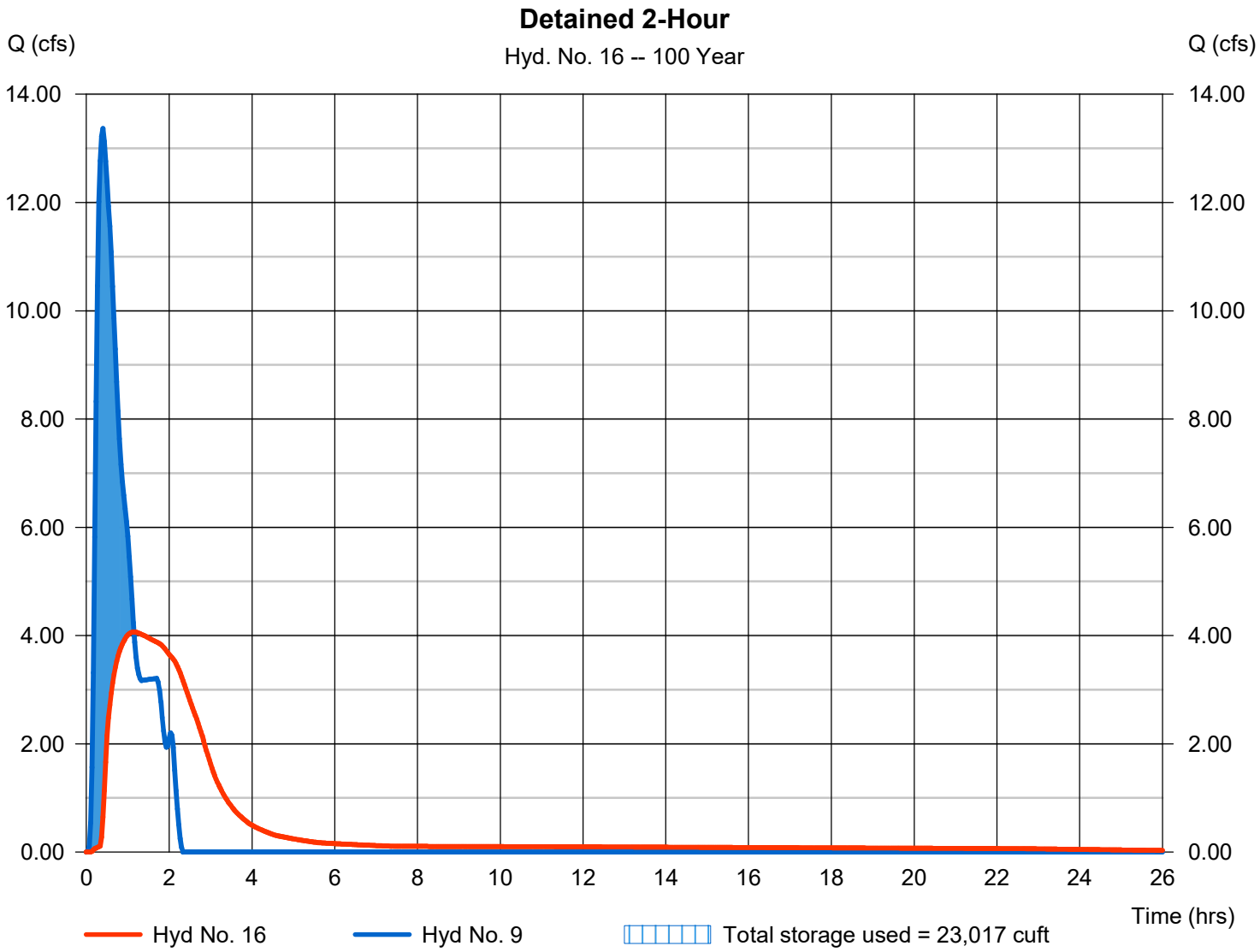
Hydrograph Report

Hyd. No. 16

Detained 2-Hour

Hydrograph type	=	Reservoir	Peak discharge	=	4.068 cfs
Storm frequency	=	100 yrs	Time to peak	=	1.13 hrs
Time interval	=	2 min	Hyd. volume	=	42,535 cuft
Inflow hyd. No.	=	9 - Proposed Basin (2-Hour)	Max. Elevation	=	759.97 ft
Reservoir name	=	Dry Pond	Max. Storage	=	23,017 cuft

Storage Indication method used.



