# Draft Site Plan Engineering Report

for

Canisius High School – Robert J. Stransky Memorial Athletic Complex
Phase Three Development Project

at

2885 Clinton Street ▪ West Seneca, NY 14224 ▪ Erie County ▪ NYSDEC Region #9


**Date:**
March 2021

**Prepared for:**
Canisius High School
1180 Delaware Avenue
Buffalo, NY 14209
(T) 716-882-0466

**Prepared by:**
Appel Osborne Landscape Architecture
50 Elk Street, Suite 400
Buffalo, NY 14210
(T) 315-476-1022

Trautman Associates
37 Franklin Street, Suite 100
Buffalo, NY 14202
(T) 716-883-4400

appel osborne
landscape architecture

# TABLE OF CONTENTS

# SECTION 1 – Project Description

## Overall Project Description

Canisius High School is undertaking this capital improvement project to add two baseball diamonds to the existing development on the property which currently includes an existing artificial turf football field, track, field event facilities, locker room and concessions buildings, and parking lot. The planned varsity baseball field will be entirely artificial turf while the junior varsity field will have an artificial turf infield with a natural grass outfield. The varsity field will have two CMU dugout structures with storage integral to the home dugout structure. The varsity field will also have an elevated press box structure, two sets of bleachers with seating for a total of two hundred spectators, a scoreboard, and one batting tunnel. The junior varsity field will have two chain link dugouts and a scoreboard. Discus and Shotput facilities will be relocated. New asphalt walking paths will be added to connect the new site amenities with existing features. The site will be recontoured to meet the requirements of the new fields as well as a natural grass practice field and another flat area suitable to receive tennis courts as part of a potential future project.

The site is located within the Town of West Seneca, Erie County, New York, 2885 Clinton Street *(refer to Supporting Information: Location Map).* The total property size is approximately 26.5 acres. The disturbed portion is approximately 16.6 acres in redevelopment. The site is adjacent to industrial and residential use to the North, a utility infrastructure corridor to the East, a vacant parcel to the South, and The Buffalo Creek along the west. Canisius High School currently owns the entire site. All slopes are presently stable in the areas to be utilized by the owner, There is no evidence of significant erosion under present conditions. All vegetation not within the limits of grading will be protected throughout the construction process.

The project is not located within a TMDL watershed. No run-off will be directly discharged into a 303(d) listed segment; however, Buffalo Creek ultimately discharges to Buffalo River which is a 303*d) listed segment. The Town of West Seneca is the regulated MS4.

A portion of the proposed grading of the site lies within the FEMA 100-year floodplain. The fill necessary to create the required geometry for the baseball fields will be more than offset by the overall recontouring within the floodplain. Analysis of the volume of flood water the site is able to receive (based on FEMA base flood elevation lines) results in a net increase of approximately 20% more volume than is currently accommodated within the site under current conditions. *(refer to Supporting Information: Flood Plain Map - Existing).*

There is a NYSDEC and Federally Regulated wetland on the adjacent property near the westernmost corner of the property. A portion of the redevelopment, including minor grading as well as an approximately 1300 SF portion of asphalt walk is located within the 100 FT buffer of the wetland. The proposed design results in a significant reduction in the footprint of the

watershed that is sheeting across the property line toward this wetland area. *(refer to Supporting Information: Wetland Mapping).*

Erosion and sediment control practices will be utilized to prevent damage to adjacent properties, water bodies, circulation routes, and vegetation. Duration of construction activity is anticipated to be in Summer/Fall of 2021 and be 100% stabilized by December of 2021.

**Existing Grading and Stormwater Description**

*(refer to Plans: Existing Watersheds).*

Watershed A is relatively small area at the entrance along Clinton Street. It flows via swale into a small stream that ultimately flows off the property to the west.

Watershed B comprises the majority of the developed area including the existing track, football field, and parking lots. These are drained to an existing infiltration basin at the center of the site which ultimately outlets to Buffalo Creek.

Watershed C hugs the north edge of the property, sheet flowing northward across the property line and contributing to the NYSDEC and Federally regulated wetland on the adjacent property.

Watershed D accounts for the majority of the undeveloped portion of the property. It sheet flows westward into the Buffalo Creek.

Watershed E is a relatively small area at the east corner of the property that sheet flows over the property line to the adjacent parcel.

**Proposed Grading and Stormwater Description**

*(refer to Plans: Proposed Watersheds).*

Watershed A remains unchanged from its existing condition.

Watershed B captures an increased area including both new artificial turf areas of the baseball fields as well as the majority of the natural grass outfield of the junior varsity field. This drains to an upsized infiltration basin which outlets via the existing 15” pipe to Buffalo Creek.

Watershed C has been significantly reduced in area leading to a net reduction in the volume of stormwater flowing across the property line toward the regulated wetland.

Watershed D has been significantly reduced in area leading to a net reduction in the volume of stormwater sheet flowing to the Buffalo Creek.

Watershed E has been fully absorbed into Watershed B eliminate all stormwater that previously drained across the property line in this location.

**Assumptions**

Note the following assumptions regarding this stormwater management:

1.) Manning's Equation was used with a 10-year storm frequency to size the full flow rate carrying capacities of the proposed storm sewer system. The proposed on-site drainage network has been designed to utilize high density smooth interior corrugated polyethylene pipe (HDPE) with a Manning's roughness coefficient of 0.012, and a minimum pipe diameter of 12".

2.) The existing onsite storm system and watershed was studied for capacity of stormwater based on 1, 10 and 100 year storm events using a stormwater modeling program Hydraflow Hydrographs Extension for AutoCAD Civil 3D 2021.

3.) The SCS soils survey shows soils within the project area to be Hamilton Silt Loam (Hm), Teel Silt Loam (Te), Tioga Silt Loam (To), and Wayland Soils Complex (Wd). *(refer to Supporting Information: Soil Information)*. For the use in TR-55 calculations, a 'B' soils run-off coefficient is being used *(refer to Supporting Information: Hydrologic Soil Information)*.

4.) The geotechnical report is pending and will include soil borings, infiltration tests, and topsoil depths. In its absence the design of the proposed stormwater basin has been based partly on the appearance that the existing basin is designed for infiltration as well as hydrological soil type data indicating that the site soils are Type B, allowing for moderate infiltration. Nevertheless, the design and calculations have been conducted with the assumption that there is zero infiltration as a worst-case scenario. Once geotechnical data becomes available it may be necessary to review and adjust the proposed basin sizing and design as well as this report.

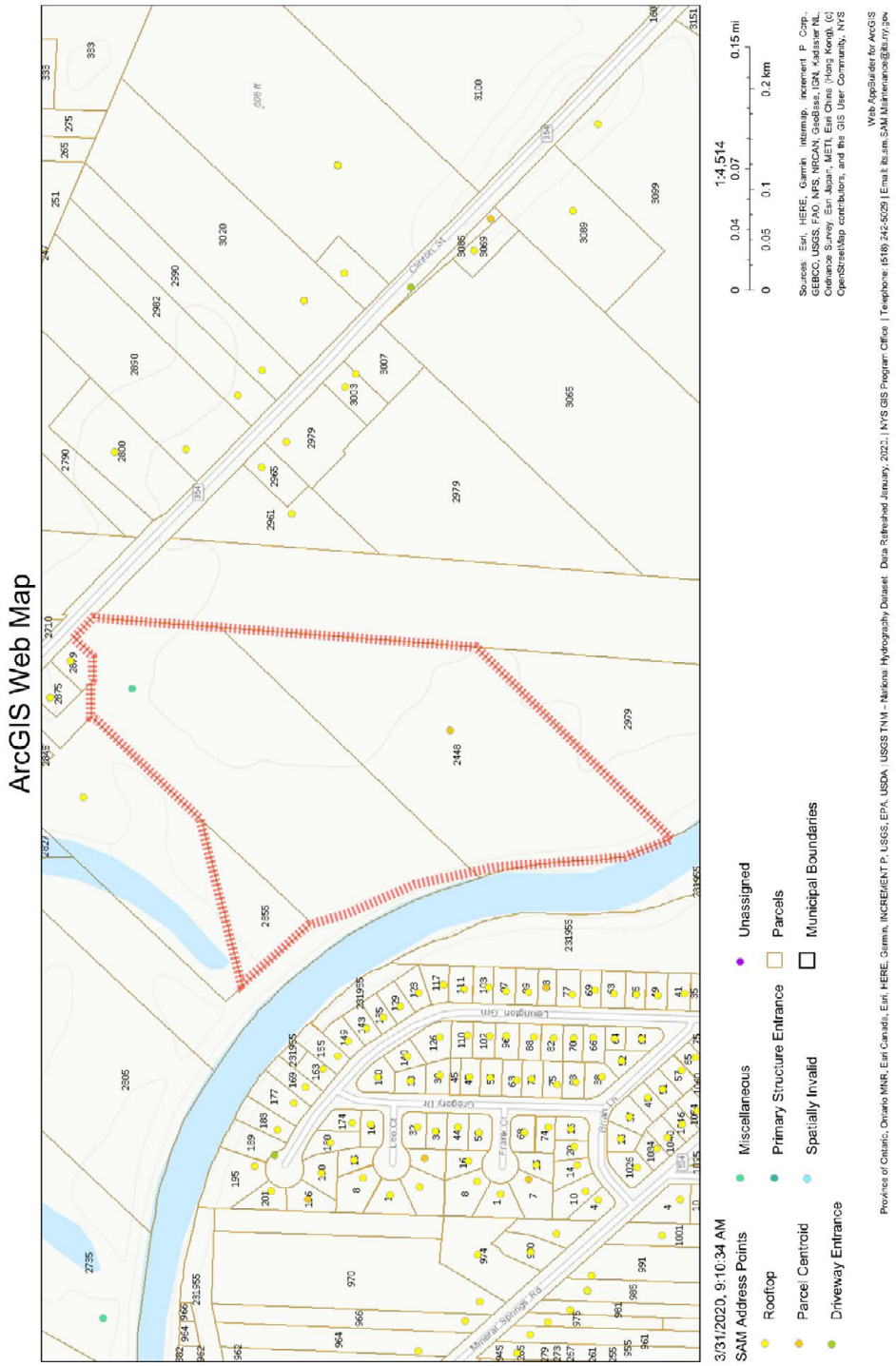
5.) Existing discharge points from the project site watersheds are working satisfactorily and will not be modified.

6.) Size of discharge pipes from the project site will not be modified.

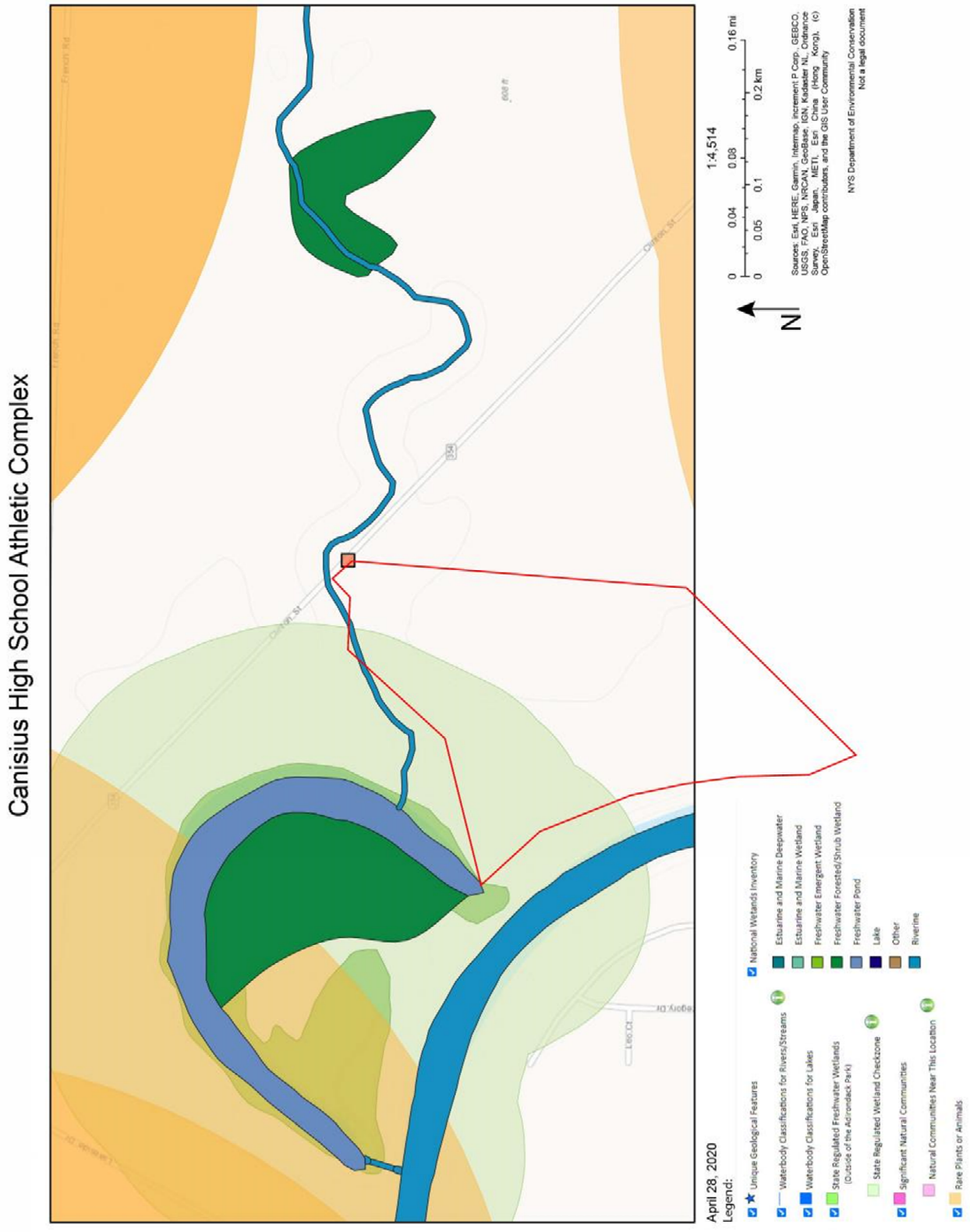
7.) Refer to CRIS Mapping in SEQR Long Form for SHPO Mapping.

