STORMWATER MANAGEMENT REPORT

Proposed Warehouse Facility
10 Russell Road
East Granby, CT

Prepared For:

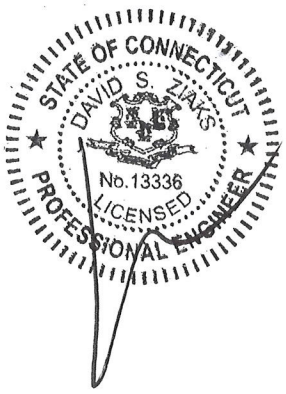
Joneser's Express Transportation (aka JET)
Windsor Locks, CT

Prepared By:

F. A. Hesketh & Associates, Inc.
3 Creamery Brook
East Granby, CT 06026

F. A. Hesketh
& Associates, Inc.

FAHA Project #23145



September 29, 2023

1. Introduction

This Stormwater Management Report has been prepared to demonstrate that the stormwater management practices for the proposed development follow sound engineering practices, adhere to the Town of East Granby Stormwater Management Plan and Town Engineering Guidelines, CT DEEP Stormwater Treatment Practices for capture and treatment of the minimum recommended water quality volume and protect adjacent landowners and the downstream watershed from adverse stormwater impacts. The East Granby Stormwater Management Plan incorporates the requirement to implement Low Impact Development (LID) practices. Several of the recommended practices have been incorporated in this design.

This report presents hydrologic analysis of both pre- and post-developed conditions to demonstrate that the development of the parcel will result in no net increase in peak rates of runoff or total volume of runoff from the development for storms of return periods of 2, 5, 10, 25, 50 and 100 years.

This report also presents a pipe to pipe design analysis to demonstrate that all proposed storm drain systems have adequate capacity to convey runoff from the site for a 25-year return period storm event.

2. Project Description

The proposed development site is comprised of three parcels totaling 12.44-acresl located on southeasterly side of the intersection of Russell Road and East Street and is located in the CP-T Zone. Except for an existing single family house and garage, the site is currently an open undeveloped mowed meadow grass lot. The site had been used for many years as a seasonal weekly classsic car auto show ground. A combination of open space, residential, industrial, warehouses and commercial uses surround the site. See attached existing topographic conditions survey Sheet ILP-1.

The proposal includes construction of a single story warehouse facility consisting of one 40,000 s.f. building with truck loading docks and truck and employee vehicle parking areas. Driveway access will be from two new paved drives off Russell Road. Utility service lines will then be extended underground to the northerly side of the new building from existing public utility services in Russell Road. The site will have private well, fire water storage tank and a conventional septic system.

Storm water management systems proposed for the development will consist of storm drain systems comprised of roof drains, catch basins and culverts and three excavated Water Quality/Detention Basins. Stormwater runoff from the roof, all on-site paved drives and parking area will be directed to the basins where stormwater will be captured, detained/retained, and treated before discharge. Catch basins will have 2 ft. sumps and outlets will be hooded prior to discharge to the basins.

Outflow from the three basins will be controlled by an individual concrete outlet structure

with a controlling concrete orifice and overflow weir. Rip rap protection designed using CTDOT standards is proposed at all outfalls to control downgradient erosion.

For the overall drainage analysis presented, two Design Points (East and South) serve as the focal point of the overall site hydrologic analysis, as discussed below and shown on the attached Sheets DA-1 and DA-2.

3. Hydrologic Analysis

A comprehensive hydrologic analysis was conducted for both the existing condition and the proposed developed condition of the site to determine peak flow of runoff under both conditions. Hydraflow Hydrographs computer software was utilized in the runoff analysis. The SCS Method was used to model peak flows for pre- and post-redeveloped conditions including the sizing for the three basins.

For purposes of the hydrologic analysis, it is assumed that all site runoff, under both existing and proposed conditions flows to the two Design Points as shown on Sheets DA-1 and DA-2. Watershed maps used in the analysis are attached.

Approximately 2/3's of the development site currently drains overland southerly towards the flagged wetlands and unnamed intermittent watercourse that follows along the southerly property line as shown on Sheet DA-1. The watercourse which flows to the east is on abutting Town Open Space. The 1/3 portion located in the northeasterly portion of the site drains overland to the abutting parcel and is then directed to the south and east to join up with flow coming from the intermittent watercourse. This receiving wetland and watercourse are all part of the overall watershed associated with DeGrayes Brook. DeGrayes Brook flows north and east of the site crossing under Russell Road approximately 750 feet to the east of the project site. The brook is one of the smaller tributaries making up the much larger watershed of Stony Brook. See the attached town watershed map.

In the existing conditions analysis, the time of concentration (Tc) was determined using TR-55 methodologies for the aggregate of flow components consisting of overland sheet flow and shallow concentrated flow as shown on Sheet DA-1. Based on the NRCS Soil Survey, the upland soils within the proposed developed portion of the site are made up of moderately to well draining silt loams typically found in the surrounding former farmlands. The soil type 25B-Brancroft silt loam falls in the Hydrologic Group C. The soil types 82B/C-Broadbrook silt loam falls in the Hydrologic Group C as well. Portions of the developed area located in the southwesterly portion of the site fall into a mixture of the soil types 5-Wilbraham silt loam and 9-Scitico,Shaker and Maybid soil which are poorly drained and tend to be more silty with some clay. See Attachment B.

In the proposed analysis, the site is divided into sub-catchment areas in the developed portion of the parcel represented by relatively small watersheds as shown on Sheets DA-2 . A starting Tc of 5 minutes was used for pavement and roof surfaces with a average travel time of 2 additional minutes added resulting in a final design Tc of 7 min. for pipe sizing.

SCS Runoff Curves Numbers were based on the following values. Detailed calculation sheets for each of the sub-catchment areas are attached.

In general:

- For impervious areas (i.e. rooftops and paved areas), CN=98 was used.
- For open meadow grass land, CN=61 to 80 was used.
- For moderately sloped wooded portions of the site, CN=77 was used.

Analysis was performed for the 2-, 5-, 10-, 25-, 50-, and 100-year return period storm events using the 24-hour duration storm event for East Granby using the NOAA Atlas 14 data, which is required by current CT DOT Drainage Manual design standards. See Attachment C.

The hydrologic analysis presents a comparison of pre-and post-developed conditions for each of the two design points East and South.

Existing Conditions Analysis

The existing conditions watershed area was utilized to model existing site conditions and to develop a baseline for comparison. The two delineated areas represent the total contributory watersheds that flow to the two points of analysis which are ultimately captured and routed through water quality/detention basin systems in the post developed model. The limits of the watersheds were determined by reviewing on-site topography from the existing conditions survey and field inspection. The limits of the modeled two sub-watersheds are depicted on Sheet DA-1.

The existing conditions watershed consists of essentially the entire property down to the south property line and over to the easterly boundary line. Final times of concentration (Tc) ranging between 8.6 and 10.1 minutes were calculated for the existing conditions sub-watersheds. Peak rates of flow for the sub-watersheds and the overall Existing Conditions Watershed for the various modeled storms (2 to 100-year return period events) are summarized in Table 1 and included in Attachment D.

Proposed Conditions Analysis

For proposed conditions, the sub-catchment areas were utilized to model proposed site conditions. For comparison, the total area modeled under the proposed site conditions is essentially equal to that modeled under the existing site conditions. There are a total of two discharge points from the proposed basins following the general patterns of runoff from the site to the downstream wetlands and off-site intermittent watercourse under current conditions.

The limits of the modeled watersheds, as well as the locations of the three water quality/detention basins are depicted on Sheet DA-2. To remain conservative in the analysis, the beneficial impacts of flow and volume reduction through possible infiltration and inflow within the basins are not included in the proposed hydrologic modeling. Because

an increase in impervious area results in increases of peak rates of runoff, storm water detention is proposed. The water quality/detention basins will mitigate increases in peak rates of runoff through use of containment and outlet methods designed to throttle back peak rates of flow.

The hydraulic model combines the overflow outflow from the two discharge points and adds that to the flow from the un-detained watershed for a total proposed conditions peak rate of flow. The peak rates of discharge for the existing and proposed site conditions for the modeled watersheds for the 2-, 5-, 10-, 25-, 50- and 100-year storm events were computed by the program. The design goal was to be below pre-development flow conditions at each of the two design points. Results of the combined analysis are presented below in Table 1.

TABLE 1

Design Point East	**Existing Conditions**	**Proposed Conditions**
Return Period (years)	**Peak Rate of Discharge (CFS)**	**Peak Rate of Discharge (CFS)**
2-Year	3.2	0.7
5-Year	5.6	1.2
10-Year	7.7	1.5
25-Year	10.8	2.1
50-Year	13.4	2.6
100-Year	15.7	3.0

Design Point South	**Existing Conditions**	**Proposed Conditions**
Return Period (years)	**Peak Rate of Discharge (CFS)**	**Peak Rate of Discharge (CFS)**
2-Year	11.8	9.5
5-Year	20.1	14.2
10-Year	27.1	17.8
25-Year	37.7	23.2
50-Year	46.2	27.4
100-Year	53.9	31.2

The model indicates that the stormwater management methods proposed will reduce peak flows in each sub-watershed and overall when combined flow is compared at the design points. Details of the analysis of the Hydraflow model, including model input and output are included in Attachment D.

4. Pipe to Pipe Design Analysis

The proposed development will employ conventional on-site storm drain systems. These systems convey runoff two the water quality/detention basins for peak flow attenuation and water quality purposes. A detailed, pipe-to-pipe analysis was conducted for all of the proposed on-site storm drain systems. All roof leaders will be piped to the systems as well.

The storm drain systems have been designed to handle the peak flow for the 25-year storm event, in accordance with town requirements. To design and analyze the pipe systems, a pipe to pipe analysis was conducted using Hydraflow Storm Sewers for Windows software. This software uses the Rational Method and Manning's Formula to compute peak flow to each basin, and to calculate the capacity of individual culverts.

Input data includes the geometry and configuration of the storm drain system, catchment area of each inlet, weighted runoff coefficients, and times to inlet. Catchment areas were calculated based on proposed topography utilizing polyline delineations in AutoCAD. The catchment areas are depicted graphically on Sheet DA-3.

Weighted runoff coefficients were calculated based on percentages of impervious and pervious areas within each catchment area, as determined by areas of pavement, rooftops, landscaped and wooded areas. The following runoff coefficients were used in the post-development conditions hydrologic model: For impervious areas, C=0.9 was used. For landscaped areas, C=0.30 was used.

Rainfall intensity data was taken from NOAA Atlas 14 rates off of the NOAA website for East Granby. A copy of the Rainfall Intensity Curve is presented in Attachment C. All inlets are small and highly urbanized, therefore, the time to inlet for all inlets is assumed to be five minutes. A Manning's roughness coefficient of 0.013 was used for specified N-12 CPE and RCP pipe.

The model calculates the capacity of each culvert and accounts for loss coefficients at bends and inlet and outlet control, whichever governs. Input data includes basin geometry, longitudinal slope, cross slope, and basin depression. Standard size CT DOT 'Type-C' and Double catch basins were modeled for all basins, as appropriate.

Results of analysis are attached, and include summaries of system design based on CT DOT output formats. Program input and output data reports are presented in Attachment E. The analysis indicates that all storm drain culverts are designed to adequately convey the 25-year storm event.

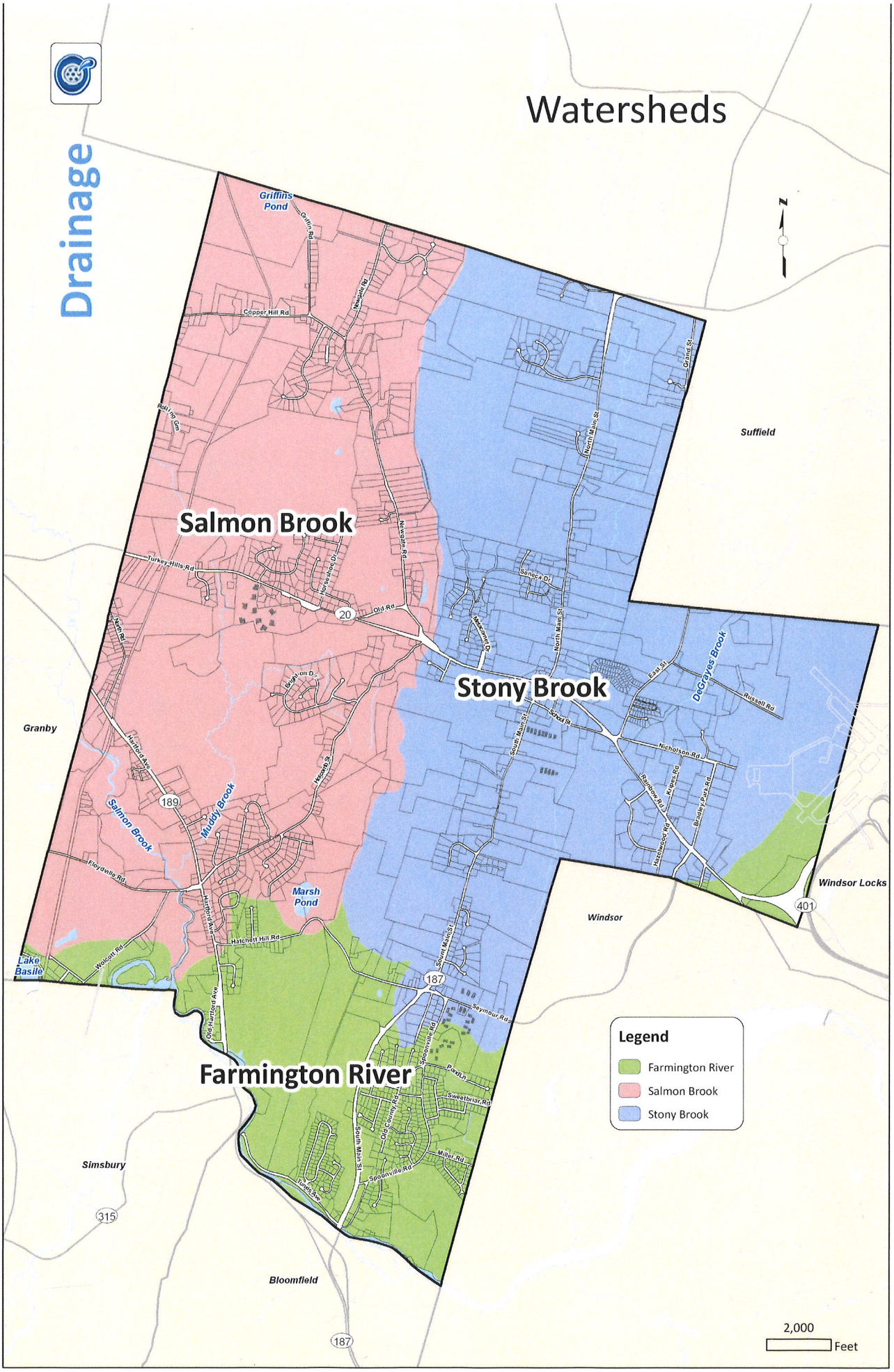
5. Water Quality Treatment Practices

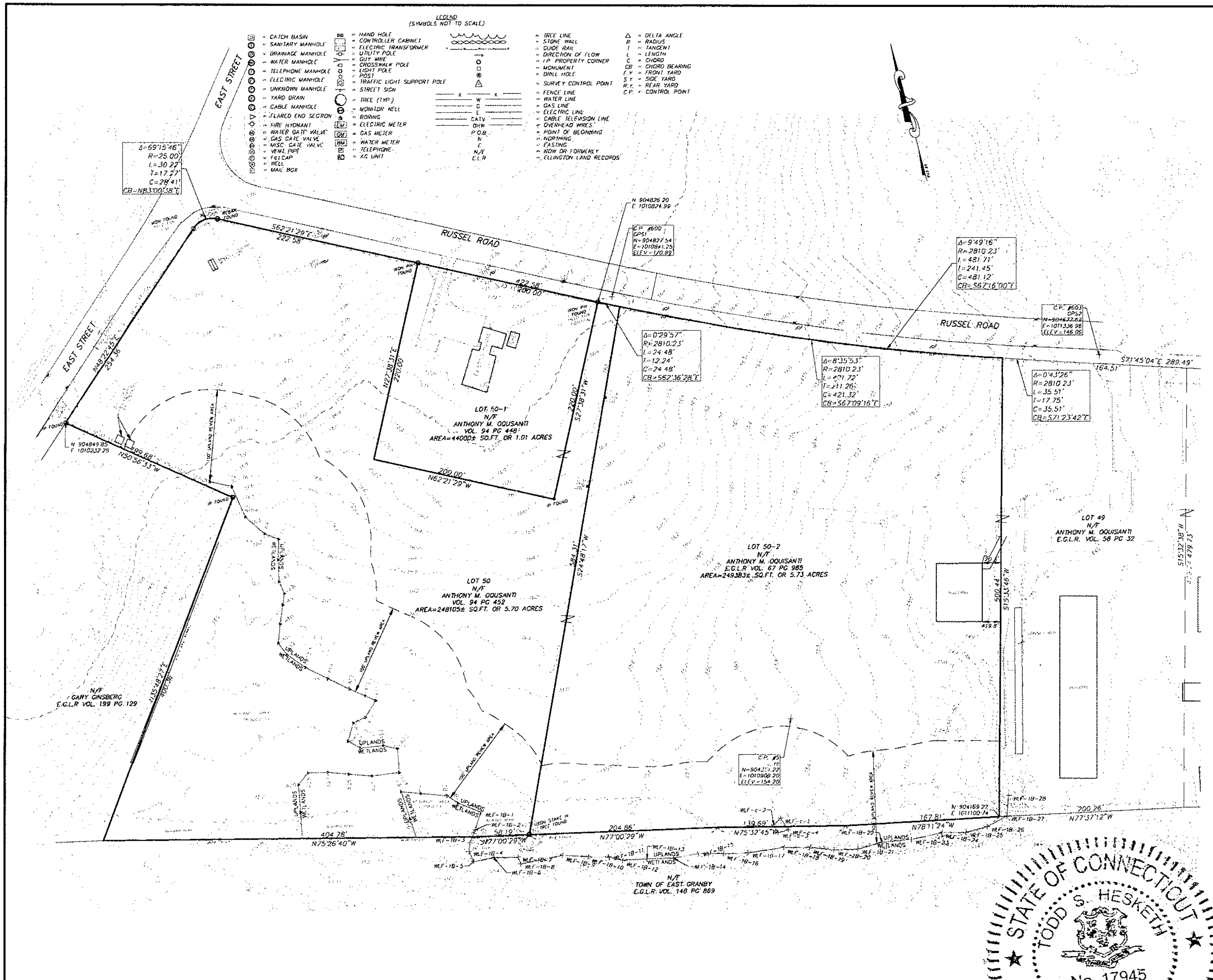
The treatment practice employed for the paved surfaces consists of a treatment train starting with catch basins with 2-foot sumps, hooded outlets, discharge to water quality /detention basins, and then discharge to riprap outlet aprons sized per CTDOT design standards.

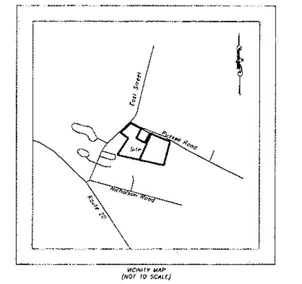
Water Quality volume (WQV) calculations were completed following the Stormwater Treatment Practice Sizing Criteria per Chapter 7 of the CTDEEP 2004 Connecticut Stormwater Quality Manual (SQM). The three water quality/detention basins are proposed as the integral part of the stormwater management of the site runoff. The water quality/detention basins are designed to capture and treat more than the minimum required Water Quality Volume (WQV) recommended by the 2004 Connecticut Stormwater Quality Manual (SWQM). The WQV calculations are included in Attachment F.

6. Summary

Both the hydrologic and pipe to pipe analyses demonstrate that the goals of the design effort have been met. More than the minimum recommended WQV is provided and peak flows have been reduced below peak existing conditions.


Watersheds
Drainage
Griffins Pond
Griffin Rd
Copper Hill Rd
Newgate Rd
Rail Rd Grn
Grand St
Suffield
North Main St
Salmon Brook
Turkey Hills Rd
Horseshoe Dr
Newgate Rd
Seneca Dr
20
Old Rd
Mohawk Dr
North Main St
Stony Brook
East St
DeGrayes Brook
Russell Rd
Granby
Beaumont Dr
South Main St
School St
Nicholson Rd
North Rd
Hartford Ave
Hayes St
Rainbow Rd
Keyes Rd
Bradley Park Rd
Hazelnut Rd
189
Salmon Brook
Muddy Brook
Floydville Rd
Marsh Pond
Windsor Locks
401
Windsor
Hartford Ave
Hatchett Hill Rd
Lake Basile
Wolcott Rd
South Main St
187
Old Hartford Ave
Seymour Rd
Spoonville Rd
Pond Ln
Farmington River
Sweetbriar Rd
Old County Rd
South Main St
Miller Rd
Spoonville Rd
Tariffville Ave
Simsbury
315
Bloomfield
187
Legend
Farmington River
Salmon Brook
Stony Brook
2,000
Feet





COMMERCE PARK TRANSITION ZONE

ZONING DISTRICT	MINIMUM REQUIRED LOT AREA (S.F.)	MAXIMUM PERMITTED LOT WIDTH (FT)	MINIMUM REQUIRED YARDS (FT.) FRONT	SIDE	REAR	MAX. BLDG. COVERAGE	MAX. PERMITTED HEIGHT
CPT	80,000	N/A	100	30	30	65%	45 FT

*NON-CONFORMING TO CURRENT ZONING REGULATIONS, SEE CT GENERAL STATUE 8-13a

NOTES:

1. THIS SURVEY HAS BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTIONS 20-300b-1 THROUGH 20-300b-20, AS AMENDED.
2. IT IS A PROPERTY/TOPOGRAPHIC SURVEY INTENDED TO BE USED FOR PRELIMINARY PLANNING PURPOSES AND TO LOCATE WETLAND FLAGS SET BY A CERTIFIED WETLANDS SOIL SCIENTIST
3. THIS SURVEY FALLS INTO THE BOUNDARY RESURVEY DETERMINATION CATEGORY
4. THIS SURVEY CONFORMS TO CLASS A-2 HORIZONTAL ACCURACY STANDARDS AND T-D TOPOGRAPHIC ACCURACY STANDARDS
5. THE SUBJECT PARCELS ARE CURRENTLY OWNED BY ANTHONY M. OQUISANTI VOL. 67 PG. 985, VOL. 94 PG. 448, AND VOL. 94 PG. 452.
6. THE SUBJECT PARCEL IS LOCATED IN THE COMMERCE PARK TRANSITION ZONE IN THE TOWN OF EAST GRANBY, CT, BASED THE TOWN OF EAST GRANBY ZONING MAP, ADOPTED ON APRIL 30, 1993 WITH AMENDMENTS TO OCTOBER 2022.
7. BEARINGS AND COORDINATES DEPICTED HEREON REFER TO THE NORTH AMERICAN DATUM OF 1983 (NAD 83). ELEVATIONS (IF ANY) DEPICTED HEREON REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88) AND ARE BASED UPON OPUS RAPID STATIC OBSERVATIONS PERFORMED ON AUGUST 1, 2023 ,RESULTING IN THE FOLLOWING VALUES: CONTROL POINT #600 N=904827.54, E=1010841.25, ELEV.=170.89' AND CONTROL POINT #603 N=904627.62, E=1011366.96, ELEV.=146.06'
8. WETLAND FLAGS A-1 TO A-30 AND B-1 TO B-4 DEPICTED HEREON ARE BASED UPON MAP REFERENCE #2. WETLAND DELINEATION FLAG SERIES 1B-1 TO 1B-28 AND C-1 TO C-4 WERE PLACED BY WILLIAM A. JACKSON, L.E.P. ON 7/15/2023 AND 7/20/2023
9. UNDERGROUND UTILITY, STRUCTURE AND FACILITY LOCATIONS (IF ANY) DEPICTED AND NOTED HEREON HAVE BEEN COMPILED, IN PART, FROM RECORD MAPPING, PAROLE TESTIMONY, VISIBLE FEATURES AND OTHER SOURCES. THESE LOCATIONS MUST BE CONSIDERED AS APPROXIMATE IN NATURE. ADDITIONALLY, OTHER SUCH FEATURES MAY EXIST ON THE SITE, THE EXISTENCE OF WHICH ARE UNKNOWN TO THIS SURVEYOR. THE SIZE, LOCATION AND EXISTENCE OF ALL SUCH FEATURES MUST BE FIELD DETERMINED AND VERIFIED BY THE APPROPRIATE AUTHORITIES PRIOR TO CONSTRUCTION. CALL BEFORE YOU DIG 1-800-922-4455.

MAP REFERENCES

1. AGRICULTURAL ZONE PROPERTY OF JENNIE M. CAGUE ESTATE OF MAITLAND J CAGUE 10 RUSSELL ROAD EAST GRANBY, CONNECTICUT SCALE 1" = 50' FEBRUARY 1989 SANDERSON & WASHBURN
2. SITE PLAN ANTHONY M. OQUISANTI 22 RUSSELL ROAD EAST GRANBY, CONNECTICUT SCALE 1" = 40' MAY 1984 SANDERSON AND WASHBURN
3. LOT LINE REVISION PROPERTY OF ANTHONY M. OQUISANTI & MARK OQUISANTI 18-22 & 30 RUSSELL ROAD EAST GRANBY, CONNECTICUT SCALE 1" = 50' DECEMBER 5, 2018 BARRESI ASSOCIATES, LLC
4. PROPERTY SURVEY PROPERTY OF RONCARI INDUSTRIES, INC.RUSSELL ROAD EAST GRANBY, CONNECTICUT SCALE 1" = 50' 9/23/03 CLOSE JENSON & MILLER, P.C.

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

TO MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON

THIS MAP IS NOT VALID WITHOUT THE LIVE SIGNATURE AND IMPRESSION TYPE SEAL OF THE LAND SURVEYOR WHOSE NAME APPEARS HEREON

TODD S. HESKETH LS 17945

No.	Date	Revisions: Description

PROPERTY/TOPOGRAPHIC SURVEY

PROPERTY OF

ANTHONY M. OQUSANTI

RUSSELL ROAD

EAST GRANBY, CONNECTICUT

Date: 05-25-2023	Drawn by: HJD	Job no: 23145
Scale: 1" = 50'	Checked by: TSH	Sheet no: 1 OF 1

ILP-1

F. A. Hesketh & Associates, Inc.
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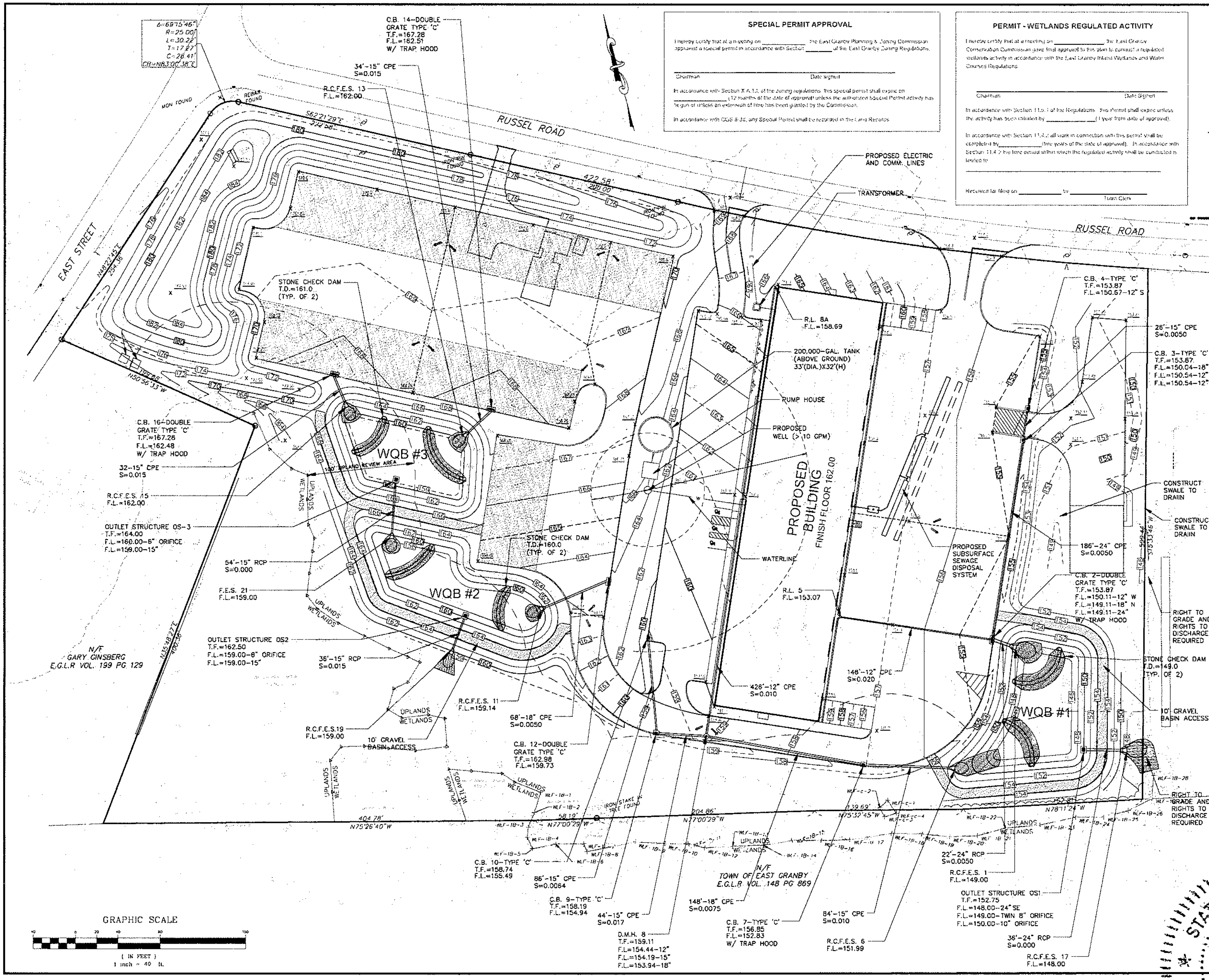
O:\2023\23145 - East Russell Road\SURVEY\BASE MAP 2023-09-29.dwg, layout, Sep. 28, 2023 - 3:24:03 PM



SPECIAL PERMIT APPROVAL

I hereby certify that at a meeting on ____________ the East Granby Planning & Zoning Commission approved a special permit in accordance with Section ______ of the East Granby Zoning Regulations.

Chairman ______________________ Date signed

In accordance with Section X A.1.c. of the Zoning regulations, this special permit shall expire on ____________ (12 months of the date of approval) unless the authorized Special Permit activity has begun or unless an extension of time has been granted by the Commission.

In accordance with CGS 8-3d, any Special Permit shall be recorded in the Land Records.

PERMIT - WETLANDS REGULATED ACTIVITY

I hereby certify that at a meeting on ____________, the East Granby Conservation Commission gave final approval to this plan to conduct a regulated wetlands activity in accordance with the East Granby Inland Wetlands and Water Courses Regulations.

Chairman ______________________ Date Signed

In accordance with Section 11.6.1 of the Regulations, this Permit shall expire unless the activity has been initiated by ____________ (1 year from date of approval).

In accordance with Section 11.4.2 all work in connection with this permit shall be completed by ____________ (five years of the date of approval). In accordance with Section 11.4.2 the time period within which the regulated activity shall be conducted is limited to ______________________

Received for filing on __________ by ______________________ Town Clerk

LEGEND

- = PROPOSED DRAINAGE MANHOLE
- = PROPOSED SANITARY MANHOLE
- = PROPOSED CATCH BASIN
- = PROPOSED STORM DRAIN CULVERT
- = PROPOSED OUTLET STRUCTURE
- = PROPOSED SPOT GRADE
- = PROPOSED CONTOUR
- = PROPOSED DRAINAGE DIVIDE
- = EXISTING CONTOUR

GENERAL GRADING NOTES:

1. SET/RAISE FRAMES OF ALL MANHOLES, CATCH BASINS, GAS AND WATER GATES, HAND HOLES, METER BOXES, AND ALL OTHER UTILITY APPURTENANCES TO MATCH PROPOSED FINISH GRADE.
2. MILL AND SAW CUT EXISTING PAVEMENT ALONG LIMITS OF WORK. CONSTRUCT APPROPRIATE PAVEMENT MATCH TREATMENT. BLEND ALL NEW WORK TO MATCH EXISTING.
3. GRADE ALL AREAS TO PRECLUDE PONDING
4. GRADE TRANSITIONS TO ROADWAYS TO MAINTAIN GUTTER FLOW AND PRECLUDE PONDING.

DRAINAGE SYSTEM NOTES:

1. CPE = CORRUGATED POLYETHYLENE PIPE CONFORMING TO CT DOT FORM 818, M.08.01-18, SMOOTH INTERIOR.
2. CATCH BASINS AND OTHER DRAINAGE STRUCTURES SHALL CONFORM TO CT DOT FORM 818, M.08.02
3. CONNECT ALL ROOF LEADERS TO STORM DRAIN SYSTEMS AS SHOWN. COORDINATE DOWNSPOUT LOCATIONS WITH PROJECT ARCHITECT/M.E.P.
4. EXISTING UTILITIES DEPICTED ARE FROM FIELD SURVEY DATA AND OTHER READILY-AVAILABLE INFORMATION. NOT ALL UTILITIES MAY BE SHOWN, AND THOSE SHOWN MAY NOT BE ACCURATE. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO START OF CONSTRUCTION OF UTILITIES. CONDUCT TEST PITS AT ALL UTILITY CROSSINGS AND POINT OF CONNECTIONS WITH EXISTING UTILITIES. NOTIFY DESIGN ENGINEER OF POTENTIAL CONFLICTS WITH PROPOSED ALIGNMENT AND GRADE.
5. CONTACT "CALL BEFORE YOU DIG" BY CALLING 811 OR 1-800-922-4455 TO MARK THE LOCATION OF ALL UNDERGROUND UTILITIES AT LEAST 72 HOURS PRIOR TO START OF CONSTRUCTION.
6. ALL MATERIALS AND INSTALLATION PER TOWN OF EAST GRANBY, CT DOT FORM 818, OR MANUFACTURER'S SPECIFICATION, AS APPROPRIATE.

GENERAL SITE DATA:

1. TOTAL SITE AREA = 12.44 ACRES
2. TOTAL SITE DISTURBANCE = 9.20 ACRES
3. TOTAL WETLANDS AREA = 1.37 ACRES
4. WETLANDS AREA DISTURBED = 0 ACRES
5. WATERCOURSE DISTURBED = 0 L.F.
6. TOTAL 100' URA = 2.60 ACRES
7. TOTAL 100' URA DISTURBED = 1.58 ACRES

OWNER: Anthony Oquisanti, P.O. Box Z, East Granby, CT 06026, (860) 653-2551

APPLICANT: Joneser's Express Transportation, P.O. Box 872, Windsor Locks, CT 06096, (877) 966-3796

No	Date	Description

Revisions:

FAH
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Civil & Traffic Engineers · Surveyors · Planners · Landscape Architects www.fahesketh.com · mail@fahesketh.com

GRADING, DRAINAGE AND UTILITY PLAN
PREPARED FOR
Jonser's Express Transportation
10 RUSSELL ROAD
EAST GRANBY, CONNECTICUT

Date: 09-29-2023	Drawn by: DRT	Job no: 23145
Scale: 1" = 40'	Checked by: GAH	Sheet no: 1 OF 1

GR-1

STATE OF CONNECTICUT
DAVID S. ZIAKS
No. 13336
LICENSED
PROFESSIONAL ENGINEER

O:\2023\23145 - East Russel Road\Submittal 2023\2023-09-29\GR-1 2023-09-29.dwg, GR-1, Sep. 28, 2023 - 9:05:30 AV

Attachment A

Watershed Area Maps

WATERSHED LIMITS (TYPICAL)

200' SHEET FLOW,
n=0.024, S=2.0%

150' SHEET FLOW,
n=0.024, S=4.0%

578' SHALLOW CONC. FLOW,
S=3.29%

WS -EX-E
AREA = 122,871 S.F. (2.82 Ac.)
CN = 75
Tc = 5 Mins.

WS-EX-S
AREA = 421,690 S.F. (9.68 Ac.)
CN = 77
Tc = 10 Mins.

DESIGN POINT EAST

DESIGN POINT SOUTH

578' SHALLOW CONC. FLOW,
S=3.29%

TRANSITION POINT (TYPICAL)

658' CHANNEL FLOW,
S=1.52%

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft

AREA TYPE LEGEND

Symbol Type

Impervious Surface

Landscaping

Wooded

SOIL TYPE LEGEND

5 - Wilbraham Silt Loam, (0-3%) - Rating: C/D
9 - Scitico, Shaker, and Maybid Soils - Rating: D
25B - Brandcroft Silt Loam, (3-8%) - Rating: C
28B - Elmridge Fine Sandy Loam, (3-8%) - Rating: C
82B - Broadbrook Silt Loam, (3-8%) - Rating: C
82C - Broadbrook Silt Loam, (8-15%) - Rating: C
306 - Udorthents-Urban Land - Rating: B

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www.fahesketh.com - mail@fahesketh.com

Revisions:

No	Date	Description

DRAINAGE ANALYSIS MAP
EXISTING CONDITIONS WATERSHED AREAS
PREPARED FOR
J.E.T.
10 RUSSELL ROAD
EAST GRANBY, CONNECTICUT

Date: 09-29-2023 | Drawn by: DRT | Job no: 23145
Scale: 1" = 50' | Checked by: GAH | Sheet no: 1 OF 1

DA-1

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WATERSHED LIMITS (TYPICAL)

WS -PR-UNDET.-S
AREA = 169,516 S.F. (3.65 Ac.)
CN = 79
Tc =10 Mins

WS-PR-S -1
AREA = 99,788 S.F. (2.29 Ac.)
CN = 89
Tc = 5 Mins

WS -PR-UNDET.-E
AREA = 18,611 S.F. (0.43 Ac.)
CN = 79
Tc = 5 Mins

WS-PR-S-2
AREA = 49,138 S.F. (1.13 Ac.)
CN = 89
Tc = 10 Mins

WS-PR-S-3
AREA = 209,989 S.F. (4.82 Ac.)
CN = 91
Tc = 10 Mins

WS -PR-UNDET.-S
AREA = 169,516 S.F. (3.65 Ac.)
CN = 79
Tc = 10 Mins

WS -PR-UNDET.-S
AREA = 169,516 S.F. (3.65 Ac.)
CN = 79
Tc = 10 Mins

WQB #1

WQB #2

WQB #3

DESIGN POINT EAST

DESIGN POINT SOUTH

AREA TYPE LEGEND

Symbol Type

Impervious Surface

Landscaping

Wooded

SOIL TYPE LEGEND

5 - Wilbraham Silt Loam, (0-3%) - Rating: C/D
9 - Scitico, Shaker, and Maybid Soils - Rating: D
25B- Brandcroft Silt Loam, (3-8%) - Rating: C
28B- Elmridge Fine Sandy Loam, (3-8%) - Rating: C
82B- Broadbrook Silt Loam, (3-8%) - Rating: C
82C- Broadbrook Silt Loam, (8-15%) - Rating: C
306- Udorthents-Urban Land - Rating: B

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft.

F. A. Hesketh & Associates, Inc.
3 Creamery Brook, East Granby, CT 06026
Phone (860) 653-8000 Fax (860) 844-8600
Civil & Traffic Engineers · Surveyors · Planners · Landscape Architects www.fahesketh.com - mail@fahesketh.com

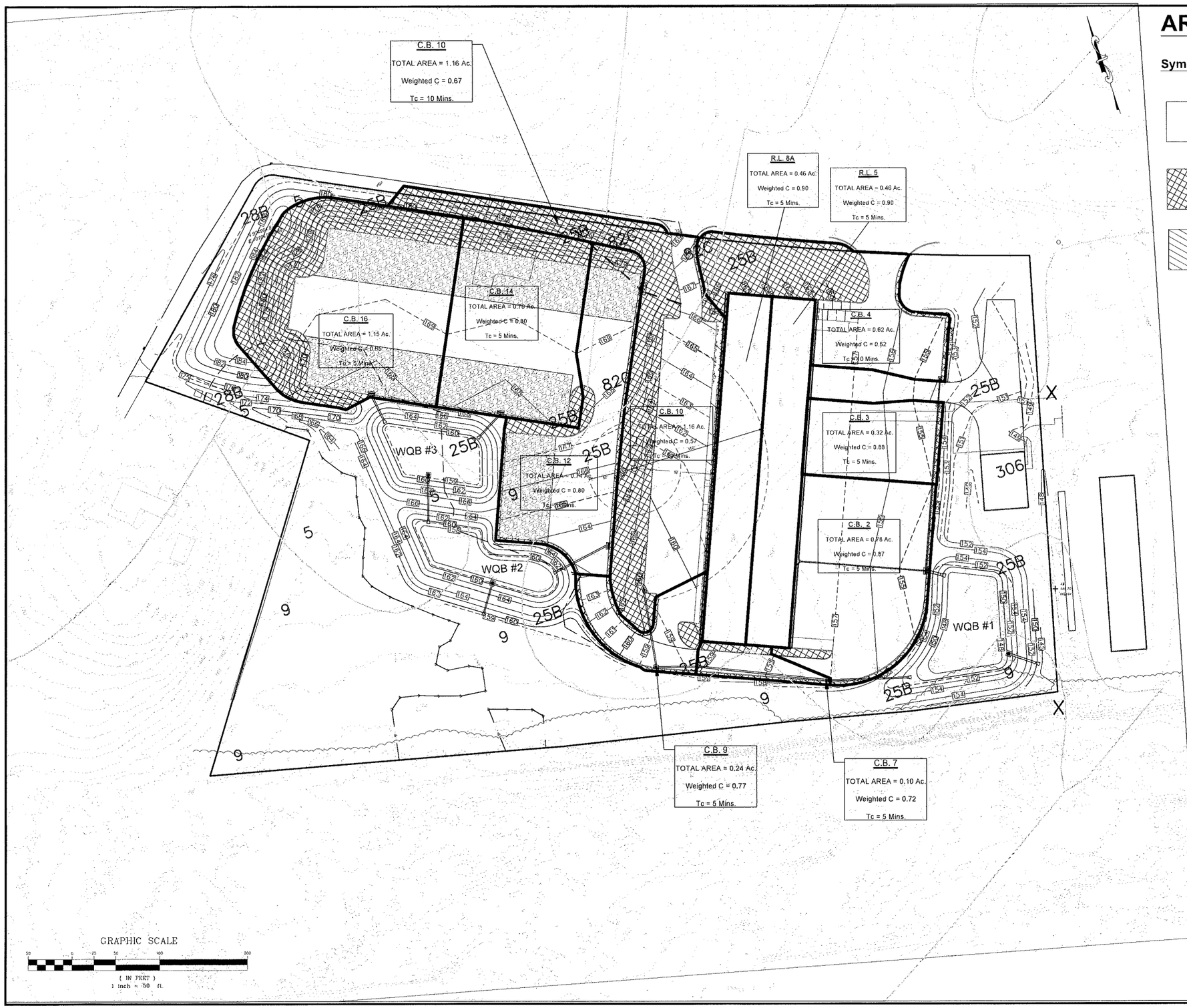
Revisions:
No | Date | Description

DRAINAGE ANALYSIS MAP
PROPOSED CONDITIONS WATERSHED AREAS
PREPARED FOR
JET
10 RUSSELL ROAD
EAST GRANBY, CONNECTICUT

Date: 09-29-2023 | Drawn by: DRT | Job no: 23145
Scale: 1" = 50' | Checked by: GAH | Sheet no: 1 OF 1

DA-2

G:\2023\23145 - East Russell Road\Submittal 2023\2023-09-29\DA-1 2023-09-28.dwg DA-2, Sep 27, 2023 - 3:48:30 PM



AREA TYPE LEGEND

Symbol Type

Impervious Surface

Landscaping

Wooded

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

F. A. Hesketh & Associates, Inc.
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Revisions:

No.	Date	Description

DRAINAGE ANALYSIS MAP
PIPE-TO-PIPE ANAYLSIS
PREPARED FOR
J.E.T
10 RUSSELL ROAD
EAST GRANBY, CONNECTICUT

Date: 09-29-2023 | Drawn by: DRT | Job no: 23145
Scale: 1" = 50' | Checked by: GAH | Sheet no: 1 OF 1

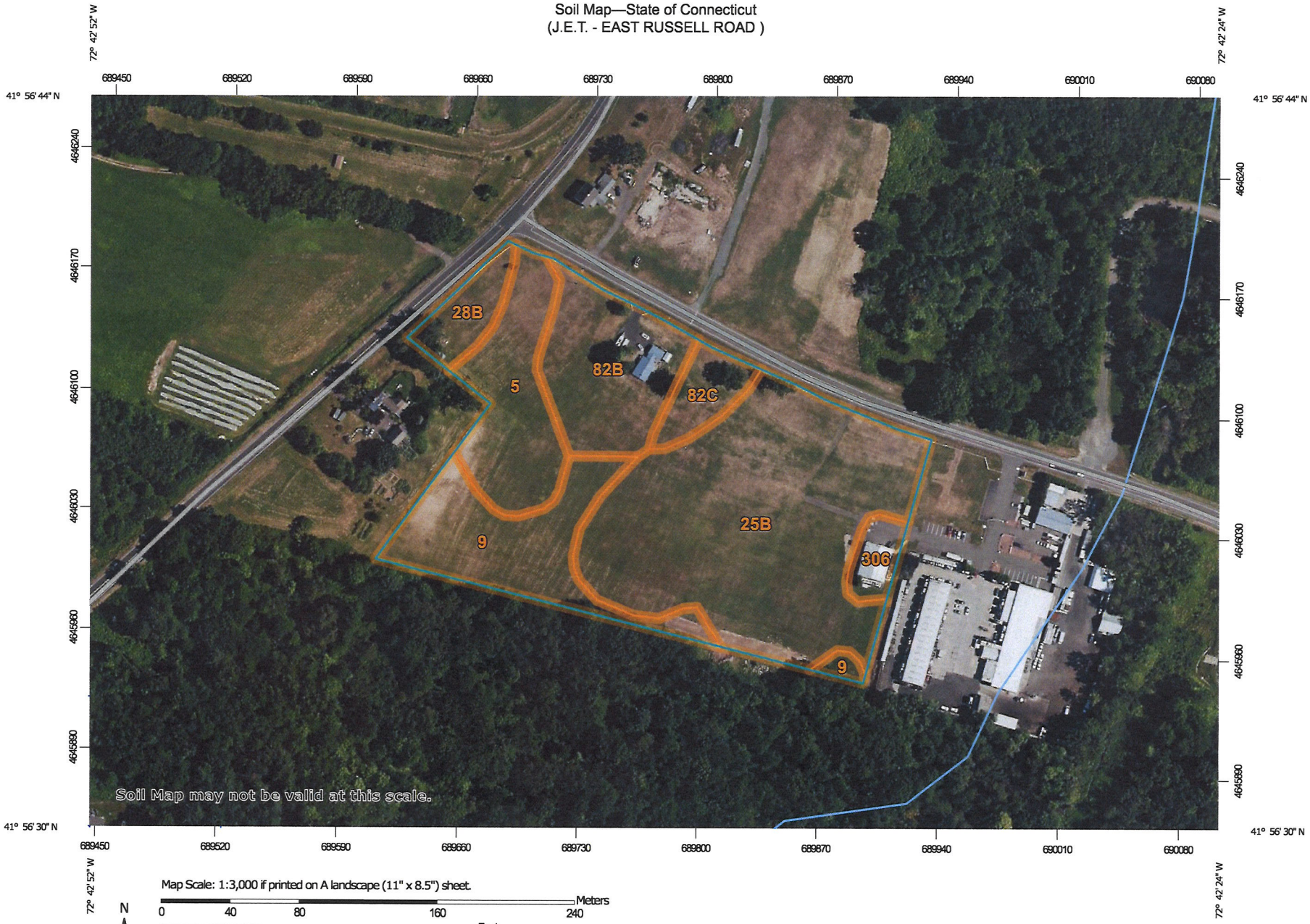
DA-3

D:\2023\23145 - East Russell Road\Submitted 2023\2023-09-29\DA-1 2023-09-29.dwg, DA-3, Sep 22, 2023 - 5:01:03 PM

Attachment B

Soil Type Maps

Soil Map—State of Connecticut
(J.E.T. - EAST RUSSELL ROAD)



Map Scale: 1:3,000 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 40 80 160 240

Feet: 0 100 200 400 600

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 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
Survey Area Data: Version 22, Sep 12, 2022

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

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
5	Wilbraham silt loam, 0 to 3 percent slopes	1.6	13.1%
9	Scitico, Shaker, and Maybid soils	1.9	16.1%
25B	Brancroft silt loam, 3 to 8 percent slopes	5.5	46.0%
28B	Elmridge fine sandy loam, 3 to 8 percent slopes	0.5	4.1%
82B	Broadbrook silt loam, 3 to 8 percent slopes	1.7	14.1%
82C	Broadbrook silt loam, 8 to 15 percent slopes	0.5	4.1%
306	Udorthents-Urban land complex	0.3	2.5%
Totals for Area of Interest		**11.9**	**100.0%**