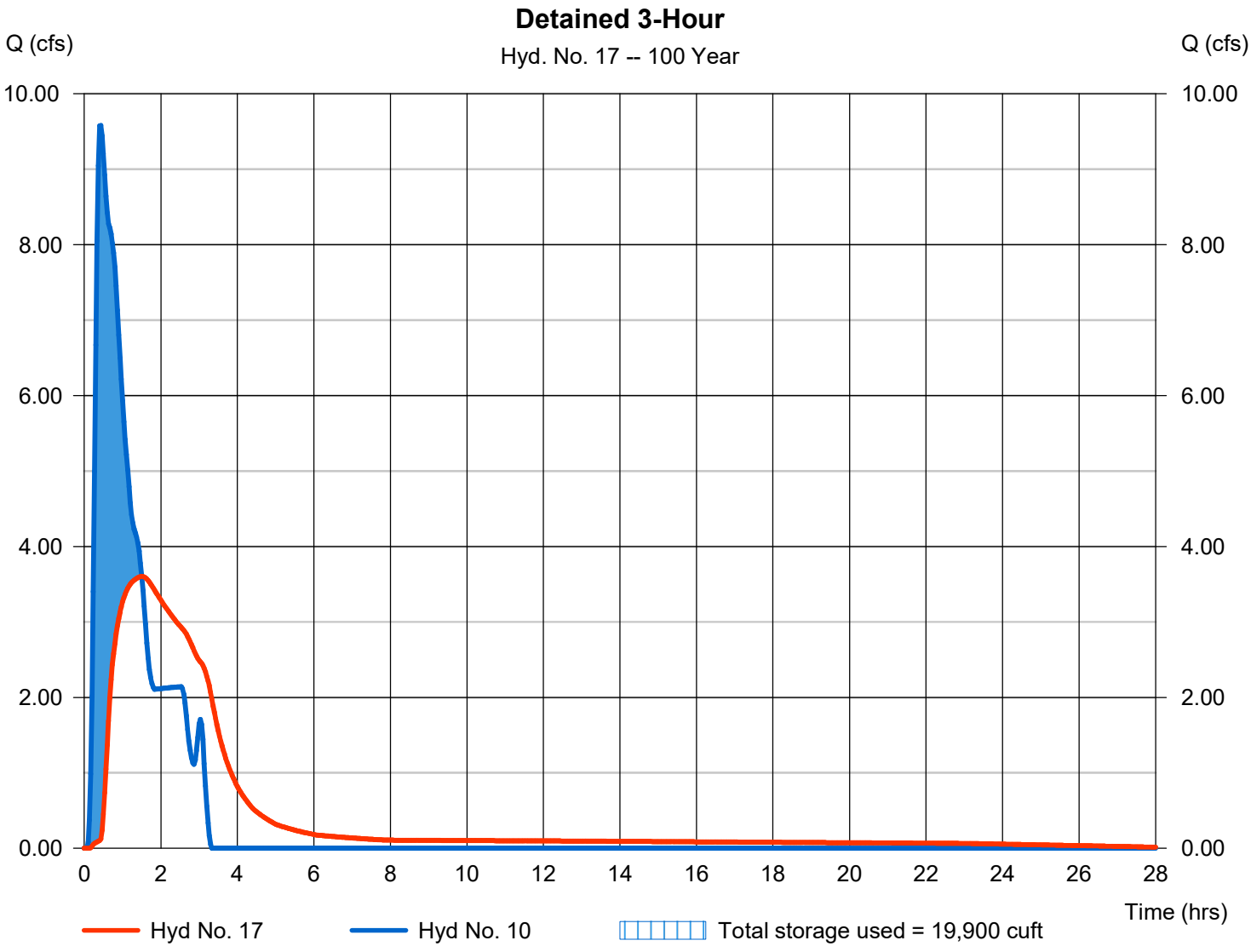
Hydrograph Report

Hyd. No. 17

Detained 3-Hour

Hydrograph type	=	Reservoir	Peak discharge	=	3.602 cfs
Storm frequency	=	100 yrs	Time to peak	=	1.50 hrs
Time interval	=	2 min	Hyd. volume	=	42,535 cuft
Inflow hyd. No.	=	10 - Proposed Basin (3-Hour)	Max. Elevation	=	759.67 ft
Reservoir name	=	Dry Pond	Max. Storage	=	19,900 cuft

Storage Indication method used.