# SECTION 2 – SUPPORTING INFORMATION

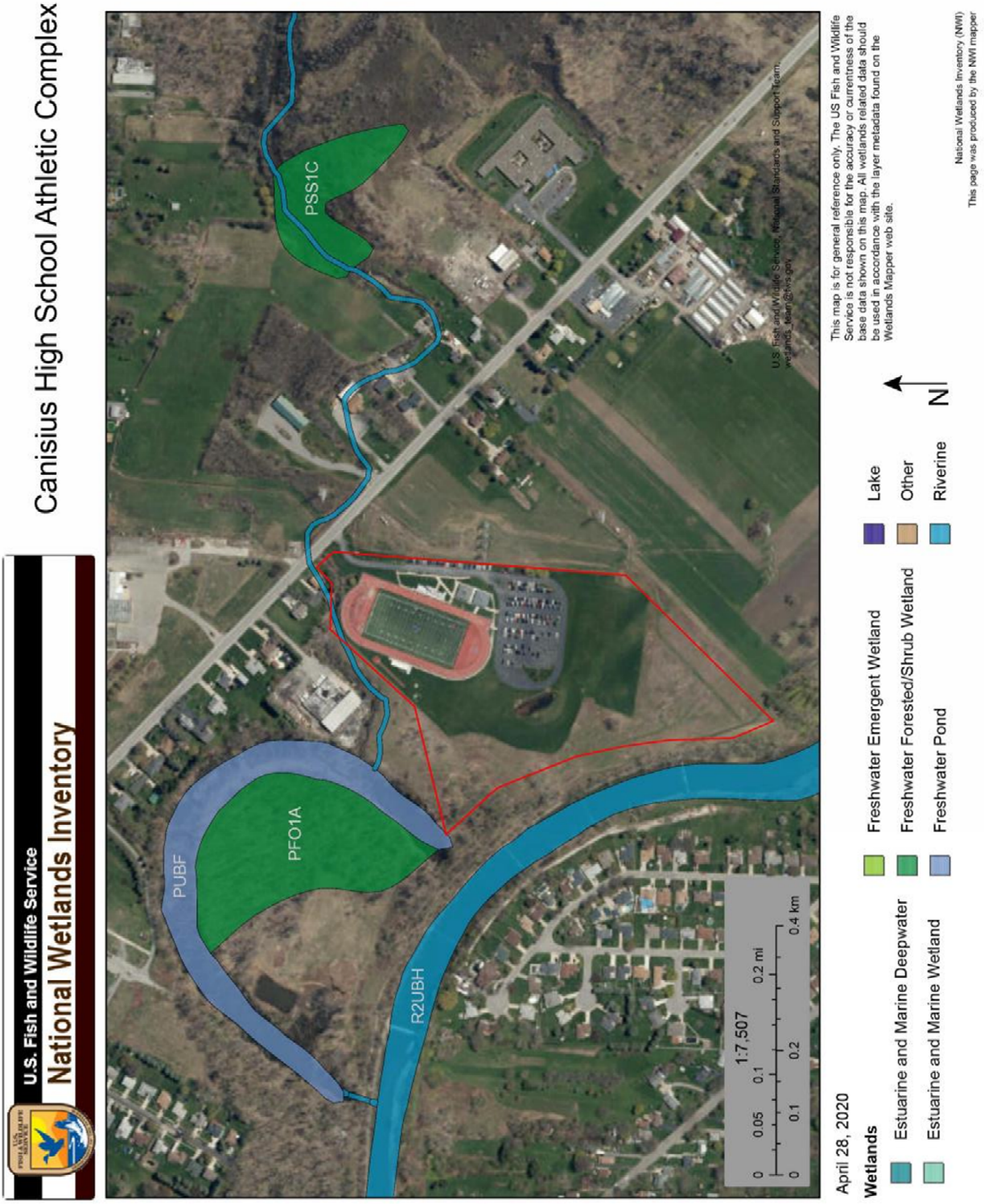
## Location Map



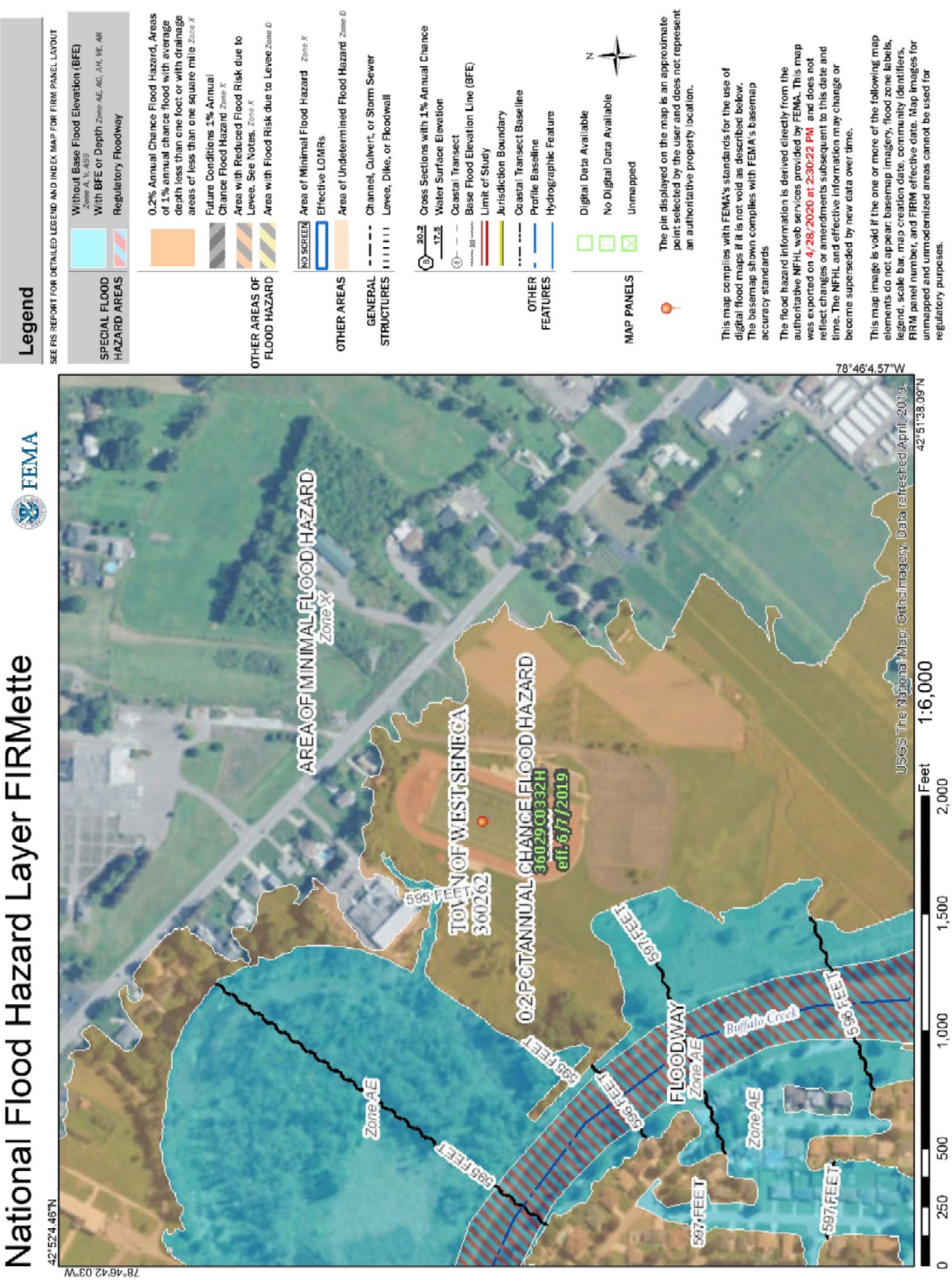
## Wetland Mapping – NYSDEC



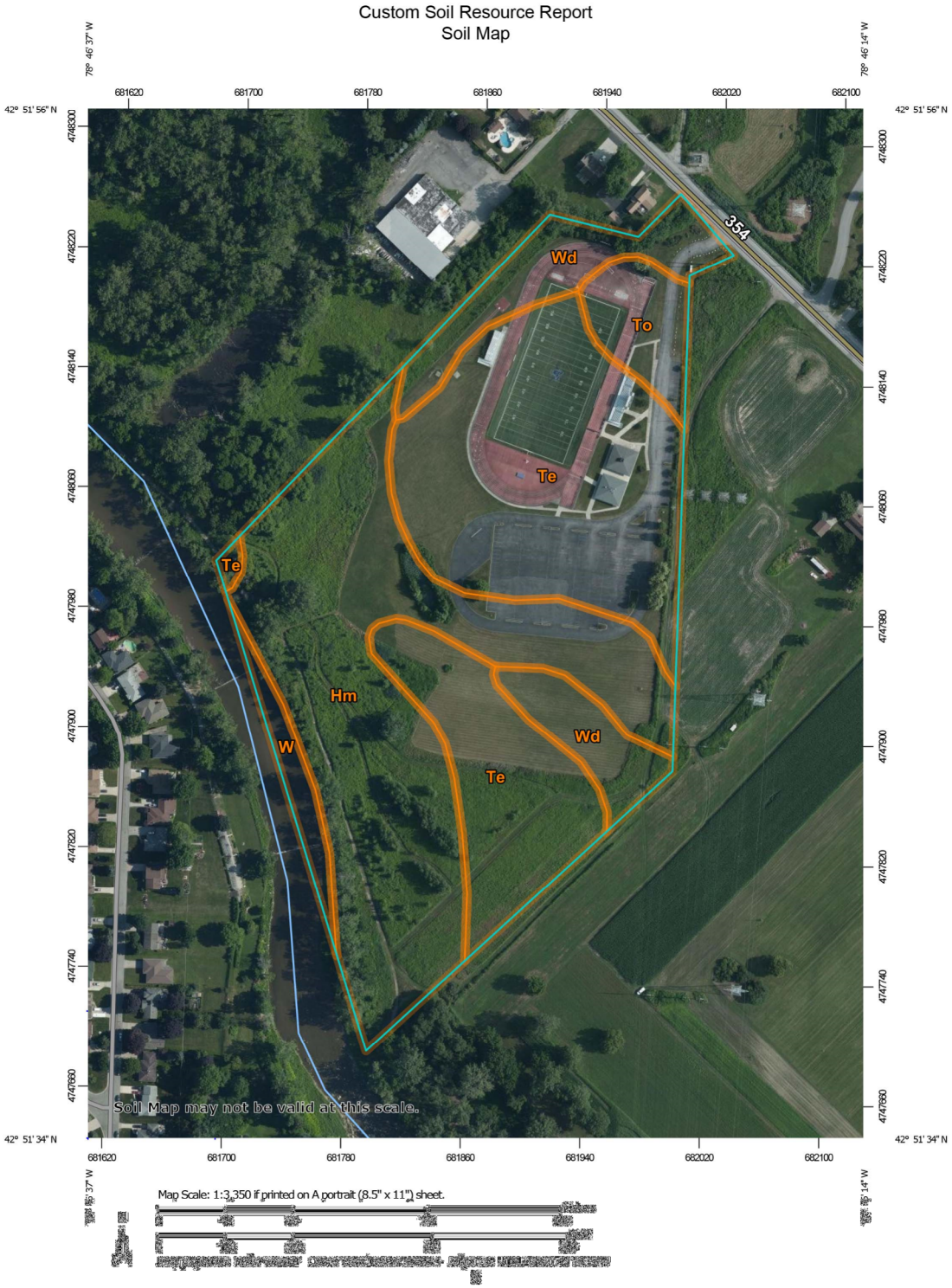
## Wetland Mapping – Federal



## Floodplain Map – FEMA (Existing)

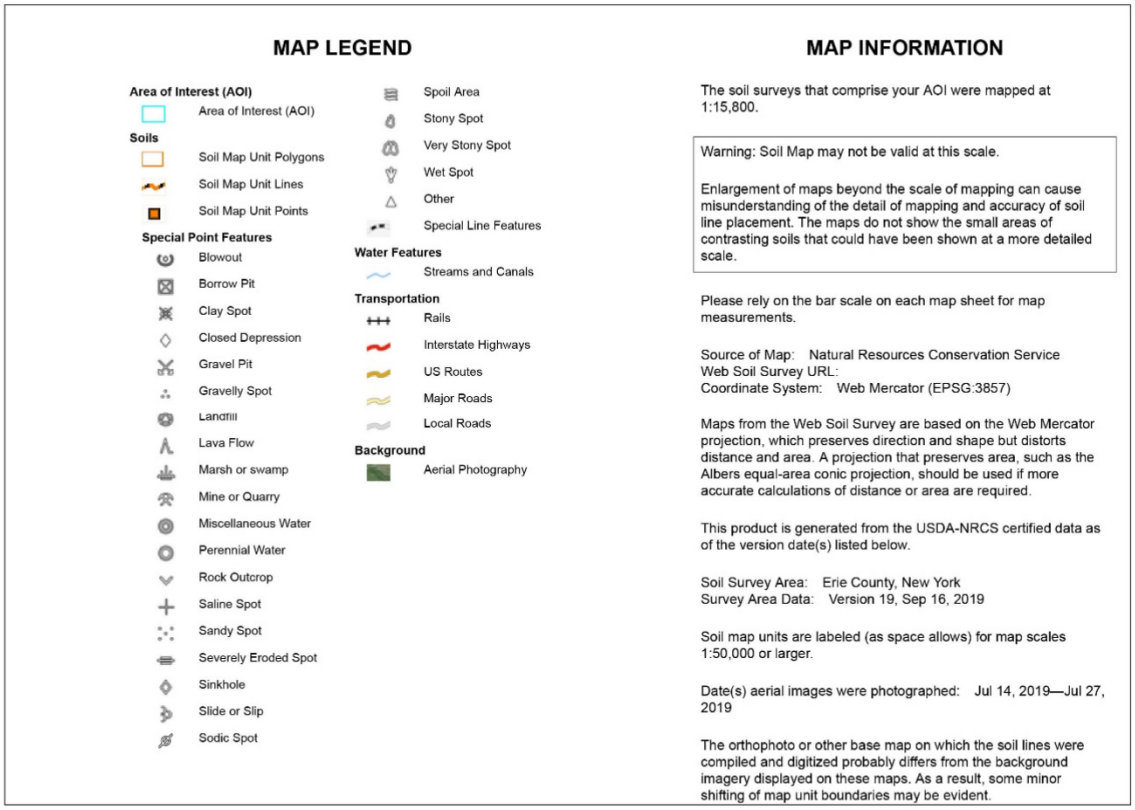


## Soil Map


Custom Soil Resource Report
Soil Map
78° 46' 37" W
78° 46' 14" W
42° 51' 56" N
42° 51' 34" N
681620
681700
681780
681860
681940
682020
682100
4748300
4748220
4748140
4748060
4747980
4747900
4747820
4747740
4747660
354
Wd
To
Te
Te
Hm
W
Wd
Te
Soil Map may not be valid at this scale.
Map Scale: 1:3,350 if printed on A portrait (8.5" x 11") sheet.

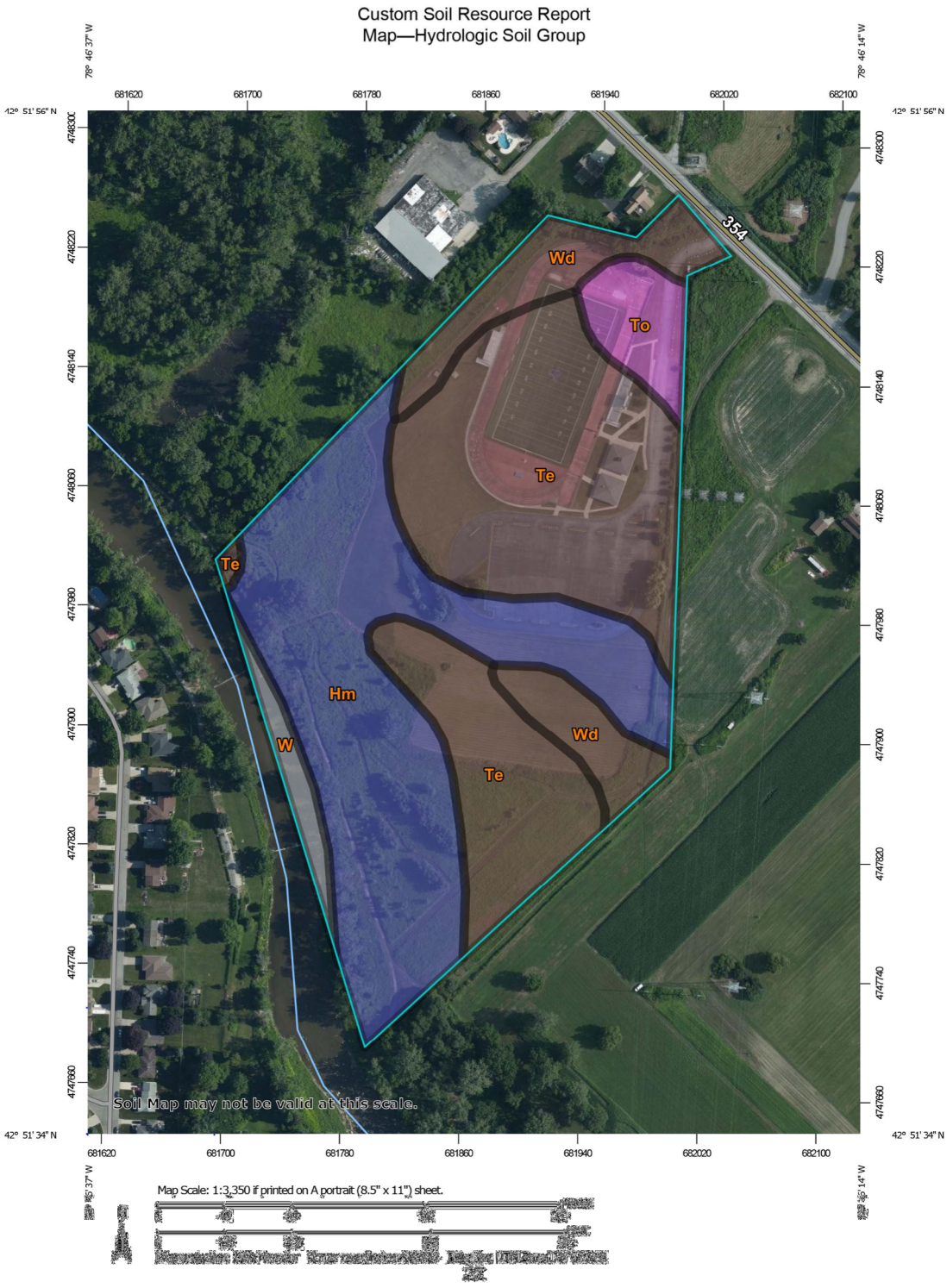
## Soil Map Legend

Custom Soil Resource Report



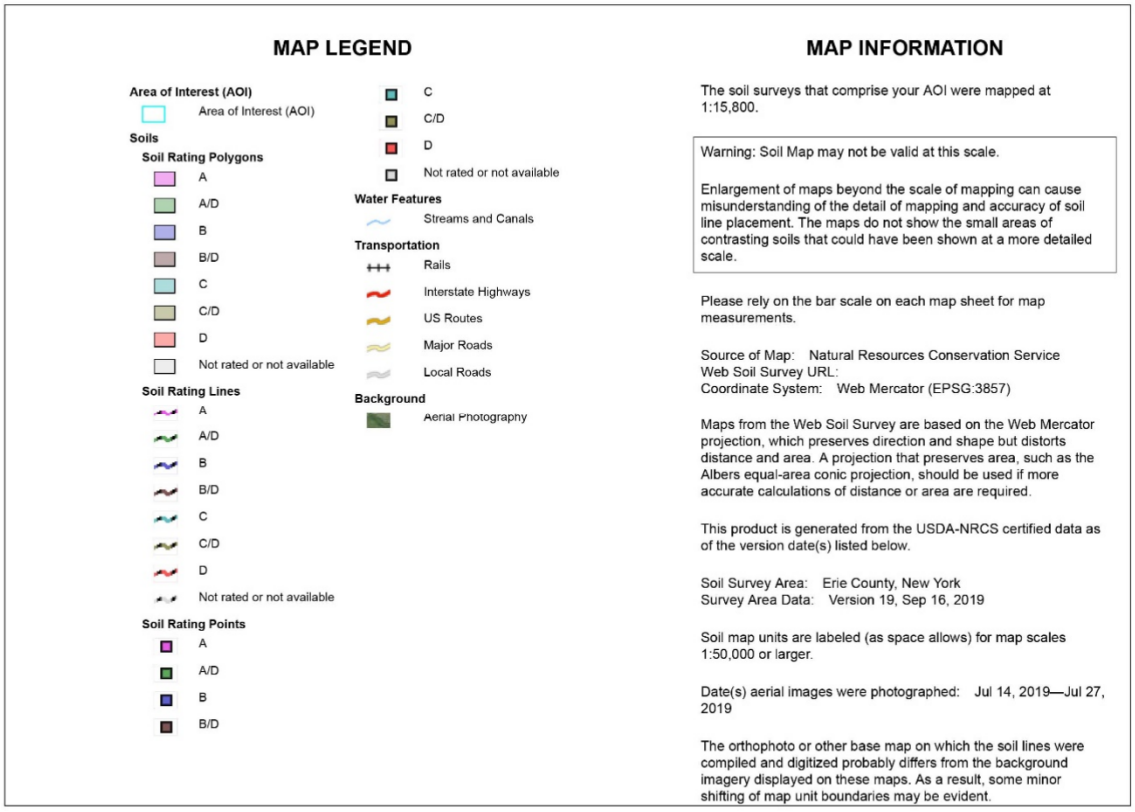

10

## Hydrologic Soil Group



## Hydrologic Soil Group Legend

Custom Soil Resource Report



## Rainfall Frequencies

3/10/2021 Extreme Precipitation Tables: 42.863°N, 78.774°W

# Extreme Precipitation Tables

### Northeast Regional Climate Center

*Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.*

| | |
|---|---|
| **Smoothing** | Yes |
| **State** | New York |
| **Location** | |
| **Longitude** | 78.774 degrees West |
| **Latitude** | 42.863 degrees North |
| **Elevation** | 0 feet |
| **Date/Time** | Wed, 10 Mar 2021 13:51:40 -0500 |

### Extreme Precipitation Estimates

| | 5min | 10min | 15min | 30min | 60min | 120min | | 1hr | 2hr | 3hr | 6hr | 12hr | 24hr | 48hr | | 1day | 2day | 4day | 7day | 10day | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1yr** | 0.27 | 0.41 | 0.51 | 0.67 | 0.83 | 1.02 | **1yr** | 0.72 | 0.94 | 1.14 | 1.35 | 1.58 | 1.83 | 2.16 | **1yr** | 1.62 | 2.08 | 2.52 | 3.01 | 3.51 | **1yr** |
| **2yr** | 0.31 | 0.48 | 0.60 | 0.79 | 0.99 | 1.21 | **2yr** | 0.86 | 1.12 | 1.37 | 1.62 | 1.90 | 2.20 | 2.52 | **2yr** | 1.95 | 2.42 | 2.87 | 3.41 | 3.91 | **2yr** |
| **5yr** | 0.37 | 0.57 | 0.72 | 0.96 | 1.23 | 1.52 | **5yr** | 1.06 | 1.40 | 1.72 | 2.03 | 2.35 | 2.69 | 3.08 | **5yr** | 2.38 | 2.96 | 3.47 | 4.09 | 4.69 | **5yr** |
| **10yr** | 0.41 | 0.65 | 0.82 | 1.12 | 1.46 | 1.81 | **10yr** | 1.26 | 1.66 | 2.04 | 2.40 | 2.77 | 3.14 | 3.58 | **10yr** | 2.78 | 3.45 | 4.01 | 4.69 | 5.38 | **10yr** |
| **25yr** | 0.49 | 0.78 | 1.00 | 1.37 | 1.82 | 2.26 | **25yr** | 1.57 | 2.08 | 2.56 | 2.99 | 3.42 | 3.84 | 4.38 | **25yr** | 3.40 | 4.22 | 4.87 | 5.63 | 6.47 | **25yr** |
| **50yr** | 0.56 | 0.90 | 1.15 | 1.61 | 2.16 | 2.69 | **50yr** | 1.87 | 2.47 | 3.04 | 3.53 | 4.01 | 4.47 | 5.11 | **50yr** | 3.96 | 4.91 | 5.63 | 6.47 | 7.43 | **50yr** |
| **100yr** | 0.63 | 1.03 | 1.33 | 1.88 | 2.56 | 3.20 | **100yr** | 2.21 | 2.95 | 3.61 | 4.19 | 4.72 | 5.22 | 5.95 | **100yr** | 4.62 | 5.72 | 6.52 | 7.44 | 8.54 | **100yr** |
| **200yr** | 0.73 | 1.19 | 1.54 | 2.21 | 3.04 | 3.81 | **200yr** | 2.63 | 3.51 | 4.29 | 4.95 | 5.55 | 6.09 | 6.94 | **200yr** | 5.39 | 6.67 | 7.56 | 8.55 | 9.82 | **200yr** |
| **500yr** | 0.88 | 1.44 | 1.88 | 2.73 | 3.82 | 4.79 | **500yr** | 3.30 | 4.42 | 5.38 | 6.17 | 6.87 | 7.48 | 8.50 | **500yr** | 6.62 | 8.17 | 9.18 | 10.27 | 11.81 | **500yr** |

### Lower Confidence Limits

| | 5min | 10min | 15min | 30min | 60min | 120min | | 1hr | 2hr | 3hr | 6hr | 12hr | 24hr | 48hr | | 1day | 2day | 4day | 7day | 10day | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1yr** | 0.23 | 0.36 | 0.43 | 0.58 | 0.72 | 0.86 | **1yr** | 0.62 | 0.84 | 0.86 | 1.13 | 1.45 | 1.64 | 1.99 | **1yr** | 1.45 | 1.91 | 2.25 | 2.70 | 3.25 | **1yr** |
| **2yr** | 0.30 | 0.46 | 0.57 | 0.77 | 0.95 | 1.10 | **2yr** | 0.82 | 1.07 | 1.20 | 1.46 | 1.75 | 2.14 | 2.46 | **2yr** | 1.89 | 2.37 | 2.79 | 3.32 | 3.81 | **2yr** |
| **5yr** | 0.34 | 0.52 | 0.65 | 0.89 | 1.13 | 1.30 | **5yr** | 0.98 | 1.27 | 1.44 | 1.74 | 2.07 | 2.50 | 2.90 | **5yr** | 2.21 | 2.79 | 3.27 | 3.86 | 4.41 | **5yr** |
| **10yr** | 0.37 | 0.57 | 0.71 | 0.99 | 1.28 | 1.46 | **10yr** | 1.10 | 1.43 | 1.64 | 1.96 | 2.34 | 2.80 | 3.27 | **10yr** | 2.48 | 3.15 | 3.69 | 4.31 | 4.89 | **10yr** |
| **25yr** | 0.43 | 0.65 | 0.81 | 1.15 | 1.51 | 1.72 | **25yr** | 1.31 | 1.68 | 1.92 | 2.30 | 2.75 | 3.26 | 3.85 | **25yr** | 2.89 | 3.70 | 4.30 | 5.00 | 5.57 | **25yr** |
| **50yr** | 0.47 | 0.71 | 0.89 | 1.28 | 1.72 | 1.93 | **50yr** | 1.48 | 1.89 | 2.18 | 2.58 | 3.10 | 3.66 | 4.36 | **50yr** | 3.24 | 4.19 | 4.85 | 5.61 | 6.16 | **50yr** |
| **100yr** | 0.51 | 0.78 | 0.97 | 1.41 | 1.93 | 2.17 | **100yr** | 1.67 | 2.12 | 2.46 | 2.91 | 3.50 | 4.09 | 4.93 | **100yr** | 3.62 | 4.74 | 5.47 | 6.29 | 6.80 | **100yr** |
| **200yr** | 0.57 | 0.86 | 1.09 | 1.57 | 2.19 | 2.44 | **200yr** | 1.89 | 2.39 | 2.78 | 3.26 | 3.94 | 4.58 | 5.59 | **200yr** | 4.05 | 5.38 | 6.16 | 7.06 | 7.49 | **200yr** |
| **500yr** | 0.65 | 0.97 | 1.25 | 1.81 | 2.58 | 2.84 | **500yr** | 2.22 | 2.77 | 3.26 | 3.79 | 4.59 | 5.32 | 6.61 | **500yr** | 4.70 | 6.36 | 7.22 | 8.23 | 8.53 | **500yr** |

### Upper Confidence Limits

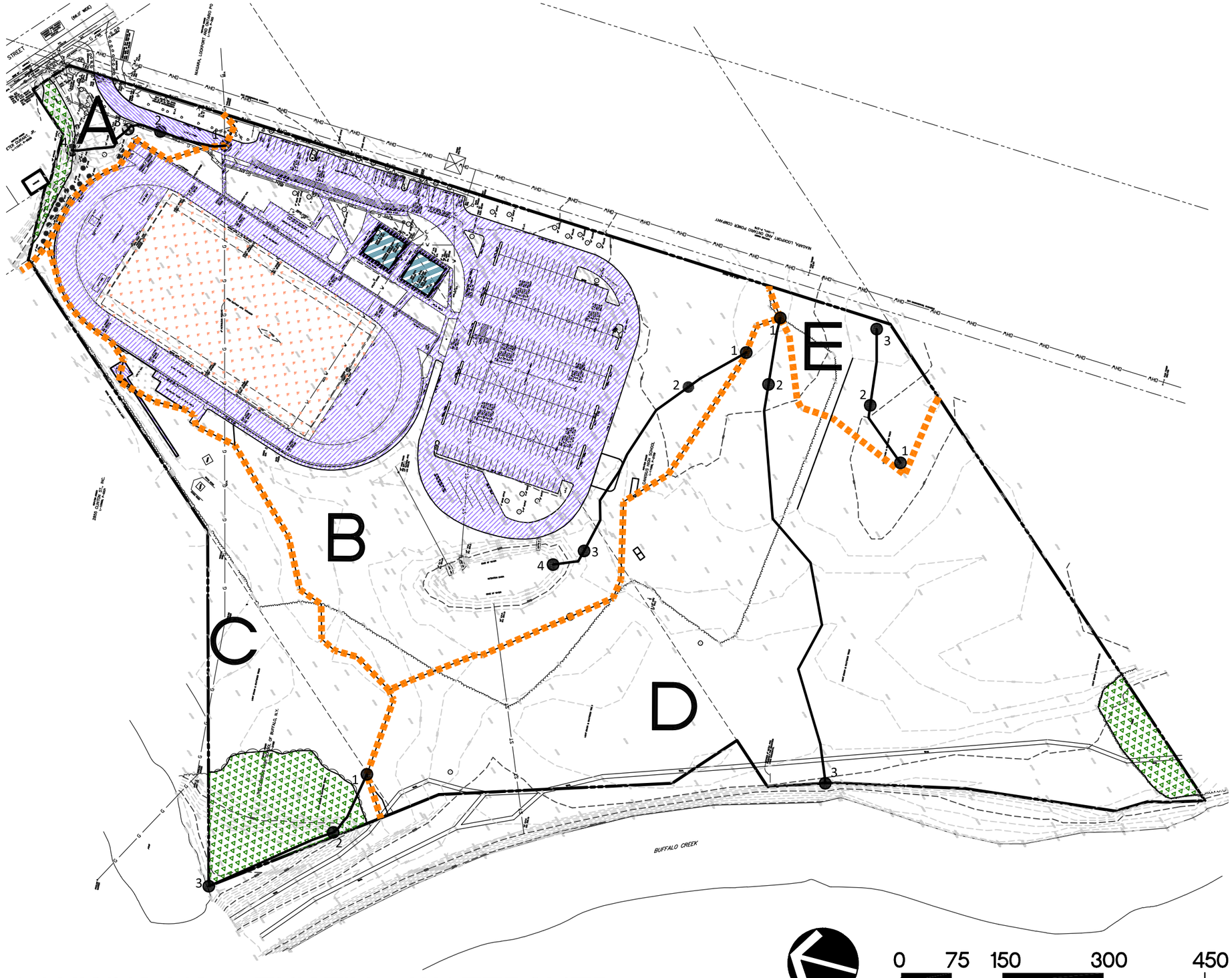
| | 5min | 10min | 15min | 30min | 60min | 120min | | 1hr | 2hr | 3hr | 6hr | 12hr | 24hr | 48hr | | 1day | 2day | 4day | 7day | 10day | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1yr** | 0.30 | 0.46 | 0.57 | 0.76 | 0.94 | 1.08 | **1yr** | 0.81 | 1.06 | 1.21 | 1.43 | 1.73 | 1.99 | 2.32 | **1yr** | 1.76 | 2.23 | 2.68 | 3.19 | 3.71 | **1yr** |
| **2yr** | 0.32 | 0.50 | 0.62 | 0.83 | 1.03 | 1.20 | **2yr** | 0.89 | 1.18 | 1.32 | 1.60 | 1.90 | 2.28 | 2.61 | **2yr** | 2.02 | 2.51 | 2.96 | 3.51 | 4.07 | **2yr** |
| **5yr** | 0.40 | 0.62 | 0.77 | 1.05 | 1.34 | 1.57 | **5yr** | 1.15 | 1.53 | 1.73 | 2.10 | 2.50 | 2.90 | 3.27 | **5yr** | 2.57 | 3.15 | 3.67 | 4.33 | 4.96 | **5yr** |
| **10yr** | 0.47 | 0.73 | 0.90 | 1.26 | 1.63 | 1.92 | **10yr** | 1.41 | 1.88 | 2.15 | 2.59 | 3.09 | 3.49 | 3.89 | **10yr** | 3.09 | 3.74 | 4.34 | 5.10 | 5.82 | **10yr** |
| **25yr** | 0.60 | 0.92 | 1.14 | 1.63 | 2.15 | 2.59 | **25yr** | 1.85 | 2.53 | 2.85 | 3.44 | 4.08 | 4.46 | 4.90 | **25yr** | 3.95 | 4.71 | 5.41 | 6.31 | 7.21 | **25yr** |
| **50yr** | 0.71 | 1.09 | 1.35 | 1.95 | 2.62 | 3.21 | **50yr** | 2.26 | 3.14 | 3.55 | 4.26 | 5.04 | 5.38 | 5.83 | **50yr** | 4.76 | 5.61 | 6.42 | 7.41 | 8.49 | **50yr** |
| **100yr** | 0.86 | 1.29 | 1.62 | 2.34 | 3.21 | 3.98 | **100yr** | 2.77 | 3.89 | 4.42 | 5.28 | 6.23 | 6.50 | 6.94 | **100yr** | 5.75 | 6.67 | 7.60 | 8.71 | 9.99 | **100yr** |
| **200yr** | 1.02 | 1.54 | 1.95 | 2.82 | 3.94 | 4.94 | **200yr** | 3.40 | 4.83 | 5.51 | 6.56 | 7.70 | 7.86 | 8.25 | **200yr** | 6.96 | 7.93 | 8.99 | 10.25 | 11.77 | **200yr** |
| **500yr** | 1.30 | 1.94 | 2.50 | 3.63 | 5.16 | 6.56 | **500yr** | 4.45 | 6.42 | 7.38 | 8.73 | 10.20 | 10.13 | 10.38 | **500yr** | 8.96 | 9.98 | 11.24 | 12.69 | 14.61 | **500yr** |

