STORMWATER MANAGEMENT PLAN

Proposed Trailer Storage Facility

375 Maple Avenue & Route 163
Montville, Connecticut

Prepared For:

349 Maple Ave, LLC & Rand-Whitney Realty, LLC

December 16, 2024
(Revised January 13, 2025)

Prepared By:
CLA Engineers, Inc.
Consulting Engineers
317 Main Street
Norwich, CT 06360
Ph: 860-886-1966 F: 860-886-9165
www.claengineers.com

Kyle Haubert, P.E.

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1.0 Introduction

The project is to provide additional trailer storage space for Rand-Whitney Containerboard's transportation operations, which are currently at maximum capacity. The project proposes construction of a paved storage area and access road for the storage of box trailers on two parcels of land owned by the parent company. The two parcels are located at 375 Maple Avenue (Parcel ID P0128100) and the adjoining parcel, Route 163 (Parcel ID R0128600) in Montville, CT. The parcels are recorded as owned by two subsidiary companies namely, 349 Maple Ave LLC and Rand-Whitney Realty LLC respectively.

The storage area will be accessed primarily by an internal paved driveway that will connect to Robertson Road, thus minimizing traffic impact to Maple Avenue. The driveway will be constructed on the parcel recorded as 'Route 163'. A secondary access from Maple Avenue is proposed to be constructed however, this access is intended for emergency access only and will be chained to prevent general access. The location of both parcels is shown on Figure 1, and in relation to the 2019 Connecticut orthoimagery as Figure 2. A location map is also included on the Site Development Plans.

As part of this project, the Town of Montville's existing 30" stormwater pipe, that currently discharges onto 375 Maple Avenue, will be extended and a new drainage easement in favor of the Town of Montville will be established.

This report was prepared to address the Soil Erosion and Sediment Control and Stormwater Management requirements stipulated in the Town of Montville's Planning and Zoning Regulations. The Soil Erosion and Sediment Control Plan has been developed in accordance with the 2023 Connecticut Guidelines for Soil Erosion and Sediment Control. The stormwater management and quality has been designed in accordance with the 2024 Connecticut Stormwater Quality Manual. A full-size Design Plan Set is included separately as Appendix E.

Existing Conditions

Both parcels are located in an industrial zone which straddles the Oxoboxo Brook. Parcel Route 163 is approximately 34.6 acres in area and is mostly comprised of Rockland Pond; a manmade pond formed by the damming of Oxoboxo Brook in 1900. The Rockland Pond Dam (CT00242) is owned and maintained by Rand-Whitney Containerboard. The only developed portion of Parcel Route 163 is located at its northeast corner which is used as a trailer storage area.

375 Maple Avenue is approximately 2.94-acres comprised mostly of undeveloped land located on the southwest side of Oxoboxo Brook. A residential house was originally present on the lot but has recently been raised. The land is currently cleared and ready for development. Access is from Maple Avenue only.

Soils

A custom soil resource report for the property was mapped using NRCS Web Soil Survey website and are listed in the table below.

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
23A	Sudbury sandy loam, 0 to 5 percent slopes	1.4	5.3%
34B	Merrimac fine sandy loam, 3 to 8 percent slopes	5.1	18.6%
38C	Hinckley loamy sand, 3 to 15 percent slopes	0.5	1.8%
75E	Hollis-Chatfield-Rock outcrop complex, 15 to 45 percent slopes	0.4	1.4%
307	Urban land	7.0	25.4%
W	Water	13.1	47.6%
Totals for Area of Interest		**27.5**	**100.0%**

Soil in the area of development mainly consist of Merrimac fine sandy loam (Hydrological Group A) and Urban Fill (Hydrological Group D). Further details of the soils located on site are presented in Appendix A

Wetland hydrology

Two wetland areas have been identified and delineated on the project site. The first is the 13-acre watercourse and pond area comprised of Oxoboxo Brook and Rockland Pond. This wetland is a large but somewhat degraded open water ecosystem. Oxoboxo Brook flows eventually into the Thames River, a major watercourse connected with the Long Island Sound (Atlantic Ocean). No work is proposed within this wetland, but a portion of the development area coincides with the wetland's 50-foot upland review area.

The second wetland area on the project site is a small (<1ac) man-made channelized wetland in the northeast corner of 375 Maple Avenue. The channel formed as a result of the discharge of stormwater over time by the Town of Montville's 30" storm pipe (identified on plans). This wetland appears to have existed for fewer than 50 years based on available online mapping from

CTECO (although the pipe itself appears to be older than 50 years) and is not associated with any watercourse. CLA believes it to have a small impact on groundwater recharge. The wetlands principal functions and the impacts to this and downstream wetlands are evaluated and detailed in the Wetland Letter Report.

Existing Watershed Hydrology

An existing conditions watershed map and stormwater flow paths are included as Figure 3. The site is located in CTDEEP Local Stormwater Basin 3004-00 (Oxoboxo Brook) and drains in a northeasterly direction. Run-off from the site is directed to the Oxoboxo Brook both upstream and downstream of the dam. Run-off from the northwest portion of the site drains to Rockland Pond, which is upstream of the dam (Ex Watershed 1). The remaining southeast portion of the site drains to the downstream side of the dam before passing beneath Robertson Road and through the Rand Whitney facility (Ex Watershed 2).

An existing municipal storm drain system originating from Sharp Hill Road enters the property and daylights approximately 200 feet from the southwest property line. The system comprises a 30” corrugated metal pipe that conveys stormwater from the roadway collection system located on Sharp Hill Road and Carol Drive. The drainage system is also used to collect overland flow from upgradient areas.

Over the course of time, the discharge has eroded the surface soils to create a fairly uniform channel that flows east and into the Oxoboxo Brook. The periodic discharge has created a man-made channelized wetland less than 1-acre in area, running directly over the town’s sanitary sewer line and, according to the WPCA, causes unwanted infiltration issues. The town has no known rights to drain onto the property and in its current location, will interfere with the proposed development. The project proposes to extend the pipe through the property and relocate the point of discharge to avoid conflict with the proposed improvements.

Analysis Point 1 – Rockland Pond

Existing Watershed 1 is located at the northwest portion of the property. It comprises cleared woodland and some rock outcrops and remnants of the foundation from the raised residential house. Grades are moderate to slight. Run-off from this watershed is directed overland in a northerly direction where it eventually reaches Rockland Pond. This is considered Analysis Point 1.

Existing Watershed 2 comprises the remainder of the southeast portion of the property. It comprises cleared woodland and brush with moderate to slight slopes. Run-off from this watershed flows northeast and is intercepted by the man-made channel associated with the town's storm drain discharge. It then follows the channel and eventually discharges to the Oxoboxo Brook immediately upstream of the Robertson Road culvert. This is considered Analysis Point 2.

Analysis Point 2 – Oxoboxo Brook

Proposed Conditions

A proposed conditions watershed map and stormwater flow paths are included as Figure 4. The proposed development includes construction of a paved laydown area sufficient to accommodate 61 storage spaces for trailers and paved driveways that access Maple Avenue and Robertson Road. The approximate total area of disturbance is 3.9 acres and impervious area to be constructed is approximately 2.14 acres. The proposed site improvements are depicted on the Site Improvement Plans.

As previously mentioned, the Town of Montville's existing 30" storm drain will be extended through the limits of the site with the point of discharge relocated to the northeast, beyond the limits of paving.

Proposed Watershed Hydrology

The proposed site grading will mimic existing drainage patterns and run-off from the site will continue to be directed to the Oxoboxo Brook both upstream and downstream of the dam. Run-off from the northwest portion of the site will be directed to drain towards Rockland Pond, which is upstream of the dam (Pr Watershed 1) and the southeast portion of the site will continue to drain to Oxoboxo Brook on the downstream side of the dam (Pr Watershed 2).

Pr-Watershed 1

Proposed Watershed 1 comprises the developed area that produces run-off directed towards and discharges to Rockland Pond (Upstream of Rockland Pond Dam). The watershed comprises the newly developed area (Pr Watershed 1a) and the remaining undeveloped area (Pr Watershed 1b). Run-off from the developed portion of the watershed will be directed northeast and intercepted by a perimeter grass-lined swale where it will be conveyed and discharged to Water Quality Basin 1. Stormwater that leaves Basin 1 will discharge over a rip-rap lined level spreader before entering Rockland Pond (Analysis Point 1)

Pr-Watershed 2

Proposed Watershed 2 comprises the remaining developed area that will ultimately discharge to the Oxoboxo Brook downstream of the Rockland Pond Dam. A portion of this watershed will be directed towards Water Quality Basin 2 (Pr Watershed 2a) and the remaining developed area comprising the Robertson Road driveway (Pr Watershed 2b) will discharge directly to Oxoboxo Brook.

Hydrological Analysis:

The site stormwater hydrological analysis was performed for the 2-year, 10-year, 25-year, 50-year and 100-year frequency storms using the USDA/NRCS TR-55 method to determine the peak flow rates from the existing and post development conditions. As recommended by the CT Stormwater Quality Manual, a Type D storm distribution was used. Precipitation data, rainfall intensities, and distribution were acquired from NOAA Atlas 14, Volume 10, Version 3 for the site, and is included in Appendix B. Rainfall data obtained from NOAA Atlas 14 is included in Appendix C.

The soils onsite in the area of development fall into the hydrologic soil groups A and D. A copy of the soil mapping is included in Appendix A. The runoff curve numbers for the site are based on the ground cover and hydrologic soil group and are included in Table 1.

Table 1 – Curve Numbers

Runoff curve numbers for the existing and post development conditions were compiled from Table 2-2 of the USDA/NRCS TR-55 manual. The following curve numbers were used for the calculations. Weighted curve number calculations are included in the hydrograph reports.

Existing Conditions	CN
Good Condition Woods (HSG A)	30
Good Condition Woods (HSG D)	77
Good Condition Open Space (HSG A)	39
Pavement	98

Post Development	CN
Good Condition Woods (HSG A)	30
Good Condition Woods (HSG D)	77
Good Open Space (HSG A)	39
Pavement	98

Stormwater Management Standards and Performance Criteria

The design of the stormwater management is required to meet and comply with the standards and performance criteria using non-structural Low Impact Development (LID) site planning and design techniques and structural stormwater Best Management Practices (BMPs), in addition to operational source controls and pollution prevention. The following standards are set out in Chapter 4 of the 2024 Connecticut Stormwater Quality Manual (SQM) and are intended to be consistent with the post-construction stormwater management requirements of the CTDEEP stormwater general permits, as well as local requirements within municipal planning, zoning, and stormwater ordinances and regulations.

2.0 Standard 1 – Runoff Volume and Pollutant Reduction

The purpose of this Standard is to preserve pre-development hydrology and pollutant loads to protect water quality and maintain groundwater recharge. For the purposes of this standard, this project is considered a new development, and therefore the Required Retention Volume (RRV) is equal to 100% of the site's Water Quality Volume (WQV). To meet this standard, a combination of pre-treatment devices and water quality basins have been designed for the site in accordance with the 2024 Connecticut Stormwater Quality Manual to treat the proposed stormwater runoff.

Proposed Watershed 1 (Analysis Point 1)

Stormwater runoff from post development Watershed 1 originates from the combined discharge associated with Pr Watershed 1a and Pr Watershed 1b. Runoff from Pr Watershed 1b comprises open space with landscaping and requires no treatment.

Run-off from new pavement associated with Pr Watershed 1a will sheet flow to vegetated swales that will convey stormwater to two sediment forebays in advance of entering Stormwater Basin 1. Although the vegetated swales will provide some level of pre-treatment, no credit for the stormwater's residency time in the swales has been taken and Pre-treatment will be provided by the two sediment forebays.

Two test pits (TP 1 & TP 9) were performed in the vicinity of Basin 1. TP 1 exhibited the most restrictive conditions where groundwater was observed at elevation 230.3 and mottling at elevation 231. No ledge was observed. To provide sufficient volume to address run-off volume and pollutant reduction, the bottom elevation of Basin 1 was set at elevation 231.0. The basin bottom elevation will therefore be at or close to the seasonally high-water level (SHWL).

The soils in the vicinity of Basin 1 are Hydrological Group A which are conducive for infiltration. While the recommended vertical separation between the basin bottom and the SHWL will not be achieved, infiltration will still occur through the bottom and sides of the basin due to hydraulic pressure head differences. The volume of water required to be treated (WQV) and the available volume provided by the basin is calculated as follows:

Pr Watershed 1a (Basin 1)		
Water Quality Volume (WQV)		
Sizing in Accordance with Chapter 4 of the DEEP 2024 Storm Water Quality Manual Water Quality Volume (WQV) = (P)(R)(A) / 12 P = 1.3" R = 0.05 + 0.009(I) I = percent of impervious cover A = watershed area		
Total Watershed Area (Ac.) :	1.92	
Watershed Impervious Area (Ac.) :	1.11	
I =	0.58	
R =	0.57	
Required WQV =	0.12	Ac.-Ft
=	**5154**	**CF**
Volume Provided =	**24,172**	**CF**

Proposed Water Quality Basin 1 contains 24,172 CF of storage below the primary outlet elevation. No flow over the primary outlet is predicted to leave the basin during a 25-year storm event and only 0.35 cfs is expected to leave basin during the 100-year event. The excess volume provided is required to address Standard 2 – Stormwater Run-off Quantity Control and will be discussed in the next section.

The dimensions and volume of the sediment forebays have been designed in accordance with Chapter 13 of the DEEP 2024 Storm Water Quality Manual as follows:

Based on the combination of the vegetated swales and the oversized sediment forebays and treatment basins, CLA believes that the stormwater system shown on the project plans is consistent with the CTDEEP 2024 Manual.

Sediment Forebay 1a		
Water Quality Volume (WQV)		
Sizing in Accordance with Chapter 4 of the DEEP 2024 Storm Water Quality Manual Water Quality Volume (WQV) = (P)(R)(A) / 12 P = 1.3" R = 0.05 + 0.009(I) I = percent of impervious cover A = watershed area		
Total Watershed Area (Ac.) :	0.91	
Watershed Impervious Area (Ac.) :	0.73	
I =	80.13%	
R =	0.77	
Required WQV =	0.08	Ac.-Ft
	3,312	**CF**
Bottom Surface Area = 0.066 * %WQV		
Recommended % of WQV to be Treated	25%	
Minimum Bottom Surface Area =	55	sf
Bottom Surface Area Provided =	185	sf
Min. Volume = 25% of the WQV below the outlet invert		
25% of the WQV =	828	cf
Volume Provided =	**1,020**	cf

Sediment Forebay 1b		
Water Quality Volume (WQV)		
Sizing in Accordance with Chapter 4 of the DEEP 2024 Storm Water Quality Manual Water Quality Volume (WQV) = (P)(R)(A) / 12 P = 1.3" R = 0.05 + 0.009(I) I = percent of impervious cover A = watershed area		
Total Watershed Area (Ac.) :	0.55	
Watershed Impervious Area (Ac.) :	0.38	
I =	69.06%	
R =	0.67	
Required WQV =	0.04	Ac.-Ft
	1,737	**CF**
Bottom Surface Area = 0.066 * %WQV		
Recommended % of WQV to be Treated	25%	
Minimum Bottom Surface Area =	29	sf
Bottom Surface Area Provided =	405	sf
Min. Volume = 25% of the WQV below the outlet invert		
25% of the WQV =	434	cf
Volume Provided =	**1,897**	cf

Proposed Watershed 2 (Analysis Point 2)

Stormwater runoff from post development Watershed 2 comprises the combined discharge associated with Pr Watershed 2a and Pr Watershed 2b.

Stormwater runoff from Proposed Watershed 2a will sheet flow to a vegetated swale that will convey stormwater to a sediment forebay in advance of entering Stormwater Basin 2. Similarly, no credit for the stormwater's residency time in the swales has been taken and pre-treatment will be provided by the sediment forebay.

The volume of water required to be treated (WQV) and the available volume provided by the basin is calculated as follows:

Pr Watershed 2a (Basin #2)		
Water Quality Volume (WQV)		
Sizing in Accordance with Chapter 4 of the DEEP 2024 Storm Water Quality Manual Water Quality Volume (WQV) = (P)(R)(A) / 12 P = 1.3" R = 0.05 + 0.009(I) I = percent of impervious cover A = watershed area		
Total Watershed Area (Ac.) :	1.11	
Watershed Impervious Area (Ac.) :	0.79	
I =	71.2%	
R =	0.69	
Required WQV =	0.08	Ac.-Ft
	3,625	**CF**
Volume Provided =	**9,515**	cf

Proposed Water Quality Basin 2 contains 9,515 CF of storage below the primary outlet elevation. Similarly, no flow over the primary outlet is predicted to leave the basin during a 2-year storm event and only 0.1 cfs is expected to leave basin during 10-year event. The excess volume provided is required to address Standard 2 – Stormwater Run-off Quantity Control and will be discussed in the next section.

Pre-treatment for stormwater flow into the basin is achieved by routing flow through an in-line sediment forebay. The dimensions and volume of the sediment forebay have been designed in accordance with Chapter 13 of the DEEP 2024 Storm Water Quality Manual as follows:

Sediment Forebay 2		
Water Quality Volume (WQV)		
Sizing in Accordance with Chapter 4 of the DEEP 2024 Storm Water Quality Manual Water Quality Volume (WQV) = (P)(R)(A) / 12 P = 1.3" R = 0.05 + 0.009(I) I = percent of impervious cover A = watershed area		
Total Watershed Area (Ac.) :	1.04	
Watershed Impervious Area (Ac.) :	0.79	
I =	76.18%	
R =	0.74	
Required WQV =	0.08	Ac.-Ft
	3,608	**CF**
Bottom Surface Area = 0.066 * %WQV		
Recommended % of WQV to be Treated	25%	
Minimum Bottom Surface Area =	60	sf
Bottom Surface Area Provided =	240	sf
Min. Volume = 25% of the WQV below the outlet invert		
25% of the WQV =	902	cf
Volume Provided =	**1,709**	cf

Runoff from Pr Watershed 2b comprises the impervious area associated with the driveway between the trailer storage area and Robertson Road. Runoff from this area will be directed to a Qualifying Pervious Area (QPA) adjacent to the driveway. The SQM explains that certain areas of impervious area can be directed to natural or landscaped vegetated areas that are of sufficient size and with adequately permeable soils to disperse and retain runoff without causing erosion or negative impacts to adjacent downgradient properties.

Certain criteria should be met in order for the QPA to qualify for credit. In general, the following criteria of the proposed QPA will be met:

- The proposed QPA is located outside of the regulated wetland
- The QPA is remote from any buildings
- The portion of the QPA disturbed during construction shall receive 6 inches of topsoil and seeded with New England Roadside Matrix Mix to promote healthy vegetative cover. The remainder of the undisturbed QPA currently consists of dense vegetation covering more than 90% of the area.
- To limit unnecessary disturbance to the existing vegetation downgradient of the QPA, grading has been set to 15%. This meets the maximum grade criteria for undisturbed

forested areas. Although this area will initially be loamed and seeded to promote vegetative growth, this area will not be maintained as lawn and is expected to quickly repopulate with larger vegetation that will promote sheet flow residency times.

Other criteria specific to driveways include:

- the maximum contributing flow path from the driveway to the QPA will be 30-feet (width of the driveway).
- The length of the QPA will be equal to the length of the driveway and the width of the QPA (min. 64-feet) will be more than twice the width of the driveway.
- Salt tolerant New England Roadside Matrix Upland Seed Mix will be placed immediately next to the roadside.

Additionally, to provide pre-treatment to the run-off, a 2-feet wide, 3-feet deep stone filled choker trench will be installed adjacent to the driveway. This will provide initial pre-treatment through nominal detention (40% stone voids), sediment retention and prevent road edge deterioration.

3.0 Standard 2 – Stormwater Runoff Quantity Control

The purpose of this standard is to ensure that pre-development peak flow rates are not exceeded and manage the volume and timing of runoff to prevent downstream flooding, channel erosion, and other adverse impacts, and safely convey flows into, through and from structural stormwater BMPs.

To mitigate peak stormwater runoff rates due to the proposed increased impervious area onsite, stormwater will be routed through two water quality basins that have been sized to detain sufficient volumes of water to mitigate post-development peak flows. A summary of the existing condition and post development peak flow rates from the site are included in Table 2.

Table 2 – Peak Flow Rates

Analysis Point 1	**Peak Flow Rate (CFS) per Storm Event**				
	2-Year	10-Year	25-Year	50-Year	100-Year
Existing Conditions	0.00	0.02	0.10	0.25	0.55
Proposed Conditions	0.00	0.00	0.04	0.17	0.35
Difference	0.00	-0.02	-0.06	-0.08	-0.20
Analysis Point 2	**Peak Flow Rate (CFS) per Storm Event**				
	2-Year	10-Year	25-Year	50-Year	100-Year
Existing Conditions	0.01	0.24	0.77	1.40	2.20
Proposed Conditions	0.52	1.50	2.26	2.84	3.48
Difference	0.51	1.26	1.49	1.44	1.28
Site Wide	**Peak Flow Rate (CFS) per Storm Event**				
	2-Year	10-Year	25-Year	50-Year	100-Year
Existing Conditions	0.01	0.24	0.86	1.64	2.72
Proposed Conditions	0.52	1.52	2.29	2.94	3.65
Difference	0.51	1.28	1.43	1.30	0.93

For Analysis Point 1, the proposed design maintains or reduces the peak stormwater flow rates in comparison to the existing conditions across all storm events.

For Analysis Point 2, small increases in run-off will be realized. This is attributed to the Qualifying Pervious Area not able to sufficiently detain run-off from the proposed driveway.

A USGS StreamStats report was generated for the watershed area contributing to the Oxoboxo Brook immediately upstream of Robertson Road (See Appendix D). The report approximates the watershed area to be 9.66 square miles with the following peak flows using the Area-Averaged Method.

2-Yr (CFS)	10-Yr (CFS)	25-Yr (CFS)	50-Yr (CFS	100-Yr (CFS)
326	608	805	978	1170

Given the significant watershed area and existing peak flows, the increases in proposed peak flows leaving the site are negligible and we believe no negative downstream impacts will occur.

Hydrographs detailing the calculations are included in Appendix B.

4.0 Standard 3 – Construction of Soil Erosion and Sediment Control

The 2023 CT Guidelines for Soil Erosion & Sedimentation Control applies to the construction phase of the project. A detailed erosion and sediment control plan has been provided in the site development plans. Due to the existing topography and the restrictive nature of the site, the proposed stormwater basins have been designed to function as temporary sedimentation traps during stabilization, and then to be converted to provide permanent water quality treatment for the life of the facility. While the guidelines do not recommend locating sediment traps in the proposed locations of permanent, post-construction stormwater BMPs, they recognize in some cases, this is unavoidable and require the sediment traps to be modified after their function is complete, to prepare it for long-term use. In this case, the bottom elevations of the sediment traps are designed to be at least 1-foot above the bottom floor elevation of the permanent stormwater basins, to avoid fine soil particles sealing the underlying soils. Removal of accumulated sediment and, if necessary, restoration of the pre-construction infiltration capacity of the underlying soils will be performed.

Trap Capacity

The temporary sediment trap shall have an initial storage volume of 134 cubic yards per acre of drainage area. Half of this volume shall be in the form of wet storage to provide a stable settling medium. The remaining storage volume shall be in the form of a drawdown (dry storage) which will provide extended settling time during less frequent, larger storm events.

The dimensions and volume of the sediment traps have been designed in accordance with Chapter 5 of the Connecticut Guidelines for Soil Erosion and Sediment Control as follows:

	Sediment Trap 1	Sediment Trap 2
Area of Disturbance (Acres)	1.51	1.62
SSV Required per Acre of Disturbance	134	134
SSV Required = (CY)	202	217
Total Storage Provided = (CY)	675	308
Dry Storage Volume Required CY =	101	109
Dry Storage Volume Provided CY =	370	172
Wet Storage Volume Required CY =	101	109
Wet Storage Volume Provided CY =	305	136

General Slope Protection

Erosion Control Matting shall be installed on all side slopes of 3H:1V in accordance with the Erosion Control Matting Detail. Matting must be listed on the latest CTDOT Qualified Products List under Class 1 Slope Protection Type D.

Erosion Control Matting (Swales)

Within the proposed grassed lined swales, a temporary (bio-degradable) lining will be required to convey runoff until grass (turf) can be established. Class 2, Flexible Channel Liner Protection shall be used for temporary linings. The specific Type shall be based on the proposed permissible shear stress calculated as follows for the 10-year storm event.

According to Section 7.6.7 of the CTDOT Drainage Manual, roadside drainage channels are designed to carry the 10-year design flow, and a 2-year return period is used for the design of temporary linings. The following hydraulic characteristics for each swale labeled on the Proposed Watershed Plan were calculated using Hydraflow Express Extension for Autodesk and the Mannings's Equation for a trapezoidal channel:

Flow Characteristics for 2-Yr Event	Swale 1a	Swale 1b	Swale 1c	Swale 2
Runoff Coefficient	0.9	0.9	0.9	0.9
5 Min. Intensity (in/hr)	4.87	4.87	4.87	4.87
Contributing Drainage Area (Ac)	0.18	0.73	0.88	0.58
Volume (Q)	0.8	3.2	3.9	2.5
Bottom Width (ft)	2	2	2	2
Slope (%)	3.7	0.5	1.8	1.7
Side slopes (Z:1)	3	3	3	3
Manning's n (HEC-15)	0.05	0.05	0.05	0.05
Depth of Flow (ft)	0.2	0.7	0.5	0.4
Velocity (Ft./Sec)	1.5	1.2	2.0	1.7
Max Shear Stress (lb/ft2)	0.5	0.2	0.6	0.5

Erosion control matting is evaluated by the CTDOT for use in eight Types (A-H), grouped into two Classes. Types E through H are included in Class 2 and are designated as Flexible Channel Liner Protection. This classification is based upon the permissible shear stress of the material. The purpose of Class 2 matting is to protect the geometry of a channel from loss of soil, and to promote the establishment of a warm-season, perennial vegetative cover. Class 2 Types are designated according to the shear stress limits shown in Table 7-5. The shear stress ranges are based on values published in HEC-15.

Table 7-5 Erosion Control Matting (Class 2) Shear Stress Ranges

Matting Type	Permissible Shear Stress – Pa (lb/ft^2)
E	< 25 (<0.5)
F	25 to < 50 (0.5 to <1.0)
G	50 to < 100 (1.0 to <2.0)
H	≥ 100 (≥2.0)

Given the maximum shear stress values calculated above, Type F matting shall be used.

5.0 Standard 4 - Post-Construction Operation and Maintenance

The purpose of this standard is to ensure that long-term maintenance of the structural stormwater management systems is performed so they continue to function as designed and to implement operational source control and pollution prevention measures.

Town of Montville 30" Drainage Pipe Capacity

As mentioned earlier in the report, the town of Montville's existing 30" drainage pipe is required to be replaced so that its vertical alignment and discharge location does not interfere with the proposed development. The pipe will be replaced on its existing horizontal alignment and the

discharge point relocated north and east, beyond the area of development and closer to the Oxoboxo Brook.

Proposed site grading requires the slope of the pipe to be lowered through the site. The pipe provides conveyance for run-off from the Sharp Hill Road drainage system. To ensure the new pipe has sufficient volume, a Manning's pipe flow calculation was performed of the down-stream most pipe of the Sharp Hill Road drainage system, prior to crossing Maple Avenue and entering the 30" pipe.

Maximum volume Q (cfs) = A *1.486/n * $R^{2/3}$ * $S^{1/2}$ = 71 c.f.s

Where: Pipe Dia. = 24"
Slope = 8.6% (Grade at bottom of Sharp Hill Road)
n = 0.013 (Concrete)

This represents the theoretical maximum flow rate for a straight length of pipe with no energy loss from in-line structures. In practice, the volume is likely to be less.

The proposed drainage pipe to be replaced through the development will be constructed in three sections connected by two manholes. The first section of pipe will be a 30" HDPE installed at 2.9%.

Maximum volume of the 30" pipe Q (cfs) = 81 c.f.s (in excess of 71 c.f.s.)

Where: Pipe Dia. = 30"
Slope = 2.9%
n = 0.012 (HDPE)

To reduce velocity at the point of discharge, the last two sections of pipe will be increased to 36" in diameter and installed at less grade. Due to hydraulic head pressure from the upstream section, the final section of pipe will be ignored.

Maximum volume of the 36" pipe Q (cfs) = 101 c.f.s (in excess 71 c.f.s.)

Where: Pipe Dia. = 36"
Slope = 2.9%
n = 0.012 (HDPE)

Using Manning's equation to calculate flow velocity V:

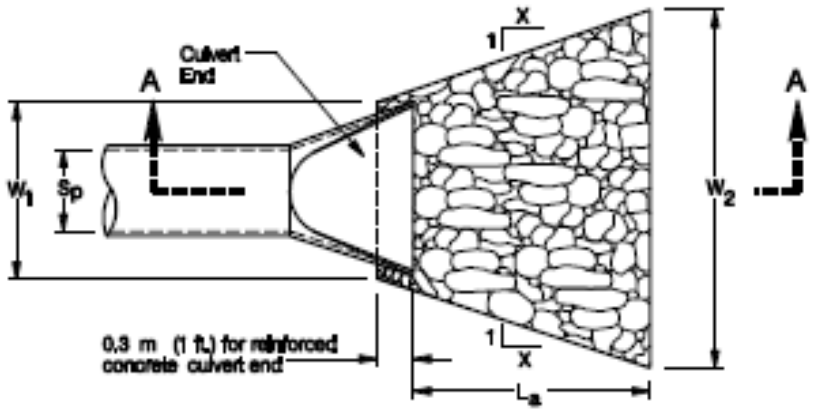
Maximum Flow Velocity V = $(1.49/n)R_h^{2/3}S^{1/2}$ = 14.6 feet/sec*

*In practice, velocity is expected to be lower.

Section 11.13 of the CTDOT Drainage Manual provides guidance on rip-rap stone size based on discharge velocity and apron size. Given there will be minimal tail conditions, a Type A rip-rap apron will be proposed.

Table 11.11 Allowable Outlet Velocities for Type A and B Riprap Aprons

Outlet Velocity - mps (fps)	Riprap Specification
0-2.44 (0-8)	Modified
2.44-3.05 (8-10)	Intermediate
3.05-4.27 (10-14)	Standard



CULVERT END PLAN VIEW

$$L_a = \frac{1.80(Q-5)}{S_P^{1.5}} + 10$$

LEGEND

Sp = { Max. inside pipe span (non-circular sections) / Inside pipe diameter (circular sections)

Rp = { Max. inside pipe rise (non-circular sections) / Inside pipe diameter (circular sections)

La = Length of riprap apron measured from the end of culvert end section or face of endwall

d = { 300 mm (12 in.) Modified Riprap / 450 mm (18 in.) Intermediate Riprap / 900 mm (36 in.) Standard Riprap

	X	W1	W2
Type A Riprap Apron	3	$3S_p$	$3S_p+0.7$ La
Type B Riprap Apron	5	$3S_p$	$3S_p+0.4$ La

The following dimensions were

Q= 71 cfs
Sp 2.5 feet
La= 40.1 feet
W1= 7.5 feet
W2= 35.5 feet

Provisions for the post-construction operation and maintenance of the permanent stormwater management and pollution prevention devices are outlined on the plans and are as follows:

1. Pollution Prevention Team:
   The Owner shall be responsible for carrying out the provisions of the plan.
2. Sweeping:
   Parking lots, sidewalks, and other impervious surfaces shall be swept clean of sand and litter and any other pollutants at least twice per year
   a. Between November 15th and December 15th (after leaf fall)
   b. During April (after snow melt)
3. Outside Storage:
   Accessories or equipment stored outside shall be covered or maintained to minimize the possibility of these materials or their residue passing to stormwater.
4. Washing:
   No washing of vehicles, accessories, equipment, or appliances onsite.
5. Maintenance and Inspection of Stormwater Infrastructure:
   a. Monthly inspection of stormwater structures and outfalls.
   b. Clean sediment and debris from structures at least once per year during April.
   c. Comply with the hydrodynamic separator operations and maintenance requirements in accordance with the Operations and Maintenance Manual provided by the Manufacturer.
   d. Comply with the rain garden maintenance schedule.
6. Spills or Accidental Discharges:
   a. Comply with State and Federal regulations to contain and clean up any spill or discharge and dispose of materials at an approved facility.
   b. Contact Connecticut DEEP oil and chemical spill response division 860-424-3338.
   c. The following steps should be performed as soon as possible
      - Stop the source of the spill
      - Contain the spill
      - Cover the spill with absorbent material such as kitty litter, saw dust, or oil absorbent pads. Do not use straw.
      - Dispose of absorber in accordance with Local and State regulations.

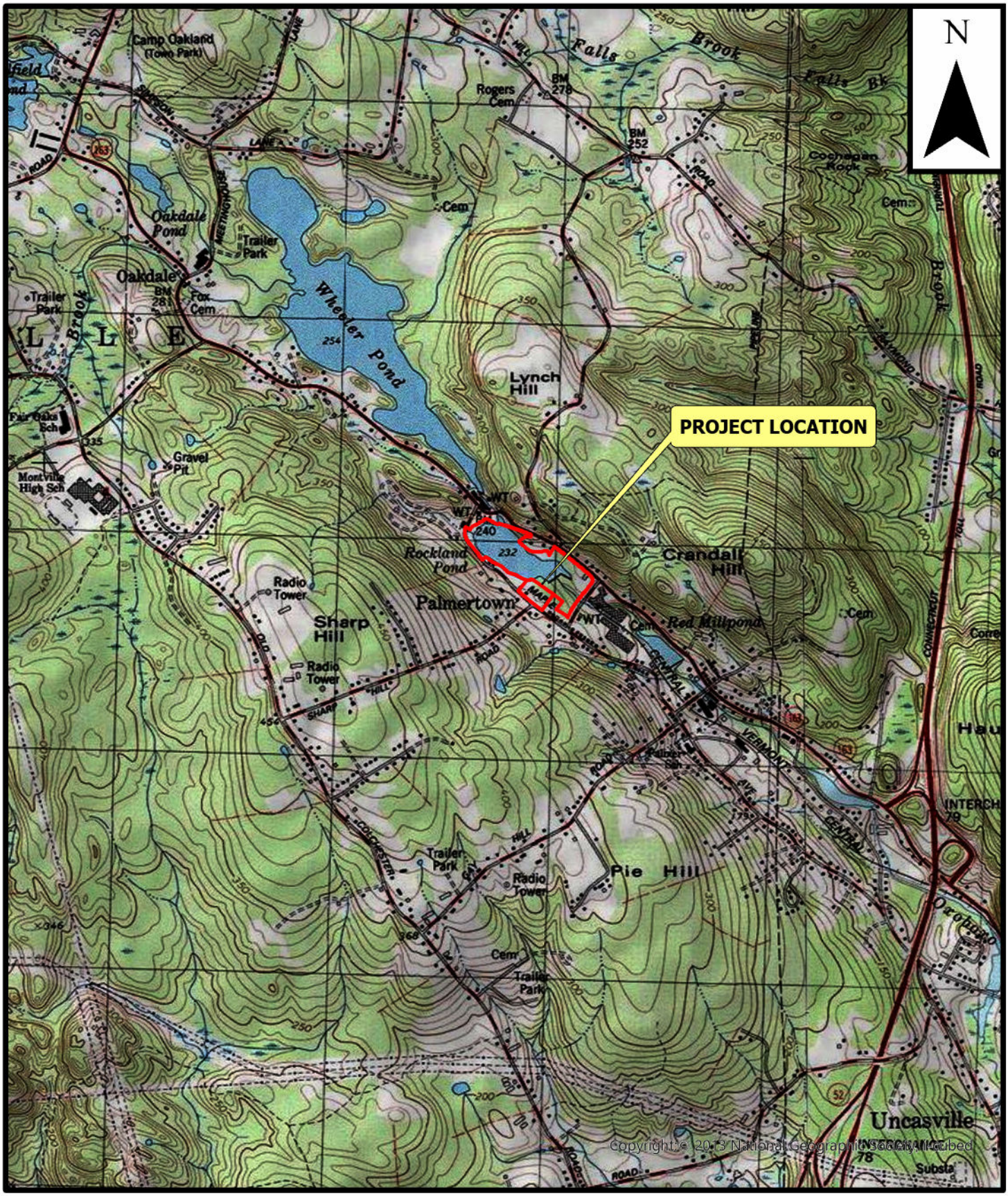
The following is a general operations and maintenance schedule for the stormwater infrastructure and project site.

MAINTENANCE SCHEDULE FOR STORMWATER BASINS	
Activity	**Schedule**
Prior to new spring growth reaching a height of 2" (e.g., shortly after forsythia or redbud blooms), trim any material standing from the previous year close to the ground (approximately 2").	Second growing season
This will allow the soil to warm more quickly, which will stimulate the emergence and growth of native seedlings and reduce the likelihood of the meadow being invaded by shrubs.	
Problem weeds should be hand pulled or spot sprayed with an approved herbicide, such as Rodeo® or Garlon® 3A.	
If you did not plant vines or spiny plants as part of your mix, be vigilant about controlling them. These are more easily pulled when they are young rather than after they have had two to three months of growth. Examples include bindweed, blackberry, multiflora rose, mile-a-minute and Japanese hops. Be equally vigilant about controlling other invasive species, such as autumn olive and Japanese knotweed.	
Special Circumstances	
If you notice a heavy infestation of ragweed or foxtail in the second growing season, trim the meadow to a height of 8". Trimming should cease by mid-September.	
For the basin and side slopes, inspect for invasive vegetation.	Monthly
Grassy weeds or persistent perennials can re-establish in these soils. Monitor and control weeds by hand pulling or spot spraying.	
Inspect for damage, undercut, or eroded area	Semi-Annually
Inspect Sediment Forebay and monitor for sediment accumulation. Remove any trash and organic debris (leaves) in spring & fall. Remove sediment from the sediment forebay or other pretreatment area when it accumulates to a depth of more than 12 inches or 50% of the design depth. Clean outlet of sediment forebay or other pretreatment measures when drawdown time exceeds 36 hours after the end of a storm event.	
Remove sediment from the infiltration basin surface when the sediment accumulation exceeds 2 inches or when drawdown time exceeds 48 hours after the end of a storm event, indicating that the system is clogged.	
Weed as necessary. Mow grass within infiltration basin to a height of 3 to 6 inches. Maintain a healthy, vigorous stand of grass cover; re-seed as necessary.	
Clean and remove debris & sediment from inlet and outlet structures.	

Mow side slopes. Close mowing throughout the regular growing season or extensive chemical use is not conducive to water quality improvement and wildlife habitat. Spring mowed vegetation can typically remain within basins providing cover for new emerging vegetation.	
Repair undercut or eroded areas.	As needed maintenance

Maintenance Schedule for Trailer Storage Areas	
Activity	**Schedule**
Sweep parking lots & impervious areas	Between November 15th and December 15th (after leaf fall) During April (after snow melt)
Remove and dispose of trash and debris onsite	Daily - As needed maintenance

Maintenance Schedule for Qualifying Pervious Area (QPA)	
Activity	**Schedule**
Sweep impervious areas	Between November 15th and December 15th (after leaf fall)
	During April (after snow melt)
Inspect QPA for erosion and loss of vegetation	Annually - As needed maintenance
Remove and dispose of trash and debris onsite	Annually - As needed maintenance



CLA Engineers, Inc.
CIVIL • STRUCTURAL • SURVEYING
317 Main Street Norwich, Connecticut
(860) 886-1966 Fax (860) 886-9165
e-mail: cla@claengineers.com

LOCUS MAP

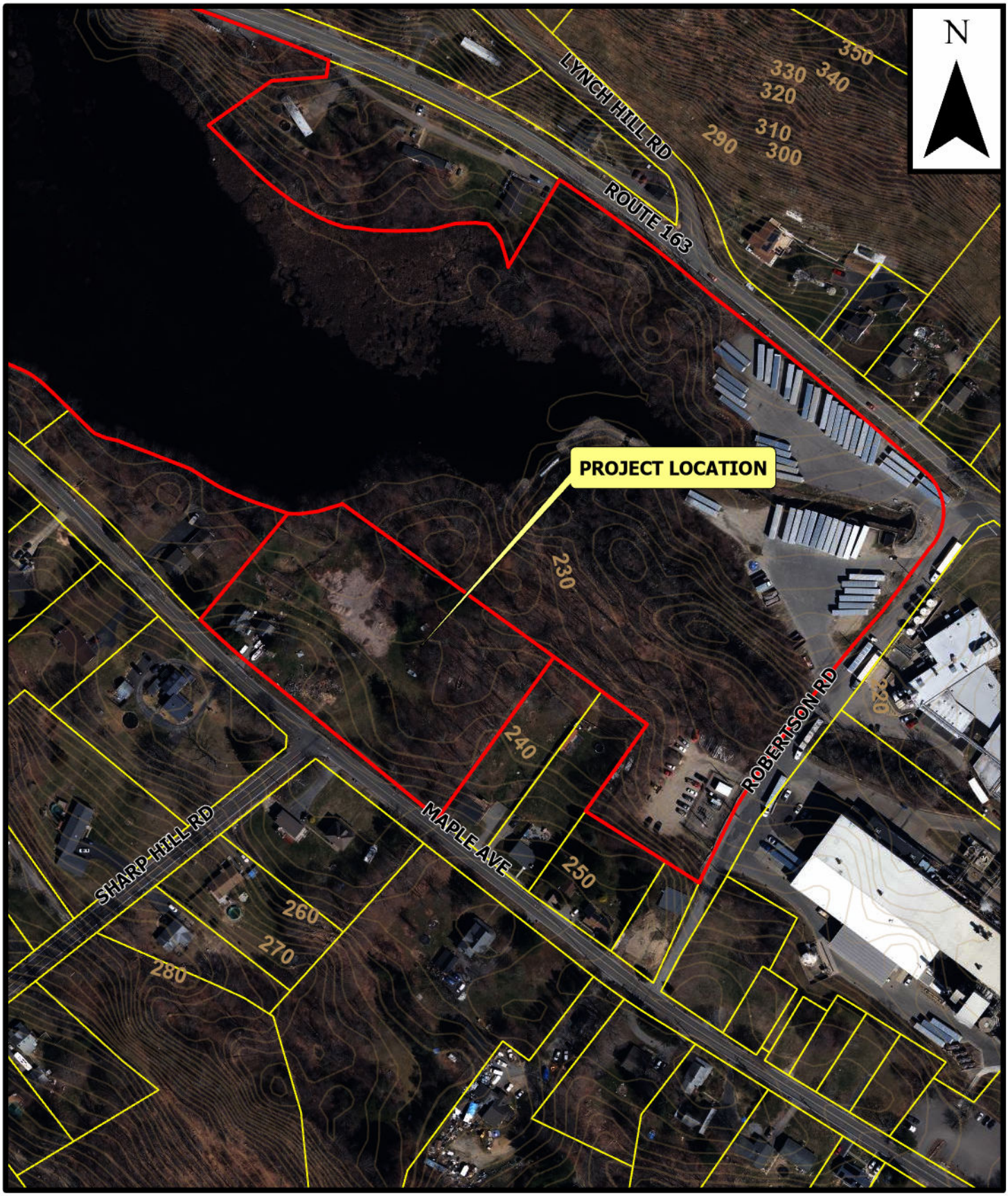
375 MAPLE AVENUE
MONTVILLE, CT

DATE: 11/7/2024

SCALE: 1"=2,000'

FIGURE

SK-1



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LOCATION MAP

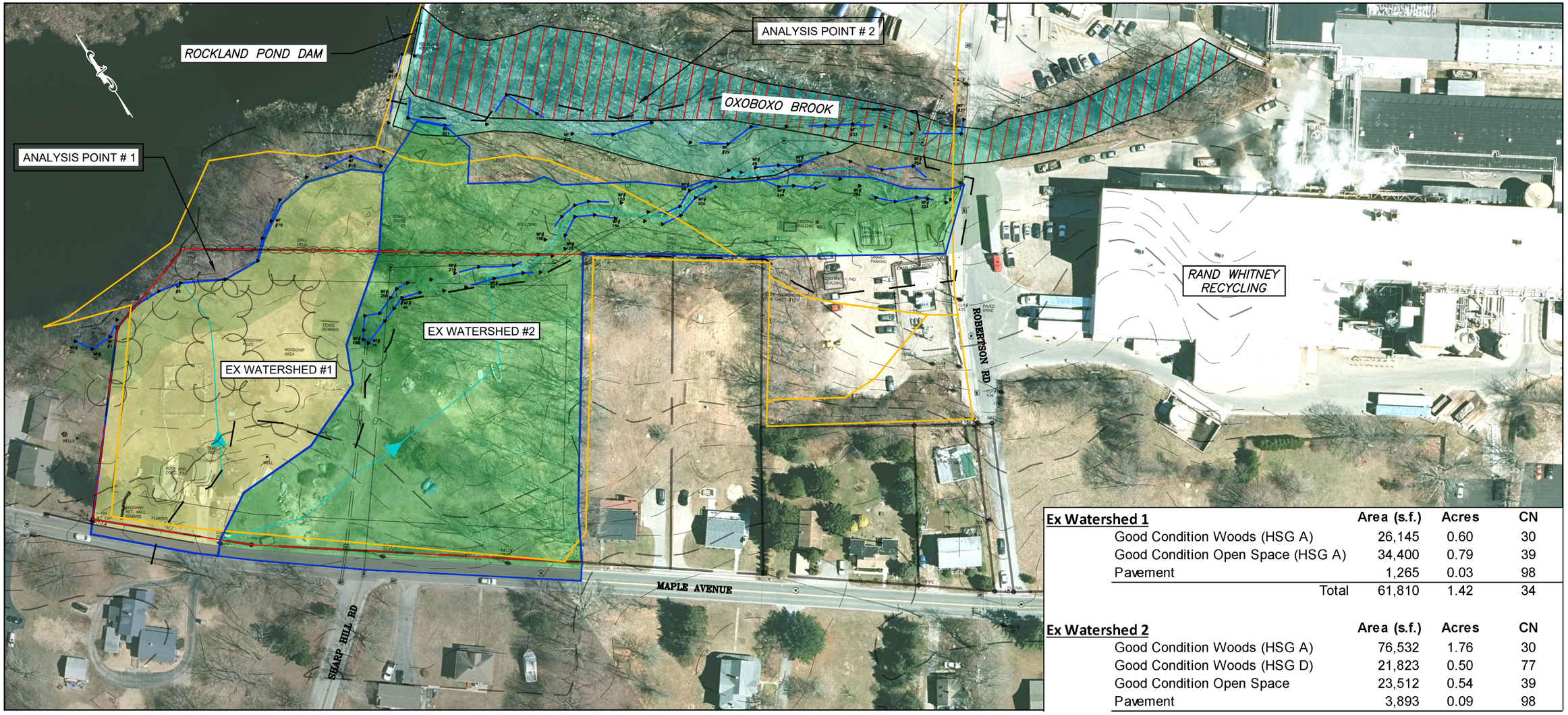
375 MAPLE AVENUE
MONTVILLE, CT

DATE: 11/7/2024

SCALE: 1"=200'

FIGURE

SK-2



Ex Watershed 1	Area (s.f.)	Acres	CN
Good Condition Woods (HSG A)	26,145	0.60	30
Good Condition Open Space (HSG A)	34,400	0.79	39
Pavement	1,265	0.03	98
Total	61,810	1.42	34

Ex Watershed 2	Area (s.f.)	Acres	CN
Good Condition Woods (HSG A)	76,532	1.76	30
Good Condition Woods (HSG D)	21,823	0.50	77
Good Condition Open Space	23,512	0.54	39
Pavement	3,893	0.09	98

Analysis Point #1	Peak Flow Rate (CFS)				
	2-Year	10-Year	25-Year	50-Year	100-Year
Existing Conditions	0.00	0.02	0.10	0.25	0.55
Analysis Point #2	**Peak Flow Rate (CFS)**				
	2-Year	10-Year	25-Year	50-Year	100-Year
Existing Conditions	0.01	0.24	0.77	1.40	2.20
Site Wide	**Peak Flow Rate (CFS)**				
	2-Year	10-Year	25-Year	50-Year	100-Year
Existing Conditions	0.01	0.24	0.86	1.64	2.72

LEGEND

- EXISTING WATERSHED 1
- EXISTING WATERSHED 2
- PROPERTY LINE
- WATERSHED BOUNDARY
- TIME OF CONCENTRATION FLOW PATH
- HYDROLOGICAL SOIL GROUP BOUNDARY
- FLOOD ZONE AE
- REGULATORY FLOODWAY

100' 0 100' 200'

SCALE: 1"=100'

No.	DATE	REVISION
1	01/08/25	TOWN COMMENTS

CLA Engineers, Inc.
CIVIL · STRUCTURAL · SURVEYING
317 Main Street Norwich, CT 06360
(860) 886-1966 Fax (860) 886-9165

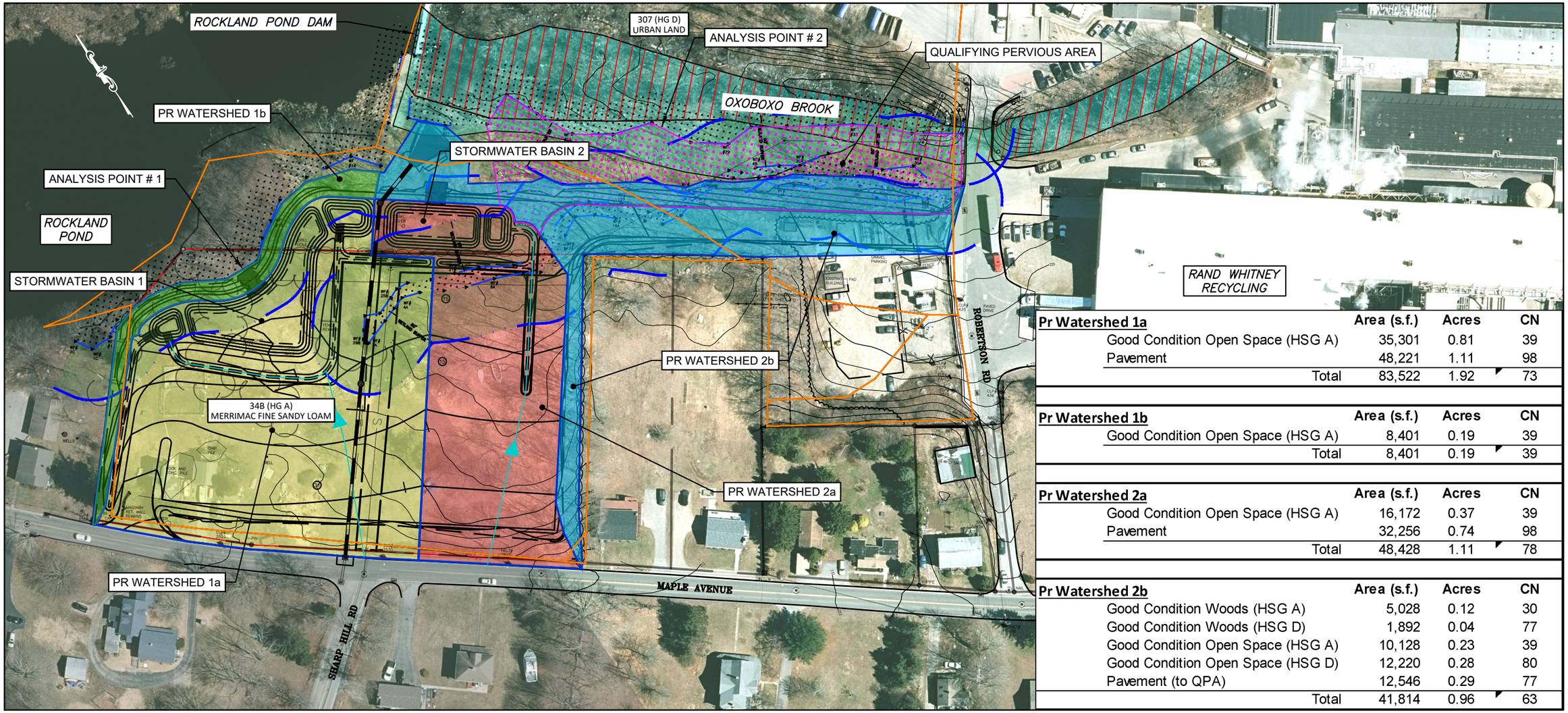
TOWN OF MONTVILLE / RAND WHITNEY

PROPOSED TRAILER STORAGE
375 MAPLE AVENUE
MONTVILLE, CT

EXISTING WATERSHED PLAN

Project No. CLA-7767F
Proj. Engineer D.P.H.
Date: 11/06/24
Sheet No. 3

CLA



Pr Watershed 1a	Area (s.f.)	Acres	CN
Good Condition Open Space (HSG A)	35,301	0.81	39
Pavement	48,221	1.11	98
Total	83,522	1.92	73

Pr Watershed 1b	Area (s.f.)	Acres	CN
Good Condition Open Space (HSG A)	8,401	0.19	39
Total	8,401	0.19	39

Pr Watershed 2a	Area (s.f.)	Acres	CN
Good Condition Open Space (HSG A)	16,172	0.37	39
Pavement	32,256	0.74	98
Total	48,428	1.11	78

Pr Watershed 2b	Area (s.f.)	Acres	CN
Good Condition Woods (HSG A)	5,028	0.12	30
Good Condition Woods (HSG D)	1,892	0.04	77
Good Condition Open Space (HSG A)	10,128	0.23	39
Good Condition Open Space (HSG D)	12,220	0.28	80
Pavement (to QPA)	12,546	0.29	77
Total	41,814	0.96	63

Analysis Point 1	Peak Flow Rate (CFS) per Storm Event				
	2-Year	10-Year	25-Year	50-Year	100-Year
Existing Conditions	0.00	0.02	0.10	0.25	0.55
Proposed Conditions	0.00	0.00	0.04	0.17	0.35
Difference	0.00	-0.02	-0.06	-0.08	-0.20

Analysis Point 2	Peak Flow Rate (CFS) per Storm Event				
	2-Year	10-Year	25-Year	50-Year	100-Year
Existing Conditions	0.01	0.24	0.77	1.40	2.20
Proposed Conditions	0.52	1.50	2.26	2.84	3.48
Difference	0.51	1.26	1.49	1.44	1.28

LEGEND

- PROPOSED WATERSHED 1a
- PROPOSED WATERSHED 1b
- PROPOSED WATERSHED 2a
- PROPOSED WATERSHED 2b
- QUALIFYING PERVIOUS AREA
- PROPERTY LINE
- WATERSHED BOUNDARY
- TIME OF CONCENTRATION FLOW PATH
- HYDROLOGICAL SOIL GROUP BOUNDARY
- FLOOD ZONE AE
- REGULATORY FLOODWAY

100' 0 100' 200'

SCALE: 1"=100'

No.	DATE	REVISION
1	01/08/25	TOWN COMMENTS

CLA Engineers, Inc.
CIVIL · STRUCTURAL · SURVEYING
317 Main Street Norwich, CT 06360
(860) 886-1966 Fax (860) 886-9165

TOWN OF MONTVILLE / RAND WHITNEY

PROPOSED TRAILER STORAGE
375 MAPLE AVENUE
MONTVILLE, CT

PROPOSED WATERSHED PLAN

Project No. CLA-7767F
Proj. Engineer D.P.H.
Date: 11/06/24
Sheet No. 4

CLA

Appendix A

NRCS Soil 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 State of Connecticut, Eastern Part

7767F Rand Whiney

November 8, 2024

Preface

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

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

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

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

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

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

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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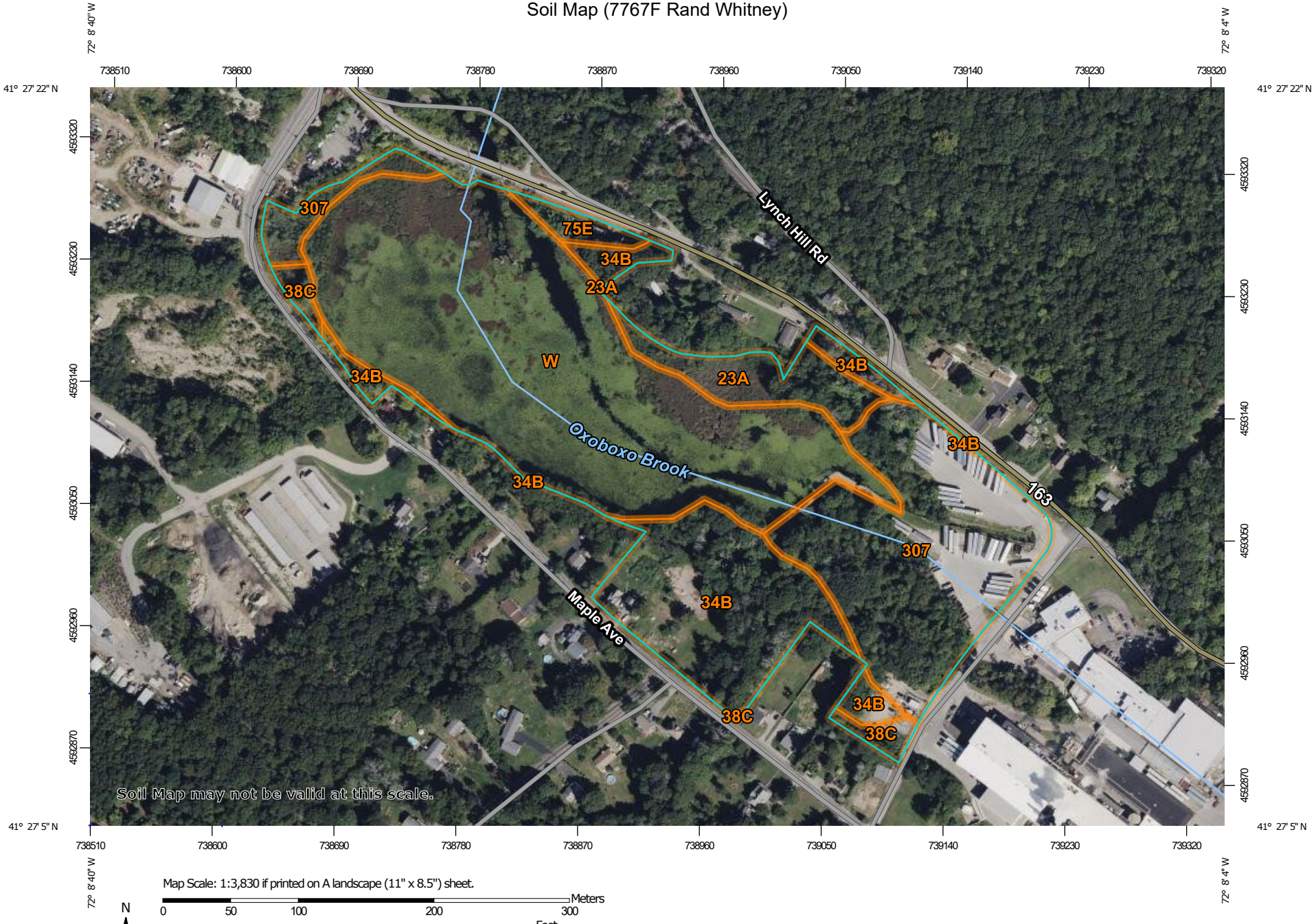
Contents

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 (7767F Rand Whitney)



MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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 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: State of Connecticut, Eastern Part
Survey Area Data: Version 2, Aug 30, 2024

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

Date(s) aerial images were photographed: Jun 14, 2022—Oct 6, 2022

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

Map Unit Legend (7767F Rand Whitney)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
23A	Sudbury sandy loam, 0 to 5 percent slopes	1.4	5.3%
34B	Merrimac fine sandy loam, 3 to 8 percent slopes	5.1	18.6%
38C	Hinckley loamy sand, 3 to 15 percent slopes	0.5	1.8%
75E	Hollis-Chatfield-Rock outcrop complex, 15 to 45 percent slopes	0.4	1.4%
307	Urban land	7.0	25.4%
W	Water	13.1	47.6%
Totals for Area of Interest		**27.5**	**100.0%**

Map Unit Descriptions (7767F Rand Whitney)

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.

