

DRAINAGE PLAN
SKYWAY WEST 2ND
ADDITION
TO
WICHITA, SEDGWICK COUNTY, KANSAS

PREPARED BY



28 OCTOBER 2011



DRAINAGE PLAN SKYWAY WEST 2ND ADDITON

FINAL REPORT

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

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

REPORT CONTENTS

City of Wichita Checklist

Project Narrative

- Existing Conditions
- Proposed Conditions
- Offsite Conditions

Existing Conditions Runoff Calculations

- Drainage Methods & Standards
- Site Characteristics
- Existing Conditions Hydrologic Analysis
- Downstream Drainage Capacity

Post-Development Hydrologic Analysis

- Drainage Methods & Standards
- Developed Conditions Hydrologic Analysis
- Detention Facilities
- Discharge Points Summary
- Potential Upstream/Downstream Impacts

Floodplain Submittal

- Source of Floodplain Information

Federal, State, & Local Permitting

- US Army Corps of Engineers
- Kansas Dept of Agriculture – DWR Permitting
- FEMA
- Kansas Dept of Transportation
- Sedgwick County ROW

Exhibits

- 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)

Appendices: Supporting Calculations

- Appendix A: USGS Soils Survey
- Appendix B: HydraFlow Hydrographs

Plan Sheets

- Drainage & Grading Plan 1: 150 Scale

PROJECT NARRATIVE

EXISTING CONDITIONS

The site is located at the southeast corner of 31st Street South and 119th Street West in Wichita, Sedgwick County, Kansas. The site consists of approximately 162 acres that is currently farmland.

The area sits on a 'high point' in the topography and drains in four distinct directions. There is a small amount of offsite runoff from the northwest which is conveyed via a 24" RCP under 31st Street. This runoff appears to be located in the ROW ditch and ROW area. The site drains to the west directly into a RCBC under 119th Street, to the south onto a private residence and into an existing pond, to the southeast into a residential subdivision, and to the west through private properties and onto a platted industrial lot.

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 into one large industrial lot. The site will be further defined upon site development. There will be dry detention ponds located near the existing site discharge points that will detain the sites developed runoff as well as provide water quality and downstream channel protection.

We expect 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 via ditches/swales and overland flow. For a half-scale copy of the Plat, see Exhibit 3.

OFFSITE CONDITIONS

The proposed site drains to four distinct locations. The western half of the site drains to the 119th Street ROW and box culvert located under the roadway. The northeast portion of the site drains via overland flow and loosely channelizes on the adjacent residential properties to the east until encroaching Skyway West Addition, also located to the east. A small portion of the site drains to the southeast and into the Harvest Ridge Addition SWS system. The remaining portion drains to the south and directly into an adjacent pond located on a platted residential property. The outfall locations of runoff appear to be well defined.

There is one location of offsite runoff that may encroach the property. There is a 24" RCP under 31st Street which conveys runoff from the north to the south ROW. This area appears to drain approximately 41 acres with a large detention pond/area in the middle of the basin. Upon site visits and lidar topography, the runoff drains via the SWS culvert and stays in the ROW ditch section. Upon larger events, if the runoff overtops the roadway, it could encroach on then property while flowing south to the box culvert.

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 = 88)
 - Time of Concentration: Lag Method (minimum 15 min)

SITE CHARACTERISTICS

The site consists of approximately 162 acres of currently agricultural farmland. The area has a high point in the topography which drains in four distinct directions. 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 88 was used for existing conditions due to row crops in a Type C soil condition. A Time of Concentration of 15 minutes was used as is the minimum Tc in the City of Wichita.

DOWNSTREAM DRAINAGE CAPACITY

The site flows to the west, east, south, and southeast. There is a box culvert located under 119th Street which conveys runoff to the west. This structure is old and partially silted in. We anticipate this structure to have been designed to convey approximately 5 year storm event, based on common historical Sedgwick County practices. Downstream to the east appears to be a non-uniform channel across two residential lots, then a platted drainage easement and proposed channel section in Sky Way West Addition. To the direct south is a wet pond which accepts this sites runoff with what appears to be a weir section discharging its flow to the south onto the same property. The runoff to the southeast discharges to the residential subdivision and its SWS system. There is an 18" RCP located with an area inlet to capture the offsite runoff at this location.

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 is proposed to be 4 separate detention ponds to detain developed runoff to the existing discharge points. A Curve Number of 91 was used for Industrial Lots in a Soil Type C. 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 4 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

This pond is located along 119th Street in Reserve A. This area will accept runoff from Basin 1 and will provide detention for the entire storm series. This pond will drain via a 36" pipe riser along with a weir section for larger storm events. The WQ and CP volumes will be discharged via a 4" orifice on the riser installed at the pond bottom elevation.

- Reserve B

The dry detention located in Reserve B will detain provide detention throughout the storm series as well as provide CP and WQ volumes. This pond will discharge to the east and into the platted Skyway West Addition. An additional easement will need to be obtained and the drainage channel as proposed in the aforementioned plat will need to be extended to this area. This area will drain via a 36" RCP and a 10' weir section. A 4" orifice will be utilized at the static surface for the WQ and CP extended detention and be installed as a riser system in conjunction with the 36" RCP.

➤ Reserve C

Reserve C will feature a dry detention pond that will serve only the peak detention requirements for Basin 3. Due to the large basin and outfall needed, no WQ or CP will be provided in this area. The dry detention area will drain via a 10' weir section at the existing outfall elevation.

➤ Reserve D

The dry detention pond located in Reserve D will serve as detention as well as WQ and CP volumes. This area will drain via an 18" RCP with a 3" orifice on a riser system. The outfall pipe will tie directly into the existing SWS located in Harvest Ridge Addition.

DISCHARGE POINTS SUMMARY

The site will continue to discharge to the directions that currently exist on site. The only exception will be Reserve B. The discharge will be moved to the north approximately 500 feet in order to avoid the adjacent residential properties and their respective drives. The new discharge location will be into the Skyway West Addition. The proposed ditch section in that addition will need to be extended to the north and west to accept this new location. We expect the ditch section to remain the same characteristically and feature a 0.2% slope.

WATER QUALITY

Preliminary water quality calculations have been provided for the basins and detention facilities. The proposed detention facilities in Reserves A, B, and D will provide 60% of the needed water quality volume. Reserve C will not provide any at its current proposed configuration. With that in mind, the remaining volumes needed will need to be achieved at site plan time. The amount needed will depend on the specific site plan and percentage of impervious cover. Since the site plan and cover is not available at this time, additional locations are not provided.

A waiver of the additional 20% water quality may be applied for due to this property not being able to use wet detention facilities due to the airport restrictions. If a waiver is granted, no additional WQ volume will be required. If the waiver is rejected, WQ can ne met onsite at the time of site development

DOWNSTREAM CHANNEL PROTECTION

The downstream channel protection requirement will be met in the current proposed configuration for Reserves A, B, and D. These detention areas will provide

extended detention with the use of small orifices and risers for the 1-year storm event on the pond outfalls.

Reserve C will only provide approximately 1 hour of the extended detention requirement. At the time of site planning for this area of the plat (Basin 3) there will need to be channel protection provided as well as storm water quality. Since the site plan and ground cover type is not available at this time, additional locations of water quality and downstream channel are not provided.

POTENTIAL UPSTREAM/DOWNSTREAM IMPACTS

Due to the construction of dry detention ponds, and the utilization of existing outfall elevations, we do not anticipate any downstream impacts with this development. The location of the detention area in Reserve B will require the extension of the drainage easement on Skyway West Addition as well as the extension of the proposed channel section.

Since this site is located on the high point in this particular basin, we do not anticipate any upstream impacts to surrounding properties. The only location of offsite runoff is located in the ROW and will continue to flow onto this area after this development.

The existing 41 acres that drains by this property at the northwest property can remain in the ROW and ditch section. At this point, there is currently 60 feet from the platted property line to the asphalt road; which is enough for a ditch section to convey this runoff to the south and under the roadway culvert. Since the main flows stay in the ditch section in the ROW, and there is sufficient room in the ROW for a larger ditch section, there is no need to convey the runoff directly onto this property.

FLOODPLAIN SUBMITTAL

SOURCE OF FLOODPLAIN INFORMATION

The site lies within a FEMA Zone X - Unshaded. The location of the property, on FEMA FIRM Panel 340 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 does not appear to be any jurisdictional waters of the US on this site.

KANSAS DEPT OF AGRICULTURE – DWR PERMITTING

There does not appear to be any DWR permitting needed on the proposed site at this time. The areas of discharge do not account for more than 240 acres.

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 appear to be Sedgwick County permitting needed at this time due to discharge into the 119th ROW.

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)

SITE LOCATION EXHIBIT
SKYWAY WEST 2ND & 3RD ADDITIONS
WICHITA, SEDGWICK COUNTY, KANSAS

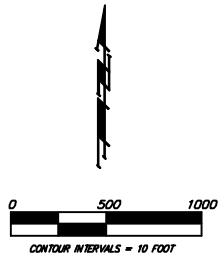
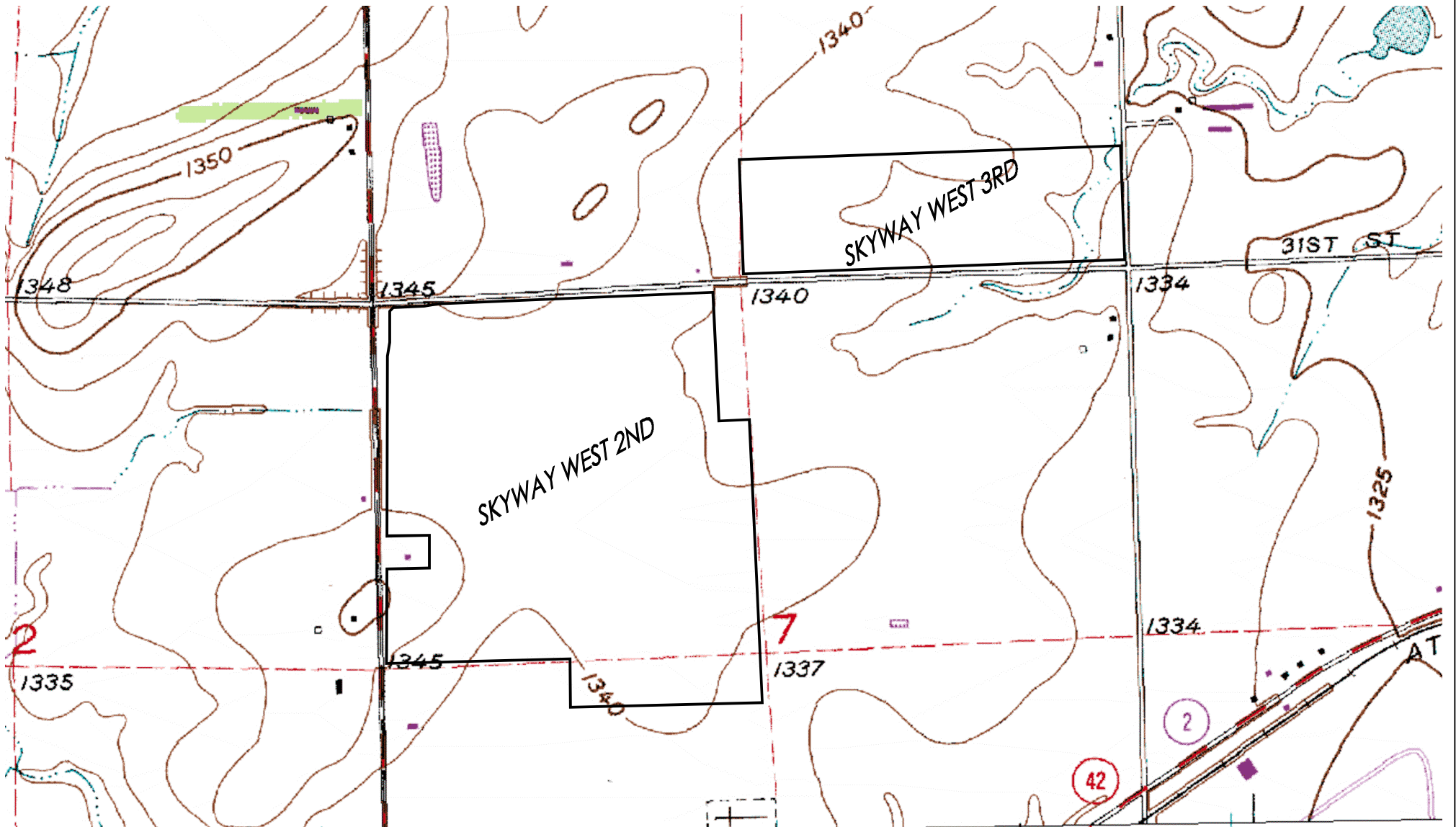
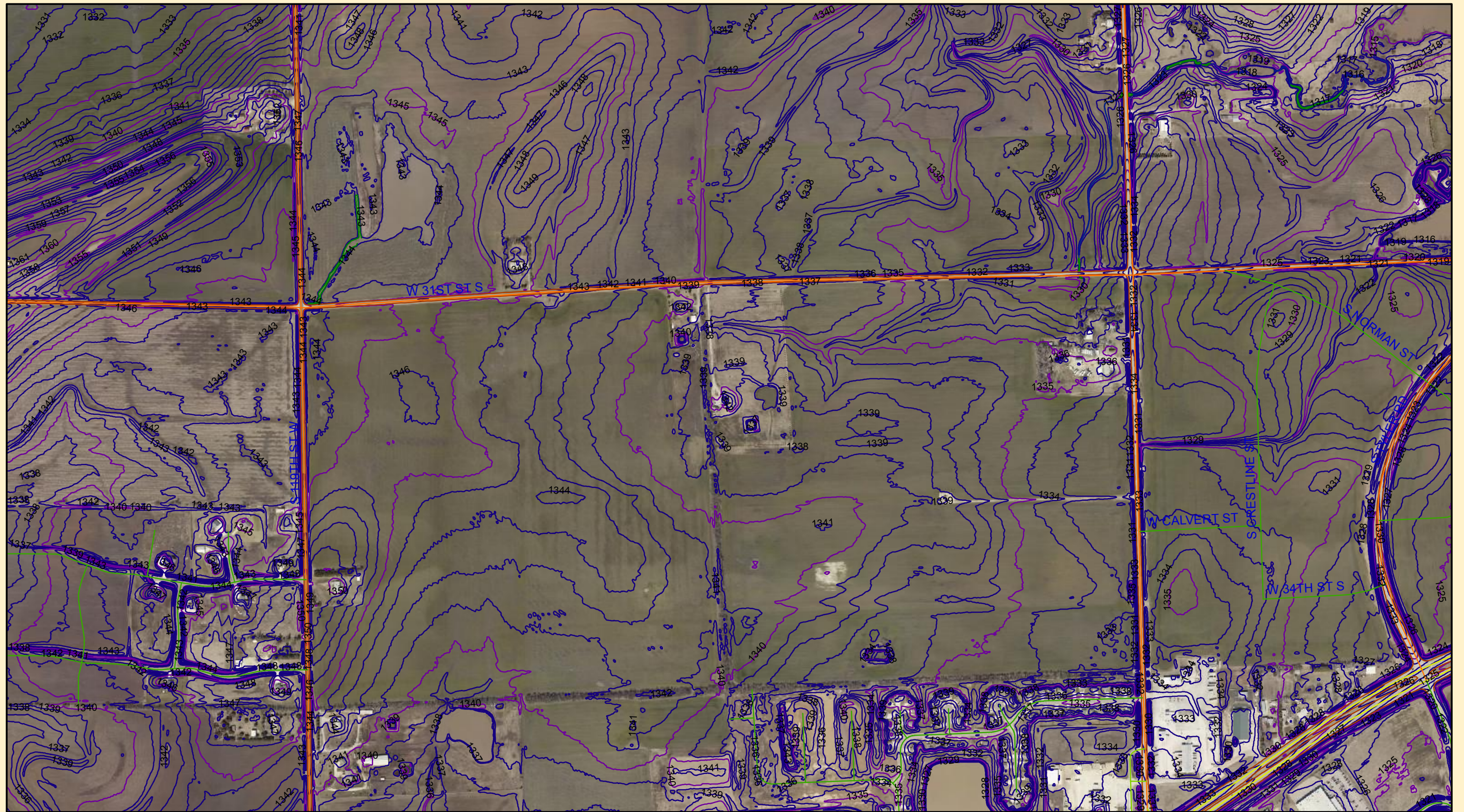


EXHIBIT 1
SKYWAY WEST 2ND & 3RD ADDITIONS
1 NOV11



AERIAL EXHIBIT

SKYWAY WEST 2ND & 3RD ADDITIONS



SKYWAY WEST 2ND ADDITION WICHITA, SEDGWICK COUNTY, KANSAS

State of Kansas) SS
Sedgwick County) We, *Baughman Company, P.A.*, Surveyors in
aforesaid county and state do hereby certify that we have surveyed and
platted "SKYWAY WEST 2ND ADDITION", Wichita, Sedgwick County, Kansas
and that the accompanying plat is a true and correct exhibit of the
property surveyed, described as the east half of the Northwest Quarter of
Section 7, Township 28 South, Range 1 West of the Sixth Principal
Meridian, Sedgwick County, Kansas; EXCEPT the East 220 feet of the
north 990 feet thereof, TOGETHER with the west half of the Northwest
Quarter of Section 7, Township 28 South, Range 1 West of the 6th P.M.,
Sedgwick County, Kansas; EXCEPT that part described as beginning at a
point on the west line of said NW1/4, 683.96 feet north of the southwest
corner thereof; thence north on said west line 238 feet; thence east at
an interior angle of 91°18', 366.15 feet; thence south at an interior angle
88°42', 238 feet; thence west 366.15 feet to the point of beginning,
TOGETHER with the north 349.65 feet of the east half of the Southwest
Quarter of Section 7, Township 28 South, Range 1 West of the 6th P.M.,
Sedgwick County, Kansas.

This plat of "SKYWAY WEST 2ND 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 _____, 2011.
Wichita-Sedgwick County Metropolitan Area Planning Commission

_____, Chair
Shawn Farney

_____, Secretary
John L. Schlegel

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

Baughman Company, P.A.

_____, Surveyor
Michael G. Conroy

This plat approved and all dedications
shown hereon accepted by the City Council of the City of Wichita,
Kansas, this _____ day of _____, 2011.

_____, Mayor
Carl Brewer

_____, City Clerk
Karen Sublett

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 2ND 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 easements are
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", "B", "C",
and "D" are reserved for open space, landscaping, berms, lakes, drainage
purposes, and utilities as confined to easements. Reserves "A", "B", "C",
and "D" 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.

Reviewed in accordance with K.S.A. 58-2005
on this _____ day of _____, 2011.

John E. Dugan Family Partnership, L.P.

_____, Partner
John E. Dugan

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

Entered on transfer record this _____ day
of _____, 2011.

State of Kansas) SS
Sedgwick County) The foregoing instrument acknowledged before
me, this _____ day of _____, 2011, by *John E. Dugan, Partner of the*
John E. Dugan Family Partnership, L.P., on behalf of the limited partnership.

_____, County Clerk
Kelly B. Arnold

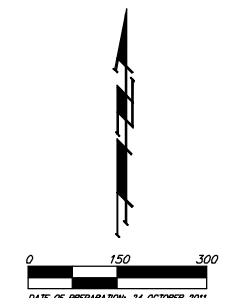
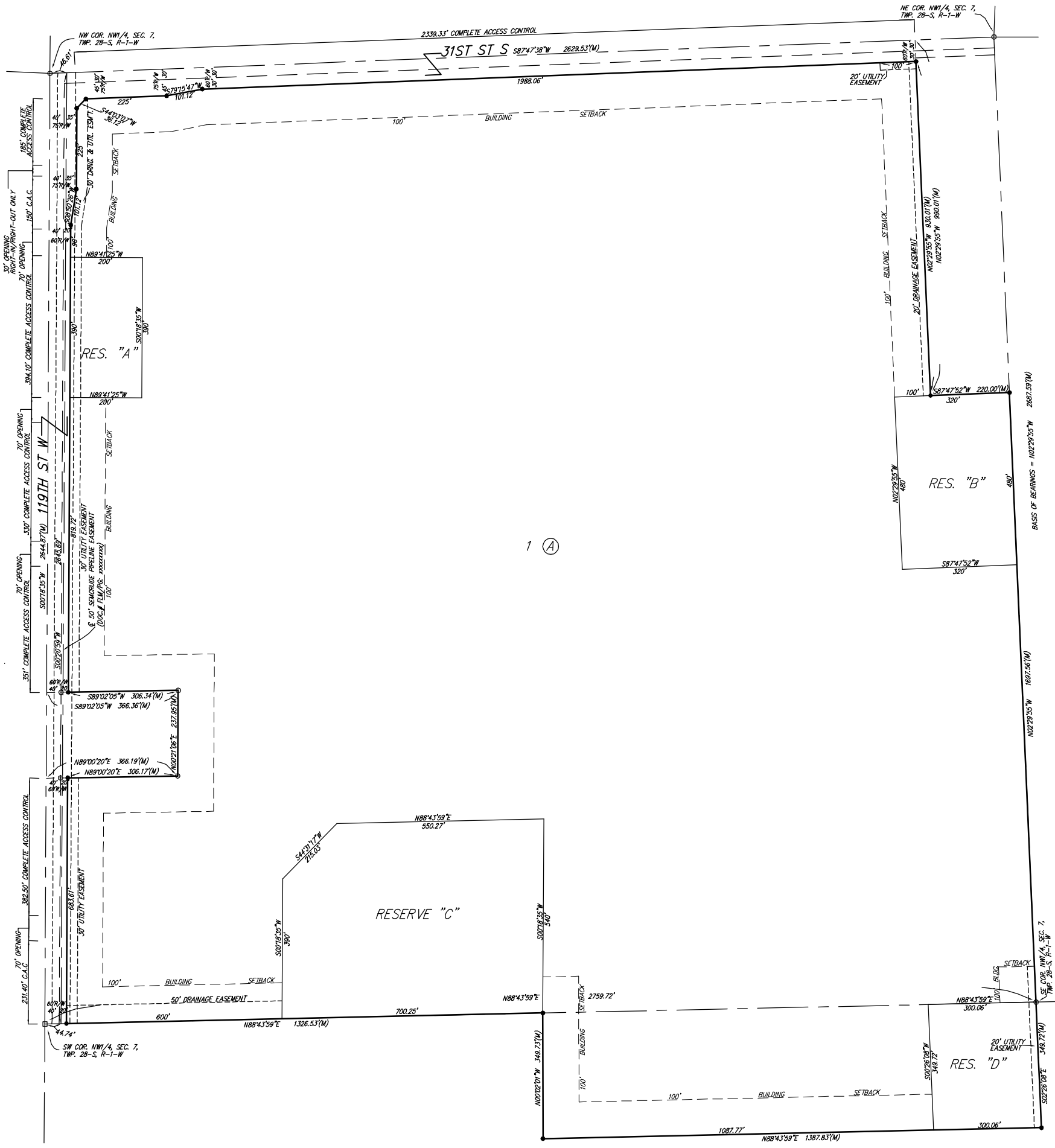
_____, Notary Public

My App'l. Exp. _____

State of Kansas) SS This is to certify that this plat has been
filed for record in the office of the Register of Deeds, this _____ day
of _____, 2011 at _____ o'clock _____ M.; and is duly recorded.