Powered by ACIS

file:///C:/Users/dseiders/Downloads/output.htm 1/1

## SECTION 3 – PLANS

- Existing Watershed
- Proposed Watershed




# EXISTING CONDITIONS

LEGEND

- PAVEMENT
- ROOF
- SYNTHETIC TURF
- WOODS
- LAWN
- 1 — TIME OF CONCENTRATION
- WATERSHED BOUNDARY

'B' Soils = 100% of Site

**A**

| SURFACE CONDITIONS = | | 0.75 Ac | CN |
|---|---|---|---|
| PAVEMENT | = | 0.12 Ac | 98 |
| WOODS | = | 0.12 Ac | 55 |
| LAWN | = | 0.51 Ac | 61 |
| | | COMPOSITE | 66 |

TIME OF CONCENTRATION = 6 minutes

100' Paved sheet flow at 1.9%
52' Lawn shallow concentrated flow at 0.86%
98' Lawn shallow concentrated flow at 3.06%

**B**

| SURFACE CONDITIONS = | | 11.78 Ac | CN |
|---|---|---|---|
| PAVEMENT | = | 4.88 Ac | 98 |
| ROOF | = | 0.11 Ac | 98 |
| SYNTHETIC TURF | = | 1.78 Ac | 85 |
| LAWN | = | 5.01 Ac | 61 |
| | | COMPOSITE | 80 |

TIME OF CONCENTRATION = 21 minutes

100' Lawn sheet flow at 0.7%
297' Lawn shallow concentrated flow at 1.16%
55' Lawn shallow concentrated flow at 9.07%

**C**

| SURFACE CONDITIONS = | | 2.94 Ac | CN |
|---|---|---|---|
| PAVEMENT | = | 0.01 Ac | 98 |
| WOODS | = | 0.73 Ac | 55 |
| LAWN | = | 2.20 Ac | 61 |
| | | COMPOSITE | 60 |

TIME OF CONCENTRATION = 8.7 minutes

100' Lawn sheet flow at 6.81%
200' Lawn shallow concentrated flow at 2.0%

**D**

| SURFACE CONDITIONS = | | 10.22 Ac | CN |
|---|---|---|---|
| WOODS | = | 0.25 Ac | 55 |
| LAWN | = | 9.97 Ac | 61 |
| | | COMPOSITE | 61 |

TIME OF CONCENTRATION = 22.2 minutes

100' Lawn sheet flow at 0.97%
628' Lawn shallow concentrated flow at 1.01%

**E**

| SURFACE CONDITIONS = | | 0.82 Ac | CN |
|---|---|---|---|
| LAWN | = | 0.82 Ac | 61 |
| | | COMPOSITE | 61 |

TIME OF CONCENTRATION = 18.8 minutes

100' Lawn sheet flow at 0.72%
113' Lawn shallow concentrated flow at 1.20%

NORTH

0 75 150 300 450

SCALE IN FEET

## CANISIUS HS - EXISTING WATERSHED

TRAUTMAN ASSOCIATES
ARCHITECTS / ENGINEERS

CANISIUS HIGH SCHOOL
ATHLETIC FIELDS - PHASE 3

Reference Sheet:
Date:
Project Number: 20020


# PROPOSED CONDITIONS

LEGEND

- PAVEMENT
- ROOF
- SYNTHETIC TURF
- WOODS
- LAWN
- 1 — TIME OF CONCENTRATION
- WATERSHED BOUNDARY

'D' Soils = 100% of Site

## A

| SURFACE CONDITIONS = | | 0.75 Ac | CN |
|---|---|---|---|
| PAVEMENT | = | 0.12 Ac | 98 |
| WOODS | = | 0.12 Ac | 55 |
| LAWN | = | 0.51 Ac | 61 |
| | | COMPOSITE | 66 |

TIME OF CONCENTRATION = 6 minutes

100' Paved sheet flow at 1.9%
52' Lawn shallow concentrated flow at 0.86%
98' Lawn shallow concentrated flow at 3.06%

## B

| SURFACE CONDITIONS = | | 17.26 Ac | CN |
|---|---|---|---|
| PAVEMENT | = | 5.14 Ac | 98 |
| ROOF | = | 0.12 Ac | 98 |
| SYNTHETIC TURF | = | 5.64 Ac | 85 |
| LAWN | = | 6.36 Ac | 61 |
| | | COMPOSITE | 80 |

TIME OF CONCENTRATION = 23.6 minutes

100' Lawn sheet flow at 1.06%
132' Lawn shallow concentrated flow at 1.51%
83' Lawn shallow concentrated flow at 6.02%

## C

| SURFACE CONDITIONS = | | 1.46 Ac | CN |
|---|---|---|---|
| PAVEMENT | = | 0.10 Ac | 98 |
| ROOF | = | 0.02 Ac | 98 |
| WOODS | = | 0.12 Ac | 55 |
| LAWN | = | 1.22 Ac | 61 |
| | | COMPOSITE | 64 |

TIME OF CONCENTRATION = 7.4 minutes

100' Lawn sheet flow at 7.0%
190' Lawn channel flow at 2.1%

## D

| SURFACE CONDITIONS = | | 6.63 Ac | CN |
|---|---|---|---|
| PAVEMENT | = | 0.16 Ac | 98 |
| ROOF | = | 0.02 Ac | 98 |
| WOODS | = | 0.25 Ac | 55 |
| LAWN | = | 6.20 Ac | 61 |
| | | COMPOSITE | 62 |

TIME OF CONCENTRATION = 15.7 minutes

100' Lawn sheet flow at 1.67%
206' Lawn shallow concentrated flow at 1.61%
119' Lawn shallow concentrated flow at 0.84%

TRAUTMAN ASSOCIATES
ARCHITECTS / ENGINEERS

CANISIUS HIGH SCHOOL
ATHLETIC FIELDS - PHASE 3

Reference Sheet:
Date:
Project Number: 20020

NORTH

0 75 150 300 450
SCALE IN FEET

# CANISIUS HS - PROPOSED WATERSHED

## SECTION 4 – CALCULATIONS and MODELING DATA

- Hydraflow Hydrographs Reports- Existing
- Hydraflow Hydrographs Reports- Proposed

# Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

| 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 | ------ | 0.041 | ------- | ------- | ------- | 0.730 | ------- | ------- | 2.398 | Ex_WS-A |
| 2 | SCS Runoff | ------ | 5.146 | ------- | ------- | ------- | 16.79 | ------- | ------- | 38.90 | Ex_WS-B |
| 3 | SCS Runoff | ------ | 0.011 | ------- | ------- | ------- | 1.232 | ------- | ------- | 6.473 | Ex_WS-C |
| 4 | SCS Runoff | ------ | 0.050 | ------- | ------- | ------- | 2.889 | ------- | ------- | 15.10 | Ex_WS-D |
| 5 | SCS Runoff | ------ | 0.004 | ------- | ------- | ------- | 0.257 | ------- | ------- | 1.328 | Ex_WS-E |

# Hydrograph Report

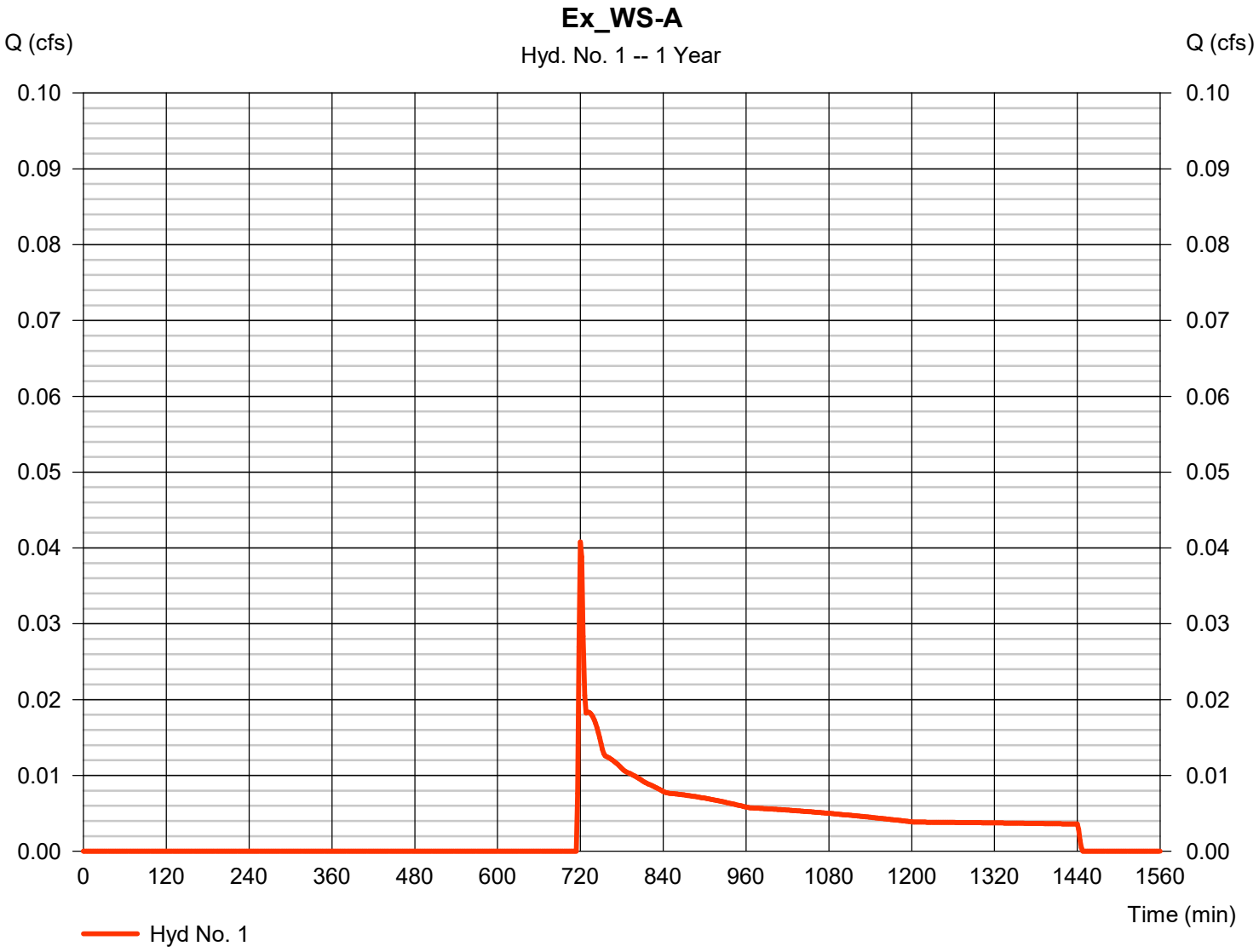


## Hyd. No. 1

Ex_WS-A

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.041 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 274 cuft |
| Drainage area | = 0.750 ac | Curve number | = 66* |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 6.00 min |
| Total precip. | = 1.83 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |

* Composite (Area/CN) = [(0.120 x 98) + (0.120 x 55) + (0.510 x 61)] / 0.750



# Hydrograph Report

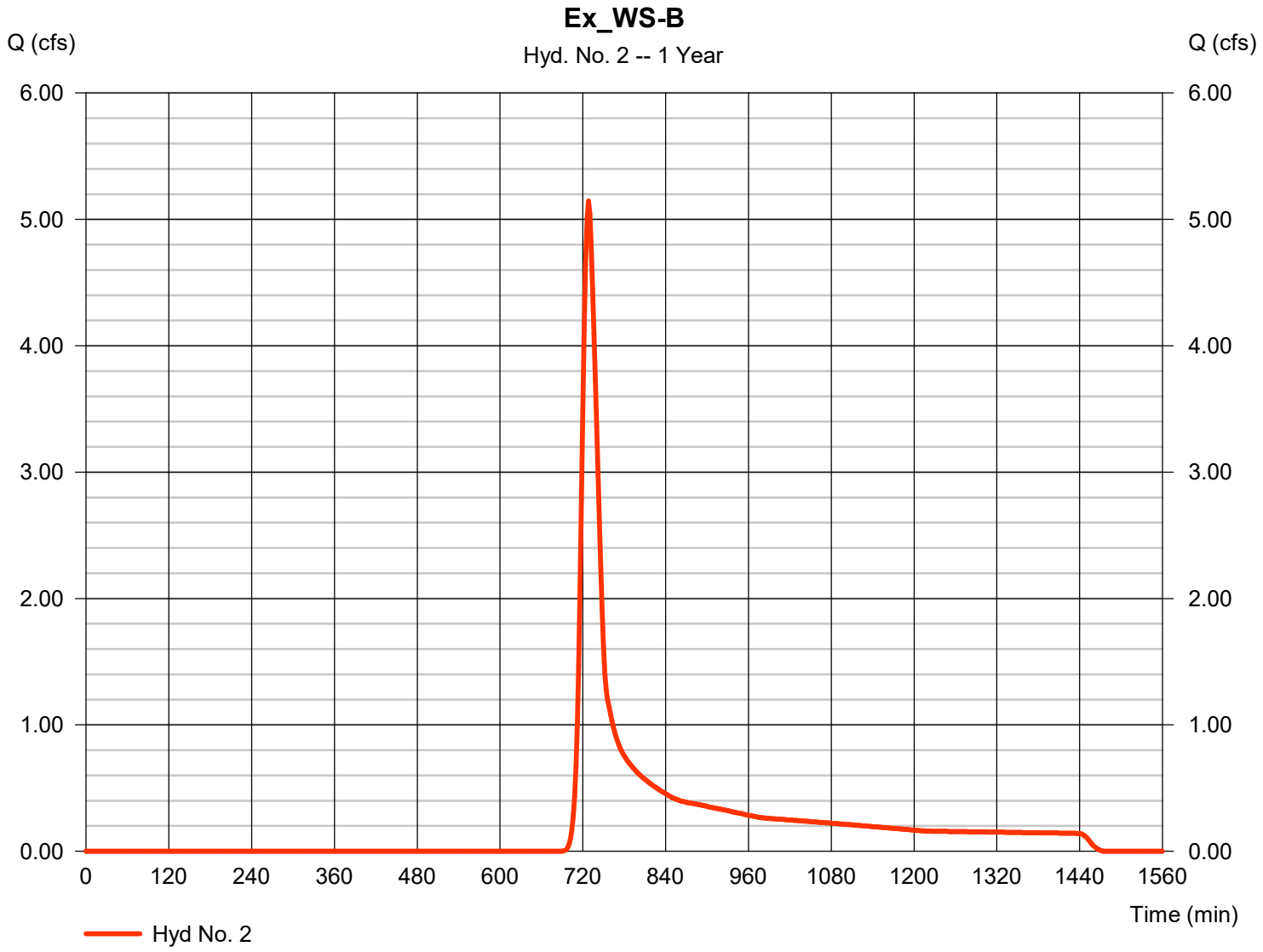


## Hyd. No. 2

Ex_WS-B

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 5.146 cfs |
| Storm frequency | = | 1 yrs | Time to peak | = | 728 min |
| Time interval | = | 2 min | Hyd. volume | = | 20,102 cuft |
| Drainage area | = | 11.780 ac | Curve number | = | 80* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 21.00 min |
| Total precip. | = | 1.83 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(4.880 x 98) + (0.110 x 98) + (1.780 x 85) + (5.010 x 61)] / 11.780



# TR55 Tc Worksheet



## Hyd. No. 2

Ex_WS-B

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.150 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 100.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 2.20 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 0.70 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 17.98** | **+** | **0.00** | **+** | **0.00** | **=** | **17.98** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 297.00 | | 55.00 | | 0.00 | | |
| Watercourse slope (%) | = 1.16 | | 9.07 | | 0.00 | | |
| Surface description | = Unpaved | | Unpaved | | Paved | | |
| Average velocity (ft/s) | =1.74 | | 4.86 | | 0.00 | | |
| **Travel Time (min)** | **= 2.85** | **+** | **0.19** | **+** | **0.00** | **=** | **3.04** |
| **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 ..... 21.00 min**

# Hydrograph Report

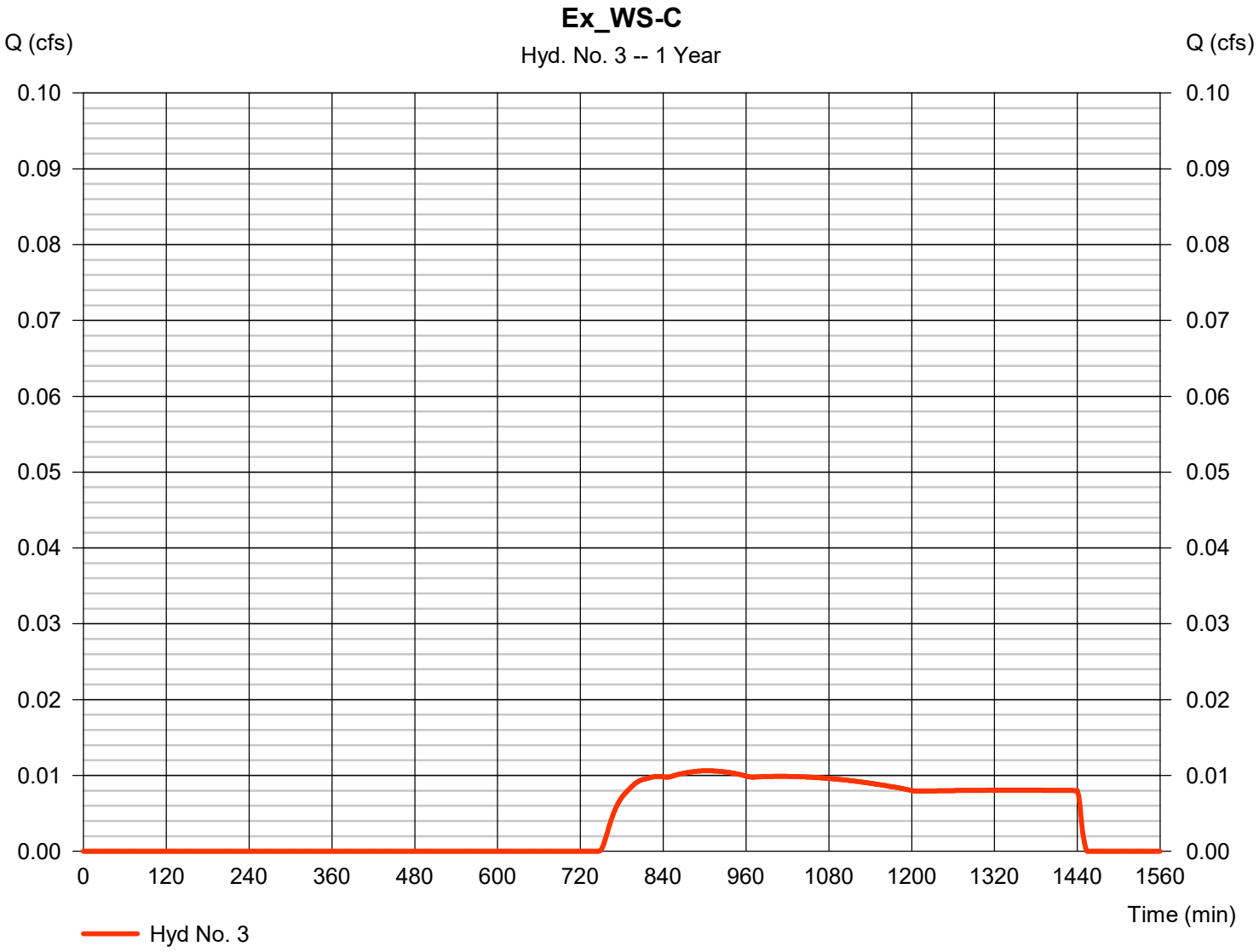


## Hyd. No. 3

Ex_WS-C

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.011 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 904 min |
| Time interval | = 2 min | Hyd. volume | = 368 cuft |
| Drainage area | = 2.940 ac | Curve number | = 60* |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 8.70 min |
| Total precip. | = 1.83 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |

* Composite (Area/CN) = [(0.010 x 98) + (0.730 x 55) + (2.200 x 61)] / 2.940



# TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

## Hyd. No. 3

Ex_WS-C

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.150 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 100.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 2.20 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 6.80 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 7.24** | **+** | **0.00** | **+** | **0.00** | **=** | **7.24** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 200.00 | | 0.00 | | 0.00 | | |
| Watercourse slope (%) | = 2.00 | | 0.00 | | 0.00 | | |
| Surface description | = Unpaved | | Unpaved | | Paved | | |
| Average velocity (ft/s) | =2.28 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 1.46** | **+** | **0.00** | **+** | **0.00** | **=** | **1.46** |
| **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 ..... 8.70 min**