State of Connecticut, Eastern Part

23A—Sudbury sandy loam, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 9lkv
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Sudbury and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sudbury

Setting

Landform: Terraces, outwash plains
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Sandy and gravelly glaciofluvial deposits derived from granite and/or schist and/or gneiss

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 5 inches: sandy loam
Bw1 - 5 to 17 inches: gravelly sandy loam
Bw2 - 17 to 25 inches: sandy loam
2C - 25 to 60 inches: stratified gravel to sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 17 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A/D
Ecological site: F144AY027MA - Moist Sandy Outwash
Hydric soil rating: No

Minor Components

Agawam

Percent of map unit: 5 percent

Landform: Terraces, outwash plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Merrimac
Percent of map unit: 5 percent
Landform: Terraces, outwash plains, kames
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Ninigret
Percent of map unit: 5 percent
Landform: Terraces, outwash plains
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Tisbury
Percent of map unit: 3 percent
Landform: Terraces, outwash plains
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Walpole
Percent of map unit: 2 percent
Landform: Drainageways on terraces, depressions on terraces
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

34B—Merrimac fine sandy loam, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: 2tyqs
Elevation: 0 to 1,290 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Merrimac and similar soils: 86 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Outwash plains, outwash terraces, moraines, eskers, kames
Landform position (two-dimensional): Backslope, footslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F145XY008MA - Dry Outwash
Hydric soil rating: No

Minor Components

Sudbury

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Nose slope, side slope, crest, head slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Windsor

Percent of map unit: 3 percent
Landform: Dunes, deltas, outwash terraces, outwash plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, riser
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Walpole

Percent of map unit: 1 percent
Landform: Depressions
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F144AY028MA - Wet Outwash
Hydric soil rating: Yes

38C—Hinckley loamy sand, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2svmb
Elevation: 0 to 1,290 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Hinckley and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hinckley

Setting

Landform: Outwash deltas, outwash terraces, moraines, eskers, kames, outwash plains, kame terraces
Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope, summit
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, riser, tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave

Parent material: Sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 8 inches: loamy sand
Bw1 - 8 to 11 inches: gravelly loamy sand
Bw2 - 11 to 16 inches: gravelly loamy sand
BC - 16 to 19 inches: very gravelly loamy sand
C - 19 to 65 inches: very gravelly sand

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 5 percent
Landform: Kames, outwash plains, outwash terraces, moraines, eskers
Landform position (two-dimensional): Backslope, footslope, shoulder, toeslope, summit
Landform position (three-dimensional): Side slope, crest, head slope, nose slope, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Windsor

Percent of map unit: 5 percent
Landform: Moraines, eskers, kames, outwash deltas, outwash terraces, outwash plains, kame terraces
Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope, summit
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, riser, tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Agawam

Percent of map unit: 3 percent
Landform: Outwash deltas, outwash terraces, moraines, eskers, kames, outwash plains, kame terraces
Landform position (two-dimensional): Shoulder, backslope, toeslope, summit, footslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, riser, tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Sudbury

Percent of map unit: 2 percent
Landform: Outwash deltas, moraines, outwash plains, kame terraces, outwash terraces
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: No

75E—Hollis-Chatfield-Rock outcrop complex, 15 to 45 percent slopes

Map Unit Setting

National map unit symbol: 9lqp
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Hollis and similar soils: 35 percent
Chatfield and similar soils: 30 percent
Rock outcrop: 15 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hollis

Setting

Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material

A - 1 to 6 inches: gravelly fine sandy loam
Bw1 - 6 to 9 inches: channery fine sandy loam
Bw2 - 9 to 15 inches: gravelly fine sandy loam
2R - 15 to 80 inches: bedrock

Properties and qualities

Slope: 15 to 45 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 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 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Description of Chatfield

Setting

Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material
A - 1 to 6 inches: gravelly fine sandy loam
Bw1 - 6 to 15 inches: gravelly fine sandy loam
Bw2 - 15 to 29 inches: gravelly fine sandy loam
2R - 29 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 45 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 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: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Rock Outcrop

Typical profile

R - 0 to 0 inches: bedrock

Properties and qualities

Slope: 15 to 45 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: Very high

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Charlton

Percent of map unit: 7 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Leicester

Percent of map unit: 5 percent
Landform: Drainageways, depressions
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Sutton, very stony

Percent of map unit: 5 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Unnamed, red parent material

Percent of map unit: 1 percent
Hydric soil rating: No

Unnamed, sandy subsoil

Percent of map unit: 1 percent
Hydric soil rating: No

Brimfield

Percent of map unit: 1 percent
Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

307—Urban land

Map Unit Setting

National map unit symbol: 9lmh
Elevation: 0 to 2,000 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 120 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Typical profile

H - 0 to 6 inches: material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Unnamed, undisturbed soils

Percent of map unit: 10 percent
Hydric soil rating: No

Udorthents, wet substratum

Percent of map unit: 10 percent
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

W—Water

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group (7767F Rand Whitney)

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.

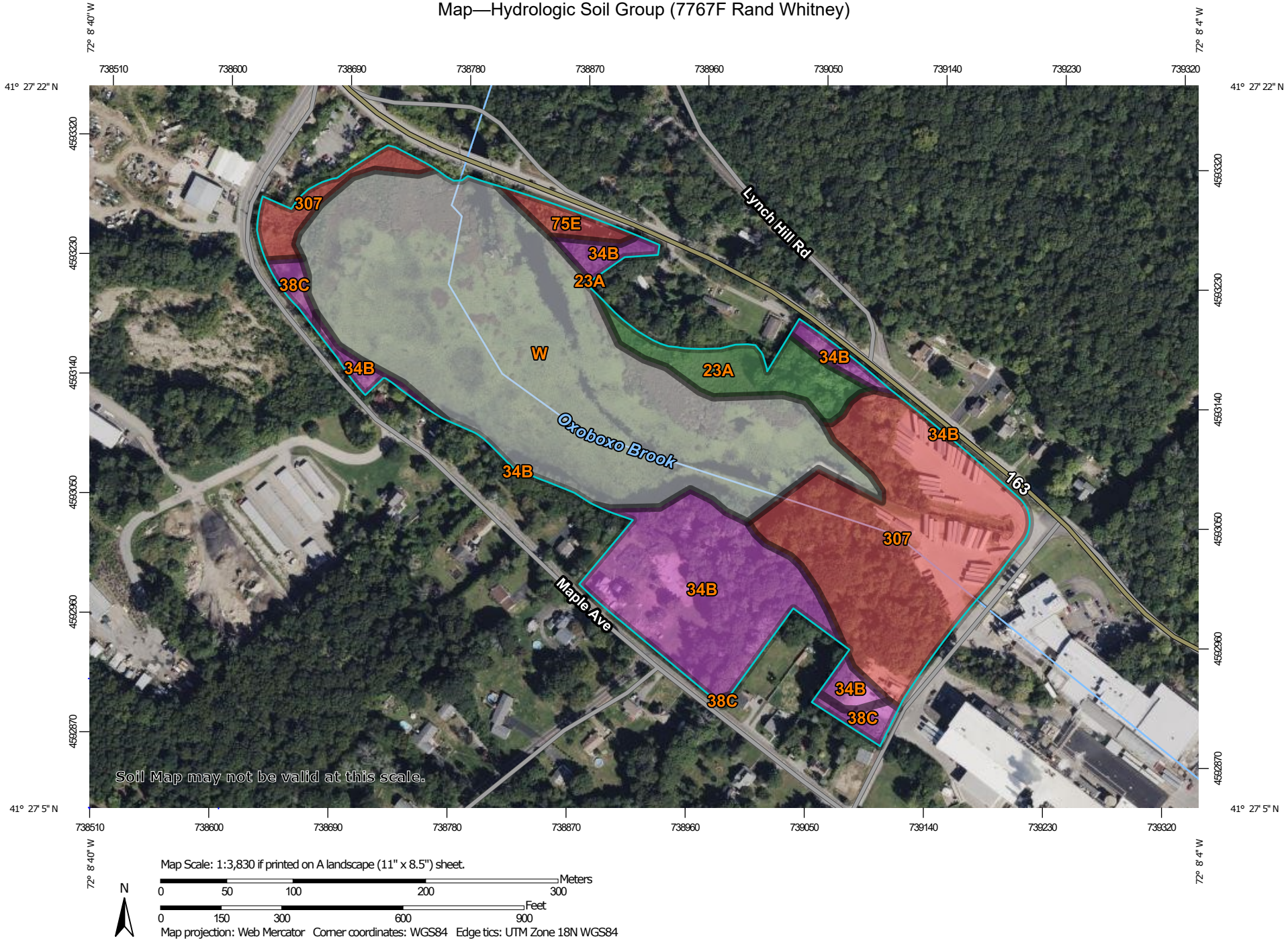
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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.

Map—Hydrologic Soil Group (7767F Rand Whitney)



Map Scale: 1:3,830 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N 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 1:12,000.

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 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: State of Connecticut, Eastern Part
Survey Area Data: Version 2, Aug 30, 2024

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

Date(s) aerial images were photographed: Jun 14, 2022—Oct 6, 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.

Table—Hydrologic Soil Group (7767F Rand Whitney)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
23A	Sudbury sandy loam, 0 to 5 percent slopes	A/D	1.4	5.3%
34B	Merrimac fine sandy loam, 3 to 8 percent slopes	A	5.1	18.6%
38C	Hinckley loamy sand, 3 to 15 percent slopes	A	0.5	1.8%
75E	Hollis-Chatfield-Rock outcrop complex, 15 to 45 percent slopes	D	0.4	1.4%
307	Urban land	D	7.0	25.4%
W	Water		13.1	47.6%
Totals for Area of Interest			**27.5**	**100.0%**

Rating Options—Hydrologic Soil Group (7767F Rand Whitney)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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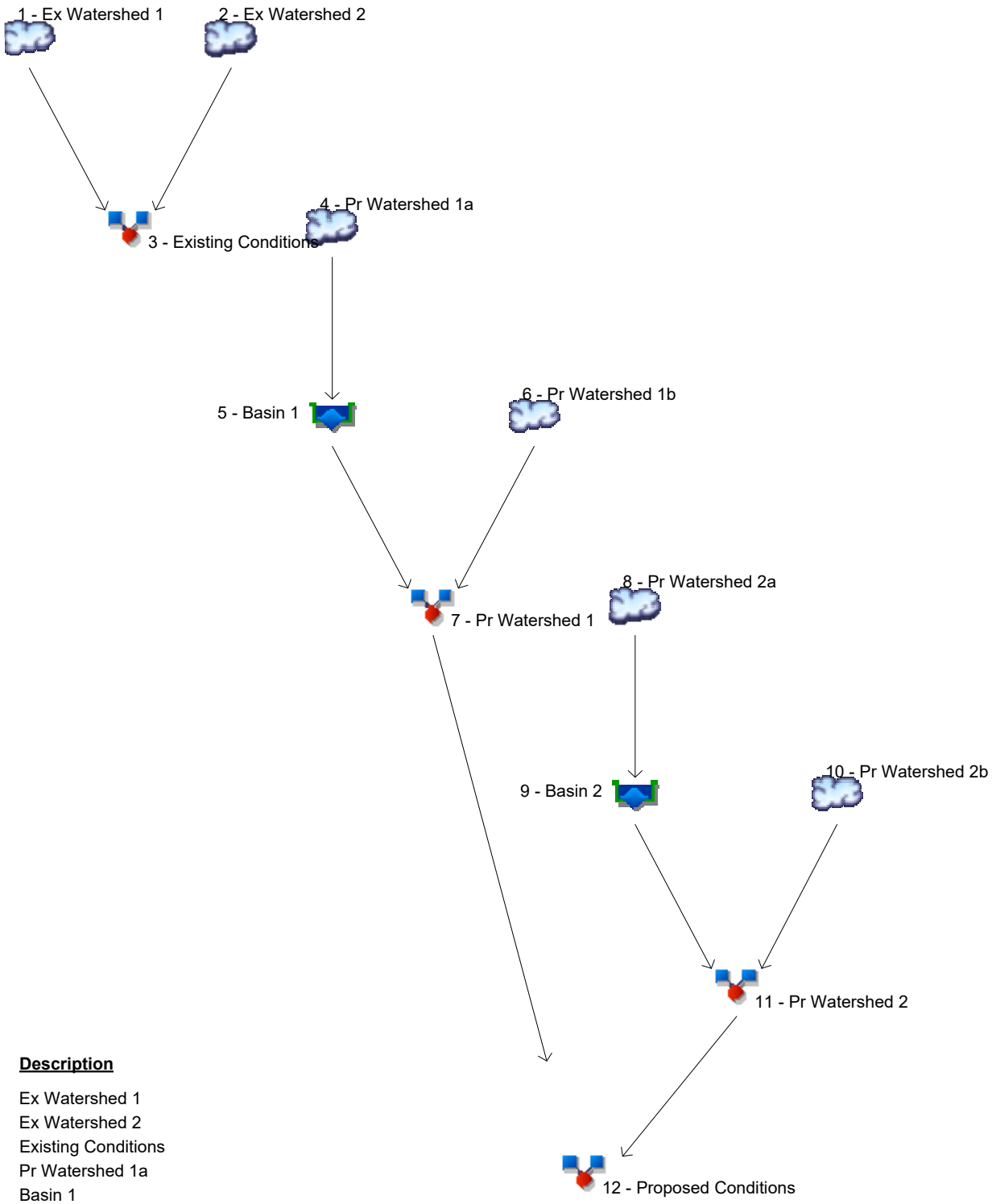
Appendix B

Hydrograph Reports – 2, 10 & 100-Year Frequencies

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	Ex Watershed 1
2	SCS Runoff	Ex Watershed 2
3	Combine	Existing Conditions
4	SCS Runoff	Pr Watershed 1a
5	Reservoir	Basin 1
6	SCS Runoff	Pr Watershed 1b
7	Combine	Pr Watershed 1
8	SCS Runoff	Pr Watershed 2a
9	Reservoir	Basin 2
10	SCS Runoff	Pr Watershed 2b
11	Combine	Pr Watershed 2
12	Combine	Proposed Conditions

Hydraflow Table of Contents

Analysis.gpw

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024 Tuesday, 01 / 14 / 2025

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	------	-------	0.000	-------	-------	0.021	0.097	0.248	0.546	Ex Watershed 1
2	SCS Runoff	------	-------	0.011	-------	-------	0.243	0.773	1.395	2.205	Ex Watershed 2
3	Combine	1, 2	-------	0.011	-------	-------	0.243	0.860	1.637	2.721	Existing Conditions
4	SCS Runoff	------	-------	1.897	-------	-------	4.074	5.544	6.676	7.884	Pr Watershed 1a
5	Reservoir	4	-------	0.000	-------	-------	0.000	0.000	0.171	0.347	Basin 1
6	SCS Runoff	------	-------	0.000	-------	-------	0.007	0.035	0.092	0.169	Pr Watershed 1b
7	Combine	5, 6	-------	0.000	-------	-------	0.007	0.035	0.178	0.361	Pr Watershed 1
8	SCS Runoff	------	-------	1.682	-------	-------	3.256	4.280	5.058	5.880	Pr Watershed 2a
9	Reservoir	8	-------	0.000	-------	-------	0.093	0.353	0.767	1.615	Basin 2
10	SCS Runoff	------	-------	0.519	-------	-------	1.522	2.257	2.842	3.481	Pr Watershed 2b
11	Combine	9, 10	-------	0.519	-------	-------	1.522	2.257	2.842	3.481	Pr Watershed 2
12	Combine	7, 11	-------	0.519	-------	-------	1.522	2.289	2.935	3.648	Proposed Conditions

Hydrograph Summary Report

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

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.000	1	n/a	0	------	------	------	Ex Watershed 1
2	SCS Runoff	0.011	1	1301	346	------	------	------	Ex Watershed 2
3	Combine	0.011	1	1301	346	1, 2	------	------	Existing Conditions
4	SCS Runoff	1.897	1	733	7,988	------	------	------	Pr Watershed 1a
5	Reservoir	0.000	1	n/a	0	4	232.23	7,988	Basin 1
6	SCS Runoff	0.000	1	1424	5	------	------	------	Pr Watershed 1b
7	Combine	0.000	1	1424	5	5, 6	------	------	Pr Watershed 1
8	SCS Runoff	1.682	1	729	5,881	------	------	------	Pr Watershed 2a
9	Reservoir	0.000	1	n/a	0	8	233.12	5,881	Basin 2
10	SCS Runoff	0.519	1	730	2,214	------	------	------	Pr Watershed 2b
11	Combine	0.519	1	730	2,214	9, 10	------	------	Pr Watershed 2
12	Combine	0.519	1	730	2,219	7, 11	------	------	Proposed Conditions

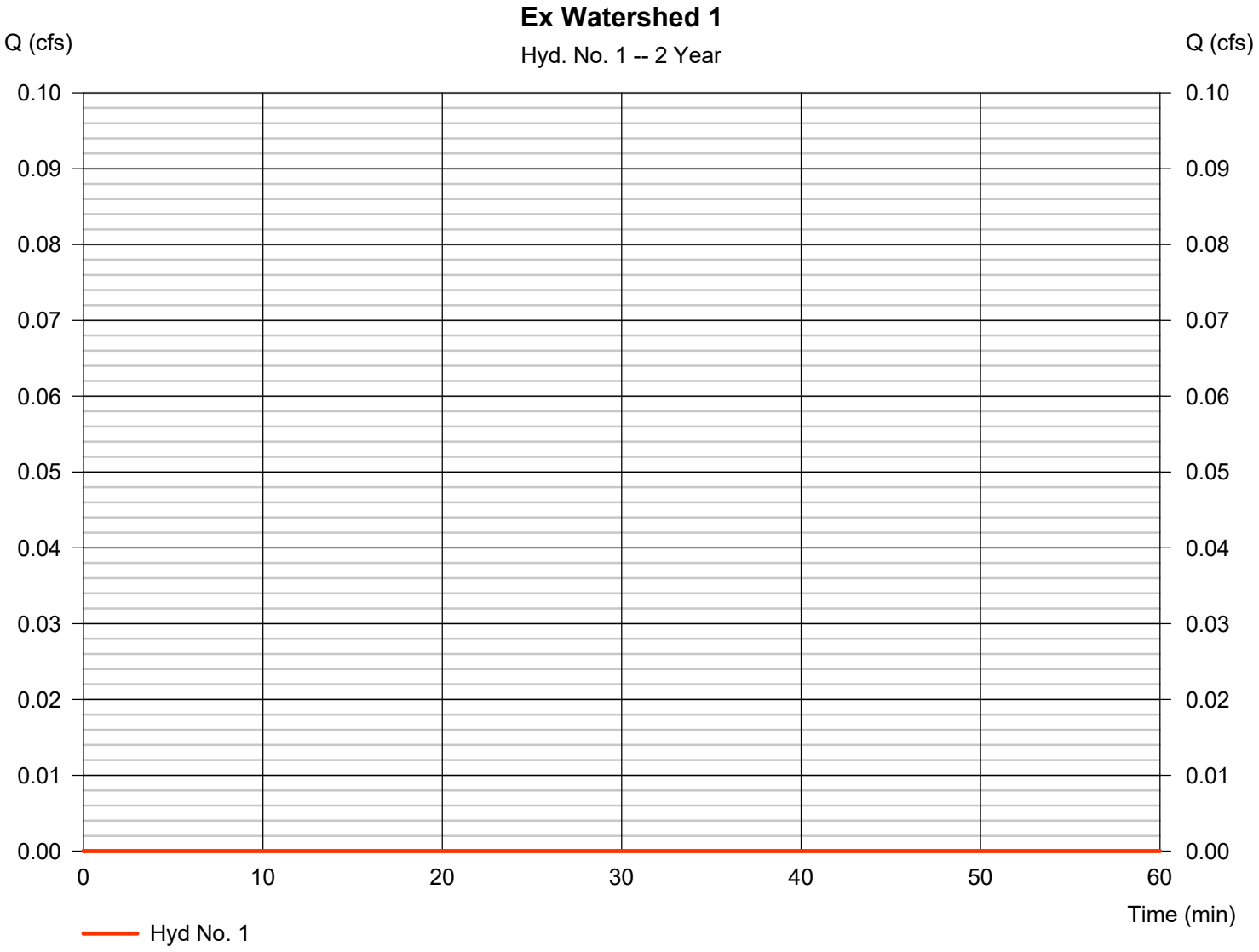
Hydrograph Report

Hyd. No. 1

Ex Watershed 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	=	1.420 ac	Curve number	=	36*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	10.30 min
Total precip.	=	3.45 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1 hr.cda	Shape factor	=	484

* Composite (Area/CN) = [(0.600 x 30) + (0.790 x 39) + (0.030 x 98)] / 1.420



TR55 Tc Worksheet

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

Hyd. No. 1

Ex Watershed 1

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 40.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.45		0.00		0.00		
Land slope (%)	= 1.10		0.00		0.00		
Travel Time (min)	**= 8.39**	**+**	**0.00**	**+**	**0.00**	**=**	**8.39**
Shallow Concentrated Flow							
Flow length (ft)	= 65.00		74.00		43.00		
Watercourse slope (%)	= 12.70		5.00		0.10		
Surface description	= Unpaved		Unpaved		Unpaved		
Average velocity (ft/s)	=5.75		3.61		0.51		
Travel Time (min)	**= 0.19**	**+**	**0.34**	**+**	**1.40**	**=**	**1.93**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

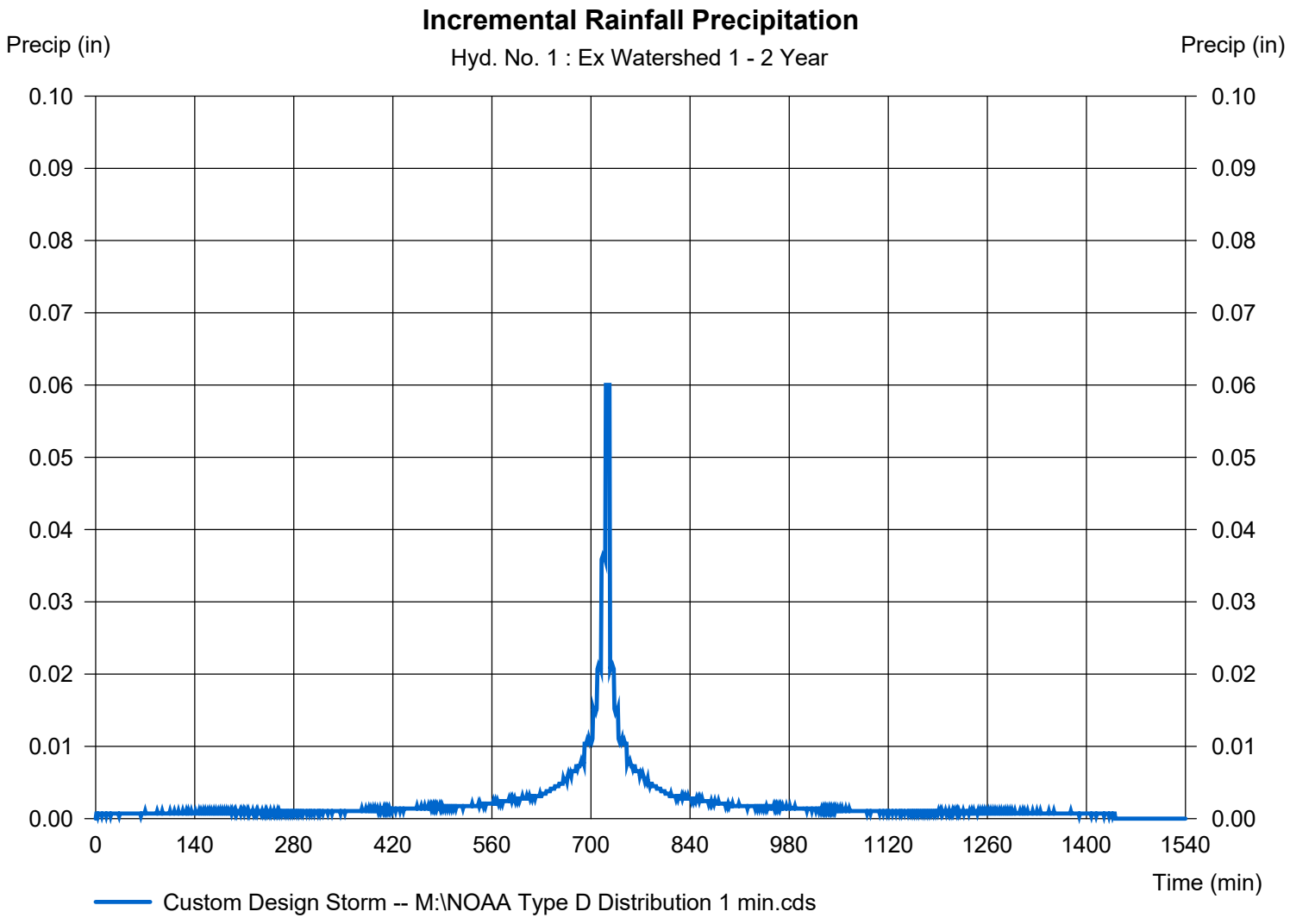
Total Travel Time, Tc ..... 10.30 min

Precipitation Report

Hyd. No. 1

Ex Watershed 1

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.4500 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		



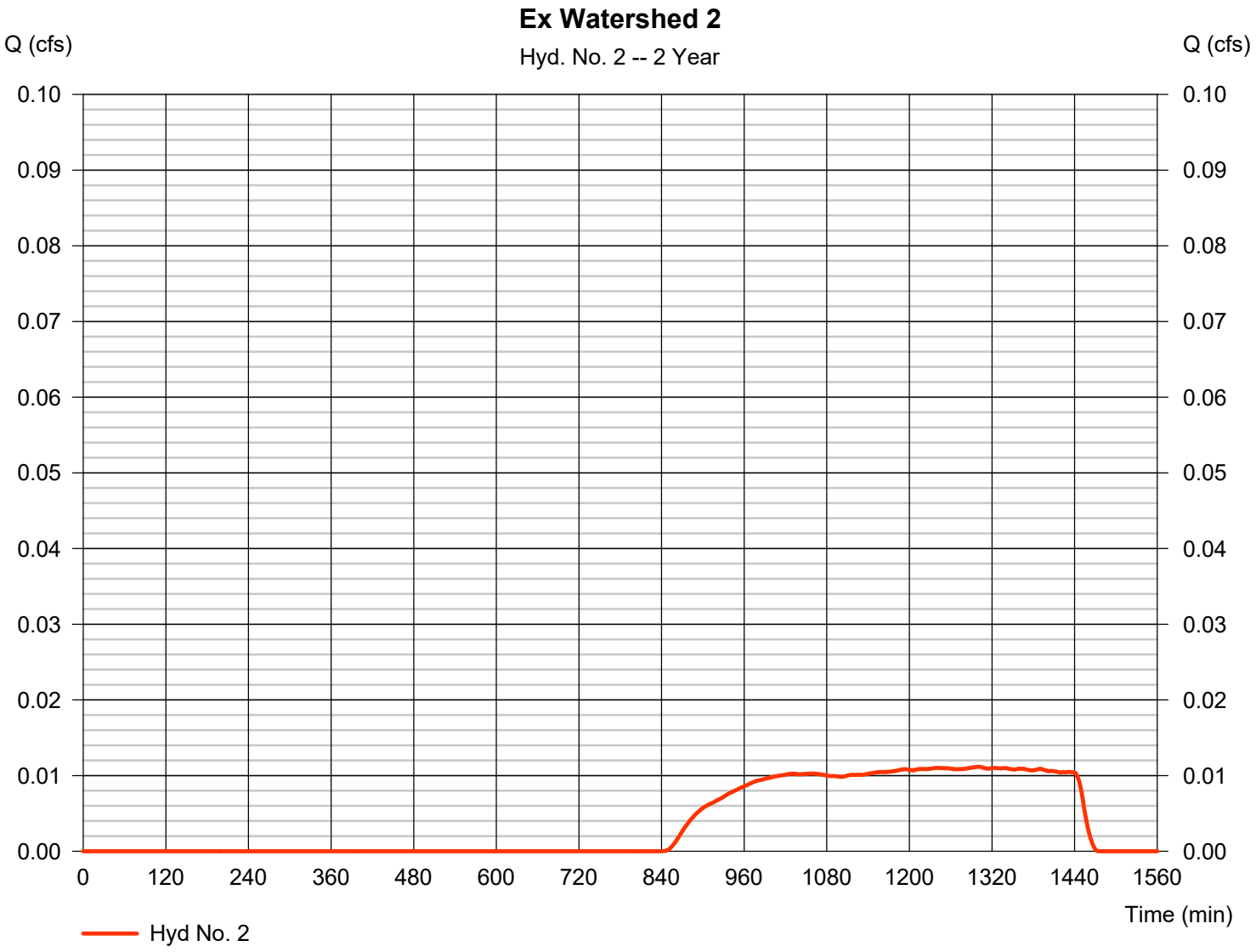
Hydrograph Report

Hyd. No. 2

Ex Watershed 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.011 cfs
Storm frequency	=	2 yrs	Time to peak	=	1301 min
Time interval	=	1 min	Hyd. volume	=	346 cuft
Drainage area	=	2.890 ac	Curve number	=	42*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	20.40 min
Total precip.	=	3.45 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1hr.cda	Shape factor	=	484

* Composite (Area/CN) = [(1.760 x 30) + (0.500 x 77) + (0.540 x 39) + (0.090 x 98)] / 2.890



TR55 Tc Worksheet

Hyd. No. 2

Ex Watershed 2

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 138.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.45		0.00		0.00		
Land slope (%)	= 2.40		0.00		0.00		
Travel Time (min)	**= 16.53**	**+**	**0.00**	**+**	**0.00**	**=**	**16.53**
Shallow Concentrated Flow							
Flow length (ft)	= 80.00		200.00		181.00		
Watercourse slope (%)	= 6.00		2.40		1.90		
Surface description	= Unpaved		Unpaved		Unpaved		
Average velocity (ft/s)	=3.95		2.50		2.22		
Travel Time (min)	**= 0.34**	**+**	**1.33**	**+**	**1.36**	**=**	**3.03**
Channel Flow							
X sectional flow area (sqft)	= 13.00		0.00		0.00		
Wetted perimeter (ft)	= 15.00		0.00		0.00		
Channel slope (%)	= 3.10		0.00		0.00		
Manning's n-value	= 0.040		0.015		0.015		
Velocity (ft/s)	=5.96						
			0.00				
					0.00		
Flow length (ft)	({0})311.0		0.0		0.0		
Travel Time (min)	**= 0.87**	**+**	**0.00**	**+**	**0.00**	**=**	**0.87**

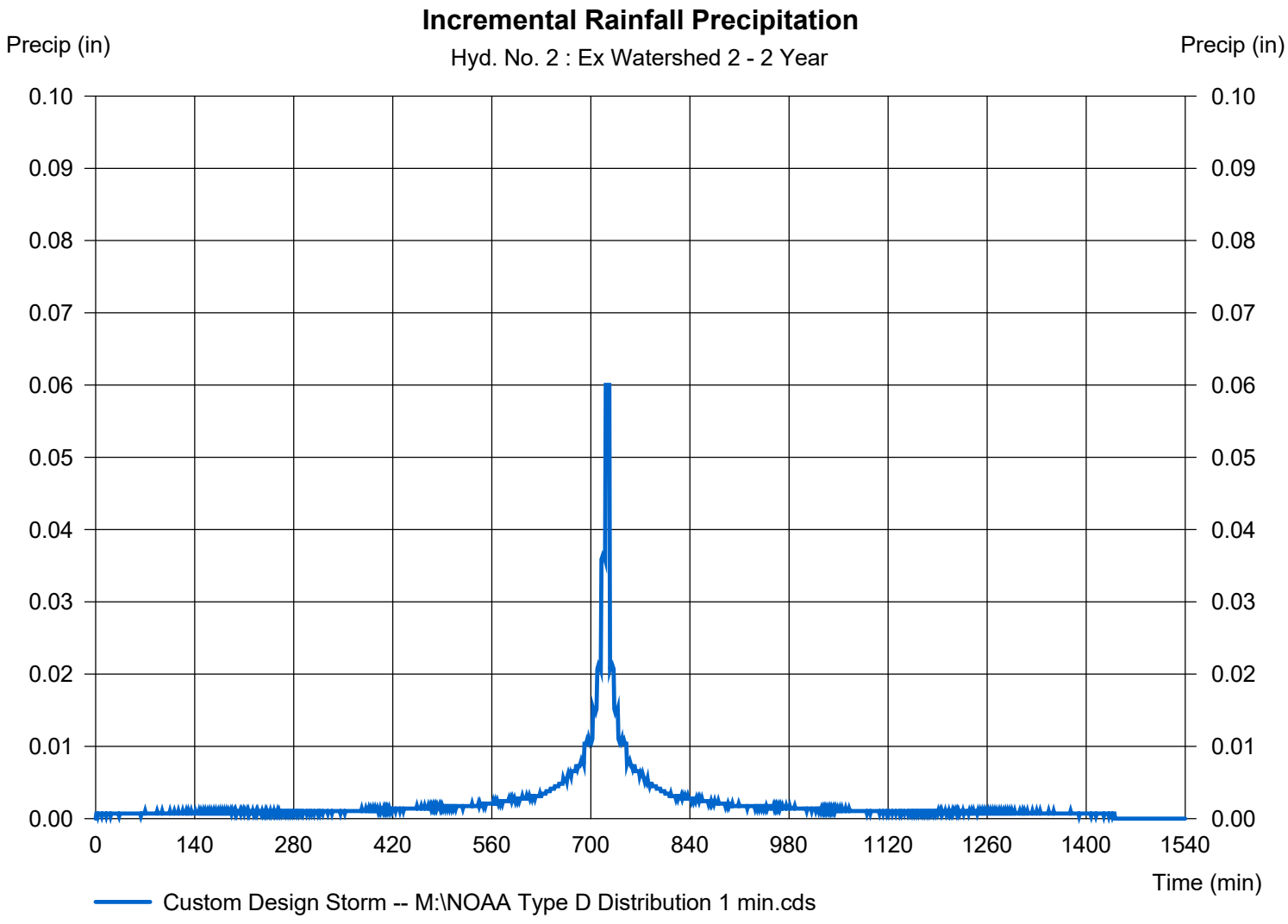
Total Travel Time, Tc ..... 20.40 min

Precipitation Report

Hyd. No. 2

Ex Watershed 2

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.4500 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		

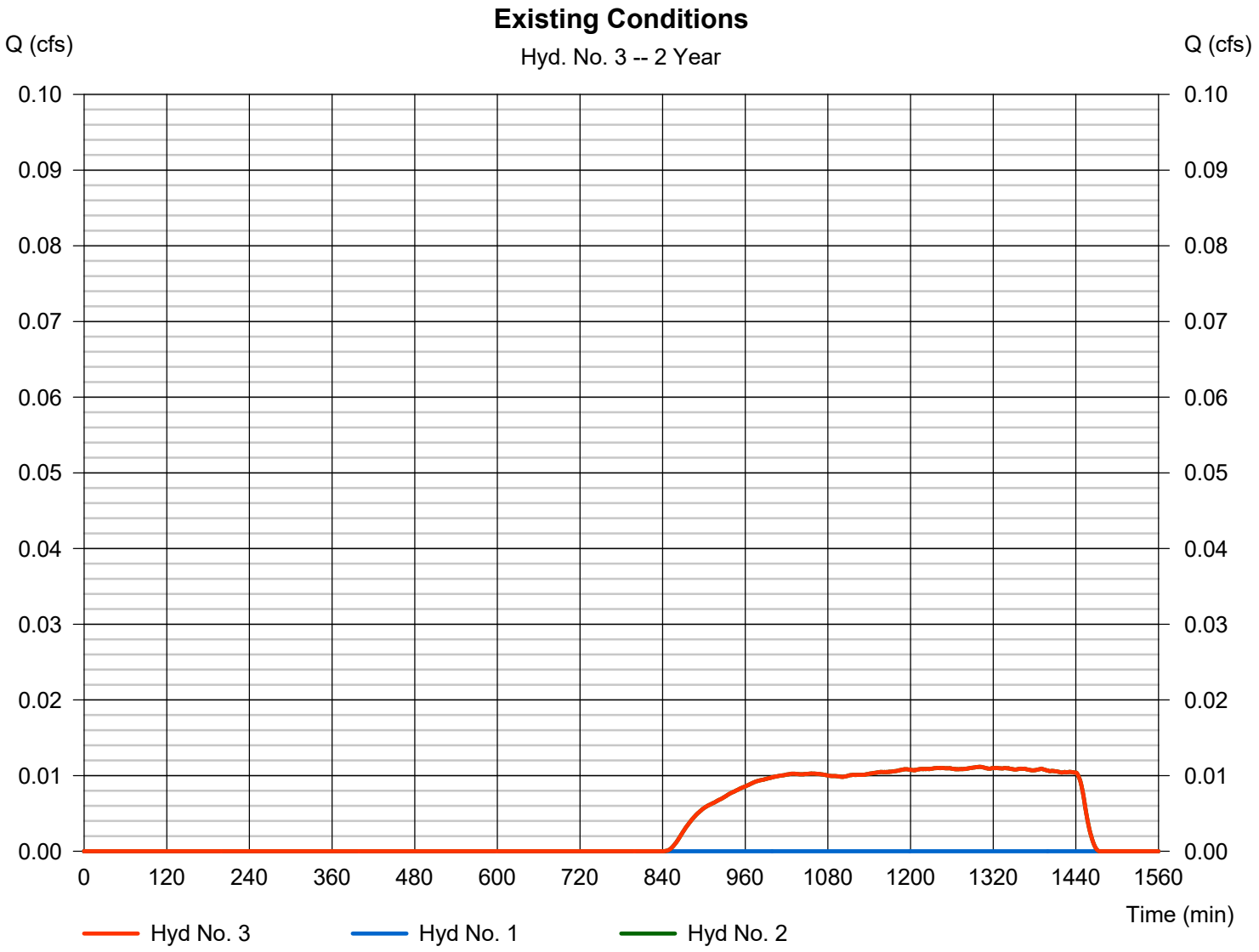


Hydrograph Report

Hyd. No. 3

Existing Conditions

Hydrograph type	= Combine	Peak discharge	= 0.011 cfs
Storm frequency	= 2 yrs	Time to peak	= 1301 min
Time interval	= 1 min	Hyd. volume	= 346 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 4.310 ac



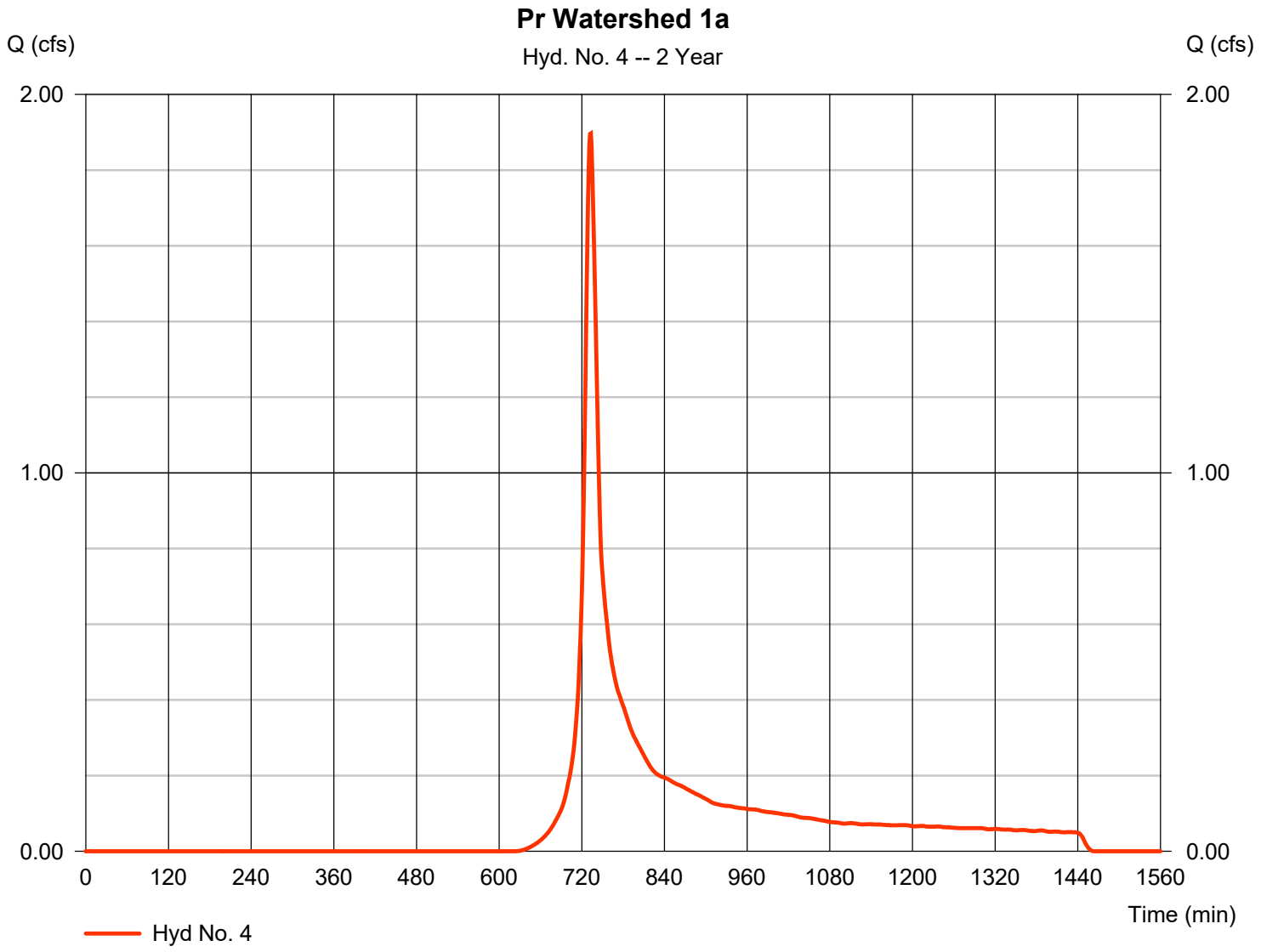
Hydrograph Report

Hyd. No. 4

Pr Watershed 1a

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.897 cfs
Storm frequency	=	2 yrs	Time to peak	=	733 min
Time interval	=	1 min	Hyd. volume	=	7,988 cuft
Drainage area	=	1.920 ac	Curve number	=	73*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	14.50 min
Total precip.	=	3.45 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1hr.csv	Shape factor	=	484

* Composite (Area/CN) = [(0.810 x 39) + (1.110 x 98)] / 1.920



TR55 Tc Worksheet

Hyd. No. 4

Pr Watershed 1a

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.011		0.011		
Flow length (ft)	= 151.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.45		0.00		0.00		
Land slope (%)	= 3.70		0.00		0.00		
Travel Time (min)	**= 1.27**	**+**	**0.00**	**+**	**0.00**	**=**	**1.27**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		0.00		0.00		
Watercourse slope (%)	= 0.00		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	=0.00		0.00		0.00		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow							
X sectional flow area (sqft)	= 5.00		0.00		0.00		
Wetted perimeter (ft)	= 8.00		0.00		0.00		
Channel slope (%)	= 0.40		0.00		0.00		
Manning's n-value	= 0.400		0.015		0.015		
Velocity (ft/s)	=0.17						
			0.00				
					0.00		
Flow length (ft)	({0})136.0		0.0		0.0		
Travel Time (min)	**= 13.18**	**+**	**0.00**	**+**	**0.00**	**=**	**13.18**

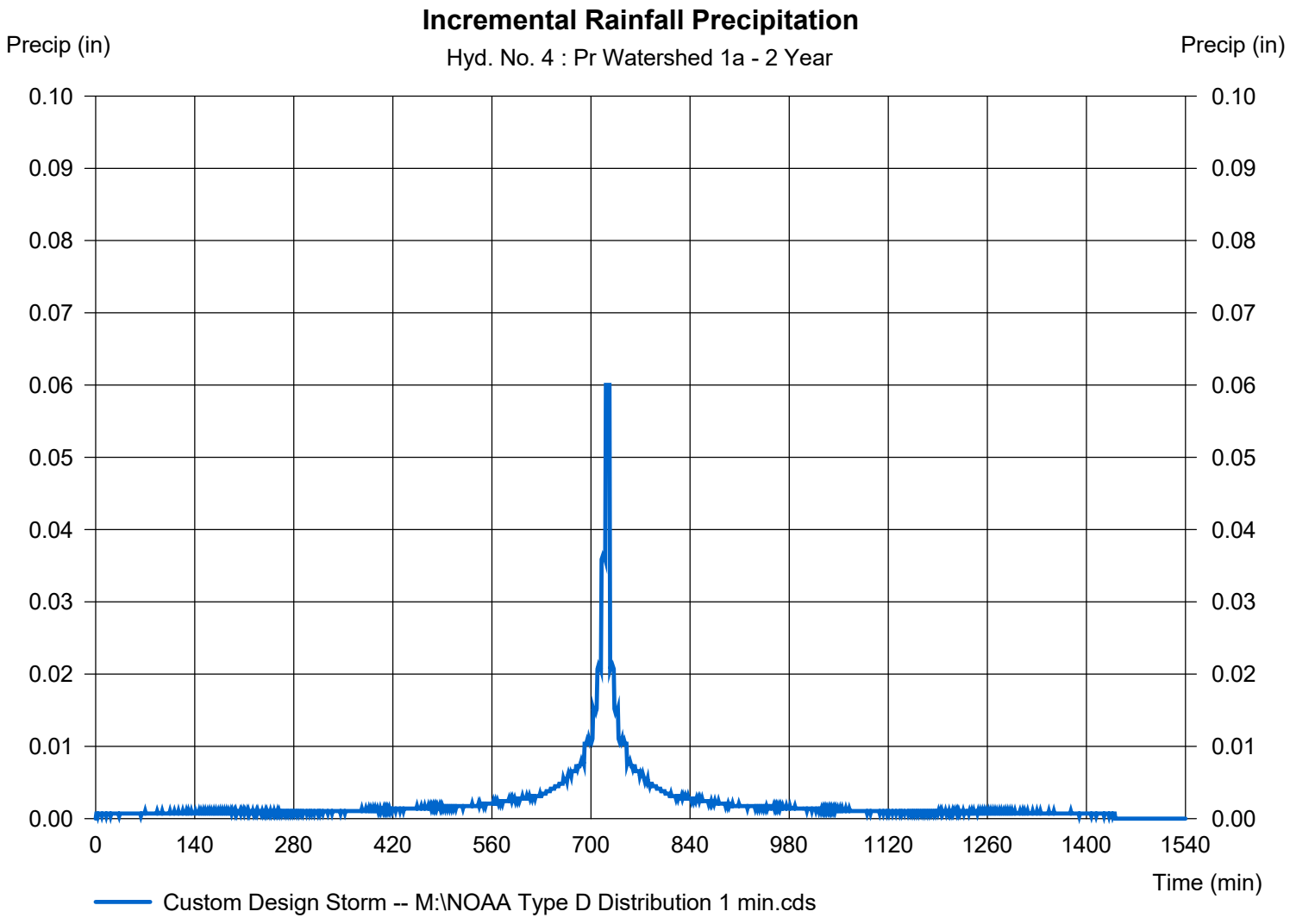
Total Travel Time, Tc ..... 14.50 min

Precipitation Report

Hyd. No. 4

Pr Watershed 1a

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.4500 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		



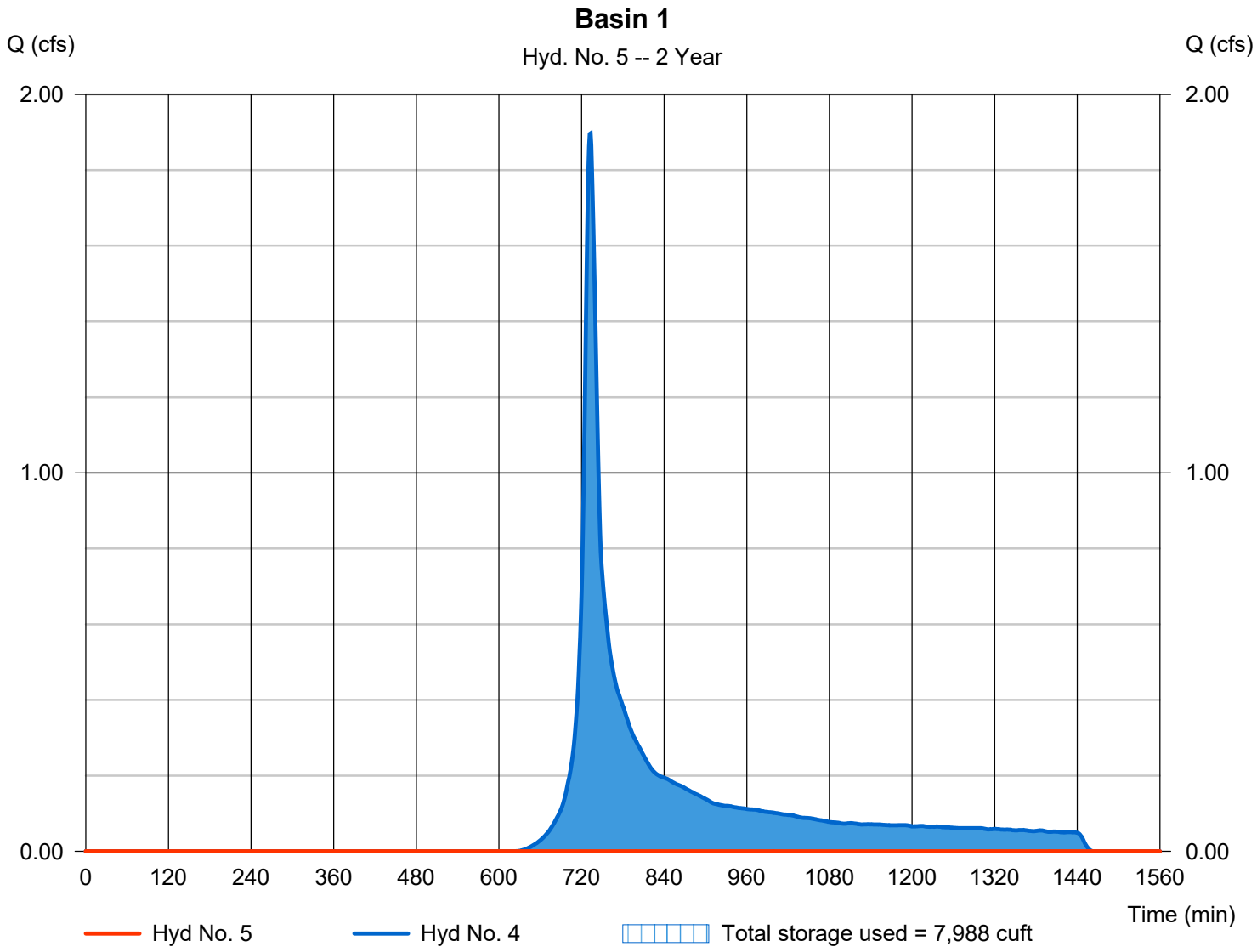
Hydrograph Report

Hyd. No. 5

Basin 1

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	4 - Pr Watershed 1a	Max. Elevation	=	232.23 ft
Reservoir name	=	Pond 1	Max. Storage	=	7,988 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - Pond 1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 231.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	231.00	5,359	0	0
1.00	232.00	7,040	6,180	6,180
2.00	233.00	8,883	7,943	14,123
3.00	234.00	11,264	10,049	24,172
4.00	235.00	13,394	12,312	36,484

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)	= 8.00	0.00	0.00	0.00
Crest El. (ft)	= 234.00	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	231.00	---	---	---	---	0.00	---	---	---	---	---	0.000
0.10	618	231.10	---	---	---	---	0.00	---	---	---	---	---	0.000
0.20	1,236	231.20	---	---	---	---	0.00	---	---	---	---	---	0.000
0.30	1,854	231.30	---	---	---	---	0.00	---	---	---	---	---	0.000
0.40	2,472	231.40	---	---	---	---	0.00	---	---	---	---	---	0.000
0.50	3,090	231.50	---	---	---	---	0.00	---	---	---	---	---	0.000
0.60	3,708	231.60	---	---	---	---	0.00	---	---	---	---	---	0.000
0.70	4,326	231.70	---	---	---	---	0.00	---	---	---	---	---	0.000
0.80	4,944	231.80	---	---	---	---	0.00	---	---	---	---	---	0.000
0.90	5,562	231.90	---	---	---	---	0.00	---	---	---	---	---	0.000
1.00	6,180	232.00	---	---	---	---	0.00	---	---	---	---	---	0.000
1.10	6,974	232.10	---	---	---	---	0.00	---	---	---	---	---	0.000
1.20	7,768	232.20	---	---	---	---	0.00	---	---	---	---	---	0.000
1.30	8,563	232.30	---	---	---	---	0.00	---	---	---	---	---	0.000
1.40	9,357	232.40	---	---	---	---	0.00	---	---	---	---	---	0.000
1.50	10,151	232.50	---	---	---	---	0.00	---	---	---	---	---	0.000
1.60	10,946	232.60	---	---	---	---	0.00	---	---	---	---	---	0.000
1.70	11,740	232.70	---	---	---	---	0.00	---	---	---	---	---	0.000
1.80	12,534	232.80	---	---	---	---	0.00	---	---	---	---	---	0.000
1.90	13,328	232.90	---	---	---	---	0.00	---	---	---	---	---	0.000
2.00	14,123	233.00	---	---	---	---	0.00	---	---	---	---	---	0.000
2.10	15,128	233.10	---	---	---	---	0.00	---	---	---	---	---	0.000
2.20	16,132	233.20	---	---	---	---	0.00	---	---	---	---	---	0.000
2.30	17,137	233.30	---	---	---	---	0.00	---	---	---	---	---	0.000
2.40	18,142	233.40	---	---	---	---	0.00	---	---	---	---	---	0.000
2.50	19,147	233.50	---	---	---	---	0.00	---	---	---	---	---	0.000
2.60	20,152	233.60	---	---	---	---	0.00	---	---	---	---	---	0.000
2.70	21,157	233.70	---	---	---	---	0.00	---	---	---	---	---	0.000
2.80	22,162	233.80	---	---	---	---	0.00	---	---	---	---	---	0.000
2.90	23,167	233.90	---	---	---	---	0.00	---	---	---	---	---	0.000
3.00	24,172	234.00	---	---	---	---	0.00	---	---	---	---	---	0.000
3.10	25,403	234.10	---	---	---	---	0.84	---	---	---	---	---	0.843
3.20	26,634	234.20	---	---	---	---	2.38	---	---	---	---	---	2.383
3.30	27,865	234.30	---	---	---	---	4.38	---	---	---	---	---	4.377
3.40	29,097	234.40	---	---	---	---	6.74	---	---	---	---	---	6.739
3.50	30,328	234.50	---	---	---	---	9.42	---	---	---	---	---	9.419
3.60	31,559	234.60	---	---	---	---	12.38	---	---	---	---	---	12.38
3.70	32,790	234.70	---	---	---	---	15.60	---	---	---	---	---	15.60

Continues on next page...

