STORMWATER REPORT

190 WASHINGTON STREET
RE-DEVELOPMENT
WESTWOOD, MASSACHUSETTS

Prepared For:
SKYE REALTY MANAGEMENT, LLC

Prepared By:
Marchionda & Associates, LP

April 12, 2023

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STORMWATER REPORT NARRATIVE

190 WASHINGTON STREET
RE-DEVELOPMENT

April 12, 2023

Introduction:

Marchionda & Associates, L.P. has completed a storm water analysis for the re-development project proposed at 190 Washington Street in Westwood, Massachusetts. The purpose of this report is to offer information on the stormwater characteristics of the site in its existing and post construction condition.

For additional information regarding the site's existing conditions and the stormwater management system reference is made to the following plans and report;

- ***Site Development Plans***
  190 Washington St., Westwood, MA
  Owner: Skye Realty Management, LLC
  Prepared by; Marchionda & Assoc., L.P.
  Dated; April 12, 2023

Existing Conditions:

The project site is located on the southeast side of the public way Washington Street in Westwood approximately 100 feet southwest of Wentworth Street. The property has a land area of 14,086 s.f. and is presently the site of a commercial office building with a bituminous concrete parking area. The property is presently accessed with two curb cuts onto Washington Street. The existing surface of the site is almost entirely made of impervious surfaces. The building, parking area and walkways amount to 12,100 s.f or 86% of the site.

The site abuts residential properties to north, south, and east. No areas of the site are located within a buffer zone to a wetland a resource area or a designated flood hazard area.

The majority of the stormwater from the existing site flows overland to a catch basin drywell in the existing parking area. A small portion of the property outside the perimeter of parking area flows either east to abutting properties or onto the Washington Street right of way and the municipal drainage system. Refer to the

existing conditions plan in project site plans for specific information on the existing topography and features of the site.

Existing soils on the site have been recently explored by Marchionda & Associates. The observation holes revealed imported filled soils over gravelly loamy sands soils. Information on the site's soils has been included in appendix of the report.

Project Description:

The project consists of the renovation of the existing commercial use building and bituminous concrete parking lot. The development will include additions to the existing structure and will have a 2,285 s.f building footprint once completed. The parking area and drive aisles will be redesigned to provide a 13-car parking area and walkways to support the development.

The construction will require mostly shallow excavation and surface preparation and will be take place in areas that have been previously disturbed. Deeper excavations will be required in the areas of the proposed building additions and utilities. Based on the soil exploration preformed some exporting of unsuitable subsoils may be required.

When completed the development will have approximately 10,600 s.f. of impervious surfaces. This will result in a reduction of approximately 1.500 +/- s.f. of impervious surfaces. The remaining open space areas will be made up of manicured grass and landscape areas.

A comprehensive stormwater management system will be constructed to manage stormwater run-off generated by the project. This system will be made up a deep sump catch basin and an underground infiltration chamber system. All of the impervious surfaces on the property will drain to the new stormwater management system. Detailed information on the components of the system is included in the project's site plans.

Project Type:

The project will take place in areas previously disturbed. For purposes of stormwater management standards this project is considered a redevelopment project.

LID Measures:

When possible environmental sensitive site design and LID techniques have been used in the planning of the project. No construction will be required to take place within a wetland resource or buffer zone. All of the proposed construction will be located in areas previously disturbed by the existing facility.

Stormwater Management Standards Compliance:

A description of how this project meets the DEP stormwater standards, along with supporting documentation, is provided herein:

Standard 1: *No New Untreated Stormwater Discharges*

No new point source discharges will be created. The project has been designed to recharge a large portion of the storm water flows generated by the project.

Standard 2: *No Increase in the Post-Development Peak Discharge Rate*

Peak flow rates were studied under existing and proposed conditions for 2-year, 10-year, 25-year, and 100-year, 24-hour Type III storm events. Two study points (1 & 2) as shown in Figures 1 and 2 and as described below were developed to analyze runoff rates from the project site to the receiving wetland. The subcatchment watersheds to each study point were then delineated for the pre- and post-development conditions.

Study Point “1” represents the portion of the project that drains to the abutting properties to the east.

Study Point “2” represents the portion of the site that drains to the southwest to Washington Street and the municipal drainage system.

In terms of the modeling methodology, Technical Release 55 (TR-55) was utilized to obtain weighted curve numbers (CNs) for each of the pre- and post-development subcatchment areas. Inputs for obtaining the weighted CNs were based on ground cover type and hydrologic soil groups (HSGs). TR-55 was also utilized to obtain times of concentration (TCs) for each of the pre- and post-development subcatchment areas. Flow paths were generally broken into segments of sheet flow and shallow concentrated flow. Refer to attached TR-55 TC data (Appendix 1).

CNs and TCs obtained from TR-55 were input into the *Hydraflow*® Hydrographs software package, which utilizes the National Resources Conservation Service (NRCS) method to generate and route hydrographs.

As shown in the attached modeling output and as summarized in Table 1 (below), the peak runoff rate from the site in the proposed conditions for the design storms at the study points show an overall reduction in peak flows from the site.

TABLE 1: PEAK RUNOFF RATES FROM THE SITE AT EACH STUDY POINT

Study Point	2-yr storm event (3.24"/24-hr)		10-yr storm event (4.90"/24-hr)		25-yr storm event (6.21"/24-hr)		100-yr storm event (8.91"/24-hr)	
	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)
1	***1.0***	***0.0***	***1.5***	***0.0***	***1.9***	***0.1***	***2.2***	***0.8***
2	***0.1***	***0.1***	***0.1***	***0.1***	***0.1***	***0.1***	***0.1***	***0.1***

Standard 3: *Loss of Annual Recharge*

DEP's *Stormwater Management Handbook* prescribes an infiltration volume based on the hydrologic soil group over which impervious area will be constructed as follows:

- HSG A – 0.60 inches of runoff
- HSG B – 0.35 inches of runoff
- HSG C – 0.25 inches of runoff
- HSG D – 0.10 inches of runoff

The proposed construction will include both the creation and removal of impervious surfaces. It appears from soil mapping and on-site soil observation that the entire project area is made up of soils that are considered to be in the hydrologic soil group "A".

A large portion of the stormwater run-off generated from the proposed impervious areas will be routed to the recharge system and will infiltrated into the soils within the project site. As a result, the proposed construction will meet and exceed the requirements for the loss of groundwater recharge.

Standard 4: *Water Quality*

The project will maintain access drives and a parking area that will generate suspended solids. The project will however slightly reduce the area of paved surfaces from the present condition. By reducing the area of pavements the proposed development will reduce the amount of total suspended solids (TSS) generated. The project will also provide Stormwater Best Management Practices (BMP's) that will further reduce Total Suspended Solids generated for the site. The TSS removal BMP's proposed for the project include a hooded deep sump catch basin that will drain into an infiltration chambers system.

A *Long-Term Stormwater Operation and Maintenance Plan & Pollution Prevention Plan* (Appendix 4) has been developed for the project to comply with this requirement and the requirements of Standard 9.

Standard 5: *Land Uses with Higher Potential Pollutant Loads*

Not applicable – this project does not propose a land use with a higher potential pollutant load.

Standard 6: *Discharges within a Zone II or Interim Wellhead Protection Area*

The project site does not fall within a Zone II of a public water supply.

Standard 7: *Redevelopment*

This project is considered a redevelopment project as defined in the DEP *Stormwater Management Handbook*. As allowed, Standards 2, 3, & 4 are met to the extent practical.

Standard 8: *Construction-Related Impacts*

A Construction Period *Erosion & Sedimentation Control Plan* has been developed for the project. The project is not subject to the National Pollutant Discharge Elimination System (NPDES) program of the United States Environmental Protection Agency, as it will not involve greater than one acre of land disturbance.

Standard 9: *Long-Term Operation and Maintenance*

A *Long-Term Stormwater Operation and Maintenance Plan & Pollution Prevention Plan* has been developed for the project to comply with this requirement and the requirements of Standard 4. A copy of this plan has been included in the appendix of the report.

Standard 10: *Illicit Discharges*

DEP does not permit illicit discharges, defined by 310 CMR 10.04 as follows, to the stormwater management system:

"Illicit discharge means a discharge that is not entirely comprised of stormwater. Notwithstanding the foregoing, an illicit discharge does not include discharges from the following activities or facilities: firefighting, water line flushing, landscape irrigation, uncontaminated ground water, potable water sources, foundation drains, air conditioning condensation, footing drains, individual resident car washing, flows from riparian habitats and wetlands, dechlorinated water from swimming pools, water used for street washing and water used to clean buildings without detergents."

Prior to the discharge of stormwater runoff to the post-construction stormwater system it shall be the project owner's responsibility to prepare an Illicit Discharge Compliance Statement in accordance with Standard 10 certifying that no illicit discharges exist on the site.

0 200 400 600

1"=200'±

FIGURE 1: LOCUS MAP

190 WASHINGTON STREET

WESTWOOD, MASSACHUSETTS

SKYE REALTY MANAGEMENT, LLC
1208 VFW PARKWAY, SUITE 200
WEST ROXBURY, MA 02132

OCTOBER 2022

SCALE: 1"=400'±

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..\1014-01...\Drainage\Report\USGS Locus.dwg

NOTES:
1. TOPOGRAPHIC FEATURES BASED UPON A FIELD SURVEY DONE BY MARCHIONDA AND ASSOC. LP, PERFORMED IN JULY OF 2022.

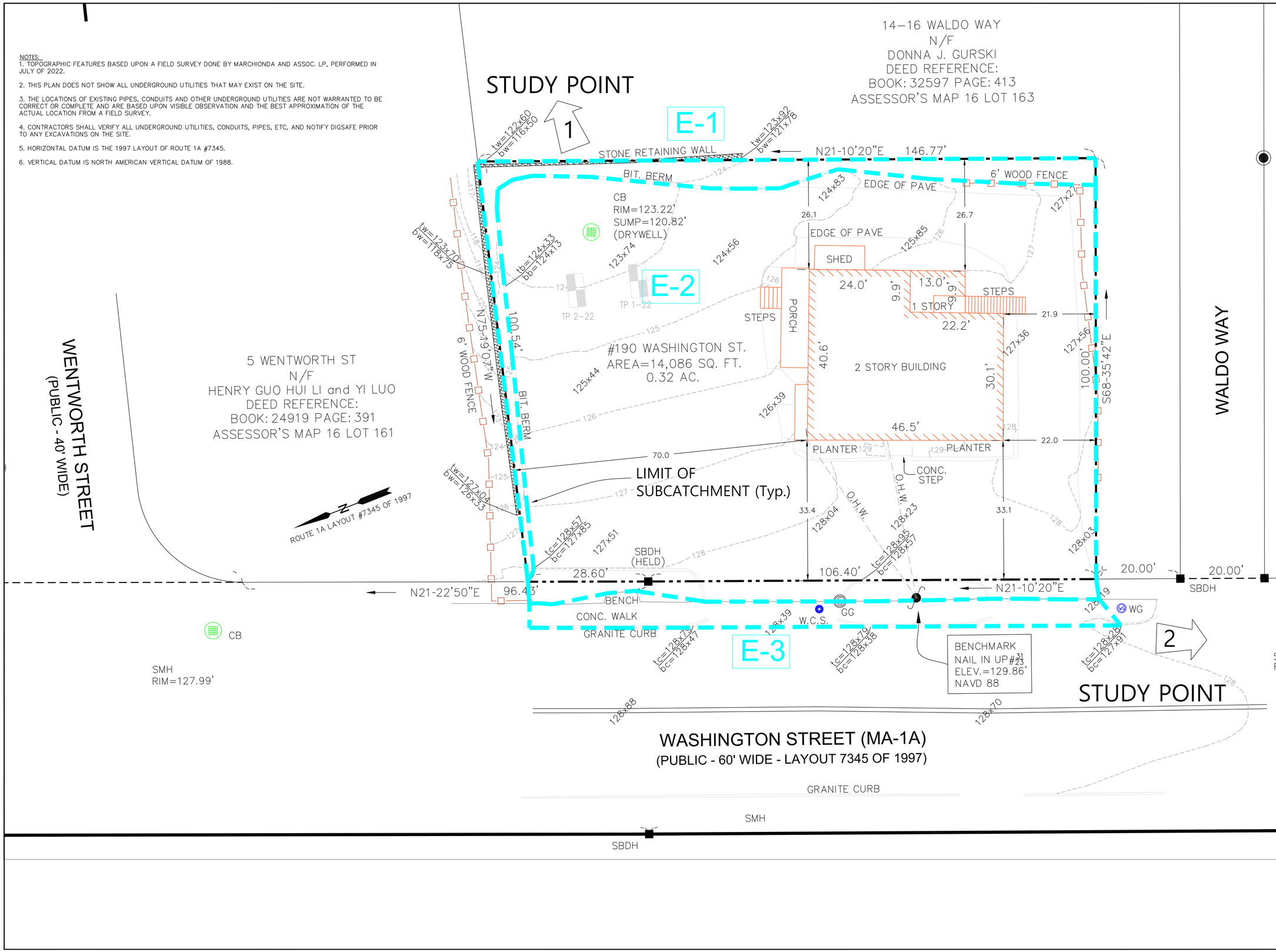
2. THIS PLAN DOES NOT SHOW ALL UNDERGROUND UTILITIES THAT MAY EXIST ON THE SITE.

3. THE LOCATIONS OF EXISTING PIPES, CONDUITS AND OTHER UNDERGROUND UTILITIES ARE NOT WARRANTED TO BE CORRECT OR COMPLETE AND ARE BASED UPON VISIBLE OBSERVATION AND THE BEST APPROXIMATION OF THE ACTUAL LOCATION FROM A FIELD SURVEY.

4. CONTRACTORS SHALL VERIFY ALL UNDERGROUND UTILITIES, CONDUITS, PIPES, ETC, AND NOTIFY DIGSAFE PRIOR TO ANY EXCAVATIONS ON THE SITE.

5. HORIZONTAL DATUM IS THE 1997 LAYOUT OF ROUTE 1A #7345.

6. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988.



CITY USE ONLY

CIVIL:

SURVEYOR:

DRW: DSG: CHK:

REV.	DESCRIPTION	DATE

PRE-DEVELOPMENT WATERSHED PLAN

190 WASHINGTON STREET
ASESSORS MAP 16 LOT 162
WESTWOOD, MASSACHUSETTS

PREPARED FOR:
SKYE REALTY MANAGEMENT, LLC
1208 VFW PARKWAY, SUITE 200
WEST ROXBURY, MA 02132

Marchionda & Associates, L.P.
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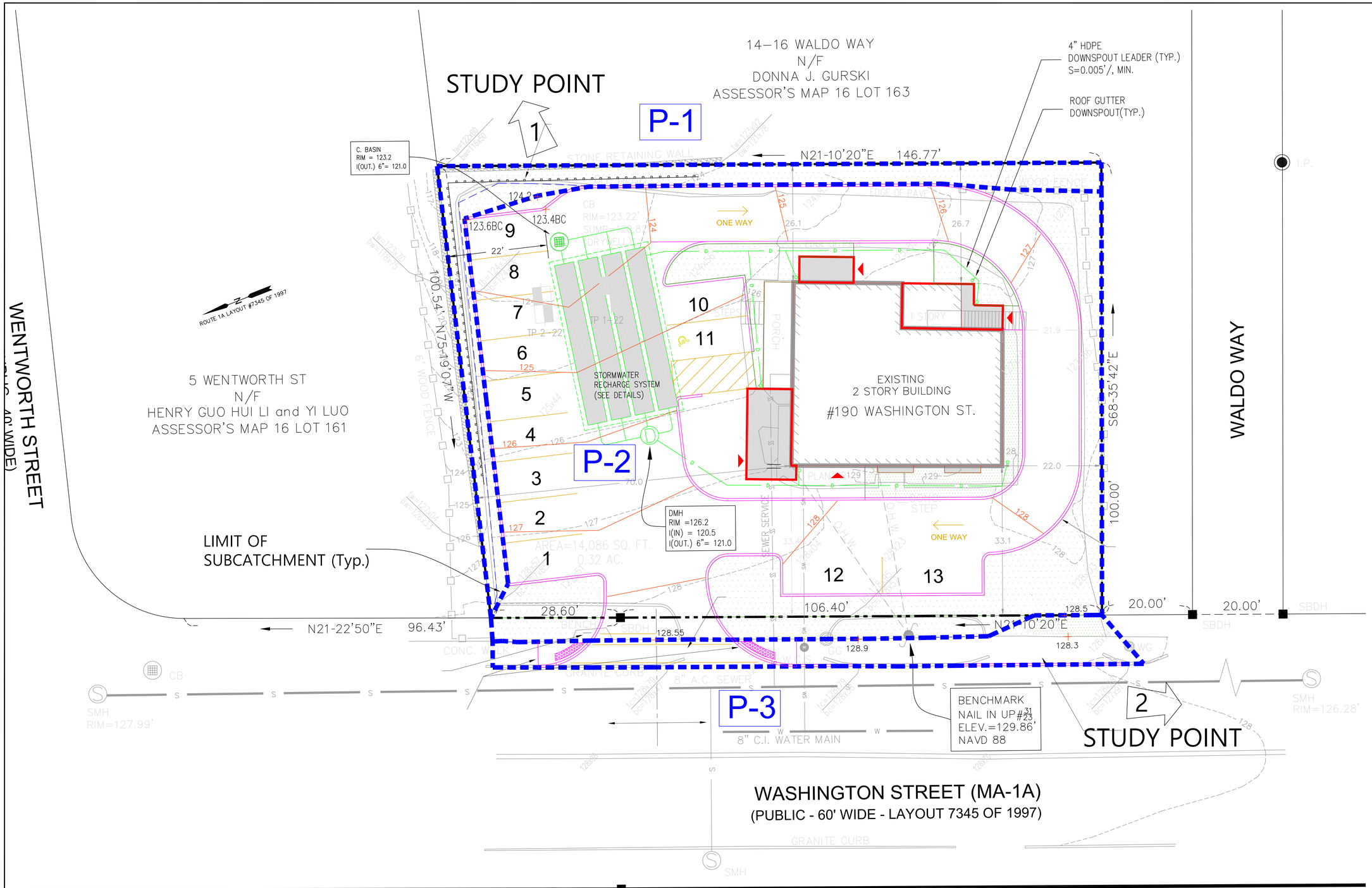
FAX: (781) 438-9654
Email: engineering@marchionda.com
Website: www.marchionda.com

DATE: 10/31/22

..\1014-01..\PLANS\ EXISTING CONDITIONS.DWG

M. & A. NO.: 1014-01 | SCALE: AS SHOWN

FIGURE - 2



SITE PLAN

0 10' 20' 30'

SCALE: 1" = 10'-0"

POST DEVLOPMENT
SUBCATCHMENTS

190 WASHINGTON STREET
ASESSORS MAP 16 LOT 162
WESTWOOD, MASSACHUSETTS

PREPARED FOR:
SKYE REALTY MANAGEMENT, LLC
1208 VFW PARKWAY, SUITE 200
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Email: engineering@marchionda.com
Website: www.marchionda.com

DATE: 4/12/23

..\PROJECTS\1014-01..\PLANS\SITE BASE 1014-01.DWG

M. & A. NO.: 1014-1 | SCALE: AS SHOWN

FIGURE 3

LIST OF APPENDICES

Appendix 1…….. *Standard 2 (Peak Flow)*

Appendix 2…….. *Standard 3 (Recharge)*

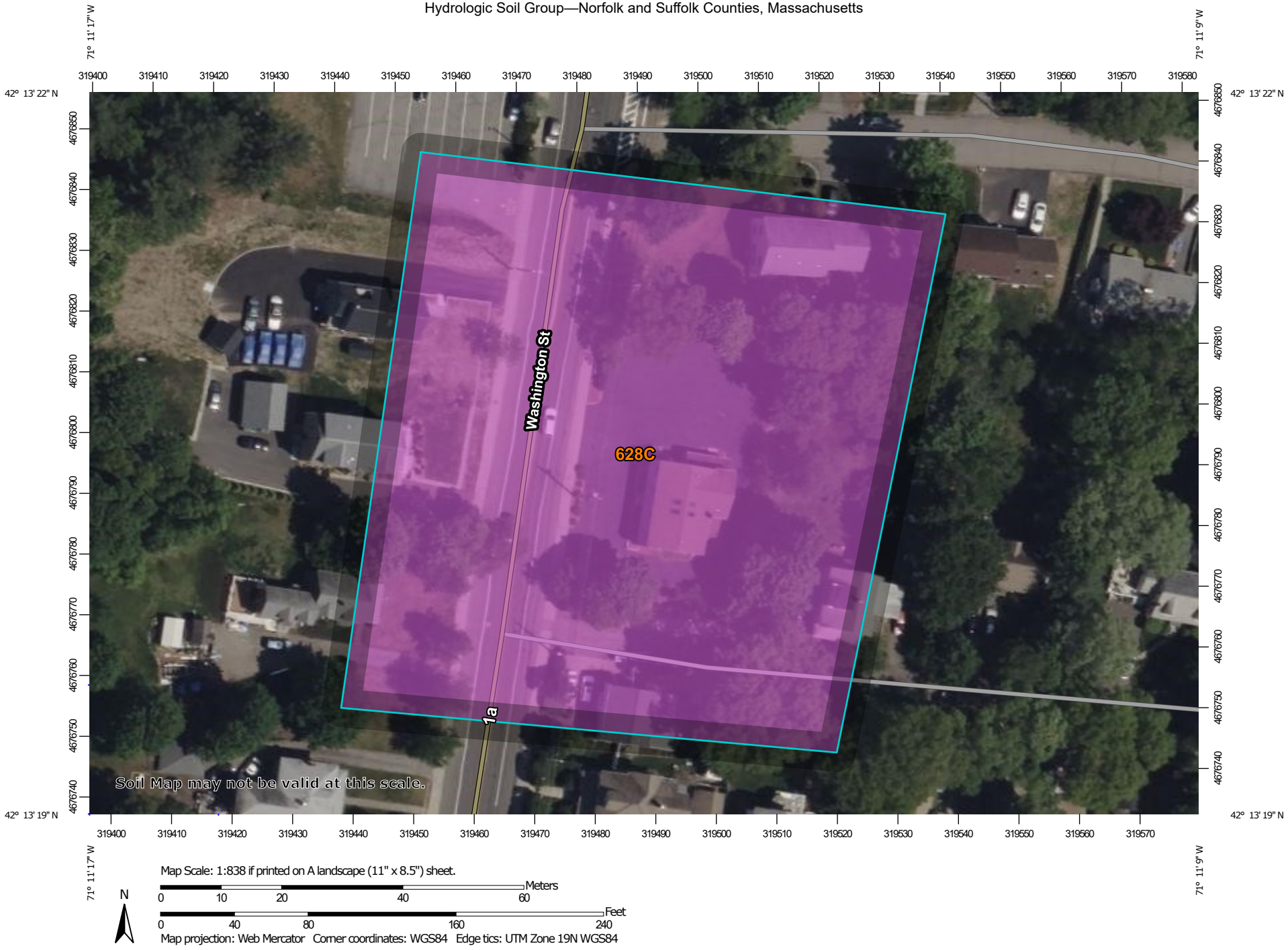
Appendix 3…….. *Standard 4 (TSS)*

Appendix 4…….. *Operation and Maintenance & Pollution Prevention Plan*

APPENDIX 1

Standard 2 (Peak Flow)

SOILS INFORMATION



Map Scale: 1:838 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 40 80 160 240

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

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

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

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

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

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

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

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 18, Sep 9, 2022

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

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
628C	Canton-Urban land complex, 3 to 15 percent slopes	A	1.9	100.0%
Totals for Area of Interest			**1.9**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Norfolk and Suffolk Counties, Massachusetts

628C—Canton-Urban land complex, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: vktb
Elevation: 0 to 1,000 feet
Mean annual precipitation: 32 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 120 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Canton and similar soils: 70 percent
Urban land: 20 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton

Setting

Landform: Ice-contact slopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over loose sandy and gravelly ablation till

Typical profile

H1 - 0 to 3 inches: fine sandy loam
H2 - 3 to 18 inches: fine sandy loam
H3 - 18 to 60 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 18 to 36 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A

Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Urban Land

Setting
Parent material: Excavated and filled land

Minor Components

Montauk
Percent of map unit: 4 percent
Hydric soil rating: No

Charlton
Percent of map unit: 2 percent
Hydric soil rating: No

Scituate
Percent of map unit: 2 percent
Hydric soil rating: No

Udorthents
Percent of map unit: 2 percent
Hydric soil rating: Unranked

Data Source Information

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 18, Sep 9, 2022

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wastewater Permitting Program
Form 11 - Soil Suitability Assessment

190 WASHINGTON ST.
Site Address or Map/Lot Number
WESTWOOD

Deep Observation Hole Deep Hole Number: 1-22

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
2	~	~	PAVEMENT			~					
60	~	~	FILL		~	~					
64	A	10YR 3/2				S.L.	<5	<5	GRAN.	V.F.	
76	B	5YR 5/8				S.L.	5	5	GRAN.	V.F.	
114	C	2.5Y 7/2	—	—		L.S.	10	15	GRAN.	V.F.	

Additional Notes HOLE OBSVd by: J. BARROWS, MASE #84 DATE: 12/21/22
NO OBSVd G.W., ESHWT @ 114", ROOTS TO 80"
SOME SMALL BOULDERS IN FILL

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wastewater Permitting Program
Form 11 - Soil Suitability Assessment

190 WASHINGTON ST,
Site Address or Map/Lot Number
WESTWOOD

Deep Observation Hole Deep Hole Number: 2-22

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
2				PAVEMENT							
58				FILL							
66	A	10YR 3/2					<5	<5	Granl.	V.F.	
78	B	5YR 5/8					5	5	GRNL.	V.F.	
110	C	2.5Y 7/2	—	—			10	15	GRNL.	V.F.	

