STORMWATER MANAGEMENT REPORT

for

University Center Addition and Renovation
Seton Hall University
Township of South Orange Village
Essex County, New Jersey

Prepared For:

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EXECUTIVE SUMMARY

Langan Engineering and Environmental Services has performed a stormwater analysis for the proposed University Center Addition and Renovation project, inclusive of Phase 1 (2018) and Phase 2 (current), on the campus of Seton Hall University. The stormwater analysis was performed in accordance with the Township of South Orange Village Ordinance, Section 185-102, Stormwater Control, and the New Jersey Department of Environmental Protection's Best Management Practices Manual (NJAC 7:8).

The subject 57-acre site is located along South Orange Avenue, in the eastern portion of the Township of South Orange Village, (See Figure 1 – Site Location Map). The existing site is occupied by Seton Hall University and consists of a variety of academic-related buildings, asphalt parking lots, sports fields and open space.

The proposed development is considered a major development as defined in N.J.A.C. 7:8 since more than 1 acre of land is disturbed. As a result, the proposed development is subject to stormwater quantity regulations. To meet these requirements, subsurface detention basins have been implemented. The storm water conveyance and detention systems were designed based on a detailed analysis of the existing and proposed hydrologic and hydraulic conditions to ensure a safe and effective means of managing stormwater both on- and off-site. The proposed development increases the impervious coverage on the project site. The increase to impervious coverage consists of roof and sidewalk areas which are considered "clean" by the regulations and do not require TSS removal and therefore the project is not subject to stormwater quality regulations. This report also addresses the engineering design of the proposed stormwater conveyance and management facilities for the proposed project site to address water quantity reductions. Groundwater recharge will not be required because the project is located in an urban area (NJDEP PA-1 Zone).

1.0 INTRODUCTION

Seton Hall University received an approval for the addition and renovation of the University Center building in 2016. The project was subsequently separated into two phases. Phase 1 was completed in 2018 and included an approximately 4,300 square foot addition to the lower level of the building, facing South Orange Avenue, and interior modifications also at the lower level. Phase 1 also included the construction of site and utility improvements adjacent to the addition. Phase 2 included all other proposed additions to the west and east sides of the building and additional interior renovations. The University is now ready to complete Phase 2, however, modifications to the design of the proposed additions, interior renovations and site improvements are being proposed.

The Phase 2 project consists of replacement of the main entry vestibule, an east entry vestibule addition, outdoor performance and seating areas, an outdoor fireplace, a meditation garden, a prayer garden, a grotto, and improvements to the parking lot south of Duffy Hall. The project also includes the reconstruction of adjacent sidewalks and landscaped areas, and utility and stormwater improvements.

As part of the Phase 1 project, a stormwater detention basin comprised of 48" HDPE pipe was constructed. This basin is defined as Detention Basin-1 in this report. This report was prepared to provide a comprehensive stormwater evaluation for both the Phase 1 and Phase 2 improvements to the building including the adjacent site improvements.

This report was prepared to address the stormwater requirements of the Township of South Orange Village Stormwater Control Ordinance and New Jersey Department of Environmental Protection Stormwater Regulations. This report supersedes the Stormwater Report dated 17 March 2016 and last revised 13 February 2017. The existing conditions utilized for the existing stormwater calculations are defined as the site conditions prior to the construction of the University Center Phase 1 improvements. The stormwater analysis incorporates the Phase 1 addition and improvements completed in 2018 and the currently proposed Phase 2 additions and improvements. Refer to Drawing VT-101 for the existing conditions prior to the construction of the University Center Phase 1 improvements. Refer to Drawing VT102 for the current site conditions.

2.0 EXISTING CONDITIONS

Seton Hall University is located in the eastern portion of the Township of South Orange Village. The existing 57-acre site is situated approximately one mile south of Route 280 in

the South Orange, Essex County, New Jersey. The property is generally bound by South Orange Avenue to the north, Ward Place to the west, Wilden Place and Ivy Hill Park to the south and residential properties to the east. The property is designated as Block 901 Lot 3, according to the Township of South Orange Village Tax Map Sheet 9, and is owned by Seton Hall University.

The existing University Center project site is located in the northeastern corner of the Seton Hall University campus. The site topography generally consists of gently-sloping grades which slope away in all directions from the high point at the southwest corner of the site. The high point is at approximately 260 feet and the lowest point of the site is at approximately 237 feet.

Site access points are currently located along South Orange Avenue and Ward Place at the intersection with Seton Drive. There are several stormwater collection systems located throughout the site which convey existing runoff to either South Orange Avenue or Seton Drive.

The disturbed portion of the site will encompass the areas immediately surrounding the current University Center and the parking lot located to the south of Duffy Hall. Presently, stormwater runoff from a majority of the area surrounding the existing University Center sheet flows to or is directed via onsite stormwater conveyance systems to the municipal storm sewer system within South Orange Avenue. Stormwater runoff from the parking lot located to the south of Duffy Hall is collected in a series of inlets which direct flow through the on-site conveyance system to the off-site discharge point to the southeast. The existing University Center building runoff is conveyed via a pipe network and the Phase 1 stormwater detention basin to the existing municipal conveyance system within South Orange Avenue.

3.0 FLOODPLAIN

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map for Essex County, New Jersey, Panel Number 151 of 200, Community Number 340184, Map Number 34013C0151F, last revised 4 June 2007, the entire site is located within Zone X (no shading). This zone is an area determined to be outside the 0.2% annual chance flood plain.

4.0 PROPOSED DEVELOPMENT

The proposed development of the subject property will consist of selective demolition of portions of the existing University Center building, including associated site and utility infrastructure. The development also includes the construction of new additions to the north (Phase 1), west (Phase 2), and east (Phase 2) sides of the existing University Center. Other construction will include site infrastructure within the disturbed area, including reconstructing sidewalks and landscaping. The University Center will also require multiple utility relocations and new below-grade utilities to support the building additions, including stormwater conveyance sewers, detention basins, sanitary sewers, water mains, electric and telecommunications conduit, and a gas service line.

5.0 STORMWATER MANAGEMENT DESIGN REQUIREMENTS

The proposed project will result in a disturbance area greater than one acre and is, therefore, considered a major development under the Township of South Orange Village Land Development Management Ordinance (§185-102). Groundwater recharge will not be required because the project is located in an urban area (NJDEP PA-1 Zone). Stormwater quality measures will also not be required because the proposed development consists of new roof and sidewalk areas which do not require TSS removal. Stormwater quantity measures will be required and are addressed in detail in this report.

6.0 GROUNDWATER RECHARGE

Groundwater recharge will not be required because the project is located in an urban area (NJDEP PA-1 Zone).

7.0 STORMWATER QUALITY STANDARDS

Stormwater quality measures will not be required because the proposed development consists of new roof and sidewalk areas which do not require TSS removal.

8.0 STORMWATER QUANTITY MANAGEMENT

8.1 Design Criteria

Runoff from the proposed project currently drains to both on-site existing and municipal storm sewer systems. Under the proposed conditions the storm sewer system within the project site will continue to drain to the same existing sewer systems. The municipal

stormwater control ordinance requires water quantity control for the post-construction peak runoff rates. The regulations state that the post-construction peak runoff rates for the 2-, 10-, and 100-year storm events must be reduced to 50%, 75% and 80%, respectively, for the existing, pre-construction peak runoff rates. These reductions are only applied to the stormwater runoff generated by areas disturbed during development. Any undisturbed areas that currently flow through the proposed area of disturbance must match existing, pre-construction flows.

The regulations also state that the development is not required provide reductions if the design engineer demonstrates through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the two-, ten-, and one-hundred-year storm events do not exceed, at any point in time, the preconstruction runoff hydrographs for the same storm events.

The following 24-hour SCS Type III cumulative rainfall distribution for the design storms (rainfall values were obtained from Figure 2 – NRCS Rainfall Frequency Data) were used to develop runoff hydrographs for existing and proposed conditions for the 2-, 10- and 100-year storm events:

- A 2-year, 24-hour storm consisting of 3.44 inches of rainfall.
- A 10-year, 24-hour storm consisting of 5.22 inches of rainfall.
- A 100-year, 24-hour storm consisting of 8.66 inches of rainfall.

8.2 Design Methodology

To analyze the pre- and post-development rainfall runoff rates and volumes, this study was prepared using methods contained in the USDA Soil Conservation Service Publication TR-55 "Urban Hydrology for Small Watersheds."

Each watershed was simulated as a series of contributing sub-areas, channel reaches, and inflow and outflow structures. Area, curve number (CN), and time of concentration (T_C) were calculated for each contributing sub-area. These calculations can be found at the beginning of each of the stormwater discharge calculation appendices (Appendix A through C).

The curve number is a land-sensitive coefficient that dictates the relationship between total rainfall depth and direct storm runoff. Based on the coverage of soil groups and land use in the watershed, an average CN was determined for each sub-area for existing and proposed conditions.

Using the Soil Conservation Service Web Soil Survey for the project site, (See Appendix E – Soils Data), the soils within the watershed were divided into hydrologic soil groups (A, B, C, and D). The SCS classification system evaluates the runoff potential of a soil according to its infiltration and transmission rates. "A" soils have the lowest runoff potential, while "D" soils have the greatest runoff potential. The soil survey does not specifically indicate which hydrologic soil group the soils within the watershed are. To be conservative, a hydrologic soil group designation of "D" was assumed for all soils on-site.

The time of concentration (T_c) is defined as the time for runoff to travel from the most hydraulically distant point in the watershed to a point of interest. Values for the T_c were determined for existing and proposed conditions based on land cover and slope of the flow path using methods outlined in TR-55. As per TR-55, the minimum T_C used is 0.1 hours (or 6 minutes). If Tc calculation sheets are not included in the appendices, the Tc can be assumed to be the minimum of 6 minutes.

Rainfall hydrographs developed from TR-55 methods for the design storm will be routed through detention facilities using level-pool routing techniques.

8.3 Existing Runoff Discharges

The existing project limits were modeled as six watersheds with two analysis points (refer to Drawing CG111 – Existing Watershed Plan).

Presently, runoff from Watersheds A through E is collected in a series of inlets or sheet flows and is ultimately conveyed to the existing municipal storm sewer system and to the Analysis Point in South Orange Avenue (AP-1).

Presently, runoff from Watershed F is collected in a series of inlets or sheet flows and is ultimately conveyed to an existing 21-inch RCP pipe that flows through the property to an offsite discharge point. The analysis point for this watershed is located in Seton Drive and designated as AP-2.

Existing peak flow rates for the site have been analyzed and are summarized below:

Table 1 - Existing Watershed Analysis – Peak Discharges				
Watershed / Analysis Point	Area (acres)	2-year Flow (cfs)	10-year Flow (cfs)	100-year Flow (cfs)
A	1.22	1.91	3.66	7.18
B	2.02	6.69	10.33	17.34
C	0.24	0.61	0.99	1.74
D	0.49	0.83	1.62	3.19
E	0.42	0.89	1.58	2.94
AP-1	4.39	10.59	17.59	31.41
F / AP-2	0.27	0.89	1.38	2.33

Note: See Appendix A for calculations.

8.4 Allowable Runoff Discharges

The required reduction rates for the water quantity analysis need to be applied to areas of disturbance contributing to Analysis Point-1. Because of the nature of this project (pockets of new impervious areas spread throughout the project limits), it was necessary to determine allowable peak runoff rates for each of the design storms based on only the disturbed areas (see Drawing CG112 – Allowable Watershed Map).

Development within Watershed F, which contributes flow to Analysis Point-2, results in a decrease in impervious area and no increase in the time of concentration. Therefore, the post-construction runoff hydrographs for the two, 10 and 100-year storm events do not exceed the pre-construction runoff hydrographs, at any point in time, for the same storm events contributing flow to Analysis Point-2.

Allowable flows representing the disturbed areas are summarized below:

Table 2 identifies the existing peak discharges from the undisturbed portions of the existing watershed areas contributing to Analysis Point-1. Tables 3 and 4 identify existing runoff from the watershed area for the disturbed portion of the site contributing to Analysis Point-1 and allowable runoff based on reductions for a major development. Table 5 identifies the allowable peak discharges for the project.

Table 2 – Existing Peak Discharges from the Undisturbed Portion of the Existing Watershed Areas A through E				
Watershed / Analysis Point	Area (acres)	2-year Flow (cfs)	10-year Flow (cfs)	100-year Flow (cfs)
A	0.97	1.48	2.69	5.67
B	1.79	6.13	9.40	15.69
C	0.03	0.09	0.14	0.25
D	0.46	0.77	1.50	2.98
E	0.18	0.43	0.73	1.33

Table 3 – Peak Discharge for Disturbed Area 1			
Return Period	Existing Flow (cfs)	Reduction	Allowable Flow (cfs)
2-year	1.51	50%	0.76
10-year	2.59	25%	1.94
100-year	4.71	20%	3.77

Table 4 – Peak Discharge for Disturbed Area 2			
Return Period	Existing Flow (cfs)	Reduction	Allowable Flow (cfs)
2-year	0.38	50%	0.19
10-year	0.72	25%	0.54
100-year	1.40	20%	1.12

Table 5 – Allowable Peak Discharges				
Watershed / Analysis Point	Area (acres)	2-year Flow (cfs)	10-year Flow (cfs)	100-year Flow (cfs)
A	0.97	1.48	2.69	5.67
B	1.79	6.13	9.40	15.69
C	0.03	0.09	0.14	0.25
D	0.46	0.77	1.50	2.98
E	0.18	0.43	0.73	1.33
Disturbed Area-1	0.75	0.76	1.94	3.77
Disturbed Area-2	0.21	0.19	0.54	1.12
AP-1	4.39	9.45	16.40	29.54
F / AP-2	0.27	0.89	1.38	2.33

Note: See Appendix B for calculations.

8.5 Proposed Runoff Discharges

As with the existing site, the proposed project limits were modeled as several watersheds and two analysis points (refer to Drawing CG113 – Proposed Watershed Plan). The proposed drainage patterns match the existing drainage patterns for runoff from Watersheds A, C, D, and E-2, which are collected in a series of inlets or sheet flows and is ultimately conveyed to the existing storm sewer system to Analysis Point-1 in South Orange Avenue. The proposed drainage patterns match the existing drainage patterns for runoff from Watershed F, which is collected in a series of inlets or sheet flows and is ultimately conveyed to Analysis Point-2, which is an existing 21-inch RCP pipe that flows through the property to an offsite discharge point.

Runoff from Watershed B-1 will be collected by both the existing and proposed system of roof leaders, catch basins, manholes, and area drains and conveyed to Underground Detention Basin-1 (constructed in 2018 as part of the Phase 1 improvements) before being discharged to the existing storm sewer system in South Orange Avenue (see Drawing CG-102 – Drainage Plan).

Runoff from Watershed B-2 will be collected by the both the proposed system of roof leaders, manholes, and area drains and conveyed to proposed Underground Detention Basin-2 before being discharged to the existing storm sewer system in South Orange Avenue (see Drawing CG-102 – Drainage Plan).

Runoff from Watershed E-1 will be collected by the both the proposed system of manholes, and area drains and conveyed to the proposed Underground Detention Basin-3 before being discharged to the existing on-site storm sewer system, which ultimately discharges to the storm sewer system in South Orange Avenue (see Drawing CG-102 – Drainage Plan).

The three underground detention facilities have been designed to reduce peak flows for the 2-, 10- and 100-year storm events to meet the maximum allowable flows at the analysis point. Peak inflows, outflows, water-surface elevations, and storage volumes for the underground detention facility are summarized in Tables 6, 7, and 8 below:

Table 6 – Proposed Watershed Analysis – Detention Basin 1 Summary

Return Period	Peak Inflow (cfs)	Peak Outflow (cfs)	Storage Elev (ft)	Storage (cu-ft)
2-year	6.69	5.45	230.38	1,477
10-year	10.27	8.58	231.01	2,347
100-year	17.16	14.34	232.34	4,014

Table 7 – Proposed Watershed Analysis – Detention Basin 2 Summary				
Return Period	Peak Inflow (cfs)	Peak Outflow (cfs)	Storage Elev (ft)	Storage (cu-ft)
2-year	1.07	0.40	233.87	660
10-year	1.69	1.02	234.51	976
100-year	2.90	1.92	236.13	1,556

Table 8 – Proposed Watershed Analysis – Detention Basin 3 Summary				
Return Period	Peak Inflow (cfs)	Peak Outflow (cfs)	Storage Elev (ft)	Storage (cu-ft)
2-year	0.34	0.15	252.10	177
10-year	0.58	0.33	252.69	307
100-year	1.05	0.88	253.96	527

Proposed peak flow rates for the site have been analyzed and are summarized in Table 9 below:

Table 9 - Proposed Watershed Analysis – Peak Discharges				
Watershed / Analysis Point	Area (acres)	2-year Flow (cfs)	10-year Flow (cfs)	100-year Flow (cfs)
A	0.97	1.71	3.25	6.33
B-1	1.96	5.45	10.27	14.34
B-2	0.34	0.40	1.02	1.92
C	0.13	0.40	0.64	1.10
D	0.46	0.80	1.53	3.00
E-1	0.13	0.15	0.33	0.88
E-2	0.30	0.76	1.31	2.39
AP-1	4.39	9.42	16.22	29.14
F / AP-2	0.27	0.79	1.29	2.25

Note: See Appendix C for calculations.

A comparison of the allowable and proposed runoff rates at the analysis points summarized in Tables 10 and 11 below show that the proposed design exceeds the reductions required by the municipal stormwater ordinance.

Table 10 – Comparison of Allowable and Proposed Peak Discharges – Analysis Point-1				
Watershed / Analysis Point	Area (acres)	2-year Flow (cfs)	10-year Flow (cfs)	100-year Flow (cfs)
Allowable (Table 5)	4.39	9.45	16.40	29.54
Proposed (Table 9)	4.39	9.42	16.22	29.14
Difference	--	-0.03	-0.18	-0.38

Table 11 – Comparison of Allowable and Proposed Peak Discharges – Analysis Point-2				
Watershed / Analysis Point	Area (acres)	2-year Flow (cfs)	10-year Flow (cfs)	100-year Flow (cfs)
Allowable (Table 1)	0.27	0.89	1.38	2.33
Proposed (Table 9)	0.27	0.79	1.29	2.25
Difference	--	-0.10	-0.09	-0.08

A comparison of the existing and proposed runoff rates at the downstream analysis point are summarized in Tables 12 and 13 below:

Table 12 – Comparison of Existing and Proposed Peak Discharges – Analysis Point-1				
Watershed / Analysis Point	Area (acres)	2-year Flow (cfs)	10-year Flow (cfs)	100-year Flow (cfs)
Existing (Table 1)	4.39	10.59	17.59	31.41
Proposed (Table 5)	4.39	9.42	16.22	29.14
Difference	--	-1.17	-1.37	-2.27

Table 13 – Comparison of Existing and Proposed Peak Discharges – Analysis Point-2				
Watershed / Analysis Point	Area (acres)	2-year Flow (cfs)	10-year Flow (cfs)	100-year Flow (cfs)
Existing (Table 1)	0.27	0.89	1.38	2.33
Proposed (Table 5)	0.27	0.79	1.29	2.25
Difference	--	-0.10	-0.09	-0.08

The post-construction peak flow rates for the 2-, 10- and 100-year storm events have all

been reduced as compared to the pre-construction conditions in accordance with the applicable regulations.

9.0 STORM SEWER COLLECTION SYSTEM DESIGN

9.1 Design Criteria

The on-site subsurface storm sewer collection system was designed to convey the runoff from the 25-year storm event.

9.2 Design Methodology

The storm sewer system was analyzed using the Rational Method for estimating runoff for the 25-year-design storm. The site was divided into sub-areas, each contributing runoff to an individual catch basin or roof drain. Values for area, T_c, and runoff coefficient (C) were calculated for each contributing sub-area (See Drawing CG114 – Inlet Catchment Area Plan).

Values for T_c were chosen based on land cover and slope of the flow path from the most hydraulically distant point in the sub-area to the appropriate inlet. The average runoff coefficient, which is the ratio of peak runoff rate to the average rainfall rate for the period known as the time of concentration, was chosen using the following values:

CONDITION	C
Grass/Landscaping	0.65
Paved/Impervious	0.99

(Refer to Appendix D for additional information)

Rainfall intensities were taken from the intensity-duration-frequency curve for Trenton (Figure 3 – Trenton IDF Curve). Storm drainage pipes were then sized based on calculated flows using Manning's Equation and were verified by solving for the hydraulic grade line.

Proposed catchment areas were developed for the proposed catch basins, and roof drainage which were incorporated into the runoff analyzed for the proposed conveyance system.

Hydraflow Storm Sewers Extension for AutoCAD Civil 3D 2020, by Autodesk, Inc., was used to analyze the proposed pipes and determine pipe dimensions, slopes, inverts, capacities, velocities, flow rates and hydraulic grade lines for each pipe.

9.3 Storm Collection System

The development will consist of rerouting the existing stormwater conveyance system conflicting with the proposed building footprint. The proposed storm conveyance system within the project limits connects to the existing municipal storm sewer system in South Orange Avenue via an existing 24-inch RCP pipe into existing MH-44. The rim of existing MH-44 could not be opened, therefore inverts were interpolated between existing MH-D40 and existing MH-D44 to obtain inverts at existing MH-44. Based on the calculated invert, the slope of the existing 24-inch RCP pipe is determined to be 3.20%. Using Manning's equation, the capacity of a 24-inch RCP @ 3.20% slope is 40.46 cfs. For a conservative analysis, a manning's coefficient of 0.013 is used. Due to the unknown slope of this pipe, an analysis of pipe capacity was performed assuming a minimum possible slope. Based on existing grades and to maintain adequate cover the existing 24-inch RCP pipe would have to be sloped at a minimum of 1.19%. The capacity of a 24-inch RCP @ 1.19% slope is 24.67 cfs. An evaluation was performed for both the 10-year storm and 25-year storm events to access runoff from the project and its impact on the existing 24-inch pipe. Based on an evaluation of available utility plans, it appears that the existing and proposed watershed analyzed for this project contributes in excess of 50% of the runoff contributing to this 24-inch pipe. The runoff for existing watershed (B) which discharges to the existing 24-inch RCP is 11.83 cfs for the 10-year storm event and 14.79 cfs for the 25-year storm event (see Appendix A – Existing Stormwater Discharge Calculations). The runoff for proposed watersheds (B1 + B2 + E1 + E2) which discharge to the existing 24-inch RCP is a combined total of 10.97 cfs for the 10-year storm event and 13.77 cfs for the 25-year storm event (see Appendix C – Proposed Stormwater Discharge Calculations). In our opinion, the existing 24-inch RCP is adequately sized to convey the proposed flows and flow from contributing sources beyond the limits of the project survey.

Design calculations for the on-site stormwater collection system are included in this report as Appendix D.

10.0 STORMWATER MANAGEMENT MAINTENANCE PLAN

The New Jersey Administrative Code 7:8-5.8 entitled "Maintenance Requirements" sets forth rules (and refers to the New Jersey Best Management Practices (BMP) Manual dated February 2004) for the maintenance of stormwater management measures of a major development.

Langan Engineering & Environmental Services has prepared a separate maintenance plan for the proposed stormwater management measures presented in this report. The Stormwater Management Maintenance Plan includes maintenance checklists and logs and contains preventative and corrective maintenance tasks and procedures to ensure the effective performance of the stormwater management measures and conveyance systems.

11.0 CONCLUSION

In conclusion, the project is considered a major development as defined by NJDEP Stormwater Management Regulations and the Township of South Orange Village stormwater ordinance. Stormwater quantity and quality regulations are satisfied because the post-construction runoff hydrographs for the 2-, 10- and 100-year storm events have been reduced from the preconstruction runoff hydrographs for the same storm events at the analysis point as shown. As such, the project complies with all governing regulations.

12.0 REFERENCES

1.) Urban Hydrology for Small Watersheds, Technical Release No. 55, USDA Soil Conservation Service Publication, June 1986.

2.) New Jersey Stormwater Best Management Practices Manual, New Jersey Department of Environmental Protection, Division of Watershed Management, April 2004.

3.) Web Soil Survey, United States Department of Agriculture; Natural Resource Conservation Service.

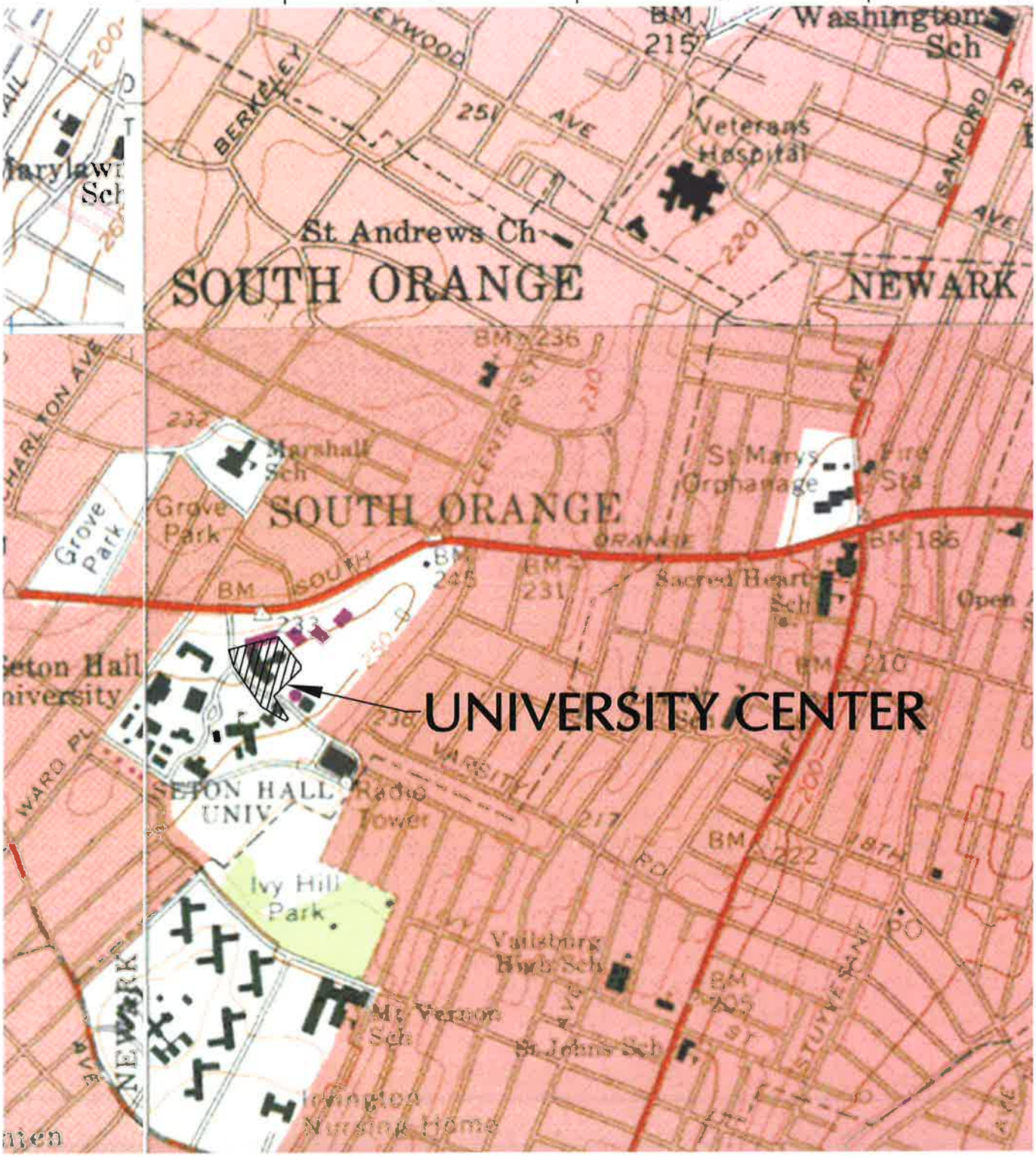
4.) Standards for Soil Erosion and Sediment Control in New Jersey, New Jersey Department of Agriculture, November 1999.

5.) Hydraflow Hydrographs Extension for AutoCAD Civil 3D 2020, by Autodesk.

6.) Hydraflow Storm Sewers Extension for AutoCAD Civil 3D 2020 by Autodesk.

FIGURES

Figure 1 Site Location Map
Figure 2 NRCS Rainfall Frequency Data
Figure 3 Trenton IDF Curve



MAP REFERENCE: USGS QUADRANGLE MAPS FOR CALDWELL, ELIZABETH, ORANGE, & ROSELLE

1000 0 500 1000
SCALE IN FEET

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NJ Certificate of Authorization No. 24GA27996400

Project
UNIVERSITY CENTER ADDITION & RENOVATION
SETON HALL UNIVERSITY
400 SOUTH ORANGE AVENUE
BLOCK No. 901, LOT No. 3
TOWNSHIP OF SOUTH ORANGE VILLAGE
ESSEX COUNTY NEW JERSEY

Drawing Title
SITE LOCATION MAP

Project No. 100577301	Drawing No. **FIGURE 1**
Date 22 MARCH 2016	
Scale 1" = 1,000'	
Drawn By SK	
Submission Date	

PROJECT No. 100577301

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Filename: \\langan.com\data\PAR\data3\100577301\CadD Data - 100577301\SheetFiles\Figures\Figure 1 - Site Location Plan.dwg Date: 10/4/2016 Time: 09:57 User: skarri Style Table: Langan.stb Layout: UC

Filename: \\langan.com\data\PAR\data3\100577301\CadD Data - 100577301\SheetFiles\Figures\Figure 2 - NRCS Rainfall Data.dwg Date: 10/4/2016 Time: 09:58 User: skarri Style Table: Langan.stb Layout: FIG. 2 (NRCS RAINFALL DATA)

NEW JERSEY 24 HOUR RAINFALL FREQUENCY DATA

Rainfall amounts in Inches

County	1 year	2 year	5 year	10 year	25 year	50 year	100 year
Atlantic	2.72	3.31	4.30	5.16	6.46	7.61	8.90
Bergen	2.75	3.34	4.27	5.07	6.28	7.32	8.47
Burlington	2.77	3.36	4.34	5.18	6.45	7.56	8.81
Camden	2.73	3.31	4.25	5.06	6.28	7.34	8.52
Cape May	2.67	3.25	4.22	5.07	6.34	7.47	8.73
Cumberland	2.69	3.27	4.25	5.09	6.37	7.49	8.76
Essex	2.85	3.44	4.40	5.22	6.44	7.49	8.66
Gloucester	2.71	3.29	4.24	5.05	6.29	7.36	8.55
Hudson	2.73	3.31	4.23	5.02	6.19	7.20	8.31
Hunterdon	2.80	3.38	4.26	5.00	6.09	7.02	8.03
Mercer	2.74	3.31	4.23	5.01	6.19	7.20	8.33
Middlesex	2.76	3.35	4.30	5.12	6.36	7.43	8.63
Monmouth	2.79	3.38	4.38	5.23	6.53	7.66	8.94
Morris	2.94	3.54	4.47	5.24	6.37	7.32	8.35
Ocean	2.81	3.42	4.45	5.33	6.68	7.87	9.20
Passaic	2.87	3.47	4.42	5.23	6.43	7.47	8.62
Salem	2.69	3.26	4.20	5.00	6.22	7.28	8.45
Somerset	2.76	3.34	4.25	5.01	6.15	7.13	8.21
Sussex	2.68	3.22	4.02	4.70	5.72	6.60	7.58
Union	2.80	3.39	4.35	5.17	6.42	7.49	8.69
Warren	2.78	3.34	4.18	4.89	5.93	6.83	7.82

Notes: The average point rainfall amounts listed above were developed from data contained in NOAA Atlas 14 Volume 2.

Point rainfall estimates for specific locations may be obtained from the Precipitation Frequency Data Server located at http://www.nws.noaa.gov/ohd/hdsc/

For most hydrologic design procedures, the rainfall amounts listed above may be rounded to the nearest tenth of an inch.

REFERENCE: NRCS NEW JERSEY BULLETIN No. NJ210-12-1.

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NJ Certificate of Authorization No. 24GA27996400

Project
UNIVERSITY CENTER ADDITION & RENOVATION
SETON HALL UNIVERSITY
400 SOUTH ORANGE AVENUE
BLOCK No. 901, LOT No. 3
TOWNSHIP OF SOUTH ORANGE VILLAGE
ESSEX COUNTY NEW JERSEY

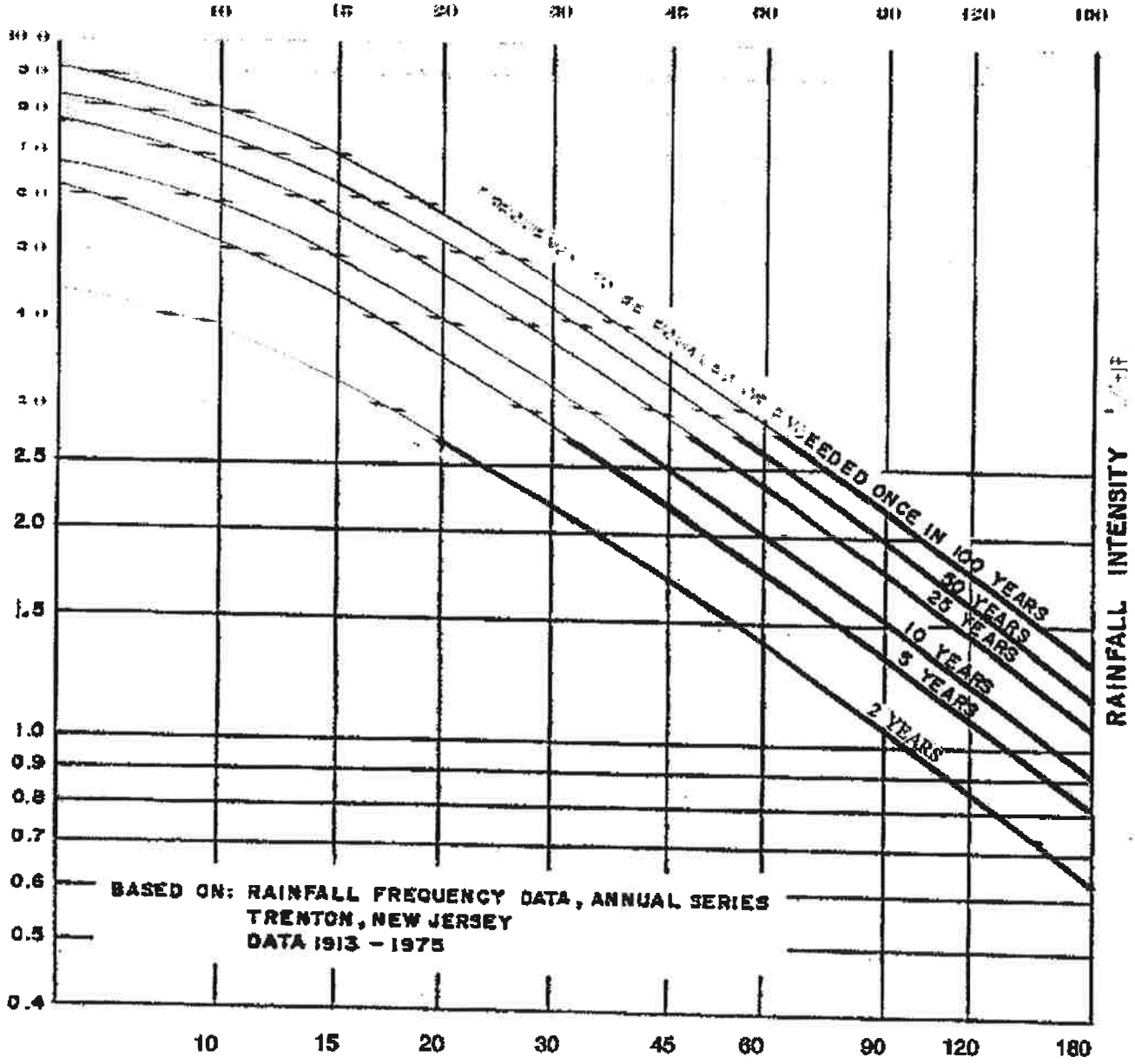
Drawing Title
NRCS RAINFALL FREQUENCY DATA

Project No. 100577301
Date 12 JULY 2016
Scale NONE
Drawn By SK
Submission Date

Drawing No.
FIGURE 2

LANGAN
PROJECT No. 100577301

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DURATION OF STORM IN MINUTES

REFERENCE: FIGURE 5-4; NJ BEST MANAGEMENT PRACTICES MANUAL; FEBRUARY 2004; CHAPTER 5.
NOTE: ADAPT FROM FIGURE 2.1-2 IN THE NJDEP TECHNICAL MANUAL FOR STREAM ENCROACHMENT PERMITS.

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Project	UNIVERSITY CENTER ADDITION & RENOVATION SETON HALL UNIVERSITY 400 SOUTH ORANGE AVENUE BLOCK No. 901, LOT No. 3 TOWNSHIP OF SOUTH ORANGE VILLAGE ESSEX COUNTY NEW JERSEY
Drawing Title	TRENTON IDF CURVE
Project No.	100559801
Date	10 MAY 2016
Scale	NTS
Drawn By	JF
Submission Date	
Drawing No.	FIGURE 3

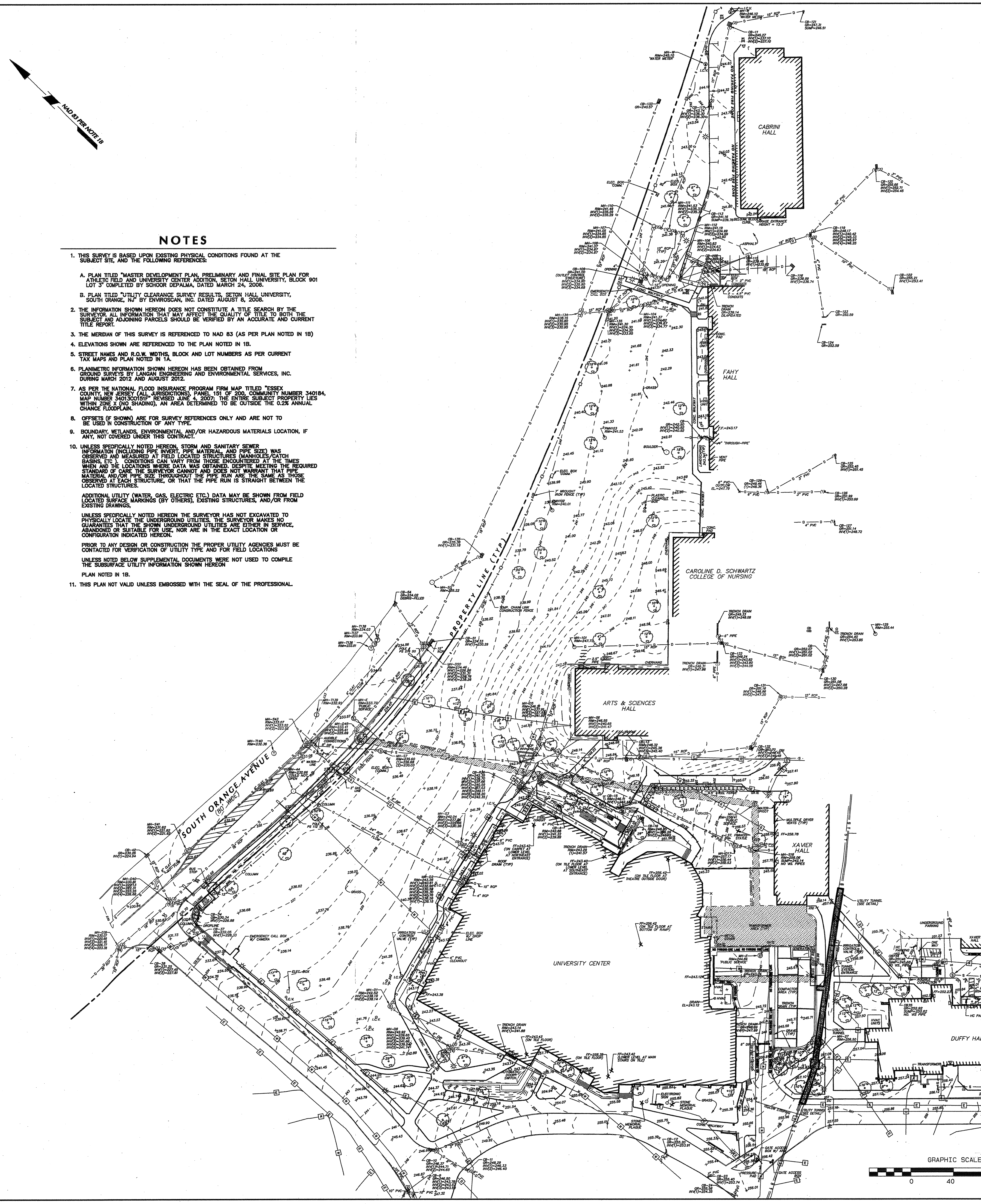
LANGAN
PROJECT No. 100559801

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Filename: \\langan.com\data\PAR\data3\100577301\Cadd Data - 100577301\SheetFiles\Figures\Figure 3 - Trenton IDF Curve.dwg Date: 10/4/2016 Time: 09:59 User: skarri Style Table: Langan.stb Layout: FIGURE 3

DRAWINGS

Drawing VT-101	**Partial Topographic Survey**
Drawing VT102	**Partial Topographic Survey**
Drawing CG101	**Grading Plan**
Drawing CG102	**Drainage Plan**
Drawing CG111	**Existing Watershed Plan**
Drawing CG112	**Allowable Watershed Plan**
Drawing CG113	**Proposed Watershed Plan**
Drawing CG114	**Inlet Catchment Area Plan**
Drawing CS502	**Details II**
Drawing CS503	**Details III**



NOTES

1. THIS SURVEY IS BASED UPON EXISTING PHYSICAL CONDITIONS FOUND AT THE SUBJECT SITE, AND THE FOLLOWING REFERENCES:

   A. PLAN TITLED "MASTER DEVELOPMENT PLAN, PRELIMINARY AND FINAL SITE PLAN FOR ATHLETIC FIELD AND UNIVERSITY CENTER ADDITION, SETON HALL UNIVERSITY, BLOCK 901 LOT 3" COMPLETED BY SCHOOR DEPALMA, DATED MARCH 24, 2006.

   B. PLAN TITLED "UTILITY CLEARANCE SURVEY RESULTS, SETON HALL UNIVERSITY, SOUTH ORANGE, NJ" BY ENVIROSCAN, INC. DATED AUGUST 8, 2008.

2. THE INFORMATION SHOWN HEREON DOES NOT CONSTITUTE A TITLE SEARCH BY THE SURVEYOR. ALL INFORMATION THAT MAY AFFECT THE QUALITY OF TITLE TO BOTH THE SUBJECT AND ADJOINING PARCELS SHOULD BE VERIFIED BY AN ACCURATE AND CURRENT TITLE REPORT.
3. THE MERIDIAN OF THIS SURVEY IS REFERENCED TO NAD 83 (AS PER PLAN NOTED IN 1B)
4. ELEVATIONS SHOWN ARE REFERENCED TO THE PLAN NOTED IN 1B.
5. STREET NAMES AND R.O.W. WIDTHS, BLOCK AND LOT NUMBERS AS PER CURRENT TAX MAPS AND PLAN NOTED IN 1A.
6. PLANIMETRIC INFORMATION SHOWN HEREON HAS BEEN OBTAINED FROM GROUND SURVEYS BY LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES, INC. DURING MARCH 2012 AND AUGUST 2012.
7. AS PER THE NATIONAL FLOOD INSURANCE PROGRAM FIRM MAP TITLED "ESSEX COUNTY, NEW JERSEY (ALL JURISDICTIONS), PANEL 151 OF 200, COMMUNITY NUMBER 340184, MAP NUMBER 34013C0151F" REVISED JUNE 4, 2007; THE ENTIRE SUBJECT PROPERTY LIES WITHIN ZONE X (NO SHADING), AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.
8. OFFSETS (IF SHOWN) ARE FOR SURVEY REFERENCES ONLY AND ARE NOT TO BE USED IN CONSTRUCTION OF ANY TYPE.
9. BOUNDARY, WETLANDS, ENVIRONMENTAL AND/OR HAZARDOUS MATERIALS LOCATION, IF ANY, NOT COVERED UNDER THIS CONTRACT.
10. UNLESS SPECIFICALLY NOTED HEREON, STORM AND SANITARY SEWER INFORMATION (INCLUDING PIPE INVERT, PIPE MATERIAL, AND PIPE SIZE) WAS OBSERVED AND MEASURED AT FIELD LOCATED STRUCTURES (MANHOLES/CATCH BASINS, ETC). CONDITIONS CAN VARY FROM THOSE ENCOUNTERED AT THE TIMES WHEN AND THE LOCATIONS WHERE DATA WAS OBTAINED. DESPITE MEETING THE REQUIRED STANDARD OF CARE THE SURVEYOR CANNOT AND DOES NOT WARRANT THAT PIPE MATERIAL AND/OR PIPE SIZE THROUGHOUT THE PIPE RUN ARE THE SAME AS THOSE OBSERVED AT EACH STRUCTURE, OR THAT THE PIPE RUN IS STRAIGHT BETWEEN THE LOCATED STRUCTURES.

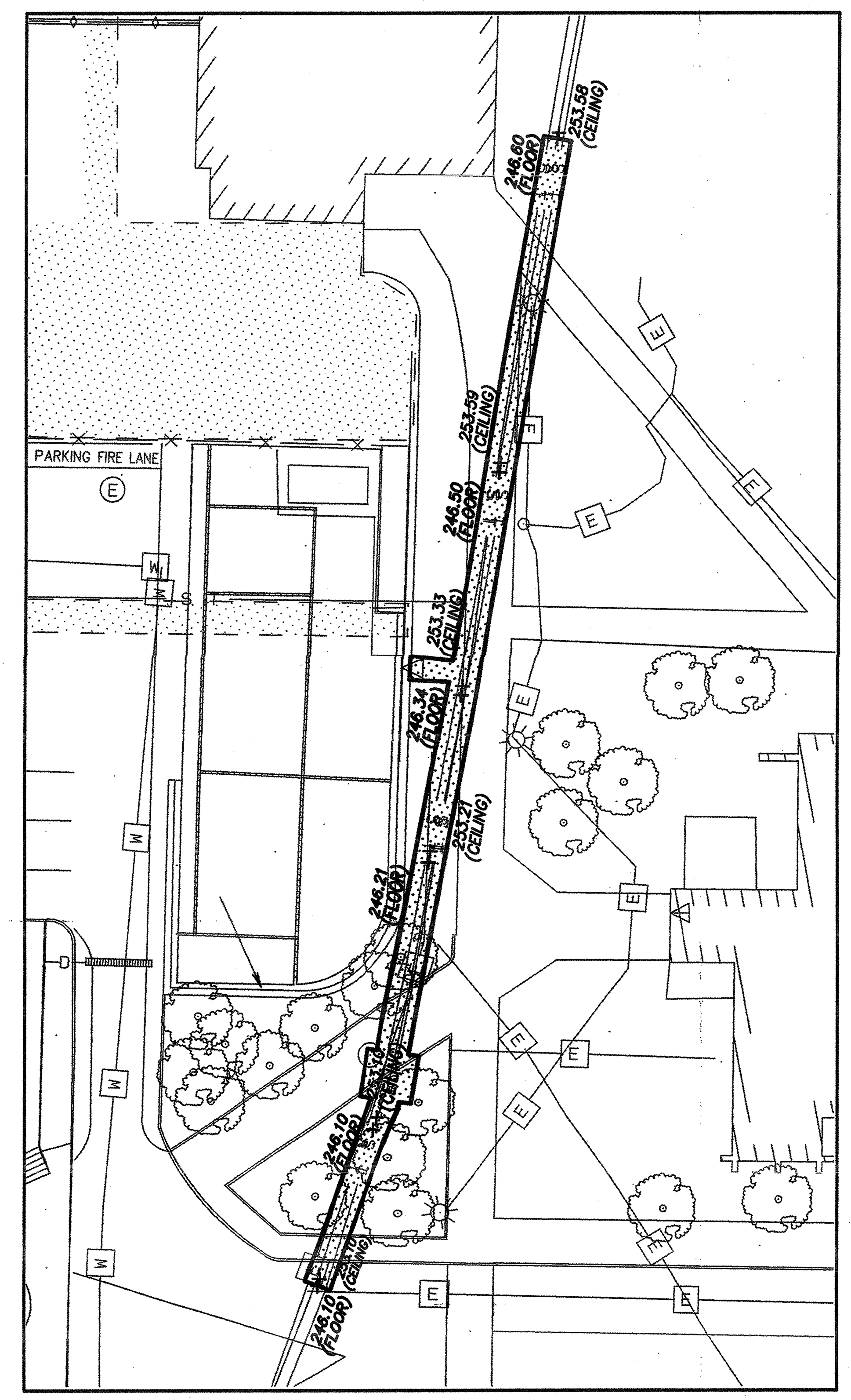
    ADDITIONAL UTILITY (WATER, GAS, ELECTRIC ETC.) DATA MAY BE SHOWN FROM FIELD LOCATED SURFACE MARKINGS (BY OTHERS), EXISTING STRUCTURES, AND/OR FROM EXISTING DRAWINGS,

    UNLESS SPECIFICALLY NOTED HEREON THE SURVEYOR HAS NOT EXCAVATED TO PHYSICALLY LOCATE THE UNDERGROUND UTILITIES. THE SURVEYOR MAKES NO GUARANTEES THAT THE SHOWN UNDERGROUND UTILITIES ARE EITHER IN SERVICE, ABANDONED OR SUITABLE FOR USE, NOR ARE IN THE EXACT LOCATION OR CONFIGURATION INDICATED HEREON.

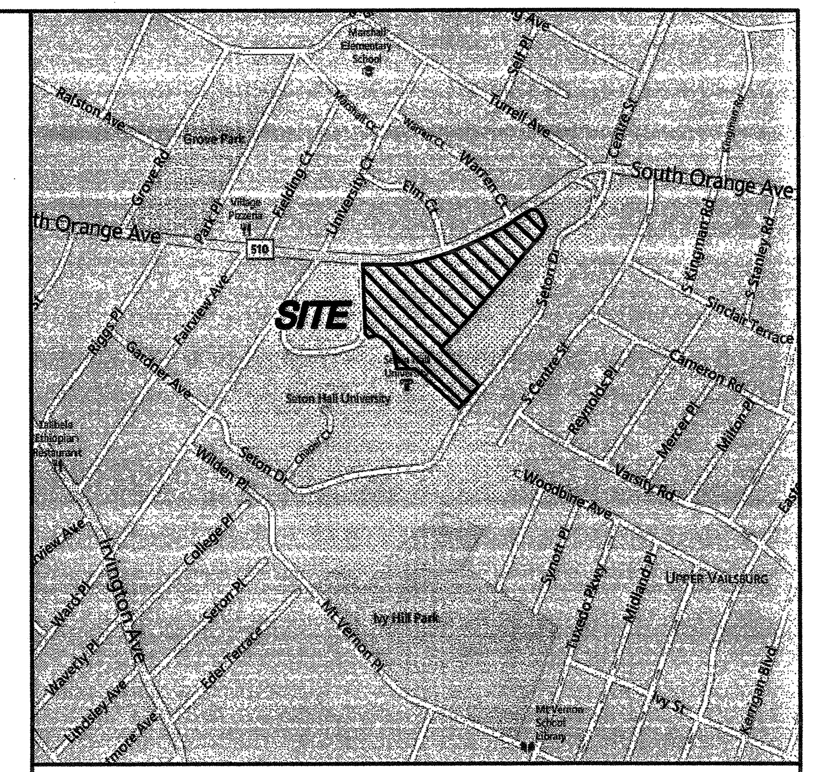
    PRIOR TO ANY DESIGN OR CONSTRUCTION THE PROPER UTILITY AGENCIES MUST BE CONTACTED FOR VERIFICATION OF UTILITY TYPE AND FOR FIELD LOCATIONS

    UNLESS NOTED BELOW SUPPLEMENTAL DOCUMENTS WERE NOT USED TO COMPILE THE SUBSURFACE UTILITY INFORMATION SHOWN HEREON

    PLAN NOTED IN 1B.
11. THIS PLAN NOT VALID UNLESS EMBOSSED WITH THE SEAL OF THE PROFESSIONAL.



TUNNEL DETAIL



KEY MAP
(N.T.S.)

LEGEND
(SYMBOLS NOT SHOWN TO SCALE)

- HYDRANT
- STREET LIGHT
- SIGNAL POLE
- MANHOLE
- WATER VALVE
- GAS VALVE
- UNKNOWN VALVE
- CATCH BASIN
- METAL COVER
- ELECTRIC BOX
- DOOR
- DOUBLE DOOR
- GARAGE DOOR
- PARKING METER
- x 322.35 SPOT ELEVATION
- CLEAN OUT
- TREE
- BM-1 BENCH MARK
- SIGN
- POLE
- ANCHOR POLE
- BOLLARD
- IRRIGATION CONTROL VALVE
- —D—D— STORM DRAIN
- —S—S— SANITARY
- —COMB— COMBINED SEWER
- —C—C— CABLE TV TONE OUT
- —G—G— GAS TONE OUT
- —W—W— WATER TONE OUT
- —E—E— ELECTRIC TONE OUT
- —T—T— TELEPHONE TONE OUT
- —ST— STEAM TONE OUT
- —UNK— UNKNOWN UTILITY TONE OUT
- —X—X— FENCE (TYPE AS NOTED)
- OVERHEAD WIRE
- GUIDE RAIL (TYPE AS NOTED)
- TREE LINE
- PROPERTY/RIGHT-OF-WAY LINE
- REFERENCED UTILITY LINE (TYPE AS NOTED)—PLOTTED FROM EXISTING MAPPING

Date	Description	No.
7/12/16	Added additional fin.floor Elevations to University Center	2
3/3/16	Revised Boundary Location & Changed Surveyor of Record	1

Revisions

"I hereby state that this plan is based on a field survey made by me or under my immediate supervision in accordance with NJAC 13:40-5.1 "Preparation of Land Surveys", and to the best of my professional knowledge, information and belief, and in my professional opinion, correctly represents the conditions found on the date of the field survey at the subject property".

11-10-16

GARY A. VEENSTRA — DATE
PROFESSIONAL LAND SURVEYOR N.J. LIC. No. 24GS03721300

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NJ Certificate of Authorization No: 24GA27996400

Project
SETON HALL UNIVERSITY
SOUTH ORANGE
ESSEX COUNTY — NEW JERSEY

Drawing Title
PARTIAL TOPOGRAPHIC SURVEY
BLOCK 901, LOT 3

Project No. 100300401	Drawing No.
Date 9/7/2012	VT-101
Scale 1"=40'	
Drn. By KEC	
Checked By JER	1 OF 1

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NOTES:

1. THIS SURVEY IS BASED UPON PHYSICAL CONDITIONS FOUND AT THE SUBJECT SITE, AND THE FOLLOWING REFERENCES:
   - A. UNDERGROUND UTILITY MAP PROVIDED BY SETON HALL UNIVERSITY, NOT DATED.
   - B. MAP ENTITLED "BOUNDARY SURVEY, SETON HALL UNIVERSITY, TAX LOT 3, BLOCK 901, TOWNSHIP OF SOUTH ORANGE VILLAGE, ESSEX COUNTY, NEW JERSEY." PREPARED BY EKA ASSOCIATES, P.A., JOB NO. B42122, DATED 9-03-2012.
   - C. PLAN ENTITLED "UTILITY CLEARANCE SURVEY RESULTS, SETON HALL UNIVERSITY, SOUTH ORANGE, NJ" PREPARED BY ENVIROSCAN, INC., DATED AUGUST 8, 2008"
2. THE MERIDIAN OF THIS SURVEY IS REFERENCED TO THE NEW JERSEY STATE PLANE COORDINATE SYSTEM NAD 83 (2011) DERIVED USING SURVEY-GRADE GNSS EQUIPMENT.
3. ELEVATIONS SHOWN ARE REFERENCED TO THE PLAN NOTED IN 1C.

SITE BENCHMARKS:	LANGAN BENCHMARK-A	LANGAN BENCHMARK-B
	N=696122.7557	N=695880.1595
	E=562058.8043	E=562178.4508
	ELEV=238.41	ELEV=249.77
	PIN AND CAP SET	X-CUT SET

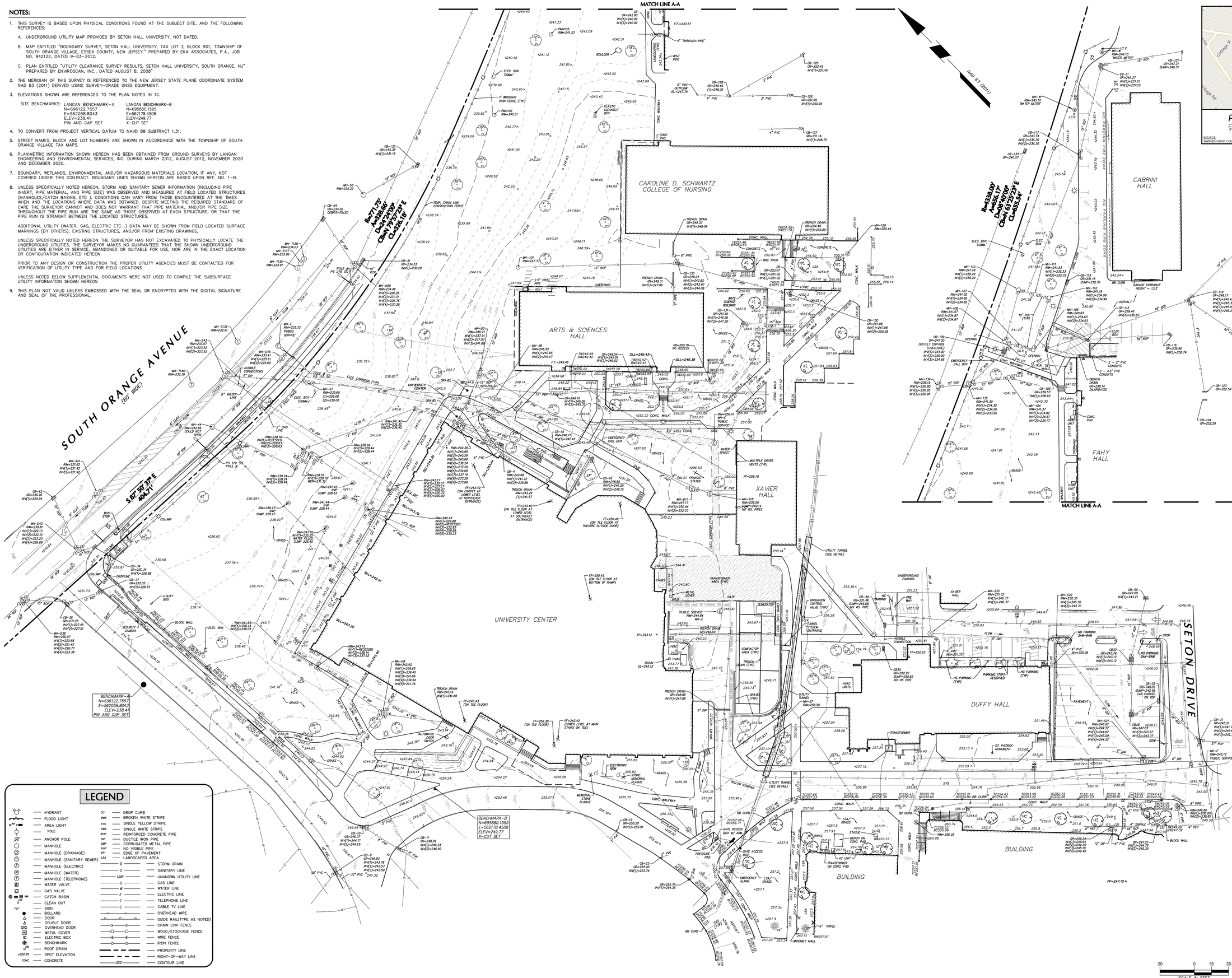
4. TO CONVERT FROM PROJECT VERTICAL DATUM TO NAVD 88 SUBTRACT 1.31.
5. STREET NAMES, BLOCK AND LOT NUMBERS ARE SHOWN IN ACCORDANCE WITH THE TOWNSHIP OF SOUTH ORANGE VILLAGE TAX MAPS.
6. PLANIMETRIC INFORMATION SHOWN HEREON HAS BEEN OBTAINED FROM GROUND SURVEYS BY LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES, INC. DURING MARCH 2012, AUGUST 2012, NOVEMBER 2020 AND DECEMBER 2020.
7. BOUNDARY, WETLANDS, ENVIRONMENTAL AND/OR HAZARDOUS MATERIALS LOCATION, IF ANY, NOT COVERED UNDER THIS CONTRACT. BOUNDARY LINES SHOWN HEREON ARE BASED UPON REF. NO. 1-B.
8. UNLESS SPECIFICALLY NOTED HEREON, STORM AND SANITARY SEWER INFORMATION (INCLUDING PIPE INVERT, PIPE MATERIAL, AND PIPE SIZE) WAS OBSERVED AND MEASURED AT FIELD LOCATED STRUCTURES (MANHOLES/CATCH BASINS, ETC.). CONDITIONS CAN VARY FROM THOSE ENCOUNTERED AT THE TIMES WHEN AND THE LOCATIONS WHERE DATA WAS OBTAINED. DESPITE MEETING THE REQUIRED STANDARD OF CARE THE SURVEYOR CANNOT AND DOES NOT WARRANT THAT PIPE MATERIAL AND/OR PIPE SIZE THROUGHOUT THE PIPE RUN ARE THE SAME AS THOSE OBSERVED AT EACH STRUCTURE, OR THAT THE PIPE RUN IS STRAIGHT BETWEEN THE LOCATED STRUCTURES.

   ADDITIONAL UTILITY (WATER, GAS, ELECTRIC ETC...) DATA MAY BE SHOWN FROM FIELD LOCATED SURFACE MARKINGS (BY OTHERS), EXISTING STRUCTURES, AND/OR FROM EXISTING DRAWINGS.

   UNLESS SPECIFICALLY NOTED HEREON THE SURVEYOR HAS NOT EXCAVATED TO PHYSICALLY LOCATE THE UNDERGROUND UTILITIES. THE SURVEYOR MAKES NO GUARANTEES THAT THE SHOWN UNDERGROUND UTILITIES ARE EITHER IN SERVICE, ABANDONED OR SUITABLE FOR USE, NOR ARE IN THE EXACT LOCATION OR CONFIGURATION INDICATED HEREON.

   PRIOR TO ANY DESIGN OR CONSTRUCTION THE PROPER UTILITY AGENCIES MUST BE CONTACTED FOR VERIFICATION OF UTILITY TYPE AND FOR FIELD LOCATIONS

   UNLESS NOTED BELOW SUPPLEMENTAL DOCUMENTS WERE NOT USED TO COMPILE THE SUBSURFACE UTILITY INFORMATION SHOWN HEREON
9. THIS PLAN NOT VALID UNLESS EMBOSSED WITH THE SEAL OR ENCRYPTED WITH THE DIGITAL SIGNATURE AND SEAL OF THE PROFESSIONAL.



LEGEND

	HYDRANT	DC	DROP CURB
	FLOOD LIGHT	BWS	BROKEN WHITE STRIPE
	AREA LIGHT	SYS	SINGLE YELLOW STRIPE
	POLE	SWS	SINGLE WHITE STRIPE
	ANCHOR POLE	RCP	REINFORCED CONCRETE PIPE
	MANHOLE	DIP	DUCTILE IRON PIPE
	MANHOLE (DRAINAGE)	CMP	CORRUGATED METAL PIPE
	MANHOLE (ELECTRIC)	NVP	NO VISIBLE PIPE
	MANHOLE (WATER)	EP	EDGE OF PAVEMENT
	MANHOLE (TELEPHONE)	LSA	LANDSCAPED AREA
	MANHOLE (SANITARY SEWER)	D	STORM DRAIN
	WATER VALVE	S	SANITARY LINE
	GAS VALVE	UNK	UNKNOWN UTILITY LINE
	CATCH BASIN	G	GAS LINE
	CLEAN OUT	W	WATER LINE
	SIGN	E	ELECTRIC LINE
	BOLLARD	T	TELEPHONE LINE
	DOOR	C	CABLE TV LINE
	DOUBLE DOOR		OVERHEAD WIRE
	OVERHEAD DOOR		GUIDE RAIL(TYPE AS NOTED)
	METAL COVER		CHAIN LINK FENCE
	ELECTRIC BOX		WOOD/STOCKADE FENCE
	BENCHMARK		WIRE FENCE
	ROOF DRAIN		IRON FENCE
x322.35	SPOT ELEVATION		PROPERTY LINE
CONC	CONCRETE		RIGHT-OF-WAY LINE
		322	CONTOUR LINE

Digitally signed by David R Avery
Date: 2020.12.16 13:05:47 -05'00'

Date	Description	No.
	REVISIONS	

"I hereby state that this plan is based on a field survey made by me or under my immediate supervision in accordance with NJAC 13:40-5.1 "Preparation of Land Surveys", and to the best of my professional knowledge, information and belief, and in my professional opinion, accurately represents the conditions found on the date of the field survey at the subject property".

SIGNATURE DAVID R. AVERY DATE SIGNED
PROFESSIONAL LAND SURVEYOR
NJ Lic. No. 24GS03964600

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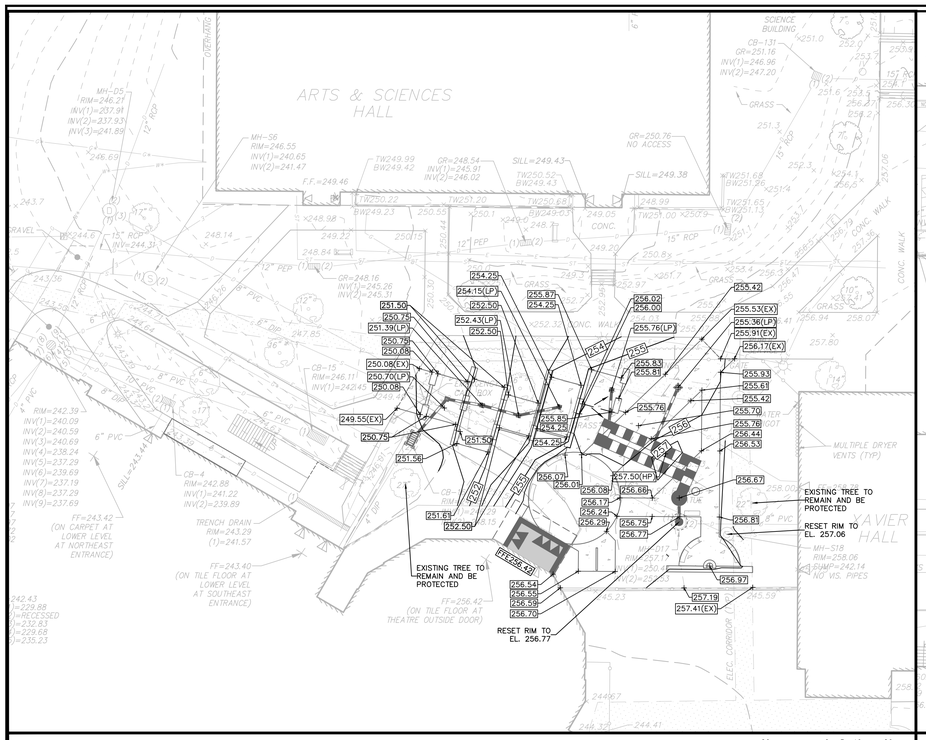
Project
SETON HALL PHASE 2
BLOCK No. 901, LOT No. 3
TOWNSHIP OF SOUTH ORANGE VILLAGE
ESSEX COUNTY NEW JERSEY

Drawing Title
PARTIAL TOPOGRAPHIC SURVEY

Project No. **100719501**	Drawing No. **VT102**
Date **DECEMBER 15, 2020**	
Scale **1"=30'**	
Drawn By **HBV** / Checked By **CH**	
Submission Date	Sheet 1 of 1

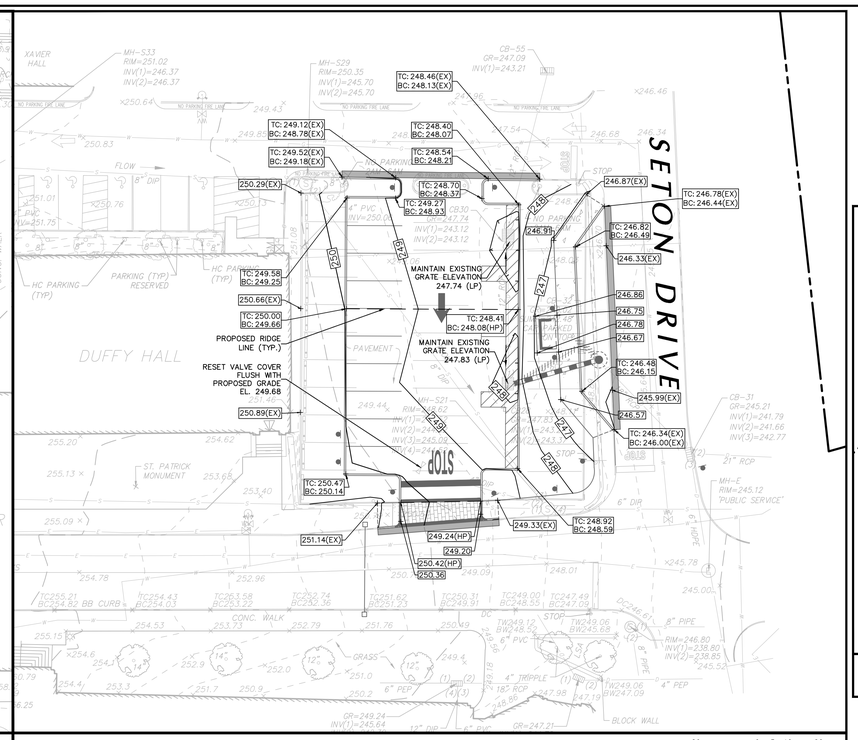
PROJECT NO. 100719501

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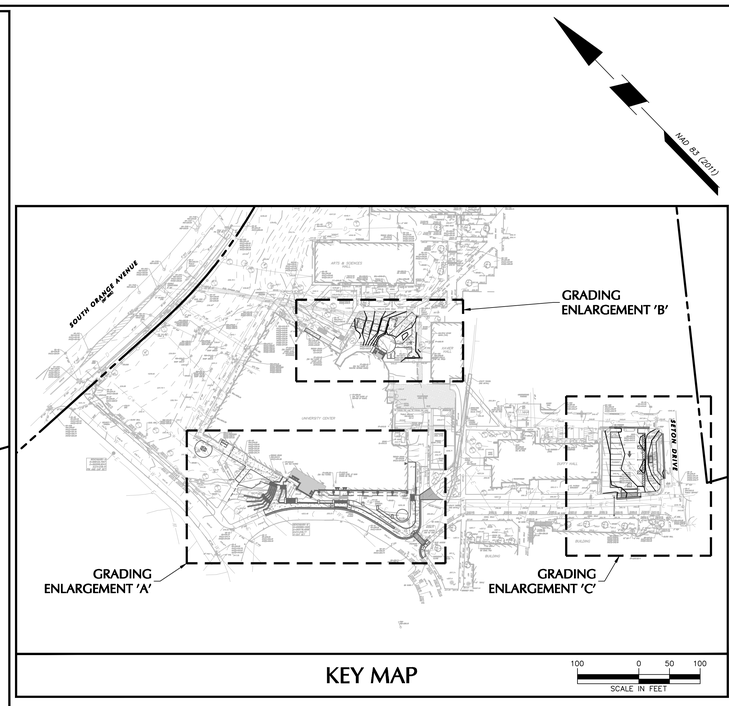
GRADING ENLARGEMENT 'B'

SCALE IN FEET: 20 0 5 10 20



GRADING ENLARGEMENT 'C'

SCALE IN FEET: 20 0 5 10 20



KEY MAP

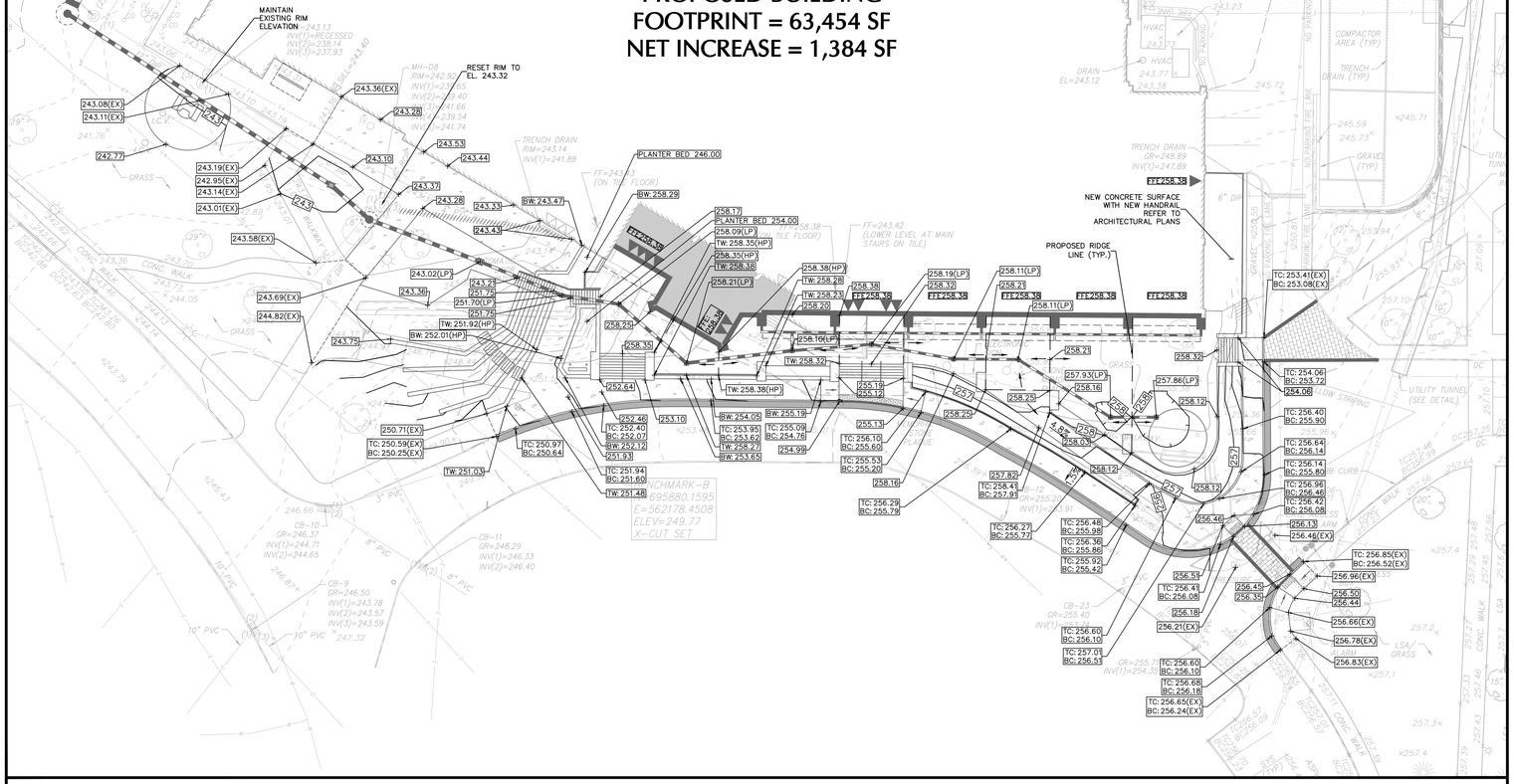
SCALE IN FEET: 100 0 50 100

GRADING AND DRAINAGE NOTES

1. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED UPON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANY AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.
2. SITE GRADING SHALL NOT PROCEED UNTIL EROSION CONTROL MEASURES HAVE BEEN INSTALLED. SEE SHEET CE101 FOR EROSION CONTROL MEASURES.
2. SET PIPES AND STRUCTURES TO ELEVATIONS AND GRADES SHOWN ON THE DRAWINGS.
3. MINIMUM DEPTH OF COVER FOR ALL STORM SEWER PIPES IS 2 FEET OR AS SPECIFIED BY THE MANUFACTURER.
4. ALL CONCRETE DRAINAGE STRUCTURES SHALL BE PRECAST IN ACCORDANCE WITH NJDOT SPECIFICATIONS, UNLESS OTHERWISE NOTED.
5. ALL DRAINAGE STRUCTURES AND STORM SEWER PIPES SHALL MEET HEAVY DUTY TRAFFIC (H20) LOADING AND BE INSTALLED ACCORDINGLY.
6. ALL DRAINAGE STRUCTURES SHALL HAVE NO SUMP AND SHALL BE PLACED ON 6 INCHES OF COURSE AGGREGATE.
7. CATCH BASIN AND MANHOLE STRUCTURES ARE NOT SHOWN TO SCALE.
8. CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS AND SPECIFICATIONS FOR ACTUAL LOCATIONS AND SIZES OF ALL ROOF LEADERS AND COORDINATE WITH PROPOSED STORMWATER SYSTEM PRIOR TO INSTALLATION.
9. ALL ROOF DRAINS TO BUILDING SHALL BE BROUGHT TO FIVE FEET OUTSIDE THE BUILDING LIMITS BY THE SITE CONTRACTOR AND SHALL BE PROVIDED WITH A TEMPORARY PLUG AT THE END. BUILDING CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLATION OF PIPING WITHIN FIVE FEET OF BUILDING AND CONNECTION OF BUILDING LATERALS TO SITE DRAINAGE SYSTEM.
12. CLEANOUTS SHALL BE PROVIDED FLUSH AT ALL LOCATIONS OF ROOF DRAIN INTERSECTIONS, BENDS AND UPSTREAM ENDS.
13. CONTRACTOR SHALL PROVIDE 24"x24"x8" THICK CONCRETE APRON AT ALL CLEANOUTS OUTSIDE OF BUILDING UNLESS MUNICIPAL REQUIREMENTS DICTATE OTHERWISE.
14. THE CONTRACTOR SHALL FLUSH AND CLEAN ALL EXISTING ON-SITE STORM PIPING AND STRUCTURES THAT ARE TO REMAIN WITHIN THE LIMITS OF WORK OR AS INDICATED ON THE PLANS.
15. COMPACTION CRITERIA FOR FILL PLACED IN THE FOLLOWING AREAS SHALL MEET OR EXCEED THE FOLLOWING MINIMUM PERCENTAGE OF MAXIMUM MODIFIED PROCTOR DRY DENSITY AS DETERMINED BY ASTM D-1557 USED ON REPRESENTATIVE SOIL SAMPLES, UNLESS MORE STRINGENT CRITERIA IS GIVEN ELSEWHERE (INCLUDING GEOTECHNICAL REPORT):

FILL AREA	% OF MAXIMUM MODIFIED PROCTOR DRY DENSITY
BUILDING FOOTINGS	95%
BUILDING FOOTPRINT, PAVEMENT, SIDEWALKS, AND ROADWAYS	95%
LANDSCAPED AREAS	92%
TRENCH BACKFILL	95%

16. PROTECT SUBGRADE FROM EXCESSIVE WHEEL LOADING DURING CONSTRUCTION, INCLUDING CONCRETE TRUCKS AND DUMP TRUCKS.
17. REMOVE AREAS OF FINISHED SUBGRADE FOUND TO BE UNSATISFACTORY BY OWNER'S ENGINEER AND REPLACE IN A MANNER THAT WILL COMPLY WITH COMPACTION REQUIREMENTS BY USE OF MATERIAL EQUAL TO OR BETTER THAN BEST SUBGRADE MATERIAL ON SITE. SURFACE OF SUBGRADE AFTER COMPACTION SHALL BE HARD, UNIFORM, SMOOTH, STABLE, AND TRUE TO GRADE AND CROSS-SECTION AND SHALL NOT RUT OR WEAVE WHEN LOADED WITH A FULL DUMP TRUCK.
18. STORMWATER PIPES CONFLICTING WITH THE PROPOSED SITE IMPROVEMENTS SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR.
19. ALL PROPOSED STORM DRAINAGE PIPING SHALL BE TEMPORARILY PROTECTED WITH REQUIRED MINIMUM COVER FOR CONSTRUCTION.
20. ALL PROPOSED STORM DRAINAGE TO BE INSTALLED UNDERGROUND UNLESS OTHERWISE NOTED.
21. PIPE LENGTHS SHOWN REPRESENT PLANAR LENGTHS MEASURED FROM CENTER-OF-STRUCTURE TO CENTER-OF-STRUCTURE.
22. PLAN AND PROFILE STRUCTURES ARE SYMBOLS THAT ARE PROVIDED FOR REFERENCE, AND ARE NOT TO BE USED AS THE BASIS FOR CONSTRUCTION. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS OF ALL DRAINAGE, SANITARY, AND UTILITY STRUCTURES TO ENGINEER.
23. HDPE PIPING SHALL CONFORM TO AASHTO M 294 AND IS TYPE S (SMOOTH INTERIOR WITH ANNULAR CORRUGATIONS) WITH GASKETED WATER-TIGHT JOINTS.
24. RCP PIPING SHALL CONFORM TO A.S.T.M SPECIFICATIONS C76-81 CLASS III.
25. ABBREVIATIONS:
    - BC = BOTTOM OF CURB
    - BW = LAWN/SIDEWALK ELEVATION AT BOTTOM OF WALL
    - CB = CATCH BASIN
    - DIP = DUCTILE IRON PIPE
    - GR = GRATE ELEVATION
    - HP = HIGH POINT
    - HDPE = HIGH DENSITY POLYETHYLENE
    - INV = INVERT
    - LF = LINEAR FEET
    - LP = LOW POINT
    - MH = MANHOLE
    - PVC = POLYVINYL CHLORIDE
    - RCP = REINFORCED CONCRETE PIPE
    - RIM = RIM ELEVATION
    - RL = ROOF LEADER
    - TC = TOP OF CURB
    - TW = LAWN/SIDEWALK ELEVATION AT TOP OF WALL



GRADING ENLARGEMENT 'A'

SCALE IN FEET: 20 0 5 10 20

LEGEND

- PROPERTY LINE
- 600 — EXISTING MAJOR CONTOUR
- 597 — EXISTING MINOR CONTOUR
- 600 — PROPOSED MAJOR CONTOUR
- 601 — PROPOSED MINOR CONTOUR
- [135.50] — PROPOSED SPOT ELEVATION
- TC 272.76 / BC 272.26 — PROPOSED TOP/BOTTOM OF CURB ELEVATION
- TW 278.20 / BW 269.00 — LAWN/SIDEWALK ELEVATION AT PROPOSED TOP/BOTTOM OF WALL
- 258.31 (LP) — PROPOSED LOW POINT
- 272.23 (HP) — PROPOSED HIGH POINT
- PROPOSED FLOW DIRECTION
- PROPOSED RIDGE LINE
- PROPOSED DRAINAGE PIPE
- PROPOSED CATCH BASIN
- PROPOSED DRAINAGE MANHOLE

REFERENCE NOTES:

1. EXISTING SURVEY AND TOPOGRAPHIC INFORMATION OBTAINED FROM A PLAN TITLED "PARTIAL TOPOGRAPHIC SURVEY – SETON HALL PHASE 2" PREPARED BY LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES, INC. ON 15 DECEMBER 2020.
2. PROPOSED BUILDING FOOTPRINT OBTAINED ELECTRONICALLY FROM CCH ARHITECTS ON 15 DECEMBER 2020.
3. THE MERIDIAN OF THE SURVEY IS REFERENCED TO THE NEW JERSEY STATE PLANE COORDINATE SYSTEM NAD 83 (2011).
4. ELEVATIONS SHOWN ARE REFERENCED TO THE PLAN TITLED "UTILITY CLEARANCE SURVEY RESULTS, SETON HALL UNIVERSITY, SOUTH ORANGE, NJ PREPARED BY ENVIROSCAN, INC., DATED AUGUST 8, 2008".

No.	Description	Date
	Revisions	

Signature Date 12/17/2020
LEONARD B. SAVINO
PROFESSIONAL ENGINEER NJ LIC. No. 39238

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NJ Certificate of Authorization No. 24GA27996400

Project
UNIVERSITY CENTER PHASE 2 RENOVATION & ADDITION
SETON HALL UNIVERSITY
400 SOUTH ORANGE AVENUE
BLOCK No. 901, LOT No. 3
TOWNSHIP OF SOUTH ORANGE VILLAGE
ESSEX COUNTY NEW JERSEY

Drawing Title
GRADING PLAN

Project No. 100898001
Date 12/17/2020
Drawn By BMW
Checked By JED

Drawing No. CG101

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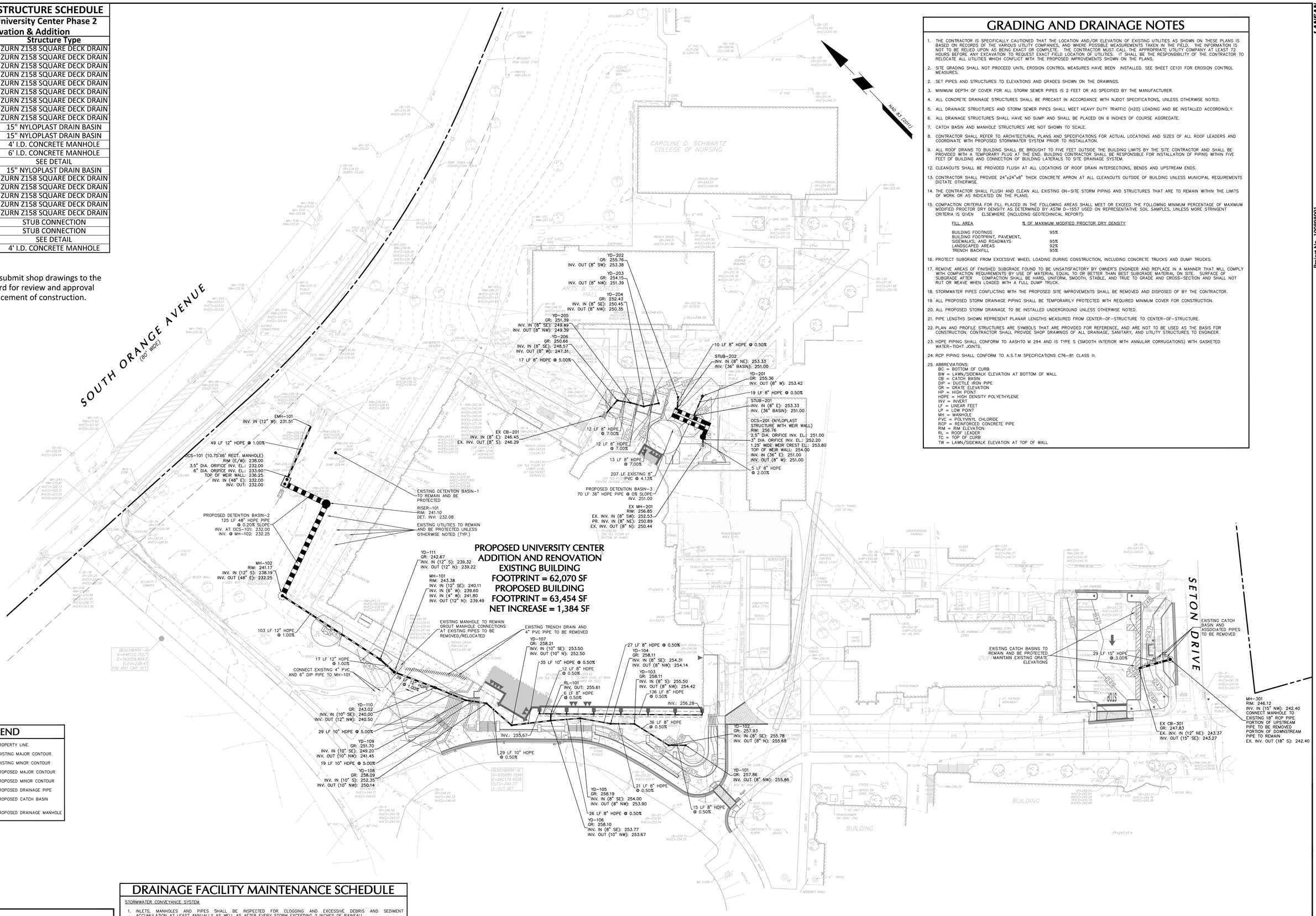
Project No. 100898001

DRAINAGE STRUCTURE SCHEDULE

Seton Hall University Center Phase 2 Renovation & Addition

Structure ID	Structure Type
YD-101	ZURN Z158 SQUARE DECK DRAIN
YD-102	ZURN Z158 SQUARE DECK DRAIN
YD-103	ZURN Z158 SQUARE DECK DRAIN
YD-104	ZURN Z158 SQUARE DECK DRAIN
YD-105	ZURN Z158 SQUARE DECK DRAIN
YD-106	ZURN Z158 SQUARE DECK DRAIN
YD-107	ZURN Z158 SQUARE DECK DRAIN
YD-108	ZURN Z158 SQUARE DECK DRAIN
YD-109	ZURN Z158 SQUARE DECK DRAIN
YD-110	15" NYLOPLAST DRAIN BASIN
YD-111	15" NYLOPLAST DRAIN BASIN
MH-101	4' I.D. CONCRETE MANHOLE
MH-102	6' I.D. CONCRETE MANHOLE
OCS-101	SEE DETAIL
YD-201	15" NYLOPLAST DRAIN BASIN
YD-202	ZURN Z158 SQUARE DECK DRAIN
YD-203	ZURN Z158 SQUARE DECK DRAIN
YD-204	ZURN Z158 SQUARE DECK DRAIN
YD-205	ZURN Z158 SQUARE DECK DRAIN
YD-206	ZURN Z158 SQUARE DECK DRAIN
STUB-201	STUB CONNECTION
STUB-202	STUB CONNECTION
OCS-201	SEE DETAIL
MH-301	4' I.D. CONCRETE MANHOLE

Note:
Contractor shall submit shop drawings to the engineer of record for review and approval prior to commencement of construction.



LEGEND

- PROPERTY LINE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED DRAINAGE PIPE
- PROPOSED CATCH BASIN
- PROPOSED DRAINAGE MANHOLE

GRADING AND DRAINAGE NOTES

1. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED UPON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANY AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.
2. SITE GRADING SHALL NOT PROCEED UNTIL EROSION CONTROL MEASURES HAVE BEEN INSTALLED. SEE SHEET CE101 FOR EROSION CONTROL MEASURES.
2. SET PIPES AND STRUCTURES TO ELEVATIONS AND GRADES SHOWN ON THE DRAWINGS.
3. MINIMUM DEPTH OF COVER FOR ALL STORM SEWER PIPES IS 2 FEET OR AS SPECIFIED BY THE MANUFACTURER.
4. ALL CONCRETE DRAINAGE STRUCTURES SHALL BE PRECAST IN ACCORDANCE WITH NJDOT SPECIFICATIONS, UNLESS OTHERWISE NOTED.
5. ALL DRAINAGE STRUCTURES AND STORM SEWER PIPES SHALL MEET HEAVY DUTY TRAFFIC (H20) LOADING AND BE INSTALLED ACCORDINGLY.
6. ALL DRAINAGE STRUCTURES SHALL HAVE NO SUMP AND SHALL BE PLACED ON 6 INCHES OF COURSE AGGREGATE.
7. CATCH BASIN AND MANHOLE STRUCTURES ARE NOT SHOWN TO SCALE.
8. CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS AND SPECIFICATIONS FOR ACTUAL LOCATIONS AND SIZES OF ALL ROOF LEADERS AND COORDINATE WITH PROPOSED STORMWATER SYSTEM PRIOR TO INSTALLATION.
9. ALL ROOF DRAINS TO BUILDING SHALL BE BROUGHT TO FIVE FEET OUTSIDE THE BUILDING LIMITS BY THE SITE CONTRACTOR AND SHALL BE PROVIDED WITH A TEMPORARY PLUG AT THE END. BUILDING CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLATION OF PIPING WITHIN FIVE FEET OF BUILDING AND CONNECTION OF BUILDING LATERALS TO SITE DRAINAGE SYSTEM.
12. CLEANOUTS SHALL BE PROVIDED FLUSH AT ALL LOCATIONS OF ROOF DRAIN INTERSECTIONS, BENDS AND UPSTREAM ENDS.
13. CONTRACTOR SHALL PROVIDE 24"x24"x8" THICK CONCRETE APRON AT ALL CLEANOUTS OUTSIDE OF BUILDING UNLESS MUNICIPAL REQUIREMENTS DICTATE OTHERWISE.
14. THE CONTRACTOR SHALL FLUSH AND CLEAN ALL EXISTING ON-SITE STORM PIPING AND STRUCTURES THAT ARE TO REMAIN WITHIN THE LIMITS OF WORK OR AS INDICATED ON THE PLANS.
15. COMPACTION CRITERIA FOR FILL PLACED IN THE FOLLOWING AREAS SHALL MEET OR EXCEED THE FOLLOWING MINIMUM PERCENTAGE OF MAXIMUM MODIFIED PROCTOR DRY DENSITY AS DETERMINED BY ASTM D-1557 USED ON REPRESENTATIVE SOIL SAMPLES, UNLESS MORE STRINGENT CRITERIA IS GIVEN ELSEWHERE (INCLUDING GEOTECHNICAL REPORT):

FILL AREA	% OF MAXIMUM MODIFIED PROCTOR DRY DENSITY
BUILDING FOOTINGS	95%
BUILDING FOOTPRINT, PAVEMENT, SIDEWALKS, AND ROADWAYS	95%
LANDSCAPED AREAS	92%
TRENCH BACKFILL	95%

16. PROTECT SUBGRADE FROM EXCESSIVE WHEEL LOADING DURING CONSTRUCTION, INCLUDING CONCRETE TRUCKS AND DUMP TRUCKS.
17. REMOVE AREAS OF FINISHED SUBGRADE FOUND TO BE UNSATISFACTORY BY OWNER'S ENGINEER AND REPLACE IN A MANNER THAT WILL COMPLY WITH COMPACTION REQUIREMENTS BY USE OF MATERIAL EQUAL TO OR BETTER THAN BEST SUBGRADE MATERIAL ON SITE. SURFACE OF SUBGRADE AFTER COMPACTION SHALL BE HARD, UNIFORM, SMOOTH, STABLE, AND TRUE TO GRADE AND CROSS-SECTION AND SHALL NOT RUT OR WEAVE WHEN LOADED WITH A FULL DUMP TRUCK.
18. STORMWATER PIPES CONFLICTING WITH THE PROPOSED SITE IMPROVEMENTS SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR.
19. ALL PROPOSED STORM DRAINAGE PIPING SHALL BE TEMPORARILY PROTECTED WITH REQUIRED MINIMUM COVER FOR CONSTRUCTION.
20. ALL PROPOSED STORM DRAINAGE TO BE INSTALLED UNDERGROUND UNLESS OTHERWISE NOTED.
21. PIPE LENGTHS SHOWN REPRESENT PLANAR LENGTHS MEASURED FROM CENTER-OF-STRUCTURE TO CENTER-OF-STRUCTURE.
22. PLAN AND PROFILE STRUCTURES ARE SYMBOLS THAT ARE PROVIDED FOR REFERENCE, AND ARE NOT TO BE USED AS THE BASIS FOR CONSTRUCTION. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS OF ALL DRAINAGE, SANITARY, AND UTILITY STRUCTURES TO ENGINEER.
23. HDPE PIPING SHALL CONFORM TO AASHTO M 294 AND IS TYPE S (SMOOTH INTERIOR WITH ANNULAR CORRUGATIONS) WITH GASKETED WATER-TIGHT JOINTS.
24. RCP PIPING SHALL CONFORM TO A.S.T.M SPECIFICATIONS C76-81 CLASS III.
25. ABBREVIATIONS:
BC = BOTTOM OF CURB
BW = LAWN/SIDEWALK ELEVATION AT BOTTOM OF WALL
CB = CATCH BASIN
DIP = DUCTILE IRON PIPE
GR = GRATE ELEVATION
HP = HIGH POINT
HDPE = HIGH DENSITY POLYETHYLENE
INV = INVERT
LF = LINEAR FEET
LP = LOW POINT
MH = MANHOLE
PVC = POLYVINYL CHLORIDE
RCP = REINFORCED CONCRETE PIPE
RIM = RIM ELEVATION
RL = ROOF LEADER
TC = TOP OF CURB
TW = LAWN/SIDEWALK ELEVATION AT TOP OF WALL

DRAINAGE FACILITY MAINTENANCE SCHEDULE

STORMWATER CONVEYANCE SYSTEM

1. INLETS, MANHOLES AND PIPES SHALL BE INSPECTED FOR CLOGGING AND EXCESSIVE DEBRIS AND SEDIMENT ACCUMULATION AT LEAST ANNUALLY AS WELL AS AFTER EVERY STORM EXCEEDING 2 INCHES OF RAINFALL.
2. DEBRIS AND SEDIMENT SHOULD BE REMOVED WHEN ENCOUNTERED DURING INSPECTIONS.
3. ALL STRUCTURAL COMPONENTS MUST BE INSPECTED FOR CRACKING, SUBSIDENCE, BREACHING, WEARING, AND DETERIORATION AT LEAST ANNUALLY.
4. THE CONDITION OF SURROUNDING AND ABOVE LYING MATERIALS SHALL BE INSPECTED FOR EVIDENCE OF POTENTIAL FAILURES OR DETERIORATION DURING EACH INSPECTION NOTED ABOVE.

STORMWATER DETENTION SYSTEM

1. INLETS, MANHOLES AND PIPES SHALL BE INSPECTED FOR CLOGGING AND EXCESSIVE DEBRIS AND SEDIMENT ACCUMULATION AT LEAST ANNUALLY.
2. DEBRIS AND SEDIMENT SHOULD BE REMOVED WHEN ENCOUNTERED DURING INSPECTIONS.
3. ALL STRUCTURAL COMPONENTS MUST BE INSPECTED FOR CRACKING, SUBSIDENCE, BREACHING, WEARING, AND DETERIORATION AT LEAST ANNUALLY.
4. THE CONDITION OF SURROUNDING AND ABOVE LYING MATERIALS SHALL BE INSPECTED FOR EVIDENCE OF POTENTIAL FAILURES OR DETERIORATION DURING EACH INSPECTION NOTED ABOVE.

REFERENCE NOTES:

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30 0 15 30
SCALE IN FEET

Date	Description	No.
Revisions		

Leonard D. Savino 12/17/2020
Signature Date
LEONARD D. SAVINO
PROFESSIONAL ENGINEER NJ LIC. No. 39238

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SETON HALL UNIVERSITY
400 SOUTH ORANGE AVENUE
BLOCK No. 901, LOT No. 3
TOWNSHIP OF SOUTH ORANGE VILLAGE
ESSEX COUNTY NEW JERSEY

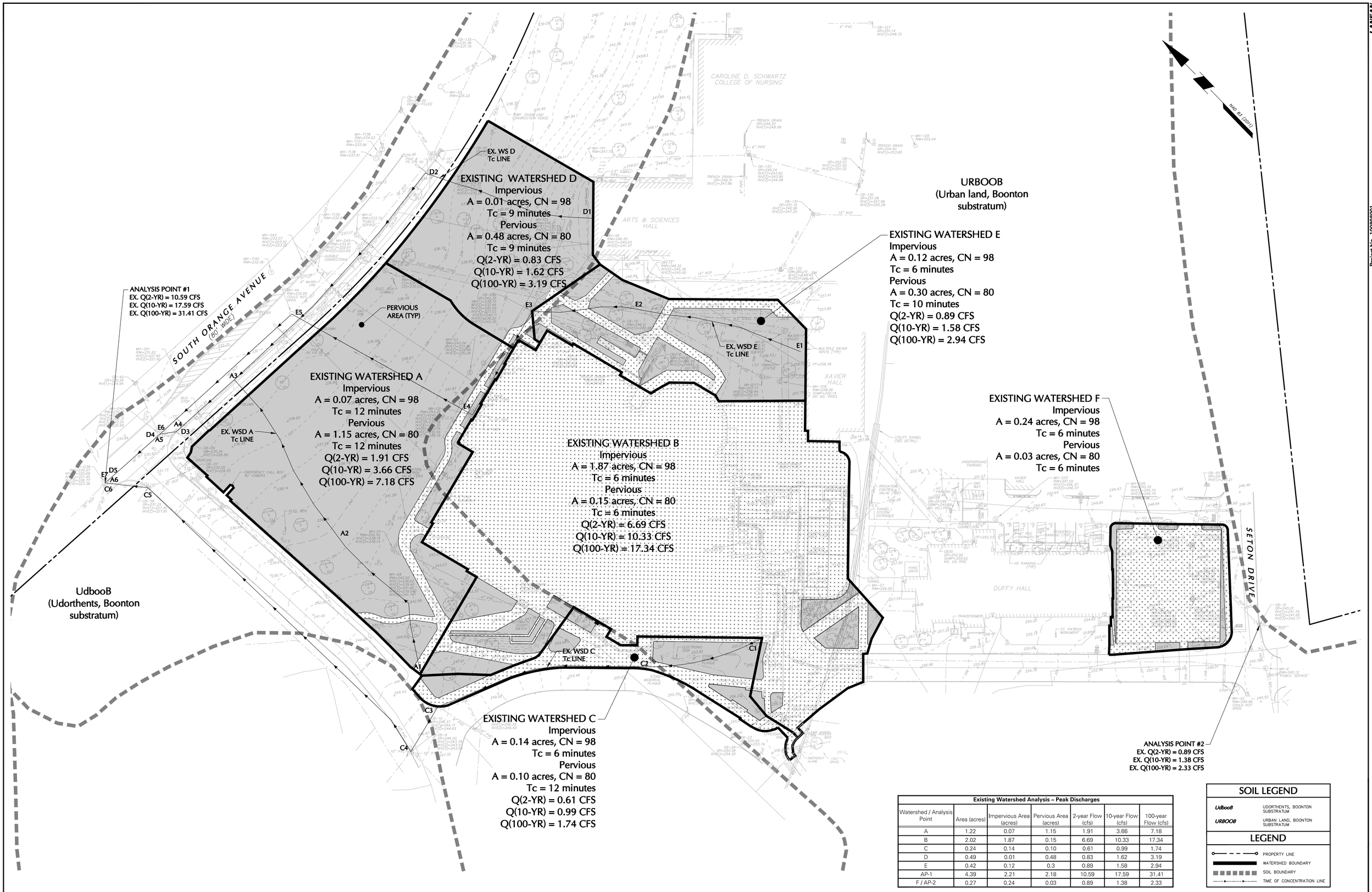
Drawing Title
DRAINAGE PLAN

Project No.	100898001
Date	12/17/2020
Drawn By	BMW
Checked By	JED
Drawing No.	CG102

LANGAN
Project No. 100898001

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Date: 12/17/2020 Time: 13:32 User: bwild Style Table: Langan.stb Layout: Layout1 Document Code: 100898001-0501-CG102-0101



Existing Watershed Analysis – Peak Discharges						
Watershed / Analysis Point	Area (acres)	Impervious Area (acres)	Pervious Area (acres)	2-year Flow (cfs)	10-year Flow (cfs)	100-year Flow (cfs)
A	1.22	0.07	1.15	1.91	3.66	7.18
B	2.02	1.87	0.15	6.69	10.33	17.34
C	0.24	0.14	0.10	0.61	0.99	1.74
D	0.49	0.01	0.48	0.83	1.62	3.19
E	0.42	0.12	0.3	0.89	1.58	2.94
AP-1	4.39	2.21	2.18	10.59	17.59	31.41
F / AP-2	0.27	0.24	0.03	0.89	1.38	2.33

SOIL LEGEND

UdbooB	UDORTHENTS, BOONTON SUBSTRATUM
URBOOB	URBAN LAND, BOONTON SUBSTRATUM

LEGEND

PROPERTY LINE
WATERSHED BOUNDARY
SOIL BOUNDARY
TIME OF CONCENTRATION LINE

REFERENCE NOTES:

1. EXISTING SURVEY AND TOPOGRAPHIC INFORMATION OBTAINED FROM A PLAN TITLED "PARTIAL TOPOGRAPHIC SURVEY", BLOCK 901, LOT 3, PREPARED BY PREPARED BY LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES, INC. ON 7 SEPTEMBER 2012, LAST REVISED 3 MARCH 2016.
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30 0 15 30
SCALE IN FEET

Date	Description	No.
Revisions		

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NJ Certificate of Authorization No. 24GA27996400

Project
UNIVERSITY CENTER PHASE 2 RENOVATION & ADDITION
SETON HALL UNIVERSITY
400 SOUTH ORANGE AVENUE
BLOCK No. 901, LOT No. 3
TOWNSHIP OF SOUTH ORANGE VILLAGE
ESSEX COUNTY NEW JERSEY

Drawing Title
EXISTING WATERSHED PLAN

Project No. 100898001
Date 12/17/2020
Drawn By BMW
Checked By JED

Figure
CG111

Project No. 100898001

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UNDISTURBED PORTION
OF WATERSHED D
Impervious
A = 0.00 acres
Pervious
A = 0.46 acres, CN = 80
Tc = 9 minutes
Q(2-YR) = 0.77 CFS
Q(10-YR) = 1.50 CFS
Q(100-YR) = 2.98 CFS

UNDISTURBED PORTION OF
WATERSHED E
Impervious
A = 0.08 acres, CN = 98
Tc = 6 minutes
Pervious
A = 0.10 acres, CN = 80
Tc = 6 minutes
Q(2-YR) = 0.43 CFS
Q(10-YR) = 0.73 CFS
Q(100-YR) = 1.33 CFS

URBOOB
(Urban land, Boonton
substratum)

DISTURBED AREA 2
Impervious
A = 0.02 acres, CN = 98
Tc = 6 minutes
Pervious
A = 0.19 acres, CN = 80
Tc = 10 minutes
EXISTING RUNOFF:
Q(2-YR) = 0.38 CFS
Q(10-YR) = 0.72 CFS
Q(100-YR) = 1.40 CFS
ALLOWABLE RUNOFF
(BASED ON REQUIRED
REDUCTION):
Q(2-YR) = 0.19 CFS
Q(10-YR) = 0.54 CFS
Q(100-YR) = 1.12 CFS

EXISTING WATERSHED F
NO REDUCTIONS REQUIRED
Impervious
A = 0.24 acres, CN = 98
Tc = 6 minutes
Pervious
A = 0.03 acres, CN = 80
Tc = 6 minutes

ANALYSIS POINT #1
ALLOWABLE Q(2-YR) = 9.45 CFS
ALLOWABLE Q(10-YR) = 16.40 CFS
ALLOWABLE Q(100-YR) = 29.54 CFS

PERVIOUS
AREA (TYP)

UNDISTURBED PORTION OF
WATERSHED A
Impervious
A = 0.02 acres, CN = 98
Tc = 12 minutes
Pervious
A = 0.95 acres, CN = 80
Tc = 12 minutes
Q(2-YR) = 1.48 CFS
Q(10-YR) = 2.69 CFS
Q(100-YR) = 5.67 CFS

UNDISTURBED PORTION OF
WATERSHED B
Impervious
A = 1.75 acres, CN = 98
Tc = 6 minutes
Pervious
A = 0.04 acres, CN = 80
Tc = 6 minutes
Q(2-YR) = 6.13 CFS
Q(10-YR) = 9.40 CFS
Q(100-YR) = 15.69 CFS

UdbooB
(Udorthents, Boonton
substratum)

DISTURBED AREA 1
Impervious
A = 0.32 acres, CN = 98
Tc = 12 minutes
Pervious
A = 0.43 acres, CN = 80
Tc = 12 minutes
EXISTING RUNOFF:
Q(2-YR) = 1.51 CFS
Q(10-YR) = 2.59 CFS
Q(100-YR) = 4.71 CFS
ALLOWABLE RUNOFF
(BASED ON REQUIRED
REDUCTION):
Q(2-YR) = 0.76 CFS
Q(10-YR) = 1.94 CFS
Q(100-YR) = 3.77 CFS

UNDISTURBED PORTION OF
WATERSHED C
Impervious
A = 0.02 acres, CN = 98
Tc = 6 minutes
Pervious
A = 0.01 acres, CN = 80
Tc = 6 minutes
Q(2-YR) = 0.09 CFS
Q(10-YR) = 0.14 CFS
Q(100-YR) = 0.25 CFS

ANALYSIS POINT #2
ALLOWABLE Q(2-YR) = 0.89 CFS
ALLOWABLE Q(10-YR) = 1.38 CFS
ALLOWABLE Q(100-YR) = 2.33 CFS

SOUTH ORANGE AVENUE (80' WIDE)

SETON DRIVE

CAROLINE D. SCHWARTZ COLLEGE OF NURSING

ARTS & SCIENCES HALL

XAVIER HALL

DUFFY HALL

NAD 83 (2011)

Allowable Watershed Analysis - Peak Discharges

Watershed / Analysis Point	Area (acres)	Impervious Area (acres)	Pervious Area (acres)	2-year Flow (cfs)	10-year Flow (cfs)	100-year Flow (cfs)
A	0.97	0.02	0.95	1.48	2.69	5.67
B	1.79	1.75	0.04	6.13	9.40	15.69
C	0.03	0.02	0.01	0.09	0.14	0.25
D	0.46	0.00	0.46	0.77	1.50	2.98
E	0.18	0.08	0.10	0.43	0.73	1.33
Disturbed Area-1	0.75	0.32	0.43	0.76	1.94	3.77
Disturbed Area-2	0.21	0.02	0.19	0.19	0.54	1.12
AP-1	4.39	2.21	2.18	9.45	16.40	29.54
F / AP-2	0.27	0.24	0.03	0.89	1.38	2.33

SOIL LEGEND

UdbooB	UDORTHENTS, BOONTON SUBSTRATUM
URBOOB	URBAN LAND, BOONTON SUBSTRATUM

LEGEND

- PROPERTY LINE
- WATERSHED BOUNDARY
- SOIL BOUNDARY
- TIME OF CONCENTRATION LINE

REFERENCE NOTES:

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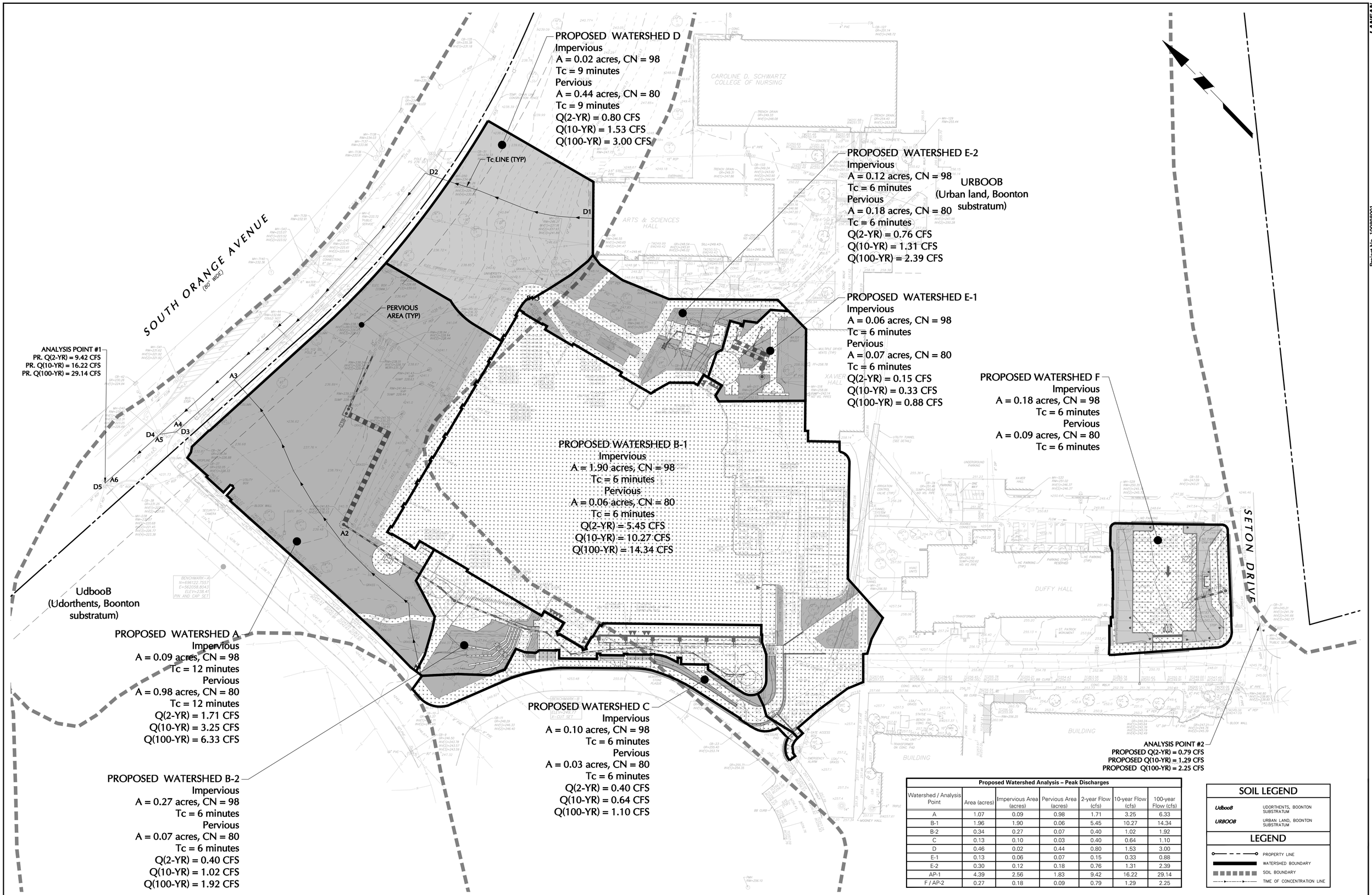
Project
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SETON HALL UNIVERSITY
400 SOUTH ORANGE AVENUE
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TOWNSHIP OF SOUTH ORANGE VILLAGE
ESSEX COUNTY NEW JERSEY

Drawing Title
ALLOWABLE
WATERSHED PLAN

Project No.	Figure
100898001	CG112
Date: 12/17/2020	
Drawn By: BMW	
Checked By: JED	

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LANGAN Project No. 100898001



Proposed Watershed Analysis – Peak Discharges						
Watershed / Analysis Point	Area (acres)	Impervious Area (acres)	Pervious Area (acres)	2-year Flow (cfs)	10-year Flow (cfs)	100-year Flow (cfs)
A	1.07	0.09	0.98	1.71	3.25	6.33
B-1	1.96	1.90	0.06	5.45	10.27	14.34
B-2	0.34	0.27	0.07	0.40	1.02	1.92
C	0.13	0.10	0.03	0.40	0.64	1.10
D	0.46	0.02	0.44	0.80	1.53	3.00
E-1	0.13	0.06	0.07	0.15	0.33	0.88
E-2	0.30	0.12	0.18	0.76	1.31	2.39
AP-1	4.39	2.56	1.83	9.42	16.22	29.14
F / AP-2	0.27	0.18	0.09	0.79	1.29	2.25

SOIL LEGEND

UdbooB	UDORTHENTS, BOONTON SUBSTRATUM
URBOOB	URBAN LAND, BOONTON SUBSTRATUM

LEGEND

- PROPERTY LINE
- WATERSHED BOUNDARY
- SOIL BOUNDARY
- TIME OF CONCENTRATION LINE

REFERENCE NOTES:

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UNIVERSITY CENTER PHASE 2 RENOVATION & ADDITION
SETON HALL UNIVERSITY
400 SOUTH ORANGE AVENUE
BLOCK No. 901, LOT No. 3
TOWNSHIP OF SOUTH ORANGE VILLAGE
ESSEX COUNTY NEW JERSEY

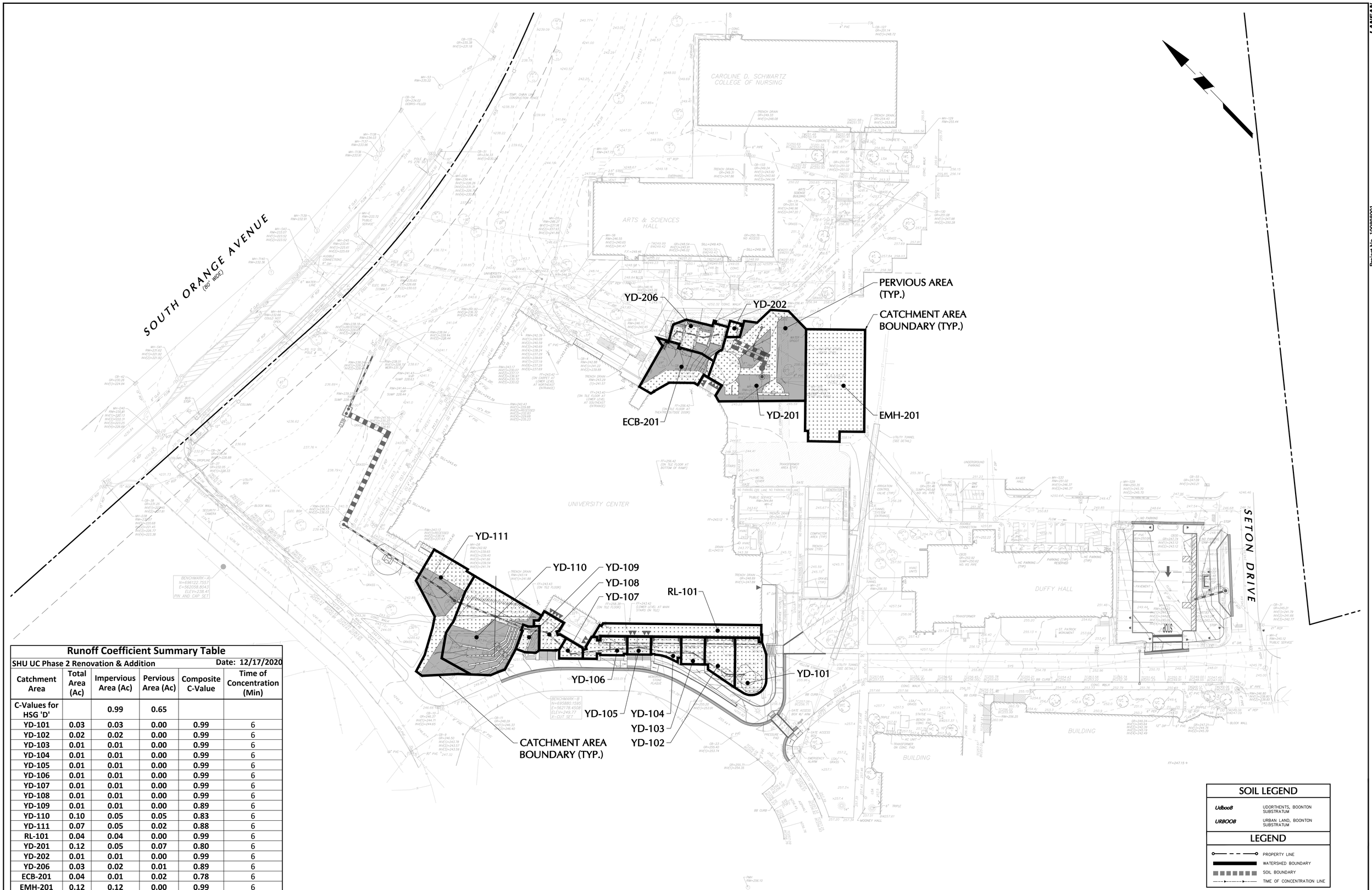
Drawing Title
PROPOSED WATERSHED PLAN

Project No.	Figure
100898001	CG113
Date: 12/17/2020	
Drawn By: BMW	
Checked By: JED	

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Project No. 100898001

Date: 12/17/2020 Time: 12:22 User: etriscari Style Table: Langan.stb Layout: CG111 Document Code: FG01-100898001-0501-CA104-0103



Runoff Coefficient Summary Table

SHU UC Phase 2 Renovation & Addition — Date: 12/17/2020

Catchment Area	Total Area (Ac)	Impervious Area (Ac)	Pervious Area (Ac)	Composite C-Value	Time of Concentration (Min)
C-Values for HSG 'D'		0.99	0.65		
YD-101	0.03	0.03	0.00	0.99	6
YD-102	0.02	0.02	0.00	0.99	6
YD-103	0.01	0.01	0.00	0.99	6
YD-104	0.01	0.01	0.00	0.99	6
YD-105	0.01	0.01	0.00	0.99	6
YD-106	0.01	0.01	0.00	0.99	6
YD-107	0.01	0.01	0.00	0.99	6
YD-108	0.01	0.01	0.00	0.99	6
YD-109	0.01	0.01	0.00	0.89	6
YD-110	0.10	0.05	0.05	0.83	6
YD-111	0.07	0.05	0.02	0.88	6
RL-101	0.04	0.04	0.00	0.99	6
YD-201	0.12	0.05	0.07	0.80	6
YD-202	0.01	0.01	0.00	0.99	6
YD-206	0.03	0.02	0.01	0.89	6
ECB-201	0.04	0.01	0.02	0.78	6
EMH-201	0.12	0.12	0.00	0.99	6

SOIL LEGEND

UdbooB	UDORTHENTS, BOONTON SUBSTRATUM
URBOOB	URBAN LAND, BOONTON SUBSTRATUM

LEGEND

- PROPERTY LINE
- WATERSHED BOUNDARY
- SOIL BOUNDARY
- TIME OF CONCENTRATION LINE

REFERENCE NOTES:

1. EXISTING SURVEY AND TOPOGRAPHIC INFORMATION OBTAINED FROM A PLAN TITLED "PARTIAL TOPOGRAPHIC SURVEY – SETON HALL PHASE 2" PREPARED BY LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES, INC. ON 15 DECEMBER 2020.
2. PROPOSED BUILDING FOOTPRINT OBTAINED ELECTRONICALLY FROM CCH ARHITECTS ON 15 DECEMBER 2020.
3. THE MERIDIAN OF THE SURVEY IS REFERENCED TO THE NEW JERSEY STATE PLANE COORDINATE SYSTEM NAD 83 (2011).
4. ELEVATIONS SHOWN ARE REFERENCED TO THE PLAN TITLED "UTILITY CLEARANCE SURVEY RESULTS, SETON HALL UNIVERSITY, SOUTH ORANGE, NJ PREPARED BY ENVIROSCAN, INC., DATED AUGUST 8, 2008".

30 0 15 30
SCALE IN FEET

Date	Description	No.
Revisions		

LANGAN
Langan Engineering and Environmental Services, Inc.
300 Kimball Drive
Parsippany, NJ 07054
T: 973.560.4900 F: 973.560.4901 www.langan.com
NJ Certificate of Authorization No. 24GA27996400

Project
UNIVERSITY CENTER PHASE 2 RENOVATION & ADDITION
SETON HALL UNIVERSITY
400 SOUTH ORANGE AVENUE
BLOCK No. 901, LOT No. 3
TOWNSHIP OF SOUTH ORANGE VILLAGE
ESSEX COUNTY NEW JERSEY

Drawing Title
INLET CATCHMENT AREA PLAN

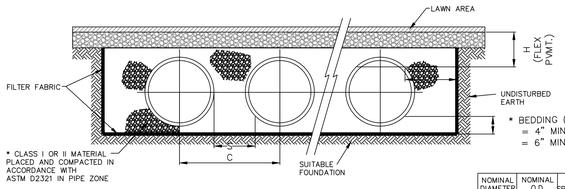
Project No. 100898001
Date 12/17/2020
Drawn By BMW
Checked By JED

Figure
CG114

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Project No. 100898001

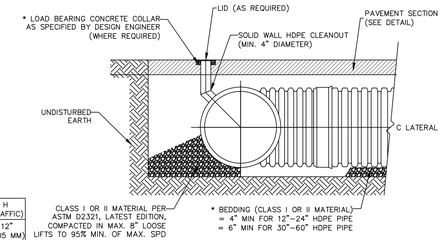
Date: 12/17/2020 Time: 12:23 User: etriscari Style Table: Langan.stb Layout: CG111 Document Code: FG01-100898001-0501-CA104-0104



NOMINAL DIAMETER	NOMINAL O.D.	TYPICAL SPACING "S"	TYPICAL SPACING "C"	TYPICAL SIDE WALL "X"	H (NON-TRAFFIC)	H (TRAFFIC)
36" (900 MM)	42" (1067 MM)	22" (559 MM)	63" (1600 MM)	18" (457 MM)	12" (305 MM)	12" (305 MM)
48" (1200 MM)	54" (1372 MM)	25" (635 MM)	78.5" (1994 MM)	18" (457 MM)	12" (305 MM)	24" (610 MM)

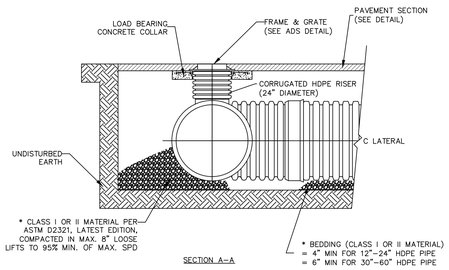
NOTES:

1. ALL REFERENCES TO CLASS I OR II MATERIAL ARE PER ASTM D2321 "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS" LATEST EDITION.
2. ALL DETENTION SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, LATEST EDITION AND THE MANUFACTURER'S PUBLISHED INSTALLATION GUIDELINES.
3. MEASURES SHOULD BE TAKEN TO PREVENT THE MIGRATION OF NATIVE FINES INTO THE BACKFILL MATERIAL, WHEN REQUIRED. SEE ASTM D2321.
4. FILTER FABRIC: A GEOTEXTILE FABRIC MAY BE USED AS SPECIFIED BY THE ENGINEER TO PREVENT THE MIGRATION OF FINES FROM THE NATIVE SOIL INTO THE SELECT BACKFILL MATERIAL.
5. FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER. AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.
6. BEDDING: SUITABLE MATERIAL SHALL BE CLASS I OR II. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. UNLESS OTHERWISE NOTED BY THE ENGINEER, MINIMUM BEDDING THICKNESS SHALL BE 4" FOR 4"–24"; 6" FOR 30"–60".
7. INITIAL BACKFILL: SUITABLE MATERIAL SHALL BE CLASS I OR II IN THE PIPE ZONE EXTENDING NOT LESS THAN 6" ABOVE CROWN OF PIPE. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.
8. MINIMUM COVER: MINIMUM COVER IS 12" UP TO 36" DIAMETER PIPE AND 24" OF COVER FOR 42" – 60" DIAMETER PIPE, MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOATATION.

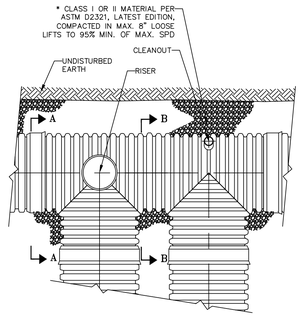


SECTION B–B

* CLASS I BACKFILL REQUIRED AROUND 60" DIAMETER FITTINGS
* LOAD BEARING CONCRETE COLLAR SHALL BE CONSTRUCTED IN TRAFFIC AREAS SUCH THAT THE LIVE LOAD IS TRANSMITTED TO THE SURROUNDING SOIL AND NOT DIRECTLY TO THE RISER.

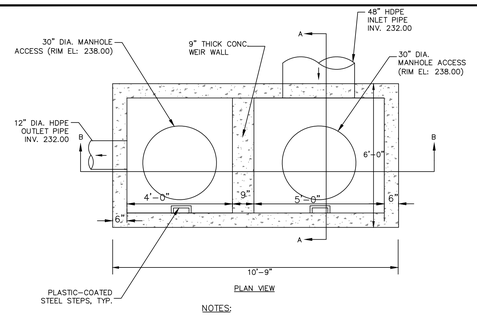


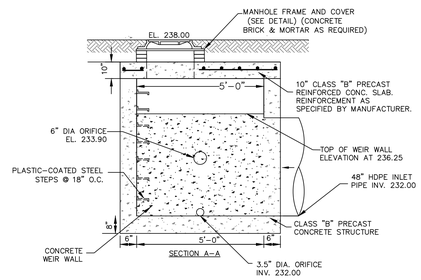
SECTION A–A

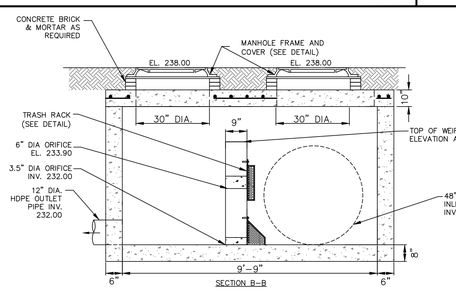


NOTE: DETAILS OBTAINED FROM ADS WEBSITE.

ADS DETENTION BASIN INSTALLATION LAYOUT





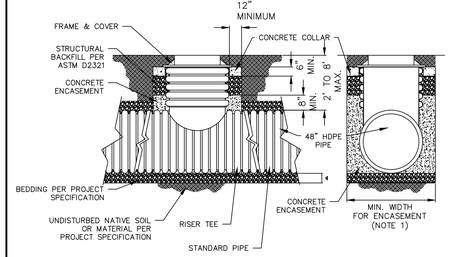


NOTES:

1. PRECAST OUTLET CONTROL STRUCTURE TO BE IN ACCORDANCE WITH THE LATEST ASTM DESIGNATION C–478. CONCRETE TO TEST TO 4,500 PSI @ 28 DAYS.
2. PROVIDE POLYPROPYLENE STEPS AT 18" O.C.
3. CONCRETE STRUCTURE TO BE DESIGNED TO AASHTO HS–20 LOADING.
4. SUBGRADE TO BE COMPACTED TO 95% PROCTOR DENSITY.
5. CONCRETE STRUCTURE REINFORCING TO MEET ASTM STANDARDS.
6. FIRST STEP NOT TO EXCEED 12 INCHES FROM THE TOP OF THE RIM.
7. PRECAST MANUFACTURER IS RESPONSIBLE FOR STRUCTURAL DESIGN OF ALL PROPOSED PRECAST STRUCTURES.
8. PROVIDE SHOP DRAWINGS FOR STRUCTURE AND APPURTENANCES FOR REVIEW.
9. EXTERIOR SURFACE OF STRUCTURE TO BE SEAL COATED WITH COAL TAR OR ASPHALTIC PITCH.

OUTLET CONTROL STRUCTURE-101

ADS MANHOLE RISER



NOTES:

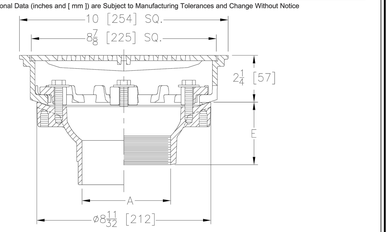
1. RECOMMENDED MINIMUM TRENCH WIDTH FOR ENCASEMENT AROUND RISER TEE = O.D. + 16". STANDARD PIPE INSTALLATION MAY REQUIRE A WIDER TRENCH. FOR MINIMUM TRENCH WIDTHS OF STANDARD PIPE REFERENCE THE DRAINAGE HANDBOOK
2. DETAIL OBTAINED FROM ADS WEBSITE.

ZURN Z158 SQUARE DECK DRAIN

Z158
10 [254] SQUARE TOP PROM-DECK DRAIN
W/ HEEL-PROOF GRATE & ROTATABLE FRAME

SPECIFICATION SHEET
TAG _____

Dimensional Data (inches and [mm]) are Subject to Manufacturing Tolerances and Change Without Notice



A Pipe Size In. [mm]	Approx. Wt. Lbs. [kg]	Grate Open Area Sq. In. [cm²]
2, 3, 4 [51, 76, 102]	20 [9]	21 [136]

ENGINEERING SPECIFICATION: ZURNZ158
10" [254mm] Square Top Prom-Deck drain, Dura-Coated cast iron body with rotatable square promenade frame with seepage openings, frame clamps and light duty heel-proof grate.

OPTIONS (Check/specify appropriate options)

PIPE SIZE	(Specify size/type) OUTLET	'E' BODY HT. DIM.
3, 4 [76, 102]	____ IC Inside Caulk	3-7/8 [98]
4 [102]	____ IP Threaded	3 [76]
3 [76]	____ IP Threaded	2- 3/4 [70]
2 [51]	____ IP Threaded	2- 7/16 [62]
2, 3, 4 [51, 76, 102]	____ NH No-Hub	4 [102]
2, 3, 4 [51, 76, 102]	____ NL Neo-Loc	3-13/16 [97]

PREFIXES
___ Z D.C.C.I. Body with Top*
___ ZB D.C.C.I. Body with Polished Bronze Top (Add 3/16 [5] to 2-1/4 [57] Dim & 5/8 [16] to 10 [254] Dim.)
___ ZN D.C.C.I. Body with Polished Nickel Bronze Top (Add 3/16 [5] to 2-1/4 [57] Dim & 5/8 [16] to 10 [254] Dim.)

SUFFIXES
___ -AR Acid Resistant Epoxy Coated Finish
___ -C Underdeck Clamp
___ -DG Duresist Grate
___ -DP Top-Set® Roof Deck Plate
___ -E 2 [51] High Static Extension
___ -EB Top-Set® Adjustable Extension Assembly
___ -G Galvanized Cast Iron
___ -SC Secondary Clamp Collar
___ -TC Neo-Loc Test Cap Gasket (2, 3, 4 [51, 76, 102] NL Bottom Outlet only)
___ -TS Top Secured with Slotted Screws
___ -VP Vandal-Proof Secured Top
___ -Y Sediment Bucket
___ -85 Stainless Steel Perforated Extension
___ -90 90° Threaded Side Outlet Body (2, 3, 4 [51, 76, 102])

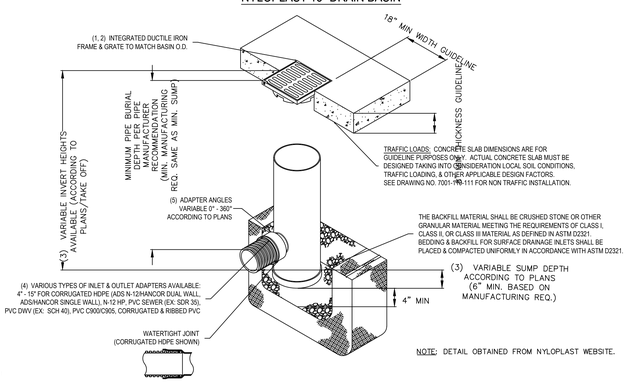
* Regularly furnished unless otherwise specified. **Note:** -DP and -90 option can not be specified together.

Zurn Industries, LLC | **Specification Drainage Operation**
1801 Pittsburgh Avenue, Erie, PA U.S.A. 16502 · Ph. 855-663-9876, Fax 814-454-7929
In Canada | **Zurn Industries Limited**
3544 Nashua Drive, Mississauga, Ontario L4V 1L2 · Ph. 905-405-8272, Fax 905-405-1292
www.zurn.com

Rev. L
Date: 09/25/2017
C.N. No. 137806
Prod. | Dwg. No. Z158

NYLOPLAST 15" DRAIN BASIN

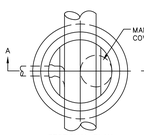
GRATE OPTIONS	LOAD RATING	PART #	DRAWING #
PEDESTRIAN	MEETS H-10	1599CGP	7001-110-207



1 - GRATES/SOLID COVER SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05, WITH THE EXCEPTION OF THE BRONZE GRATE.
2 - FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
3 - DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS. RISERS ARE NEEDED FOR BASINS OVER 84" DUE TO SHIPPING RESTRICTIONS. SEE DRAWING NO. 7001-110-005
4 - DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS N-12/HANCOR DUAL WALL), N-12 HP, & PVC SEWER.
5 - ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0° TO 360°. TO DETERMINE MINIMUM ANGLE BETWEEN ADAPTERS SEE DRAWING NO. 7001-110-012.

NOTE: DETAIL OBTAINED FROM NYLOPLAST WEBSITE.

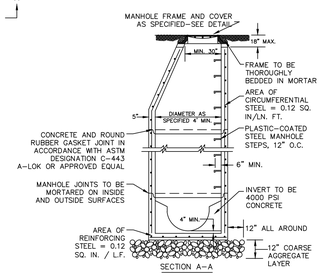
15" NYLOPLAST DRAIN BASIN



SECTIONAL PLAN

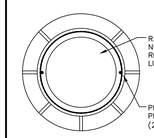
PIPE IN AND OUT OF MANHOLE TO BE BEDDED IN STONE, OR AS ORDERED BY ENGINEER.

CONSTRUCTION NOTES:
1. PRECAST MANHOLE SECTIONS TO BE IN ACCORDANCE WITH LATEST ASTM DESIGNATION C–478, MINIMUM COMPRESSION STRENGTH TO BE 4000 PSI.
2. FLEXIBLE RUBBER BOOT SHALL BE USED FOR CONNECTION OF PVC PIPE TO MANHOLE.
3. PRECAST CHANNELS SHALL NOT BE USED FOR BENDS GREATER THAN 45°. POURED CONCRETE LONG RADIUS CHANNELS SHALL BE CONSTRUCTED.
4. MANHOLE INSIDE DIAMETER SHALL BE 5 FT FOR 48" DIA. PIPE.

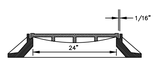


SECTION A–A

MANHOLE



PLAN – MANHOLE FRAME



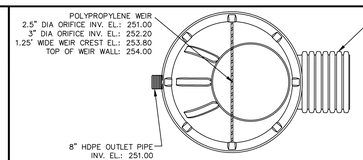
SECTION – MANHOLE FRAME

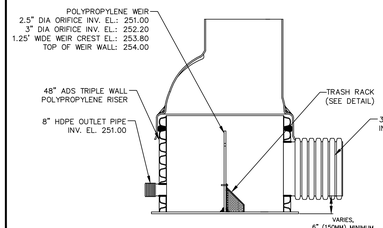
MANHOLE COVERS AND FRAMES SHALL BE:

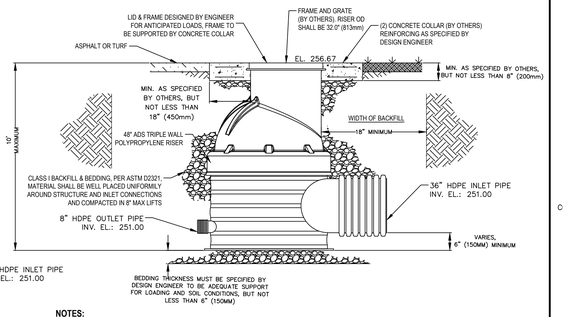
STANDARD (HEAVY TRAFFIC TYPE): CAMPBELL FOUNDRY COMPANY PATTERN NO. 1203, OR APPROVED EQUAL.

CONSTRUCTION NOTES:
1. MANHOLE FRAME AND COVER CASTINGS SHALL CONFORM TO THE LATEST ASTM A–48 CLASS 30 SPECIFICATION.
2. FRAME AND COVERS SHALL BE COATED WITH TWO COATS OF ASPHALTUM VARNISH.

MANHOLE FRAME & COVER



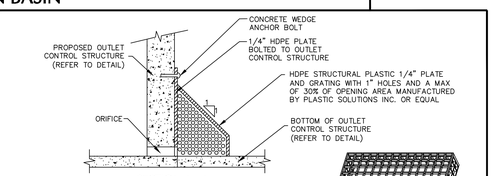




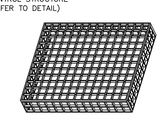
NOTES:
1 - FOR BURIAL DEPTHS GREATER THAN 10', OR WHERE GROUND WATER WILL BE ENCOUNTERED, CONTACT ADS APPLICAITONS
2 - AVOID CONSTRUCTION LOADING ON DOME AND STRUCUTRE PRIOR TO CONCRETE COLLAR INSTALLATION

NOTE: DETAIL OBTAINED FROM NYLOPLAST WEBSITE.

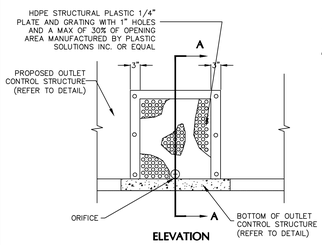
OUTLET CONTROL STRUCTURE 201



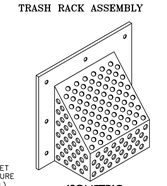
SECTION A - A
NOT TO SCALE



TRASH RACK ASSEMBLY



ELEVATION



ISOMETRIC

OUTLET CONTROL STRUCTURE TRASH RACK

Date	Description	No.
	Revisions	

Leonard D. Savino 12/17/2020
Signature Date
LEONARD D. SAVINO
PROFESSIONAL ENGINEER NJ LIC. No. 39238

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NJ Certificate of Authorization No. 24GA27996400

Project
UNIVERSITY CENTER PHASE 2 RENOVATION & ADDITION
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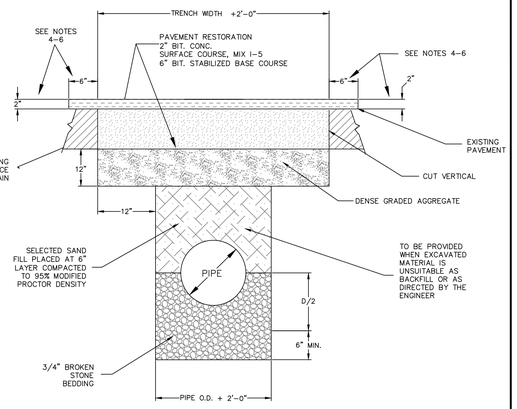
Drawing Title
CONSTRUCTION DETAILS II

Project No.	Drawing No.
100898001	CS502
Date: 12/17/2020	
Drawn By: BMW	
Checked By: JED	

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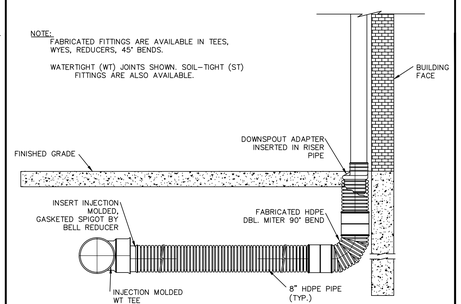
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LANGAN
Project No. 100898001

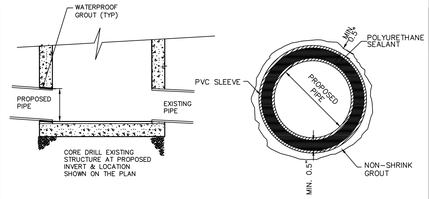


NOTE
1. SUBBASE SHALL BE FIRM AND APPROVED BY THE ENGINEER OR HIS REPRESENTATIVE PRIOR TO POURING.
2. ALL CONSTRUCTION METHODS AND MATERIALS SHALL CONFORM TO LATEST NJDOT STANDARDS, SPECIFICATIONS AND INSPECTIONS.
3. CONTRACTOR MUST PROVIDE SQUARE AND UNIFORM PAVEMENT CUT PRIOR TO PAVEMENT REPLACEMENT.
4. REMOVE: 6" WIDTH AND 2" THICK TOP SURFACE LAYER BEYOND TRENCH WIDTH.
5. CONSTRUCT: TACK COAT ALONG VERTICAL AND HORIZONTAL SURFACES.
6. CONSTRUCT: 2" THICK BITUMINOUS CONCRETE SURFACE COURSE AND ROLL IT PROPERLY.
7. BACKFILL BENEATH PAVEMENT SHOULD BE DENSE GRADED AGGREGATE.

PIPE INSTALLATION AND PAVEMENT RESTORATION

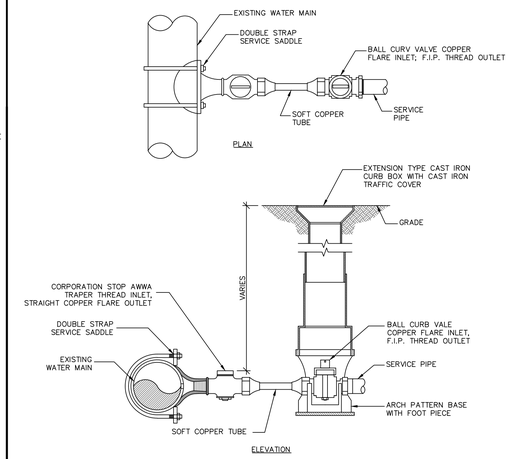


DOWNSPOUT CONNECTION

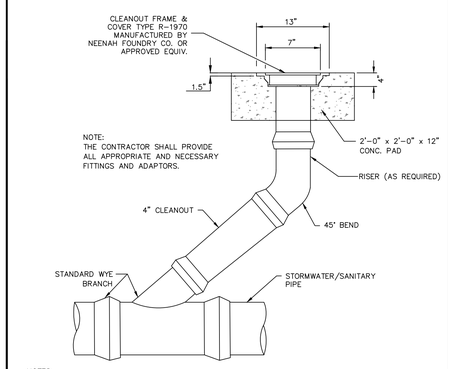


NOTES:
1. CORE-DRILL OPENING IN EXISTING WALL TO ACCOMMODATE PVC SLEEVE WITH MIN. 0.5" CLEARANCE ALL AROUND.
2. SET SLEEVE IN POSITION USING NON-SHRINK GROUT TO ASTM 1107 (SIKA GROUT 212, MANUFACTURED BY SIKA, OR APPROVED EQUIVALENT).
3. PRIOR TO GROUT SETTING, SET UTILITY IN POSITION.
4. SEAL USING POLYURETHANE SEALANT (SIKA FLEX-2C-NF/SL SEALANT, OR APPROVED EQUIVALENT), APPLIED FROM EITHER END TO FILL SLEEVE.
5. CONTROL WATER LEVELS AND KEEP CONNECTION DRY FROM INITIAL CORE-DRILLING TO END OF RECOMMENDED SET TIME OF POLYURETHANE SEALANT.

UTILITY CONNECTION TO EXISTING STRUCTURE

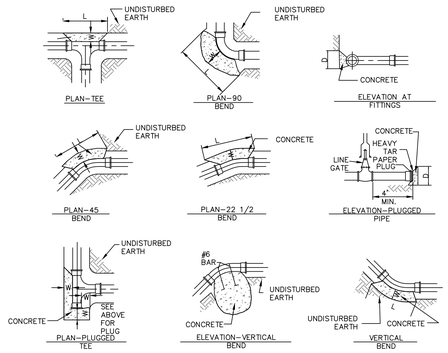


WATER MAIN CONNECTION



NOTES:
1. FOR USE IN LAWN AND LANDSCAPE AREAS.
2. REFER TO MEP DRAWINGS FOR CLEANOUTS WITHIN SIDEWALKS.

CLEAN OUT



THRUST BLOCK SCHEDULE

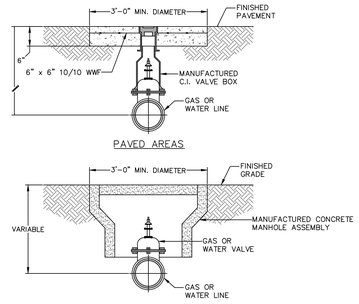
PIPE	TEE		22 1/2		45		90		
SIZE	L	D	L	D	L	D	L	D	W
6"	18"	15"	12"	15"	12"	15"	15"	15"	21"
8"	2'	18"	18"	12"	18"	12"	2'	18"	2'
12"	3'	2'	2'	12"	2'	12"	3'	2'	28"
16"	4'	2.5'	2'	12"	2.33	15"	4'	2.5'	31"
20"	5.25	3'	2'	18"	3'	2'	5.25	3'	33"
24"	7.5'	3'	3'	18"	4'	2.5'	7.5'	3'	3'

BASIS:
2,500 LB/SQ.FT. SOIL RESISTANCE 100 PSI
WATER PRESSURE CORRECTION FACTORS FOR OTHER SOILS:

SOFT CLAY	4
SAND	2
SAND & GRAVEL	1.33
SHALE	0.4

NOTE:
1. IF SOFT MATERIALS ARE ENCOUNTERED, THE THRUST BLOCKS SIZES SHALL BE ADJUSTED ACCORDINGLY.
2. CONCRETE TO BE 4000 PSI.

WATER MAIN THRUST BLOCKS



NOTE:
WORD "WATER" OR "GAS" CAST INTO CENTER OF CAST IRON CAP OR CONCRETE LID.