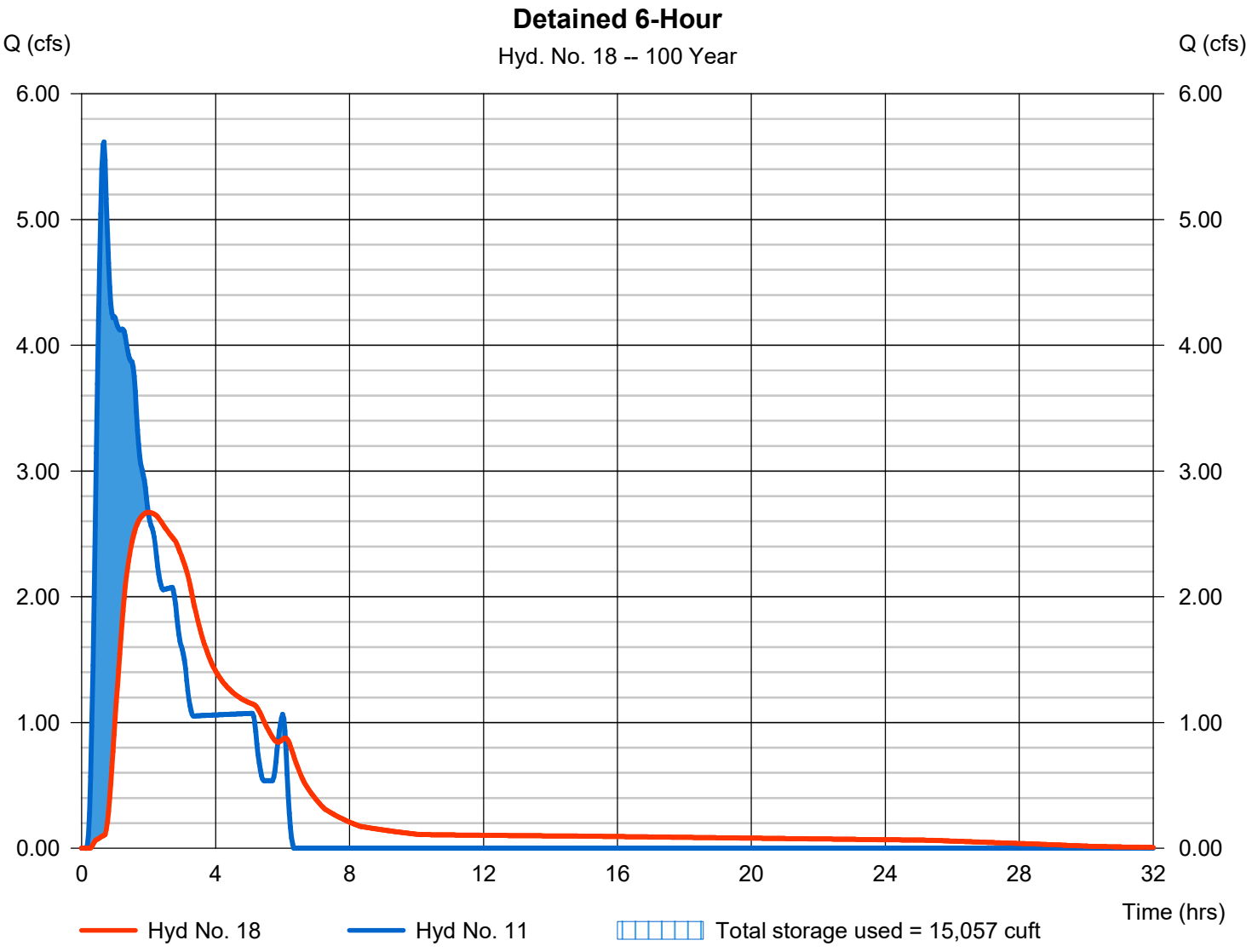
Hydrograph Report

Hyd. No. 18

Detained 6-Hour

Hydrograph type	=	Reservoir	Peak discharge	=	2.672 cfs
Storm frequency	=	100 yrs	Time to peak	=	2.00 hrs
Time interval	=	2 min	Hyd. volume	=	42,535 cuft
Inflow hyd. No.	=	11 - Proposed Basin (6-Hour)	Max. Elevation	=	759.20 ft
Reservoir name	=	Dry Pond	Max. Storage	=	15,057 cuft

Storage Indication method used.



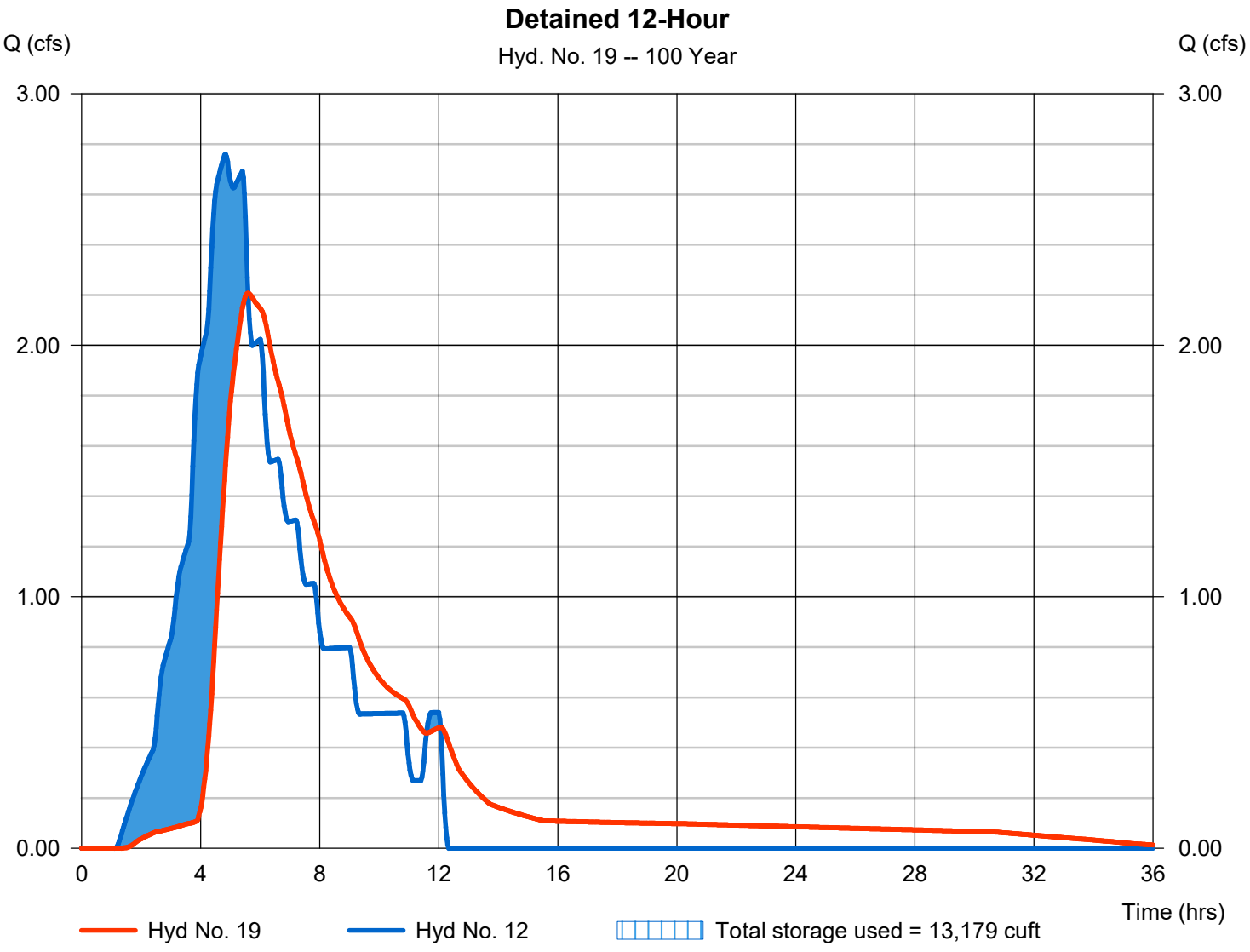
Hydrograph Report

Hyd. No. 19

Detained 12-Hour

Hydrograph type	=	Reservoir	Peak discharge	=	2.207 cfs
Storm frequency	=	100 yrs	Time to peak	=	5.60 hrs
Time interval	=	2 min	Hyd. volume	=	42,535 cuft
Inflow hyd. No.	=	12 - Proposed Basin (12-Hour)	Max. Elevation	=	759.02 ft
Reservoir name	=	Dry Pond	Max. Storage	=	13,179 cuft

Storage Indication method used.



