DRAINAGE PLAN

TURKEY CREEK COMMERCIAL ADDITION

TO

WICHITA, SEDGWICK COUNTY, KANSAS

PREPARED BY

Baughman
ENGINEERING | SURVEYING | PLANNING
LANDSCAPE ARCHITECTURE

06 JANUARY 2009

ENGINEERING | SURVEYING | PLANNING
LANDSCAPE ARCHITECTURE

DRAINAGE PLAN
TURKEY CREEK COMMERCIAL ADDITION

FINAL REPORT

Prepared by Baughman Company, P.A.
07 January

By N. Brent Wooten, P.E. L.S.
Trevor R. Kurth, P.E. CFM
Nicholas H. Jefferson, P.E. CFM

REPORT CONTENTS

EXISTING CONDITIONS

The site is located at the northeast corner of the intersection of Pawnee and 135th Street West. The site is approximately 7.6 acres and is currently agricultural farmland. The site can be accessed via Pawnee or 135th Street. The site gradually slopes from west to east and onto the adjacent Turkey Creek 3rd Addition. All existing runoff appears to stay on the north side of Pawnee.

The site location is depicted on the USGS Quadrangle Sheet as Exhibit 1. The aerial photograph with existing topography can be seen as Exhibit 2.

There is no FEMA SFHA located on the property as of this report.

PROPOSED CONDITIONS

The proposed Turkey Creek Commercial will consist of 3 commercial lots with direct access to 135th Street and Pawnee. The development will continue to drain its runoff to the east. This will be accomplished by utilizing storm water sewers and pond systems, which were proposed in Turkey Creek 3rd Addition. This development will not have onsite detention, but will provide detention in the pond system within Turkey Creek 3rd Addition. The majority of the site will drain via internal storm water sewer to the adjacent subdivision. A small portion of runoff is still expected to be conveyed in the Pawnee ROW ditch.

There is no FEMA SFHA located on this property as of this report.

For a half scale copy of the Plat, see Exhibit 3.

OFFSITE CONDITIONS

The site slopes from the west to the east and generally drains to the southeast and into the Pawnee Road Right of Way ditch section. There is a ROW ditch along 135th Street which conveys ROW runoff from the north to the south and then to the Pawnee ROW ditch. This amount of runoff appears to be minimal, as the 'high point' of the drainage pattern is located at the northwest portion of this property. The surrounding property, platted as Turkey Creek 3rd Addition, appears to drain to the east and ultimately into the Calfskin Creek. According to the approved Drainage Plan for Turkey Creek 3rd Addition, that site will utilize storm water sewer conveyances as well as detention ponds to limit the develop runoff. This site will be developed along with Turkey Creek 3rd to ensure adequate drainage systems as well as appropriately sized detention facilities.

There does not appear to be any offsite runoff encroaching the property.

EXISTING CONDITIONS RUNOFF CALCULATIONS

DRAINAGE METHODS & STANDARDS

The following methods and standards, although not a complete list, were used in calculating the existing conditions runoff values.

- Ø STORM SERIES
  - 24-hour; 2-yr, 5-yr, 10-yr, 25-yr, 100-yr Storm Events Modeled
  - 2-yr Rainfall Depth = 3.5 in
  - 5-yr Rainfall Depth = 4.5 in
  - 10-yr Rainfall Depth = 5.3 in
  - 25-yr Rainfall Depth = 6.1 in
  - 100-yr Rainfall Depth = 7.9 in

- Ø FLOW DATA
  - Existing Conditions runoff utilizing SCS Curve Number Method
  - Areas per USGS Quadrangle Sheet, Aerial Photos, and Site Visits
  - SCS Curve Number Method used for all flows
  - SCS CN = 75 (Type B Soils, Row Crops and Open Space)
  - Time of Concentration: Lag Method (15 min minimum)

SITE CHARACTERISTICS

The site is currently agricultural farmland. The site slopes gradually, approximately 1.5%, from the west to the east. The site is bounded on the west by 135th Street, the south by Pawnee, and the north and east by the platted subdivision Turkey Creek 3rd. The adjacent phase of the subdivision, as of this report, is not yet under construction. There does not appear to be any drainage problems associated with this site in the area.
The Aerial Exhibit can be seen as Exhibit 2.

EXISTING CONDITIONS HYDROLOGIC ANALYSIS

The site was analyzed for pre-development conditions using the SCS Curve Number Method for the 2, 5, 10, 25, and 100-year storm events. The curve number used, 75, was based on open space as well agricultural row crops in Type B soils. The time of concentration was calculated using the Lag Method with a minimum time of concentration of 15 minutes.

DOWNSTREAM DRAINAGE CAPACITY

The site ultimately drains to the Calfskin Creek, which is located approximately ½ mile to the east of this site. The site drains across the platted Turkey Creek 3rd Addition to the east and to the creek. The site currently drains to the southeast and into the Pawnee ROW. The Pawnee ROW ditch conveys the runoff to the east and into the Calfskin Creek.

POST-DEVELOPMENT HYDROLOGIC ANALYSIS

DRAINAGE METHODS & STANDARDS

The following methods and standards, although not a complete list, were used in developing the drainage and grading plans.

- Ø STORM SERIES
  - 24-hour; 2-yr, 5-yr, 10-yr, 25-yr, 100-yr Storm Events Modeled
  - HydraFlow Hydrographs software for existing flows
  - SCS Curve Number Method; CN = 92 (Type B Soils, Business / Commercial)
  - Time of Concentration; Lag method, minimum Tc = 15min

- Ø GRADING CONSTRAINTS
  - Match grades along site perimeter
  - Correlate grades with proposed / adjacent Turkey Creek 3rd Addition
  - Emergency Overflows for 24-hr, 100-yr Storm Event

DETENTION FACILITIES

There is no detention facility proposed on this site. However, this sites developed runoff will be detained in the adjacent Turkey Creek 3rd Additions drainage systems. The original drainage plan for Turkey Creek 3rd Addition accounted for some of this sites runoff in its detention facilities. However, this pond system was re-evaluated with this plan and is included herein. The developed runoff will be conveyed to the adjacent subdivision via storm water sewer. The proposed pond system in Turkey Creek 3rd Addition appears adequate to handle the additional runoff from this development.

DETENTION SUMMARY

As stated earlier, detention will be provided in the adjacent subdivisions pond system. According to the approved Drainage Plan for Turkey Creek 3rd, the 100-year water surface of the pond was expected to be at elevation 1339.2. Based on the re-model of this system, the pond is expected to be at elevation 1339.9. The proposed rear lot grades around the pond were expected to be at least at elevation 1341.0. This would still allow the 1-foot freeboard which we adhere to, as well as still give the surrounding structures 3-feet of freeboard to their lowest openings. An emergency escape will still be expected at the internal road crossing (Grant) at the ponds outlet.

DISCHARGE POINTS SUMMARY

The majority of the site will drain to the northeast corner and into a previously proposed storm sewer system. This system will convey the runoff to a detention pond located in Turkey Creek 3rd Addition. A smaller portion of the site, approximately 2.1 acres, will flow to the southeast corner of the property – as it does in existing conditions. This runoff is expected to be conveyed in a proposed storm water sewer system within Turkey Creek 3rd Addition. The proposed storm sewer will need to be extended approximately 300 feet to the west to satisfy this sites runoff. We expect this to be accomplished at the time of the adjacent Turkey Creek 3rd development.

POTENTIAL UPSTREAM/DOWNSTREAM IMPACTS

There does not appear to be any negative impact with the development of this property. The site will increase the developed runoff to the proposed detention facility in Turkey Creek 3rd Addition. However, the drainage systems in this subdivision have not yet been constructed. The drainage systems in that subdivision, relative to this plat, will be up-sized (where appropriate) and constructed to manage this sites developed runoff.

SOURCE OF FLOODPLAIN INFORMATION

There is no FEMA SFHA located on this property as of this report. The location of the property, on FEMA FIRM Panel 340 of 700 for Sedgwick County, Kansas, effective date February 2, 2007 is attached as Exhibit 5.

FEDERAL, STATE, & LOCAL PERMITTING

US ARMY CORPS OF ENGINEERS
We do not expect any USACOE permitting at this time.

KANSAS DEPT OF AGRICULTURE – DWR PERMITTING
We do not expect any DWR permitting at this time.

FEMA
No FEMA SFHA exists on this property and we do not expect any FEMA permitting at this time.

KANSAS DEPT OF TRANSPORTATION
There does not appear to be any KDOT permitting needed on the proposed project.

SEDGWICK COUNTY ROW
We do not expect any Sedgwick County permits at this time.

EXHIBIT 1: Site Location Map

EXHIBIT 2: Aerial Photo Exhibit with Topography

EXHIBIT 3: Plat – Half Scale

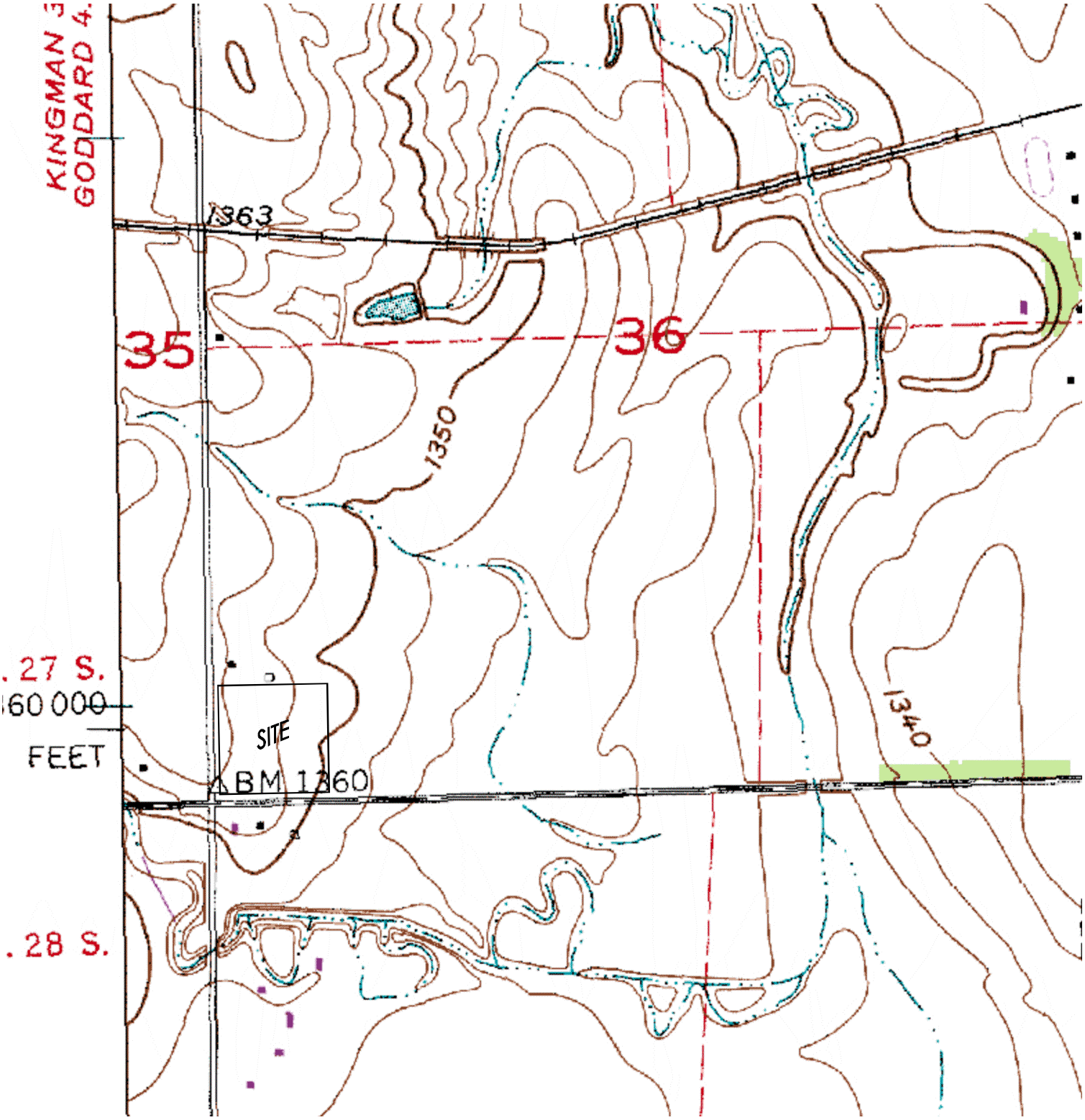
EXHIBIT 4: Drainage & Grading Plan – Half Scale

EXHIBIT 5: Floodplain Location (FIRM)

SITE LOCATION MAP

TURKEY CREEK COMMERCIAL ADDITION

WICHITA, SEDGWICK COUNTY, KANSAS



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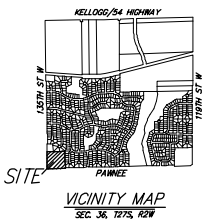


VICINITY MAP
SEC. 36, T27S, R2W

EXHIBIT 1
TURKEY CREEK COMMERCIAL ADDITION

09 JAN 2009

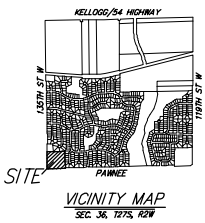
Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
Baughman ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SITE LOCATION MAP

TURKEY CREEK COMMERCIAL ADDITION

WICHITA, SEDGWICK COUNTY, KANSAS

0 100 200



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SEC. 36, T27S, R2W

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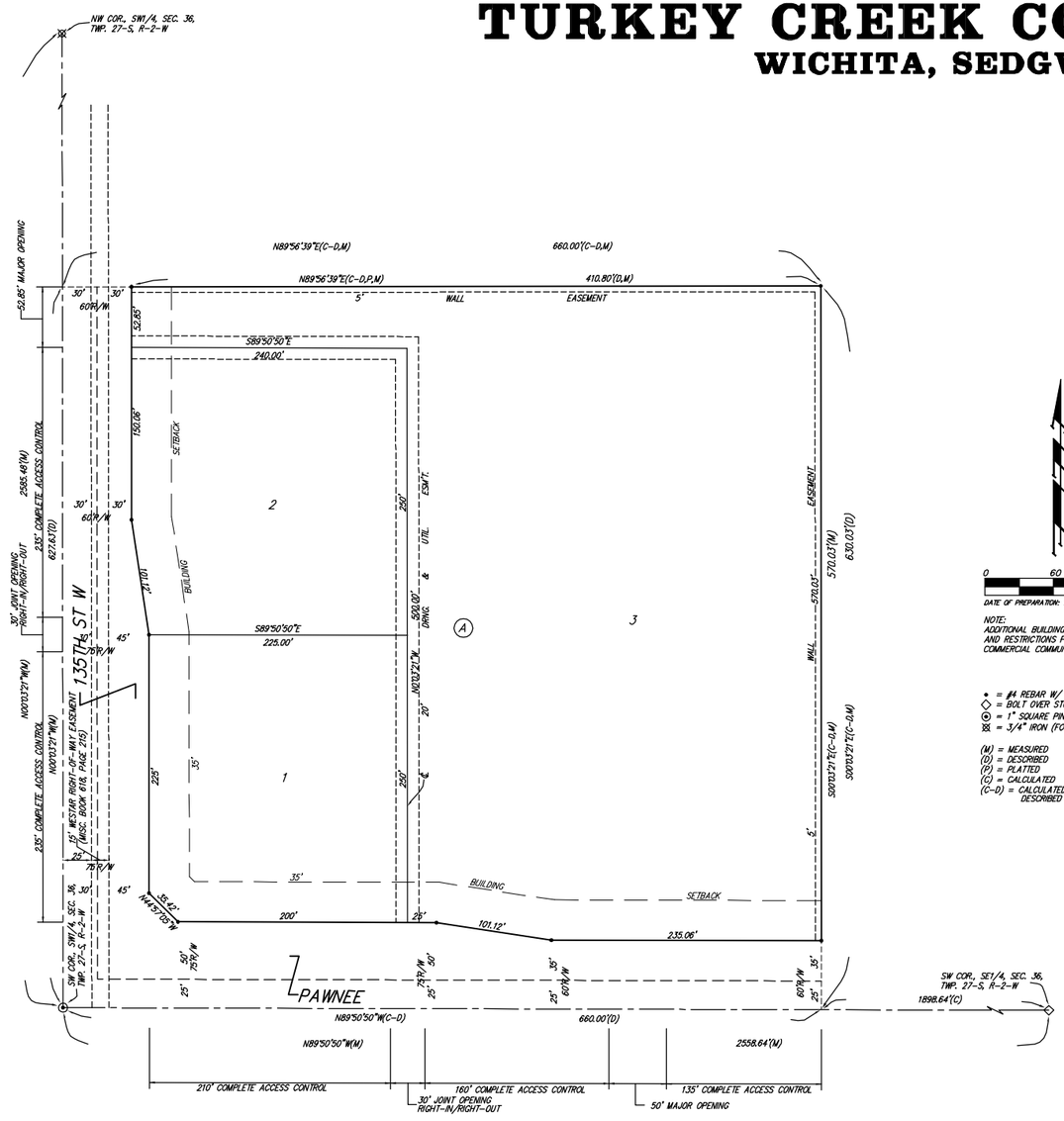
TURKEY CREEK COMMERCIAL ADDITION
WICHITA, SEDGWICK COUNTY, KANSAS



DATE OF PREPARATION: 29 DECEMBER 2008

NOTE:
ADDITIONAL BUILDING SETBACK REQUIREMENTS AND RESTRICTIONS PER TURKEY CREEK COMMERCIAL COMMUNITY UNIT PLAN DP-314.

• = ∮4 REBAR W/ "BAUGHMAN" CAP (SET)
◇ = BOLT OVER STONE (FOUND)
⊙ = 1" SQUARE PIN OVER STONE (FOUND)
⊠ = 3/4" IRON (FOUND)

(M) = MEASURED
(D) = DESCRIBED
(P) = PLATTED
(C) = CALCULATED
(C-D) = CALCULATED PER DESCRIBED INFO.

State of Kansas)
Sedgwick County) SS

We, Baughman Company, P.A., Surveyors in aforesaid county and state do hereby certify that we have surveyed and platted "TURKEY CREEK COMMERCIAL ADDITION", Wichita, Sedgwick County, Kansas and that the accompanying plat is a true and correct exhibit of the property surveyed, described as beginning at the SW corner of said SW1/4 of Sec. 36, Twp. 27-S, R-2-W of the 6th P.M., Sedgwick county, Kansas; thence northerly along the west line of said SW1/4, 627.63 feet; thence easterly at right angles to the west line of said SW1/4, 249.20 feet to the SW corner of Lot 54, Block C, Turkey Creek 3rd Addition, Wichita, Sedgwick County, Kansas; thence continuing easterly along the south line of said Lot 54 and Lot 53 in said Block C, 410.80 feet to the most southerly SE corner of said Lot 53; thence southerly along the west line of said Block C, and as extended southerly, 630.03 feet to a point of the south line of said SW1/4; thence westerly along the south line of said SW1/4, 660.00 feet to the point of beginning, all being subject to road rights-of-way of record.

Existing public easements and dedications being vacated by virtue of K.S.A. 12-512(b).

Baughman Company, P.A.

_____, Surveyor
Michael G. Conrey

Know all men by these presents that we, the undersigned, have caused the land in the surveyors certificate to be platted into Lots, a Block, and Streets, to be known as "TURKEY CREEK COMMERCIAL ADDITION", Wichita, Sedgwick County, Kansas. The drainage and utility easements are hereby granted as indicated for drainage purposes and for the construction and maintenance of all public utilities. The wall easements are hereby granted as indicated for the construction and maintenance of a private screening wall and utility main lines and service lines shall be allowed to cross these easements. Access controls shall be as depicted on the face of the plat and are hereby granted to the City of Wichita, Kansas. The permitted opening locations shall be as determined by the City Engineer of the City of Wichita, Kansas.

John E. Dugan Family Partnership, L.P.,
a Kansas limited partnership
By: John E. Dugan Revocable Trust #1,
Manager

_____, Trustee
John E. Dugan

State of Kansas)
Sedgwick County) SS

The foregoing instrument acknowledged before me, this____day of_____, 2009, by John E. Dugan, Trustee of the John E. Revocable Trust #1, Manager of the John E. Dugan Family Partnership, L.P., a Kansas limited partnership, on behalf of the trust.

_____ Notary Public

My App't. Exp. _____

This plat of "TURKEY CREEK COMMERCIAL ADDITION", Wichita, Sedgwick County, Kansas has been submitted to and approved by the Wichita-Sedgwick County Metropolitan Area Planning Commission, Wichita, Kansas.

Dated this ____ day of _____, 2009.
Wichita-Sedgwick County Metropolitan Area Planning Commission

_____, Chair
Darrell Downing

_____, Secretary
John L. Schlegel

This plat approved and all dedications shown hereon accepted by the City Council of the City of Wichita, Kansas, this ____ day of _____, 2009.

_____, Mayor
Carl Brewer

_____, City Clerk
Karen Sublett

Reviewed in accordance with K.S.A. 58-2005 on this____day of _____, 2009.

_____
Tricia L. Robello, L.S. #1246
Deputy County Surveyor
Sedgwick County, Kansas

Entered on transfer record this_____day of _____ , 2009.

_____, County Clerk
Kelly Arnold

State of Kansas)
Sedgwick County) SS

This is to certify that this plat has been filed for record in the office of the Register of Deeds, this____day of_____, 2009 at____o'clock___M; and is duly recorded.

_____, Register of Deeds
Bill Meek

_____, Deputy
Tonya Buckingham

NOTE:
A drainage plan has been developed for this subdivision and is on file with the City of Wichita, Kansas. Drainage intent shall remain as depicted or as modified with the approval of the City Engineer of the City of Wichita, Kansas. No obstructions which impede the flow of this drainage plan shall be allowed.

29 DECEMBER 2008

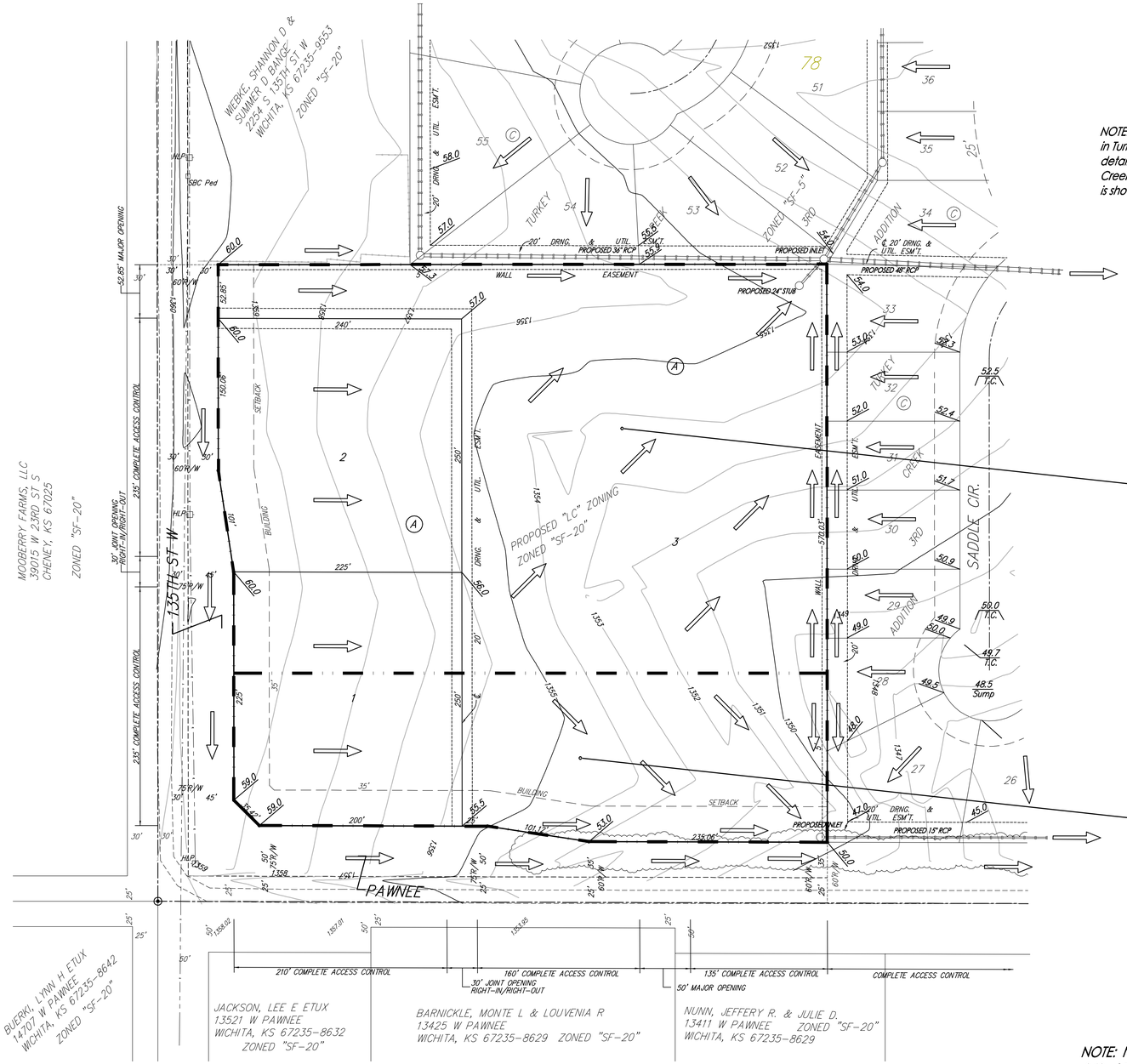
Baughman Company, P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

F:\PLAT\TURKEY CREEK COMMERCIAL ADD\DWG\TURKEY CREEK COMM-F.DWG-RKR

DRAINAGE & GRADING PLAN

TURKEY CREEK COMMERCIAL ADDITION

WICHITA, SEDGWICK COUNTY, KANSAS



NOTE: The stormwater sewer shown was proposed and approved in Turkey Creek 3rd Addition. This sites developed runoff will be detained and conveyed in proposed detention ponds in Turkey Creek 3rd Addition. The pond system has been re-modeled and is shown in the accompanying 'Drainage Plan'.

PROPOSED NORTH	
Area = 5.5 acres	
Tc = 15 min	
EXISTING	DEVELOPED
Tc = 15 min	Tc = 15 min
CN = 75	CN = 92
Q_2 = 3.0 cfs	Q_2 = 10 cfs
Q_5 = 14 cfs	Q_5 = 22 cfs
Q_{100} = 35 cfs	Q_{100} = 45 cfs

PROPOSED SOUTH	
Area = 2.1 acres	
Tc = 15 min	
EXISTING	DEVELOPED
Tc = 15 min	Tc = 15 min
CN = 75	CN = 92
Q_2 = 1.0 cfs	Q_2 = 3.7 cfs
Q_5 = 5.0 cfs	Q_5 = 8.5 cfs
Q_{100} = 13 cfs	Q_{100} = 17 cfs

0 60 120

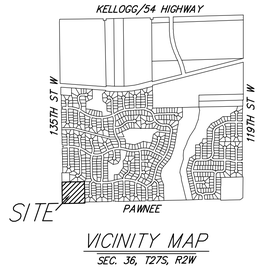
DATE OF PREPARATION: 10 NOVEMBER 2008
DATE OF TOPOGRAPHY: 23 MAY 2006
CONTOUR INTERVALS = 1 FOOT

OWNER:
JOHN E. DUGAN FAMILY PARTNERSHIP
ATTN: JOHN DUGAN
2416 MORNING DEW
WICHITA, KS 67205-1302
721-2416

LEGAL DESCRIPTION:
BEGINNING AT THE SW CORNER OF SAID SW1/4 OF SEC. 36, TWP. 27-S, R-2-W OF THE 6TH P.M., SEDGWICK COUNTY, KANSAS; THENCE NORTHERLY ALONG THE WEST LINE OF SAID SW1/4, 627.63 FEET; THENCE EASTERLY AT RIGHT ANGLES TO THE WEST LINE OF SAID SW1/4, 249.20 FEET TO THE SW CORNER OF LOT 54, BLOCK C, TURKEY CREEK 3RD ADDITION, WICHITA, SEDGWICK COUNTY, KANSAS; THENCE CONTINUING EASTERLY ALONG THE SOUTH LINE OF SAID LOT 54 AND LOT 53 IN SAID BLOCK C, 410.80 FEET TO THE MOST SOUTHERLY SE CORNER OF SAID LOT 53; THENCE SOUTHERLY ALONG THE WEST LINE OF SAID BLOCK C, AND AS EXTENDED SOUTHERLY, 630.03 FEET TO A POINT OF THE SOUTH LINE OF SAID SW1/4; THENCE WESTERLY ALONG THE SOUTH LINE OF SAID SW1/4, 660.00 FEET TO THE POINT OF BEGINNING, ALL BEING SUBJECT TO ROAD RIGHTS-OF-WAY OF RECORD.