# Hydrograph Report

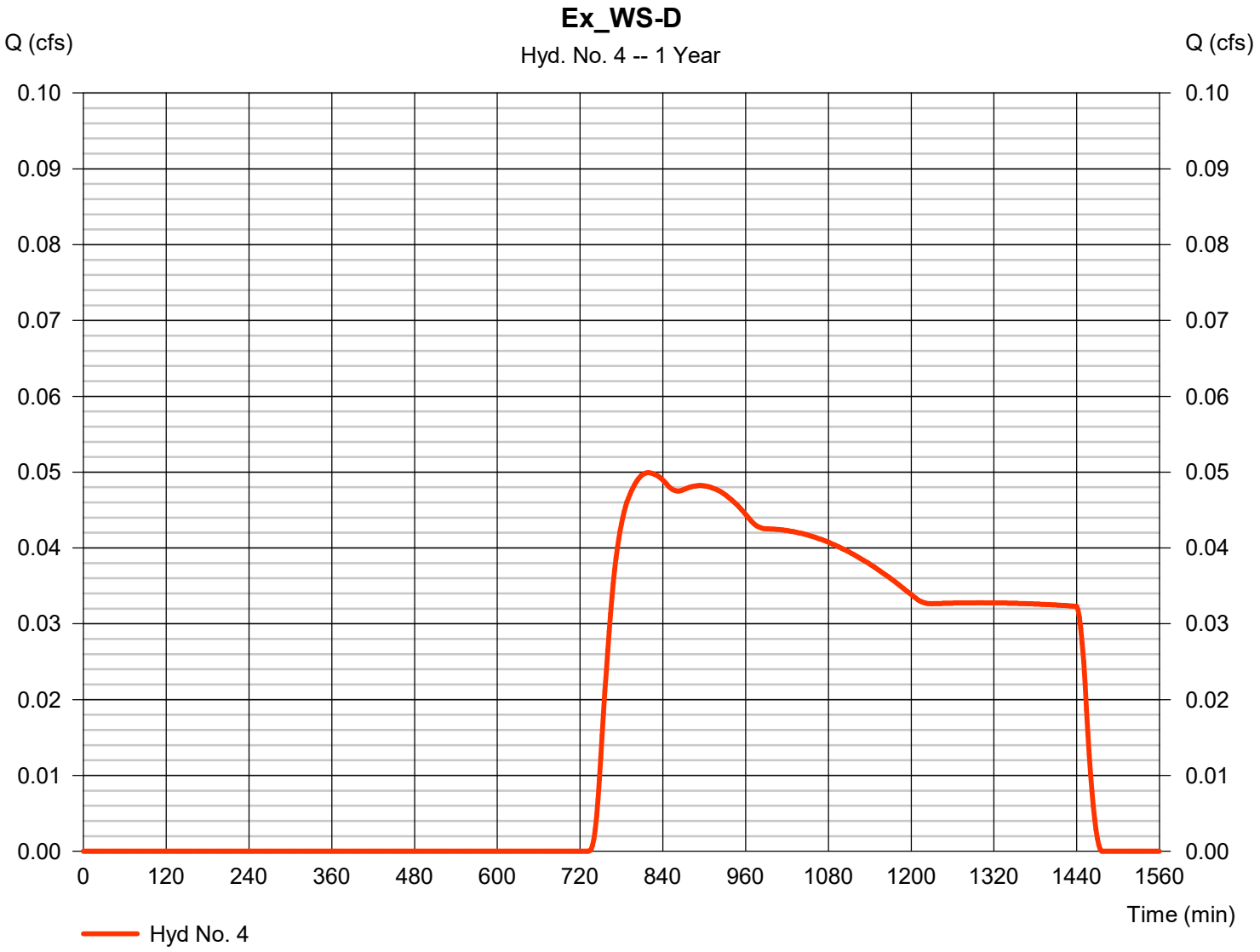


## Hyd. No. 4

Ex_WS-D

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 0.050 cfs |
| Storm frequency | = | 1 yrs | Time to peak | = | 818 min |
| Time interval | = | 2 min | Hyd. volume | = | 1,653 cuft |
| Drainage area | = | 10.220 ac | Curve number | = | 61* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 22.20 min |
| Total precip. | = | 1.83 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(0.250 x 55) + (9.970 x 61)] / 10.220



# TR55 Tc Worksheet



## Hyd. No. 4

Ex_WS-D

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.150 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 100.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 2.20 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 0.97 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 15.78** | **+** | **0.00** | **+** | **0.00** | **=** | **15.78** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 628.09 | | 0.00 | | 0.00 | | |
| Watercourse slope (%) | = 1.01 | | 0.00 | | 0.00 | | |
| Surface description | = Unpaved | | Paved | | Paved | | |
| Average velocity (ft/s) | =1.62 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 6.46** | **+** | **0.00** | **+** | **0.00** | **=** | **6.46** |
| **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 ..... 22.20 min**

# Hydrograph Report

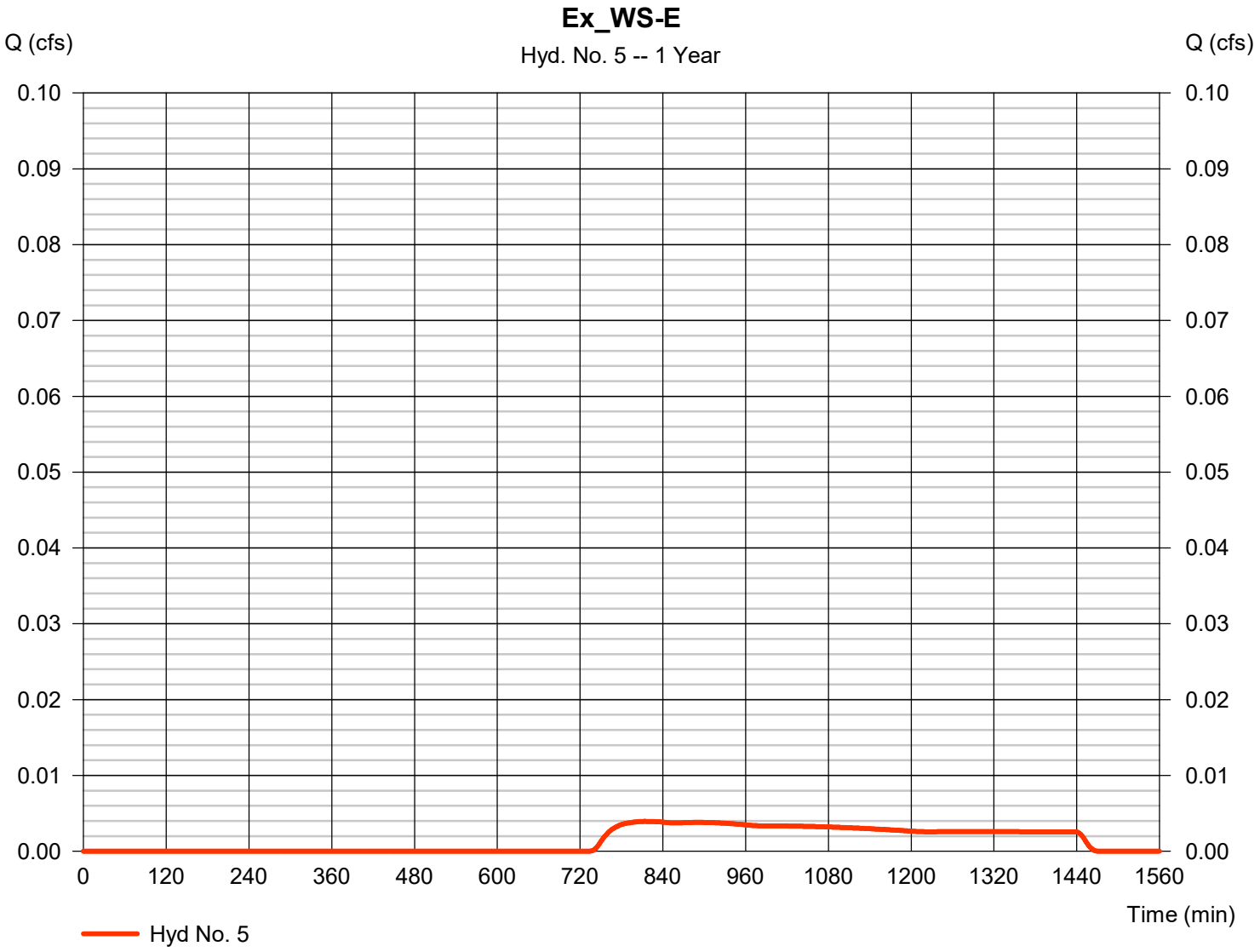


## Hyd. No. 5

Ex_WS-E

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.004 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 814 min |
| Time interval | = 2 min | Hyd. volume | = 130 cuft |
| Drainage area | = 0.820 ac | Curve number | = 61* |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 18.80 min |
| Total precip. | = 1.83 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |

* Composite (Area/CN) = [(0.820 x 61)] / 0.820



# TR55 Tc Worksheet



## Hyd. No. 5

Ex_WS-E

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.150 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 100.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 2.20 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 0.72 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 17.78** | **+** | **0.00** | **+** | **0.00** | **=** | **17.78** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 113.00 | | 0.00 | | 0.00 | | |
| Watercourse slope (%) | = 1.20 | | 0.00 | | 0.00 | | |
| Surface description | = Unpaved | | Paved | | Paved | | |
| Average velocity (ft/s) | =1.77 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 1.07** | **+** | **0.00** | **+** | **0.00** | **=** | **1.07** |
| **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 ..... 18.80 min**

# Hydrograph Report

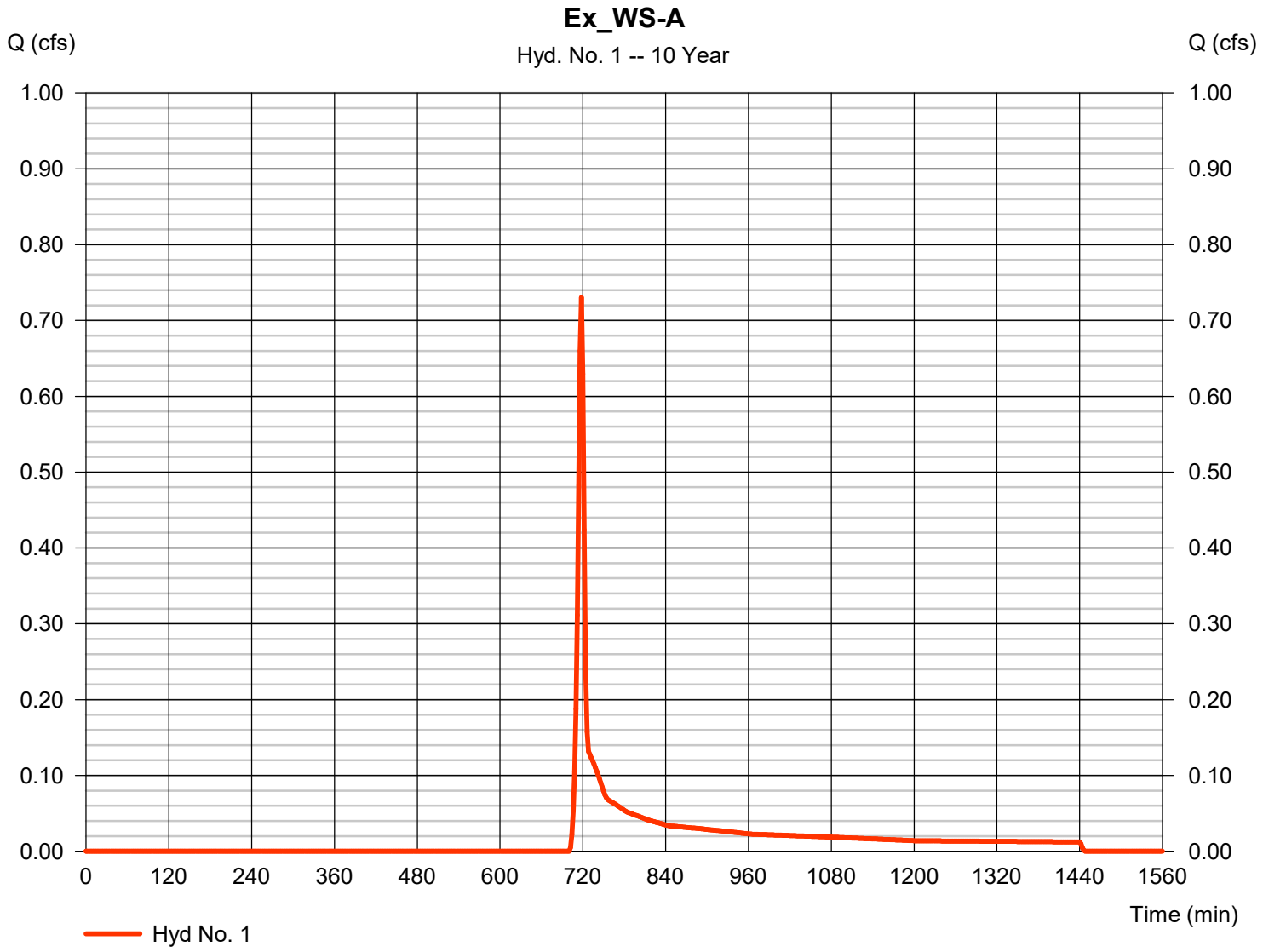


## Hyd. No. 1

Ex_WS-A

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.730 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 1,564 cuft |
| Drainage area | = 0.750 ac | Curve number | = 66* |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 6.00 min |
| Total precip. | = 3.14 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |

* Composite (Area/CN) = [(0.120 x 98) + (0.120 x 55) + (0.510 x 61)] / 0.750



# Hydrograph Report

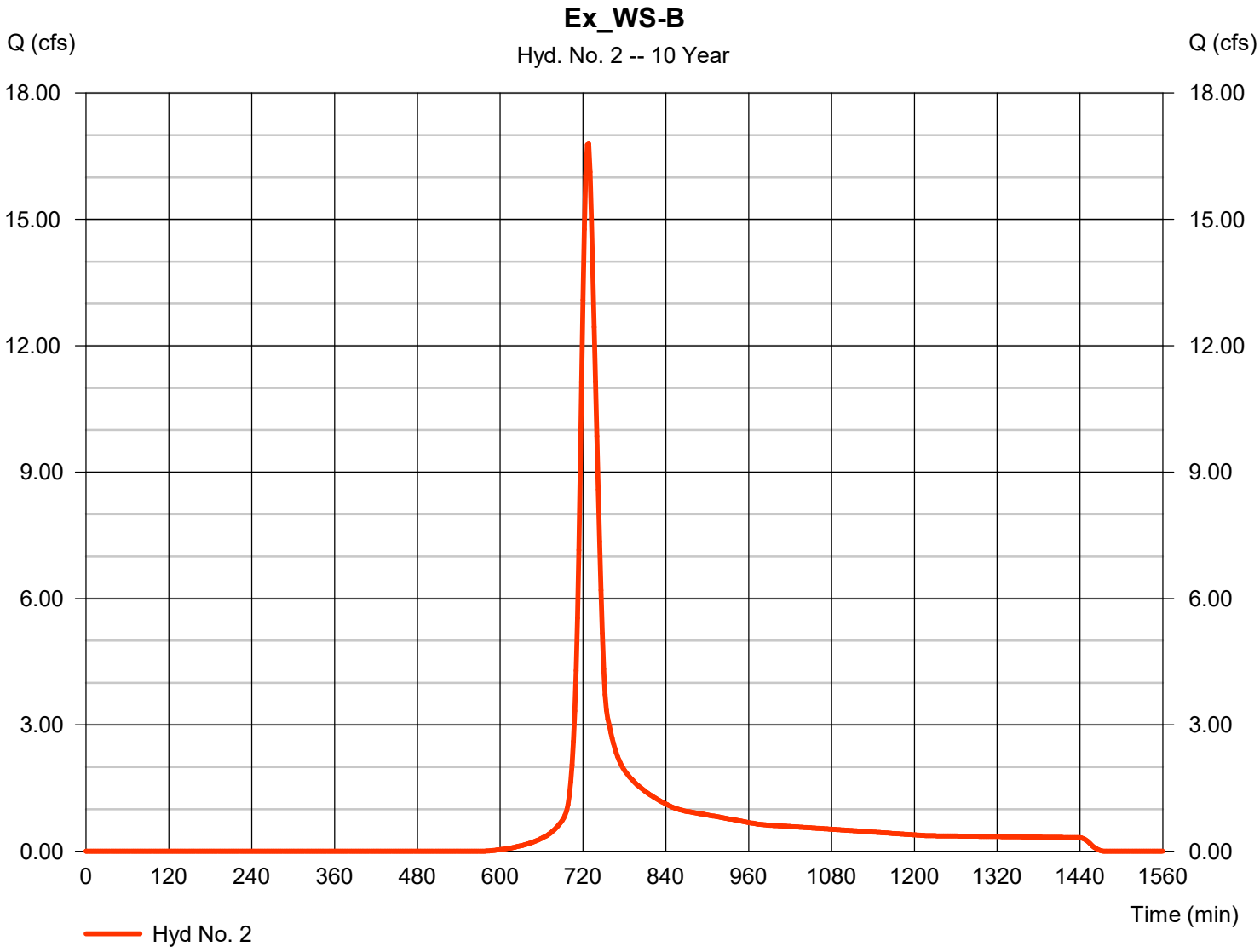


## Hyd. No. 2

Ex_WS-B

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 16.79 cfs |
| Storm frequency | = | 10 yrs | Time to peak | = | 728 min |
| Time interval | = | 2 min | Hyd. volume | = | 59,018 cuft |
| Drainage area | = | 11.780 ac | Curve number | = | 80* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 21.00 min |
| Total precip. | = | 3.14 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(4.880 x 98) + (0.110 x 98) + (1.780 x 85) + (5.010 x 61)] / 11.780



# Hydrograph Report

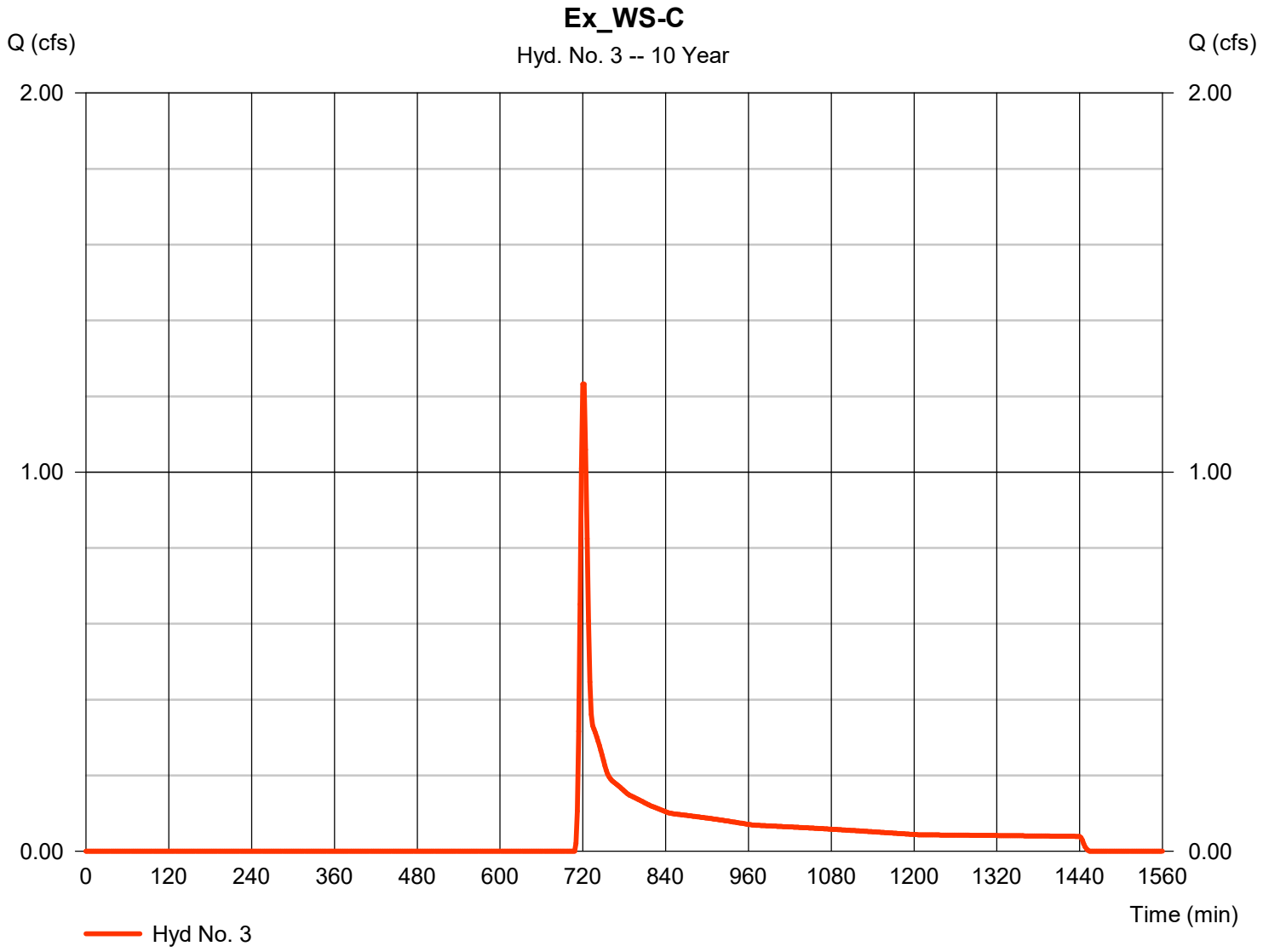


## Hyd. No. 3

Ex_WS-C

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 1.232 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 4,110 cuft |
| Drainage area | = 2.940 ac | Curve number | = 60* |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 8.70 min |
| Total precip. | = 3.14 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |

* Composite (Area/CN) = [(0.010 x 98) + (0.730 x 55) + (2.200 x 61)] / 2.940



# Hydrograph Report

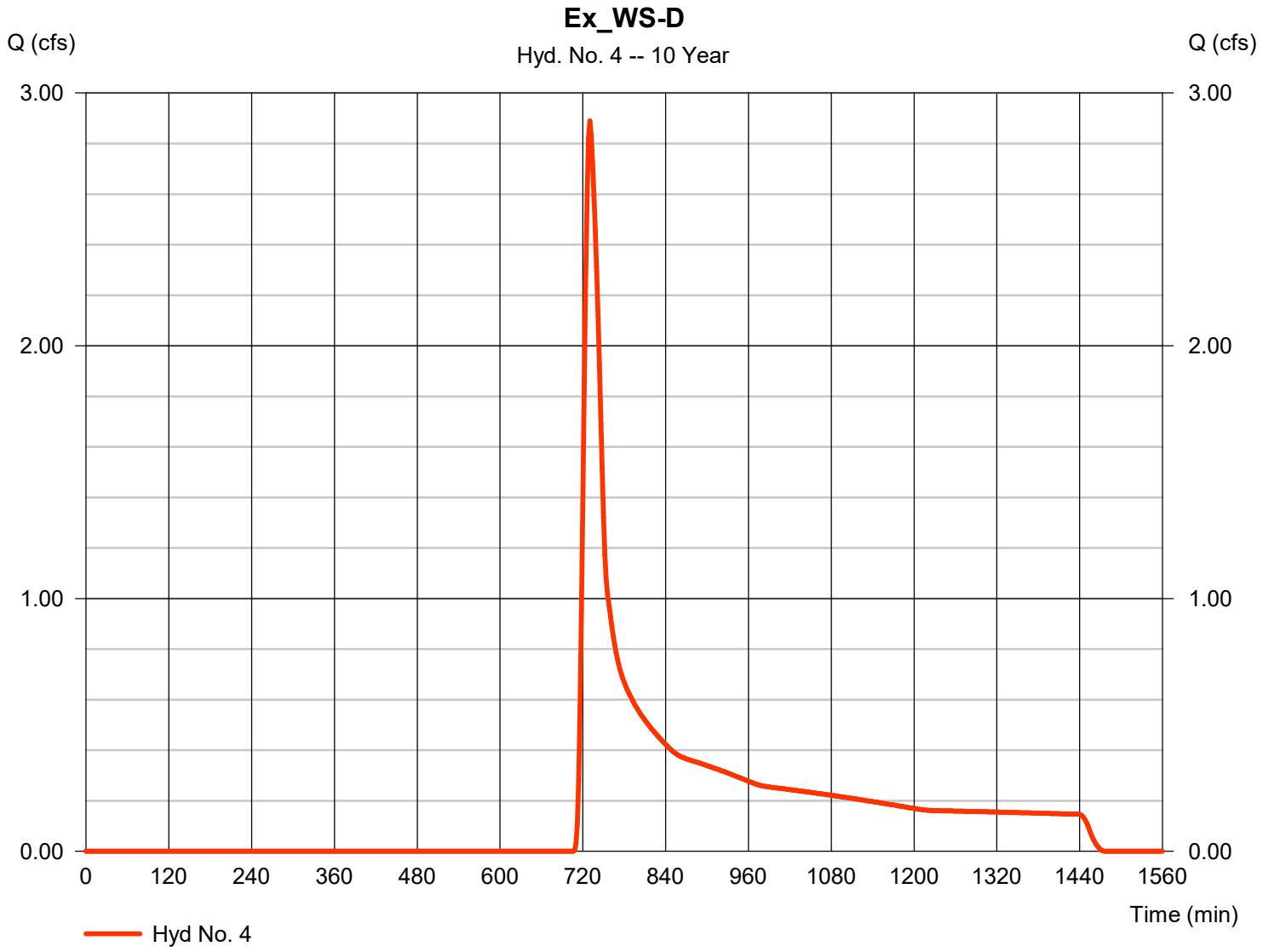


## Hyd. No. 4

Ex_WS-D

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 2.889 cfs |
| Storm frequency | = | 10 yrs | Time to peak | = | 730 min |
| Time interval | = | 2 min | Hyd. volume | = | 15,845 cuft |
| Drainage area | = | 10.220 ac | Curve number | = | 61* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 22.20 min |
| Total precip. | = | 3.14 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(0.250 x 55) + (9.970 x 61)] / 10.220