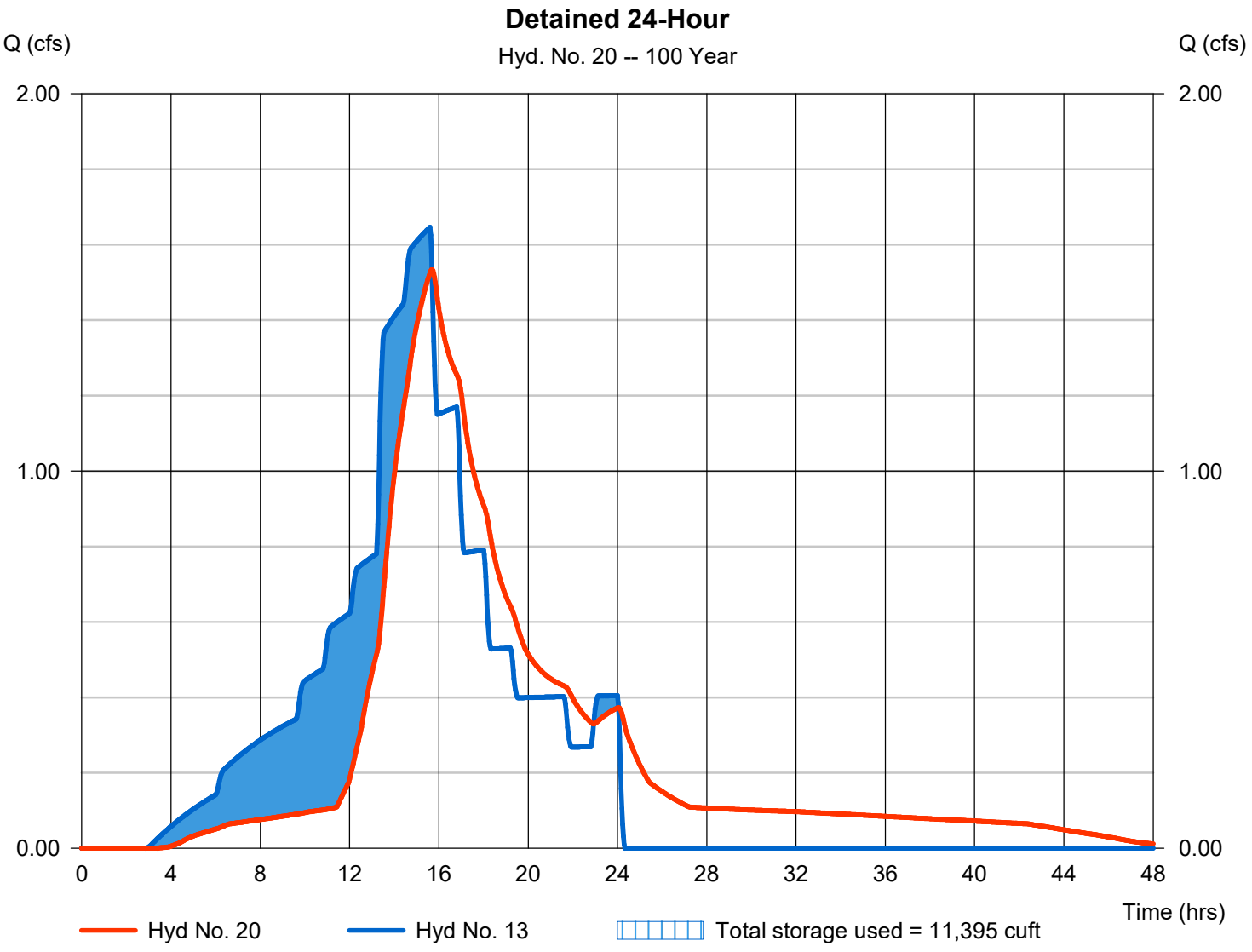
Hydrograph Report

Hyd. No. 20

Detained 24-Hour

Hydrograph type	=	Reservoir	Peak discharge	=	1.534 cfs
Storm frequency	=	100 yrs	Time to peak	=	15.70 hrs
Time interval	=	2 min	Hyd. volume	=	42,535 cuft
Inflow hyd. No.	=	13 - Proposed Basin (24-Hour)	Max. Elevation	=	758.83 ft
Reservoir name	=	Dry Pond	Max. Storage	=	11,395 cuft

Storage Indication method used.