BENCHMARK:
135TH ST. W. & PAWNEE-
CITY OF WICHITA BENCHMARK DISC ON SW CORNER OF CONCRETE BASE OF HIGH LINE POLE.
ELEV. = 1359.65 NGVD29

NOTE:
ADDITIONAL BUILDING SETBACK REQUIREMENTS AND RESTRICTIONS PER TURKEY CREEK COMMERCIAL COMMUNITY UNIT PLAN DP-314.



VICINITY MAP
SEC. 36, T27S, R2W

NOTE: No FEMA SFHA exists on this property per FEMA FIRM Panel 340 of 700 for Sedgwick County, Kansas, effective February 2, 2007.

Internal stormwater sewer systems are expected upon site development to convey developed runoff to the stormwater sewer stubs - as shown. The size and location of all internal stormwater sewers will be proposed at site development.

DRAINAGE & GRADING PLAN
TURKEY CREEK COMMERCIAL ADDITION

06 JANUARY 2009

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315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
Baughman ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

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JOINS PANEL 0320

35

36

ZONE A

ZONE X

S 135TH ST W

S 119TH ST W

SITE

T. 27 S.

T. 28 S.

W PAWNEE AVE

41 68 000m N

ZONE X

Arkansas River

MAP SCALE 1" = 1000"

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0340E

FIRM

FLOOD INSURANCE RATE MAP

SEDGWICK COUNTY, KANSAS
AND INCORPORATED AREAS

PANEL 340 OF 700

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SEDGWICK COUNTY	200321	0340	E
WICHITA, CITY OF	200328	0340	E

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

MAP NUMBER
20173C0340E

EFFECTIVE DATE
FEBRUARY 2, 2007

Federal Emergency Management Agency

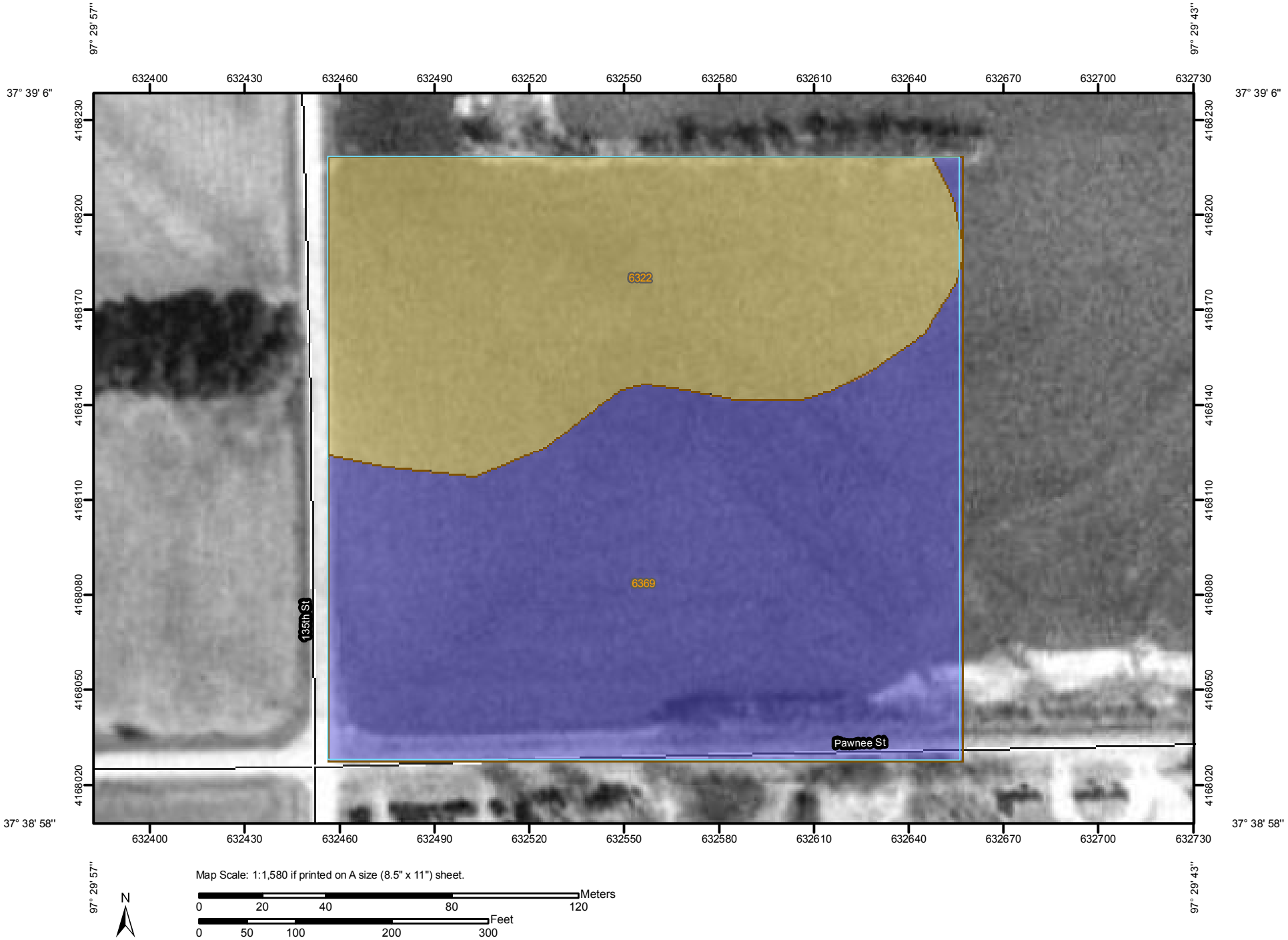
SUPPORTING CALCULATIONS

APPENDIX A: USGS Soils Survey

APPENDIX B: HydraFlow Hydrographs
-Existing & Proposed Runoff
-Turkey Creek 3rd Addition Pond Re-Model

USGS Soils Survey

Hydrologic Soil Group
(Turkey Creek Commercial)



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Soil Ratings

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

Political Features

- Cities

Water Features

- Oceans
- Streams and Canals

Transportation

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

MAP INFORMATION

Map Scale: 1:1,580 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 14N NAD83

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

Soil Survey Area: Sedgwick County, Kansas
Survey Area Data: Version 4, Dec 29, 2007

Date(s) aerial images were photographed: 8/17/1991; 3/20/1996

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

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Sedgwick County, Kansas				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
6322	Blanket silt loam, 0 to 1 percent slopes	C	3.9	41.8%
6369	Milan loam, 1 to 3 percent slopes	B	5.5	58.2%
Totals for Area of Interest			**9.4**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie.

The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Lower

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

HydraFlow Hydrographs

-Existing & Proposed Conditions
- Proposed Turkey Creek 3rd Pond Re-Model

Watershed Model Schematic

1 - North Basin - Existing

3 - South Basin - Existing

2 - North Basin - Proposed

4 - South Basin - Proposed

Legend

Hyd.	Origin	Description
1	SCS Runoff	North Basin - Existing
2	SCS Runoff	North Basin - Proposed
3	SCS Runoff	South Basin - Existing
4	SCS Runoff	South Basin - Proposed

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	------	-------	8.799	-------	14.15	18.70	23.38	-------	34.20	North Basin - Existing
2	SCS Runoff	------	-------	17.73	-------	23.83	28.68	33.49	-------	44.26	North Basin - Proposed
3	SCS Runoff	------	-------	3.359	-------	5.405	7.139	8.927	-------	13.06	South Basin - Existing
4	SCS Runoff	------	-------	6.771	-------	9.099	10.95	12.79	-------	16.90	South Basin - Proposed

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

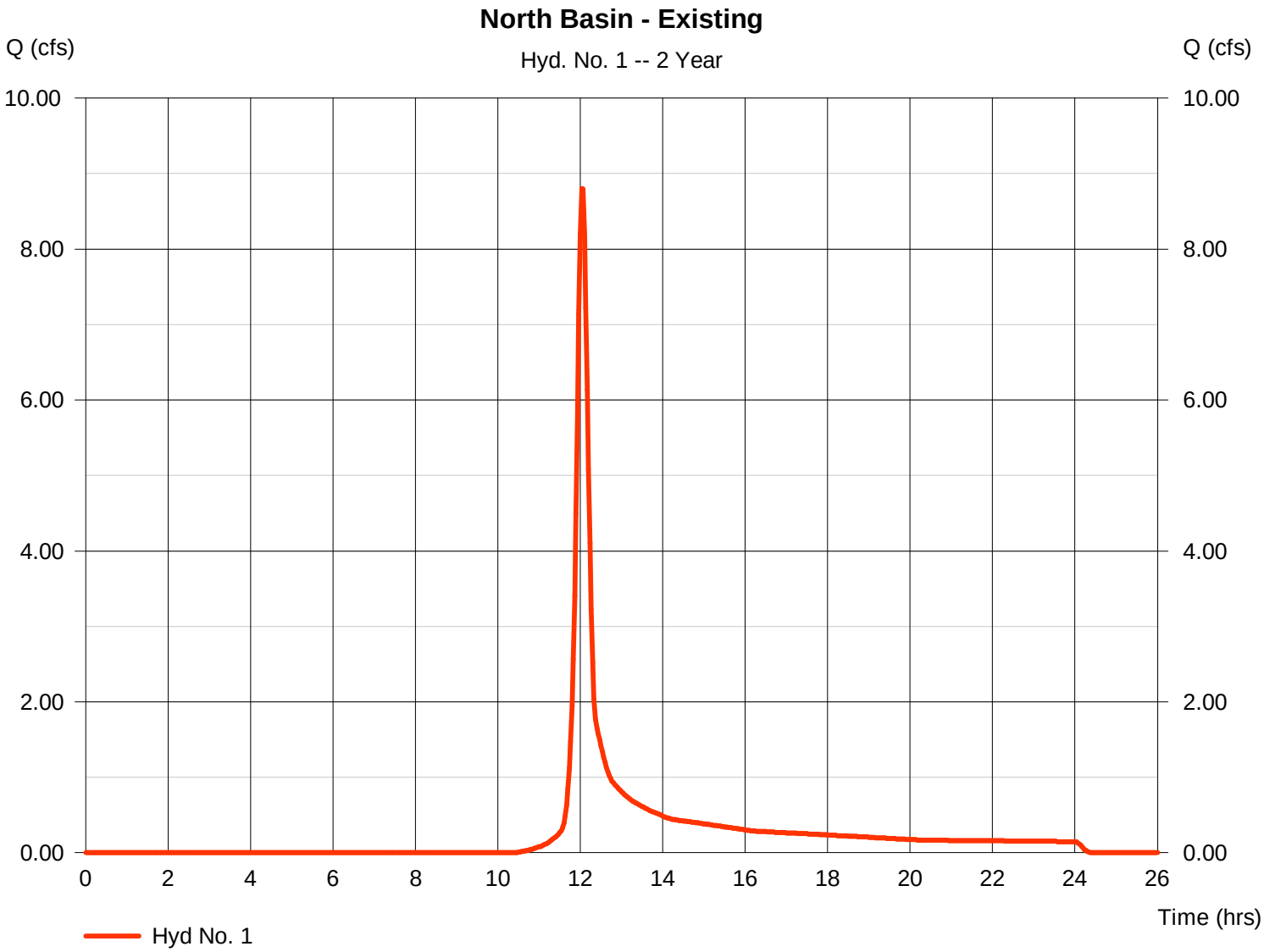
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	8.799	2	722	25,341	------	------	------	North Basin - Existing
2	SCS Runoff	17.73	2	722	51,326	------	------	------	North Basin - Proposed
3	SCS Runoff	3.359	2	722	9,676	------	------	------	South Basin - Existing
4	SCS Runoff	6.771	2	722	19,597	------	------	------	South Basin - Proposed

Hydrograph Report

Hyd. No. 1

North Basin - Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.799 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	25,341 cuft
Drainage area	=	5.500 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	3.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

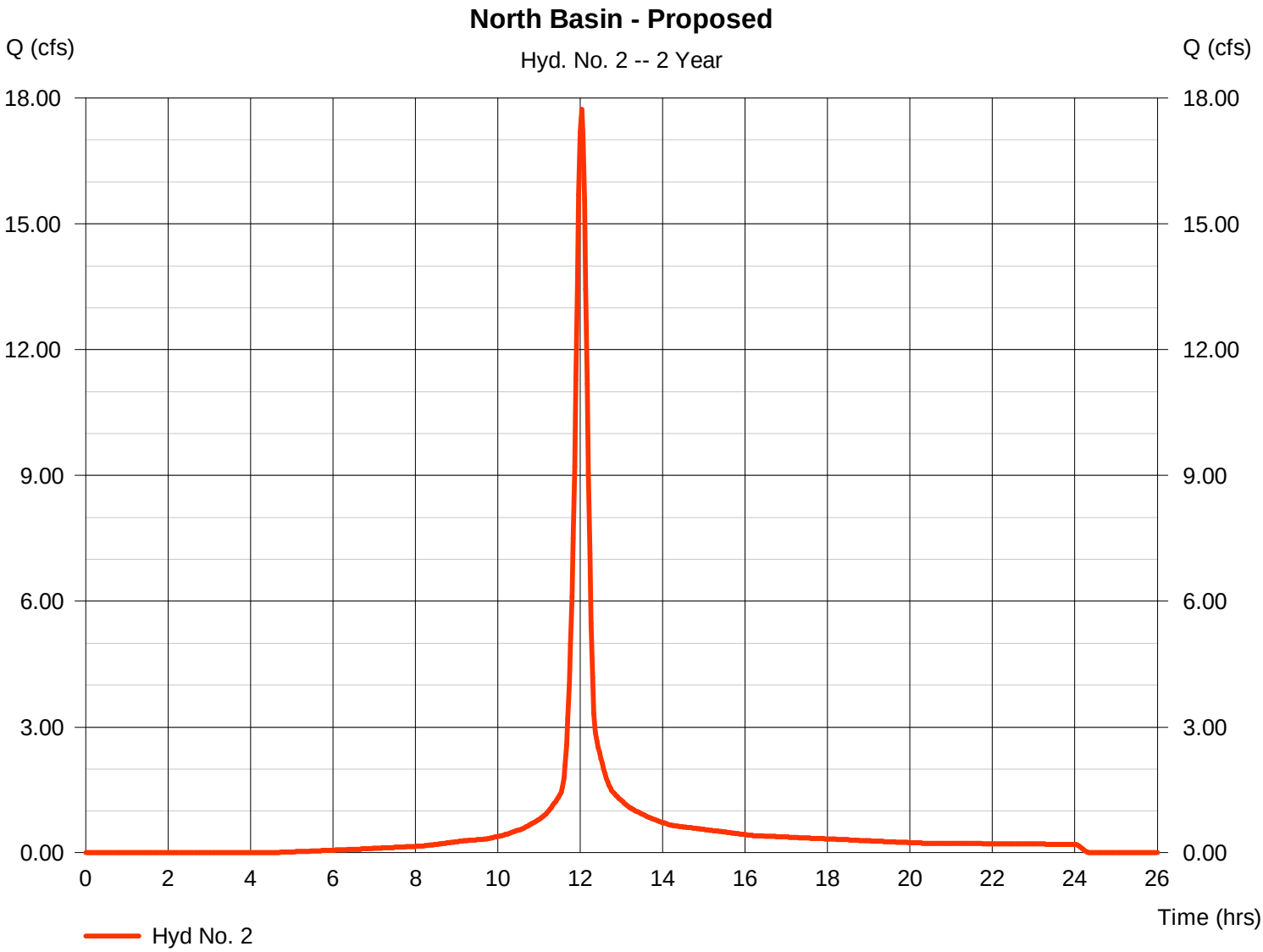


Hydrograph Report

Hyd. No. 2

North Basin - Proposed

Hydrograph type	=	SCS Runoff	Peak discharge	=	17.73 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	51,326 cuft
Drainage area	=	5.500 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	3.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

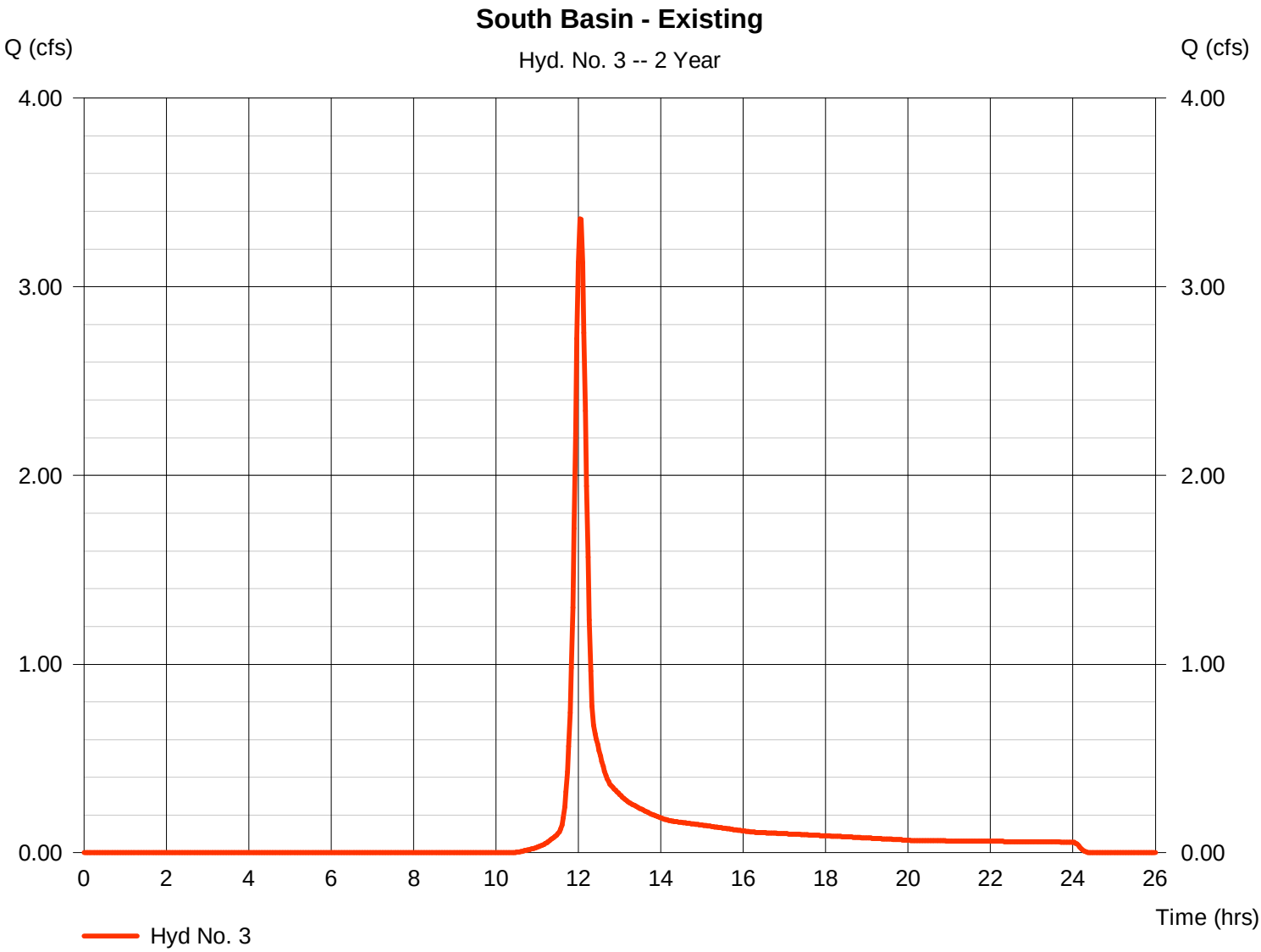


Hydrograph Report

Hyd. No. 3

South Basin - Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.359 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	9,676 cuft
Drainage area	=	2.100 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	3.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

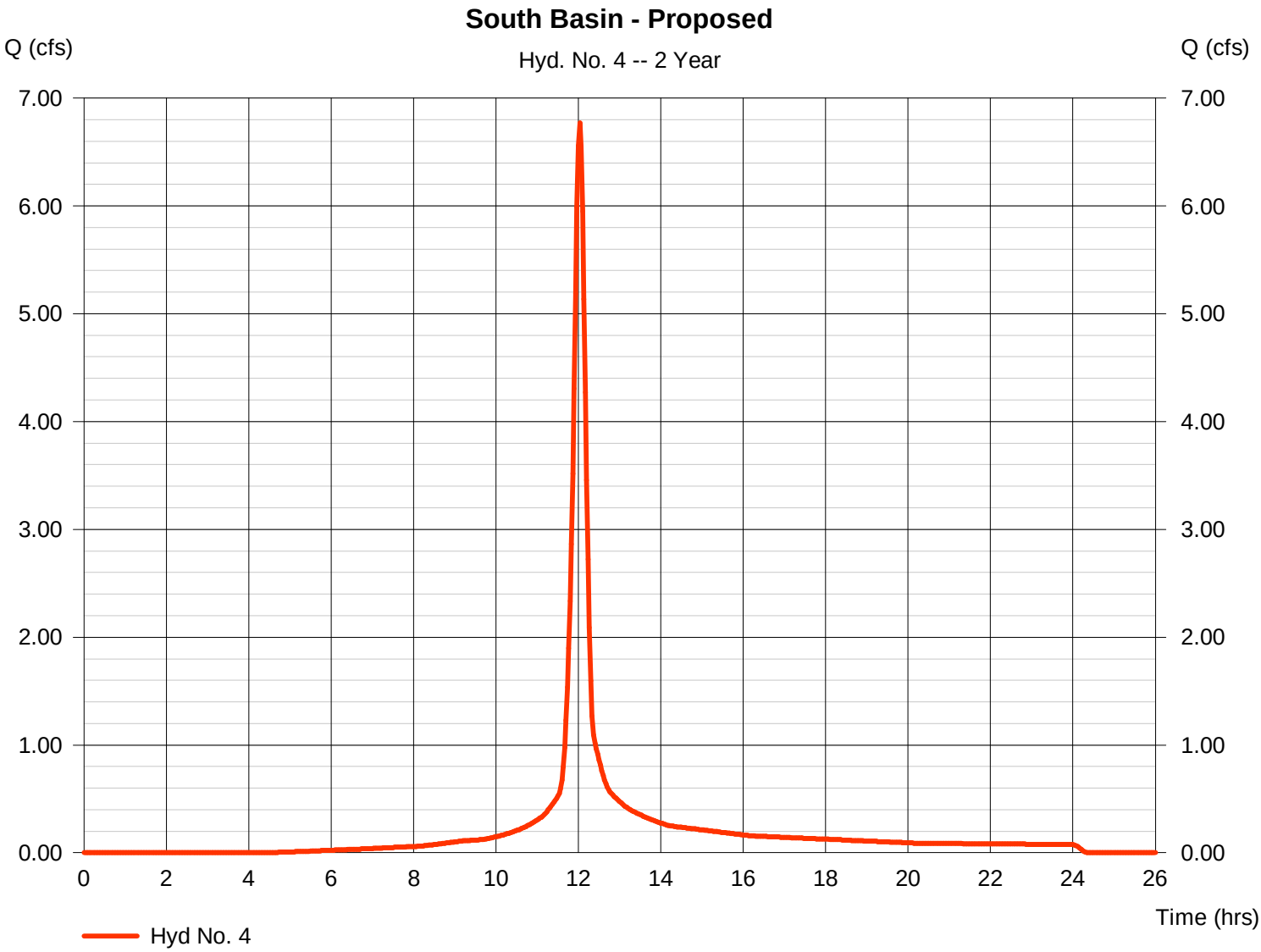


Hydrograph Report

Hyd. No. 4

South Basin - Proposed

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.771 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	19,597 cuft
Drainage area	=	2.100 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	3.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

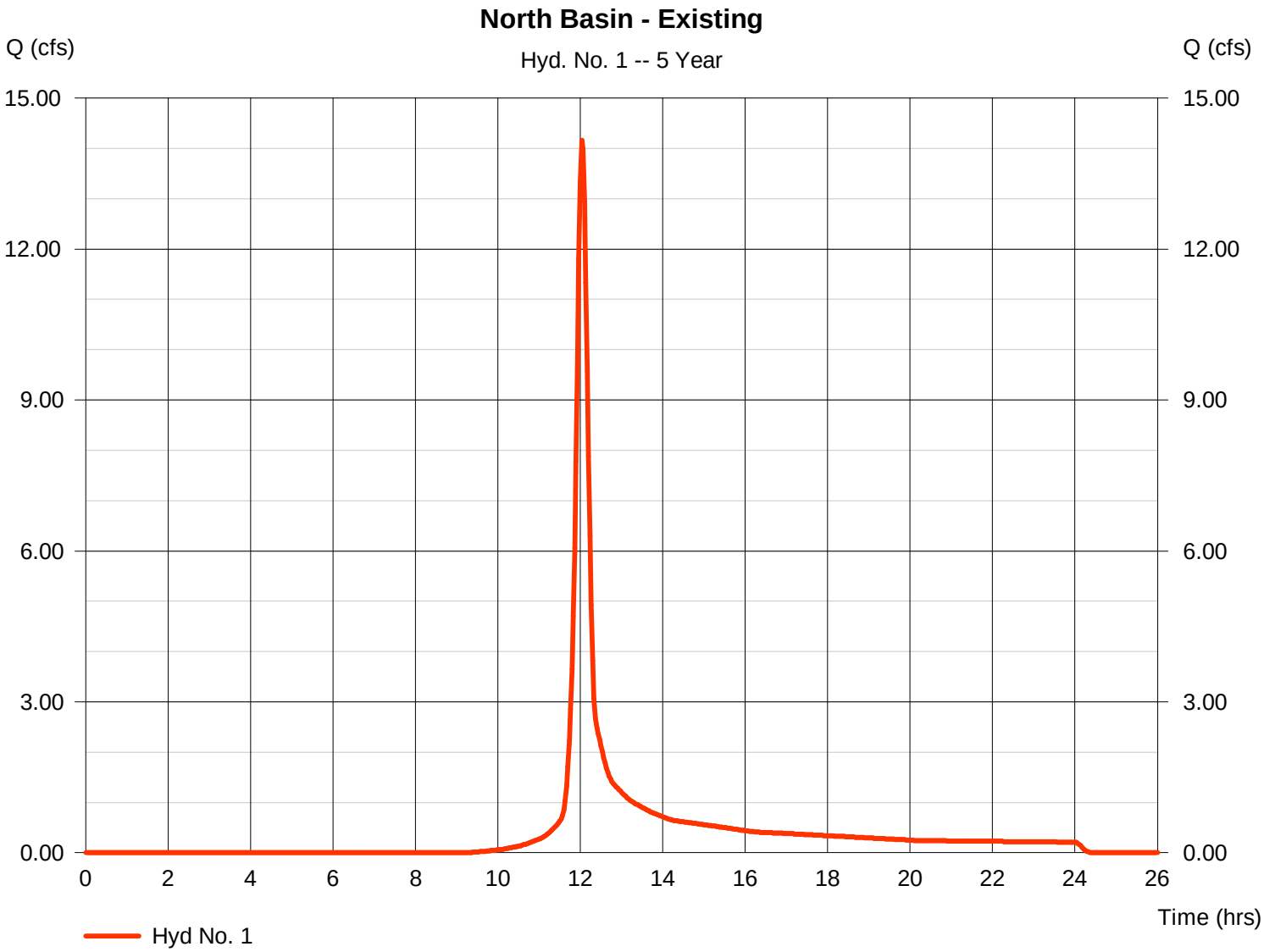
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	14.15	2	722	39,913	------	------	------	North Basin - Existing
2	SCS Runoff	23.83	2	722	70,117	------	------	------	North Basin - Proposed
3	SCS Runoff	5.405	2	722	15,239	------	------	------	South Basin - Existing
4	SCS Runoff	9.099	2	722	26,772	------	------	------	South Basin - Proposed

Hydrograph Report

Hyd. No. 1

North Basin - Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	14.15 cfs
Storm frequency	=	5 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	39,913 cuft
Drainage area	=	5.500 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