_____, Register of Deeds
Bill Meek

_____, Deputy
Tonya Buckingham



MINIMUM BUILDING PAD ELEVATIONS FOR
LOWEST OPENING TO THE STRUCTURES

LOT	BLOCK	ELEVATION
1	A	NAVD88 1,345.0

- = #4 REBAR W/ "BAUGHMAN" CAP (SET)
- ⊕ = 3/4" IRON (FOUND)
- = 1" IRON (FOUND)
- ◻ = 1" IRON PIPE IN THIMBLE (FOUND)
- (M) = MEASURED
- (D) = DESCRIBED
- (P) = PLATTED

BENCHMARK:
MAIZE ROAD & 31ST SOUTH-CITY OF WICHITA
BENCHMARK DISC. 200'± WEST OF INTERSECTION,
SOUTHEAST CORNER OF HUBGUARD OF R.C.B.C.
ELEV. = 1331.82 NAVD88

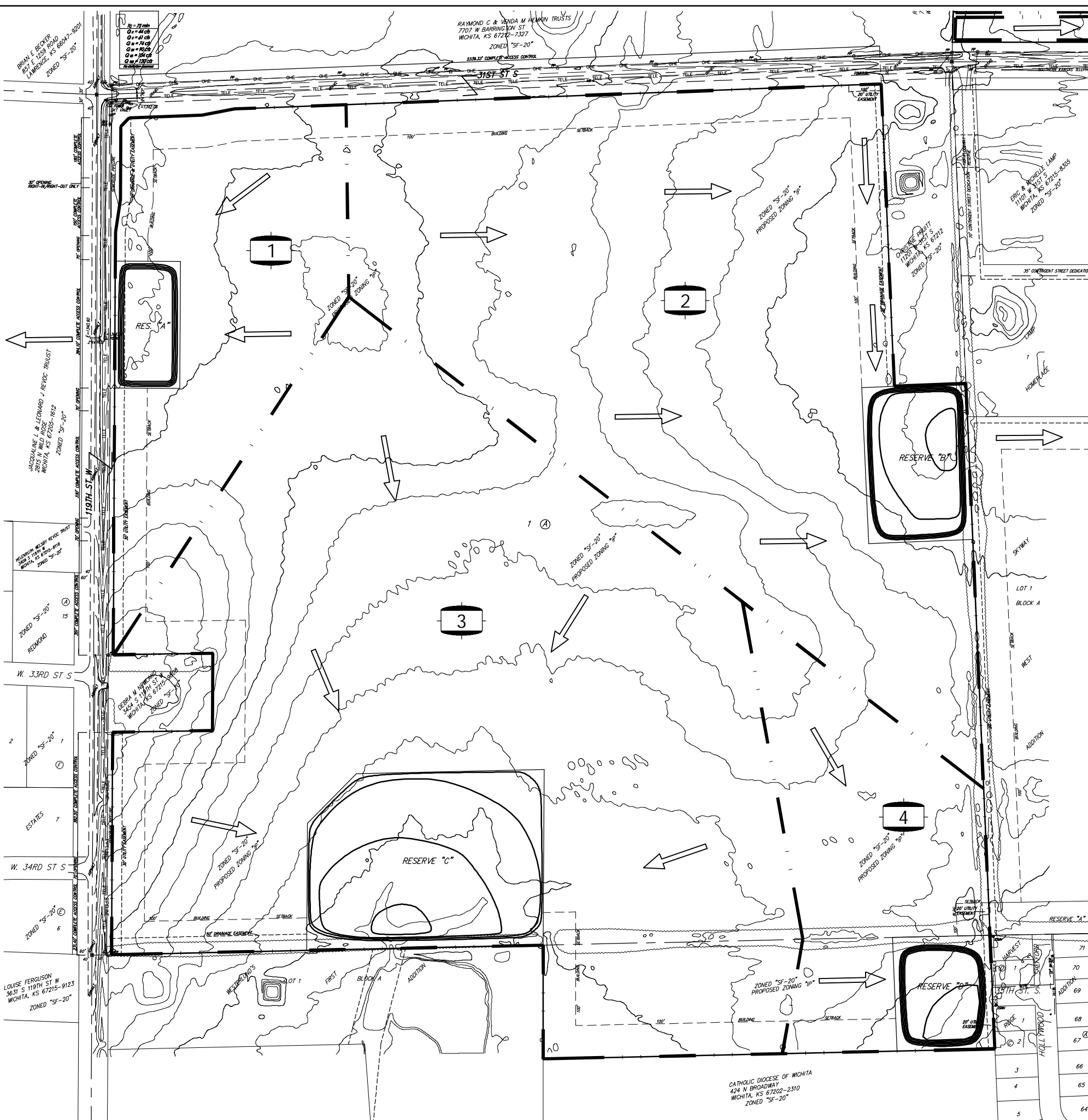
NOTE:
A drainage plan has been developed for this subdivision
and is on file with the City of Wichita, Kansas. Drainage
intent shall remain as depicted or as modified with the
approval of the City Engineer of the City of Wichita,
Kansas. No obstructions which impede the flow of this
drainage plan shall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

SKYWAY WEST 2ND ADDITION

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

24 OCTOBER 2011

SKYWAY WEST 2ND ADDITION WICHITA, SEDGWICK COUNTY, KANSAS



1	2
EXISTING Discharge Point 1 Area = 18 acres CN = 88 Tc = 19 min Q ₂ = 47 cfs Q ₅ = 66 cfs Q ₁₀ = 79 cfs Q ₂₅ = 96 cfs Q ₁₀₀ = 127 cfs	EXISTING Discharge Point 2 Area = 55 acres CN = 88 Tc = 46 min Q ₂ = 84 cfs Q ₅ = 117 cfs Q ₁₀ = 141 cfs Q ₂₅ = 171 cfs Q ₁₀₀ = 228 cfs

3	4
EXISTING Discharge Point 3 Area = 73 acres CN = 88 Tc = 50 min Q ₂ = 106 cfs Q ₅ = 149 cfs Q ₁₀ = 179 cfs Q ₂₅ = 217 cfs Q ₁₀₀ = 290 cfs	EXISTING Discharge Point 4 Area = 15 acres CN = 88 Tc = 50 min Q ₂ = 22 cfs Q ₅ = 31 cfs Q ₁₀ = 37 cfs Q ₂₅ = 45 cfs Q ₁₀₀ = 60 cfs

RESERVE A (Bottom = 1341.0)

STAGE	INFLOW	OUTFLOW	ELEVATION
2 yr	51 cfs	5.1 cfs	1342.8
5 yr	70 cfs	7.4 cfs	1343.3
10 yr	84 cfs	8.6 cfs	1343.8
25 yr	100 cfs	18 cfs	1344.2
100 yr	131 cfs	38 cfs	1344.8

PROPOSED POND

ELEVATION	AREA (sq ft)
1341	52000
1342	56700
1343	49200
1344	87000
1345	72000

RESERVE B (Bottom = 1334.0)

STAGE	INFLOW	OUTFLOW	ELEVATION
2 yr	104 cfs	24 cfs	1337.2
5 yr	141 cfs	54 cfs	1337.8
10 yr	167 cfs	75 cfs	1338.1
25 yr	201 cfs	103 cfs	1338.6
100 yr	263 cfs	153 cfs	1339.3

PROPOSED POND

ELEVATION	AREA (sq ft)
1334	15000
1335	86000
1336	117000
1337	128000
1338	128000
1339	133000
1340	138000

RESERVE C (Bottom = 1338.0)

STAGE	INFLOW	OUTFLOW	ELEVATION
2 yr	124 cfs	44 cfs	1339.9
5 yr	168 cfs	89 cfs	1339.9
10 yr	199 cfs	103 cfs	1340.1
25 yr	239 cfs	119 cfs	1340.3
100 yr	314 cfs	153 cfs	1340.8

PROPOSED POND

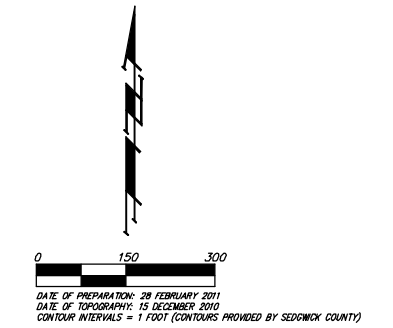
ELEVATION	AREA (sq ft)
1338	13700
1339	140000
1340	300000
1341	350000

RESERVE D (Bottom = 1333.0)

STAGE	INFLOW	OUTFLOW	ELEVATION
2 yr	39 cfs	4.9 cfs	1335.0
5 yr	49 cfs	8.7 cfs	1335.4
10 yr	58 cfs	10 cfs	1336.8
25 yr	69 cfs	11 cfs	1336.3
100 yr	91 cfs	14 cfs	1337.2

PROPOSED POND

ELEVATION	AREA (sq ft)
1333	23500
1334	41000
1335	45000
1336	69000
1337	73000
1338	77000



DATE OF PREPARATION: 28 FEBRUARY 2011
DATE OF TOPOGRAPHY: 15 DECEMBER 2010
CONTOUR INTERVALS = 1 FOOT (CONTOURS PROVIDED BY SEDGWICK COUNTY)

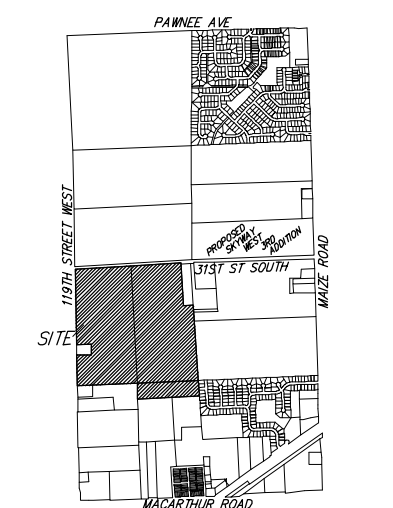
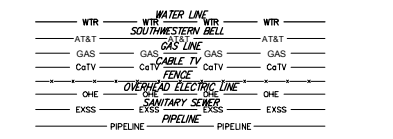
OWNER:
JOHN E. DUGAN FAMILY PARTNERSHIP, L.P.
ATTN: JOHN DUGAN
2416 MORNING DEW
WICHITA, KS 67205
316-221-2416

LEGAL DESCRIPTION:
THE EAST HALF OF THE NORTHWEST QUARTER OF SECTION 7, TOWNSHIP 28 SOUTH, RANGE 1 WEST OF THE SIXTH PRINCIPAL MERIDIAN, SEDGWICK COUNTY, KANSAS, EXCEPT THE EAST 220 FEET OF THE NORTH 990 FEET THEREOF, TOGETHER WITH THE WEST HALF OF THE NORTHWEST QUARTER (NW/2 NW/4) OF SECTION 7, TOWNSHIP 28 SOUTH, RANGE 1 WEST, SEDGWICK COUNTY, KANSAS, EXCEPT A TRACT BEGINNING 683.96 FEET NORTH OF THE SOUTHWEST CORNER OF SAID NORTHWEST QUARTER, THENCE NORTH 238 FEET, THENCE EAST 368.15 FEET, THENCE SOUTH 238 FEET, THENCE WEST 366.15 FEET TO BEGINNING.

BENCHMARK:
MAIZE ROAD & 31ST SOUTH-CITY OF WICHITA BENCHMARK DISC.
200' WEST OF INTERSECTION, SOUTHEAST CORNER OF HUBBARD OF R.C.B.C.
ELEV. = 1331.82 NGVD88

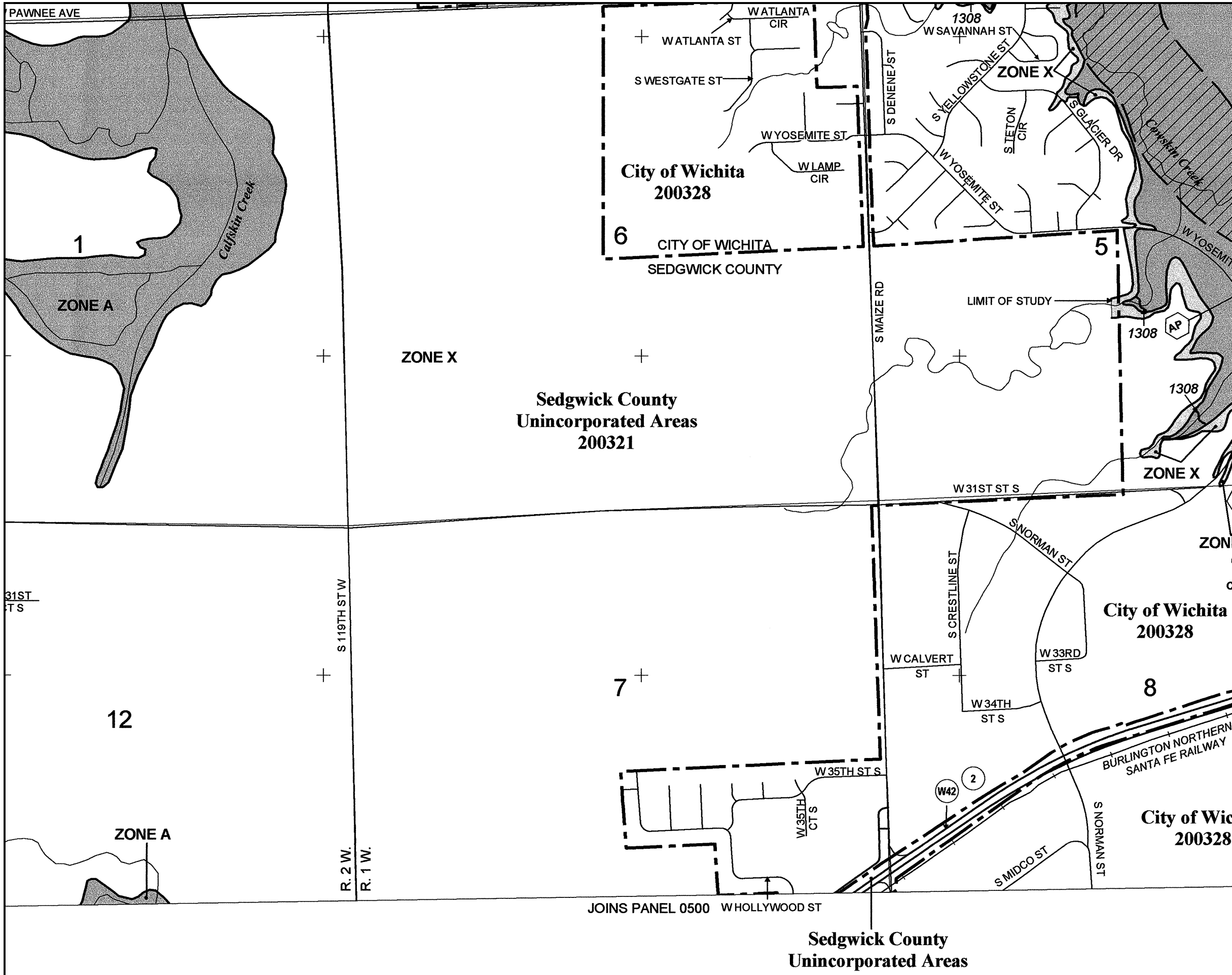
RESERVES "A", "B", "C", AND "D" ARE RESERVED FOR OPEN SPACE, LANDSCAPING, BERMS, LAKES, DRAINAGE PURPOSES, AND UTILITIES AS CONFINED TO EASEMENTS.

- FH = Fire Hydrant
- OP = Out Pole
- OP- = Out Anchor
- MB = Mail Box
- PM = Pipeline Marker
- PP = Power Pole
- Sign = Sign
- SSM = Sanitary Sewer Manhole
- ATT Ped = ATT Pedestal
- WM = Water Meter
- WV = Water Valve



VICINITY MAP
SEC. 6, T28S, R1W
SEC. 7, T28S, R1W

DRAINAGE PLAN SKYWAY WEST 2ND ADDITION



MAP SCALE 1" = 1000'

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 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

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

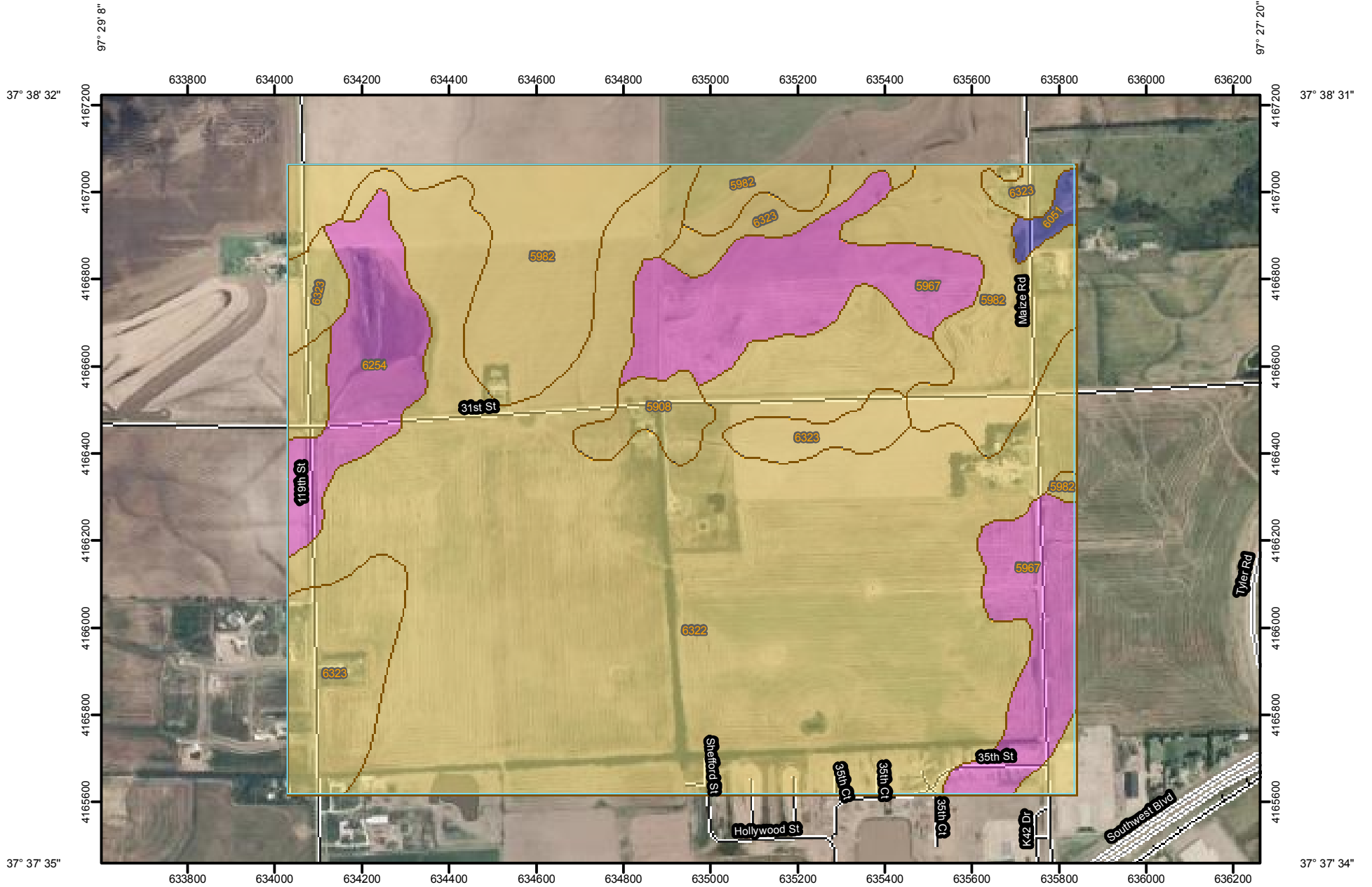
SUPPORTING CALCULATIONS

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)



97° 29' 9"




Map Scale: 1:12,600 if printed on A size (8.5" x 11") sheet.



97° 27' 21"

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

 Streams and Canals


Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

MAP INFORMATION

Map Scale: 1:12,600 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 7, Nov 30, 2010

Date(s) aerial images were photographed: 6/30/2006

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	9.9	1.5%
5967	Tabler silty clay loam, 0 to 1 percent slopes	D	70.5	10.9%
5982	Nalim loam, 1 to 3 percent slopes	C	95.7	14.8%
6051	Elandco silt loam, frequently flooded	B	3.4	0.5%
6254	Waurika silt loam, 0 to 1 percent slopes	D	30.6	4.7%
6322	Blanket silt loam, 0 to 1 percent slopes	C	378.2	58.7%
6323	Blanket silt loam, 1 to 3 percent slopes	C	56.3	8.7%
Totals for Area of Interest			644.6	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 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: Higher

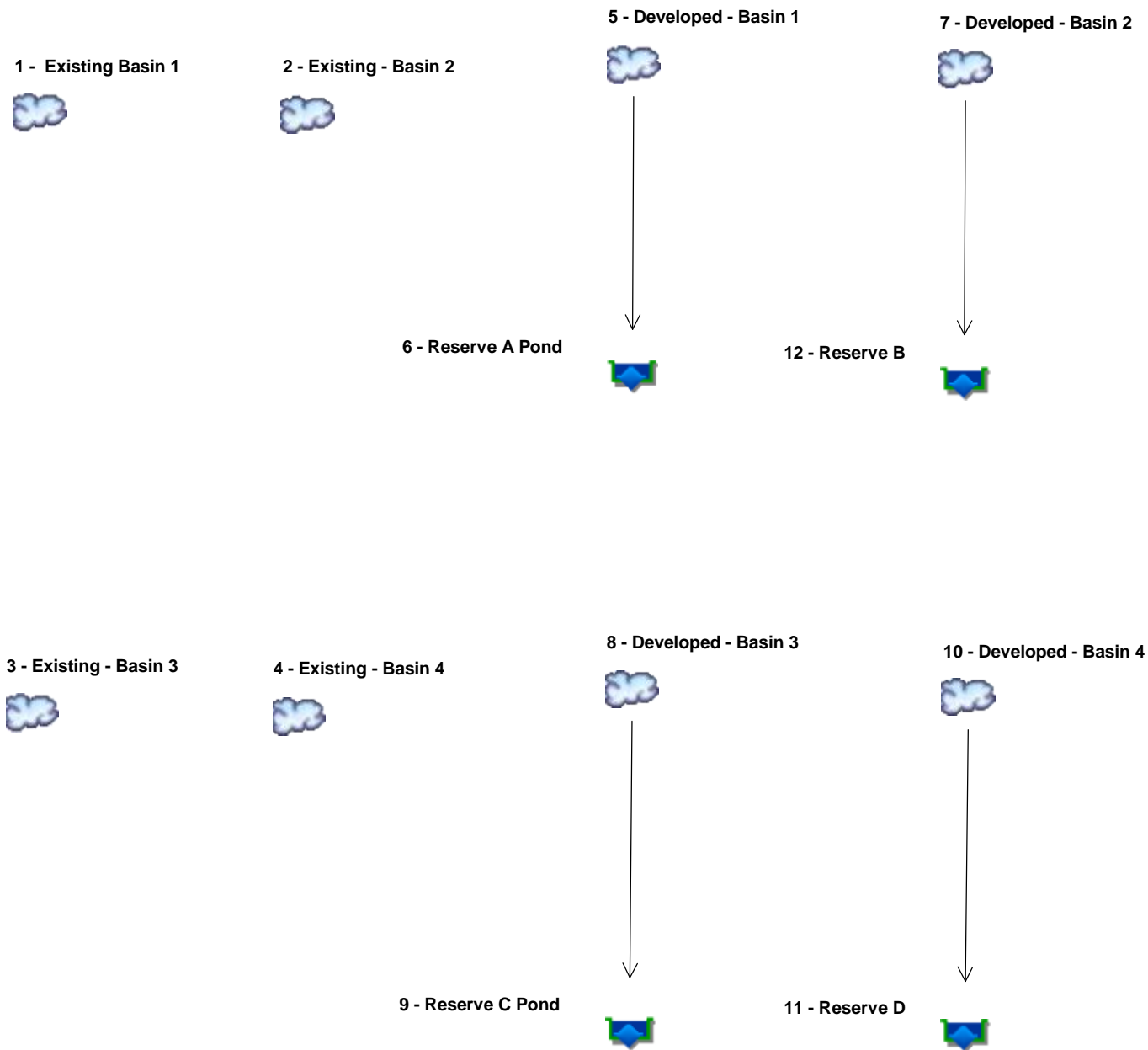
The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

HydraFlow Hydrographs

Site Flow & Pond Routing

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8



Legend

Hyd. Origin	Description
1	SCS Runoff Existing Basin 1
2	SCS Runoff Existing - Basin 2
3	SCS Runoff Existing - Basin 3
4	SCS Runoff Existing - Basin 4
5	SCS Runoff Developed - Basin 1
6	Reservoir Reserve A Pond
7	SCS Runoff Developed - Basin 2
8	SCS Runoff Developed - Basin 3
9	Reservoir Reserve C Pond
10	SCS Runoff Developed - Basin 4
11	Reservoir Reserve D
12	Reservoir Reserve B
13	SCS Runoff Offsite North

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

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	-----	34.29	47.17	7.403	65.78	78.83	95.57	110.40	127.01	Existing Basin 1
2	SCS Runoff	-----	60.59	83.74	12.69	117.32	140.92	171.24	198.12	228.25	Existing - Basin 2
3	SCS Runoff	-----	76.82	106.13	16.04	148.76	178.72	217.22	251.35	289.61	Existing - Basin 3
4	SCS Runoff	-----	15.78	21.81	3.295	30.57	36.72	44.63	51.65	59.51	Existing - Basin 4
5	SCS Runoff	-----	39.07	52.12	10.35	70.72	83.69	100.27	114.93	131.35	Developed - Basin 1
6	Reservoir	5	2.252	5.097	0.207	7.406	8.552	18.24	28.73	37.84	Reserve A Pond
7	SCS Runoff	-----	77.48	103.70	20.26	141.18	167.31	200.76	230.35	263.49	Developed - Basin 2
8	SCS Runoff	-----	92.23	123.51	24.07	168.23	199.42	239.34	274.65	314.22	Developed - Basin 3
9	Reservoir	8	51.00	65.93	14.28	88.99	102.52	119.13	134.62	152.71	Reserve C Pond
10	SCS Runoff	-----	26.80	35.86	7.021	48.80	57.82	69.36	79.57	91.01	Developed - Basin 4
11	Reservoir	10	1.567	4.903	0.162	8.687	10.17	11.64	12.76	13.88	Reserve D
12	Reservoir	7	6.774	23.92	0.445	53.80	75.34	102.53	126.59	152.61	Reserve B
13	SCS Runoff	-----	32.76	45.32	6.759	63.56	76.43	92.98	107.66	124.12	Offsite North

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

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	34.29	2	724	107,259	-----	-----	-----	Existing Basin 1
2	SCS Runoff	60.59	2	740	324,809	-----	-----	-----	Existing - Basin 2
3	SCS Runoff	76.82	2	744	434,994	-----	-----	-----	Existing - Basin 3
4	SCS Runoff	15.78	2	744	89,382	-----	-----	-----	Existing - Basin 4
5	SCS Runoff	39.07	2	724	123,202	-----	-----	-----	Developed - Basin 1
6	Reservoir	2.252	2	818	113,323	5	1342.43	79,911	Reserve A Pond
7	SCS Runoff	77.48	2	736	376,452	-----	-----	-----	Developed - Basin 2
8	SCS Runoff	92.23	2	740	495,193	-----	-----	-----	Developed - Basin 3
9	Reservoir	51.00	2	766	495,187	8	1339.33	136,416	Reserve C Pond
10	SCS Runoff	26.80	2	734	121,802	-----	-----	-----	Developed - Basin 4
11	Reservoir	1.567	2	886	101,465	10	1334.69	83,995	Reserve D
12	Reservoir	6.774	2	836	300,829	7	1336.82	245,697	Reserve B
13	SCS Runoff	32.76	2	758	245,699	-----	-----	-----	Offsite North
Total Site.gpw					Return Period: 1 Year			Tuesday, Nov 1, 2011	

