DRAINAGE PLAN

SKYWAY WEST 4TH ADDITION

TO

WICHITA, SEDGWICK COUNTY, KANSAS

PREPARED BY

Baughman
ENGINEERING | SURVEYING | PLANNING
LANDSCAPE ARCHITECTURE

21 OCTOBER 2011

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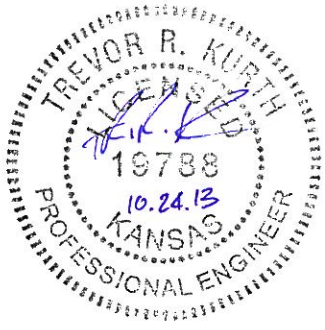
LANDSCAPE ARCHITECTURE

DRAINAGE PLAN
SKYWAY WEST 4TH ADDITON

FINAL REPORT

Prepared by Baughman Company, P.A.
21 October 2011



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

REPORT CONTENTS

EXISTING CONDITIONS

The site is approximately 73 acres located at the north east corner of 31st Street South and 119th Street West. The property is located adjacent to the west to Skyway West 3rd Addition and is across the street to the north from Skyway West 2nd Addition. The site is currently farmland and pasture and has a single family home-site located along 31st Street which will be razed when this site develops.

The site features a high point near the middle running north and south through the site which divides the drainage patterns. Approximately half of the site flow west and the remaining to the east.

There is no FEMA SFHA located on this property as of this report. The drainage patterns as defined above can be seen on the Existing Conditions Exhibit.

PROPOSED CONDITIONS

The property is being platted as one large industrial lot with 2 reserves for onsite detention and water quality of onsite runoff. The site will be further defined upon site development in the future. The detention facilities will both be dry due to the area of influence near the airport.

We expect portions of the site to be paved with asphalt/concrete or with gravel upon development. The site will likely be graded to minimum grades to account for large industrial users and will likely drain overland in ditches and/or swales.

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

OFFSITE CONDITIONS

The proposed site drains to the south west and east and then offsite. The site has a high point near the mid-point which directs runoff to the east and west. There is very little offsite runoff, approximately 2 acres from the north, that encroach the proposed site. A current portion of this site, approximately4 acres, discharges to the north offsite via sheet flow.

The runoff from the north appears to be sheet flow from the adjacent farmland. Similar to the offsite flow, the flow that leaves the site to the north also appears to be sheet flow from the agricultural land.

The majority of the site discharges to the southwest and east offsite. The west half primarily drains to the south west corner of the property and is conveyed across 31st Street via a 24" CMP. This pipe appears undersized and we expect 31st Street to overtop under current conditions. The east half of the site discharges via sheet flow and shallow concentrated flow to the adjacent east property. Both properties in which this property discharges are platted and are designed to accept the runoff.

The USGS Quadrangle Sheet can be seen with the site location plotted as Exhibit 1.

The Aerial for this area can be viewed as Exhibit 2.

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.

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

- FLOW DATA
  - Areas per LIDAR data, USGS Quadrangle Sheet, Aerial Photos, and Site Visits
  - SCS Curve Number used for Existing Flows (CN = 80)
  - Time of Concentration: Lag Method (minimum 15 min)

SITE CHARACTERISTICS

The site consists of approximately 73 acres of currently agricultural farmland. The area drains to the west and east and offsite at the southwest corner under 31st Street as well as overland to the east adjacent platted property.
The existing site characteristics can be seen from the aerial exhibit (Exhibit 2).

EXISTING CONDITIONS HYDROLOGIC ANALYSIS

The site was analyzed for pre-development conditions using the SCS Curve Number method for the entire storm event series. A Curve Number (CN) of 80 was used for existing conditions due to row crops in a Type C soil condition. Although the CN's for this soil type would be higher utilizing TR-55, a more conservative CN of an 80 was used. This was used based on Table 4-2 in the City of Wichita's storm water manual. The Time of Concentration was calculated using the Lag Method with a minimum Tc of 15 minutes, if needed. Basin slopes and run lengths were computed using lidar and the City of Wichita's hydrogeodatabase.

DOWNSTREAM DRAINAGE CAPACITY

The west half of the site flows to the southeast corner where it is conveyed to the south via a 24" CMP under 31st Street. This pipe will not convey even the 2 year event without major ponding on the adjacent site or overtopping the roadway. The pipe conveys the runoff directly south along the front of Skyway West 2nd Addition and then across 119th Street via a 2'x4' RCBC. There is a drainage easement located along the western portion of Skyway West 2nd to account for this drainage encroaching the property.
The eastern half of the site drains via sheet flow and shallow concentrated flow to the adjacent east Skyway West 3rd Addition. That addition was designed to accommodate the runoff into its pond and ditch system.

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.

- STORM SERIES
  - 24-hour; 2-yr, 5-yr, 10-yr, 25-yr, 50-yr, 100-yr Storm Events Modeled
  - 1.2" Water Quality Flow modeled as '3-yr event' in HydraFlow
  - Hydrograph Method utilized for Developed Flows
  - CN = 91 (Soil Type C – Industrial Cover)
  - Time of Concentration; Lag Method, minimum Tc = 15min

- GRADING CONSTRAINTS
  - One foot freeboard between 100-yr WSE and adjacent lot corner
  - Match all existing perimeter grades

DEVELOPED CONDITIONS HYDROLOGIC ANALYSIS

The site is proposed to be platted into a one lot industrial development. There are 3 detention areas proposed in this development to detain developed runoff to existing conditions as well as to provide water quality and channel protection volumes. A Curve Number of 91 was used for Industrial Lots in a Soil Type C. Based on the Storm Water Manual, Table 4-4, Industrial cover will be assumed to have an impervious coverage of 72%. Since this table was taken directly from TR-55, but does not include the rest of the expanded table, TR-55 was used and a corresponding CN was used. No specific grading or lot configuration is known at the time of this plat, which will be done during the site development process.

Please be aware, that the storm listed as the '3-yr event' in the Hydraflow model is actually the 1.2" rainfall water quality event. This is due to the constraints of the programs naming conventions. All the other storm events correspond to their respective years. The Channel Protection volume is generated using the 1-year event.

DETENTION FACILITIES

There are 2 detention facilities proposed for this plat. Each facility will be dry detention due to the proximity to Wichita's Mid-Continent Airport. These facilities can achieve only 60% of the water quality for the proposed site in each of their respective basins according to the Storm Water Manual design for extended dry detention ponds. Each facility is detailed further below.

- Reserve A – East Detention Basin

  This pond is located along the east line of the property and will accept runoff from approximately 33 acres of developed area from the eastern half of the site. The pond will drain via a 36" RCP at the bottom elevation and will discharge directly into the adjacent Reserve where a dry detention basin is proposed. The dry basin will have a 100-year water surface elevation of approximately 1339.3.

- Reserve B – West Detention Basin

  The detention basin in Reserve B will accept runoff from approximately 40 acres of developed industrial area. Due to this area having little elevation change and the existing 24" CMP under 31st Street having little to no depth for storage, the proposed basin will have a pump to discharge the volume. This basin will have a 15' overflow weir at elevation 1343 and a dry basin bottom at elevation 1338.0. The pump will discharge the volume under the 1343 elevation and will be sized to discharge the volume within 4 days. The pump will discharge to the 24" CMP in the 31st Street ROW.

  The pump will be sized to discharge the volume no longer than a 4 day period. To accomplish a 4 day drawdown, the pump will have to discharge at least 312 gpm. To achieve a 2 day drawdown to dry conditions in the basin, the pump will need to discharge 625 gpm. These figures are based on discharging 240,000 cu ft of volume, which is the non-discharging volume under the weir elevation.

DISCHARGE POINTS SUMMARY

Both detention basins will limit the developed runoff to at the least the existing conditions runoff values. Both areas of discharge will discharge directly to adjacent platted industrial areas where easements and reserves have been provided for these discharge points.
It appears the 24" CMP is undersized based on existing conditions runoff values. However, this development will not add additional runoff to these areas as the dry basin will feature a pump system that will greatly diminish the peak runoff from the more frequent storm events.

WATER QUALITY

Preliminary water quality calculations have been provided for the basins and detention facilities. The proposed detention facilities in Reserves A and B will provide 60% of the needed water quality volume. Since the site plan and cover is not available at this time, additional locations or BMP's are not provided at this time. At this time, the following chart can be used for a general requirement of the WQ needed on the site.

Total Developed Area	Water Quality Volume Needed	WQv needed per Developed sqft
73 acres	91,580 cuft	0.04 cuft

This chart portrays the overall WQv needed per square foot of development. This does include the 60% of treatment that the dry detention areas will offer to the development. Upon site development, these values can be adjusted to account for the specific project. These values are a representative of what the site can expect upon development. Industrial cover was assumed which includes 72%

impervious cover for the proposed development. For the purpose of this report, the total needed per developed square foot for the site is shown above.

DOWNSTREAM CHANNEL PROTECTION

Downstream channel protection will be provided in the east pond due to the discharge being primarily the pump system during the 1 year event. The pump will be designed to fully discharge the basin within 2 or 4 days which will inherently cut the peak flow and velocities down on the erosion forming storm events.

The eastern detention basin will not provide channel protection onsite. However, the detention pond system located immediately downstream in Skyway West 3rd Addition was specifically designed for channel protection and incorporated the peak flows from this site. The detention basins were designed with this sites runoff in mind and the channel protection volume and timing was incorporated into that design.

POTENTIAL UPSTREAM/DOWNSTREAM IMPACTS

Due to the construction of dry detention ponds, and the utilization of the existing outfall elevations and structures, we do not anticipate any downstream impacts with this development. The immediately downstream industrial additions were developed with this sites offsite drainage incorporated into their design.

SOURCE OF FLOODPLAIN INFORMATION

The site lies within a FEMA Zone X - Unshaded. The location of the property, on FEMA FIRM Panel 338 of 700 for Sedgwick County, Kansas, effective February 2, 2007, is attached as Exhibit 6.

FEDERAL, STATE, & LOCAL PERMITTING

US ARMY CORPS OF ENGINEERS

There is a low lying area near the western portion of the site that stands water during rain events. We recommend this area be more closely looked at as possible wetlands or jurisdictional waters before proceeding with development.

KANSAS DEPT OF AGRICULTURE – DWR PERMITTING

There does not appear to be any DWR permitting needed on the proposed site at this time.

FEMA

There is no mapped floodplain located upon the proposed site. Therefore, no FEMA permitting is expected at this time.

KANSAS DEPT OF TRANSPORTATION

There does not appear to be any KDOT permitting needed on the proposed project.

SEDGWICK COUNTY PERMITTING

There does not appear to be any Sedgwick County permitting needed at this time.

EXHIBIT 1: Site Location Map

EXHIBIT 2: Aerial Photo Exhibit with Lidar Topography

EXHIBIT 3: Plat – Half Scale

EXHIBIT 4: Drainage Plan – Half Scale

EXHIBIT 5: Floodplain Location (FIRM)

Skyway West 4th

Location Exhibit

0 150 300 600 Feet

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Skyway West 4th

Aerial Exhibit

0 150 300 600 Feet

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SKYWAY WEST 4TH ADDITION
WICHITA, SEDGWICK COUNTY, KANSAS

Know all men by these presents that we, the undersigned, have caused the land in the surveyors certificate to be platted into a Lot, a Block, Streets, and Reserves to be known as "SKYWAY WEST 4TH ADDITION", Wichita, Sedgwick County, Kansas. The utility easements are hereby granted as indicated for the construction and maintenance of all public utilities. The drainage and utility easement is hereby granted as indicated for drainage purposes and for the construction and maintenance of all public utilities. The drainage easements are hereby granted as indicated for drainage purposes. The streets are hereby dedicated to and for the use of the public. Reserves "A" and "B" are reserved for open space, landscaping, berms, lakes, and drainage purposes. Reserves "A", and "B" shall be owned and maintained by the owner/owners of Lot 1. 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. The Minimum Building Pad Elevations for the lowest opening to the structures shall be as indicated on the face of the plat.

JEDCO, LLC
a Kansas limited liability company

_____, Manager
John E. Dugan

State of Kansas)
Sedgwick County) SS *The foregoing instrument acknowledged before me, this_____day of_____, 2013, by John E. Dugan, manager of JEDCO, LLC, a Kansas limited liability company, on behalf of the limited liability company.*

_____, Notary Public
*My App't. Exp.*_____

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 "SKYWAY WEST 4TH ADDITION", Wichita, Sedgwick County, Kansas and that the accompanying plat is a true and correct exhibit of the property surveyed, described as follows: South Half of the Southwest Quarter of Section 6, Township 28 South, Range 1 West of the 6th Principal Meridian, Sedgwick County, Kansas.*

Existing public easements and dedications being vacated by virtue of K.S.A. 12-512b, as amended.

Baughman Company, P.A.

_____, Surveyor
Michael G. Conrey

This plat of "SKYWAY WEST 4TH 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_____, _____.
Wichita-Sedgwick County Metropolitan Area Planning Commission

_____, Chair
Don Klausmeyer

_____, 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_____, 2013.

_____, Mayor
Carl Brewer

_____, City Clerk
Karen Sublett

Reviewed in accordance with K.S.A. 58-2005 on this_____day of_____, 2013.

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

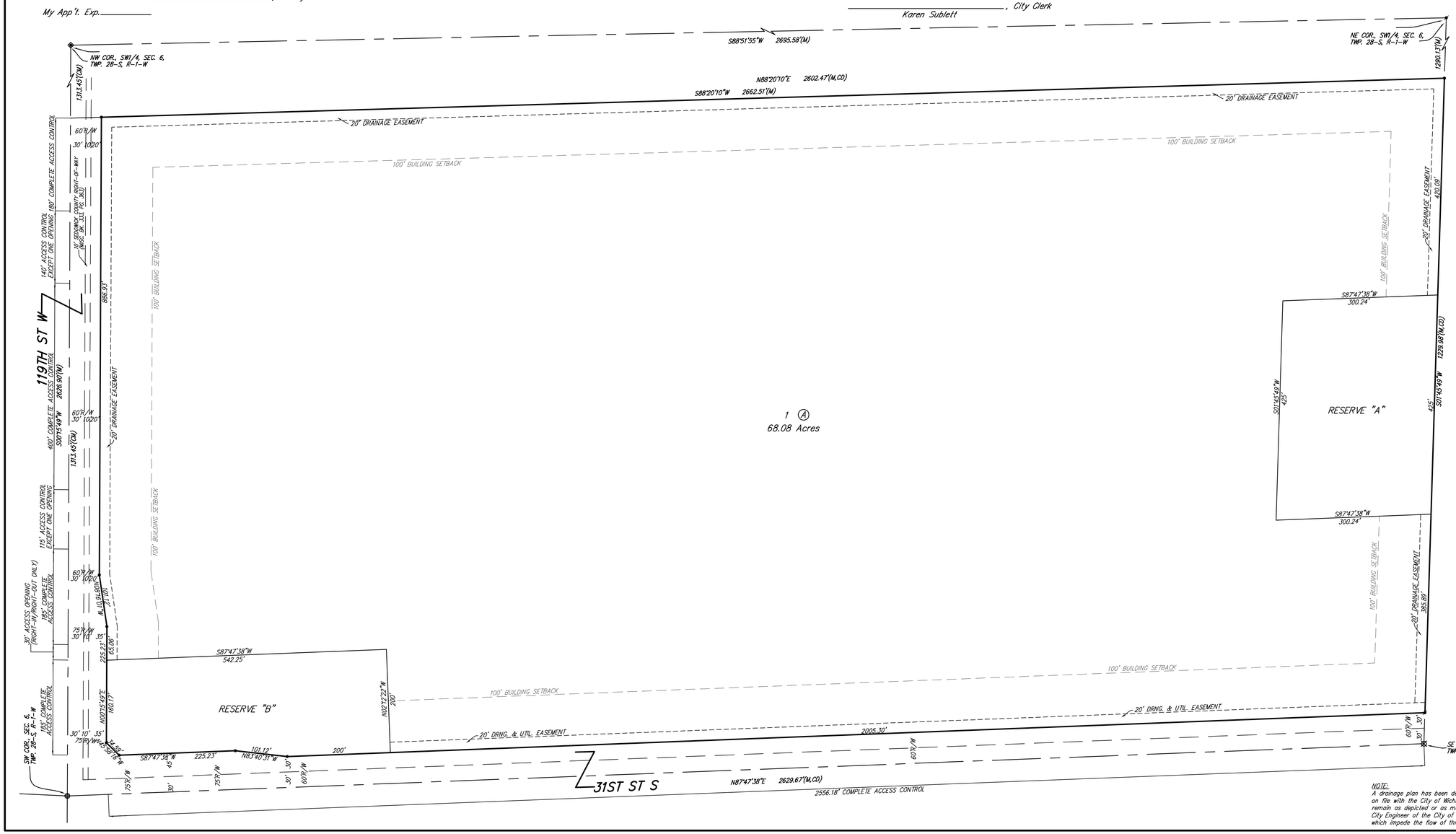
Entered on transfer record this_____day of_____, 2013.

_____, County Clerk
Kelly B. 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_____, 2013 at_____o'clock___M; and is duly recorded.*

_____, Register of Deeds
Bill Meek

_____, Deputy
Tonya Buckingham



0' 100' 200'

DATE OF PREPARATION: 14 OCTOBER 2013

✖ = #4 REBAR W/ "BAUGHMAN" CAP (FOUND)
● = #4 REBAR W/ "BAUGHMAN" CAP (SET)
○ = 1 1/4" IRON IN THIMBLE (FOUND)
⊠ = 1" IRON (FOUND)
◈ = 1/2" IRON IN THIMBLE (FOUND)

(M) = MEASURED
(D) = DESCRIBED
(P) = PLATTED
(C) = CALCULATED
(CM) = CALCULATED PER MEASURED

MINIMUM BUILDING PAD ELEVATIONS FOR LOWEST OPENING TO THE STRUCTURES		
LOT	BLOCK	ELEVATION NAVD88
EAST HALF, LOT 1	A	1342.0
WEST HALF, LOT 1	A	1344.0

BENCHMARK:
DISC ON TOP OF WEST SIDE OF HEADWALL OF BOX CULVERT 120' EAST & 15' NORTH OF THE SW SEC. COR. OF 6-28S-1W.
ELEVATION = 1344.96 NAVD88

NOTE:
BLANKET CITIES SERVICE GAS COMPANY RIGHT-OF-WAY CONTRACT OVER THE S1/2 OF THE SW1/4 OF SEC. 6, TWP. 28-S, R-1-W RECORDED IN MISC. BOOK 111, PAGE 579, AND BLANKET CITIES SERVICE OIL COMPANY RIGHT-OF-WAY AGREEMENT RECORDED IN MISC. BOOK 372, PAGE 50, (NOW ASSIGNED TO SEMINOLE TRANSPORTATION AND GATHERING, INC. RECORDED IN FILM 2480, PAGE 1766), AND BLANKET SEA BREEZE COMMUNICATION COMPANY EASEMENT AS CITED IN THE MEMORANDUM OF TRANSFER AND CONTRIBUTION OF TELECOMMUNICATION RIGHTS RECORDED IN FILM 2333, PAGE 11 ARE IN THE PROCESS OF BEING CONFINED THIS 14TH DAY OF OCTOBER, 2013.

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.

SKYWAY WEST 4TH ADDITION
14 OCTOBER 2013

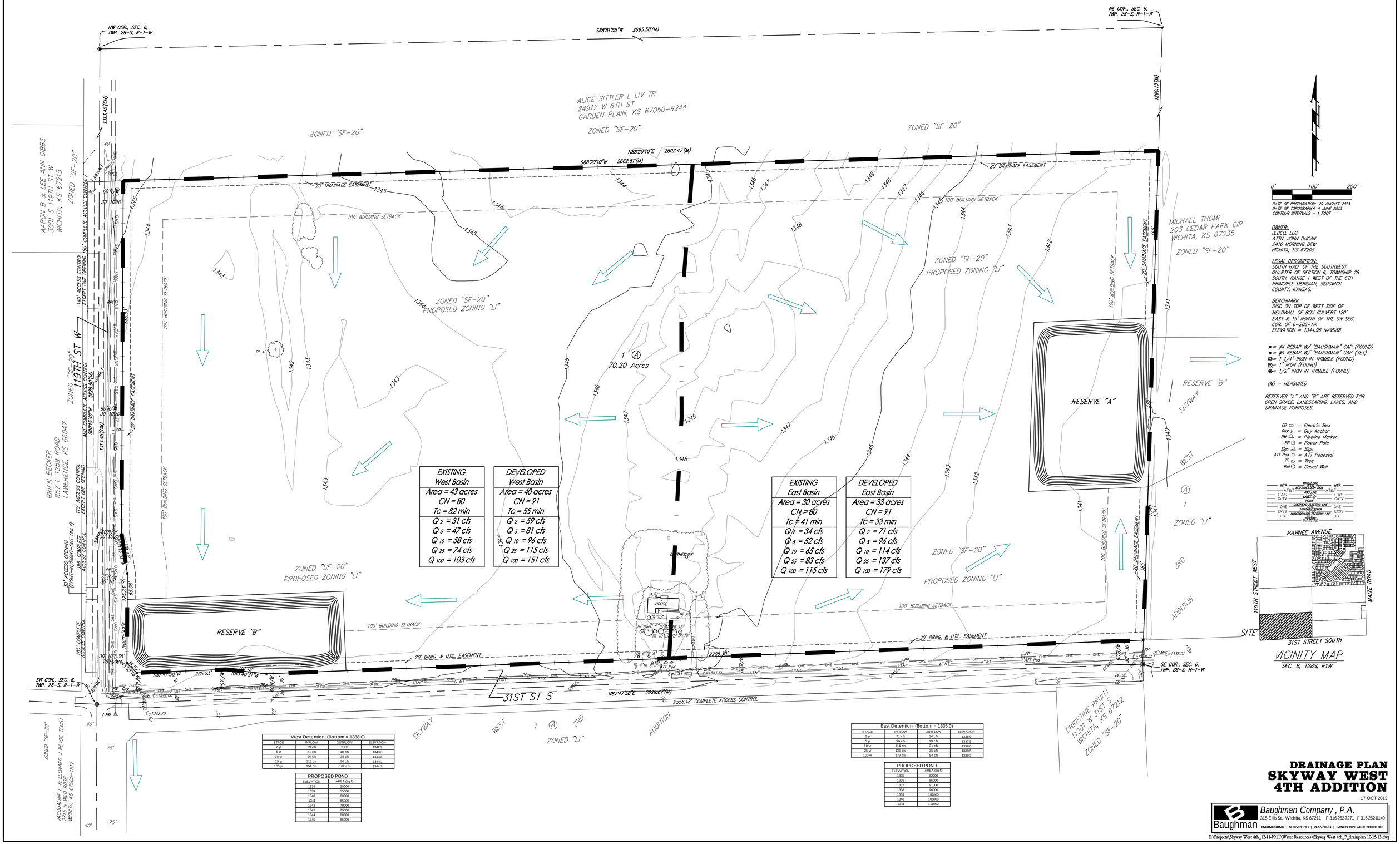
Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316.262.7271 F 316.262.0149
Baughman ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

E:/PROJECTS/SKYWAY WEST 4TH/SKYWAY WEST 4TH_F.DWG-RKR

DRAINAGE PLAN

SKYWAY WEST 4TH ADDITION

WICHITA, SEDGWICK COUNTY, KANSAS



West Detention (Bottom = 1338.0)

STAGE	INFLOW	OUTFLOW	ELEVATION
2 yr	59 cfs	2 cfs	1342.9
5 yr	81 cfs	10 cfs	1343.3
10 yr	96 cfs	25 cfs	1343.8
25 yr	115 cfs	56 cfs	1344.1
100 yr	151 cfs	102 cfs	1344.7

PROPOSED POND

ELEVATION	AREA (sq ft)
1338	50000
1339	55000
1340	60000
1341	65000
1342	70000
1343	75000
1344	80000
1345	85000

East Detention (Bottom = 1335.0)

STAGE	INFLOW	OUTFLOW	ELEVATION
2 yr	71 cfs	14 cfs	1336.9
5 yr	96 cfs	19 cfs	1337.5
10 yr	114 cfs	21 cfs	1338.0
25 yr	136 cfs	35 cfs	1338.5
100 yr	179 cfs	54 cfs	1339.3

PROPOSED POND

ELEVATION	AREA (sq ft)
1335	82000
1336	86000
1337	91000
1338	96000
1339	101000
1340	106000
1341	111000