Attachment C

NOAA Rainfall Data

NOAA Atlas 14, Volume 10, Version 3
Location name: East Granby, Connecticut, USA*
Latitude: 41.9443°, Longitude: -72.7107°
Elevation: 172 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	0.348 (0.266-0.453)	0.417 (0.319-0.543)	0.530 (0.404-0.693)	0.623 (0.472-0.819)	0.751 (0.553-1.03)	0.848 (0.613-1.19)	0.949 (0.669-1.38)	1.06 (0.712-1.59)	1.22 (0.792-1.90)	1.36 (0.859-2.14)
10-min	0.493 (0.377-0.642)	0.591 (0.452-0.770)	0.750 (0.572-0.982)	0.882 (0.669-1.16)	1.06 (0.784-1.46)	1.20 (0.868-1.69)	1.34 (0.947-1.96)	1.51 (1.01-2.25)	1.74 (1.12-2.68)	1.92 (1.22-3.04)
15-min	0.580 (0.444-0.755)	0.695 (0.531-0.906)	0.883 (0.673-1.16)	1.04 (0.787-1.36)	1.25 (0.922-1.72)	1.41 (1.02-1.99)	1.58 (1.11-2.31)	1.77 (1.19-2.64)	2.04 (1.32-3.16)	2.26 (1.43-3.57)
30-min	0.779 (0.596-1.01)	0.939 (0.718-1.22)	1.20 (0.915-1.57)	1.42 (1.07-1.86)	1.71 (1.26-2.36)	1.94 (1.40-2.72)	2.17 (1.53-3.17)	2.43 (1.63-3.63)	2.80 (1.82-4.34)	3.11 (1.97-4.91)
60-min	0.978 (0.748-1.27)	1.18 (0.904-1.54)	1.52 (1.16-1.98)	1.79 (1.36-2.36)	2.17 (1.60-2.99)	2.46 (1.78-3.46)	2.76 (1.94-4.03)	3.10 (2.07-4.62)	3.57 (2.31-5.52)	3.96 (2.50-6.25)
2-hr	1.26 (0.972-1.63)	1.52 (1.17-1.96)	1.94 (1.48-2.51)	2.28 (1.74-2.98)	2.76 (2.05-3.78)	3.12 (2.27-4.36)	3.49 (2.48-5.10)	3.94 (2.64-5.84)	4.58 (2.97-7.06)	5.13 (3.26-8.06)
3-hr	1.45 (1.12-1.87)	1.75 (1.35-2.26)	2.23 (1.72-2.89)	2.63 (2.01-3.42)	3.18 (2.37-4.35)	3.59 (2.63-5.02)	4.03 (2.88-5.88)	4.55 (3.07-6.74)	5.34 (3.47-8.20)	6.01 (3.82-9.41)
6-hr	1.82 (1.42-2.33)	2.21 (1.72-2.83)	2.84 (2.20-3.66)	3.37 (2.60-4.36)	4.09 (3.07-5.56)	4.62 (3.41-6.45)	5.20 (3.76-7.58)	5.92 (4.00-8.71)	7.02 (4.58-10.7)	7.97 (5.09-12.4)
12-hr	2.23 (1.74-2.83)	2.74 (2.14-3.49)	3.58 (2.79-4.58)	4.28 (3.32-5.50)	5.24 (3.96-7.10)	5.94 (4.42-8.26)	6.72 (4.89-9.77)	7.69 (5.22-11.3)	9.22 (6.03-14.0)	10.6 (6.75-16.3)
24-hr	2.58 (2.04-3.26)	3.23 (2.55-4.09)	4.30 (3.37-5.45)	5.18 (4.04-6.61)	6.40 (4.87-8.64)	7.28 (5.46-10.1)	8.27 (6.08-12.0)	9.55 (6.50-13.9)	11.6 (7.60-17.5)	13.4 (8.60-20.6)
2-day	2.87 (2.28-3.60)	3.65 (2.89-4.58)	4.92 (3.89-6.21)	5.98 (4.70-7.58)	7.43 (5.70-10.0)	8.49 (6.41-11.8)	9.68 (7.19-14.1)	11.3 (7.69-16.3)	13.9 (9.13-20.8)	16.2 (10.5-24.8)
3-day	3.13 (2.50-3.91)	3.99 (3.18-4.99)	5.39 (4.28-6.77)	6.56 (5.17-8.28)	8.16 (6.28-10.9)	9.31 (7.07-12.9)	10.6 (7.93-15.5)	12.4 (8.48-17.9)	15.3 (10.1-22.9)	18.0 (11.6-27.4)
4-day	3.38 (2.70-4.21)	4.30 (3.43-5.36)	5.81 (4.62-7.27)	7.05 (5.58-8.88)	8.77 (6.77-11.7)	10.0 (7.62-13.8)	11.4 (8.54-16.6)	13.3 (9.13-19.2)	16.5 (10.9-24.6)	19.3 (12.5-29.4)
7-day	4.07 (3.27-5.05)	5.12 (4.11-6.36)	6.84 (5.47-8.52)	8.27 (6.57-10.4)	10.2 (7.93-13.6)	11.7 (8.89-15.9)	13.3 (9.94-19.1)	15.4 (10.6-22.1)	19.0 (12.5-28.1)	22.2 (14.3-33.5)
10-day	4.76 (3.83-5.87)	5.88 (4.73-7.26)	7.70 (6.18-9.55)	9.22 (7.35-11.5)	11.3 (8.79-15.0)	12.8 (9.80-17.4)	14.5 (10.9-20.8)	16.8 (11.6-23.9)	20.5 (13.6-30.2)	23.8 (15.4-35.8)
20-day	6.88 (5.58-8.43)	8.06 (6.53-9.88)	9.98 (8.06-12.3)	11.6 (9.29-14.3)	13.8 (10.7-18.0)	15.4 (11.8-20.6)	17.2 (12.8-24.0)	19.4 (13.5-27.4)	22.9 (15.3-33.6)	26.0 (16.9-38.9)
30-day	8.68 (7.07-10.6)	9.88 (8.04-12.1)	11.8 (9.59-14.5)	13.5 (10.8-16.6)	15.7 (12.2-20.3)	17.3 (13.2-23.0)	19.1 (14.2-26.4)	21.2 (14.8-29.9)	24.4 (16.3-35.6)	27.1 (17.6-40.4)
45-day	10.9 (8.95-13.3)	12.2 (9.94-14.8)	14.2 (11.5-17.3)	15.9 (12.8-19.5)	18.2 (14.2-23.2)	19.9 (15.2-26.0)	21.7 (16.0-29.4)	23.7 (16.6-33.1)	26.3 (17.7-38.2)	28.4 (18.6-42.3)
60-day	12.8 (10.5-15.6)	14.1 (11.6-17.1)	16.2 (13.2-19.8)	18.0 (14.6-22.0)	20.4 (15.9-25.9)	22.2 (16.9-28.8)	24.1 (17.6-32.2)	25.8 (18.1-36.0)	28.1 (18.9-40.6)	29.7 (19.4-44.0)

[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

NOAA Atlas 14, Volume 10, Version 3
Location name: East Granby, Connecticut, USA*
Latitude: 41.9443°, Longitude: -72.7107°
Elevation: 172 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	0.348 (0.266-0.453)	0.417 (0.319-0.543)	0.530 (0.404-0.693)	0.623 (0.472-0.819)	0.751 (0.553-1.03)	0.848 (0.613-1.19)	0.949 (0.669-1.38)	1.06 (0.712-1.59)	1.22 (0.792-1.90)	1.36 (0.859-2.14)
10-min	0.493 (0.377-0.642)	0.591 (0.452-0.770)	0.750 (0.572-0.982)	0.882 (0.669-1.16)	1.06 (0.784-1.46)	1.20 (0.868-1.69)	1.34 (0.947-1.96)	1.51 (1.01-2.25)	1.74 (1.12-2.68)	1.92 (1.22-3.04)
15-min	0.580 (0.444-0.755)	0.695 (0.531-0.906)	0.883 (0.673-1.16)	1.04 (0.787-1.36)	1.25 (0.922-1.72)	1.41 (1.02-1.99)	1.58 (1.11-2.31)	1.77 (1.19-2.64)	2.04 (1.32-3.16)	2.26 (1.43-3.57)
30-min	0.779 (0.596-1.01)	0.939 (0.718-1.22)	1.20 (0.915-1.57)	1.42 (1.07-1.86)	1.71 (1.26-2.36)	1.94 (1.40-2.72)	2.17 (1.53-3.17)	2.43 (1.63-3.63)	2.80 (1.82-4.34)	3.11 (1.97-4.91)
60-min	0.978 (0.748-1.27)	1.18 (0.904-1.54)	1.52 (1.16-1.98)	1.79 (1.36-2.36)	2.17 (1.60-2.99)	2.46 (1.78-3.46)	2.76 (1.94-4.03)	3.10 (2.07-4.62)	3.57 (2.31-5.52)	3.96 (2.50-6.25)
2-hr	1.26 (0.972-1.63)	1.52 (1.17-1.96)	1.94 (1.48-2.51)	2.28 (1.74-2.98)	2.76 (2.05-3.78)	3.12 (2.27-4.36)	3.49 (2.48-5.10)	3.94 (2.64-5.84)	4.58 (2.97-7.06)	5.13 (3.26-8.06)
3-hr	1.45 (1.12-1.87)	1.75 (1.35-2.26)	2.23 (1.72-2.89)	2.63 (2.01-3.42)	3.18 (2.37-4.35)	3.59 (2.63-5.02)	4.03 (2.88-5.88)	4.55 (3.07-6.74)	5.34 (3.47-8.20)	6.01 (3.82-9.41)
6-hr	1.82 (1.42-2.33)	2.21 (1.72-2.83)	2.84 (2.20-3.66)	3.37 (2.60-4.36)	4.09 (3.07-5.56)	4.62 (3.41-6.45)	5.20 (3.76-7.58)	5.92 (4.00-8.71)	7.02 (4.58-10.7)	7.97 (5.09-12.4)
12-hr	2.23 (1.74-2.83)	2.74 (2.14-3.49)	3.58 (2.79-4.58)	4.28 (3.32-5.50)	5.24 (3.96-7.10)	5.94 (4.42-8.26)	6.72 (4.89-9.77)	7.69 (5.22-11.3)	9.22 (6.03-14.0)	10.6 (6.75-16.3)
24-hr	2.58 (2.04-3.26)	3.23 (2.55-4.09)	4.30 (3.37-5.45)	5.18 (4.04-6.61)	6.40 (4.87-8.64)	7.28 (5.46-10.1)	8.27 (6.08-12.0)	9.55 (6.50-13.9)	11.6 (7.60-17.5)	13.4 (8.60-20.6)
2-day	2.87 (2.28-3.60)	3.65 (2.89-4.58)	4.92 (3.89-6.21)	5.98 (4.70-7.58)	7.43 (5.70-10.0)	8.49 (6.41-11.8)	9.68 (7.19-14.1)	11.3 (7.69-16.3)	13.9 (9.13-20.8)	16.2 (10.5-24.8)
3-day	3.13 (2.50-3.91)	3.99 (3.18-4.99)	5.39 (4.28-6.77)	6.56 (5.17-8.28)	8.16 (6.28-10.9)	9.31 (7.07-12.9)	10.6 (7.93-15.5)	12.4 (8.48-17.9)	15.3 (10.1-22.9)	18.0 (11.6-27.4)
4-day	3.38 (2.70-4.21)	4.30 (3.43-5.36)	5.81 (4.62-7.27)	7.05 (5.58-8.88)	8.77 (6.77-11.7)	10.0 (7.62-13.8)	11.4 (8.54-16.6)	13.3 (9.13-19.2)	16.5 (10.9-24.6)	19.3 (12.5-29.4)
7-day	4.07 (3.27-5.05)	5.12 (4.11-6.36)	6.84 (5.47-8.52)	8.27 (6.57-10.4)	10.2 (7.93-13.6)	11.7 (8.89-15.9)	13.3 (9.94-19.1)	15.4 (10.6-22.1)	19.0 (12.5-28.1)	22.2 (14.3-33.5)
10-day	4.76 (3.83-5.87)	5.88 (4.73-7.26)	7.70 (6.18-9.55)	9.22 (7.35-11.5)	11.3 (8.79-15.0)	12.8 (9.80-17.4)	14.5 (10.9-20.8)	16.8 (11.6-23.9)	20.5 (13.6-30.2)	23.8 (15.4-35.8)
20-day	6.88 (5.58-8.43)	8.06 (6.53-9.88)	9.98 (8.06-12.3)	11.6 (9.29-14.3)	13.8 (10.7-18.0)	15.4 (11.8-20.6)	17.2 (12.8-24.0)	19.4 (13.5-27.4)	22.9 (15.3-33.6)	26.0 (16.9-38.9)
30-day	8.68 (7.07-10.6)	9.88 (8.04-12.1)	11.8 (9.59-14.5)	13.5 (10.8-16.6)	15.7 (12.2-20.3)	17.3 (13.2-23.0)	19.1 (14.2-26.4)	21.2 (14.8-29.9)	24.4 (16.3-35.6)	27.1 (17.6-40.4)
45-day	10.9 (8.95-13.3)	12.2 (9.94-14.8)	14.2 (11.5-17.3)	15.9 (12.8-19.5)	18.2 (14.2-23.2)	19.9 (15.2-26.0)	21.7 (16.0-29.4)	23.7 (16.6-33.1)	26.3 (17.7-38.2)	28.4 (18.6-42.3)
60-day	12.8 (10.5-15.6)	14.1 (11.6-17.1)	16.2 (13.2-19.8)	18.0 (14.6-22.0)	20.4 (15.9-25.9)	22.2 (16.9-28.8)	24.1 (17.6-32.2)	25.8 (18.1-36.0)	28.1 (18.9-40.6)	29.7 (19.4-44.0)

[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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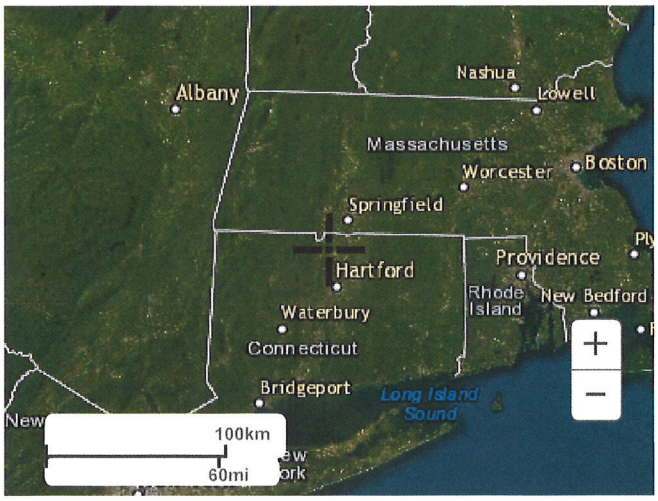
PF graphical



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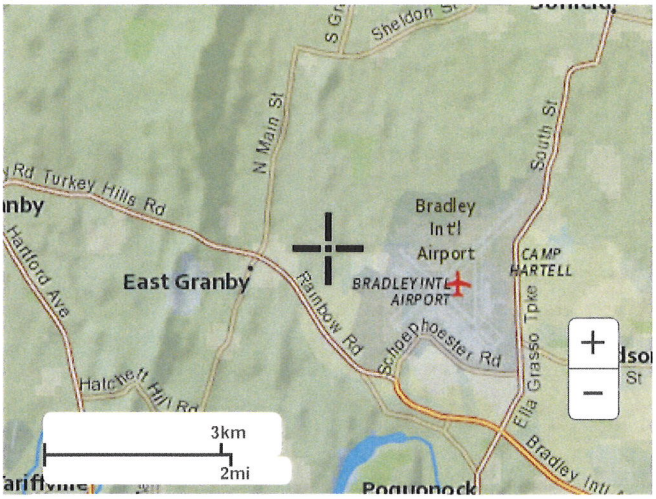
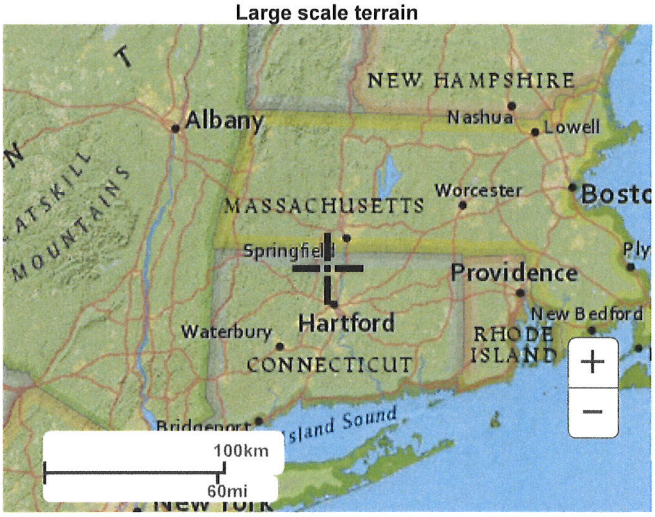
US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

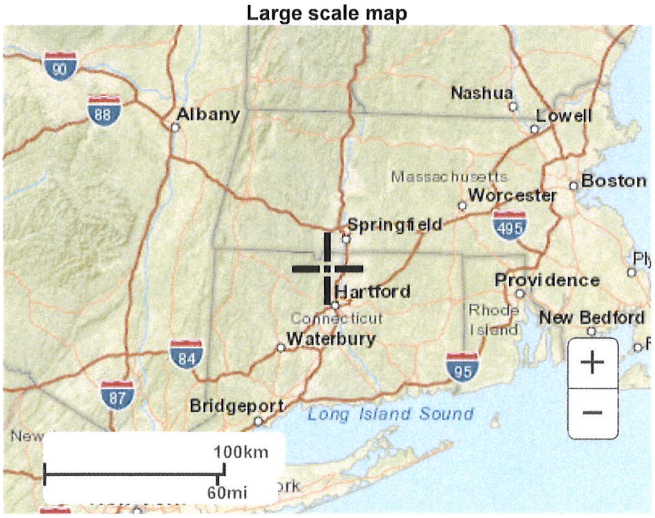
Disclaimer



Large scale terrain



Large scale map



Large scale aerial

Attachment D

Hydrologic Analysis

Runoff curve number and runoff

Project:	J.E.T. 10 Russell Road	By:	DRT	Date:	9/29/2023
Location:	East Granby, CT.	Checked:	GAH	Date:	
Check one		Present	X	Developed	WS-EX-E

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition;percent impervious; unconnected/connected impervious area ratio)	CN	Area ☐ acres ☒ ft² ☐ %	Area ☒ acres ☐ mi² ☐ %
	IMPERVIOUS (GOOD)	98	6,633	0.15
C	MEADOW : NON-GRAZED (GOOD)	74	116,237	2.67
Use only one CN source per line		**Totals**	122,871	2.82

CN (weighted) = total product / total area = 212.39 / 2.82 = 75.30 **Use CN** **75**

Runoff curve number and runoff

Project:	J.E.T. 10 Russell Road	By:	DRT	Date:	9/29/2023
Location:	East Granby, CT.	Checked:	GAH	Date:	
Check one		Present	X	Developed	WS-EX-S

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition;percent impervious; unconnected/connected impervious area ratio)	CN	Area ☐ acres ☒ ft² ☐ %	Area ☒ acres ☐ mi² ☐ %
	IMPERVIOUS (GOOD)	98	8,295	0.19
B	MEADOW : NON-GRAZED (GOOD)	74	5,495	0.13
C	MEADOW : NON-GRAZED (GOOD)	74	234,754	5.39
D	MEADOW : NON-GRAZED (GOOD)	80	151,066	3.47
C	WOODS (GOOD)	70	1,607	0.04
D	WOODS (GOOD)	77	20,473	0.47
Use only one CN source per line		**Totals**	421,690	9.68

CN (weighted) = total product / total area = 743.01 / 9.68 = 76.75 **Use CN** 77

Runoff curve number and runoff

Project: J.E.T. 10 Russell Road By: DRT Date: 9/29/2023

Location: East Granby, CT. Checked: GAH Date:

Check one Present Developed X WS-PR-UNDET-E

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition;percent impervious; unconnected/connected impervious area ratio)	CN	Area ☐ acres ☒ ft² ☐ %	Area ☒ acres ☐ mi² ☐ %	Product of CN x area
	IMPERVIOUS (GOOD)	98	3,837	0.09	8.63
C	MEADOW : NON-GRAZED (GOOD)	74	14,774	0.34	25.10
Use only one CN source per line		Totals	18,611	0.43	33.73

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{33.73}{0.43} =$ 78.95 **Use CN** 79

Runoff curve number and runoff

Project: J.E.T. 10 Russell Road By: DRT Date: 9/29/2023

Location: East Granby, CT. Checked: GAH Date:

Check one Present Developed X WS-PR-UNDET-S

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition;percent impervious; unconnected/connected impervious area ratio)	CN	Area ☐ acres ☒ ft² ☐ %	Area ☒ acres ☐ mi² ☐ %	Product of CN x area
	IMPERVIOUS (GOOD)	98	14,088	0.32	31.70
B	MEADOW : NON-GRAZED (GOOD)	61	7,250	0.17	10.15
C	MEADOW : NON-GRAZED (GOOD)	74	41,490	0.95	70.48
D	MEADOW : NON-GRAZED (GOOD)	80	93,845	2.15	172.35
D	WOODS (GOOD)	77	12,841	0.29	22.70
Use only one CN source per line		Totals	169,516	3.89	307.38

14088.448

203.0625

CN (weighted) = total product / total area = 307.38 / 3.89 = 78.99 **Use CN** 79

Runoff curve number and runoff

Project:	J.E.T. 10 Russell Road	By:	DRT	Date:	
Location:	East Granby, CT.	Checked:	GAH	Date:	
Check one		Present	Developed X	WS-PR-S-1	

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition;percent impervious; unconnected/connected impervious area ratio)	CN	Area ☐ acres ☒ ft² ☐ %	Area ☒ acres ☐ mi² ☐ %	Product of CN x area
B	IMPERVIOUS (GOOD)	98	56,874	1.31	127.95
C	MEADOW : NON-GRAZED (GOOD)	78	21,027	0.48	37.65
D	MEADOW : NON-GRAZED (GOOD)	78	21,887	0.50	39.19
Use only one CN source per line		**Totals**	99,788	2.29	204.80

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{204.80}{2.29} =$ 89.40 **Use CN** **89**

Runoff curve number and runoff

Project:	J.E.T. 10 Russell Road	By:	DRT	Date:	9/29/2023
Location:	East Granby, CT.	Checked:	GAH	Date:	
Check one	Present	Developed	X	WS-PR-S-2	

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition;percent impervious; unconnected/connected impervious area ratio)	CN	Area ☐ acres ☒ ft^2 ☐ %	Area ☒ acres ☐ mi^2 ☐ %
	IMPERVIOUS (GOOD)	98	26,880	0.62
C	MEADOW : NON-GRAZED (GOOD)	78	8,723	0.20
D	MEADOW : NON-GRAZED (GOOD)	78	13,535	0.31
		Totals	49,138	1.13

Use only one CN source per line

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{100.33}{1.13} = 88.94$ **Use CN** **89**

Runoff curve number and runoff

Project: J.E.T. 10 Russell Road By: DRT Date: 9/29/2023

Location: East Granby, CT. Checked: GAH Date:

Check one Present Developed X WS-PR-S-3

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition;percent impervious; unconnected/connected impervious area ratio)	CN	Area ☐ acres ☒ ft² ☐ %	Area ☒ acres ☐ mi² ☐ %	Product of CN x area
	IMPERVIOUS (GOOD)	98	133,525	3.07	300.40
C	MEADOW : NON-GRAZED (GOOD)	78	65,374	1.50	117.06
D	MEADOW : NON-GRAZED (GOOD)	78	6,609	0.15	11.83
D	WOODS (GOOD)	77	4,480	0.10	7.92
Use only one CN source per line		**Totals**	209,988	4.82	437.21

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{437.21}{4.82} =$ 90.70 **Use CN** **91**

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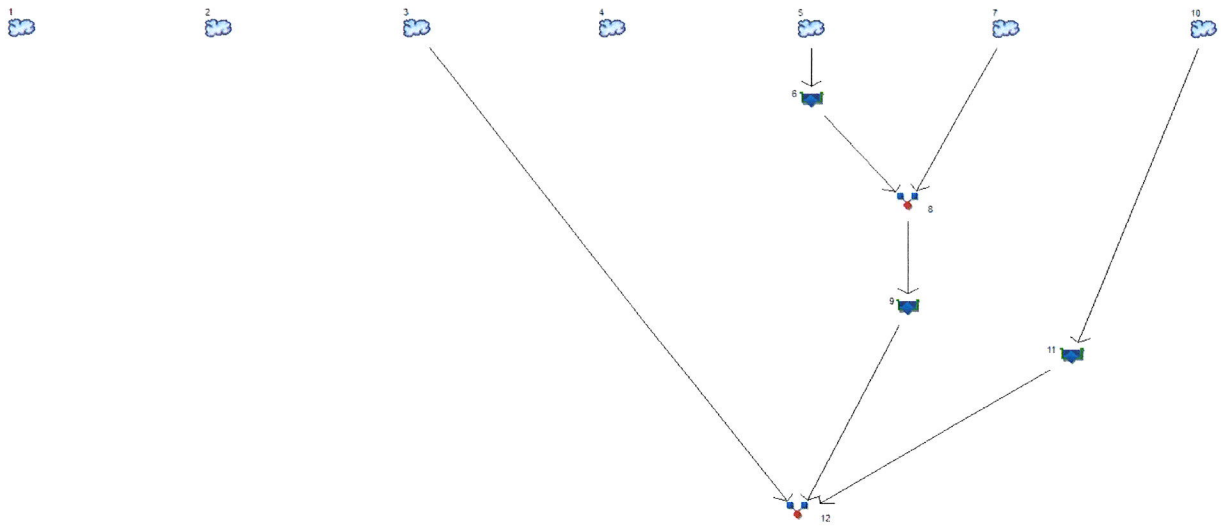
Watershed Model Schematic

Hydraflow Hydrographs by Intelisolve v9.1



Legend

Hyd.	Origin	Description
1	SCS Runoff	WS-EX-S
2	SCS Runoff	WS-EX-E
3	SCS Runoff	WS-PR-UNDET-S
4	SCS Runoff	WS-PR-UNDET-E
5	SCS Runoff	WS-PR-S-1 TO WQB #3
6	Reservoir	WQB 3 (OUTFLOW)
7	SCS Runoff	WS-PR-S-2 TO WQB #2
8	Combine	WQB 2 (TOTAL INFLOW)
9	Reservoir	WQB 2 (OUTFLOW)
10	SCS Runoff	WS-PR-S-3 TO WQB #1
11	Reservoir	WQB1 (OUTFLOW)
12	Combine	TOTAL PROPOSED SOUTH

Hydrograph Return Period Recap

Hydraflow Hydrographs by Intelisolve v9.1

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	-------	-------	11.80	-------	20.09	27.08	37.69	46.17	53.91	WS-EX-S
2	SCS Runoff	-------	-------	3.192	-------	5.612	7.677	10.84	13.38	15.71	WS-EX-E
3	SCS Runoff	-------	-------	5.528	-------	9.108	12.09	16.58	20.13	23.38	WS-PR-UNDET-S
4	SCS Runoff	-------	-------	0.702	-------	1.154	1.530	2.096	2.545	2.956	WS-PR-UNDET-E
5	SCS Runoff	-------	-------	5.810	-------	8.440	10.53	13.59	15.98	18.13	WS-PR-S-1 TO WQB #3
6	Reservoir	5	-------	0.915	-------	1.147	1.301	1.491	1.622	1.728	WQB 3 (OUTFLOW)
7	SCS Runoff	-------	-------	2.867	-------	4.165	5.197	6.708	7.885	8.948	WS-PR-S-2 TO WQB #2
8	Combine	6, 7	-------	3.555	-------	5.054	6.208	7.875	9.161	10.31	WQB 2 (TOTAL INFLOW)
9	Reservoir	8	-------	0.874	-------	1.098	1.251	1.428	1.555	1.653	WQB 2 (OUTFLOW)
10	SCS Runoff	-------	-------	11.47	-------	16.29	20.12	25.70	30.05	33.99	WS-PR-S-3 TO WQB #1
11	Reservoir	10	-------	4.155	-------	5.243	5.942	6.857	7.455	8.292	WQB1 (OUTFLOW)
12	Combine	3, 9, 11	-------	9.534	-------	14.15	17.82	23.22	27.38	31.15	TOTAL PROPOSED SOUTH

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

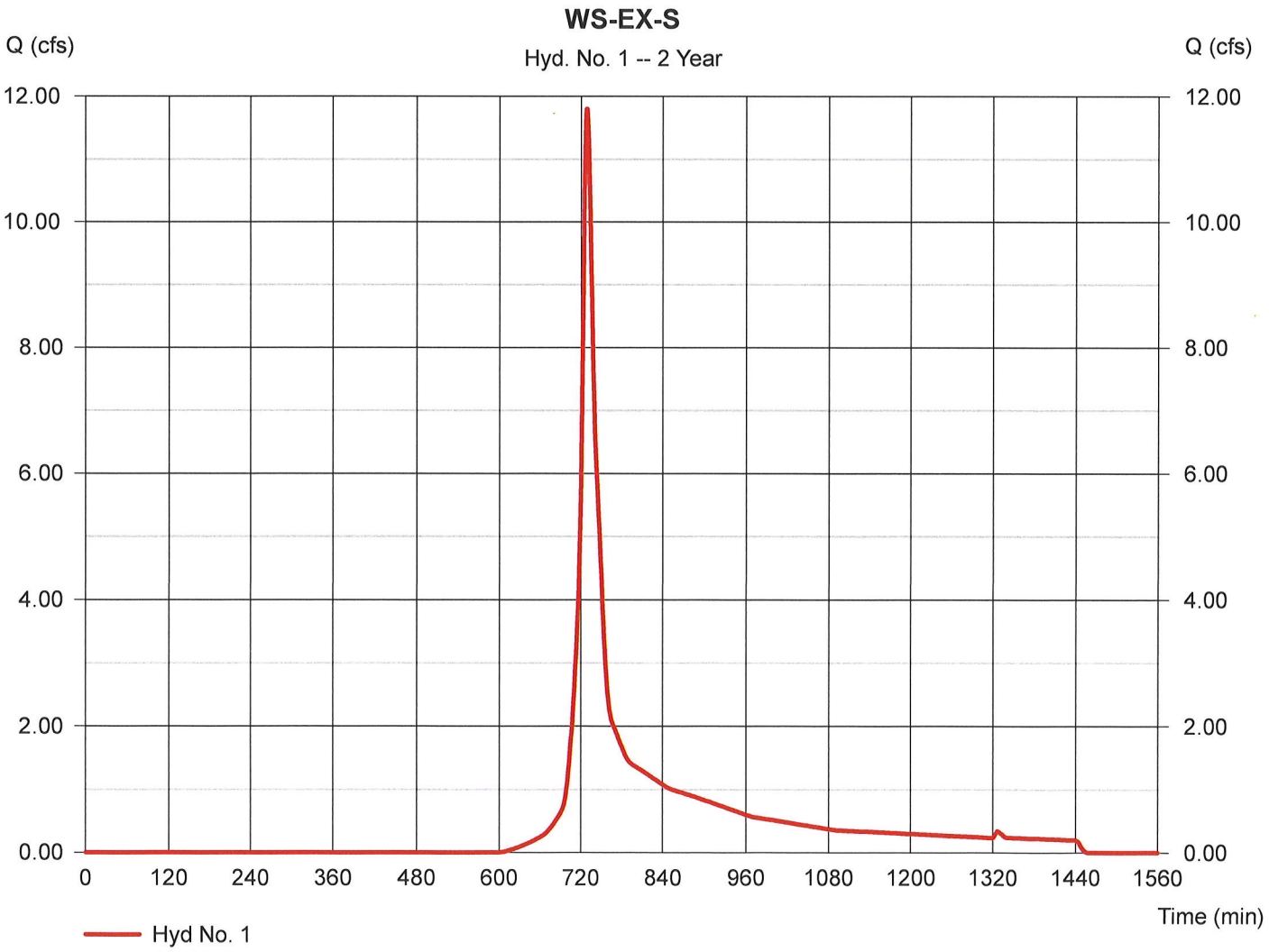
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	11.80	1	728	44,109	----	------	------	WS-EX-S
2	SCS Runoff	3.192	1	727	11,407	----	------	------	WS-EX-E
3	SCS Runoff	5.528	1	727	19,194	----	------	------	WS-PR-UNDET-S
4	SCS Runoff	0.702	1	725	2,188	----	------	------	WS-PR-UNDET-E
5	SCS Runoff	5.810	1	725	18,079	----	------	------	WS-PR-S-1 TO WQB #3
6	Reservoir	0.915	1	754	18,058	5	161.19	7,988	WQB 3 (OUTFLOW)
7	SCS Runoff	2.867	1	725	8,921	----	------	------	WS-PR-S-2 TO WQB #2
8	Combine	3.555	1	725	26,979	6, 7	------	------	WQB 2 (TOTAL INFLOW)
9	Reservoir	0.874	1	865	26,896	8	160.10	7,507	WQB 2 (OUTFLOW)
10	SCS Runoff	11.47	1	727	40,005	----	------	------	WS-PR-S-3 TO WQB #1
11	Reservoir	4.155	1	745	39,993	10	150.33	31,875	WQB1 (OUTFLOW)
12	Combine	9.534	1	728	86,083	3, 9, 11	------	------	TOTAL PROPOSED SOUTH

Hydrograph Report

Hyd. No. 1

WS-EX-S

Hydrograph type	= SCS Runoff	Peak discharge	= 11.80 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 44,109 cuft
Drainage area	= 9.680 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.10 min
Total precip.	= 3.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 1

WS-EX-S

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.024		0.011		0.011		
Flow length (ft)	= 200.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.34		3.22		0.00		
Land slope (%)	= 2.00		0.00		0.00		
Travel Time (min)	**= 3.85**	**+**	**0.00**	**+**	**0.00**	**=**	**3.85**
Shallow Concentrated Flow							
Flow length (ft)	= 578.00		0.00		0.00		
Watercourse slope (%)	= 3.29		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 2.93		0.00		0.00		
Travel Time (min)	**= 3.29**	**+**	**0.00**	**+**	**0.00**	**=**	**3.29**
Channel Flow							
X sectional flow area (sqft)	= 3.00		0.00		0.00		
Wetted perimeter (ft)	= 3.00		0.00		0.00		
Channel slope (%)	= 1.52		0.00		0.00		
Manning's n-value	= 0.050		0.015		0.015		
Velocity (ft/s)	= 3.67		0.00		0.00		
Flow length (ft)	= 658.0		0.0		0.0		
Travel Time (min)	**= 2.98**	**+**	**0.00**	**+**	**0.00**	**=**	**2.98**

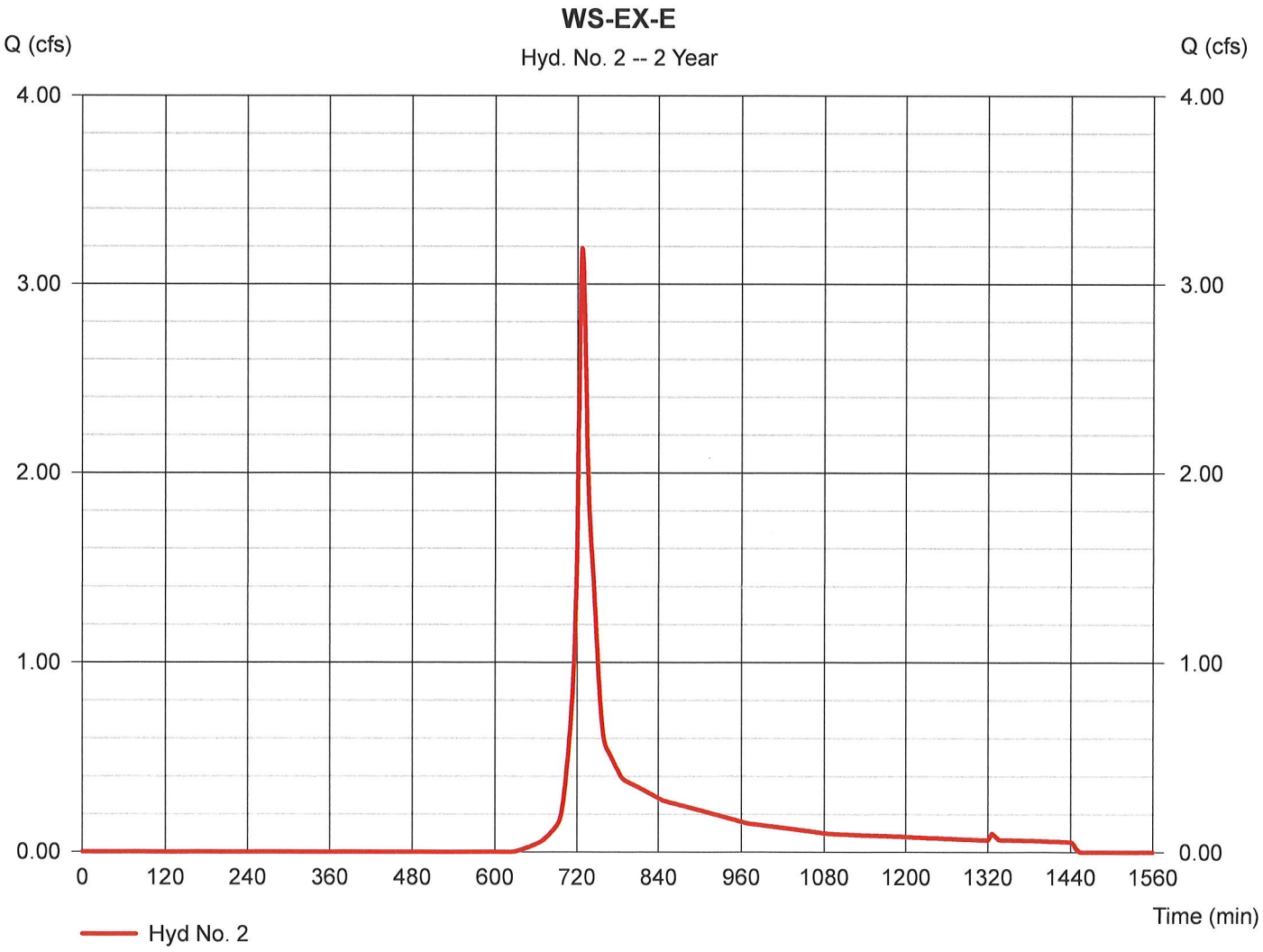
Total Travel Time, Tc ..... 10.10 min

Hydrograph Report

Hyd. No. 2

WS-EX-E

Hydrograph type	= SCS Runoff	Peak discharge	= 3.192 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 11,407 cuft
Drainage area	= 2.820 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.60 min
Total precip.	= 3.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 2

WS-EX-E

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.024		0.011		0.011		
Flow length (ft)	= 200.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.34		3.22		0.00		
Land slope (%)	= 2.00		0.00		0.00		
Travel Time (min)	**= 3.85**	**+**	**0.00**	**+**	**0.00**	**=**	**3.85**
Shallow Concentrated Flow							
Flow length (ft)	= 578.00		0.00		0.00		
Watercourse slope (%)	= 3.29		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 2.93		0.00		0.00		
Travel Time (min)	**= 3.29**	**+**	**0.00**	**+**	**0.00**	**=**	**3.29**
Channel Flow							
X sectional flow area (sqft)	= 3.00		0.00		0.00		
Wetted perimeter (ft)	= 3.00		0.00		0.00		
Channel slope (%)	= 1.52		0.00		0.00		
Manning's n-value	= 0.024		0.015		0.015		
Velocity (ft/s)	= 7.65		0.00		0.00		
Flow length (ft)	= 658.0		0.0		0.0		
Travel Time (min)	**= 1.43**	**+**	**0.00**	**+**	**0.00**	**=**	**1.43**

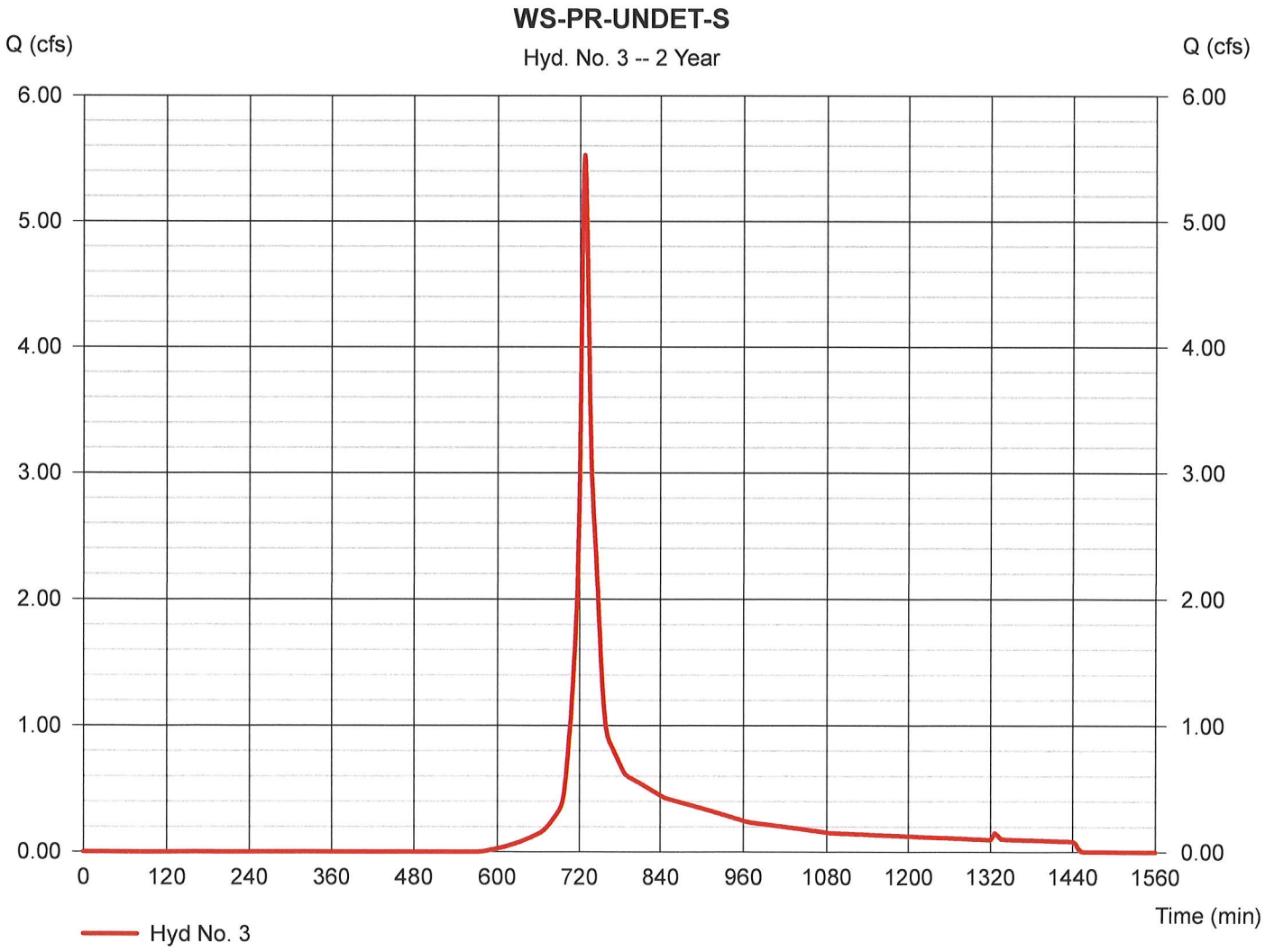
Total Travel Time, Tc ..... 8.60 min

Hydrograph Report

Hyd. No. 3

WS-PR-UNDET-S

Hydrograph type	= SCS Runoff	Peak discharge	= 5.528 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 19,194 cuft
Drainage area	= 3.890 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

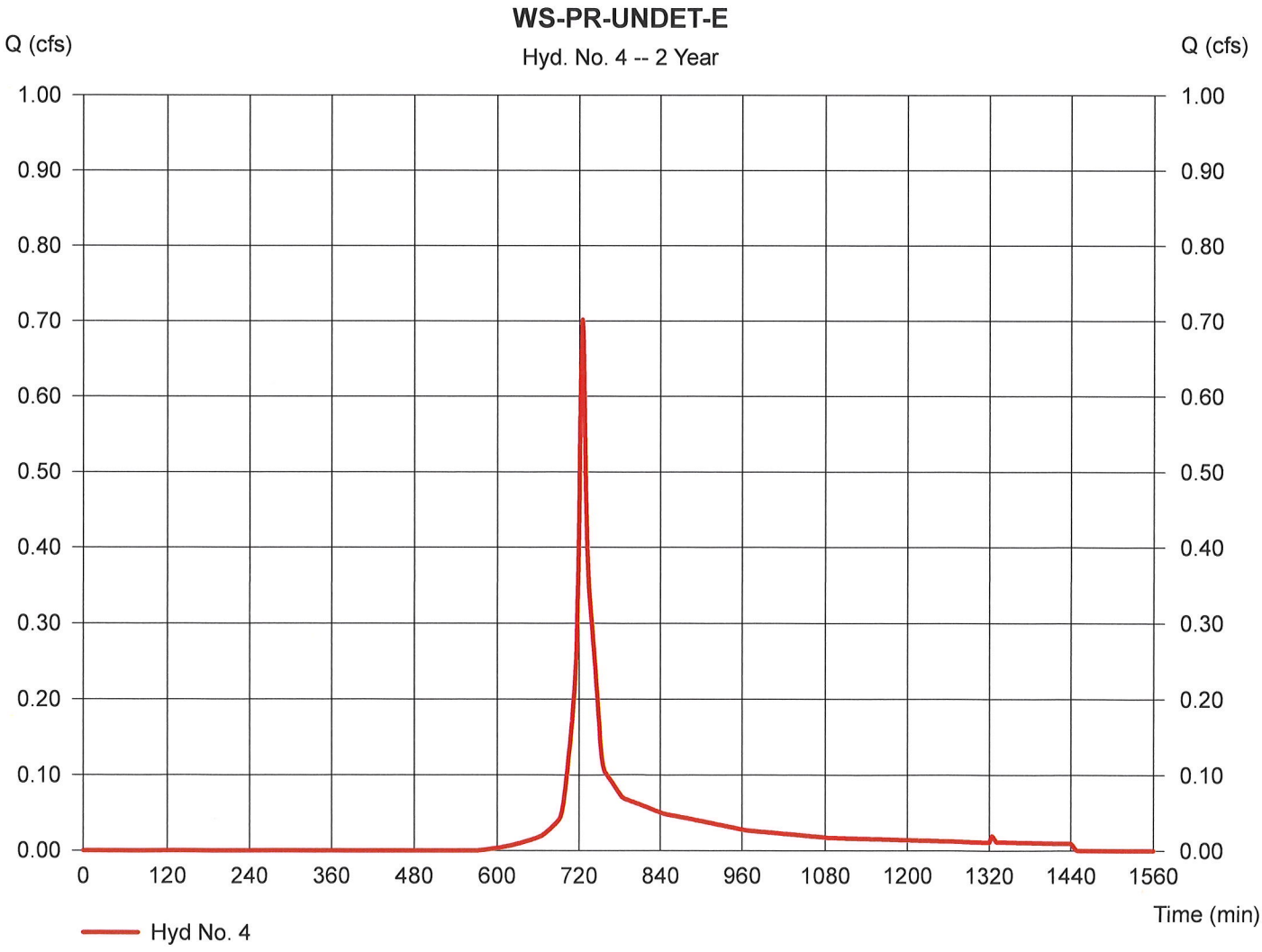


Hydrograph Report

Hyd. No. 4

WS-PR-UNDET-E

Hydrograph type	= SCS Runoff	Peak discharge	= 0.702 cfs
Storm frequency	= 2 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 2,188 cuft
Drainage area	= 0.430 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

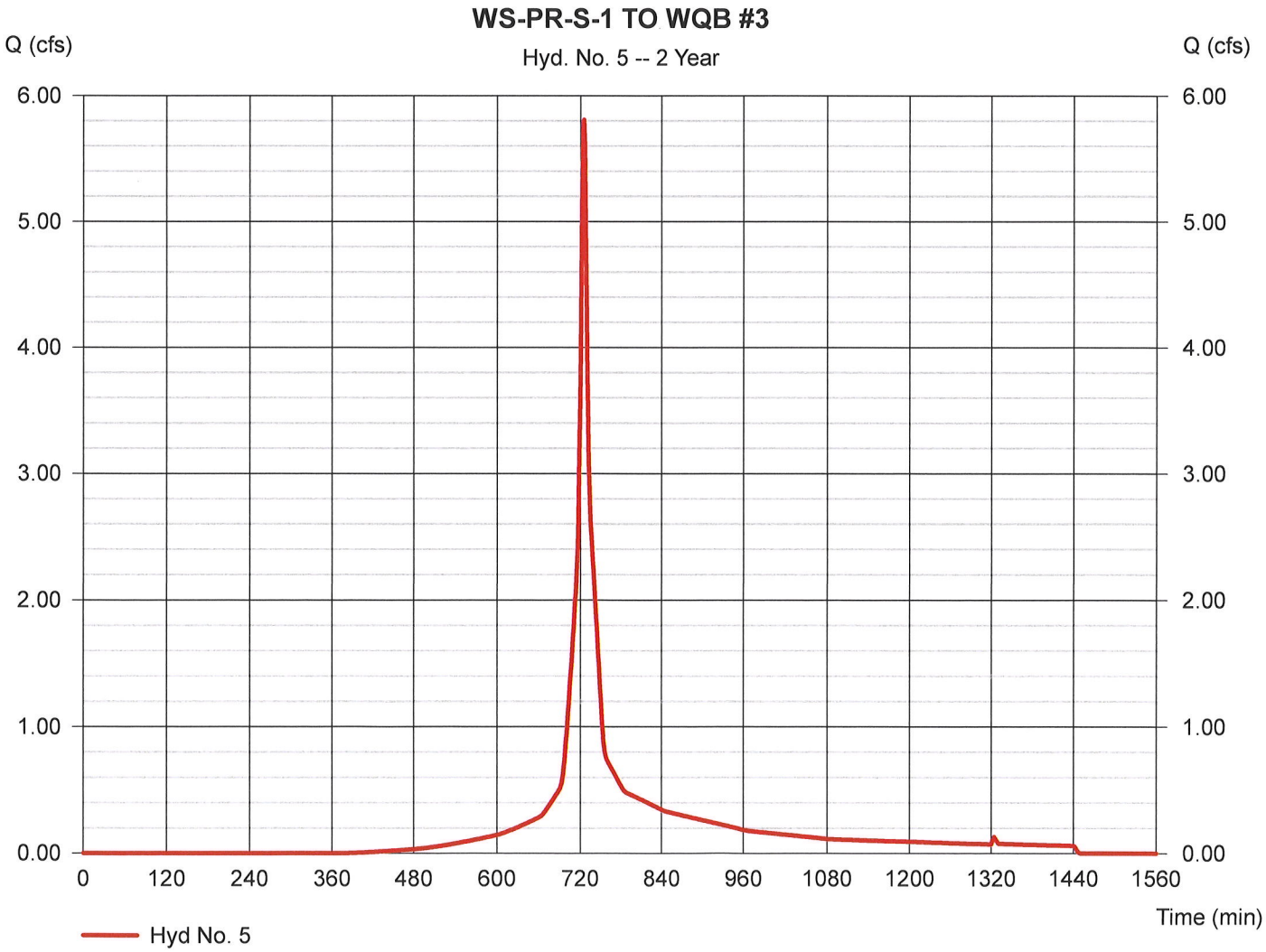


Hydrograph Report

Hyd. No. 5

WS-PR-S-1 TO WQB #3

Hydrograph type	= SCS Runoff	Peak discharge	= 5.810 cfs
Storm frequency	= 2 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 18,079 cuft
Drainage area	= 2.290 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



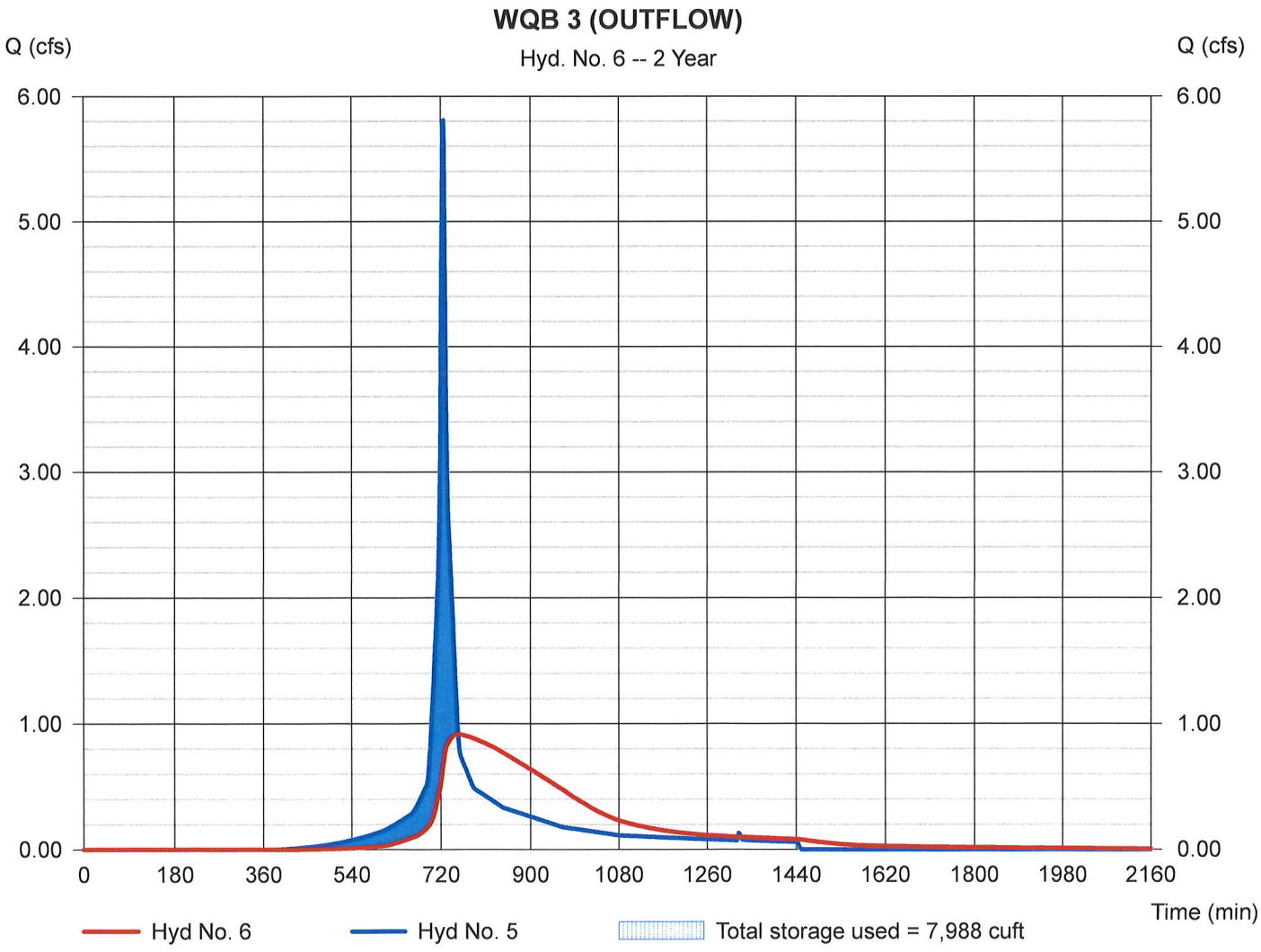
Hydrograph Report

Hyd. No. 6

WQB 3 (OUTFLOW)

Hydrograph type	= Reservoir	Peak discharge	= 0.915 cfs
Storm frequency	= 2 yrs	Time to peak	= 754 min
Time interval	= 1 min	Hyd. volume	= 18,058 cuft
Inflow hyd. No.	= 5 - WS-PR-S-1 TO WQB #3	Max. Elevation	= 161.19 ft
Reservoir name	= WQB3	Max. Storage	= 7,988 cuft

Storage Indication method used.