Pond 1

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
3.80	34,022	234.80	---	---	---	---	19.06	---	---	---	---	---	19.06
3.90	35,253	234.90	---	---	---	---	22.75	---	---	---	---	---	22.75
4.00	36,484	235.00	---	---	---	---	26.64	---	---	---	---	---	26.64

...End

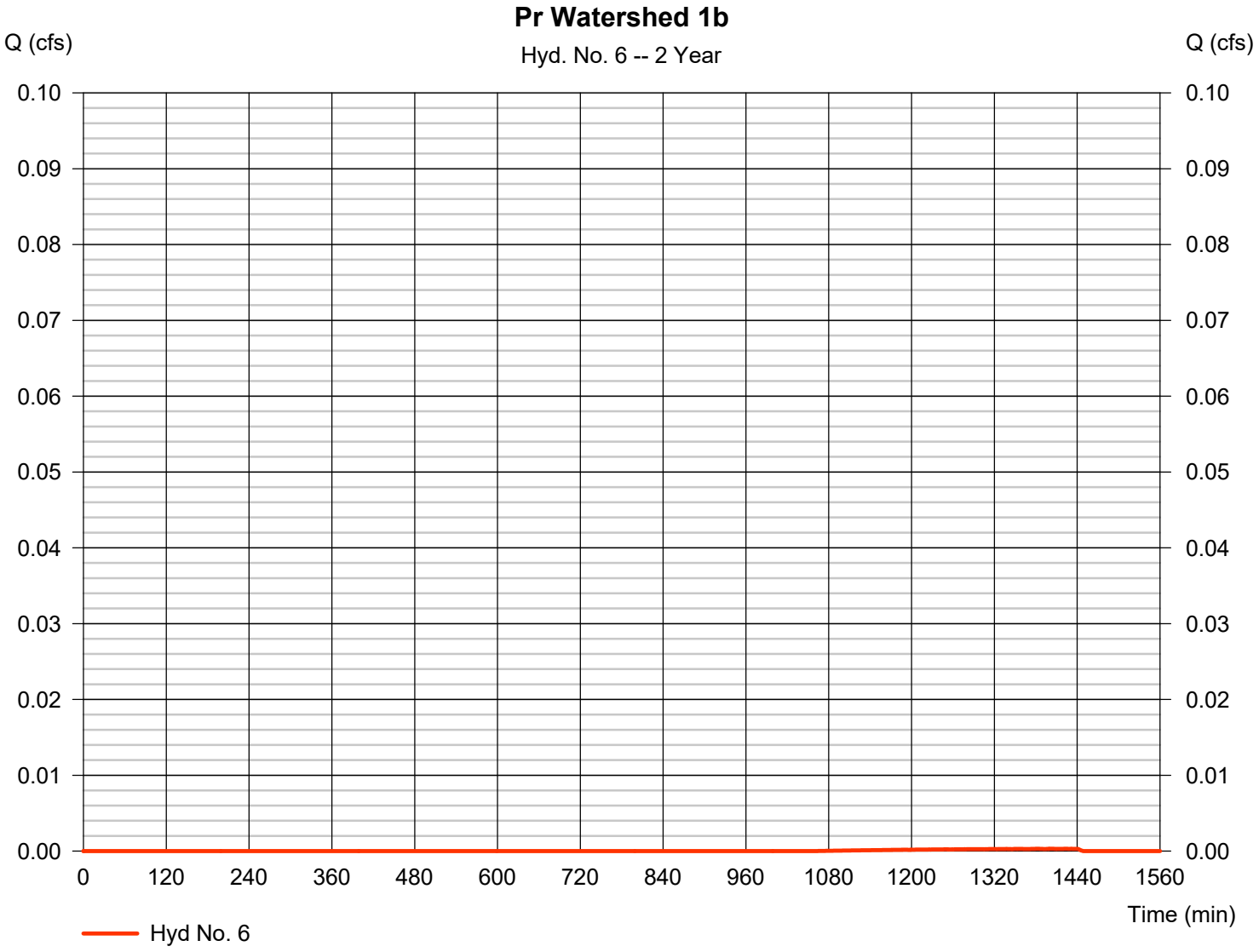
Hydrograph Report

Hyd. No. 6

Pr Watershed 1b

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	1424 min
Time interval	=	1 min	Hyd. volume	=	5 cuft
Drainage area	=	0.190 ac	Curve number	=	39*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.45 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1hr.cda	Shape factor	=	484

* Composite (Area/CN) = [(0.190 x 39)] / 0.190

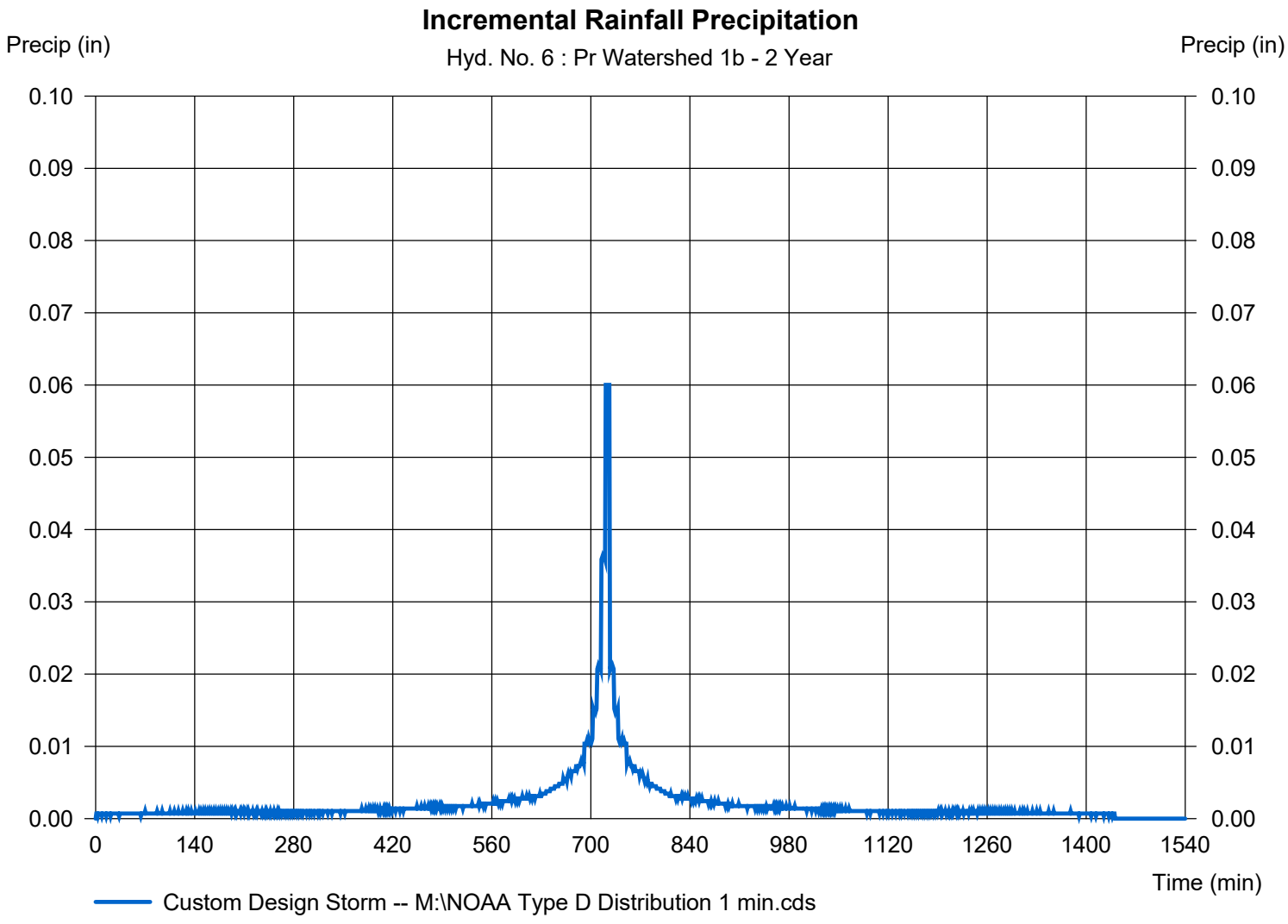


Precipitation Report

Hyd. No. 6

Pr Watershed 1b

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.4500 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		

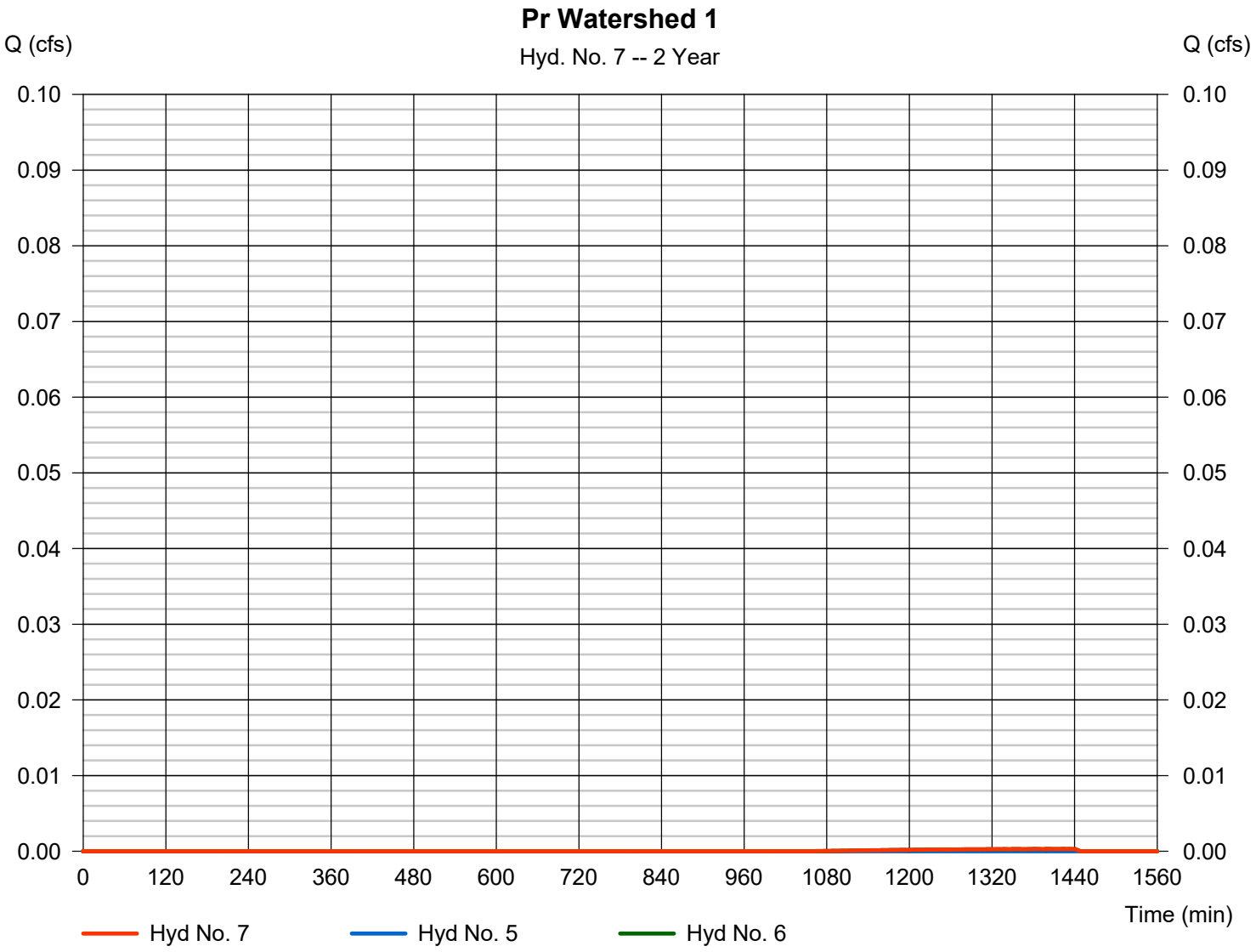


Hydrograph Report

Hyd. No. 7

Pr Watershed 1

Hydrograph type	=	Combine	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	1424 min
Time interval	=	1 min	Hyd. volume	=	5 cuft
Inflow hyds.	=	5, 6	Contrib. drain. area	=	0.190 ac



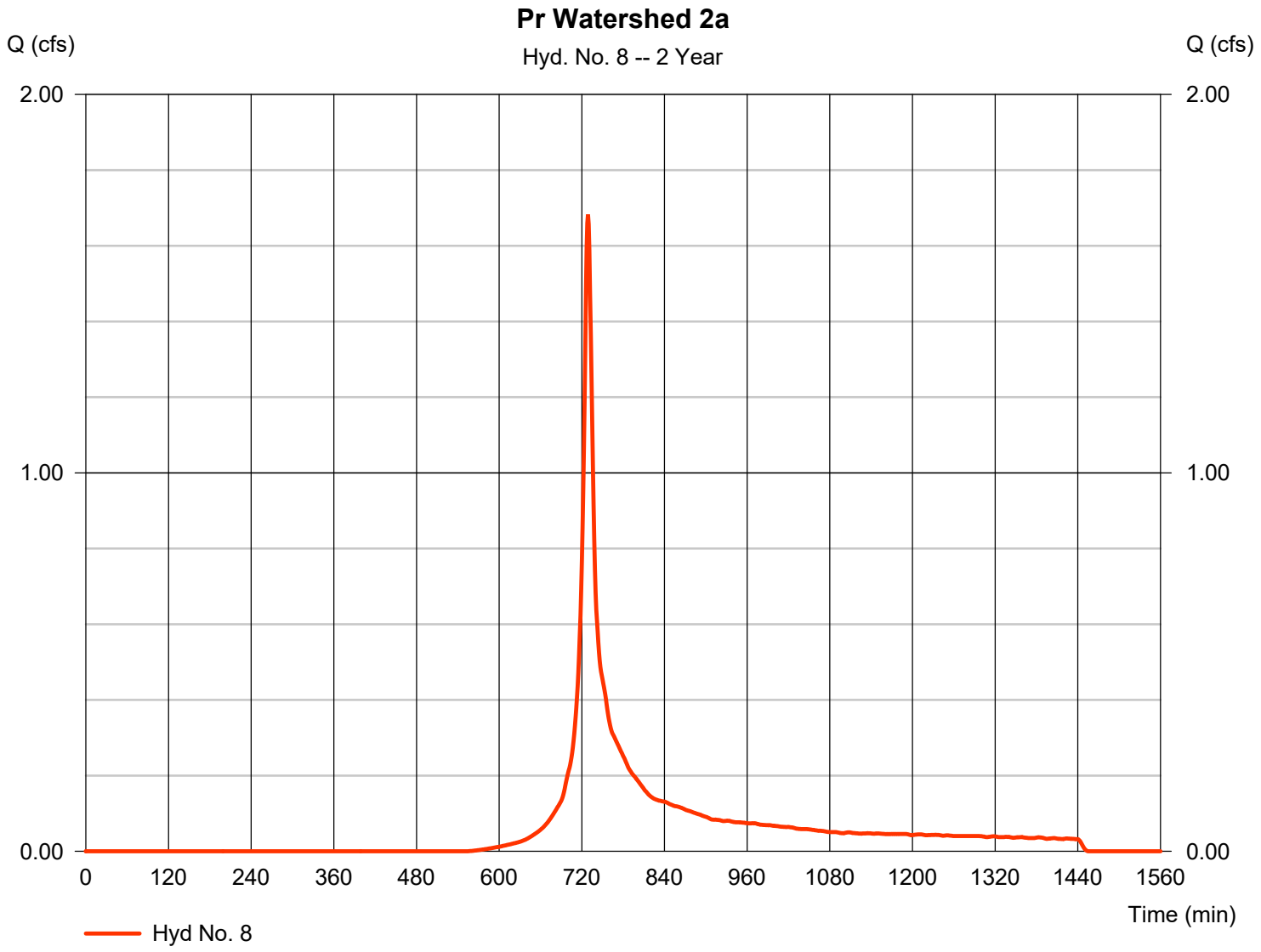
Hydrograph Report

Hyd. No. 8

Pr Watershed 2a

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.682 cfs
Storm frequency	=	2 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	5,881 cuft
Drainage area	=	1.110 ac	Curve number	=	78*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	8.80 min
Total precip.	=	3.45 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1 hr.cds	Shape factor	=	484

* Composite (Area/CN) = [(0.370 x 39) + (0.740 x 98)] / 1.110



TR55 Tc Worksheet

Hyd. No. 8

Pr Watershed 2a

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.011		0.011		
Flow length (ft)	= 132.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.45		0.00		0.00		
Land slope (%)	= 3.00		0.00		0.00		
Travel Time (min)	**= 1.24**	**+**	**0.00**	**+**	**0.00**	**=**	**1.24**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		0.00		0.00		
Watercourse slope (%)	= 0.00		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	=0.00		0.00		0.00		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow							
X sectional flow area (sqft)	= 5.00		5.00		0.00		
Wetted perimeter (ft)	= 8.00		8.00		0.00		
Channel slope (%)	= 2.80		1.30		0.00		
Manning's n-value	= 0.400		0.400		0.015		
Velocity (ft/s)	=0.45						
			0.31				
					0.00		
Flow length (ft)	({0})120.0		58.0		0.0		
Travel Time (min)	**= 4.40**	**+**	**3.12**	**+**	**0.00**	**=**	**7.51**

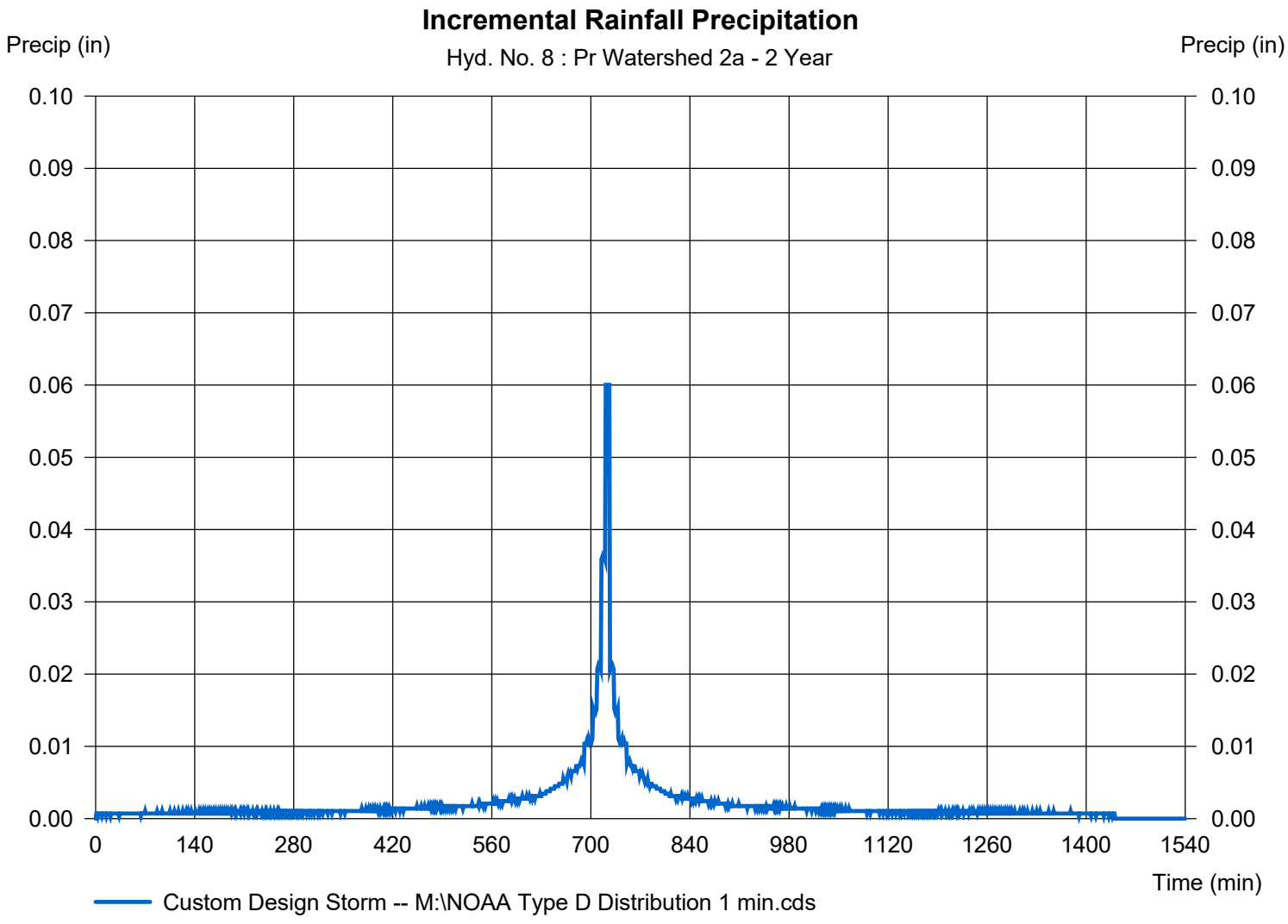
Total Travel Time, Tc ..... 8.80 min

Precipitation Report

Hyd. No. 8

Pr Watershed 2a

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.4500 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		



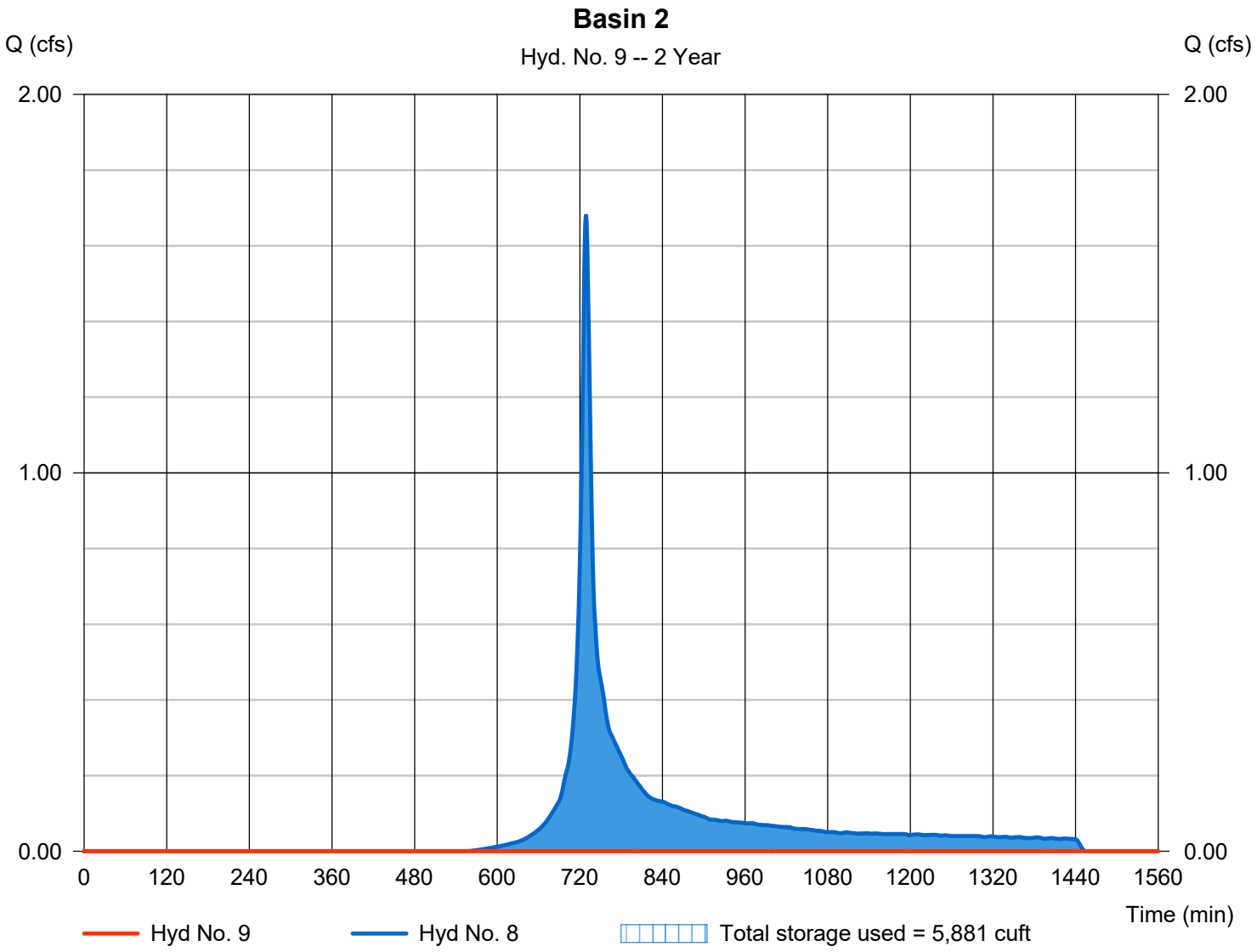
Hydrograph Report

Hyd. No. 9

Basin 2

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	8 - Pr Watershed 2a	Max. Elevation	=	233.12 ft
Reservoir name	=	Pond 2	Max. Storage	=	5,881 cuft

Storage Indication method used.



Pond No. 2 - Pond 2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 231.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	231.00	1,906	0	0
1.00	232.00	2,680	2,282	2,282
2.00	233.00	3,551	3,105	5,387
3.00	234.00	4,734	4,128	9,515
4.00	235.00	5,671	5,195	14,710

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)	= 8.00	0.00	0.00	0.00
Crest El. (ft)	= 234.00	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	231.00	---	---	---	---	0.00	---	---	---	---	---	0.000
0.10	228	231.10	---	---	---	---	0.00	---	---	---	---	---	0.000
0.20	456	231.20	---	---	---	---	0.00	---	---	---	---	---	0.000
0.30	685	231.30	---	---	---	---	0.00	---	---	---	---	---	0.000
0.40	913	231.40	---	---	---	---	0.00	---	---	---	---	---	0.000
0.50	1,141	231.50	---	---	---	---	0.00	---	---	---	---	---	0.000
0.60	1,369	231.60	---	---	---	---	0.00	---	---	---	---	---	0.000
0.70	1,597	231.70	---	---	---	---	0.00	---	---	---	---	---	0.000
0.80	1,825	231.80	---	---	---	---	0.00	---	---	---	---	---	0.000
0.90	2,054	231.90	---	---	---	---	0.00	---	---	---	---	---	0.000
1.00	2,282	232.00	---	---	---	---	0.00	---	---	---	---	---	0.000
1.10	2,592	232.10	---	---	---	---	0.00	---	---	---	---	---	0.000
1.20	2,903	232.20	---	---	---	---	0.00	---	---	---	---	---	0.000
1.30	3,213	232.30	---	---	---	---	0.00	---	---	---	---	---	0.000
1.40	3,524	232.40	---	---	---	---	0.00	---	---	---	---	---	0.000
1.50	3,834	232.50	---	---	---	---	0.00	---	---	---	---	---	0.000
1.60	4,145	232.60	---	---	---	---	0.00	---	---	---	---	---	0.000
1.70	4,455	232.70	---	---	---	---	0.00	---	---	---	---	---	0.000
1.80	4,766	232.80	---	---	---	---	0.00	---	---	---	---	---	0.000
1.90	5,076	232.90	---	---	---	---	0.00	---	---	---	---	---	0.000
2.00	5,387	233.00	---	---	---	---	0.00	---	---	---	---	---	0.000
2.10	5,800	233.10	---	---	---	---	0.00	---	---	---	---	---	0.000
2.20	6,212	233.20	---	---	---	---	0.00	---	---	---	---	---	0.000
2.30	6,625	233.30	---	---	---	---	0.00	---	---	---	---	---	0.000
2.40	7,038	233.40	---	---	---	---	0.00	---	---	---	---	---	0.000
2.50	7,451	233.50	---	---	---	---	0.00	---	---	---	---	---	0.000
2.60	7,864	233.60	---	---	---	---	0.00	---	---	---	---	---	0.000
2.70	8,276	233.70	---	---	---	---	0.00	---	---	---	---	---	0.000
2.80	8,689	233.80	---	---	---	---	0.00	---	---	---	---	---	0.000
2.90	9,102	233.90	---	---	---	---	0.00	---	---	---	---	---	0.000
3.00	9,515	234.00	---	---	---	---	0.00	---	---	---	---	---	0.000
3.10	10,034	234.10	---	---	---	---	0.84	---	---	---	---	---	0.843
3.20	10,554	234.20	---	---	---	---	2.38	---	---	---	---	---	2.383
3.30	11,073	234.30	---	---	---	---	4.38	---	---	---	---	---	4.378
3.40	11,593	234.40	---	---	---	---	6.74	---	---	---	---	---	6.740
3.50	12,112	234.50	---	---	---	---	9.42	---	---	---	---	---	9.420
3.60	12,632	234.60	---	---	---	---	12.38	---	---	---	---	---	12.38
3.70	13,151	234.70	---	---	---	---	15.60	---	---	---	---	---	15.60

Continues on next page...

Pond 2

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
3.80	13,671	234.80	---	---	---	---	19.06	---	---	---	---	---	19.06
3.90	14,190	234.90	---	---	---	---	22.75	---	---	---	---	---	22.75
4.00	14,710	235.00	---	---	---	---	26.64	---	---	---	---	---	26.64

...End

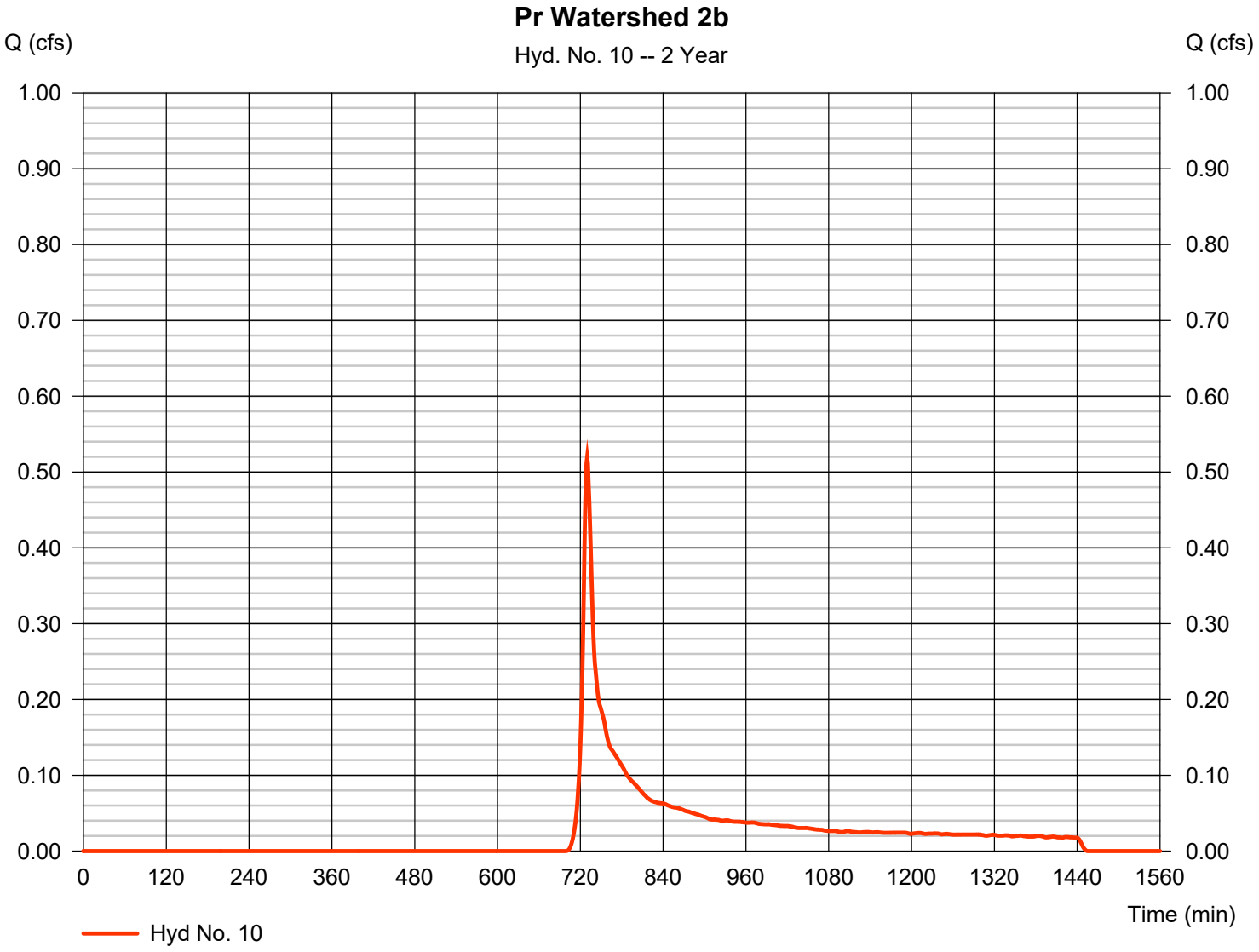
Hydrograph Report

Hyd. No. 10

Pr Watershed 2b

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.519 cfs
Storm frequency	=	2 yrs	Time to peak	=	730 min
Time interval	=	1 min	Hyd. volume	=	2,214 cuft
Drainage area	=	0.960 ac	Curve number	=	63*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	3.45 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1 hr.cds	Shape factor	=	484

* Composite (Area/CN) = [(0.120 x 30) + (0.040 x 77) + (0.230 x 39) + (0.280 x 80) + (0.290 x 77)] / 0.960

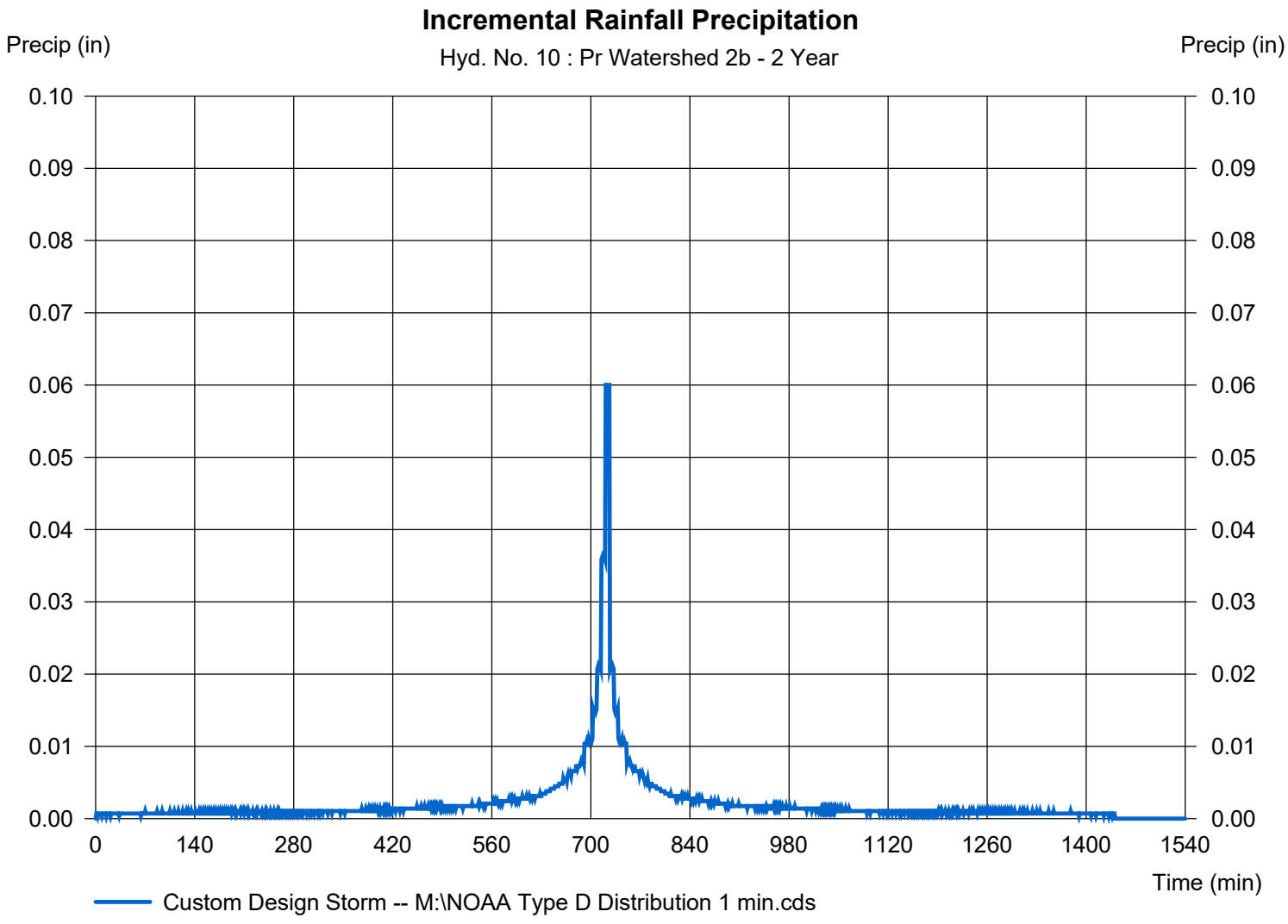


Precipitation Report

Hyd. No. 10

Pr Watershed 2b

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.4500 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		

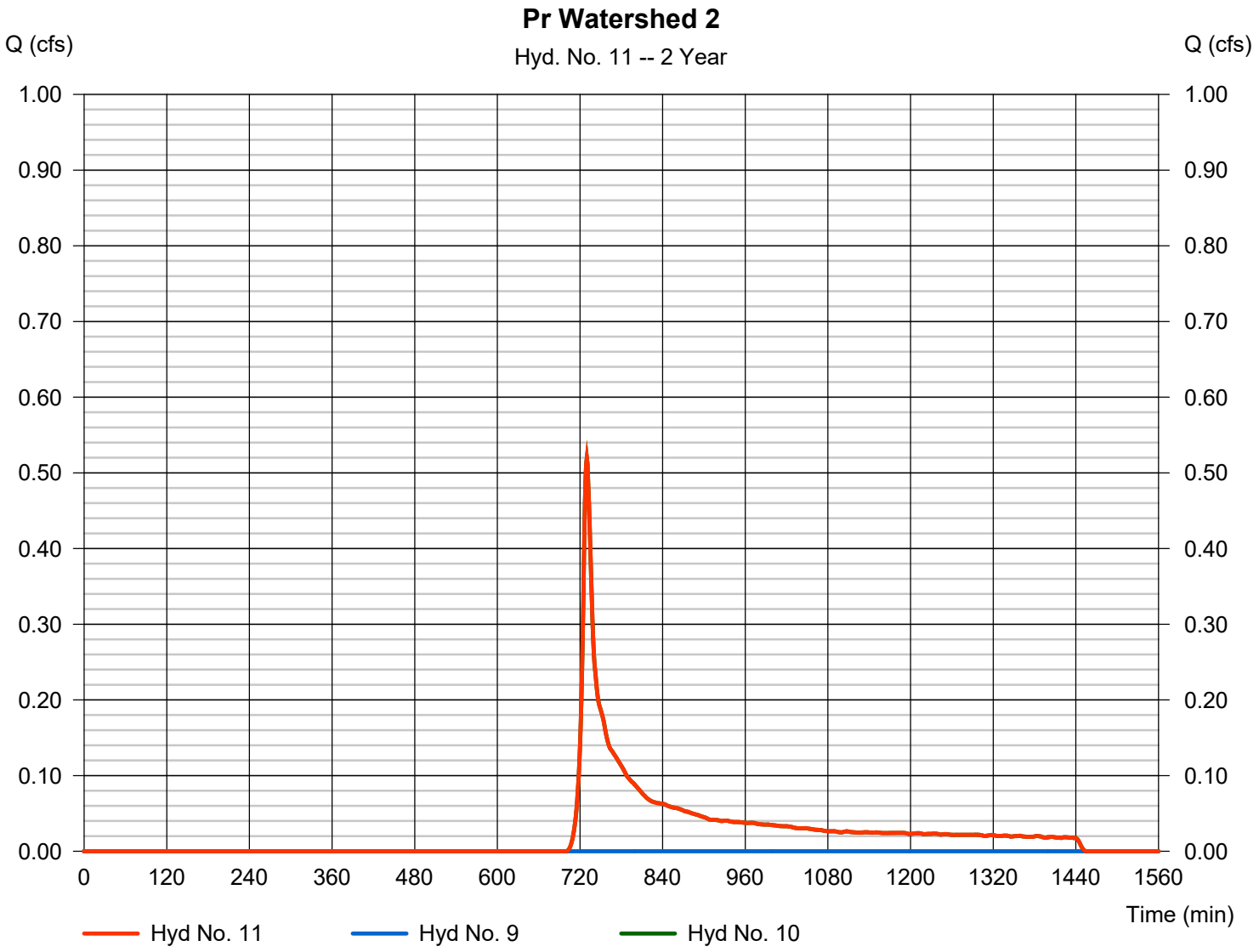


Hydrograph Report

Hyd. No. 11

Pr Watershed 2

Hydrograph type	=	Combine	Peak discharge	=	0.519 cfs
Storm frequency	=	2 yrs	Time to peak	=	730 min
Time interval	=	1 min	Hyd. volume	=	2,214 cuft
Inflow hyds.	=	9, 10	Contrib. drain. area	=	0.960 ac

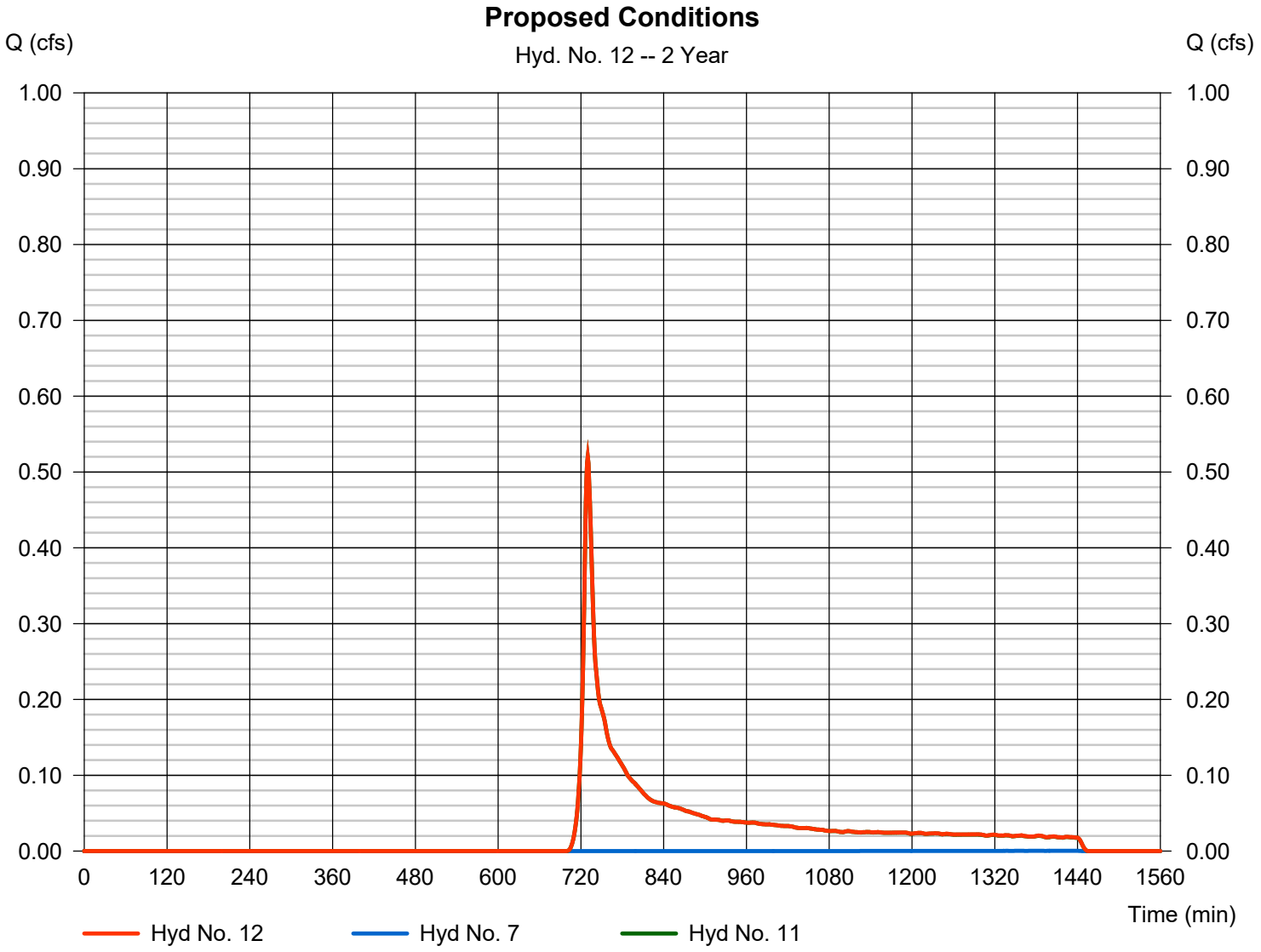


Hydrograph Report

Hyd. No. 12

Proposed Conditions

Hydrograph type	=	Combine	Peak discharge	=	0.519 cfs
Storm frequency	=	2 yrs	Time to peak	=	730 min
Time interval	=	1 min	Hyd. volume	=	2,219 cuft
Inflow hyds.	=	7, 11	Contrib. drain. area	=	0.000 ac



Hydrograph Summary Report

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

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.021	1	863	664	------	------	------	Ex Watershed 1
2	SCS Runoff	0.243	1	757	3,641	------	------	------	Ex Watershed 2
3	Combine	0.243	1	757	4,305	1, 2	------	------	Existing Conditions
4	SCS Runoff	4.074	1	732	16,552	------	------	------	Pr Watershed 1a
5	Reservoir	0.000	1	n/a	0	4	233.24	16,552	Basin 1
6	SCS Runoff	0.007	1	775	160	------	------	------	Pr Watershed 1b
7	Combine	0.007	1	775	160	5, 6	------	------	Pr Watershed 1
8	SCS Runoff	3.256	1	729	11,338	------	------	------	Pr Watershed 2a
9	Reservoir	0.093	1	1061	1,823	8	234.01	9,572	Basin 2
10	SCS Runoff	1.522	1	729	5,525	------	------	------	Pr Watershed 2b
11	Combine	1.522	1	729	7,347	9, 10	------	------	Pr Watershed 2
12	Combine	1.522	1	729	7,507	7, 11	------	------	Proposed Conditions

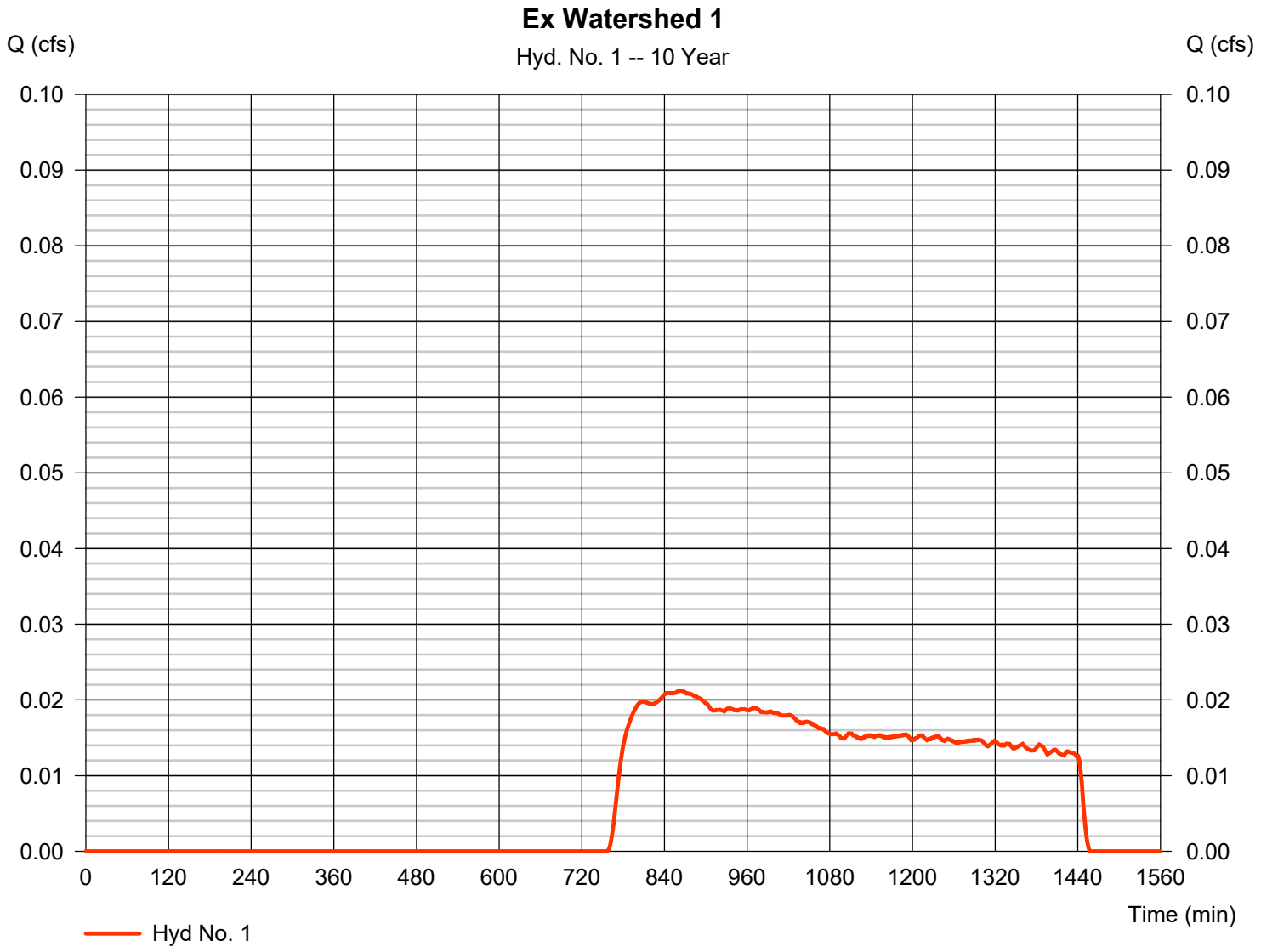
Hydrograph Report

Hyd. No. 1

Ex Watershed 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.021 cfs
Storm frequency	=	10 yrs	Time to peak	=	863 min
Time interval	=	1 min	Hyd. volume	=	664 cuft
Drainage area	=	1.420 ac	Curve number	=	36*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	10.30 min
Total precip.	=	5.12 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1 hr.cds	Shape factor	=	484

* Composite (Area/CN) = [(0.600 x 30) + (0.790 x 39) + (0.030 x 98)] / 1.420

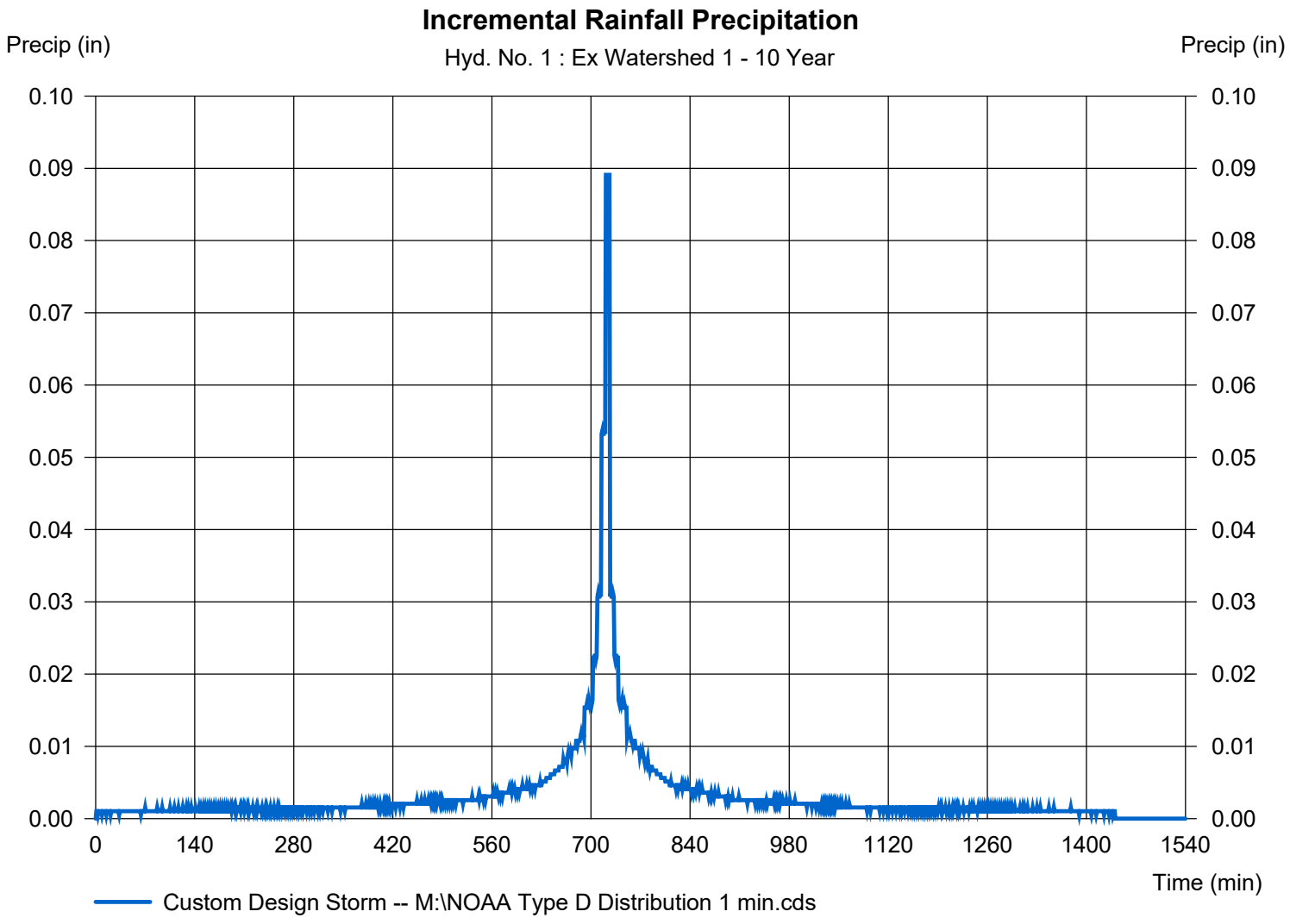


Precipitation Report

Hyd. No. 1

Ex Watershed 1

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 5.1200 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		



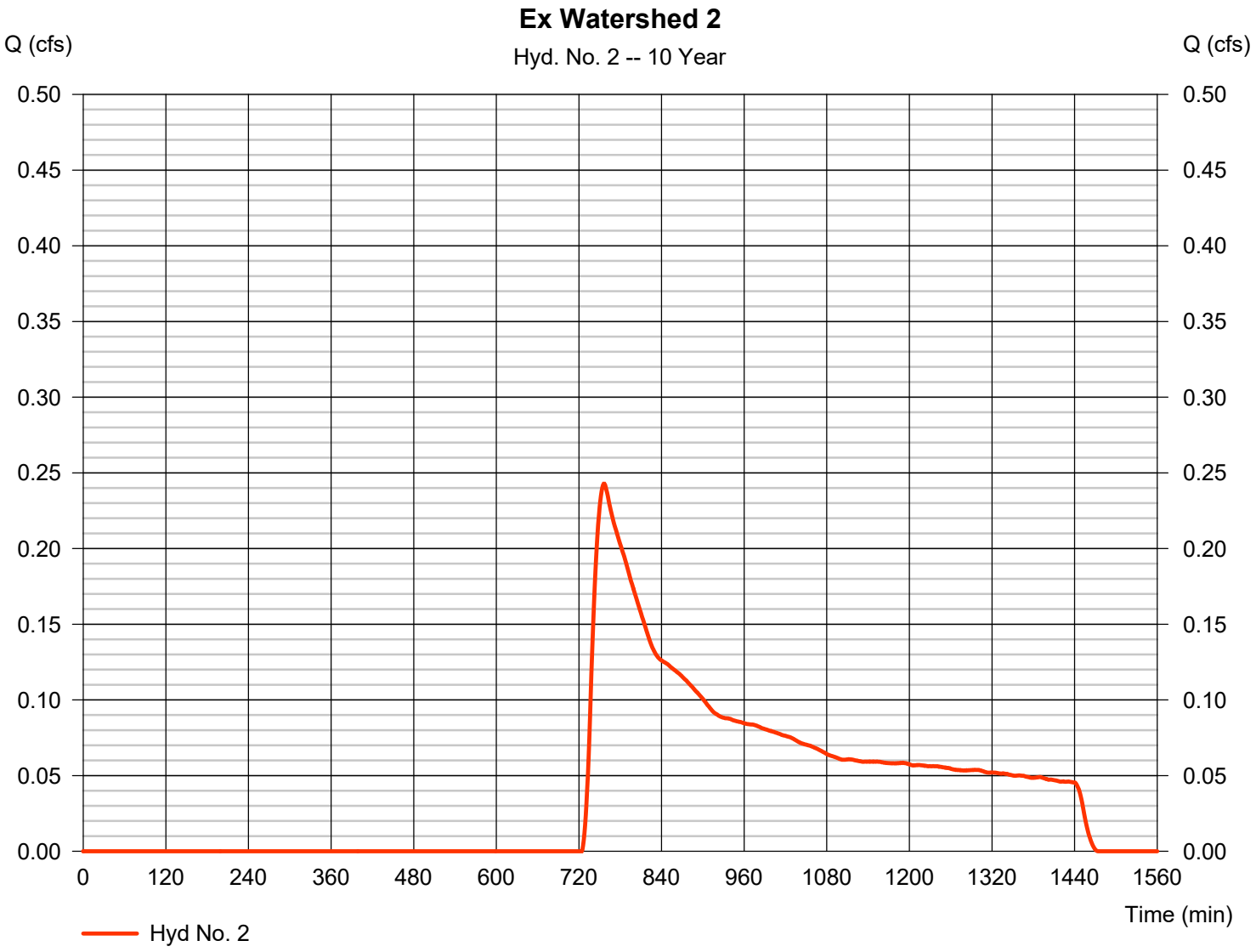
Hydrograph Report

Hyd. No. 2

Ex Watershed 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.243 cfs
Storm frequency	=	10 yrs	Time to peak	=	757 min
Time interval	=	1 min	Hyd. volume	=	3,641 cuft
Drainage area	=	2.890 ac	Curve number	=	42*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	20.40 min
Total precip.	=	5.12 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1hr.csv	Shape factor	=	484

* Composite (Area/CN) = [(1.760 x 30) + (0.500 x 77) + (0.540 x 39) + (0.090 x 98)] / 2.890

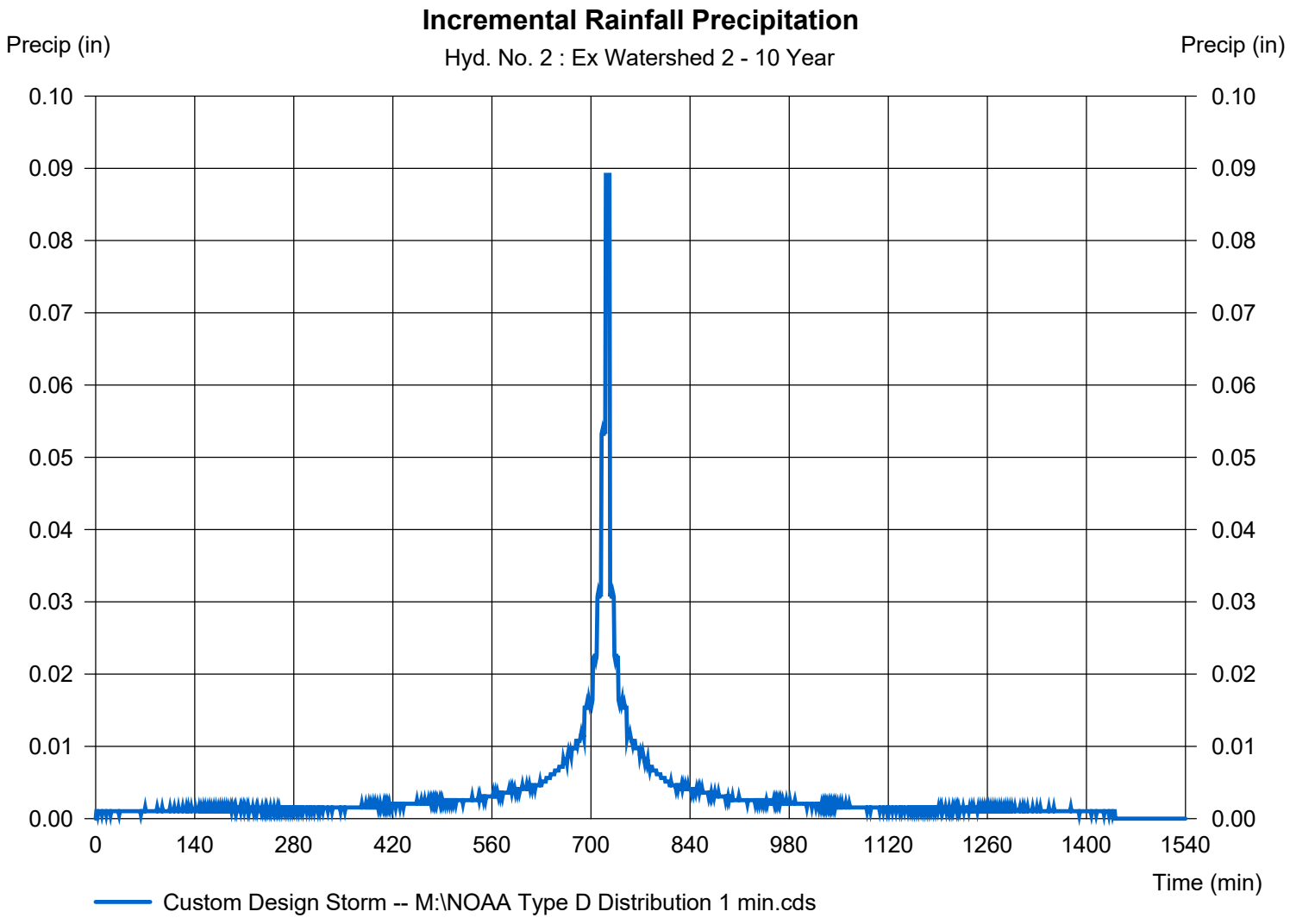


Precipitation Report

Hyd. No. 2

Ex Watershed 2

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 5.1200 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		

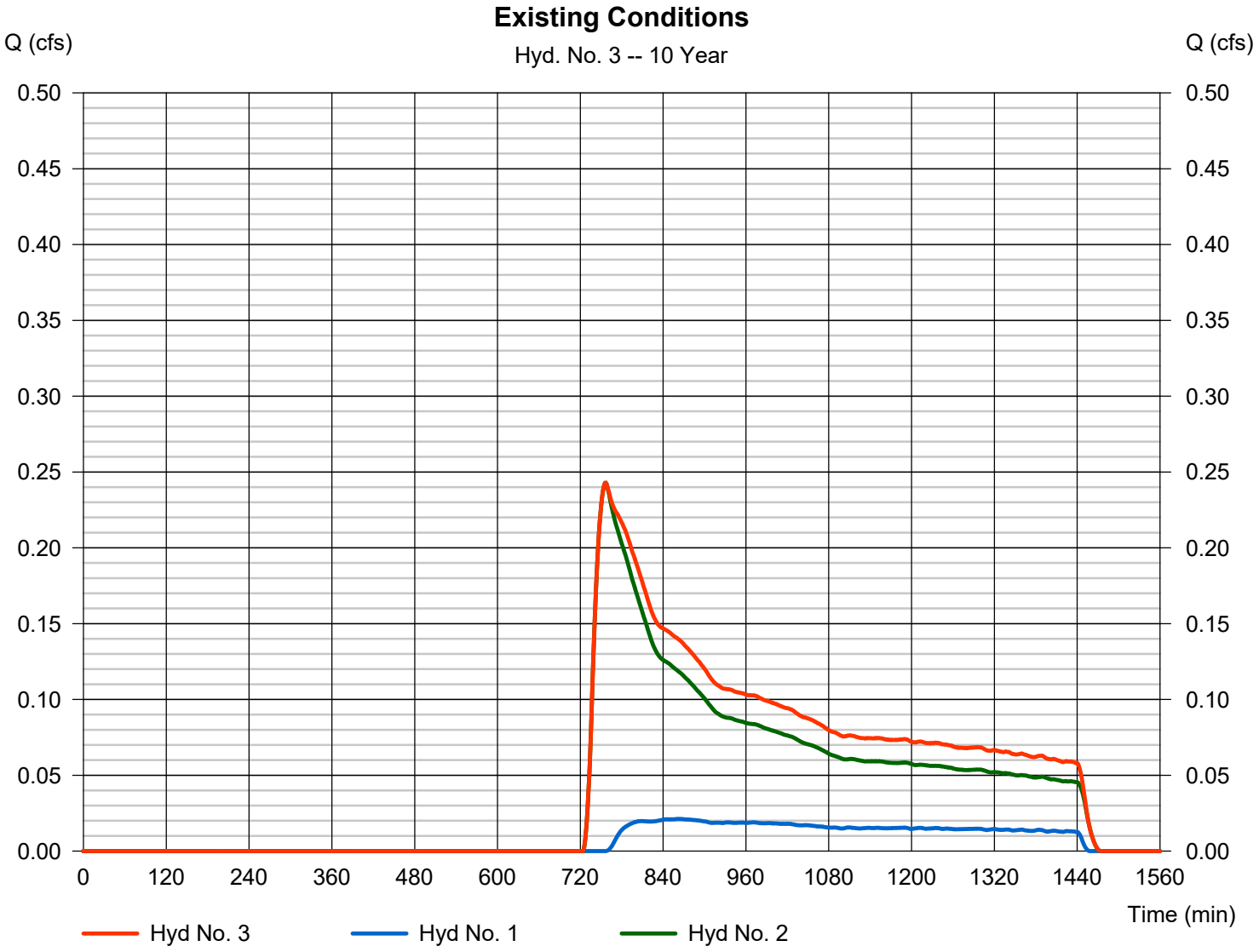


Hydrograph Report

Hyd. No. 3

Existing Conditions

Hydrograph type	=	Combine	Peak discharge	=	0.243 cfs
Storm frequency	=	10 yrs	Time to peak	=	757 min
Time interval	=	1 min	Hyd. volume	=	4,305 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	4.310 ac



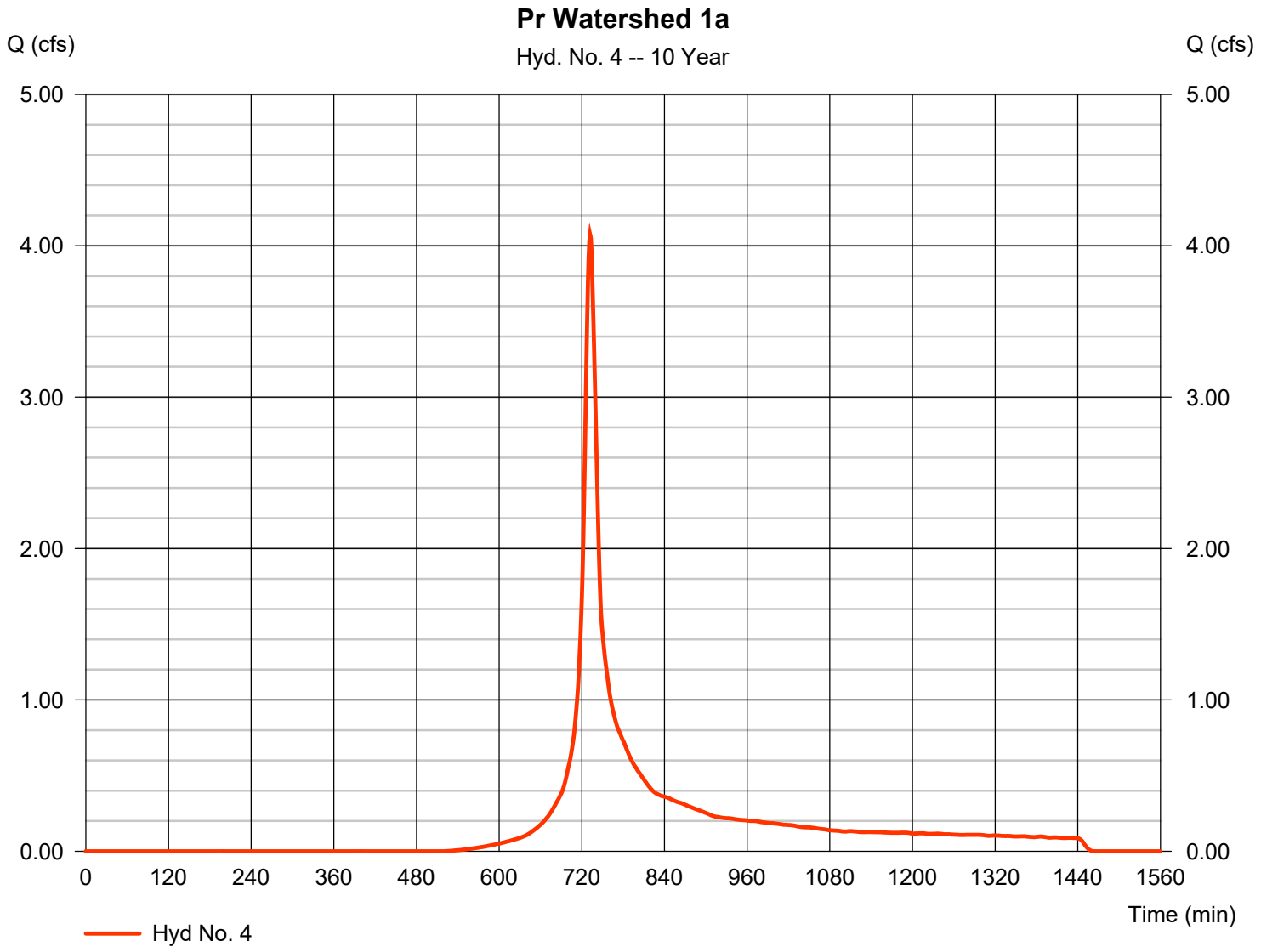
Hydrograph Report

Hyd. No. 4

Pr Watershed 1a

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.074 cfs
Storm frequency	=	10 yrs	Time to peak	=	732 min
Time interval	=	1 min	Hyd. volume	=	16,552 cuft
Drainage area	=	1.920 ac	Curve number	=	73*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	14.50 min
Total precip.	=	5.12 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1 hr.csv	Shape factor	=	484

* Composite (Area/CN) = [(0.810 x 39) + (1.110 x 98)] / 1.920

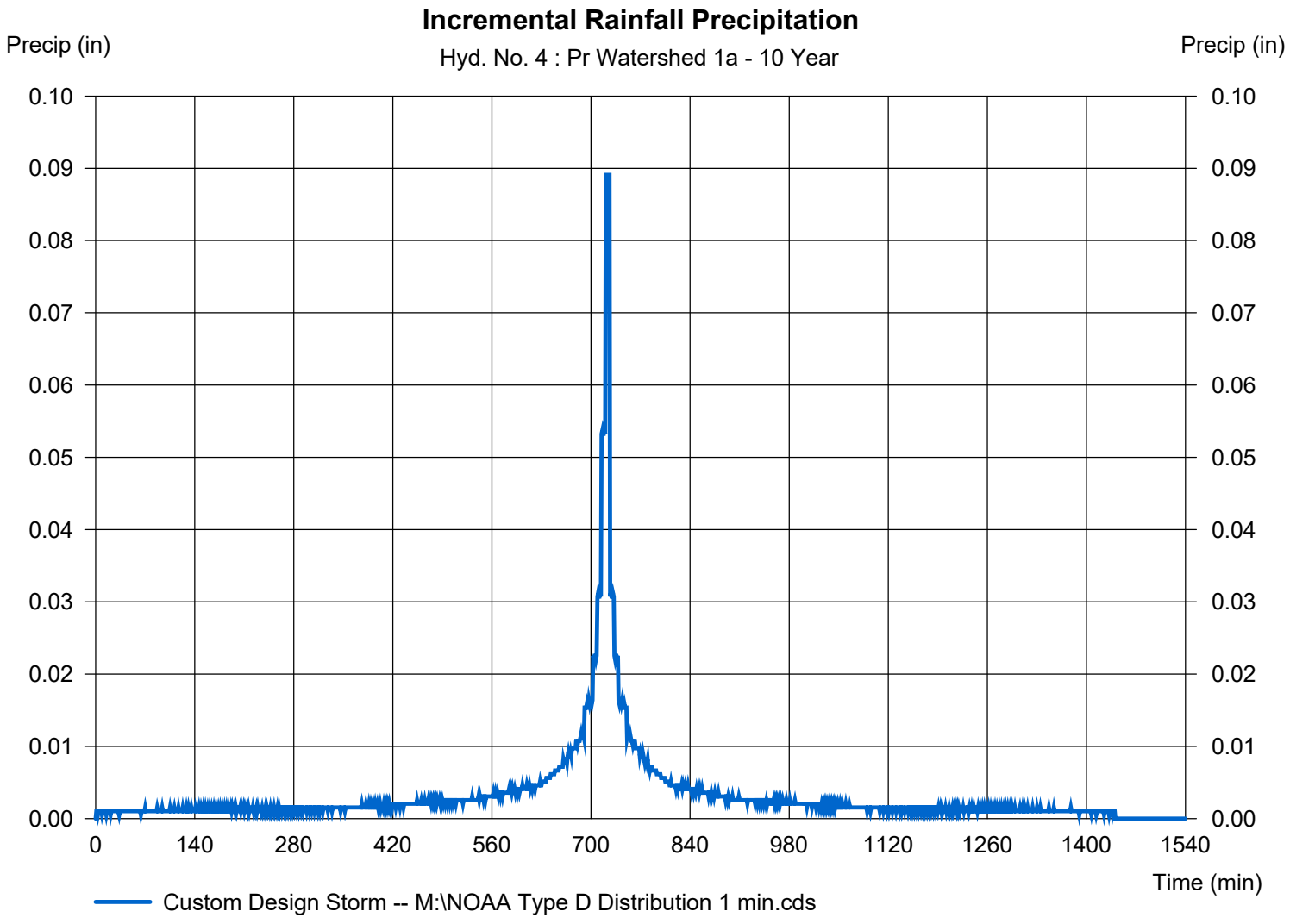


Precipitation Report

Hyd. No. 4

Pr Watershed 1a

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 5.1200 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		



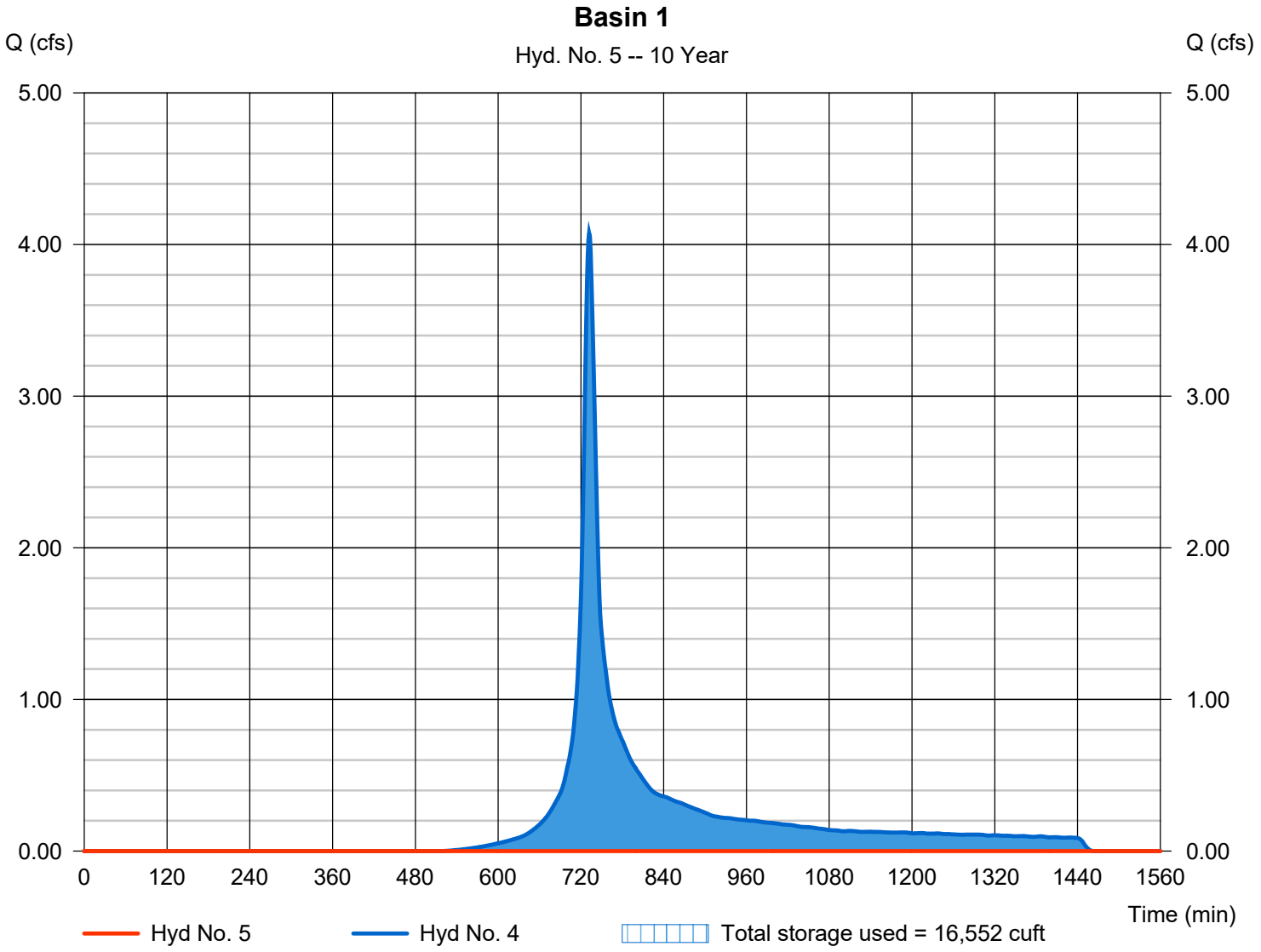
Hydrograph Report

Hyd. No. 5

Basin 1

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	10 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	4 - Pr Watershed 1a	Max. Elevation	=	233.24 ft
Reservoir name	=	Pond 1	Max. Storage	=	16,552 cuft

Storage Indication method used.