# Hydrograph Report

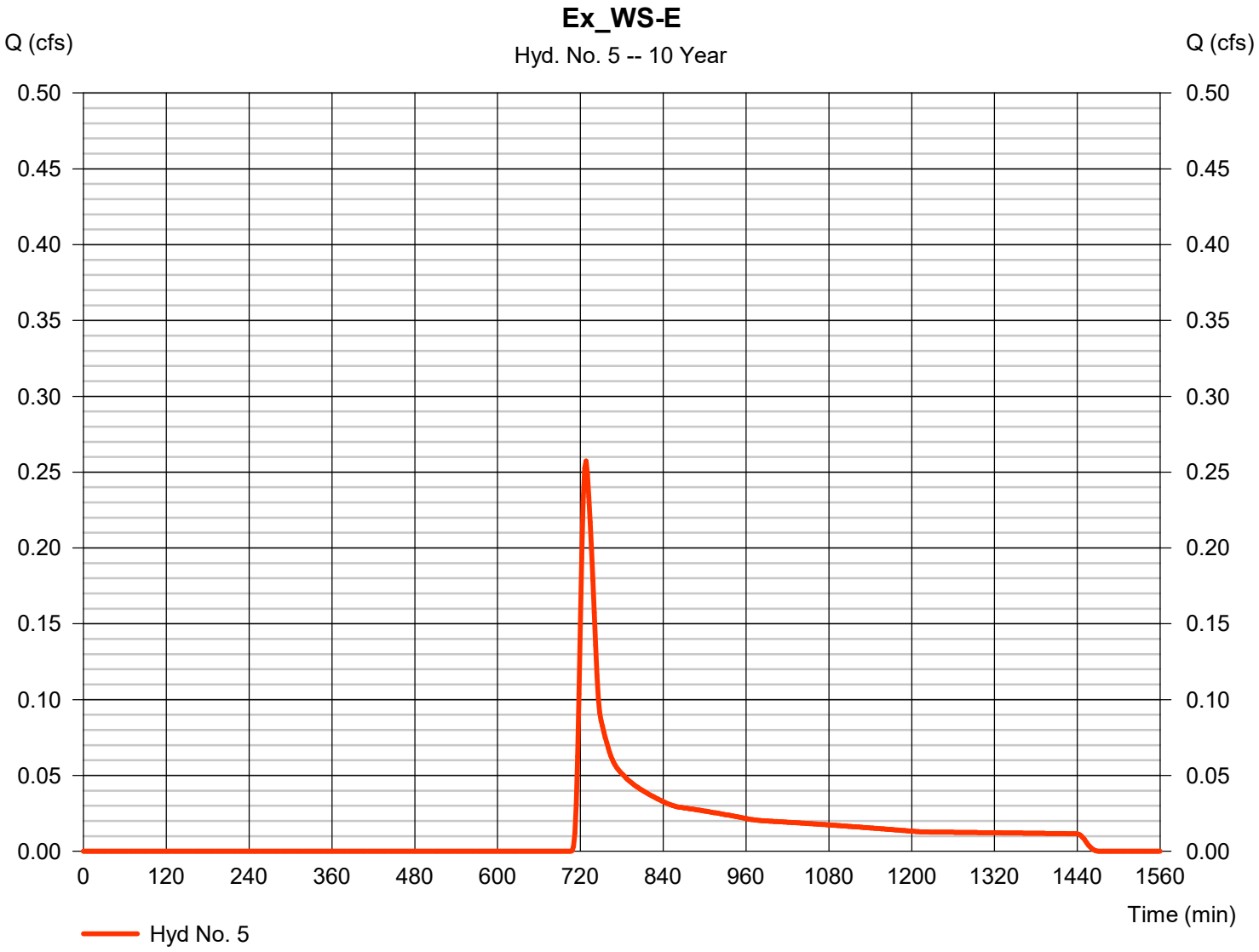


## Hyd. No. 5

Ex_WS-E

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.257 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 728 min |
| Time interval | = 2 min | Hyd. volume | = 1,249 cuft |
| Drainage area | = 0.820 ac | Curve number | = 61* |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 18.80 min |
| Total precip. | = 3.14 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |

* Composite (Area/CN) = [(0.820 x 61)] / 0.820



# Hydrograph Report

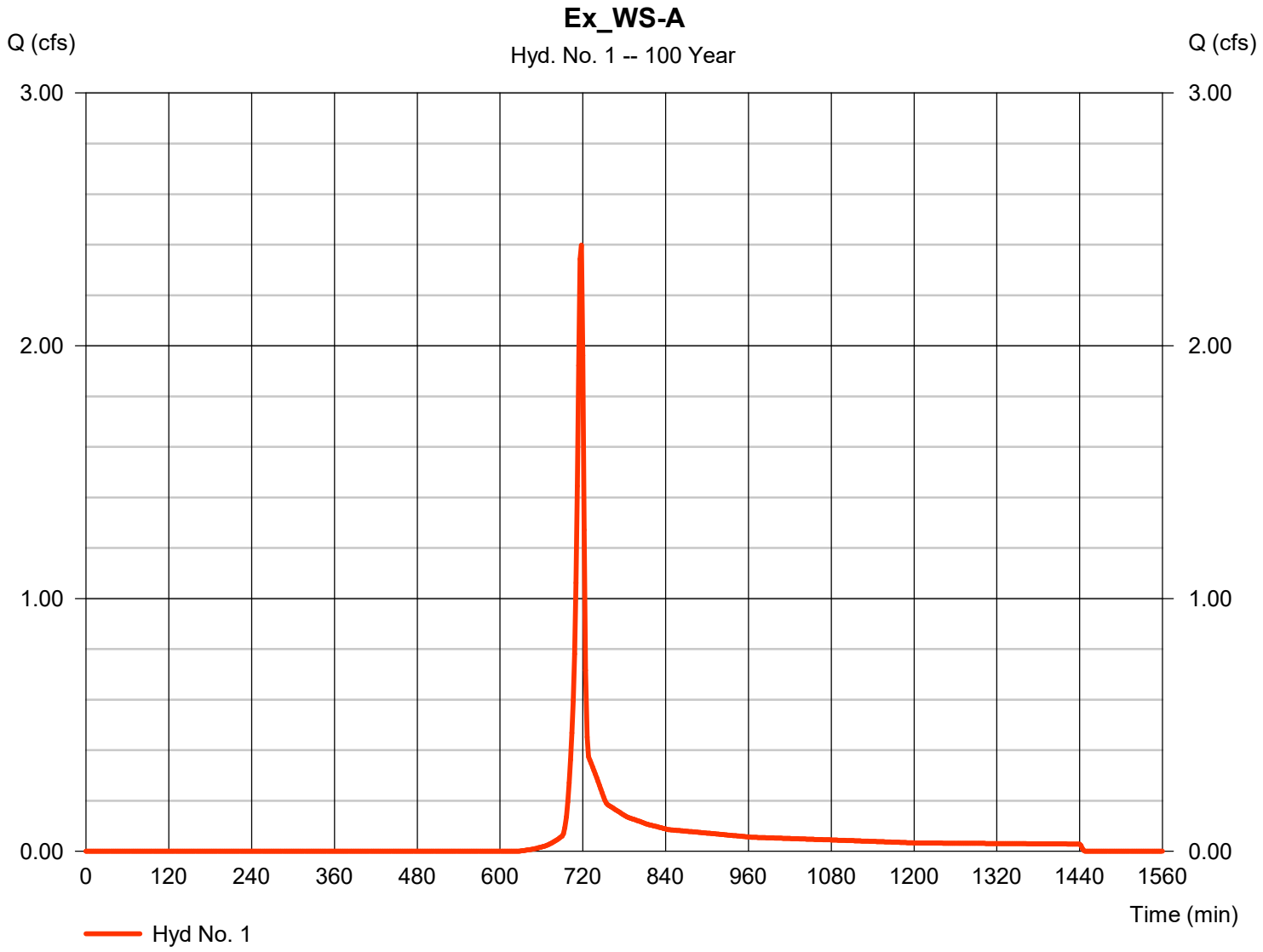


## Hyd. No. 1

Ex_WS-A

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 2.398 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 4,796 cuft |
| Drainage area | = | 0.750 ac | Curve number | = | 66* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 6.00 min |
| Total precip. | = | 5.22 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(0.120 x 98) + (0.120 x 55) + (0.510 x 61)] / 0.750



# Hydrograph Report

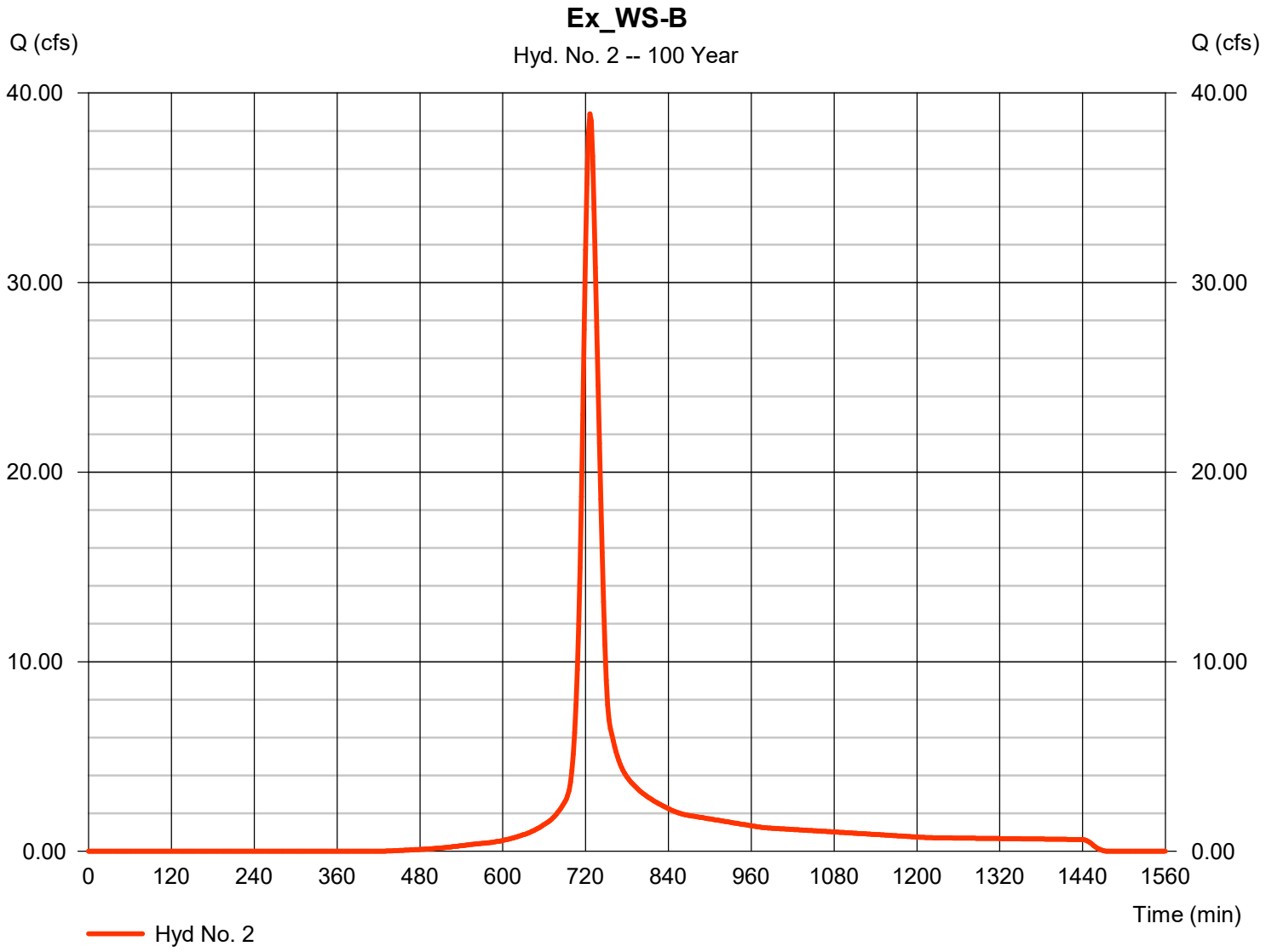


## Hyd. No. 2

Ex_WS-B

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 38.90 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 726 min |
| Time interval | = | 2 min | Hyd. volume | = | 134,303 cuft |
| Drainage area | = | 11.780 ac | Curve number | = | 80* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 21.00 min |
| Total precip. | = | 5.22 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(4.880 x 98) + (0.110 x 98) + (1.780 x 85) + (5.010 x 61)] / 11.780



# Hydrograph Report

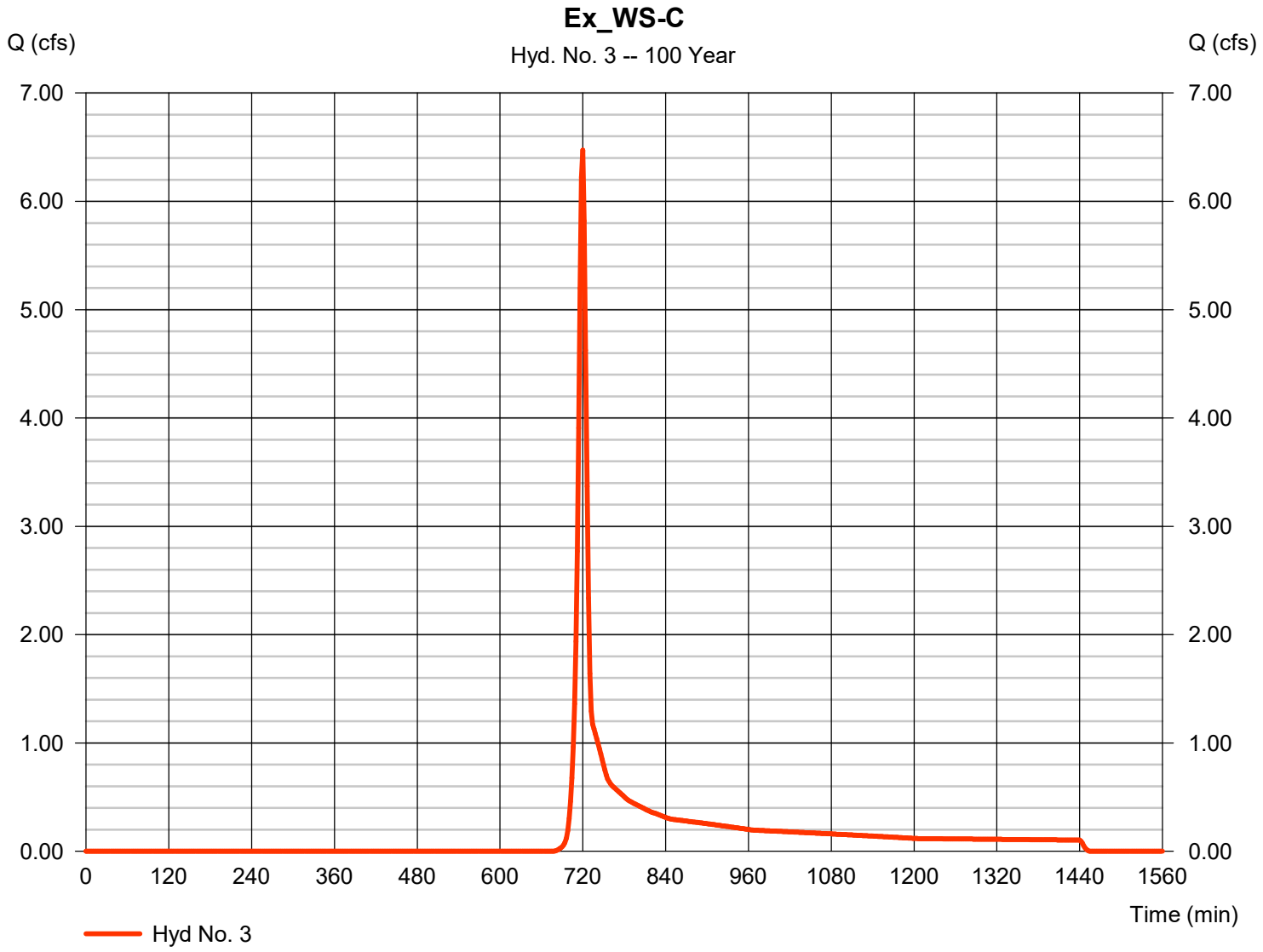


## Hyd. No. 3

Ex_WS-C

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 6.473 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 720 min |
| Time interval | = | 2 min | Hyd. volume | = | 15,276 cuft |
| Drainage area | = | 2.940 ac | Curve number | = | 60* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 8.70 min |
| Total precip. | = | 5.22 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(0.010 x 98) + (0.730 x 55) + (2.200 x 61)] / 2.940



# Hydrograph Report

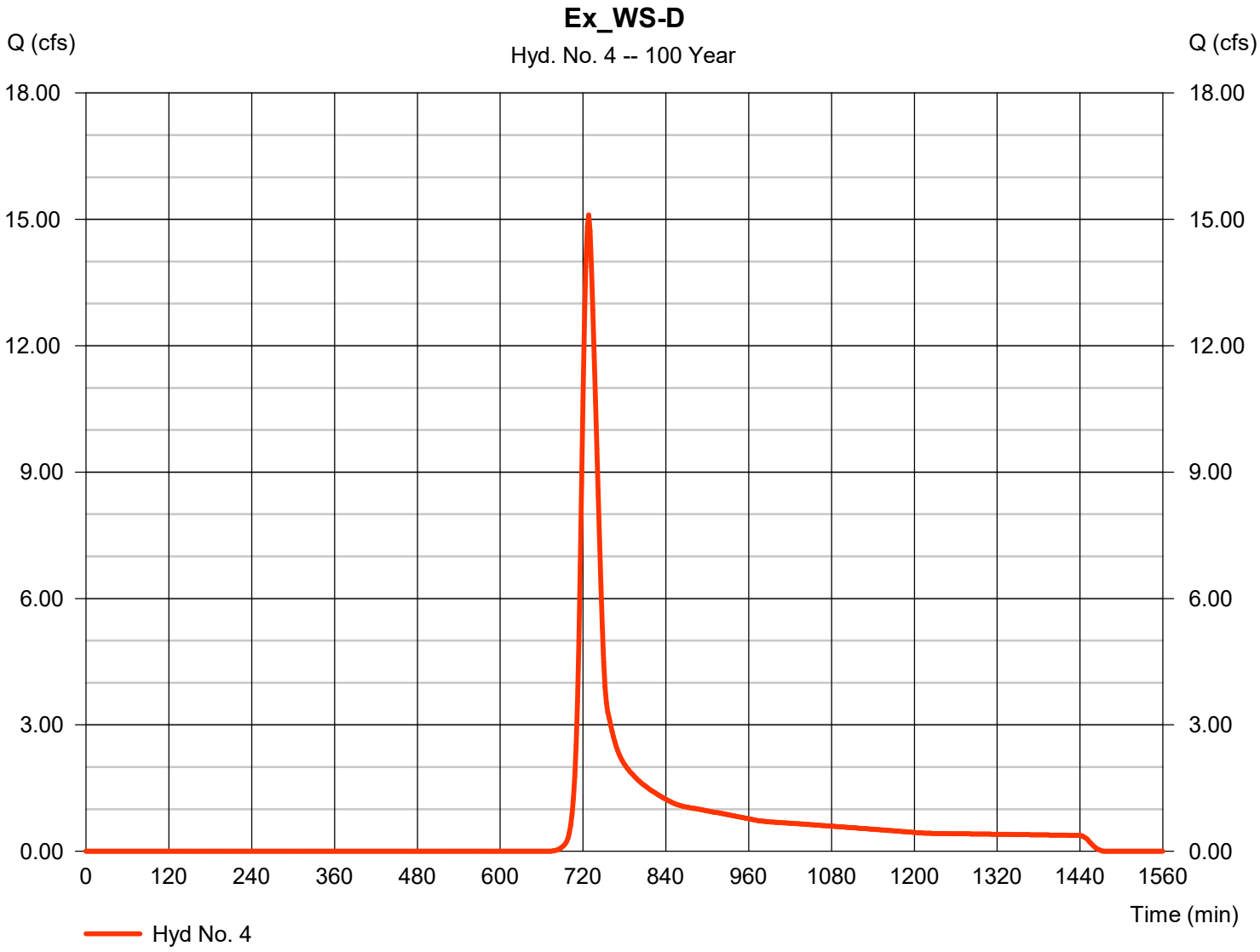


## Hyd. No. 4

Ex_WS-D

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 15.10 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 728 min |
| Time interval | = | 2 min | Hyd. volume | = | 56,758 cuft |
| Drainage area | = | 10.220 ac | Curve number | = | 61* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 22.20 min |
| Total precip. | = | 5.22 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(0.250 x 55) + (9.970 x 61)] / 10.220