Additional Notes HOLE OBSV'd BY: J. BARROWS, MASS #84, DATE: 12/21/22
NO OBSV'd G.W., ESHWT @ 110

CURVE NUMBER COMPUTATIONS

Worksheet 2: Runoff curve number and runoff

Project	By	Date
190 WASHINGTON ST.	JB	10/31/22
Location	**Checked**	**Date**
WESTWOOD		

Check one: ☑ Present ☐ Developed "E-1"

1. Runoff curve number

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] Figure 2-3	CN [1] Figure 2-4	Area ☑ acres ☐ mi² ☐ %	Product of CN x area
A	OPEN SPACE (GOOD)	39			0.02	

[1] Use only one CN source per line

Totals ➡ 0.02

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = _____ = _____ ; Use CN ➡ 39

2. Runoff

		Storm #1	Storm #2	Storm #3
Frequency	yr			
Rainfall, P (24-hour)	in			
Runoff, Q	in			

(Use P and CN with table 2-1, figure 2-1, or equation 2-3 and 2-4)

Worksheet 2: Runoff curve number and runoff

Project	By	Date
190 WASHINGTON ST.	J.B.	10-31-22
Location WESTWOOD	**Checked**	**Date**

Check one: ☑ Present ☐ Developed "E-2"

1. Runoff curve number

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] Figure 2-3	CN [1] Figure 2-4	Area ☐ acres ☐ mi² ☐ %	Product of CN x area
	IMPERVIOUS	98			0.30	29.40
A	OPEN SPACE (GOOD)	39			0.02	0.78
[1] Use only one CN source per line				Totals ➡	0.32	30.18

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{30.18}{0.32} = 94.3$; Use CN ➡ 94

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency ..... yr			
Rainfall, P (24-hour) ..... in			
Runoff, Q ..... in			

(Use P and CN with table 2-1, figure 2-1, or equation 2-3 and 2-4)

Worksheet 2: Runoff curve number and runoff

Project	By	Date
190 WASHINGTON ST.	JTB,	10-31-22
Location	**Checked**	**Date**
WESTWOOD		

Check one: ☑ Present ☐ Developed — 11E-3

1. Runoff curve number

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/ Figure 2-3	CN 1/ Figure 2-4	Area ☑ acres ☐ mi² ☐ %	Product of CN x area
	IMPERVIOUS	98			0.02	

1/ Use only one CN source per line

Totals ➡ 0.02

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = _____ = _____ ; Use CN ➡ 98

2. Runoff

		Storm #1	Storm #2	Storm #3
Frequency	yr			
Rainfall, P (24-hour)	in			
Runoff, Q	in			

(Use P and CN with table 2-1, figure 2-1, or equation 2-3 and 2-4)

Worksheet 2: Runoff curve number and runoff

Project 190 WASHINGTON ST.	By JB	Date 11/17/22
Location WESTWOOD	Checked	Date

Check one: ☐ Present ☑ Developed "P-1"

1. Runoff curve number

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/ Figure 2-3	CN 1/ Figure 2-4	Area ☑ acres ☐ mi² ☐ %	Product of CN x area
A	OPEN SPACE (GOOD)	39			0.02	

1/ Use only one CN source per line

Totals ➡ 0.02

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = _____ = _____ ; Use CN ➡ 39

2. Runoff

		Storm #1	Storm #2	Storm #3
Frequency	yr			
Rainfall, P (24-hour)	in			
Runoff, Q	in			

(Use P and CN with table 2-1, figure 2-1, or equation 2-3 and 2-4)

Worksheet 2: Runoff curve number and runoff

Project	By	Date
190 WASHINGTON ST.	TB	11/17/22
Location WESTWOOD	**Checked**	**Date**

Check one: ☐ Present ☑ Developed "P-2"

1. Runoff curve number

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] Figure 2-3	CN [1] Figure 2-4	Area ☑ acres ☐ mi² ☐ %	Product of CN x area
A	OPEN SPACE (GOOD)	39			0.09	3.51
	IMPERVIOUS	98			0.23	22.54

[1] Use only one CN source per line

Totals ➡ 0.32 26.05

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{26.05}{0.32} = 81.4$; Use CN ➡ 81

2. Runoff

		Storm #1	Storm #2	Storm #3
Frequency	yr			
Rainfall, P (24-hour)	in			
Runoff, Q	in			

(Use P and CN with table 2-1, figure 2-1, or equation 2-3 and 2-4)

Worksheet 2: Runoff curve number and runoff

Project	By	Date
190 WASHINGTON ST.	JB	11/17/22
Location	**Checked**	**Date**
WESTWOOD		

Check one: ☐ Present ☑ Developed "P-3"

1. Runoff curve number

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] Figure 2-3	CN [1] Figure 2-4	Area ☑ acres ☐ mi² ☐ %	Product of CN x area
	IMPERVIOUS	98			0.02	

[1] Use only one CN source per line

Totals ➡ 0.02

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = _____ = _____ ; Use CN ➡ 98

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency ..... yr			
Rainfall, P (24-hour) ..... in			
Runoff, Q ..... in			

(Use P and CN with table 2-1, figure 2-1, or equation 2-3 and 2-4)

HYDROGRAPHS

Hydrograph Return Period Recap

Hydraflow Hydrographs by Intelisolve v9.2

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	-------	-------	0.000	-------	-------	0.000	0.003	-------	0.006	E-1
2	SCS Runoff	-------	-------	0.911	-------	-------	1.420	1.812	-------	2.089	E-2
3	SCS Runoff	-------	-------	0.062	-------	-------	0.093	0.117	-------	0.134	E-3
4	Reservoir	2	-------	0.908	-------	-------	1.414	1.805	-------	2.081	Ex. DW outflow
5	Combine	2, 3,	-------	0.973	-------	-------	1.513	1.929	-------	2.223	Flow to SP #1 (Pre)
6	SCS Runoff	-------	-------	0.000	-------	-------	0.000	0.003	-------	0.006	P-1
7	SCS Runoff	-------	-------	0.537	-------	-------	1.024	1.418	-------	1.701	P-2
8	SCS Runoff	-------	-------	0.062	-------	-------	0.093	0.117	-------	0.134	P-3
9	Reservoir	7	-------	0.000	-------	-------	0.000	0.126	-------	0.829	RA #1 Outflow
10	Combine	6, 9	-------	0.000	-------	-------	0.000	0.127	-------	0.835	Flow to SP #1 (Post)

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.2

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	0.000	1	n/a	0	----	------	------	E-1
2	SCS Runoff	0.911	1	724	2,931	----	------	------	E-2
3	SCS Runoff	0.062	1	724	215	----	------	------	E-3
4	Reservoir	0.908	1	724	2,636	2	123.75	195	Ex. DW outflow
5	Combine	0.973	1	724	3,146	2, 3,	------	------	Flow to SP #1 (Pre)
6	SCS Runoff	0.000	1	n/a	0	----	------	------	P-1
7	SCS Runoff	0.537	1	725	1,666	----	------	------	P-2
8	SCS Runoff	0.062	1	724	215	----	------	------	P-3
9	Reservoir	0.000	1	704	0	7	119.87	738	RA #1 Outflow
10	Combine	0.000	1	704	0	6, 9	------	------	Flow to SP #1 (Post)

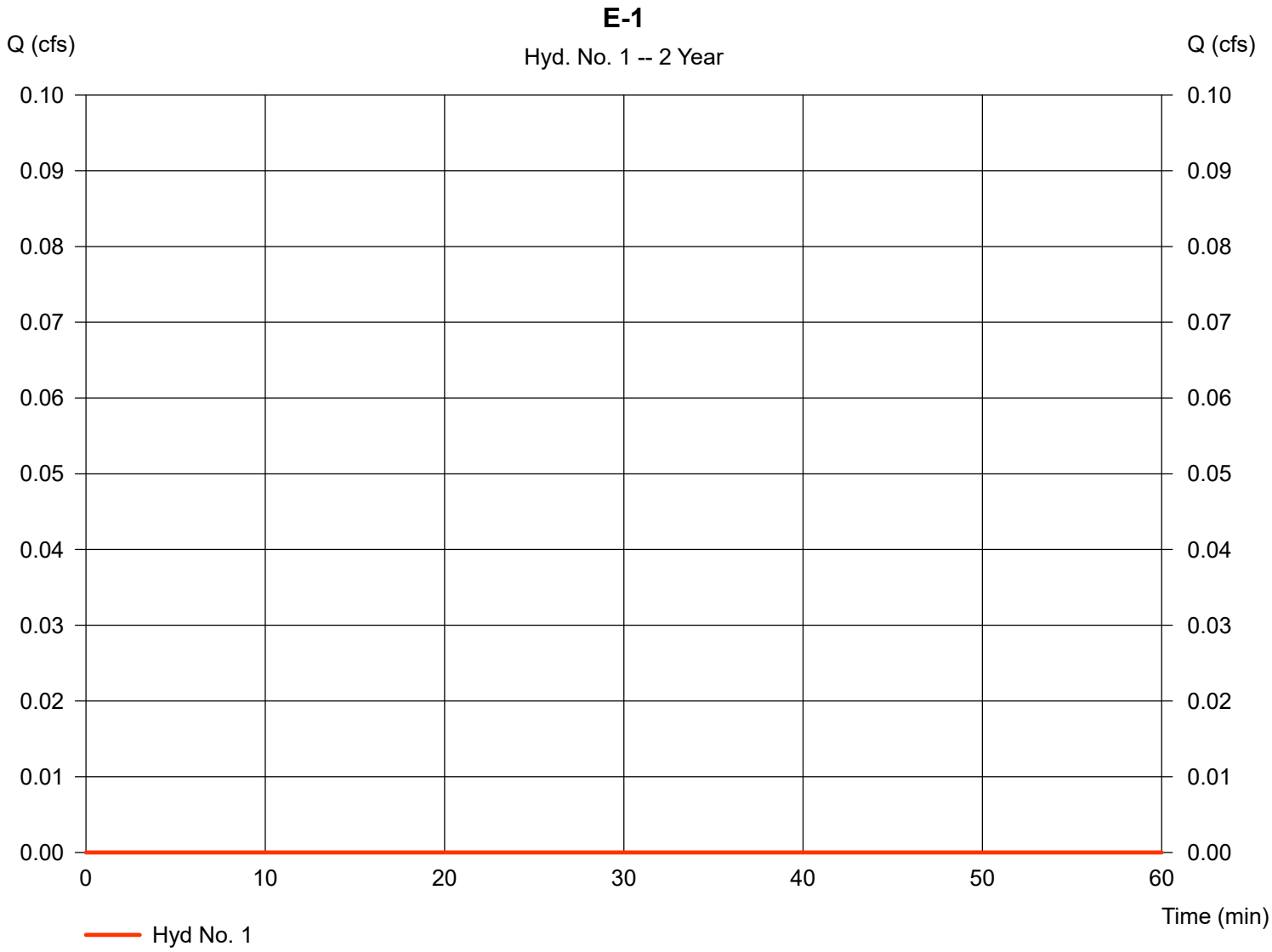
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 1

E-1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Drainage area	=	0.020 ac	Curve number	=	39
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.10 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



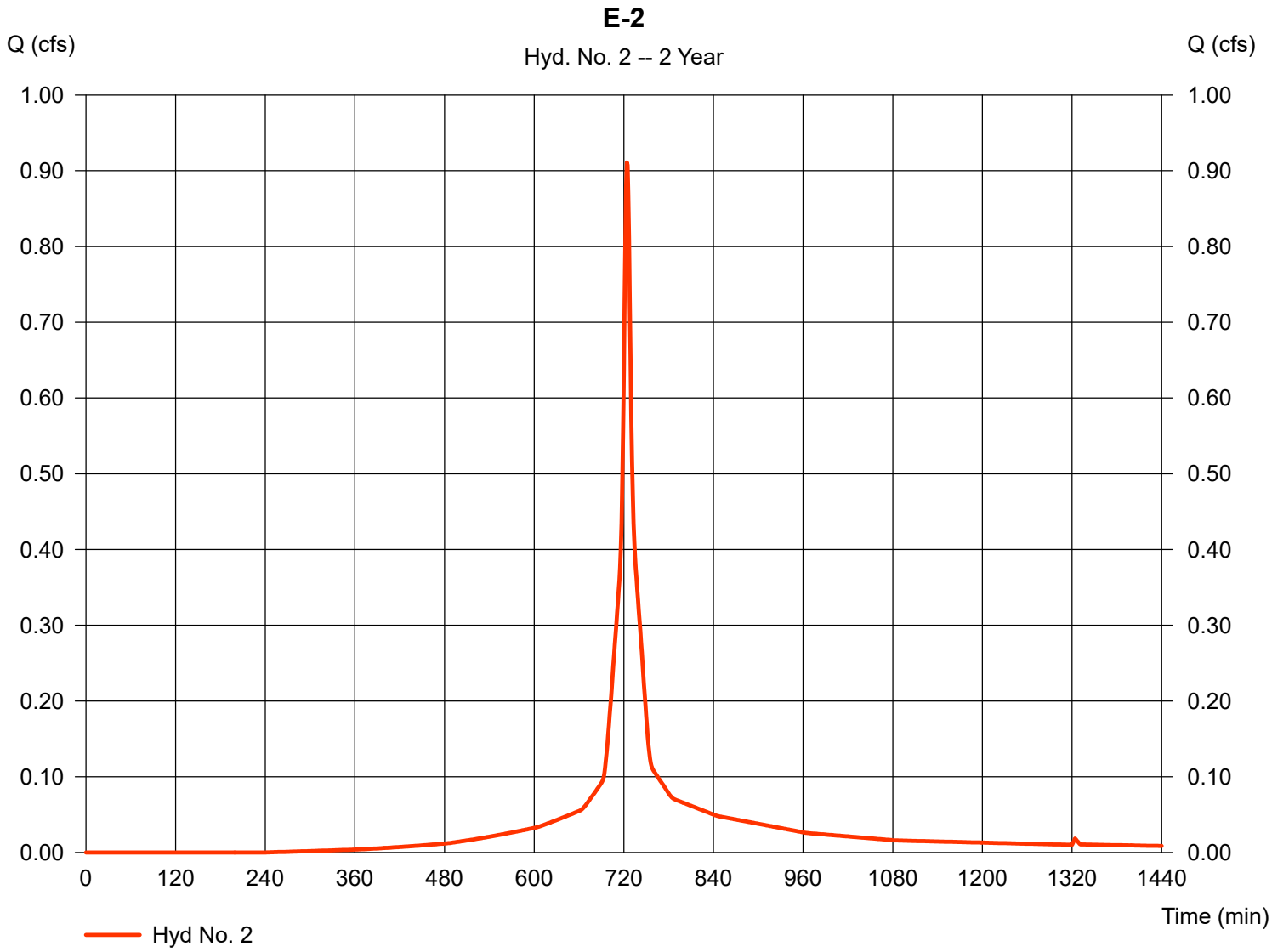
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 2

E-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.911 cfs
Storm frequency	=	2 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	2,931 cuft
Drainage area	=	0.320 ac	Curve number	=	94
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.10 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



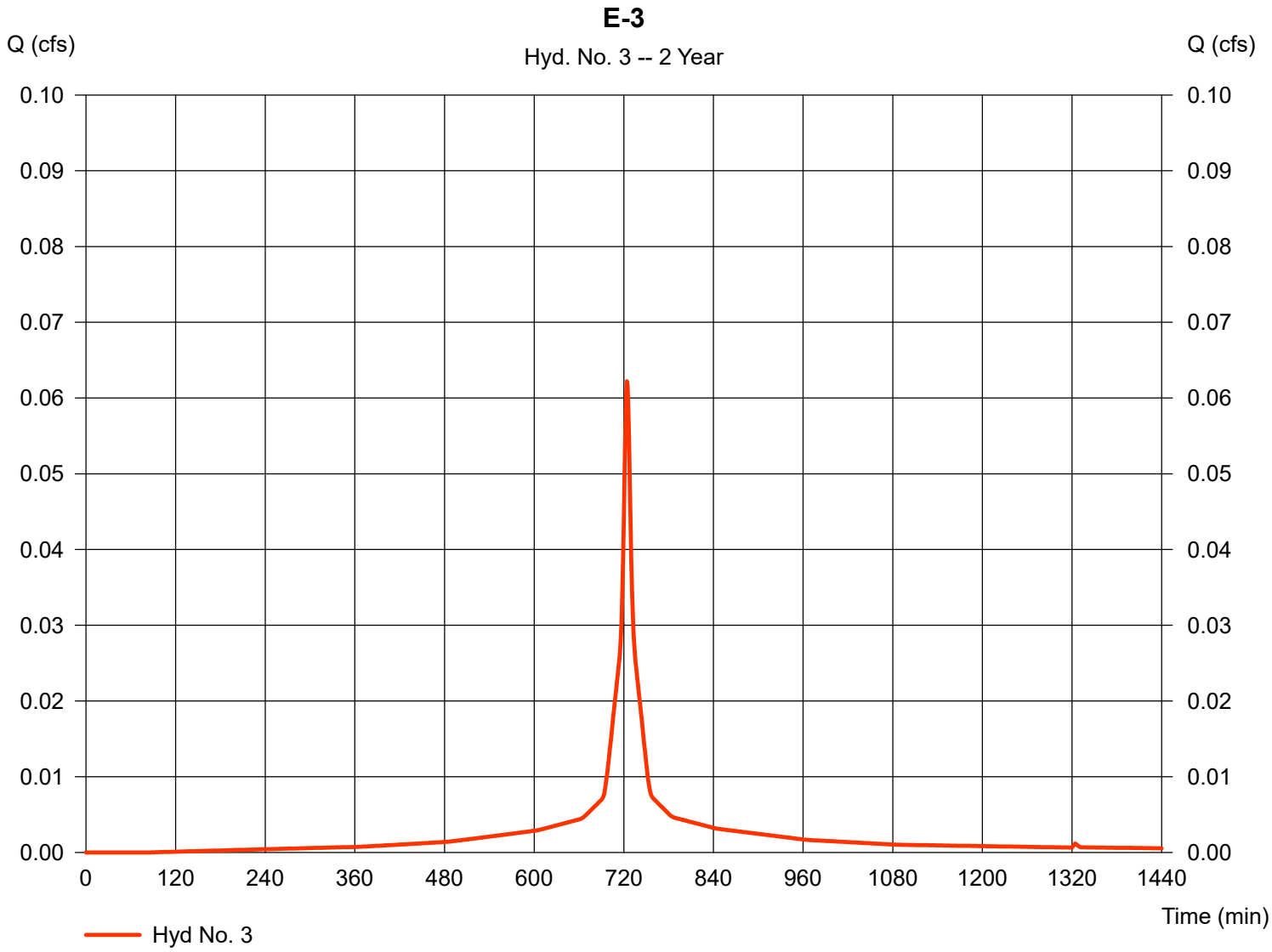
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 3

E-3

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.062 cfs
Storm frequency	=	2 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	215 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.	=	3.10 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

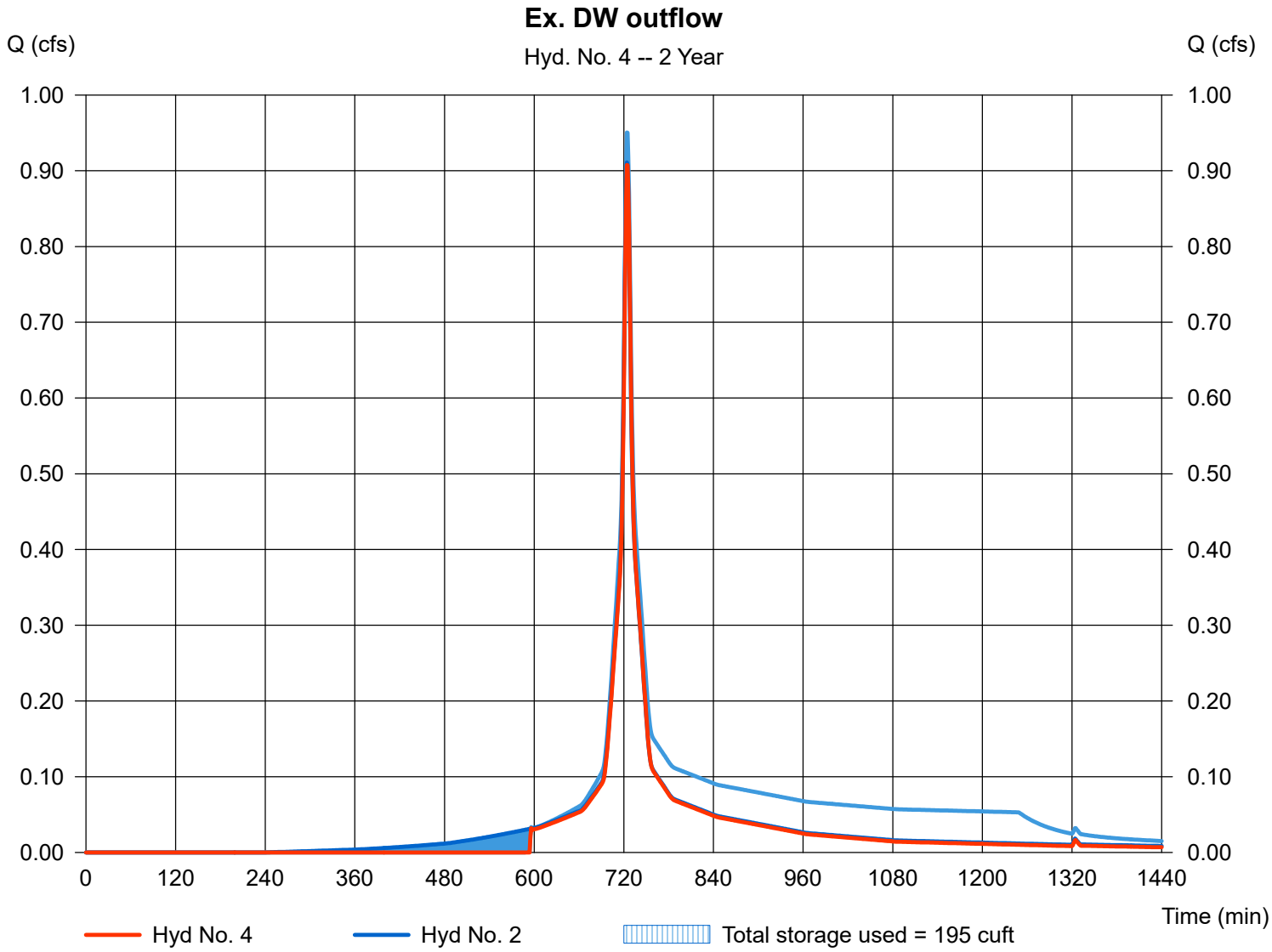
Hydraflow Hydrographs by Intelisolve v9.2 — Thursday, Apr 6, 2023

Hyd. No. 4

Ex. DW outflow

Hydrograph type	=	Reservoir	Peak discharge	=	0.908 cfs
Storm frequency	=	2 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	2,636 cuft
Inflow hyd. No.	=	2 - E-2	Max. Elevation	=	123.75 ft
Reservoir name	=	Ex. Drywell	Max. Storage	=	195 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.2 — Thursday, Apr 6, 2023

Pond No. 1 - Ex. Drywell

Pond Data

UG Chambers - Invert elev. = 120.80 ft, Rise x Span = 2.40 x 3.50 ft, Barrel Len = 4.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No
Encasement - Invert elev. = 119.80 ft, Width = 7.50 ft, Height = 3.40 ft, Voids = 40.00%
Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 123.30 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	119.80	n/a	0	0
0.34	120.14	n/a	4	4
0.68	120.48	n/a	4	8
1.02	120.82	n/a	4	12
1.36	121.16	n/a	7	19
1.70	121.50	n/a	7	26
2.04	121.84	n/a	7	33
2.38	122.18	n/a	7	40
2.72	122.52	n/a	7	47
3.06	122.86	n/a	7	54
3.40	123.20	n/a	7	61
3.50	123.30	50	2	63
4.00	123.80	650	147	209

Culvert / Orifice Structures

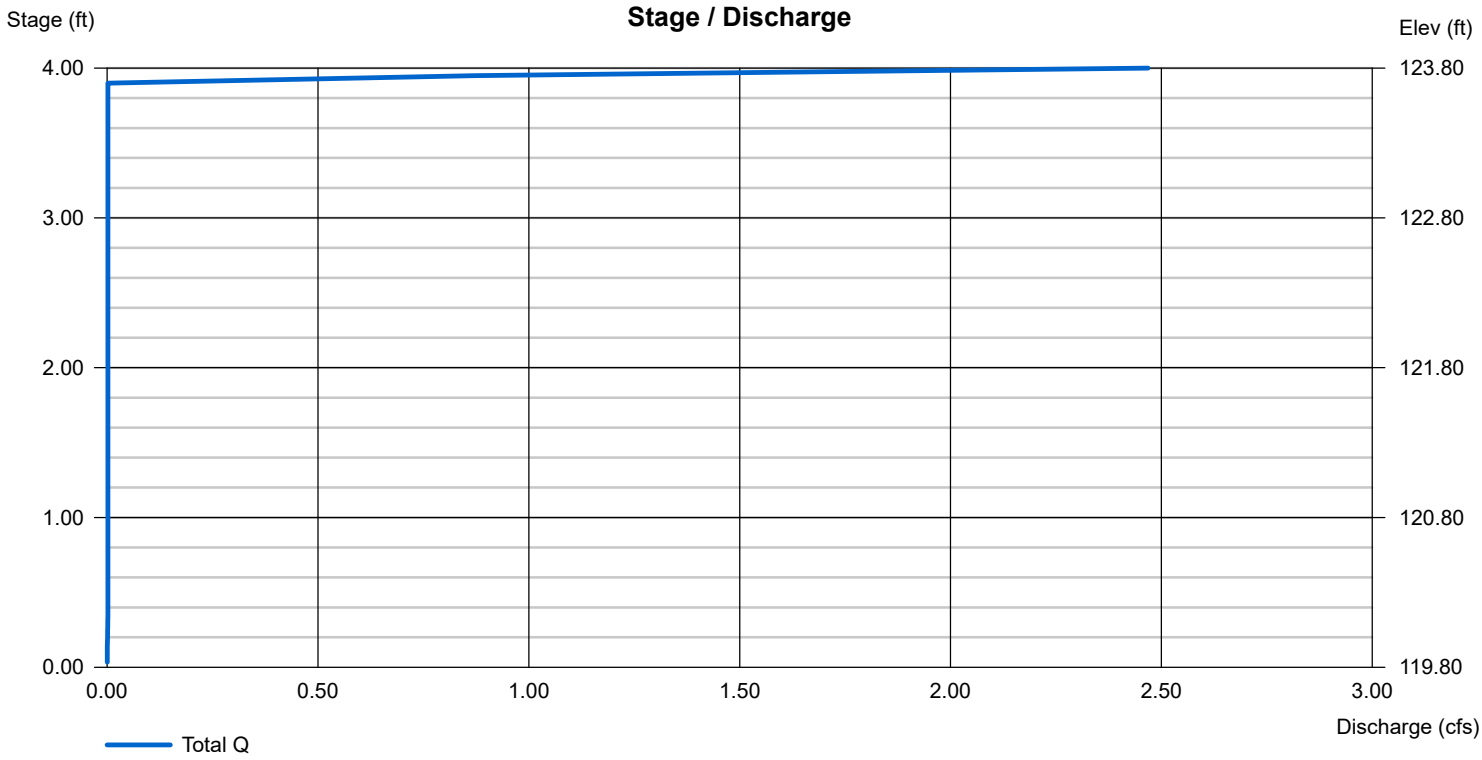
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 30.00	0.00	0.00	0.00
Crest El. (ft)	= 123.70	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 2.410 (by Contour)
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).