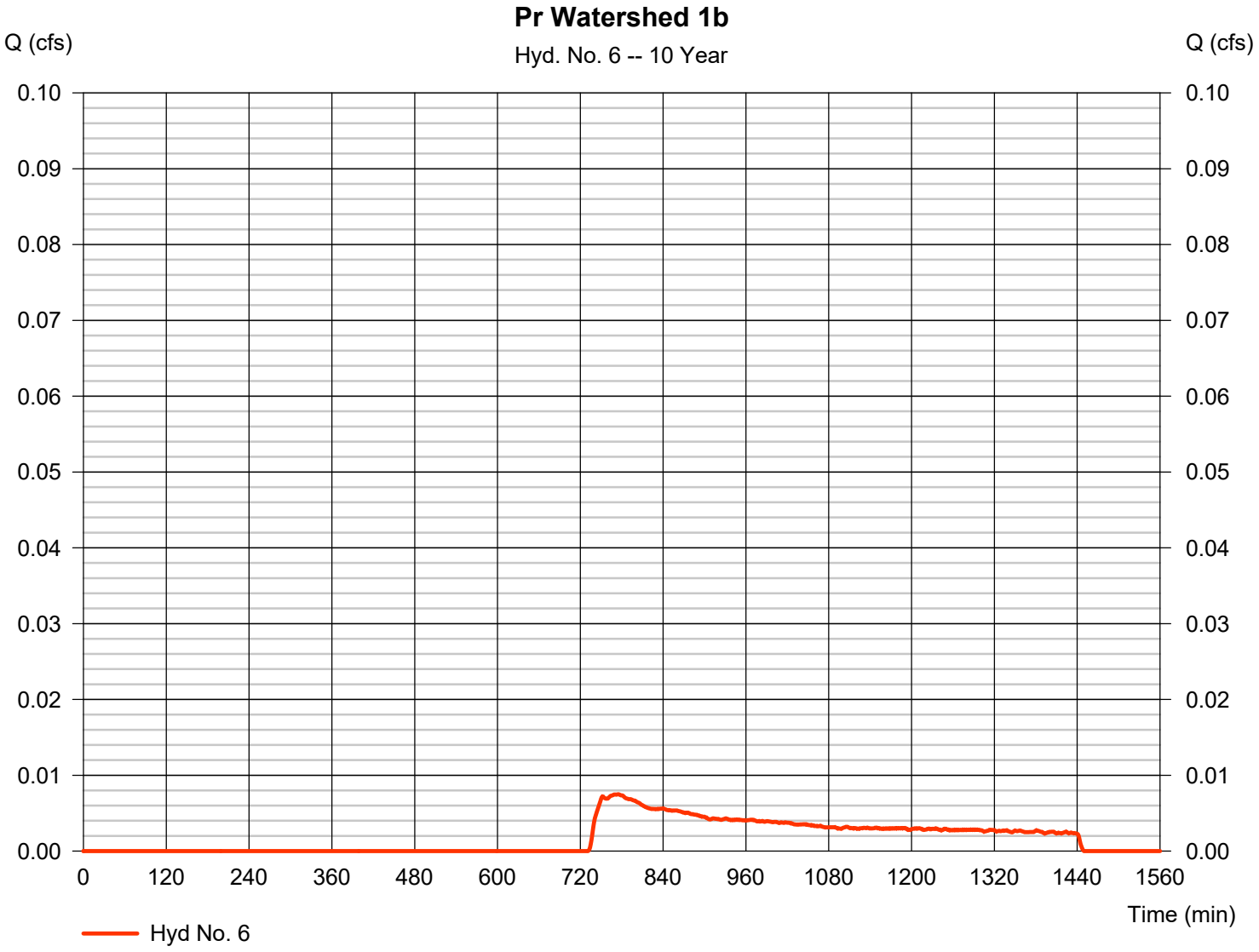
Hydrograph Report

Hyd. No. 6

Pr Watershed 1b

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.007 cfs
Storm frequency	=	10 yrs	Time to peak	=	775 min
Time interval	=	1 min	Hyd. volume	=	160 cuft
Drainage area	=	0.190 ac	Curve number	=	39*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.12 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1 hr.cds	Shape factor	=	484

* Composite (Area/CN) = [(0.190 x 39)] / 0.190

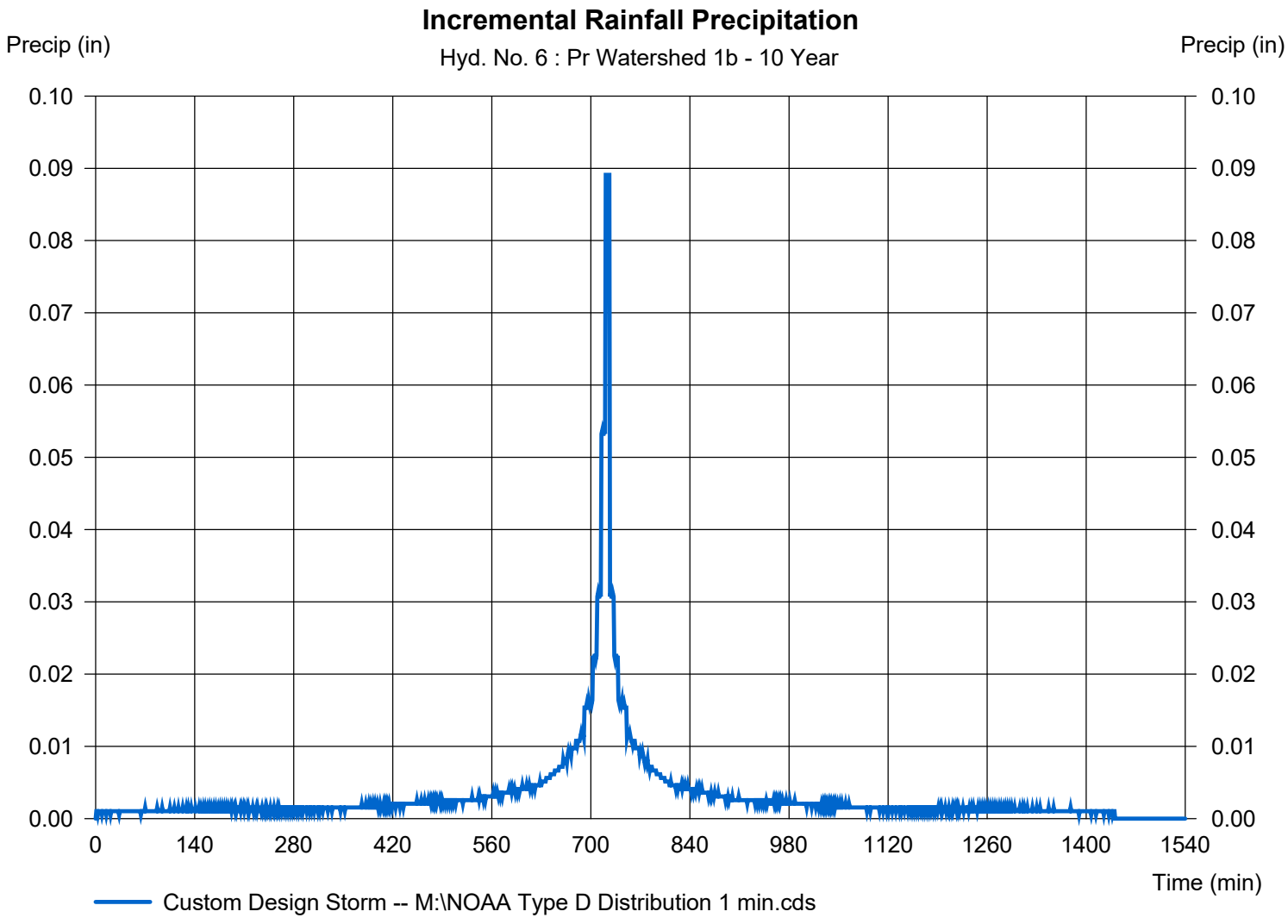


Precipitation Report

Hyd. No. 6

Pr Watershed 1b

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 5.1200 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		

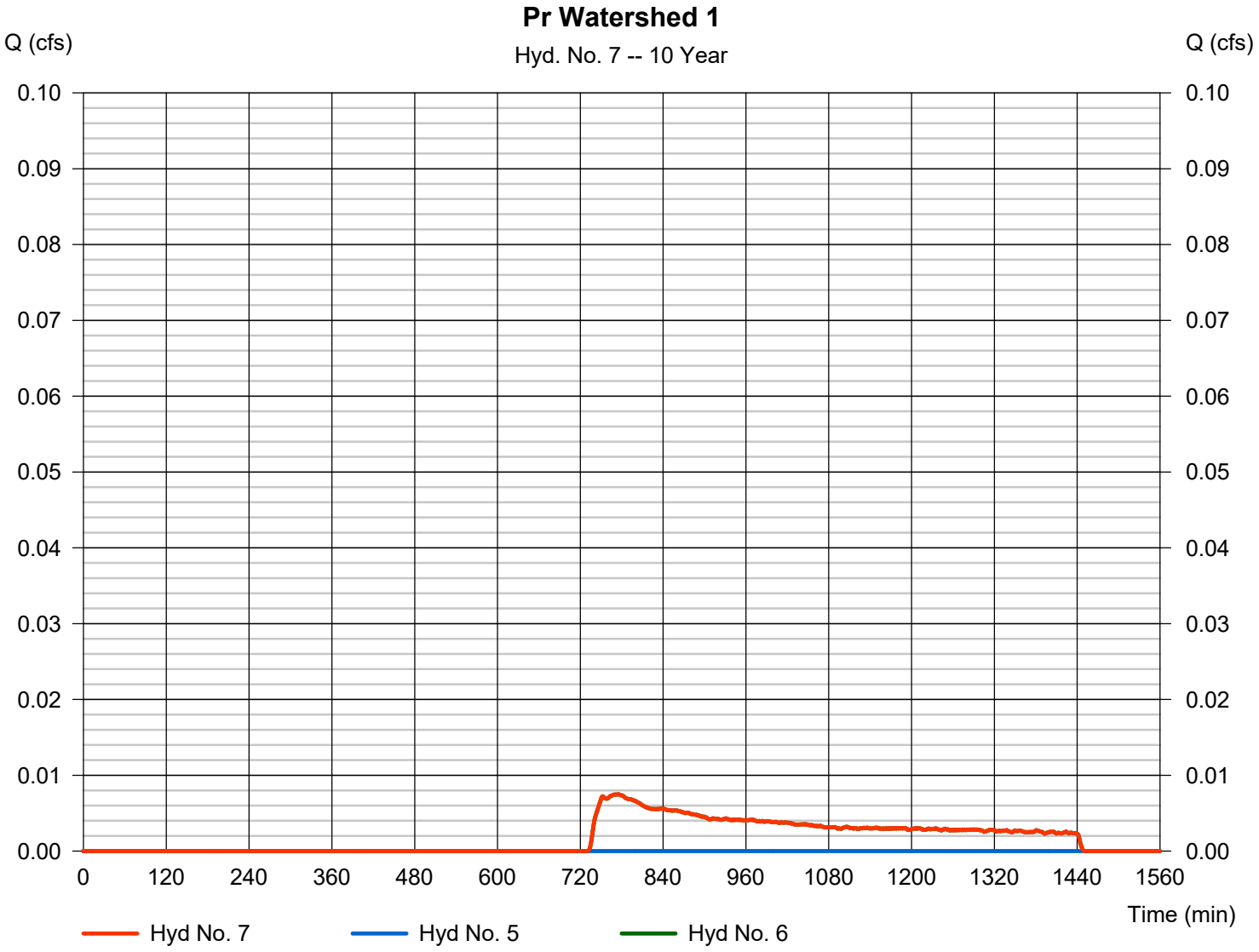


Hydrograph Report

Hyd. No. 7

Pr Watershed 1

Hydrograph type	=	Combine	Peak discharge	=	0.007 cfs
Storm frequency	=	10 yrs	Time to peak	=	775 min
Time interval	=	1 min	Hyd. volume	=	160 cuft
Inflow hyds.	=	5, 6	Contrib. drain. area	=	0.190 ac



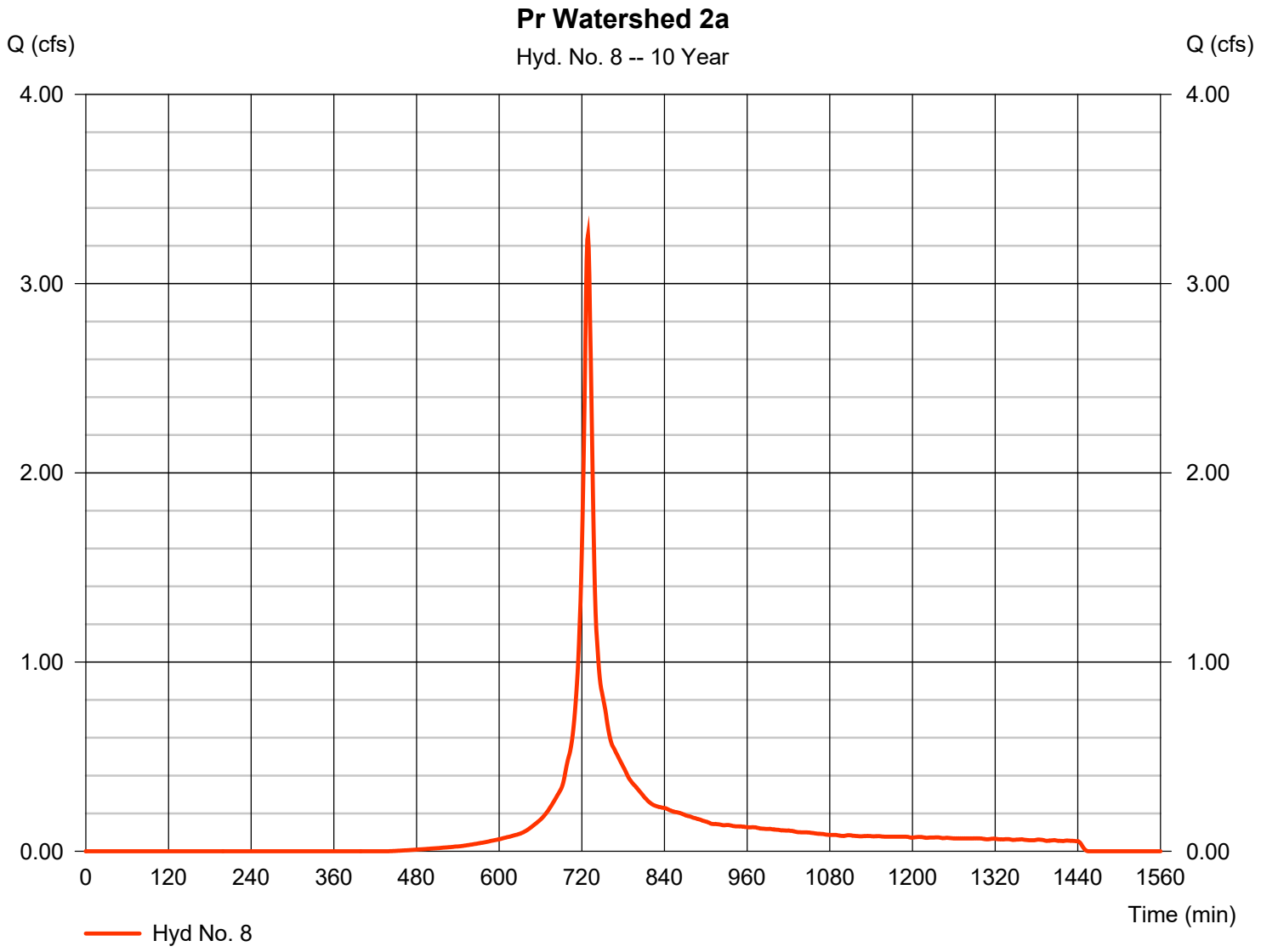
Hydrograph Report

Hyd. No. 8

Pr Watershed 2a

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.256 cfs
Storm frequency	=	10 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	11,338 cuft
Drainage area	=	1.110 ac	Curve number	=	78*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	8.80 min
Total precip.	=	5.12 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1 hr.cds	Shape factor	=	484

* Composite (Area/CN) = [(0.370 x 39) + (0.740 x 98)] / 1.110

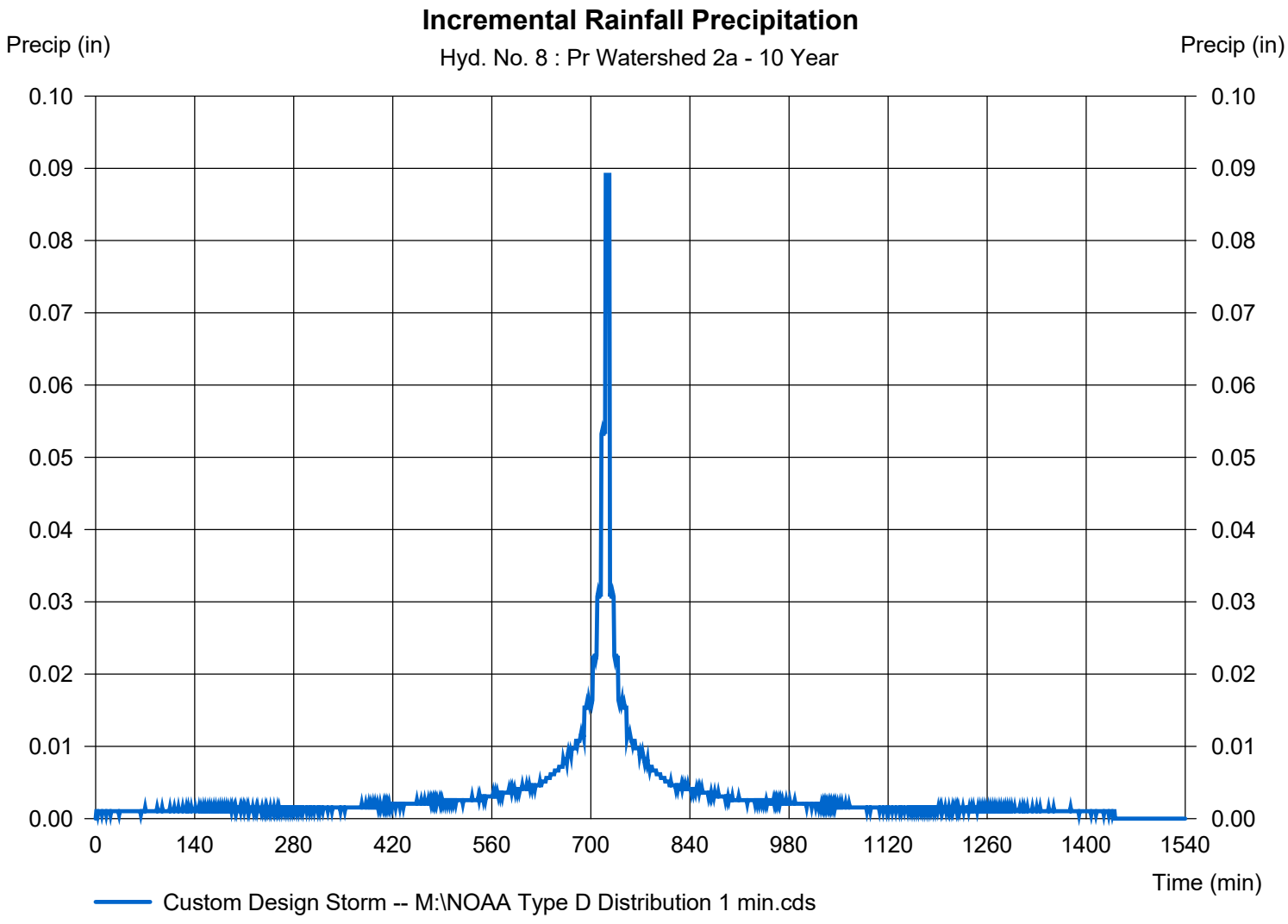


Precipitation Report

Hyd. No. 8

Pr Watershed 2a

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 5.1200 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		



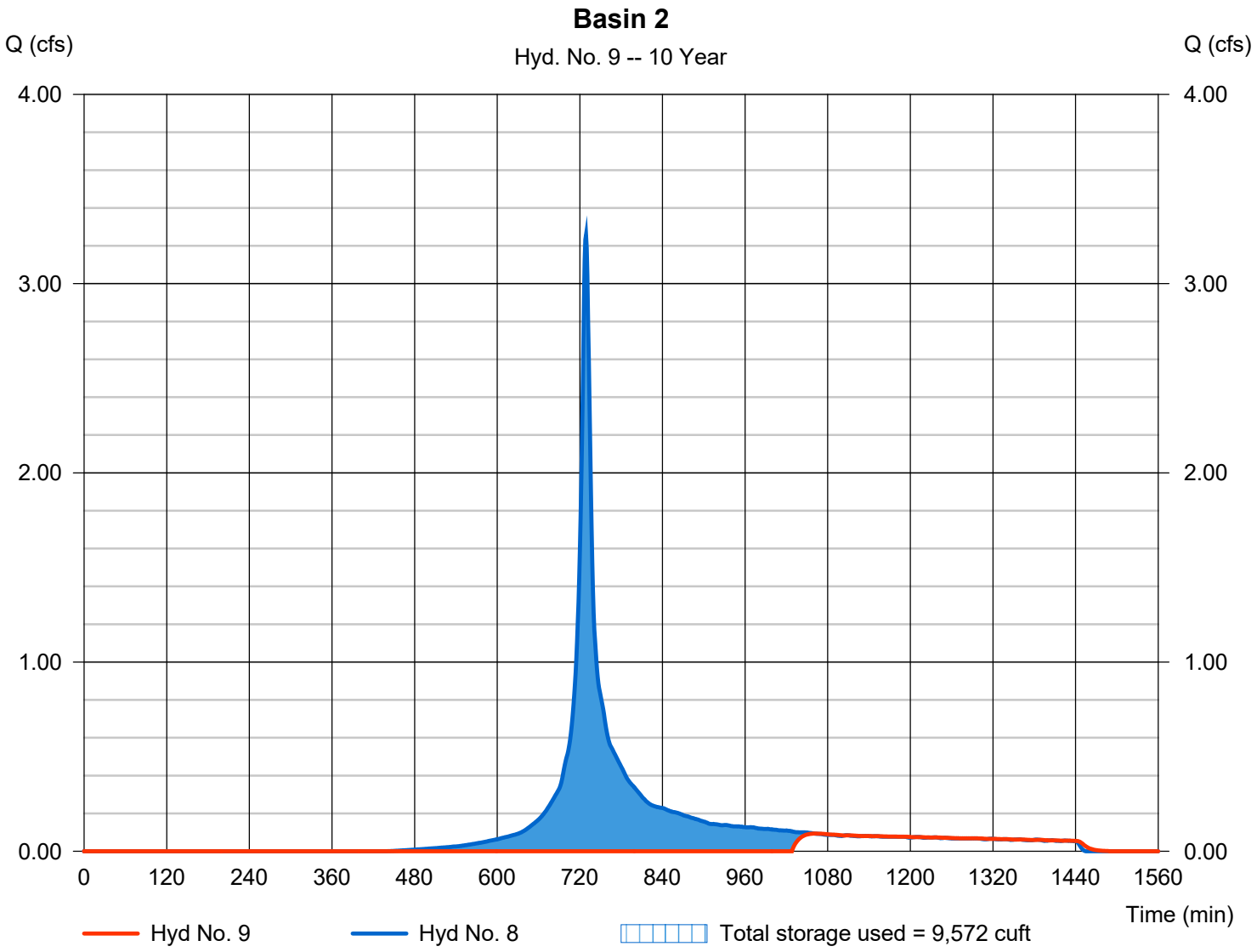
Hydrograph Report

Hyd. No. 9

Basin 2

Hydrograph type	=	Reservoir	Peak discharge	=	0.093 cfs
Storm frequency	=	10 yrs	Time to peak	=	1061 min
Time interval	=	1 min	Hyd. volume	=	1,823 cuft
Inflow hyd. No.	=	8 - Pr Watershed 2a	Max. Elevation	=	234.01 ft
Reservoir name	=	Pond 2	Max. Storage	=	9,572 cuft

Storage Indication method used.



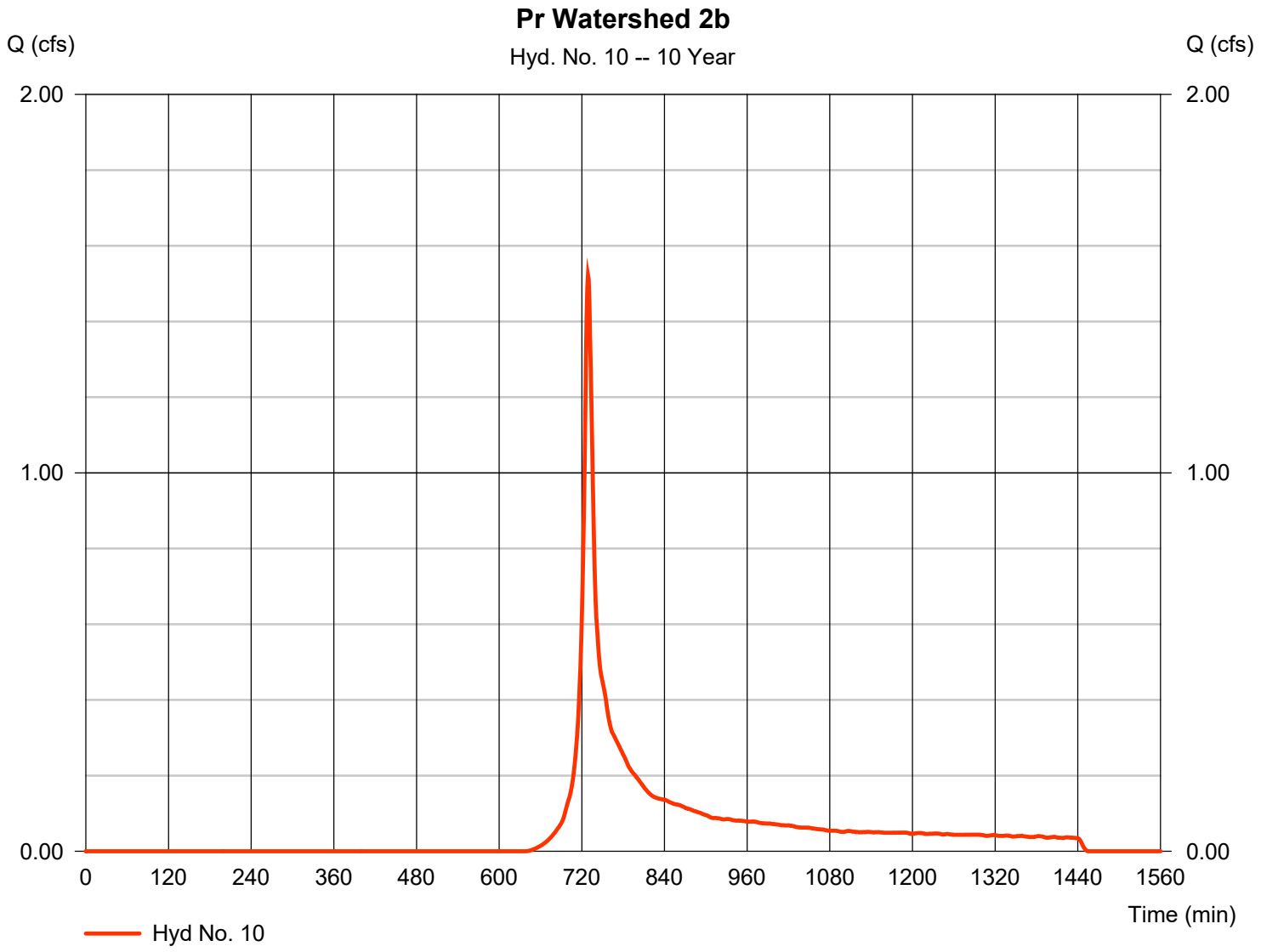
Hydrograph Report

Hyd. No. 10

Pr Watershed 2b

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.522 cfs
Storm frequency	=	10 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	5,525 cuft
Drainage area	=	0.960 ac	Curve number	=	63*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	5.12 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1 hr.cds	Shape factor	=	484

* Composite (Area/CN) = [(0.120 x 30) + (0.040 x 77) + (0.230 x 39) + (0.280 x 80) + (0.290 x 77)] / 0.960

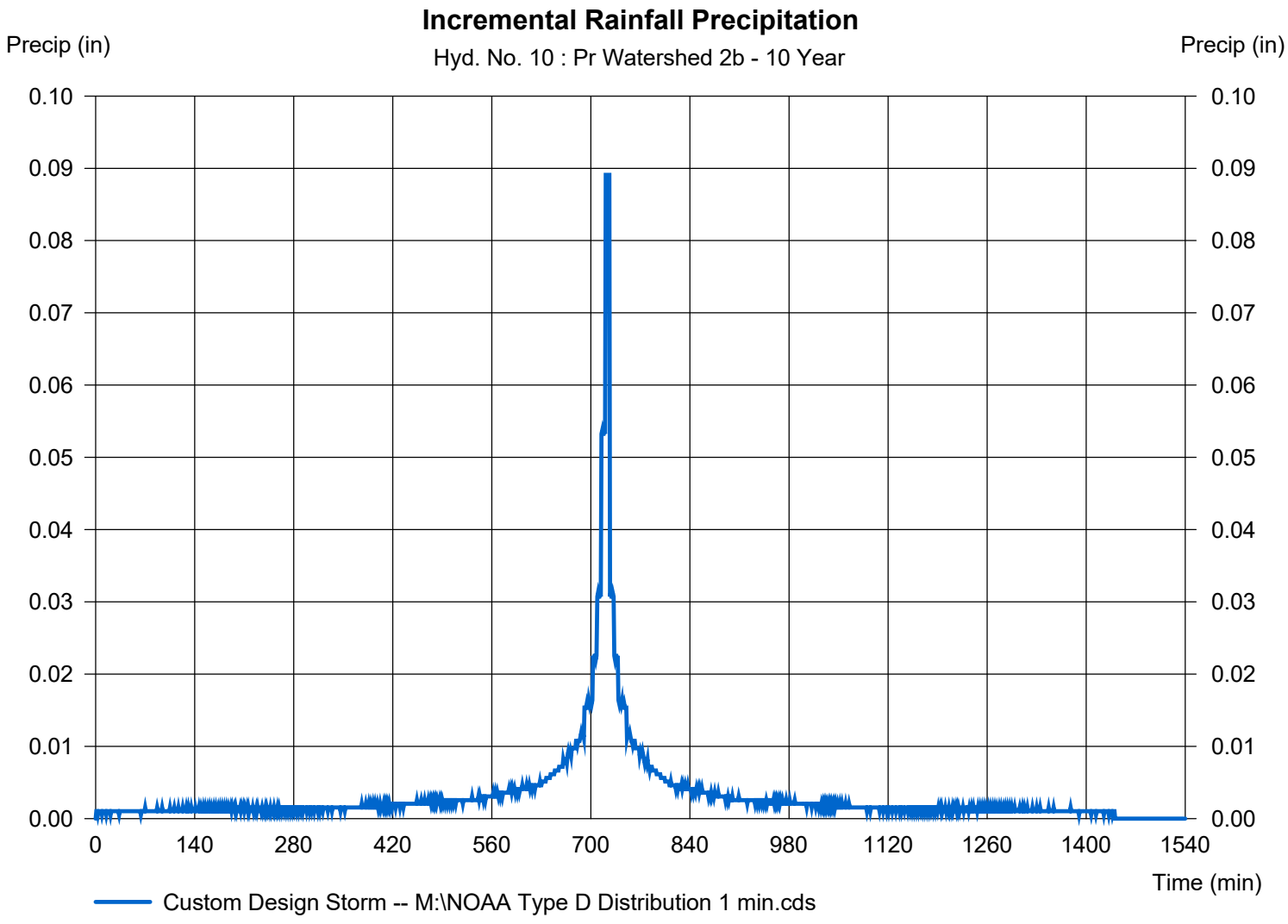


Precipitation Report

Hyd. No. 10

Pr Watershed 2b

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 5.1200 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		

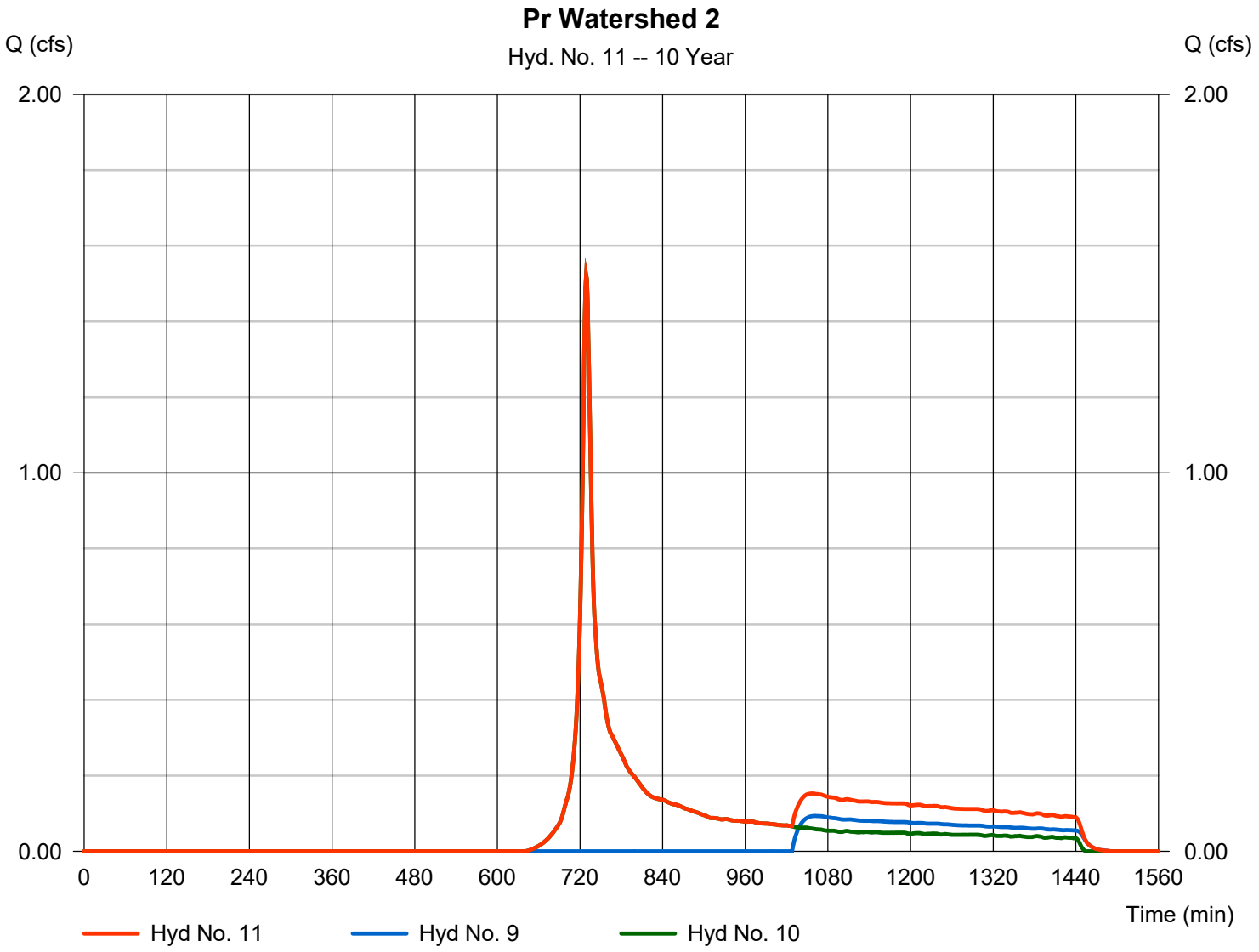


Hydrograph Report

Hyd. No. 11

Pr Watershed 2

Hydrograph type	=	Combine	Peak discharge	=	1.522 cfs
Storm frequency	=	10 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	7,347 cuft
Inflow hyds.	=	9, 10	Contrib. drain. area	=	0.960 ac

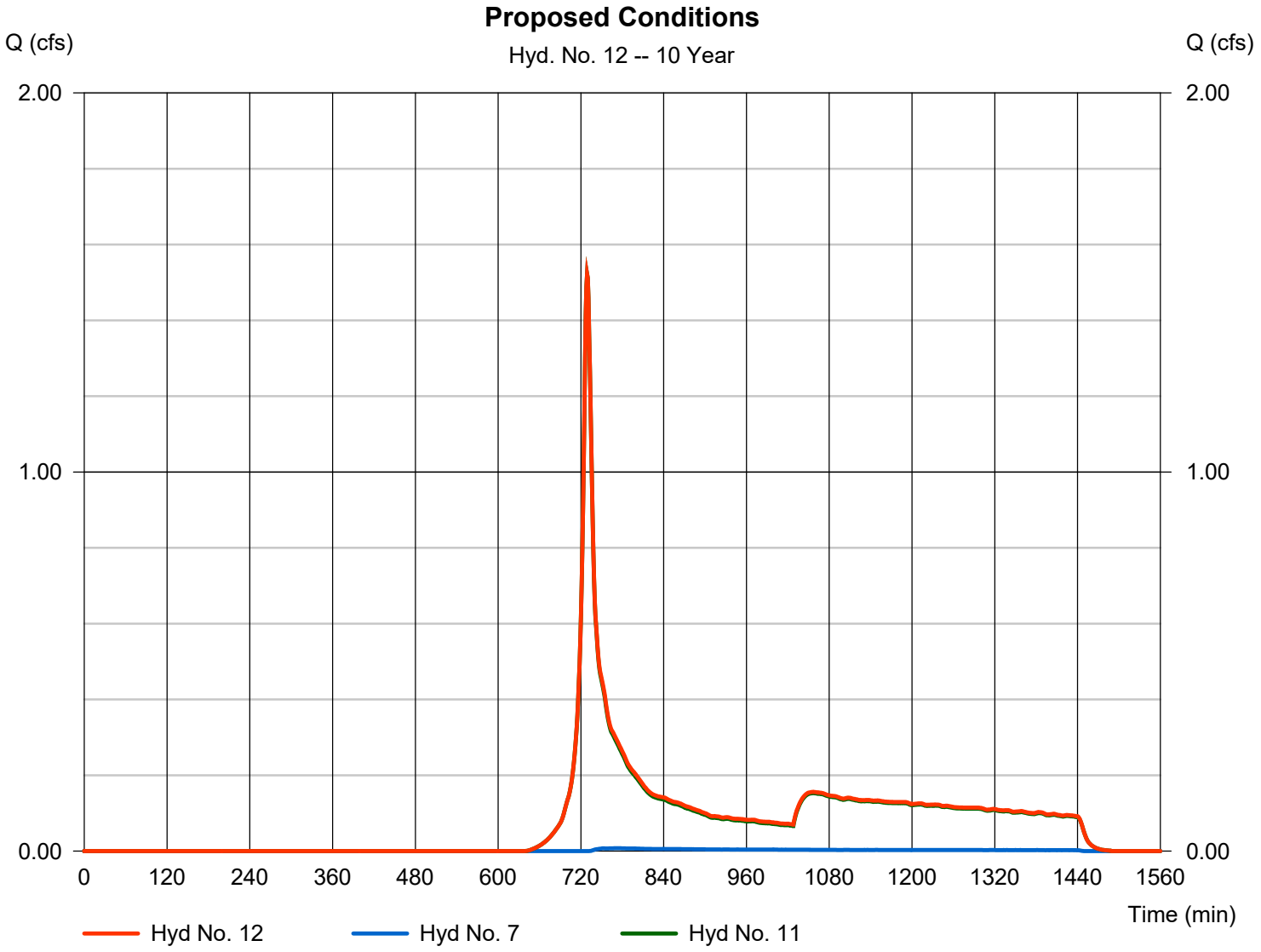


Hydrograph Report

Hyd. No. 12

Proposed Conditions

Hydrograph type	=	Combine	Peak discharge	=	1.522 cfs
Storm frequency	=	10 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	7,507 cuft
Inflow hyds.	=	7, 11	Contrib. drain. area	=	0.000 ac



Hydrograph Summary Report

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

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.097	1	754	1,746	------	------	------	Ex Watershed 1
2	SCS Runoff	0.773	1	745	7,107	------	------	------	Ex Watershed 2
3	Combine	0.860	1	746	8,853	1, 2	------	------	Existing Conditions
4	SCS Runoff	5.544	1	732	22,455	------	------	------	Pr Watershed 1a
5	Reservoir	0.000	1	n/a	0	4	233.83	22,455	Basin 1
6	SCS Runoff	0.035	1	732	350	------	------	------	Pr Watershed 1b
7	Combine	0.035	1	732	350	5, 6	------	------	Pr Watershed 1
8	SCS Runoff	4.280	1	729	14,991	------	------	------	Pr Watershed 2a
9	Reservoir	0.353	1	813	5,476	8	234.04	9,733	Basin 2
10	SCS Runoff	2.257	1	729	7,976	------	------	------	Pr Watershed 2b
11	Combine	2.257	1	729	13,453	9, 10	------	------	Pr Watershed 2
12	Combine	2.289	1	729	13,803	7, 11	------	------	Proposed Conditions

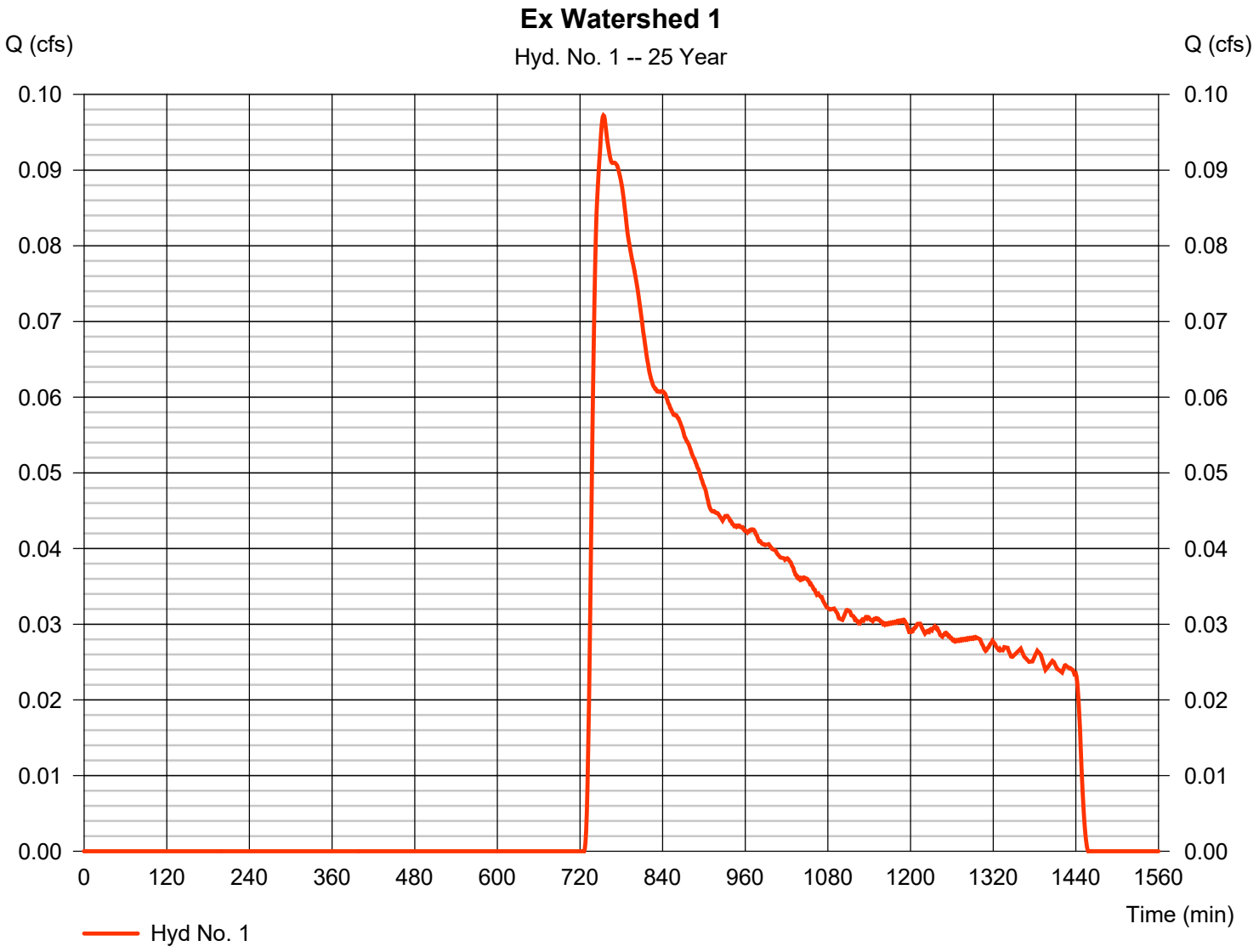
Hydrograph Report

Hyd. No. 1

Ex Watershed 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.097 cfs
Storm frequency	=	25 yrs	Time to peak	=	754 min
Time interval	=	1 min	Hyd. volume	=	1,746 cuft
Drainage area	=	1.420 ac	Curve number	=	36*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	10.30 min
Total precip.	=	6.16 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1hr.cda	Shape factor	=	484

* Composite (Area/CN) = [(0.600 x 30) + (0.790 x 39) + (0.030 x 98)] / 1.420

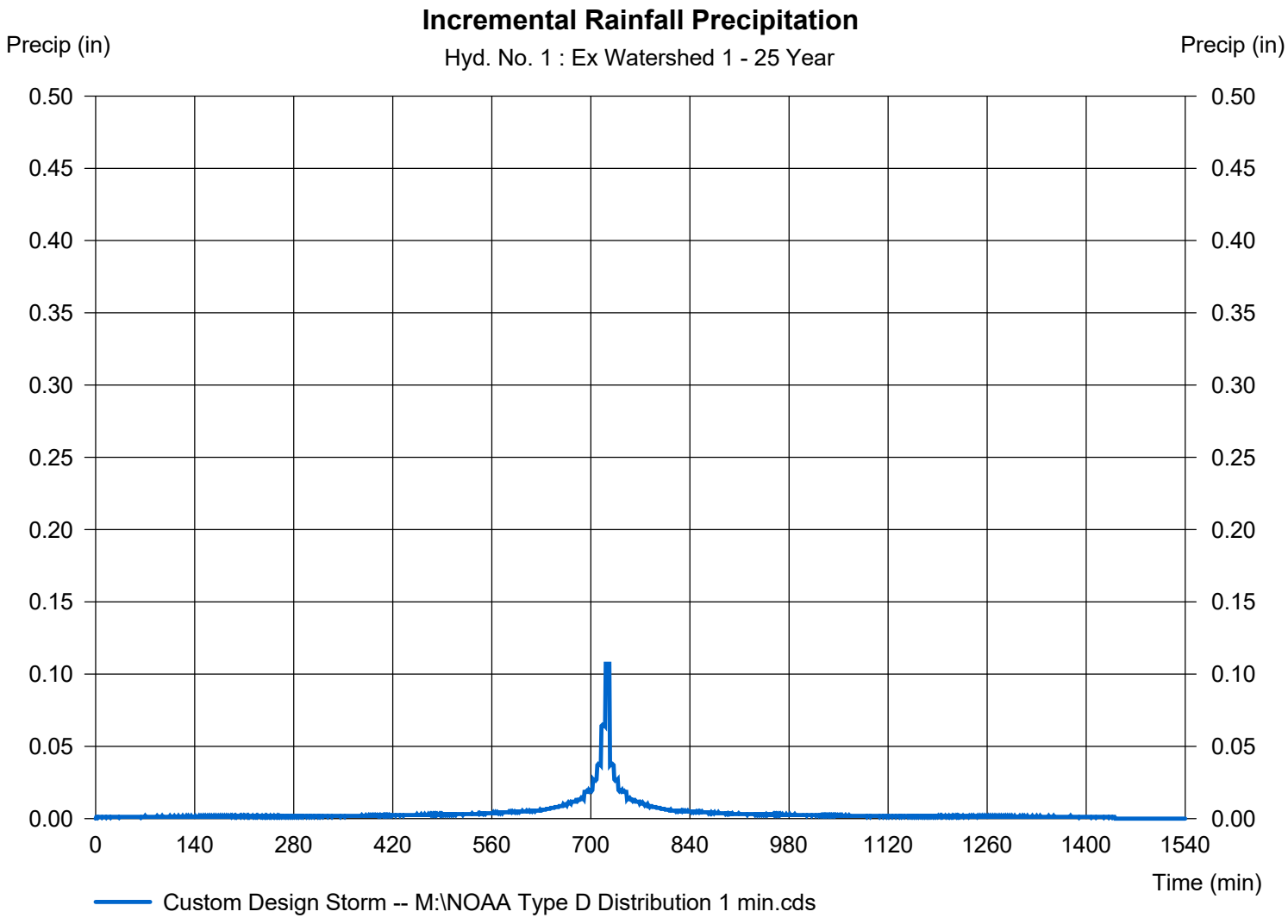


Precipitation Report

Hyd. No. 1

Ex Watershed 1

Storm Frequency	= 25 yrs	Time interval	= 1 min
Total precip.	= 6.1600 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		



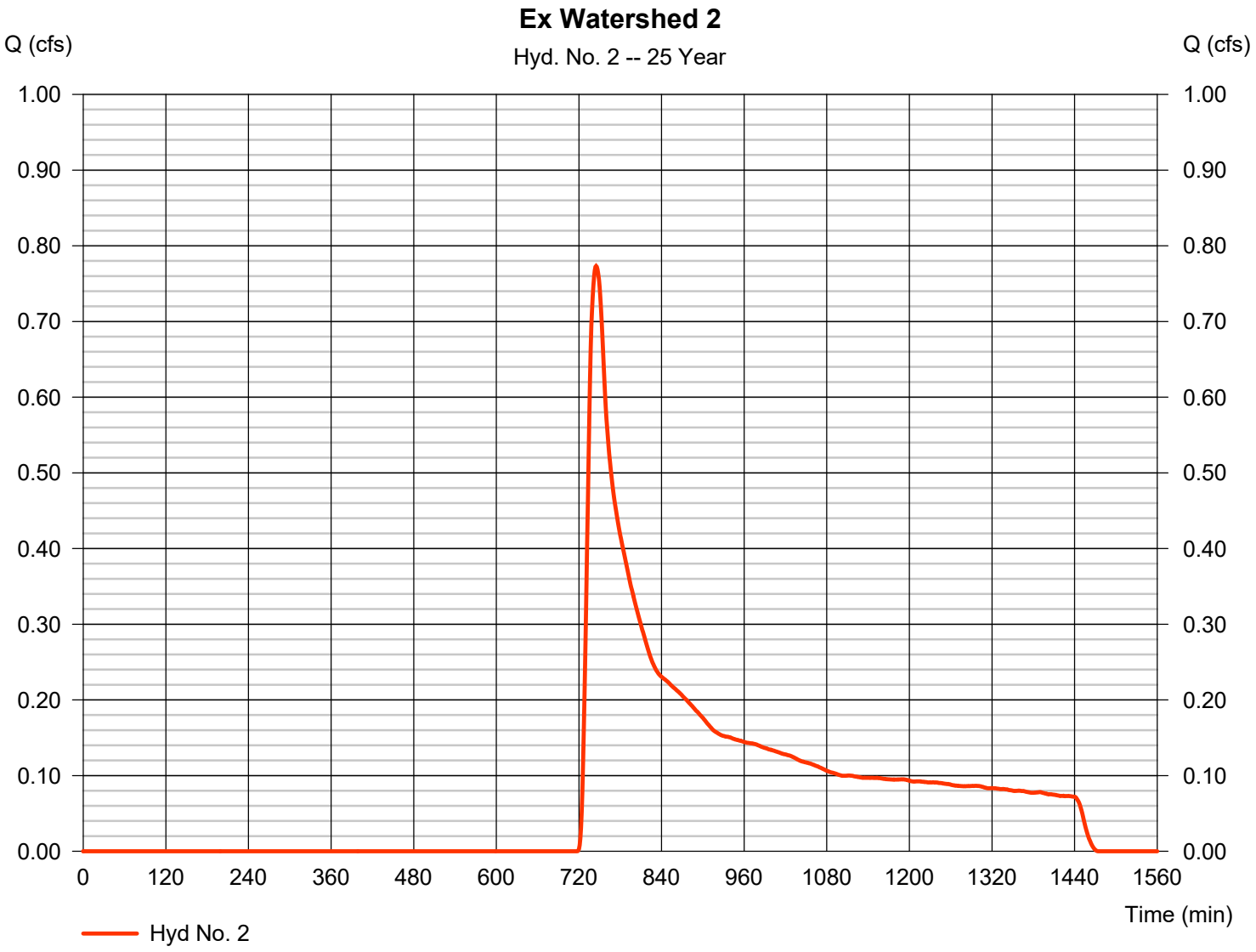
Hydrograph Report

Hyd. No. 2

Ex Watershed 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.773 cfs
Storm frequency	=	25 yrs	Time to peak	=	745 min
Time interval	=	1 min	Hyd. volume	=	7,107 cuft
Drainage area	=	2.890 ac	Curve number	=	42*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	20.40 min
Total precip.	=	6.16 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1hr.csv	Shape factor	=	484