DRAINAGE PLAN
SKYWAY WEST 4TH ADDITION
17 OCT 2013

Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
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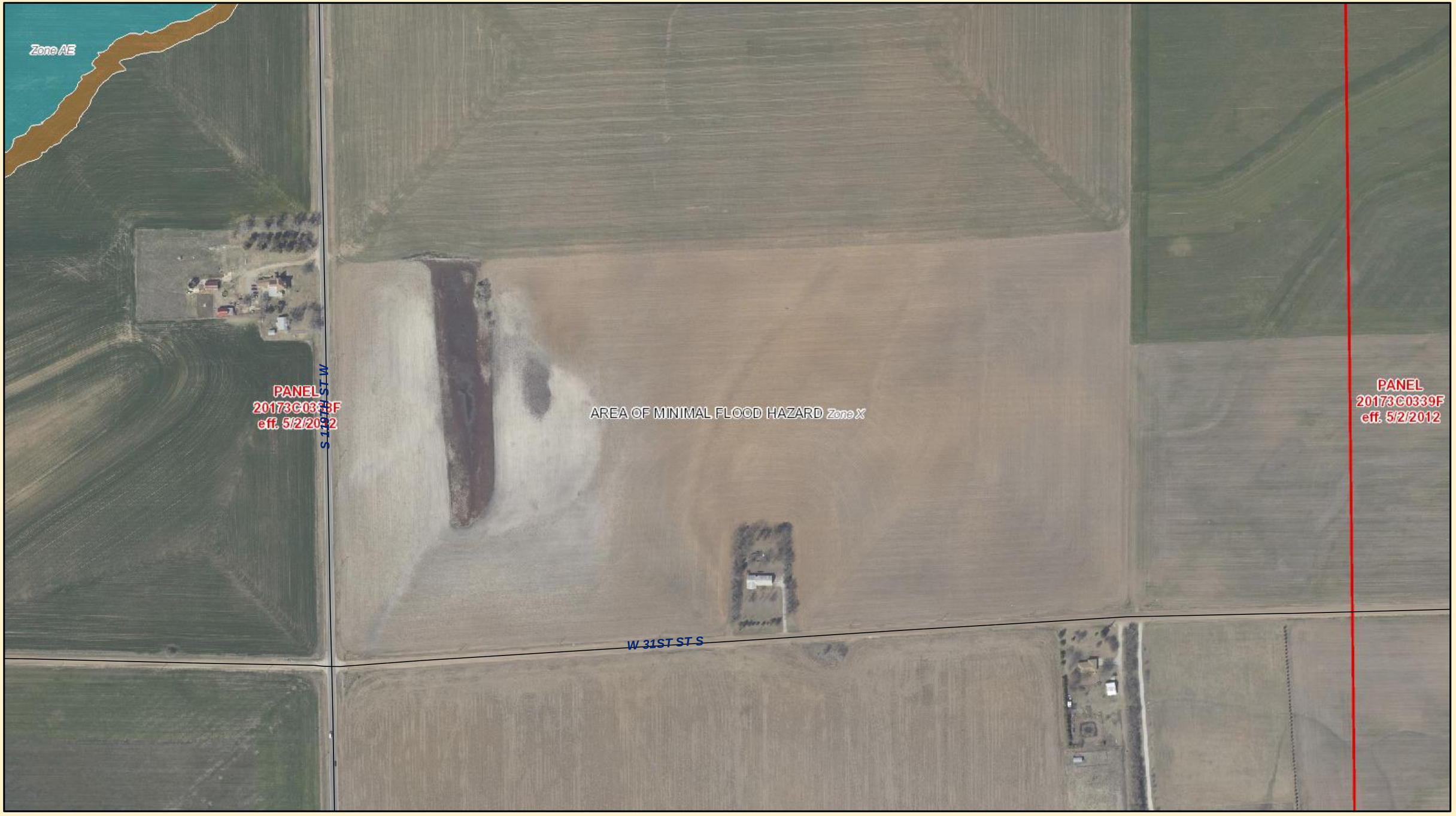

Skyway West 4th

FEMA Exhibit

0 150 300 600 Feet

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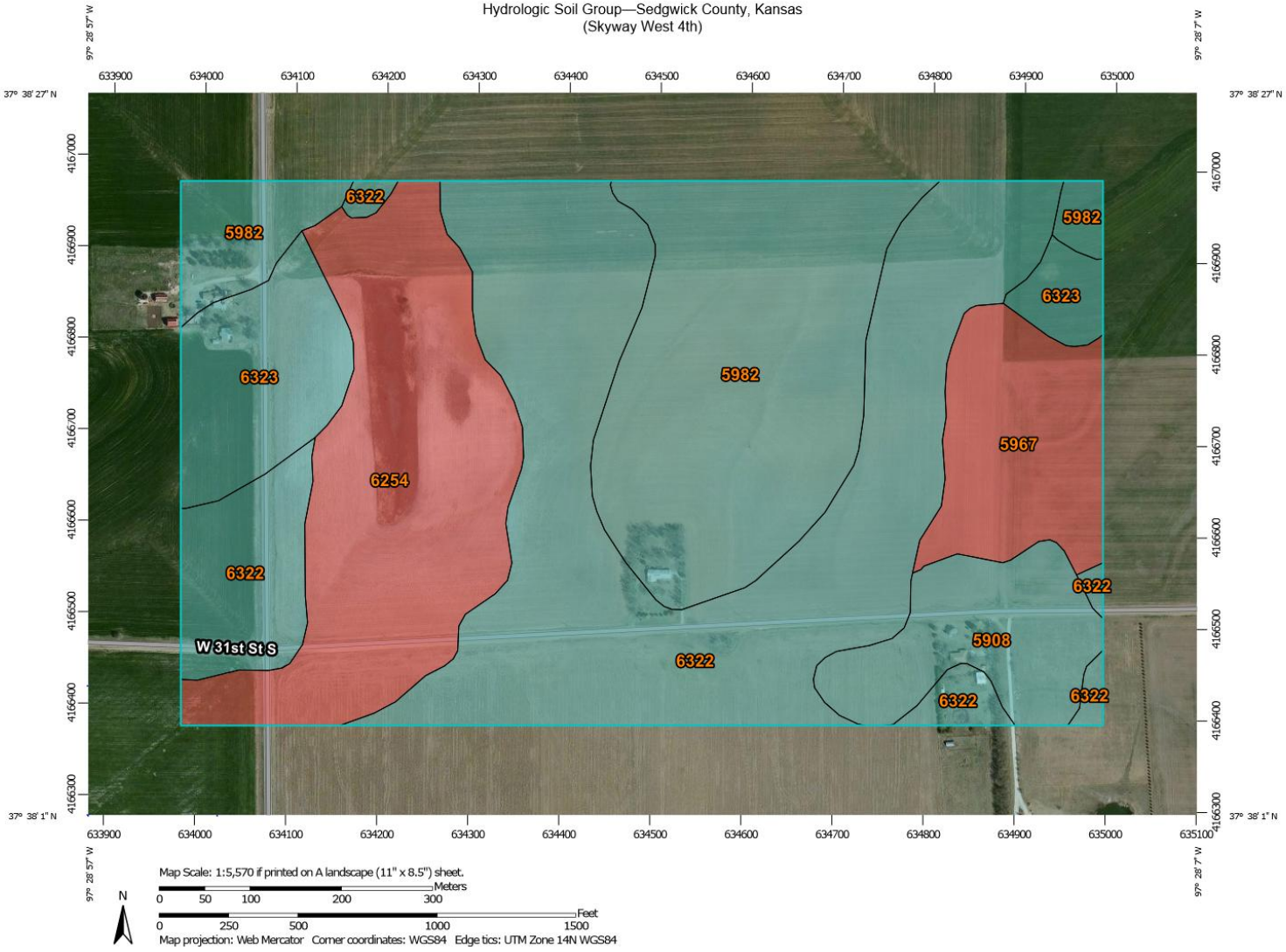
APPENDIX A: USGS Soils Survey

APPENDIX B : HydraFlow Hydrographs
Site Flow and Pond Routing

USGS Soils Survey

Hydrologic Soil Group—Sedgwick County, Kansas
(Skyway West 4th)



MAP LEGEND

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

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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: http://websoilsurvey.nrcs.usda.gov
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: Sedgwick County, Kansas
Survey Area Data: Version 8, Sep 20, 2012

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

Date(s) aerial images were photographed. Jul 18, 2010—Sep 27, 2011

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 (KS173)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
5908	Nalim loam, 0 to 1 percent slopes	C	9.7	6.5%
5967	Tabler silty clay loam, 0 to 1 percent slopes	D	11.2	7.5%
5982	Nalim loam, 1 to 3 percent slopes	C	34.4	23.0%
6254	Waurika silt loam, 0 to 1 percent slopes	D	26.9	18.0%
6322	Blanket silt loam, 0 to 1 percent slopes	C	56.1	37.5%
6323	Blanket silt loam, 1 to 3 percent slopes	C	11.3	7.6%
Totals for Area of Interest			**149.6**	**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 component. 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.

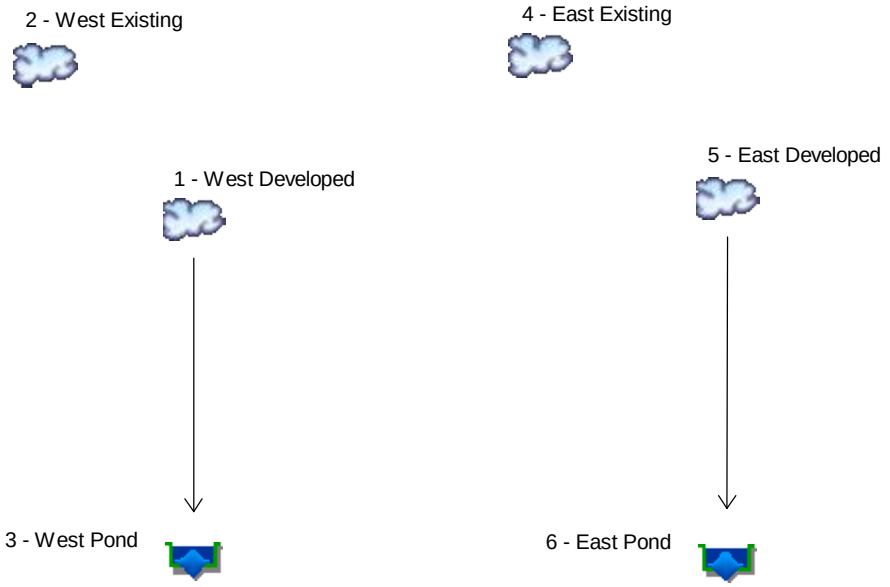
Tie-break Rule: Higher

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

Site Flow & Pond Routing

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	West Developed
2	SCS Runoff	West Existing
3	Reservoir	West Pond
4	SCS Runoff	East Existing
5	SCS Runoff	East Developed
6	Reservoir	East Pond

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	------	44.09	59.08	11.47	80.54	95.50	114.66	131.61	150.60	West Developed
2	SCS Runoff	------	19.96	30.52	1.788	46.66	58.41	73.81	87.68	103.39	West Existing
3	Reservoir	1	0.491	2.009	0.000	11.40	29.77	56.09	78.25	101.84	West Pond
4	SCS Runoff	------	22.65	34.42	1.929	52.36	65.37	82.52	97.94	115.38	East Existing
5	SCS Runoff	------	52.75	70.57	13.84	96.02	113.76	136.46	156.54	179.04	East Developed
6	Reservoir	5	9.698	14.04	1.228	19.21	21.14	35.27	43.96	54.37	East Pond

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2013 by Autodesk, Inc. v10

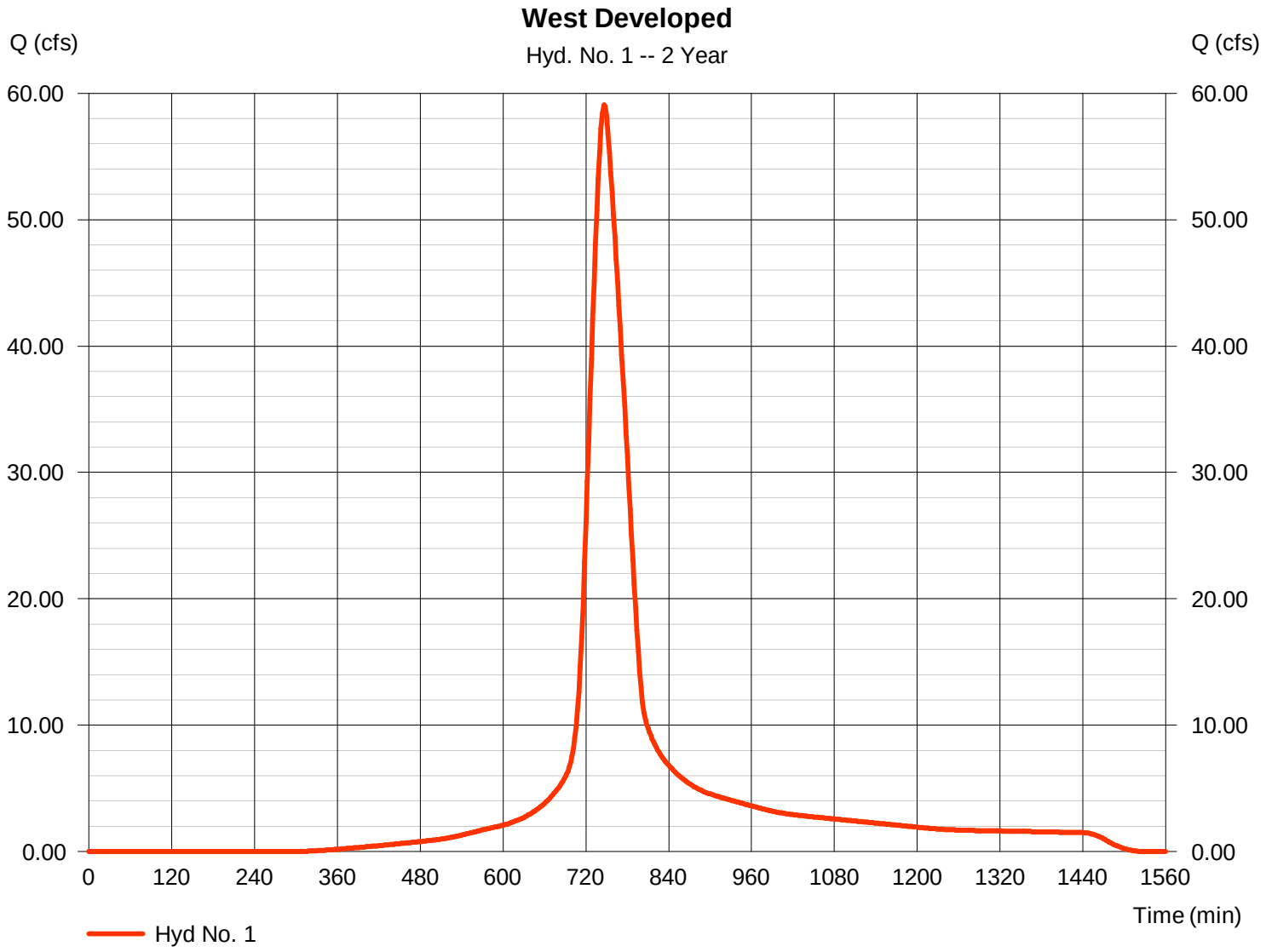
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	59.08	2	746	366,259	------	------	------	West Developed
2	SCS Runoff	30.52	2	764	256,697	------	------	------	West Existing
3	Reservoir	2.009	2	1186	122,598	1	1342.88	303,650	West Pond
4	SCS Runoff	34.42	2	740	179,914	------	------	------	East Existing
5	SCS Runoff	70.57	2	732	308,207	------	------	------	East Developed
6	Reservoir	14.04	2	766	306,567	5	1336.89	162,911	East Pond

Hydrograph Report

Hyd. No. 1

West Developed

Hydrograph type	= SCS Runoff	Peak discharge	= 59.08 cfs
Storm frequency	= 2 yrs	Time to peak	= 746 min
Time interval	= 2 min	Hyd. volume	= 366,259 cuft
Drainage area	= 40.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 2100 ft
Tc method	= LAG	Time of conc. (Tc)	= 54.80 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

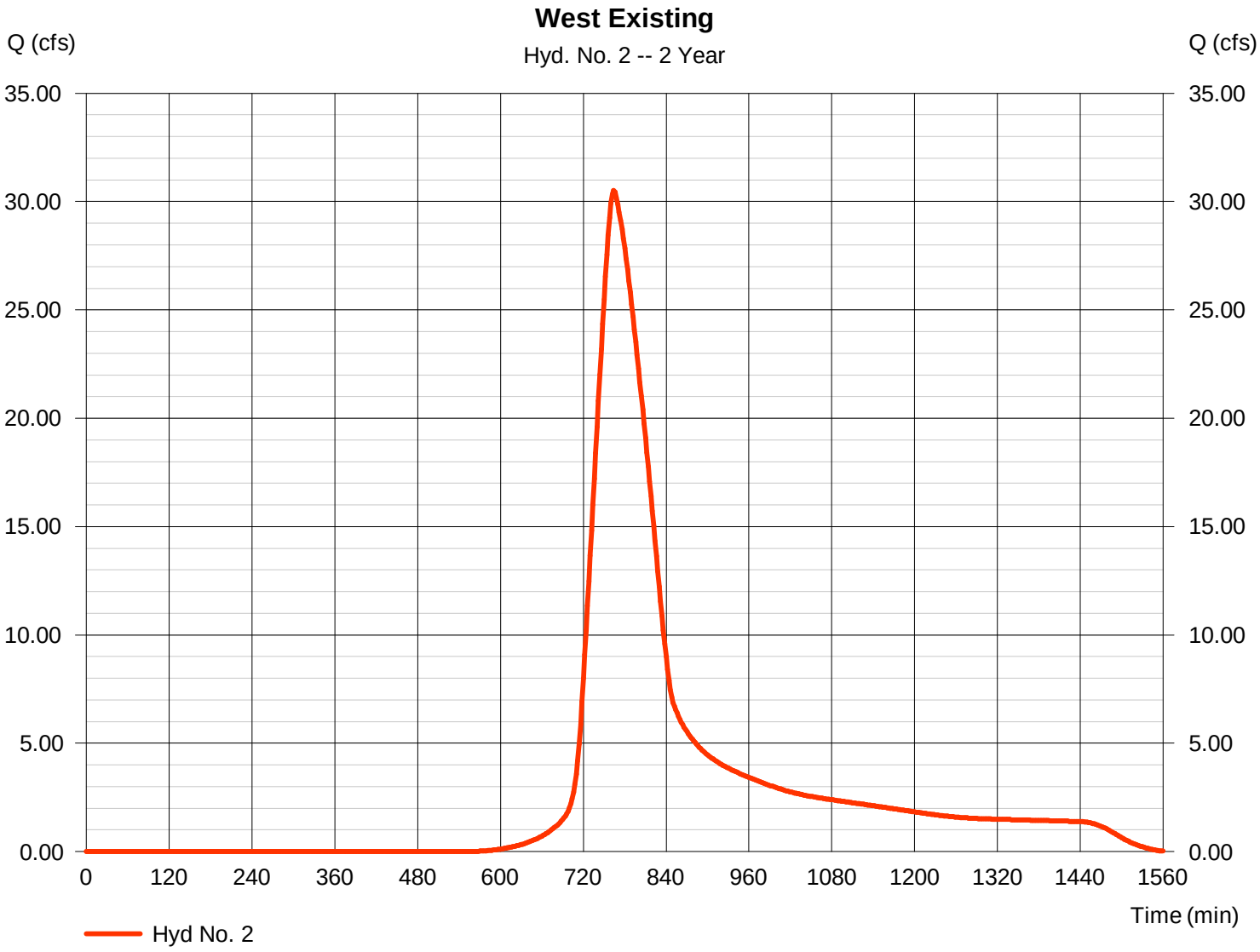


Hydrograph Report

Hyd. No. 2

West Existing

Hydrograph type	= SCS Runoff	Peak discharge	= 30.52 cfs
Storm frequency	= 2 yrs	Time to peak	= 764 min
Time interval	= 2 min	Hyd. volume	= 256,697 cuft
Drainage area	= 43.000 ac	Curve number	= 80
Basin Slope	= 0.5 %	Hydraulic length	= 2100 ft
Tc method	= LAG	Time of conc. (Tc)	= 81.50 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



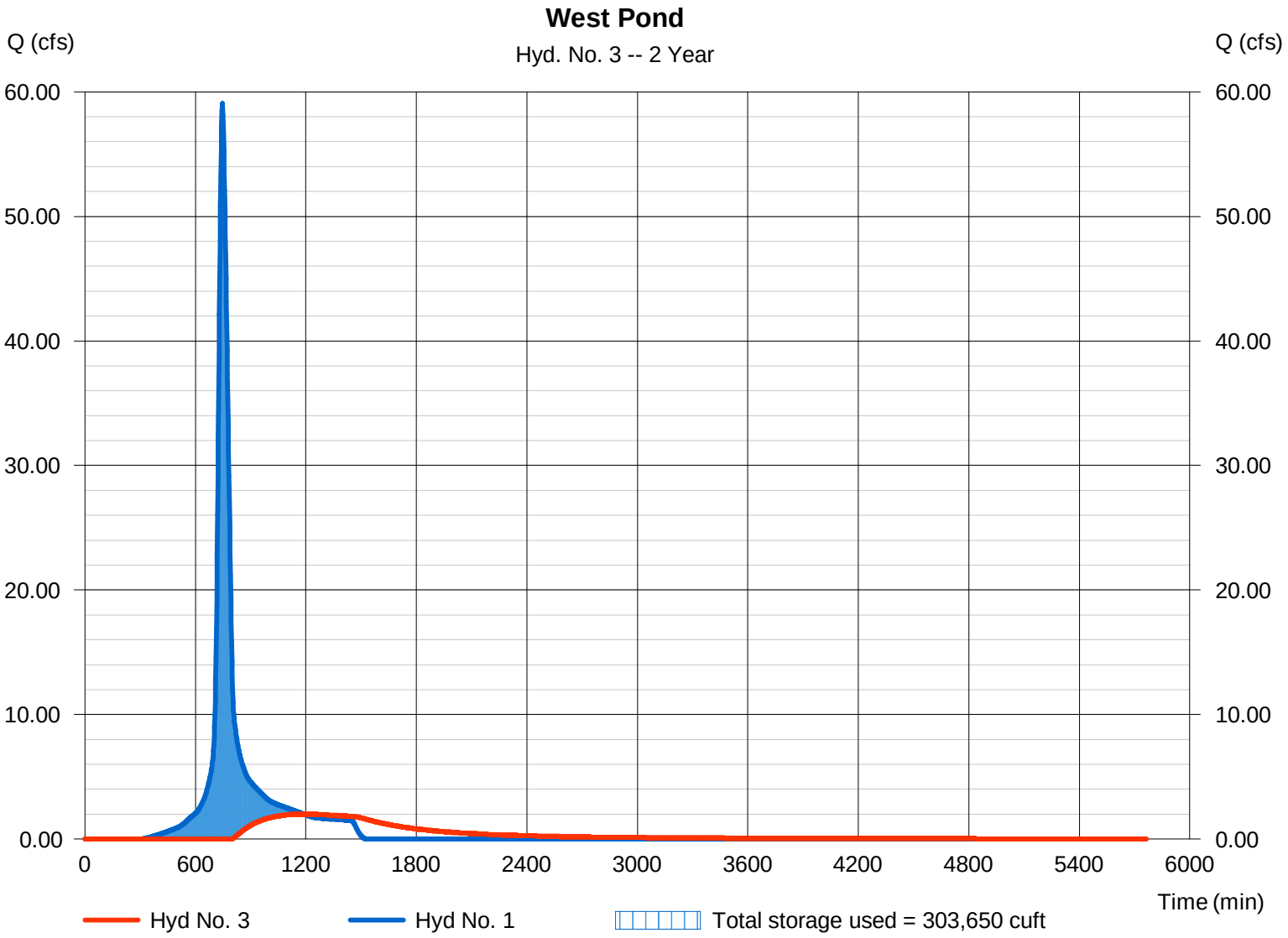
Hydrograph Report

Hyd. No. 3

West Pond

Hydrograph type	= Reservoir	Peak discharge	= 2.009 cfs
Storm frequency	= 2 yrs	Time to peak	= 1186 min
Time interval	= 2 min	Hyd. volume	= 122,598 cuft
Inflow hyd. No.	= 1 - West Developed	Max. Elevation	= 1342.88 ft
Reservoir name	= West Dry Detention	Max. Storage	= 303,650 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - West Dry Detention

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 1338.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1338.00	50,000	0	0
1.00	1339.00	55,000	52,475	52,475
2.00	1340.00	60,000	57,476	109,951
3.00	1341.00	65,000	62,477	172,428
4.00	1342.00	70,000	67,478	239,906
5.00	1343.00	75,000	72,478	312,384
6.00	1344.00	80,000	77,479	389,863
7.00	1345.00	85,000	82,479	472,342

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	0.00	0.00	0.00
Span (in)	= 24.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 1342.00	0.00	0.00	0.00
Length (ft)	= 35.00	0.00	0.00	0.00
Slope (%)	= 0.20	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