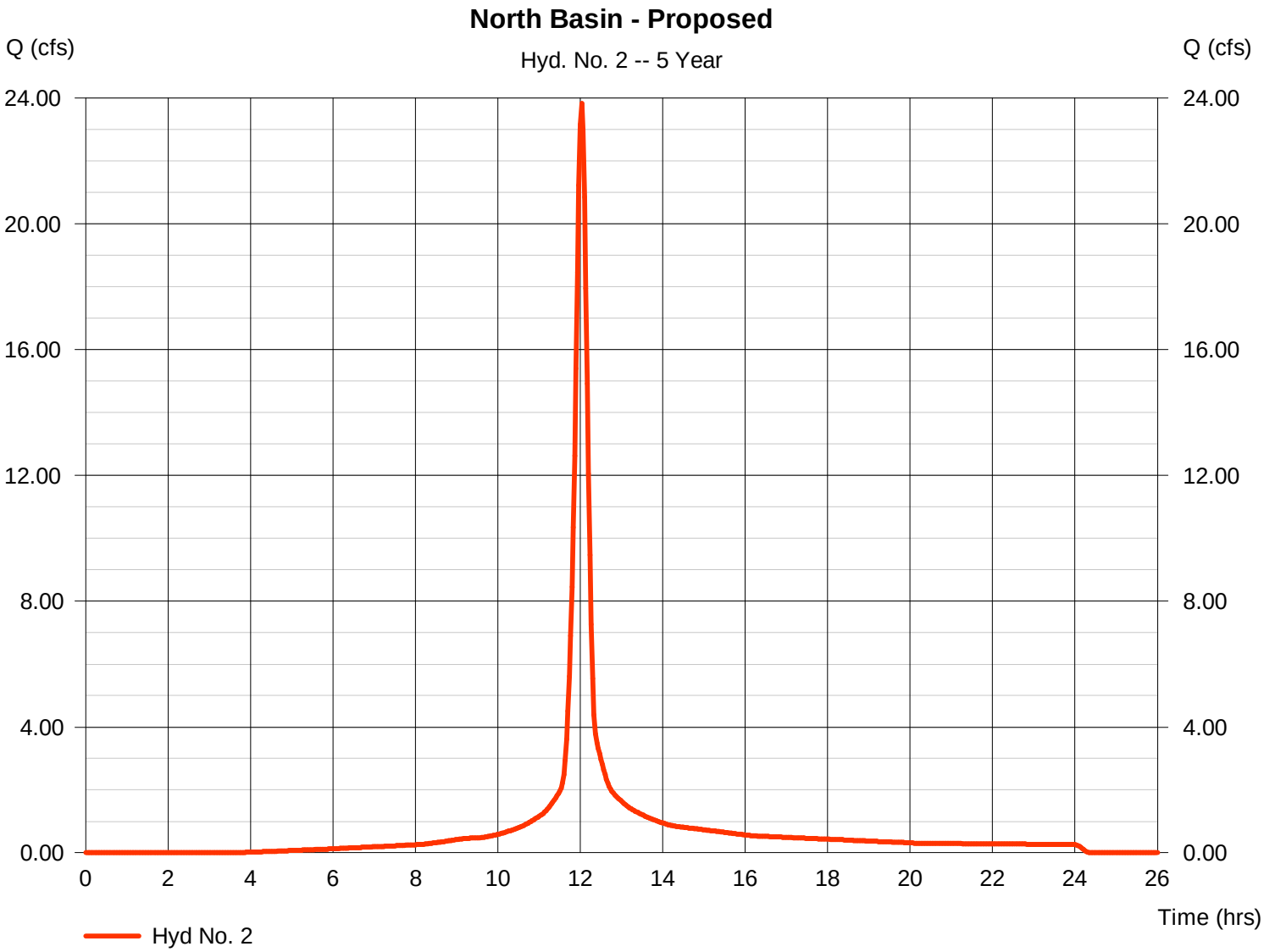


Hydrograph Report

Hyd. No. 2

North Basin - Proposed

Hydrograph type	=	SCS Runoff	Peak discharge	=	23.83 cfs
Storm frequency	=	5 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	70,117 cuft
Drainage area	=	5.500 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

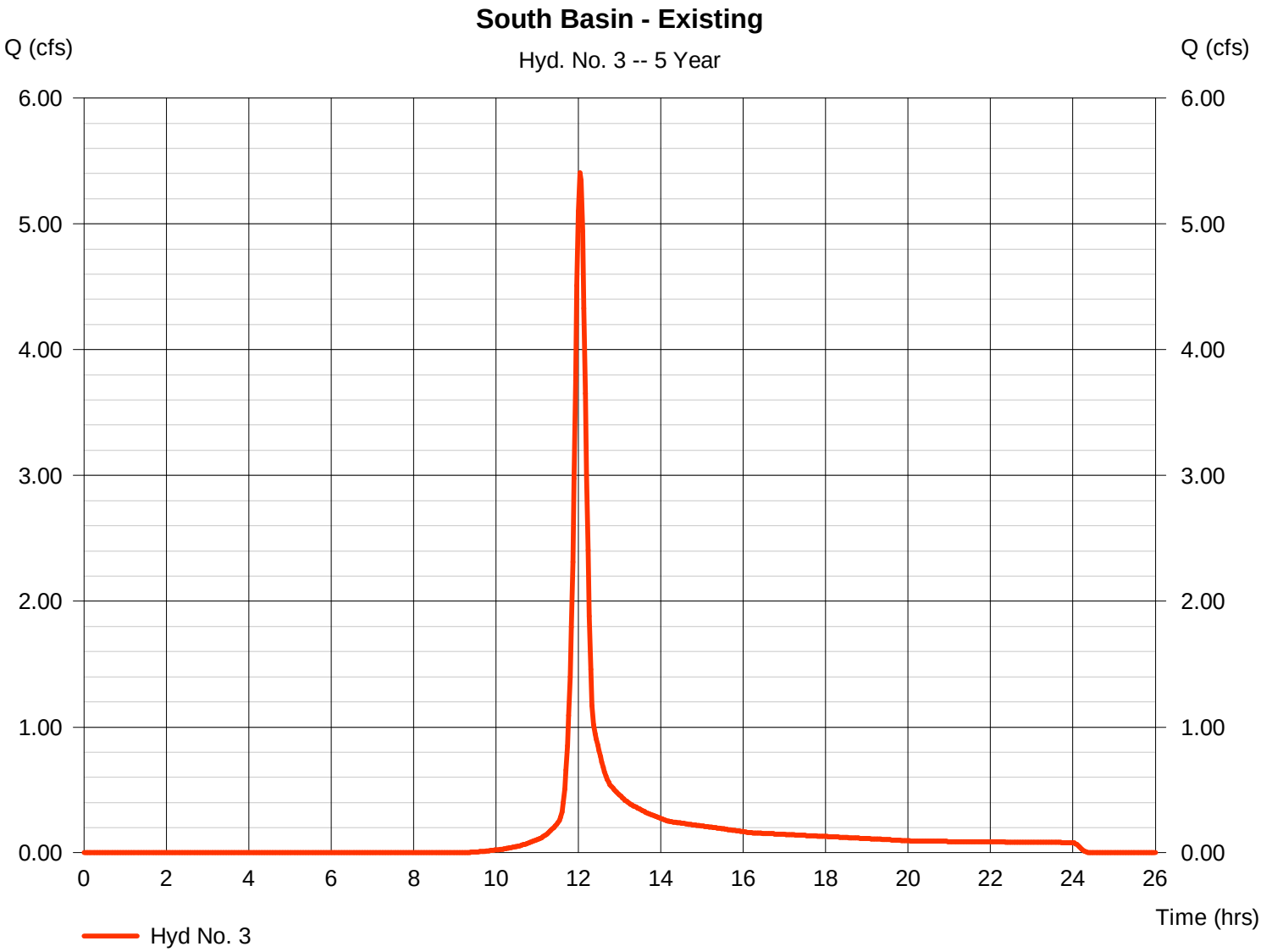


Hydrograph Report

Hyd. No. 3

South Basin - Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.405 cfs
Storm frequency	=	5 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	15,239 cuft
Drainage area	=	2.100 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

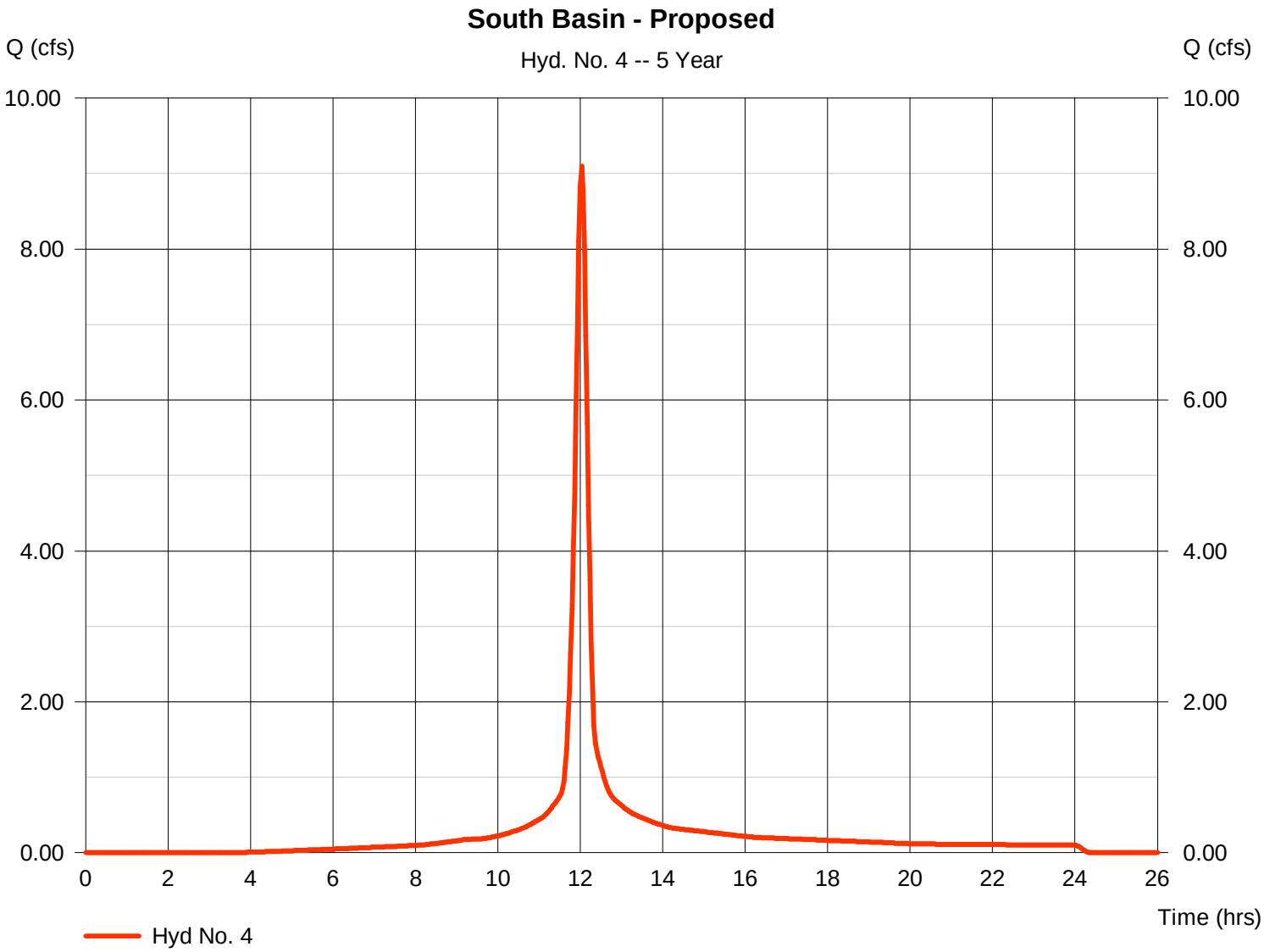


Hydrograph Report

Hyd. No. 4

South Basin - Proposed

Hydrograph type	=	SCS Runoff	Peak discharge	=	9.099 cfs
Storm frequency	=	5 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	26,772 cuft
Drainage area	=	2.100 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

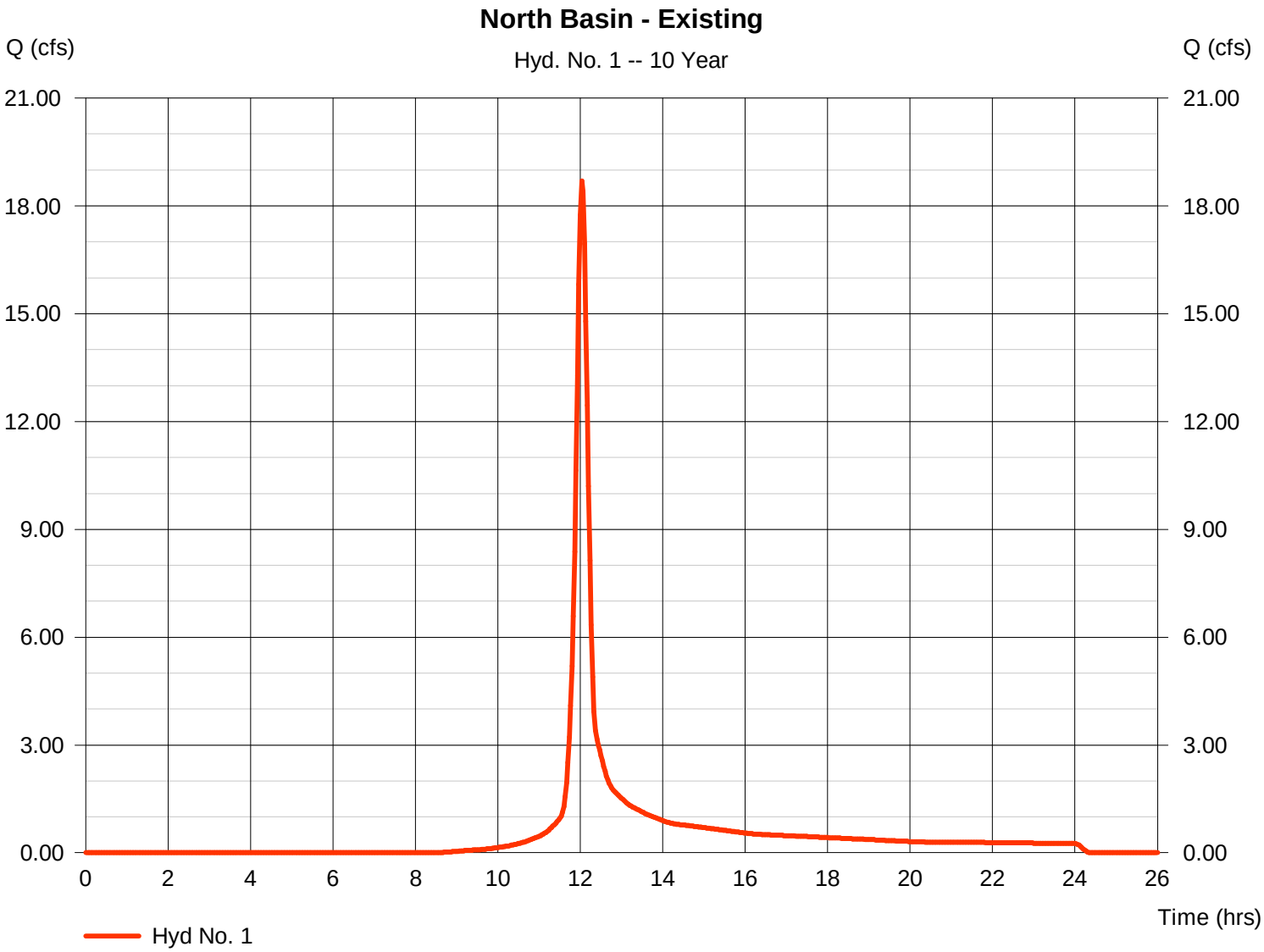
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	18.70	2	722	52,455	------	------	------	North Basin - Existing
2	SCS Runoff	28.68	2	722	85,312	------	------	------	North Basin - Proposed
3	SCS Runoff	7.139	2	722	20,028	------	------	------	South Basin - Existing
4	SCS Runoff	10.95	2	722	32,574	------	------	------	South Basin - Proposed

Hydrograph Report

Hyd. No. 1

North Basin - Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	18.70 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	52,455 cuft
Drainage area	=	5.500 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	5.30 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



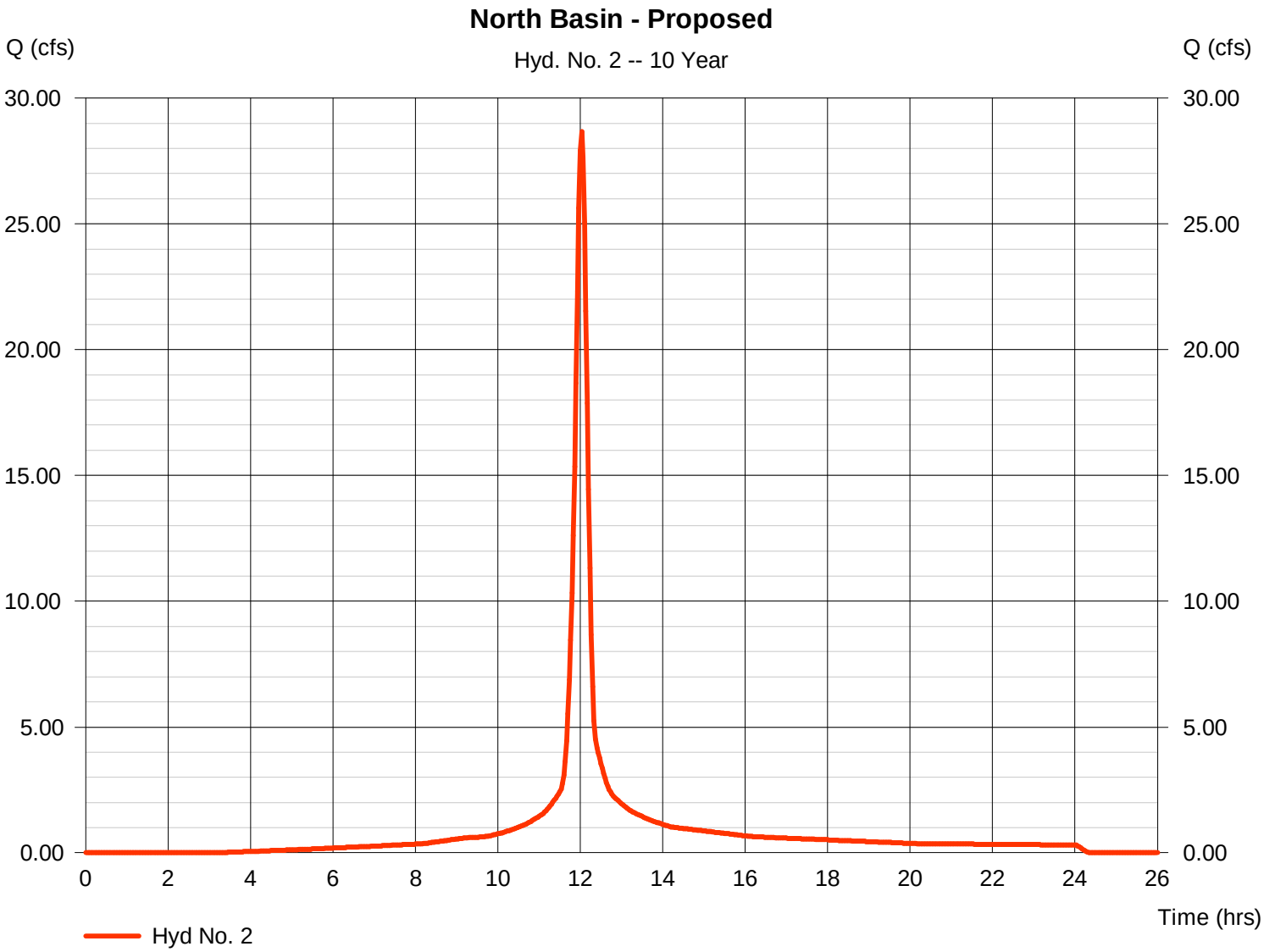
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 9, 2009

Hyd. No. 2

North Basin - Proposed

Hydrograph type	=	SCS Runoff	Peak discharge	=	28.68 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	85,312 cuft
Drainage area	=	5.500 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	5.30 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

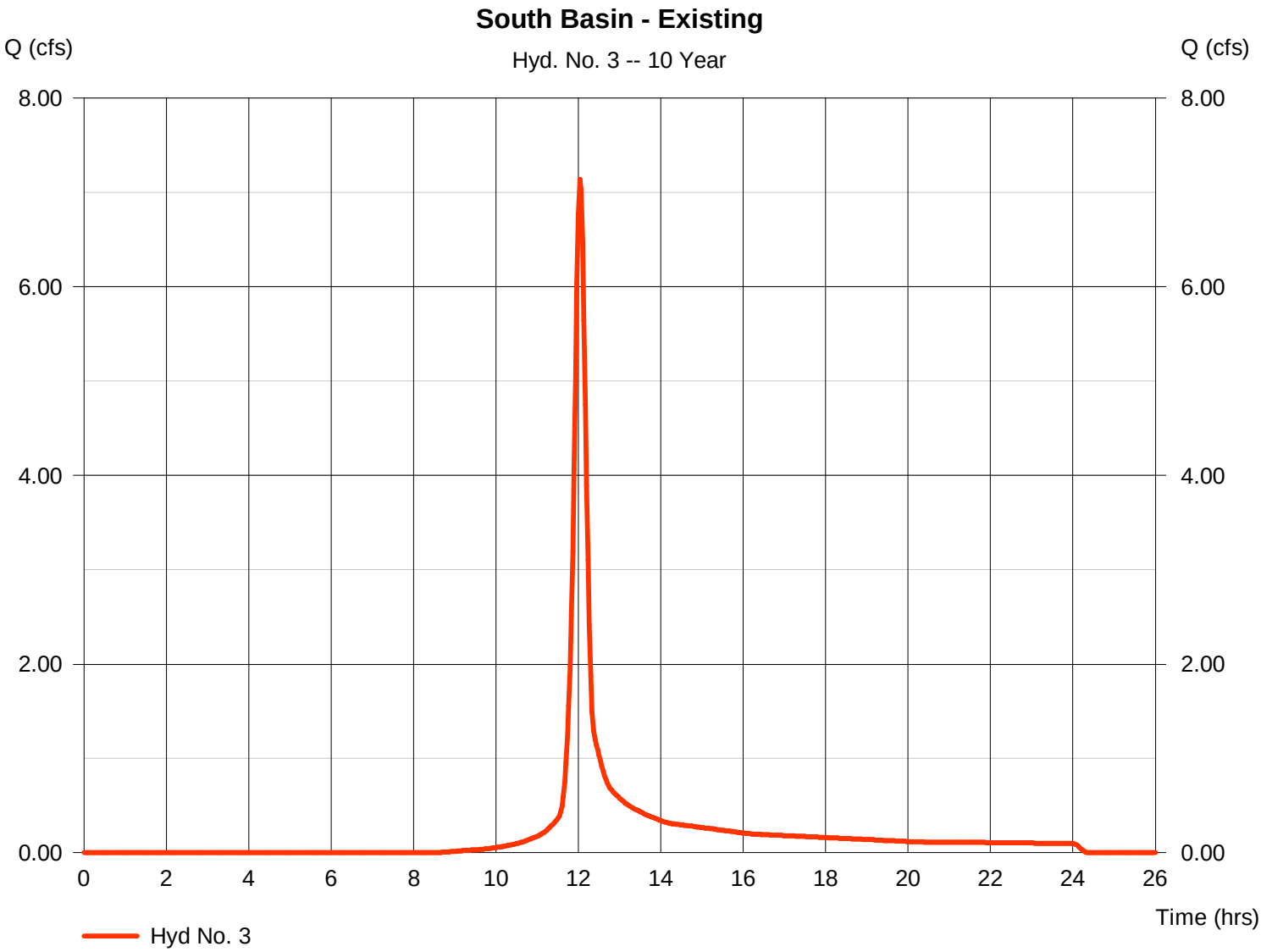


Hydrograph Report

Hyd. No. 3

South Basin - Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.139 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	20,028 cuft
Drainage area	=	2.100 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	5.30 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

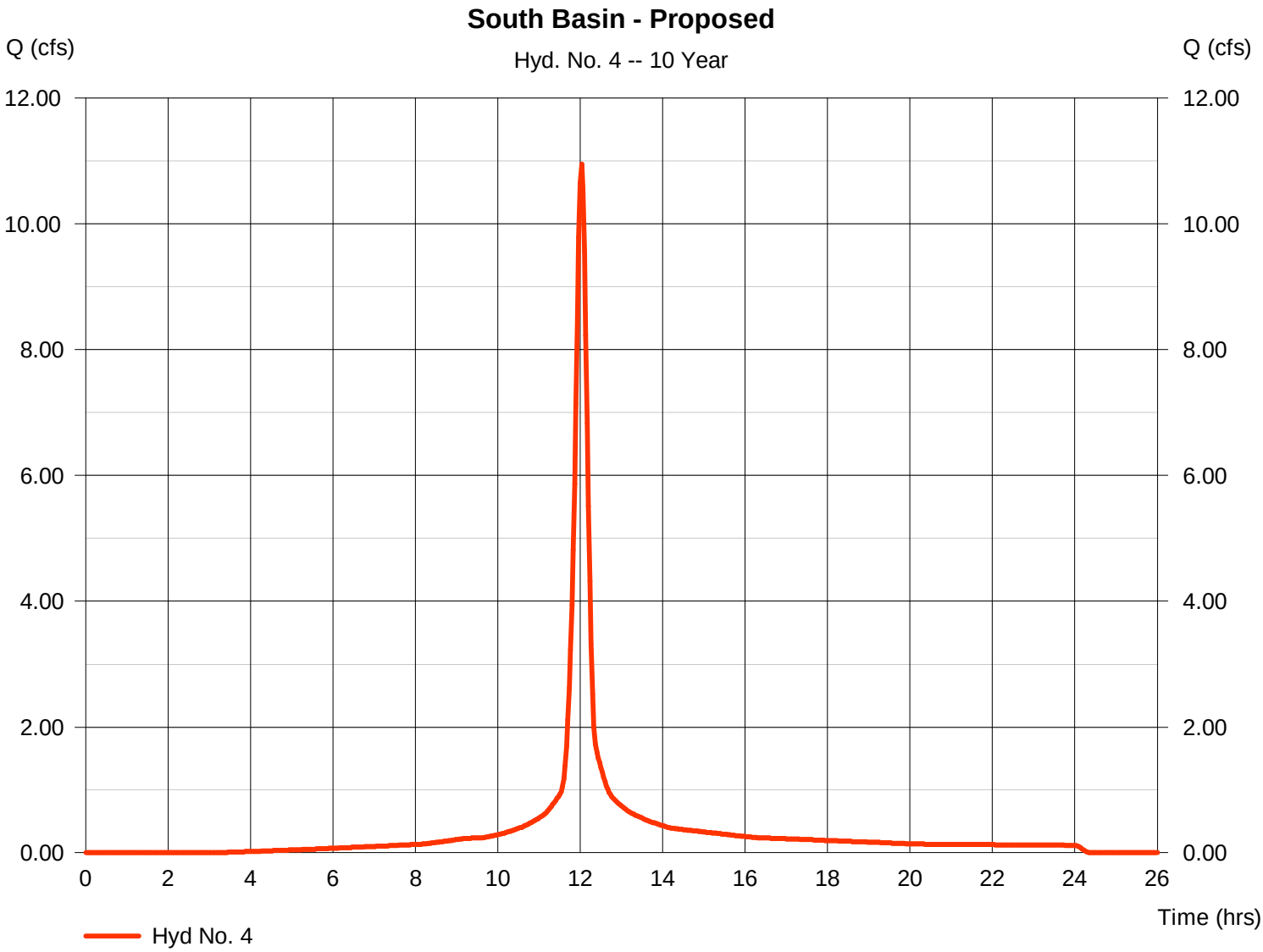


Hydrograph Report

Hyd. No. 4

South Basin - Proposed

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.95 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	32,574 cuft
Drainage area	=	2.100 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	5.30 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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	23.38	2	722	65,550	------	------	------	North Basin - Existing
2	SCS Runoff	33.49	2	722	100,596	------	------	------	North Basin - Proposed
3	SCS Runoff	8.927	2	722	25,028	------	------	------	South Basin - Existing
4	SCS Runoff	12.79	2	722	38,409	------	------	------	South Basin - Proposed