* Composite (Area/CN) = [(1.760 x 30) + (0.500 x 77) + (0.540 x 39) + (0.090 x 98)] / 2.890

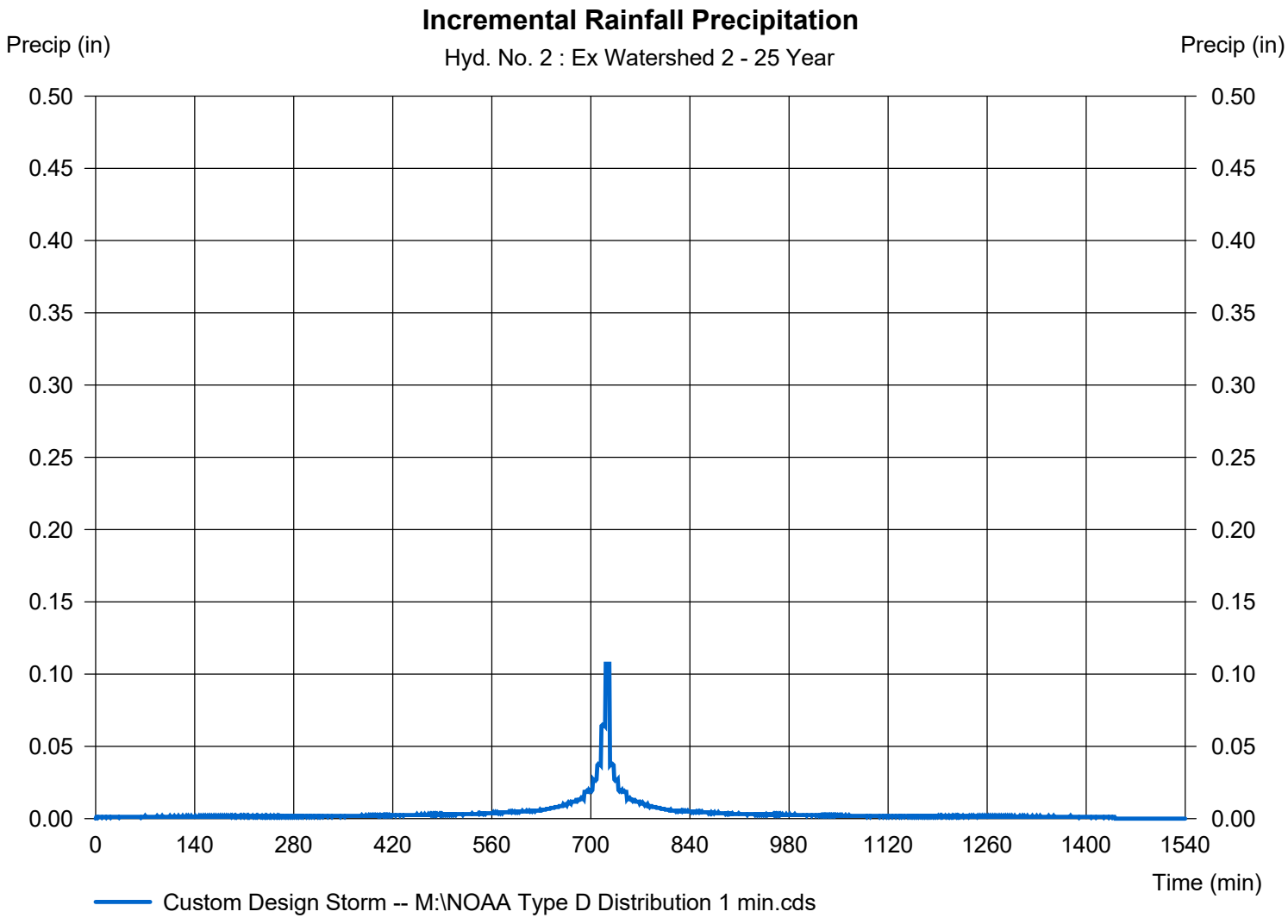


Precipitation Report

Hyd. No. 2

Ex Watershed 2

Storm Frequency	= 25 yrs	Time interval	= 1 min
Total precip.	= 6.1600 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		

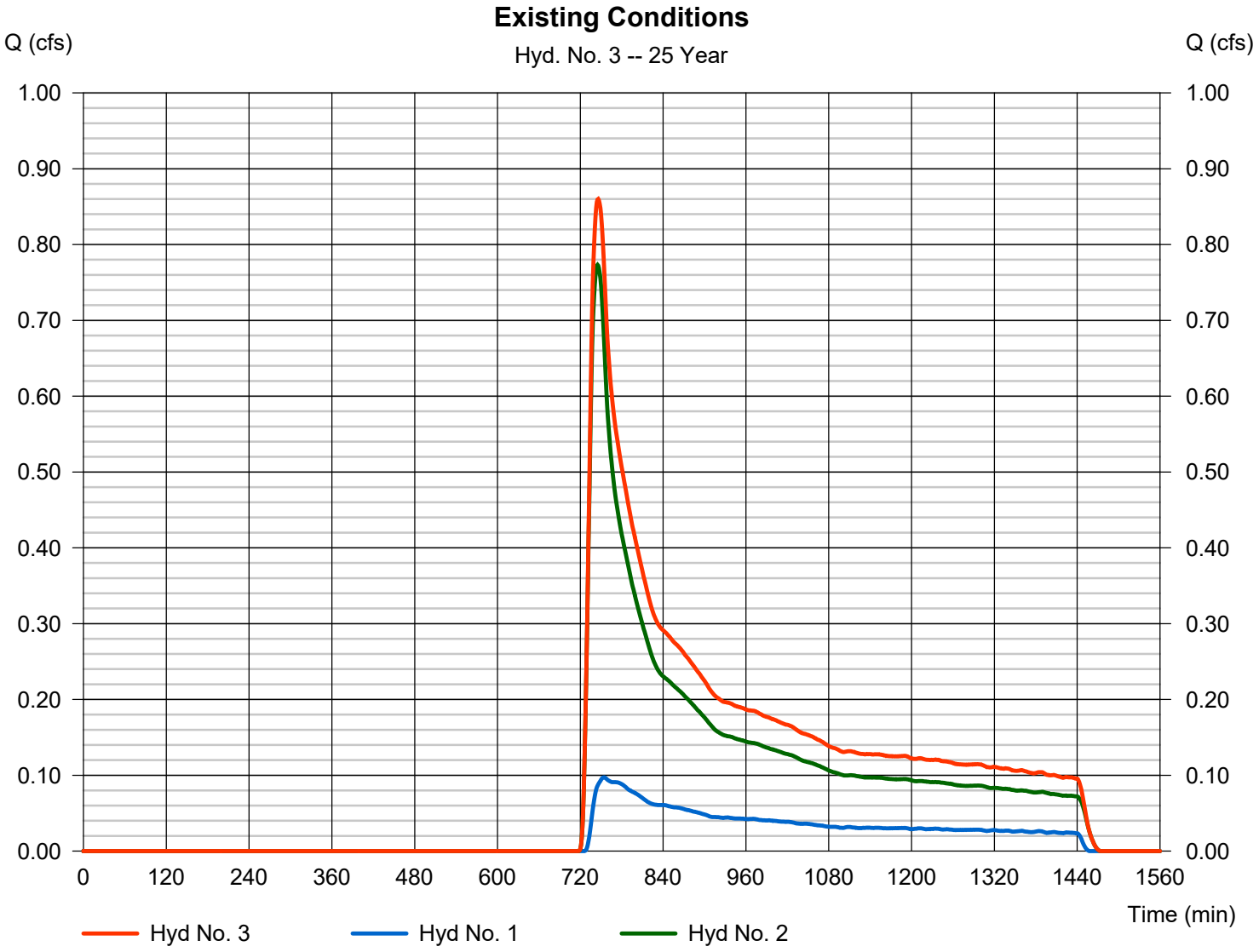


Hydrograph Report

Hyd. No. 3

Existing Conditions

Hydrograph type	=	Combine	Peak discharge	=	0.860 cfs
Storm frequency	=	25 yrs	Time to peak	=	746 min
Time interval	=	1 min	Hyd. volume	=	8,853 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	4.310 ac



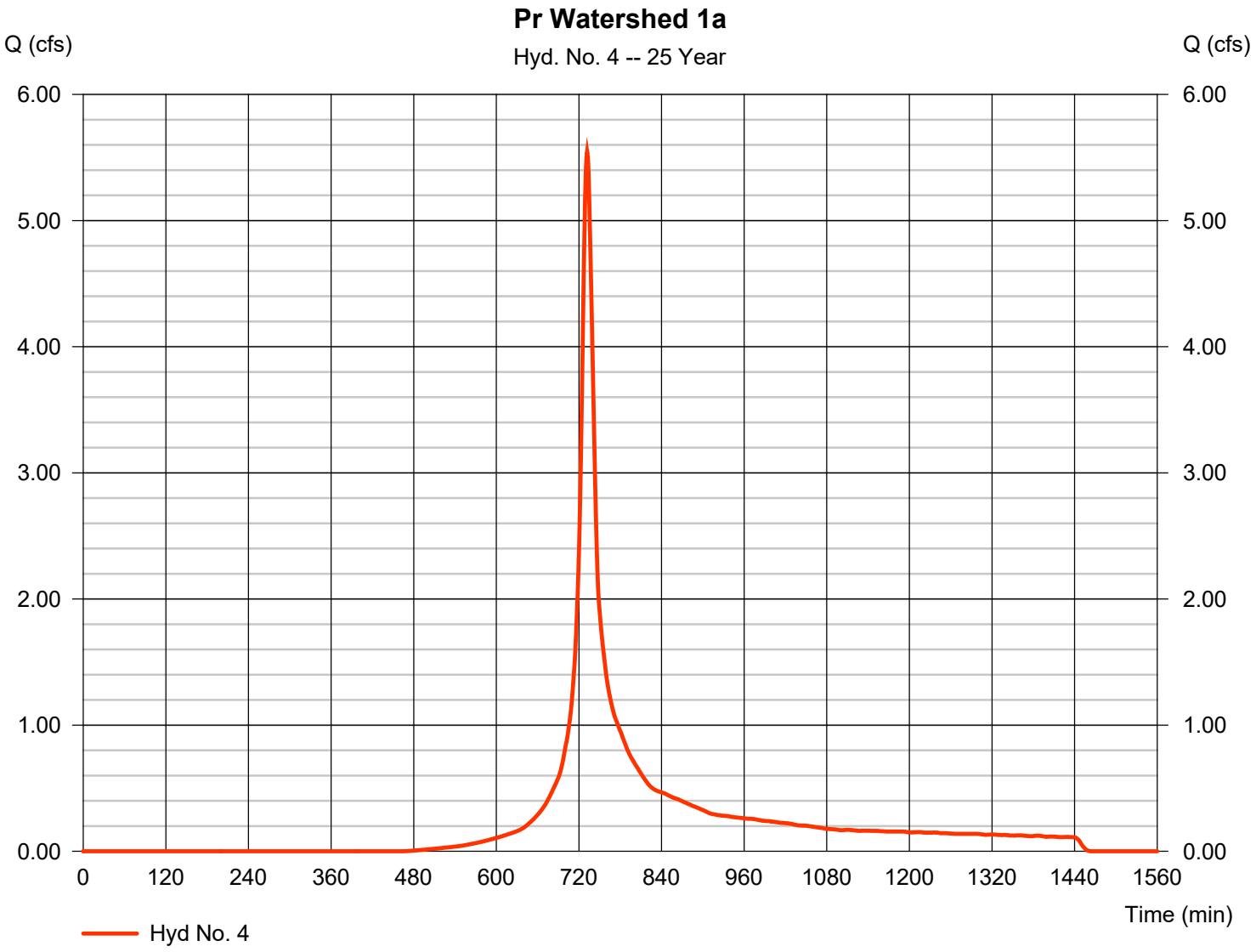
Hydrograph Report

Hyd. No. 4

Pr Watershed 1a

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.544 cfs
Storm frequency	=	25 yrs	Time to peak	=	732 min
Time interval	=	1 min	Hyd. volume	=	22,455 cuft
Drainage area	=	1.920 ac	Curve number	=	73*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	14.50 min
Total precip.	=	6.16 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1hr.csv	Shape factor	=	484

* Composite (Area/CN) = [(0.810 x 39) + (1.110 x 98)] / 1.920

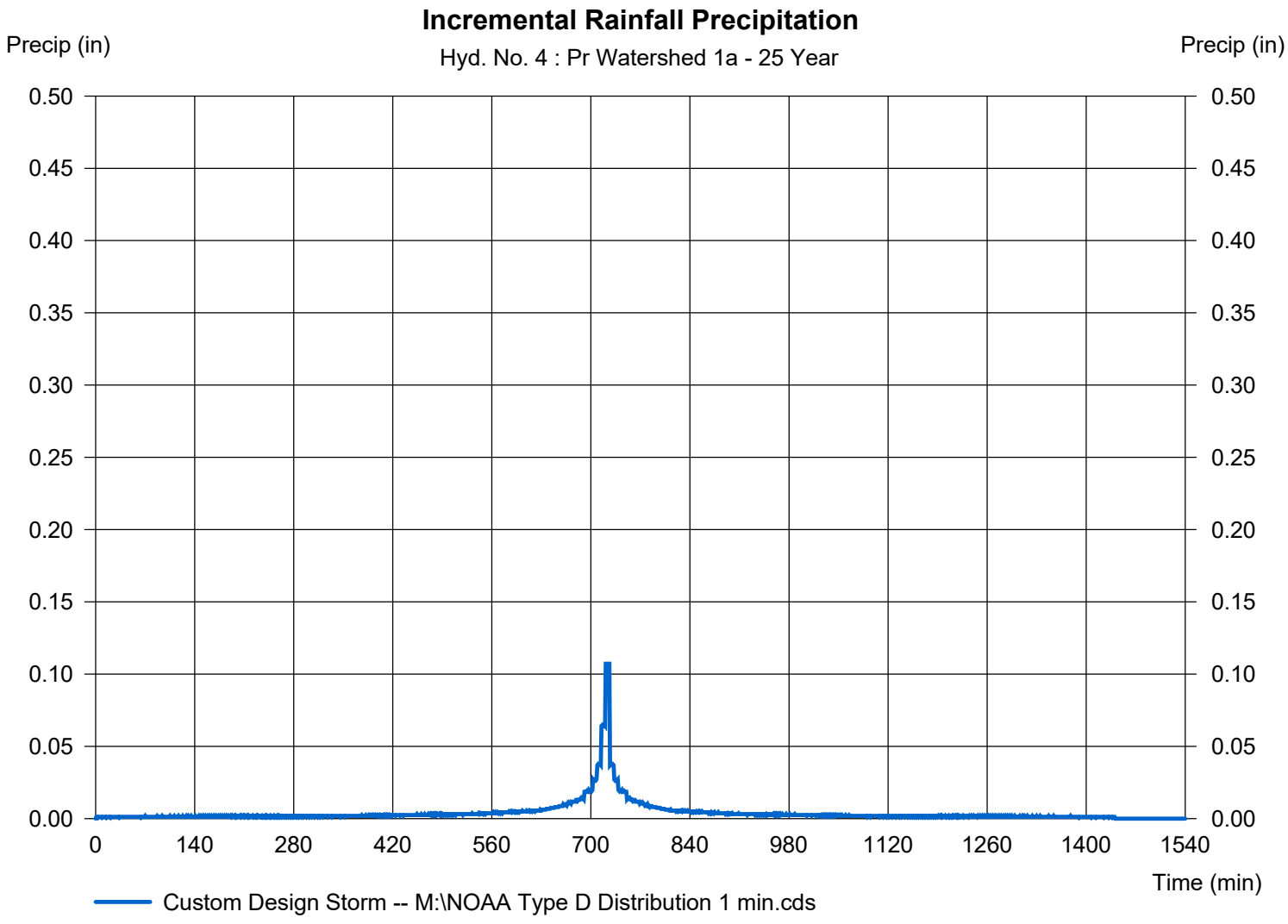


Precipitation Report

Hyd. No. 4

Pr Watershed 1a

Storm Frequency	= 25 yrs	Time interval	= 1 min
Total precip.	= 6.1600 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		



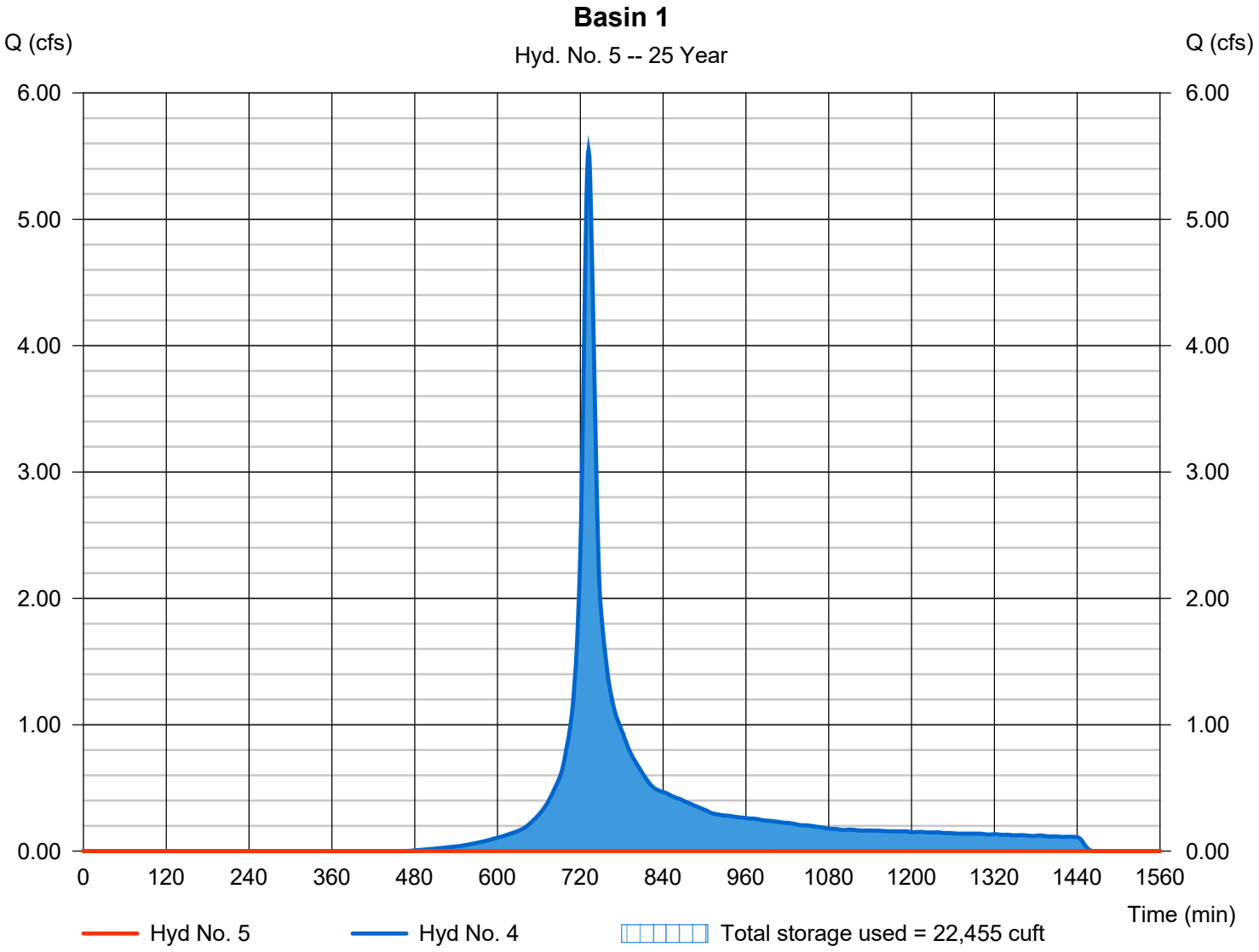
Hydrograph Report

Hyd. No. 5

Basin 1

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	25 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	4 - Pr Watershed 1a	Max. Elevation	=	233.83 ft
Reservoir name	=	Pond 1	Max. Storage	=	22,455 cuft

Storage Indication method used.



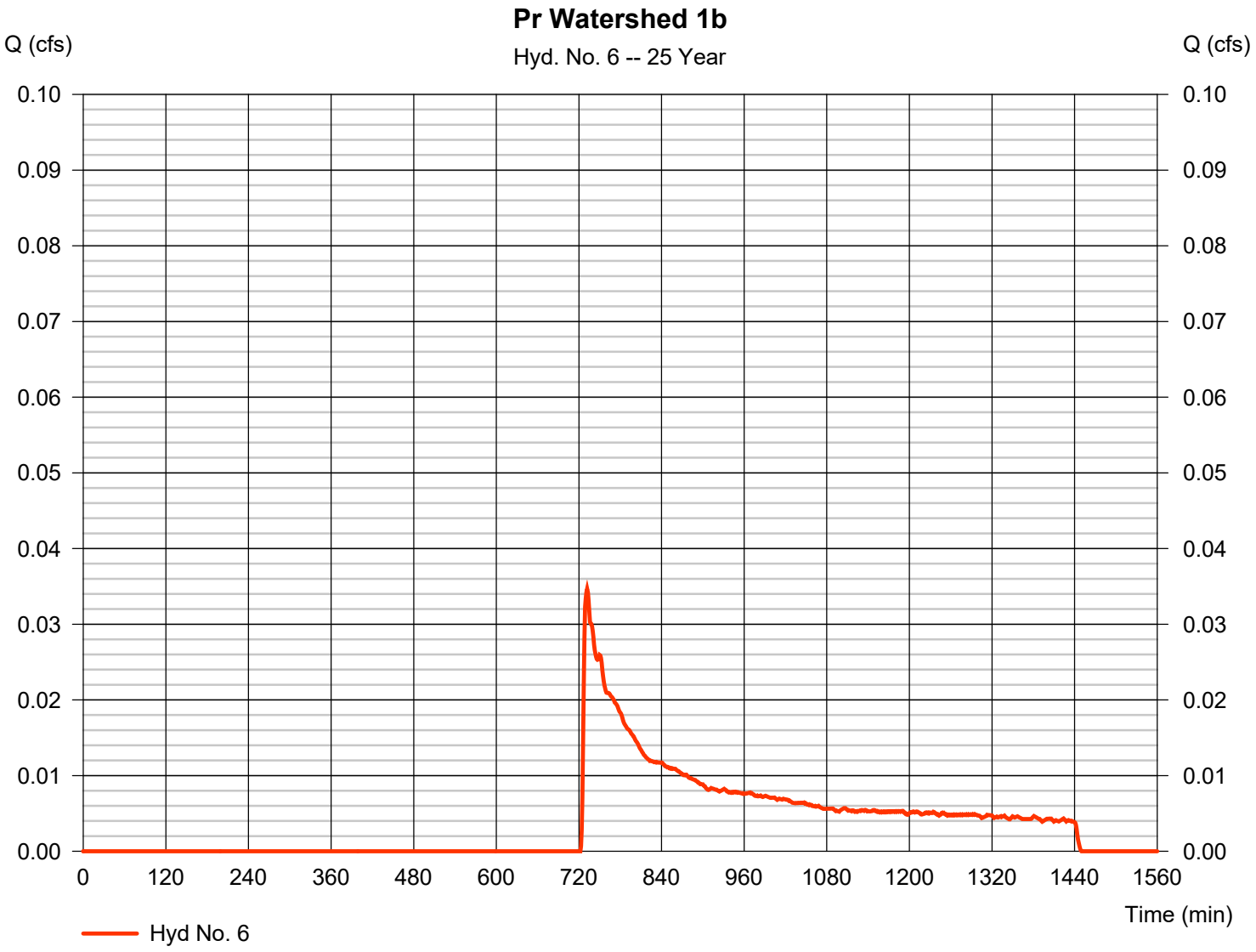
Hydrograph Report

Hyd. No. 6

Pr Watershed 1b

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.035 cfs
Storm frequency	=	25 yrs	Time to peak	=	732 min
Time interval	=	1 min	Hyd. volume	=	350 cuft
Drainage area	=	0.190 ac	Curve number	=	39*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	6.16 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1 hr.cds	Shape factor	=	484

* Composite (Area/CN) = [(0.190 x 39)] / 0.190

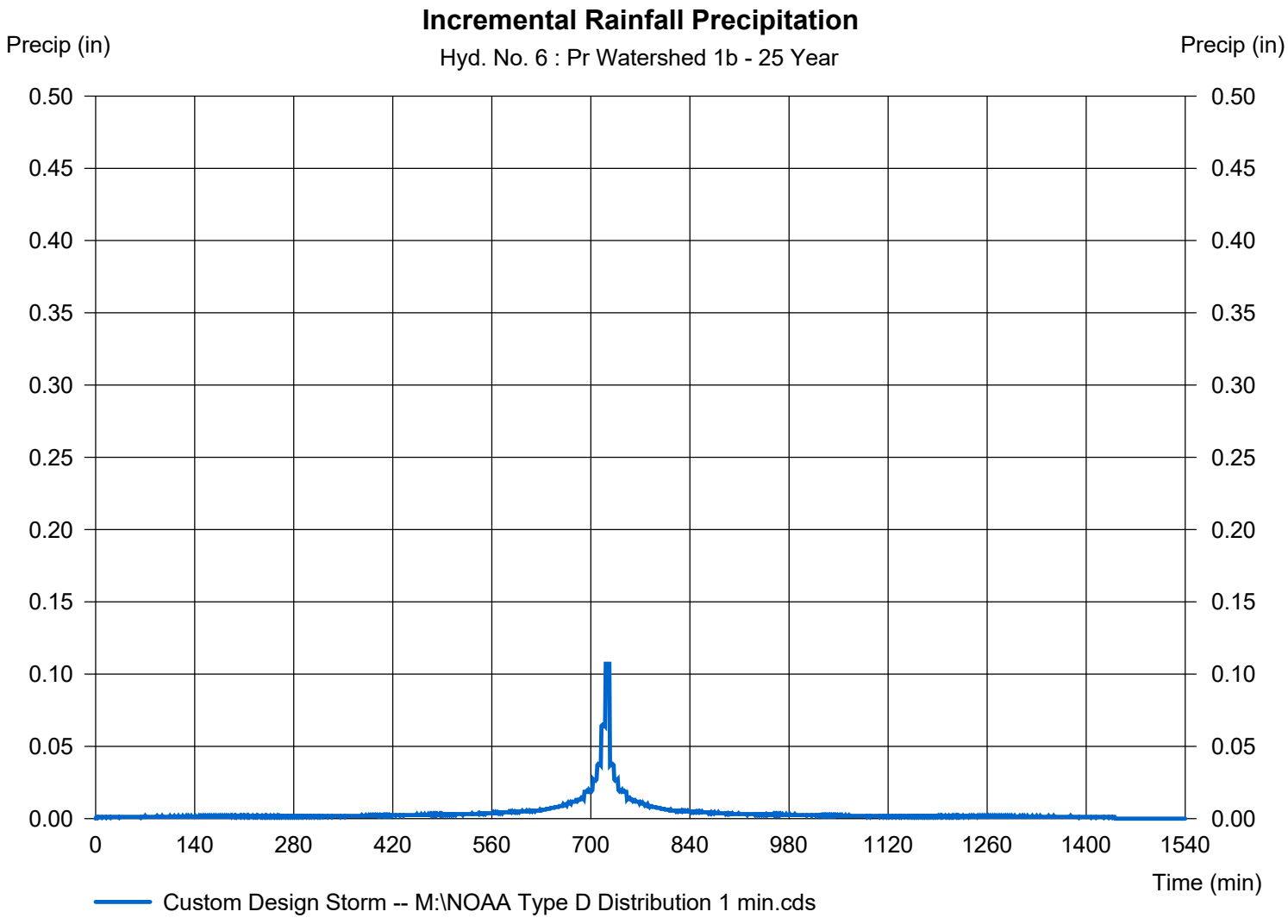


Precipitation Report

Hyd. No. 6

Pr Watershed 1b

Storm Frequency	= 25 yrs	Time interval	= 1 min
Total precip.	= 6.1600 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		

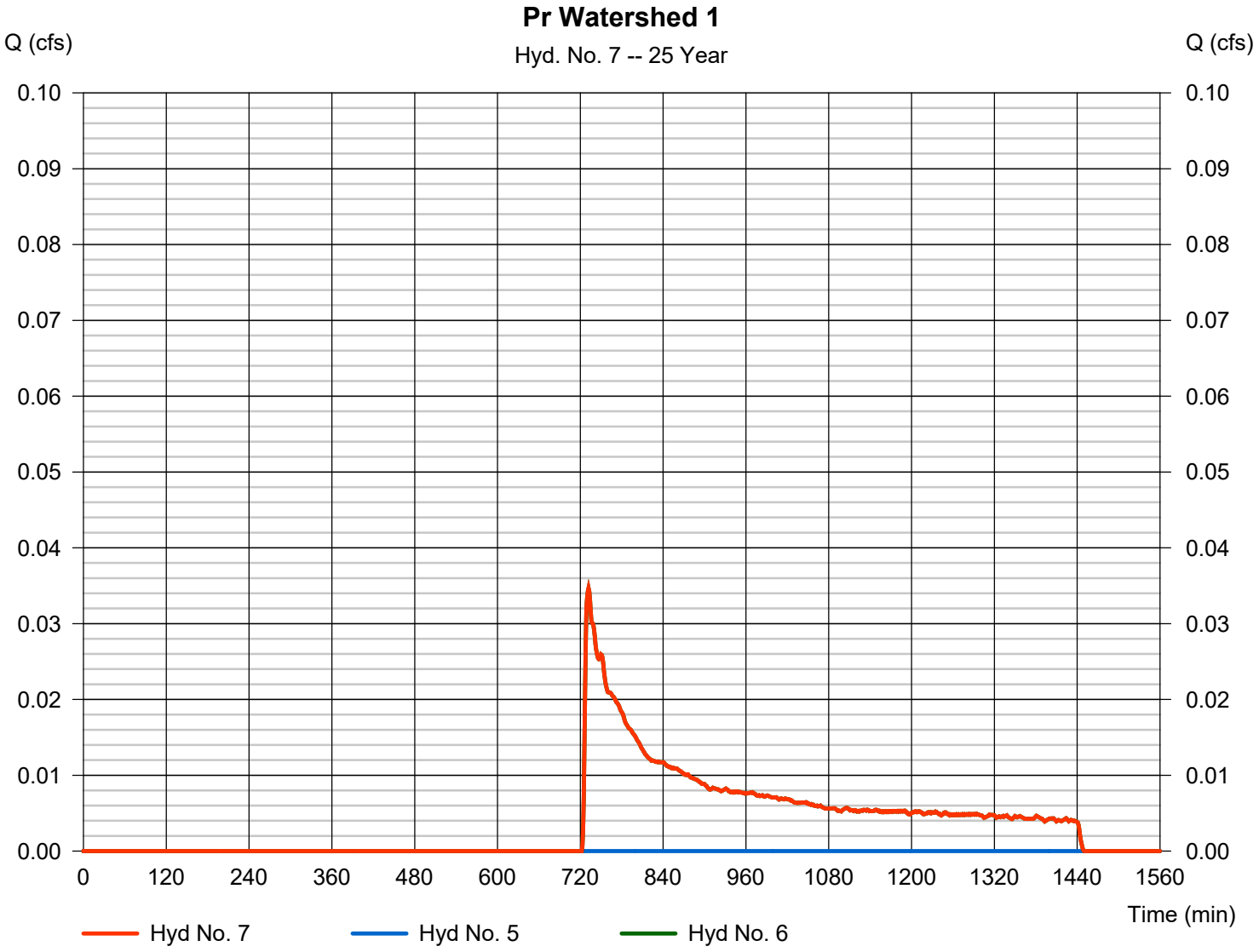


Hydrograph Report

Hyd. No. 7

Pr Watershed 1

Hydrograph type	=	Combine	Peak discharge	=	0.035 cfs
Storm frequency	=	25 yrs	Time to peak	=	732 min
Time interval	=	1 min	Hyd. volume	=	350 cuft
Inflow hyds.	=	5, 6	Contrib. drain. area	=	0.190 ac



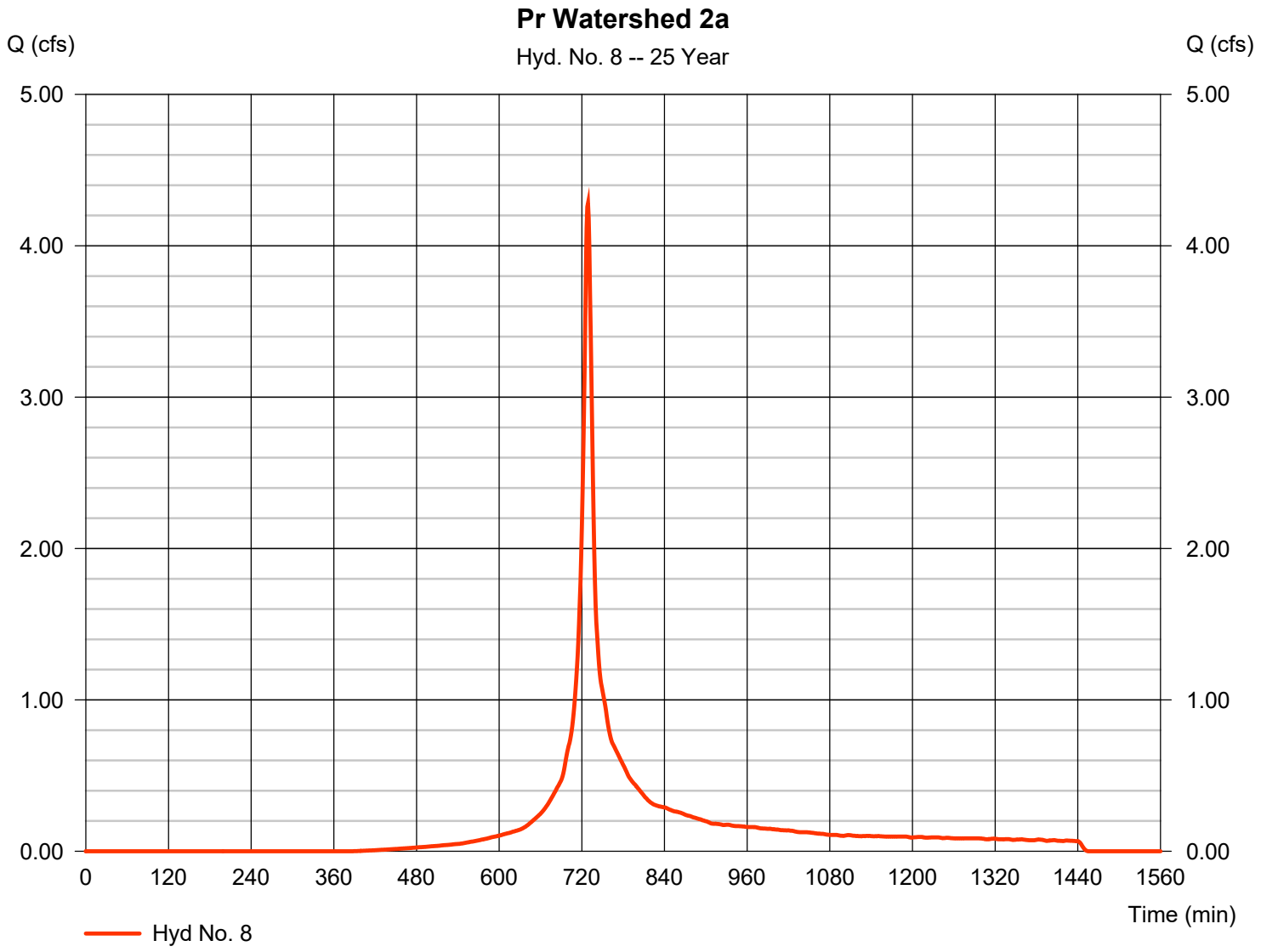
Hydrograph Report

Hyd. No. 8

Pr Watershed 2a

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.280 cfs
Storm frequency	=	25 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	14,991 cuft
Drainage area	=	1.110 ac	Curve number	=	78*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	8.80 min
Total precip.	=	6.16 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1hr.csv	Shape factor	=	484

* Composite (Area/CN) = [(0.370 x 39) + (0.740 x 98)] / 1.110

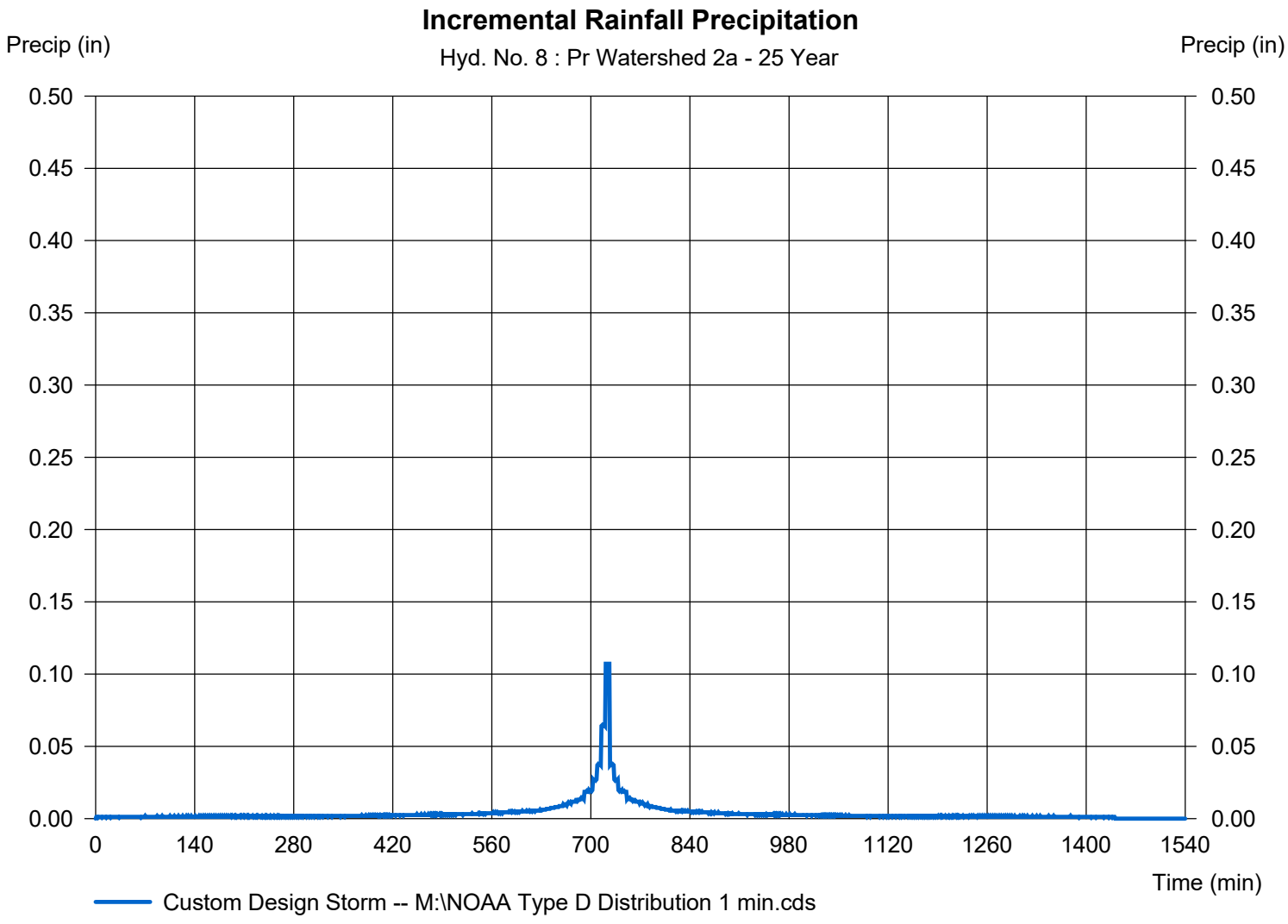


Precipitation Report

Hyd. No. 8

Pr Watershed 2a

Storm Frequency	= 25 yrs	Time interval	= 1 min
Total precip.	= 6.1600 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		



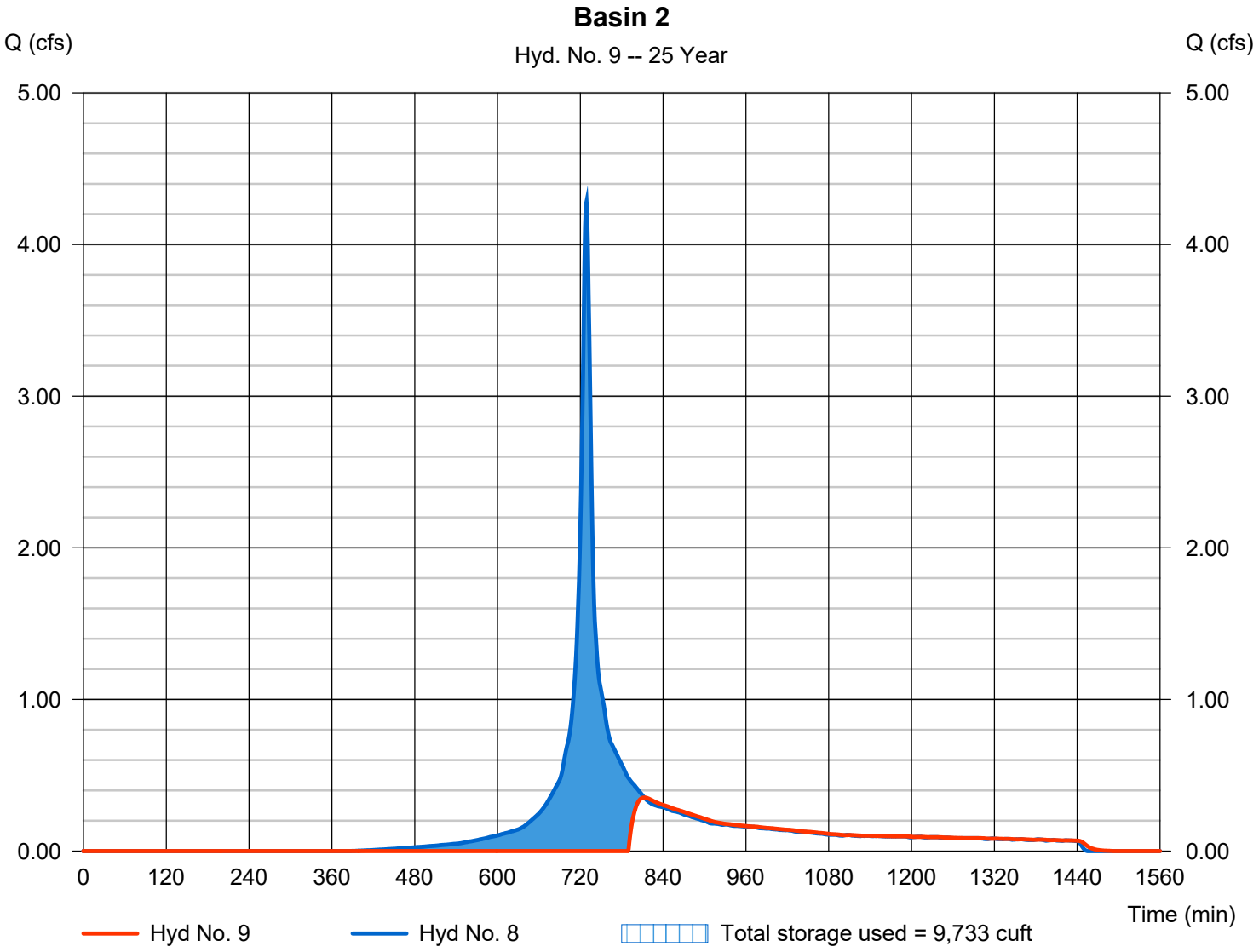
Hydrograph Report

Hyd. No. 9

Basin 2

Hydrograph type	=	Reservoir	Peak discharge	=	0.353 cfs
Storm frequency	=	25 yrs	Time to peak	=	813 min
Time interval	=	1 min	Hyd. volume	=	5,476 cuft
Inflow hyd. No.	=	8 - Pr Watershed 2a	Max. Elevation	=	234.04 ft
Reservoir name	=	Pond 2	Max. Storage	=	9,733 cuft

Storage Indication method used.



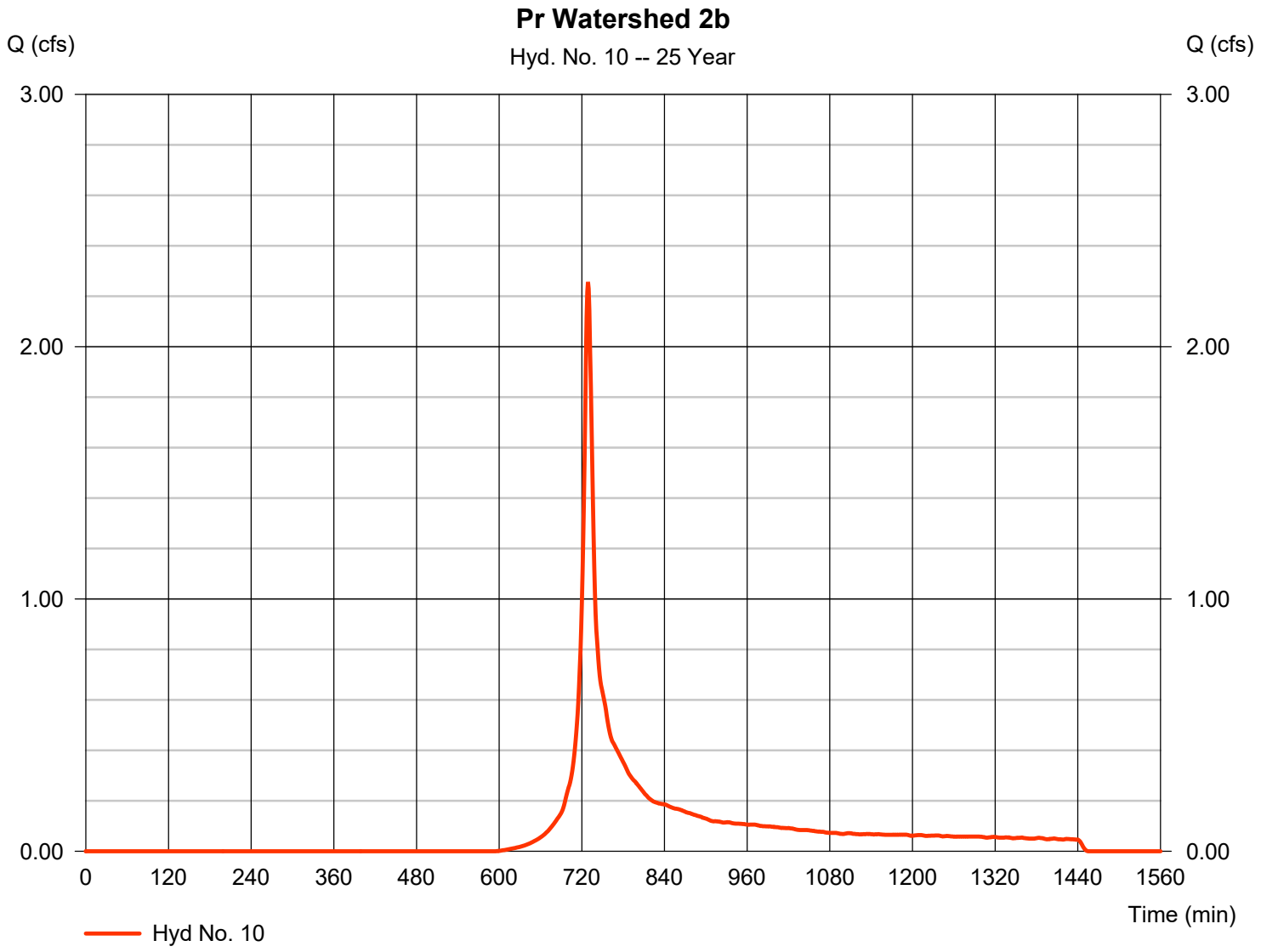
Hydrograph Report

Hyd. No. 10

Pr Watershed 2b

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.257 cfs
Storm frequency	=	25 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	7,976 cuft
Drainage area	=	0.960 ac	Curve number	=	63*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	6.16 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1 hr.cds	Shape factor	=	484

* Composite (Area/CN) = [(0.120 x 30) + (0.040 x 77) + (0.230 x 39) + (0.280 x 80) + (0.290 x 77)] / 0.960

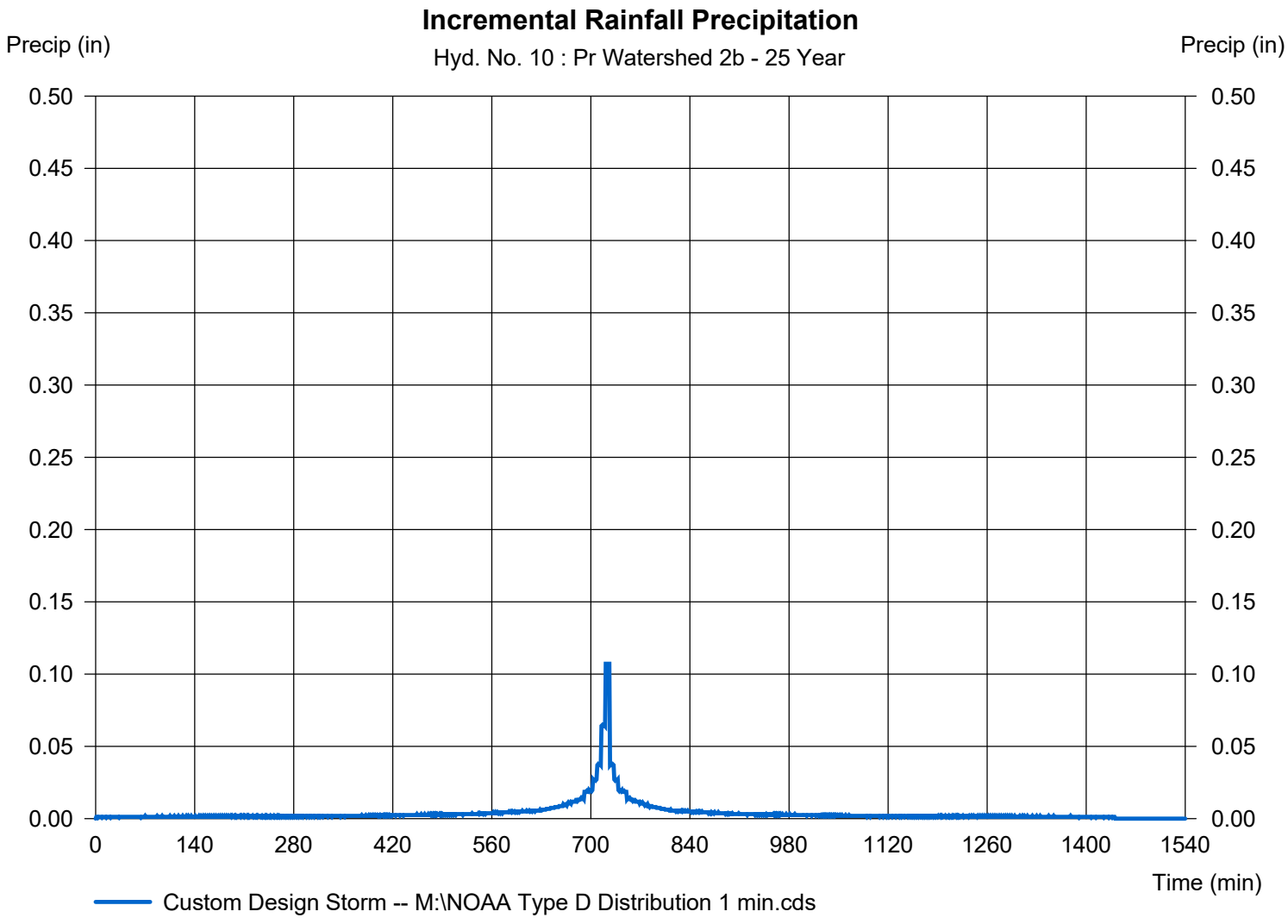


Precipitation Report

Hyd. No. 10

Pr Watershed 2b

Storm Frequency	= 25 yrs	Time interval	= 1 min
Total precip.	= 6.1600 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		

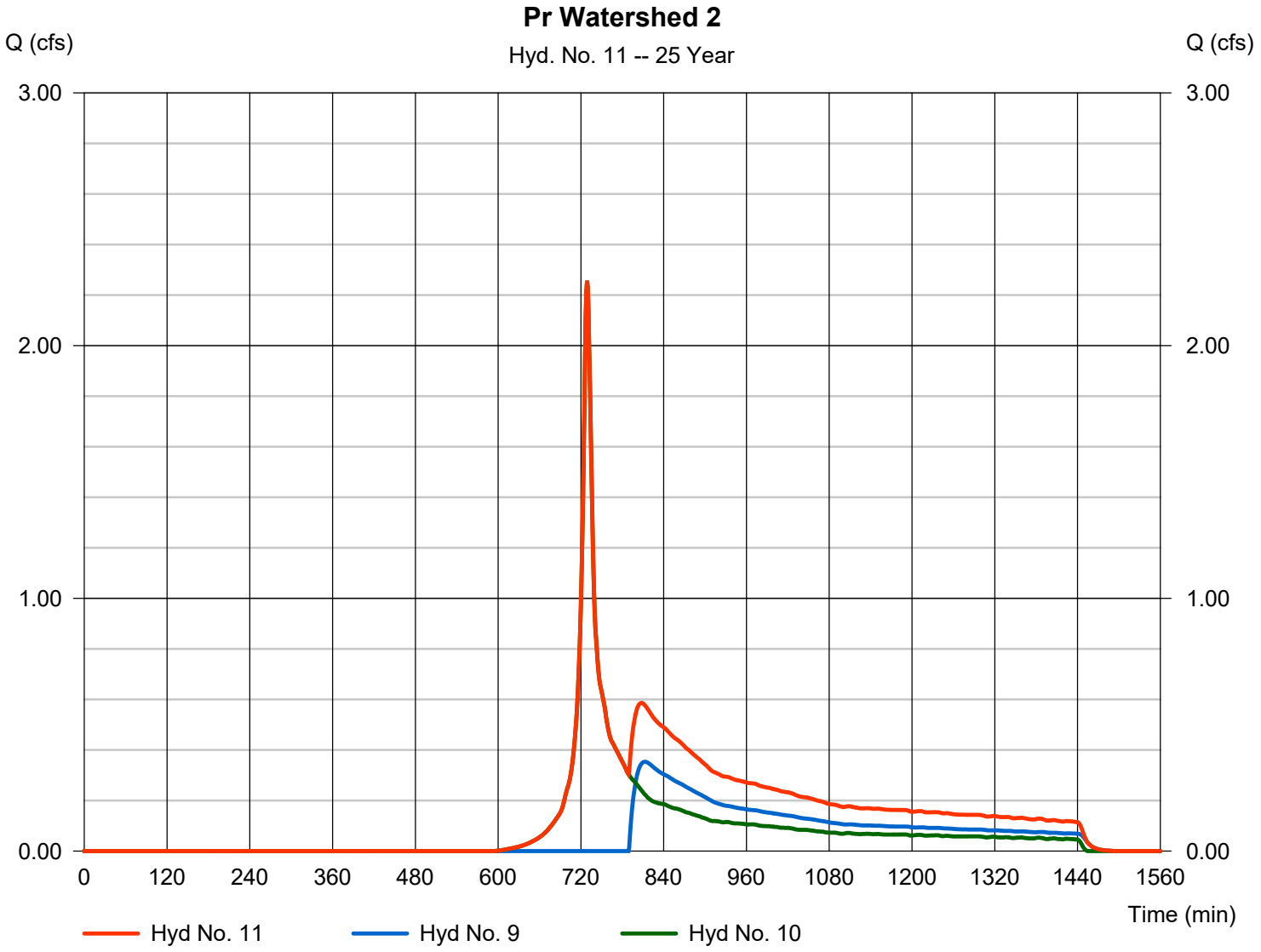


Hydrograph Report

Hyd. No. 11

Pr Watershed 2

Hydrograph type	=	Combine	Peak discharge	=	2.257 cfs
Storm frequency	=	25 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	13,453 cuft
Inflow hyds.	=	9, 10	Contrib. drain. area	=	0.960 ac

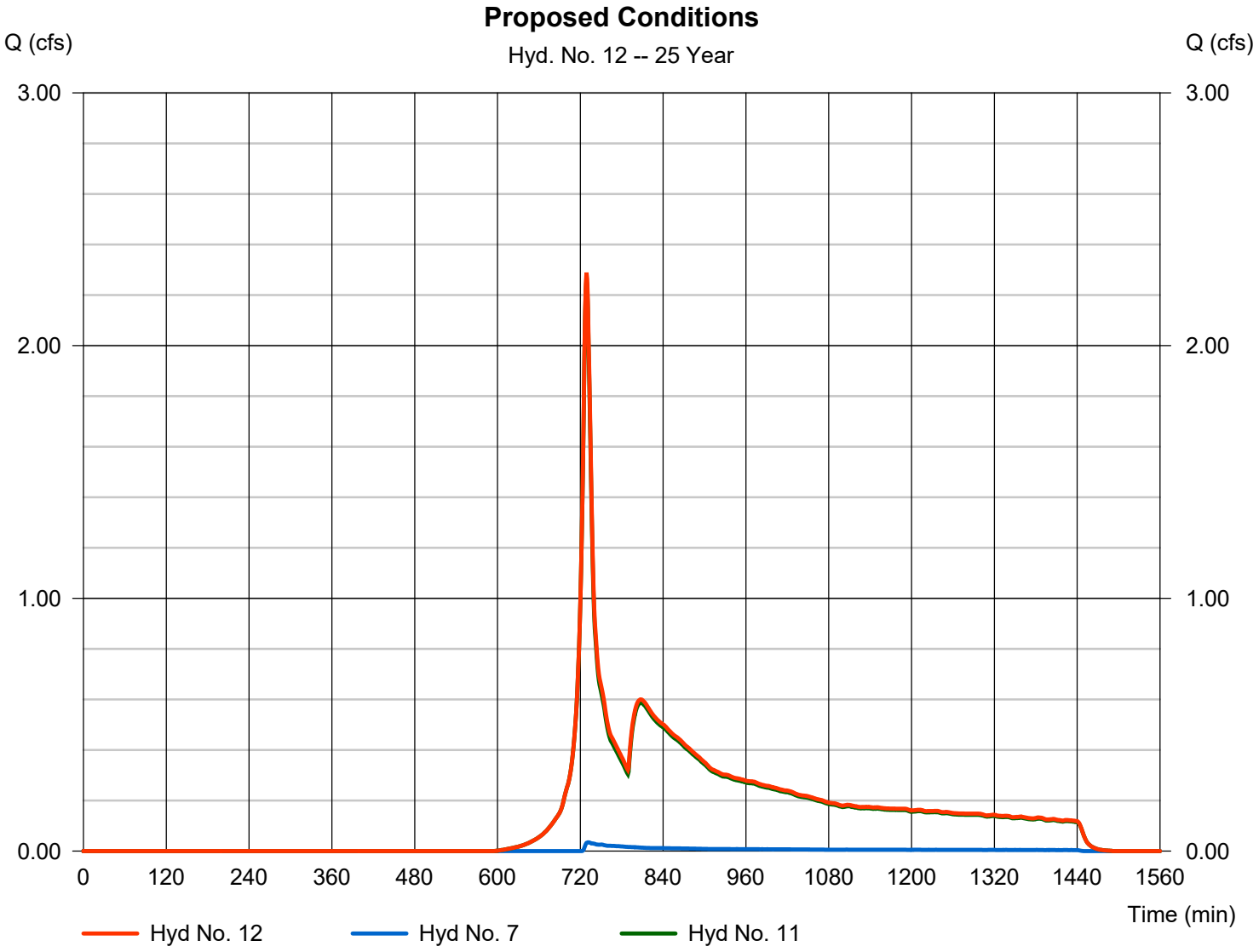


Hydrograph Report

Hyd. No. 12

Proposed Conditions

Hydrograph type	=	Combine	Peak discharge	=	2.289 cfs
Storm frequency	=	25 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	13,803 cuft
Inflow hyds.	=	7, 11	Contrib. drain. area	=	0.000 ac



Hydrograph Summary Report

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

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.248	1	739	2,840	------	------	------	Ex Watershed 1
2	SCS Runoff	1.395	1	742	10,279	------	------	------	Ex Watershed 2
3	Combine	1.637	1	741	13,119	1, 2	------	------	Existing Conditions
4	SCS Runoff	6.676	1	732	27,067	------	------	------	Pr Watershed 1a
5	Reservoir	0.171	1	1241	2,894	4	234.02	24,421	Basin 1
6	SCS Runoff	0.092	1	729	531	------	------	------	Pr Watershed 1b
7	Combine	0.178	1	1236	3,425	5, 6	------	------	Pr Watershed 1
8	SCS Runoff	5.058	1	729	17,811	------	------	------	Pr Watershed 2a
9	Reservoir	0.767	1	770	8,296	8	234.09	9,988	Basin 2
10	SCS Runoff	2.842	1	729	9,953	------	------	------	Pr Watershed 2b
11	Combine	2.842	1	729	18,249	9, 10	------	------	Pr Watershed 2
12	Combine	2.935	1	729	21,674	7, 11	------	------	Proposed Conditions