WATER VALVE BOX

Date	Description	No.
Revisions		

Signature — Date 12/17/2020
LEONARD D. SAVINO
PROFESSIONAL ENGINEER NJ LIC. No. 39238

LANGAN
Langan Engineering and Environmental Services, Inc.
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NJ Certificate of Authorization No. 24GA27996400

Project
UNIVERSITY CENTER PHASE 2 RENOVATION & ADDITION
SETON HALL UNIVERSITY
400 SOUTH ORANGE AVENUE
BLOCK No. 901, LOT No. 3
TOWNSHIP OF SOUTH ORANGE VILLAGE
ESSEX COUNTY NEW JERSEY

Drawing Title
CONSTRUCTION DETAILS III

Project No. 100898001
Date 12/17/2020
Drawn By BMW
Checked By JED

Drawing No. CS503

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Date: 12/17/2020 Time: 11:55 User: etriscari Style Table: Langan.stb Layout: Layout1 Document Code: 100898001-0501-CS501-0103

LANGAN
Project No. 100898001

APPENDIX A

EXISTING STORMWATER DISCHARGE CALCULATIONS

CURVE NUMBER (CN) AND TIME OF CONCENTRATION (Tc) CALCULATIONS

LANGAN

Project **New University Center - Seton Hall University** By **JF** Date **5/10/2016**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **5/10/2016**

Circle one: (Present) Developed **Existing Watershed A - Pervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
D	**Open Space (Good Cond.)**	**80**			**1.15**	**92.00**

1 Use only one CN source per line

Totals = **1.15** **92.00**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{92.00}{1.15} =$ 80.00 Use CN = **80**

Project **New University Center - Seton Hall University** By **JF** Date **5/10/2016**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **5/10/2016**

Circle one: (Present) Developed **Existing Watershed A - Impervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
	Impervious	**98**			**0.07**	**6.86**

1 Use only one CN source per line

Totals = **0.07** **6.86**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{6.86}{0.07} =$ 98.00 Use CN = **98**

Project **New University Center - Seton Hall University** By **JF** Date **5/10/2016**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **5/10/2016**

Circle one: (Present) Developed **Existing Watershed B - Pervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
D	**Open Space (Good Cond.)**	**80**			**0.15**	**12.00**

1 Use only one CN source per line

Totals = **0.15** **12.00**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{12.00}{0.15} =$ 80.00 Use CN = **80**

Project **New University Center - Seton Hall University** By **JF** Date **5/10/2016**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **5/10/2016**

Circle one: (Present) Developed **Existing Watershed B - Impervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
	Impervious	**98**			**1.87**	**183.26**

1 Use only one CN source per line

Totals = **1.87** **183.26**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{183.26}{1.87} =$ 98.00 Use CN = **98**

Project **New University Center - Seton Hall University** By **JF** Date **5/10/2016**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **5/10/2016**

Circle one: (Present) Developed **Existing Watershed C - Pervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
D	**Open Space (Good Cond.)**	**80**			**0.10**	**8.00**
1 Use only one CN source per line				Totals =	**0.10**	**8.00**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{8.00}{0.10} =$ 80.00 Use CN = **80**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: (Present) Developed **Existing Watershed C - Impervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
	Impervious	**98**			**0.14**	**13.72**

1 Use only one CN source per line

Totals = **0.14** **13.72**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{13.72}{0.14} =$ 98.00 Use CN = **98**

Project **New University Center - Seton Hall University** By **SK** Date **9/29/2016**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **9/29/2016**

Circle one: (Present) Developed **Existing Watershed D - Pervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
D	**Open Space (Good Cond.)**	**80**			**0.48**	**38.40**

1 Use only one CN source per line

Totals = **0.48** **38.40**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{38.40}{0.48} =$ 80.00 Use CN = **80**

Project **New University Center - Seton Hall University** By **JF** Date **5/10/2016**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **5/10/2016**

Circle one: (Present) Developed **Existing Watershed D - Impervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
	Impervious	**98**			**0.01**	**0.98**

1 Use only one CN source per line

Totals = **0.01** **0.98**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{0.98}{0.01} =$ 98.00 Use CN = **98**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: (Present) Developed **Existing Watershed E - Pervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
D	**Open Space (Good Cond.)**	**80**			**0.30**	**24.00**

1 Use only one CN source per line

Totals = **0.30** **24.00**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{24.00}{0.30} =$ 80.00 Use CN = **80**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: (Present) Developed **Existing Watershed E - Impervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
	Impervious	**98**			**0.12**	**11.76**

1 Use only one CN source per line

Totals = **0.12** **11.76**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{11.76}{0.12} =$ 98.00 Use CN = **98**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: (Present) Developed **Existing Watershed F - Pervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
D	**Open Space (Good Cond.)**	**80**			**0.03**	**2.40**

1 Use only one CN source per line

Totals = **0.03** **2.40**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{2.40}{0.03} =$ 80.00 Use CN = **80**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: (Present) Developed **Existing Watershed D - Impervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
	Impervious	**98**			**0.24**	**23.52**

1 Use only one CN source per line

Totals = **0.24** **23.52**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{23.52}{0.24} =$ 98.00 Use CN = **98**

Project	**New University Center - Seton Hall**	By	**DJA**	Date	**12/30/2016**
Location	**South Orange, New Jersey (100300401)**	Checked	**JF**	Date	**12/30/2016**

Circle One: (Present) Developed

Circle One: (T_c) T_t through subarea **Exsiting Watershed A**

Sheet flow (Applicable to T_c Only)		Segment ID	A1-A2			
1. Surface description (table 3-1)			Grass			
2. Manning's roughness coeff., n (table 3-1)			**0.150**			
3. Flow Length, L (total L $\leq$ 150 ft)		ft	**150**			
4. Two-yr 24-hr rainfall, P_2		in	**3.44**			
5. Land slope, s		ft/ft	**0.036**			
6. $T_t = \frac{0.007(nL)^{0.8}}{P_2^{0.5} s^{0.4}}$	Compute T_t	hr	**0.172**			**0.172**

Shallow concentrated flow		Segment ID	A2-A3		A3-A4		
7. Surface description (paved or unpaved)			Unpaved		Paved		
8. Flow length, L		ft	**169**		**70**		
9. Watercourse slope, s		ft/ft	**0.05**		**0.024**		
10. Average velocity, V (figure 3-1)		ft/s	**3.6**		**3.2**		
11. $T_t = \frac{L}{3600\ V}$	Compute T_t	hr	**0.013**	+	**0.006**		**0.019**

Channel flow		Segment ID	A4-A5		A5-A6				
12. Cross sectional flow area, a		ft^2	**1.23**		**1.77**				
13. Wetted perimeter, p_w		ft	**3.93**		**4.71**				
14. Hydraulic radius, r $r = \frac{a}{p_w}$	Compute r	ft	**0.31**		**0.38**				
15. Channel slope, s		ft/ft	**0.015**		**0.01**				
16. Manning's roughness coeff., n			**0.013**		**0.013**				
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$	Compute V	ft/s	**6.47**		**5.97**				
18. Flow length, L		ft	**15**		**66**				
19. $T_t = \frac{L}{3600\ V}$	Compute T_t	hr	**0.001**	+	**0.003**	+		=	**0.004**

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)	**0.195**	HR
	12	MIN
USE MINIMUM TC OF	**12**	MIN

Project	**New University Center - Seton Hall**	By	**DJA**	Date	**12/30/2016**
Location	**South Orange, New Jersey (100300401)**	Checked	**JF**	Date	**12/30/2016**

Circle One: (Present) Developed

Circle One: (T_c) T_t through subarea **Exsiting Watershed C**

Sheet flow (Applicable to T_c Only)		Segment ID	C1-C2				
1. Surface description (table 3-1)			Grass				
2. Manning's roughness coeff., n (table 3-1)			**0.150**				
3. Flow Length, L (total L ≤ 150 ft)		ft	**113**				
4. Two-yr 24-hr rainfall, P_2		in	**3.44**				
5. Land slope, s		ft/ft	**0.020**				
6. $T_t = \frac{0.007(nL)^{0.8}}{P_2^{0.5} s^{0.4}}$	Compute T_t	hr	**0.174**				**0.174**

Shallow concentrated flow		Segment ID	C2-C3				
7. Surface description (paved or unpaved)			Paved				
8. Flow length, L		ft	**187**				
9. Watercourse slope, s		ft/ft	**0.05**				
10. Average velocity, V (figure 3-1)		ft/s	**4.6**				
11. $T_t = \frac{L}{3600\ V}$	Compute T_t	hr	**0.011**	+			**0.011**

Channel flow		Segment ID	C3-C4	C4-C5	C5-C6				
12. Cross sectional flow area, a		ft^2	**0.35**	**0.55**	**1.23**				
13. Wetted perimeter, p_w		ft	**2.09**	**2.62**	**3.93**				
14. Hydraulic radius, r	$r = \frac{a}{p_w}$ Compute r	ft	**0.17**	**0.21**	**0.31**				
15. Channel slope, s		ft/ft	**0.023**	**0.048**	**0.017**				
16. Manning's roughness coeff., n			**0.009**	**0.013**	**0.013**				
17. $V = \frac{1.49\ r^{2/3} s^{1/2}}{n}$	Compute V	ft/s	**7.61**	**8.87**	**6.89**				
18. Flow length, L		ft	**47**	**333**	**39**				
19. $T_t = \frac{L}{3600\ V}$	Compute T_t	hr	**0.002**	+ **0.010**	+ **0.0016**	+	=	**0.014**	

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)	**0.199**	HR
	12	MIN
USE MINIMUM TC OF	**12**	MIN

Project	New University Center - Seton Hall	By	DJA	Date	12/30/2016
Location	South Orange, New Jersey (100300401)	Checked	JF	Date	12/30/2016

Circle One: (Present) Developed

Circle One: (T_c) T_t through subarea **Exsiting Watershed D**

Sheet flow (Applicable to T_c Only)		Segment ID	D1-D2				
1. Surface description (table 3-1)			Grass				
2. Manning's roughness coeff., n (table 3-1)			0.150				
3. Flow Length, L (total L ≤ 150 ft)		ft	150				
4. Two-yr 24-hr rainfall, P_2		in	3.44				
5. Land slope, s		ft/ft	0.100				
6. $T_t = \frac{0.007(nL)^{0.8}}{P_2^{0.5} s^{0.4}}$	Compute T_t	hr	0.114				0.114

Shallow concentrated flow		Segment ID	D2-D3				
7. Surface description (paved or unpaved)			Paved				
8. Flow length, L		ft	326				
9. Watercourse slope, s		ft/ft	0.013				
10. Average velocity, V (figure 3-1)		ft/s	2.3				
11. $T_t = \frac{L}{3600\ V}$	Compute T_t	hr	0.039	+			0.039

Channel flow		Segment ID	D3-D4	D4-D5				
12. Cross sectional flow area, a		ft^2	1.23	1.77				
13. Wetted perimeter, p_w		ft	3.93	4.71				
14. Hydraulic radius, r	$r = \frac{a}{p_w}$ Compute r	ft	0.31	0.38				
15. Channel slope, s		ft/ft	0.015	0.01				
16. Manning's roughness coeff., n			0.013	0.013				
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$	Compute V	ft/s	6.47	5.97				
18. Flow length, L		ft	15	66				
19. $T_t = \frac{L}{3600\ V}$	Compute T_t	hr	0.001	+ 0.003	+	+	=	0.004

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)	0.158	HR
	9	MIN
USE MINIMUM TC OF	9	MIN

Project	**New University Center - Seton Hall**	By	**DJA**	Date	**12/30/2016**
Location	**South Orange, New Jersey (100300401)**	Checked	**JF**	Date	**12/30/2016**

Circle One: (Present) Developed

Circle One: (T_c) T_t through subarea **Exsiting Watershed E**

Sheet flow (Applicable to T_c Only)		Segment ID	E1-E2				
1. Surface description (table 3-1)			Grass				
2. Manning's roughness coeff., n (table 3-1)			**0.150**				
3. Flow Length, L (total L ≤ 150 ft)		ft	**150**				
4. Two-yr 24-hr rainfall, P_2		in	**3.44**				
5. Land slope, s		ft/ft	**0.060**				
6. $T_t = \frac{0.007(nL)^{0.8}}{P_2^{0.5} s^{0.4}}$	Compute T_t	hr	**0.140**				**0.140**

Shallow concentrated flow		Segment ID	E2-E3				
7. Surface description (paved or unpaved)			Unpaved				
8. Flow length, L		ft	**95**				
9. Watercourse slope, s		ft/ft	**0.07**				
10. Average velocity, V (figure 3-1)		ft/s	**4.2**				
11. $T_t = \frac{L}{3600\ V}$	Compute T_t	hr	**0.006**	+			**0.006**

Channel flow		Segment ID	E3-E4	E4-E5	E5-E6	E6-E7		
12. Cross sectional flow area, a		ft^2	**0.35**	**3.14**	**1.77**	**1.77**		
13. Wetted perimeter, p_w		ft	**2.09**	**6.28**	**4.71**	**4.71**		
14. Hydraulic radius, r	$r = \frac{a}{p_w}$ Compute r	ft	**0.17**	**0.50**	**0.38**	**0.38**		
15. Channel slope, s		ft/ft	**0.021**	**0.021**	**0.021**	**0.01**		
16. Manning's roughness coeff., n			**0.013**	**0.013**	**0.013**	**0.013**		
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$	Compute V	ft/s	**5.04**	**10.46**	**8.65**	**5.97**		
18. Flow length, L		ft	**107**	**184**	**159**	**66**		
19. $T_t = \frac{L}{3600\ V}$	Compute T_t	hr	**0.006**	+ **0.005**	+ **0.0051**	+ **0.003072**	=	**0.019**
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)								**0.166** HR
								10 MIN
							USE MINIMUM TC OF	**10** MIN

EXISTING RUNOFF HYDROGRAPHS

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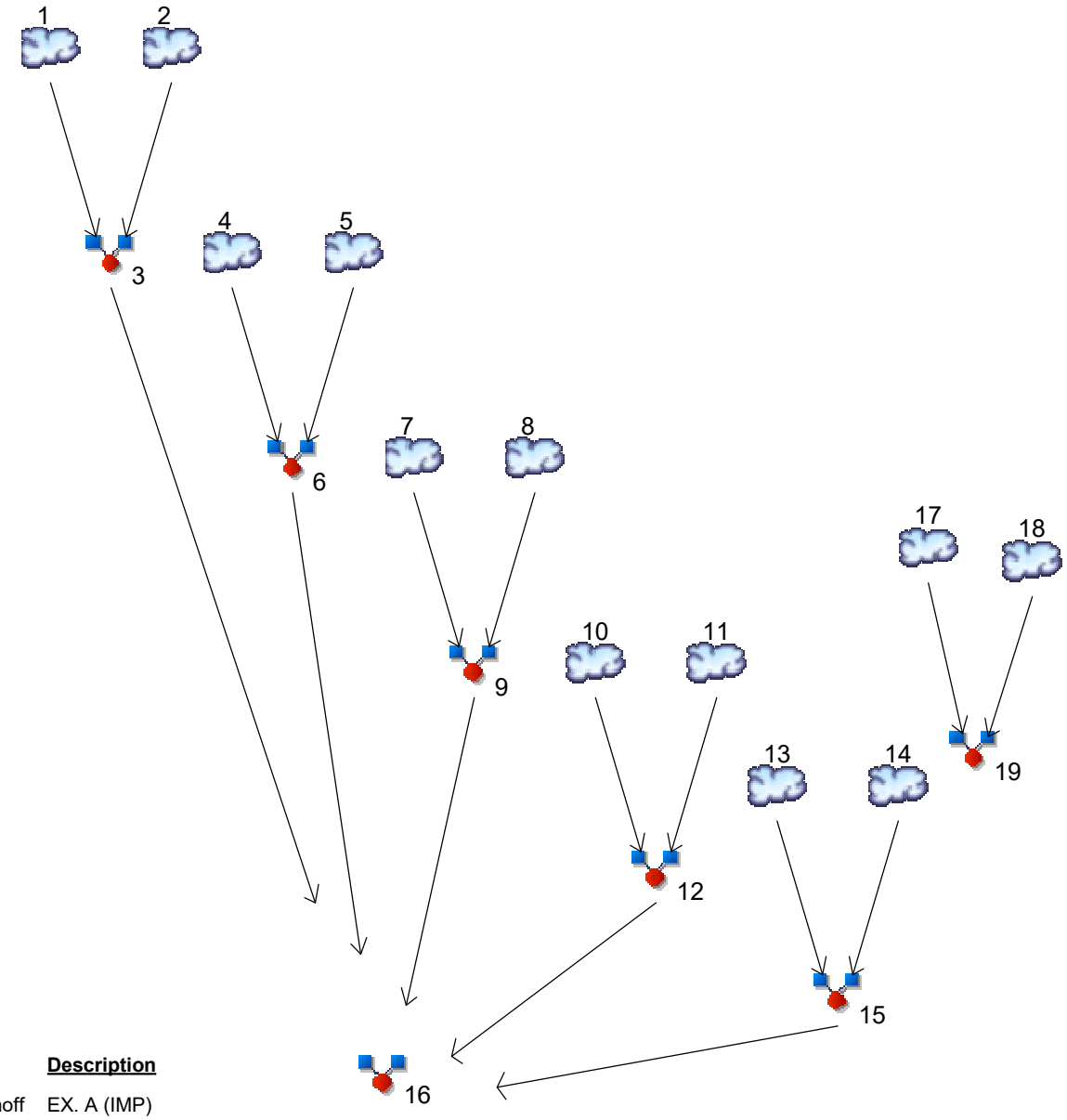
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Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	EX. A (IMP)
2	SCS Runoff	EX. A (PER)
3	Combine	EX. WSD A
4	SCS Runoff	EX. B (IMP)
5	SCS Runoff	EX. B (PER)
6	Combine	EX. WSD B
7	SCS Runoff	EX. C (IMP)
8	SCS Runoff	EX. C (PER)
9	Combine	EX. WSD C
10	SCS Runoff	EX. D (IMP)
11	SCS Runoff	EX. D (PER)
12	Combine	EX. WSD D
13	SCS Runoff	EX. E (IMP)
14	SCS Runoff	EX. E (PER)
15	Combine	EX. WSD E
16	Combine	AP-1
17	SCS Runoff	EX. F (IMP)
18	SCS Runoff	EX. F (PER)
19	Combine	A.P-2

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)							Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	-------	0.190	-------	-------	0.291	0.359	-------	0.484	EX. A (IMP)
2	SCS Runoff	------	-------	1.724	-------	-------	3.371	4.542	-------	6.694	EX. A (PER)
3	Combine	1, 2	-------	1.914	-------	-------	3.661	4.901	-------	7.177	EX. WSD A
4	SCS Runoff	------	-------	6.470	-------	-------	9.883	12.22	-------	16.45	EX. B (IMP)
5	SCS Runoff	------	-------	0.251	-------	-------	0.490	0.660	-------	0.972	EX. B (PER)
6	Combine	4, 5	-------	6.693	-------	-------	10.33	12.82	-------	17.34	EX. WSD B
7	SCS Runoff	------	-------	0.484	-------	-------	0.740	0.915	-------	1.232	EX. C (IMP)
8	SCS Runoff	------	-------	0.150	-------	-------	0.293	0.395	-------	0.582	EX. C (PER)
9	Combine	7, 8	-------	0.608	-------	-------	0.989	1.254	-------	1.738	EX. WSD C
10	SCS Runoff	------	-------	0.030	-------	-------	0.046	0.057	-------	0.077	EX. D (IMP)
11	SCS Runoff	------	-------	0.804	-------	-------	1.569	2.112	-------	3.110	EX. D (PER)
12	Combine	10, 11	-------	0.834	-------	-------	1.615	2.169	-------	3.186	EX. WSD D
13	SCS Runoff	------	-------	0.415	-------	-------	0.634	0.784	-------	1.056	EX. E (IMP)
14	SCS Runoff	------	-------	0.502	-------	-------	0.980	1.320	-------	1.944	EX. E (PER)
15	Combine	13, 14	-------	0.890	-------	-------	1.576	2.058	-------	2.942	EX. WSD E
16	Combine	3, 6, 9, 12, 15	-------	10.59	-------	-------	17.59	22.47	-------	31.41	AP-1
17	SCS Runoff	------	-------	0.830	-------	-------	1.268	1.568	-------	2.112	EX. F (IMP)
18	SCS Runoff	------	-------	0.058	-------	-------	0.112	0.151	-------	0.222	EX. F (PER)
19	Combine	17, 18	-------	0.887	-------	-------	1.380	1.719	-------	2.334	A.P-2

2-YEAR STORM CALCULATIONS

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

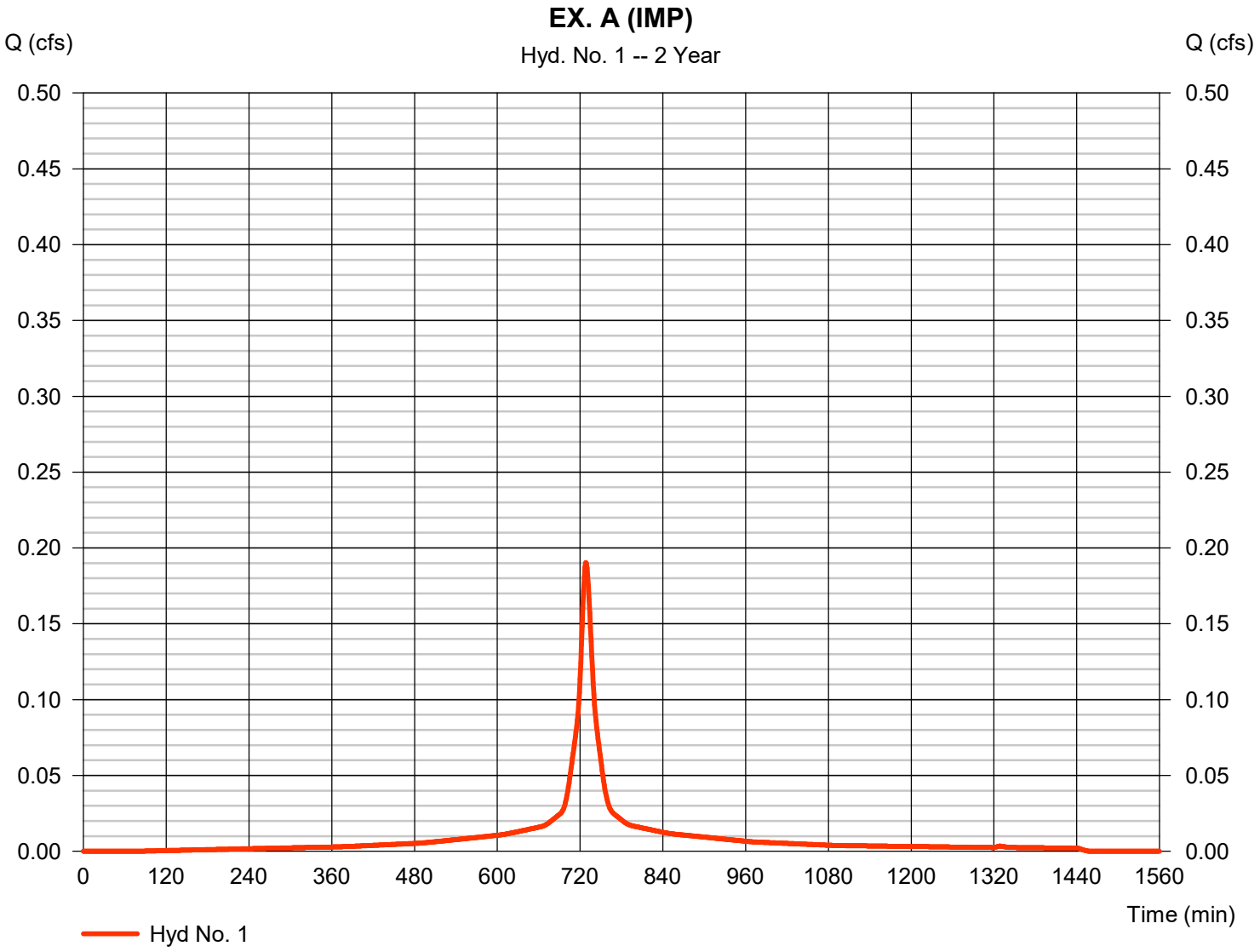
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.190	1	728	802	------	------	------	EX. A (IMP)
2	SCS Runoff	1.724	1	729	6,529	------	------	------	EX. A (PER)
3	Combine	1.914	1	729	7,331	1, 2	------	------	EX. WSD A
4	SCS Runoff	6.470	1	724	22,447	------	------	------	EX. B (IMP)
5	SCS Runoff	0.251	1	727	865	------	------	------	EX. B (PER)
6	Combine	6.693	1	724	23,312	4, 5	------	------	EX. WSD B
7	SCS Runoff	0.484	1	724	1,681	------	------	------	EX. C (IMP)
8	SCS Runoff	0.150	1	729	568	------	------	------	EX. C (PER)
9	Combine	0.608	1	725	2,248	7, 8	------	------	EX. WSD C
10	SCS Runoff	0.030	1	726	116	------	------	------	EX. D (IMP)
11	SCS Runoff	0.804	1	727	2,768	------	------	------	EX. D (PER)
12	Combine	0.834	1	727	2,885	10, 11	------	------	EX. WSD D
13	SCS Runoff	0.415	1	724	1,440	------	------	------	EX. E (IMP)
14	SCS Runoff	0.502	1	727	1,730	------	------	------	EX. E (PER)
15	Combine	0.890	1	726	3,171	13, 14	------	------	EX. WSD E
16	Combine	10.59	1	725	38,948	3, 6, 9, 12, 15	------	------	AP-1
17	SCS Runoff	0.830	1	724	2,881	------	------	------	EX. F (IMP)
18	SCS Runoff	0.058	1	725	178	------	------	------	EX. F (PER)
19	Combine	0.887	1	724	3,059	17, 18	------	------	A.P-2

Hydrograph Report

Hyd. No. 1

EX. A (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.190 cfs
Storm frequency	=	2 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	802 cuft
Drainage area	=	0.070 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

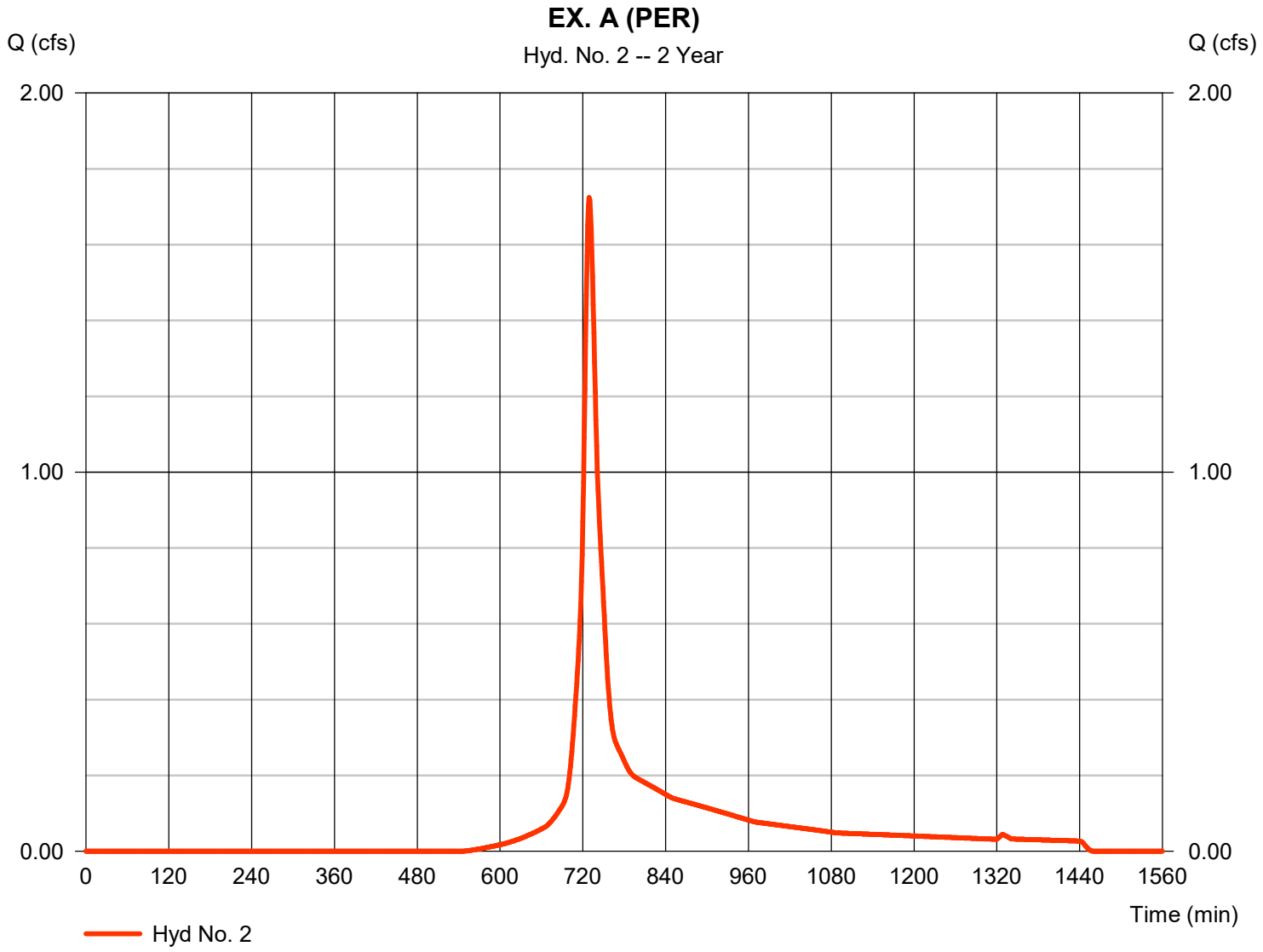


Hydrograph Report

Hyd. No. 2

EX. A (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.724 cfs
Storm frequency	=	2 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	6,529 cuft
Drainage area	=	1.150 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

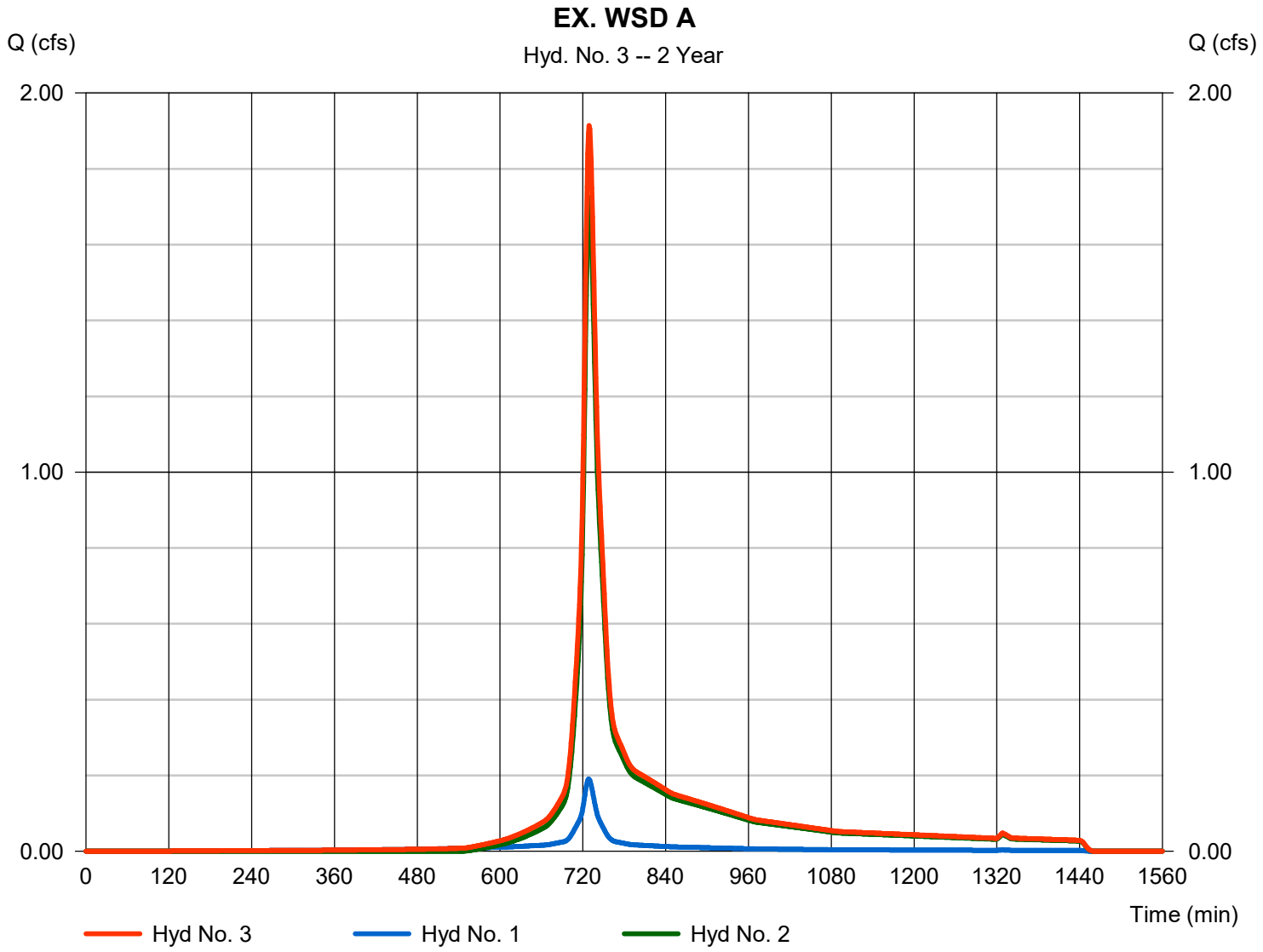


Hydrograph Report

Hyd. No. 3

EX. WSD A

Hydrograph type	= Combine	Peak discharge	= 1.914 cfs
Storm frequency	= 2 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 7,331 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 1.220 ac

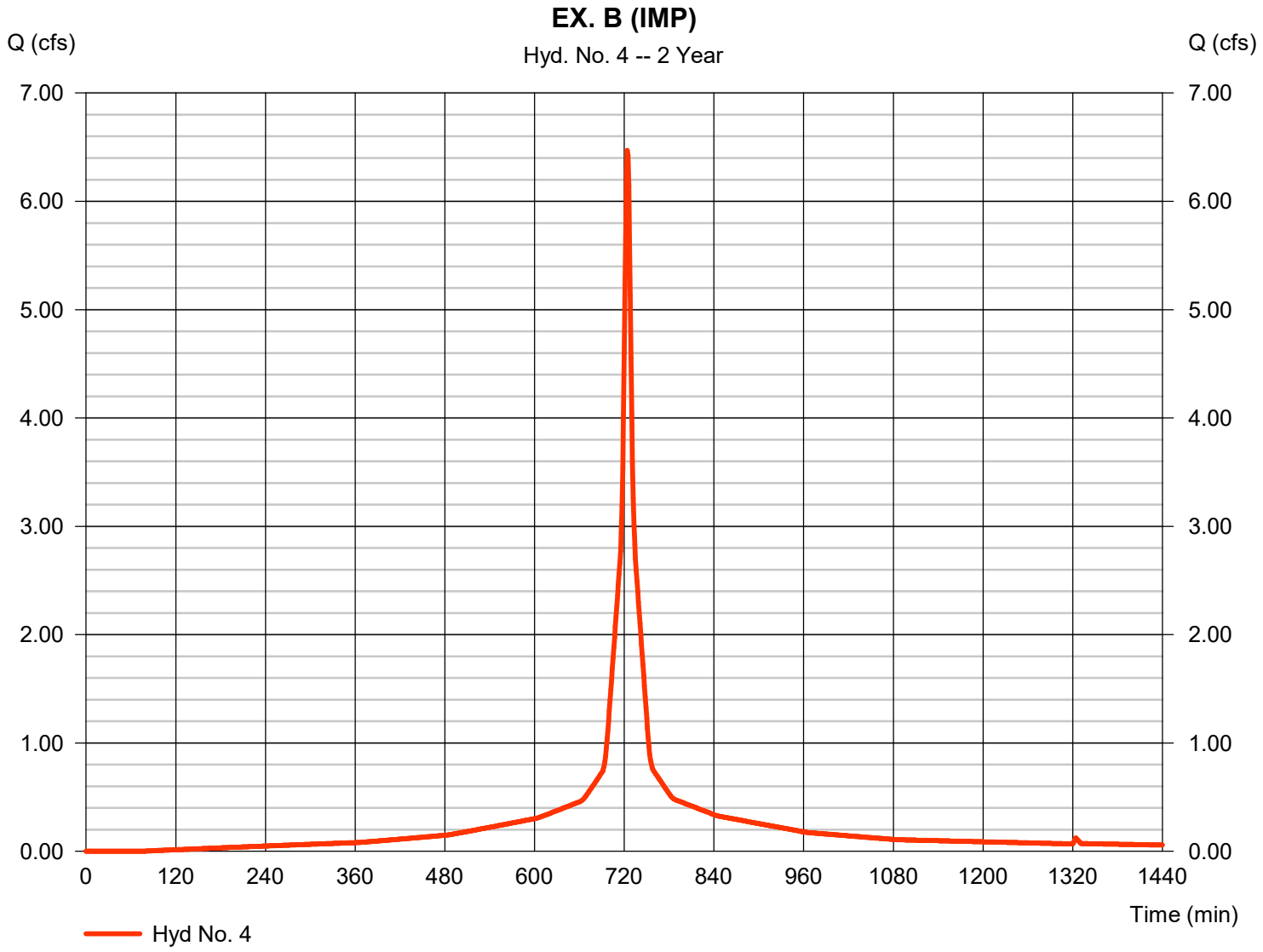


Hydrograph Report

Hyd. No. 4

EX. B (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.470 cfs
Storm frequency	=	2 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	22,447 cuft
Drainage area	=	1.870 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

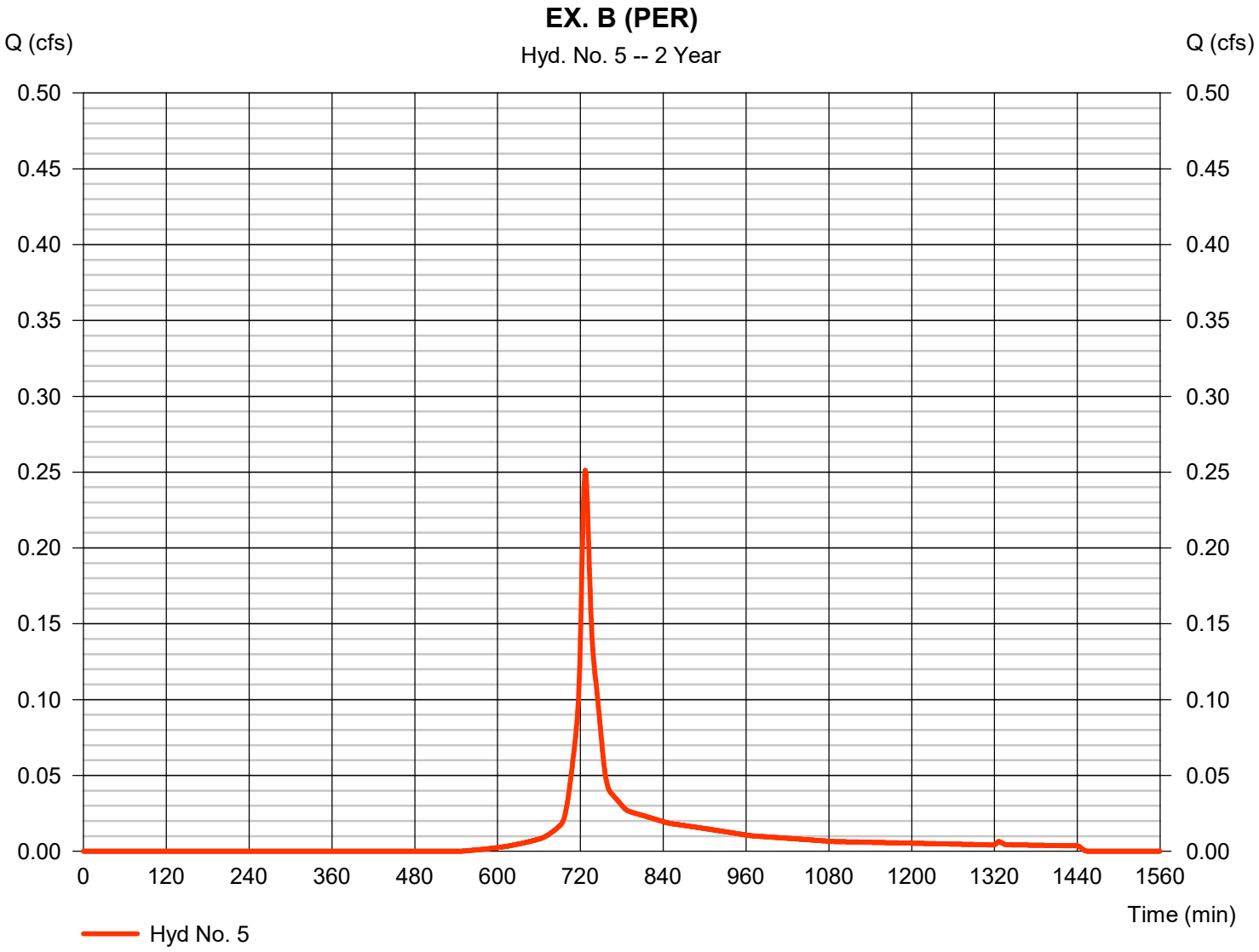


Hydrograph Report

Hyd. No. 5

EX. B (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.251 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	865 cuft
Drainage area	=	0.150 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

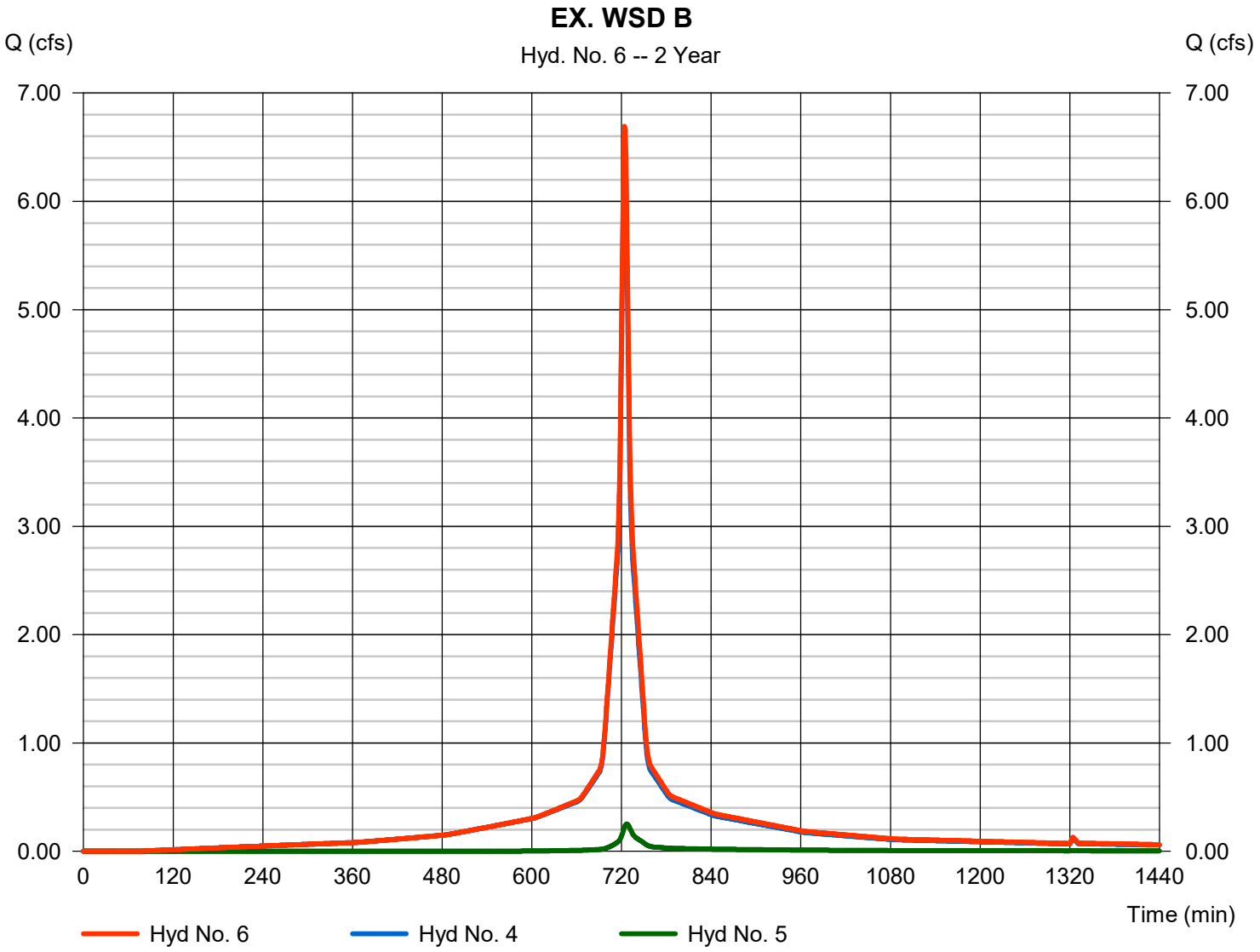


Hydrograph Report

Hyd. No. 6

EX. WSD B

Hydrograph type	=	Combine	Peak discharge	=	6.693 cfs
Storm frequency	=	2 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	23,312 cuft
Inflow hyds.	=	4, 5	Contrib. drain. area	=	2.020 ac

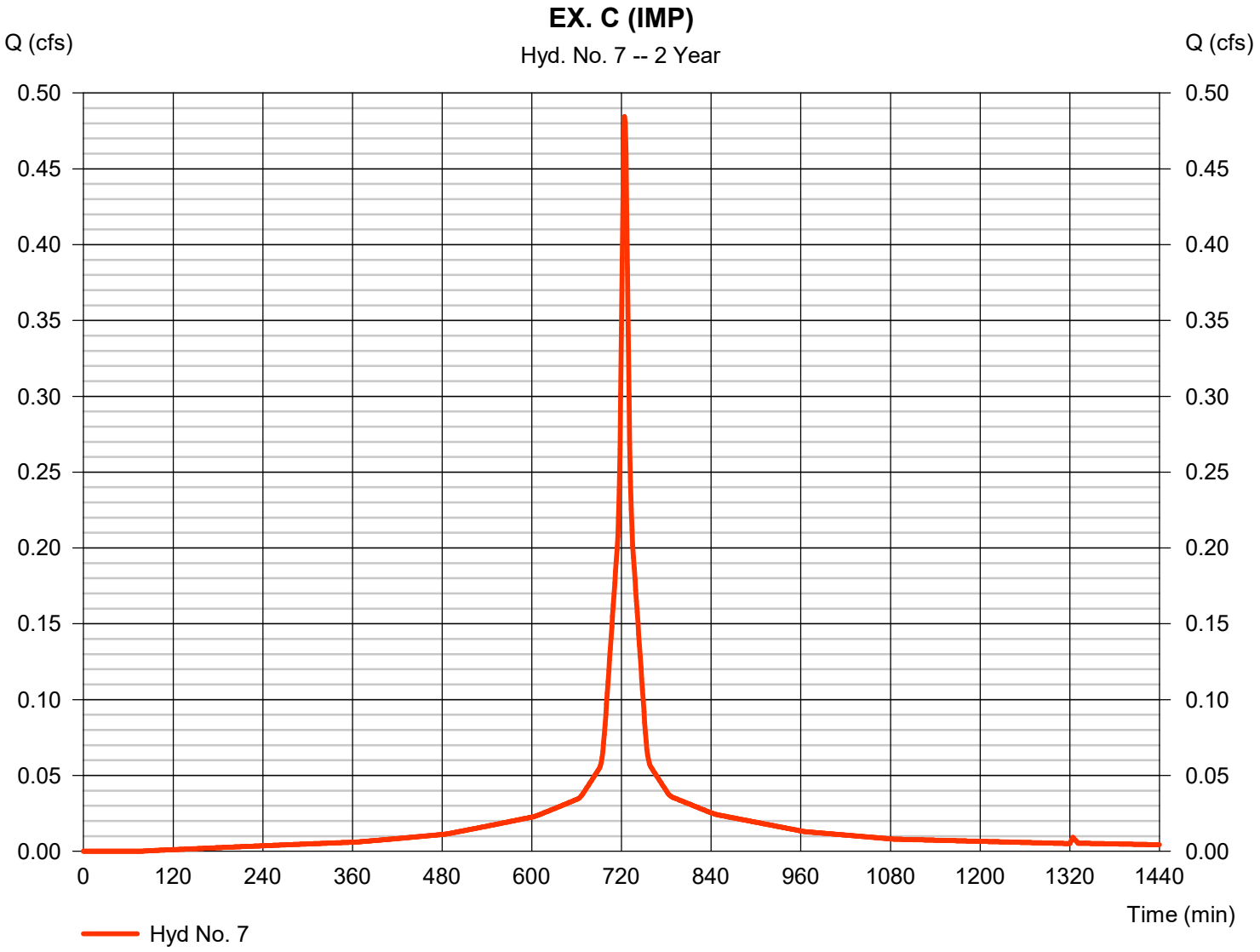


Hydrograph Report

Hyd. No. 7

EX. C (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.484 cfs
Storm frequency	=	2 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	1,681 cuft
Drainage area	=	0.140 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

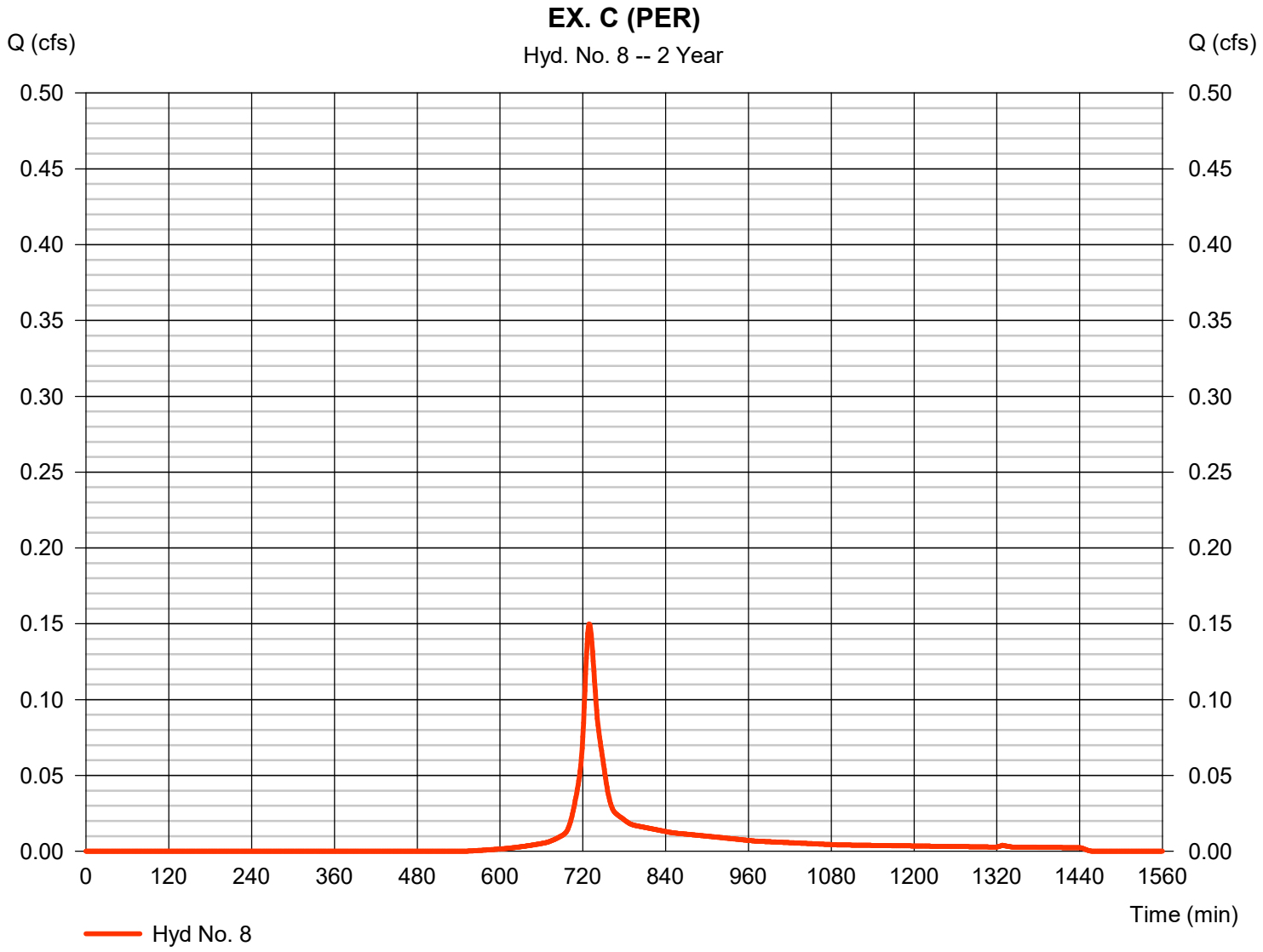


Hydrograph Report

Hyd. No. 8

EX. C (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.150 cfs
Storm frequency	=	2 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	568 cuft
Drainage area	=	0.100 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

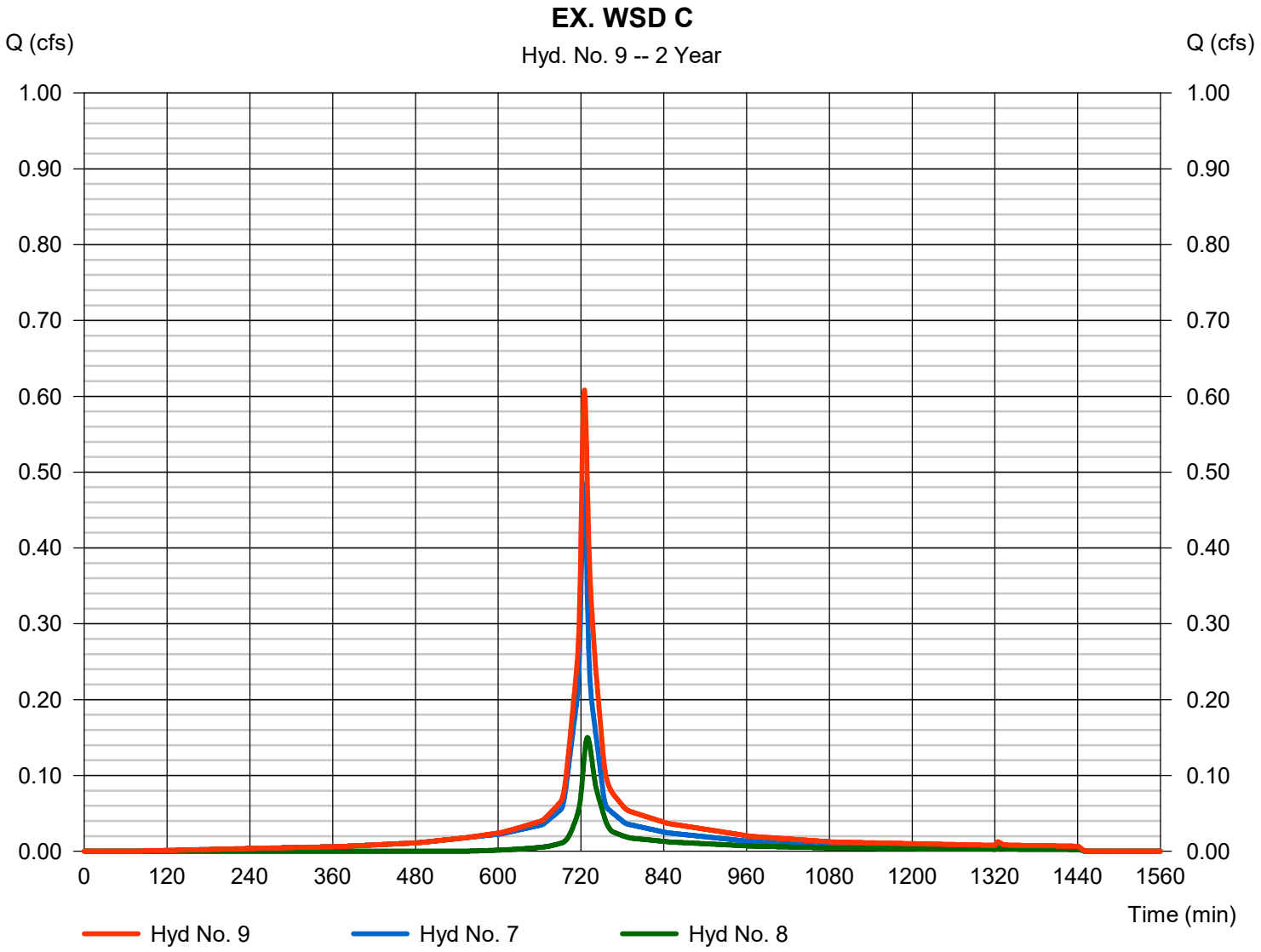


Hydrograph Report

Hyd. No. 9

EX. WSD C

Hydrograph type	=	Combine	Peak discharge	=	0.608 cfs
Storm frequency	=	2 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	2,248 cuft
Inflow hyds.	=	7, 8	Contrib. drain. area	=	0.240 ac

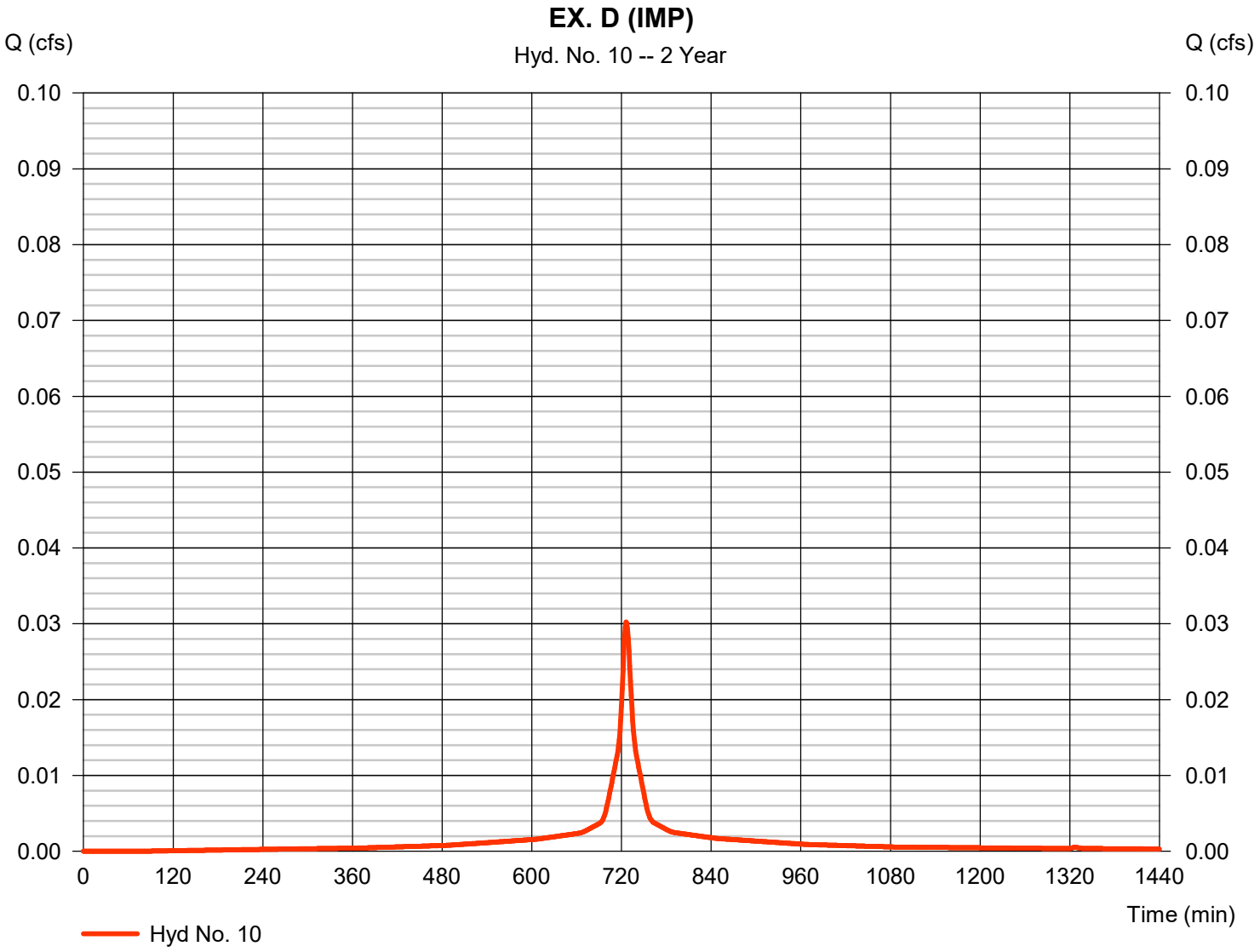


Hydrograph Report

Hyd. No. 10

EX. D (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.030 cfs
Storm frequency	=	2 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	116 cuft
Drainage area	=	0.010 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

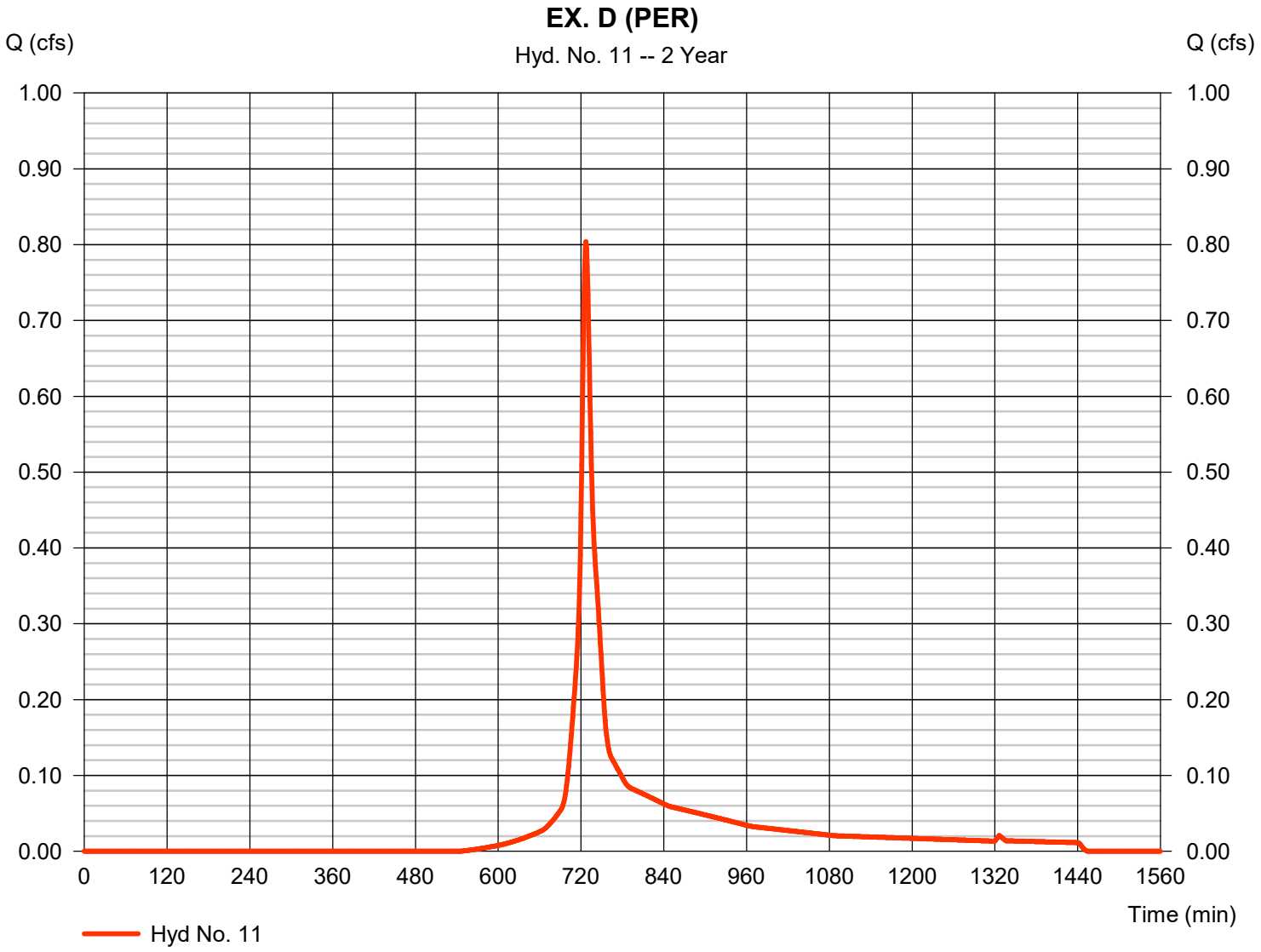


Hydrograph Report

Hyd. No. 11

EX. D (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.804 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	2,768 cuft
Drainage area	=	0.480 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

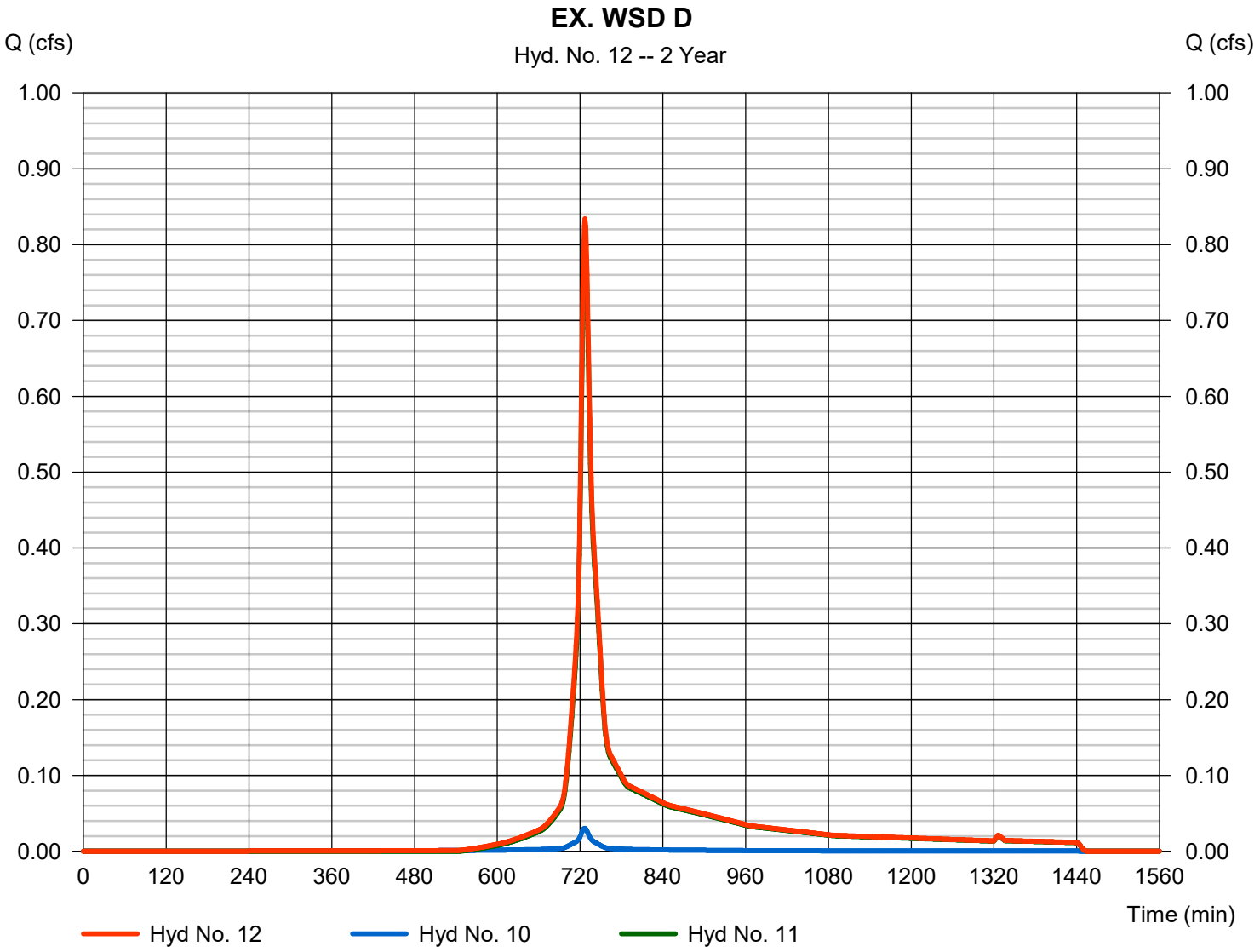


Hydrograph Report

Hyd. No. 12

EX. WSD D

Hydrograph type	=	Combine	Peak discharge	=	0.834 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	2,885 cuft
Inflow hyds.	=	10, 11	Contrib. drain. area	=	0.490 ac

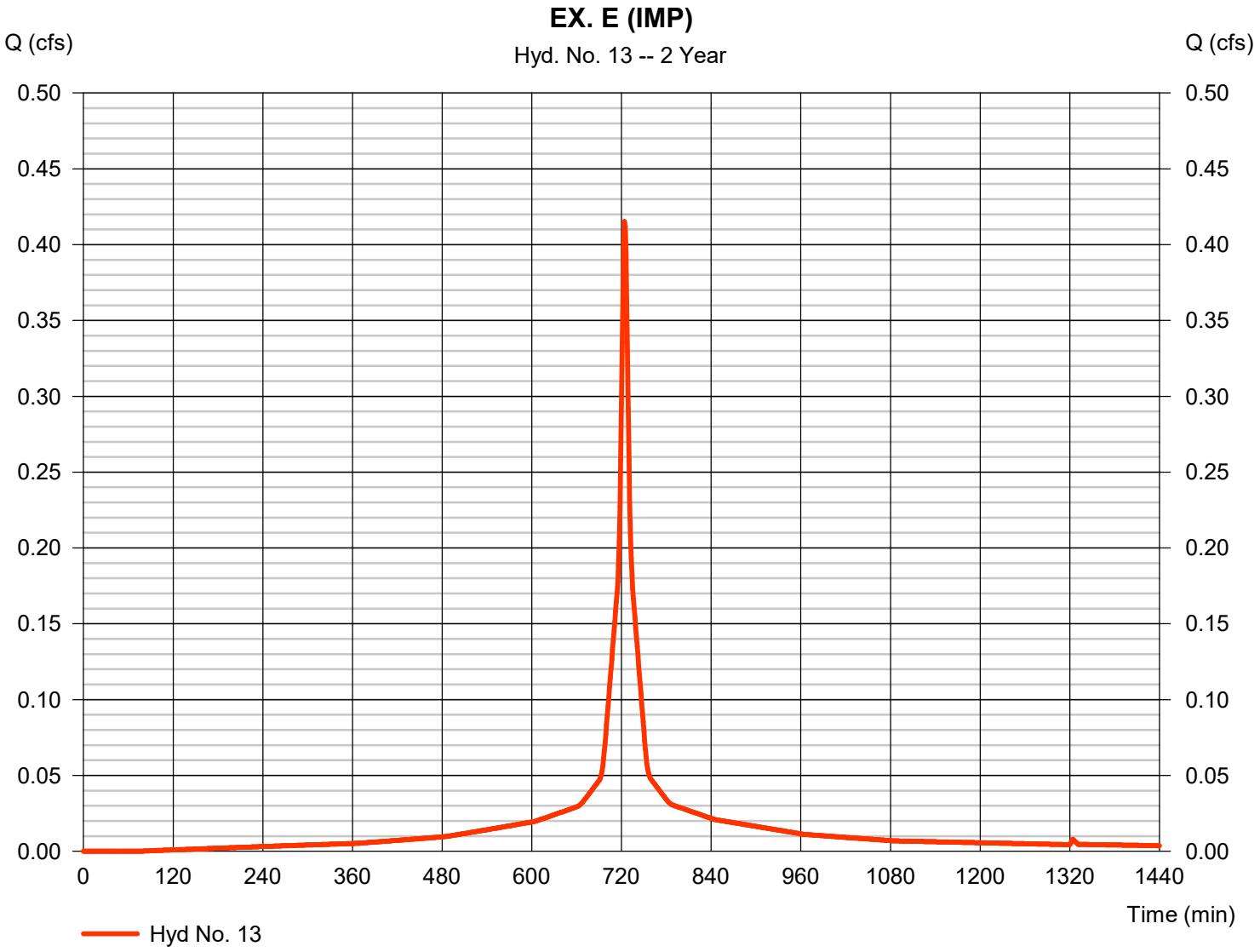


Hydrograph Report

Hyd. No. 13

EX. E (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.415 cfs
Storm frequency	=	2 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	1,440 cuft
Drainage area	=	0.120 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

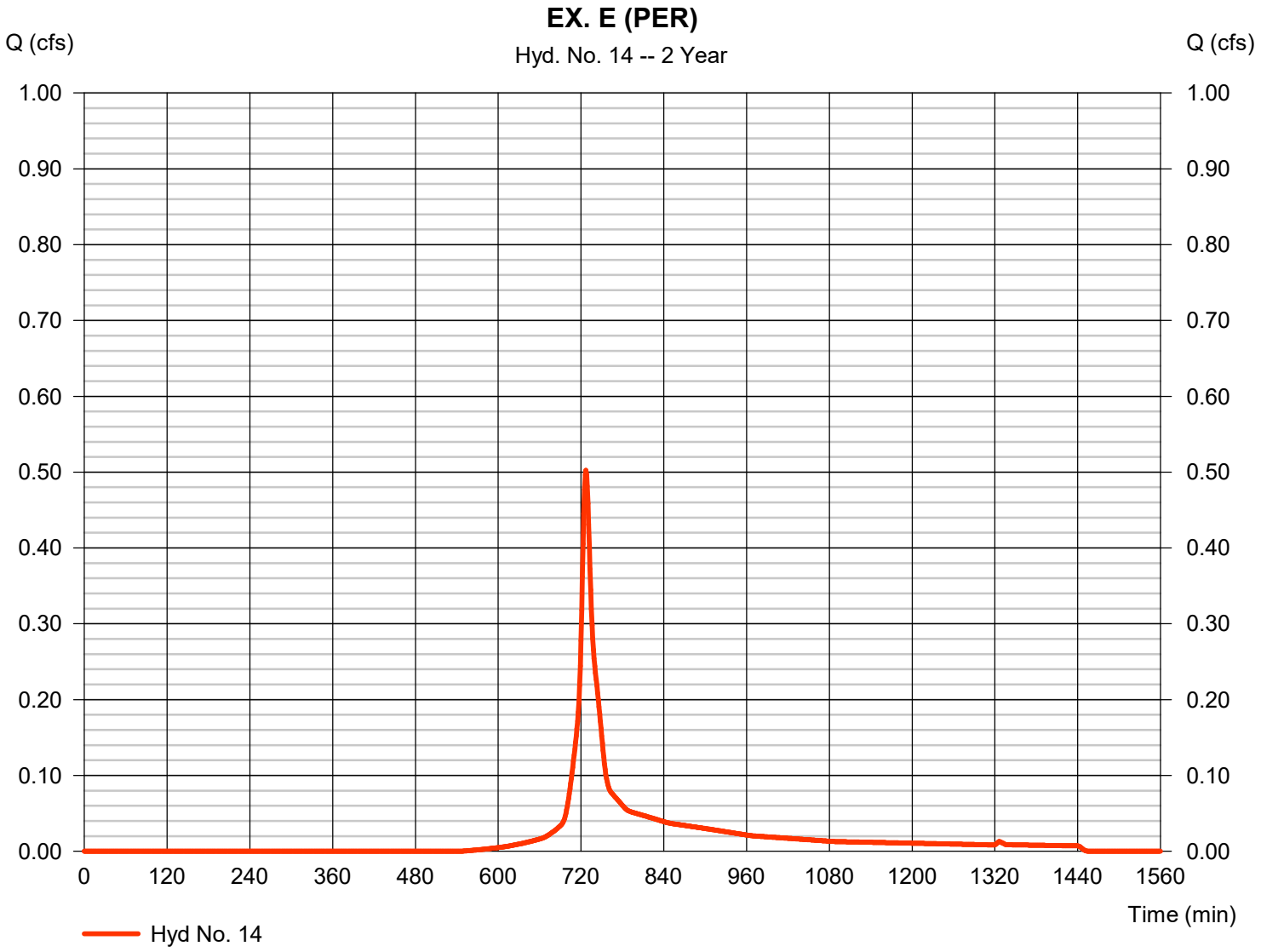


Hydrograph Report

Hyd. No. 14

EX. E (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.502 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	1,730 cuft
Drainage area	=	0.300 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

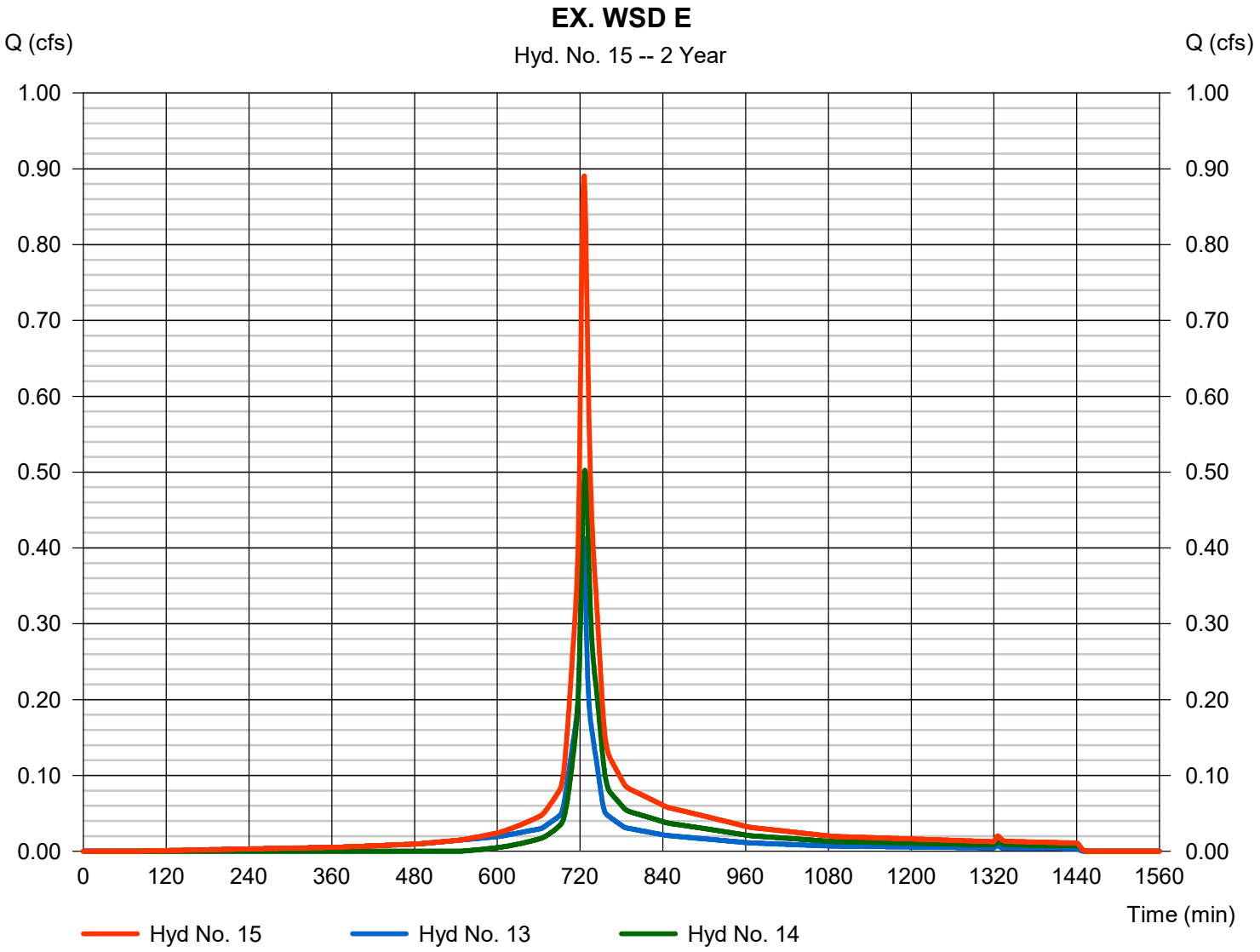


Hydrograph Report

Hyd. No. 15

EX. WSD E

Hydrograph type	=	Combine	Peak discharge	=	0.890 cfs
Storm frequency	=	2 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	3,171 cuft
Inflow hyds.	=	13, 14	Contrib. drain. area	=	0.420 ac

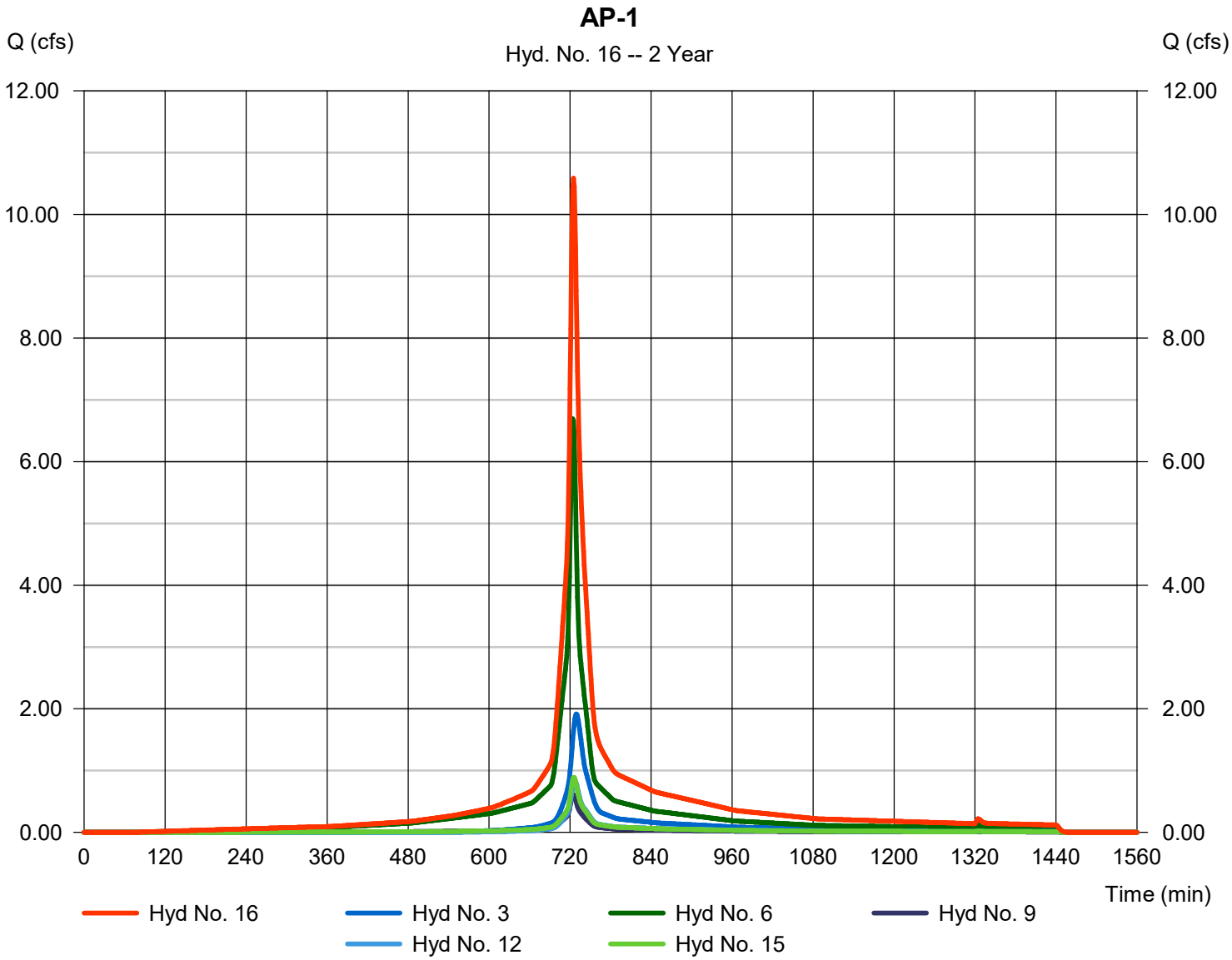


Hydrograph Report

Hyd. No. 16

AP-1

Hydrograph type	=	Combine	Peak discharge	=	10.59 cfs
Storm frequency	=	2 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	38,948 cuft
Inflow hyds.	=	3, 6, 9, 12, 15	Contrib. drain. area	=	0.000 ac

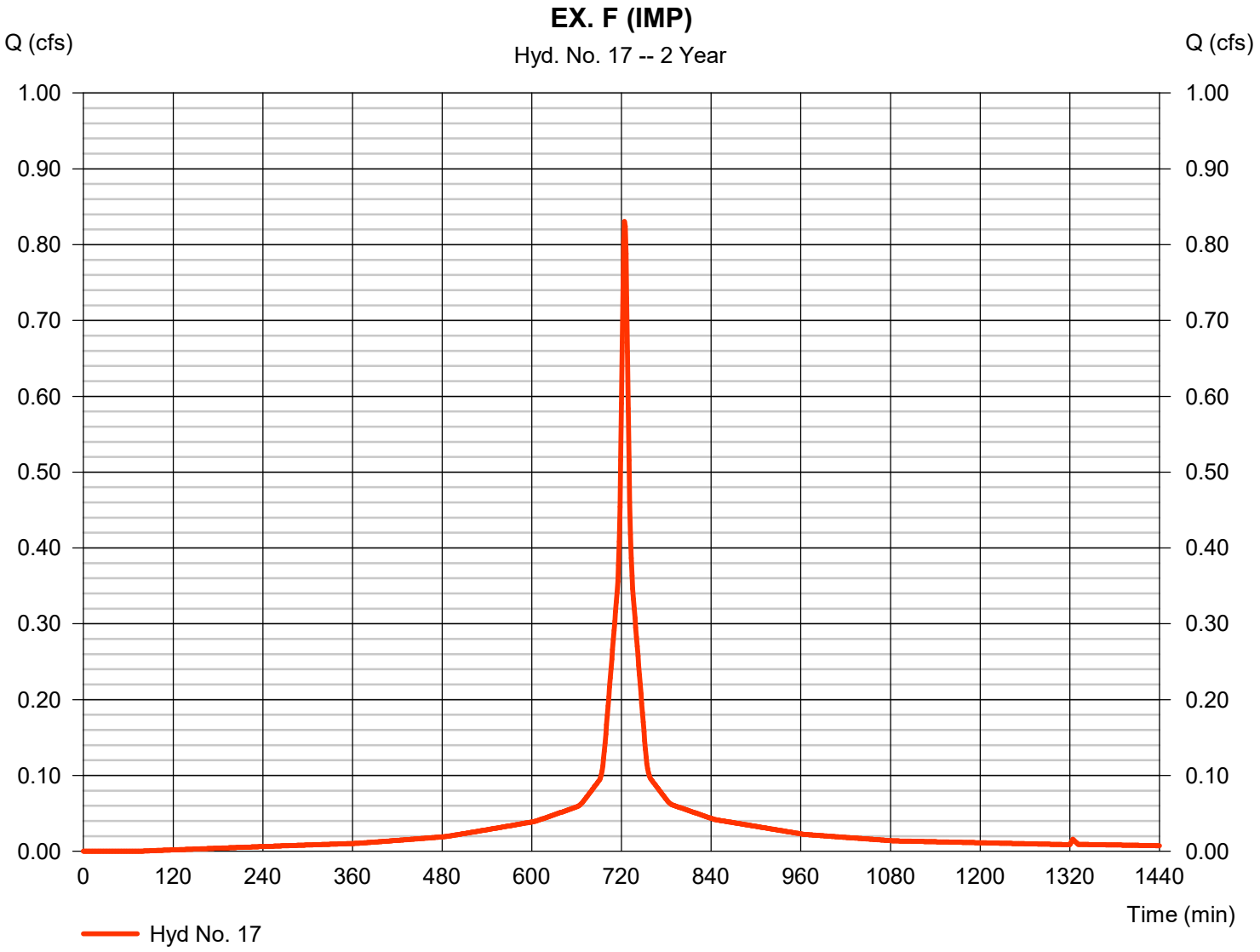


Hydrograph Report

Hyd. No. 17

EX. F (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.830 cfs
Storm frequency	=	2 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	2,881 cuft
Drainage area	=	0.240 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

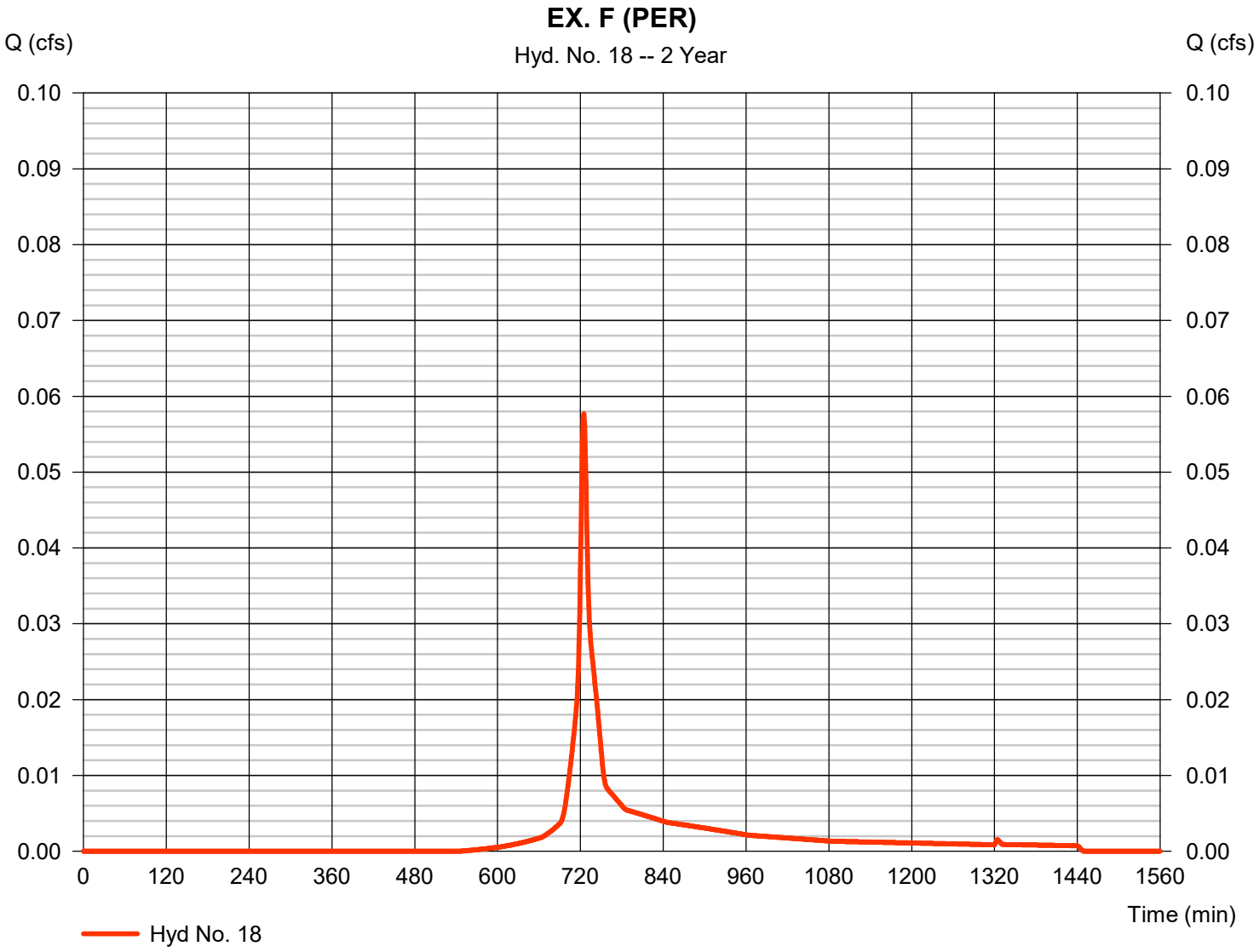


Hydrograph Report

Hyd. No. 18

EX. F (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.058 cfs
Storm frequency	=	2 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	178 cuft
Drainage area	=	0.030 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

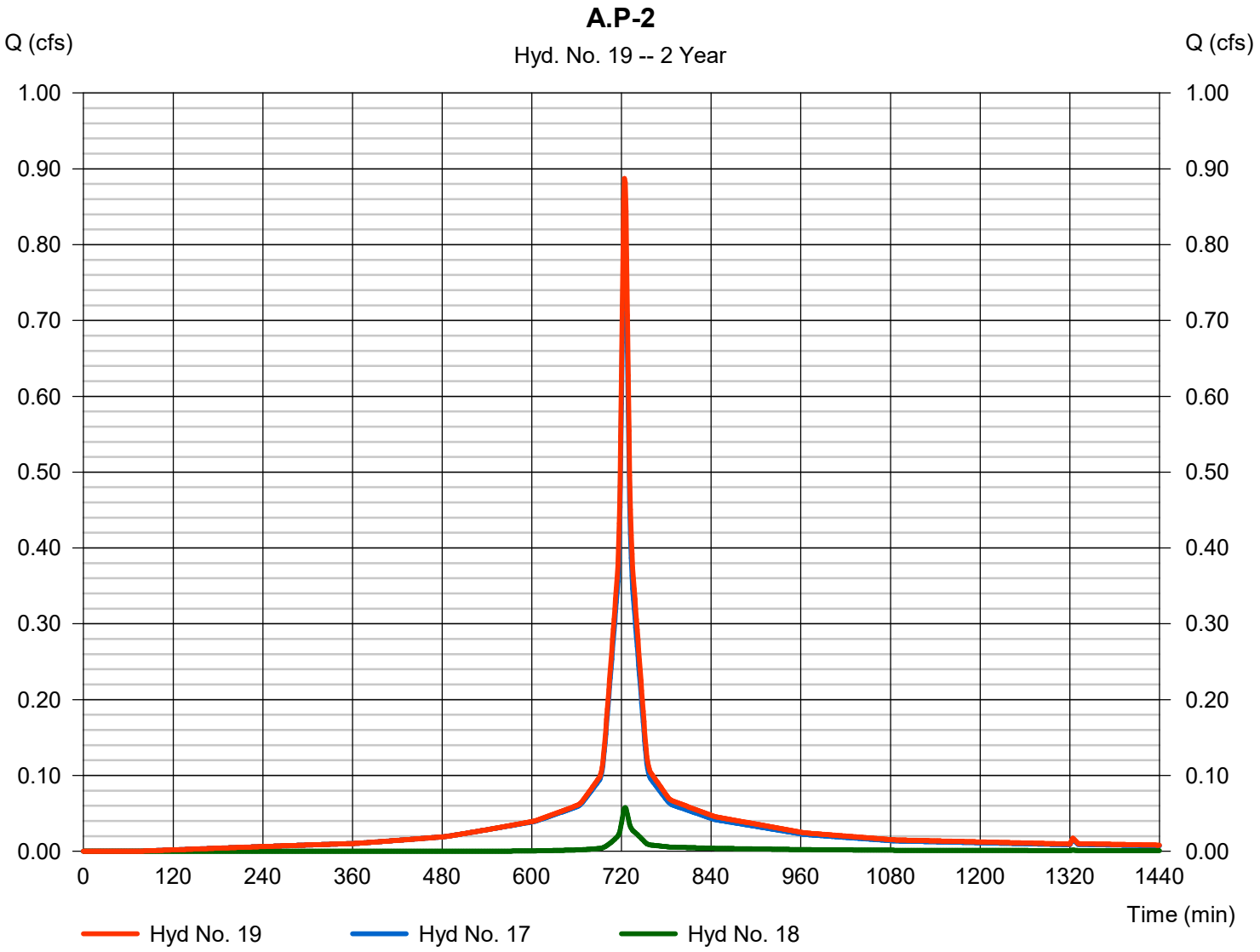


Hydrograph Report

Hyd. No. 19

A.P-2

Hydrograph type	=	Combine	Peak discharge	=	0.887 cfs
Storm frequency	=	2 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	3,059 cuft
Inflow hyds.	=	17, 18	Contrib. drain. area	=	0.270 ac



10-YEAR STORM CALCULATIONS

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

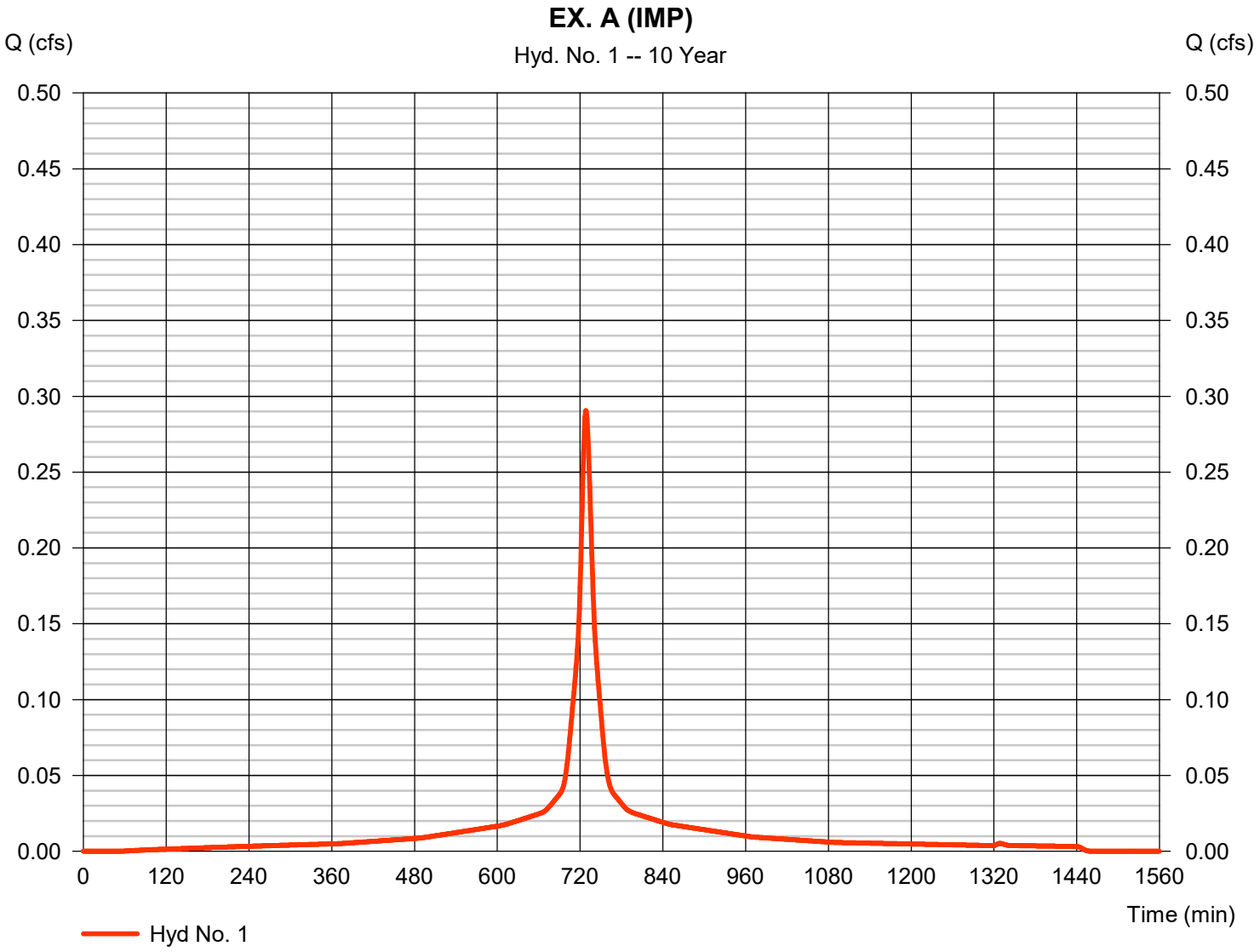
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.291	1	728	1,246	------	------	------	EX. A (IMP)
2	SCS Runoff	3.371	1	729	12,680	------	------	------	EX. A (PER)
3	Combine	3.661	1	729	13,926	1, 2	------	------	EX. WSD A
4	SCS Runoff	9.883	1	724	34,881	------	------	------	EX. B (IMP)
5	SCS Runoff	0.490	1	727	1,680	------	------	------	EX. B (PER)
6	Combine	10.33	1	724	36,561	4, 5	------	------	EX. WSD B
7	SCS Runoff	0.740	1	724	2,611	------	------	------	EX. C (IMP)
8	SCS Runoff	0.293	1	729	1,103	------	------	------	EX. C (PER)
9	Combine	0.989	1	725	3,714	7, 8	------	------	EX. WSD C
10	SCS Runoff	0.046	1	726	181	------	------	------	EX. D (IMP)
11	SCS Runoff	1.569	1	727	5,376	------	------	------	EX. D (PER)
12	Combine	1.615	1	727	5,557	10, 11	------	------	EX. WSD D
13	SCS Runoff	0.634	1	724	2,238	------	------	------	EX. E (IMP)
14	SCS Runoff	0.980	1	727	3,360	------	------	------	EX. E (PER)
15	Combine	1.576	1	726	5,599	13, 14	------	------	EX. WSD E
16	Combine	17.59	1	725	65,357	3, 6, 9, 12, 15	------	------	AP-1
17	SCS Runoff	1.268	1	724	4,477	------	------	------	EX. F (IMP)
18	SCS Runoff	0.112	1	725	347	------	------	------	EX. F (PER)
19	Combine	1.380	1	724	4,823	17, 18	------	------	A.P-2

Hydrograph Report

Hyd. No. 1

EX. A (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.291 cfs
Storm frequency	=	10 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	1,246 cuft
Drainage area	=	0.070 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

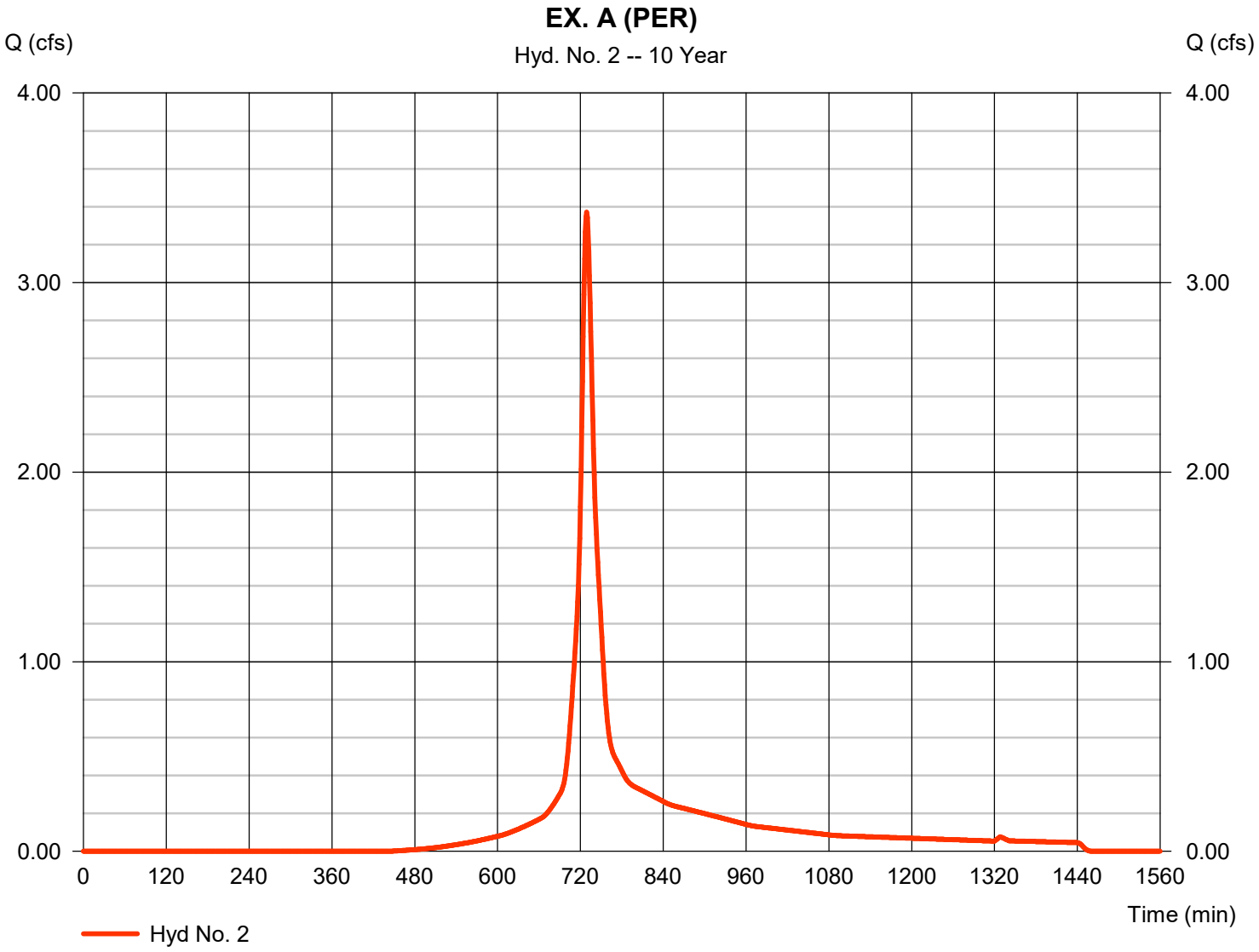


Hydrograph Report

Hyd. No. 2

EX. A (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.371 cfs
Storm frequency	=	10 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	12,680 cuft
Drainage area	=	1.150 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

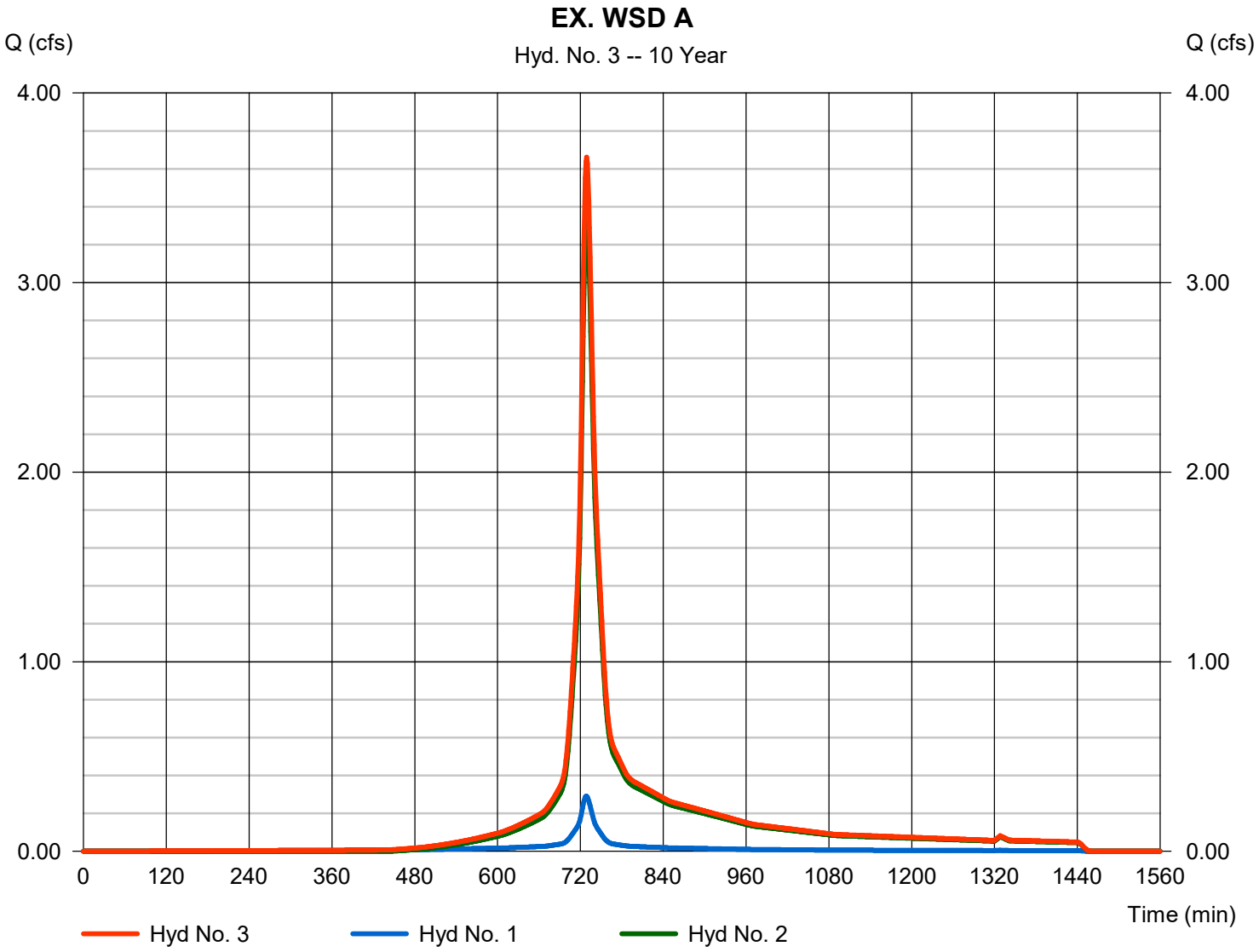


Hydrograph Report

Hyd. No. 3

EX. WSD A

Hydrograph type	=	Combine	Peak discharge	=	3.661 cfs
Storm frequency	=	10 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	13,926 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	1.220 ac

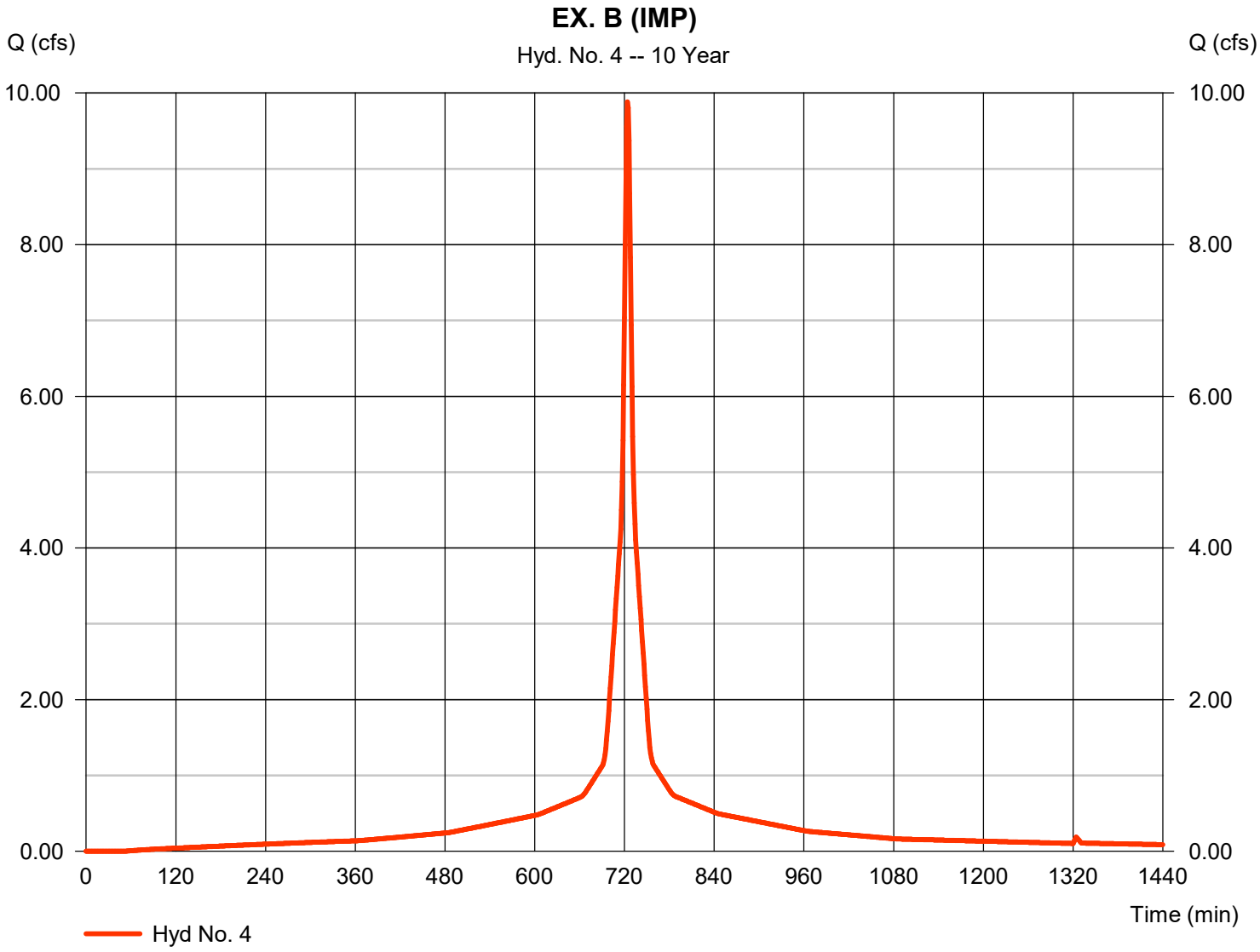


Hydrograph Report

Hyd. No. 4

EX. B (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	9.883 cfs
Storm frequency	=	10 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	34,881 cuft
Drainage area	=	1.870 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

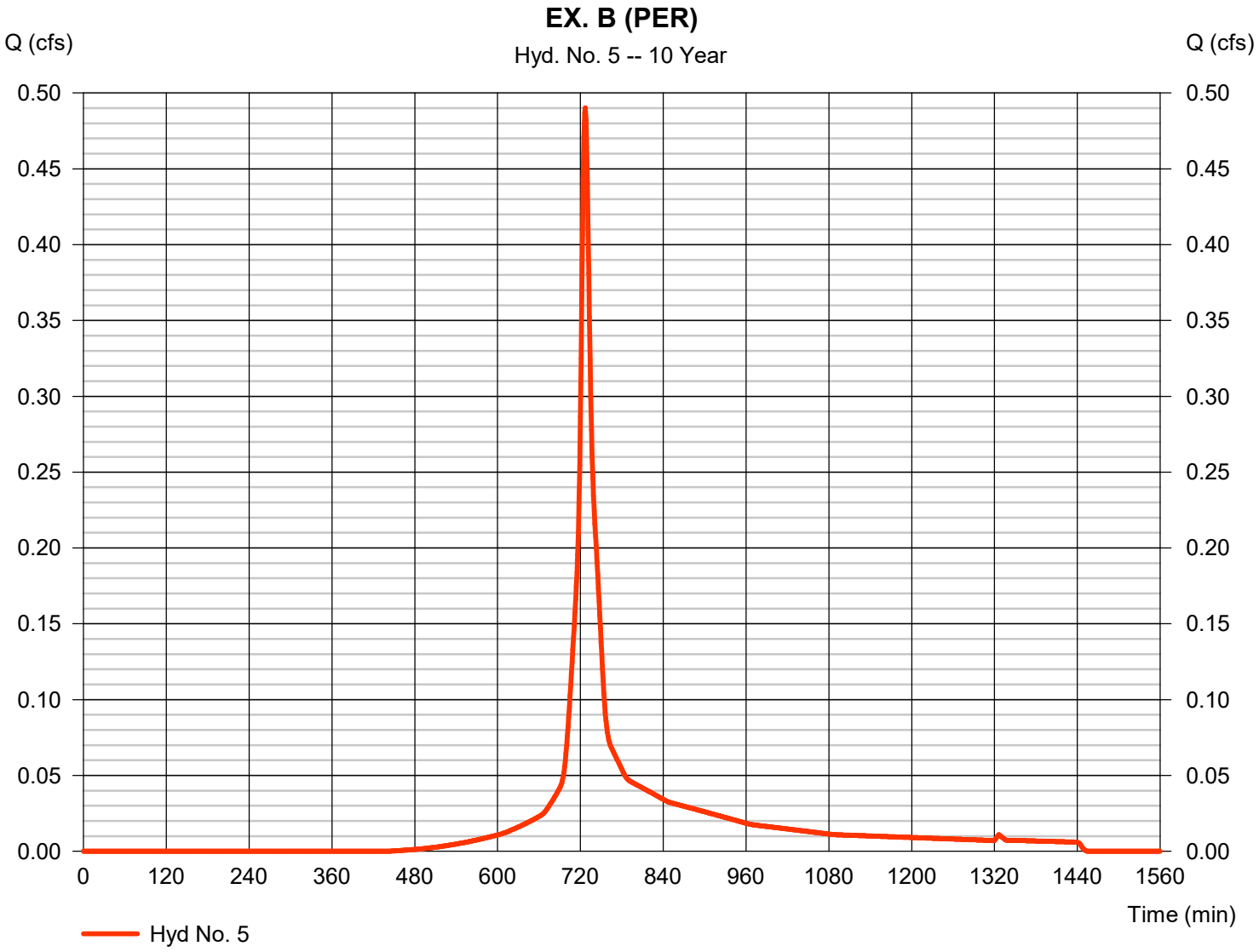


Hydrograph Report

Hyd. No. 5

EX. B (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.490 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	1,680 cuft
Drainage area	=	0.150 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

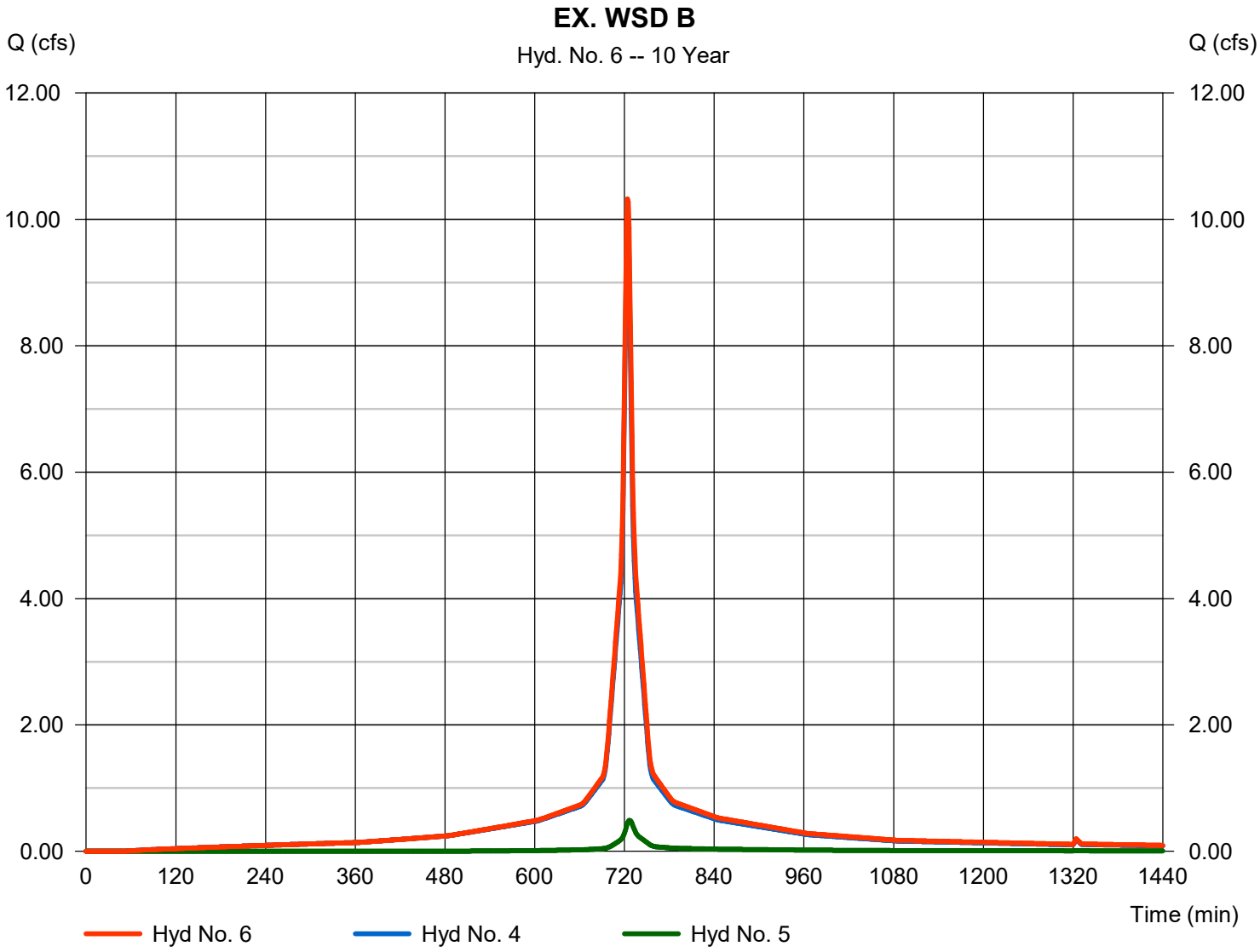


Hydrograph Report

Hyd. No. 6

EX. WSD B

Hydrograph type	= Combine	Peak discharge	= 10.33 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 36,561 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 2.020 ac

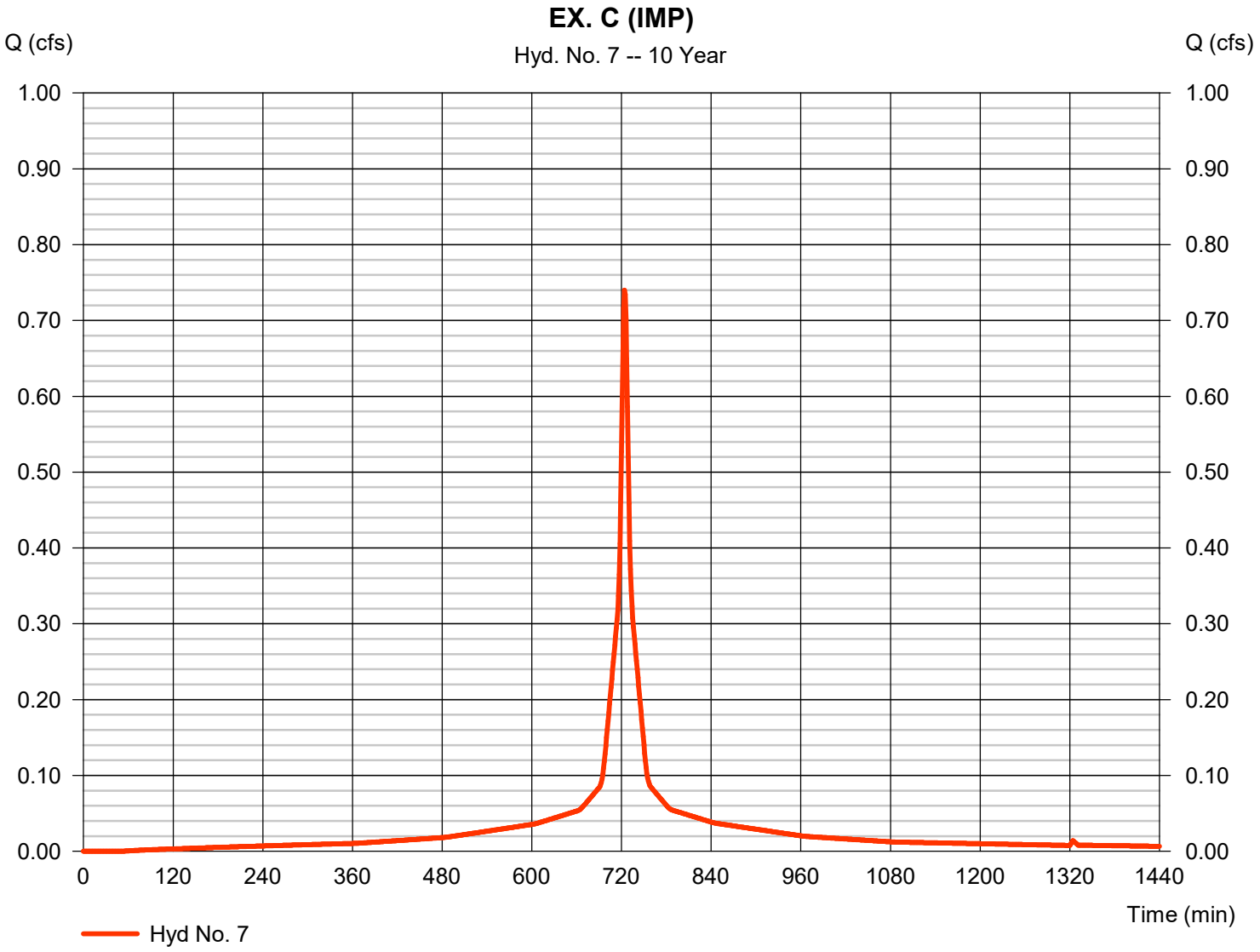


Hydrograph Report

Hyd. No. 7

EX. C (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.740 cfs
Storm frequency	=	10 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	2,611 cuft
Drainage area	=	0.140 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

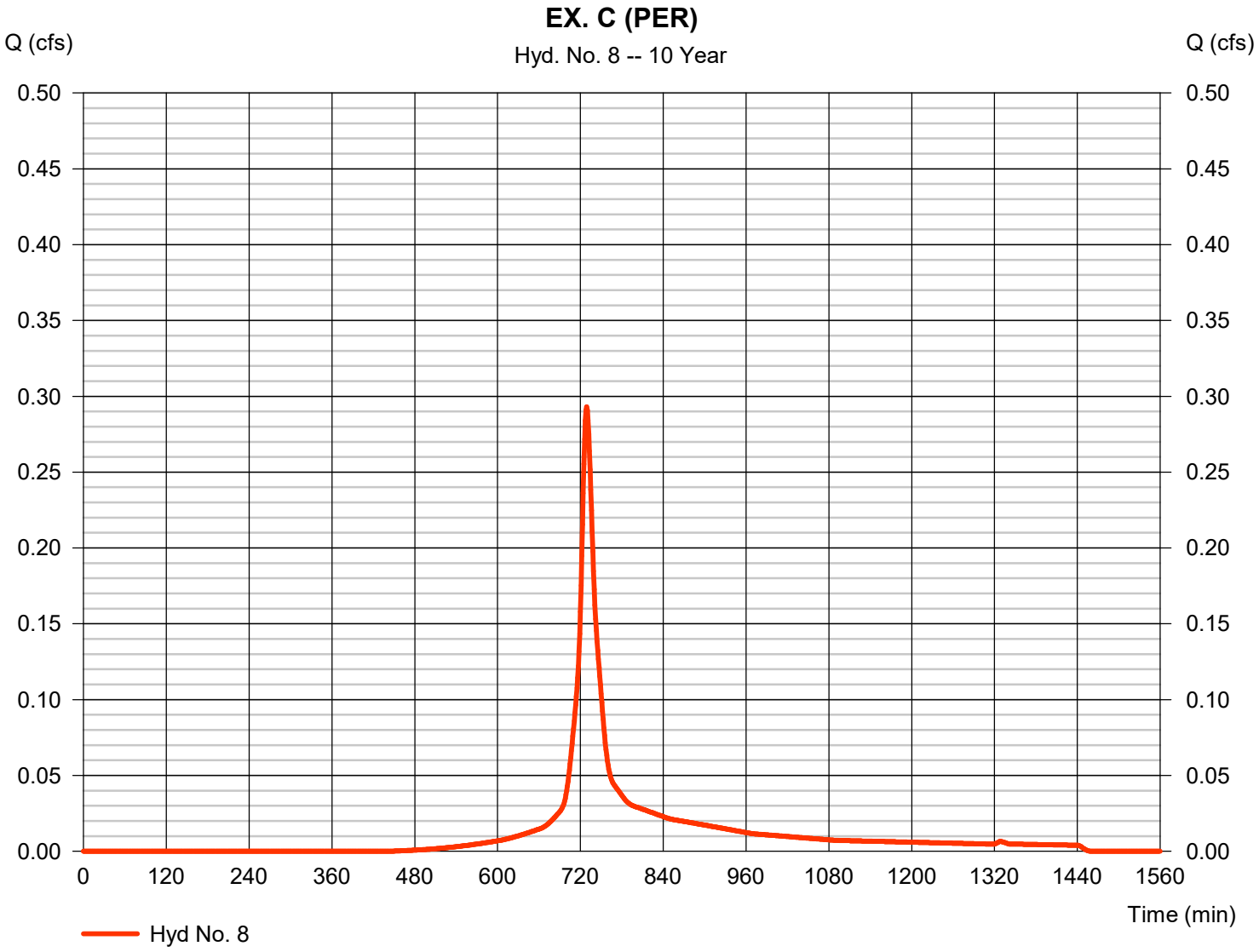


Hydrograph Report

Hyd. No. 8

EX. C (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.293 cfs
Storm frequency	=	10 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	1,103 cuft
Drainage area	=	0.100 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

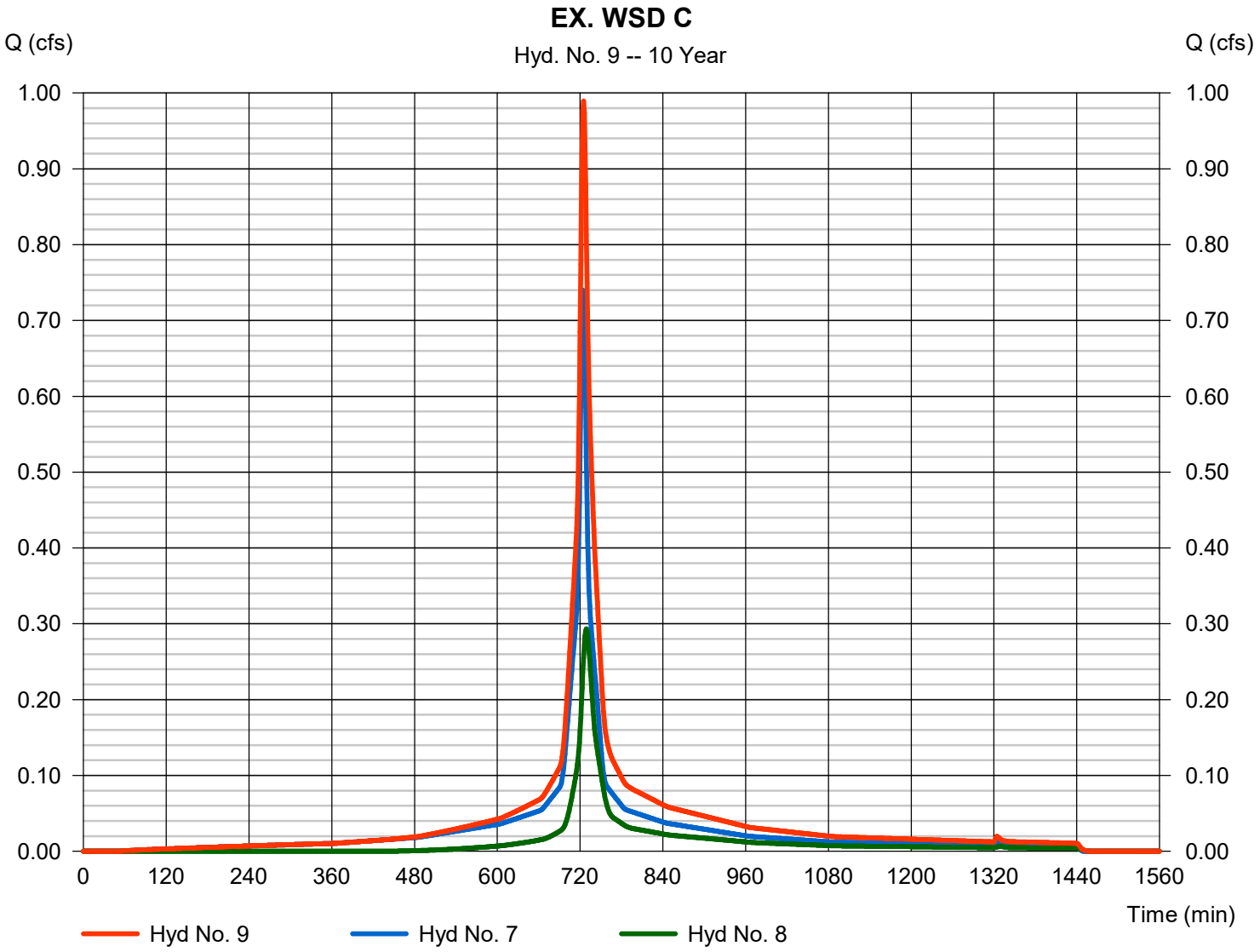


Hydrograph Report

Hyd. No. 9

EX. WSD C

Hydrograph type	=	Combine	Peak discharge	=	0.989 cfs
Storm frequency	=	10 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	3,714 cuft
Inflow hyds.	=	7, 8	Contrib. drain. area	=	0.240 ac

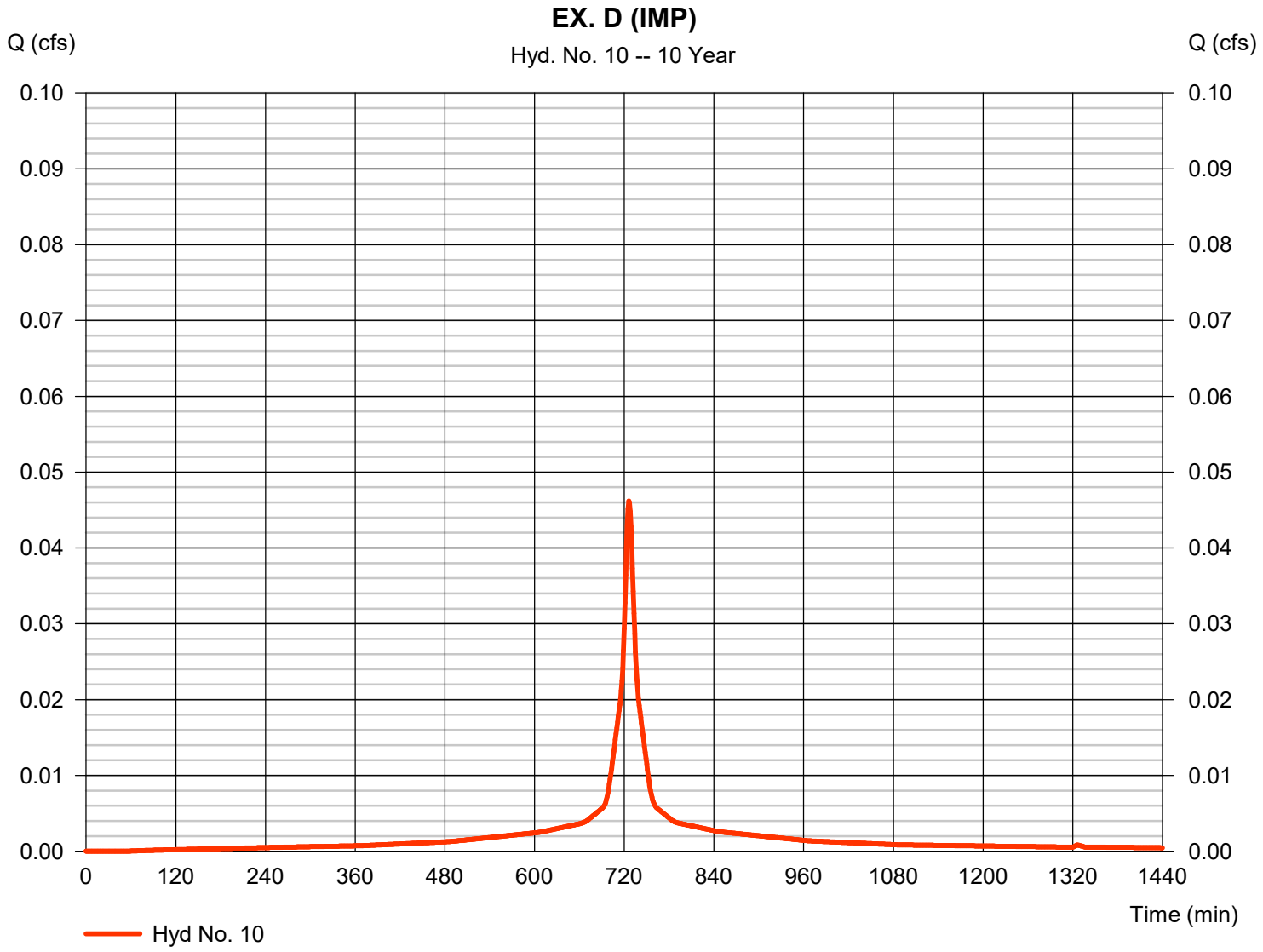


Hydrograph Report

Hyd. No. 10

EX. D (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.046 cfs
Storm frequency	=	10 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	181 cuft
Drainage area	=	0.010 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

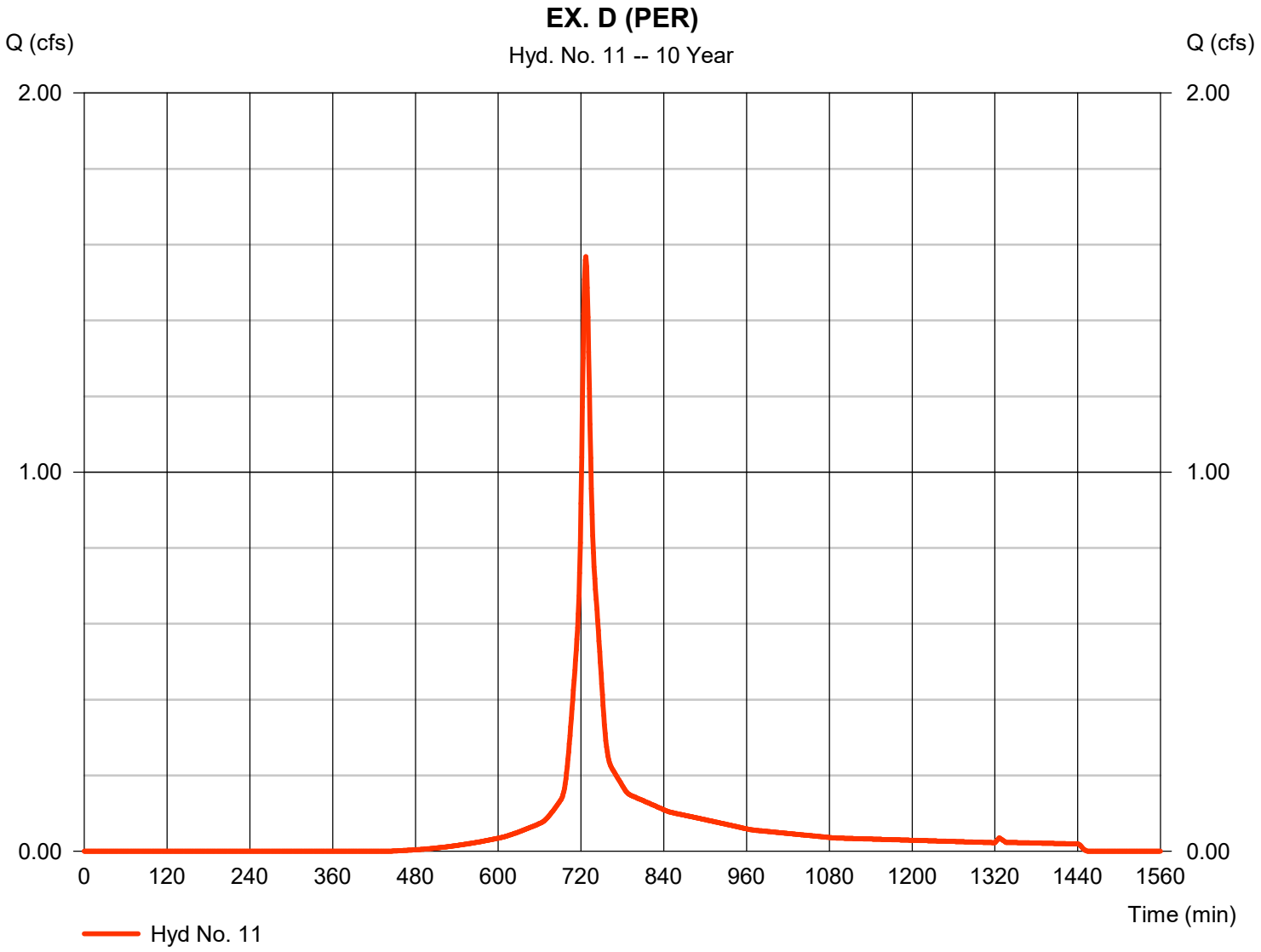


Hydrograph Report

Hyd. No. 11

EX. D (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.569 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	5,376 cuft
Drainage area	=	0.480 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

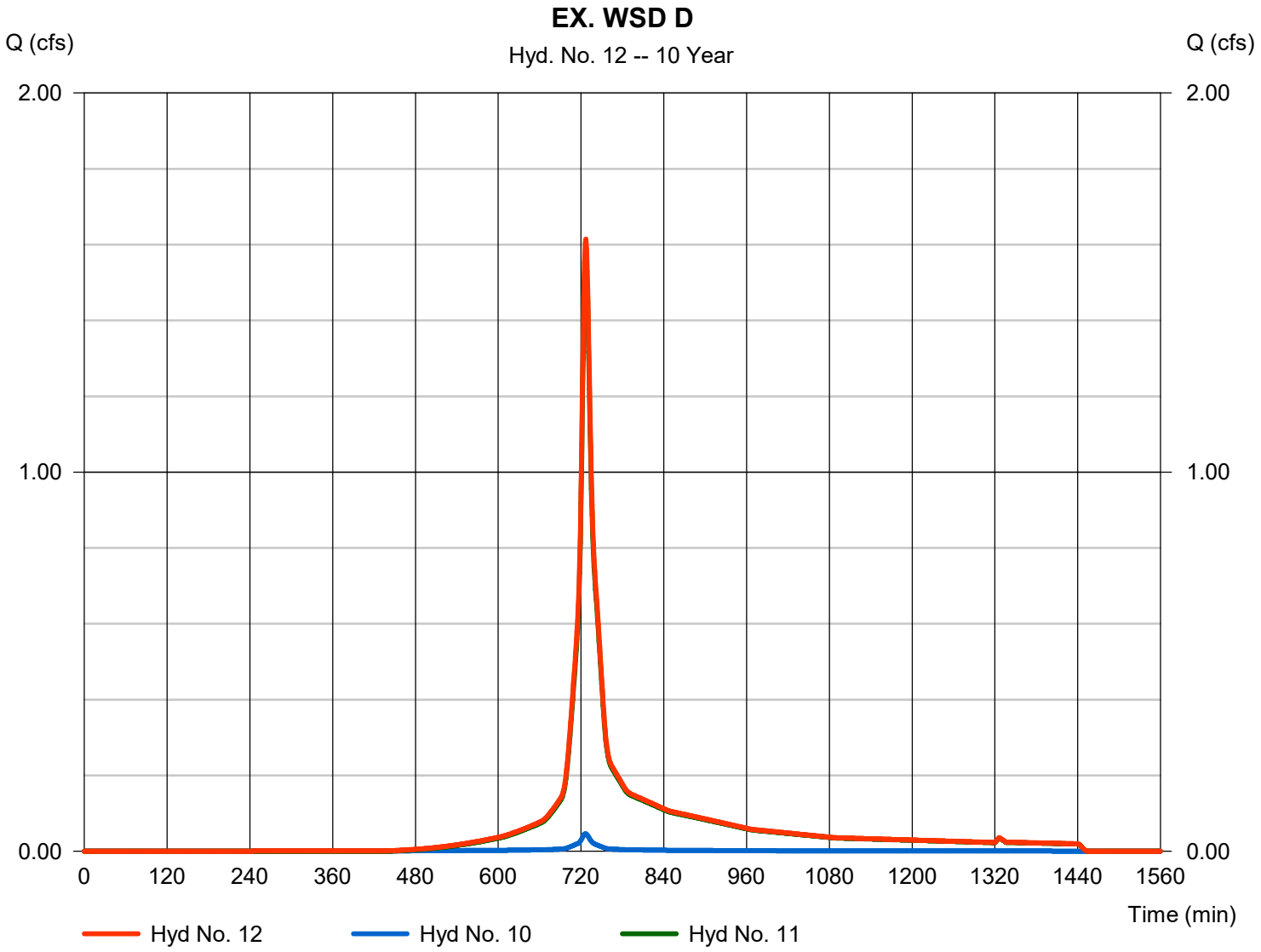


Hydrograph Report

Hyd. No. 12

EX. WSD D

Hydrograph type	=	Combine	Peak discharge	=	1.615 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	5,557 cuft
Inflow hyds.	=	10, 11	Contrib. drain. area	=	0.490 ac

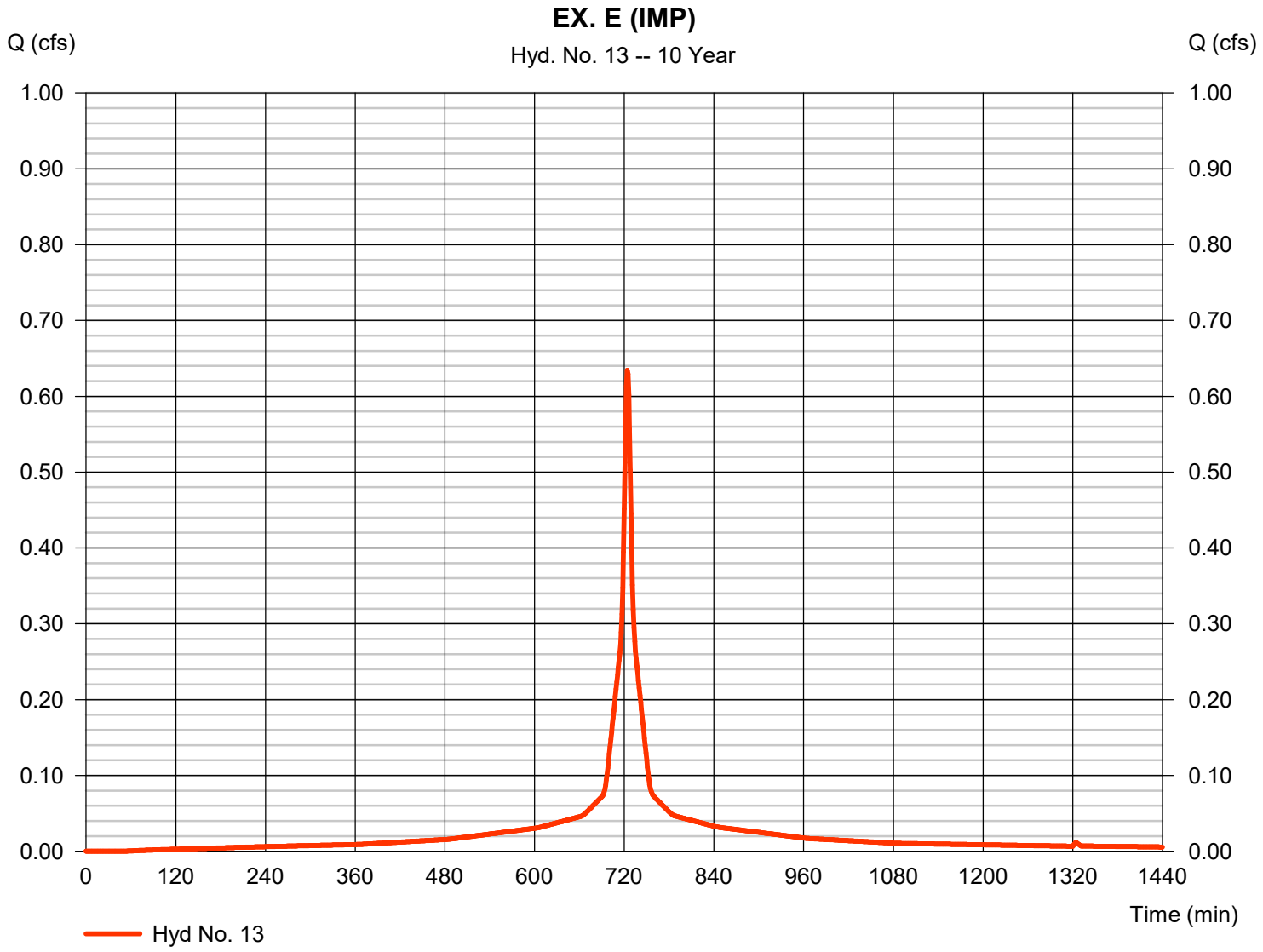


Hydrograph Report

Hyd. No. 13

EX. E (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.634 cfs
Storm frequency	=	10 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	2,238 cuft
Drainage area	=	0.120 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

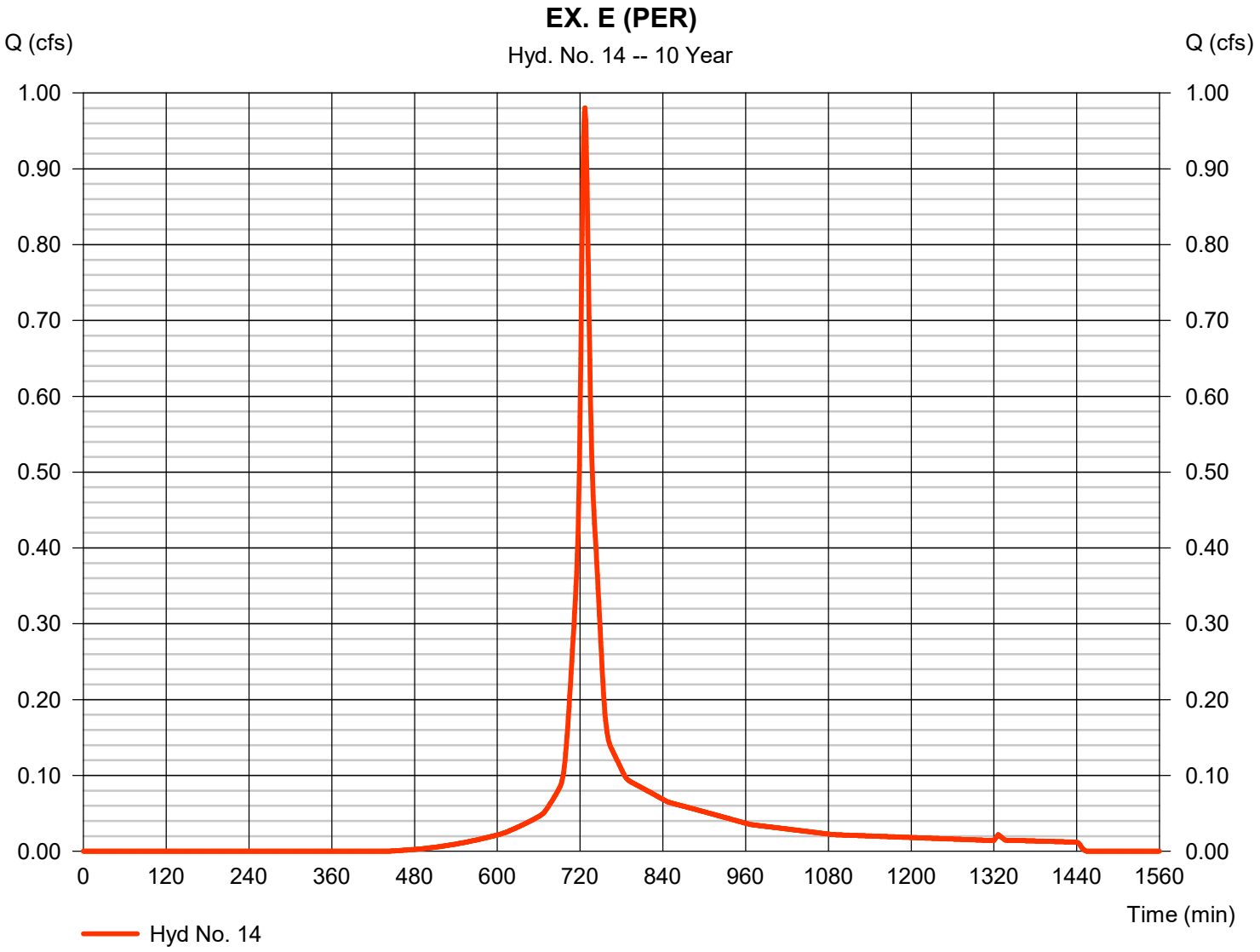


Hydrograph Report

Hyd. No. 14

EX. E (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.980 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	3,360 cuft
Drainage area	=	0.300 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

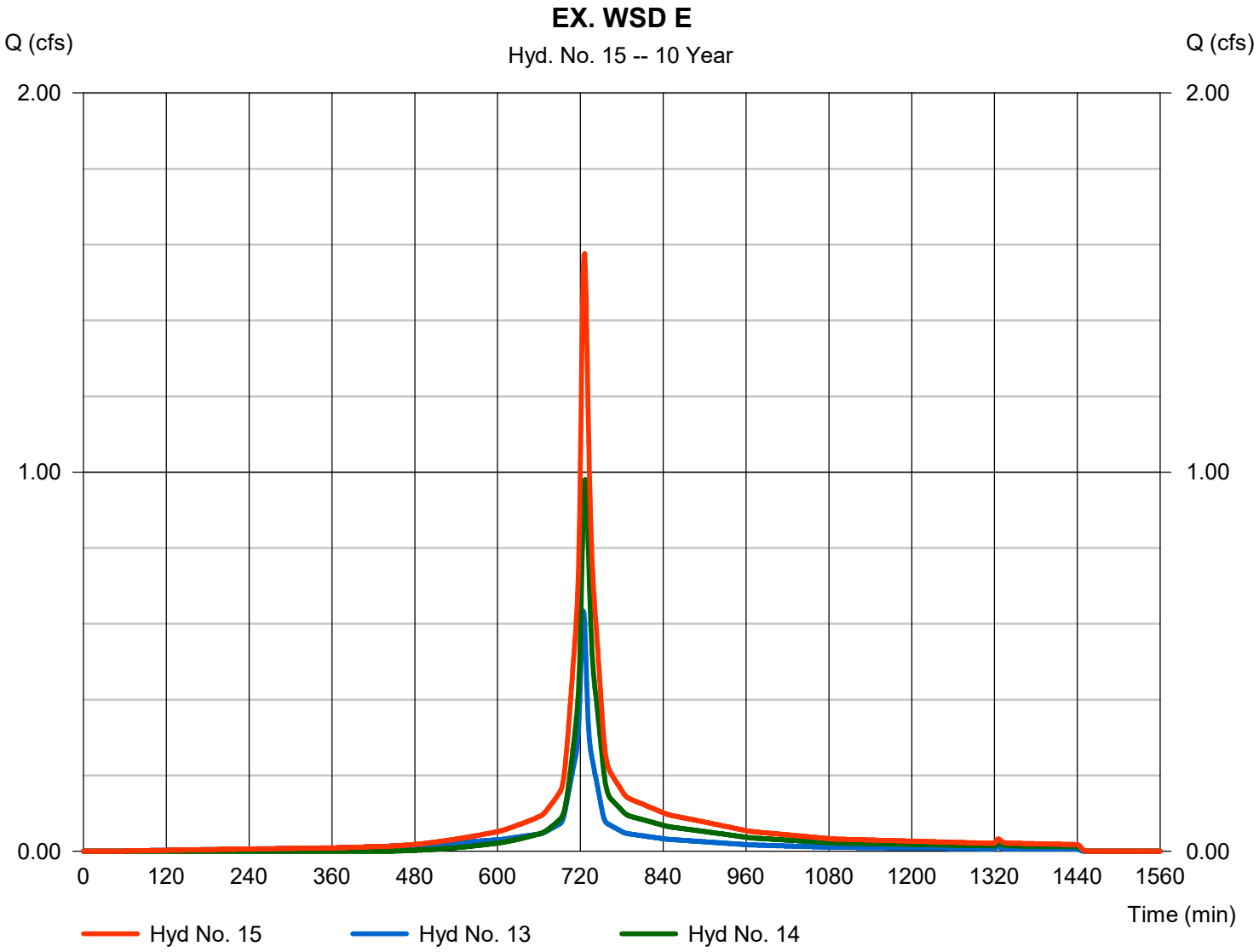


Hydrograph Report

Hyd. No. 15

EX. WSD E

Hydrograph type	= Combine	Peak discharge	= 1.576 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 5,599 cuft
Inflow hyds.	= 13, 14	Contrib. drain. area	= 0.420 ac

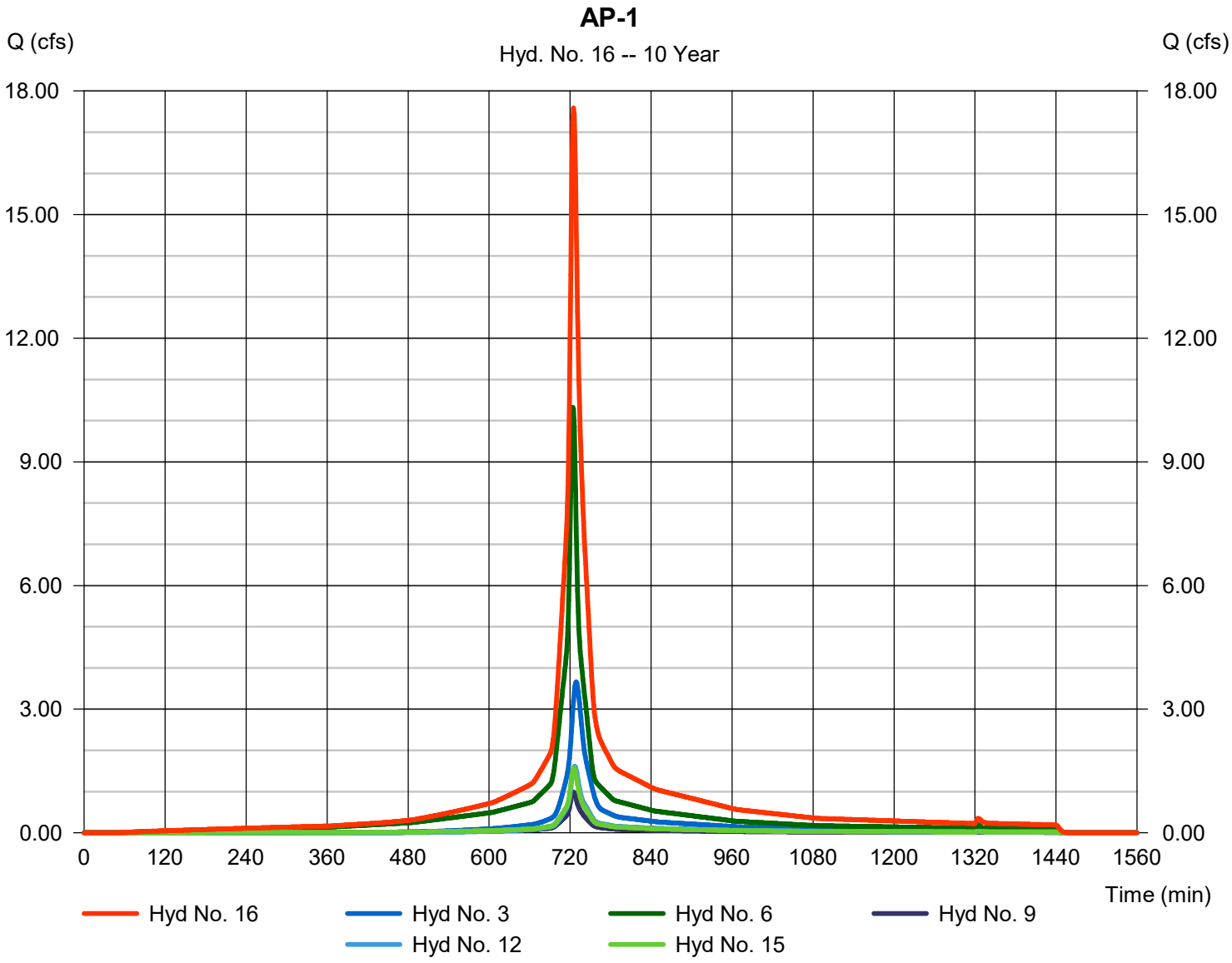


Hydrograph Report

Hyd. No. 16

AP-1

Hydrograph type	=	Combine	Peak discharge	=	17.59 cfs
Storm frequency	=	10 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	65,357 cuft
Inflow hyds.	=	3, 6, 9, 12, 15	Contrib. drain. area	=	0.000 ac

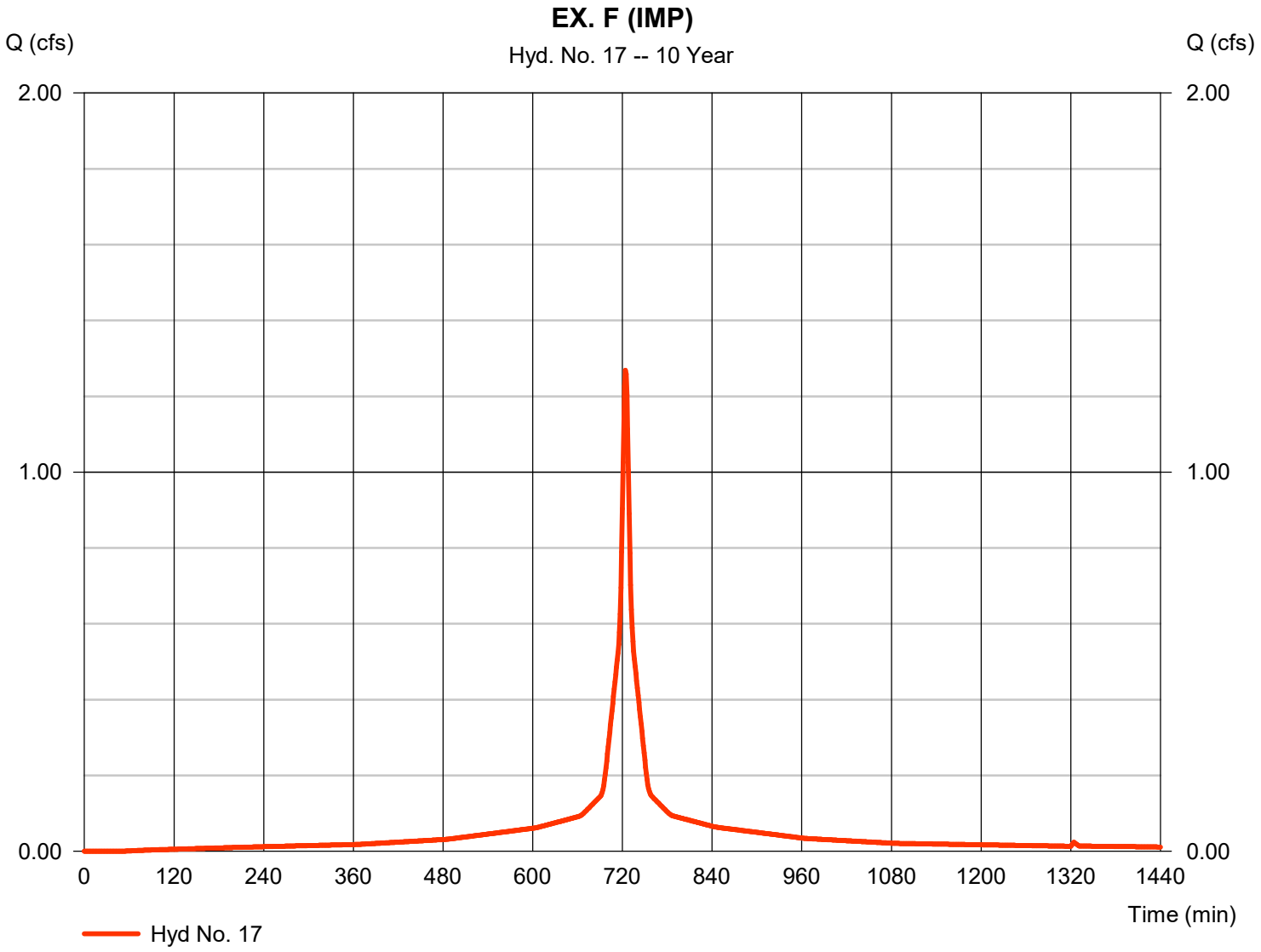


Hydrograph Report

Hyd. No. 17

EX. F (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.268 cfs
Storm frequency	=	10 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	4,477 cuft
Drainage area	=	0.240 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

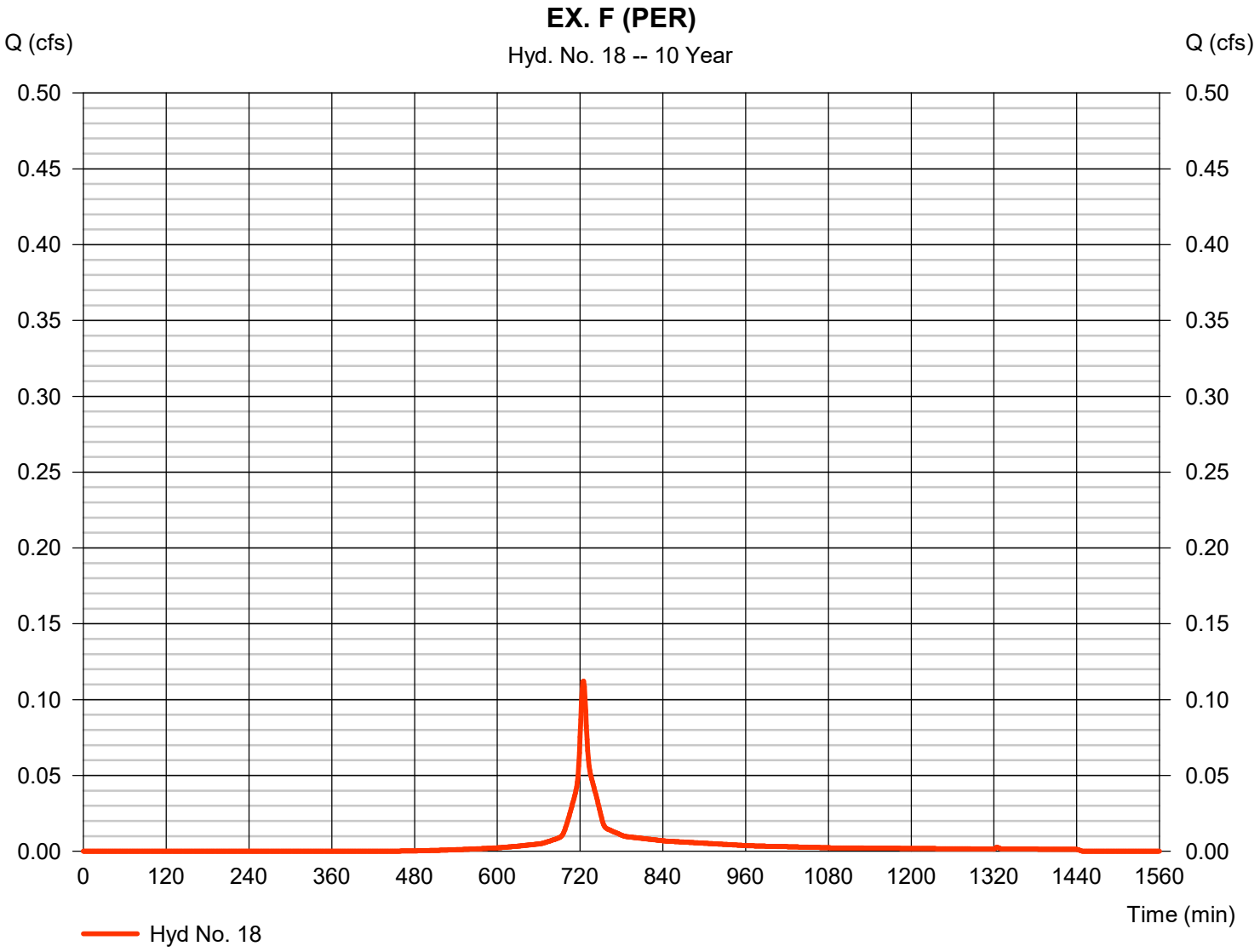


Hydrograph Report

Hyd. No. 18

EX. F (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.112 cfs
Storm frequency	=	10 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	347 cuft
Drainage area	=	0.030 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

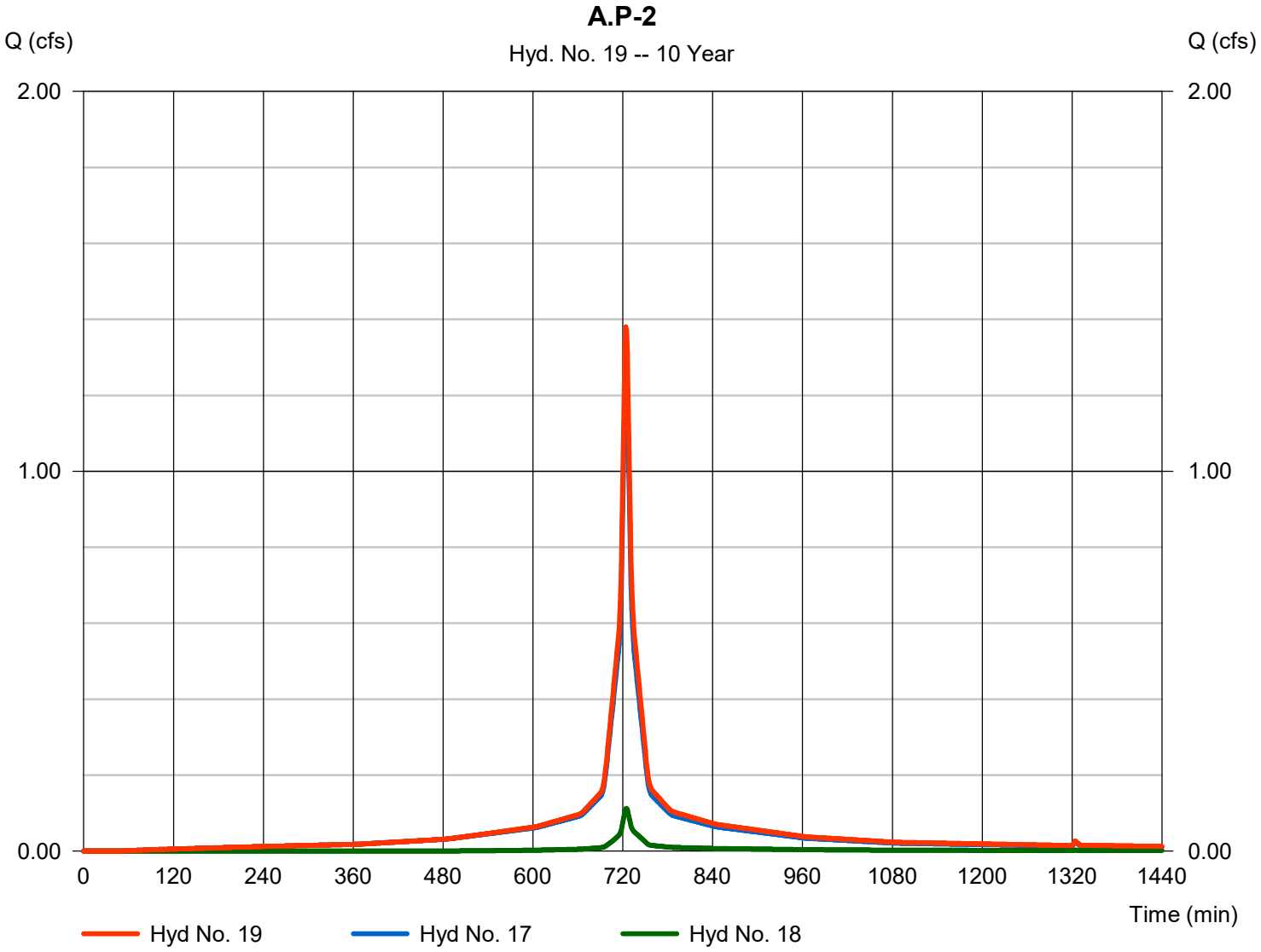


Hydrograph Report

Hyd. No. 19

A.P-2

Hydrograph type	=	Combine	Peak discharge	=	1.380 cfs
Storm frequency	=	10 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	4,823 cuft
Inflow hyds.	=	17, 18	Contrib. drain. area	=	0.270 ac



25-YEAR STORM CALCULATIONS

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

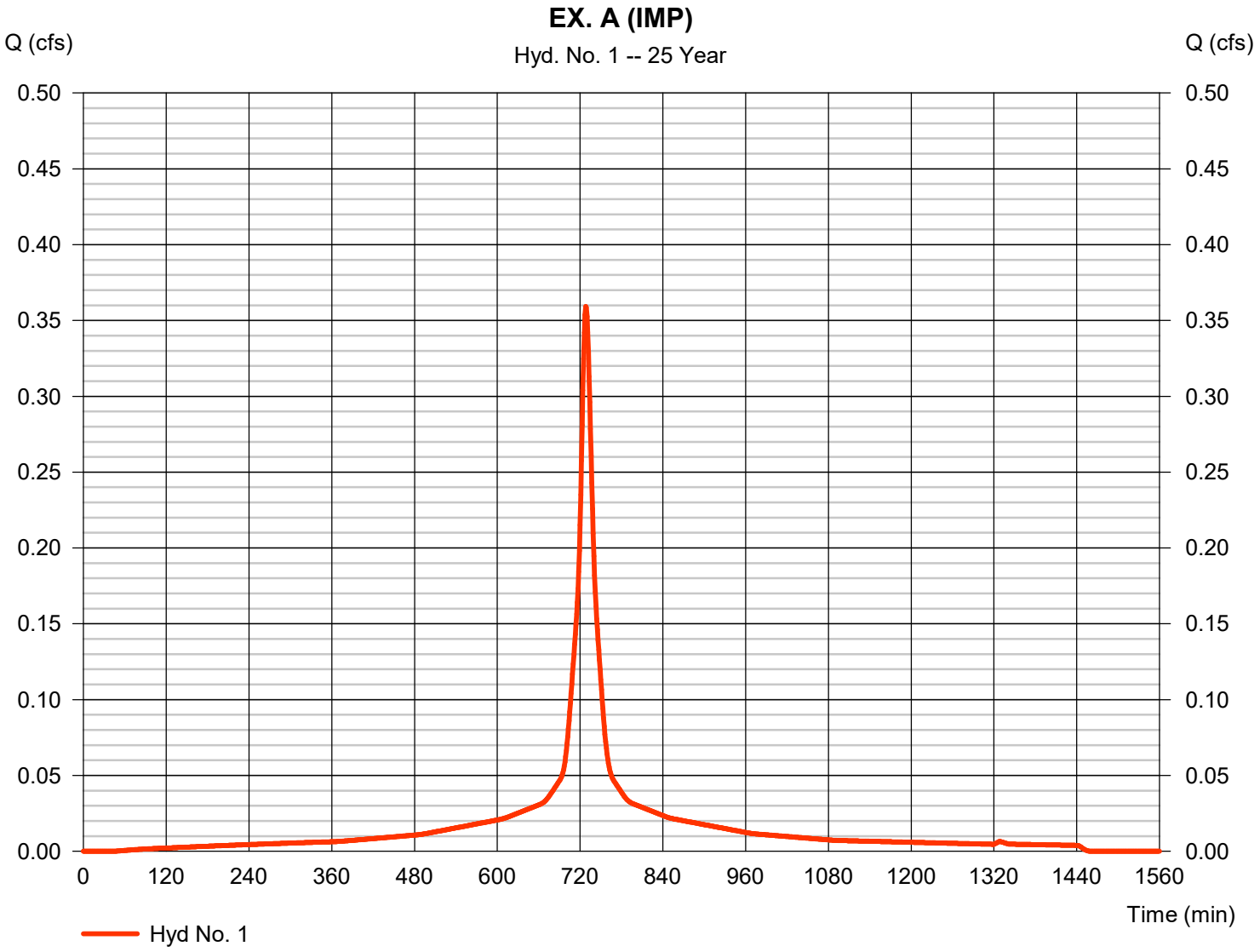
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.359	1	728	1,551	------	------	------	EX. A (IMP)
2	SCS Runoff	4.542	1	729	17,179	------	------	------	EX. A (PER)
3	Combine	4.901	1	729	18,730	1, 2	------	------	EX. WSD A
4	SCS Runoff	12.22	1	724	43,411	------	------	------	EX. B (IMP)
5	SCS Runoff	0.660	1	727	2,276	------	------	------	EX. B (PER)
6	Combine	12.82	1	724	45,688	4, 5	------	------	EX. WSD B
7	SCS Runoff	0.915	1	724	3,250	------	------	------	EX. C (IMP)
8	SCS Runoff	0.395	1	729	1,494	------	------	------	EX. C (PER)
9	Combine	1.254	1	725	4,744	7, 8	------	------	EX. WSD C
10	SCS Runoff	0.057	1	726	225	------	------	------	EX. D (IMP)
11	SCS Runoff	2.112	1	727	7,284	------	------	------	EX. D (PER)
12	Combine	2.169	1	727	7,509	10, 11	------	------	EX. WSD D
13	SCS Runoff	0.784	1	724	2,786	------	------	------	EX. E (IMP)
14	SCS Runoff	1.320	1	727	4,553	------	------	------	EX. E (PER)
15	Combine	2.058	1	726	7,338	13, 14	------	------	EX. WSD E
16	Combine	22.47	1	725	84,009	3, 6, 9, 12, 15	------	------	AP-1
17	SCS Runoff	1.568	1	724	5,572	------	------	------	EX. F (IMP)
18	SCS Runoff	0.151	1	725	469	------	------	------	EX. F (PER)
19	Combine	1.719	1	724	6,041	17, 18	------	------	A.P-2

Hydrograph Report

Hyd. No. 1

EX. A (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.359 cfs
Storm frequency	=	25 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	1,551 cuft
Drainage area	=	0.070 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

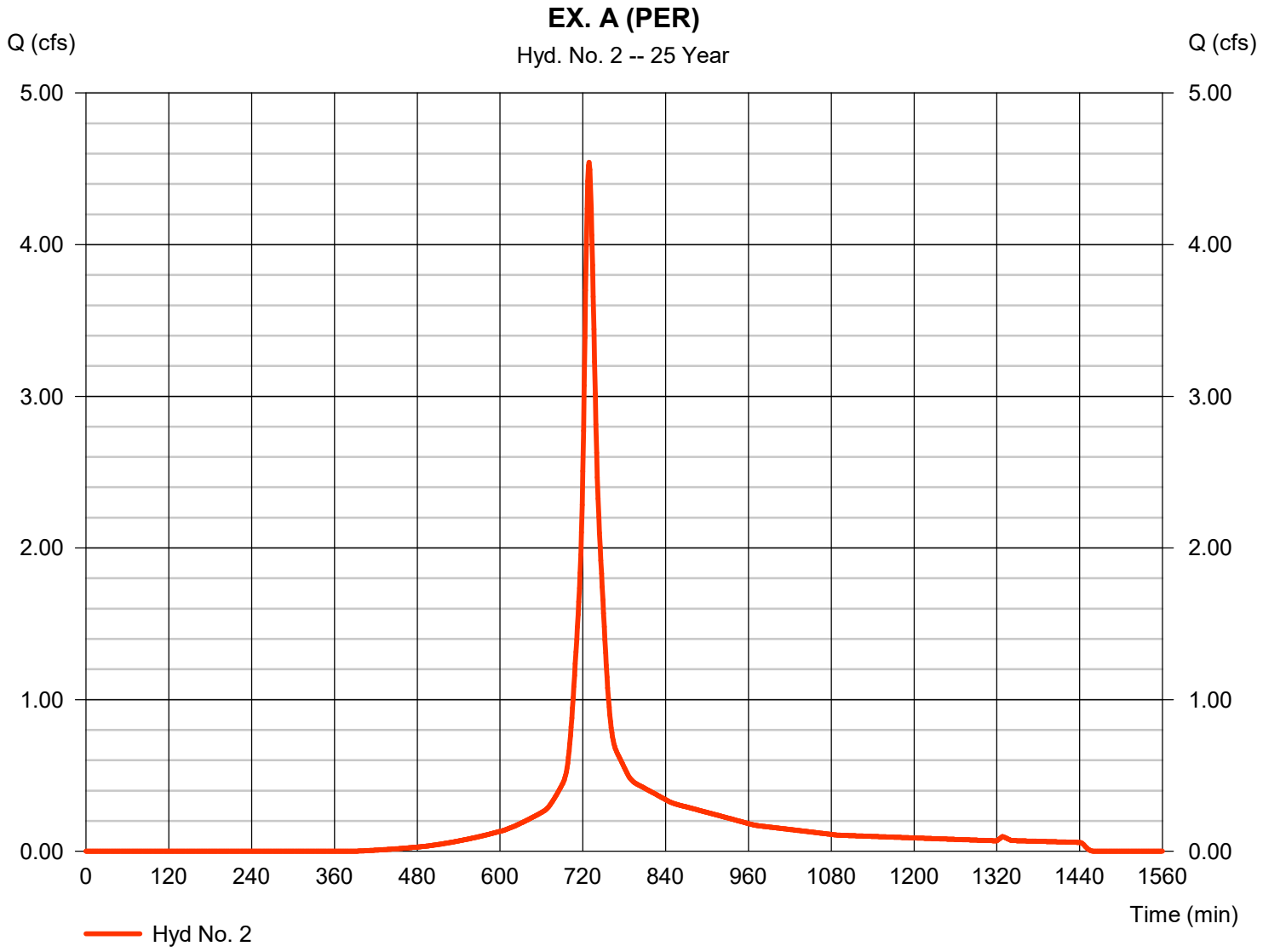


Hydrograph Report

Hyd. No. 2

EX. A (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.542 cfs
Storm frequency	=	25 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	17,179 cuft
Drainage area	=	1.150 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

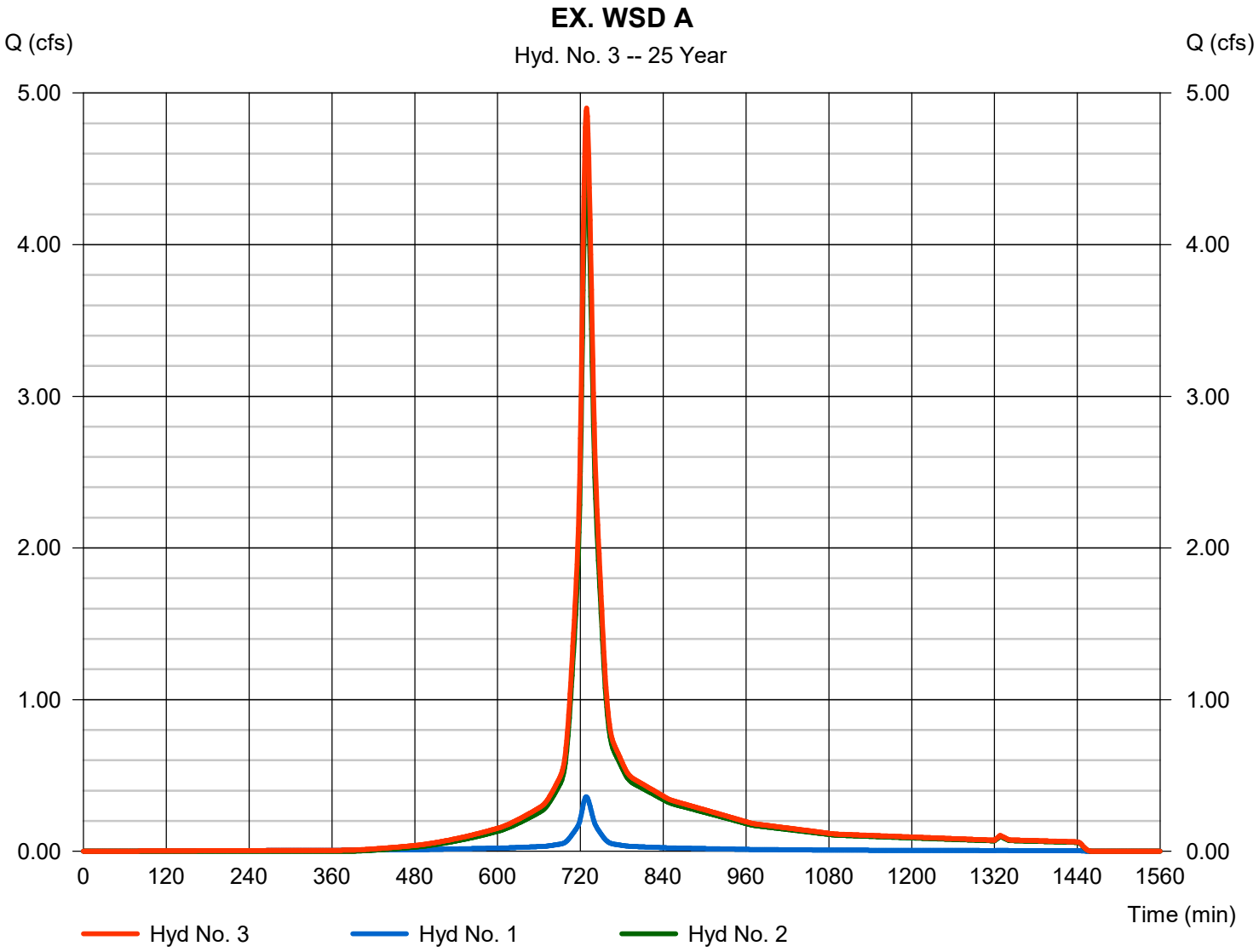


Hydrograph Report

Hyd. No. 3

EX. WSD A

Hydrograph type	=	Combine	Peak discharge	=	4.901 cfs
Storm frequency	=	25 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	18,730 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	1.220 ac