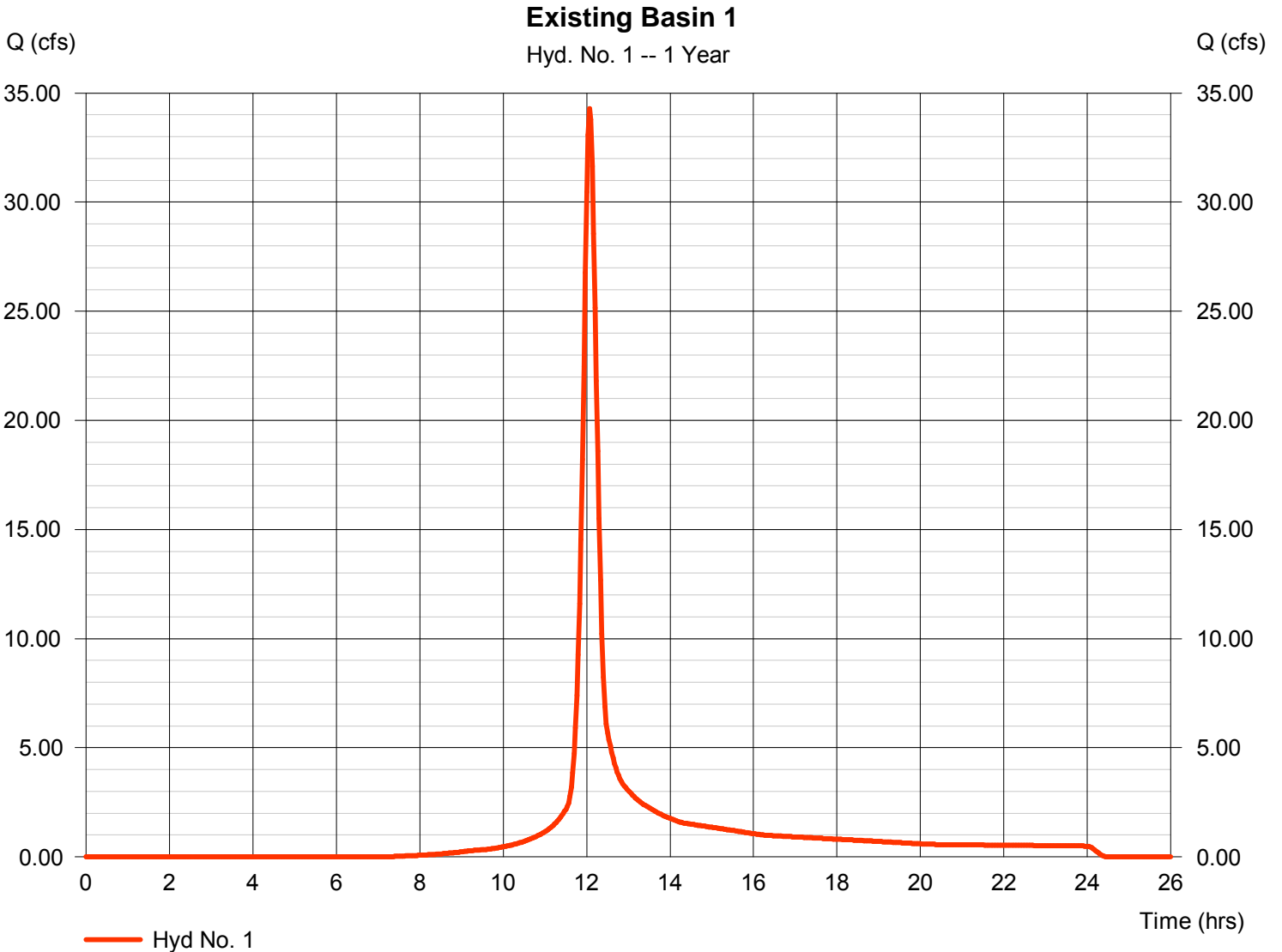
Hydrograph Report

Hyd. No. 1

Existing Basin 1

Hydrograph type = SCS Runoff
Storm frequency = 1 yrs
Time interval = 2 min
Drainage area = 18.000 ac
Basin Slope = 0.7 %
Tc method = LAG
Total precip. = 2.80 in
Storm duration = 24 hrs

Peak discharge = 34.29 cfs
Time to peak = 12.07 hrs
Hyd. volume = 107,259 cuft
Curve number = 88
Hydraulic length = 600 ft
Time of conc. (Tc) = 19.20 min
Distribution = Type II
Shape factor = 484



Hydrograph Report

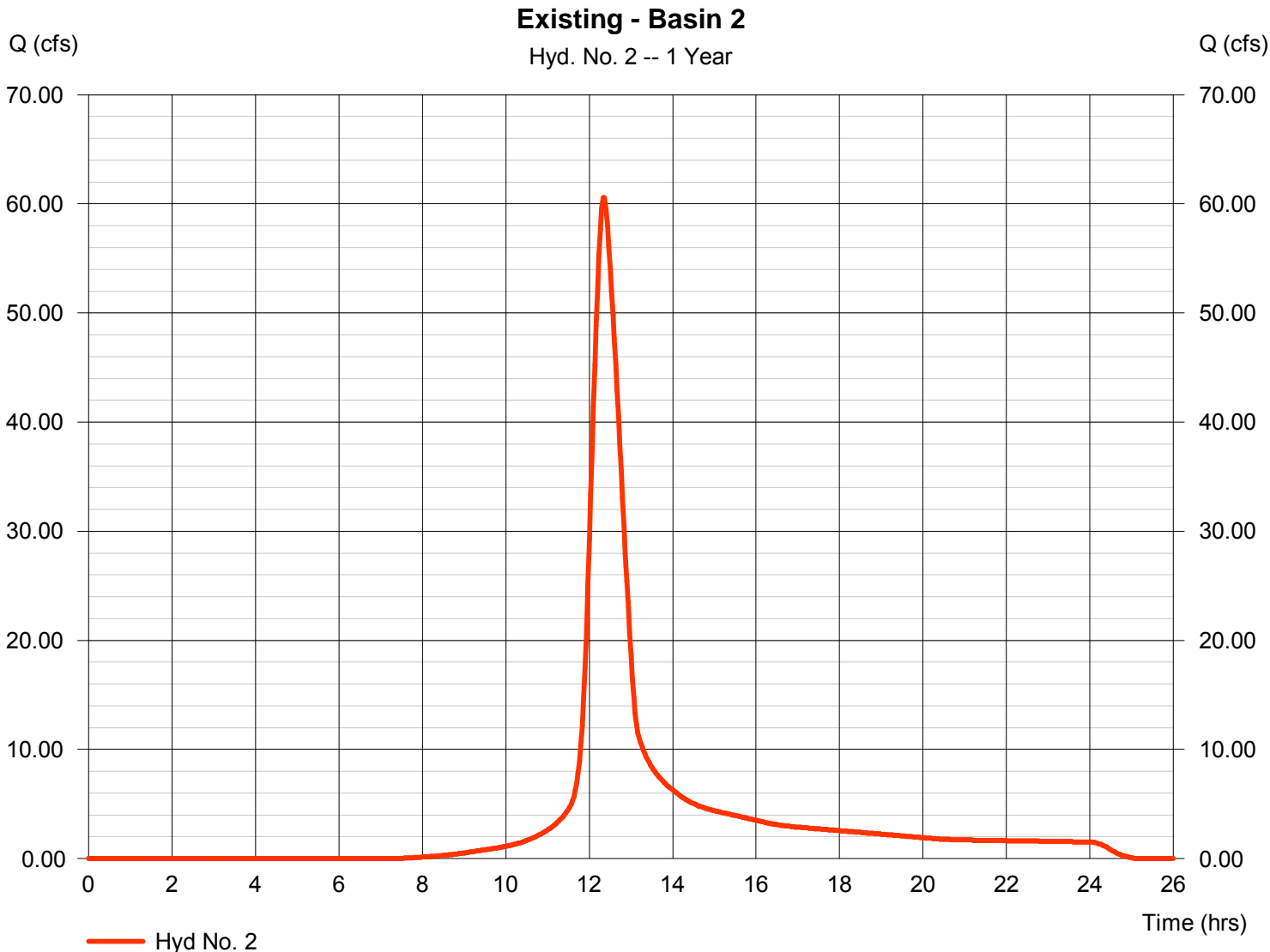
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 2

Existing - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 60.59 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.33 hrs
Time interval	= 2 min	Hyd. volume	= 324,809 cuft
Drainage area	= 55.000 ac	Curve number	= 88
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 45.40 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

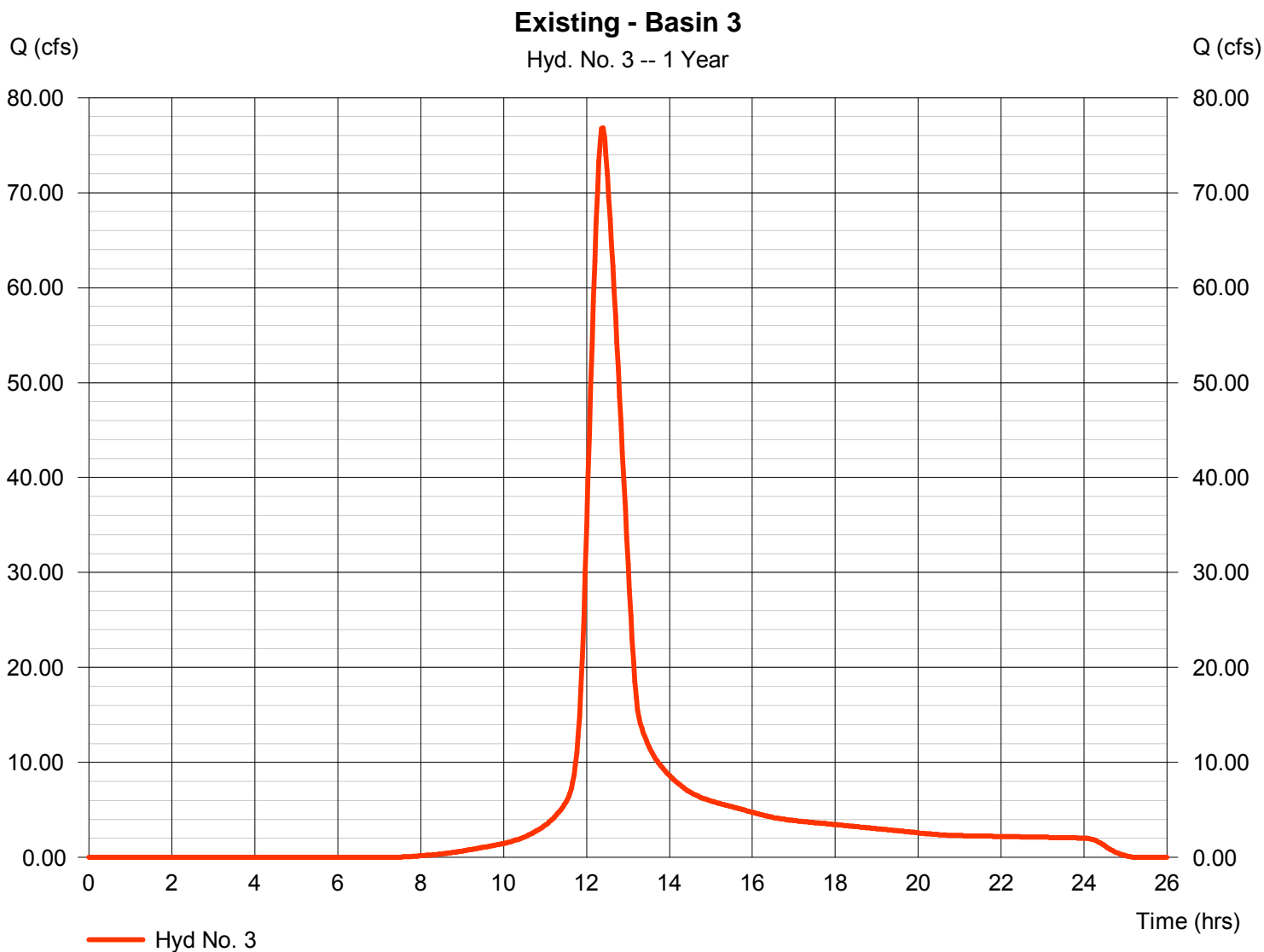
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 3

Existing - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 76.82 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.40 hrs
Time interval	= 2 min	Hyd. volume	= 434,994 cuft
Drainage area	= 73.000 ac	Curve number	= 88
Basin Slope	= 0.6 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 49.90 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

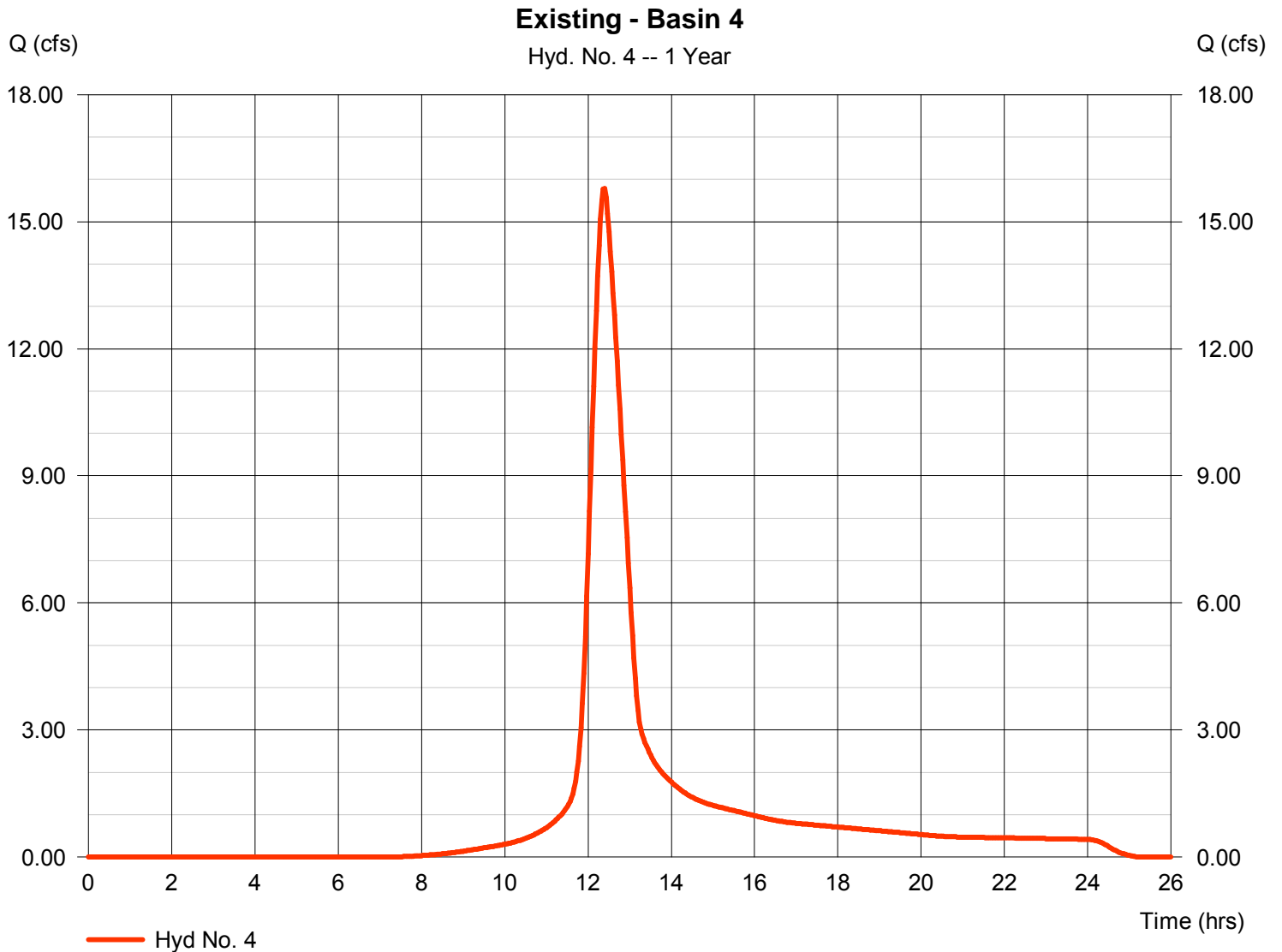


Hydrograph Report

Hyd. No. 4

Existing - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 15.78 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.40 hrs
Time interval	= 2 min	Hyd. volume	= 89,382 cuft
Drainage area	= 15.000 ac	Curve number	= 88
Basin Slope	= 0.4 %	Hydraulic length	= 1400 ft
Tc method	= LAG	Time of conc. (Tc)	= 50.00 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

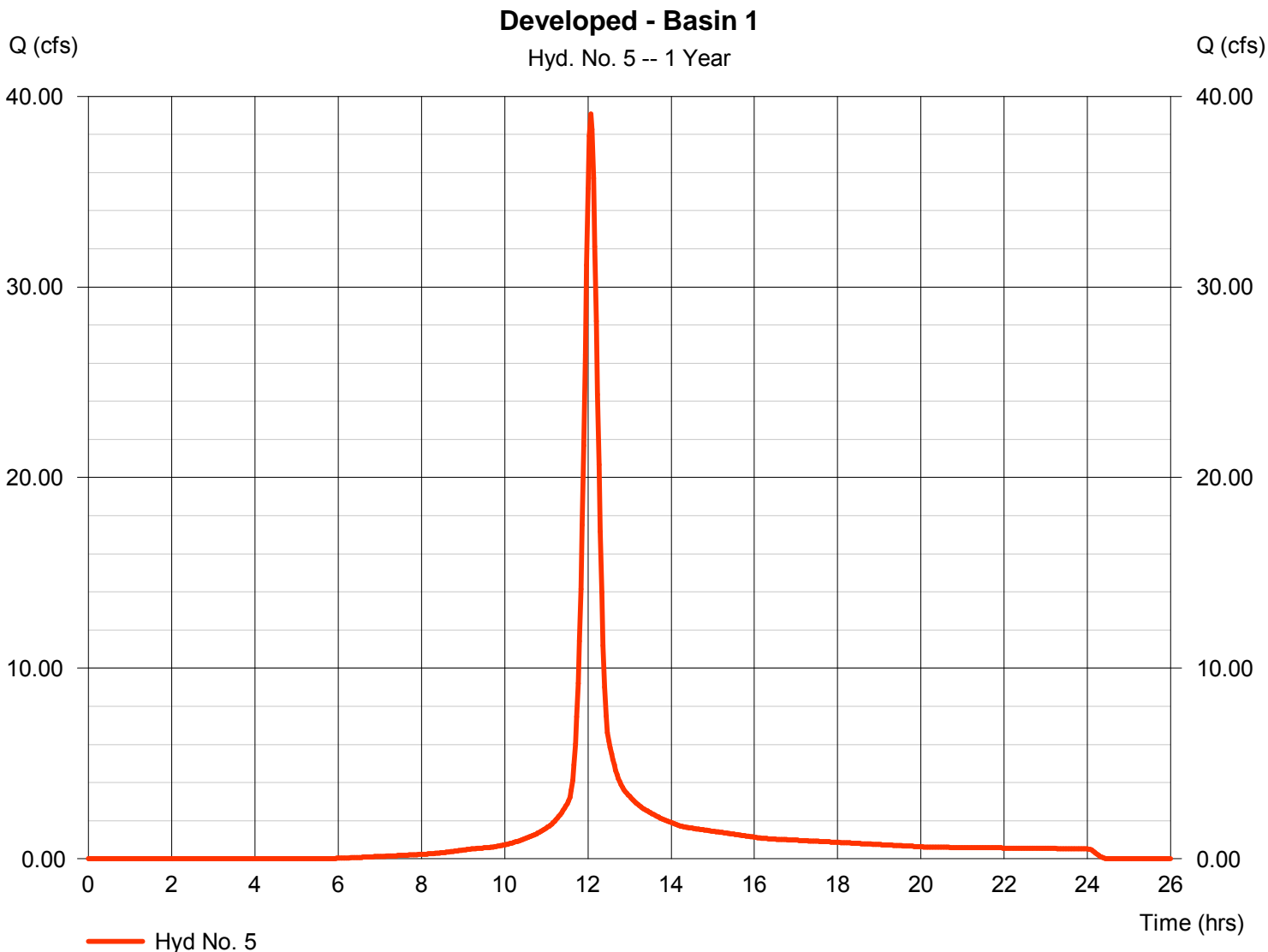
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Tuesday, Nov 1, 2011

Hyd. No. 5

Developed - Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 39.07 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 123,202 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 500 ft
Tc method	= LAG	Time of conc. (Tc)	= 17.40 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

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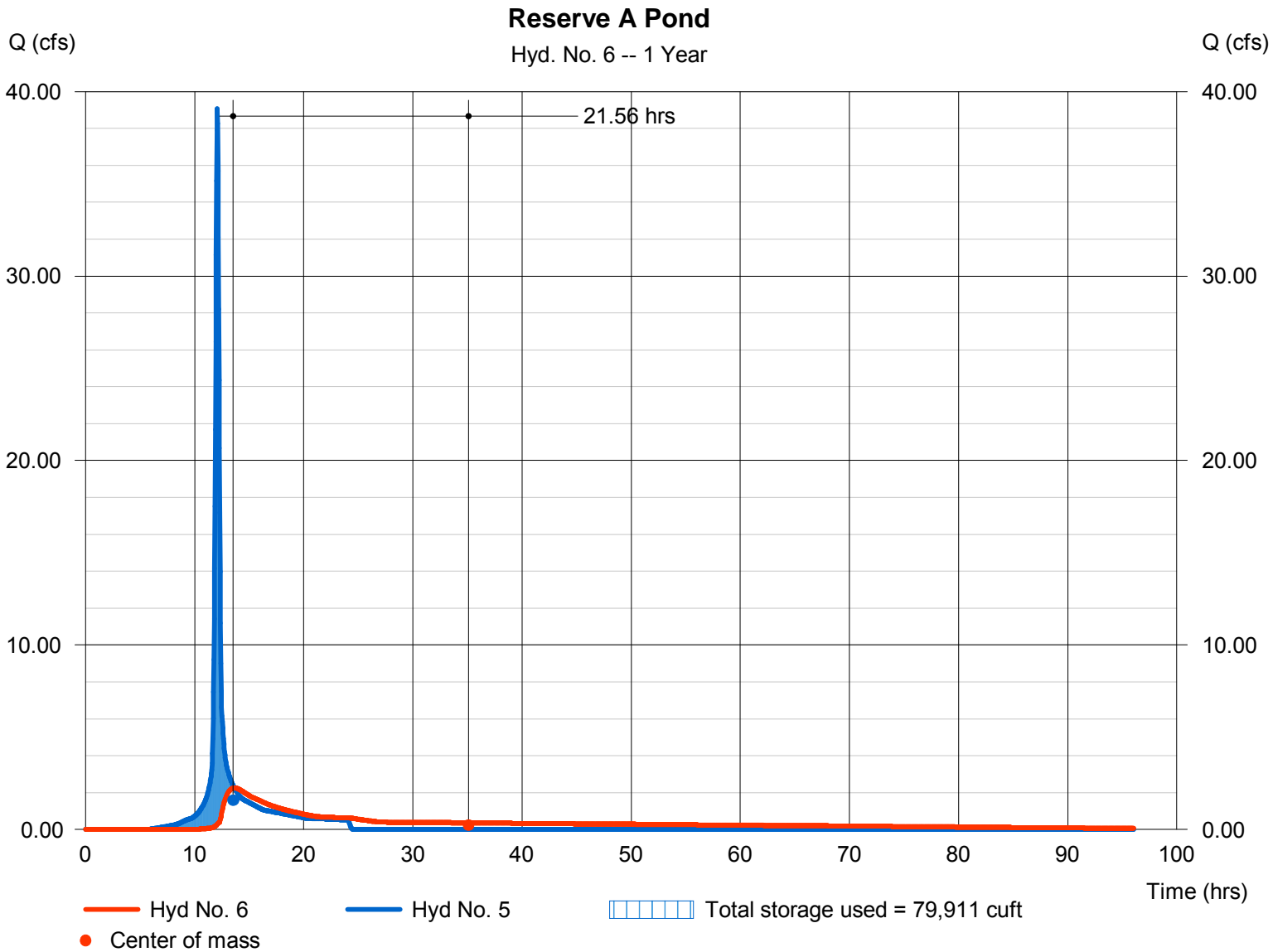
Tuesday, Nov 1, 2011

Hyd. No. 6

Reserve A Pond

Hydrograph type	= Reservoir	Peak discharge	= 2.252 cfs
Storm frequency	= 1 yrs	Time to peak	= 13.63 hrs
Time interval	= 2 min	Hyd. volume	= 113,323 cuft
Inflow hyd. No.	= 5 - Developed - Basin 1	Max. Elevation	= 1342.43 ft
Reservoir name	= Reserve A	Max. Storage	= 79,911 cuft

Storage Indication method used.