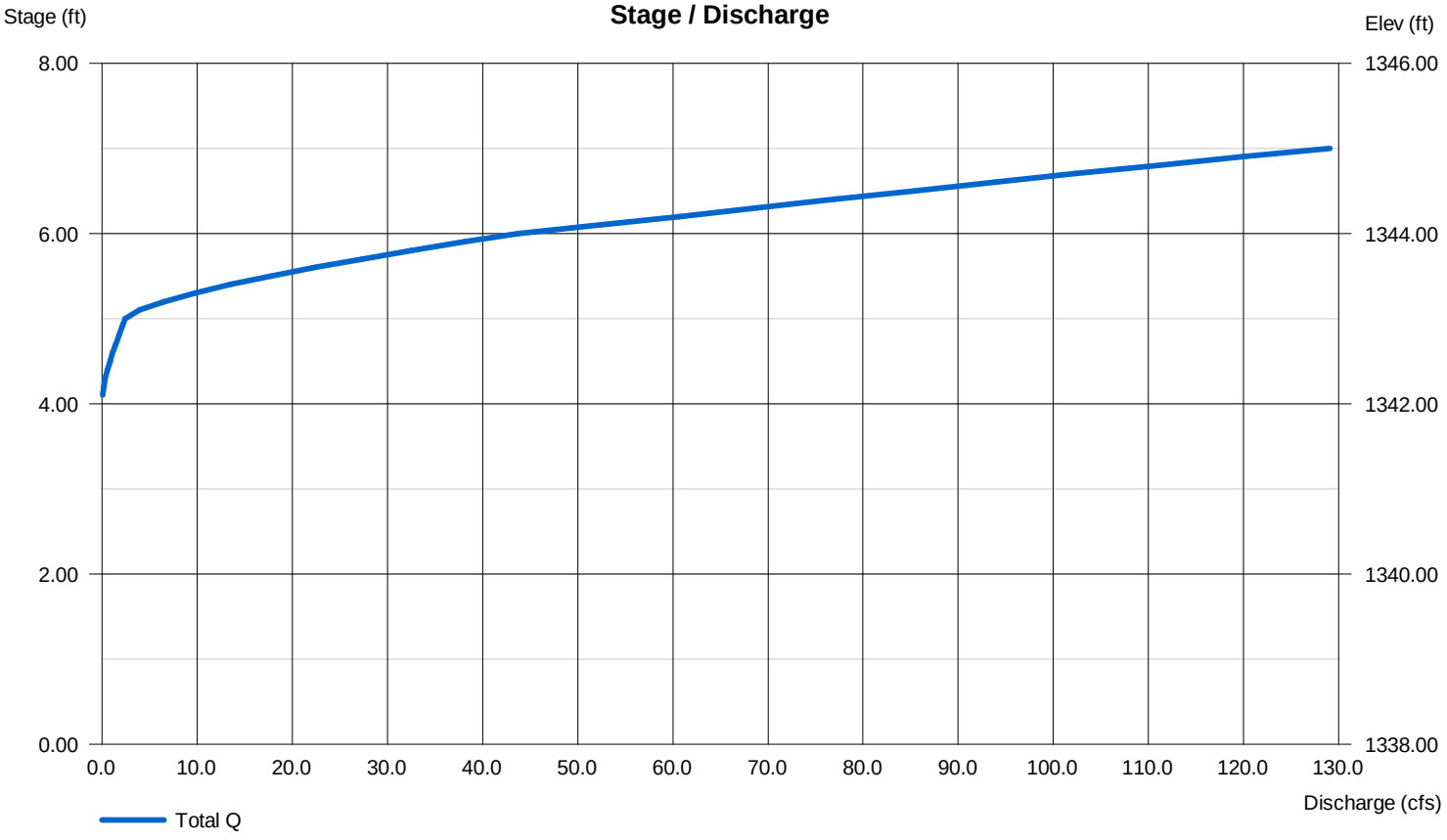
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 15.00	0.00	0.00	0.00
Crest El. (ft)	= 1343.00	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

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

TW Elev. (ft) = 0.00

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

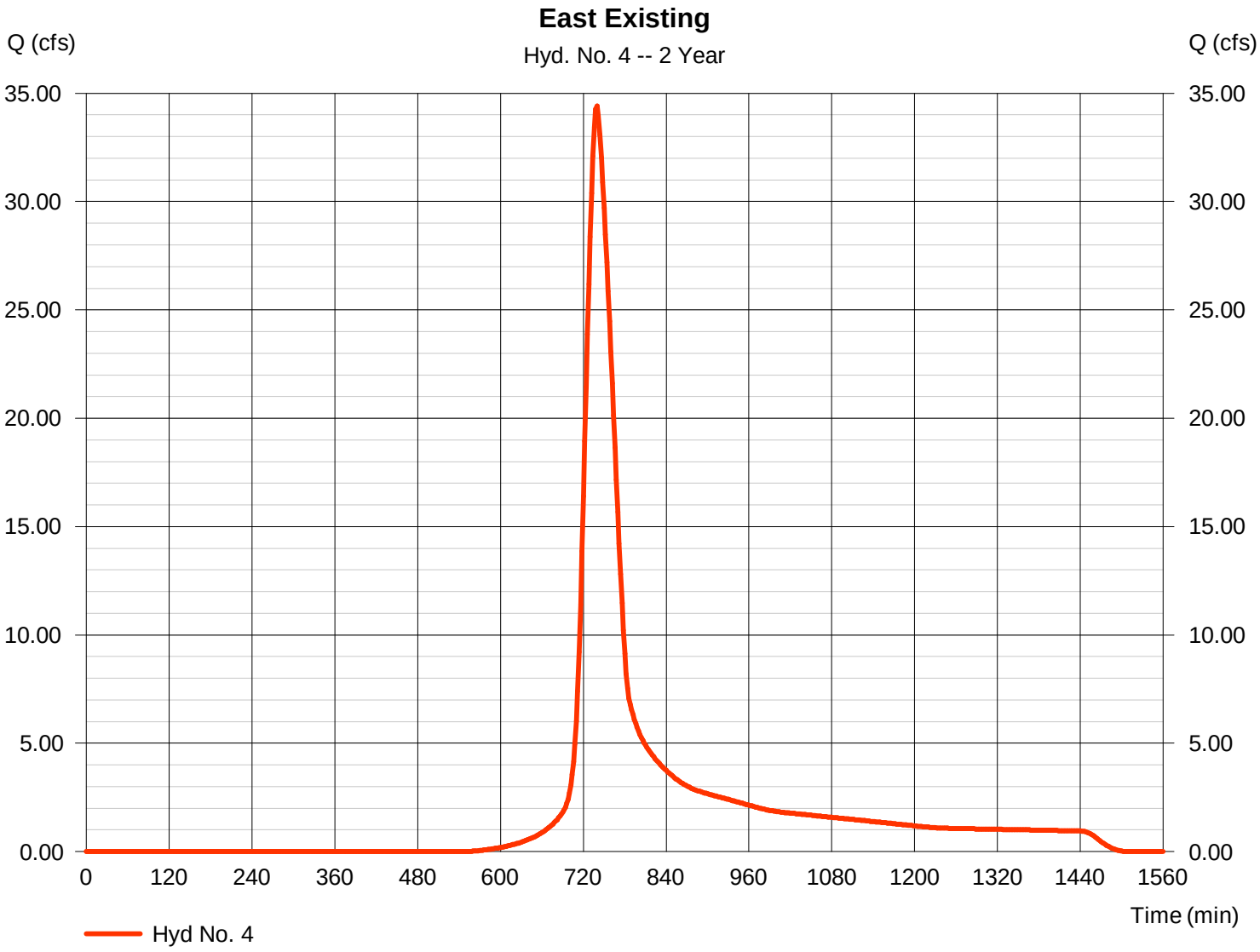


Hydrograph Report

Hyd. No. 4

East Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	34.42 cfs
Storm frequency	=	2 yrs	Time to peak	=	740 min
Time interval	=	2 min	Hyd. volume	=	179,914 cuft
Drainage area	=	30.000 ac	Curve number	=	80
Basin Slope	=	0.7 %	Hydraulic length	=	1100 ft
Tc method	=	LAG	Time of conc. (Tc)	=	41.00 min
Total precip.	=	3.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

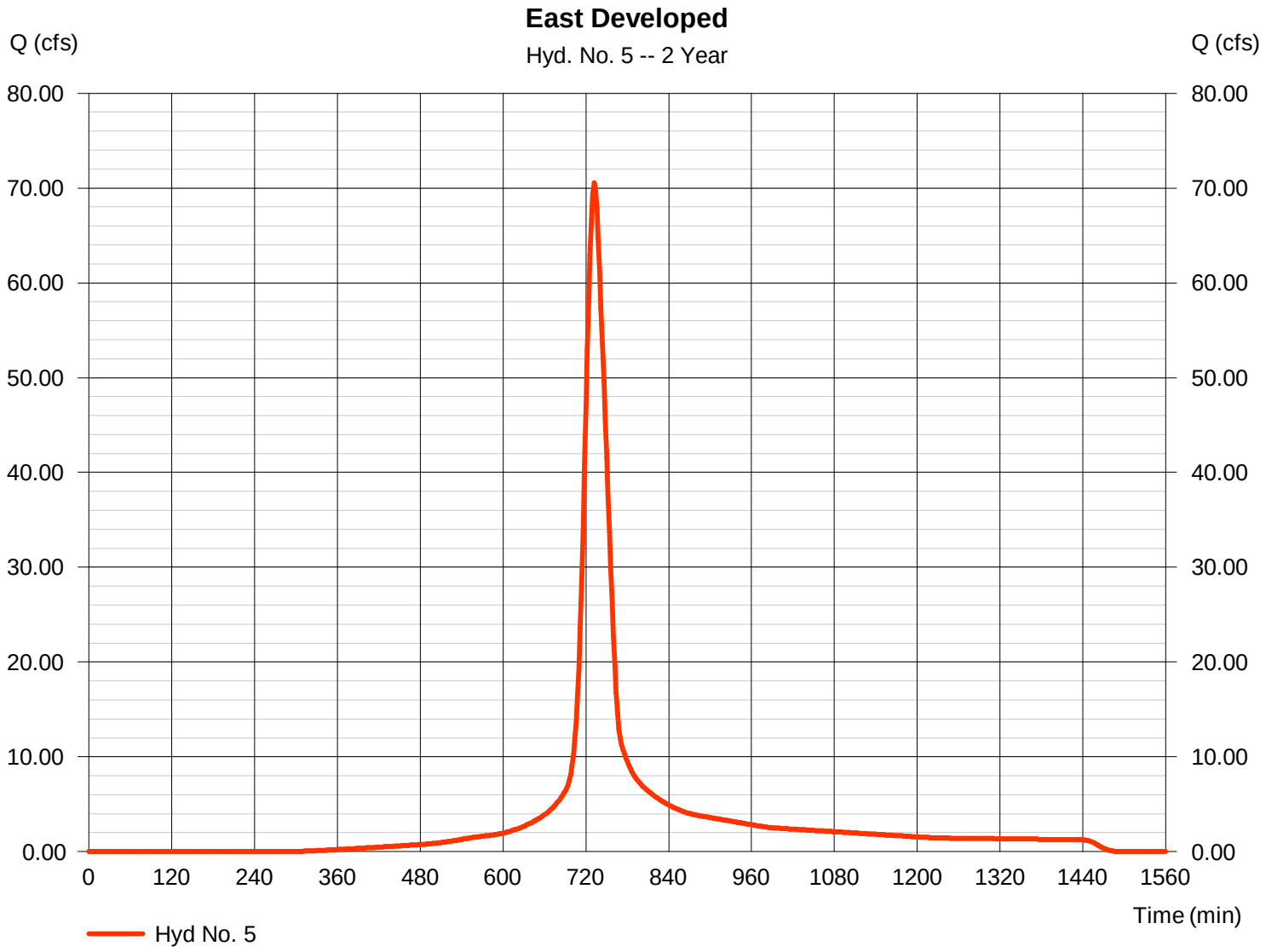


Hydrograph Report

Hyd. No. 5

East Developed

Hydrograph type	=	SCS Runoff	Peak discharge	=	70.57 cfs
Storm frequency	=	2 yrs	Time to peak	=	732 min
Time interval	=	2 min	Hyd. volume	=	308,207 cuft
Drainage area	=	33.000 ac	Curve number	=	91
Basin Slope	=	0.5 %	Hydraulic length	=	1100 ft
Tc method	=	LAG	Time of conc. (Tc)	=	32.70 min
Total precip.	=	3.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



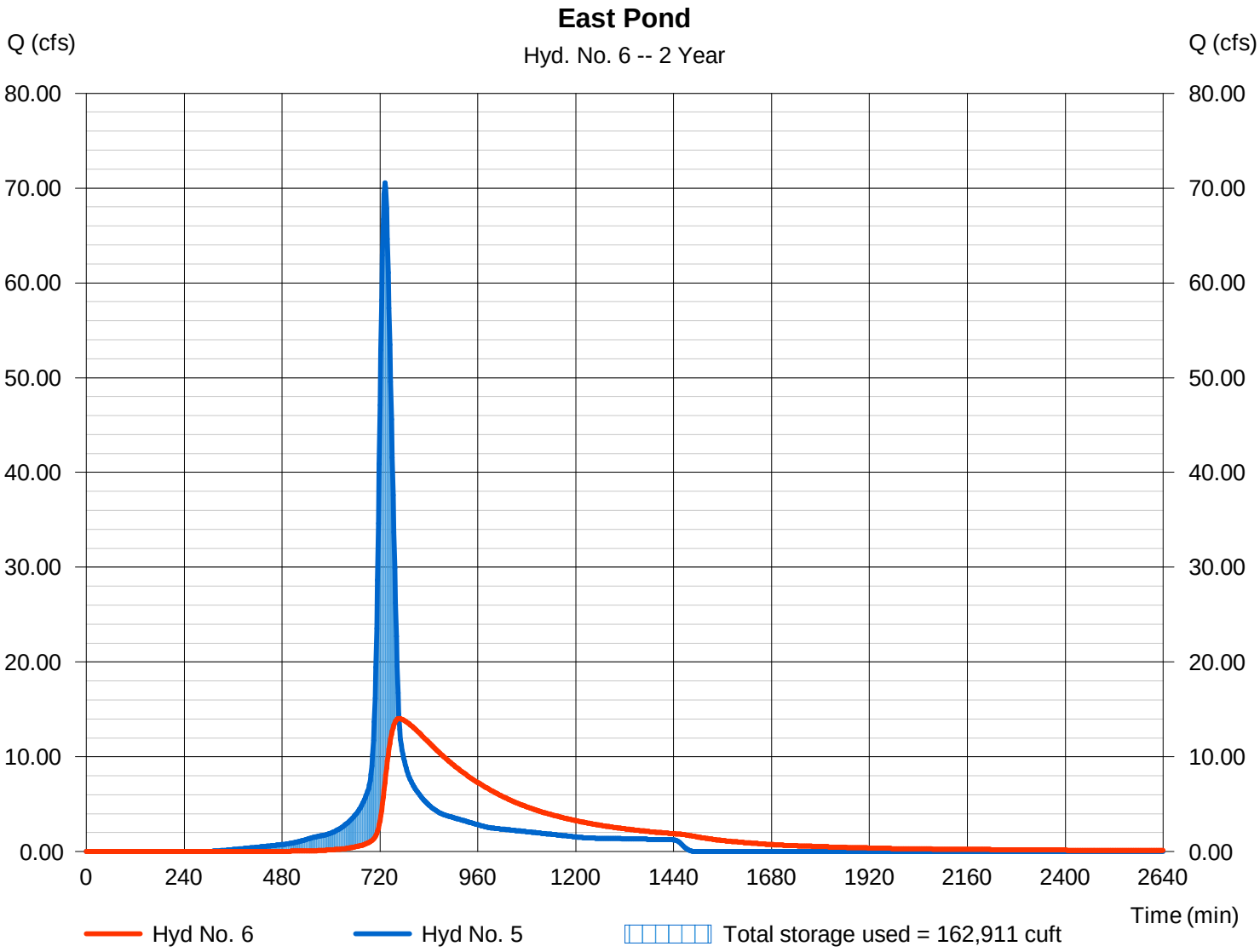
Hydrograph Report

Hyd. No. 6

East Pond

Hydrograph type	= Reservoir	Peak discharge	= 14.04 cfs
Storm frequency	= 2 yrs	Time to peak	= 766 min
Time interval	= 2 min	Hyd. volume	= 306,567 cuft
Inflow hyd. No.	= 5 - East Developed	Max. Elevation	= 1336.89 ft
Reservoir name	= East Pond	Max. Storage	= 162,911 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - East Pond

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 1335.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1335.00	82,000	0	0
1.00	1336.00	86,000	83,984	83,984
2.00	1337.00	91,000	88,479	172,463
3.00	1338.00	96,000	93,480	265,943
4.00	1339.00	101,000	98,480	364,422
5.00	1340.00	106,000	103,480	467,902
6.00	1341.00	111,000	108,480	576,381

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 36.00	0.00	0.00	0.00
Span (in)	= 36.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 1335.00	0.00	0.00	0.00
Length (ft)	= 50.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

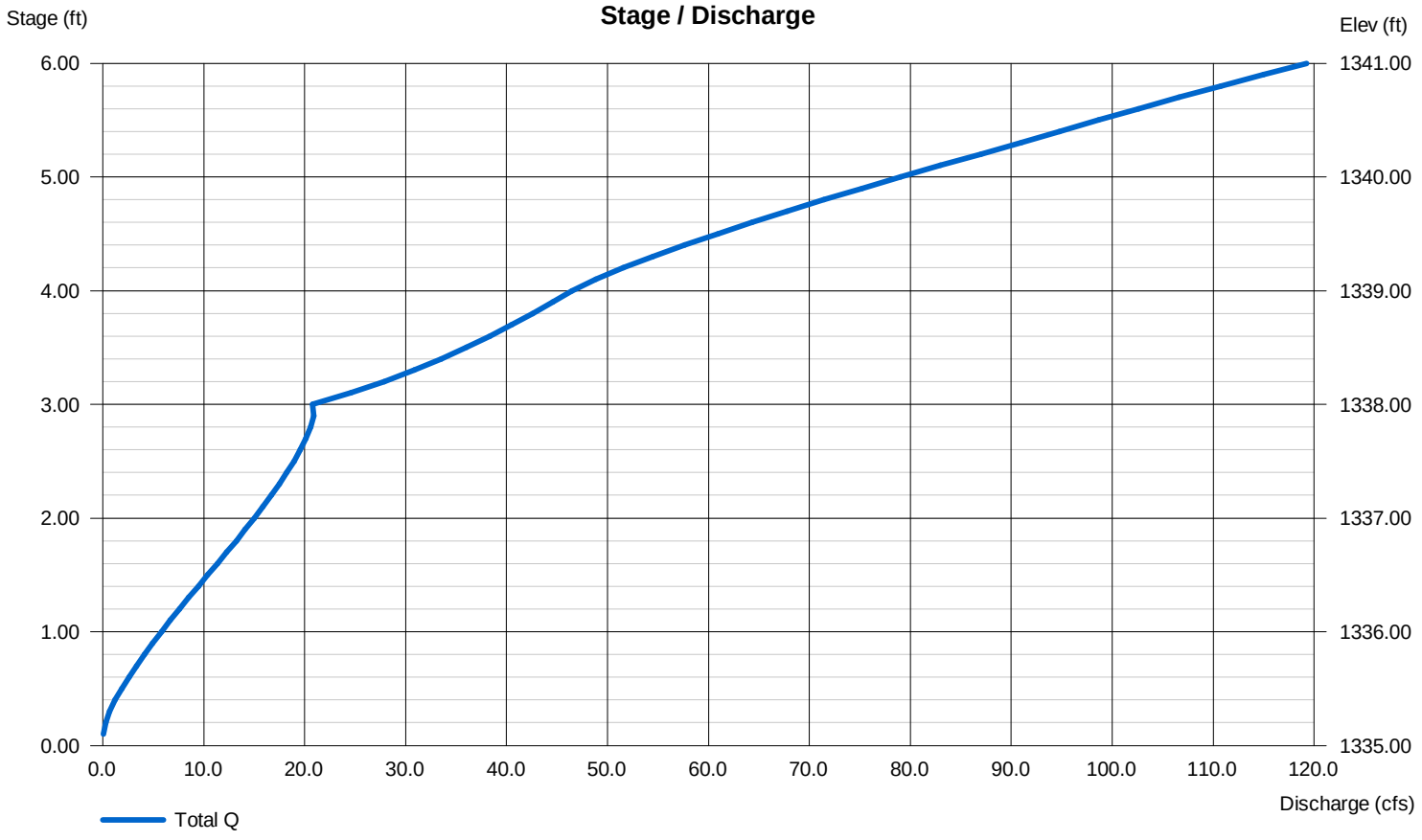
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 5.00	0.00	0.00	0.00
Crest El. (ft)	= 1339.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

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

TW Elev. (ft) = 0.00

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



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2013 by Autodesk, Inc. v10

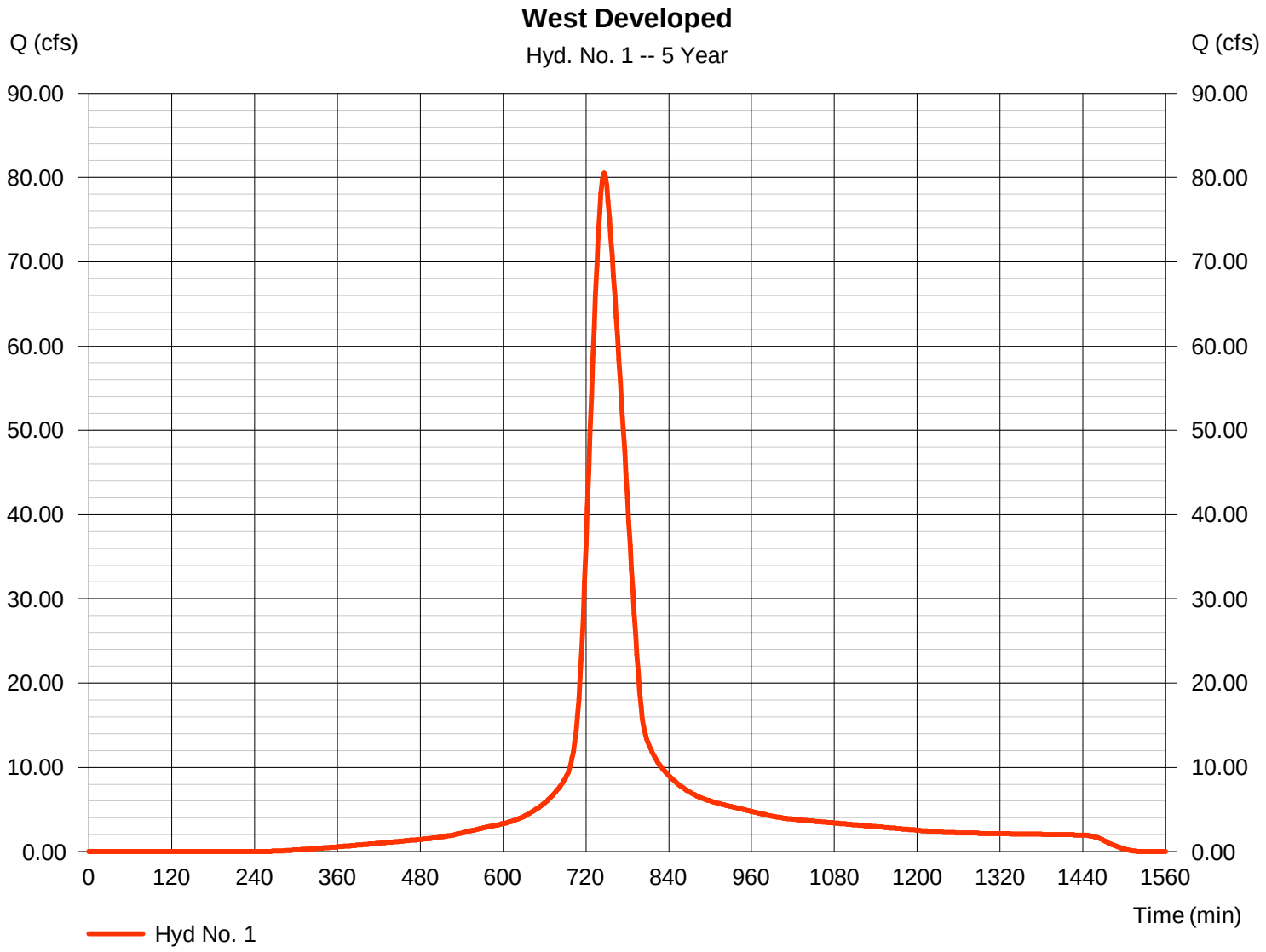
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	80.54	2	746	504,182	------	------	------	West Developed
2	SCS Runoff	46.66	2	764	386,142	------	------	------	West Existing
3	Reservoir	11.40	2	818	260,398	1	1343.34	338,966	West Pond
4	SCS Runoff	52.36	2	740	270,639	------	------	------	East Existing
5	SCS Runoff	96.02	2	732	424,269	------	------	------	East Developed
6	Reservoir	19.21	2	766	422,582	5	1337.54	223,017	East Pond

Hydrograph Report

Hyd. No. 1

West Developed

Hydrograph type	=	SCS Runoff	Peak discharge	=	80.54 cfs
Storm frequency	=	5 yrs	Time to peak	=	746 min
Time interval	=	2 min	Hyd. volume	=	504,182 cuft
Drainage area	=	40.000 ac	Curve number	=	91
Basin Slope	=	0.5 %	Hydraulic length	=	2100 ft
Tc method	=	LAG	Time of conc. (Tc)	=	54.80 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