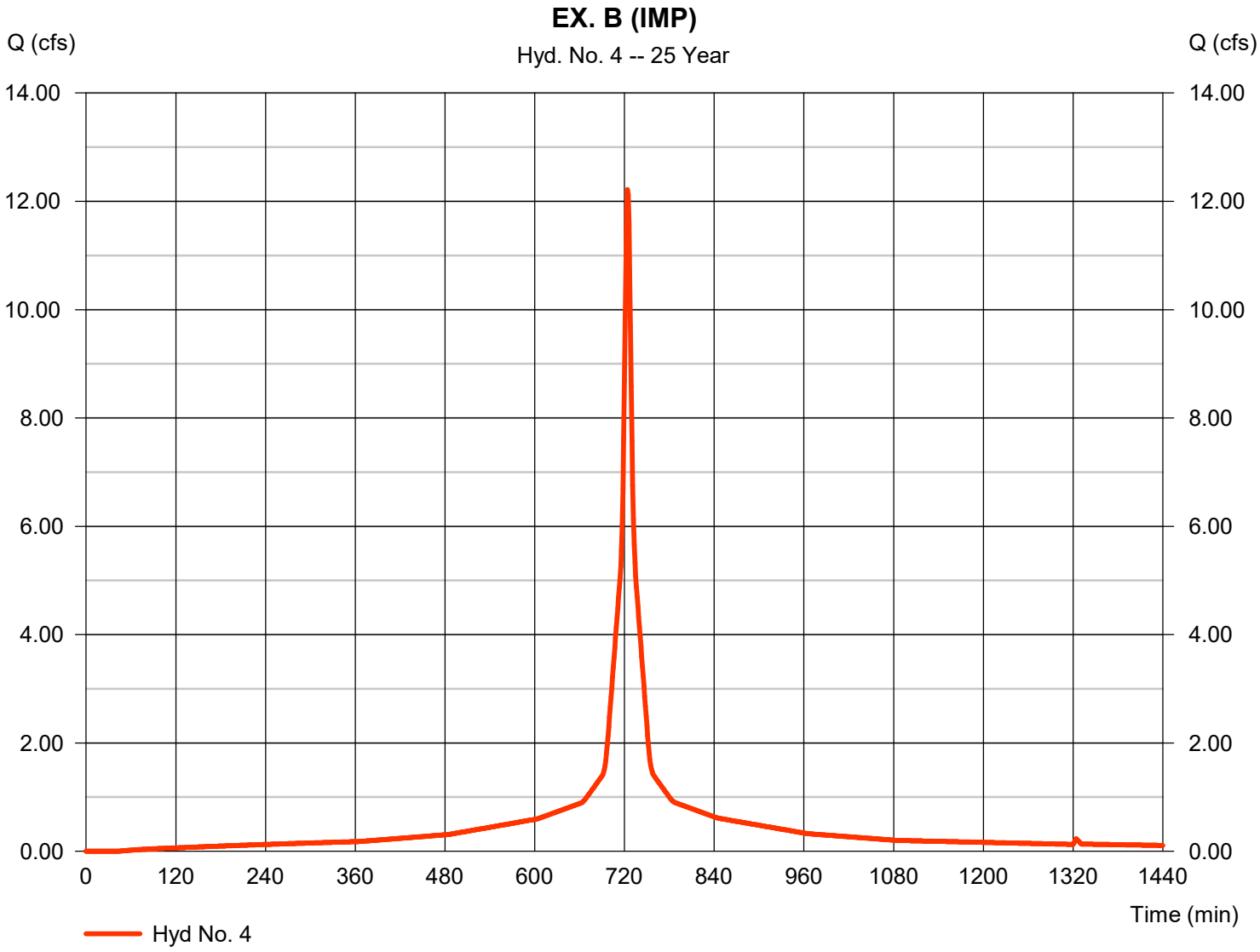


Hydrograph Report

Hyd. No. 4

EX. B (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	12.22 cfs
Storm frequency	=	25 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	43,411 cuft
Drainage area	=	1.870 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

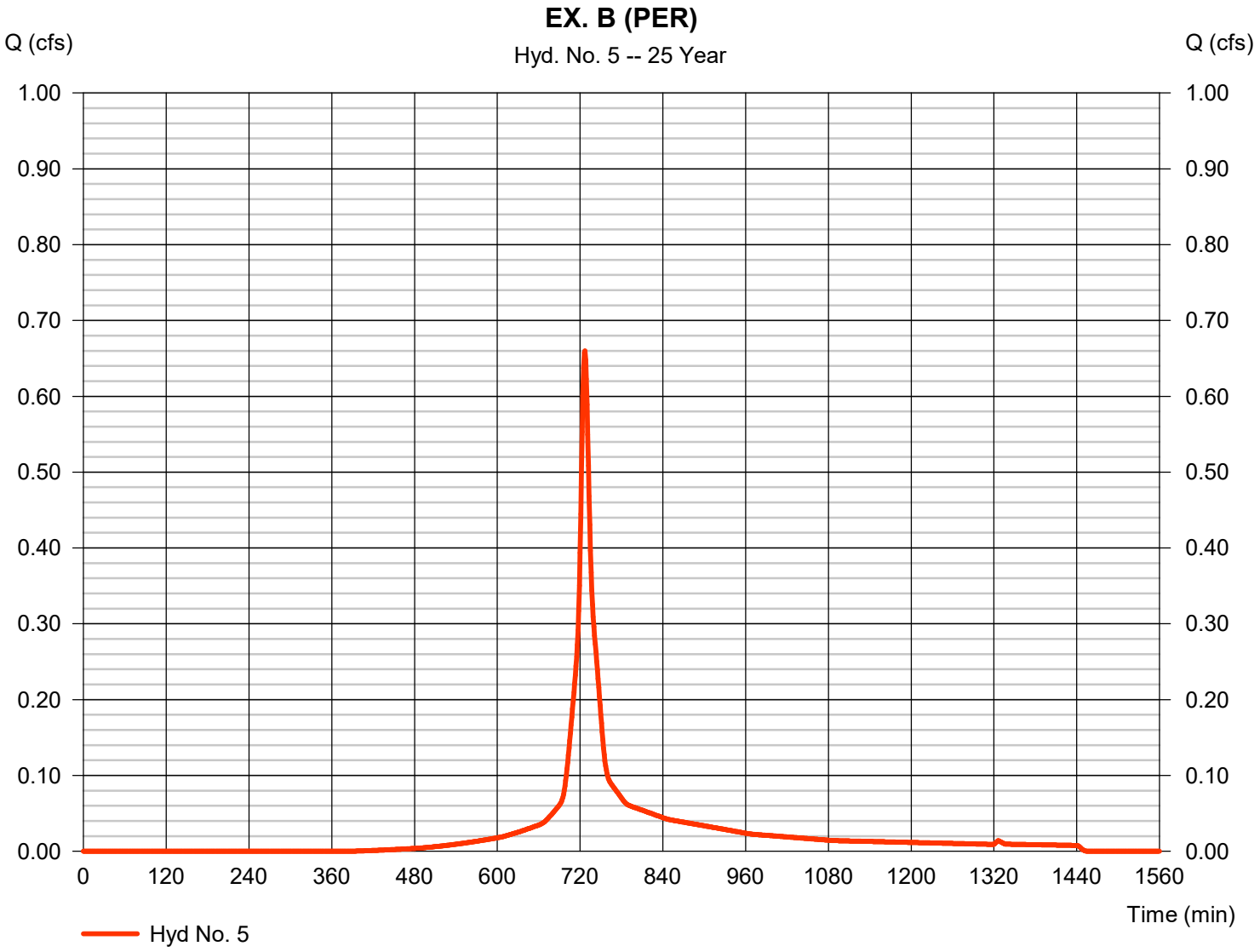


Hydrograph Report

Hyd. No. 5

EX. B (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.660 cfs
Storm frequency	=	25 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	2,276 cuft
Drainage area	=	0.150 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

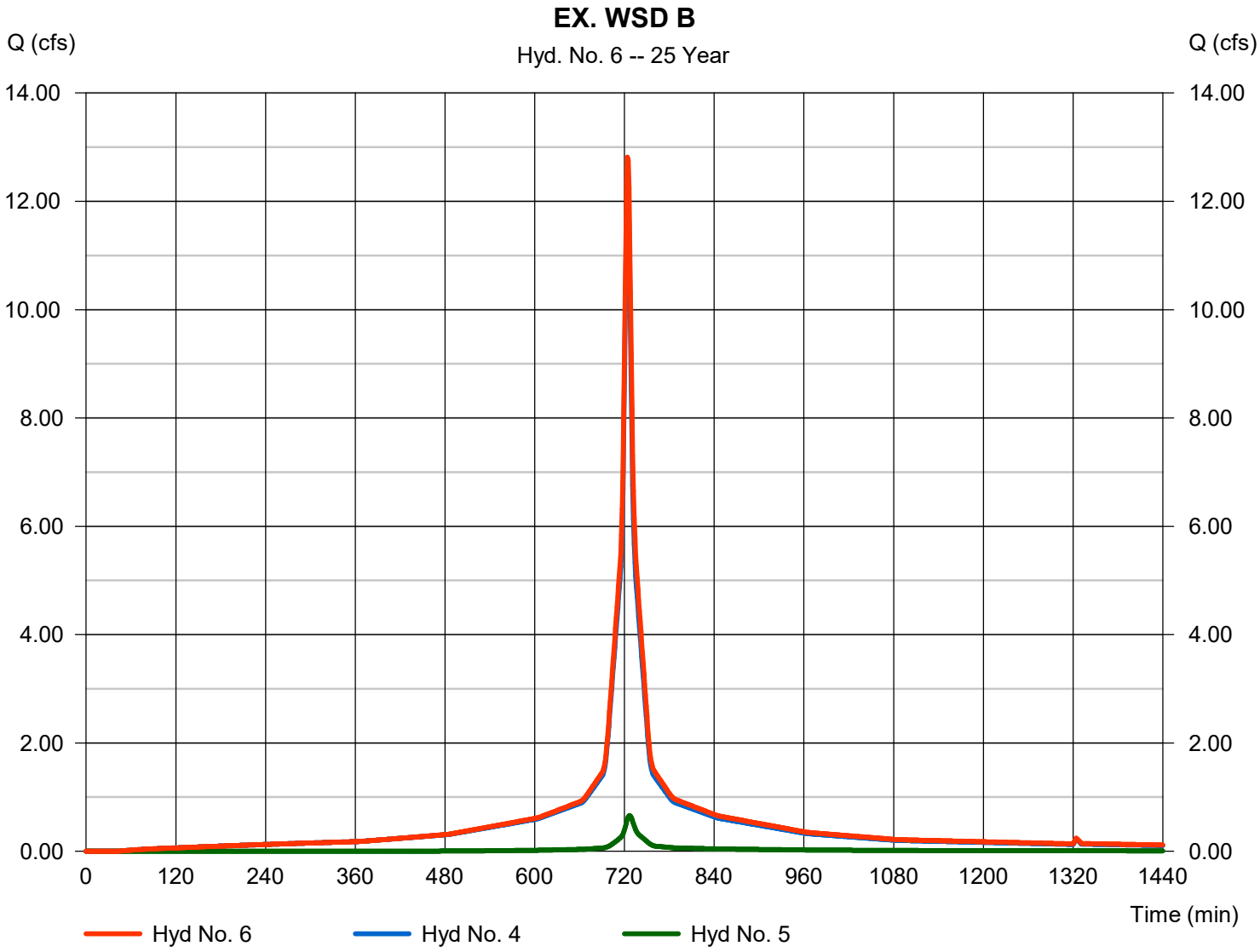


Hydrograph Report

Hyd. No. 6

EX. WSD B

Hydrograph type	=	Combine	Peak discharge	=	12.82 cfs
Storm frequency	=	25 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	45,688 cuft
Inflow hyds.	=	4, 5	Contrib. drain. area	=	2.020 ac

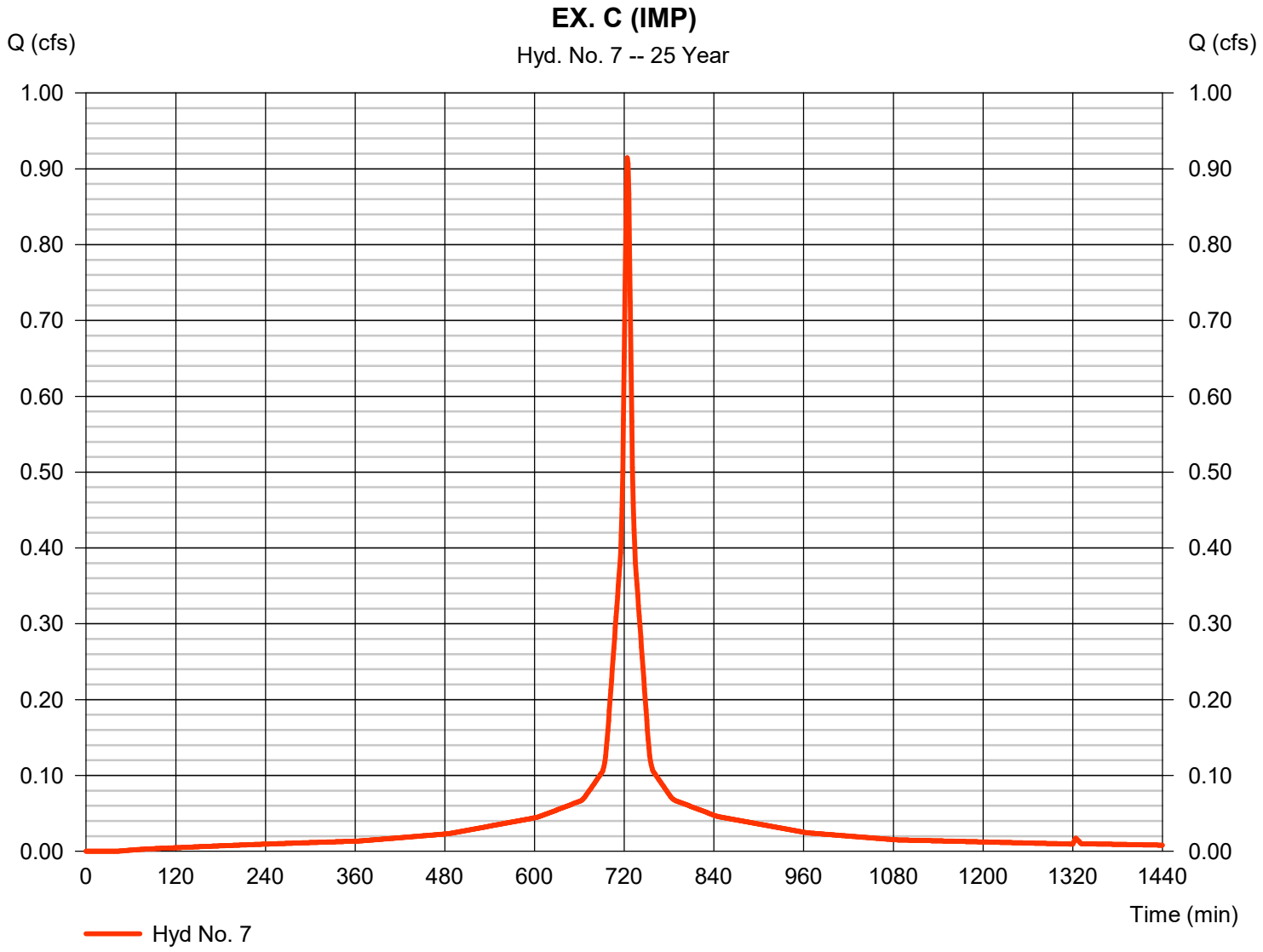


Hydrograph Report

Hyd. No. 7

EX. C (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.915 cfs
Storm frequency	=	25 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	3,250 cuft
Drainage area	=	0.140 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

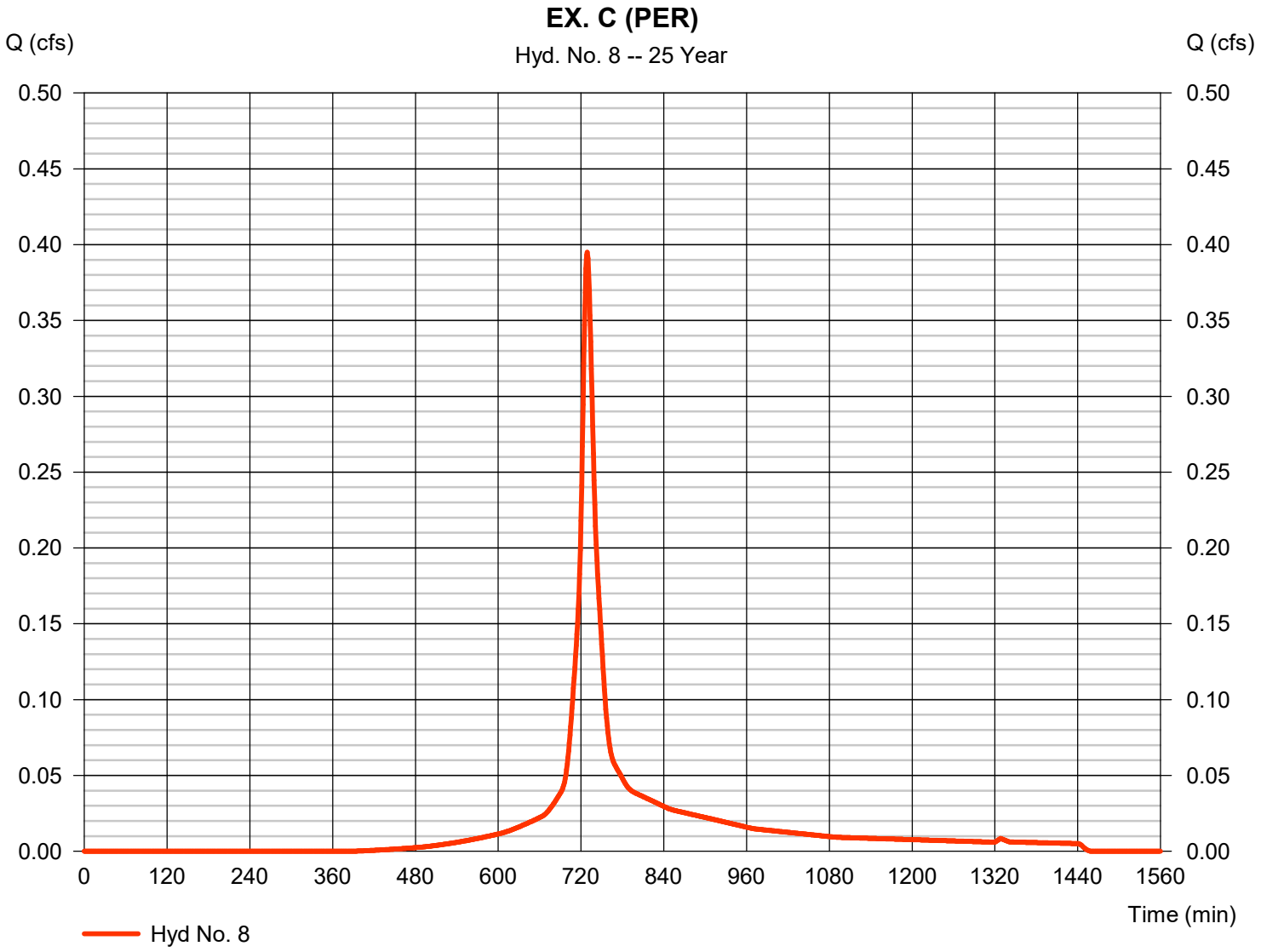


Hydrograph Report

Hyd. No. 8

EX. C (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.395 cfs
Storm frequency	=	25 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	1,494 cuft
Drainage area	=	0.100 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

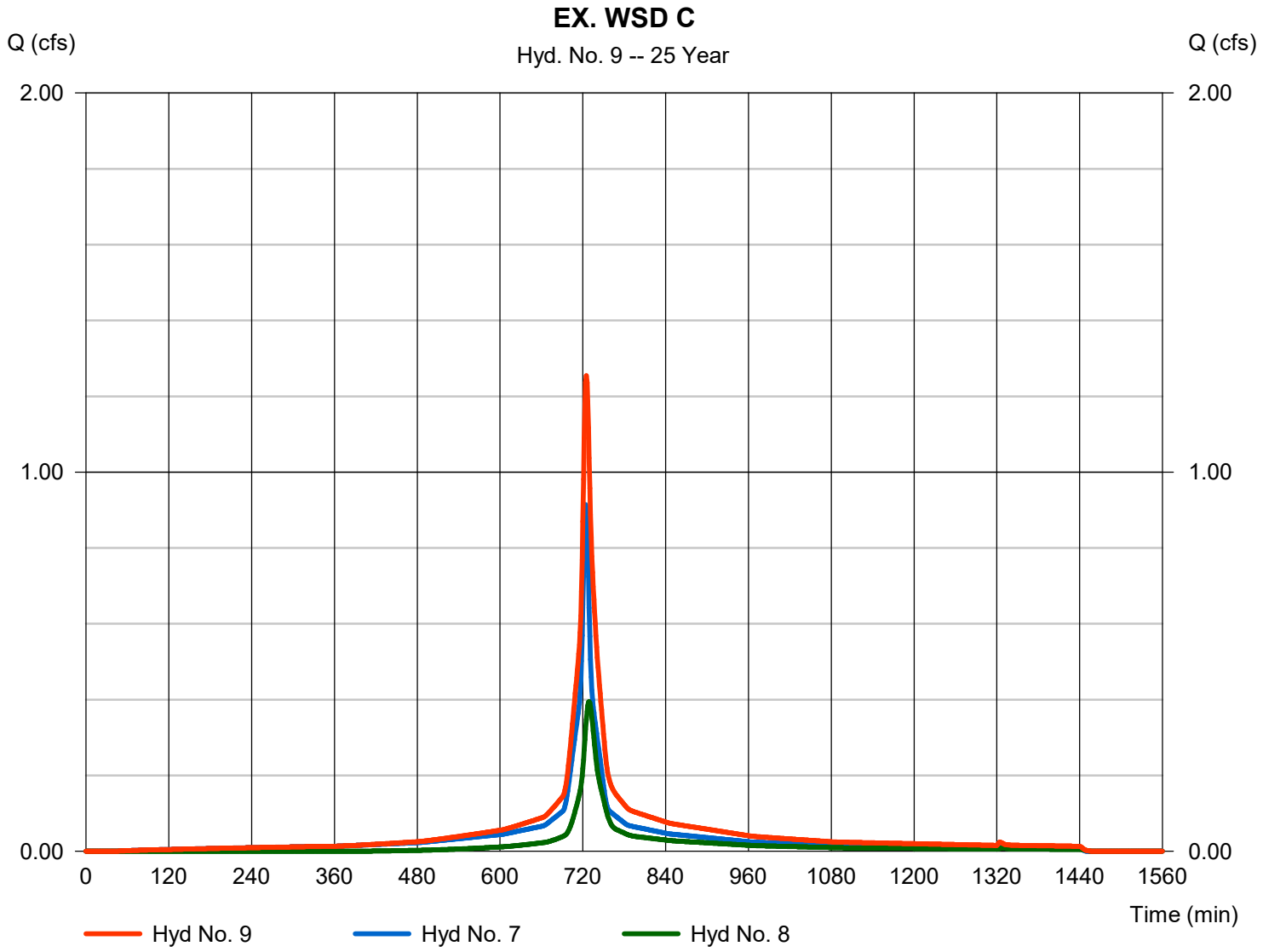


Hydrograph Report

Hyd. No. 9

EX. WSD C

Hydrograph type	=	Combine	Peak discharge	=	1.254 cfs
Storm frequency	=	25 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	4,744 cuft
Inflow hyds.	=	7, 8	Contrib. drain. area	=	0.240 ac

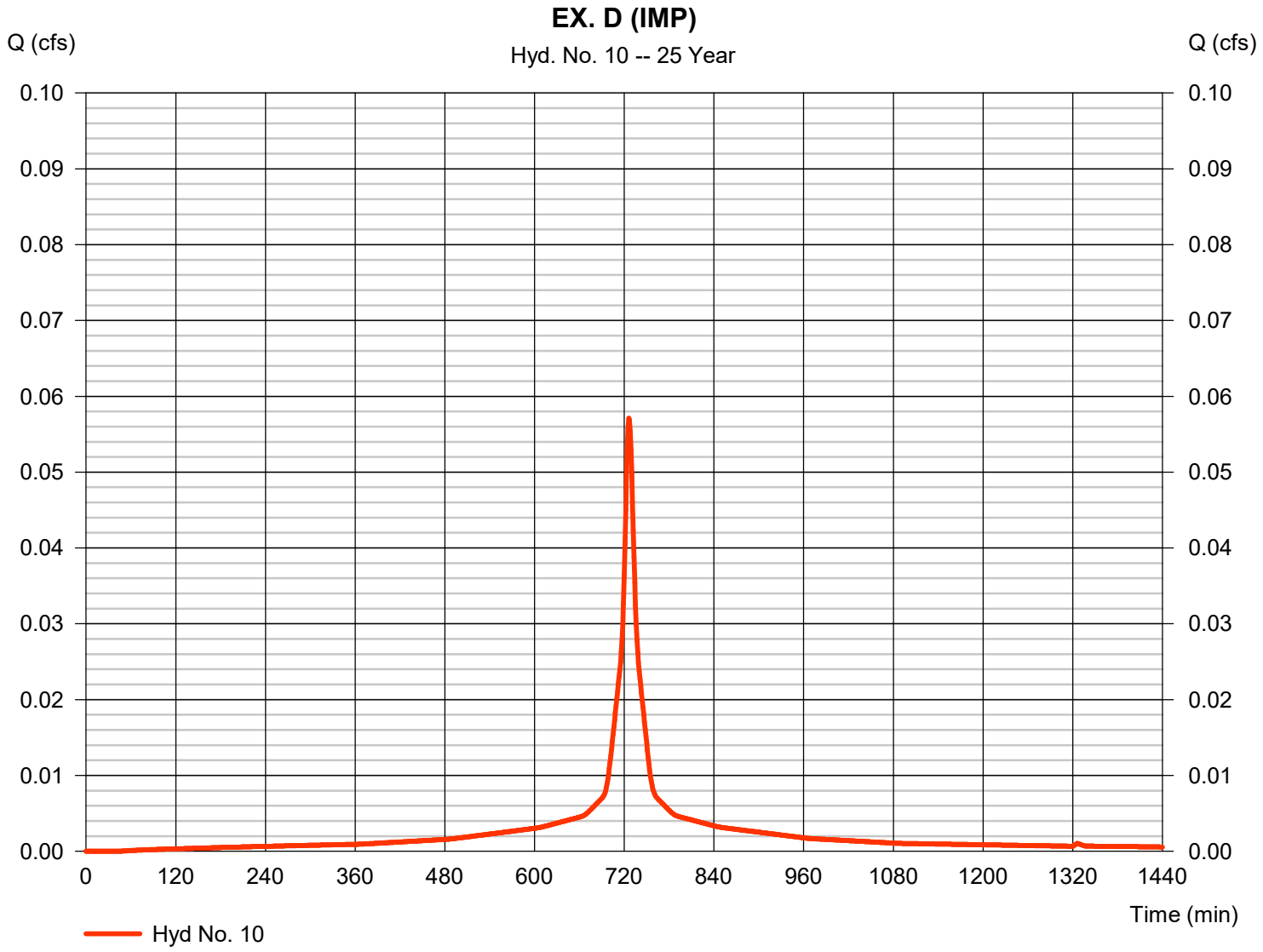


Hydrograph Report

Hyd. No. 10

EX. D (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.057 cfs
Storm frequency	=	25 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	225 cuft
Drainage area	=	0.010 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

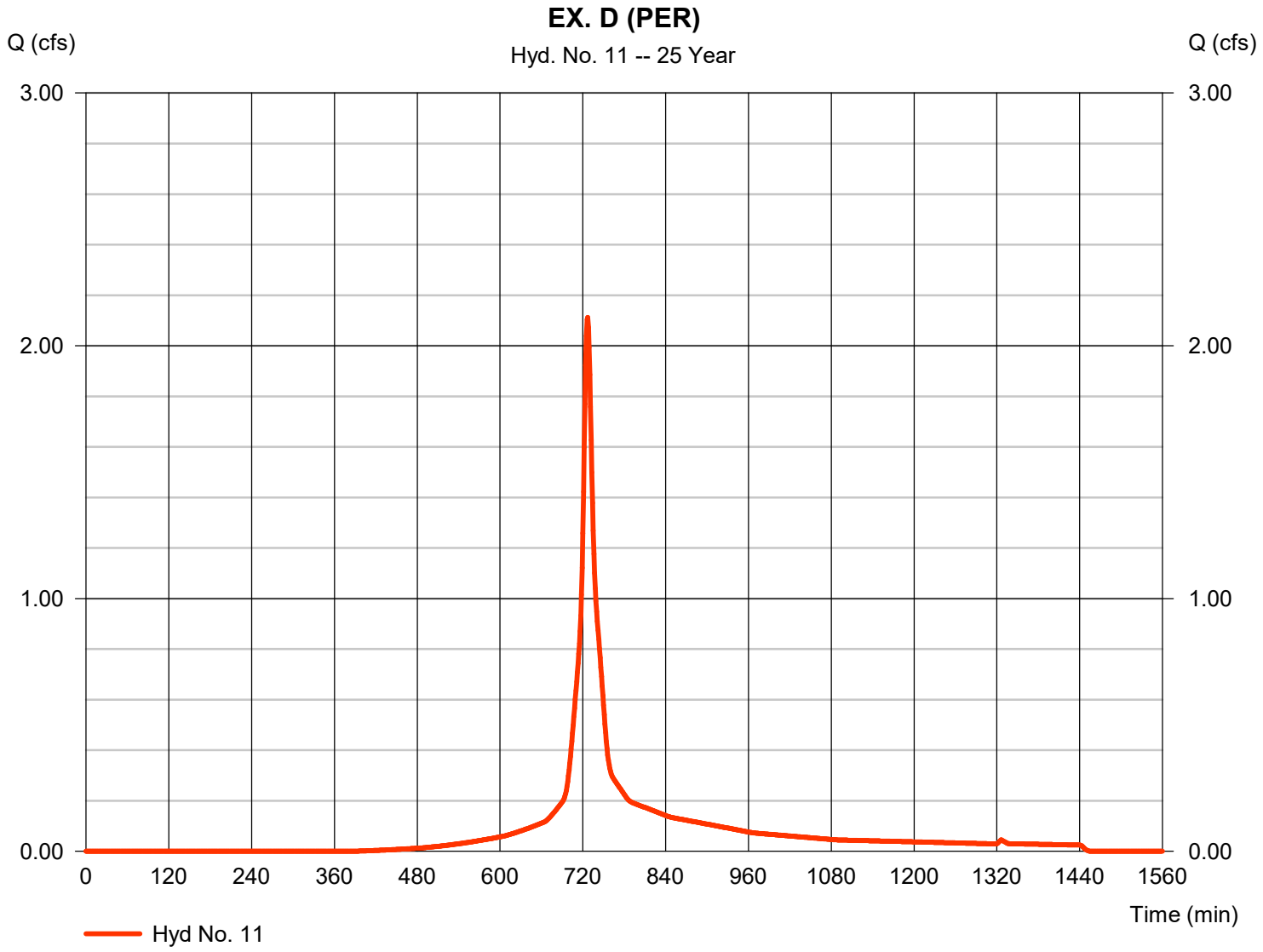


Hydrograph Report

Hyd. No. 11

EX. D (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.112 cfs
Storm frequency	=	25 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	7,284 cuft
Drainage area	=	0.480 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

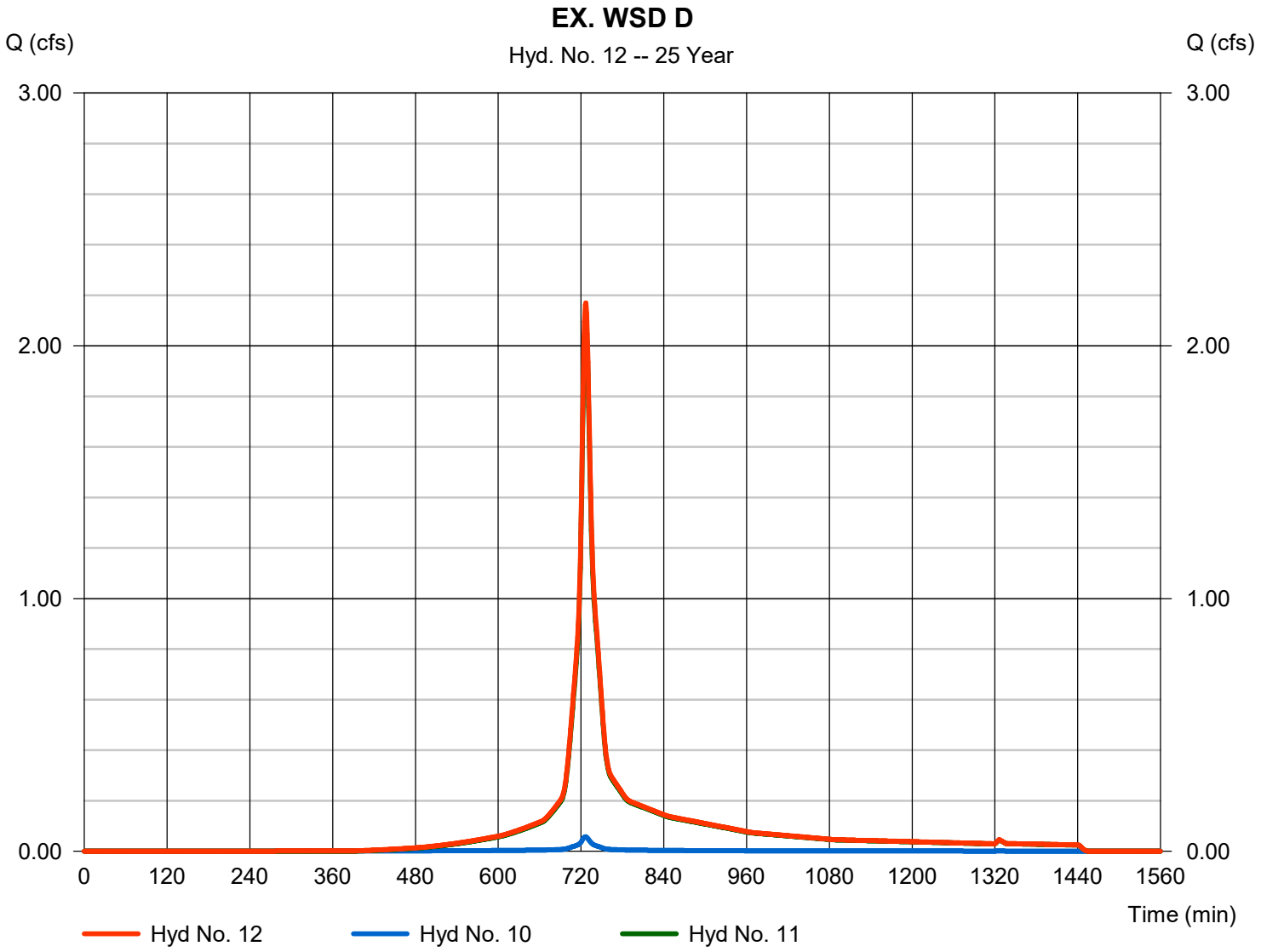


Hydrograph Report

Hyd. No. 12

EX. WSD D

Hydrograph type	=	Combine	Peak discharge	=	2.169 cfs
Storm frequency	=	25 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	7,509 cuft
Inflow hyds.	=	10, 11	Contrib. drain. area	=	0.490 ac

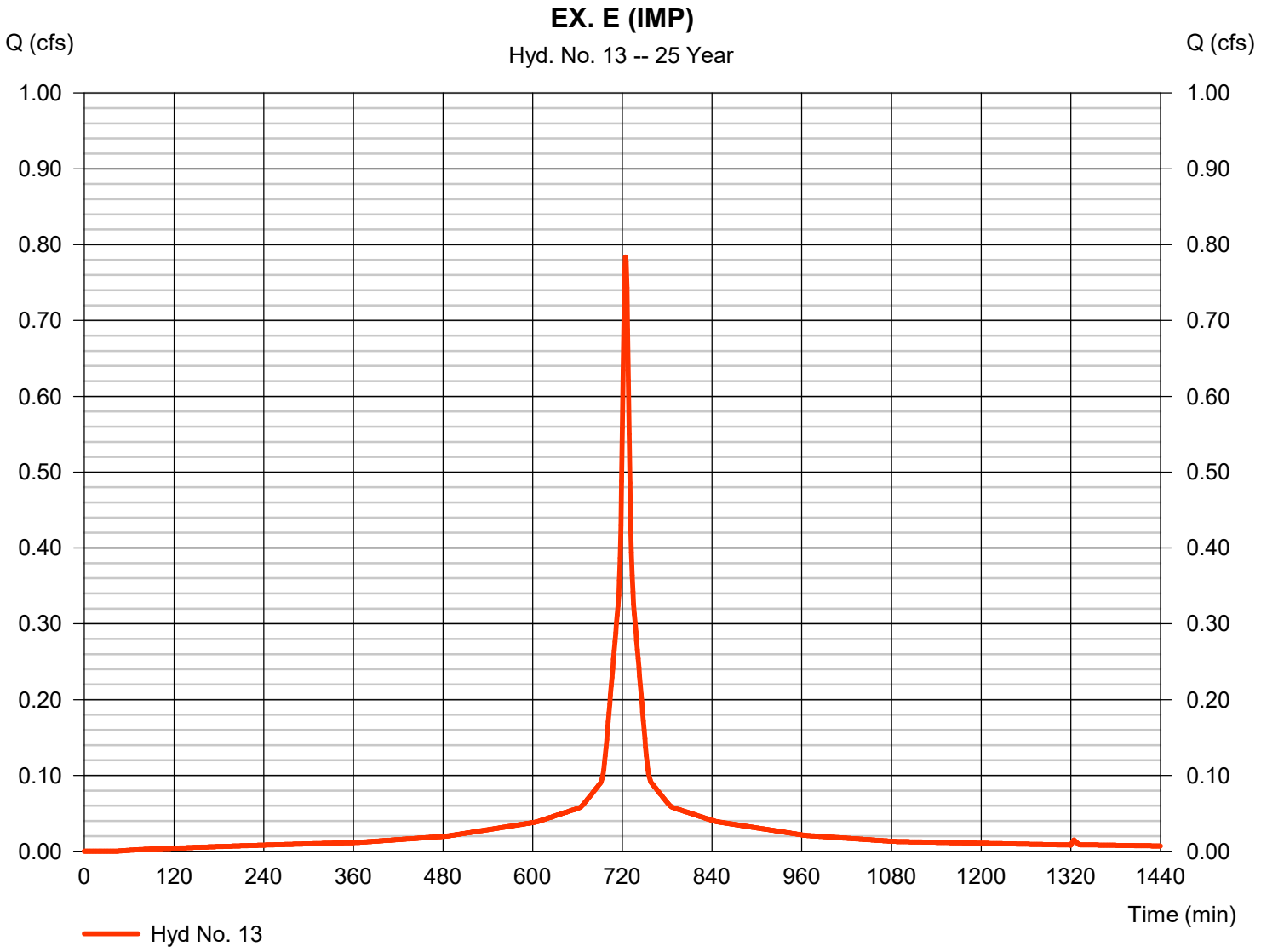


Hydrograph Report

Hyd. No. 13

EX. E (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.784 cfs
Storm frequency	=	25 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	2,786 cuft
Drainage area	=	0.120 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

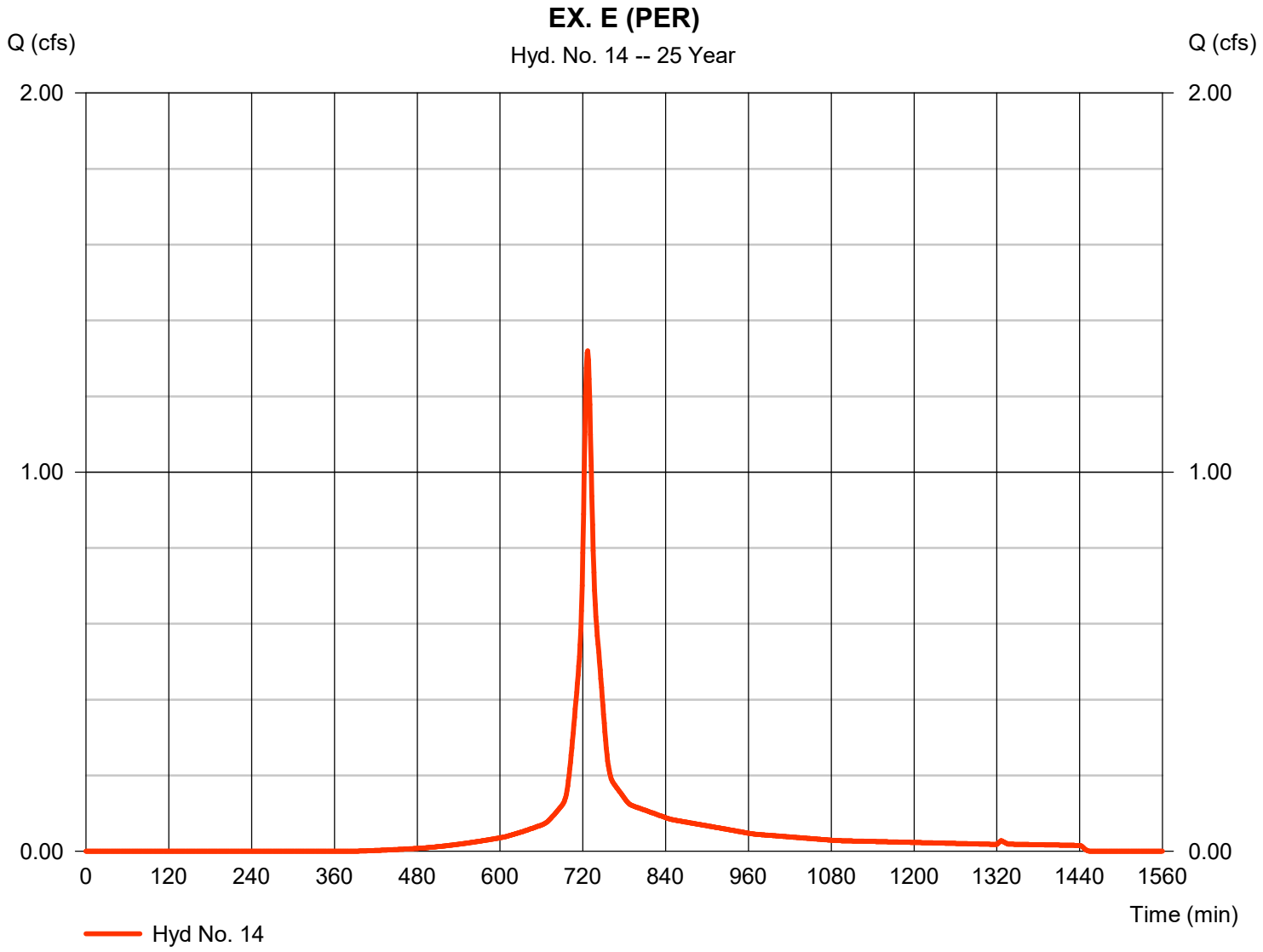


Hydrograph Report

Hyd. No. 14

EX. E (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.320 cfs
Storm frequency	=	25 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	4,553 cuft
Drainage area	=	0.300 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

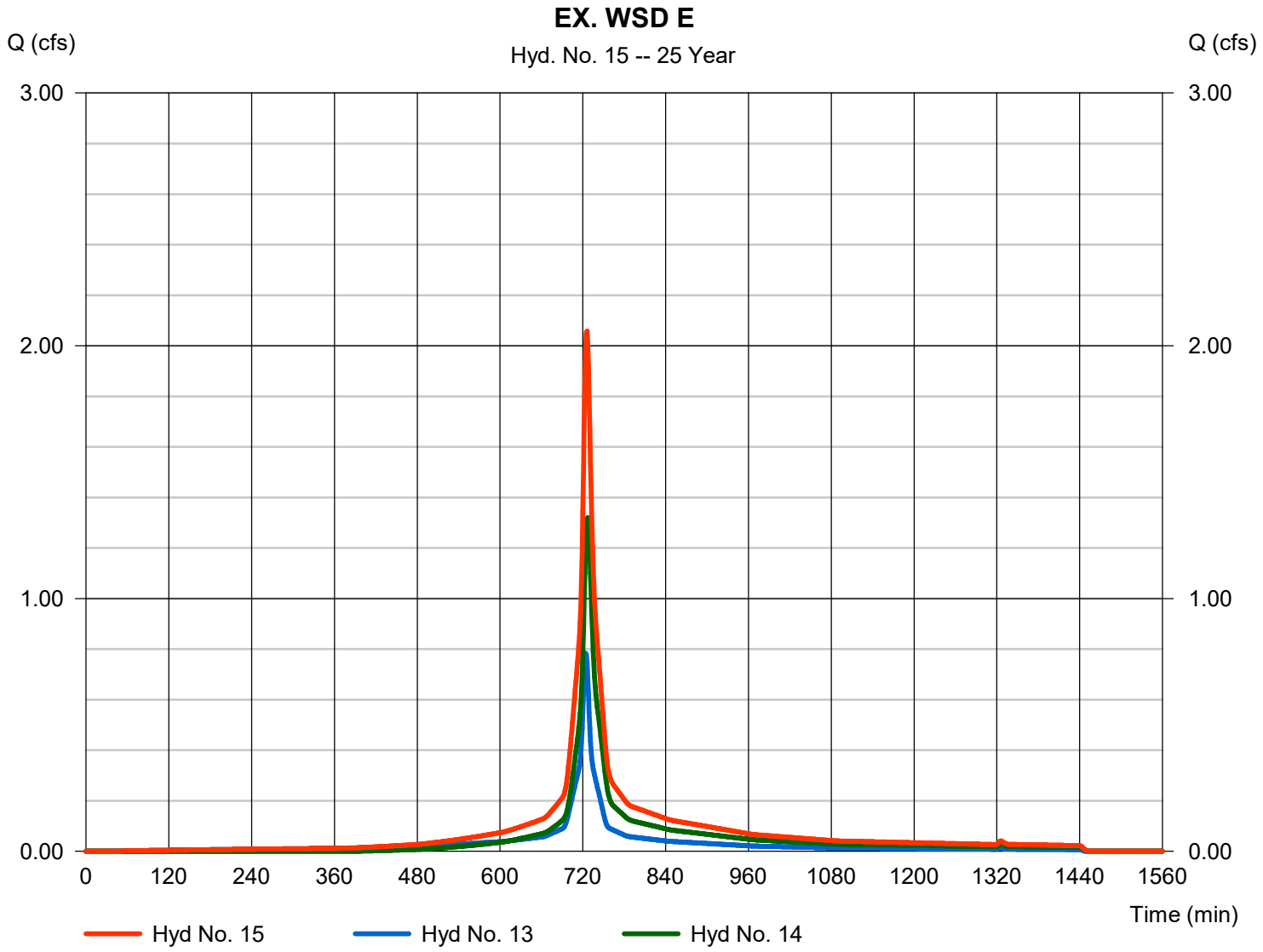


Hydrograph Report

Hyd. No. 15

EX. WSD E

Hydrograph type	=	Combine	Peak discharge	=	2.058 cfs
Storm frequency	=	25 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	7,338 cuft
Inflow hyds.	=	13, 14	Contrib. drain. area	=	0.420 ac

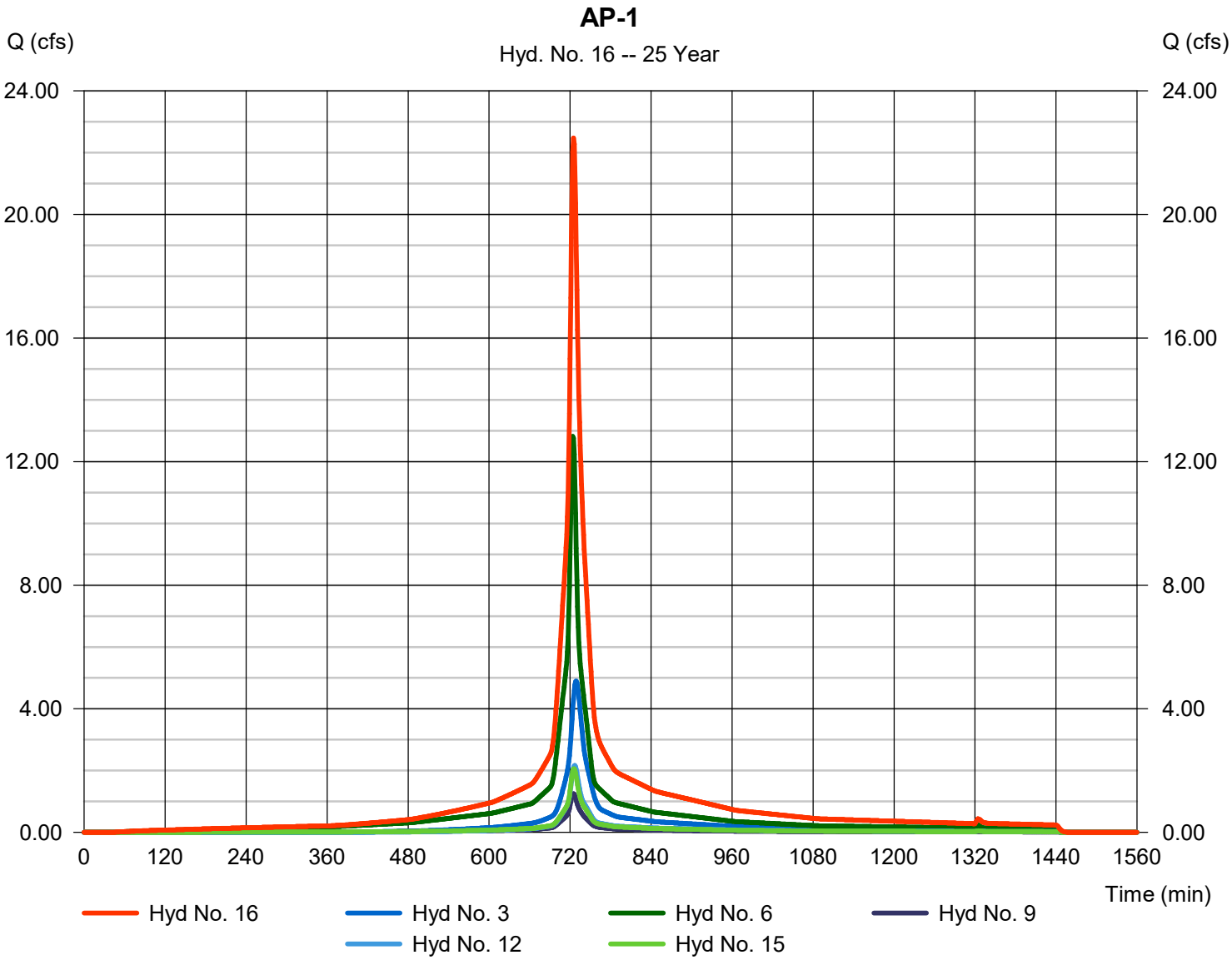


Hydrograph Report

Hyd. No. 16

AP-1

Hydrograph type	=	Combine	Peak discharge	=	22.47 cfs
Storm frequency	=	25 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	84,009 cuft
Inflow hyds.	=	3, 6, 9, 12, 15	Contrib. drain. area	=	0.000 ac

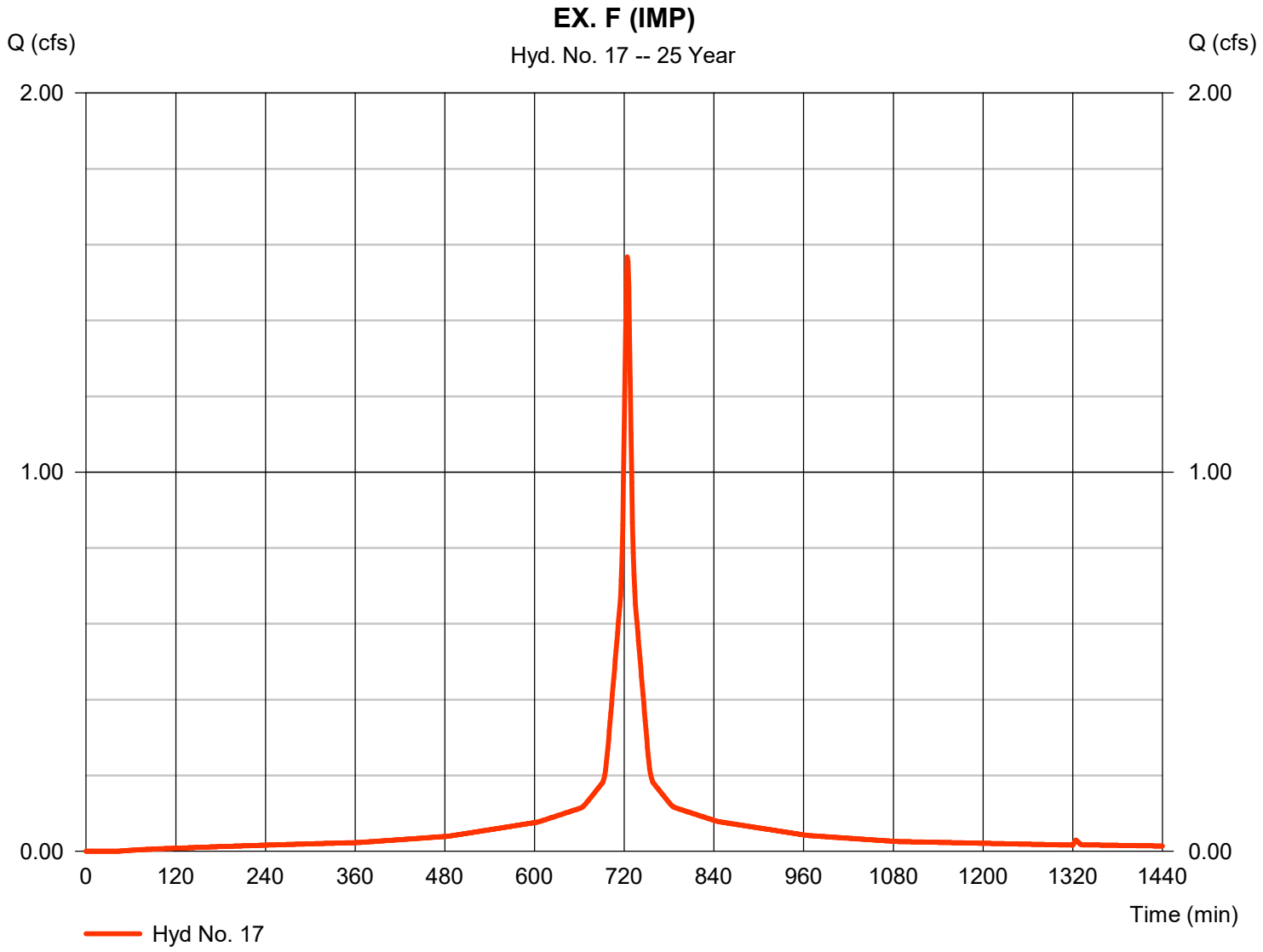


Hydrograph Report

Hyd. No. 17

EX. F (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.568 cfs
Storm frequency	=	25 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	5,572 cuft
Drainage area	=	0.240 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

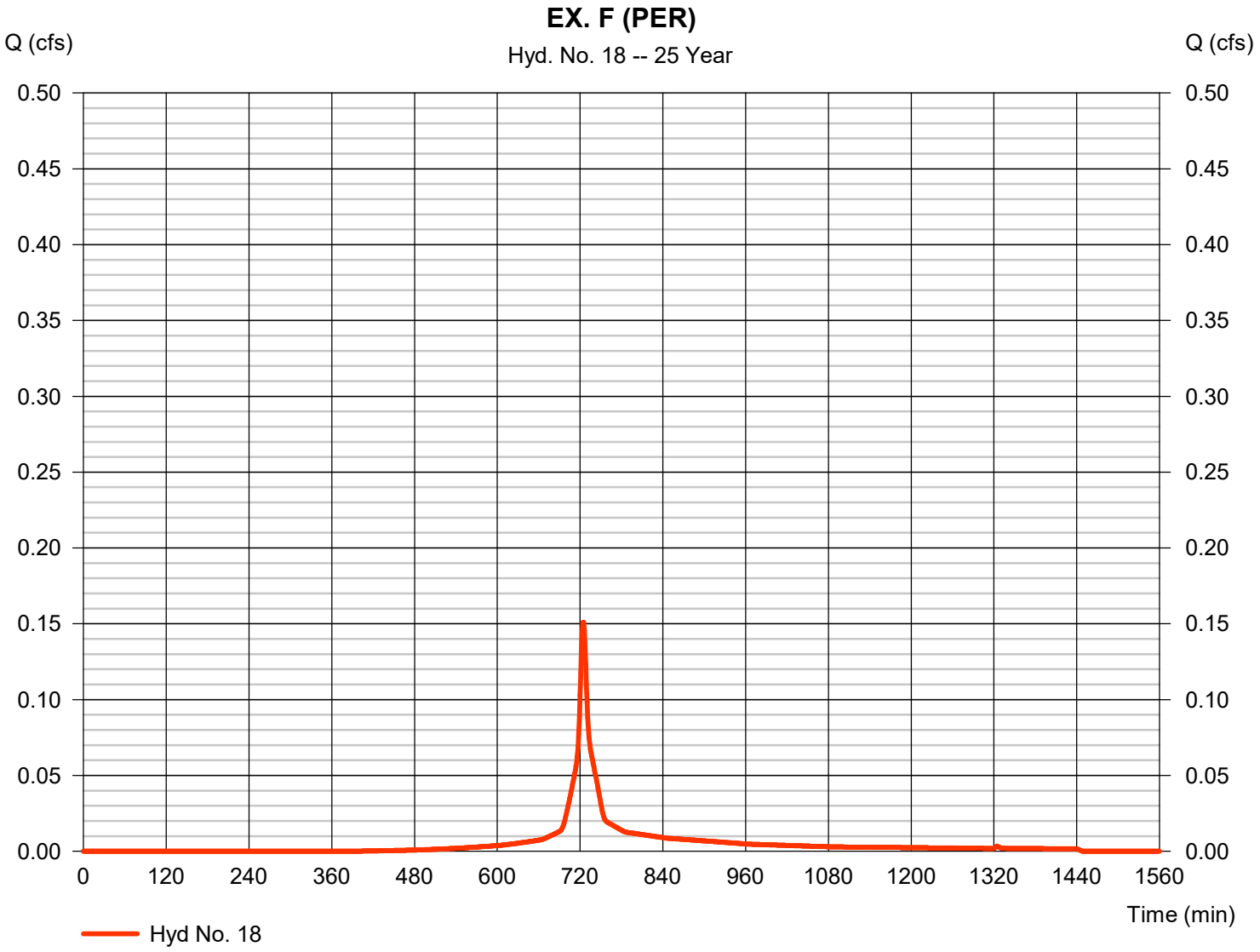


Hydrograph Report

Hyd. No. 18

EX. F (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.151 cfs
Storm frequency	=	25 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	469 cuft
Drainage area	=	0.030 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

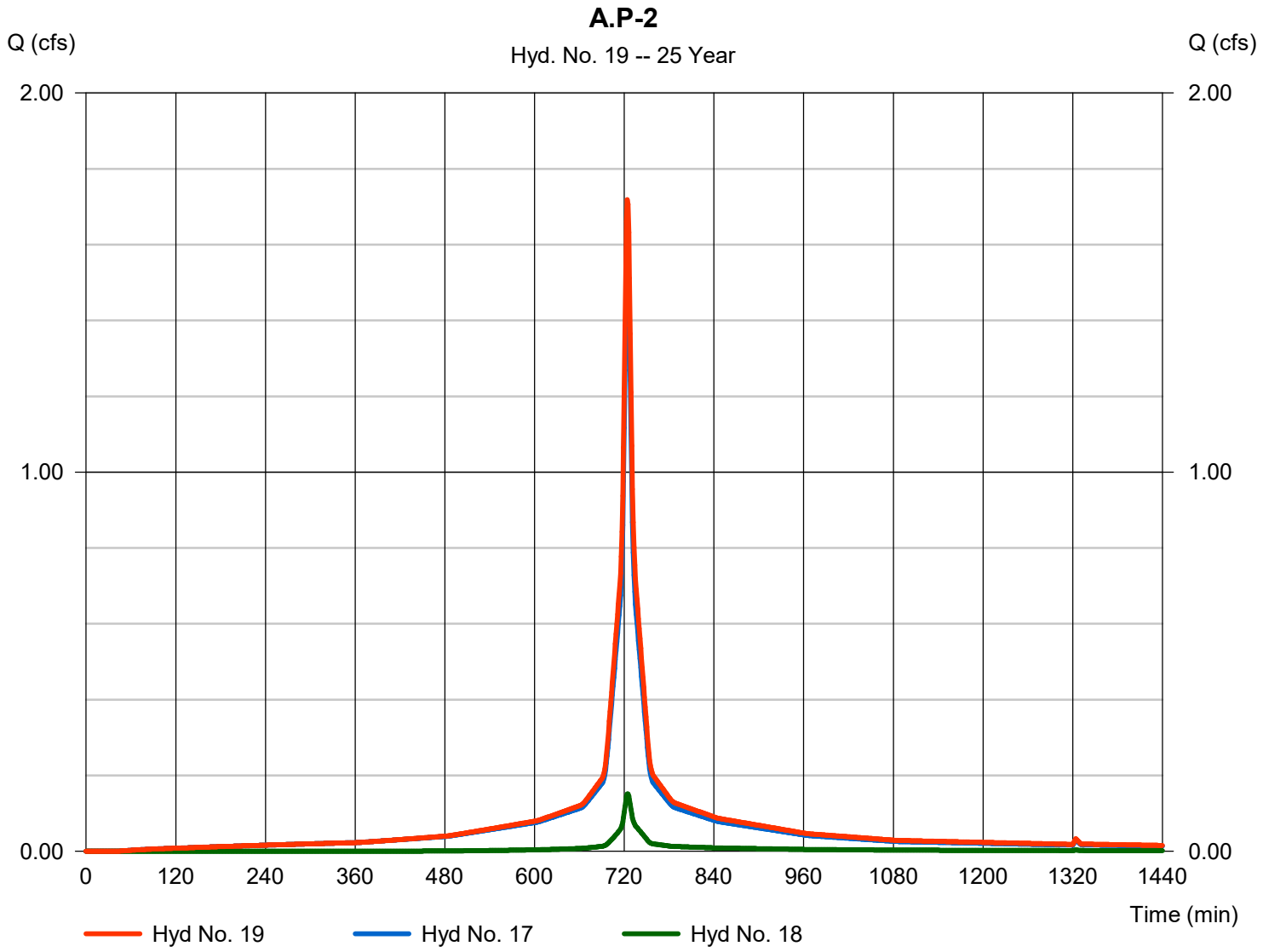


Hydrograph Report

Hyd. No. 19

A.P-2

Hydrograph type	=	Combine	Peak discharge	=	1.719 cfs
Storm frequency	=	25 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	6,041 cuft
Inflow hyds.	=	17, 18	Contrib. drain. area	=	0.270 ac



100-YEAR STORM CALCULATIONS

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

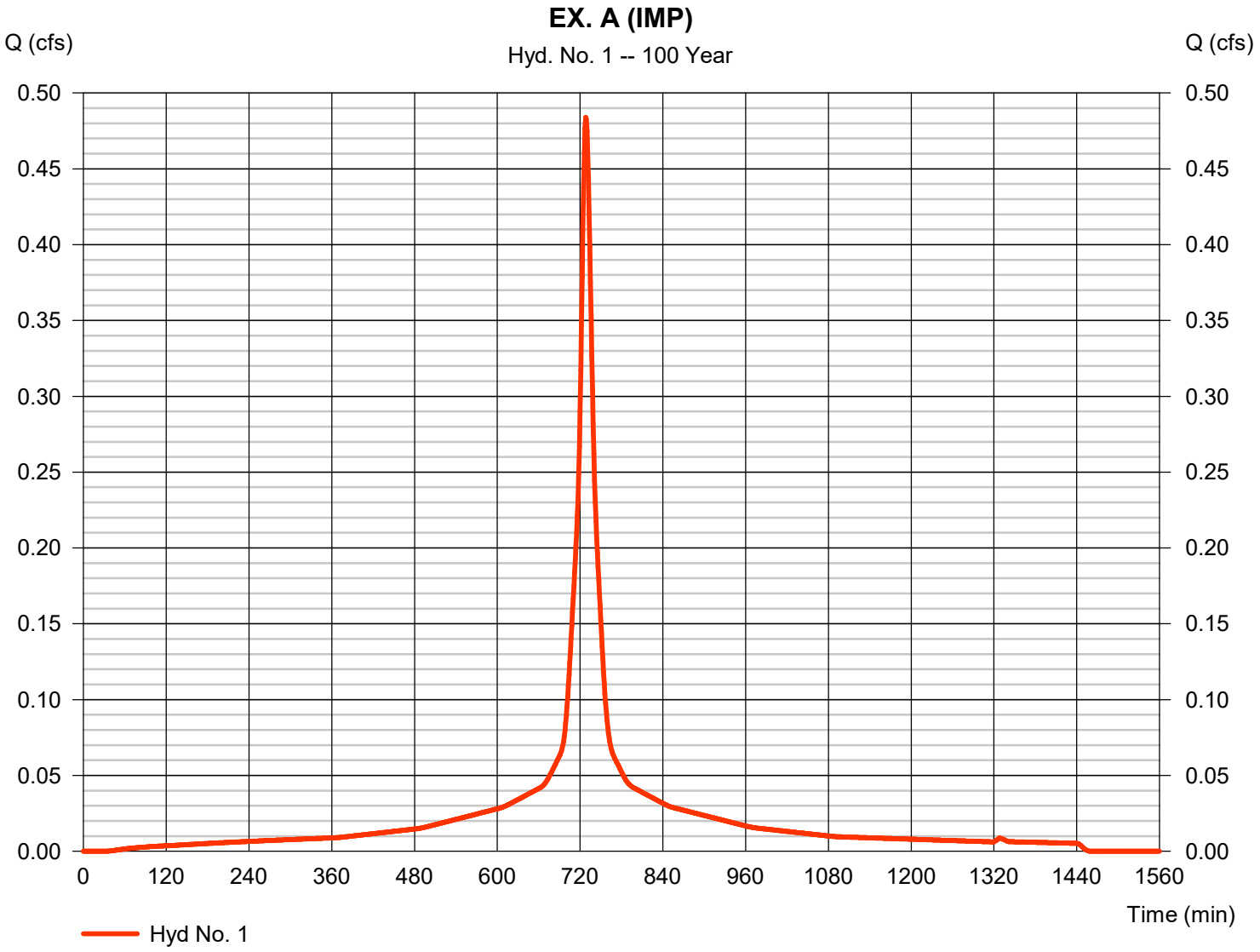
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.484	1	728	2,106	------	------	------	EX. A (IMP)
2	SCS Runoff	6.694	1	729	25,668	------	------	------	EX. A (PER)
3	Combine	7.177	1	729	27,774	1, 2	------	------	EX. WSD A
4	SCS Runoff	16.45	1	724	58,941	------	------	------	EX. B (IMP)
5	SCS Runoff	0.972	1	727	3,401	------	------	------	EX. B (PER)
6	Combine	17.34	1	724	62,342	4, 5	------	------	EX. WSD B
7	SCS Runoff	1.232	1	724	4,413	------	------	------	EX. C (IMP)
8	SCS Runoff	0.582	1	729	2,232	------	------	------	EX. C (PER)
9	Combine	1.738	1	725	6,645	7, 8	------	------	EX. WSD C
10	SCS Runoff	0.077	1	726	306	------	------	------	EX. D (IMP)
11	SCS Runoff	3.110	1	727	10,884	------	------	------	EX. D (PER)
12	Combine	3.186	1	727	11,189	10, 11	------	------	EX. WSD D
13	SCS Runoff	1.056	1	724	3,782	------	------	------	EX. E (IMP)
14	SCS Runoff	1.944	1	727	6,802	------	------	------	EX. E (PER)
15	Combine	2.942	1	726	10,585	13, 14	------	------	EX. WSD E
16	Combine	31.41	1	725	118,534	3, 6, 9, 12, 15	------	------	AP-1
17	SCS Runoff	2.112	1	724	7,565	------	------	------	EX. F (IMP)
18	SCS Runoff	0.222	1	724	701	------	------	------	EX. F (PER)
19	Combine	2.334	1	724	8,266	17, 18	------	------	A.P-2

Hydrograph Report

Hyd. No. 1

EX. A (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.484 cfs
Storm frequency	=	100 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	2,106 cuft
Drainage area	=	0.070 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

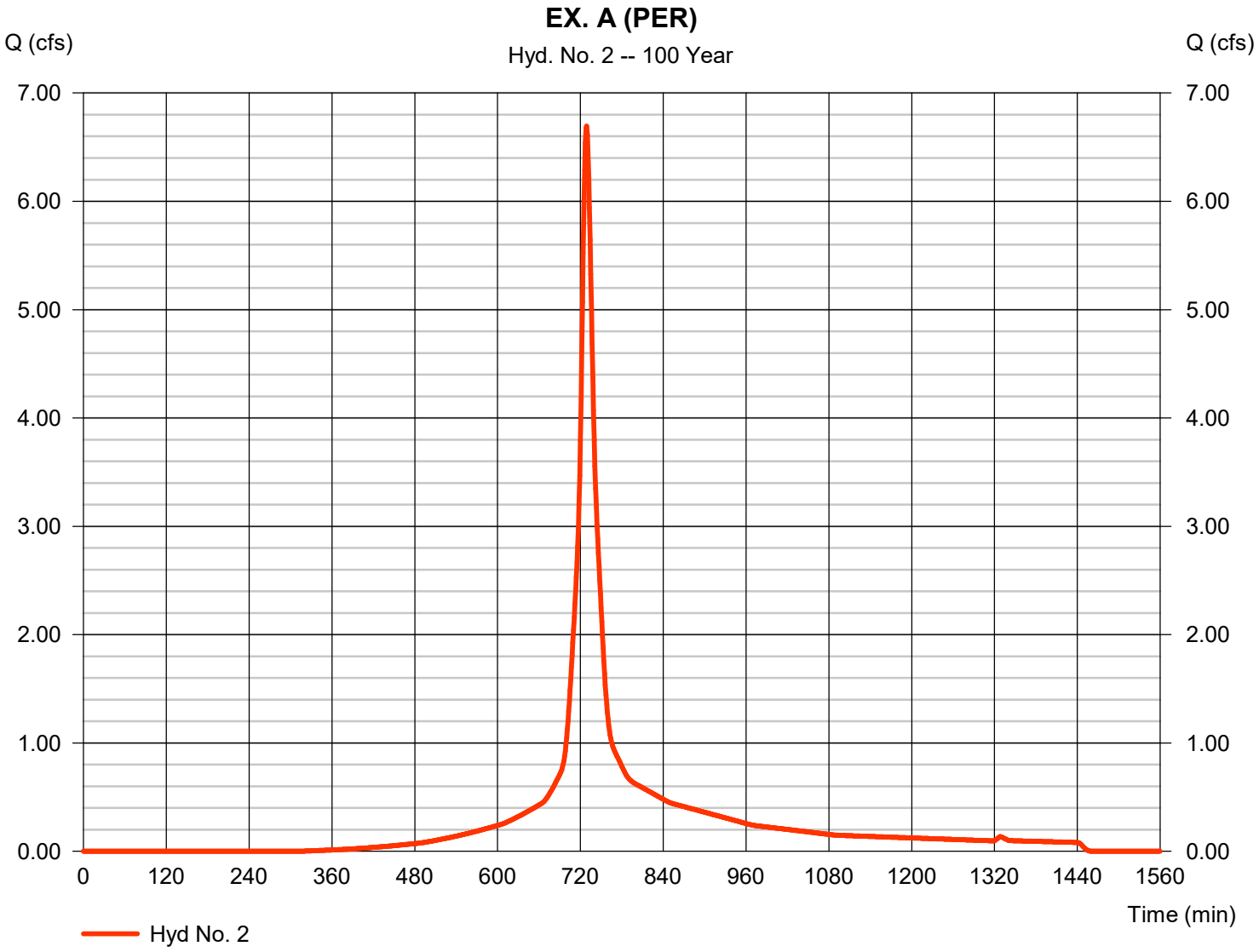


Hydrograph Report

Hyd. No. 2

EX. A (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.694 cfs
Storm frequency	=	100 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	25,668 cuft
Drainage area	=	1.150 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

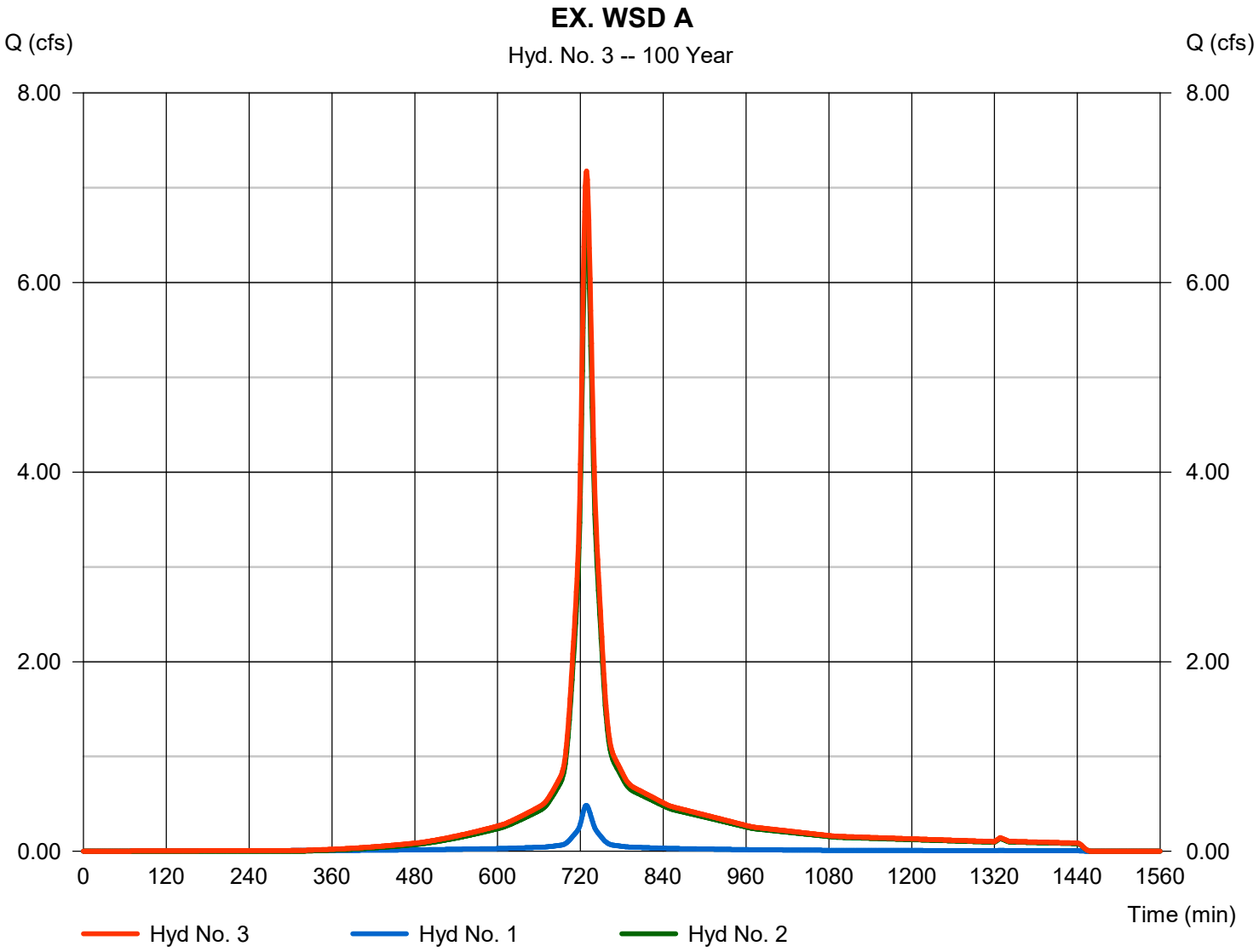


Hydrograph Report

Hyd. No. 3

EX. WSD A

Hydrograph type	=	Combine	Peak discharge	=	7.177 cfs
Storm frequency	=	100 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	27,774 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	1.220 ac

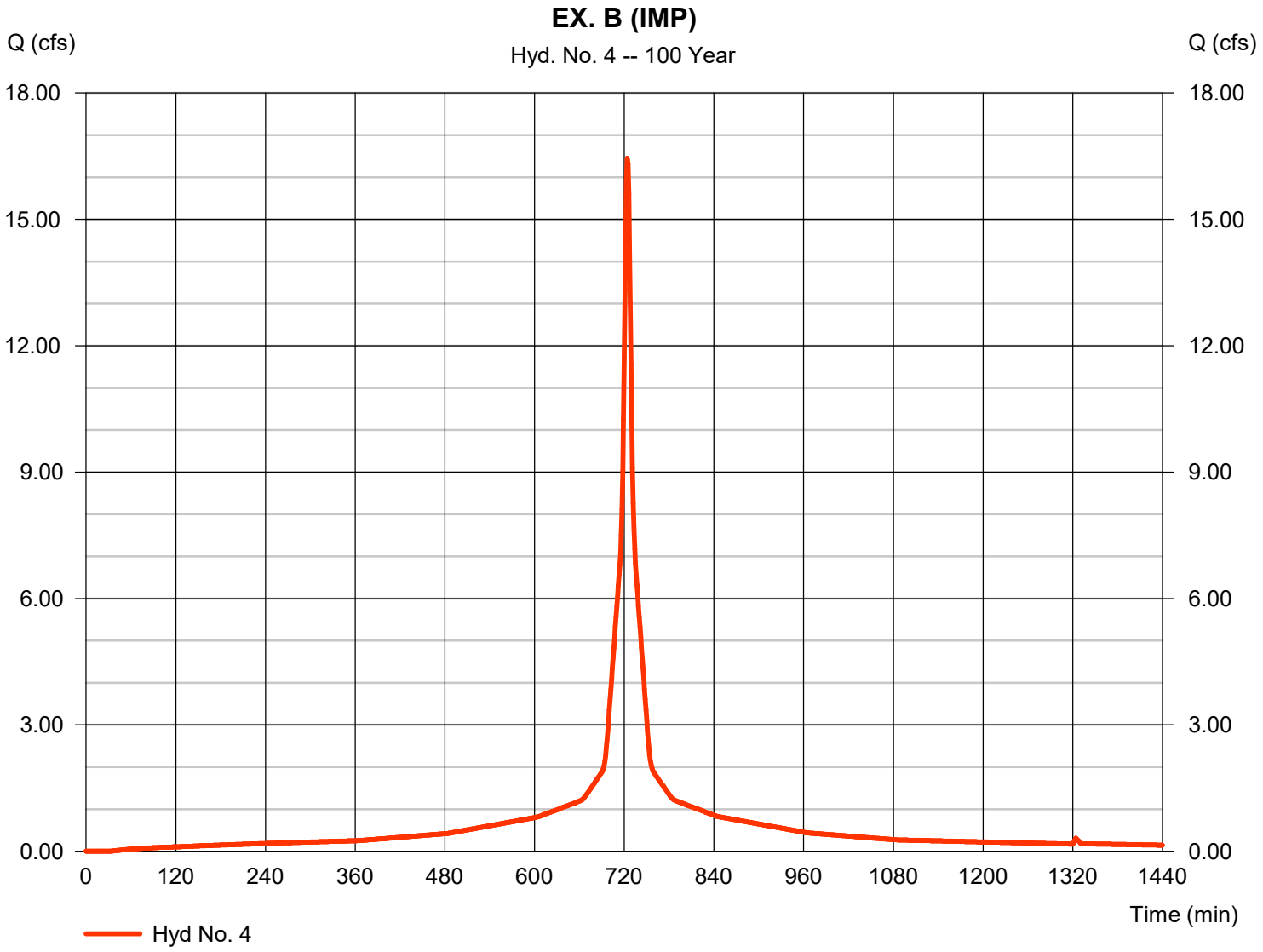


Hydrograph Report

Hyd. No. 4

EX. B (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.45 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	58,941 cuft
Drainage area	=	1.870 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

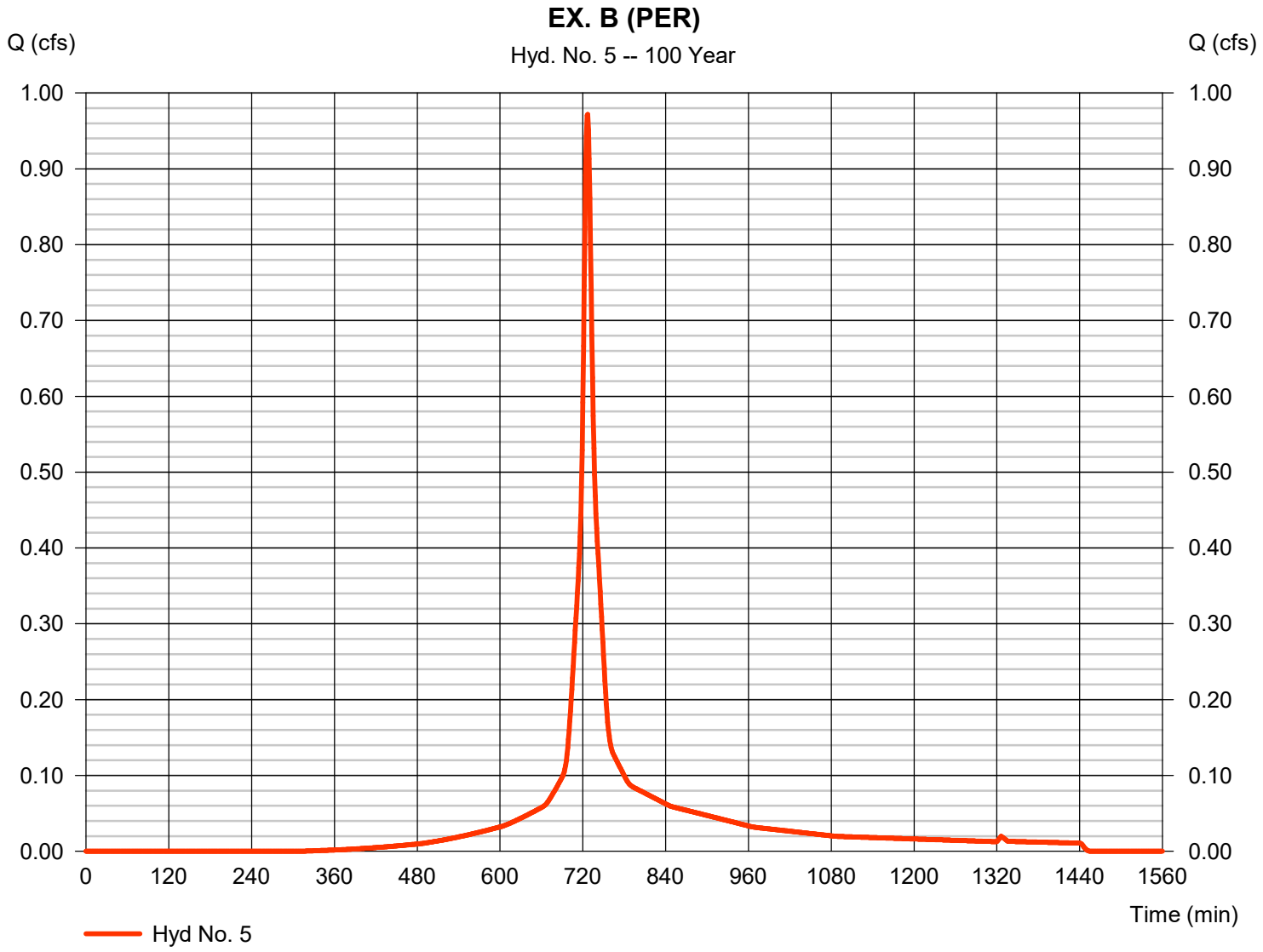


Hydrograph Report

Hyd. No. 5

EX. B (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.972 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	3,401 cuft
Drainage area	=	0.150 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

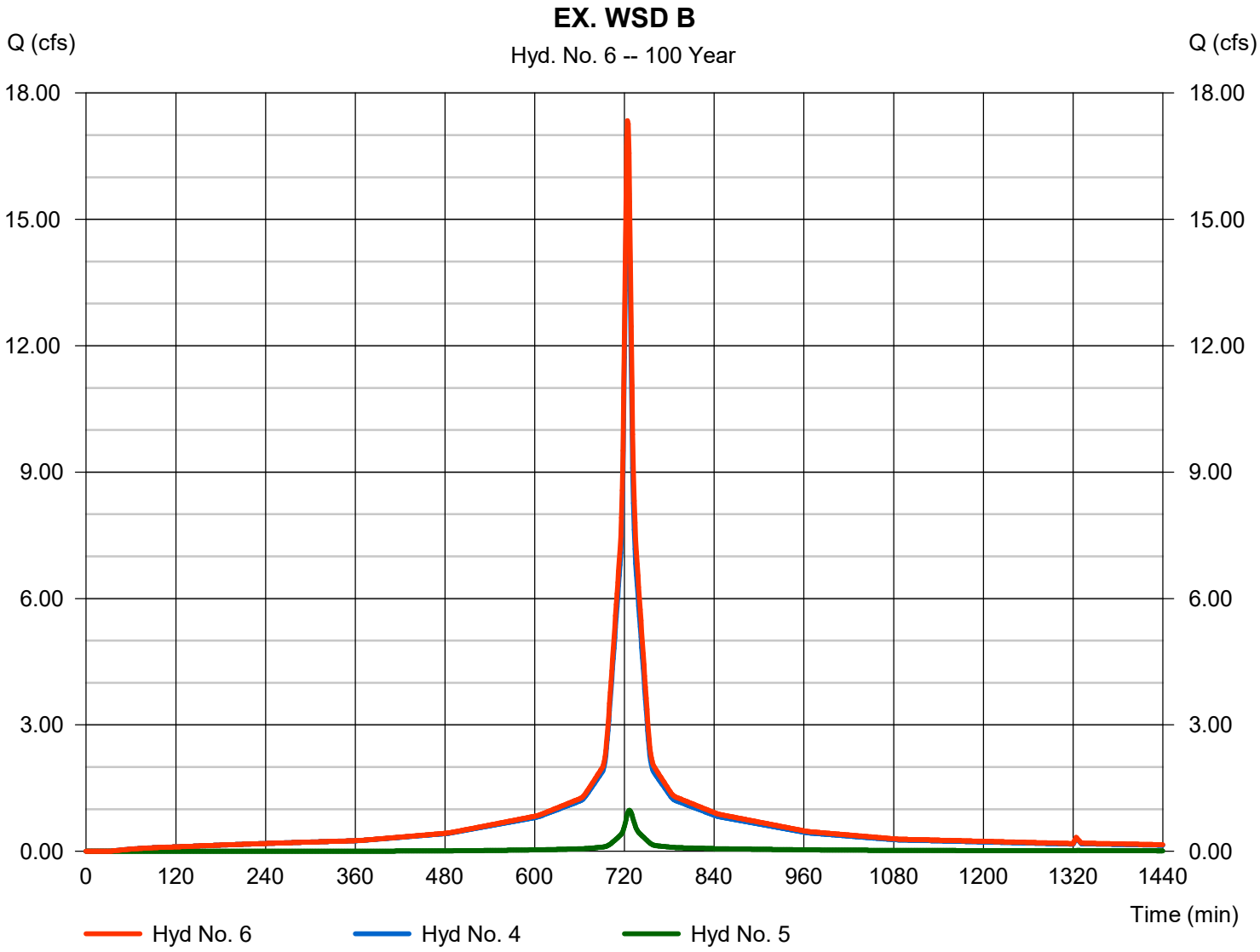


Hydrograph Report

Hyd. No. 6

EX. WSD B

Hydrograph type	= Combine	Peak discharge	= 17.34 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 62,342 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 2.020 ac

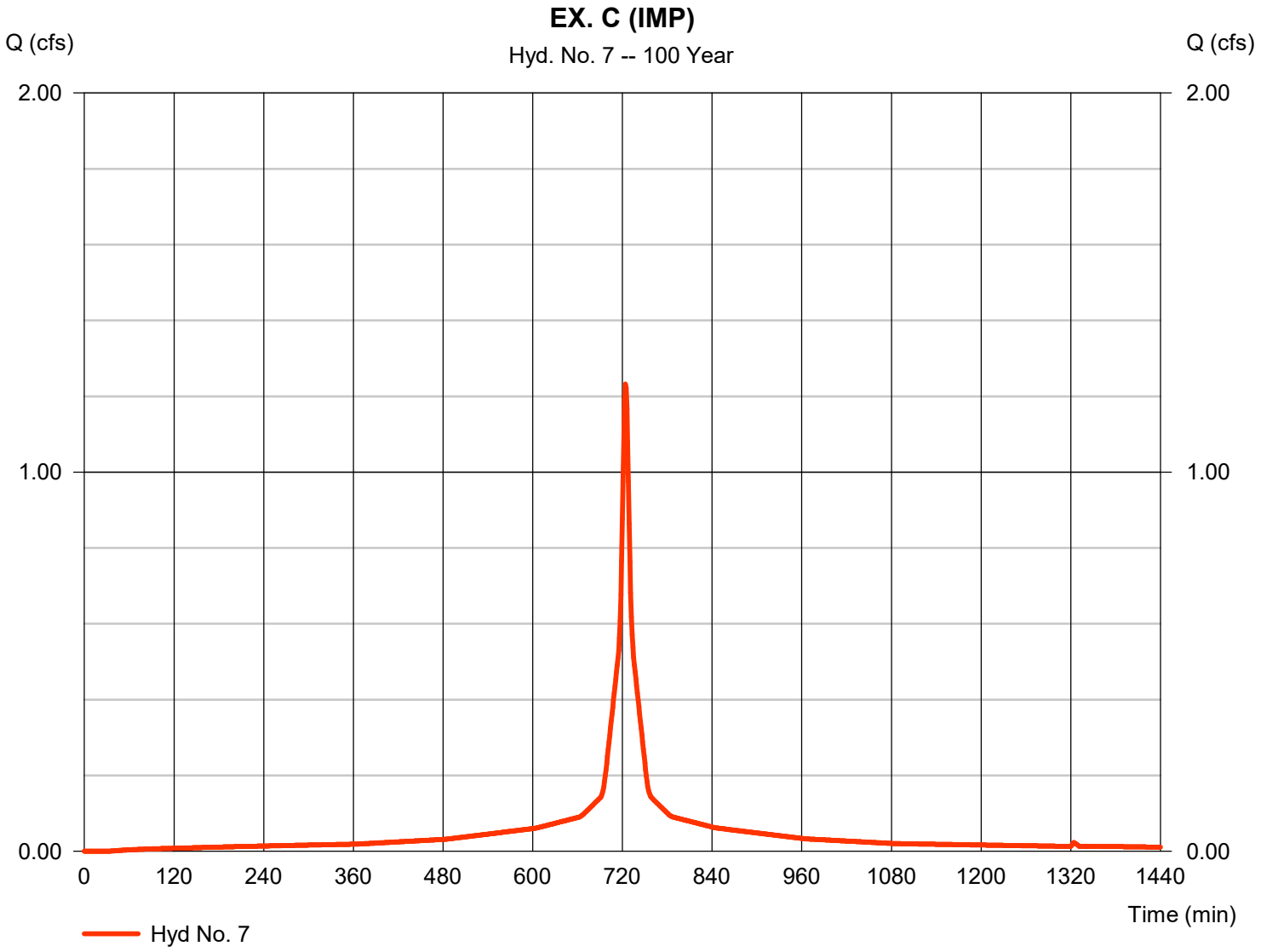


Hydrograph Report

Hyd. No. 7

EX. C (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.232 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	4,413 cuft
Drainage area	=	0.140 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

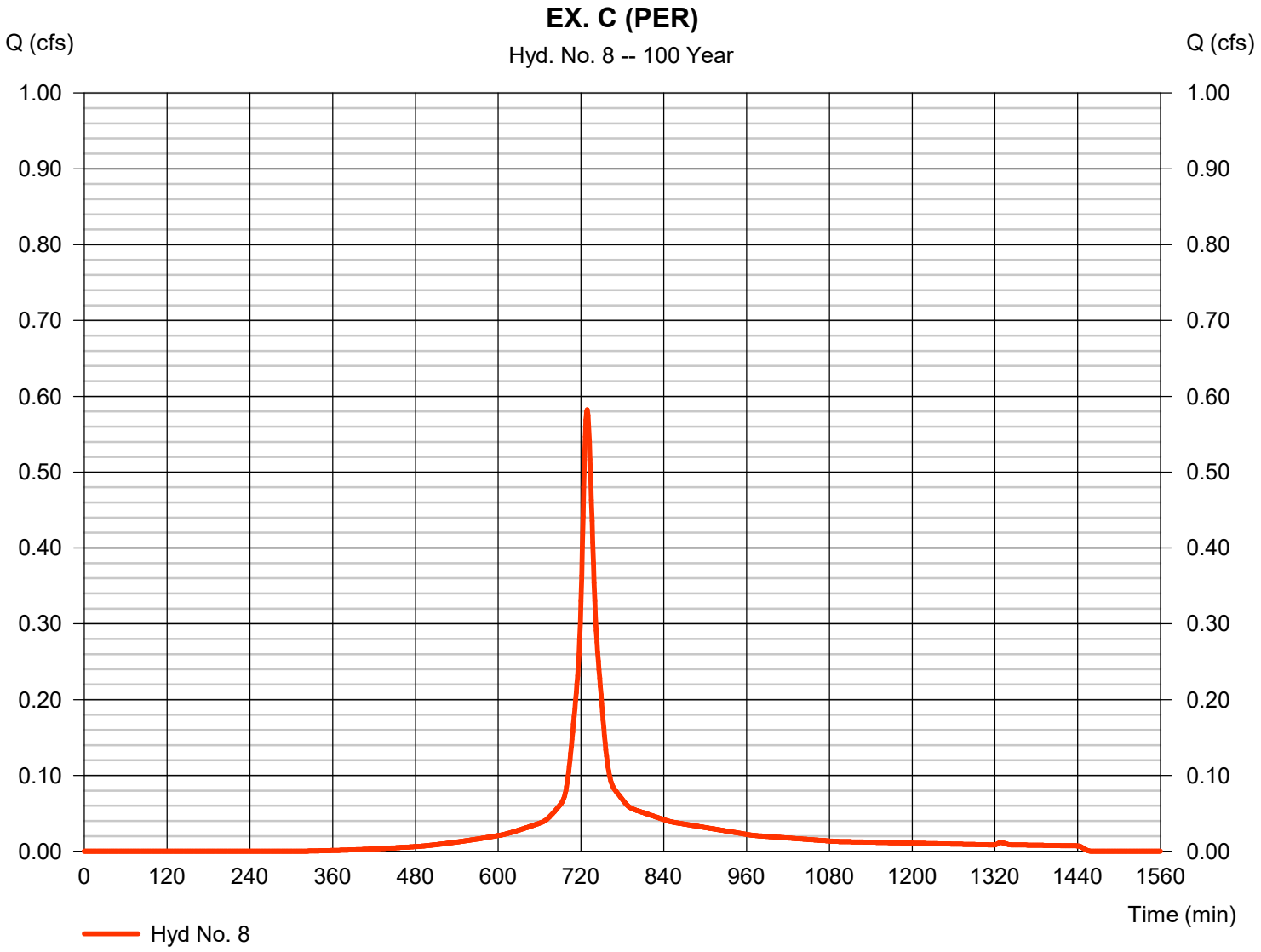


Hydrograph Report

Hyd. No. 8

EX. C (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.582 cfs
Storm frequency	=	100 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	2,232 cuft
Drainage area	=	0.100 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

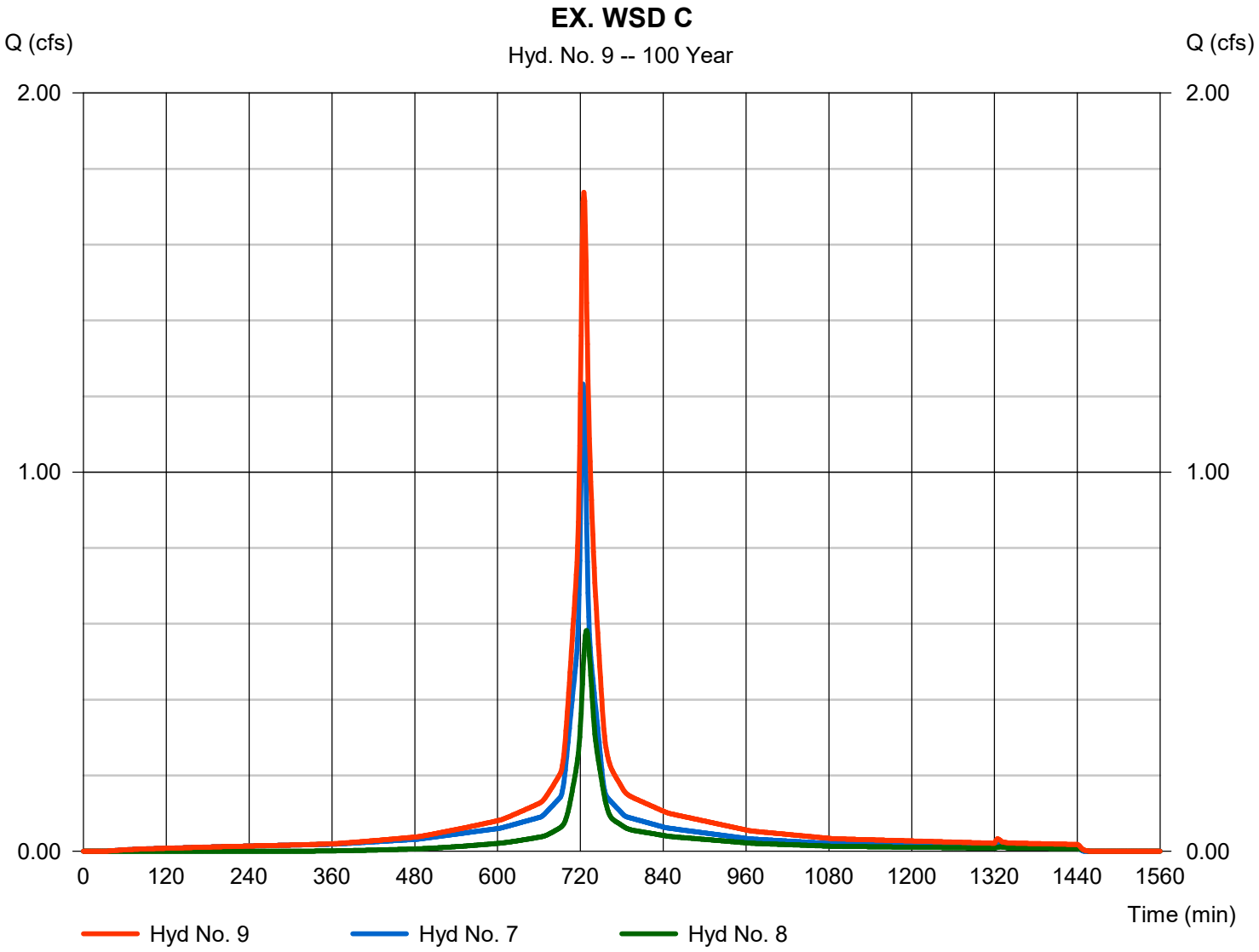


Hydrograph Report

Hyd. No. 9

EX. WSD C

Hydrograph type	= Combine	Peak discharge	= 1.738 cfs
Storm frequency	= 100 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 6,645 cuft
Inflow hyds.	= 7, 8	Contrib. drain. area	= 0.240 ac

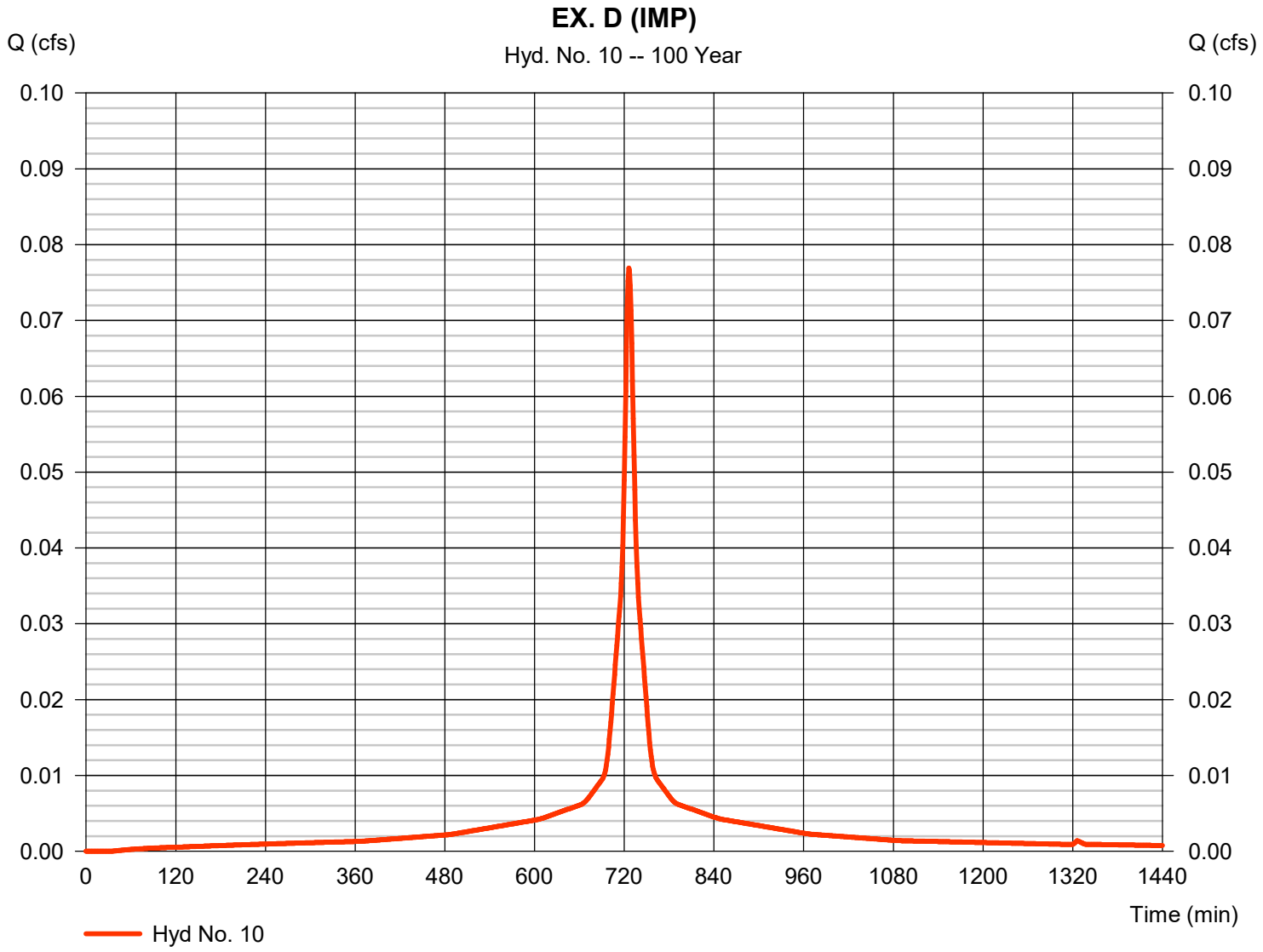


Hydrograph Report

Hyd. No. 10

EX. D (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.077 cfs
Storm frequency	=	100 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	306 cuft
Drainage area	=	0.010 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

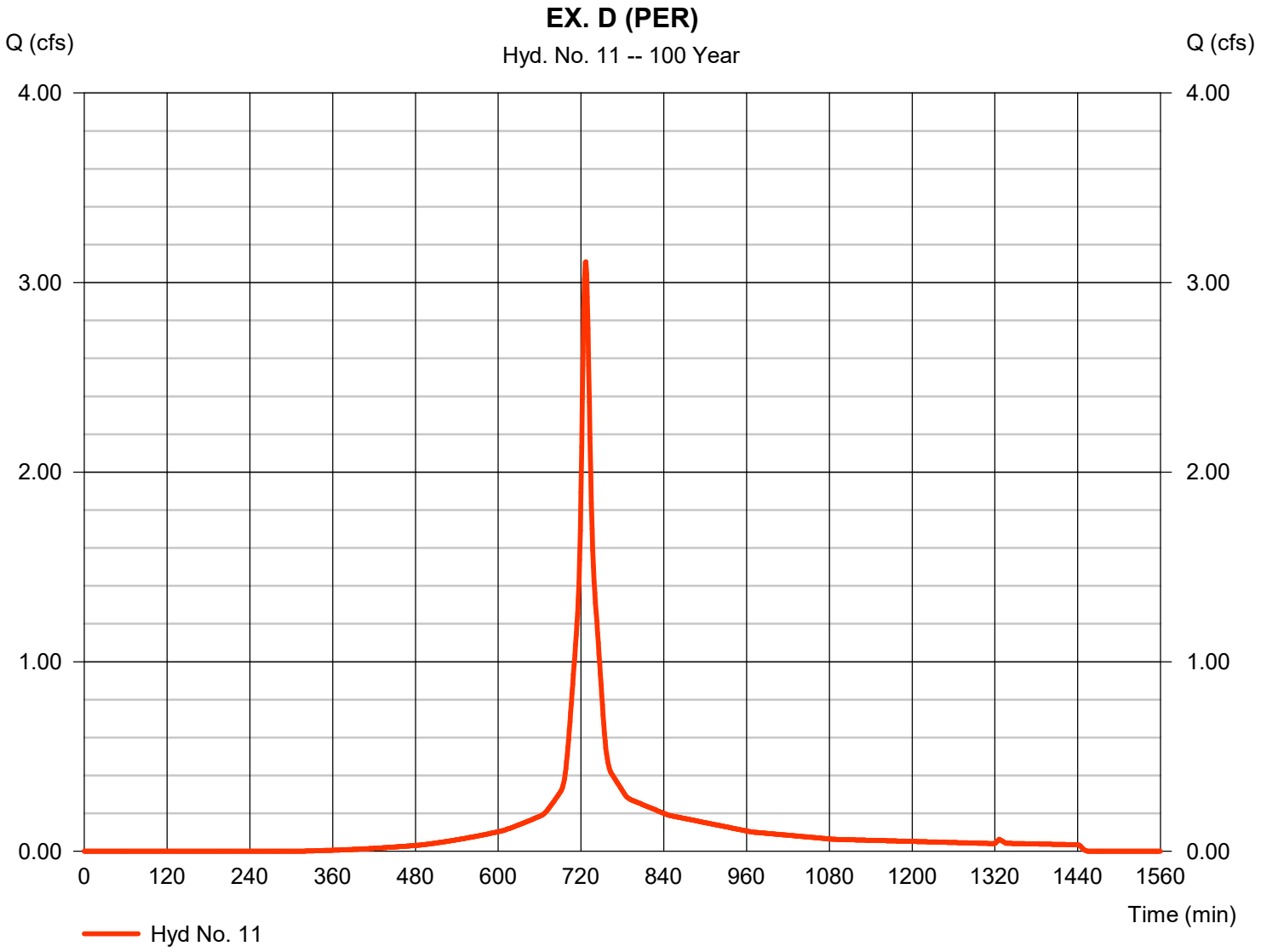


Hydrograph Report

Hyd. No. 11

EX. D (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.110 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	10,884 cuft
Drainage area	=	0.480 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

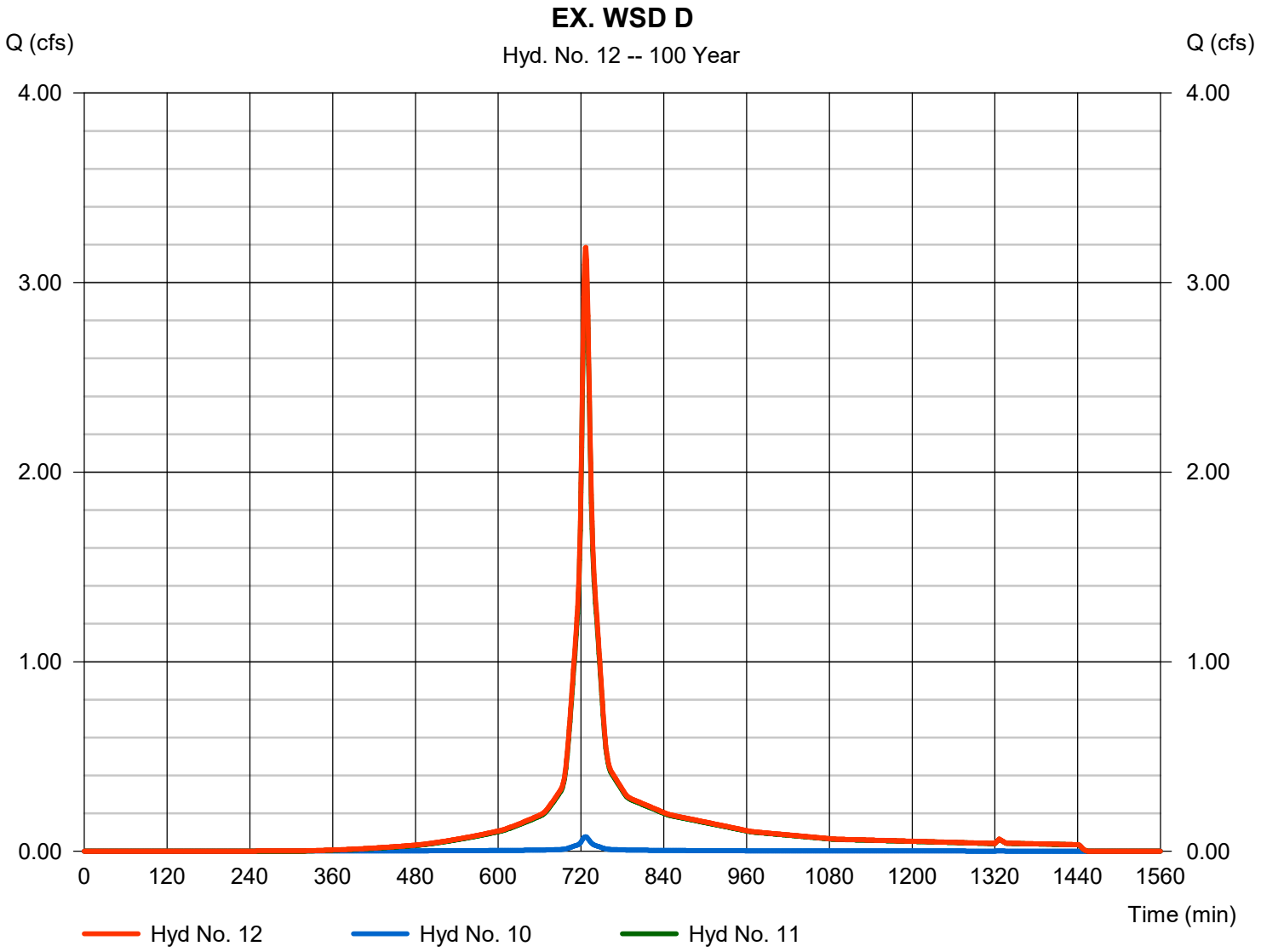


Hydrograph Report

Hyd. No. 12

EX. WSD D

Hydrograph type	=	Combine	Peak discharge	=	3.186 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	11,189 cuft
Inflow hyds.	=	10, 11	Contrib. drain. area	=	0.490 ac

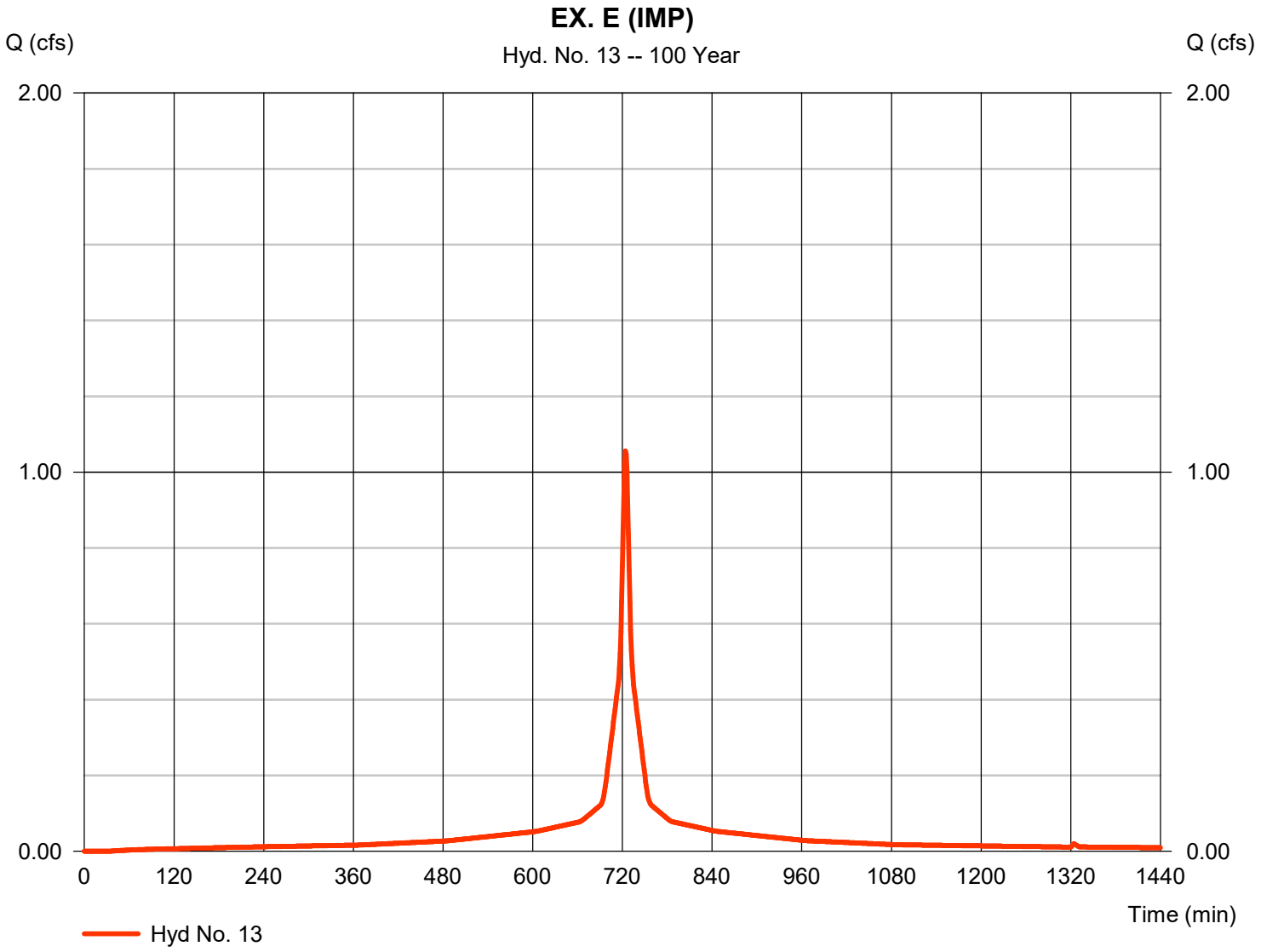


Hydrograph Report

Hyd. No. 13

EX. E (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.056 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	3,782 cuft
Drainage area	=	0.120 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

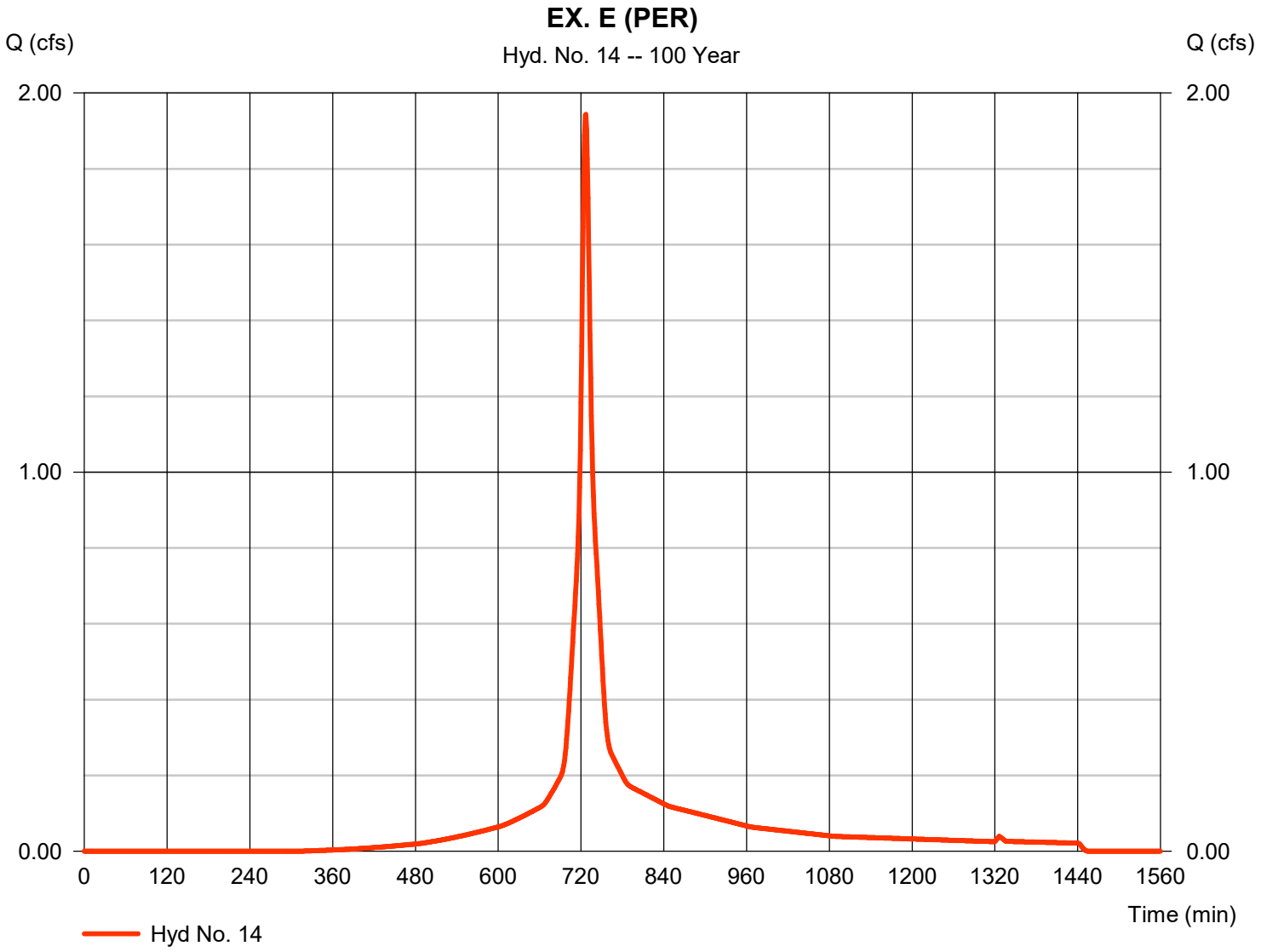


Hydrograph Report

Hyd. No. 14

EX. E (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.944 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	6,802 cuft
Drainage area	=	0.300 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

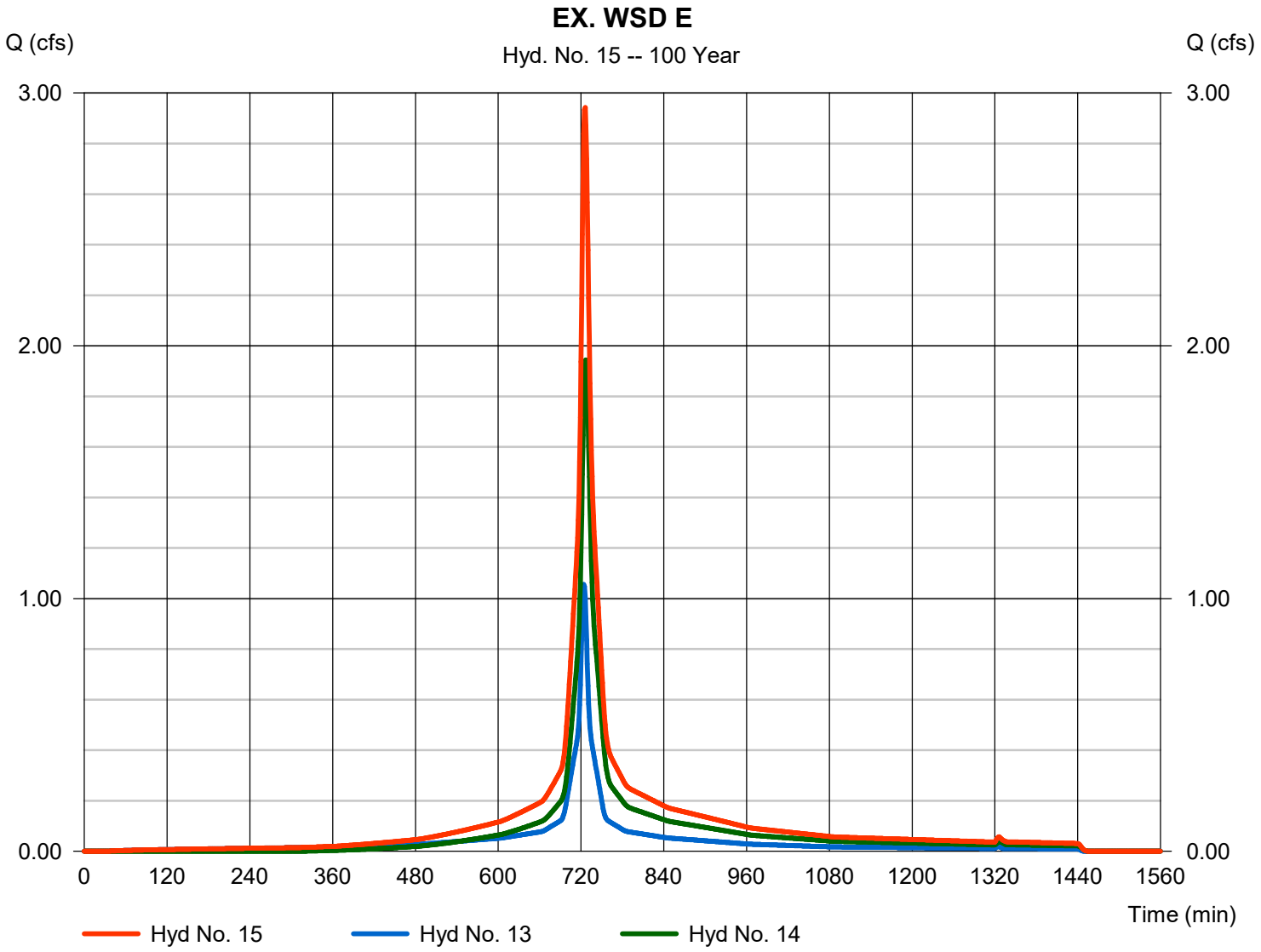


Hydrograph Report

Hyd. No. 15

EX. WSD E

Hydrograph type	=	Combine	Peak discharge	=	2.942 cfs
Storm frequency	=	100 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	10,585 cuft
Inflow hyds.	=	13, 14	Contrib. drain. area	=	0.420 ac

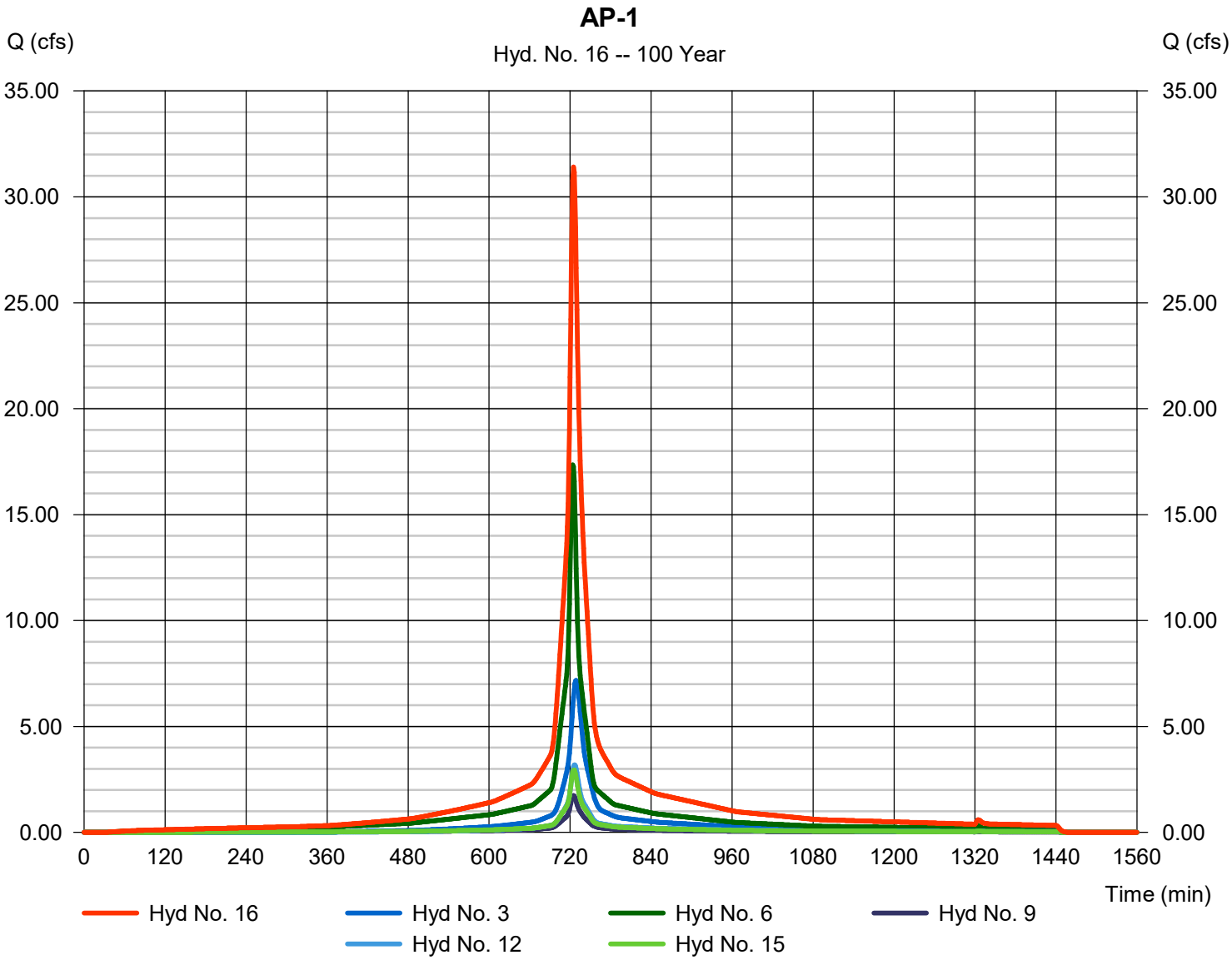


Hydrograph Report

Hyd. No. 16

AP-1

Hydrograph type	=	Combine	Peak discharge	=	31.41 cfs
Storm frequency	=	100 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	118,534 cuft
Inflow hyds.	=	3, 6, 9, 12, 15	Contrib. drain. area	=	0.000 ac

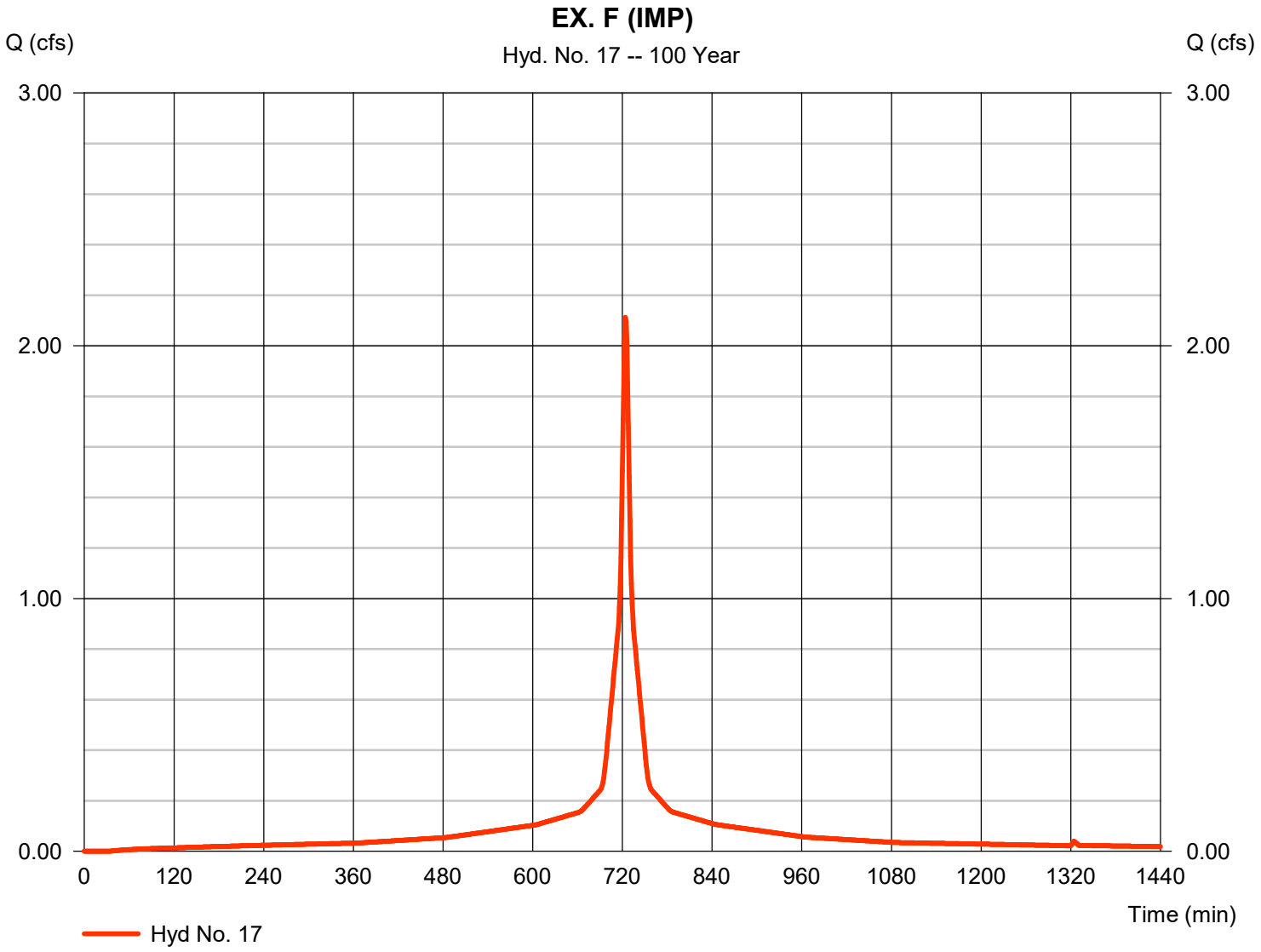


Hydrograph Report

Hyd. No. 17

EX. F (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.112 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	7,565 cuft
Drainage area	=	0.240 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

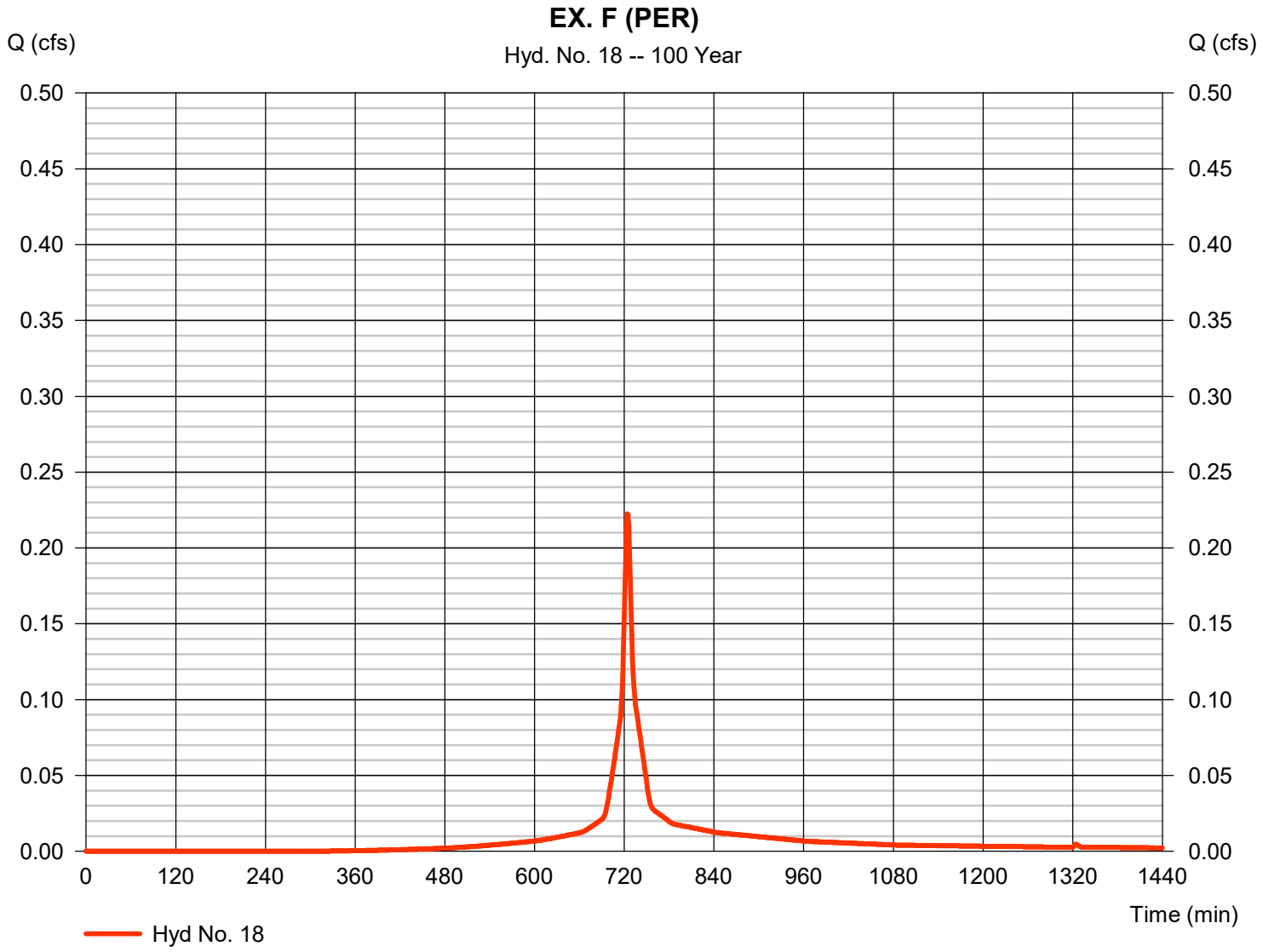


Hydrograph Report

Hyd. No. 18

EX. F (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.222 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	701 cuft
Drainage area	=	0.030 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

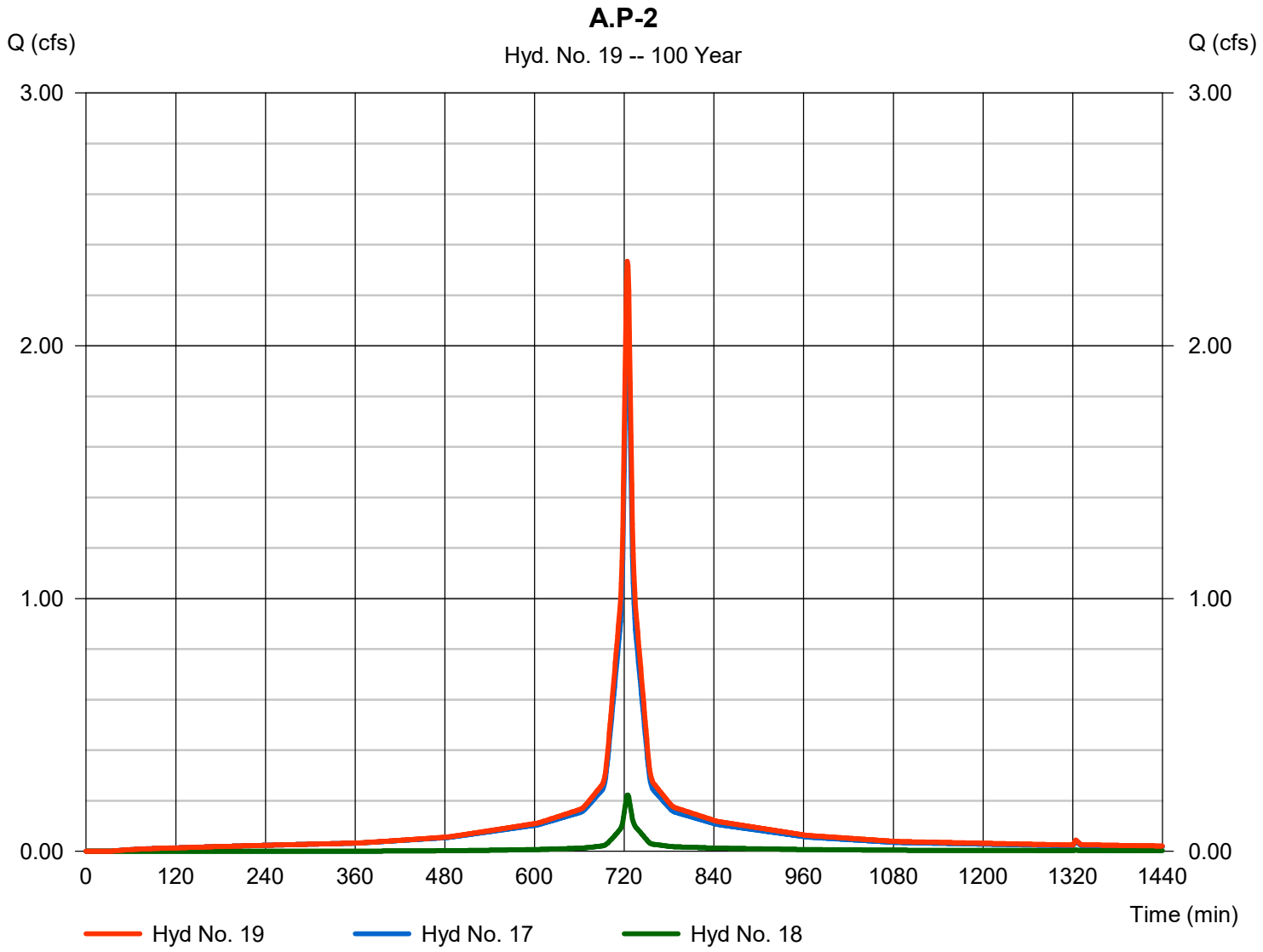


Hydrograph Report

Hyd. No. 19

A.P-2

Hydrograph type	=	Combine	Peak discharge	=	2.334 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	8,266 cuft
Inflow hyds.	=	17, 18	Contrib. drain. area	=	0.270 ac



100-YEAR STORM CALCULATIONS

ALLOWABLE RUNOFF HYDROGRAPHS

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: (Present) Developed **Existing Target/Disturbed Area 1 - Pervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
D	**Open Space (Good Cond.)**	**80**			**0.43**	**34.40**

1 Use only one CN source per line

Totals = **0.43** **34.40**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{34.40}{0.43} =$ 80.00 Use CN = **80**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: (Present) Developed **Existing Target/Disturbed Area 1 - Impervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
	Impervious	**98**			**0.32**	**31.36**

1 Use only one CN source per line

Totals = **0.32** **31.36**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{31.36}{0.32} =$ 98.00 Use CN = **98**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: (Present) Developed **Existing Target/Disturbed Area 2 - Pervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
D	**Open Space (Good Cond.)**	**80**			**0.19**	**15.20**

1 Use only one CN source per line

Totals = **0.19** **15.20**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{15.20}{0.19} =$ 80.00 Use CN = **80**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: (Present) Developed **Existing Target/Disturbed Area 2 - Impervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
	Impervious	**98**			**0.02**	**1.96**

1 Use only one CN source per line

Totals = **0.02** **1.96**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{1.96}{0.02} =$ 98.00 Use CN = **98**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: (Present) Developed **Existing Undisturbed Watershed A - Pervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
D	**Open Space (Good Cond.)**	**80**			**0.95**	**76.00**

1 Use only one CN source per line

Totals = **0.95** **76.00**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{76.00}{0.95} =$ 80.00 Use CN = **80**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: (Present) Developed **Existing Undisturbed Watershed A - Impervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
	Impervious	**98**			**0.02**	**1.96**

1 Use only one CN source per line

Totals = **0.02** **1.96**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{1.96}{0.02} =$ 98.00 Use CN = **98**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: (Present) Developed **Existing Undisturbed Watershed B - Pervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
D	**Open Space (Good Cond.)**	**80**			**0.04**	**3.20**

1 Use only one CN source per line

Totals = **0.04** **3.20**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{3.20}{0.04} =$ 80.00 Use CN = **80**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: (Present) Developed **Existing Undisturbed Watershed B - Impervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
	Impervious	**98**			**1.75**	**171.50**

1 Use only one CN source per line

Totals = **1.75** **171.50**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{171.50}{1.75} =$ 98.00 Use CN = **98**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: (Present) Developed **Existing Undisturbed Watershed C - Pervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
D	**Open Space (Good Cond.)**	**80**			**0.01**	**0.80**

1 Use only one CN source per line

Totals = **0.01** **0.80**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{0.80}{0.01} =$ 80.00 Use CN = **80**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: (Present) Developed **Existing Undisturbed Watershed C - Impervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
	Impervious	**98**			**0.02**	**1.96**

1 Use only one CN source per line

Totals = **0.02** **1.96**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{1.96}{0.02} =$ 98.00 Use CN = **98**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: (Present) Developed **Existing Undisturbed Watershed D - Pervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
D	**Open Space (Good Cond.)**	**80**			**0.46**	**36.80**

1 Use only one CN source per line

Totals = **0.46** **36.80**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{36.80}{0.46} =$ 80.00 Use CN = **80**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: (Present) Developed **Existing Undisturbed Watershed E - Pervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
D	**Open Space (Good Cond.)**	**80**			**0.10**	**8.00**

1 Use only one CN source per line

Totals = **0.10** **8.00**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{8.00}{0.10} =$ 80.00 Use CN = **80**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: (Present) Developed **Existing Undisturbed Watershed E - Impervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
	Impervious	**98**			**0.08**	**7.84**

1 Use only one CN source per line

Totals = **0.08** **7.84**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{7.84}{0.08} =$ 98.00 Use CN = **98**

ALLOWABLE RUNOFF HYDROGRAPHS

2-YEAR STORM CALCULATIONS

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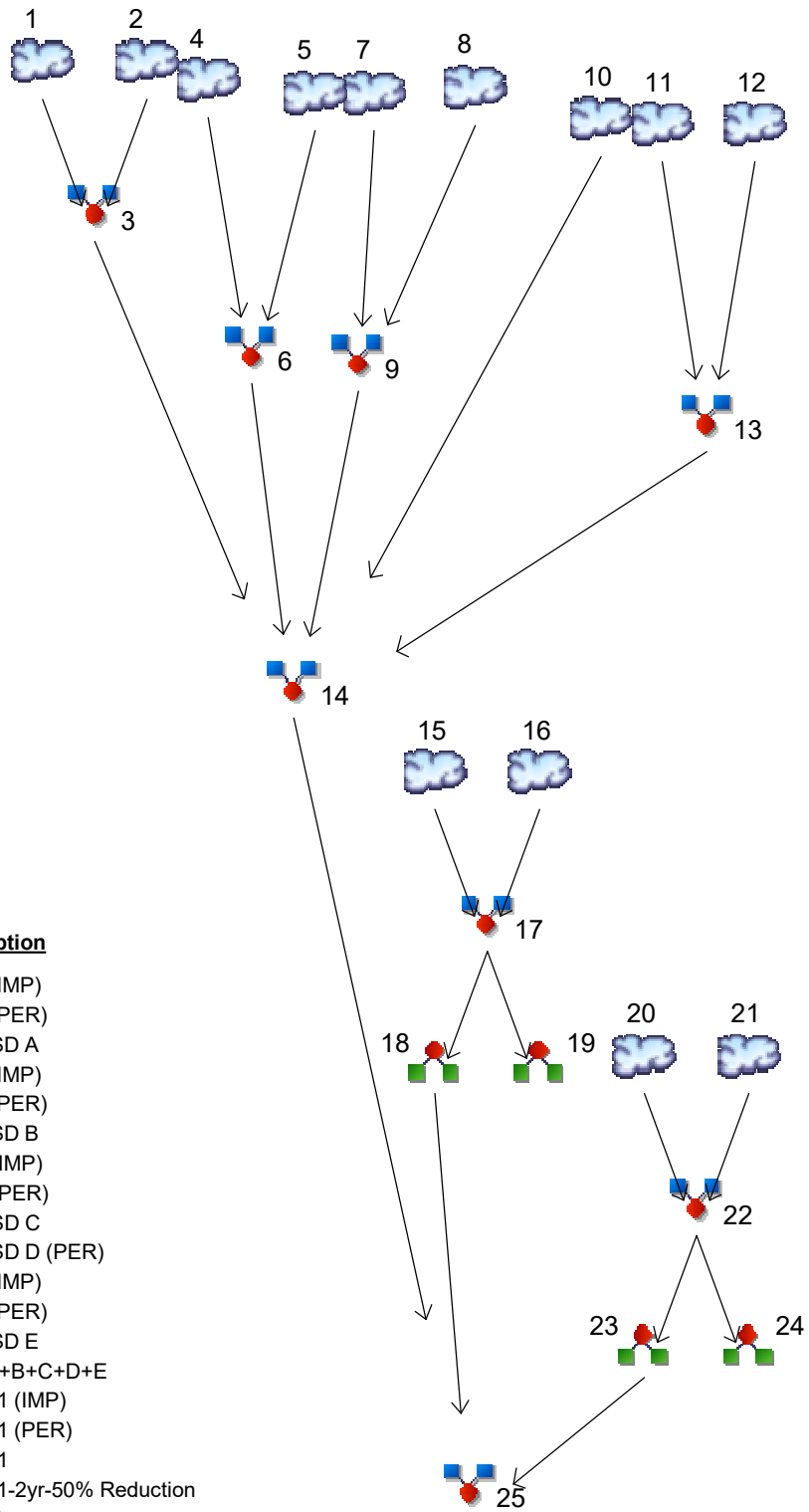
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Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020



Legend

Hyd.	Origin	Description
1	SCS Runoff	EX. A (IMP)
2	SCS Runoff	EX. A (PER)
3	Combine	EX. WSD A
4	SCS Runoff	EX. B (IMP)
5	SCS Runoff	EX. B (PER)
6	Combine	EX. WSD B
7	SCS Runoff	EX. C (IMP)
8	SCS Runoff	EX. C (PER)
9	Combine	EX. WSD C
10	SCS Runoff	EX. WSD D (PER)
11	SCS Runoff	EX. E (IMP)
12	SCS Runoff	EX. E (PER)
13	Combine	EX. WSD E
14	Combine	WSD A+B+C+D+E
15	SCS Runoff	Target 1 (IMP)
16	SCS Runoff	Target 1 (PER)
17	Combine	Target 1
18	Diversion1	Target 1-2yr-50% Reduction
19	Diversion2	Discard
20	SCS Runoff	Target 2 (IMP)
21	SCS Runoff	Target 2 (PER)
22	Combine	Target 2
23	Diversion1	Target 2-2yr-50% Reduction
24	Diversion2	Discard
25	Combine	2yr Allowable

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	-------	0.054	-------	-------	-------	-------	-------	-------	EX. A (IMP)
2	SCS Runoff	------	-------	1.424	-------	-------	-------	-------	-------	-------	EX. A (PER)
3	Combine	1, 2	-------	1.479	-------	-------	-------	-------	-------	-------	EX. WSD A
4	SCS Runoff	------	-------	6.055	-------	-------	-------	-------	-------	-------	EX. B (IMP)
5	SCS Runoff	------	-------	0.077	-------	-------	-------	-------	-------	-------	EX. B (PER)
6	Combine	4, 5	-------	6.131	-------	-------	-------	-------	-------	-------	EX. WSD B
7	SCS Runoff	------	-------	0.069	-------	-------	-------	-------	-------	-------	EX. C (IMP)
8	SCS Runoff	------	-------	0.019	-------	-------	-------	-------	-------	-------	EX. C (PER)
9	Combine	7, 8	-------	0.088	-------	-------	-------	-------	-------	-------	EX. WSD C
10	SCS Runoff	------	-------	0.770	-------	-------	-------	-------	-------	-------	EX. WSD D (PER)
11	SCS Runoff	------	-------	0.277	-------	-------	-------	-------	-------	-------	EX. E (IMP)
12	SCS Runoff	------	-------	0.167	-------	-------	-------	-------	-------	-------	EX. E (PER)
13	Combine	11, 12	-------	0.434	-------	-------	-------	-------	-------	-------	EX. WSD E
14	Combine	3, 6, 9, 10, 13	-------	8.599	-------	-------	-------	-------	-------	-------	WSD A+B+C+D+E
15	SCS Runoff	------	-------	0.870	-------	-------	-------	-------	-------	-------	Target 1 (IMP)
16	SCS Runoff	------	-------	0.645	-------	-------	-------	-------	-------	-------	Target 1 (PER)
17	Combine	15, 16	-------	1.513	-------	-------	-------	-------	-------	-------	Target 1
18	Diversion1	17	-------	0.756	-------	-------	-------	-------	-------	-------	Target 1-2yr-50% Reduction
19	Diversion2	17	-------	0.756	-------	-------	-------	-------	-------	-------	Discard
20	SCS Runoff	------	-------	0.069	-------	-------	-------	-------	-------	-------	Target 2 (IMP)
21	SCS Runoff	------	-------	0.318	-------	-------	-------	-------	-------	-------	Target 2 (PER)
22	Combine	20, 21	-------	0.380	-------	-------	-------	-------	-------	-------	Target 2
23	Diversion1	22	-------	0.190	-------	-------	-------	-------	-------	-------	Target 2-2yr-50% Reduction
24	Diversion2	22	-------	0.190	-------	-------	-------	-------	-------	-------	Discard
25	Combine	14, 18, 23,	-------	9.451	-------	-------	-------	-------	-------	-------	2yr Allowable

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

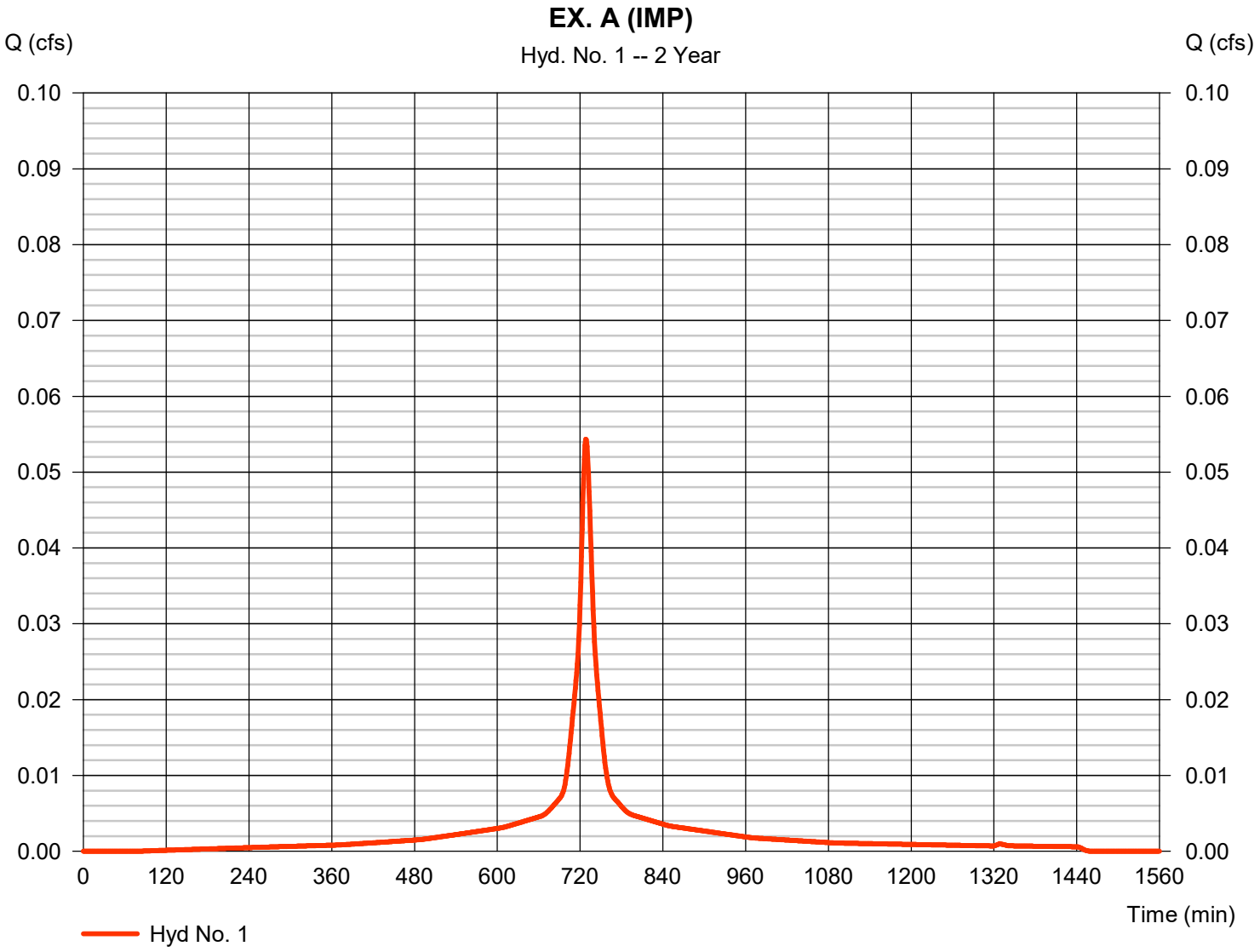
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.054	1	728	229	------	------	------	EX. A (IMP)
2	SCS Runoff	1.424	1	729	5,394	------	------	------	EX. A (PER)
3	Combine	1.479	1	729	5,623	1, 2	------	------	EX. WSD A
4	SCS Runoff	6.055	1	724	21,007	------	------	------	EX. B (IMP)
5	SCS Runoff	0.077	1	725	238	------	------	------	EX. B (PER)
6	Combine	6.131	1	724	21,245	4, 5	------	------	EX. WSD B
7	SCS Runoff	0.069	1	724	240	------	------	------	EX. C (IMP)
8	SCS Runoff	0.019	1	725	59	------	------	------	EX. C (PER)
9	Combine	0.088	1	724	300	7, 8	------	------	EX. WSD C
10	SCS Runoff	0.770	1	727	2,653	------	------	------	EX. WSD D (PER)
11	SCS Runoff	0.277	1	724	960	------	------	------	EX. E (IMP)
12	SCS Runoff	0.167	1	727	577	------	------	------	EX. E (PER)
13	Combine	0.434	1	725	1,537	11, 12	------	------	EX. WSD E
14	Combine	8.599	1	725	31,357	3, 6, 9, 10, 13	------	------	WSD A+B+C+D+E
15	SCS Runoff	0.870	1	728	3,667	------	------	------	Target 1 (IMP)
16	SCS Runoff	0.645	1	729	2,441	------	------	------	Target 1 (PER)
17	Combine	1.513	1	729	6,108	15, 16	------	------	Target 1
18	Diversion1	0.756	1	729	3,054	17	------	------	Target 1-2yr-50% Reduction
19	Diversion2	0.756	1	729	3,054	17	------	------	Discard
20	SCS Runoff	0.069	1	724	240	------	------	------	Target 2 (IMP)
21	SCS Runoff	0.318	1	727	1,096	------	------	------	Target 2 (PER)
22	Combine	0.380	1	726	1,336	20, 21	------	------	Target 2
23	Diversion1	0.190	1	726	668	22	------	------	Target 2-2yr-50% Reduction
24	Diversion2	0.190	1	726	668	22	------	------	Discard
25	Combine	9.451	1	725	35,079	14, 18, 23,	------	------	2yr Allowable

Hydrograph Report

Hyd. No. 1

EX. A (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.054 cfs
Storm frequency	=	2 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	229 cuft
Drainage area	=	0.020 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

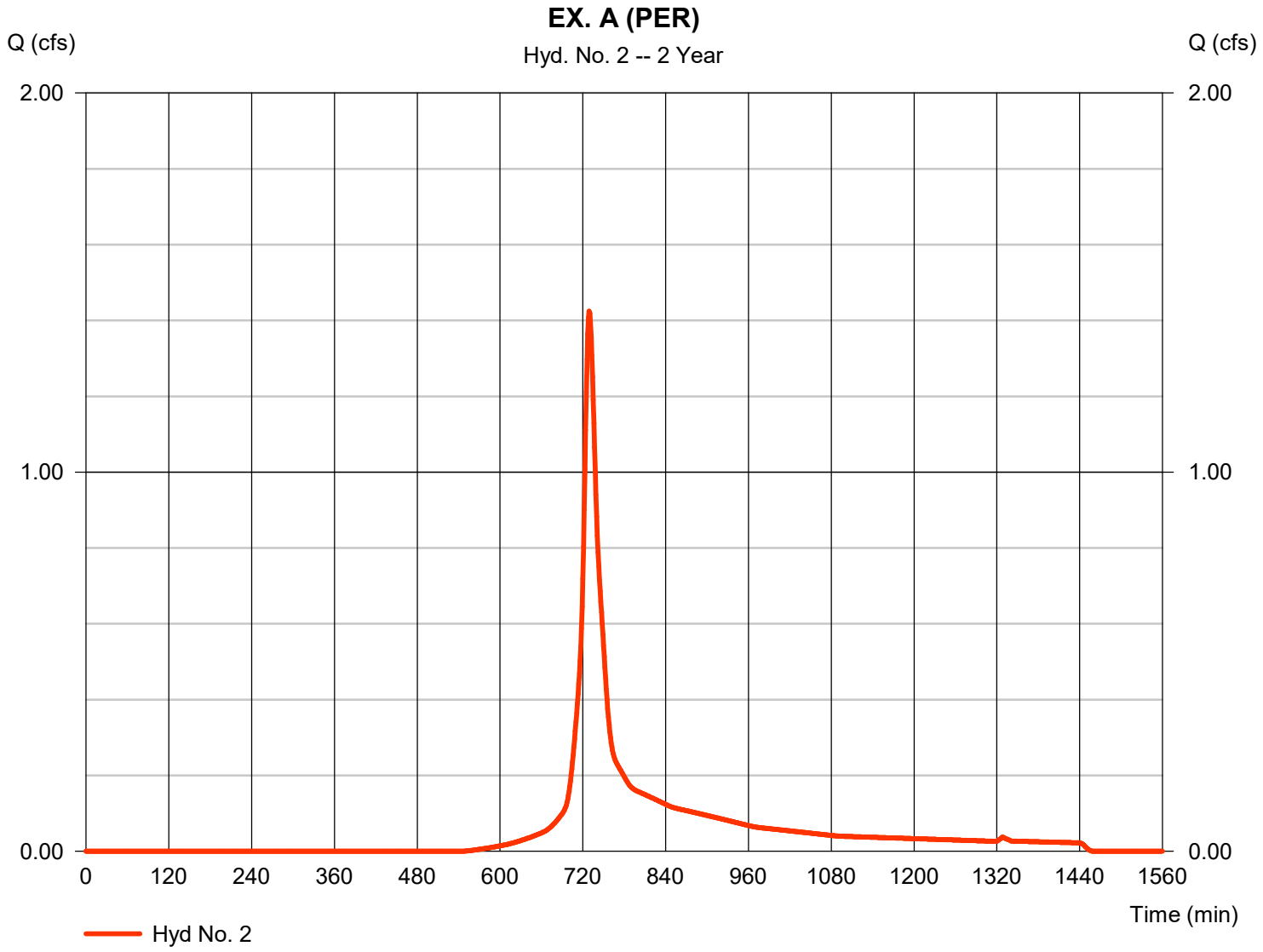


Hydrograph Report

Hyd. No. 2

EX. A (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.424 cfs
Storm frequency	=	2 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	5,394 cuft
Drainage area	=	0.950 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

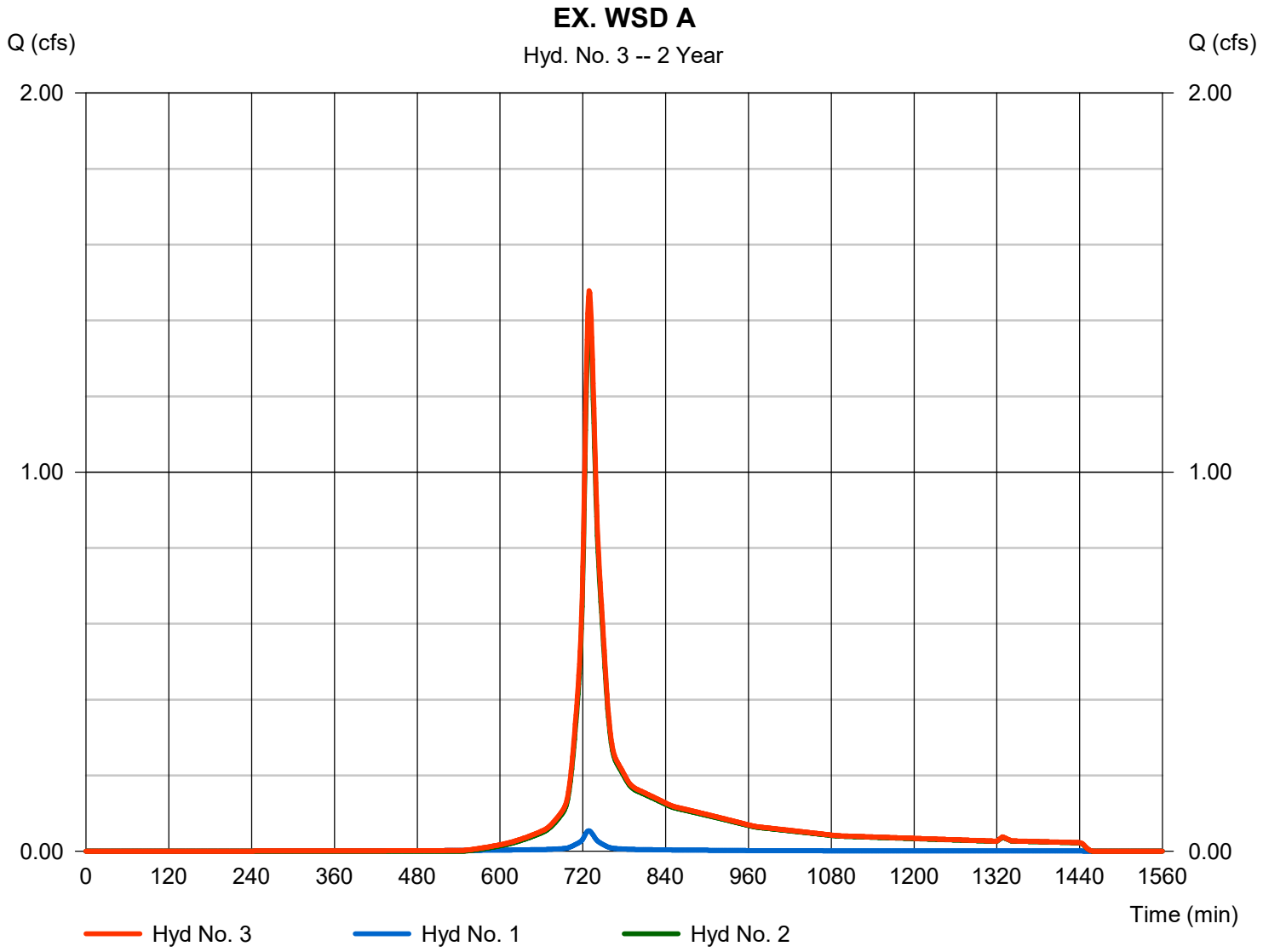


Hydrograph Report

Hyd. No. 3

EX. WSD A

Hydrograph type	= Combine	Peak discharge	= 1.479 cfs
Storm frequency	= 2 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 5,623 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 0.970 ac

