Stormwater Management Study
Little Platte River Watershed

Clay Creek Meadows

Corbyn Lane @ Lake Meadows Dr./Route W

Smithville, Missouri, 64089
Section 12, Township 53 N, Range 36 W

Prepared On:
June 13, 2024

Prepared For:
Clay Creek Meadows, LLC
19835 Highway B
Edgerton, MO 64444

Prepared by:
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RL Buford & Associates Engineering, LLC
PO Box 14069
Parkville, Missouri 64152

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BIBLIOGRAPHY

"STORM WATER MANAGEMENT PLAN-PROCEDURES, FORMAT AND GUIDELINES-PART I - DRAINAGE STUDY", dated June 17, 2002 and revised April 8, 2010.

Division V - Section 5600 – Storm Drainage Systems and Facilities" of the Kansas City Metropolitan Chapter of the American Public Works Association's "Standard Specifications and Design Criteria" dated February 15th, 2006 and all supplements to the APWA Section 5600

APWA 5600 SPECIFICATIONS
http://kcmetro.apwa.net/chapters/kcmetro/specs/APWA5600.pdf

APWA 5600 SUPPLEMENT(S)
http://www.kcmo.org/idc/groups/publicworks/documents/publicworks/specifications_apwa5600supp1.pdf

APWA MARC BMP MANUAL 2012
http://kcmetro.apwa.net/content/chapters/kcmetro.apwa.net/file/Specifications/BMPManual_Oct2012.pdf

GOOGLE MAP
https://maps.google.com/maps?hl=en

FEMA MAP SERVICE CENTER -
https://msc.fema.gov/webapp/wcs/stores/servlet/CategoryDisplay?catalogId=10001&storeId=10001&categ oryId=12001&langId=-1&userType=G&type=1&dfirmCatId=12009&future=false

UNITED STATES OF AGRICULTURE – NATURAL RESOURCES CONSERVATION SERVICE
http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

Methodology

This report was prepared in accordance with the provisions of the "STORM WATER MANAGEMENT PLAN-PROCEDURES, FORMAT AND GUIDELINES-PART I - DRAINAGE STUDY", dated June 17, 2002 and revised April 8, 2010. The analytical and design criteria used in the study conform to those of "Division V - Section 5600 – Storm Drainage Systems and Facilities" of the Kansas City Metropolitan Chapter of the American Public Works Association's "Standard Specifications and Design Criteria" dated February 2006 and all supplements to the APWA Section 5600. Based on these criteria, allowable discharge from the development is based on limiting 100- year (1%), 10-year (10%), and 2-Year (50%) post peak development discharge rates and to no more than existing discharge from the site for each respective storm. The following approved methods were used in this report:

- Hydraflow Hydrographs Extension for AutoCAD Civil 3D 2023
- NRCS TR-55 Unit Hydrograph Method
- 2-, 10-, and 100-Year Return Frequency
- 24 hr. Storm Precipitation Depths (TP-40)
- 24 hr. NRCS Type II Rainfall Distribution
- ARC Type II Moisture Conditions
- Runoff Curve Numbers per NRCS TR-55
- APWA 5600 for Time of Concentration and Travel Time.

Table 1. Rainfall Depths

STORM	PERCENT	RAINFALL DEPTH (in.)
2 Year	50%	3.57
10 Year	10%	5.33
100 Year	1%	8.50

General Information

The proposed development on Corbyn Lane between Route W and Lake Meadows Drive is in Smithville, Missouri. The proposed development plan will consist of a townhome Complex of 203 Townhomes on Corbyn Lane and 13 single family homes on Lake Meadows Drive. The site consists of approximately 26.76 acres. See Appendix A for an aerial image of the site along with an aerial of the surrounding area.

Existing Conditions Analysis

The existing site is farmland and native grass in fair condition. Currently there are three field inlets on this parcel connected to the existing storm sewers on Corbyn Lane. Those storm sewers discharge to existing detention areas behind the Clay Creek Townhome complex. The detention areas outfall to city storm sewers and Rock Branch creek which ultimately connects to Smithville Lake. There is a natural low point in the middle of the site that water is conveyed to by overland flow as well as the field inlets for the Northeastern portion of the site. There are also curb inlets along Lake Meadows Dr. to capture runoff from the southern portion of the site. We have included approximately 32 acres of offsite drainage in our analysis.

Table 2: Existing Conditions Outfalls

SUB BASIN DESCRIPTION	OUTFALL SUMMARY	WATERSHED
Existing North	Tract B Detention	Little Platte River
Existing South	Tract C Detention	Little Platte River

Curve Numbers

The land use designation for the site under existing conditions is Open Space – Good Condition, Row Crops, and Paved Streets and Roofs. Based on the land use designation and the information obtained from the NRCS Web Soil Survey, the curve numbers specified in Table 3 have been used to develop a composite curve number for the sub basins. The composite curve numbers calculated for each sub basin are provided in Table 4.

Soil Classification

Soil classifications published by the United States Department of Agriculture/Natural Resources Conservation Service (USDA/NRCS) indicate the existing site is made up of two soil types:

10081 Macksburg silt loam, 5 to 9 percent slopes, HSG C/D

10120 Sharpsburg silt loam, 2 to 5 percent slopes, HSG C

**See Appendix B for a detailed soil report of the proposed development.

Table 3: Curves Numbers based on Land Use and HSG

SOIL TYPE	HSG	LAND USE	CURVE NUMBER
10081	C/D	Open Lawn – Good Condition	76
10081	C/D	Row Crops	90
10081	C/D	Roofs, Pavement	98
10120	C	Open Lawn – Good Condition	74
10120	C	Row Crops	88
10120	C	Roofs, Pavement	98

Table 4. Existing Curve Numbers (Composite)

SUB BASIN DESCRIPTION	CN (ACRE)	CN (ACRE)	WEIGHTED CN
EXISTING NORTH	88 (7.75)	90 (2.16)	88
EXISTING SOUTH	88 (10.21)	90	89
EXISTING NORTH OFFISTE	75 (6.46)	98 (4.62)	85
EXISTING SOUTH OFFSITE	76 (12.46)	98 (6.31)	83

Times of Concentration

Runoff from sub basins reach their corresponding outfall locations via a combination of sheet flow, shallow concentrated flow and channel flow. See the Appendix for Time of Concentration calculations and corresponding TR-55 worksheets. The results from the existing conditions model have been provided in the Appendix. A summary of the analysis and results has been provided in Table 5.

Table 5. Existing Conditions Outfall Summary (DETENTION)

OUTFALL	Q_2 (CFS)	Q_{10} (CFS)	Q_{100} (CFS)
EXISTING NORTH	14.24	25.48	36.94
EXISTING SOUTH	41.54	73.15	91.86
EXISTING TOTAL	55.78	98.63	128.80

Proposed Conditions Analysis

The proposed sub basins have been analyzed under proposed conditions with one retention basin designed to capture and store the runoff from the southern portion of site. This retention pond will be installed as a complement to the walking path that will be extended on site. Runoff that is flowing to the existing south detention basin will be diverted to the retention basin. In the storm events analyzed, a higher peak flow will be generated by the shorter times of concentration due to the increase in impervious area. The existing detention basins will be able to contain and disperse the flow adequately. The proposed outflow consists of the Proposed Retention, Proposed South Detention and Proposed North Detention as outlined on the attached hydrograph report.

Curve Numbers

Impervious areas of pavement and building structures on the site have been given a CN designation of 98.00. Grass areas have been given a CN designation according to soil type.

Table 6. Proposed Curve Numbers

SUB BASIN DESCRIPTION	CN (ACRE)	CN (ACRE)	WEIGHTED CN
PROPOSED NORTH	74 (3.96)	98 (5.95)	88
PROPOSED SOUTH	75 (7.81)	98 (11.30)	89
EXISTING NORTH OFFISTE	75 (6.46)	98 (4.62)	85
EXISTING SOUTH OFFSITE	76 (12.46)	98 (6.31)	83

Times of Concentration

Runoff from sub basins reaches their corresponding outfall locations via a combination of sheet flow, shallow concentrated flow and channel flow. See the Appendix for Time of Concentration calculations and applicable TR-55 worksheets. Refer to Table 7 for a summary of the sub basins under proposed conditions with detention.

Table 7. Proposed Conditions Hydrology Summary

OUTFALL	Q_2 (CFS)	Q_{10} (CFS)	Q_{100} (CFS)
PROPOSED NORTH DETENTION	14.68	25.71	36.90
PROPOSED SOUTH DETENTION	25.28	57.31	78.24
PROPOSED RETENTION	11.19	22.44	33.06
TOTAL	51.15	105.46	148.20

A. Identification of Downstream Drainage Issues

To date we are not aware of any drainage issues with the downstream flow. There are no current downstream flooding issues. The proposed project will increase impervious areas, therefore, to assure no adverse impact is anticipated in the downstream drainage system, we are proposing to provide detention.

B. Preliminary Onsite Drainage System

See Appendix A for the existing and proposed drainage boundaries. The site will be graded to allow runoff to be contained within the storm sewers to flow to the existing detention basins and new retention pond. A summary of existing and proposed discharge rates and volumes are included in Table 8, Section D.

C. Drainage Computations

See Appendix D for drainage computations for the 2-year, 10-year and 100-year Storm design flows for the proposed site and for each downstream outfall. A summary of existing and proposed discharge rates is included in Table 8, Section D.

D. Flood Control Detention

The proposed project does increase the runoff from the site, yet that runoff is already captured within the existing storm sewers and detention areas offsite. The new storm

sewer system will be diverted to the new retention basin on the south side of the development. Combined outfalls are displayed in Table 8.

Table 8: Allowable/Existing and Proposed Rates

OUTFALL	Q_2 (CFS)	Q_{10} (CFS)	Q_{100} (CFS)
PROPOSED TOTAL	51.15	105.46	148.20
EXISTING TOTAL	55.78	98.63	128.80

E. Stream Corridors

This section is not applicable.

F. Stormwater Treatment Requirements

This section is not applicable.

G. Corps of Engineers Requirements

The project site does not contain “wetlands” or “waters of the U.S.” therefore a 404 permit will not be required.

H. FEMA/DWR Requirements

The existing site lies in Zone X per the Flood Insurance Rate Map, FIRM 29047C0025E, Map Effective April 3, 2015 for Clay County, Missouri, and Incorporated Areas. The FIRM identifies Zone X as “Areas determined to be outside the 0.2% annual chance floodplain”.

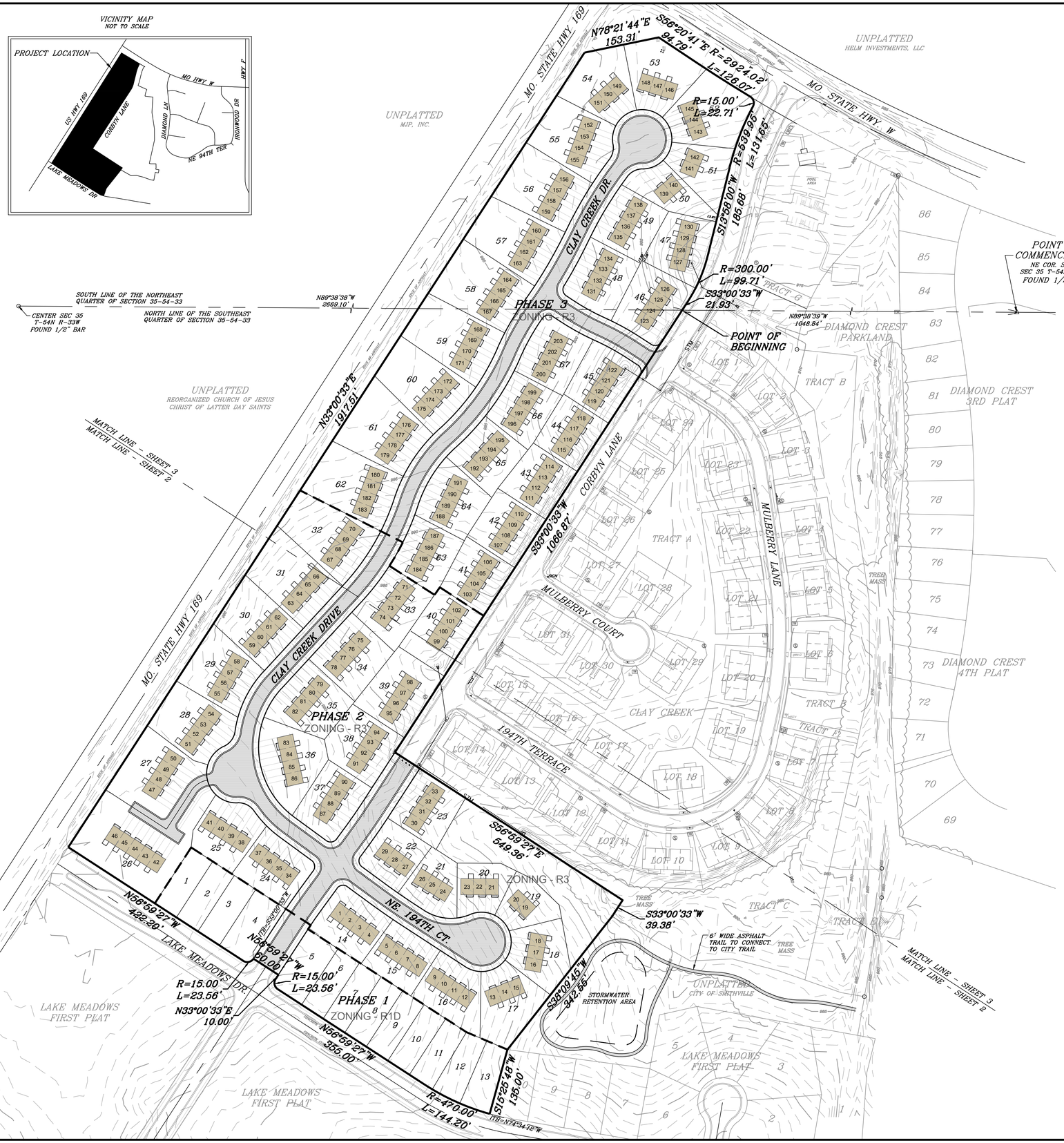
Conclusions and Recommendations

The proposed Clay Creek Meadows will cause an increase in peak discharge after the improvements are made to the site. The increased discharge volume will be captured in the existing detention basins as well as the proposed retention basin, reducing the overall peak discharge to below existing conditions. We were able to reduce the proposed hydrograph volumes to below existing conditions for the 2-year and 100-year storms.

The proposed redevelopment project meets or exceeds all the required stormwater management criteria set forth by the city of Smithville, Missouri. Based on this information, RL Buford and Associates Engineering, LLC recommends approval of this Stormwater Management Study for Clay Creek Meadows. If you have any questions, please do not hesitate to contact us.

Appendix A - Figures

PRELIMINARY PLAT
CLAY CREEK MEADOWS
A SUBDIVISION IN PART OF THE SOUTHEAST QUARTER OF SECTION 35, TOWNSHIP 54 NORTH, RANGE 33 WEST SMITHVILLE, CLAY COUNTY, MISSOURI



APPLICANT/OWNER:
CLAY CREEK MEADOWS, LLC
19835 HIGHWAY 69
EDGERTON, MO 64444

PROPERTY DESCRIPTION
CONTAINING 1,165,637 SQUARE FEET OR 26.76 ACRES

ALL THAT PART OF THE EAST ONE-HALF OF SECTION 35, TOWNSHIP 54, RANGE 33, SMITHVILLE, CLAY COUNTY, MISSOURI, DESCRIBED AS FOLLOWS: COMMENCING AT THE NORTHEAST CORNER OF SOUTHEAST QUARTER OF SAID SECTION 35, ALSO BEING THE SOUTHEAST CORNER OF THE NORTHEAST QUARTER OF SAID SECTION 35, THENCE NORTH 89° 38' 38" WEST ALONG THE NORTH LINE OF THE SOUTHEAST QUARTER OF SAID SECTION 35, ALSO BEING THE SOUTH LINE OF THE NORTHEAST QUARTER OF SAID SECTION 35, A DISTANCE OF 1048.84 FEET TO A POINT ON THE WESTERLY LINE OF CLAY CREEK, A SUBDIVISION OF LAND IN SMITHVILLE, CLAY COUNTY, MISSOURI AND THE WESTERLY RIGHT OF WAY LINE OF CORBYN LANE, ALSO BEING THE POINT OF BEGINNING OF THE TRACT OF LAND HEREIN TO BE DESCRIBED; THENCE S33°00'33"W, ALONG THE WESTERLY LINE OF SAID CLAY CREEK AND THE WESTERLY RIGHT OF WAY LINE OF SAID CORBYN LANE, A DISTANCE OF 1066.87 FEET TO THE MOST WESTERLY CORNER OF SAID CLAY CREEK; THENCE S56°59'27"E, ALONG THE SOUTHERLY LINE OF SAID CLAY CREEK, A DISTANCE OF 549.36 FEET; THENCE CONTINUING ALONG SAID LINE, S33°00'33"W, A DISTANCE OF 39.38 FEET; THENCE S38°09'45"W, A DISTANCE OF 342.55 FEET TO THE NORTHWEST CORNER OF LOT 10, LAKE MEADOWS FIRST PLAT, A SUBDIVISION OF LAND IN SMITHVILLE, CLAY COUNTY, MISSOURI; THENCE S15°25'48"W, ALONG THE WESTERLY LINE OF SAID LOT 10, A DISTANCE OF 135.00 FEET TO THE SOUTHWEST CORNER OF SAID LOT 10, ALSO BEING A POINT ON THE NORTHERY RIGHT OF WAY LINE OF LAKE MEADOWS DRIVE; THENCE NORTHWESTERLY, ALONG THE NORTHERLY LINE OF SAID LAKE MEADOWS AND THE NORTHERLY RIGHT OF WAY LINE OF SAID LAKE MEADOWS DRIVE, ALONG A CURVE TO THE RIGHT HAVING AN INITIAL TANGENT BEARING OF N74°34'15"W HAVING A RADIUS OF 470.00 FEET, AN ARC DISTANCE OF 144.20 FEET; THENCE, CONTINUING ALONG SAID LINE, N56°59'27"W, A DISTANCE OF 355.00 FEET; THENCE, CONTINUING ALONG SAID LINE, ALONG A CURVE TO THE RIGHT BEING TANGENT TO THE PREVIOUSLY DESCRIBED COURSE HAVING A RADIUS OF 15.00 FEET, AN ARC DISTANCE OF 23.56 FEET; THENCE, CONTINUING ALONG SAID LINE, N33°00'33"E, A DISTANCE OF 10.00 FEET; THENCE, CONTINUING ALONG SAID LINE, N56°59'27"W, A DISTANCE OF 60.00 FEET; THENCE, CONTINUING ALONG SAID LINE, ALONG A CURVE TO THE RIGHT HAVING AN INITIAL TANGENT BEARING OF S33°00'33"W HAVING A RADIUS OF 15.00 FEET, AN ARC DISTANCE OF 23.56 FEET; THENCE, CONTINUING ALONG SAID LINE, N56°59'27"W, A DISTANCE OF 422.20 FEET TO THE MOST NORTHERLY CORNER OF SAID LAKE MEADOWS FIRST PLAT, SAID POINT ALSO BEING ON THE SOUTHEASTERLY RIGHT OF WAY LINE OF MISSOURI STATE HIGHWAY NO. 169; THENCE N33°00'33"E, ALONG THE SOUTHEASTERLY RIGHT OF WAY LINE OF SAID MISSOURI STATE HIGHWAY NO. 169, A DISTANCE OF 1917.51 FEET; THENCE N78°21'44"E, A DISTANCE OF 153.31 FEET TO THE SOUTHWESTERLY RIGHT OF WAY LINE OF MISSOURI STATE HIGHWAY W; THENCE S56°20'41"E, ALONG THE SOUTHWESTERLY RIGHT OF WAY LINE OF SAID MISSOURI STATE HIGHWAY W, A DISTANCE OF 94.79 FEET; THENCE, CONTINUING ALONG SAID LINE, ALONG A CURVE TO THE LEFT BEING TANGENT TO THE LAST DESCRIBED COURSE HAVING A RADIUS OF 2924.02 FEET, AN ARC DISTANCE OF 126.07 FEET TO A POINT ON THE WESTERLY LINE OF SAID CLAY CREEK; THENCE SOUTHERLY ALONG A REVERSE CURVE TO THE RIGHT, ALONG THE WESTERLY LINE OF SAID CLAY CREEK, HAVING A RADIUS OF 15.00 FEET, AN ARC DISTANCE OF 22.71 FEET TO A POINT ON THE WESTERLY RIGHT OF WAY LINE OF SAID CORBYN LANE; THENCE CONTINUING SOUTHERLY ALONG A REVERSE CURVE TO THE LEFT; ALONG THE WESTERLY LINE OF SAID CLAY CREEK AND THE WESTERLY RIGHT OF WAY LINE OF SAID CORBYN LANE, HAVING A RADIUS OF 538.95 FEET, AN ARC DISTANCE OF 131.65 FEET; THENCE, CONTINUING ALONG SAID LINE, S13°58'00"W, A DISTANCE OF 185.68 FEET; THENCE, CONTINUING ALONG SAID LINE, SOUTHWESTERLY ALONG A CURVE TO THE RIGHT BEING TANGENT TO THE LAST DESCRIBED COURSE HAVING A RADIUS OF 300.00 FEET, AN ARC DISTANCE OF 99.71 FEET; THENCE, CONTINUING ALONG SAID LINE, S33°00'33"W, A DISTANCE OF 21.93 FEET TO THE POINT OF BEGINNING.

NOTE: PHASING SCHEDULE IS APPROXIMATE AND WILL BE DETERMINED BY MARKET DEMAND.

DEVELOPMENT DATA

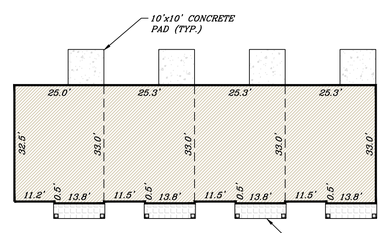
PHASE	EXISTING ZONING	PROPOSED ZONING	LAND USE	GROSS ACRES	PROPOSED R/W	OPEN SPACE	NET AREA	SINGLE FAMILY UNITS	SINGLE FAMILY LOTS	AVERAGE GROSS DENSITY DUAC.	COMMENCE / COMPLETTION DATES
1	B3	R1D	SINGLE FAMILY RESIDENTIAL	2.40	0.17	N/A	2.23	13	13	5.42	2024-2025

PHASE	EXISTING ZONING	PROPOSED ZONING	LAND USE	GROSS ACRES	PROPOSED R/W	OPEN SPACE	NET AREA	MULTI FAMILY UNITS	MULTI FAMILY LOTS	AVERAGE GROSS DENSITY DUAC.	COMMENCE / COMPLETTION DATES
2	B3	R3	MULTI FAMILY RESIDENTIAL	12.94	2.18	0.83	9.93	102	27	7.88	2025-2026

PHASE	EXISTING ZONING	PROPOSED ZONING	LAND USE	GROSS ACRES	PROPOSED R/W	OPEN SPACE	NET AREA	MULTI FAMILY UNITS	MULTI FAMILY LOTS	AVERAGE GROSS DENSITY DUAC.	COMMENCE / COMPLETTION DATES
3	B3	R3	MULTI FAMILY RESIDENTIAL	11.42	1.57	N/A	9.85	101	27	8.84	2026-2027

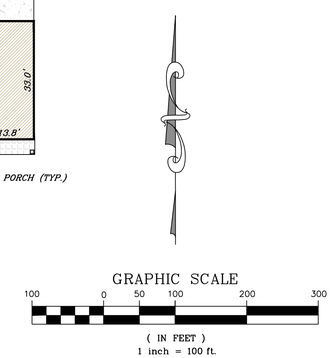
TOTALS		R1D / R3		26.76	3.92	0.83	22.01	216	67	8.07	

PHASE 1 WILL CONSIST OF 13 SINGLE FAMILY UNITS AND SHALL COMPLY WITH THE STANDARDS OF R1D ZONING.
PHASE 2 WILL CONSIST OF 102 MULTI FAMILY UNITS AND SHALL COMPLY WITH THE STANDARDS OF R3 ZONING.
PHASE 3 WILL CONSIST OF 101 MULTI FAMILY UNITS AND SHALL COMPLY WITH THE STANDARDS OF R3 ZONING.



TYPICAL 4-PLEX DETAIL
SCALE: 1"=20'

NOTE:
DUPLEX, 3-PLEX AND 5-PLEX SIZE ARE THE SAME.



SURVEYOR'S CERTIFICATION
I, HEREBY CERTIFY THAT WE HAVE MADE A SURVEY OF THE PREMISES HEREIN DESCRIBED WHICH MEET OR EXCEED THE CURRENT "MISSOURI MINIMUM STANDARDS FOR PROPERTY BOUNDARY SURVEYS" AS JOINTLY ESTABLISHED BY THE MISSOURI DEPARTMENT OF NATURAL RESOURCES, DIVISION OF GEOLOGY AND LAND SURVEY AND THE MISSOURI BOARD FOR ARCHITECTS, PROFESSIONAL ENGINEERS, PROFESSIONAL LAND SURVEYORS AND LANDSCAPE ARCHITECTS, AND THAT THE RESULTS OF SAID SURVEYS ARE REPRESENTED ON THIS DRAWING TO THE BEST OF MY PROFESSIONAL KNOWLEDGE AND BELIEF.

06.10.2024
DATE

ROBERT G. YOUNG, PLS-2010000089

STATE OF MISSOURI
ROBERT G. YOUNG
NUMBER
PLS-2010000089
PROFESSIONAL LAND SURVEYOR

R.L. Buford & Associates, LLC
LAND SURVEYING - DEVELOPMENT CONSULTANTS
R.L. BUFORD & ASSOCIATES, LLC - MO CERT. OF AUTHORITY LICENSE NO. LS-2010031977
(816) 741-6152
P.O. BOX 14069, PARKVILLE, MO. 64152
DOB@RLBUFORD.COM

FOR	*CLAY CREEK MEADOWS, LLC*
SEC-TWP-RGE.	35-54-33
COUNTY	CLAY
JOB NO.	L-23197
DATE	06/11/2024
FIELD BOOK	
DRAWN BY	J.K.K.

PRELIMINARY PLAT (SHEET 1 OF 3)

20.99 AC.

37.61 AC.

POINT OF BEGINNING

CENTER SEC. 35
T-5AN R-3W
FOUND 1/2" BAR

SOUTH LINE OF THE NORTHEAST QUARTER OF SECTION 35-5A-3W

NORTH LINE OF THE SOUTHEAST QUARTER OF SECTION 35-5A-3W

UNPLATTED
REORGANIZED CHURCH OF JESUS CHRIST OF LATTER DAY SAINTS

UNPLATTED
M.P. INC.