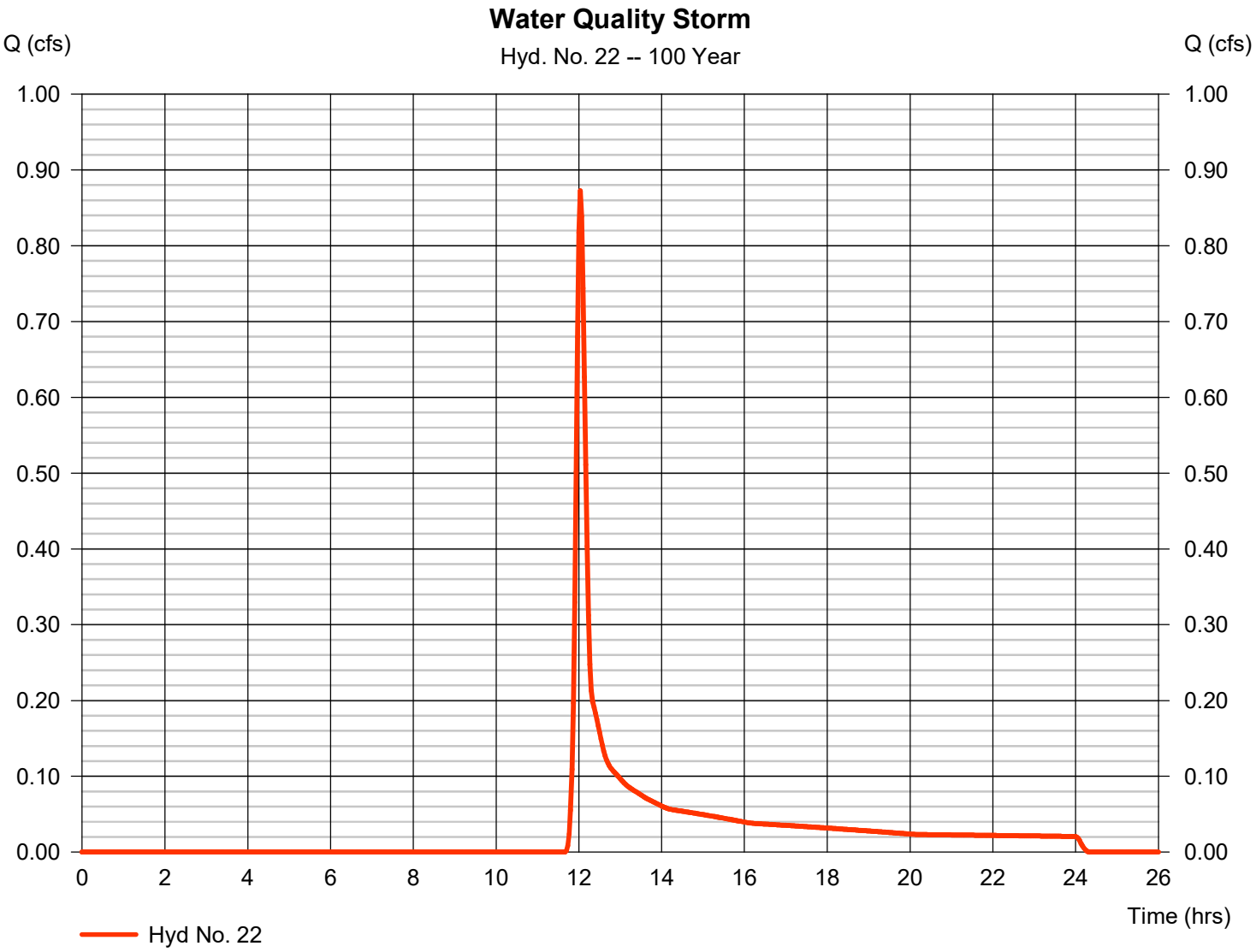


Hydrograph Report

Hyd. No. 22

Water Quality Storm

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.873 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	2,644 cuft
Drainage area	=	2.890 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	1.25 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

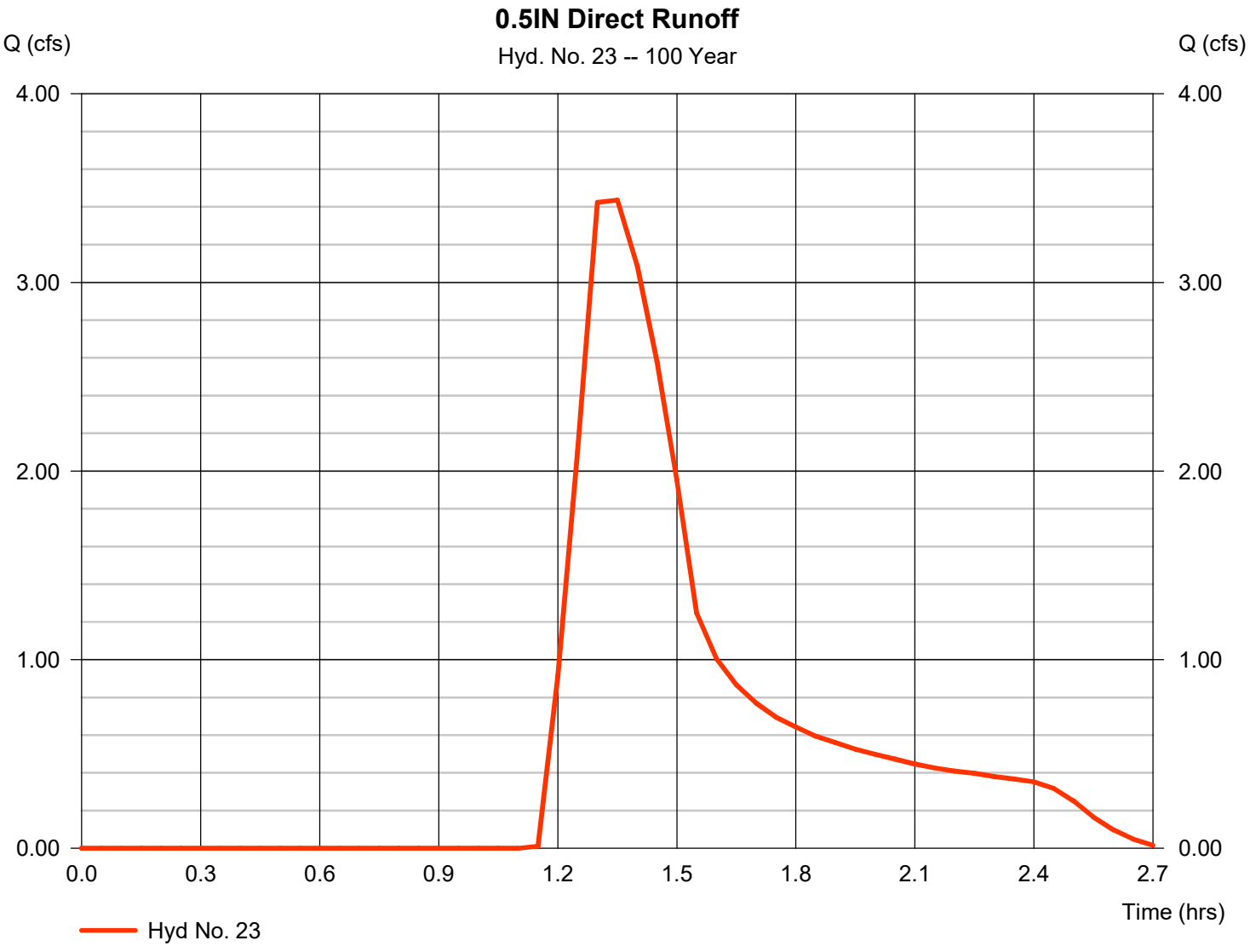


Hydrograph Report

Hyd. No. 23

0.5IN Direct Runoff

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.436 cfs
Storm frequency	=	100 yrs	Time to peak	=	1.35 hrs
Time interval	=	3 min	Hyd. volume	=	5,231 cuft
Drainage area	=	2.890 ac	Curve number	=	83
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	1.70 in	Distribution	=	Custom
Storm duration	=	Sample.cds	Shape factor	=	484