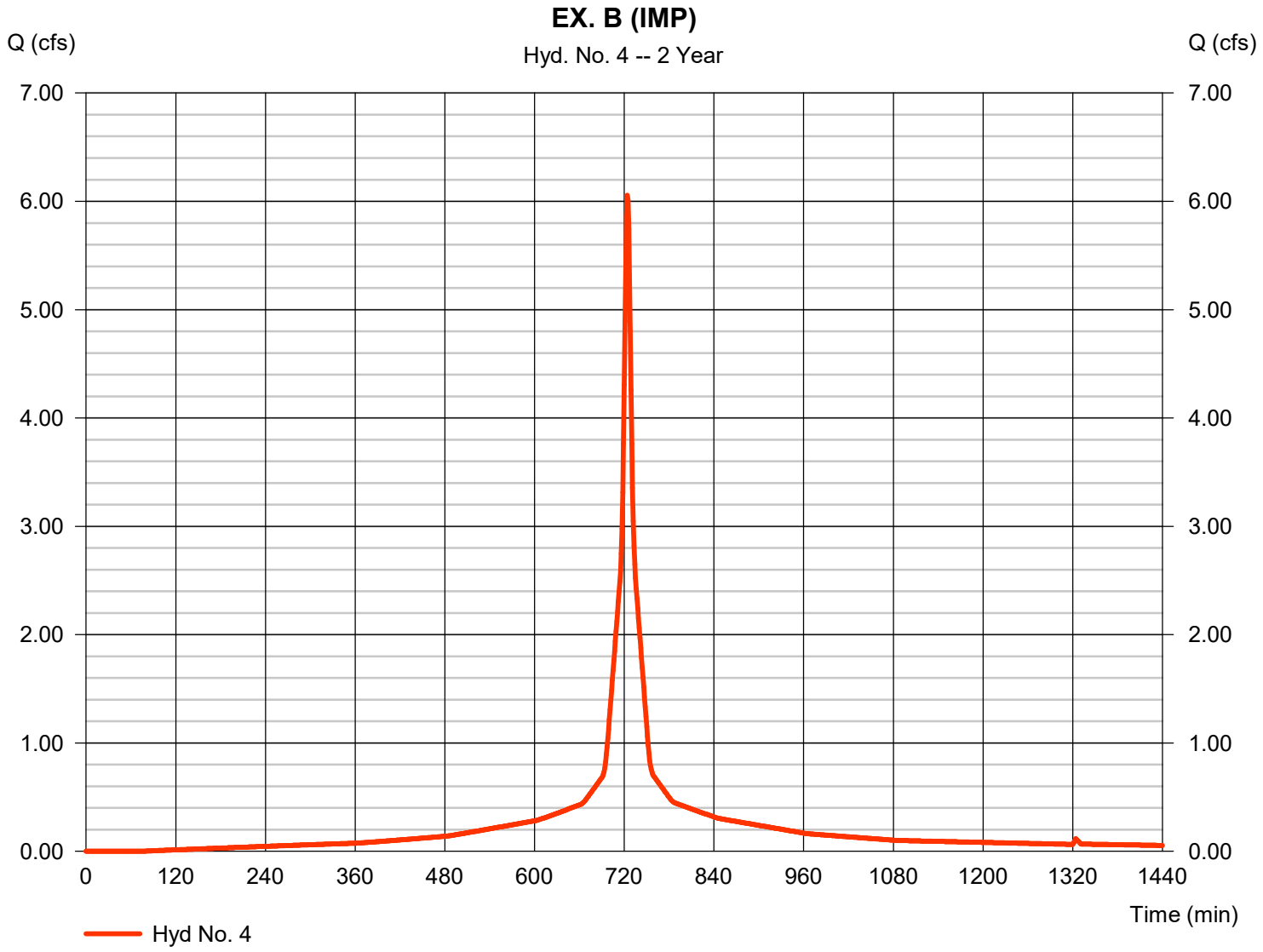


Hydrograph Report

Hyd. No. 4

EX. B (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.055 cfs
Storm frequency	=	2 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	21,007 cuft
Drainage area	=	1.750 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

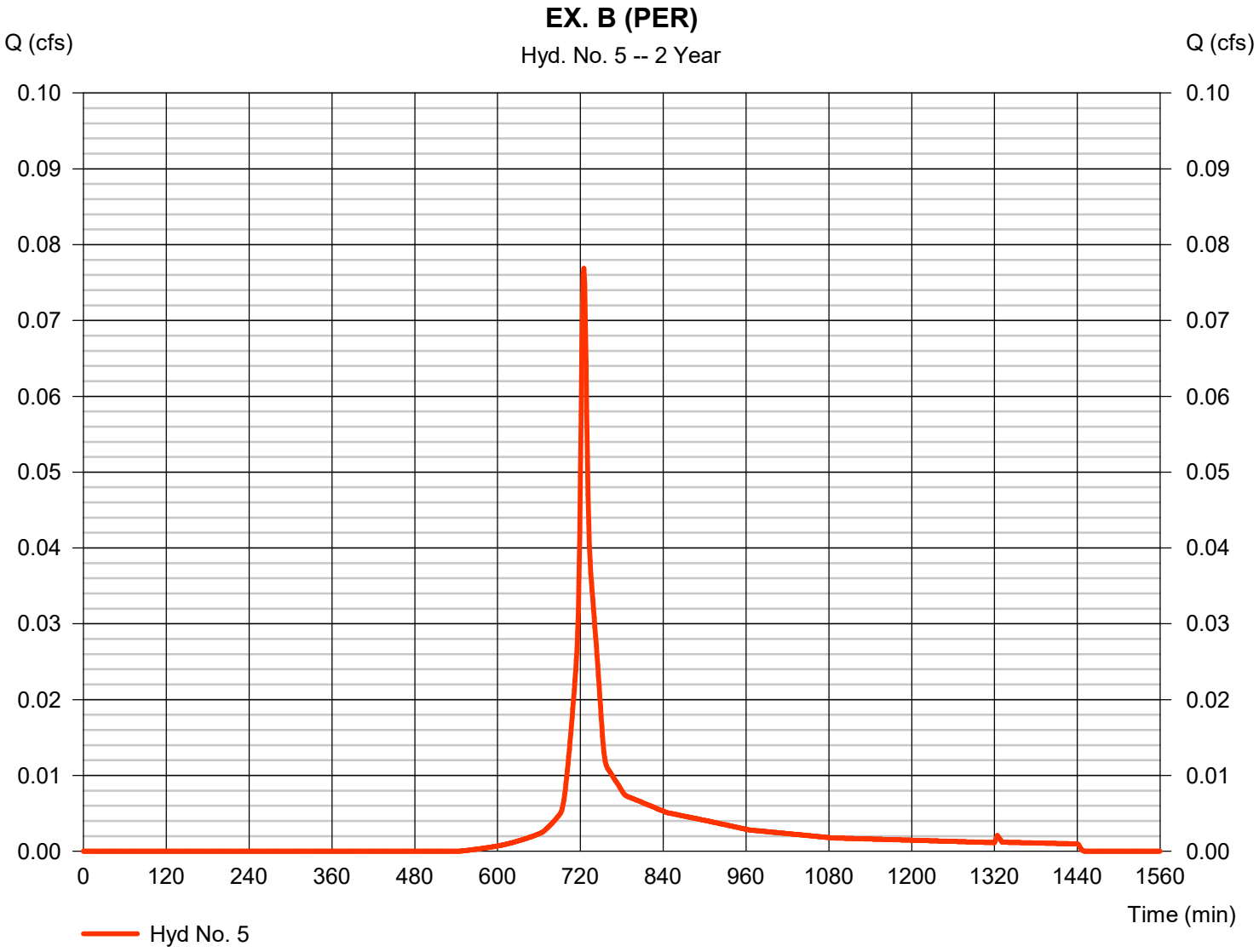


Hydrograph Report

Hyd. No. 5

EX. B (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.077 cfs
Storm frequency	=	2 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	238 cuft
Drainage area	=	0.040 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

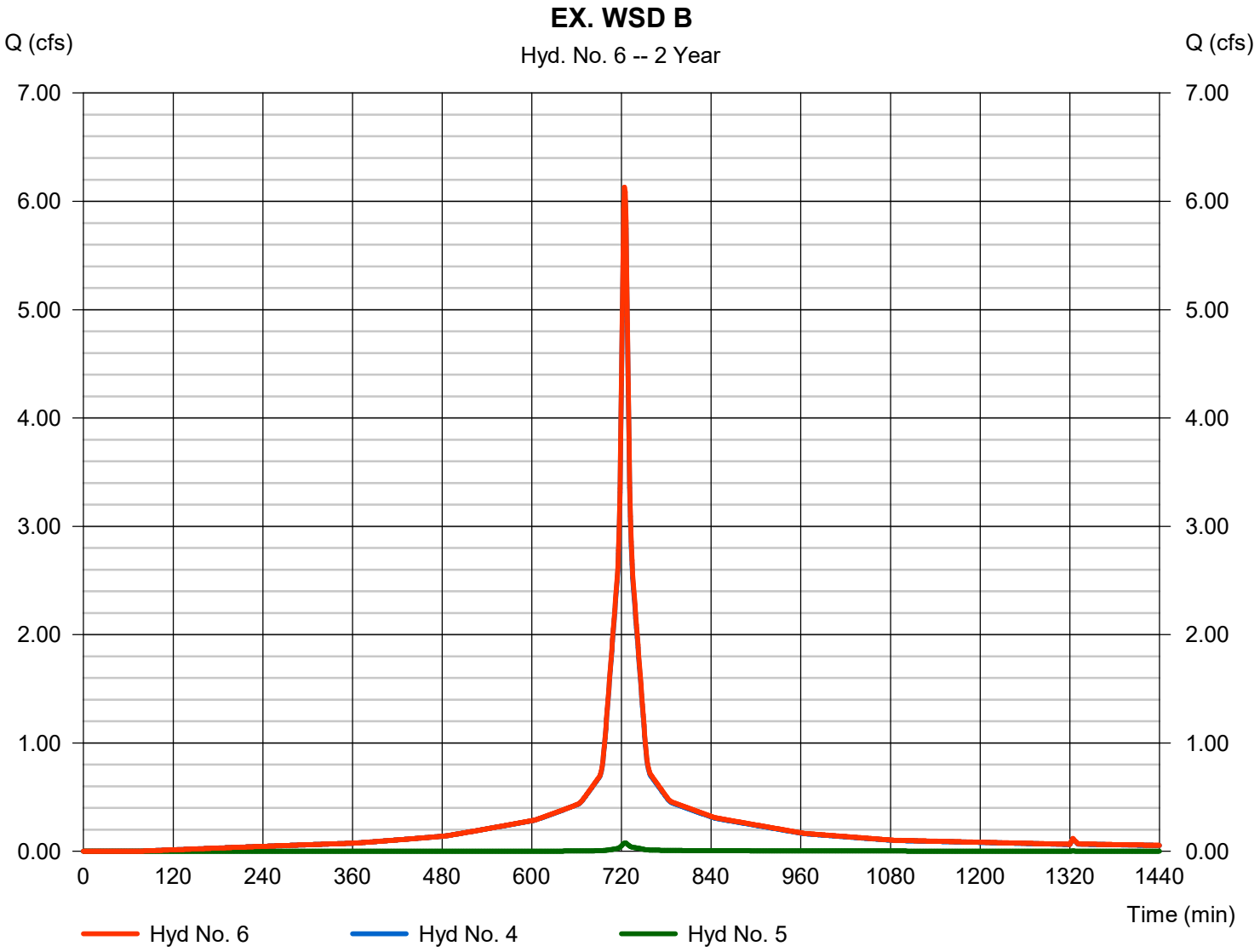


Hydrograph Report

Hyd. No. 6

EX. WSD B

Hydrograph type	= Combine	Peak discharge	= 6.131 cfs
Storm frequency	= 2 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 21,245 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 1.790 ac

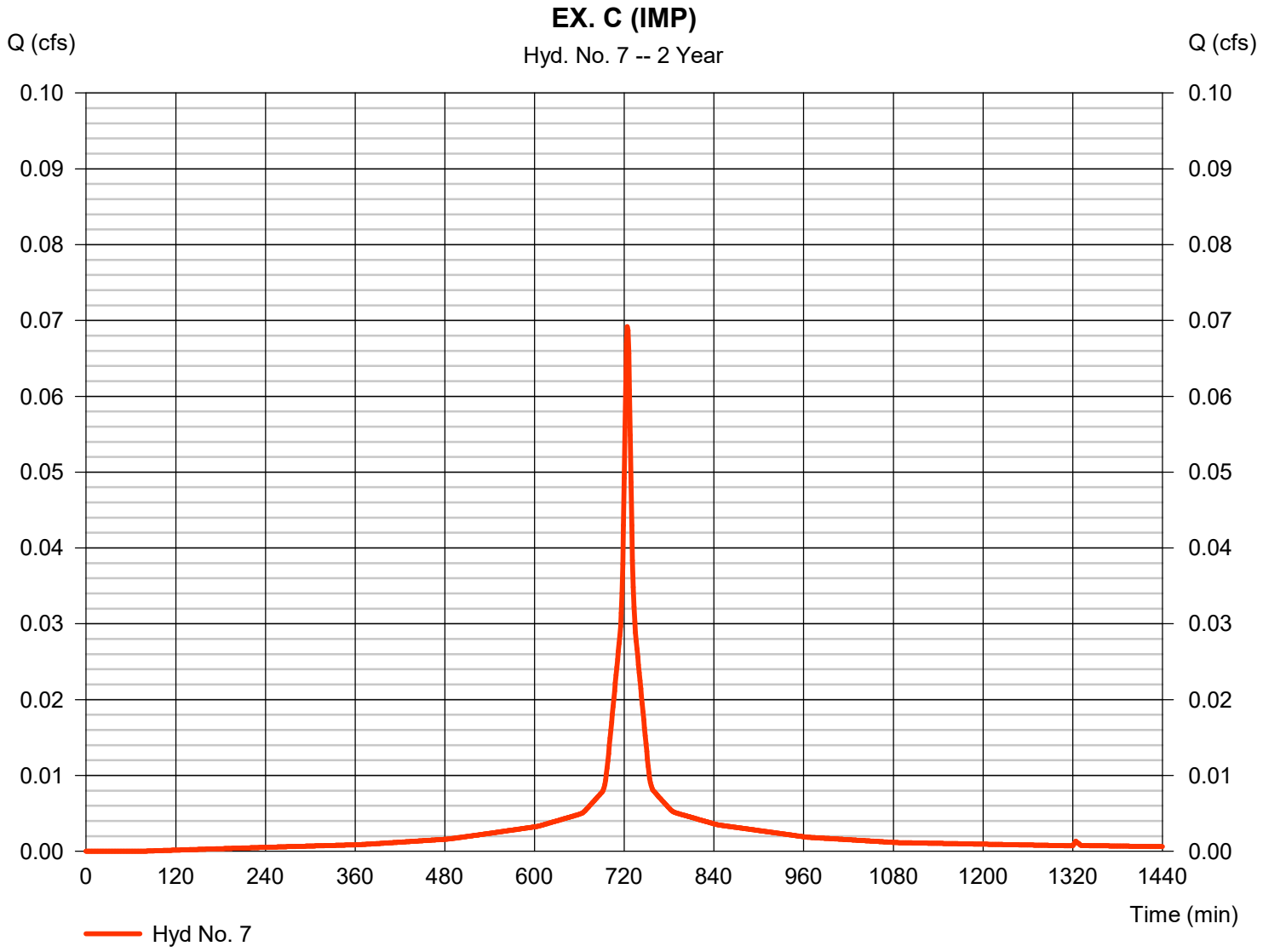


Hydrograph Report

Hyd. No. 7

EX. C (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.069 cfs
Storm frequency	=	2 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	240 cuft
Drainage area	=	0.020 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

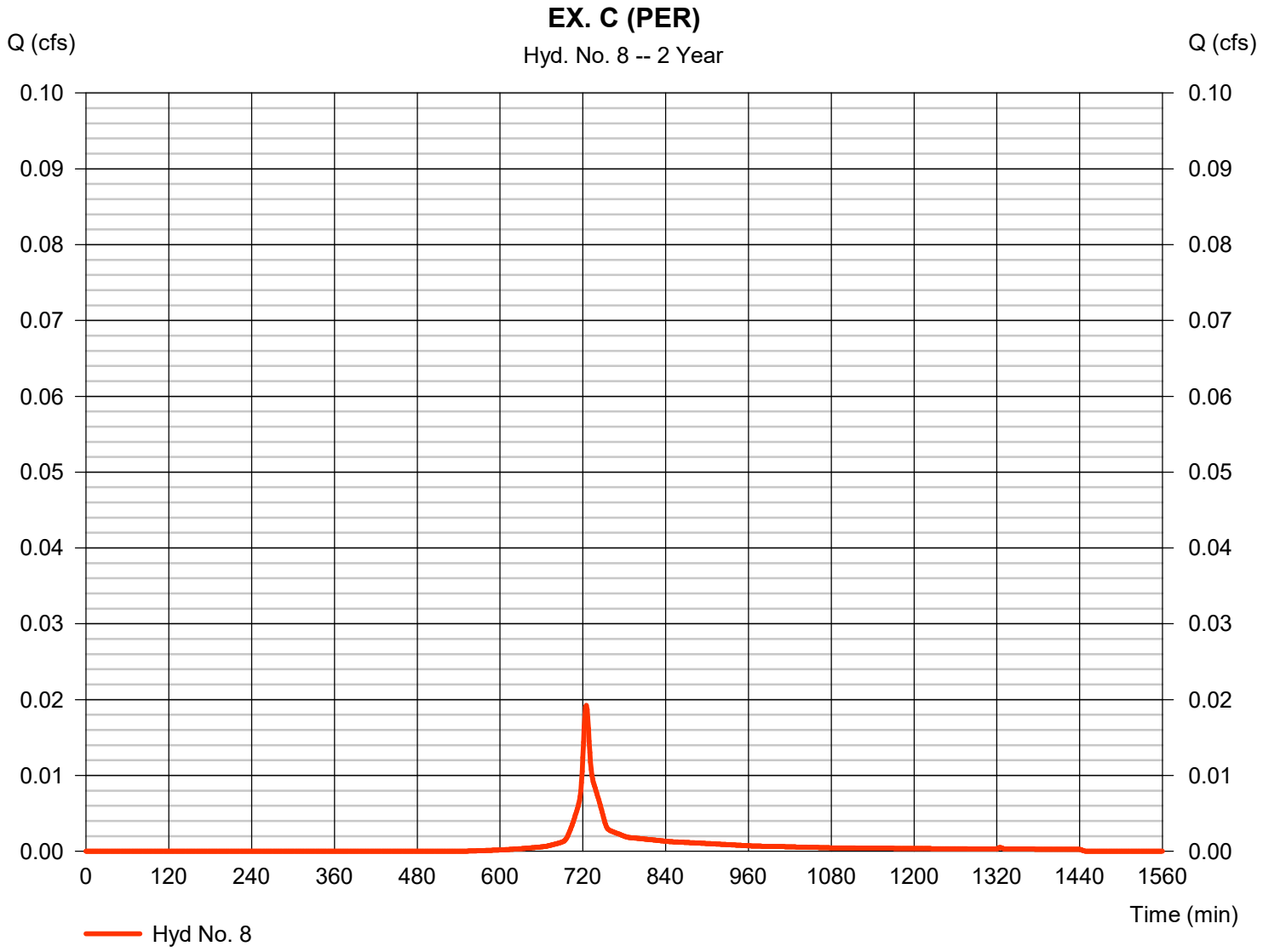


Hydrograph Report

Hyd. No. 8

EX. C (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.019 cfs
Storm frequency	=	2 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	59 cuft
Drainage area	=	0.010 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

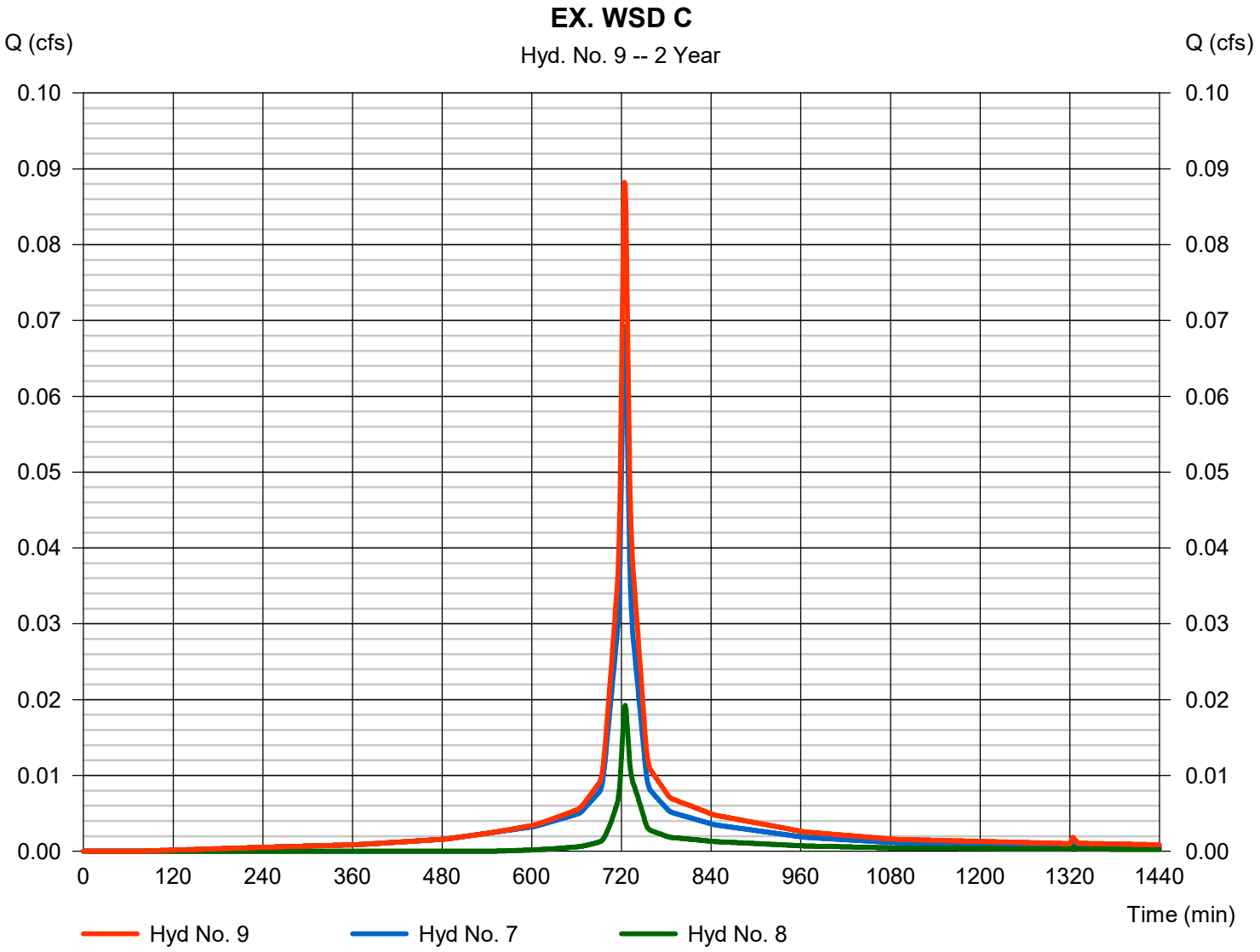


Hydrograph Report

Hyd. No. 9

EX. WSD C

Hydrograph type	=	Combine	Peak discharge	=	0.088 cfs
Storm frequency	=	2 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	300 cuft
Inflow hyds.	=	7, 8	Contrib. drain. area	=	0.030 ac

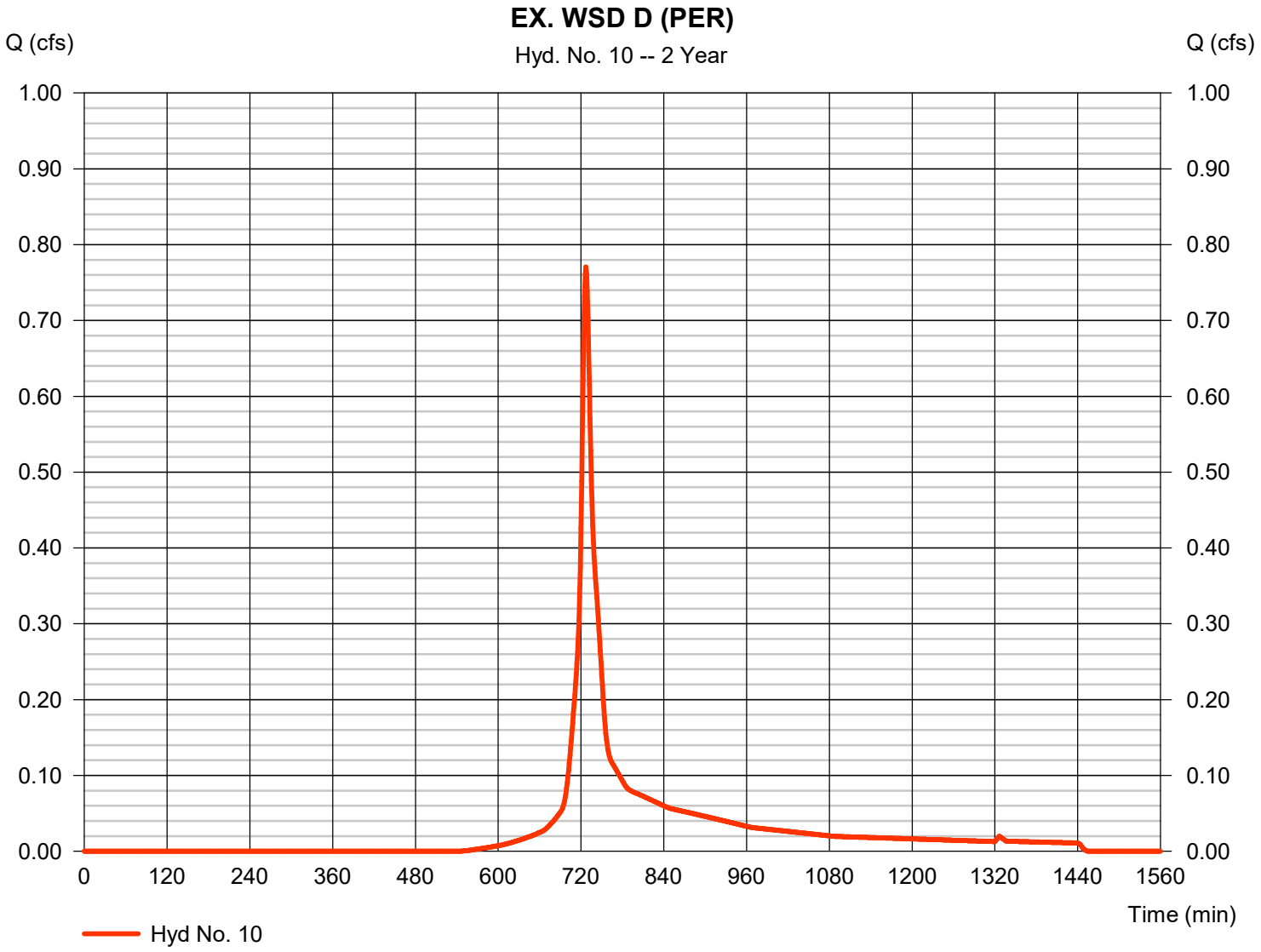


Hydrograph Report

Hyd. No. 10

EX. WSD D (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.770 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	2,653 cuft
Drainage area	=	0.460 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

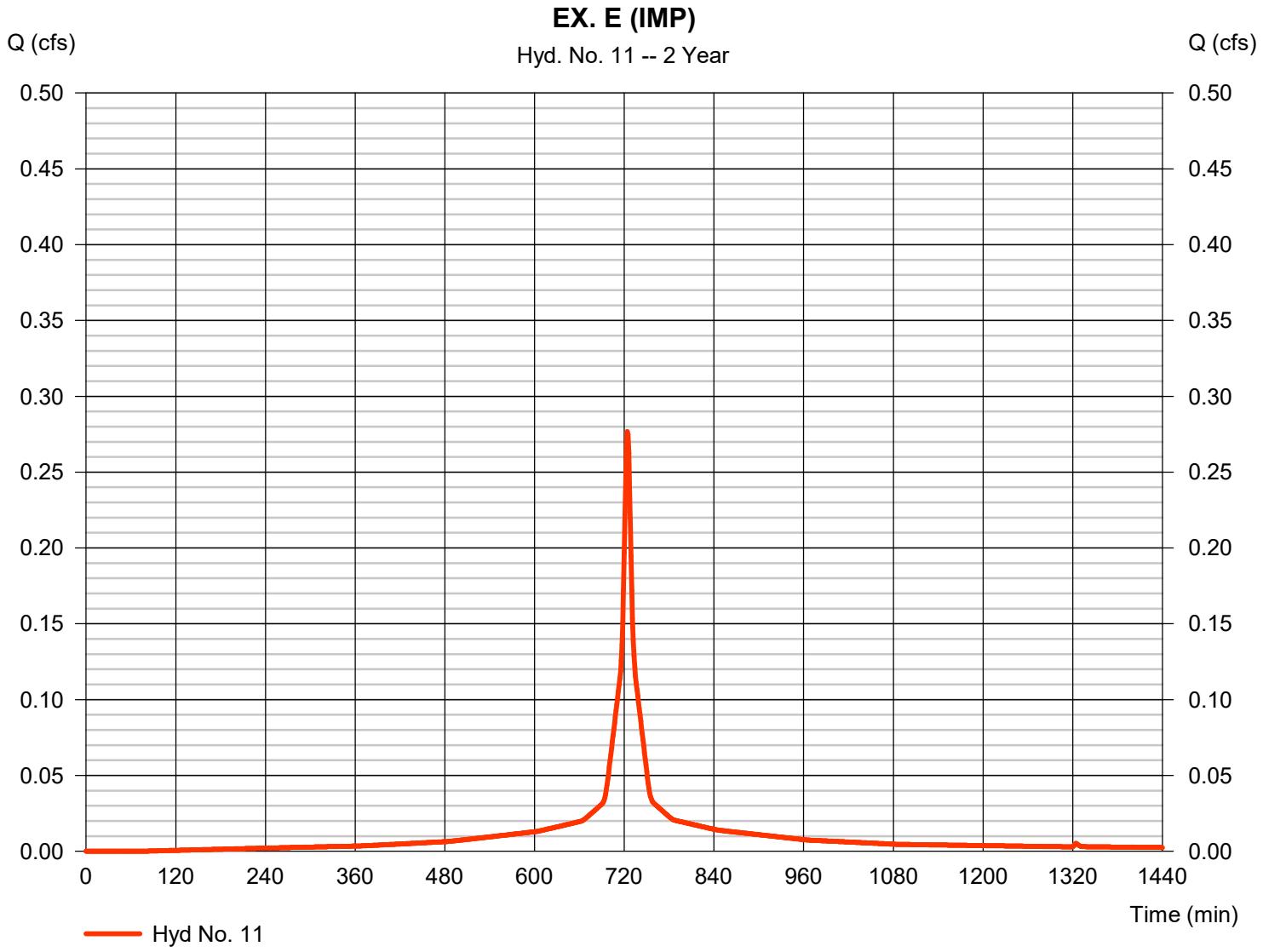


Hydrograph Report

Hyd. No. 11

EX. E (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.277 cfs
Storm frequency	=	2 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	960 cuft
Drainage area	=	0.080 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

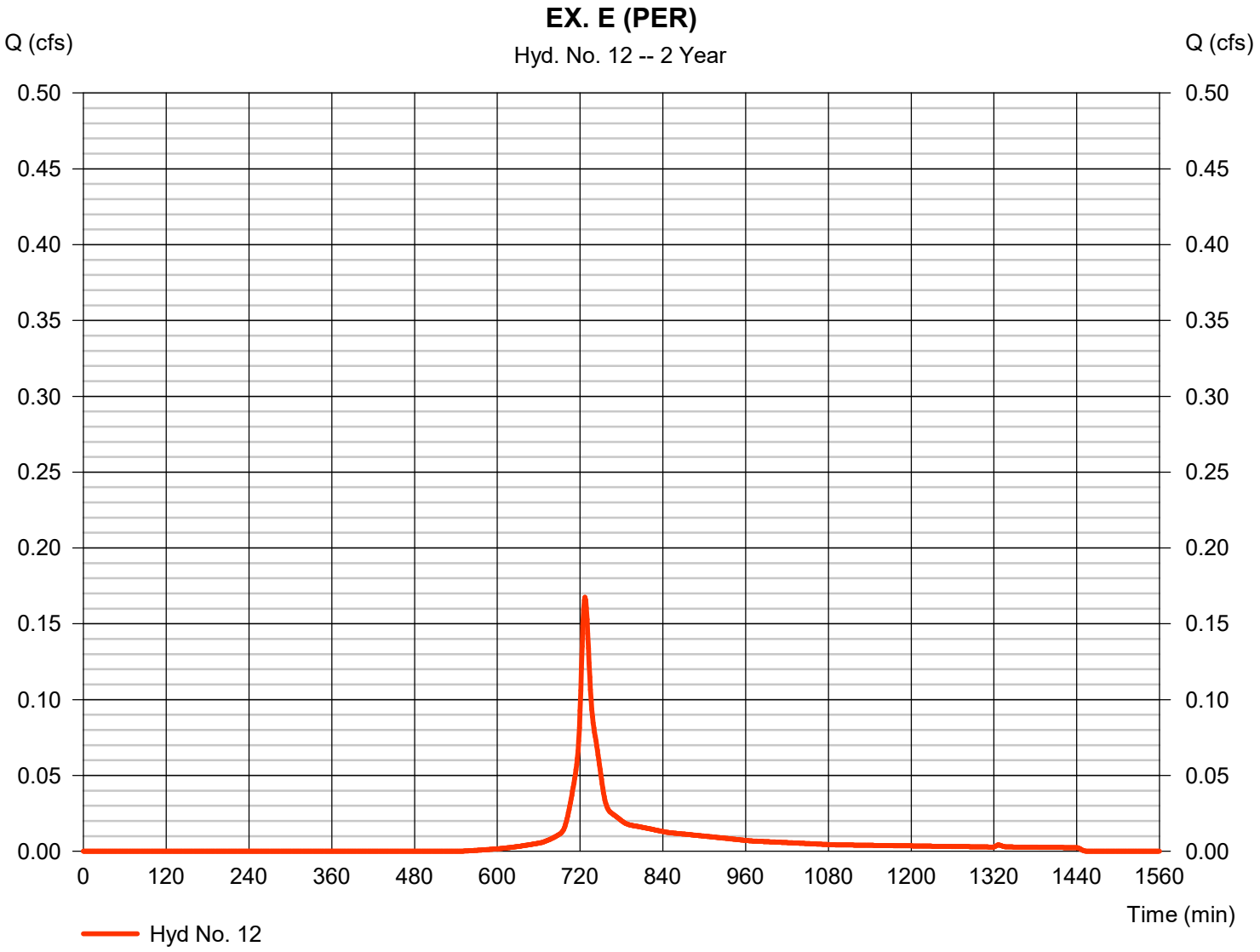


Hydrograph Report

Hyd. No. 12

EX. E (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.167 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	577 cuft
Drainage area	=	0.100 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

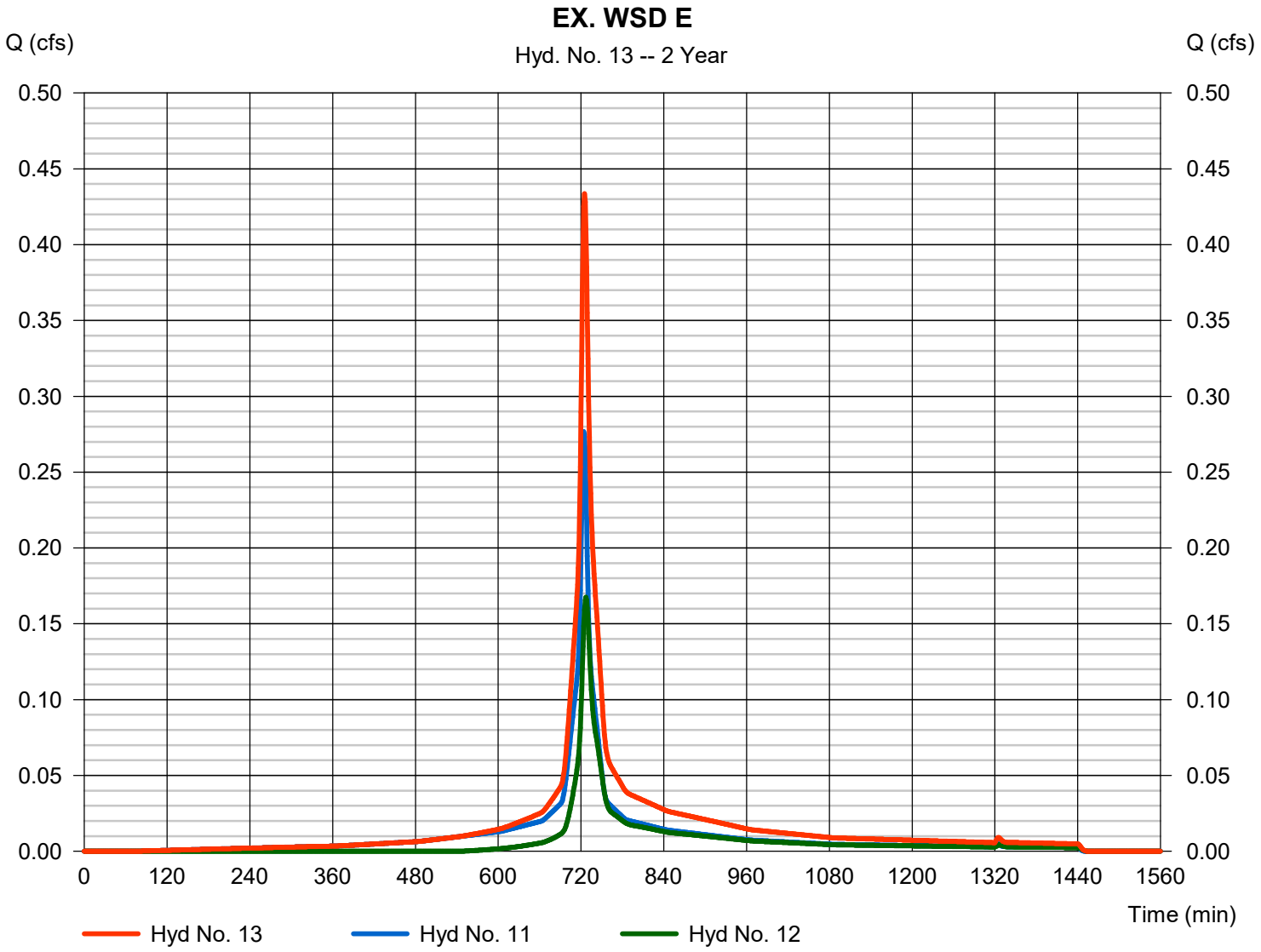


Hydrograph Report

Hyd. No. 13

EX. WSD E

Hydrograph type	=	Combine	Peak discharge	=	0.434 cfs
Storm frequency	=	2 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	1,537 cuft
Inflow hyds.	=	11, 12	Contrib. drain. area	=	0.180 ac

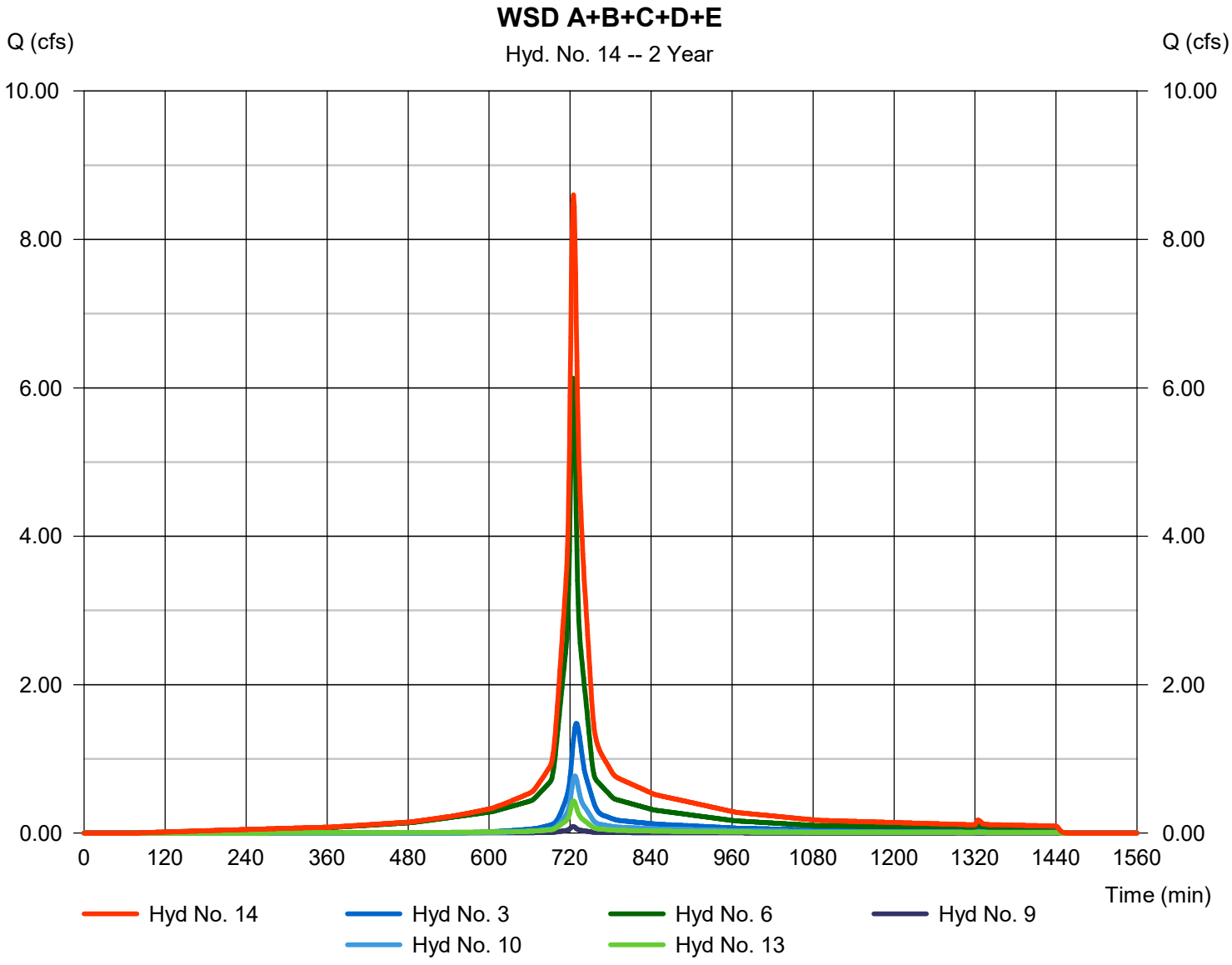


Hydrograph Report

Hyd. No. 14

WSD A+B+C+D+E

Hydrograph type	=	Combine	Peak discharge	=	8.599 cfs
Storm frequency	=	2 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	31,357 cuft
Inflow hyds.	=	3, 6, 9, 10, 13	Contrib. drain. area	=	0.460 ac

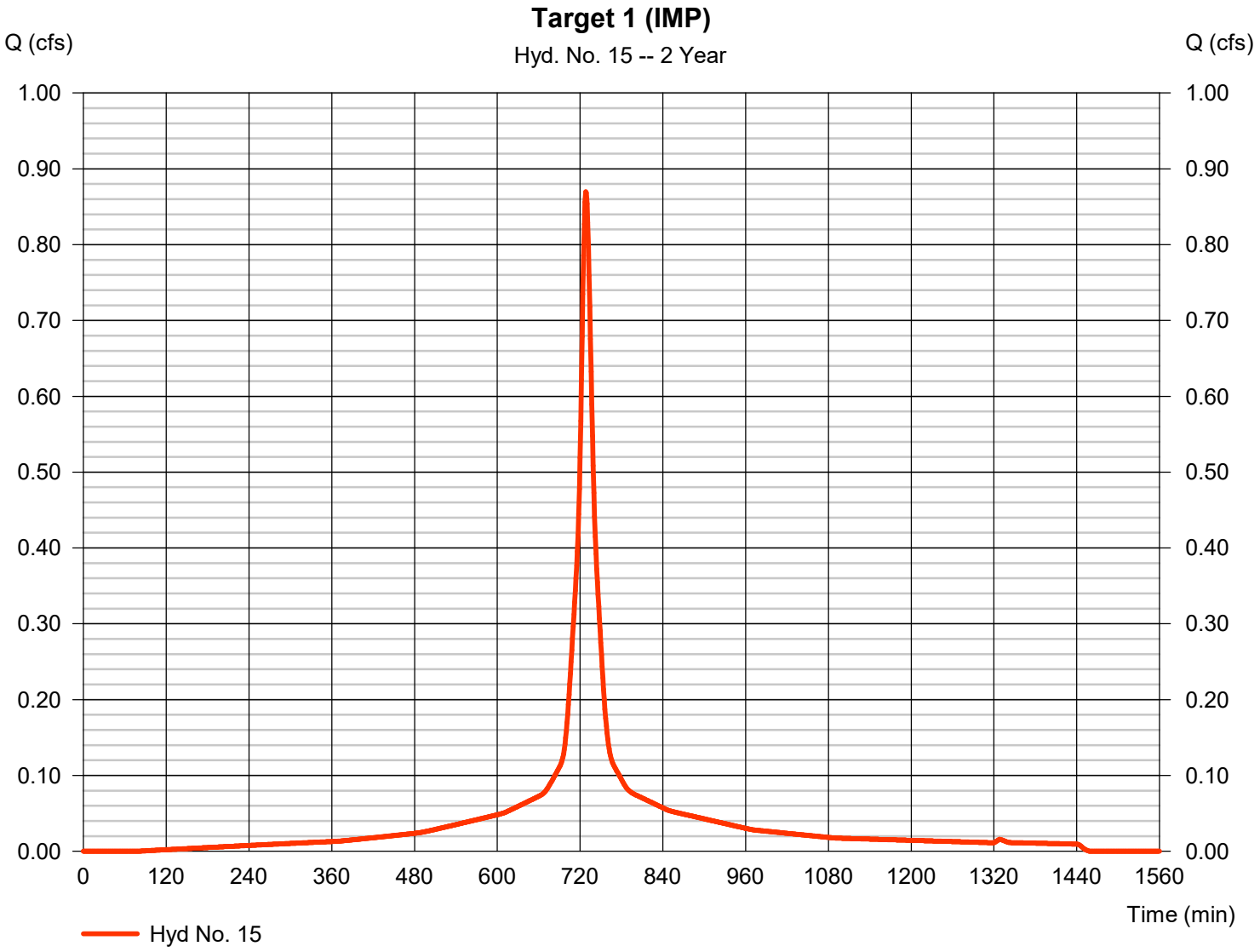


Hydrograph Report

Hyd. No. 15

Target 1 (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.870 cfs
Storm frequency	=	2 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	3,667 cuft
Drainage area	=	0.320 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

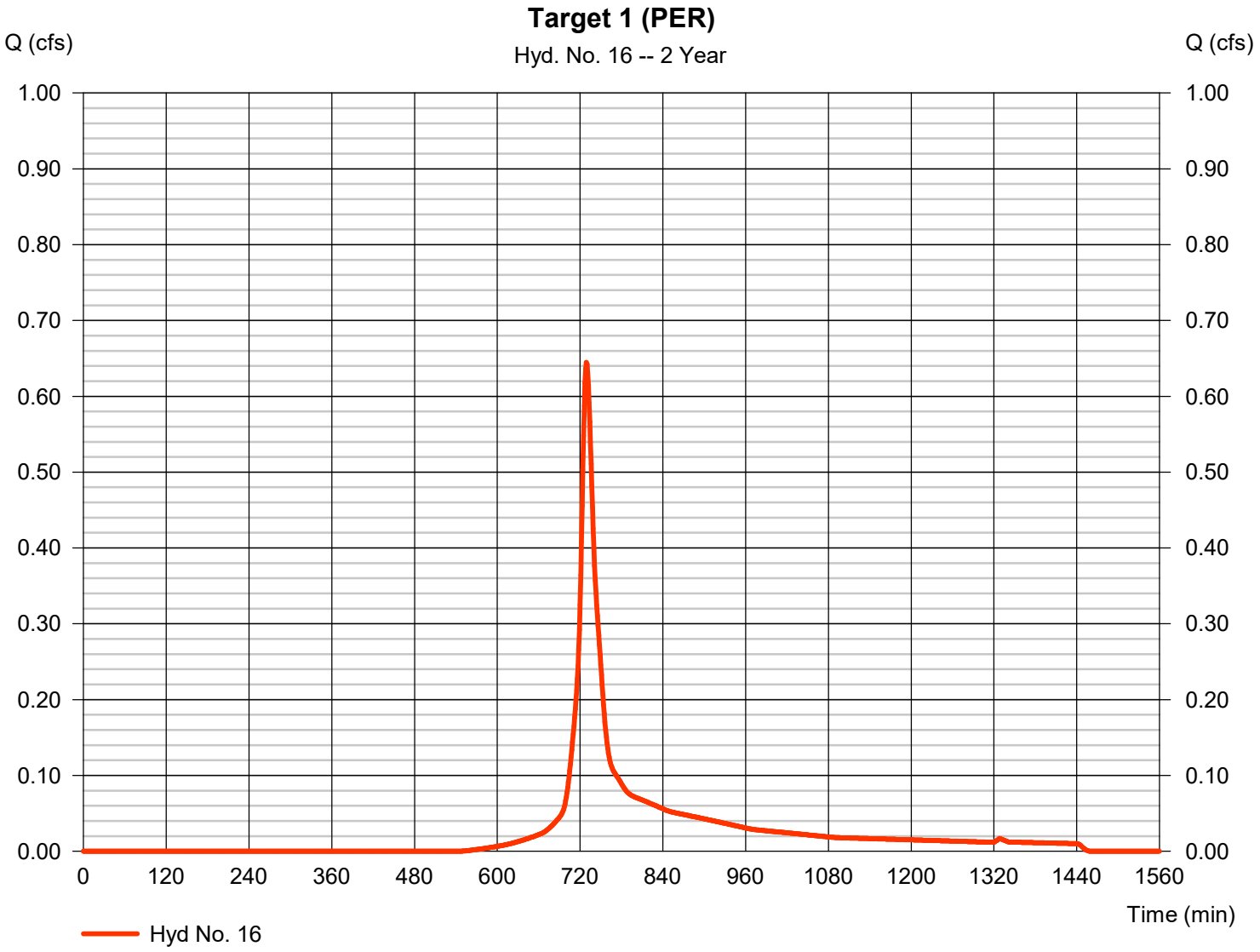


Hydrograph Report

Hyd. No. 16

Target 1 (PER)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.645 cfs
Storm frequency	= 2 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 2,441 cuft
Drainage area	= 0.430 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 3.44 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

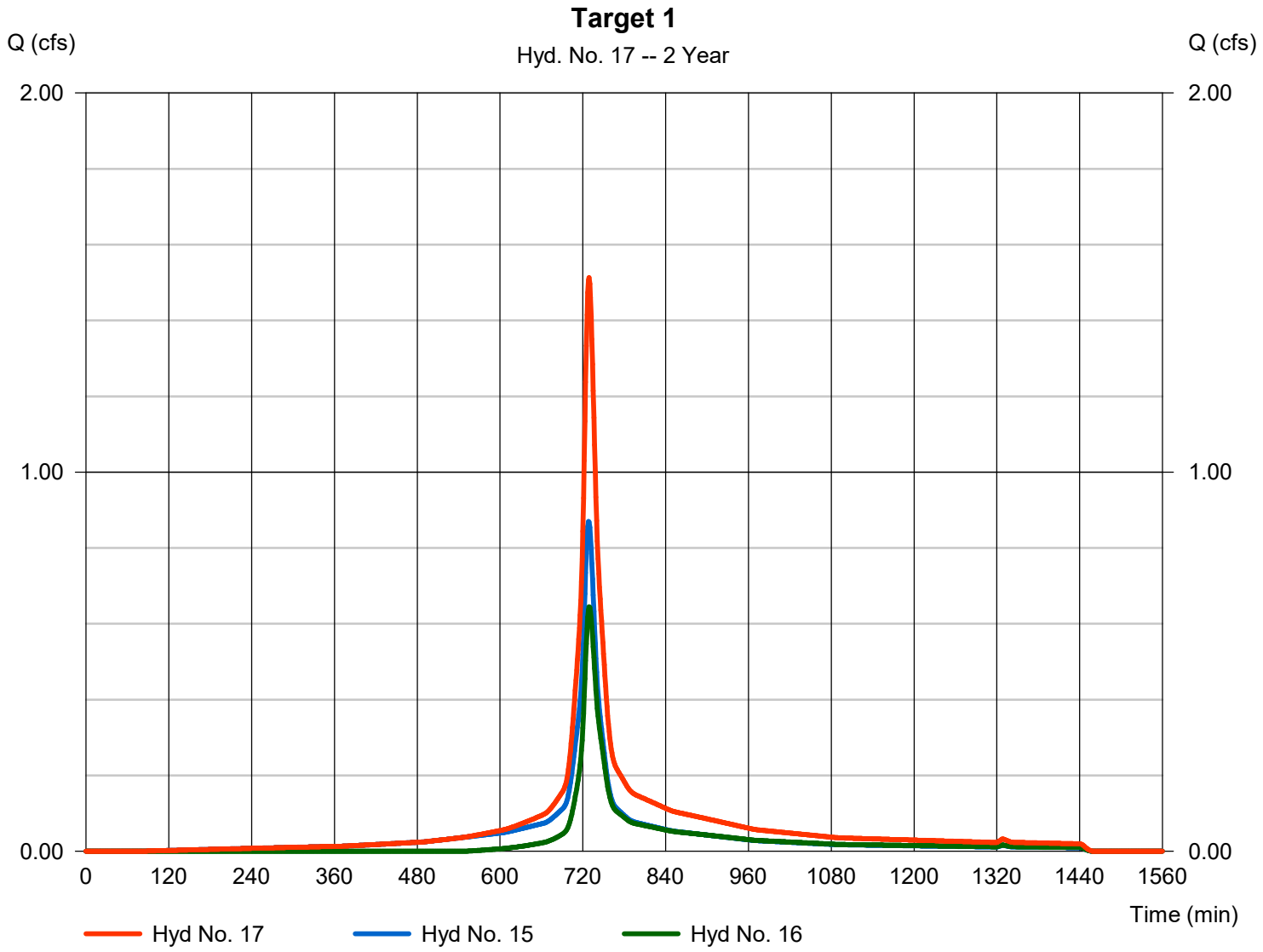


Hydrograph Report

Hyd. No. 17

Target 1

Hydrograph type	= Combine	Peak discharge	= 1.513 cfs
Storm frequency	= 2 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 6,108 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 0.750 ac

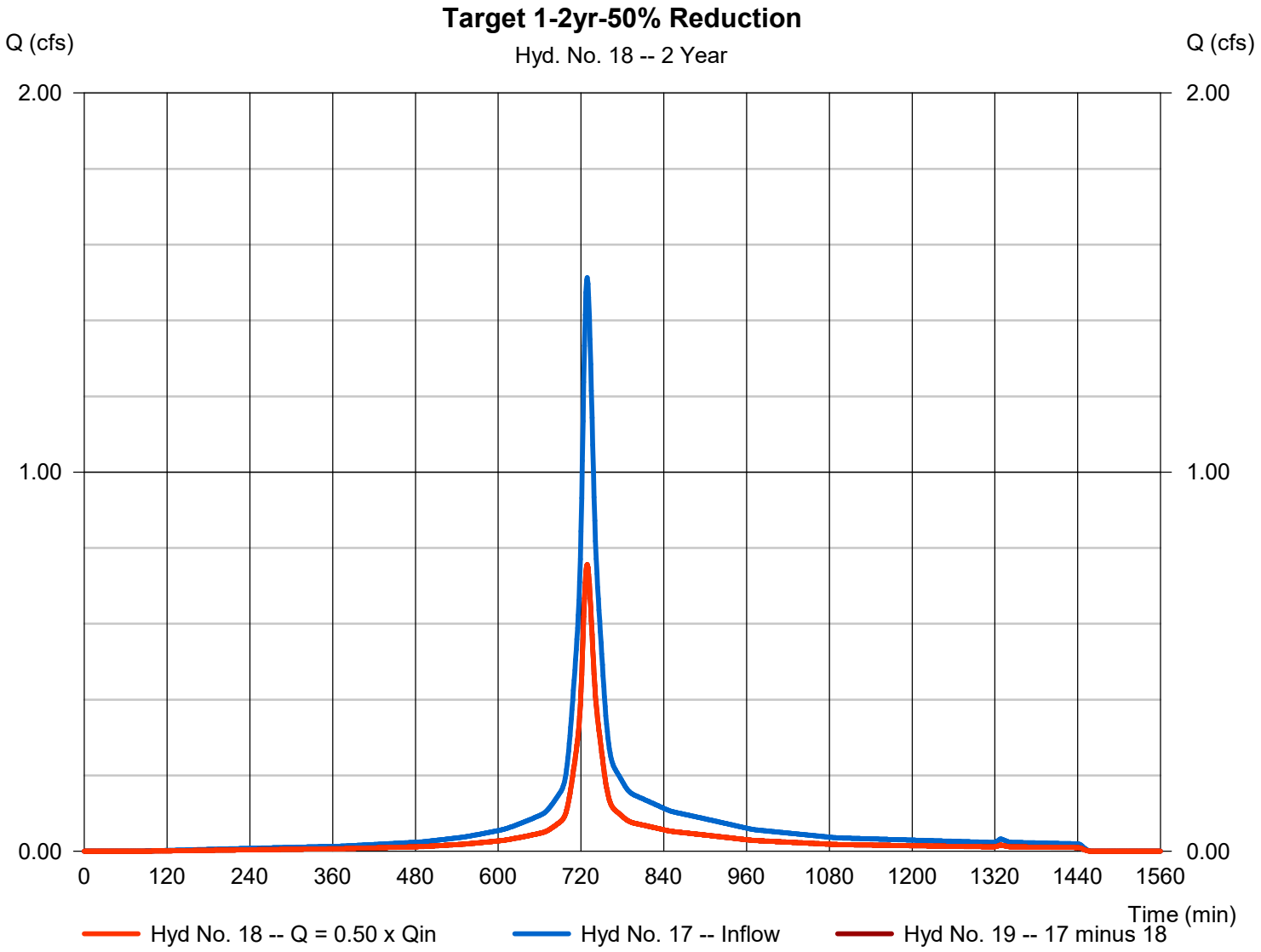


Hydrograph Report

Hyd. No. 18

Target 1-2yr-50% Reduction

Hydrograph type	= Diversion1	Peak discharge	= 0.756 cfs
Storm frequency	= 2 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 3,054 cuft
Inflow hydrograph	= 17 - Target 1	2nd diverted hyd.	= 19
Diversion method	= Flow Ratio	Flow ratio	= 0.50

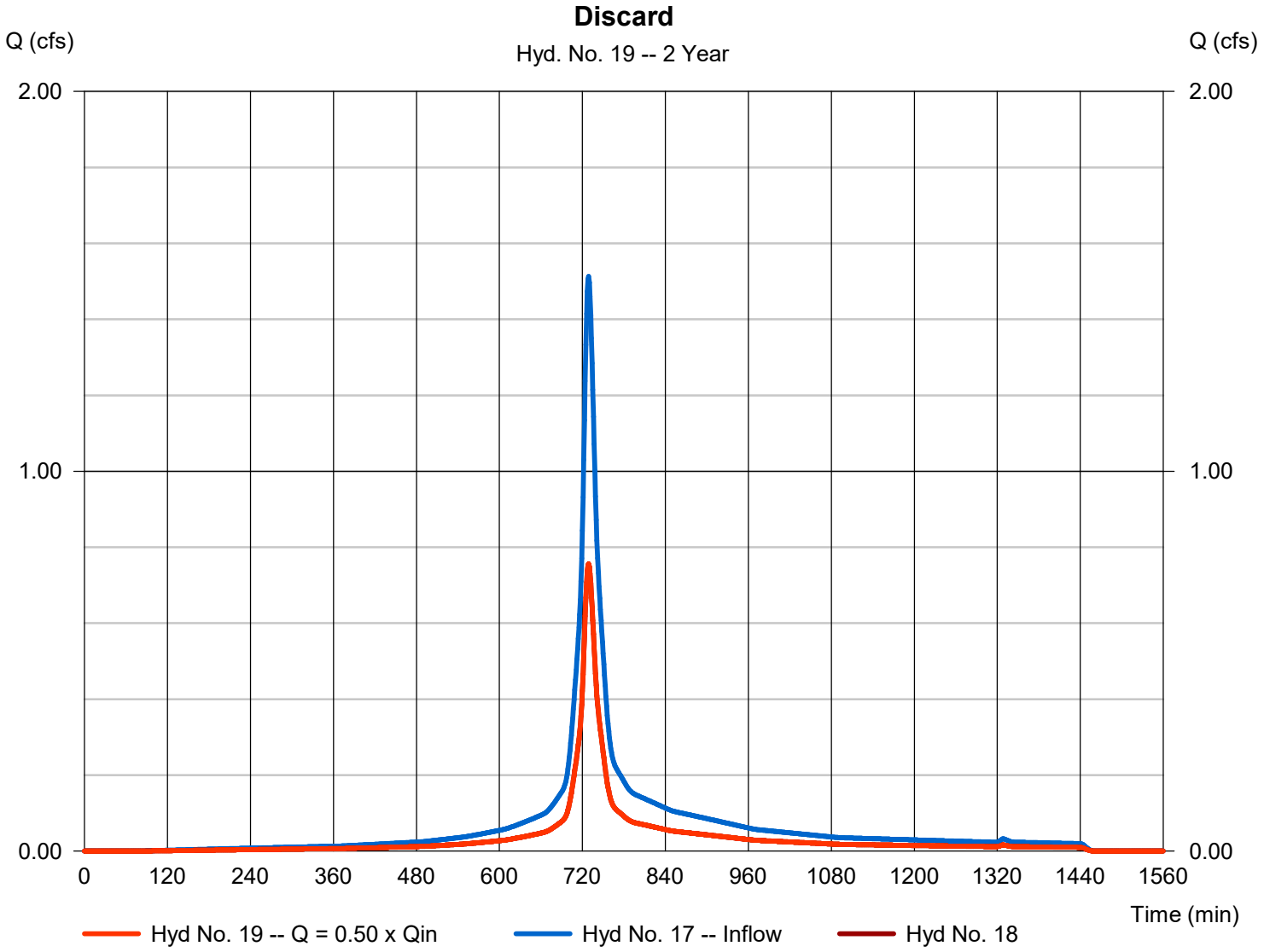


Hydrograph Report

Hyd. No. 19

Discard

Hydrograph type	= Diversion2	Peak discharge	= 0.756 cfs
Storm frequency	= 2 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 3,054 cuft
Inflow hydrograph	= 17 - Target 1	2nd diverted hyd.	= 18
Diversion method	= Flow Ratio	Flow ratio	= 0.50

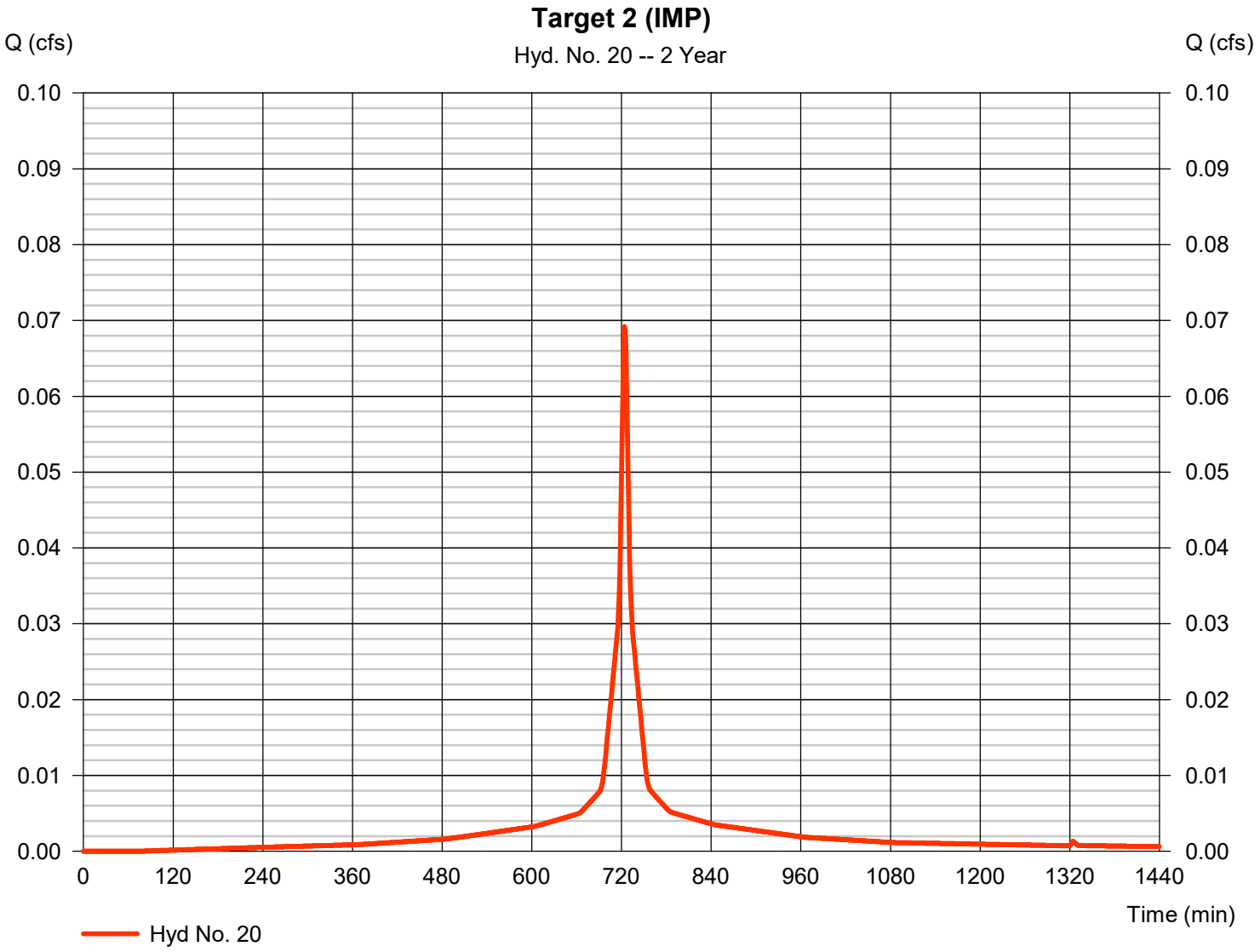


Hydrograph Report

Hyd. No. 20

Target 2 (IMP)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.069 cfs
Storm frequency	= 2 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 240 cuft
Drainage area	= 0.020 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.44 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

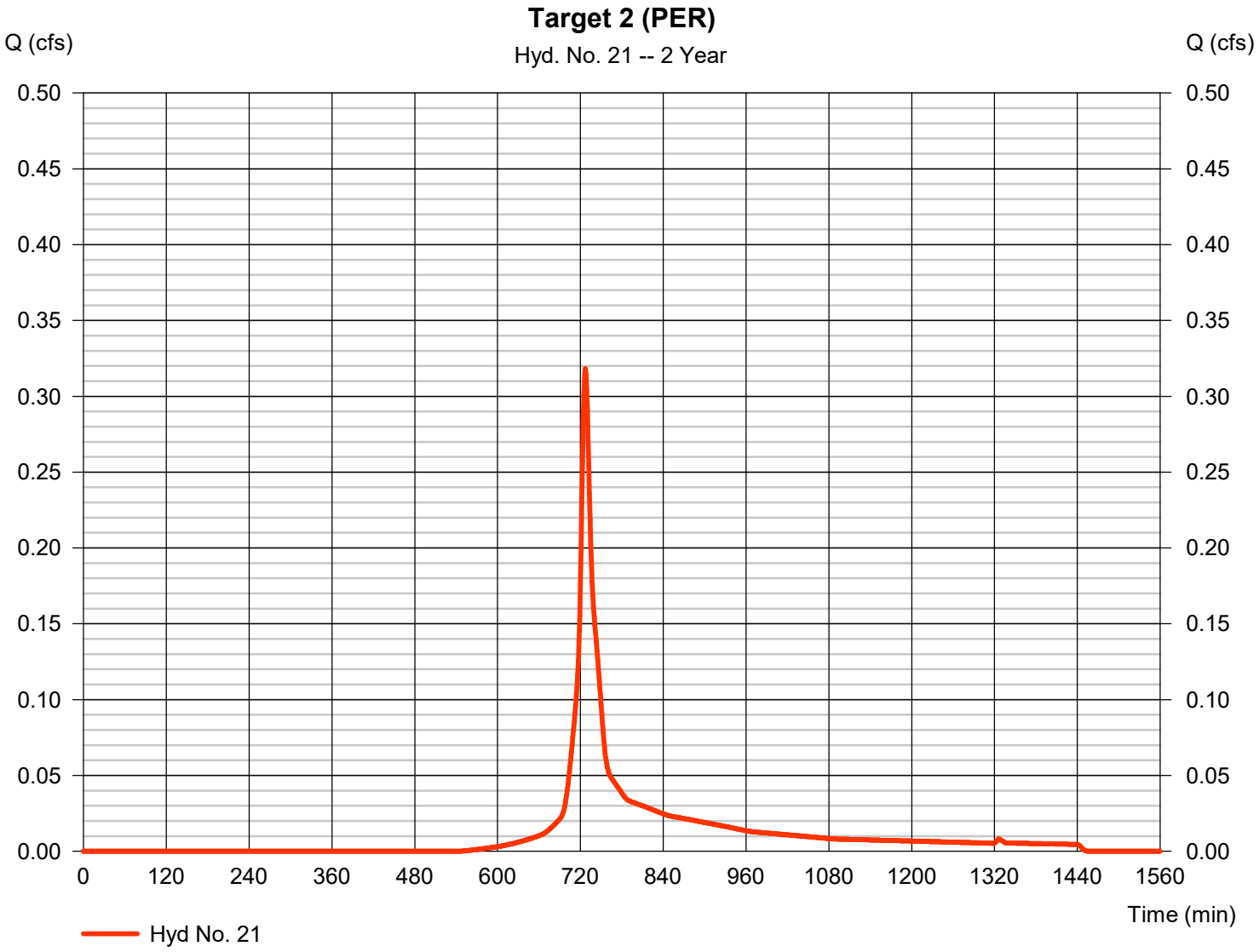


Hydrograph Report

Hyd. No. 21

Target 2 (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.318 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	1,096 cuft
Drainage area	=	0.190 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

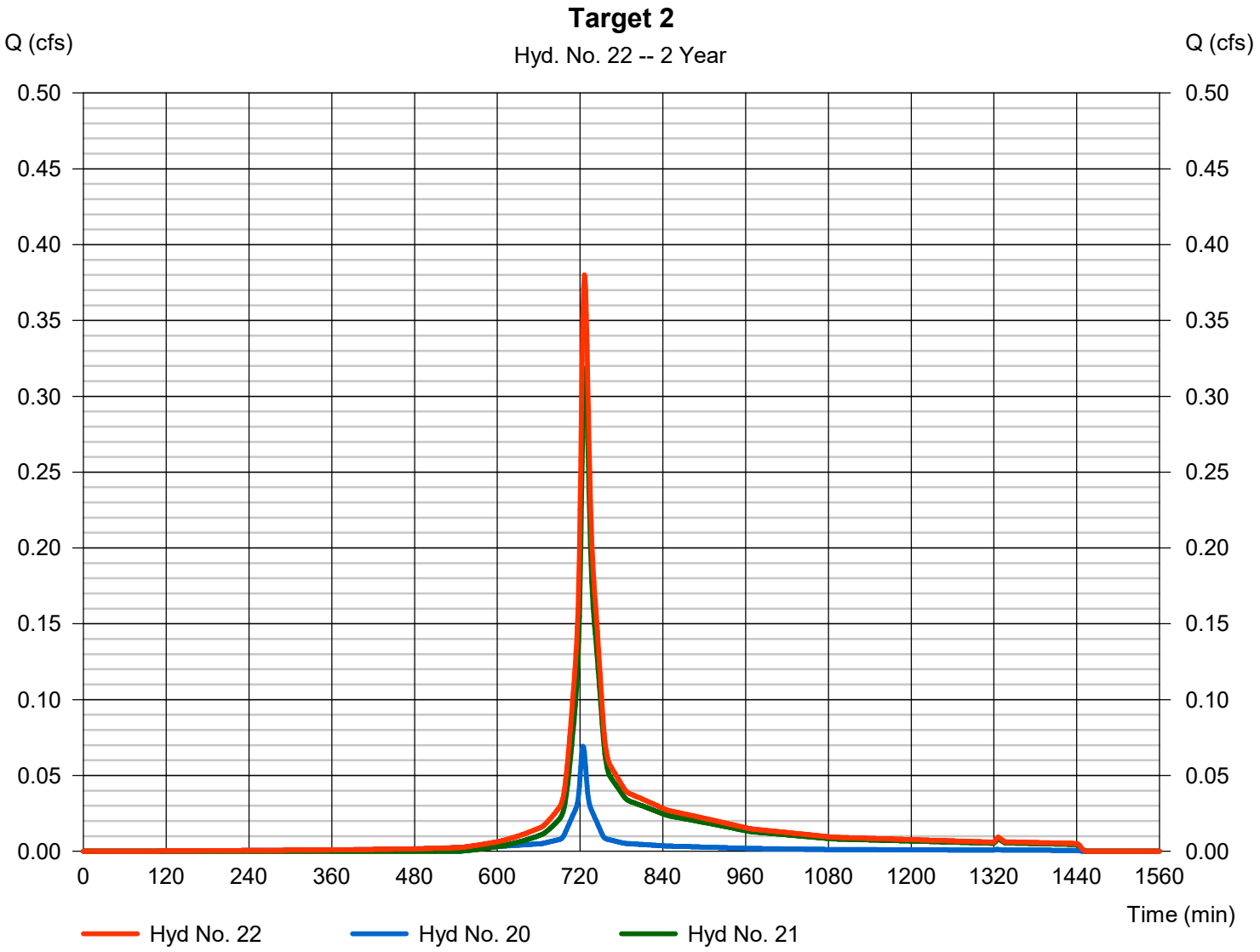


Hydrograph Report

Hyd. No. 22

Target 2

Hydrograph type	= Combine	Peak discharge	= 0.380 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 1,336 cuft
Inflow hyds.	= 20, 21	Contrib. drain. area	= 0.210 ac

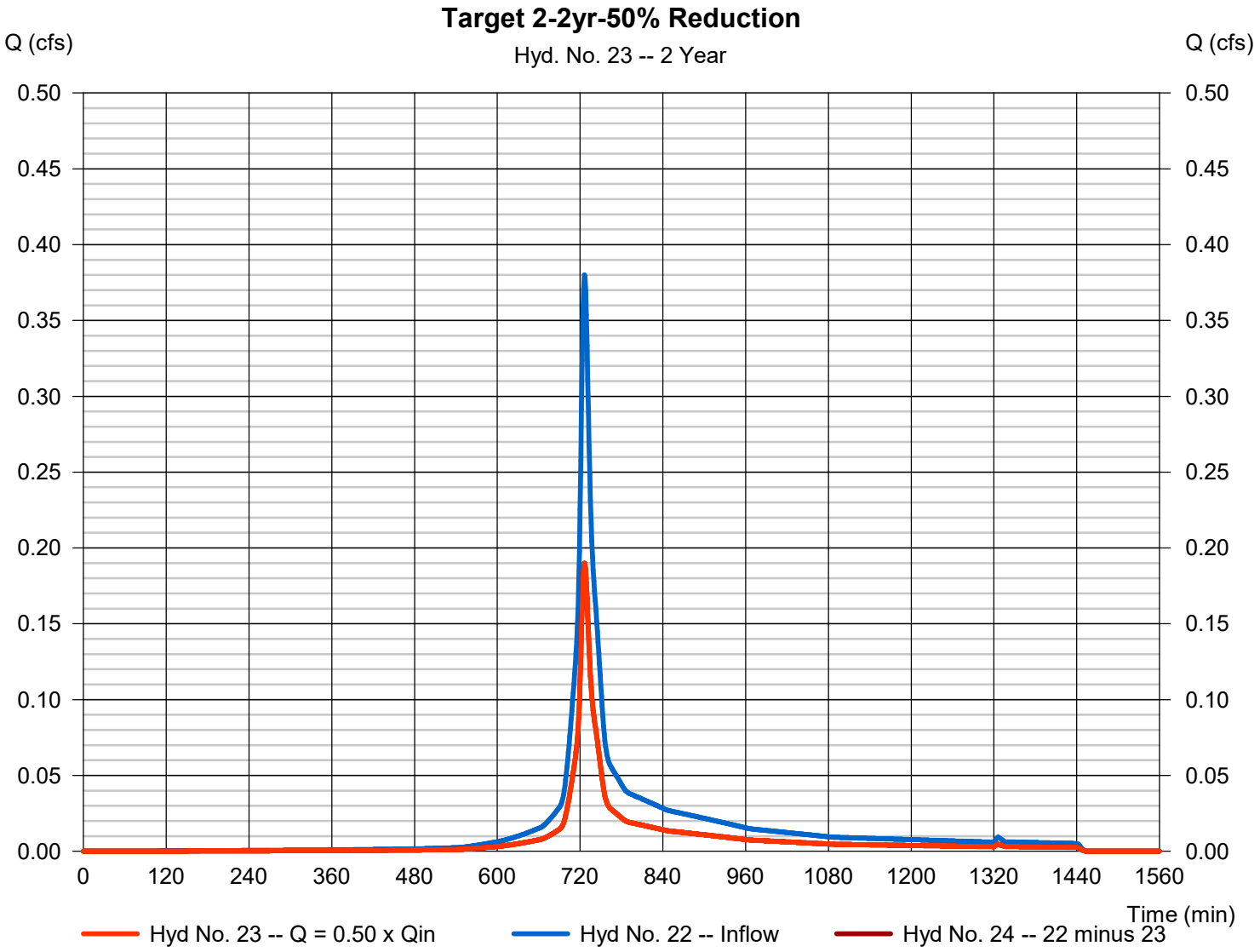


Hydrograph Report

Hyd. No. 23

Target 2-2yr-50% Reduction

Hydrograph type	= Diversion1	Peak discharge	= 0.190 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 668 cuft
Inflow hydrograph	= 22 - Target 2	2nd diverted hyd.	= 24
Diversion method	= Flow Ratio	Flow ratio	= 0.50

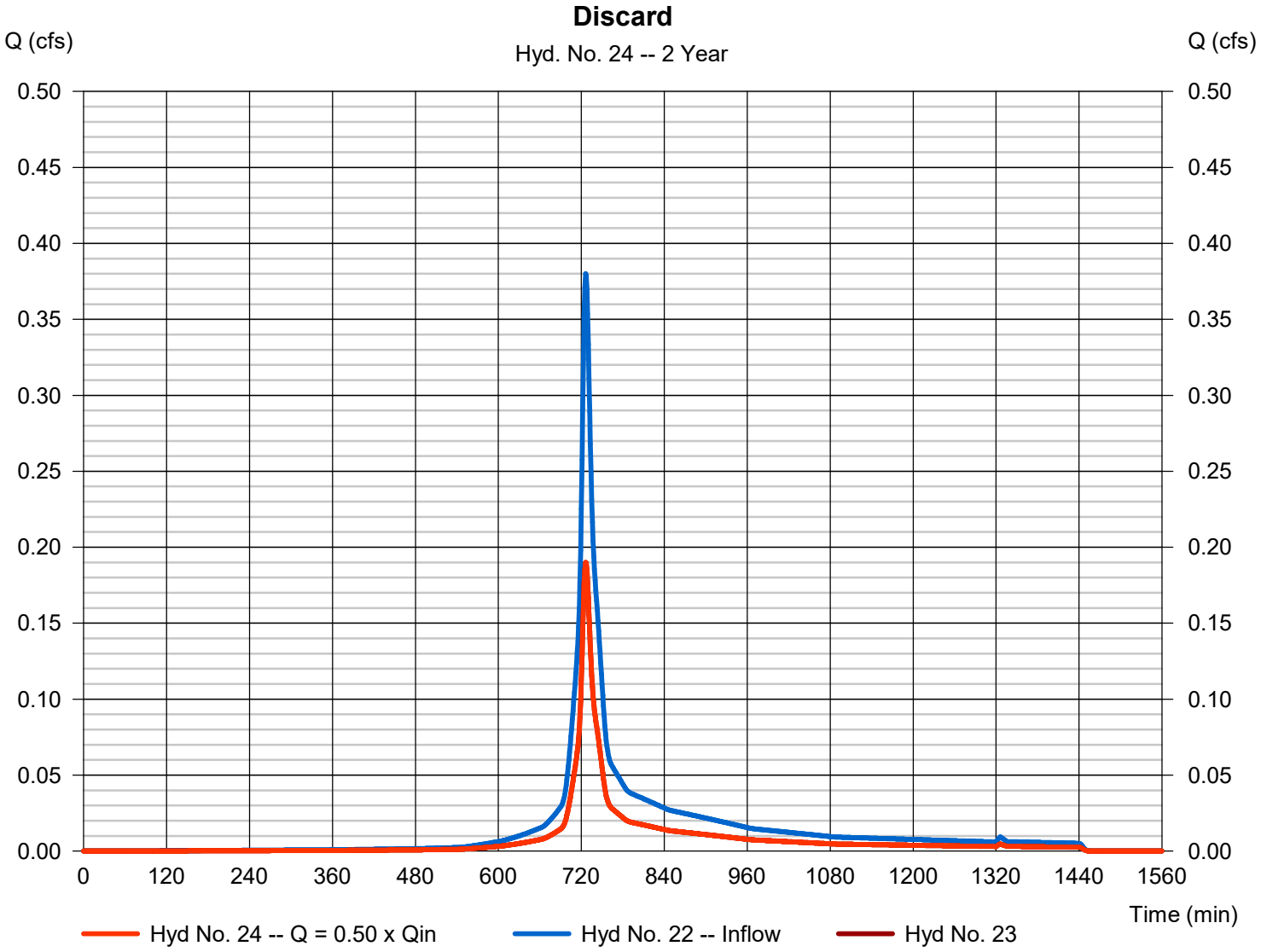


Hydrograph Report

Hyd. No. 24

Discard

Hydrograph type	= Diversion2	Peak discharge	= 0.190 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 668 cuft
Inflow hydrograph	= 22 - Target 2	2nd diverted hyd.	= 23
Diversion method	= Flow Ratio	Flow ratio	= 0.50

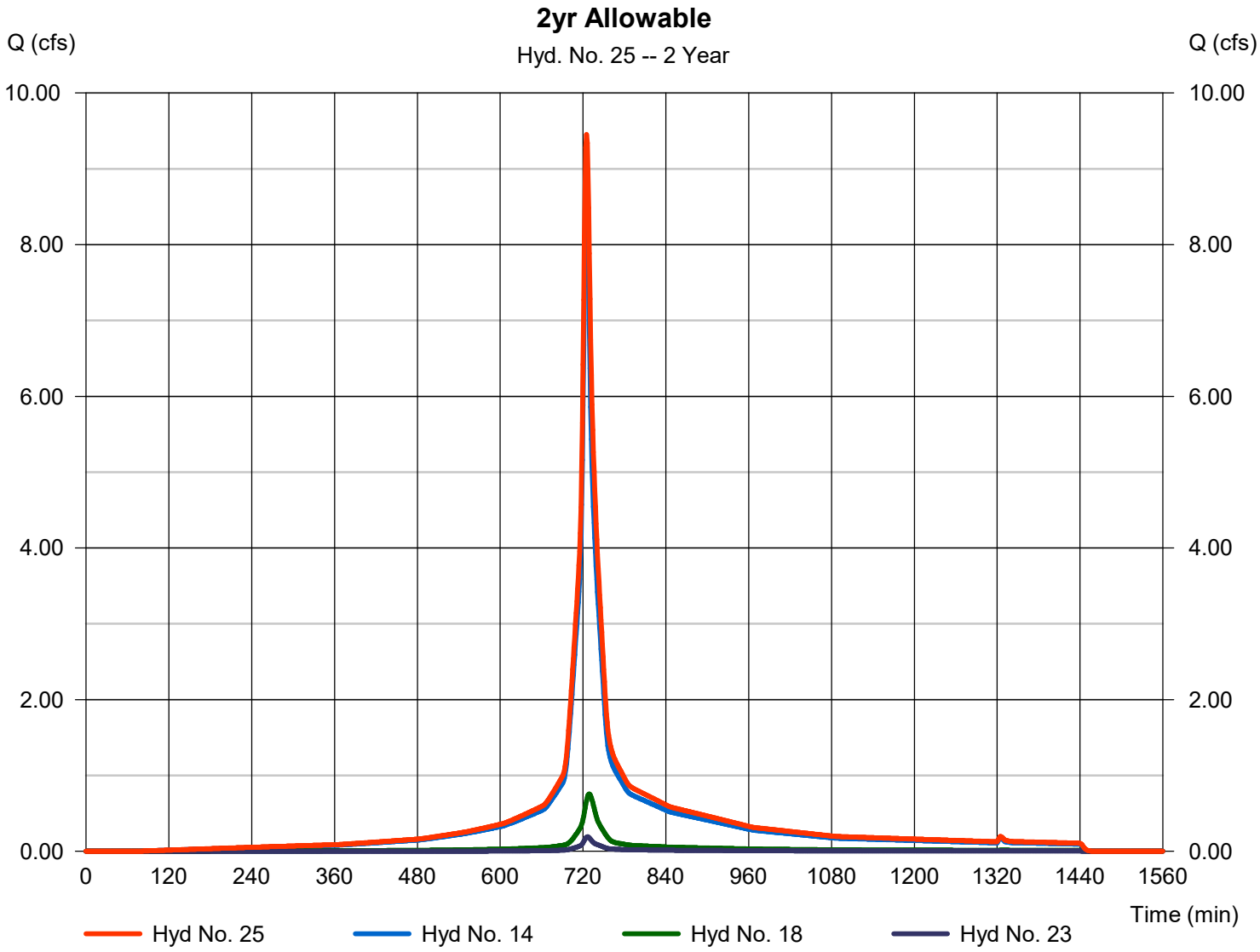


Hydrograph Report

Hyd. No. 25

2yr Allowable

Hydrograph type	= Combine	Peak discharge	= 9.451 cfs
Storm frequency	= 2 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 35,079 cuft
Inflow hyds.	= 14, 18, 23	Contrib. drain. area	= 0.000 ac



10-YEAR STORM CALCULATIONS

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100300401 - TARGET-10yr.gpw

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10 - Year

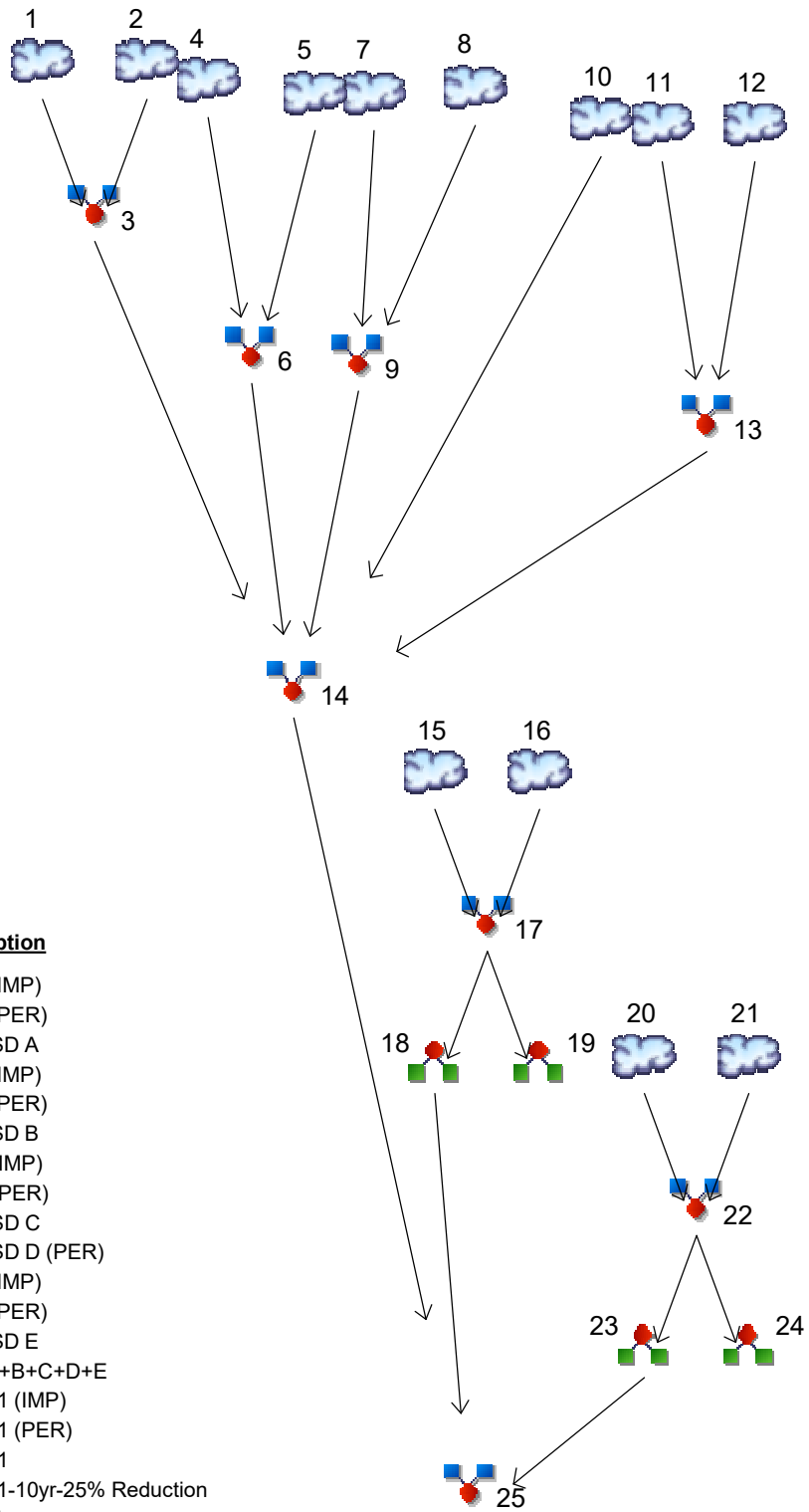
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Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020



Legend

Hyd.	Origin	Description
1	SCS Runoff	EX. A (IMP)
2	SCS Runoff	EX. A (PER)
3	Combine	EX. WSD A
4	SCS Runoff	EX. B (IMP)
5	SCS Runoff	EX. B (PER)
6	Combine	EX. WSD B
7	SCS Runoff	EX. C (IMP)
8	SCS Runoff	EX. C (PER)
9	Combine	EX. WSD C
10	SCS Runoff	EX. WSD D (PER)
11	SCS Runoff	EX. E (IMP)
12	SCS Runoff	EX. E (PER)
13	Combine	EX. WSD E
14	Combine	WSD A+B+C+D+E
15	SCS Runoff	Target 1 (IMP)
16	SCS Runoff	Target 1 (PER)
17	Combine	Target 1
18	Diversion1	Target 1-10yr-25% Reduction
19	Diversion2	Discard
20	SCS Runoff	Target 2 (IMP)
21	SCS Runoff	Target 2 (PER)
22	Combine	Target 2
23	Diversion1	Target 2-10yr-25% Reduction
24	Diversion2	Discard
25	Combine	2yr Allowable

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	-------	-------	-------	-------	0.083	-------	-------	-------	EX. A (IMP)
2	SCS Runoff	------	-------	-------	-------	-------	2.785	-------	-------	-------	EX. A (PER)
3	Combine	1, 2	-------	-------	-------	-------	2.868	-------	-------	-------	EX. WSD A
4	SCS Runoff	------	-------	-------	-------	-------	9.249	-------	-------	-------	EX. B (IMP)
5	SCS Runoff	------	-------	-------	-------	-------	0.150	-------	-------	-------	EX. B (PER)
6	Combine	4, 5	-------	-------	-------	-------	9.398	-------	-------	-------	EX. WSD B
7	SCS Runoff	------	-------	-------	-------	-------	0.106	-------	-------	-------	EX. C (IMP)
8	SCS Runoff	------	-------	-------	-------	-------	0.037	-------	-------	-------	EX. C (PER)
9	Combine	7, 8	-------	-------	-------	-------	0.143	-------	-------	-------	EX. WSD C
10	SCS Runoff	------	-------	-------	-------	-------	1.503	-------	-------	-------	EX. WSD D (PER)
11	SCS Runoff	------	-------	-------	-------	-------	0.423	-------	-------	-------	EX. E (IMP)
12	SCS Runoff	------	-------	-------	-------	-------	0.327	-------	-------	-------	EX. E (PER)
13	Combine	11, 12	-------	-------	-------	-------	0.734	-------	-------	-------	EX. WSD E
14	Combine	3, 6, 9, 10, 13	-------	-------	-------	-------	14.15	-------	-------	-------	WSD A+B+C+D+E
15	SCS Runoff	------	-------	-------	-------	-------	1.329	-------	-------	-------	Target 1 (IMP)
16	SCS Runoff	------	-------	-------	-------	-------	1.260	-------	-------	-------	Target 1 (PER)
17	Combine	15, 16	-------	-------	-------	-------	2.587	-------	-------	-------	Target 1
18	Diversion1	17	-------	-------	-------	-------	1.940	-------	-------	-------	Target 1-10yr-25% Reduction
19	Diversion2	17	-------	-------	-------	-------	0.647	-------	-------	-------	Discard
20	SCS Runoff	------	-------	-------	-------	-------	0.106	-------	-------	-------	Target 2 (IMP)
21	SCS Runoff	------	-------	-------	-------	-------	0.621	-------	-------	-------	Target 2 (PER)
22	Combine	20, 21	-------	-------	-------	-------	0.717	-------	-------	-------	Target 2
23	Diversion1	22	-------	-------	-------	-------	0.538	-------	-------	-------	Target 2-10yr-25% Reduction
24	Diversion2	22	-------	-------	-------	-------	0.179	-------	-------	-------	Discard
25	Combine	14, 18, 23,	-------	-------	-------	-------	16.40	-------	-------	-------	2yr Allowable

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

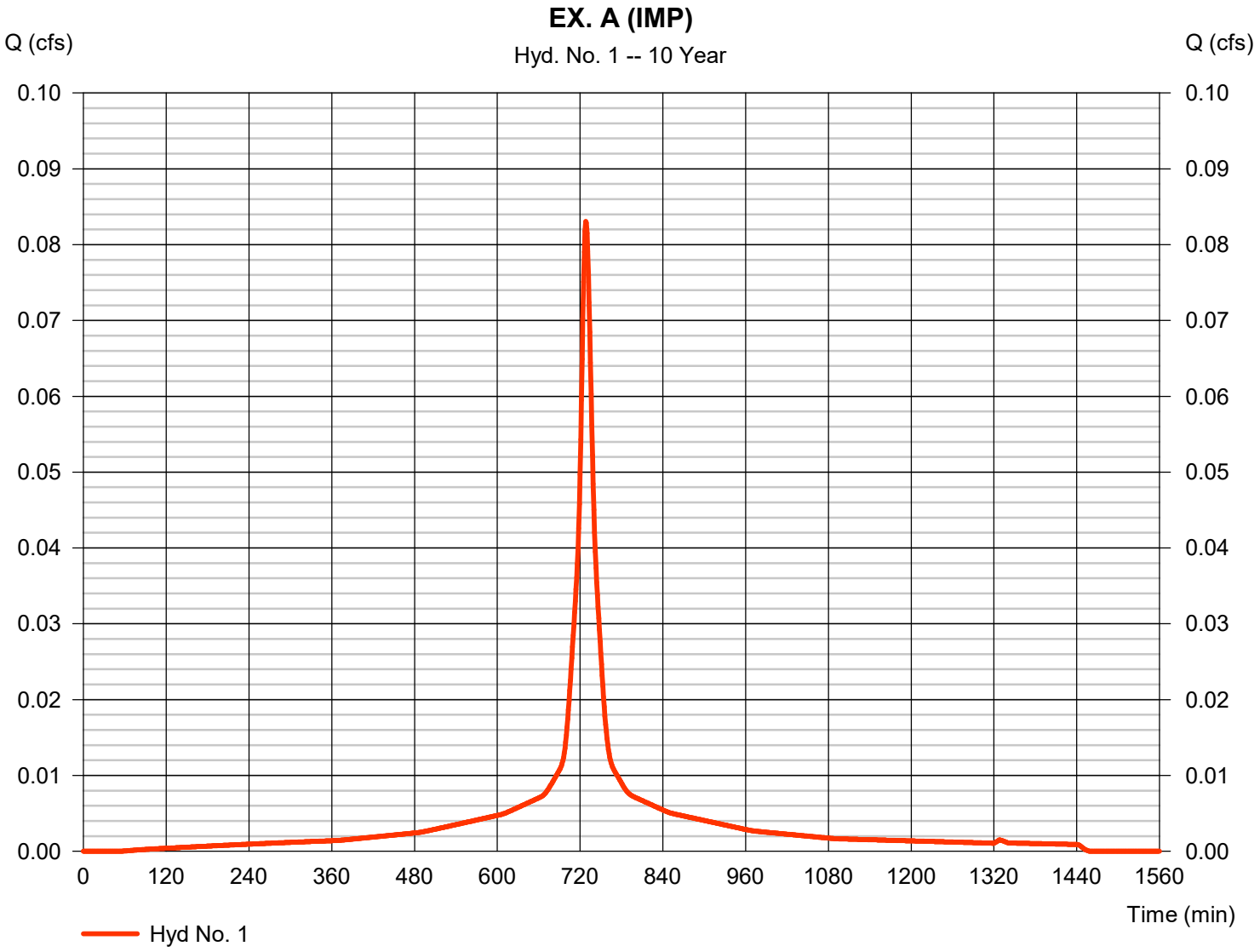
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.083	1	728	356	------	------	------	EX. A (IMP)
2	SCS Runoff	2.785	1	729	10,475	------	------	------	EX. A (PER)
3	Combine	2.868	1	729	10,831	1, 2	------	------	EX. WSD A
4	SCS Runoff	9.249	1	724	32,643	------	------	------	EX. B (IMP)
5	SCS Runoff	0.150	1	725	462	------	------	------	EX. B (PER)
6	Combine	9.398	1	724	33,105	4, 5	------	------	EX. WSD B
7	SCS Runoff	0.106	1	724	373	------	------	------	EX. C (IMP)
8	SCS Runoff	0.037	1	725	116	------	------	------	EX. C (PER)
9	Combine	0.143	1	724	489	7, 8	------	------	EX. WSD C
10	SCS Runoff	1.503	1	727	5,152	------	------	------	EX. WSD D (PER)
11	SCS Runoff	0.423	1	724	1,492	------	------	------	EX. E (IMP)
12	SCS Runoff	0.327	1	727	1,120	------	------	------	EX. E (PER)
13	Combine	0.734	1	725	2,612	11, 12	------	------	EX. WSD E
14	Combine	14.15	1	725	52,189	3, 6, 9, 10, 13	------	------	WSD A+B+C+D+E
15	SCS Runoff	1.329	1	728	5,698	------	------	------	Target 1 (IMP)
16	SCS Runoff	1.260	1	729	4,741	------	------	------	Target 1 (PER)
17	Combine	2.587	1	729	10,439	15, 16	------	------	Target 1
18	Diversion1	1.940	1	729	7,829	17	------	------	Target 1-10yr-25% Reduction
19	Diversion2	0.647	1	729	2,610	17	------	------	Discard
20	SCS Runoff	0.106	1	724	373	------	------	------	Target 2 (IMP)
21	SCS Runoff	0.621	1	727	2,128	------	------	------	Target 2 (PER)
22	Combine	0.717	1	726	2,501	20, 21	------	------	Target 2
23	Diversion1	0.538	1	726	1,876	22	------	------	Target 2-10yr-25% Reduction
24	Diversion2	0.179	1	726	625	22	------	------	Discard
25	Combine	16.40	1	725	61,894	14, 18, 23,	------	------	2yr Allowable

Hydrograph Report

Hyd. No. 1

EX. A (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.083 cfs
Storm frequency	=	10 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	356 cuft
Drainage area	=	0.020 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

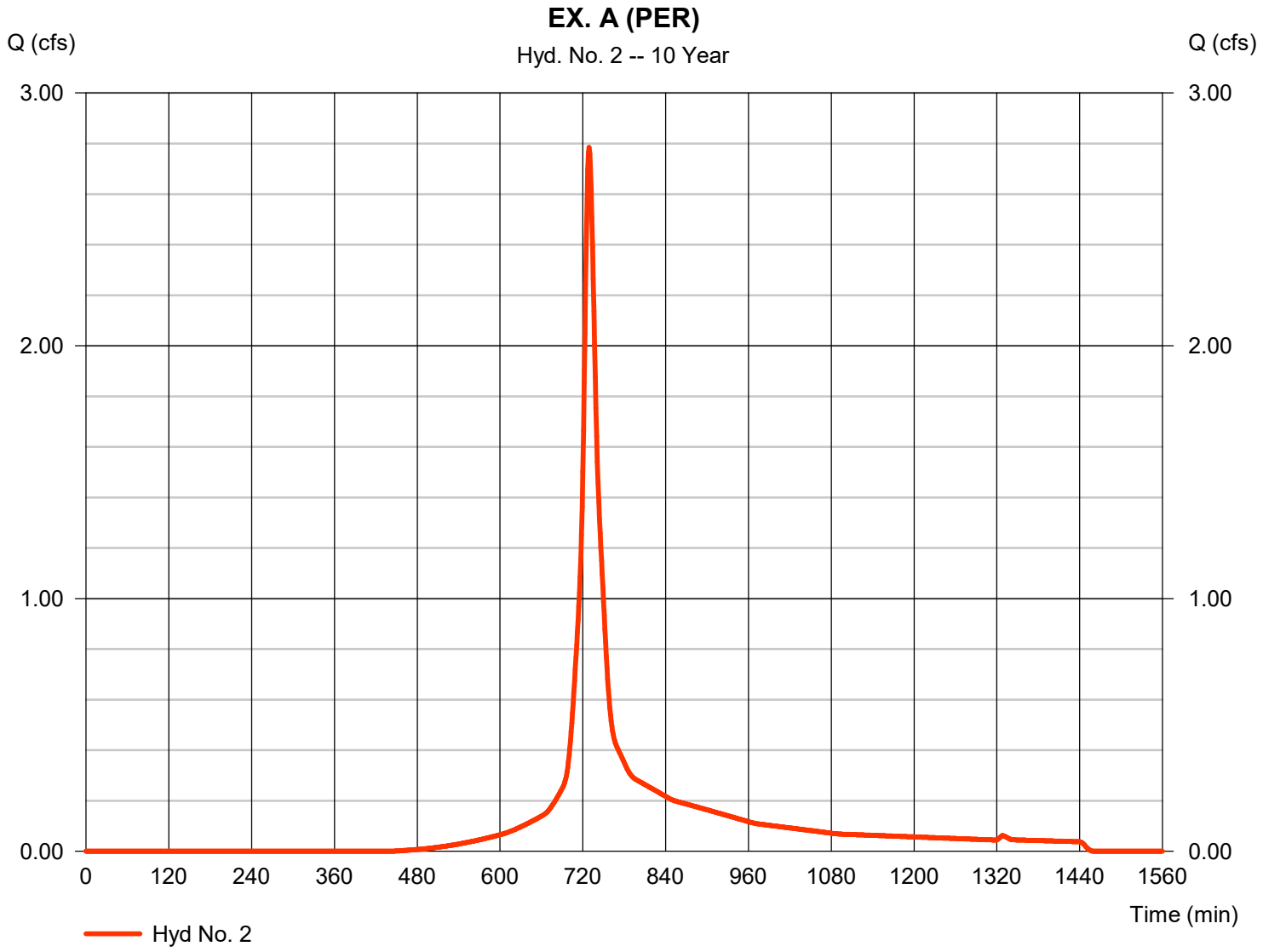


Hydrograph Report

Hyd. No. 2

EX. A (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.785 cfs
Storm frequency	=	10 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	10,475 cuft
Drainage area	=	0.950 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

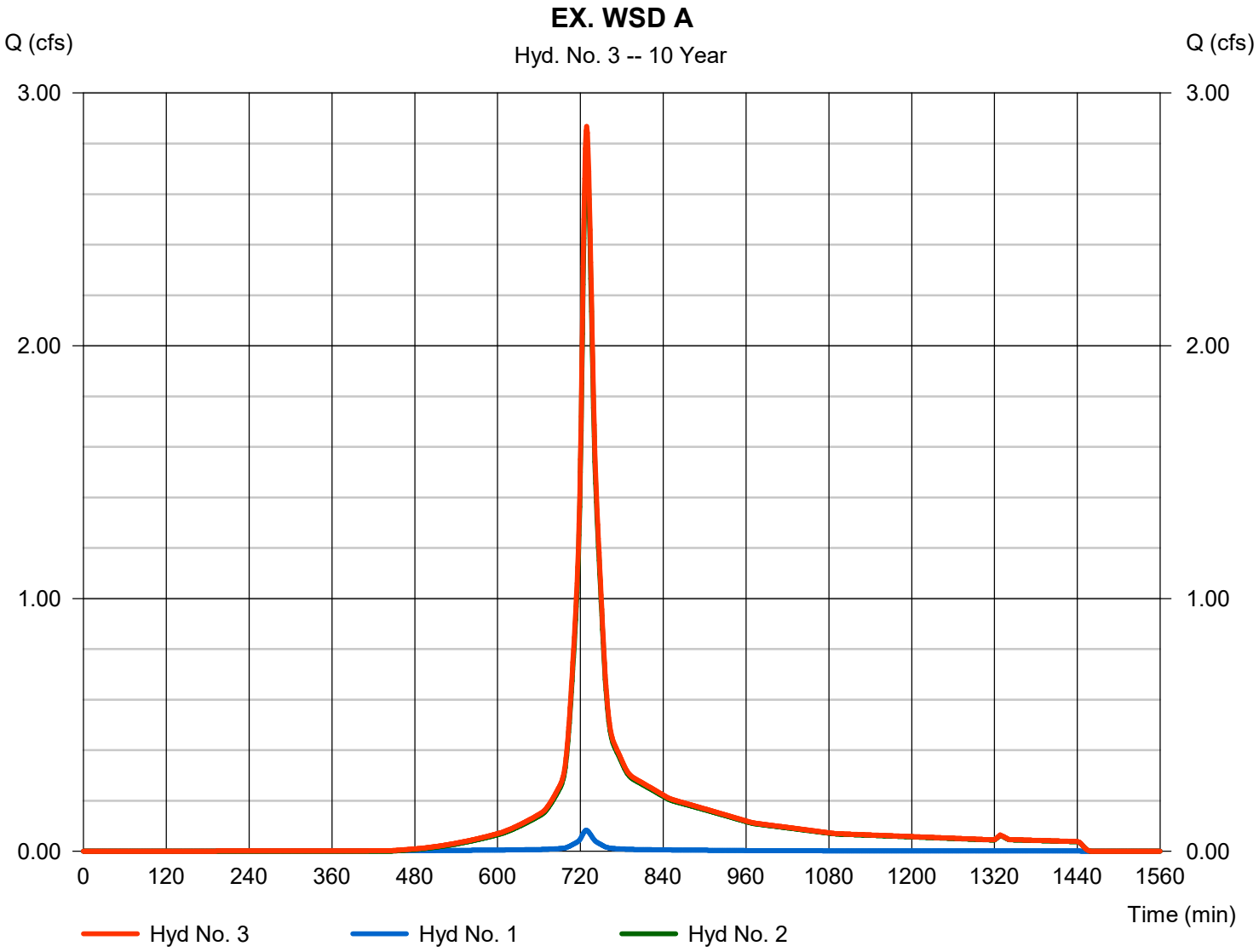


Hydrograph Report

Hyd. No. 3

EX. WSD A

Hydrograph type	=	Combine	Peak discharge	=	2.868 cfs
Storm frequency	=	10 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	10,831 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	0.970 ac

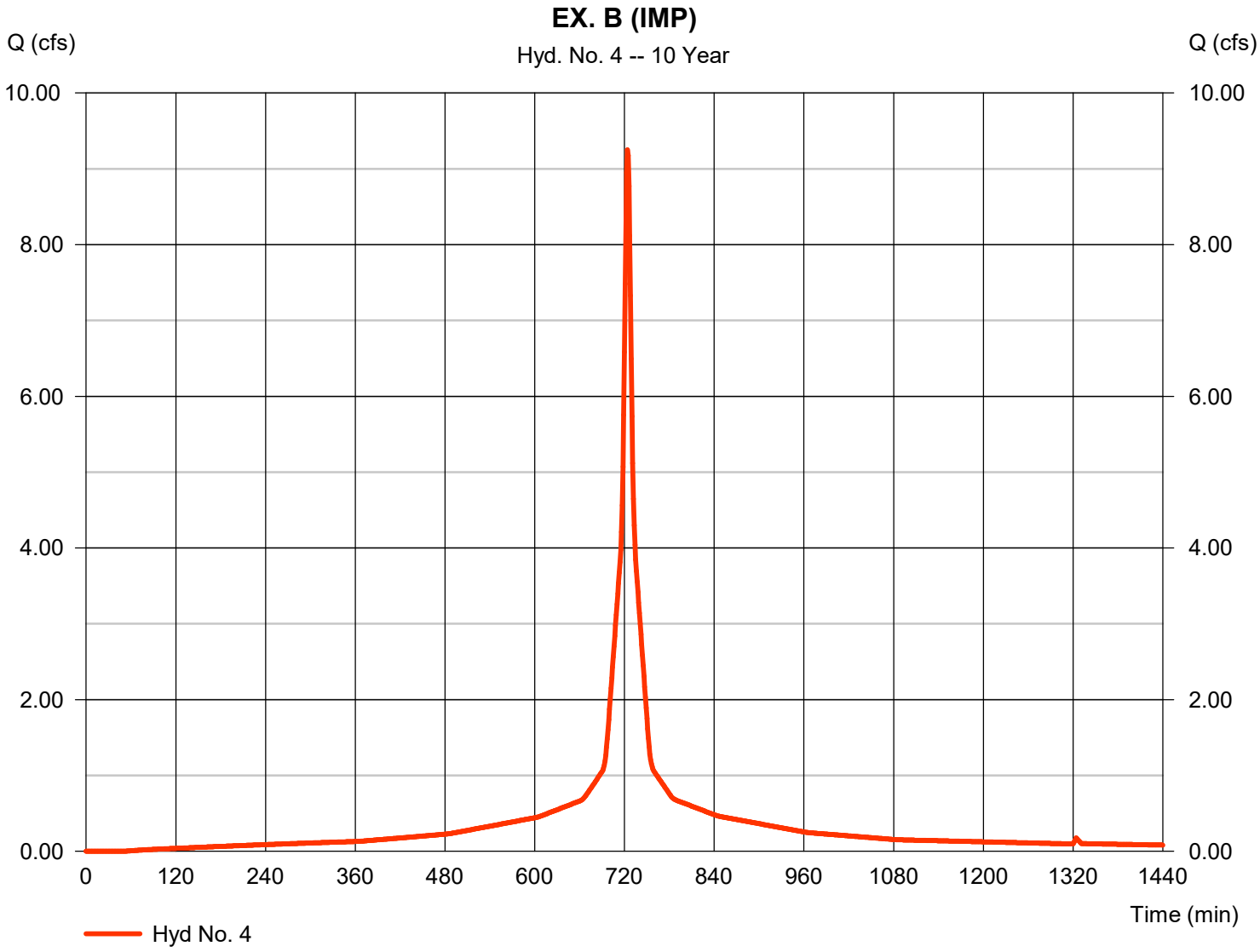


Hydrograph Report

Hyd. No. 4

EX. B (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	9.249 cfs
Storm frequency	=	10 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	32,643 cuft
Drainage area	=	1.750 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

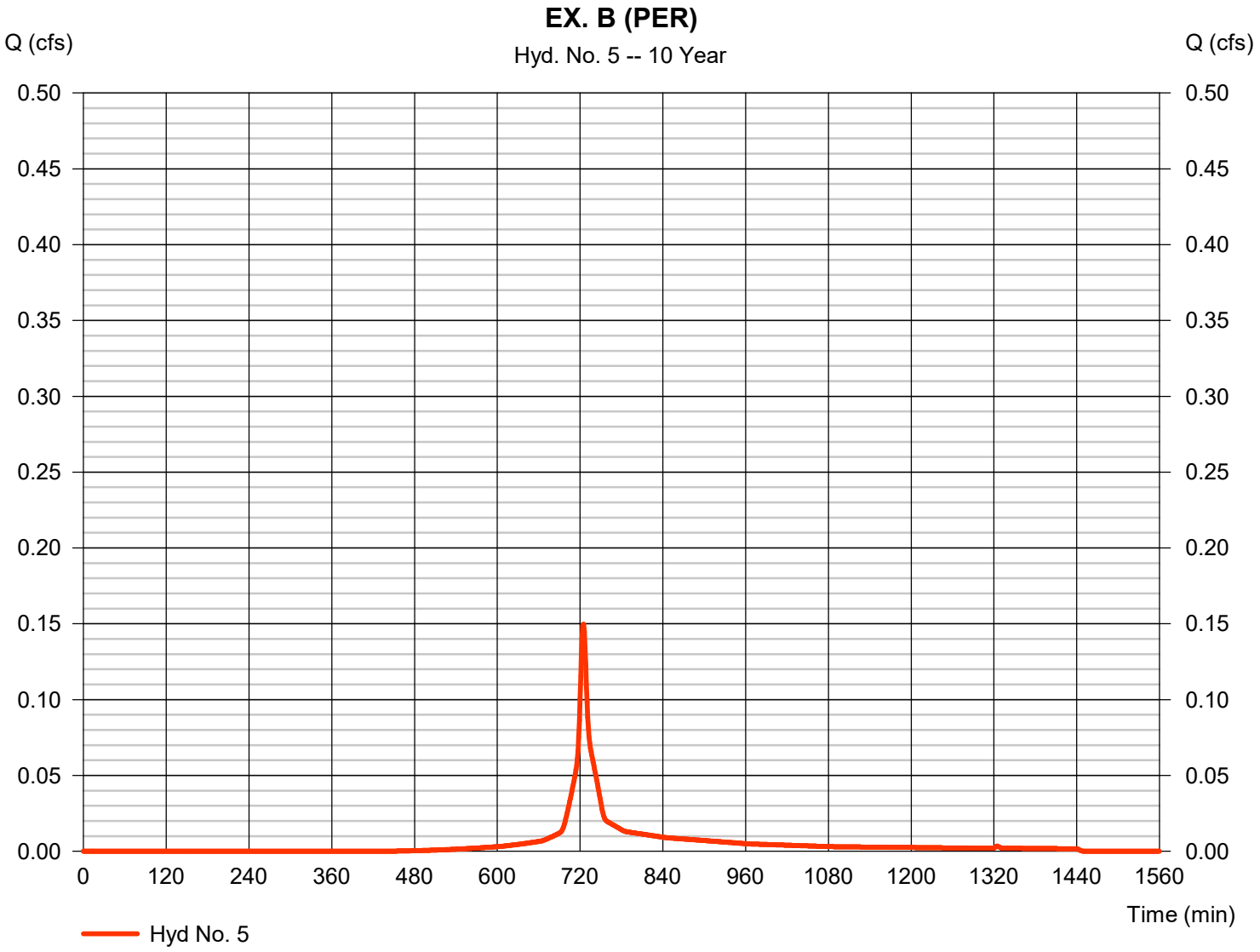


Hydrograph Report

Hyd. No. 5

EX. B (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.150 cfs
Storm frequency	=	10 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	462 cuft
Drainage area	=	0.040 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

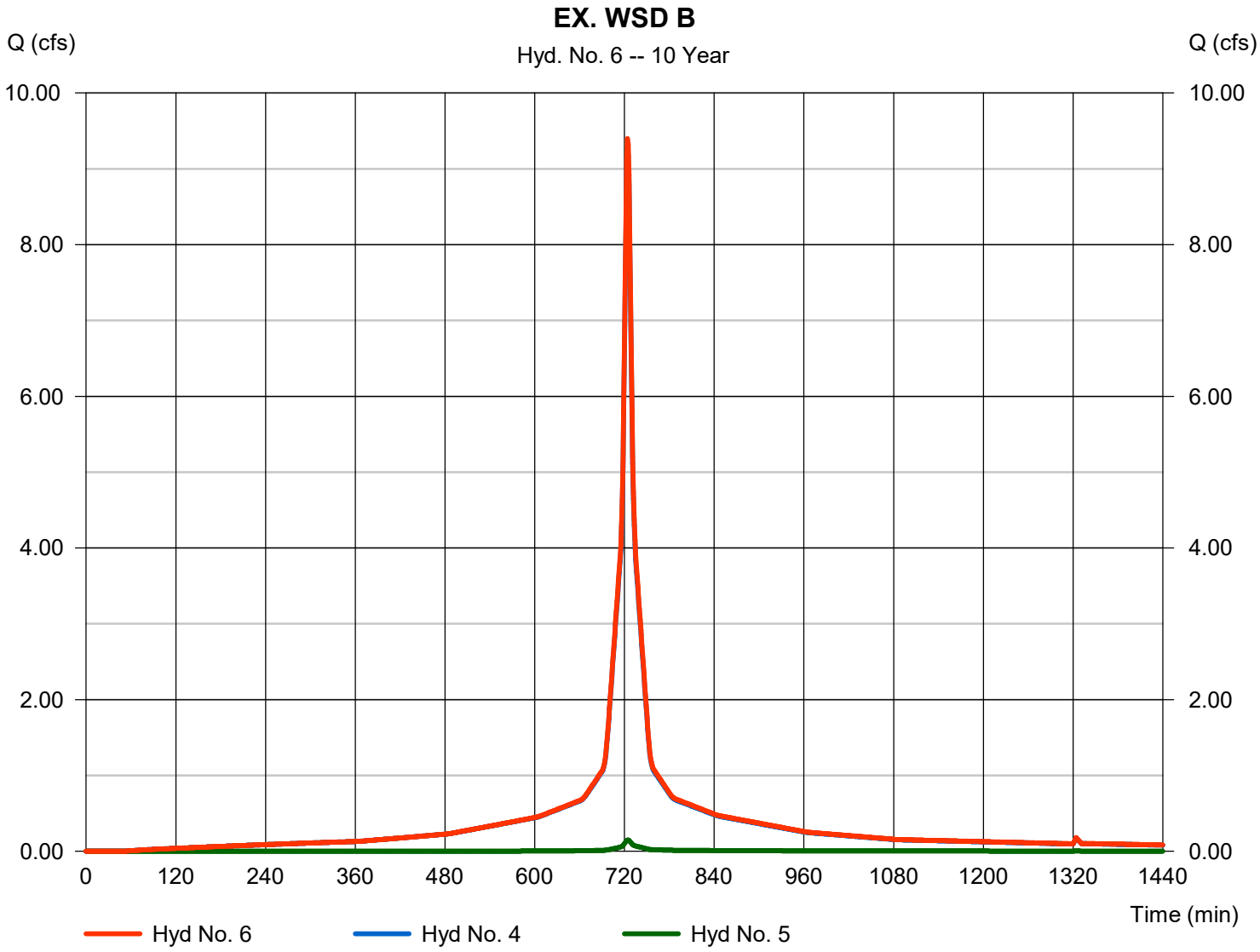


Hydrograph Report

Hyd. No. 6

EX. WSD B

Hydrograph type	= Combine	Peak discharge	= 9.398 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 33,105 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 1.790 ac

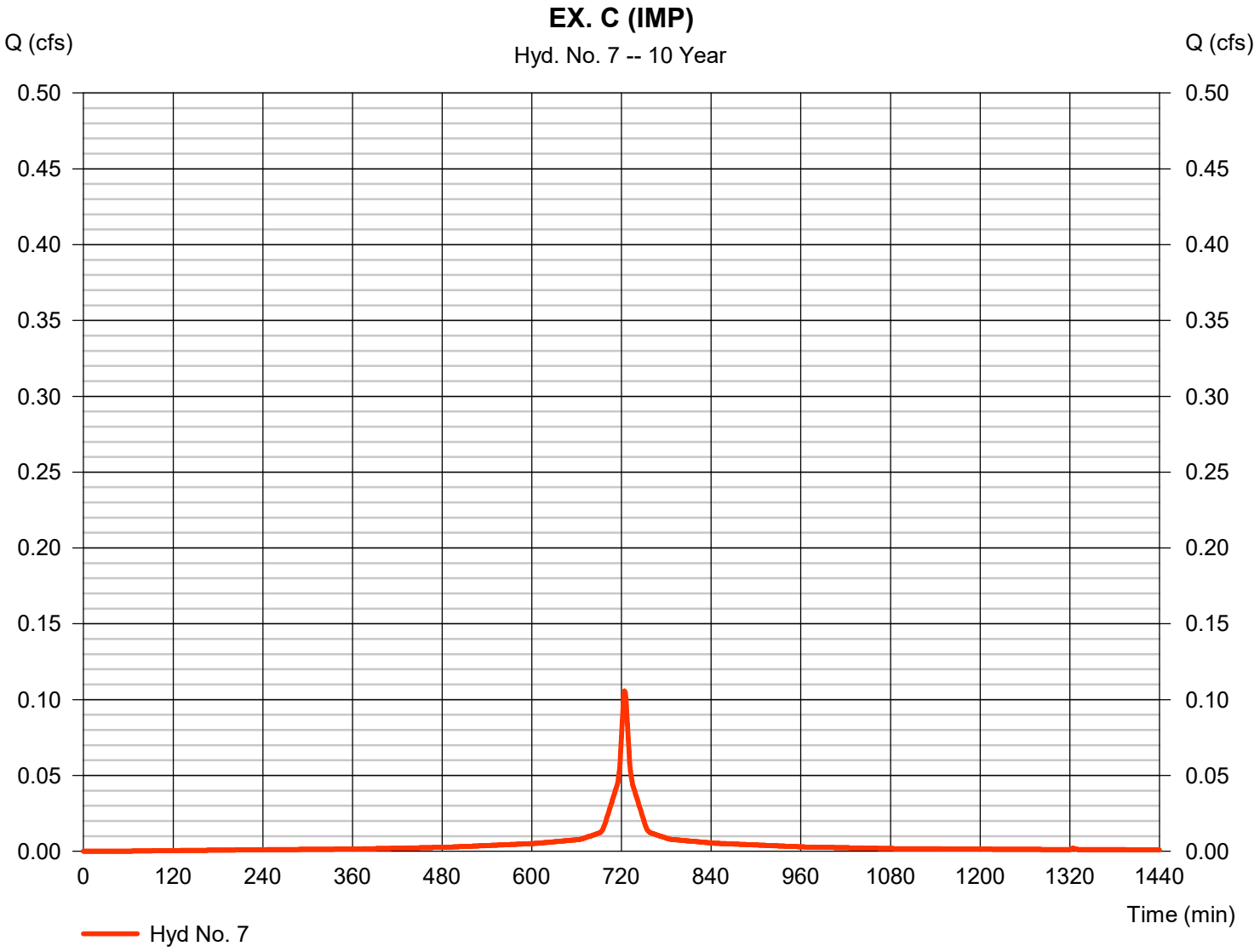


Hydrograph Report

Hyd. No. 7

EX. C (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.106 cfs
Storm frequency	=	10 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	373 cuft
Drainage area	=	0.020 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

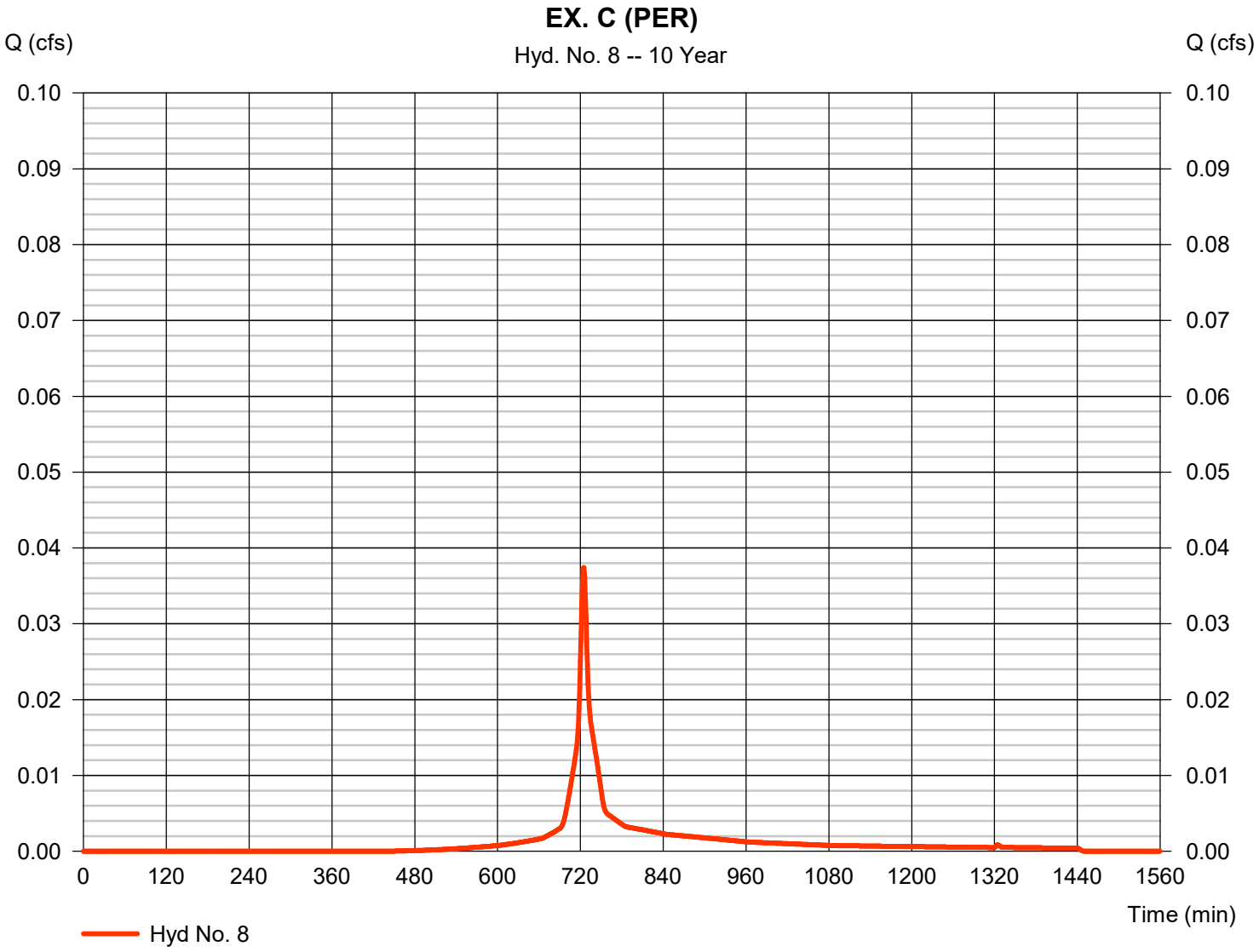


Hydrograph Report

Hyd. No. 8

EX. C (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.037 cfs
Storm frequency	=	10 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	116 cuft
Drainage area	=	0.010 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

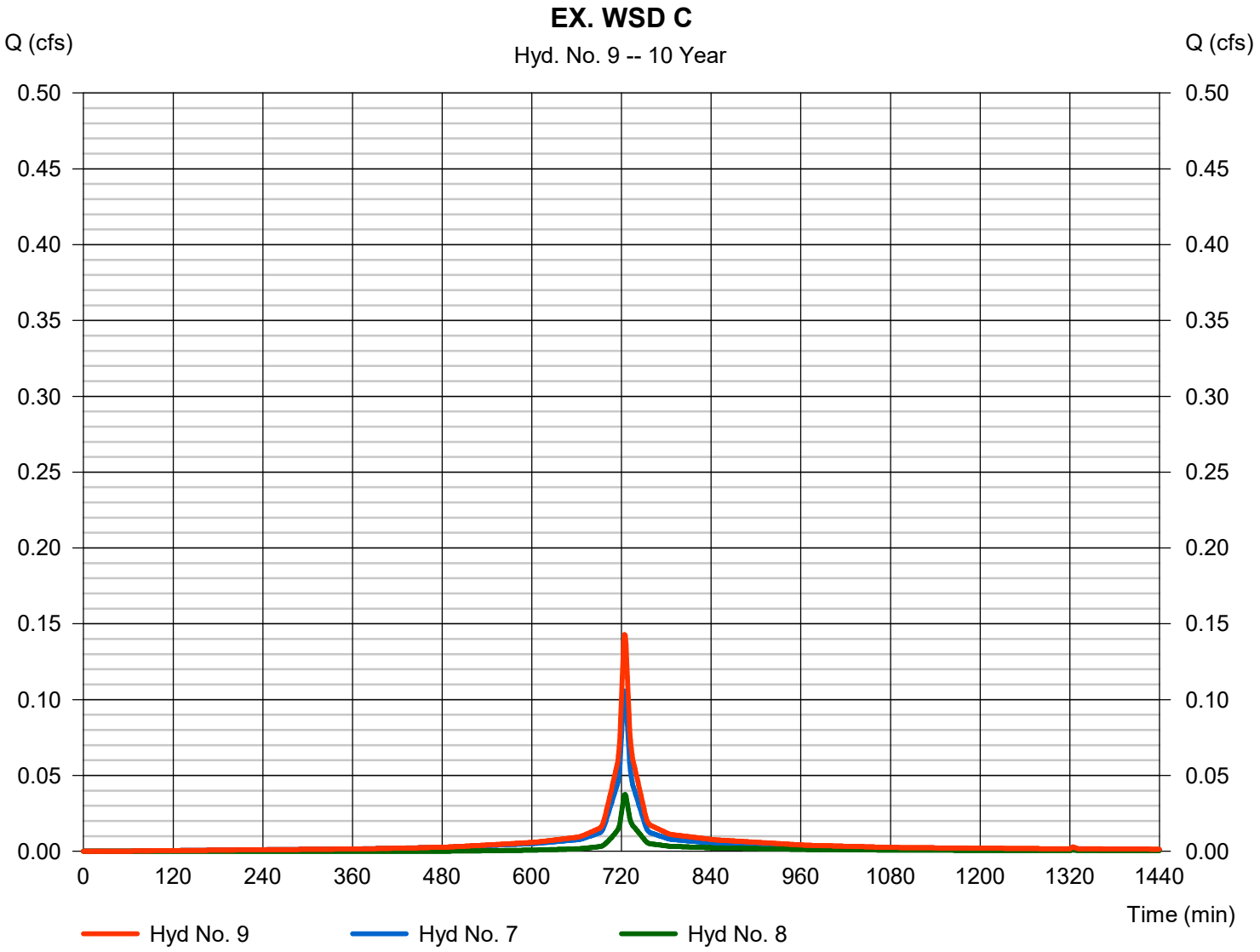


Hydrograph Report

Hyd. No. 9

EX. WSD C

Hydrograph type	=	Combine	Peak discharge	=	0.143 cfs
Storm frequency	=	10 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	489 cuft
Inflow hyds.	=	7, 8	Contrib. drain. area	=	0.030 ac

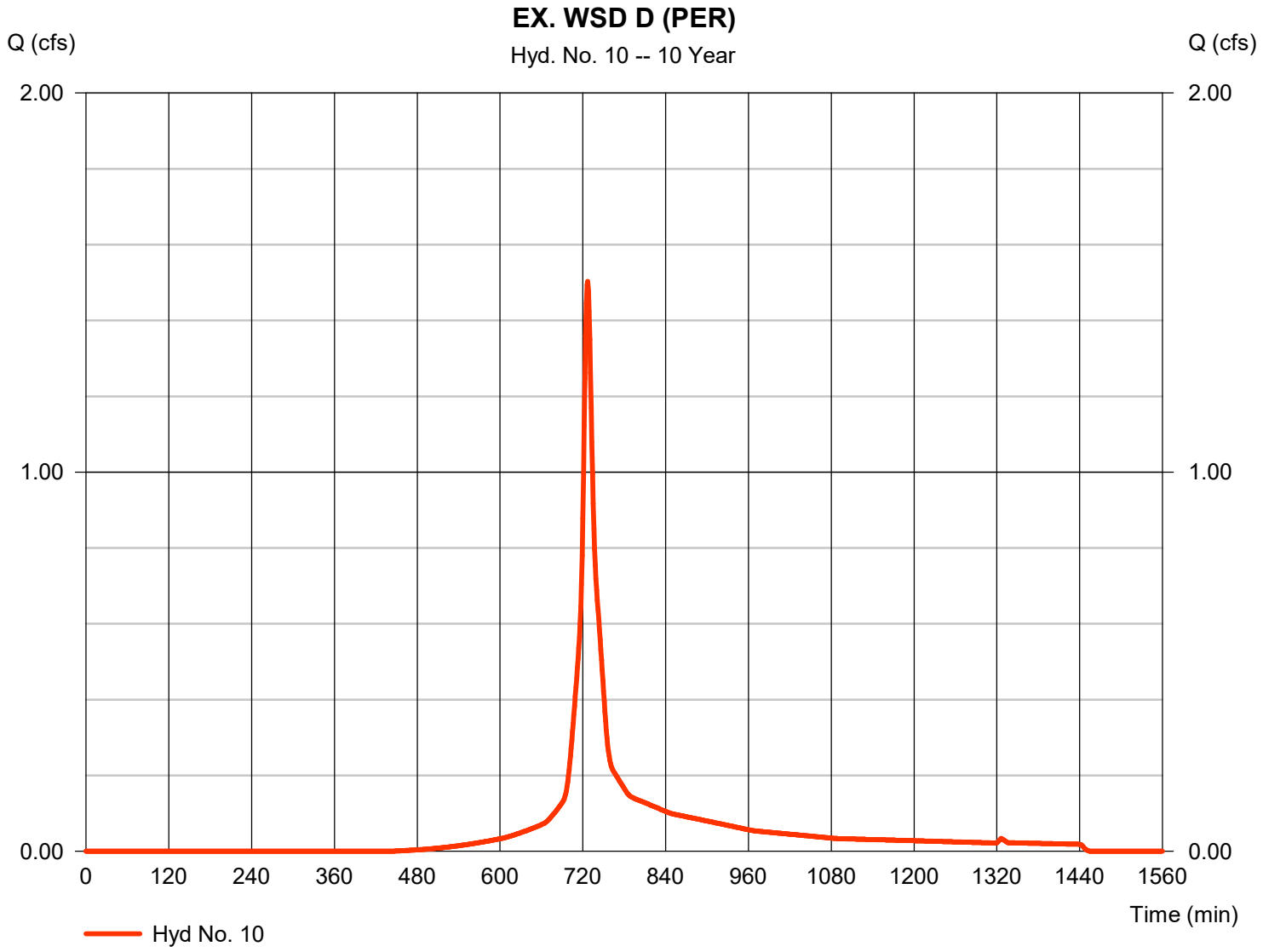


Hydrograph Report

Hyd. No. 10

EX. WSD D (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.503 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	5,152 cuft
Drainage area	=	0.460 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

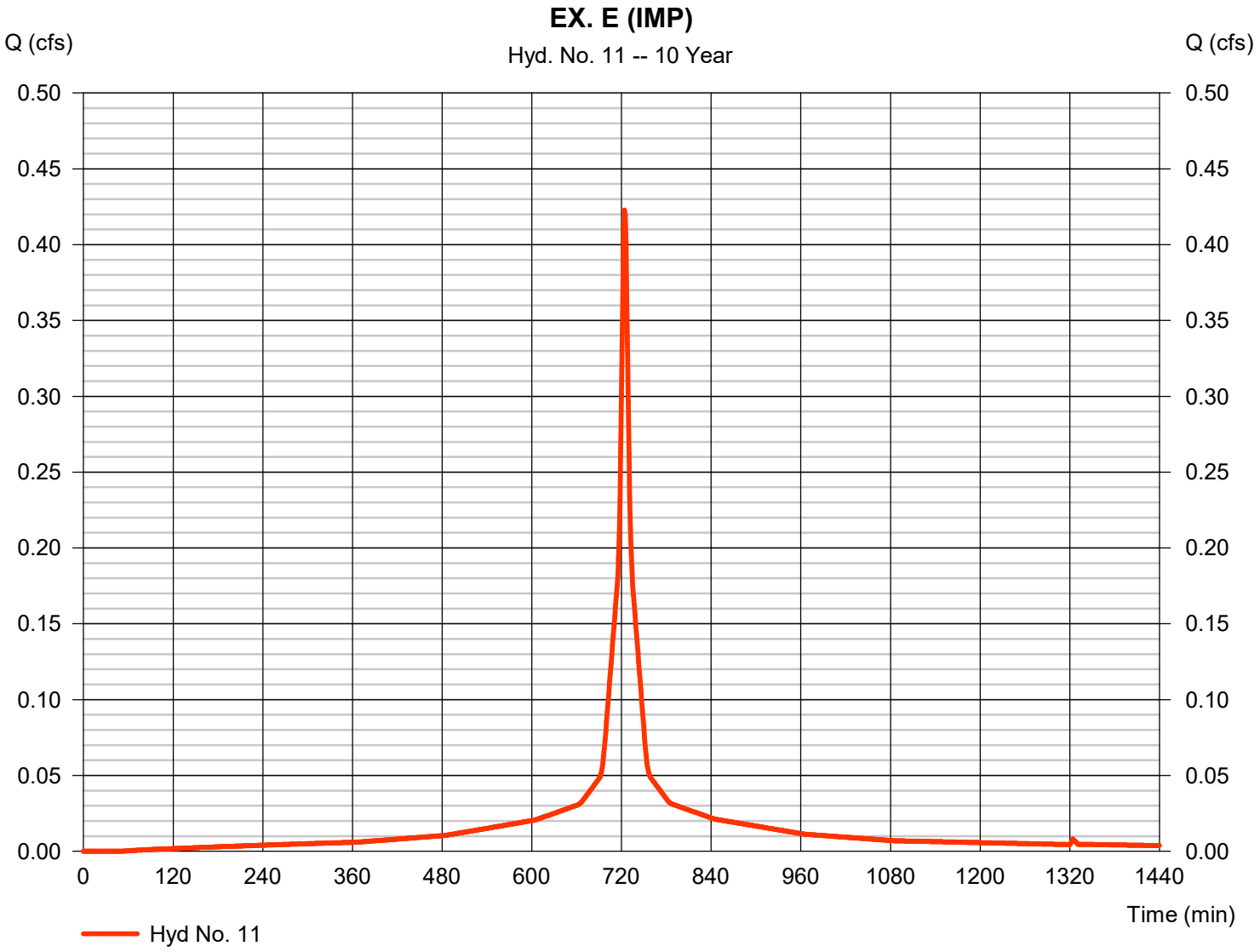


Hydrograph Report

Hyd. No. 11

EX. E (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.423 cfs
Storm frequency	=	10 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	1,492 cuft
Drainage area	=	0.080 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

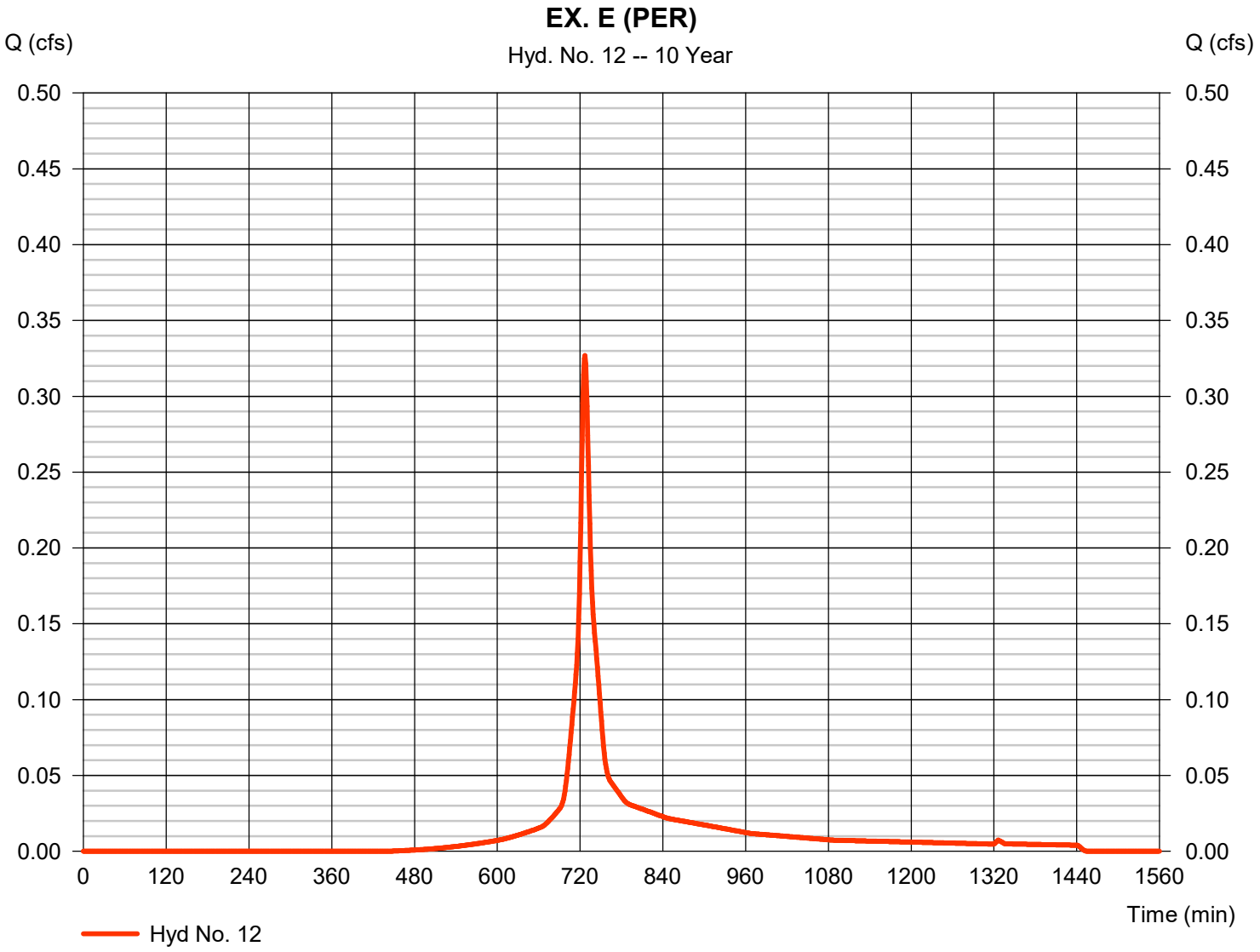


Hydrograph Report

Hyd. No. 12

EX. E (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.327 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	1,120 cuft
Drainage area	=	0.100 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

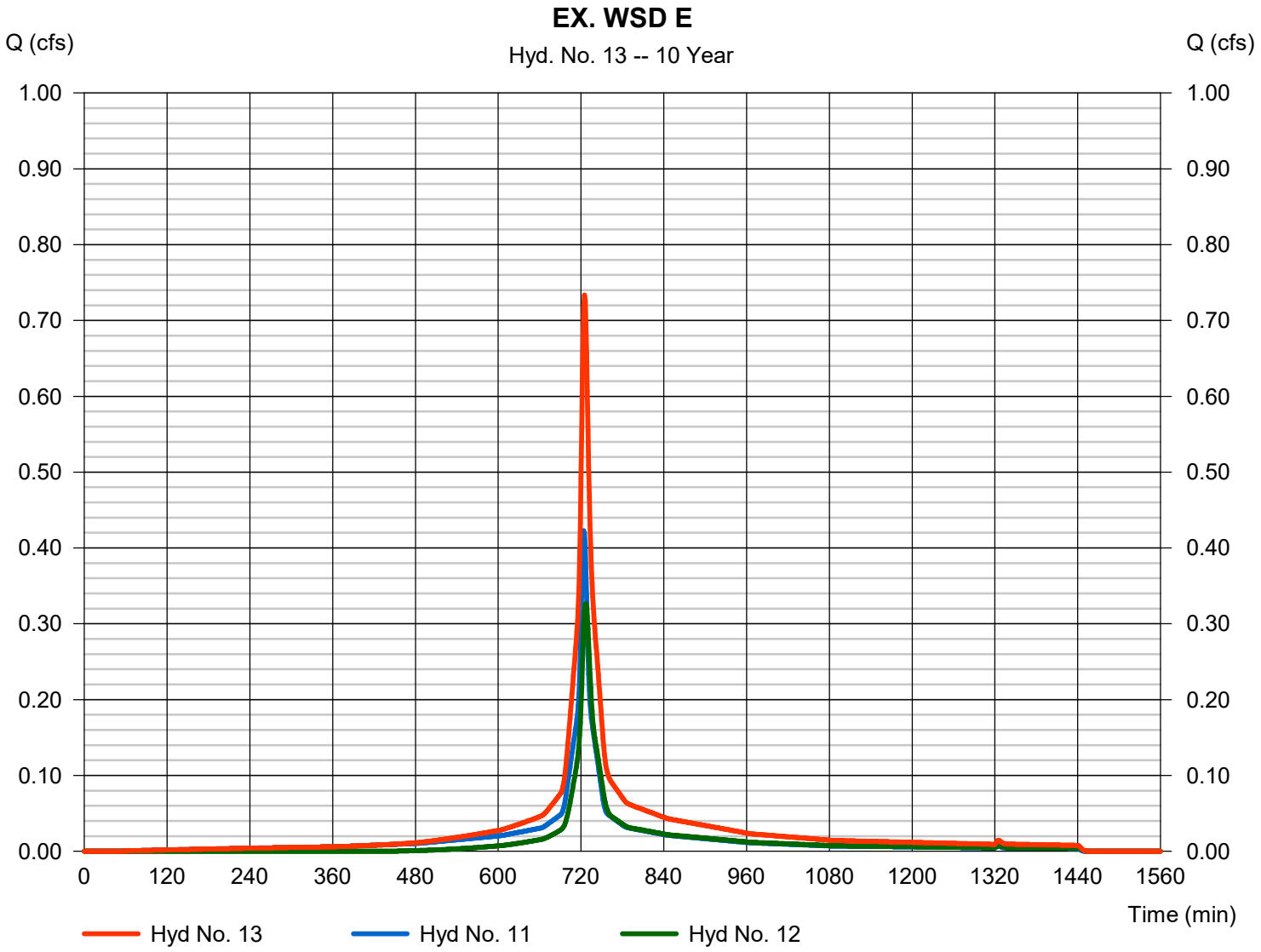


Hydrograph Report

Hyd. No. 13

EX. WSD E

Hydrograph type	=	Combine	Peak discharge	=	0.734 cfs
Storm frequency	=	10 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	2,612 cuft
Inflow hyds.	=	11, 12	Contrib. drain. area	=	0.180 ac

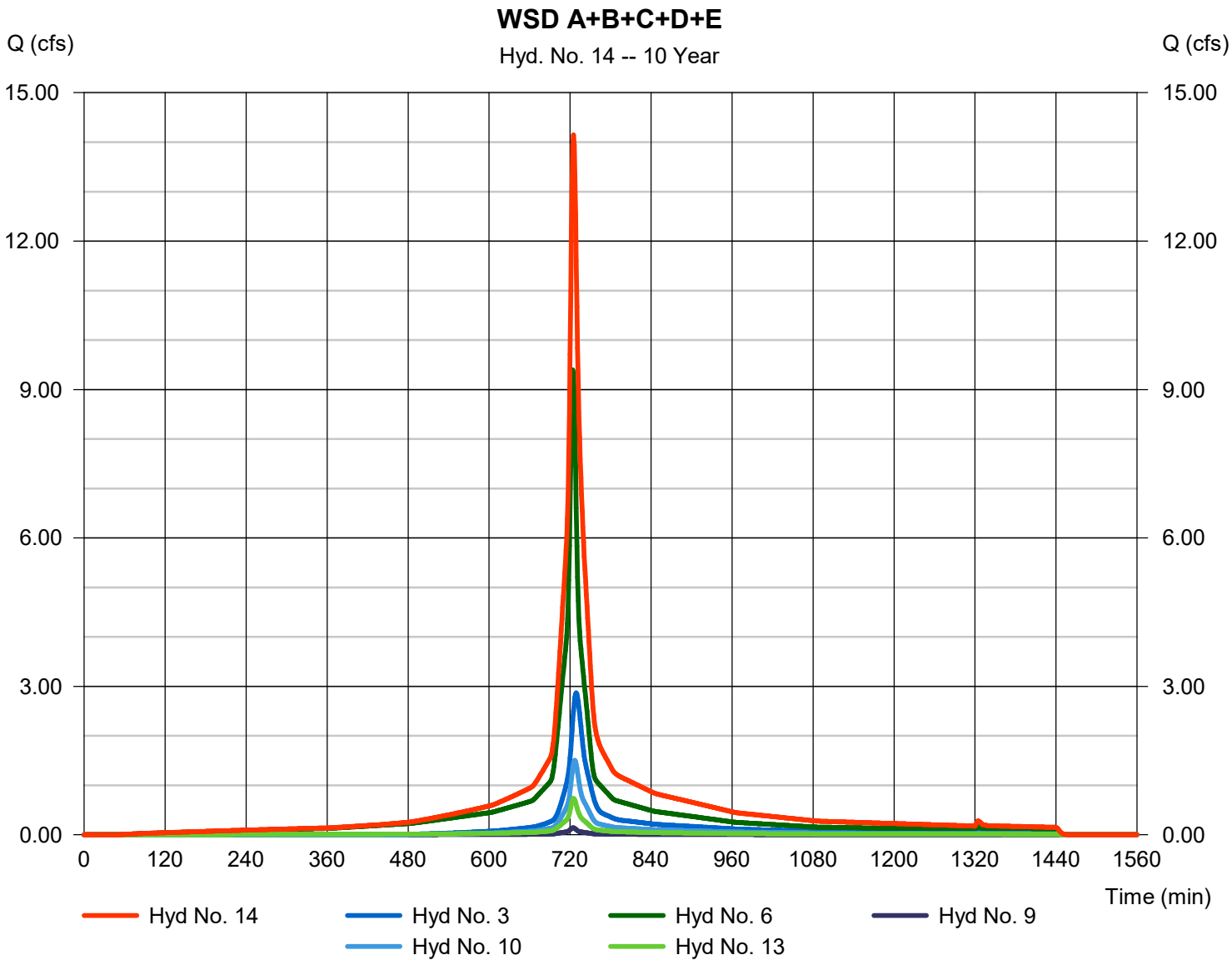


Hydrograph Report

Hyd. No. 14

WSD A+B+C+D+E

Hydrograph type	= Combine	Peak discharge	= 14.15 cfs
Storm frequency	= 10 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 52,189 cuft
Inflow hyds.	= 3, 6, 9, 10, 13	Contrib. drain. area	= 0.460 ac

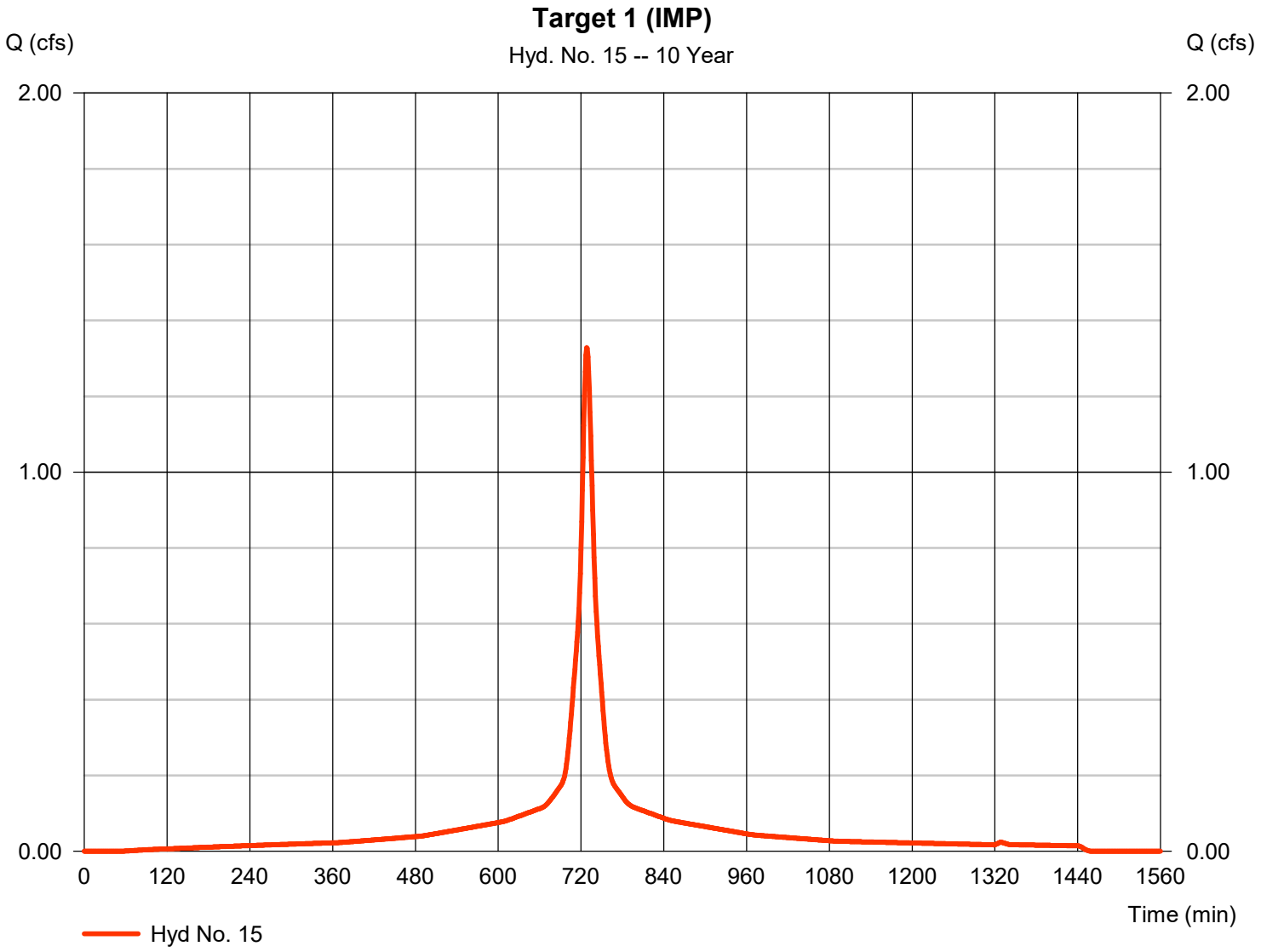


Hydrograph Report

Hyd. No. 15

Target 1 (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.329 cfs
Storm frequency	=	10 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	5,698 cuft
Drainage area	=	0.320 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

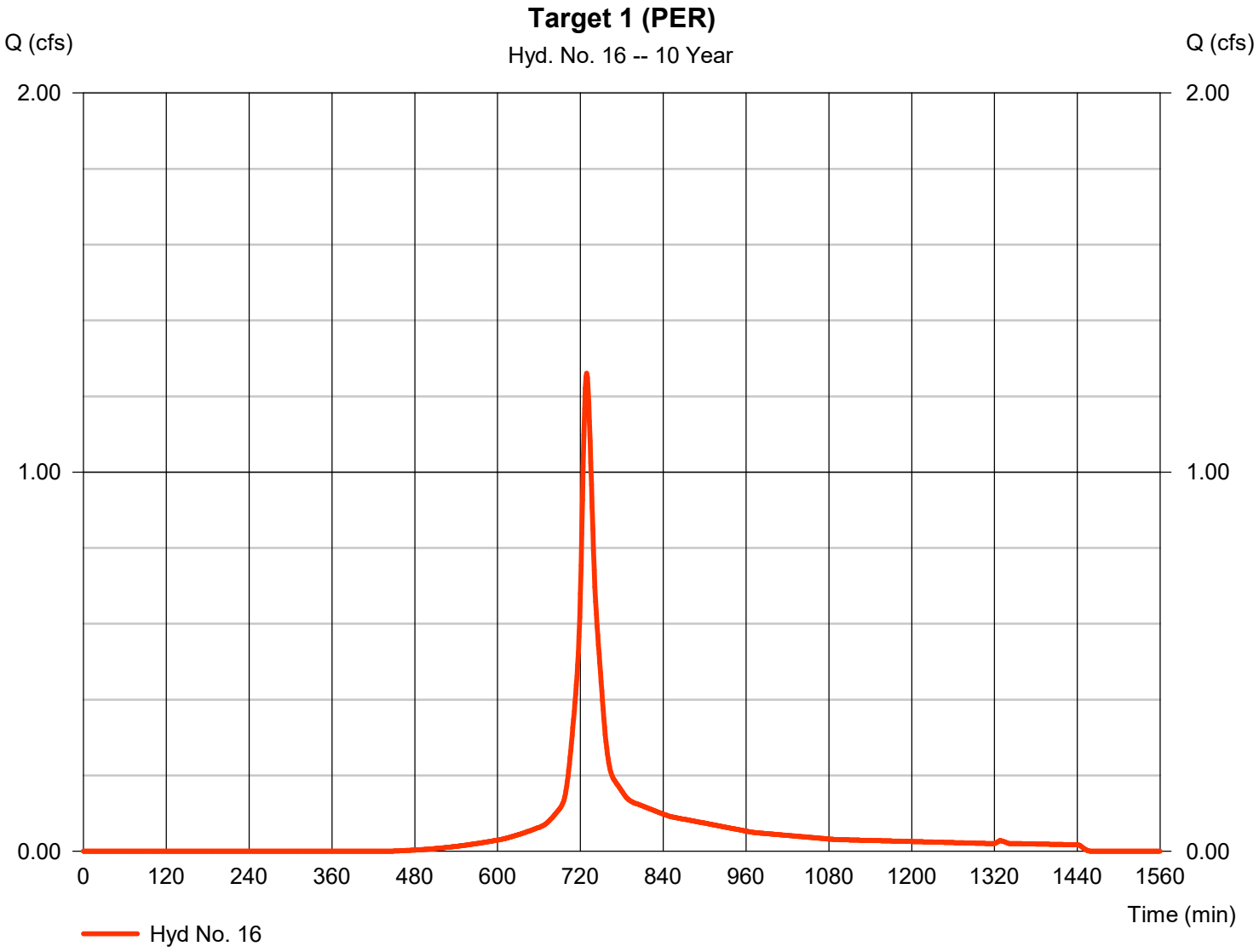


Hydrograph Report

Hyd. No. 16

Target 1 (PER)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.260 cfs
Storm frequency	= 10 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 4,741 cuft
Drainage area	= 0.430 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.00 min
Total precip.	= 5.22 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

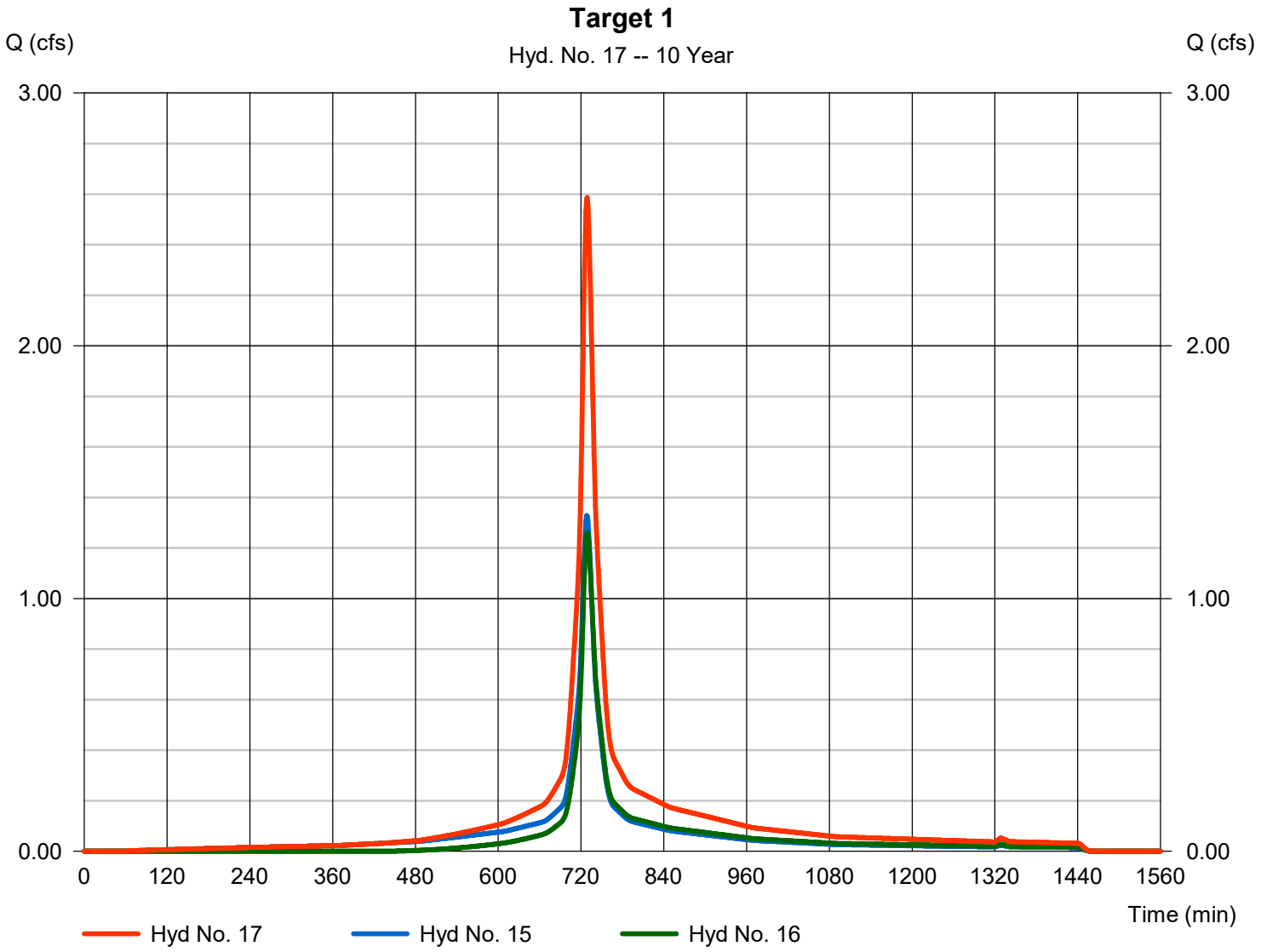


Hydrograph Report

Hyd. No. 17

Target 1

Hydrograph type	=	Combine	Peak discharge	=	2.587 cfs
Storm frequency	=	10 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	10,439 cuft
Inflow hyds.	=	15, 16	Contrib. drain. area	=	0.750 ac

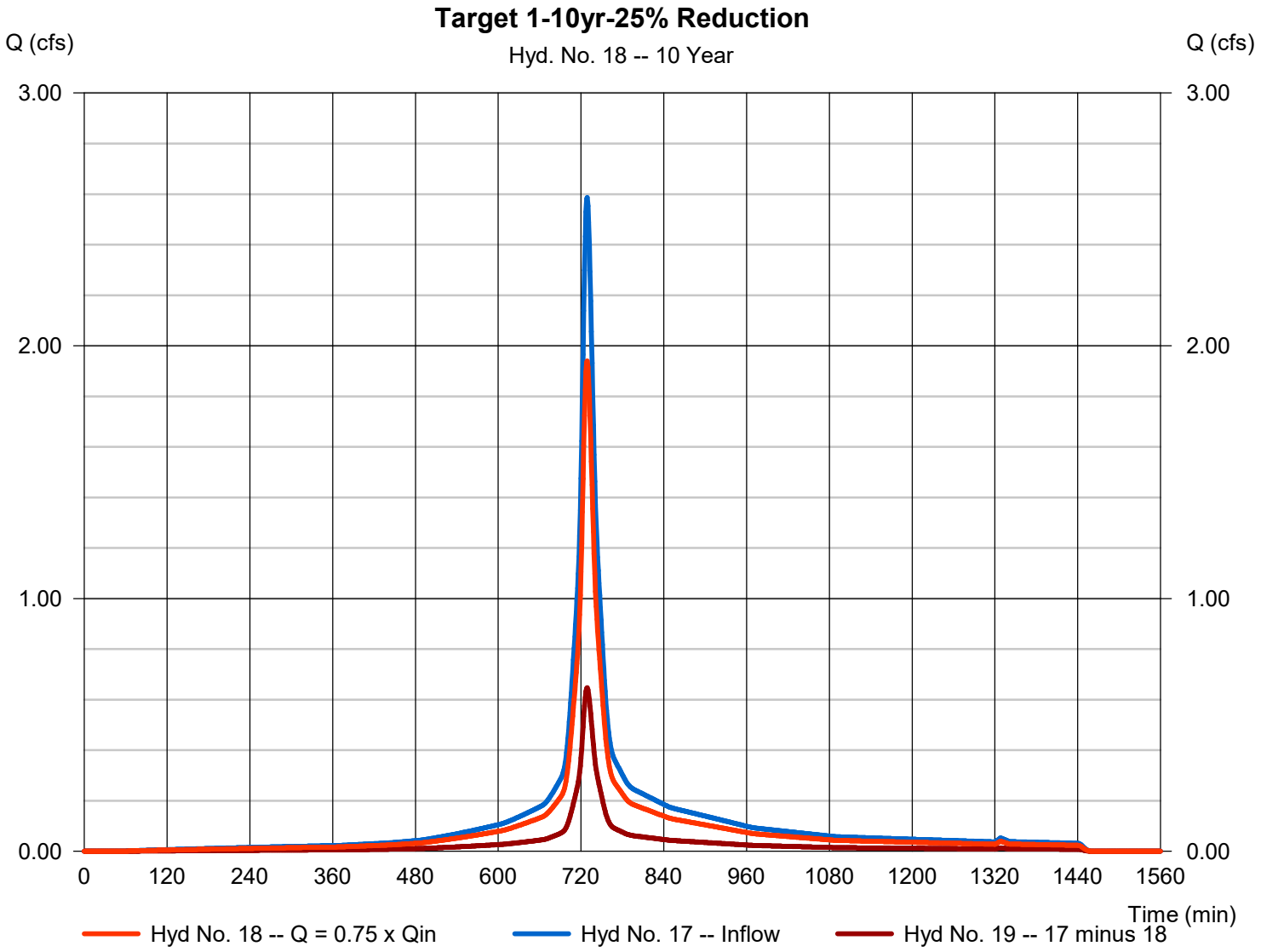


Hydrograph Report

Hyd. No. 18

Target 1-10yr-25% Reduction

Hydrograph type	= Diversion1	Peak discharge	= 1.940 cfs
Storm frequency	= 10 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 7,829 cuft
Inflow hydrograph	= 17 - Target 1	2nd diverted hyd.	= 19
Diversion method	= Flow Ratio	Flow ratio	= 0.75