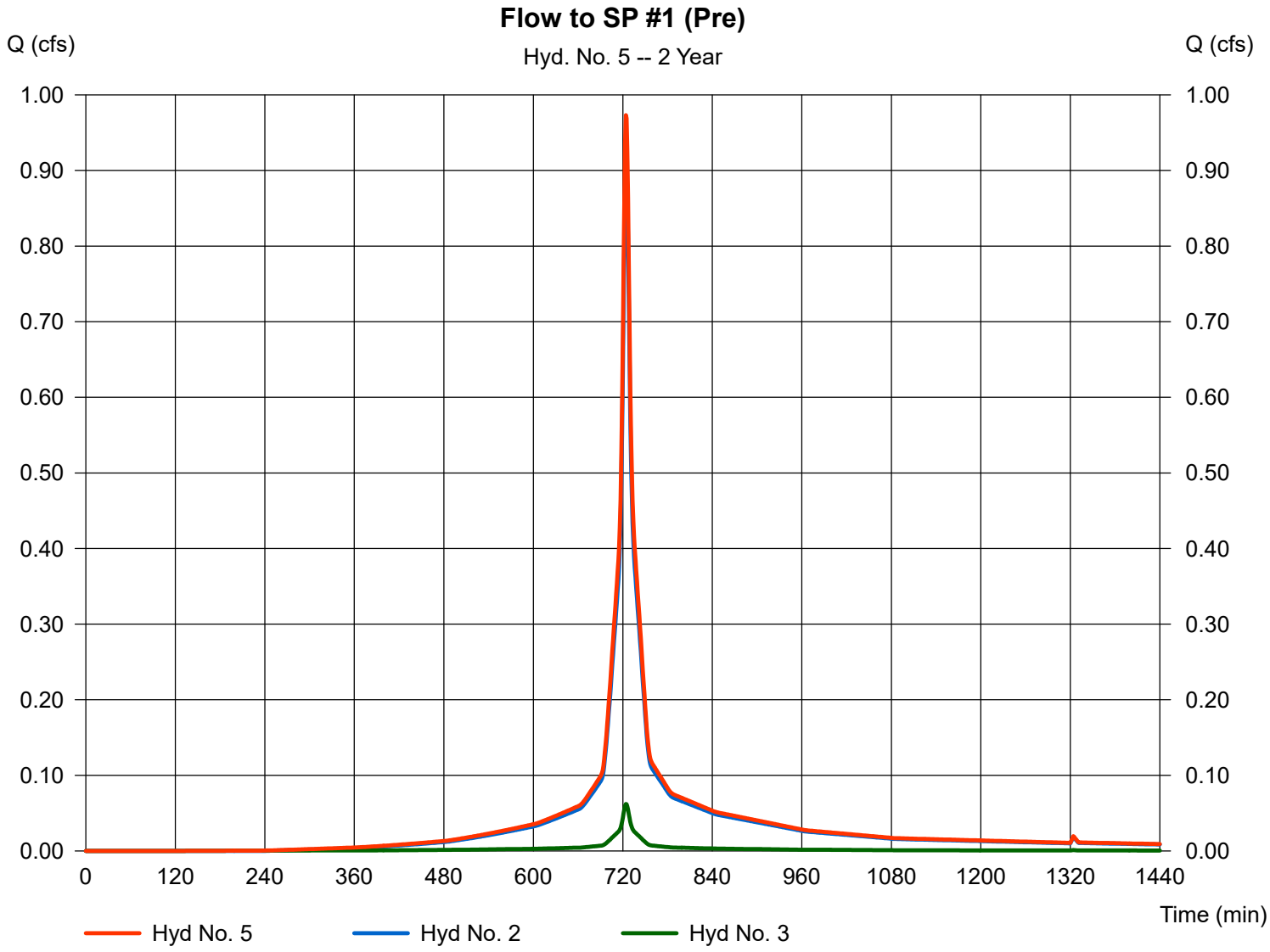
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 5

Flow to SP #1 (Pre)

Hydrograph type	=	Combine	Peak discharge	=	0.973 cfs
Storm frequency	=	2 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	3,146 cuft
Inflow hyds.	=	2, 3	Contrib. drain. area	=	0.340 ac



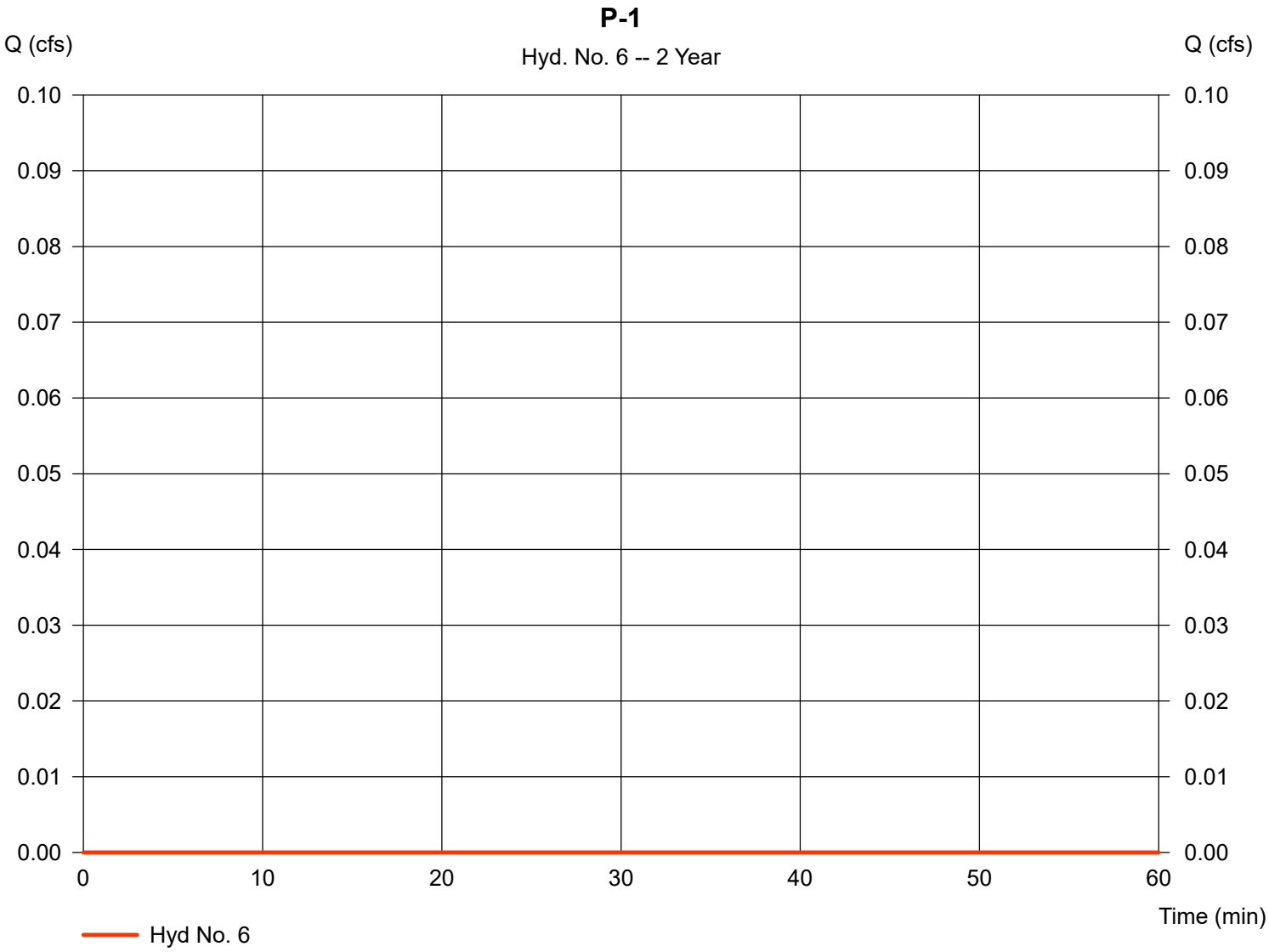
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 6

P-1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Drainage area	=	0.020 ac	Curve number	=	39
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.10 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



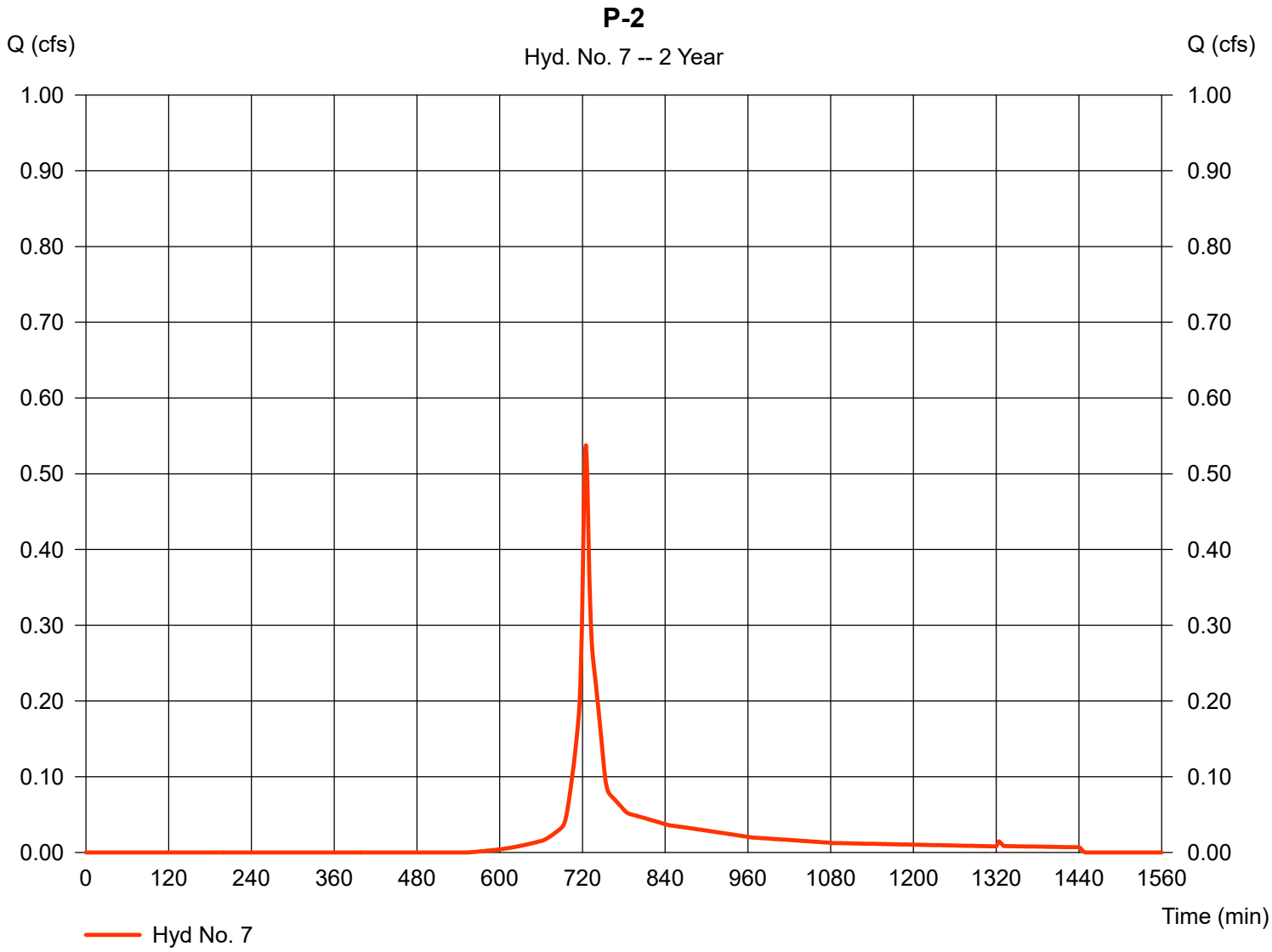
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 7

P-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.537 cfs
Storm frequency	=	2 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	1,666 cuft
Drainage area	=	0.320 ac	Curve number	=	81
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.10 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



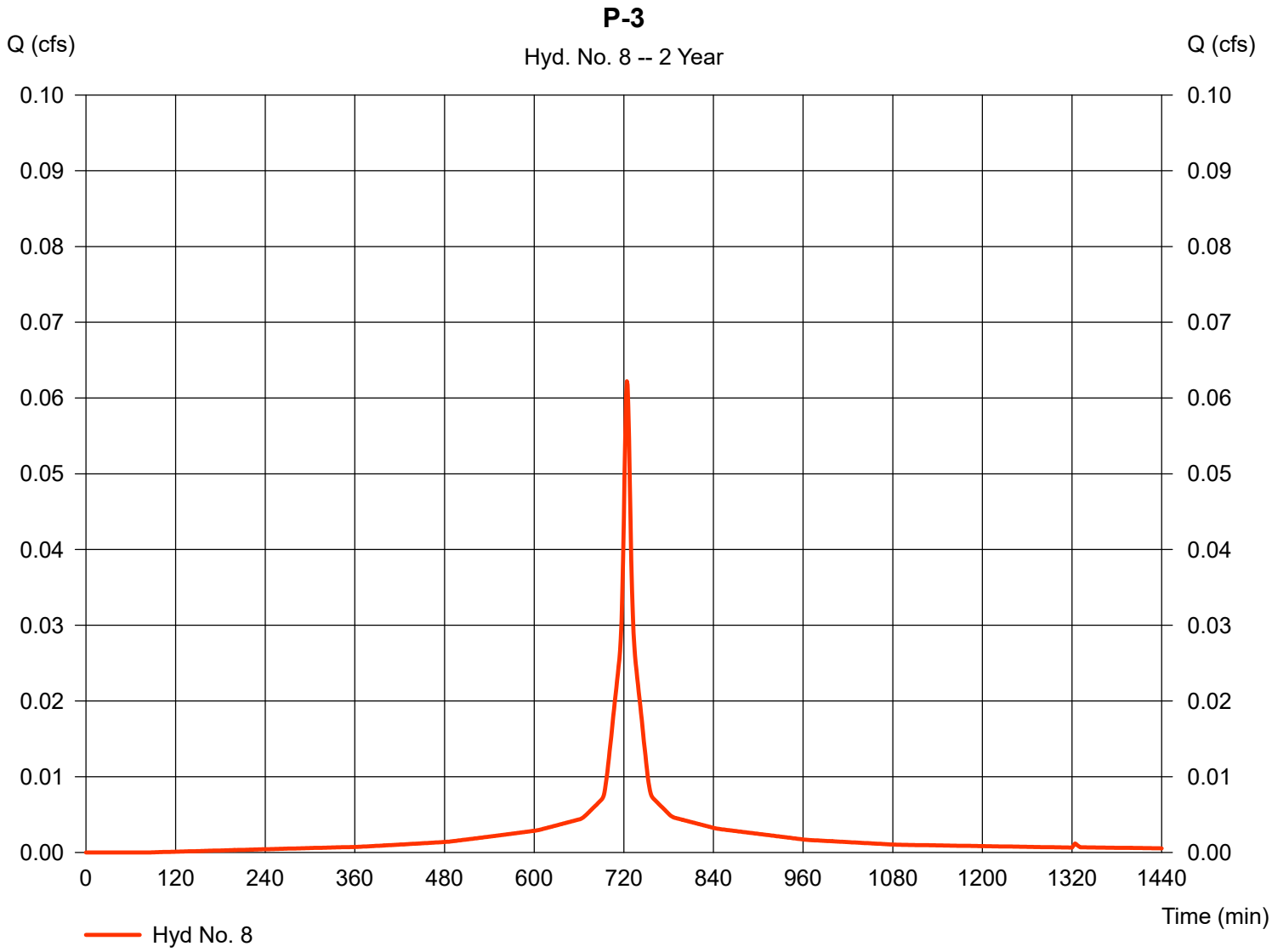
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 8

P-3

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.062 cfs
Storm frequency	=	2 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	215 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.	=	3.10 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

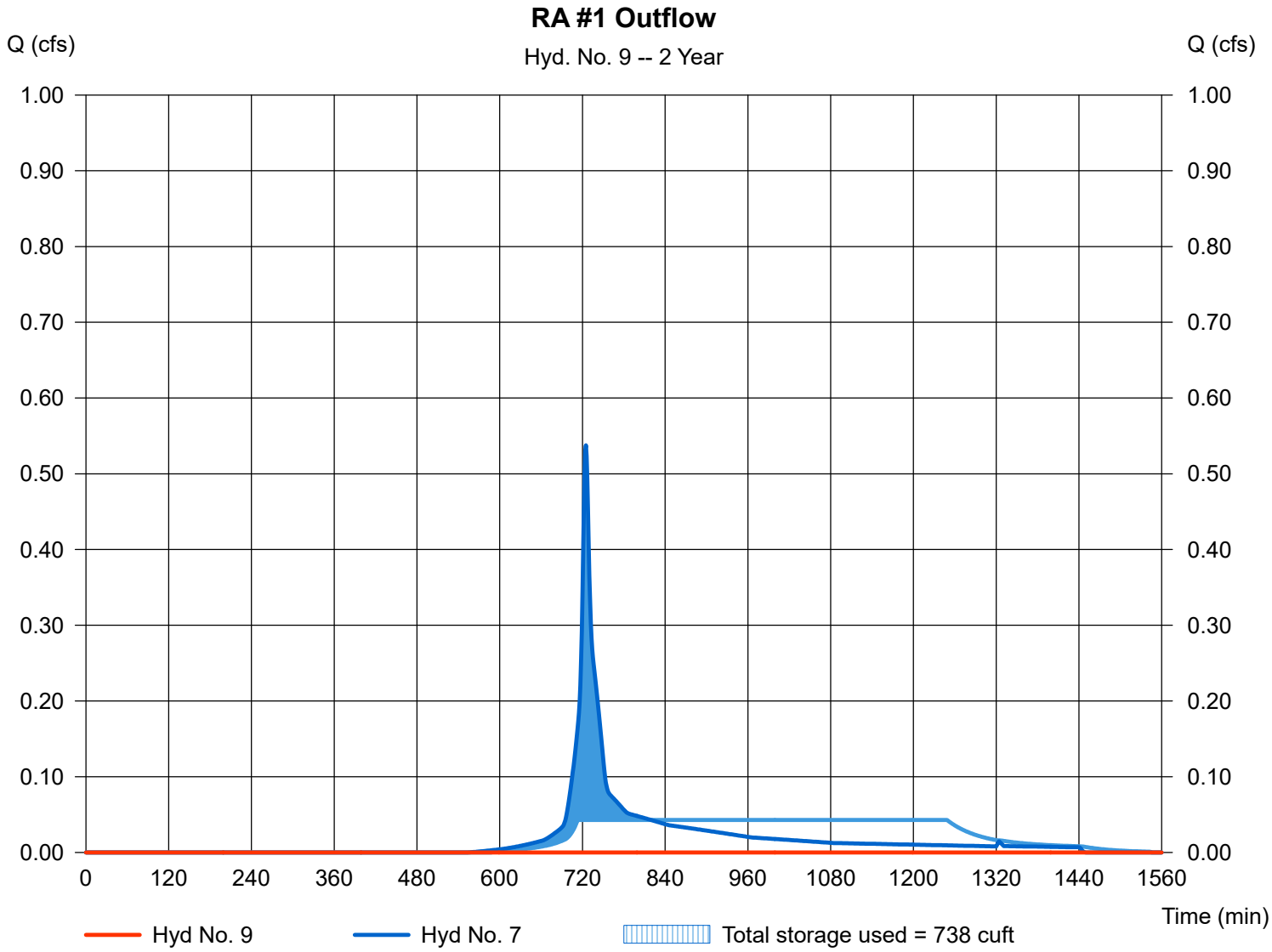
Hydraflow Hydrographs by Intelisolve v9.2 — Thursday, Apr 6, 2023

Hyd. No. 9

RA #1 Outflow

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	704 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	7 - P-2	Max. Elevation	=	119.87 ft
Reservoir name	=	RA #1	Max. Storage	=	738 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.2 — Thursday, Apr 6, 2023

Pond No. 2 - RA #1

Pond Data

UG Chambers - Invert elev. = 119.00 ft, Rise x Span = 2.50 x 4.33 ft, Barrel Len = 36.00 ft, No. Barrels = 4, Slope = 0.00%, Headers = No
Encasement - Invert elev. = 118.50 ft, Width = 5.33 ft, Height = 4.00 ft, Voids = 40.00%
Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 122.60 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	118.50	n/a	0	0
0.40	118.90	n/a	123	123
0.80	119.30	n/a	235	358
1.20	119.70	n/a	269	627
1.60	120.10	n/a	262	889
2.00	120.50	n/a	250	1,140
2.40	120.90	n/a	232	1,372
2.80	121.30	n/a	203	1,575
3.20	121.70	n/a	143	1,717
3.60	122.10	n/a	123	1,840
4.00	122.50	n/a	123	1,963
4.10	122.60	50	2	1,965
5.00	123.50	800	315	2,280

Culvert / Orifice Structures

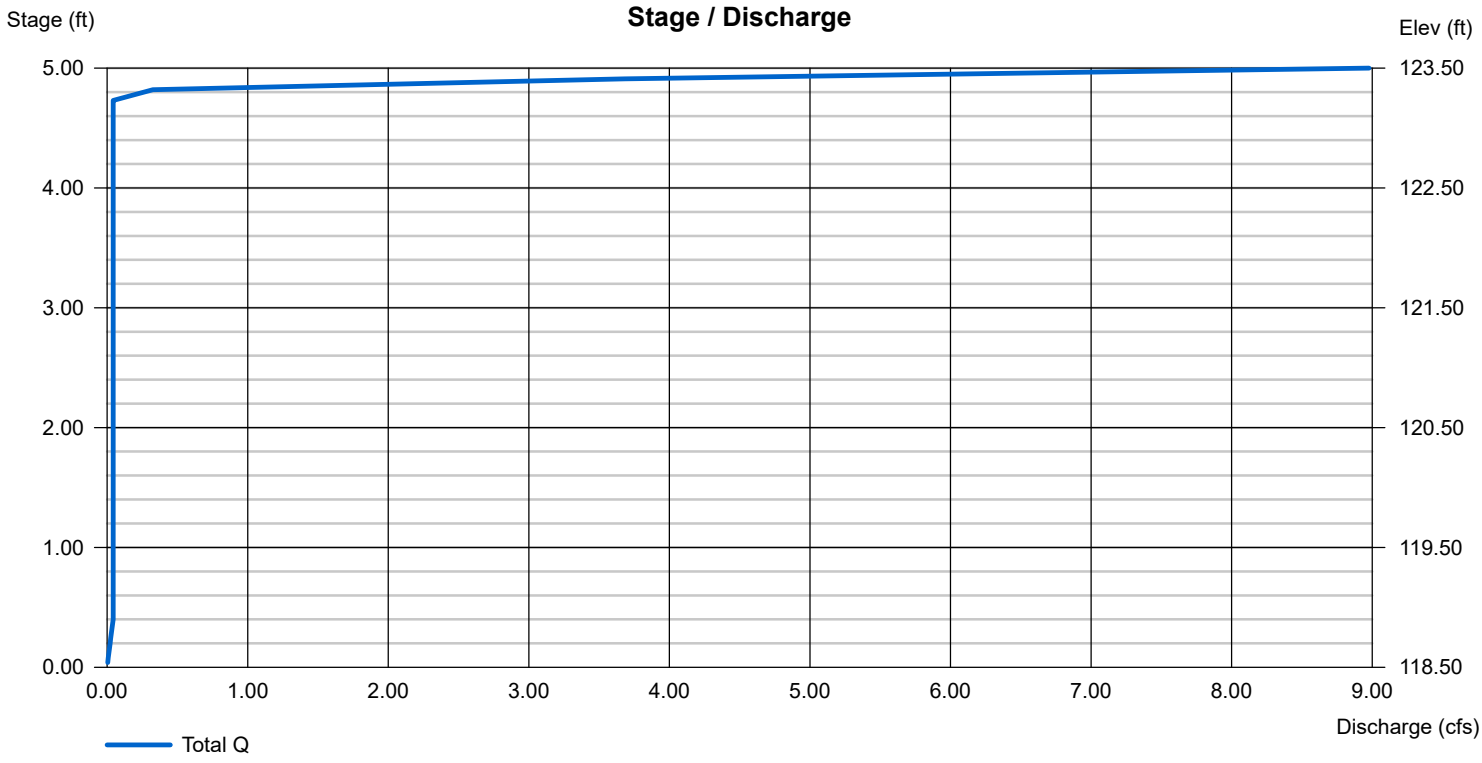
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 30.00	0.00	0.00	0.00
Crest El. (ft)	= 123.30	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) = 2.410 (by Contour)
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).



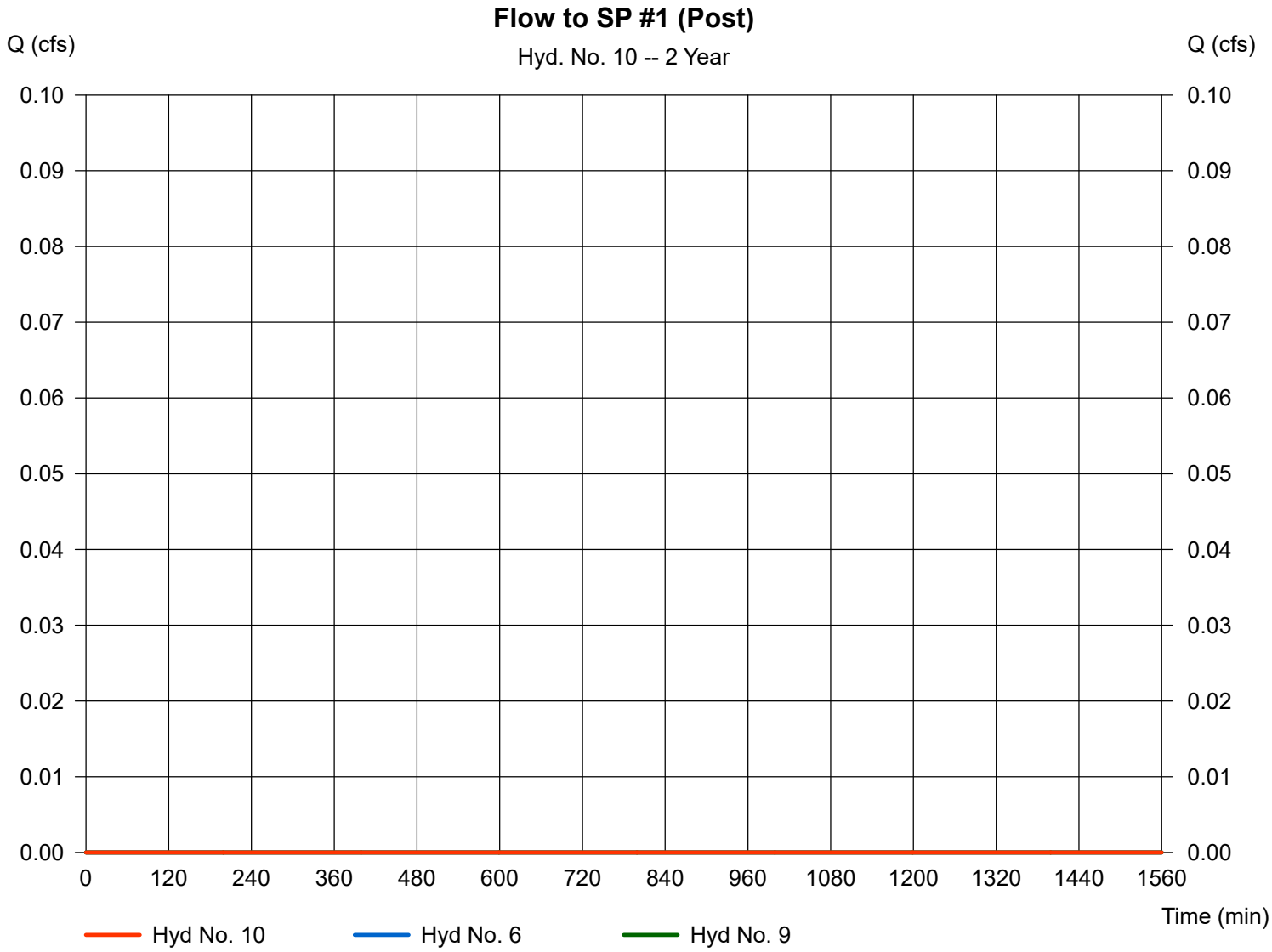
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 10

Flow to SP #1 (Post)

Hydrograph type	=	Combine	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	704 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyds.	=	6, 9	Contrib. drain. area	=	0.020 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.2

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	0.000	1	874	9	----	------	------	E-1
2	SCS Runoff	1.420	1	724	4,688	----	------	------	E-2
3	SCS Runoff	0.093	1	724	327	----	------	------	E-3
4	Reservoir	1.414	1	725	4,385	2	123.77	200	Ex. DW outflow
5	Combine	1.513	1	724	5,015	2, 3,	------	------	Flow to SP #1 (Pre)
6	SCS Runoff	0.000	1	874	9	----	------	------	P-1
7	SCS Runoff	1.024	1	725	3,156	----	------	------	P-2
8	SCS Runoff	0.093	1	724	327	----	------	------	P-3
9	Reservoir	0.000	1	665	0	7	121.86	1,767	RA #1 Outflow
10	Combine	0.000	1	874	9	6, 9	------	------	Flow to SP #1 (Post)