UNPLATTED
HOLA INVESTMENTS, LLC

UNPLATTED
CITY OF SHERWOOD

DIAMOND CREST
PARKLAND

DIAMOND CREST
3RD PLAT

DIAMOND CREST
4TH PLAT

LAKE MEADOWS
FIRST PLAT

CLAY CREEK

HWY. 99W

CLAY CREEK DRIVE

COMMON LANE

MARYLWOOD DRIVE

LAKE MEADOWS DRIVE

BOOK 3693
PAGE 831

N88°07'26"W (M)
1039.18' (M)

NORTH BASIN
968 - 36,918 S.F.
967 - 30,500 S.F.
966 - 26,777 S.F.
965 - 23,274 S.F.
964 - 19,918 S.F.
963 - 12,932 S.F.
962 - 0

SOUTH BASIN
964 - 107,521 S.F.
963 - 67,137 S.F.
962 - 67,607 S.F.
961 - 45,356 S.F.
960 - 36,825 S.F.
959 - 12,648 S.F.
958 - 6,817 S.F.
957 - 4,703 S.F.
956 - 2,507 S.F.
955 - 92 S.F.
954 - 0

Appendix B

United States Department of Agriculture

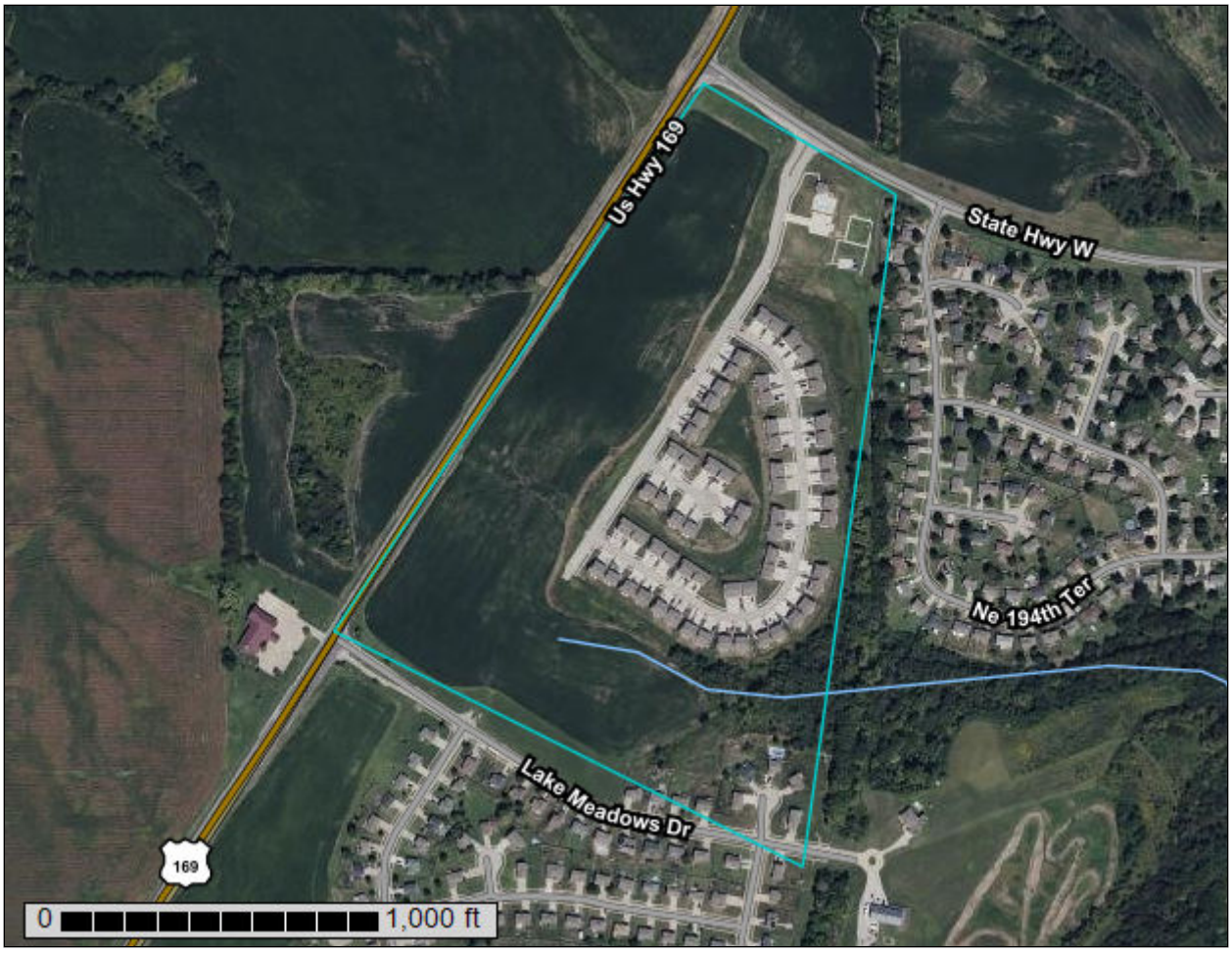
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Clay County, Missouri

Overall Drainage Area - Clay Creek



June 7, 2024

Preface

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

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

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

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

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

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

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

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

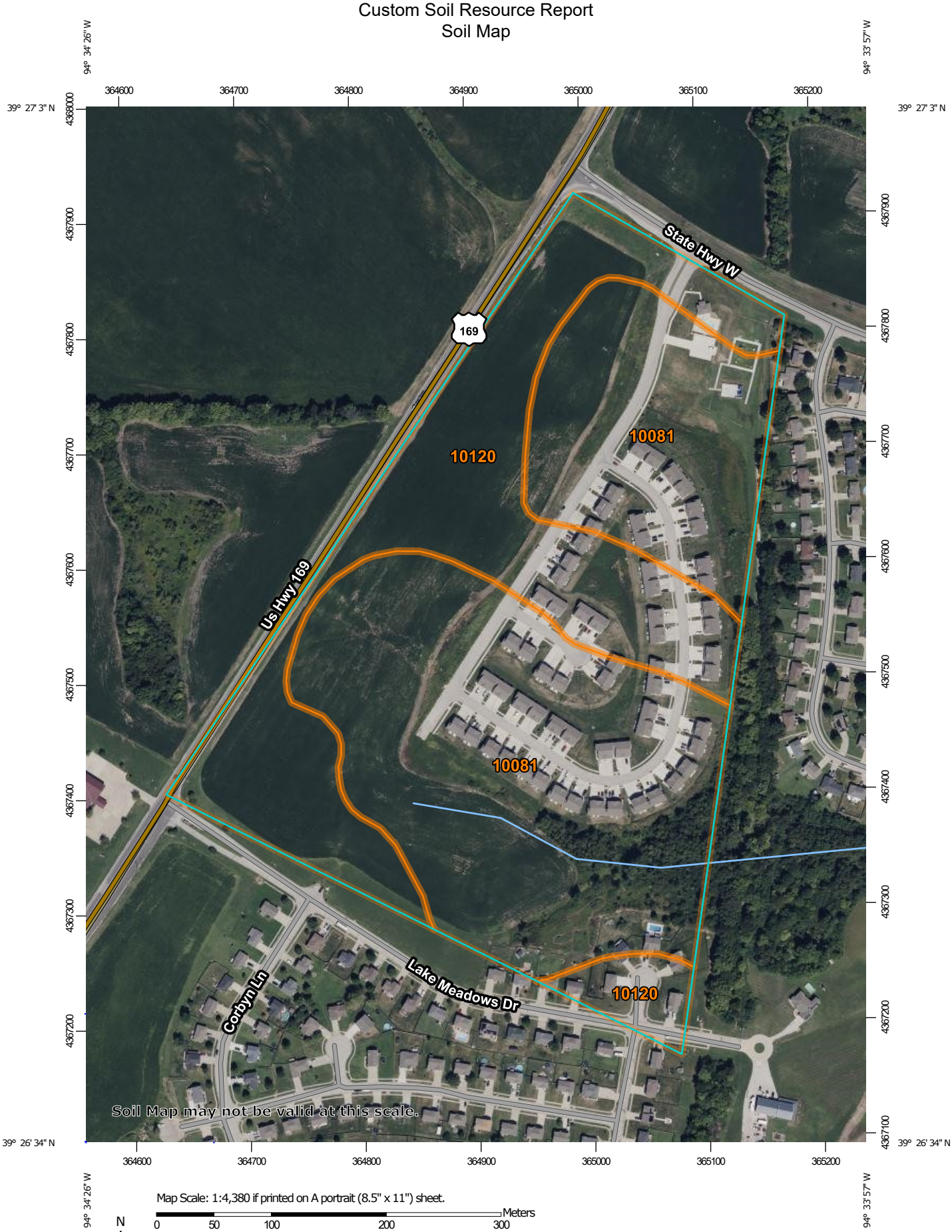
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:4,380 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N 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 1:24,000.

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: Clay County, Missouri
Survey Area Data: Version 24, Aug 22, 2023

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

Date(s) aerial images were photographed: Aug 30, 2022—Sep 16, 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
10081	Macksburg silt loam, 5 to 9 percent slopes	34.1	62.2%
10120	Sharpsburg silt loam, 2 to 5 percent slopes	20.7	37.8%
Totals for Area of Interest		**54.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Clay County, Missouri

10081—Macksburg silt loam, 5 to 9 percent slopes

Map Unit Setting

National map unit symbol: 2qkz7
Elevation: 700 to 1,390 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 175 to 220 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Macksburg and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Macksburg

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Concave
Parent material: Loess

Typical profile

A - 0 to 19 inches: silt loam
Bt1 - 19 to 37 inches: silty clay loam
Bt2 - 37 to 60 inches: silty clay loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D
Ecological site: R107XB007MO - Loess Upland Prairie
Other vegetative classification: Grass/Prairie (Herbaceous Vegetation)
Hydric soil rating: No

Minor Components

Higginsville, eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

Sharpsburg

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

10120—Sharpsburg silt loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2yy7v
Elevation: 1,000 to 1,300 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 177 to 220 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Sharpsburg and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sharpsburg

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 6 inches: silt loam
A - 6 to 16 inches: silty clay loam

Bt1 - 16 to 22 inches: silty clay loam
Bt2 - 22 to 46 inches: silty clay loam
BC - 46 to 58 inches: silty clay loam
C - 58 to 79 inches: silty clay loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 45 to 50 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C
Ecological site: R109XY002MO - Loess Upland Prairie
Hydric soil rating: No

Minor Components

Sibley

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R109XY002MO - Loess Upland Prairie
Hydric soil rating: No

Higginsville, eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R109XY002MO - Loess Upland Prairie
Hydric soil rating: No

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NOTES TO USERS

o is for use in administering the National Flood Insurance Program. It does essarily identify all areas subject to flooding, particularly from local sources of small size. The **community map repository** should be d for possible updated or additional flood hazard information.

n more detailed information in areas where **Base Flood Elevations** nd/or **floodways** have been determined, users are encouraged to consult d Profiles and Floodway Data and/or Summary of Stillwater Elevations ontained within the Flood Insurance Study (FIS) report that accompanies M. Users should be aware that BFEs shown on the FIRM represent whole-foot elevations. These BFEs are intended for flood insurance rating s only and should not be used as the sole source of flood elevation on. Accordingly, flood elevation data presented in the FIS report should be n conjunction with the FIRM for purposes of construction and/or floodplain ment.

ies of the **floodways** were computed at cross sections and interpolated cross sections. The floodways were based on hydraulic considerations ard to requirements of the National Flood Insurance Program. Floodway nd other pertinent floodway data are provided in the Flood Insurance port for this jurisdiction.

areas not in Special Flood Hazard Areas may be protected by **flood structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood e Study report for information on flood control structures for this on.

jection used in the preparation of this map was NAD 1983 State Plane West, zone 2403. **The Horizontal datum** was NAD 83, GRS1980 Differences in datum, spheroid, or projection used in the production of or adjacent jurisdictions may result in slight positional differences in map across jurisdiction boundaries. These differences do not affect the of this FIRM.

evations on this map are referenced to the North American Vertical Datum These flood elevations must be compared to structure and ground ns referenced to the same **vertical datum**. For information regarding on between the National Geodetic Vertical Datum of 1929 and the North n Vertical Datum of 1988, visit the National Geodetic Survey website at w.ngs.noaa.gov/ or contact the National Geodetic Survey at the following

ormation Services
i/NGS12
Geodetic Survey
, #9202
st-West Highway
ring, Maryland 20910-3282
3-3242

n current elevation, description, and/or location information for **bench** hown on this map, please contact the Information Services Branch of the Geodetic Survey at **(301) 713-3242**, or visit its website at w.ngs.noaa.gov/.

ap information shown on this FIRM was provided in digital format by the m Service Agency National Agriculture Imagery Program (NAIP), dated 2010, and by the U.S. Geological Survey Digital Orthophoto Quadrangles, 93 and later, produced at a scale of 1:24000.

n updated topographic information, this map reflects more detailed and te **stream channel configurations and floodplain delineations** than own on the previous FIRM for this jurisdiction. As a result, the Flood and Floodway Data tables may reflect stream channel distances that differ at is shown on the map. Also, the road to floodplain relationships for d streams may differ from what is shown on previous maps.

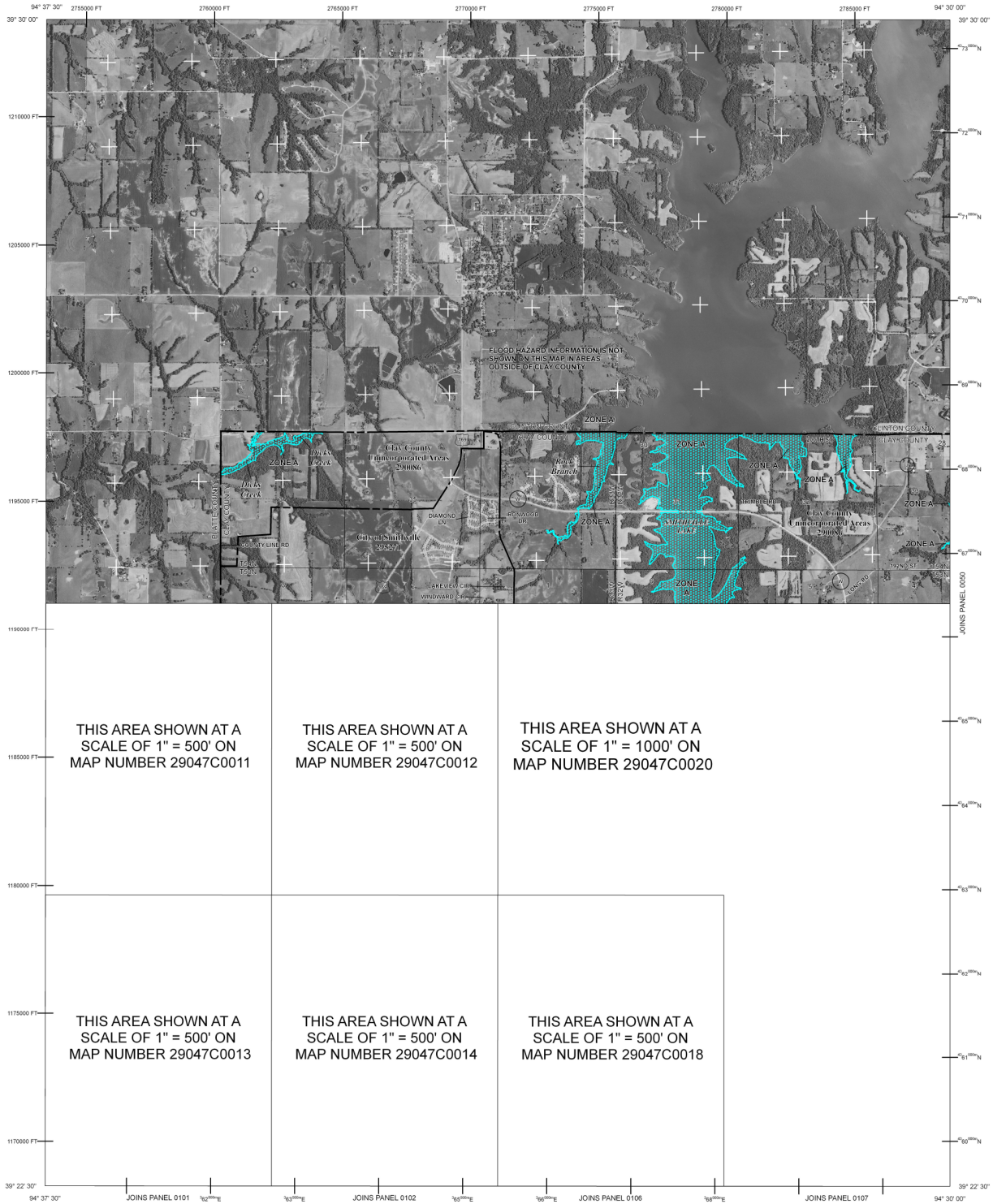
file base lines" depicted on this map represent the hydraulic modeling s that match the flood profiles in the FIS report. As a result of improved hic data the "profile base line," in some cases, may deviate significantly channel centerline or appear outside the SFHA.

te limits shown on this map are based on the best data available at the ublication. Because changes due to annexations or de-annexations may urred after this map was published, map users should contact appropriate ity officials to verify current corporate limit locations.

efer to the separately printed **Map Index** for an overview map of the howing the layout of map panels; community map repository addresses; sting of Communities table containing National Flood Insurance Program r each community as well as a listing of the panels on which each ity is located.

the **FEMA Map Service Center** (MSC) via the FEMA Map Information e (FMIX) at 1-877-336-2627 for information on available products ed with this FIRM. Available products may include previously issued f Map Change, a Flood Insurance Study report, and/or digital versions of . The MSC may also be reached by Fax at 1-800-358-9620 and its at http://msc.fema.gov/.

ve **questions about this map** or questions concerning the National Flood e Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or FEMA website at http://www.fema.gov/business/nfip/.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUN BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the has a 1% chance of being equaled or exceeded in any given year. The Special Floo Area is the area subject to flooding by the 1% annual chance flood. Areas of Spe Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevati water-surface elevation of the 1% annual chance flood.

- **ZONE A** No Base Flood Elevations determined.
- **ZONE AE** Base Flood Elevations determined.
- **ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood determined.
- **ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); avera determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chanc a flood control system that was subsequently decertified. Zone AR indi the former flood control system is being restored to provide protection 1% annual chance or greater flood.
- **ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood system under construction; no Base Flood Elevations determined.
- **ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood determined.
- **ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that mus free of encroachment so that the 1% annual chance flood can be carried without s increases in flood heights.

OTHER FLOOD AREAS

- **ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood wit depths of less than 1 foot or with drainage areas less than 1 square areas protected by levees from 1% annual chance flood.

OTHER AREAS

- **ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- **ZONE D** Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAS)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Area

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- Boundary dividing Special Flood Hazard Areas of different E Elevations, flood depths, or flood velocities.
- CBRS and OPA boundary
- International, State, or County boundary
- Corporate, Extraterritorial Jurisdiction, or Urban Growth bou
- Area Not Included boundary
- Military Reservation, Native American Lands boundary
- 513 Base Flood Elevation line and value; elevation in feet*
- (EL 987) Base Flood Elevation value where uniform within zone; eleva

* Referenced to the North American Vertical Datum of 1988

- A — A Cross section line
- 23 — 23 Transect line
- 87°07'45", 32°22'30" Geographic coordinates referenced to the North American 1983 (NAD 83)
- 4276000mE 1000-meter Universal Transverse Mercator grid values, zone
- 600000 FT 5000-foot grid ticks: Missouri State Plane coordinate sys zone (FIPSZONE 2403), Transverse Mercator projection
- DX5510 × Bench mark (see explanation in Notes to Users section of panel)
- M1.5 River Mile
- Aqueduct, Culvert, Flume, Penstock, or Storm Sewer
- Road or Railroad Bridge

MAP REPOSITORIES
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
August 3, 2015

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Comm History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance ag the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 2000'
1000 0 2000 4000 FEET
600 0 600 1200 METER

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0025E

FIRM
FLOOD INSURANCE RATE M

CLAY COUNTY, MISSOURI
AND INCORPORATED AR

PANEL 25 OF 350
(SEE LOCATOR DIAGRAM OR MA FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL
CLAY COUNTY	290086	0025
SMITHVILLE, CITY OF	295271	0025

Notice to User: The **Map Number** shown below sh when placing map orders; the **Community Number** should be used on insurance applications for the subject

MAP NU 29047C

EFFECTIVE AUGUST

Federal Emergency Management

Appendix C

Appendix D

Hydrograph Summary Report

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

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	14.12	2	722	39,587	------	------	------	EXISTING NORTH
2	SCS Runoff	26.15	2	724	81,787	------	------	------	EXISTING SOUTH
3	SCS Runoff	16.60	2	720	37,992	------	------	------	EXISTING NORTH OFFSITE
4	SCS Runoff	26.67	2	718	53,340	------	------	------	EXISTING SOUTH OFFSITE
5	SCS Runoff	18.83	2	716	38,065	------	------	------	PROPOSED NORTH
6	SCS Runoff	37.85	2	716	76,675	------	------	------	PROPOSED SOUTH
7	Combine	30.01	2	720	77,579	1, 3,	------	------	EXISTING NORTH TOTAL
8	Combine	46.83	2	718	135,127	2, 4,	------	------	EXISTING SOUTH TOTAL
9	Combine	35.24	2	718	76,056	3, 5,	------	------	PROPOSED NORTH TOTAL
10	Combine	64.13	2	718	130,016	4, 6,	------	------	PROPOSED SOUTH TOTAL
11	Reservoir	14.24	2	730	77,572	7	963.87	18,506	NORTH DETENTION
12	Reservoir	41.54	2	722	135,127	8	956.99	4,562	SOUTH DETENTION
13	Reservoir	14.68	2	724	76,050	9	963.93	19,461	NORTH DET. PROPOSED
14	Reservoir	25.28	2	718	53,341	4	956.06	1,267	SOUTH DET PROPOSED
15	Reservoir	11.19	2	724	53,334	14	963.56	13,406	PROPOSED RETENTION

Hydrograph Report

Hyd. No. 1

EXISTING NORTH

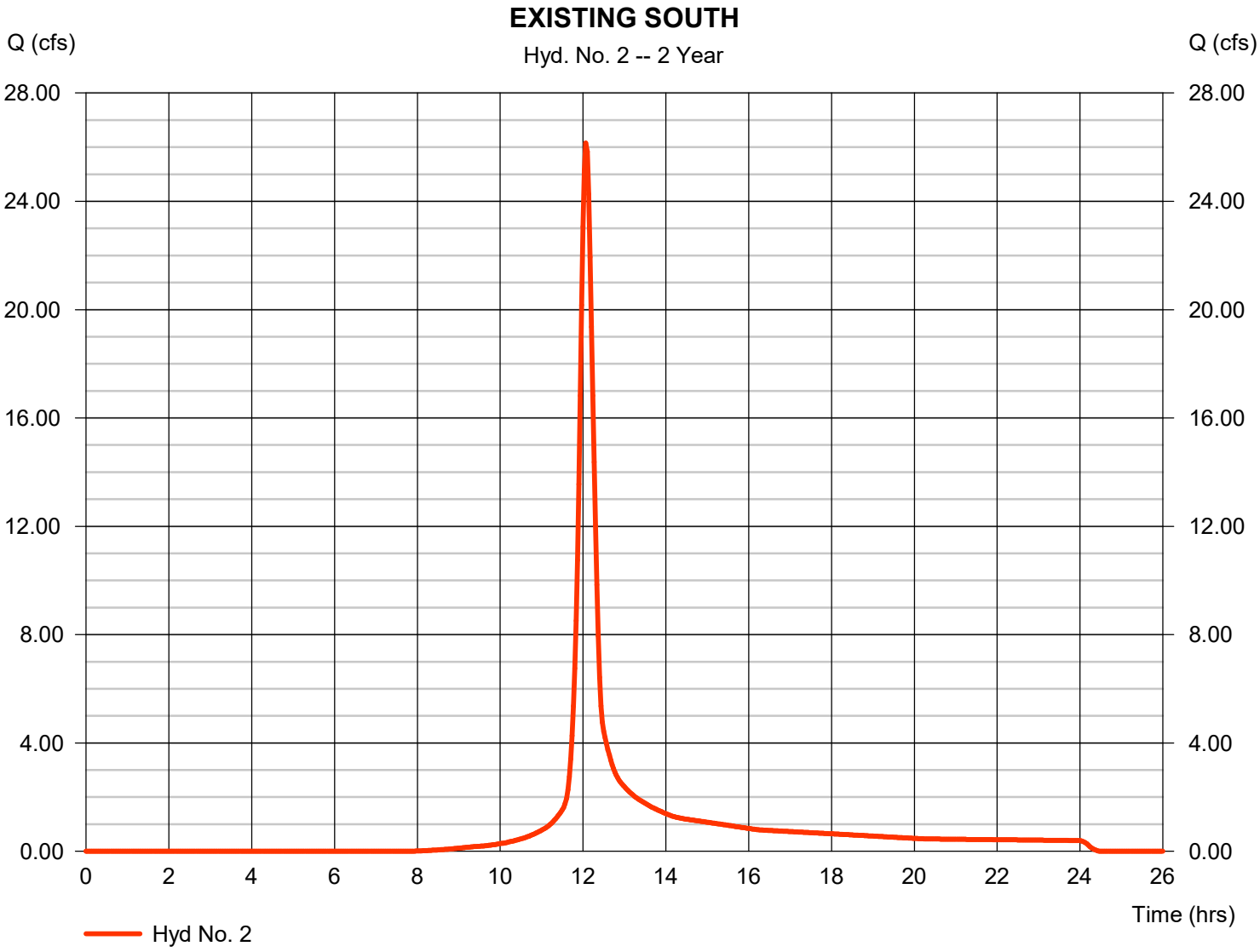
Hydrograph type	=	SCS Runoff	Peak discharge	=	14.12 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	39,587 cuft
Drainage area	=	9.910 ac	Curve number	=	88
Basin Slope	=	1.5 %	Hydraulic length	=	656 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.10 min
Total precip.	=	2.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Report

Hyd. No. 2

EXISTING SOUTH

Hydrograph type	=	SCS Runoff	Peak discharge	=	26.15 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	81,787 cuft
Drainage area	=	18.840 ac	Curve number	=	89
Basin Slope	=	2.0 %	Hydraulic length	=	1076 ft
Tc method	=	LAG	Time of conc. (Tc)	=	17.45 min
Total precip.	=	2.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



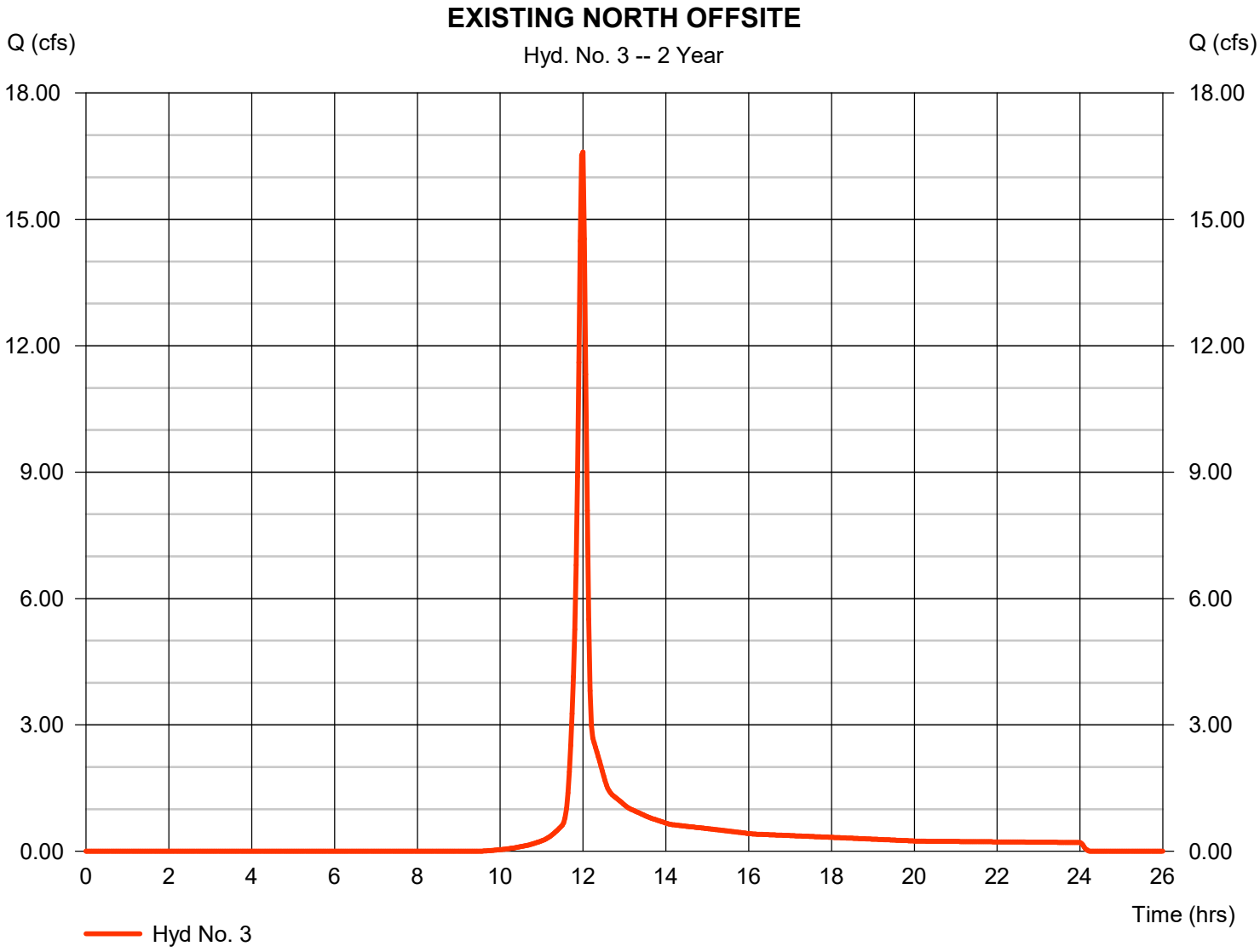
Hydrograph Report

Hyd. No. 3

EXISTING NORTH OFFSITE

Hydrograph type	= SCS Runoff	Peak discharge	= 16.60 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 37,992 cuft
Drainage area	= 11.080 ac	Curve number	= 85*
Basin Slope	= 3.8 %	Hydraulic length	= 394 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.20 min
Total precip.	= 2.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(4.618 x 98) + (6.462 x 75)] / 11.080