Pond Report

Pond No. 3 - WQB3

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 160.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	160.00	6,076	0	0
1.00	161.00	7,068	6,565	6,565
2.00	162.00	8,116	7,585	14,150
3.00	163.00	9,221	8,662	22,812
4.00	164.00	10,382	9,795	32,607
5.00	165.00	11,599	10,984	43,591
6.00	166.00	12,874	12,230	55,820

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	6.00	0.00	0.00
Span (in)	= 15.00	6.00	0.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 159.00	160.00	0.00	0.00
Length (ft)	= 54.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .012	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 11.33	0.00	0.00	0.00
Crest El. (ft)	= 164.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Riser	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

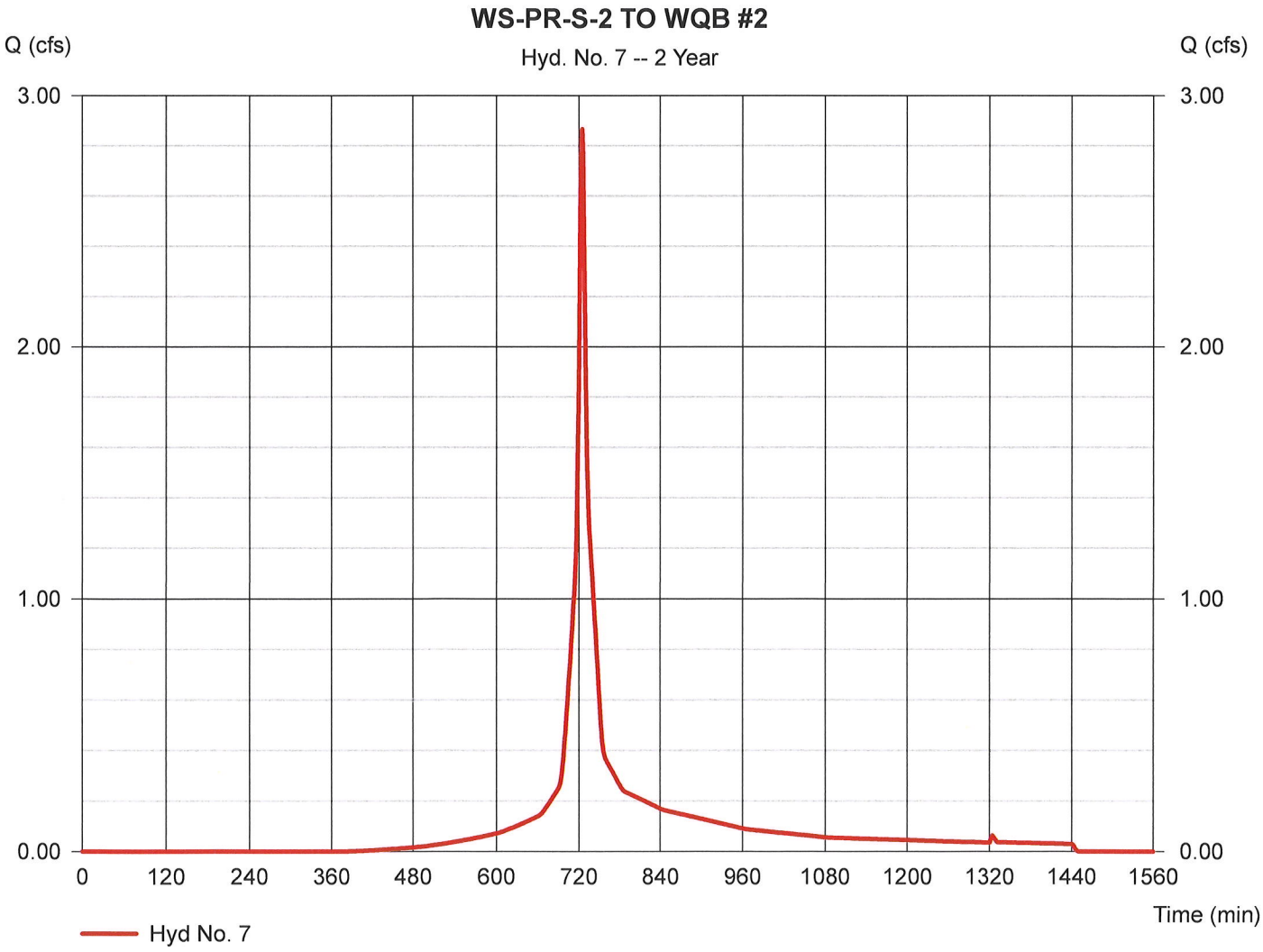
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	160.00	0.00	0.00	---	---	0.00	---	---	---	---	---	0.00
1.00	6,565	161.00	3.58 ic	0.82 ic	---	---	0.00	---	---	---	---	---	0.82
2.00	14,150	162.00	3.58 ic	1.25 ic	---	---	0.00	---	---	---	---	---	1.25
3.00	22,812	163.00	3.58 ic	1.57 ic	---	---	0.00	---	---	---	---	---	1.57
4.00	32,607	164.00	3.58 ic	1.83 ic	---	---	0.00	---	---	---	---	---	1.83
5.00	43,591	165.00	13.35 oc	0.20 ic	---	---	13.15 s	---	---	---	---	---	13.35
6.00	55,820	166.00	14.75 oc	0.08 ic	---	---	14.60 s	---	---	---	---	---	14.69

Hydrograph Report

Hyd. No. 7

WS-PR-S-2 TO WQB #2

Hydrograph type	= SCS Runoff	Peak discharge	= 2.867 cfs
Storm frequency	= 2 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 8,921 cuft
Drainage area	= 1.130 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

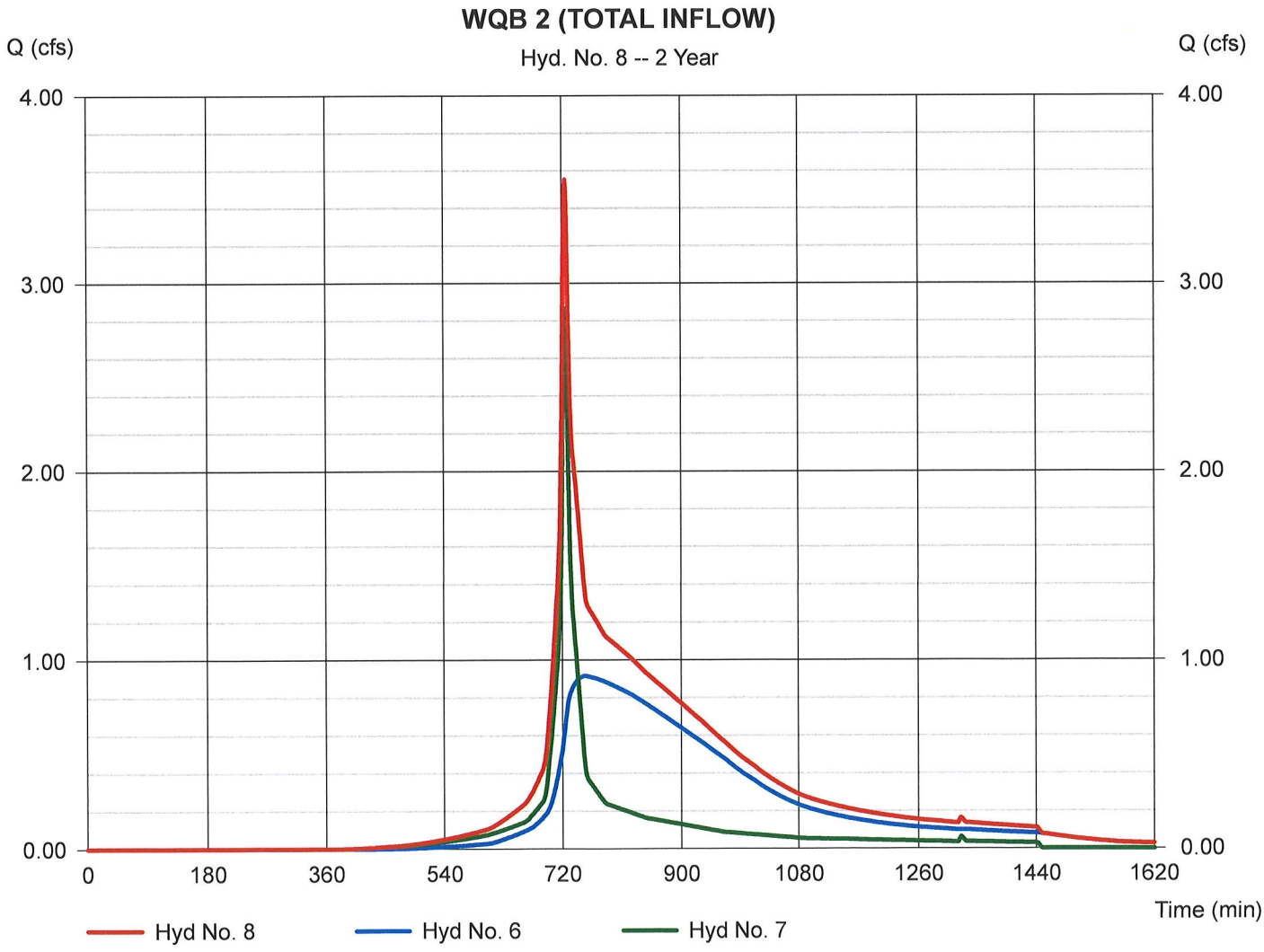


Hydrograph Report

Hyd. No. 8

WQB 2 (TOTAL INFLOW)

Hydrograph type	= Combine	Peak discharge	= 3.555 cfs
Storm frequency	= 2 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 26,979 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 1.130 ac



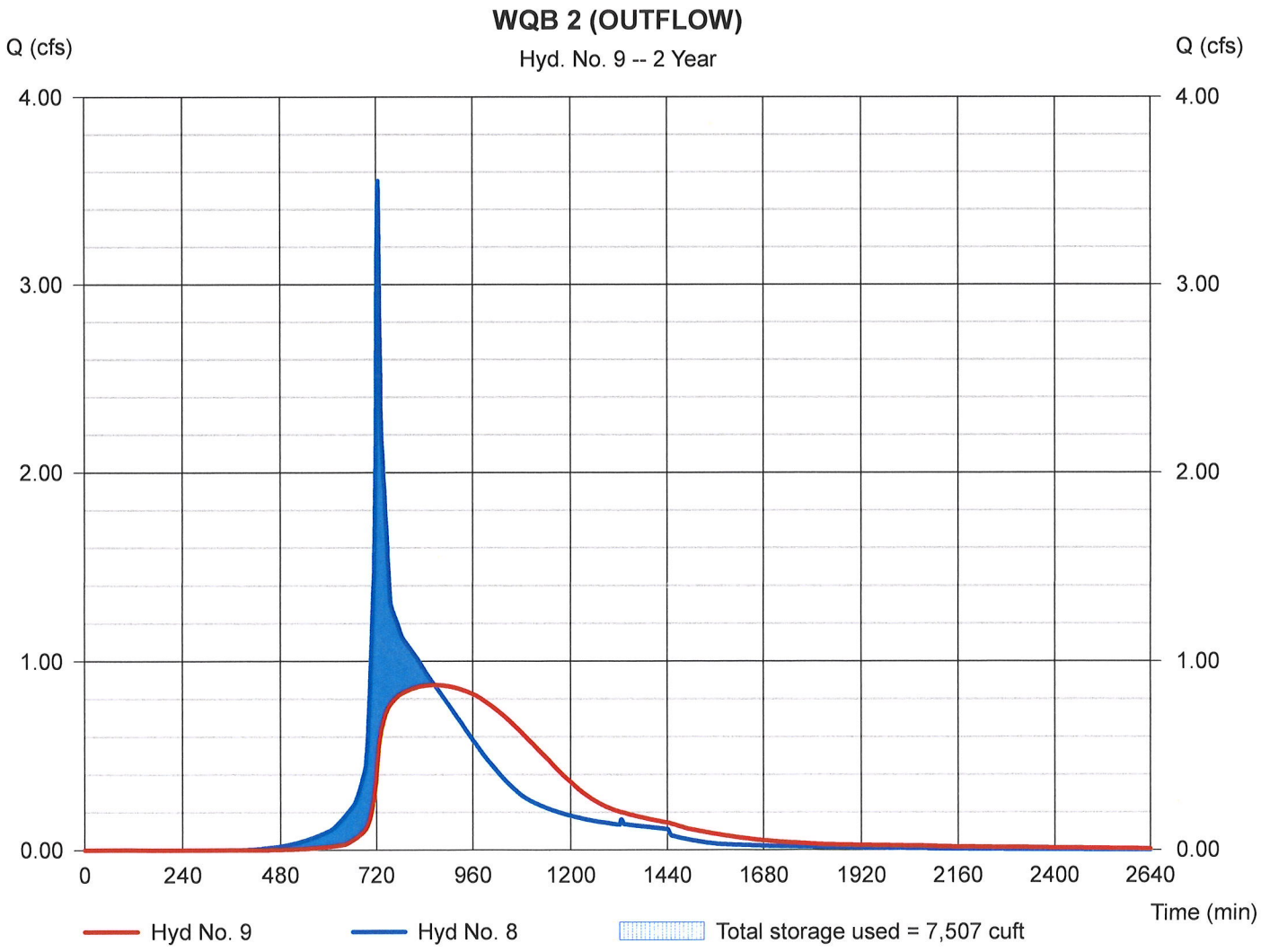
Hydrograph Report

Hyd. No. 9

WQB 2 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	0.874 cfs
Storm frequency	=	2 yrs	Time to peak	=	865 min
Time interval	=	1 min	Hyd. volume	=	26,896 cuft
Inflow hyd. No.	=	8 - WQB 2 (TOTAL INFLOW)	Max. Elevation	=	160.10 ft
Reservoir name	=	WQB2	Max. Storage	=	7,507 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - WQB2

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 159.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	159.00	6,058	0	0
1.00	160.00	7,311	6,674	6,674
2.00	161.00	8,601	7,946	14,621
3.00	162.00	9,968	9,275	23,896
4.00	163.00	11,377	10,664	34,559
5.00	164.00	12,974	12,166	46,725
6.00	165.00	12,985	12,978	59,703

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	6.00	0.00	0.00
Span (in)	= 15.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 159.00	159.00	0.00	0.00
Length (ft)	= 28.00	0.00	0.00	0.00
Slope (%)	= 1.50	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)	= 11.33	0.00	0.00	0.00
Crest El. (ft)	= 162.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Riser	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

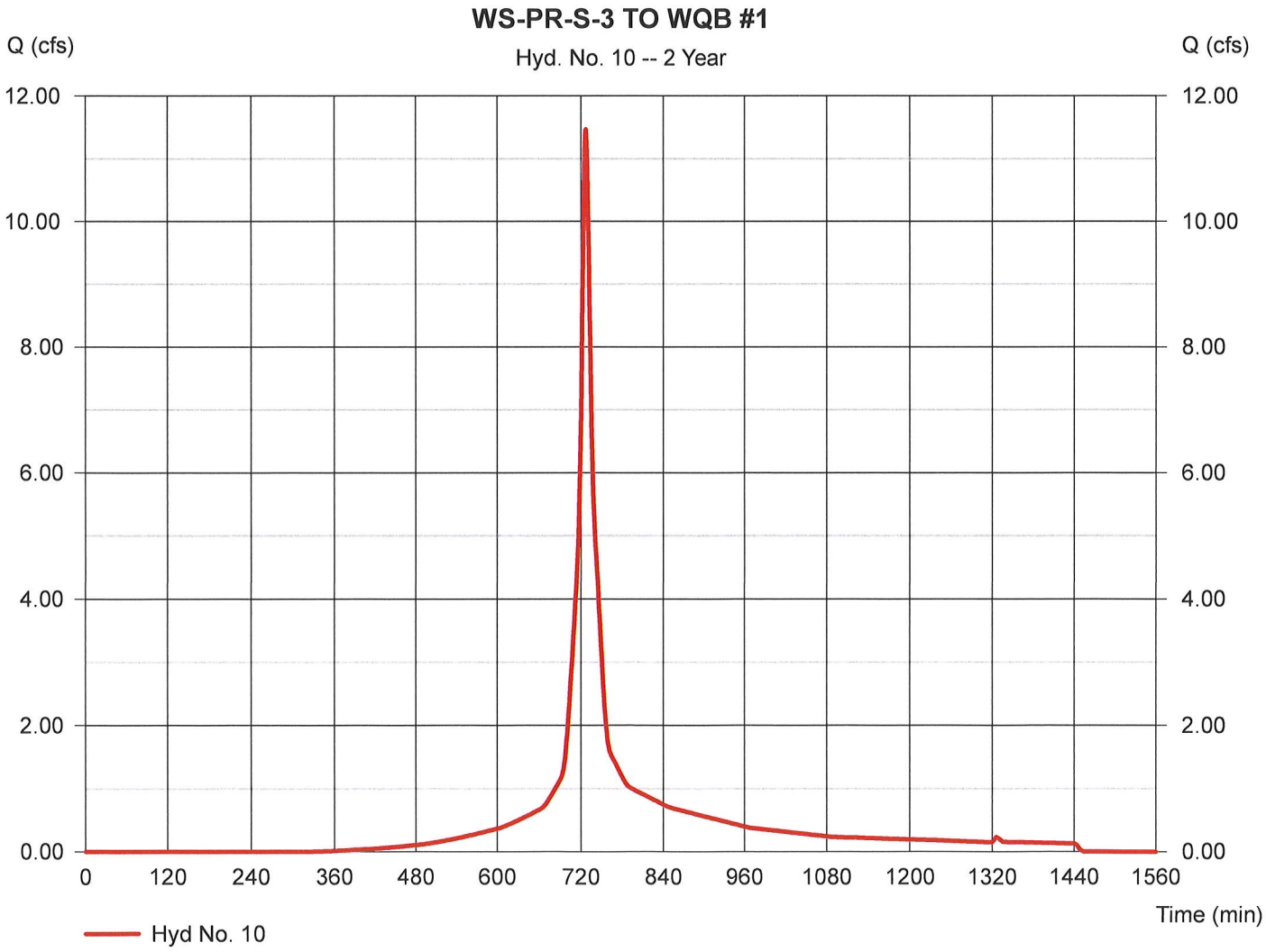
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	159.00	0.00	0.00	---	---	0.00	---	---	---	---	---	0.00
1.00	6,674	160.00	0.00	0.82 ic	---	---	0.00	---	---	---	---	---	0.82
2.00	14,621	161.00	0.00	1.25 ic	---	---	0.00	---	---	---	---	---	1.25
3.00	23,896	162.00	0.00	1.57 ic	---	---	0.00	---	---	---	---	---	1.57
4.00	34,559	163.00	10.52 ic	1.83 ic	---	---	10.52 s	---	---	---	---	---	12.35
5.00	46,725	164.00	12.34 ic	2.06 ic	---	---	12.31 s	---	---	---	---	---	14.37
6.00	59,703	165.00	13.69 ic	2.27 ic	---	---	13.67 s	---	---	---	---	---	15.94

Hydrograph Report

Hyd. No. 10

WS-PR-S-3 TO WQB #1

Hydrograph type	= SCS Runoff	Peak discharge	= 11.47 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 40,005 cuft
Drainage area	= 4.820 ac	Curve number	= 91
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



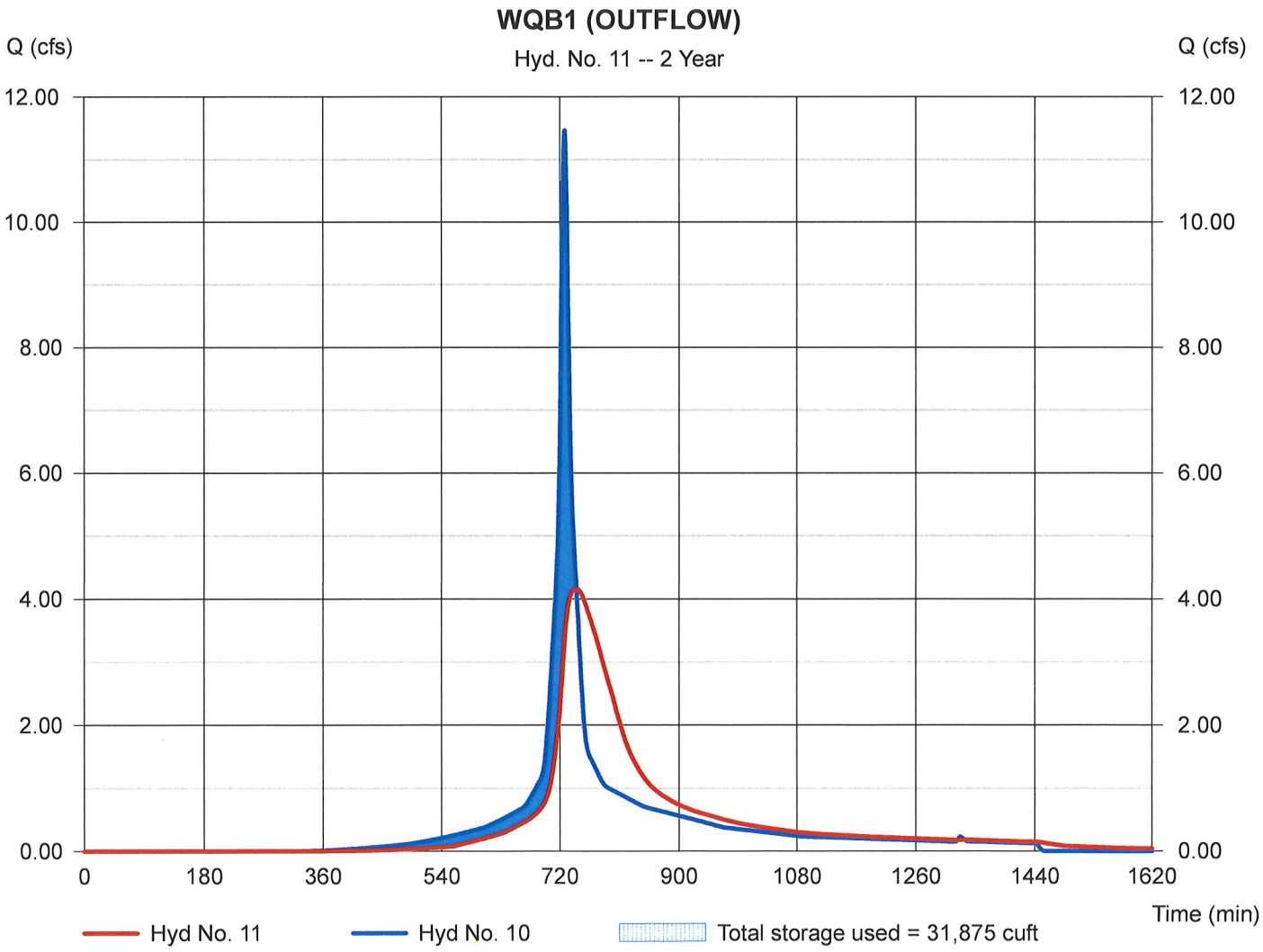
Hydrograph Report

Hyd. No. 11

WQB1 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	4.155 cfs
Storm frequency	=	2 yrs	Time to peak	=	745 min
Time interval	=	1 min	Hyd. volume	=	39,993 cuft
Inflow hyd. No.	=	10 - WS-PR-S-3 TO WQB #1	Max. Elevation	=	150.33 ft
Reservoir name	=	WQB1	Max. Storage	=	31,875 cuft

Storage Indication method used. Wet pond routing start elevation = 149.00 ft.



Pond Report

Pond No. 1 - WQB1

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 146.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	146.00	5,069	0	0
1.00	147.00	6,017	5,536	5,536
2.00	148.00	7,066	6,534	12,070
3.00	149.00	8,217	7,634	19,703
4.00	150.00	9,469	8,835	28,538
5.00	151.00	10,801	10,127	38,664
6.00	152.00	12,249	11,516	50,181
7.00	153.00	13,656	12,945	63,126
8.00	154.00	15,120	14,380	77,506

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	9.00	0.00	0.00
Span (in)	= 24.00	9.00	0.00	0.00
No. Barrels	= 1	2	1	0
Invert El. (ft)	= 148.00	149.00	0.00	0.00
Length (ft)	= 30.00	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	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 11.33	0.00	0.00	0.00
Crest El. (ft)	= 152.85	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Riser	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

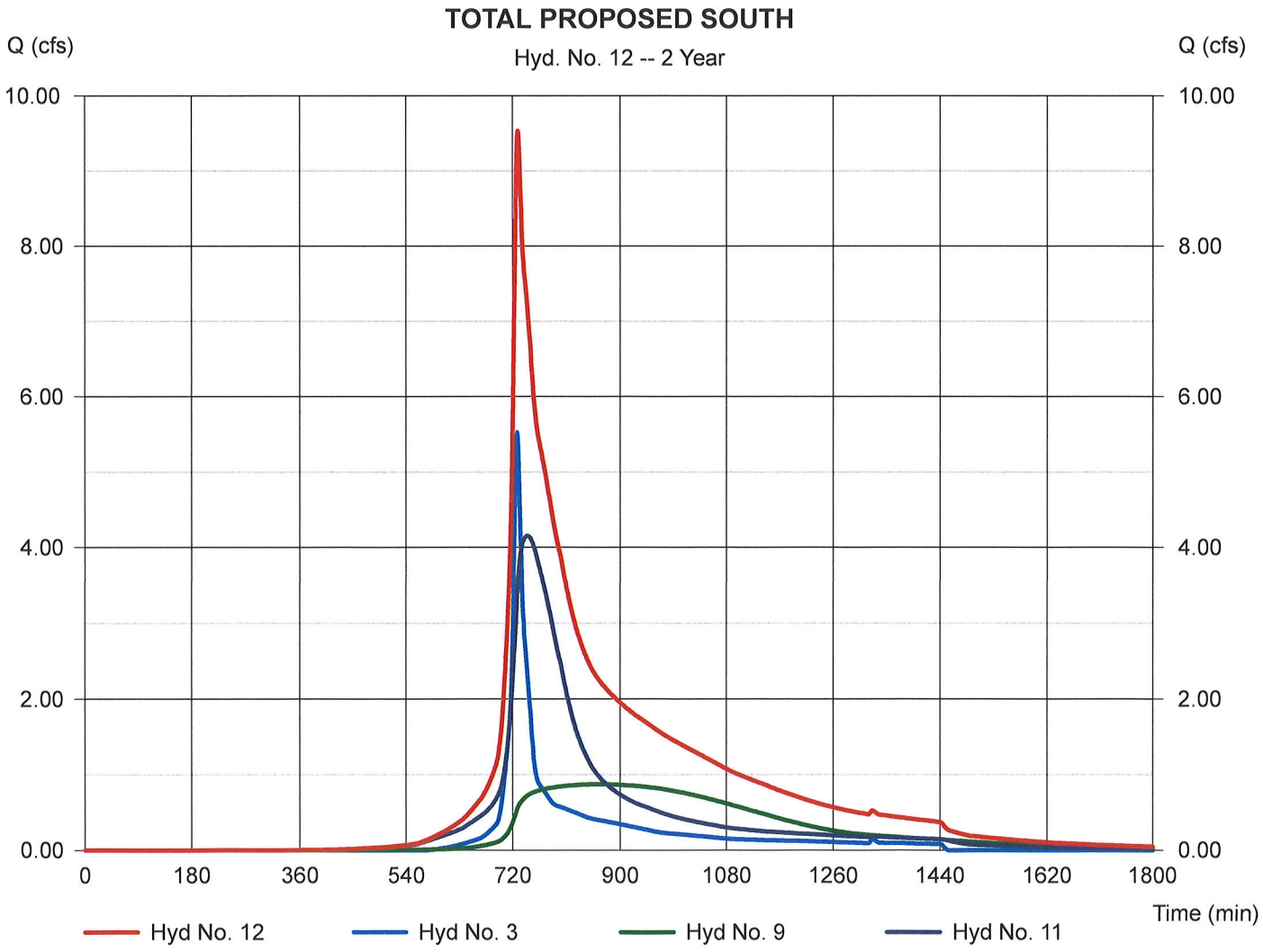
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	146.00	0.00	0.00	---	---	0.00	---	---	---	---	---	0.00
1.00	5,536	147.00	0.00	0.00	---	---	0.00	---	---	---	---	---	0.00
2.00	12,070	148.00	0.00	0.00	---	---	0.00	---	---	---	---	---	0.00
3.00	19,703	149.00	0.00	0.00	---	---	0.00	---	---	---	---	---	0.00
4.00	28,538	150.00	3.39 ic	3.36 ic	---	---	0.00	---	---	---	---	---	3.36
5.00	38,664	151.00	5.46 ic	5.42 ic	---	---	0.00	---	---	---	---	---	5.42
6.00	50,181	152.00	7.00 ic	6.89 ic	---	---	0.00	---	---	---	---	---	6.89
7.00	63,126	153.00	10.19 ic	8.00 ic	---	---	2.19	---	---	---	---	---	10.19
8.00	77,506	154.00	32.87 ic	2.24 ic	---	---	30.64 s	---	---	---	---	---	32.87

Hydrograph Report

Hyd. No. 12

TOTAL PROPOSED SOUTH

Hydrograph type	= Combine	Peak discharge	= 9.534 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 86,083 cuft
Inflow hyds.	= 3, 9, 11	Contrib. drain. area	= 3.890 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

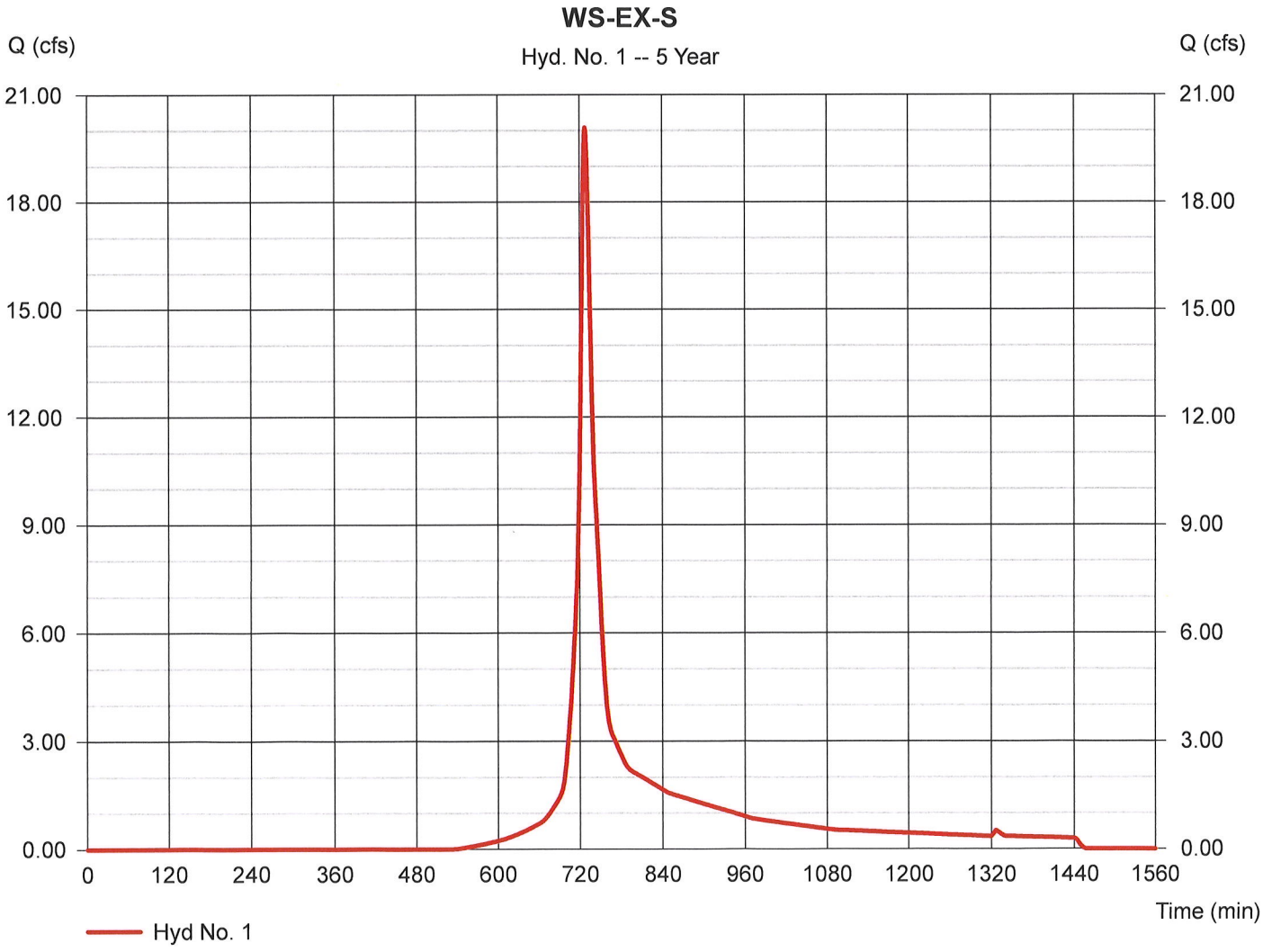
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	20.09	1	728	73,296	----	------	------	WS-EX-S
2	SCS Runoff	5.612	1	727	19,397	----	------	------	WS-EX-E
3	SCS Runoff	9.108	1	727	31,202	----	------	------	WS-PR-UNDET-S
4	SCS Runoff	1.154	1	725	3,557	----	------	------	WS-PR-UNDET-E
5	SCS Runoff	8.440	1	724	26,623	----	------	------	WS-PR-S-1 TO WQB #3
6	Reservoir	1.147	1	756	26,603	5	161.72	12,052	WQB 3 (OUTFLOW)
7	SCS Runoff	4.165	1	724	13,137	----	------	------	WS-PR-S-2 TO WQB #2
8	Combine	5.054	1	725	39,740	6, 7	------	------	WQB 2 (TOTAL INFLOW)
9	Reservoir	1.098	1	898	39,647	8	160.60	11,433	WQB 2 (OUTFLOW)
10	SCS Runoff	16.29	1	727	57,832	----	------	------	WS-PR-S-3 TO WQB #1
11	Reservoir	5.243	1	746	57,820	10	150.89	37,591	WQB1 (OUTFLOW)
12	Combine	14.15	1	728	128,669	3, 9, 11	------	------	TOTAL PROPOSED SOUTH

Hydrograph Report

Hyd. No. 1

WS-EX-S

Hydrograph type	= SCS Runoff	Peak discharge	= 20.09 cfs
Storm frequency	= 5 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 73,296 cuft
Drainage area	= 9.680 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.10 min
Total precip.	= 4.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

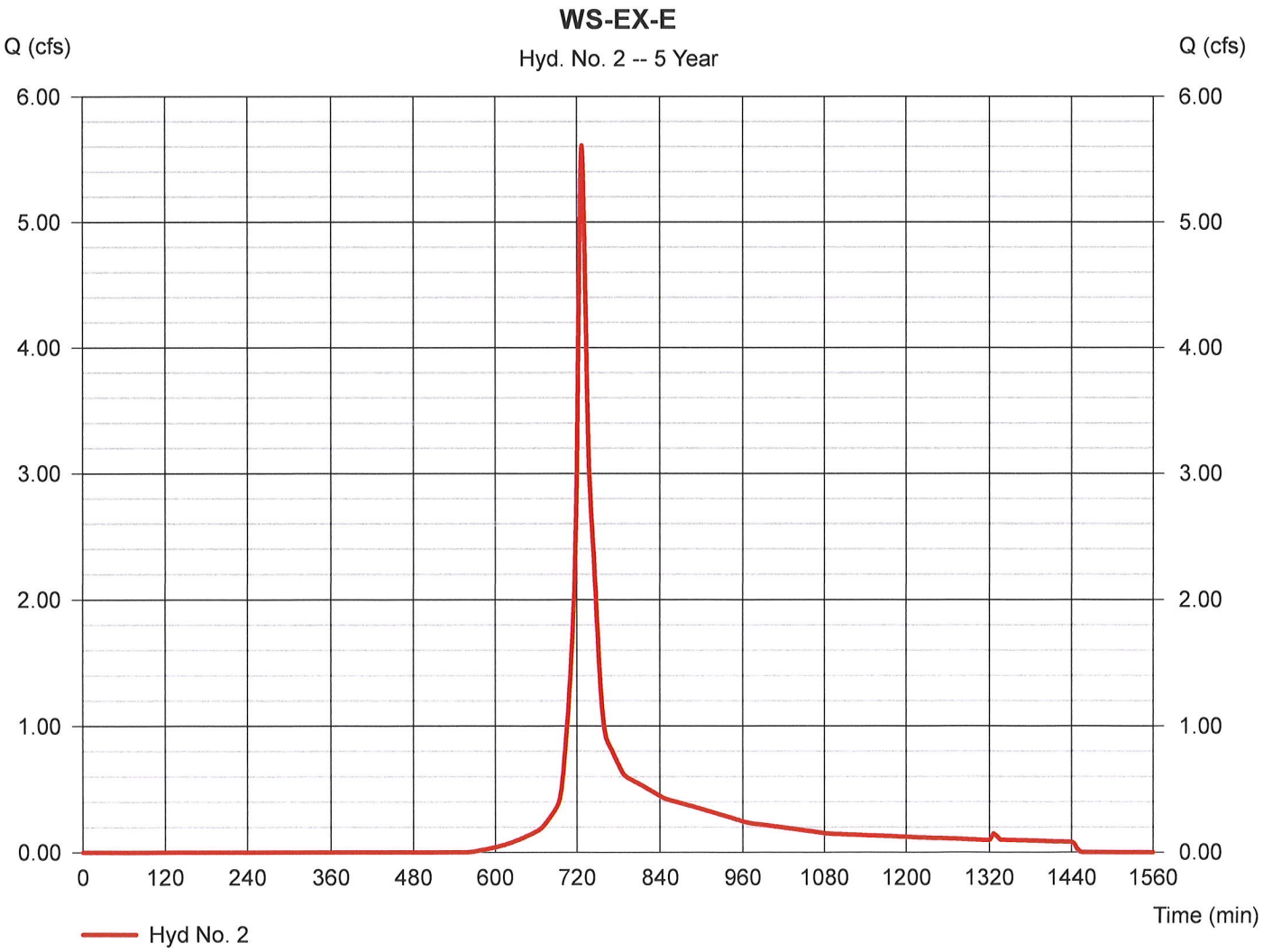


Hydrograph Report

Hyd. No. 2

WS-EX-E

Hydrograph type	= SCS Runoff	Peak discharge	= 5.612 cfs
Storm frequency	= 5 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 19,397 cuft
Drainage area	= 2.820 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.60 min
Total precip.	= 4.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

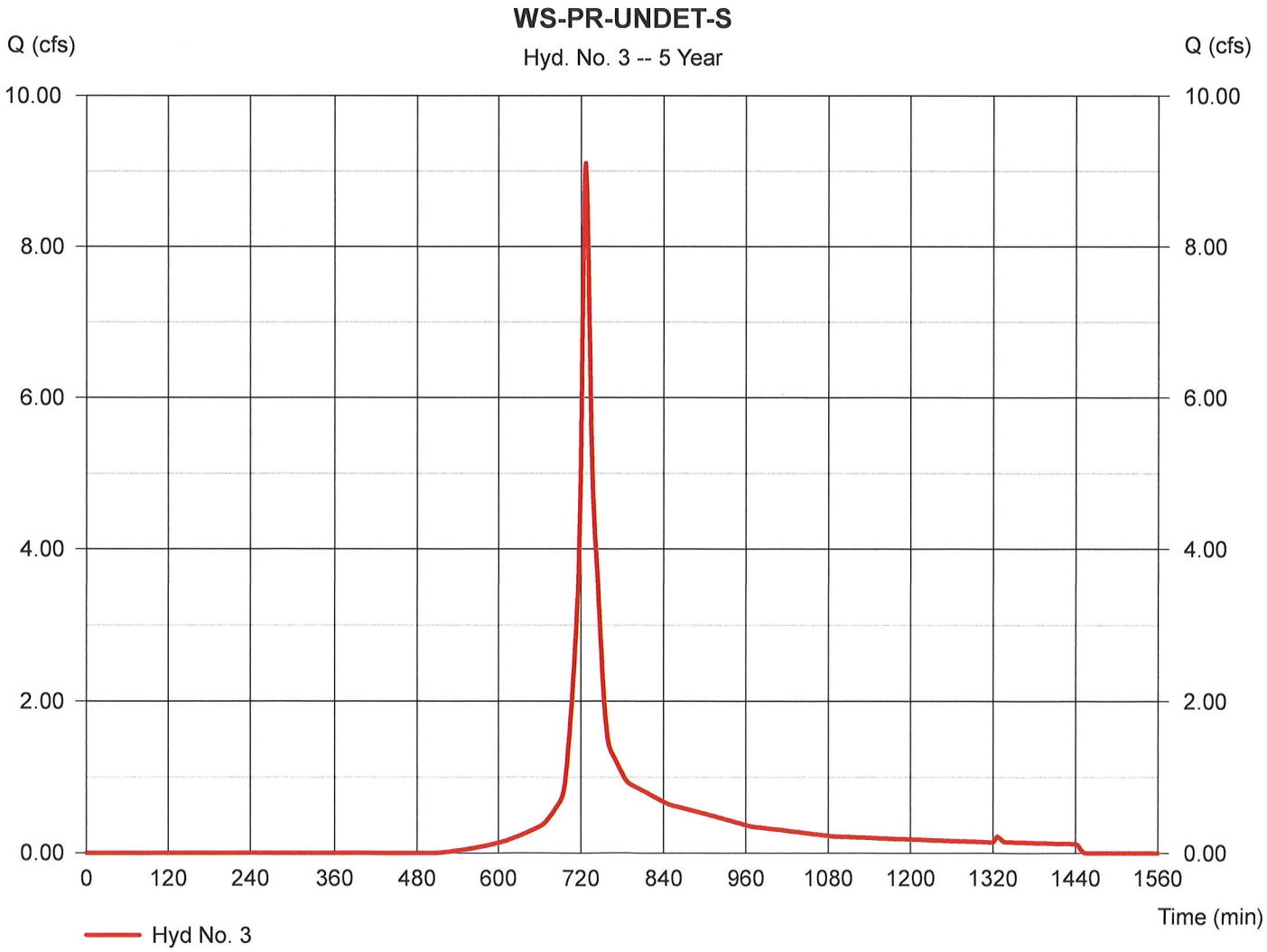


Hydrograph Report

Hyd. No. 3

WS-PR-UNDET-S

Hydrograph type	= SCS Runoff	Peak discharge	= 9.108 cfs
Storm frequency	= 5 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 31,202 cuft
Drainage area	= 3.890 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 4.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

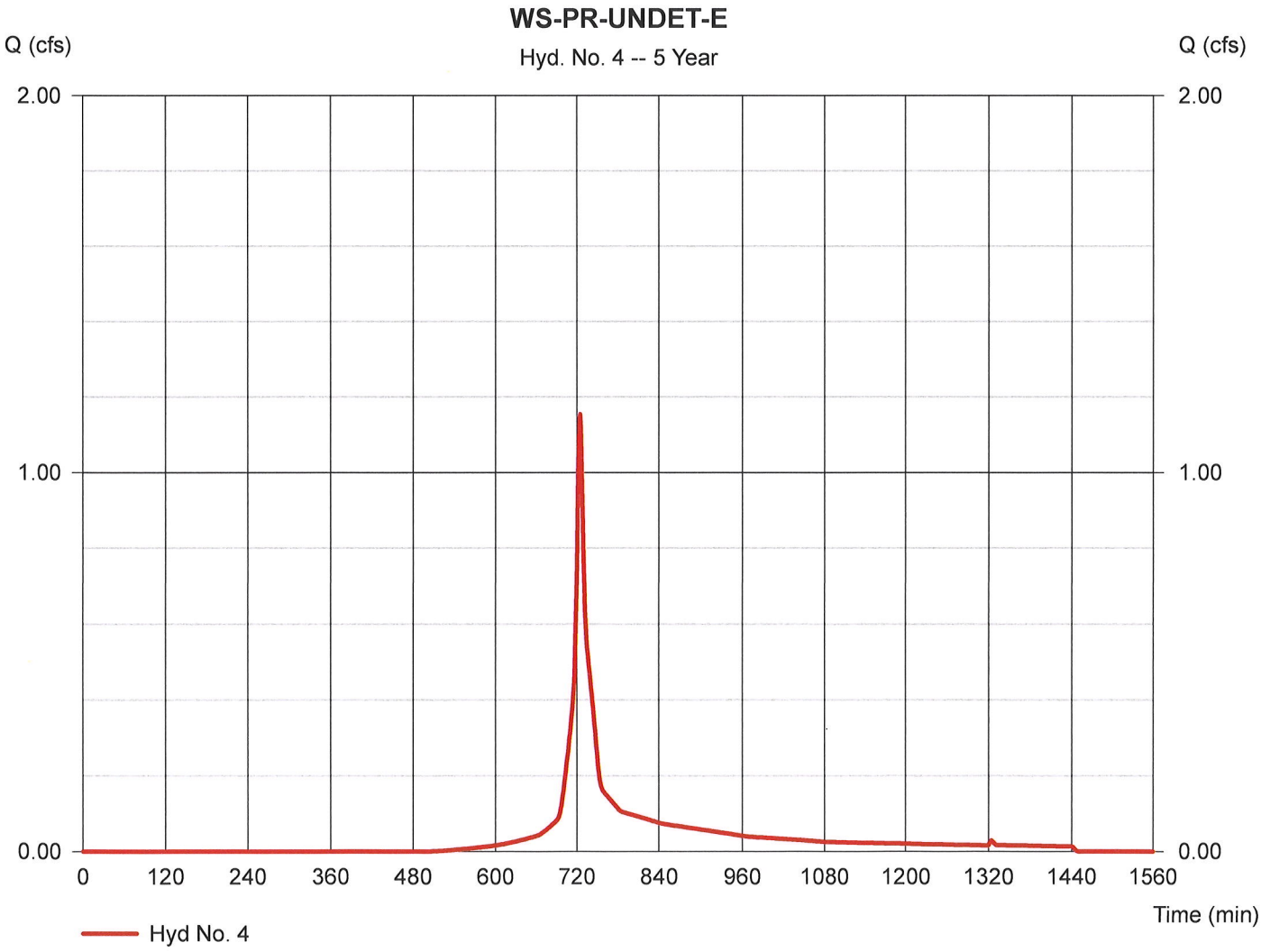


Hydrograph Report

Hyd. No. 4

WS-PR-UNDET-E

Hydrograph type	= SCS Runoff	Peak discharge	= 1.154 cfs
Storm frequency	= 5 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 3,557 cuft
Drainage area	= 0.430 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