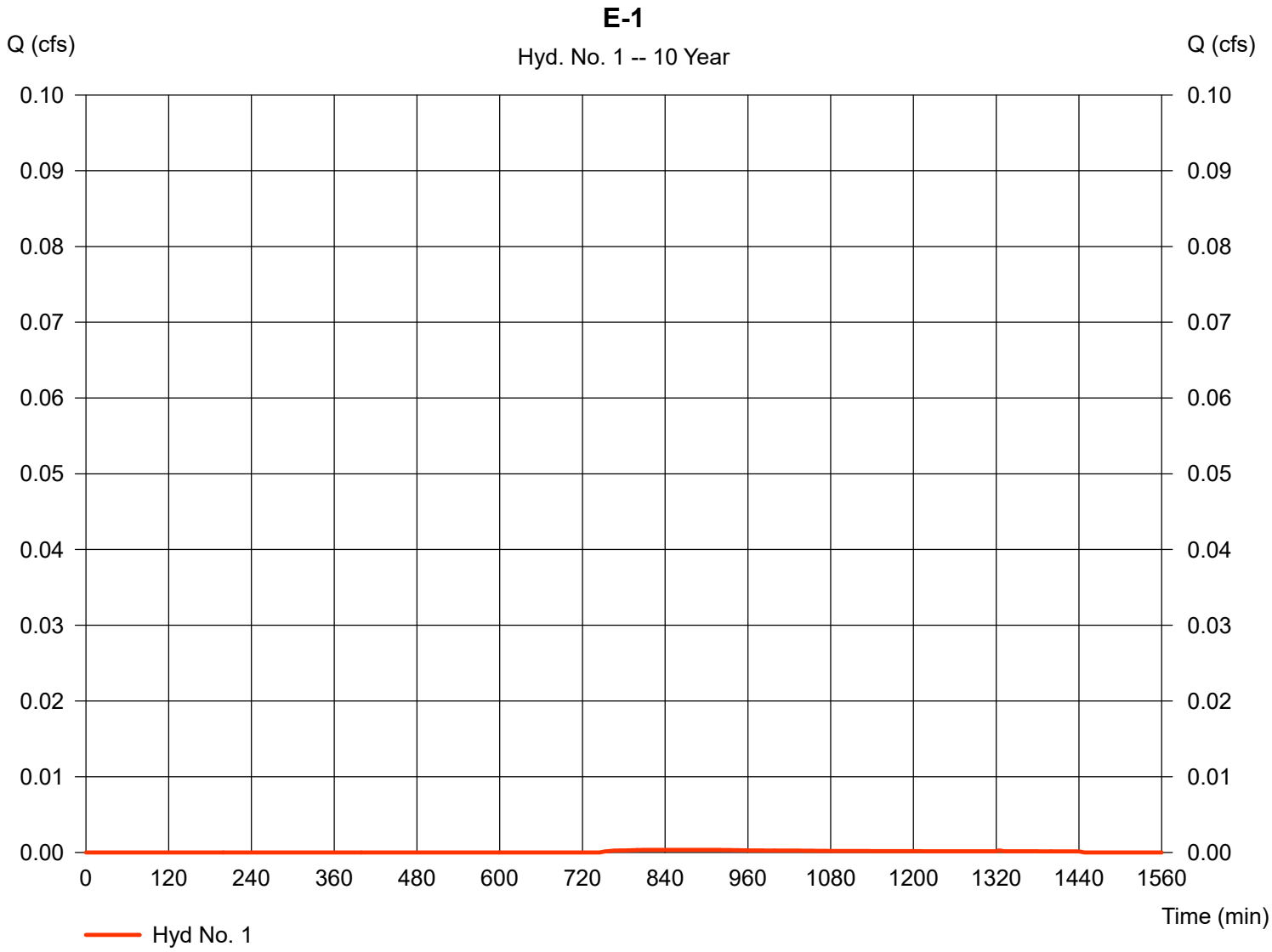
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 1

E-1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.000 cfs
Storm frequency	=	10 yrs	Time to peak	=	874 min
Time interval	=	1 min	Hyd. volume	=	9 cuft
Drainage area	=	0.020 ac	Curve number	=	39
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.60 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



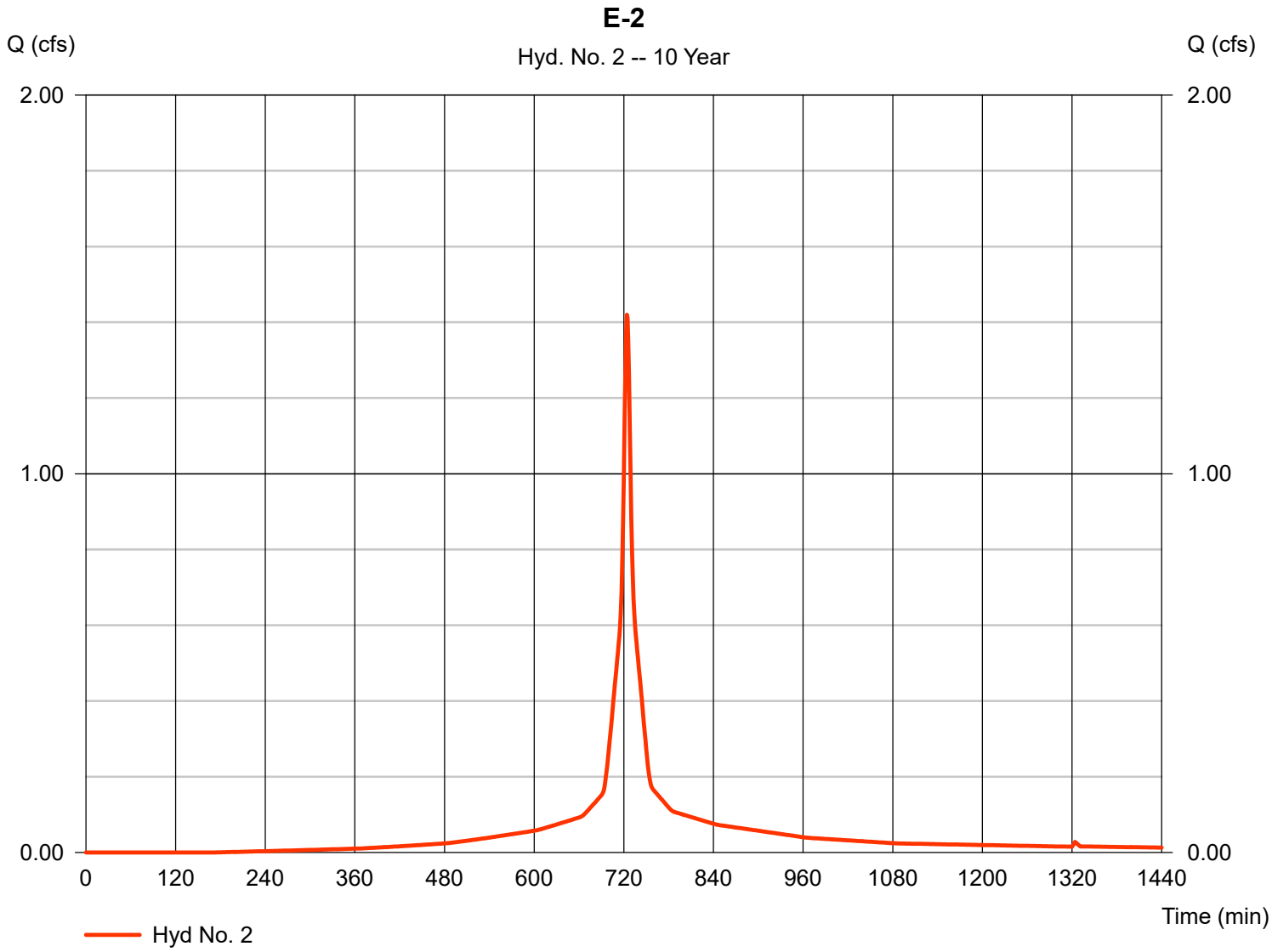
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 — Thursday, Apr 6, 2023

Hyd. No. 2

E-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.420 cfs
Storm frequency	=	10 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	4,688 cuft
Drainage area	=	0.320 ac	Curve number	=	94
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.60 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



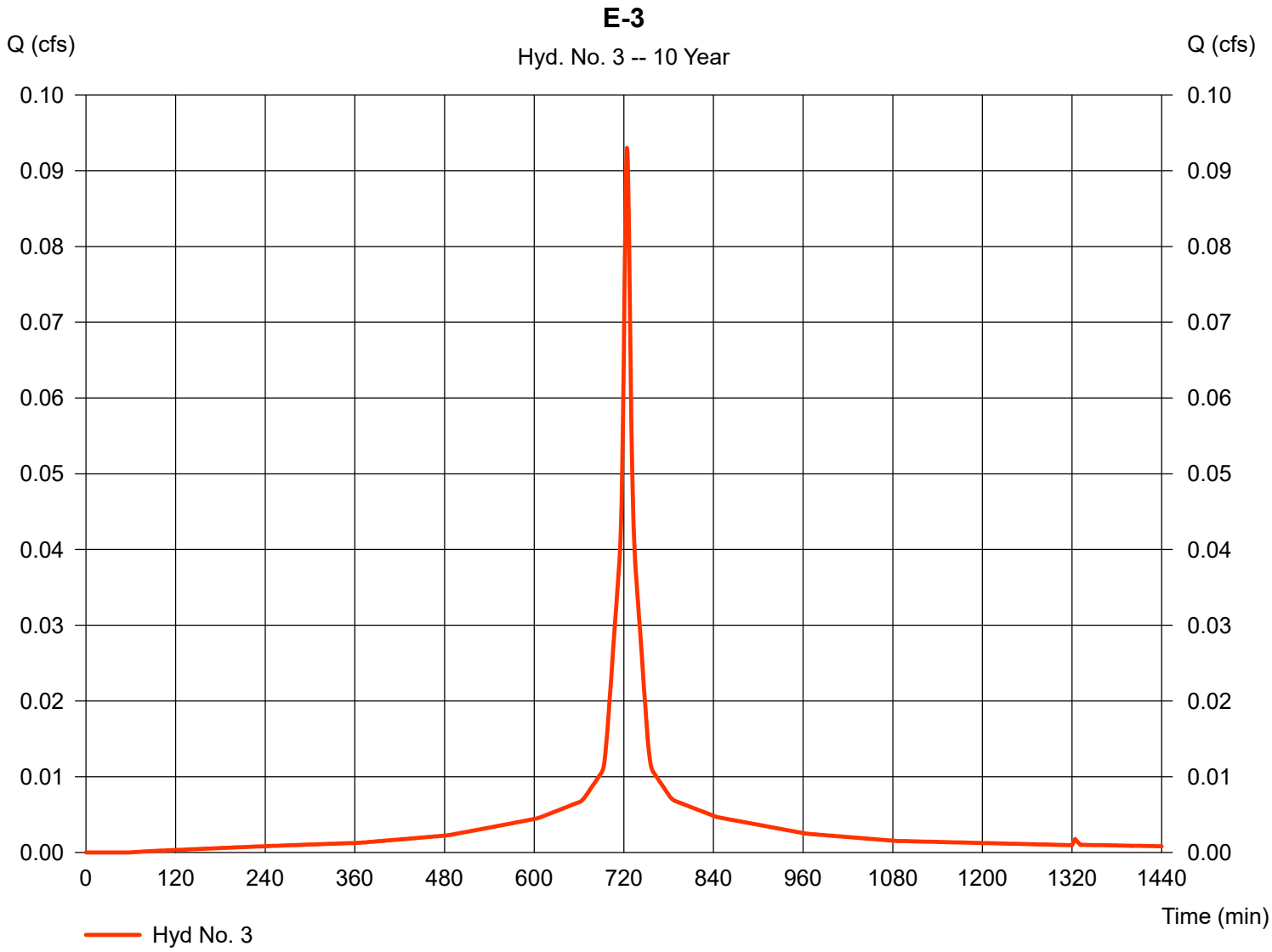
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 — Thursday, Apr 6, 2023

Hyd. No. 3

E-3

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.093 cfs
Storm frequency	=	10 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	327 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.	=	4.60 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

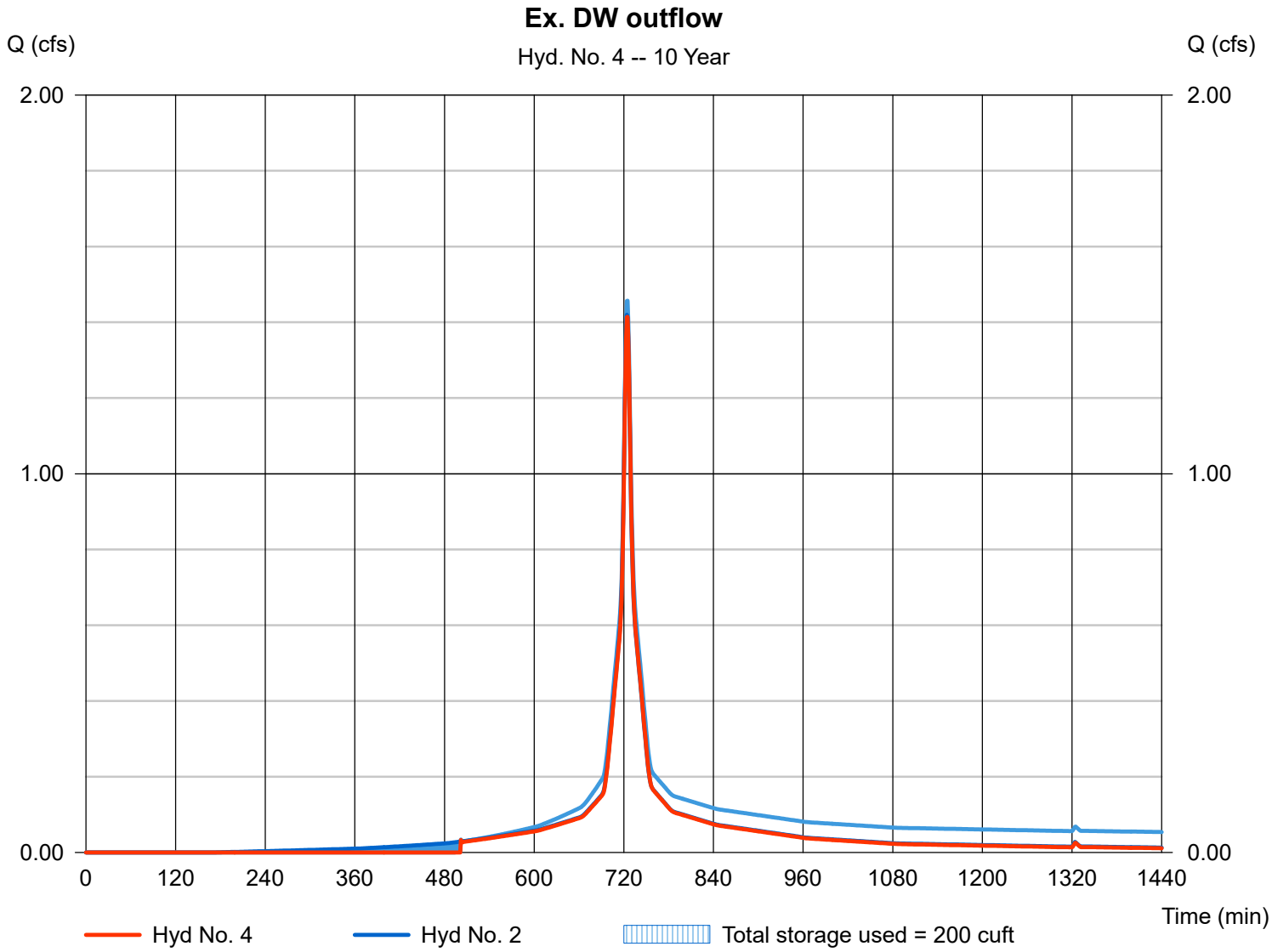
Hydraflow Hydrographs by Intelisolve v9.2 — Thursday, Apr 6, 2023

Hyd. No. 4

Ex. DW outflow

Hydrograph type	=	Reservoir	Peak discharge	=	1.414 cfs
Storm frequency	=	10 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	4,385 cuft
Inflow hyd. No.	=	2 - E-2	Max. Elevation	=	123.77 ft
Reservoir name	=	Ex. Drywell	Max. Storage	=	200 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



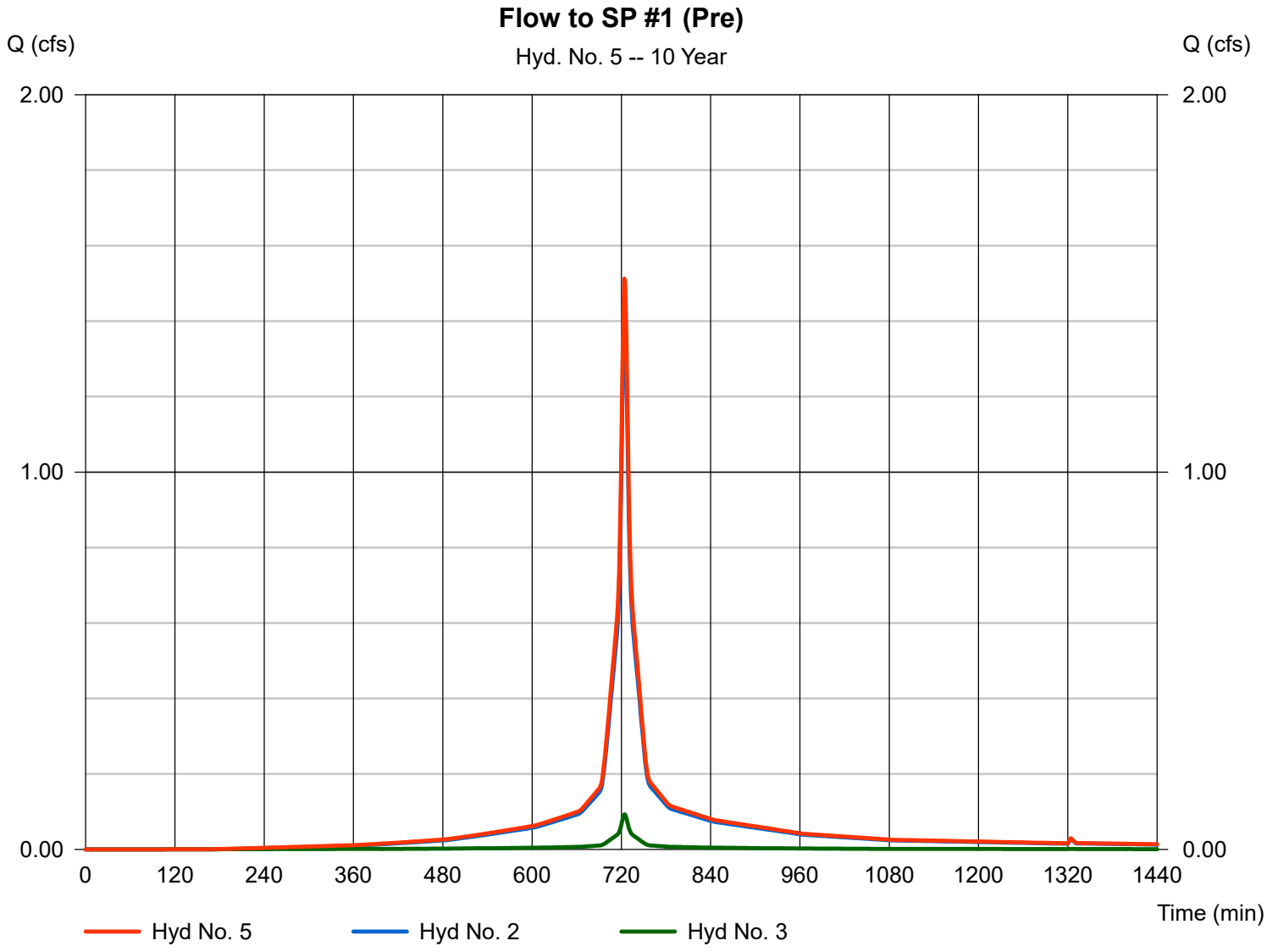
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 5

Flow to SP #1 (Pre)

Hydrograph type	= Combine	Peak discharge	= 1.513 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 5,015 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 0.340 ac



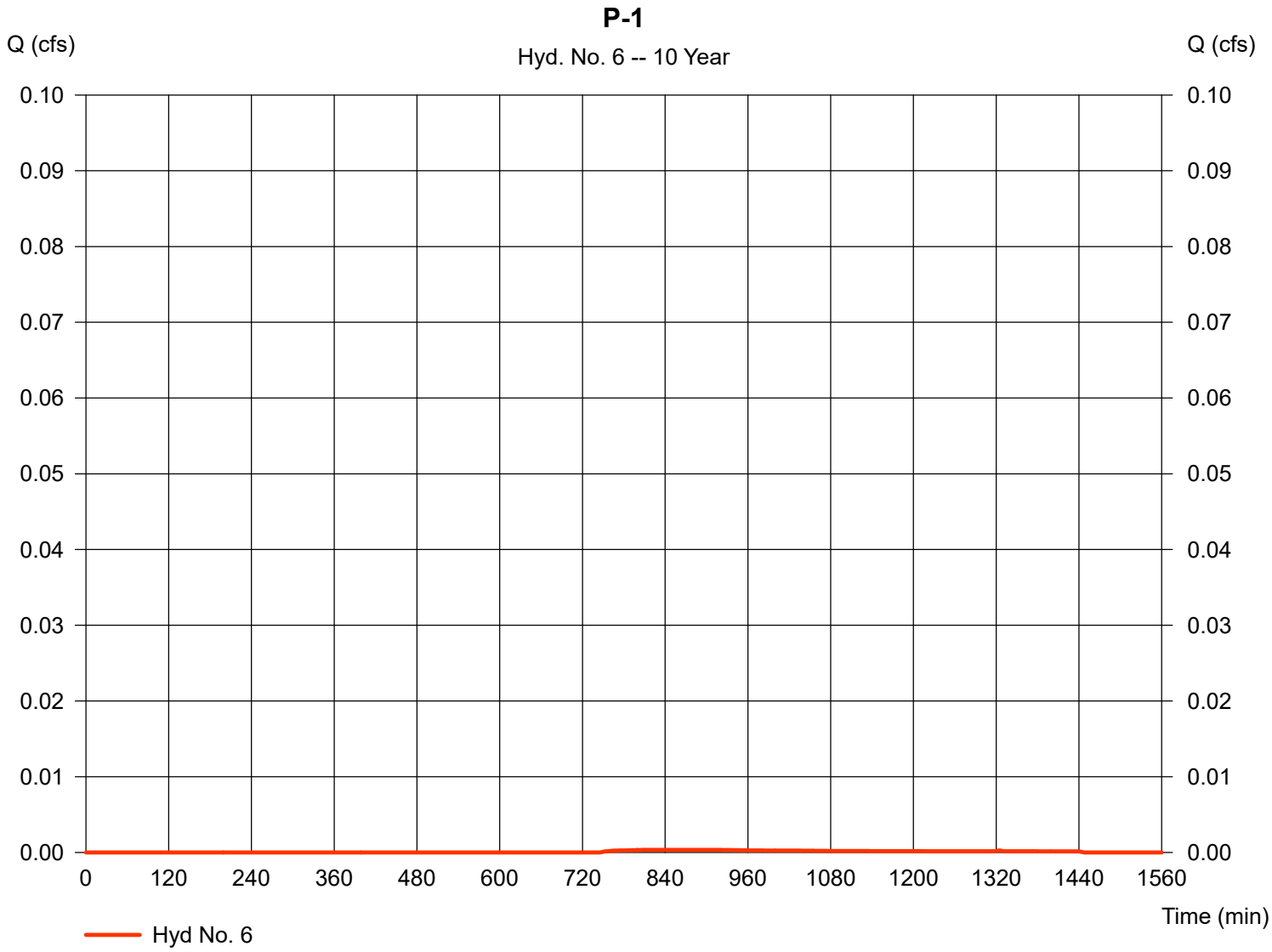
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 — Thursday, Apr 6, 2023

Hyd. No. 6

P-1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.000 cfs
Storm frequency	=	10 yrs	Time to peak	=	874 min
Time interval	=	1 min	Hyd. volume	=	9 cuft
Drainage area	=	0.020 ac	Curve number	=	39
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.60 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



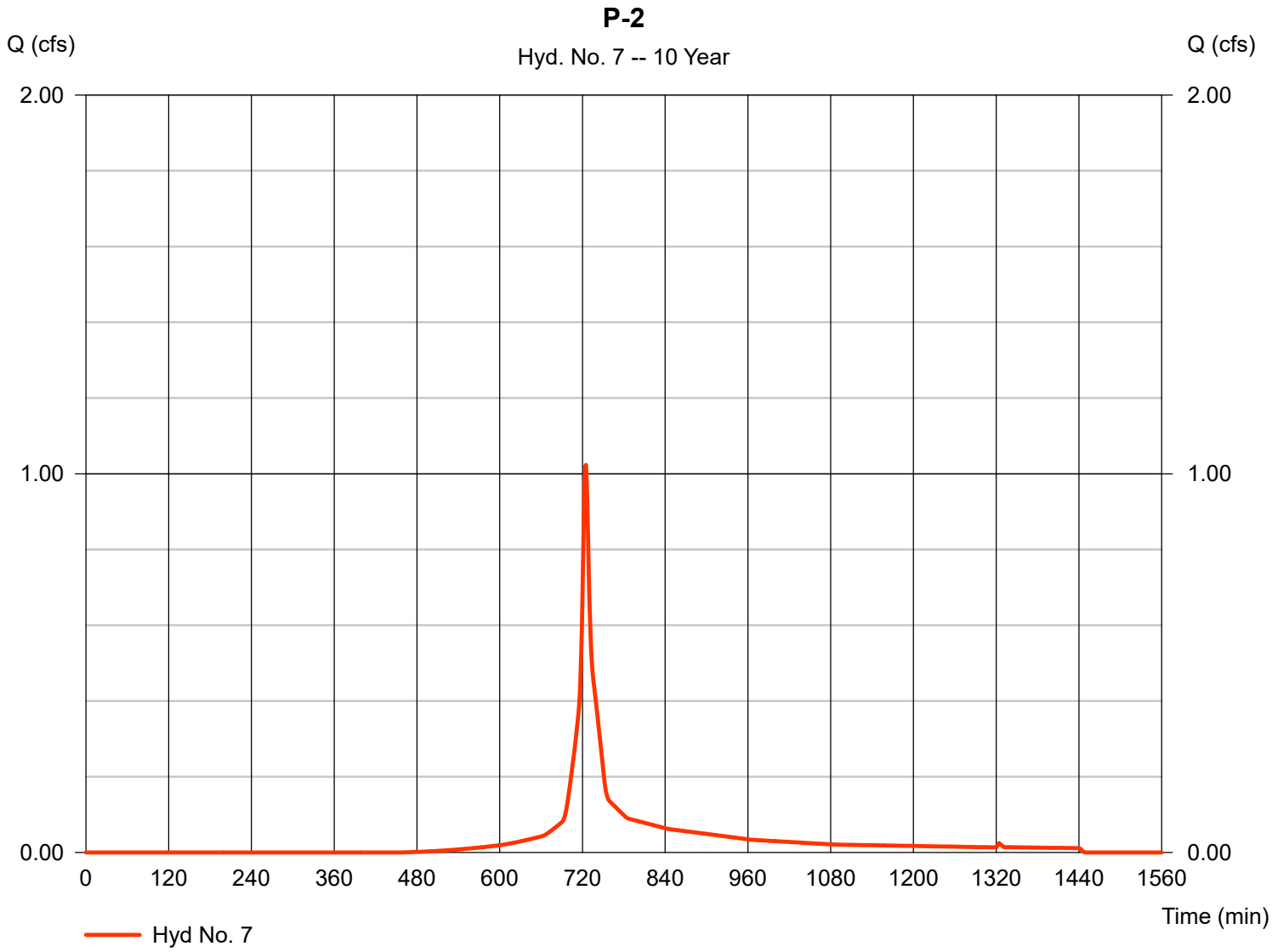
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 7