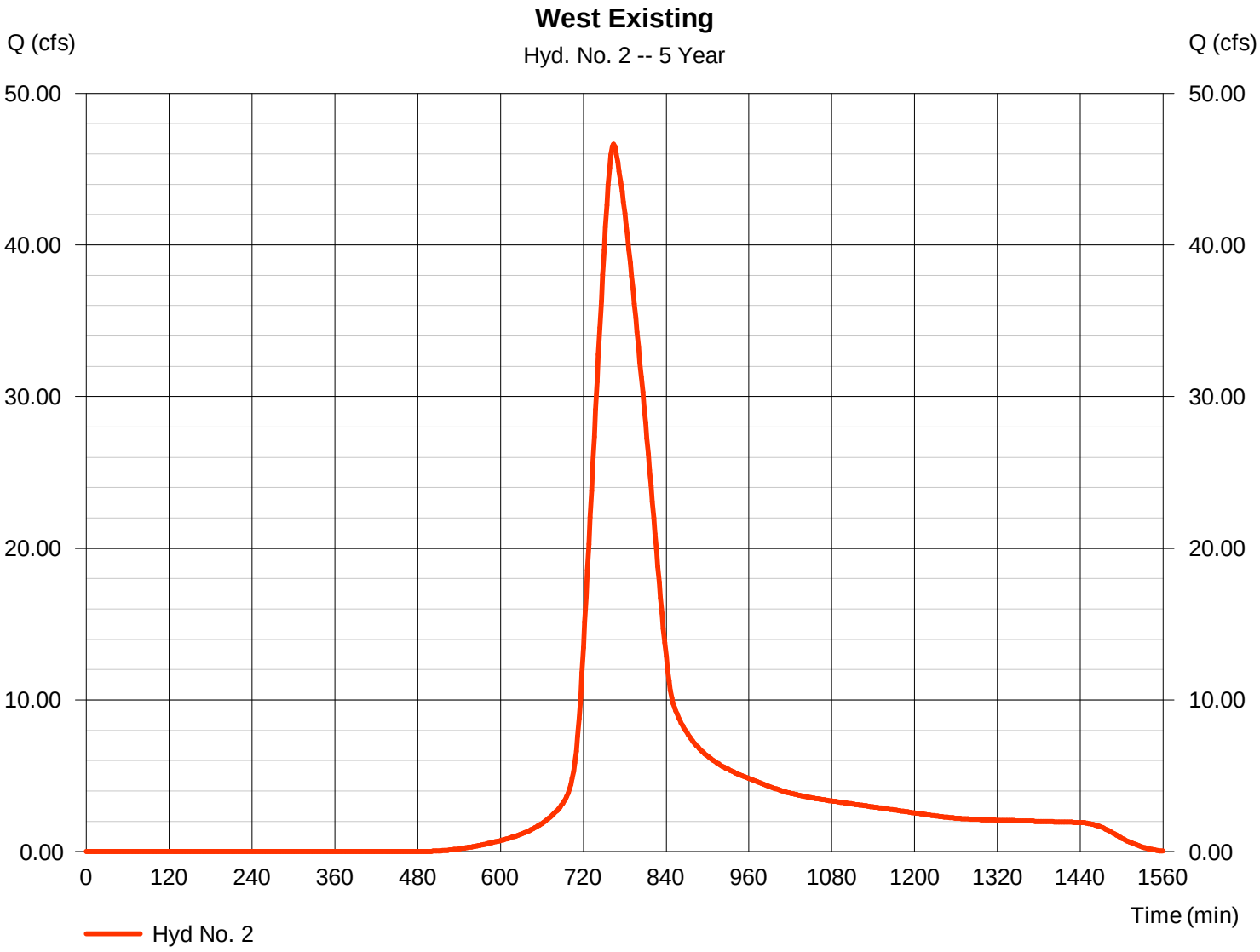


Hydrograph Report

Hyd. No. 2

West Existing

Hydrograph type	= SCS Runoff	Peak discharge	= 46.66 cfs
Storm frequency	= 5 yrs	Time to peak	= 764 min
Time interval	= 2 min	Hyd. volume	= 386,142 cuft
Drainage area	= 43.000 ac	Curve number	= 80
Basin Slope	= 0.5 %	Hydraulic length	= 2100 ft
Tc method	= LAG	Time of conc. (Tc)	= 81.50 min
Total precip.	= 4.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



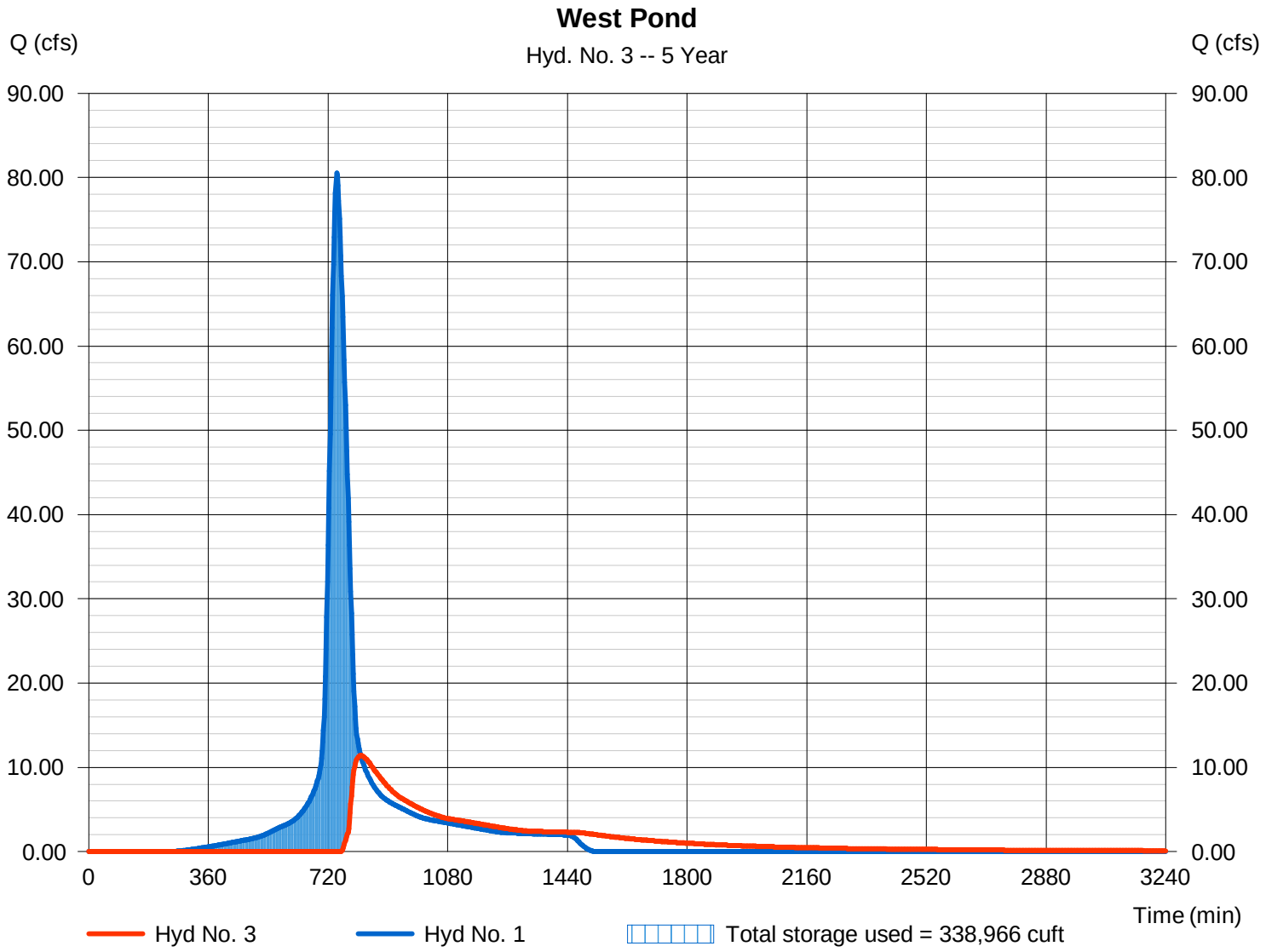
Hydrograph Report

Hyd. No. 3

West Pond

Hydrograph type	=	Reservoir	Peak discharge	=	11.40 cfs
Storm frequency	=	5 yrs	Time to peak	=	818 min
Time interval	=	2 min	Hyd. volume	=	260,398 cuft
Inflow hyd. No.	=	1 - West Developed	Max. Elevation	=	1343.34 ft
Reservoir name	=	West Dry Detention	Max. Storage	=	338,966 cuft

Storage Indication method used.

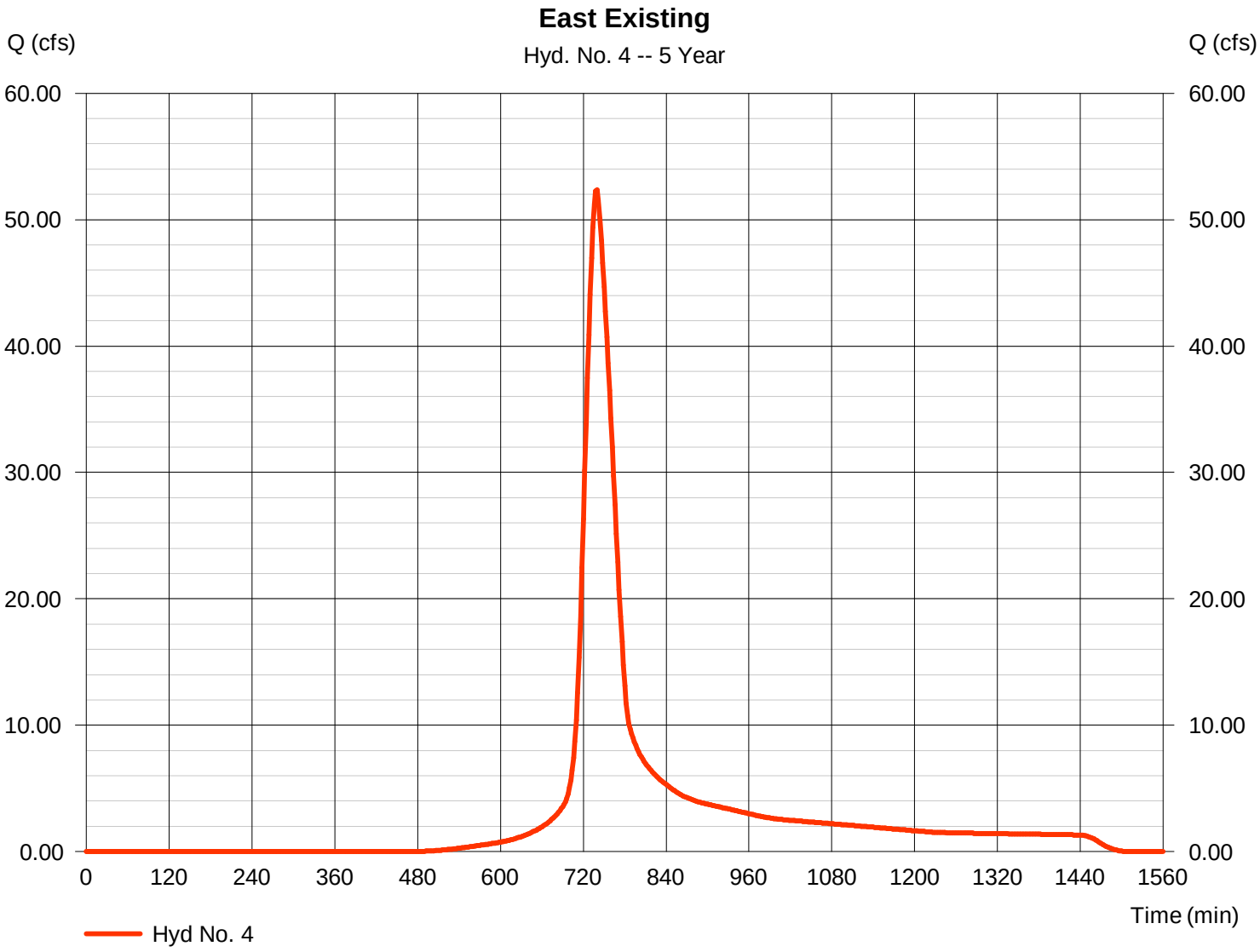


Hydrograph Report

Hyd. No. 4

East Existing

Hydrograph type	= SCS Runoff	Peak discharge	= 52.36 cfs
Storm frequency	= 5 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 270,639 cuft
Drainage area	= 30.000 ac	Curve number	= 80
Basin Slope	= 0.7 %	Hydraulic length	= 1100 ft
Tc method	= LAG	Time of conc. (Tc)	= 41.00 min
Total precip.	= 4.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

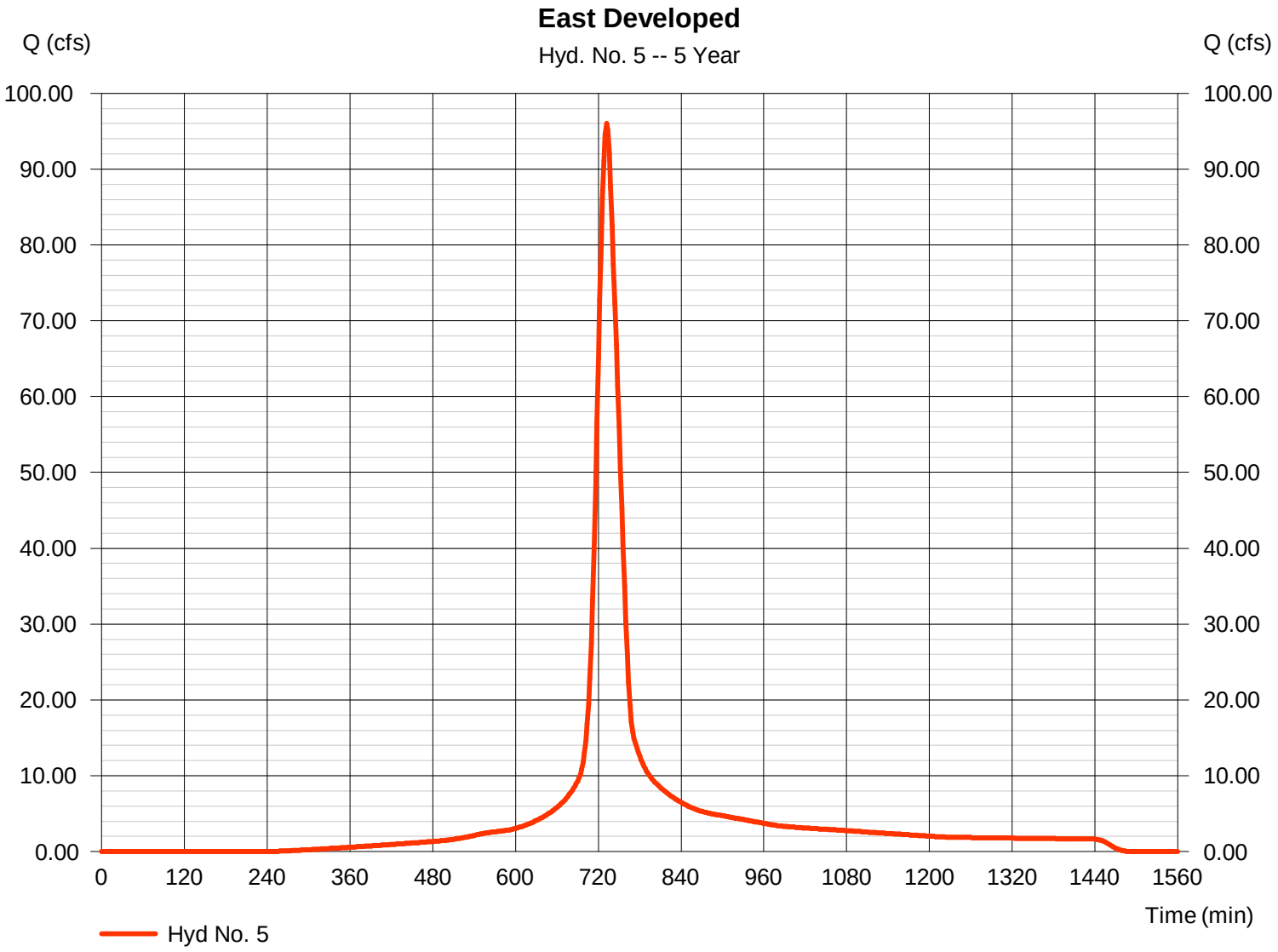


Hydrograph Report

Hyd. No. 5

East Developed

Hydrograph type	=	SCS Runoff	Peak discharge	=	96.02 cfs
Storm frequency	=	5 yrs	Time to peak	=	732 min
Time interval	=	2 min	Hyd. volume	=	424,269 cuft
Drainage area	=	33.000 ac	Curve number	=	91
Basin Slope	=	0.5 %	Hydraulic length	=	1100 ft
Tc method	=	LAG	Time of conc. (Tc)	=	32.70 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



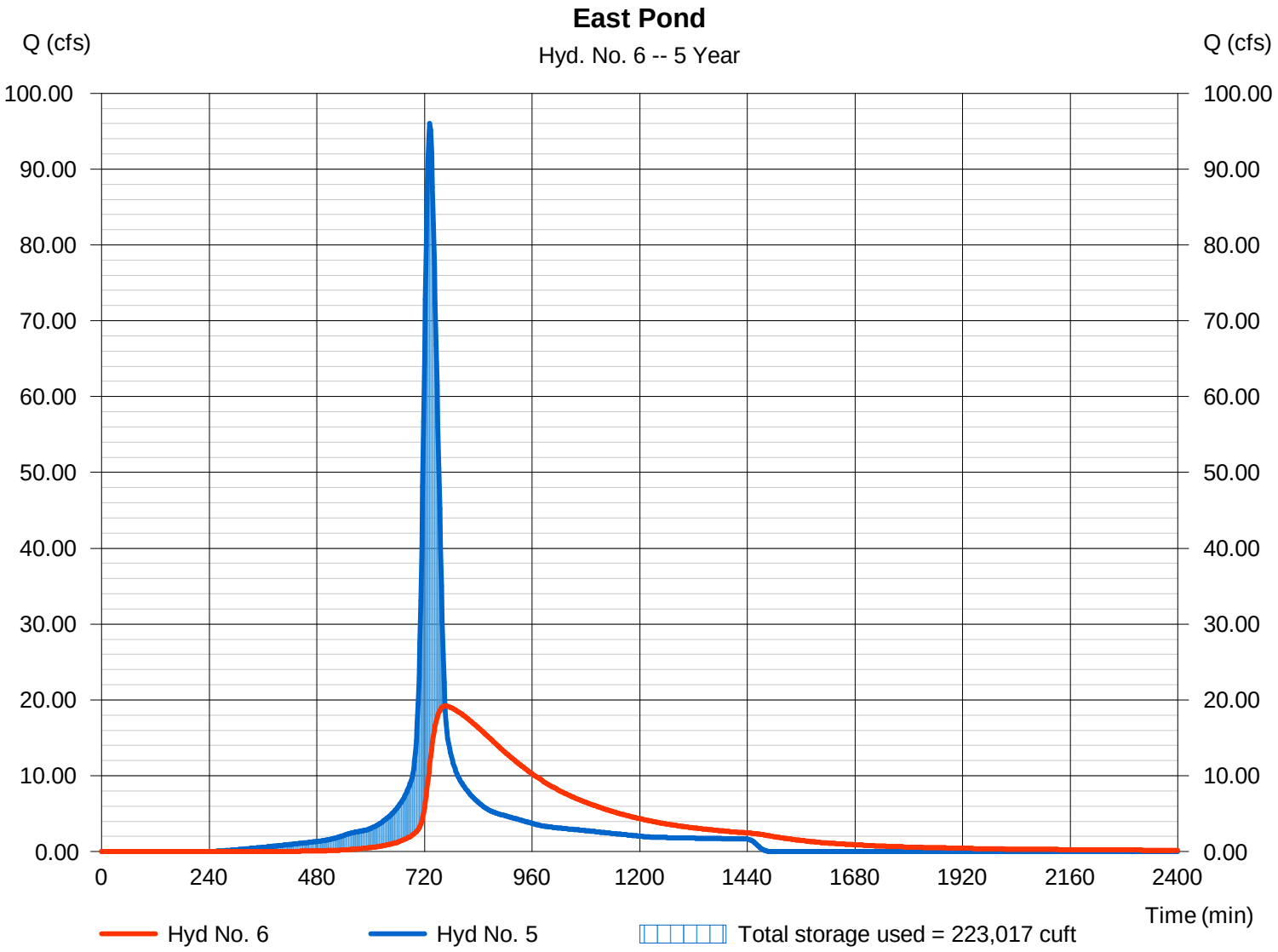
Hydrograph Report

Hyd. No. 6

East Pond

Hydrograph type	= Reservoir	Peak discharge	= 19.21 cfs
Storm frequency	= 5 yrs	Time to peak	= 766 min
Time interval	= 2 min	Hyd. volume	= 422,582 cuft
Inflow hyd. No.	= 5 - East Developed	Max. Elevation	= 1337.54 ft
Reservoir name	= East Pond	Max. Storage	= 223,017 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2013 by Autodesk, Inc. v10

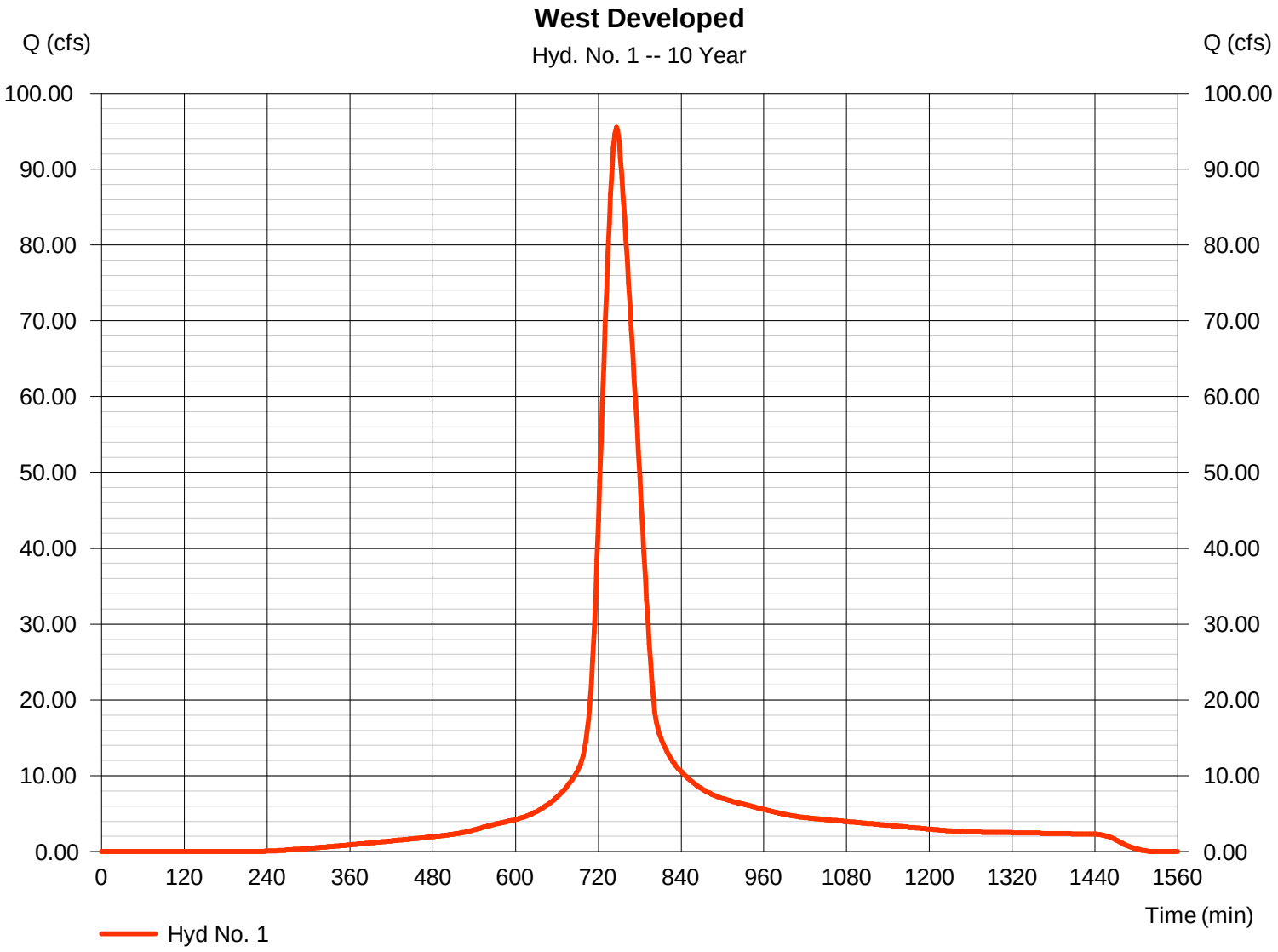
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	95.50	2	746	601,962	------	------	------	West Developed
2	SCS Runoff	58.41	2	764	481,288	------	------	------	West Existing
3	Reservoir	29.77	2	792	358,149	1	1343.75	370,256	West Pond
4	SCS Runoff	65.37	2	740	337,324	------	------	------	East Existing
5	SCS Runoff	113.76	2	732	506,551	------	------	------	East Developed
6	Reservoir	21.14	2	768	504,835	5	1338.01	266,838	East Pond