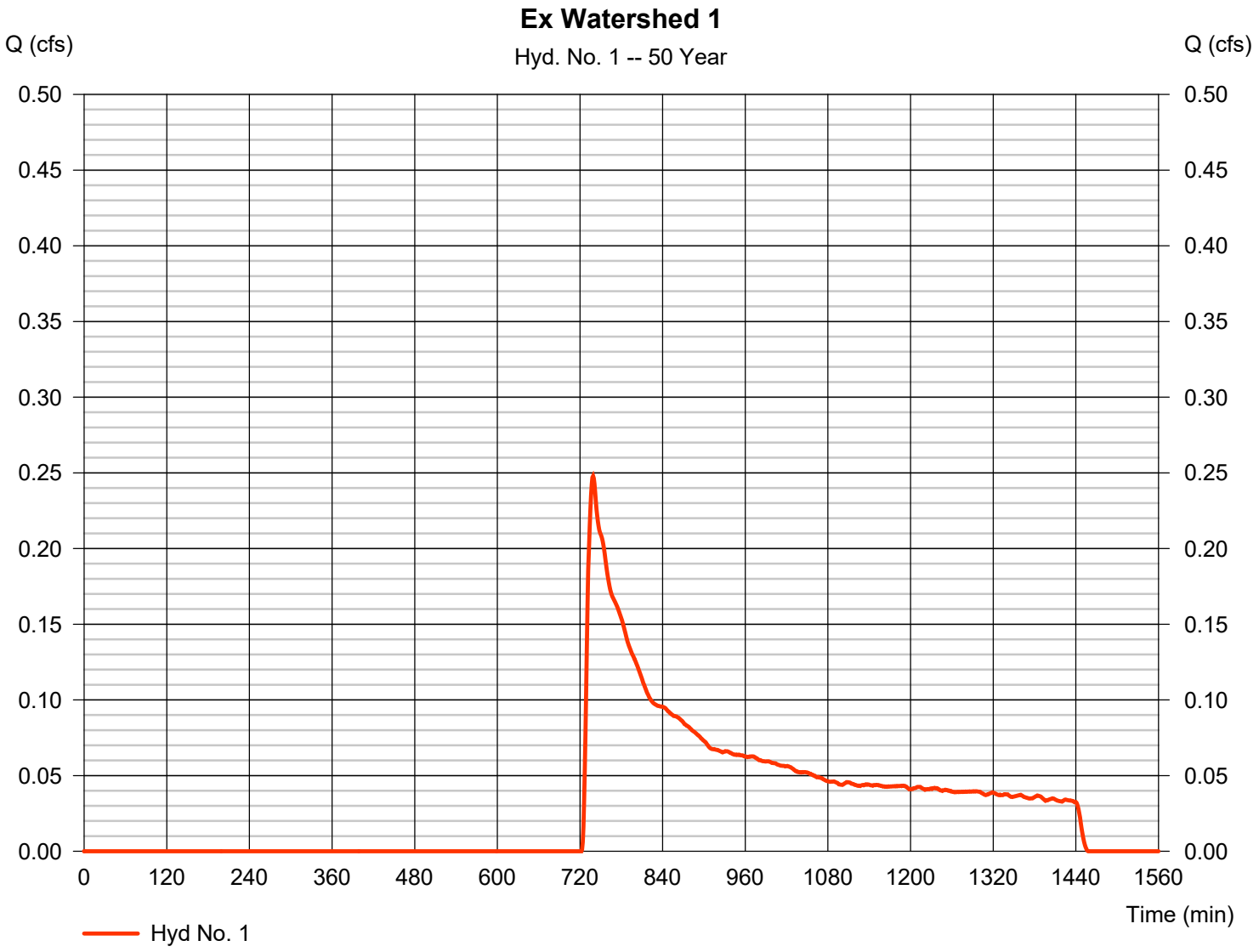
Hydrograph Report

Hyd. No. 1

Ex Watershed 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.248 cfs
Storm frequency	=	50 yrs	Time to peak	=	739 min
Time interval	=	1 min	Hyd. volume	=	2,840 cuft
Drainage area	=	1.420 ac	Curve number	=	36*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	10.30 min
Total precip.	=	6.94 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1 hr.csv	Shape factor	=	484

* Composite (Area/CN) = [(0.600 x 30) + (0.790 x 39) + (0.030 x 98)] / 1.420

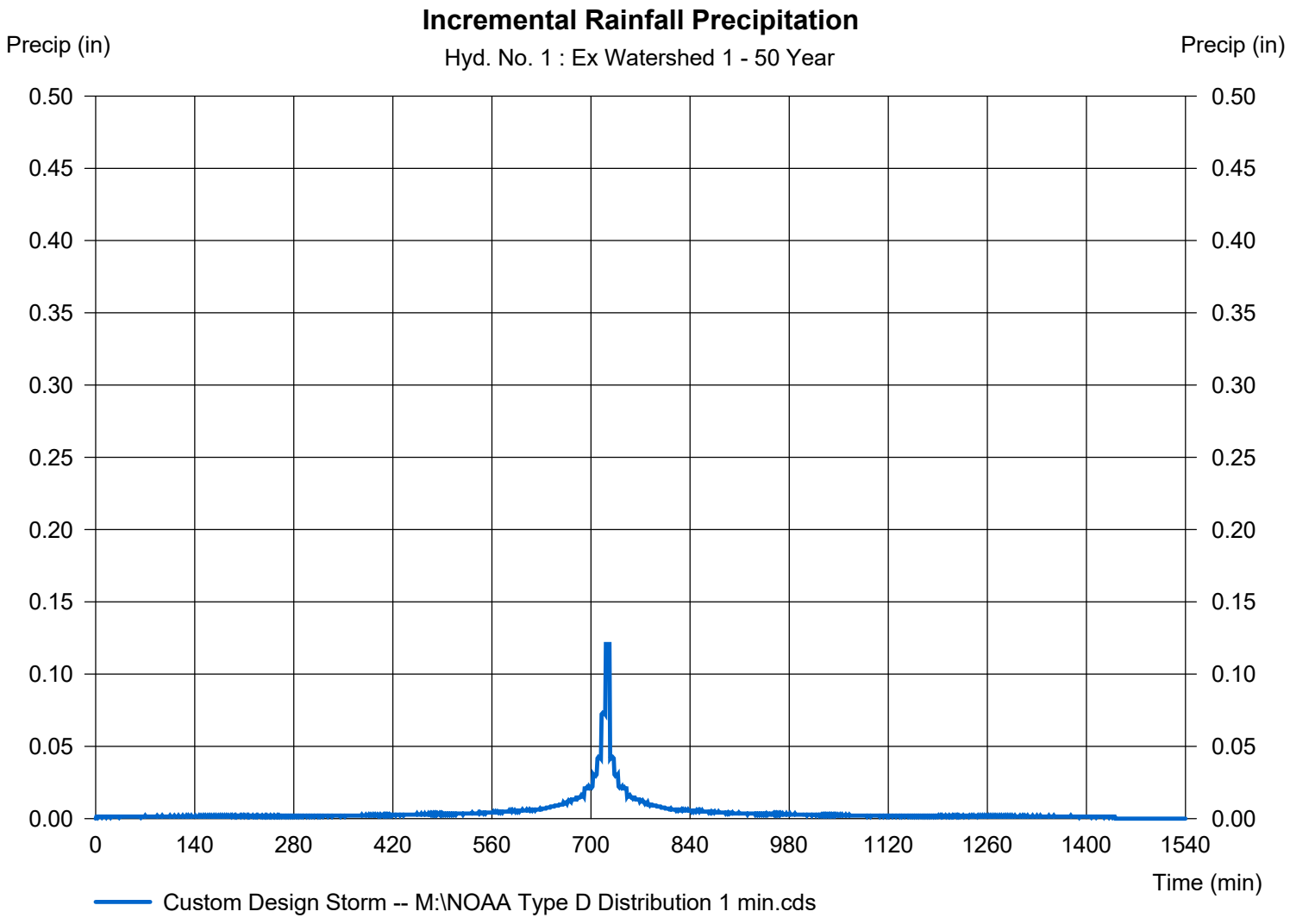


Precipitation Report

Hyd. No. 1

Ex Watershed 1

Storm Frequency	= 50 yrs	Time interval	= 1 min
Total precip.	= 6.9400 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		



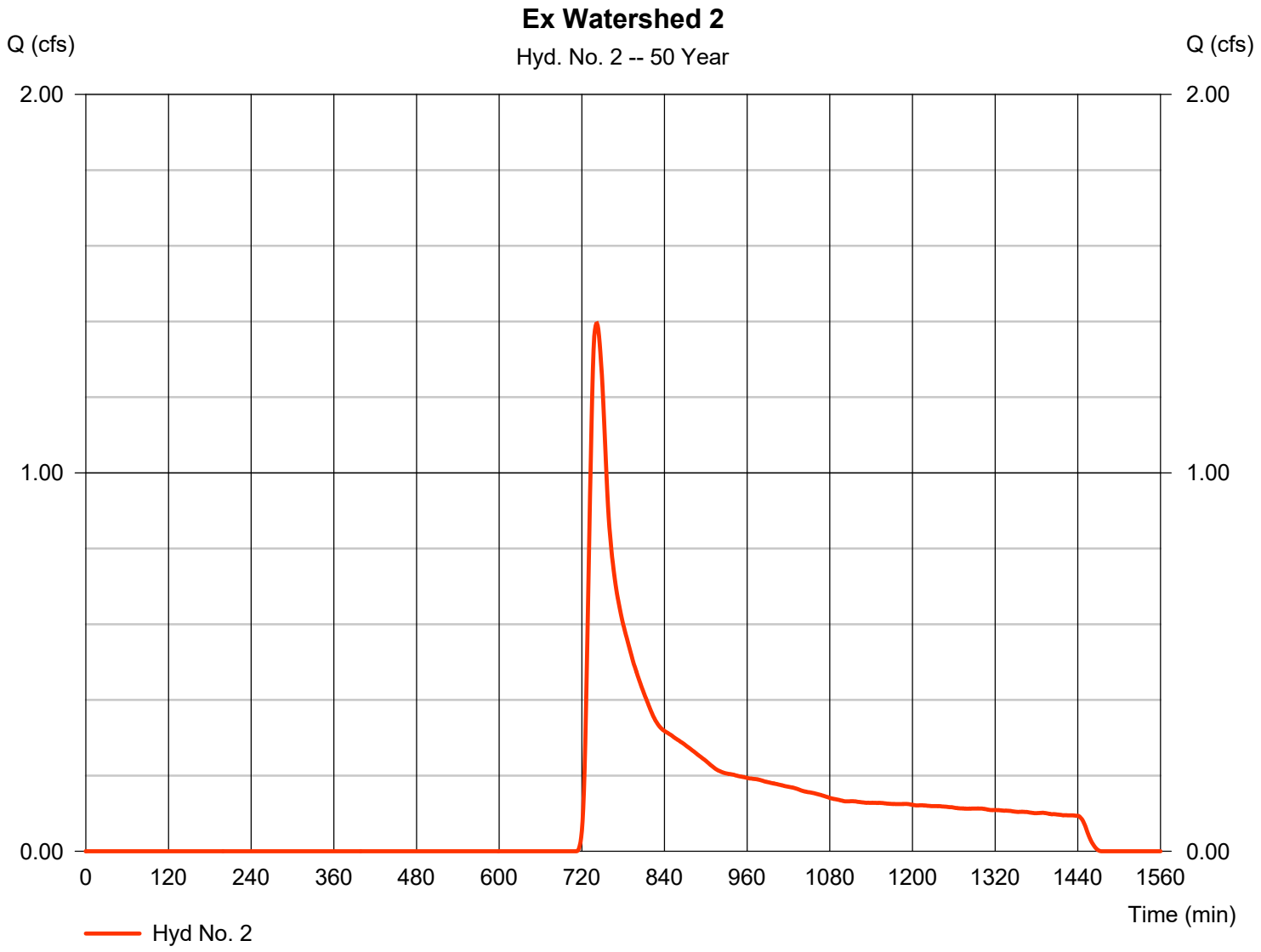
Hydrograph Report

Hyd. No. 2

Ex Watershed 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.395 cfs
Storm frequency	=	50 yrs	Time to peak	=	742 min
Time interval	=	1 min	Hyd. volume	=	10,279 cuft
Drainage area	=	2.890 ac	Curve number	=	42*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	20.40 min
Total precip.	=	6.94 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1hr.cds	Shape factor	=	484

* Composite (Area/CN) = [(1.760 x 30) + (0.500 x 77) + (0.540 x 39) + (0.090 x 98)] / 2.890

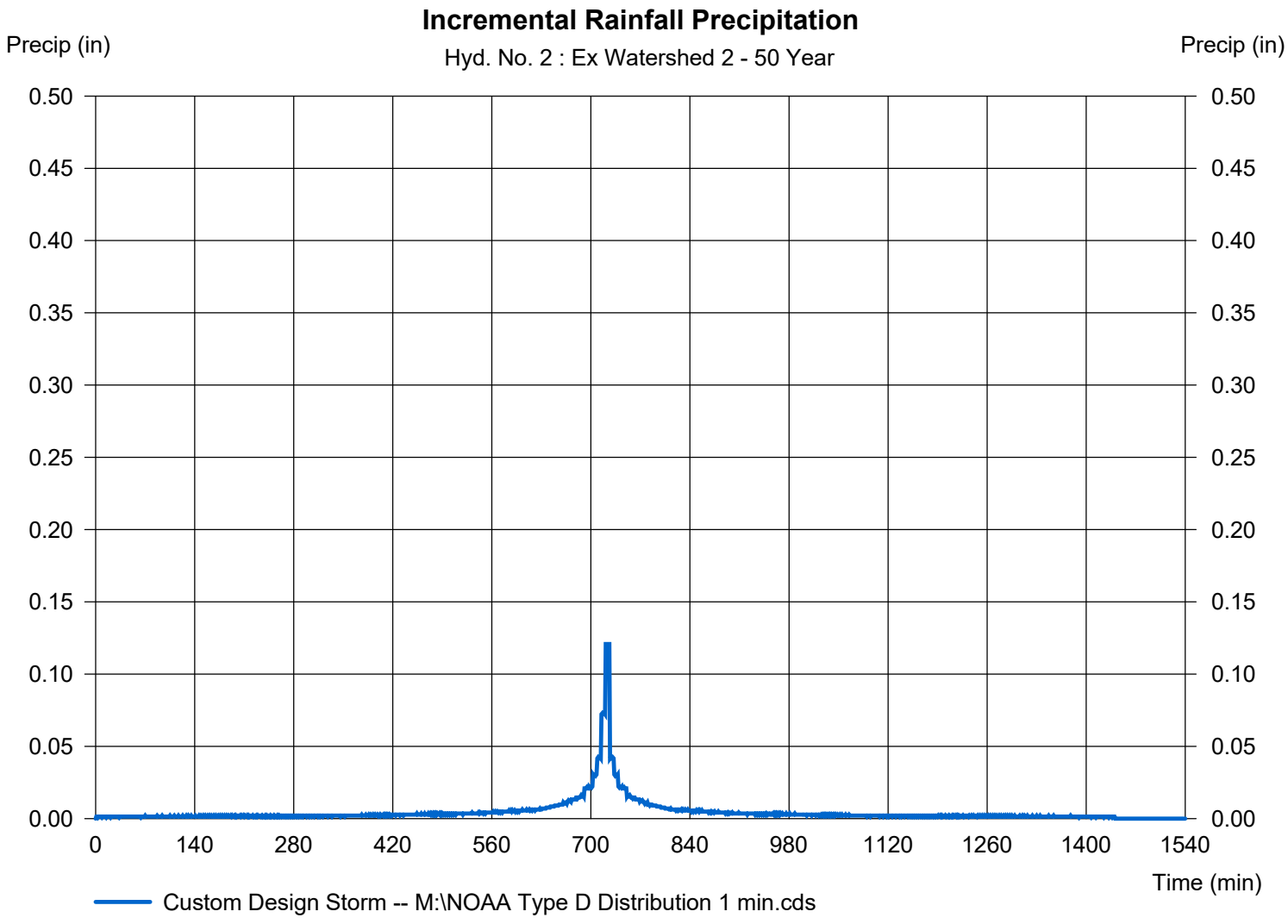


Precipitation Report

Hyd. No. 2

Ex Watershed 2

Storm Frequency	= 50 yrs	Time interval	= 1 min
Total precip.	= 6.9400 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		

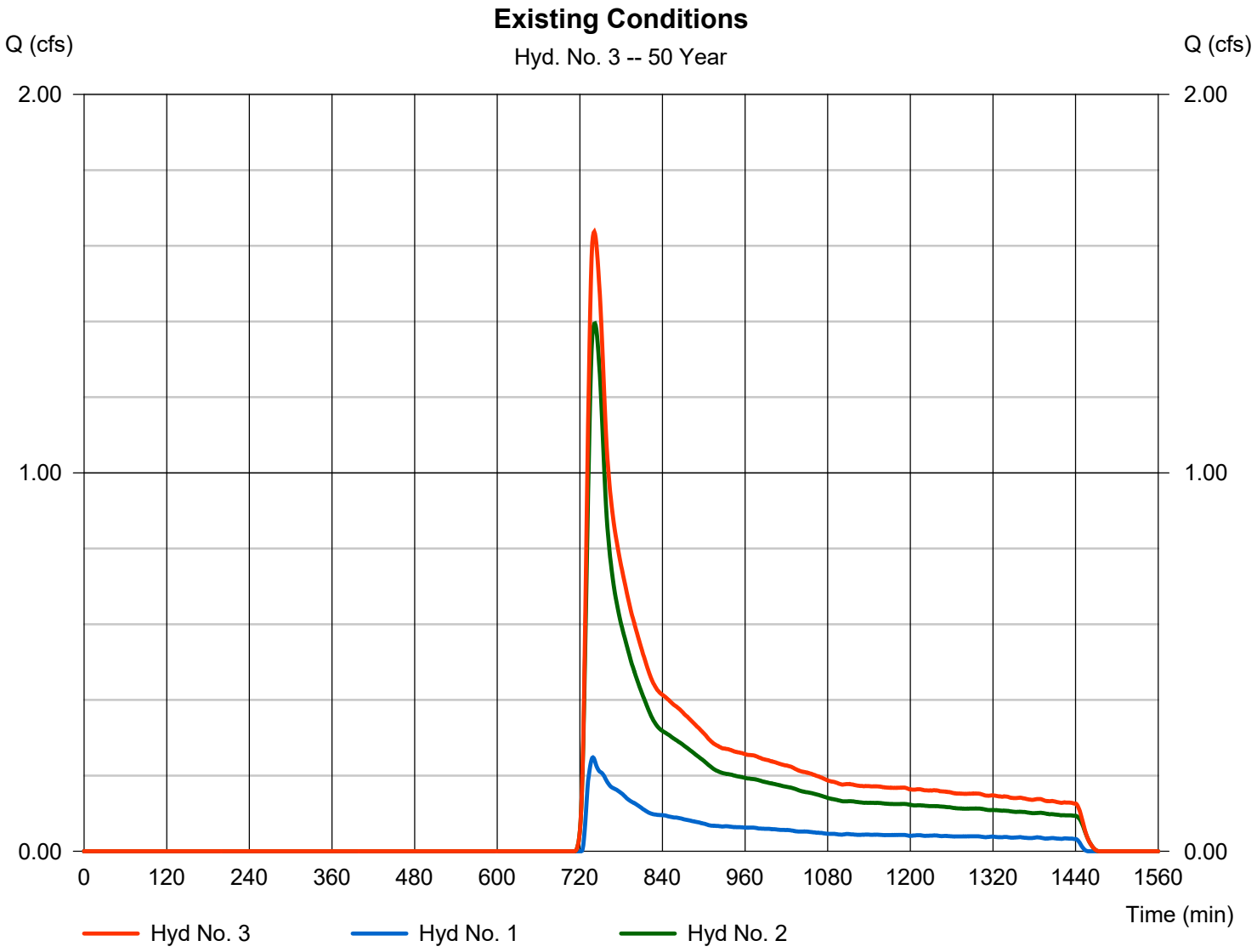


Hydrograph Report

Hyd. No. 3

Existing Conditions

Hydrograph type	= Combine	Peak discharge	= 1.637 cfs
Storm frequency	= 50 yrs	Time to peak	= 741 min
Time interval	= 1 min	Hyd. volume	= 13,119 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 4.310 ac



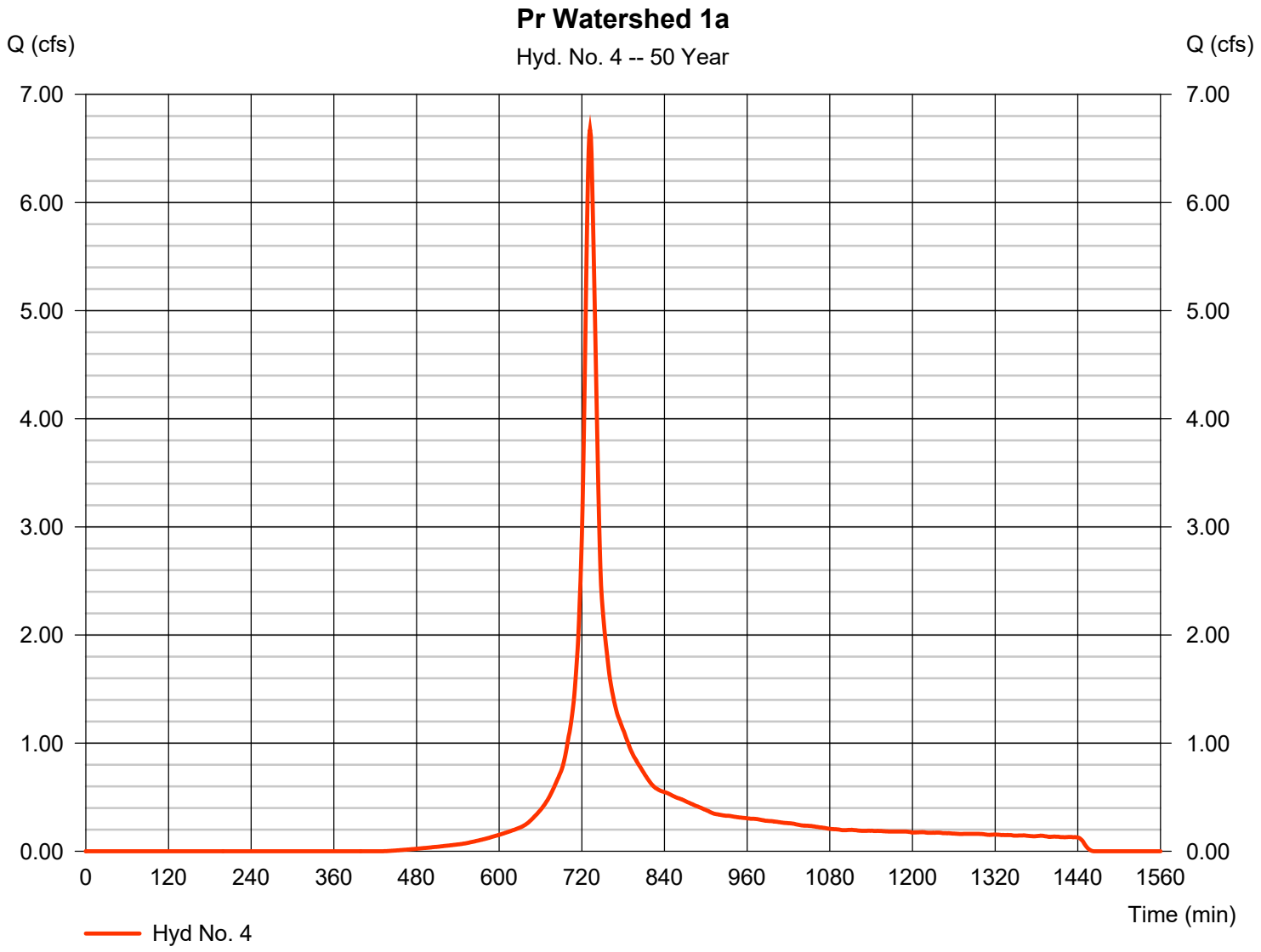
Hydrograph Report

Hyd. No. 4

Pr Watershed 1a

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.676 cfs
Storm frequency	=	50 yrs	Time to peak	=	732 min
Time interval	=	1 min	Hyd. volume	=	27,067 cuft
Drainage area	=	1.920 ac	Curve number	=	73*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	14.50 min
Total precip.	=	6.94 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1 hr.cda	Shape factor	=	484

* Composite (Area/CN) = [(0.810 x 39) + (1.110 x 98)] / 1.920

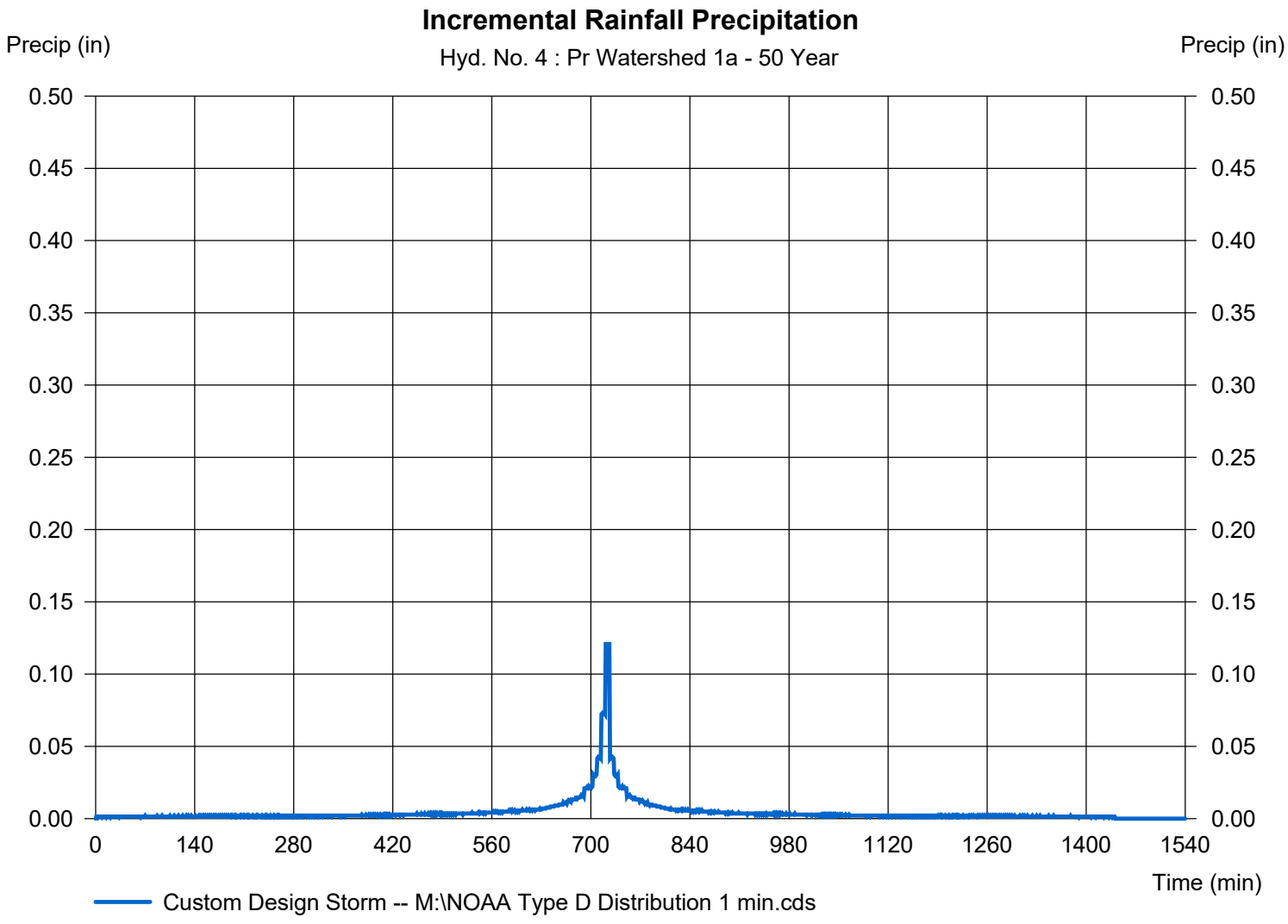


Precipitation Report

Hyd. No. 4

Pr Watershed 1a

Storm Frequency	= 50 yrs	Time interval	= 1 min
Total precip.	= 6.9400 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		



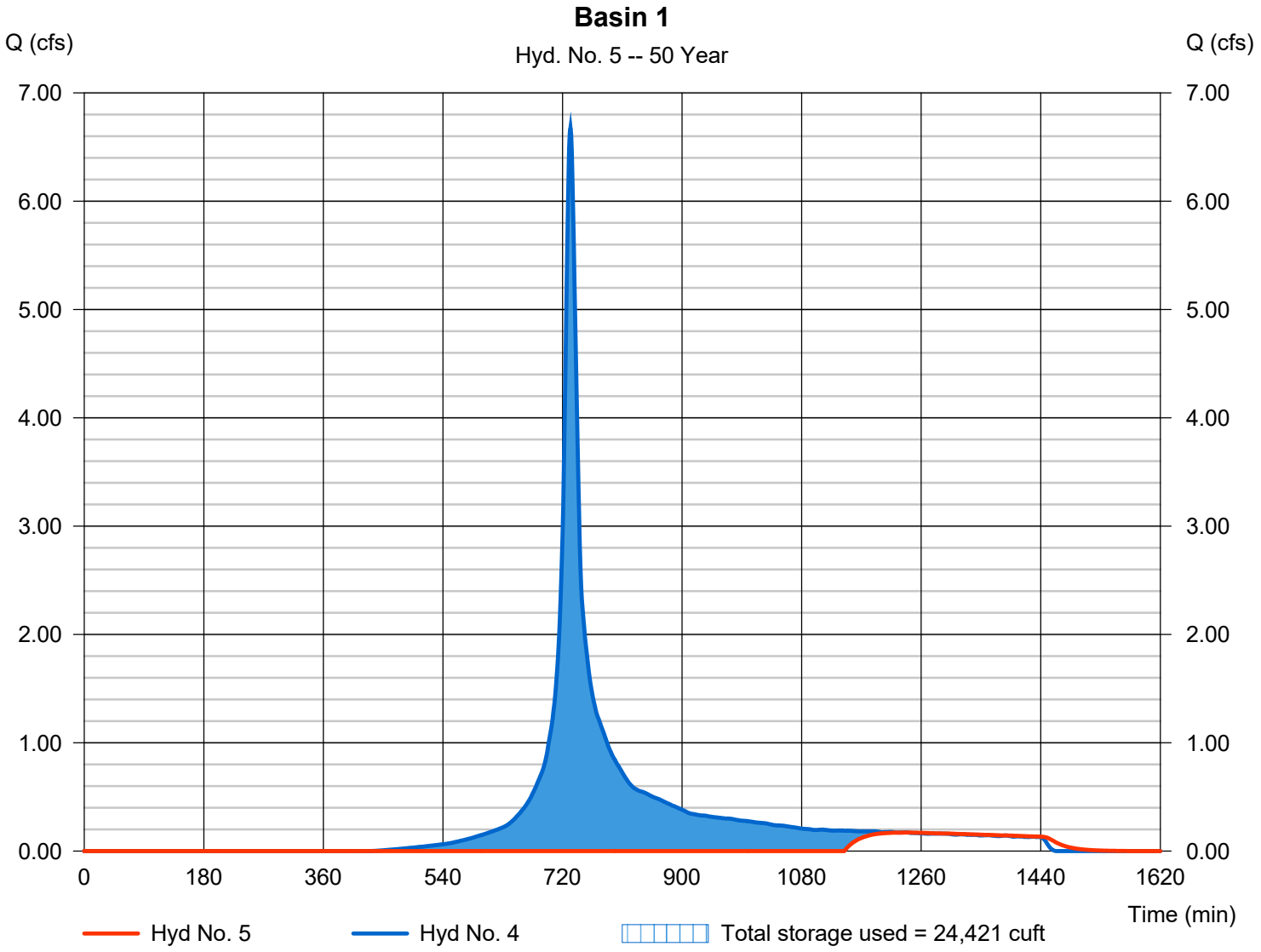
Hydrograph Report

Hyd. No. 5

Basin 1

Hydrograph type	=	Reservoir	Peak discharge	=	0.171 cfs
Storm frequency	=	50 yrs	Time to peak	=	1241 min
Time interval	=	1 min	Hyd. volume	=	2,894 cuft
Inflow hyd. No.	=	4 - Pr Watershed 1a	Max. Elevation	=	234.02 ft
Reservoir name	=	Pond 1	Max. Storage	=	24,421 cuft

Storage Indication method used.



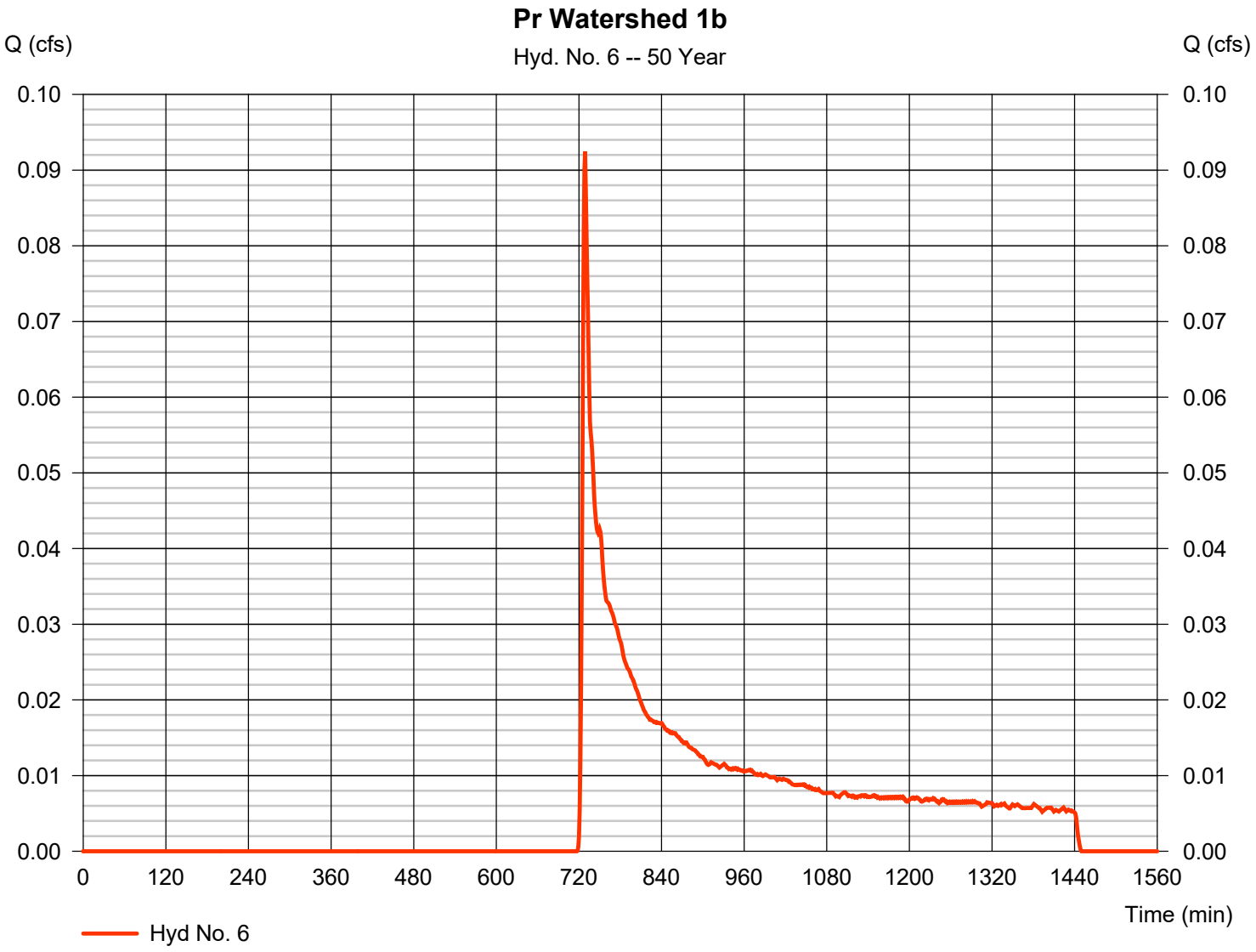
Hydrograph Report

Hyd. No. 6

Pr Watershed 1b

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.092 cfs
Storm frequency	=	50 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	531 cuft
Drainage area	=	0.190 ac	Curve number	=	39*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	6.94 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1hr.cda	Shape factor	=	484

* Composite (Area/CN) = [(0.190 x 39)] / 0.190

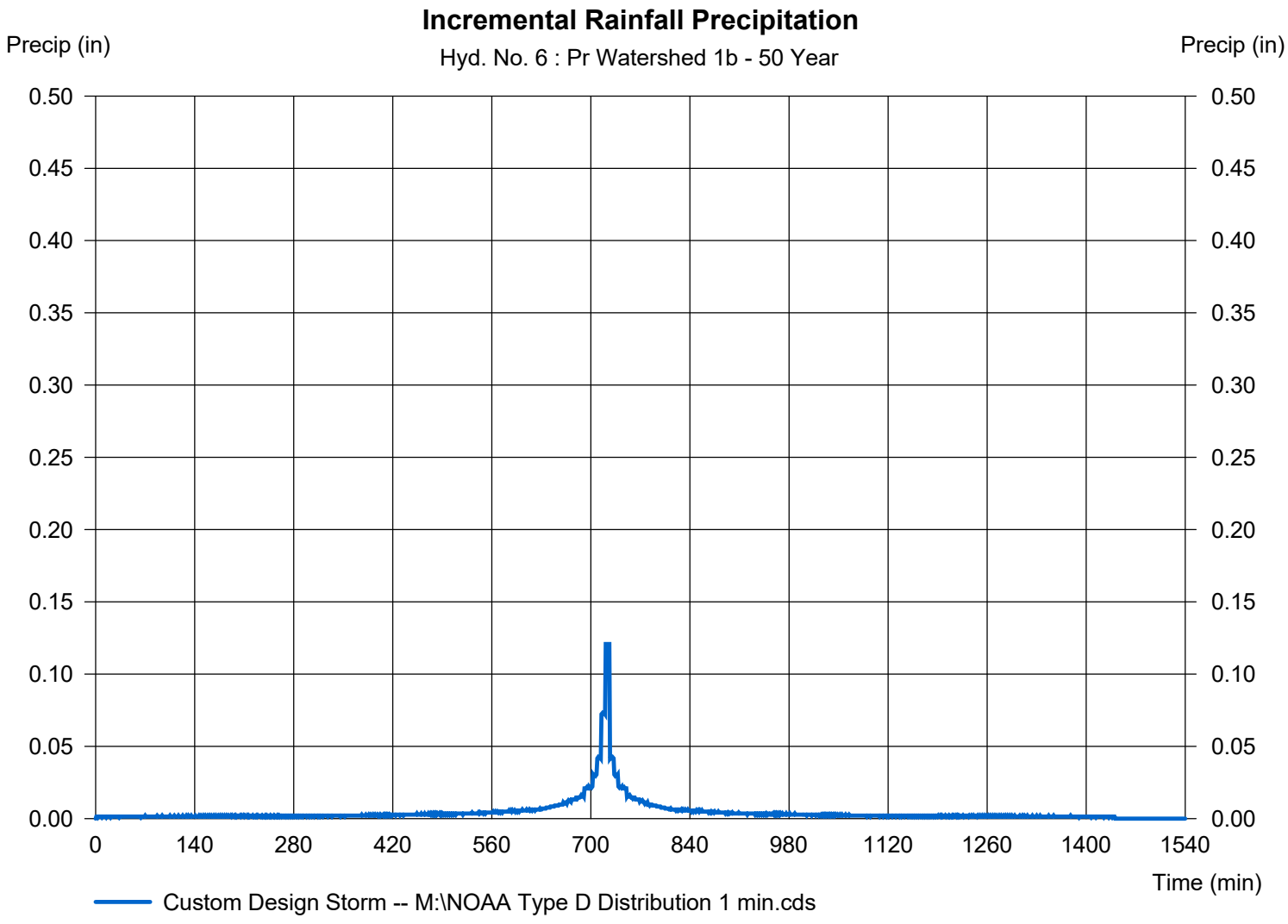


Precipitation Report

Hyd. No. 6

Pr Watershed 1b

Storm Frequency	= 50 yrs	Time interval	= 1 min
Total precip.	= 6.9400 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		

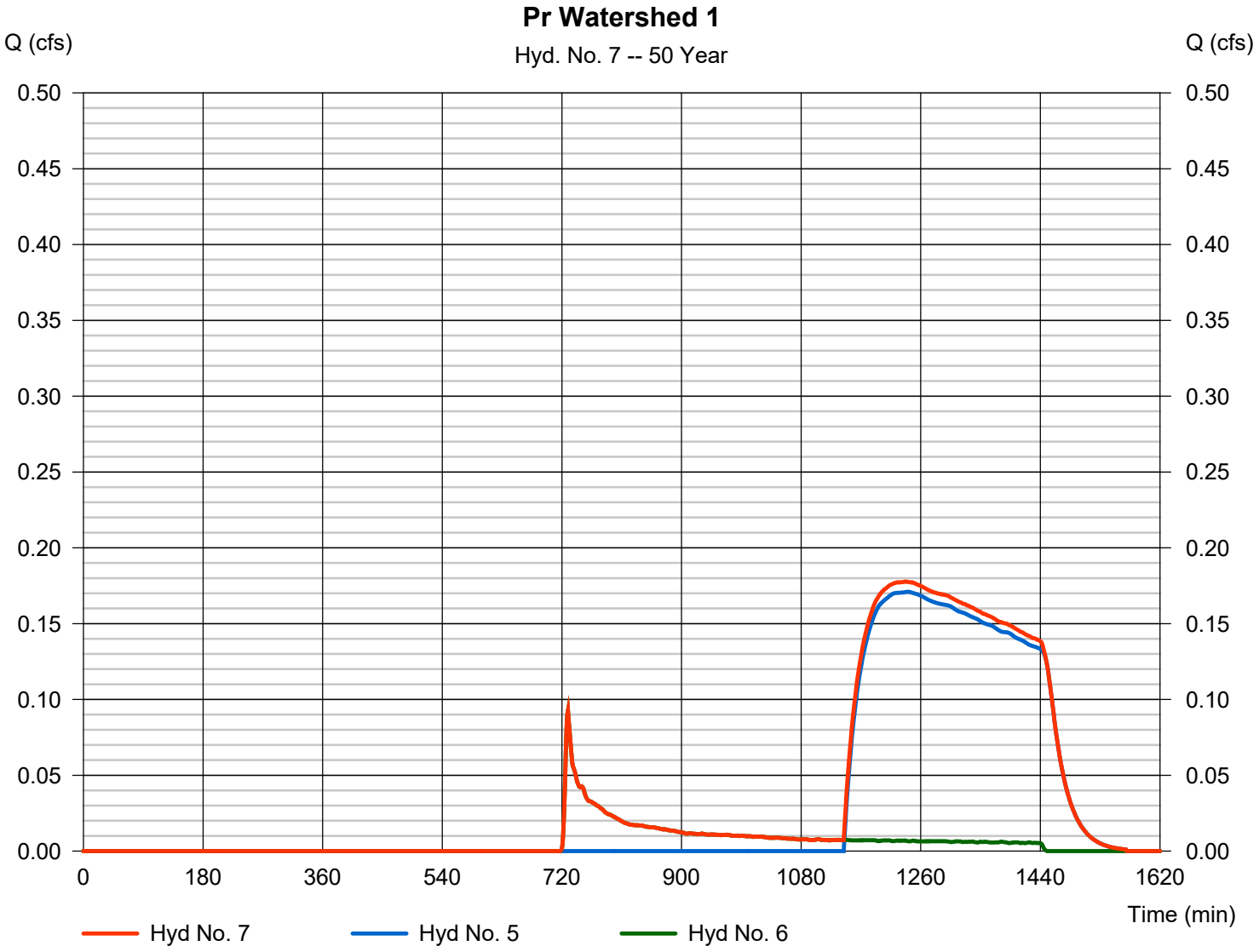


Hydrograph Report

Hyd. No. 7

Pr Watershed 1

Hydrograph type	=	Combine	Peak discharge	=	0.178 cfs
Storm frequency	=	50 yrs	Time to peak	=	1236 min
Time interval	=	1 min	Hyd. volume	=	3,425 cuft
Inflow hyds.	=	5, 6	Contrib. drain. area	=	0.190 ac



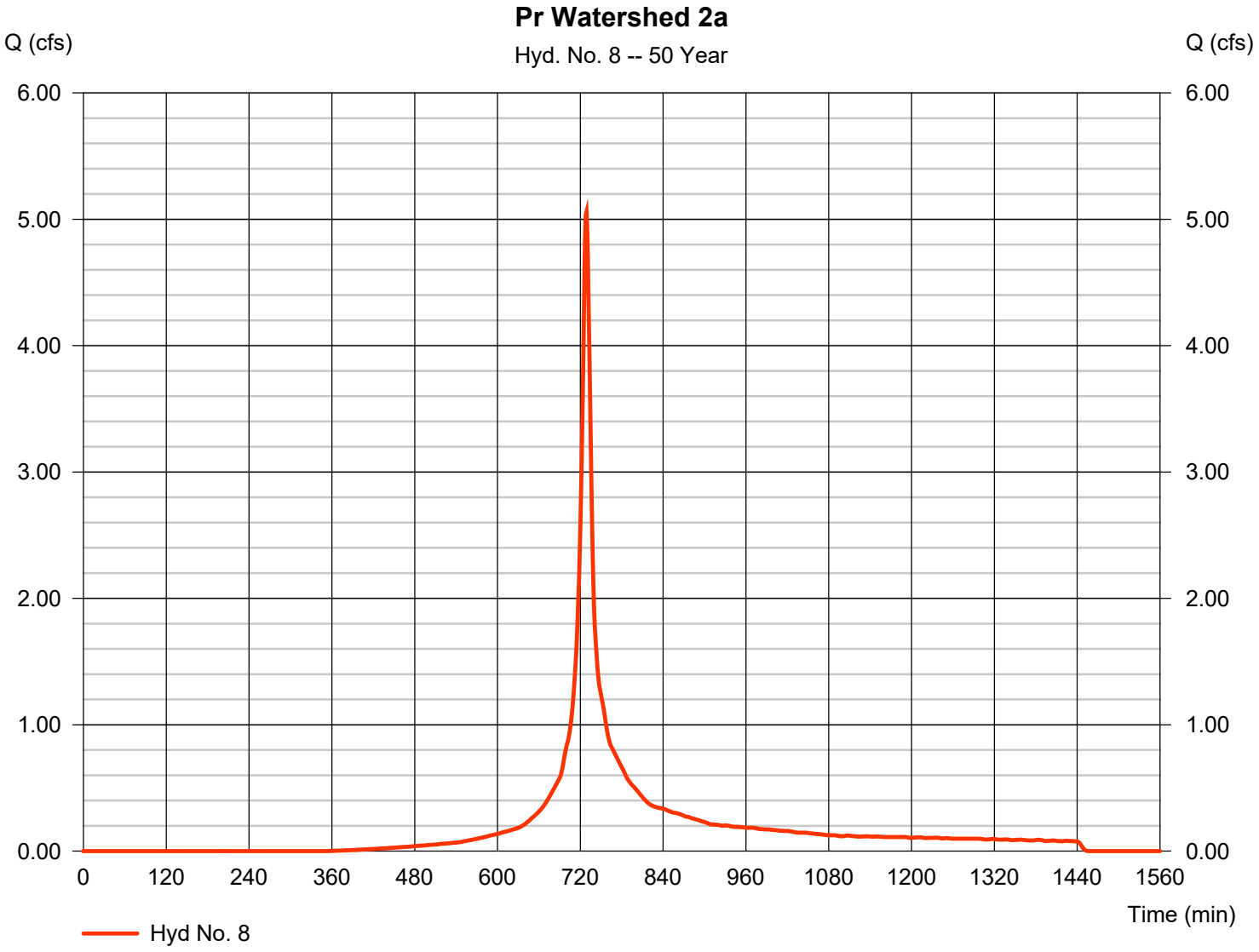
Hydrograph Report

Hyd. No. 8

Pr Watershed 2a

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.058 cfs
Storm frequency	=	50 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	17,811 cuft
Drainage area	=	1.110 ac	Curve number	=	78*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	8.80 min
Total precip.	=	6.94 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1hr.cds	Shape factor	=	484

* Composite (Area/CN) = [(0.370 x 39) + (0.740 x 98)] / 1.110

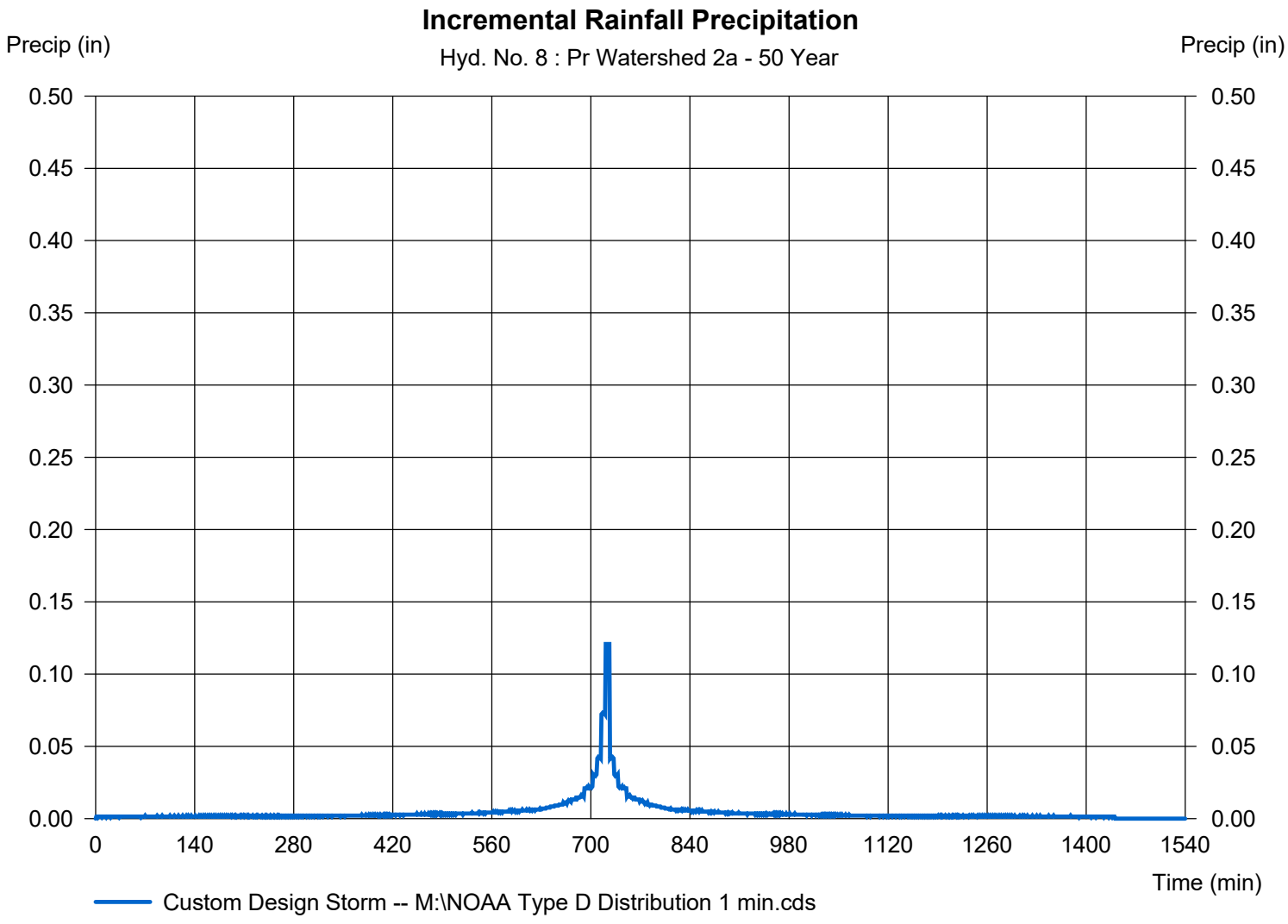


Precipitation Report

Hyd. No. 8

Pr Watershed 2a

Storm Frequency	= 50 yrs	Time interval	= 1 min
Total precip.	= 6.9400 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		



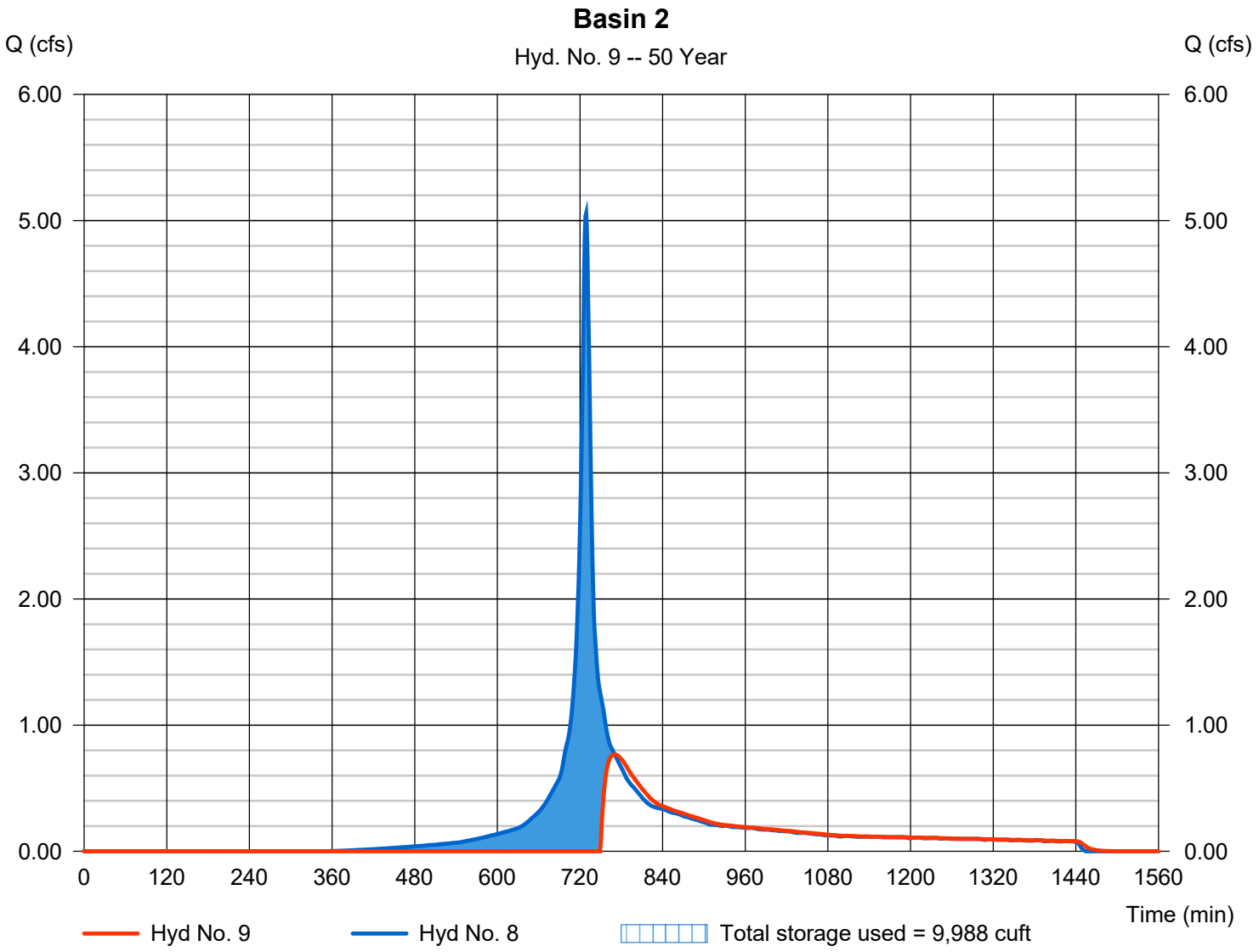
Hydrograph Report

Hyd. No. 9

Basin 2

Hydrograph type	=	Reservoir	Peak discharge	=	0.767 cfs
Storm frequency	=	50 yrs	Time to peak	=	770 min
Time interval	=	1 min	Hyd. volume	=	8,296 cuft
Inflow hyd. No.	=	8 - Pr Watershed 2a	Max. Elevation	=	234.09 ft
Reservoir name	=	Pond 2	Max. Storage	=	9,988 cuft

Storage Indication method used.