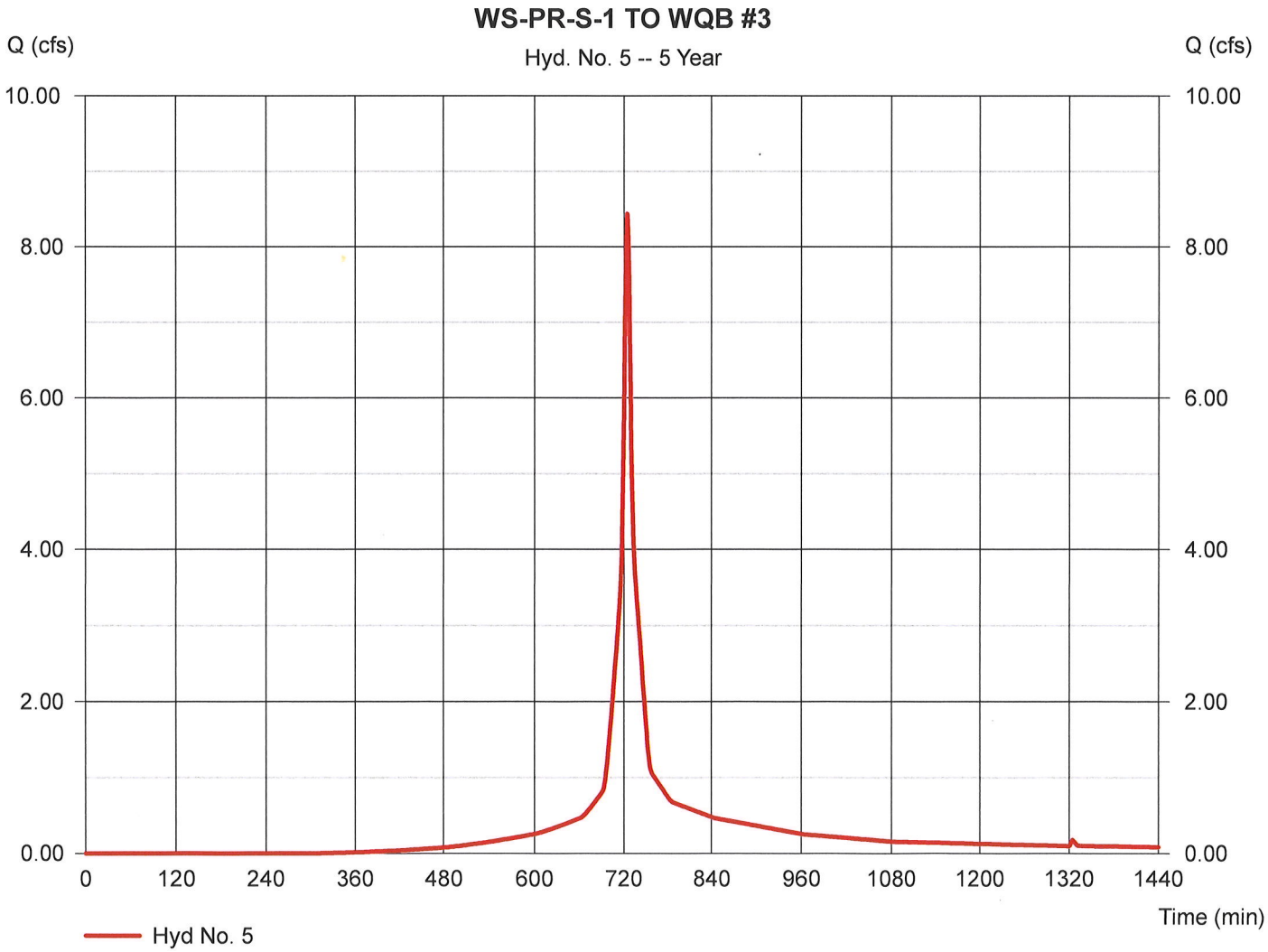


Hydrograph Report

Hyd. No. 5

WS-PR-S-1 TO WQB #3

Hydrograph type	= SCS Runoff	Peak discharge	= 8.440 cfs
Storm frequency	= 5 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 26,623 cuft
Drainage area	= 2.290 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



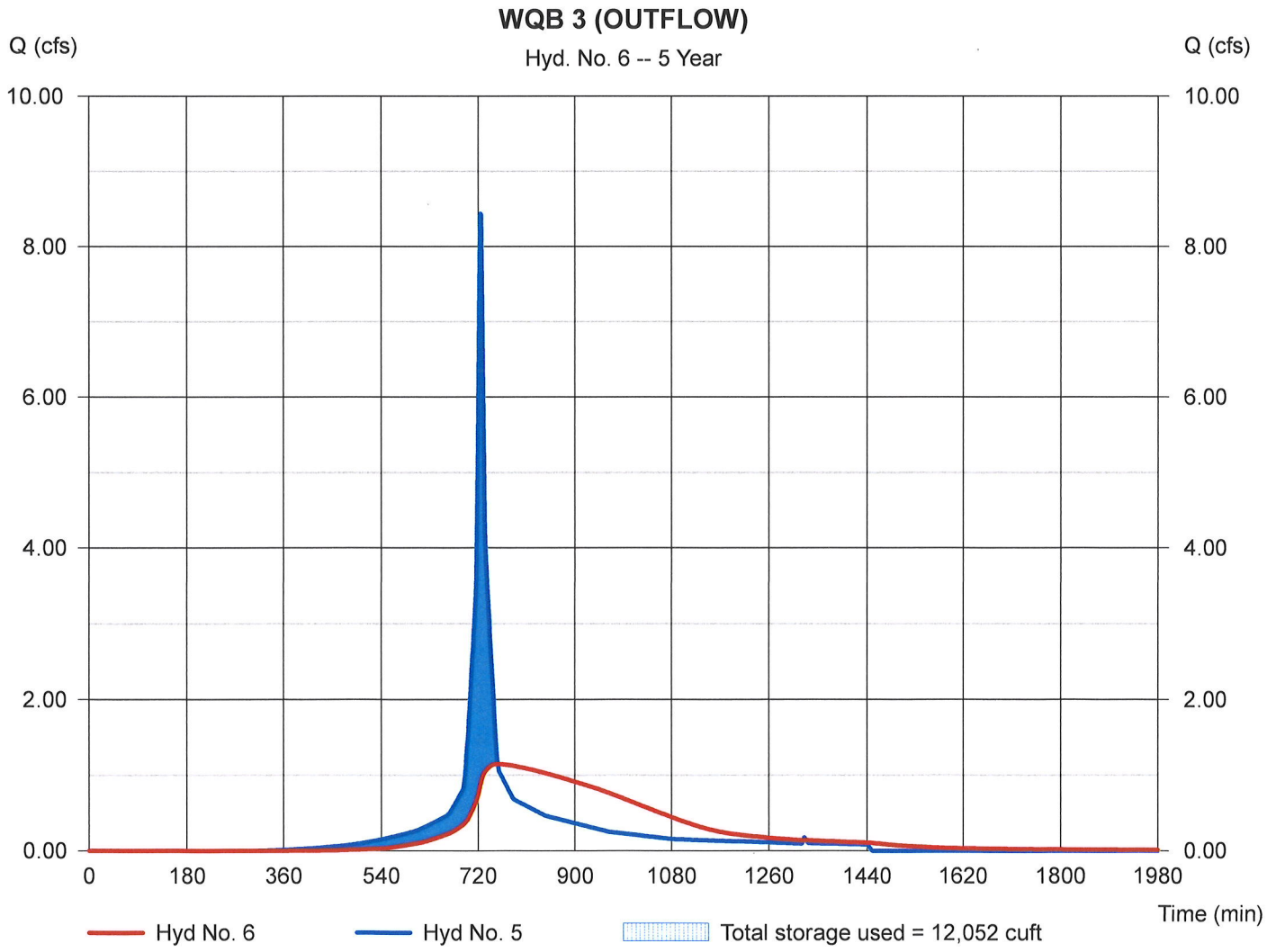
Hydrograph Report

Hyd. No. 6

WQB 3 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	1.147 cfs
Storm frequency	=	5 yrs	Time to peak	=	756 min
Time interval	=	1 min	Hyd. volume	=	26,603 cuft
Inflow hyd. No.	=	5 - WS-PR-S-1 TO WQB #3	Max. Elevation	=	161.72 ft
Reservoir name	=	WQB3	Max. Storage	=	12,052 cuft

Storage Indication method used.

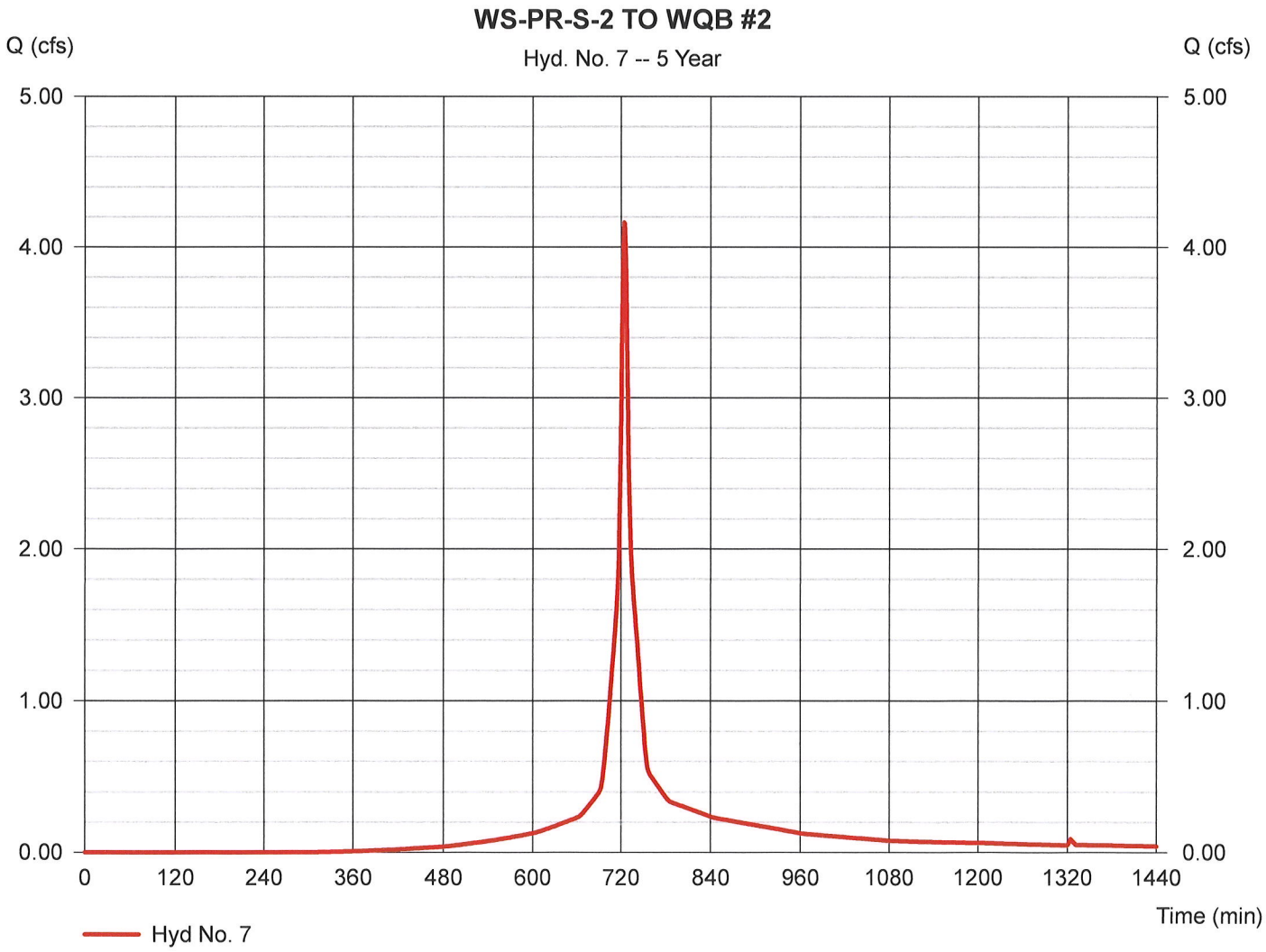


Hydrograph Report

Hyd. No. 7

WS-PR-S-2 TO WQB #2

Hydrograph type	= SCS Runoff	Peak discharge	= 4.165 cfs
Storm frequency	= 5 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 13,137 cuft
Drainage area	= 1.130 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

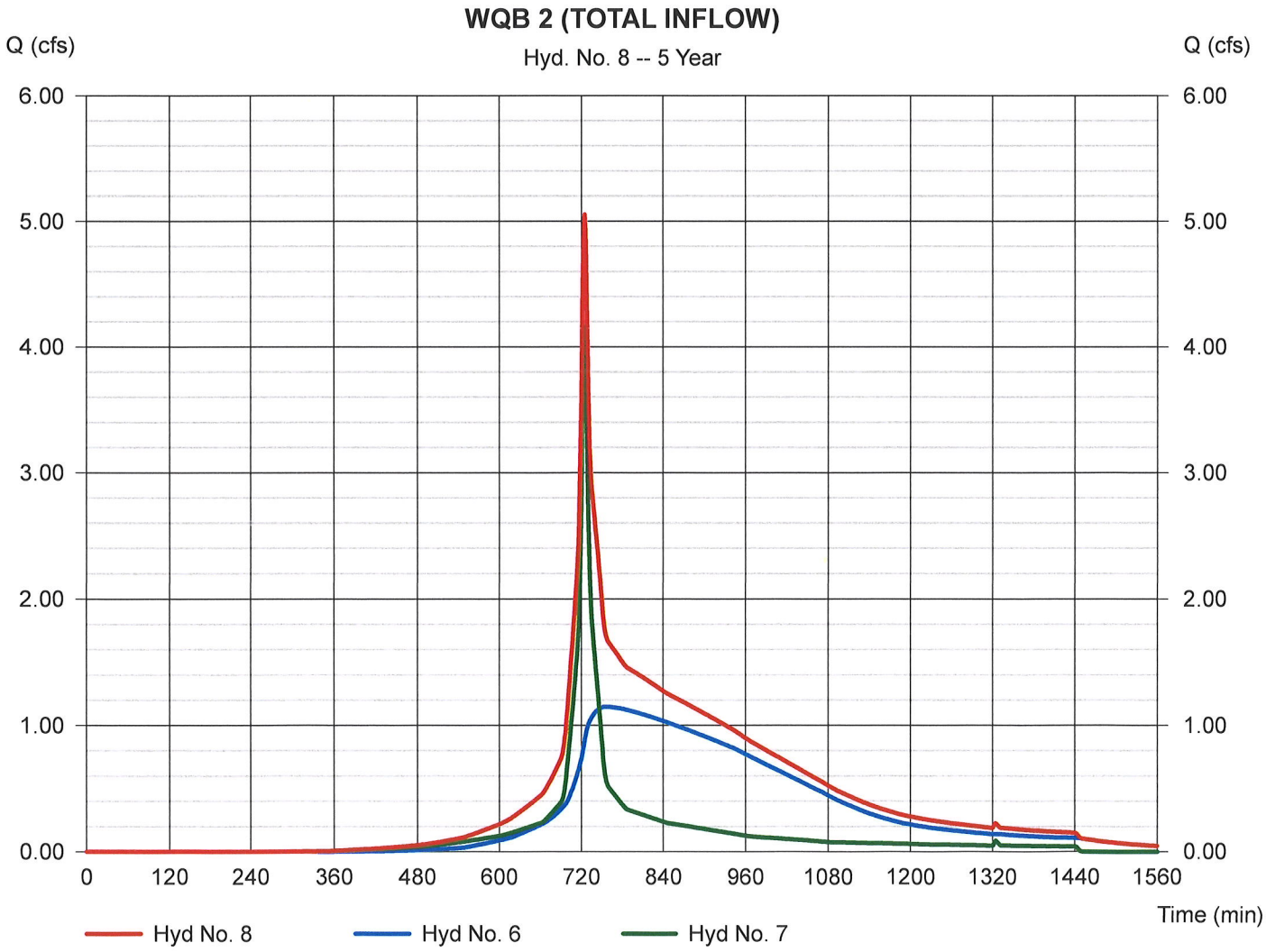


Hydrograph Report

Hyd. No. 8

WQB 2 (TOTAL INFLOW)

Hydrograph type	= Combine	Peak discharge	= 5.054 cfs
Storm frequency	= 5 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 39,740 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 1.130 ac



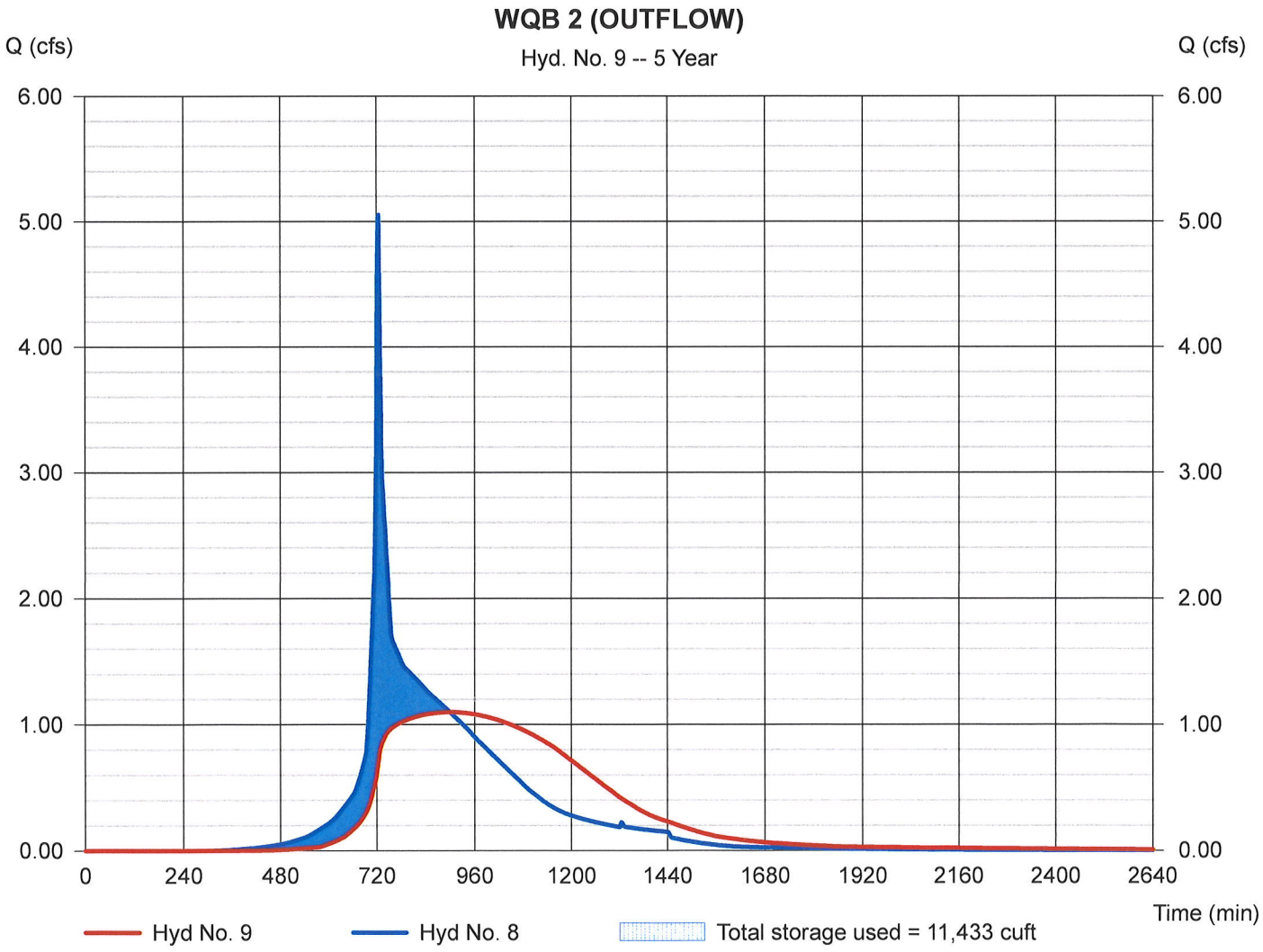
Hydrograph Report

Hyd. No. 9

WQB 2 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	1.098 cfs
Storm frequency	=	5 yrs	Time to peak	=	898 min
Time interval	=	1 min	Hyd. volume	=	39,647 cuft
Inflow hyd. No.	=	8 - WQB 2 (TOTAL INFLOW)	Max. Elevation	=	160.60 ft
Reservoir name	=	WQB2	Max. Storage	=	11,433 cuft

Storage Indication method used.

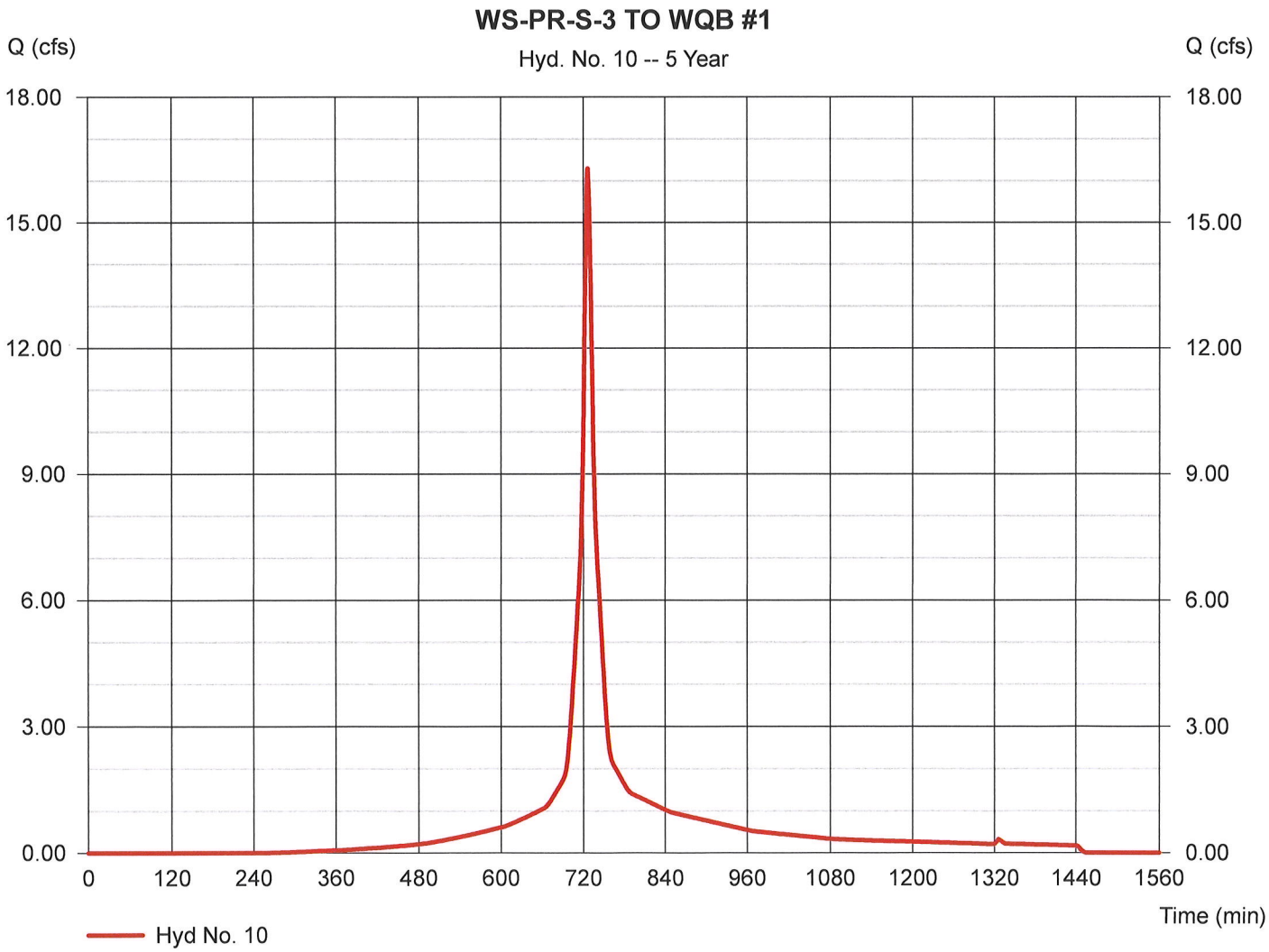


Hydrograph Report

Hyd. No. 10

WS-PR-S-3 TO WQB #1

Hydrograph type	= SCS Runoff	Peak discharge	= 16.29 cfs
Storm frequency	= 5 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 57,832 cuft
Drainage area	= 4.820 ac	Curve number	= 91
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 4.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



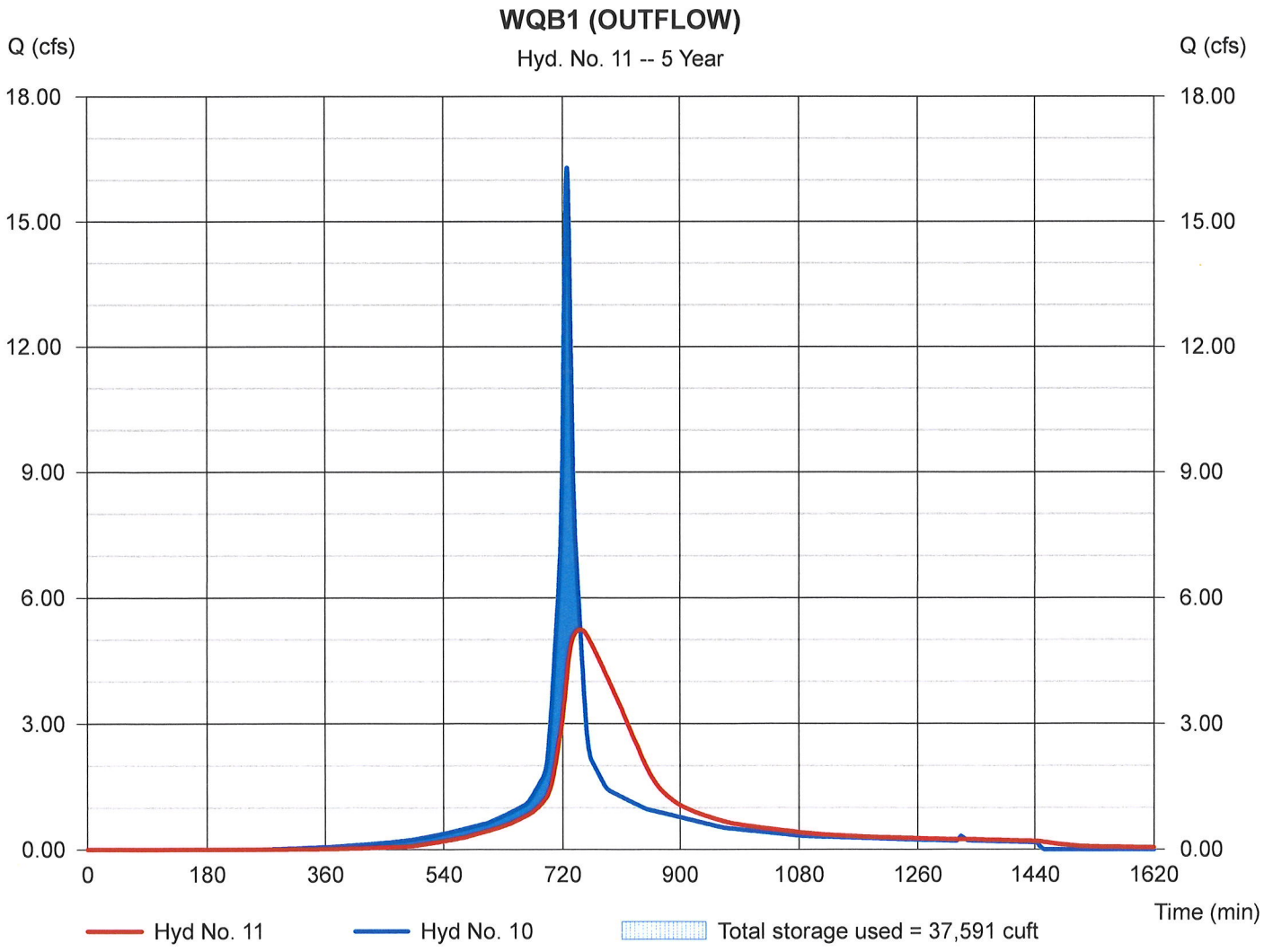
Hydrograph Report

Hyd. No. 11

WQB1 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	5.243 cfs
Storm frequency	=	5 yrs	Time to peak	=	746 min
Time interval	=	1 min	Hyd. volume	=	57,820 cuft
Inflow hyd. No.	=	10 - WS-PR-S-3 TO WQB #1	Max. Elevation	=	150.89 ft
Reservoir name	=	WQB1	Max. Storage	=	37,591 cuft

Storage Indication method used. Wet pond routing start elevation = 149.00 ft.

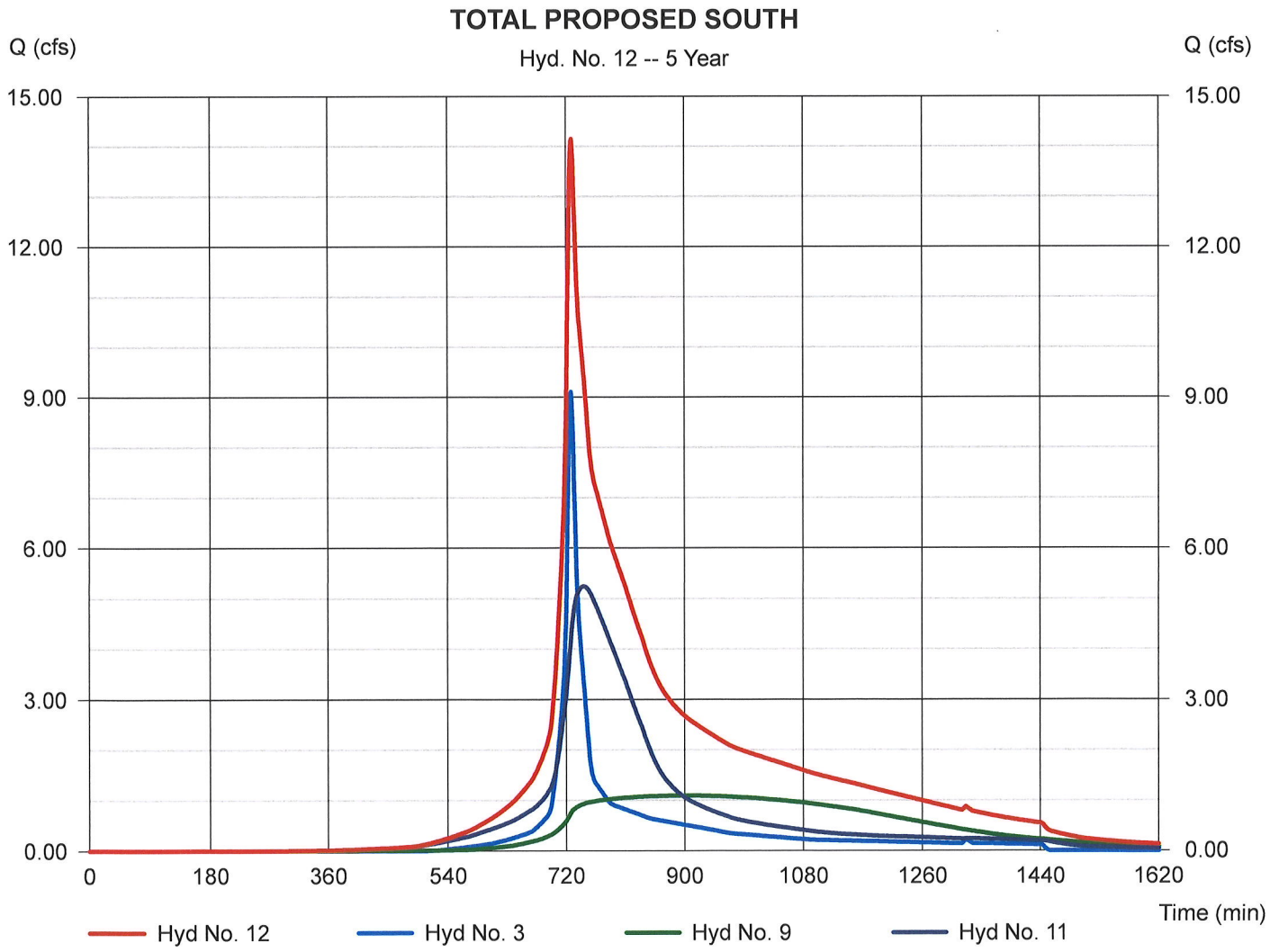


Hydrograph Report

Hyd. No. 12

TOTAL PROPOSED SOUTH

Hydrograph type	= Combine	Peak discharge	= 14.15 cfs
Storm frequency	= 5 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 128,669 cuft
Inflow hyds.	= 3, 9, 11	Contrib. drain. area	= 3.890 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

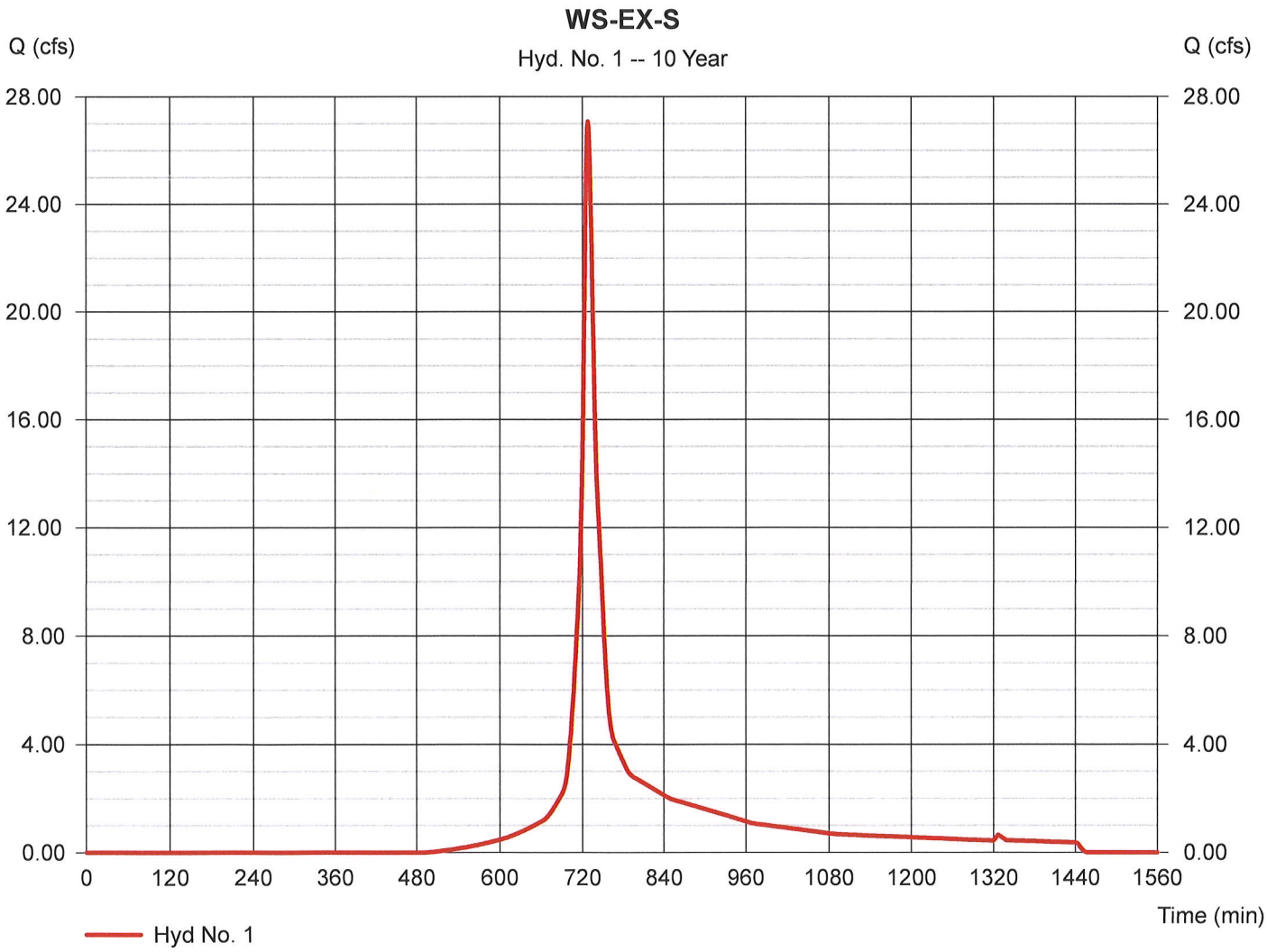
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	27.08	1	728	98,319	----	------	------	WS-EX-S
2	SCS Runoff	7.677	1	727	26,323	----	------	------	WS-EX-E
3	SCS Runoff	12.09	1	727	41,391	----	------	------	WS-PR-UNDET-S
4	SCS Runoff	1.530	1	725	4,718	----	------	------	WS-PR-UNDET-E
5	SCS Runoff	10.53	1	724	33,567	----	------	------	WS-PR-S-1 TO WQB #3
6	Reservoir	1.301	1	758	33,546	5	162.14	15,398	WQB 3 (OUTFLOW)
7	SCS Runoff	5.197	1	724	16,564	----	------	------	WS-PR-S-2 TO WQB #2
8	Combine	6.208	1	725	50,110	6, 7	------	------	WQB 2 (TOTAL INFLOW)
9	Reservoir	1.251	1	918	50,011	8	161.00	14,641	WQB 2 (OUTFLOW)
10	SCS Runoff	20.12	1	726	72,223	----	------	------	WS-PR-S-3 TO WQB #1
11	Reservoir	5.942	1	748	72,212	10	151.33	42,425	WQB1 (OUTFLOW)
12	Combine	17.82	1	727	163,613	3, 9, 11	------	------	TOTAL PROPOSED SOUTH

Hydrograph Report

Hyd. No. 1

WS-EX-S

Hydrograph type	= SCS Runoff	Peak discharge	= 27.08 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 98,319 cuft
Drainage area	= 9.680 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.10 min
Total precip.	= 5.15 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

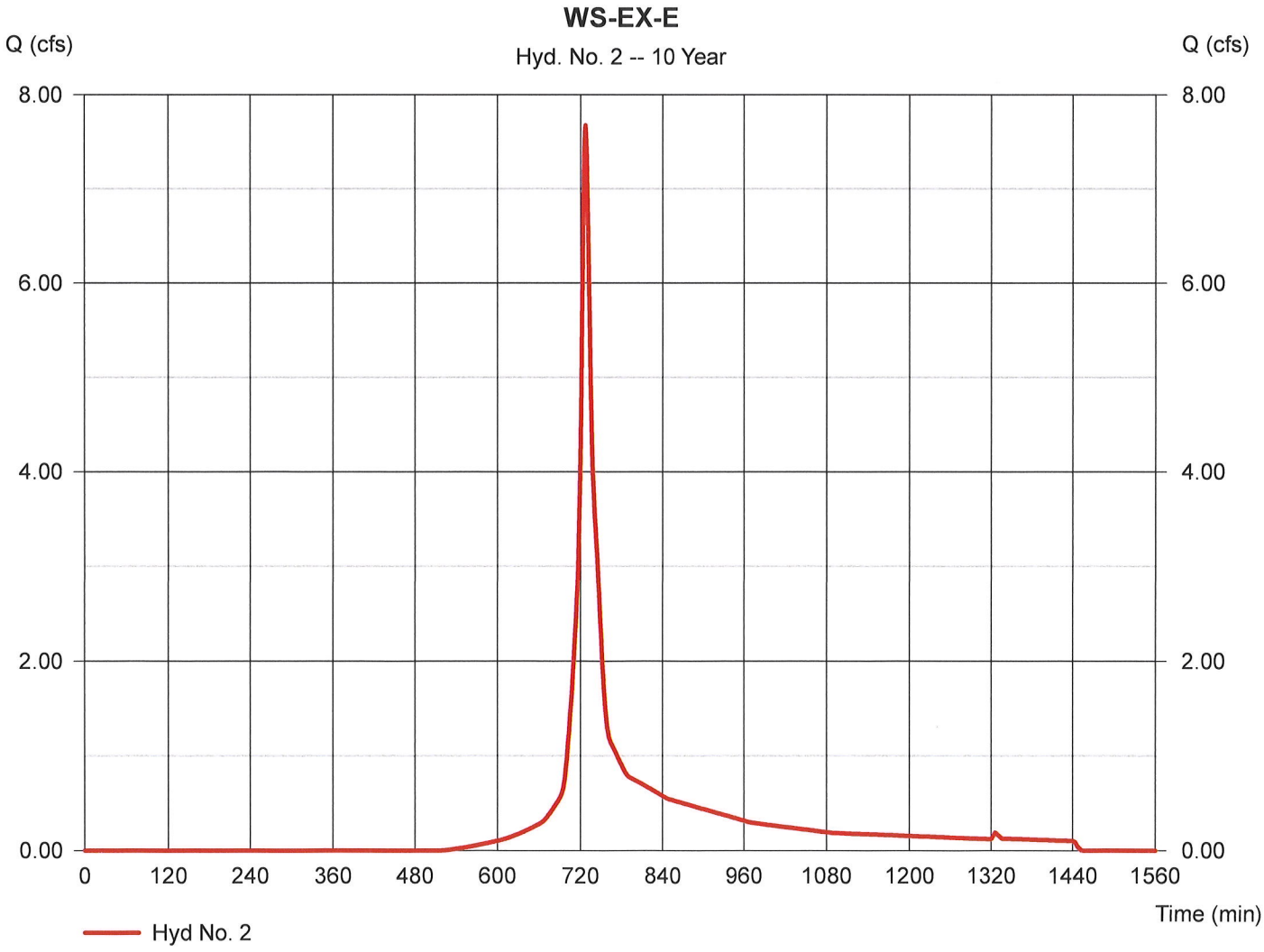


Hydrograph Report

Hyd. No. 2

WS-EX-E

Hydrograph type	= SCS Runoff	Peak discharge	= 7.677 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 26,323 cuft
Drainage area	= 2.820 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.60 min
Total precip.	= 5.15 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

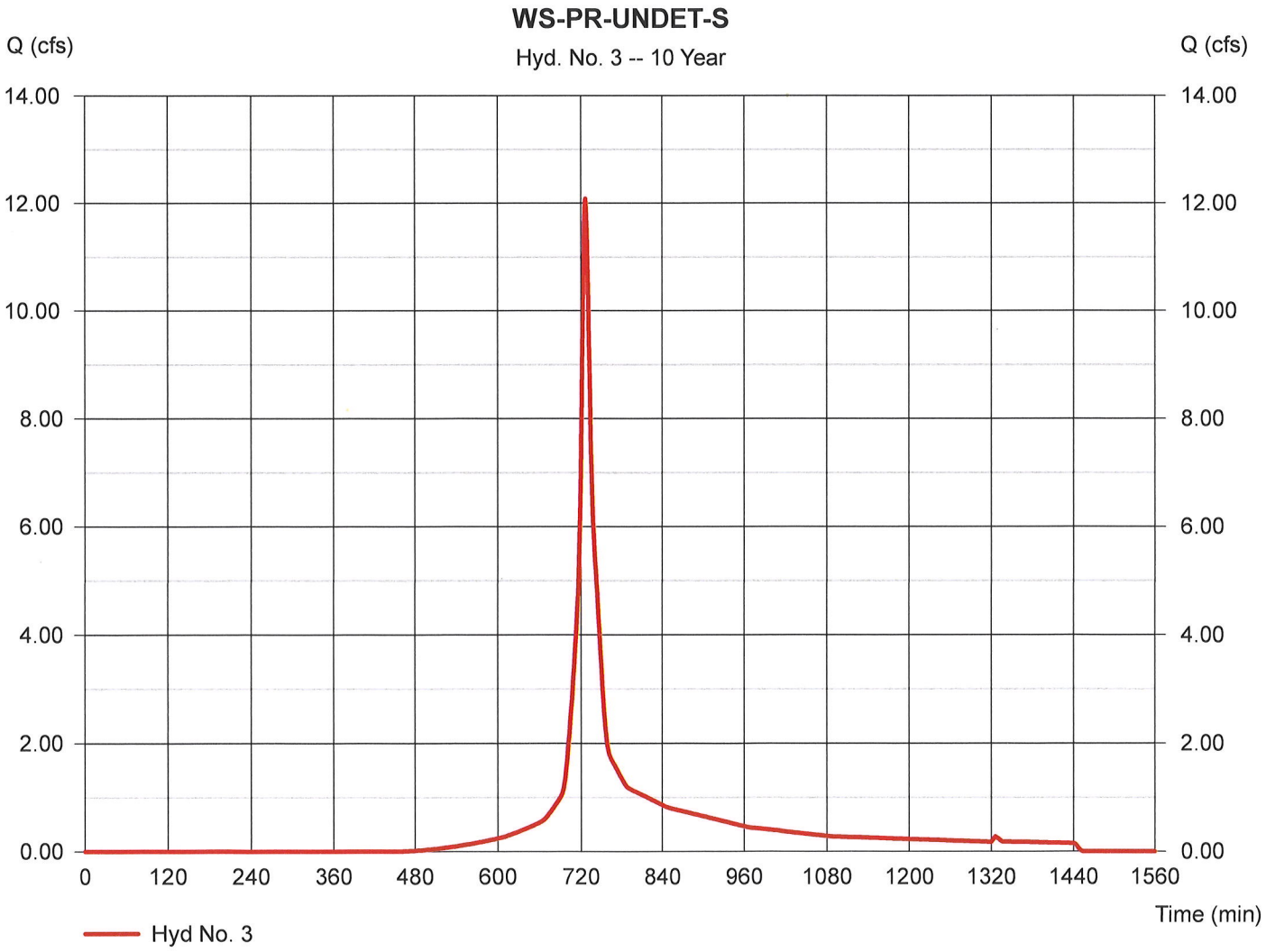


Hydrograph Report

Hyd. No. 3

WS-PR-UNDET-S

Hydrograph type	= SCS Runoff	Peak discharge	= 12.09 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 41,391 cuft
Drainage area	= 3.890 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.15 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

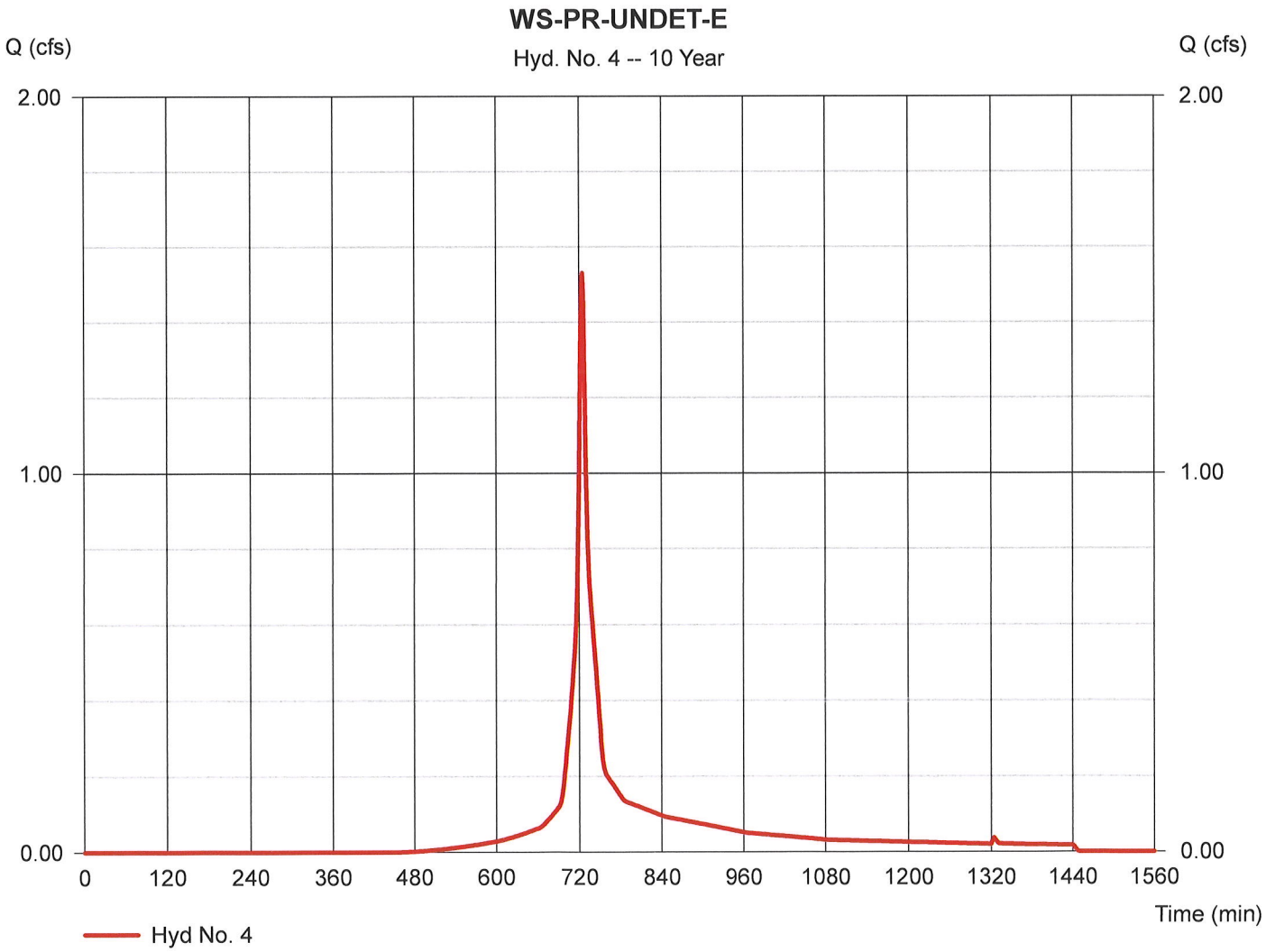


Hydrograph Report

Hyd. No. 4

WS-PR-UNDET-E

Hydrograph type	= SCS Runoff	Peak discharge	= 1.530 cfs
Storm frequency	= 10 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 4,718 cuft
Drainage area	= 0.430 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.15 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