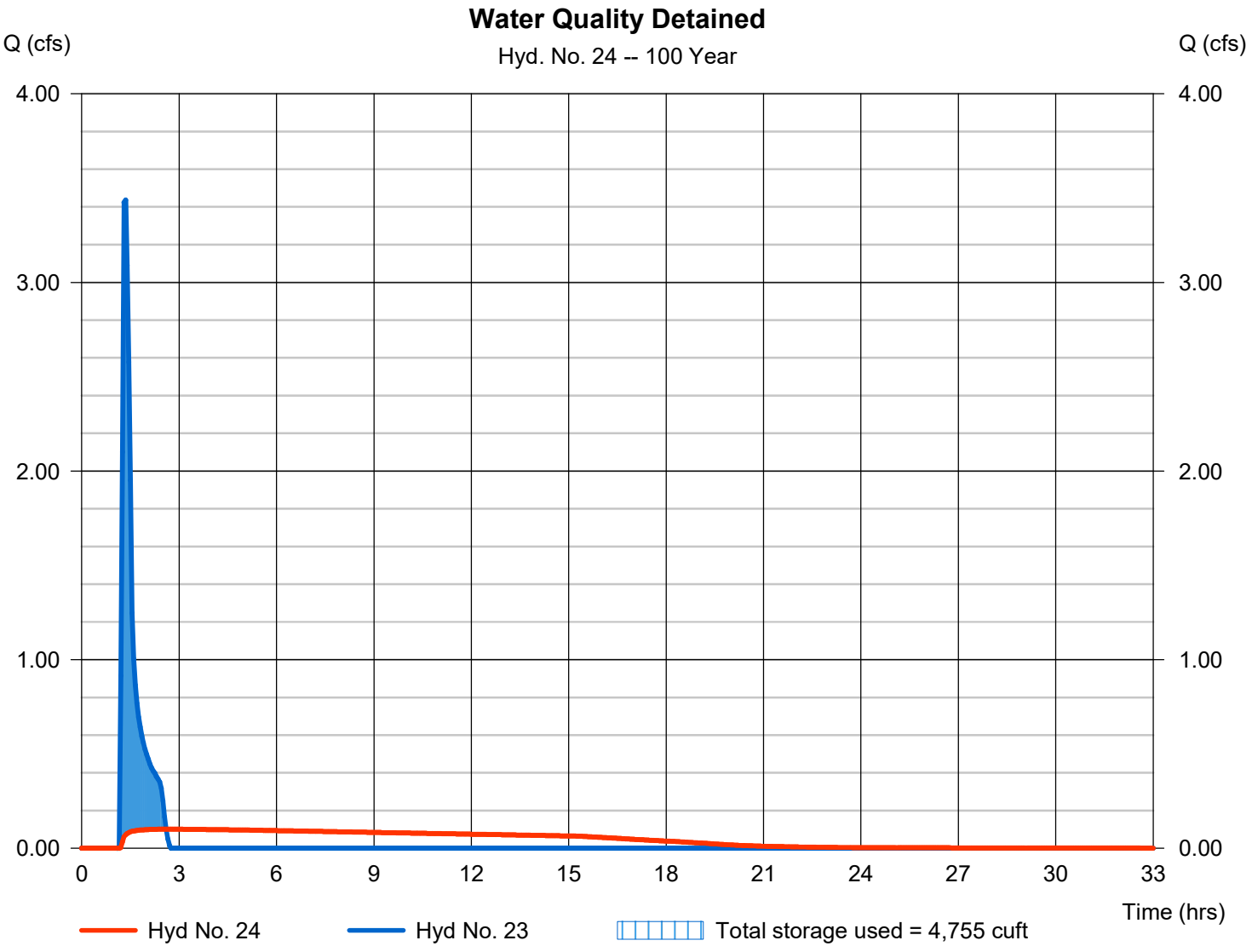
Hydrograph Report

Hyd. No. 24

Water Quality Detained

Hydrograph type	=	Reservoir	Peak discharge	=	0.102 cfs
Storm frequency	=	100 yrs	Time to peak	=	2.60 hrs
Time interval	=	3 min	Hyd. volume	=	5,208 cuft
Inflow hyd. No.	=	23 - 0.5IN Direct Runoff	Max. Elevation	=	758.09 ft
Reservoir name	=	Dry Pond	Max. Storage	=	4,755 cuft

Storage Indication method used.