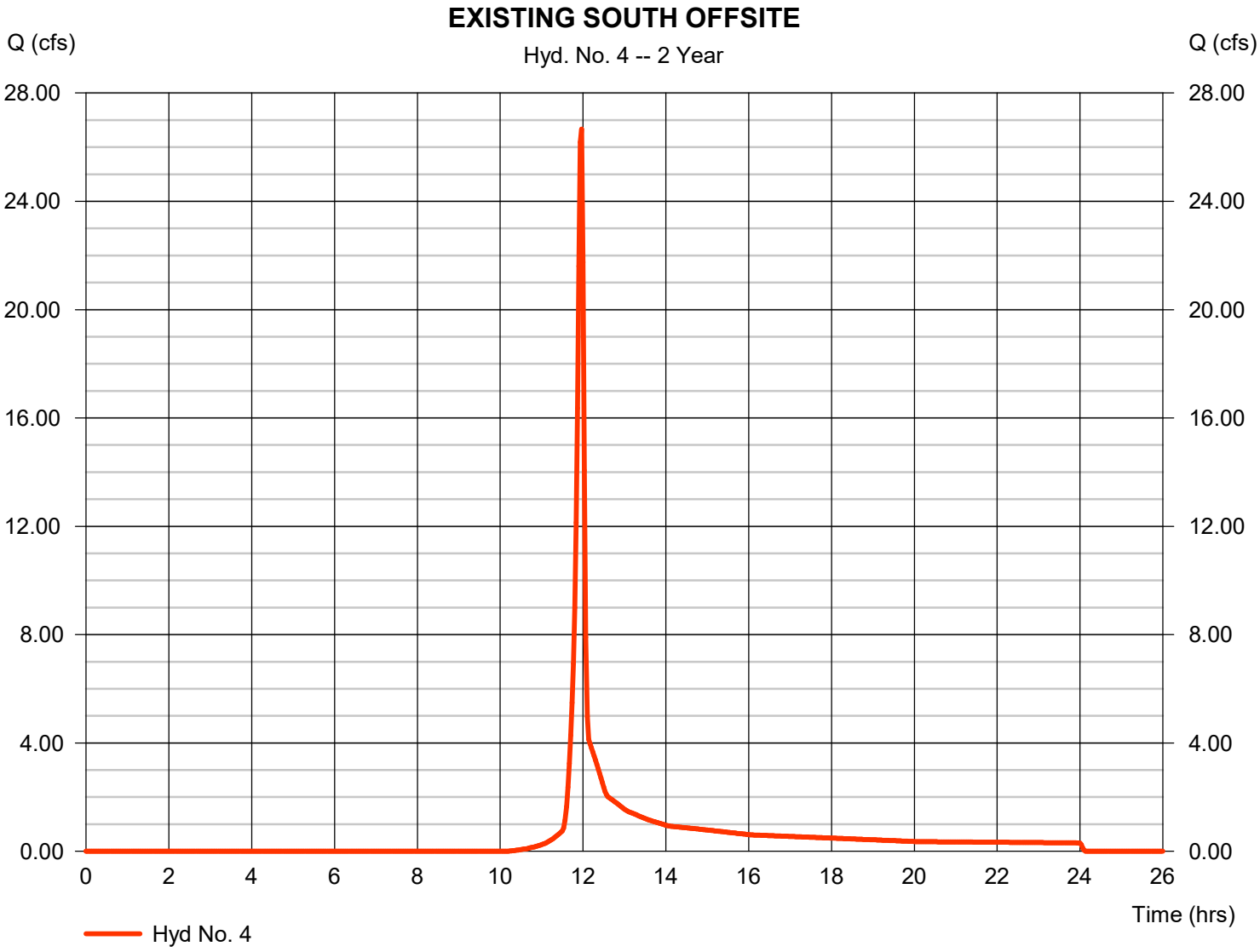
Hydrograph Report

Hyd. No. 4

EXISTING SOUTH OFFSITE

Hydrograph type	= SCS Runoff	Peak discharge	= 26.67 cfs
Storm frequency	= 2 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 53,340 cuft
Drainage area	= 18.770 ac	Curve number	= 83*
Basin Slope	= 2.0 %	Hydraulic length	= 100 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(6.310 x 98) + (12.460 x 76)] / 18.770

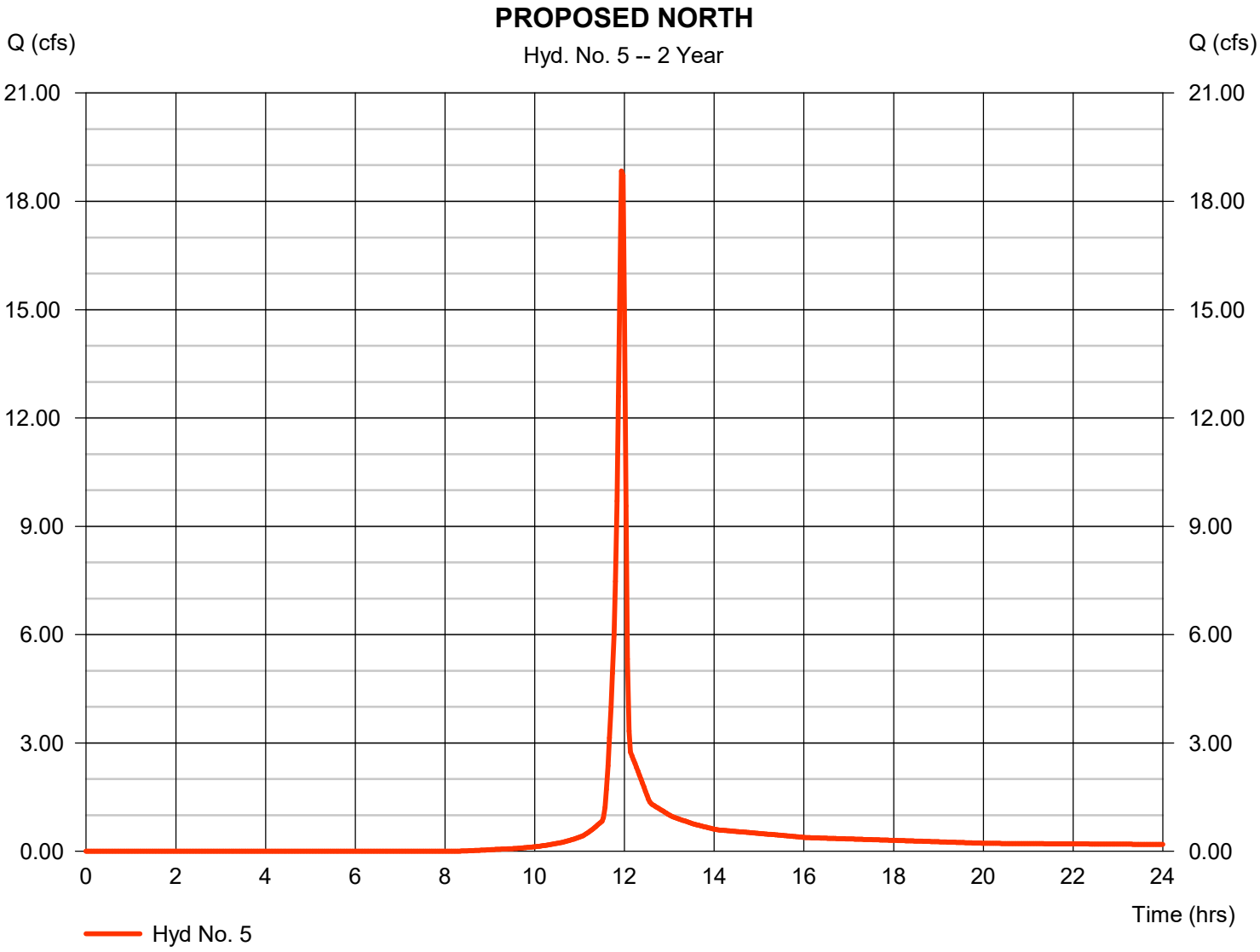


Hydrograph Report

Hyd. No. 5

PROPOSED NORTH

Hydrograph type	=	SCS Runoff	Peak discharge	=	18.83 cfs
Storm frequency	=	2 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	38,065 cuft
Drainage area	=	9.910 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

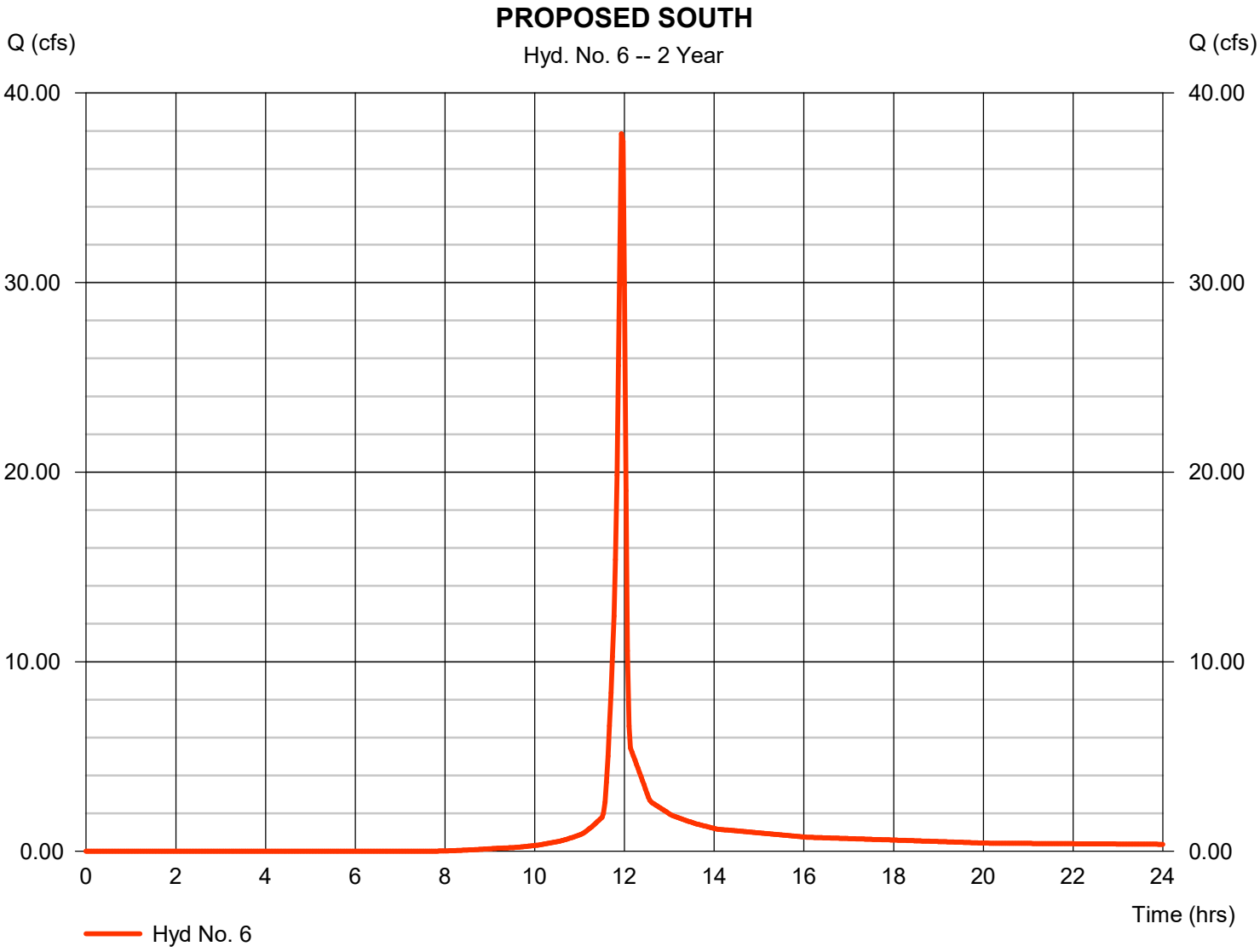


Hydrograph Report

Hyd. No. 6

PROPOSED SOUTH

Hydrograph type	=	SCS Runoff	Peak discharge	=	37.85 cfs
Storm frequency	=	2 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	76,675 cuft
Drainage area	=	18.840 ac	Curve number	=	89
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

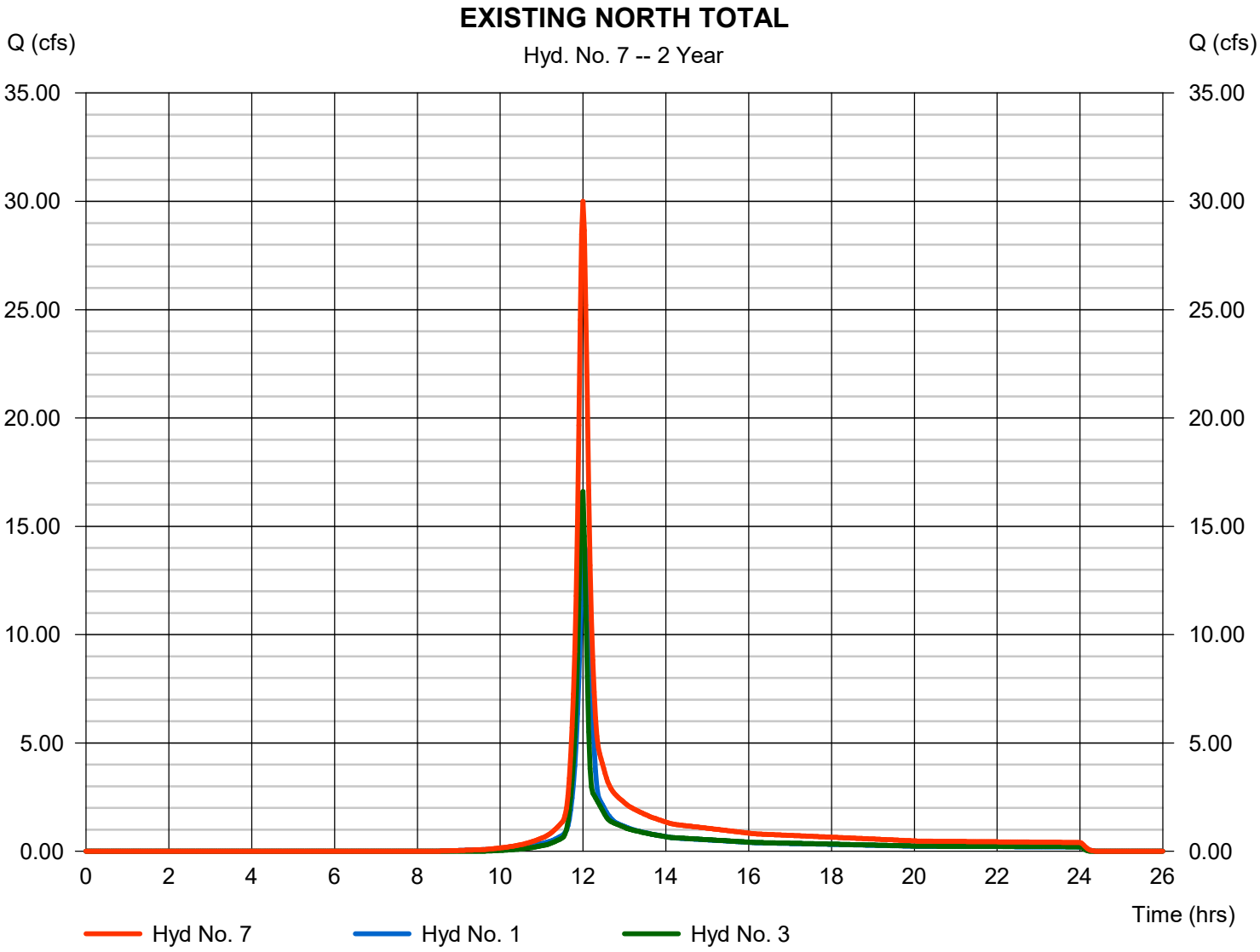


Hydrograph Report

Hyd. No. 7

EXISTING NORTH TOTAL

Hydrograph type	= Combine	Peak discharge	= 30.01 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 77,579 cuft
Inflow hyds.	= 1, 3	Contrib. drain. area	= 20.990 ac

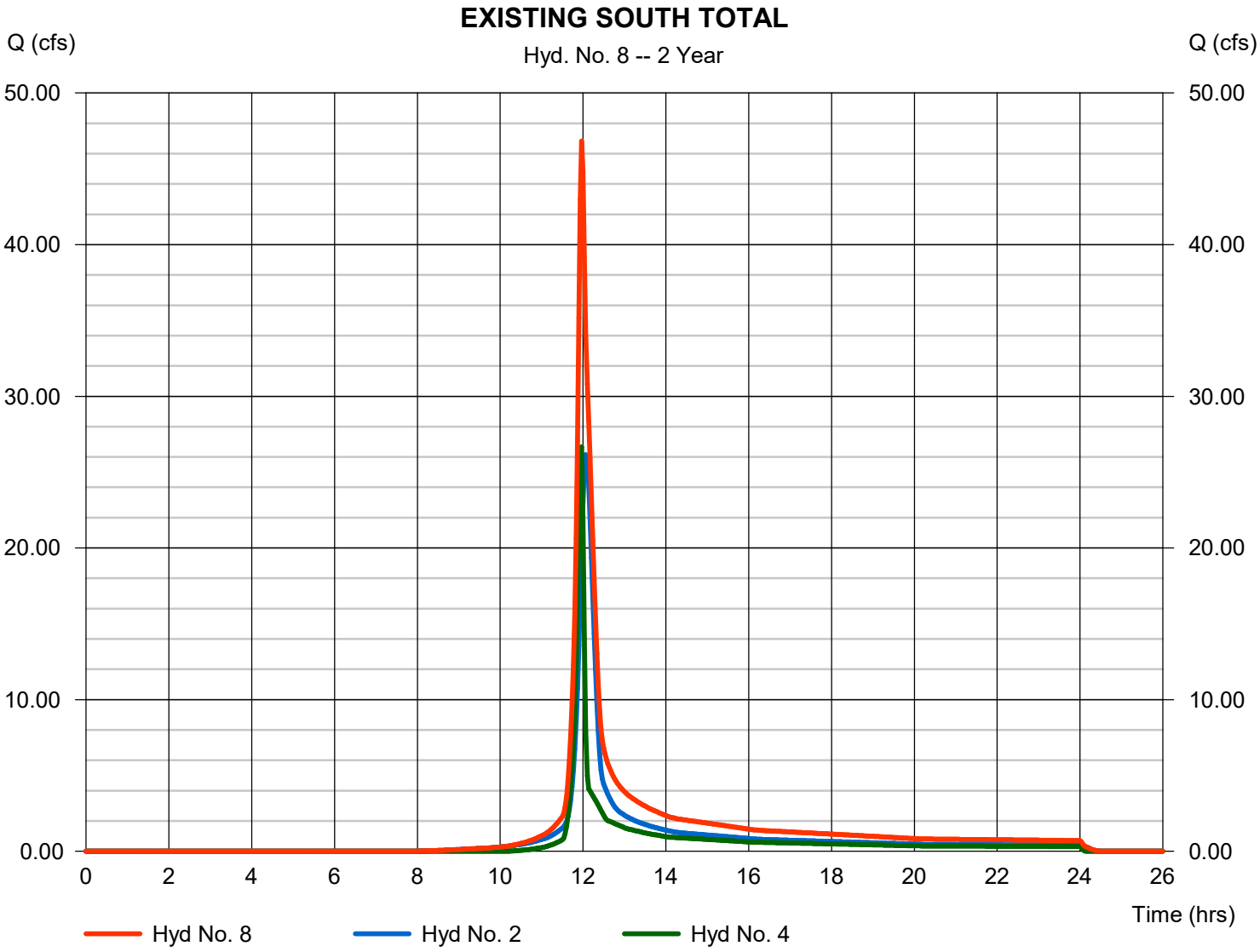


Hydrograph Report

Hyd. No. 8

EXISTING SOUTH TOTAL

Hydrograph type	= Combine	Peak discharge	= 46.83 cfs
Storm frequency	= 2 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 135,127 cuft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 37.610 ac

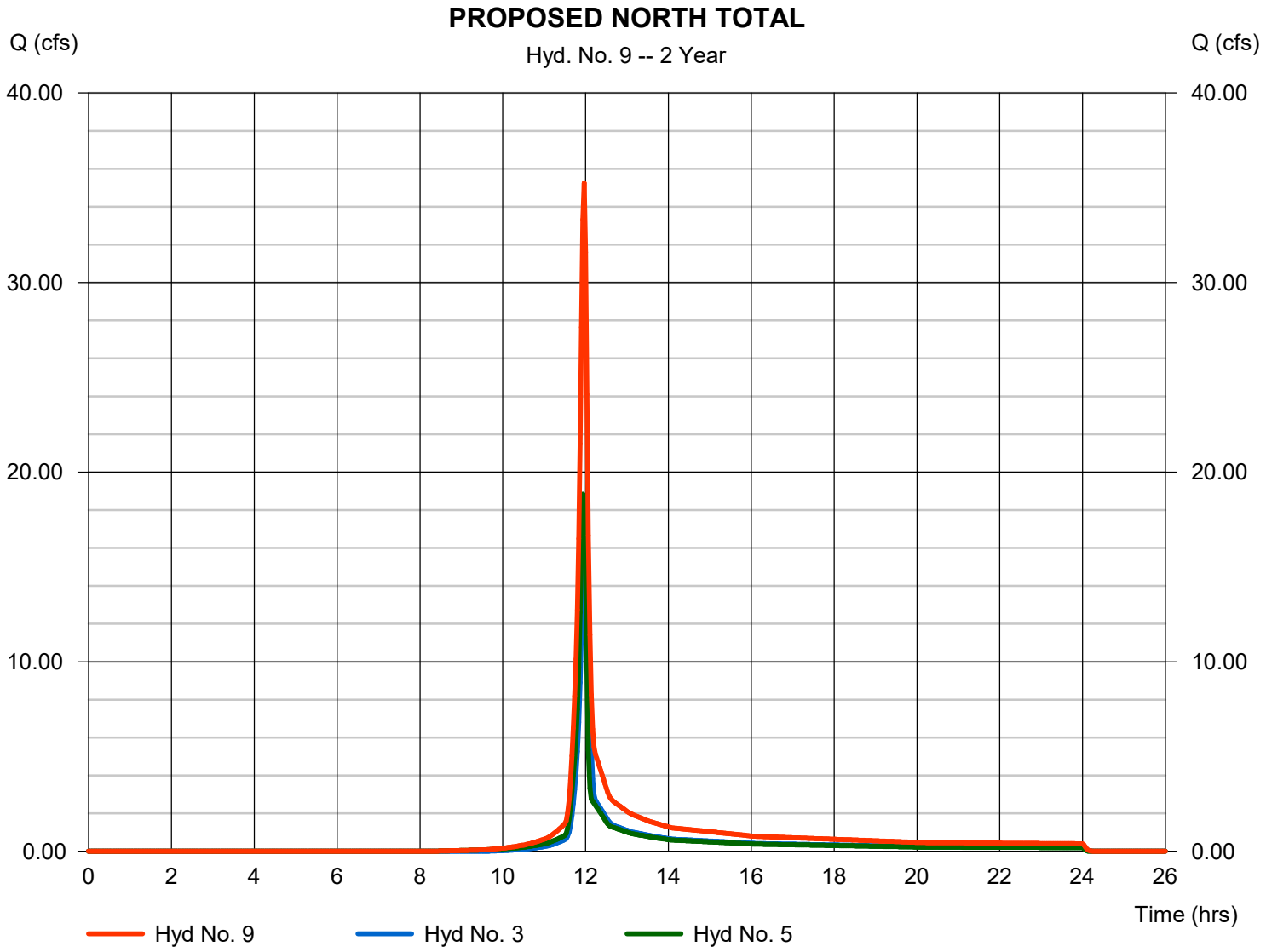


Hydrograph Report

Hyd. No. 9

PROPOSED NORTH TOTAL

Hydrograph type	= Combine	Peak discharge	= 35.24 cfs
Storm frequency	= 2 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 76,056 cuft
Inflow hyds.	= 3, 5	Contrib. drain. area	= 20.990 ac

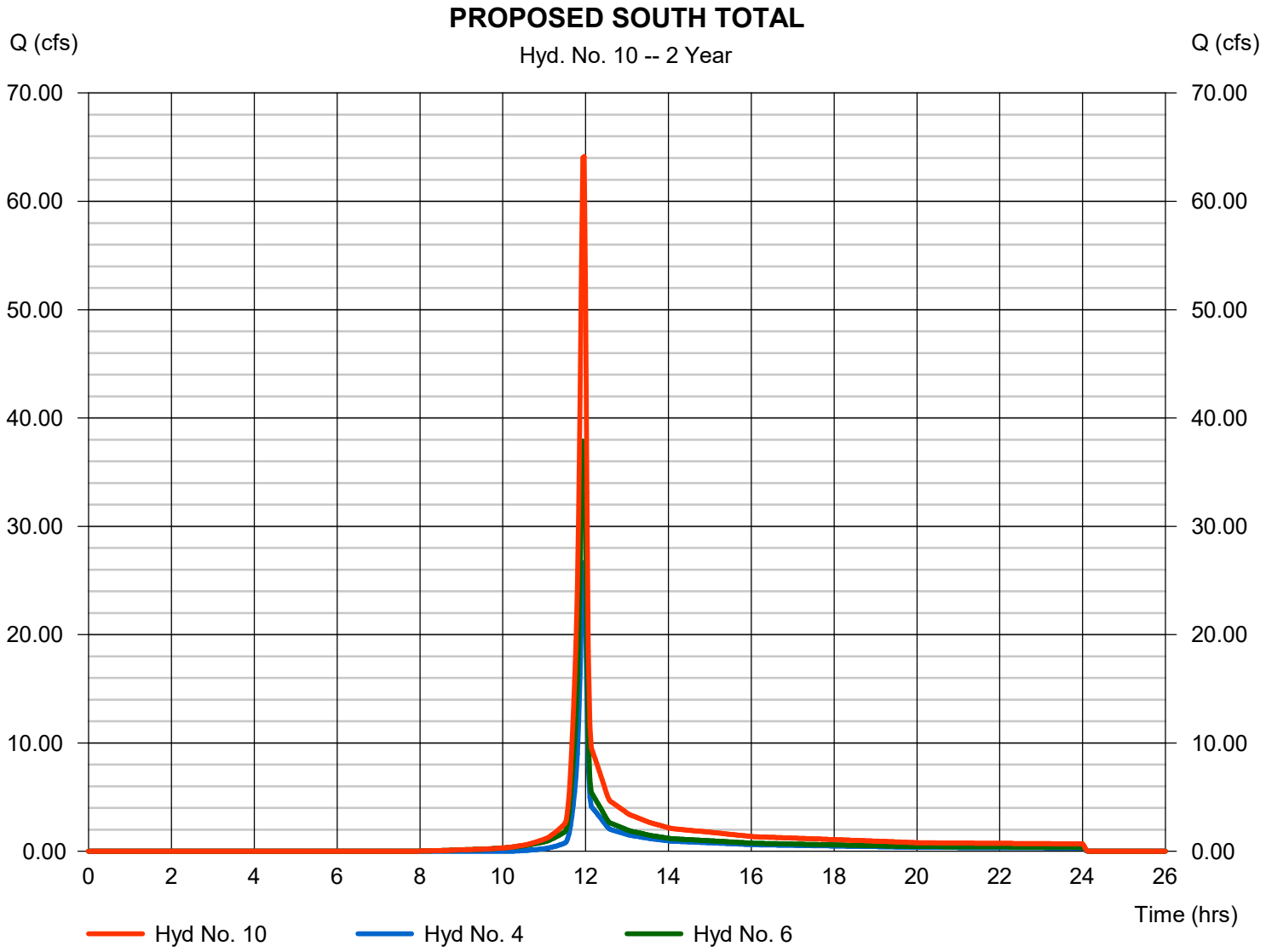


Hydrograph Report

Hyd. No. 10

PROPOSED SOUTH TOTAL

Hydrograph type	= Combine	Peak discharge	= 64.13 cfs
Storm frequency	= 2 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 130,016 cuft
Inflow hyds.	= 4, 6	Contrib. drain. area	= 37.610 ac



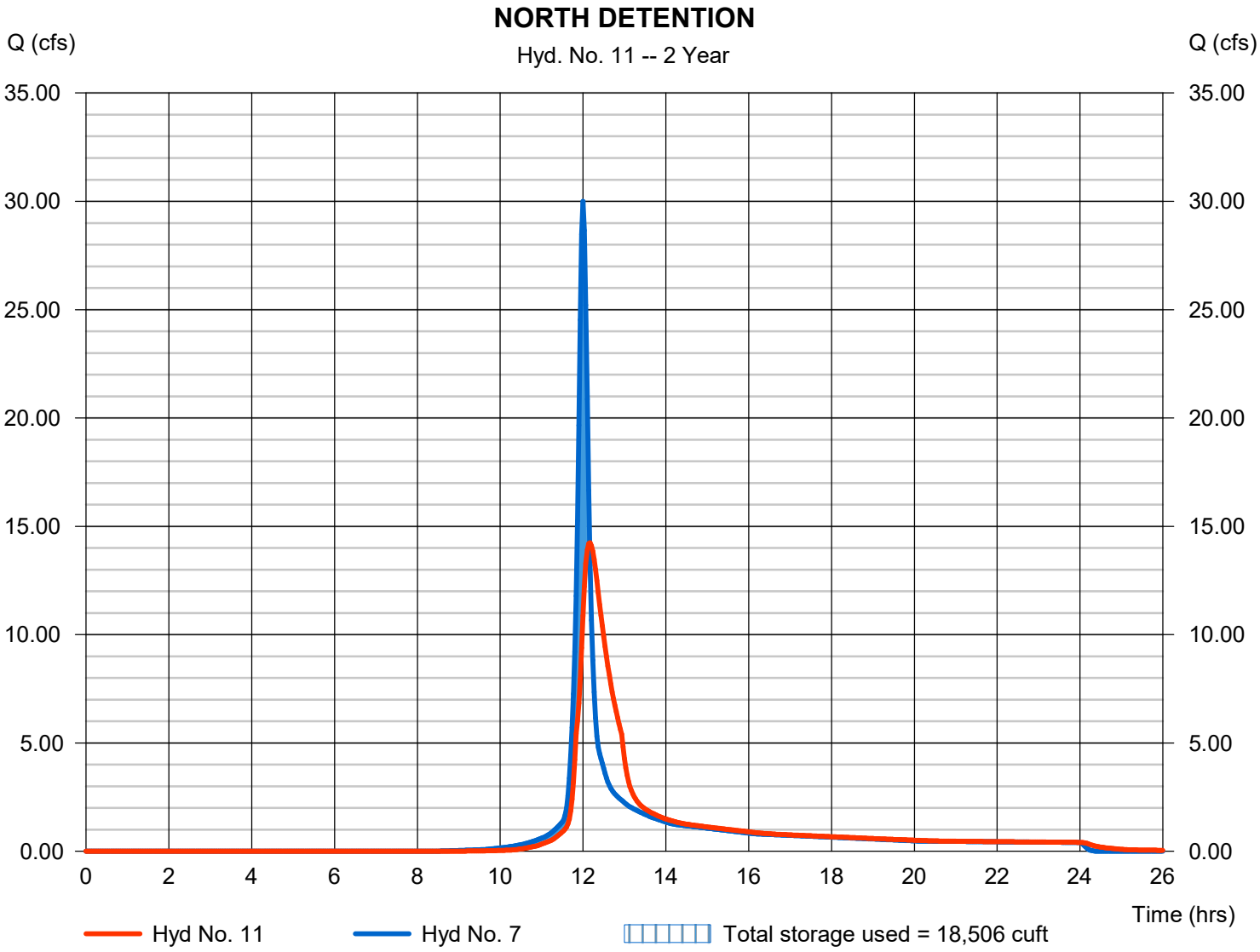
Hydrograph Report

Hyd. No. 11

NORTH DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	14.24 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.17 hrs
Time interval	=	2 min	Hyd. volume	=	77,572 cuft
Inflow hyd. No.	=	7 - EXISTING NORTH TOTAL	Max. Elevation	=	963.87 ft
Reservoir name	=	NORTH BASIN	Max. Storage	=	18,506 cuft

Storage Indication method used.