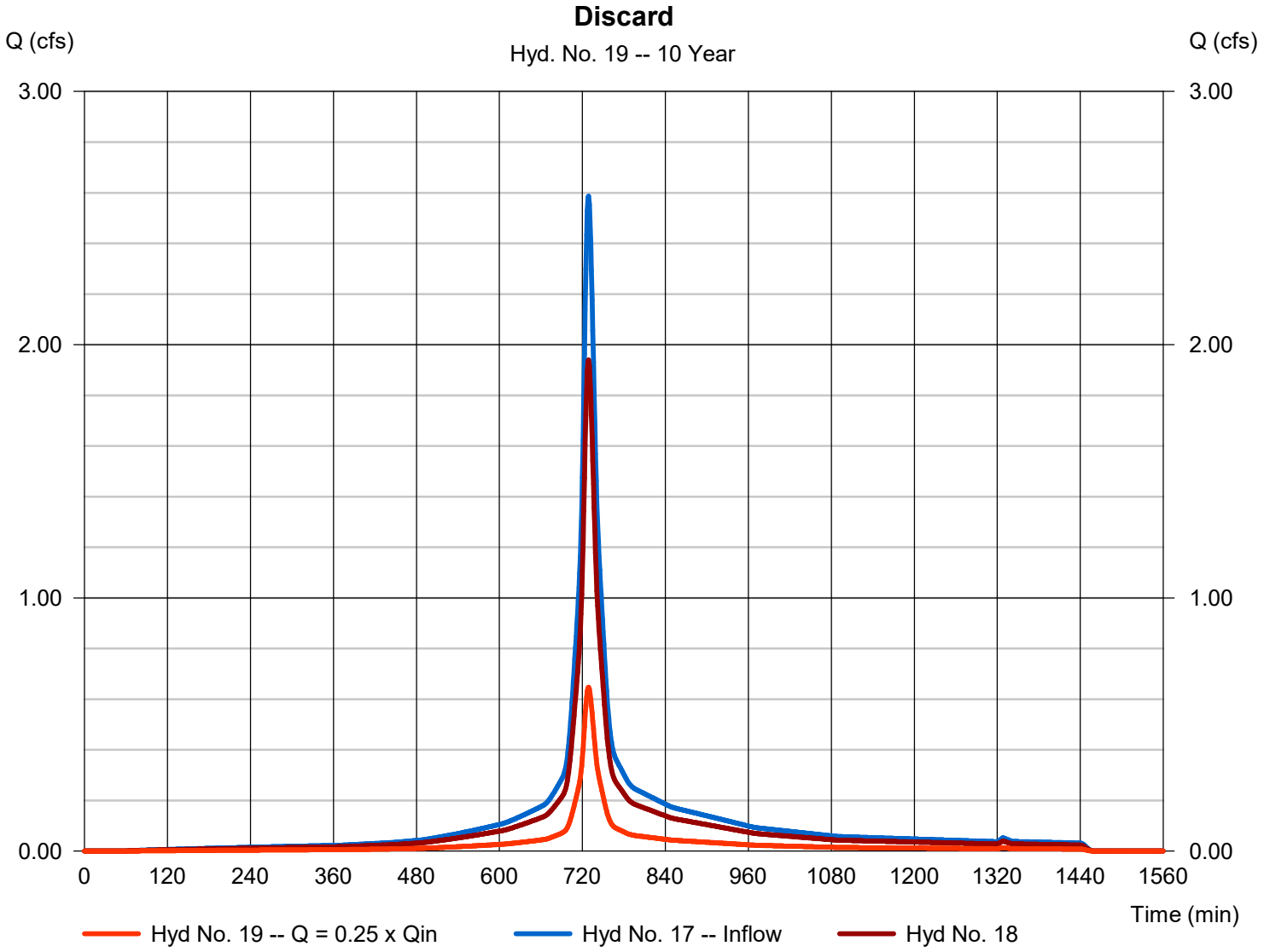


Hydrograph Report

Hyd. No. 19

Discard

Hydrograph type	= Diversion2	Peak discharge	= 0.647 cfs
Storm frequency	= 10 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 2,610 cuft
Inflow hydrograph	= 17 - Target 1	2nd diverted hyd.	= 18
Diversion method	= Flow Ratio	Flow ratio	= 0.75

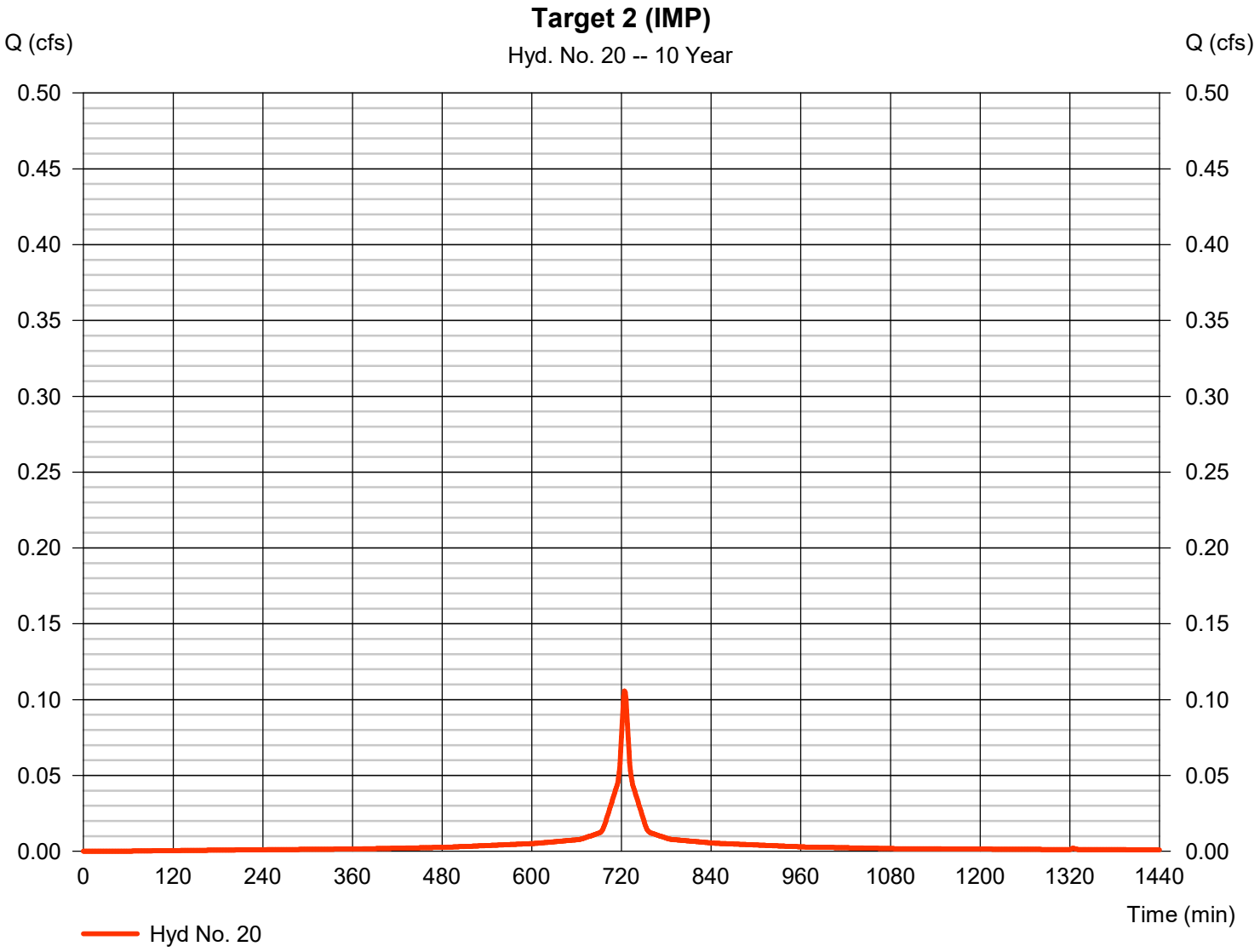


Hydrograph Report

Hyd. No. 20

Target 2 (IMP)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.106 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 373 cuft
Drainage area	= 0.020 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.22 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

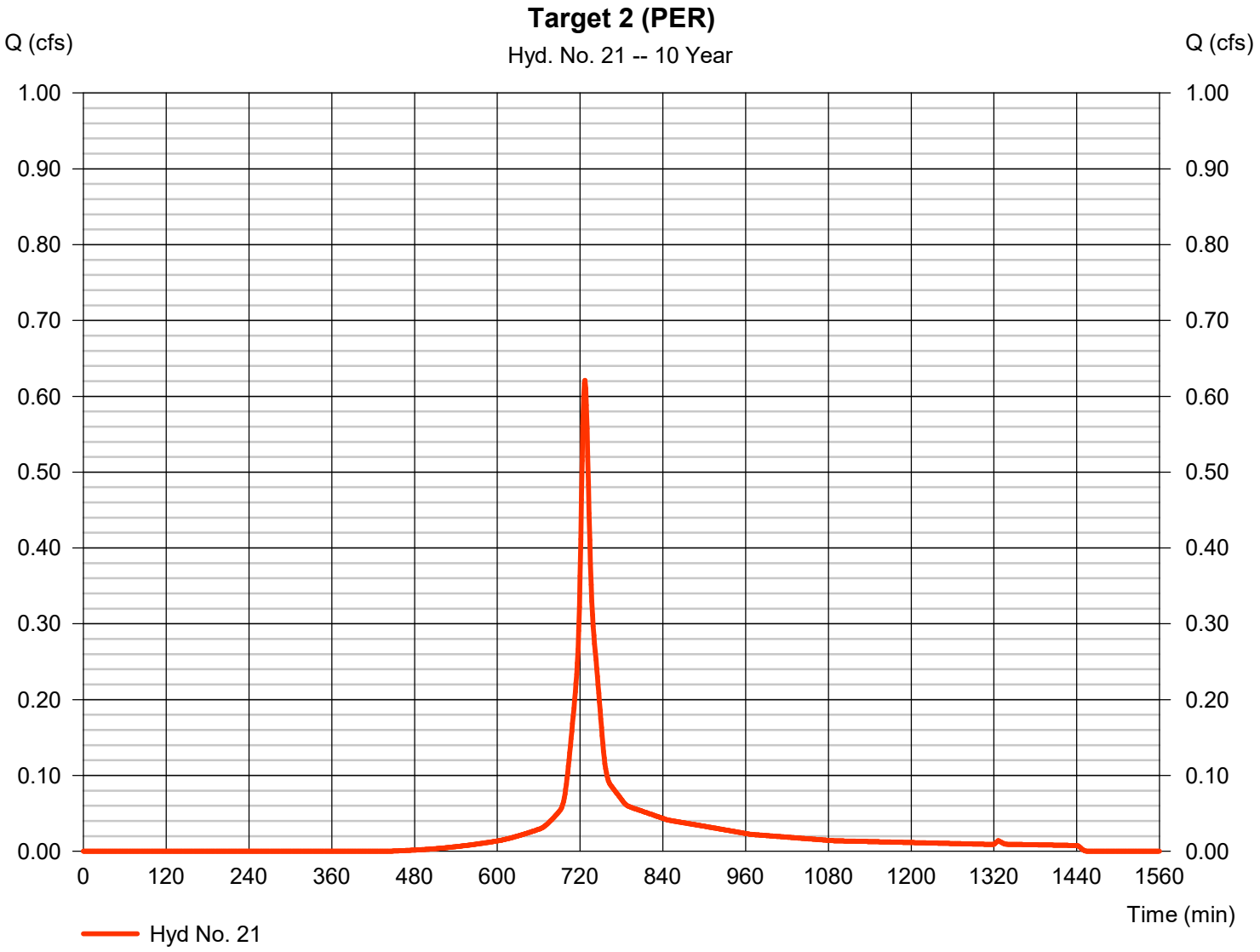


Hydrograph Report

Hyd. No. 21

Target 2 (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.621 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	2,128 cuft
Drainage area	=	0.190 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

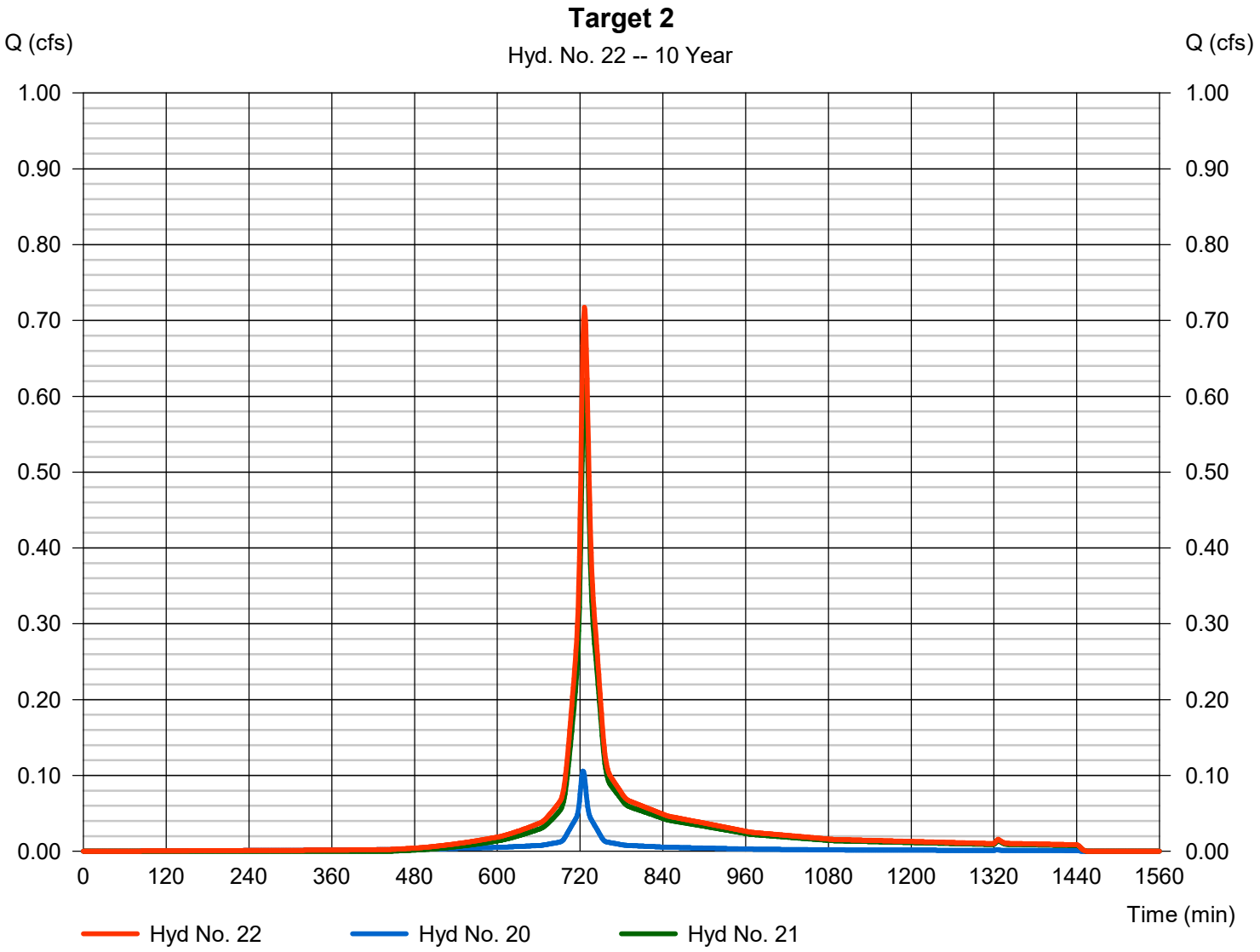


Hydrograph Report

Hyd. No. 22

Target 2

Hydrograph type	= Combine	Peak discharge	= 0.717 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 2,501 cuft
Inflow hyds.	= 20, 21	Contrib. drain. area	= 0.210 ac

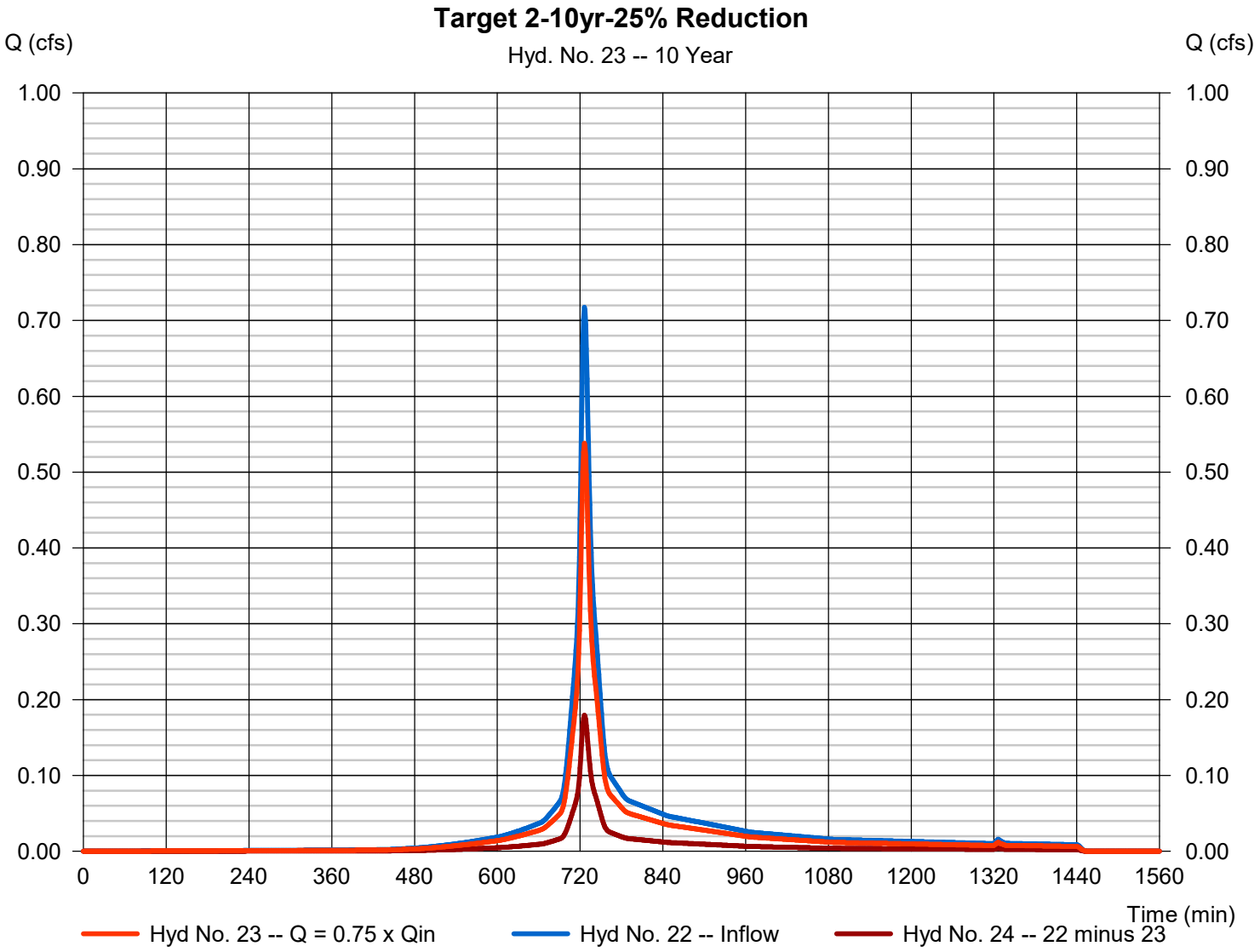


Hydrograph Report

Hyd. No. 23

Target 2-10yr-25% Reduction

Hydrograph type	= Diversion1	Peak discharge	= 0.538 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 1,876 cuft
Inflow hydrograph	= 22 - Target 2	2nd diverted hyd.	= 24
Diversion method	= Flow Ratio	Flow ratio	= 0.75

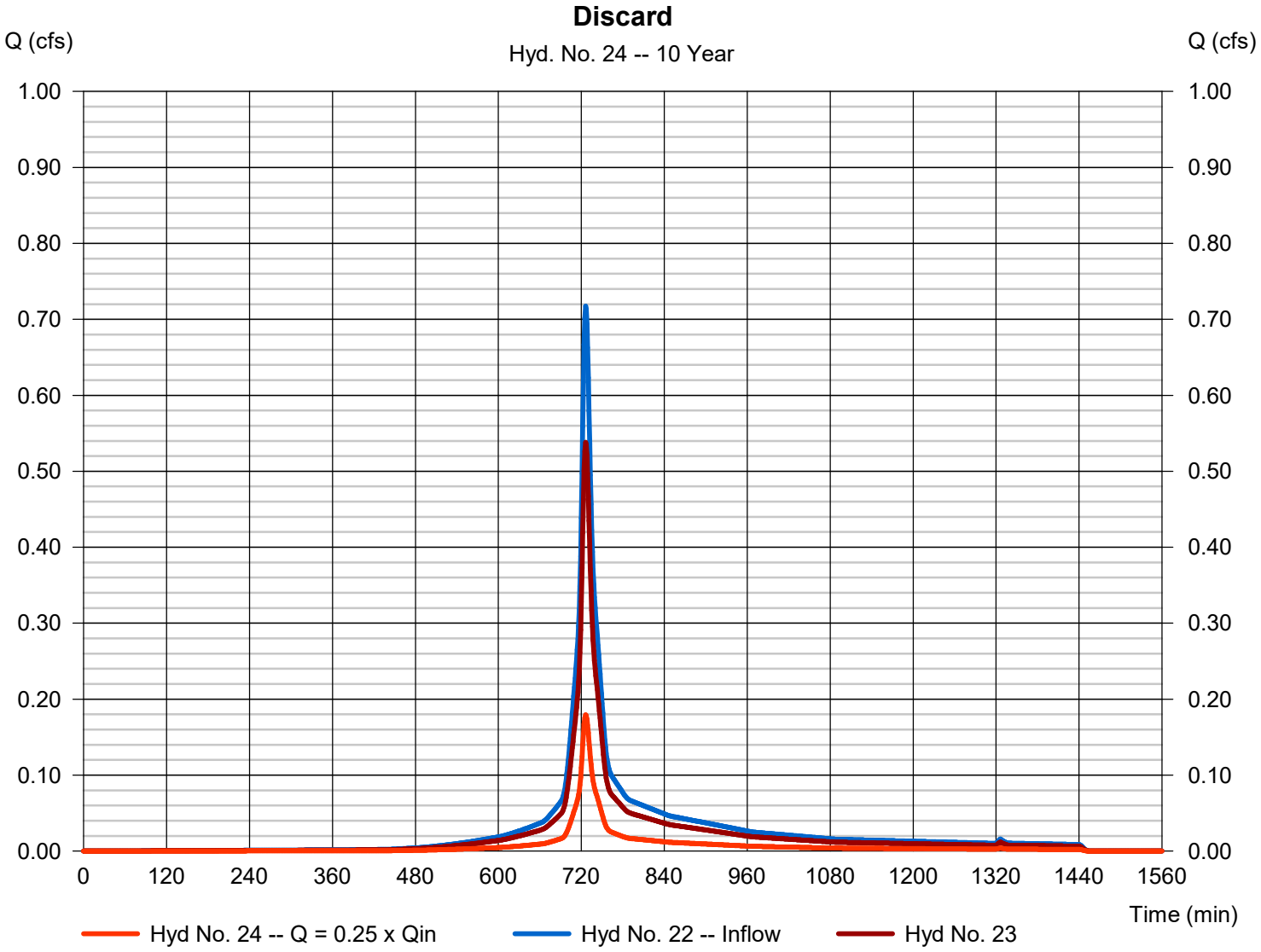


Hydrograph Report

Hyd. No. 24

Discard

Hydrograph type	= Diversion2	Peak discharge	= 0.179 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 625 cuft
Inflow hydrograph	= 22 - Target 2	2nd diverted hyd.	= 23
Diversion method	= Flow Ratio	Flow ratio	= 0.75

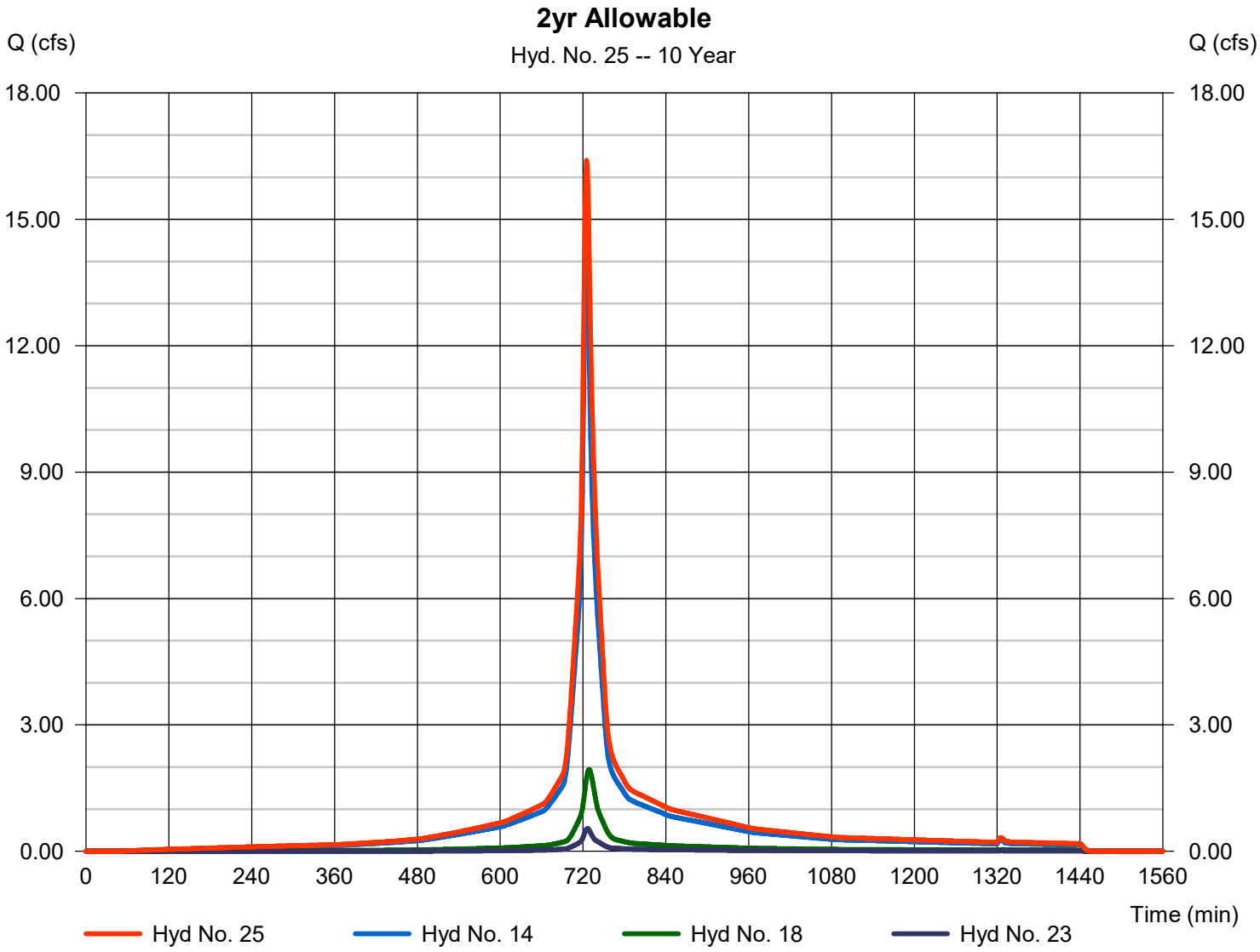


Hydrograph Report

Hyd. No. 25

2yr Allowable

Hydrograph type	=	Combine	Peak discharge	=	16.40 cfs
Storm frequency	=	10 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	61,894 cuft
Inflow hyds.	=	14, 18, 23	Contrib. drain. area	=	0.000 ac



100-YEAR STORM CALCULATIONS

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100 - Year

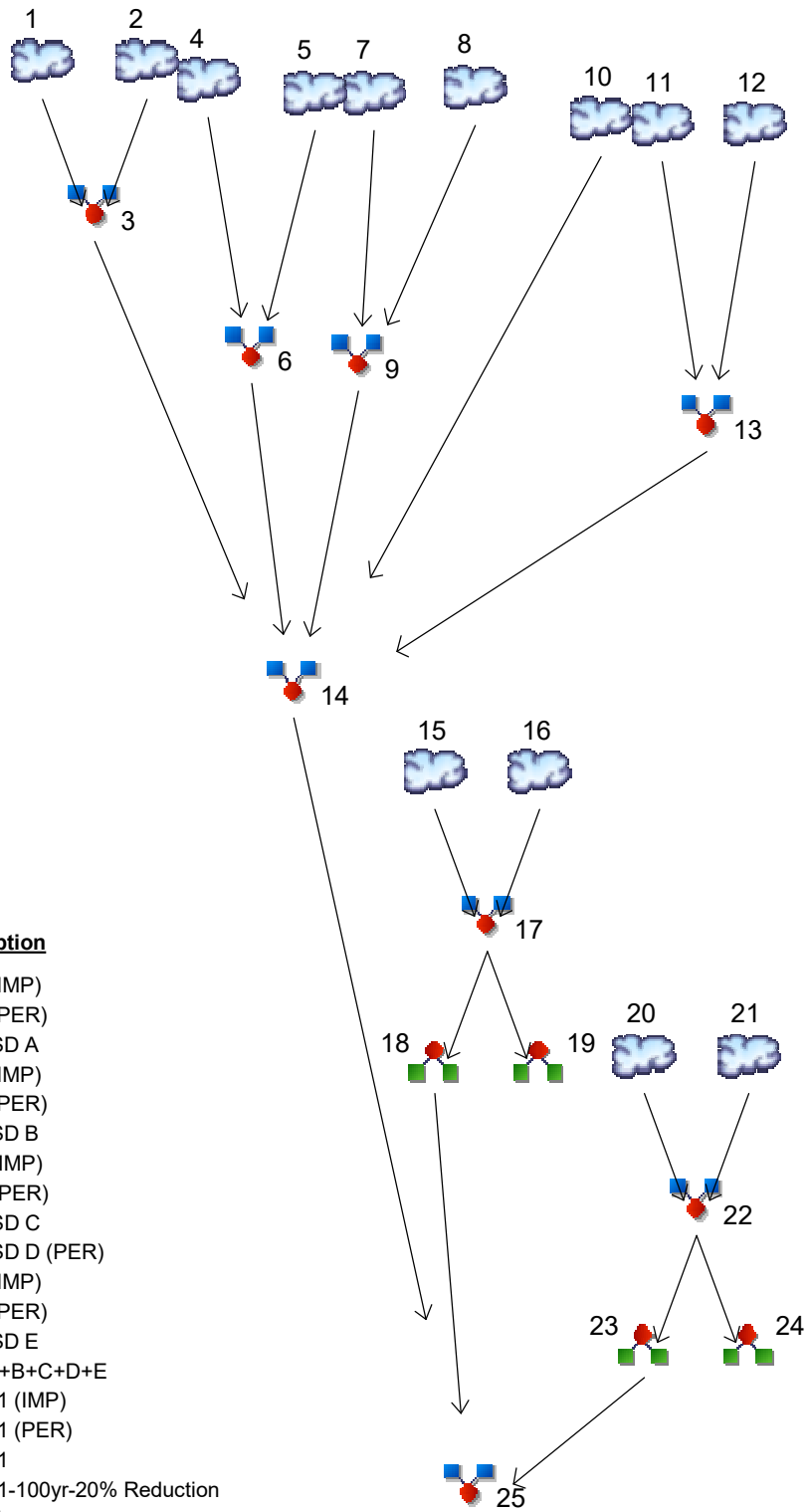
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Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020



Legend

Hyd.	Origin	Description
1	SCS Runoff	EX. A (IMP)
2	SCS Runoff	EX. A (PER)
3	Combine	EX. WSD A
4	SCS Runoff	EX. B (IMP)
5	SCS Runoff	EX. B (PER)
6	Combine	EX. WSD B
7	SCS Runoff	EX. C (IMP)
8	SCS Runoff	EX. C (PER)
9	Combine	EX. WSD C
10	SCS Runoff	EX. WSD D (PER)
11	SCS Runoff	EX. E (IMP)
12	SCS Runoff	EX. E (PER)
13	Combine	EX. WSD E
14	Combine	WSD A+B+C+D+E
15	SCS Runoff	Target 1 (IMP)
16	SCS Runoff	Target 1 (PER)
17	Combine	Target 1
18	Diversion1	Target 1-100yr-20% Reduction
19	Diversion2	Discard
20	SCS Runoff	Target 2 (IMP)
21	SCS Runoff	Target 2 (PER)
22	Combine	Target 2
23	Diversion1	Target 2-100yr-20% Reduction
24	Diversion2	Discard
25	Combine	2yr Allowable

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	-------	-------	-------	-------	-------	-------	-------	0.138	EX. A (IMP)
2	SCS Runoff	------	-------	-------	-------	-------	-------	-------	-------	5.530	EX. A (PER)
3	Combine	1, 2	-------	-------	-------	-------	-------	-------	-------	5.668	EX. WSD A
4	SCS Runoff	------	-------	-------	-------	-------	-------	-------	-------	15.40	EX. B (IMP)
5	SCS Runoff	------	-------	-------	-------	-------	-------	-------	-------	0.297	EX. B (PER)
6	Combine	4, 5	-------	-------	-------	-------	-------	-------	-------	15.69	EX. WSD B
7	SCS Runoff	------	-------	-------	-------	-------	-------	-------	-------	0.176	EX. C (IMP)
8	SCS Runoff	------	-------	-------	-------	-------	-------	-------	-------	0.074	EX. C (PER)
9	Combine	7, 8	-------	-------	-------	-------	-------	-------	-------	0.250	EX. WSD C
10	SCS Runoff	------	-------	-------	-------	-------	-------	-------	-------	2.980	EX. WSD D (PER)
11	SCS Runoff	------	-------	-------	-------	-------	-------	-------	-------	0.704	EX. E (IMP)
12	SCS Runoff	------	-------	-------	-------	-------	-------	-------	-------	0.648	EX. E (PER)
13	Combine	11, 12	-------	-------	-------	-------	-------	-------	-------	1.327	EX. WSD E
14	Combine	3, 6, 9, 10, 13	-------	-------	-------	-------	-------	-------	-------	25.07	WSD A+B+C+D+E
15	SCS Runoff	------	-------	-------	-------	-------	-------	-------	-------	2.212	Target 1 (IMP)
16	SCS Runoff	------	-------	-------	-------	-------	-------	-------	-------	2.503	Target 1 (PER)
17	Combine	15, 16	-------	-------	-------	-------	-------	-------	-------	4.711	Target 1
18	Diversion1	17	-------	-------	-------	-------	-------	-------	-------	3.769	Target 1-100yr-20% Reduction
19	Diversion2	17	-------	-------	-------	-------	-------	-------	-------	0.942	Discard
20	SCS Runoff	------	-------	-------	-------	-------	-------	-------	-------	0.176	Target 2 (IMP)
21	SCS Runoff	------	-------	-------	-------	-------	-------	-------	-------	1.231	Target 2 (PER)
22	Combine	20, 21	-------	-------	-------	-------	-------	-------	-------	1.396	Target 2
23	Diversion1	22	-------	-------	-------	-------	-------	-------	-------	1.117	Target 2-100yr-20% Reduction
24	Diversion2	22	-------	-------	-------	-------	-------	-------	-------	0.279	Discard
25	Combine	14, 18, 23,	-------	-------	-------	-------	-------	-------	-------	29.54	2yr Allowable

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

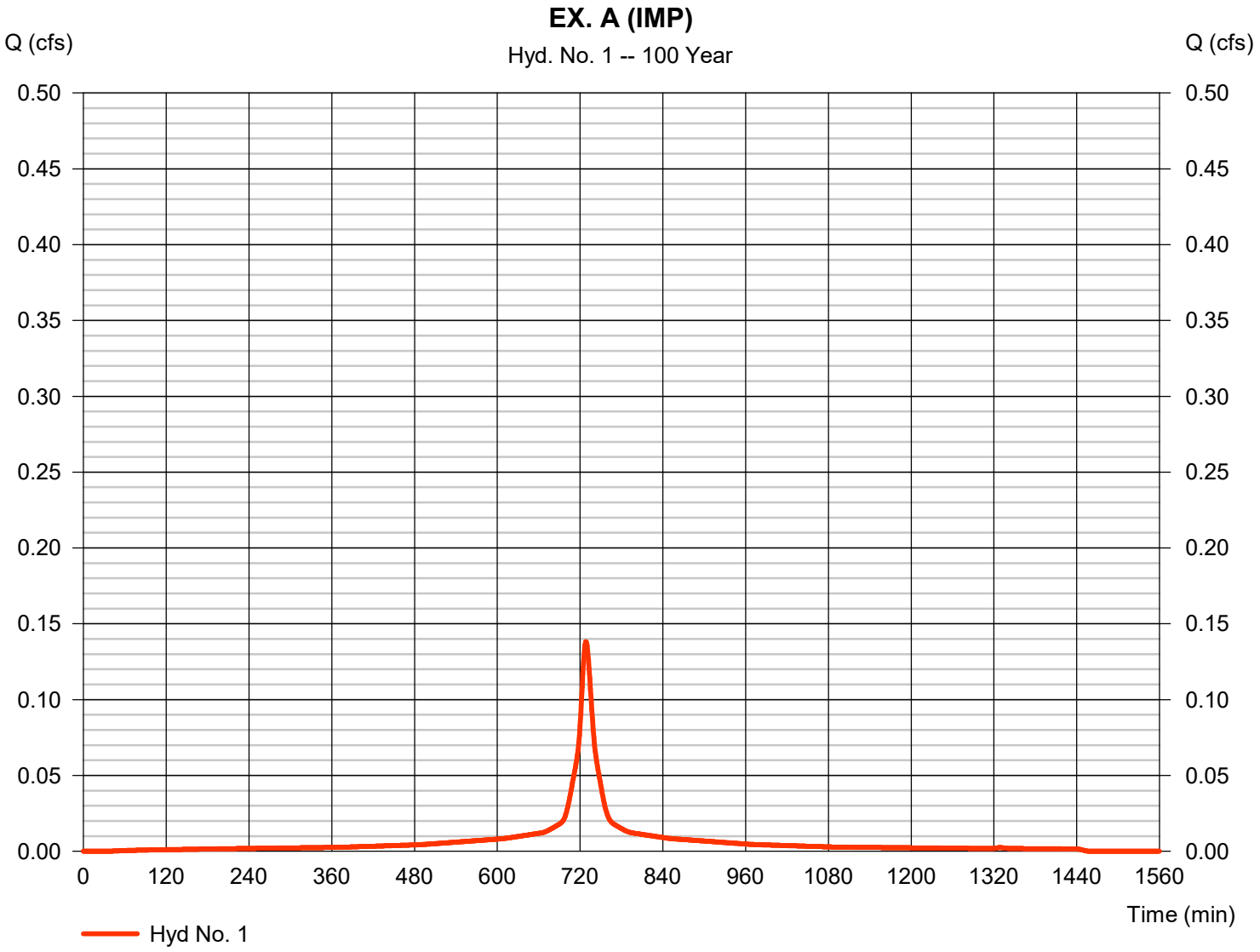
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.138	1	728	602	------	------	------	EX. A (IMP)
2	SCS Runoff	5.530	1	729	21,204	------	------	------	EX. A (PER)
3	Combine	5.668	1	729	21,806	1, 2	------	------	EX. WSD A
4	SCS Runoff	15.40	1	724	55,158	------	------	------	EX. B (IMP)
5	SCS Runoff	0.297	1	724	935	------	------	------	EX. B (PER)
6	Combine	15.69	1	724	56,094	4, 5	------	------	EX. WSD B
7	SCS Runoff	0.176	1	724	630	------	------	------	EX. C (IMP)
8	SCS Runoff	0.074	1	724	234	------	------	------	EX. C (PER)
9	Combine	0.250	1	724	864	7, 8	------	------	EX. WSD C
10	SCS Runoff	2.980	1	727	10,430	------	------	------	EX. WSD D (PER)
11	SCS Runoff	0.704	1	724	2,522	------	------	------	EX. E (IMP)
12	SCS Runoff	0.648	1	727	2,267	------	------	------	EX. E (PER)
13	Combine	1.327	1	725	4,789	11, 12	------	------	EX. WSD E
14	Combine	25.07	1	725	93,982	3, 6, 9, 10, 13	------	------	WSD A+B+C+D+E
15	SCS Runoff	2.212	1	728	9,628	------	------	------	Target 1 (IMP)
16	SCS Runoff	2.503	1	729	9,598	------	------	------	Target 1 (PER)
17	Combine	4.711	1	729	19,225	15, 16	------	------	Target 1
18	Diversion1	3.769	1	729	15,380	17	------	------	Target 1-100yr-20% Reduction
19	Diversion2	0.942	1	729	3,845	17	------	------	Discard
20	SCS Runoff	0.176	1	724	630	------	------	------	Target 2 (IMP)
21	SCS Runoff	1.231	1	727	4,308	------	------	------	Target 2 (PER)
22	Combine	1.396	1	726	4,938	20, 21	------	------	Target 2
23	Diversion1	1.117	1	726	3,951	22	------	------	Target 2-100yr-20% Reduction
24	Diversion2	0.279	1	726	988	22	------	------	Discard
25	Combine	29.54	1	725	113,313	14, 18, 23,	------	------	2yr Allowable

Hydrograph Report

Hyd. No. 1

EX. A (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.138 cfs
Storm frequency	=	100 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	602 cuft
Drainage area	=	0.020 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

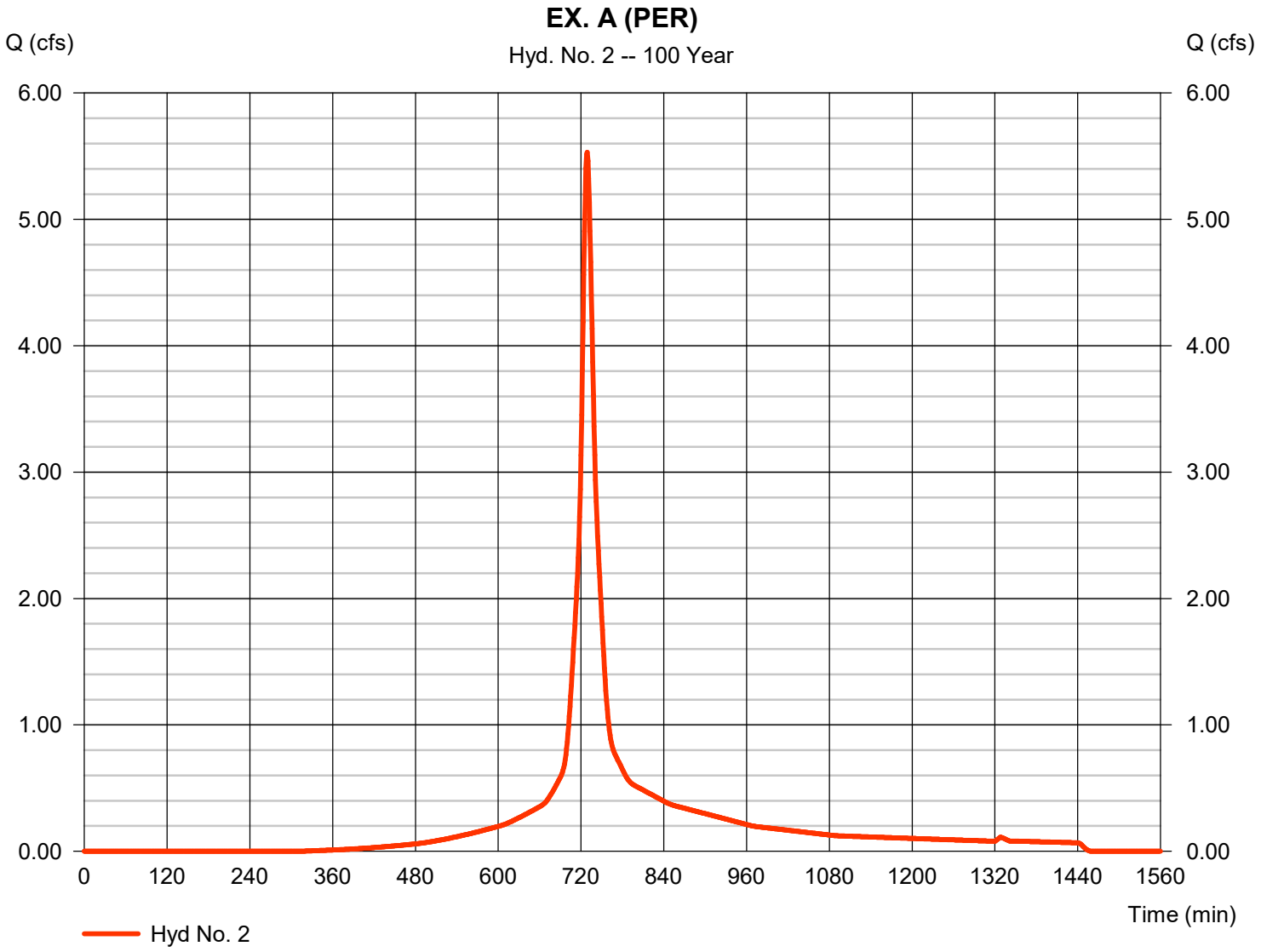


Hydrograph Report

Hyd. No. 2

EX. A (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.530 cfs
Storm frequency	=	100 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	21,204 cuft
Drainage area	=	0.950 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

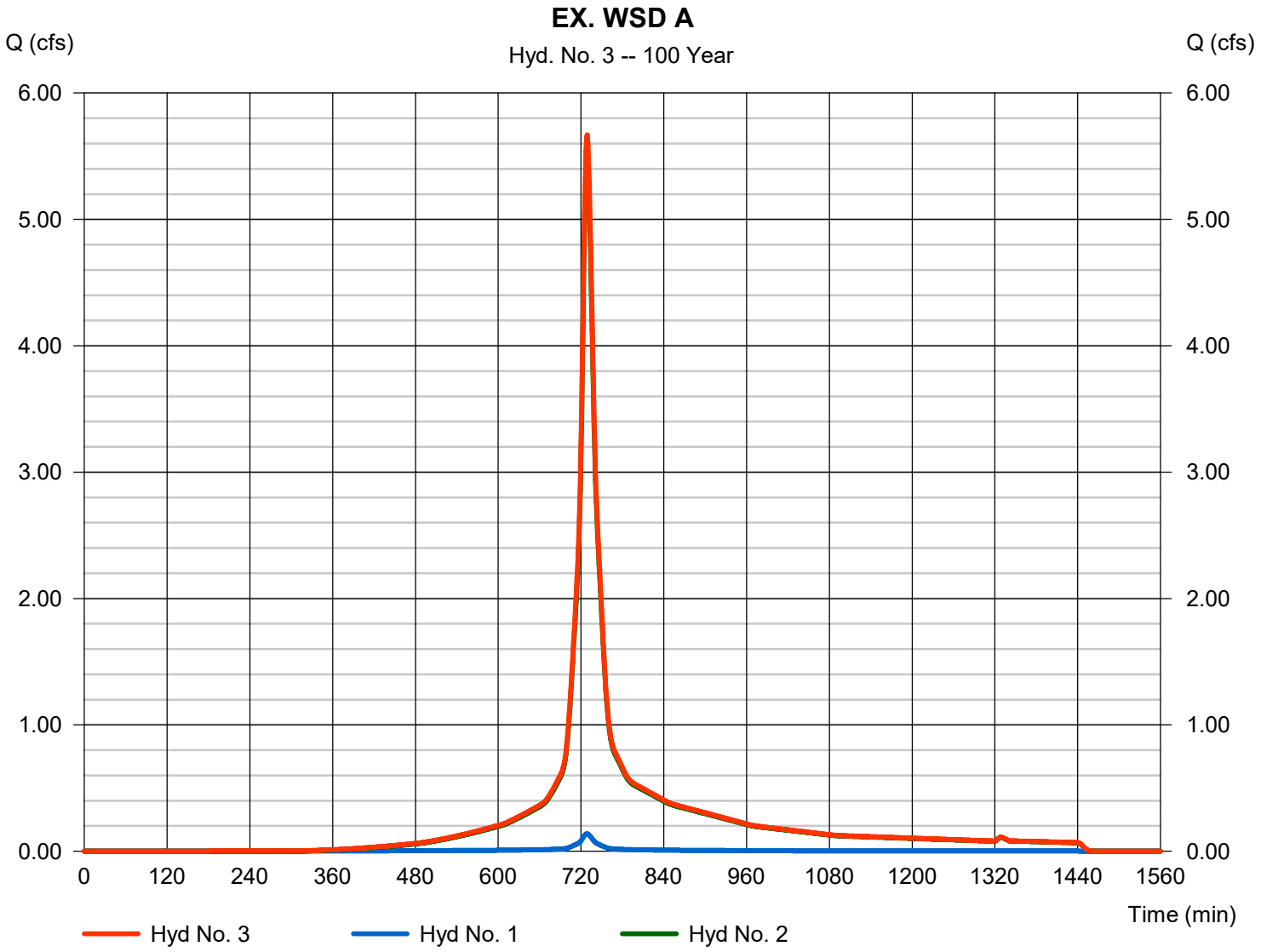


Hydrograph Report

Hyd. No. 3

EX. WSD A

Hydrograph type	=	Combine	Peak discharge	=	5.668 cfs
Storm frequency	=	100 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	21,806 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	0.970 ac

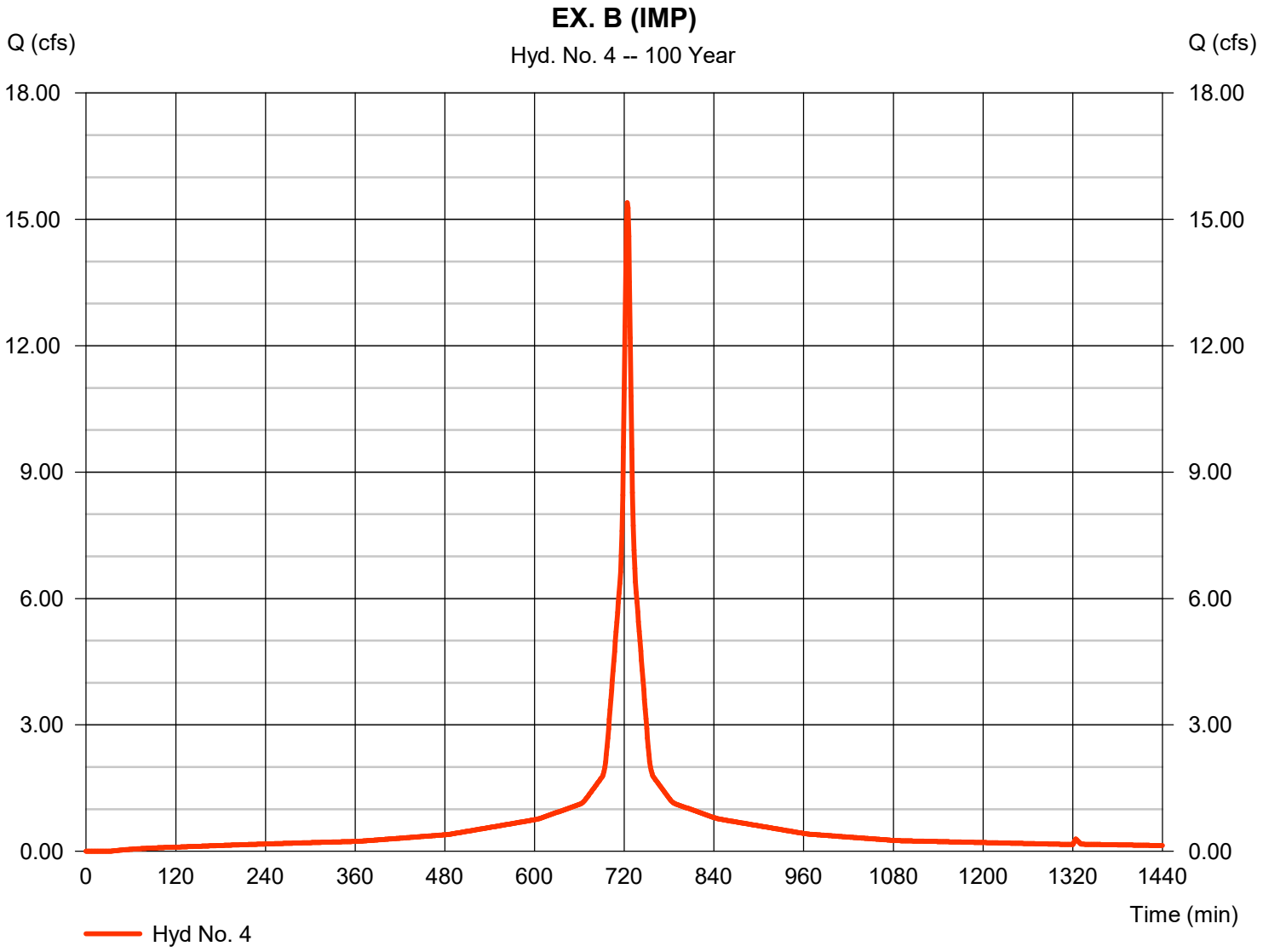


Hydrograph Report

Hyd. No. 4

EX. B (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	15.40 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	55,158 cuft
Drainage area	=	1.750 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

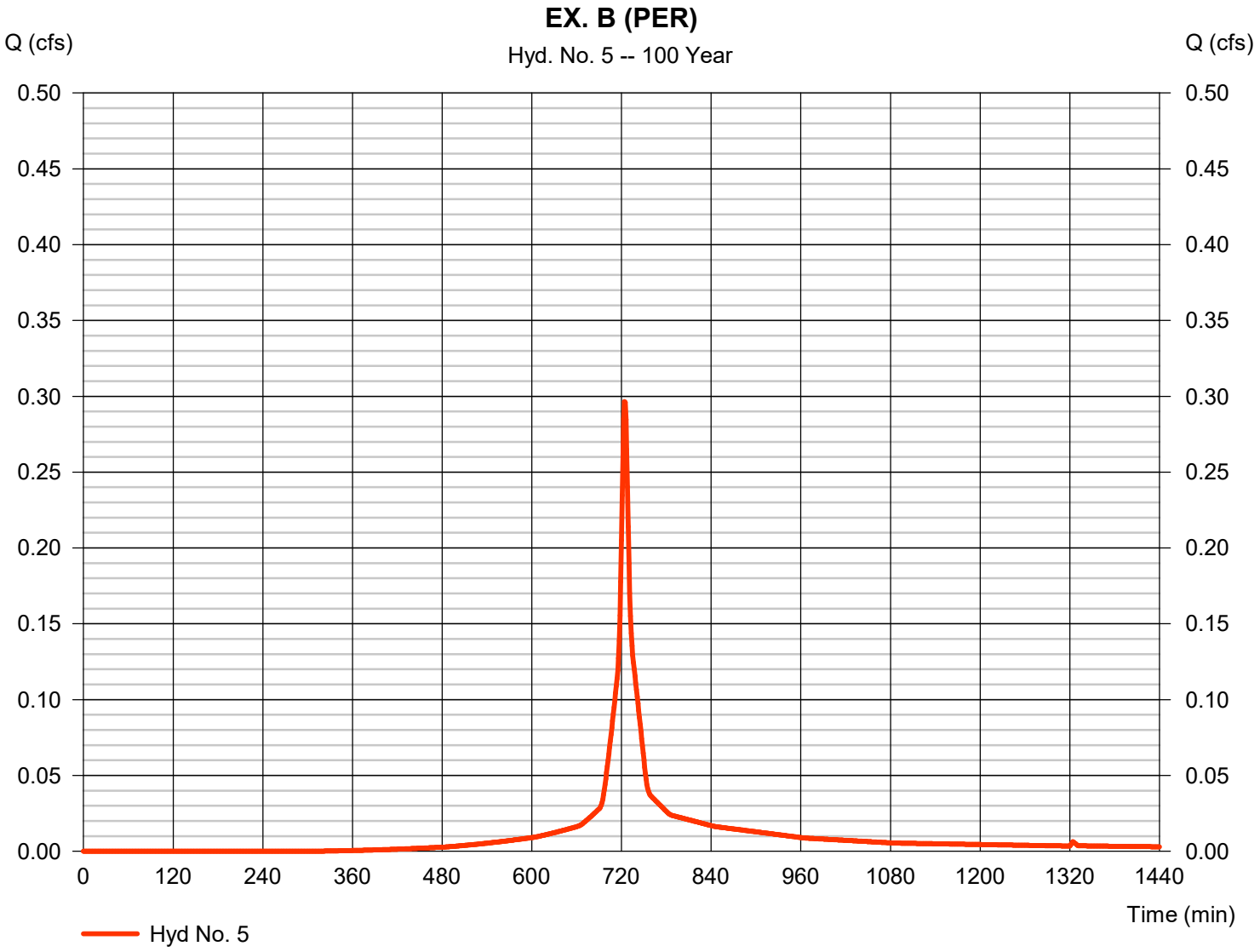


Hydrograph Report

Hyd. No. 5

EX. B (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.297 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	935 cuft
Drainage area	=	0.040 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

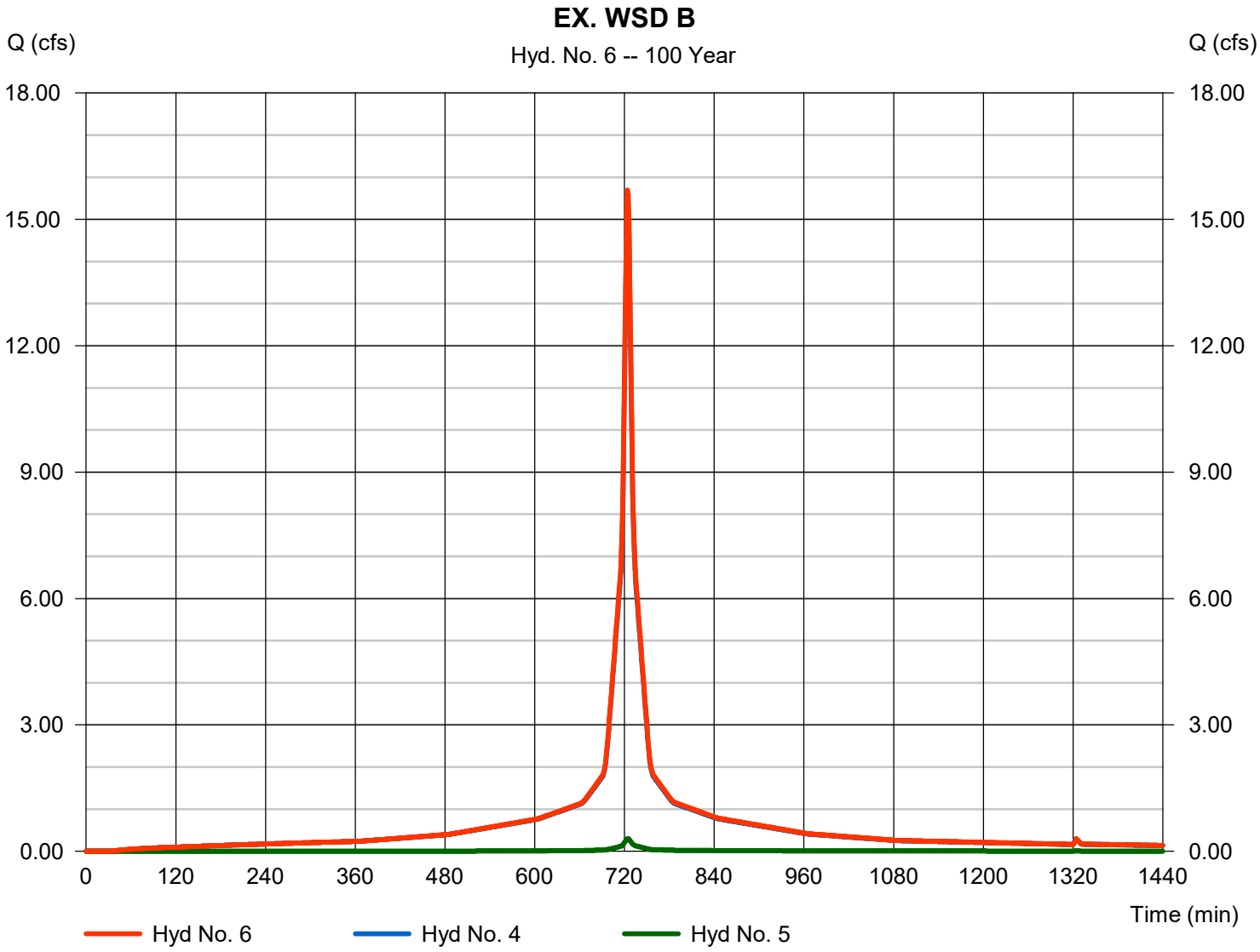


Hydrograph Report

Hyd. No. 6

EX. WSD B

Hydrograph type	= Combine	Peak discharge	= 15.69 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 56,094 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 1.790 ac

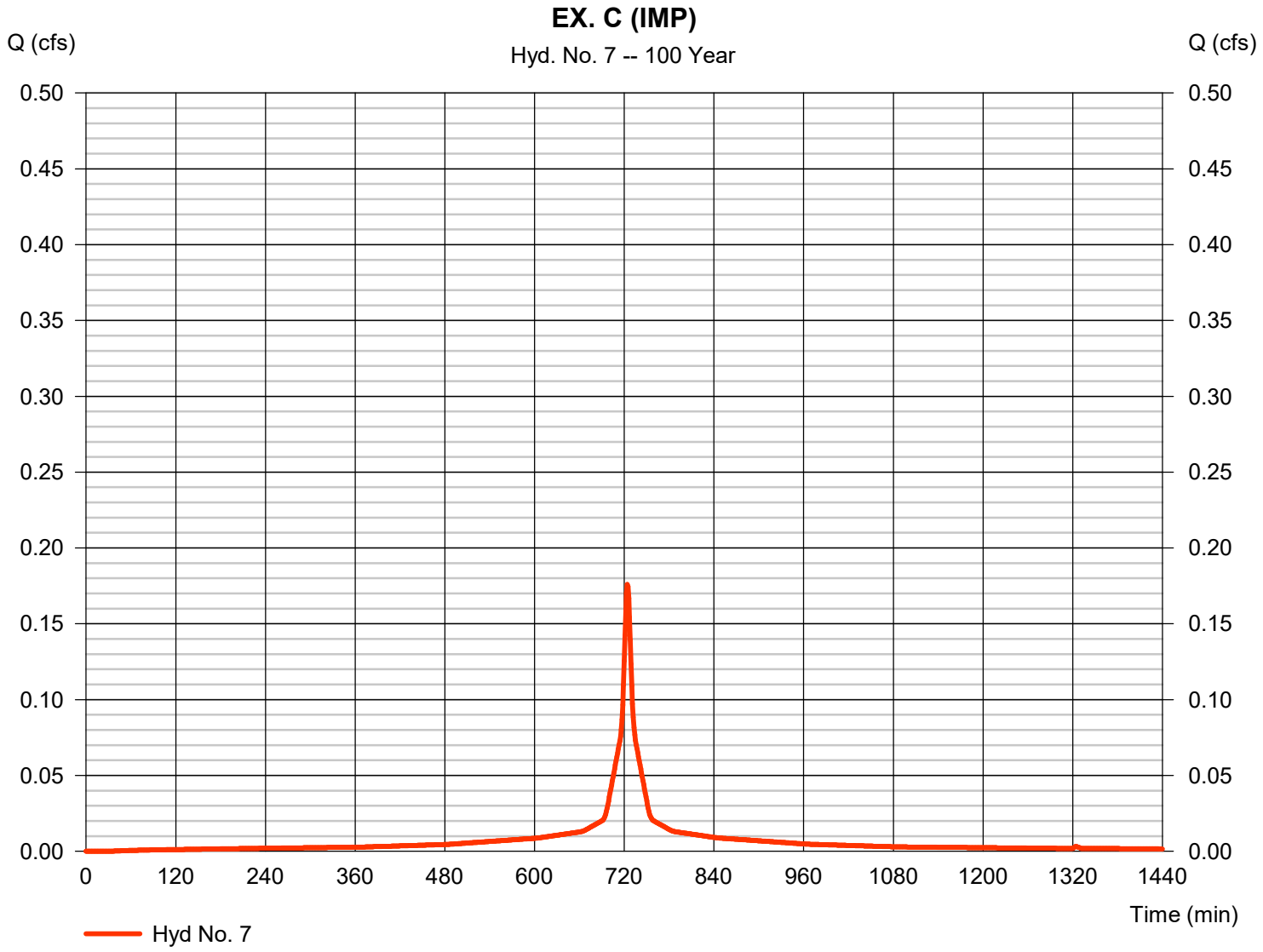


Hydrograph Report

Hyd. No. 7

EX. C (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.176 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	630 cuft
Drainage area	=	0.020 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

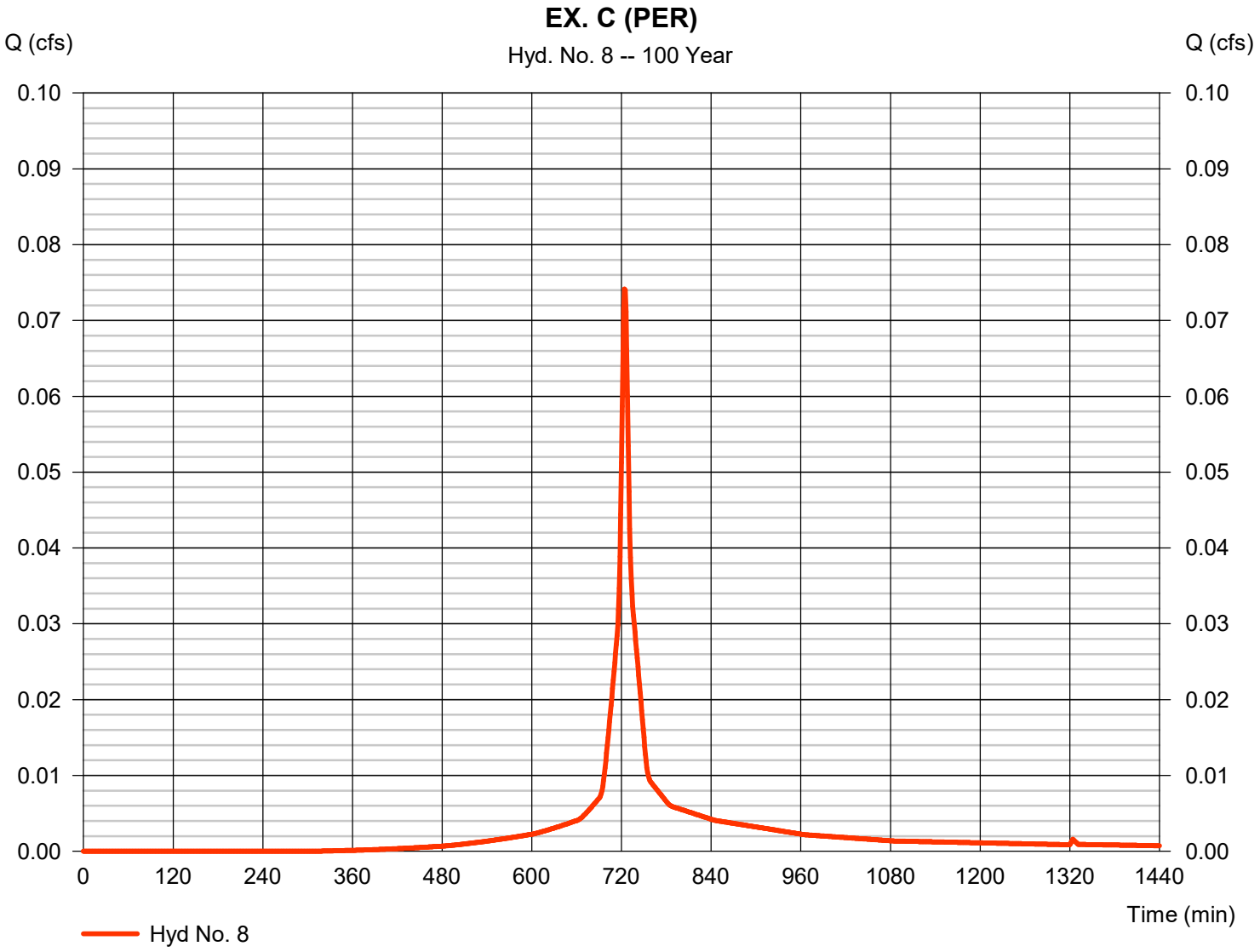


Hydrograph Report

Hyd. No. 8

EX. C (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.074 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	234 cuft
Drainage area	=	0.010 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

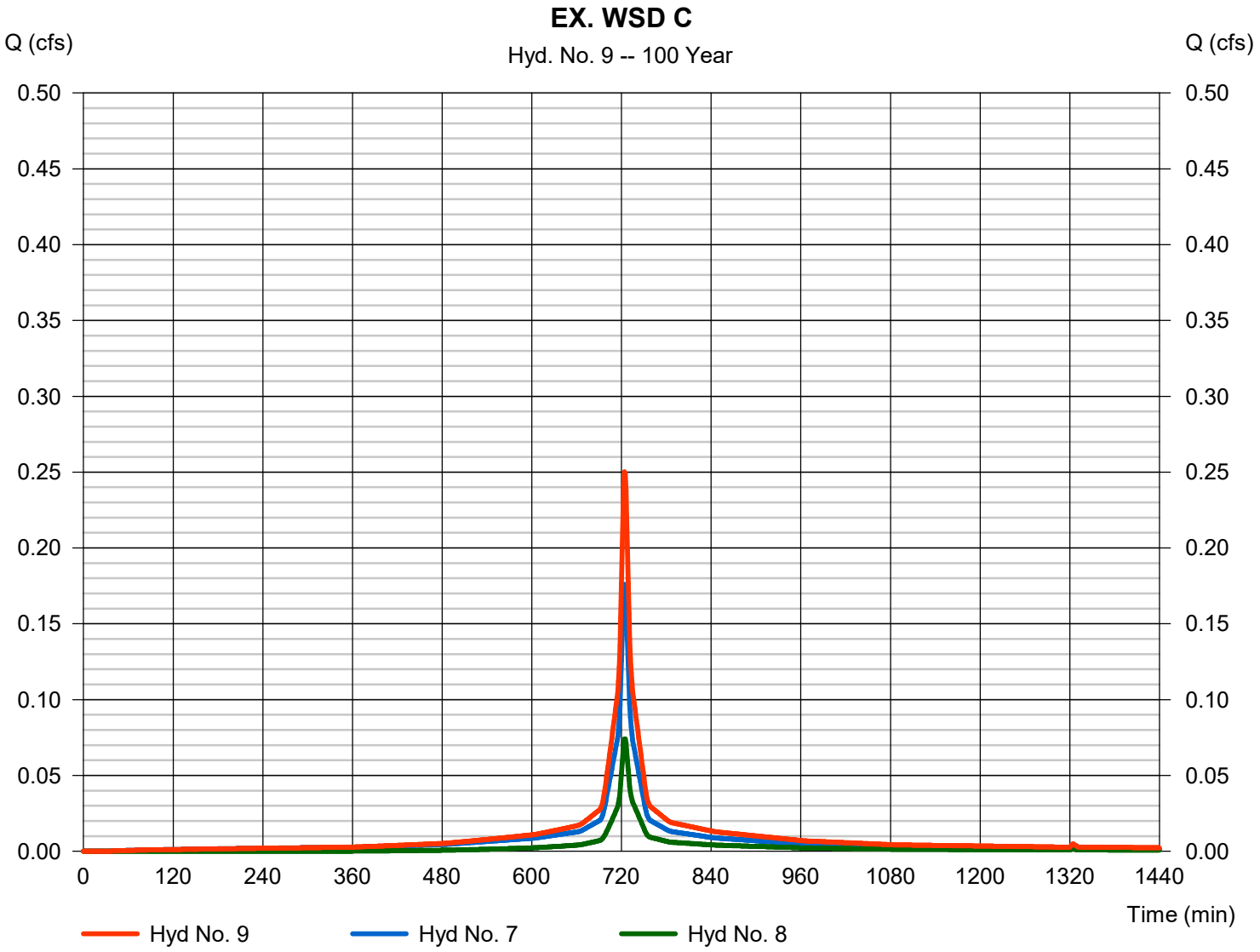


Hydrograph Report

Hyd. No. 9

EX. WSD C

Hydrograph type	= Combine	Peak discharge	= 0.250 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 864 cuft
Inflow hyds.	= 7, 8	Contrib. drain. area	= 0.030 ac

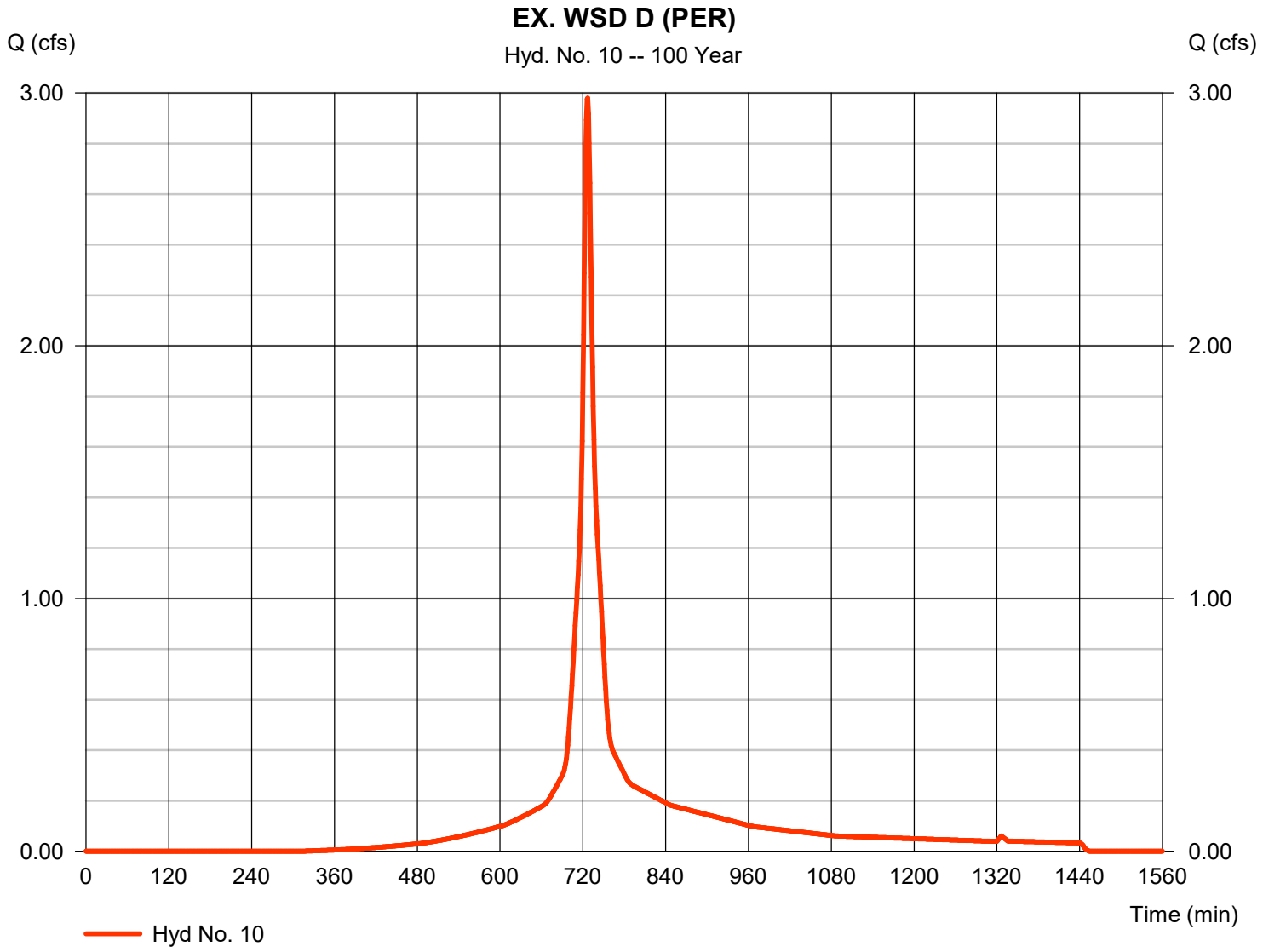


Hydrograph Report

Hyd. No. 10

EX. WSD D (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.980 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	10,430 cuft
Drainage area	=	0.460 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

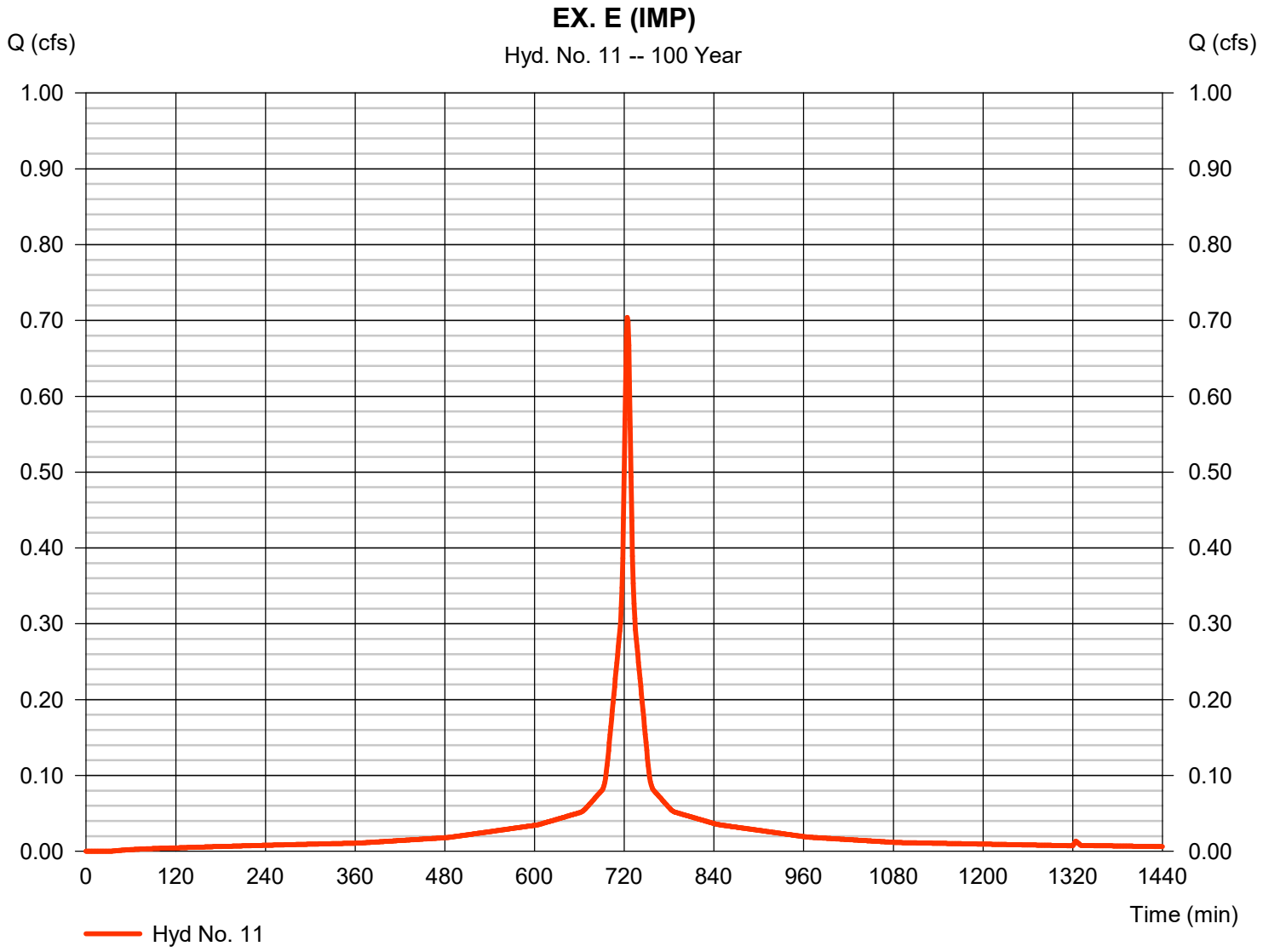


Hydrograph Report

Hyd. No. 11

EX. E (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.704 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	2,522 cuft
Drainage area	=	0.080 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

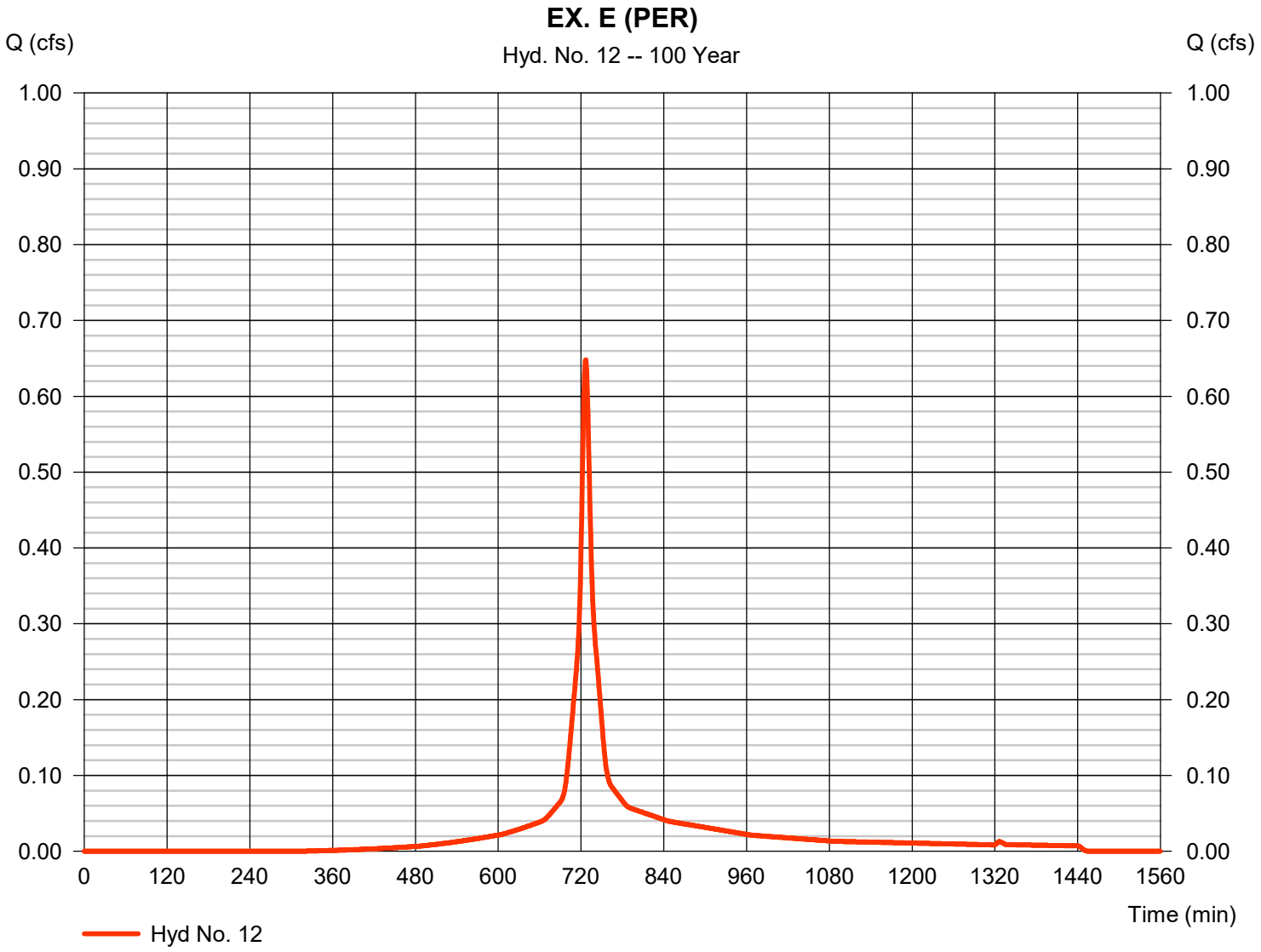


Hydrograph Report

Hyd. No. 12

EX. E (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.648 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	2,267 cuft
Drainage area	=	0.100 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

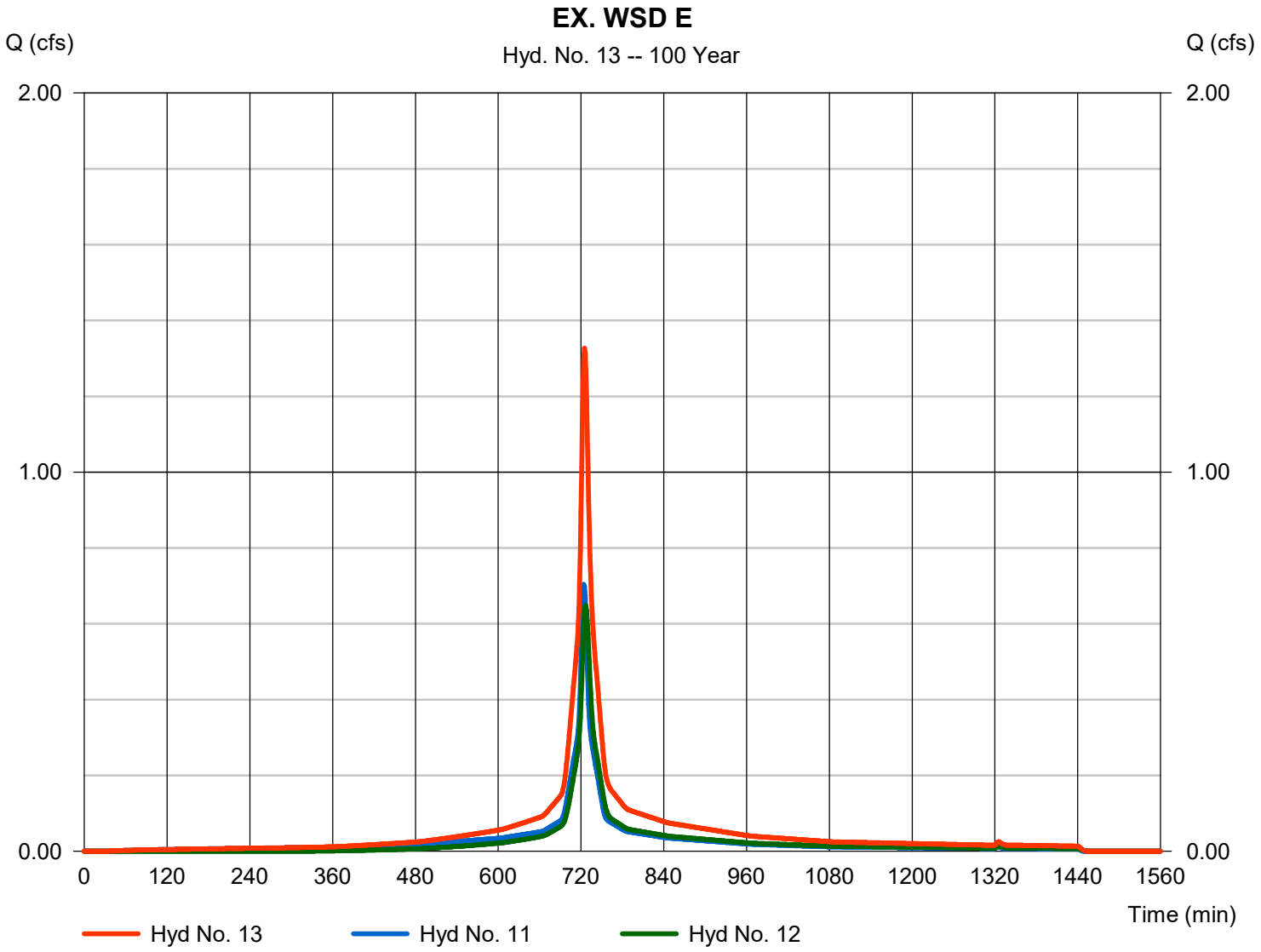


Hydrograph Report

Hyd. No. 13

EX. WSD E

Hydrograph type	=	Combine	Peak discharge	=	1.327 cfs
Storm frequency	=	100 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	4,789 cuft
Inflow hyds.	=	11, 12	Contrib. drain. area	=	0.180 ac

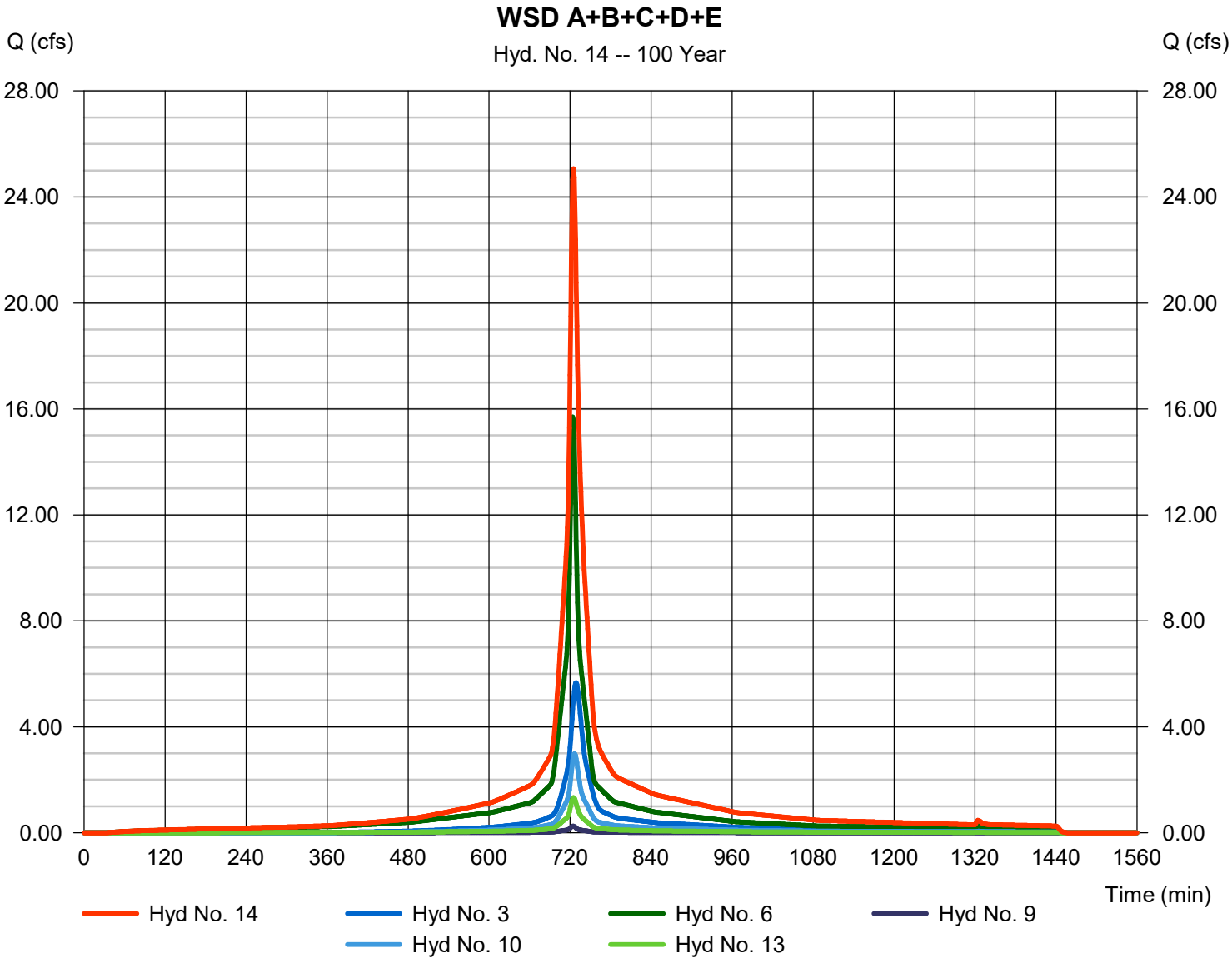


Hydrograph Report

Hyd. No. 14

WSD A+B+C+D+E

Hydrograph type	= Combine	Peak discharge	= 25.07 cfs
Storm frequency	= 100 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 93,982 cuft
Inflow hyds.	= 3, 6, 9, 10, 13	Contrib. drain. area	= 0.460 ac

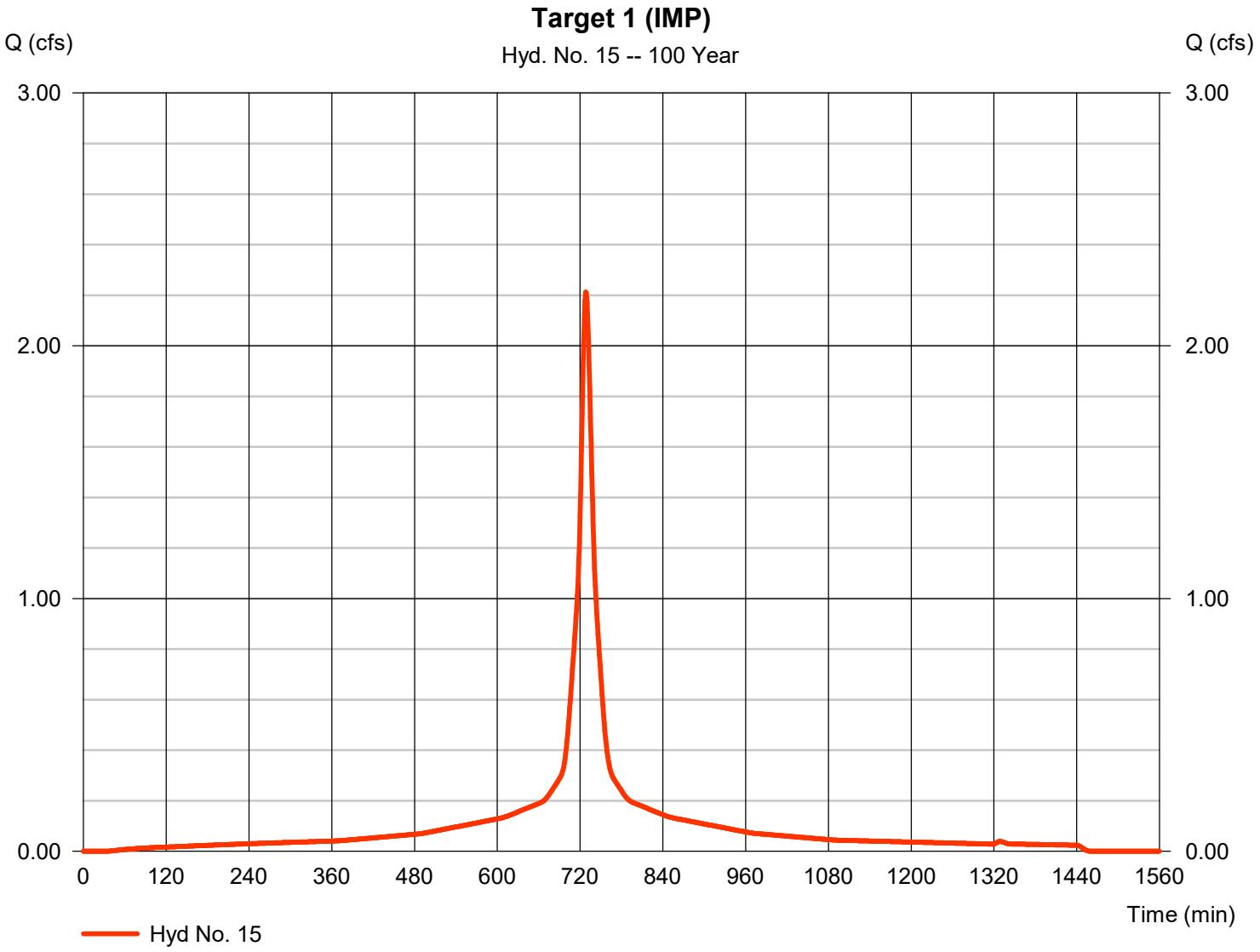


Hydrograph Report

Hyd. No. 15

Target 1 (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.212 cfs
Storm frequency	=	100 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	9,628 cuft
Drainage area	=	0.320 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

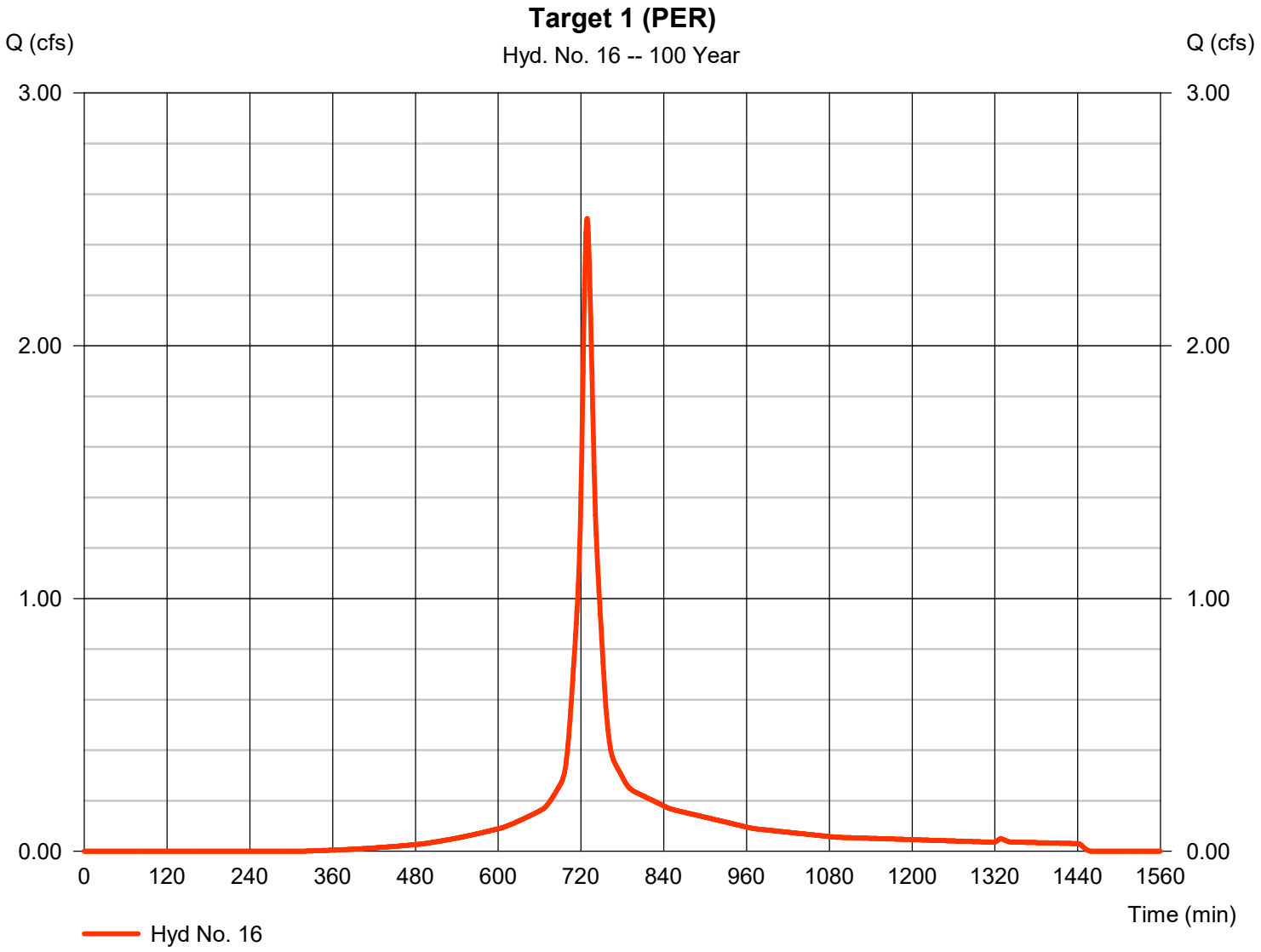


Hydrograph Report

Hyd. No. 16

Target 1 (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.503 cfs
Storm frequency	=	100 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	9,598 cuft
Drainage area	=	0.430 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

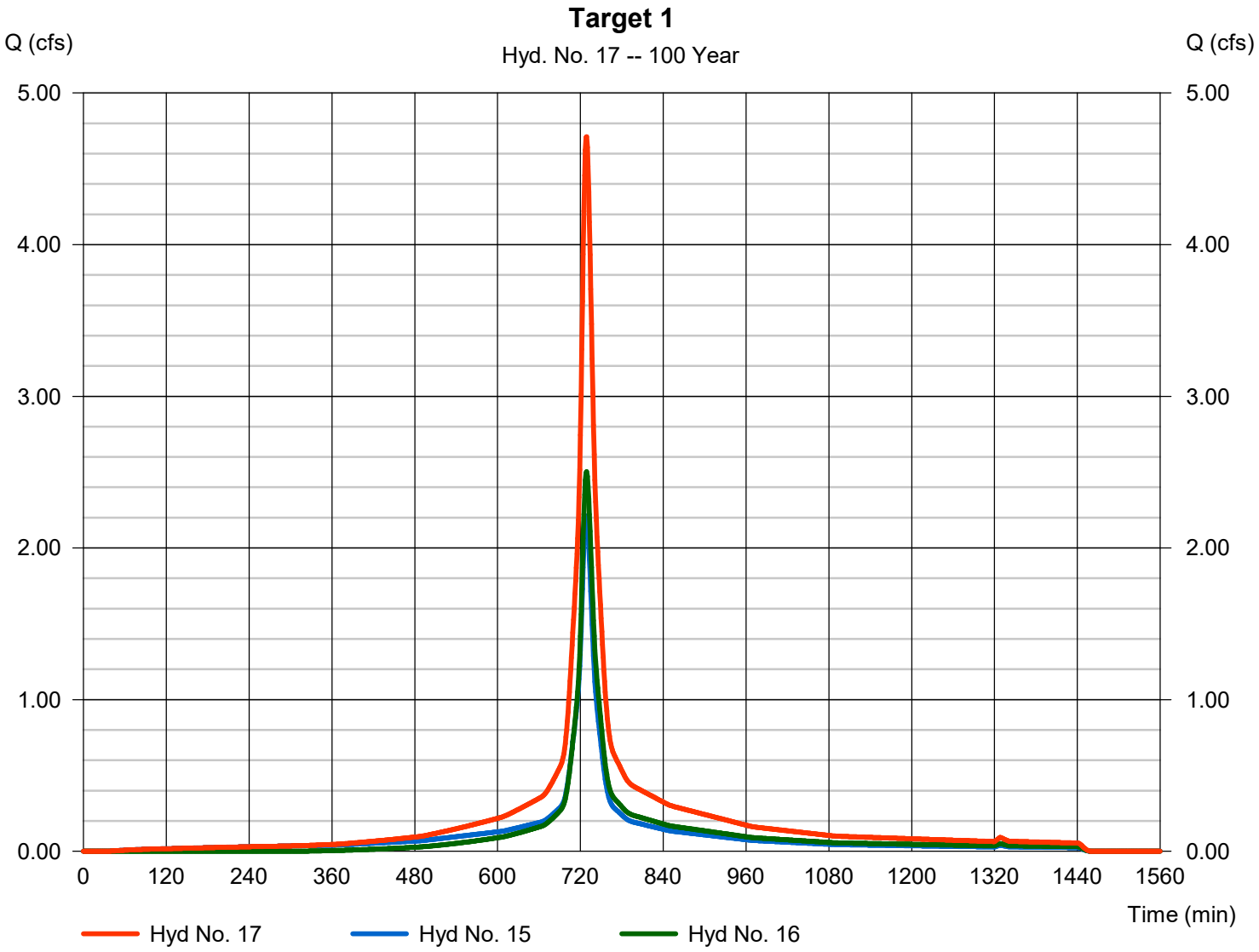


Hydrograph Report

Hyd. No. 17

Target 1

Hydrograph type	= Combine	Peak discharge	= 4.711 cfs
Storm frequency	= 100 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 19,225 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 0.750 ac

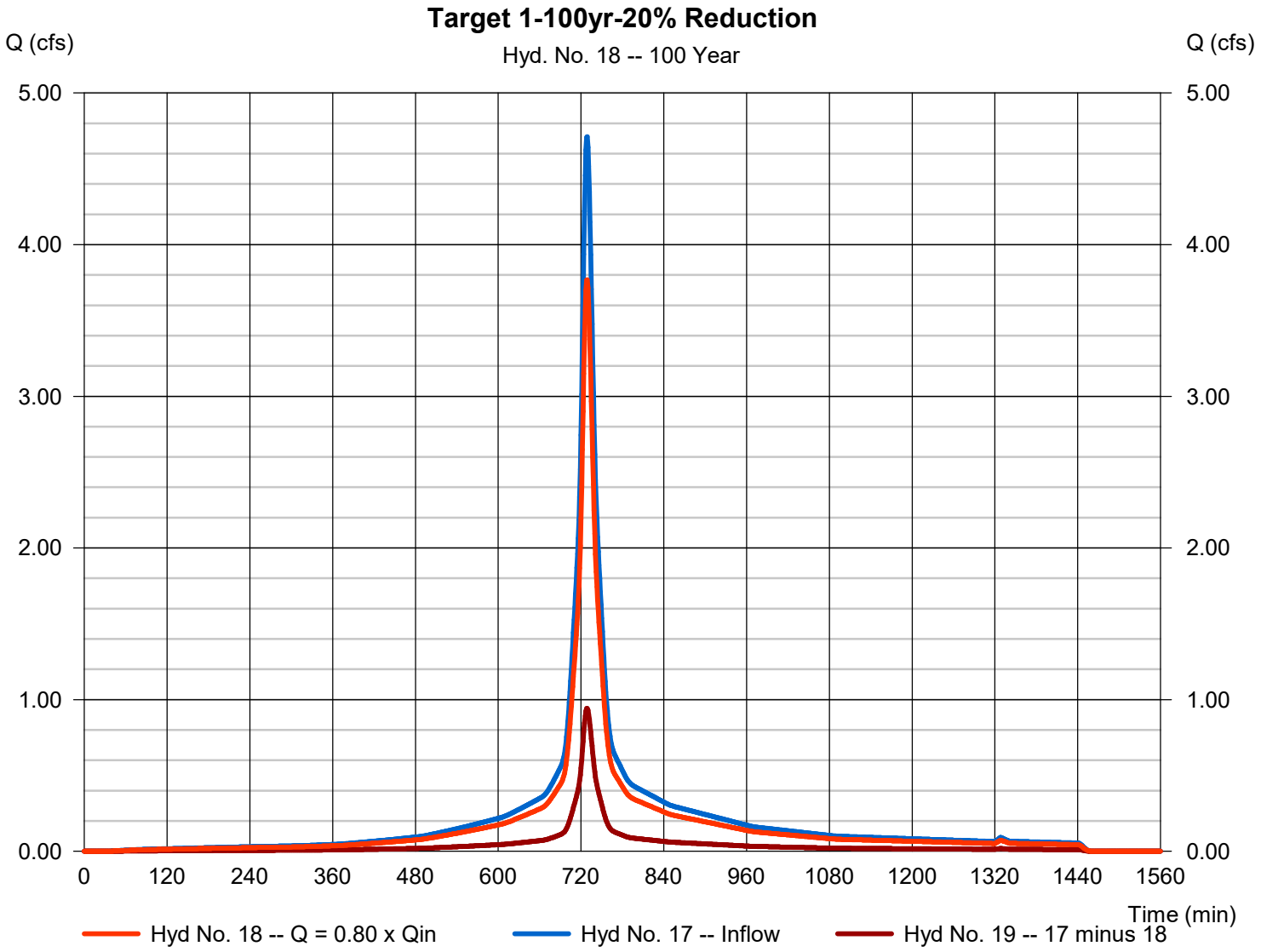


Hydrograph Report

Hyd. No. 18

Target 1-100yr-20% Reduction

Hydrograph type	= Diversion1	Peak discharge	= 3.769 cfs
Storm frequency	= 100 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 15,380 cuft
Inflow hydrograph	= 17 - Target 1	2nd diverted hyd.	= 19
Diversion method	= Flow Ratio	Flow ratio	= 0.80

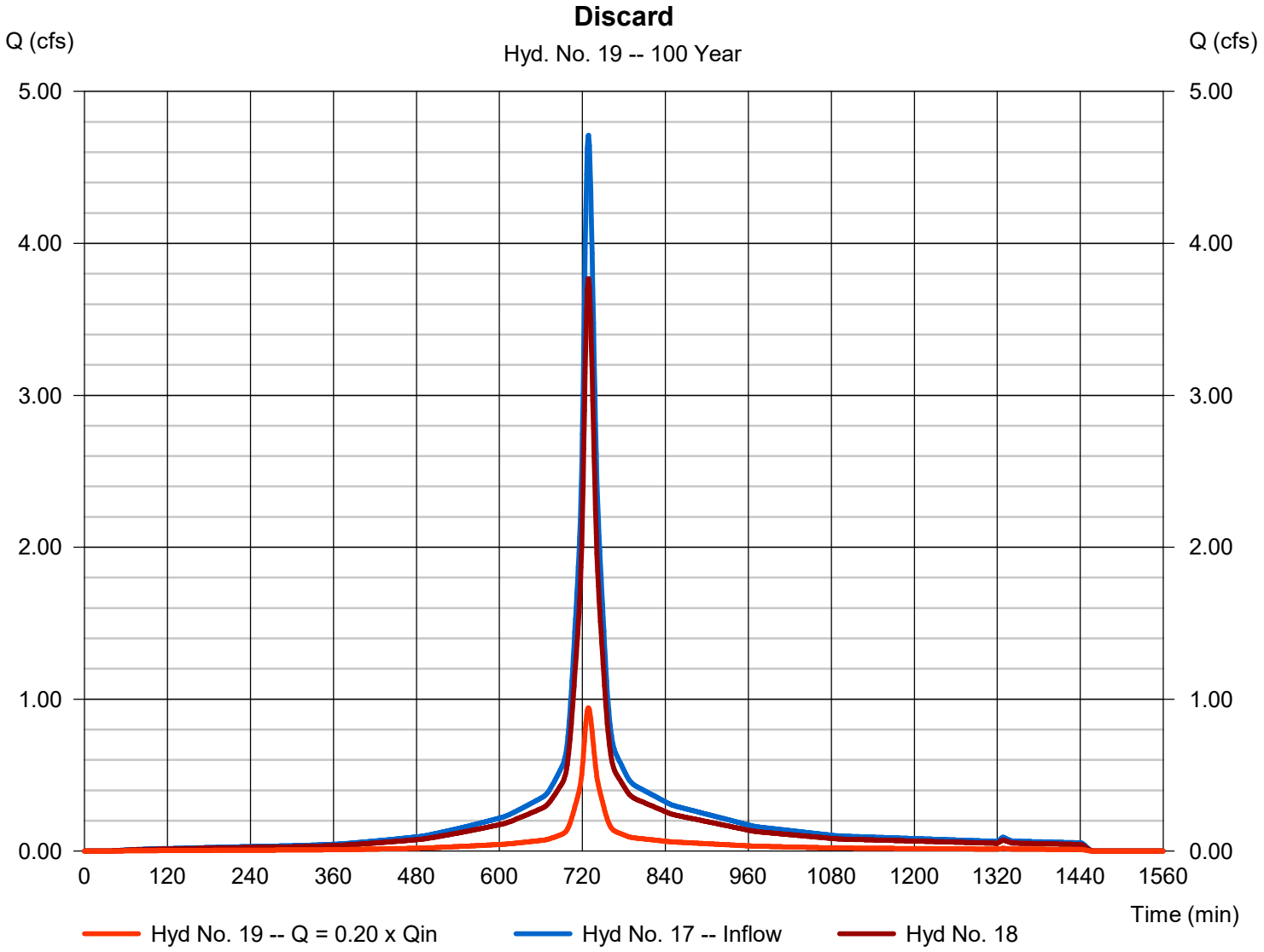


Hydrograph Report

Hyd. No. 19

Discard

Hydrograph type	= Diversion2	Peak discharge	= 0.942 cfs
Storm frequency	= 100 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 3,845 cuft
Inflow hydrograph	= 17 - Target 1	2nd diverted hyd.	= 18
Diversion method	= Flow Ratio	Flow ratio	= 0.80

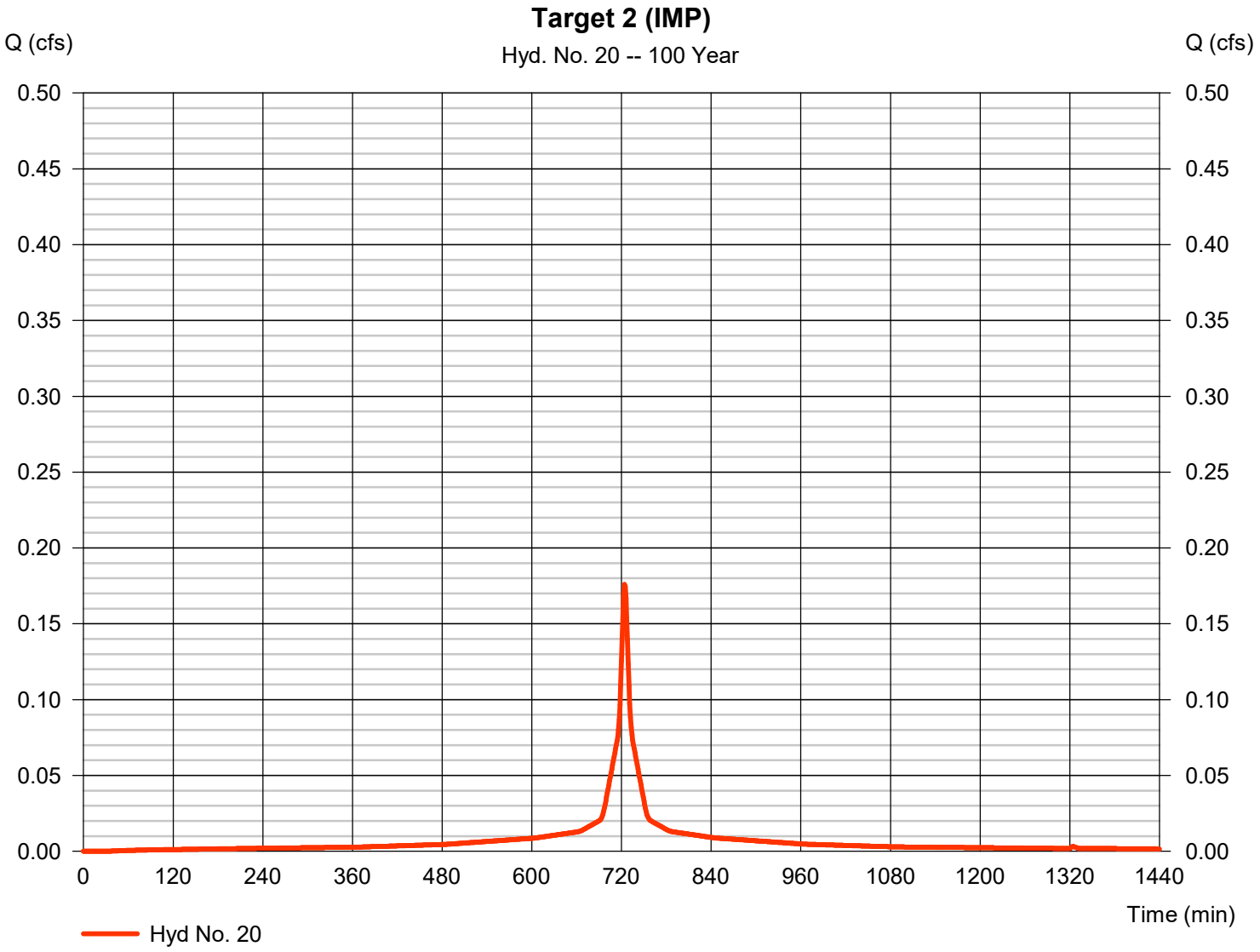


Hydrograph Report

Hyd. No. 20

Target 2 (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.176 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	630 cuft
Drainage area	=	0.020 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

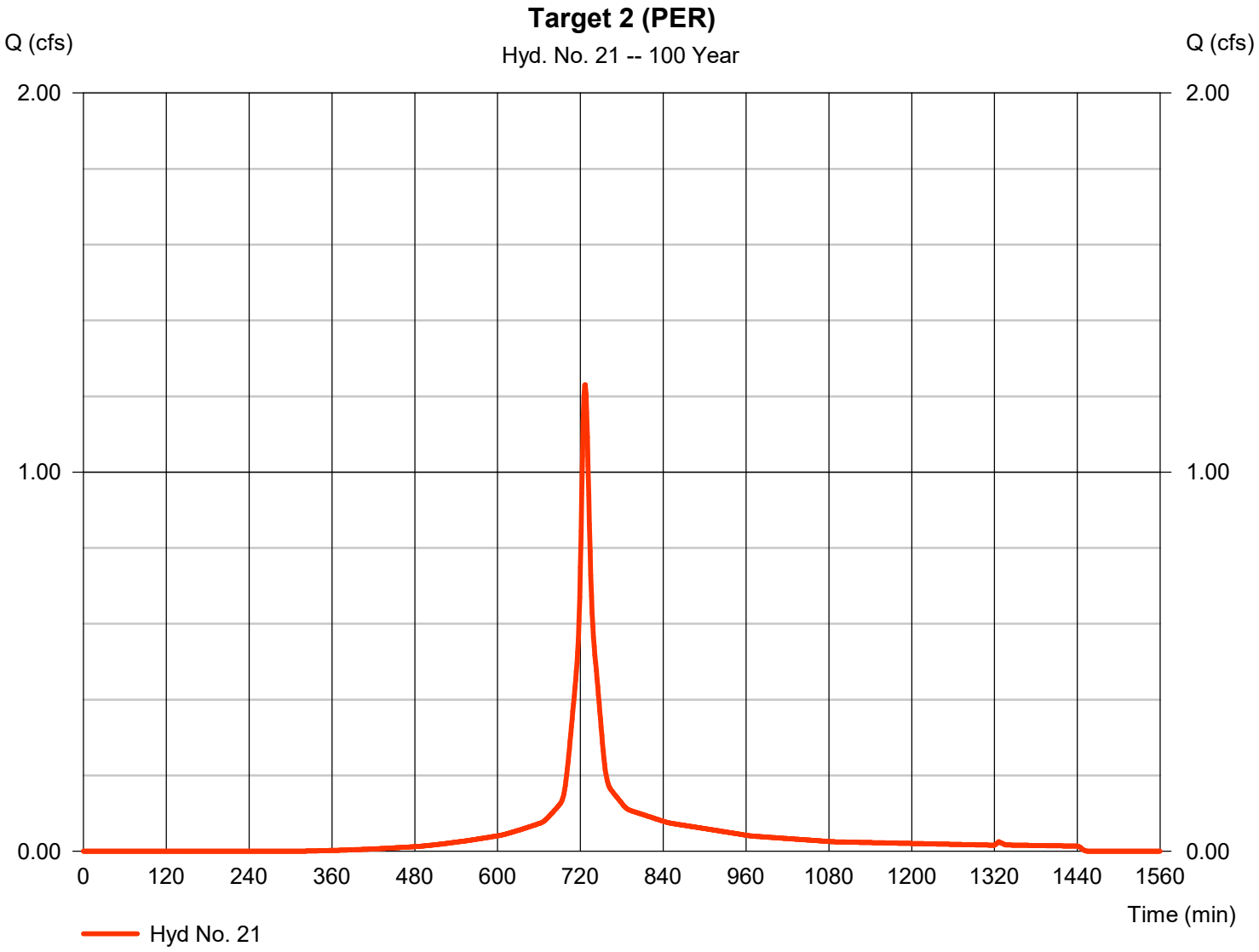


Hydrograph Report

Hyd. No. 21

Target 2 (PER)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.231 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 4,308 cuft
Drainage area	= 0.190 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.66 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

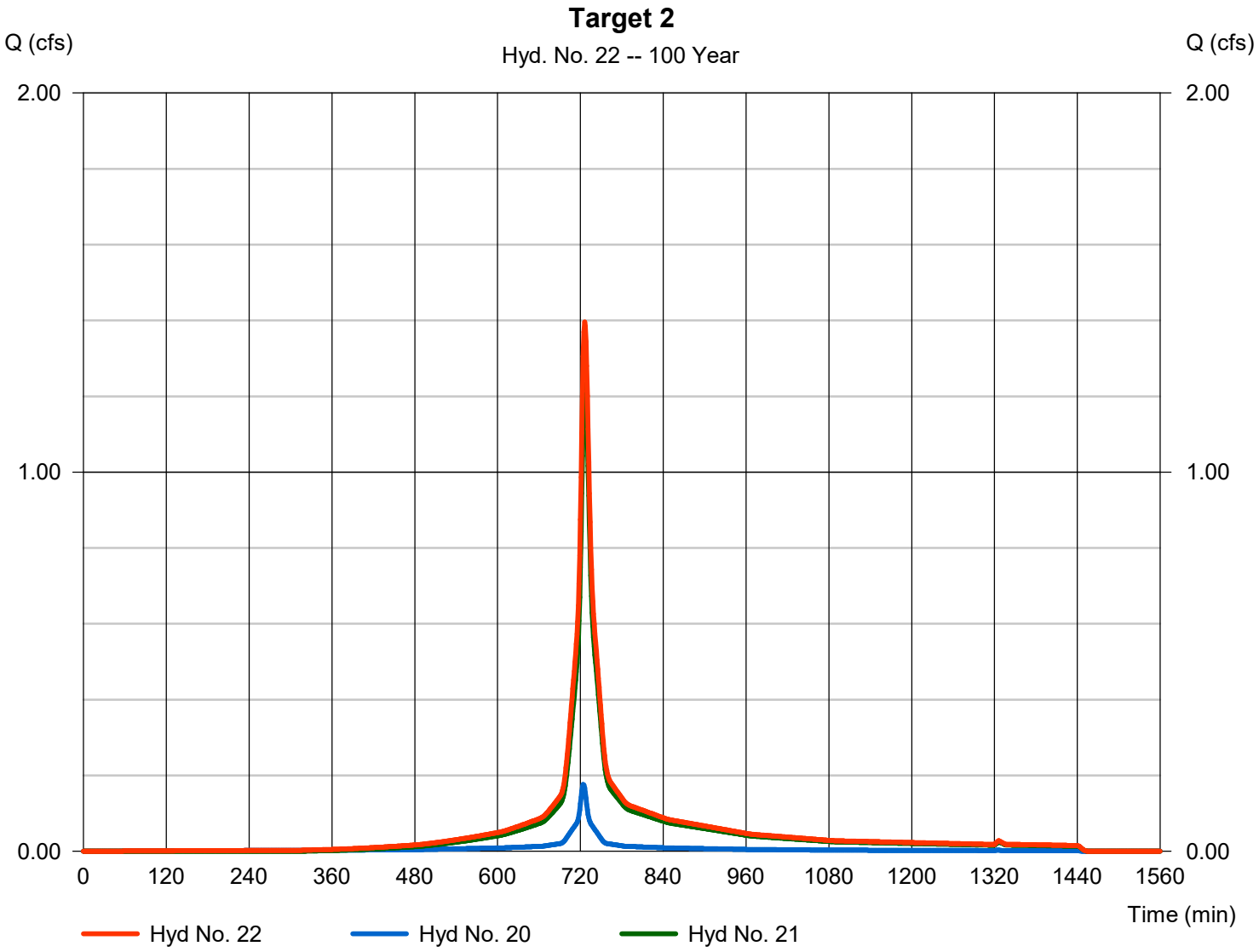


Hydrograph Report

Hyd. No. 22

Target 2

Hydrograph type	= Combine	Peak discharge	= 1.396 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 4,938 cuft
Inflow hyds.	= 20, 21	Contrib. drain. area	= 0.210 ac

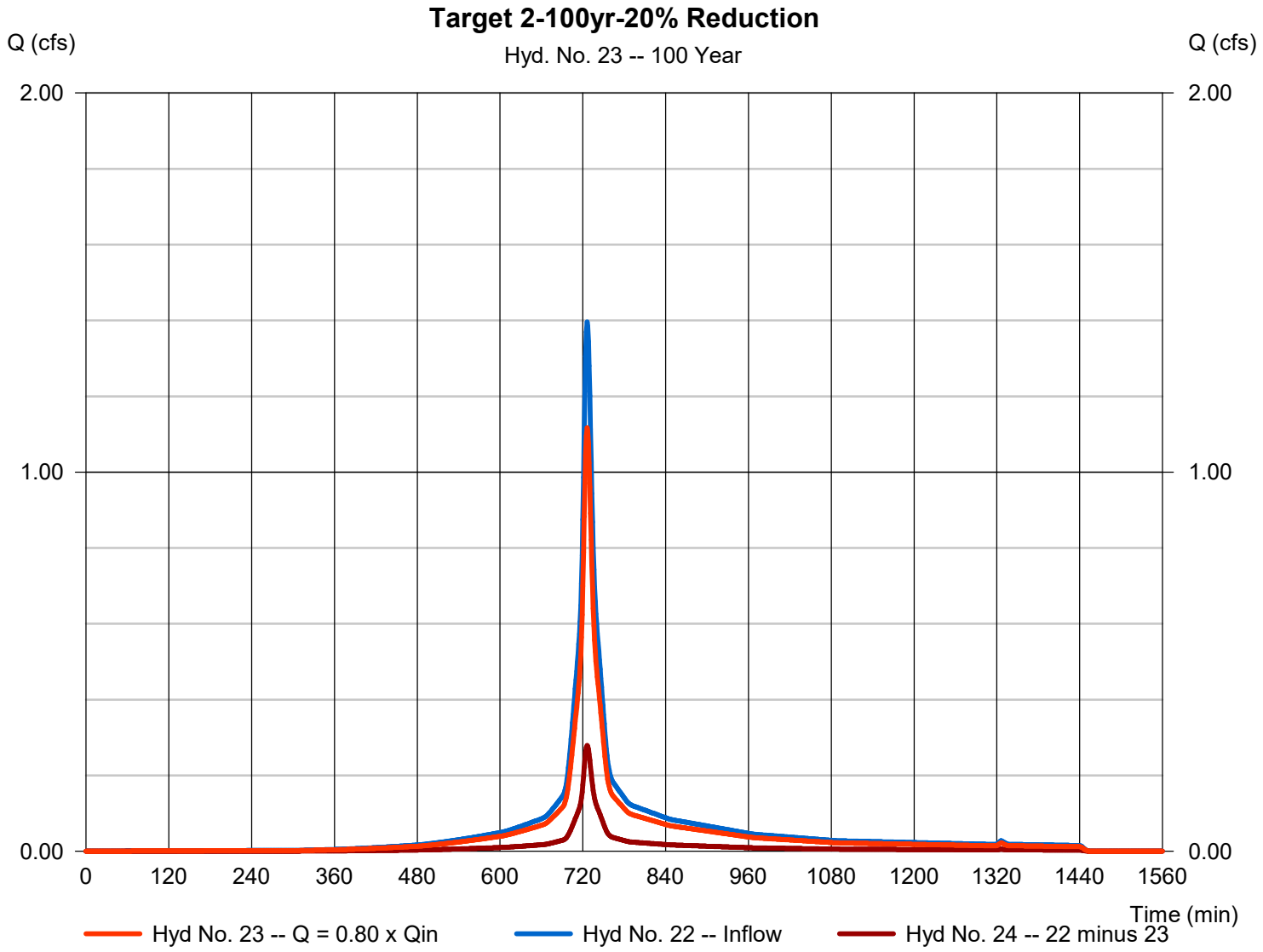


Hydrograph Report

Hyd. No. 23

Target 2-100yr-20% Reduction

Hydrograph type	= Diversion1	Peak discharge	= 1.117 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 3,951 cuft
Inflow hydrograph	= 22 - Target 2	2nd diverted hyd.	= 24
Diversion method	= Flow Ratio	Flow ratio	= 0.80

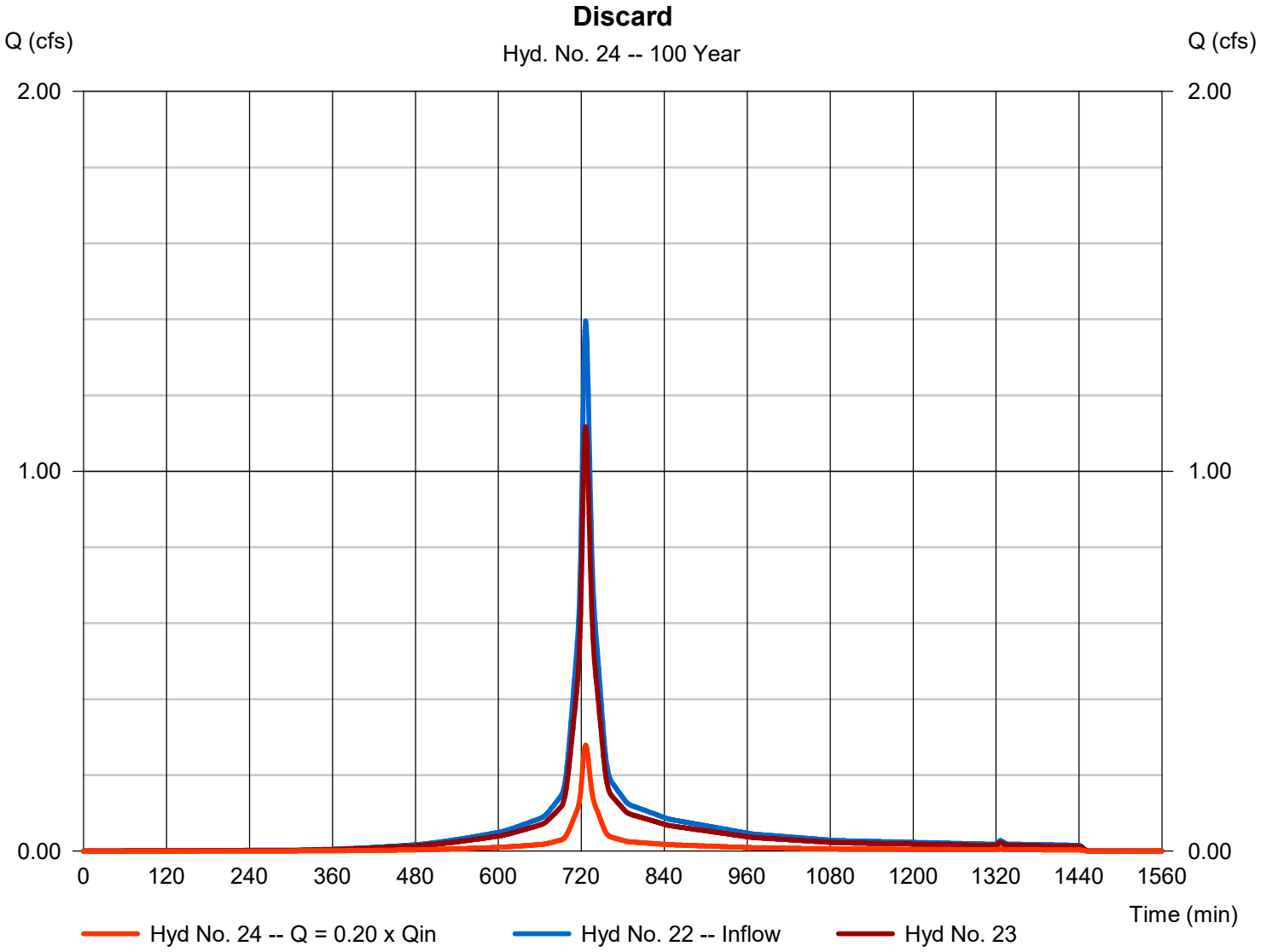


Hydrograph Report

Hyd. No. 24

Discard

Hydrograph type	= Diversion2	Peak discharge	= 0.279 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 988 cuft
Inflow hydrograph	= 22 - Target 2	2nd diverted hyd.	= 23
Diversion method	= Flow Ratio	Flow ratio	= 0.80

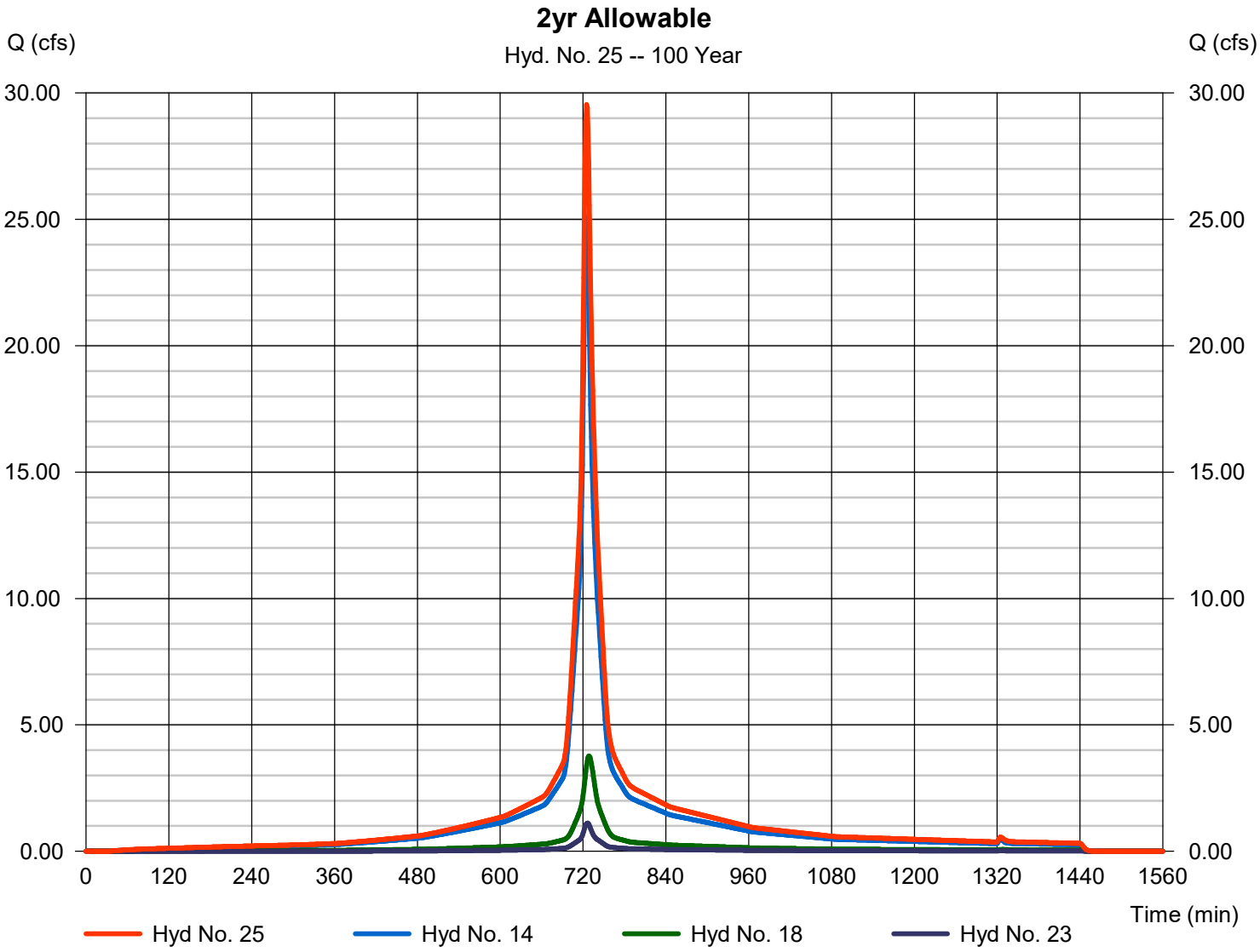


Hydrograph Report

Hyd. No. 25

2yr Allowable

Hydrograph type	=	Combine	Peak discharge	=	29.54 cfs
Storm frequency	=	100 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	113,313 cuft
Inflow hyds.	=	14, 18, 23	Contrib. drain. area	=	0.000 ac



APPENDIX C

PROPOSED STORMWATER DISCHARGE CALCULATIONS

CURVE NUMBER (CN) AND TIME OF CONCENTRATION (Tc) CALCULATIONS

LANGAN

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: Present (Developed) **Proposed Watershed A - Pervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
D	**Open Space (Good Cond.)**	**80**			**0.98**	**78.40**

1 Use only one CN source per line

Totals = **0.98** **78.40**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{78.40}{0.98} =$ 80.00 Use CN = **80**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: Present (Developed) **Proposed Watershed A - Impervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
	Impervious	**98**			**0.09**	**8.82**

1 Use only one CN source per line

Totals = **0.09** **8.82**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{8.82}{0.09} =$ 98.00 Use CN = **98**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: Present (Developed)

Proposed Watershed B-1 - Pervious

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
D	**Open Space (Good Cond.)**	**80**			**0.06**	**4.80**

1 Use only one CN source per line

Totals = **0.06** **4.80**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{4.80}{0.06} =$ 80.00 Use CN = **80**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: Present (Developed)

Proposed Watershed B-1 - Impervious

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
	Impervious	**98**			**1.90**	**186.20**

1 Use only one CN source per line

Totals = **1.90** **186.20**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{186.20}{1.90} =$ 98.00 Use CN = **98**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: Present (Developed) **Proposed Watershed B-2 - Pervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
D	**Open Space (Good Cond.)**	**80**			**0.07**	**5.60**

1 Use only one CN source per line

Totals = **0.07** **5.60**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{5.60}{0.07} =$ 80.00 Use CN = **80**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: Present (Developed)

Proposed Watershed B-2 - Impervious

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
	Impervious	**98**			**0.27**	**26.46**

1 Use only one CN source per line

Totals = **0.27** **26.46**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{26.46}{0.27} =$ 98.00 Use CN = **98**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: Present (Developed) **Proposed Watershed C - Pervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
D	**Open Space (Good Cond.)**	**80**			**0.03**	**2.40**

1 Use only one CN source per line

Totals = **0.03** **2.40**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{2.40}{0.03} =$ 80.00 Use CN = **80**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: Present (Developed) **Proposed Watershed C - Impervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
	Impervious	**98**			**0.10**	**9.80**

1 Use only one CN source per line

Totals = **0.10** **9.80**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{9.80}{0.10} =$ 98.00 Use CN = **98**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: Present (Developed) **Proposed Watershed D - Pervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
D	**Open Space (Good Cond.)**	**80**			**0.44**	**35.20**

1 Use only one CN source per line

Totals = **0.44** **35.20**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{35.20}{0.44} =$ 80.00 Use CN = **80**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: Present (Developed) **Proposed Watershed D - Impervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
	Impervious	**98**			**0.02**	**1.96**

1 Use only one CN source per line

Totals = **0.02** **1.96**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{1.96}{0.02} =$ 98.00 Use CN = **98**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: Present (Developed) **Proposed Watershed E-1 - Pervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
D	**Open Space (Good Cond.)**	**80**			**0.07**	**5.60**
1 Use only one CN source per line				Totals =	**0.07**	**5.60**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{5.60}{0.07} =$ 80.00 Use CN = **80**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: Present (Developed)

Proposed Watershed E-1 - Impervious

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
	Impervious	**98**			**0.06**	**5.88**

1 Use only one CN source per line

Totals = **0.06** **5.88**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{5.88}{0.06} =$ 98.00 Use CN = **98**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: Present (Developed) **Proposed Watershed E-2 - Pervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
D	**Open Space (Good Cond.)**	**80**			**0.18**	**14.40**

1 Use only one CN source per line

Totals = **0.18** **14.40**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{14.40}{0.18} =$ 80.00 Use CN = **80**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: Present (Developed)

Proposed Watershed E-2 - Impervious

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
	Impervious	**98**			**0.12**	**11.76**

1 Use only one CN source per line

Totals = **0.12** **11.76**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{11.76}{0.12} =$ 98.00 Use CN = **98**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: Present (Developed) **Proposed Watershed F - Pervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
D	**Open Space (Good Cond.)**	**80**			**0.09**	**7.20**

1 Use only one CN source per line

Totals = **0.09** **7.20**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{7.20}{0.09} =$ 80.00 Use CN = **80**

Project **New University Center - Seton Hall University** By **BMW** Date **12/17/2020**

Location **South Orange, New Jersey (100300401)** Checked **JD** Date **12/17/2020**

Circle one: Present (Developed) **Proposed Watershed F - Impervious**

1. Runoff Curve Number (CN)

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Fig. 2-3	CN [1] Fig. 2-4	Area [x] acres [ ] mi^2 [ ] %	Product of CN x area
	Impervious	**98**			**0.18**	**17.64**

1 Use only one CN source per line

Totals = **0.18** **17.64**

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{17.64}{0.18} =$ 98.00 Use CN = **98**

Project	**New University Center - Seton Hall**	By	**DJA**	Date	**12/30/2016**
Location	**South Orange, New Jersey (100300401)**	Checked	**JF**	Date	**12/30/2016**

Circle One: Present (Developed)

Circle One: (T_c) T_t through subarea **Proposed Watershed A**

Sheet flow (Applicable to T_c Only)	Segment ID	A1-A2			
1. Surface description (table 3-1)		Grass			
2. Manning's roughness coeff., n (table 3-1)		**0.150**			
3. Flow Length, L (total L $\leq$ 150 ft)	ft	**150**			
4. Two-yr 24-hr rainfall, P_2	in	**3.44**			
5. Land slope, s	ft/ft	**0.036**			
6. $T_t = \frac{0.007(nL)^{0.8}}{P_2^{0.5} s^{0.4}}$	Compute T_t hr	**0.172**			**0.172**

Shallow concentrated flow	Segment ID	A2-A3		A3-A4			
7. Surface description (paved or unpaved)		Unpaved		Paved			
8. Flow length, L	ft	**169**		**70**			
9. Watercourse slope, s	ft/ft	**0.05**		**0.024**			
10. Average velocity, V (figure 3-1)	ft/s	**3.6**		**3.2**			
11. $T_t = \frac{L}{3600\ V}$	Compute T_t hr	**0.013**	+	**0.006**			**0.019**

Channel flow	Segment ID	A4-A5		A5-A6				
12. Cross sectional flow area, a	ft^2	**1.23**		**1.77**				
13. Wetted perimeter, p_w	ft	**3.93**		**4.71**				
14. Hydraulic radius, r $r = \frac{a}{p_w}$	Compute r ft	**0.31**		**0.38**				
15. Channel slope, s	ft/ft	**0.015**		**0.01**				
16. Manning's roughness coeff., n		**0.013**		**0.013**				
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$	Compute V ft/s	**6.47**		**5.97**				
18. Flow length, L	ft	**15**		**66**				
19. $T_t = \frac{L}{3600\ V}$	Compute T_t hr	**0.001**	+	**0.003**	+		=	**0.004**

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)	**0.195**	HR
	12	MIN
USE MINIMUM TC OF	**12**	MIN

Project	**New University Center - Seton Hall**	By	**DJA**	Date	**12/30/2016**
Location	**South Orange, New Jersey (100300401)**	Checked	**JF**	Date	**12/30/2016**

Circle One: Present (Developed)

Circle One: (T_c) T_t through subarea **Proposed Watershed D**

Sheet flow (Applicable to T_c Only)		Segment ID	D1-D2			
1. Surface description (table 3-1)			Grass			
2. Manning's roughness coeff., n (table 3-1)			**0.150**			
3. Flow Length, L (total L $\leq$ 150 ft)		ft	**150**			
4. Two-yr 24-hr rainfall, P_2		in	**3.44**			
5. Land slope, s		ft/ft	**0.100**			
6. $T_t = \frac{0.007(nL)^{0.8}}{P_2^{0.5} s^{0.4}}$	Compute T_t	hr	**0.114**			**0.114**

Shallow concentrated flow		Segment ID	D2-D3			
7. Surface description (paved or unpaved)			Paved			
8. Flow length, L		ft	**326**			
9. Watercourse slope, s		ft/ft	**0.013**			
10. Average velocity, V (figure 3-1)		ft/s	**2.3**			
11. $T_t = \frac{L}{3600\ V}$	Compute T_t	hr	**0.039**	+		**0.039**

Channel flow		Segment ID	D3-D4	D4-D5				
12. Cross sectional flow area, a		ft^2	**1.23**	**1.77**				
13. Wetted perimeter, p_w		ft	**3.93**	**4.71**				
14. Hydraulic radius, r	$r = \frac{a}{p_w}$ Compute r	ft	**0.31**	**0.38**				
15. Channel slope, s		ft/ft	**0.015**	**0.01**				
16. Manning's roughness coeff., n			**0.013**	**0.013**				
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$	Compute V	ft/s	**6.47**	**5.97**				
18. Flow length, L		ft	**15**	**66**				
19. $T_t = \frac{L}{3600\ V}$	Compute T_t	hr	**0.001**	+ **0.003**	+	+	=	**0.004**

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, 19)	**0.158**	HR
	9	MIN
USE MINIMUM TC OF	**9**	MIN

PROPOSED RUNOFF HYDROGRAPHS

2-YEAR STORM CALCULATIONS

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100300401 - PROPOSED.gpw

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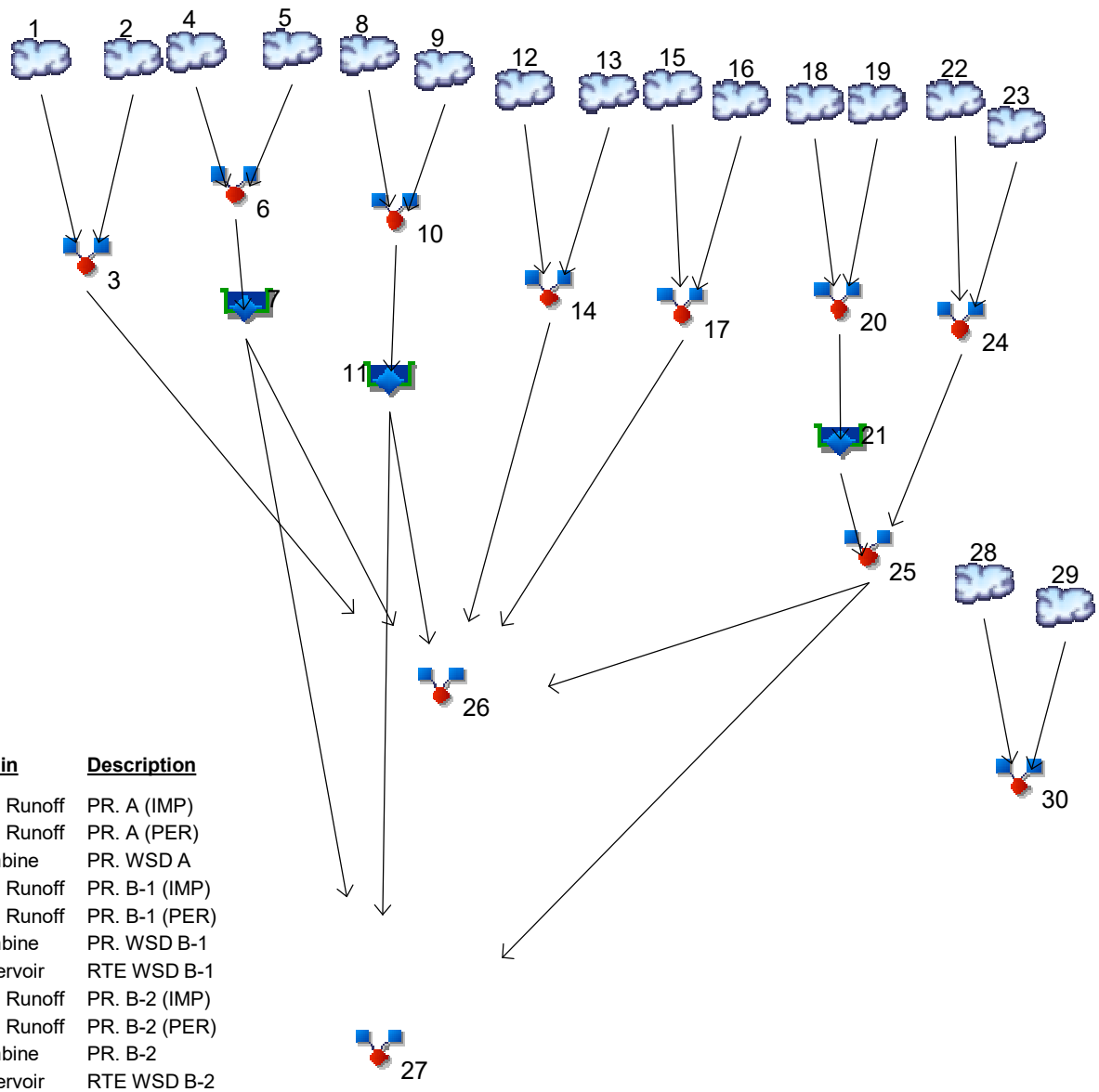
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Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	PR. A (IMP)
2	SCS Runoff	PR. A (PER)
3	Combine	PR. WSD A
4	SCS Runoff	PR. B-1 (IMP)
5	SCS Runoff	PR. B-1 (PER)
6	Combine	PR. WSD B-1
7	Reservoir	RTE WSD B-1
8	SCS Runoff	PR. B-2 (IMP)
9	SCS Runoff	PR. B-2 (PER)
10	Combine	PR. B-2
11	Reservoir	RTE WSD B-2
12	SCS Runoff	PR. C (IMP)
13	SCS Runoff	PR. C (PER)
14	Combine	PR. WSD C
15	SCS Runoff	PR.D (IMP)
16	SCS Runoff	PR. D (PER)
17	Combine	PR. WSD D
18	SCS Runoff	PR. E-1 (IMP)
19	SCS Runoff	PR. E-1 (PER)
20	Combine	PR. WSD E-1
21	Reservoir	RTE WSD E-1
22	SCS Runoff	PR. E-2 (IMP)
23	SCS Runoff	PR. E-2 (PER)
24	Combine	PR. WSD E-2
25	Combine	PR. WSD E
26	Combine	AP-1
27	Combine	RTE WSD B1+B2+E
28	SCS Runoff	PR. F (IMP)
29	SCS Runoff	PR. F (PER)
30	Combine	AP-2

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)							Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	-------	0.245	-------	-------	0.374	0.462	-------	0.622	PR. A (IMP)
2	SCS Runoff	------	-------	1.469	-------	-------	2.873	3.871	-------	5.705	PR. A (PER)
3	Combine	1, 2	-------	1.714	-------	-------	3.246	4.332	-------	6.326	PR. WSD A
4	SCS Runoff	------	-------	6.574	-------	-------	10.04	12.41	-------	16.72	PR. B-1 (IMP)
5	SCS Runoff	------	-------	0.115	-------	-------	0.224	0.302	-------	0.445	PR. B-1 (PER)
6	Combine	4, 5	-------	6.688	-------	-------	10.27	12.71	-------	17.16	PR. WSD B-1
7	Reservoir	6	-------	5.450	-------	-------	8.580	10.60	-------	14.34	RTE WSD B-1
8	SCS Runoff	------	-------	0.934	-------	-------	1.427	1.764	-------	2.376	PR. B-2 (IMP)
9	SCS Runoff	------	-------	0.135	-------	-------	0.262	0.352	-------	0.519	PR. B-2 (PER)
10	Combine	8, 9	-------	1.067	-------	-------	1.688	2.116	-------	2.895	PR. B-2
11	Reservoir	10	-------	0.402	-------	-------	1.021	1.336	-------	1.922	RTE WSD B-2
12	SCS Runoff	------	-------	0.346	-------	-------	0.529	0.653	-------	0.880	PR. C (IMP)
13	SCS Runoff	------	-------	0.058	-------	-------	0.112	0.151	-------	0.222	PR. C (PER)
14	Combine	12, 13	-------	0.403	-------	-------	0.640	0.804	-------	1.102	PR. WSD C
15	SCS Runoff	------	-------	0.060	-------	-------	0.092	0.114	-------	0.154	PR.D (IMP)
16	SCS Runoff	------	-------	0.737	-------	-------	1.438	1.936	-------	2.851	PR. D (PER)
17	Combine	15, 16	-------	0.797	-------	-------	1.530	2.050	-------	3.004	PR. WSD D
18	SCS Runoff	------	-------	0.208	-------	-------	0.317	0.392	-------	0.528	PR. E-1 (IMP)
19	SCS Runoff	------	-------	0.135	-------	-------	0.262	0.352	-------	0.519	PR. E-1 (PER)
20	Combine	18, 19	-------	0.341	-------	-------	0.578	0.744	-------	1.047	PR. WSD E-1
21	Reservoir	20	-------	0.154	-------	-------	0.332	0.424	-------	0.879	RTE WSD E-1
22	SCS Runoff	------	-------	0.415	-------	-------	0.634	0.784	-------	1.056	PR. E-2 (IMP)
23	SCS Runoff	------	-------	0.346	-------	-------	0.673	0.906	-------	1.334	PR. E-2 (PER)
24	Combine	22, 23	-------	0.758	-------	-------	1.305	1.688	-------	2.390	PR. WSD E-2
25	Combine	21, 24	-------	0.892	-------	-------	1.558	2.041	-------	2.872	PR. WSD E
26	Combine	3, 7, 11, 14, 17, 25	-------	9.424	-------	-------	16.22	20.75	-------	29.14	AP-1
27	Combine	7, 11, 25,	-------	6.622	-------	-------	10.97	13.77	-------	19.00	RTE WSD B1+B2+E
28	SCS Runoff	------	-------	0.623	-------	-------	0.951	1.176	-------	1.584	PR. F (IMP)
29	SCS Runoff	------	-------	0.173	-------	-------	0.337	0.453	-------	0.667	PR. F (PER)
30	Combine	28, 29	-------	0.794	-------	-------	1.287	1.628	-------	2.251	AP-2

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

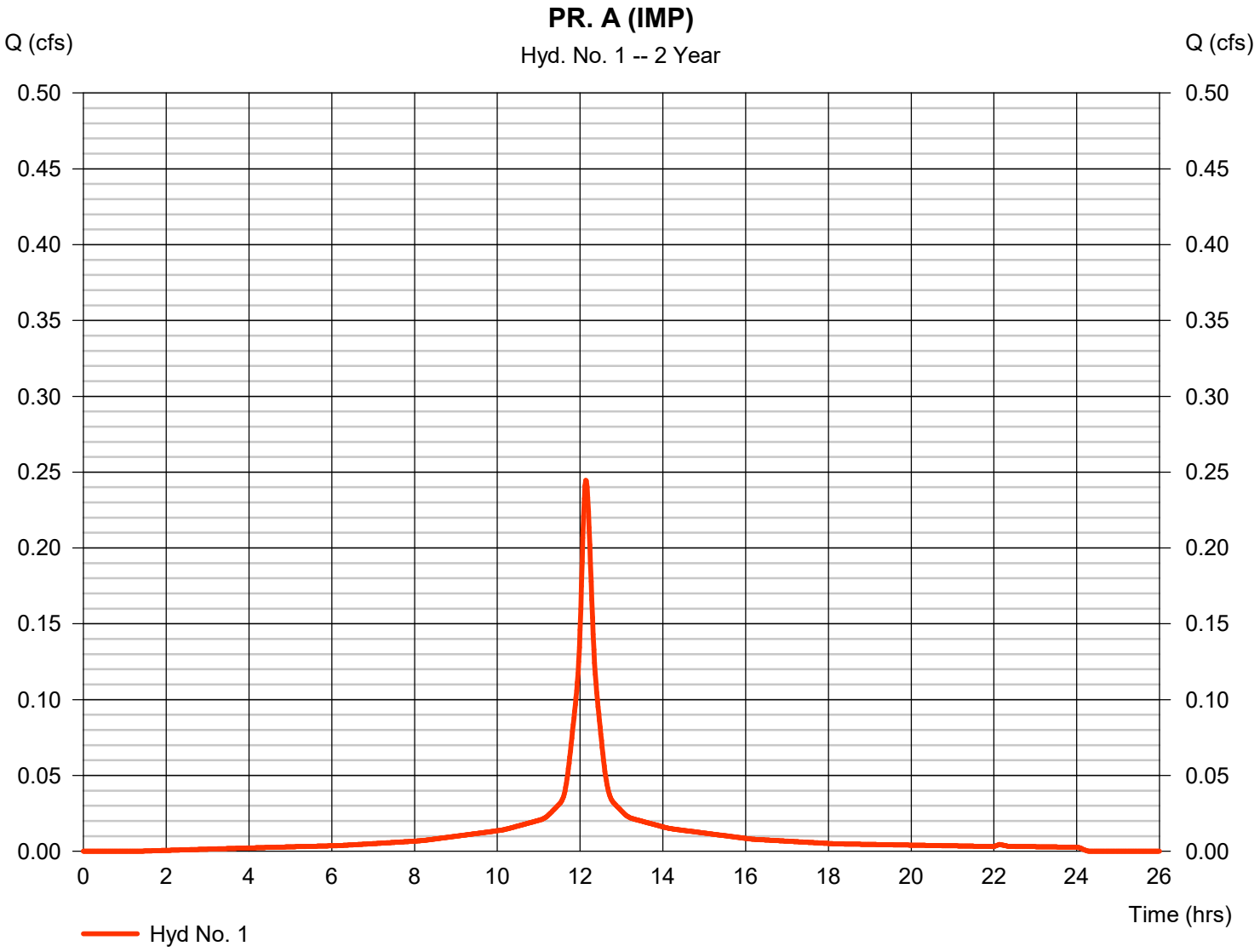
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.245	1	728	1,031	------	------	------	PR. A (IMP)
2	SCS Runoff	1.469	1	729	5,564	------	------	------	PR. A (PER)
3	Combine	1.714	1	729	6,595	1, 2	------	------	PR. WSD A
4	SCS Runoff	6.574	1	724	22,807	------	------	------	PR. B-1 (IMP)
5	SCS Runoff	0.115	1	725	357	------	------	------	PR. B-1 (PER)
6	Combine	6.688	1	724	23,164	4, 5	------	------	PR. WSD B-1
7	Reservoir	5.450	1	728	23,162	6	230.38	1,477	RTE WSD B-1
8	SCS Runoff	0.934	1	724	3,241	------	------	------	PR. B-2 (IMP)
9	SCS Runoff	0.135	1	725	416	------	------	------	PR. B-2 (PER)
10	Combine	1.067	1	724	3,657	8, 9	------	------	PR. B-2
11	Reservoir	0.402	1	738	3,656	10	233.87	660	RTE WSD B-2
12	SCS Runoff	0.346	1	724	1,200	------	------	------	PR. C (IMP)
13	SCS Runoff	0.058	1	725	178	------	------	------	PR. C (PER)
14	Combine	0.403	1	724	1,379	12, 13	------	------	PR. WSD C
15	SCS Runoff	0.060	1	726	233	------	------	------	PR.D (IMP)
16	SCS Runoff	0.737	1	727	2,538	------	------	------	PR. D (PER)
17	Combine	0.797	1	727	2,771	15, 16	------	------	PR. WSD D
18	SCS Runoff	0.208	1	724	720	------	------	------	PR. E-1 (IMP)
19	SCS Runoff	0.135	1	725	416	------	------	------	PR. E-1 (PER)
20	Combine	0.341	1	724	1,137	18, 19	------	------	PR. WSD E-1
21	Reservoir	0.154	1	734	1,135	20	252.10	176	RTE WSD E-1
22	SCS Runoff	0.415	1	724	1,440	------	------	------	PR. E-2 (IMP)
23	SCS Runoff	0.346	1	725	1,071	------	------	------	PR. E-2 (PER)
24	Combine	0.758	1	725	2,511	22, 23	------	------	PR. WSD E-2
25	Combine	0.892	1	725	3,646	21, 24	------	------	PR. WSD E
26	Combine	9.424	1	727	41,208	3, 7, 11, 14, 17, 25	------	------	AP-1
27	Combine	6.622	1	727	30,463	7, 11, 25,	------	------	RTE WSD B1+B2+E
28	SCS Runoff	0.623	1	724	2,161	------	------	------	PR. F (IMP)
29	SCS Runoff	0.173	1	725	535	------	------	------	PR. F (PER)
30	Combine	0.794	1	724	2,696	28, 29	------	------	AP-2

Hydrograph Report

Hyd. No. 1

PR. A (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.245 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.13 hrs
Time interval	=	1 min	Hyd. volume	=	1,031 cuft
Drainage area	=	0.090 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

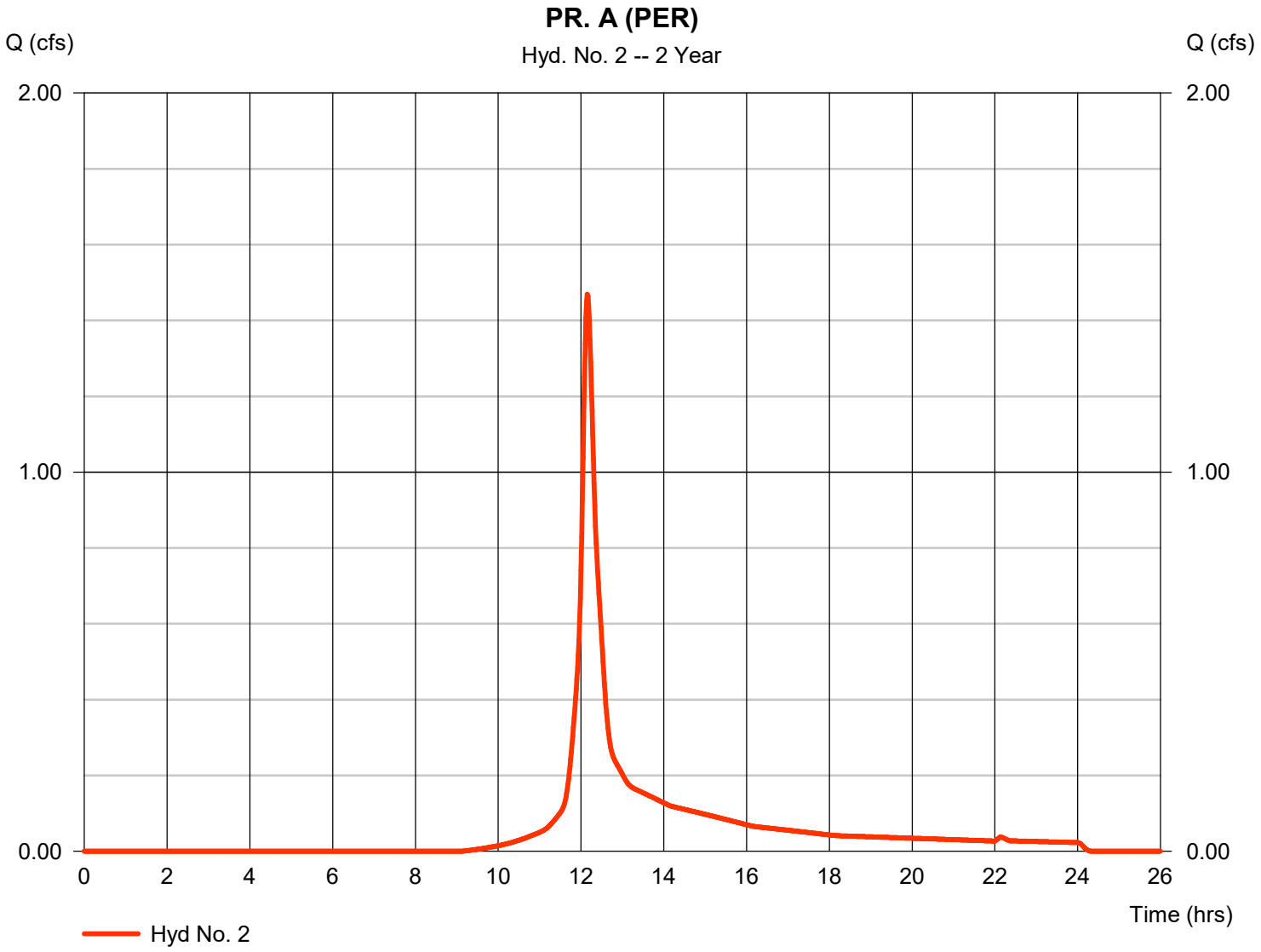


Hydrograph Report

Hyd. No. 2

PR. A (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.469 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.15 hrs
Time interval	=	1 min	Hyd. volume	=	5,564 cuft
Drainage area	=	0.980 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

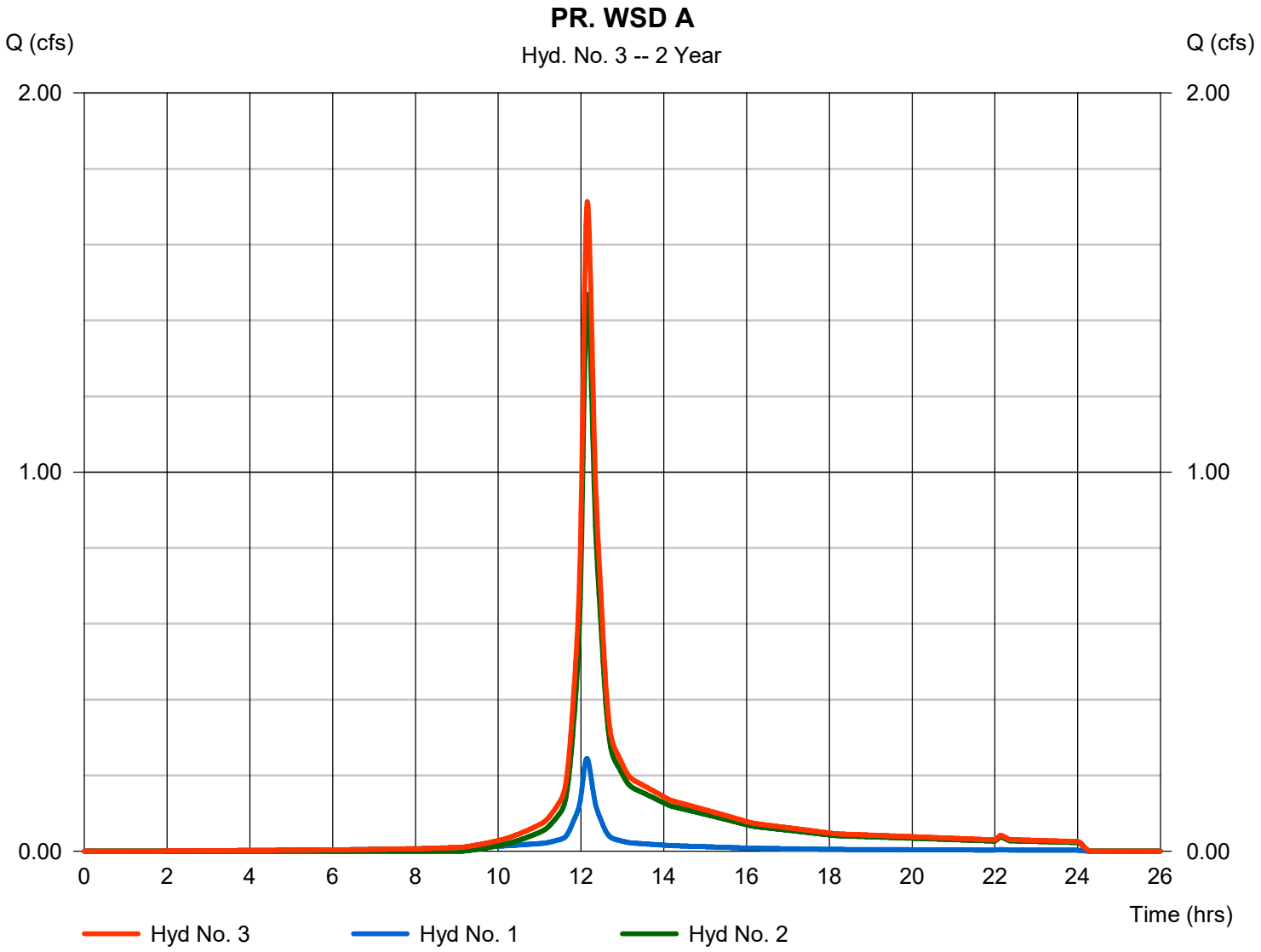


Hydrograph Report

Hyd. No. 3

PR. WSD A

Hydrograph type	=	Combine	Peak discharge	=	1.714 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.15 hrs
Time interval	=	1 min	Hyd. volume	=	6,595 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	1.070 ac

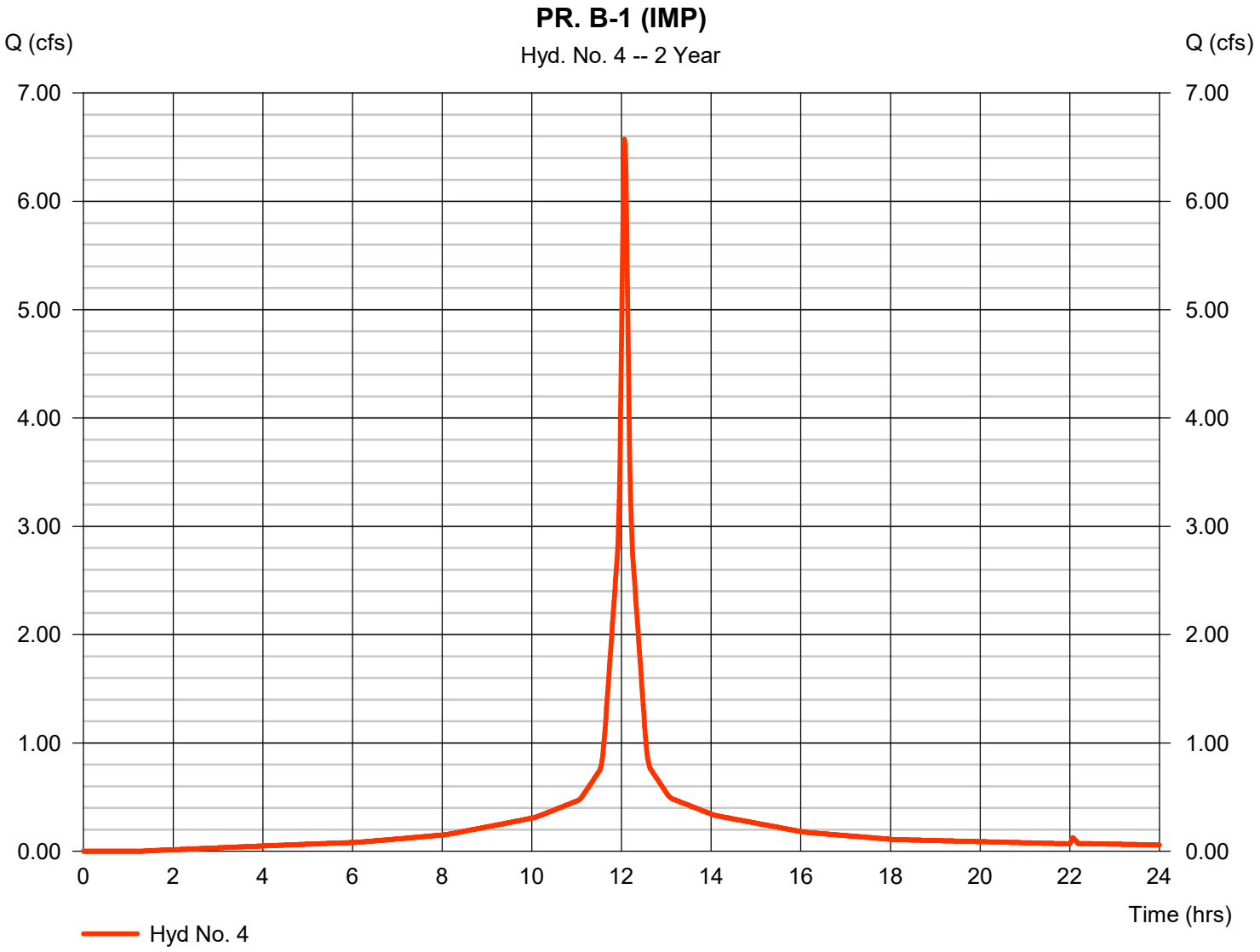


Hydrograph Report

Hyd. No. 4

PR. B-1 (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.574 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	22,807 cuft
Drainage area	=	1.900 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

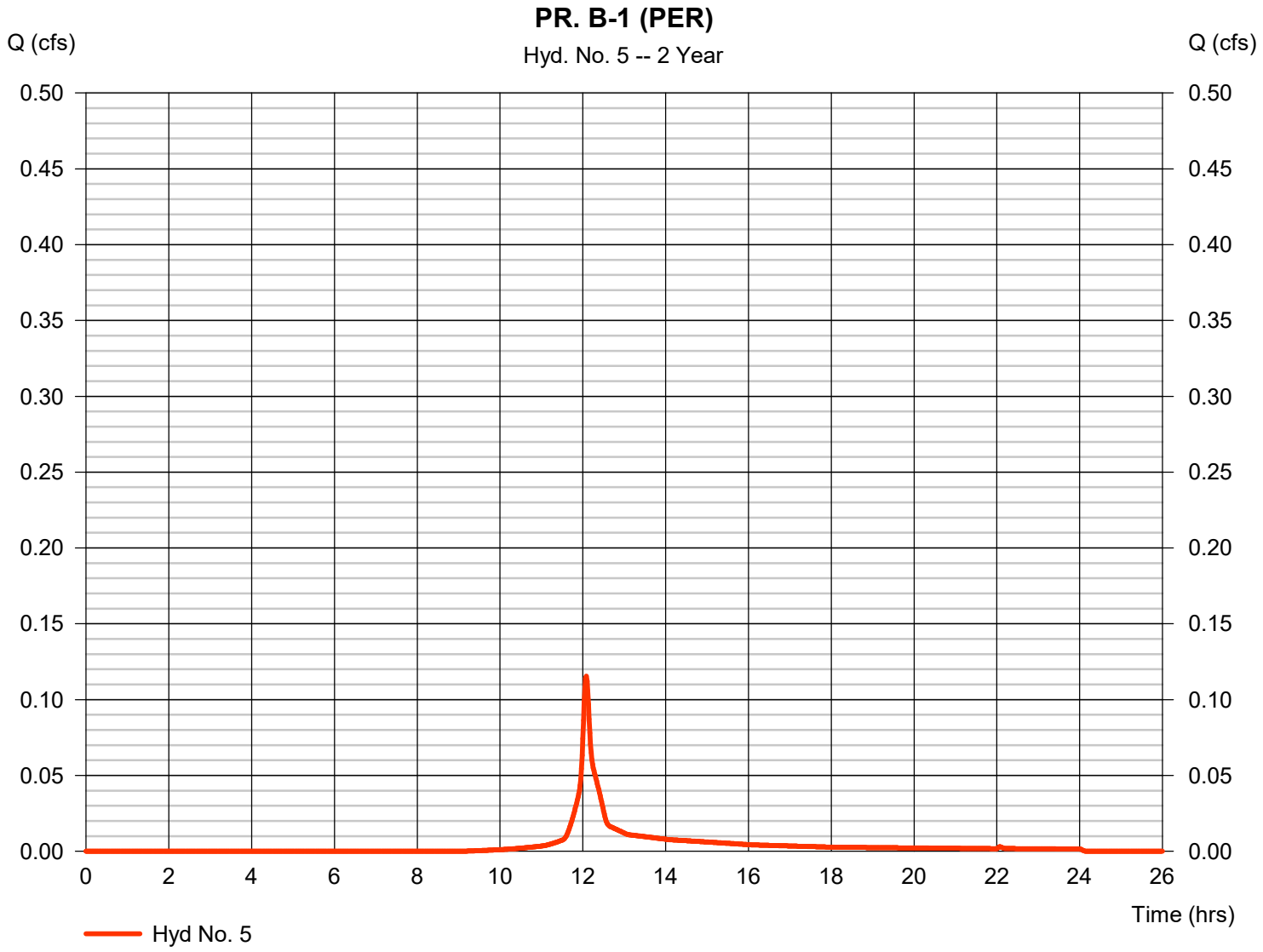


Hydrograph Report

Hyd. No. 5

PR. B-1 (PER)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.115 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.08 hrs
Time interval	= 1 min	Hyd. volume	= 357 cuft
Drainage area	= 0.060 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.44 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

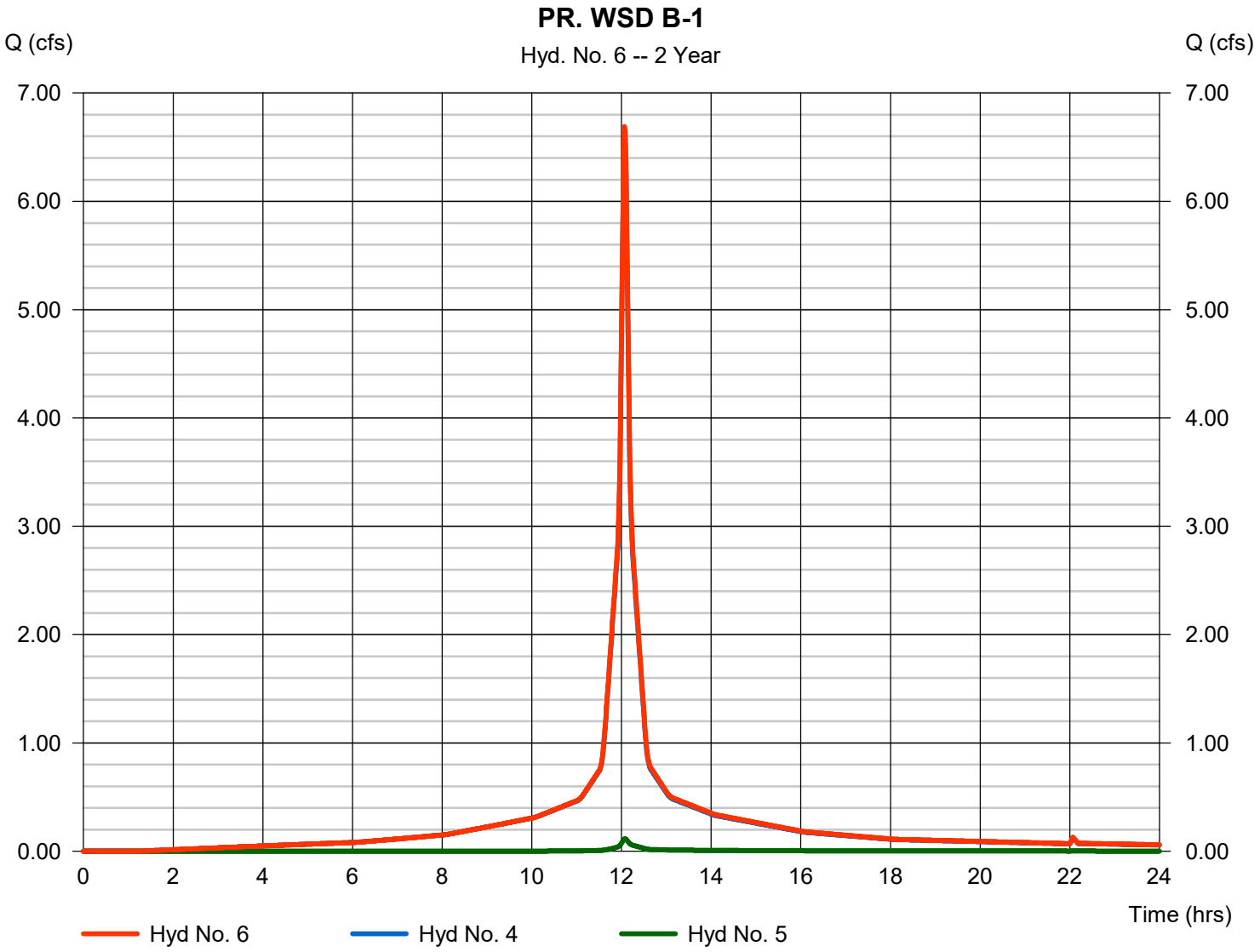


Hydrograph Report

Hyd. No. 6

PR. WSD B-1

Hydrograph type	= Combine	Peak discharge	= 6.688 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.07 hrs
Time interval	= 1 min	Hyd. volume	= 23,164 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 1.960 ac



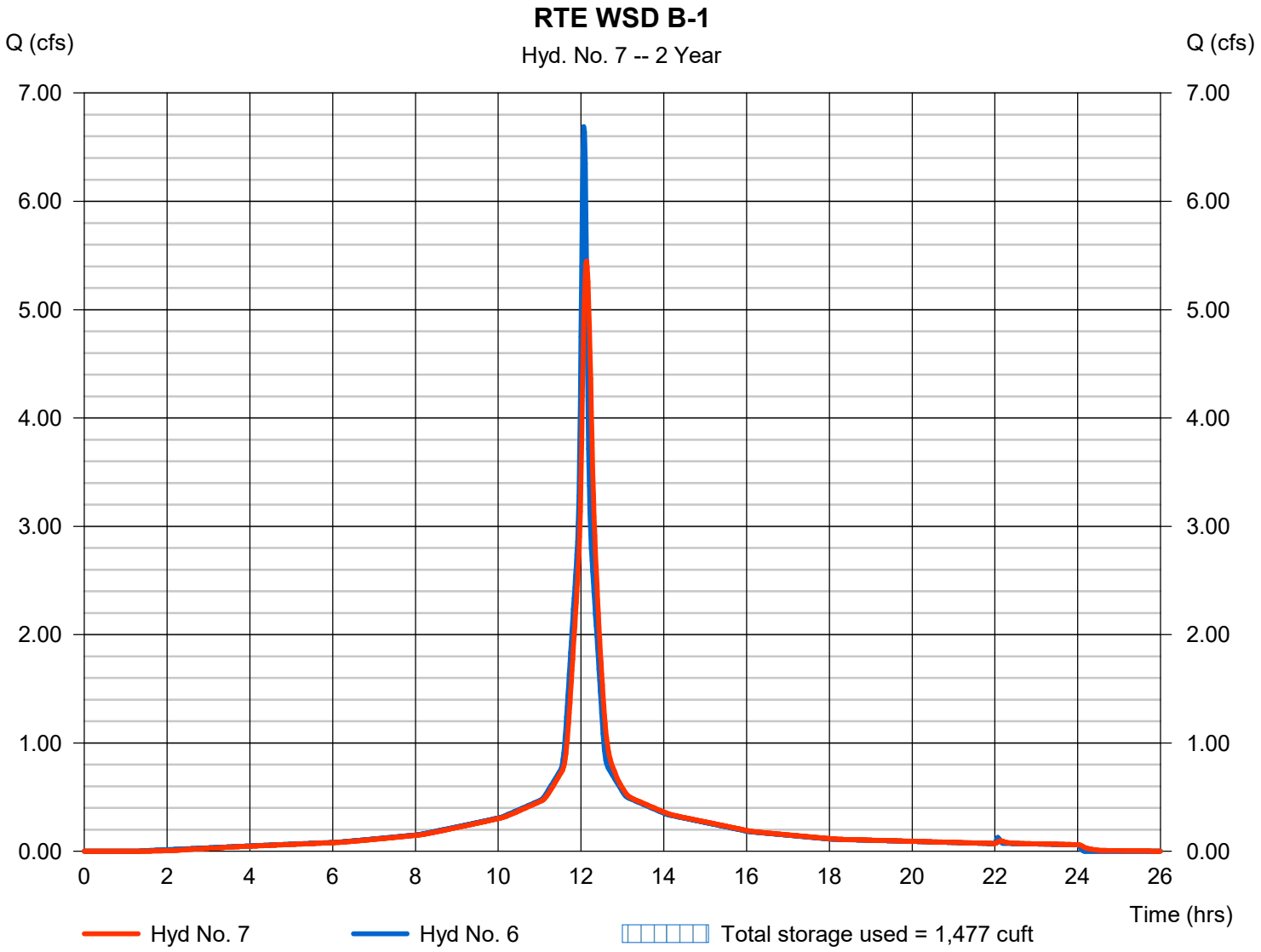
Hydrograph Report

Hyd. No. 7

RTE WSD B-1

Hydrograph type	=	Reservoir	Peak discharge	=	5.450 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.13 hrs
Time interval	=	1 min	Hyd. volume	=	23,162 cuft
Inflow hyd. No.	=	6 - PR. WSD B-1	Max. Elevation	=	230.38 ft
Reservoir name	=	BASIN-1	Max. Storage	=	1,477 cuft

Storage Indication method used.