P-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.024 cfs
Storm frequency	=	10 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	3,156 cuft
Drainage area	=	0.320 ac	Curve number	=	81
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.60 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



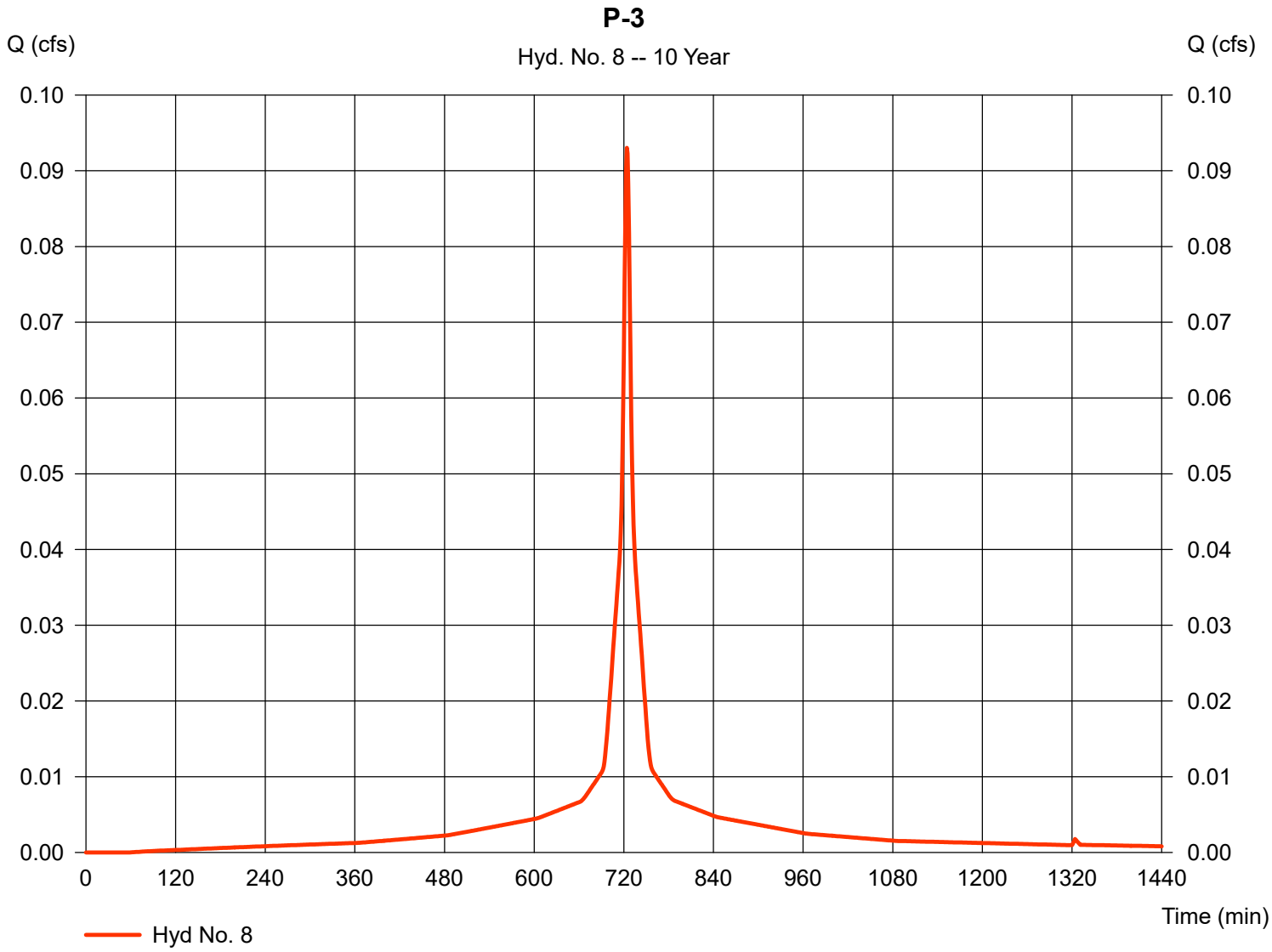
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 — Thursday, Apr 6, 2023

Hyd. No. 8

P-3

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.093 cfs
Storm frequency	=	10 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	327 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.	=	4.60 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

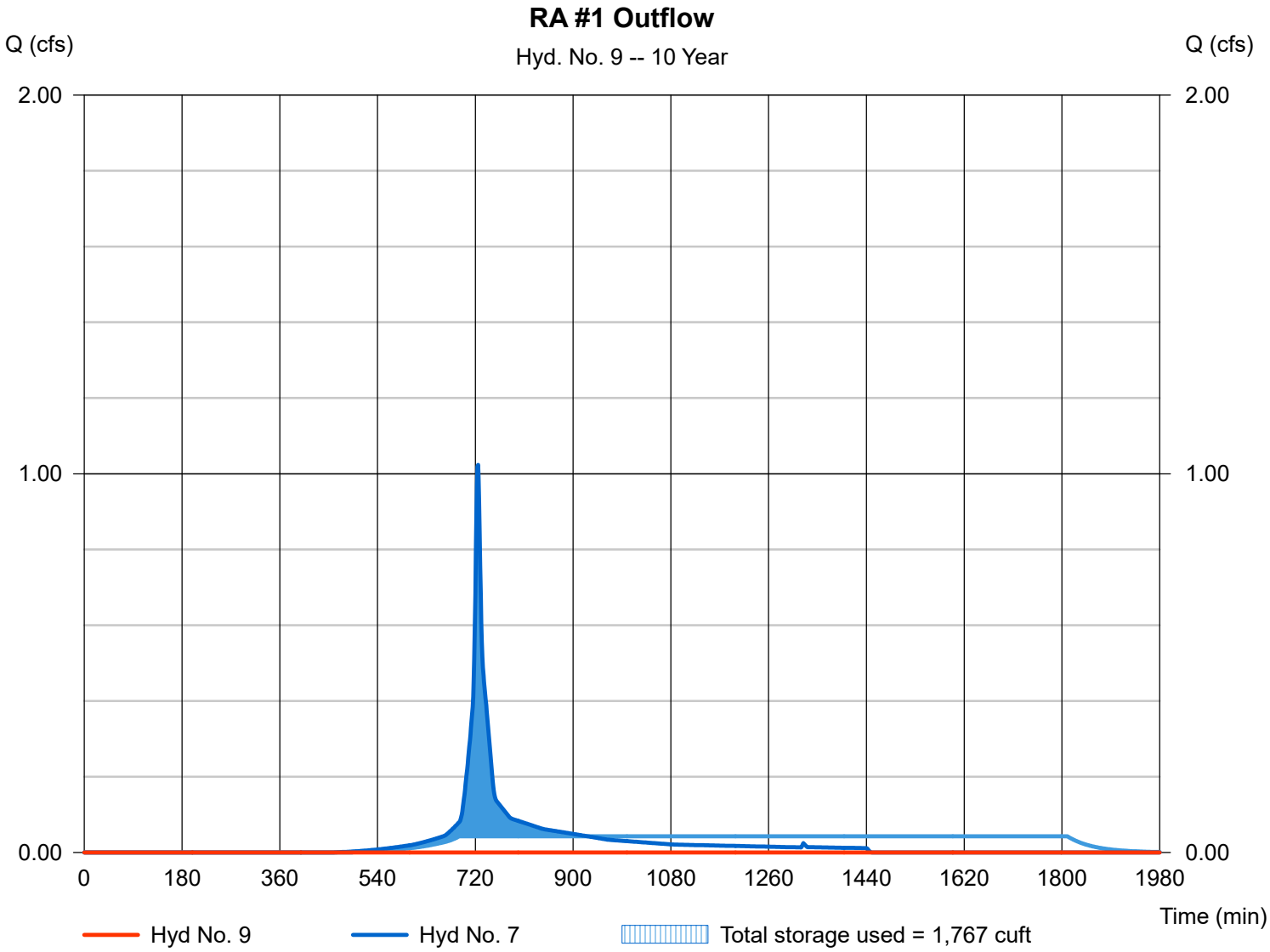
Hydraflow Hydrographs by Intelisolve v9.2 — Thursday, Apr 6, 2023

Hyd. No. 9

RA #1 Outflow

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	10 yrs	Time to peak	=	665 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	7 - P-2	Max. Elevation	=	121.86 ft
Reservoir name	=	RA #1	Max. Storage	=	1,767 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



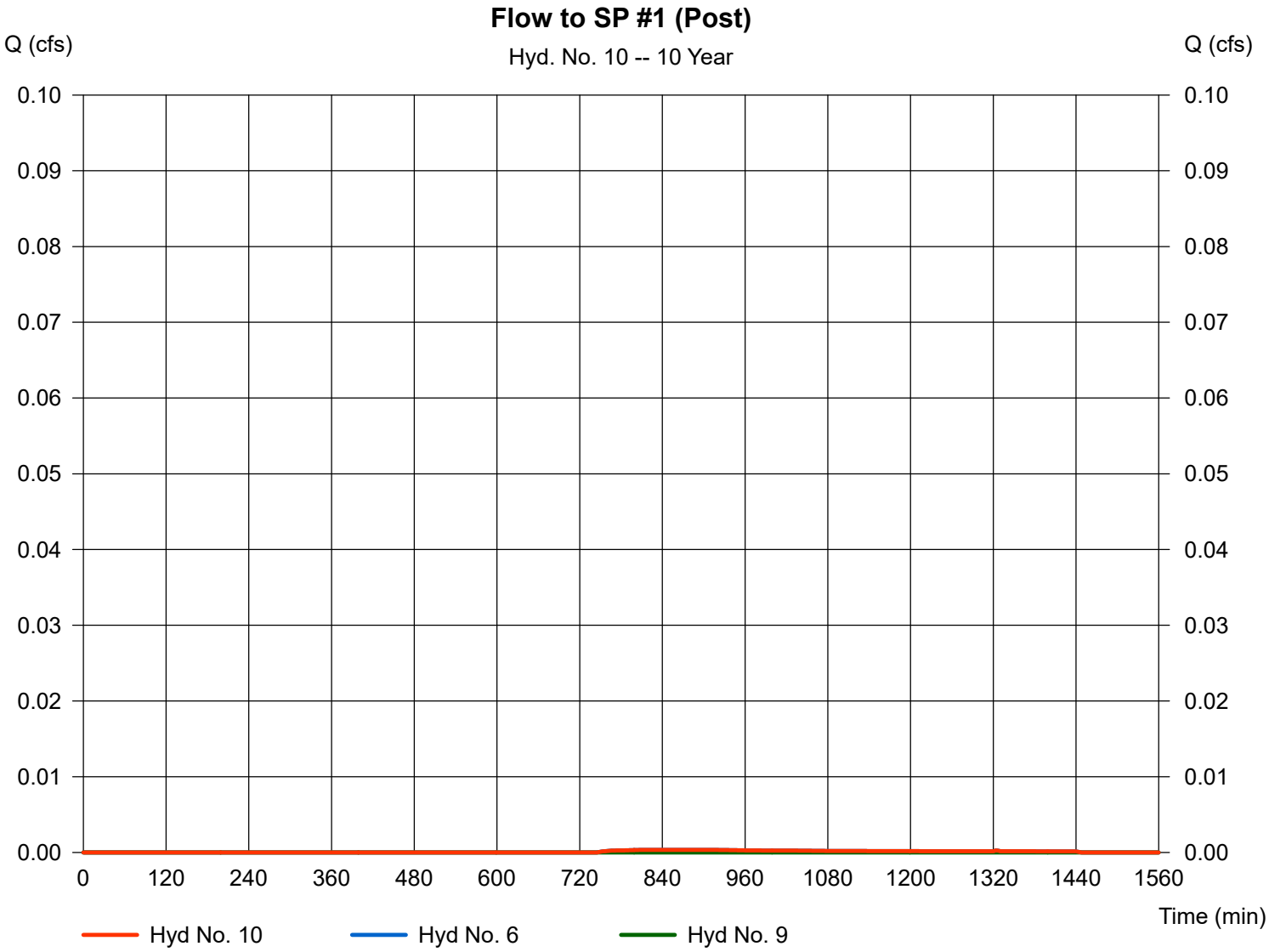
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 10

Flow to SP #1 (Post)

Hydrograph type	=	Combine	Peak discharge	=	0.000 cfs
Storm frequency	=	10 yrs	Time to peak	=	874 min
Time interval	=	1 min	Hyd. volume	=	9 cuft
Inflow hyds.	=	6, 9	Contrib. drain. area	=	0.020 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.2

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	0.003	1	741	29	----	------	------	E-1
2	SCS Runoff	1.812	1	724	6,072	----	------	------	E-2
3	SCS Runoff	0.117	1	724	414	----	------	------	E-3
4	Reservoir	1.805	1	724	5,764	2	123.78	203	Ex. DW outflow
5	Combine	1.929	1	724	6,486	2, 3,	------	------	Flow to SP #1 (Pre)
6	SCS Runoff	0.003	1	741	29	----	------	------	P-1
7	SCS Runoff	1.418	1	725	4,402	----	------	------	P-2
8	SCS Runoff	0.117	1	724	414	----	------	------	P-3
9	Reservoir	0.126	1	765	531	7	123.27	2,199	RA #1 Outflow
10	Combine	0.127	1	765	559	6, 9	------	------	Flow to SP #1 (Post)

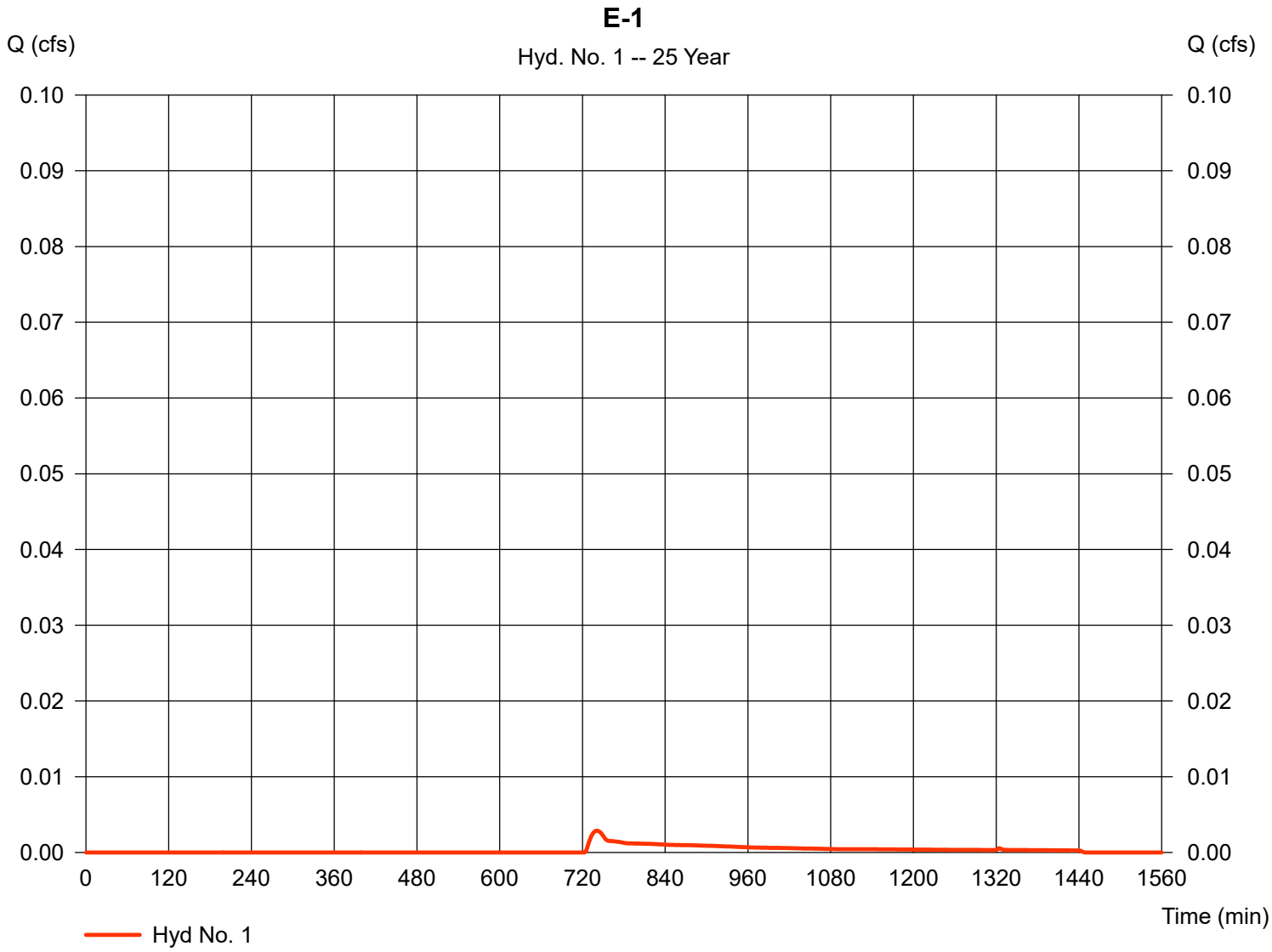
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 1

E-1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.003 cfs
Storm frequency	=	25 yrs	Time to peak	=	741 min
Time interval	=	1 min	Hyd. volume	=	29 cuft
Drainage area	=	0.020 ac	Curve number	=	39
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.77 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



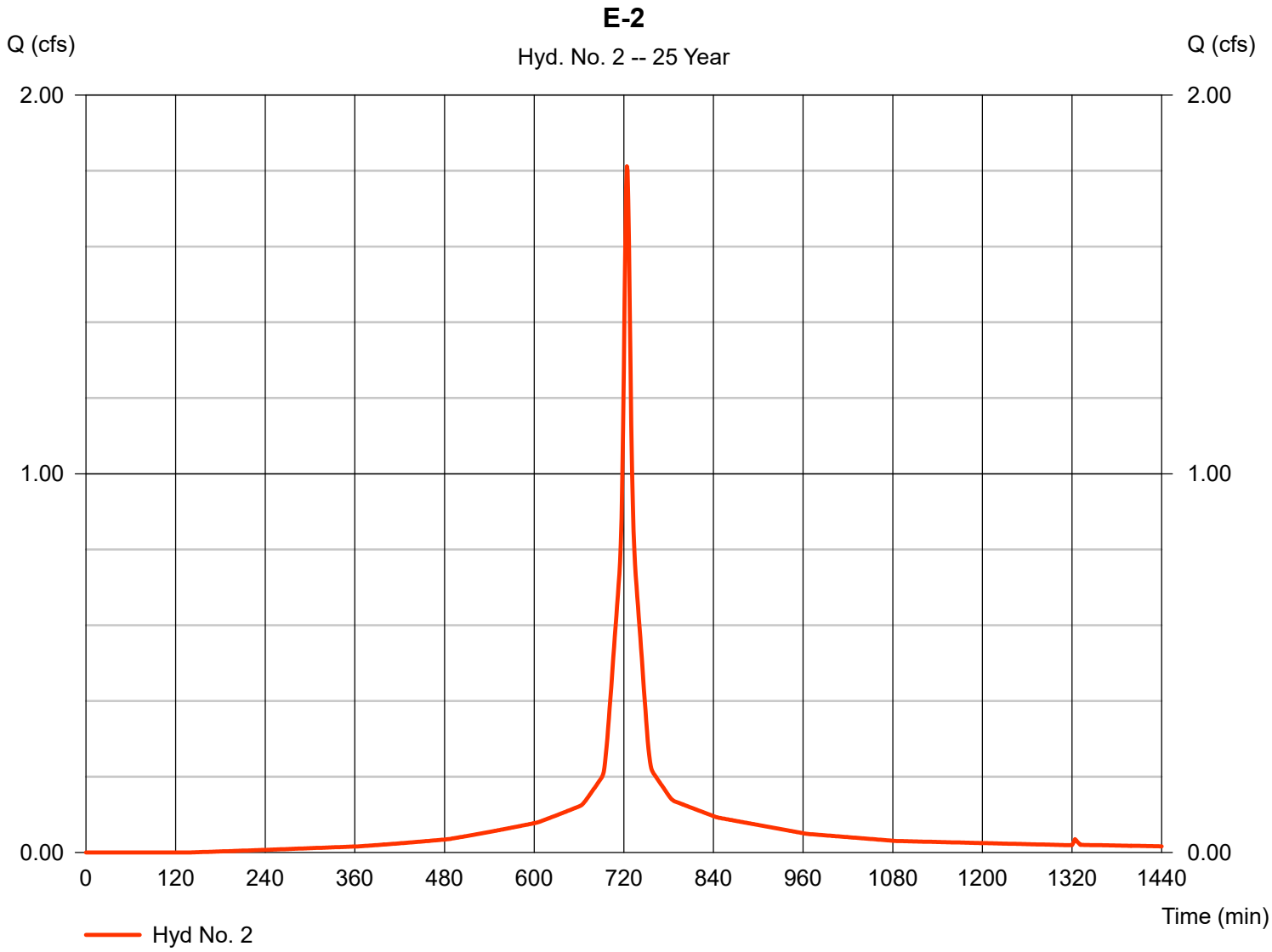
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 2

E-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.812 cfs
Storm frequency	=	25 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	6,072 cuft
Drainage area	=	0.320 ac	Curve number	=	94
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.77 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



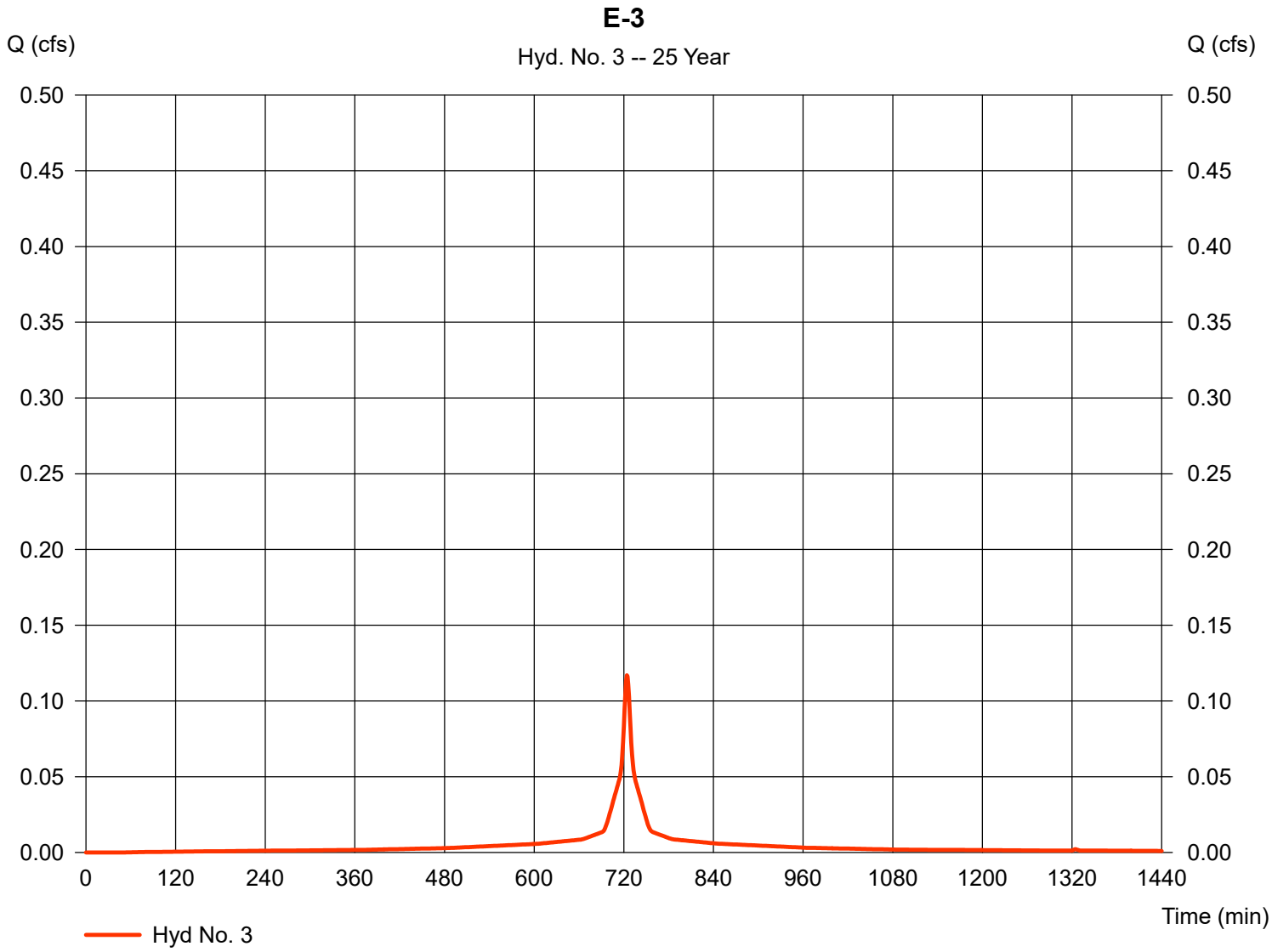
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 — Thursday, Apr 6, 2023

Hyd. No. 3

E-3

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.117 cfs
Storm frequency	=	25 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	414 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.	=	5.77 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