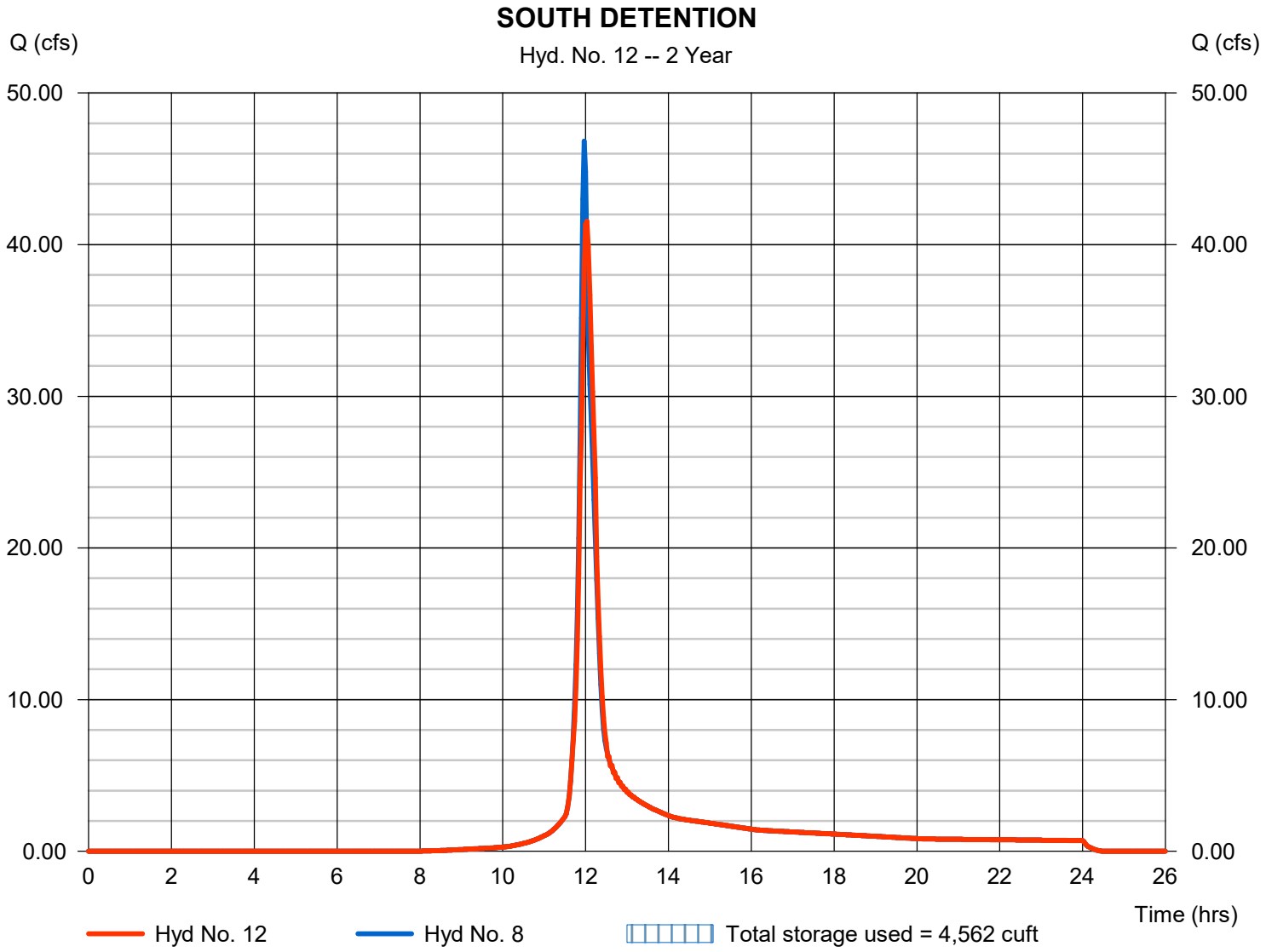
Hydrograph Report

Hyd. No. 12

SOUTH DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	41.54 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	135,127 cuft
Inflow hyd. No.	=	8 - EXISTING SOUTH TOTAL	Max. Elevation	=	956.99 ft
Reservoir name	=	SOUTH BASIN	Max. Storage	=	4,562 cuft

Storage Indication method used.



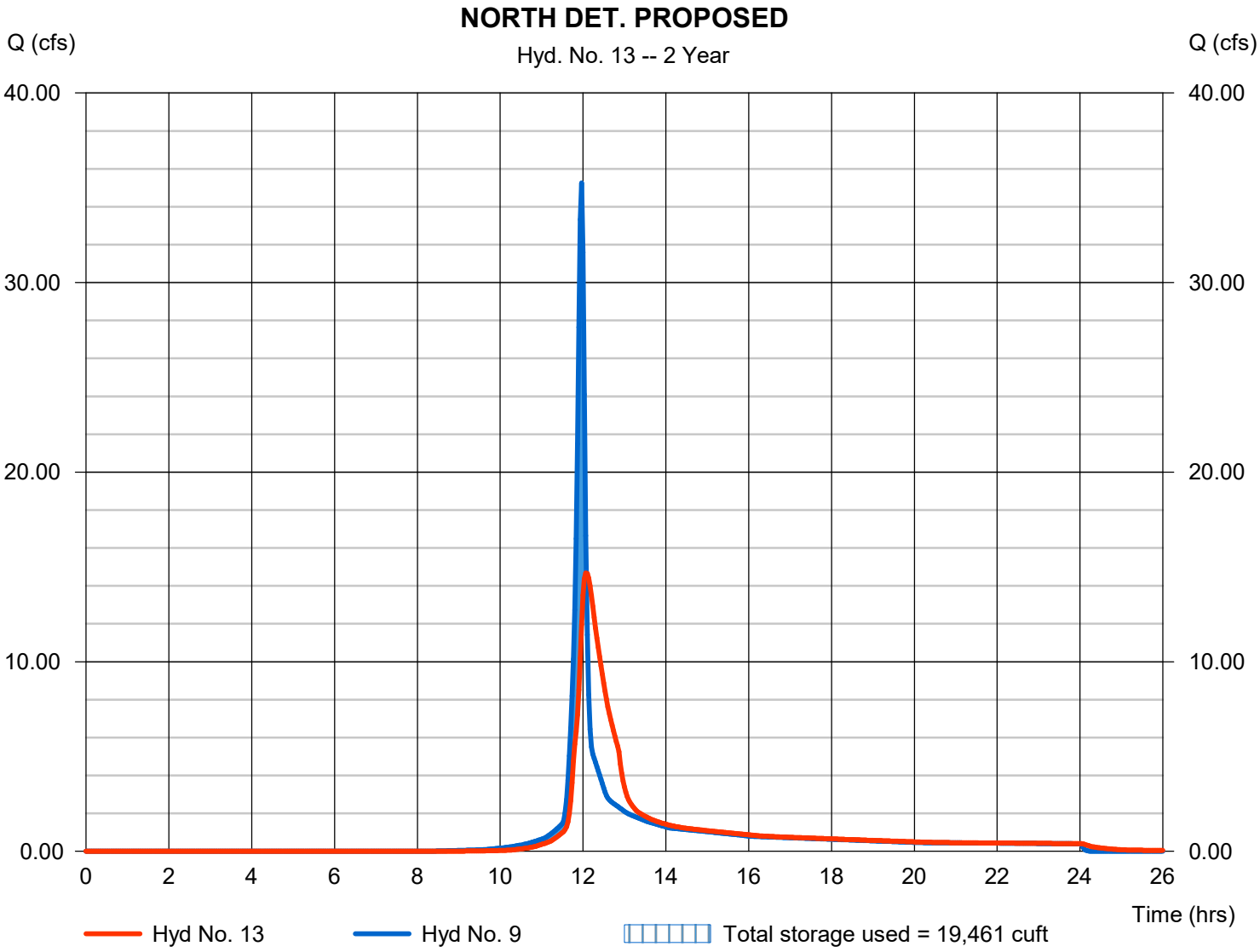
Hydrograph Report

Hyd. No. 13

NORTH DET. PROPOSED

Hydrograph type	=	Reservoir	Peak discharge	=	14.68 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	76,050 cuft
Inflow hyd. No.	=	9 - PROPOSED NORTH TOTAL	Max. Elevation	=	963.93 ft
Reservoir name	=	NORTH BASIN	Max. Storage	=	19,461 cuft

Storage Indication method used.



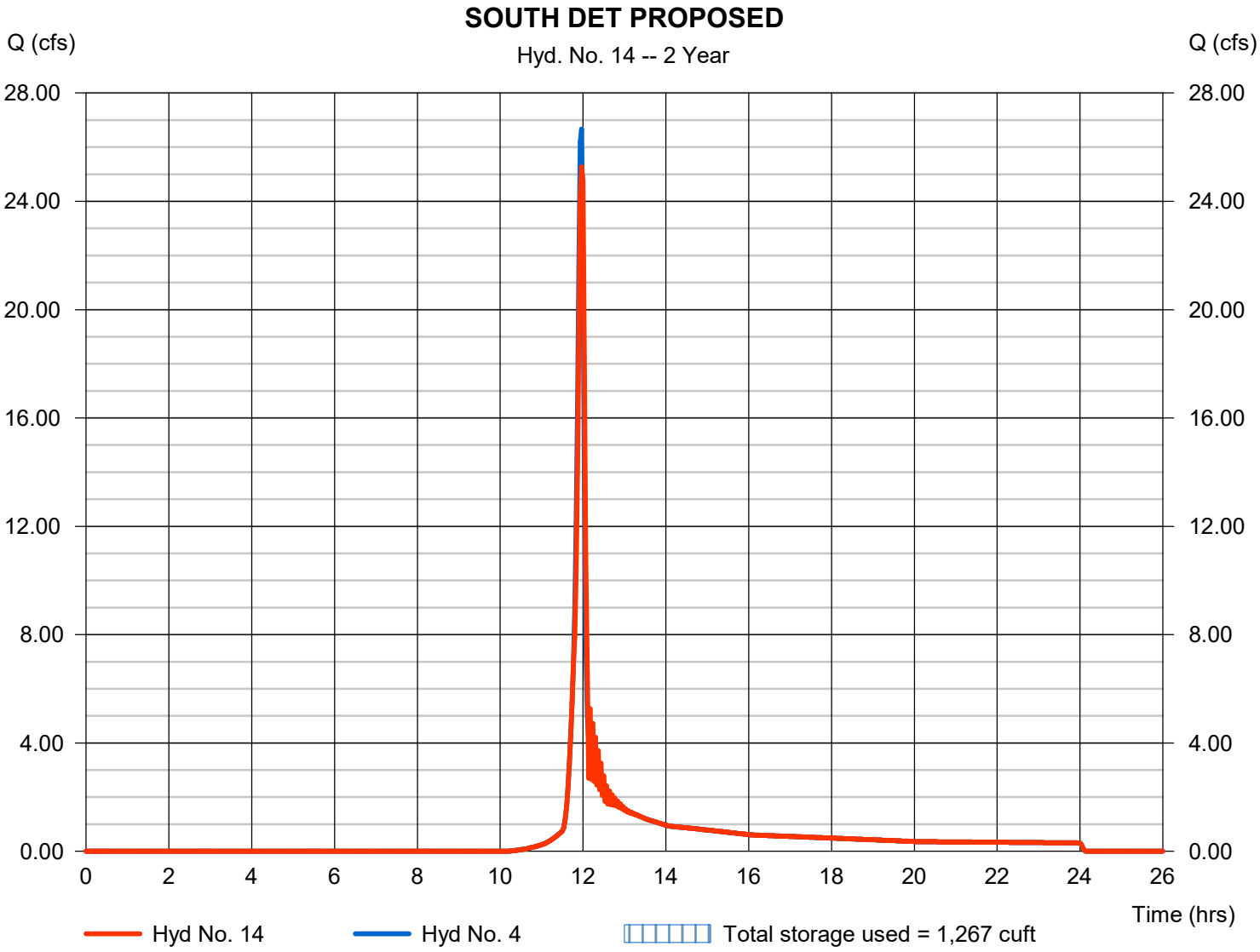
Hydrograph Report

Hyd. No. 14

SOUTH DET PROPOSED

Hydrograph type	=	Reservoir	Peak discharge	=	25.28 cfs
Storm frequency	=	2 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	53,341 cuft
Inflow hyd. No.	=	4 - EXISTING SOUTH OFFSITE	Max. Elevation	=	956.06 ft
Reservoir name	=	SOUTH BASIN	Max. Storage	=	1,267 cuft

Storage Indication method used.



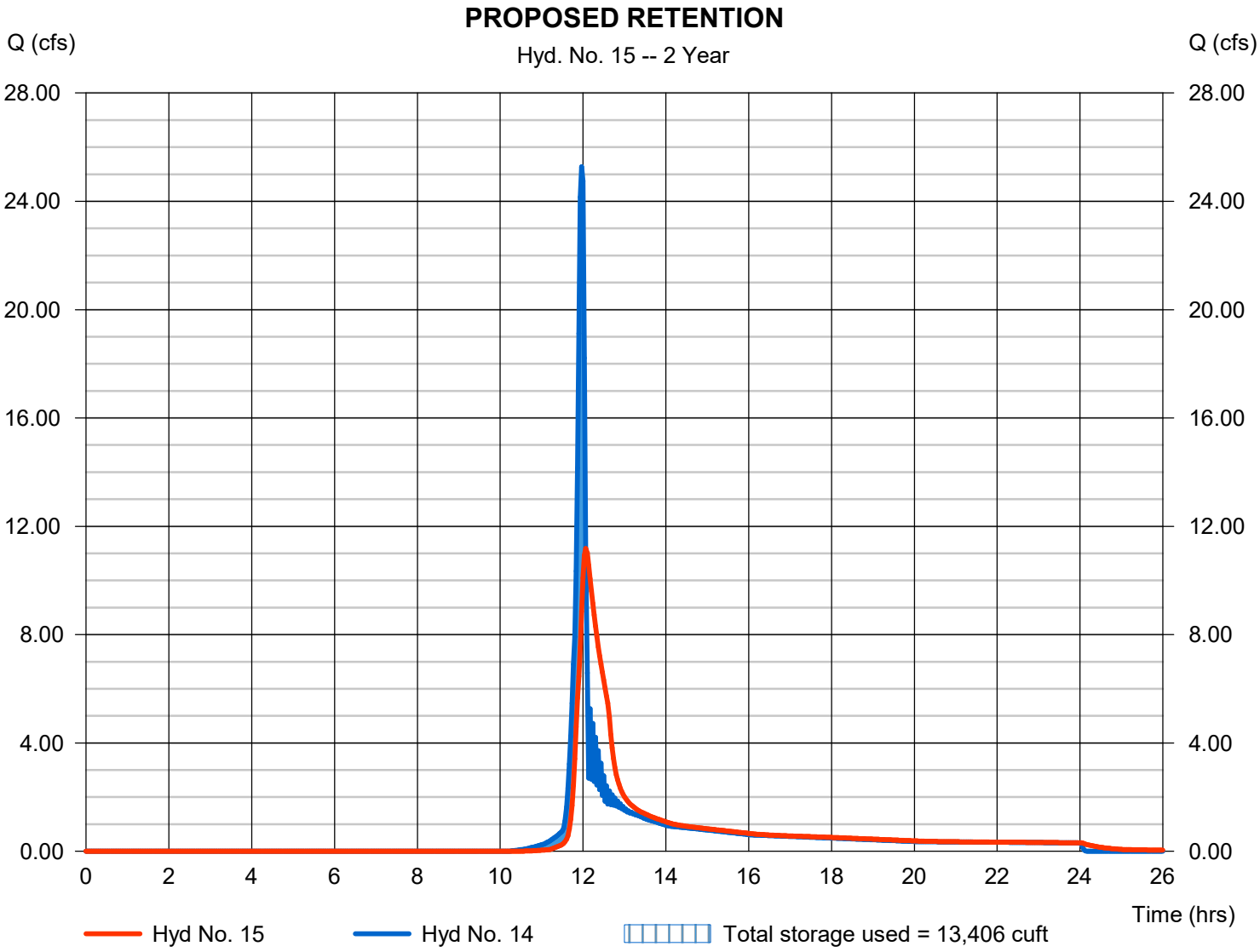
Hydrograph Report

Hyd. No. 15

PROPOSED RETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	11.19 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	53,334 cuft
Inflow hyd. No.	=	14 - SOUTH DET PROPOSED	Max. Elevation	=	963.56 ft
Reservoir name	=	NORTH BASIN	Max. Storage	=	13,406 cuft

Storage Indication method used.



Hydrograph Summary Report

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

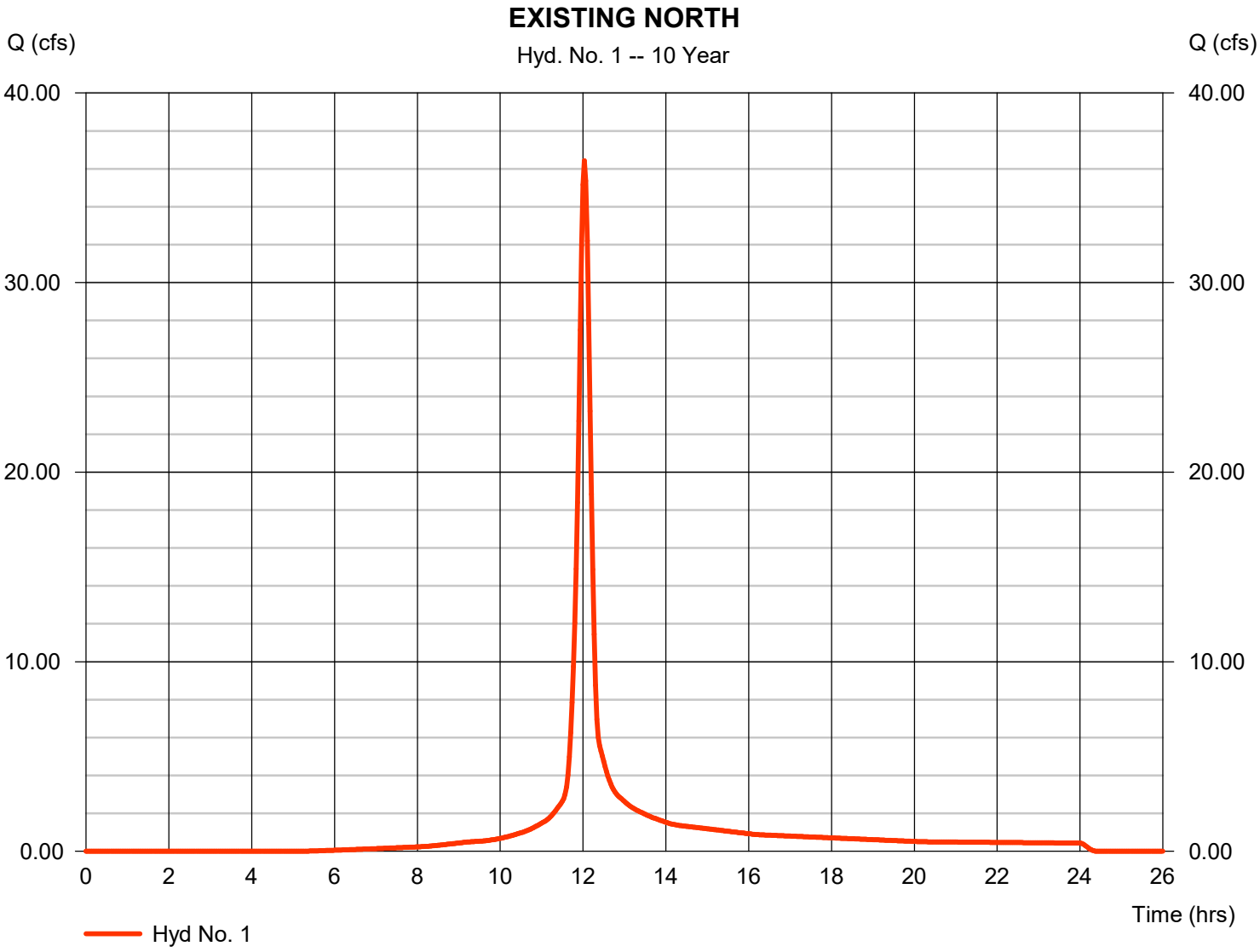
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	36.43	2	722	103,882	------	------	------	EXISTING NORTH
2	SCS Runoff	65.75	2	724	209,165	------	------	------	EXISTING SOUTH
3	SCS Runoff	46.65	2	718	107,887	------	------	------	EXISTING NORTH OFFSITE
4	SCS Runoff	78.52	2	716	159,984	------	------	------	EXISTING SOUTH OFFSITE
5	SCS Runoff	47.86	2	716	99,887	------	------	------	PROPOSED NORTH
6	SCS Runoff	93.30	2	716	196,092	------	------	------	PROPOSED SOUTH
7	Combine	80.93	2	720	211,769	1, 3,	------	------	EXISTING NORTH TOTAL
8	Combine	130.19	2	718	369,149	2, 4,	------	------	EXISTING SOUTH TOTAL
9	Combine	93.15	2	718	207,773	3, 5,	------	------	PROPOSED NORTH TOTAL
10	Combine	171.82	2	716	356,077	4, 6,	------	------	PROPOSED SOUTH TOTAL
11	Reservoir	25.48	2	732	211,762	7	965.84	63,135	NORTH DETENTION
12	Reservoir	73.15	2	728	369,149	8	960.12	43,623	SOUTH DETENTION
13	Reservoir	25.71	2	726	207,767	9	965.89	64,417	NORTH DET. PROPOSED
14	Reservoir	57.31	2	720	159,985	4	958.34	13,625	SOUTH DET PROPOSED
15	Reservoir	22.44	2	730	159,978	14	965.20	47,234	PROPOSED RETENTION

Hydrograph Report

Hyd. No. 1

EXISTING NORTH

Hydrograph type	=	SCS Runoff	Peak discharge	=	36.43 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	103,882 cuft
Drainage area	=	9.910 ac	Curve number	=	88
Basin Slope	=	1.5 %	Hydraulic length	=	656 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.10 min
Total precip.	=	4.25 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

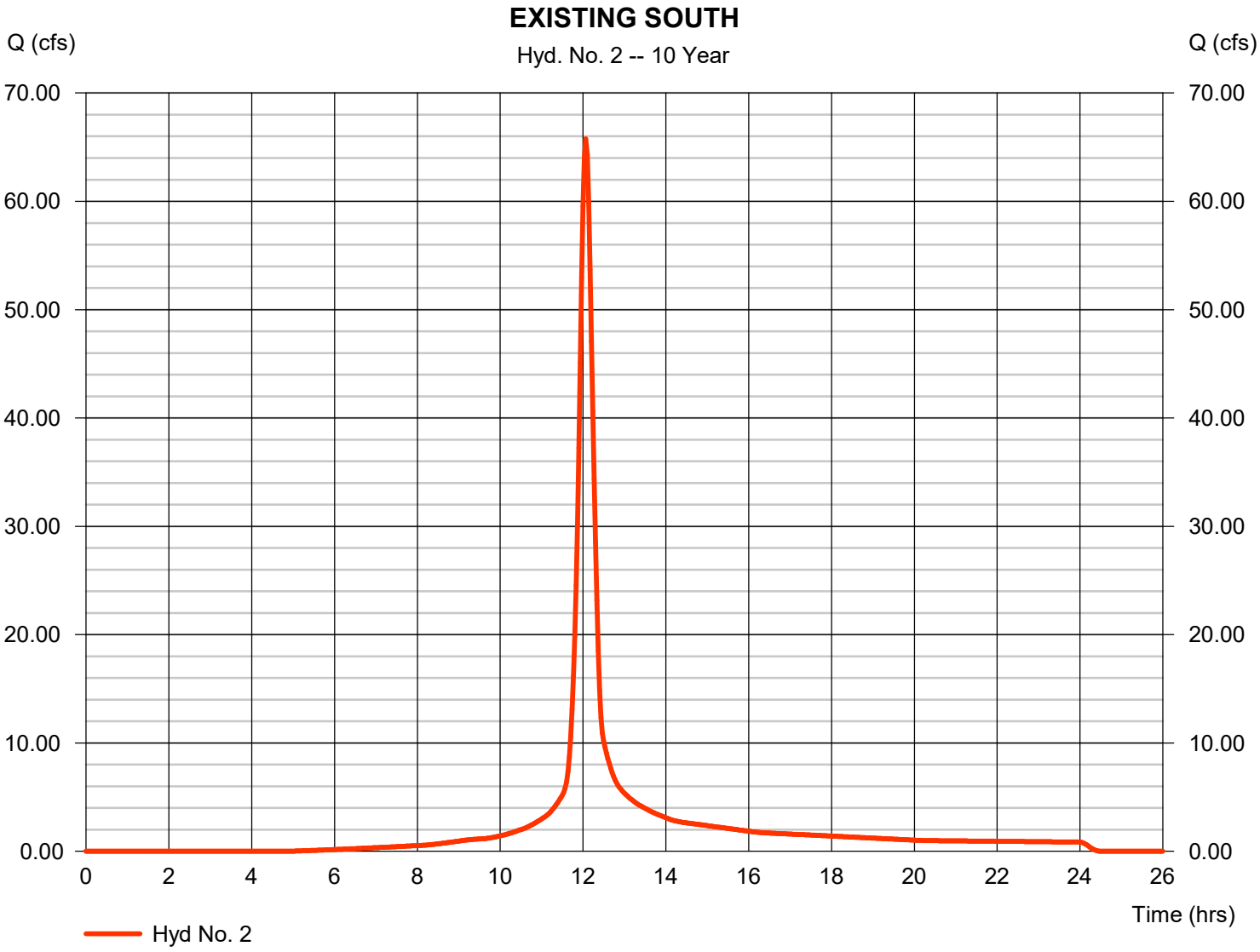


Hydrograph Report

Hyd. No. 2

EXISTING SOUTH

Hydrograph type	=	SCS Runoff	Peak discharge	=	65.75 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	209,165 cuft
Drainage area	=	18.840 ac	Curve number	=	89
Basin Slope	=	2.0 %	Hydraulic length	=	1076 ft
Tc method	=	LAG	Time of conc. (Tc)	=	17.45 min
Total precip.	=	4.25 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