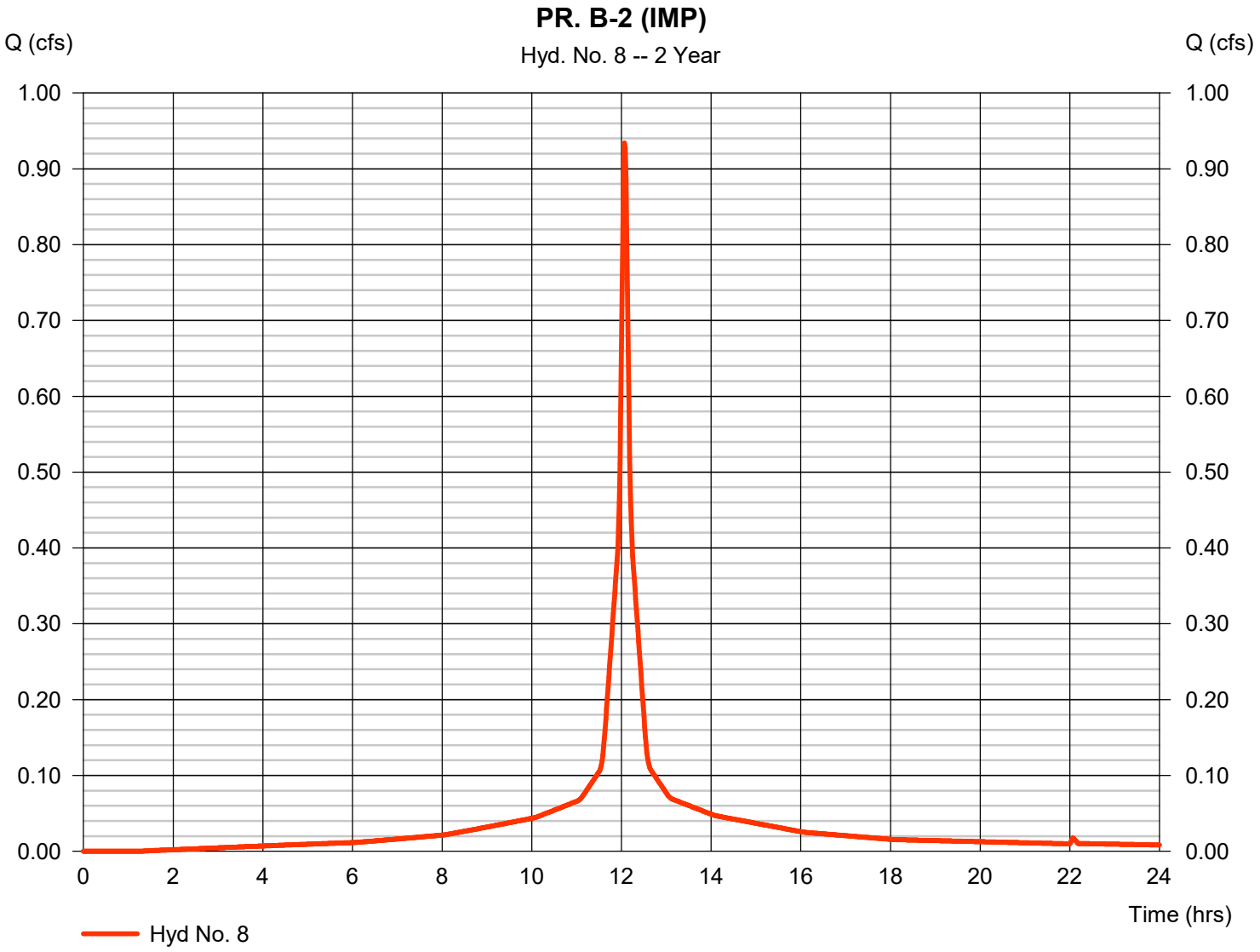


Hydrograph Report

Hyd. No. 8

PR. B-2 (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.934 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	3,241 cuft
Drainage area	=	0.270 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

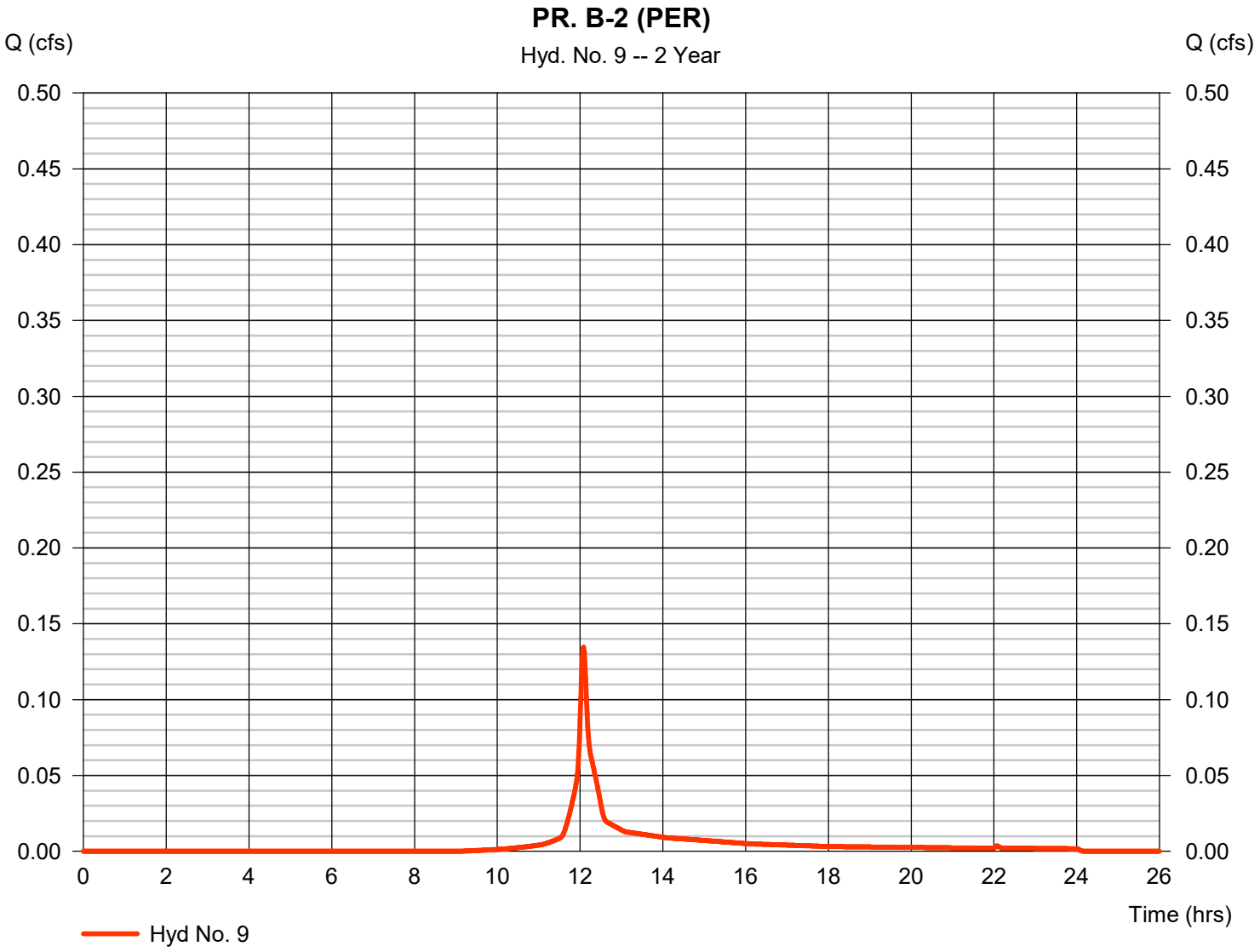


Hydrograph Report

Hyd. No. 9

PR. B-2 (PER)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.135 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.08 hrs
Time interval	= 1 min	Hyd. volume	= 416 cuft
Drainage area	= 0.070 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.44 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

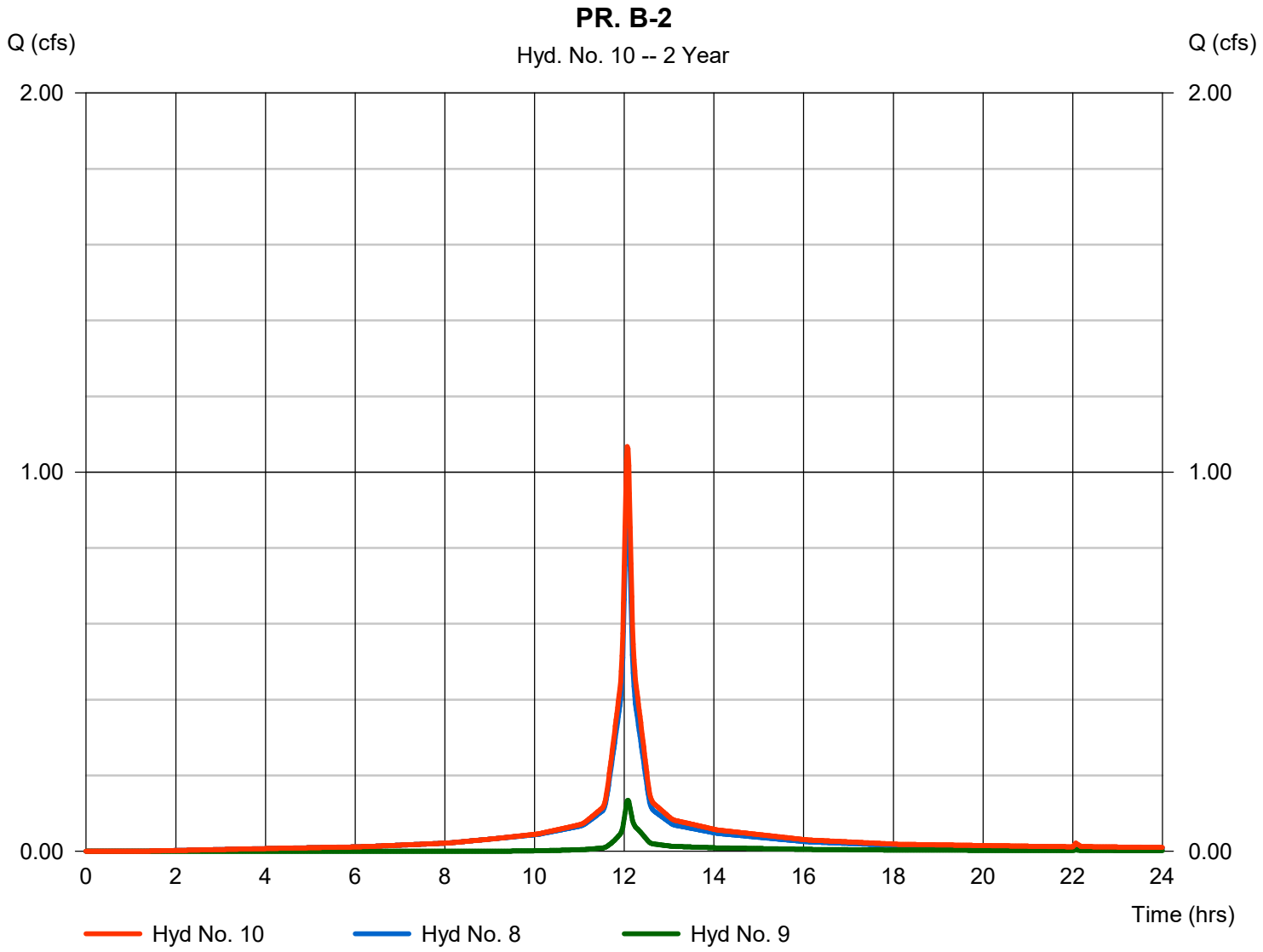


Hydrograph Report

Hyd. No. 10

PR. B-2

Hydrograph type	=	Combine	Peak discharge	=	1.067 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	3,657 cuft
Inflow hyds.	=	8, 9	Contrib. drain. area	=	0.340 ac



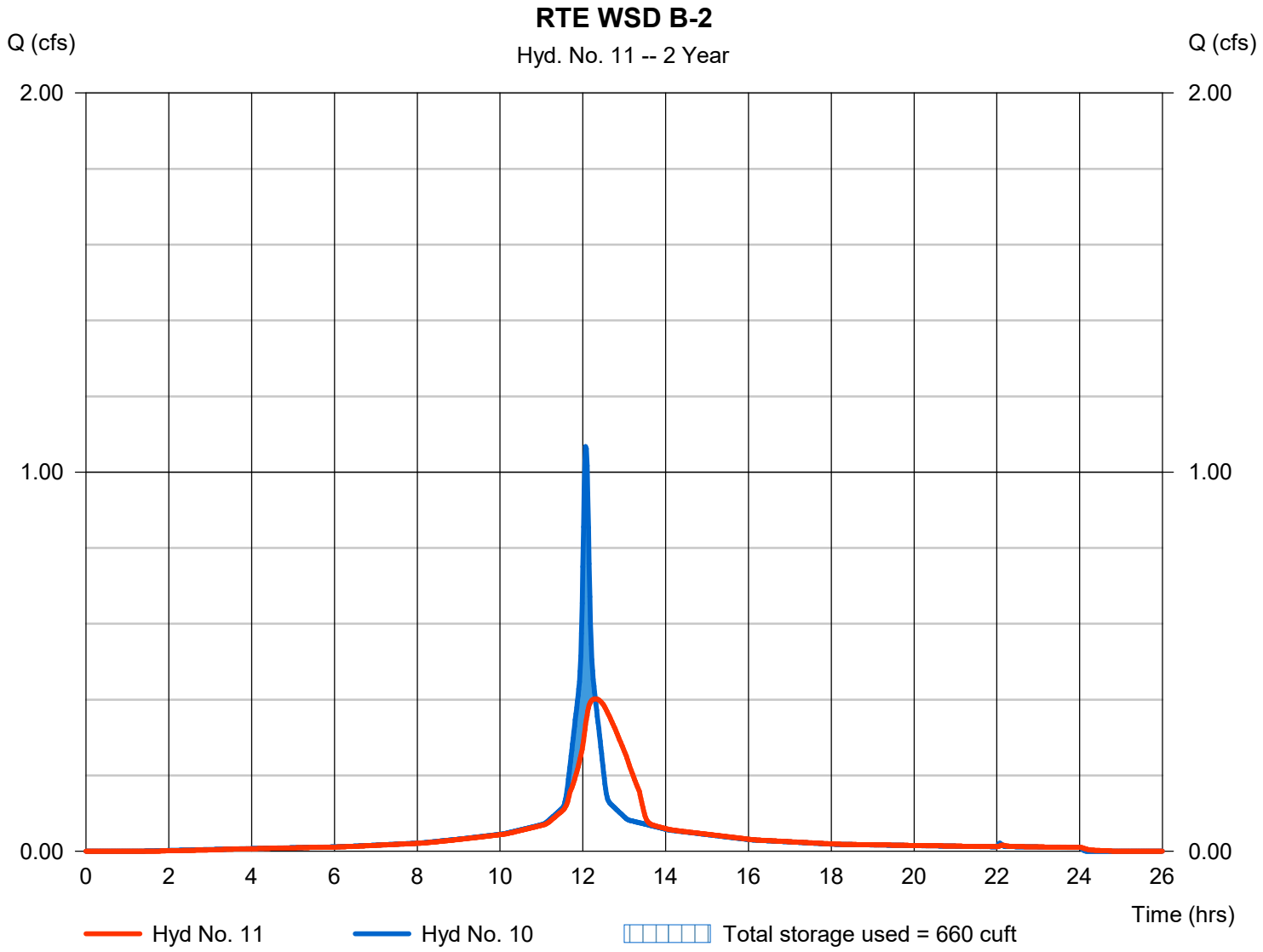
Hydrograph Report

Hyd. No. 11

RTE WSD B-2

Hydrograph type	=	Reservoir	Peak discharge	=	0.402 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.30 hrs
Time interval	=	1 min	Hyd. volume	=	3,656 cuft
Inflow hyd. No.	=	10 - PR. B-2	Max. Elevation	=	233.87 ft
Reservoir name	=	BASIN-2	Max. Storage	=	660 cuft

Storage Indication method used.

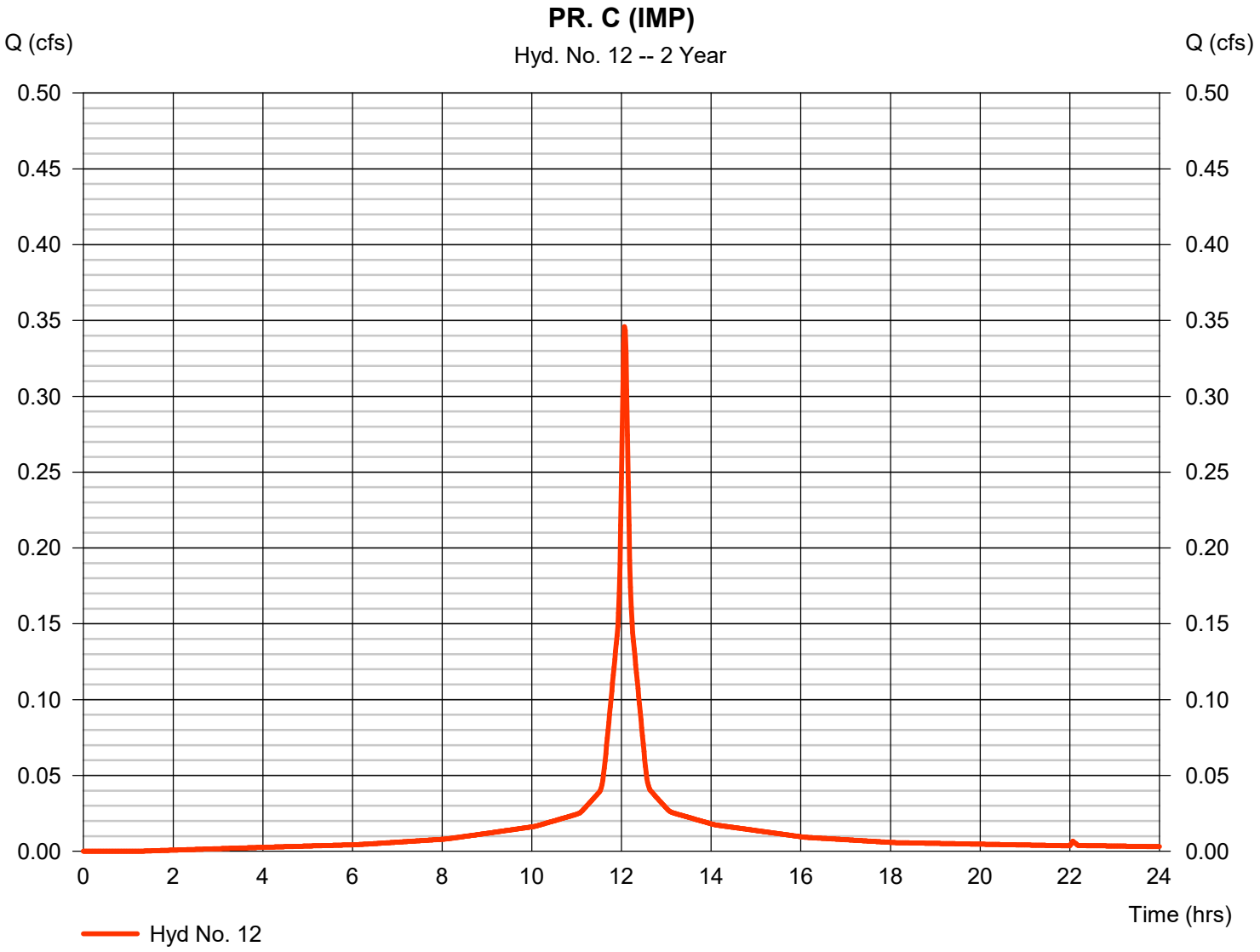


Hydrograph Report

Hyd. No. 12

PR. C (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.346 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	1,200 cuft
Drainage area	=	0.100 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

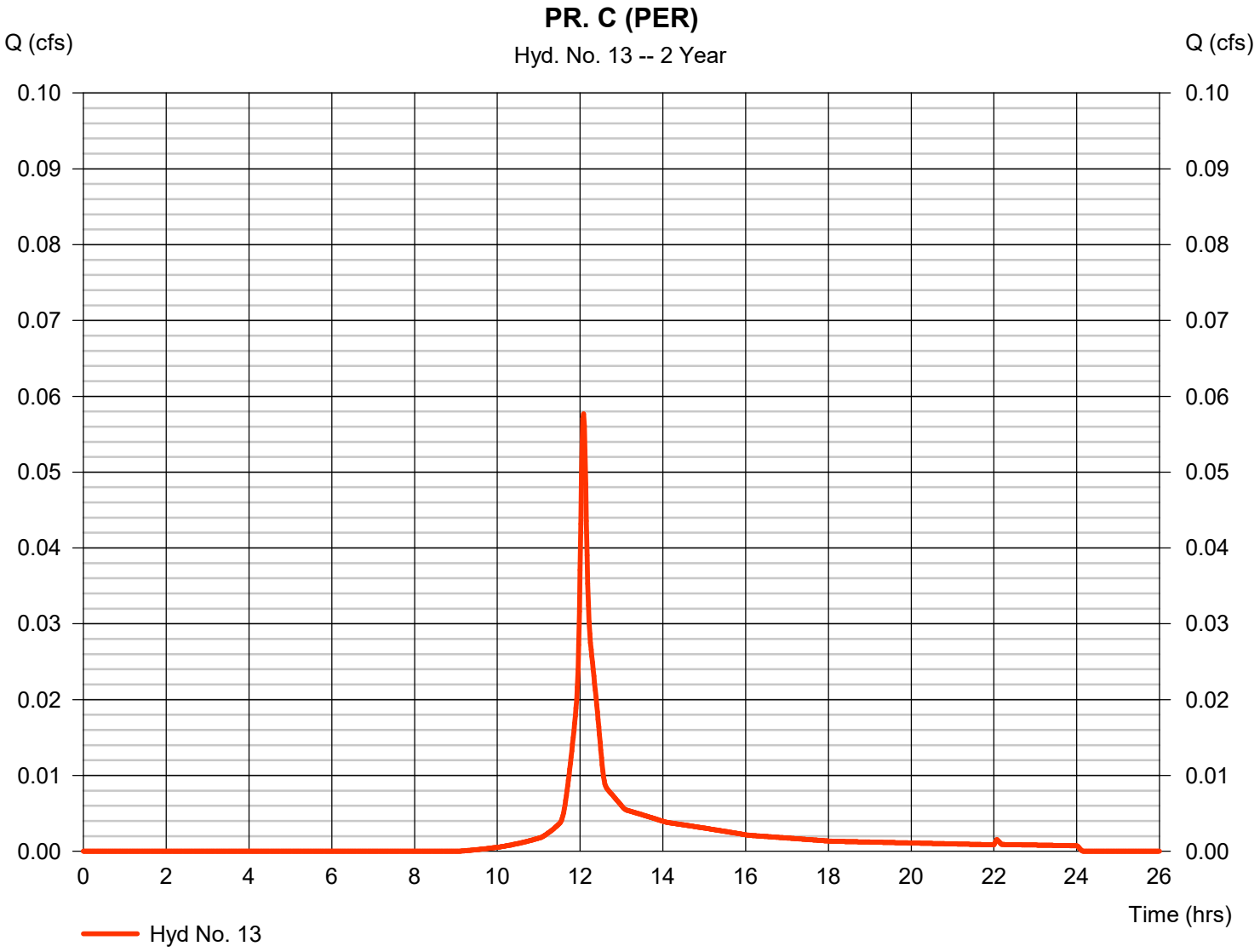


Hydrograph Report

Hyd. No. 13

PR. C (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.058 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.08 hrs
Time interval	=	1 min	Hyd. volume	=	178 cuft
Drainage area	=	0.030 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

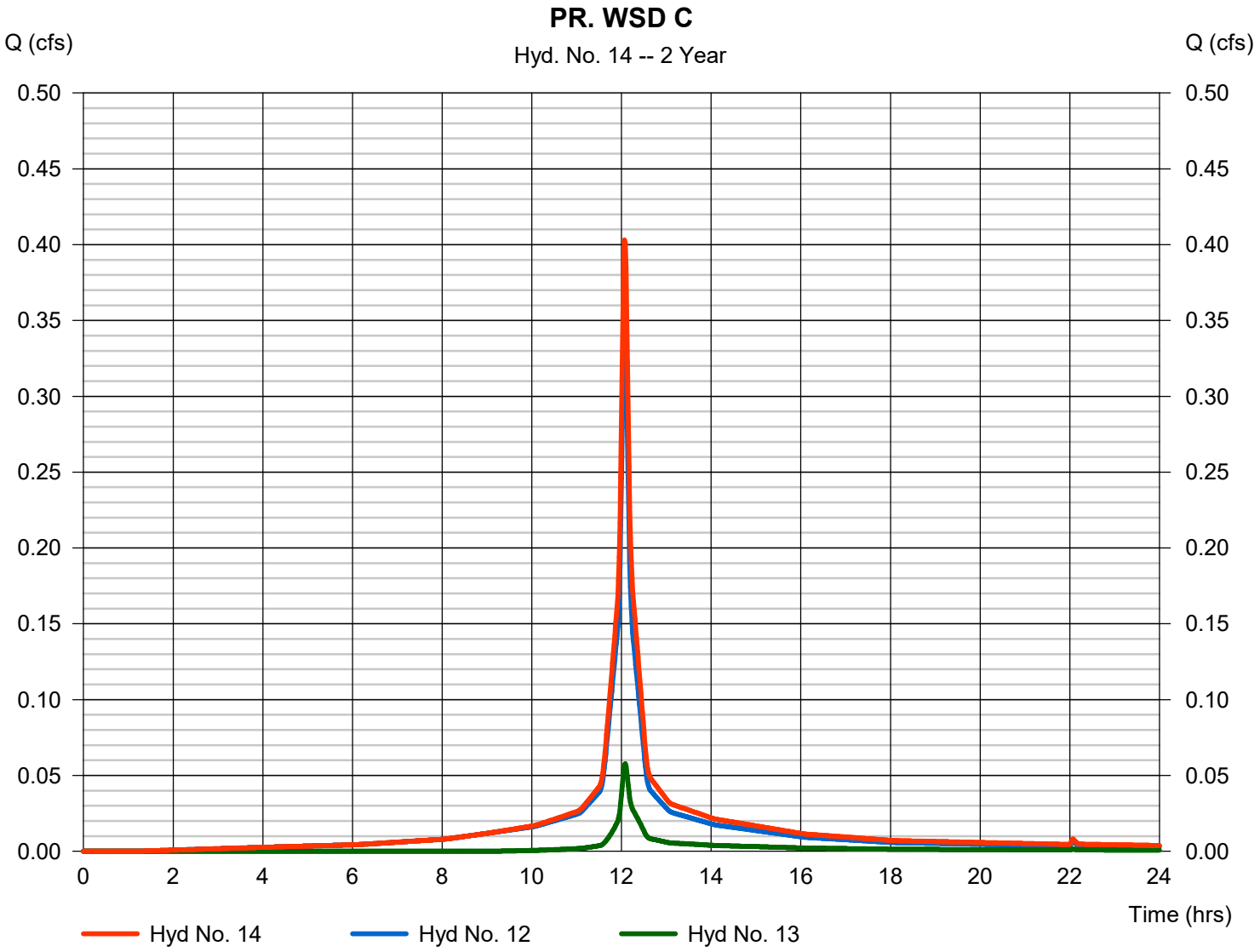


Hydrograph Report

Hyd. No. 14

PR. WSD C

Hydrograph type	=	Combine	Peak discharge	=	0.403 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	1,379 cuft
Inflow hyds.	=	12, 13	Contrib. drain. area	=	0.130 ac

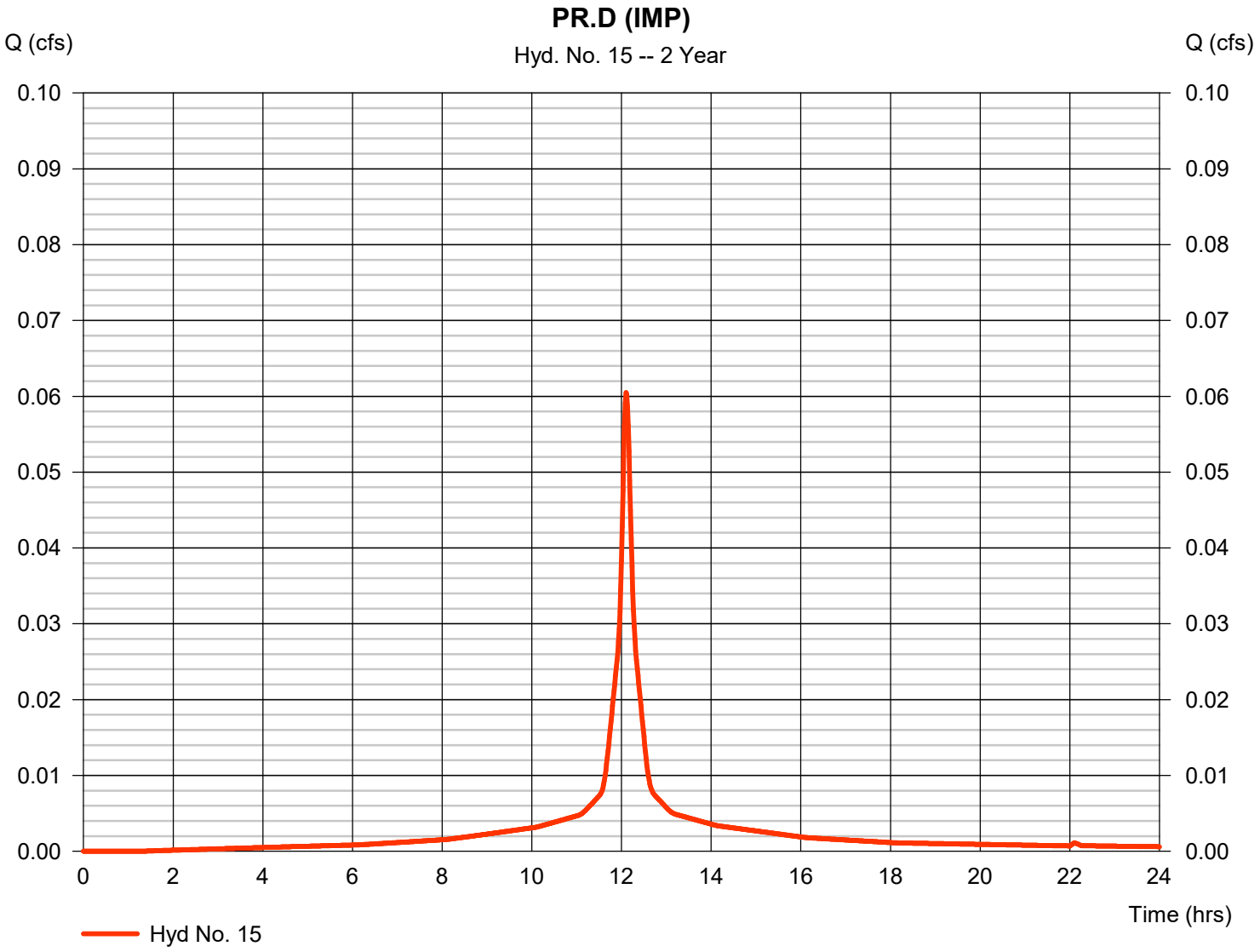


Hydrograph Report

Hyd. No. 15

PR.D (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.060 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.10 hrs
Time interval	=	1 min	Hyd. volume	=	233 cuft
Drainage area	=	0.020 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

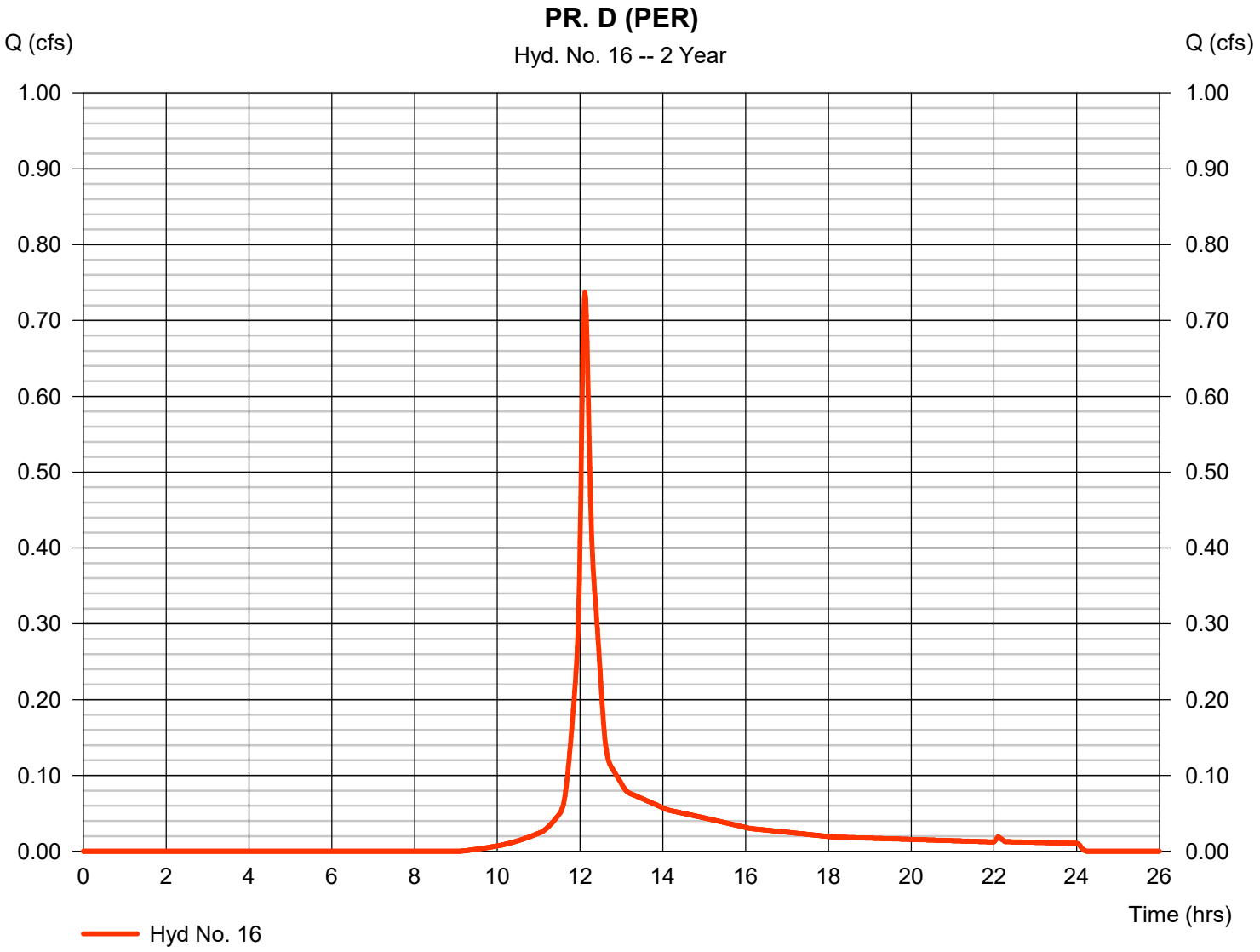


Hydrograph Report

Hyd. No. 16

PR. D (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.737 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.12 hrs
Time interval	=	1 min	Hyd. volume	=	2,538 cuft
Drainage area	=	0.440 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

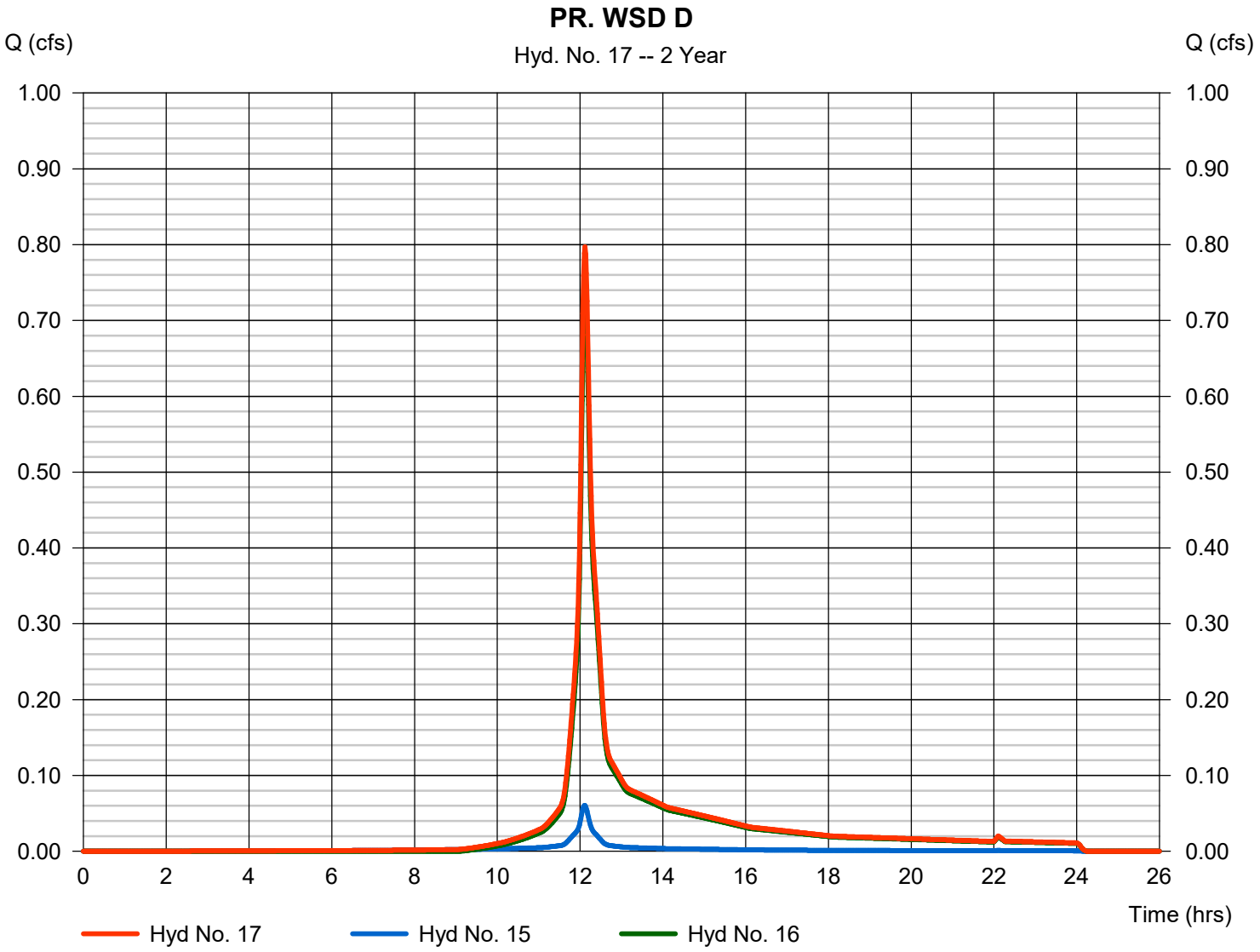


Hydrograph Report

Hyd. No. 17

PR. WSD D

Hydrograph type	=	Combine	Peak discharge	=	0.797 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.12 hrs
Time interval	=	1 min	Hyd. volume	=	2,771 cuft
Inflow hyds.	=	15, 16	Contrib. drain. area	=	0.460 ac

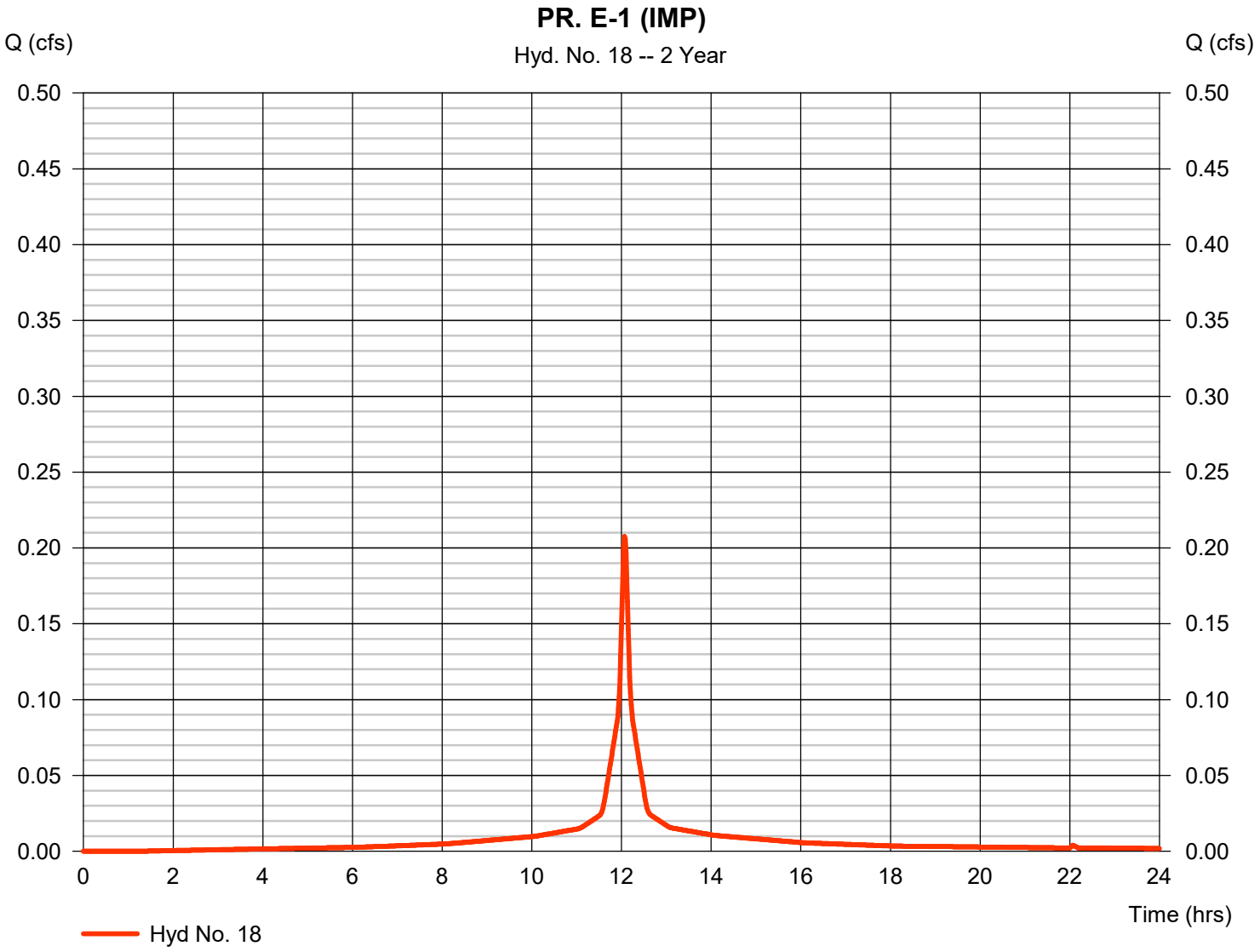


Hydrograph Report

Hyd. No. 18

PR. E-1 (IMP)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.208 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.07 hrs
Time interval	= 1 min	Hyd. volume	= 720 cuft
Drainage area	= 0.060 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.44 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

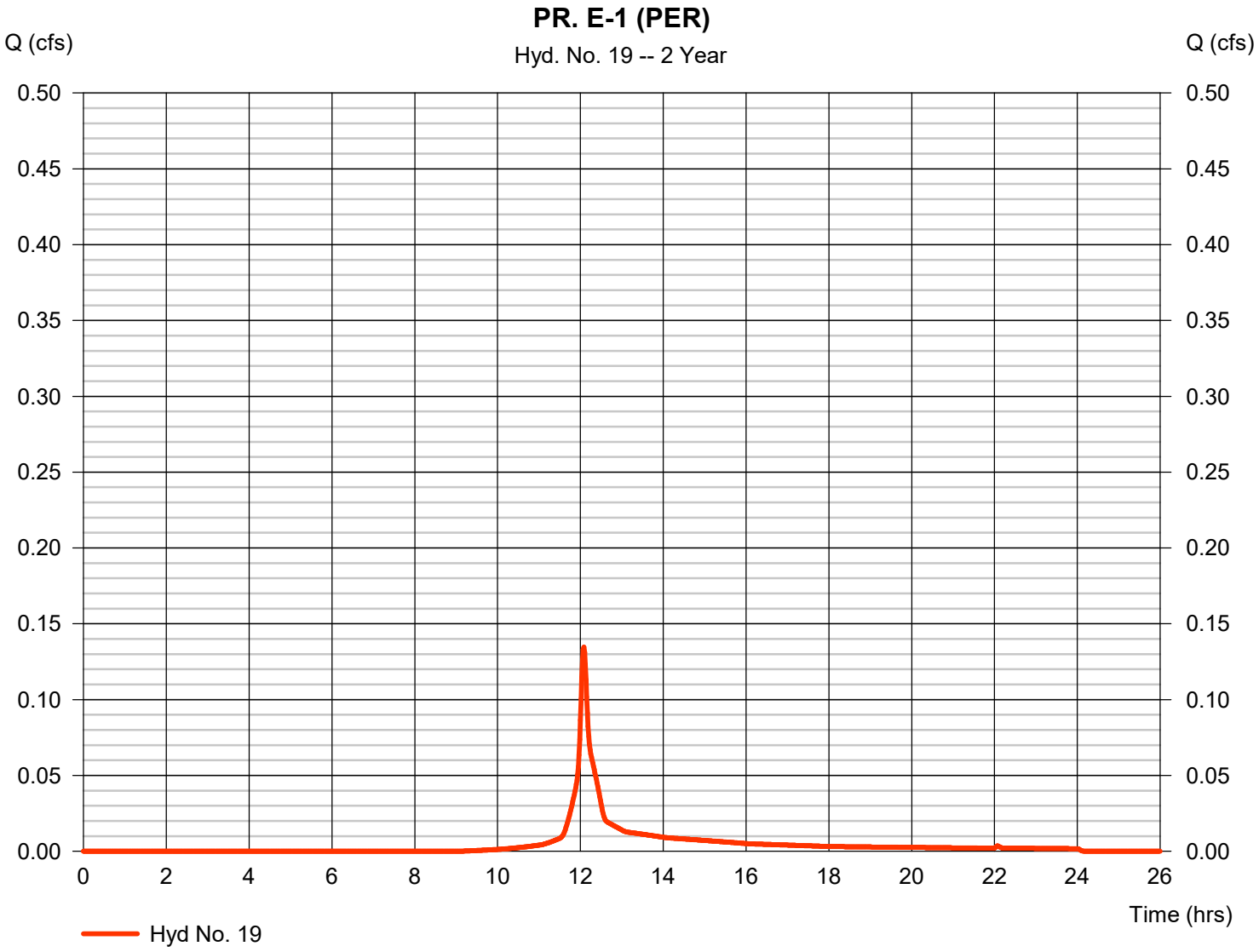


Hydrograph Report

Hyd. No. 19

PR. E-1 (PER)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.135 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.08 hrs
Time interval	= 1 min	Hyd. volume	= 416 cuft
Drainage area	= 0.070 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.44 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

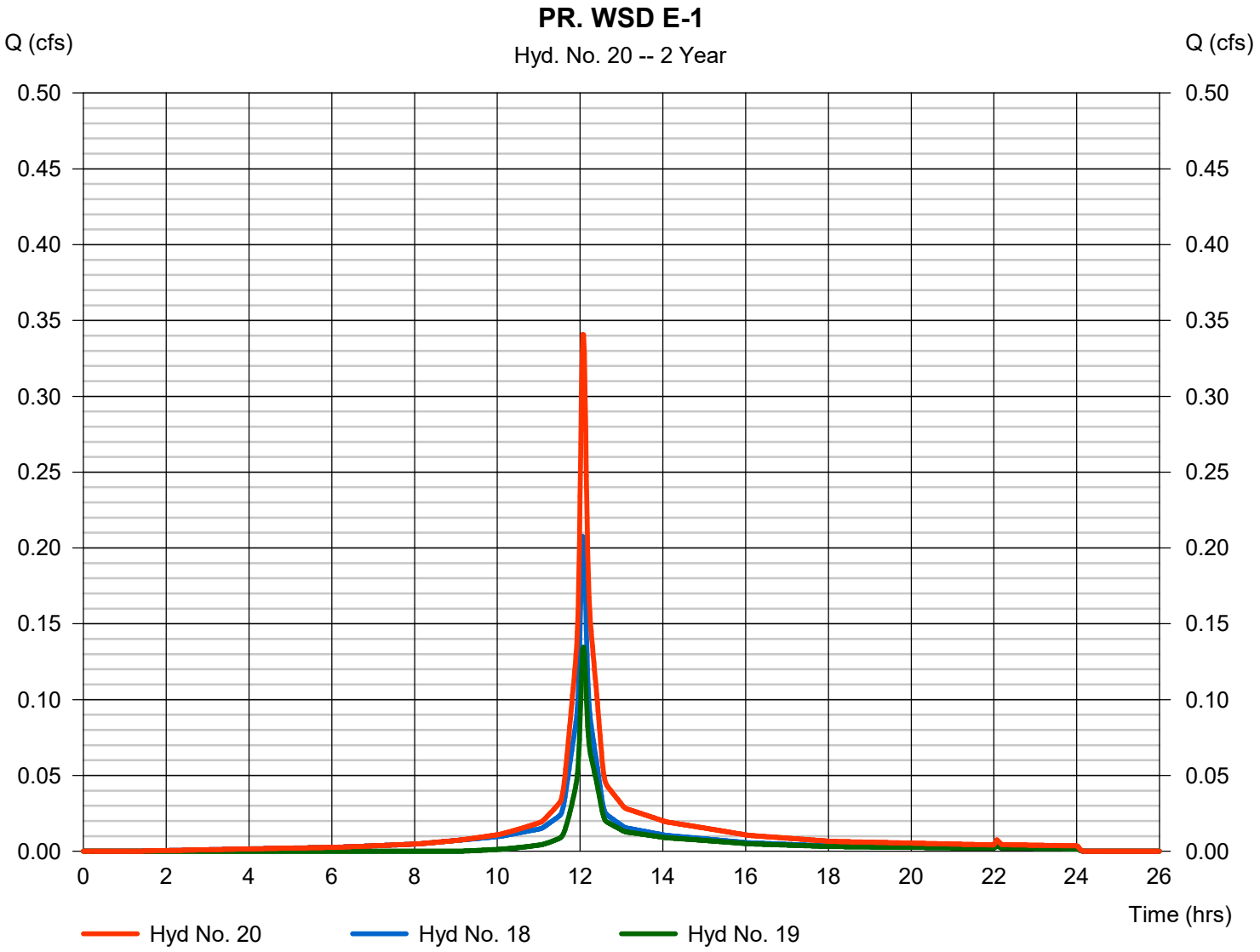


Hydrograph Report

Hyd. No. 20

PR. WSD E-1

Hydrograph type	= Combine	Peak discharge	= 0.341 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.07 hrs
Time interval	= 1 min	Hyd. volume	= 1,137 cuft
Inflow hyds.	= 18, 19	Contrib. drain. area	= 0.130 ac



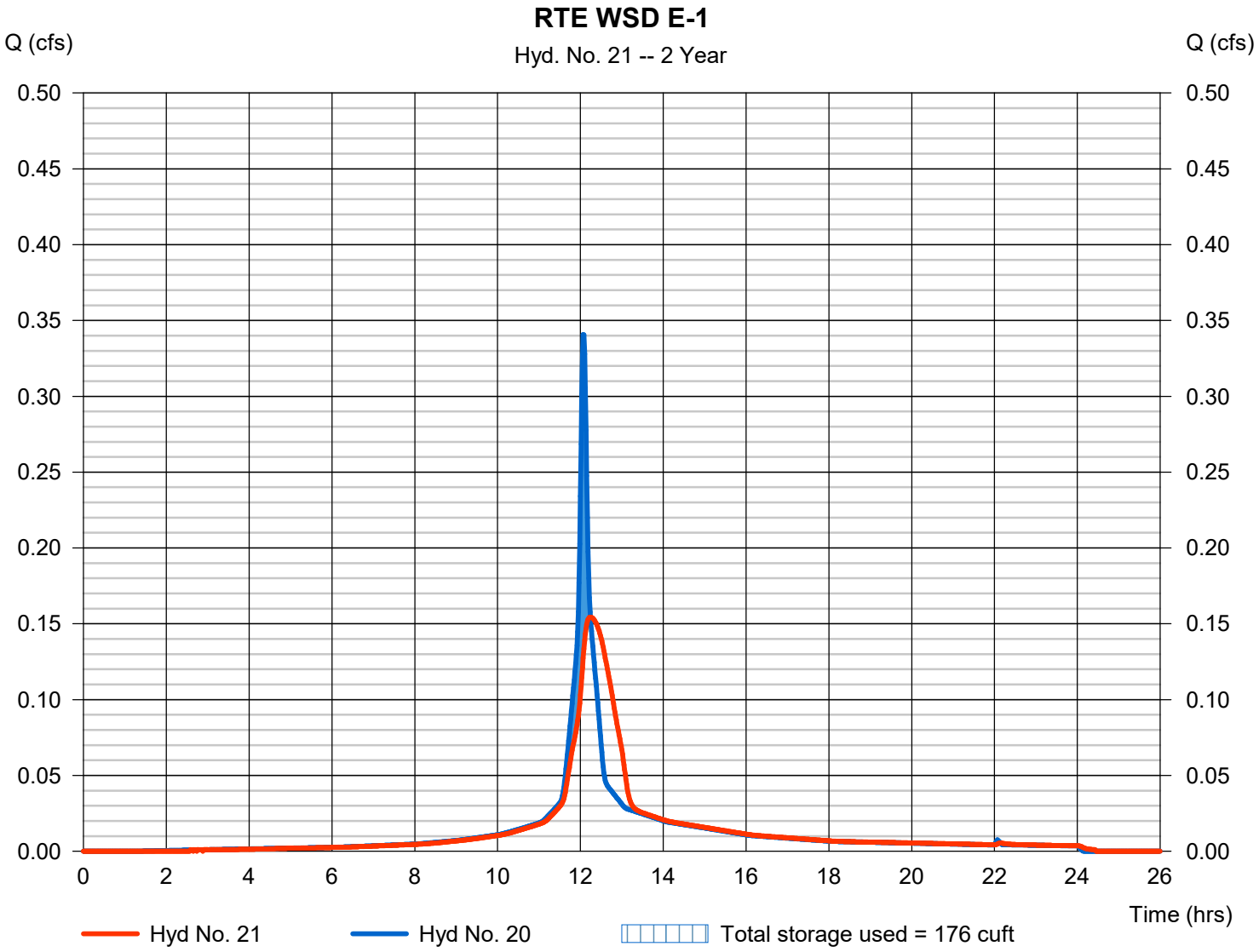
Hydrograph Report

Hyd. No. 21

RTE WSD E-1

Hydrograph type	=	Reservoir	Peak discharge	=	0.154 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.23 hrs
Time interval	=	1 min	Hyd. volume	=	1,135 cuft
Inflow hyd. No.	=	20 - PR. WSD E-1	Max. Elevation	=	252.10 ft
Reservoir name	=	BASIN-3	Max. Storage	=	176 cuft

Storage Indication method used.

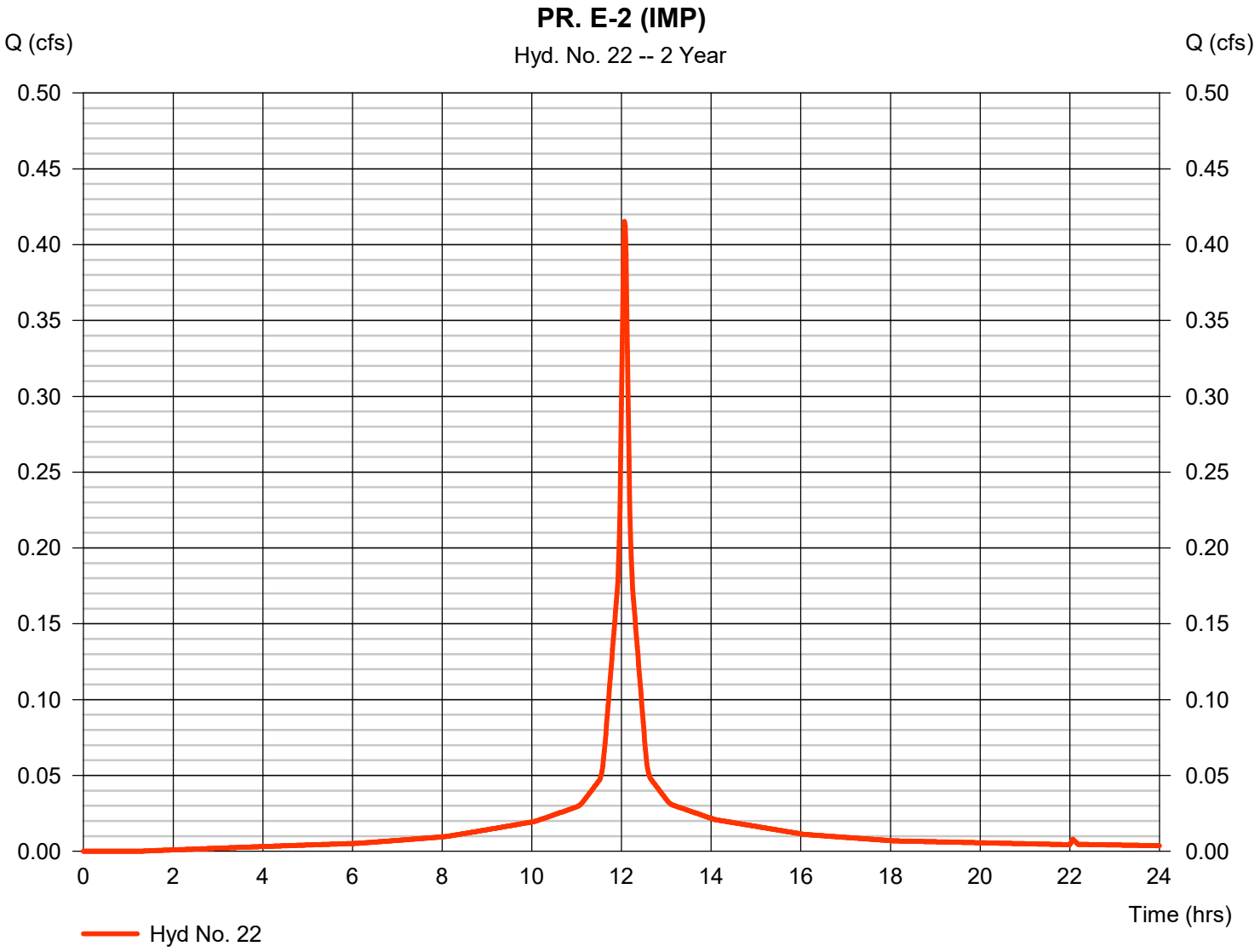


Hydrograph Report

Hyd. No. 22

PR. E-2 (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.415 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	1,440 cuft
Drainage area	=	0.120 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

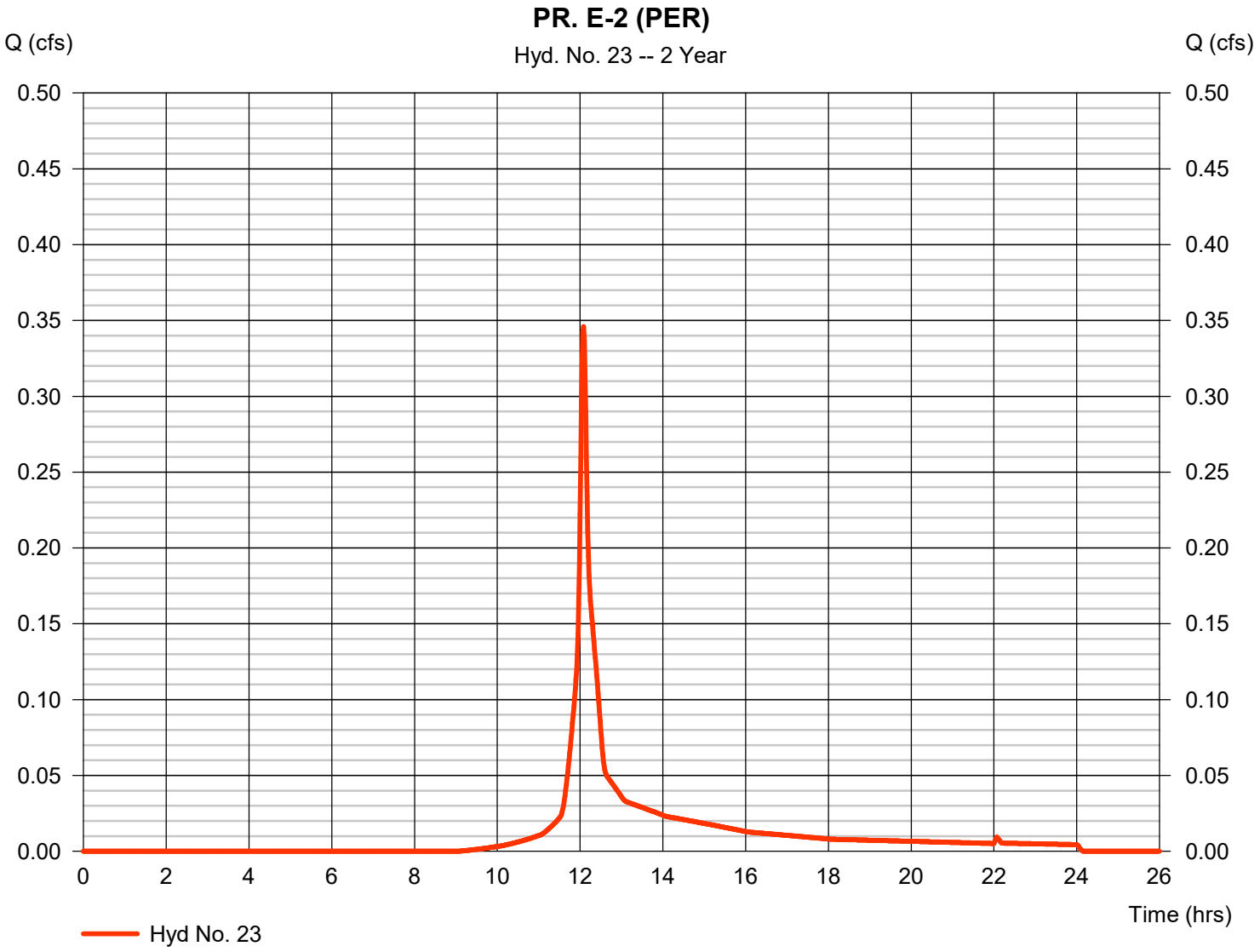


Hydrograph Report

Hyd. No. 23

PR. E-2 (PER)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.346 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.08 hrs
Time interval	= 1 min	Hyd. volume	= 1,071 cuft
Drainage area	= 0.180 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.44 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

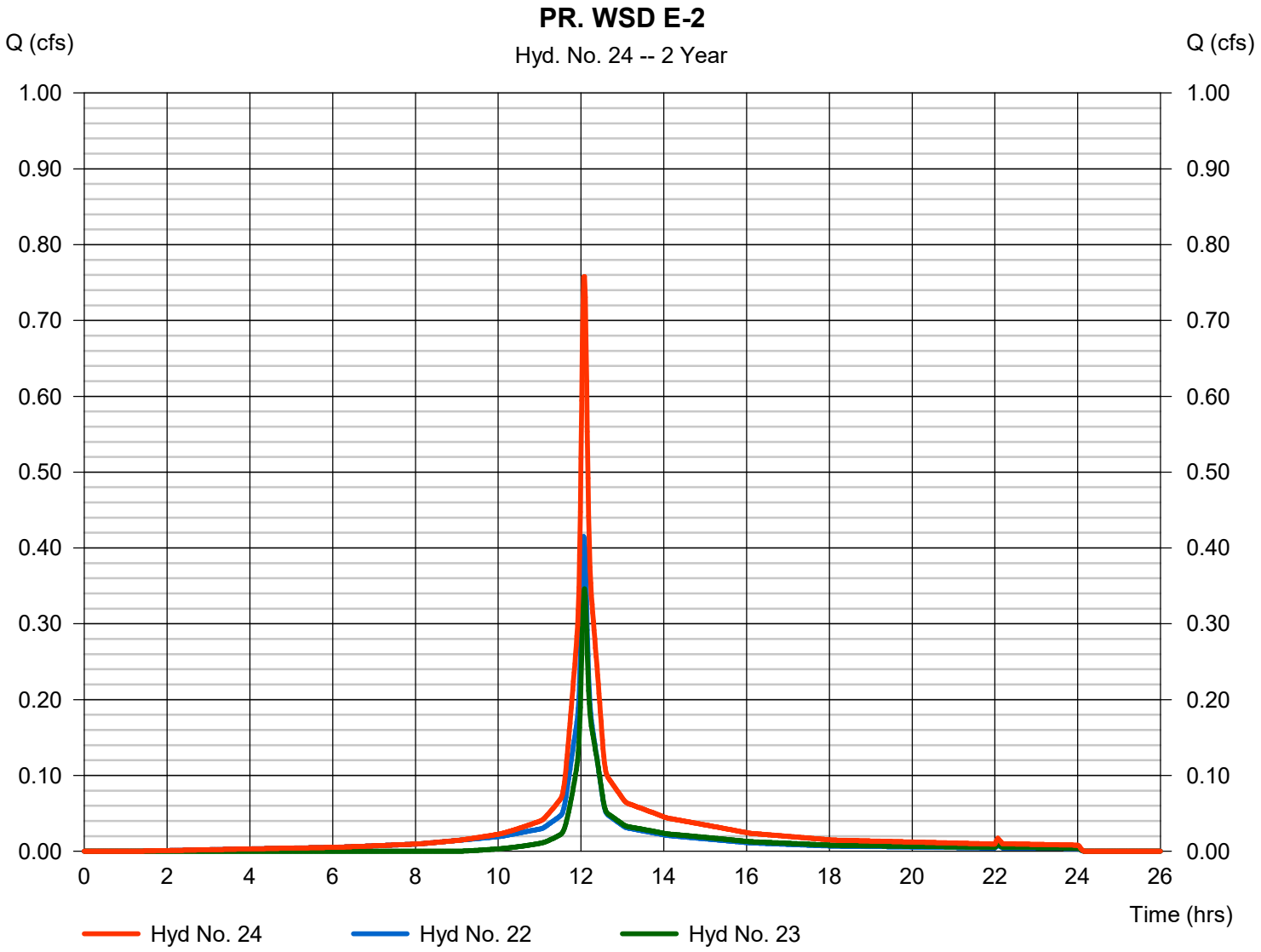


Hydrograph Report

Hyd. No. 24

PR. WSD E-2

Hydrograph type	=	Combine	Peak discharge	=	0.758 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.08 hrs
Time interval	=	1 min	Hyd. volume	=	2,511 cuft
Inflow hyds.	=	22, 23	Contrib. drain. area	=	0.300 ac

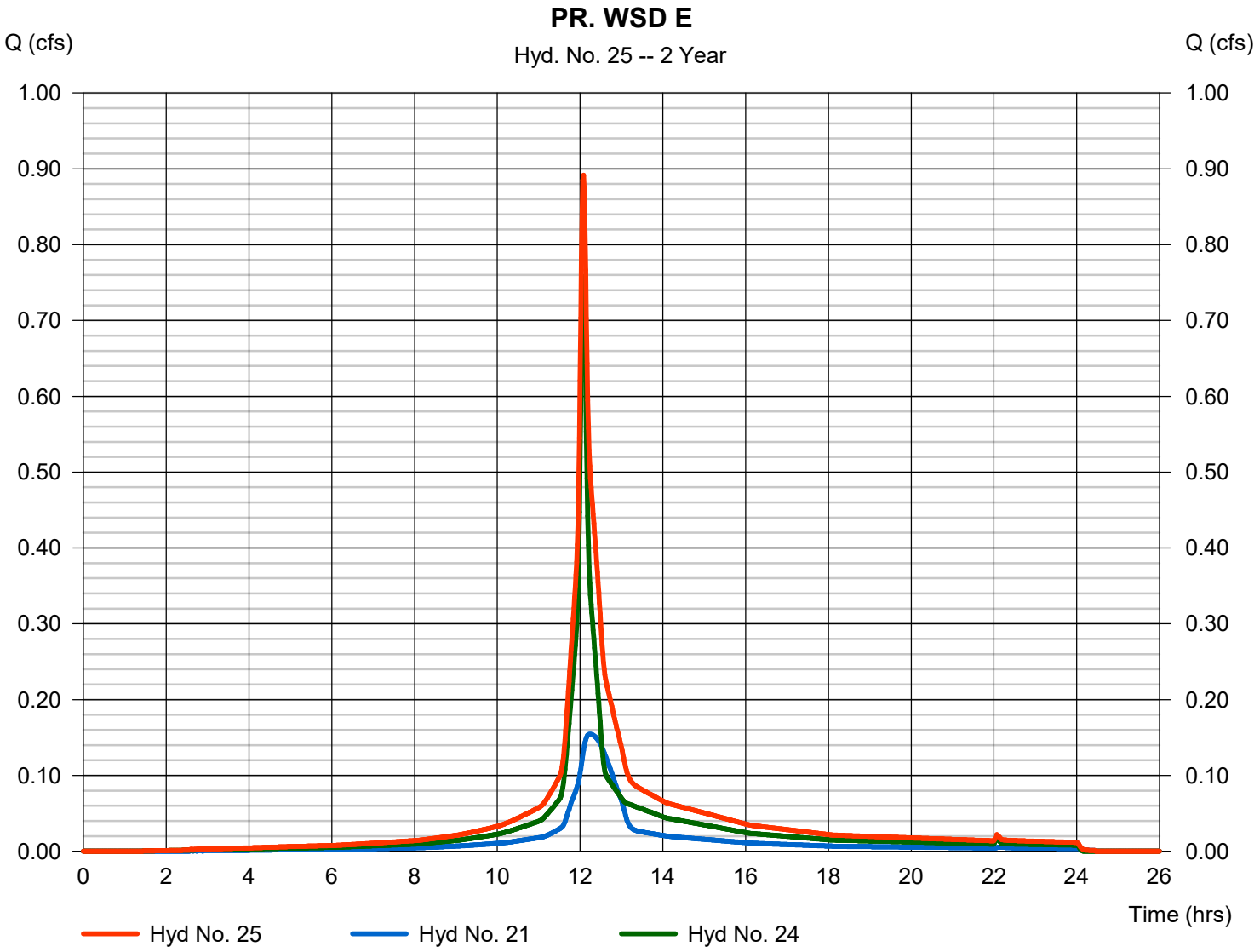


Hydrograph Report

Hyd. No. 25

PR. WSD E

Hydrograph type	= Combine	Peak discharge	= 0.892 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.08 hrs
Time interval	= 1 min	Hyd. volume	= 3,646 cuft
Inflow hyds.	= 21, 24	Contrib. drain. area	= 0.000 ac

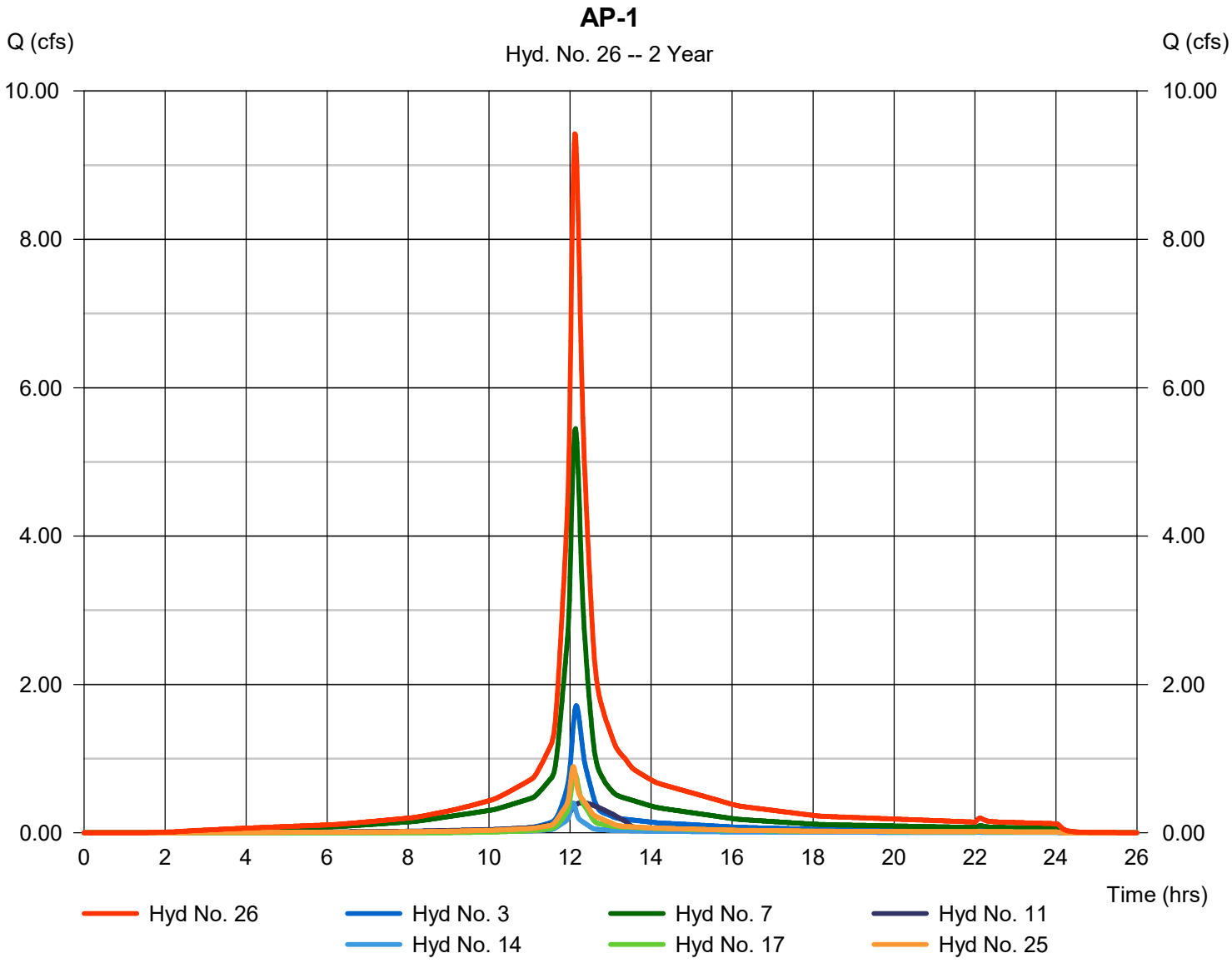


Hydrograph Report

Hyd. No. 26

AP-1

Hydrograph type	= Combine	Peak discharge	= 9.424 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 41,208 cuft
Inflow hyds.	= 3, 7, 11, 14, 17, 25	Contrib. drain. area	= 0.000 ac

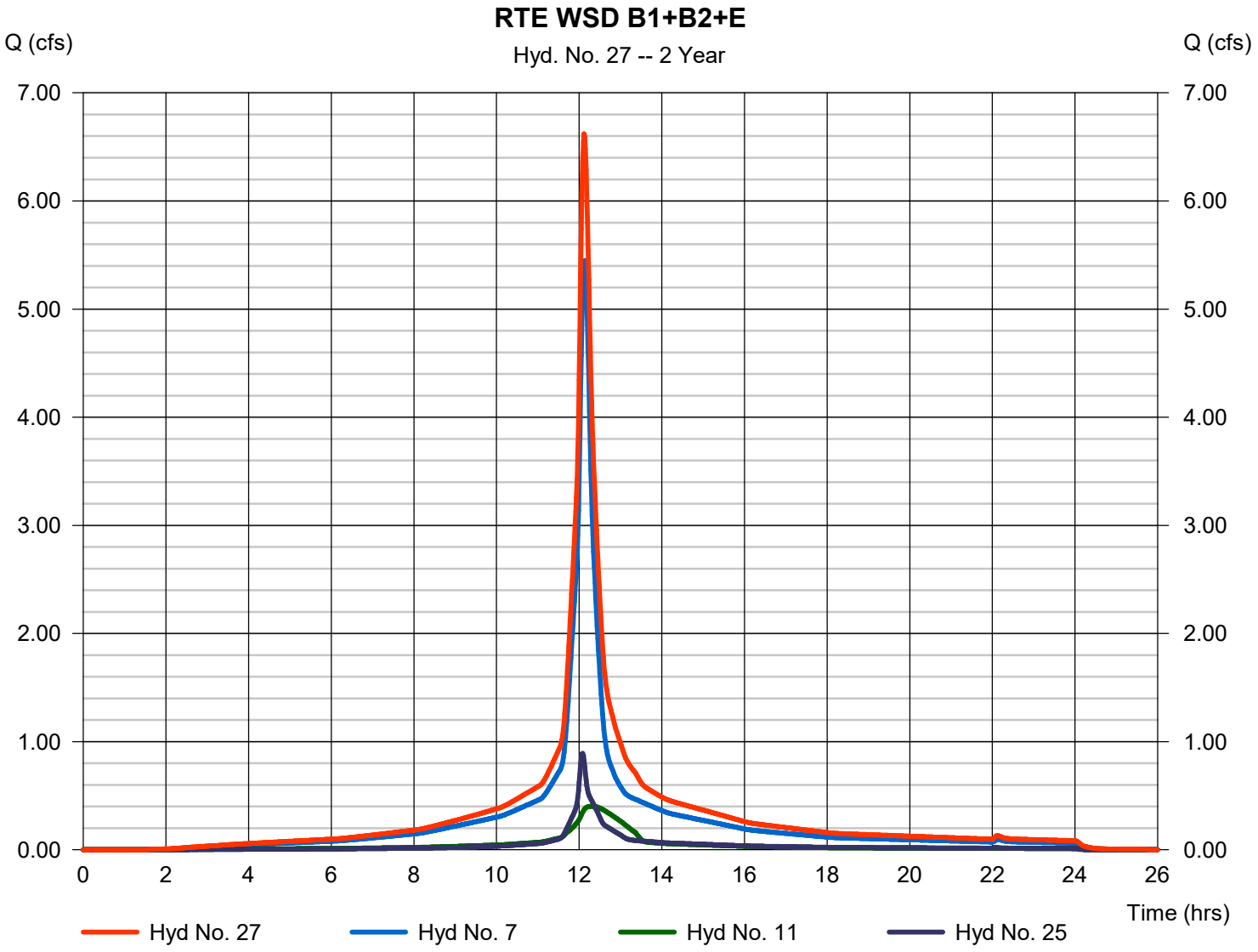


Hydrograph Report

Hyd. No. 27

RTE WSD B1+B2+E

Hydrograph type	= Combine	Peak discharge	= 6.622 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 30,463 cuft
Inflow hyds.	= 7, 11, 25	Contrib. drain. area	= 0.000 ac

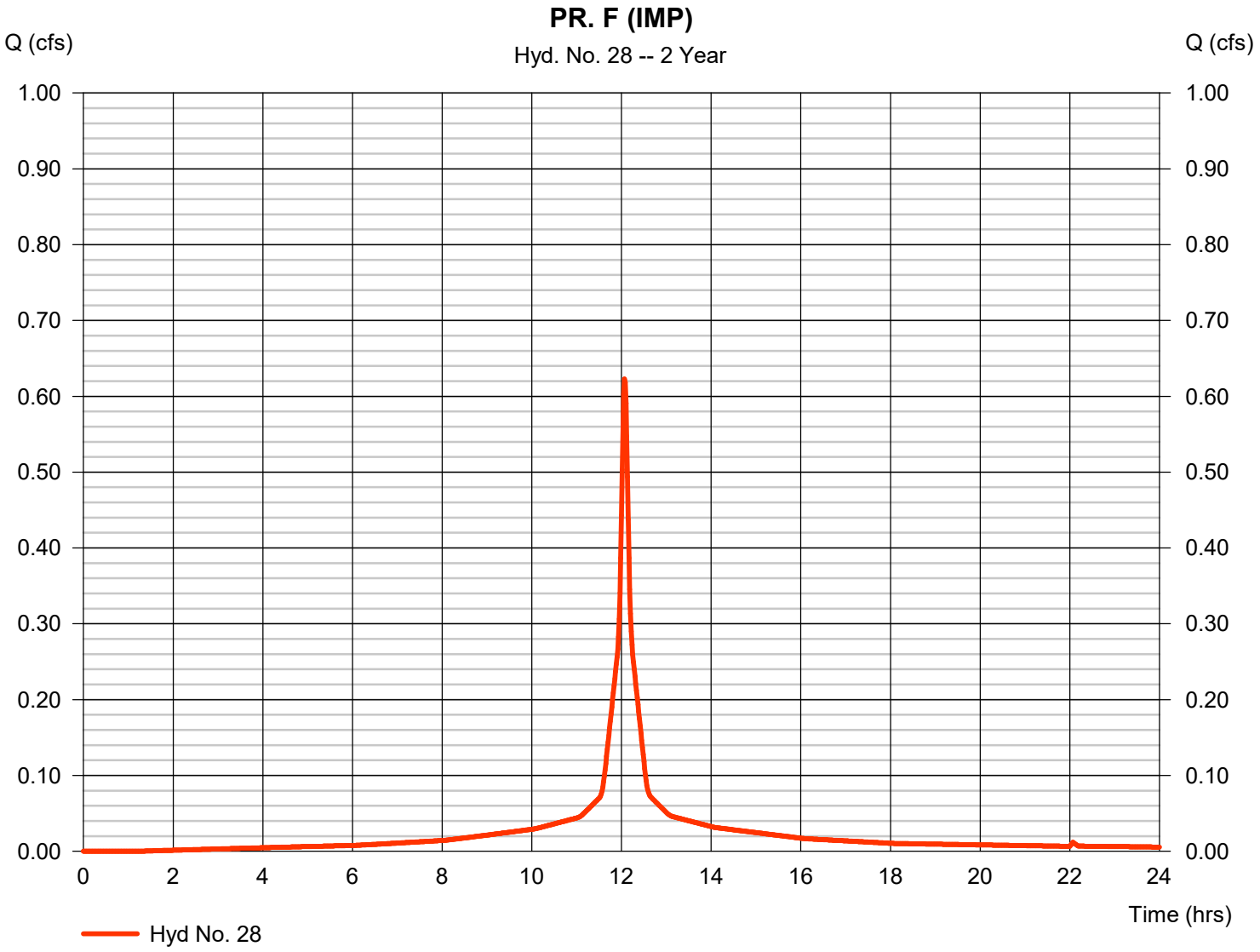


Hydrograph Report

Hyd. No. 28

PR. F (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.623 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	2,161 cuft
Drainage area	=	0.180 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

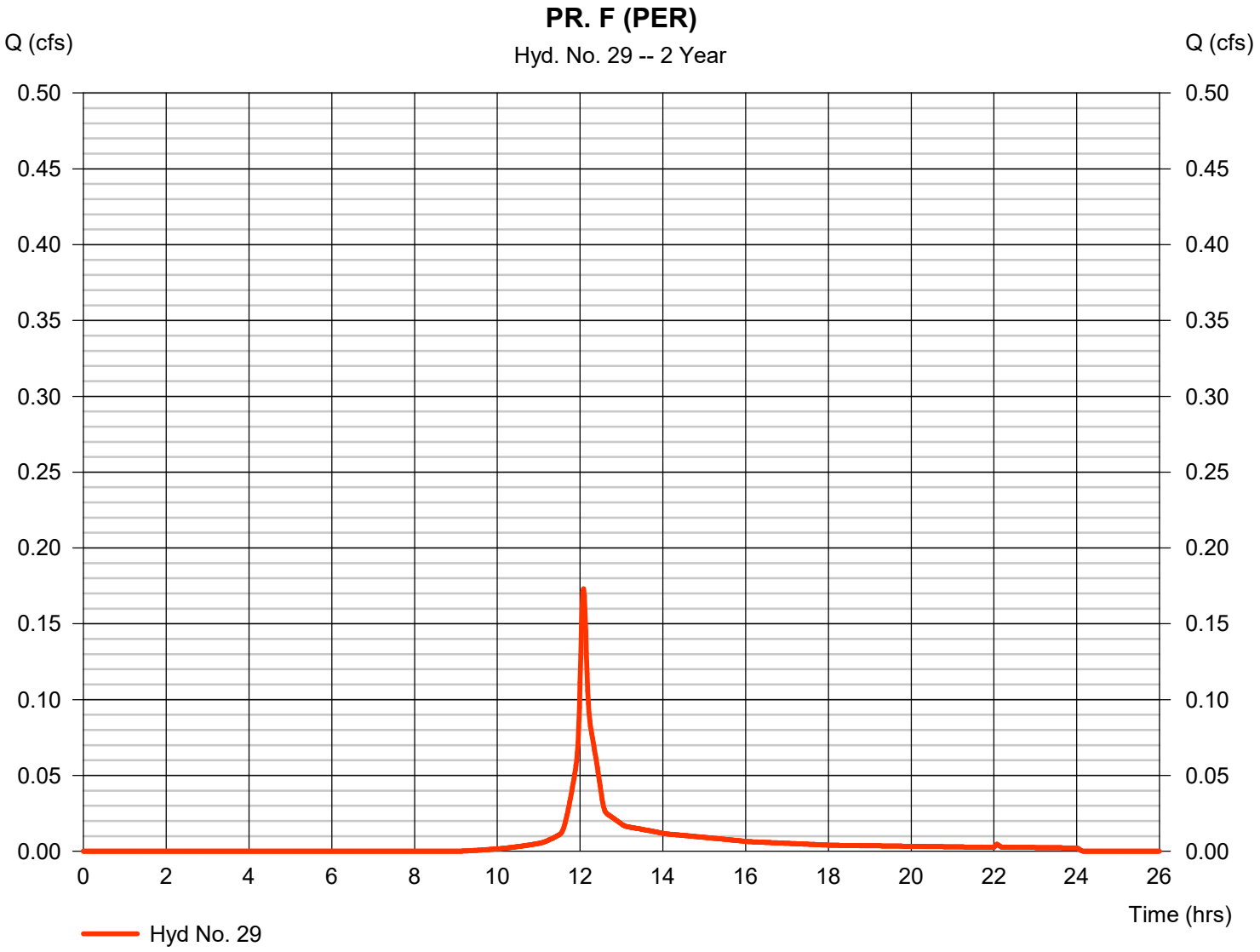


Hydrograph Report

Hyd. No. 29

PR. F (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.173 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.08 hrs
Time interval	=	1 min	Hyd. volume	=	535 cuft
Drainage area	=	0.090 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

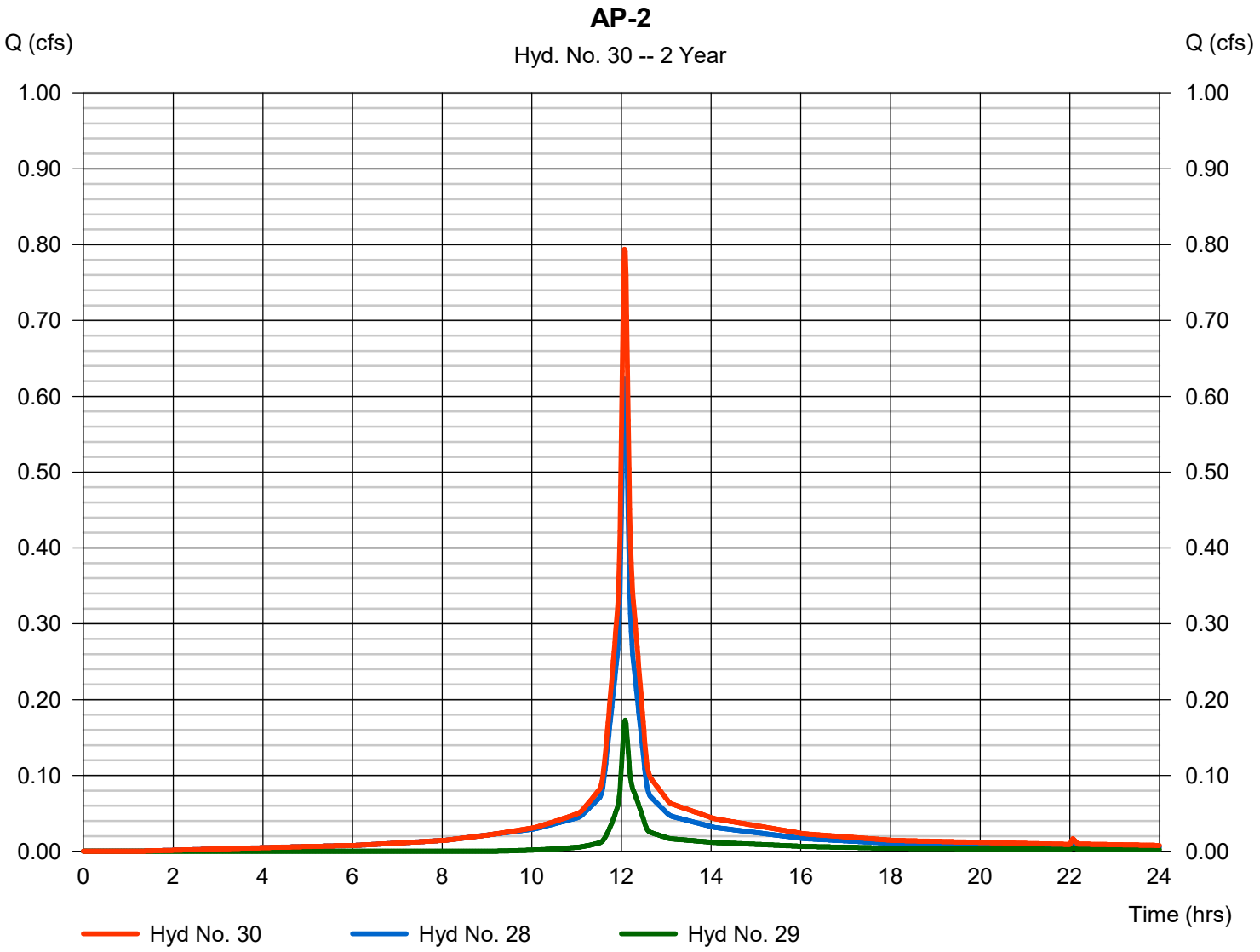


Hydrograph Report

Hyd. No. 30

AP-2

Hydrograph type	=	Combine	Peak discharge	=	0.794 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	2,696 cuft
Inflow hyds.	=	28, 29	Contrib. drain. area	=	0.270 ac



10-YEAR STORM CALCULATIONS

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

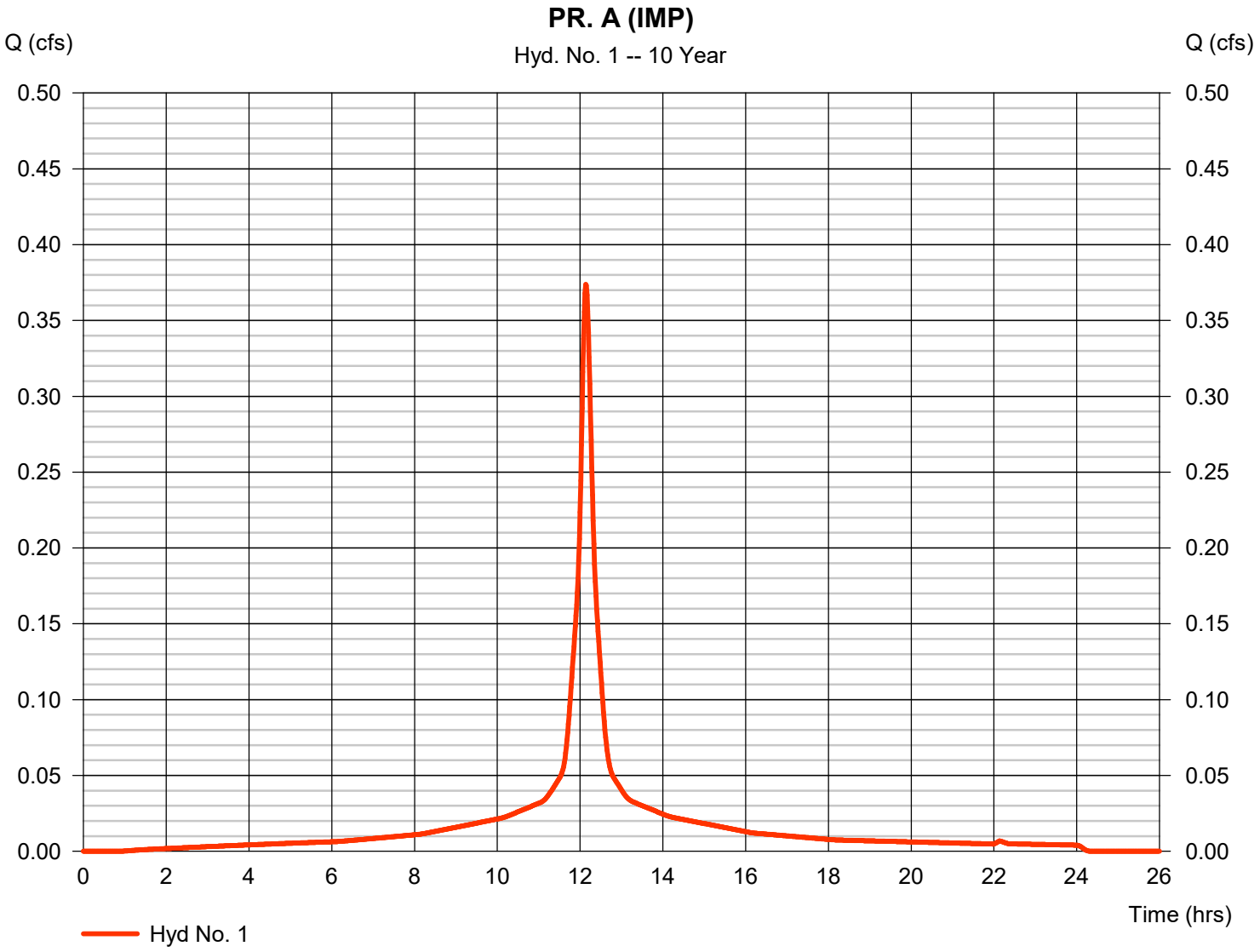
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.374	1	728	1,602	------	------	------	PR. A (IMP)
2	SCS Runoff	2.873	1	729	10,805	------	------	------	PR. A (PER)
3	Combine	3.246	1	729	12,408	1, 2	------	------	PR. WSD A
4	SCS Runoff	10.04	1	724	35,441	------	------	------	PR. B-1 (IMP)
5	SCS Runoff	0.224	1	725	693	------	------	------	PR. B-1 (PER)
6	Combine	10.27	1	724	36,134	4, 5	------	------	PR. WSD B-1
7	Reservoir	8.580	1	727	36,131	6	231.01	2,347	RTE WSD B-1
8	SCS Runoff	1.427	1	724	5,036	------	------	------	PR. B-2 (IMP)
9	SCS Runoff	0.262	1	725	809	------	------	------	PR. B-2 (PER)
10	Combine	1.688	1	724	5,845	8, 9	------	------	PR. B-2
11	Reservoir	1.021	1	730	5,843	10	234.51	976	RTE WSD B-2
12	SCS Runoff	0.529	1	724	1,865	------	------	------	PR. C (IMP)
13	SCS Runoff	0.112	1	725	347	------	------	------	PR. C (PER)
14	Combine	0.640	1	724	2,212	12, 13	------	------	PR. WSD C
15	SCS Runoff	0.092	1	726	362	------	------	------	PR.D (IMP)
16	SCS Runoff	1.438	1	727	4,928	------	------	------	PR. D (PER)
17	Combine	1.530	1	727	5,290	15, 16	------	------	PR. WSD D
18	SCS Runoff	0.317	1	724	1,119	------	------	------	PR. E-1 (IMP)
19	SCS Runoff	0.262	1	725	809	------	------	------	PR. E-1 (PER)
20	Combine	0.578	1	724	1,928	18, 19	------	------	PR. WSD E-1
21	Reservoir	0.332	1	731	1,926	20	252.68	306	RTE WSD E-1
22	SCS Runoff	0.634	1	724	2,238	------	------	------	PR. E-2 (IMP)
23	SCS Runoff	0.673	1	725	2,079	------	------	------	PR. E-2 (PER)
24	Combine	1.305	1	724	4,318	22, 23	------	------	PR. WSD E-2
25	Combine	1.558	1	725	6,243	21, 24	------	------	PR. WSD E
26	Combine	16.22	1	727	68,127	3, 7, 11, 14, 17, 25	------	------	AP-1
27	Combine	10.97	1	727	48,218	7, 11, 25,	------	------	RTE WSD B1+B2+E
28	SCS Runoff	0.951	1	724	3,358	------	------	------	PR. F (IMP)
29	SCS Runoff	0.337	1	725	1,040	------	------	------	PR. F (PER)
30	Combine	1.287	1	724	4,397	28, 29	------	------	AP-2

Hydrograph Report

Hyd. No. 1

PR. A (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.374 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.13 hrs
Time interval	=	1 min	Hyd. volume	=	1,602 cuft
Drainage area	=	0.090 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

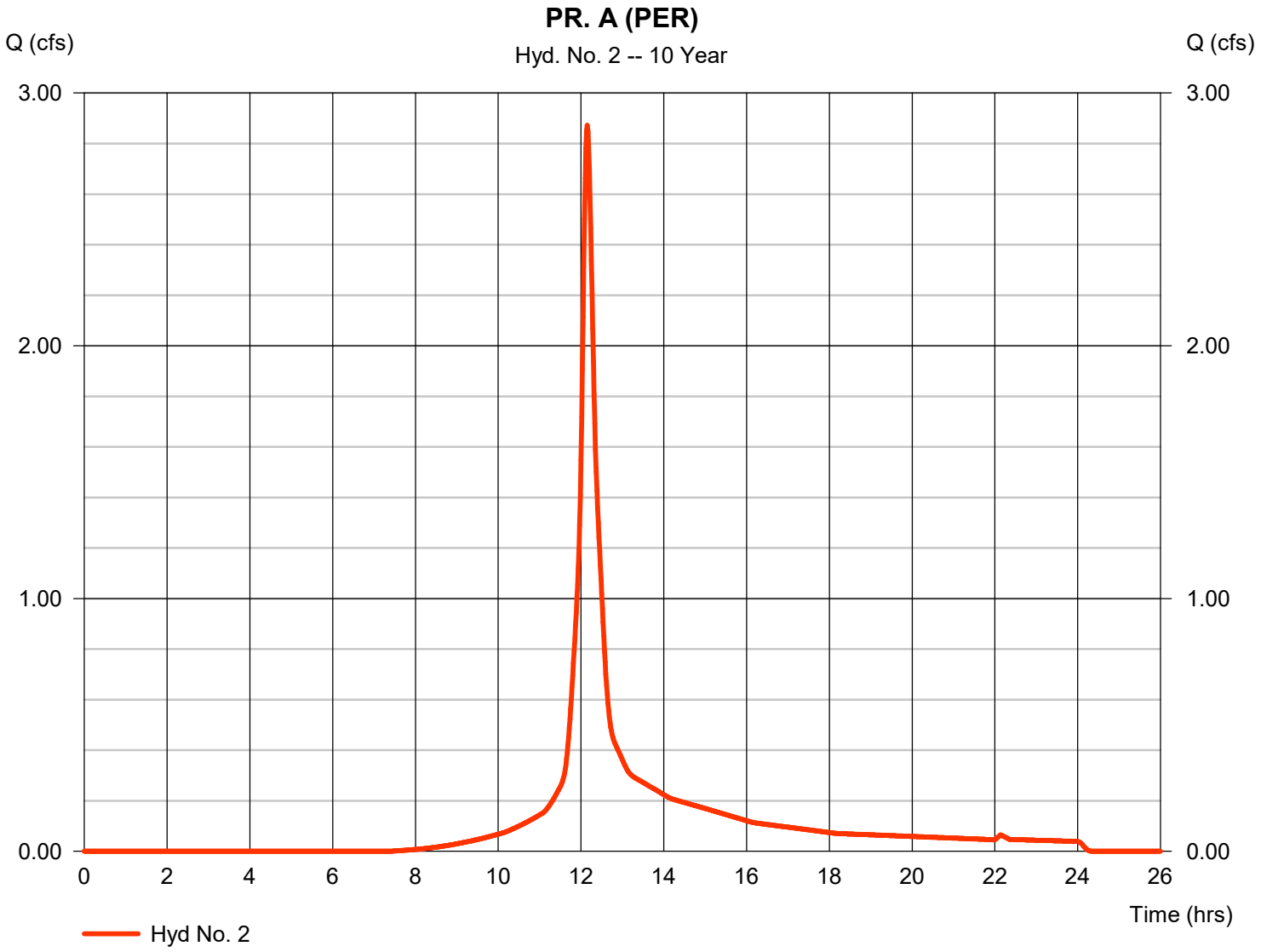


Hydrograph Report

Hyd. No. 2

PR. A (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.873 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.15 hrs
Time interval	=	1 min	Hyd. volume	=	10,805 cuft
Drainage area	=	0.980 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

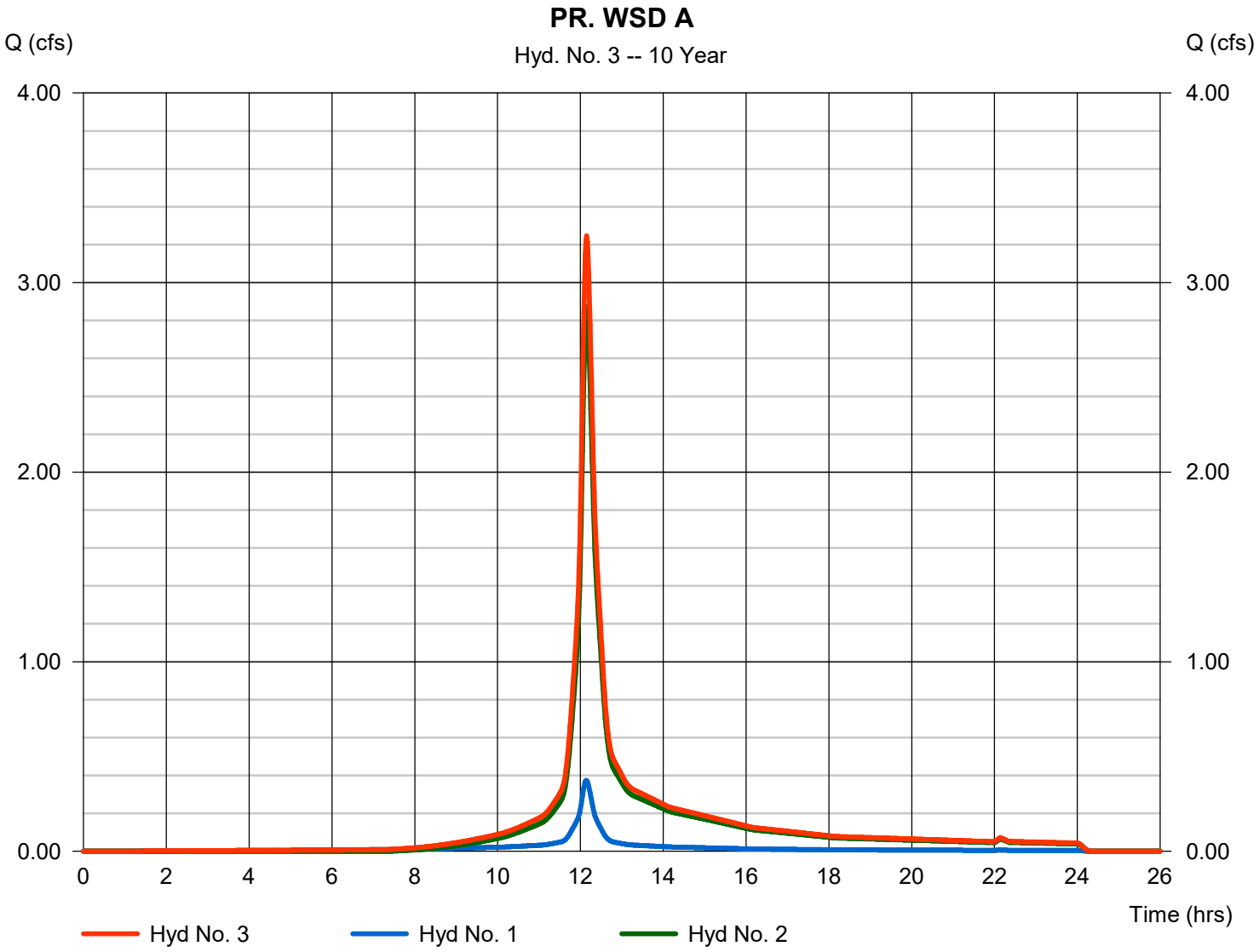


Hydrograph Report

Hyd. No. 3

PR. WSD A

Hydrograph type	= Combine	Peak discharge	= 3.246 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.15 hrs
Time interval	= 1 min	Hyd. volume	= 12,408 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 1.070 ac

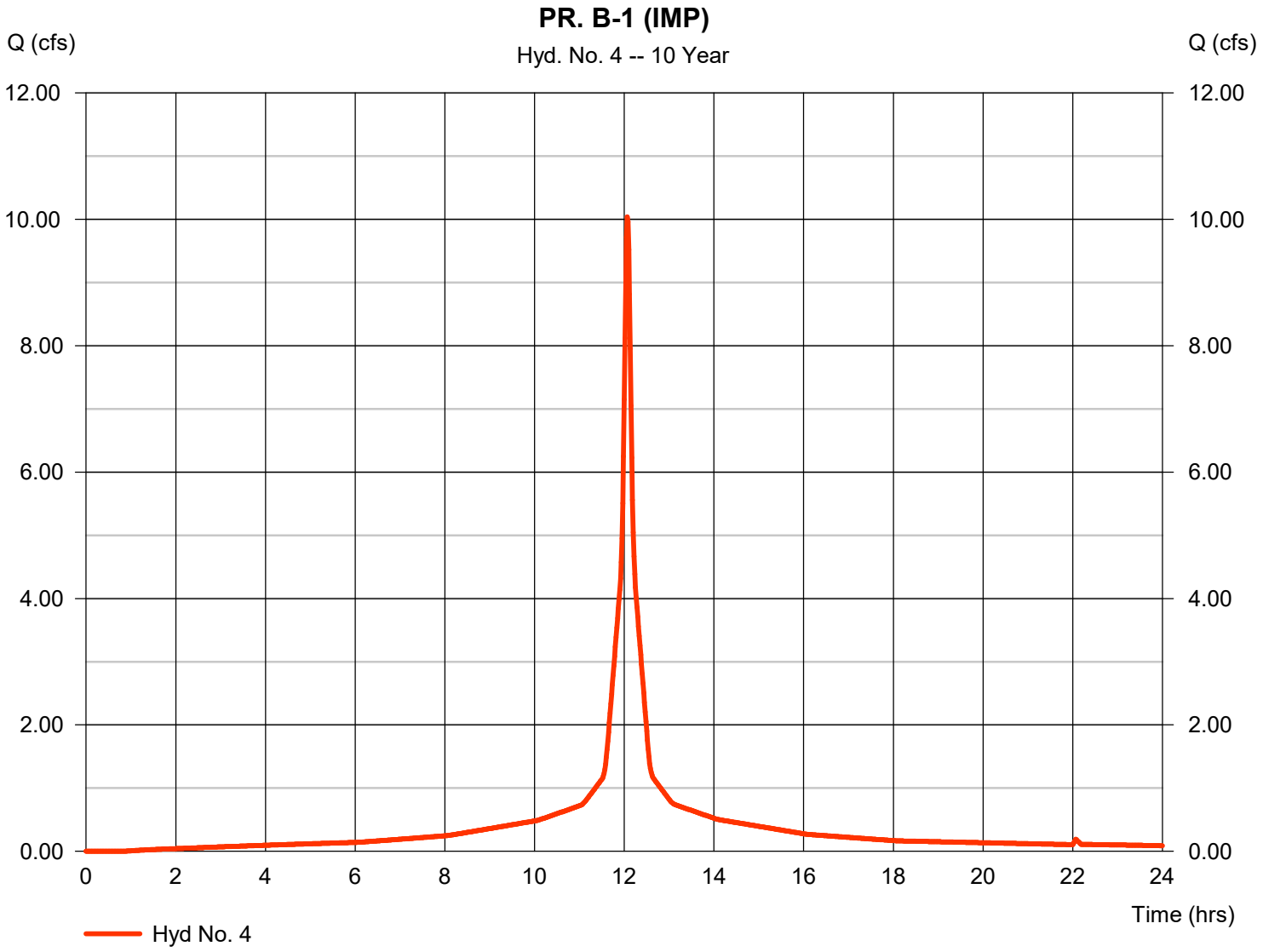


Hydrograph Report

Hyd. No. 4

PR. B-1 (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.04 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	35,441 cuft
Drainage area	=	1.900 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

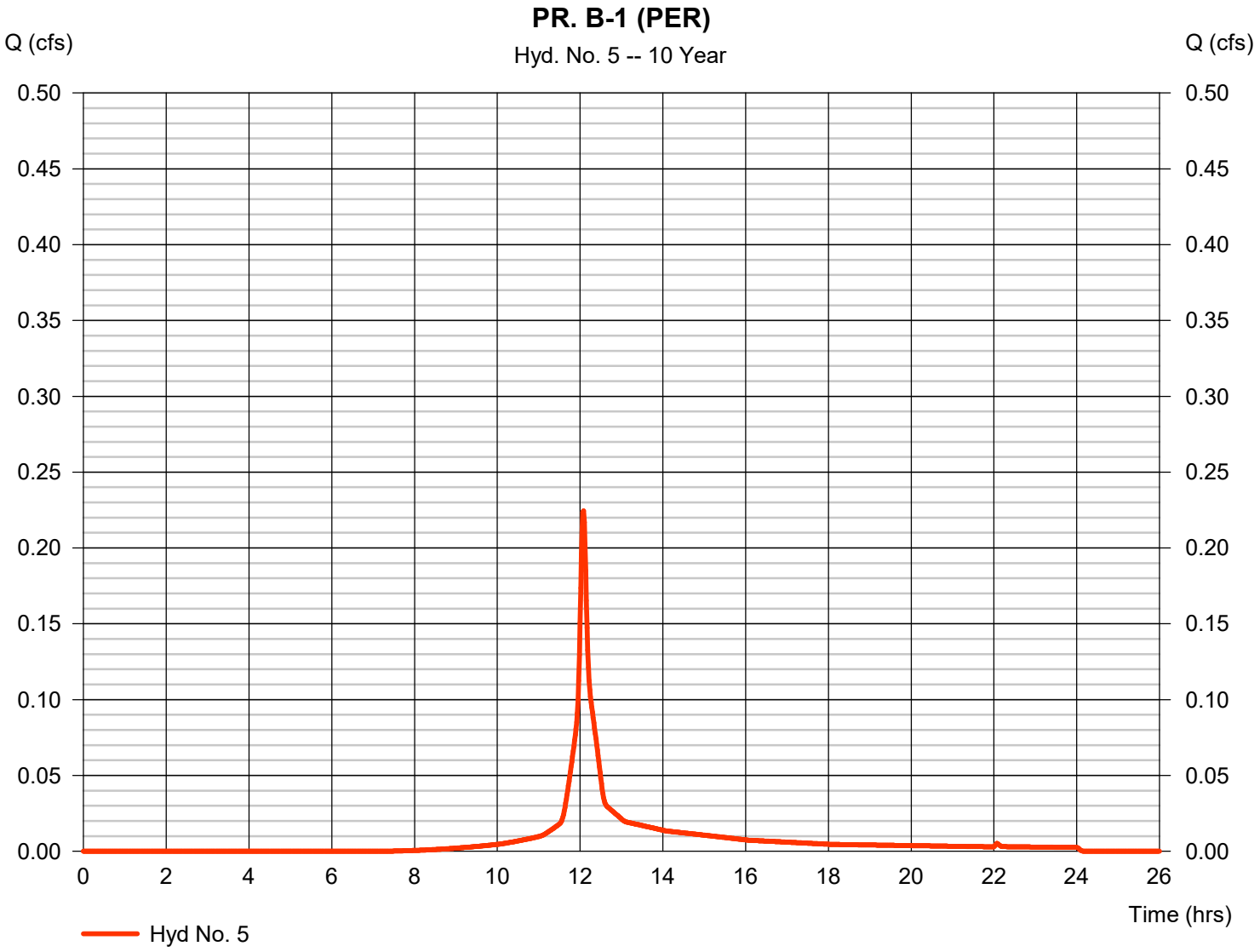


Hydrograph Report

Hyd. No. 5

PR. B-1 (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.224 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.08 hrs
Time interval	=	1 min	Hyd. volume	=	693 cuft
Drainage area	=	0.060 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

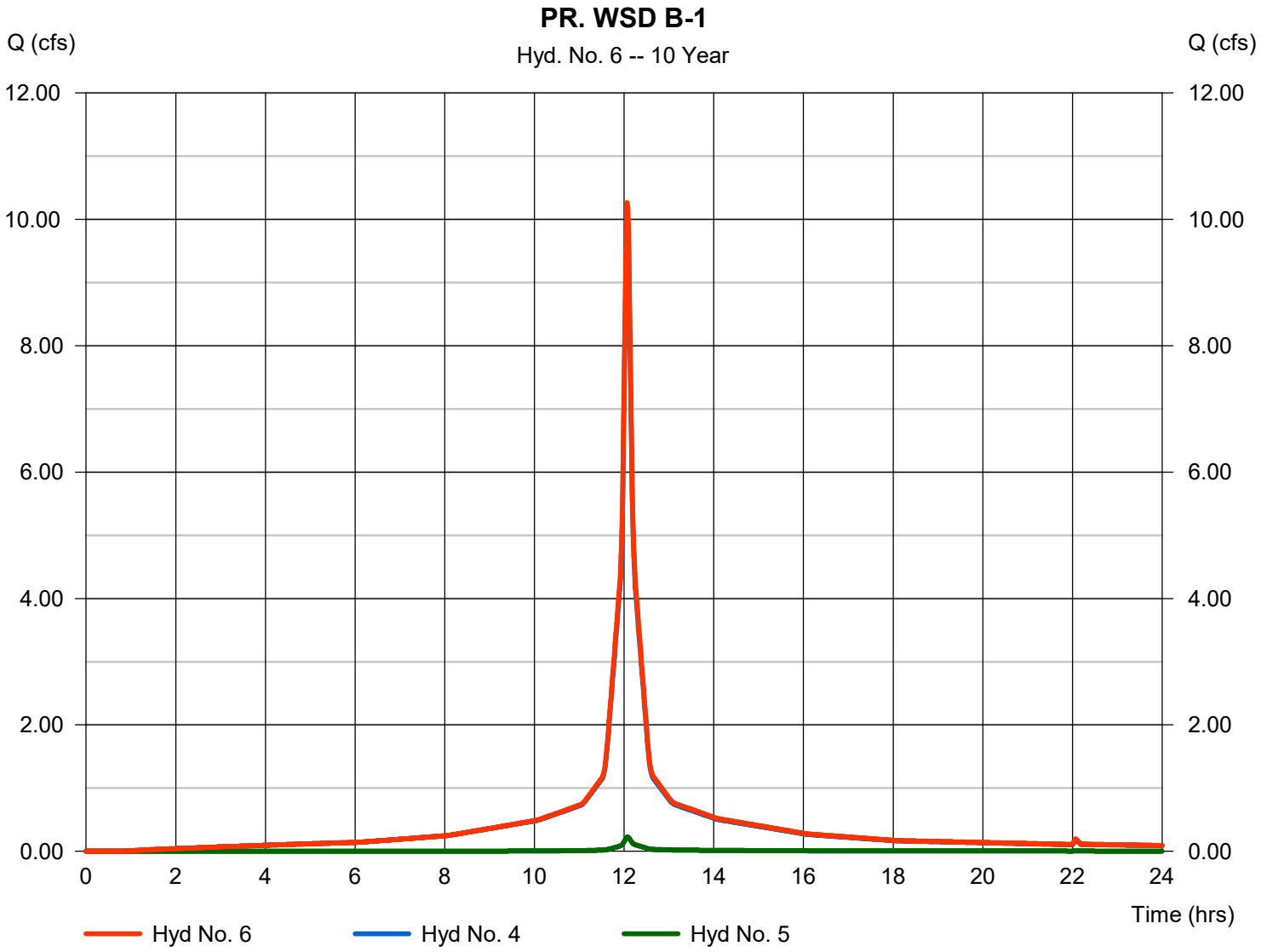


Hydrograph Report

Hyd. No. 6

PR. WSD B-1

Hydrograph type	= Combine	Peak discharge	= 10.27 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.07 hrs
Time interval	= 1 min	Hyd. volume	= 36,134 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 1.960 ac



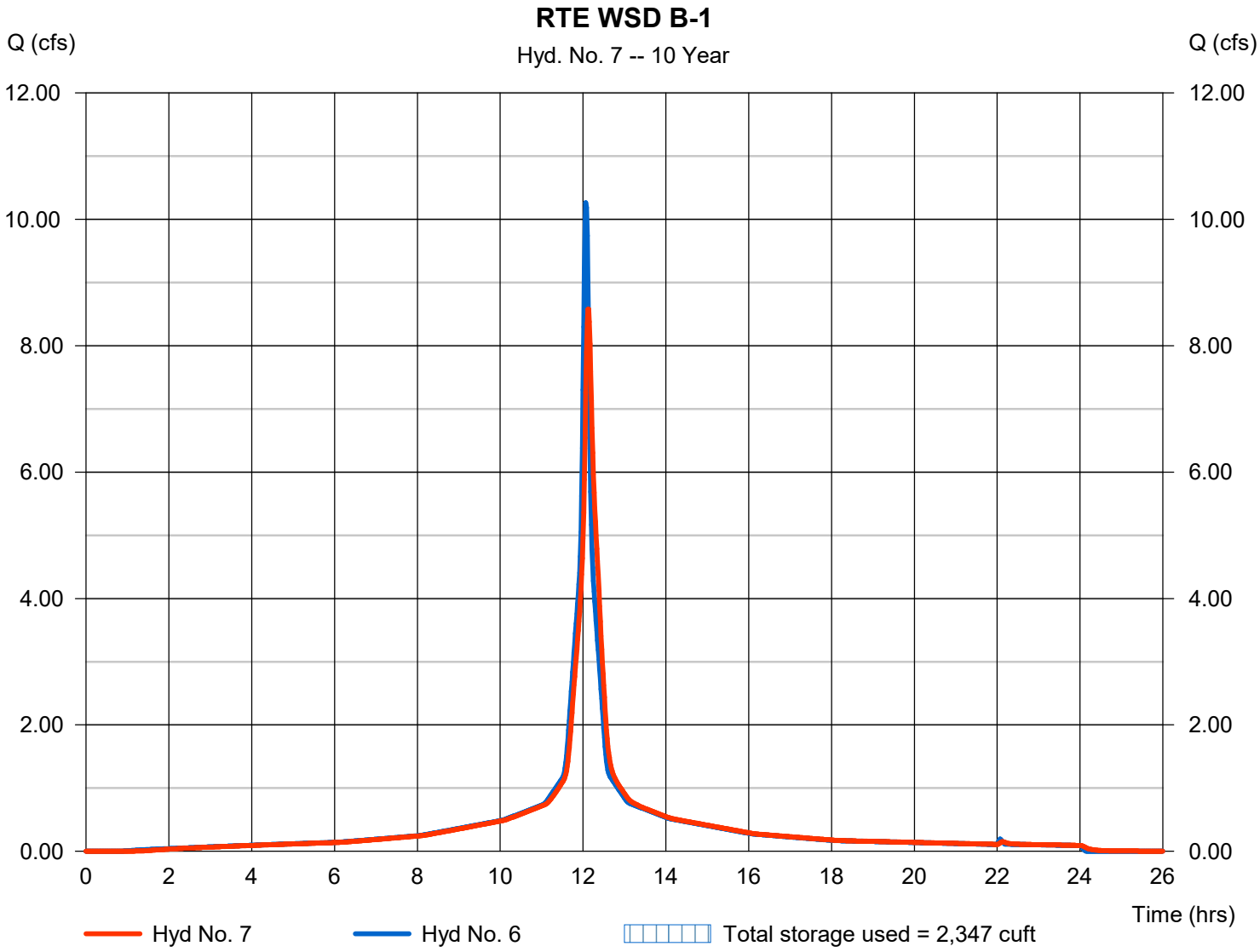
Hydrograph Report

Hyd. No. 7

RTE WSD B-1

Hydrograph type	=	Reservoir	Peak discharge	=	8.580 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.12 hrs
Time interval	=	1 min	Hyd. volume	=	36,131 cuft
Inflow hyd. No.	=	6 - PR. WSD B-1	Max. Elevation	=	231.01 ft
Reservoir name	=	BASIN-1	Max. Storage	=	2,347 cuft

Storage Indication method used.

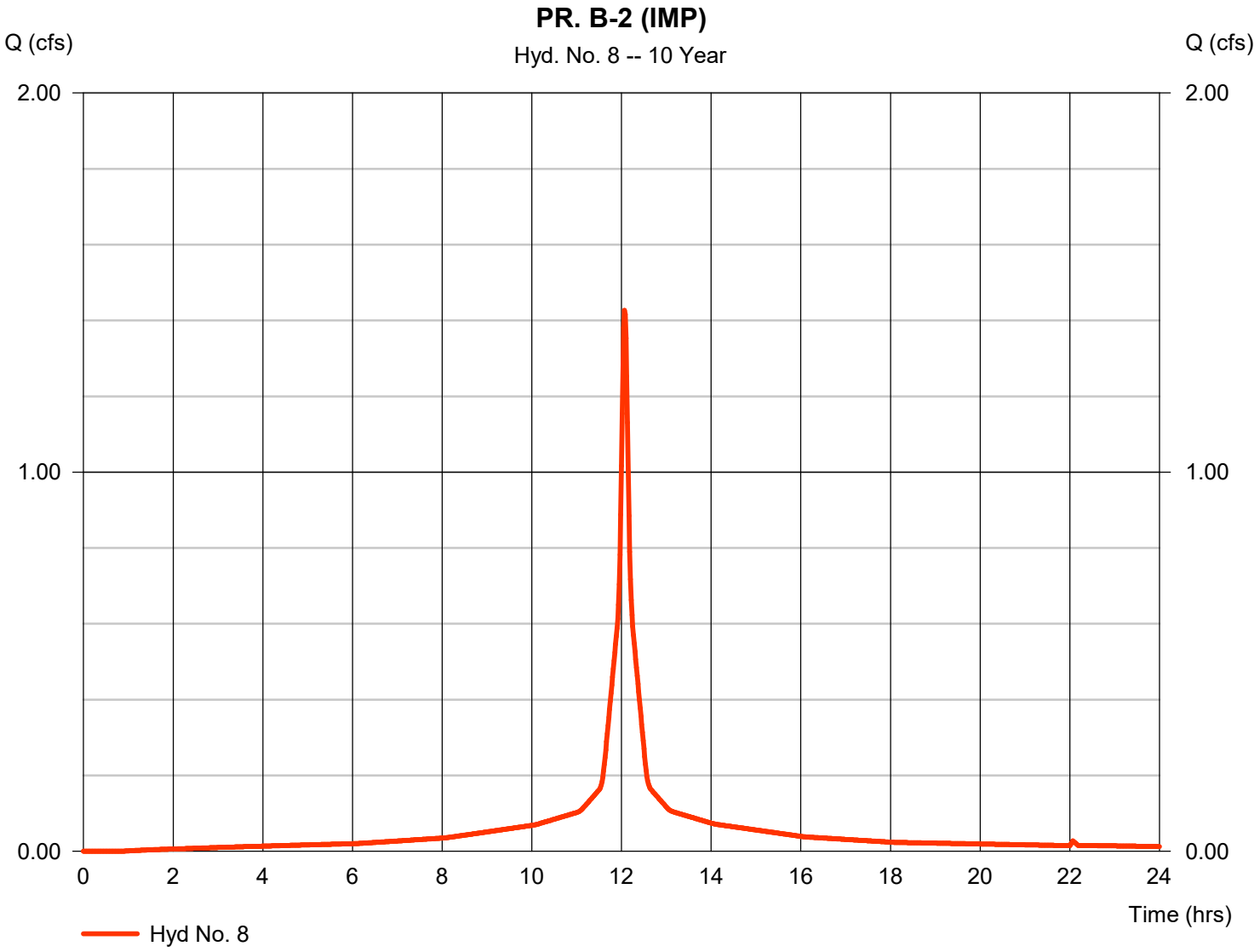


Hydrograph Report

Hyd. No. 8

PR. B-2 (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.427 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	5,036 cuft
Drainage area	=	0.270 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

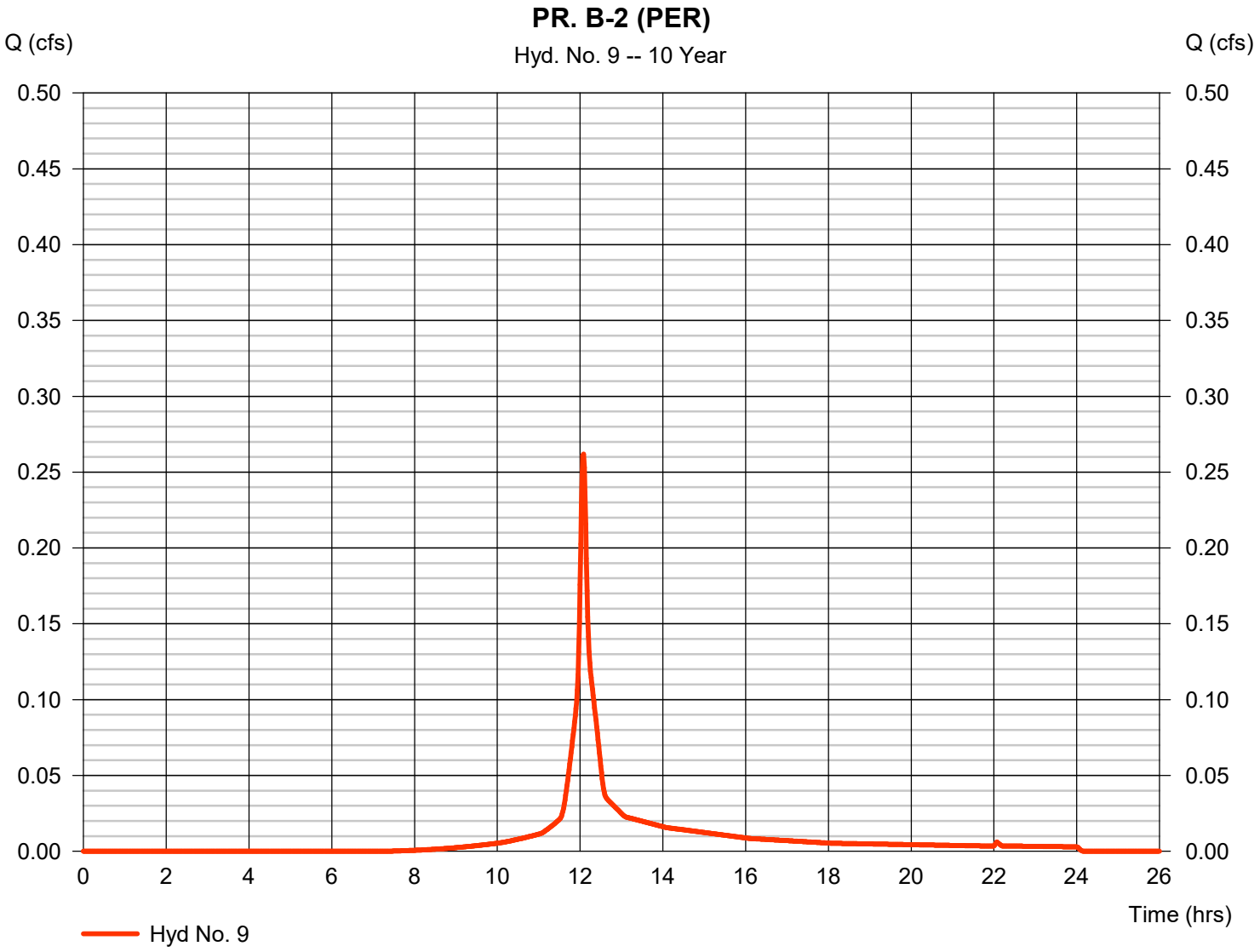


Hydrograph Report

Hyd. No. 9

PR. B-2 (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.262 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.08 hrs
Time interval	=	1 min	Hyd. volume	=	809 cuft
Drainage area	=	0.070 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

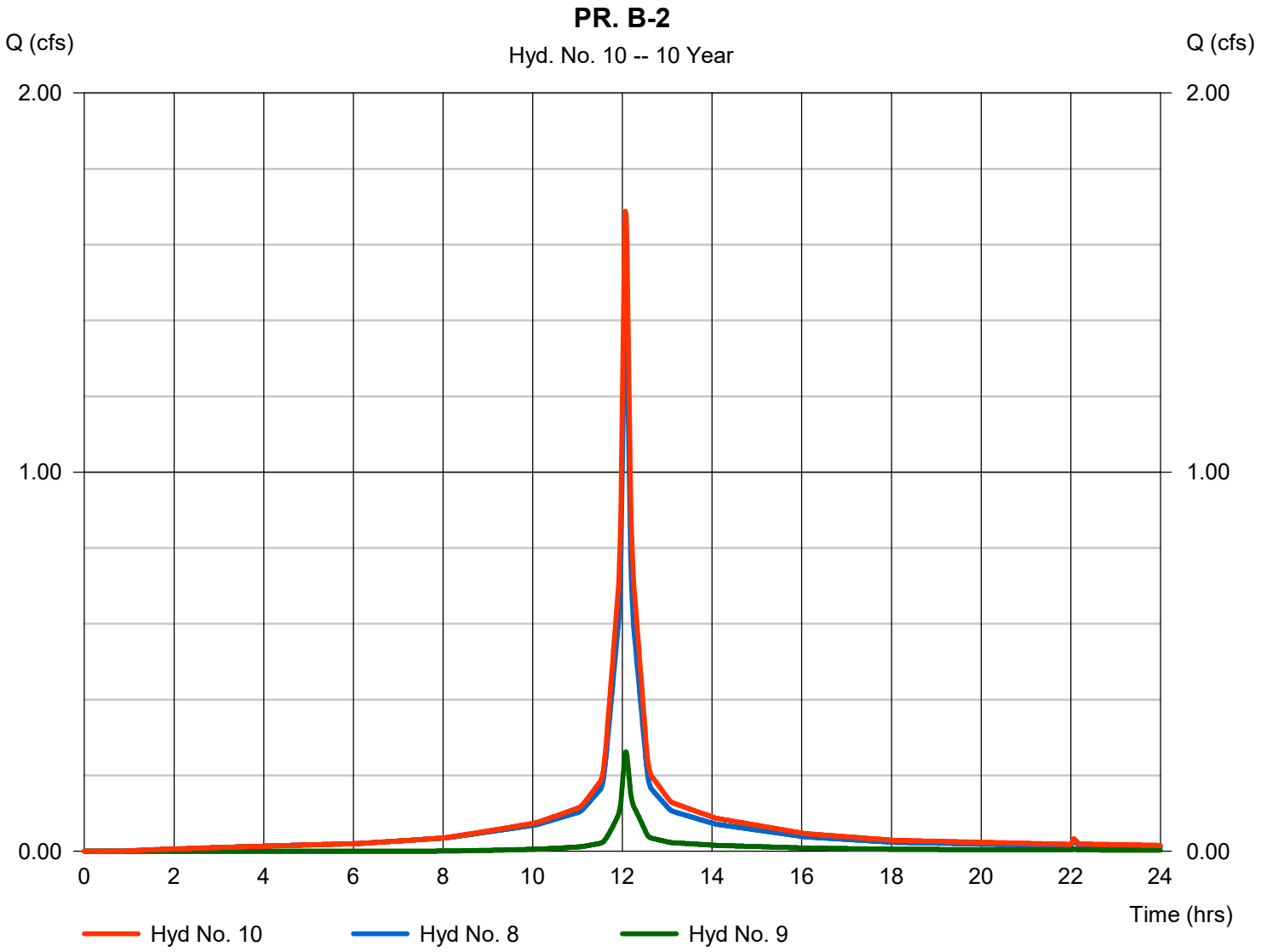


Hydrograph Report

Hyd. No. 10

PR. B-2

Hydrograph type	=	Combine	Peak discharge	=	1.688 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	5,845 cuft
Inflow hyds.	=	8, 9	Contrib. drain. area	=	0.340 ac



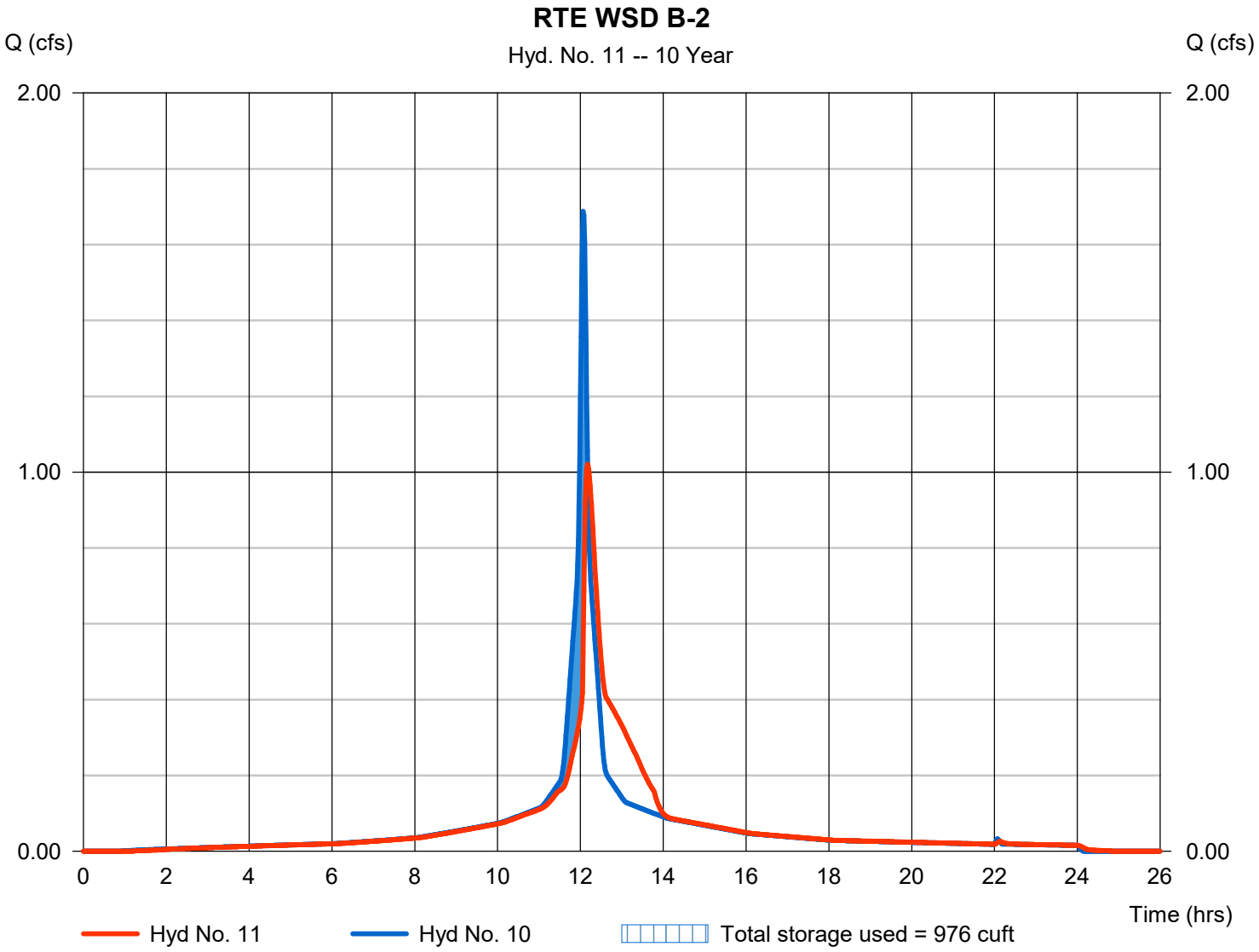
Hydrograph Report

Hyd. No. 11

RTE WSD B-2

Hydrograph type	=	Reservoir	Peak discharge	=	1.021 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.17 hrs
Time interval	=	1 min	Hyd. volume	=	5,843 cuft
Inflow hyd. No.	=	10 - PR. B-2	Max. Elevation	=	234.51 ft
Reservoir name	=	BASIN-2	Max. Storage	=	976 cuft

Storage Indication method used.