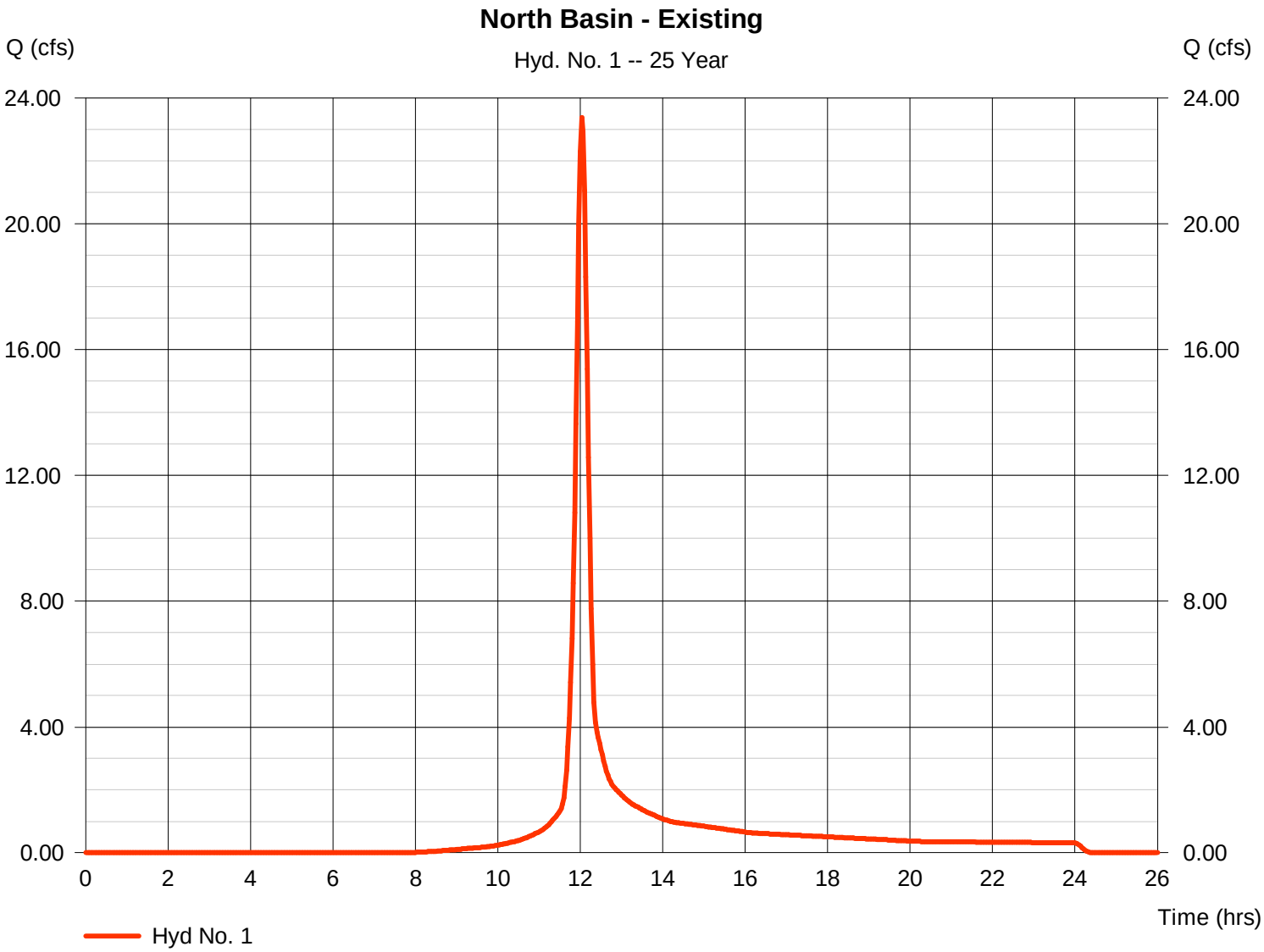
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 9, 2009

Hyd. No. 1

North Basin - Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	23.38 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	65,550 cuft
Drainage area	=	5.500 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	6.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

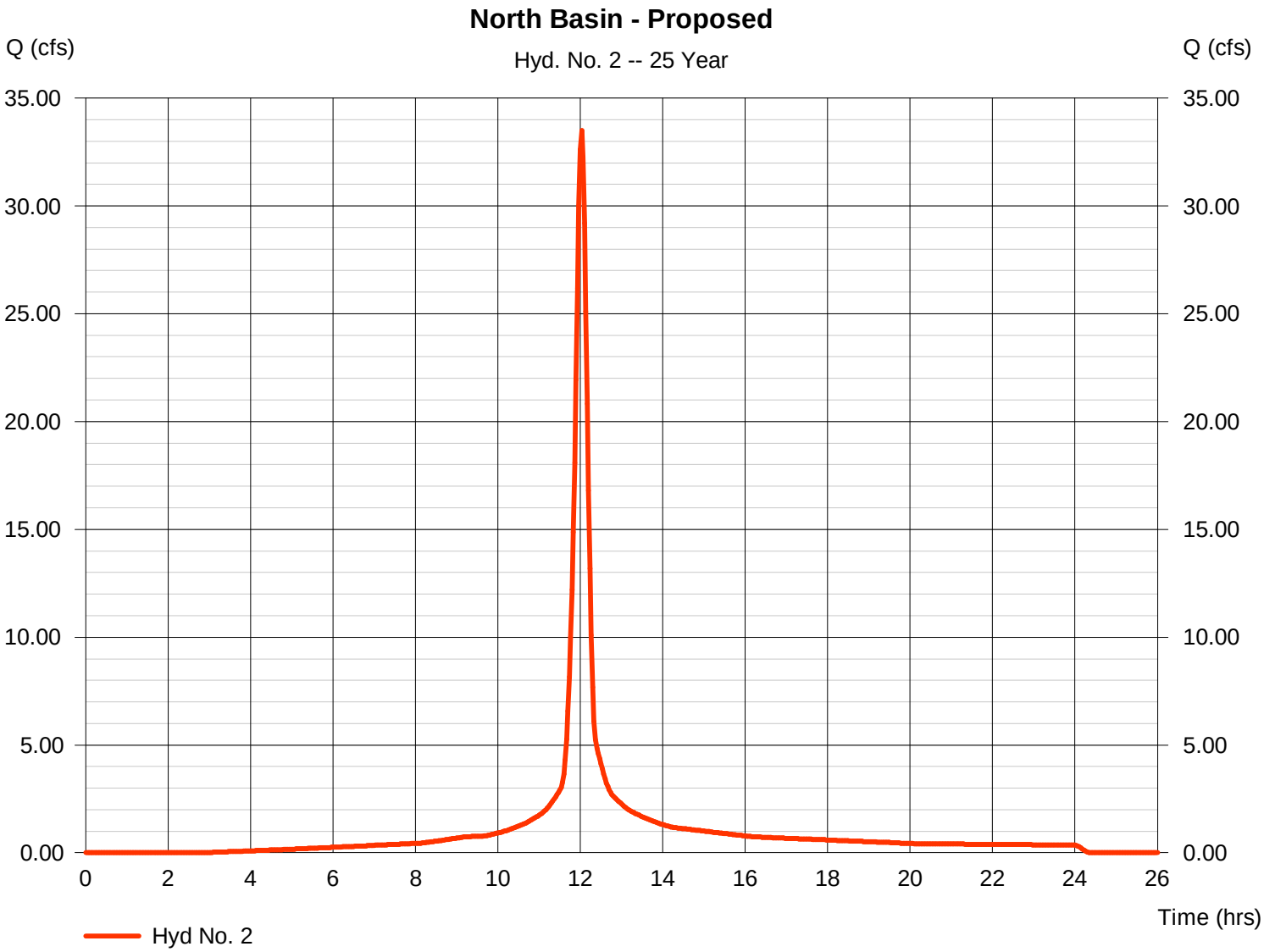


Hydrograph Report

Hyd. No. 2

North Basin - Proposed

Hydrograph type	=	SCS Runoff	Peak discharge	=	33.49 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	100,596 cuft
Drainage area	=	5.500 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	6.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

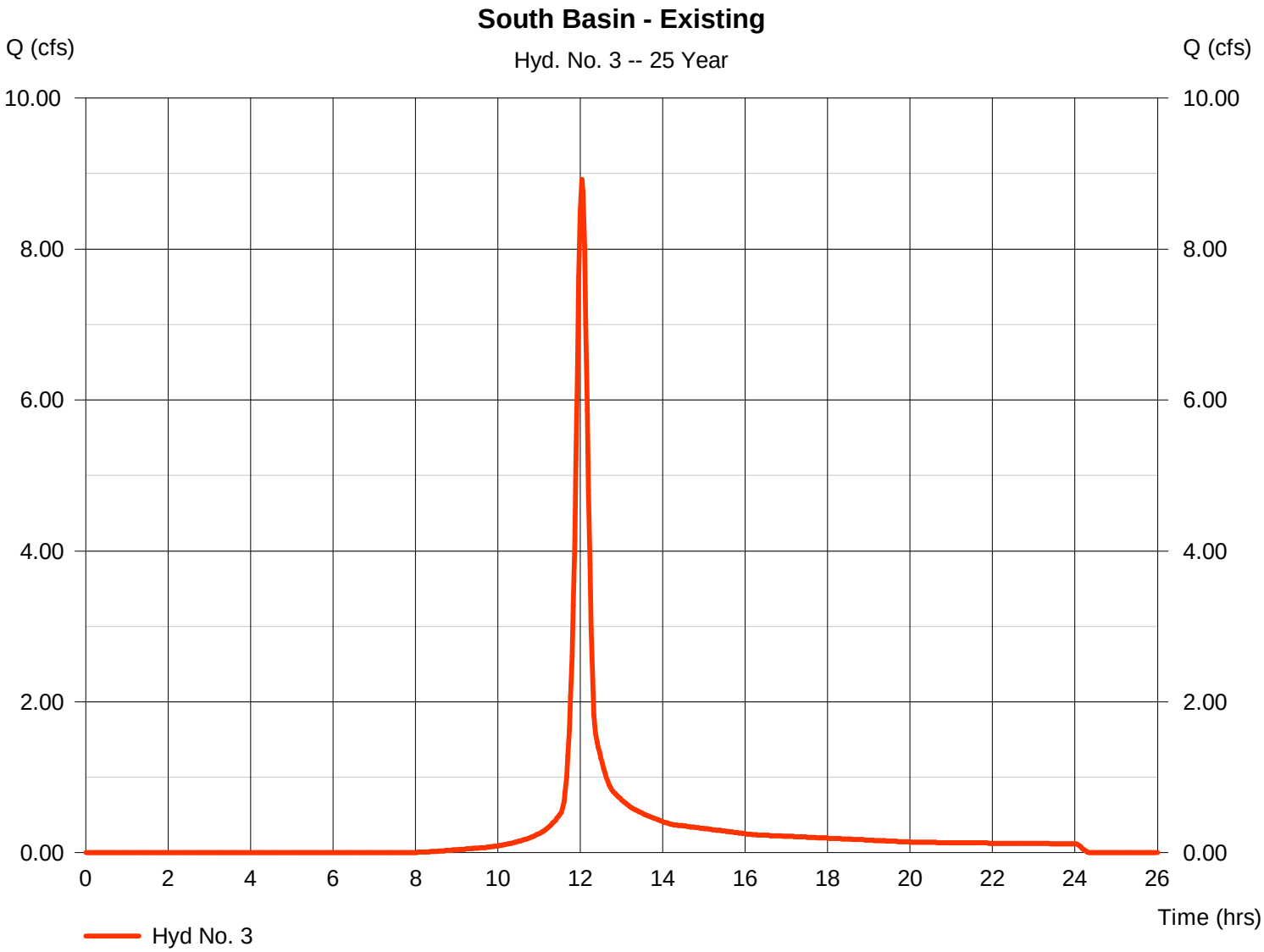


Hydrograph Report

Hyd. No. 3

South Basin - Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.927 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	25,028 cuft
Drainage area	=	2.100 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	6.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

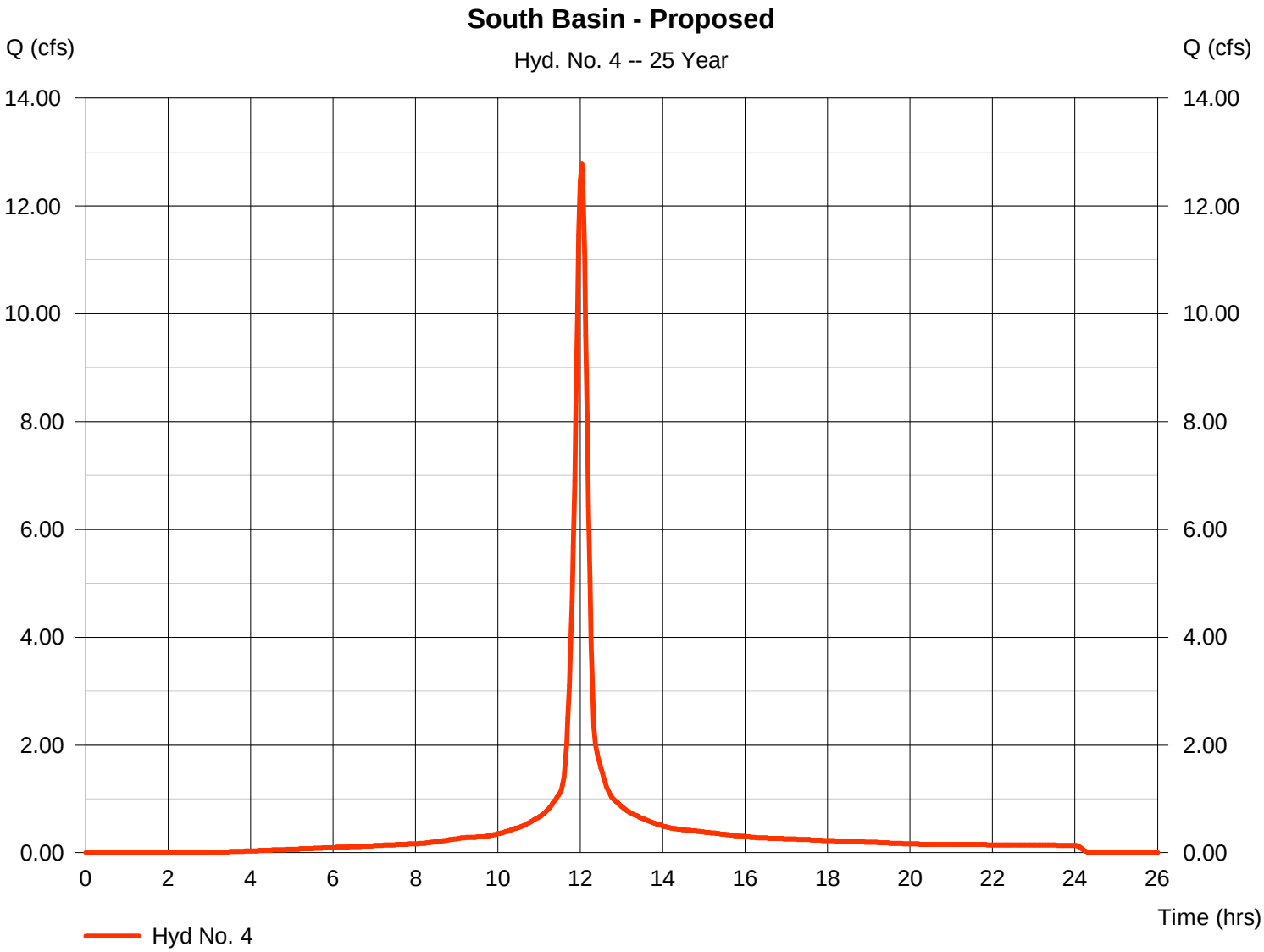


Hydrograph Report

Hyd. No. 4

South Basin - Proposed

Hydrograph type	=	SCS Runoff	Peak discharge	=	12.79 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	38,409 cuft
Drainage area	=	2.100 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	6.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

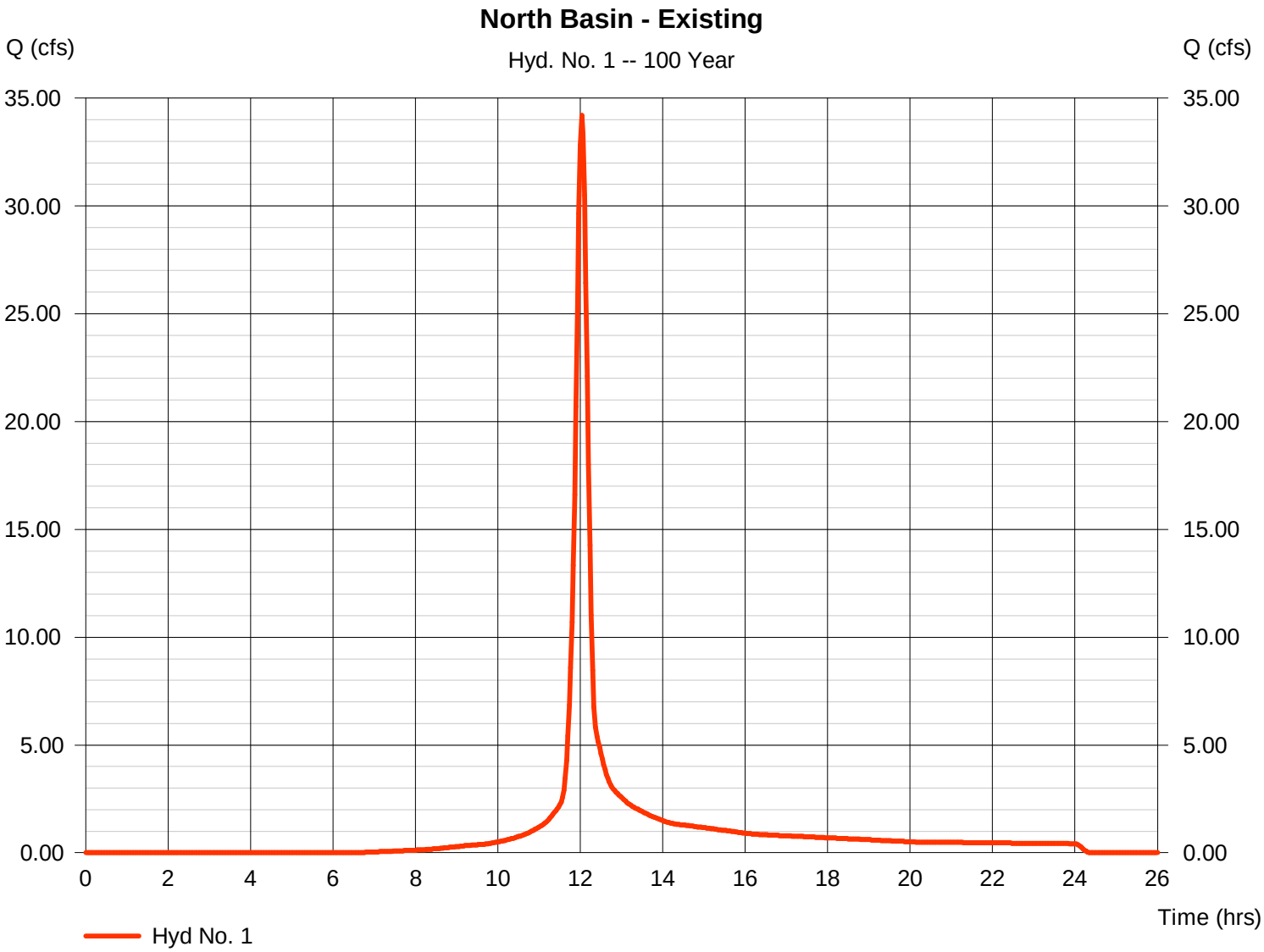
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	34.20	2	722	96,386	------	------	------	North Basin - Existing
2	SCS Runoff	44.26	2	722	135,181	------	------	------	North Basin - Proposed
3	SCS Runoff	13.06	2	722	36,802	------	------	------	South Basin - Existing
4	SCS Runoff	16.90	2	722	51,614	------	------	------	South Basin - Proposed

Hydrograph Report

Hyd. No. 1

North Basin - Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	34.20 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	96,386 cuft
Drainage area	=	5.500 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	7.90 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

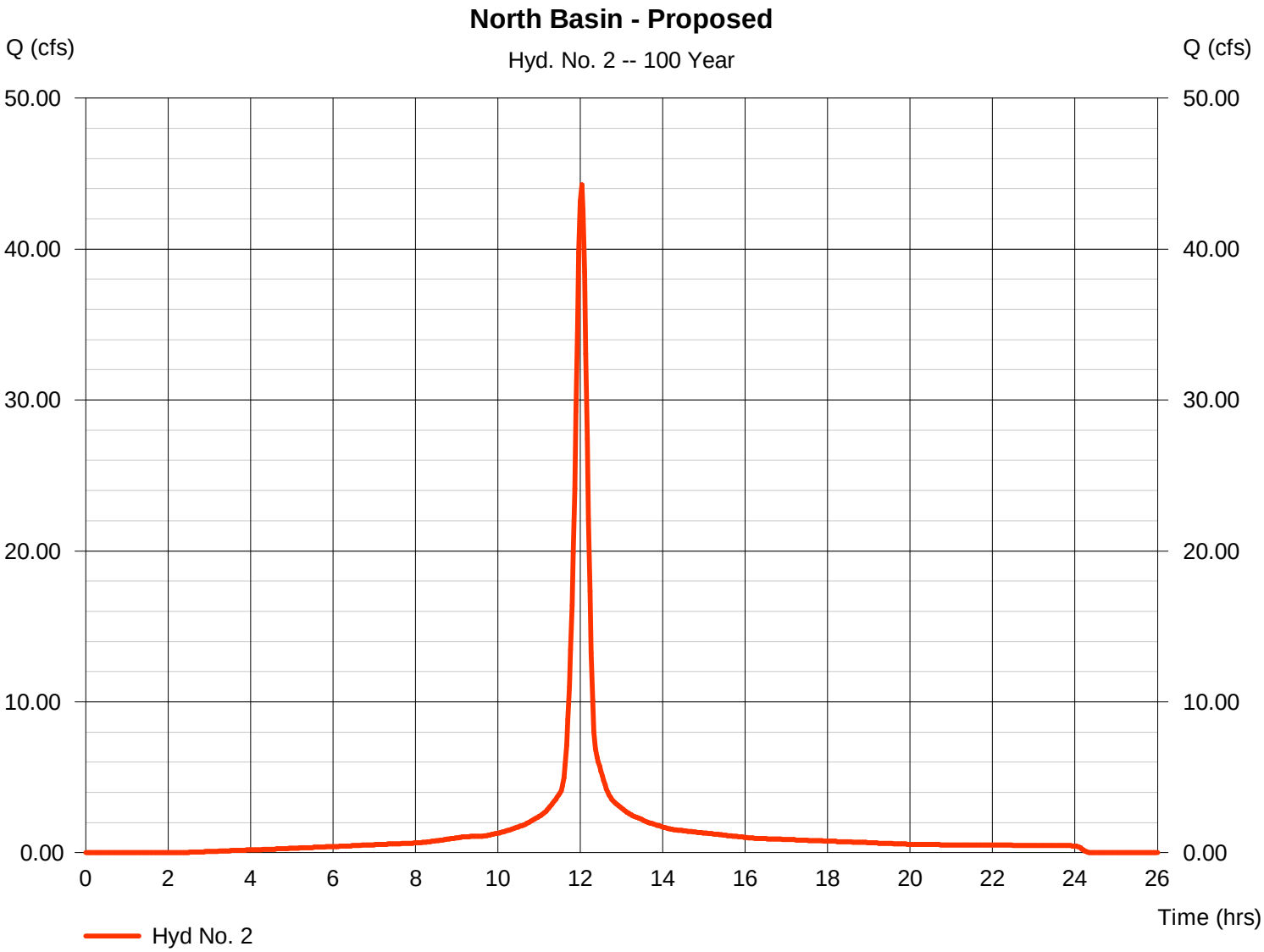


Hydrograph Report

Hyd. No. 2

North Basin - Proposed

Hydrograph type	=	SCS Runoff	Peak discharge	=	44.26 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	135,181 cuft
Drainage area	=	5.500 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	7.90 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

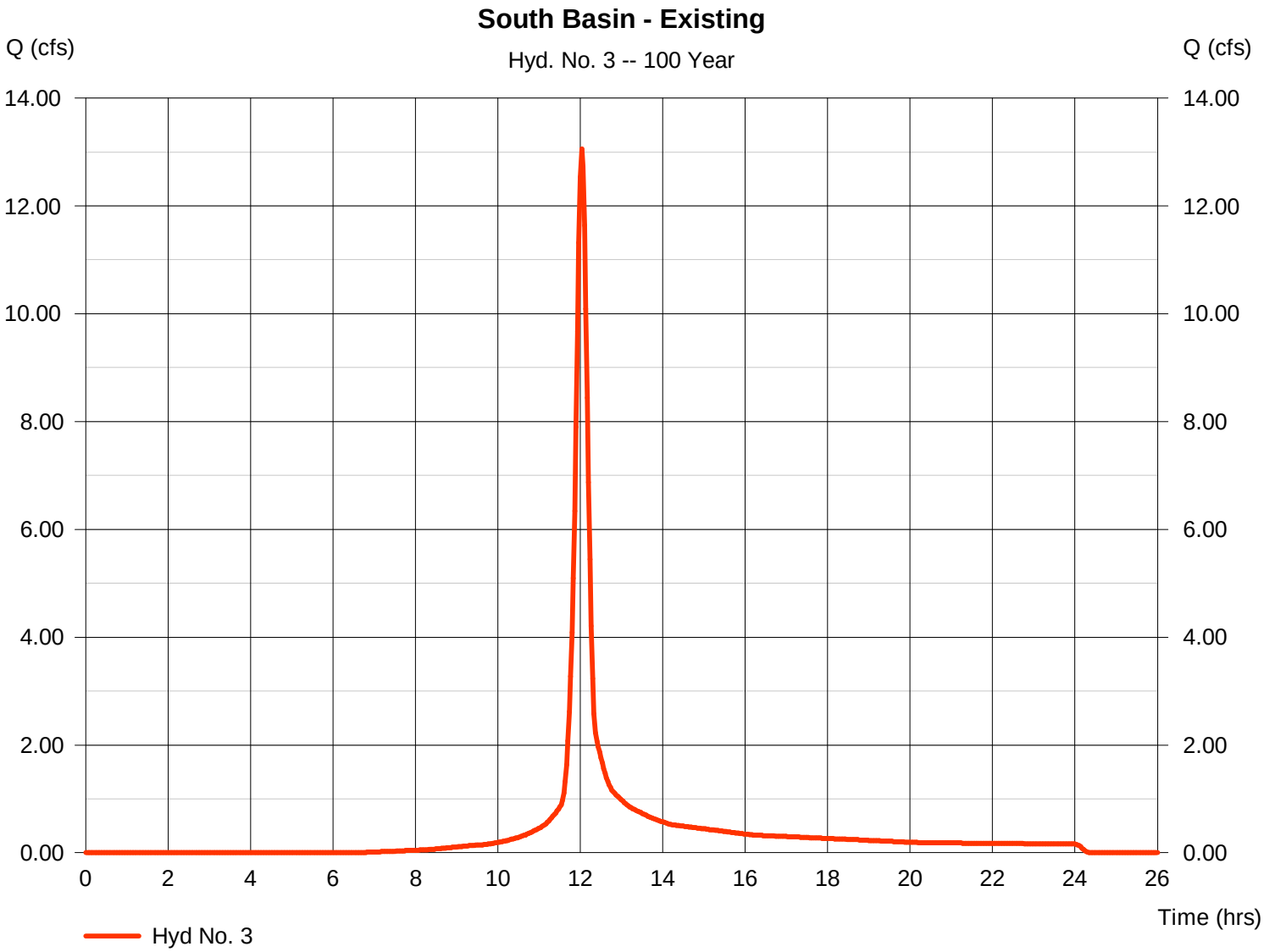


Hydrograph Report

Hyd. No. 3

South Basin - Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	13.06 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	36,802 cuft
Drainage area	=	2.100 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	7.90 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

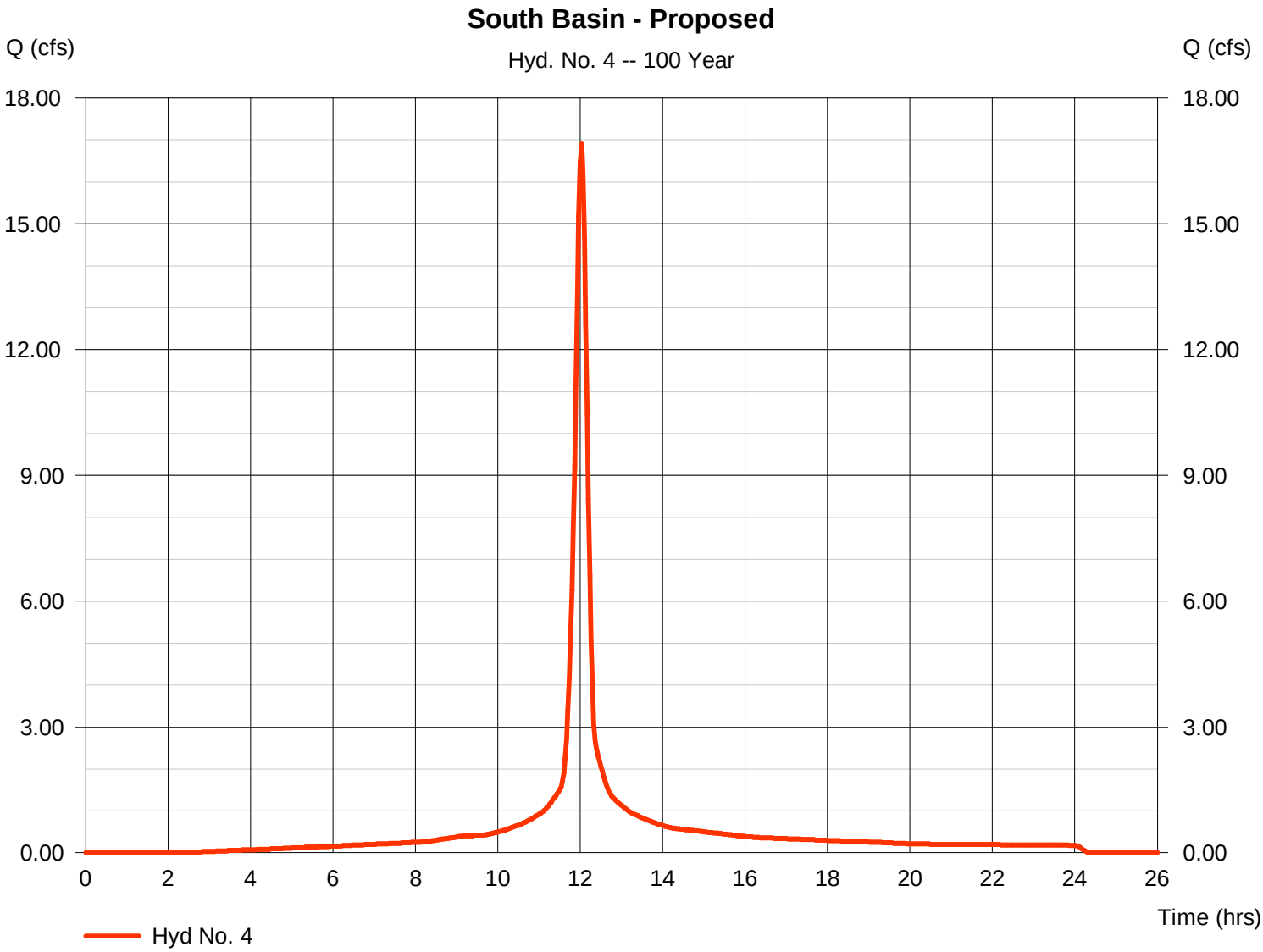


Hydrograph Report

Hyd. No. 4

South Basin - Proposed

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.90 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	51,614 cuft
Drainage area	=	2.100 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	7.90 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	69.8703	13.1000	0.8658	--------
3	0.0000	0.0000	0.0000	--------
5	79.2597	14.6000	0.8369	--------
10	88.2351	15.5000	0.8279	--------
25	102.6072	16.5000	0.8217	--------
50	114.8193	17.2000	0.8199	--------
100	127.1596	17.8000	0.8186	--------

File name: SampleFHA.idf

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5.69	4.61	3.89	3.38	2.99	2.69	2.44	2.24	2.07	1.93	1.81	1.70
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	6.57	5.43	4.65	4.08	3.65	3.30	3.02	2.79	2.59	2.42	2.27	2.15
10	7.24	6.04	5.21	4.59	4.12	3.74	3.43	3.17	2.95	2.77	2.60	2.46
25	8.25	6.95	6.03	5.34	4.80	4.38	4.02	3.73	3.48	3.26	3.07	2.91
50	9.04	7.65	6.66	5.92	5.34	4.87	4.49	4.16	3.88	3.65	3.44	3.25
100	9.83	8.36	7.30	6.50	5.87	5.36	4.94	4.59	4.29	4.03	3.80	3.60

Tc = time in minutes. Values may exceed 60.