Pond No. 1 - Reserve A

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 1341.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1341.00	52,000	0	0
1.00	1342.00	56,700	54,328	54,328
2.00	1343.00	62,000	59,324	113,652
3.00	1344.00	67,000	64,477	178,129
4.00	1345.00	72,000	69,478	247,607

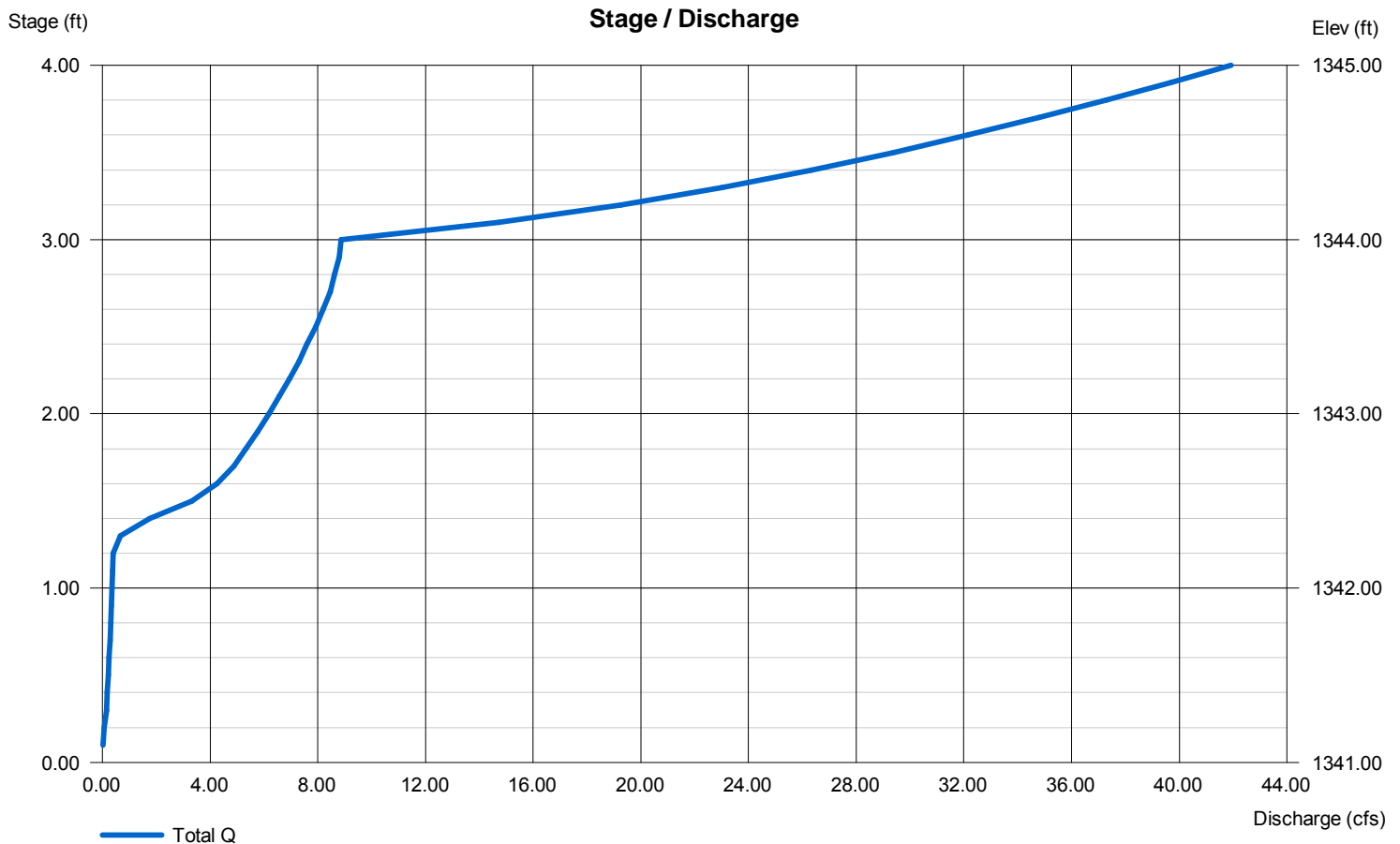
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 36.00	4.00	0.00	0.00
Span (in)	= 36.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 1341.00	1341.00	0.00	0.00
Length (ft)	= 20.00	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	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 9.50	0.00	0.00	0.00
Crest El. (ft)	= 1342.25	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= Yes	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

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



Hydrograph Report

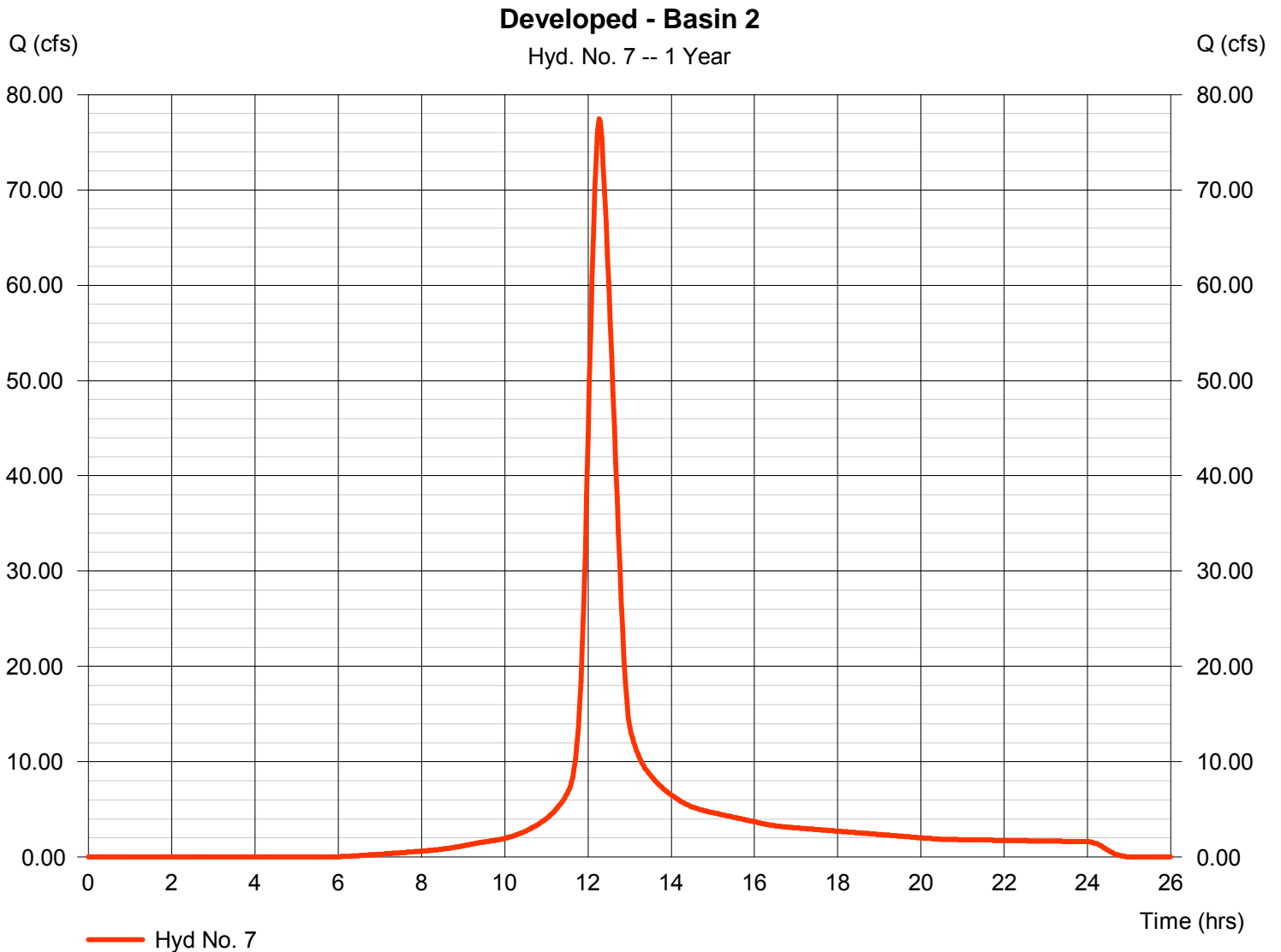
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Tuesday, Nov 1, 2011

Hyd. No. 7

Developed - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 77.48 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.27 hrs
Time interval	= 2 min	Hyd. volume	= 376,452 cuft
Drainage area	= 55.000 ac	Curve number	= 91
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 40.30 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

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Tuesday, Nov 1, 2011

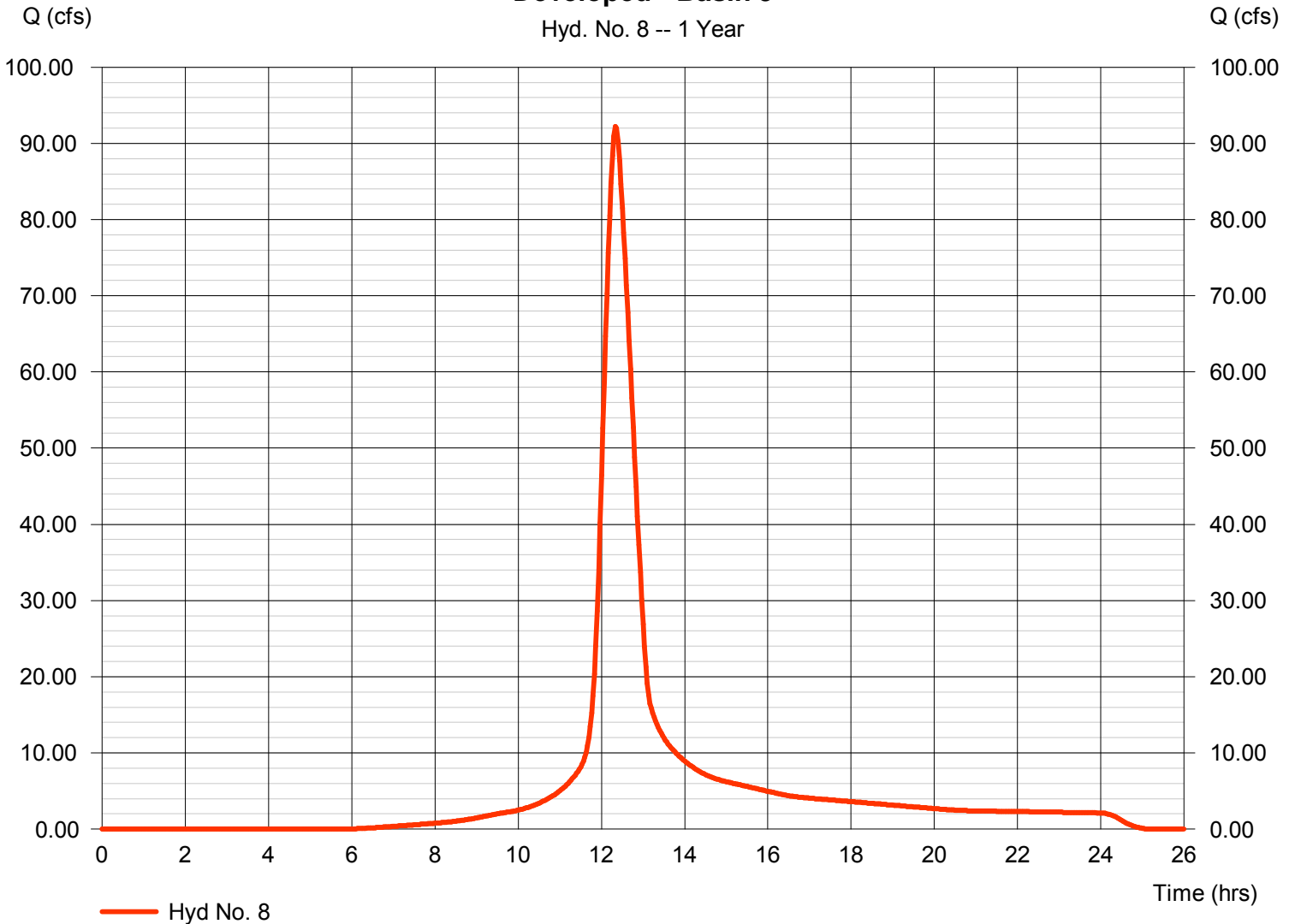
Hyd. No. 8

Developed - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 92.23 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.33 hrs
Time interval	= 2 min	Hyd. volume	= 495,193 cuft
Drainage area	= 73.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 44.10 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Developed - Basin 3

Hyd. No. 8 -- 1 Year



Hydrograph Report

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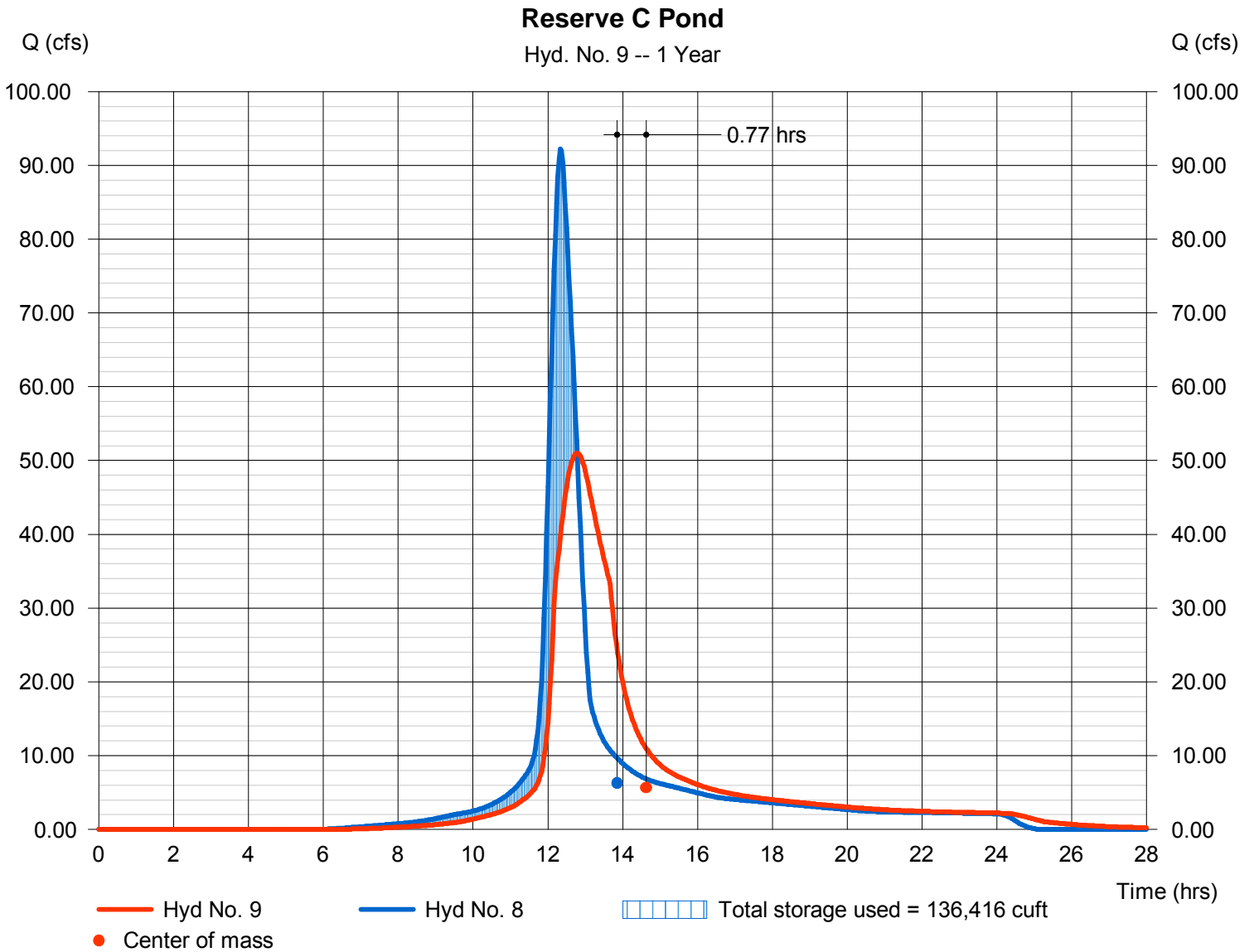
Tuesday, Nov 1, 2011

Hyd. No. 9

Reserve C Pond

Hydrograph type	= Reservoir	Peak discharge	= 51.00 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.77 hrs
Time interval	= 2 min	Hyd. volume	= 495,187 cuft
Inflow hyd. No.	= 8 - Developed - Basin 3	Max. Elevation	= 1339.33 ft
Reservoir name	= Reserve C Pond	Max. Storage	= 136,416 cuft

Storage Indication method used.



Pond No. 2 - Reserve C Pond

Pond Data

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

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1338.00	13,700	0	0
1.00	1339.00	140,000	65,825	65,825
2.00	1340.00	300,000	214,958	280,783
3.00	1341.00	350,000	324,647	605,430

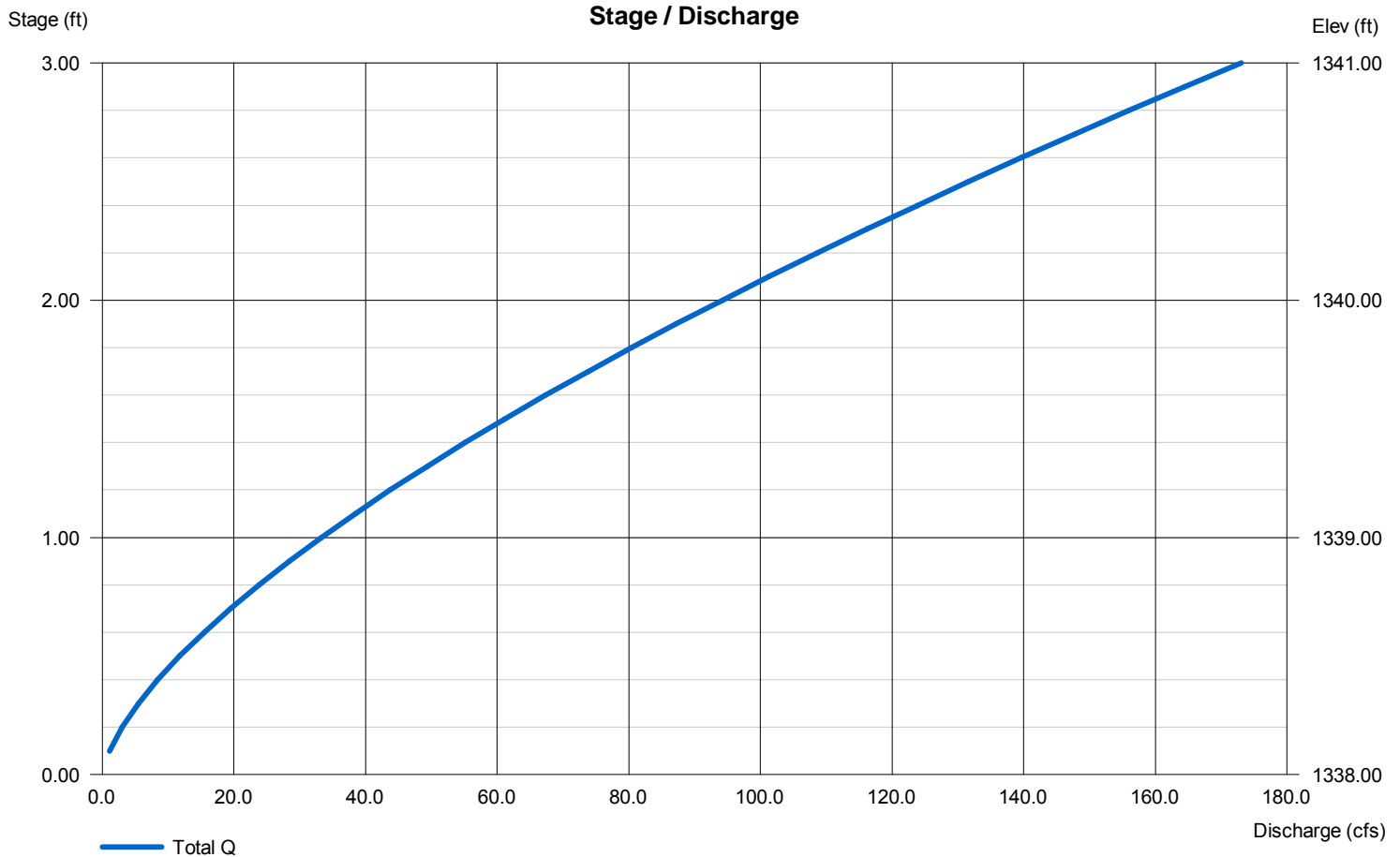
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 1338.00	0.00	0.00	0.00
Length (ft)	= 30.00	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)	= 10.00	0.00	0.00	0.00
Crest El. (ft)	= 1338.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	Rect	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

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



Hydrograph Report

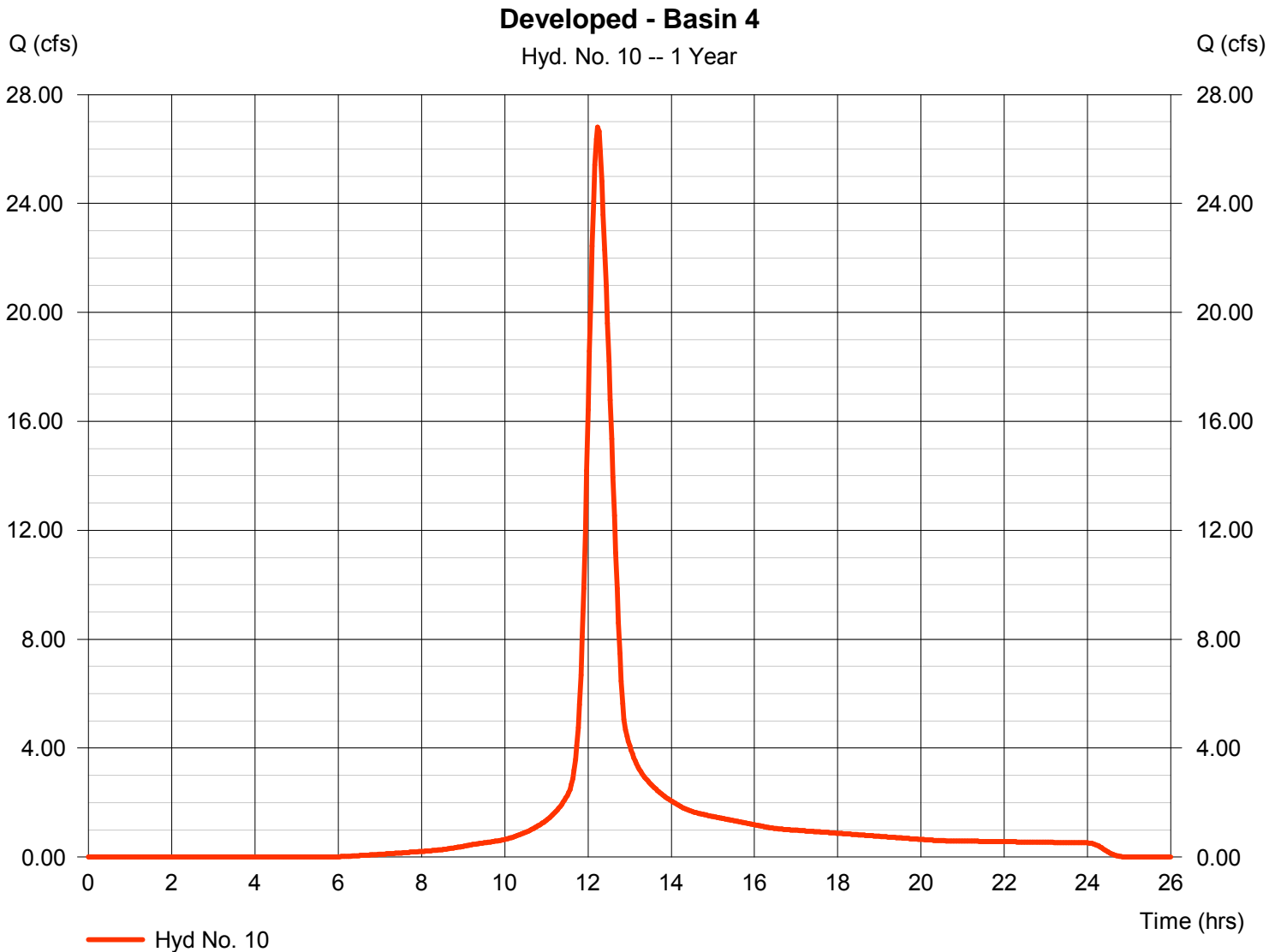
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Tuesday, Nov 1, 2011

Hyd. No. 10

Developed - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 26.80 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.23 hrs
Time interval	= 2 min	Hyd. volume	= 121,802 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1200 ft
Tc method	= LAG	Time of conc. (Tc)	= 35.00 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

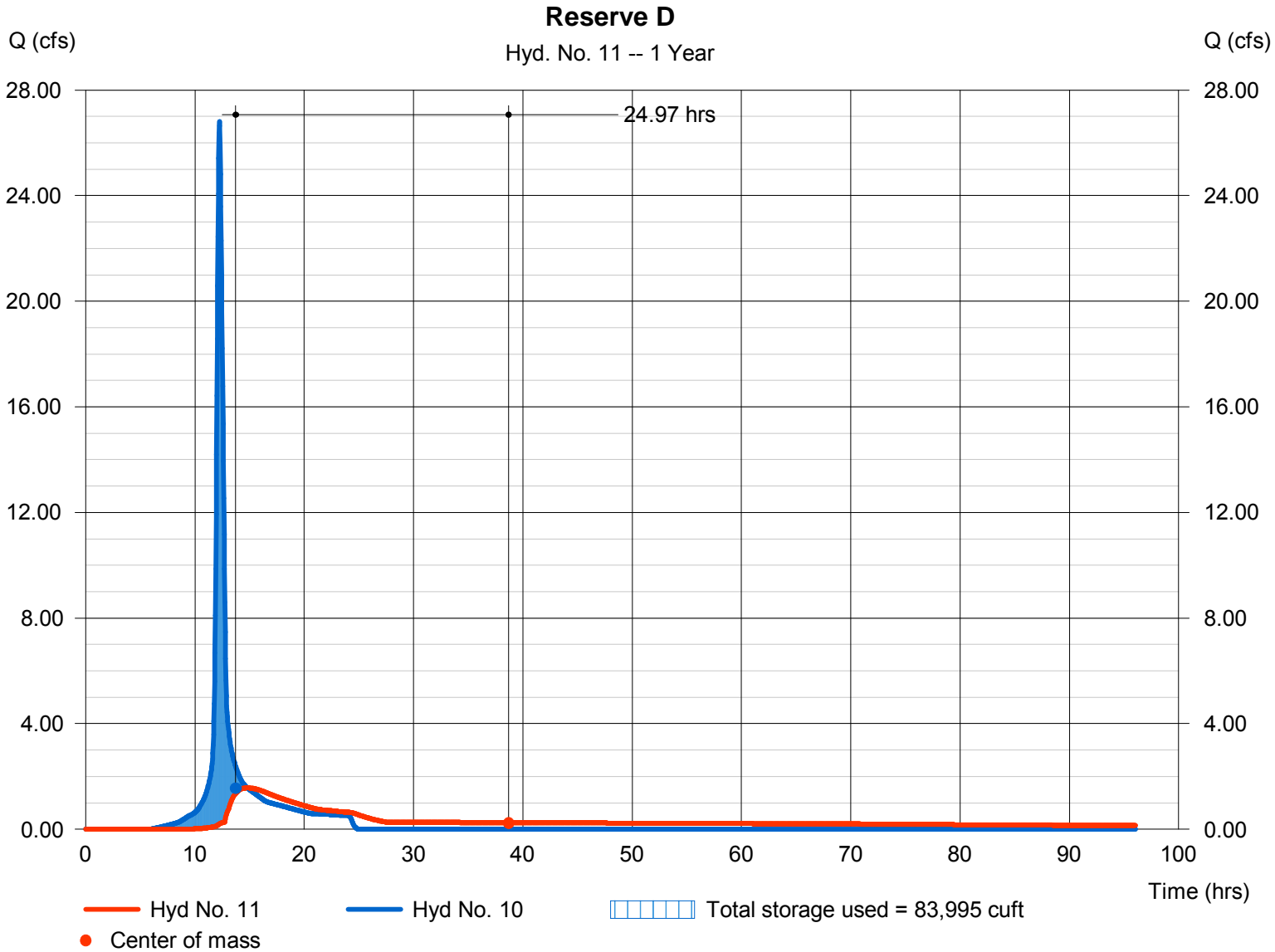
Tuesday, Nov 1, 2011

Hyd. No. 11

Reserve D

Hydrograph type	= Reservoir	Peak discharge	= 1.567 cfs
Storm frequency	= 1 yrs	Time to peak	= 14.77 hrs
Time interval	= 2 min	Hyd. volume	= 101,465 cuft
Inflow hyd. No.	= 10 - Developed - Basin 4	Max. Elevation	= 1334.69 ft
Reservoir name	= Reserve D	Max. Storage	= 83,995 cuft

Storage Indication method used.