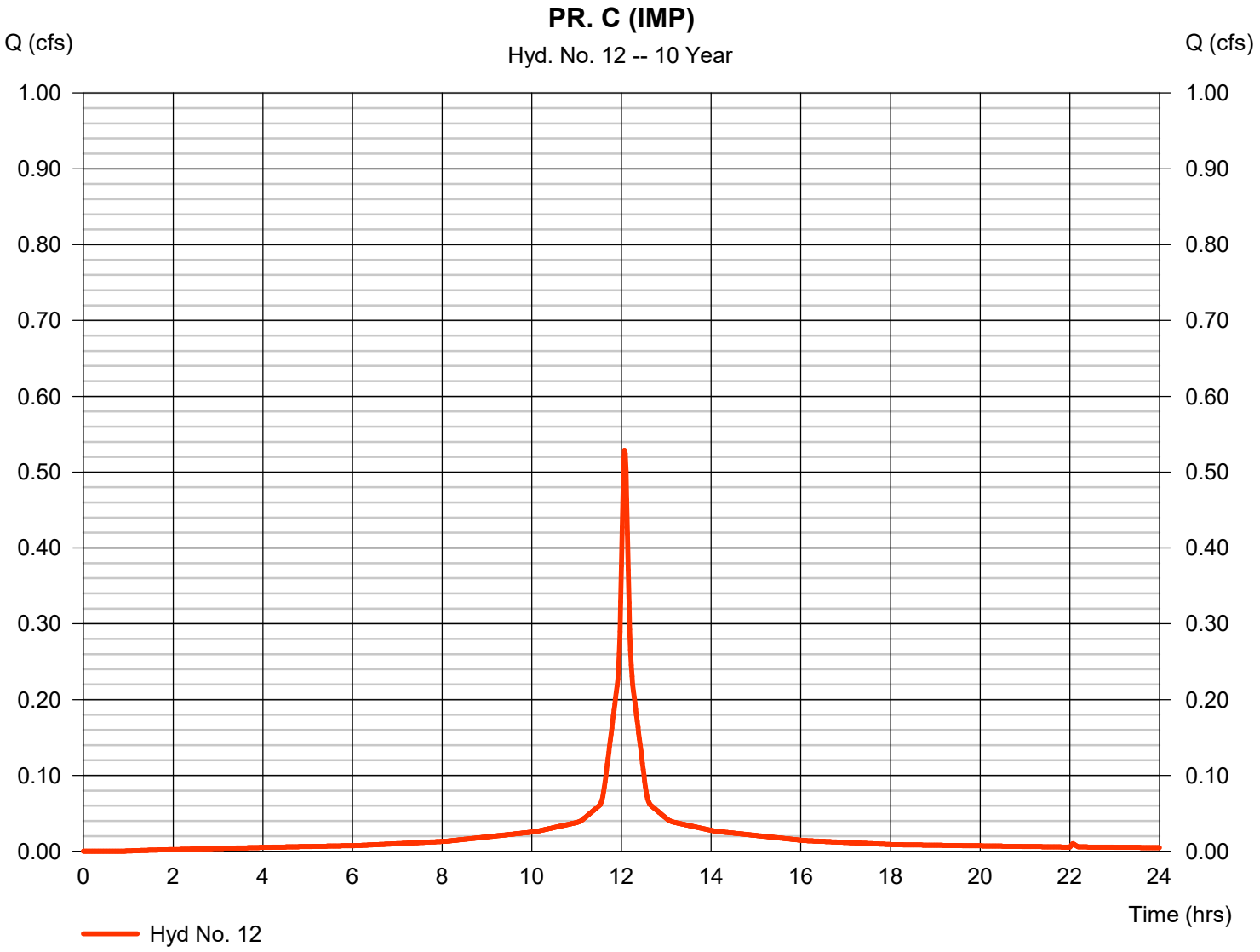


Hydrograph Report

Hyd. No. 12

PR. C (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.529 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	1,865 cuft
Drainage area	=	0.100 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

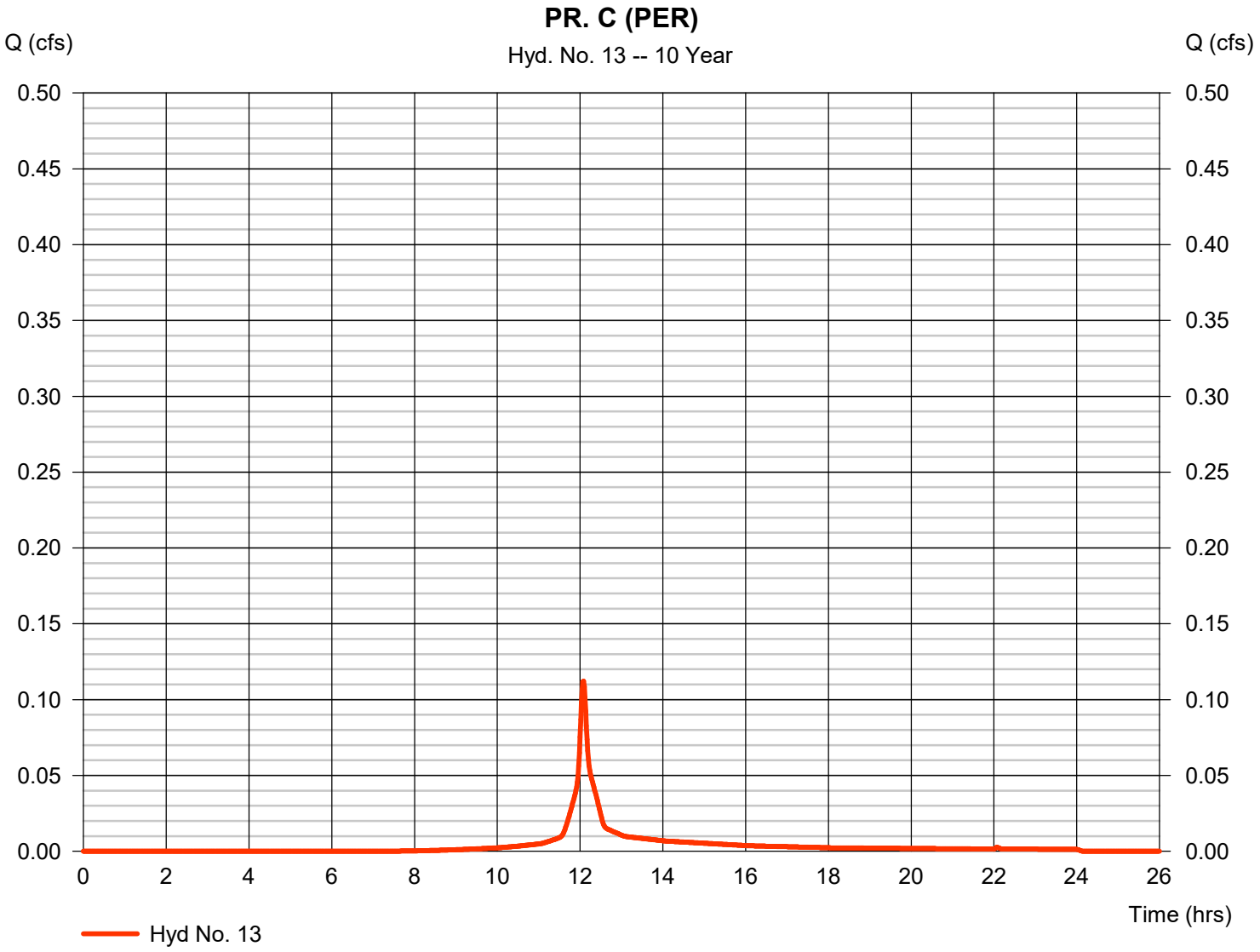


Hydrograph Report

Hyd. No. 13

PR. C (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.112 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.08 hrs
Time interval	=	1 min	Hyd. volume	=	347 cuft
Drainage area	=	0.030 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

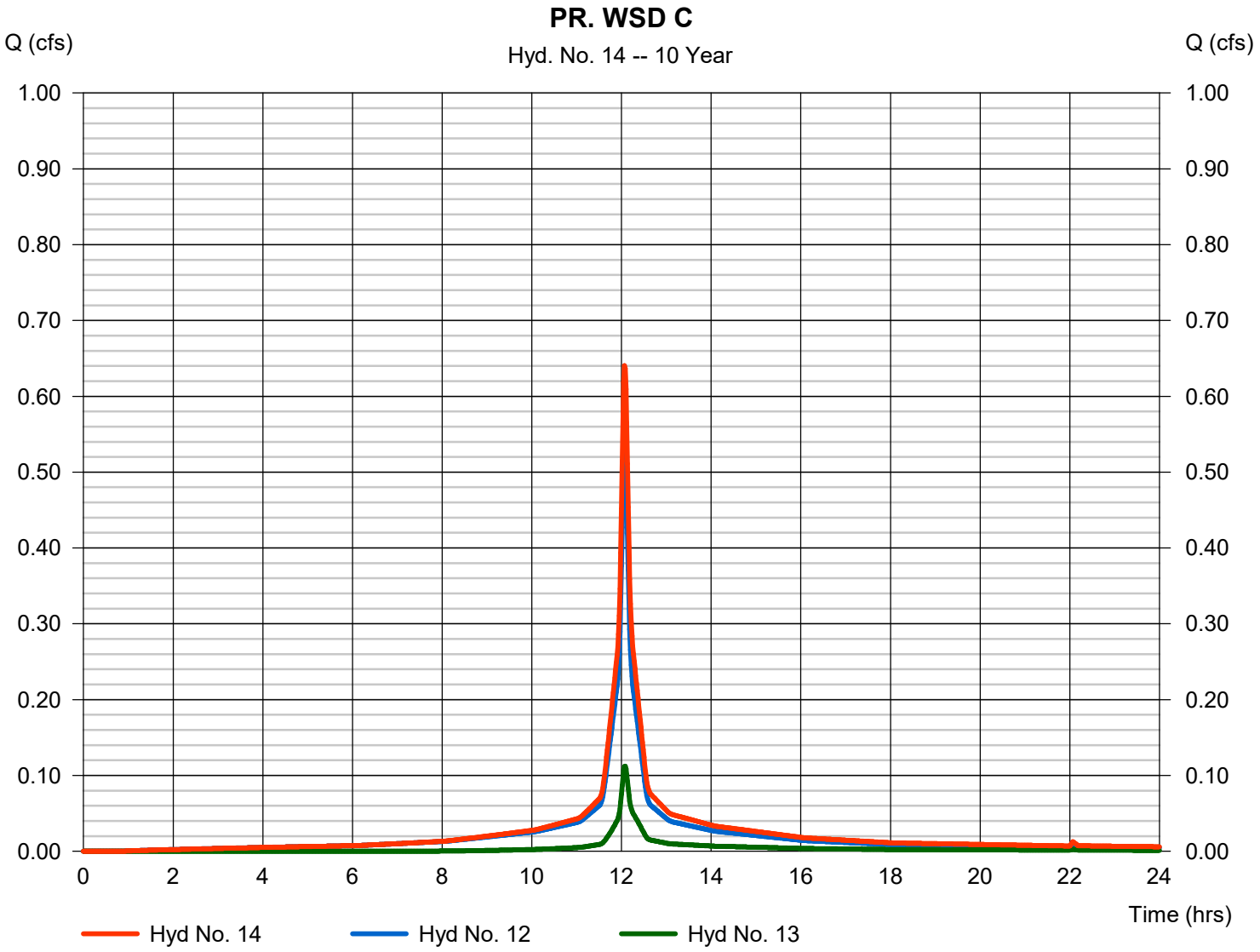


Hydrograph Report

Hyd. No. 14

PR. WSD C

Hydrograph type	= Combine	Peak discharge	= 0.640 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.07 hrs
Time interval	= 1 min	Hyd. volume	= 2,212 cuft
Inflow hyds.	= 12, 13	Contrib. drain. area	= 0.130 ac

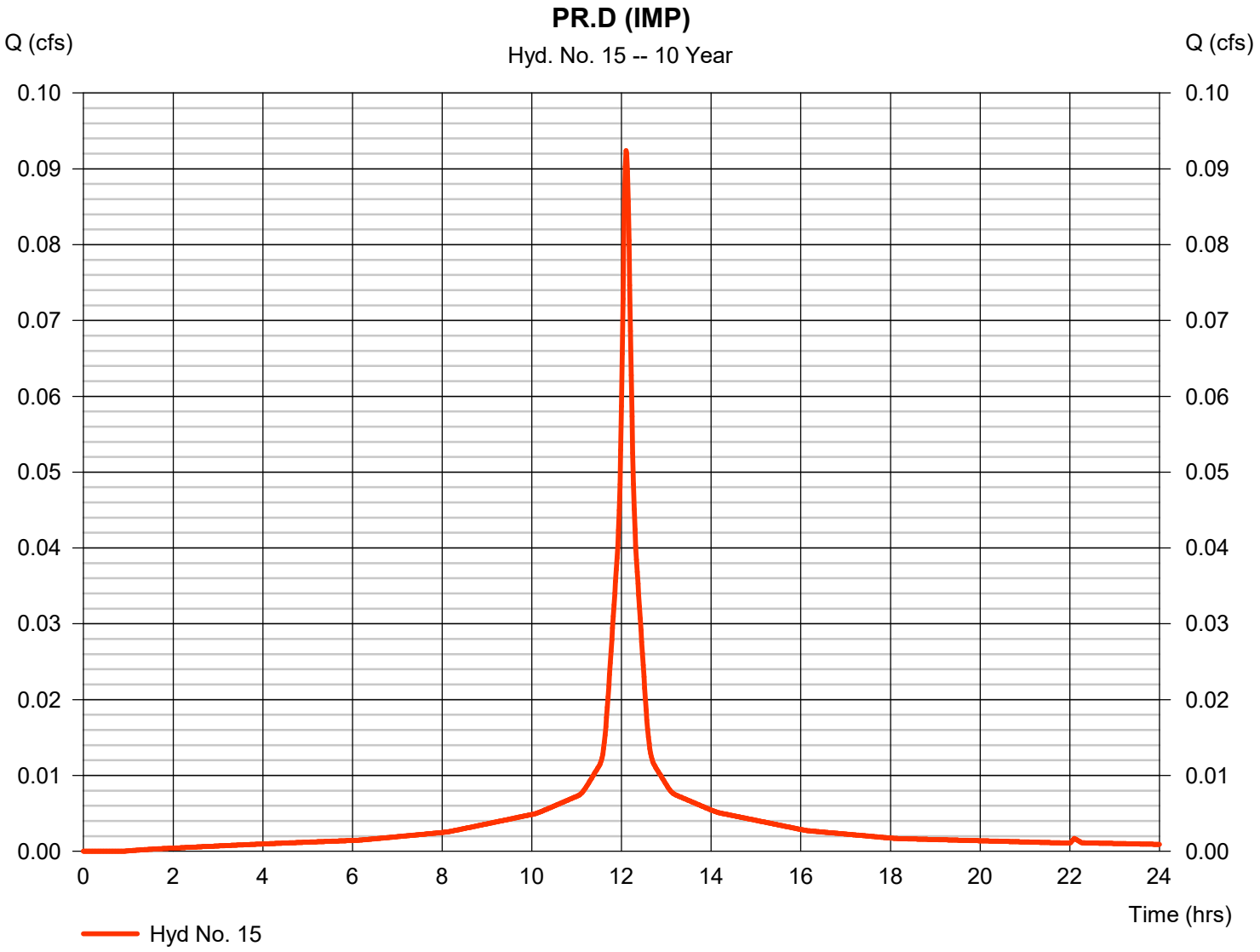


Hydrograph Report

Hyd. No. 15

PR.D (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.092 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.10 hrs
Time interval	=	1 min	Hyd. volume	=	362 cuft
Drainage area	=	0.020 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

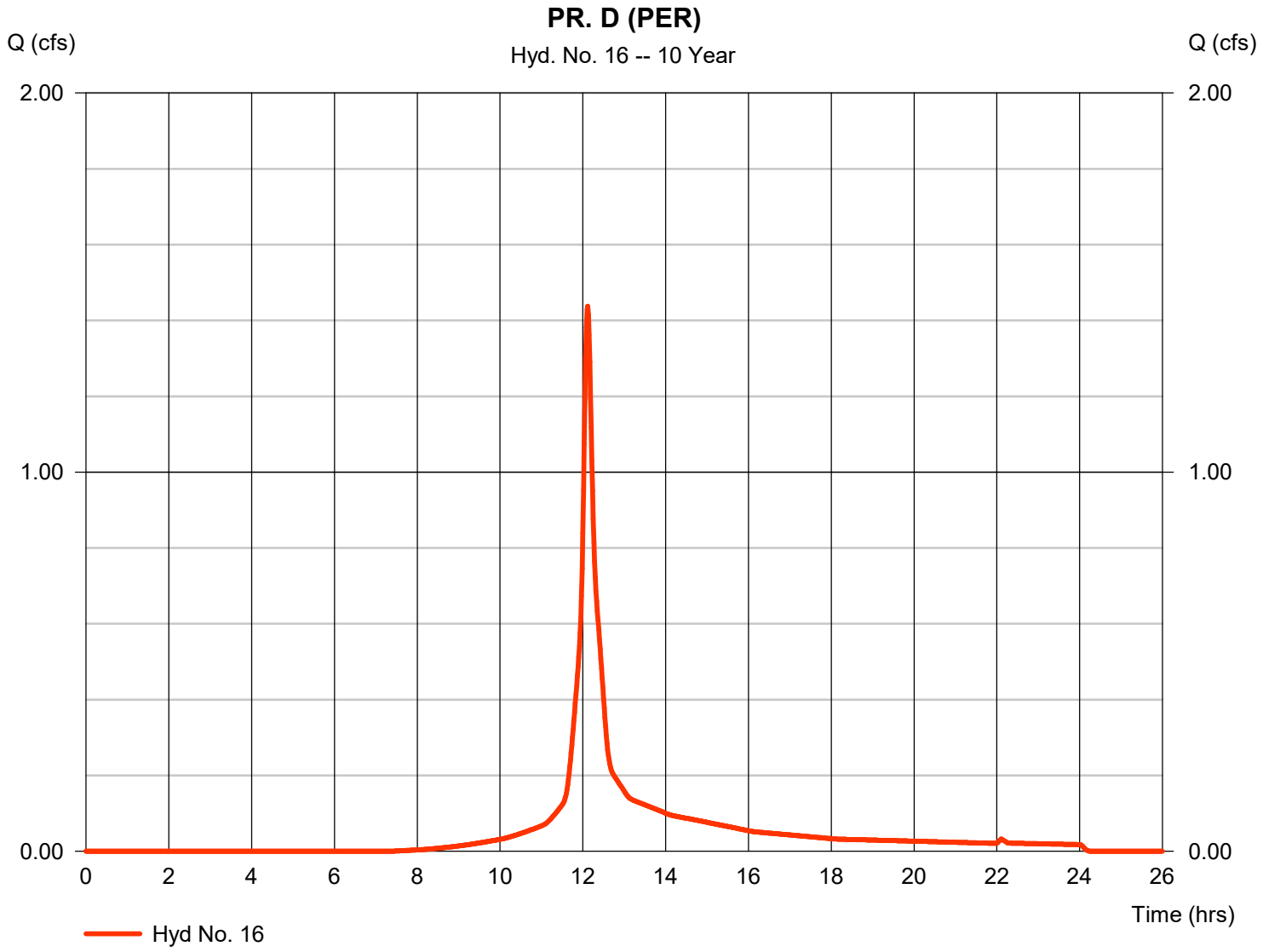


Hydrograph Report

Hyd. No. 16

PR. D (PER)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.438 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 4,928 cuft
Drainage area	= 0.440 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.00 min
Total precip.	= 5.22 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

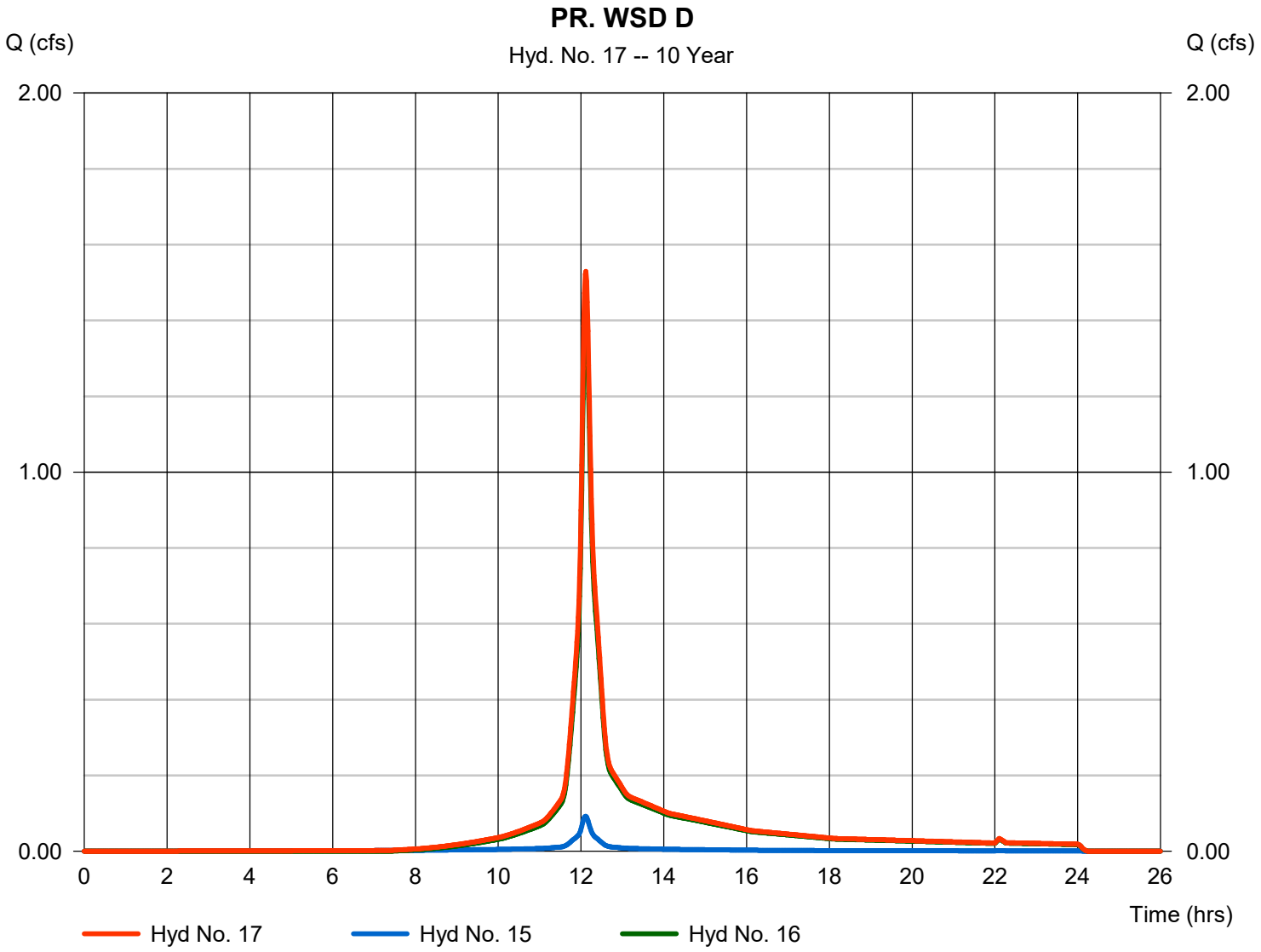


Hydrograph Report

Hyd. No. 17

PR. WSD D

Hydrograph type	=	Combine	Peak discharge	=	1.530 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.12 hrs
Time interval	=	1 min	Hyd. volume	=	5,290 cuft
Inflow hyds.	=	15, 16	Contrib. drain. area	=	0.460 ac

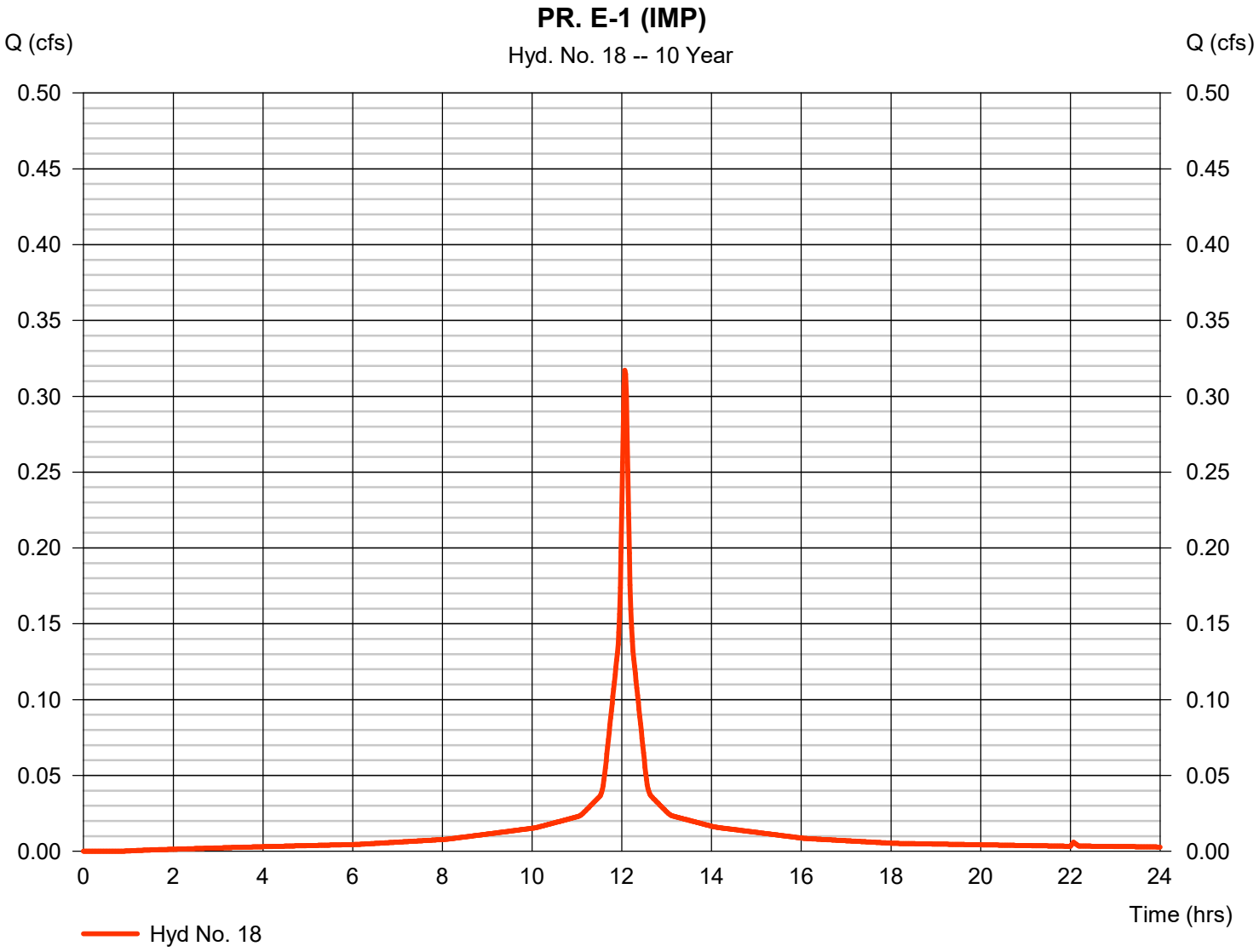


Hydrograph Report

Hyd. No. 18

PR. E-1 (IMP)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.317 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.07 hrs
Time interval	= 1 min	Hyd. volume	= 1,119 cuft
Drainage area	= 0.060 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.22 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

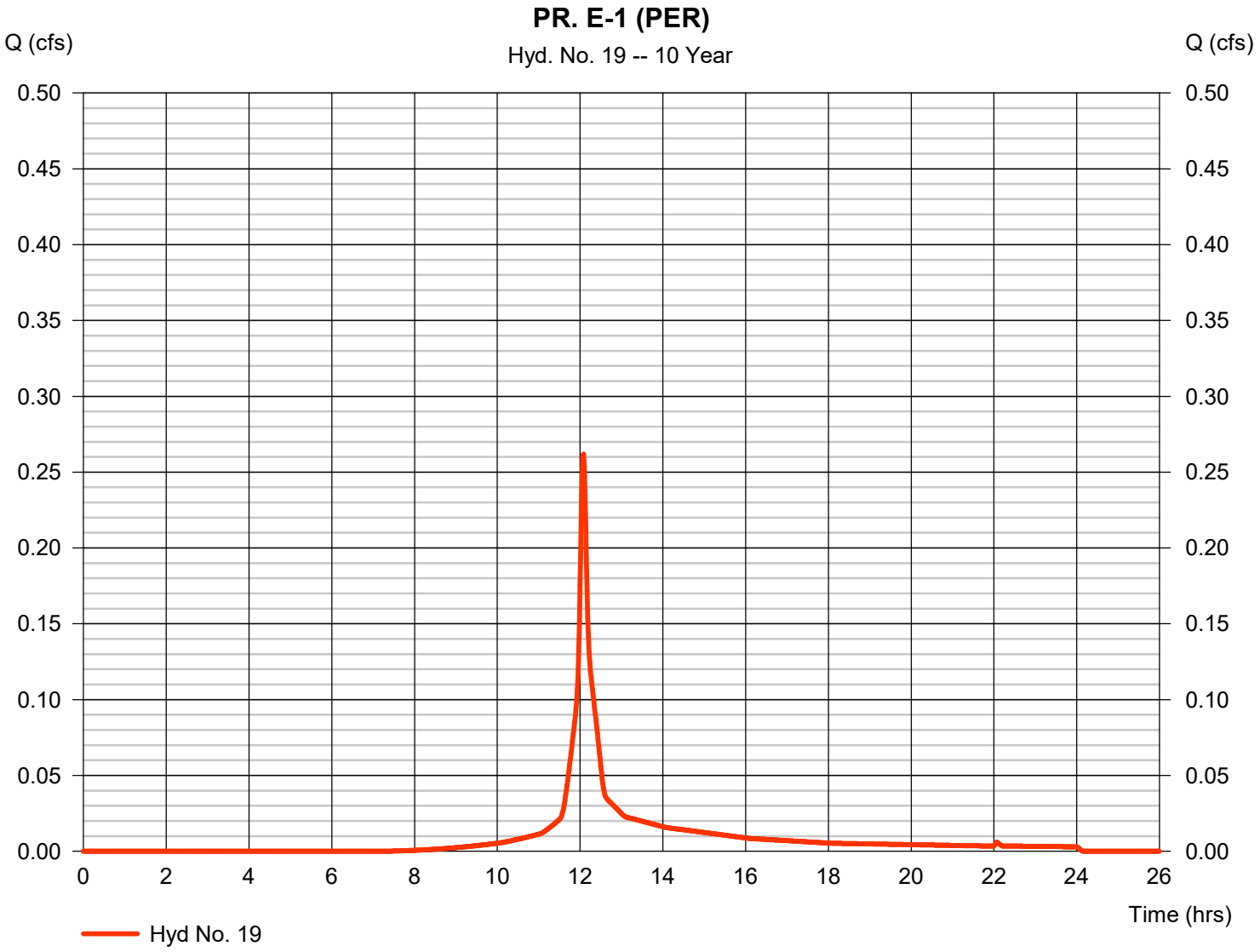


Hydrograph Report

Hyd. No. 19

PR. E-1 (PER)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.262 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.08 hrs
Time interval	= 1 min	Hyd. volume	= 809 cuft
Drainage area	= 0.070 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.22 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

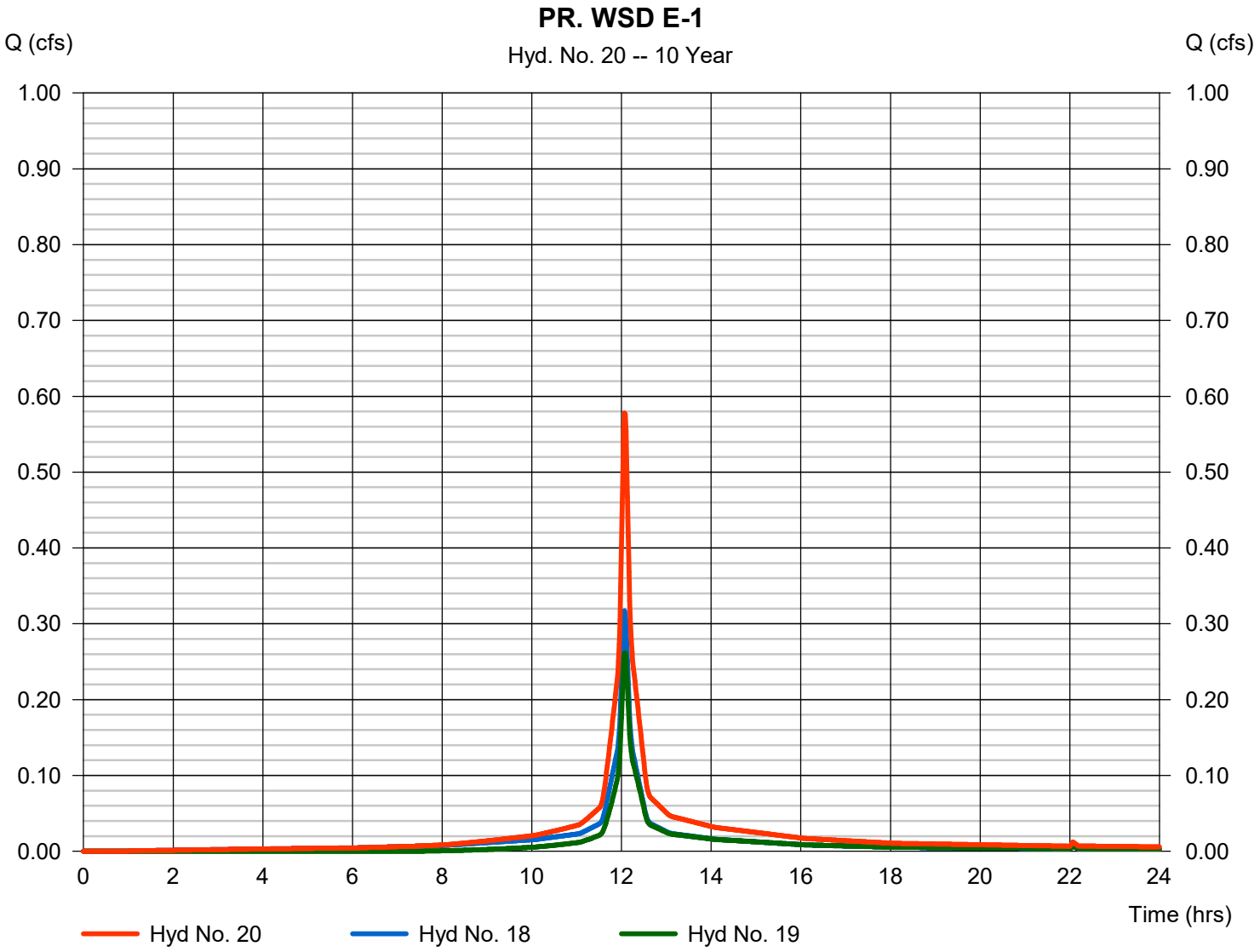


Hydrograph Report

Hyd. No. 20

PR. WSD E-1

Hydrograph type	=	Combine	Peak discharge	=	0.578 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	1,928 cuft
Inflow hyds.	=	18, 19	Contrib. drain. area	=	0.130 ac



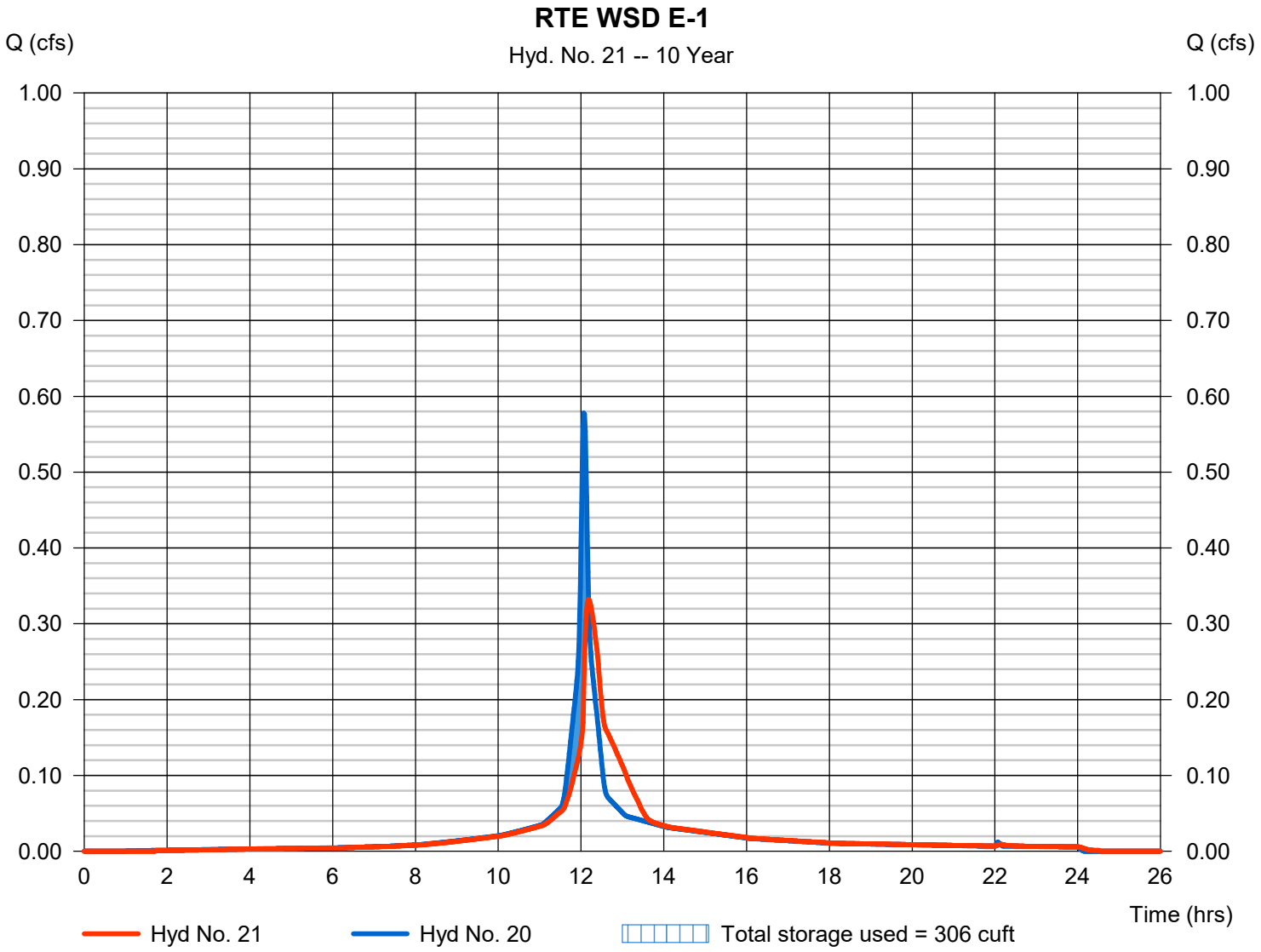
Hydrograph Report

Hyd. No. 21

RTE WSD E-1

Hydrograph type	=	Reservoir	Peak discharge	=	0.332 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.18 hrs
Time interval	=	1 min	Hyd. volume	=	1,926 cuft
Inflow hyd. No.	=	20 - PR. WSD E-1	Max. Elevation	=	252.68 ft
Reservoir name	=	BASIN-3	Max. Storage	=	306 cuft

Storage Indication method used.

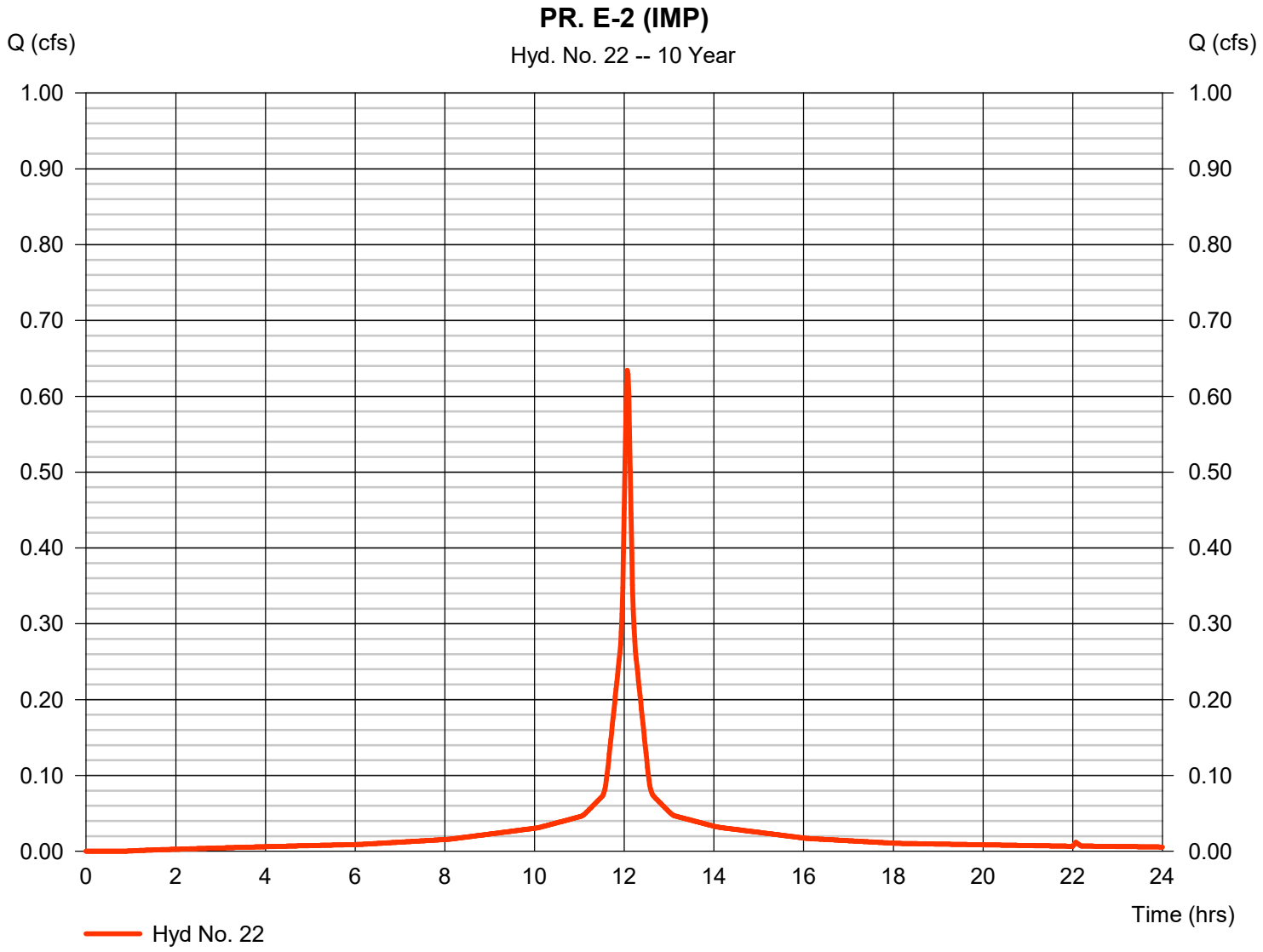


Hydrograph Report

Hyd. No. 22

PR. E-2 (IMP)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.634 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.07 hrs
Time interval	= 1 min	Hyd. volume	= 2,238 cuft
Drainage area	= 0.120 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.22 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

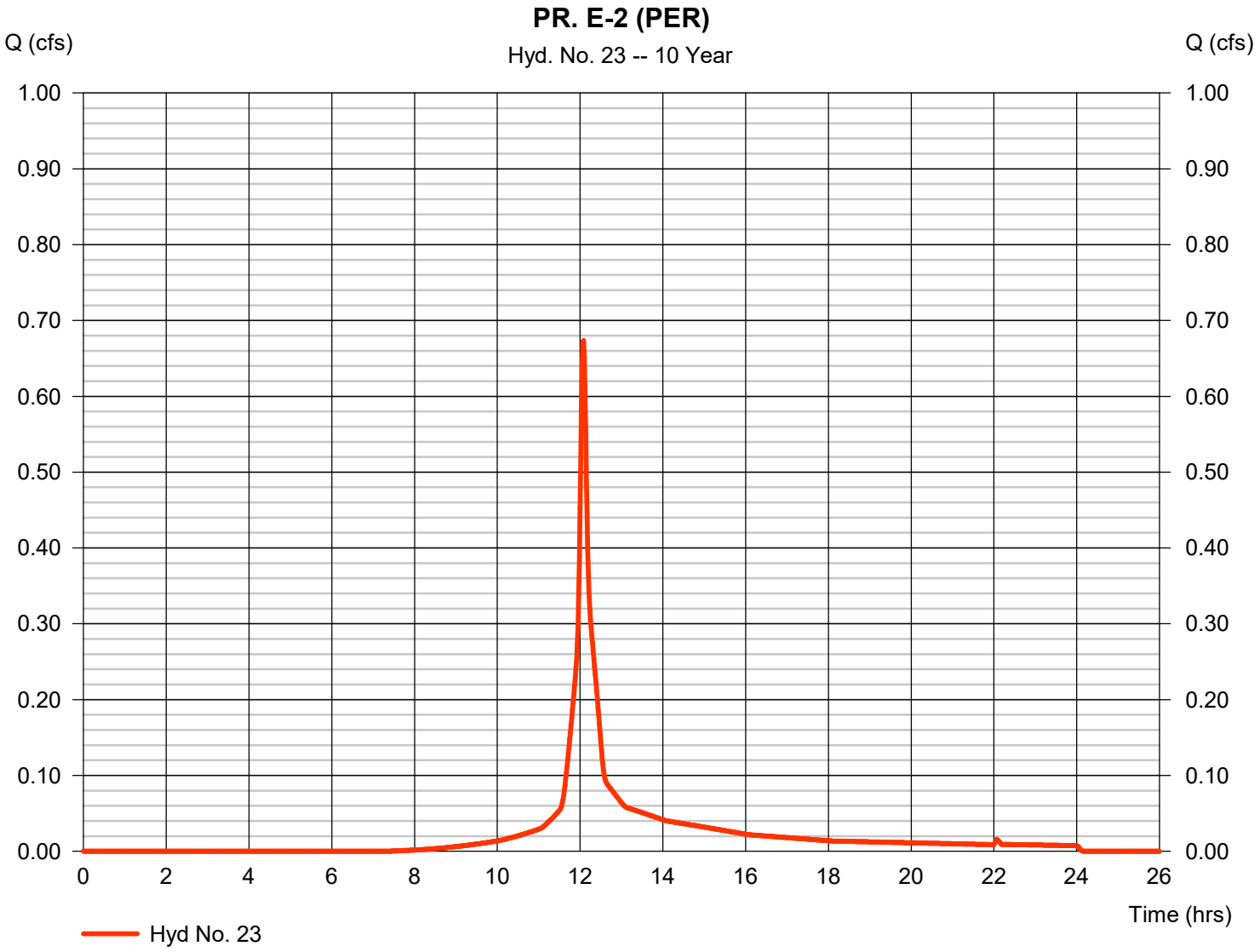


Hydrograph Report

Hyd. No. 23

PR. E-2 (PER)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.673 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.08 hrs
Time interval	= 1 min	Hyd. volume	= 2,079 cuft
Drainage area	= 0.180 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.22 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

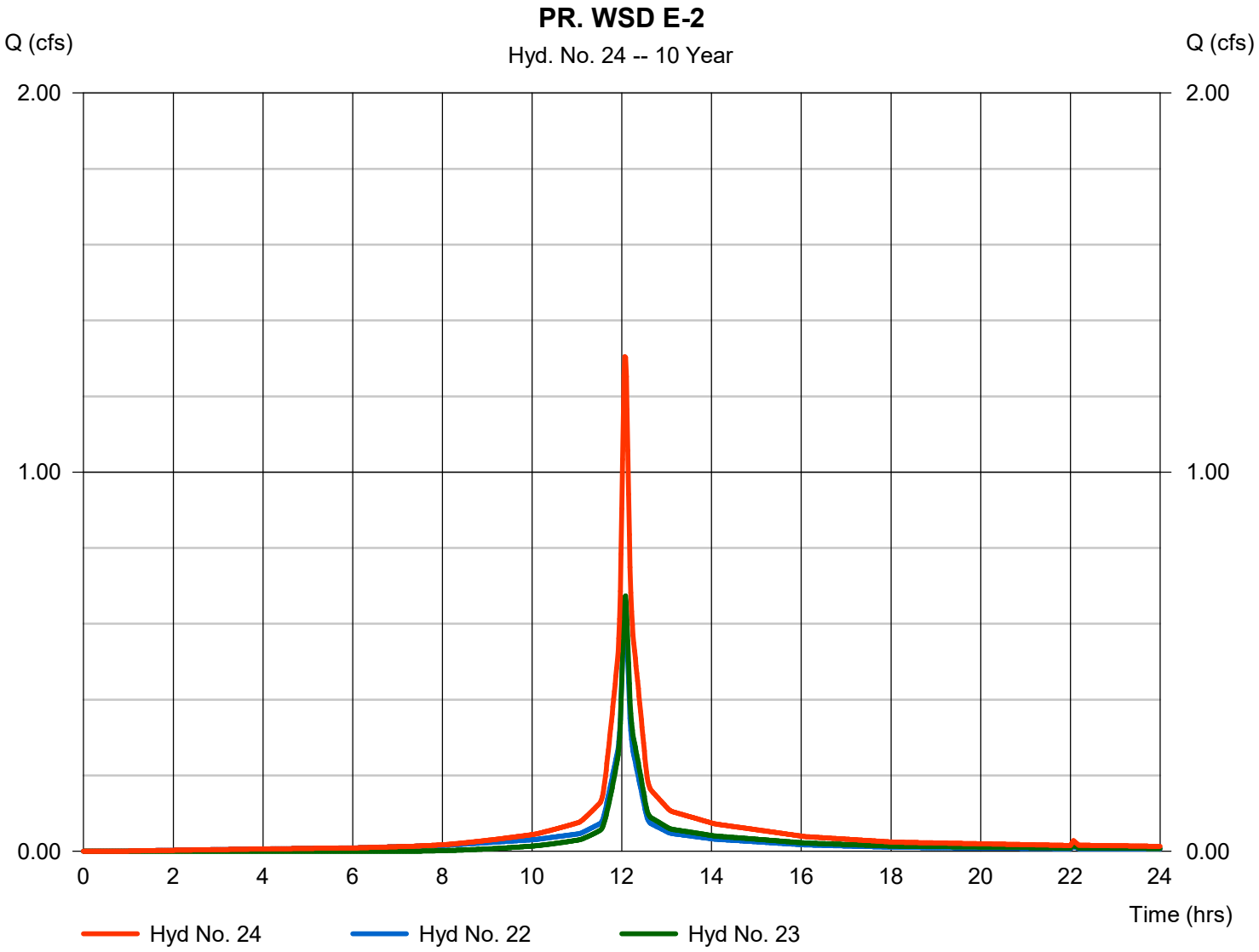


Hydrograph Report

Hyd. No. 24

PR. WSD E-2

Hydrograph type	= Combine	Peak discharge	= 1.305 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.07 hrs
Time interval	= 1 min	Hyd. volume	= 4,318 cuft
Inflow hyds.	= 22, 23	Contrib. drain. area	= 0.300 ac

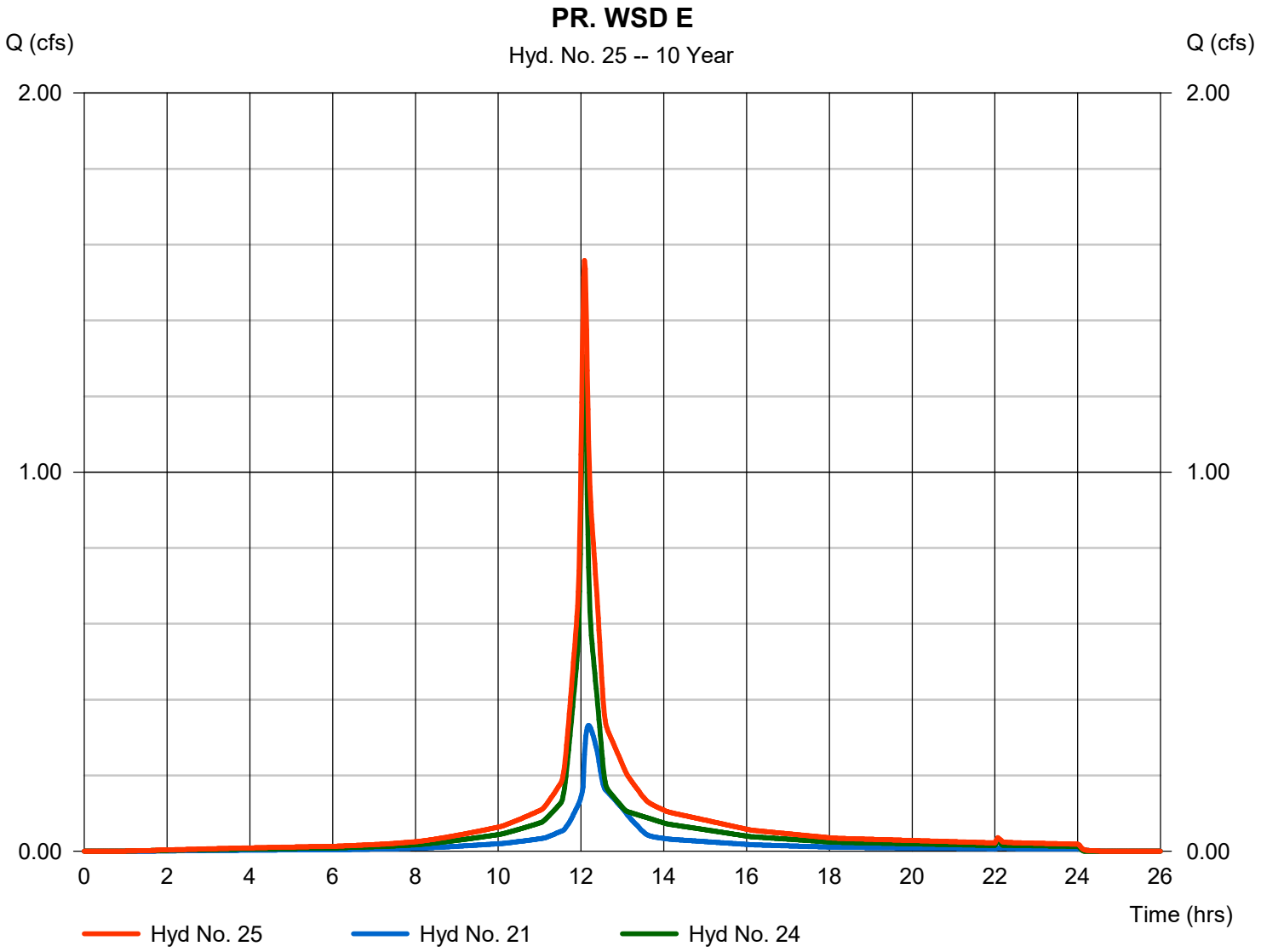


Hydrograph Report

Hyd. No. 25

PR. WSD E

Hydrograph type	= Combine	Peak discharge	= 1.558 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.08 hrs
Time interval	= 1 min	Hyd. volume	= 6,243 cuft
Inflow hyds.	= 21, 24	Contrib. drain. area	= 0.000 ac

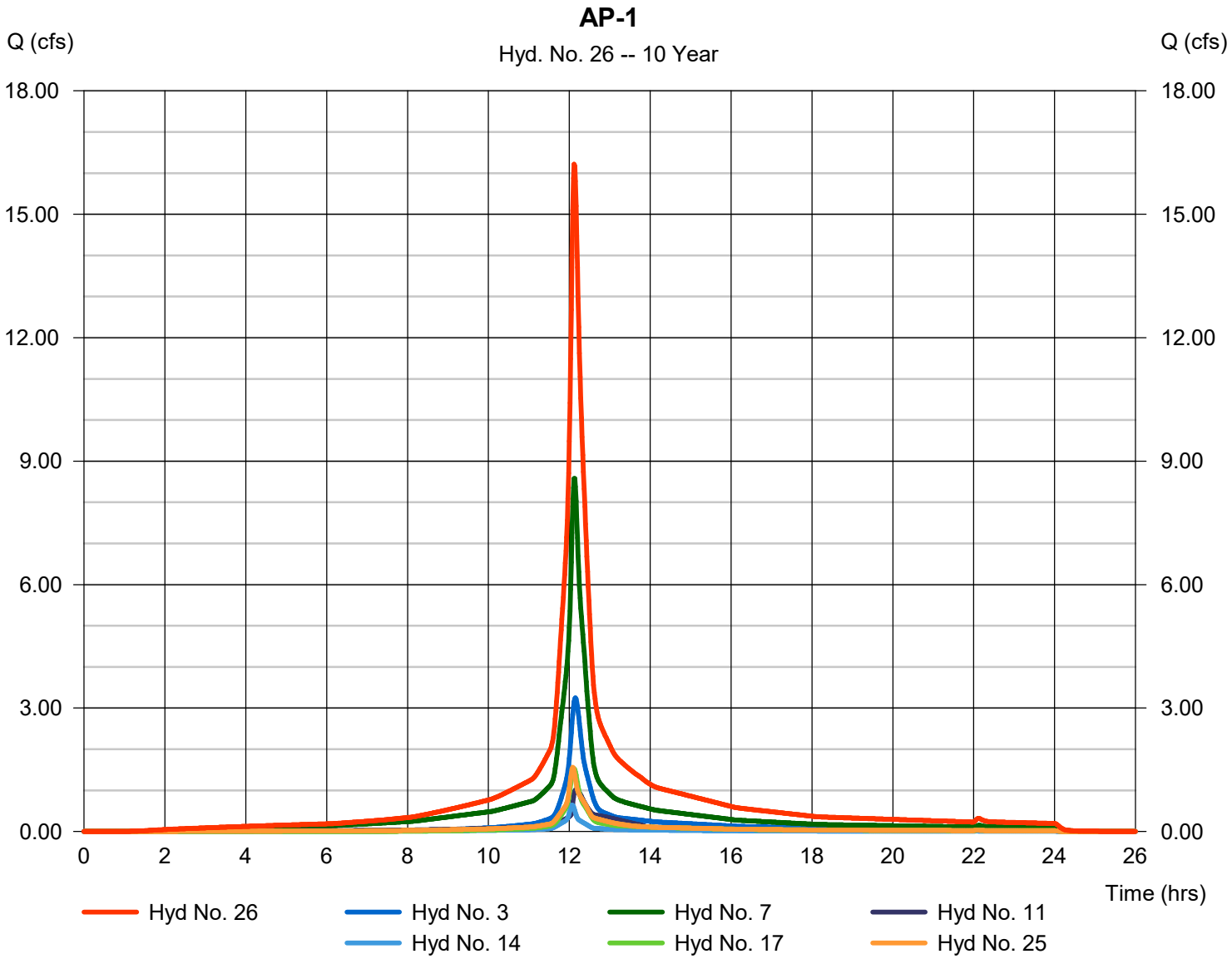


Hydrograph Report

Hyd. No. 26

AP-1

Hydrograph type	= Combine	Peak discharge	= 16.22 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 68,127 cuft
Inflow hyds.	= 3, 7, 11, 14, 17, 25	Contrib. drain. area	= 0.000 ac

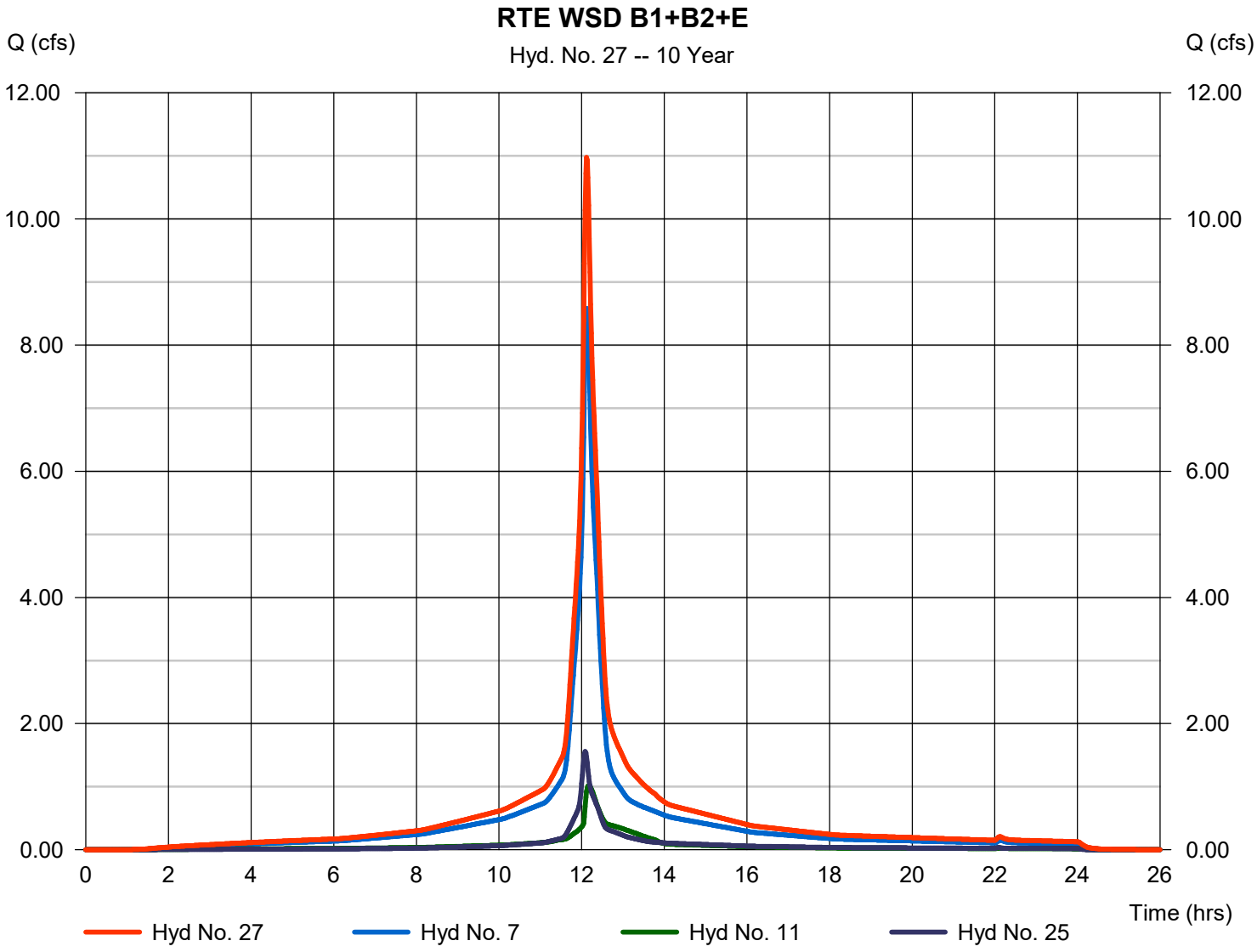


Hydrograph Report

Hyd. No. 27

RTE WSD B1+B2+E

Hydrograph type	= Combine	Peak discharge	= 10.97 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 48,218 cuft
Inflow hyds.	= 7, 11, 25	Contrib. drain. area	= 0.000 ac

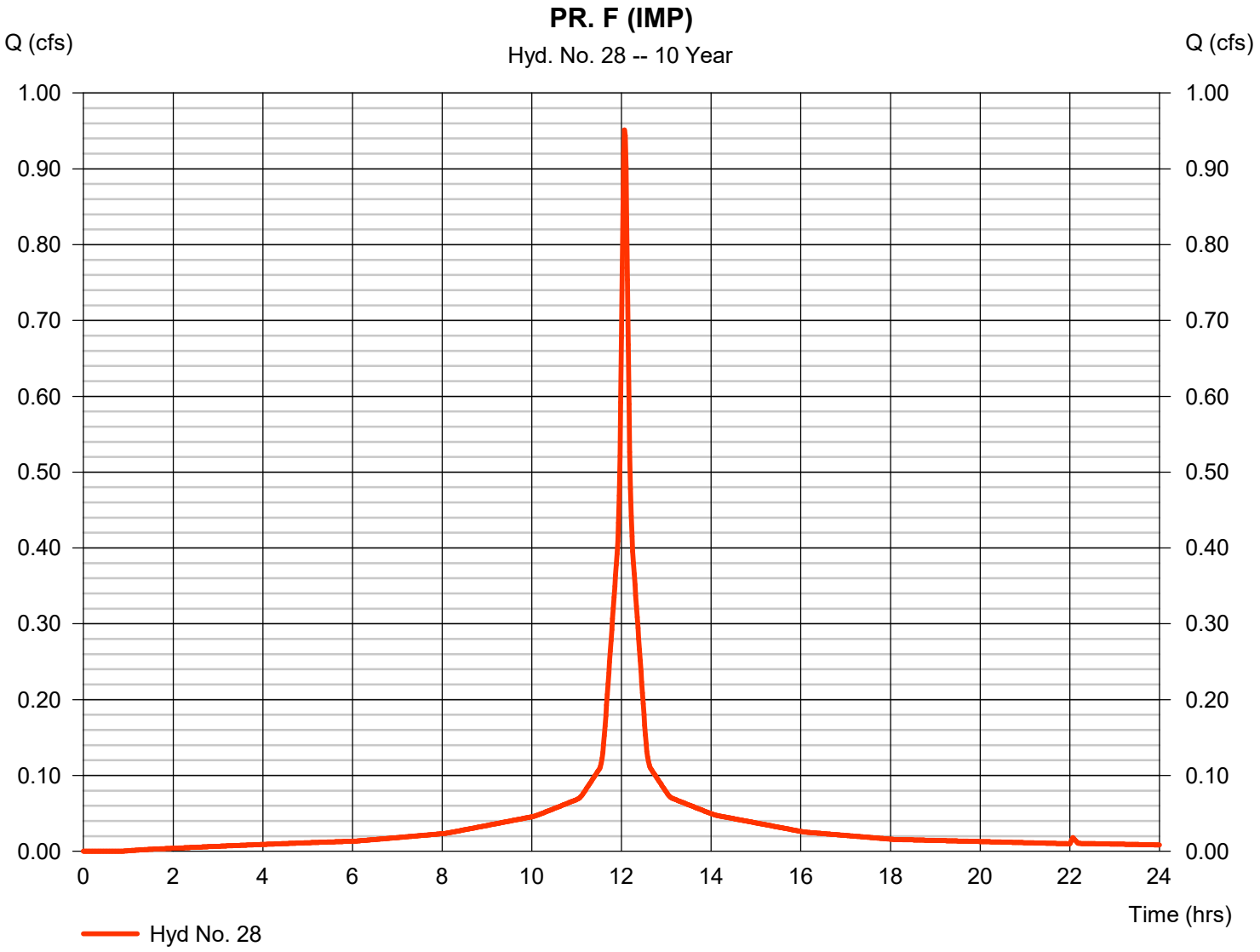


Hydrograph Report

Hyd. No. 28

PR. F (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.951 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	3,358 cuft
Drainage area	=	0.180 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

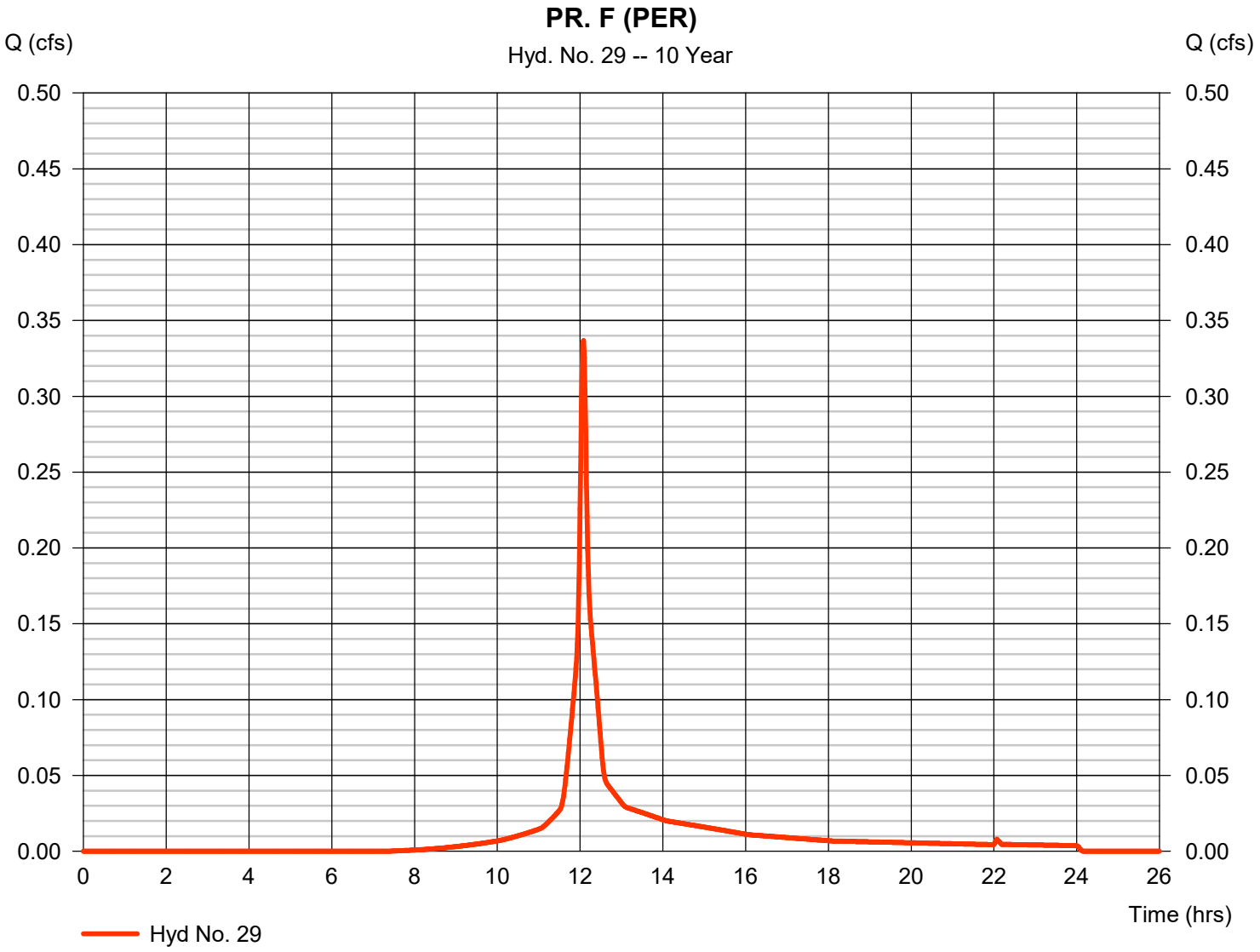


Hydrograph Report

Hyd. No. 29

PR. F (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.337 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.08 hrs
Time interval	=	1 min	Hyd. volume	=	1,040 cuft
Drainage area	=	0.090 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.22 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

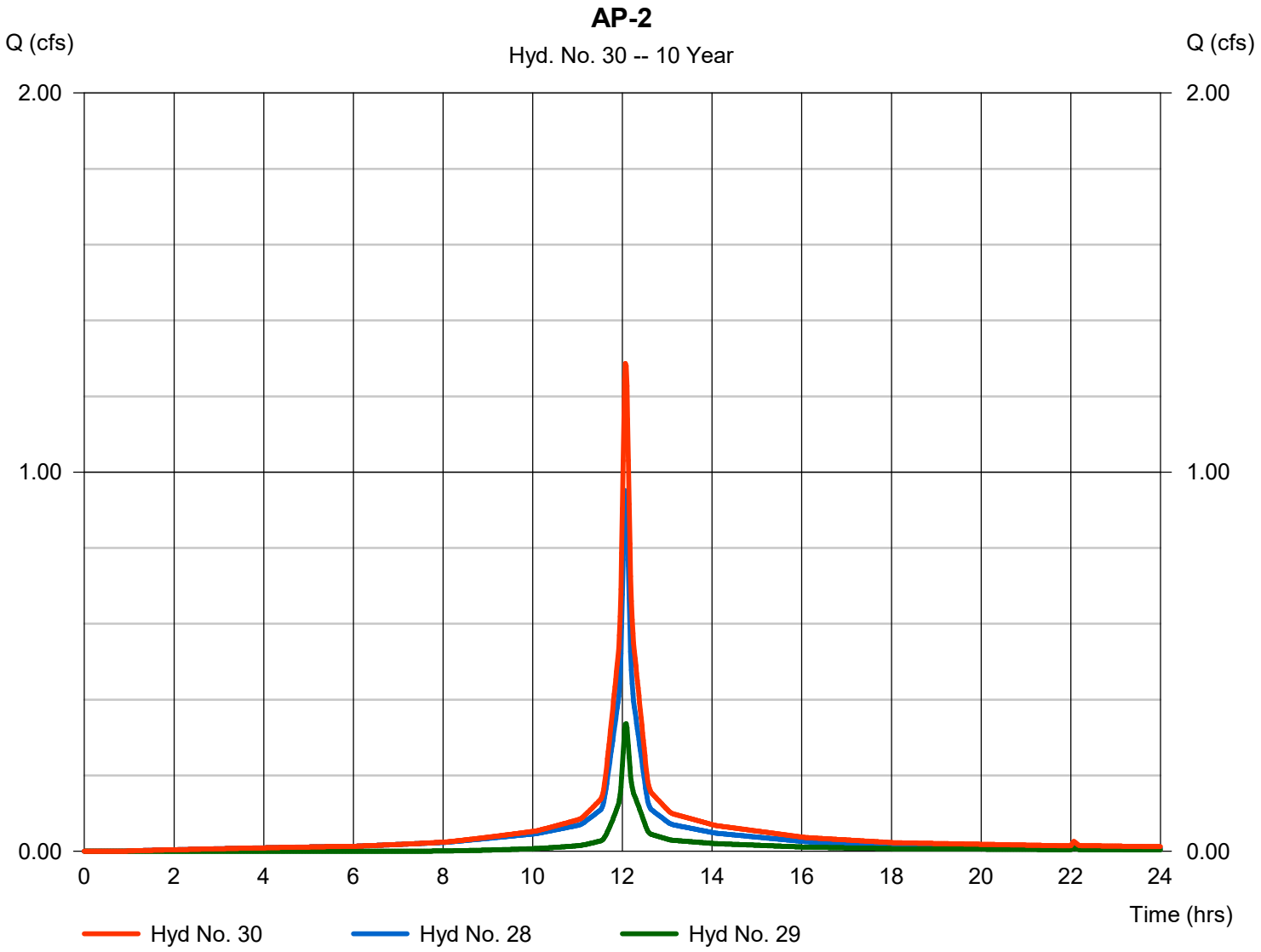


Hydrograph Report

Hyd. No. 30

AP-2

Hydrograph type	=	Combine	Peak discharge	=	1.287 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	4,397 cuft
Inflow hyds.	=	28, 29	Contrib. drain. area	=	0.270 ac



25-YEAR STORM CALCULATIONS

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

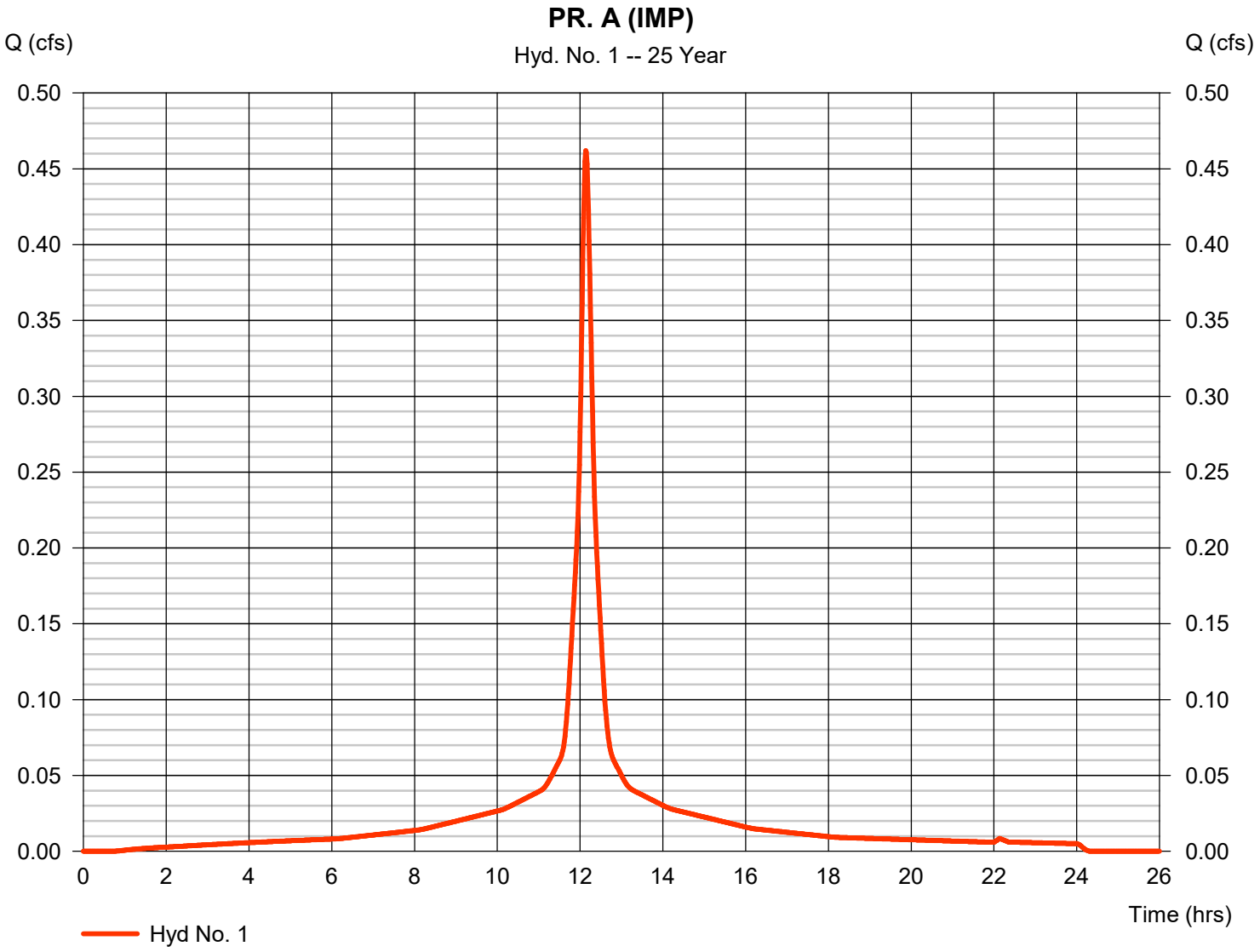
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.462	1	728	1,994	------	------	------	PR. A (IMP)
2	SCS Runoff	3.871	1	729	14,639	------	------	------	PR. A (PER)
3	Combine	4.332	1	729	16,634	1, 2	------	------	PR. WSD A
4	SCS Runoff	12.41	1	724	44,108	------	------	------	PR. B-1 (IMP)
5	SCS Runoff	0.302	1	725	939	------	------	------	PR. B-1 (PER)
6	Combine	12.71	1	724	45,047	4, 5	------	------	PR. WSD B-1
7	Reservoir	10.60	1	728	45,044	6	231.42	2,912	RTE WSD B-1
8	SCS Runoff	1.764	1	724	6,268	------	------	------	PR. B-2 (IMP)
9	SCS Runoff	0.352	1	725	1,095	------	------	------	PR. B-2 (PER)
10	Combine	2.116	1	724	7,363	8, 9	------	------	PR. B-2
11	Reservoir	1.336	1	730	7,362	10	234.95	1,184	RTE WSD B-2
12	SCS Runoff	0.653	1	724	2,321	------	------	------	PR. C (IMP)
13	SCS Runoff	0.151	1	725	469	------	------	------	PR. C (PER)
14	Combine	0.804	1	724	2,791	12, 13	------	------	PR. WSD C
15	SCS Runoff	0.114	1	726	450	------	------	------	PR.D (IMP)
16	SCS Runoff	1.936	1	727	6,677	------	------	------	PR. D (PER)
17	Combine	2.050	1	727	7,127	15, 16	------	------	PR. WSD D
18	SCS Runoff	0.392	1	724	1,393	------	------	------	PR. E-1 (IMP)
19	SCS Runoff	0.352	1	725	1,095	------	------	------	PR. E-1 (PER)
20	Combine	0.744	1	724	2,488	18, 19	------	------	PR. WSD E-1
21	Reservoir	0.424	1	731	2,487	20	253.11	398	RTE WSD E-1
22	SCS Runoff	0.784	1	724	2,786	------	------	------	PR. E-2 (IMP)
23	SCS Runoff	0.906	1	725	2,817	------	------	------	PR. E-2 (PER)
24	Combine	1.688	1	724	5,603	22, 23	------	------	PR. WSD E-2
25	Combine	2.041	1	725	8,089	21, 24	------	------	PR. WSD E
26	Combine	20.75	1	727	87,047	3, 7, 11, 14, 17, 25	------	------	AP-1
27	Combine	13.77	1	727	60,495	7, 11, 25,	------	------	RTE WSD B1+B2+E
28	SCS Runoff	1.176	1	724	4,179	------	------	------	PR. F (IMP)
29	SCS Runoff	0.453	1	725	1,408	------	------	------	PR. F (PER)
30	Combine	1.628	1	724	5,587	28, 29	------	------	AP-2

Hydrograph Report

Hyd. No. 1

PR. A (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.462 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.13 hrs
Time interval	=	1 min	Hyd. volume	=	1,994 cuft
Drainage area	=	0.090 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

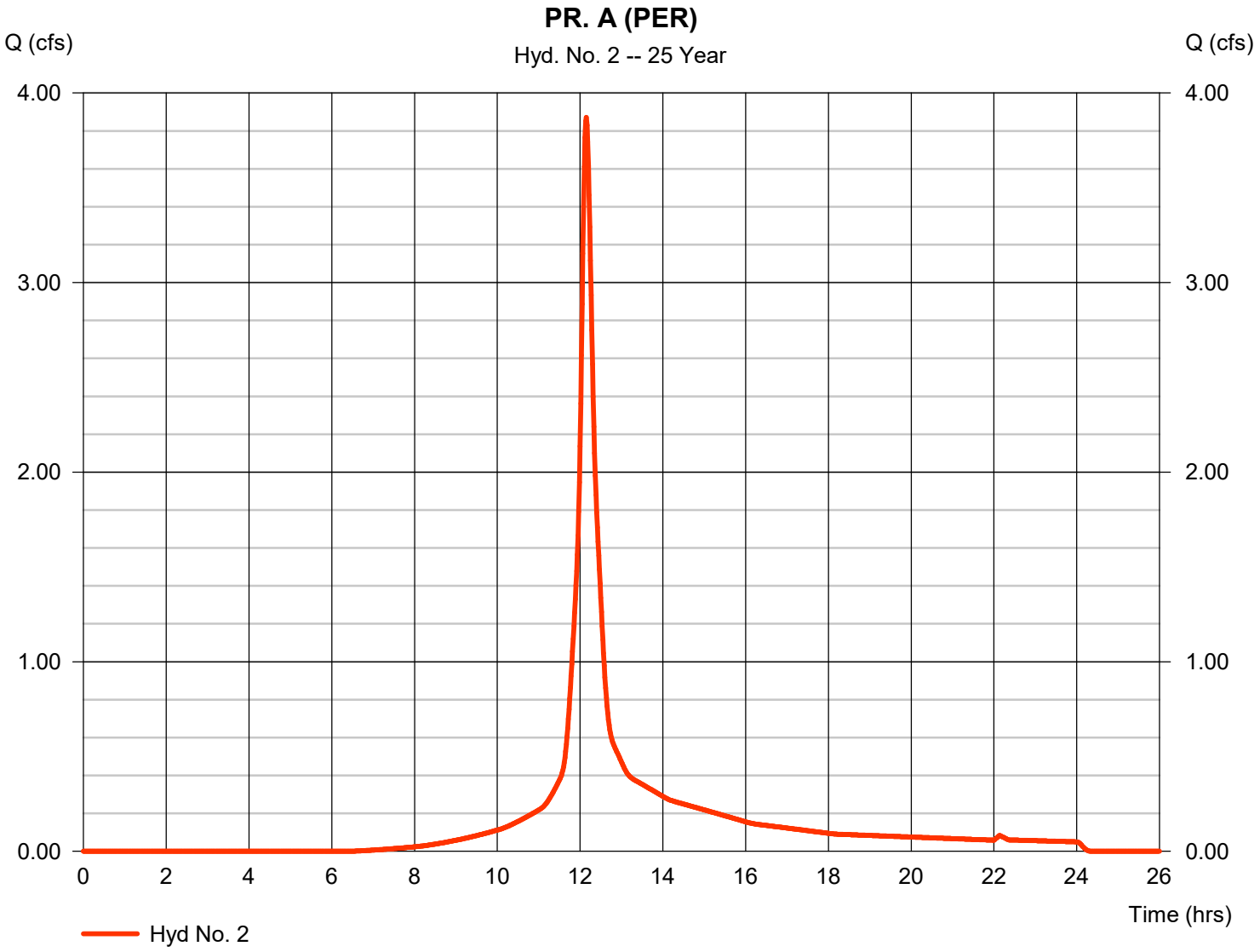


Hydrograph Report

Hyd. No. 2

PR. A (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.871 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.15 hrs
Time interval	=	1 min	Hyd. volume	=	14,639 cuft
Drainage area	=	0.980 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

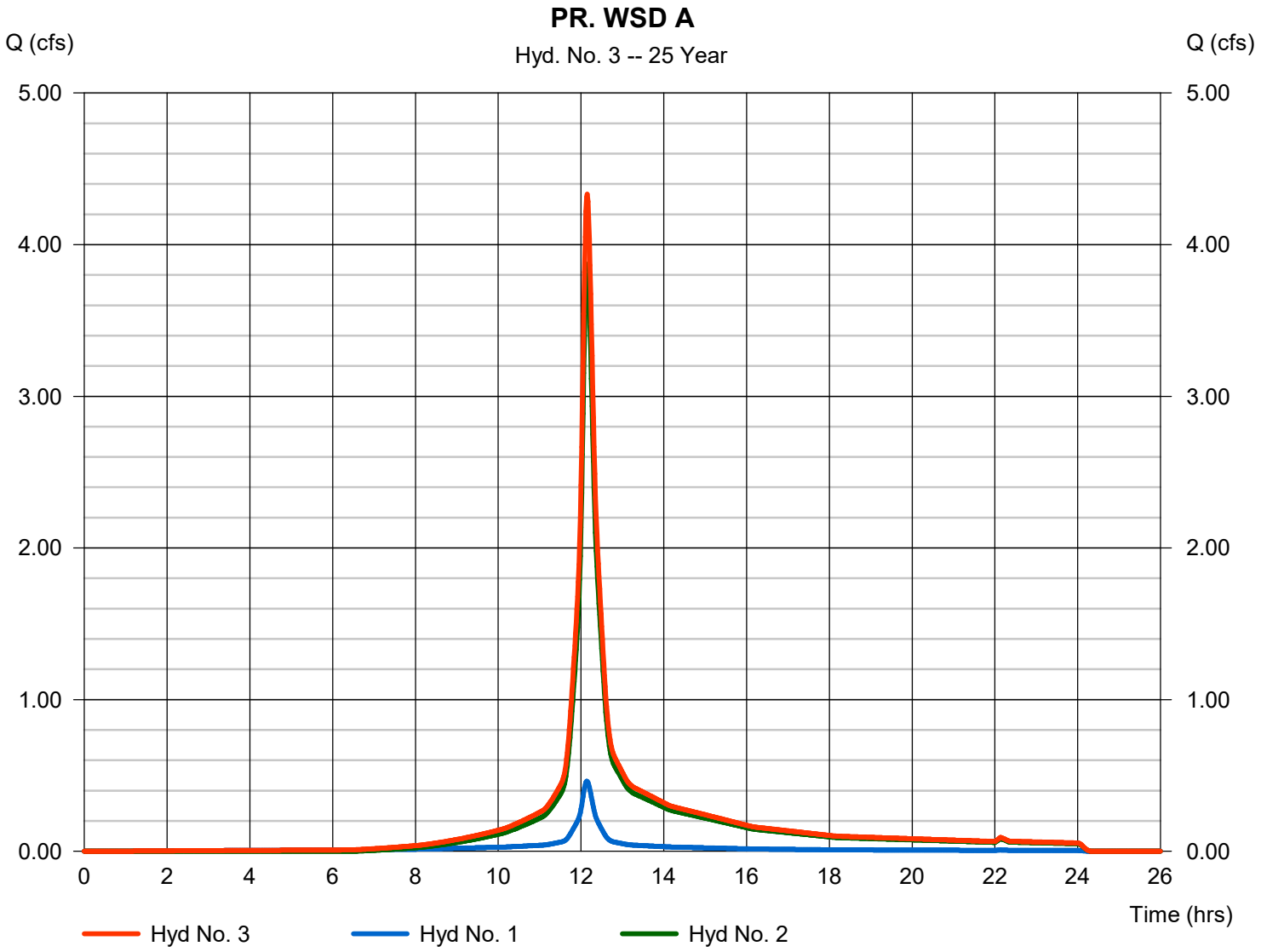


Hydrograph Report

Hyd. No. 3

PR. WSD A

Hydrograph type	=	Combine	Peak discharge	=	4.332 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.15 hrs
Time interval	=	1 min	Hyd. volume	=	16,634 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	1.070 ac

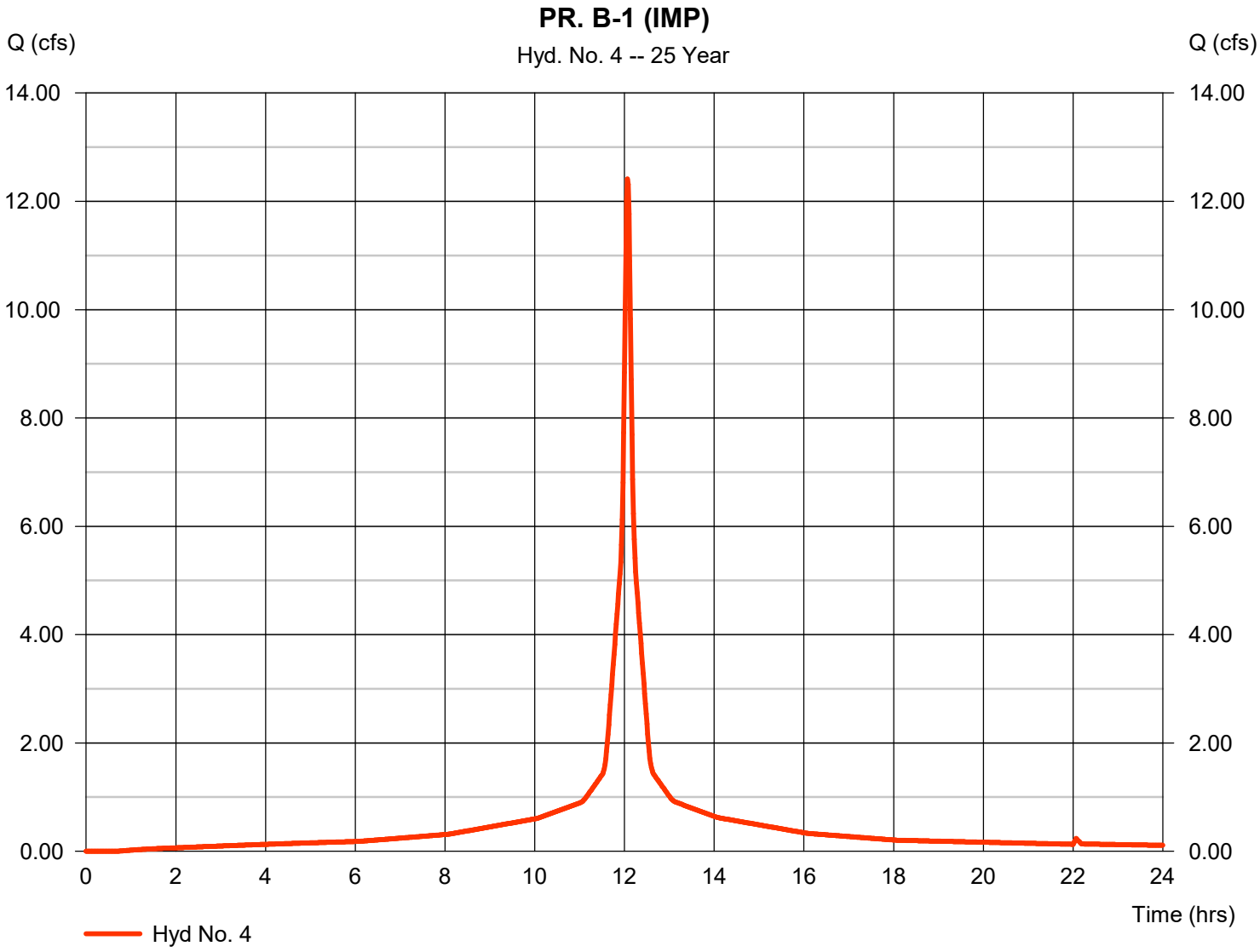


Hydrograph Report

Hyd. No. 4

PR. B-1 (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	12.41 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	44,108 cuft
Drainage area	=	1.900 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

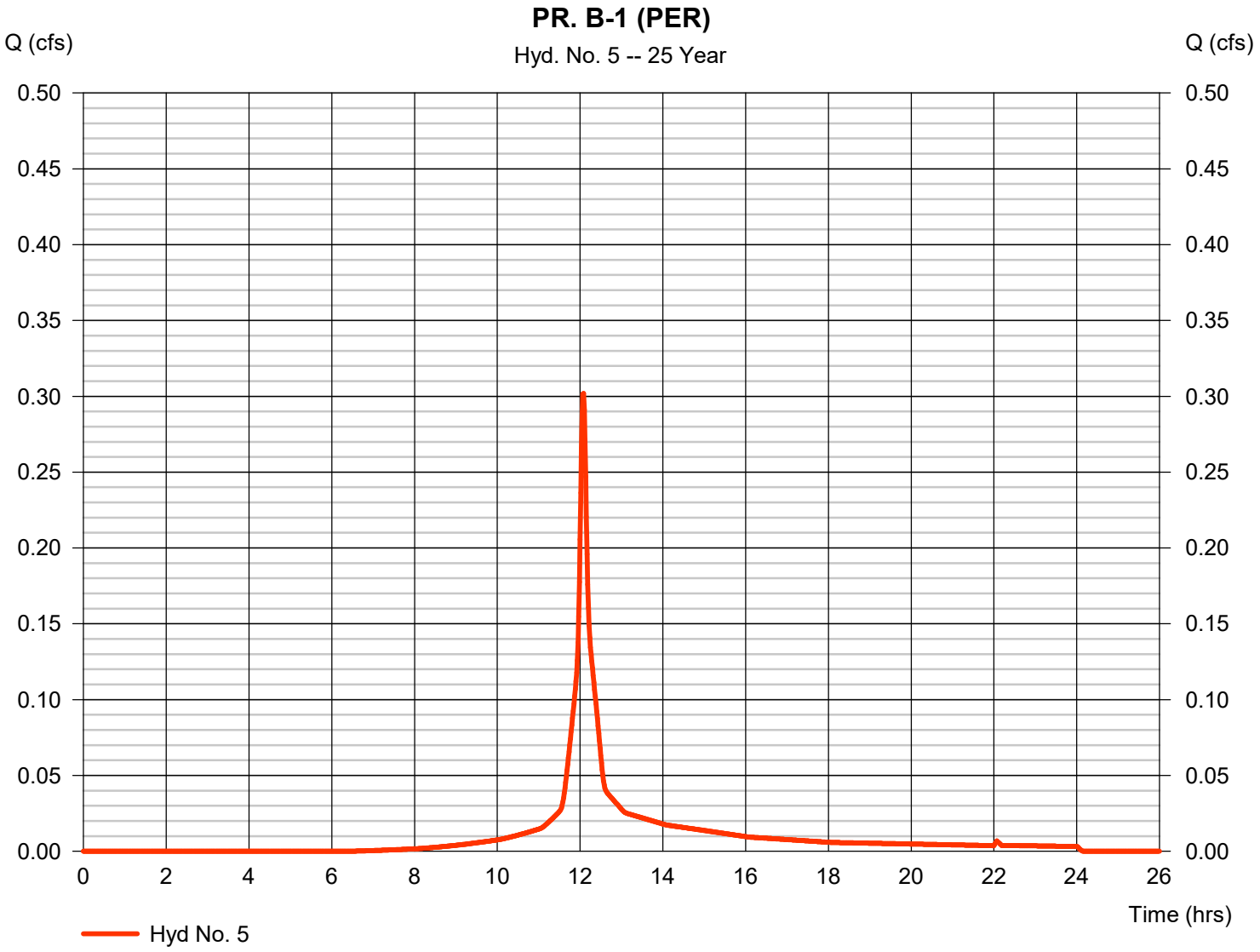


Hydrograph Report

Hyd. No. 5

PR. B-1 (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.302 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.08 hrs
Time interval	=	1 min	Hyd. volume	=	939 cuft
Drainage area	=	0.060 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

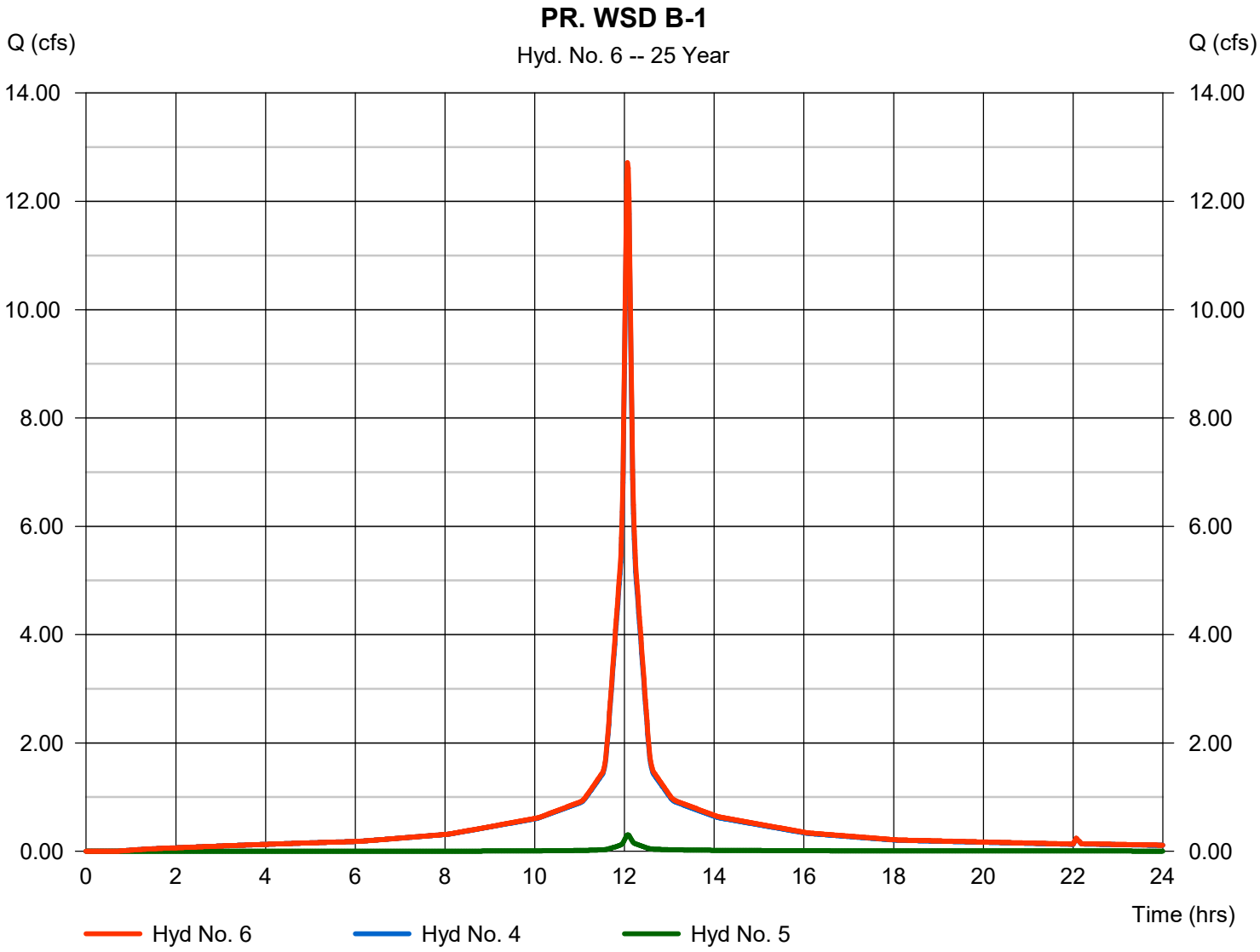


Hydrograph Report

Hyd. No. 6

PR. WSD B-1

Hydrograph type	= Combine	Peak discharge	= 12.71 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.07 hrs
Time interval	= 1 min	Hyd. volume	= 45,047 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 1.960 ac



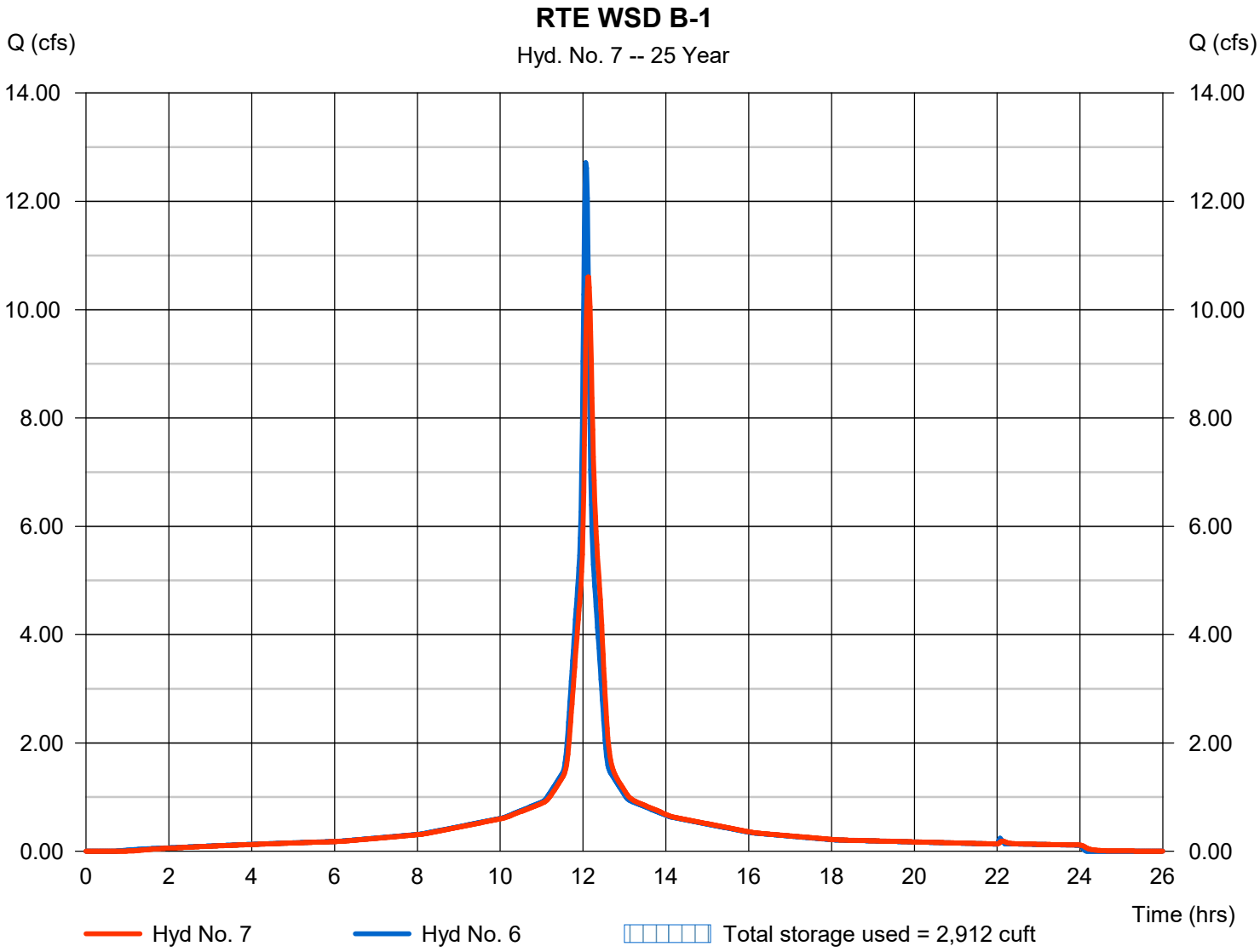
Hydrograph Report

Hyd. No. 7

RTE WSD B-1

Hydrograph type	=	Reservoir	Peak discharge	=	10.60 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.13 hrs
Time interval	=	1 min	Hyd. volume	=	45,044 cuft
Inflow hyd. No.	=	6 - PR. WSD B-1	Max. Elevation	=	231.42 ft
Reservoir name	=	BASIN-1	Max. Storage	=	2,912 cuft

Storage Indication method used.

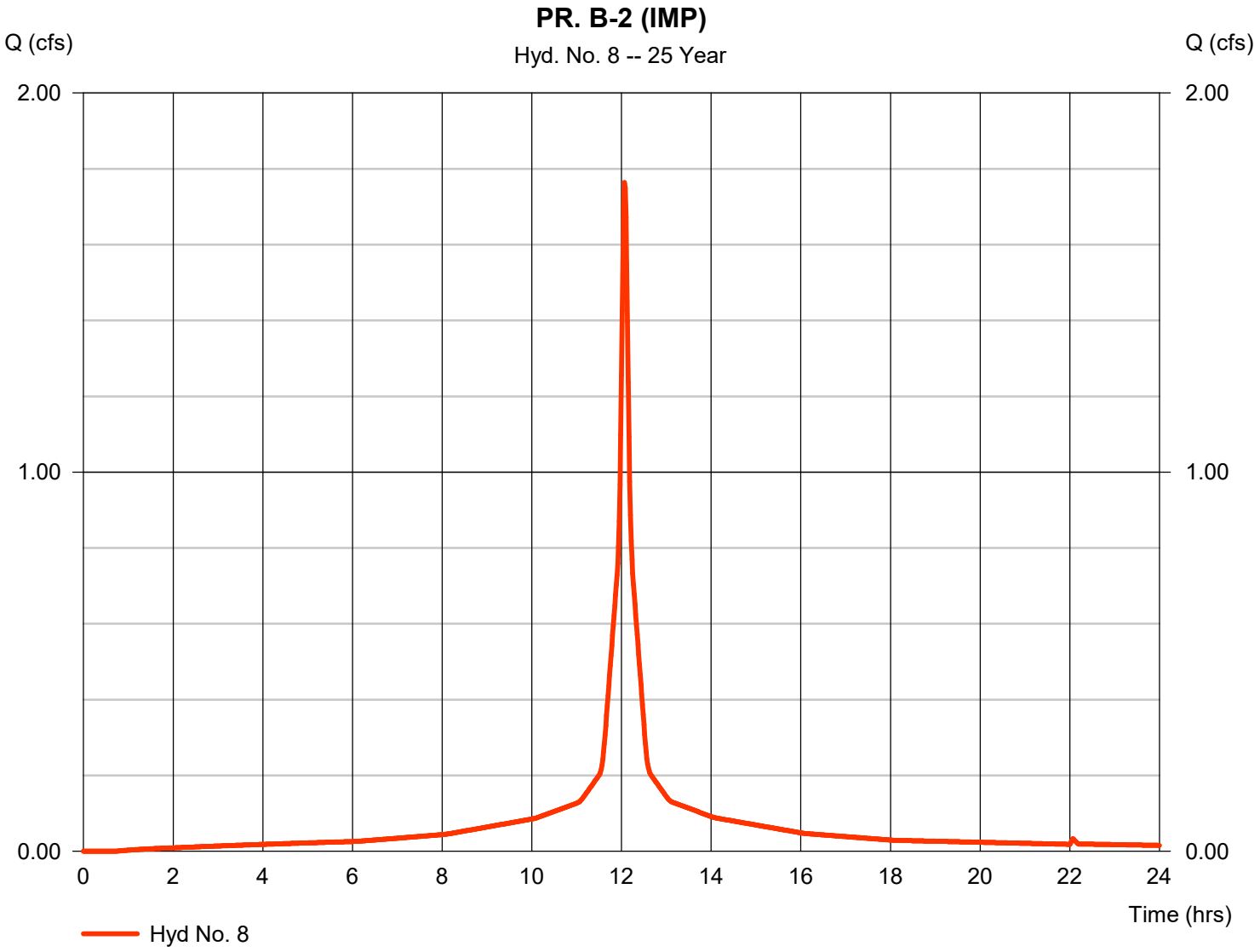


Hydrograph Report

Hyd. No. 8

PR. B-2 (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.764 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	6,268 cuft
Drainage area	=	0.270 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

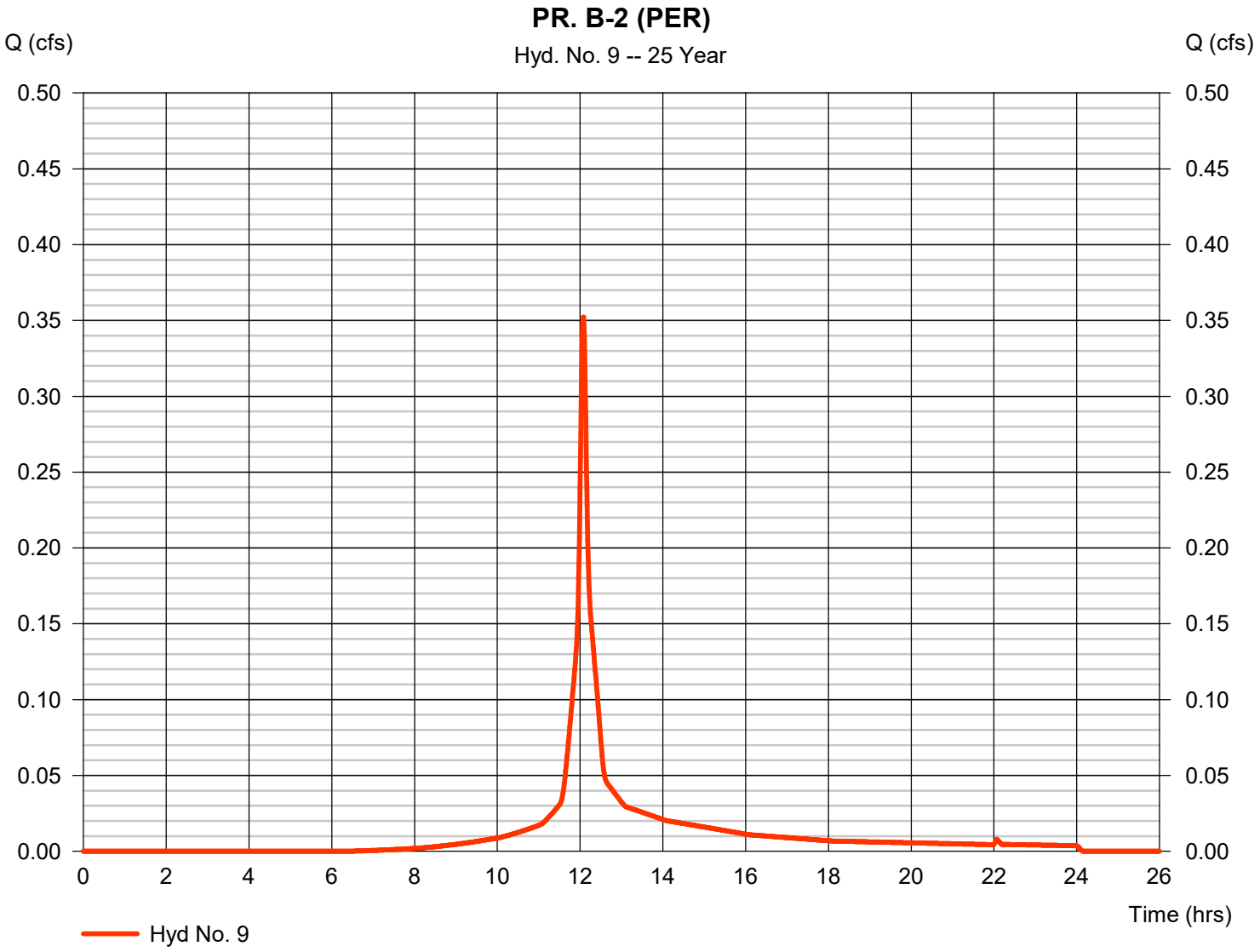


Hydrograph Report

Hyd. No. 9

PR. B-2 (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.352 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.08 hrs
Time interval	=	1 min	Hyd. volume	=	1,095 cuft
Drainage area	=	0.070 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

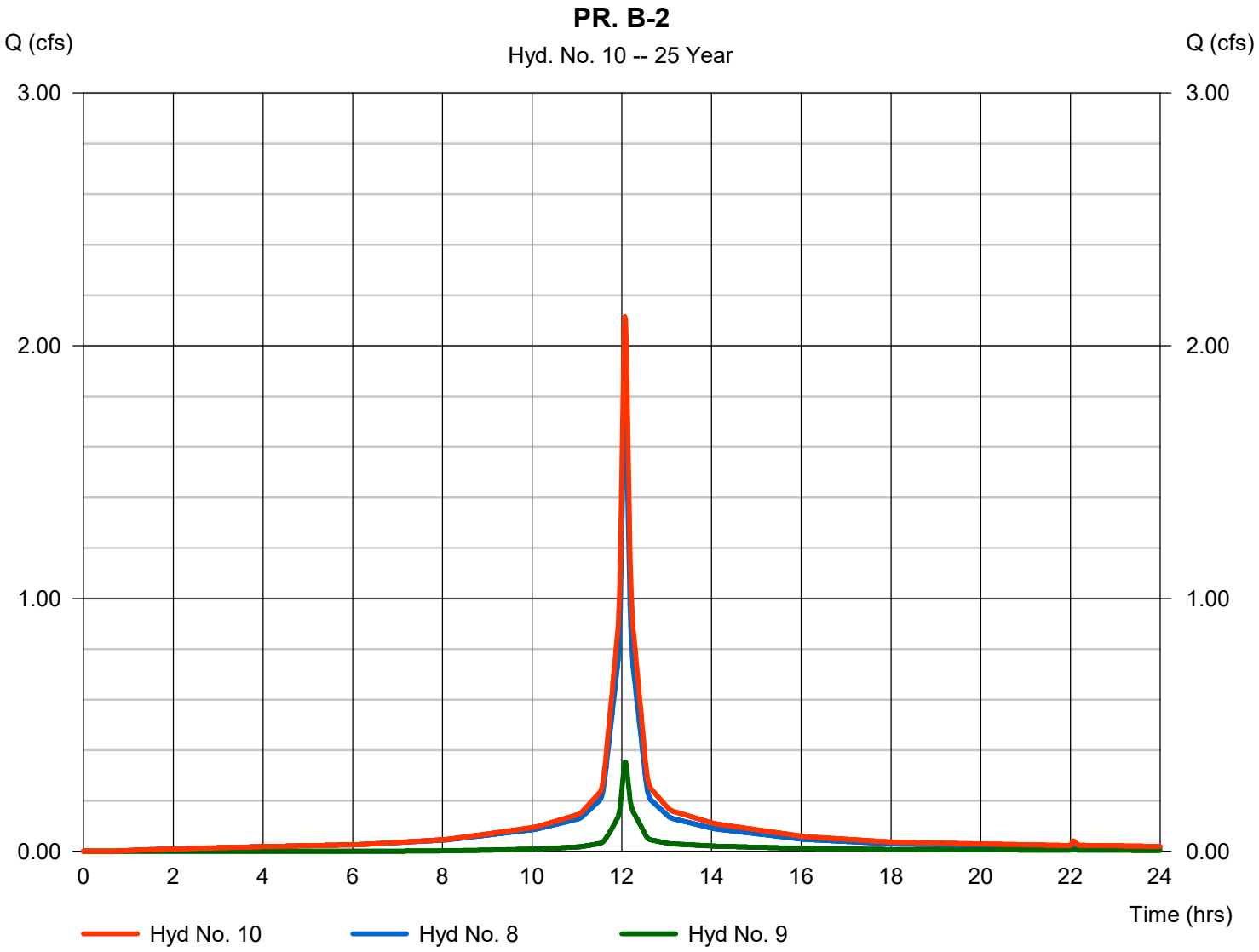


Hydrograph Report

Hyd. No. 10

PR. B-2

Hydrograph type	=	Combine	Peak discharge	=	2.116 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	7,363 cuft
Inflow hyds.	=	8, 9	Contrib. drain. area	=	0.340 ac



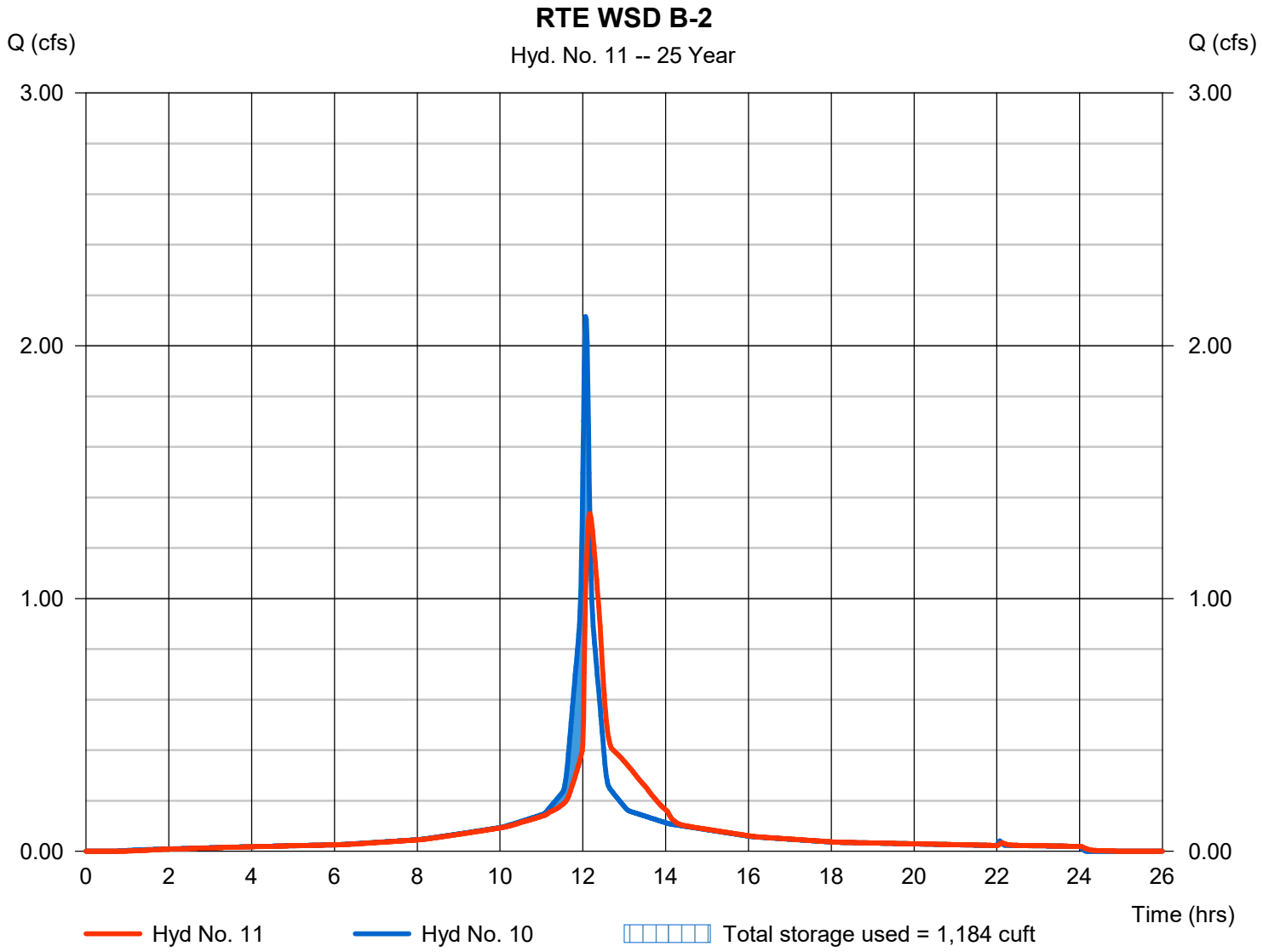
Hydrograph Report

Hyd. No. 11

RTE WSD B-2

Hydrograph type	=	Reservoir	Peak discharge	=	1.336 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.17 hrs
Time interval	=	1 min	Hyd. volume	=	7,362 cuft
Inflow hyd. No.	=	10 - PR. B-2	Max. Elevation	=	234.95 ft
Reservoir name	=	BASIN-2	Max. Storage	=	1,184 cuft

Storage Indication method used.

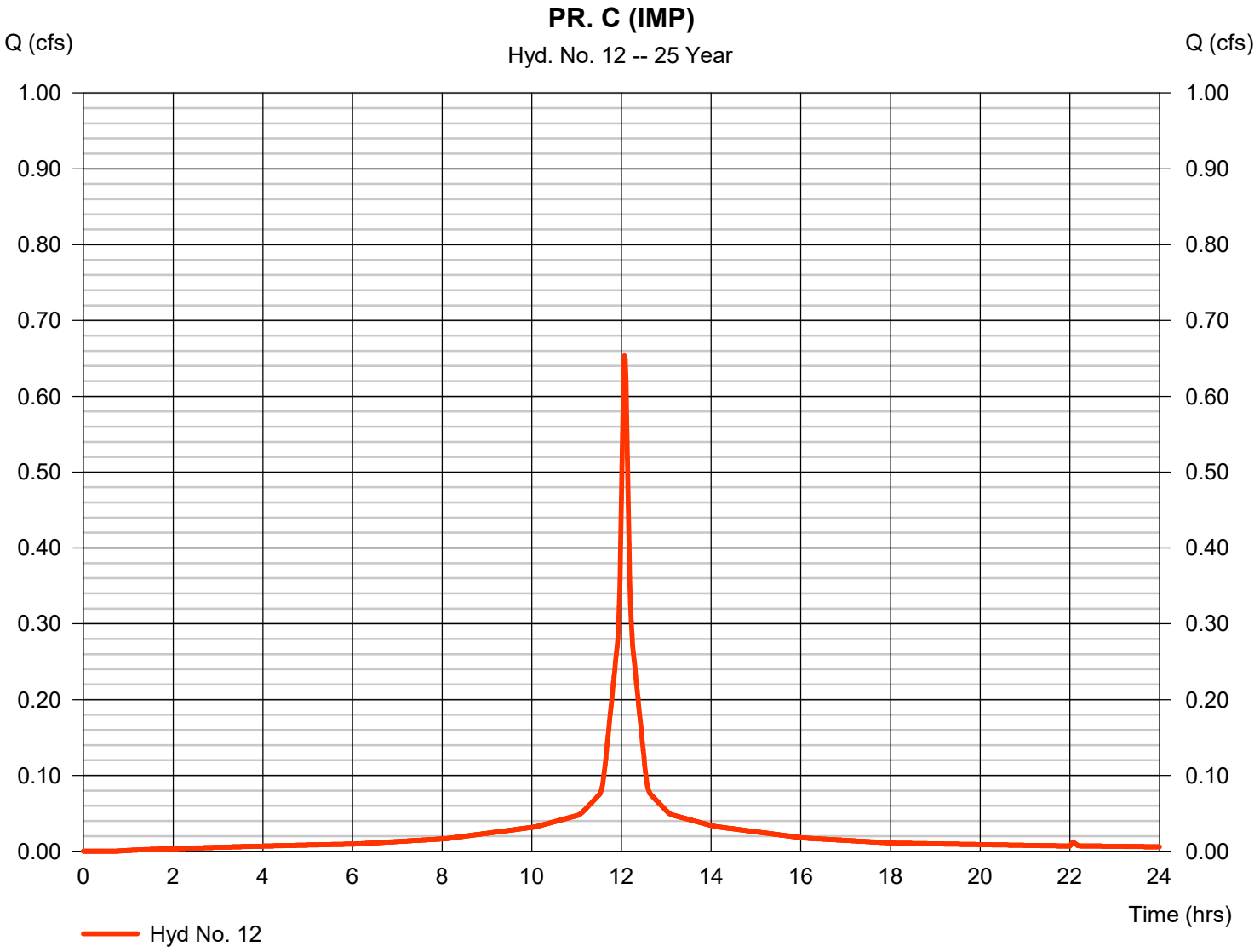


Hydrograph Report

Hyd. No. 12

PR. C (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.653 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	2,321 cuft
Drainage area	=	0.100 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

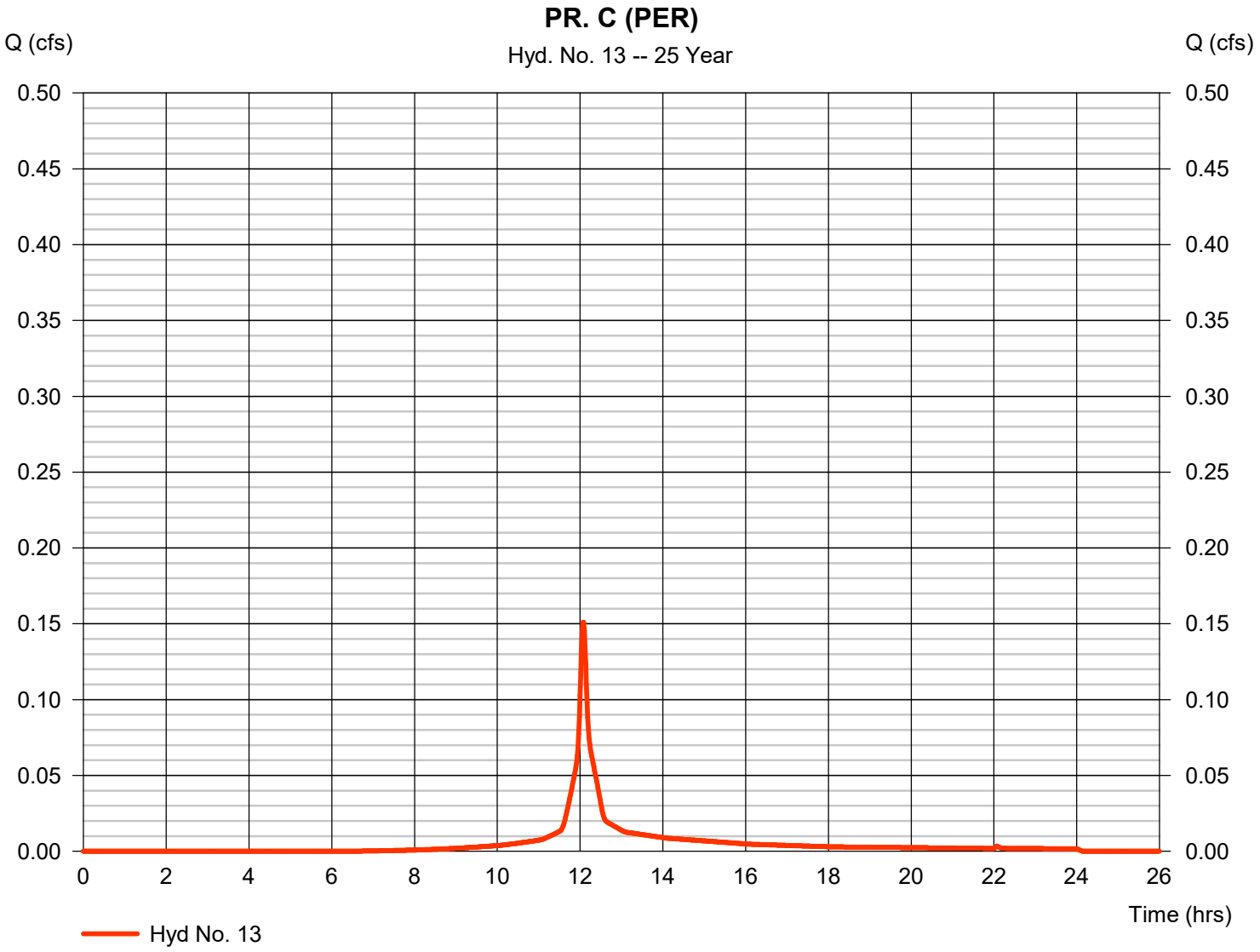


Hydrograph Report

Hyd. No. 13

PR. C (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.151 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.08 hrs
Time interval	=	1 min	Hyd. volume	=	469 cuft
Drainage area	=	0.030 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

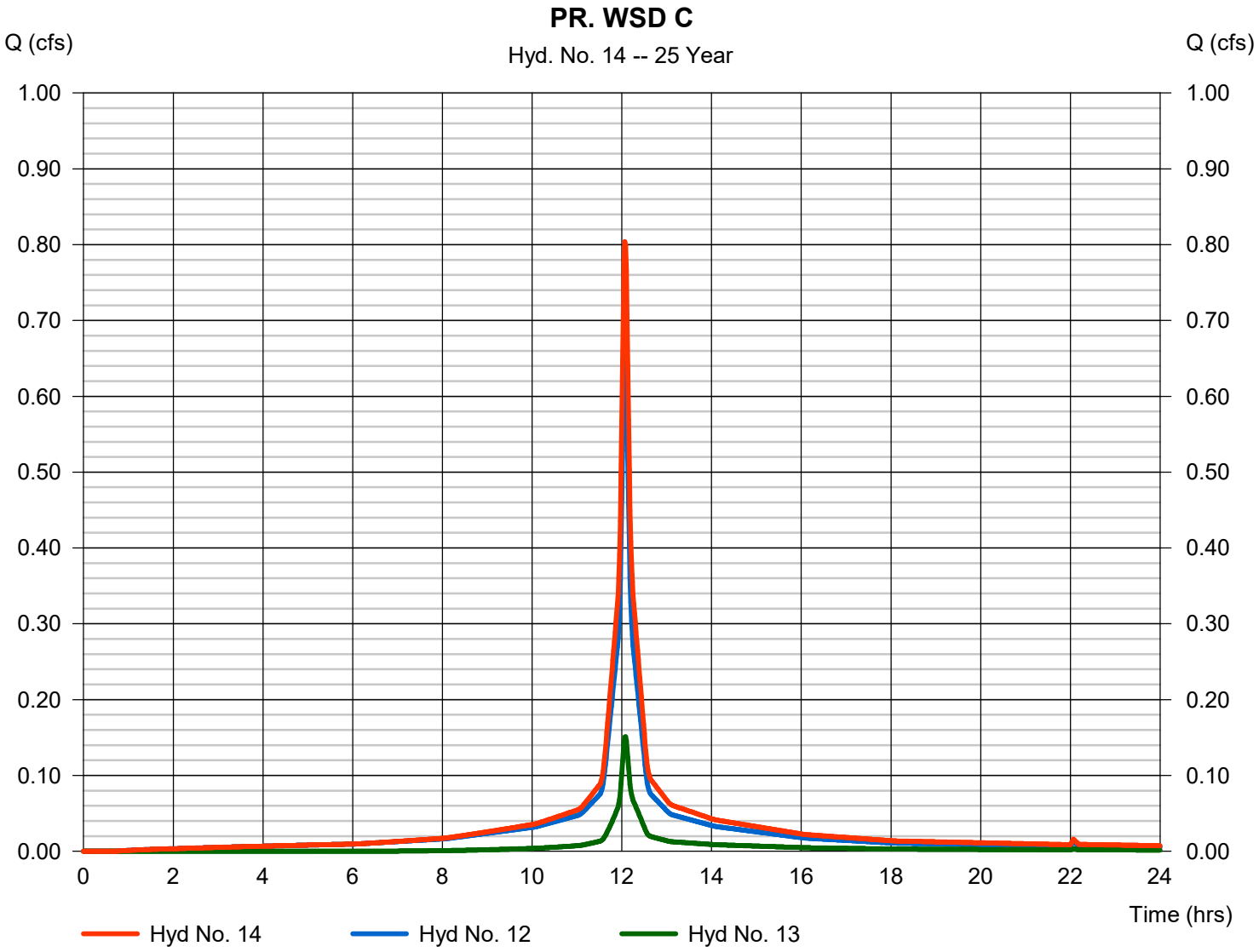


Hydrograph Report

Hyd. No. 14

PR. WSD C

Hydrograph type	=	Combine	Peak discharge	=	0.804 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	2,791 cuft
Inflow hyds.	=	12, 13	Contrib. drain. area	=	0.130 ac

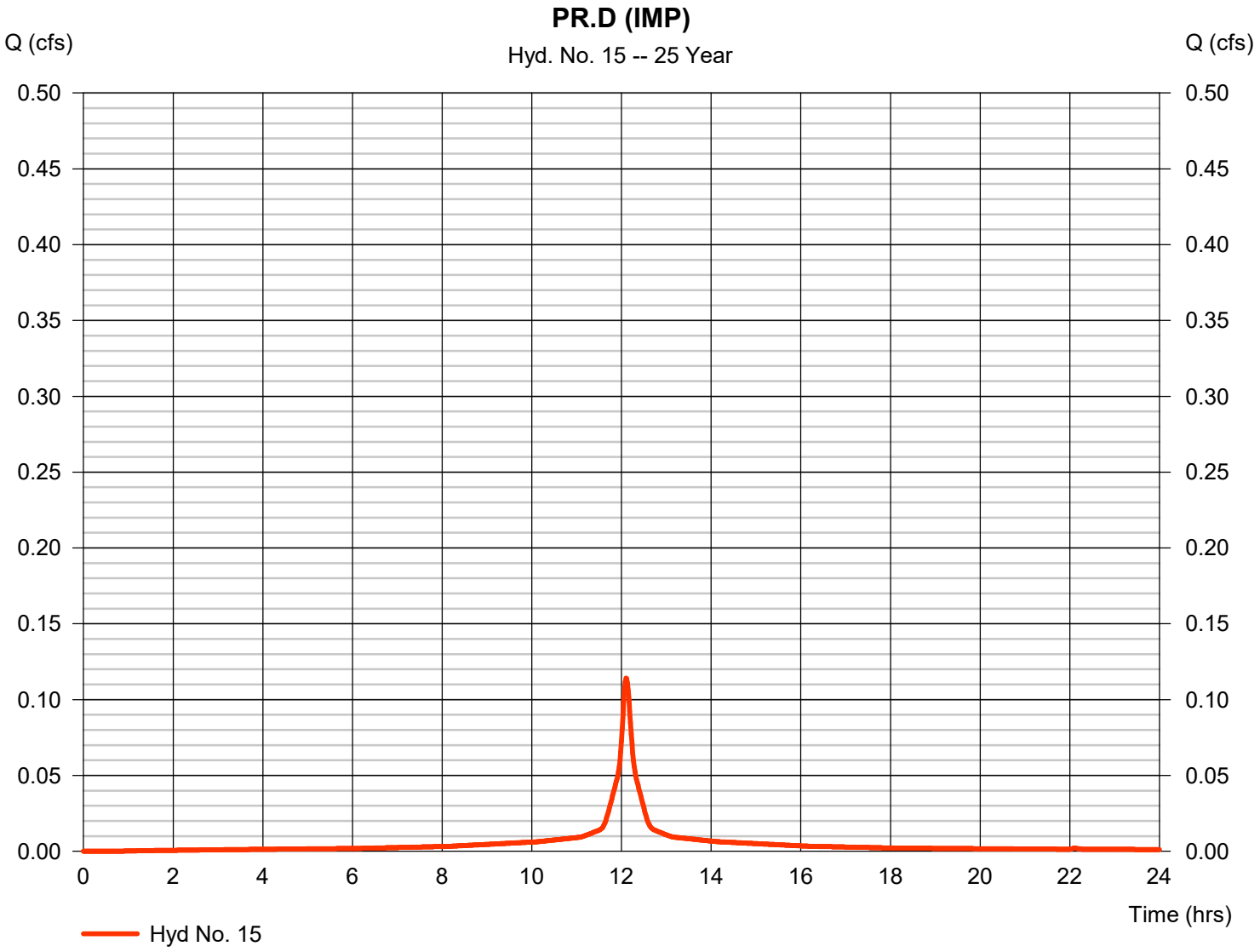


Hydrograph Report

Hyd. No. 15

PR.D (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.114 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.10 hrs
Time interval	=	1 min	Hyd. volume	=	450 cuft
Drainage area	=	0.020 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

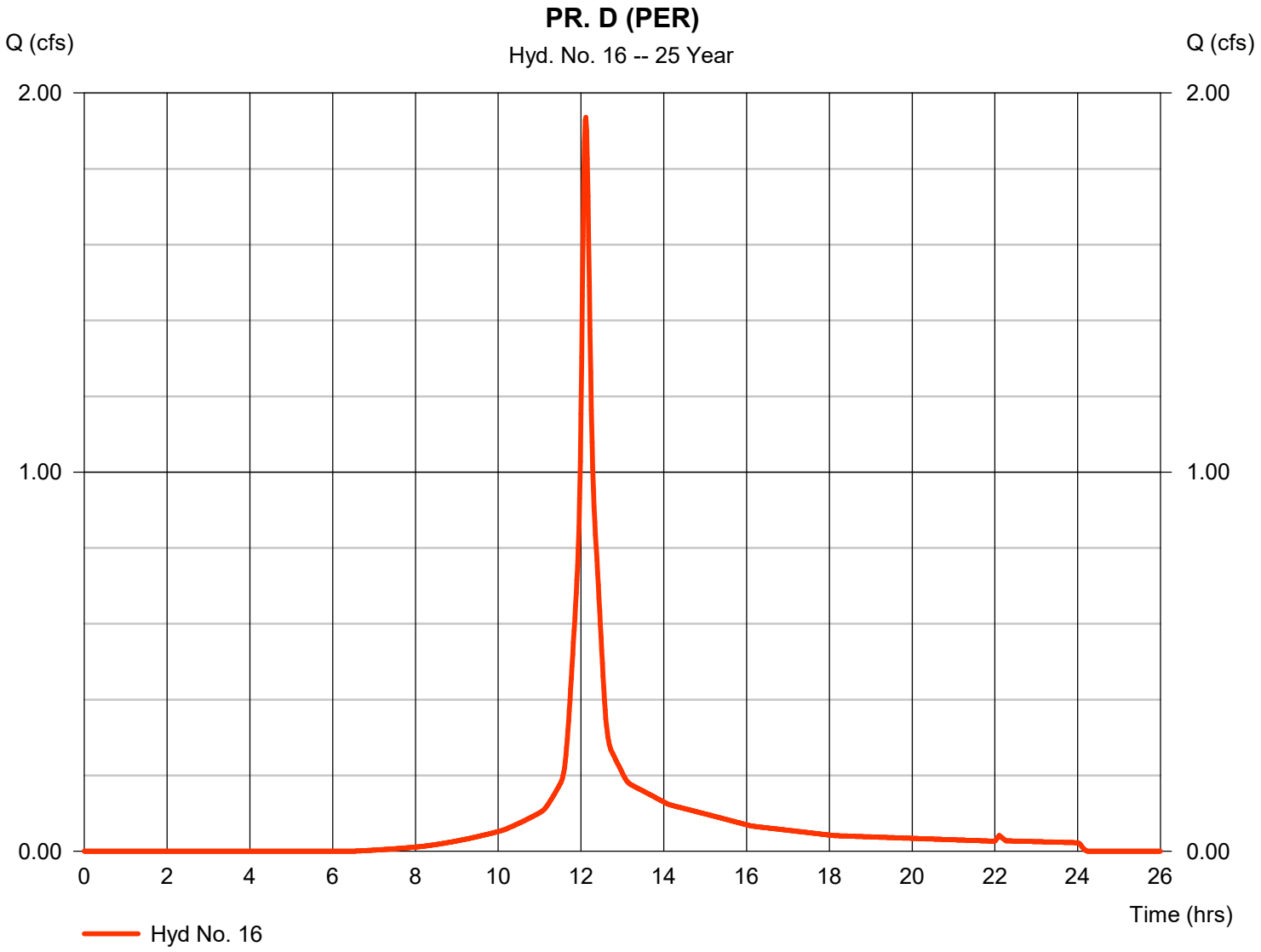


Hydrograph Report

Hyd. No. 16

PR. D (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.936 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.12 hrs
Time interval	=	1 min	Hyd. volume	=	6,677 cuft
Drainage area	=	0.440 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

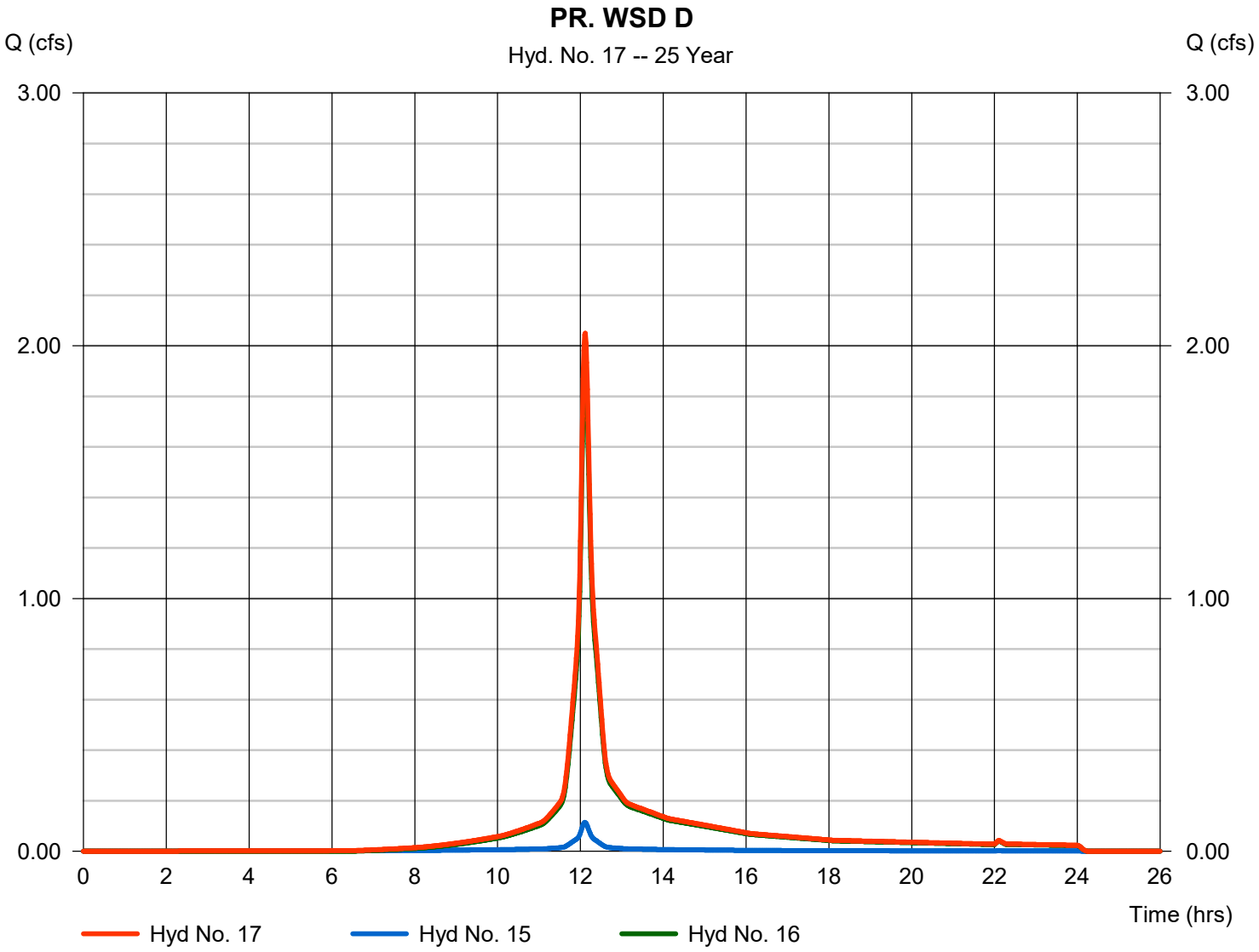


Hydrograph Report

Hyd. No. 17

PR. WSD D

Hydrograph type	=	Combine	Peak discharge	=	2.050 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.12 hrs
Time interval	=	1 min	Hyd. volume	=	7,127 cuft
Inflow hyds.	=	15, 16	Contrib. drain. area	=	0.460 ac

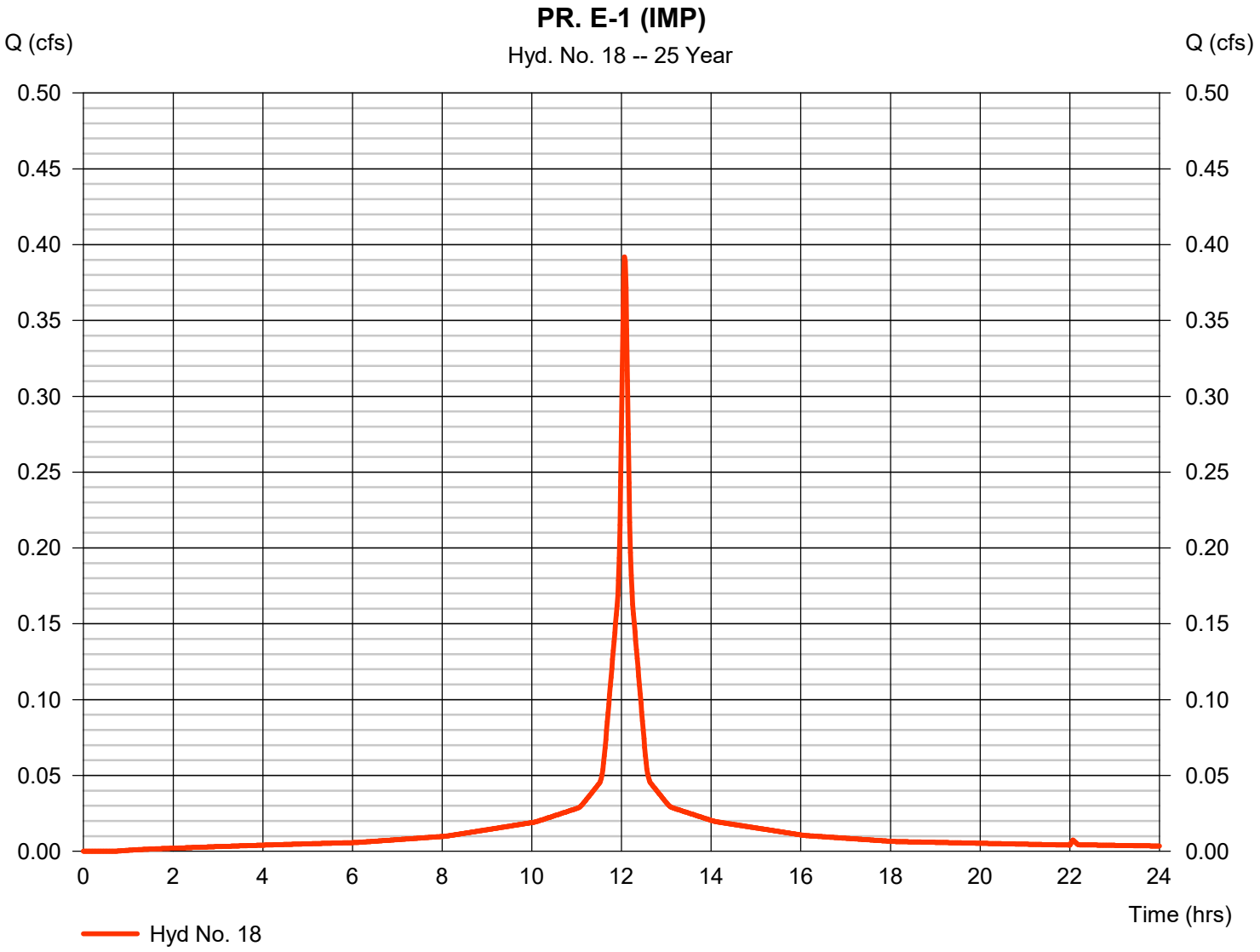


Hydrograph Report

Hyd. No. 18

PR. E-1 (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.392 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	1,393 cuft
Drainage area	=	0.060 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

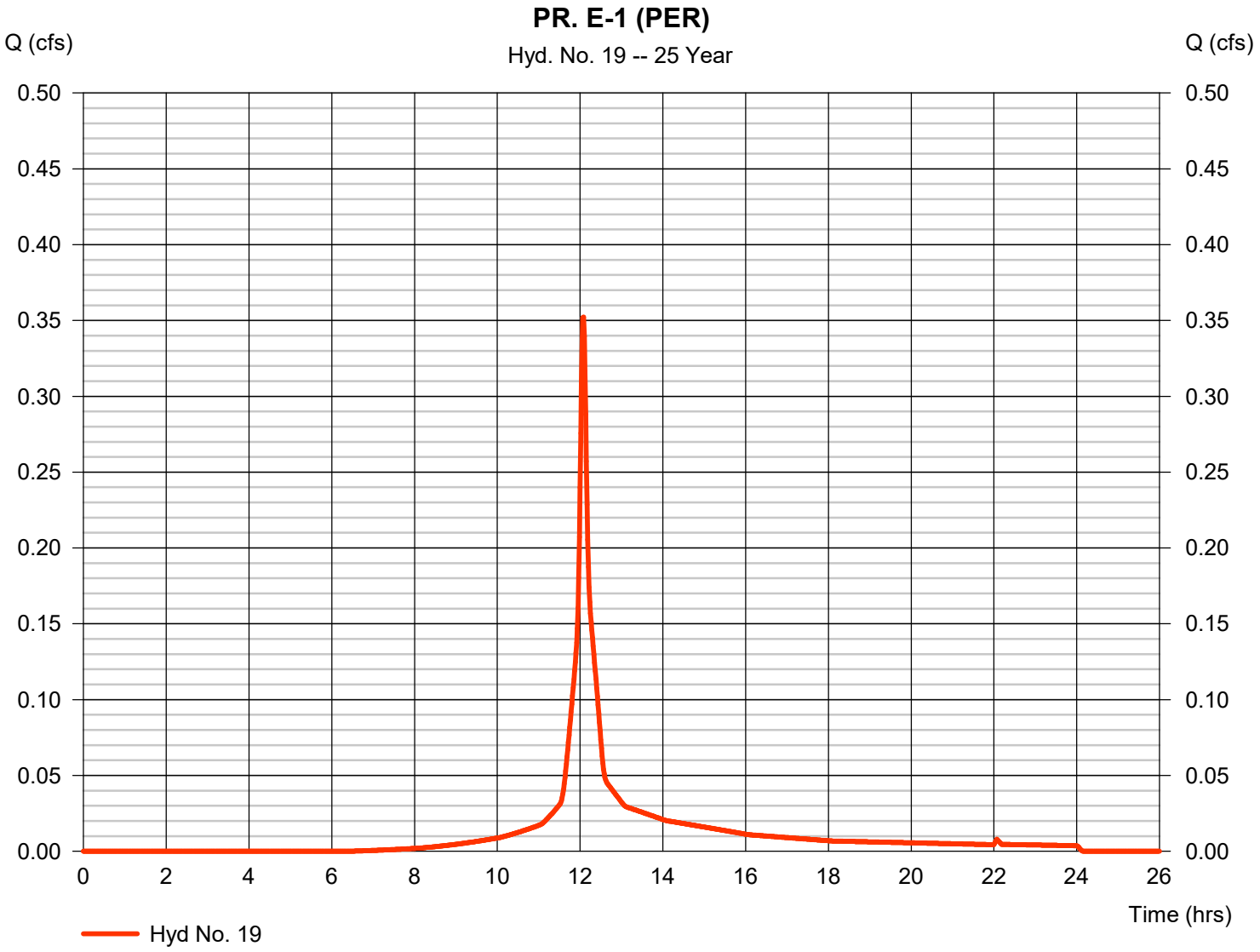


Hydrograph Report

Hyd. No. 19

PR. E-1 (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.352 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.08 hrs
Time interval	=	1 min	Hyd. volume	=	1,095 cuft
Drainage area	=	0.070 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

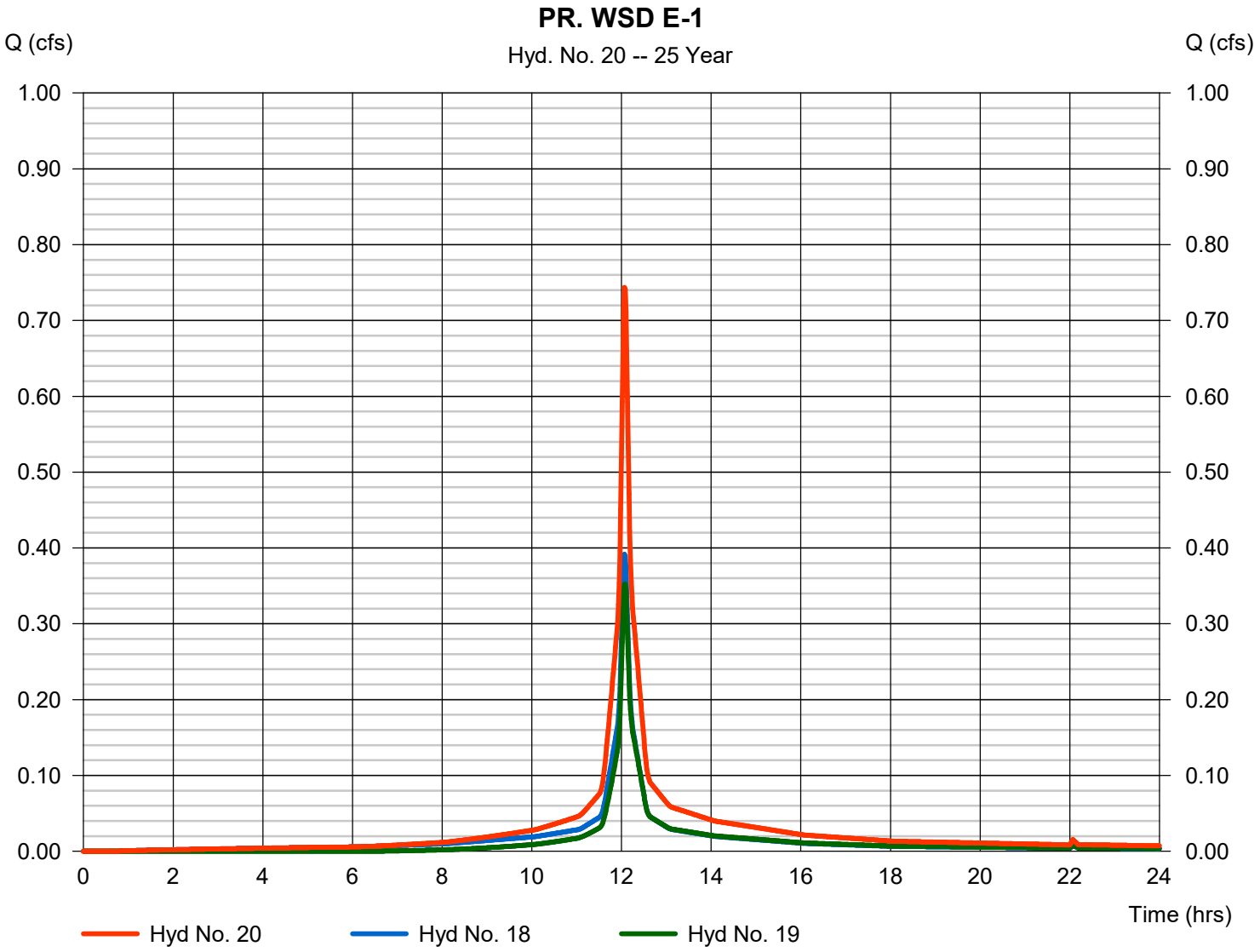


Hydrograph Report

Hyd. No. 20

PR. WSD E-1

Hydrograph type	=	Combine	Peak discharge	=	0.744 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	2,488 cuft
Inflow hyds.	=	18, 19	Contrib. drain. area	=	0.130 ac



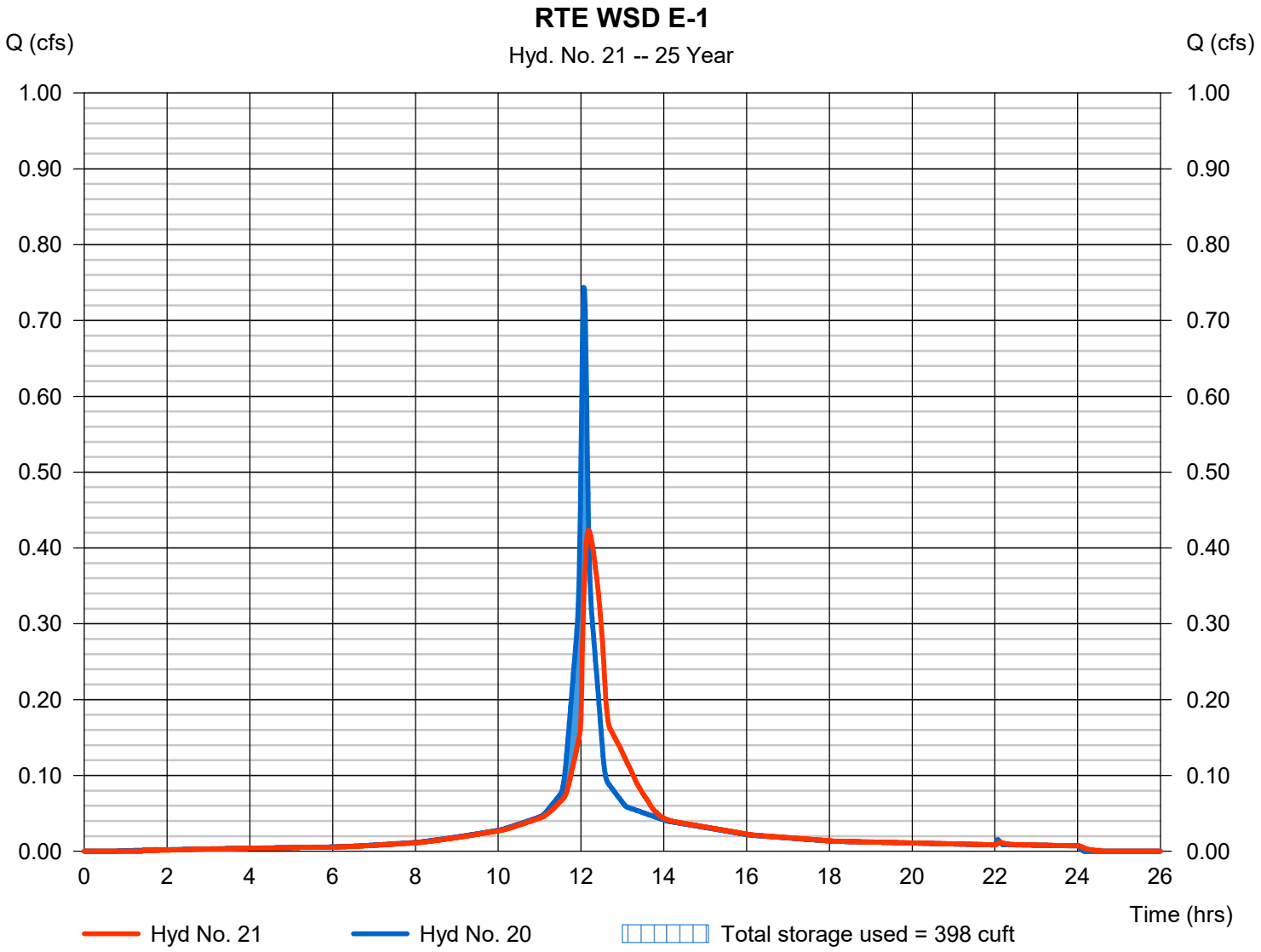
Hydrograph Report

Hyd. No. 21

RTE WSD E-1

Hydrograph type	=	Reservoir	Peak discharge	=	0.424 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.18 hrs
Time interval	=	1 min	Hyd. volume	=	2,487 cuft
Inflow hyd. No.	=	20 - PR. WSD E-1	Max. Elevation	=	253.11 ft
Reservoir name	=	BASIN-3	Max. Storage	=	398 cuft

Storage Indication method used.