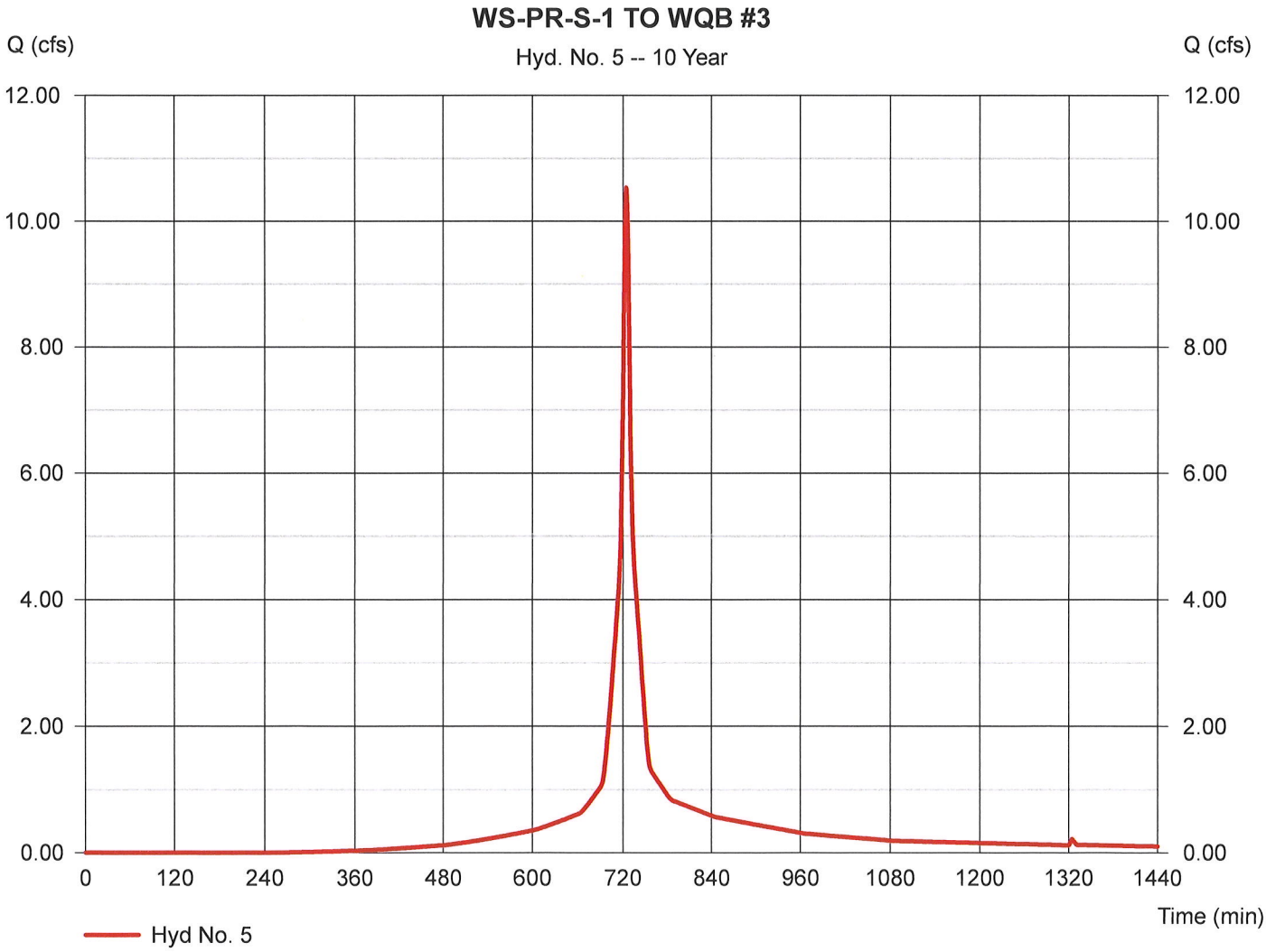


Hydrograph Report

Hyd. No. 5

WS-PR-S-1 TO WQB #3

Hydrograph type	= SCS Runoff	Peak discharge	= 10.53 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 33,567 cuft
Drainage area	= 2.290 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.15 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



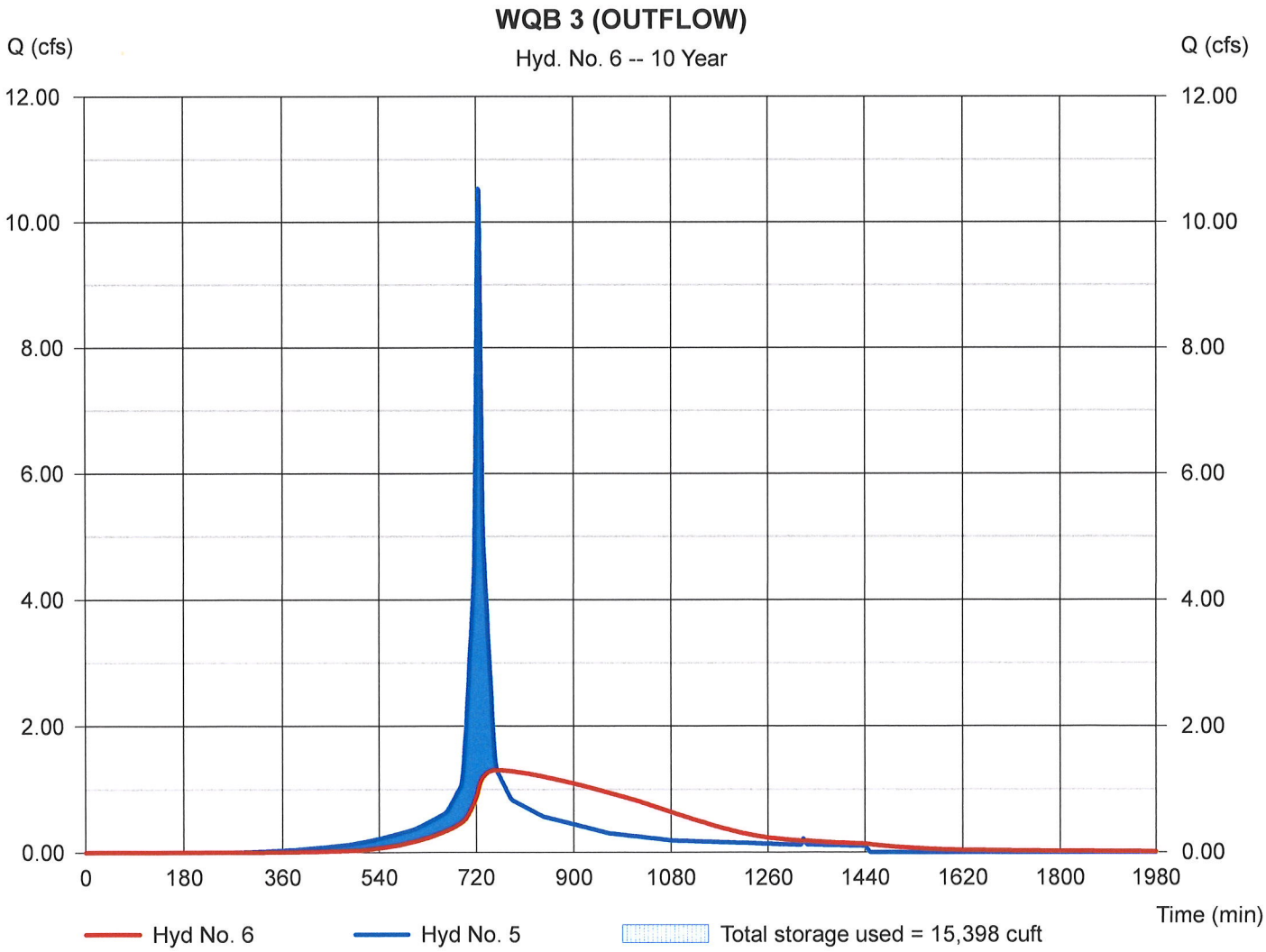
Hydrograph Report

Hyd. No. 6

WQB 3 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	1.301 cfs
Storm frequency	=	10 yrs	Time to peak	=	758 min
Time interval	=	1 min	Hyd. volume	=	33,546 cuft
Inflow hyd. No.	=	5 - WS-PR-S-1 TO WQB #3	Max. Elevation	=	162.14 ft
Reservoir name	=	WQB3	Max. Storage	=	15,398 cuft

Storage Indication method used.

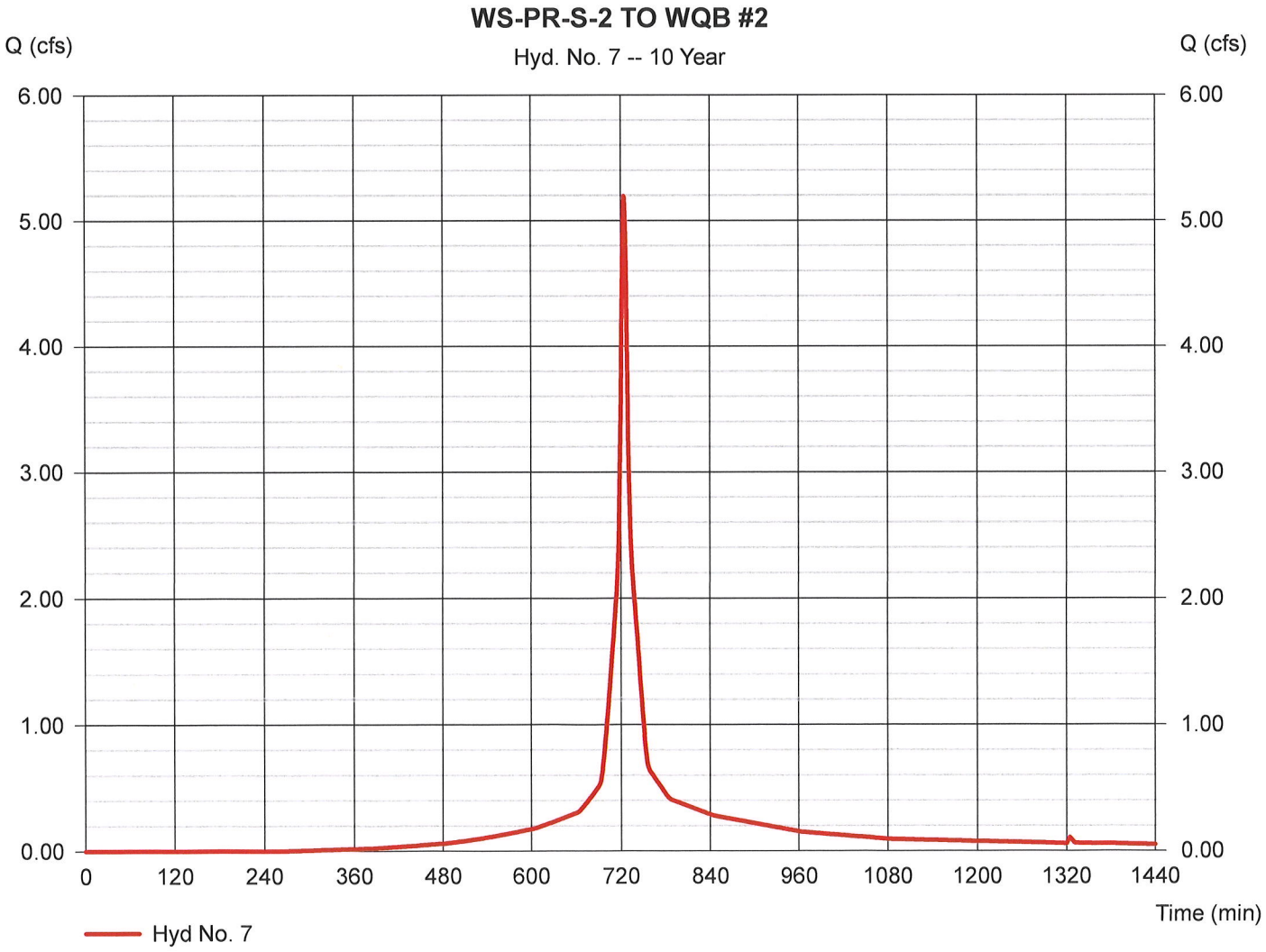


Hydrograph Report

Hyd. No. 7

WS-PR-S-2 TO WQB #2

Hydrograph type	= SCS Runoff	Peak discharge	= 5.197 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 16,564 cuft
Drainage area	= 1.130 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.15 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

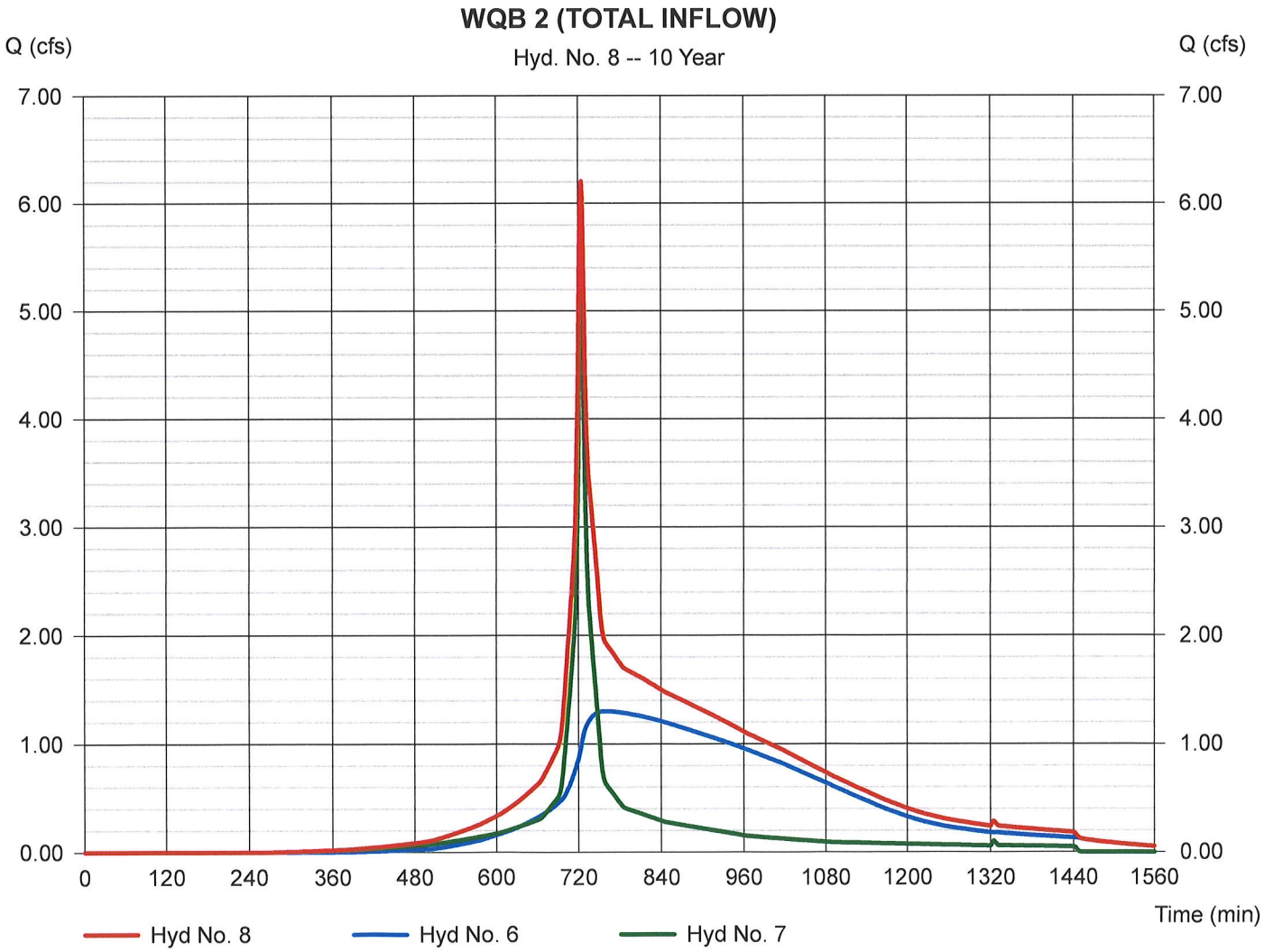


Hydrograph Report

Hyd. No. 8

WQB 2 (TOTAL INFLOW)

Hydrograph type	= Combine	Peak discharge	= 6.208 cfs
Storm frequency	= 10 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 50,110 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 1.130 ac



Hydrograph Report

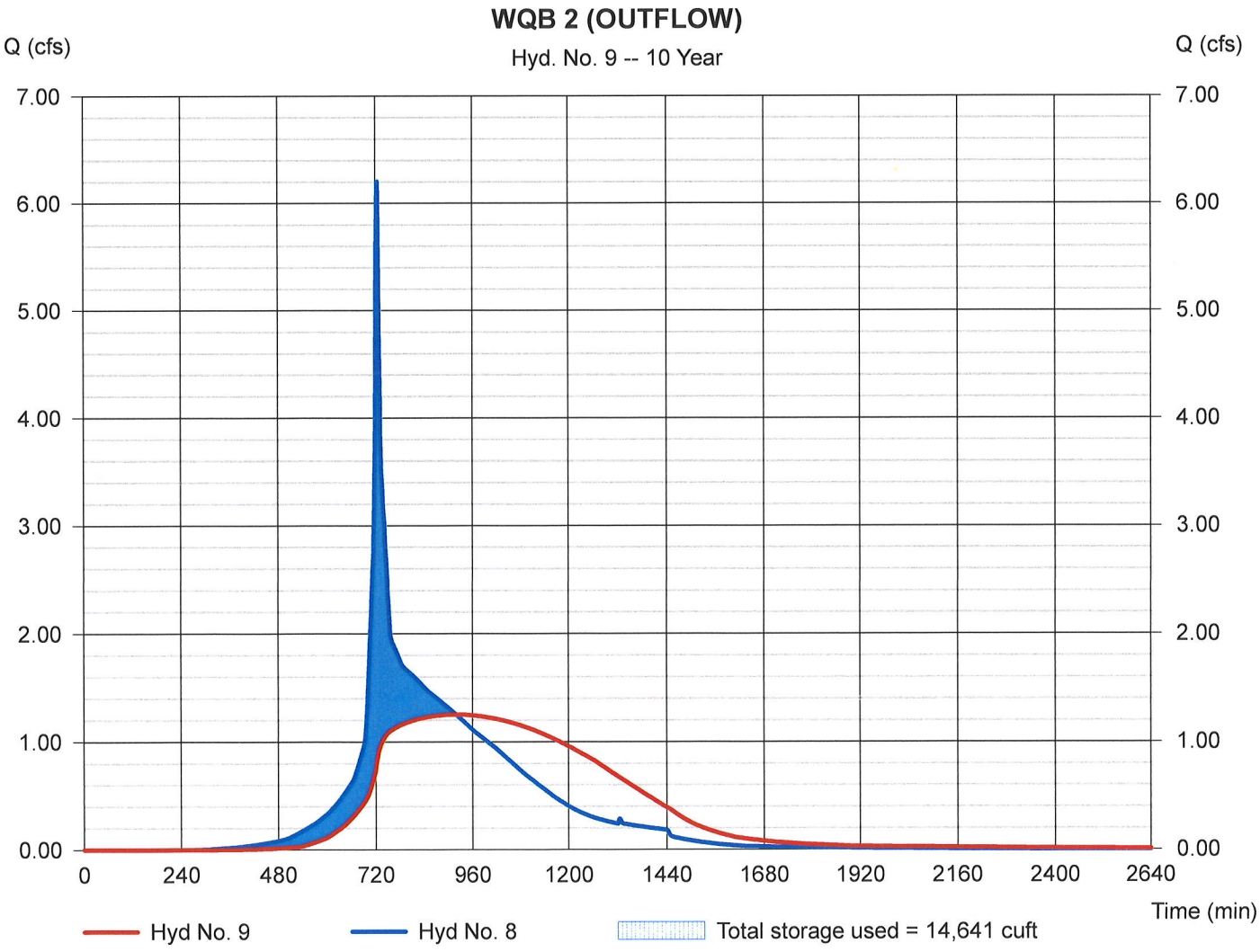
Hydraflow Hydrographs by Intelisolve v9.1 — Friday, Sep 22, 2023

Hyd. No. 9

WQB 2 (OUTFLOW)

Hydrograph type	= Reservoir	Peak discharge	= 1.251 cfs
Storm frequency	= 10 yrs	Time to peak	= 918 min
Time interval	= 1 min	Hyd. volume	= 50,011 cuft
Inflow hyd. No.	= 8 - WQB 2 (TOTAL INFLOW)	Max. Elevation	= 161.00 ft
Reservoir name	= WQB2	Max. Storage	= 14,641 cuft

Storage Indication method used.

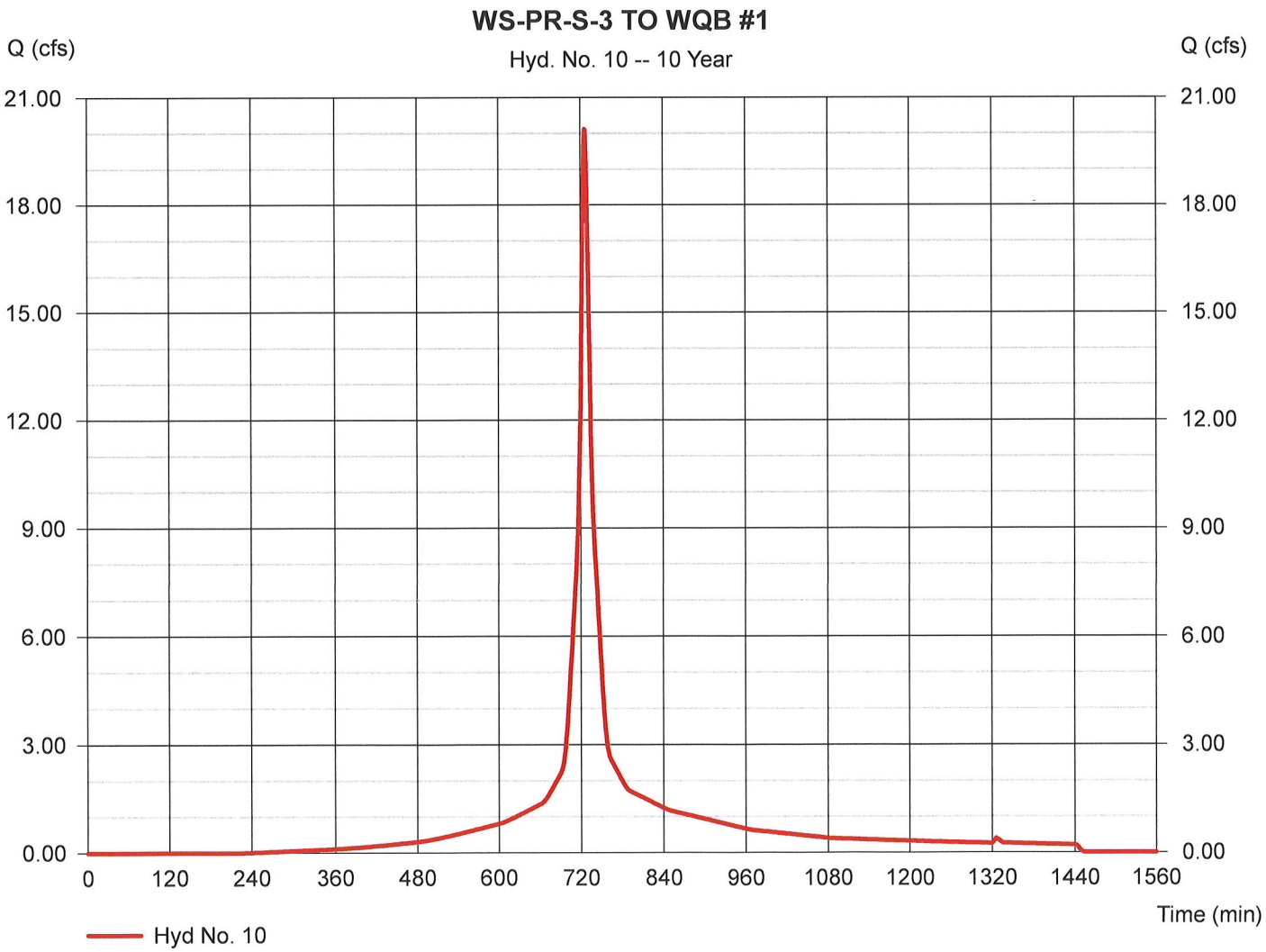


Hydrograph Report

Hyd. No. 10

WS-PR-S-3 TO WQB #1

Hydrograph type	= SCS Runoff	Peak discharge	= 20.12 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 72,223 cuft
Drainage area	= 4.820 ac	Curve number	= 91
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.15 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1

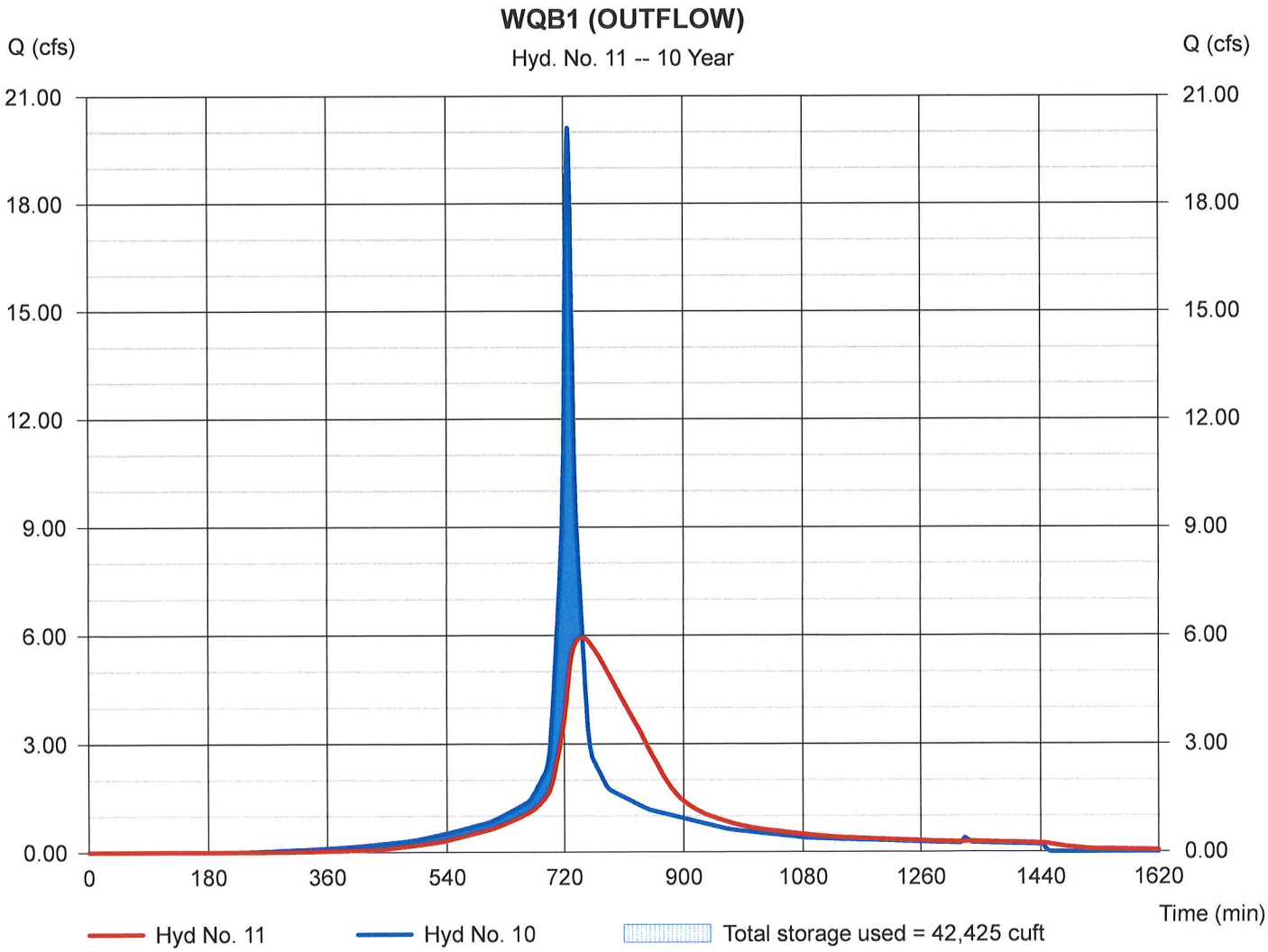
Friday, Sep 22, 2023

Hyd. No. 11

WQB1 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	5.942 cfs
Storm frequency	=	10 yrs	Time to peak	=	748 min
Time interval	=	1 min	Hyd. volume	=	72,212 cuft
Inflow hyd. No.	=	10 - WS-PR-S-3 TO WQB #1	Max. Elevation	=	151.33 ft
Reservoir name	=	WQB1	Max. Storage	=	42,425 cuft

Storage Indication method used. Wet pond routing start elevation = 149.00 ft.

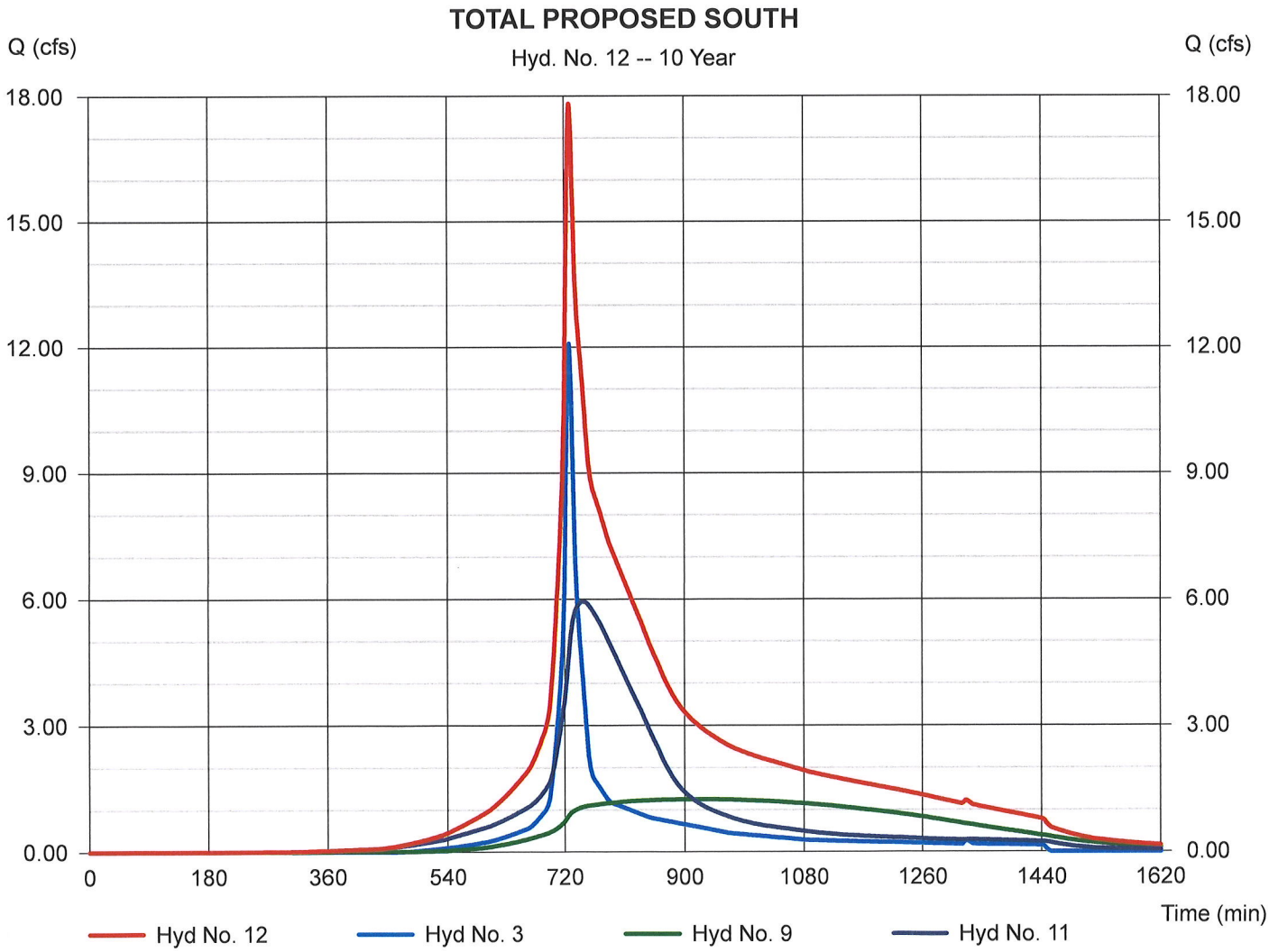


Hydrograph Report

Hyd. No. 12

TOTAL PROPOSED SOUTH

Hydrograph type	= Combine	Peak discharge	= 17.82 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 163,613 cuft
Inflow hyds.	= 3, 9, 11	Contrib. drain. area	= 3.890 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

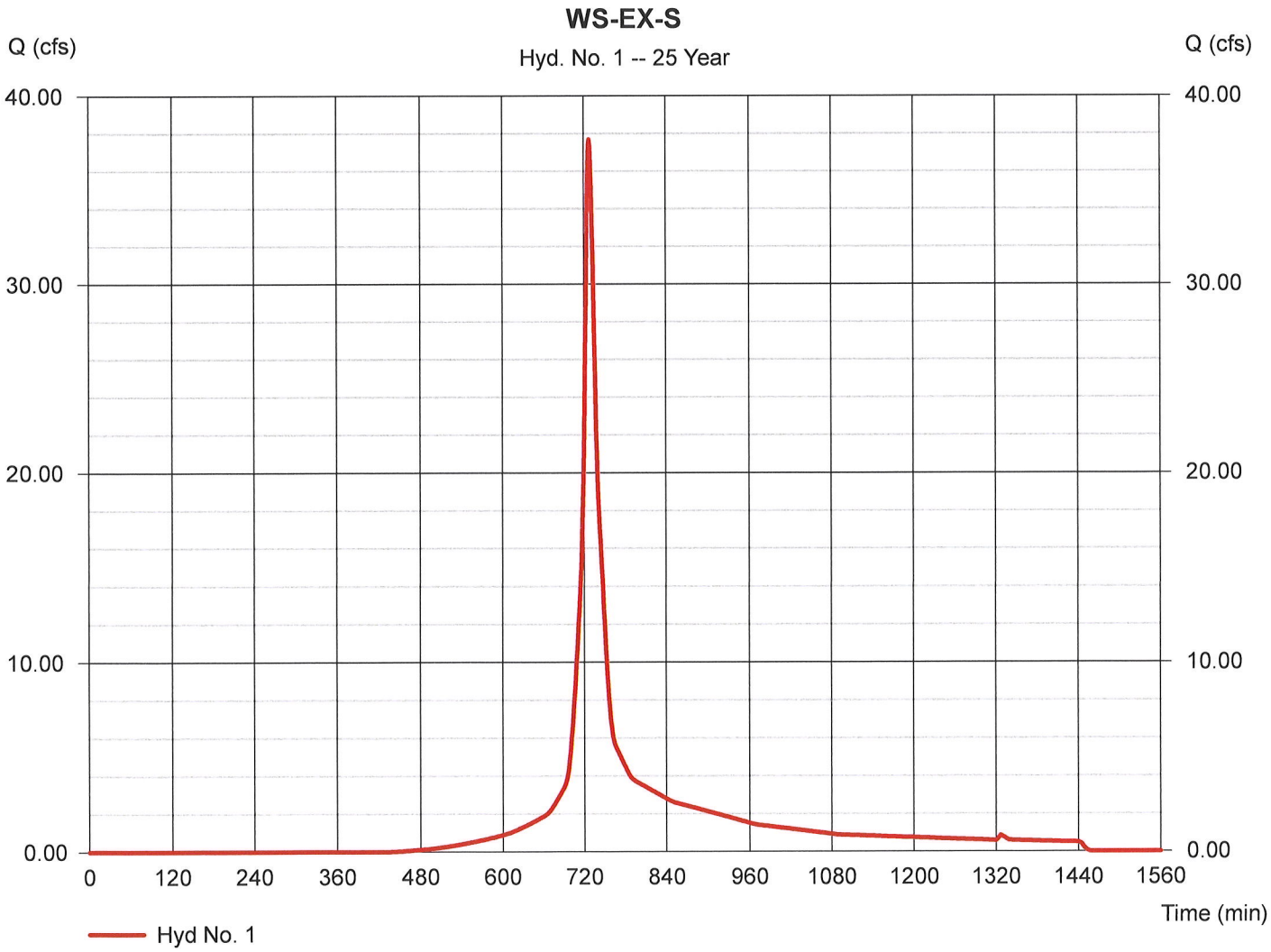
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	37.69	1	728	137,007	----	------	------	WS-EX-S
2	SCS Runoff	10.84	1	727	37,113	----	------	------	WS-EX-E
3	SCS Runoff	16.58	1	727	57,031	----	------	------	WS-PR-UNDET-S
4	SCS Runoff	2.096	1	725	6,501	----	------	------	WS-PR-UNDET-E
5	SCS Runoff	13.59	1	724	43,922	----	------	------	WS-PR-S-1 TO WQB #3
6	Reservoir	1.491	1	765	43,901	5	162.74	20,531	WQB 3 (OUTFLOW)
7	SCS Runoff	6.708	1	724	21,673	----	------	------	WS-PR-S-2 TO WQB #2
8	Combine	7.875	1	725	65,574	6, 7	------	------	WQB 2 (TOTAL INFLOW)
9	Reservoir	1.428	1	950	65,465	8	161.53	19,571	WQB 2 (OUTFLOW)
10	SCS Runoff	25.70	1	726	93,593	----	------	------	WS-PR-S-3 TO WQB #1
11	Reservoir	6.857	1	749	93,581	10	151.97	49,873	WQB1 (OUTFLOW)
12	Combine	23.22	1	727	216,078	3, 9, 11	------	------	TOTAL PROPOSED SOUTH

Hydrograph Report

Hyd. No. 1

WS-EX-S

Hydrograph type	= SCS Runoff	Peak discharge	= 37.69 cfs
Storm frequency	= 25 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 137,007 cuft
Drainage area	= 9.680 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.10 min
Total precip.	= 6.40 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

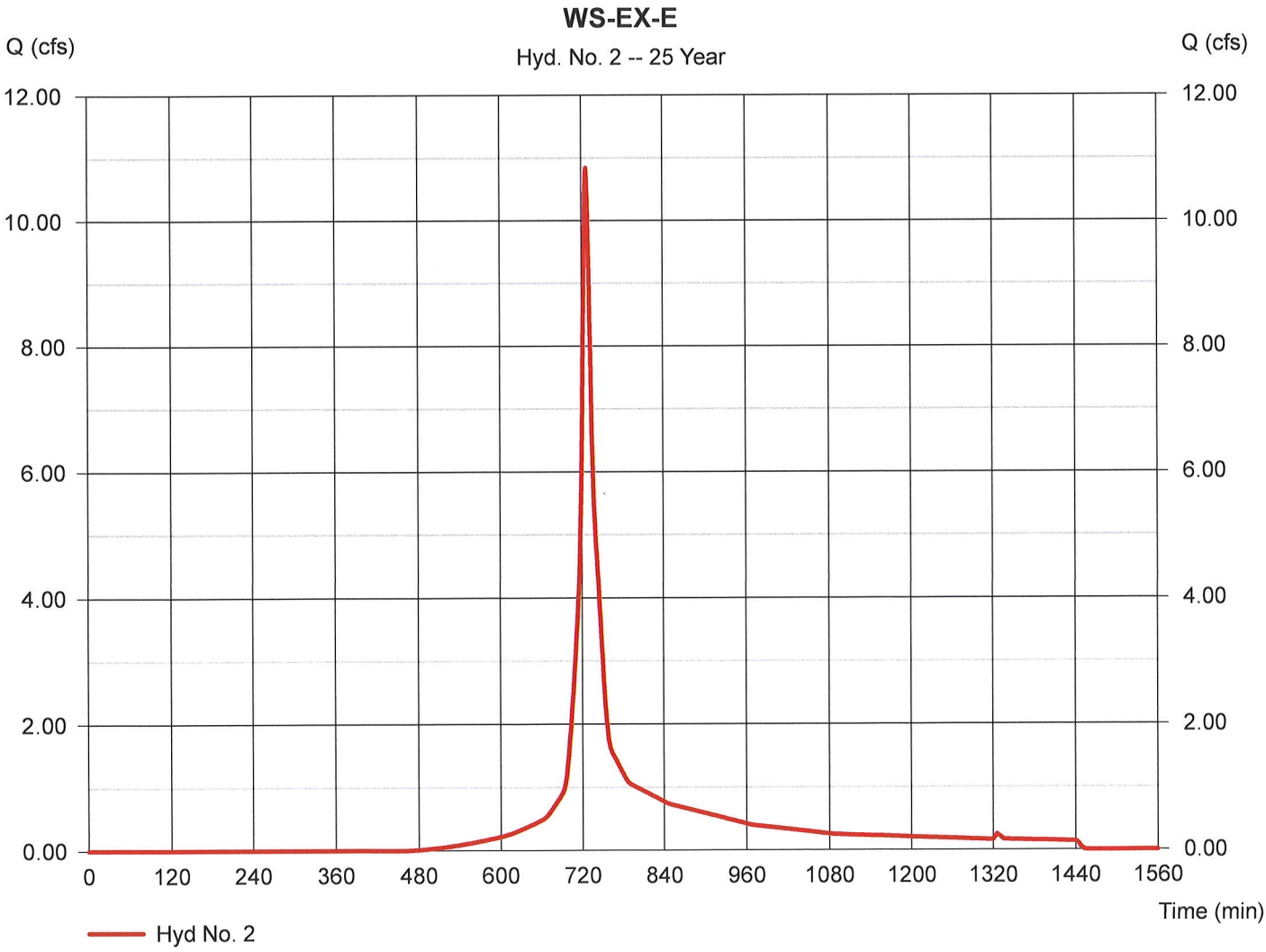


Hydrograph Report

Hyd. No. 2

WS-EX-E

Hydrograph type	= SCS Runoff	Peak discharge	= 10.84 cfs
Storm frequency	= 25 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 37,113 cuft
Drainage area	= 2.820 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.60 min
Total precip.	= 6.40 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

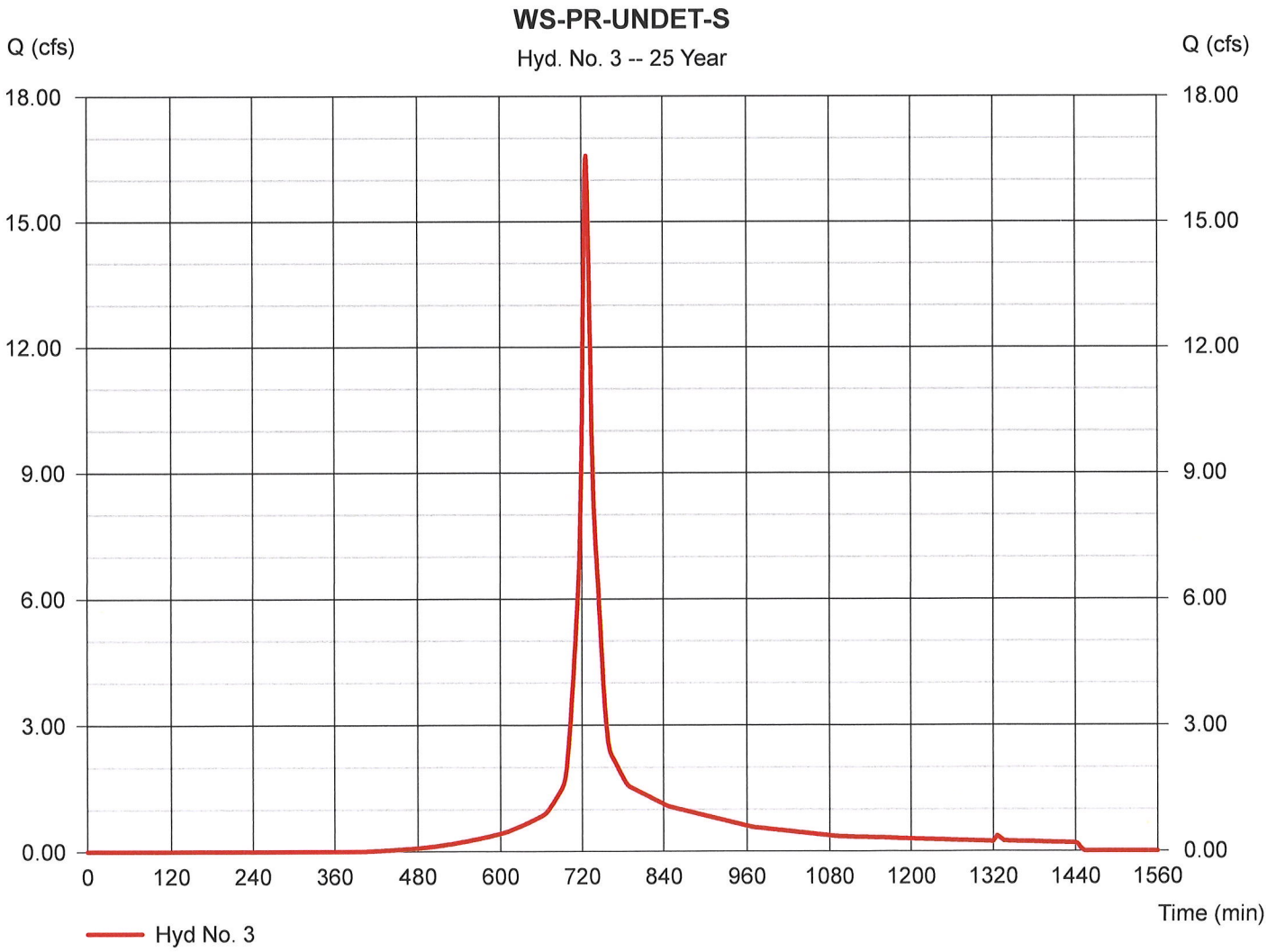


Hydrograph Report

Hyd. No. 3

WS-PR-UNDET-S

Hydrograph type	= SCS Runoff	Peak discharge	= 16.58 cfs
Storm frequency	= 25 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 57,031 cuft
Drainage area	= 3.890 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.40 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

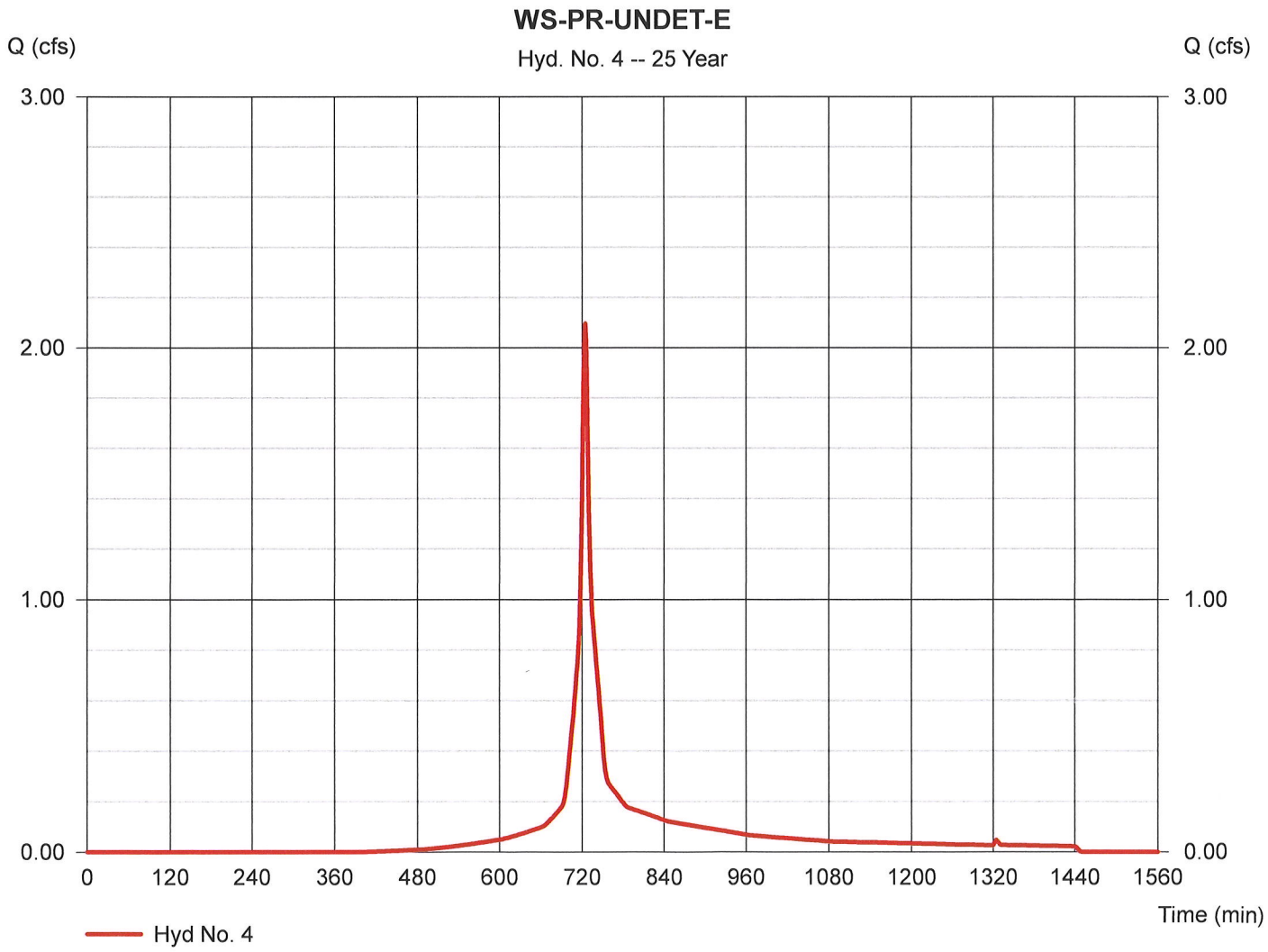


Hydrograph Report

Hyd. No. 4

WS-PR-UNDET-E

Hydrograph type	= SCS Runoff	Peak discharge	= 2.096 cfs
Storm frequency	= 25 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 6,501 cuft
Drainage area	= 0.430 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.40 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