Pond No. 3 - Reserve D

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 1333.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1333.00	23,000	0	0
1.00	1334.00	61,000	40,482	40,482
2.00	1335.00	65,000	62,983	103,465
3.00	1336.00	69,000	66,983	170,448
4.00	1337.00	73,000	70,984	241,432
5.00	1338.00	77,000	74,984	316,415

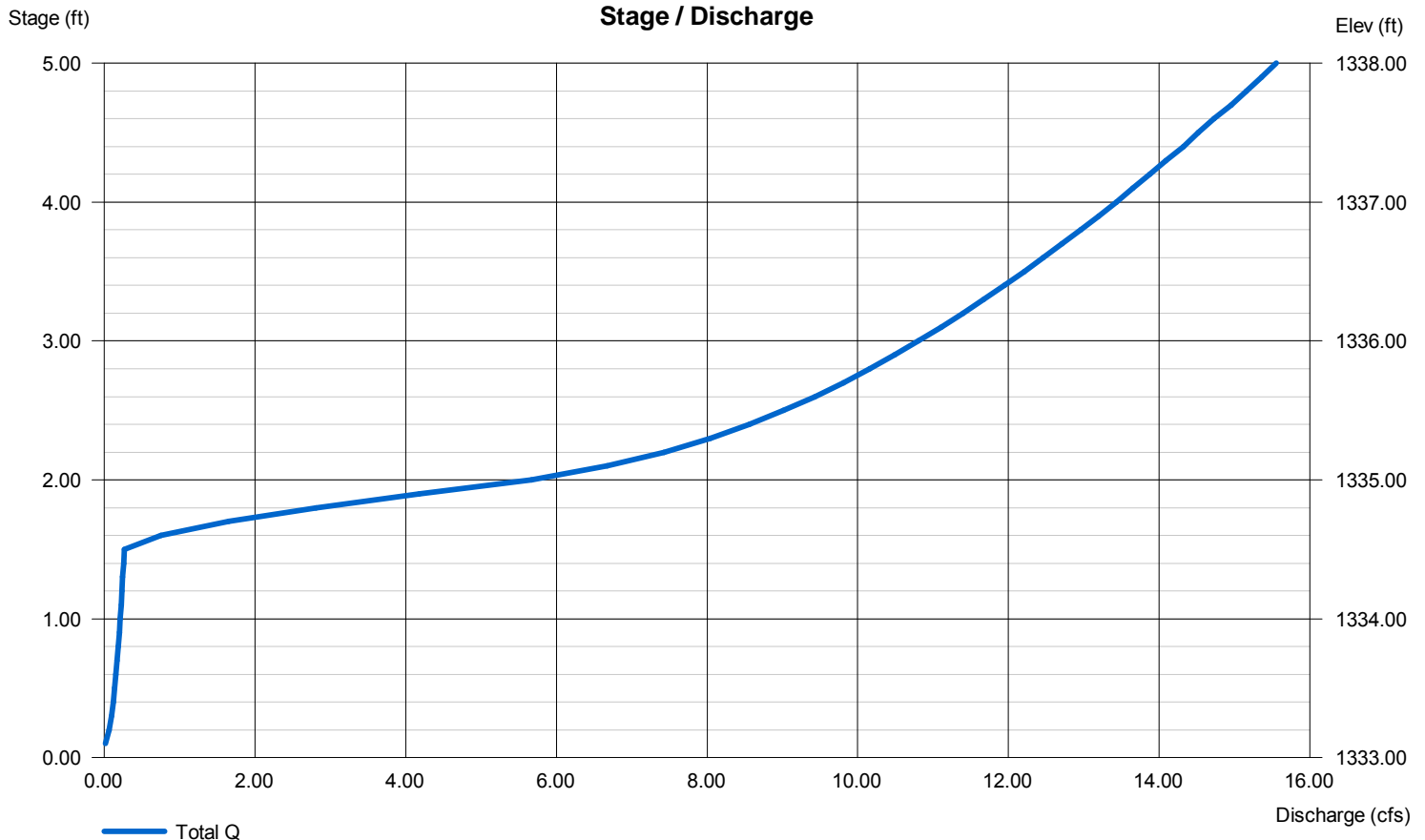
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	3.00	0.00	0.00
Span (in)	= 18.00	3.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 1333.00	1333.00	0.00	0.00
Length (ft)	= 100.00	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	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.70	0.00	0.00	0.00
Crest El. (ft)	= 1334.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

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



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

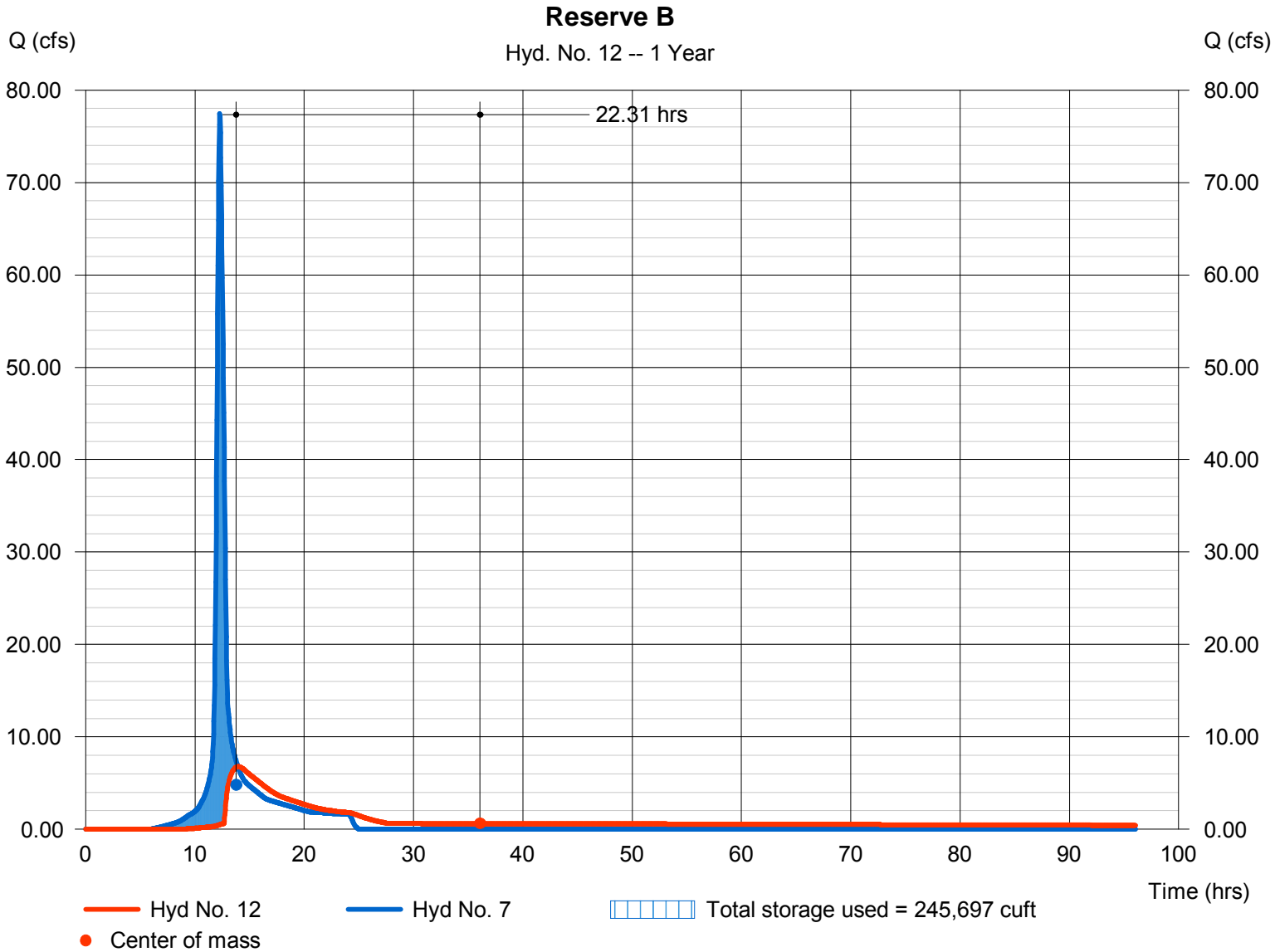
Tuesday, Nov 1, 2011

Hyd. No. 12

Reserve B

Hydrograph type	= Reservoir	Peak discharge	= 6.774 cfs
Storm frequency	= 1 yrs	Time to peak	= 13.93 hrs
Time interval	= 2 min	Hyd. volume	= 300,829 cuft
Inflow hyd. No.	= 7 - Developed - Basin 2	Max. Elevation	= 1336.82 ft
Reservoir name	= Reserve B	Max. Storage	= 245,697 cuft

Storage Indication method used.



Pond No. 4 - Reserve B

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 1334.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1334.00	15,000	0	0
1.00	1335.00	86,000	45,634	45,634
2.00	1336.00	117,000	101,093	146,727
3.00	1337.00	123,000	119,976	266,703
4.00	1338.00	128,000	125,479	392,182
5.00	1339.00	133,000	130,479	522,661
6.00	1340.00	138,000	135,479	658,140

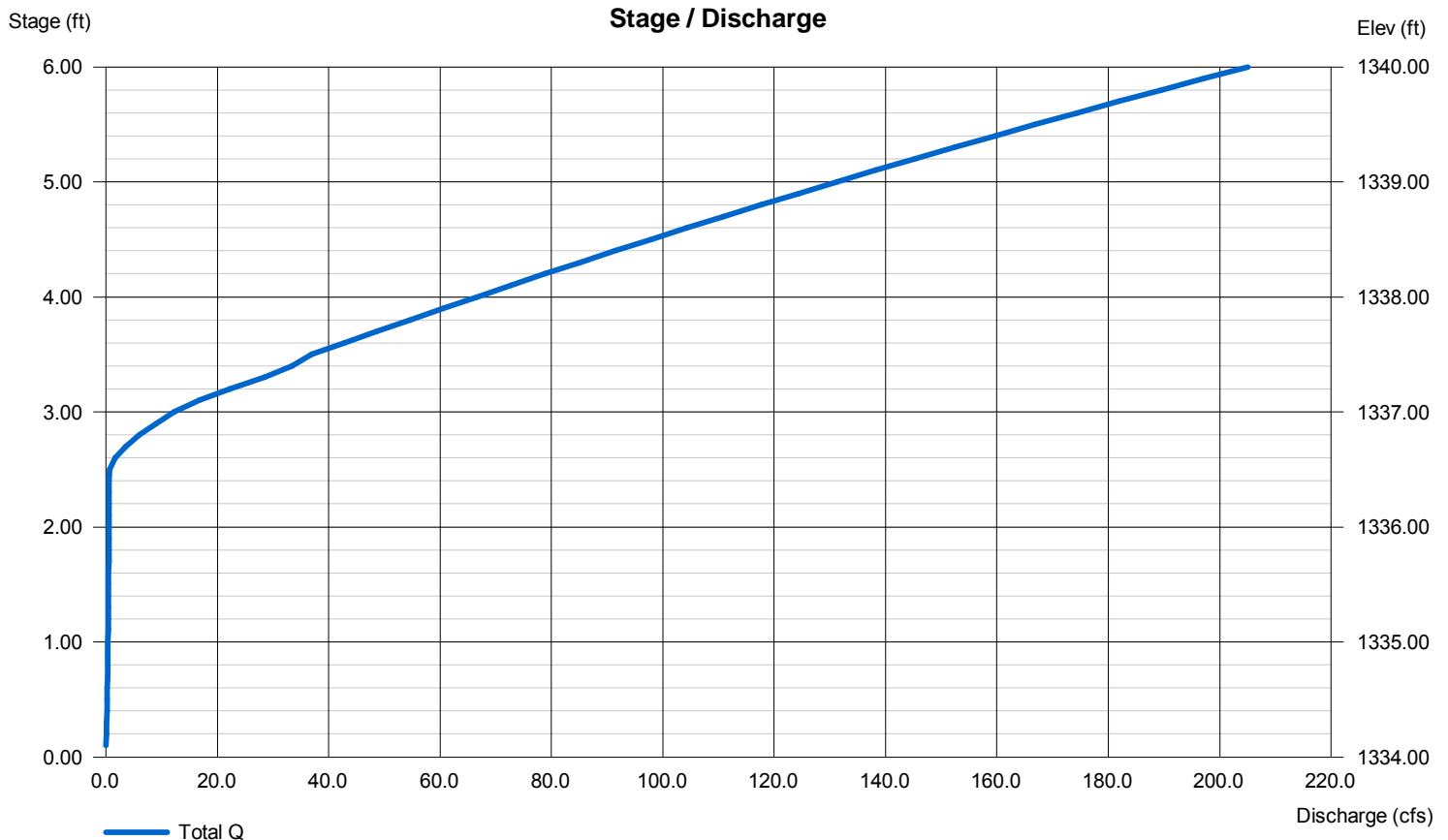
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 36.00	4.00	0.00	0.00
Span (in)	= 36.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 1334.00	1334.00	0.00	0.00
Length (ft)	= 100.00	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	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	10.00	0.00	0.00
Crest El. (ft)	= 1336.50	1337.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
Multi-Stage	= Yes	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

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



Hydrograph Report

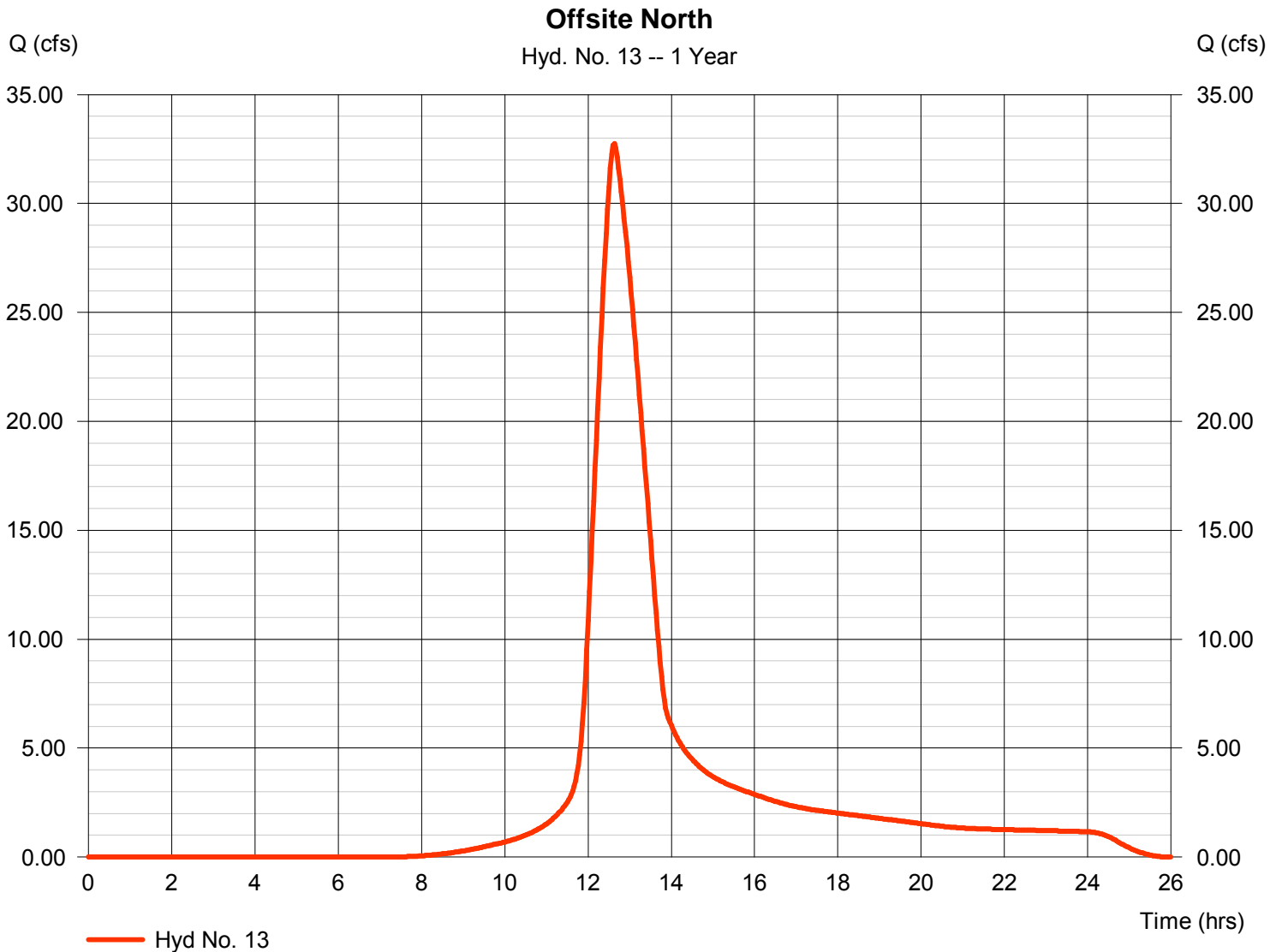
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 13

Offsite North

Hydrograph type	= SCS Runoff	Peak discharge	= 32.76 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.63 hrs
Time interval	= 2 min	Hyd. volume	= 245,699 cuft
Drainage area	= 41.000 ac	Curve number	= 88
Basin Slope	= 0.3 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 74.50 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

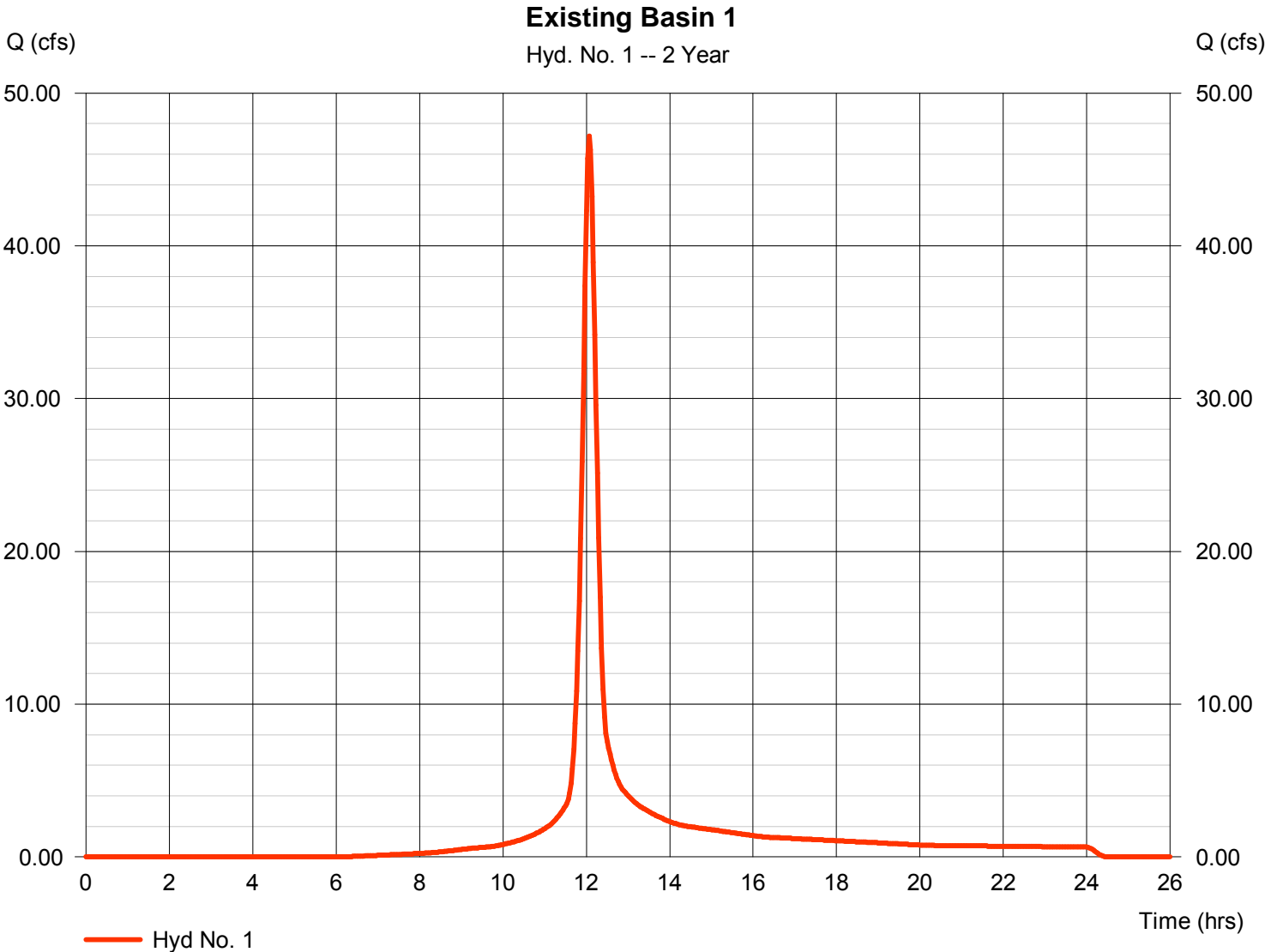
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	47.17	2	724	148,235	-----	-----	-----	Existing Basin 1
2	SCS Runoff	83.74	2	740	448,897	-----	-----	-----	Existing - Basin 2
3	SCS Runoff	106.13	2	742	601,177	-----	-----	-----	Existing - Basin 3
4	SCS Runoff	21.81	2	742	123,529	-----	-----	-----	Existing - Basin 4
5	SCS Runoff	52.12	2	724	166,037	-----	-----	-----	Developed - Basin 1
6	Reservoir	5.097	2	768	156,030	5	1342.75	98,751	Reserve A Pond
7	SCS Runoff	103.70	2	736	507,336	-----	-----	-----	Developed - Basin 2
8	SCS Runoff	123.51	2	740	667,360	-----	-----	-----	Developed - Basin 3
9	Reservoir	65.93	2	768	667,355	8	1339.58	189,778	Reserve C Pond
10	SCS Runoff	35.86	2	734	164,150	-----	-----	-----	Developed - Basin 4
11	Reservoir	4.903	2	784	143,495	10	1334.95	100,230	Reserve D
12	Reservoir	23.92	2	774	431,040	7	1337.23	295,103	Reserve B
13	SCS Runoff	45.32	2	758	339,565	-----	-----	-----	Offsite North
Total Site.gpw					Return Period: 2 Year			Tuesday, Nov 1, 2011	