# Hydrograph Report

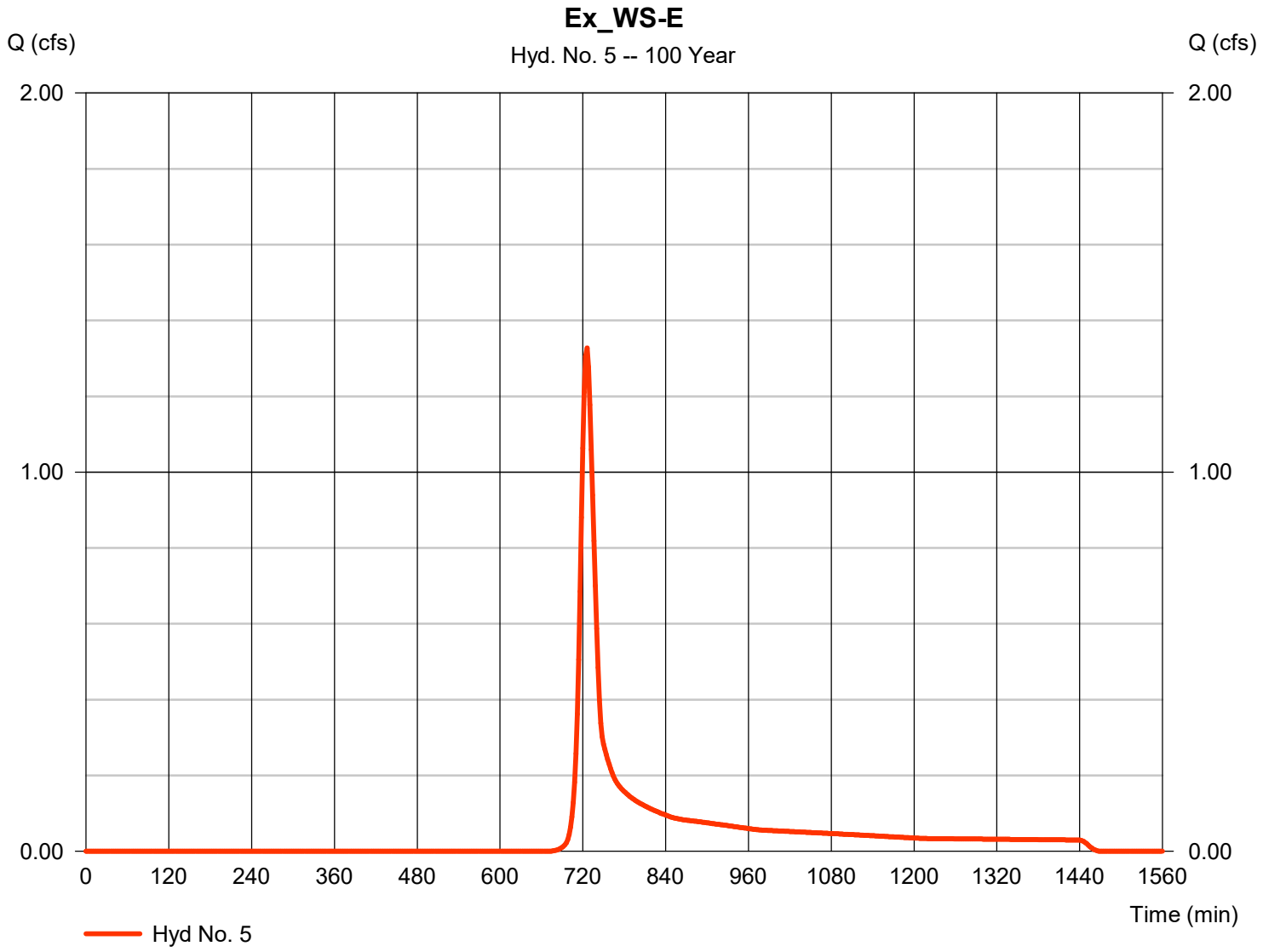


## Hyd. No. 5

Ex_WS-E

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 1.328 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 726 min |
| Time interval | = | 2 min | Hyd. volume | = | 4,474 cuft |
| Drainage area | = | 0.820 ac | Curve number | = | 61* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 18.80 min |
| Total precip. | = | 5.22 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(0.820 x 61)] / 0.820



# Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

| 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 | ------ | 0.041 | 0.174 | ------- | ------- | 0.730 | ------- | ------- | 2.398 | PR Watershed A |
| 2 | SCS Runoff | ------ | 6.822 | 10.79 | ------- | ------- | 22.35 | ------- | ------- | 51.87 | PR Watershed B |
| 3 | SCS Runoff | ------ | 0.022 | 0.173 | ------- | ------- | 1.043 | ------- | ------- | 3.957 | PR Watershed C |
| 4 | SCS Runoff | ------ | 0.043 | 0.287 | ------- | ------- | 2.678 | ------- | ------- | 12.49 | PR Watershed D |
| 5 | Reservoir | 2 | 0.000 | 0.000 | ------- | ------- | 1.053 | ------- | ------- | 6.719 | Outlets Basin |

# Hydrograph Report

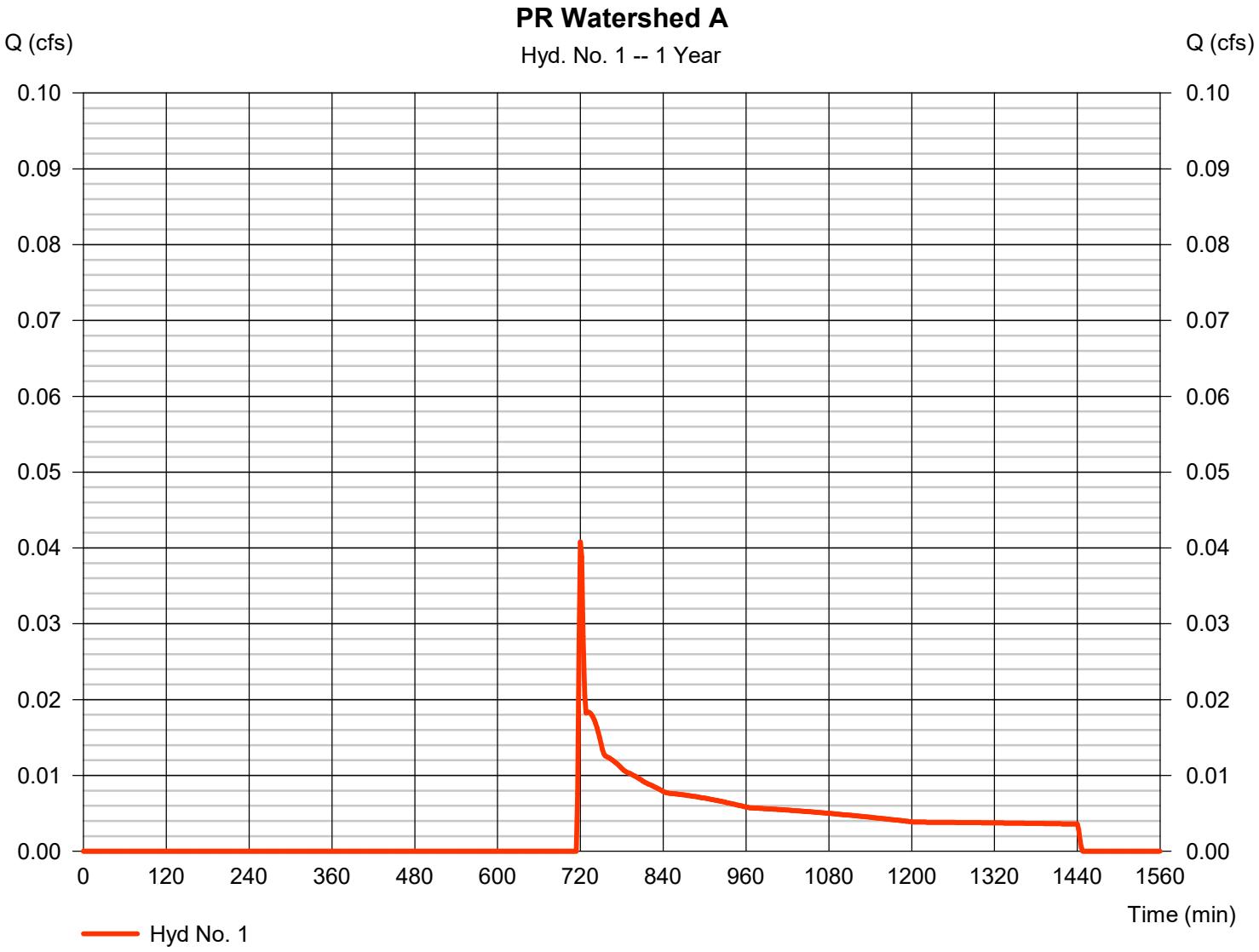
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Tuesday, 03 / 16 / 2021

## Hyd. No. 1

PR Watershed A

| | | | |
|---|---|---|---|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.041 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 274 cuft |
| Drainage area | = 0.750 ac | Curve number | = 66* |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 6.00 min |
| Total precip. | = 1.83 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |

* Composite (Area/CN) = [(0.120 x 98) + (0.120 x 55) + (0.510 x 61)] / 0.750



# Hydrograph Report

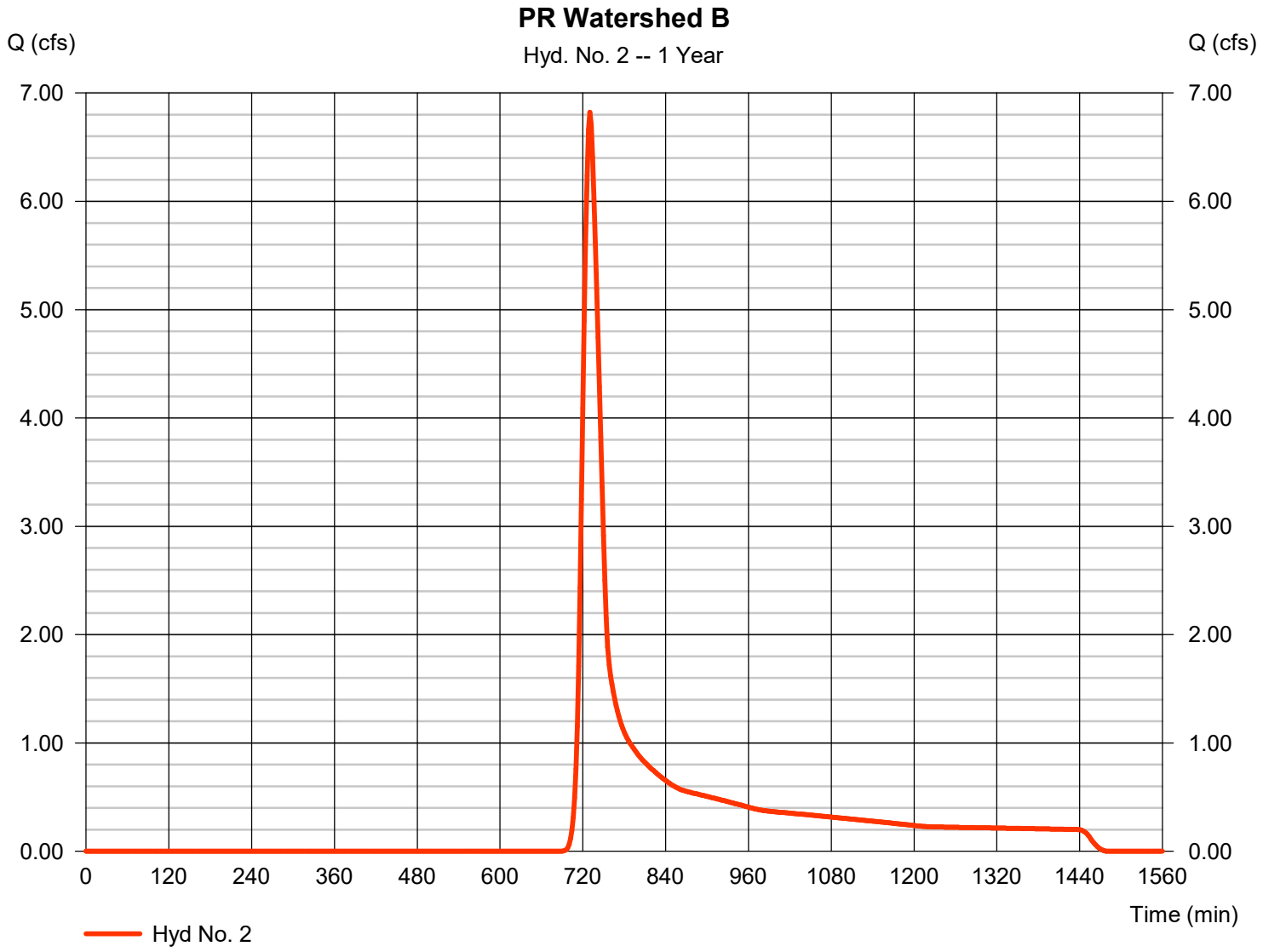


## Hyd. No. 2

PR Watershed B

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 6.822 cfs |
| Storm frequency | = | 1 yrs | Time to peak | = | 730 min |
| Time interval | = | 2 min | Hyd. volume | = | 28,485 cuft |
| Drainage area | = | 17.260 ac | Curve number | = | 80* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 23.60 min |
| Total precip. | = | 1.83 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(5.140 x 98) + (0.120 x 98) + (5.640 x 85) + (6.360 x 61)] / 17.260



# TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

## Hyd. No. 2

PR Watershed B

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.240 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 100.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 2.20 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 1.06 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 22.19** | **+** | **0.00** | **+** | **0.00** | **=** | **22.19** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 132.00 | | 83.00 | | 0.00 | | |
| Watercourse slope (%) | = 1.51 | | 6.02 | | 0.00 | | |
| Surface description | = Unpaved | | Unpaved | | Paved | | |
| Average velocity (ft/s) | =1.98 | | 3.96 | | 0.00 | | |
| **Travel Time (min)** | **= 1.11** | **+** | **0.35** | **+** | **0.00** | **=** | **1.46** |
| **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 ..... 23.60 min**

# Hydrograph Report

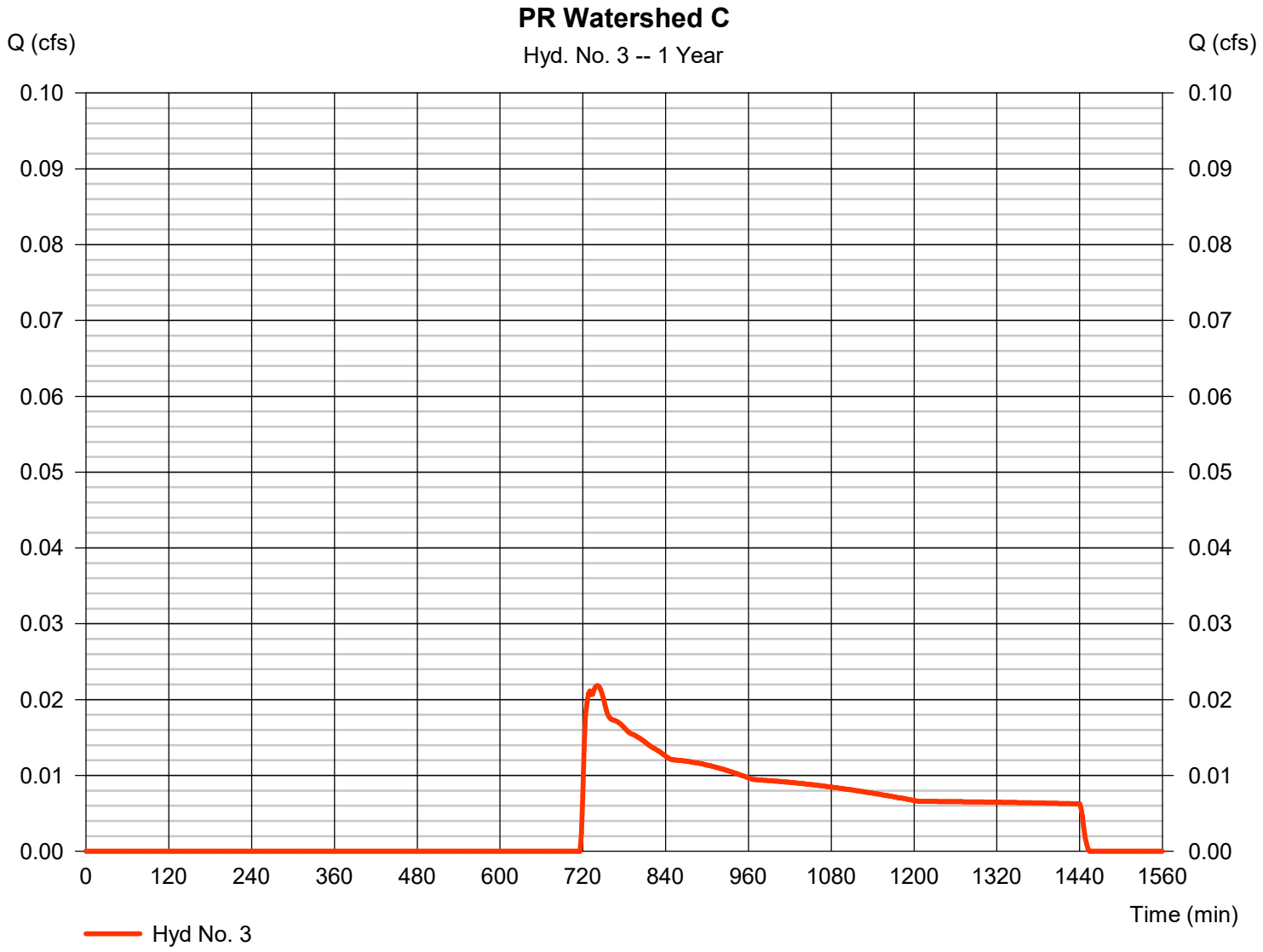


## Hyd. No. 3

PR Watershed C

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 0.022 cfs |
| Storm frequency | = | 1 yrs | Time to peak | = | 740 min |
| Time interval | = | 2 min | Hyd. volume | = | 416 cuft |
| Drainage area | = | 1.460 ac | Curve number | = | 64* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 8.50 min |
| Total precip. | = | 1.83 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(0.100 x 98) + (0.020 x 98) + (0.120 x 55) + (1.220 x 61)] / 1.460



# TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

## Hyd. No. 3

PR Watershed C

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.150 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 100.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 2.20 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 7.00 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 7.16** | **+** | **0.00** | **+** | **0.00** | **=** | **7.16** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 190.00 | | 0.00 | | 0.00 | | |
| Watercourse slope (%) | = 2.10 | | 0.00 | | 0.00 | | |
| Surface description | = Unpaved | | Paved | | Paved | | |
| Average velocity (ft/s) | =2.34 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 1.35** | **+** | **0.00** | **+** | **0.00** | **=** | **1.35** |
| **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 ..... 8.50 min**

# Hydrograph Report

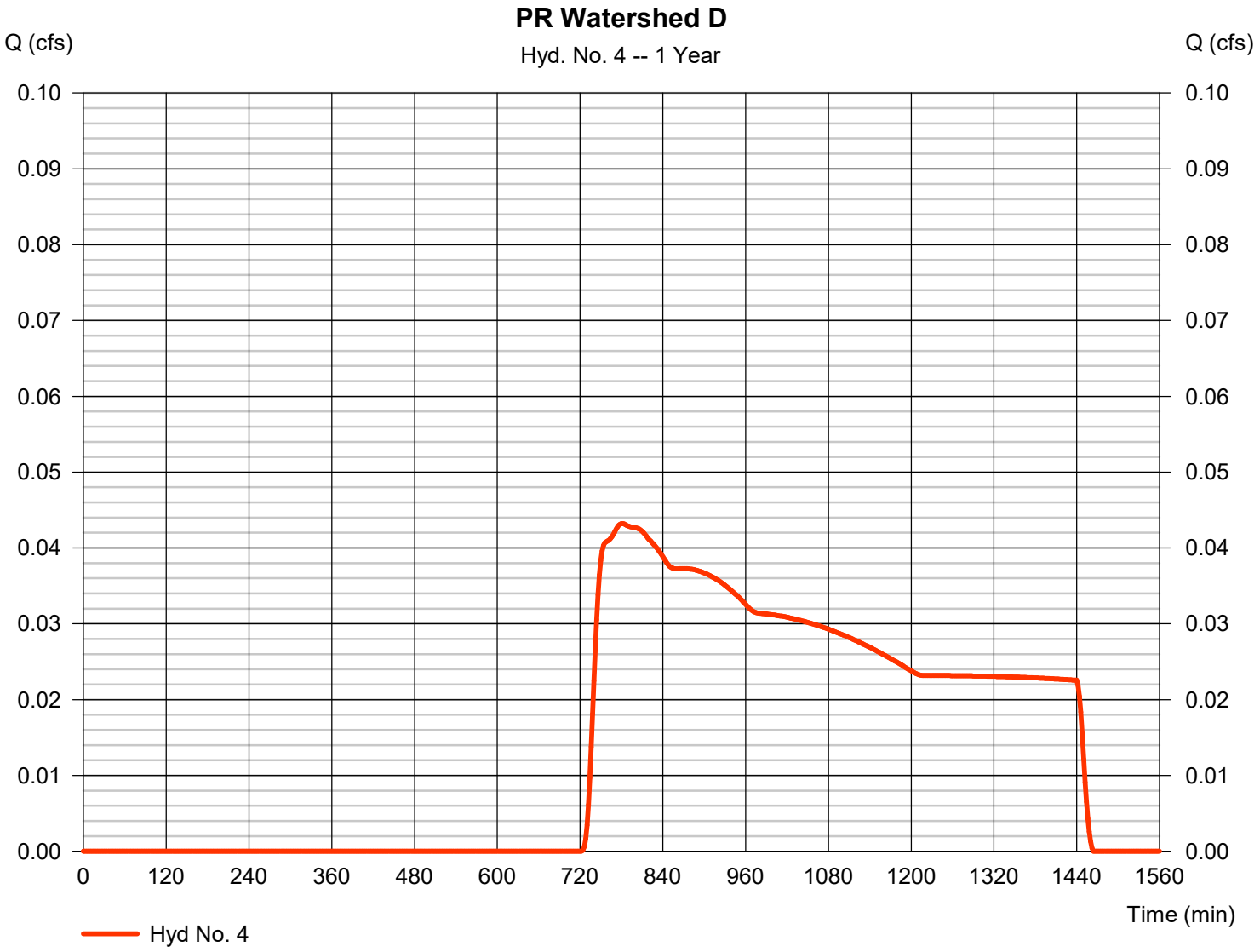


## Hyd. No. 4

PR Watershed D

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 0.043 cfs |
| Storm frequency | = | 1 yrs | Time to peak | = | 780 min |
| Time interval | = | 2 min | Hyd. volume | = | 1,272 cuft |
| Drainage area | = | 6.630 ac | Curve number | = | 62* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 15.70 min |
| Total precip. | = | 1.83 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(0.160 x 98) + (0.020 x 98) + (0.250 x 55) + (6.200 x 61)] / 6.630



# TR55 Tc Worksheet



## Hyd. No. 4

PR Watershed D

| Description | A | | B | | C | | Totals |
|---|---|---|---|---|---|---|---|
| **Sheet Flow** | | | | | | | |
| Manning's n-value | = 0.150 | | 0.011 | | 0.011 | | |
| Flow length (ft) | = 100.0 | | 0.0 | | 0.0 | | |
| Two-year 24-hr precip. (in) | = 2.20 | | 0.00 | | 0.00 | | |
| Land slope (%) | = 1.67 | | 0.00 | | 0.00 | | |
| **Travel Time (min)** | **= 12.70** | **+** | **0.00** | **+** | **0.00** | **=** | **12.70** |
| **Shallow Concentrated Flow** | | | | | | | |
| Flow length (ft) | = 206.00 | | 119.00 | | 0.00 | | |
| Watercourse slope (%) | = 1.61 | | 0.84 | | 0.00 | | |
| Surface description | = Unpaved | | Unpaved | | Paved | | |
| Average velocity (ft/s) | =2.05 | | 1.48 | | 0.00 | | |
| **Travel Time (min)** | **= 1.68** | **+** | **1.34** | **+** | **0.00** | **=** | **3.02** |
| **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 ..... 15.70 min**

# Hydrograph Report

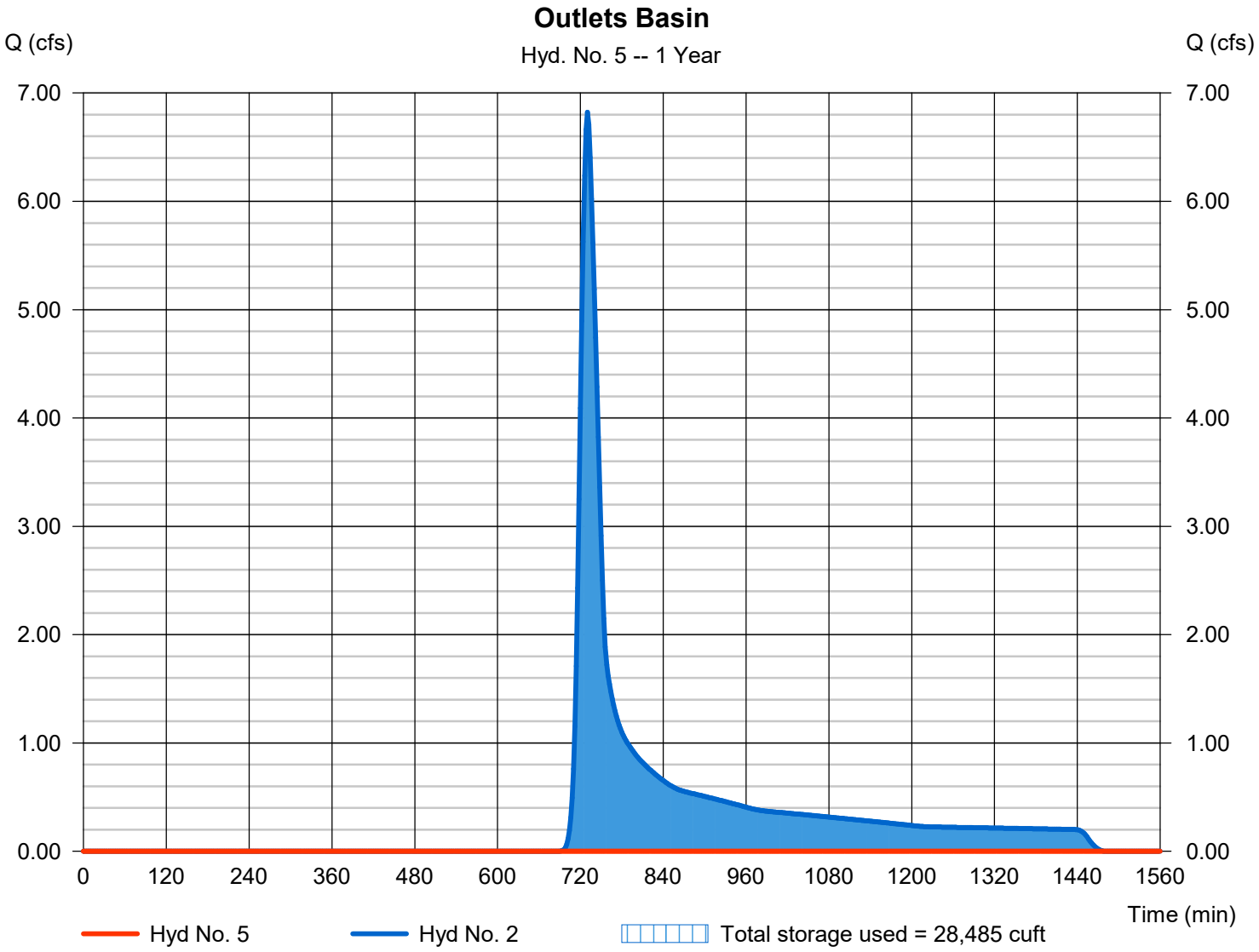


## Hyd. No. 5

Outlets Basin

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 0.000 cfs |
| Storm frequency | = | 1 yrs | Time to peak | = | n/a |
| Time interval | = | 2 min | Hyd. volume | = | 0 cuft |
| Inflow hyd. No. | = | 2 - PR Watershed B | Max. Elevation | = | 592.20 ft |
| Reservoir name | = | Modified Basin | Max. Storage | = | 28,485 cuft |

Storage Indication method used.