Precip. file name: wich_24hr.pcp

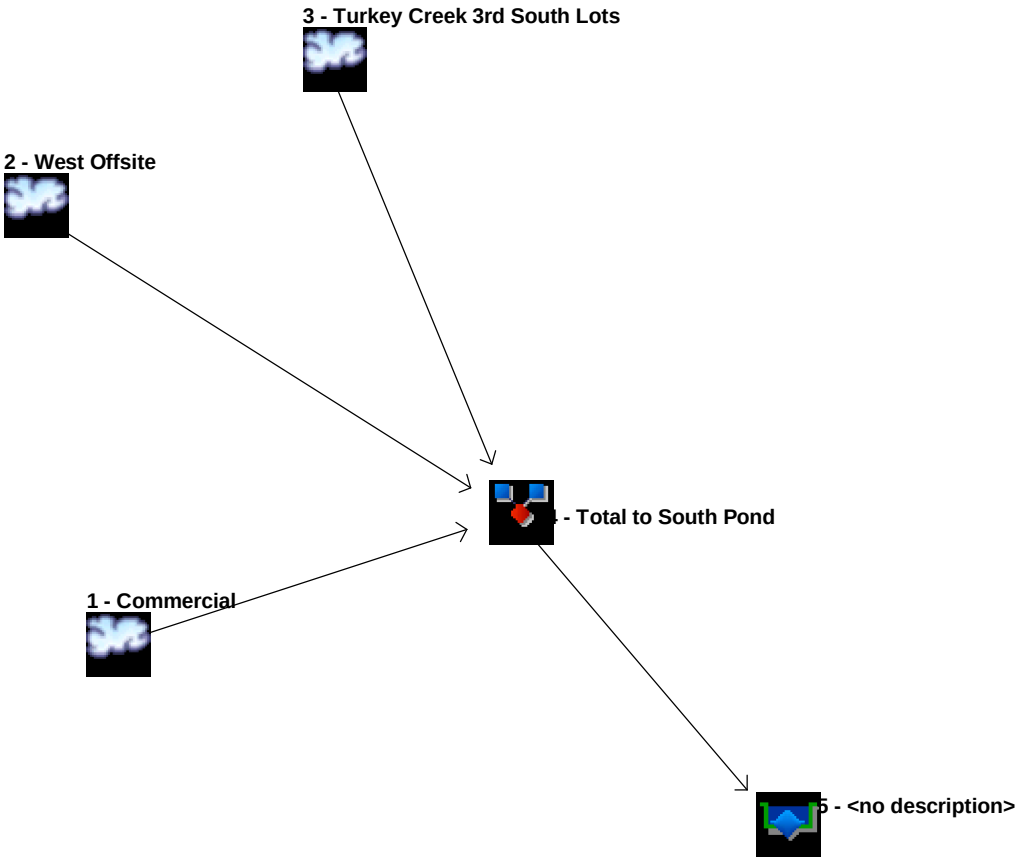
Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	3.50	0.00	4.50	5.30	6.10	6.80	7.90
SCS 6-Hr	0.00	1.80	0.00	0.00	2.60	0.00	0.00	4.00
Huff-1st	0.00	1.55	0.00	2.75	4.00	5.38	6.50	8.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	1.75	0.00	2.80	3.90	5.25	6.00	7.10

Hydraflow Table of Contents

commercial.gpw

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 9, 2009

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	Commercial
2	SCS Runoff	West Offsite
3	SCS Runoff	Turkey Creek 3rd South Lots
4	Combine	Total to South Pond
5	Reservoir	<no description>

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	------	-------	17.73	-------	23.83	28.68	33.49	-------	44.26	Commercial
2	SCS Runoff	------	-------	5.768	-------	11.09	15.86	21.03	-------	33.62	West Offsite
3	SCS Runoff	------	-------	65.59	-------	105.52	139.38	174.30	-------	254.96	Turkey Creek 3rd South Lots
4	Combine	1, 2, 3	-------	88.87	-------	140.30	183.88	228.82	-------	332.83	Total to South Pond
5	Reservoir	4	-------	9.987	-------	20.42	30.02	39.13	-------	53.15	<no description>

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

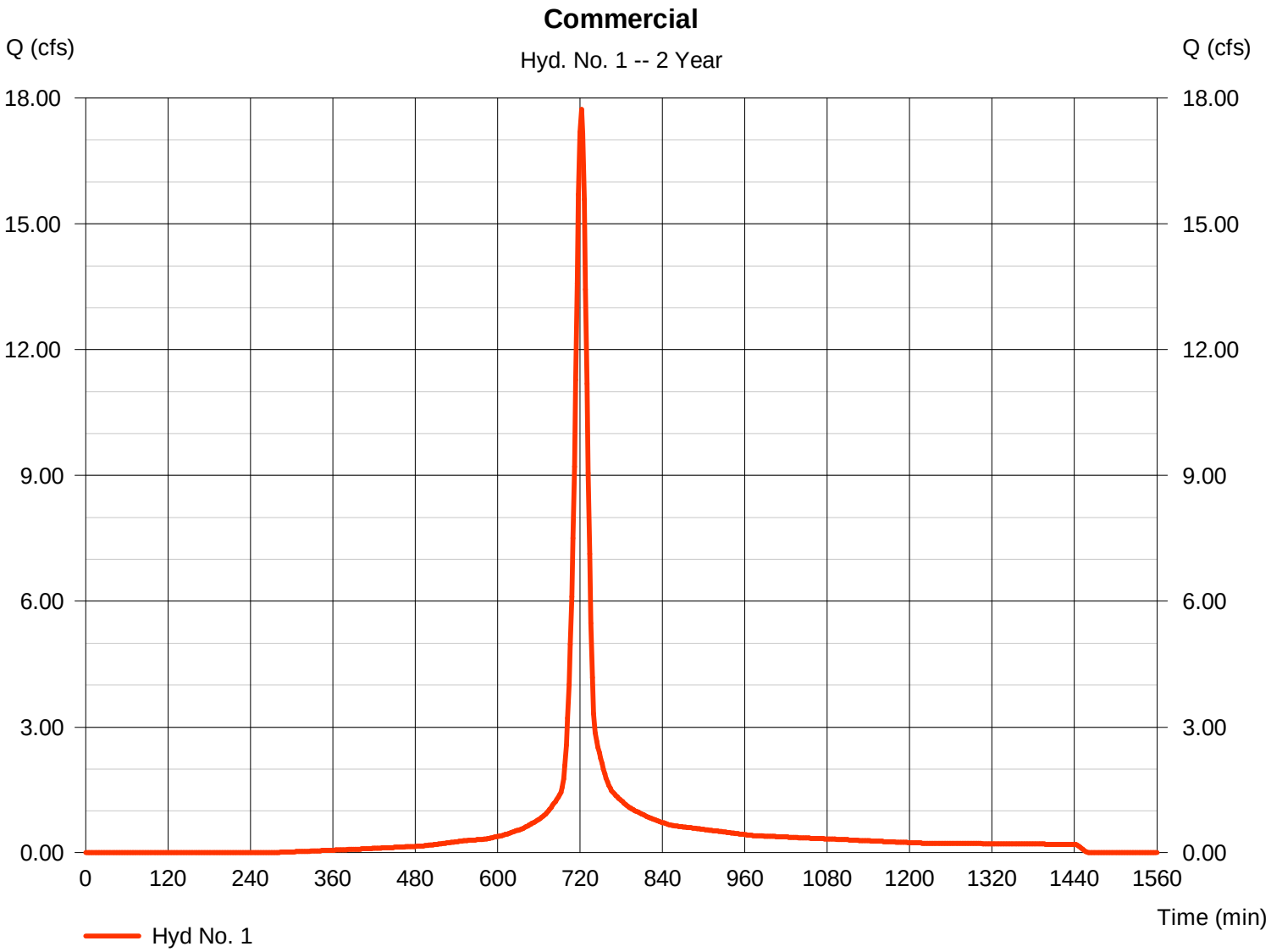
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	17.73	2	722	51,326	------	------	------	Commercial
2	SCS Runoff	5.768	2	724	18,630	------	------	------	West Offsite
3	SCS Runoff	65.59	2	722	188,904	------	------	------	Turkey Creek 3rd South Lots
4	Combine	88.87	2	722	258,860	1, 2, 3	------	------	Total to South Pond
5	Reservoir	9.987	2	762	256,113	4	1337.21	121,565	<no description>

Hydrograph Report

Hyd. No. 1

Commercial

Hydrograph type	=	SCS Runoff	Peak discharge	=	17.73 cfs
Storm frequency	=	2 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	51,326 cuft
Drainage area	=	5.500 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	3.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

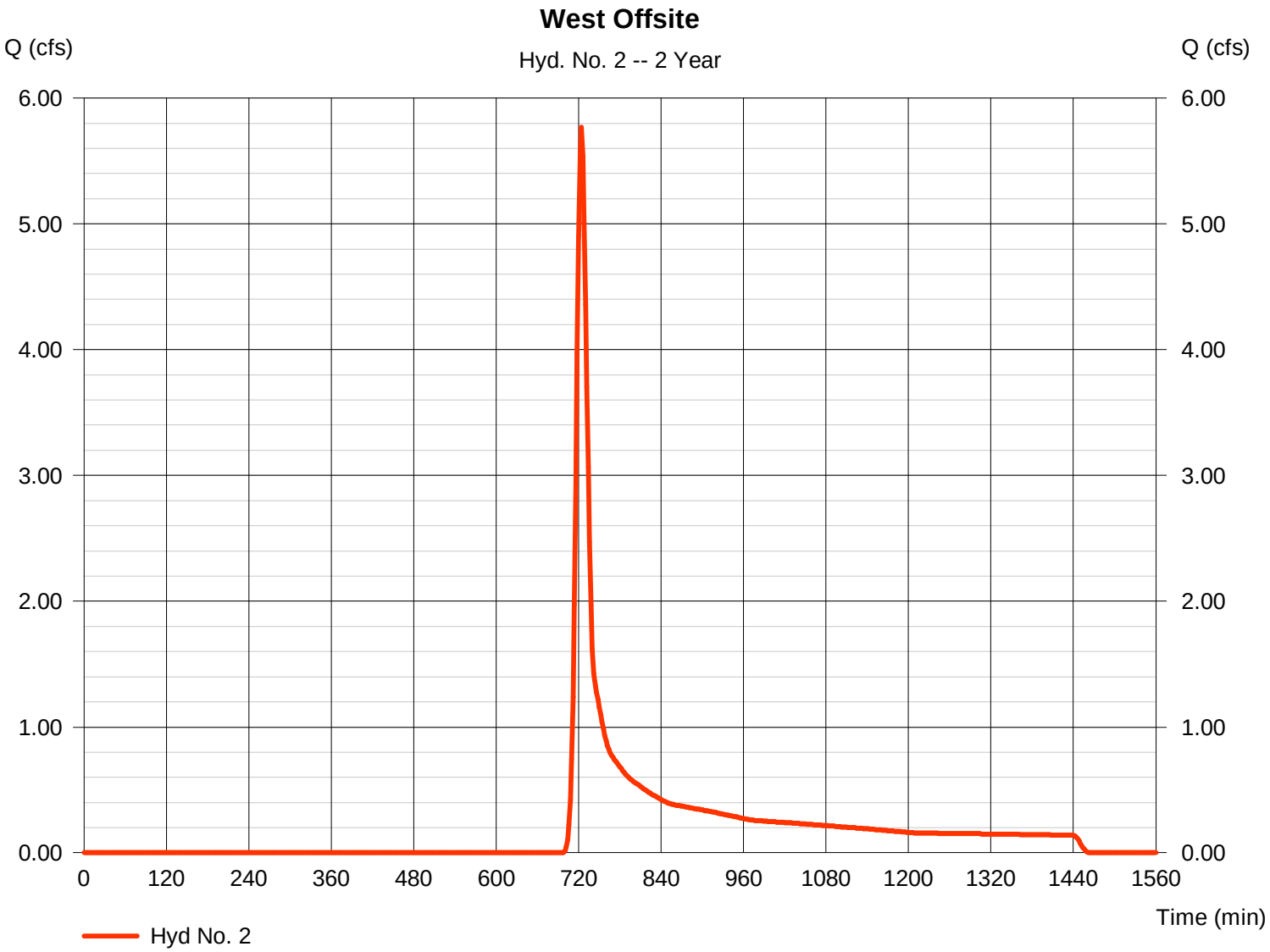


Hydrograph Report

Hyd. No. 2

West Offsite

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.768 cfs
Storm frequency	=	2 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	18,630 cuft
Drainage area	=	7.000 ac	Curve number	=	65
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	3.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

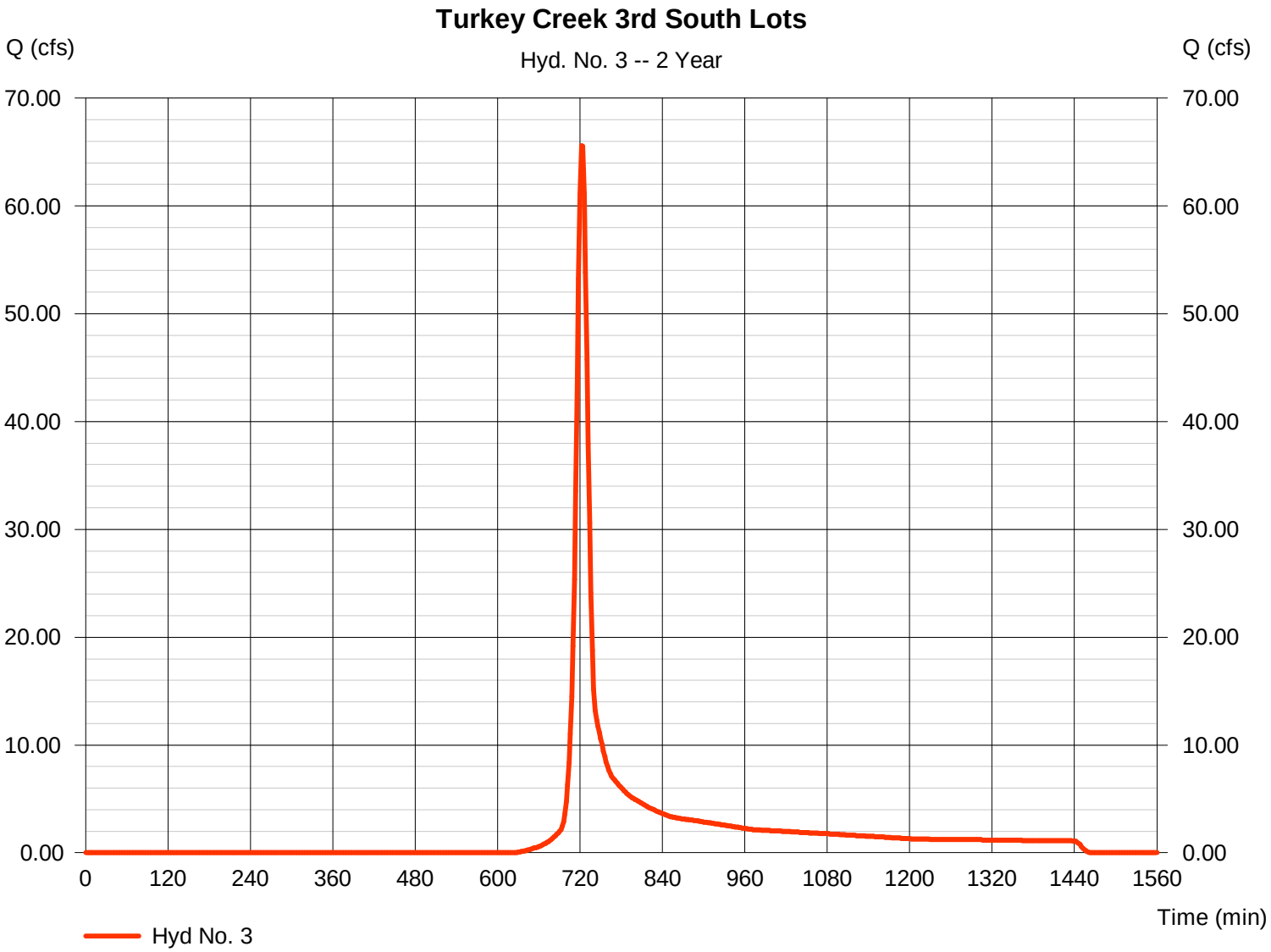


Hydrograph Report

Hyd. No. 3

Turkey Creek 3rd South Lots

Hydrograph type	=	SCS Runoff	Peak discharge	=	65.59 cfs
Storm frequency	=	2 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	188,904 cuft
Drainage area	=	41.000 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	3.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

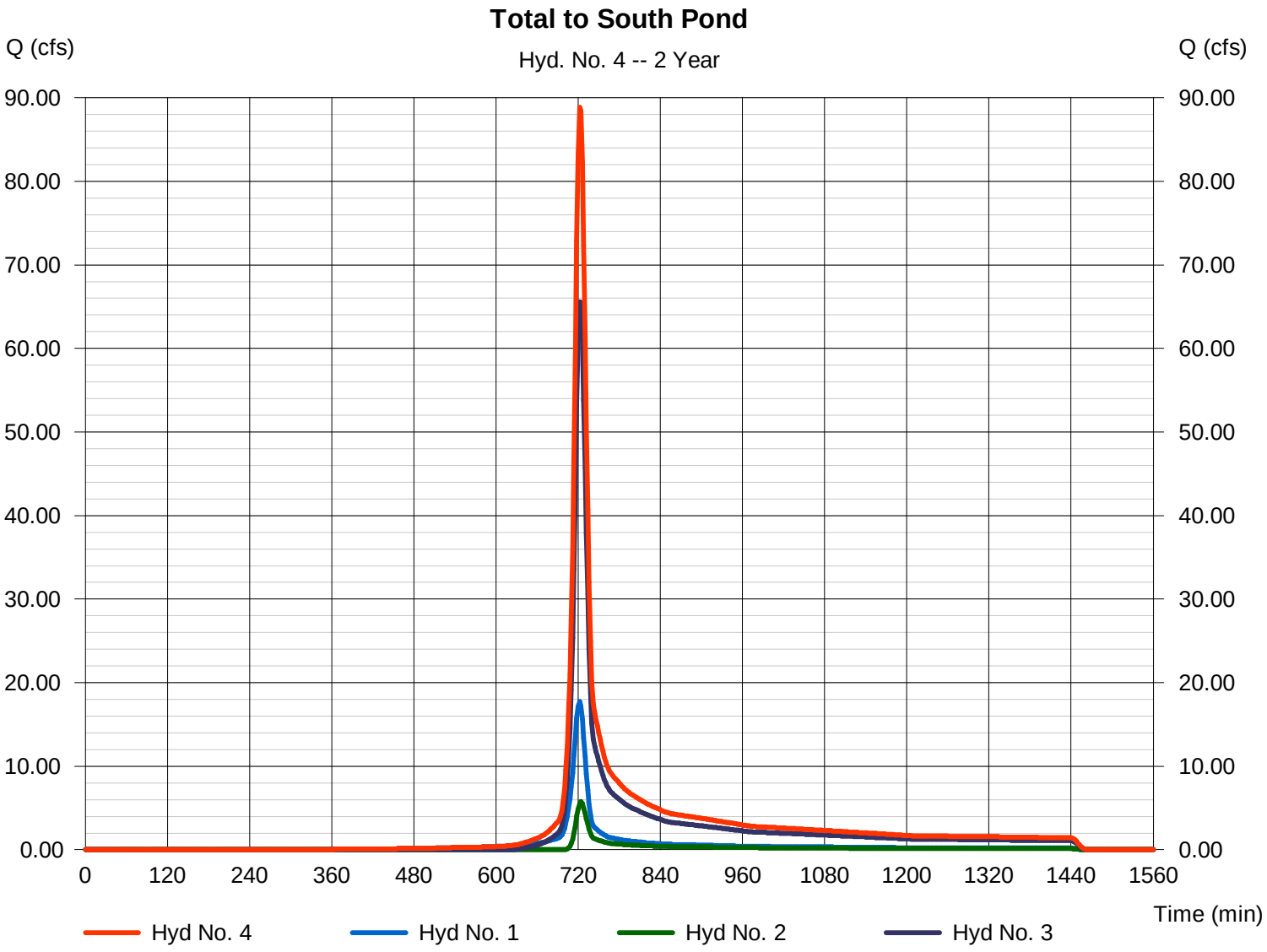


Hydrograph Report

Hyd. No. 4

Total to South Pond

Hydrograph type	= Combine	Peak discharge	= 88.87 cfs
Storm frequency	= 2 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 258,860 cuft
Inflow hyds.	= 1, 2, 3	Contrib. drain. area	= 53.500 ac



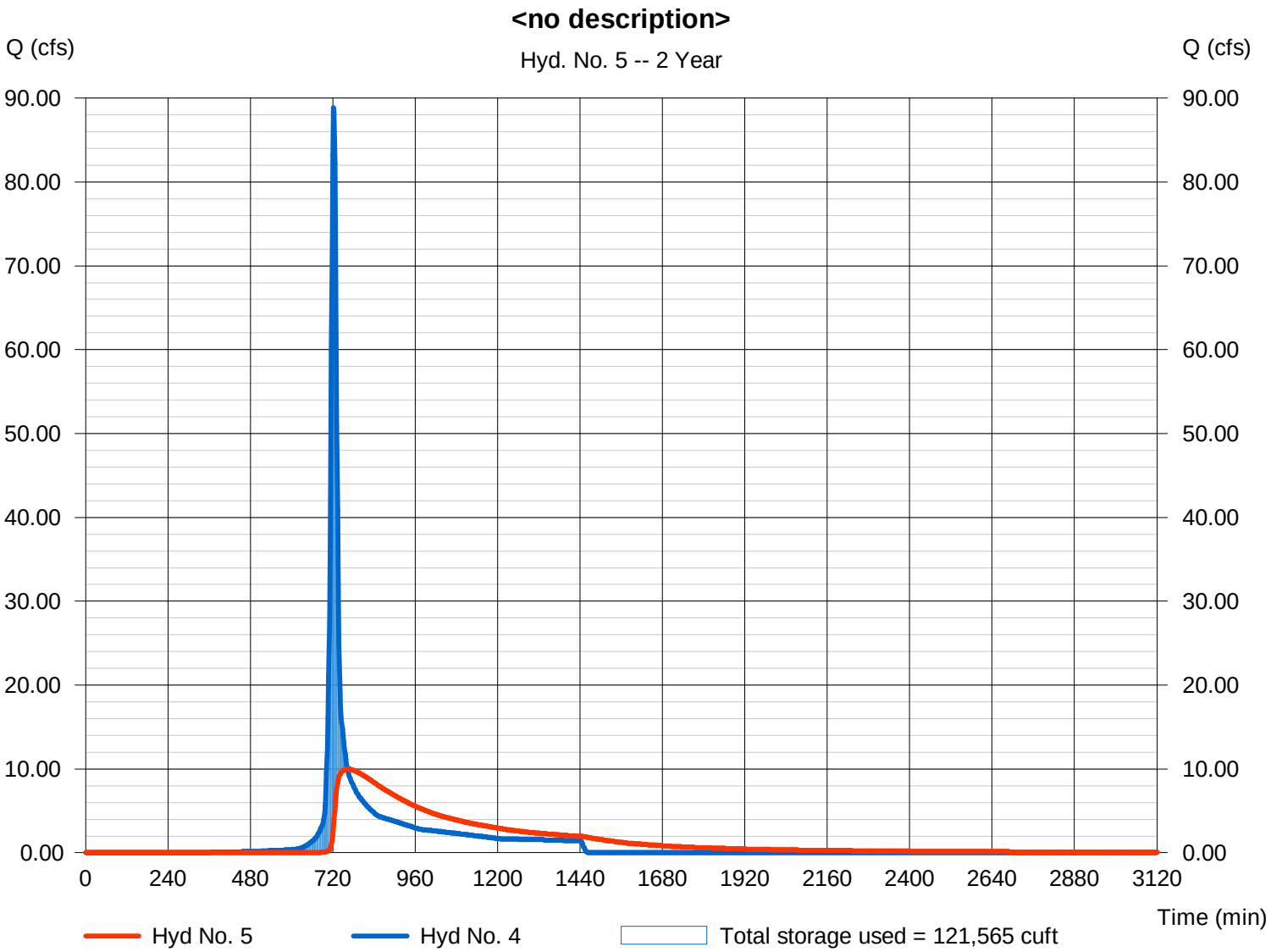
Hydrograph Report

Hyd. No. 5

<no description>

Hydrograph type	=	Reservoir	Peak discharge	=	9.987 cfs
Storm frequency	=	2 yrs	Time to peak	=	762 min
Time interval	=	2 min	Hyd. volume	=	256,113 cuft
Inflow hyd. No.	=	4 - Total to South Pond	Max. Elevation	=	1337.21 ft
Reservoir name	=	South Pond	Max. Storage	=	121,565 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