Hydrograph Report

Hyd. No. 1

West Developed

Hydrograph type	=	SCS Runoff	Peak discharge	=	95.50 cfs
Storm frequency	=	10 yrs	Time to peak	=	746 min
Time interval	=	2 min	Hyd. volume	=	601,962 cuft
Drainage area	=	40.000 ac	Curve number	=	91
Basin Slope	=	0.5 %	Hydraulic length	=	2100 ft
Tc method	=	LAG	Time of conc. (Tc)	=	54.80 min
Total precip.	=	5.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

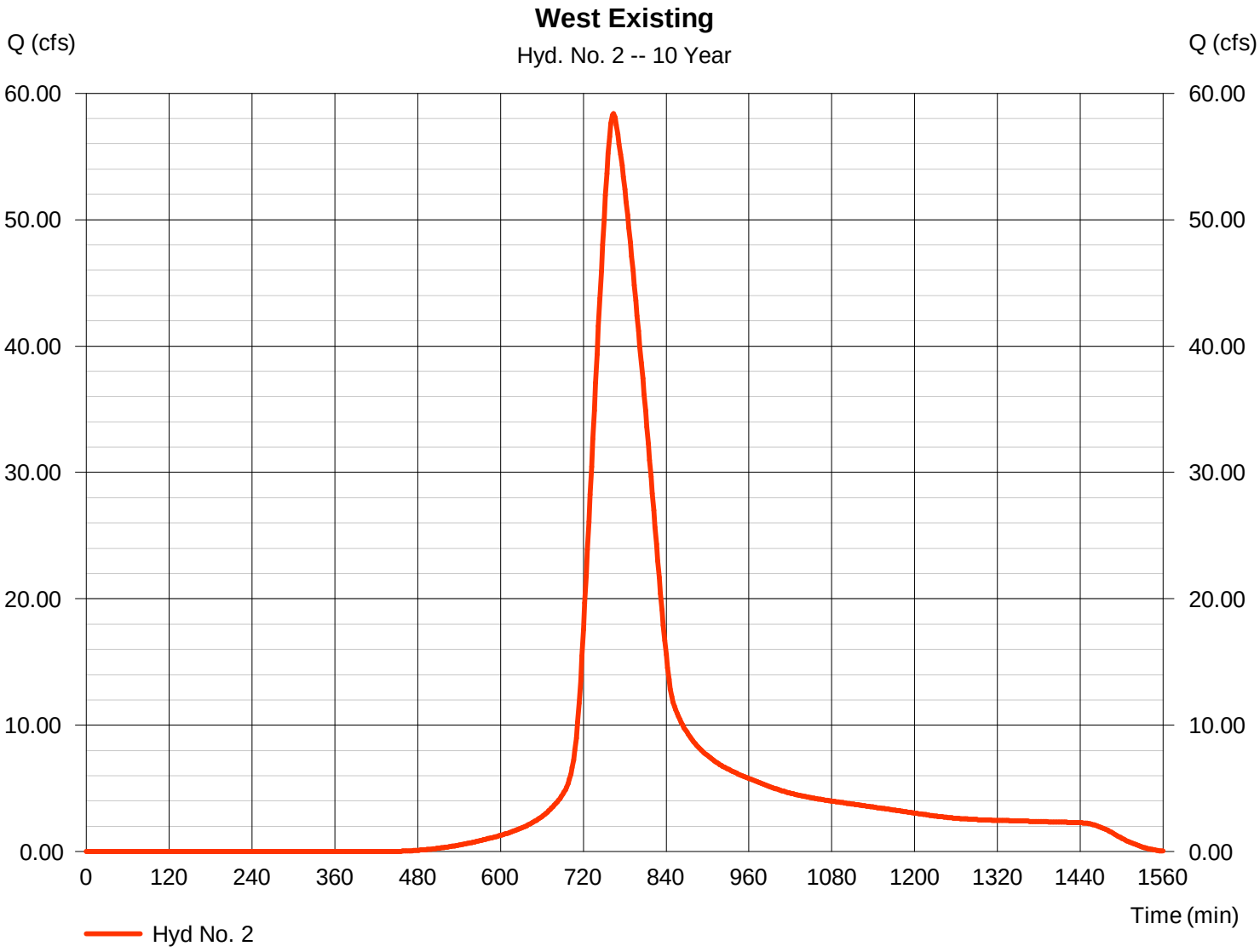


Hydrograph Report

Hyd. No. 2

West Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	58.41 cfs
Storm frequency	=	10 yrs	Time to peak	=	764 min
Time interval	=	2 min	Hyd. volume	=	481,288 cuft
Drainage area	=	43.000 ac	Curve number	=	80
Basin Slope	=	0.5 %	Hydraulic length	=	2100 ft
Tc method	=	LAG	Time of conc. (Tc)	=	81.50 min
Total precip.	=	5.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



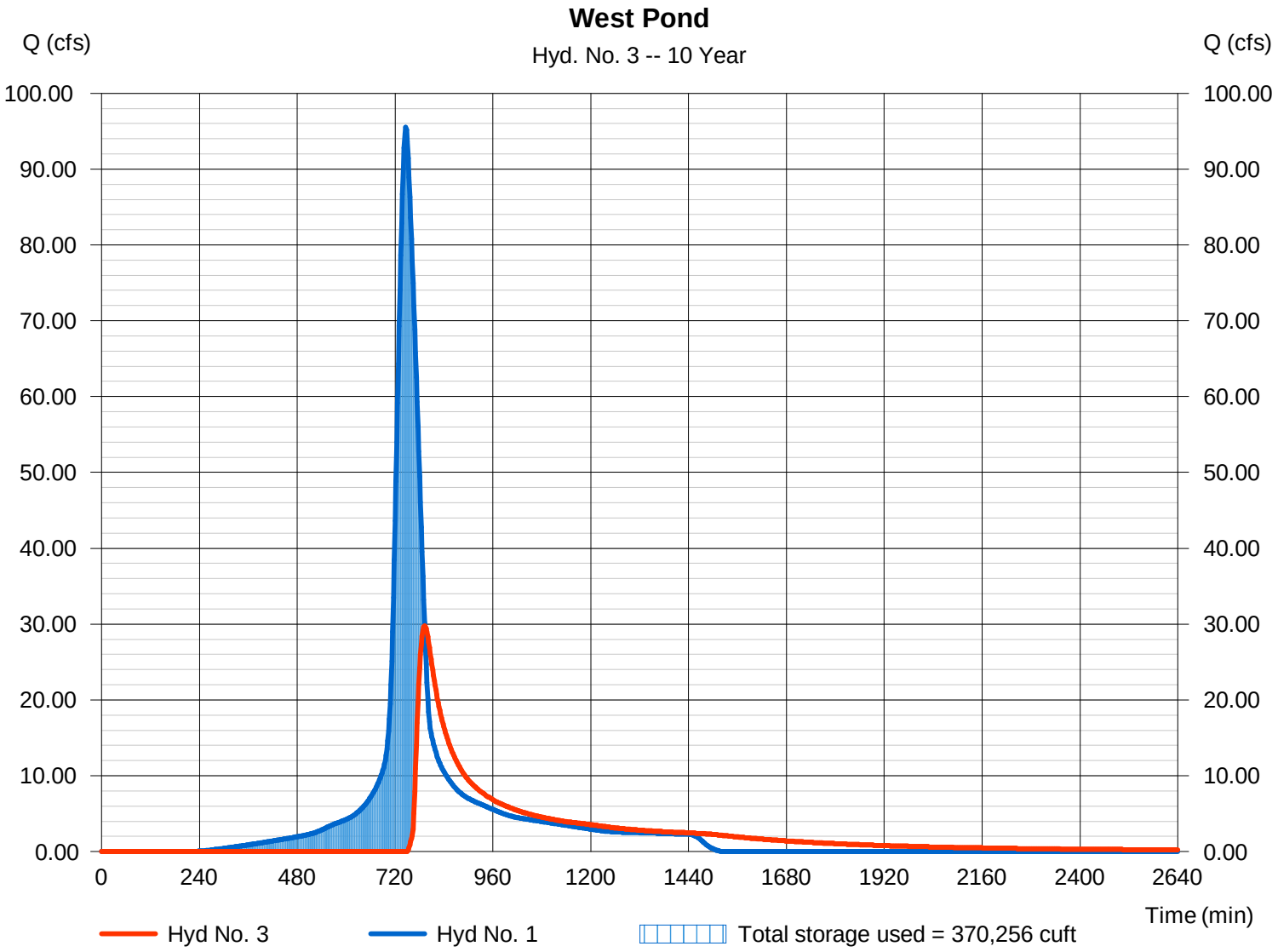
Hydrograph Report

Hyd. No. 3

West Pond

Hydrograph type	= Reservoir	Peak discharge	= 29.77 cfs
Storm frequency	= 10 yrs	Time to peak	= 792 min
Time interval	= 2 min	Hyd. volume	= 358,149 cuft
Inflow hyd. No.	= 1 - West Developed	Max. Elevation	= 1343.75 ft
Reservoir name	= West Dry Detention	Max. Storage	= 370,256 cuft

Storage Indication method used.

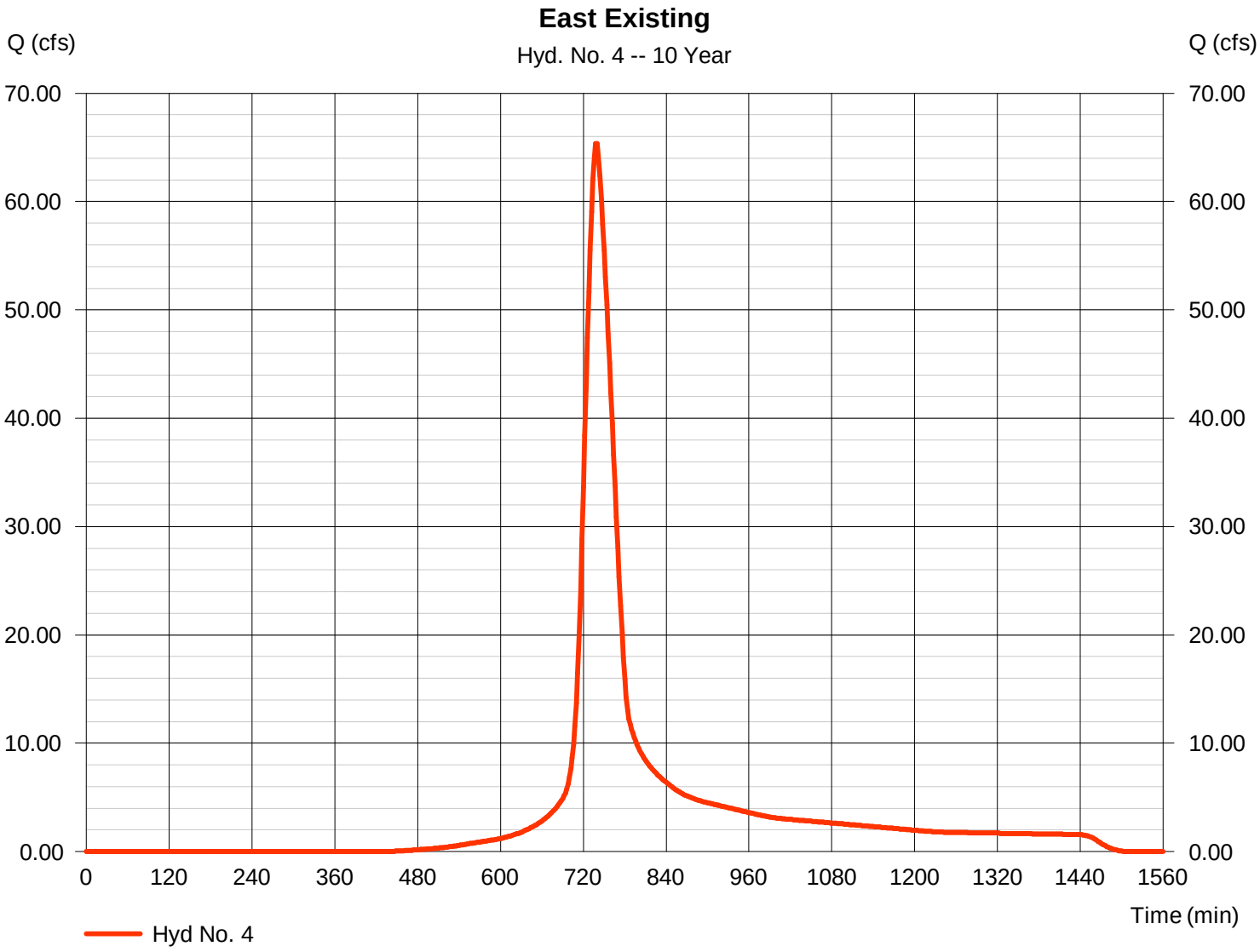


Hydrograph Report

Hyd. No. 4

East Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	65.37 cfs
Storm frequency	=	10 yrs	Time to peak	=	740 min
Time interval	=	2 min	Hyd. volume	=	337,324 cuft
Drainage area	=	30.000 ac	Curve number	=	80
Basin Slope	=	0.7 %	Hydraulic length	=	1100 ft
Tc method	=	LAG	Time of conc. (Tc)	=	41.00 min
Total precip.	=	5.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

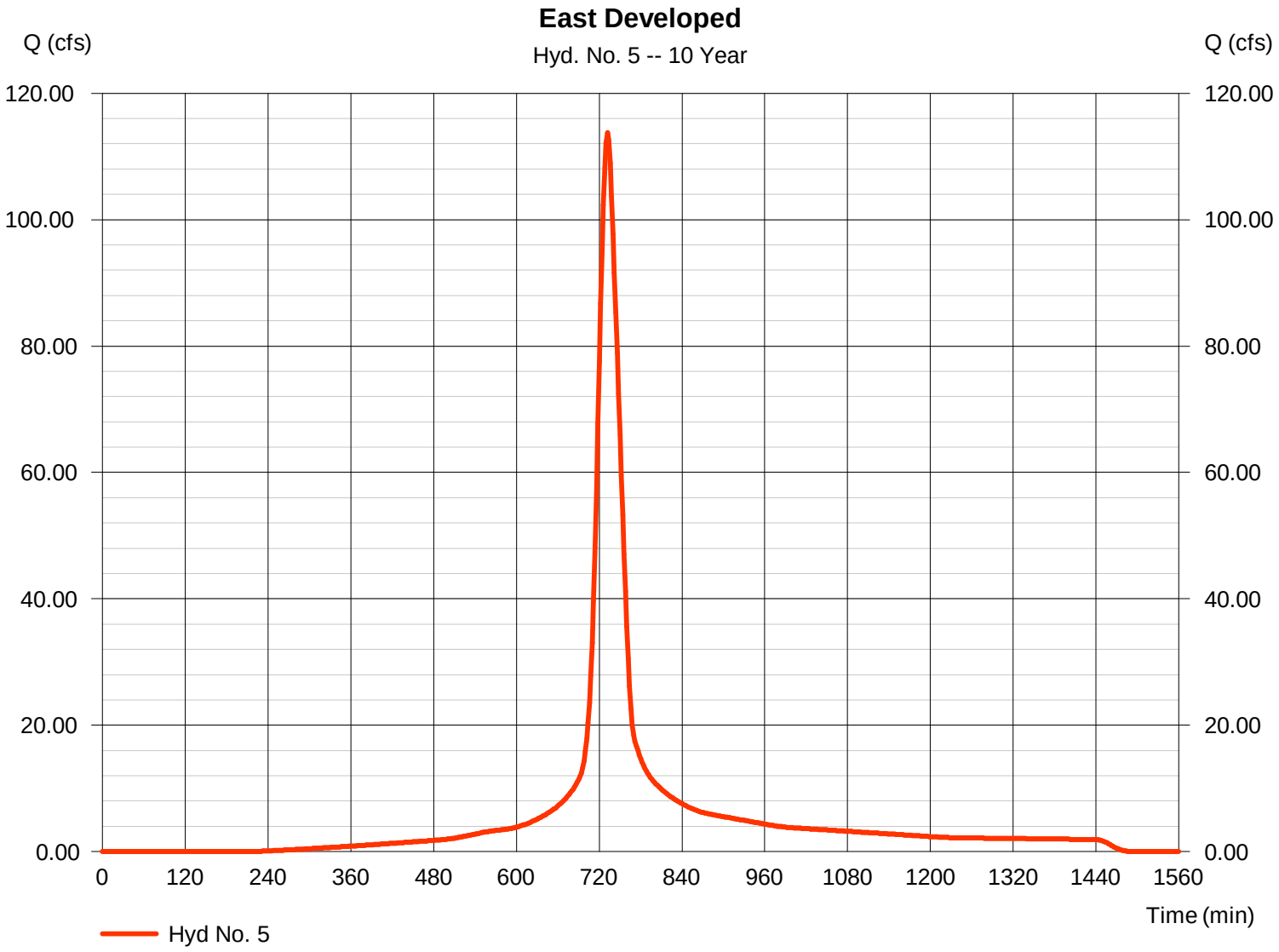


Hydrograph Report

Hyd. No. 5

East Developed

Hydrograph type	=	SCS Runoff	Peak discharge	=	113.76 cfs
Storm frequency	=	10 yrs	Time to peak	=	732 min
Time interval	=	2 min	Hyd. volume	=	506,551 cuft
Drainage area	=	33.000 ac	Curve number	=	91
Basin Slope	=	0.5 %	Hydraulic length	=	1100 ft
Tc method	=	LAG	Time of conc. (Tc)	=	32.70 min
Total precip.	=	5.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



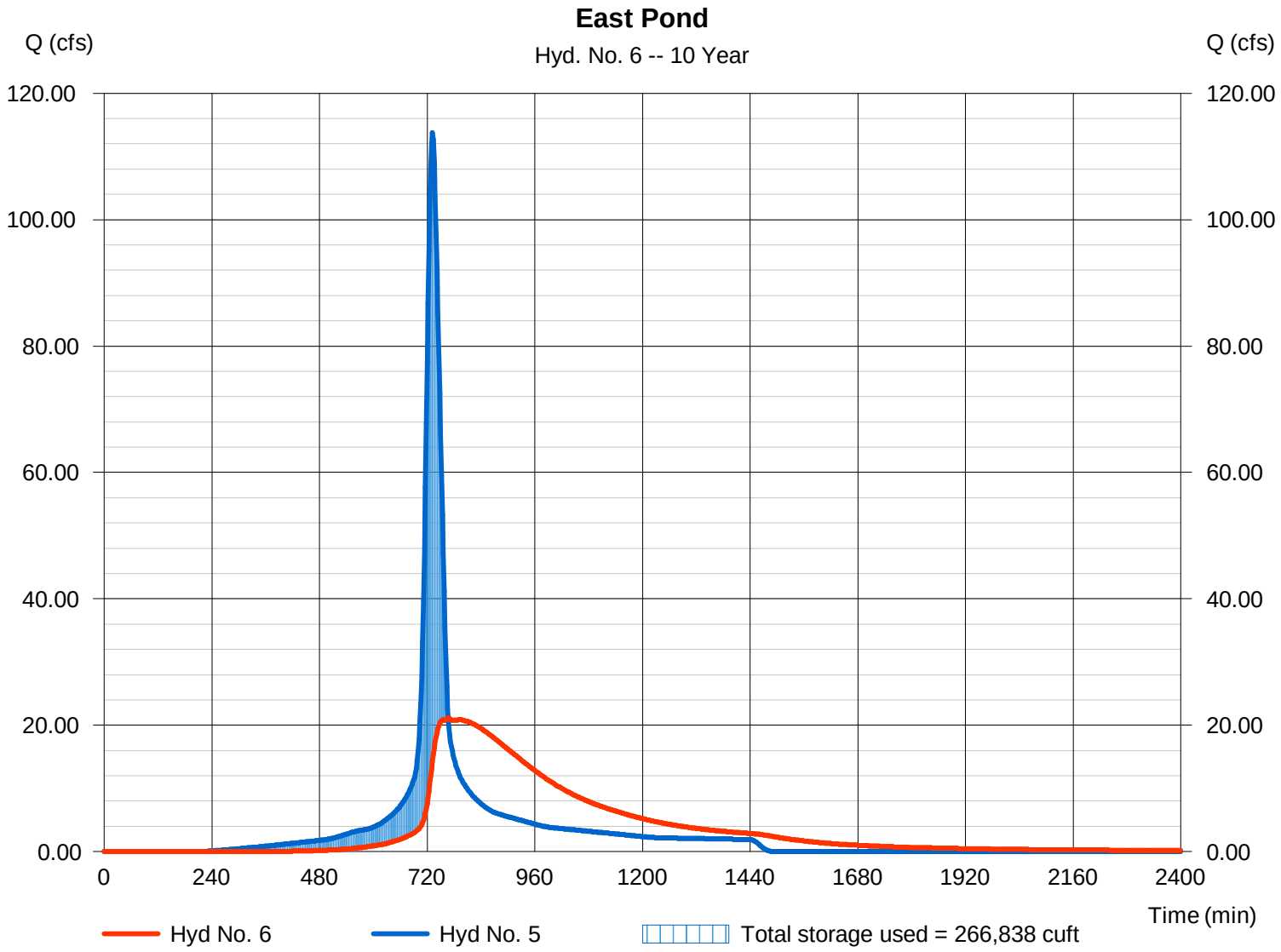
Hydrograph Report

Hyd. No. 6

East Pond

Hydrograph type	=	Reservoir	Peak discharge	=	21.14 cfs
Storm frequency	=	10 yrs	Time to peak	=	768 min
Time interval	=	2 min	Hyd. volume	=	504,835 cuft
Inflow hyd. No.	=	5 - East Developed	Max. Elevation	=	1338.01 ft
Reservoir name	=	East Pond	Max. Storage	=	266,838 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2013 by Autodesk, Inc. v10

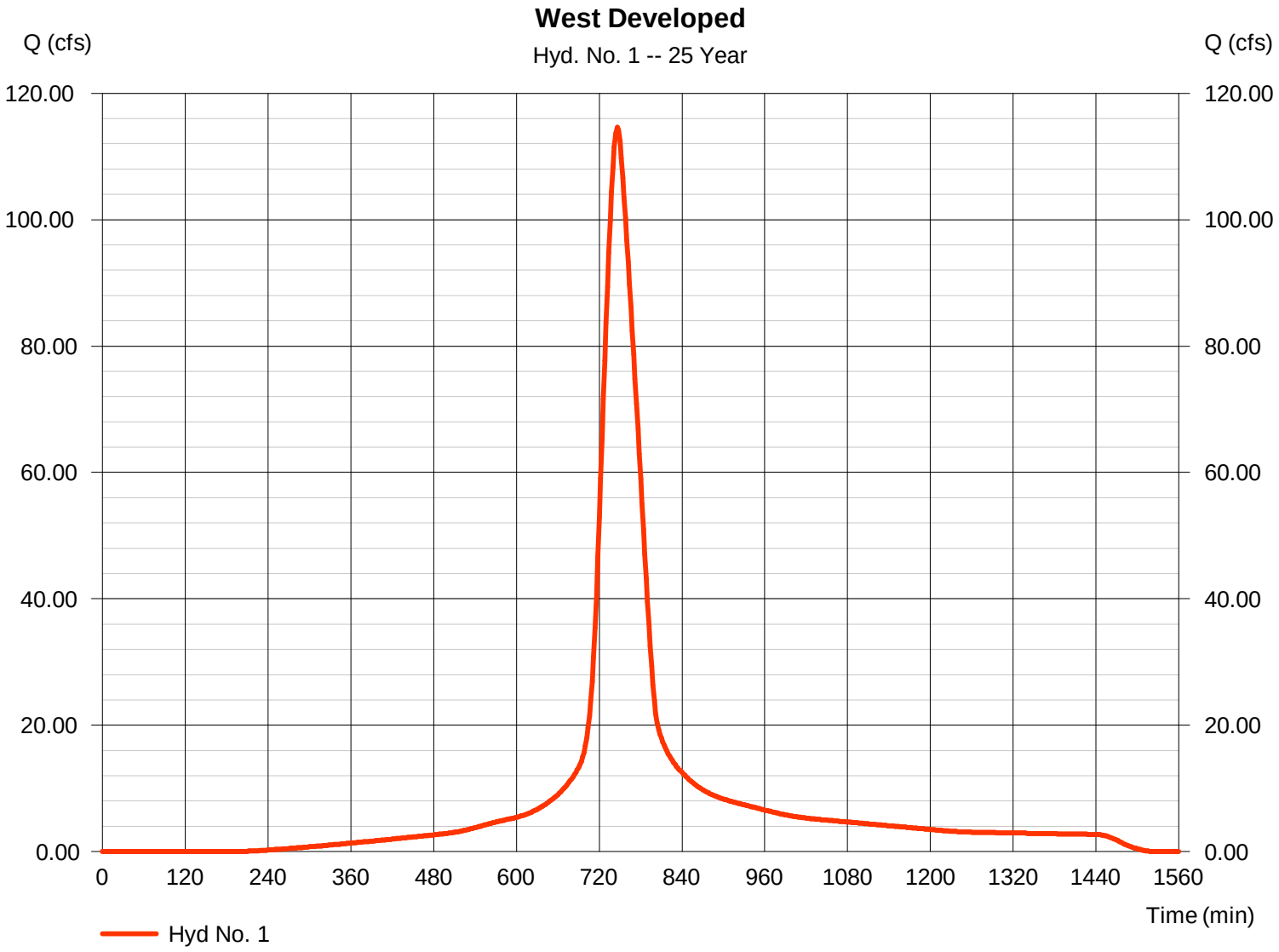
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	114.66	2	746	728,608	------	------	------	West Developed
2	SCS Runoff	73.81	2	764	607,340	------	------	------	West Existing
3	Reservoir	56.09	2	782	484,772	1	1344.14	401,744	West Pond
4	SCS Runoff	82.52	2	738	425,672	------	------	------	East Existing
5	SCS Runoff	136.46	2	732	613,124	------	------	------	East Developed
6	Reservoir	35.27	2	762	611,382	5	1338.47	312,218	East Pond