## Pond No. 5 - Modified Basin

### Pond Data

**Contours -**User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 590.50 ft

### Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 590.50 | 12,727 | 0 | 0 |
| 0.50 | 591.00 | 15,302 | 7,007 | 7,007 |
| 1.50 | 592.00 | 19,247 | 17,275 | 24,282 |
| 2.50 | 593.00 | 23,492 | 21,370 | 45,651 |
| 3.50 | 594.00 | 27,986 | 25,739 | 71,390 |
| 4.50 | 595.00 | 32,556 | 30,271 | 101,661 |
| 5.50 | 596.00 | 37,545 | 35,051 | 136,712 |

### Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|---|---|---|---|---|
| **Rise (in)** | = 15.00 | Inactive | 0.00 | 0.00 |
| **Span (in)** | = 15.00 | 0.00 | 0.00 | 0.00 |
| **No. Barrels** | = 1 | 1 | 0 | 0 |
| **Invert El. (ft)** | = 592.93 | 0.00 | 0.00 | 0.00 |
| **Length (ft)** | = 220.00 | 1.00 | 0.00 | 0.00 |
| **Slope (%)** | = 1.00 | 1.00 | 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)** | Inactive | 0.00 | 0.00 | 0.00 |
| **Crest El. (ft)** | = 595.00 | 0.00 | 0.00 | 0.00 |
| **Weir Coeff.** | = 3.33 | 3.33 | 3.33 | 3.33 |
| **Weir Type** | = 1 | --- | --- | --- |
| **Multi-Stage** | = Yes | No | No | No |

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

**TW Elev. (ft)** = 0.00

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

### Stage / Storage / Discharge Table

| Stage ft | Storage cuft | Elevation ft | Clv A cfs | Clv B cfs | Clv C cfs | PrfRsr cfs | Wr A cfs | Wr B cfs | Wr C cfs | Wr D cfs | Exfil cfs | User cfs | Total cfs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0 | 590.50 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.05 | 701 | 590.55 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.10 | 1,401 | 590.60 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.15 | 2,102 | 590.65 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.20 | 2,803 | 590.70 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.25 | 3,504 | 590.75 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.30 | 4,204 | 590.80 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.35 | 4,905 | 590.85 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.40 | 5,606 | 590.90 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.45 | 6,307 | 590.95 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.50 | 7,007 | 591.00 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.60 | 8,735 | 591.10 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.70 | 10,462 | 591.20 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.80 | 12,190 | 591.30 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 0.90 | 13,917 | 591.40 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.00 | 15,645 | 591.50 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.10 | 17,372 | 591.60 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.20 | 19,099 | 591.70 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.30 | 20,827 | 591.80 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.40 | 22,554 | 591.90 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.50 | 24,282 | 592.00 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.60 | 26,419 | 592.10 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.70 | 28,556 | 592.20 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.80 | 30,693 | 592.30 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 1.90 | 32,830 | 592.40 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 2.00 | 34,967 | 592.50 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 2.10 | 37,103 | 592.60 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 2.20 | 39,240 | 592.70 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 2.30 | 41,377 | 592.80 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 2.40 | 43,514 | 592.90 | 0.00 | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.000 |
| 2.50 | 45,651 | 593.00 | 0.02 ic | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.025 |
| 2.60 | 48,225 | 593.10 | 0.14 ic | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.141 |
| 2.70 | 50,799 | 593.20 | 0.35 ic | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.346 |
| 2.80 | 53,373 | 593.30 | 0.63 ic | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.631 |
| 2.90 | 55,947 | 593.40 | 0.99 ic | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 0.986 |
| 3.00 | 58,521 | 593.50 | 1.40 ic | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 1.401 |

*Continues on next page...*

Modified Basin

## 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3.10 | 61,095 | 593.60 | 1.87 ic | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 1.867 |
| 3.20 | 63,669 | 593.70 | 2.37 ic | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 2.369 |
| 3.30 | 66,242 | 593.80 | 2.90 ic | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 2.897 |
| 3.40 | 68,816 | 593.90 | 3.43 ic | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 3.428 |
| 3.50 | 71,390 | 594.00 | 3.94 ic | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 3.940 |
| 3.60 | 74,417 | 594.10 | 4.40 ic | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 4.398 |
| 3.70 | 77,444 | 594.20 | 4.74 ic | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 4.745 |
| 3.80 | 80,472 | 594.30 | 5.10 ic | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 5.099 |
| 3.90 | 83,499 | 594.40 | 5.43 ic | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 5.431 |
| 4.00 | 86,526 | 594.50 | 5.74 ic | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 5.743 |
| 4.10 | 89,553 | 594.60 | 6.04 ic | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 6.039 |
| 4.20 | 92,580 | 594.70 | 6.32 ic | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 6.322 |
| 4.30 | 95,607 | 594.80 | 6.45 oc | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 6.453 |
| 4.40 | 98,634 | 594.90 | 6.57 oc | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 6.567 |
| 4.50 | 101,661 | 595.00 | 6.68 oc | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 6.678 |
| 4.60 | 105,166 | 595.10 | 6.79 oc | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 6.788 |
| 4.70 | 108,671 | 595.20 | 6.90 oc | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 6.896 |
| 4.80 | 112,176 | 595.30 | 7.00 oc | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 7.002 |
| 4.90 | 115,681 | 595.40 | 7.11 oc | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 7.107 |
| 5.00 | 119,187 | 595.50 | 7.21 oc | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 7.210 |
| 5.10 | 122,692 | 595.60 | 7.31 oc | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 7.312 |
| 5.20 | 126,197 | 595.70 | 7.41 oc | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 7.412 |
| 5.30 | 129,702 | 595.80 | 7.51 oc | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 7.511 |
| 5.40 | 133,207 | 595.90 | 7.61 oc | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 7.608 |
| 5.50 | 136,712 | 596.00 | 7.71 oc | --- | --- | --- | 0.00 | --- | --- | --- | --- | --- | 7.705 |

...End

# Hydrograph Report

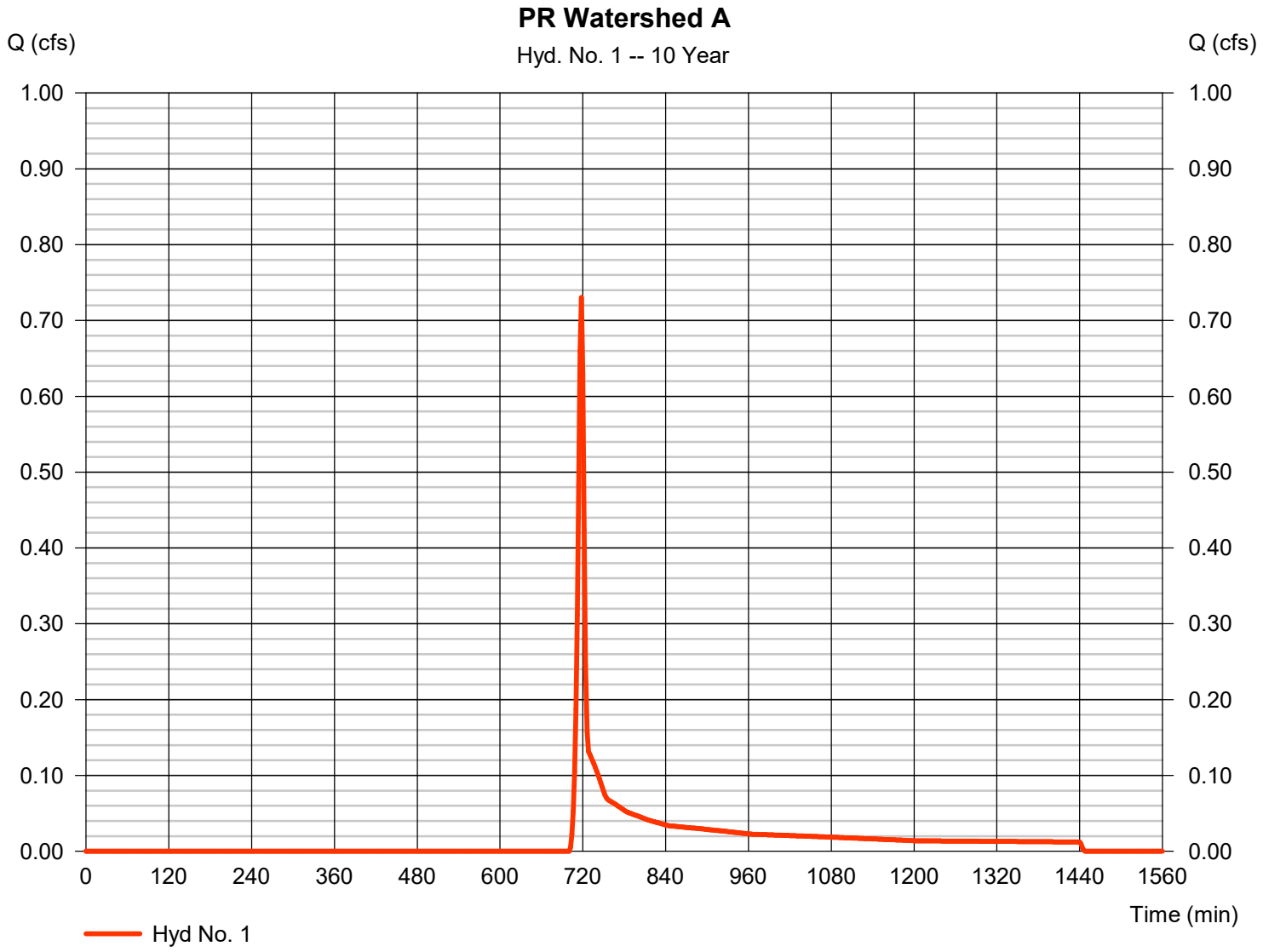


## Hyd. No. 1

PR Watershed A

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 0.730 cfs |
| Storm frequency | = | 10 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 1,564 cuft |
| Drainage area | = | 0.750 ac | Curve number | = | 66* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 6.00 min |
| Total precip. | = | 3.14 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(0.120 x 98) + (0.120 x 55) + (0.510 x 61)] / 0.750



# Hydrograph Report

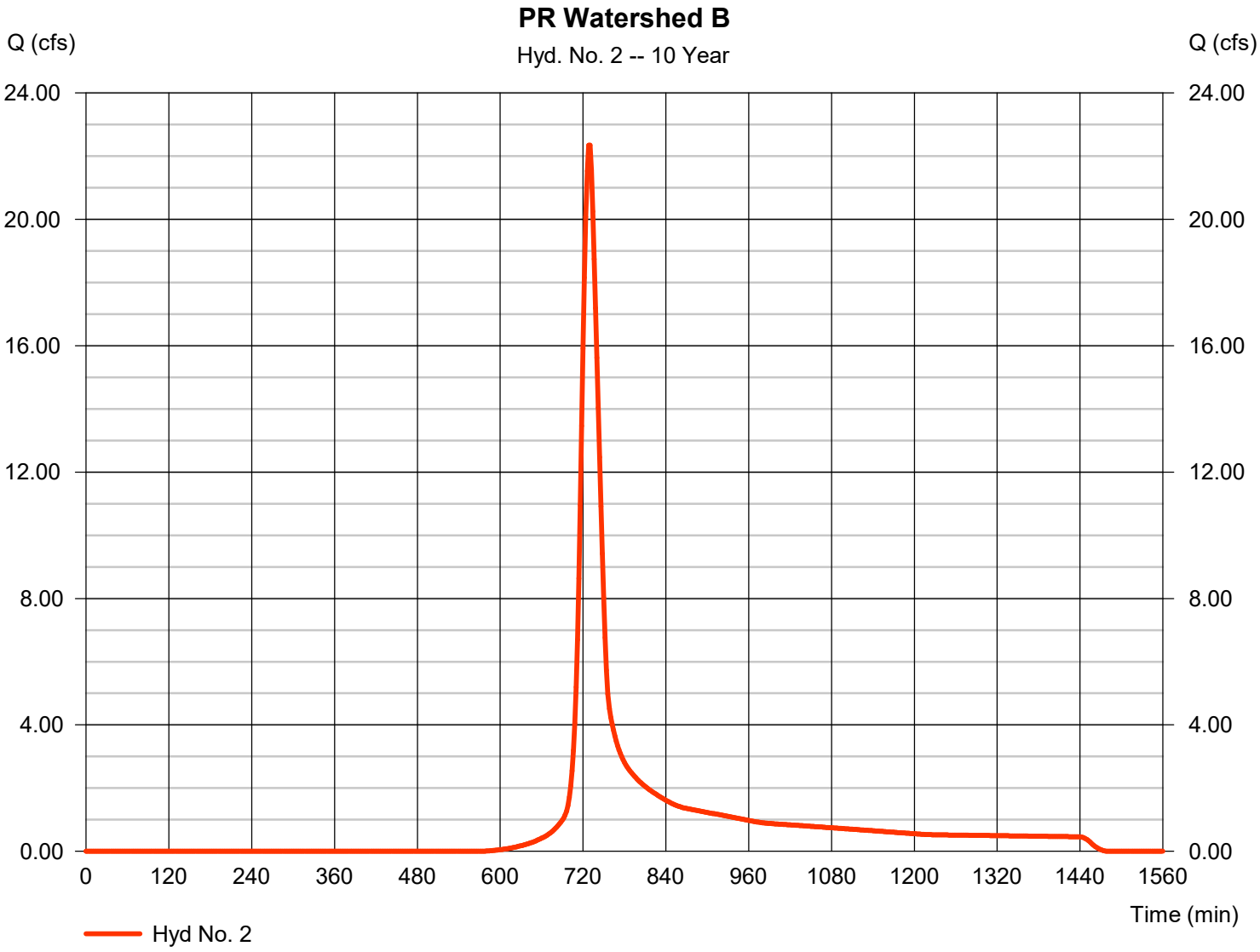


## Hyd. No. 2

PR Watershed B

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 22.35 cfs |
| Storm frequency | = | 10 yrs | Time to peak | = | 730 min |
| Time interval | = | 2 min | Hyd. volume | = | 83,628 cuft |
| Drainage area | = | 17.260 ac | Curve number | = | 80* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 23.60 min |
| Total precip. | = | 3.14 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(5.140 x 98) + (0.120 x 98) + (5.640 x 85) + (6.360 x 61)] / 17.260



# Hydrograph Report

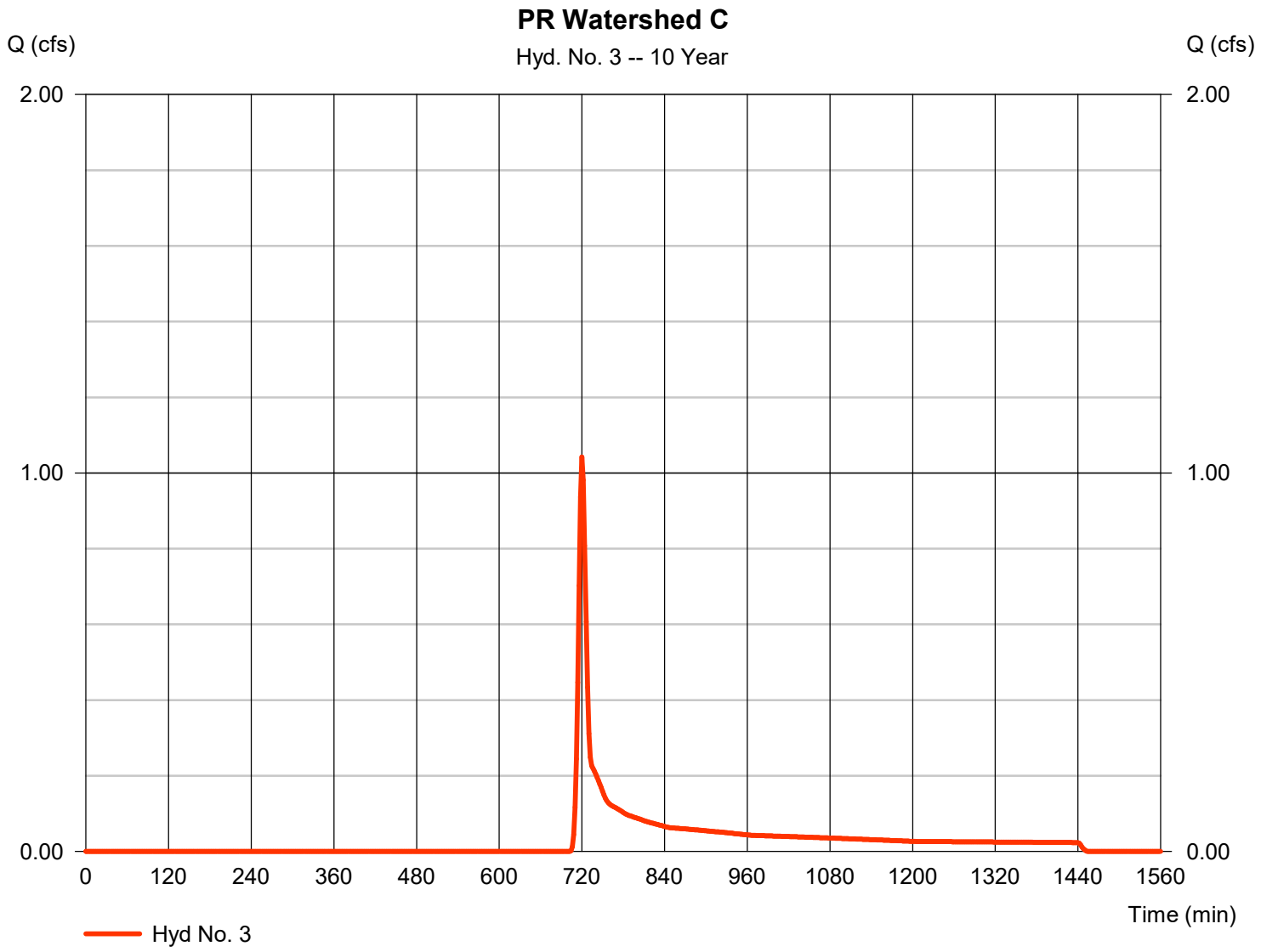


## Hyd. No. 3

PR Watershed C

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 1.043 cfs |
| Storm frequency | = | 10 yrs | Time to peak | = | 720 min |
| Time interval | = | 2 min | Hyd. volume | = | 2,816 cuft |
| Drainage area | = | 1.460 ac | Curve number | = | 64* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 8.50 min |
| Total precip. | = | 3.14 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(0.100 x 98) + (0.020 x 98) + (0.120 x 55) + (1.220 x 61)] / 1.460