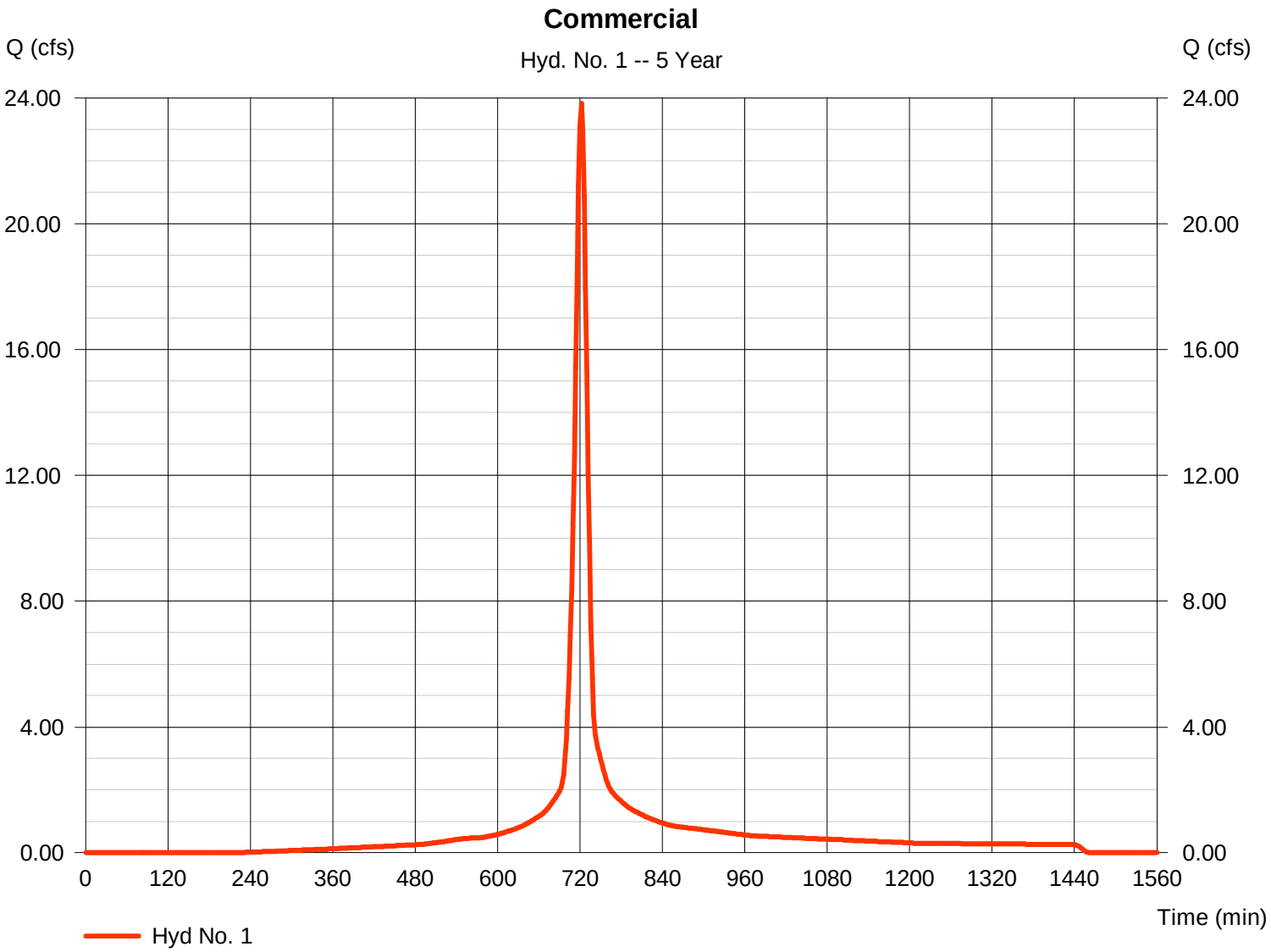
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	23.83	2	722	70,117	------	------	------	Commercial
2	SCS Runoff	11.09	2	724	32,959	------	------	------	West Offsite
3	SCS Runoff	105.52	2	722	297,530	------	------	------	Turkey Creek 3rd South Lots
4	Combine	140.30	2	722	400,607	1, 2, 3	------	------	Total to South Pond
5	Reservoir	20.42	2	750	397,777	4	1337.81	187,608	<no description>

Hydrograph Report

Hyd. No. 1

Commercial

Hydrograph type	=	SCS Runoff	Peak discharge	=	23.83 cfs
Storm frequency	=	5 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	70,117 cuft
Drainage area	=	5.500 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

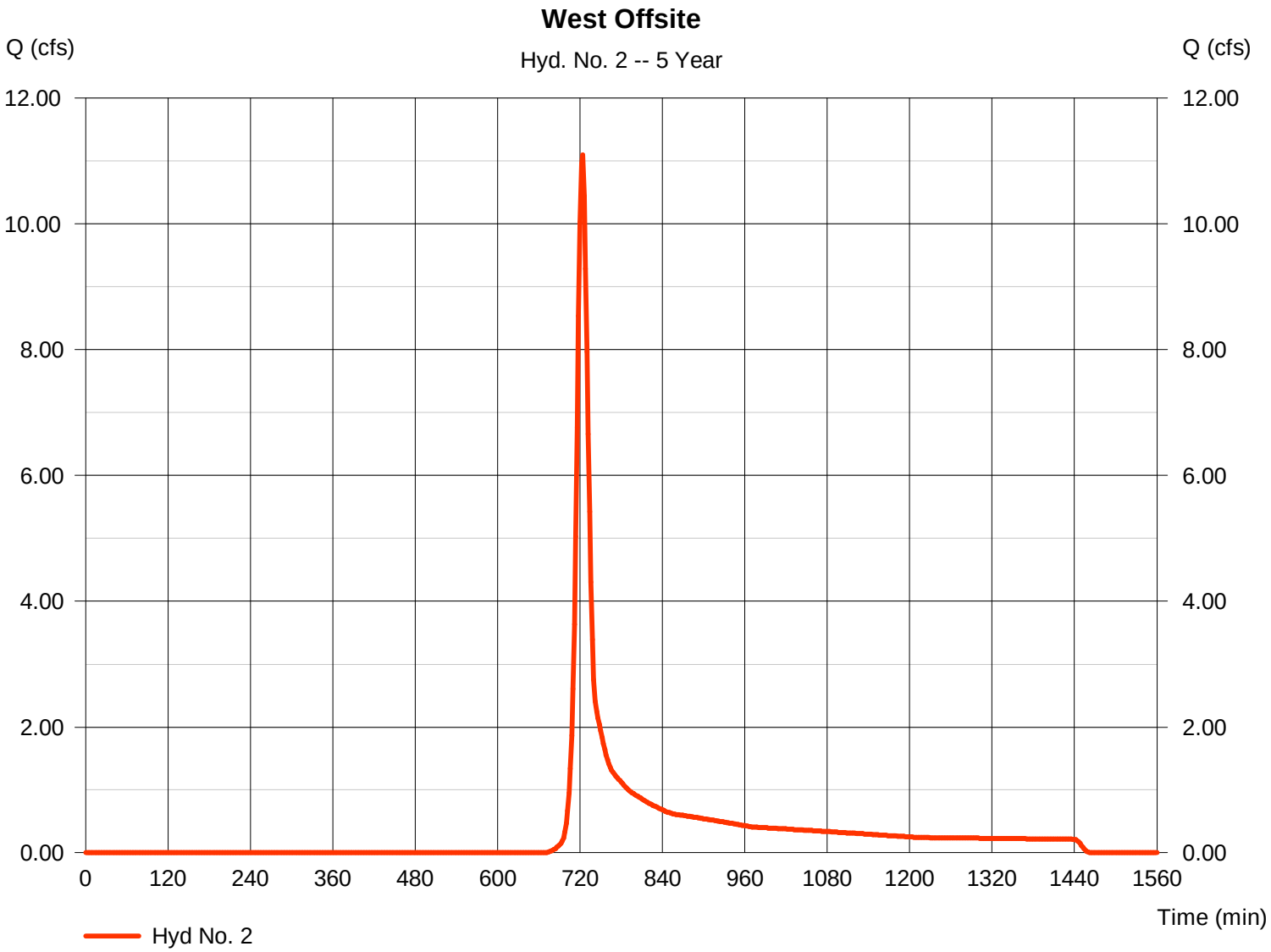


Hydrograph Report

Hyd. No. 2

West Offsite

Hydrograph type	=	SCS Runoff	Peak discharge	=	11.09 cfs
Storm frequency	=	5 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	32,959 cuft
Drainage area	=	7.000 ac	Curve number	=	65
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

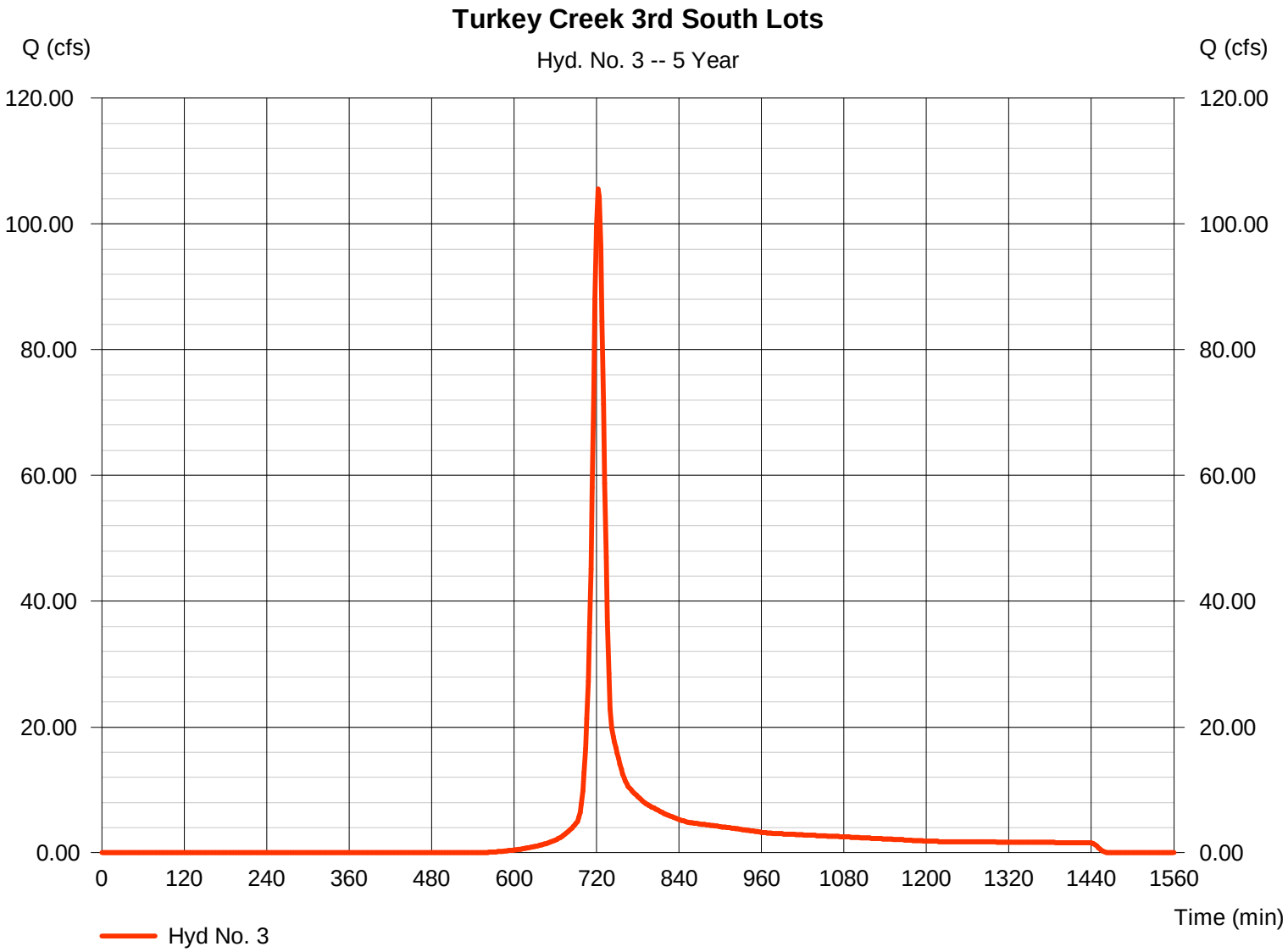


Hydrograph Report

Hyd. No. 3

Turkey Creek 3rd South Lots

Hydrograph type	=	SCS Runoff	Peak discharge	=	105.52 cfs
Storm frequency	=	5 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	297,530 cuft
Drainage area	=	41.000 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

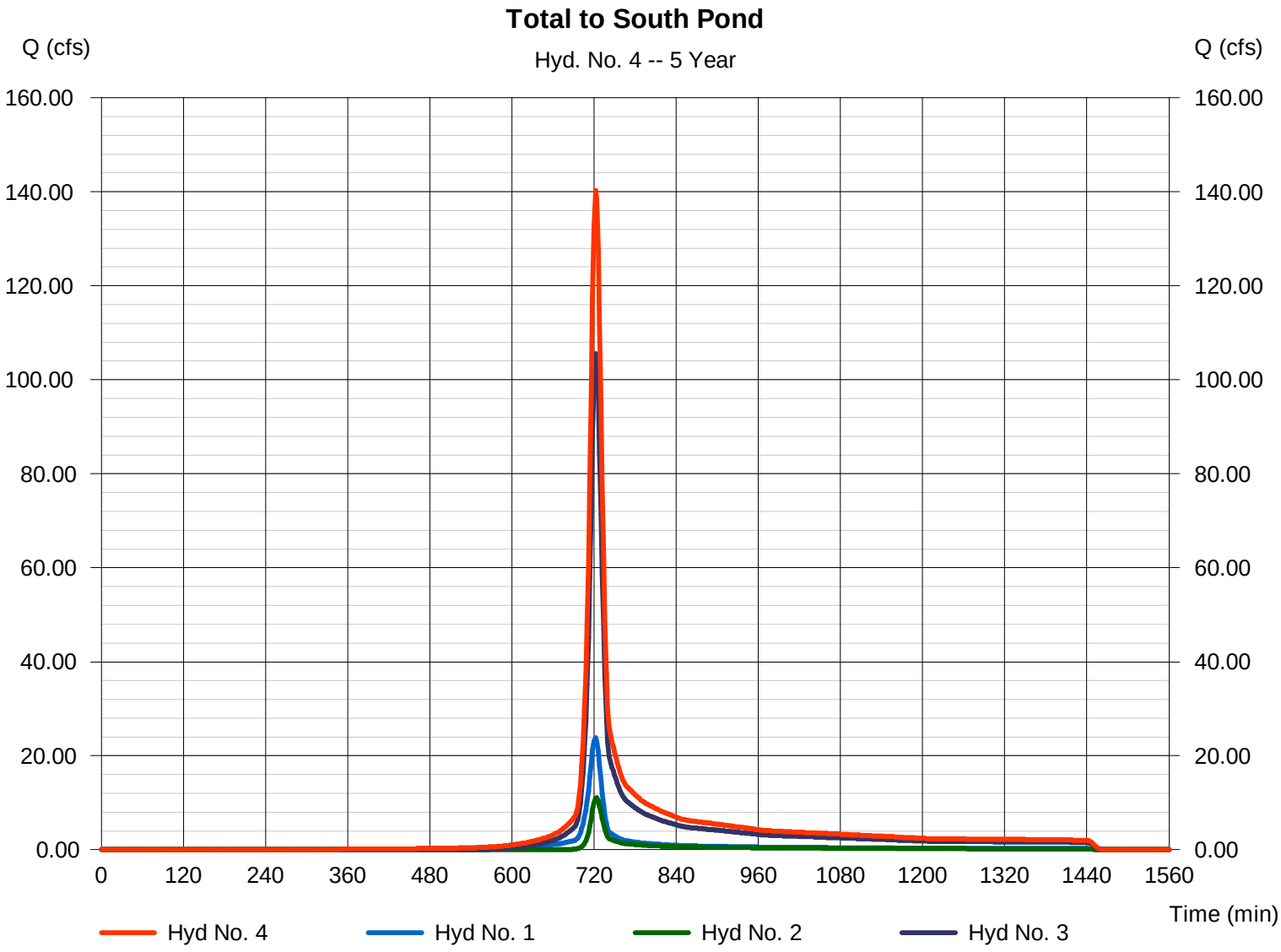


Hydrograph Report

Hyd. No. 4

Total to South Pond

Hydrograph type	= Combine	Peak discharge	= 140.30 cfs
Storm frequency	= 5 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 400,607 cuft
Inflow hyds.	= 1, 2, 3	Contrib. drain. area	= 53.500 ac



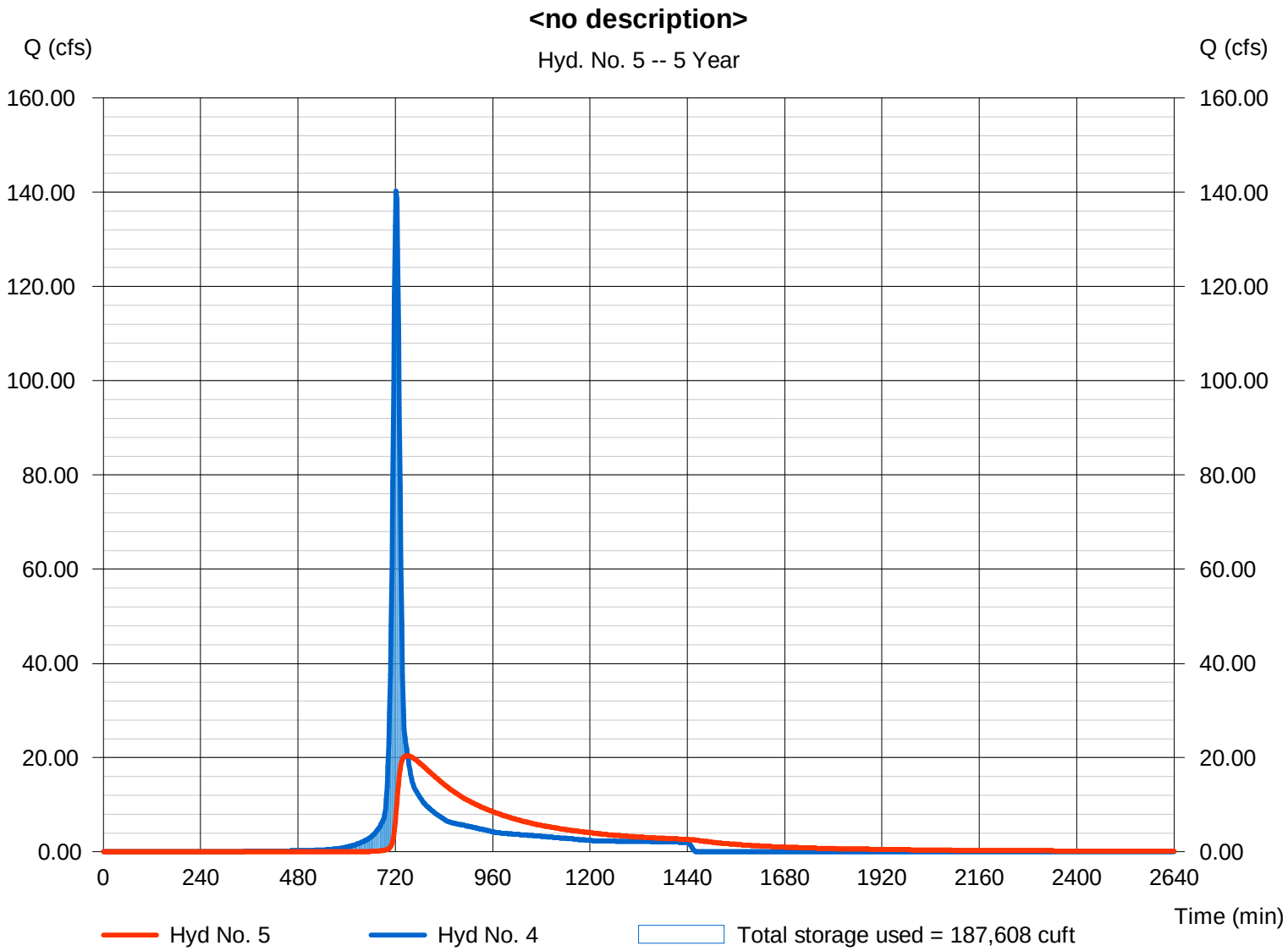
Hydrograph Report

Hyd. No. 5

<no description>

Hydrograph type	=	Reservoir	Peak discharge	=	20.42 cfs
Storm frequency	=	5 yrs	Time to peak	=	750 min
Time interval	=	2 min	Hyd. volume	=	397,777 cuft
Inflow hyd. No.	=	4 - Total to South Pond	Max. Elevation	=	1337.81 ft
Reservoir name	=	South Pond	Max. Storage	=	187,608 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

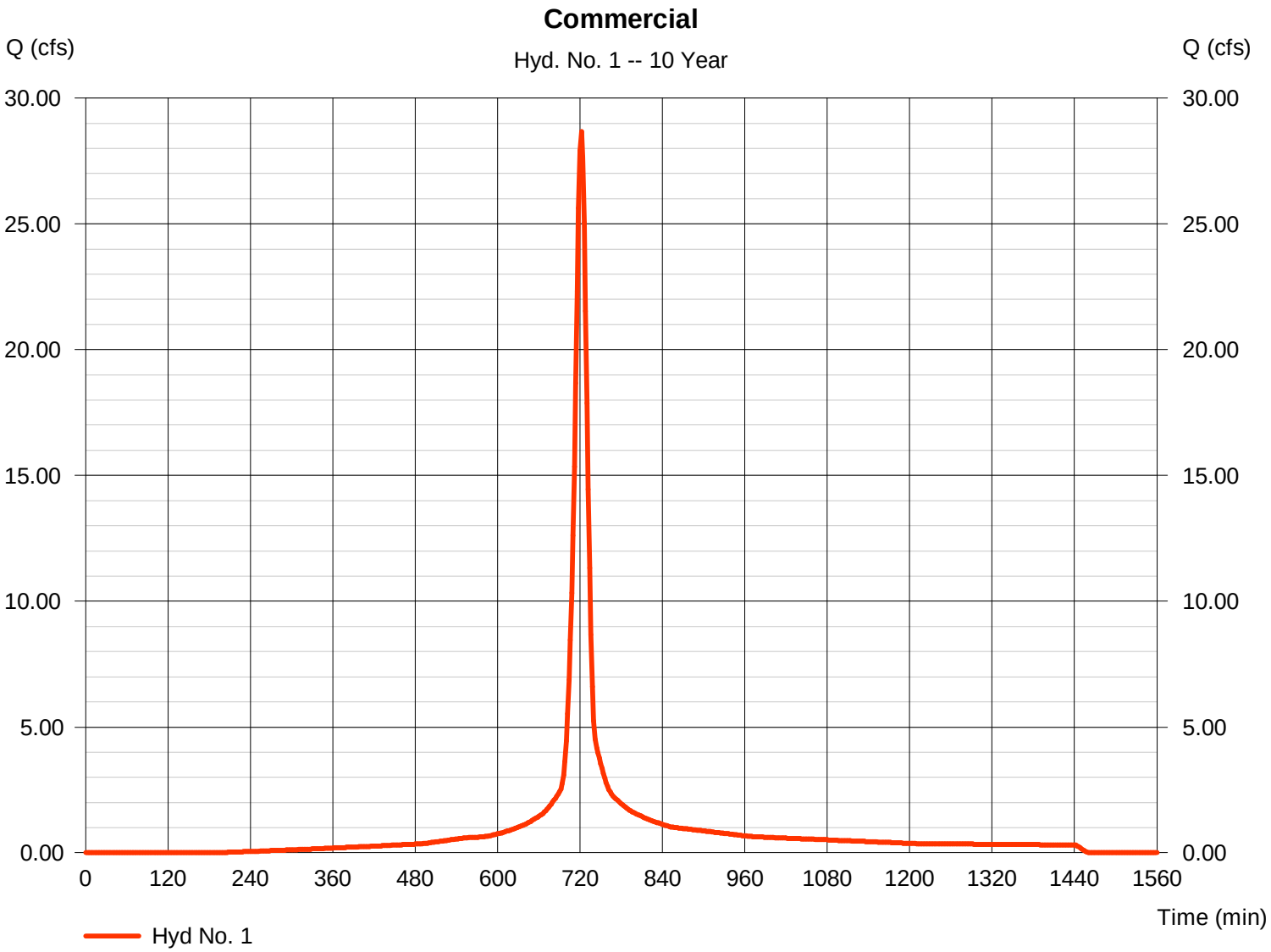
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	28.68	2	722	85,312	------	------	------	Commercial
2	SCS Runoff	15.86	2	724	45,988	------	------	------	West Offsite
3	SCS Runoff	139.38	2	722	391,026	------	------	------	Turkey Creek 3rd South Lots
4	Combine	183.88	2	722	522,326	1, 2, 3	------	------	Total to South Pond
5	Reservoir	30.02	2	744	519,449	4	1338.30	245,068	<no description>

Hydrograph Report

Hyd. No. 1

Commercial

Hydrograph type	=	SCS Runoff	Peak discharge	=	28.68 cfs
Storm frequency	=	10 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	85,312 cuft
Drainage area	=	5.500 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	5.30 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

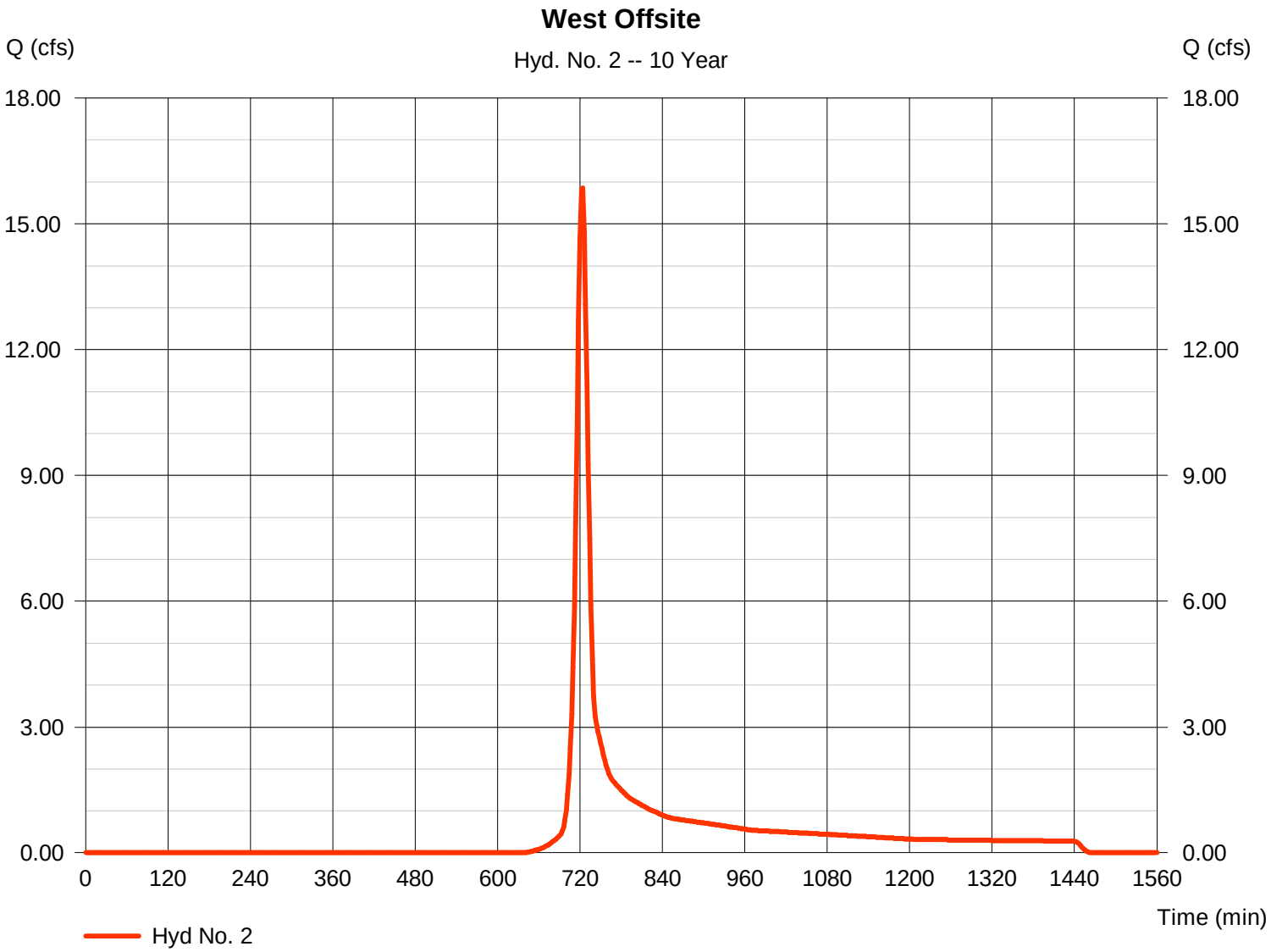


Hydrograph Report

Hyd. No. 2

West Offsite

Hydrograph type	=	SCS Runoff	Peak discharge	=	15.86 cfs
Storm frequency	=	10 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	45,988 cuft
Drainage area	=	7.000 ac	Curve number	=	65
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	5.30 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