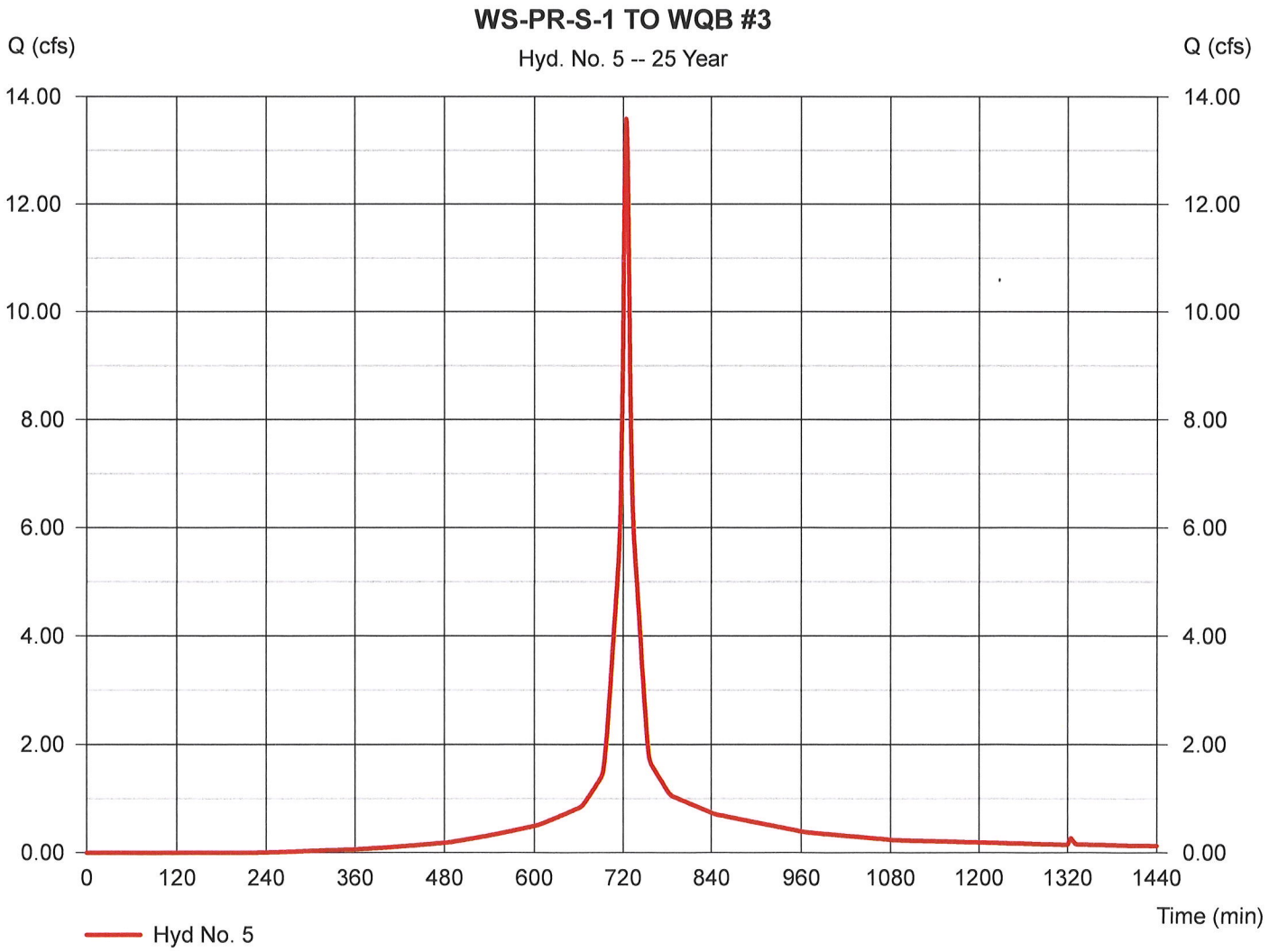


Hydrograph Report

Hyd. No. 5

WS-PR-S-1 TO WQB #3

Hydrograph type	= SCS Runoff	Peak discharge	= 13.59 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 43,922 cuft
Drainage area	= 2.290 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.40 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

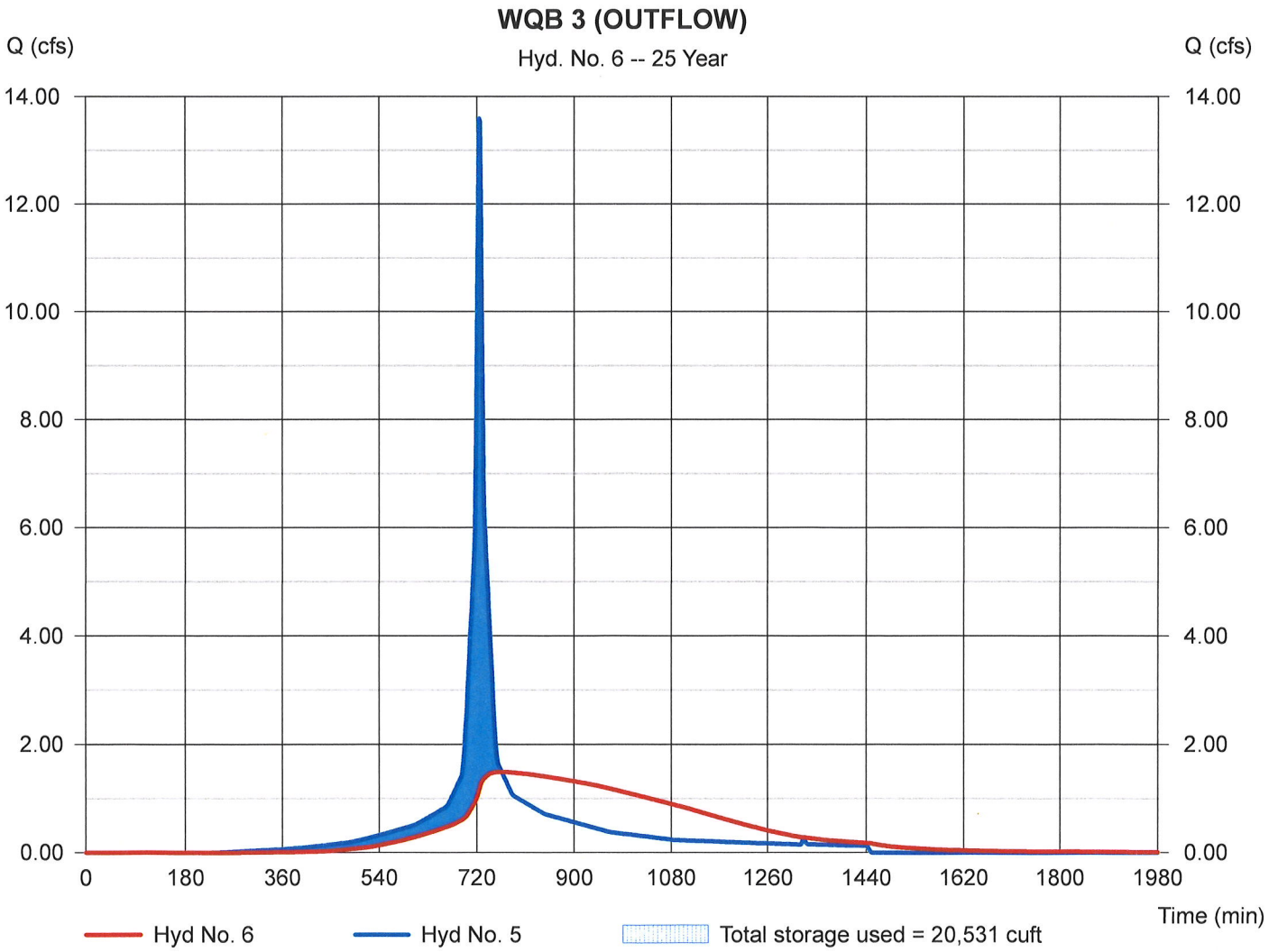
Hydraflow Hydrographs by Intelisolve v9.1 — Friday, Sep 22, 2023

Hyd. No. 6

WQB 3 (OUTFLOW)

Hydrograph type	= Reservoir	Peak discharge	= 1.491 cfs
Storm frequency	= 25 yrs	Time to peak	= 765 min
Time interval	= 1 min	Hyd. volume	= 43,901 cuft
Inflow hyd. No.	= 5 - WS-PR-S-1 TO WQB #3	Max. Elevation	= 162.74 ft
Reservoir name	= WQB3	Max. Storage	= 20,531 cuft

Storage Indication method used.

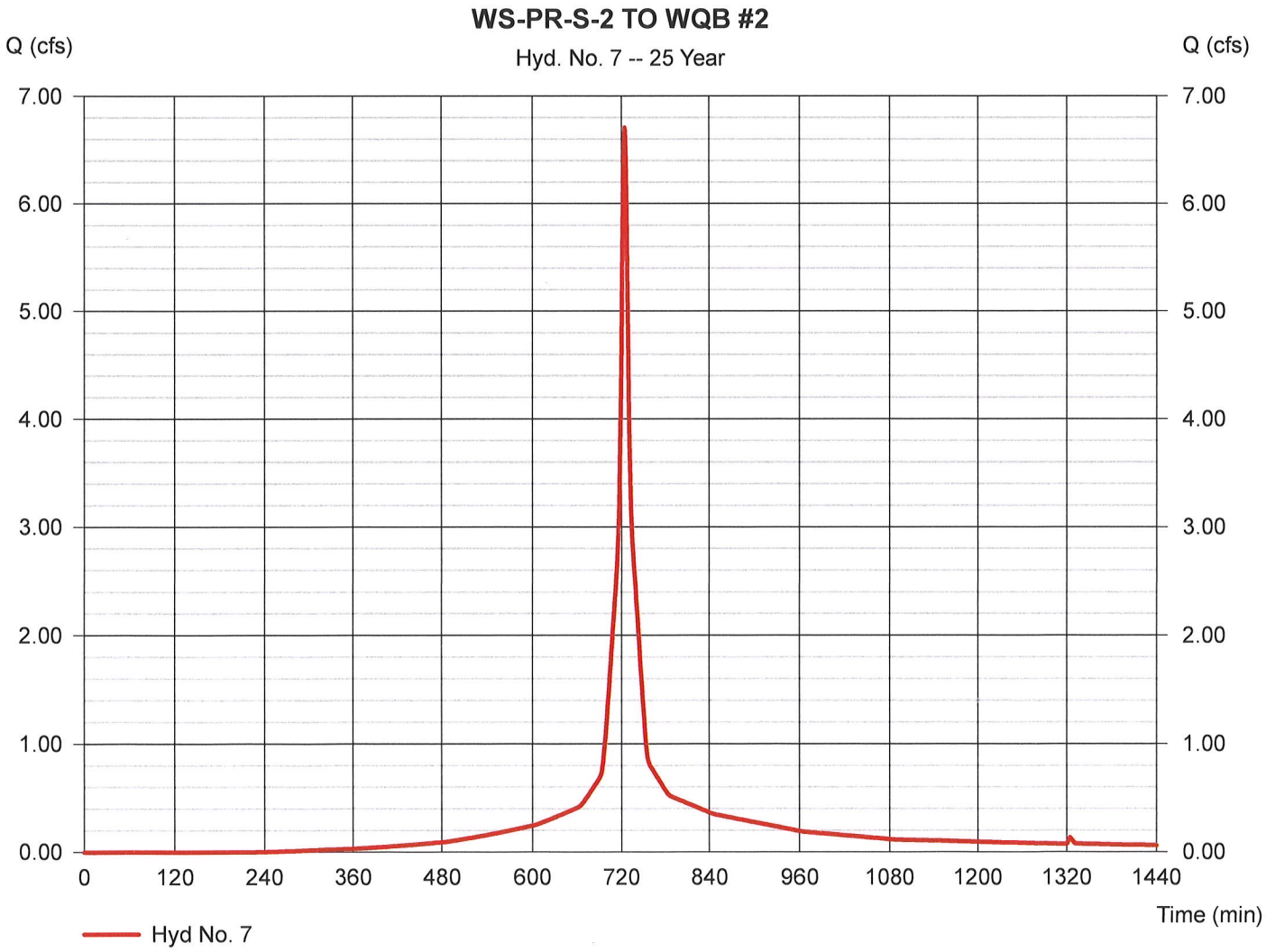


Hydrograph Report

Hyd. No. 7

WS-PR-S-2 TO WQB #2

Hydrograph type	= SCS Runoff	Peak discharge	= 6.708 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 21,673 cuft
Drainage area	= 1.130 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.40 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

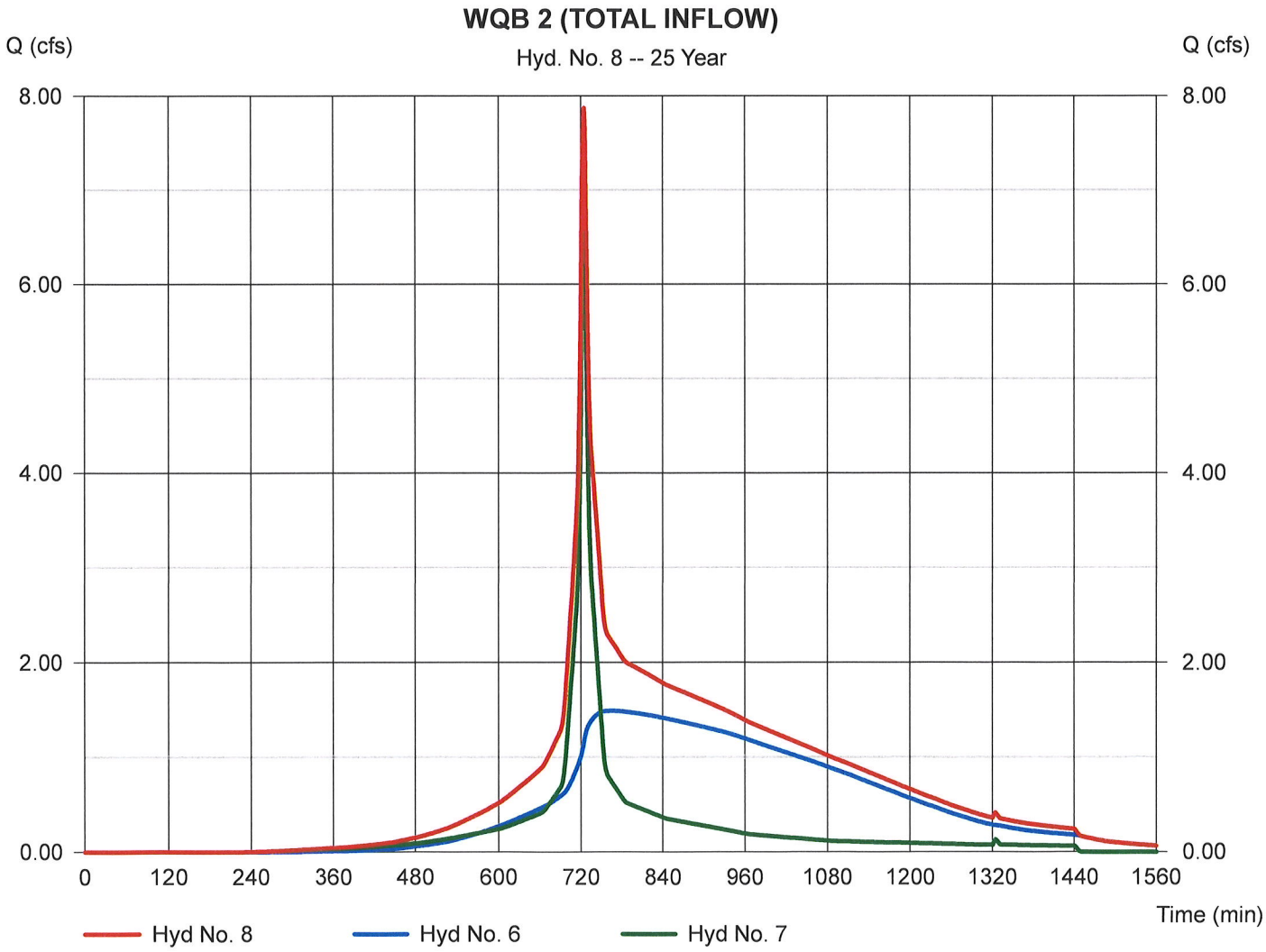


Hydrograph Report

Hyd. No. 8

WQB 2 (TOTAL INFLOW)

Hydrograph type	= Combine	Peak discharge	= 7.875 cfs
Storm frequency	= 25 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 65,574 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 1.130 ac



Hydrograph Report

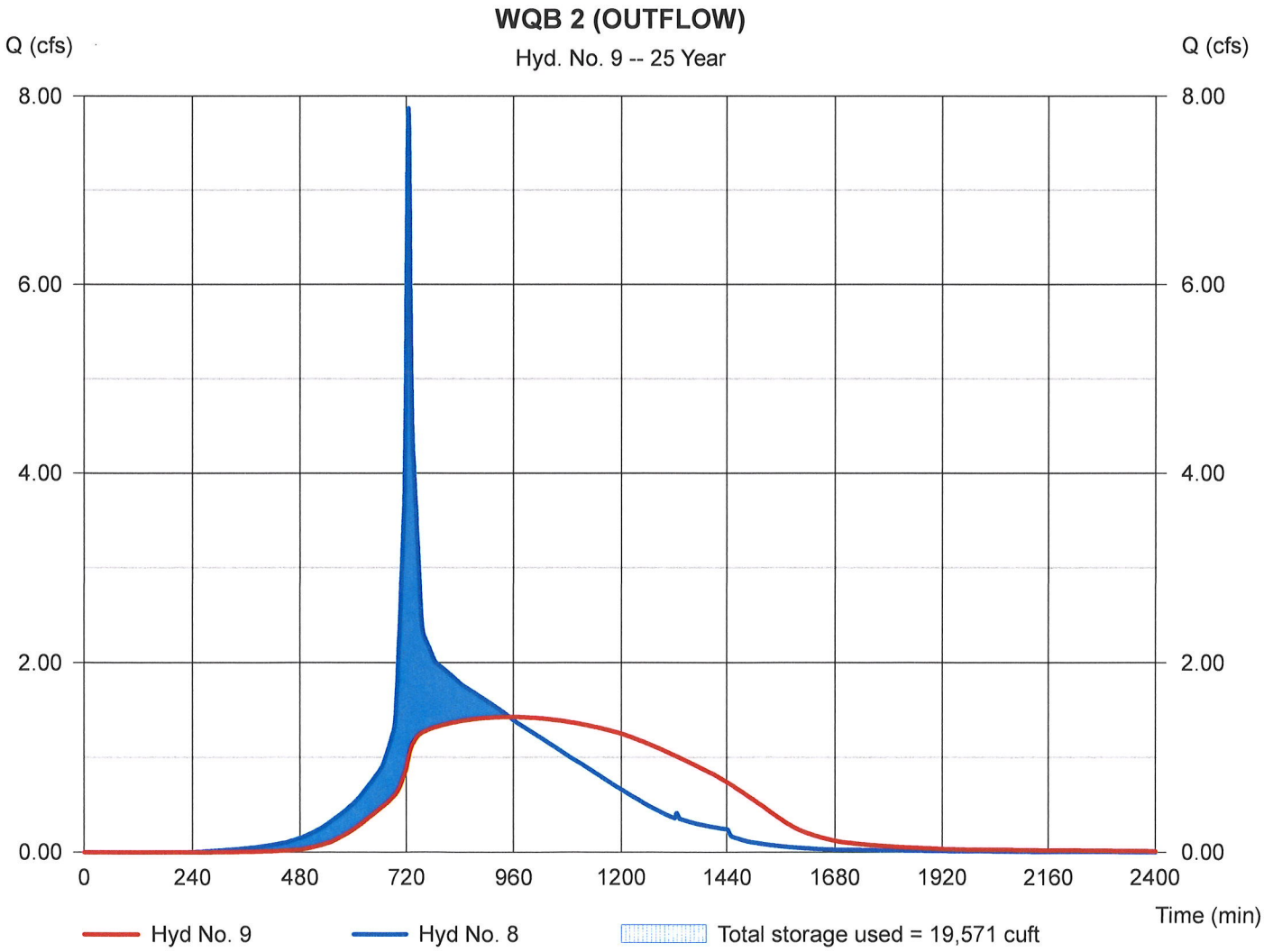
Hydraflow Hydrographs by Intelisolve v9.1 — Friday, Sep 22, 2023

Hyd. No. 9

WQB 2 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	1.428 cfs
Storm frequency	=	25 yrs	Time to peak	=	950 min
Time interval	=	1 min	Hyd. volume	=	65,465 cuft
Inflow hyd. No.	=	8 - WQB 2 (TOTAL INFLOW)	Max. Elevation	=	161.53 ft
Reservoir name	=	WQB2	Max. Storage	=	19,571 cuft

Storage Indication method used.

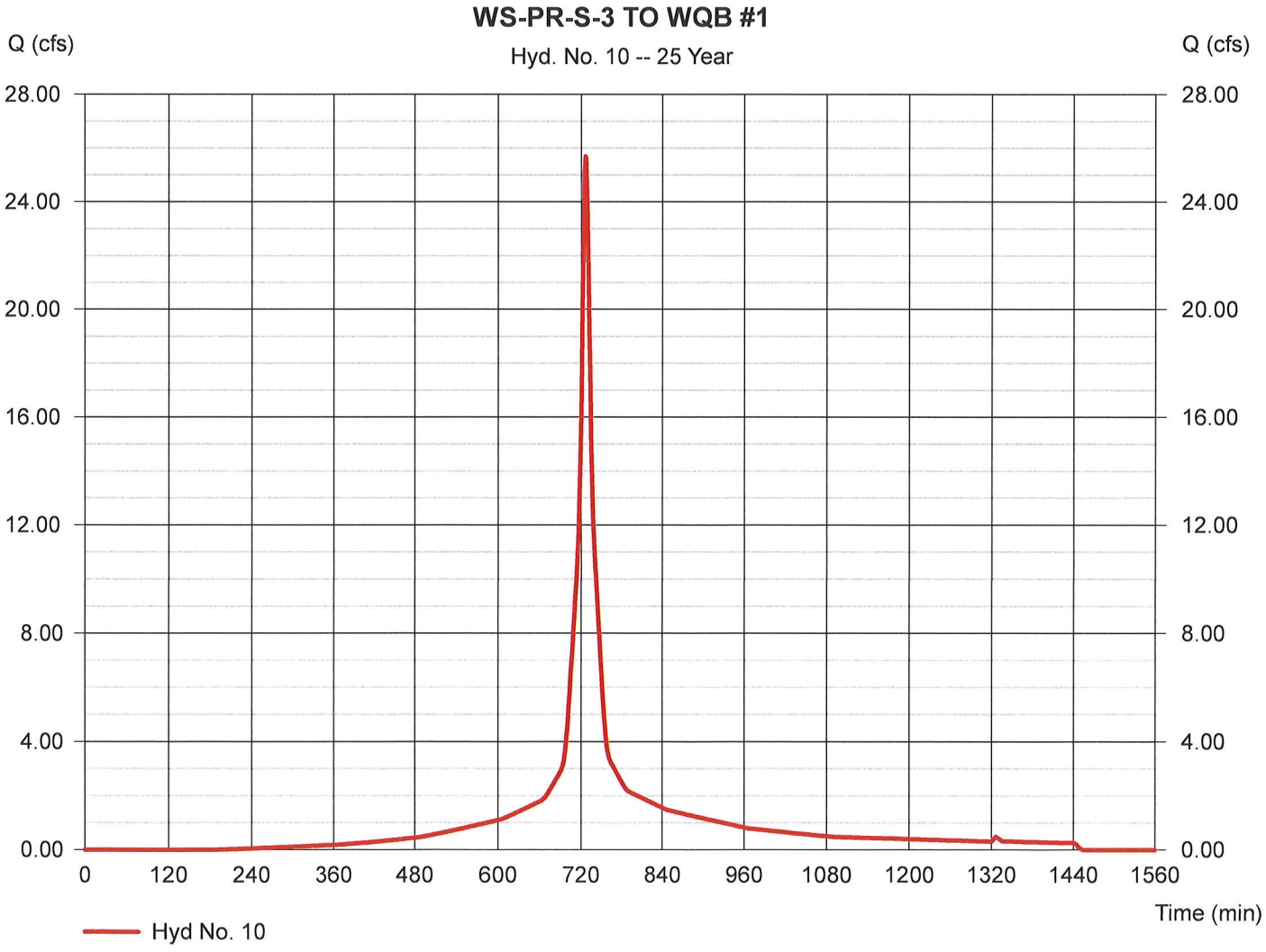


Hydrograph Report

Hyd. No. 10

WS-PR-S-3 TO WQB #1

Hydrograph type	= SCS Runoff	Peak discharge	= 25.70 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 93,593 cuft
Drainage area	= 4.820 ac	Curve number	= 91
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.40 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



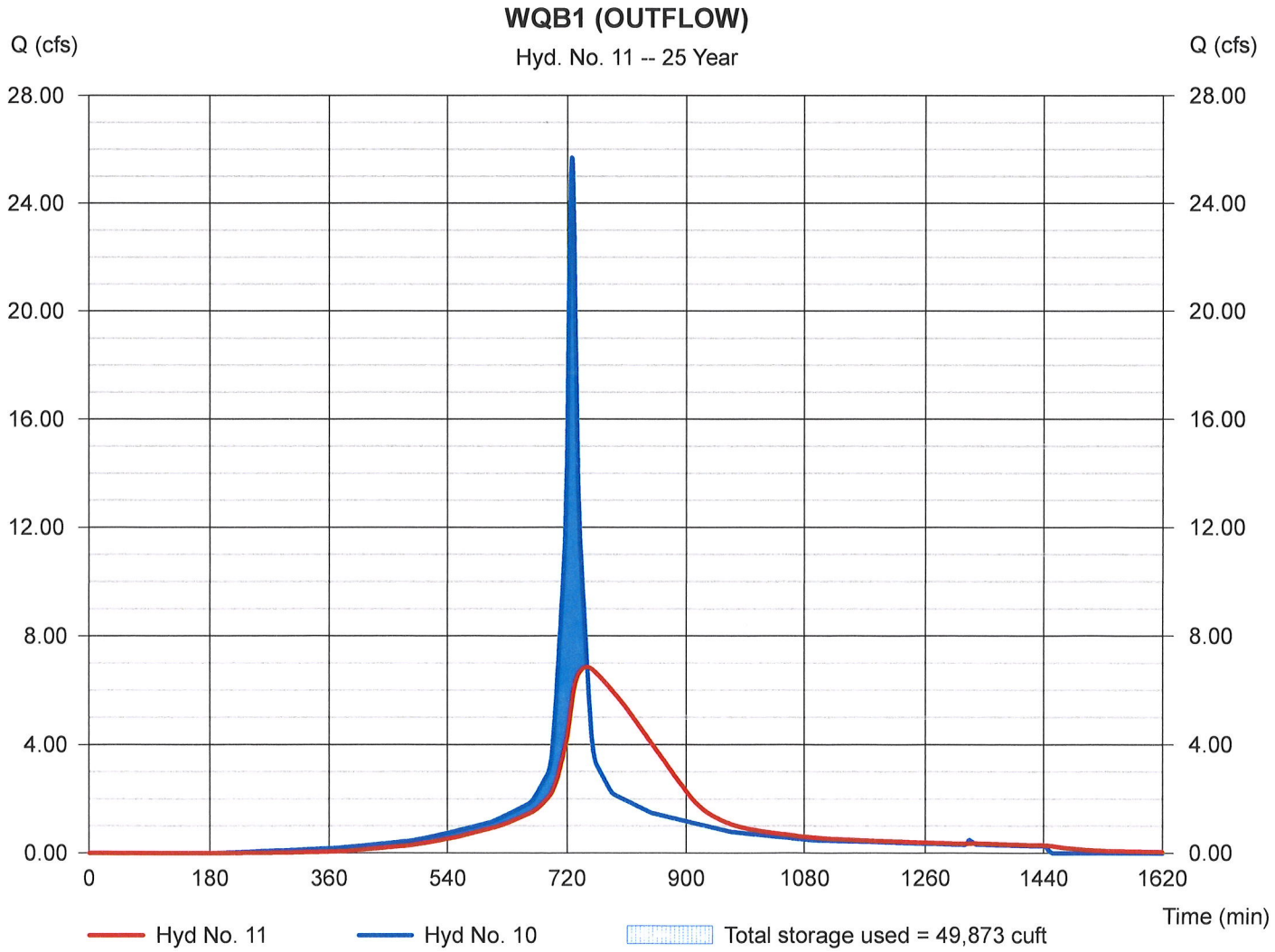
Hydrograph Report

Hyd. No. 11

WQB1 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	6.857 cfs
Storm frequency	=	25 yrs	Time to peak	=	749 min
Time interval	=	1 min	Hyd. volume	=	93,581 cuft
Inflow hyd. No.	=	10 - WS-PR-S-3 TO WQB #1	Max. Elevation	=	151.97 ft
Reservoir name	=	WQB1	Max. Storage	=	49,873 cuft

Storage Indication method used. Wet pond routing start elevation = 149.00 ft.

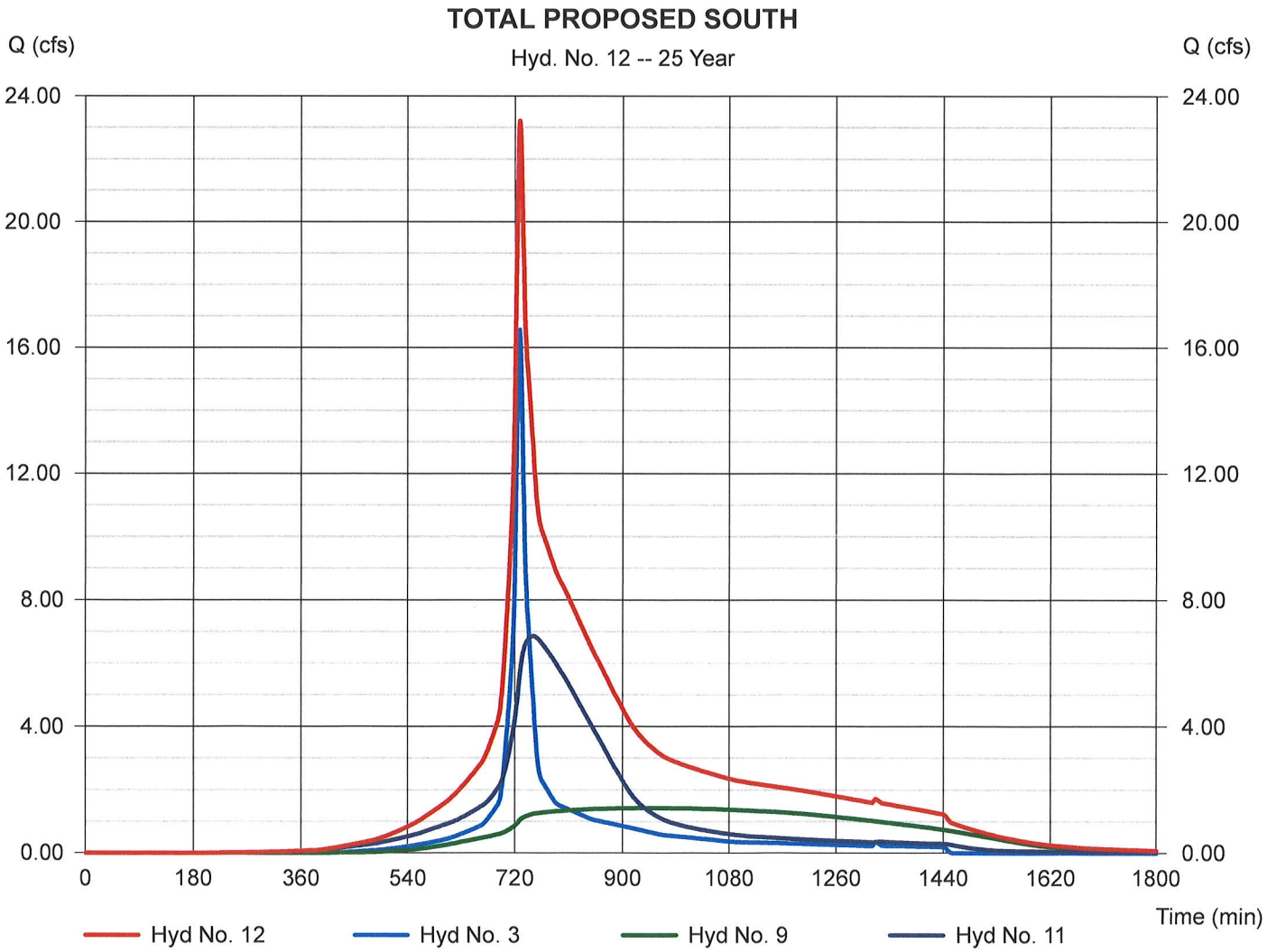


Hydrograph Report

Hyd. No. 12

TOTAL PROPOSED SOUTH

Hydrograph type	= Combine	Peak discharge	= 23.22 cfs
Storm frequency	= 25 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 216,078 cuft
Inflow hyds.	= 3, 9, 11	Contrib. drain. area	= 3.890 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

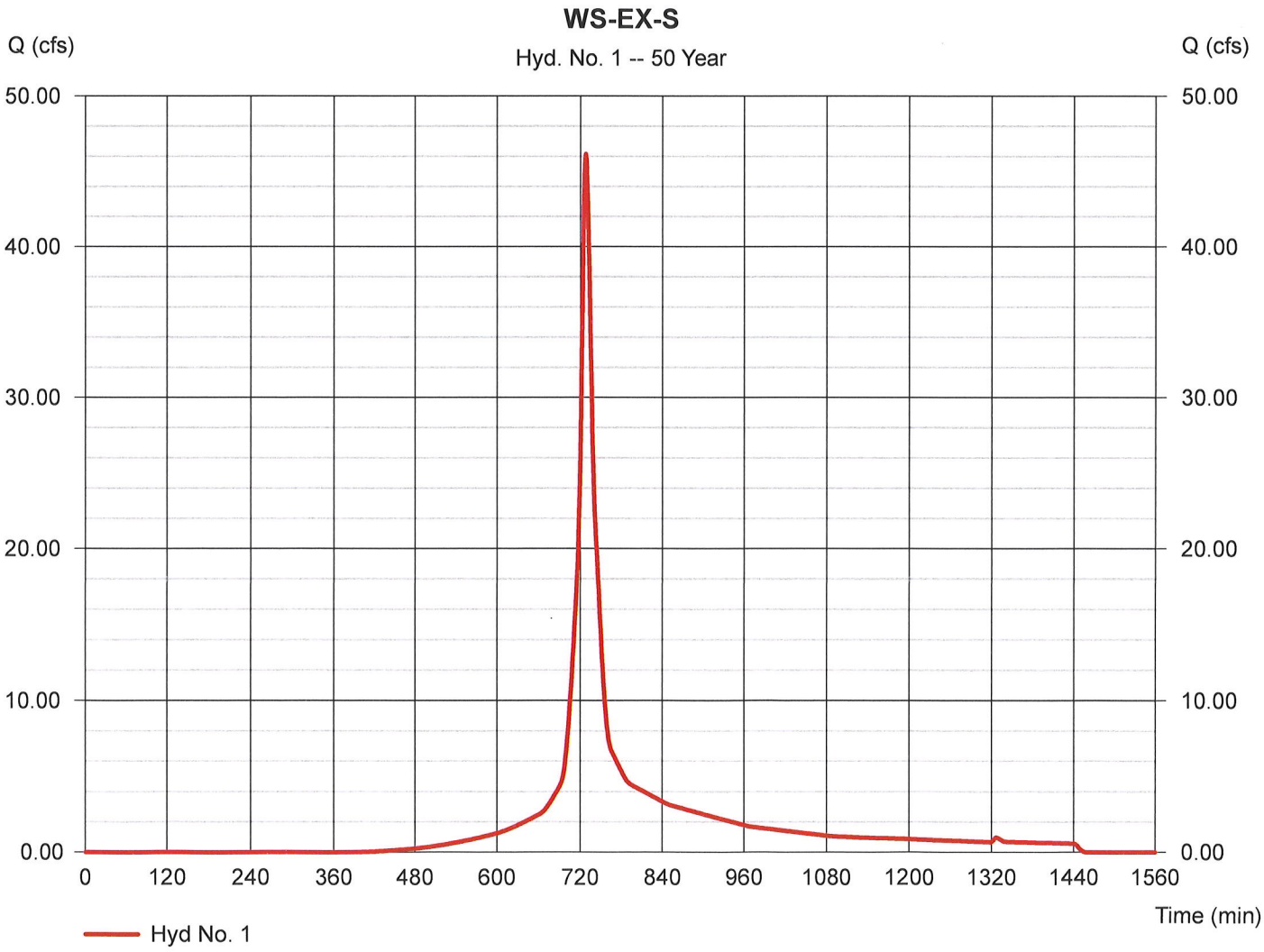
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	46.17	1	728	168,416	----	------	------	WS-EX-S
2	SCS Runoff	13.38	1	727	45,921	----	------	------	WS-EX-E
3	SCS Runoff	20.13	1	727	69,663	----	------	------	WS-PR-UNDET-S
4	SCS Runoff	2.545	1	725	7,941	----	------	------	WS-PR-UNDET-E
5	SCS Runoff	15.98	1	724	52,115	----	------	------	WS-PR-S-1 TO WQB #3
6	Reservoir	1.622	1	770	52,094	5	163.19	24,706	WQB 3 (OUTFLOW)
7	SCS Runoff	7.885	1	724	25,716	----	------	------	WS-PR-S-2 TO WQB #2
8	Combine	9.161	1	724	77,811	6, 7	------	------	WQB 2 (TOTAL INFLOW)
9	Reservoir	1.555	1	969	77,691	8	161.96	23,500	WQB 2 (OUTFLOW)
10	SCS Runoff	30.05	1	726	110,454	----	------	------	WS-PR-S-3 TO WQB #1
11	Reservoir	7.455	1	750	110,443	10	152.45	55,965	WQB1 (OUTFLOW)
12	Combine	27.38	1	727	257,797	3, 9, 11	------	------	TOTAL PROPOSED SOUTH

Hydrograph Report

Hyd. No. 1

WS-EX-S

Hydrograph type	= SCS Runoff	Peak discharge	= 46.17 cfs
Storm frequency	= 50 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 168,416 cuft
Drainage area	= 9.680 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.10 min
Total precip.	= 7.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

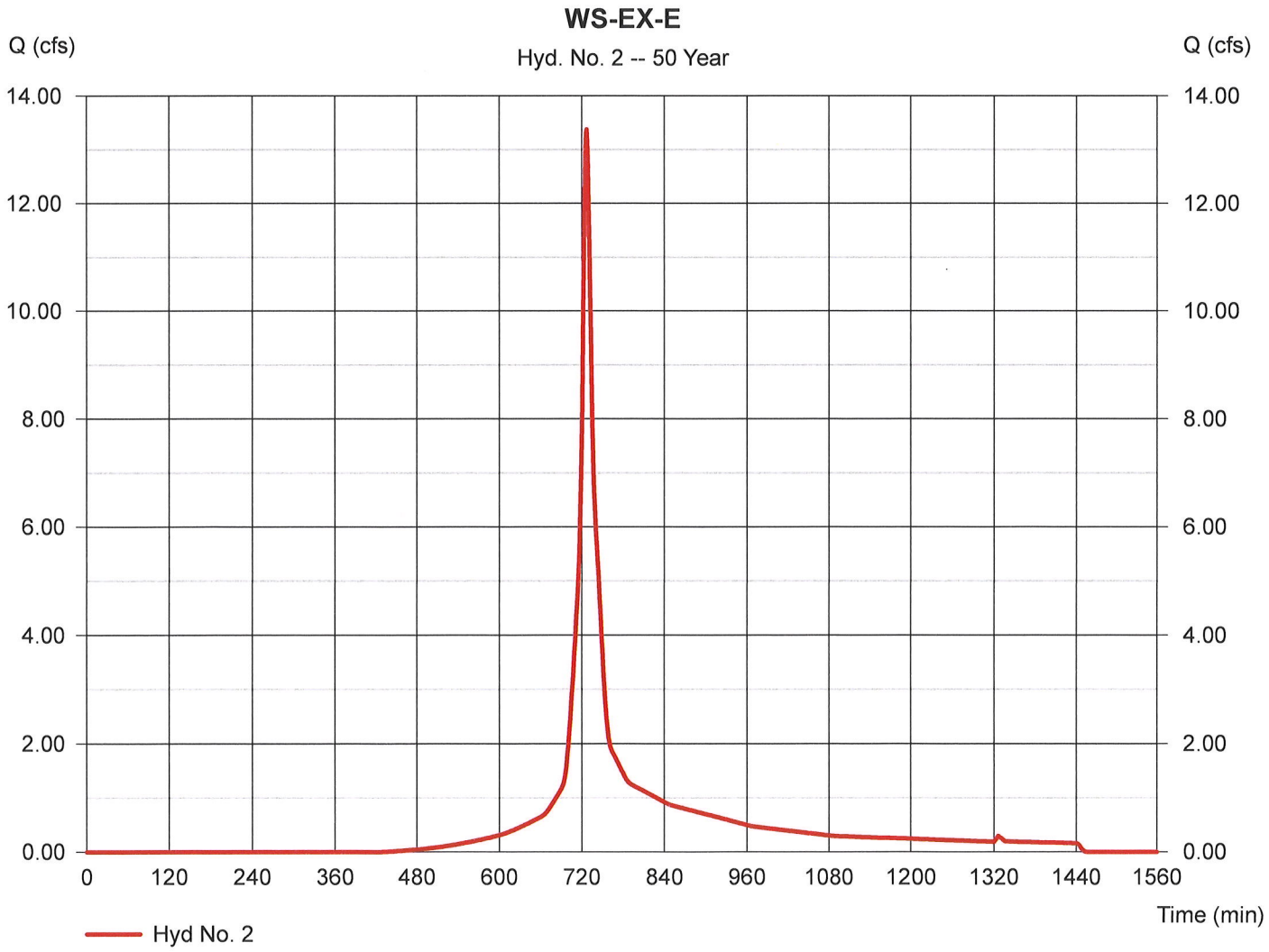


Hydrograph Report

Hyd. No. 2

WS-EX-E

Hydrograph type	= SCS Runoff	Peak discharge	= 13.38 cfs
Storm frequency	= 50 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 45,921 cuft
Drainage area	= 2.820 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.60 min
Total precip.	= 7.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

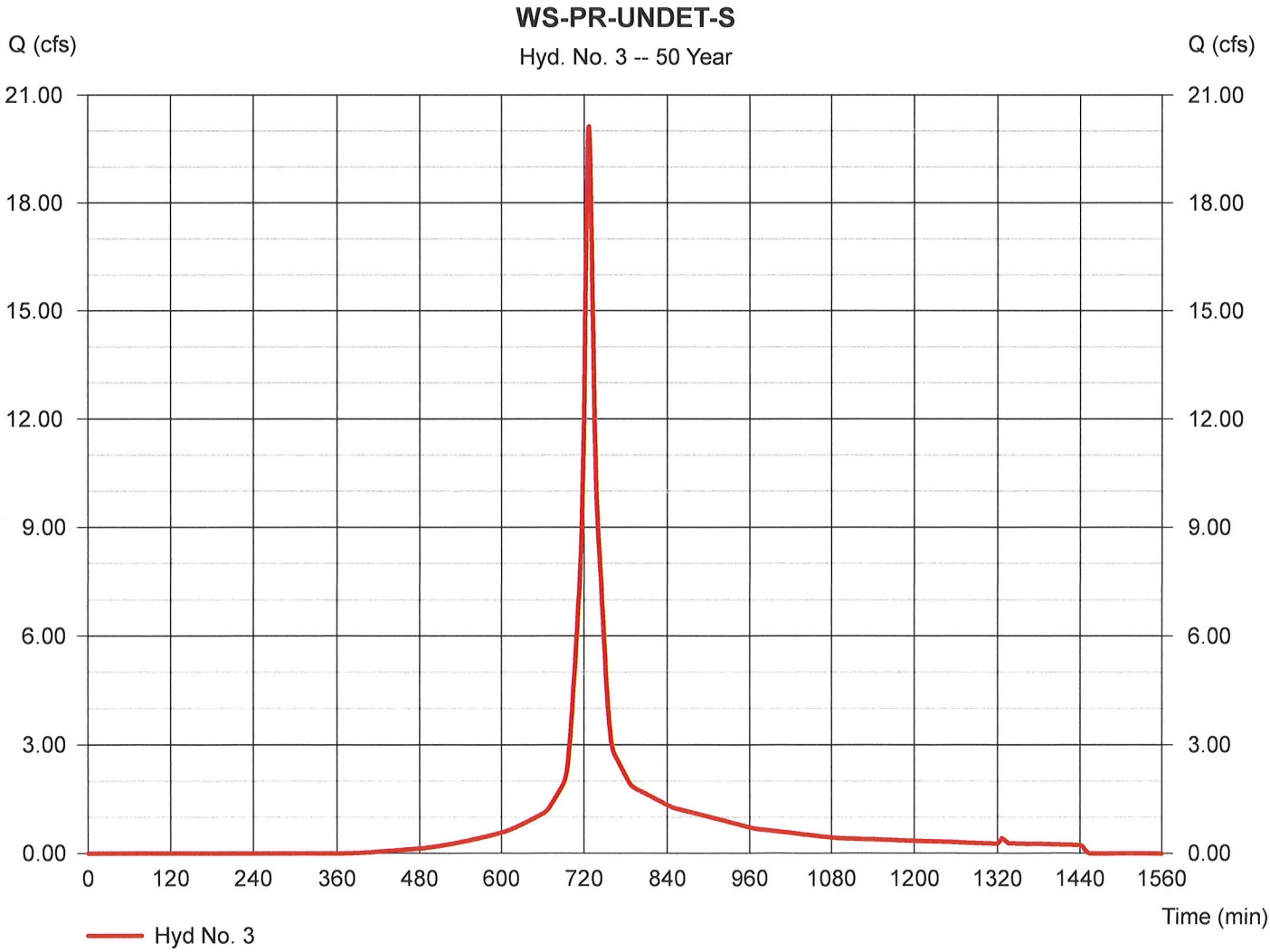


Hydrograph Report

Hyd. No. 3

WS-PR-UNDET-S

Hydrograph type	= SCS Runoff	Peak discharge	= 20.13 cfs
Storm frequency	= 50 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 69,663 cuft
Drainage area	= 3.890 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 7.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

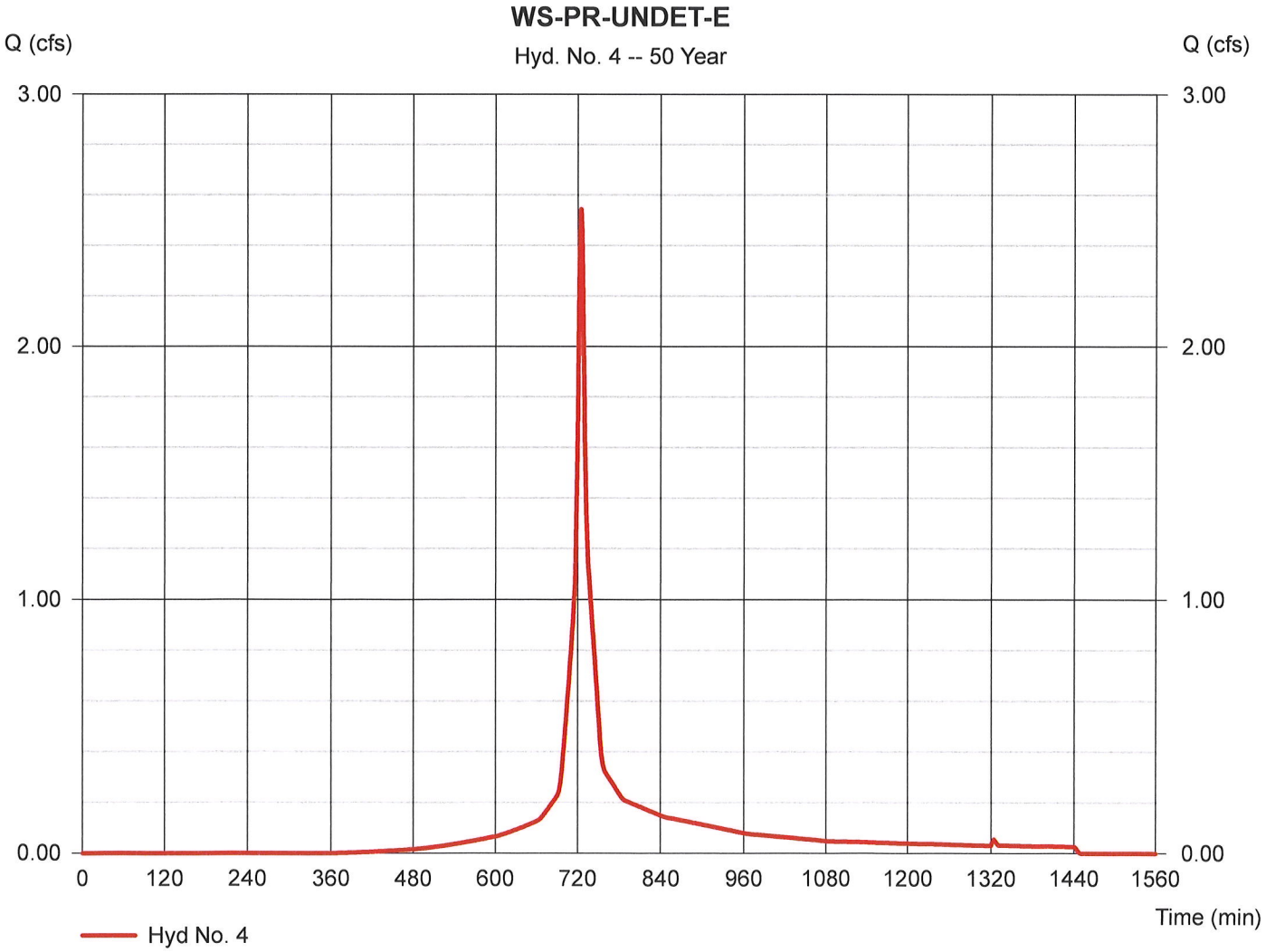


Hydrograph Report

Hyd. No. 4

WS-PR-UNDET-E

Hydrograph type	= SCS Runoff	Peak discharge	= 2.545 cfs
Storm frequency	= 50 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 7,941 cuft
Drainage area	= 0.430 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