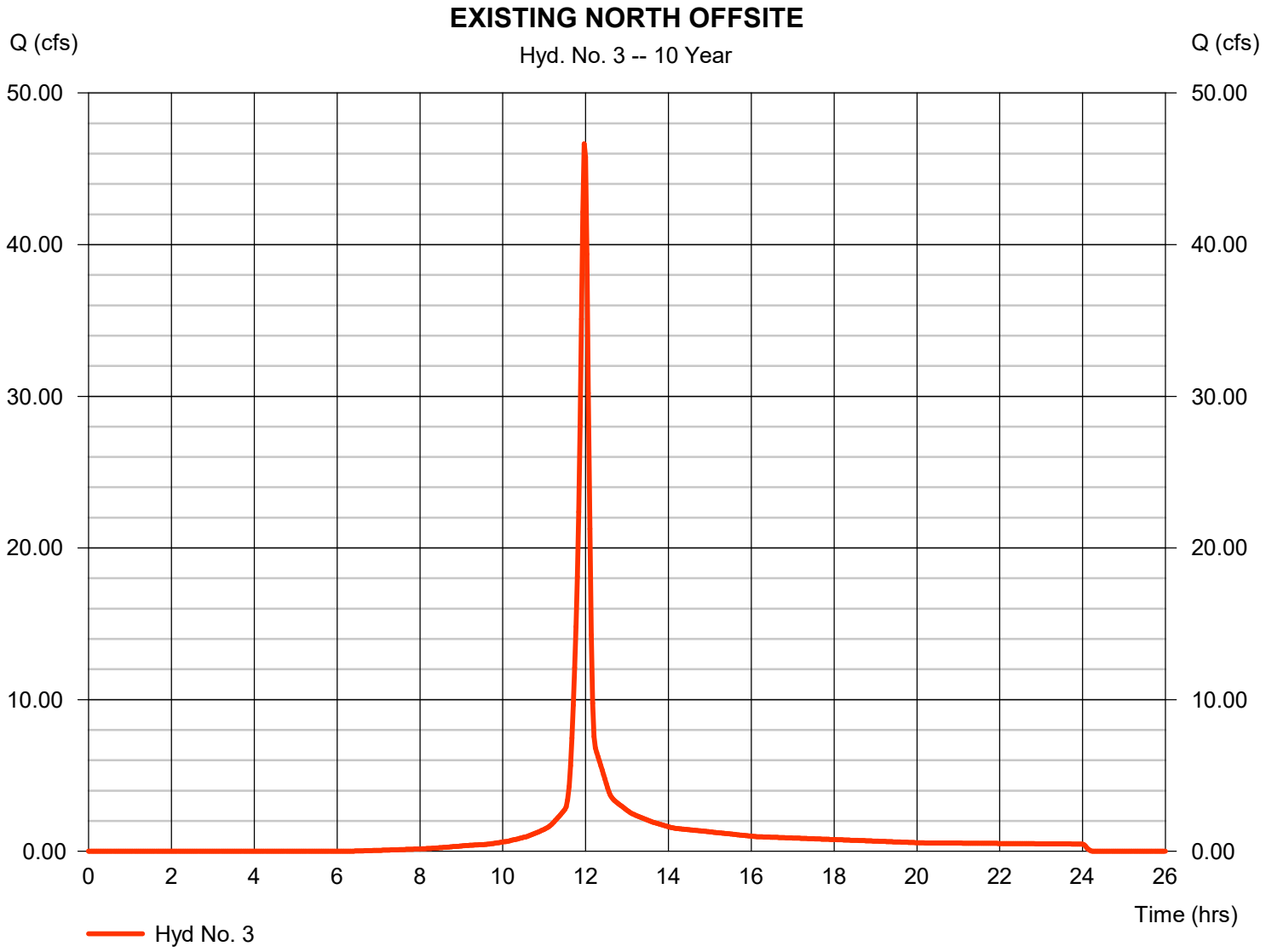
Hydrograph Report

Hyd. No. 3

EXISTING NORTH OFFSITE

Hydrograph type	= SCS Runoff	Peak discharge	= 46.65 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 107,887 cuft
Drainage area	= 11.080 ac	Curve number	= 85*
Basin Slope	= 3.8 %	Hydraulic length	= 394 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.20 min
Total precip.	= 4.25 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(4.618 x 98) + (6.462 x 75)] / 11.080



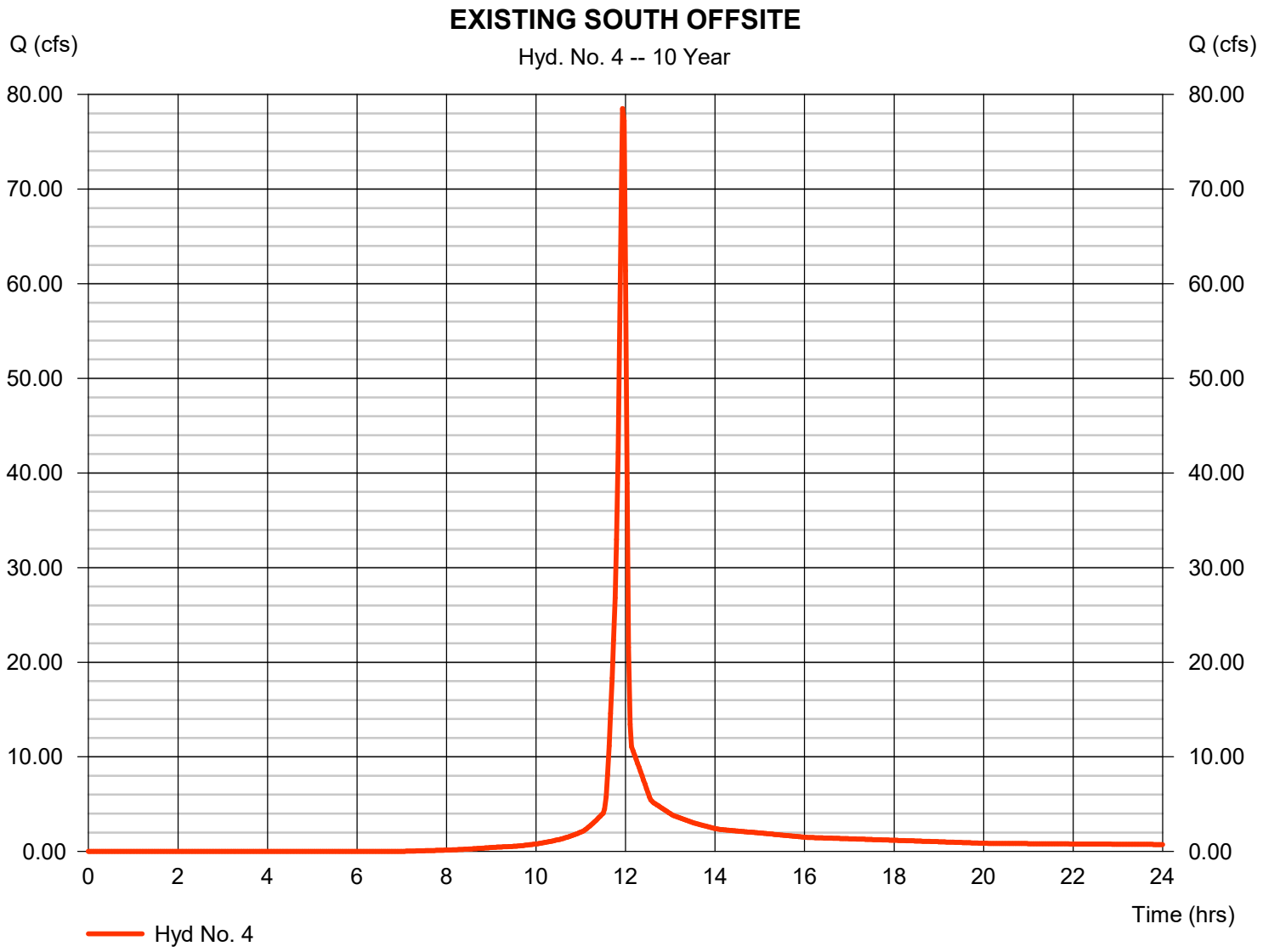
Hydrograph Report

Hyd. No. 4

EXISTING SOUTH OFFSITE

Hydrograph type	= SCS Runoff	Peak discharge	= 78.52 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 159,984 cuft
Drainage area	= 18.770 ac	Curve number	= 83*
Basin Slope	= 2.0 %	Hydraulic length	= 100 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.25 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(6.310 x 98) + (12.460 x 76)] / 18.770

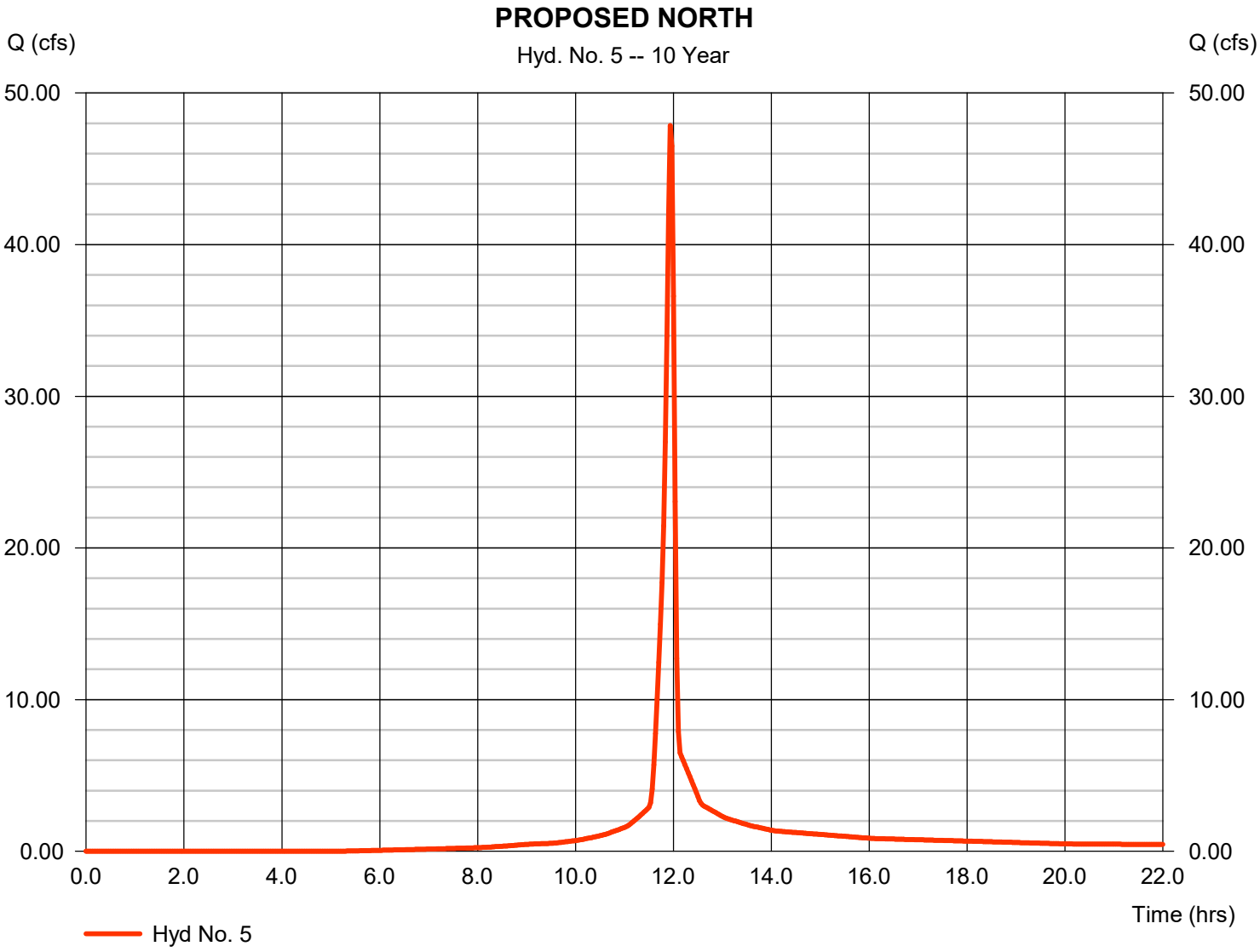


Hydrograph Report

Hyd. No. 5

PROPOSED NORTH

Hydrograph type	=	SCS Runoff	Peak discharge	=	47.86 cfs
Storm frequency	=	10 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	99,887 cuft
Drainage area	=	9.910 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	4.25 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

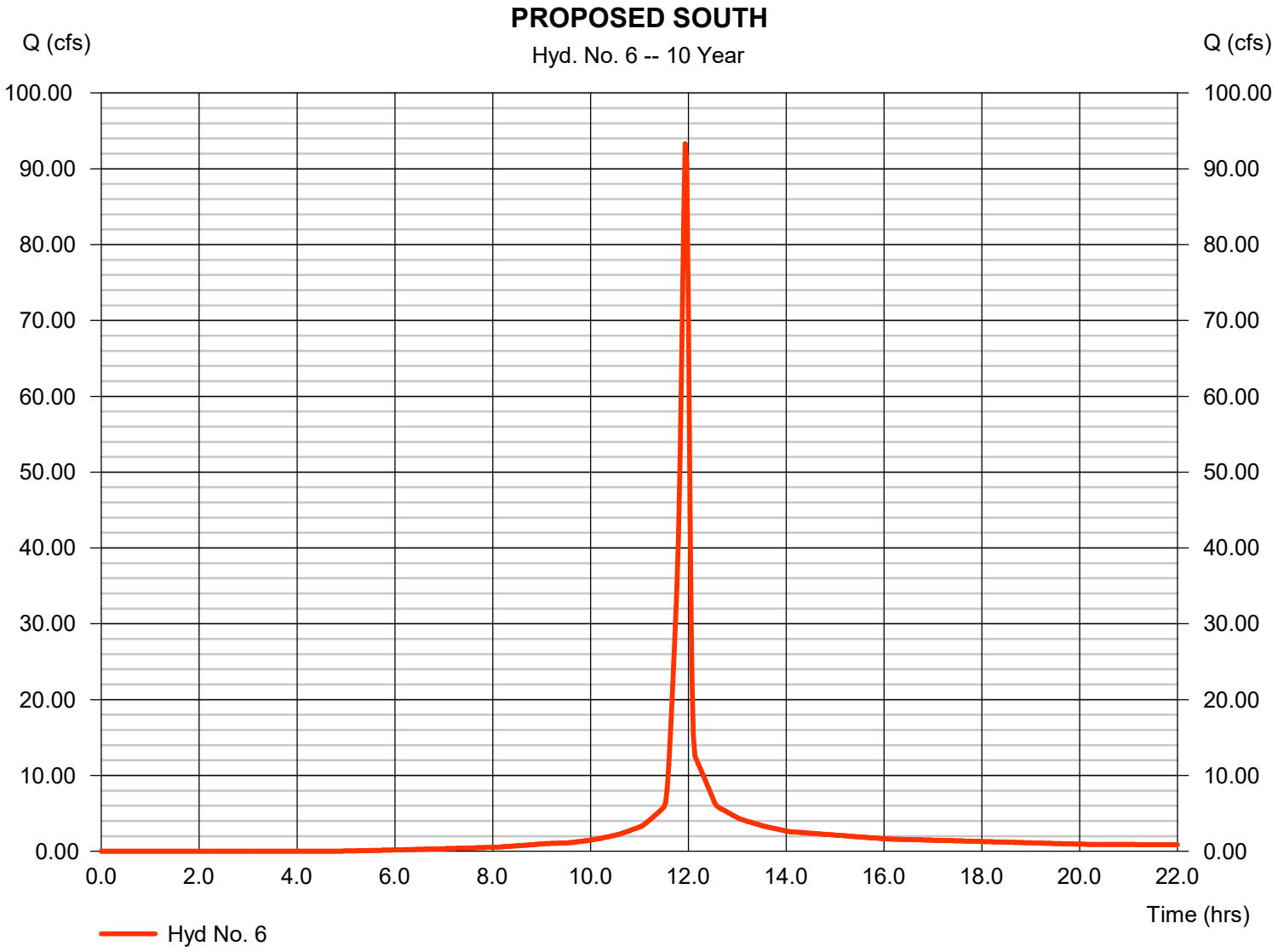


Hydrograph Report

Hyd. No. 6

PROPOSED SOUTH

Hydrograph type	=	SCS Runoff	Peak discharge	=	93.30 cfs
Storm frequency	=	10 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	196,092 cuft
Drainage area	=	18.840 ac	Curve number	=	89
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	4.25 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

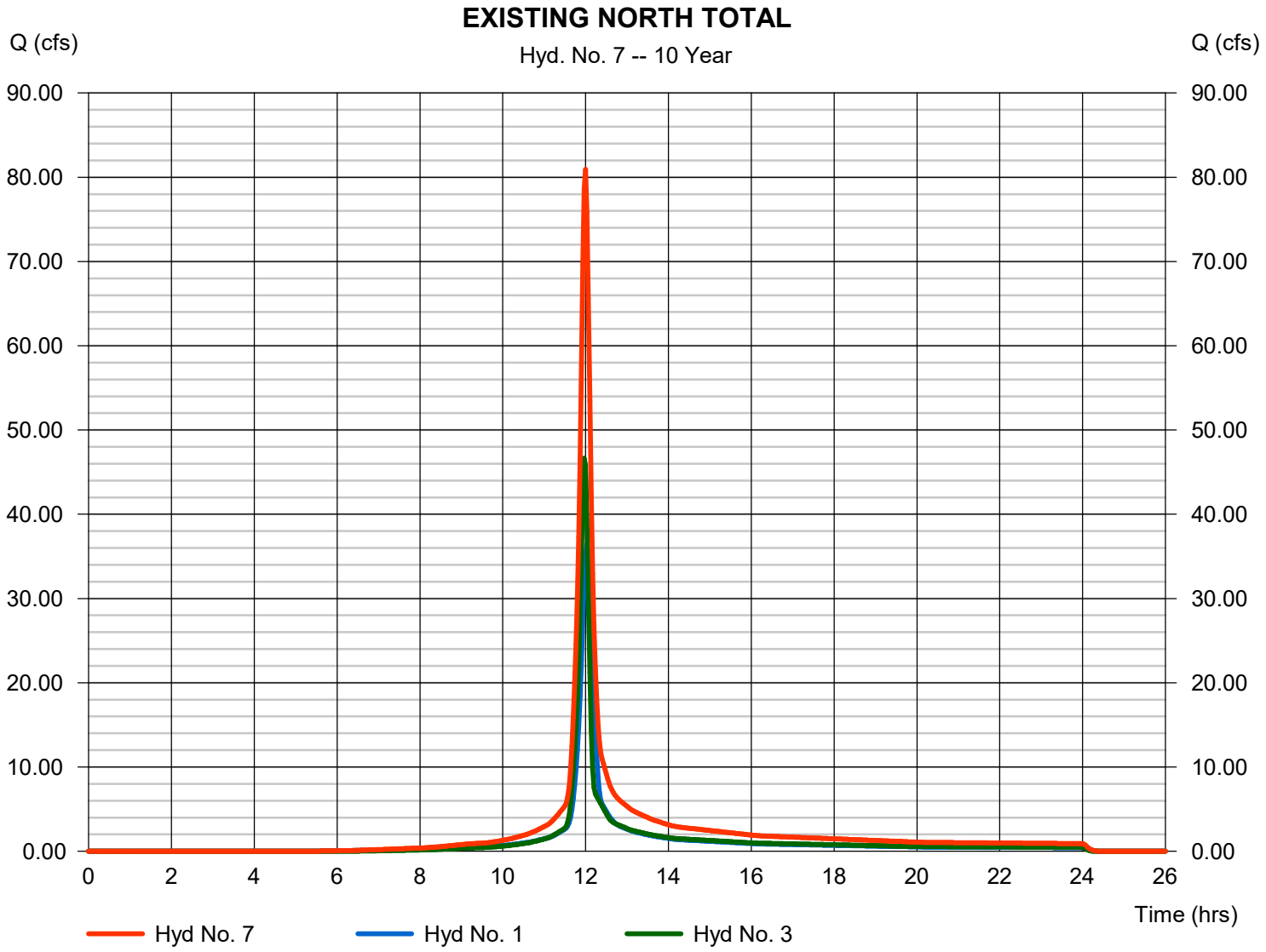


Hydrograph Report

Hyd. No. 7

EXISTING NORTH TOTAL

Hydrograph type	= Combine	Peak discharge	= 80.93 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 211,769 cuft
Inflow hyds.	= 1, 3	Contrib. drain. area	= 20.990 ac

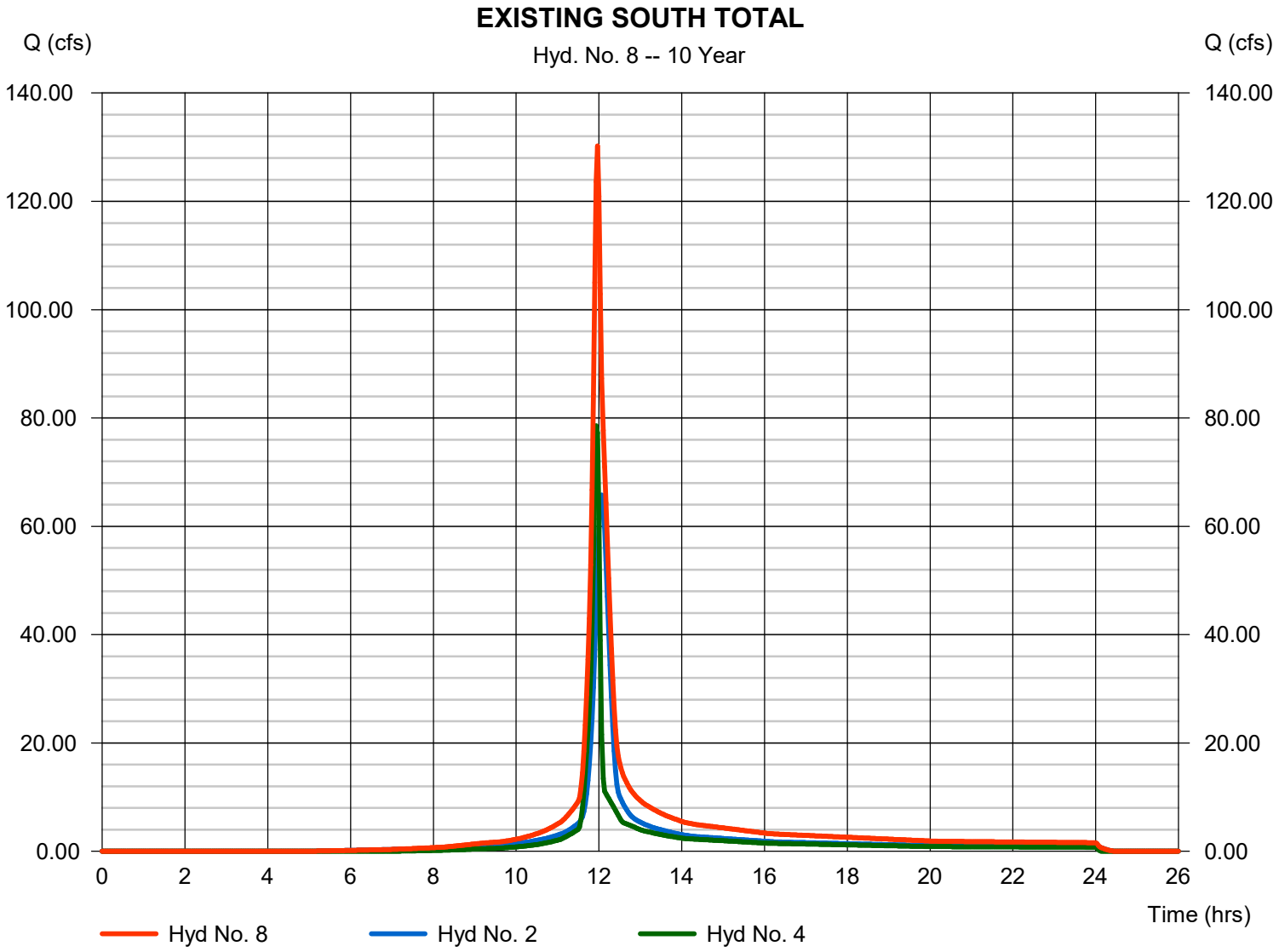


Hydrograph Report

Hyd. No. 8

EXISTING SOUTH TOTAL

Hydrograph type	= Combine	Peak discharge	= 130.19 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 369,149 cuft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 37.610 ac

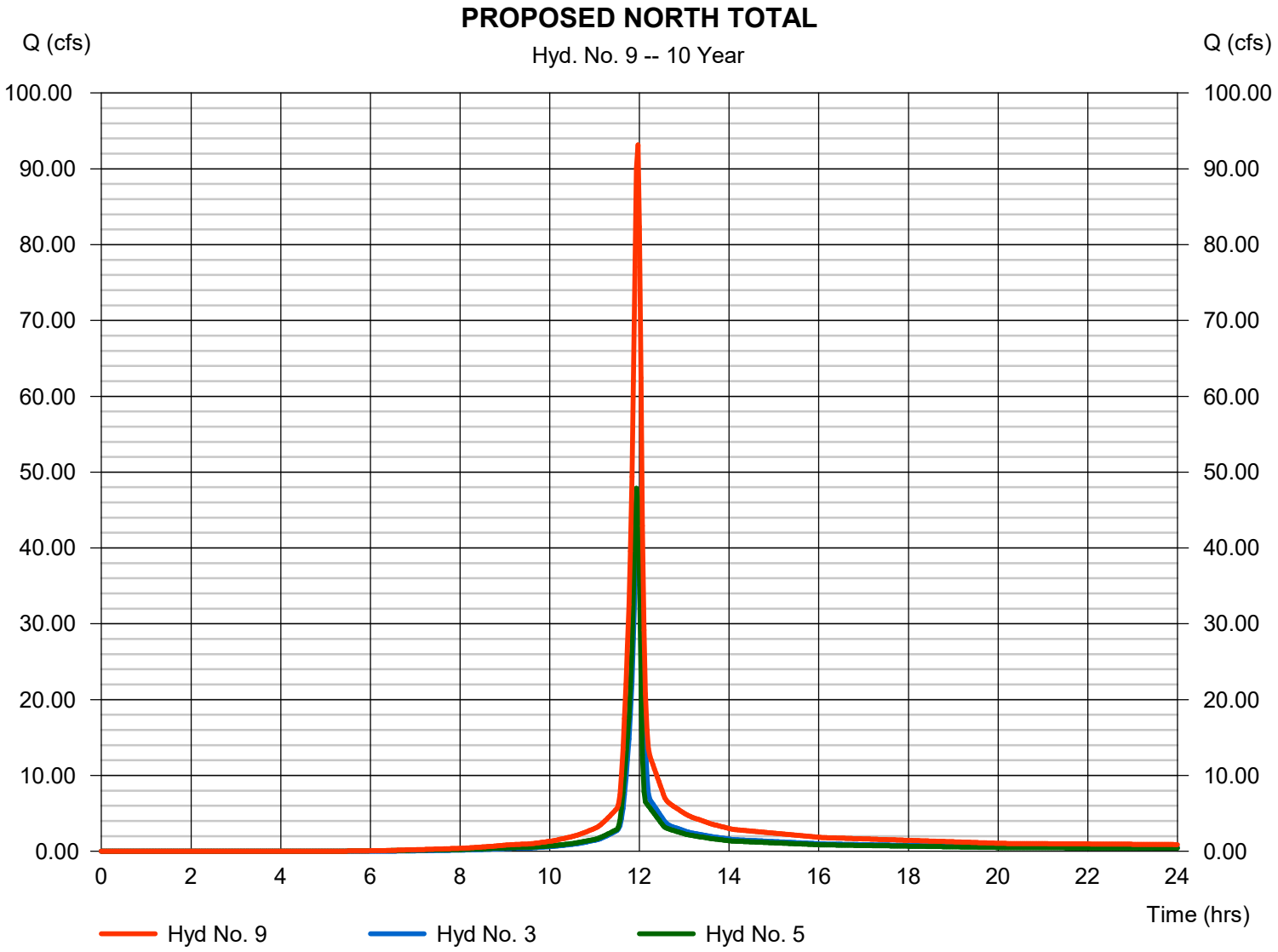


Hydrograph Report

Hyd. No. 9

PROPOSED NORTH TOTAL

Hydrograph type	= Combine	Peak discharge	= 93.15 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 207,773 cuft
Inflow hyds.	= 3, 5	Contrib. drain. area	= 20.990 ac