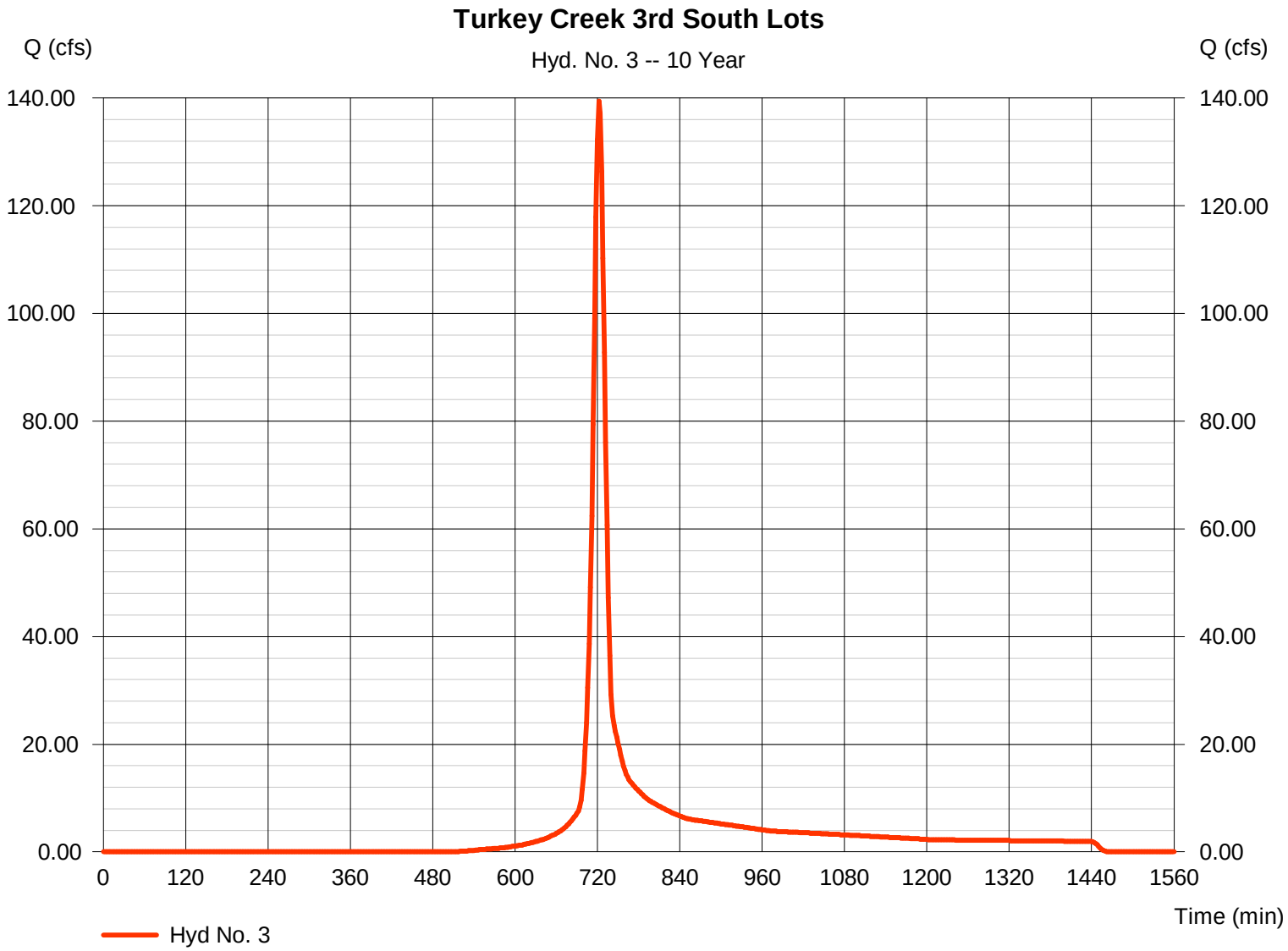


Hydrograph Report

Hyd. No. 3

Turkey Creek 3rd South Lots

Hydrograph type	=	SCS Runoff	Peak discharge	=	139.38 cfs
Storm frequency	=	10 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	391,026 cuft
Drainage area	=	41.000 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	5.30 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

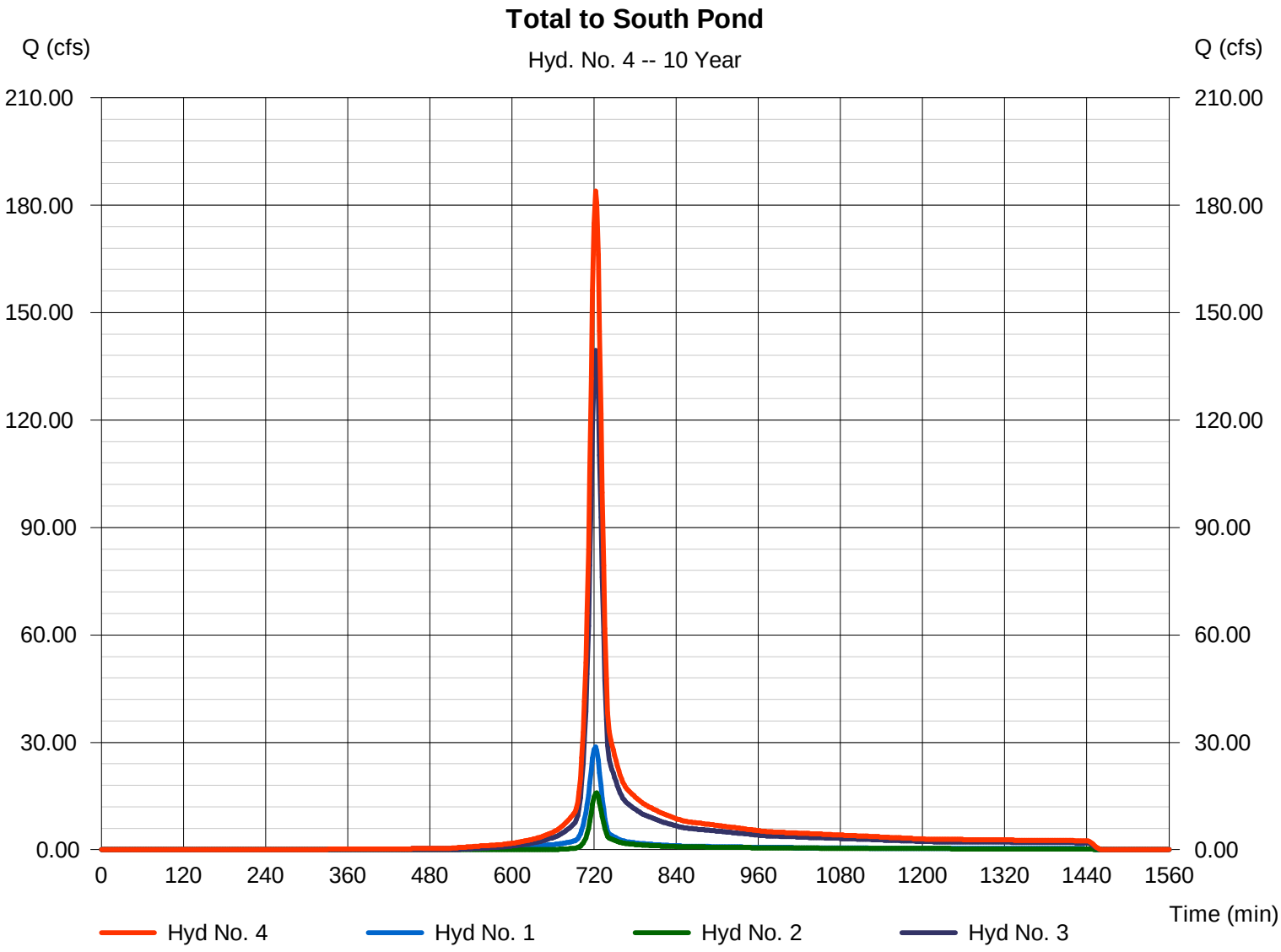


Hydrograph Report

Hyd. No. 4

Total to South Pond

Hydrograph type	= Combine	Peak discharge	= 183.88 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 522,326 cuft
Inflow hyds.	= 1, 2, 3	Contrib. drain. area	= 53.500 ac



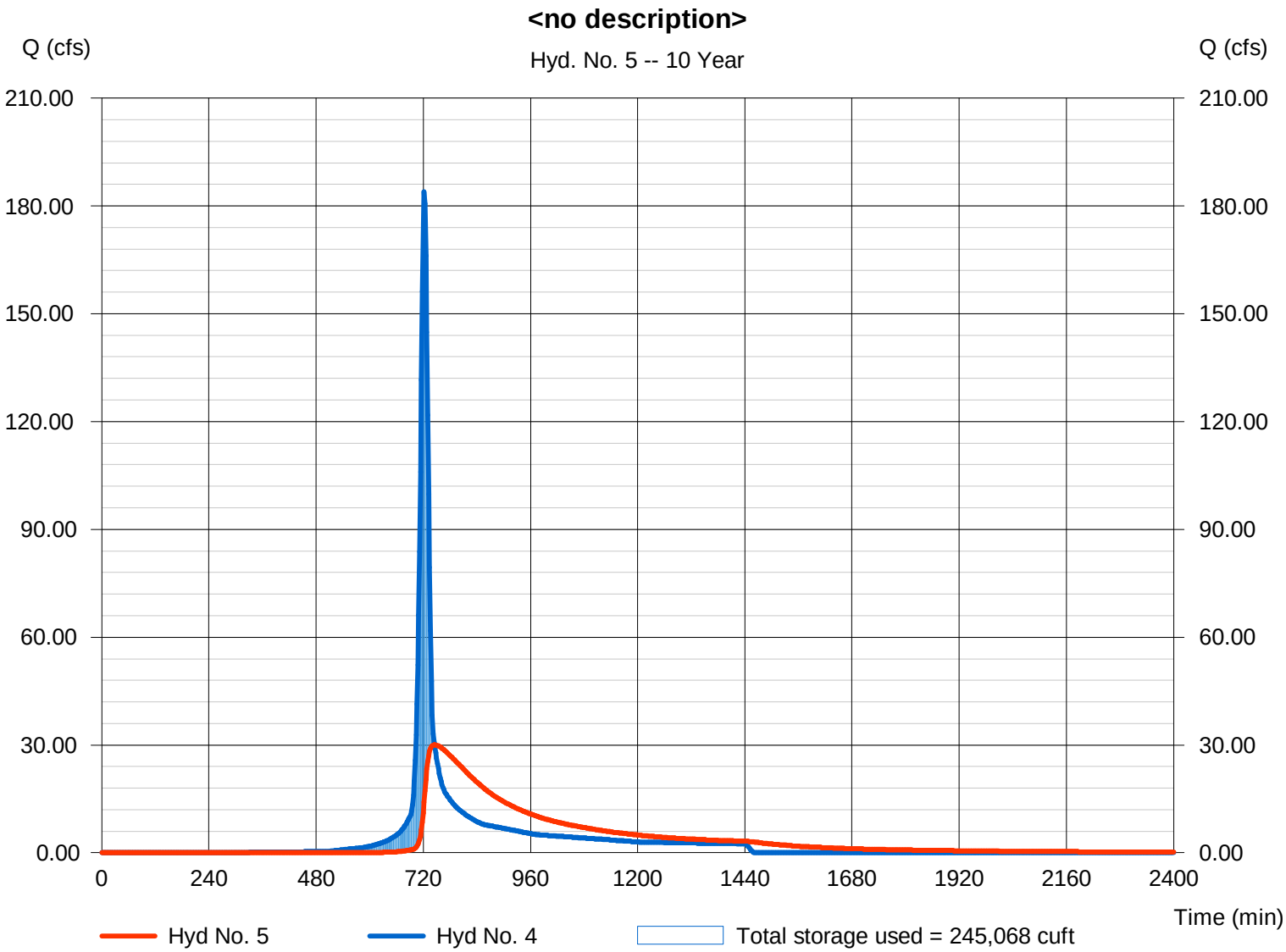
Hydrograph Report

Hyd. No. 5

<no description>

Hydrograph type	=	Reservoir	Peak discharge	=	30.02 cfs
Storm frequency	=	10 yrs	Time to peak	=	744 min
Time interval	=	2 min	Hyd. volume	=	519,449 cuft
Inflow hyd. No.	=	4 - Total to South Pond	Max. Elevation	=	1338.30 ft
Reservoir name	=	South Pond	Max. Storage	=	245,068 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

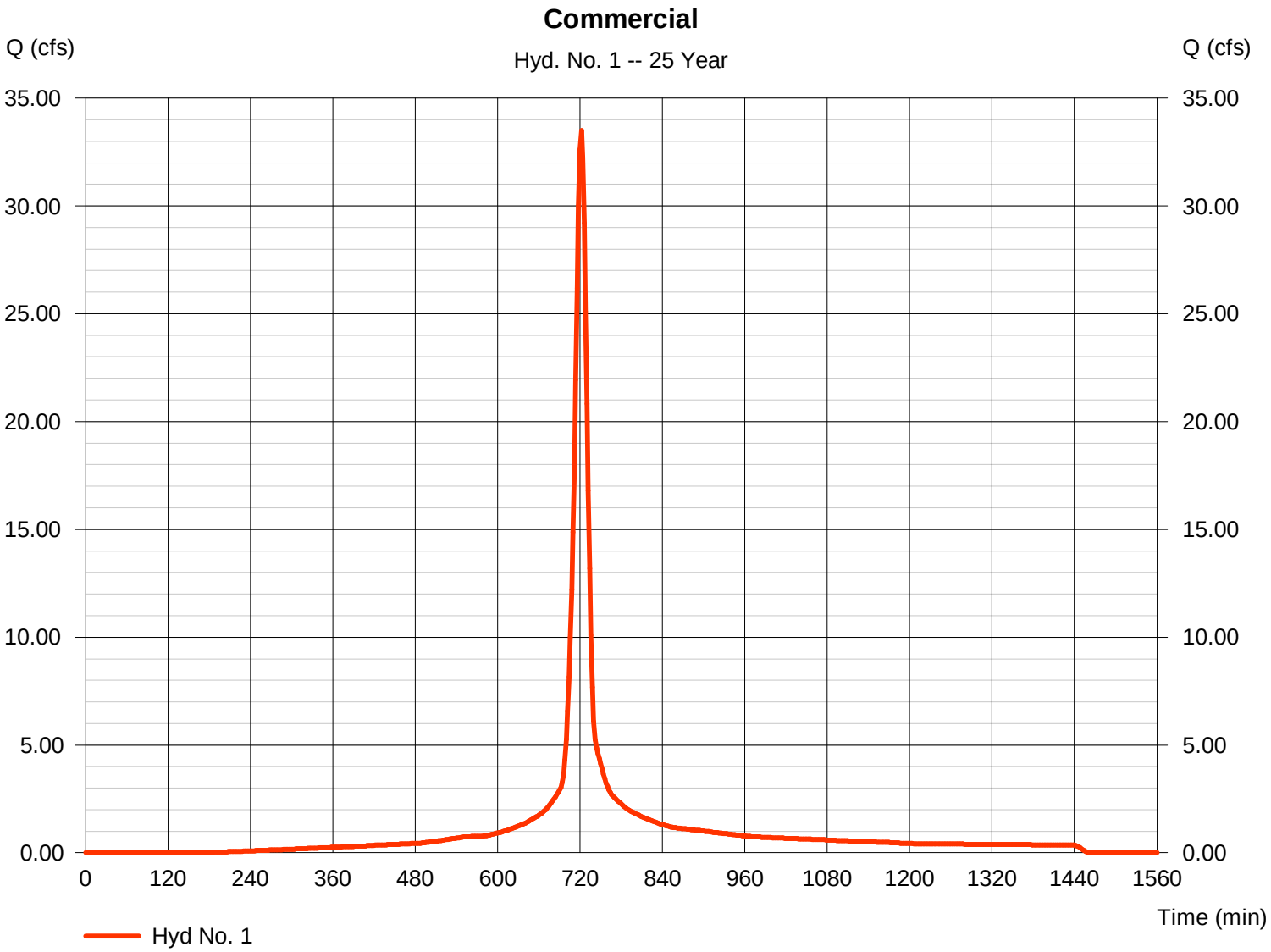
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	33.49	2	722	100,596	------	------	------	Commercial
2	SCS Runoff	21.03	2	722	60,061	------	------	------	West Offsite
3	SCS Runoff	174.30	2	722	488,645	------	------	------	Turkey Creek 3rd South Lots
4	Combine	228.82	2	722	649,302	1, 2, 3	------	------	Total to South Pond
5	Reservoir	39.13	2	742	646,386	4	1338.80	306,333	<no description>

Hydrograph Report

Hyd. No. 1

Commercial

Hydrograph type	=	SCS Runoff	Peak discharge	=	33.49 cfs
Storm frequency	=	25 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	100,596 cuft
Drainage area	=	5.500 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	6.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

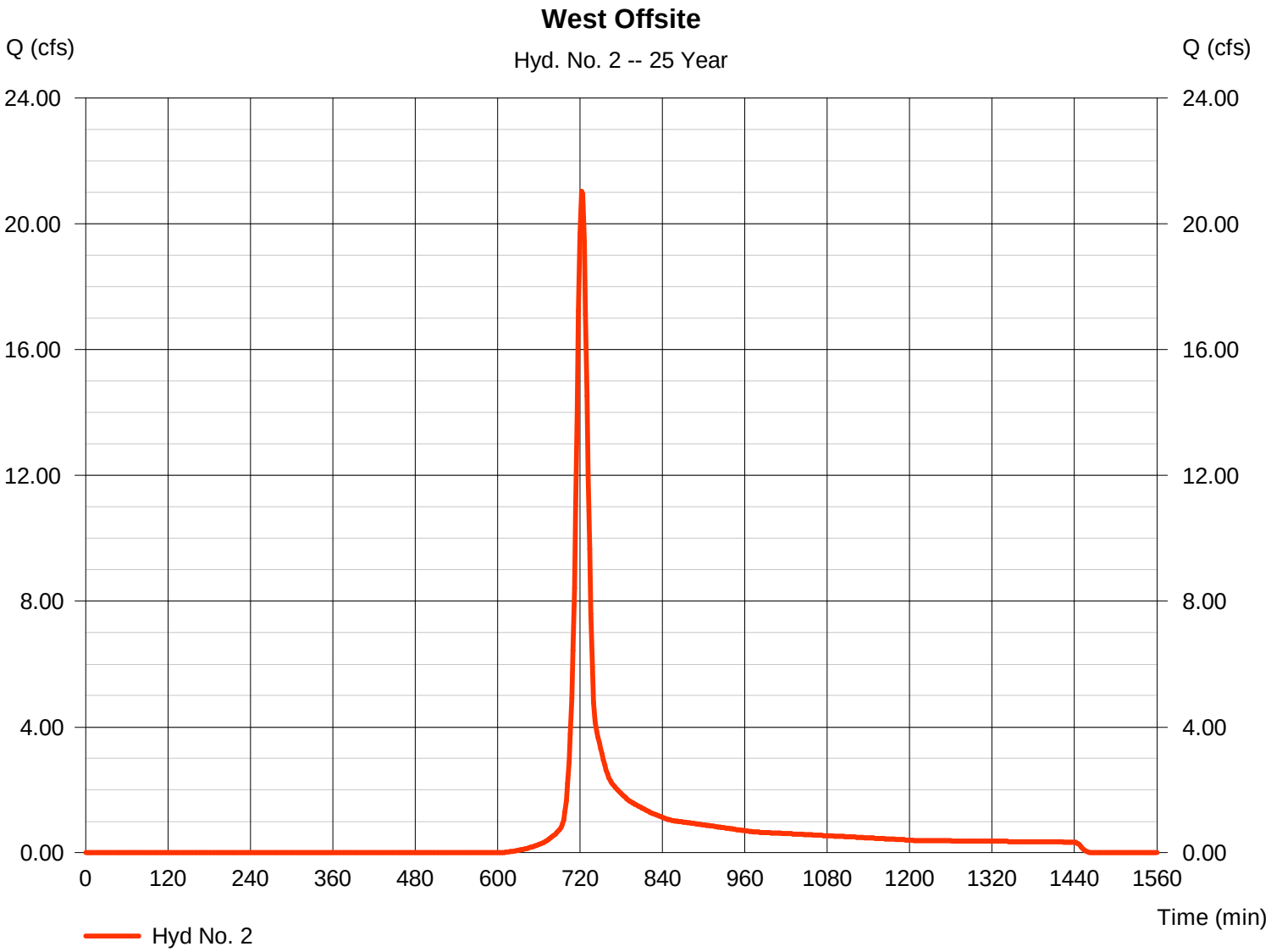


Hydrograph Report

Hyd. No. 2

West Offsite

Hydrograph type	=	SCS Runoff	Peak discharge	=	21.03 cfs
Storm frequency	=	25 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	60,061 cuft
Drainage area	=	7.000 ac	Curve number	=	65
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	6.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

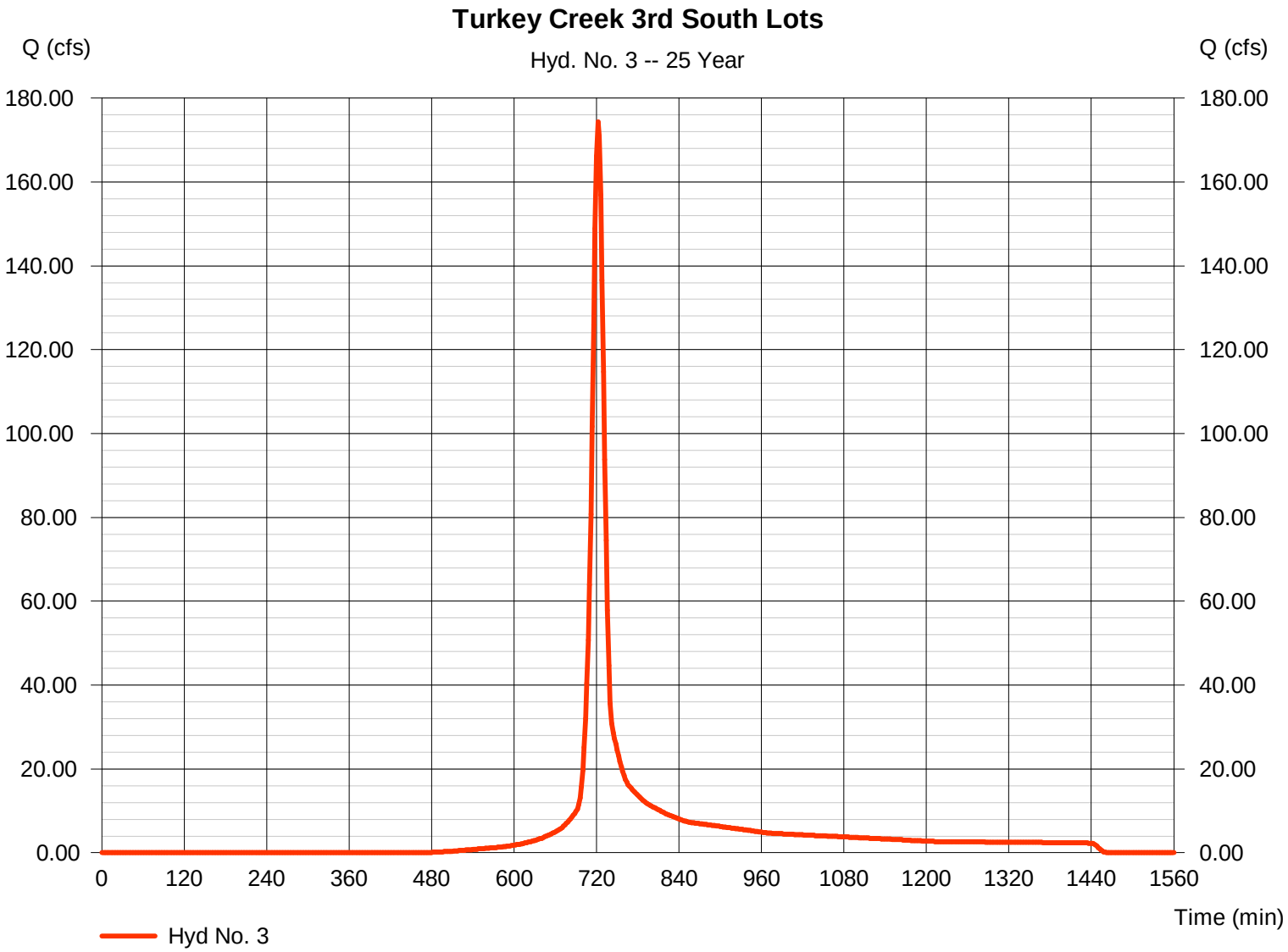


Hydrograph Report

Hyd. No. 3

Turkey Creek 3rd South Lots

Hydrograph type	=	SCS Runoff	Peak discharge	=	174.30 cfs
Storm frequency	=	25 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	488,645 cuft
Drainage area	=	41.000 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	6.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

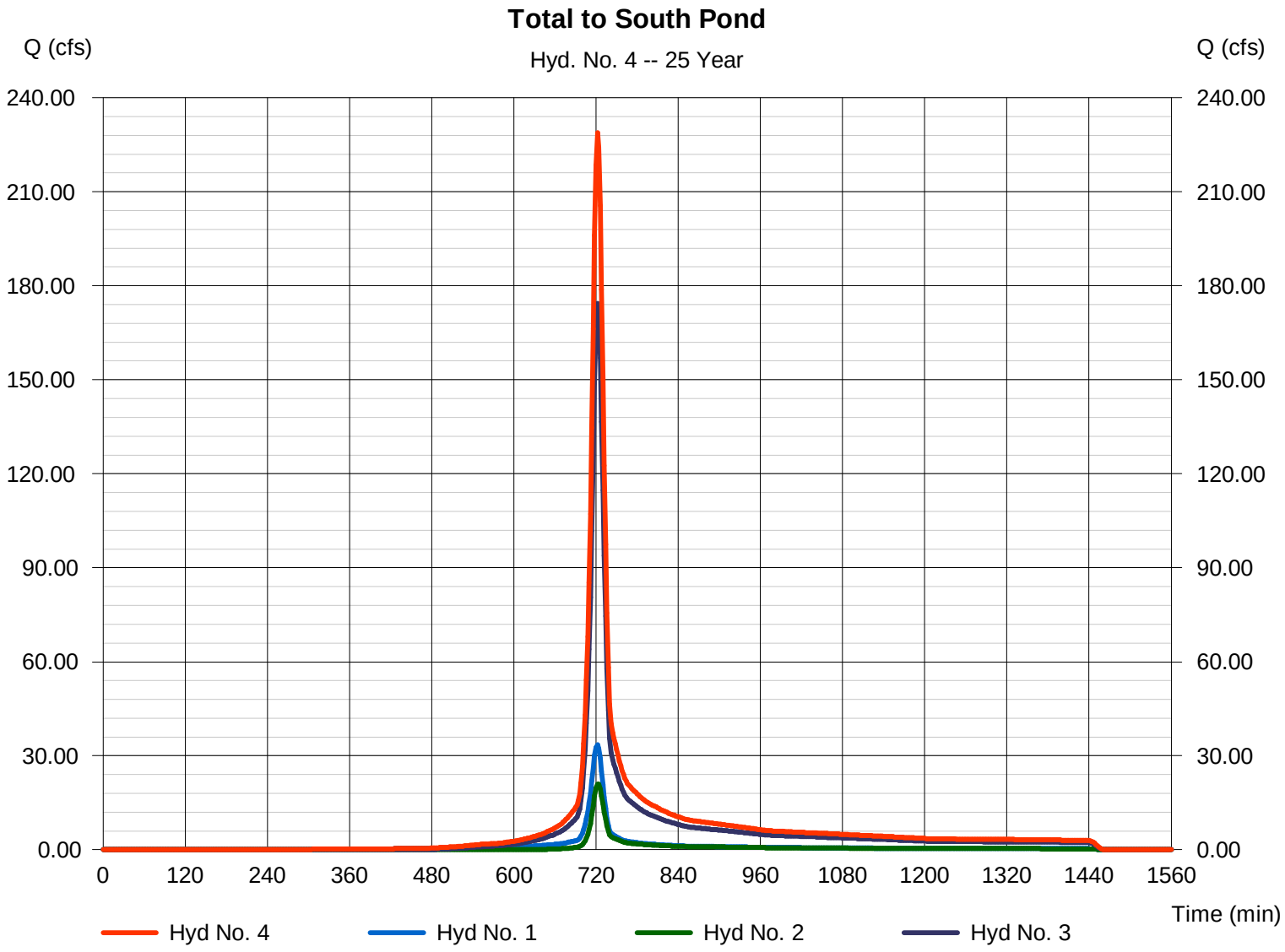


Hydrograph Report

Hyd. No. 4

Total to South Pond

Hydrograph type	= Combine	Peak discharge	= 228.82 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 649,302 cuft
Inflow hyds.	= 1, 2, 3	Contrib. drain. area	= 53.500 ac