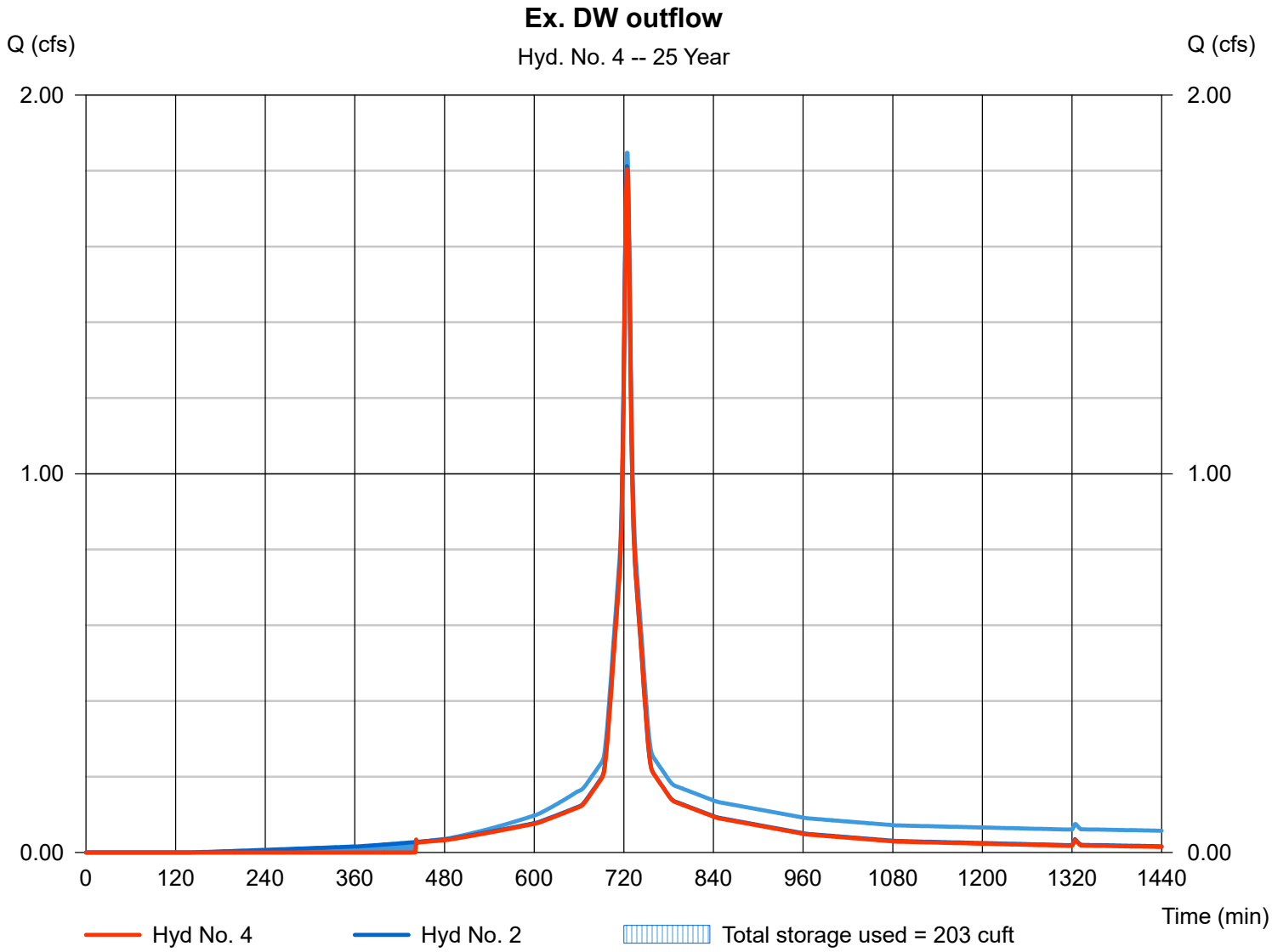
Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 4

Ex. DW outflow

Hydrograph type	=	Reservoir	Peak discharge	=	1.805 cfs
Storm frequency	=	25 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	5,764 cuft
Inflow hyd. No.	=	2 - E-2	Max. Elevation	=	123.78 ft
Reservoir name	=	Ex. Drywell	Max. Storage	=	203 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



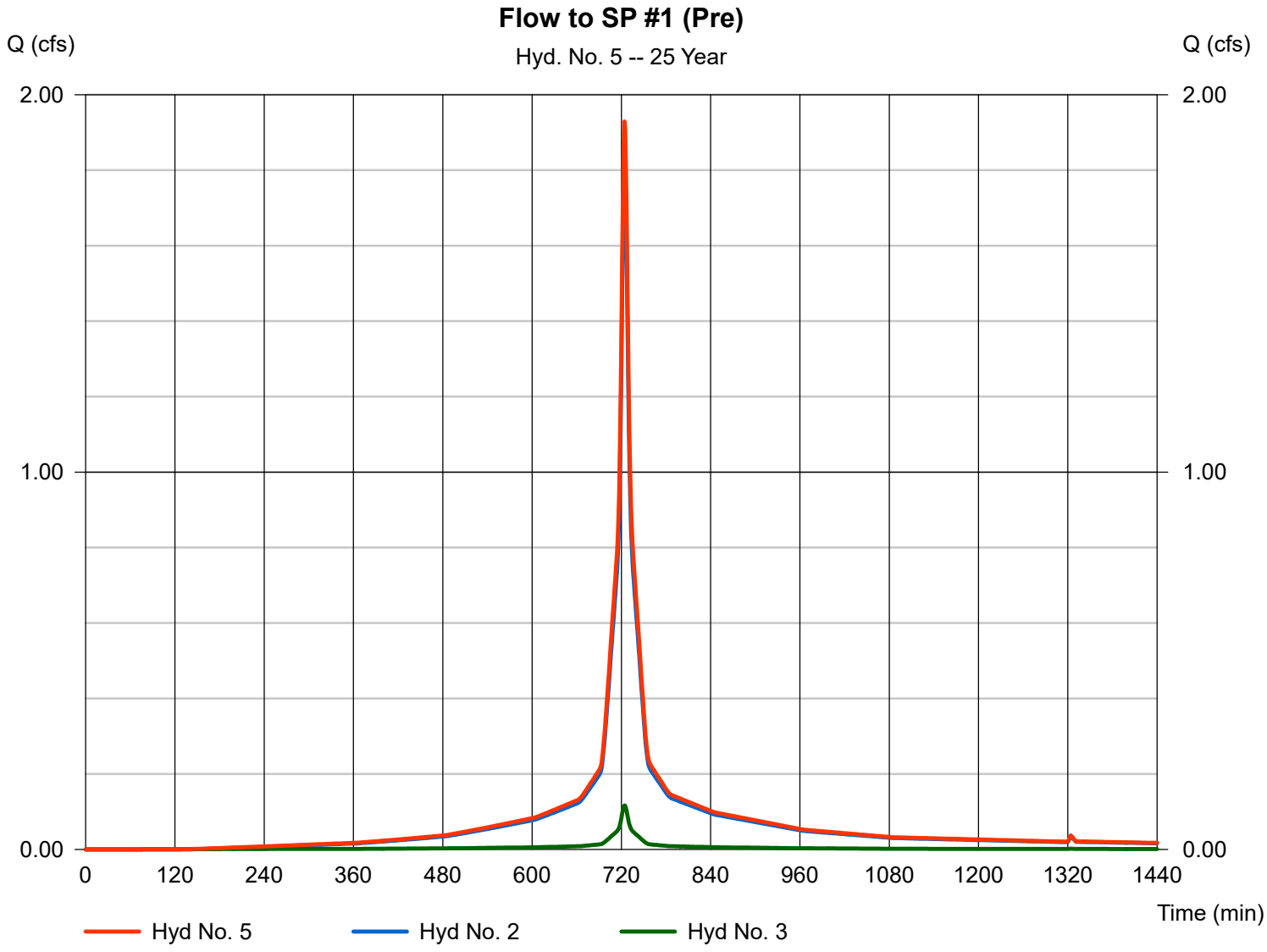
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 5

Flow to SP #1 (Pre)

Hydrograph type	=	Combine	Peak discharge	=	1.929 cfs
Storm frequency	=	25 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	6,486 cuft
Inflow hyds.	=	2, 3	Contrib. drain. area	=	0.340 ac



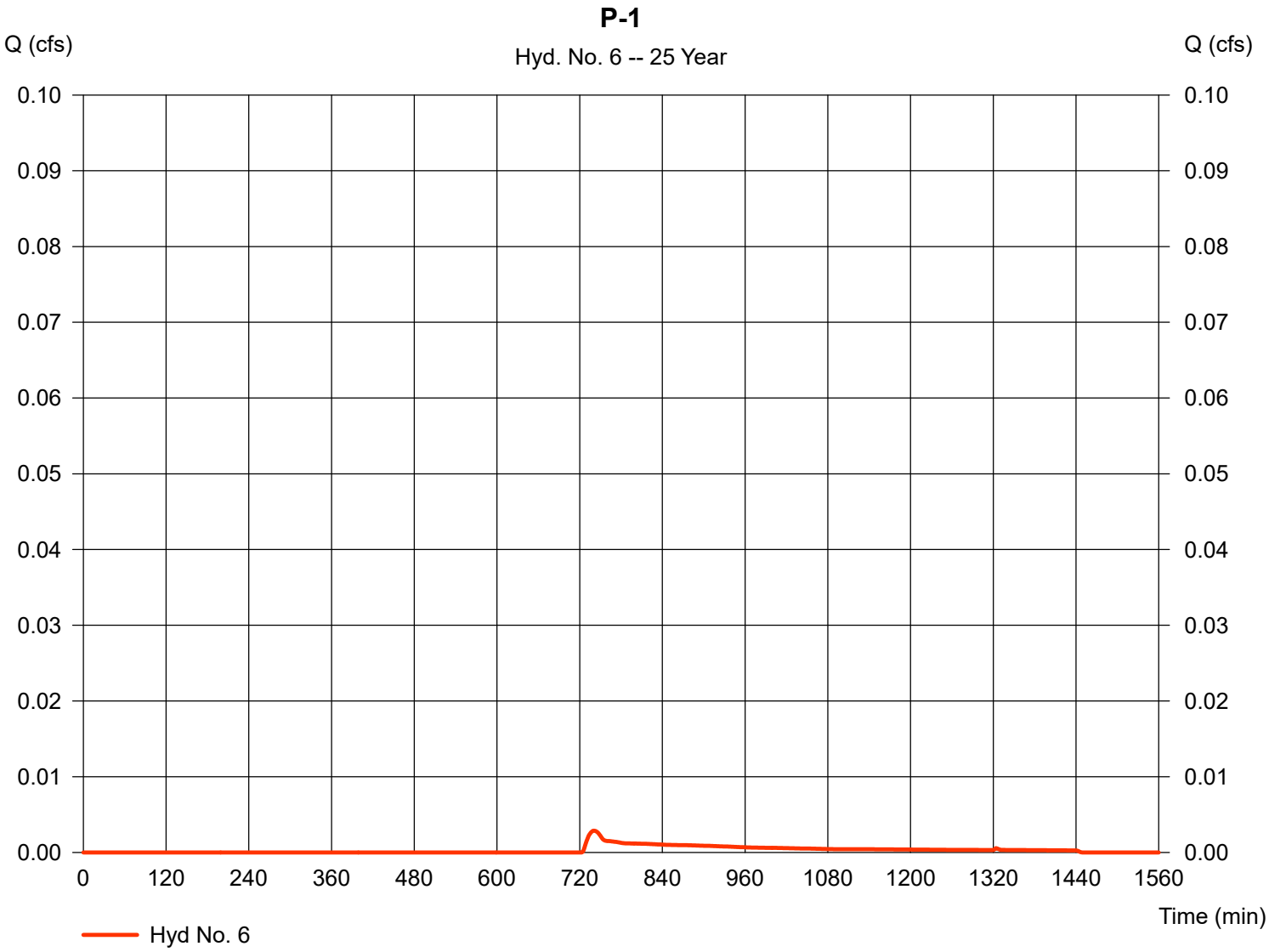
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 — Thursday, Apr 6, 2023

Hyd. No. 6

P-1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.003 cfs
Storm frequency	=	25 yrs	Time to peak	=	741 min
Time interval	=	1 min	Hyd. volume	=	29 cuft
Drainage area	=	0.020 ac	Curve number	=	39
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.77 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



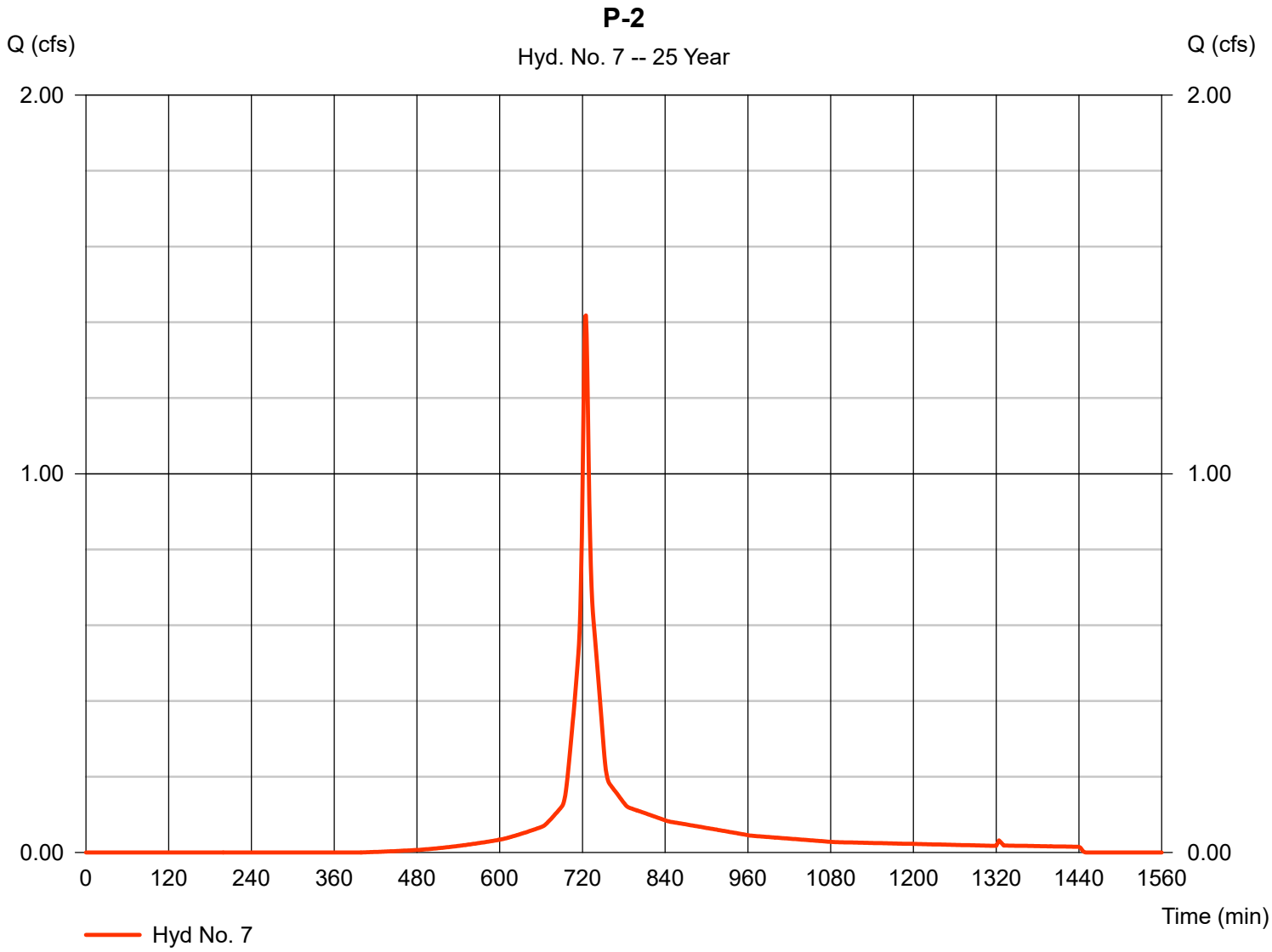
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 — Thursday, Apr 6, 2023

Hyd. No. 7

P-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.418 cfs
Storm frequency	=	25 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	4,402 cuft
Drainage area	=	0.320 ac	Curve number	=	81
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.77 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



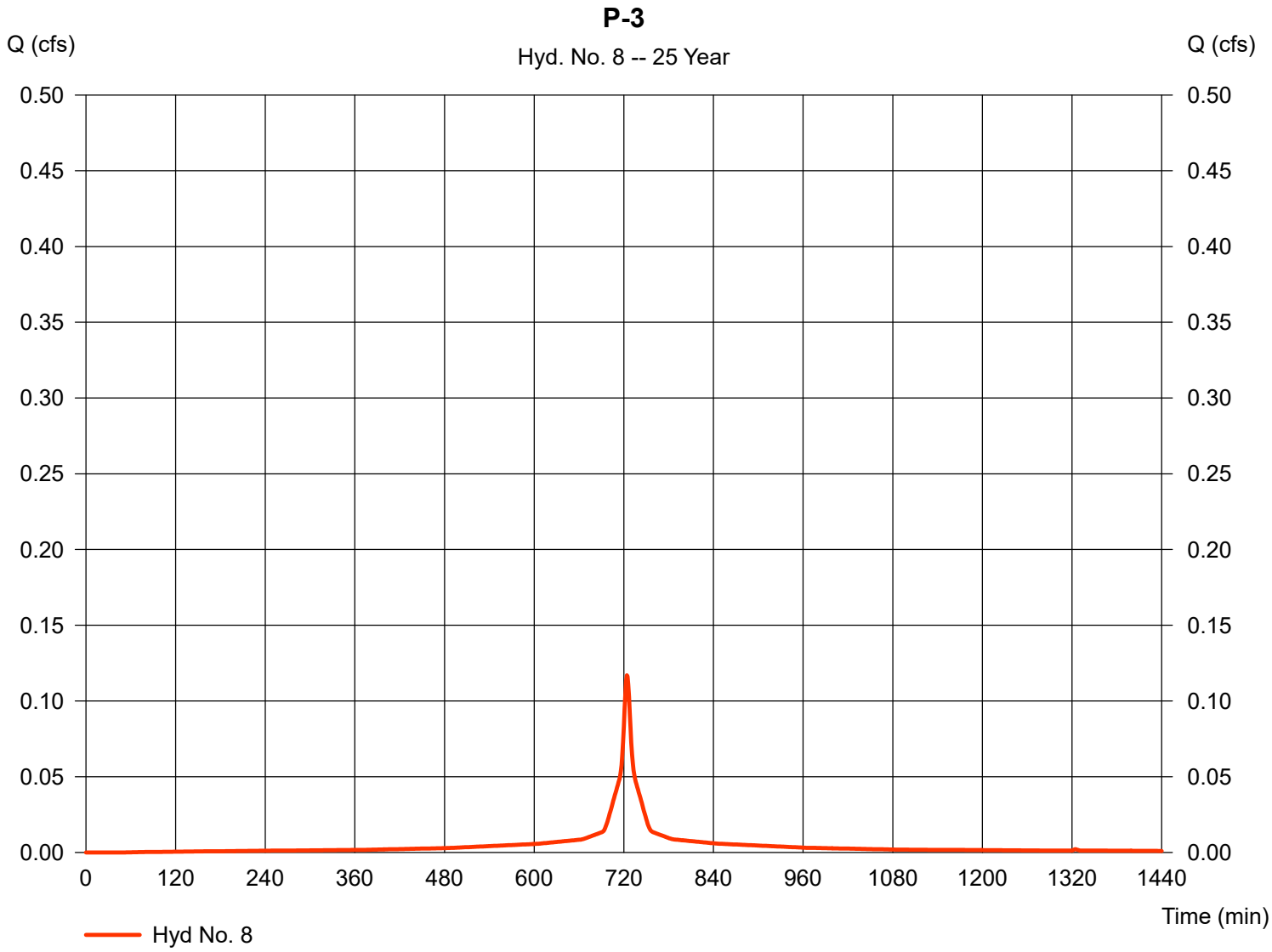
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 8

P-3

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.117 cfs
Storm frequency	=	25 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	414 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.	=	5.77 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

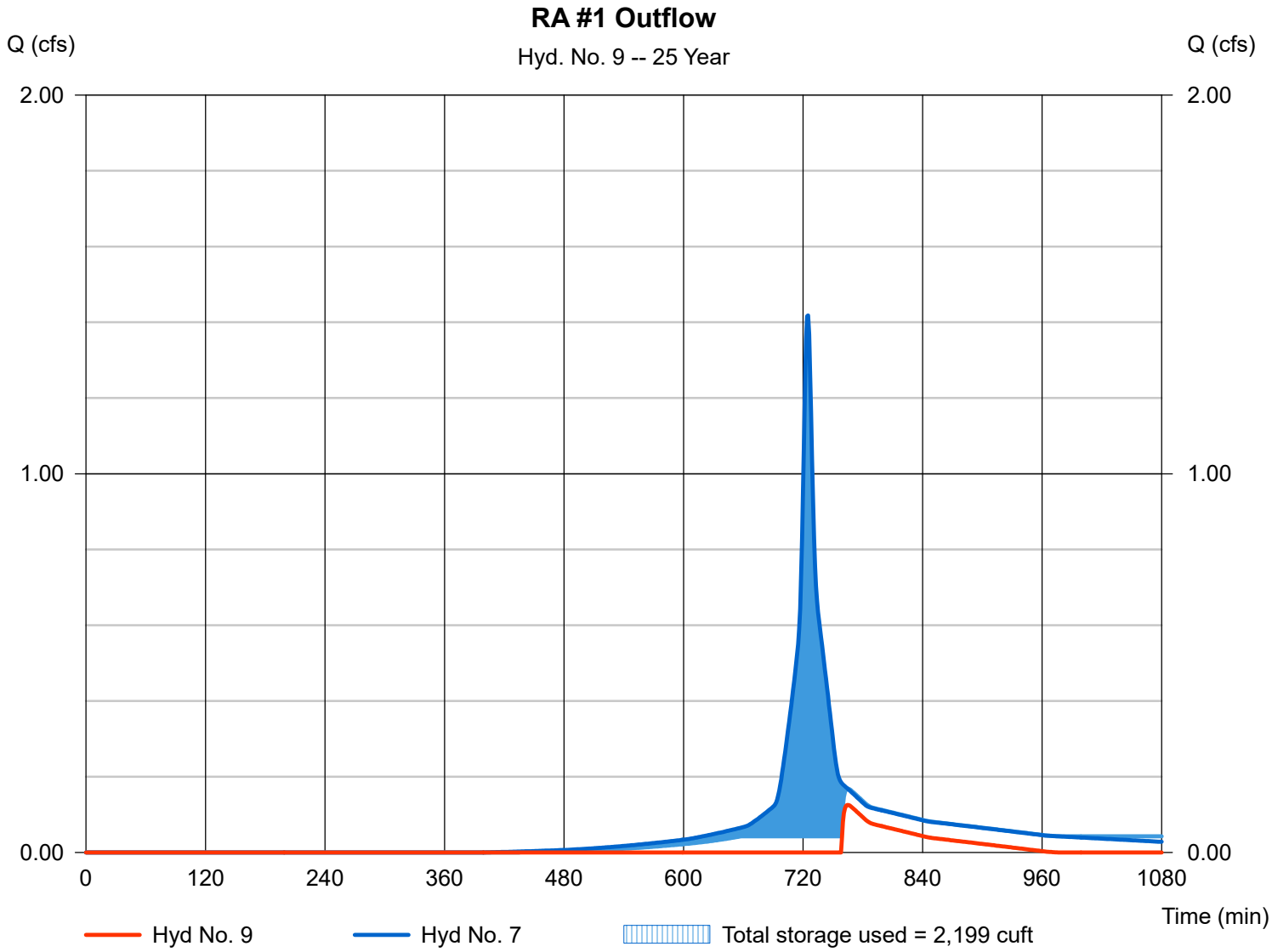
Hydraflow Hydrographs by Intelisolve v9.2 — Thursday, Apr 6, 2023

Hyd. No. 9

RA #1 Outflow

Hydrograph type	=	Reservoir	Peak discharge	=	0.126 cfs
Storm frequency	=	25 yrs	Time to peak	=	765 min
Time interval	=	1 min	Hyd. volume	=	531 cuft
Inflow hyd. No.	=	7 - P-2	Max. Elevation	=	123.27 ft
Reservoir name	=	RA #1	Max. Storage	=	2,199 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



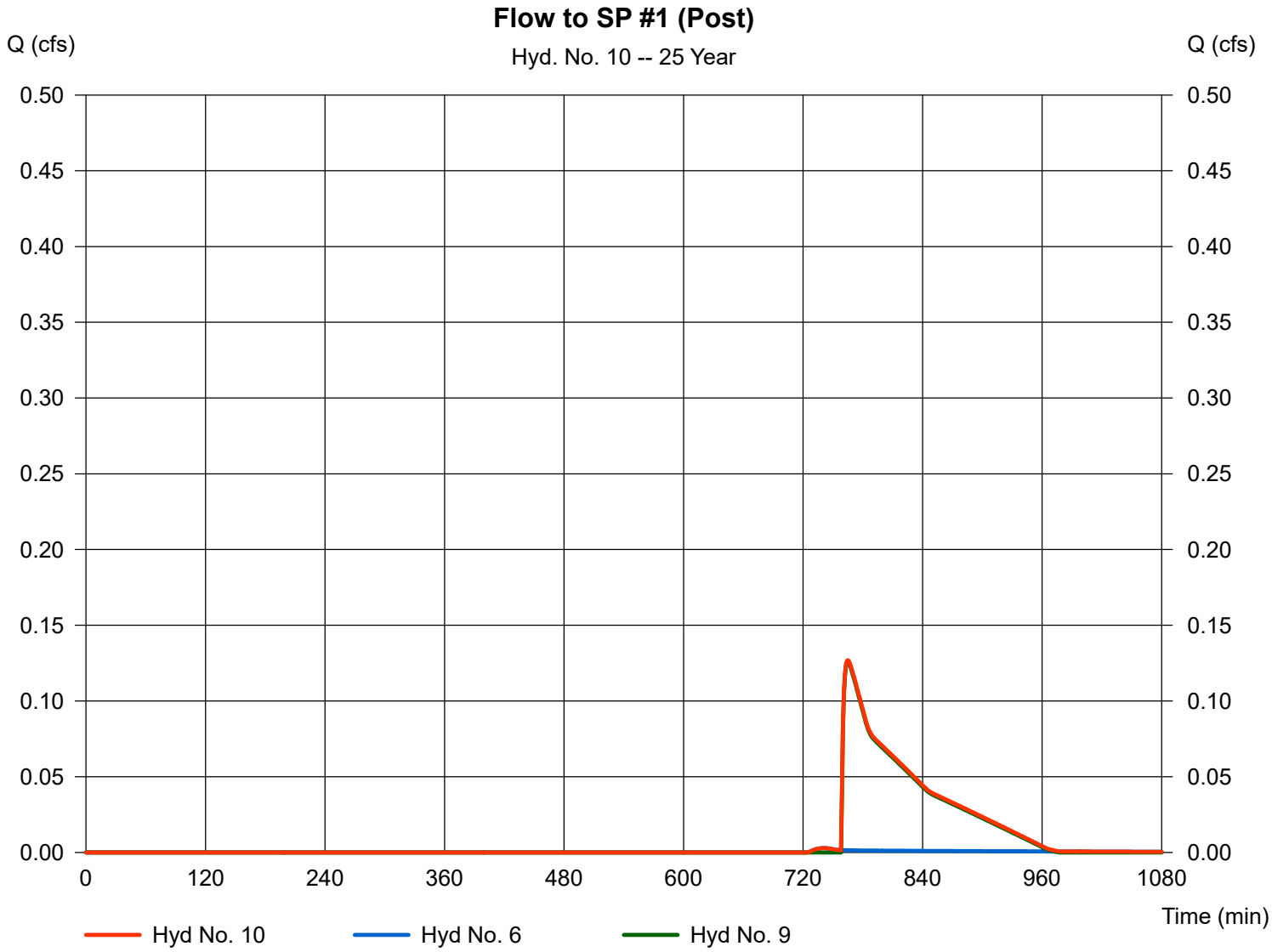
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 10

Flow to SP #1 (Post)

Hydrograph type	=	Combine	Peak discharge	=	0.127 cfs
Storm frequency	=	25 yrs	Time to peak	=	765 min
Time interval	=	1 min	Hyd. volume	=	559 cuft
Inflow hyds.	=	6, 9	Contrib. drain. area	=	0.020 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.2

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	0.006	1	730	47	----	------	------	E-1
2	SCS Runoff	2.089	1	724	7,057	----	------	------	E-2
3	SCS Runoff	0.134	1	724	476	----	------	------	E-3
4	Reservoir	2.081	1	724	6,748	2	123.79	206	Ex. DW outflow
5	Combine	2.223	1	724	7,533	2, 3,	------	------	Flow to SP #1 (Pre)
6	SCS Runoff	0.006	1	730	47	----	------	------	P-1
7	SCS Runoff	1.701	1	725	5,312	----	------	------	P-2
8	SCS Runoff	0.134	1	724	476	----	------	------	P-3
9	Reservoir	0.829	1	738	1,260	7	123.35	2,222	RA #1 Outflow
10	Combine	0.835	1	738	1,307	6, 9	------	------	Flow to SP #1 (Post)