Hydrograph Report

Hyd. No. 1

West Developed

Hydrograph type	= SCS Runoff	Peak discharge	= 114.66 cfs
Storm frequency	= 25 yrs	Time to peak	= 746 min
Time interval	= 2 min	Hyd. volume	= 728,608 cuft
Drainage area	= 40.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 2100 ft
Tc method	= LAG	Time of conc. (Tc)	= 54.80 min
Total precip.	= 6.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

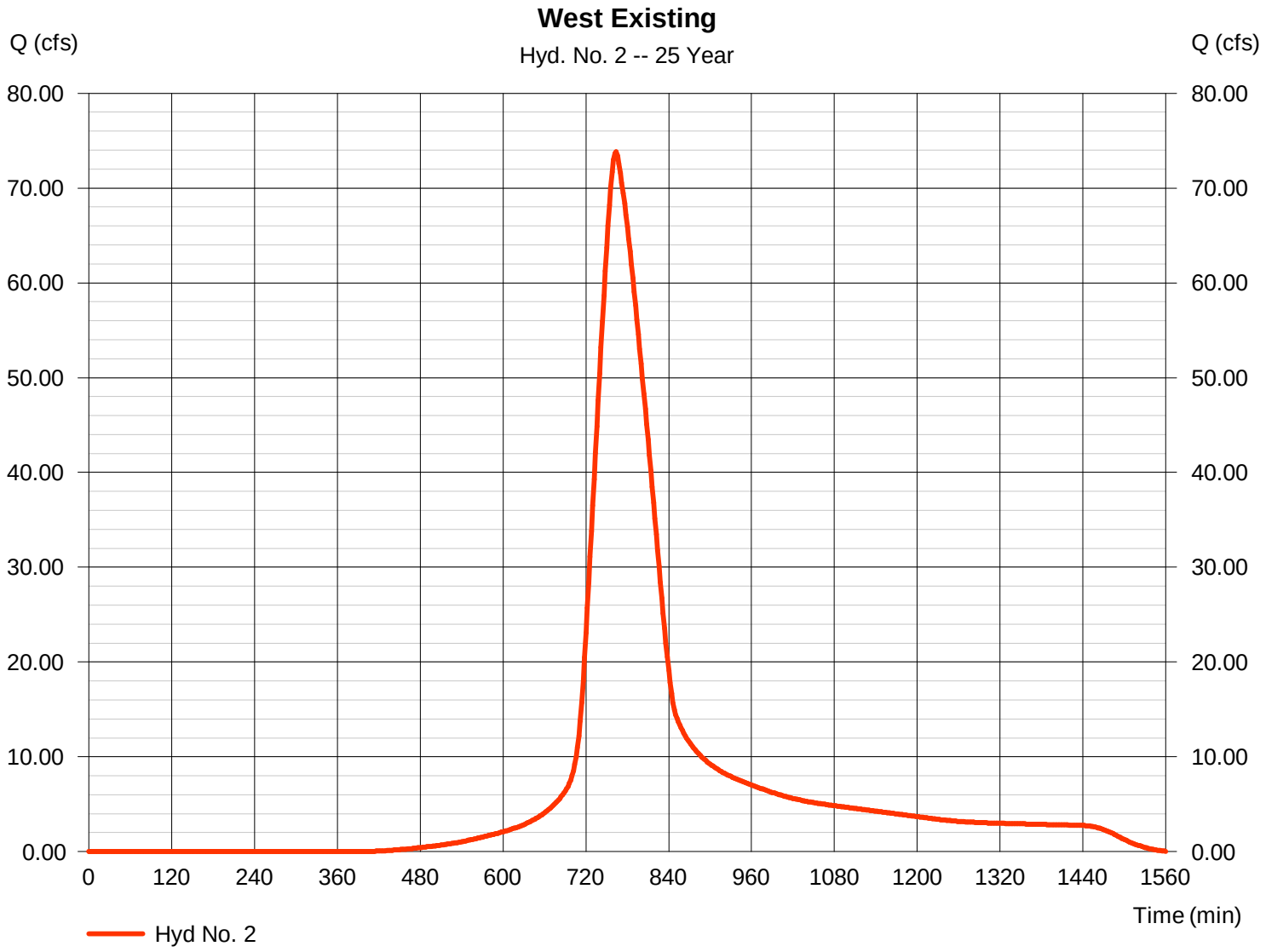


Hydrograph Report

Hyd. No. 2

West Existing

Hydrograph type	= SCS Runoff	Peak discharge	= 73.81 cfs
Storm frequency	= 25 yrs	Time to peak	= 764 min
Time interval	= 2 min	Hyd. volume	= 607,340 cuft
Drainage area	= 43.000 ac	Curve number	= 80
Basin Slope	= 0.5 %	Hydraulic length	= 2100 ft
Tc method	= LAG	Time of conc. (Tc)	= 81.50 min
Total precip.	= 6.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



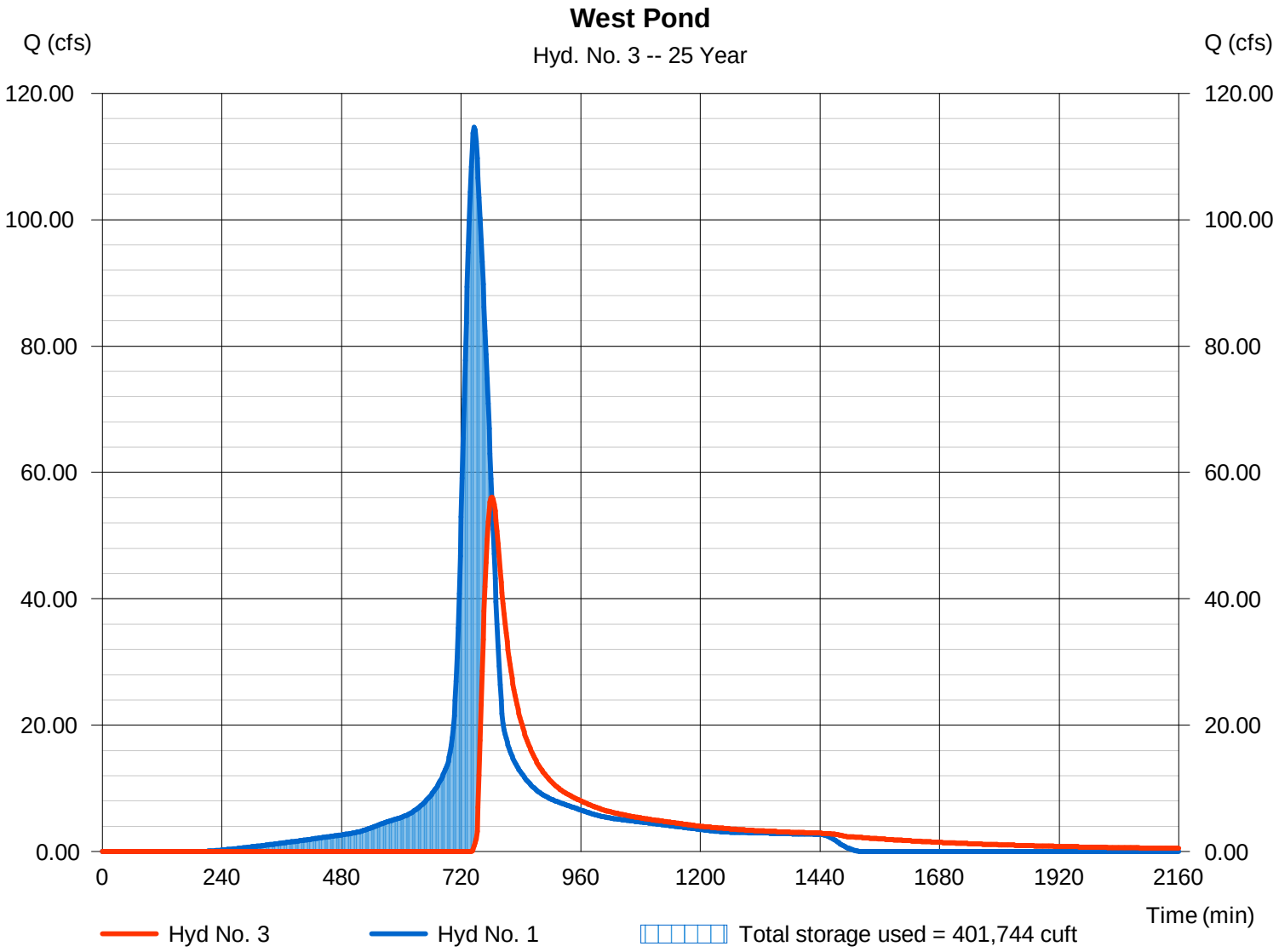
Hydrograph Report

Hyd. No. 3

West Pond

Hydrograph type	= Reservoir	Peak discharge	= 56.09 cfs
Storm frequency	= 25 yrs	Time to peak	= 782 min
Time interval	= 2 min	Hyd. volume	= 484,772 cuft
Inflow hyd. No.	= 1 - West Developed	Max. Elevation	= 1344.14 ft
Reservoir name	= West Dry Detention	Max. Storage	= 401,744 cuft

Storage Indication method used.

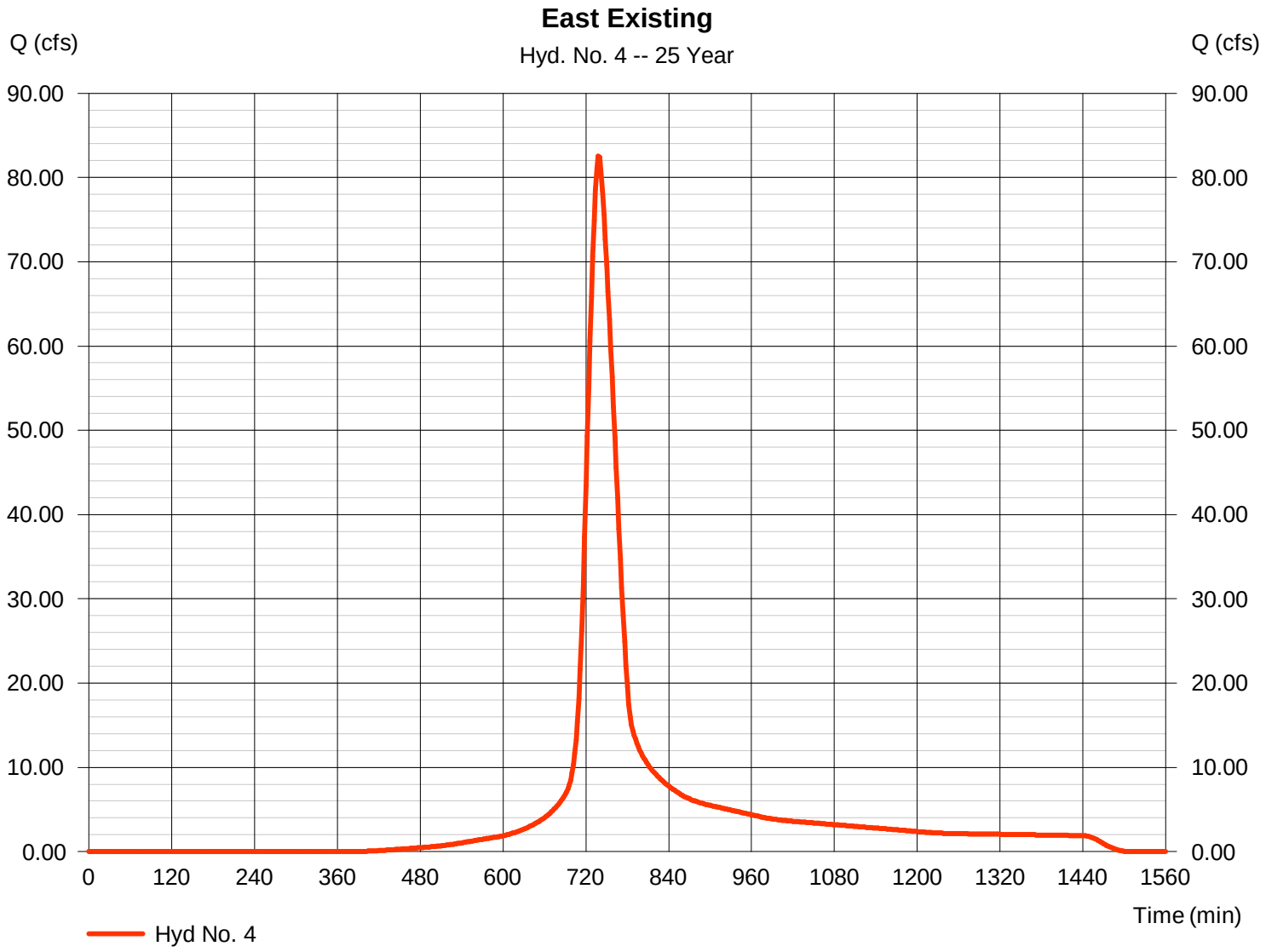


Hydrograph Report

Hyd. No. 4

East Existing

Hydrograph type	= SCS Runoff	Peak discharge	= 82.52 cfs
Storm frequency	= 25 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 425,672 cuft
Drainage area	= 30.000 ac	Curve number	= 80
Basin Slope	= 0.7 %	Hydraulic length	= 1100 ft
Tc method	= LAG	Time of conc. (Tc)	= 41.00 min
Total precip.	= 6.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

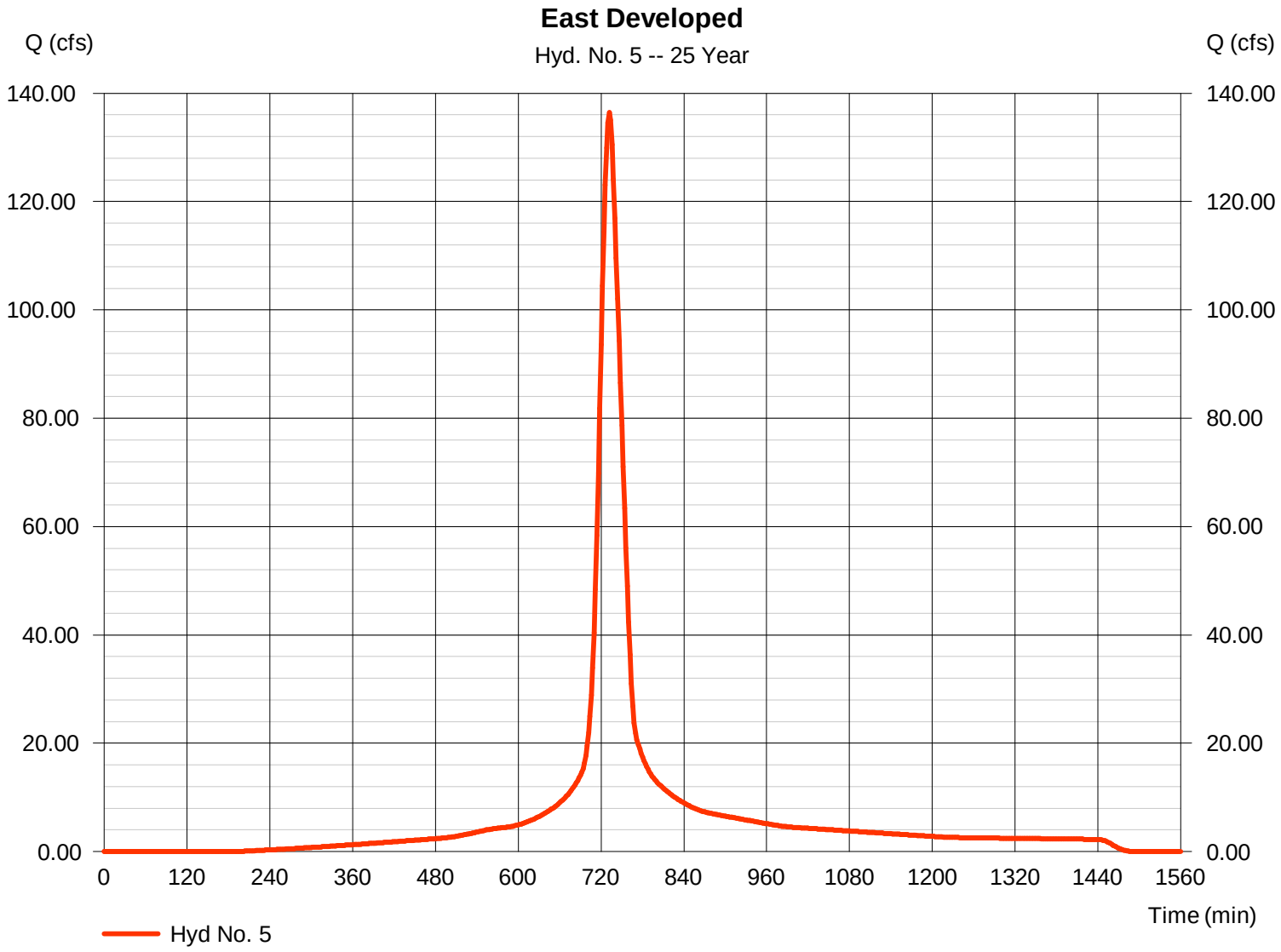


Hydrograph Report

Hyd. No. 5

East Developed

Hydrograph type	=	SCS Runoff	Peak discharge	=	136.46 cfs
Storm frequency	=	25 yrs	Time to peak	=	732 min
Time interval	=	2 min	Hyd. volume	=	613,124 cuft
Drainage area	=	33.000 ac	Curve number	=	91
Basin Slope	=	0.5 %	Hydraulic length	=	1100 ft
Tc method	=	LAG	Time of conc. (Tc)	=	32.70 min
Total precip.	=	6.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



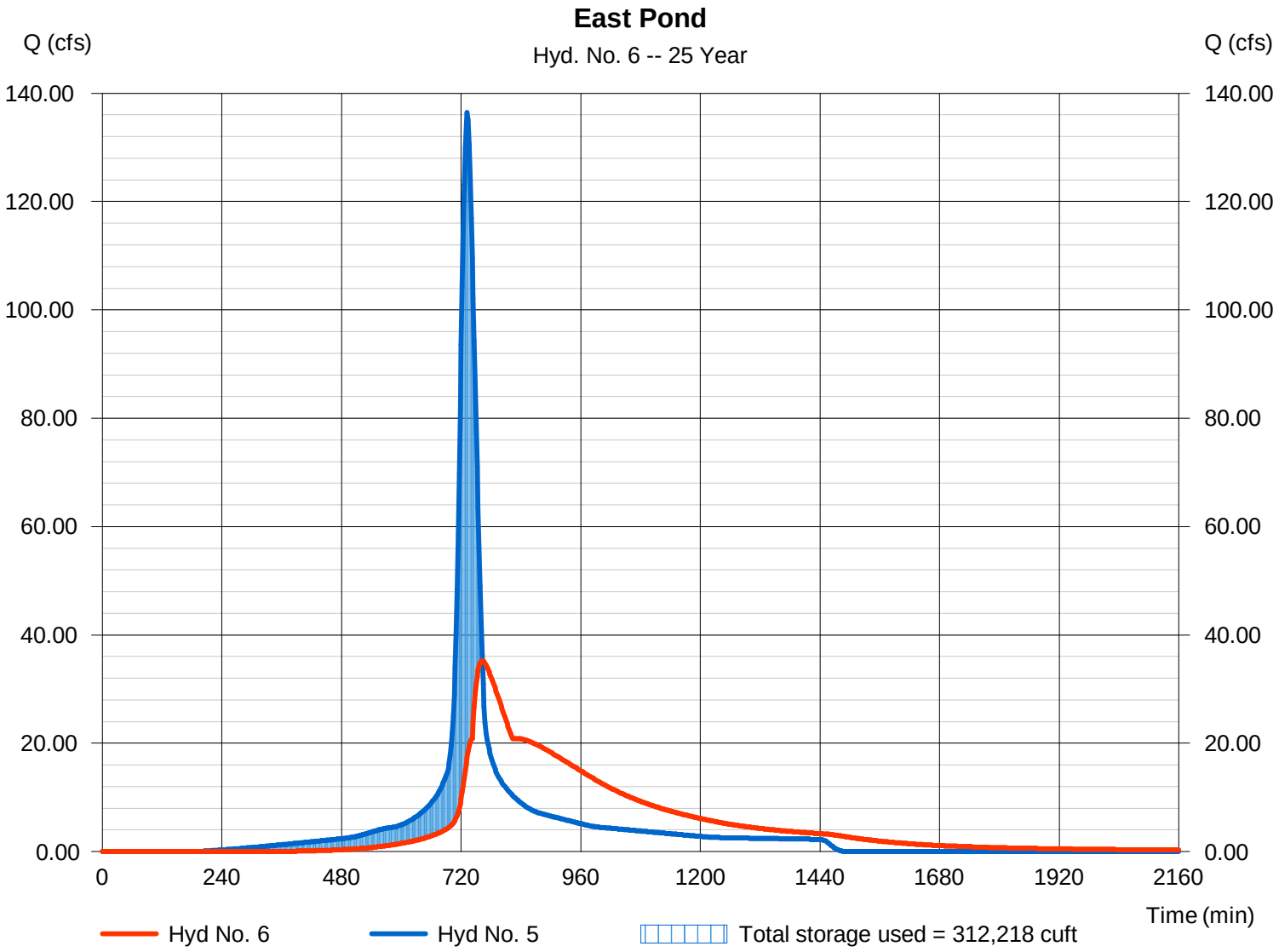
Hydrograph Report

Hyd. No. 6

East Pond

Hydrograph type	= Reservoir	Peak discharge	= 35.27 cfs
Storm frequency	= 25 yrs	Time to peak	= 762 min
Time interval	= 2 min	Hyd. volume	= 611,382 cuft
Inflow hyd. No.	= 5 - East Developed	Max. Elevation	= 1338.47 ft
Reservoir name	= East Pond	Max. Storage	= 312,218 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2013 by Autodesk, Inc. v10

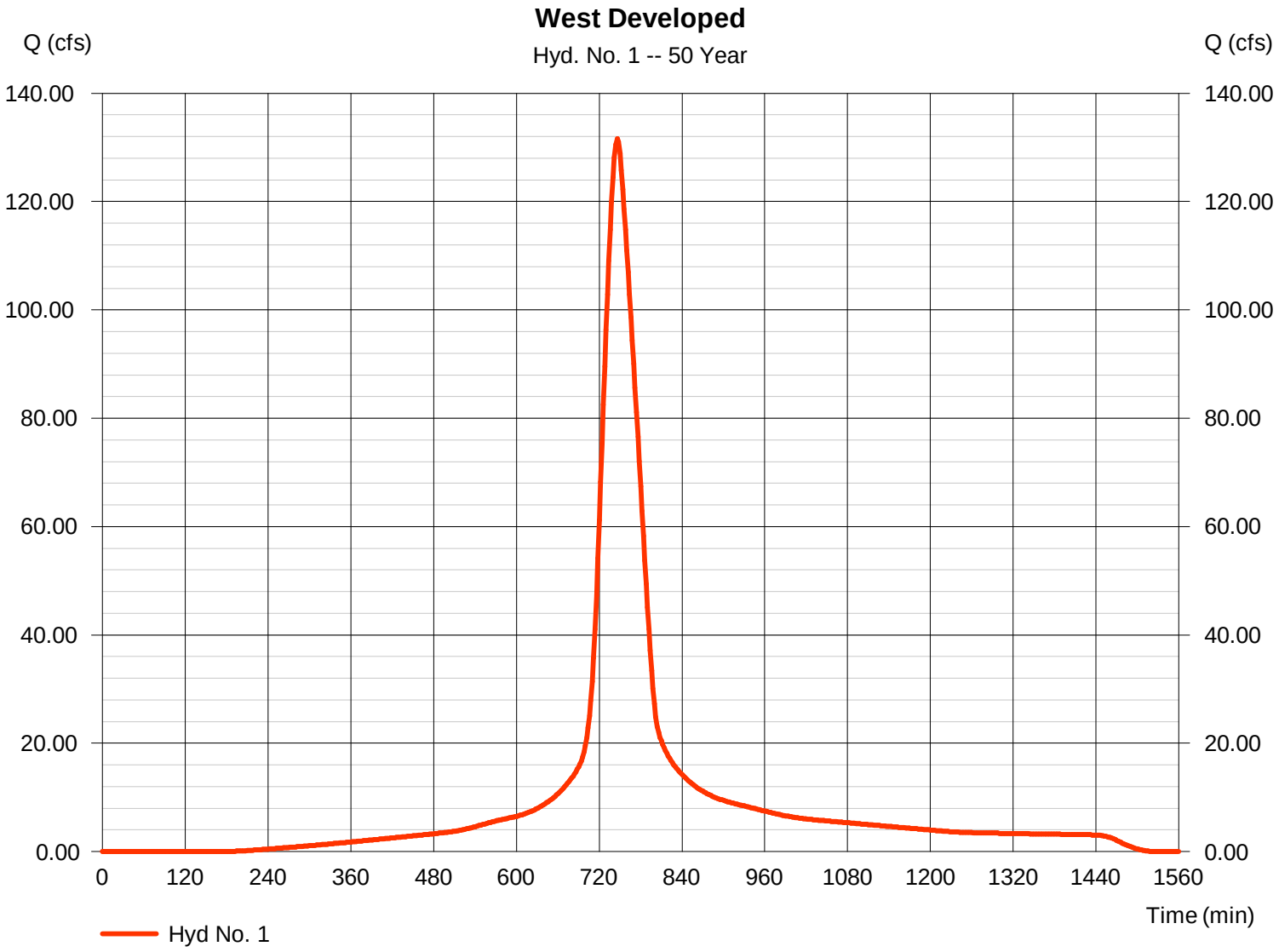
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	131.61	2	746	841,785	------	------	------	West Developed
2	SCS Runoff	87.68	2	764	721,957	------	------	------	West Existing
3	Reservoir	78.25	2	776	597,936	1	1344.42	424,060	West Pond
4	SCS Runoff	97.94	2	738	506,004	------	------	------	East Existing
5	SCS Runoff	156.54	2	732	708,362	------	------	------	East Developed
6	Reservoir	43.96	2	762	706,601	5	1338.87	351,382	East Pond