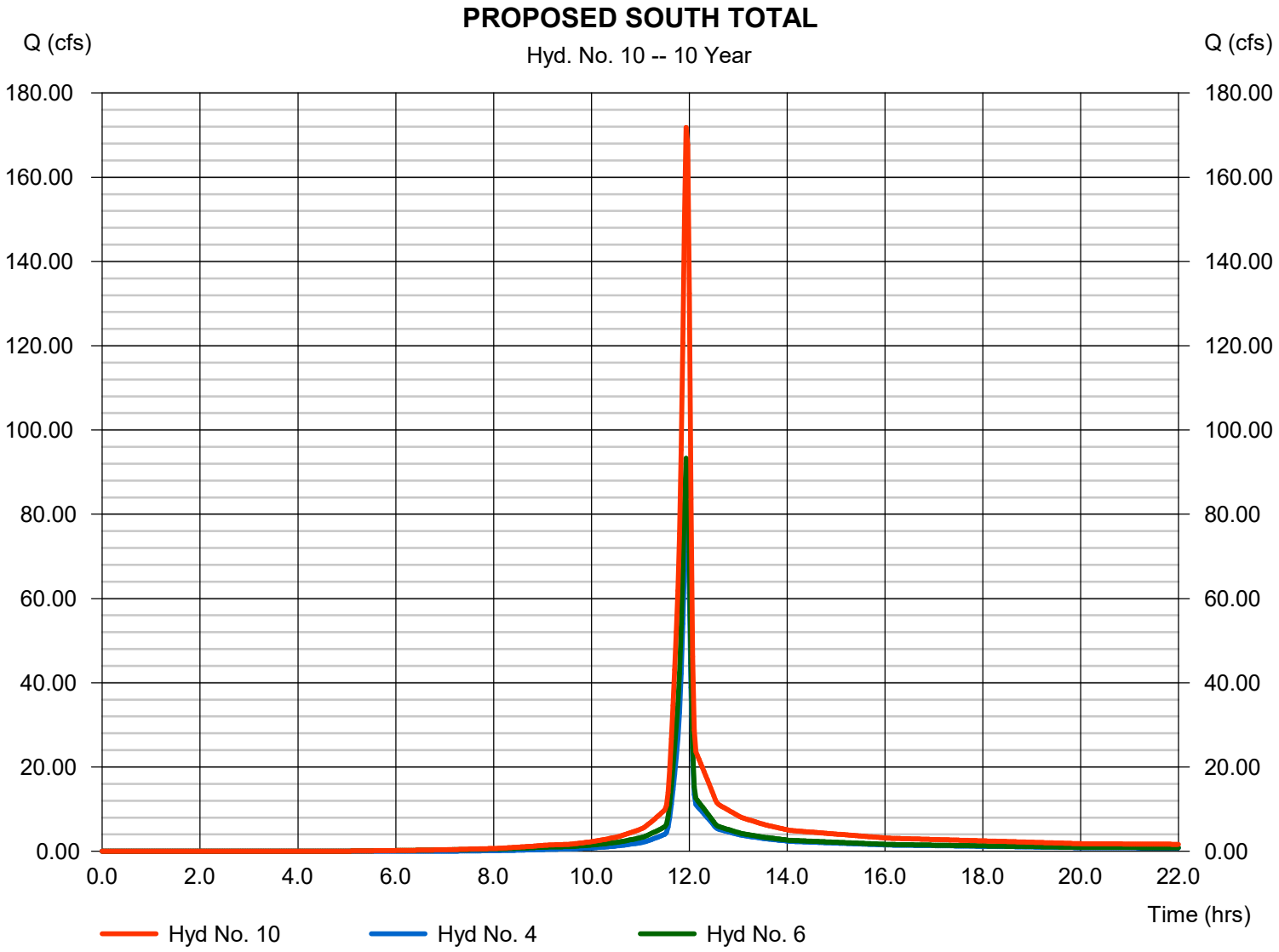


Hydrograph Report

Hyd. No. 10

PROPOSED SOUTH TOTAL

Hydrograph type	= Combine	Peak discharge	= 171.82 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 356,077 cuft
Inflow hyds.	= 4, 6	Contrib. drain. area	= 37.610 ac



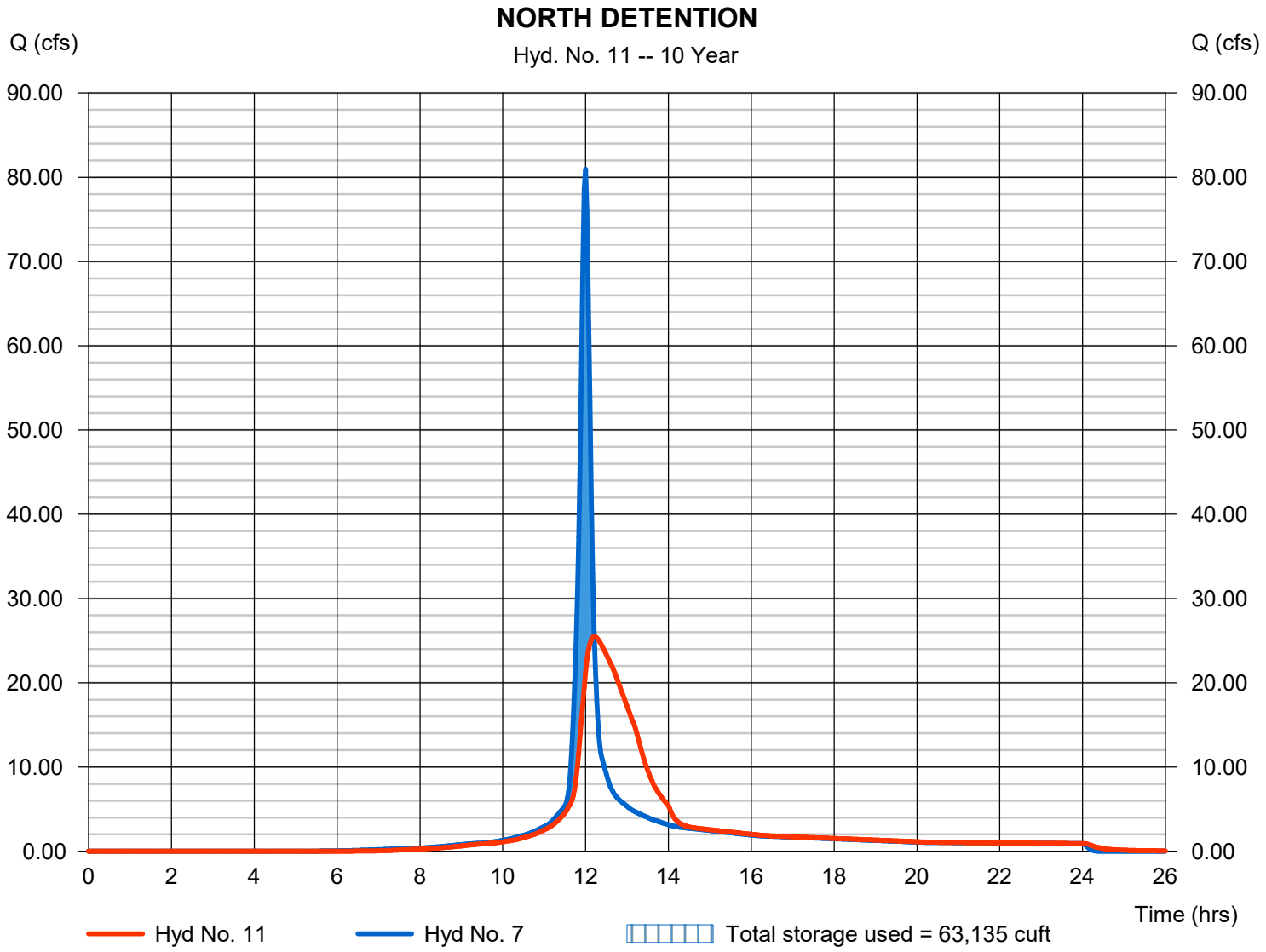
Hydrograph Report

Hyd. No. 11

NORTH DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	25.48 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.20 hrs
Time interval	=	2 min	Hyd. volume	=	211,762 cuft
Inflow hyd. No.	=	7 - EXISTING NORTH TOTAL	Max. Elevation	=	965.84 ft
Reservoir name	=	NORTH BASIN	Max. Storage	=	63,135 cuft

Storage Indication method used.



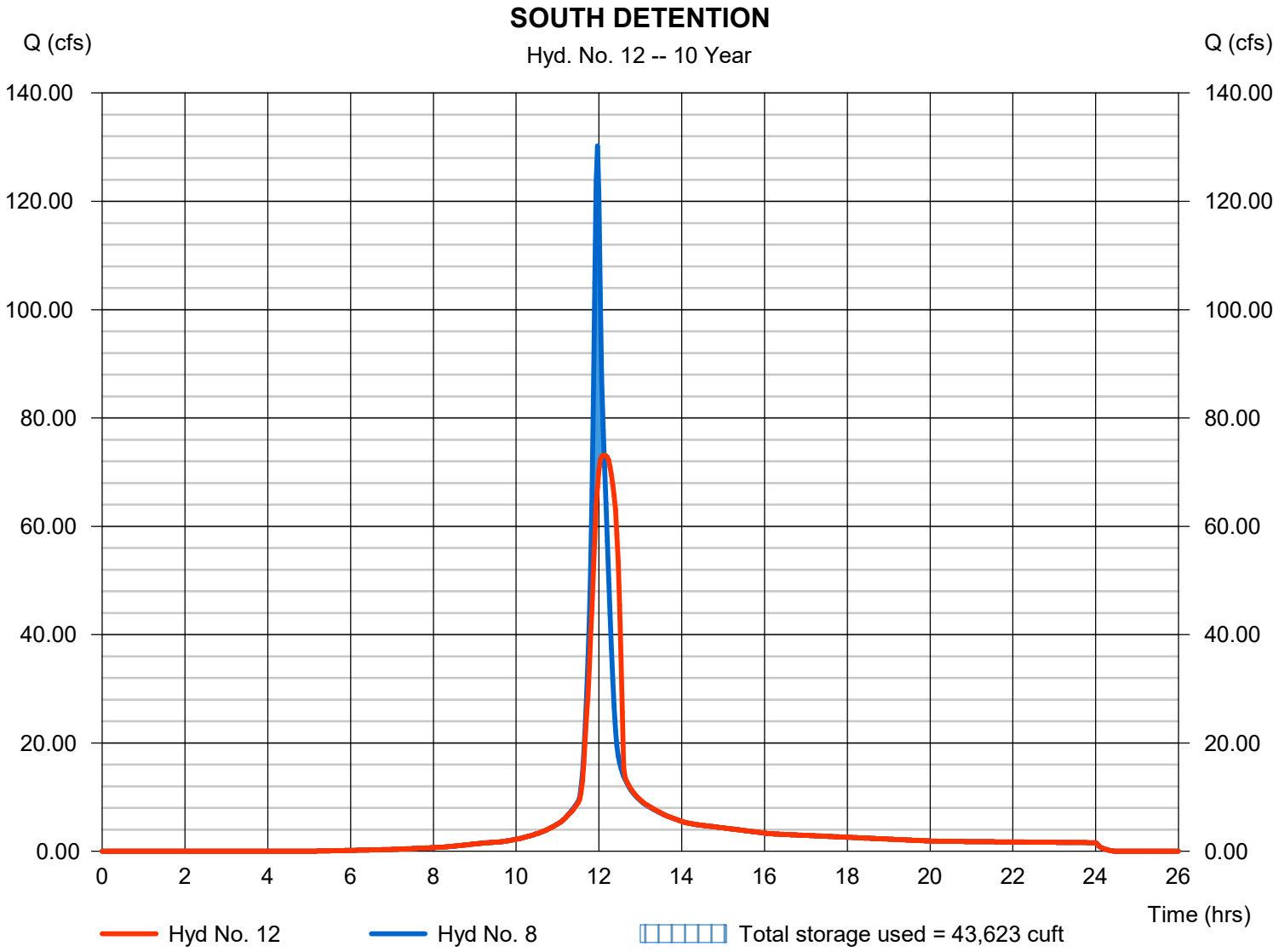
Hydrograph Report

Hyd. No. 12

SOUTH DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	73.15 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.13 hrs
Time interval	=	2 min	Hyd. volume	=	369,149 cuft
Inflow hyd. No.	=	8 - EXISTING SOUTH TOTAL	Max. Elevation	=	960.12 ft
Reservoir name	=	SOUTH BASIN	Max. Storage	=	43,623 cuft

Storage Indication method used.



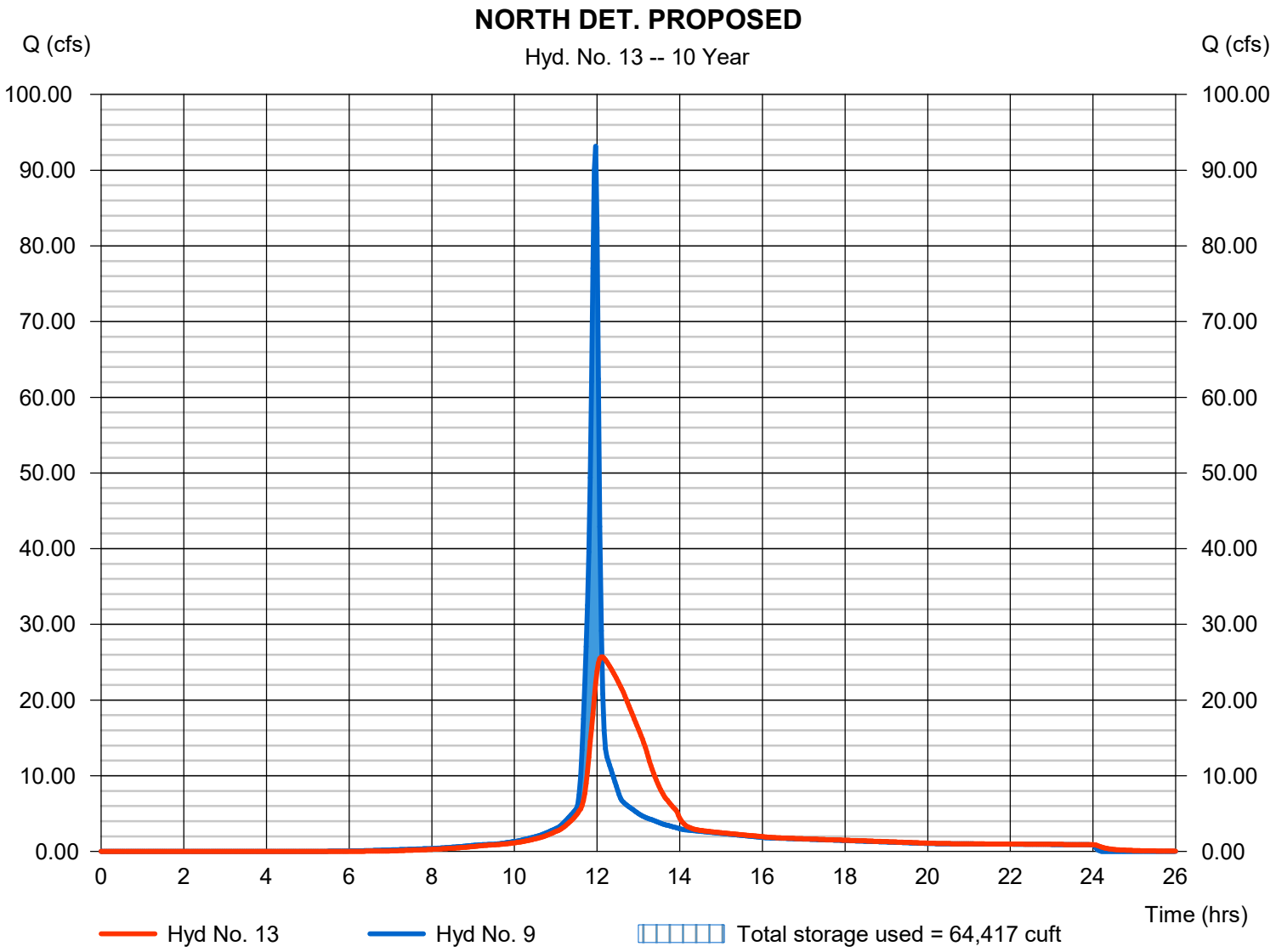
Hydrograph Report

Hyd. No. 13

NORTH DET. PROPOSED

Hydrograph type	=	Reservoir	Peak discharge	=	25.71 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	207,767 cuft
Inflow hyd. No.	=	9 - PROPOSED NORTH TOTAL	Max. Elevation	=	965.89 ft
Reservoir name	=	NORTH BASIN	Max. Storage	=	64,417 cuft

Storage Indication method used.



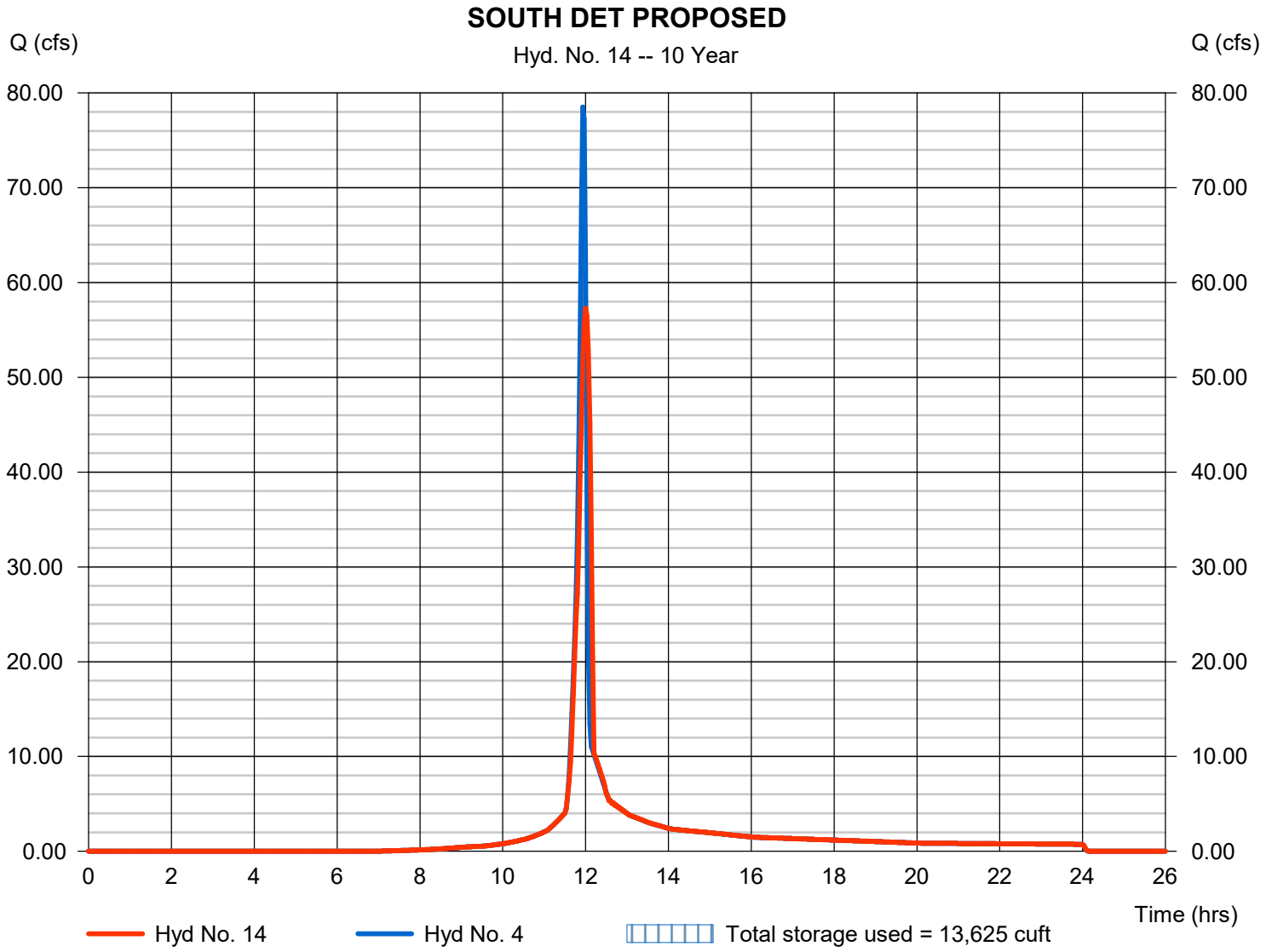
Hydrograph Report

Hyd. No. 14

SOUTH DET PROPOSED

Hydrograph type	=	Reservoir	Peak discharge	=	57.31 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	159,985 cuft
Inflow hyd. No.	=	4 - EXISTING SOUTH OFFSITE	Max. Elevation	=	958.34 ft
Reservoir name	=	SOUTH BASIN	Max. Storage	=	13,625 cuft

Storage Indication method used.



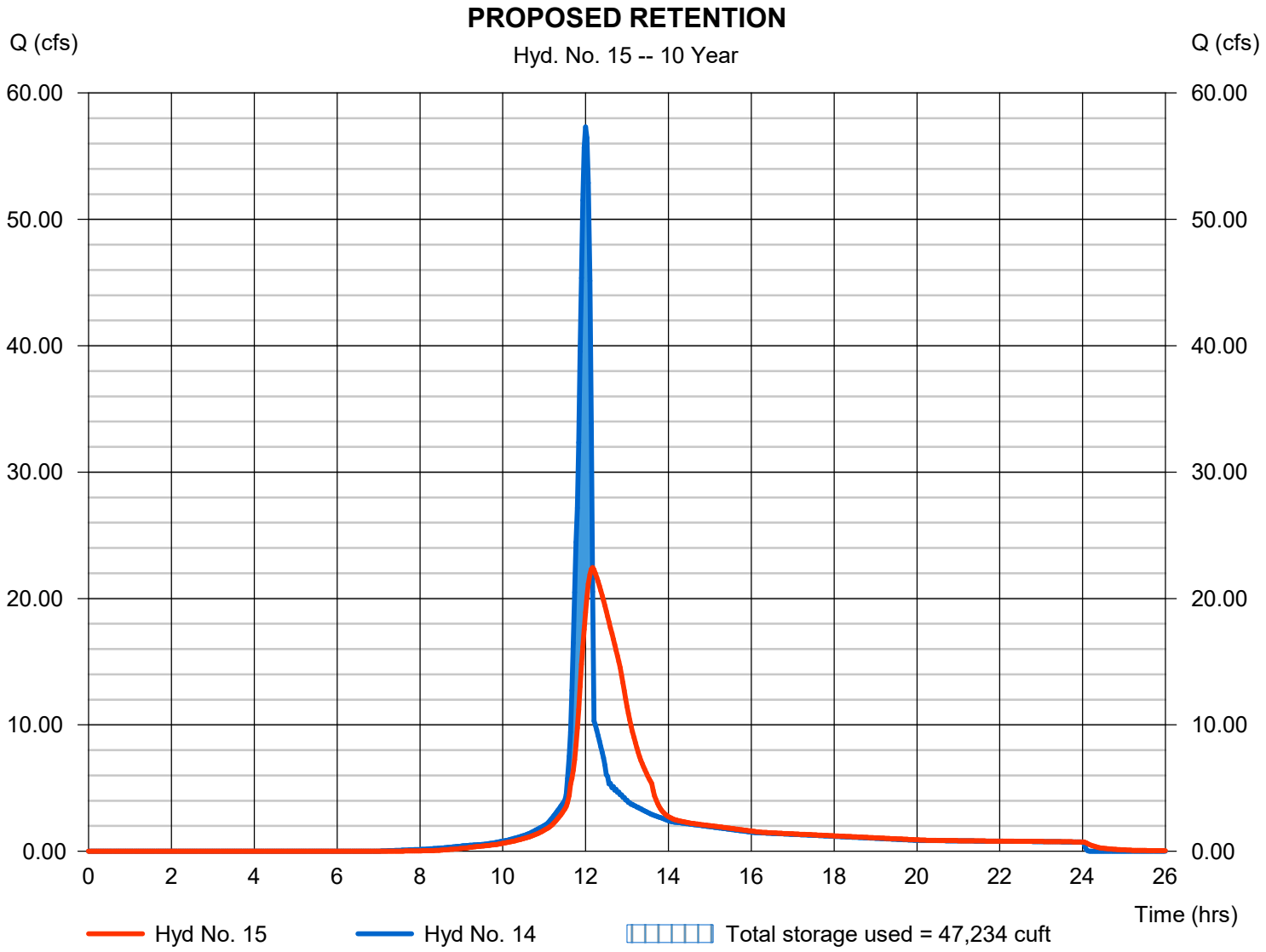
Hydrograph Report

Hyd. No. 15

PROPOSED RETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	22.44 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.17 hrs
Time interval	=	2 min	Hyd. volume	=	159,978 cuft
Inflow hyd. No.	=	14 - SOUTH DET PROPOSED	Max. Elevation	=	965.20 ft
Reservoir name	=	NORTH BASIN	Max. Storage	=	47,234 cuft

Storage Indication method used.