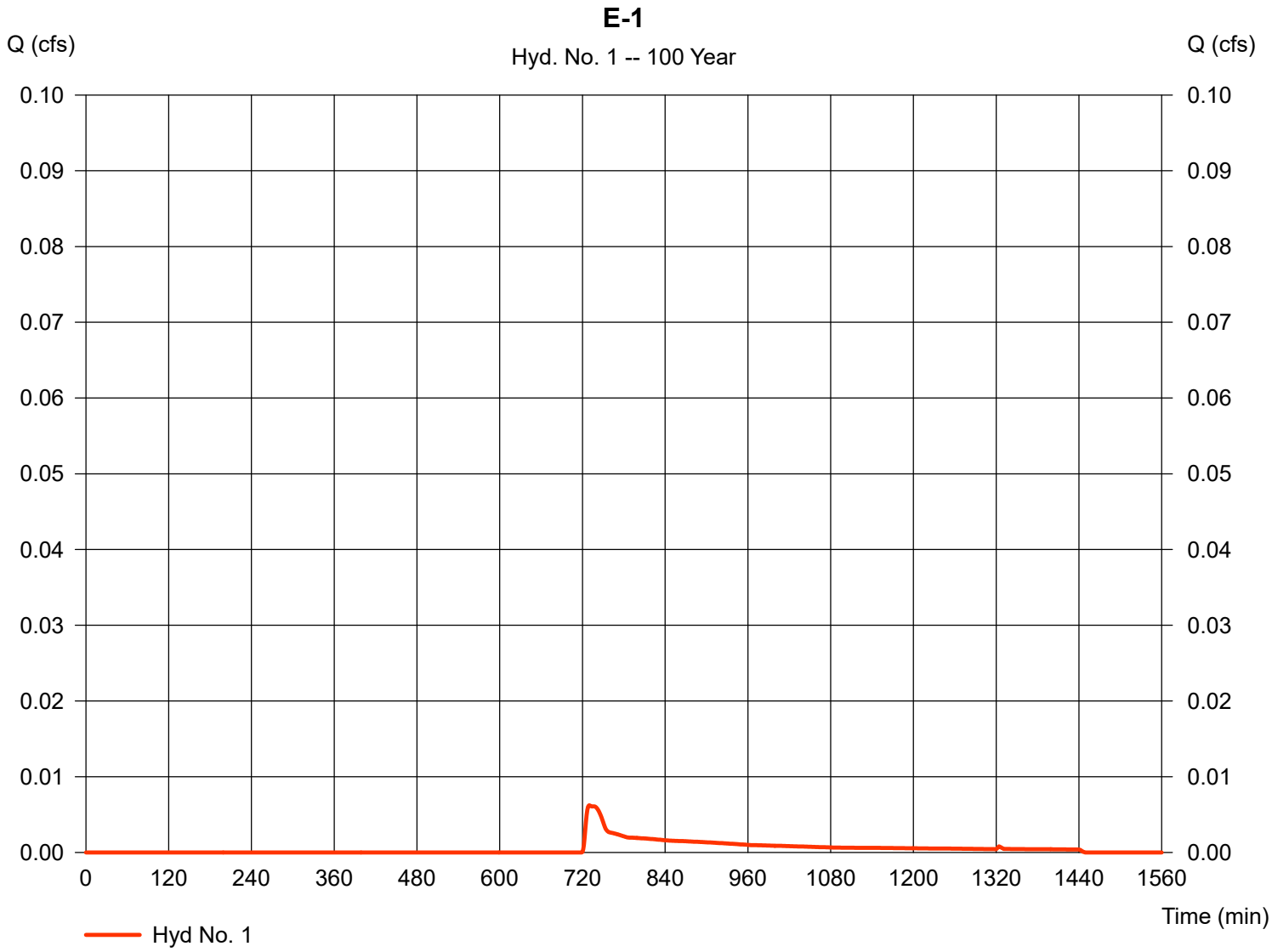
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 1

E-1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.006 cfs
Storm frequency	=	100 yrs	Time to peak	=	730 min
Time interval	=	1 min	Hyd. volume	=	47 cuft
Drainage area	=	0.020 ac	Curve number	=	39
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.60 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

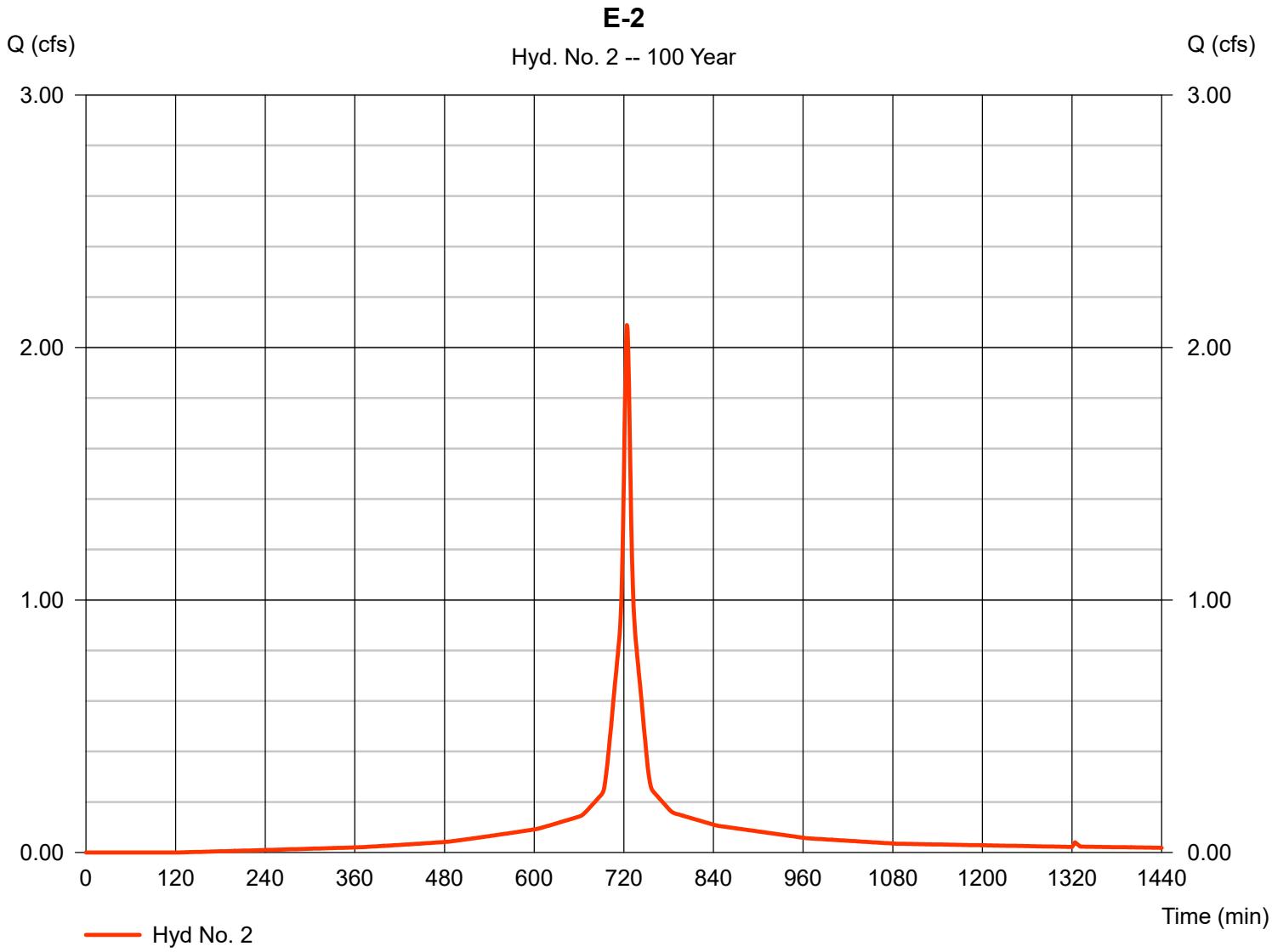


Hydrograph Report

Hyd. No. 2

E-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.089 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	7,057 cuft
Drainage area	=	0.320 ac	Curve number	=	94
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.60 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



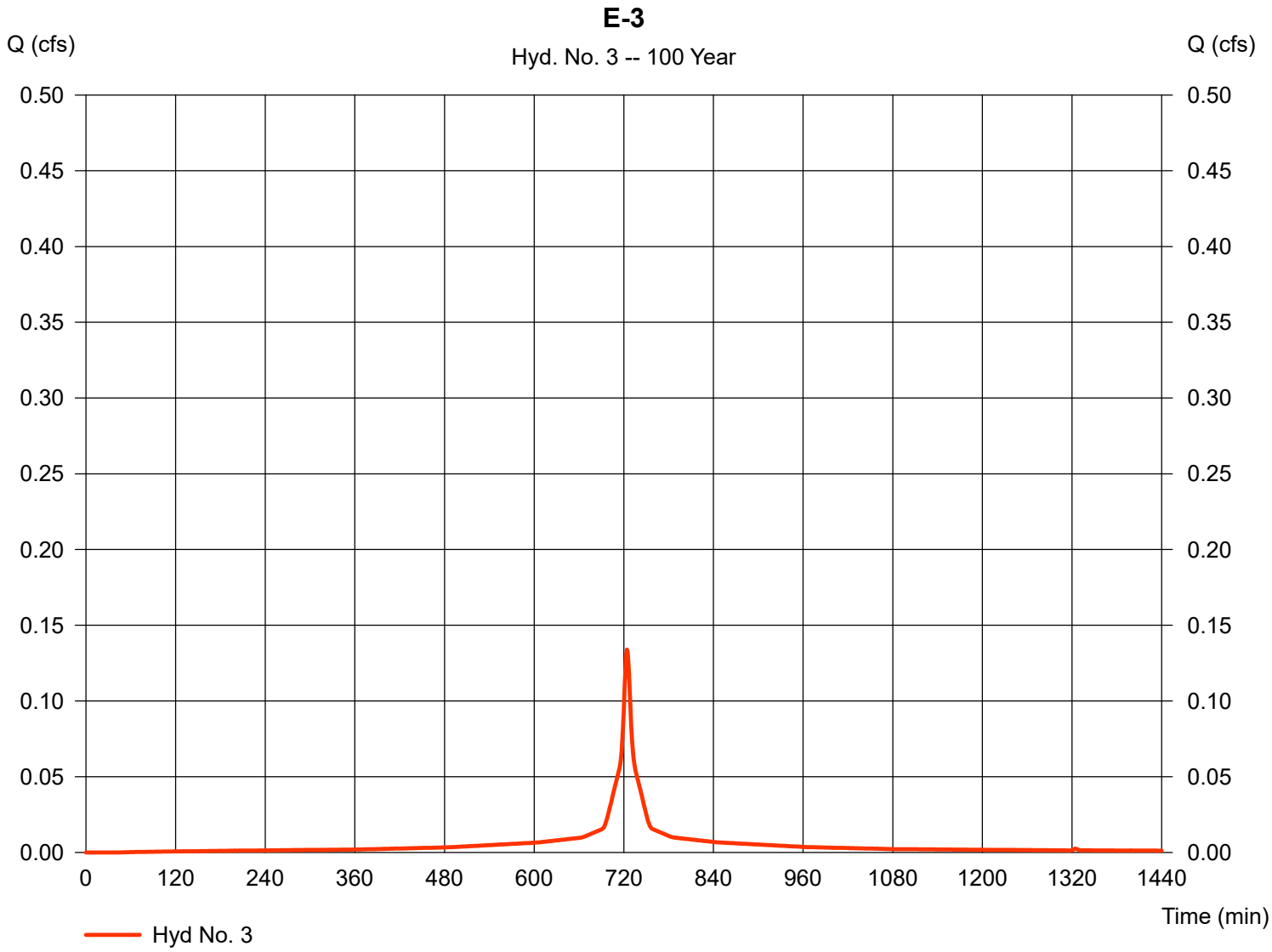
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 3

E-3

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.134 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	476 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.	=	6.60 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

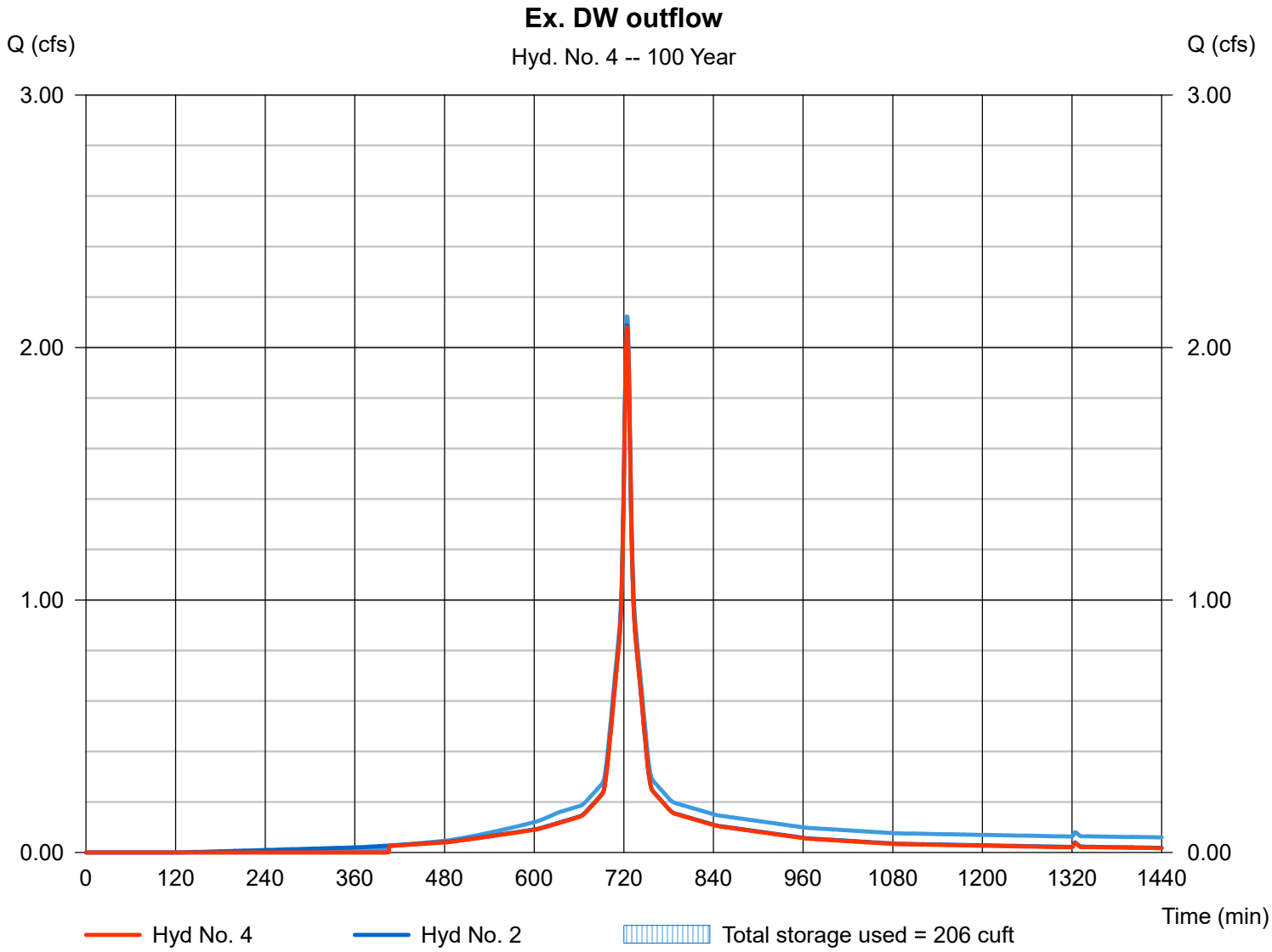
Hydraflow Hydrographs by Intelisolve v9.2 — Thursday, Apr 6, 2023

Hyd. No. 4

Ex. DW outflow

Hydrograph type	=	Reservoir	Peak discharge	=	2.081 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	6,748 cuft
Inflow hyd. No.	=	2 - E-2	Max. Elevation	=	123.79 ft
Reservoir name	=	Ex. Drywell	Max. Storage	=	206 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



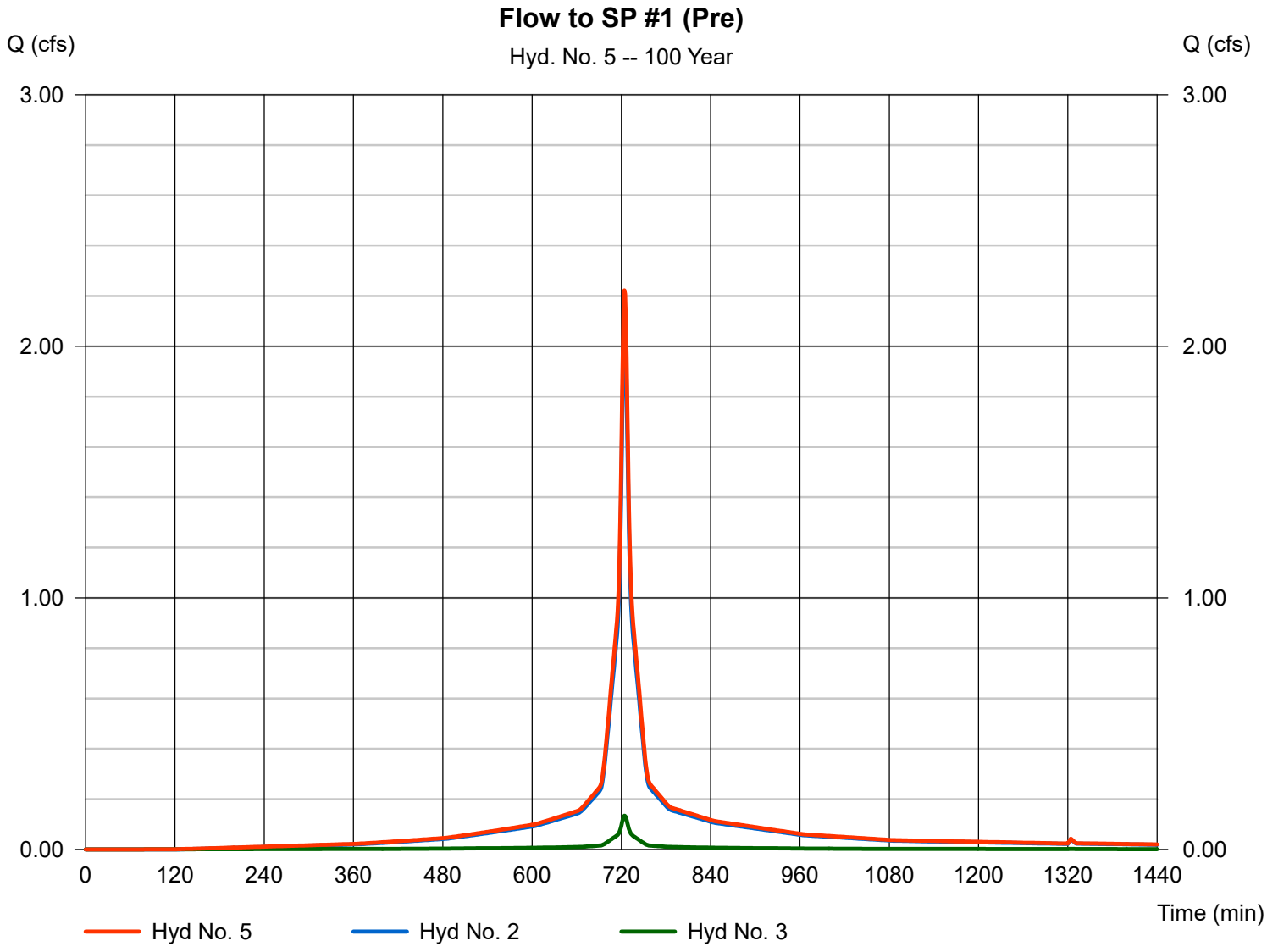
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 5

Flow to SP #1 (Pre)

Hydrograph type	= Combine	Peak discharge	= 2.223 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 7,533 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 0.340 ac



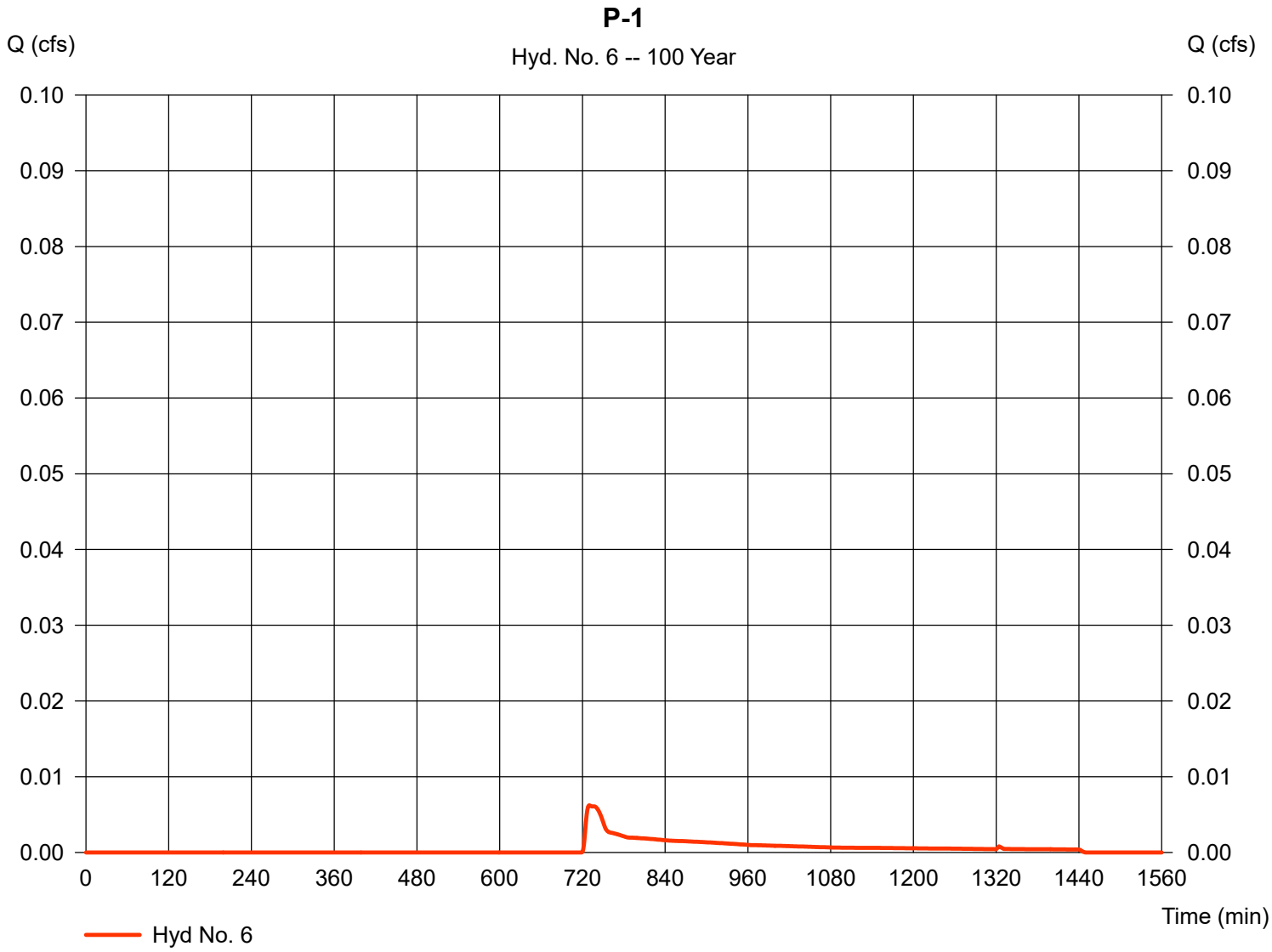
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 6

P-1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.006 cfs
Storm frequency	=	100 yrs	Time to peak	=	730 min
Time interval	=	1 min	Hyd. volume	=	47 cuft
Drainage area	=	0.020 ac	Curve number	=	39
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.60 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



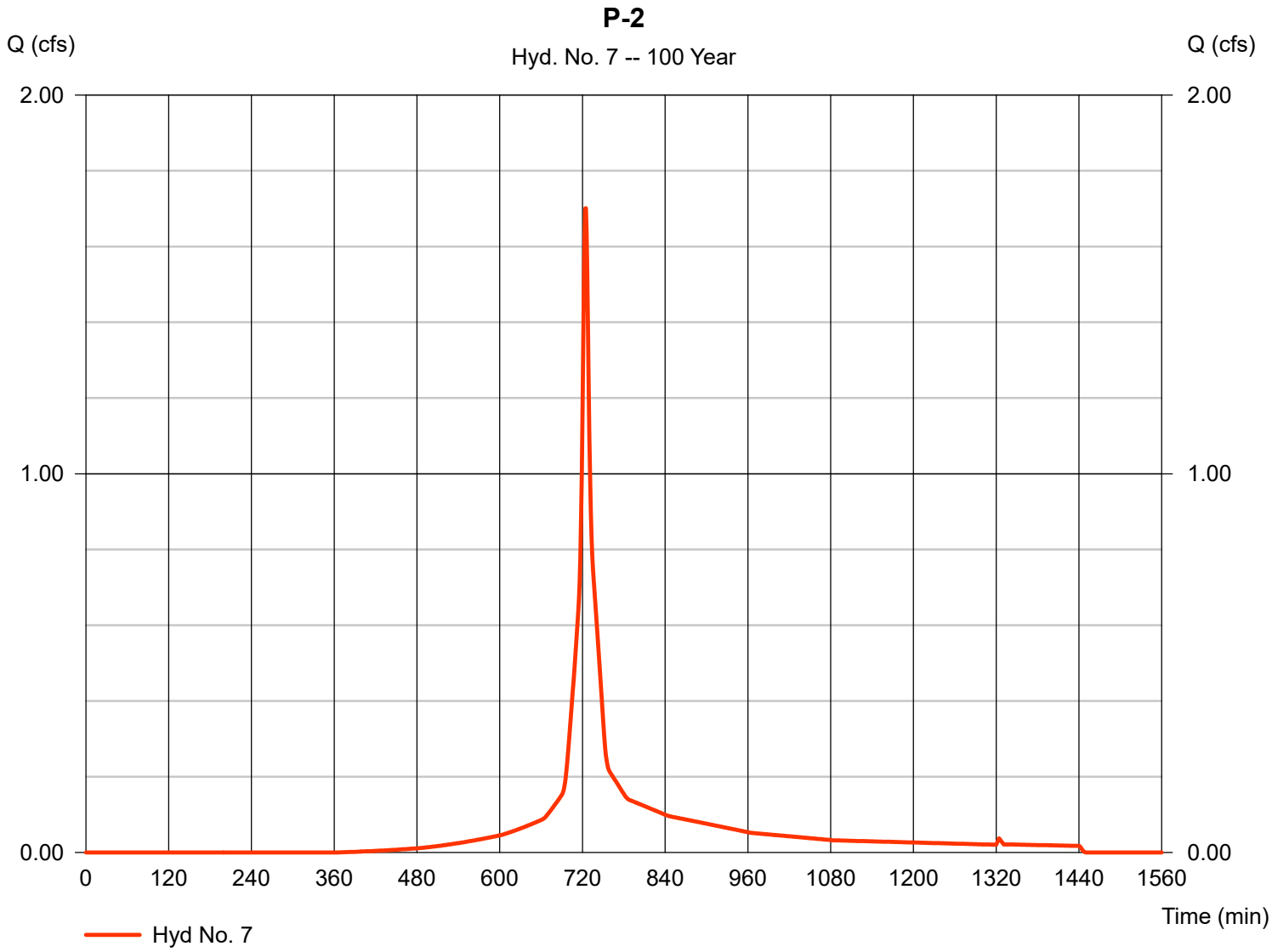
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 7