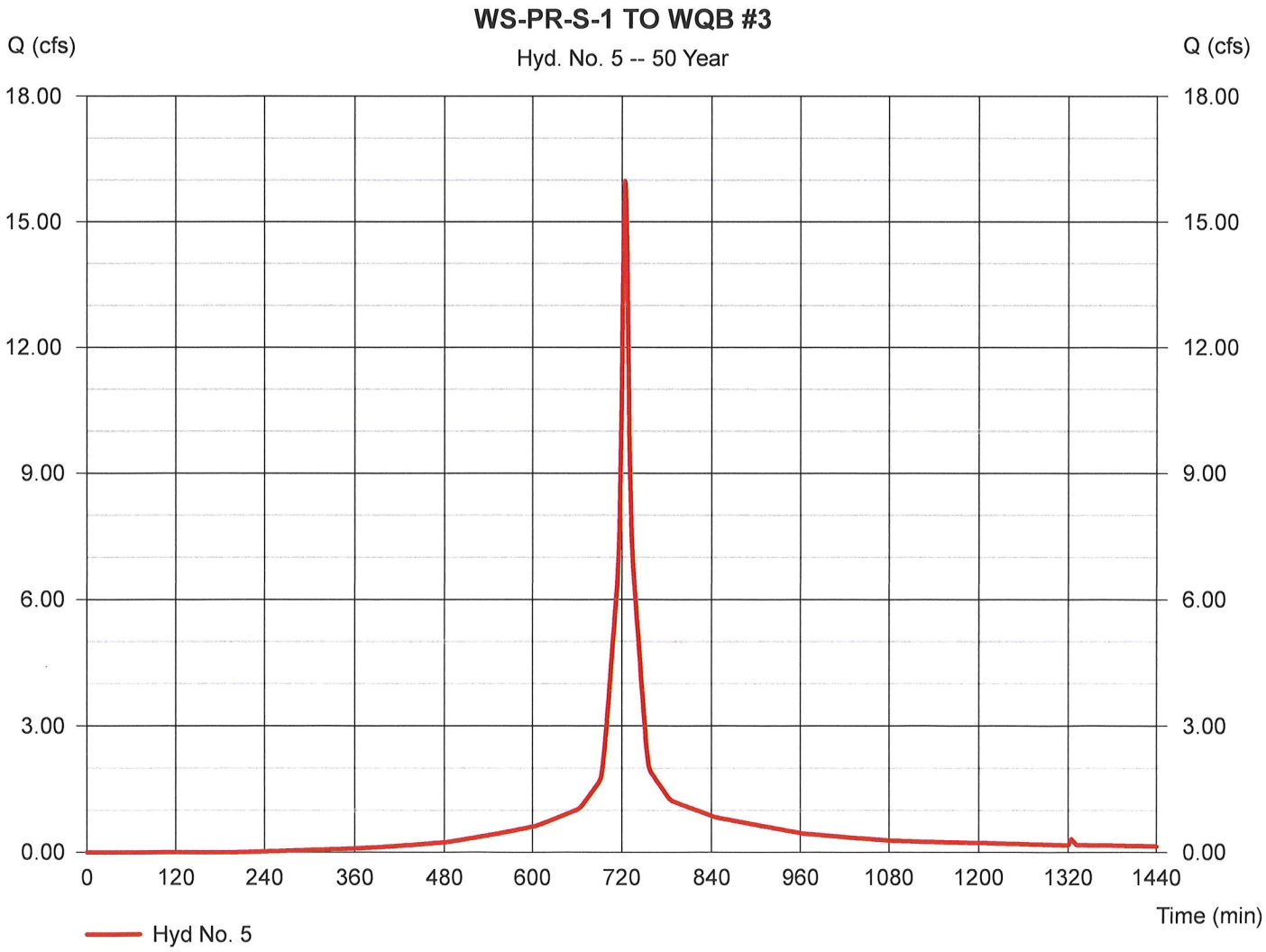


Hydrograph Report

Hyd. No. 5

WS-PR-S-1 TO WQB #3

Hydrograph type	= SCS Runoff	Peak discharge	= 15.98 cfs
Storm frequency	= 50 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 52,115 cuft
Drainage area	= 2.290 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

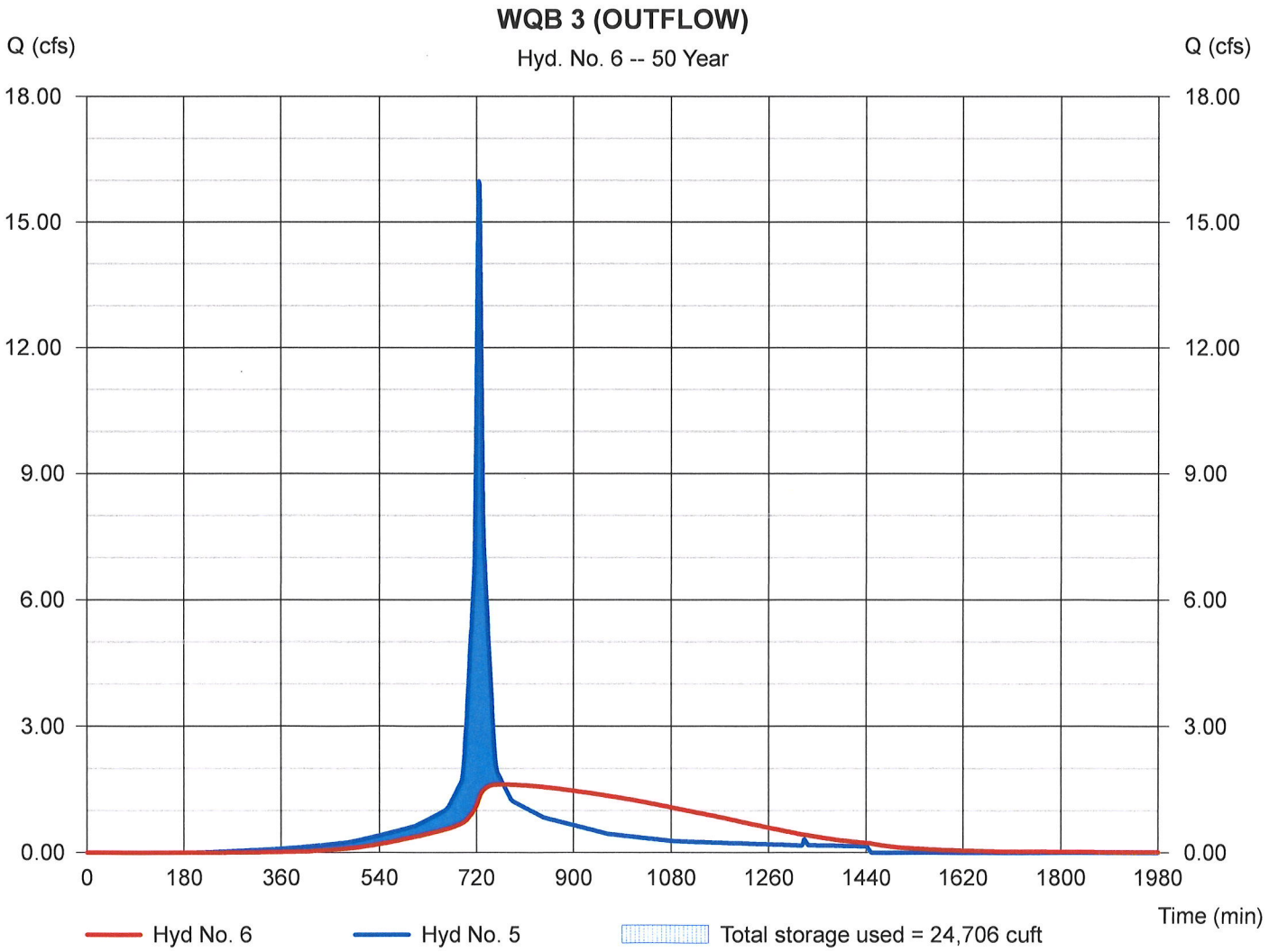
Hydraflow Hydrographs by Intelisolve v9.1 — Friday, Sep 22, 2023

Hyd. No. 6

WQB 3 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	1.622 cfs
Storm frequency	=	50 yrs	Time to peak	=	770 min
Time interval	=	1 min	Hyd. volume	=	52,094 cuft
Inflow hyd. No.	=	5 - WS-PR-S-1 TO WQB #3	Max. Elevation	=	163.19 ft
Reservoir name	=	WQB3	Max. Storage	=	24,706 cuft

Storage Indication method used.

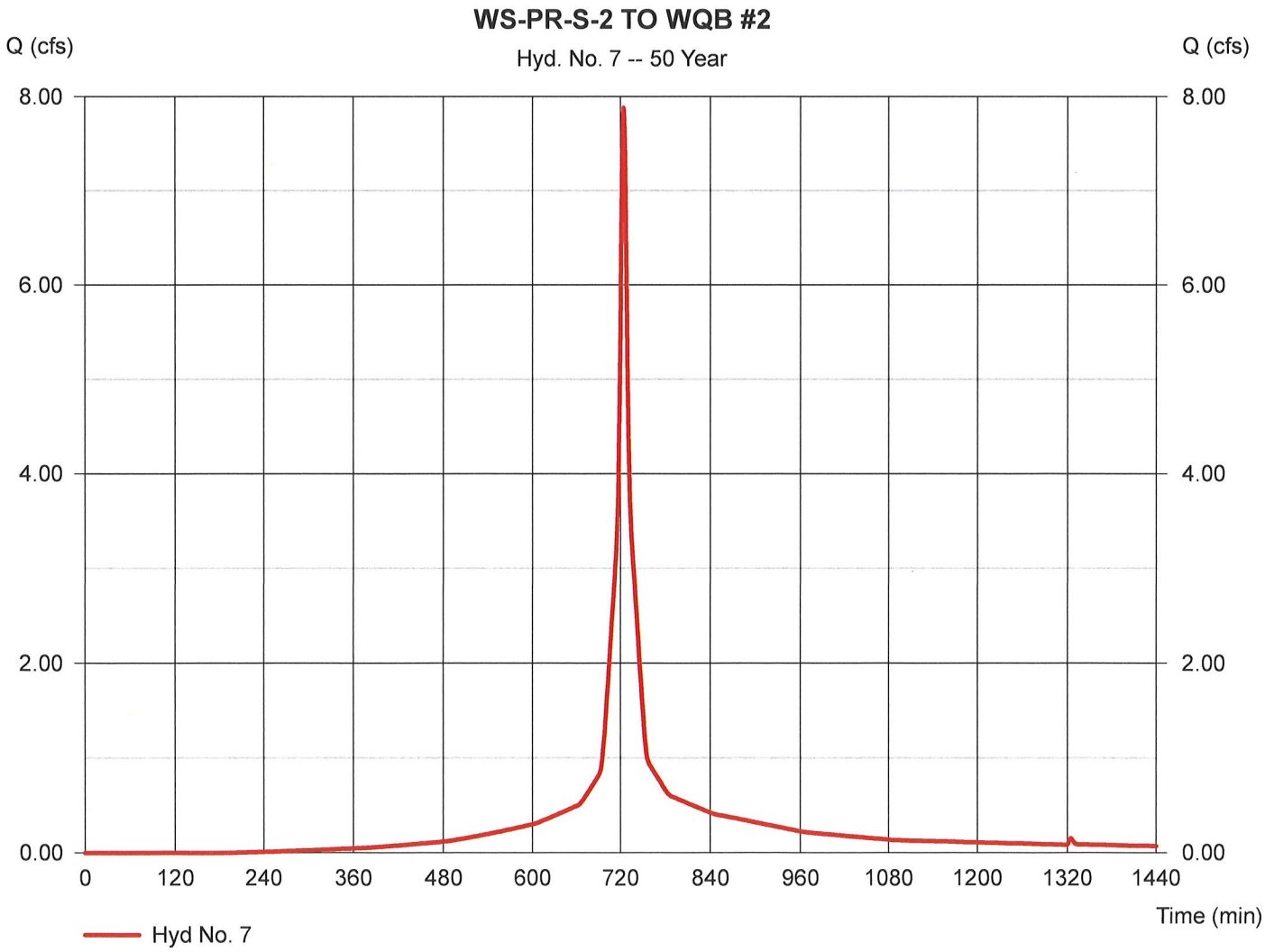


Hydrograph Report

Hyd. No. 7

WS-PR-S-2 TO WQB #2

Hydrograph type	= SCS Runoff	Peak discharge	= 7.885 cfs
Storm frequency	= 50 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 25,716 cuft
Drainage area	= 1.130 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

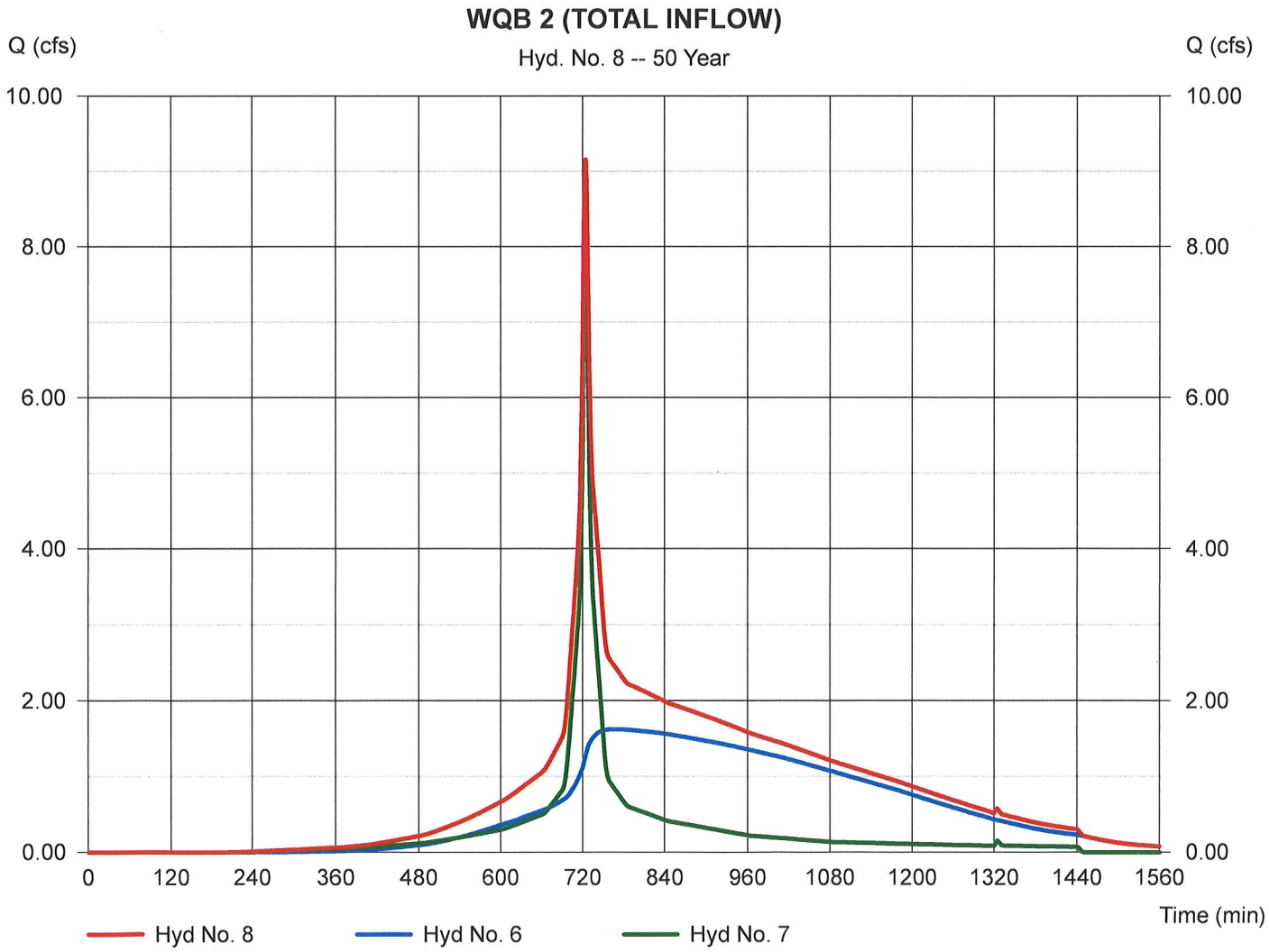


Hydrograph Report

Hyd. No. 8

WQB 2 (TOTAL INFLOW)

Hydrograph type	= Combine	Peak discharge	= 9.161 cfs
Storm frequency	= 50 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 77,811 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 1.130 ac



Hydrograph Report

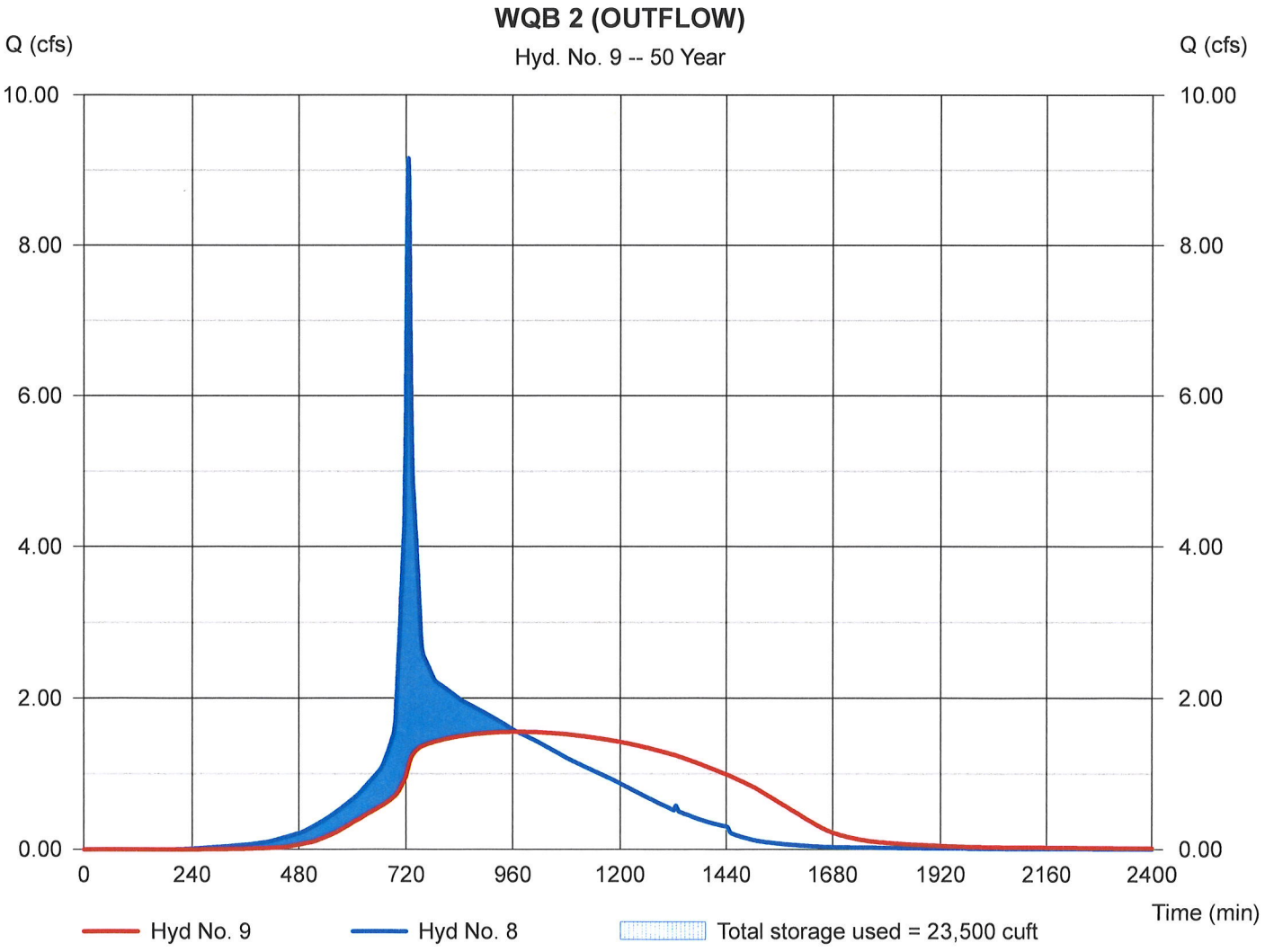
Hydraflow Hydrographs by Intelisolve v9.1 — Friday, Sep 22, 2023

Hyd. No. 9

WQB 2 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	1.555 cfs
Storm frequency	=	50 yrs	Time to peak	=	969 min
Time interval	=	1 min	Hyd. volume	=	77,691 cuft
Inflow hyd. No.	=	8 - WQB 2 (TOTAL INFLOW)	Max. Elevation	=	161.96 ft
Reservoir name	=	WQB2	Max. Storage	=	23,500 cuft

Storage Indication method used.

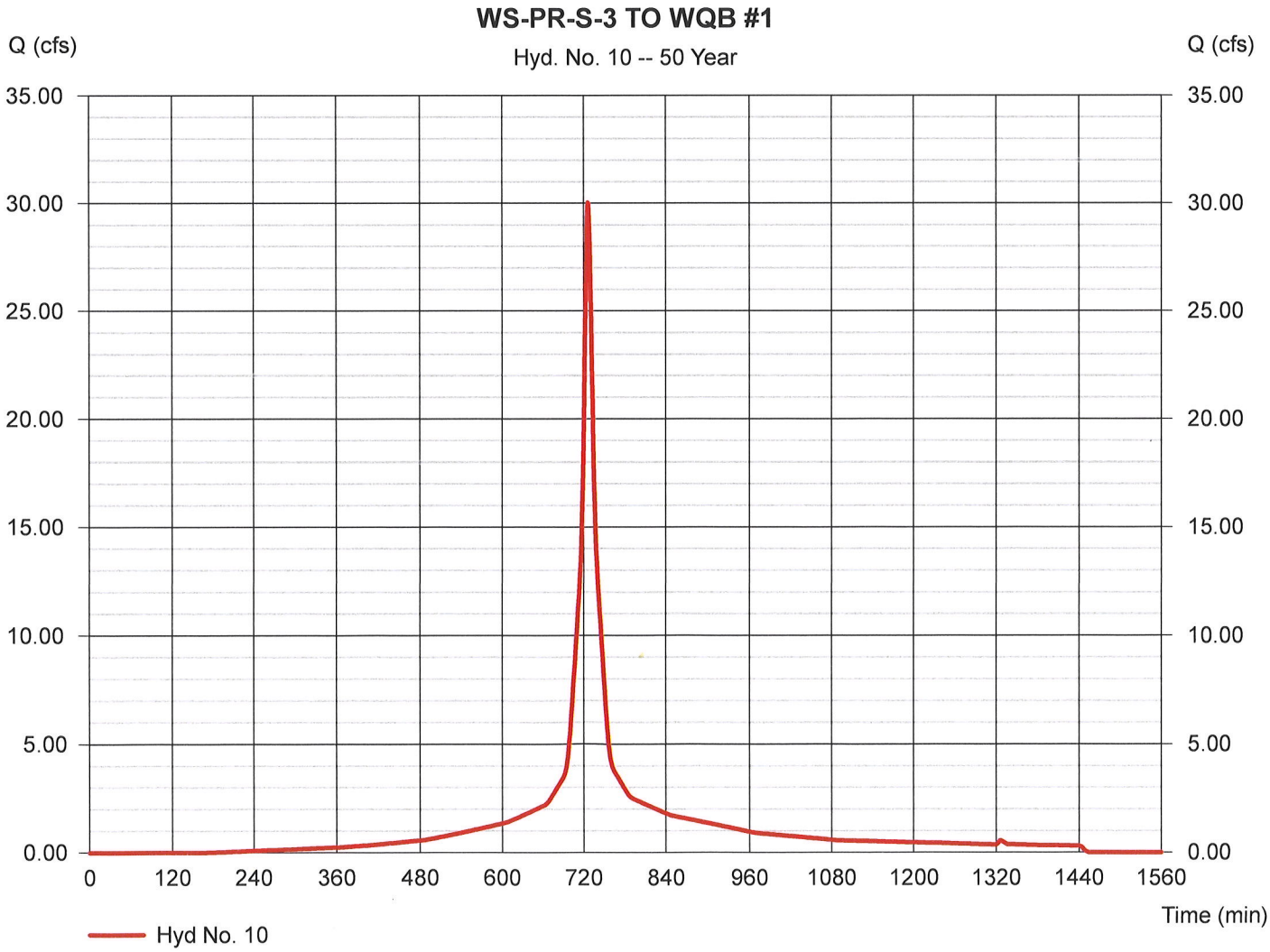


Hydrograph Report

Hyd. No. 10

WS-PR-S-3 TO WQB #1

Hydrograph type	= SCS Runoff	Peak discharge	= 30.05 cfs
Storm frequency	= 50 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 110,454 cuft
Drainage area	= 4.820 ac	Curve number	= 91
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 7.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

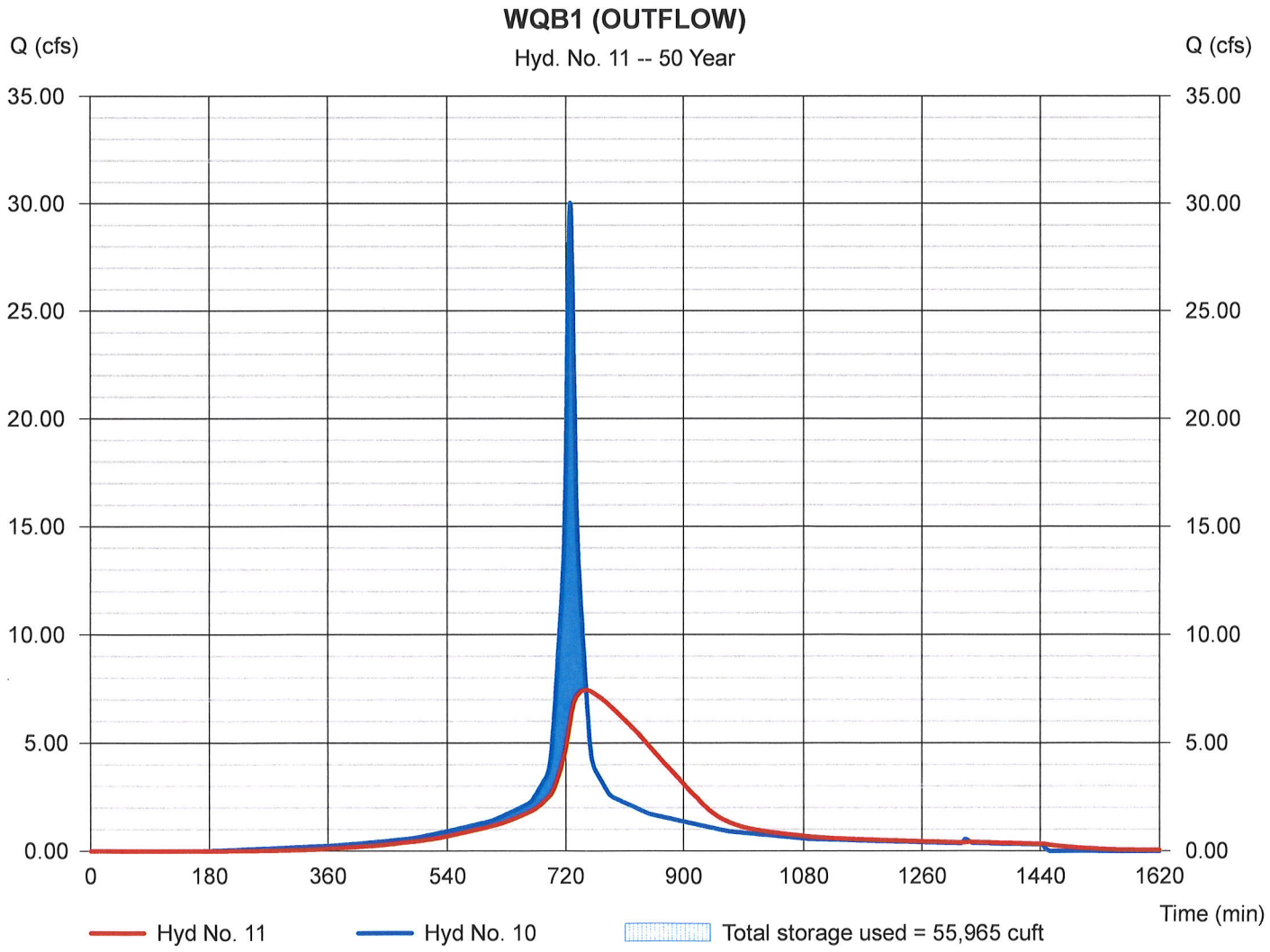
Hydraflow Hydrographs by Intelisolve v9.1 — Friday, Sep 22, 2023

Hyd. No. 11

WQB1 (OUTFLOW)

Hydrograph type	= Reservoir	Peak discharge	= 7.455 cfs
Storm frequency	= 50 yrs	Time to peak	= 750 min
Time interval	= 1 min	Hyd. volume	= 110,443 cuft
Inflow hyd. No.	= 10 - WS-PR-S-3 TO WQB #1	Max. Elevation	= 152.45 ft
Reservoir name	= WQB1	Max. Storage	= 55,965 cuft

Storage Indication method used. Wet pond routing start elevation = 149.00 ft.

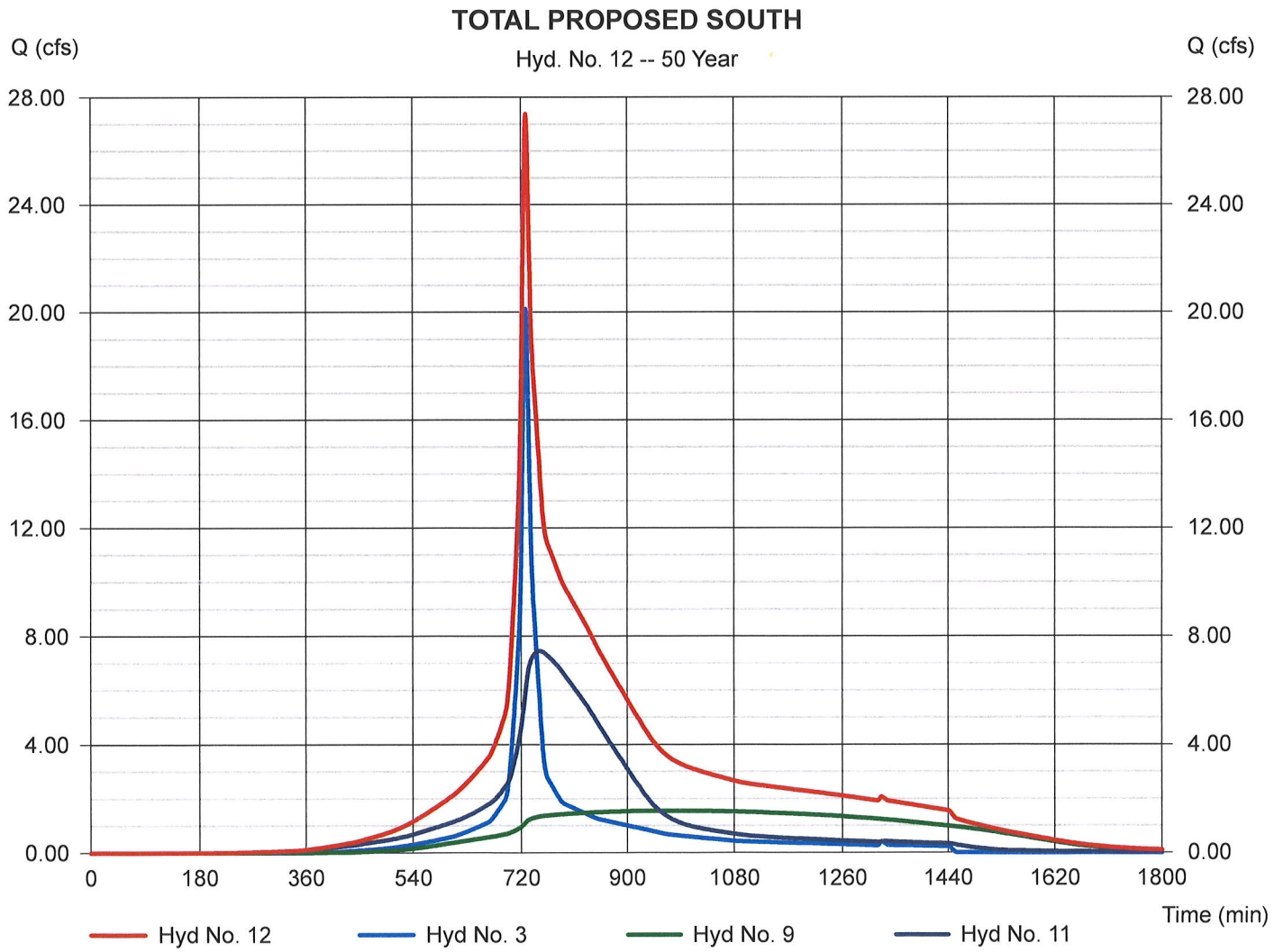


Hydrograph Report

Hyd. No. 12

TOTAL PROPOSED SOUTH

Hydrograph type	= Combine	Peak discharge	= 27.38 cfs
Storm frequency	= 50 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 257,797 cuft
Inflow hyds.	= 3, 9, 11	Contrib. drain. area	= 3.890 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

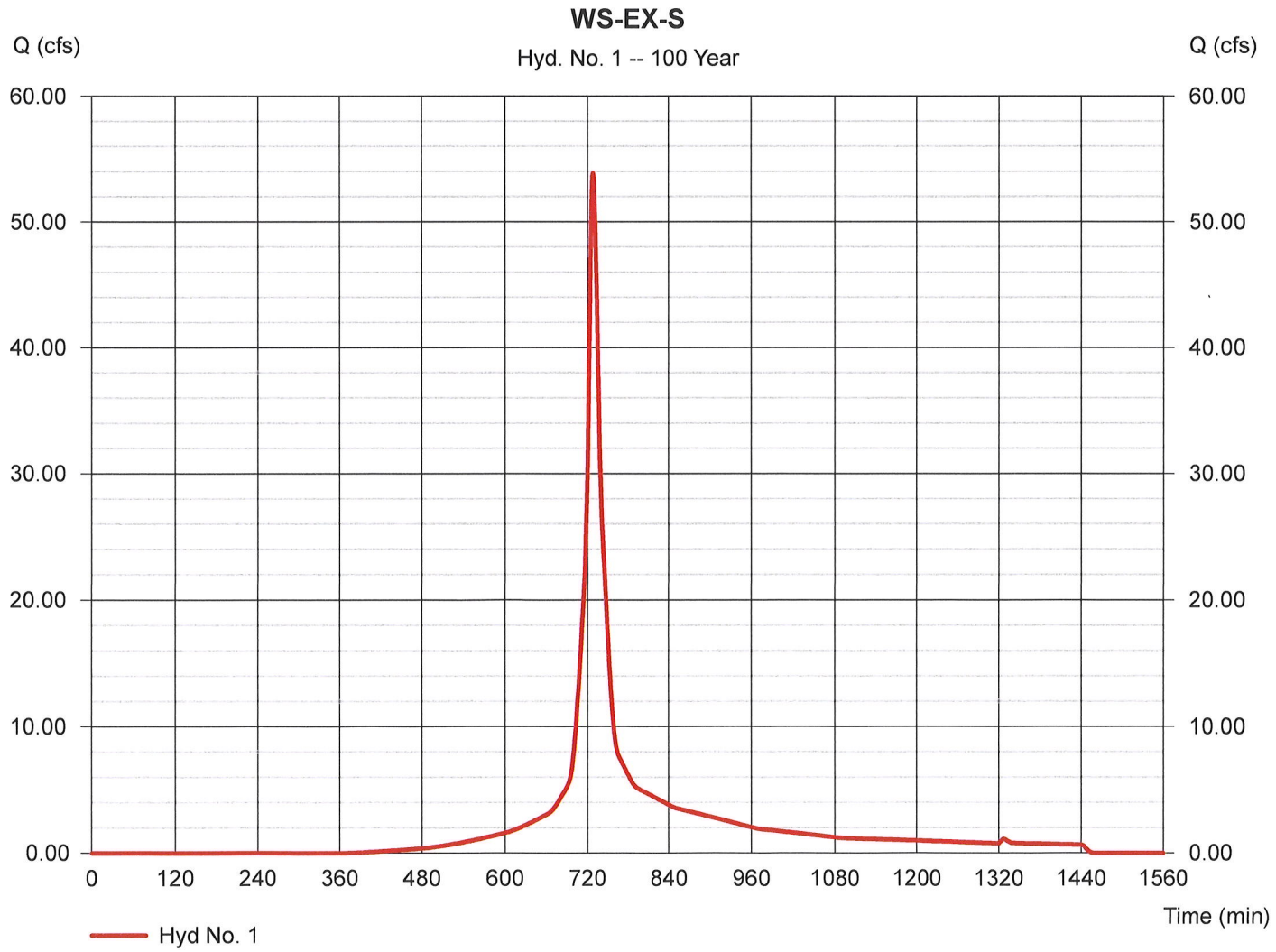
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	53.91	1	728	197,520	----	------	------	WS-EX-S
2	SCS Runoff	15.71	1	727	54,110	----	------	------	WS-EX-E
3	SCS Runoff	23.38	1	727	81,332	----	------	------	WS-PR-UNDET-S
4	SCS Runoff	2.956	1	724	9,271	----	------	------	WS-PR-UNDET-E
5	SCS Runoff	18.13	1	724	59,594	----	------	------	WS-PR-S-1 TO WQB #3
6	Reservoir	1.728	1	773	59,572	5	163.59	28,607	WQB 3 (OUTFLOW)
7	SCS Runoff	8.948	1	724	29,407	----	------	------	WS-PR-S-2 TO WQB #2
8	Combine	10.31	1	724	88,979	6, 7	------	------	WQB 2 (TOTAL INFLOW)
9	Reservoir	1.653	1	992	88,849	8	162.31	27,160	WQB 2 (OUTFLOW)
10	SCS Runoff	33.99	1	726	125,820	----	------	------	WS-PR-S-3 TO WQB #1
11	Reservoir	8.292	1	751	125,809	10	152.88	61,548	WQB1 (OUTFLOW)
12	Combine	31.15	1	727	295,990	3, 9, 11	------	------	TOTAL PROPOSED SOUTH

Hydrograph Report

Hyd. No. 1

WS-EX-S

Hydrograph type	= SCS Runoff	Peak discharge	= 53.91 cfs
Storm frequency	= 100 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 197,520 cuft
Drainage area	= 9.680 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 10.10 min
Total precip.	= 8.27 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

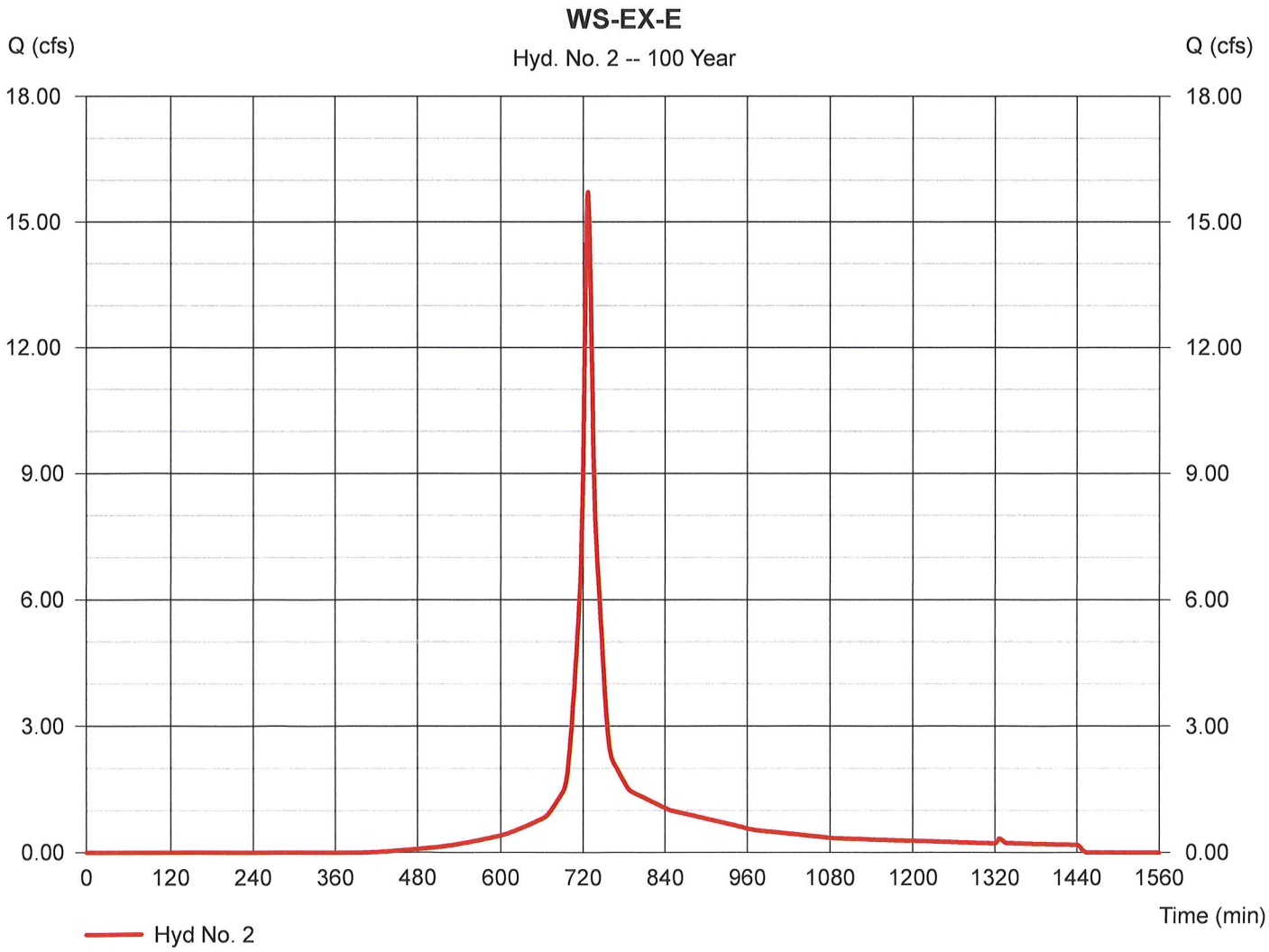


Hydrograph Report

Hyd. No. 2

WS-EX-E

Hydrograph type	= SCS Runoff	Peak discharge	= 15.71 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 54,110 cuft
Drainage area	= 2.820 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.60 min
Total precip.	= 8.27 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

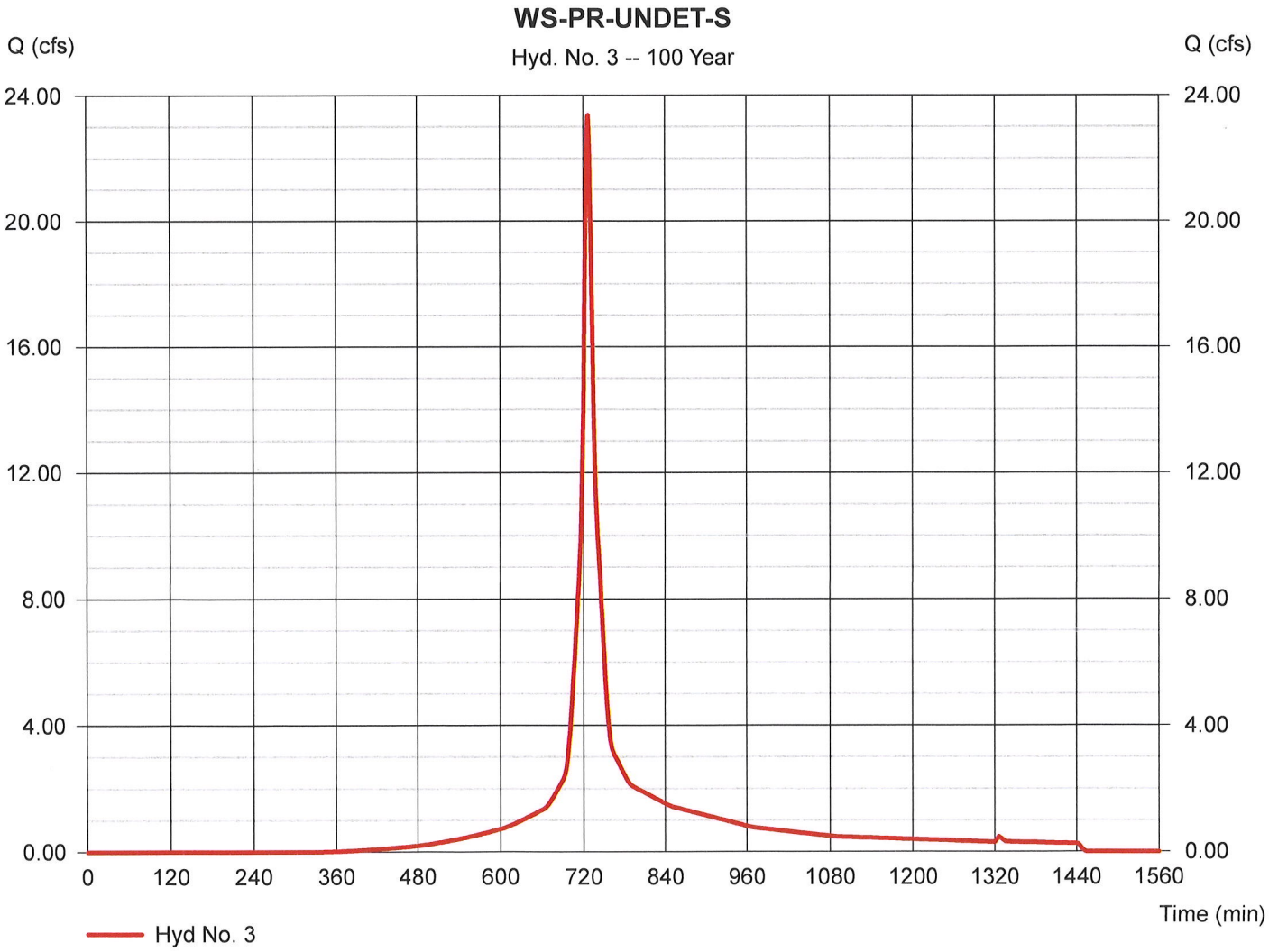


Hydrograph Report

Hyd. No. 3

WS-PR-UNDET-S

Hydrograph type	= SCS Runoff	Peak discharge	= 23.38 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 81,332 cuft
Drainage area	= 3.890 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.27 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

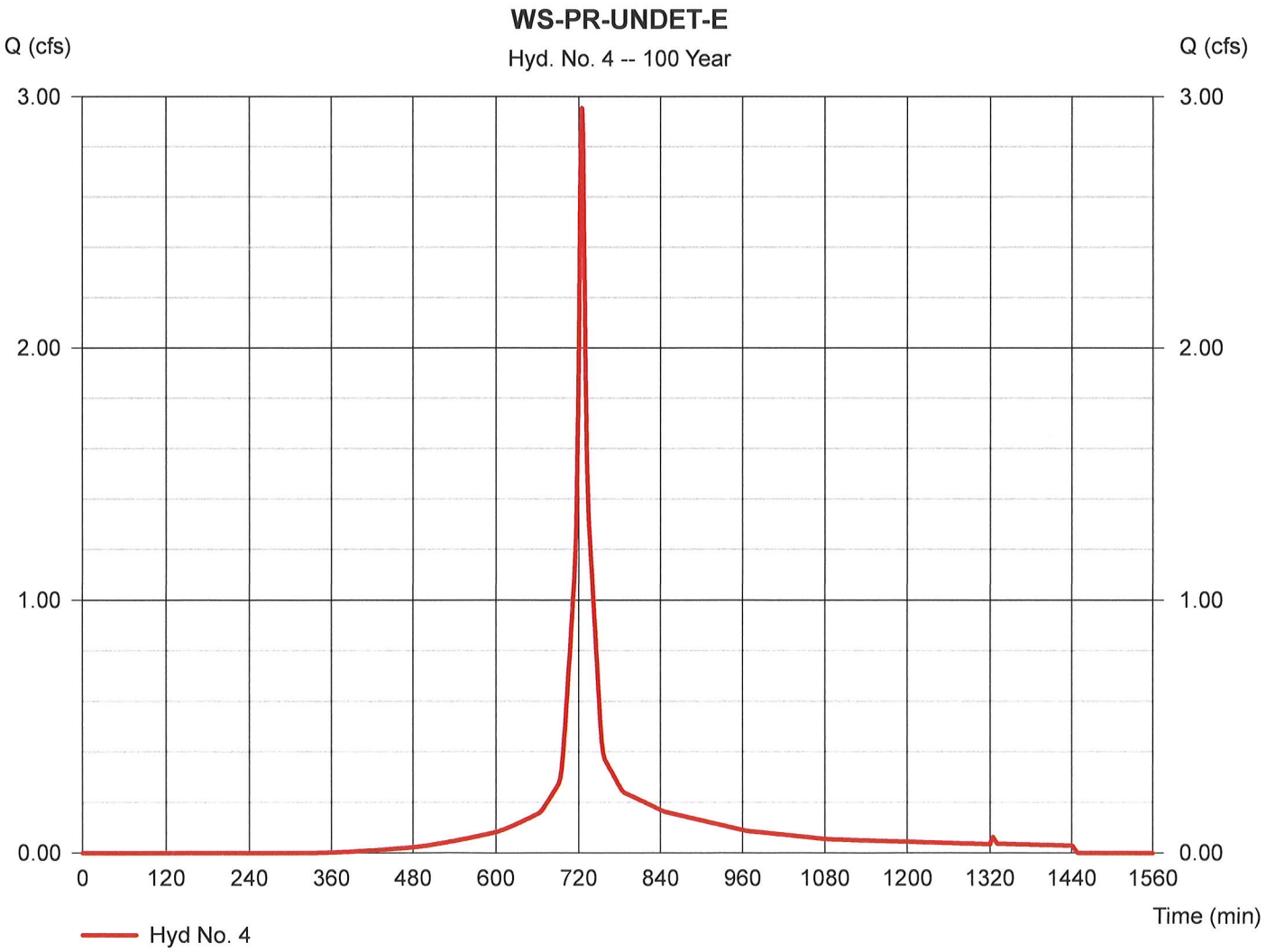


Hydrograph Report

Hyd. No. 4

WS-PR-UNDET-E

Hydrograph type	= SCS Runoff	Peak discharge	= 2.956 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 9,271 cuft
Drainage area	= 0.430 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 8.27 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