Hydrograph Summary Report

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

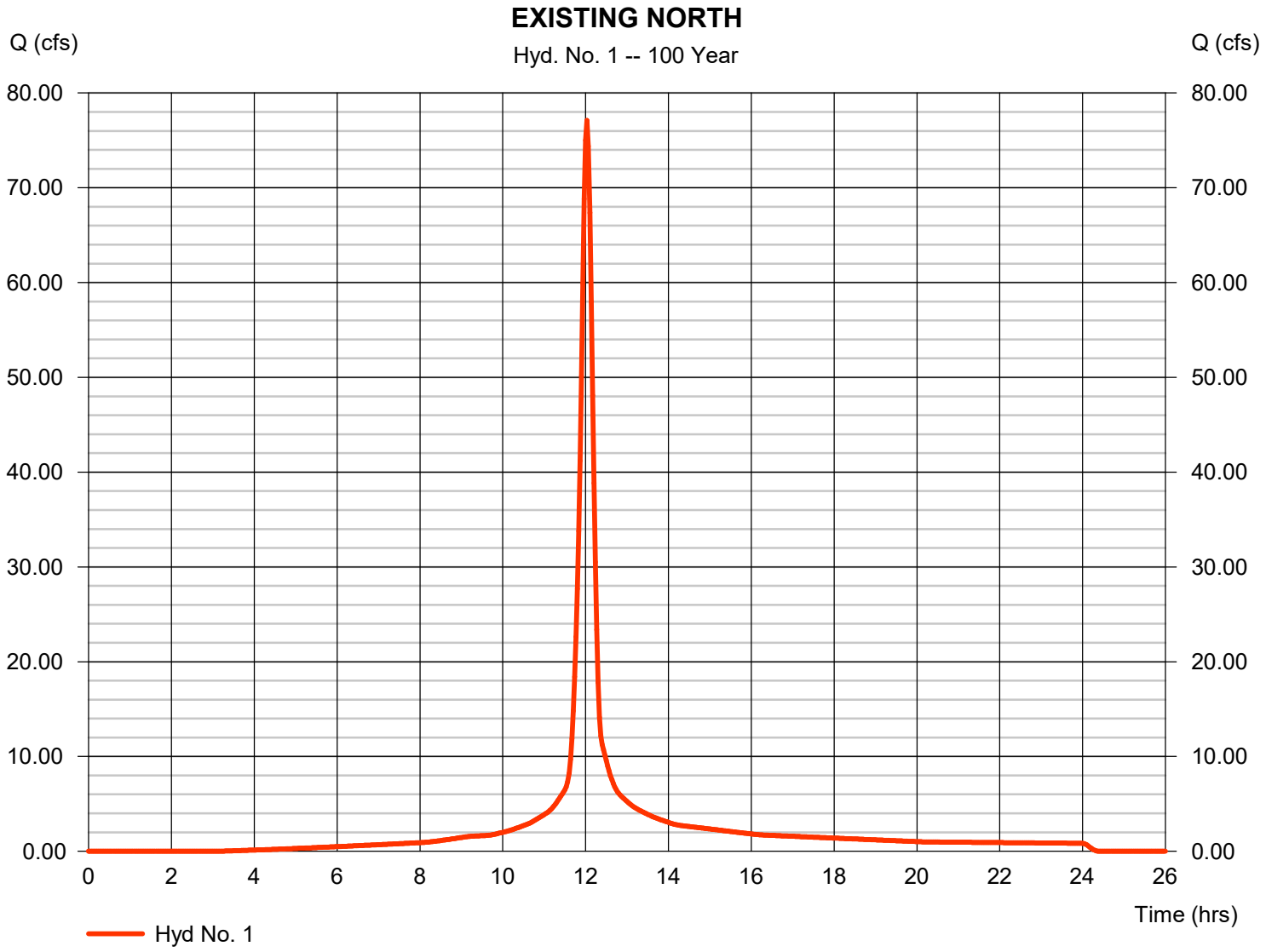
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	77.10	2	722	228,658	------	------	------	EXISTING NORTH
2	SCS Runoff	137.44	2	724	453,950	------	------	------	EXISTING SOUTH
3	SCS Runoff	103.09	2	718	247,959	------	------	------	EXISTING NORTH OFFSITE
4	SCS Runoff	178.58	2	716	378,768	------	------	------	EXISTING SOUTH OFFSITE
5	SCS Runoff	100.42	2	716	219,864	------	------	------	PROPOSED NORTH
6	SCS Runoff	192.91	2	716	425,578	------	------	------	PROPOSED SOUTH
7	Combine	174.97	2	720	476,617	1, 3,	------	------	EXISTING NORTH TOTAL
8	Combine	285.77	2	718	832,719	2, 4,	------	------	EXISTING SOUTH TOTAL
9	Combine	199.58	2	718	467,822	3, 5,	------	------	PROPOSED NORTH TOTAL
10	Combine	371.48	2	716	804,347	4, 6,	------	------	PROPOSED SOUTH TOTAL
11	Reservoir	36.94	2	736	476,611	7	968.97	166,363	NORTH DETENTION
12	Reservoir	91.86	2	736	832,718	8	962.79	191,782	SOUTH DETENTION
13	Reservoir	36.90	2	730	467,815	9	968.95	165,849	NORTH DET. PROPOSED
14	Reservoir	78.24	2	722	378,769	4	960.79	67,346	SOUTH DET PROPOSED
15	Reservoir	33.06	2	748	378,762	14	967.78	121,962	PROPOSED RETENTION

Hydrograph Report

Hyd. No. 1

EXISTING NORTH

Hydrograph type	=	SCS Runoff	Peak discharge	=	77.10 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	228,658 cuft
Drainage area	=	9.910 ac	Curve number	=	88
Basin Slope	=	1.5 %	Hydraulic length	=	656 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.10 min
Total precip.	=	7.95 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

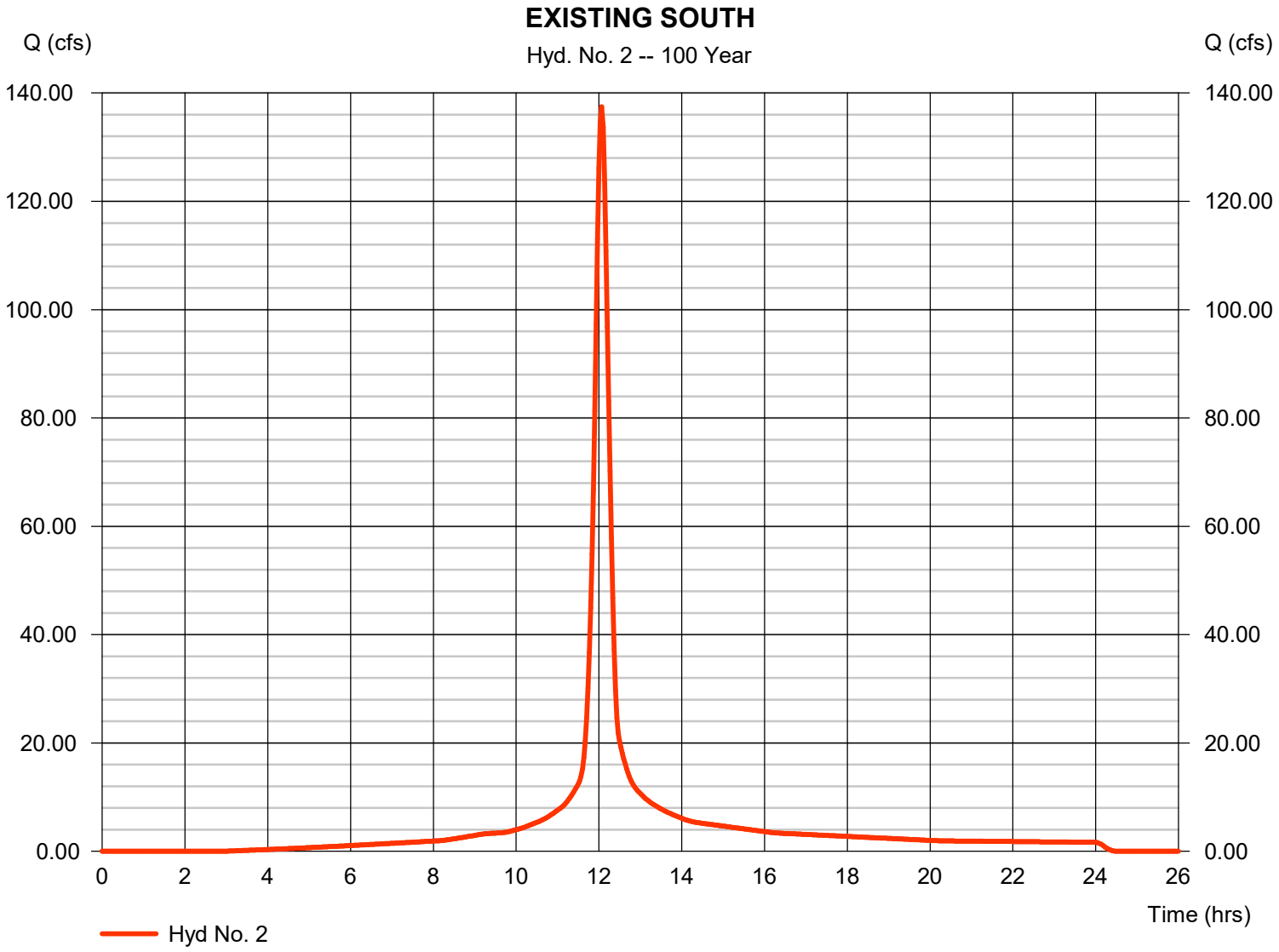


Hydrograph Report

Hyd. No. 2

EXISTING SOUTH

Hydrograph type	=	SCS Runoff	Peak discharge	=	137.44 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	453,950 cuft
Drainage area	=	18.840 ac	Curve number	=	89
Basin Slope	=	2.0 %	Hydraulic length	=	1076 ft
Tc method	=	LAG	Time of conc. (Tc)	=	17.45 min
Total precip.	=	7.95 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



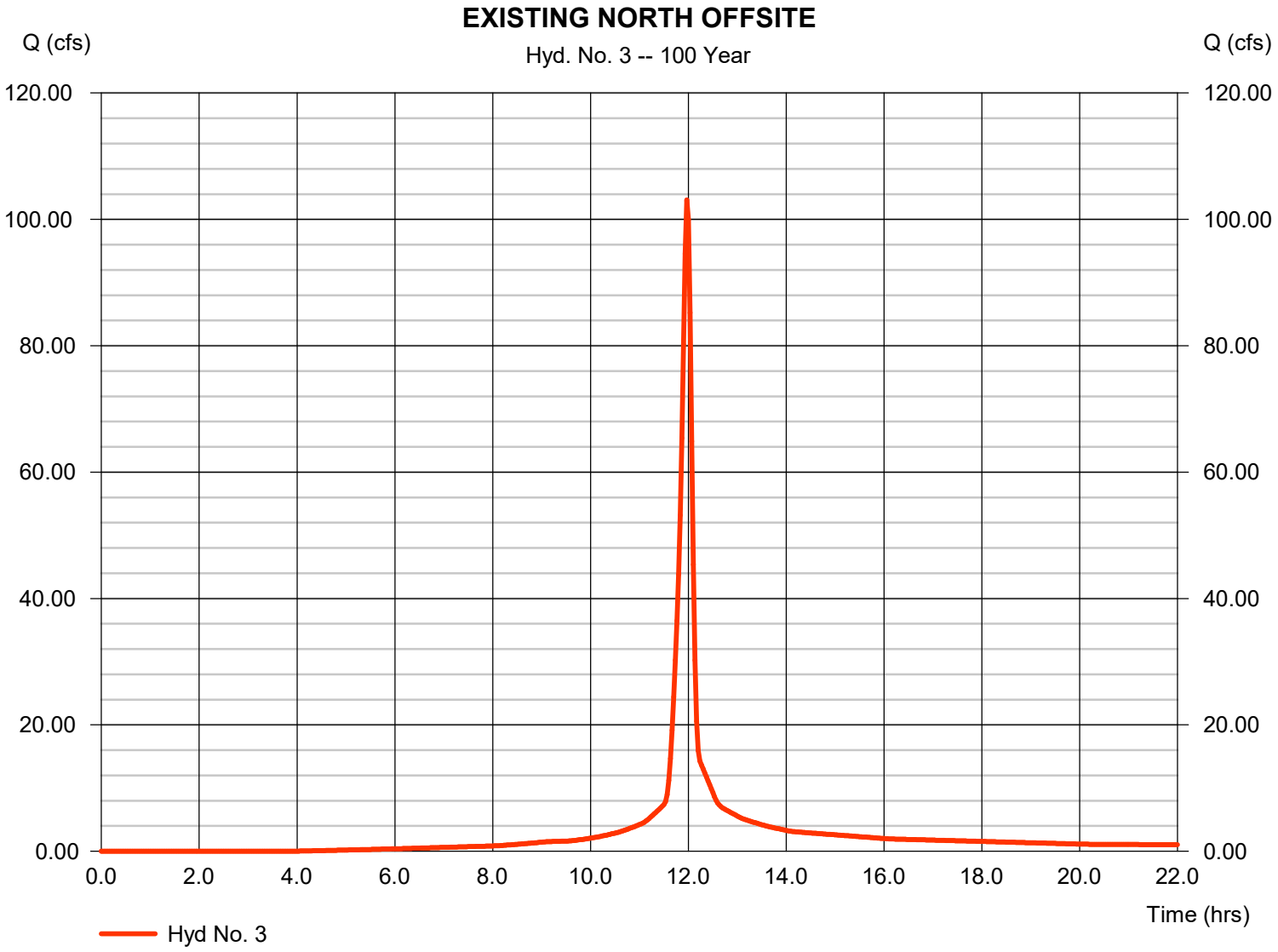
Hydrograph Report

Hyd. No. 3

EXISTING NORTH OFFSITE

Hydrograph type	= SCS Runoff	Peak discharge	= 103.09 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 247,959 cuft
Drainage area	= 11.080 ac	Curve number	= 85*
Basin Slope	= 3.8 %	Hydraulic length	= 394 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.20 min
Total precip.	= 7.95 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(4.618 x 98) + (6.462 x 75)] / 11.080



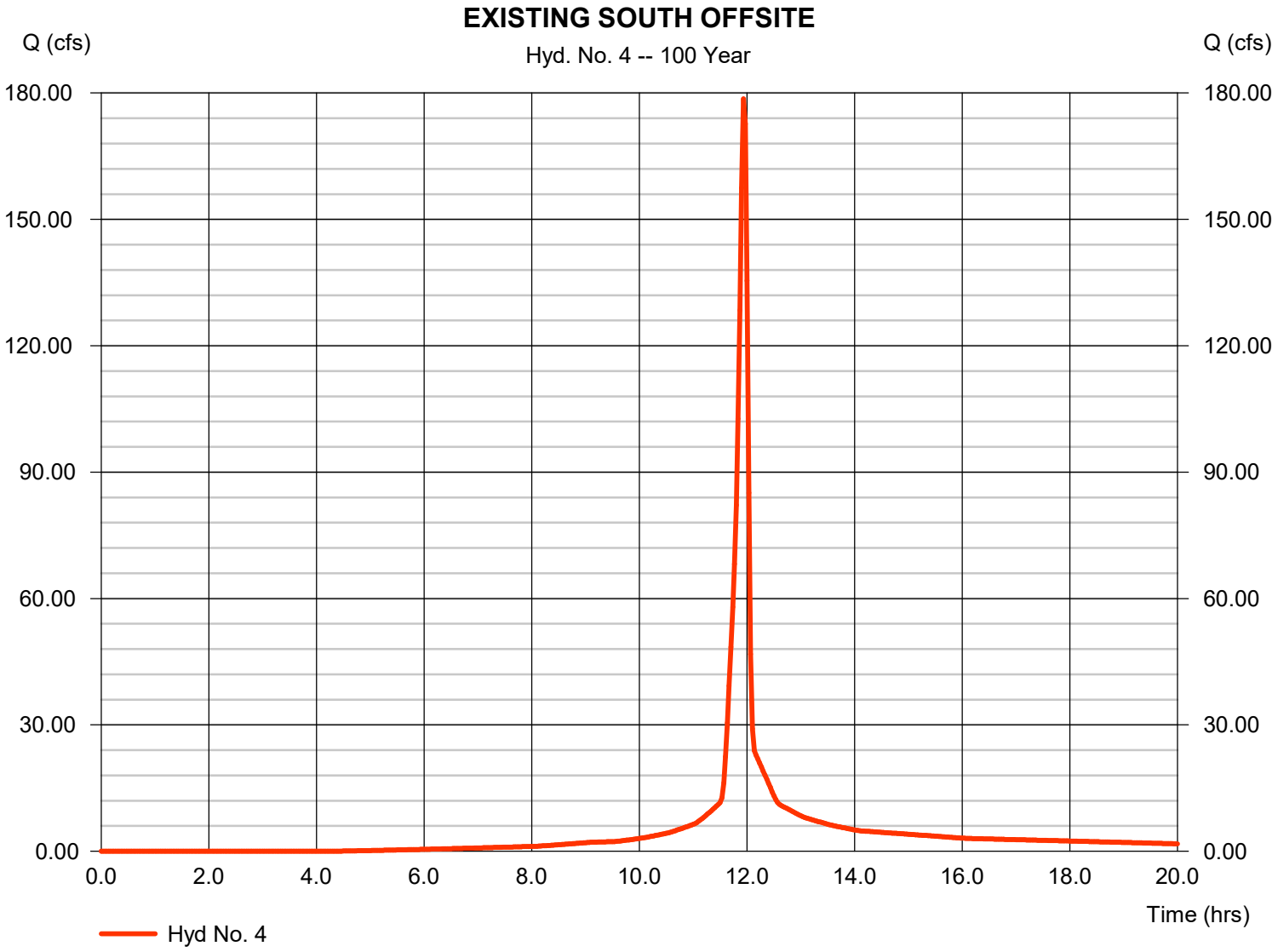
Hydrograph Report

Hyd. No. 4

EXISTING SOUTH OFFSITE

Hydrograph type	= SCS Runoff	Peak discharge	= 178.58 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 378,768 cuft
Drainage area	= 18.770 ac	Curve number	= 83*
Basin Slope	= 2.0 %	Hydraulic length	= 100 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.95 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(6.310 x 98) + (12.460 x 76)] / 18.770

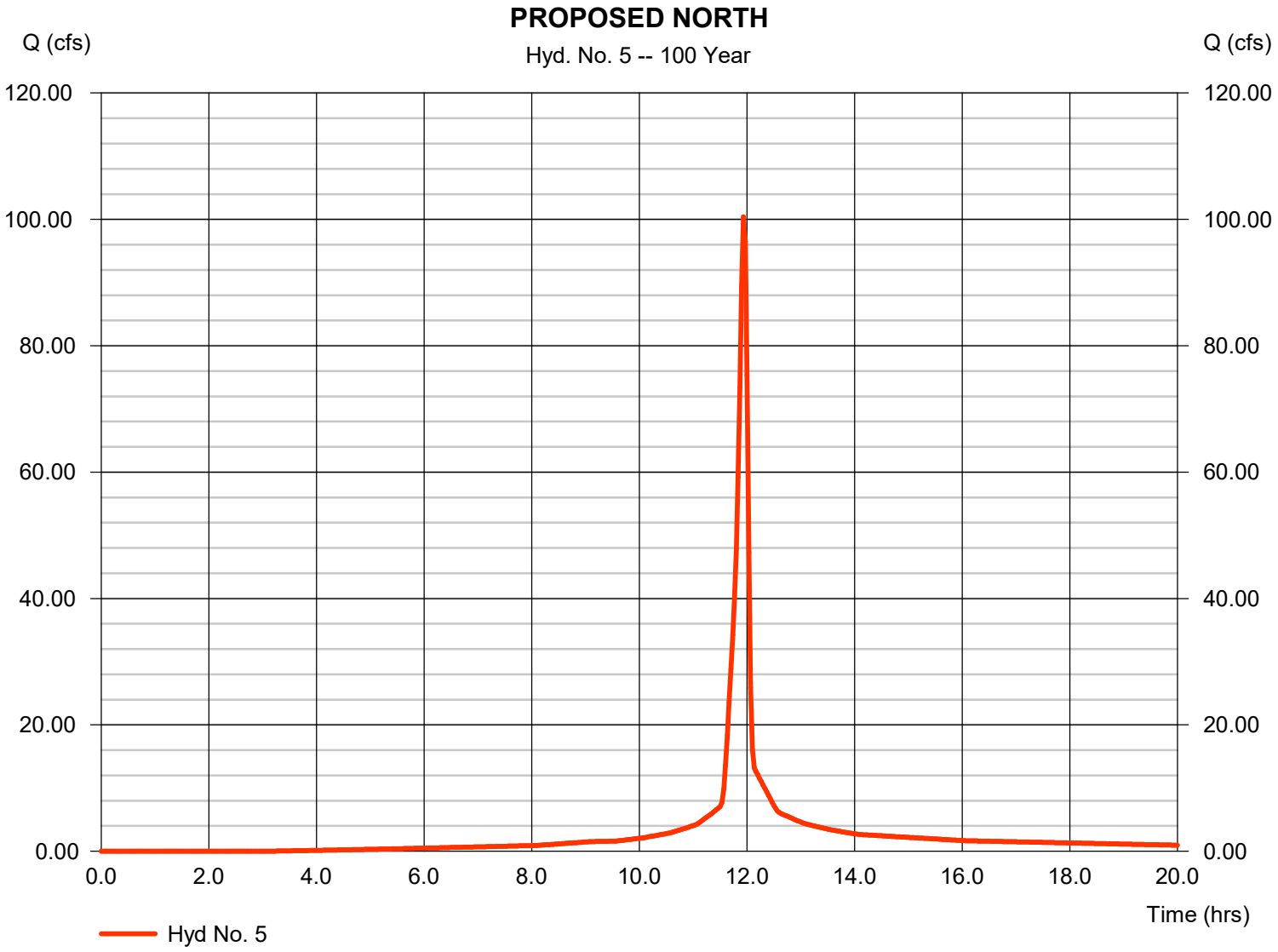


Hydrograph Report

Hyd. No. 5

PROPOSED NORTH

Hydrograph type	=	SCS Runoff	Peak discharge	=	100.42 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	219,864 cuft
Drainage area	=	9.910 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	7.95 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

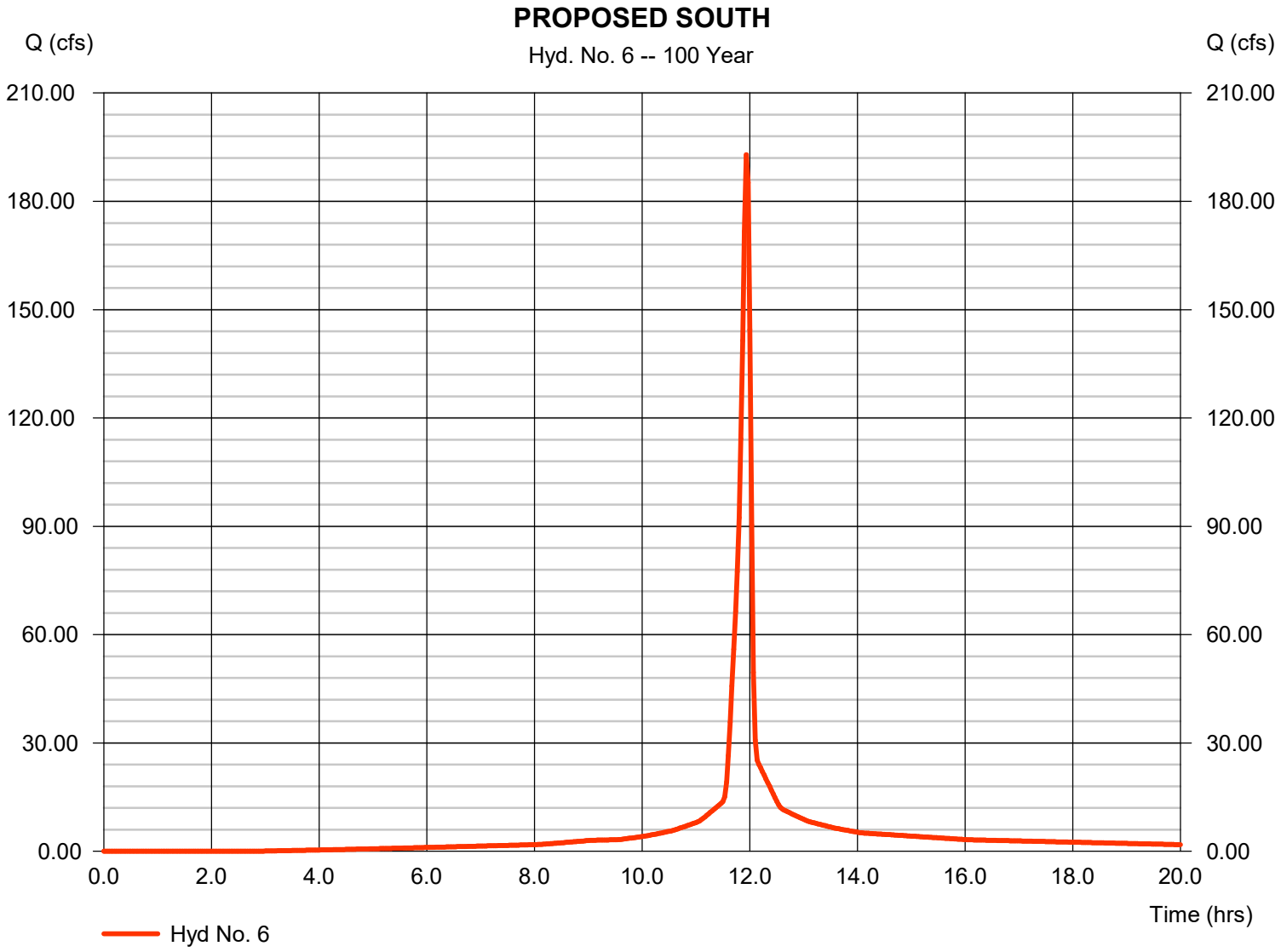


Hydrograph Report

Hyd. No. 6

PROPOSED SOUTH

Hydrograph type	=	SCS Runoff	Peak discharge	=	192.91 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	425,578 cuft
Drainage area	=	18.840 ac	Curve number	=	89
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	7.95 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

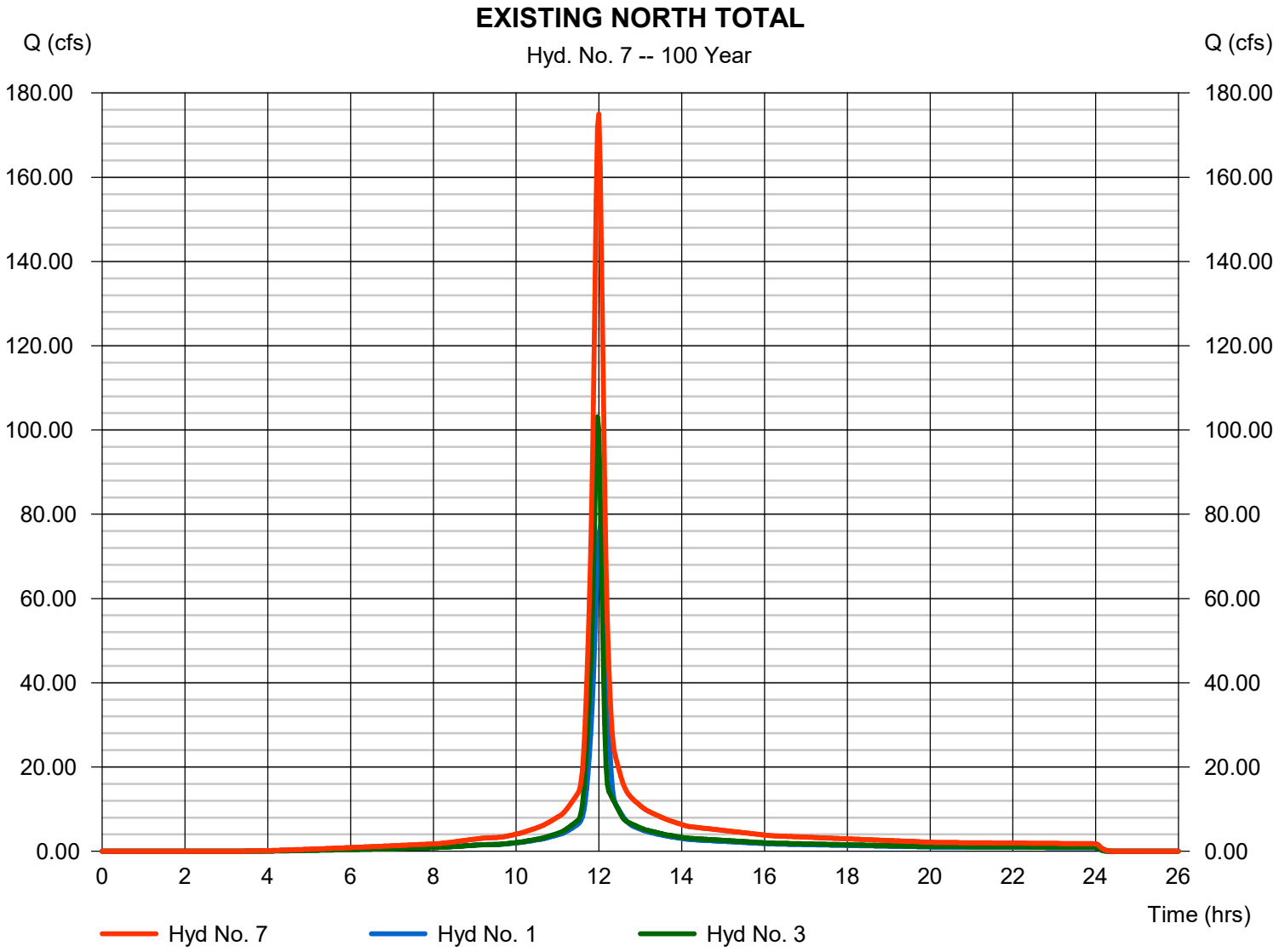


Hydrograph Report

Hyd. No. 7

EXISTING NORTH TOTAL

Hydrograph type	= Combine	Peak discharge	= 174.97 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 476,617 cuft
Inflow hyds.	= 1, 3	Contrib. drain. area	= 20.990 ac