P-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.701 cfs
Storm frequency	=	100 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	5,312 cuft
Drainage area	=	0.320 ac	Curve number	=	81
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.60 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



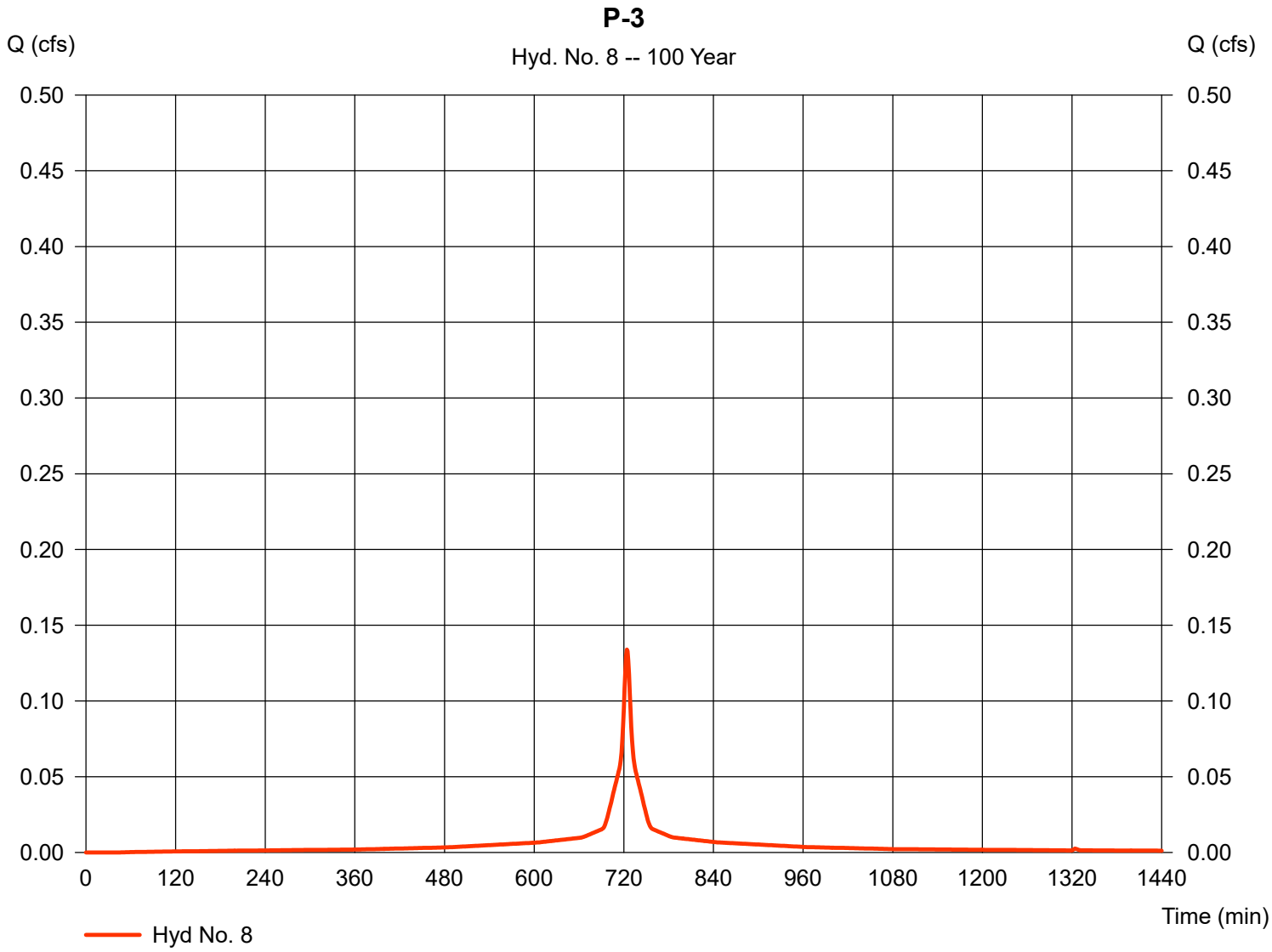
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 8

P-3

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.134 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	476 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.	=	6.60 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

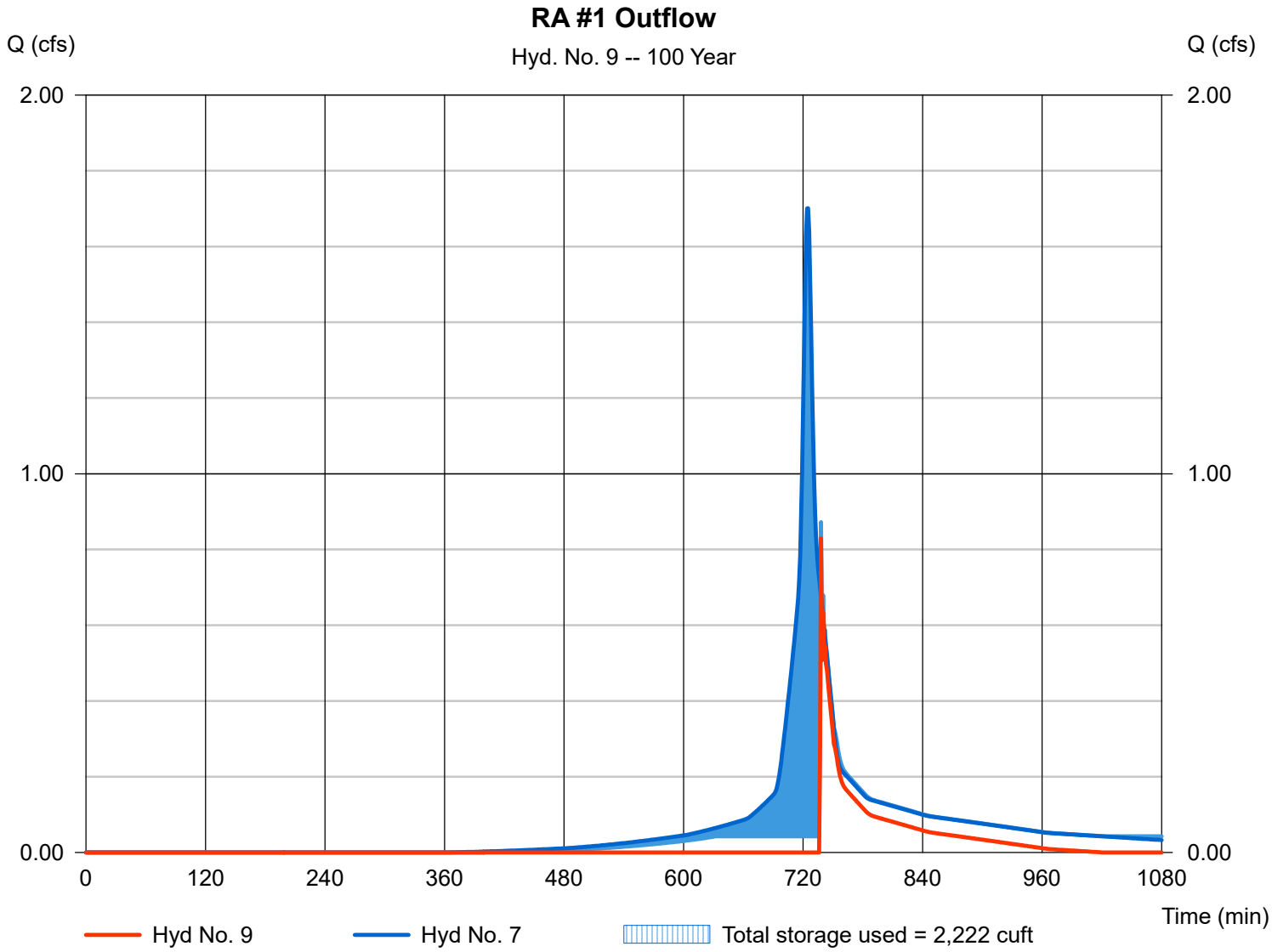
Hydraflow Hydrographs by Intelisolve v9.2 — Thursday, Apr 6, 2023

Hyd. No. 9

RA #1 Outflow

Hydrograph type	=	Reservoir	Peak discharge	=	0.829 cfs
Storm frequency	=	100 yrs	Time to peak	=	738 min
Time interval	=	1 min	Hyd. volume	=	1,260 cuft
Inflow hyd. No.	=	7 - P-2	Max. Elevation	=	123.35 ft
Reservoir name	=	RA #1	Max. Storage	=	2,222 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



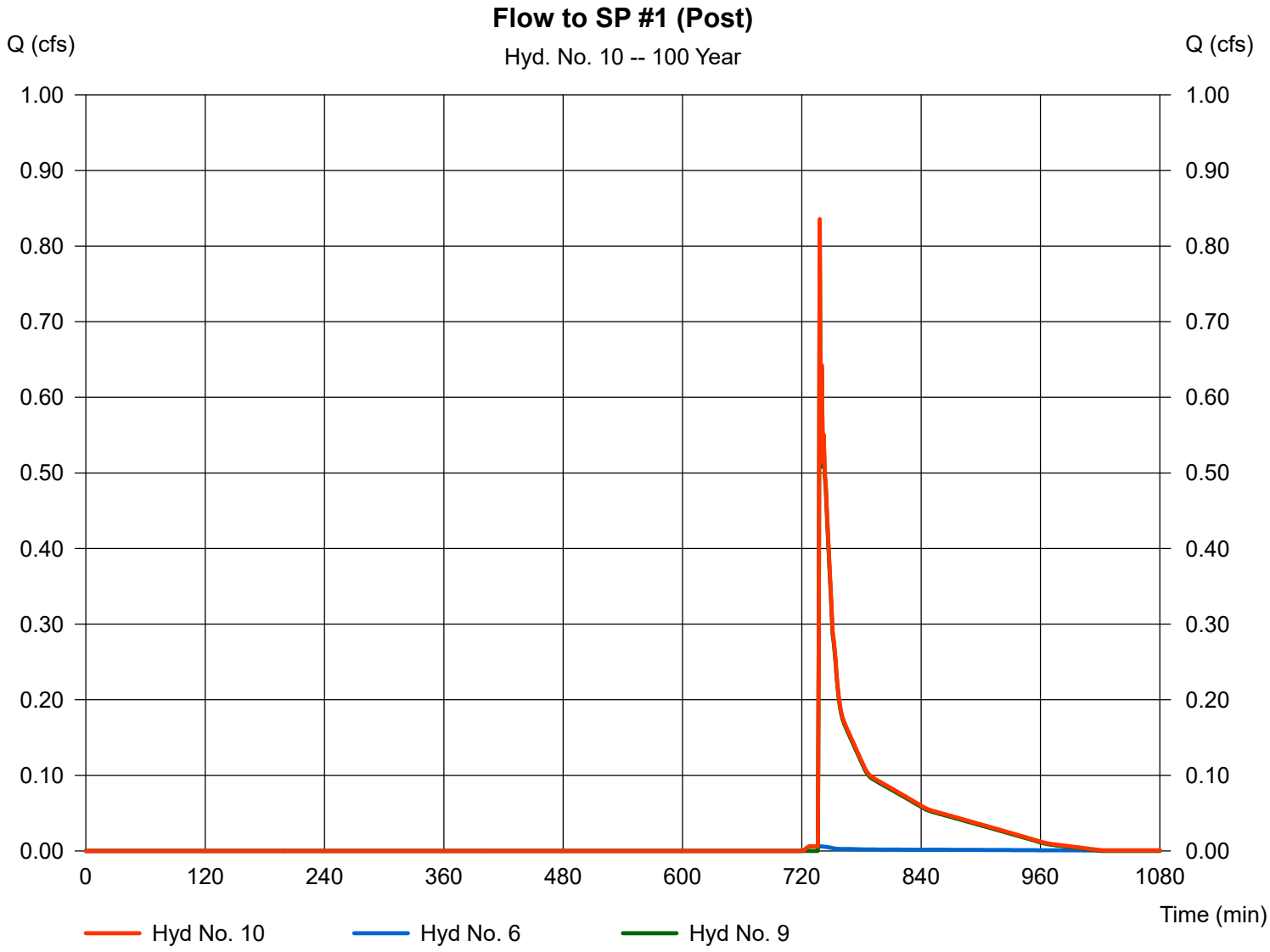
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.2 Thursday, Apr 6, 2023

Hyd. No. 10

Flow to SP #1 (Post)

Hydrograph type	=	Combine	Peak discharge	=	0.835 cfs
Storm frequency	=	100 yrs	Time to peak	=	738 min
Time interval	=	1 min	Hyd. volume	=	1,307 cuft
Inflow hyds.	=	6, 9	Contrib. drain. area	=	0.020 ac



APPENDIX 2

Standard 3 (Recharge)

Marchionda & Associates, LP
62 Montvale Ave, Suite I
Stoneham, MA 02180
781-438-6121 Fax 781-438-9654

JOB 1014-01 - 190 WASHINGTON ST.
SHEET NO. 1 OF 1
CALCULATED BY JB DATE 4/12/23
CHECKED BY DATE
SCALE

STANDARD #3

LOSS OF ANNUAL RECHARGE CALCULATION

PROPOSED IMPERVIOUS COVER = 10,600 SF
HYDROLOGIC SOIL GROUP = "A"
TARGET DEPTH = 0.60" (MA D.E.P.)

$$10{,}600_{SF} \times 0.60''/12 = 530_{FT^3}$$

VOLUME PROVIDED = $1{,}963_{FT^3}$ (RECHARGE SYSTEM)

$1{,}963_{FT^3} > 530_{FT^3}$ ∴ STANDARD ✓ MET

DRAWN DOWN CALCULATION

RECHARGE SYSTEM
SOIL INFILTRATION RATE = 2.41 IN/HR (RAWL'S TABLE: LOAMY SAND)

$$\text{TIME} = \frac{1{,}963\ FT^3}{(2.41\ IN/HR)(1\ FT/12")(22.3' \times 88')}$$

$= 11.5_{HRS} < 72_{HRS}$ ∴ OK ✓

Pond Report

Hydraflow Hydrographs by Intelisolve v9.2 — Thursday, Apr 6, 2023

Pond No. 2 - RA #1

Pond Data

UG Chambers - Invert elev. = 119.00 ft, Rise x Span = 2.50 x 4.33 ft, Barrel Len = 36.00 ft, No. Barrels = 4, Slope = 0.00%, Headers = No
Encasement - Invert elev. = 118.50 ft, Width = 5.33 ft, Height = 4.00 ft, Voids = 40.00%
Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 122.60 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	118.50	n/a	0	0
0.40	118.90	n/a	123	123
0.80	119.30	n/a	235	358
1.20	119.70	n/a	269	627
1.60	120.10	n/a	262	889
2.00	120.50	n/a	250	1,140
2.40	120.90	n/a	232	1,372
2.80	121.30	n/a	203	1,575
3.20	121.70	n/a	143	1,717
3.60	122.10	n/a	123	1,840
4.00	122.50	n/a	123	1,963
4.10	122.60	50	2	1,965
5.00	123.50	800	315	2,280

Culvert / Orifice Structures

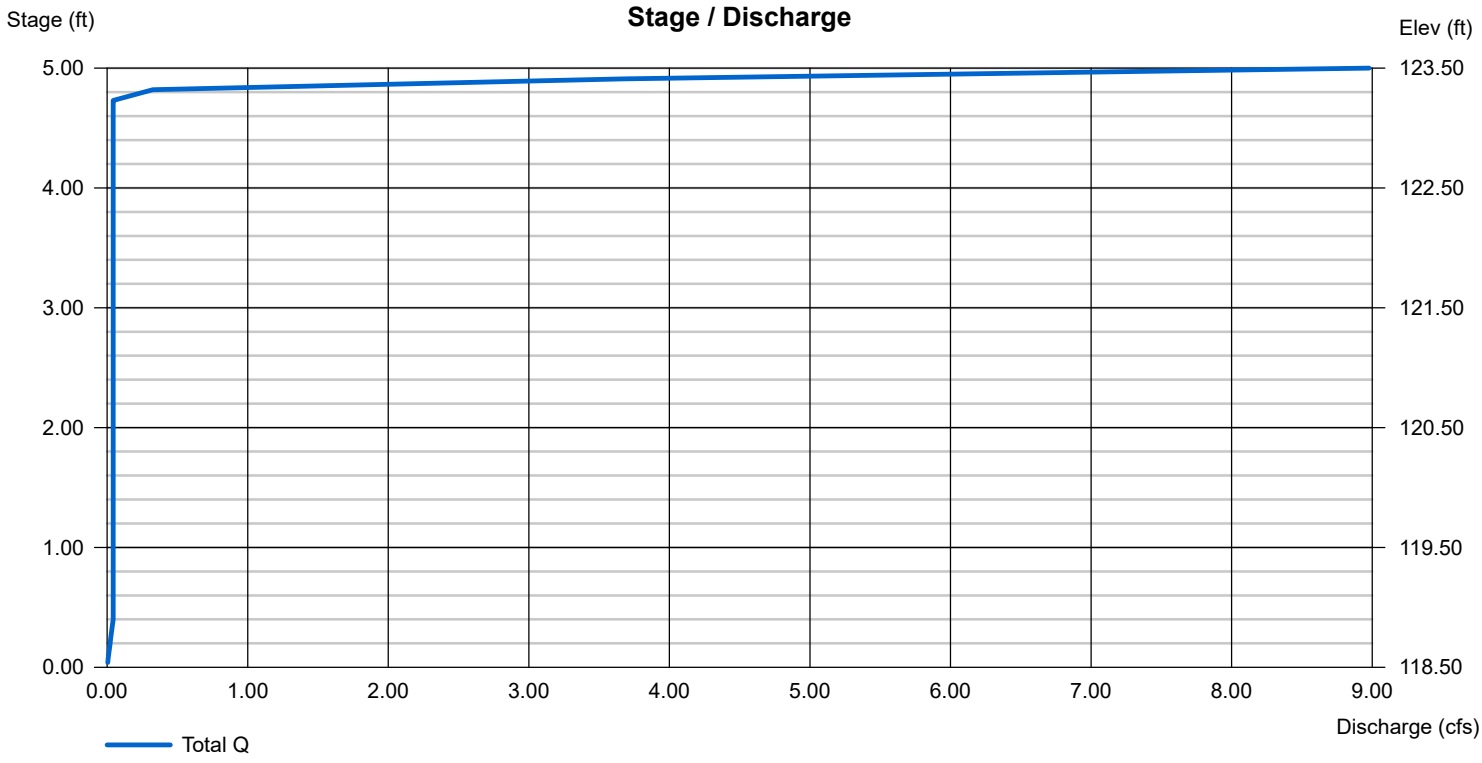
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 30.00	0.00	0.00	0.00
Crest El. (ft)	= 123.30	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) = 2.410 (by Contour)
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).



APPENDIX 3

Standard 4 (TSS)

Location: 190 WASHINGTON ST., WESTWOOD

TSS Removal Calculation Worksheet

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BxC)	E Remaining Load (C-D)
DEEP SUMP CATCH BASIN	25%	1.00*	0.25	0.75
INFILTRATION CHAMBERS	80%	0.75	0.60	0.15
Total TSS Removal =			0.85	85%

Project: 190 WASHINGTON ST.
Prepared By: J.B.
Date: 4/12/23

* Equals remaining load from previous BMP (E) which enters the BMP

APPENDIX 4

Operation & Maintenance Plan

OPERATION AND MAINTENANCE
&
LONG TERM POLLUTION PREVENTION PLAN
FOR POST-CONSTRUCTION STORM WATER CONTROLS

190 WASHINGTON STREET
WESTWOOD, MASSACHUSETTS
April 12, 2023

GENERAL

The Best Management Practices (BMPs) used in the design of the 190 Washington Street project were chosen for their effectiveness at reducing peak discharge and infiltrating groundwater. Routine maintenance is required for the BMPs, as proper maintenance is essential in achieving the desired result of improved water quality. This Operations and Maintenance (O&M) and Long Term Pollution Prevention Plan (LTPPP) is intended to cover the post-construction maintenance of the permanent BMPs[1] and site specific pollution prevention.

MAINTENANCE REQUIREMENTS

Qualified personnel shall inspect all components of the stormwater management system as outlined below. To be considered "qualified", personnel should have a working knowledge of the maintenance requirements of storm water BMP's and must be approved by the Westwood DPW. Qualified personnel shall be responsible for overseeing the required inspections and shall file annual reports with the town of Lawrence officials. Additionally, a copy of the Inspection/Maintenance Log, as further described herein, shall be provided to town of Lawrence officials on an annual basis.

SUMMARY OF MAINTENANCE REQUIREMENTS

BMP	MIN. FREQUENCY	RESPONSIBLE PARTY
Drive and Parking Area Sweeping	once/quarter	*Skye Realty Management, LLC*
Trash Removal	Inspect once/month Clean as necessary	*Skye Realty Management, LLC*
Catch Basin	Inspect 4x/year Clean once/year	*Skye Realty Management, LLC*
Infiltration Chambers	Inspect Once/year Maintain as necessary	*Skye Realty Management, LLC*

[1] Operations and maintenance of temporary erosion and sedimentation controls utilized during construction will be covered by a *Stormwater Pollution Prevention Plan* as required by the National Pollutant Discharge Elimination System program of the Environmental Protection Agency, and is not part of this O&M Plan.

RESPONSIBILITY TO ADMINISTER O&M PLAN

During construction, the general contractor will be responsible for maintaining the stormwater management system in accordance with this O&M Plan until such time that ownership of the project or phases thereof are turned over to the owner. The owner is then responsible for maintaining the portions of the stormwater management system under their ownership in accordance with this O&M Plan. This section below (names and signatures) shall be updated with every change in ownership and/or person(s) responsible for administering/financing the O&M of the system.

Owner(s) of the stormwater management system:

Name: _____ Name: _____

Signature: _____ Signature: _____

Person(s) responsible for financing maintenance and emergency repairs:

_____

_____

INSPECTION AND MAINTENANCE LOG

A sample inspection and maintenance log to be used is attached to the end of this O&M Plan. At a minimum, any inspection and maintenance log used shall include the following items:

- Date activity performed
- Specific inspection/maintenance task
- Structural components inspected/maintained
- Staff person or contractor performing activity
- Supervisor verification of maintenance activity
- Recommended additional maintenance tasks

An Annual Report shall be submitted to the Town of Westwood to meet the requirements of the town's Stormwater Management and Erosion Control Regulations.

PROPOSED BMPS AND CORRESPONDING O&M REQUIREMENTS:

DRIVEWAY and PARKING AREA SWEEPING:

Sweeping of impervious surfaces shall be conducted once per quarter. All sweepings shall be handled and disposed of in accordance with applicable local, state and federal guidelines and regulations.

TRASH REMOVAL:

The field areas shall be inspected for litter and trash monthly as part of overall site maintenance. Any accumulated trash, litter and discarded materials in these areas shall be removed.

No disposal of materials will be permitted within the landscaped areas or wooded areas on the Site. This prohibition applies to trash, fill material, construction debris, grass clippings, collected leaves and cut branches.

CATCH BASIN:

The catch basin shall be inspected four times per year for build-up of sediment, oil, and/or other debris which could decrease the effectiveness of the sumps. A qualified company specializing in the cleaning of catch basins shall perform the inspection of catch basins.

Typically a dipstick tube equipped with a ball valve, such as a Sludge Judge®, is used to measure the approximate oil and sediment depth, and a vacuum truck is used to clean out the catch basin. Catch basins shall be cleaned once per year, or sooner if the depth of sediment is found to reach 12 inches. If visual inspection observes any evidence of hydrocarbons, the material shall be immediately cleaned and disposed in accordance with all applicable local, state and federal guidelines and regulations.

As part of the inspection, catch basins should be inspected for structural soundness. Hoods and associated hardware should be inspected to ensure that they are correctly attached and functioning properly. Catch basins shall be repaired or replaced as necessary to ensure proper operation.

Frames and grates should be inspected and repaired or replaced as necessary to ensure proper operation.

Budget for Catch Basin Inspections and Maintenance: $1,000/year

INFILTRATION CHAMBERS:

The project includes a roof drainage recharge system comprised of 15 HDPE infiltration chambers. The system includes clean out junction manholes and observation ports located in the chambers.

It is important to occasionally inspect the system to ensure that it remains clear of any debris and sediment. This will help to ensure that trenches will continue to function efficiently long term.

To accomplish this, the system should be inspected once every year. A stadia rod should be used to measure the depth of sediment in the chambers. Should the depth of sediment exceed six inches the basin(s) should be cleaned of the sediment. In the event that the system would need to be cleaned, a culvert cleaning nozzle such as a JetVac® is recommended.

Budget for Chamber Inspections and Maintenance: $1,000/year

LONG TERM POLLUTION PREVENTION:

MAINTENANCE OF LANDSCAPED AREAS:

Fertilizers used for landscaping and lawn areas shall be slow release, low-nitrogen types (<5%) and shall not be used within 25 feet of a wetland resource area, and pesticides/herbicides shall not be used within 100 feet of a wetland resource area. Furthermore, the use of any fertilizers, pesticides, and herbicides shall be in accordance with the manufacturer's recommendations.

WINTER MAINTENANCE OF WALKS AND DRIVES:

Snow storage shall take place on pervious surfaces to the extent practicable to allow the snowmelt to filter through the soil, leaving behind sand and debris that can be removed in the springtime. Snow shall not be stockpiled in drainage collection areas or conveyance channels as this may block the system causing flooding. Furthermore, snow shall not be stored in or within 25 feet of a wetland resource area. No road salt, sodium chloride, or other deicing chemicals shall be used on paved surfaces within 25 feet of a wetland resource area.

STORAGE OF WASTE PRODUCTS:

Any outdoor storage of waste products shall be covered to prevent rainfall from picking up contaminants from the waste. This requirement shall include any dumpster(s) which shall have the lid(s) closed when not being loaded or unloaded.

ILLICIT DISCHARGES:

There shall be no illicit discharges to the stormwater management system. Illicit discharges are defined by 310 CMR 10.04 as follows:

"Illicit discharge means a discharge that is not entirely comprised of stormwater. Notwithstanding the foregoing, an illicit discharge does not include discharges from the following activities or facilities: firefighting, water line flushing, landscape irrigation, uncontaminated ground water, potable water sources, foundation drains, air conditioning condensation, footing drains, individual resident car washing, flows from riparian habitats and wetlands, dechlorinated water from swimming pools, water used for street washing and water used to clean residential buildings without detergents."

Prior to the discharge of stormwater runoff to the post-construction stormwater best management practices, an Illicit Discharge Compliance Statement shall be submitted to the Lawrence Planning Board verifying that no illicit discharges exist on the site.

EMERGENCY SPILLS

The owner shall provide personnel with a list of emergency contact phone numbers to use to report a spill. At a minimum the list should include the DEP Emergency Response Section, an environmental cleanup contractor such as Clean Harbors, Inc., the Lawrence Fire Department, and a contact person/phone number for the owner:

- DEP Emergency Response **1(888)304-1133**
- Clean Harbors, Inc. **1(800)645-8265**
- Westwood Fire Department **911 or (781)-320-1000**
- Owner (*Skye Realty Management, LLC*)

While the above-listed phone numbers are current as of the writing of this O&M Plan, the owner shall be responsible for verifying these numbers prior to distribution to the homeowners. Additionally, the owner shall update and redistribute a list of emergency contact phone numbers to the homeowners every other year, or sooner should any changes occur.