Hydraflow Table of Contents

2 - Year

10 - Year

100 - Year

Weir Report

<Name>

Trapezoidal Weir

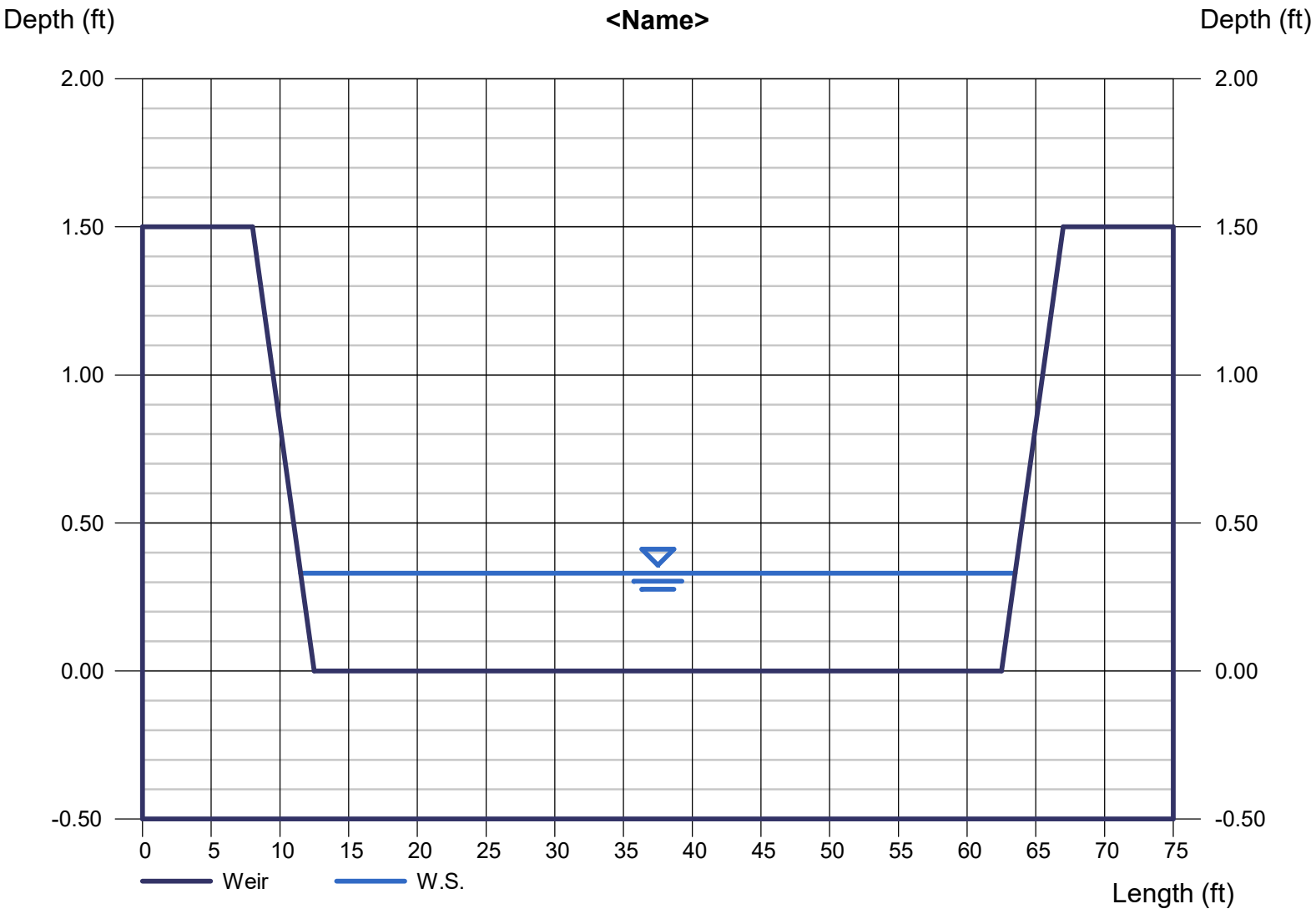
Crest	= Sharp
Bottom Length (ft)	= 50.00
Total Depth (ft)	= 1.50
Side Slope (z:1)	= 3.00

Calculations

Weir Coeff. Cw	= 3.10
Compute by:	Known Q
Known Q (cfs)	= 28.63

Highlighted

Depth (ft)	= 0.33
Q (cfs)	= 28.63
Area (sqft)	= 16.83
Velocity (ft/s)	= 1.70
Top Width (ft)	= 51.98



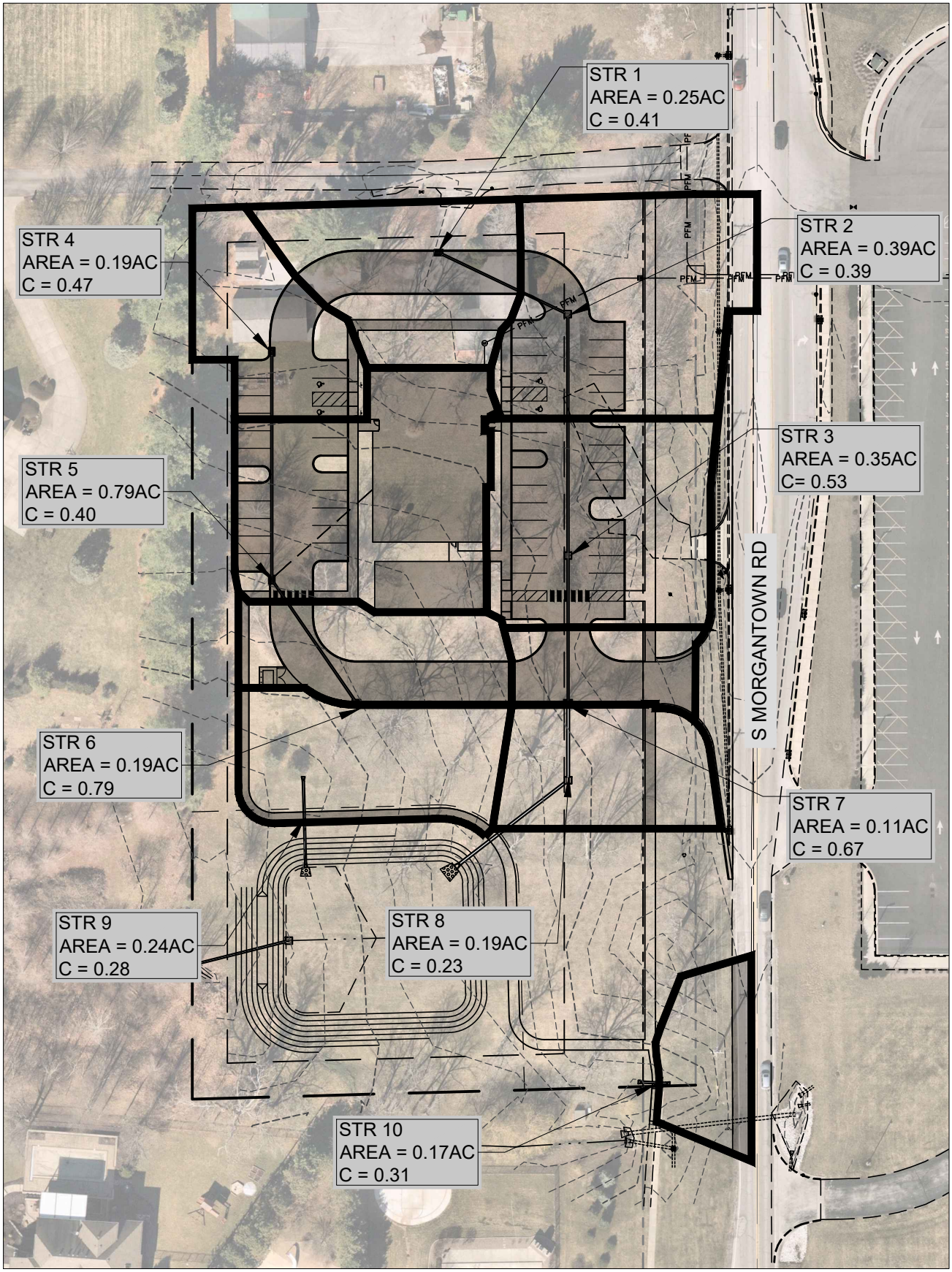
Section 5: Pipe Sizing Calculations

Pipe Sizing Summary

The Rational Method was used to size the pipes to convey the peak runoff from the 10-year storm. The TR-55 Method was used to calculate the Times of Concentration. A minimum of 5 minutes was used where applicable. The Inlet Basin Map and pipe sizing calculation spreadsheet are included within this section.