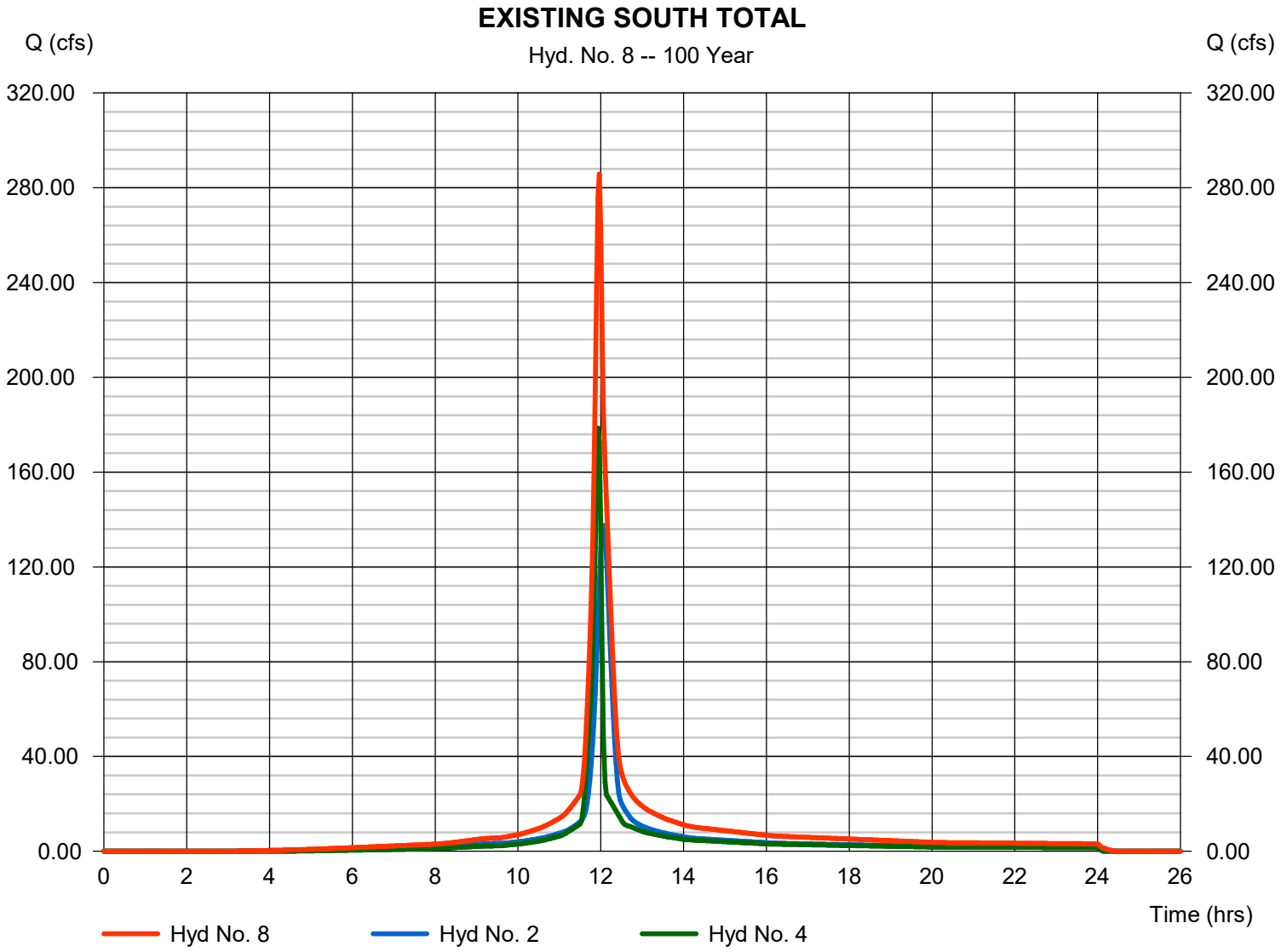


Hydrograph Report

Hyd. No. 8

EXISTING SOUTH TOTAL

Hydrograph type	= Combine	Peak discharge	= 285.77 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 832,719 cuft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 37.610 ac

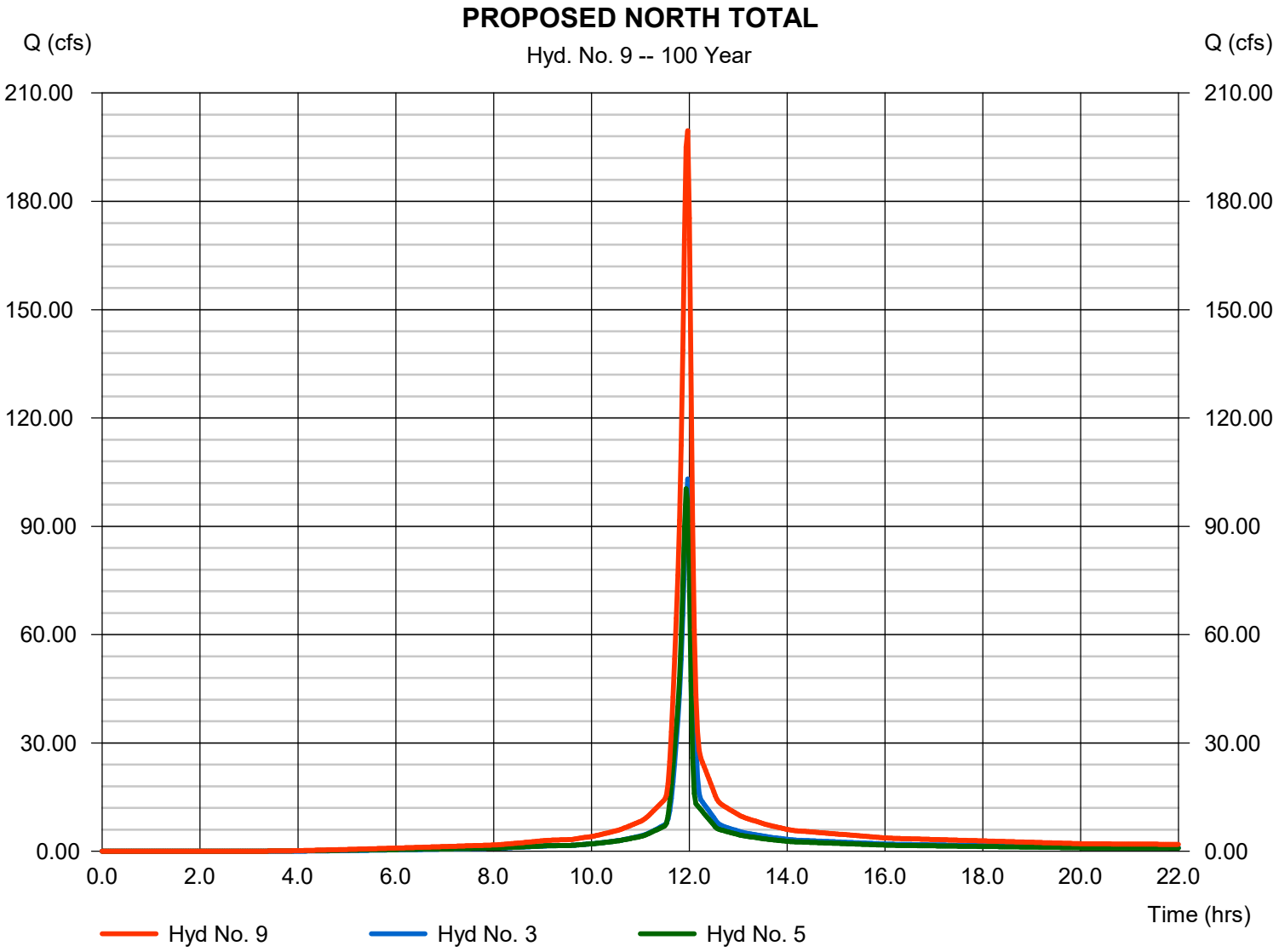


Hydrograph Report

Hyd. No. 9

PROPOSED NORTH TOTAL

Hydrograph type	= Combine	Peak discharge	= 199.58 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 467,822 cuft
Inflow hyds.	= 3, 5	Contrib. drain. area	= 20.990 ac

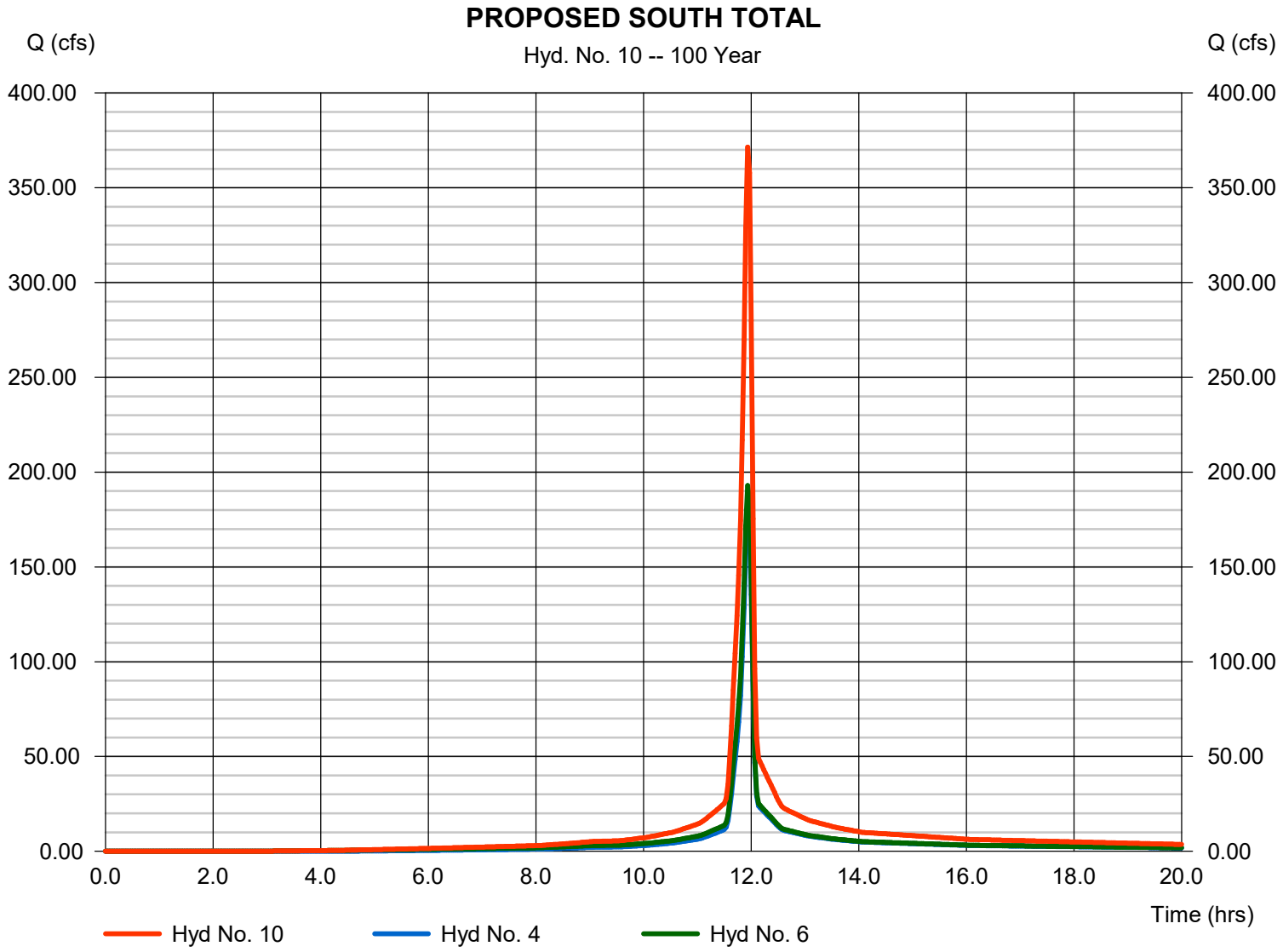


Hydrograph Report

Hyd. No. 10

PROPOSED SOUTH TOTAL

Hydrograph type	= Combine	Peak discharge	= 371.48 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 804,347 cuft
Inflow hyds.	= 4, 6	Contrib. drain. area	= 37.610 ac



Hydrograph Report

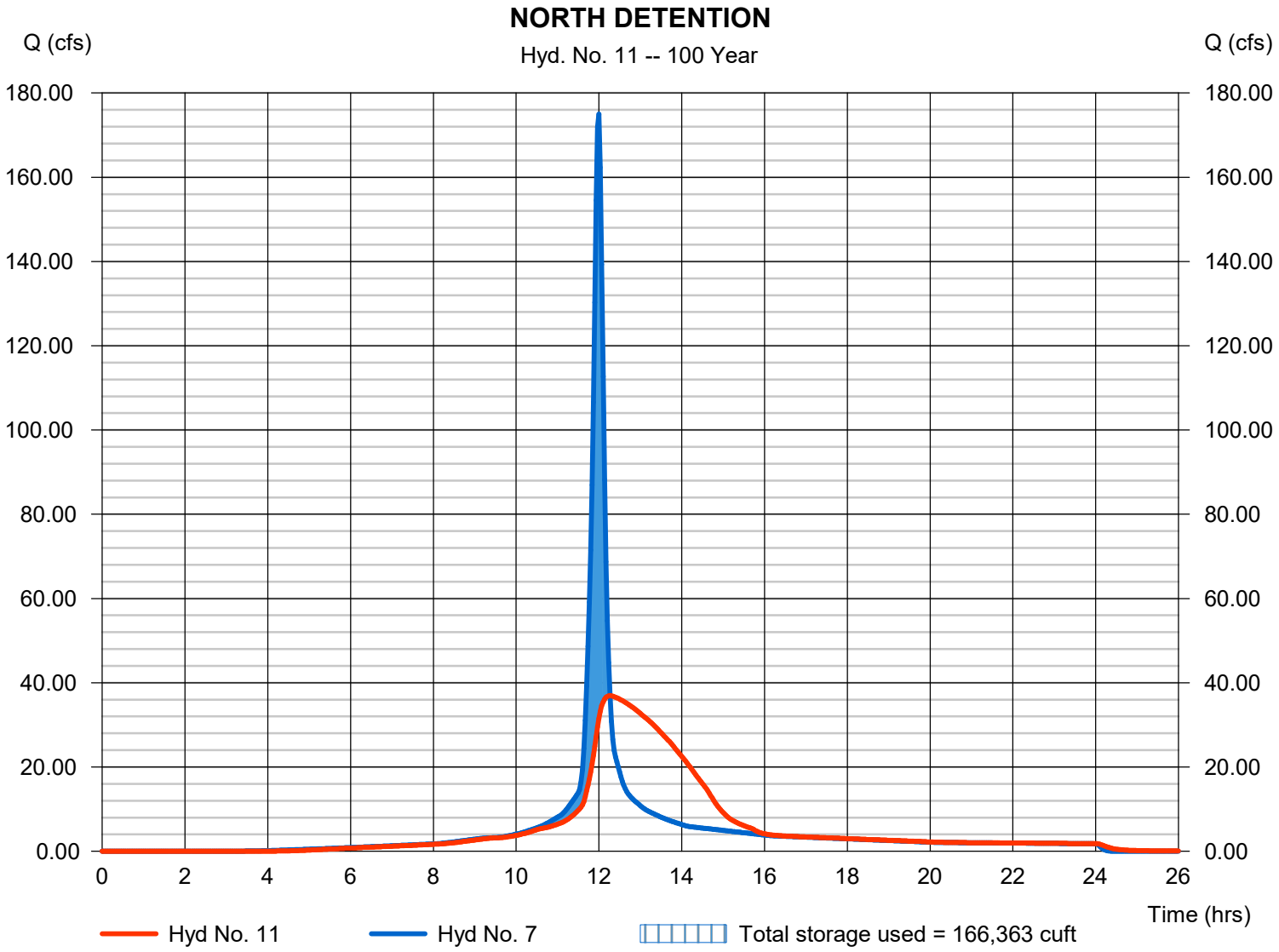
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024 Thursday, 06 / 13 / 2024

Hyd. No. 11

NORTH DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	36.94 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.27 hrs
Time interval	=	2 min	Hyd. volume	=	476,611 cuft
Inflow hyd. No.	=	7 - EXISTING NORTH TOTAL	Max. Elevation	=	968.97 ft
Reservoir name	=	NORTH BASIN	Max. Storage	=	166,363 cuft

Storage Indication method used.



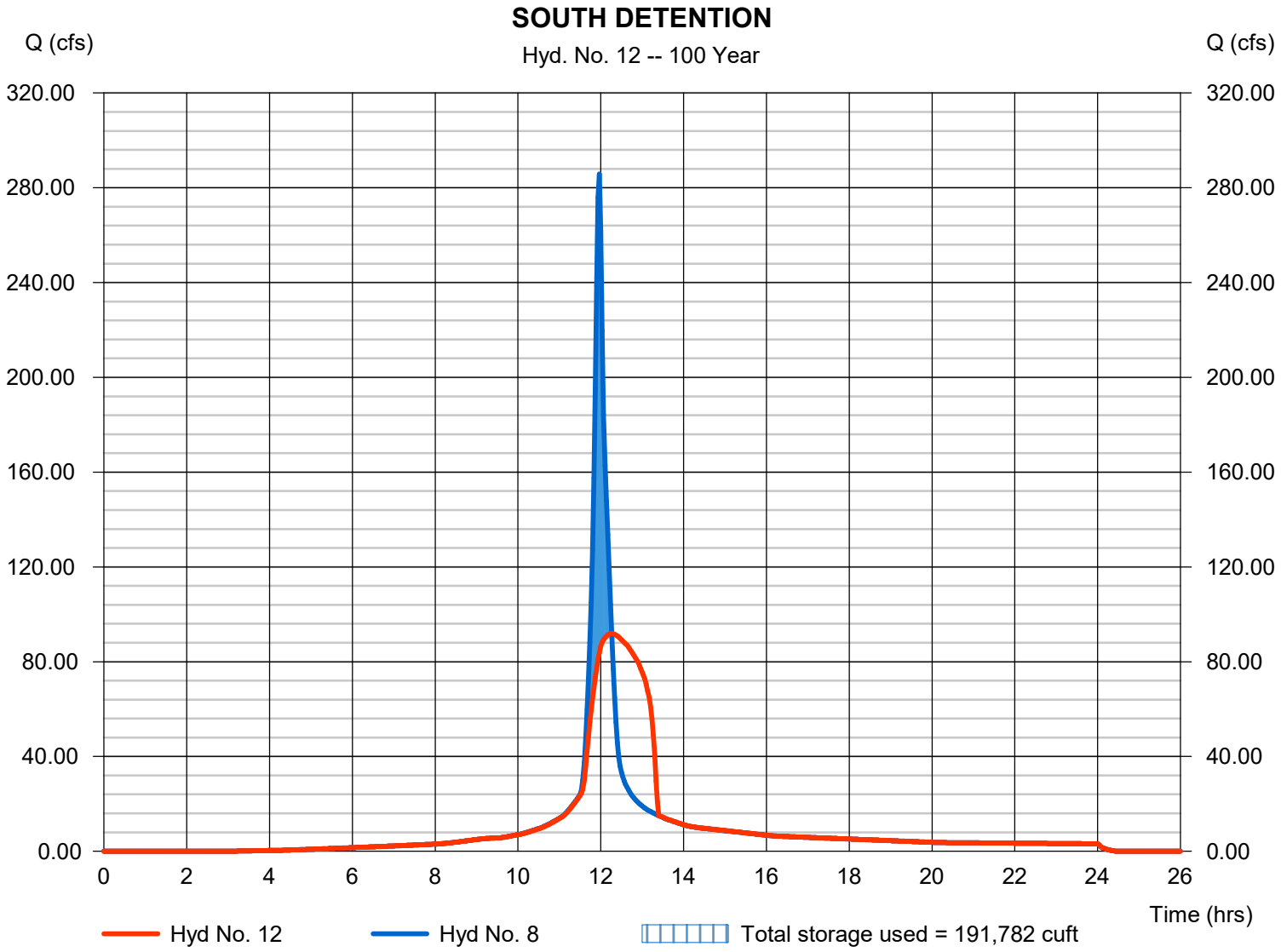
Hydrograph Report

Hyd. No. 12

SOUTH DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	91.86 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.27 hrs
Time interval	=	2 min	Hyd. volume	=	832,718 cuft
Inflow hyd. No.	=	8 - EXISTING SOUTH TOTAL	Max. Elevation	=	962.79 ft
Reservoir name	=	SOUTH BASIN	Max. Storage	=	191,782 cuft

Storage Indication method used.



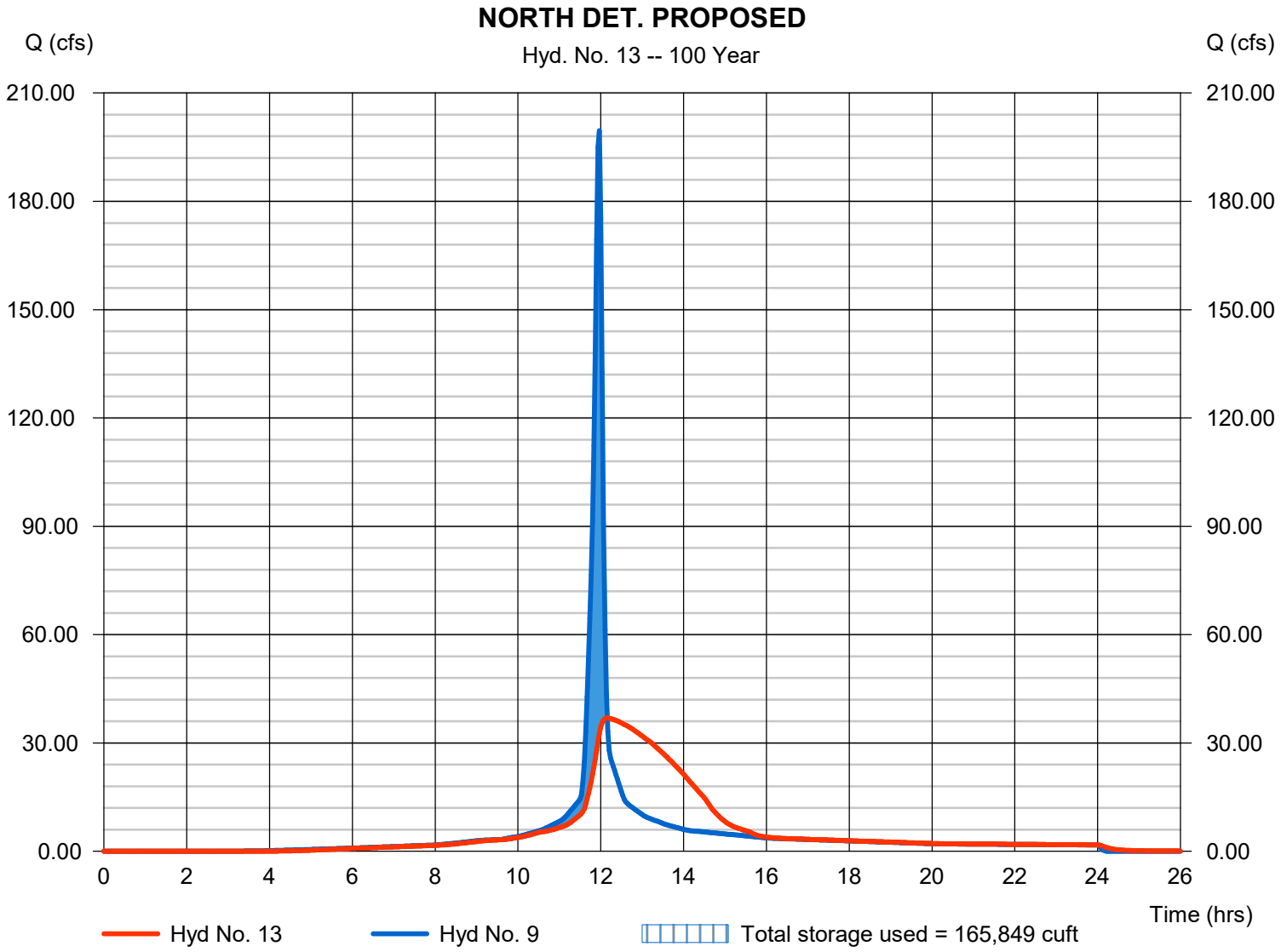
Hydrograph Report

Hyd. No. 13

NORTH DET. PROPOSED

Hydrograph type	=	Reservoir	Peak discharge	=	36.90 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.17 hrs
Time interval	=	2 min	Hyd. volume	=	467,815 cuft
Inflow hyd. No.	=	9 - PROPOSED NORTH TOTAL	Max. Elevation	=	968.95 ft
Reservoir name	=	NORTH BASIN	Max. Storage	=	165,849 cuft

Storage Indication method used.



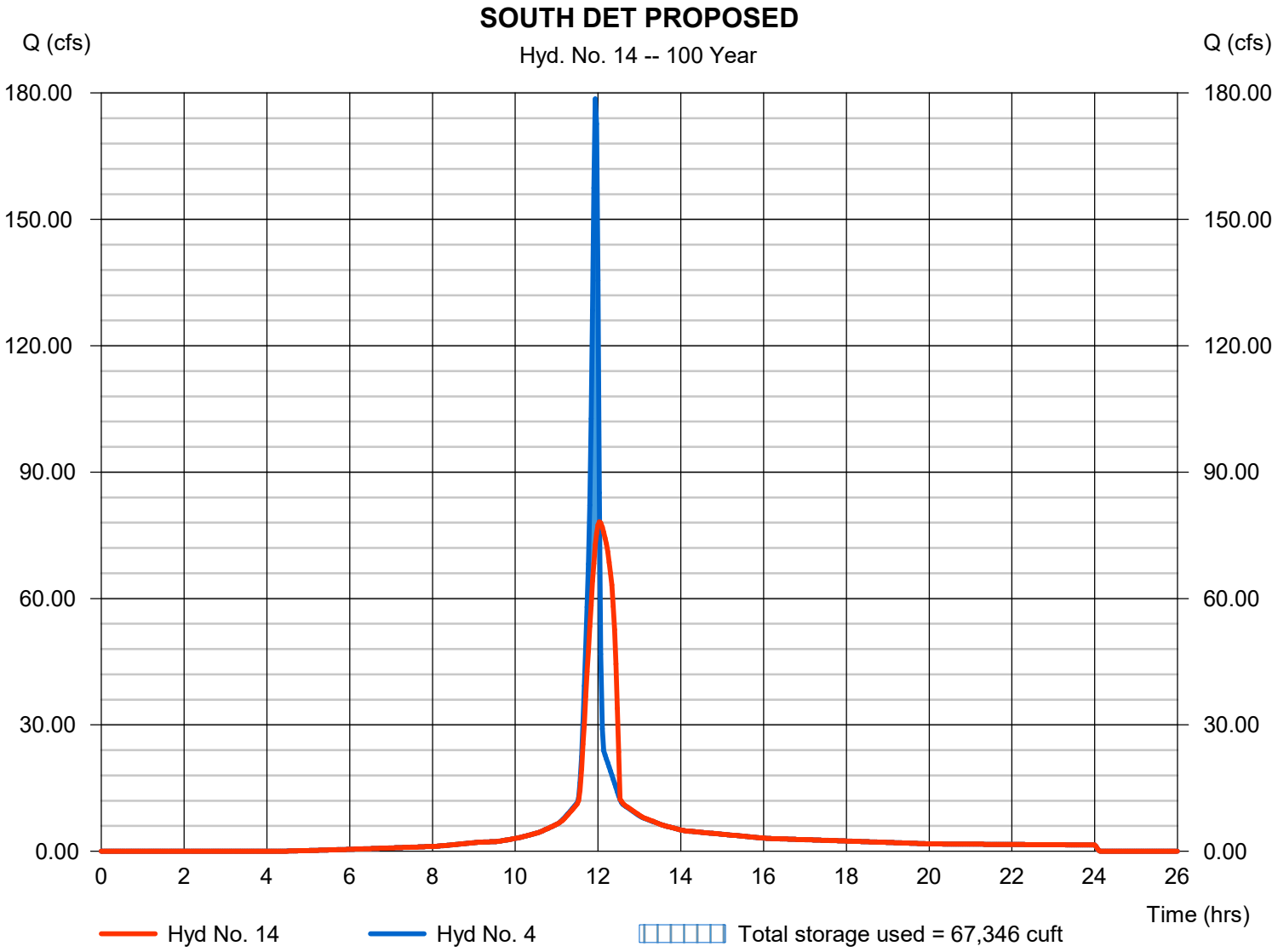
Hydrograph Report

Hyd. No. 14

SOUTH DET PROPOSED

Hydrograph type	=	Reservoir	Peak discharge	=	78.24 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	378,769 cuft
Inflow hyd. No.	=	4 - EXISTING SOUTH OFFSITE	Max. Elevation	=	960.79 ft
Reservoir name	=	SOUTH BASIN	Max. Storage	=	67,346 cuft

Storage Indication method used.



Hydrograph Report

Hyd. No. 15

PROPOSED RETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	33.06 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.47 hrs
Time interval	=	2 min	Hyd. volume	=	378,762 cuft
Inflow hyd. No.	=	14 - SOUTH DET PROPOSED	Max. Elevation	=	967.78 ft
Reservoir name	=	NORTH BASIN	Max. Storage	=	121,962 cuft

Storage Indication method used.