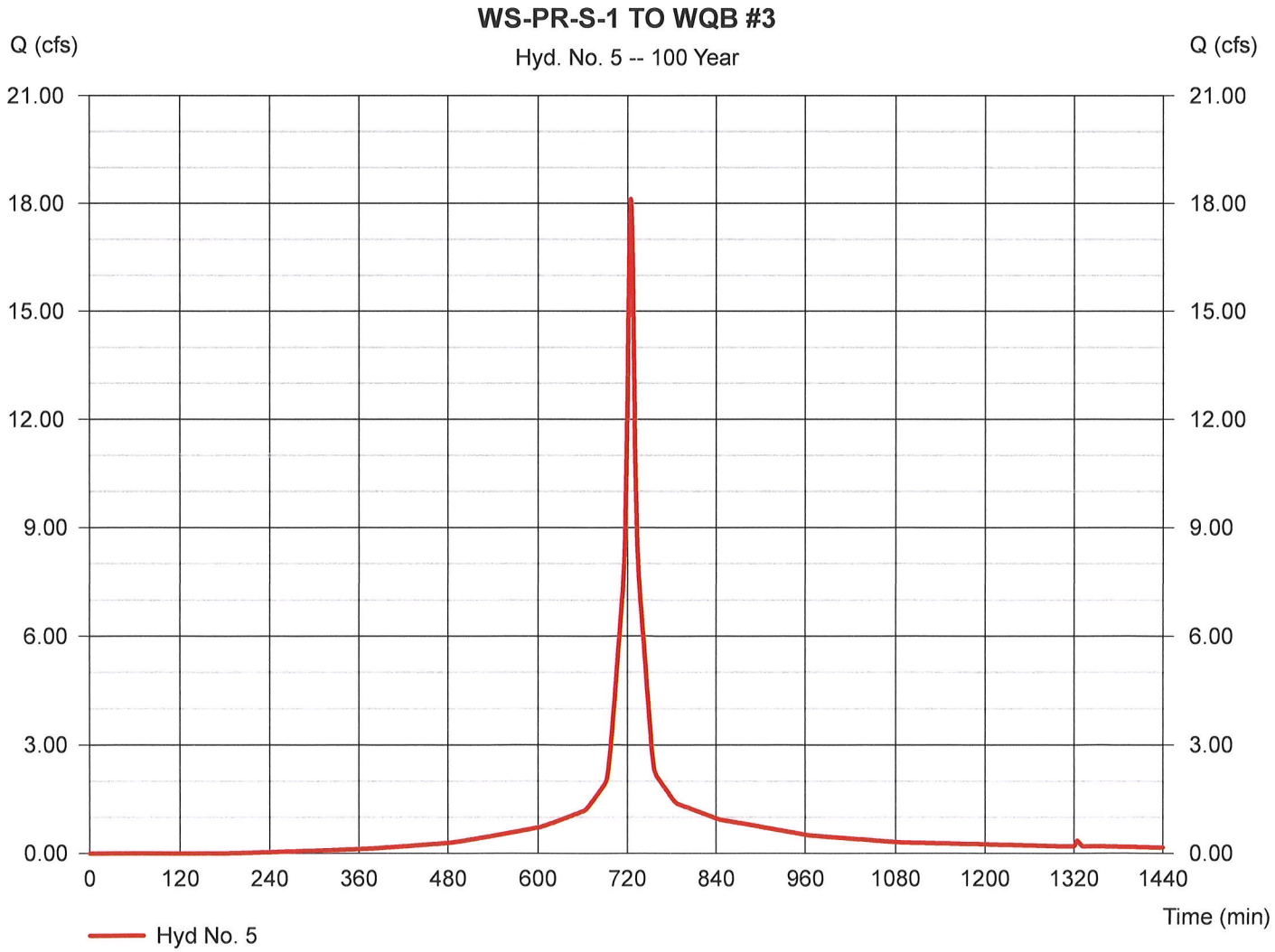


Hydrograph Report

Hyd. No. 5

WS-PR-S-1 TO WQB #3

Hydrograph type	= SCS Runoff	Peak discharge	= 18.13 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 59,594 cuft
Drainage area	= 2.290 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 8.27 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

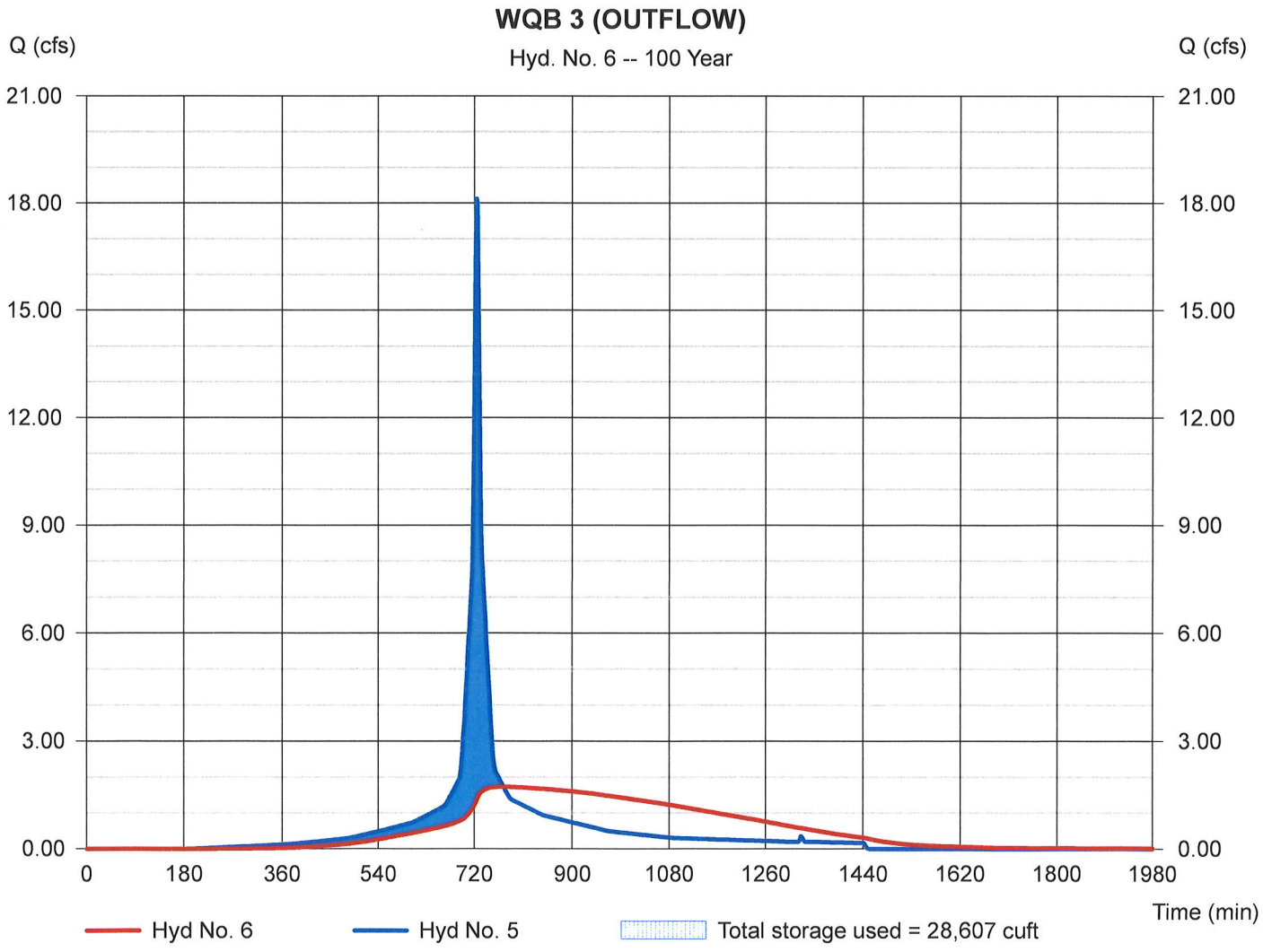
Hydraflow Hydrographs by Intelisolve v9.1 — Friday, Sep 22, 2023

Hyd. No. 6

WQB 3 (OUTFLOW)

Hydrograph type	= Reservoir	Peak discharge	= 1.728 cfs
Storm frequency	= 100 yrs	Time to peak	= 773 min
Time interval	= 1 min	Hyd. volume	= 59,572 cuft
Inflow hyd. No.	= 5 - WS-PR-S-1 TO WQB #3	Max. Elevation	= 163.59 ft
Reservoir name	= WQB3	Max. Storage	= 28,607 cuft

Storage Indication method used.



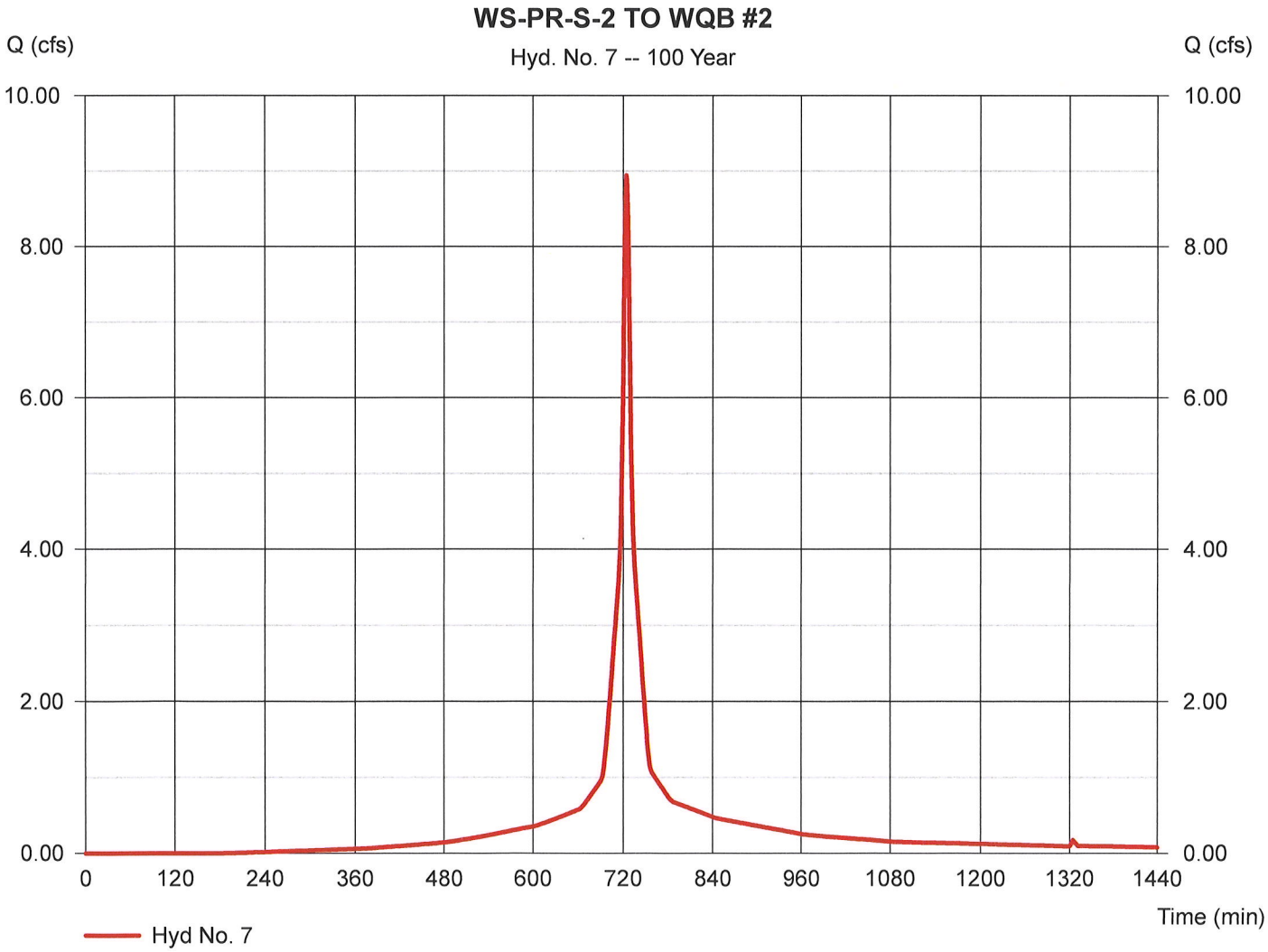
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Friday, Sep 22, 2023

Hyd. No. 7

WS-PR-S-2 TO WQB #2

Hydrograph type	= SCS Runoff	Peak discharge	= 8.948 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 29,407 cuft
Drainage area	= 1.130 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 8.27 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

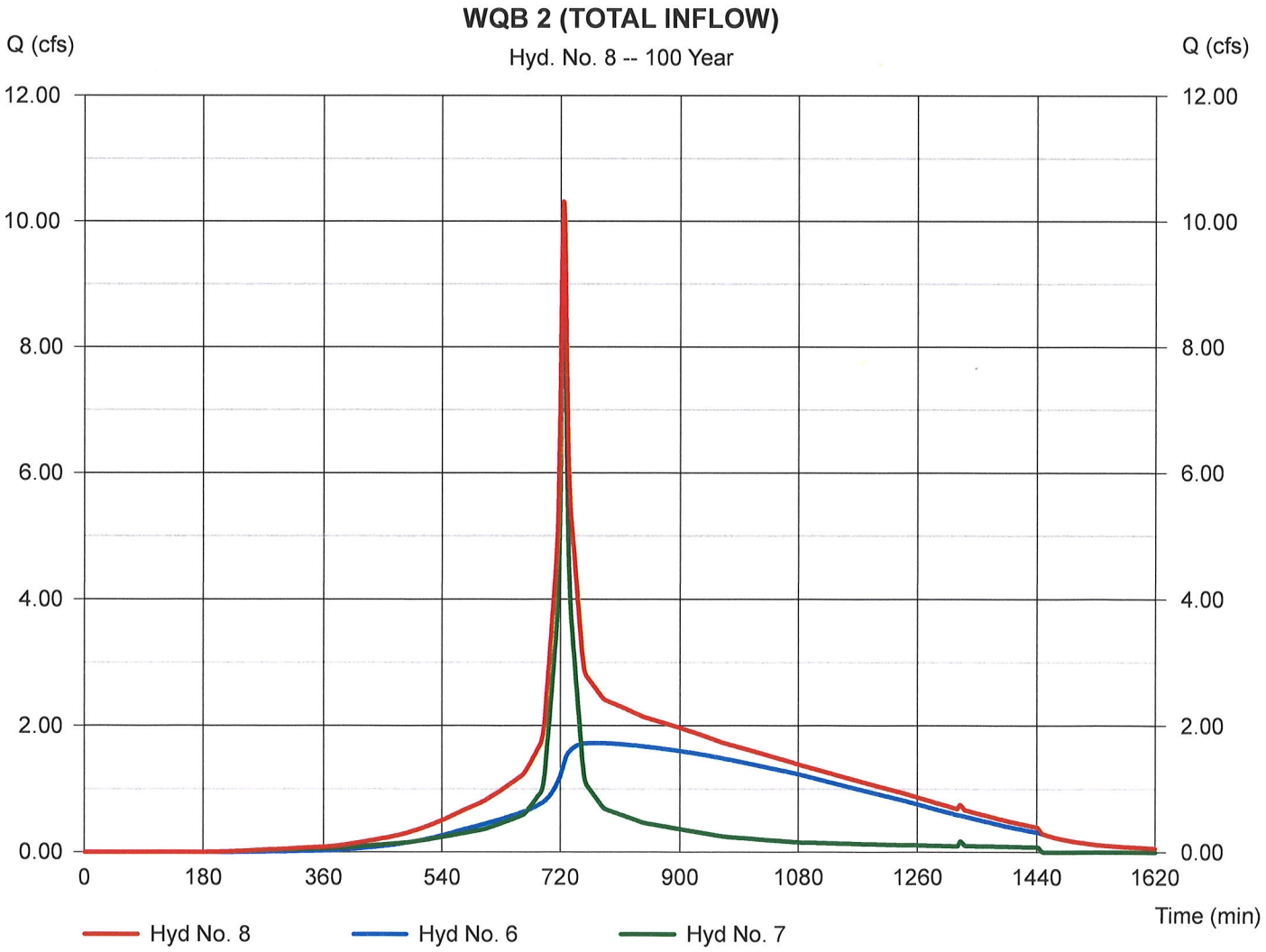


Hydrograph Report

Hyd. No. 8

WQB 2 (TOTAL INFLOW)

Hydrograph type	= Combine	Peak discharge	= 10.31 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 88,979 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 1.130 ac



Hydrograph Report

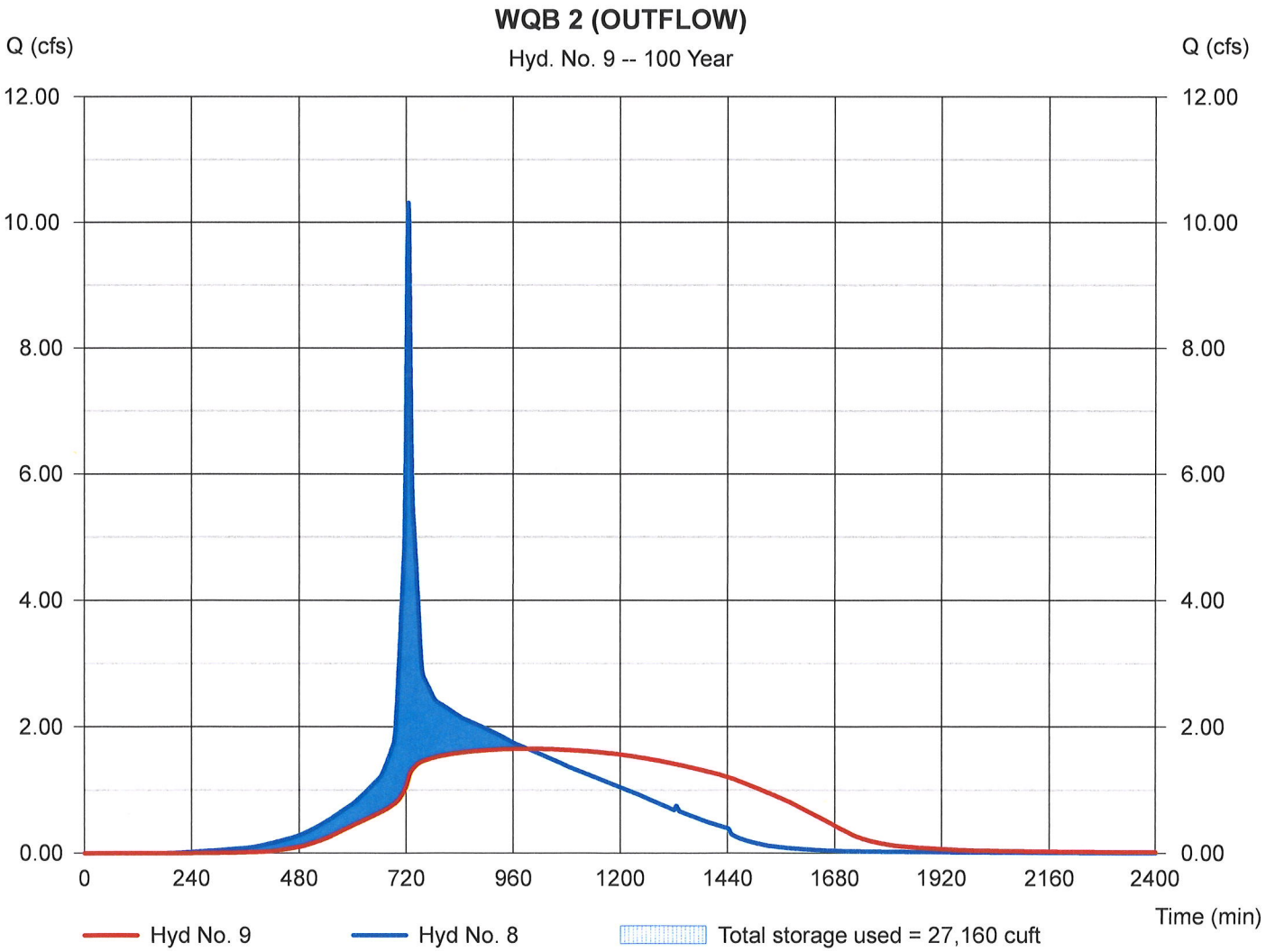
Hydraflow Hydrographs by Intelisolve v9.1 — Friday, Sep 22, 2023

Hyd. No. 9

WQB 2 (OUTFLOW)

Hydrograph type	= Reservoir	Peak discharge	= 1.653 cfs
Storm frequency	= 100 yrs	Time to peak	= 992 min
Time interval	= 1 min	Hyd. volume	= 88,849 cuft
Inflow hyd. No.	= 8 - WQB 2 (TOTAL INFLOW)	Max. Elevation	= 162.31 ft
Reservoir name	= WQB2	Max. Storage	= 27,160 cuft

Storage Indication method used.

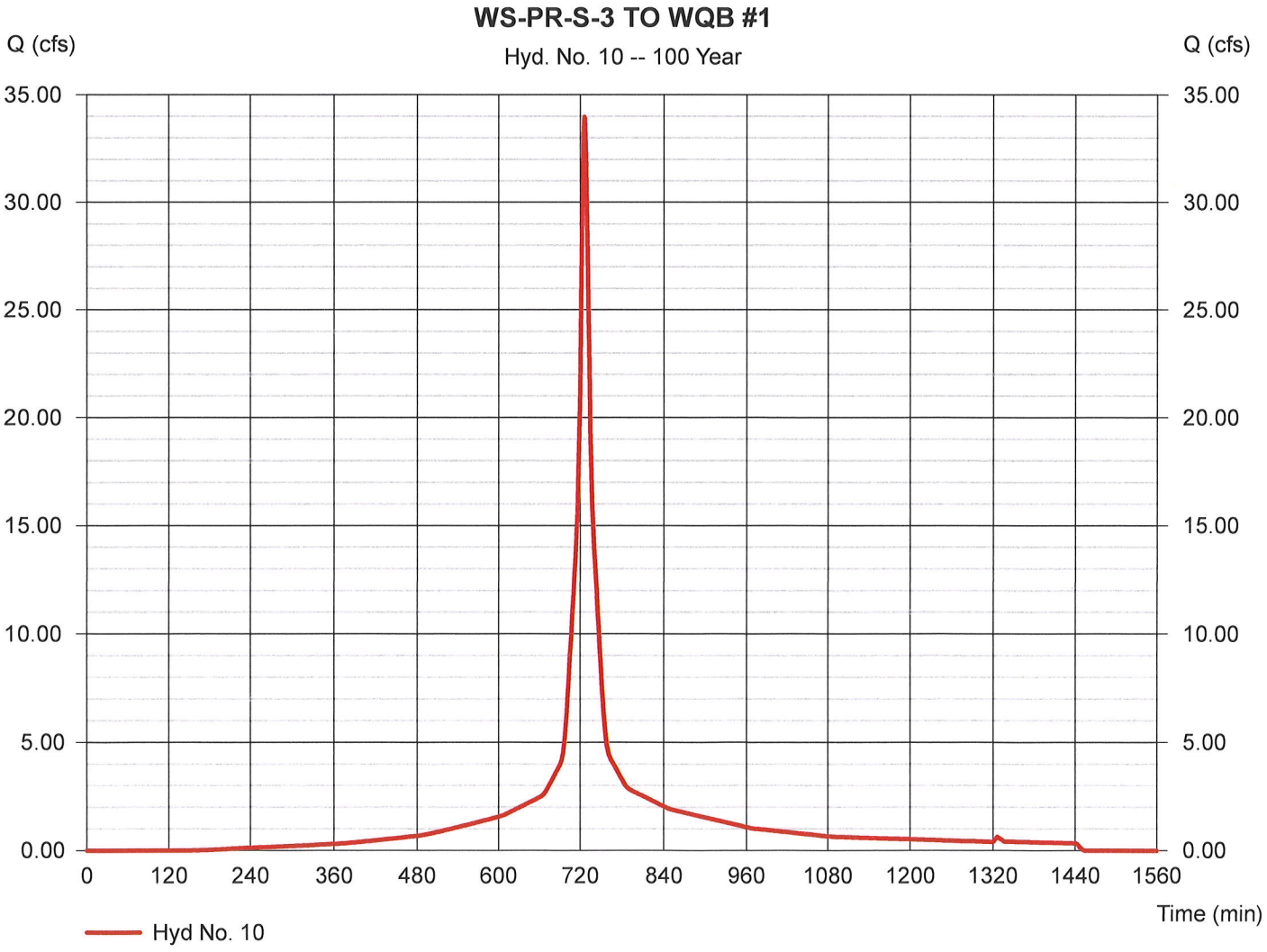


Hydrograph Report

Hyd. No. 10

WS-PR-S-3 TO WQB #1

Hydrograph type	= SCS Runoff	Peak discharge	= 33.99 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 125,820 cuft
Drainage area	= 4.820 ac	Curve number	= 91
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.27 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

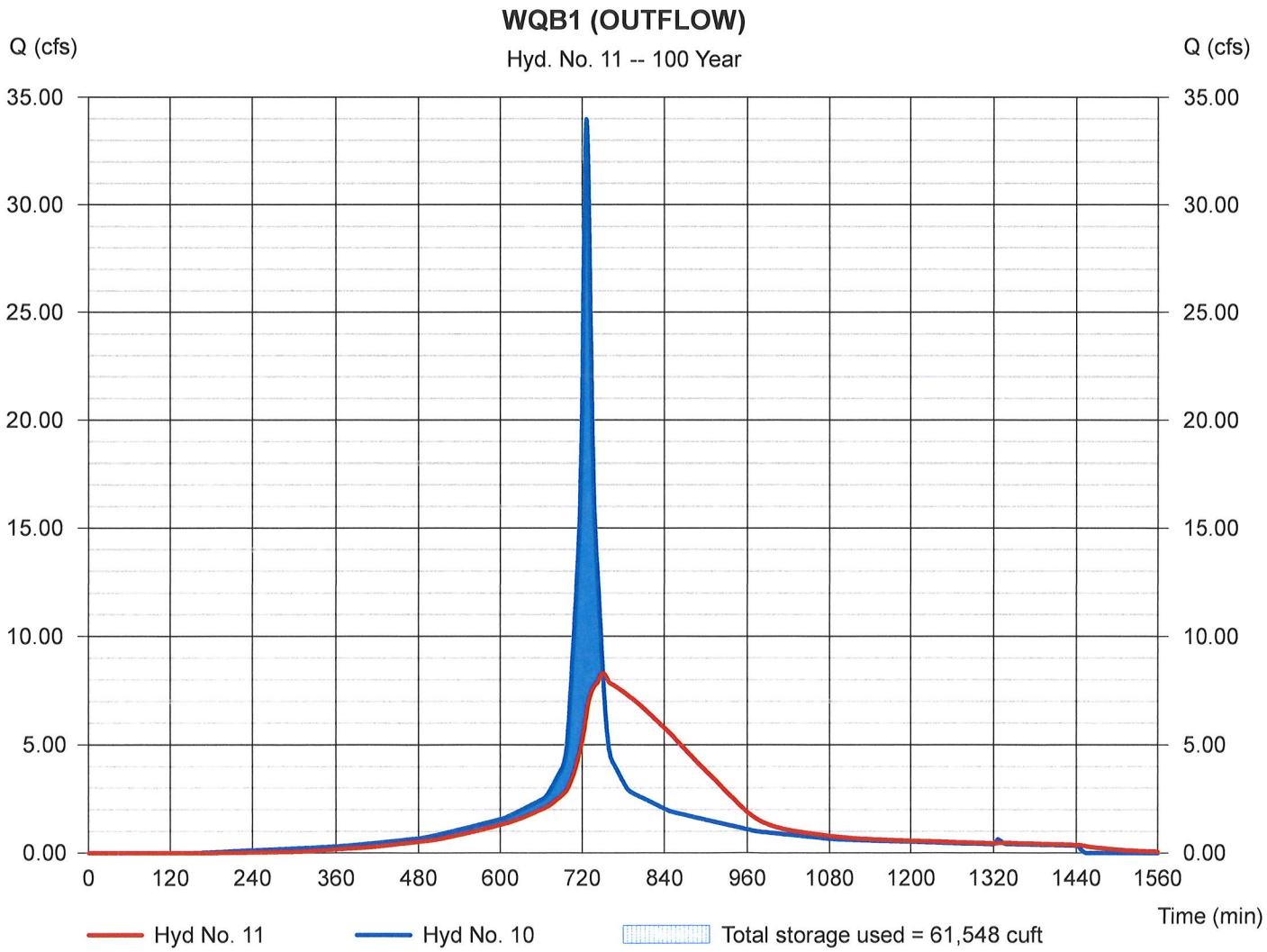
Hydraflow Hydrographs by Intelisolve v9.1 — Friday, Sep 22, 2023

Hyd. No. 11

WQB1 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	8.292 cfs
Storm frequency	=	100 yrs	Time to peak	=	751 min
Time interval	=	1 min	Hyd. volume	=	125,809 cuft
Inflow hyd. No.	=	10 - WS-PR-S-3 TO WQB #1	Max. Elevation	=	152.88 ft
Reservoir name	=	WQB1	Max. Storage	=	61,548 cuft

Storage Indication method used. Wet pond routing start elevation = 149.00 ft.



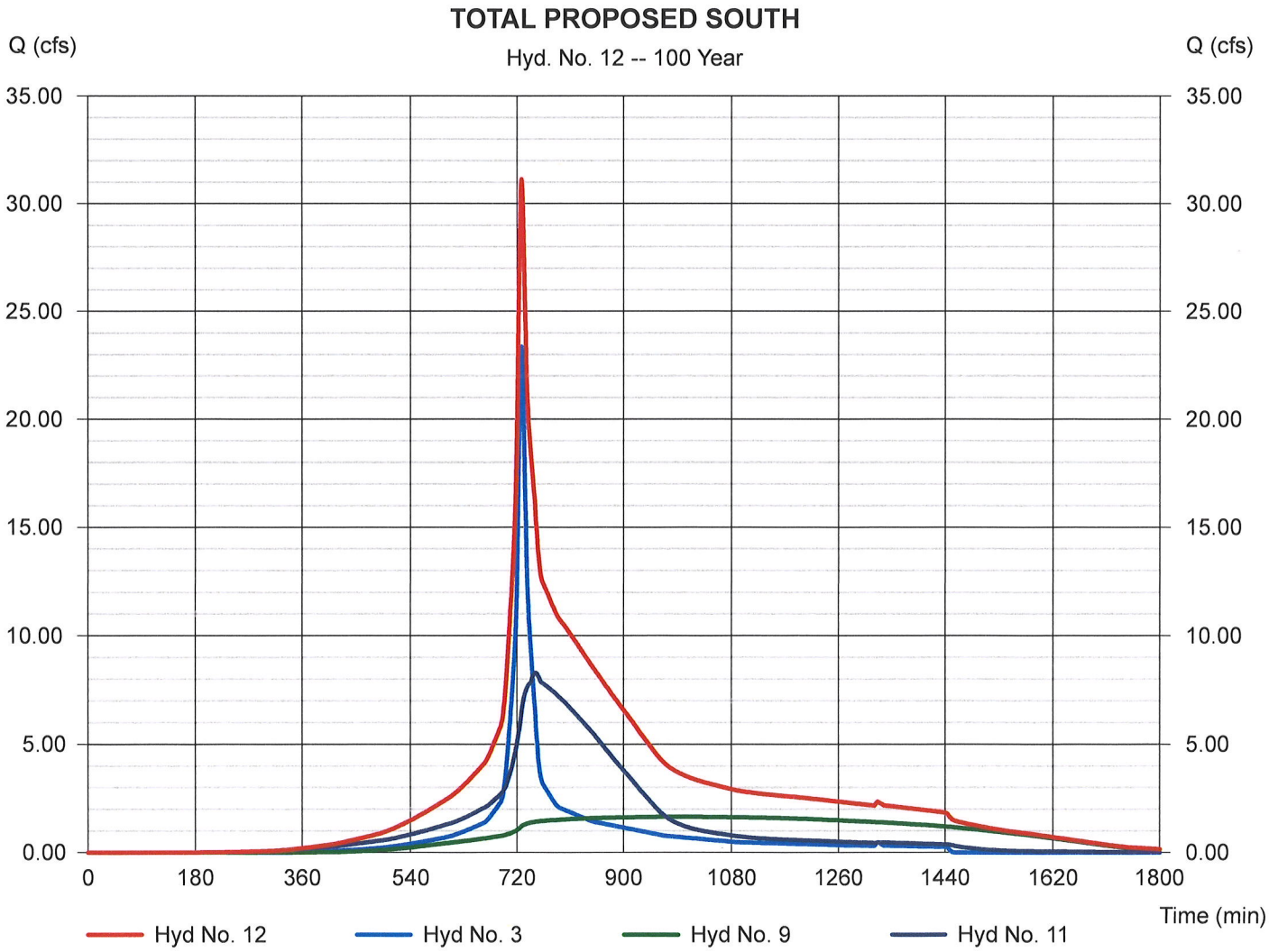
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 Friday, Sep 22, 2023

Hyd. No. 12

TOTAL PROPOSED SOUTH

Hydrograph type	= Combine	Peak discharge	= 31.15 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 295,990 cuft
Inflow hyds.	= 3, 9, 11	Contrib. drain. area	= 3.890 ac



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	20.5089	3.8000	0.7318	--------
2	25.4250	4.1000	0.7380	--------
3	0.0000	0.0000	0.0000	--------
5	29.9317	3.7000	0.7174	--------
10	35.8238	3.8000	0.7210	--------
25	44.0363	4.0000	0.7238	--------
50	48.4699	3.8000	0.7173	--------
100	52.9100	3.7000	0.7109	--------

File name: Marks Auto Part- 2023-09-22.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	4.18	3.00	2.40	2.02	1.75	1.56	1.41	1.29	1.19	1.11	1.04	0.98
2	4.98	3.61	2.88	2.43	2.11	1.88	1.70	1.56	1.44	1.34	1.25	1.18
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	6.34	4.58	3.66	3.09	2.69	2.40	2.17	1.99	1.84	1.72	1.61	1.52
10	7.47	5.40	4.32	3.64	3.18	2.83	2.56	2.35	2.17	2.02	1.90	1.79
25	8.98	6.52	5.23	4.41	3.85	3.43	3.11	2.85	2.63	2.45	2.30	2.17
50	10.19	7.38	5.91	4.99	4.35	3.88	3.51	3.22	2.98	2.78	2.61	2.46
100	11.37	8.23	6.60	5.57	4.86	4.34	3.93	3.61	3.34	3.12	2.93	2.76

Tc = time in minutes. Values may exceed 60.

Precip. file name: Mark's Auto Part - 2023-09-22.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	2.58	3.23	0.00	4.30	5.15	6.40	7.38	8.27
SCS 6-Hr	1.82	2.21	0.00	2.84	3.37	4.09	4.62	5.20
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	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Attachment E

Pipe to Pipe Analysis

9/29/2023

J.E.T. - RUSSELL ROAD

East Granby, Connecticut

PIPE TO PIPE ANAYLSIS

PROPOSED Area #	Landscape Area (S.F.)	Paved/Roof Area (S.F.)	Total Area (S.F.)	Landscape Area (Acre)	Paved/Roof Area (Acre)	Total Area (Acre)
C.B. 2	1,677	32,226	33,903	0.04	0.74	0.78
C.B. 3	370	13,554	13,924	0.01	0.31	0.32
C.B. 4	13,706	13,476	27,182	0.31	0.31	0.62
R.L. 5	0	20,000	20,000	0.00	0.46	0.46
C.B. 7	1,318	3,199	4,517	0.03	0.07	0.10
R.L. 8A	0	20,000	20,000	0.00	0.46	0.46
C.B. 9	2,234	8,260	10,494	0.05	0.19	0.24
C.B. 10	27,626	23,067	50,693	0.63	0.53	1.16
C.B. 12	5,456	26,880	32,336	0.13	0.62	0.74
C.B. 14	5,755	27,428	33,183	0.13	0.63	0.76
C.B. 16	20,538	29,449	49,986	0.47	0.68	1.15

STORM DRAINAGE SYSTEM DESIGN COMPUTATION SHEET

F. A. Hesketh & Associates, Inc.

Civil & Traffic Engineers - Surveyors

Planners - Landscape Architects

JOB: 23145 - Jonser's Express Transportation : Russell Road

CALCULATED BY: DRT DATE: September 29, 2023

CHECKED BY: _____ CHECKED BY: _____ DATE: _____ .

PIPE TO PIPE ANALYSIS

COVER CONDITION	LANDSCAPED		IMPERVIOUS		TOTAL		
RUNOFF 'C'	C_2=0.30		C_3=0.90				
DRAINAGE AREA (Ac.)	A_2	$(AxC)_2$	A_3	$(AxC)_3$	A	AxC	C
C.B. 2	0.04	0.01	0.74	0.67	**0.78**	0.68	**0.87**
C.B. 3	0.01	0.00	0.31	0.28	**0.32**	0.28	**0.88**
C.B. 4	0.31	0.09	0.31	0.28	**0.62**	0.37	**0.60**
R.L. 5	0.00	0.00	0.46	0.41	**0.46**	0.41	**0.90**
C.B. 7	0.03	0.01	0.07	0.07	**0.10**	0.08	**0.72**
R.L. 8A	0.00	0.00	0.46	0.41	**0.46**	0.41	**0.90**
C.B. 9	0.05	0.02	0.19	0.17	**0.24**	0.19	**0.77**
C.B. 10	0.63	0.19	0.53	0.48	**1.16**	0.67	**0.57**
C.B. 12	0.13	0.04	0.62	0.56	**0.74**	0.59	**0.80**
C.B. 14	0.13	0.04	0.63	0.57	**0.76**	0.61	**0.80**
C.B. 16	0.47	0.14	0.68	0.61	**1.15**	0.75	**0.65**

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	22	0.78	2.18	0.87	0.68	1.73	5.0	10.0	6.5	11.26	15.99	3.59	24	0.50	149.00	149.11	151.97	152.02	151.00	153.87	FES1-CB2
2	1	186	0.32	0.94	0.88	0.28	0.64	5.0	10.0	6.5	4.16	8.04	2.36	18	0.50	149.11	150.04	152.44	152.69	153.87	153.87	CB2-CB3
3	2	26	0.62	0.62	0.58	0.36	0.36	10.0	10.0	6.5	2.34	2.73	2.97	12	0.50	150.54	150.67	152.73	152.83	153.87	153.87	CB3-CB4
4	1	148	0.46	0.46	0.90	0.41	0.41	5.0	5.0	9.0	3.71	5.46	5.06	12	2.00	150.11	153.07	152.32	153.89	153.87	158.00	CB2-RL5
5	End	84	0.10	1.96	0.70	0.07	1.33	5.0	10.0	6.5	8.64	10.50	6.09	18	1.00	151.99	152.83	153.11	153.95	154.00	156.85	FES6-CB7
6	5	148	0.00	1.86	0.00	0.00	1.26	0.0	10.0	6.5	8.18	9.85	5.39	18	0.75	152.83	153.94	154.20	155.03	156.85	159.11	CB7-DMH8
7	6	44	0.24	1.40	0.77	0.18	0.85	5.0	10.0	6.5	5.50	9.13	5.22	15	1.70	154.19	154.94	155.27	155.88	159.11	158.19	DMH8-CB9
8	7	86	1.16	1.16	0.57	0.66	0.66	10.0	10.0	6.5	4.29	5.59	3.99	15	0.64	154.94	155.49	156.17	156.40	158.19	158.74	CB9-CB10
9	6	426	0.46	0.46	0.90	0.41	0.41	5.0	5.0	9.0	3.71	3.85	5.40	12	1.00	154.44	158.69	155.26	159.51	159.11	162.00	DMH8-RL8A
10	End	68	0.74	0.74	0.80	0.59	0.59	5.0	5.0	9.0	5.31	7.43	3.00	18	0.50	159.14	159.48	161.53	161.70	161.67	162.98	FES11-CB12
11	End	34	0.76	0.76	0.80	0.61	0.61	5.0	5.0	9.0	5.45	7.91	5.54	15	1.50	162.00	162.51	162.93	163.44	164.00	167.28	FES13-CB14
12	End	32	1.15	1.15	0.65	0.75	0.75	5.0	5.0	9.0	6.70	7.91	6.15	15	1.50	162.00	162.48	163.04	163.52	164.00	167.28	FES15-CB16

Project File: P2P-2023-09-29.stm

Number of lines: 12

Run Date: 09-23-2023

NOTES: Intensity = 42.54 / (Inlet time + 3.80) ^ 0.72; Return period = 25 Yrs. ; Pipe travel time suppressed. ; c = cir e = ellip b = box

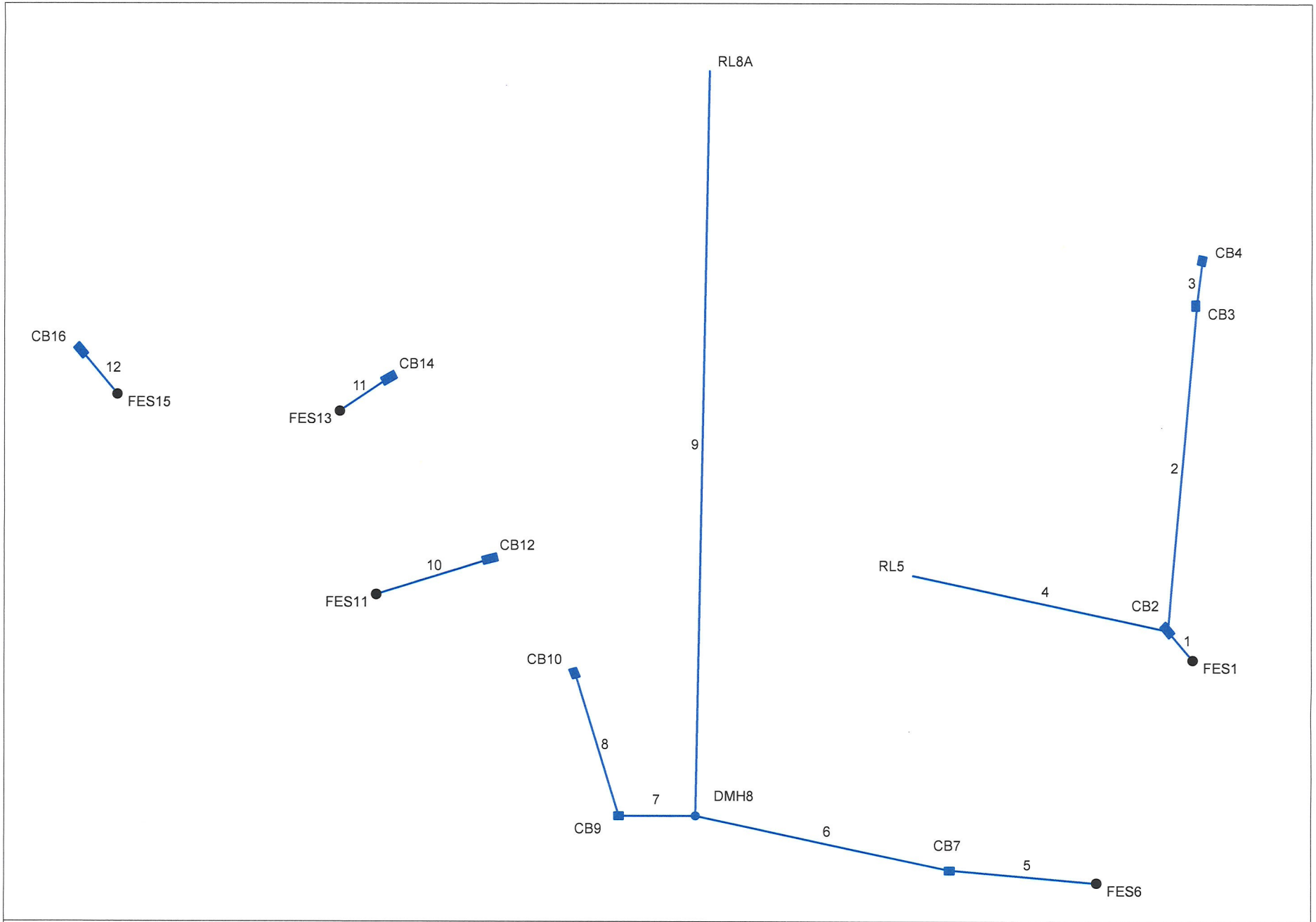
Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	CB2	6.08	0.21	6.29	0.00	Comb	3.0	5.83	6.26	4.62	1.35	Sag	2.00	0.030	0.030	0.000	0.27	9.11	0.44	9.11	2.0	Off
2	CB3	2.52	0.00	2.52	0.00	Comb	3.0	2.73	3.13	2.31	1.35	Sag	2.00	0.030	0.030	0.000	0.14	4.78	0.31	4.78	2.0	Off
3	CB4	2.34	0.00	2.34	0.00	Comb	3.0	2.73	3.13	2.31	1.35	Sag	2.00	0.030	0.030	0.000	0.12	4.11	0.29	4.11	2.0	Off
4	RL5	3.71	0.00	0.00	3.71	None	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
5	CB7	0.63	0.00	0.42	0.21	Comb	3.0	2.73	0.00	2.31	1.35	0.030	2.00	0.010	0.010	0.012	0.07	6.90	0.16	1.69	2.0	1
6	DMH8	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
7	CB9	1.66	0.00	1.66	0.00	Comb	3.0	2.73	3.13	2.31	1.35	Sag	2.00	0.030	0.030	0.000	0.06	2.11	0.23	2.11	2.0	Off
8	CB10	4.29	0.00	4.29	0.00	Comb	3.0	2.73	3.13	2.31	1.35	Sag	2.00	0.030	0.030	0.000	0.27	9.11	0.44	9.11	2.0	Off
9	RL8A	3.71	0.00	0.00	3.71	None	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
10	CB12	5.31	0.00	5.31	0.00	Comb	3.0	5.83	6.26	4.62	1.35	Sag	2.00	0.030	0.030	0.000	0.22	7.44	0.39	7.44	2.0	Off
11	CB14	5.45	0.00	5.45	0.00	Comb	3.0	5.83	6.26	4.62	1.35	Sag	2.00	0.030	0.030	0.000	0.23	7.78	0.40	7.78	2.0	Off
12	CB16	6.70	0.00	6.70	0.00	Comb	3.0	5.83	6.26	4.62	1.35	Sag	2.00	0.030	0.030	0.000	0.29	9.78	0.46	9.78	2.0	Off

Project File: P2P-2023-09-29.stm | Number of lines: 12 | Run Date: 09-23-2023

NOTES: Inlet N-Values = 0.016 ; Intensity = 42.54 / (Inlet time + 3.80) ^ 0.72; Return period = 25 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.

Hydraflow Storm Sewers Plan



Project File: P2P-2023-09-22.stm	Number of lines: 12	Date: 09-23-2023

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1	FES1-CB2	11.26	24	Cir	22	149.00	149.11	0.500	151.97*	152.02*	0.30	152.32	End	Combination
2	CB2-CB3	4.16	18	Cir	186	149.11	150.04	0.500	152.44*	152.69*	0.04	152.73	1	Combination
3	CB3-CB4	2.34	12	Cir	26	150.54	150.67	0.500	152.73*	152.83*	0.14	152.96	2	Combination
4	CB2-RL5	3.71	12	Cir	148	150.11	153.07	2.000	152.32	153.89	n/a	153.89 j	1	None
5	FES6-CB7	8.64	18	Cir	84	151.99	152.83	1.000	153.11	153.95	0.29	153.95	End	Combination
6	CB7-DMH8	8.18	18	Cir	148	152.83	153.94	0.750	154.20	155.03	n/a	155.03 j	5	Manhole
7	DMH8-CB9	5.50	15	Cir	44	154.19	154.94	1.705	155.27	155.88	n/a	155.88 j	6	Combination
8	CB9-CB10	4.29	15	Cir	86	154.94	155.49	0.640	156.17	156.40	0.31	156.71	7	Combination
9	DMH8-RL8A	3.71	12	Cir	426	154.44	158.69	0.998	155.26	159.51	0.45	159.51	6	None
10	FES11-CB12	5.31	18	Cir	68	159.14	159.48	0.500	161.53*	161.70*	0.14	161.84	End	Combination
11	FES13-CB14	5.45	15	Cir	34	162.00	162.51	1.500	162.93	163.44	n/a	163.44	End	Combination
12	FES15-CB16	6.70	15	Cir	32	162.00	162.48	1.500	163.04	163.52	n/a	163.52 j	End	Combination

Project File: P2P-2023-09-29.stm | Number of lines: 12 | Run Date: 09-23-2023

NOTES: Return period = 25 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Attachment F

WQV Calculations

RUSSELL ROAD

9/22/2023

East Grnaby, Connecticut

Water Quality Volume Size Calculations

Septermber 22, 2023

Minimum-Recommended Water Quality Volume (WQV)

Watershed	Total Area (Ac) A	Impervious Area (Ac)	Impervious (%) I	Runoff (R)	Min. Rec. WQV (ac-ft)	Min. Rec. WQV (Cu.Ft.)
WS-WEST-1	2.29	1.31	57.0	0.5629	0.10747	4,681
WS-WEST-2	1.13	0.62	54.7	0.5424	0.05098	2,221
WS-EAST	4.79	3.17	66.2	0.6459	0.25761	11,221

$$WQV = \frac{(1")(R)(A)}{12}$$

WQV = water quality volume (ac-ft)

R = volumetric runoff coefficient
0.05+0.009(I)

I = percent impervious cover

A= Site area (acres)

Provided Water Quality Volume

Water Quality Basins

Watershed	Elevations (Ft.)	Area (Sq. Ft.)	Avg. Area (Sq. Ft.)	Avg. Depth (FT)	Net. WQV (Cu. Ft.)	Total Provided WQV (Cu. Ft.)	Total Rec. WQV (Cu. Ft.)
WQ BASIN 3	148	5,665				**33,594**	4,681
			3,888	2.00	**7,776**		
	150	7,776					
			5,120	2.00	**10,240**		
	152	10,240					
			11,677	2.00	**23,354**		
	154	13,114					

WQ BASIN 2	159	6,058				**46,906**	2,221
			6,685	1.00	**6,685**		
	160	7,311					
			8,640	2.00	**17,279**		
	162	9,968					
			11,471	2.00	**22,942**		
	164	12,974					

Watershed	Elevations (Ft.)	Area (Sq. Ft.)	Avg. Area (Sq. Ft.)	Avg. Depth (FT)	Net. WQV (Cu. Ft.)	Total Provided WQV (Cu. Ft.)	Total Rec. WQV (Cu. Ft.)
WQ BASIN 1	160	6,076				**23,256**	11,221
			7,096	2.00	**14,192**		
	162	8,116					
			9,249	2.00	**18,498**		
	164	10,382					
			11,628	2.00	**23,256**		
	1666	12,874					