CENTER GROVE WELLNESS CENTER

EXHIBIT 4 - INLET BASIN MAP



SCALE: 1" = 80'

Pipe and Inlet Sizing Calculations

STR NO.	Pipe Data						Inlet Watershed Data											Contributing Watershed Data						Pipe Analysis		
	Downstream Structure	Length (ft)	Pipe Diameter (in)	Pipe Material	Invert Slope (%)	Mannings Number n	Total Area A (ac)	Area Grass (Ac)	C Grass	Area Roof (Ac)	C Roof	Area Paved (Ac)	C Paved	Composite Coefficient C	Tc (min)	Rainfall Intensity (i) in/hr	Q=CiA (cfs)	Total Area A (ac)	Runoff Coefficient C	Time in Upstream Pipe (min)	Total ime of Concentration Tc (min)	Intensity I (in/hr)	Total Pipe Flow (cfs)	Pipe Capacity Qmax (cfs)	Pipe Velocity (ft/s)	% of Full Flow Capacity
STR 1	STR 2	82	12	RCP	0.31	0.012	0.25	0.17	0.20	0.00	0.90	0.08	0.85	0.41	5.00	6.99	0.71	0.25	0.41	N/A	5.00	6.99	0.71	2.14	2.73	33.24%
STR 2	STR 3	138	12	RCP	0.31	0.012	0.39	0.28	0.20	0.00	0.90	0.11	0.85	0.38	5.00	6.99	1.05	0.64	0.39	0.50	5.50	6.84	1.72	2.14	2.73	80.20%
STR 3	STR 7	85	12	RCP	0.50	0.012	0.35	0.17	0.20	0.00	0.90	0.18	0.85	0.53	5.00	6.99	1.31	0.99	0.44	0.84	6.34	5.59	2.45	2.72	3.47	89.99%
STR 4	STR 5	130	12	RCP	0.31	0.012	0.19	0.11	0.20	0.00	0.90	0.08	0.85	0.47	5.00	6.99	0.63	0.19	0.47	N/A	5.00	6.99	0.63	2.14	2.73	29.33%
STR 5	STR 6	86	12	RCP	0.65	0.012	0.40	0.05	0.20	0.20	0.90	0.15	0.85	0.79	5.00	6.99	2.22	0.59	0.69	0.79	5.79	6.75	2.75	3.11	3.95	88.56%
STR 6	STR 7	121	15	RCP	0.30	0.012	0.19	0.09	0.20	0.00	0.90	0.10	0.85	0.54	5.00	6.99	0.72	0.78	0.65	0.36	6.16	6.67	3.41	3.83	3.95	88.94%
STR 7	STR 8	43	18	RCP	0.45	0.012	0.11	0.03	0.20	0.00	0.90	0.08	0.85	0.67	5.00	6.99	0.52	1.88	0.54	0.41	6.75	6.46	6.61	7.63	4.32	86.62%
STR 8	POND	81	18	RCP	0.50	0.012	0.19	0.18	0.20	0.00	0.90	0.01	0.85	0.23	5.00	6.99	0.31	2.07	0.51	0.52	0.17	6.63	7.06	8.04	4.55	87.76%
STR 9	POND	52	12	RCP	0.31	0.012	0.24	0.21	0.20	0.00	0.90	0.03	0.85	0.28	5.00	6.99	0.47	0.24	0.28	N/A	5.00	6.99	0.47	2.14	2.73	22.00%
STR 10	N/A	18	12	RCP	0.31	0.012	0.17	0.14	0.20	0.00	0.90	0.03	0.85	0.31	5.00	6.99	0.37	0.17	0.31	N/A	5.00	6.99	0.37	2.14	2.73	17.44%

Section 6: Storm Inlet Calculations

Storm Inlet Summary

Storm inlets were placed throughout the site to ensure that sag inlets will be adequate to pass the design 10-year flow with 50% of the inlet area or perimeter clogged with no impact to the surrounding permanent structures. All curb inlets will utilize a Neenah R-3287-10V grate with a wetted perimeter of 5.5 feet and an open area of 2.1 square feet. Inlets within pavement but not against curb will utilize the Neenah R-1878-A9G with a wetted perimeter of 10.6 feet and an open area of 2.5 square feet. The yard basin will use the Neenah R-4215-C with a wetted perimeter of 11.3 and an open area of 3.3 square feet. Values were cut in half in the analysis to account for the 50% clogged scenario.

The weir equation was used when depth of flow is less than 4" and the orifice equation was utilized for depths 4" or greater.

The weir equation is as follows: $Q = 3.3P(h)^{1.5}$

Where: P = perimeter of the grate; h = head above the casting; Q = Capacity

The orifice equation is as follows: $Q = 0.6A(2gh)^{0.5}$

Where: A = open area of the grate; h = head above the casting; g = 32.2 ft/sec^2

Structure No.	Casting Type	Watershed Runoff (cfs)	10-YR Depth Over Grate
1	R-3287-10V	0.71	2.2"
2	R-1878-A9G	1.05	1.8"
3	R-1878-A9G	1.31	2.1"
4	R-3287-10V	0.63	2.0"
5	R-3287-10V	2.22	4.6"
6	R-3287-10V	0.72	2.0"
7	R-3287-10V	0.52	1.4"
8	R-4215-C	0.31	0.8"