Hydrograph Report

Hyd. No. 1

Existing Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 47.17 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 148,235 cuft
Drainage area	= 18.000 ac	Curve number	= 88
Basin Slope	= 0.7 %	Hydraulic length	= 600 ft
Tc method	= LAG	Time of conc. (Tc)	= 19.20 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

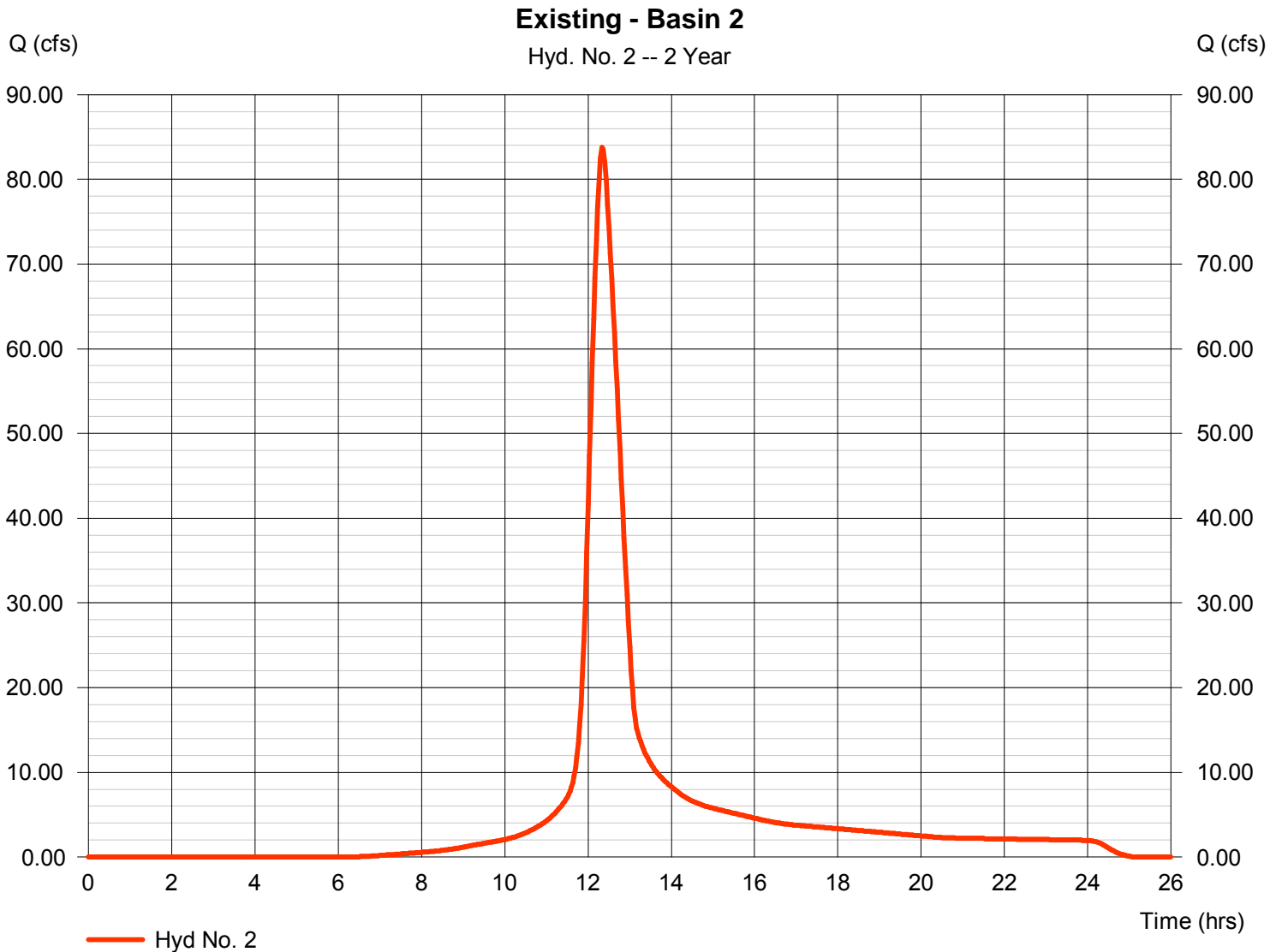
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Tuesday, Nov 1, 2011

Hyd. No. 2

Existing - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 83.74 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.33 hrs
Time interval	= 2 min	Hyd. volume	= 448,897 cuft
Drainage area	= 55.000 ac	Curve number	= 88
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 45.40 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

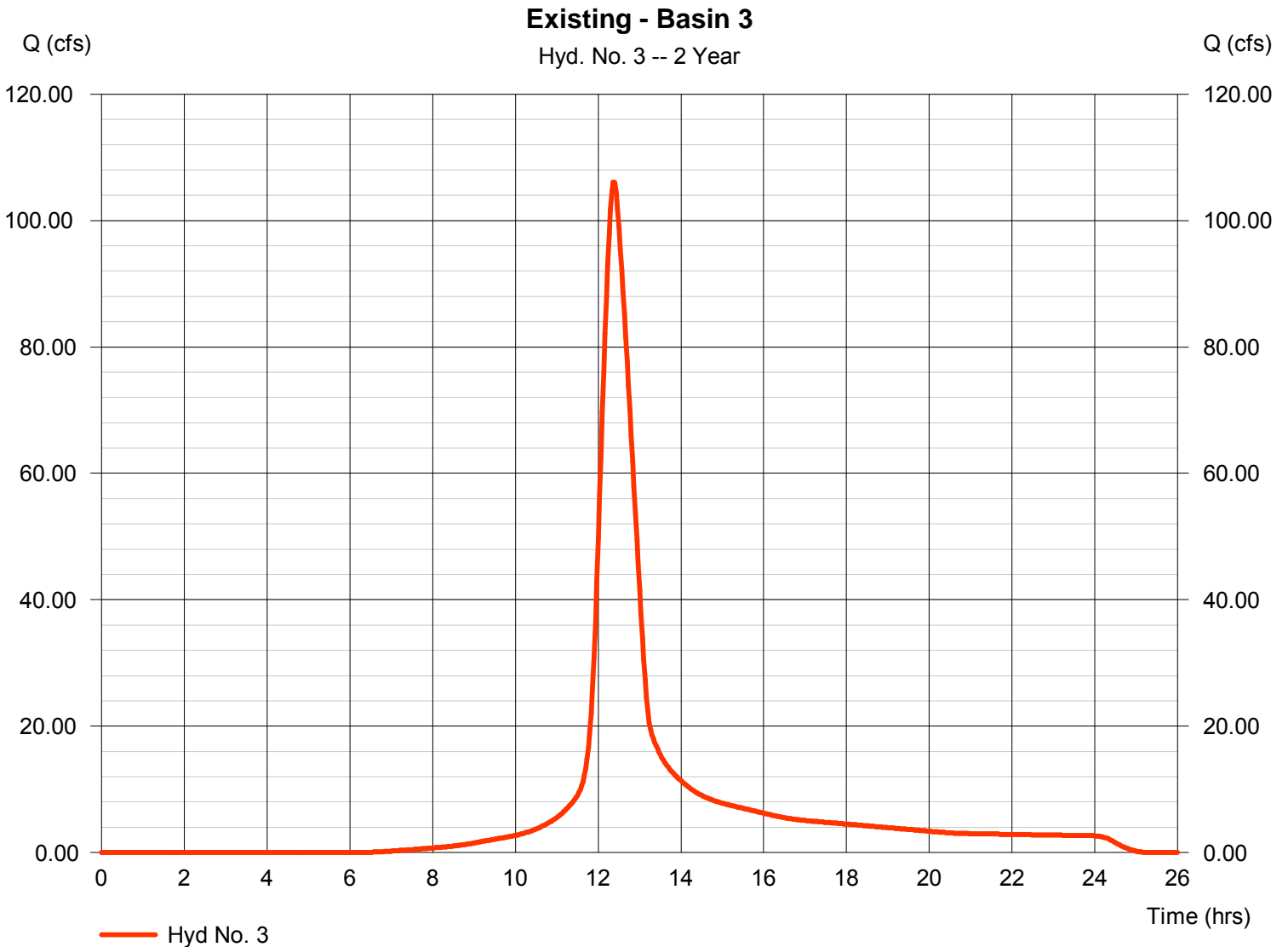
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 3

Existing - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 106.13 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 601,177 cuft
Drainage area	= 73.000 ac	Curve number	= 88
Basin Slope	= 0.6 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 49.90 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

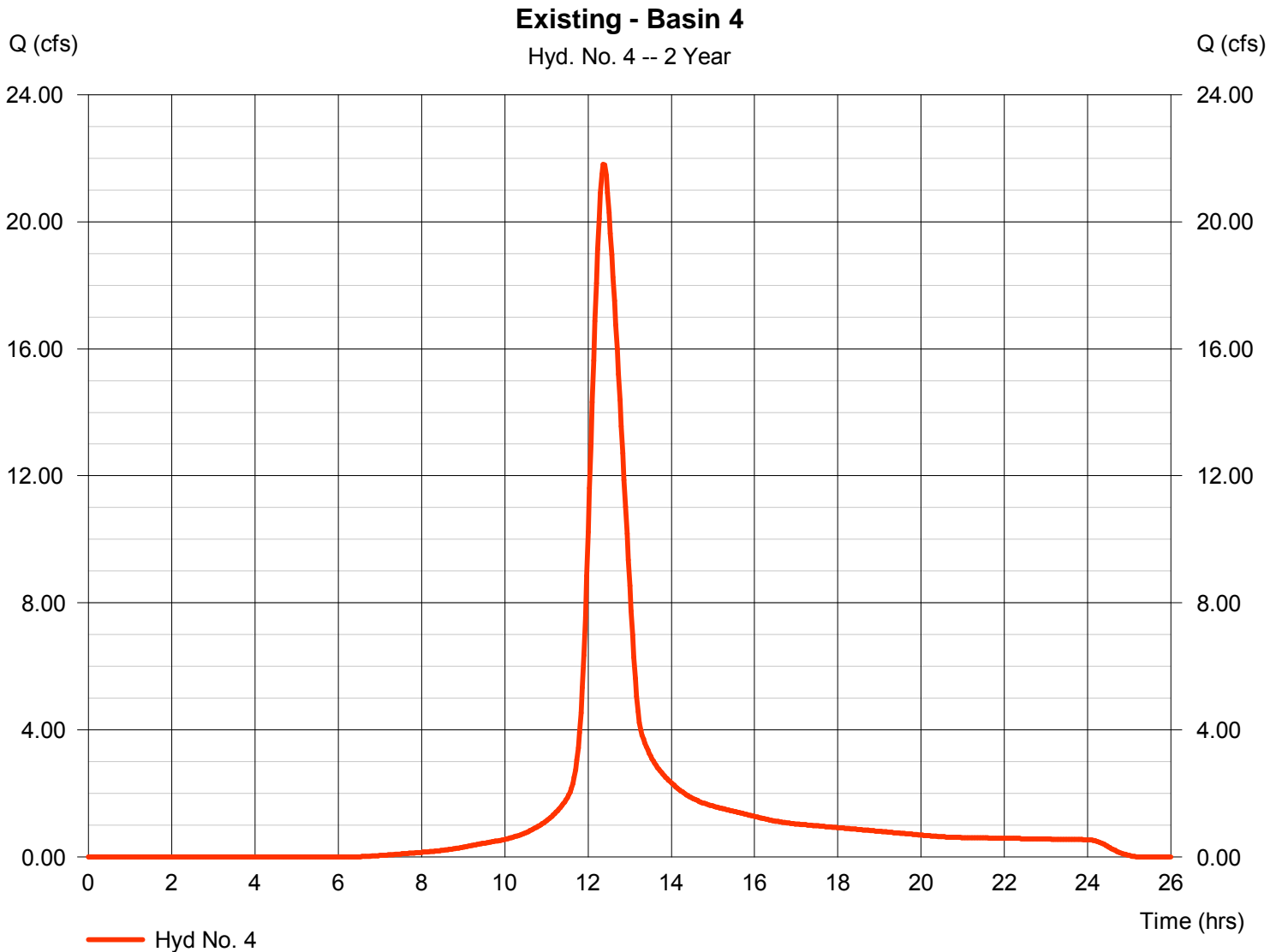
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 4

Existing - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 21.81 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 123,529 cuft
Drainage area	= 15.000 ac	Curve number	= 88
Basin Slope	= 0.4 %	Hydraulic length	= 1400 ft
Tc method	= LAG	Time of conc. (Tc)	= 50.00 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

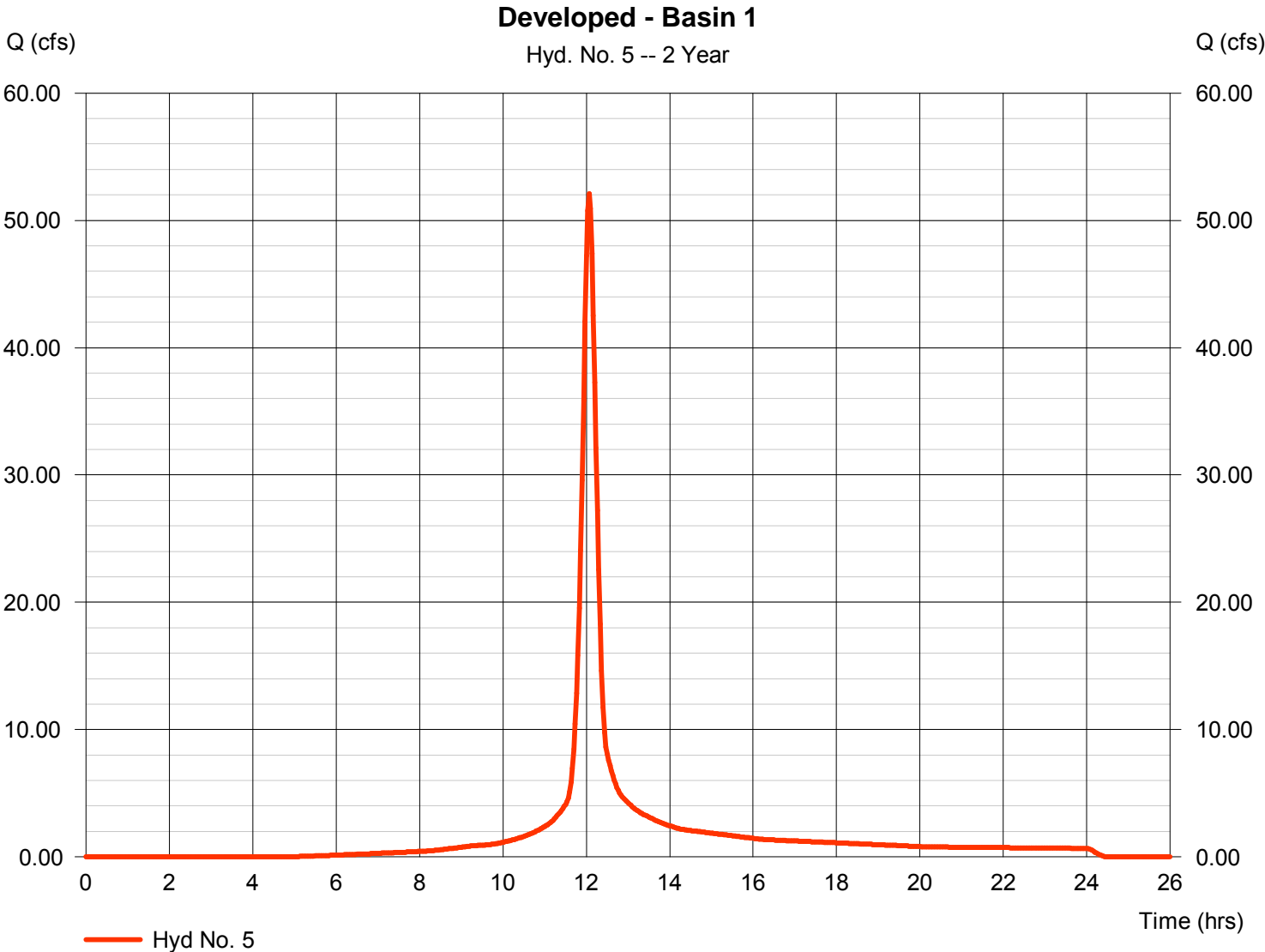


Hydrograph Report

Hyd. No. 5

Developed - Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 52.12 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 166,037 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 500 ft
Tc method	= LAG	Time of conc. (Tc)	= 17.40 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

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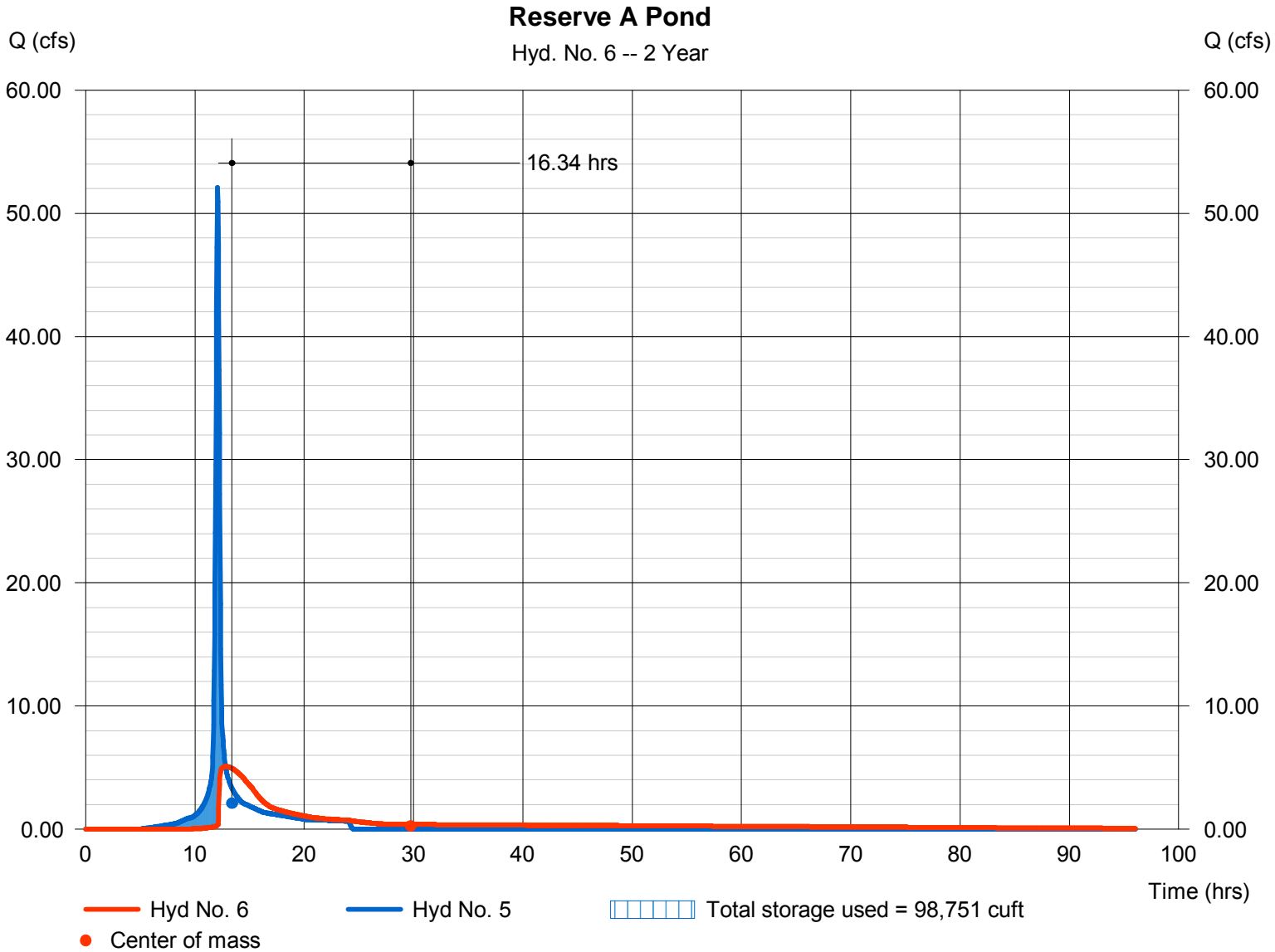
Tuesday, Nov 1, 2011

Hyd. No. 6

Reserve A Pond

Hydrograph type	= Reservoir	Peak discharge	= 5.097 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.80 hrs
Time interval	= 2 min	Hyd. volume	= 156,030 cuft
Inflow hyd. No.	= 5 - Developed - Basin 1	Max. Elevation	= 1342.75 ft
Reservoir name	= Reserve A	Max. Storage	= 98,751 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

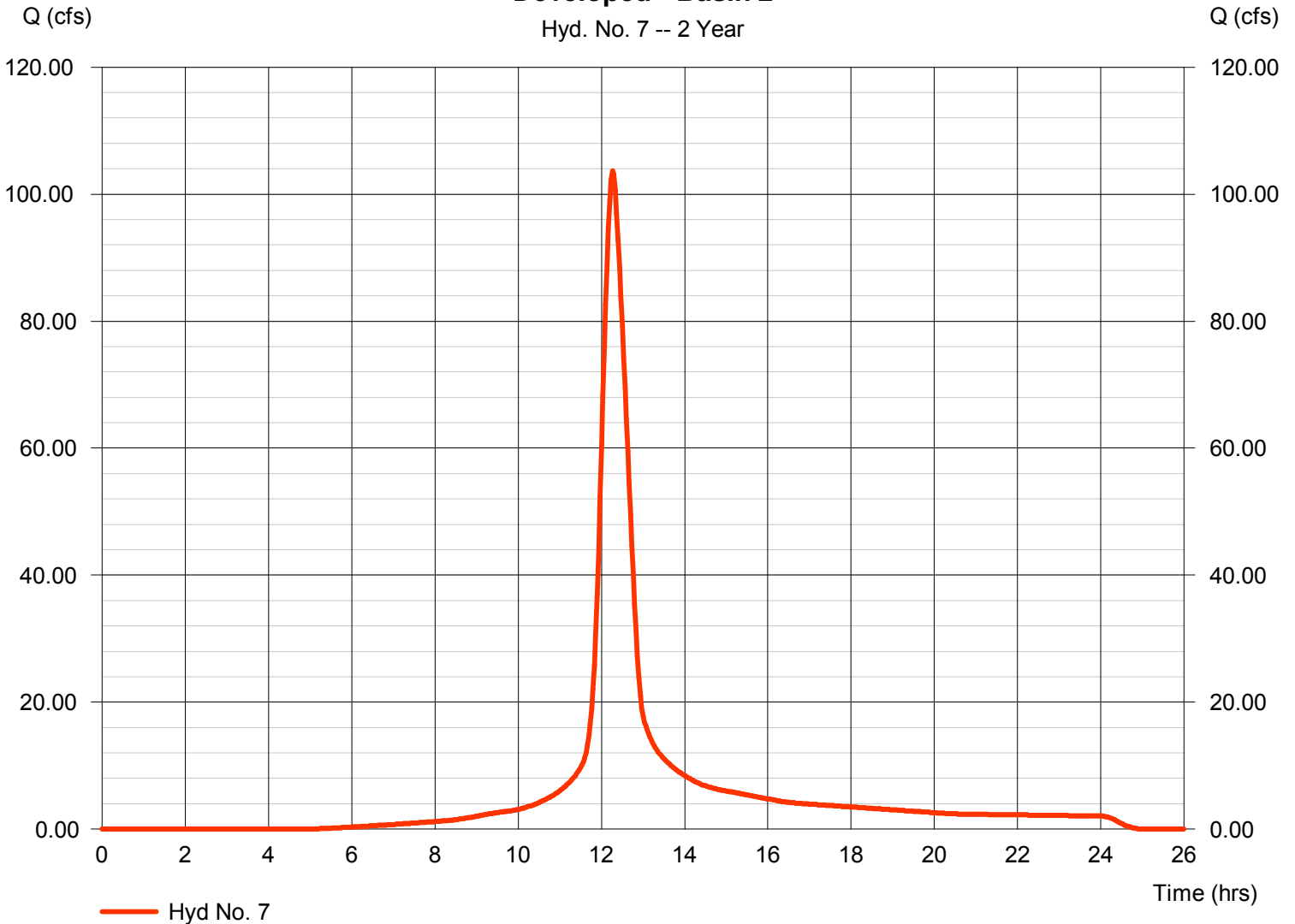
Hyd. No. 7

Developed - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 103.70 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.27 hrs
Time interval	= 2 min	Hyd. volume	= 507,336 cuft
Drainage area	= 55.000 ac	Curve number	= 91
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 40.30 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Developed - Basin 2