Hydrograph Report

Hyd. No. 1

West Developed

Hydrograph type	=	SCS Runoff	Peak discharge	=	131.61 cfs
Storm frequency	=	50 yrs	Time to peak	=	746 min
Time interval	=	2 min	Hyd. volume	=	841,785 cuft
Drainage area	=	40.000 ac	Curve number	=	91
Basin Slope	=	0.5 %	Hydraulic length	=	2100 ft
Tc method	=	LAG	Time of conc. (Tc)	=	54.80 min
Total precip.	=	6.90 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

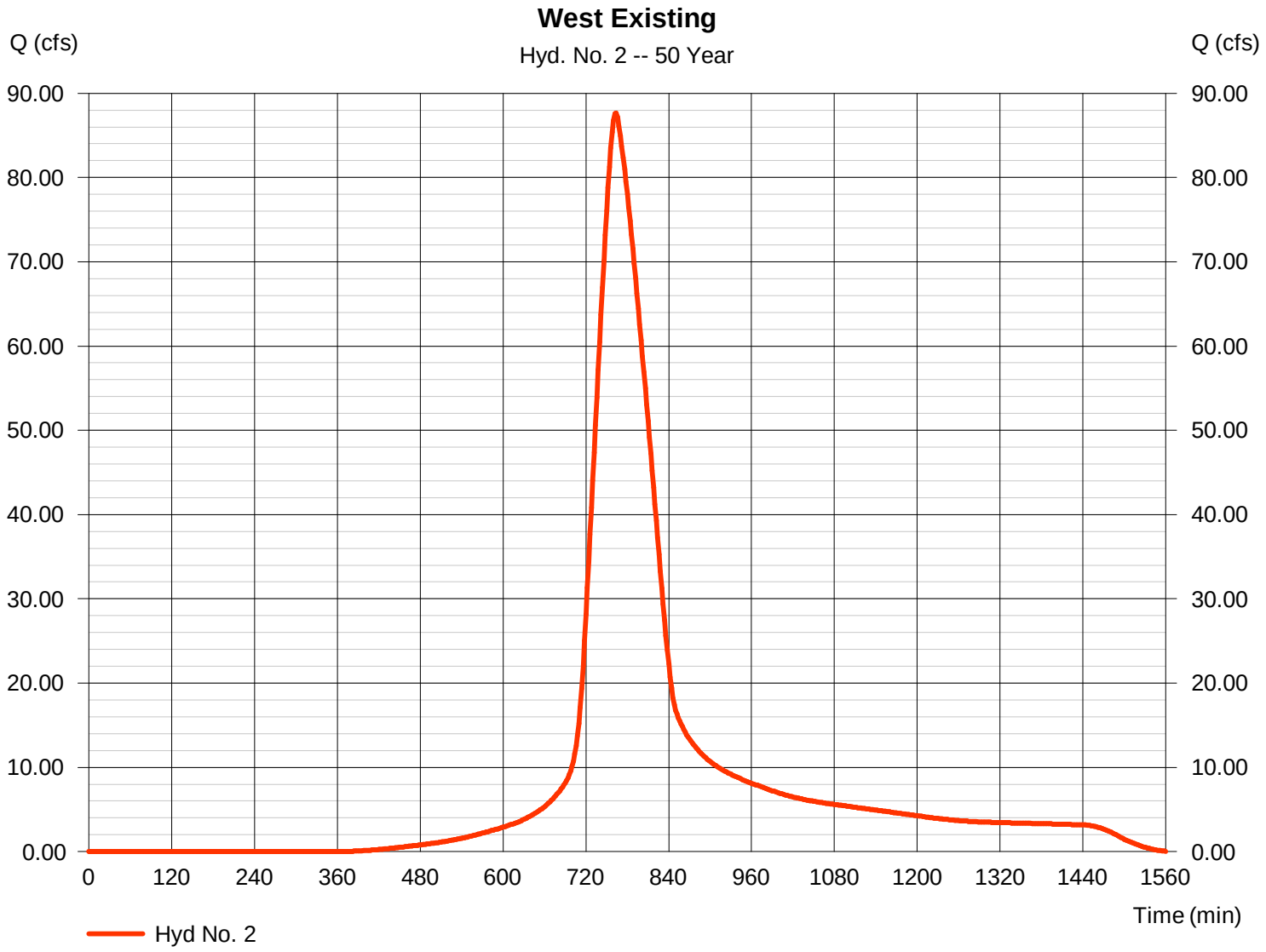


Hydrograph Report

Hyd. No. 2

West Existing

Hydrograph type	= SCS Runoff	Peak discharge	= 87.68 cfs
Storm frequency	= 50 yrs	Time to peak	= 764 min
Time interval	= 2 min	Hyd. volume	= 721,957 cuft
Drainage area	= 43.000 ac	Curve number	= 80
Basin Slope	= 0.5 %	Hydraulic length	= 2100 ft
Tc method	= LAG	Time of conc. (Tc)	= 81.50 min
Total precip.	= 6.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



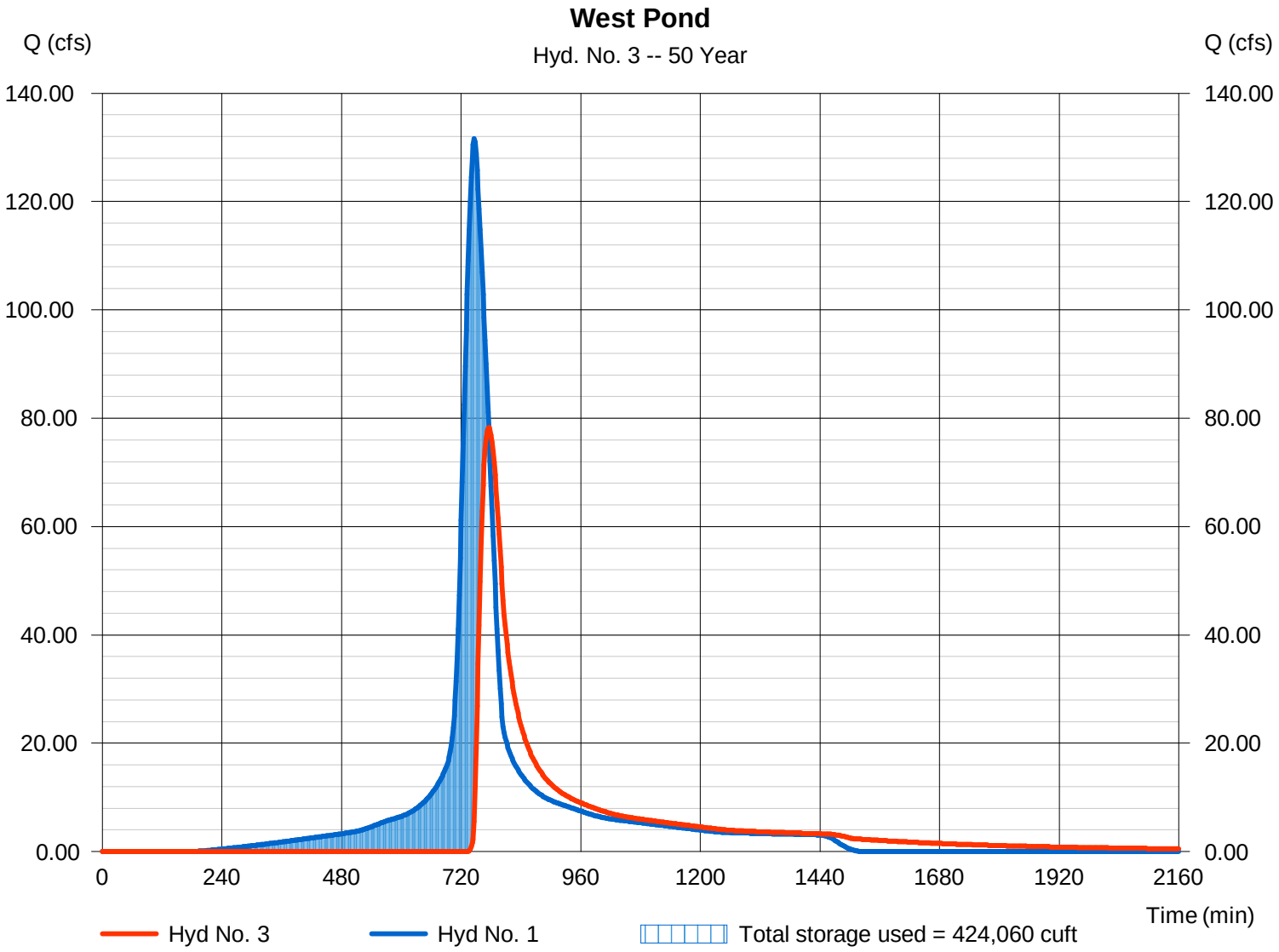
Hydrograph Report

Hyd. No. 3

West Pond

Hydrograph type	= Reservoir	Peak discharge	= 78.25 cfs
Storm frequency	= 50 yrs	Time to peak	= 776 min
Time interval	= 2 min	Hyd. volume	= 597,936 cuft
Inflow hyd. No.	= 1 - West Developed	Max. Elevation	= 1344.42 ft
Reservoir name	= West Dry Detention	Max. Storage	= 424,060 cuft

Storage Indication method used.

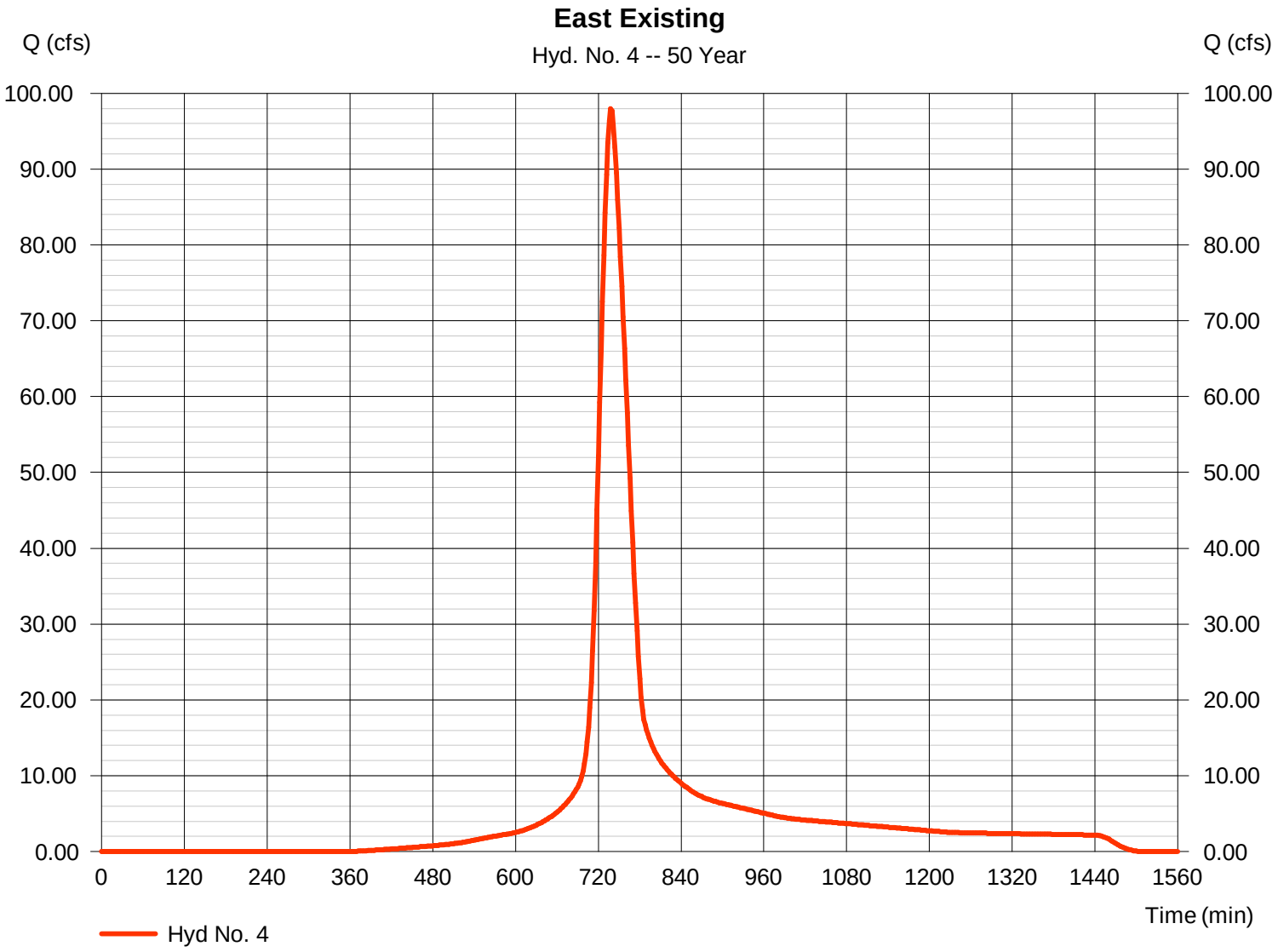


Hydrograph Report

Hyd. No. 4

East Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	97.94 cfs
Storm frequency	=	50 yrs	Time to peak	=	738 min
Time interval	=	2 min	Hyd. volume	=	506,004 cuft
Drainage area	=	30.000 ac	Curve number	=	80
Basin Slope	=	0.7 %	Hydraulic length	=	1100 ft
Tc method	=	LAG	Time of conc. (Tc)	=	41.00 min
Total precip.	=	6.90 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

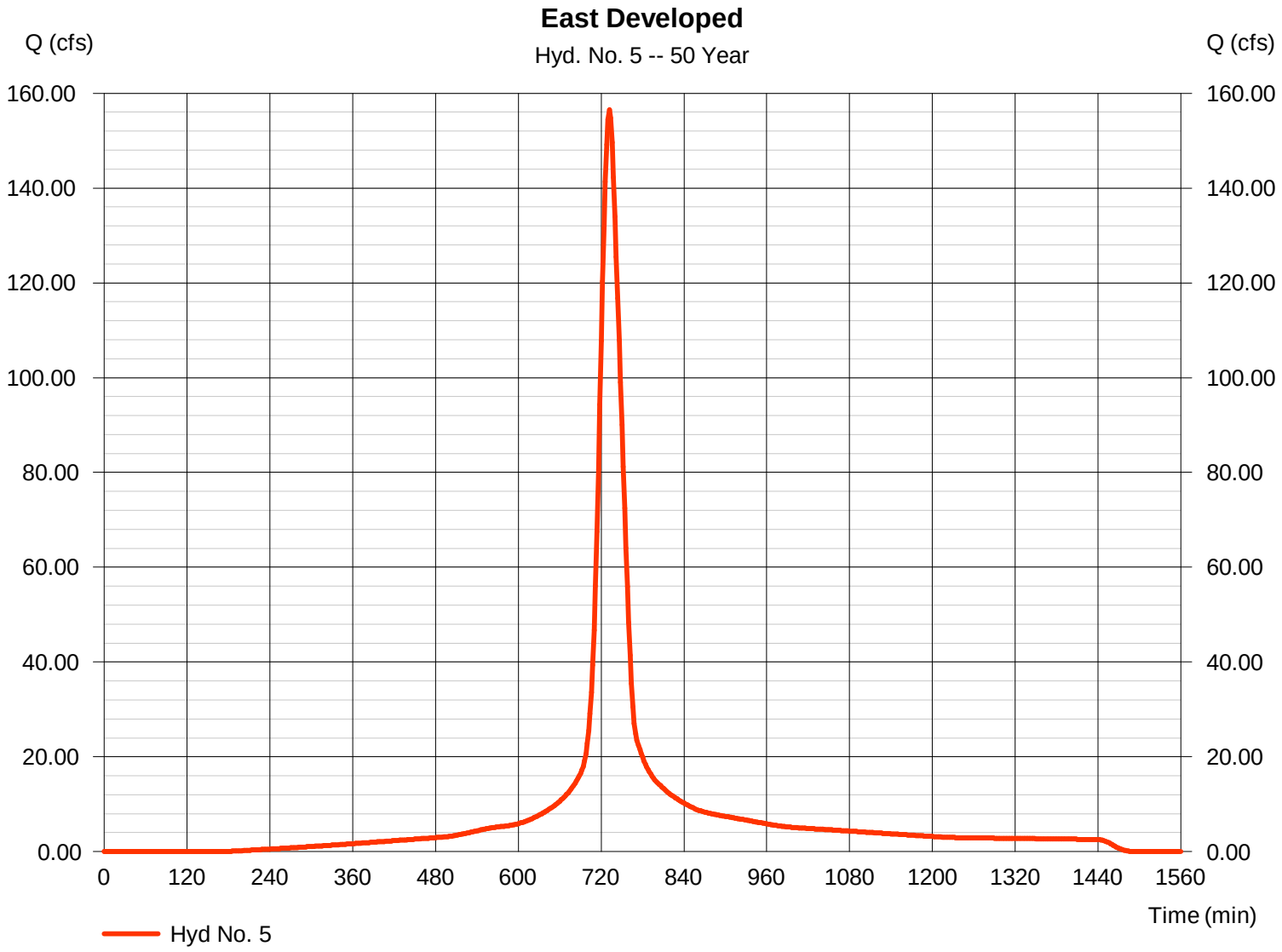


Hydrograph Report

Hyd. No. 5

East Developed

Hydrograph type	=	SCS Runoff	Peak discharge	=	156.54 cfs
Storm frequency	=	50 yrs	Time to peak	=	732 min
Time interval	=	2 min	Hyd. volume	=	708,362 cuft
Drainage area	=	33.000 ac	Curve number	=	91
Basin Slope	=	0.5 %	Hydraulic length	=	1100 ft
Tc method	=	LAG	Time of conc. (Tc)	=	32.70 min
Total precip.	=	6.90 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



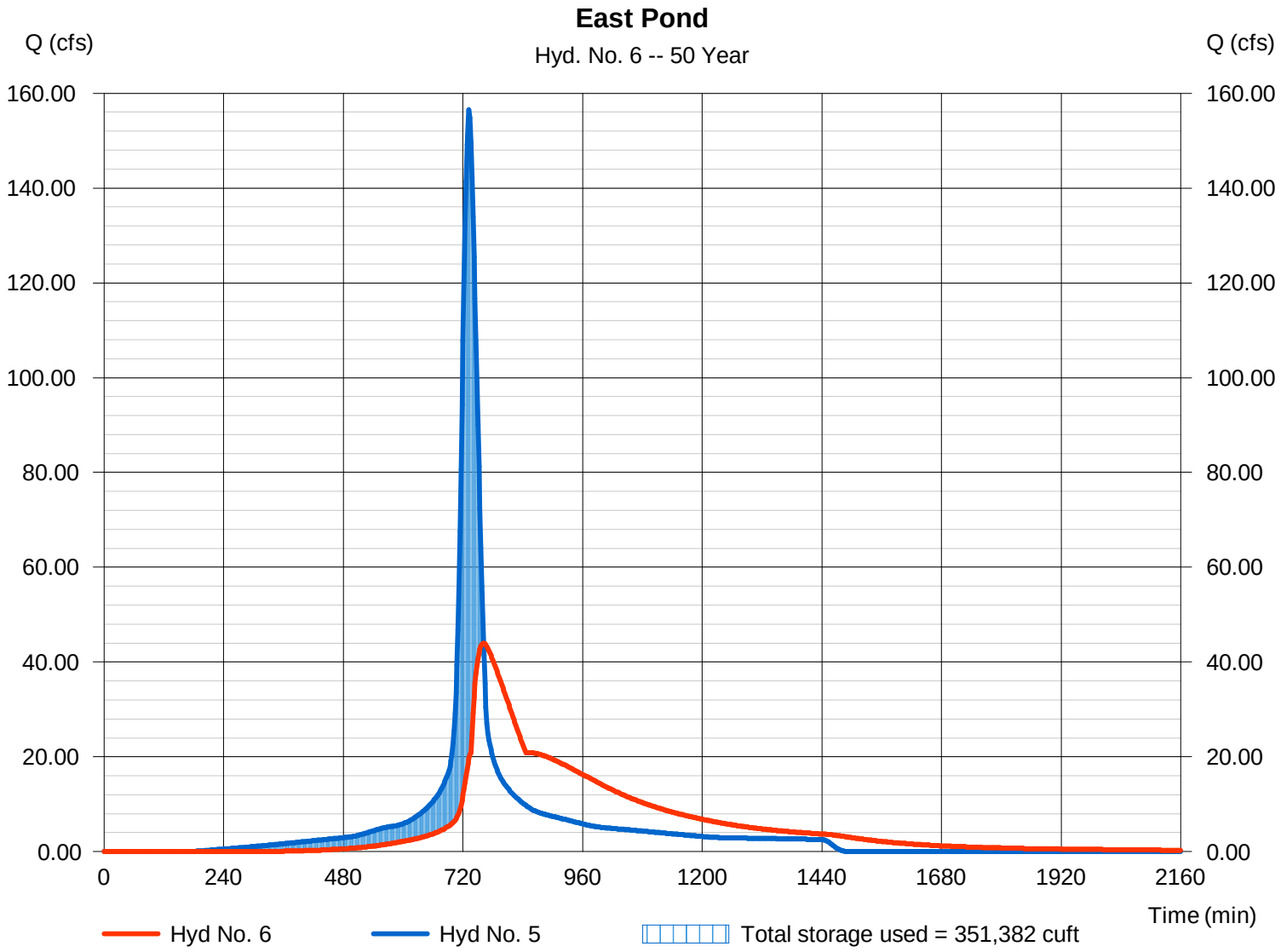
Hydrograph Report

Hyd. No. 6

East Pond

Hydrograph type	=	Reservoir	Peak discharge	=	43.96 cfs
Storm frequency	=	50 yrs	Time to peak	=	762 min
Time interval	=	2 min	Hyd. volume	=	706,601 cuft
Inflow hyd. No.	=	5 - East Developed	Max. Elevation	=	1338.87 ft
Reservoir name	=	East Pond	Max. Storage	=	351,382 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2013 by Autodesk, Inc. v10