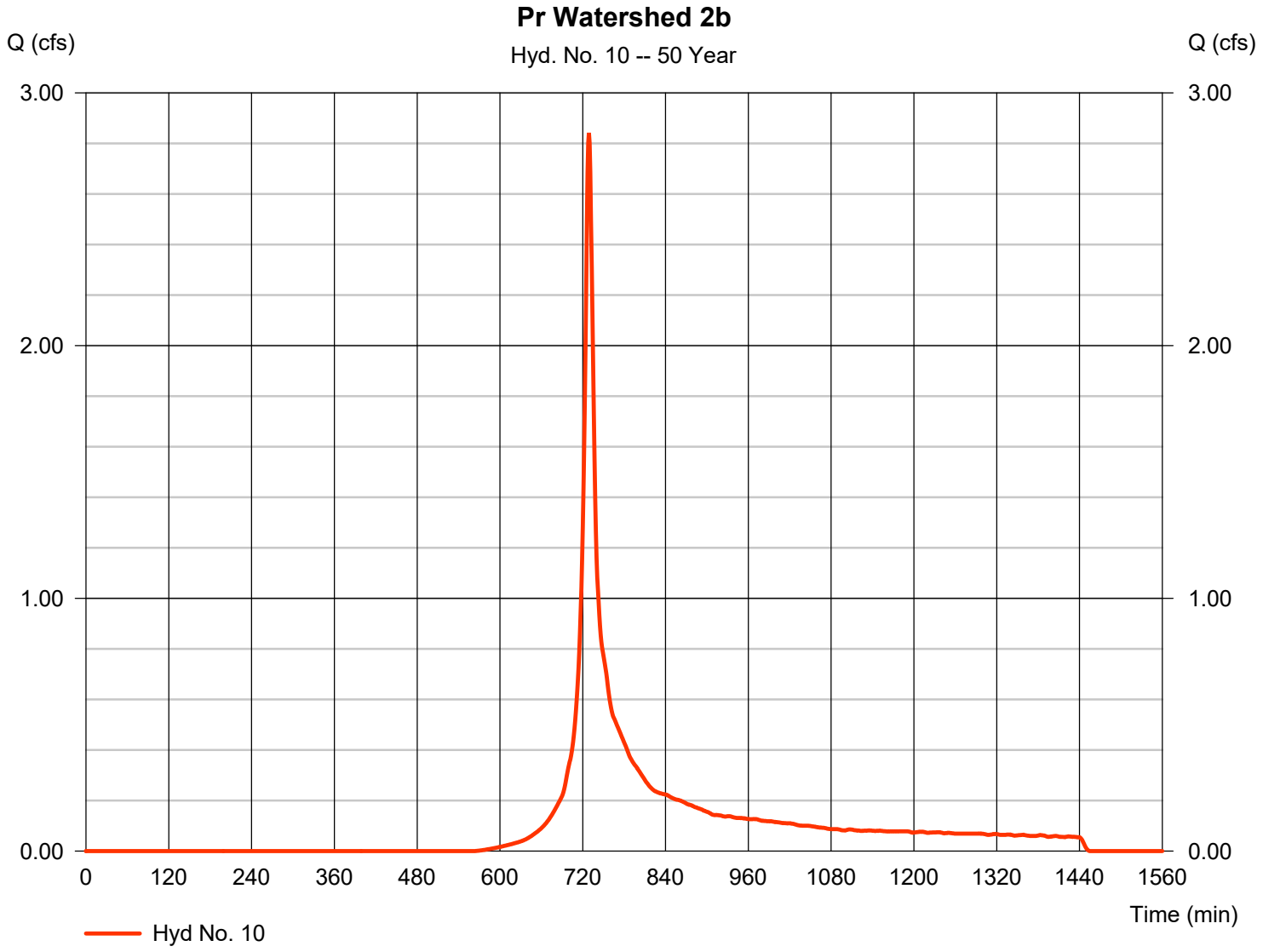
Hydrograph Report

Hyd. No. 10

Pr Watershed 2b

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.842 cfs
Storm frequency	=	50 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	9,953 cuft
Drainage area	=	0.960 ac	Curve number	=	63*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	6.94 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1hr.cds	Shape factor	=	484

* Composite (Area/CN) = [(0.120 x 30) + (0.040 x 77) + (0.230 x 39) + (0.280 x 80) + (0.290 x 77)] / 0.960

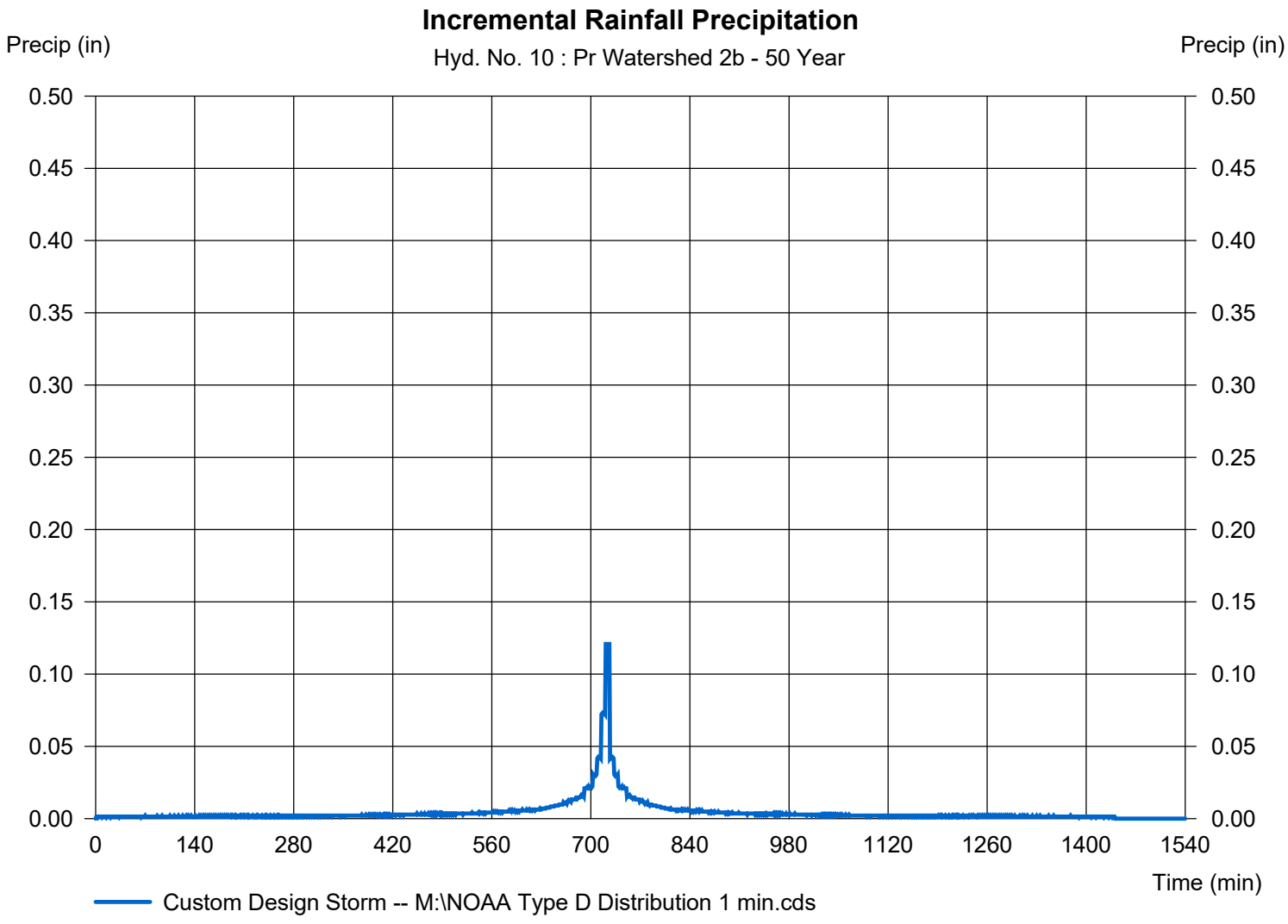


Precipitation Report

Hyd. No. 10

Pr Watershed 2b

Storm Frequency	= 50 yrs	Time interval	= 1 min
Total precip.	= 6.9400 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		

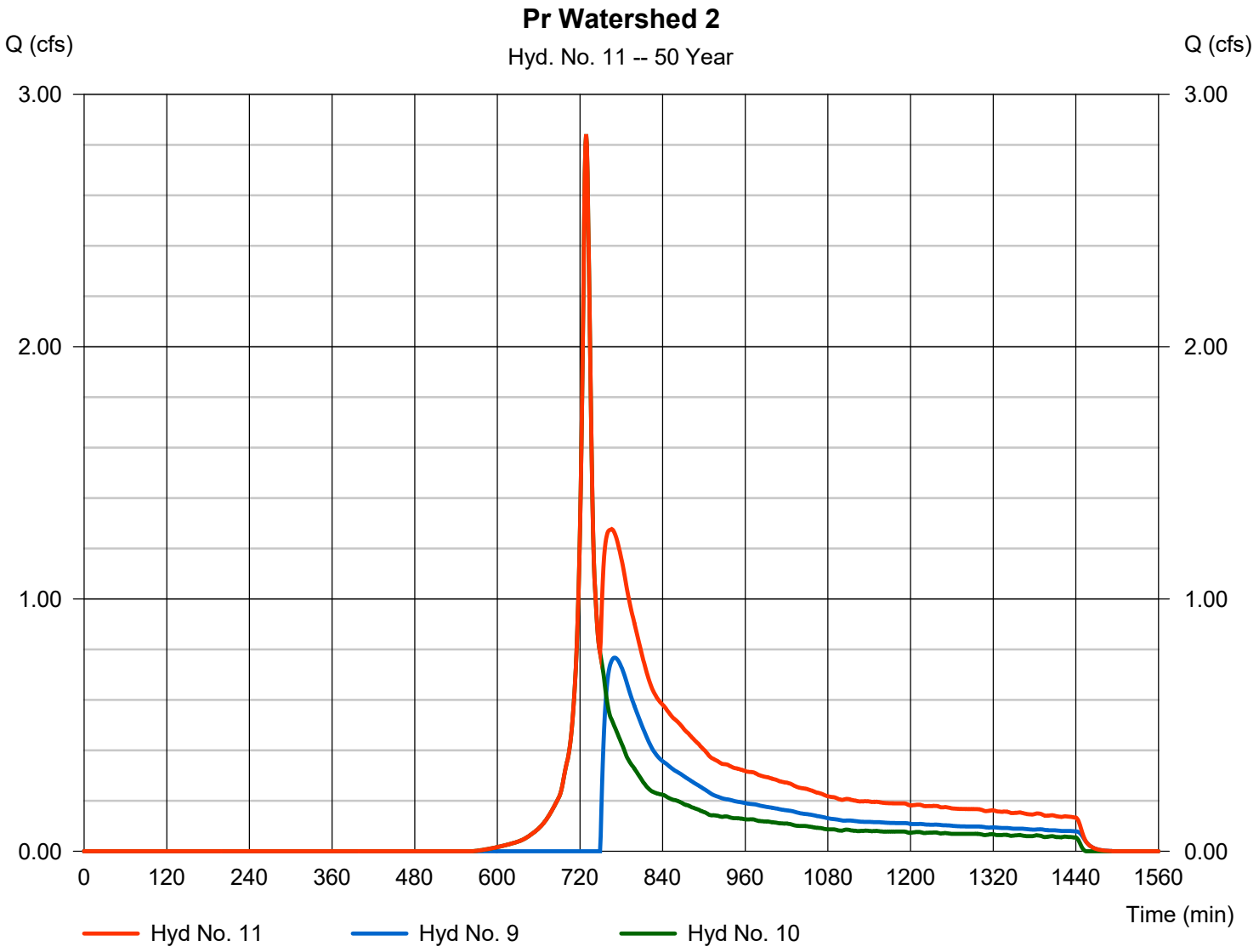


Hydrograph Report

Hyd. No. 11

Pr Watershed 2

Hydrograph type	=	Combine	Peak discharge	=	2.842 cfs
Storm frequency	=	50 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	18,249 cuft
Inflow hyds.	=	9, 10	Contrib. drain. area	=	0.960 ac

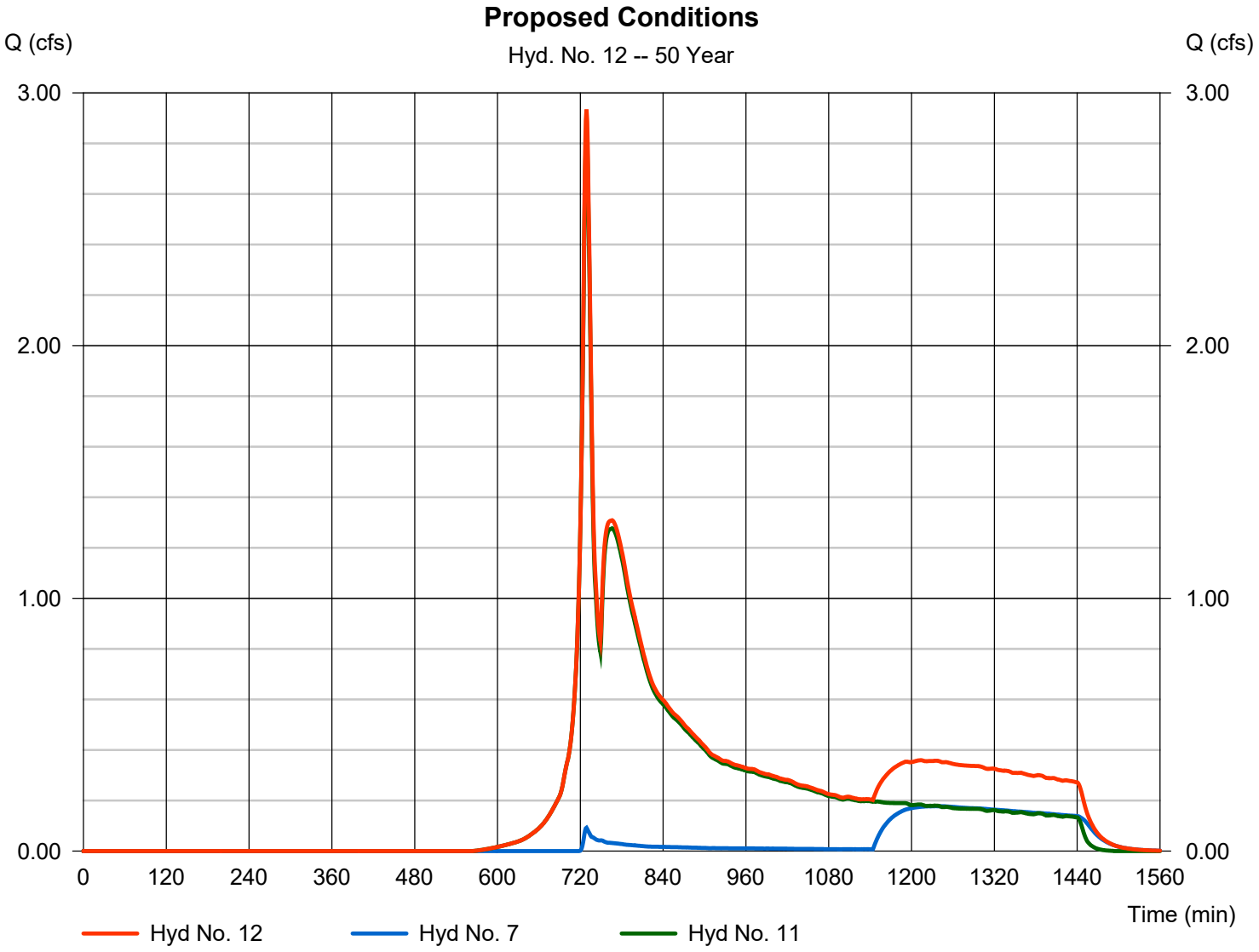


Hydrograph Report

Hyd. No. 12

Proposed Conditions

Hydrograph type	=	Combine	Peak discharge	=	2.935 cfs
Storm frequency	=	50 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	21,674 cuft
Inflow hyds.	=	7, 11	Contrib. drain. area	=	0.000 ac



Hydrograph Summary Report

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

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.546	1	735	4,219	------	------	------	Ex Watershed 1
2	SCS Runoff	2.205	1	739	14,068	------	------	------	Ex Watershed 2
3	Combine	2.721	1	738	18,287	1, 2	------	------	Existing Conditions
4	SCS Runoff	7.884	1	732	32,045	------	------	------	Pr Watershed 1a
5	Reservoir	0.347	1	964	7,872	4	234.04	24,679	Basin 1
6	SCS Runoff	0.169	1	728	753	------	------	------	Pr Watershed 1b
7	Combine	0.361	1	967	8,625	5, 6	------	------	Pr Watershed 1
8	SCS Runoff	5.880	1	729	20,830	------	------	------	Pr Watershed 2a
9	Reservoir	1.615	1	746	11,315	8	234.15	10,295	Basin 2
10	SCS Runoff	3.481	1	729	12,131	------	------	------	Pr Watershed 2b
11	Combine	3.481	1	729	23,445	9, 10	------	------	Pr Watershed 2
12	Combine	3.648	1	729	32,070	7, 11	------	------	Proposed Conditions

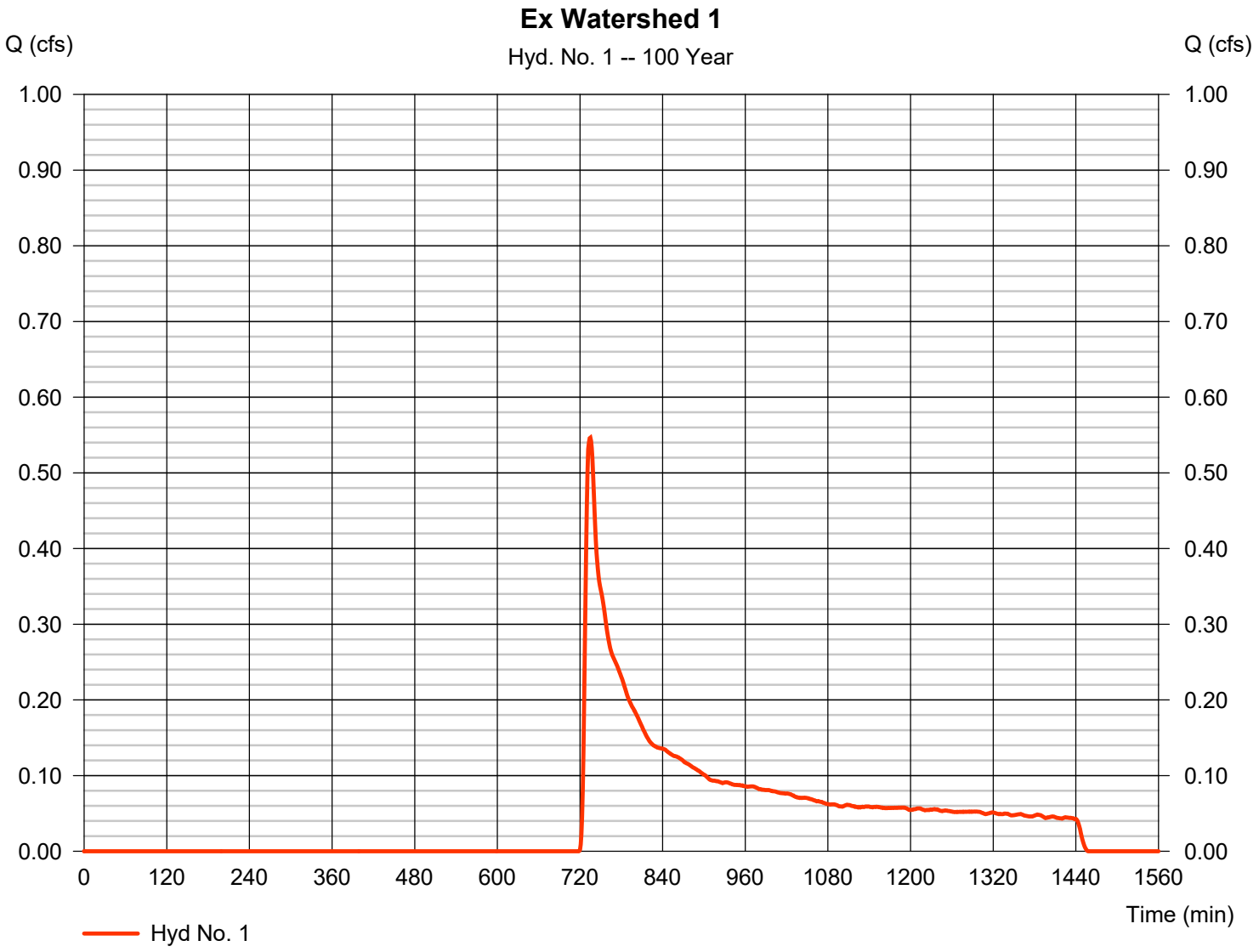
Hydrograph Report

Hyd. No. 1

Ex Watershed 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.546 cfs
Storm frequency	=	100 yrs	Time to peak	=	735 min
Time interval	=	1 min	Hyd. volume	=	4,219 cuft
Drainage area	=	1.420 ac	Curve number	=	36*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	10.30 min
Total precip.	=	7.76 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1 hr.cda	Shape factor	=	484

* Composite (Area/CN) = [(0.600 x 30) + (0.790 x 39) + (0.030 x 98)] / 1.420

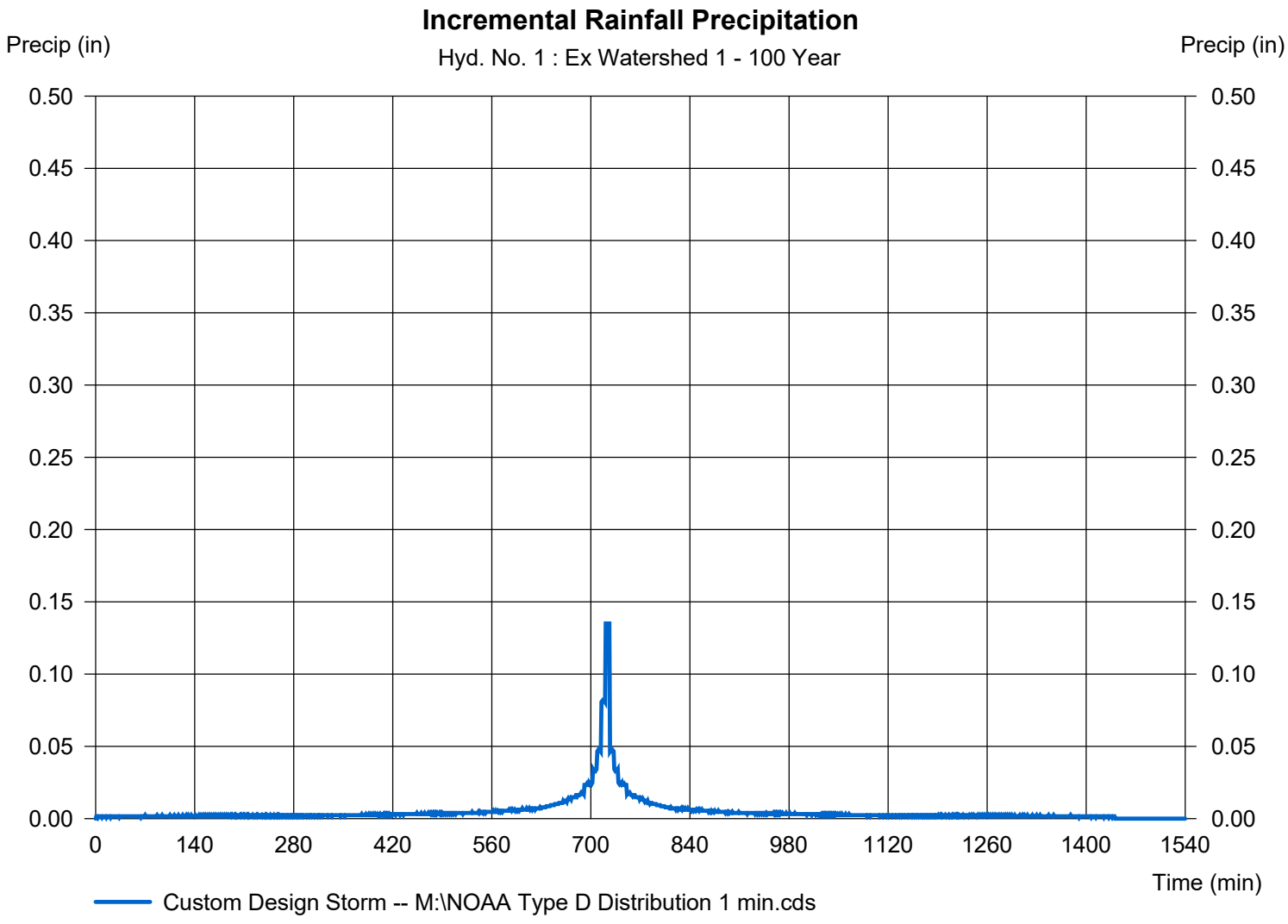


Precipitation Report

Hyd. No. 1

Ex Watershed 1

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.7600 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		



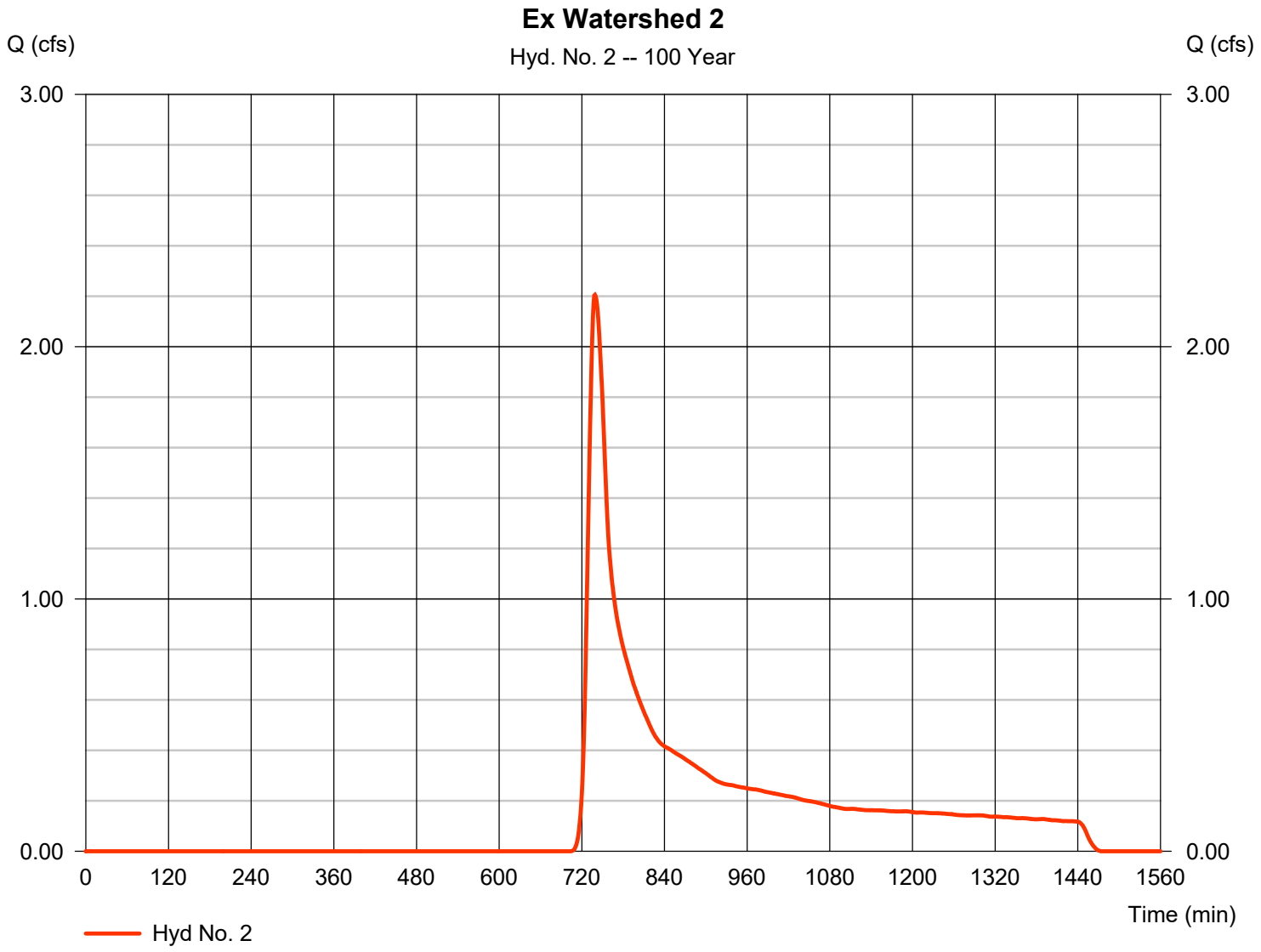
Hydrograph Report

Hyd. No. 2

Ex Watershed 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.205 cfs
Storm frequency	=	100 yrs	Time to peak	=	739 min
Time interval	=	1 min	Hyd. volume	=	14,068 cuft
Drainage area	=	2.890 ac	Curve number	=	42*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	20.40 min
Total precip.	=	7.76 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1 hr.cda	Shape factor	=	484

* Composite (Area/CN) = [(1.760 x 30) + (0.500 x 77) + (0.540 x 39) + (0.090 x 98)] / 2.890

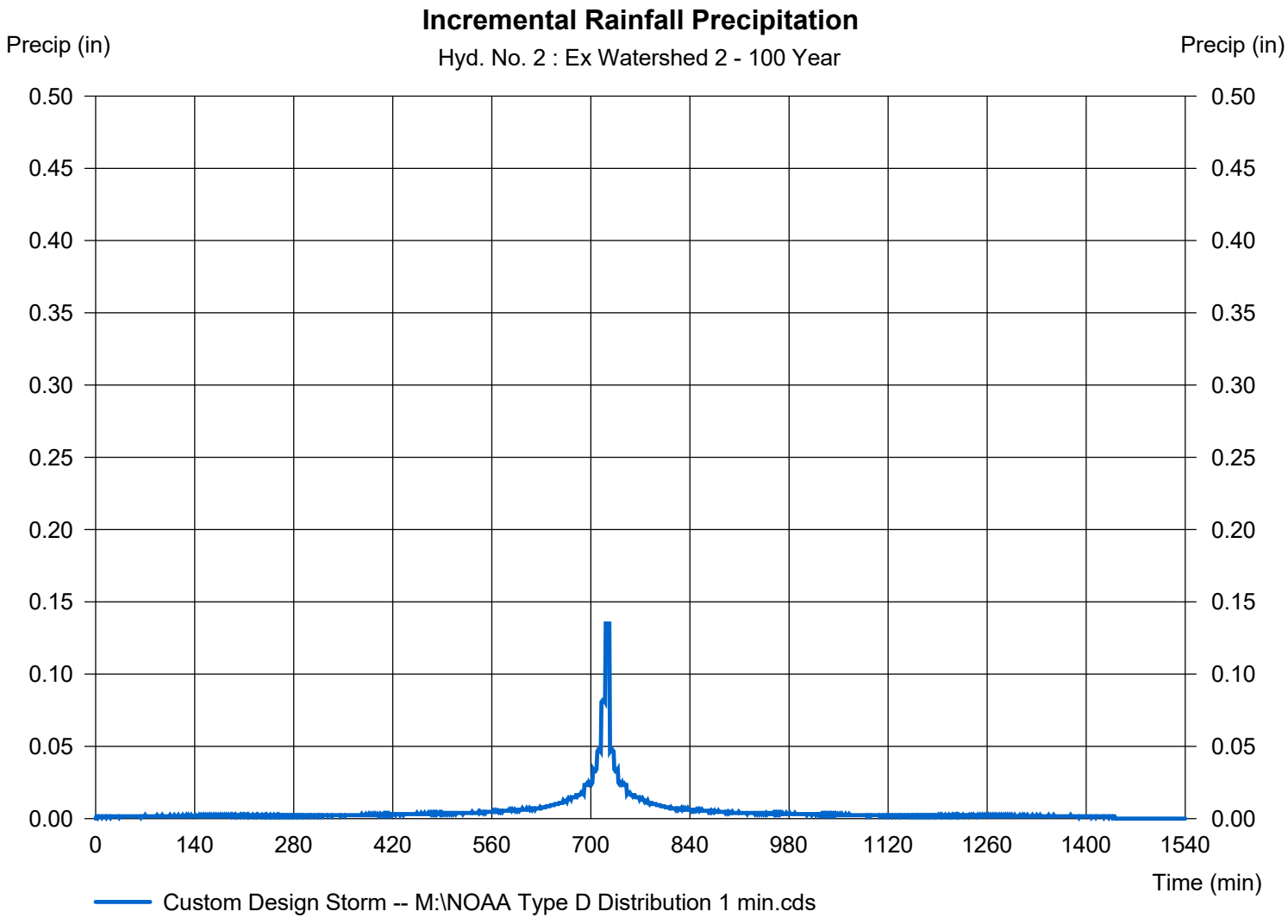


Precipitation Report

Hyd. No. 2

Ex Watershed 2

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.7600 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		

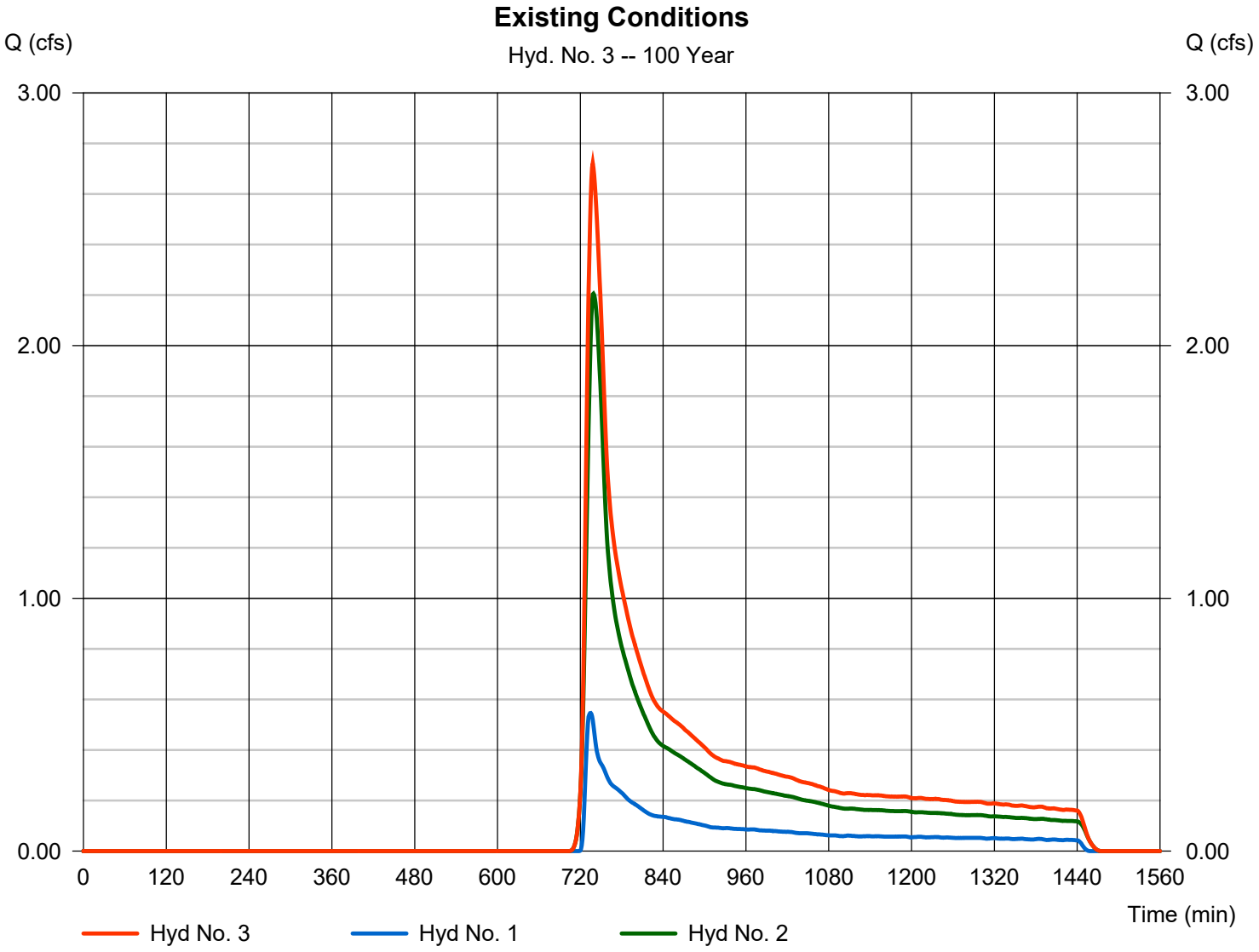


Hydrograph Report

Hyd. No. 3

Existing Conditions

Hydrograph type	= Combine	Peak discharge	= 2.721 cfs
Storm frequency	= 100 yrs	Time to peak	= 738 min
Time interval	= 1 min	Hyd. volume	= 18,287 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 4.310 ac



Hydrograph Report

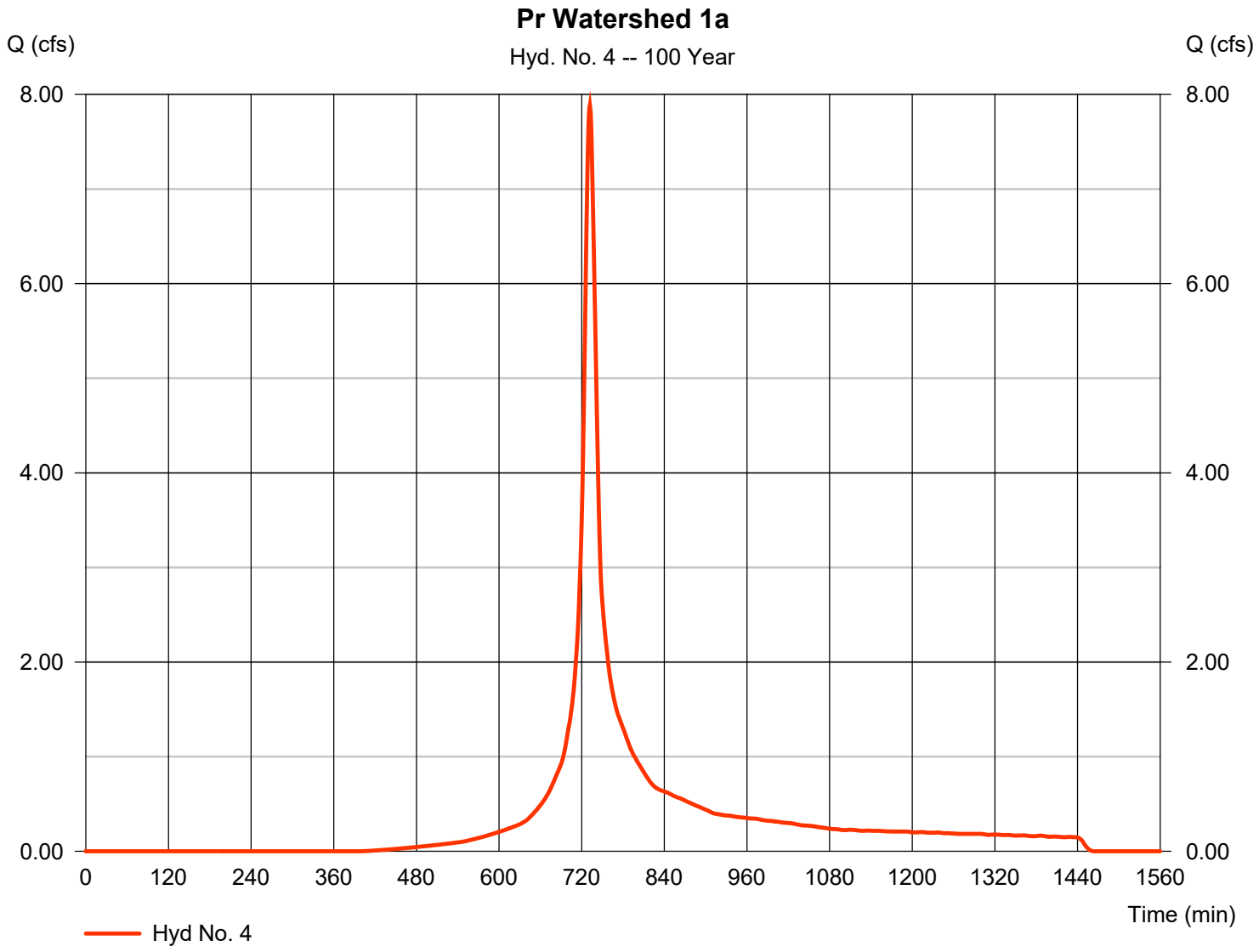
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024 Tuesday, 01 / 14 / 2025

Hyd. No. 4

Pr Watershed 1a

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.884 cfs
Storm frequency	=	100 yrs	Time to peak	=	732 min
Time interval	=	1 min	Hyd. volume	=	32,045 cuft
Drainage area	=	1.920 ac	Curve number	=	73*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	14.50 min
Total precip.	=	7.76 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1hr.csv	Shape factor	=	484

* Composite (Area/CN) = [(0.810 x 39) + (1.110 x 98)] / 1.920

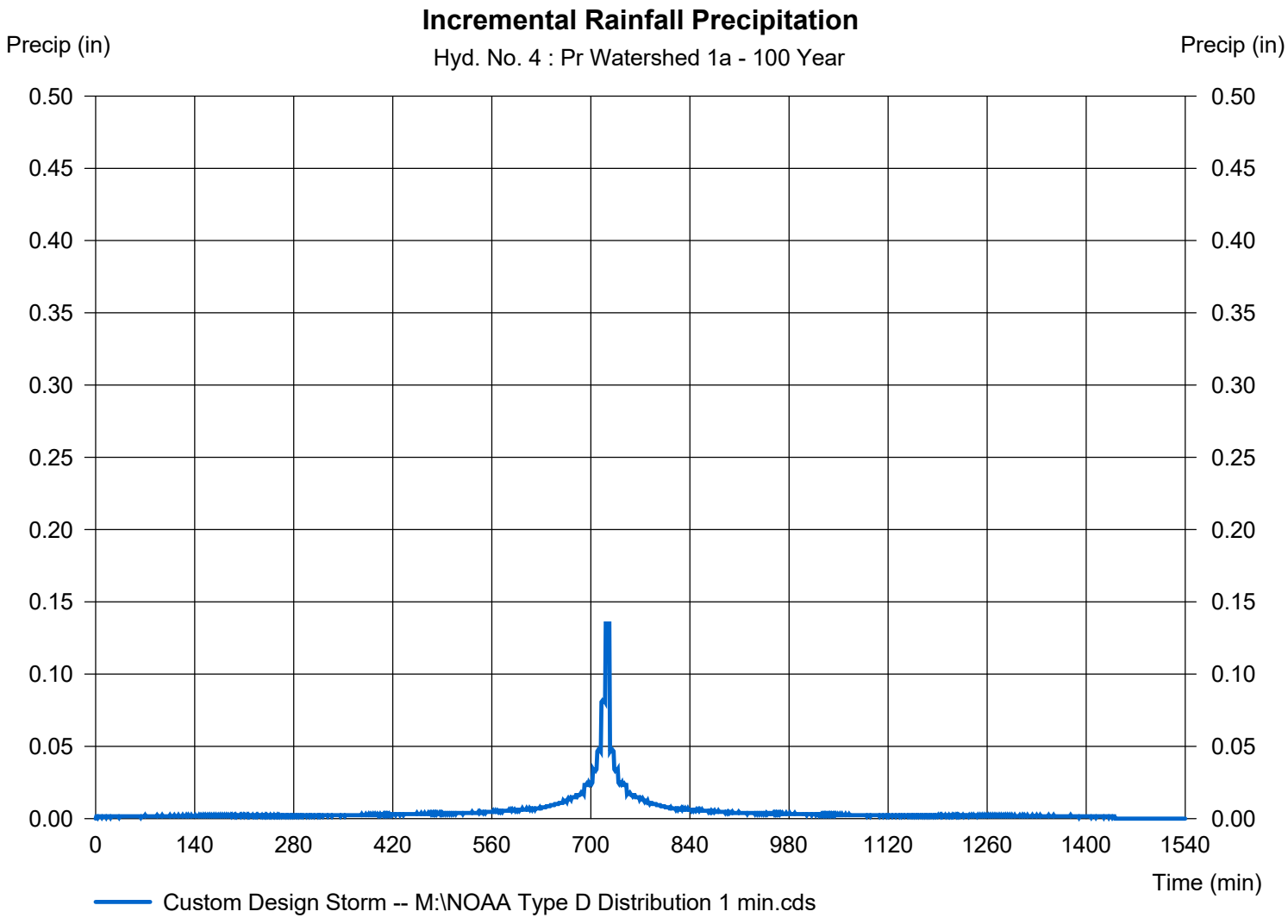


Precipitation Report

Hyd. No. 4

Pr Watershed 1a

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.7600 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		



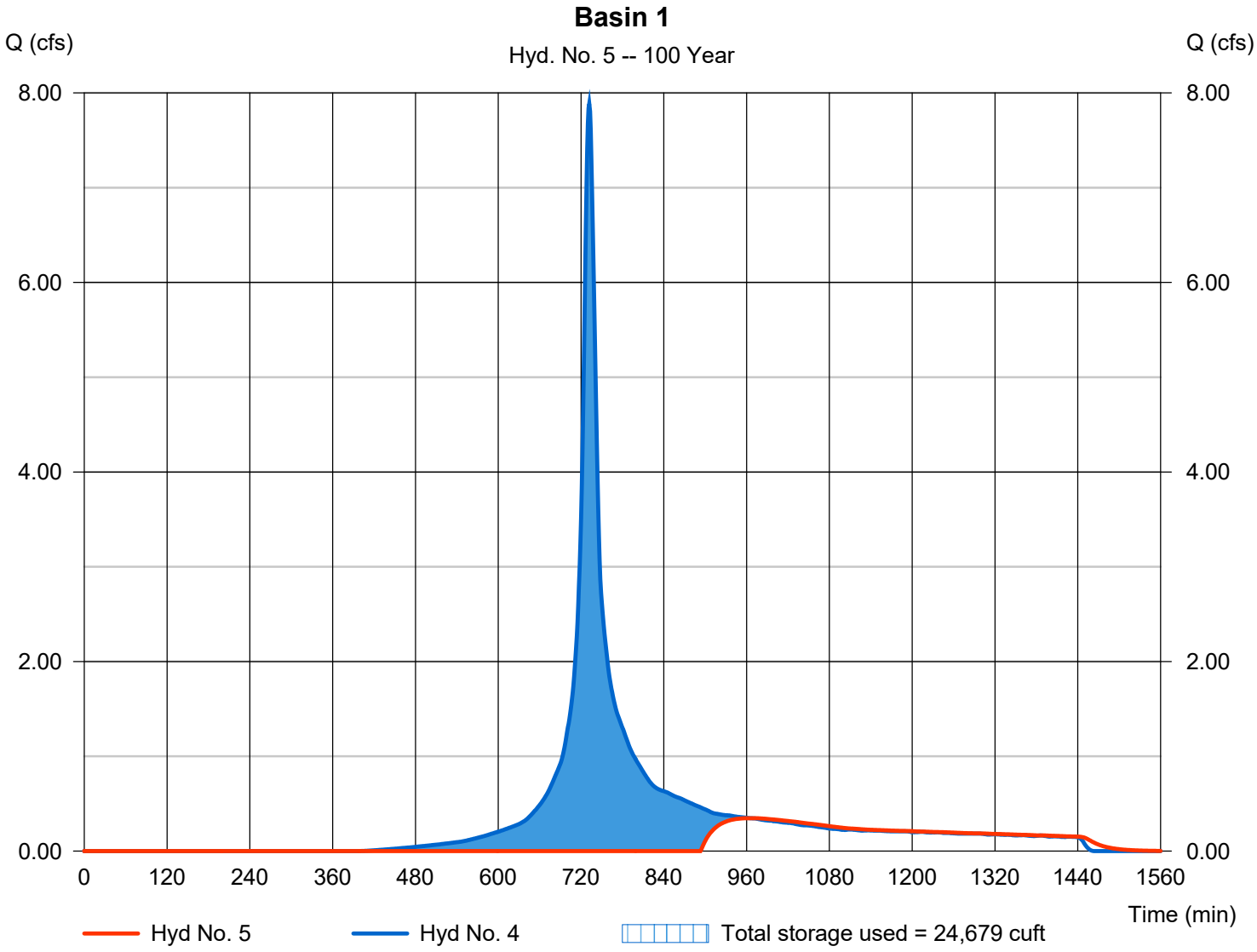
Hydrograph Report

Hyd. No. 5

Basin 1

Hydrograph type	=	Reservoir	Peak discharge	=	0.347 cfs
Storm frequency	=	100 yrs	Time to peak	=	964 min
Time interval	=	1 min	Hyd. volume	=	7,872 cuft
Inflow hyd. No.	=	4 - Pr Watershed 1a	Max. Elevation	=	234.04 ft
Reservoir name	=	Pond 1	Max. Storage	=	24,679 cuft

Storage Indication method used.



Hydrograph Report

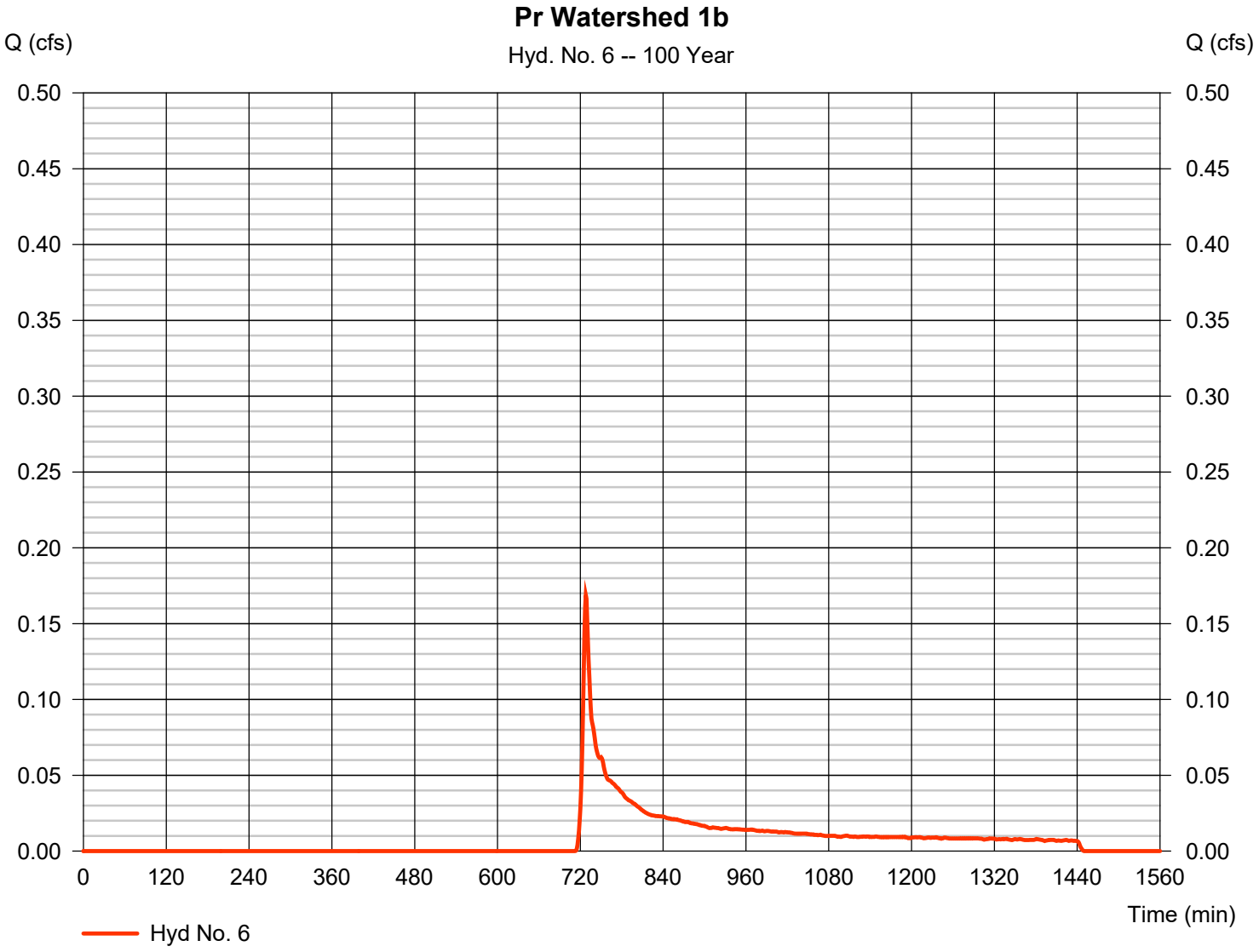
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024 Tuesday, 01 / 14 / 2025

Hyd. No. 6

Pr Watershed 1b

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.169 cfs
Storm frequency	=	100 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	753 cuft
Drainage area	=	0.190 ac	Curve number	=	39*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	7.76 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1 hr.cda	Shape factor	=	484

* Composite (Area/CN) = [(0.190 x 39)] / 0.190

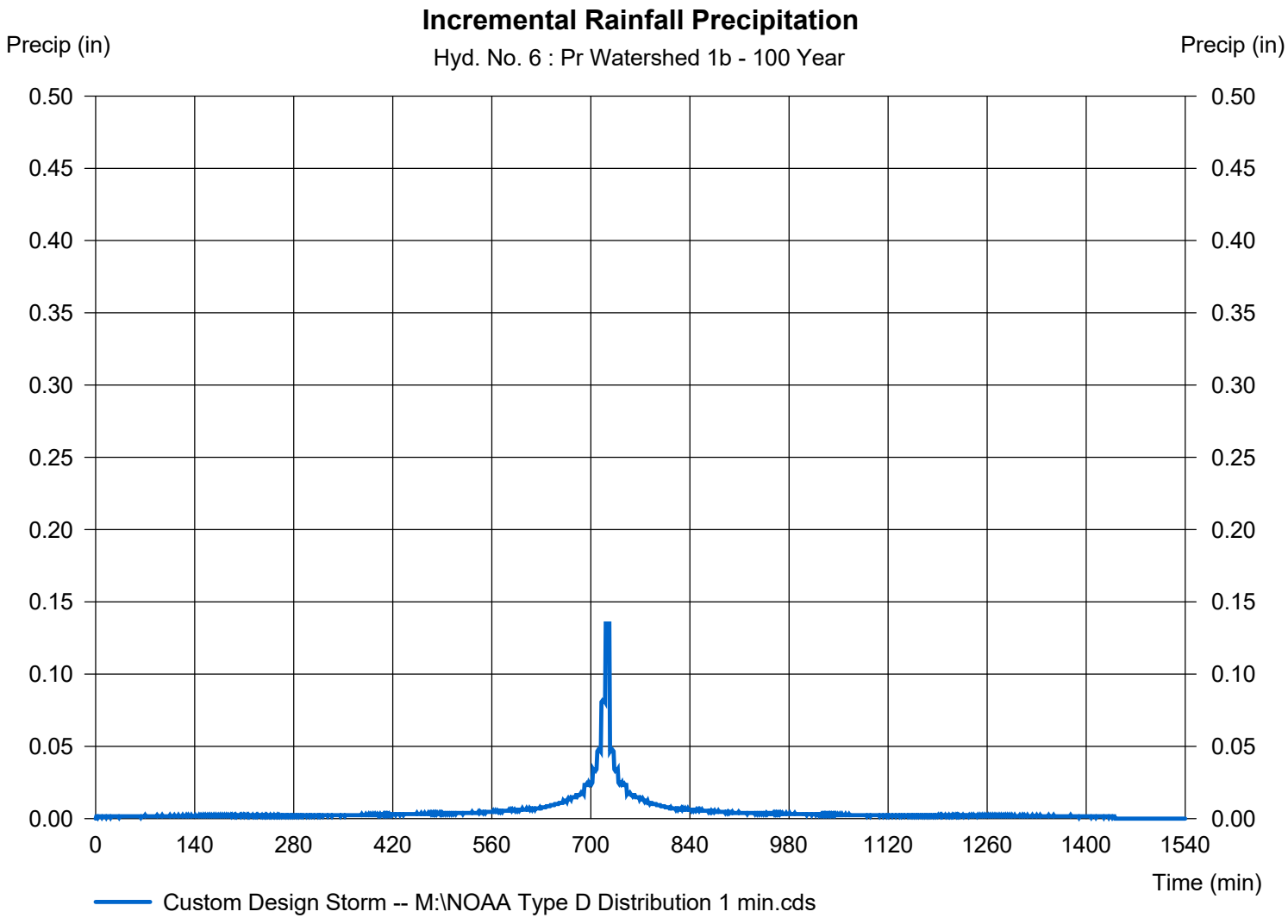


Precipitation Report

Hyd. No. 6

Pr Watershed 1b

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.7600 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		

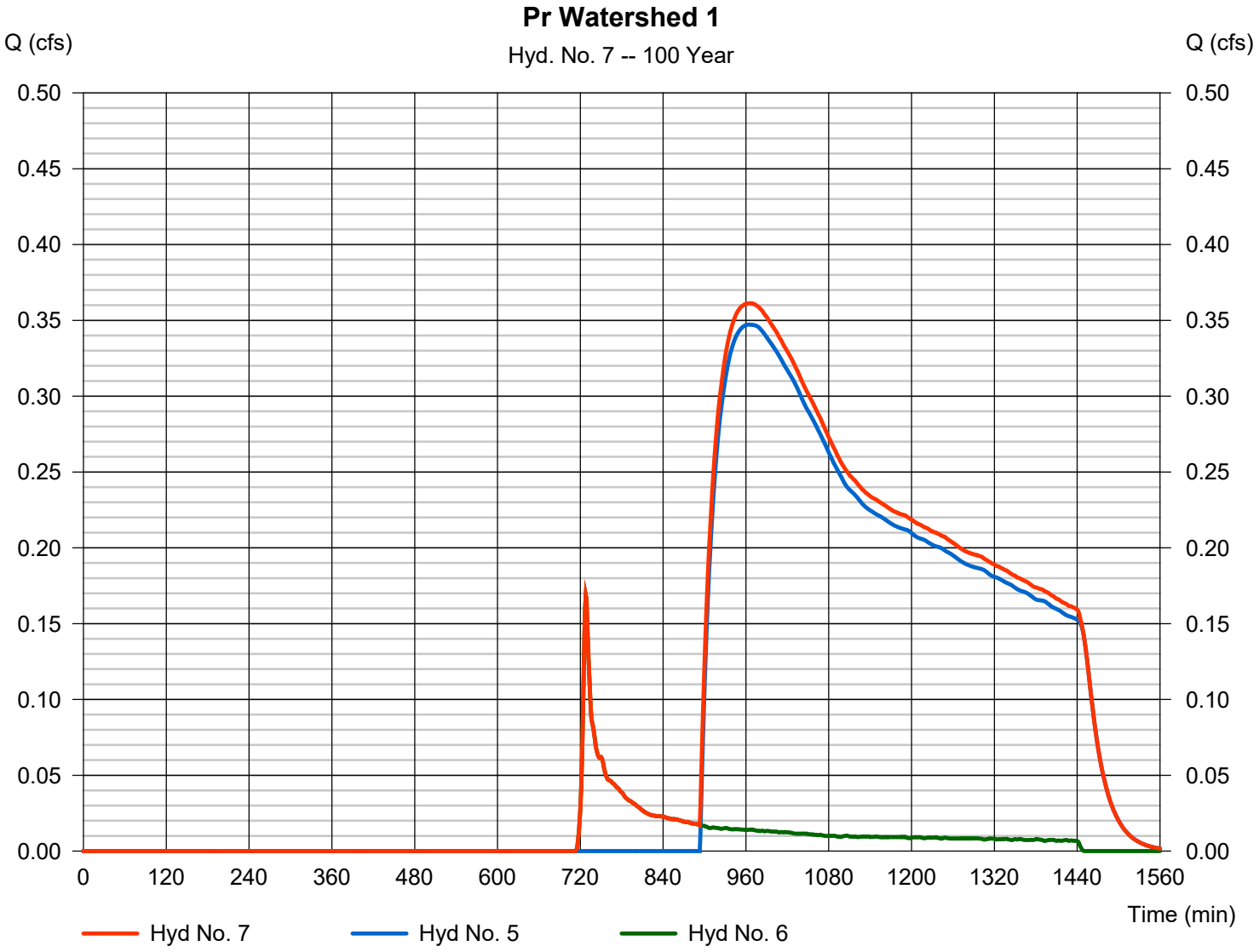


Hydrograph Report

Hyd. No. 7

Pr Watershed 1

Hydrograph type	=	Combine	Peak discharge	=	0.361 cfs
Storm frequency	=	100 yrs	Time to peak	=	967 min
Time interval	=	1 min	Hyd. volume	=	8,625 cuft
Inflow hyds.	=	5, 6	Contrib. drain. area	=	0.190 ac



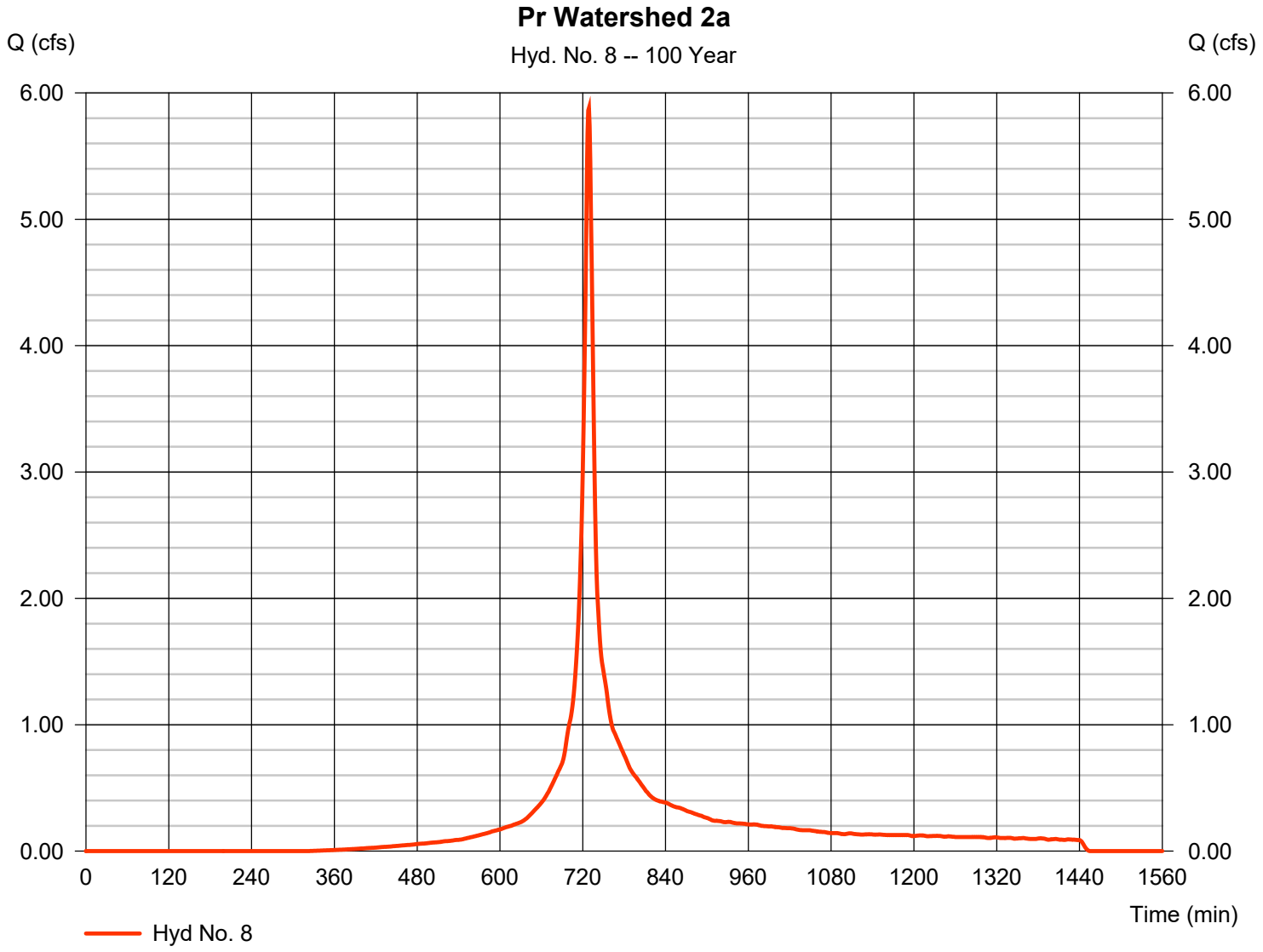
Hydrograph Report

Hyd. No. 8

Pr Watershed 2a

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.880 cfs
Storm frequency	=	100 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	20,830 cuft
Drainage area	=	1.110 ac	Curve number	=	78*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	8.80 min
Total precip.	=	7.76 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1hr.cda	Shape factor	=	484

* Composite (Area/CN) = [(0.370 x 39) + (0.740 x 98)] / 1.110

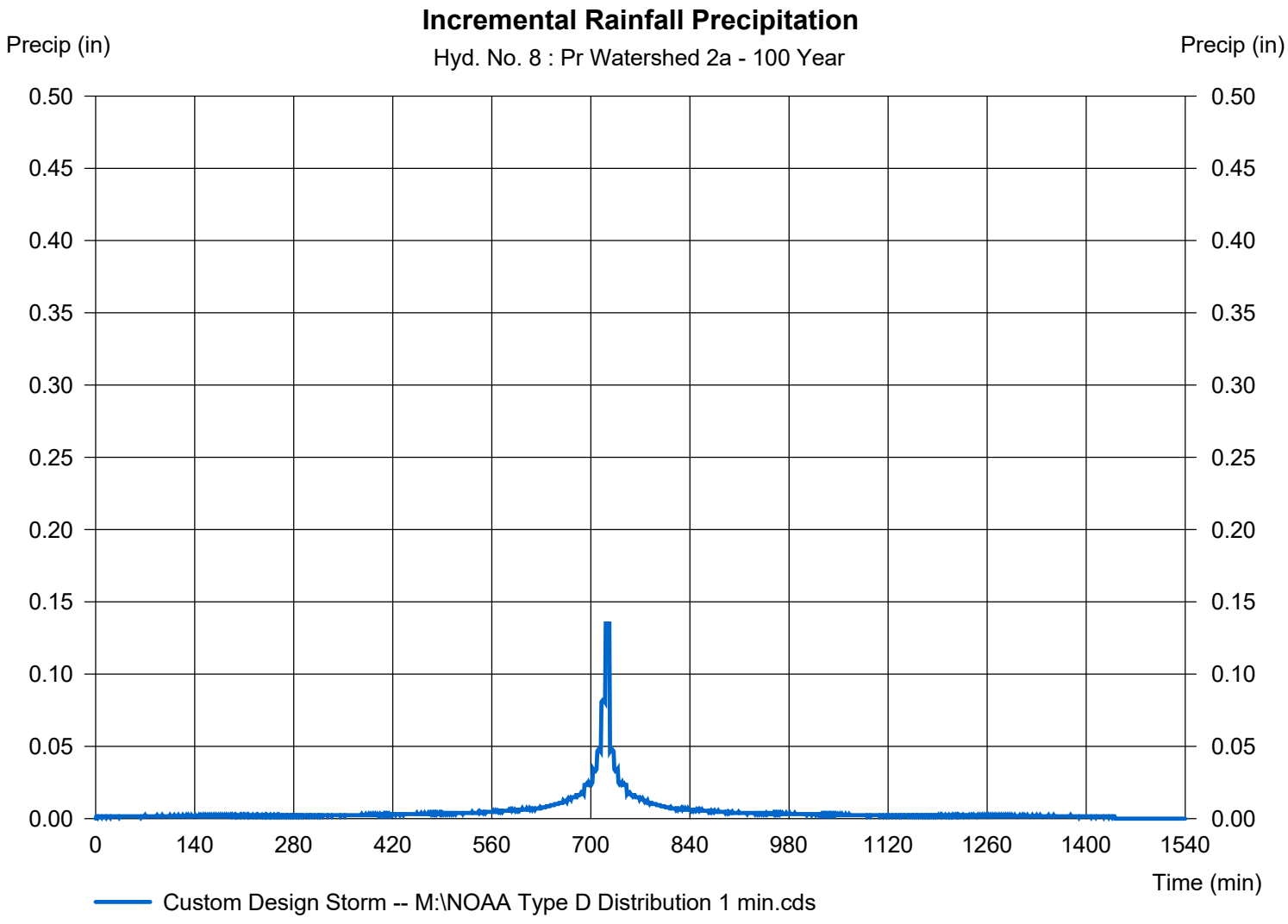


Precipitation Report

Hyd. No. 8

Pr Watershed 2a

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.7600 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		



Hydrograph Report

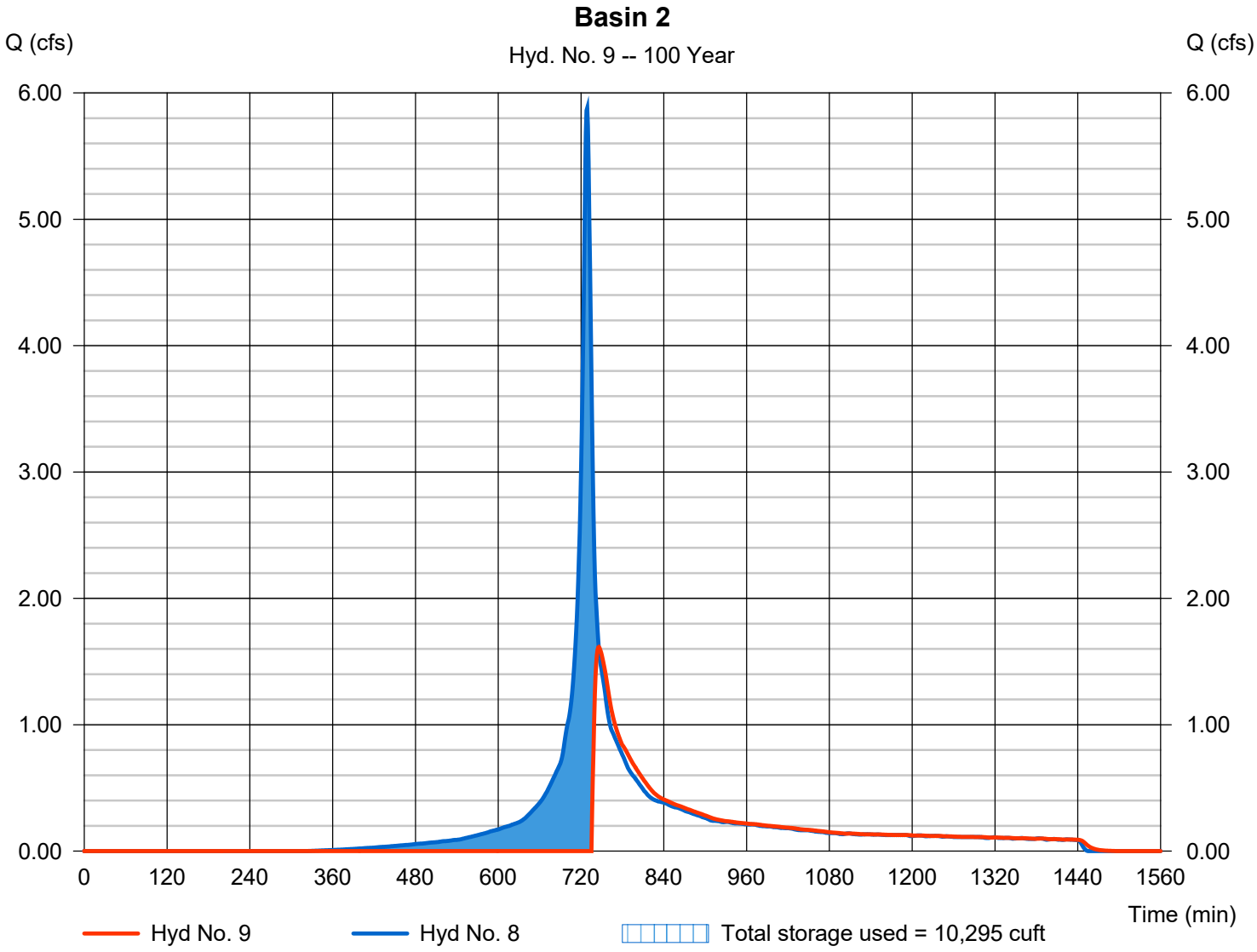
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024 Tuesday, 01 / 14 / 2025

Hyd. No. 9

Basin 2

Hydrograph type	=	Reservoir	Peak discharge	=	1.615 cfs
Storm frequency	=	100 yrs	Time to peak	=	746 min
Time interval	=	1 min	Hyd. volume	=	11,315 cuft
Inflow hyd. No.	=	8 - Pr Watershed 2a	Max. Elevation	=	234.15 ft
Reservoir name	=	Pond 2	Max. Storage	=	10,295 cuft

Storage Indication method used.