Hyd. No. 7 -- 2 Year

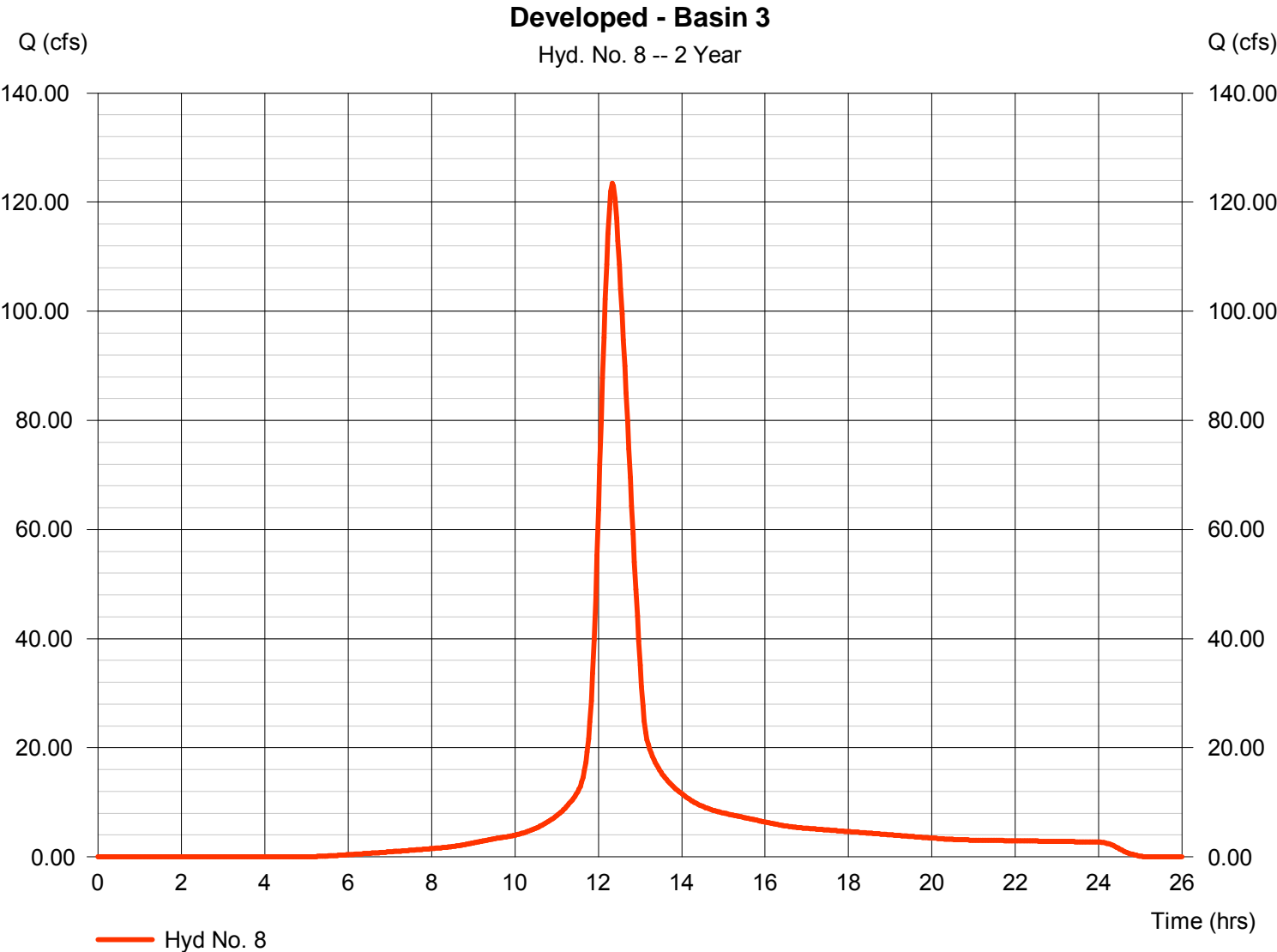


Hydrograph Report

Hyd. No. 8

Developed - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 123.51 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.33 hrs
Time interval	= 2 min	Hyd. volume	= 667,360 cuft
Drainage area	= 73.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 44.10 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

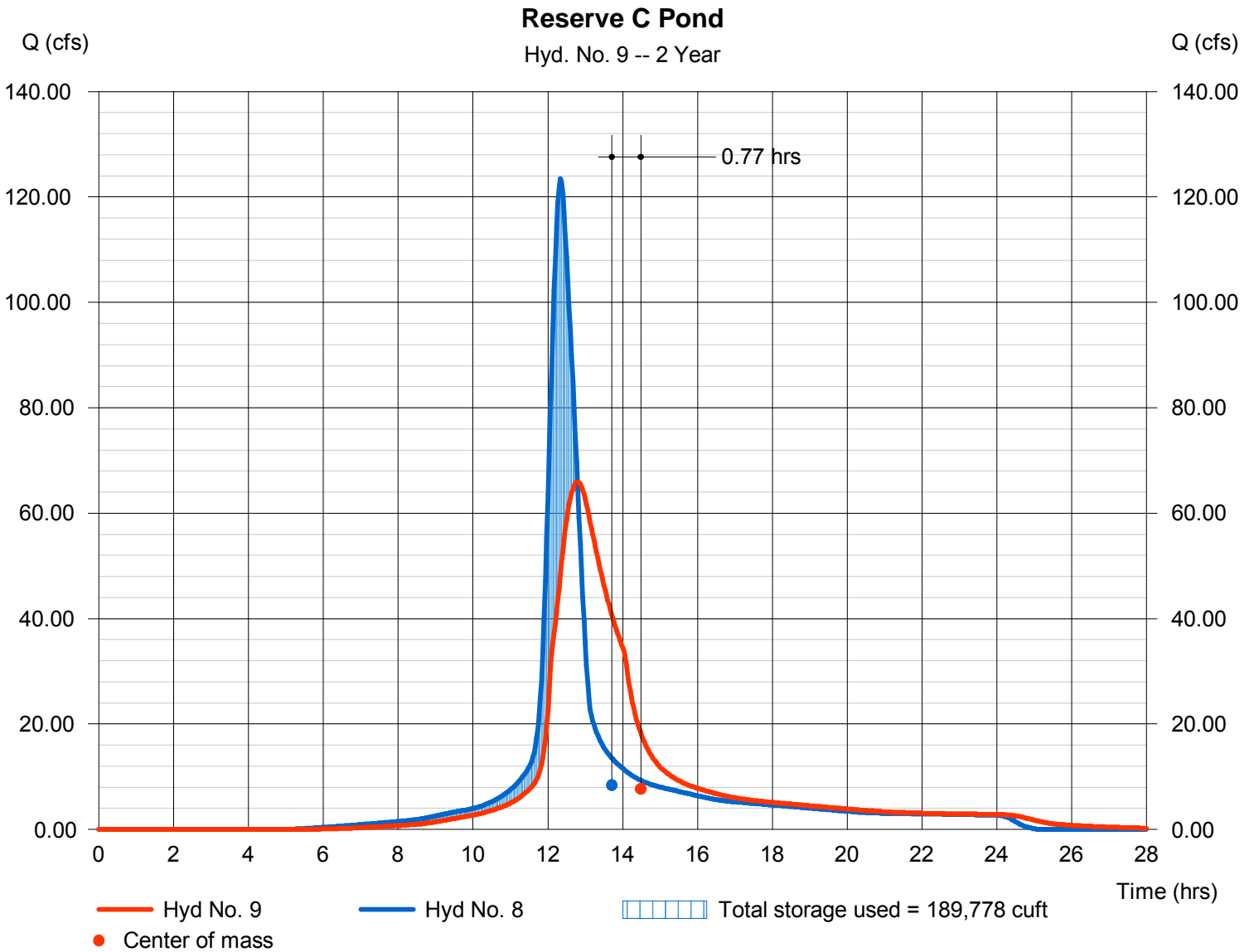
Tuesday, Nov 1, 2011

Hyd. No. 9

Reserve C Pond

Hydrograph type	= Reservoir	Peak discharge	= 65.93 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.80 hrs
Time interval	= 2 min	Hyd. volume	= 667,355 cuft
Inflow hyd. No.	= 8 - Developed - Basin 3	Max. Elevation	= 1339.58 ft
Reservoir name	= Reserve C Pond	Max. Storage	= 189,778 cuft

Storage Indication method used.



Hydrograph Report

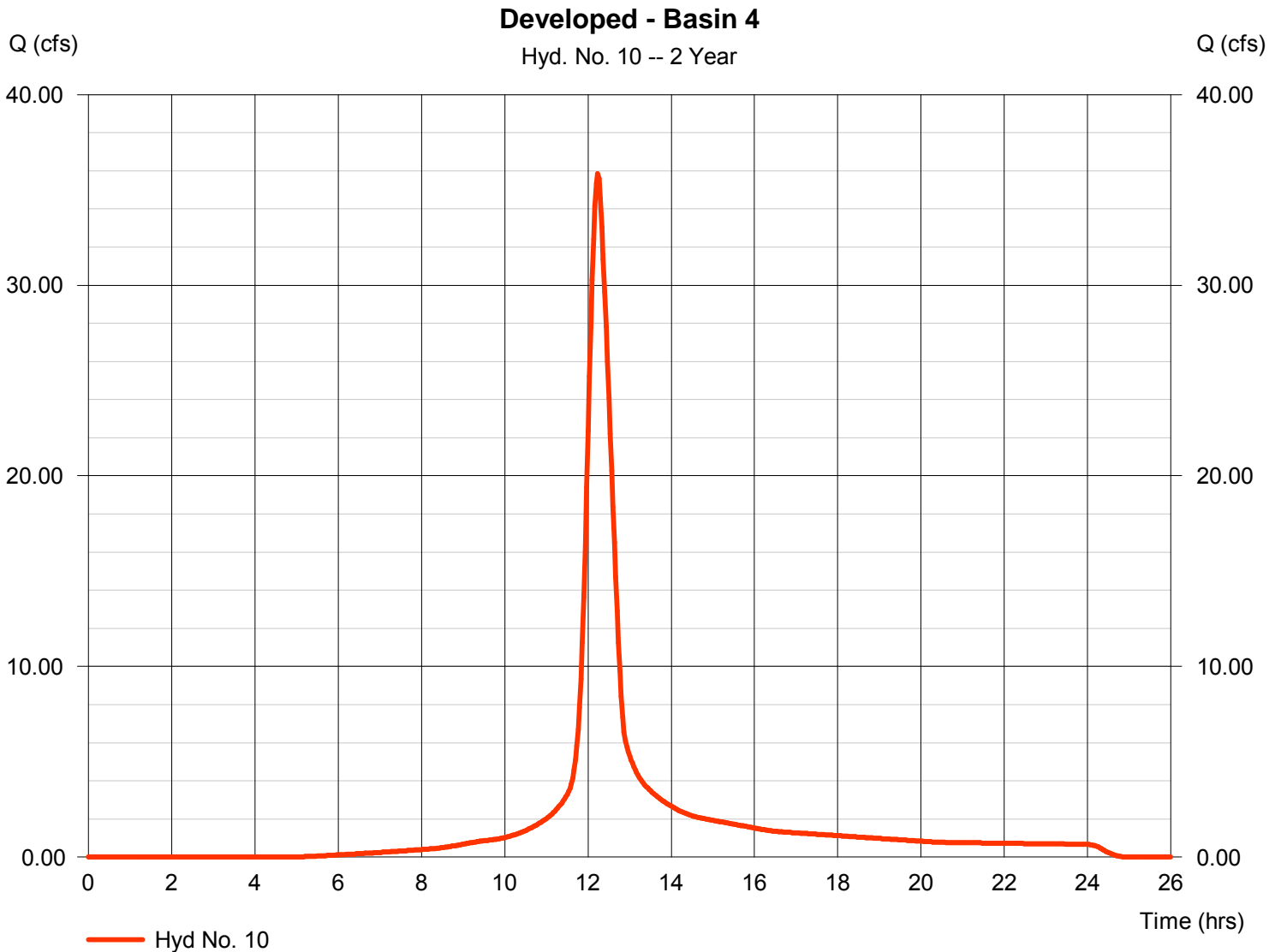
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Tuesday, Nov 1, 2011

Hyd. No. 10

Developed - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 35.86 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.23 hrs
Time interval	= 2 min	Hyd. volume	= 164,150 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1200 ft
Tc method	= LAG	Time of conc. (Tc)	= 35.00 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

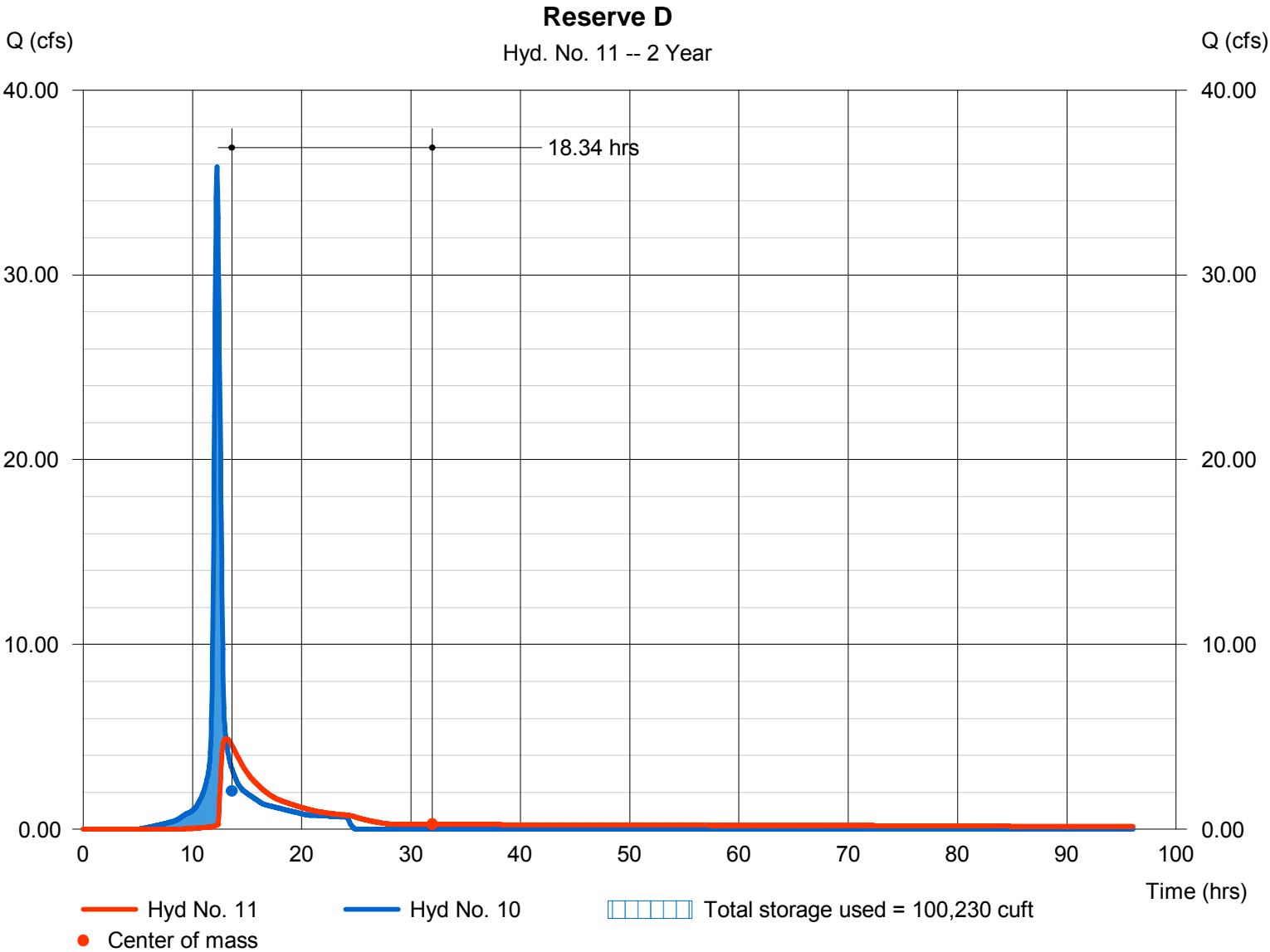
Tuesday, Nov 1, 2011

Hyd. No. 11

Reserve D

Hydrograph type	= Reservoir	Peak discharge	= 4.903 cfs
Storm frequency	= 2 yrs	Time to peak	= 13.07 hrs
Time interval	= 2 min	Hyd. volume	= 143,495 cuft
Inflow hyd. No.	= 10 - Developed - Basin 4	Max. Elevation	= 1334.95 ft
Reservoir name	= Reserve D	Max. Storage	= 100,230 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

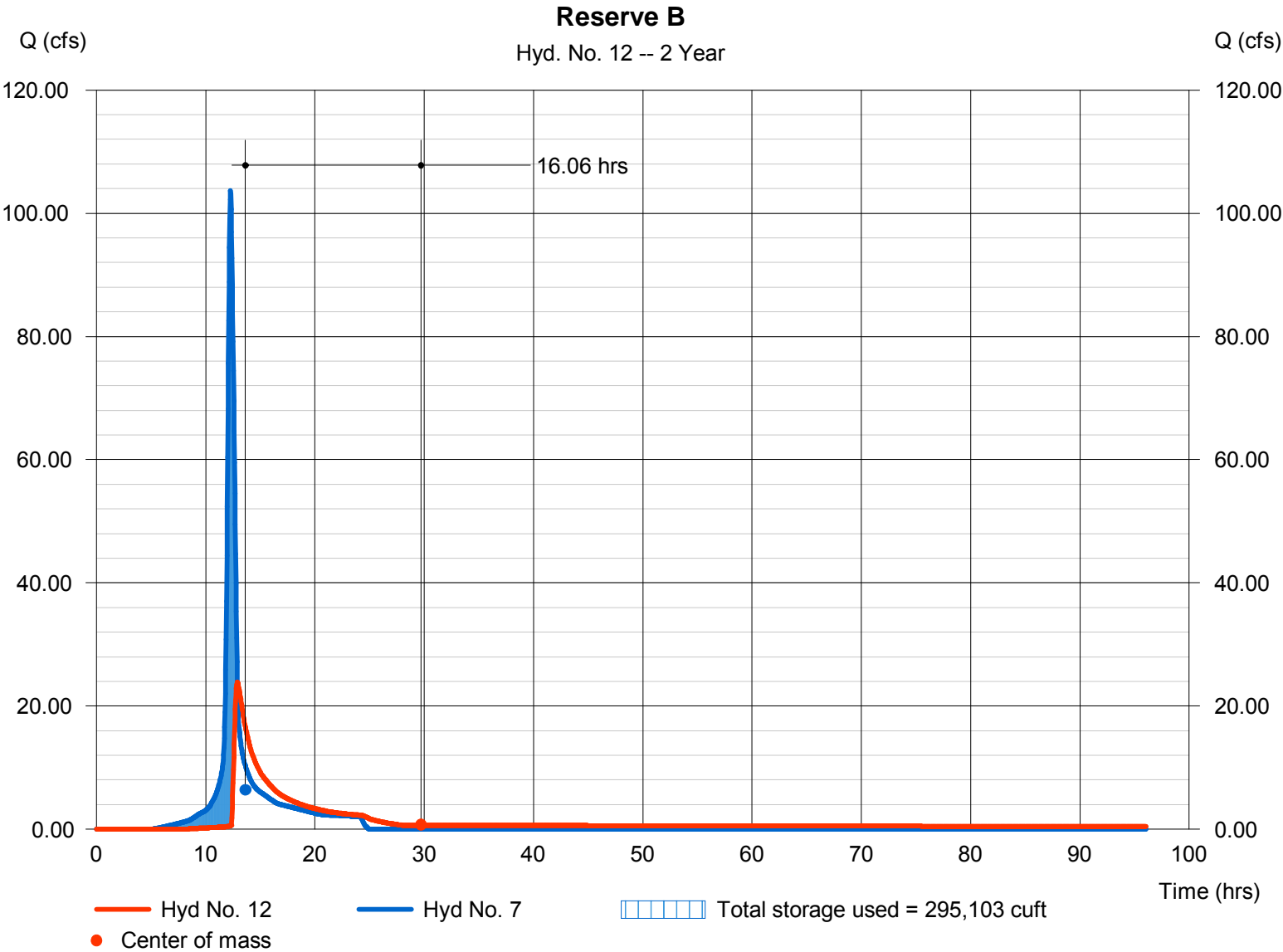
Tuesday, Nov 1, 2011

Hyd. No. 12

Reserve B

Hydrograph type	= Reservoir	Peak discharge	= 23.92 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.90 hrs
Time interval	= 2 min	Hyd. volume	= 431,040 cuft
Inflow hyd. No.	= 7 - Developed - Basin 2	Max. Elevation	= 1337.23 ft
Reservoir name	= Reserve B	Max. Storage	= 295,103 cuft

Storage Indication method used.



Hydrograph Report

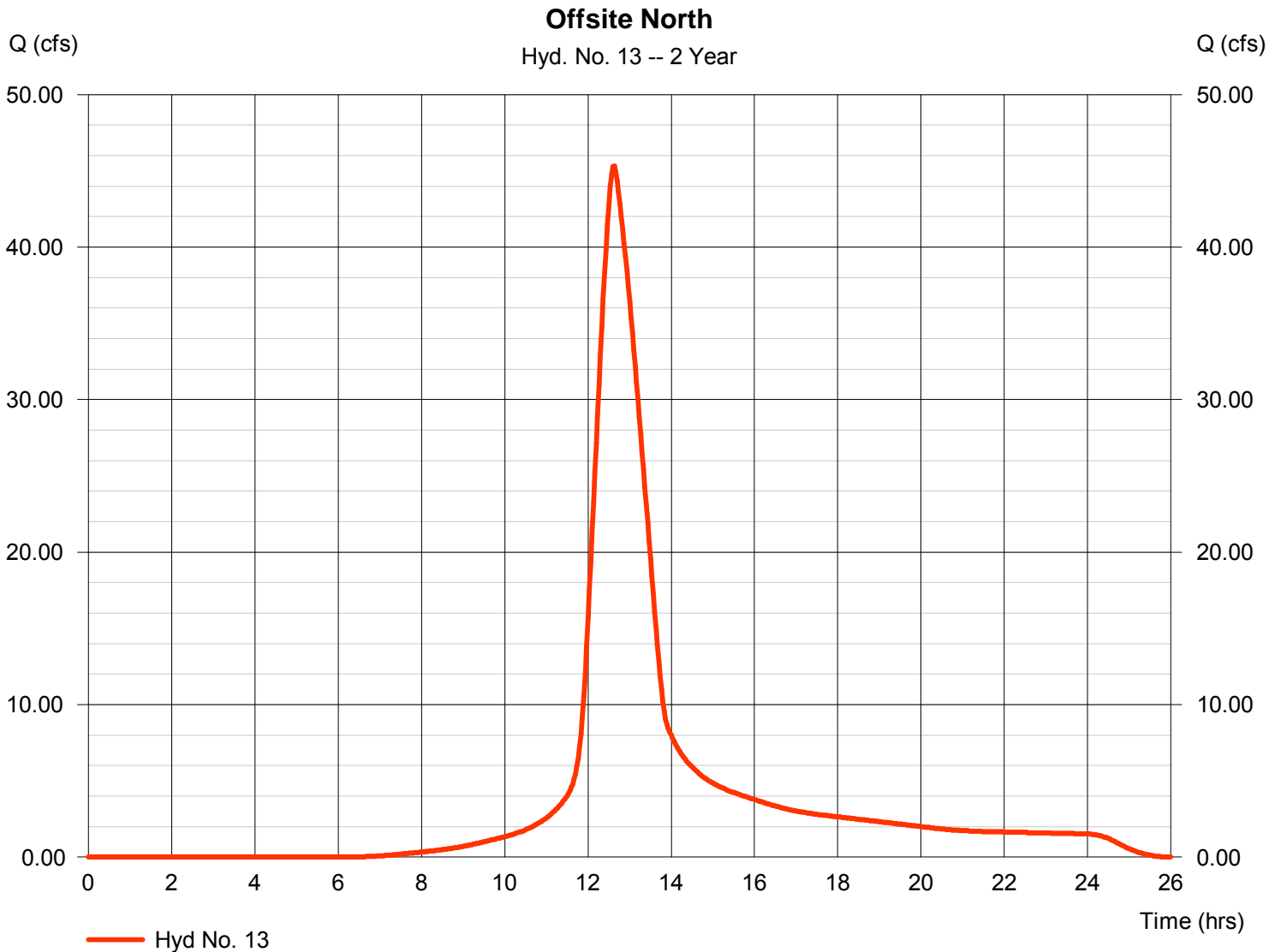
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 13

Offsite North

Hydrograph type	= SCS Runoff	Peak discharge	= 45.32 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.63 hrs
Time interval	= 2 min	Hyd. volume	= 339,565 cuft
Drainage area	= 41.000 ac	Curve number	= 88
Basin Slope	= 0.3 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 74.50 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® 2011 by Autodesk, Inc. v8

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	7.403	2	726	24,524	-----	-----	-----	Existing Basin 1
2	SCS Runoff	12.69	2	742	74,264	-----	-----	-----	Existing - Basin 2
3	SCS Runoff	16.04	2	744	99,457	-----	-----	-----	Existing - Basin 3
4	SCS Runoff	3.295	2	744	20,436	-----	-----	-----	Existing - Basin 4
5	SCS Runoff	10.35	2	724	32,959	-----	-----	-----	Developed - Basin 1
6	Reservoir	0.207	2	1228	28,260	5	1341.45	24,524	Reserve A Pond
7	SCS Runoff	20.26	2	738	100,707	-----	-----	-----	Developed - Basin 2
8	SCS Runoff	24.07	2	742	132,472	-----	-----	-----	Developed - Basin 3
9	Reservoir	14.28	2	768	132,466	8	1338.57	37,378	Reserve C Pond
10	SCS Runoff	7.021	2	736	32,584	-----	-----	-----	Developed - Basin 4
11	Reservoir	0.162	2	1450	28,303	10	1333.64	25,873	Reserve D
12	Reservoir	0.445	2	1456	92,237	7	1335.36	81,642	Reserve B
13	SCS Runoff	6.759	2	760	56,177	-----	-----	-----	Offsite North
Total Site.gpw					Return Period: 3 Year			Tuesday, Nov 1, 2011	