# Hydrograph Report

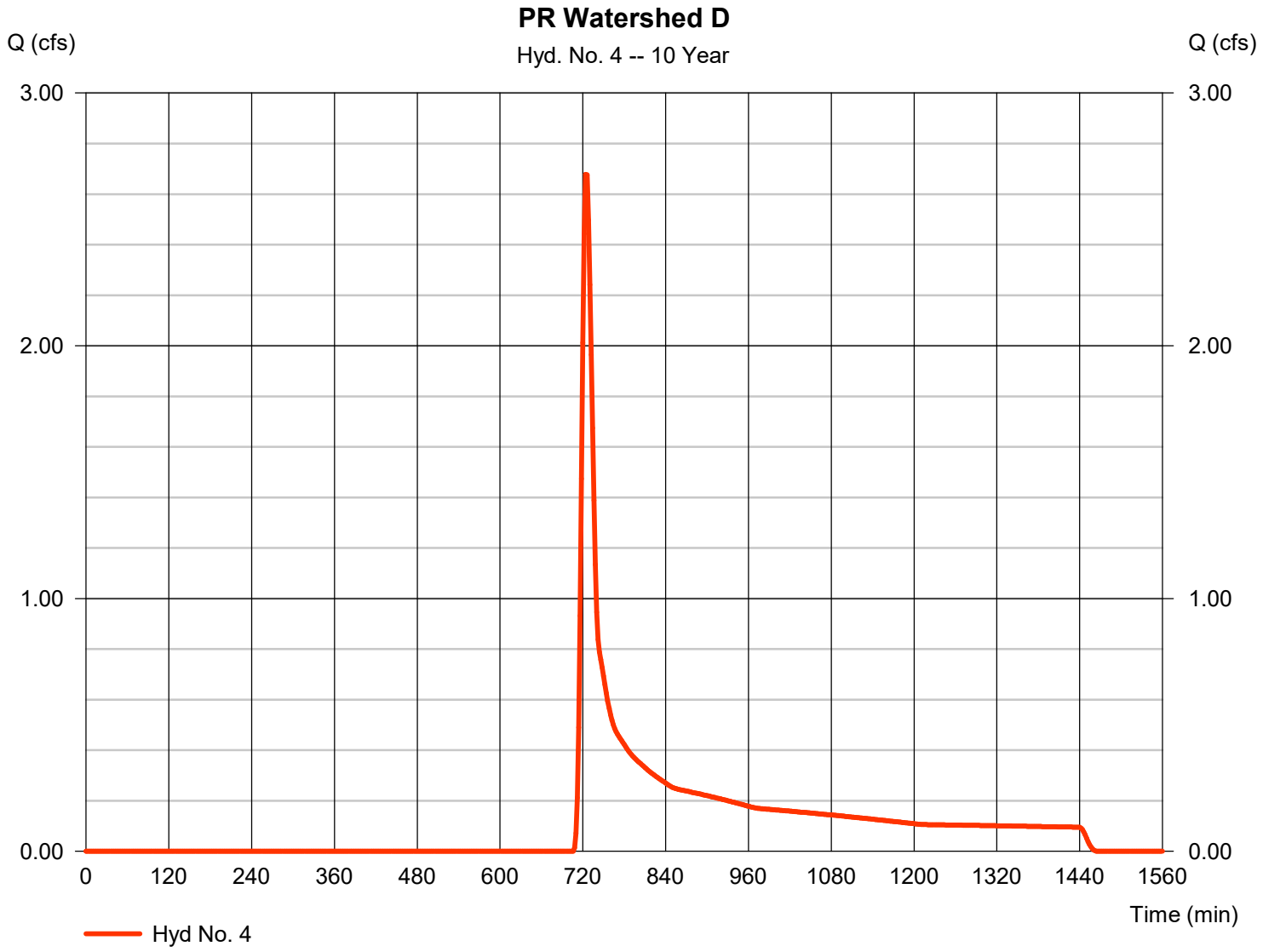


## Hyd. No. 4

PR Watershed D

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 2.678 cfs |
| Storm frequency | = | 10 yrs | Time to peak | = | 724 min |
| Time interval | = | 2 min | Hyd. volume | = | 10,686 cuft |
| Drainage area | = | 6.630 ac | Curve number | = | 62* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 15.70 min |
| Total precip. | = | 3.14 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(0.160 x 98) + (0.020 x 98) + (0.250 x 55) + (6.200 x 61)] / 6.630



# Hydrograph Report

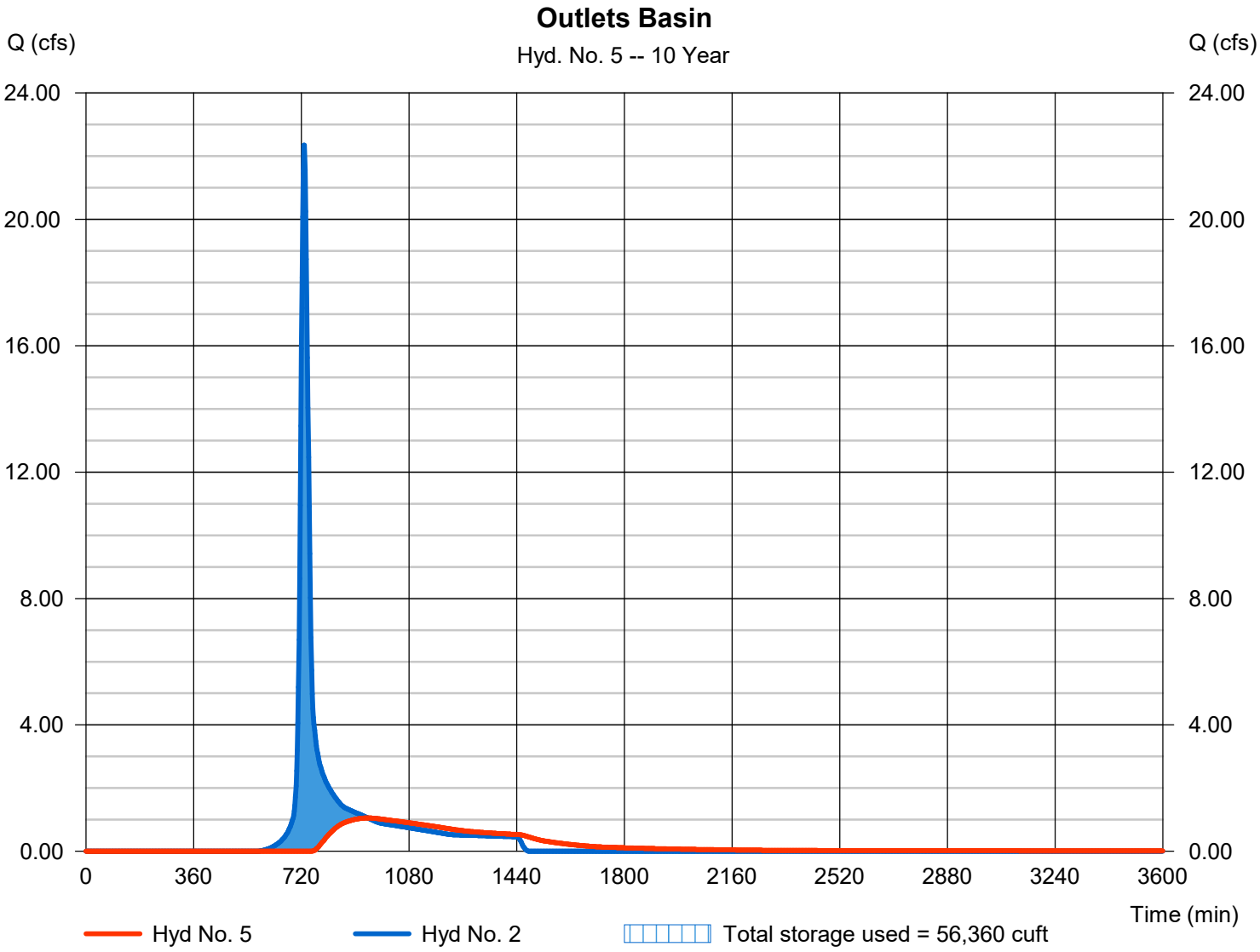


## Hyd. No. 5

Outlets Basin

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 1.053 cfs |
| Storm frequency | = | 10 yrs | Time to peak | = | 942 min |
| Time interval | = | 2 min | Hyd. volume | = | 39,912 cuft |
| Inflow hyd. No. | = | 2 - PR Watershed B | Max. Elevation | = | 593.42 ft |
| Reservoir name | = | Modified Basin | Max. Storage | = | 56,360 cuft |

Storage Indication method used.



# Hydrograph Report

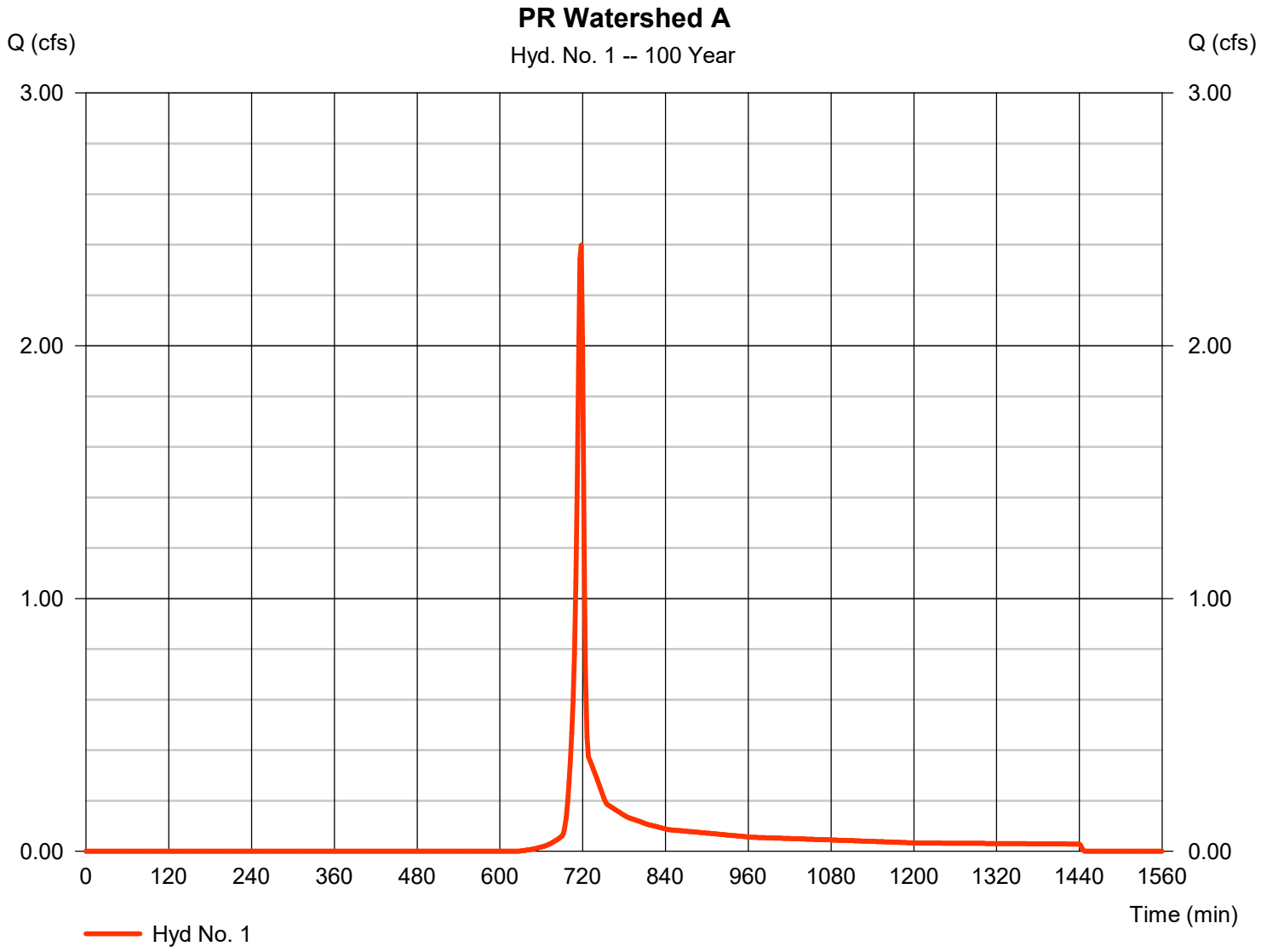


## Hyd. No. 1

PR Watershed A

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 2.398 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 4,796 cuft |
| Drainage area | = | 0.750 ac | Curve number | = | 66* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 6.00 min |
| Total precip. | = | 5.22 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(0.120 x 98) + (0.120 x 55) + (0.510 x 61)] / 0.750



# Hydrograph Report

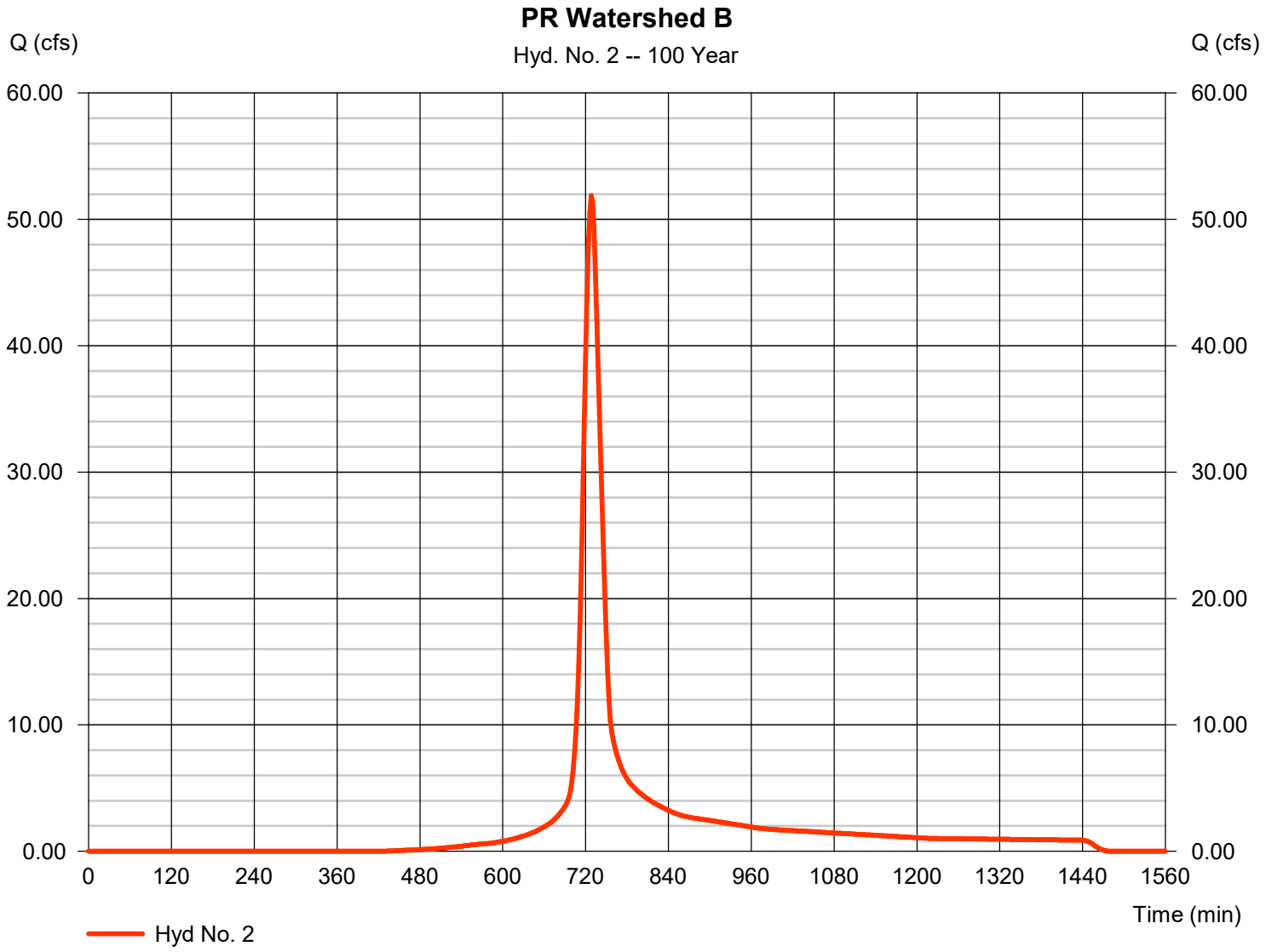


## Hyd. No. 2

PR Watershed B

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 51.87 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 728 min |
| Time interval | = | 2 min | Hyd. volume | = | 190,307 cuft |
| Drainage area | = | 17.260 ac | Curve number | = | 80* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 23.60 min |
| Total precip. | = | 5.22 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(5.140 x 98) + (0.120 x 98) + (5.640 x 85) + (6.360 x 61)] / 17.260



# Hydrograph Report

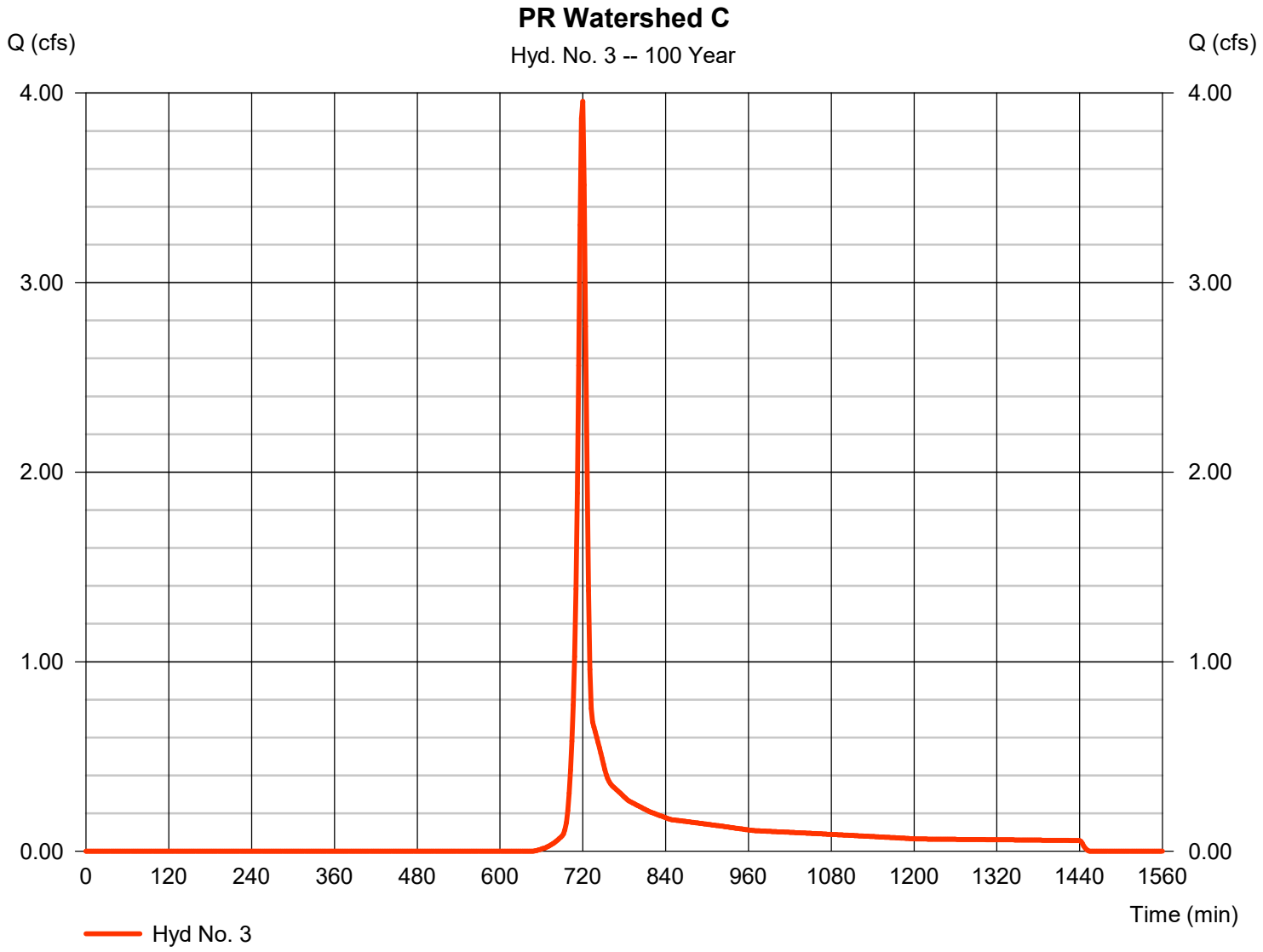


## Hyd. No. 3

PR Watershed C

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 3.957 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 720 min |
| Time interval | = | 2 min | Hyd. volume | = | 9,143 cuft |
| Drainage area | = | 1.460 ac | Curve number | = | 64* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 8.50 min |
| Total precip. | = | 5.22 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(0.100 x 98) + (0.020 x 98) + (0.120 x 55) + (1.220 x 61)] / 1.460



# Hydrograph Report

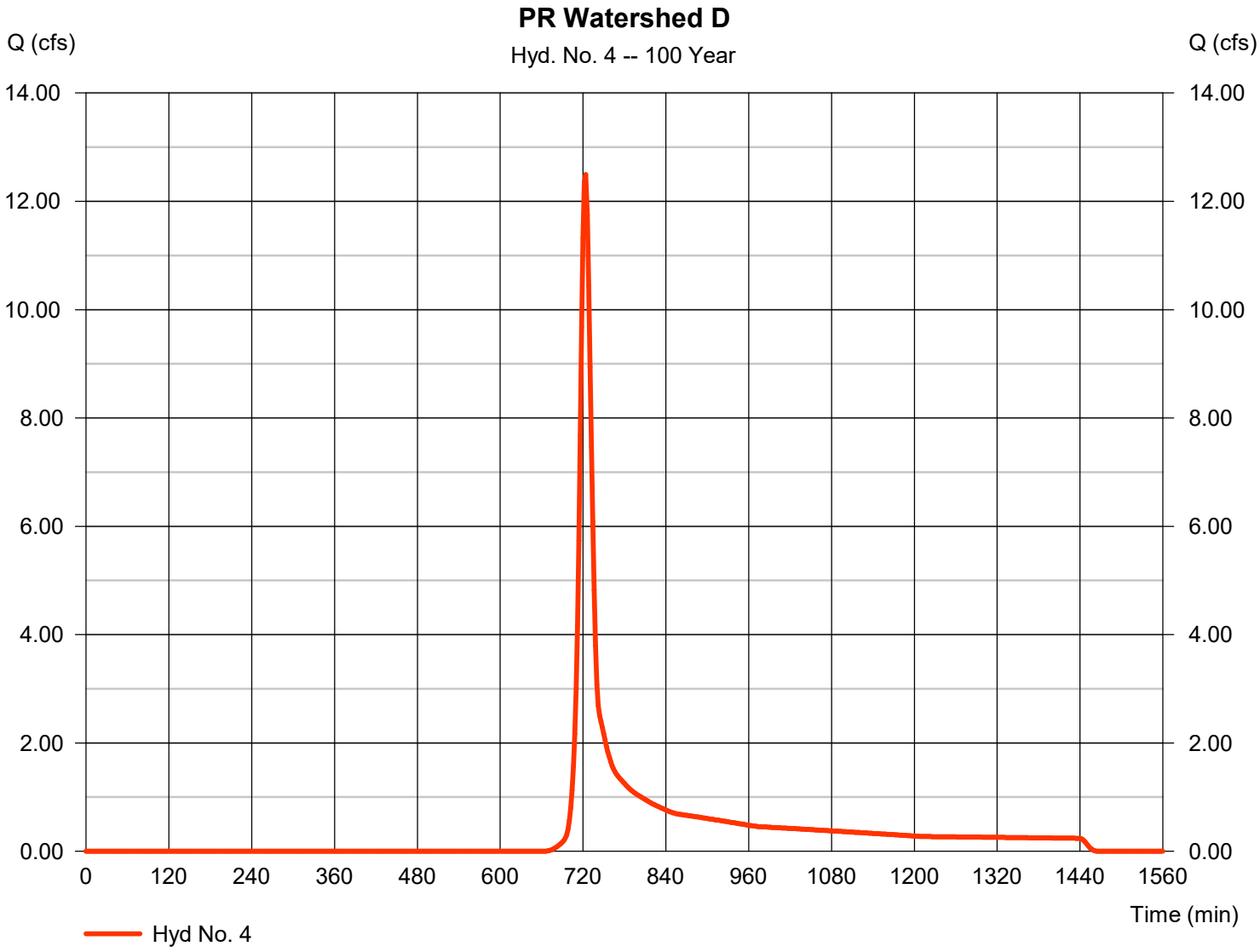


## Hyd. No. 4

PR Watershed D

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 12.49 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 724 min |
| Time interval | = | 2 min | Hyd. volume | = | 36,980 cuft |
| Drainage area | = | 6.630 ac | Curve number | = | 62* |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 15.70 min |
| Total precip. | = | 5.22 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

* Composite (Area/CN) = [(0.160 x 98) + (0.020 x 98) + (0.250 x 55) + (6.200 x 61)] / 6.630



# Hydrograph Report



## Hyd. No. 5

Outlets Basin

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 6.719 cfs |
| Storm frequency | = | 100 yrs | Time to peak | = | 770 min |
| Time interval | = | 2 min | Hyd. volume | = | 146,579 cuft |
| Inflow hyd. No. | = | 2 - PR Watershed B | Max. Elevation | = | 595.04 ft |
| Reservoir name | = | Modified Basin | Max. Storage | = | 102,976 cuft |

Storage Indication method used.