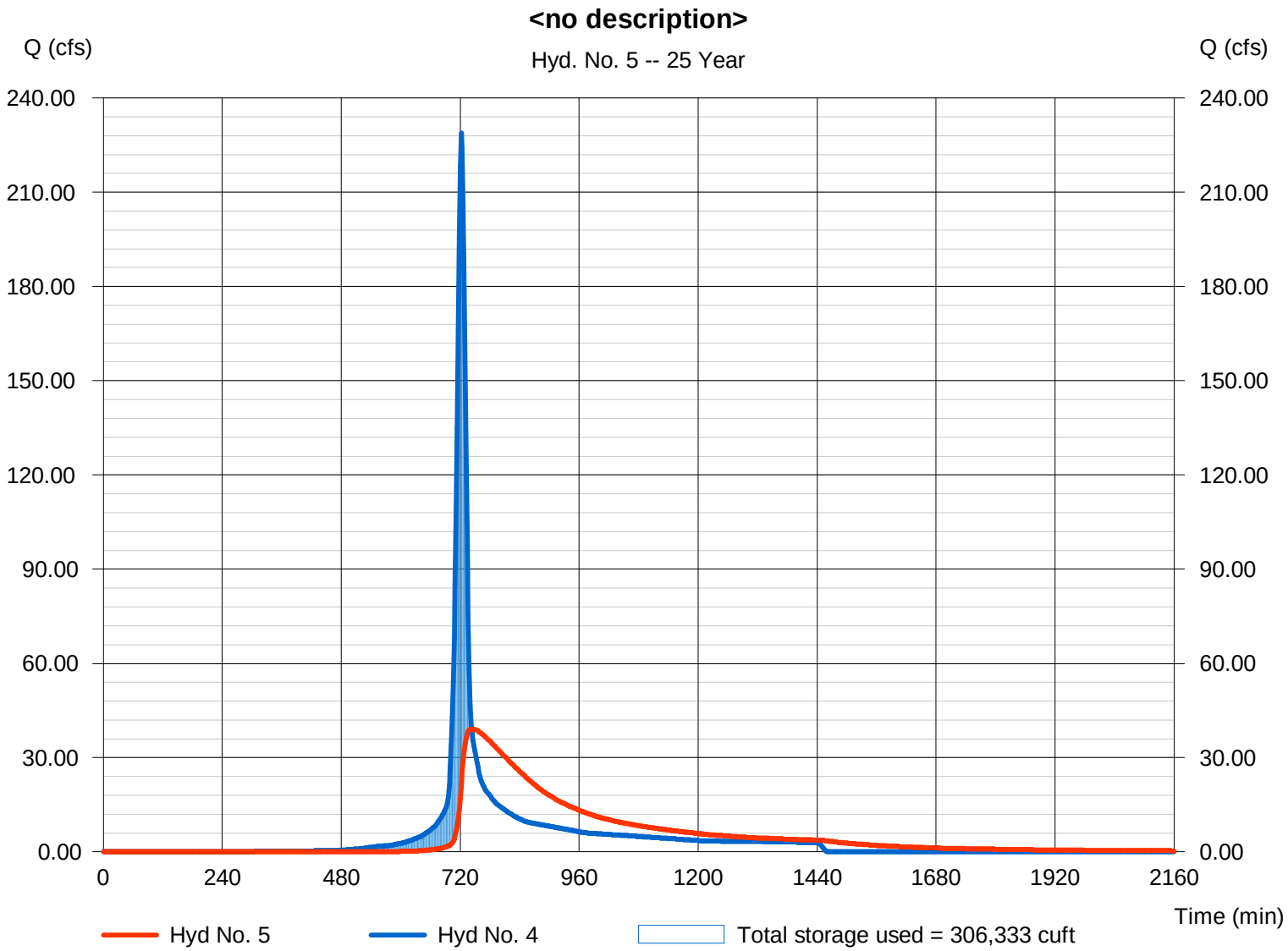
Hydrograph Report

Hyd. No. 5

<no description>

Hydrograph type	=	Reservoir	Peak discharge	=	39.13 cfs
Storm frequency	=	25 yrs	Time to peak	=	742 min
Time interval	=	2 min	Hyd. volume	=	646,386 cuft
Inflow hyd. No.	=	4 - Total to South Pond	Max. Elevation	=	1338.80 ft
Reservoir name	=	South Pond	Max. Storage	=	306,333 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

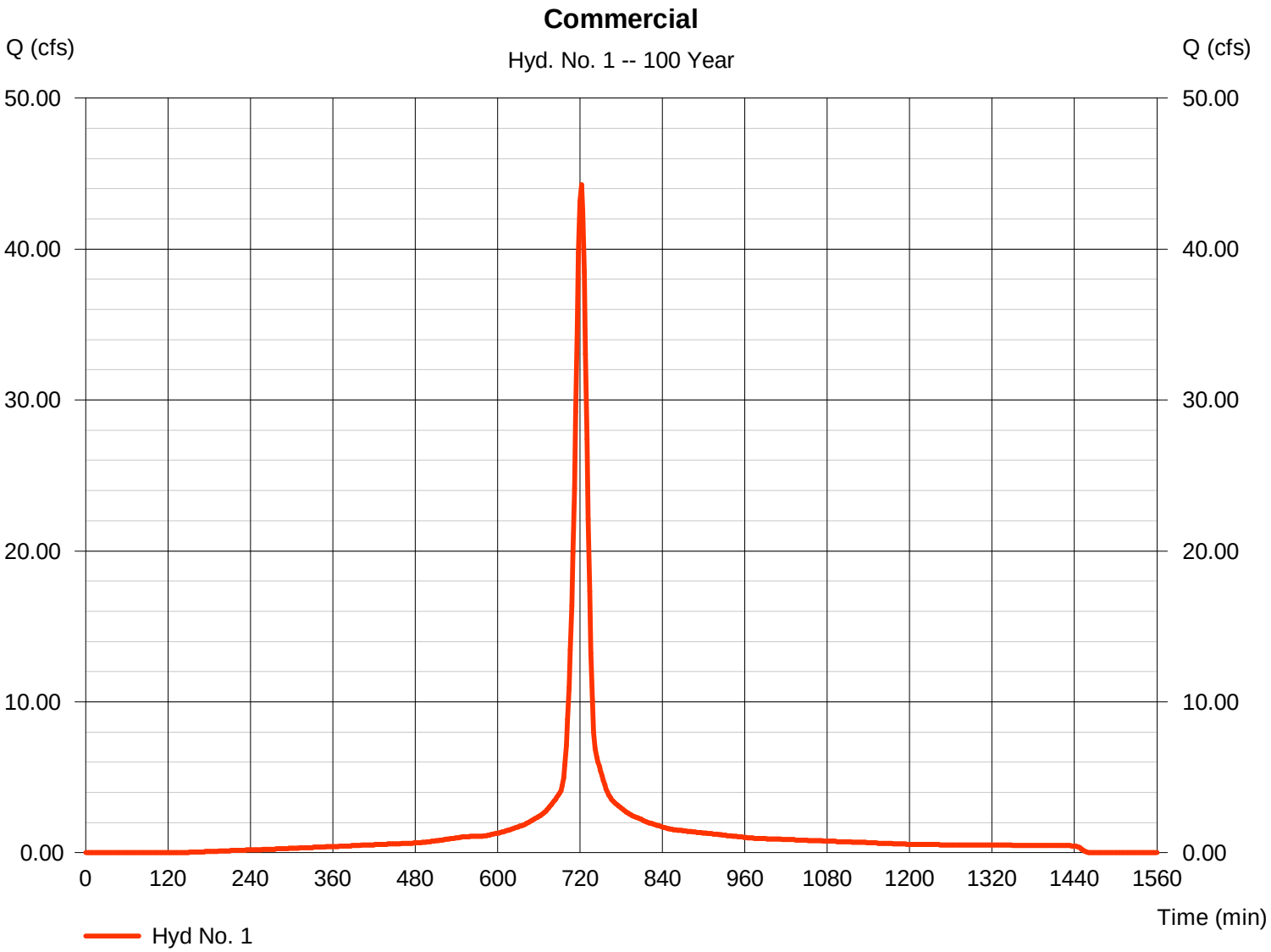
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	44.26	2	722	135,181	------	------	------	Commercial
2	SCS Runoff	33.62	2	722	94,479	------	------	------	West Offsite
3	SCS Runoff	254.96	2	722	718,512	------	------	------	Turkey Creek 3rd South Lots
4	Combine	332.83	2	722	948,172	1, 2, 3	------	------	Total to South Pond
5	Reservoir	53.15	2	744	945,197	4	1339.94	456,455	<no description>

Hydrograph Report

Hyd. No. 1

Commercial

Hydrograph type	=	SCS Runoff	Peak discharge	=	44.26 cfs
Storm frequency	=	100 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	135,181 cuft
Drainage area	=	5.500 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	7.90 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

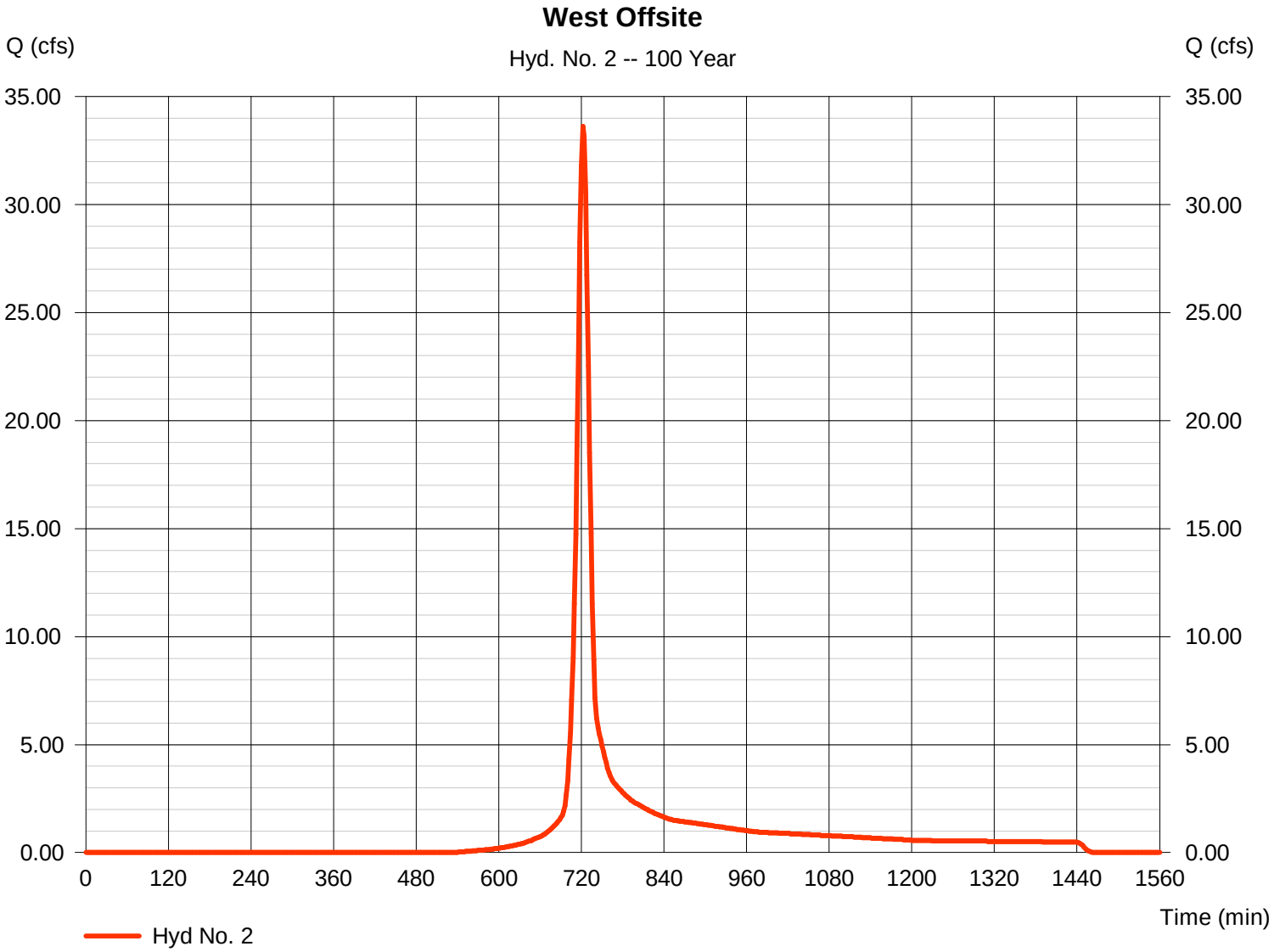


Hydrograph Report

Hyd. No. 2

West Offsite

Hydrograph type	=	SCS Runoff	Peak discharge	=	33.62 cfs
Storm frequency	=	100 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	94,479 cuft
Drainage area	=	7.000 ac	Curve number	=	65
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	7.90 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

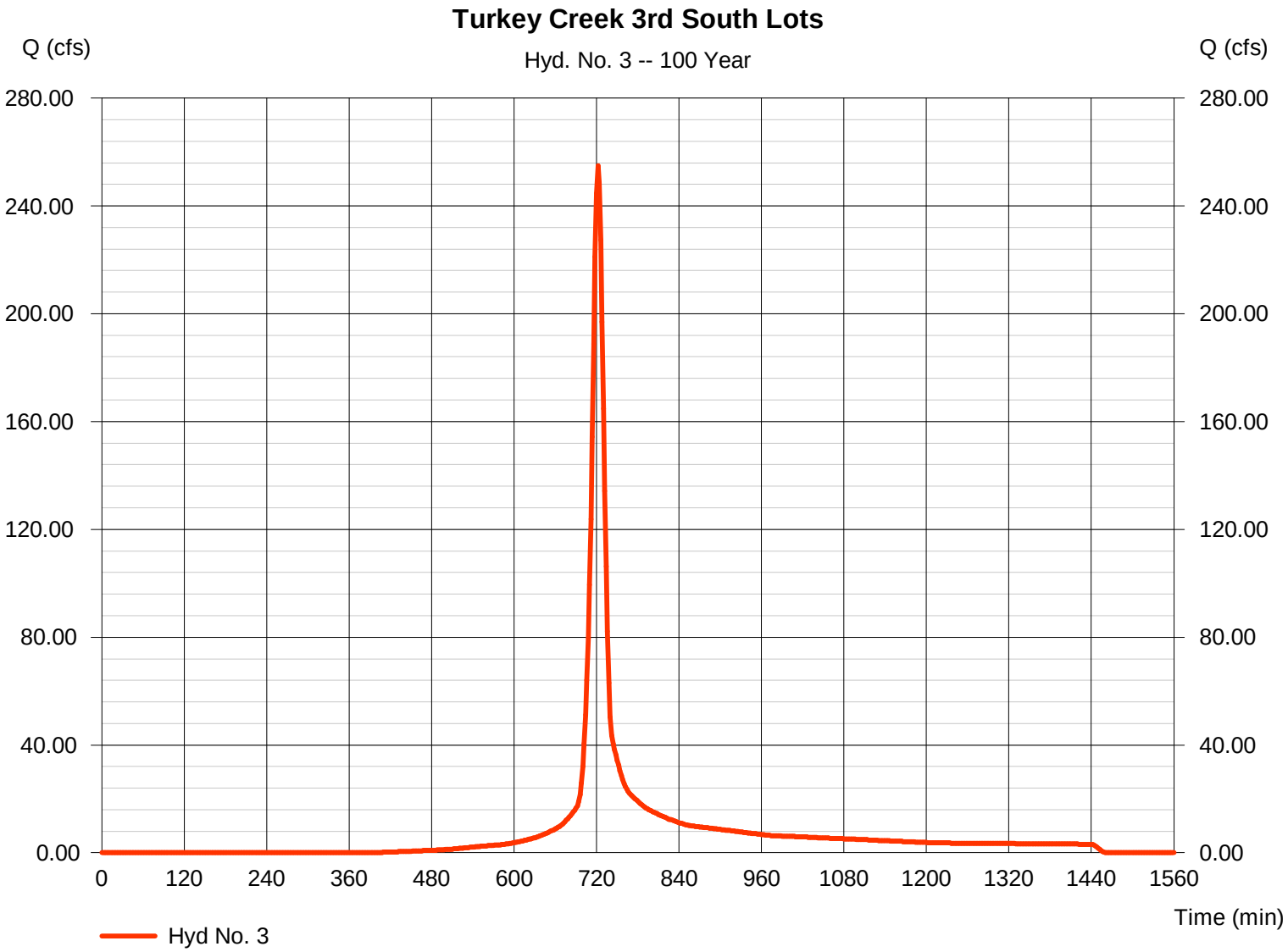


Hydrograph Report

Hyd. No. 3

Turkey Creek 3rd South Lots

Hydrograph type	=	SCS Runoff	Peak discharge	=	254.96 cfs
Storm frequency	=	100 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	718,512 cuft
Drainage area	=	41.000 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	7.90 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

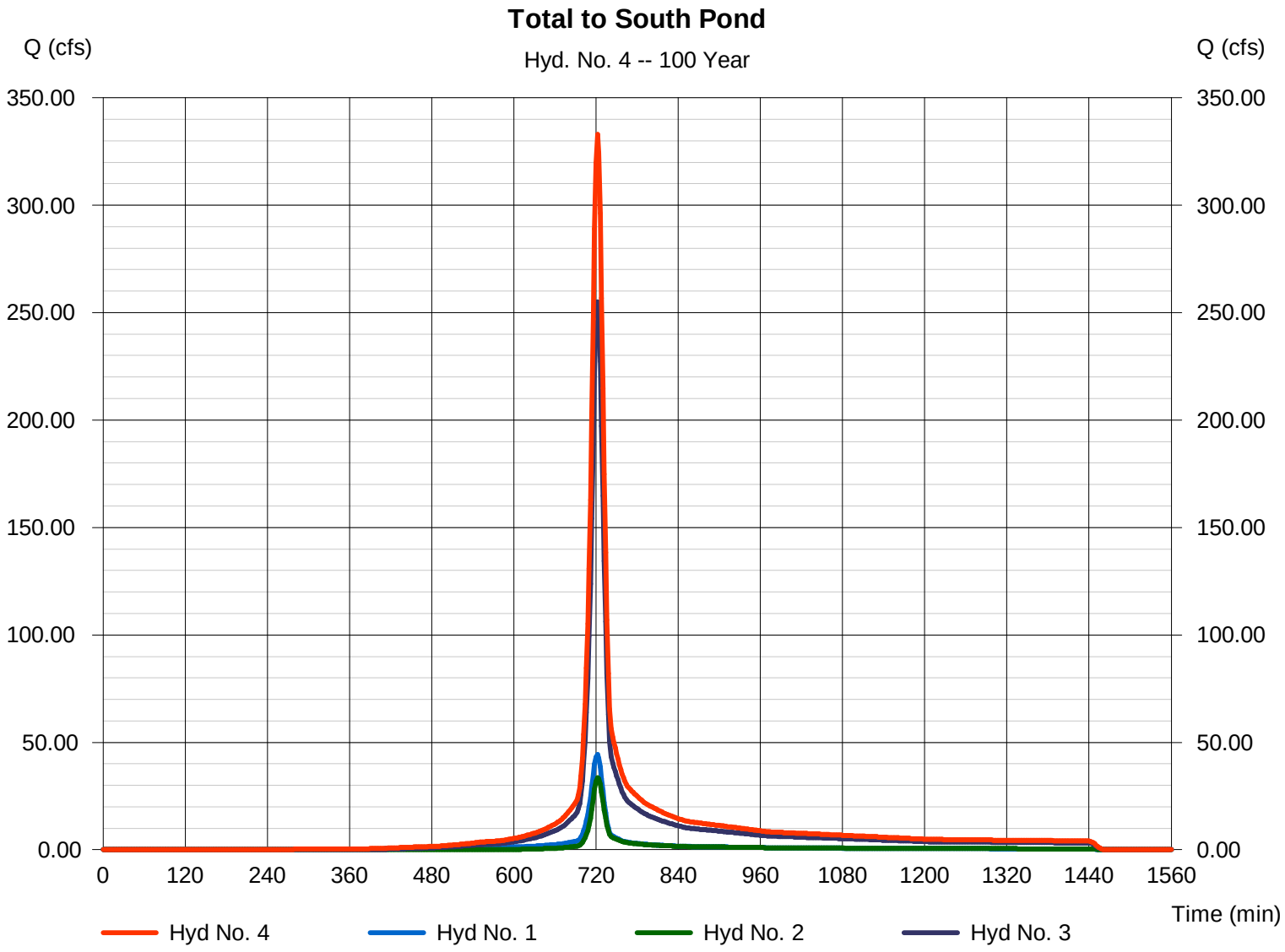


Hydrograph Report

Hyd. No. 4

Total to South Pond

Hydrograph type	= Combine	Peak discharge	= 332.83 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 948,172 cuft
Inflow hyds.	= 1, 2, 3	Contrib. drain. area	= 53.500 ac



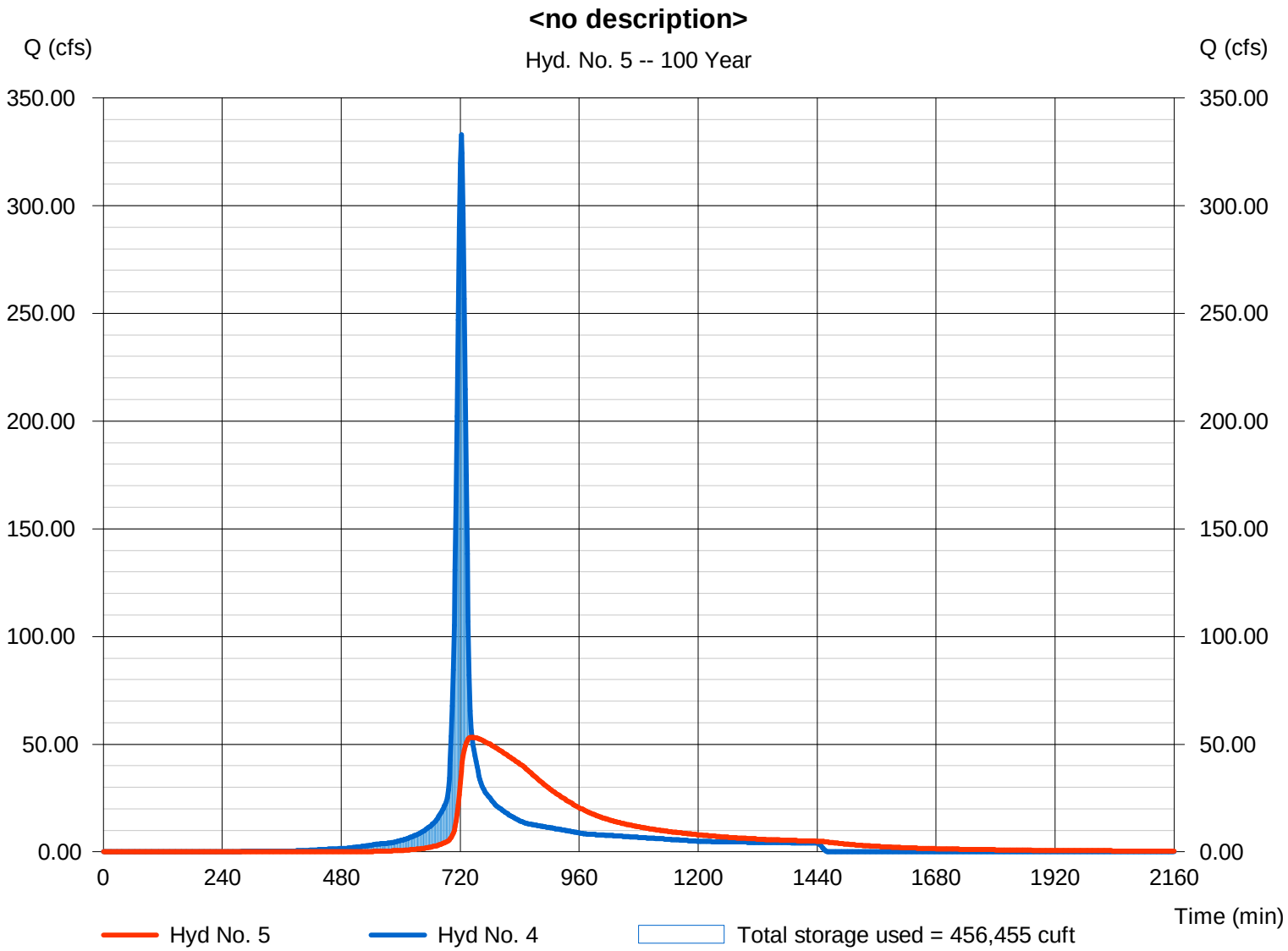
Hydrograph Report

Hyd. No. 5

<no description>

Hydrograph type	=	Reservoir	Peak discharge	=	53.15 cfs
Storm frequency	=	100 yrs	Time to peak	=	744 min
Time interval	=	2 min	Hyd. volume	=	945,197 cuft
Inflow hyd. No.	=	4 - Total to South Pond	Max. Elevation	=	1339.94 ft
Reservoir name	=	South Pond	Max. Storage	=	456,455 cuft

Storage Indication method used.



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	76.3137	14.3000	0.8844	--------
3	0.0000	0.0000	0.0000	--------
5	52.6224	11.2000	0.7497	--------
10	55.1841	11.1000	0.7229	--------
25	60.7012	11.1000	0.7068	--------
50	66.9222	11.3000	0.7004	--------
100	62.2794	10.1000	0.6624	--------

File name: wichita.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5.57	4.54	3.85	3.35	2.97	2.67	2.43	2.23	2.06	1.92	1.80	1.69
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	6.52	5.33	4.55	3.99	3.57	3.24	2.97	2.75	2.57	2.41	2.27	2.15
10	7.40	6.09	5.22	4.60	4.13	3.76	3.46	3.21	3.00	2.82	2.67	2.53
25	8.51	7.03	6.05	5.35	4.81	4.39	4.05	3.76	3.52	3.32	3.14	2.98
50	9.47	7.86	6.78	6.00	5.41	4.94	4.56	4.24	3.98	3.75	3.55	3.37
100	10.31	8.53	7.37	6.53	5.90	5.40	5.00	4.66	4.37	4.13	3.92	3.73

Tc = time in minutes. Values may exceed 60.

Precip. file name: wich_24hr.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	3.50	0.00	4.50	5.30	6.10	6.80	7.90
SCS 6-Hr	0.00	1.80	0.00	0.00	2.60	0.00	0.00	4.00
Huff-1st	0.00	1.55	0.00	2.75	4.00	5.38	6.50	8.00
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	1.75	0.00	2.80	3.90	5.25	6.00	7.10

Hydraflow Table of Contents

Pond System.gpw

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Friday, Jan 9, 2009

DRAINAGE & GRADING PLAN Scale 1:60