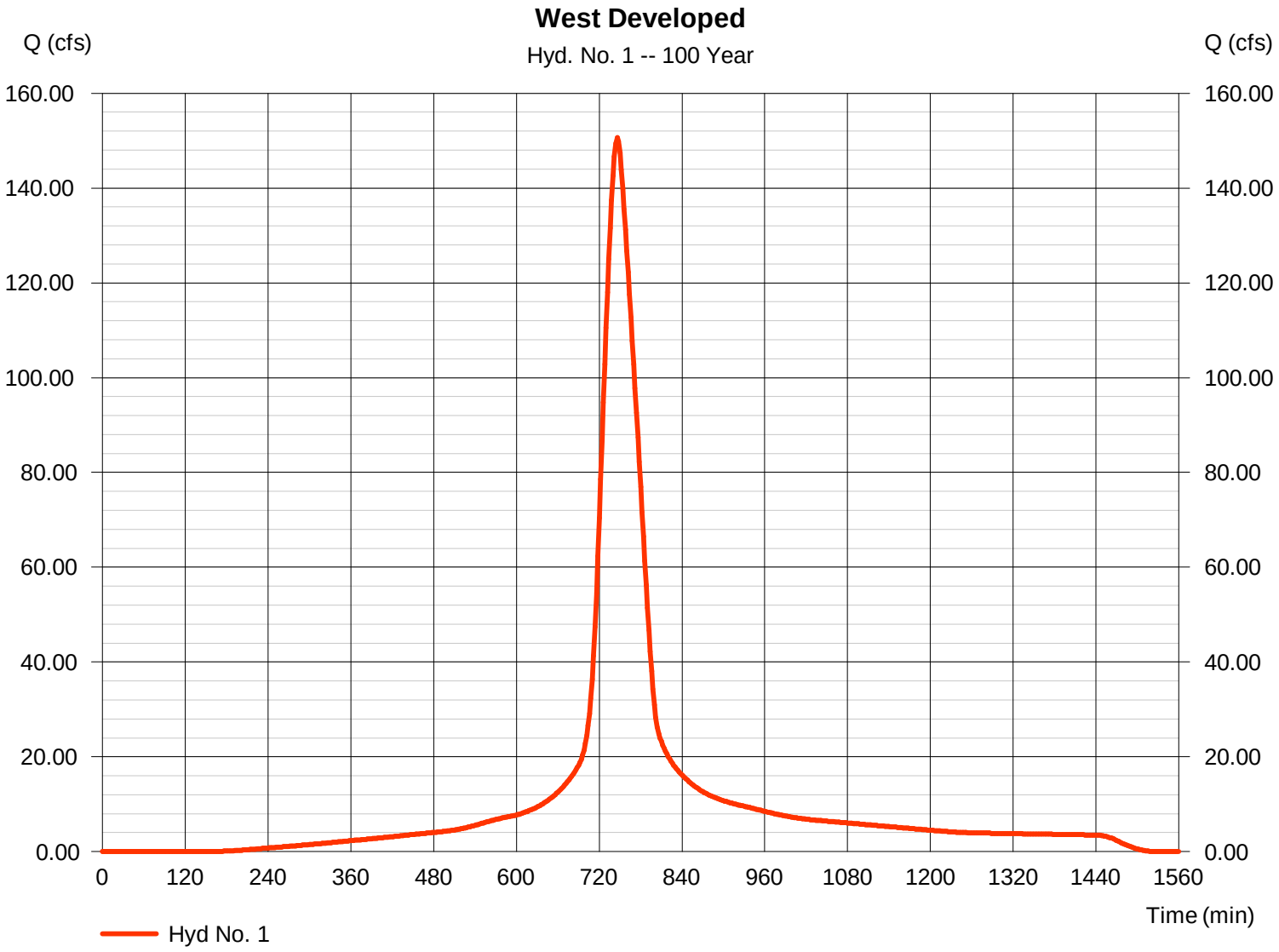
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	150.60	2	746	969,584	------	------	------	West Developed
2	SCS Runoff	103.39	2	764	853,023	------	------	------	West Existing
3	Reservoir	101.84	2	770	725,720	1	1344.69	447,104	West Pond
4	SCS Runoff	115.38	2	738	597,866	------	------	------	East Existing
5	SCS Runoff	179.04	2	732	815,905	------	------	------	East Developed
6	Reservoir	54.37	2	760	814,124	5	1339.30	394,952	East Pond

Hydrograph Report

Hyd. No. 1

West Developed

Hydrograph type	=	SCS Runoff	Peak discharge	=	150.60 cfs
Storm frequency	=	100 yrs	Time to peak	=	746 min
Time interval	=	2 min	Hyd. volume	=	969,584 cuft
Drainage area	=	40.000 ac	Curve number	=	91
Basin Slope	=	0.5 %	Hydraulic length	=	2100 ft
Tc method	=	LAG	Time of conc. (Tc)	=	54.80 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

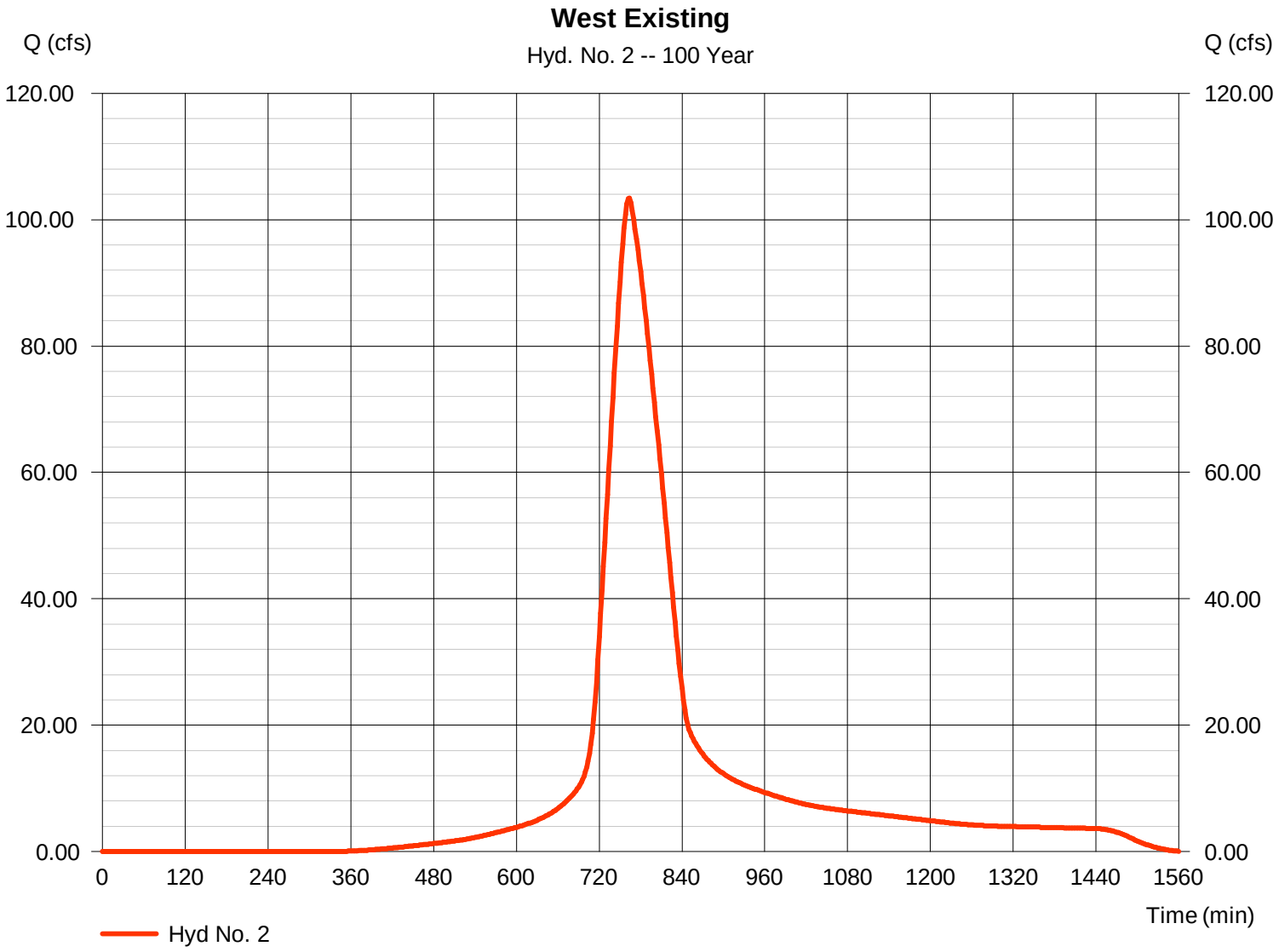


Hydrograph Report

Hyd. No. 2

West Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	103.39 cfs
Storm frequency	=	100 yrs	Time to peak	=	764 min
Time interval	=	2 min	Hyd. volume	=	853,023 cuft
Drainage area	=	43.000 ac	Curve number	=	80
Basin Slope	=	0.5 %	Hydraulic length	=	2100 ft
Tc method	=	LAG	Time of conc. (Tc)	=	81.50 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



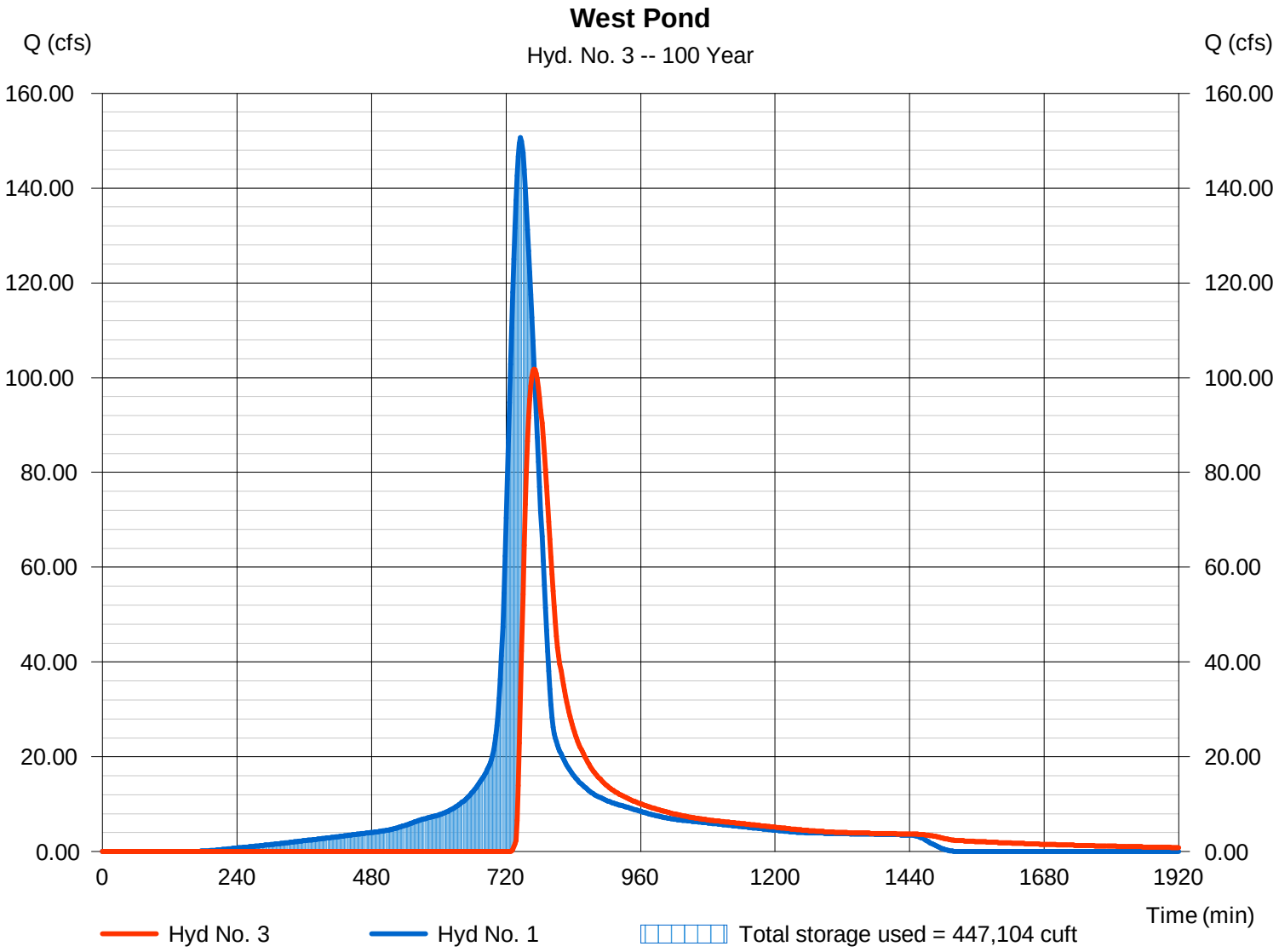
Hydrograph Report

Hyd. No. 3

West Pond

Hydrograph type	=	Reservoir	Peak discharge	=	101.84 cfs
Storm frequency	=	100 yrs	Time to peak	=	770 min
Time interval	=	2 min	Hyd. volume	=	725,720 cuft
Inflow hyd. No.	=	1 - West Developed	Max. Elevation	=	1344.69 ft
Reservoir name	=	West Dry Detention	Max. Storage	=	447,104 cuft

Storage Indication method used.

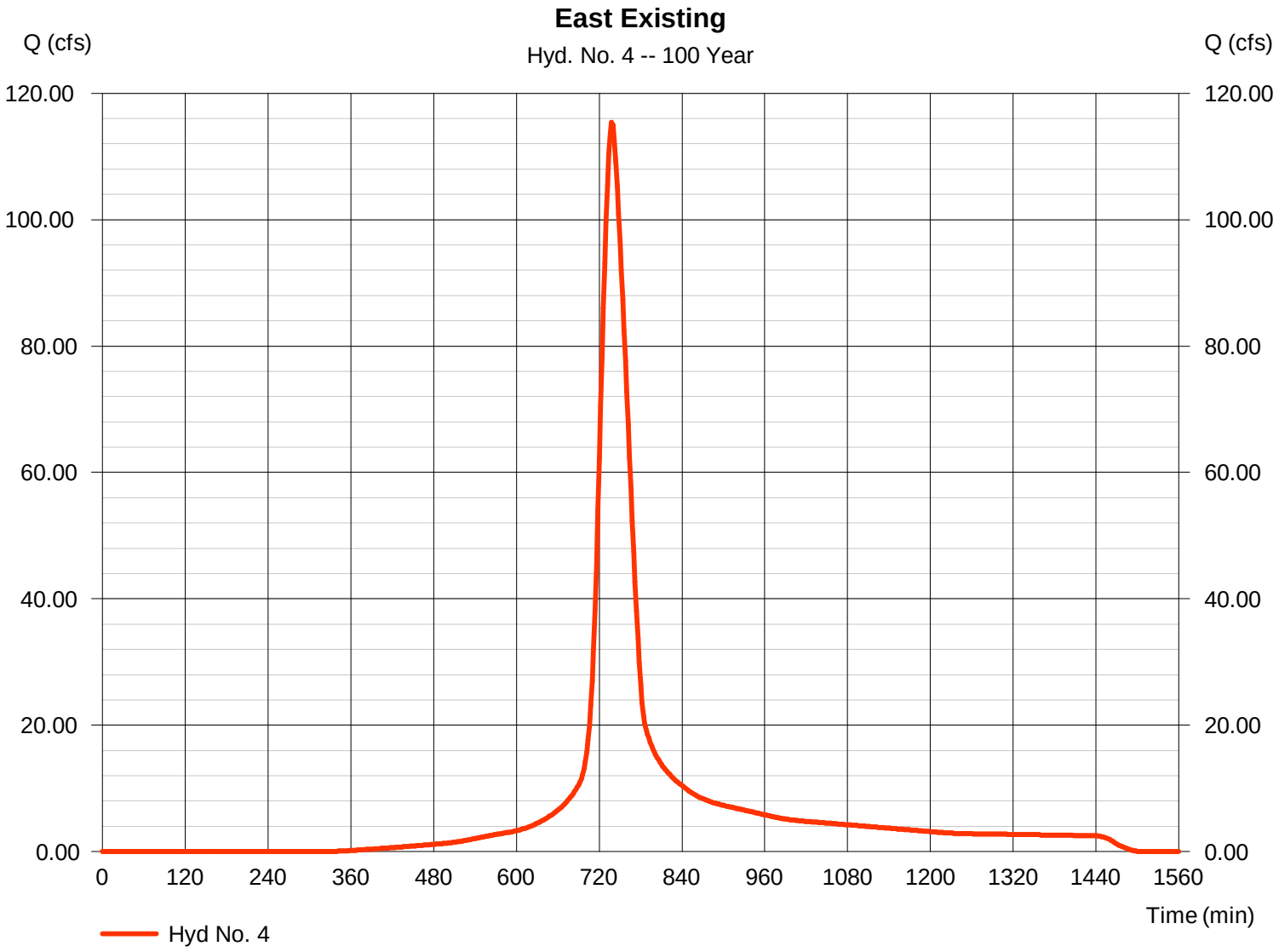


Hydrograph Report

Hyd. No. 4

East Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	115.38 cfs
Storm frequency	=	100 yrs	Time to peak	=	738 min
Time interval	=	2 min	Hyd. volume	=	597,866 cuft
Drainage area	=	30.000 ac	Curve number	=	80
Basin Slope	=	0.7 %	Hydraulic length	=	1100 ft
Tc method	=	LAG	Time of conc. (Tc)	=	41.00 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

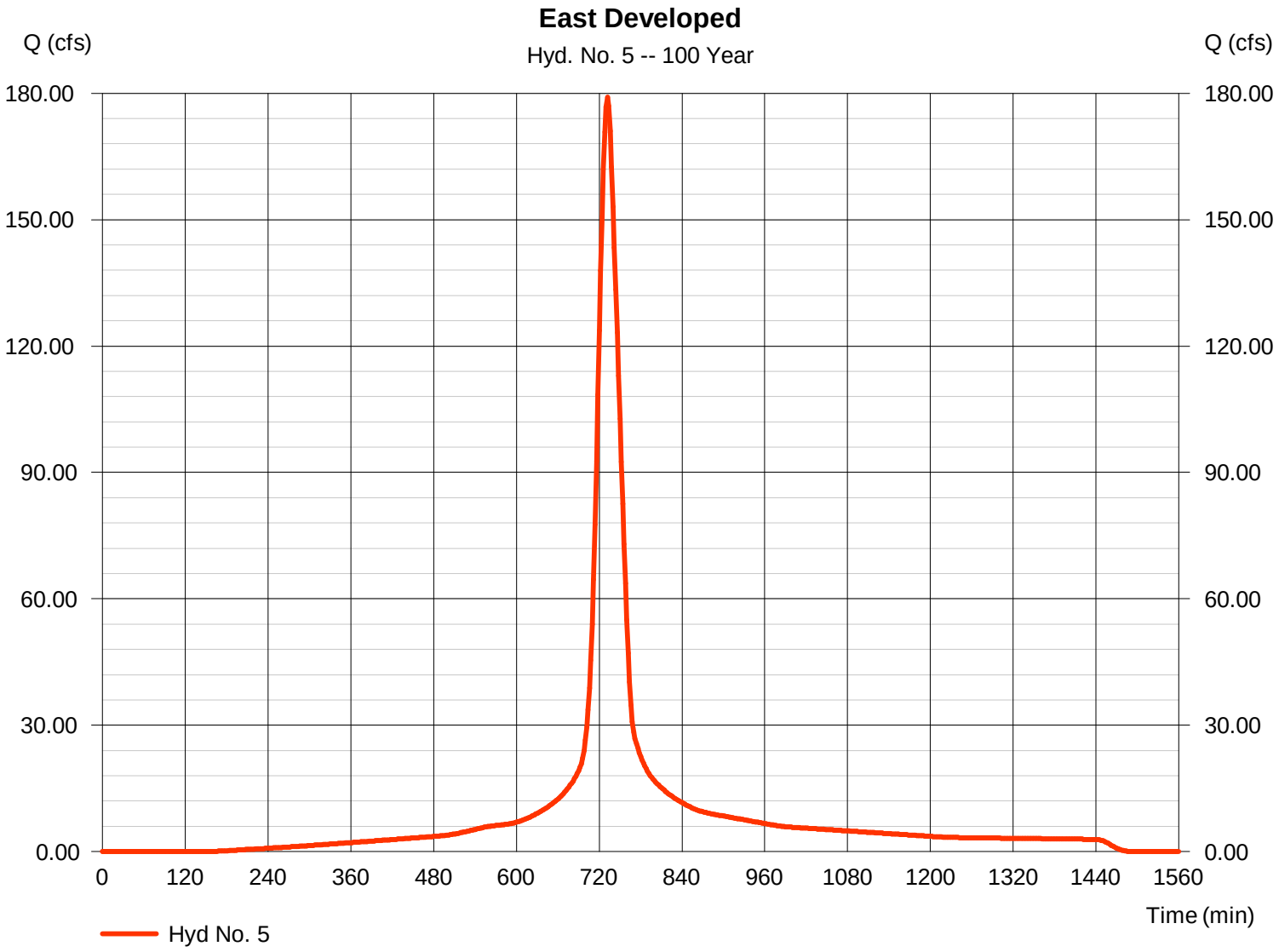


Hydrograph Report

Hyd. No. 5

East Developed

Hydrograph type	=	SCS Runoff	Peak discharge	=	179.04 cfs
Storm frequency	=	100 yrs	Time to peak	=	732 min
Time interval	=	2 min	Hyd. volume	=	815,905 cuft
Drainage area	=	33.000 ac	Curve number	=	91
Basin Slope	=	0.5 %	Hydraulic length	=	1100 ft
Tc method	=	LAG	Time of conc. (Tc)	=	32.70 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



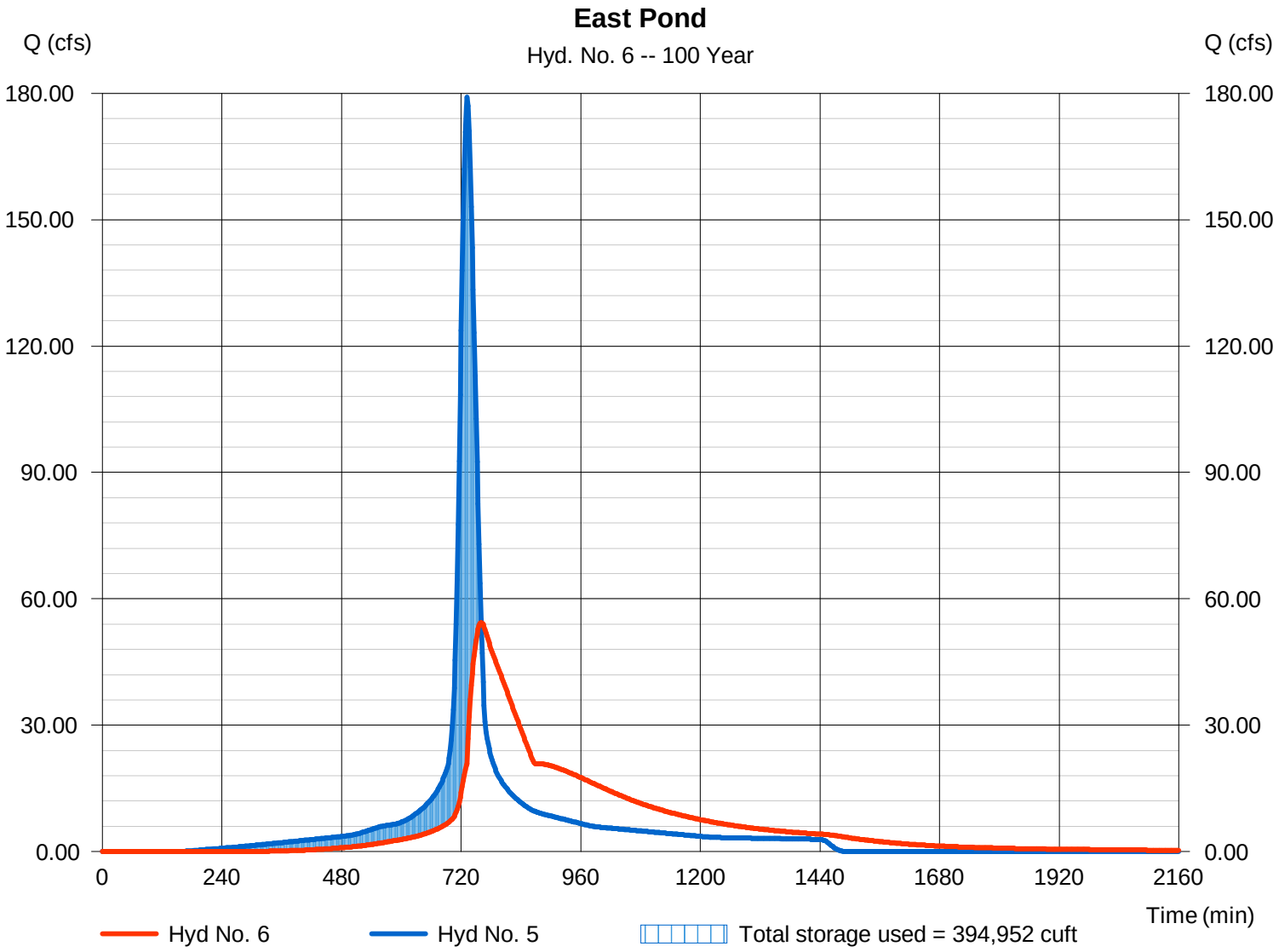
Hydrograph Report

Hyd. No. 6

East Pond

Hydrograph type	= Reservoir	Peak discharge	= 54.37 cfs
Storm frequency	= 100 yrs	Time to peak	= 760 min
Time interval	= 2 min	Hyd. volume	= 814,124 cuft
Inflow hyd. No.	= 5 - East Developed	Max. Elevation	= 1339.30 ft
Reservoir name	= East Pond	Max. Storage	= 394,952 cuft

Storage Indication method used.



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	27.8967	9.8000	0.7047	--------
2	76.3137	14.3000	0.8844	--------
3	1.2000	0.1000	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: wich_IDF.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	4.18	3.40	2.90	2.55	2.29	2.08	1.91	1.78	1.66	1.56	1.48	1.40
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	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
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	2.80	3.50	1.20	4.50	5.20	6.10	6.90	7.80
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

Drainage Plan

1:100 Scale