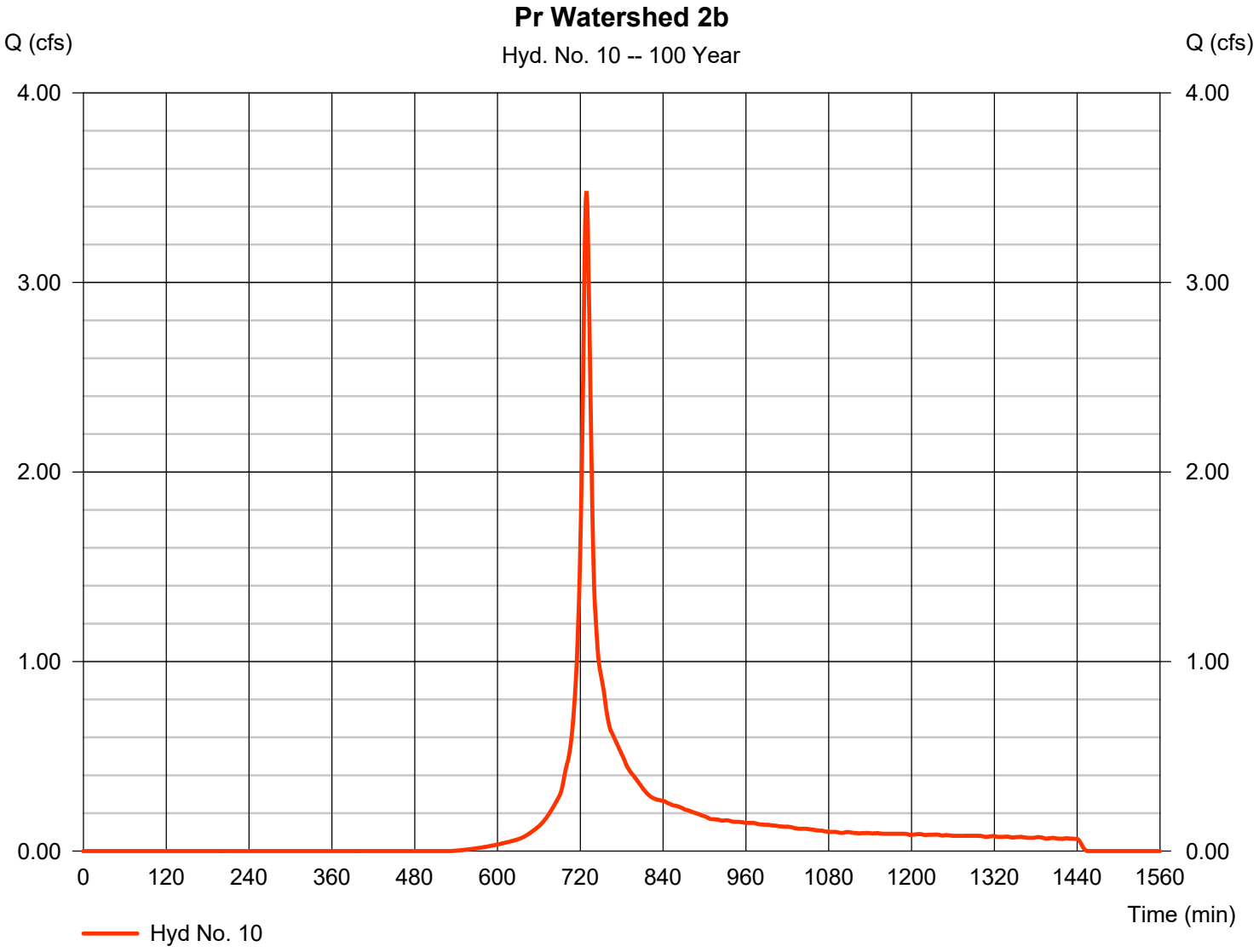
Hydrograph Report

Hyd. No. 10

Pr Watershed 2b

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.481 cfs
Storm frequency	=	100 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	12,131 cuft
Drainage area	=	0.960 ac	Curve number	=	63*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	7.76 in	Distribution	=	Custom
Storm duration	=	M:\NOAA Type D Distribution 1hr.cds	Shape factor	=	484

* Composite (Area/CN) = [(0.120 x 30) + (0.040 x 77) + (0.230 x 39) + (0.280 x 80) + (0.290 x 77)] / 0.960

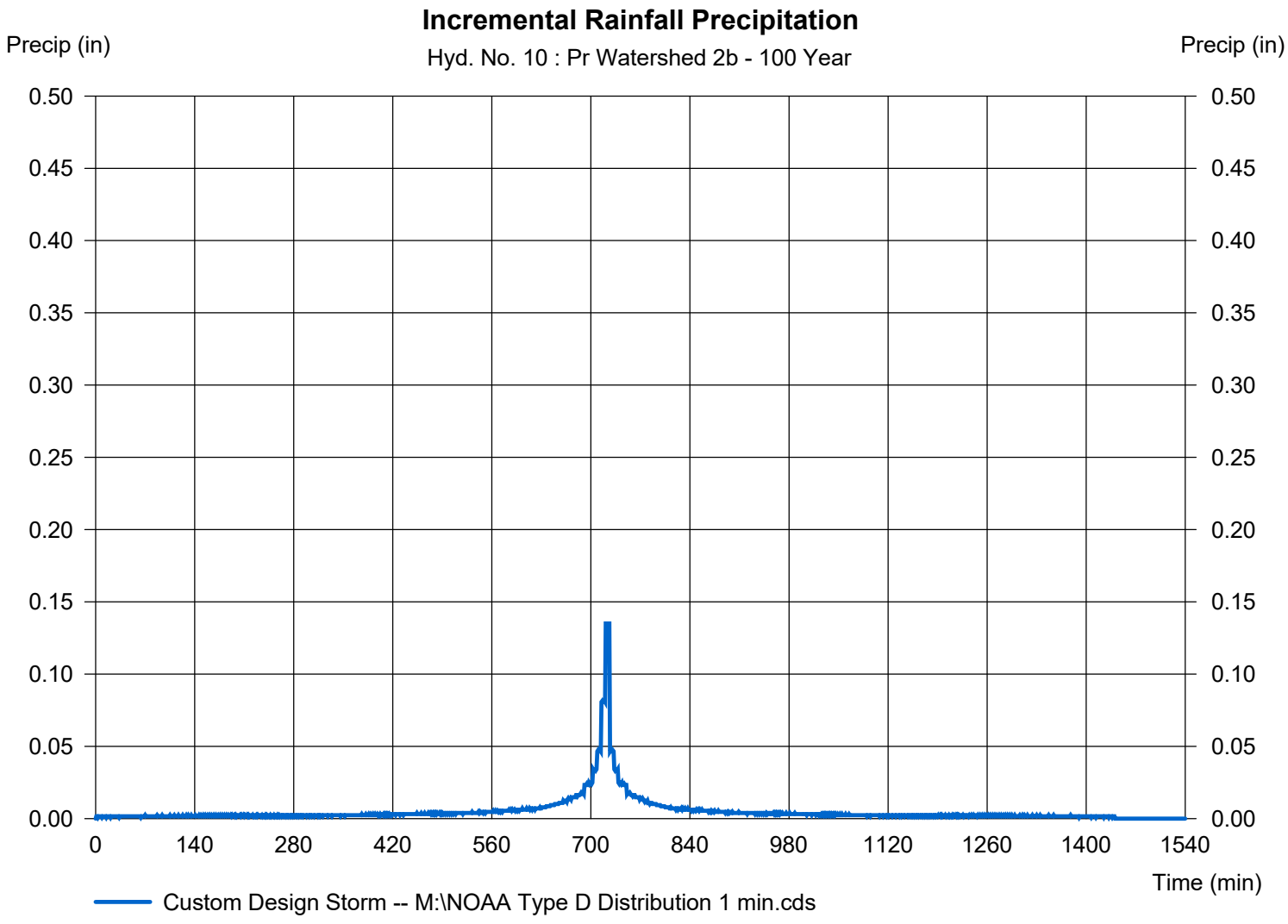


Precipitation Report

Hyd. No. 10

Pr Watershed 2b

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 7.7600 in	Distribution	= Custom
Storm duration	= M:\NOAA Type D Distribution 1 min.cds		

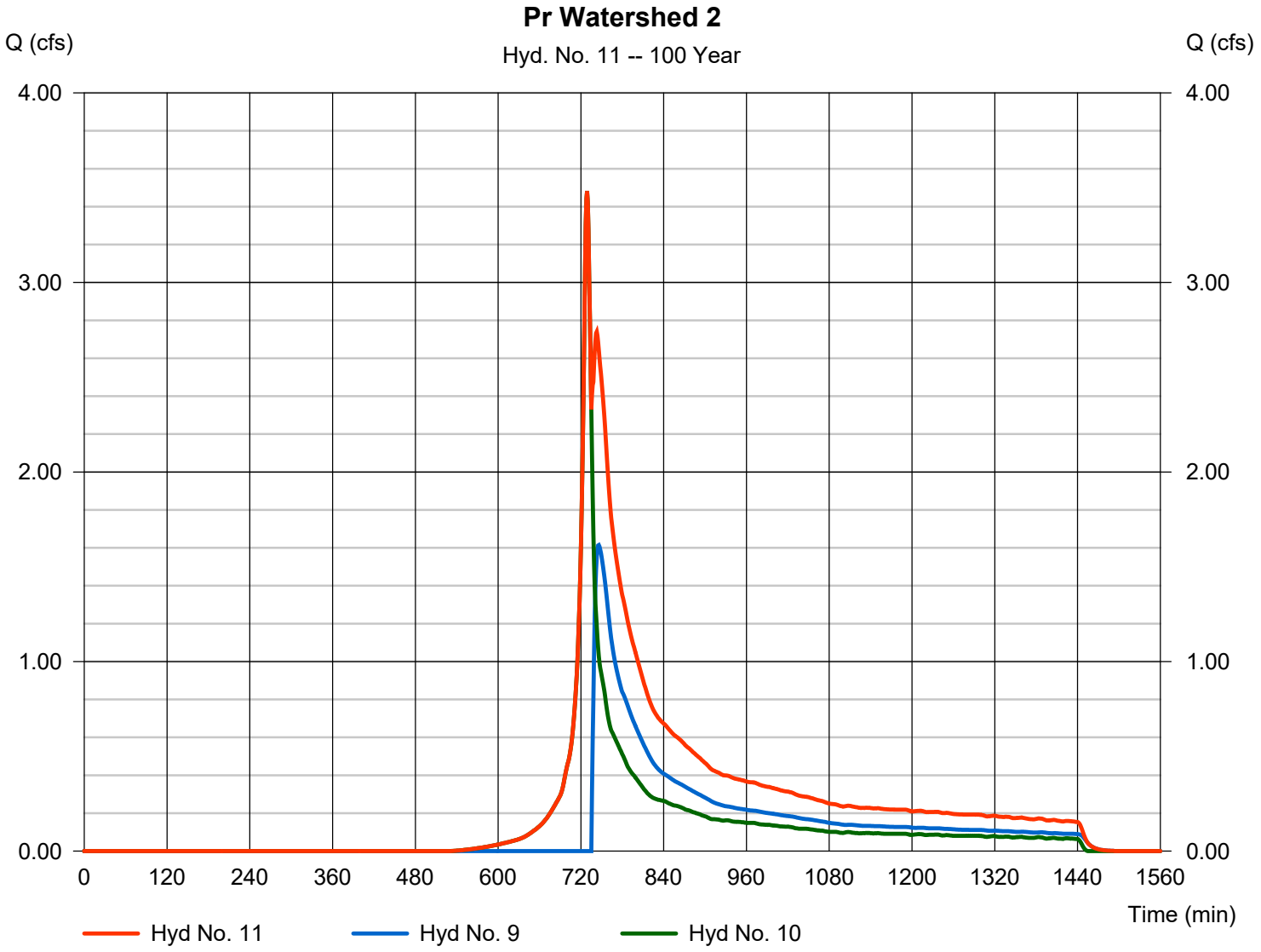


Hydrograph Report

Hyd. No. 11

Pr Watershed 2

Hydrograph type	=	Combine	Peak discharge	=	3.481 cfs
Storm frequency	=	100 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	23,445 cuft
Inflow hyds.	=	9, 10	Contrib. drain. area	=	0.960 ac

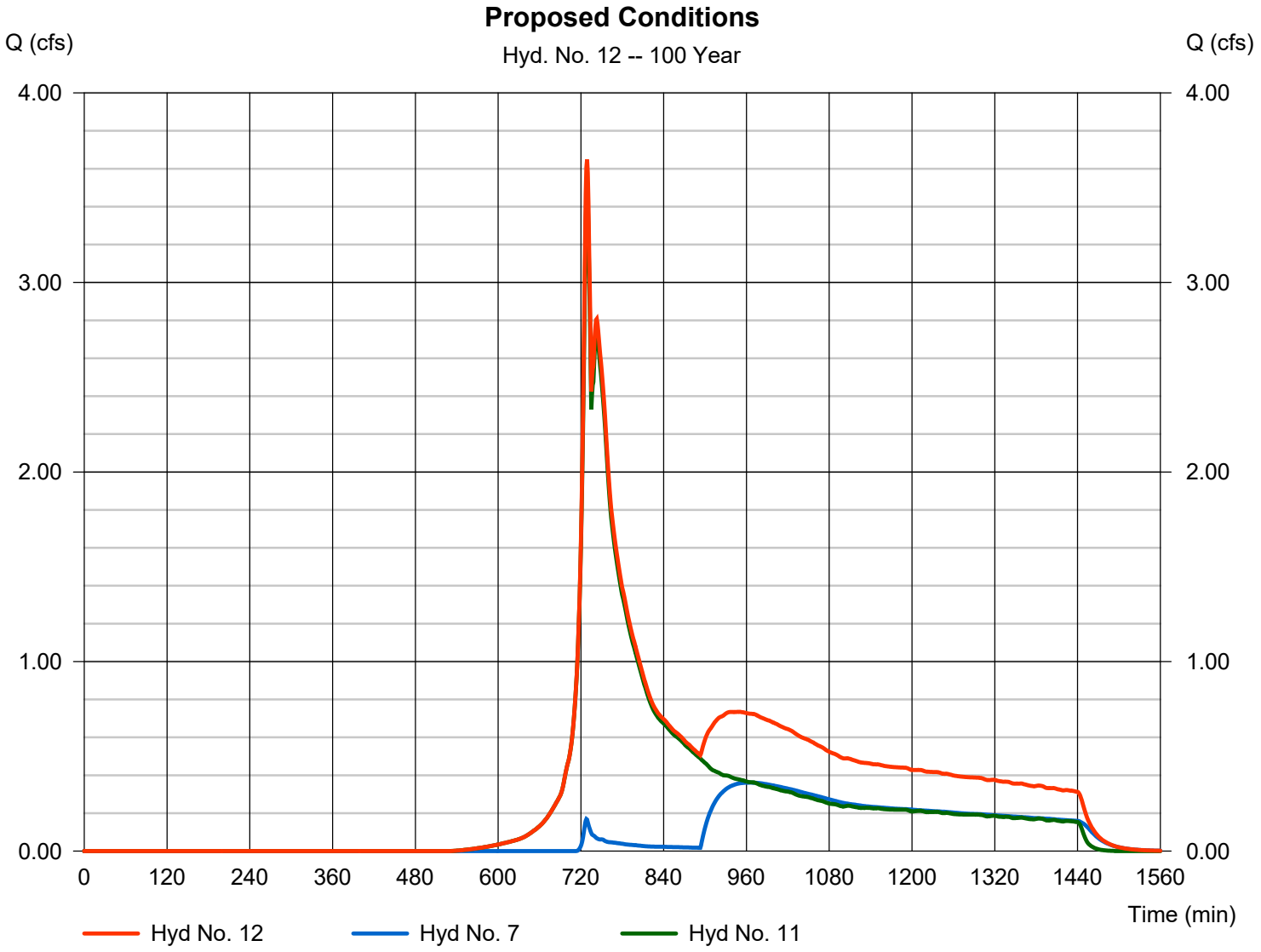


Hydrograph Report

Hyd. No. 12

Proposed Conditions

Hydrograph type	=	Combine	Peak discharge	=	3.648 cfs
Storm frequency	=	100 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	32,070 cuft
Inflow hyds.	=	7, 11	Contrib. drain. area	=	0.000 ac



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	21.8860	3.8000	0.6927	--------
3	0.0000	0.0000	0.0000	--------
5	0.0000	0.0000	0.0000	--------
10	30.7805	3.4000	0.6802	--------
25	37.8346	3.5000	0.6853	--------
50	43.4031	3.6000	0.6893	--------
100	48.2349	3.6000	0.6872	--------

File name: 7767F Intensity Values for Rational Method.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	4.85	3.55	2.87	2.44	2.13	1.91	1.74	1.60	1.48	1.38	1.30	1.23
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	7.24	5.27	4.25	3.60	3.16	2.83	2.57	2.37	2.20	2.06	1.94	1.83
25	8.73	6.36	5.12	4.35	3.81	3.41	3.10	2.85	2.65	2.47	2.33	2.20
50	9.85	7.18	5.79	4.91	4.30	3.85	3.50	3.22	2.99	2.79	2.62	2.48
100	10.99	8.02	6.47	5.49	4.81	4.31	3.92	3.60	3.34	3.13	2.94	2.78

Tc = time in minutes. Values may exceed 60.

00\7767F - Rand Whitney Stormwater Design\Studies-Calculations\Drainage\7767F Depth Values for SCS Method.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	3.45	0.00	0.00	5.12	6.16	6.94	7.76
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	3.45	0.00	0.00	5.12	6.16	6.94	7.76

Appendix B

Rainfall Data

NOAA Atlas 14, Volume 10, Version 3
Location name: Uncasville, Connecticut, USA*
Latitude: 41.453°, Longitude: -72.1399°
Elevation: 240 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.340** (0.265-0.426)	**0.406** (0.316-0.509)	**0.514** (0.399-0.647)	**0.604** (0.466-0.763)	**0.728** (0.544-0.953)	**0.821** (0.601-1.09)	**0.918** (0.654-1.26)	**1.03** (0.693-1.44)	**1.19** (0.770-1.70)	**1.32** (0.836-1.93)
10-min	**0.482** (0.375-0.603)	**0.576** (0.448-0.721)	**0.729** (0.566-0.916)	**0.856** (0.660-1.08)	**1.03** (0.771-1.35)	**1.16** (0.852-1.55)	**1.30** (0.926-1.79)	**1.46** (0.982-2.03)	**1.68** (1.09-2.42)	**1.87** (1.18-2.73)
15-min	**0.567** (0.442-0.710)	**0.677** (0.527-0.849)	**0.857** (0.665-1.08)	**1.01** (0.777-1.27)	**1.21** (0.907-1.59)	**1.37** (1.00-1.82)	**1.53** (1.09-2.10)	**1.72** (1.16-2.39)	**1.98** (1.28-2.84)	**2.20** (1.39-3.21)
30-min	**0.798** (0.622-1.00)	**0.953** (0.742-1.20)	**1.21** (0.937-1.52)	**1.42** (1.09-1.79)	**1.71** (1.28-2.24)	**1.92** (1.41-2.56)	**2.15** (1.53-2.96)	**2.41** (1.62-3.36)	**2.78** (1.80-4.00)	**3.09** (1.96-4.51)
60-min	**1.03** (0.802-1.29)	**1.23** (0.957-1.54)	**1.56** (1.21-1.96)	**1.83** (1.41-2.31)	**2.20** (1.64-2.88)	**2.48** (1.82-3.31)	**2.78** (1.98-3.82)	**3.11** (2.10-4.34)	**3.59** (2.33-5.15)	**3.98** (2.52-5.81)
2-hr	**1.35** (1.06-1.68)	**1.61** (1.27-2.01)	**2.04** (1.59-2.54)	**2.39** (1.86-3.00)	**2.88** (2.17-3.74)	**3.24** (2.39-4.29)	**3.63** (2.60-4.96)	**4.07** (2.76-5.63)	**4.73** (3.08-6.72)	**5.27** (3.35-7.62)
3-hr	**1.57** (1.24-1.95)	**1.87** (1.48-2.32)	**2.36** (1.86-2.94)	**2.77** (2.16-3.46)	**3.33** (2.52-4.32)	**3.75** (2.78-4.94)	**4.19** (3.02-5.71)	**4.71** (3.20-6.48)	**5.48** (3.57-7.75)	**6.12** (3.90-8.79)
6-hr	**2.00** (1.59-2.46)	**2.37** (1.88-2.92)	**2.99** (2.36-3.69)	**3.50** (2.75-4.33)	**4.20** (3.19-5.39)	**4.72** (3.52-6.17)	**5.27** (3.82-7.12)	**5.92** (4.04-8.08)	**6.88** (4.51-9.64)	**7.68** (4.91-10.9)
12-hr	**2.47** (1.98-3.02)	**2.93** (2.34-3.58)	**3.68** (2.93-4.51)	**4.30** (3.41-5.30)	**5.16** (3.95-6.58)	**5.80** (4.35-7.53)	**6.48** (4.72-8.67)	**7.27** (4.98-9.83)	**8.42** (5.54-11.7)	**9.38** (6.02-13.2)
24-hr	**2.90** (2.34-3.52)	**3.45** (2.78-4.20)	**4.36** (3.50-5.31)	**5.12** (4.08-6.26)	**6.16** (4.75-7.80)	**6.94** (5.24-8.93)	**7.76** (5.69-10.3)	**8.72** (6.01-11.7)	**10.1** (6.71-14.0)	**11.3** (7.31-15.8)
2-day	**3.25** (2.64-3.91)	**3.91** (3.18-4.72)	**5.00** (4.04-6.04)	**5.90** (4.74-7.16)	**7.14** (5.55-8.99)	**8.06** (6.14-10.3)	**9.06** (6.70-12.0)	**10.2** (7.09-13.6)	**12.0** (7.98-16.4)	**13.6** (8.77-18.8)
3-day	**3.52** (2.88-4.23)	**4.24** (3.46-5.10)	**5.42** (4.40-6.53)	**6.40** (5.16-7.73)	**7.74** (6.05-9.71)	**8.74** (6.68-11.2)	**9.82** (7.29-12.9)	**11.1** (7.71-14.7)	**13.1** (8.69-17.7)	**14.7** (9.55-20.3)
4-day	**3.78** (3.10-4.53)	**4.54** (3.72-5.44)	**5.78** (4.71-6.94)	**6.81** (5.51-8.20)	**8.22** (6.44-10.3)	**9.27** (7.11-11.8)	**10.4** (7.74-13.7)	**11.8** (8.18-15.5)	**13.8** (9.20-18.7)	**15.6** (10.1-21.3)
7-day	**4.52** (3.72-5.37)	**5.34** (4.40-6.36)	**6.70** (5.50-8.00)	**7.83** (6.38-9.38)	**9.38** (7.38-11.6)	**10.5** (8.10-13.3)	**11.8** (8.78-15.3)	**13.2** (9.24-17.3)	**15.4** (10.3-20.6)	**17.2** (11.2-23.4)
10-day	**5.24** (4.33-6.21)	**6.10** (5.05-7.24)	**7.53** (6.20-8.95)	**8.71** (7.12-10.4)	**10.3** (8.15-12.7)	**11.5** (8.90-14.5)	**12.8** (9.57-16.5)	**14.3** (10.0-18.6)	**16.5** (11.1-22.0)	**18.3** (12.0-24.8)
20-day	**7.45** (6.21-8.76)	**8.37** (6.98-9.86)	**9.89** (8.20-11.7)	**11.1** (9.19-13.2)	**12.9** (10.2-15.7)	**14.2** (11.0-17.5)	**15.5** (11.6-19.6)	**17.0** (12.0-21.8)	**18.9** (12.8-24.9)	**20.4** (13.4-27.3)
30-day	**9.29** (7.78-10.9)	**10.2** (8.58-12.0)	**11.8** (9.85-13.9)	**13.1** (10.9-15.5)	**14.9** (11.9-18.0)	**16.3** (12.6-19.9)	**17.7** (13.1-22.0)	**19.0** (13.5-24.3)	**20.7** (14.1-27.2)	**22.0** (14.5-29.3)
45-day	**11.6** (9.74-13.5)	**12.6** (10.6-14.7)	**14.2** (11.9-16.6)	**15.6** (13.0-18.3)	**17.5** (13.9-20.9)	**19.0** (14.7-23.0)	**20.4** (15.1-25.1)	**21.6** (15.4-27.5)	**23.2** (15.8-30.2)	**24.2** (15.9-32.0)
60-day	**13.5** (11.4-15.7)	**14.5** (12.2-16.9)	**16.2** (13.6-18.9)	**17.7** (14.7-20.7)	**19.6** (15.7-23.4)	**21.2** (16.5-25.6)	**22.7** (16.8-27.8)	**23.9** (17.1-30.3)	**25.3** (17.3-32.9)	**26.2** (17.4-34.5)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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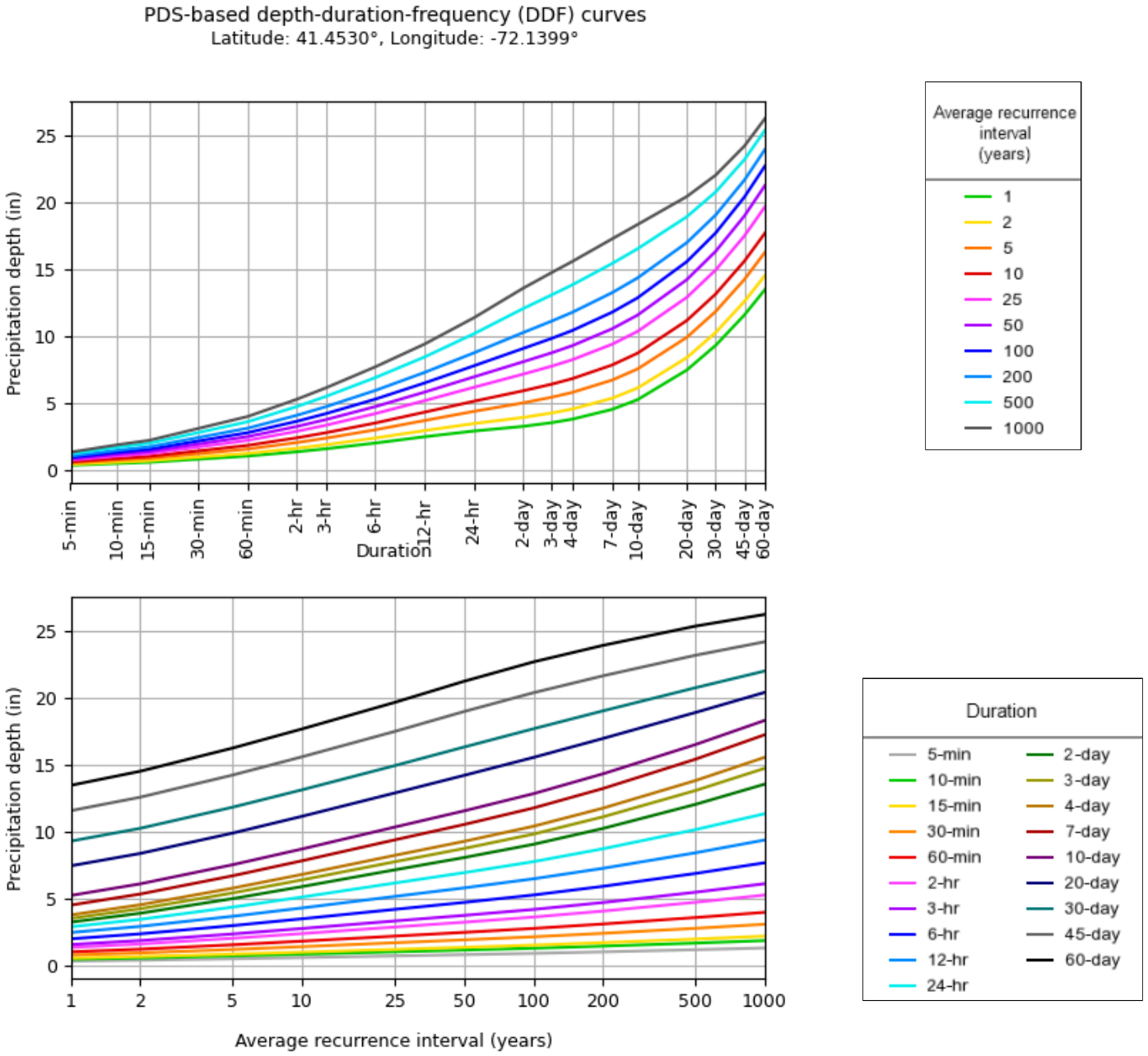
PF graphical



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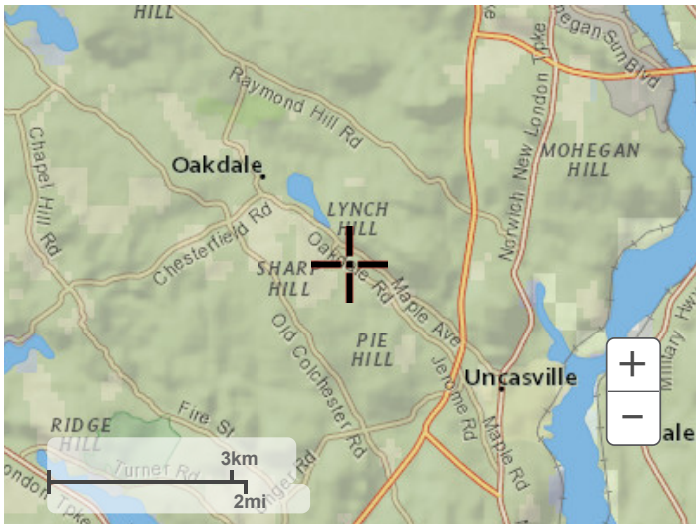
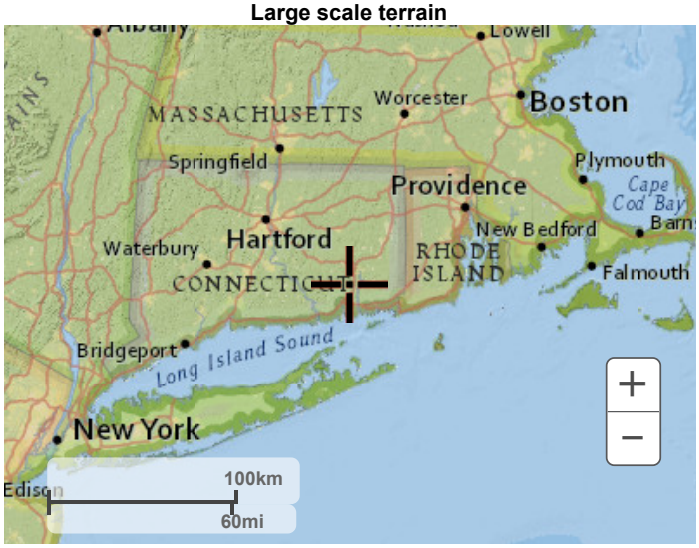
Maps & aerials

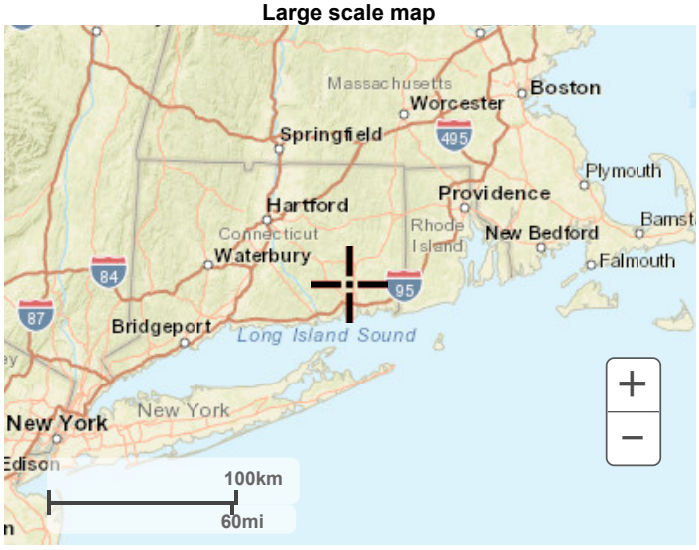
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

NOAA Atlas 14, Volume 10, Version 3
Location name: Uncasville, Connecticut, USA*
Latitude: 41.453°, Longitude: -72.1399°
Elevation: 240 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**4.08** (3.18-5.11)	**4.87** (3.79-6.11)	**6.17** (4.79-7.76)	**7.25** (5.59-9.16)	**8.74** (6.53-11.4)	**9.85** (7.21-13.1)	**11.0** (7.85-15.1)	**12.3** (8.32-17.2)	**14.3** (9.24-20.5)	**15.9** (10.0-23.1)
10-min	**2.89** (2.25-3.62)	**3.46** (2.69-4.33)	**4.37** (3.40-5.50)	**5.14** (3.96-6.49)	**6.19** (4.63-8.10)	**6.98** (5.11-9.29)	**7.81** (5.56-10.7)	**8.75** (5.89-12.2)	**10.1** (6.55-14.5)	**11.2** (7.10-16.4)
15-min	**2.27** (1.77-2.84)	**2.71** (2.11-3.40)	**3.43** (2.66-4.31)	**4.03** (3.11-5.08)	**4.85** (3.63-6.35)	**5.47** (4.01-7.29)	**6.12** (4.36-8.42)	**6.86** (4.62-9.58)	**7.93** (5.14-11.4)	**8.80** (5.57-12.8)
30-min	**1.60** (1.24-2.00)	**1.91** (1.48-2.39)	**2.41** (1.87-3.03)	**2.83** (2.19-3.58)	**3.41** (2.55-4.47)	**3.85** (2.82-5.13)	**4.31** (3.06-5.92)	**4.83** (3.25-6.73)	**5.57** (3.61-7.99)	**6.18** (3.91-9.02)
60-min	**1.03** (0.802-1.29)	**1.23** (0.957-1.54)	**1.56** (1.21-1.96)	**1.83** (1.41-2.31)	**2.20** (1.64-2.88)	**2.48** (1.82-3.31)	**2.78** (1.98-3.82)	**3.11** (2.10-4.34)	**3.59** (2.33-5.15)	**3.98** (2.52-5.81)
2-hr	**0.677** (0.531-0.842)	**0.807** (0.633-1.00)	**1.02** (0.797-1.27)	**1.20** (0.930-1.50)	**1.44** (1.08-1.87)	**1.62** (1.20-2.15)	**1.81** (1.30-2.48)	**2.04** (1.38-2.82)	**2.36** (1.54-3.36)	**2.64** (1.67-3.81)
3-hr	**0.523** (0.413-0.649)	**0.623** (0.491-0.773)	**0.787** (0.617-0.978)	**0.922** (0.719-1.15)	**1.11** (0.838-1.44)	**1.25** (0.924-1.65)	**1.40** (1.00-1.90)	**1.57** (1.06-2.16)	**1.82** (1.19-2.58)	**2.04** (1.30-2.93)
6-hr	**0.334** (0.265-0.410)	**0.396** (0.314-0.488)	**0.498** (0.394-0.615)	**0.583** (0.458-0.723)	**0.700** (0.533-0.900)	**0.787** (0.587-1.03)	**0.880** (0.637-1.19)	**0.988** (0.674-1.35)	**1.15** (0.752-1.61)	**1.28** (0.820-1.83)
12-hr	**0.205** (0.164-0.250)	**0.243** (0.194-0.297)	**0.305** (0.243-0.374)	**0.357** (0.282-0.439)	**0.428** (0.328-0.546)	**0.481** (0.361-0.624)	**0.537** (0.391-0.719)	**0.603** (0.413-0.815)	**0.698** (0.459-0.970)	**0.778** (0.499-1.10)
24-hr	**0.120** (0.097-0.146)	**0.143** (0.115-0.174)	**0.181** (0.145-0.221)	**0.213** (0.170-0.260)	**0.256** (0.197-0.325)	**0.288** (0.218-0.372)	**0.323** (0.237-0.429)	**0.363** (0.250-0.487)	**0.422** (0.279-0.582)	**0.472** (0.304-0.660)
2-day	**0.067** (0.054-0.081)	**0.081** (0.066-0.098)	**0.104** (0.084-0.125)	**0.122** (0.098-0.149)	**0.148** (0.115-0.187)	**0.167** (0.127-0.215)	**0.188** (0.139-0.249)	**0.213** (0.147-0.283)	**0.250** (0.166-0.341)	**0.282** (0.182-0.390)
3-day	**0.048** (0.039-0.058)	**0.058** (0.048-0.070)	**0.075** (0.061-0.090)	**0.088** (0.071-0.107)	**0.107** (0.083-0.134)	**0.121** (0.092-0.154)	**0.136** (0.101-0.179)	**0.154** (0.107-0.204)	**0.181** (0.120-0.246)	**0.204** (0.132-0.281)
4-day	**0.039** (0.032-0.047)	**0.047** (0.038-0.056)	**0.060** (0.049-0.072)	**0.070** (0.057-0.085)	**0.085** (0.067-0.107)	**0.096** (0.074-0.122)	**0.108** (0.080-0.142)	**0.122** (0.085-0.161)	**0.143** (0.095-0.194)	**0.162** (0.105-0.222)
7-day	**0.026** (0.022-0.031)	**0.031** (0.026-0.037)	**0.039** (0.032-0.047)	**0.046** (0.037-0.055)	**0.055** (0.043-0.069)	**0.062** (0.048-0.078)	**0.070** (0.052-0.090)	**0.078** (0.054-0.102)	**0.091** (0.061-0.122)	**0.102** (0.066-0.139)
10-day	**0.021** (0.018-0.025)	**0.025** (0.021-0.030)	**0.031** (0.025-0.037)	**0.036** (0.029-0.043)	**0.043** (0.033-0.053)	**0.048** (0.037-0.060)	**0.053** (0.039-0.068)	**0.059** (0.041-0.077)	**0.068** (0.046-0.091)	**0.076** (0.049-0.103)
20-day	**0.015** (0.012-0.018)	**0.017** (0.014-0.020)	**0.020** (0.017-0.024)	**0.023** (0.019-0.027)	**0.026** (0.021-0.032)	**0.029** (0.022-0.036)	**0.032** (0.024-0.040)	**0.035** (0.024-0.045)	**0.039** (0.026-0.051)	**0.042** (0.027-0.056)
30-day	**0.012** (0.010-0.015)	**0.014** (0.011-0.016)	**0.016** (0.013-0.019)	**0.018** (0.015-0.021)	**0.020** (0.016-0.024)	**0.022** (0.017-0.027)	**0.024** (0.018-0.030)	**0.026** (0.018-0.033)	**0.028** (0.019-0.037)	**0.030** (0.020-0.040)
45-day	**0.010** (0.009-0.012)	**0.011** (0.009-0.013)	**0.013** (0.011-0.015)	**0.014** (0.012-0.016)	**0.016** (0.012-0.019)	**0.017** (0.013-0.021)	**0.018** (0.013-0.023)	**0.020** (0.014-0.025)	**0.021** (0.014-0.027)	**0.022** (0.014-0.029)
60-day	**0.009** (0.007-0.010)	**0.010** (0.008-0.011)	**0.011** (0.009-0.013)	**0.012** (0.010-0.014)	**0.013** (0.010-0.016)	**0.014** (0.011-0.017)	**0.015** (0.011-0.019)	**0.016** (0.011-0.021)	**0.017** (0.011-0.022)	**0.018** (0.012-0.023)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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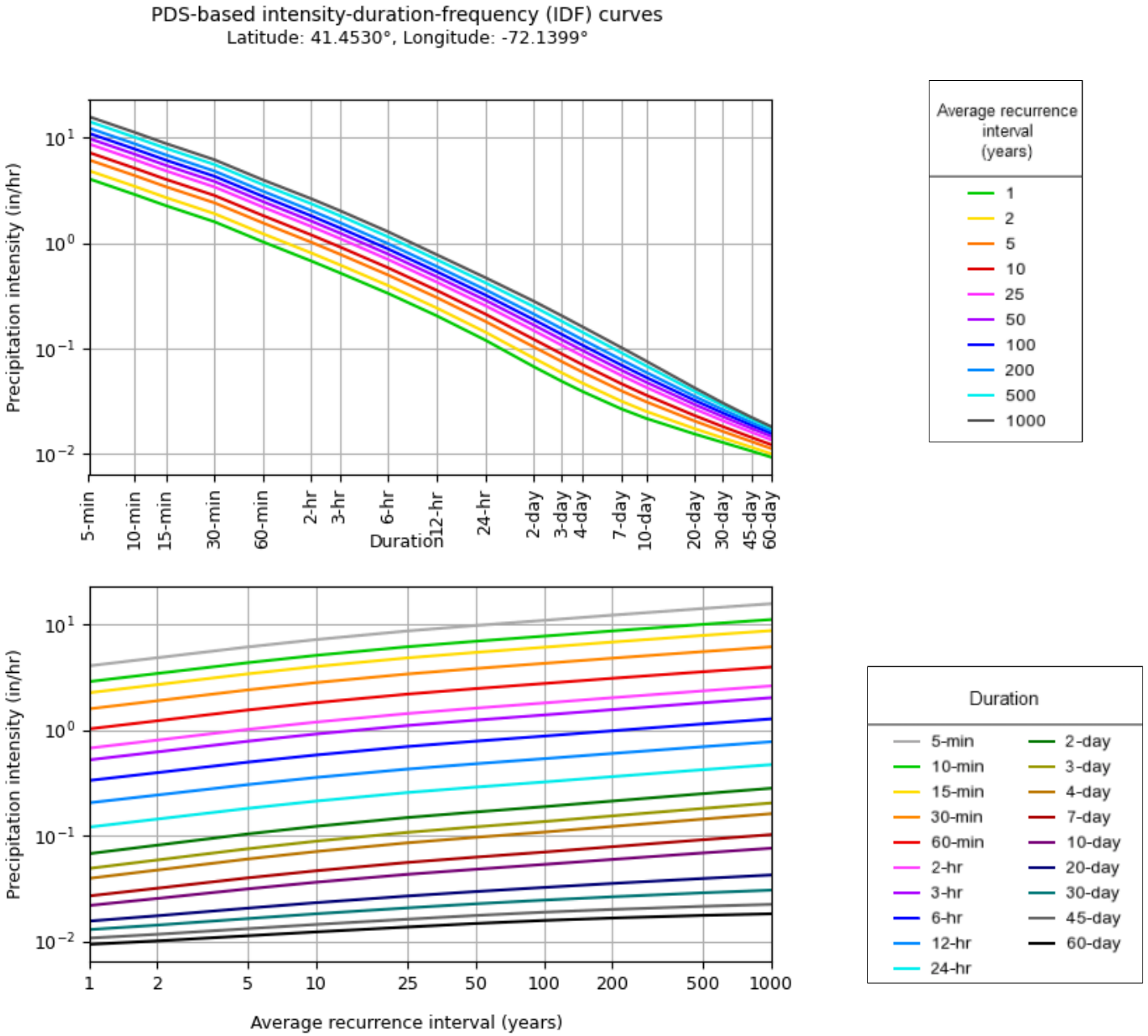
PF graphical



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Created (GMT): Tue Oct 1 15:49:40 2024

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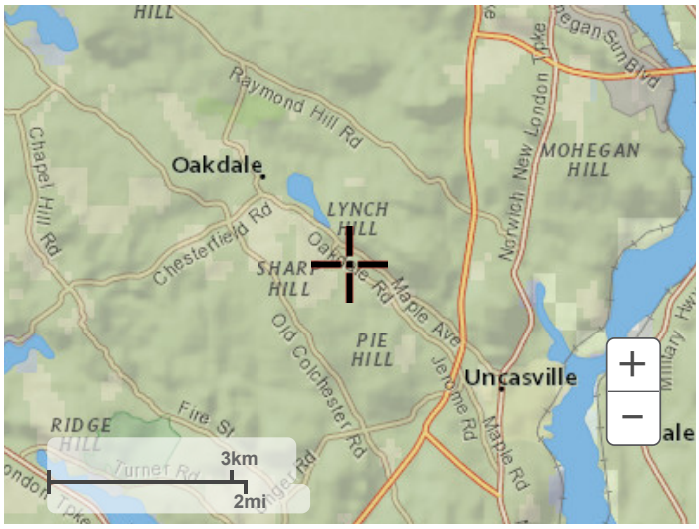
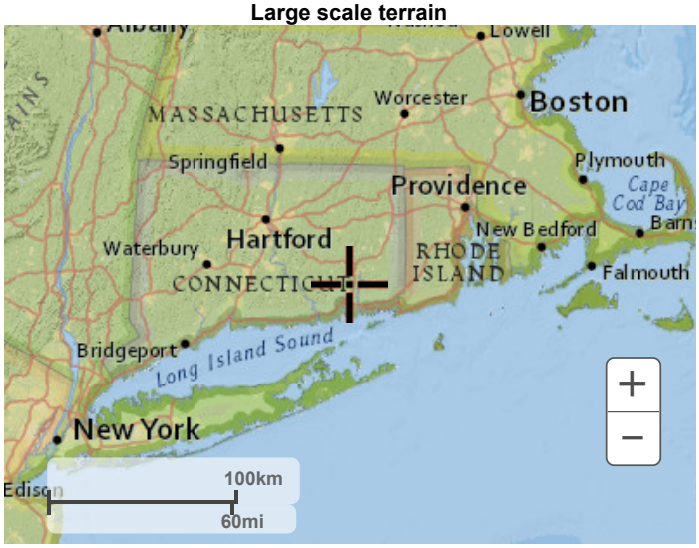
Maps & aerials

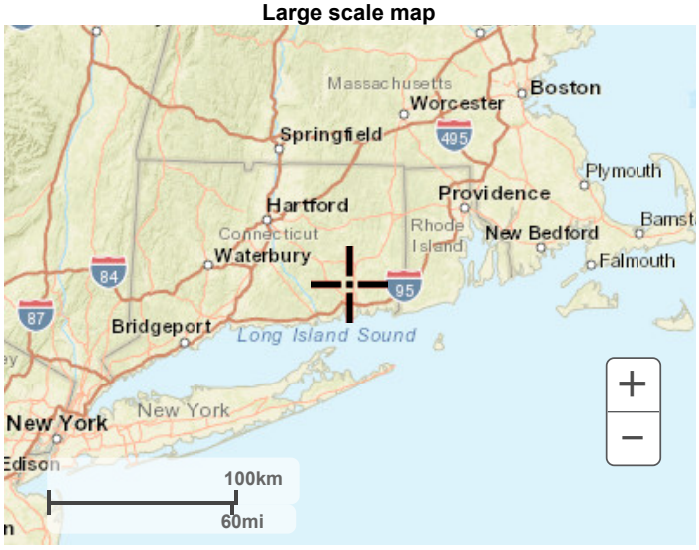
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

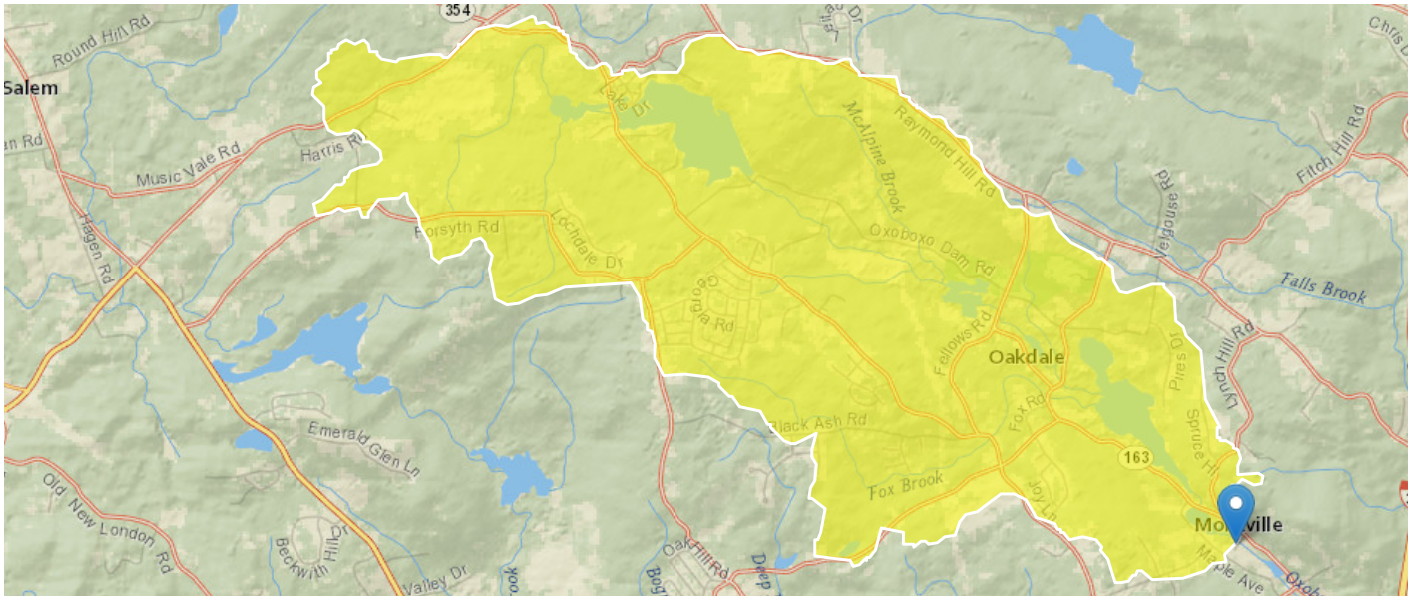
Disclaimer

Appendix D

StreamStats Report

StreamStats Report

Region ID: CT
Workspace ID: CT20241205180712767000
Clicked Point (Latitude, Longitude): 41.45263, -72.13696
Time: 2024-12-05 13:07:40 -0500



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	9.66	square miles
I24H100Y	Maximum 24-hour precipitation that occurs on average once in 100 years	7.79	inches
I24H10Y	Maximum 24-hour precipitation that occurs on average once in 10 years	5.07	inches
I24H200Y	Maximum 24-hour precipitation that occurs on average once in 200 years	8.89	inches
I24H25Y	Maximum 24-hour precipitation that occurs on average once in 25 years	6.15	inches
I24H2Y	Maximum 24-hour precipitation that occurs on average once in 2 years - Equivalent to precipitation intensity index	3.16	inches
I24H500Y	Maximum 24-hour precipitation that occurs on average once in 500 years	10.34	inches
I24H50Y	Maximum 24-hour precipitation that occurs on average once in 50 years	6.97	inches
I24H5Y	Maximum 24-hour precipitation that occurs on average once in 5 years	4.25	inches
SSURGOCCDD	Percentage of area with hydrologic soil types C, D, or C/D from SSURGO	0.3108	percent

Peak-Flow Statistics

Peak-Flow Statistics Parameters [Statewide DA only SIR 2020 5054]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	9.66	square miles	0.69	325

Peak-Flow Statistics Parameters [Statewide Multiparameter SIR 2020 5054]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	9.66	square miles	0.69	325
I24H2Y	24 Hour 2 Year Precipitation	3.16	inches	2.77	3.32
SSURGOCCDD	Percent soil type C or D from SSURGO	0.3108	percent	0.118	0.945
I24H5Y	24 Hour 5 Year Precipitation	4.25	inches	4	4.7
I24H10Y	24 Hour 10 Year Precipitation	5.07	inches	4.86	5.79
I24H25Y	24 Hour 25 Year Precipitation	6.15	inches	5.99	7.22
I24H50Y	24 Hour 50 Year Precipitation	6.97	inches	6.81	8.3
I24H100Y	24 Hour 100 Year Precipitation	7.79	inches	7.62	9.38
I24H200Y	24 Hour 200 YearPrecipitation	8.89	inches	8.7	11.22
I24H500Y	24 Hour 500 Year Precipitation	10.34	inches	10.1	13.64

Peak-Flow Statistics Flow Report [Statewide DA only SIR 2020 5054]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	ASEp
Drainage Area Only 50-percent AEP flood	374	ft^3/s	35
Drainage Area Only 20-percent AEP flood	645	ft^3/s	35
Drainage Area Only 10-percent AEP flood	870	ft^3/s	36.3
Drainage Area Only 4-percent AEP flood	1210	ft^3/s	37.8
Drainage Area Only 2-percent AEP flood	1490	ft^3/s	39.8
Drainage Area Only 1-percent AEP flood	1810	ft^3/s	42.4
Drainage Area Only 0.5-percent AEP flood	2180	ft^3/s	44.4
Drainage Area Only 0.2-percent AEP flood	2720	ft^3/s	48

Peak-Flow Statistics Flow Report [Statewide Multiparameter SIR 2020 5054]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	PIL	PIU	ASEp
50-percent AEP flood	326	ft^3/s	80	1330	26.5
20-percent AEP flood	488	ft^3/s	109	2190	26.3
10-percent AEP flood	608	ft^3/s	125	2950	28.4
4-percent AEP flood	805	ft^3/s	150	4320	31.5
2-percent AEP flood	978	ft^3/s	166	5760	34.3
1-percent AEP flood	1170	ft^3/s	181	7580	37.1
0.5-percent AEP flood	1380	ft^3/s	241	7890	40.6

Statistic	Value	Unit	PIL	PIU	ASEp
0.2-percent AEP flood	1730	ft^3/s	323	9270	45

Peak-Flow Statistics Flow Report [Area-Averaged]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	ASEp		
Drainage Area Only 50-percent AEP flood	374	ft^3/s	35		
Drainage Area Only 20-percent AEP flood	645	ft^3/s	35		
Drainage Area Only 10-percent AEP flood	870	ft^3/s	36.3		
Drainage Area Only 4-percent AEP flood	1210	ft^3/s	37.8		
Drainage Area Only 2-percent AEP flood	1490	ft^3/s	39.8		
Drainage Area Only 1-percent AEP flood	1810	ft^3/s	42.4		
Drainage Area Only 0.5-percent AEP flood	2180	ft^3/s	44.4		
Drainage Area Only 0.2-percent AEP flood	2720	ft^3/s	48		
50-percent AEP flood	326	ft^3/s	80	1330	26.5
20-percent AEP flood	488	ft^3/s	109	2190	26.3
10-percent AEP flood	608	ft^3/s	125	2950	28.4
4-percent AEP flood	805	ft^3/s	150	4320	31.5
2-percent AEP flood	978	ft^3/s	166	5760	34.3
1-percent AEP flood	1170	ft^3/s	181	7580	37.1
0.5-percent AEP flood	1380	ft^3/s	241	7890	40.6
0.2-percent AEP flood	1730	ft^3/s	323	9270	45

Peak-Flow Statistics Citations

Ahearn, E.A., and Hodgkins, G.A.,2020, Estimating flood magnitude and frequency on streams and rivers in Connecticut, based on data through water year 2015: U.S. Geological Survey Scientific Investigations Report 2020–5054, 42 p. (https://doi.org/10.3133/sir20205054)

Application Version: 4.24.0
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1