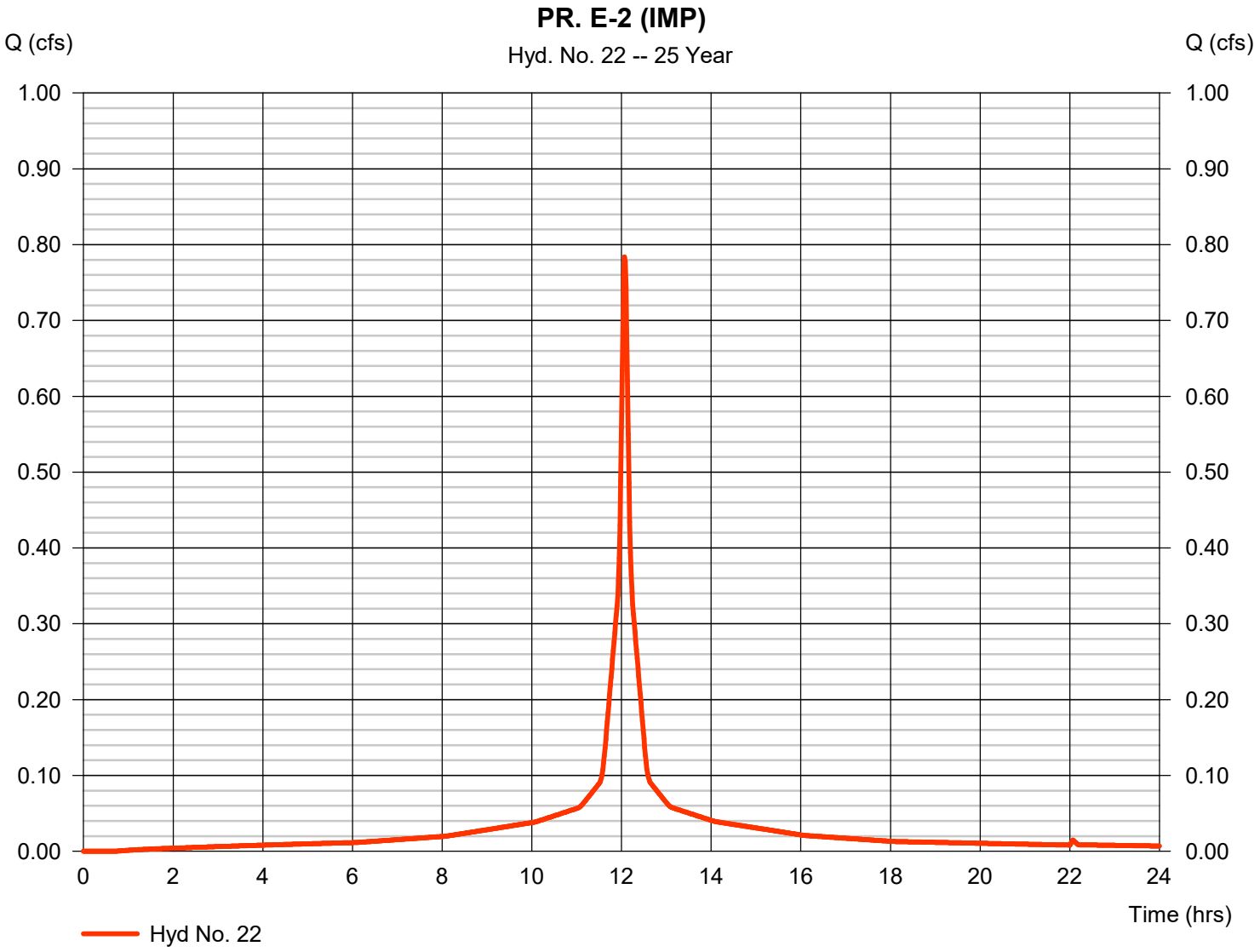


Hydrograph Report

Hyd. No. 22

PR. E-2 (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.784 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	2,786 cuft
Drainage area	=	0.120 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

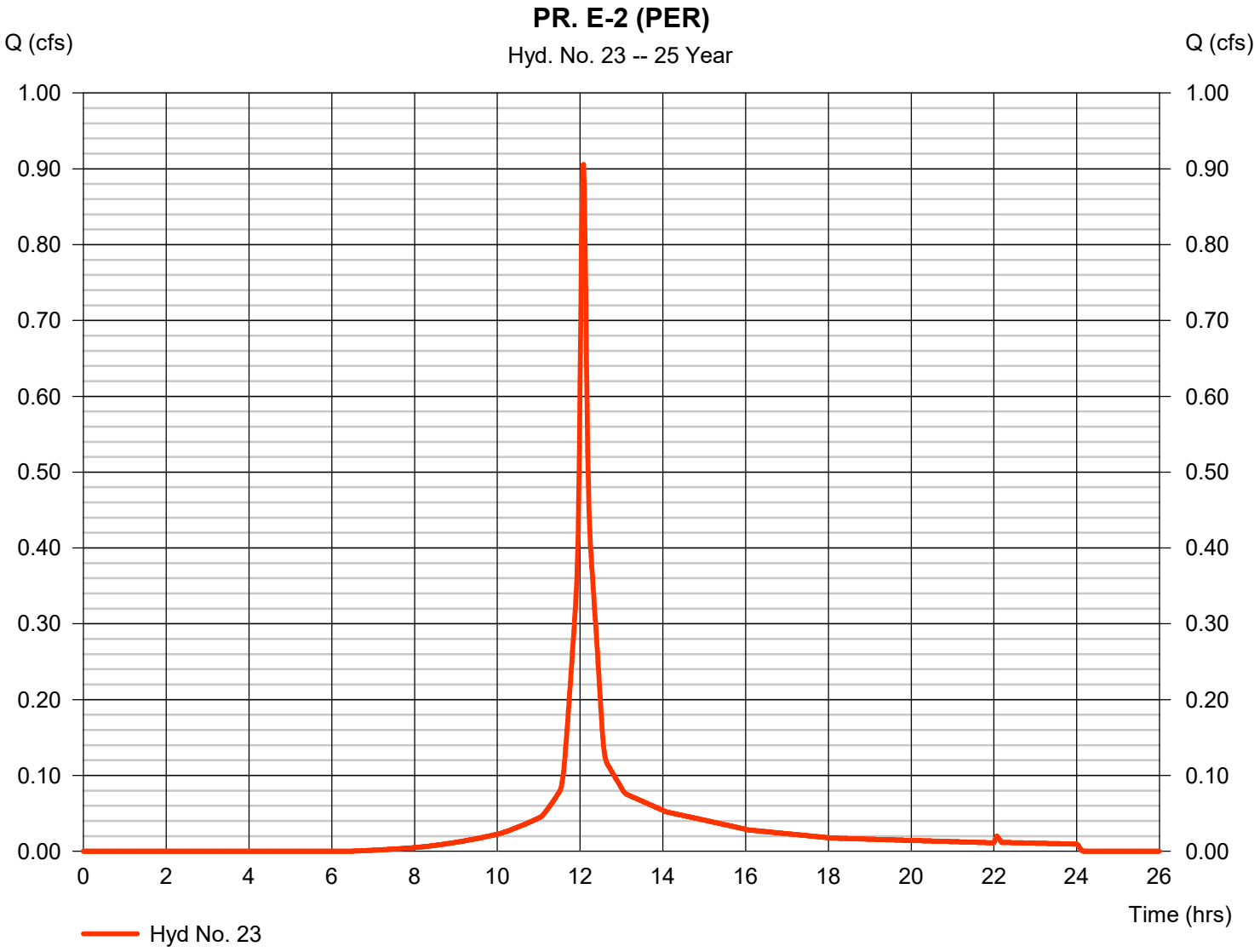


Hydrograph Report

Hyd. No. 23

PR. E-2 (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.906 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.08 hrs
Time interval	=	1 min	Hyd. volume	=	2,817 cuft
Drainage area	=	0.180 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

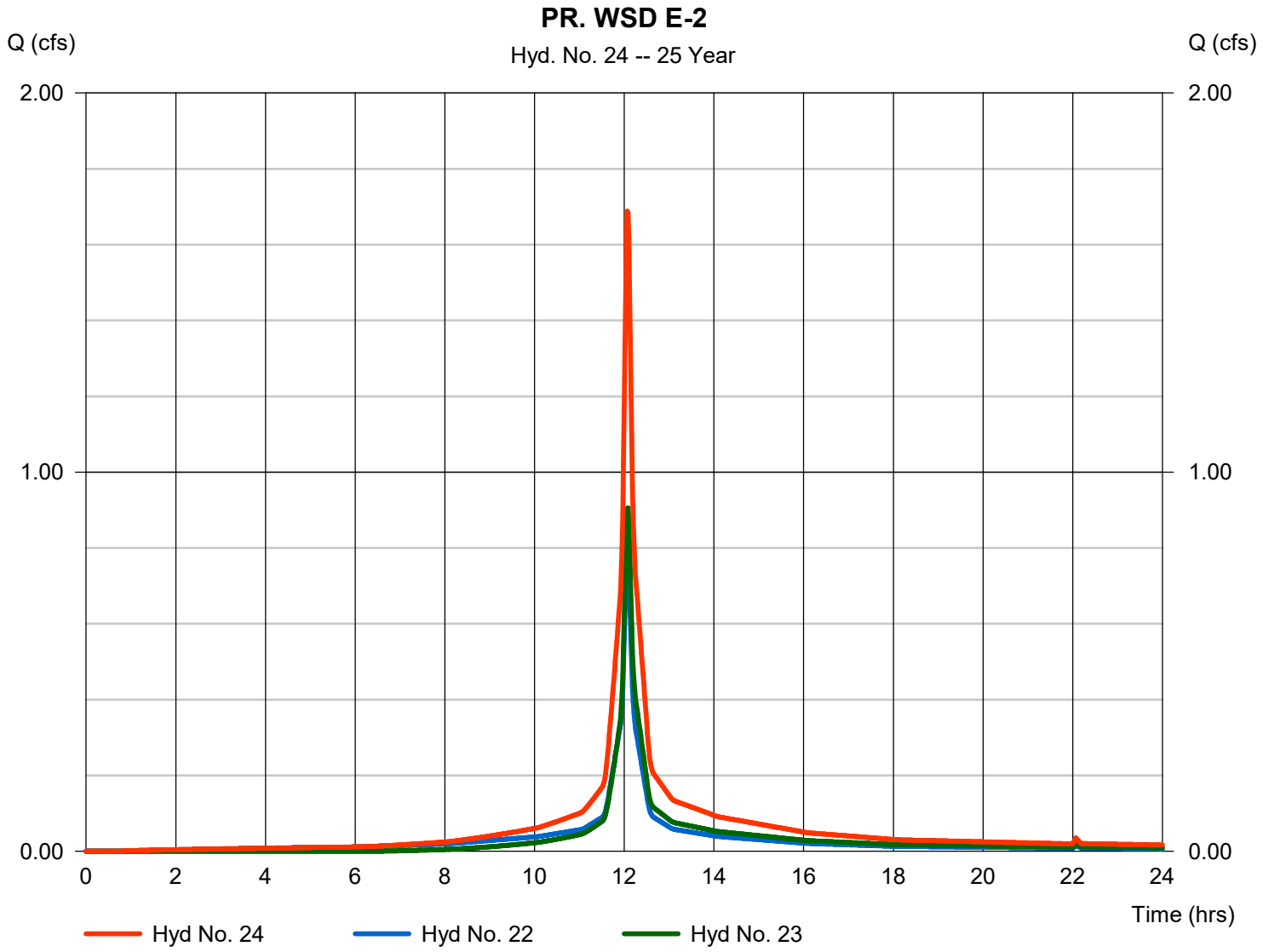


Hydrograph Report

Hyd. No. 24

PR. WSD E-2

Hydrograph type	=	Combine	Peak discharge	=	1.688 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	5,603 cuft
Inflow hyds.	=	22, 23	Contrib. drain. area	=	0.300 ac

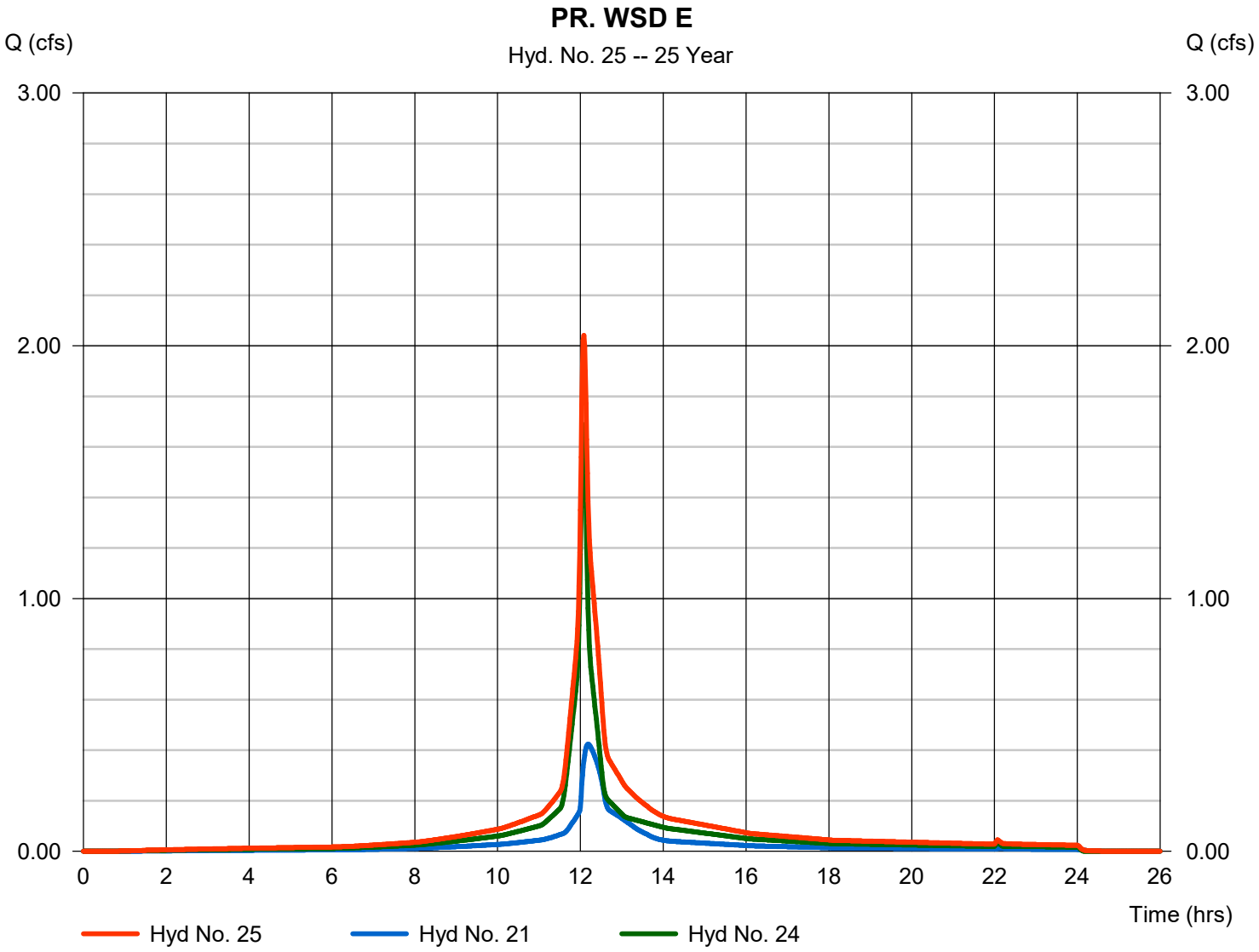


Hydrograph Report

Hyd. No. 25

PR. WSD E

Hydrograph type	= Combine	Peak discharge	= 2.041 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.08 hrs
Time interval	= 1 min	Hyd. volume	= 8,089 cuft
Inflow hyds.	= 21, 24	Contrib. drain. area	= 0.000 ac

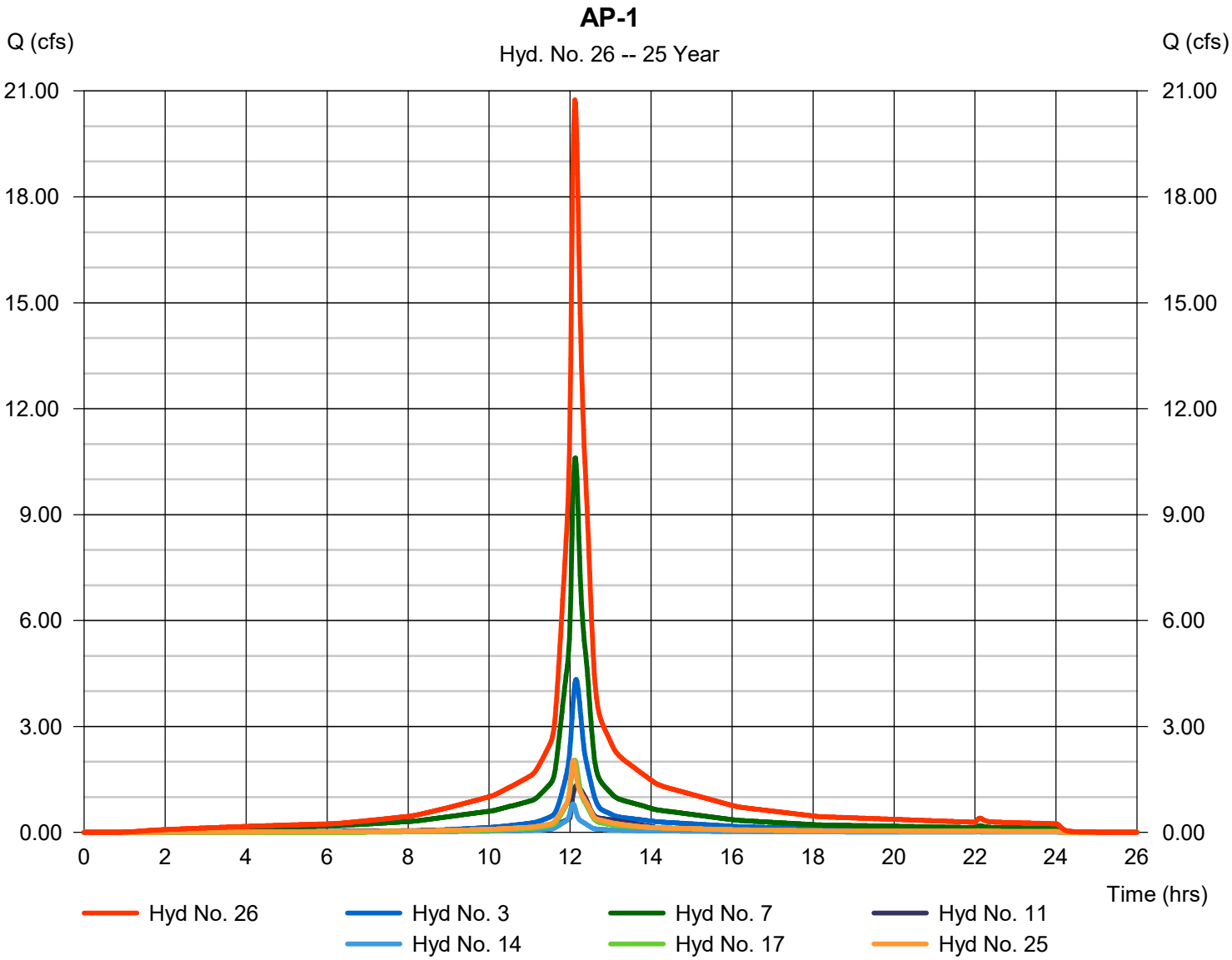


Hydrograph Report

Hyd. No. 26

AP-1

Hydrograph type	= Combine	Peak discharge	= 20.75 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 87,047 cuft
Inflow hyds.	= 3, 7, 11, 14, 17, 25	Contrib. drain. area	= 0.000 ac

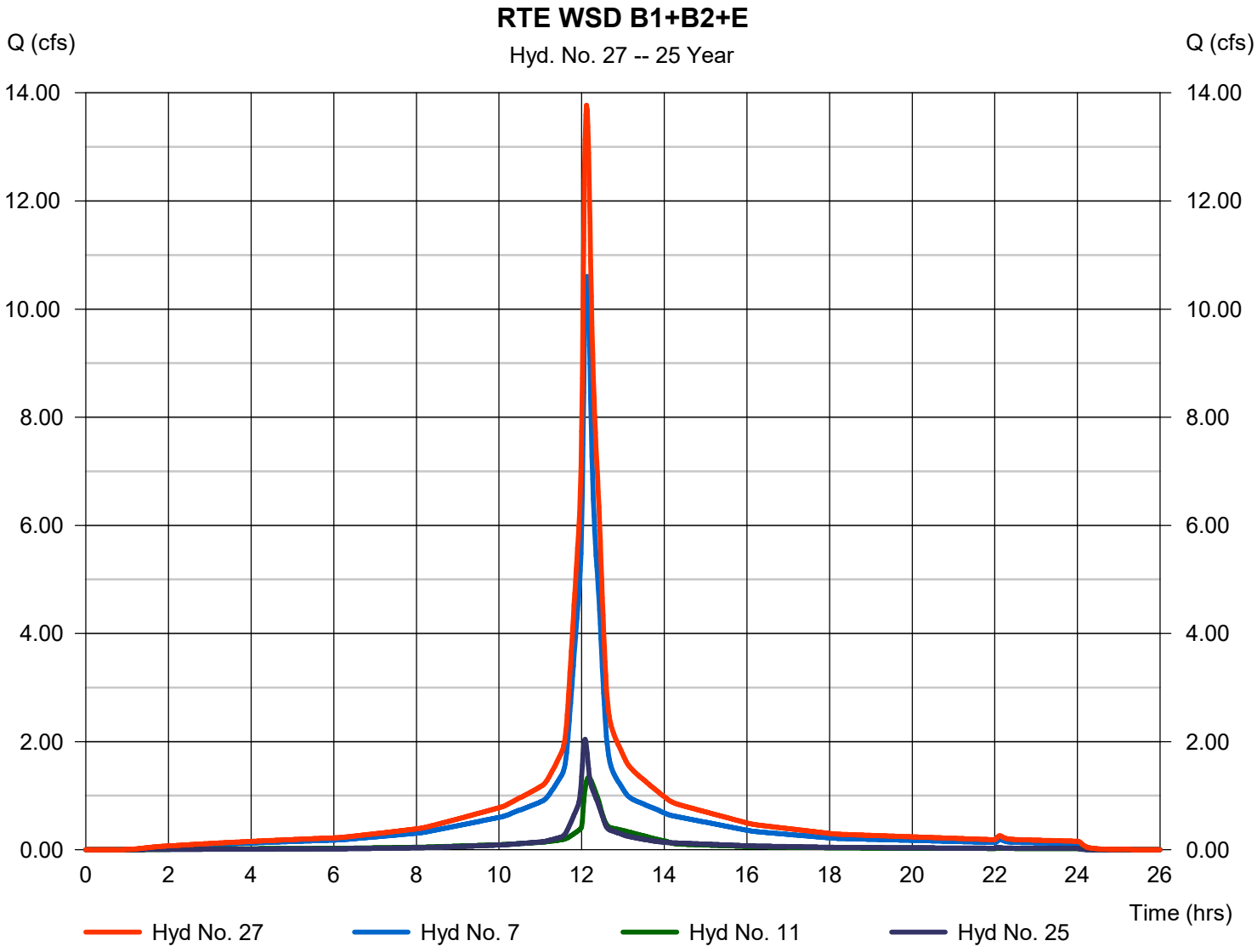


Hydrograph Report

Hyd. No. 27

RTE WSD B1+B2+E

Hydrograph type	= Combine	Peak discharge	= 13.77 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 60,495 cuft
Inflow hyds.	= 7, 11, 25	Contrib. drain. area	= 0.000 ac

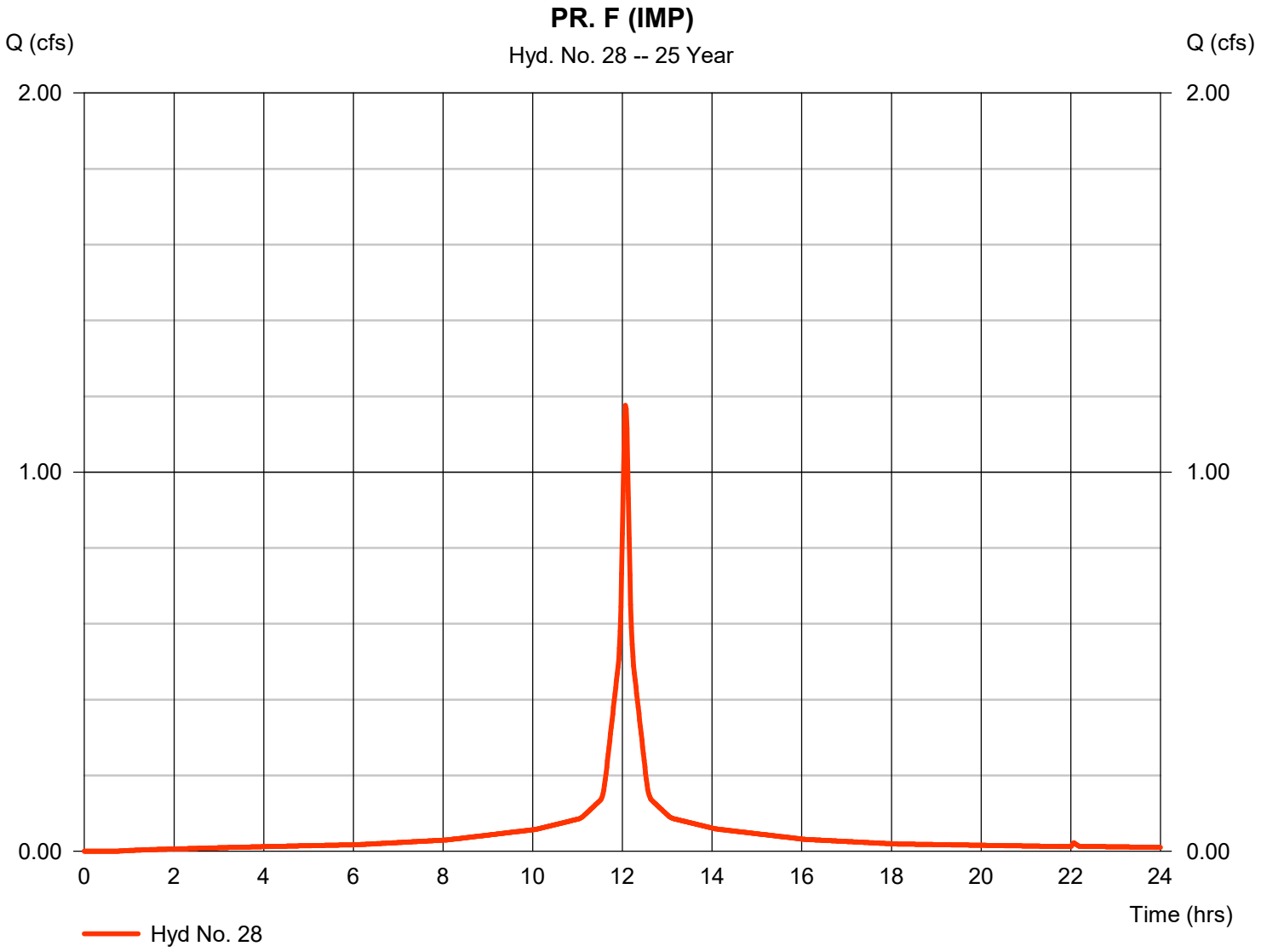


Hydrograph Report

Hyd. No. 28

PR. F (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.176 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	4,179 cuft
Drainage area	=	0.180 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

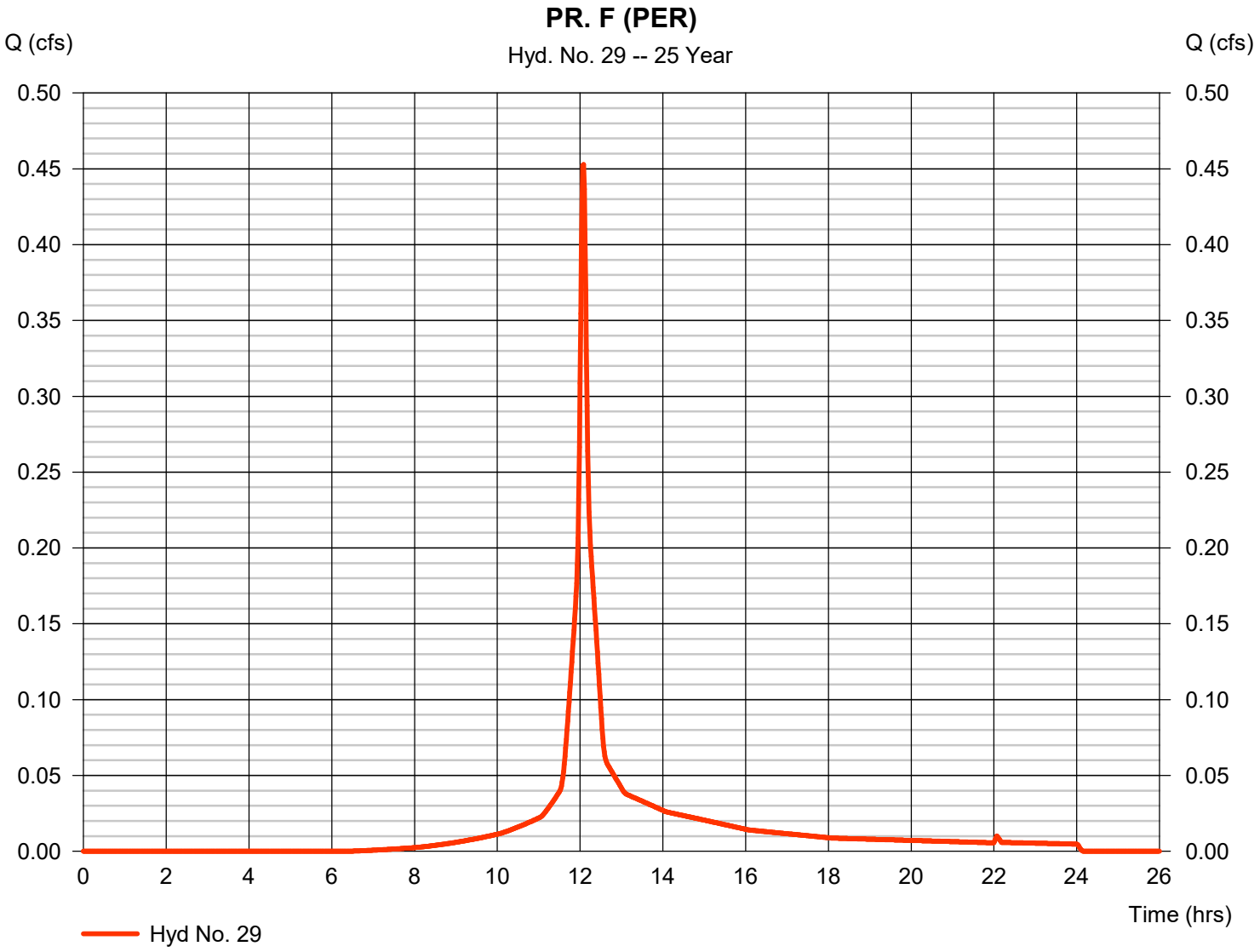


Hydrograph Report

Hyd. No. 29

PR. F (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.453 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.08 hrs
Time interval	=	1 min	Hyd. volume	=	1,408 cuft
Drainage area	=	0.090 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

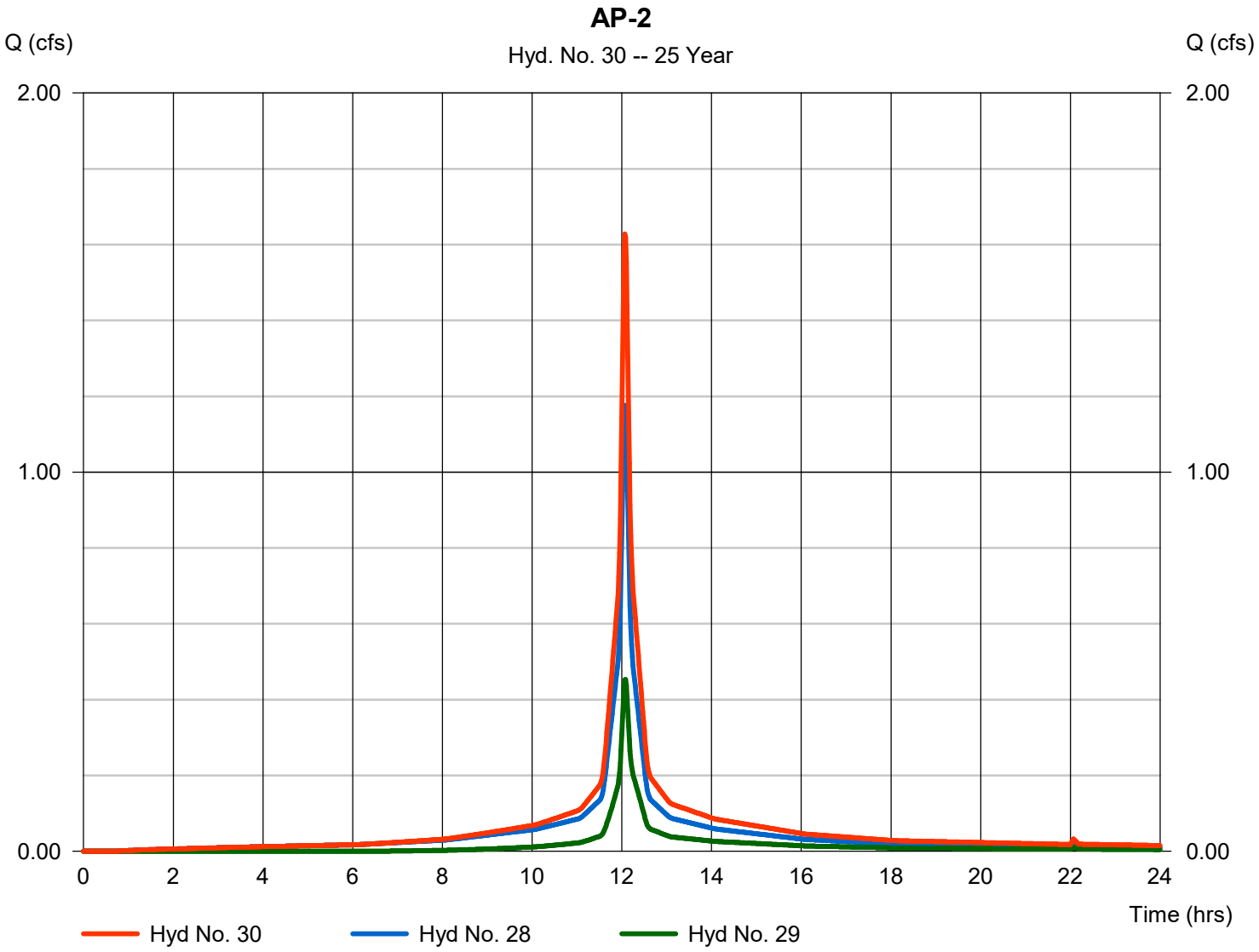


Hydrograph Report

Hyd. No. 30

AP-2

Hydrograph type	=	Combine	Peak discharge	=	1.628 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	5,587 cuft
Inflow hyds.	=	28, 29	Contrib. drain. area	=	0.270 ac



100-YEAR STORM CALCULATIONS

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

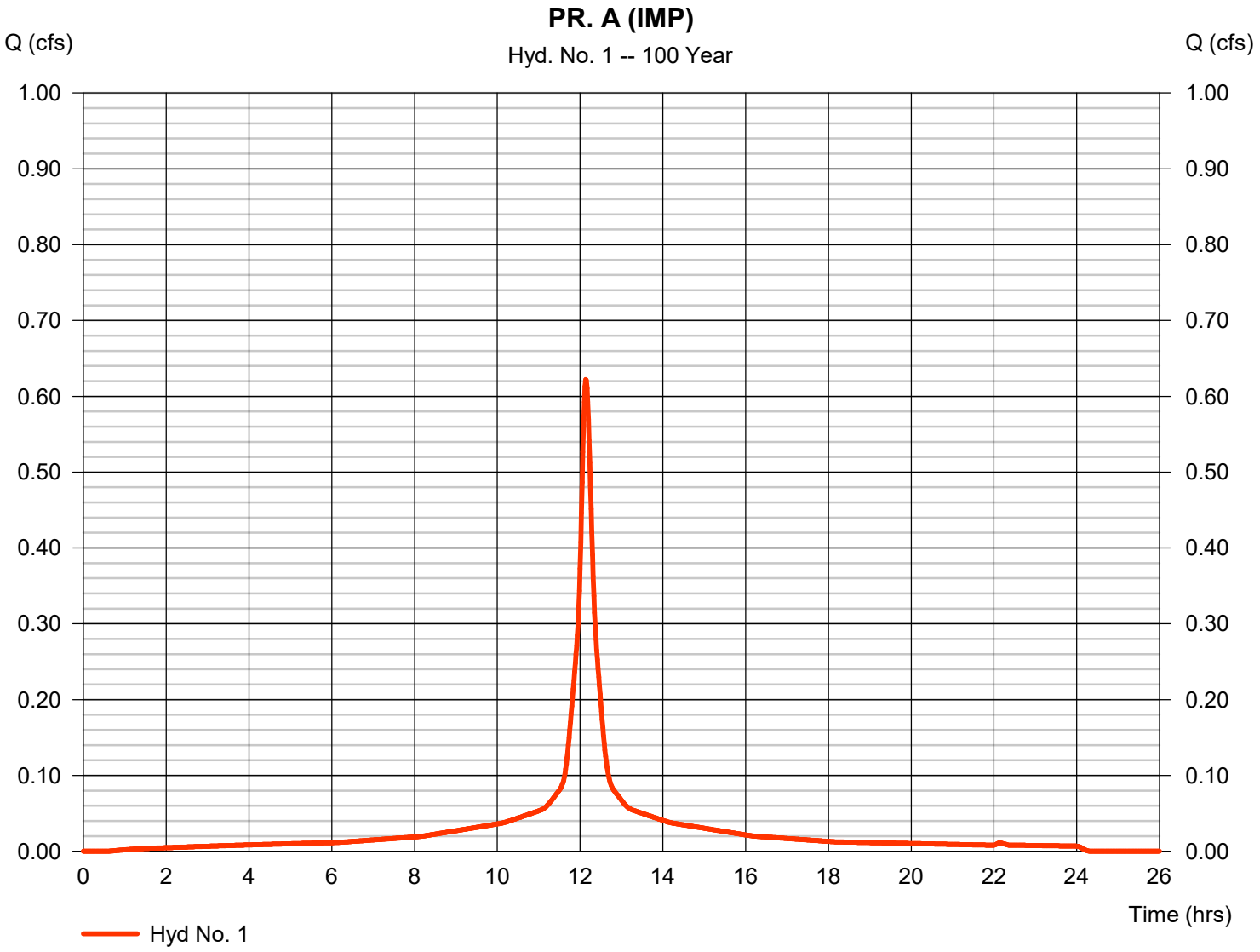
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.622	1	728	2,708	------	------	------	PR. A (IMP)
2	SCS Runoff	5.705	1	729	21,873	------	------	------	PR. A (PER)
3	Combine	6.326	1	729	24,581	1, 2	------	------	PR. WSD A
4	SCS Runoff	16.72	1	724	59,886	------	------	------	PR. B-1 (IMP)
5	SCS Runoff	0.445	1	724	1,403	------	------	------	PR. B-1 (PER)
6	Combine	17.16	1	724	61,289	4, 5	------	------	PR. WSD B-1
7	Reservoir	14.34	1	727	61,286	6	232.34	4,014	RTE WSD B-1
8	SCS Runoff	2.376	1	724	8,510	------	------	------	PR. B-2 (IMP)
9	SCS Runoff	0.519	1	724	1,637	------	------	------	PR. B-2 (PER)
10	Combine	2.895	1	724	10,147	8, 9	------	------	PR. B-2
11	Reservoir	1.922	1	730	10,145	10	236.13	1,556	RTE WSD B-2
12	SCS Runoff	0.880	1	724	3,152	------	------	------	PR. C (IMP)
13	SCS Runoff	0.222	1	724	701	------	------	------	PR. C (PER)
14	Combine	1.102	1	724	3,853	12, 13	------	------	PR. WSD C
15	SCS Runoff	0.154	1	726	611	------	------	------	PR.D (IMP)
16	SCS Runoff	2.851	1	727	9,977	------	------	------	PR. D (PER)
17	Combine	3.004	1	727	10,588	15, 16	------	------	PR. WSD D
18	SCS Runoff	0.528	1	724	1,891	------	------	------	PR. E-1 (IMP)
19	SCS Runoff	0.519	1	724	1,637	------	------	------	PR. E-1 (PER)
20	Combine	1.047	1	724	3,528	18, 19	------	------	PR. WSD E-1
21	Reservoir	0.879	1	728	3,526	20	253.96	527	RTE WSD E-1
22	SCS Runoff	1.056	1	724	3,782	------	------	------	PR. E-2 (IMP)
23	SCS Runoff	1.334	1	724	4,209	------	------	------	PR. E-2 (PER)
24	Combine	2.390	1	724	7,991	22, 23	------	------	PR. WSD E-2
25	Combine	2.872	1	725	11,517	21, 24	------	------	PR. WSD E
26	Combine	29.14	1	727	121,972	3, 7, 11, 14, 17, 25	------	------	AP-1
27	Combine	19.00	1	728	82,949	7, 11, 25,	------	------	RTE WSD B1+B2+E
28	SCS Runoff	1.584	1	724	5,673	------	------	------	PR. F (IMP)
29	SCS Runoff	0.667	1	724	2,104	------	------	------	PR. F (PER)
30	Combine	2.251	1	724	7,778	28, 29	------	------	AP-2

Hydrograph Report

Hyd. No. 1

PR. A (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.622 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.13 hrs
Time interval	=	1 min	Hyd. volume	=	2,708 cuft
Drainage area	=	0.090 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

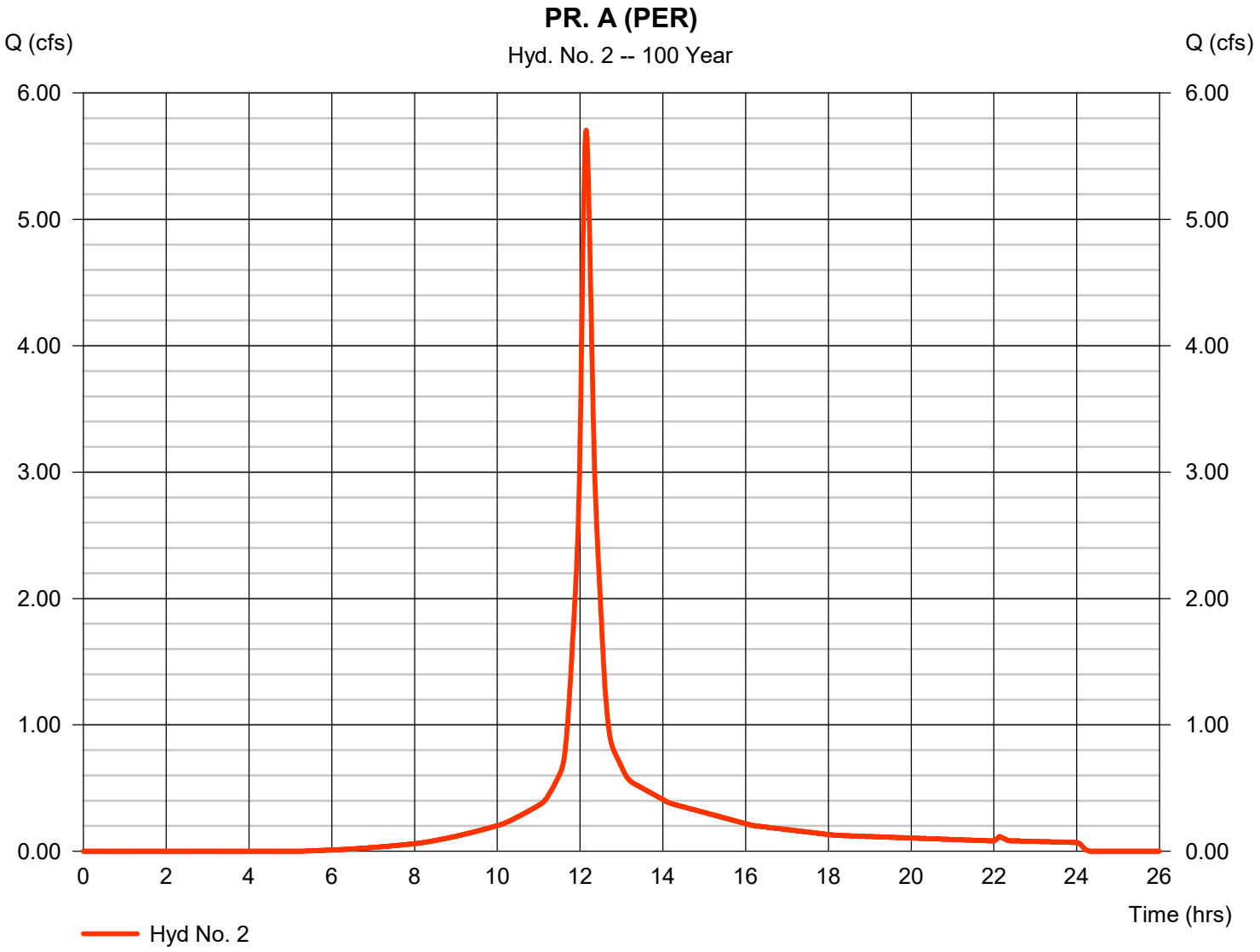


Hydrograph Report

Hyd. No. 2

PR. A (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.705 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.15 hrs
Time interval	=	1 min	Hyd. volume	=	21,873 cuft
Drainage area	=	0.980 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

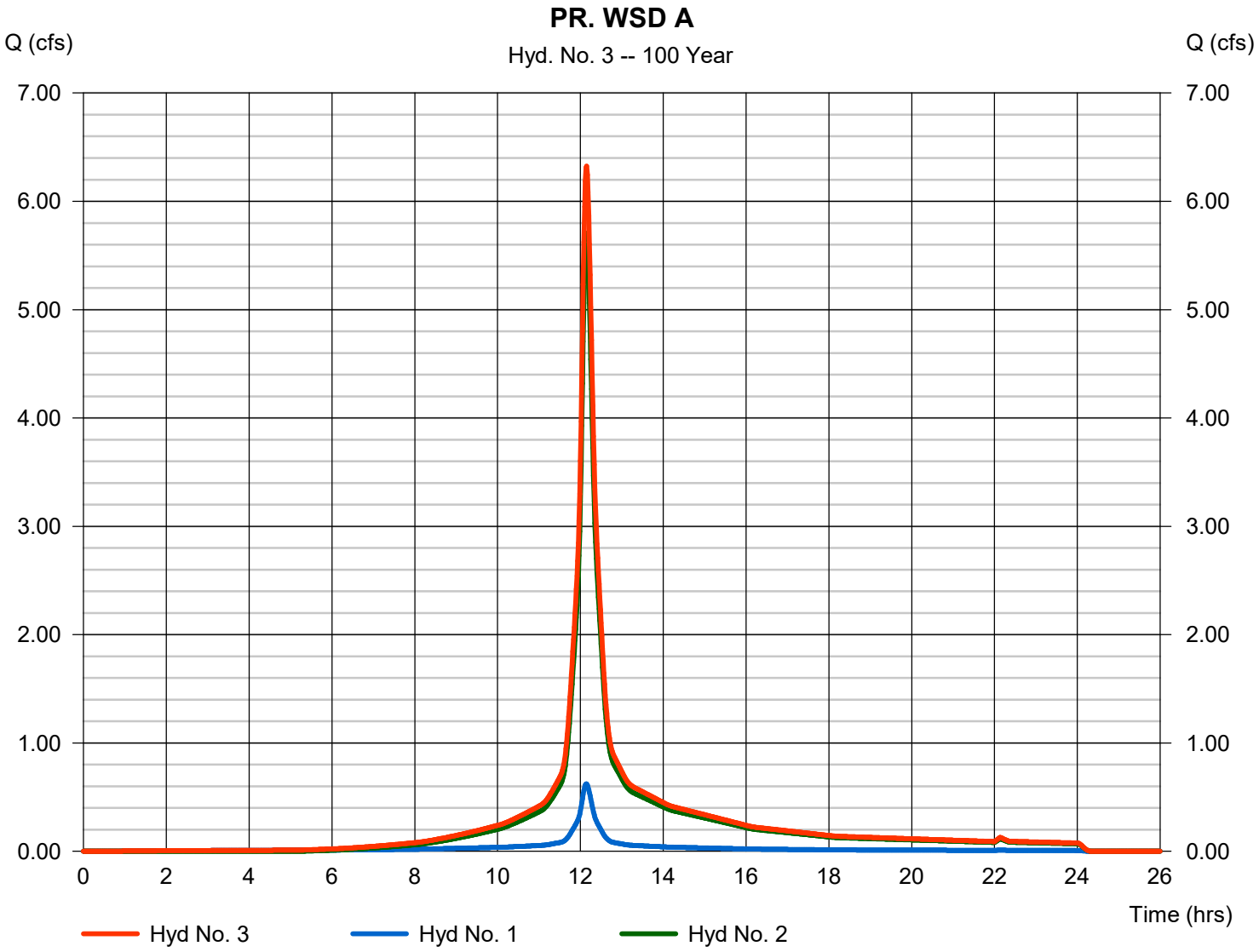


Hydrograph Report

Hyd. No. 3

PR. WSD A

Hydrograph type	= Combine	Peak discharge	= 6.326 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.15 hrs
Time interval	= 1 min	Hyd. volume	= 24,581 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 1.070 ac

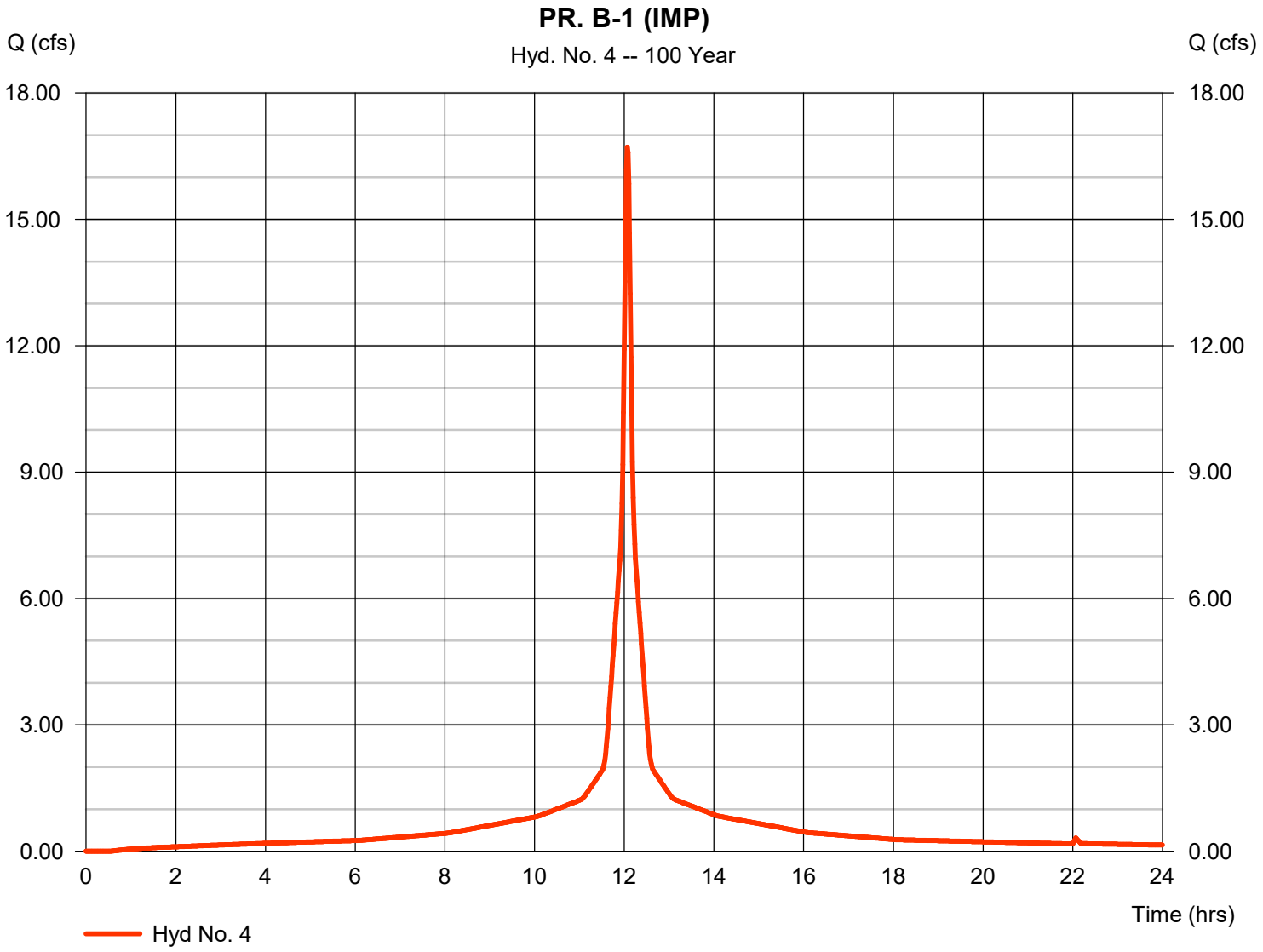


Hydrograph Report

Hyd. No. 4

PR. B-1 (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.72 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	59,886 cuft
Drainage area	=	1.900 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

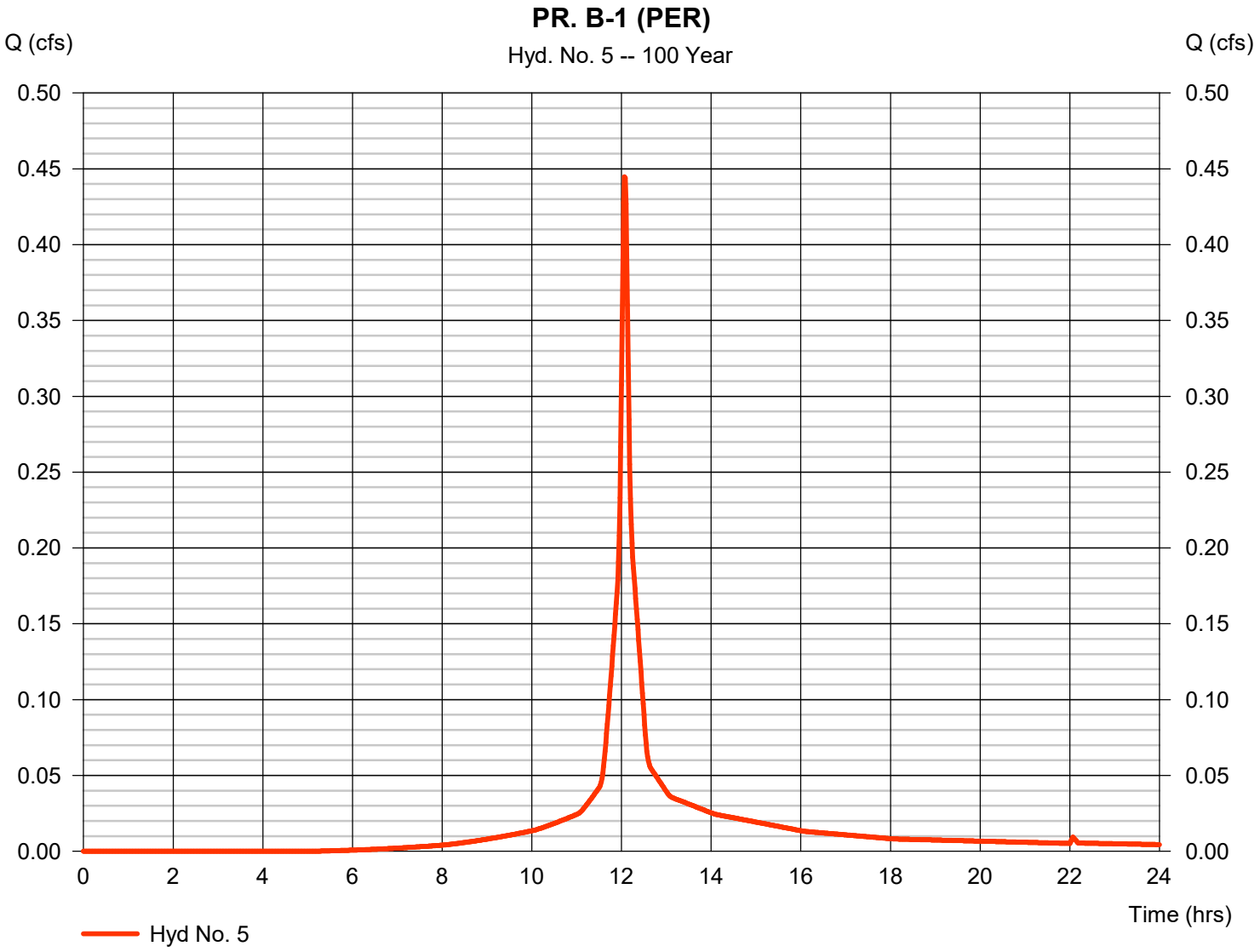


Hydrograph Report

Hyd. No. 5

PR. B-1 (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.445 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	1,403 cuft
Drainage area	=	0.060 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

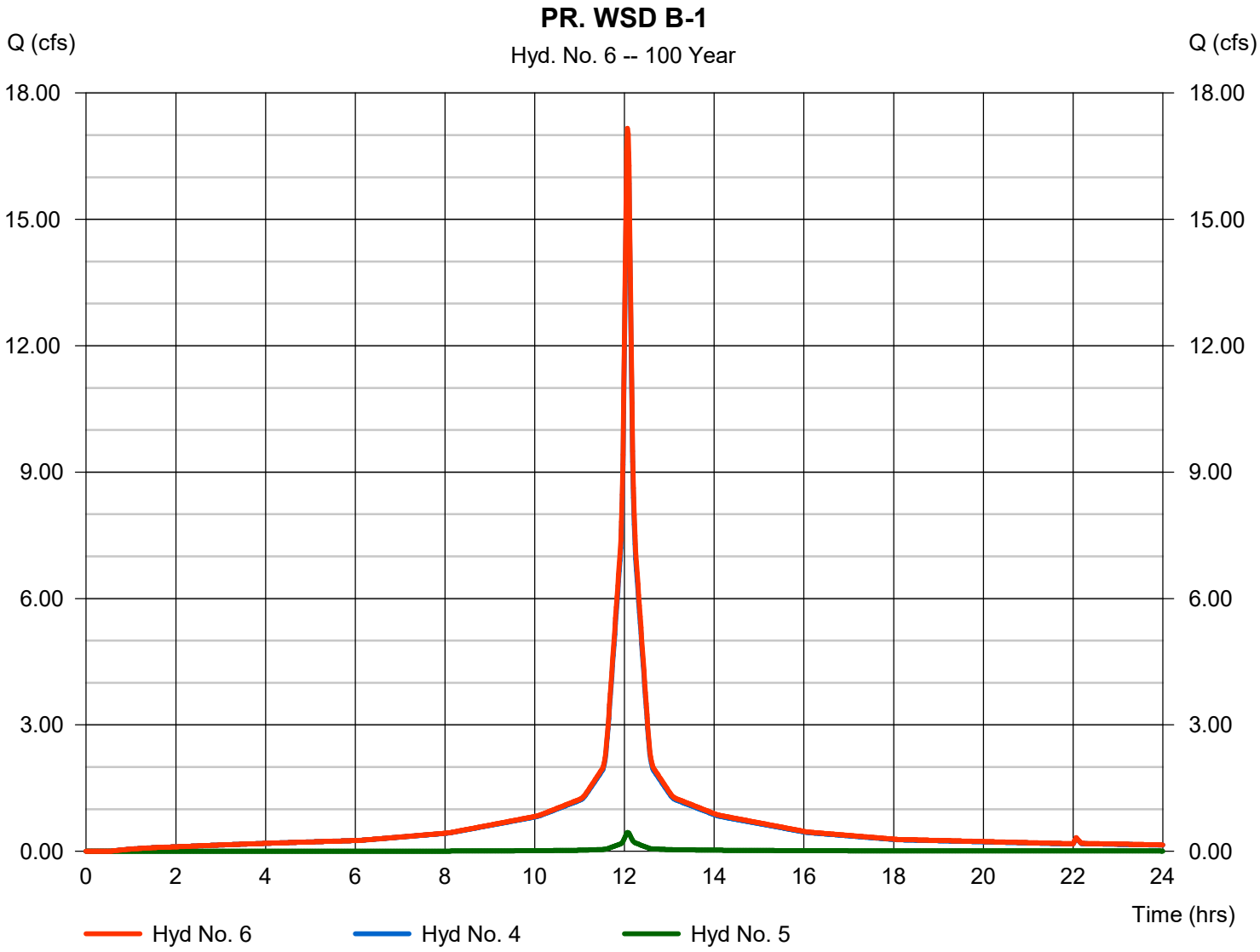


Hydrograph Report

Hyd. No. 6

PR. WSD B-1

Hydrograph type	= Combine	Peak discharge	= 17.16 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.07 hrs
Time interval	= 1 min	Hyd. volume	= 61,289 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 1.960 ac



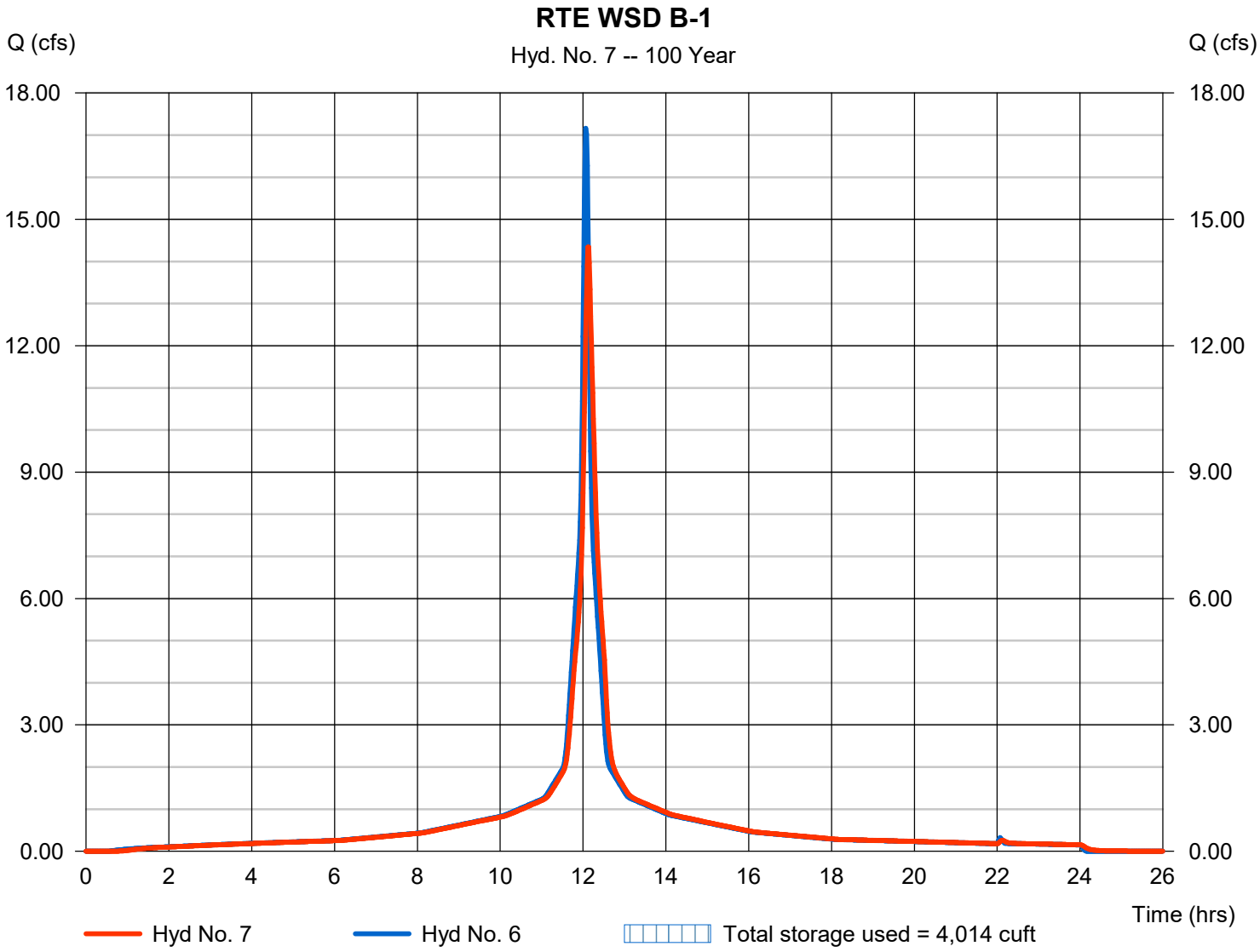
Hydrograph Report

Hyd. No. 7

RTE WSD B-1

Hydrograph type	=	Reservoir	Peak discharge	=	14.34 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.12 hrs
Time interval	=	1 min	Hyd. volume	=	61,286 cuft
Inflow hyd. No.	=	6 - PR. WSD B-1	Max. Elevation	=	232.34 ft
Reservoir name	=	BASIN-1	Max. Storage	=	4,014 cuft

Storage Indication method used.

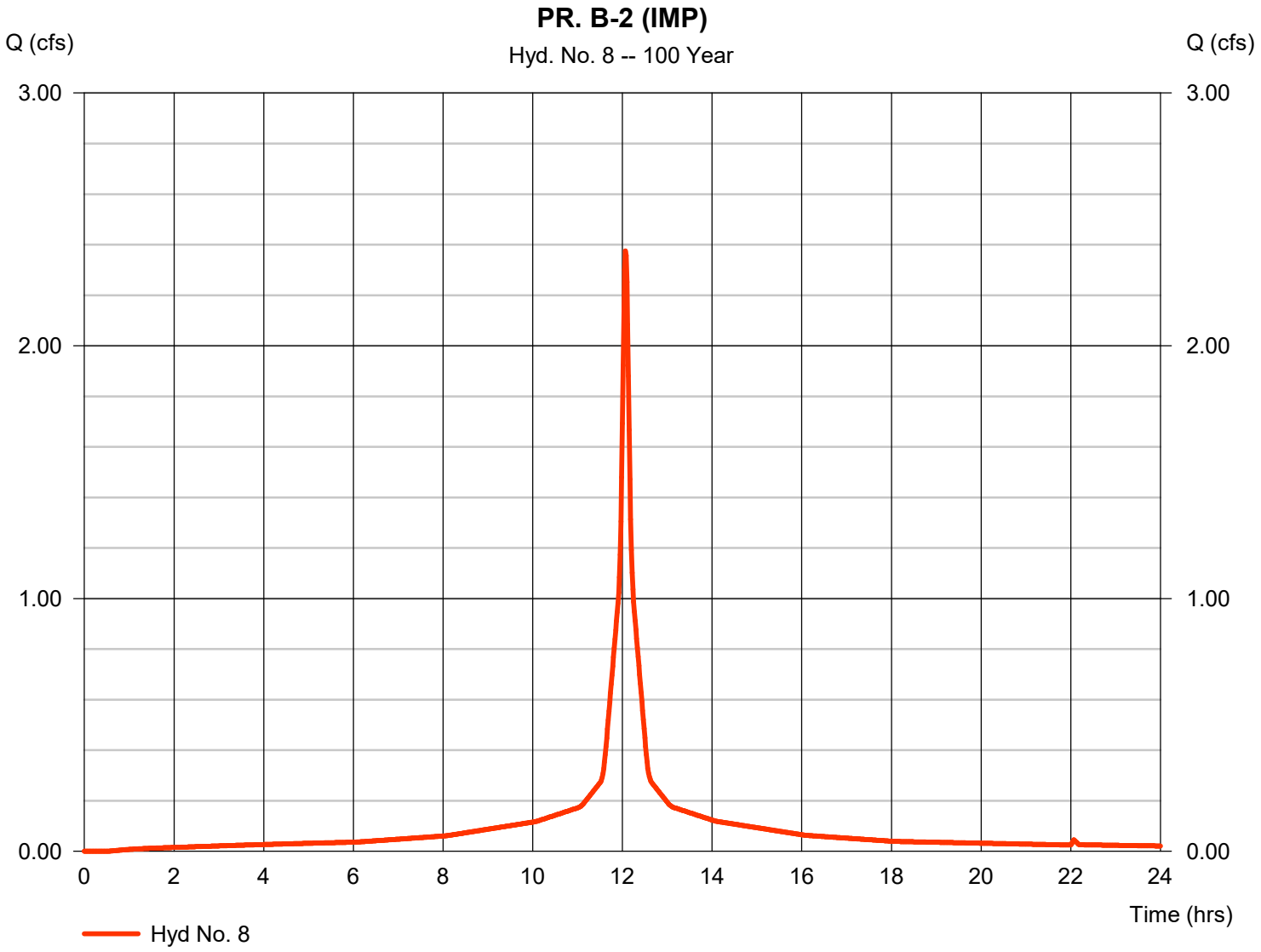


Hydrograph Report

Hyd. No. 8

PR. B-2 (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.376 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	8,510 cuft
Drainage area	=	0.270 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

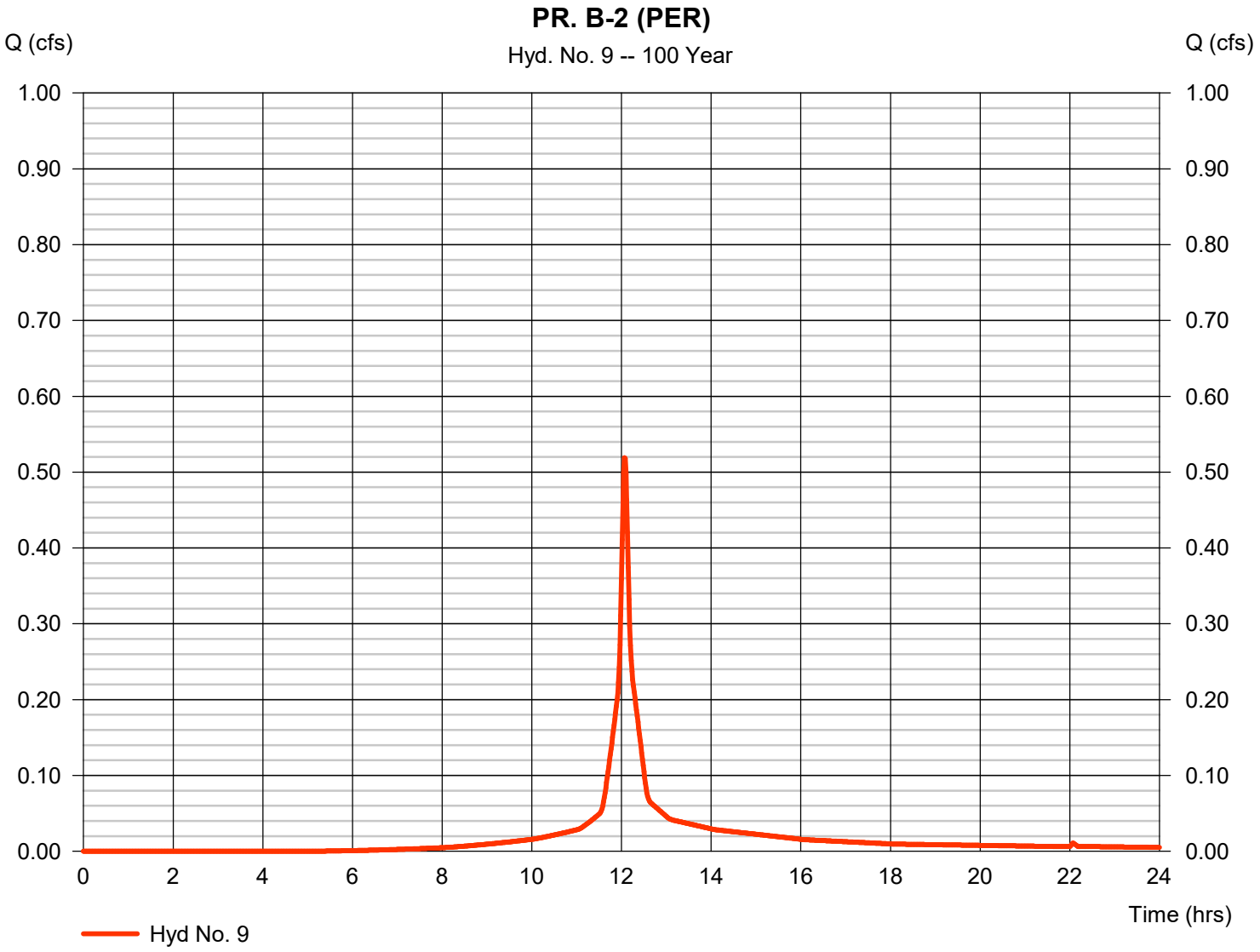


Hydrograph Report

Hyd. No. 9

PR. B-2 (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.519 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	1,637 cuft
Drainage area	=	0.070 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

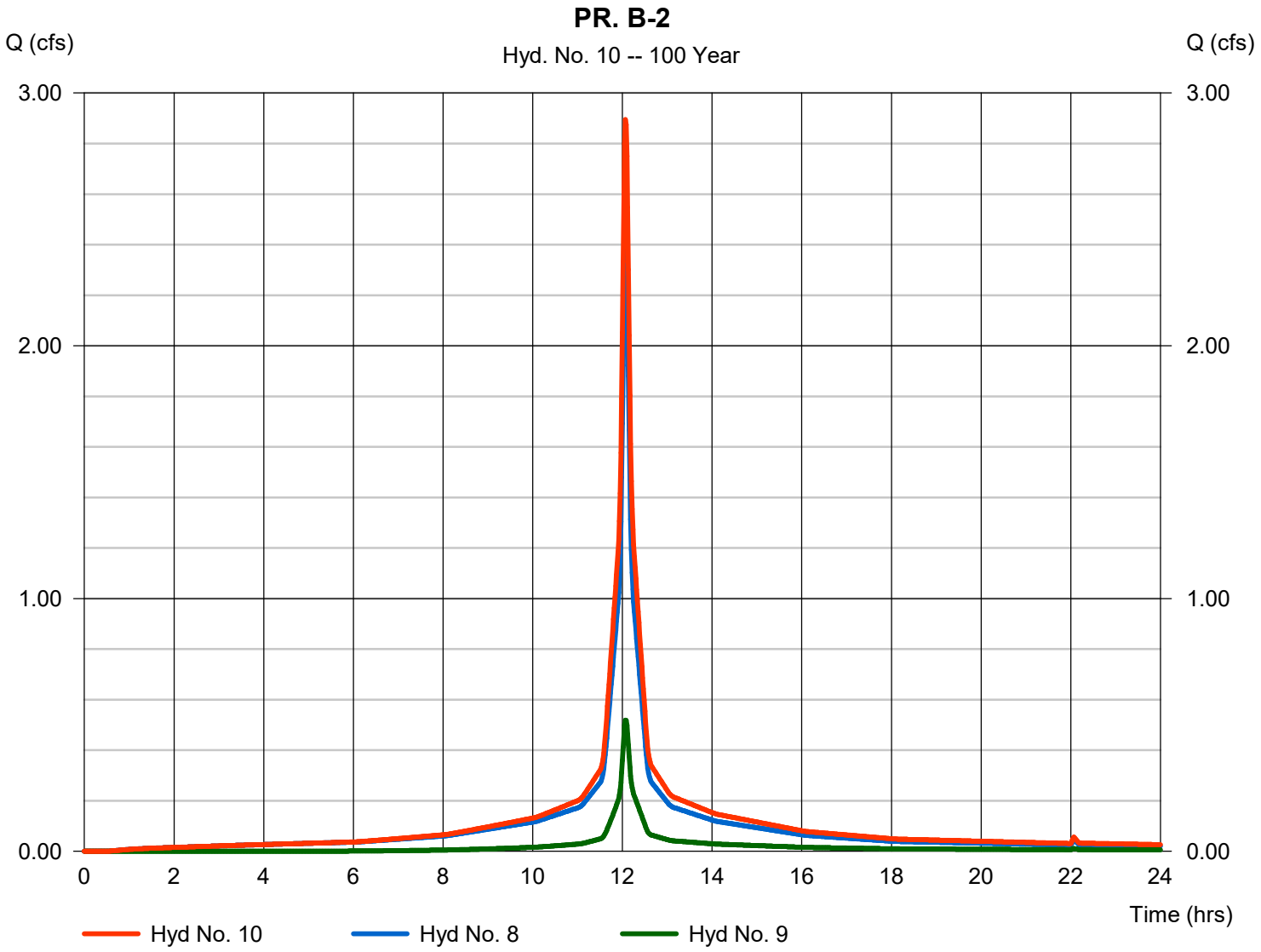


Hydrograph Report

Hyd. No. 10

PR. B-2

Hydrograph type	=	Combine	Peak discharge	=	2.895 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	10,147 cuft
Inflow hyds.	=	8, 9	Contrib. drain. area	=	0.340 ac



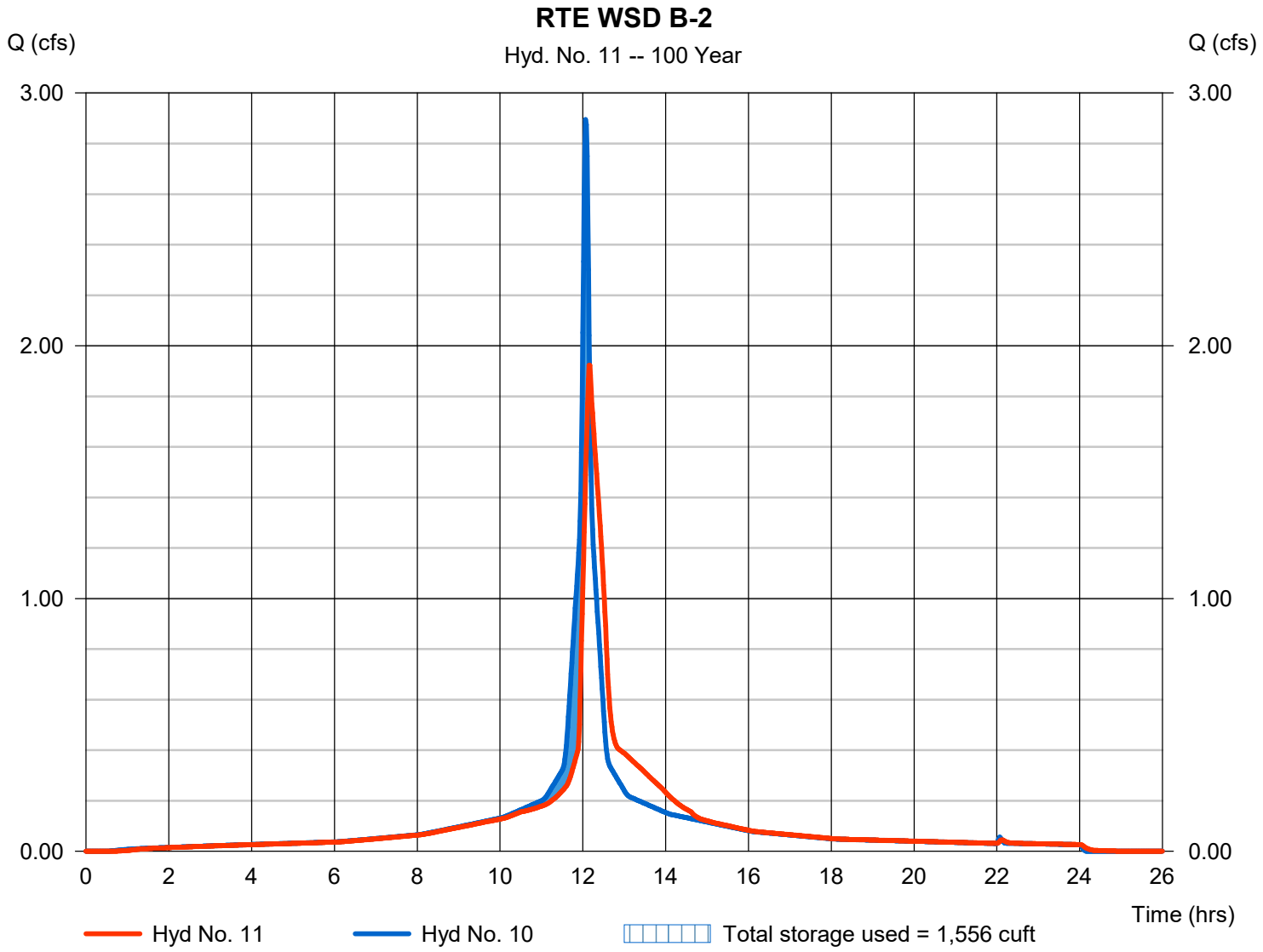
Hydrograph Report

Hyd. No. 11

RTE WSD B-2

Hydrograph type	=	Reservoir	Peak discharge	=	1.922 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.17 hrs
Time interval	=	1 min	Hyd. volume	=	10,145 cuft
Inflow hyd. No.	=	10 - PR. B-2	Max. Elevation	=	236.13 ft
Reservoir name	=	BASIN-2	Max. Storage	=	1,556 cuft

Storage Indication method used.

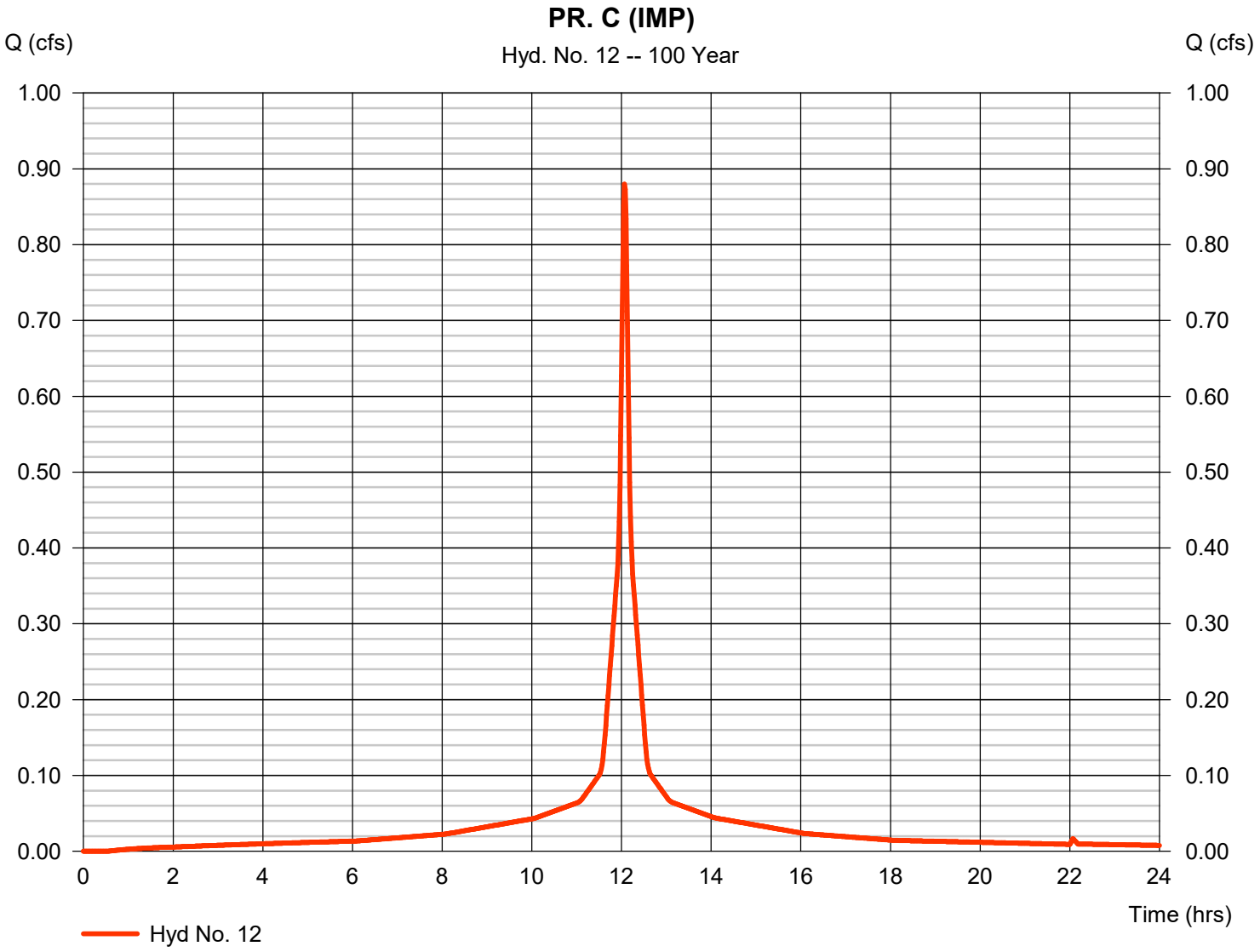


Hydrograph Report

Hyd. No. 12

PR. C (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.880 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	3,152 cuft
Drainage area	=	0.100 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

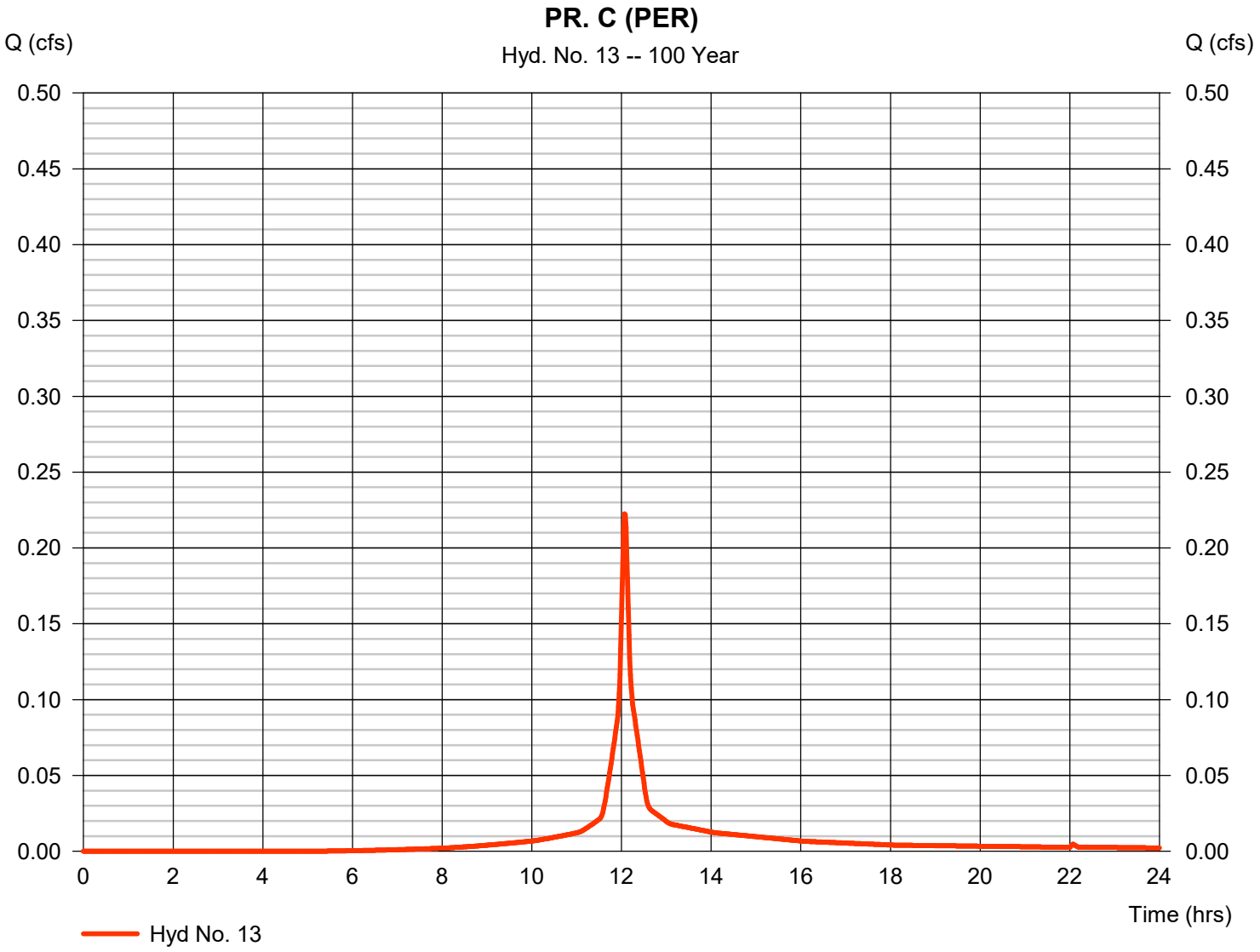


Hydrograph Report

Hyd. No. 13

PR. C (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.222 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	701 cuft
Drainage area	=	0.030 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

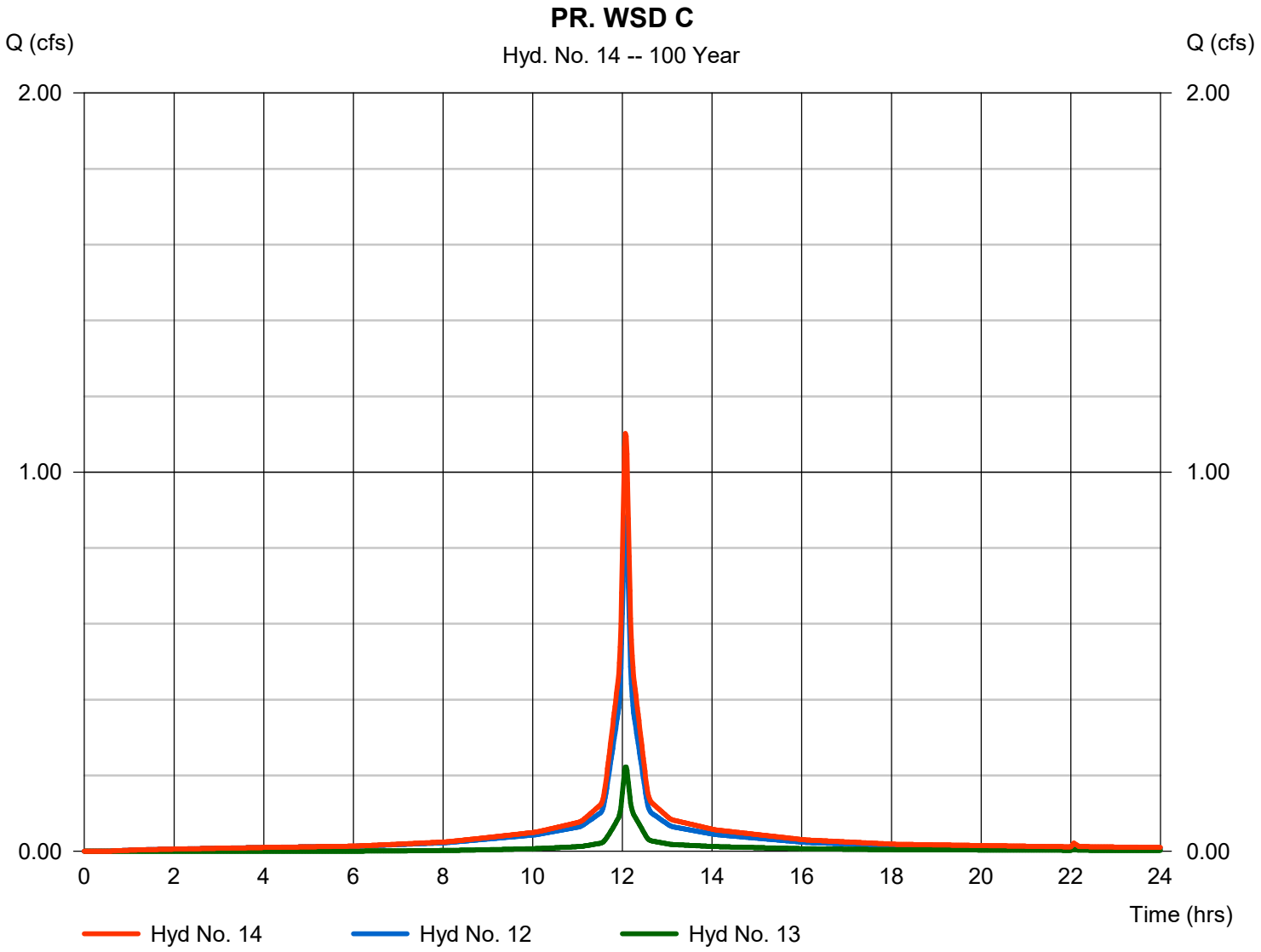


Hydrograph Report

Hyd. No. 14

PR. WSD C

Hydrograph type	=	Combine	Peak discharge	=	1.102 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	3,853 cuft
Inflow hyds.	=	12, 13	Contrib. drain. area	=	0.130 ac

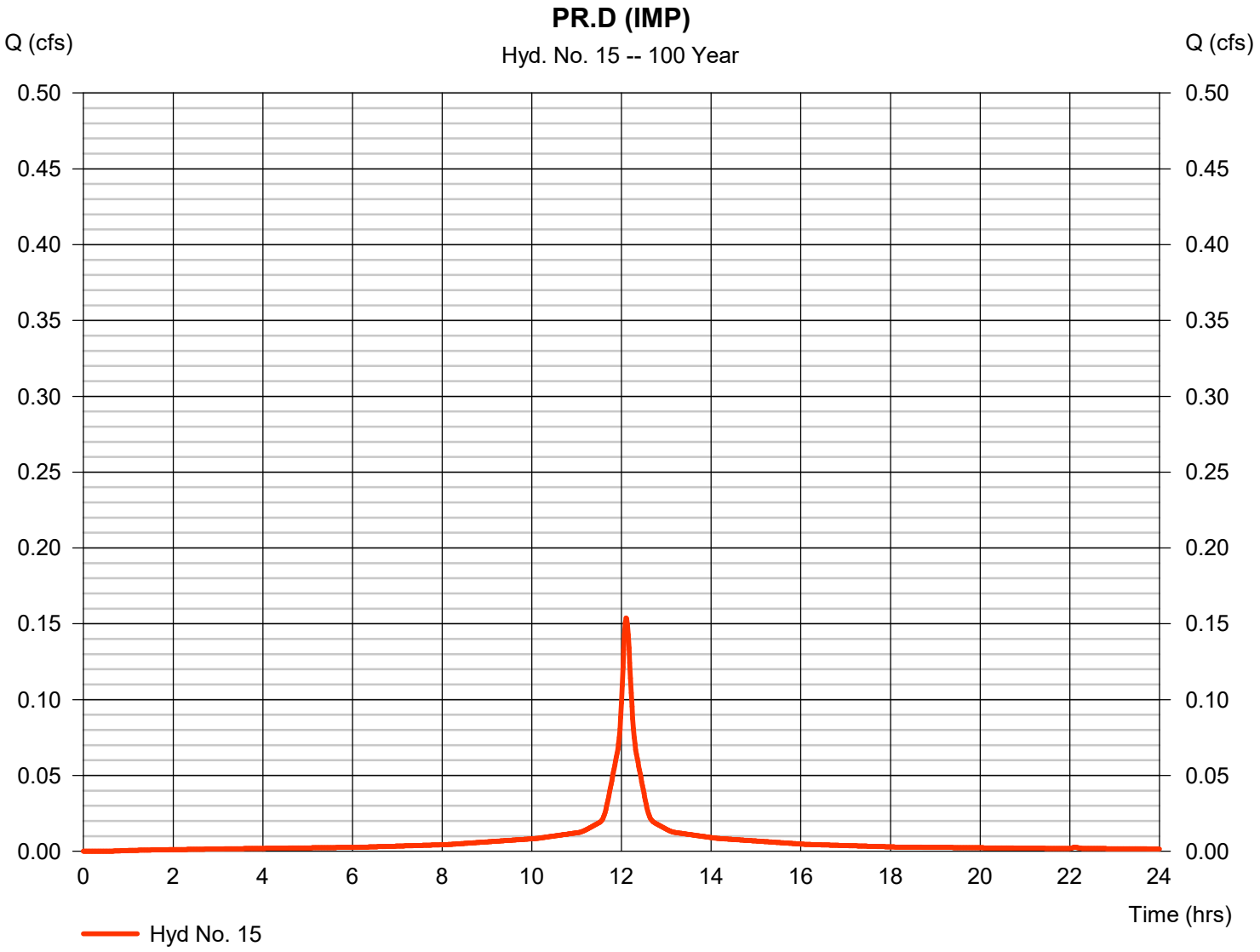


Hydrograph Report

Hyd. No. 15

PR.D (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.154 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.10 hrs
Time interval	=	1 min	Hyd. volume	=	611 cuft
Drainage area	=	0.020 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

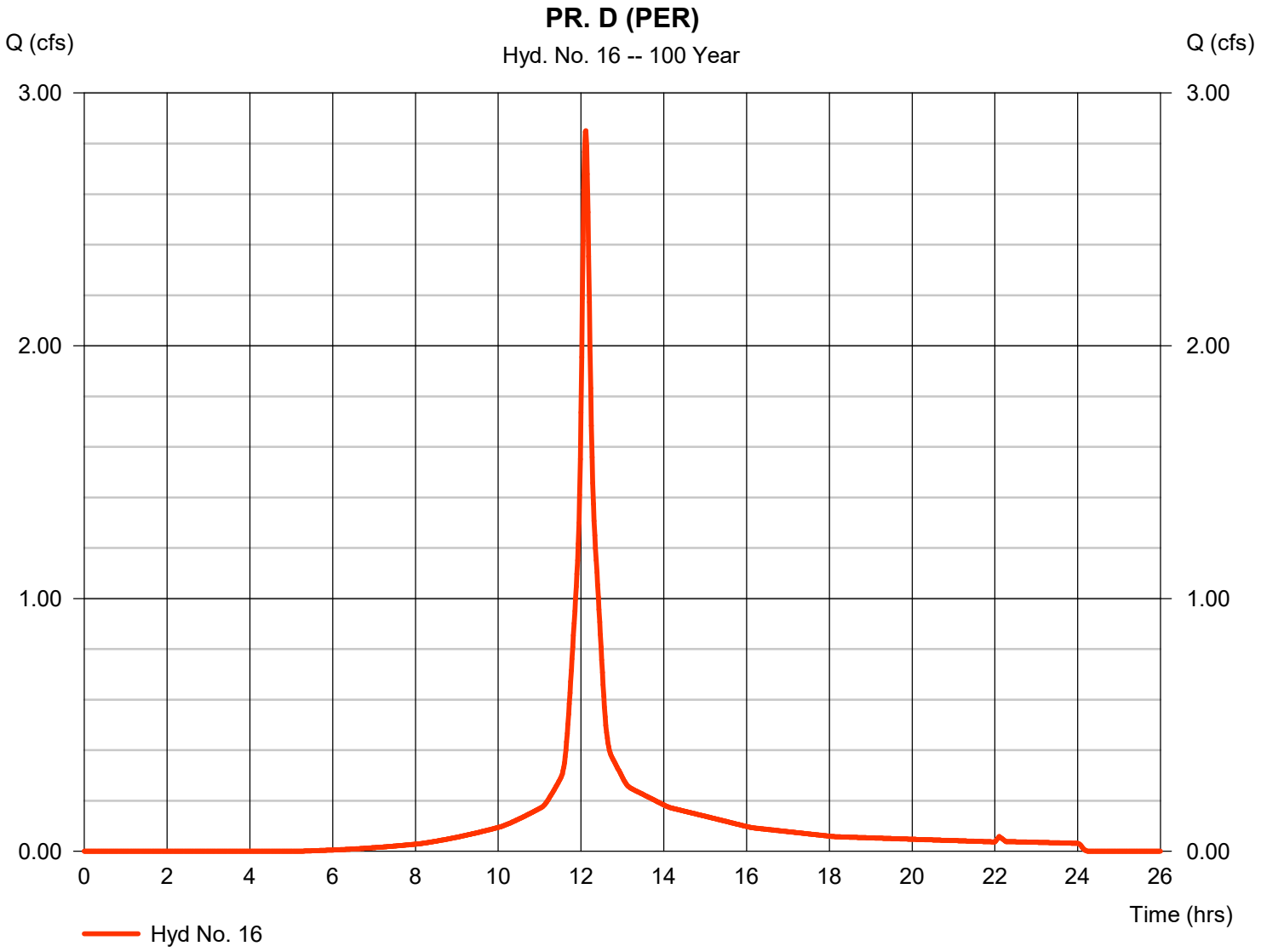


Hydrograph Report

Hyd. No. 16

PR. D (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.851 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.12 hrs
Time interval	=	1 min	Hyd. volume	=	9,977 cuft
Drainage area	=	0.440 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	9.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

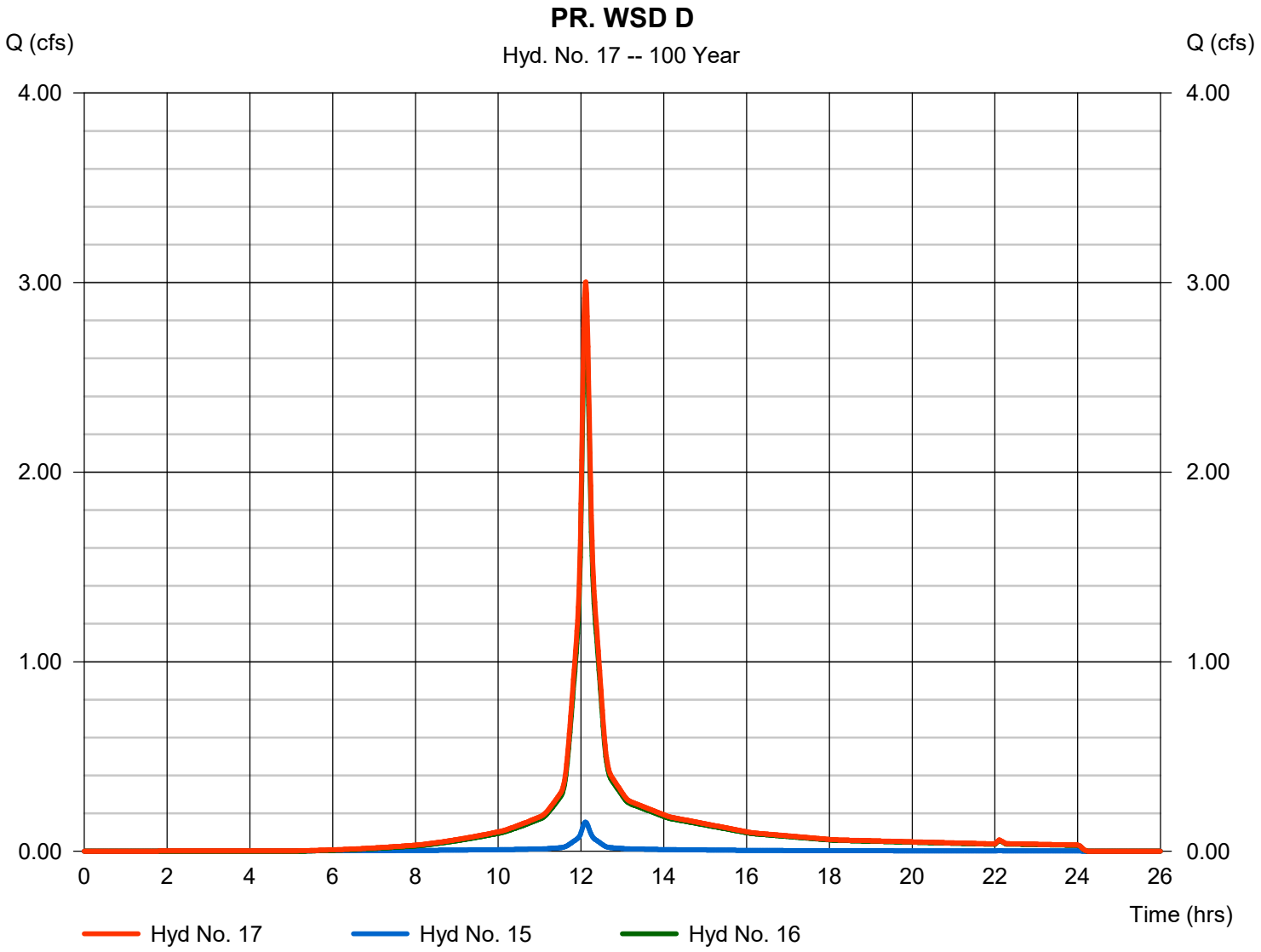


Hydrograph Report

Hyd. No. 17

PR. WSD D

Hydrograph type	=	Combine	Peak discharge	=	3.004 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.12 hrs
Time interval	=	1 min	Hyd. volume	=	10,588 cuft
Inflow hyds.	=	15, 16	Contrib. drain. area	=	0.460 ac

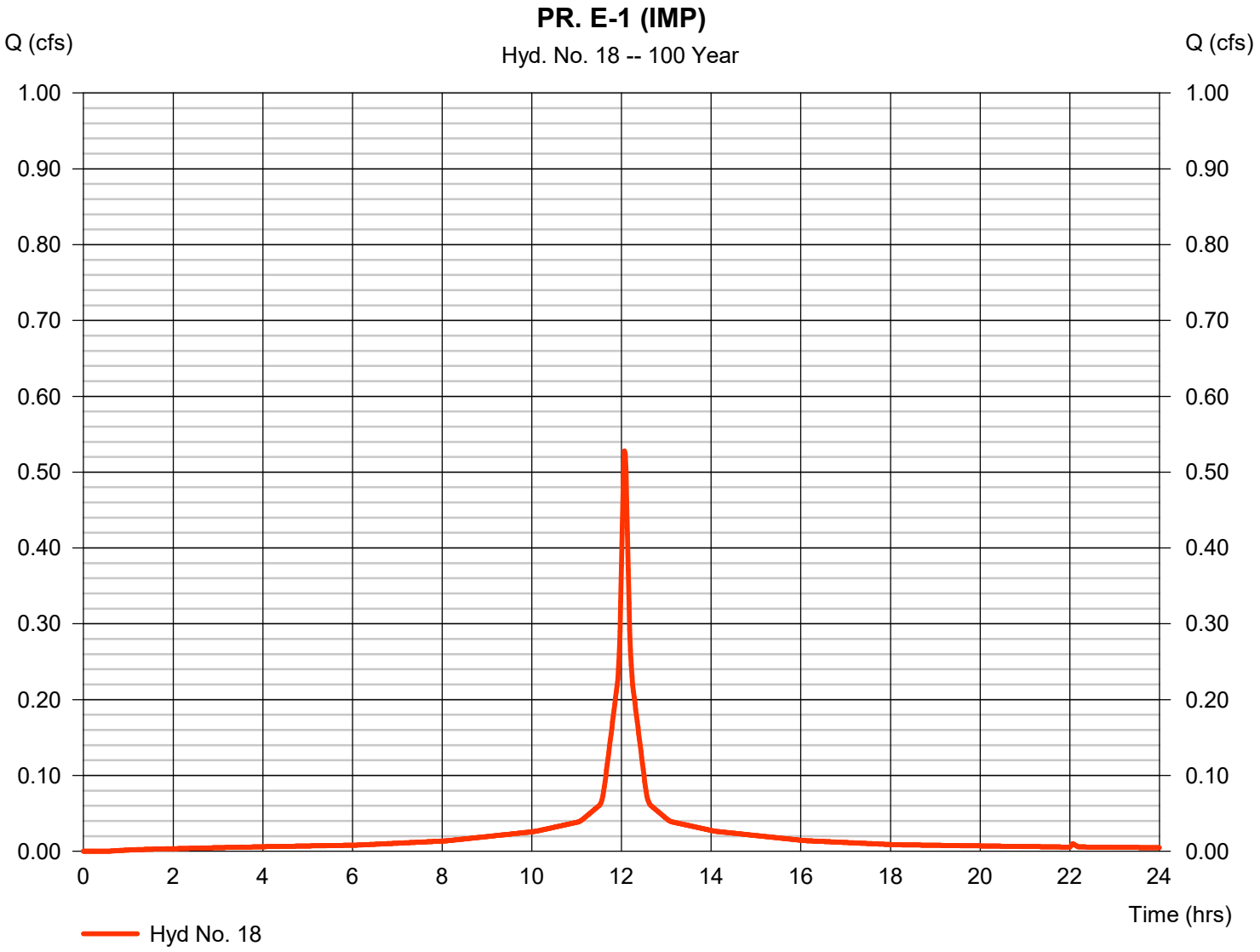


Hydrograph Report

Hyd. No. 18

PR. E-1 (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.528 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	1,891 cuft
Drainage area	=	0.060 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

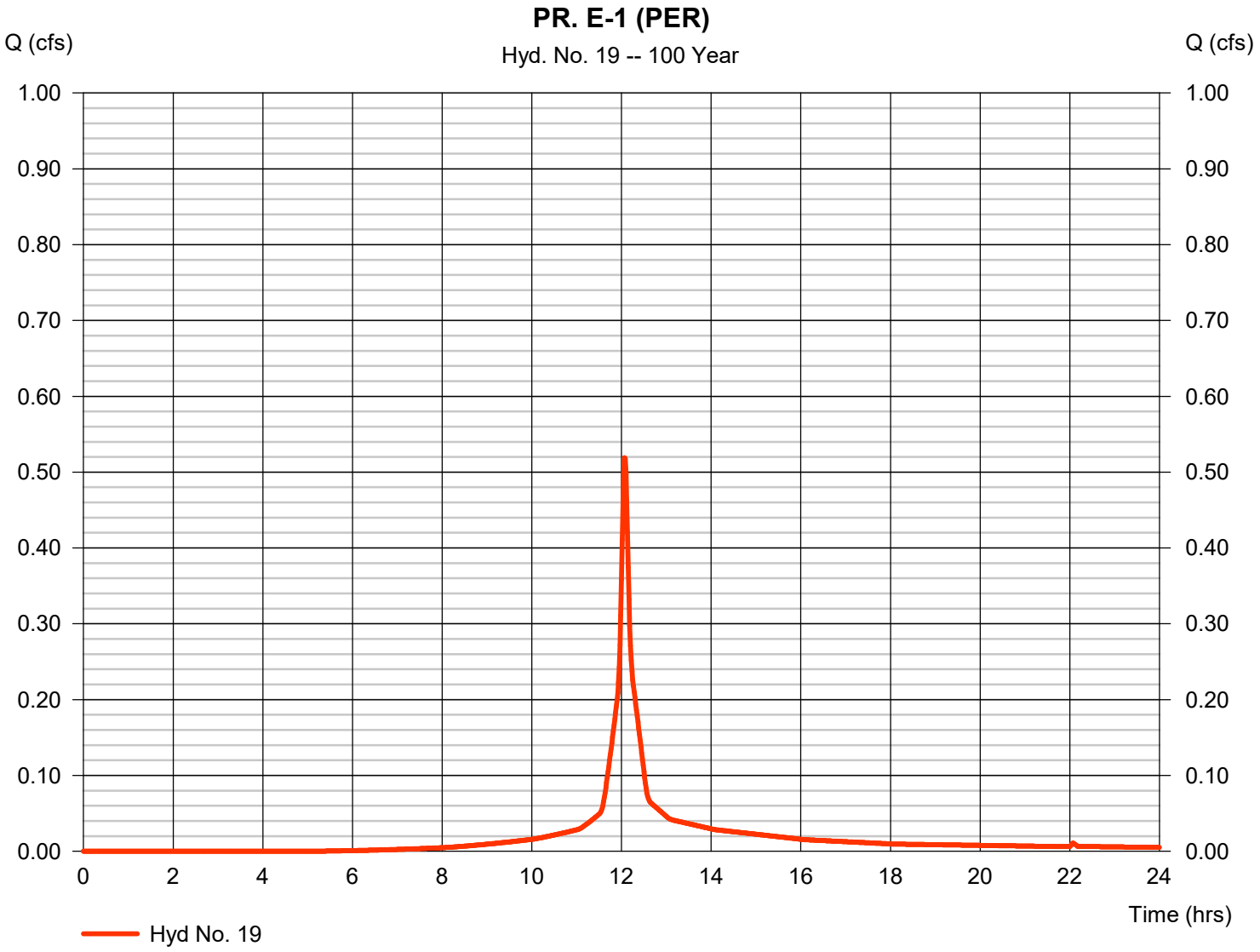


Hydrograph Report

Hyd. No. 19

PR. E-1 (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.519 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	1,637 cuft
Drainage area	=	0.070 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

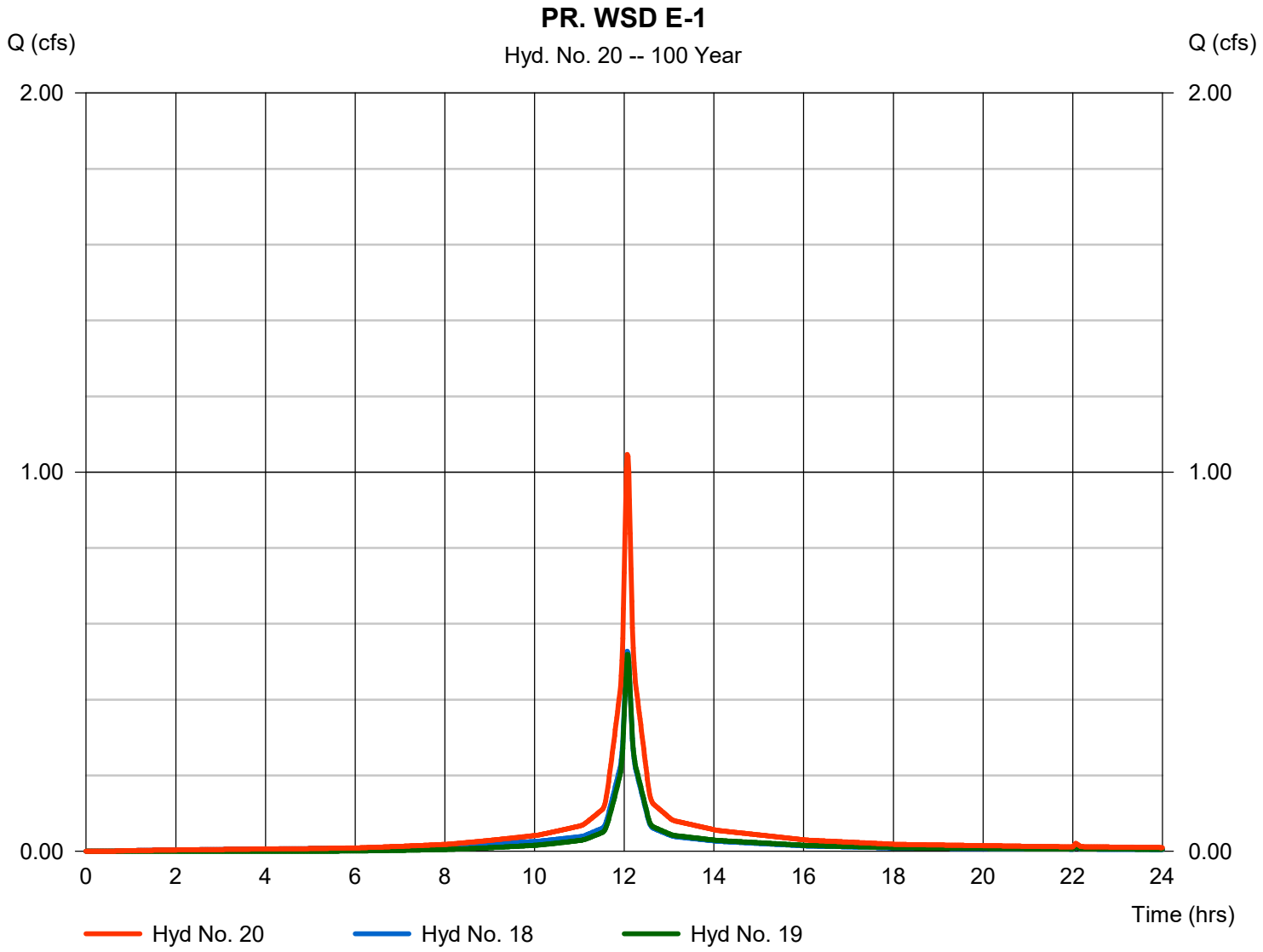


Hydrograph Report

Hyd. No. 20

PR. WSD E-1

Hydrograph type	=	Combine	Peak discharge	=	1.047 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	3,528 cuft
Inflow hyds.	=	18, 19	Contrib. drain. area	=	0.130 ac



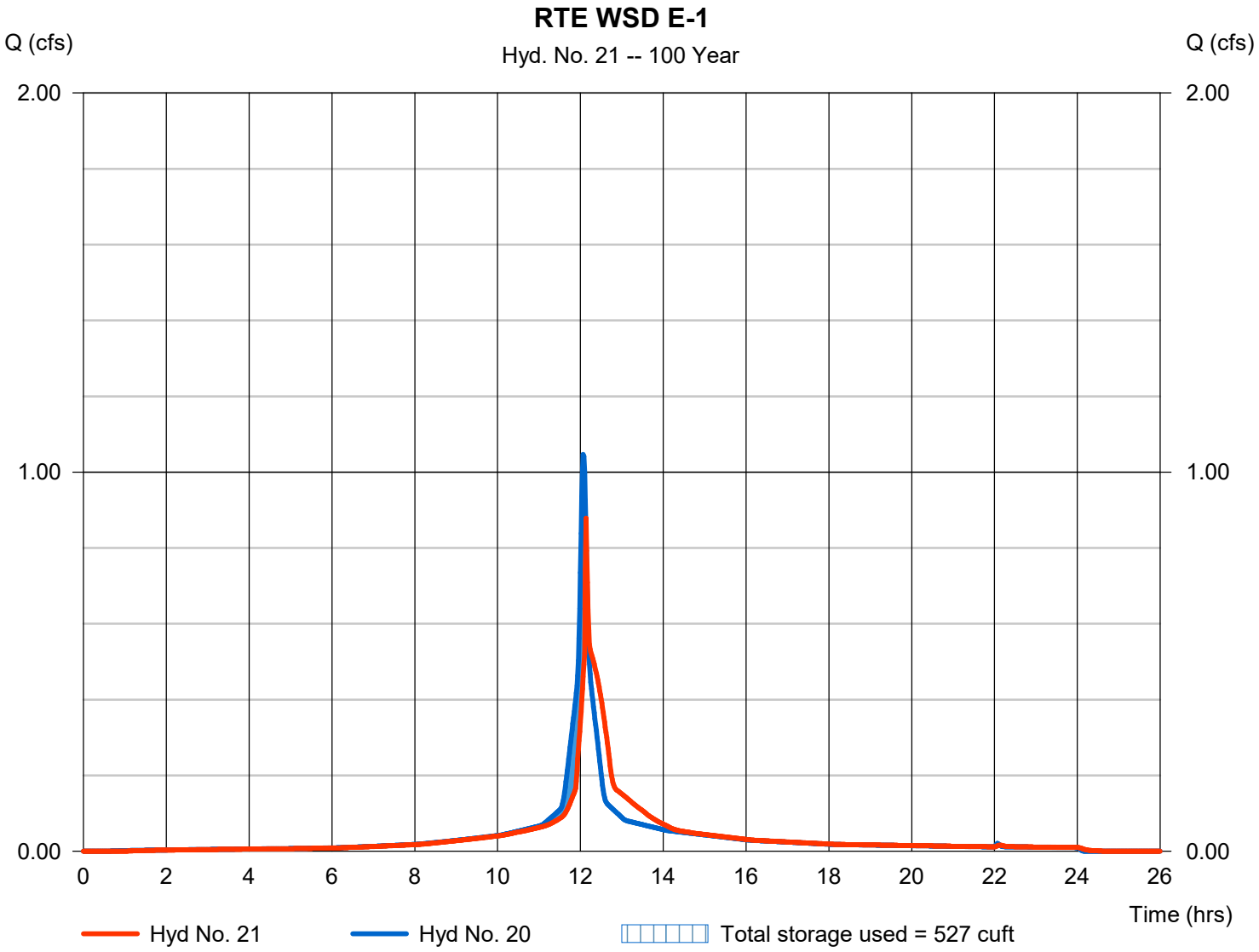
Hydrograph Report

Hyd. No. 21

RTE WSD E-1

Hydrograph type	=	Reservoir	Peak discharge	=	0.879 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.13 hrs
Time interval	=	1 min	Hyd. volume	=	3,526 cuft
Inflow hyd. No.	=	20 - PR. WSD E-1	Max. Elevation	=	253.96 ft
Reservoir name	=	BASIN-3	Max. Storage	=	527 cuft

Storage Indication method used.

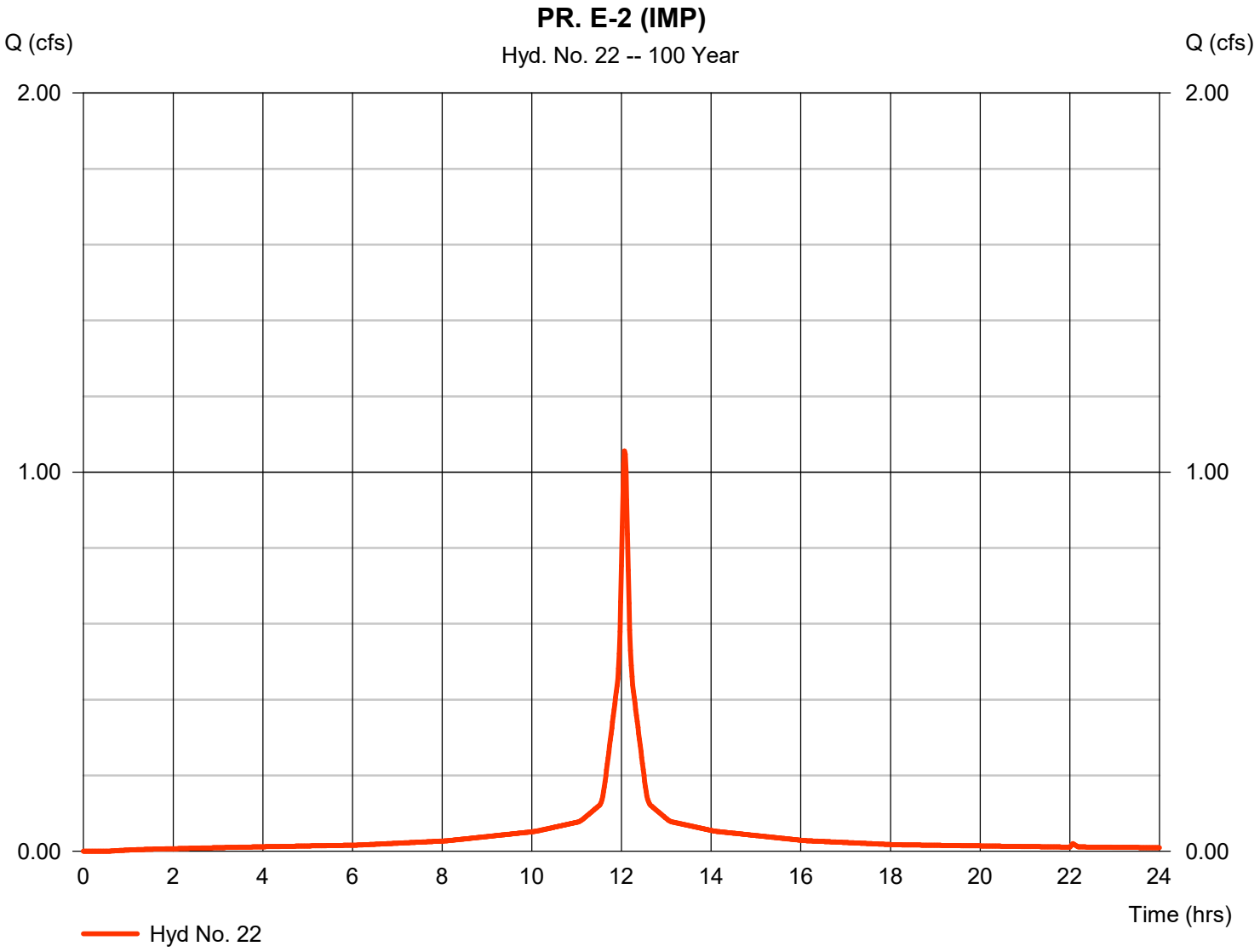


Hydrograph Report

Hyd. No. 22

PR. E-2 (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.056 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	3,782 cuft
Drainage area	=	0.120 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

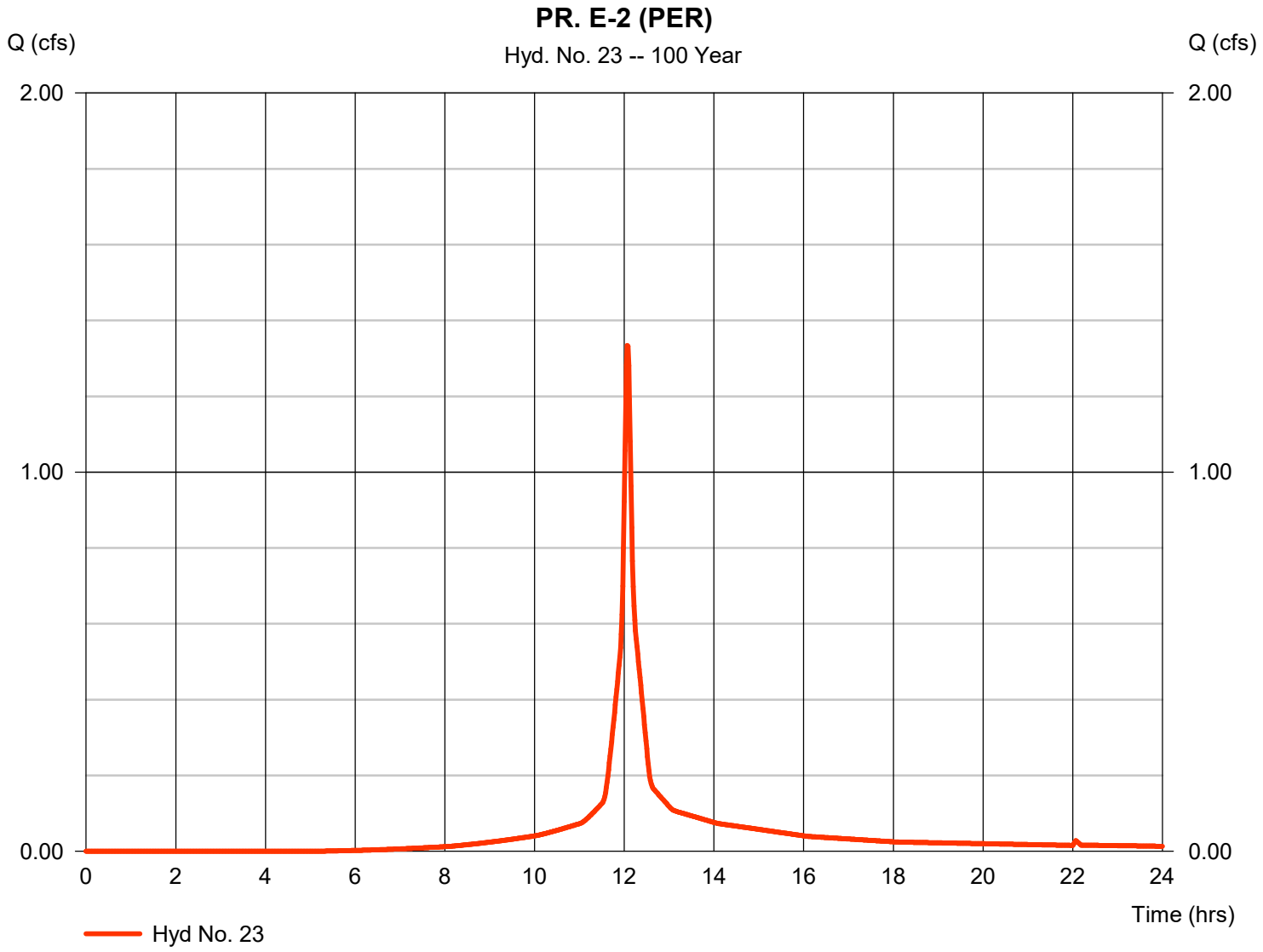


Hydrograph Report

Hyd. No. 23

PR. E-2 (PER)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.334 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.07 hrs
Time interval	= 1 min	Hyd. volume	= 4,209 cuft
Drainage area	= 0.180 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 8.66 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

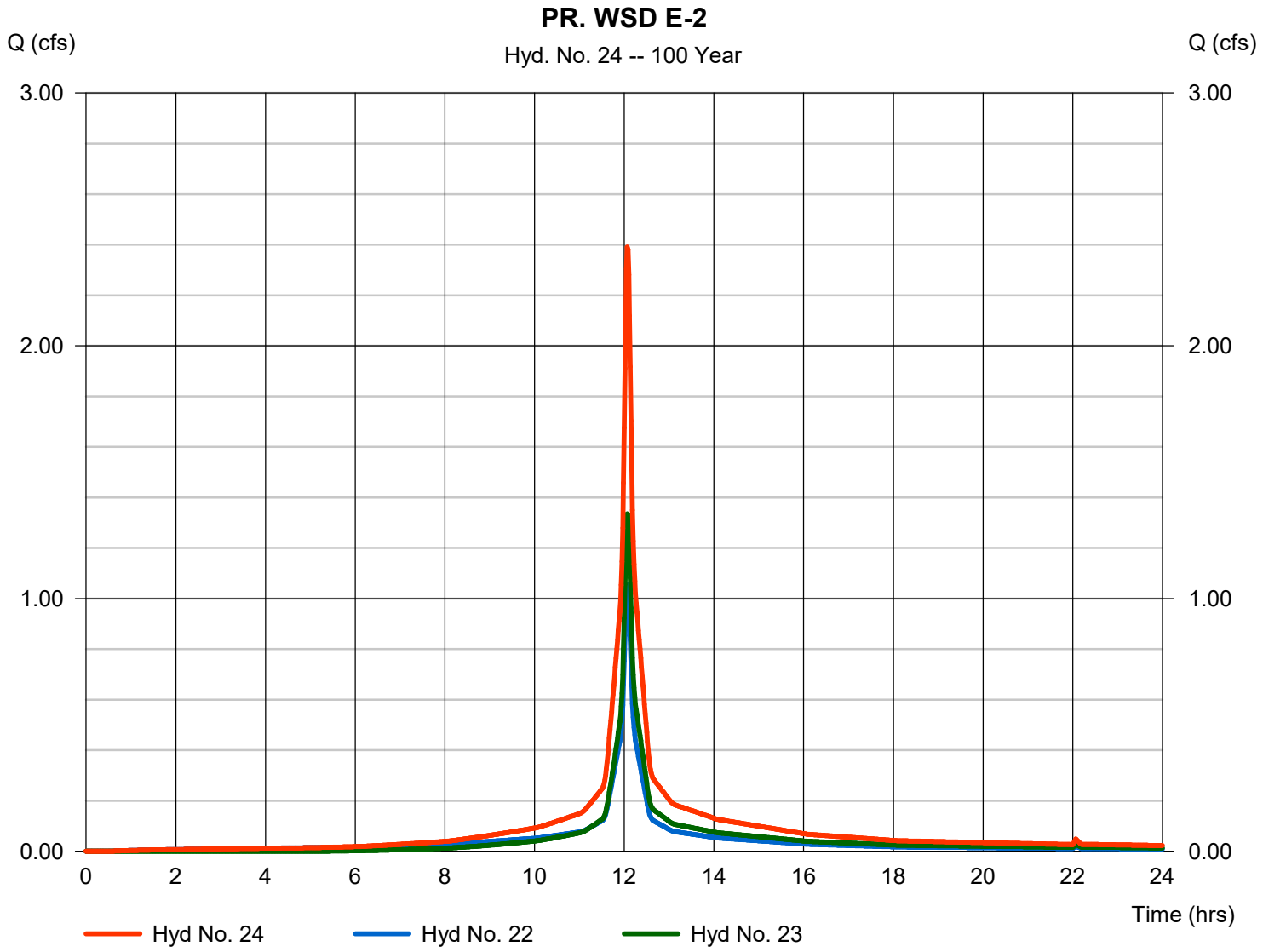


Hydrograph Report

Hyd. No. 24

PR. WSD E-2

Hydrograph type	=	Combine	Peak discharge	=	2.390 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	7,991 cuft
Inflow hyds.	=	22, 23	Contrib. drain. area	=	0.300 ac

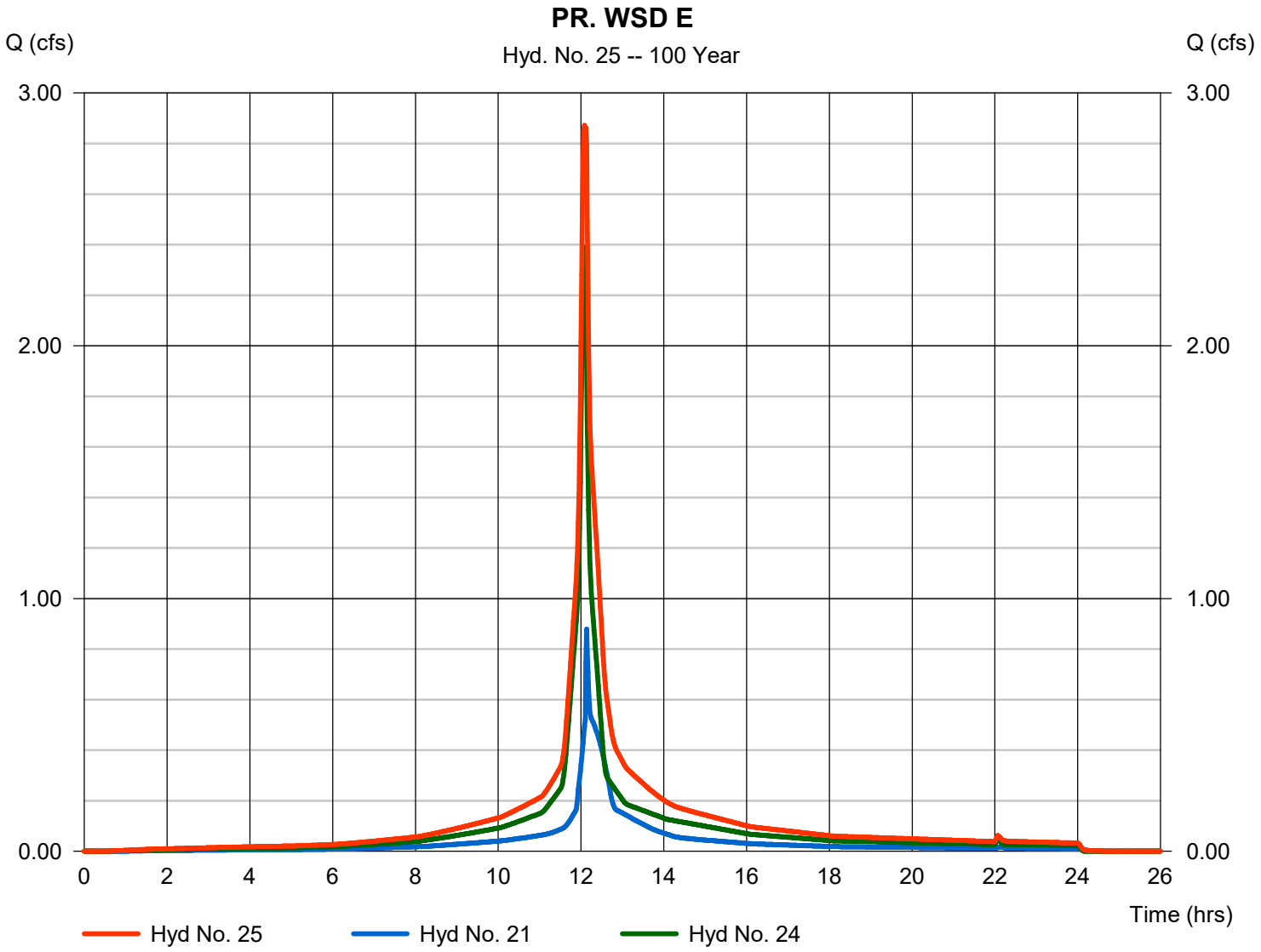


Hydrograph Report

Hyd. No. 25

PR. WSD E

Hydrograph type	=	Combine	Peak discharge	=	2.872 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.08 hrs
Time interval	=	1 min	Hyd. volume	=	11,517 cuft
Inflow hyds.	=	21, 24	Contrib. drain. area	=	0.000 ac

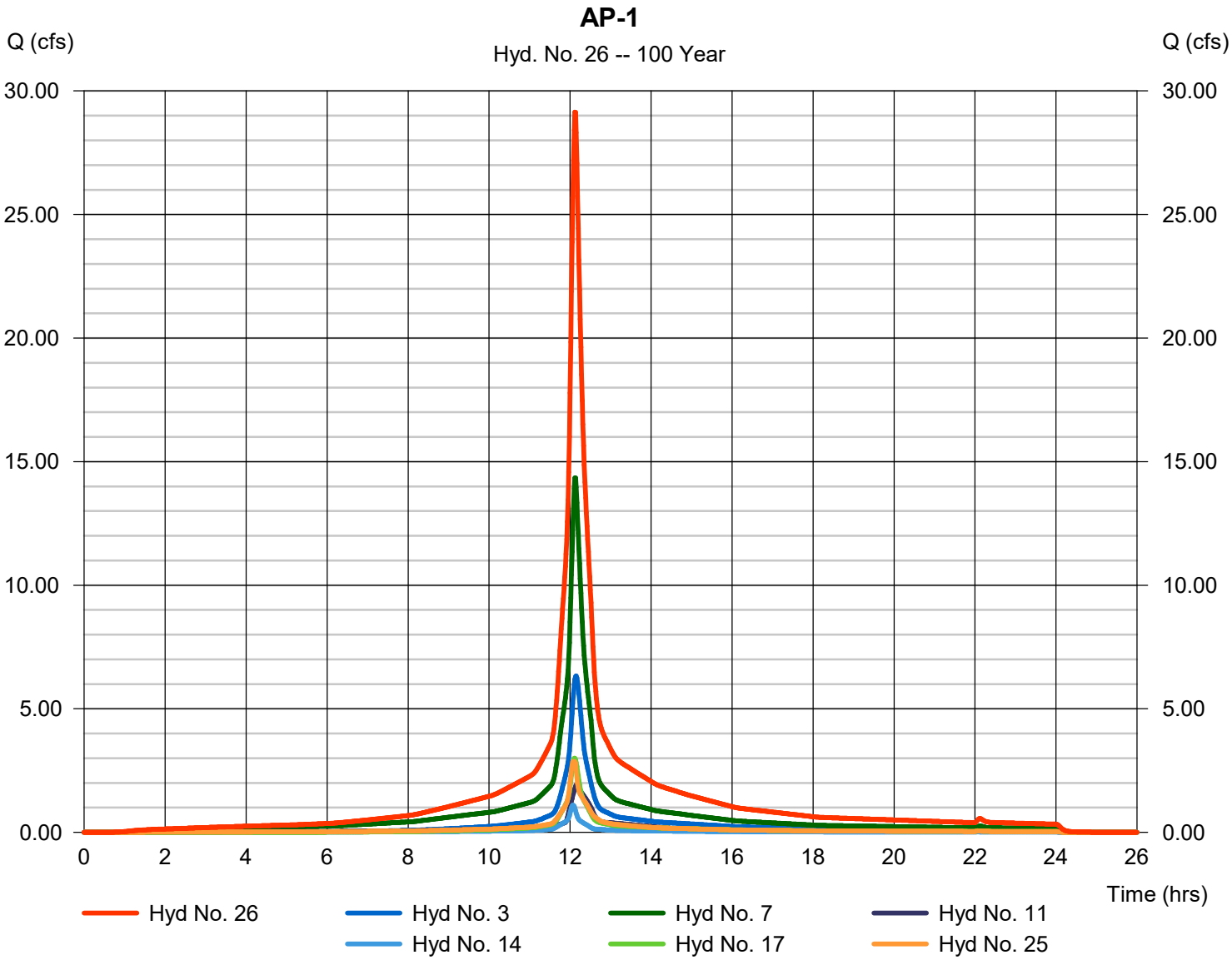


Hydrograph Report

Hyd. No. 26

AP-1

Hydrograph type	= Combine	Peak discharge	= 29.14 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 121,972 cuft
Inflow hyds.	= 3, 7, 11, 14, 17, 25	Contrib. drain. area	= 0.000 ac

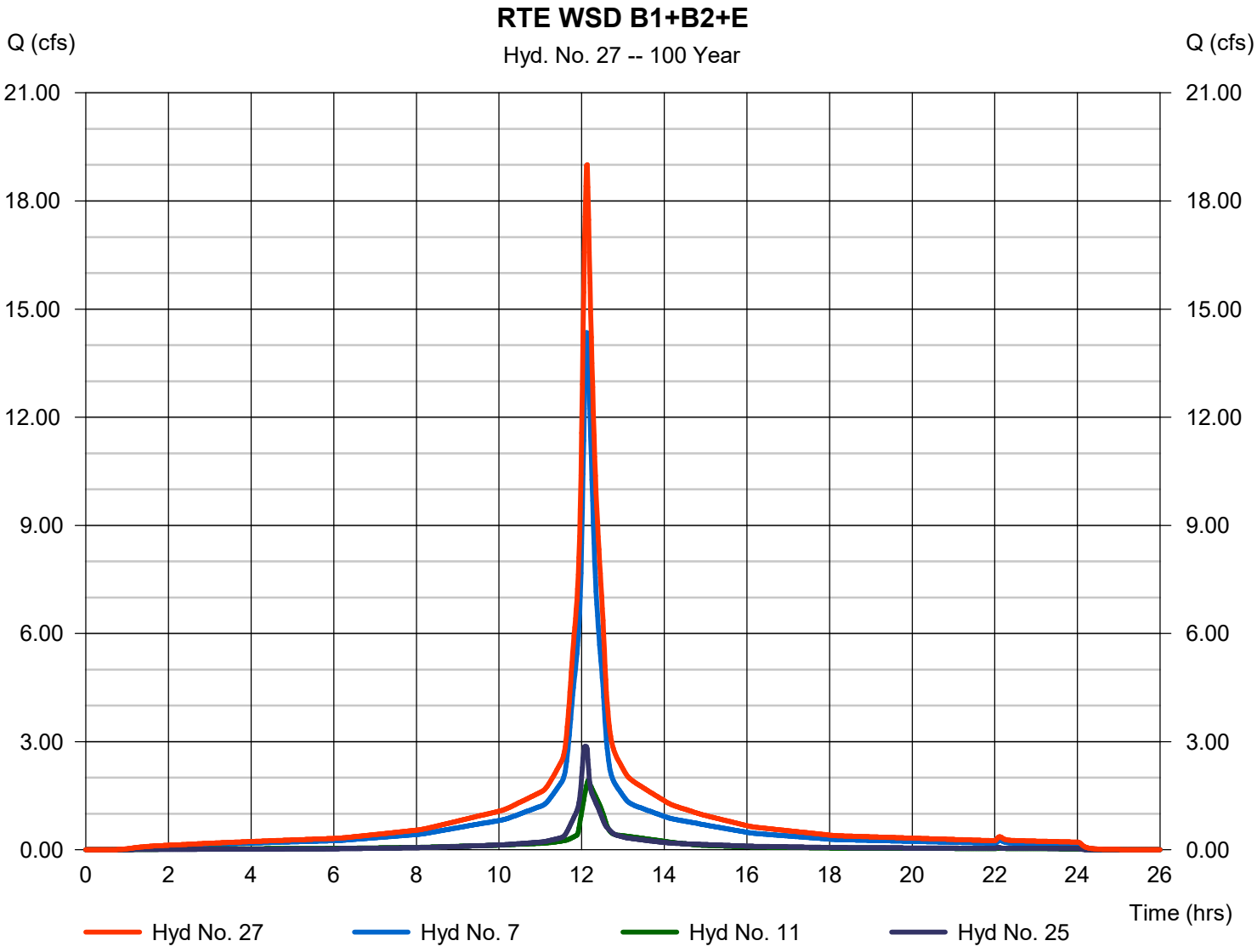


Hydrograph Report

Hyd. No. 27

RTE WSD B1+B2+E

Hydrograph type	= Combine	Peak discharge	= 19.00 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.13 hrs
Time interval	= 1 min	Hyd. volume	= 82,949 cuft
Inflow hyds.	= 7, 11, 25	Contrib. drain. area	= 0.000 ac

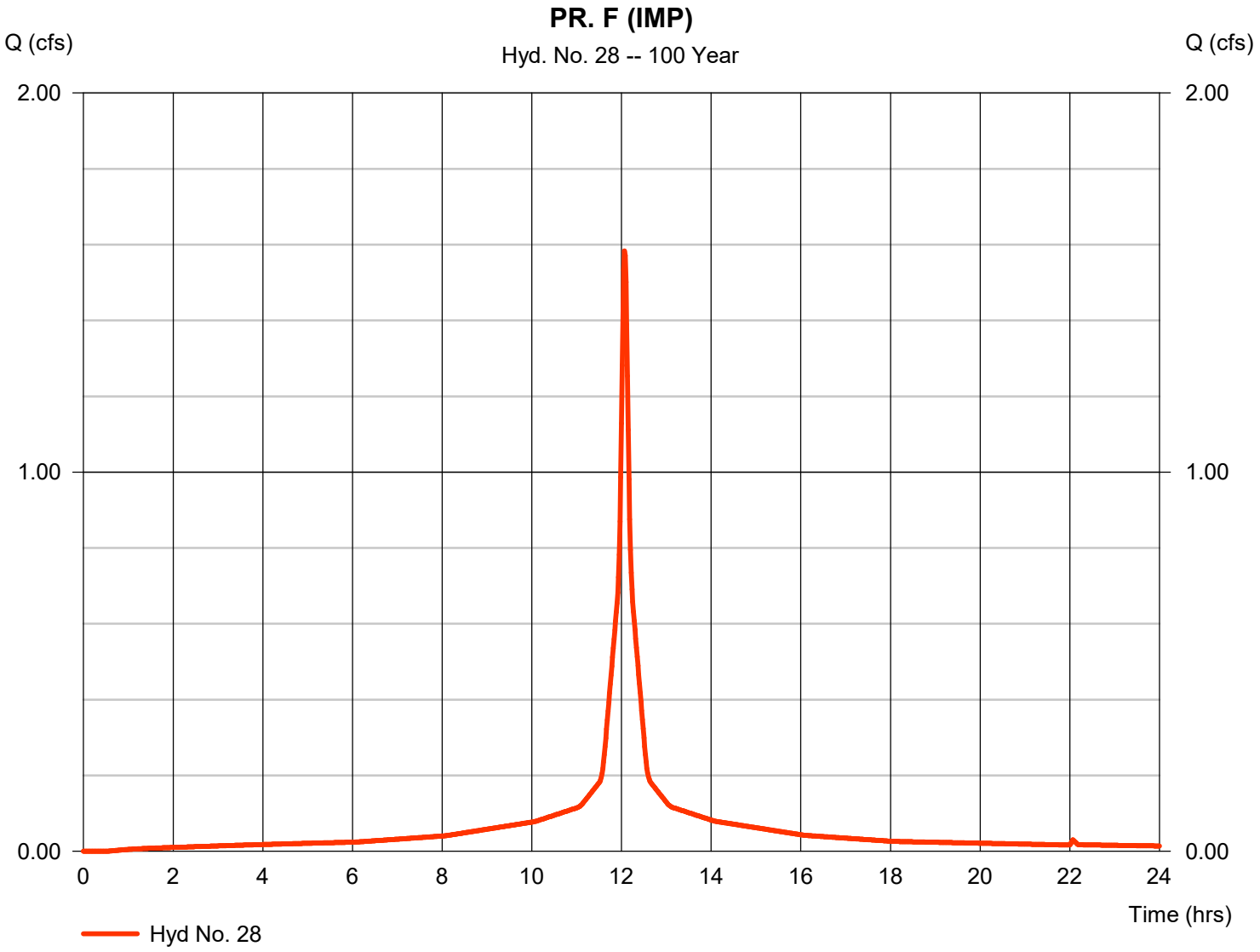


Hydrograph Report

Hyd. No. 28

PR. F (IMP)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.584 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	5,673 cuft
Drainage area	=	0.180 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

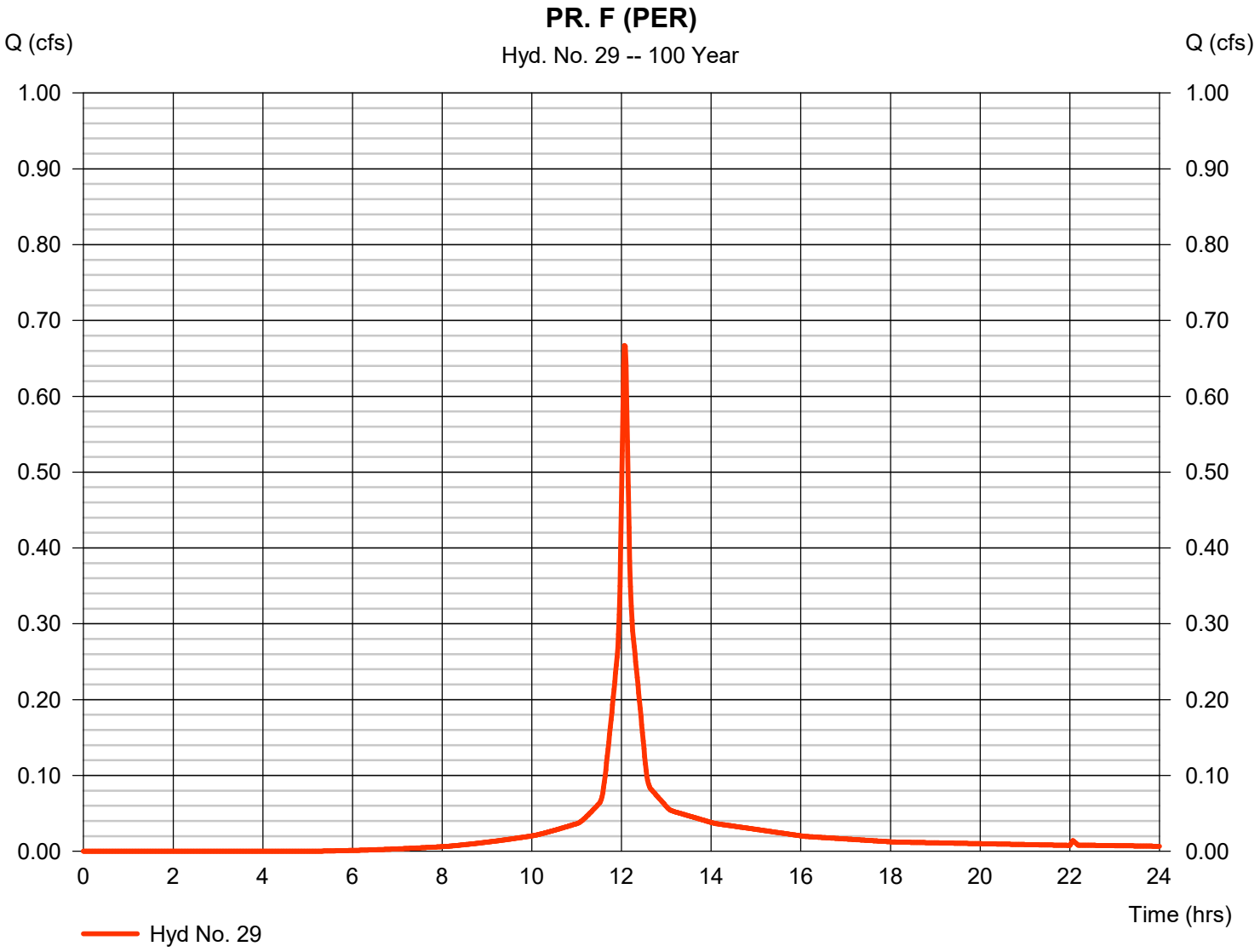


Hydrograph Report

Hyd. No. 29

PR. F (PER)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.667 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	2,104 cuft
Drainage area	=	0.090 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.66 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

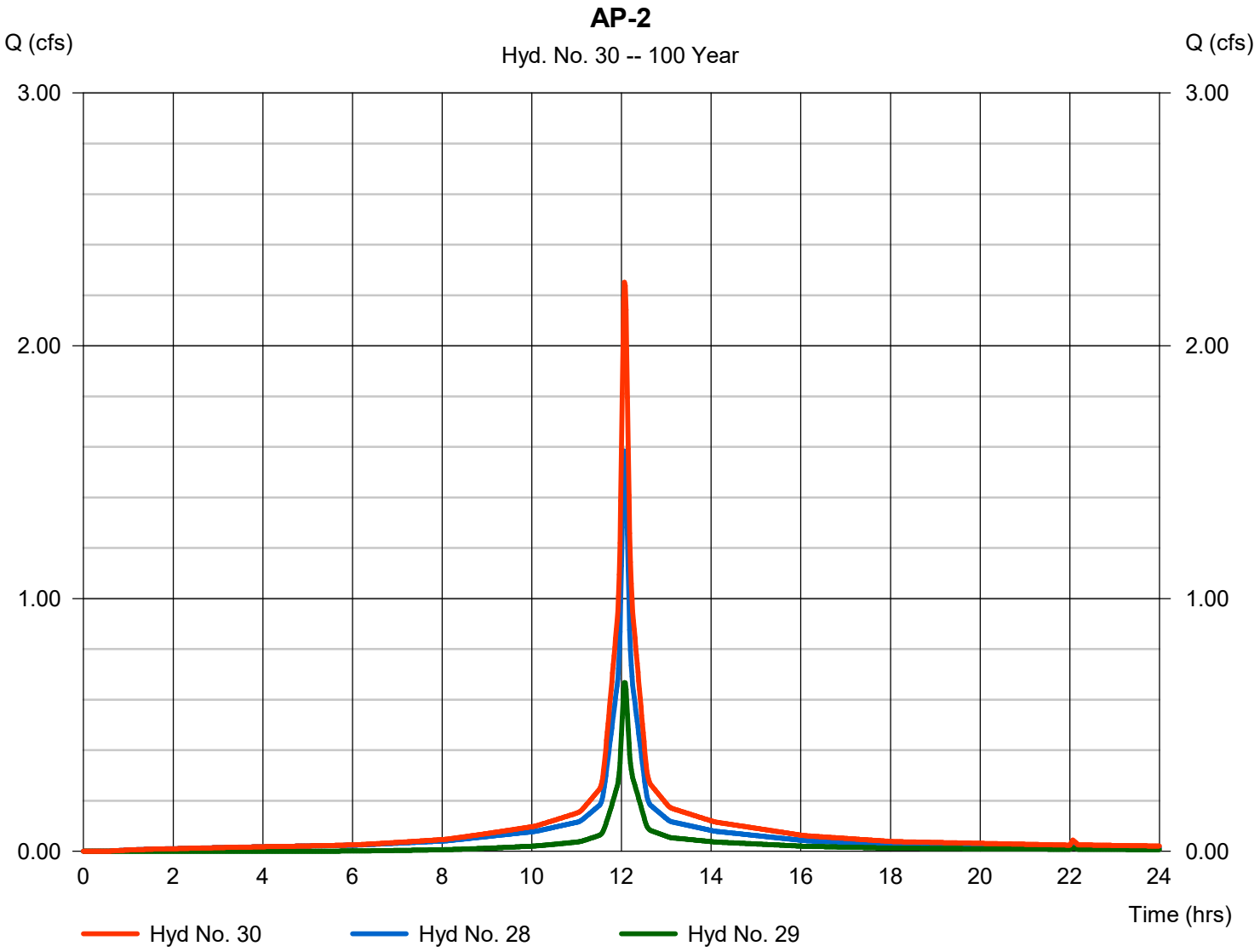


Hydrograph Report

Hyd. No. 30

AP-2

Hydrograph type	= Combine	Peak discharge	= 2.251 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.07 hrs
Time interval	= 1 min	Hyd. volume	= 7,778 cuft
Inflow hyds.	= 28, 29	Contrib. drain. area	= 0.270 ac



DETENTION BASIN

Pond Report

Pond No. 1 - BASIN-1

Pond Data

UG Chambers -Invert elev. = 228.90 ft, Rise x Span = 4.00 x 4.00 ft, Barrel Len = 50.00 ft, No. Barrels = 7, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	228.90	n/a	0	0
0.40	229.30	n/a	229	229
0.80	229.70	n/a	398	627
1.20	230.10	n/a	484	1,111
1.60	230.50	n/a	533	1,643
2.00	230.90	n/a	557	2,200
2.40	231.30	n/a	557	2,757
2.80	231.70	n/a	533	3,289
3.20	232.10	n/a	484	3,773
3.60	232.50	n/a	397	4,170
4.00	232.90	n/a	229	4,399

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	15.00	11.00	Inactive
Span (in)	= 0.00	15.00	11.00	0.00
No. Barrels	= 0	1	1	0
Invert El. (ft)	= 0.00	228.90	230.35	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.012	.012	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)	= 0.50	Inactive	Inactive	Inactive
Crest El. (ft)	= 231.90	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
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	228.90	---	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.40	229	229.30	---	0.73 ic	0.00	---	0.00	---	---	---	---	---	0.730
0.80	627	229.70	---	2.53 ic	0.00	---	0.00	---	---	---	---	---	2.527
1.20	1,111	230.10	---	4.52 ic	0.00	---	0.00	---	---	---	---	---	4.516
1.60	1,643	230.50	---	5.83 ic	0.09 ic	---	0.00	---	---	---	---	---	5.927
2.00	2,200	230.90	---	6.93 ic	1.05 ic	---	0.00	---	---	---	---	---	7.973
2.40	2,757	231.30	---	7.87 ic	2.23 ic	---	0.00	---	---	---	---	---	10.10
2.80	3,289	231.70	---	8.71 ic	3.00 ic	---	0.00	---	---	---	---	---	11.71
3.20	3,773	232.10	---	9.48 ic	3.61 ic	---	0.15	---	---	---	---	---	13.24
3.60	4,170	232.50	---	10.19 ic	4.13 ic	---	0.77	---	---	---	---	---	15.10
4.00	4,399	232.90	---	10.85 ic	4.60 ic	---	1.66	---	---	---	---	---	17.11

Pond Report

Pond No. 2 - BASIN-2

Pond Data

UG Chambers -Invert elev. = 232.00 ft, Rise x Span = 4.00 x 4.00 ft, Barrel Len = 125.00 ft, No. Barrels = 1, Slope = 0.20%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	232.00	n/a	0	0
0.43	232.43	n/a	55	55
0.85	232.85	n/a	140	195
1.27	233.27	n/a	179	374
1.70	233.70	n/a	201	575
2.13	234.13	n/a	211	786
2.55	234.55	n/a	211	996
2.97	234.98	n/a	201	1,197
3.40	235.40	n/a	179	1,377
3.83	235.82	n/a	140	1,517
4.25	236.25	n/a	55	1,571

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	3.50	6.00	0.00
Span (in)	= 12.00	3.50	6.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 232.00	232.00	233.90	0.00
Length (ft)	= 49.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .012	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	Inactive	0.00	0.00	0.00
Crest El. (ft)	= 234.80	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= Yes	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	232.00	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.43	55	232.43	0.16 ic	0.16 ic	0.00	---	0.00	---	---	---	---	---	0.157
0.85	195	232.85	0.25 ic	0.25 ic	0.00	---	0.00	---	---	---	---	---	0.251
1.27	374	233.27	0.32 ic	0.32 ic	0.00	---	0.00	---	---	---	---	---	0.322
1.70	575	233.70	0.39 ic	0.38 ic	0.00	---	0.00	---	---	---	---	---	0.380
2.13	786	234.13	0.58 ic	0.43 ic	0.14 ic	---	0.00	---	---	---	---	---	0.565
2.55	996	234.55	1.07 ic	0.46 ic	0.60 ic	---	0.00	---	---	---	---	---	1.055
2.97	1,197	234.98	1.35 ic	0.49 ic	0.86 ic	---	0.00	---	---	---	---	---	1.353
3.40	1,377	235.40	1.60 ic	0.53 ic	1.06 ic	---	0.00	---	---	---	---	---	1.588
3.83	1,517	235.82	1.79 ic	0.57 ic	1.22 ic	---	0.00	---	---	---	---	---	1.790
4.25	1,571	236.25	1.97 ic	0.60 ic	1.37 ic	---	0.00	---	---	---	---	---	1.970

Pond Report

Pond No. 3 - BASIN-3

Pond Data

UG Chambers -Invert elev. = 251.00 ft, Rise x Span = 3.00 x 3.00 ft, Barrel Len = 75.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	251.00	n/a	0	0
0.30	251.30	n/a	28	28
0.60	251.60	n/a	48	76
0.90	251.90	n/a	58	134
1.20	252.20	n/a	64	198
1.50	252.50	n/a	67	265
1.80	252.80	n/a	67	332
2.10	253.10	n/a	64	396
2.40	253.40	n/a	58	455
2.70	253.70	n/a	48	503
3.00	254.00	n/a	28	530

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 8.00	2.50	3.00	0.00
Span (in)	= 8.00	2.50	3.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 251.00	251.00	252.20	0.00
Length (ft)	= 5.00	0.00	0.00	0.00
Slope (%)	= 2.00	0.00	0.00	n/a
N-Value	= .012	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 1.50	0.00	0.00	0.00
Crest El. (ft)	= 253.80	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= Yes	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).

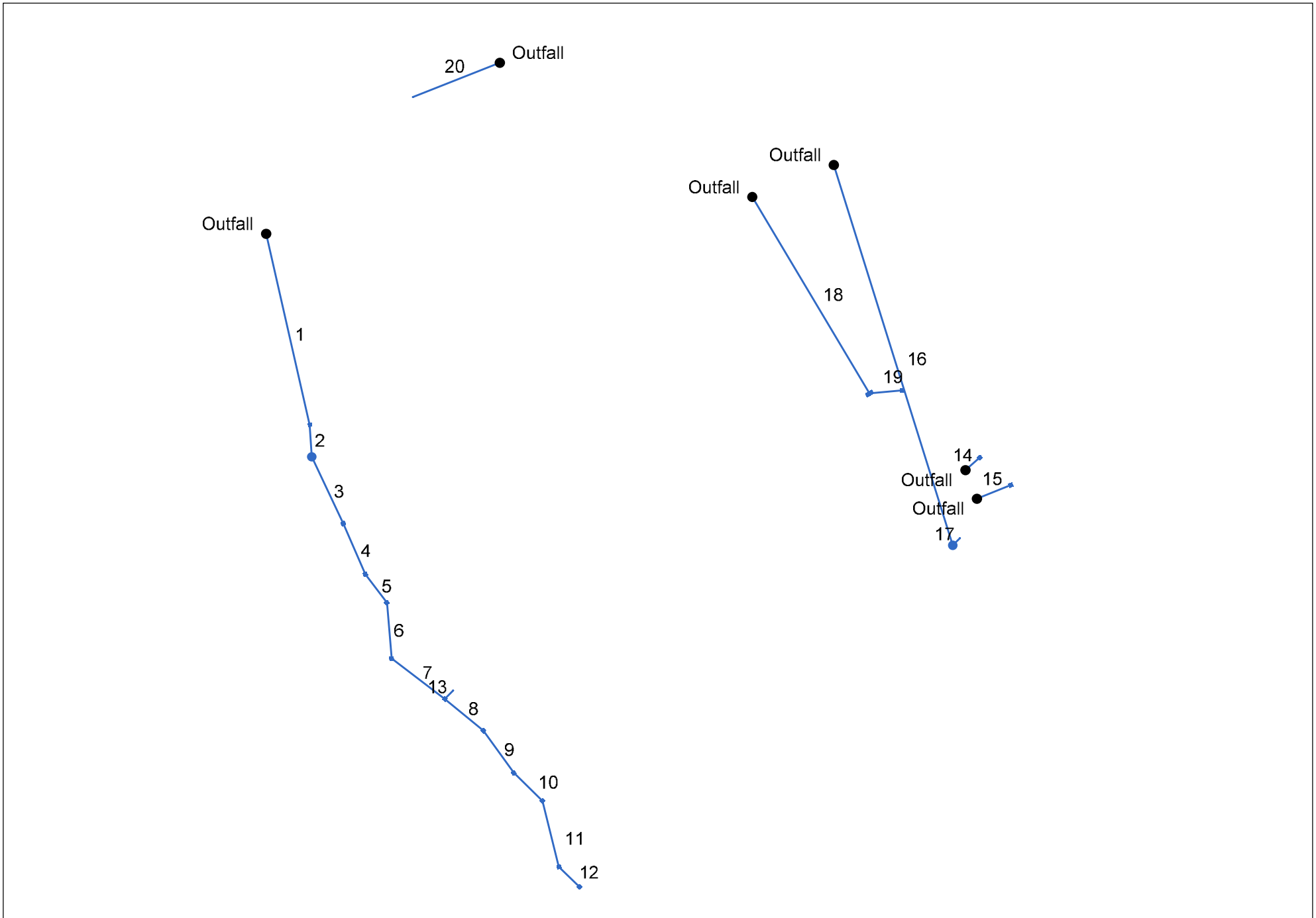
Stage / Storage / Discharge Table

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	251.00	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.30	28	251.30	0.07 ic	0.07 ic	0.00	---	0.00	---	---	---	---	---	0.066
0.60	76	251.60	0.11 ic	0.11 ic	0.00	---	0.00	---	---	---	---	---	0.107
0.90	134	251.90	0.14 ic	0.14 ic	0.00	---	0.00	---	---	---	---	---	0.137
1.20	198	252.20	0.17 ic	0.16 ic	0.00	---	0.00	---	---	---	---	---	0.162
1.50	265	252.50	0.29 ic	0.18 ic	0.10 ic	---	0.00	---	---	---	---	---	0.279
1.80	332	252.80	0.37 oc	0.20 ic	0.16 ic	---	0.00	---	---	---	---	---	0.361
2.10	396	253.10	0.43 oc	0.21 ic	0.21 ic	---	0.00	---	---	---	---	---	0.422
2.40	455	253.40	0.48 oc	0.23 ic	0.25 ic	---	0.00	---	---	---	---	---	0.475
2.70	503	253.70	0.53 oc	0.24 ic	0.28 ic	---	0.00	---	---	---	---	---	0.522
3.00	530	254.00	1.00 oc	0.24 ic	0.31 ic	---	0.45	---	---	---	---	---	0.997

APPENDIX D

STORMWATER CONVEYANCE SYSTEM CALCULATIONS

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: SHU UC PH 2 Storm.stm	Number of lines: 20	Date: 12/17/2020

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	YD-111-MH-102	2.06	12	Cir	103.000	238.19	239.22	1.000	238.71	239.83	0.13	239.83	End	DropGrate
2	MH-101-YD-111	1.65	12	Cir	16.821	239.32	239.49	1.011	239.83	240.03	n/a	240.03	1	Manhole
3	YD-110-MH-101	1.66	12	Cir	38.800	240.11	240.50	1.005	240.57	241.05	n/a	241.05	2	DropGrate
4	YD-109-YD-110	1.09	10	Cir	28.998	240.00	241.45	5.000	241.05	241.91	n/a	241.91 j	3	DropGrate
5	YD-108-YD-109	1.03	10	Cir	18.838	249.20	250.14	4.990	249.45	250.59	0.16	250.59	4	DropGrate
6	YD-107-YD-108	0.97	10	Cir	29.402	252.35	252.50	0.510	252.80	252.95	0.19	253.14	5	DropGrate
7	YD-106-YD-107	0.91	10	Cir	35.000	253.50	253.67	0.486	253.94	254.11	0.22	254.33	6	DropGrate
8	YD-105-YD-106	0.56	8	Cir	26.093	253.77	253.90	0.498	254.33	254.37	0.04	254.40	7	DropGrate
9	YD-104-YD-105	0.50	8	Cir	27.333	254.00	254.14	0.512	254.40	254.48	0.06	254.54	8	DropGrate
10	YD-103-YD-104	0.43	8	Cir	21.108	254.31	254.42	0.521	254.63	254.74	0.09	254.83	9	DropGrate
11	YD-102-YD-103	0.36	8	Cir	35.698	255.50	255.68	0.504	255.79	255.97	n/a	256.05 j	10	DropGrate
12	YD-101-YD-102	0.22	8	Cir	15.023	255.78	255.86	0.533	256.05	256.08	n/a	256.15 j	11	DropGrate
13	RL-101-YD-106	0.29	8	Cir	6.128	255.58	255.61	0.490	255.84	255.87	0.08	255.95	7	Manhole
14	YD-202-STUB-202	0.07	8	Cir	9.976	253.33	253.38	0.501	253.46	253.50	0.04	253.55	End	DropGrate
15	YD-201-STUB-201	0.71	8	Cir	19.000	253.33	253.43	0.526	253.76	253.86	0.14	254.00	End	DropGrate
16	EMH-201-EMH-202	1.29	8	Cir	209.461	241.89	250.44	4.082	242.20	250.98	n/a	250.98	End	Manhole
17	OCS-201-EMH-201	0.42	8	Cir	5.283	250.89	251.00	2.082	251.10	251.30	n/a	251.30	16	Manhole
18	ECB-201-ECB-202	0.42	8	Cir	120.093	240.69	246.29	4.663	240.86	246.59	n/a	246.59	End	DropGrate
19	YD-206-ECB-201	0.20	8	Cir	17.184	246.45	247.31	5.005	246.59	247.51	n/a	247.51	18	DropGrate
20	OCS-101-EMH-101	1.34	12	Cir	48.980	231.51	232.00	1.000	231.92	232.49	0.19	232.49	End	Manhole

Project File: SHU UC PH 2 Storm.stm | Number of lines: 20 | Run Date: 12/17/2020

NOTES: Return period = 25 Yrs. ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	103.000	0.07	0.33	0.88	0.06	0.30	6.0	7.7	6.8	2.06	3.86	4.54	12	1.00	238.19	239.22	238.71	239.83	241.17	242.67	YD-111-MH-102
2	1	16.821	0.00	0.26	0.00	0.00	0.24	0.0	7.6	6.8	1.65	3.88	3.91	12	1.01	239.32	239.49	239.83	240.03	242.67	243.38	MH-101-YD-111
3	2	38.800	0.10	0.26	0.83	0.08	0.24	6.0	7.5	6.9	1.66	3.87	4.25	12	1.01	240.11	240.50	240.57	241.05	243.38	243.02	YD-110-MH-101
4	3	28.998	0.01	0.16	0.89	0.01	0.16	6.0	7.3	6.9	1.09	5.30	2.75	10	5.00	240.00	241.45	241.05	241.91	243.02	251.70	YD-109-YD-110
5	4	18.838	0.01	0.15	0.99	0.01	0.15	6.0	7.2	7.0	1.03	5.30	5.48	10	4.99	249.20	250.14	249.45	250.59	251.70	258.09	YD-108-YD-109
6	5	29.402	0.01	0.14	0.99	0.01	0.14	6.0	7.1	7.0	0.97	1.69	3.21	10	0.51	252.35	252.50	252.80	252.95	258.09	258.21	YD-107-YD-108
7	6	35.000	0.01	0.13	0.99	0.01	0.13	6.0	6.9	7.1	0.91	1.65	3.10	10	0.49	253.50	253.67	253.94	254.11	258.21	258.10	YD-106-YD-107
8	7	26.093	0.01	0.08	0.99	0.01	0.08	6.0	6.7	7.1	0.56	0.92	1.97	8	0.50	253.77	253.90	254.33	254.37	258.10	258.19	YD-105-YD-106
9	8	27.333	0.01	0.07	0.99	0.01	0.07	6.0	6.5	7.2	0.50	0.94	2.52	8	0.51	254.00	254.14	254.40	254.48	258.19	258.11	YD-104-YD-105
10	9	21.108	0.01	0.06	0.99	0.01	0.06	6.0	6.4	7.2	0.43	0.94	2.64	8	0.52	254.31	254.42	254.63	254.74	258.11	258.11	YD-103-YD-104
11	10	35.698	0.02	0.05	0.99	0.02	0.05	6.0	6.1	7.3	0.36	0.93	2.49	8	0.50	255.50	255.68	255.79	255.97	258.11	257.93	YD-102-YD-103
12	11	15.023	0.03	0.03	0.99	0.03	0.03	6.0	6.0	7.3	0.22	0.95	1.92	8	0.53	255.78	255.86	256.05	256.08	257.93	257.86	YD-101-YD-102
13	7	6.128	0.04	0.04	0.99	0.04	0.04	6.0	6.0	7.3	0.29	0.92	2.32	8	0.49	255.58	255.61	255.84	255.87	258.10	258.15	RL-101-YD-106
14	End	9.976	0.01	0.01	0.99	0.01	0.01	6.0	6.0	7.3	0.07	0.93	1.57	8	0.50	253.33	253.38	253.46	253.50	255.84	255.76	YD-202-STUB-20
15	End	19.000	0.12	0.12	0.80	0.10	0.10	6.0	6.0	7.3	0.71	0.95	2.97	8	0.53	253.33	253.43	253.76	253.86	256.00	255.36	YD-201-STUB-20
16	End	209.461	0.12	0.12	0.99	0.12	0.12	6.0	6.0	7.3	1.29	2.88	6.16	8	4.08	241.89	250.44	242.20	250.98	246.21	256.87	EMH-201-EMH-20
17	16	5.283	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.42	1.89	3.54	8	2.08	250.89	251.00	251.10	251.30	256.87	256.76	OCS-201-EMH-20
18	End	120.093	0.04	0.07	0.78	0.03	0.06	6.0	6.1	7.3	0.42	3.08	4.39	8	4.66	240.69	246.29	240.86	246.59	242.39	248.85	ECB-201-ECB-20
19	18	17.184	0.03	0.03	0.89	0.03	0.03	6.0	6.0	7.3	0.20	2.93	2.87	8	5.00	246.45	247.31	246.59	247.51	248.85	250.66	YD-206-ECB-201
20	End	48.980	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	1.34	3.86	3.97	12	1.00	231.51	232.00	231.92	232.49	238.24	238.00	OCS-101-EMH-10

Project File: SHU UC PH 2 Storm.stm

Number of lines: 20

Run Date: 12/17/2020

NOTES:Intensity = 72.26 / (Inlet time + 11.60) ^ 0.80; Return period =Yrs. 25 ; c = cir e = ellip b = box

APPENDIX E

SOILS DATA
(WEB SOIL SURVEY REPORT)

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 Essex County, New Jersey

100300401 - Seton Hall University



August 2, 2012

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://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

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 Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

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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 LEGEND

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

Soils
- Soil Map Units

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
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Streams and Canals

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

MAP INFORMATION

Map Scale: 1:5,330 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:12,000.

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 accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 18N NAD83

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

Soil Survey Area: Essex County, New Jersey
Survey Area Data: Version 8, Aug 18, 2008

Date(s) aerial images were photographed: 8/13/2006; 8/5/2006

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

Essex County, New Jersey (NJ013)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
BooB	Boonton silt loam, red sandstone lowland, 3 to 8 percent slopes	0.0	0.0%
BowrB	Boonton - Urban land, Boonton substratum complex, red sandstone lowland, 0 to 8 percent slopes	44.9	35.2%
UdbooB	Udorthents, Boonton substratum, 0 to 8 percent slopes, red sandstone lowland	9.3	7.3%
UdhalB	Udorthents, Haledon substratum, 0 to 8 percent slopes	3.4	2.7%
URBOOB	Urban land, Boonton substratum, 0 to 8 percent slopes, red sandstone lowland	36.7	28.8%
USBOOB	Urban land, Boonton substratum - Boonton complex, red sandstone lowland, 0 to 8 percent slopes	33.1	26.0%
Totals for Area of Interest		**127.5**	**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.

Essex County, New Jersey

BooB—Boonton silt loam, red sandstone lowland, 3 to 8 percent slopes

Map Unit Setting

Mean annual precipitation: 40 to 45 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 130 to 150 days

Map Unit Composition

Boonton, red sandstone lowland, and similar soils: 95 percent
Minor components: 5 percent

Description of Boonton, Red Sandstone Lowland

Setting

Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy till derived from sandstone and shale

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 36 inches to fragipan
Drainage class: 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: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.8 inches)

Interpretive groups

Land capability (nonirrigated): 2e

Typical profile

0 to 1 inches: Slightly decomposed plant material
1 to 3 inches: Silt loam
3 to 10 inches: Loam
10 to 27 inches: Gravelly loam
27 to 40 inches: Gravelly fine sandy loam
40 to 67 inches: Gravelly fine sandy loam
67 to 83 inches: Gravelly sandy loam

Minor Components

Boonton moderately well drained, red sandstone lowland

Percent of map unit: 5 percent
Landform: Ground moraines
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Linear
Across-slope shape: Linear

BowrB—Boonton - Urban land, Boonton substratum complex, red sandstone lowland, 0 to 8 percent slopes

Map Unit Setting

Mean annual precipitation: 0 to 48 inches
Mean annual air temperature: 32 to 55 degrees F
Frost-free period: 0 to 190 days

Map Unit Composition

Boonton, red sandstone lowland, and similar soils: 50 percent
Urban land, boonton red sandstone lowland substratum: 40 percent
Minor components: 10 percent

Description of Boonton, Red Sandstone Lowland

Setting

Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy till derived from sandstone and shale

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 36 inches to fragipan
Drainage class: 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: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.8 inches)

Interpretive groups

Land capability (nonirrigated): 2e

Typical profile

0 to 1 inches: Slightly decomposed plant material
1 to 3 inches: Silt loam
3 to 10 inches: Loam
10 to 27 inches: Gravelly loam
27 to 40 inches: Gravelly fine sandy loam
40 to 67 inches: Gravelly fine sandy loam
67 to 83 inches: Gravelly sandy loam

Description of Urban Land, Boonton Red Sandstone Lowland Substratum

Setting

Landform: Ground moraines
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Linear, convex

Across-slope shape: Linear, convex
Parent material: Surface covered by pavement, concrete, buildings, and other structures underlain by disturbed and natural soil material

Interpretive groups
Land capability (nonirrigated): 8s

Typical profile
0 to 12 inches: Material
12 to 67 inches: Gravelly loam
67 to 83 inches: Gravelly sandy loam

Minor Components

Udorthents, boonton red sandstone lowland substratum
Percent of map unit: 10 percent
Landform: Ground moraines
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Linear
Across-slope shape: Linear

UdbooB—Udorthents, Boonton substratum, 0 to 8 percent slopes, red sandstone lowland

Map Unit Setting
Mean annual precipitation: 42 to 48 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 180 to 200 days

Map Unit Composition
Udorthents, boonton red sandstone lowland substratum, and similar soils: 95 percent
Minor components: 5 percent

Description of Udorthents, Boonton Red Sandstone Lowland Substratum

Setting
Landform: Ground moraines
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy material transported by human activity

Properties and qualities
Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: 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: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Available water capacity: Moderate (about 6.4 inches)

Interpretive groups
Land capability (nonirrigated): 2e

Typical profile
0 to 12 inches: Loam
12 to 83 inches: Gravelly sandy loam

Minor Components

Boonton, red sandstone lowland
Percent of map unit: 5 percent
Landform: Ground moraines
Down-slope shape: Convex
Across-slope shape: Linear

UdhalB—Udorthents, Haledon substratum, 0 to 8 percent slopes

Map Unit Setting
Elevation: 50 to 500 feet
Mean annual precipitation: 40 to 48 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 140 to 180 days

Map Unit Composition
Udorthents, haledon substratum, and similar soils: 90 percent
Minor components: 10 percent

Description of Udorthents, Haledon Substratum

Setting
Landform: Ground moraines
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy material transported by human activity

Properties and qualities
Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly 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 7 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 6.0 inches)

Interpretive groups
Land capability (nonirrigated): 2e

Typical profile

0 to 12 inches: Loam
12 to 60 inches: Gravelly fine sandy loam

Minor Components

Haledon

Percent of map unit: 10 percent
Landform: Ground moraines
Down-slope shape: Convex
Across-slope shape: Linear

URBOOB—Urban land, Boonton substratum, 0 to 8 percent slopes, red sandstone lowland

Map Unit Setting

Mean annual precipitation: 42 to 48 inches
Mean annual air temperature: 48 to 55 degrees F
Frost-free period: 170 to 190 days

Map Unit Composition

Urban land, boonton red sandstone lowland substratum: 90 percent
Minor components: 10 percent

Description of Urban Land, Boonton Red Sandstone Lowland Substratum

Setting

Landform: Ground moraines
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Surface covered by pavement, concrete, buildings, and other structures underlain by disturbed and natural soil material

Interpretive groups

Land capability (nonirrigated): 8s

Typical profile

0 to 12 inches: Material
12 to 67 inches: Gravelly loam
67 to 83 inches: Gravelly sandy loam

Minor Components

Boonton, red sandstone lowland

Percent of map unit: 5 percent
Landform: Ground moraines
Down-slope shape: Convex
Across-slope shape: Linear

Udorthents, boonton red sandstone lowland substratum

Percent of map unit: 5 percent
Landform: Ground moraines
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear

USBOOB—Urban land, Boonton substratum - Boonton complex, red sandstone lowland, 0 to 8 percent slopes

Map Unit Setting

Mean annual precipitation: 42 to 48 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 180 to 200 days

Map Unit Composition

Urban land, boonton red sandstone lowland substratum: 60 percent
Boonton, red sandstone lowland, and similar soils: 30 percent
Minor components: 10 percent

Description of Urban Land, Boonton Red Sandstone Lowland Substratum

Setting

Landform: Ground moraines
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Surface covered by pavement, concrete, buildings, and other structures underlain by disturbed and natural soil material

Interpretive groups

Land capability (nonirrigated): 8s

Typical profile

0 to 12 inches: Material
12 to 67 inches: Gravelly loam
67 to 83 inches: Gravelly sandy loam

Description of Boonton, Red Sandstone Lowland

Setting

Landform: Ground moraines
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy till derived from sandstone and shale

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 36 inches to fragipan
Drainage class: 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: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.8 inches)

Interpretive groups

Land capability (nonirrigated): 2e

Typical profile

0 to 1 inches: Slightly decomposed plant material
1 to 3 inches: Silt loam
3 to 10 inches: Loam
10 to 27 inches: Gravelly loam
27 to 40 inches: Gravelly fine sandy loam
40 to 67 inches: Gravelly fine sandy loam
67 to 83 inches: Gravelly sandy loam

Minor Components

Udorthents, boonton red sandstone lowland substratum

Percent of map unit: 10 percent
Landform: Ground moraines
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear

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