Hydrograph Report

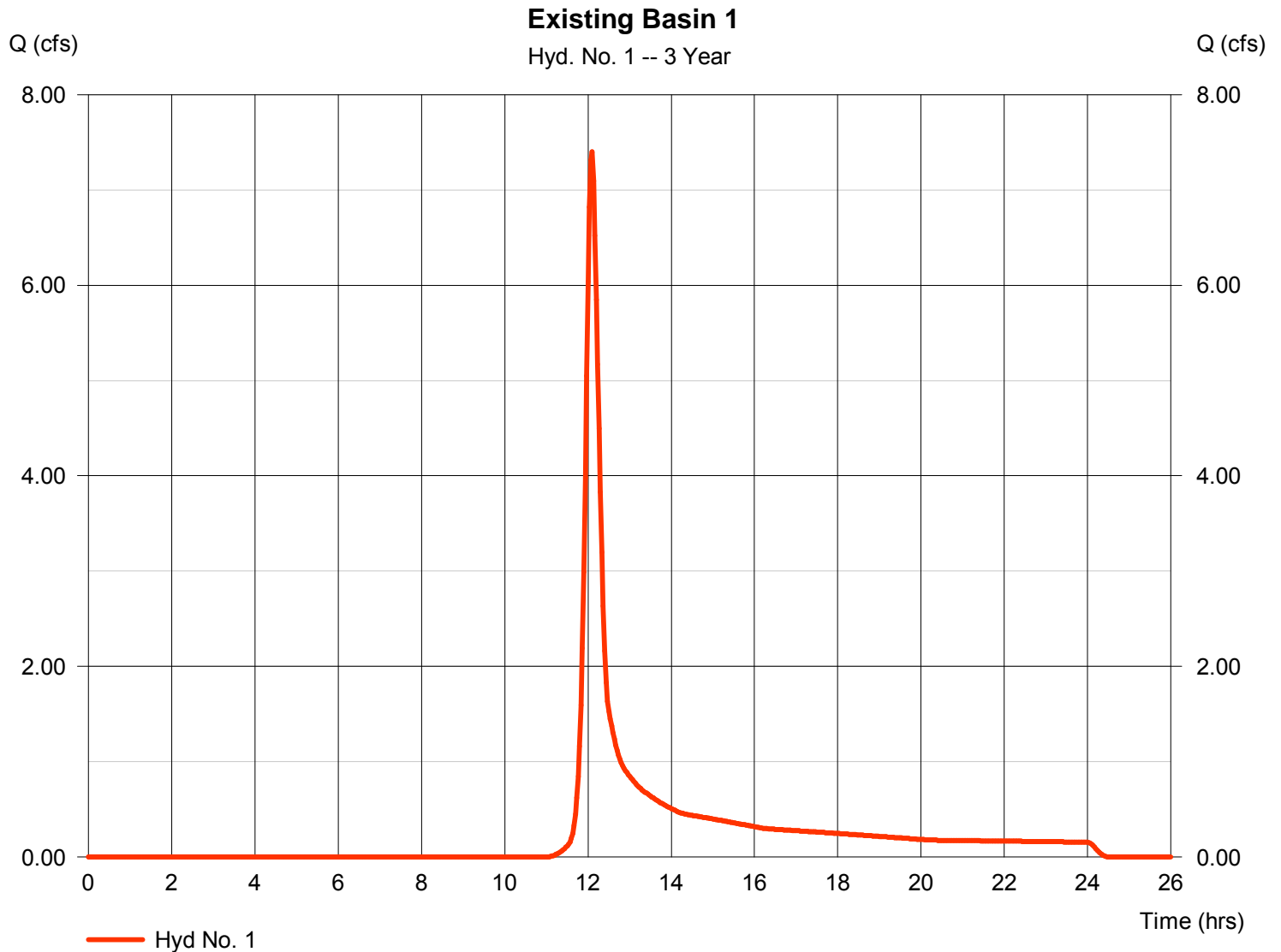
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Tuesday, Nov 1, 2011

Hyd. No. 1

Existing Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 7.403 cfs
Storm frequency	= 3 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 24,524 cuft
Drainage area	= 18.000 ac	Curve number	= 88
Basin Slope	= 0.7 %	Hydraulic length	= 600 ft
Tc method	= LAG	Time of conc. (Tc)	= 19.20 min
Total precip.	= 1.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

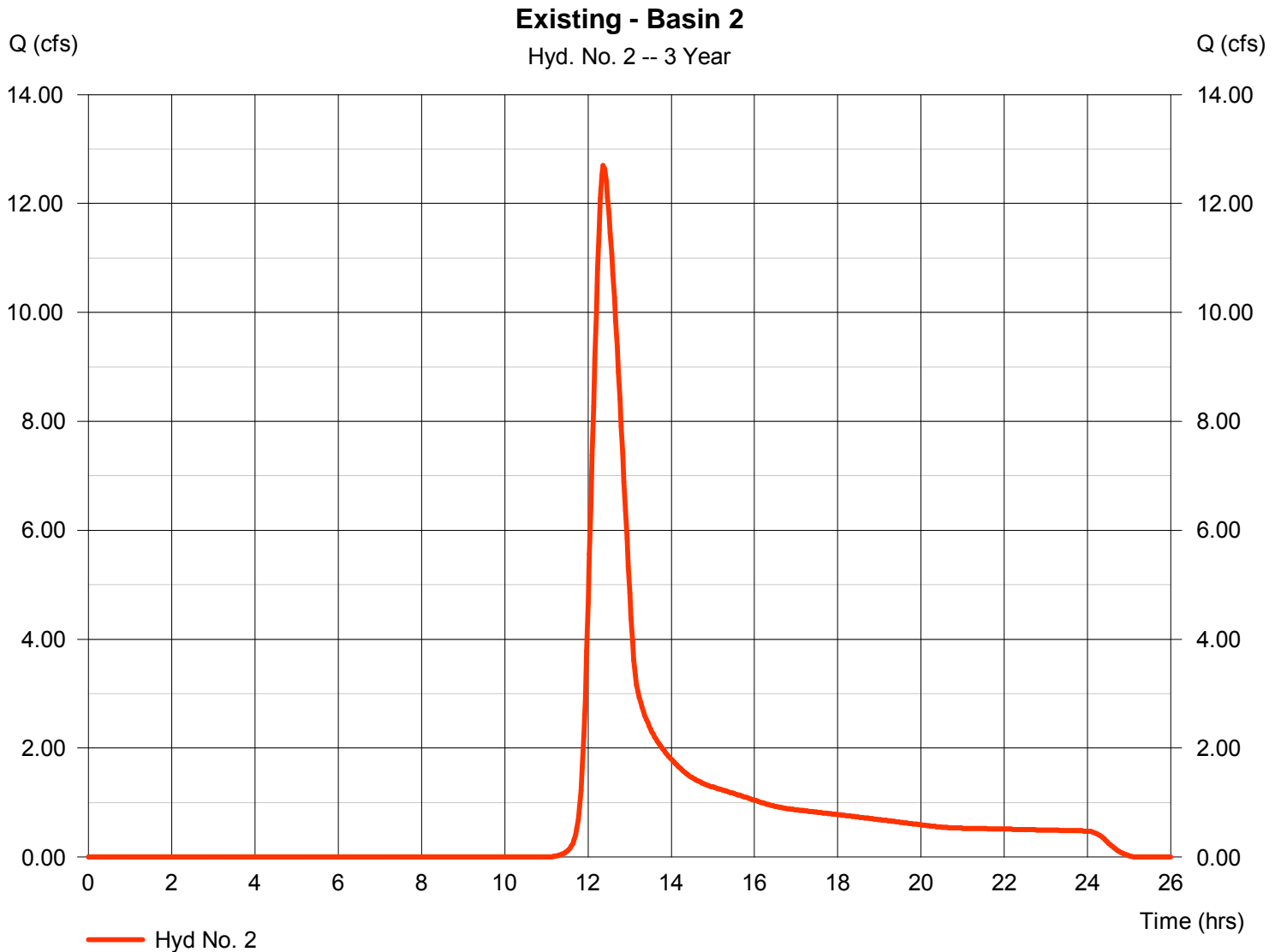
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Tuesday, Nov 1, 2011

Hyd. No. 2

Existing - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 12.69 cfs
Storm frequency	= 3 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 74,264 cuft
Drainage area	= 55.000 ac	Curve number	= 88
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 45.40 min
Total precip.	= 1.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

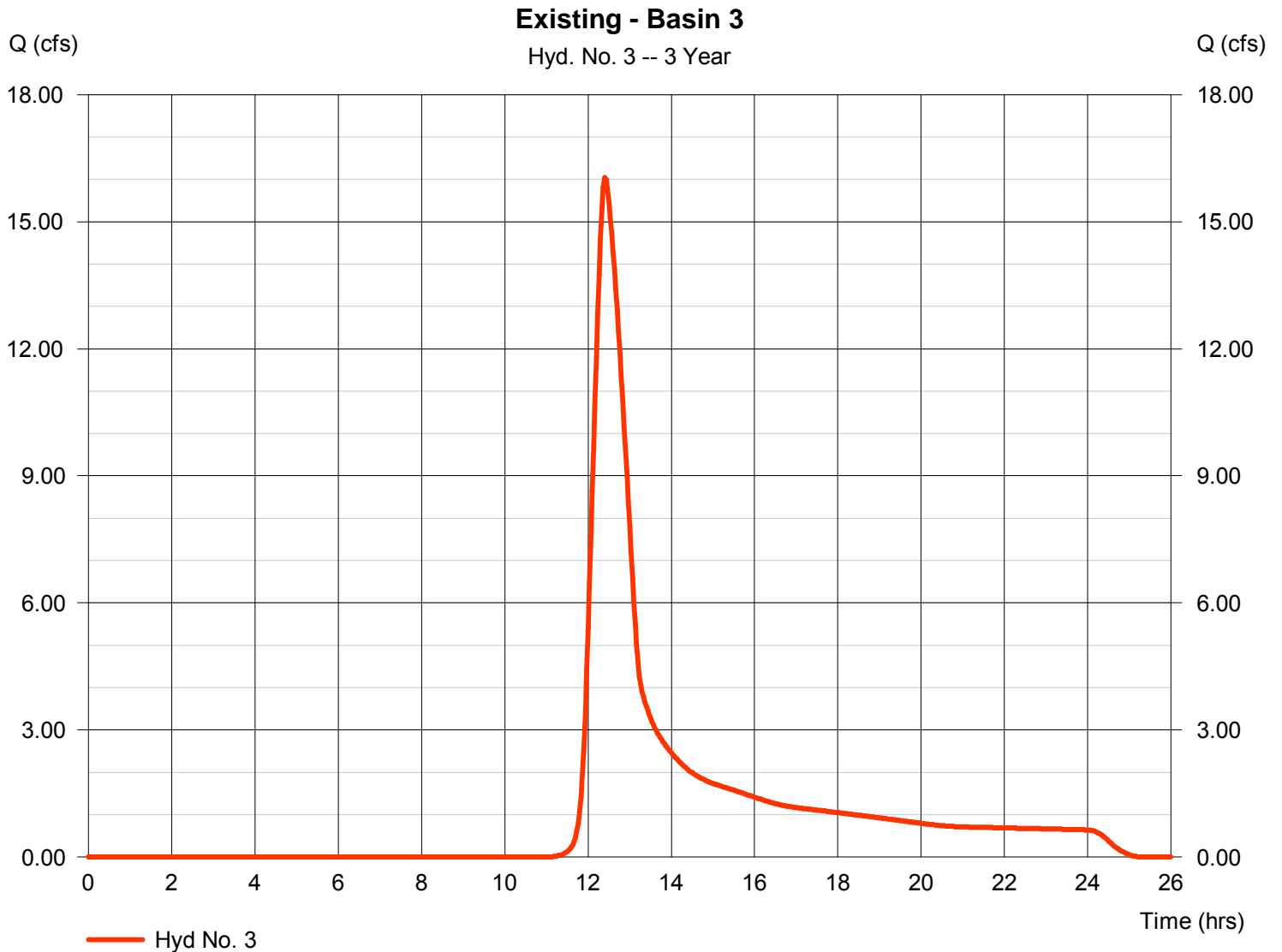
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 3

Existing - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 16.04 cfs
Storm frequency	= 3 yrs	Time to peak	= 12.40 hrs
Time interval	= 2 min	Hyd. volume	= 99,457 cuft
Drainage area	= 73.000 ac	Curve number	= 88
Basin Slope	= 0.6 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 49.90 min
Total precip.	= 1.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

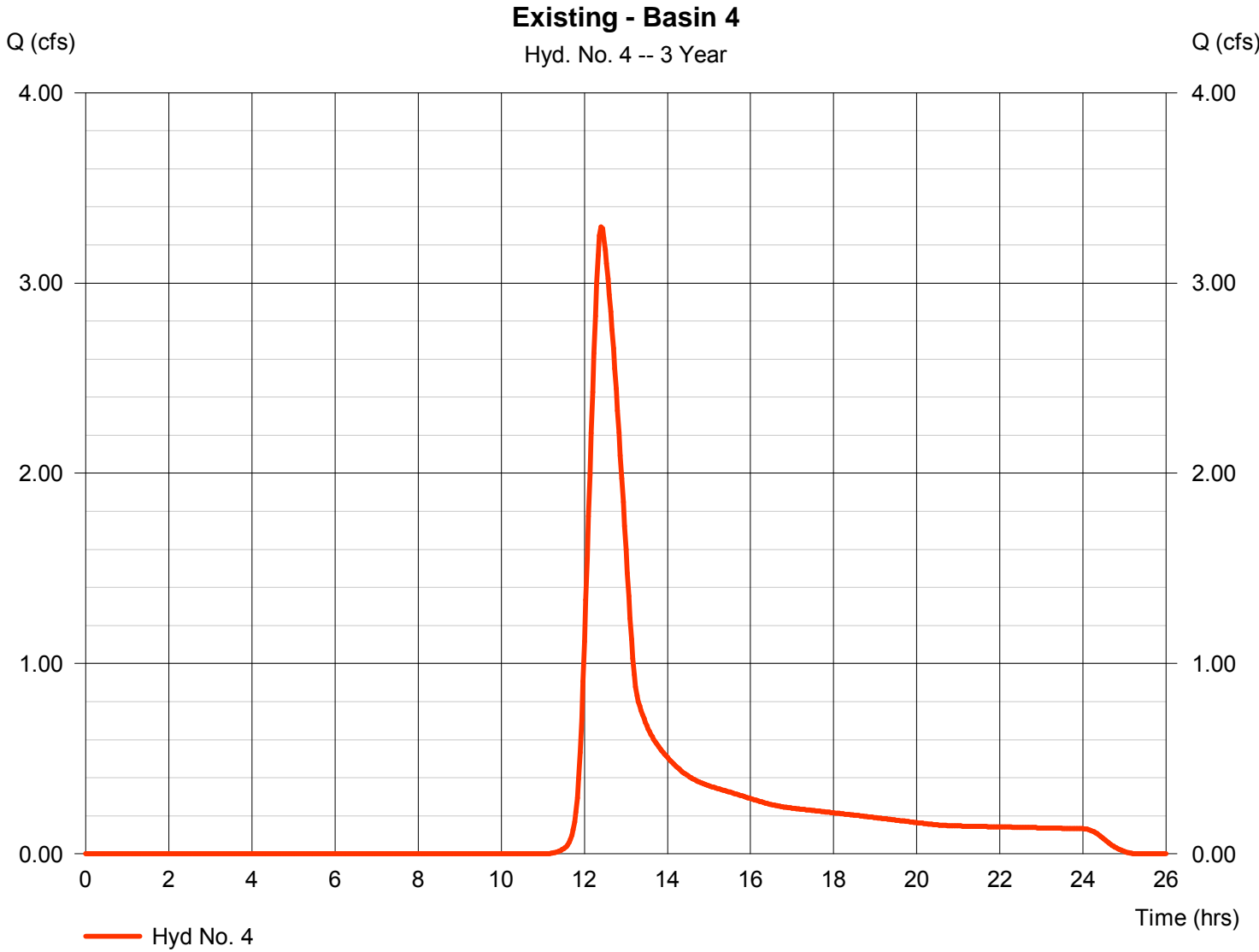


Hydrograph Report

Hyd. No. 4

Existing - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 3.295 cfs
Storm frequency	= 3 yrs	Time to peak	= 12.40 hrs
Time interval	= 2 min	Hyd. volume	= 20,436 cuft
Drainage area	= 15.000 ac	Curve number	= 88
Basin Slope	= 0.4 %	Hydraulic length	= 1400 ft
Tc method	= LAG	Time of conc. (Tc)	= 50.00 min
Total precip.	= 1.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

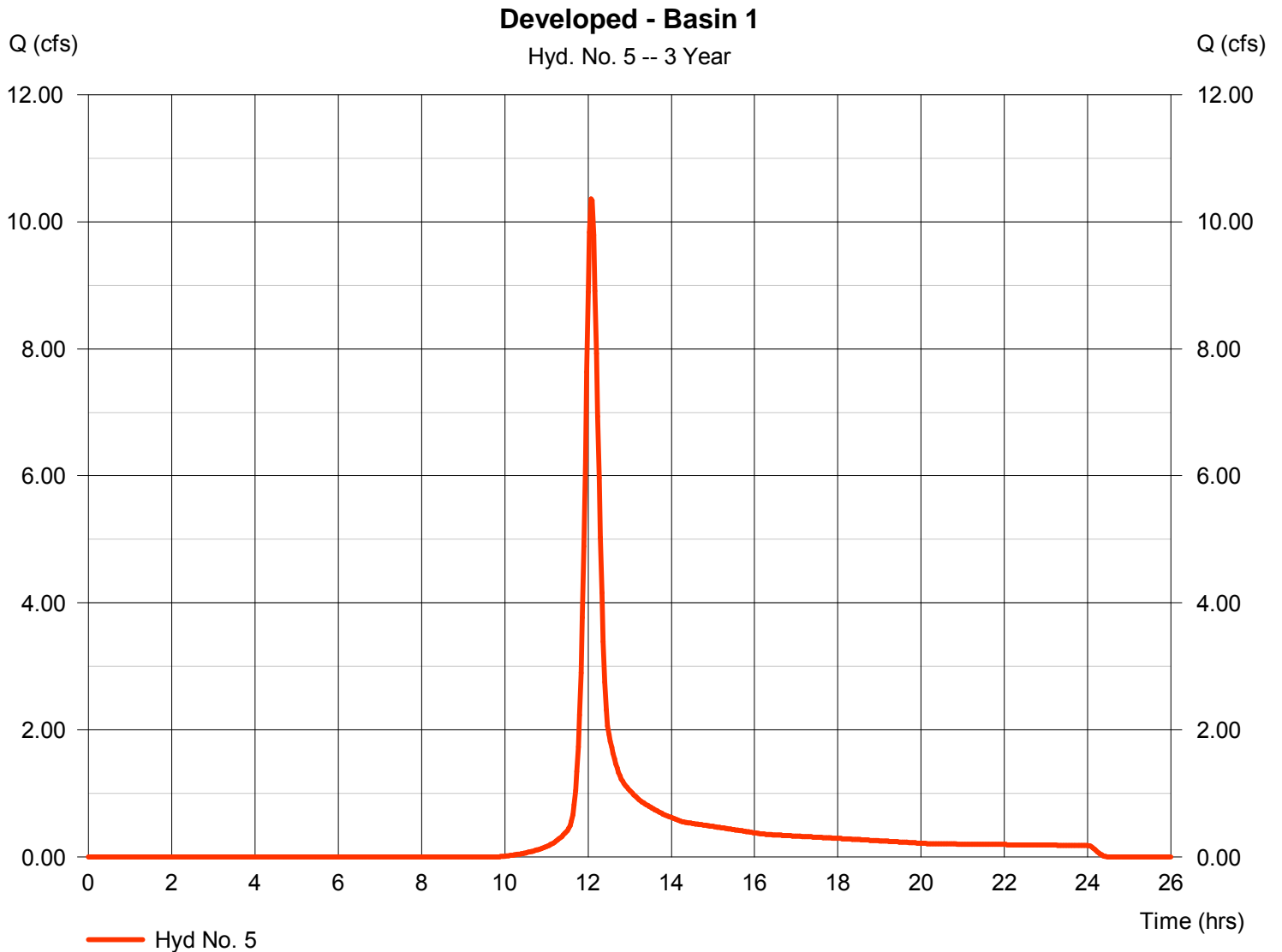
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 5

Developed - Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 10.35 cfs
Storm frequency	= 3 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 32,959 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 500 ft
Tc method	= LAG	Time of conc. (Tc)	= 17.40 min
Total precip.	= 1.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

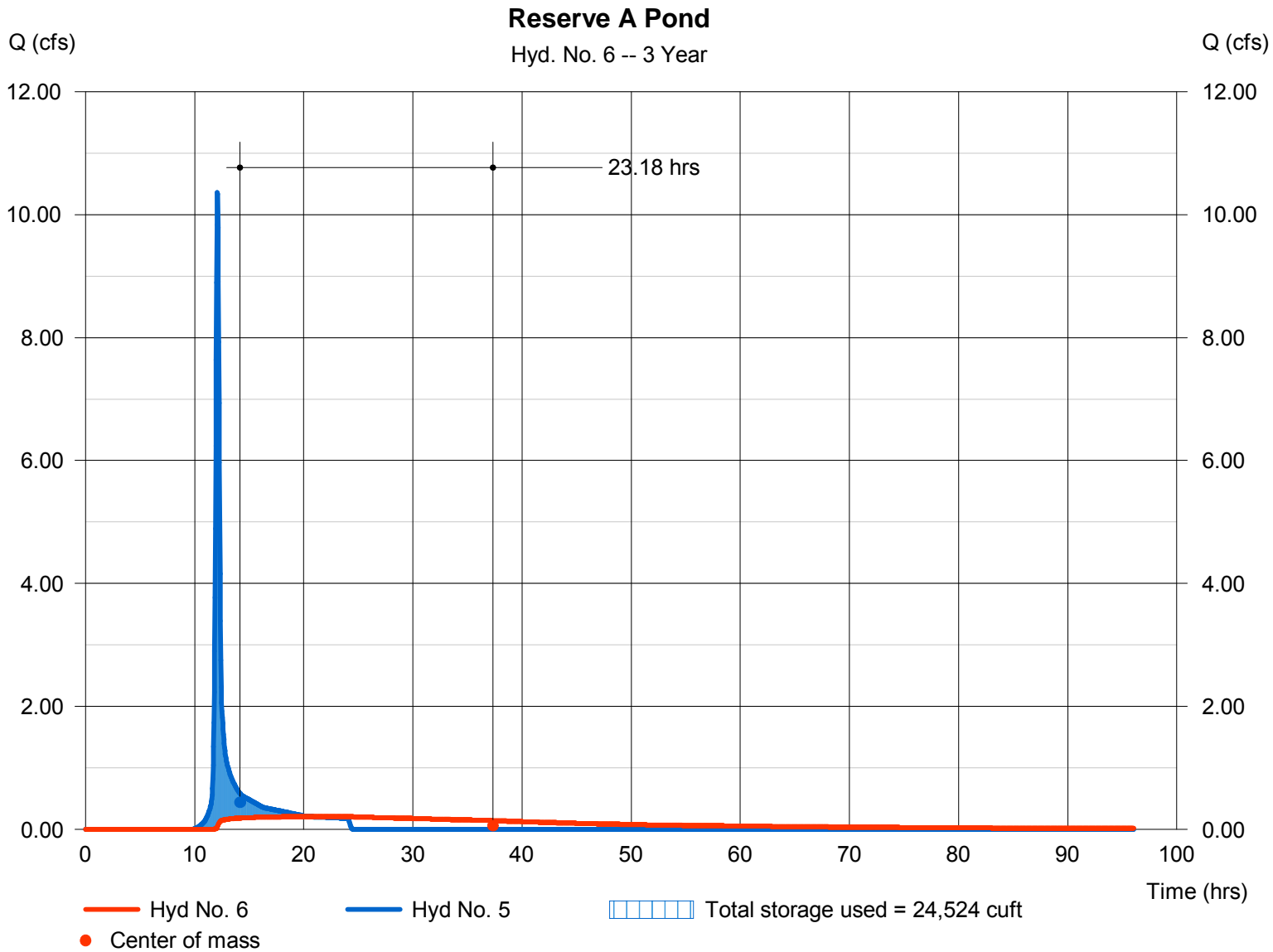
Tuesday, Nov 1, 2011

Hyd. No. 6

Reserve A Pond

Hydrograph type	= Reservoir	Peak discharge	= 0.207 cfs
Storm frequency	= 3 yrs	Time to peak	= 20.47 hrs
Time interval	= 2 min	Hyd. volume	= 28,260 cuft
Inflow hyd. No.	= 5 - Developed - Basin 1	Max. Elevation	= 1341.45 ft
Reservoir name	= Reserve A	Max. Storage	= 24,524 cuft

Storage Indication method used.



Hydrograph Report

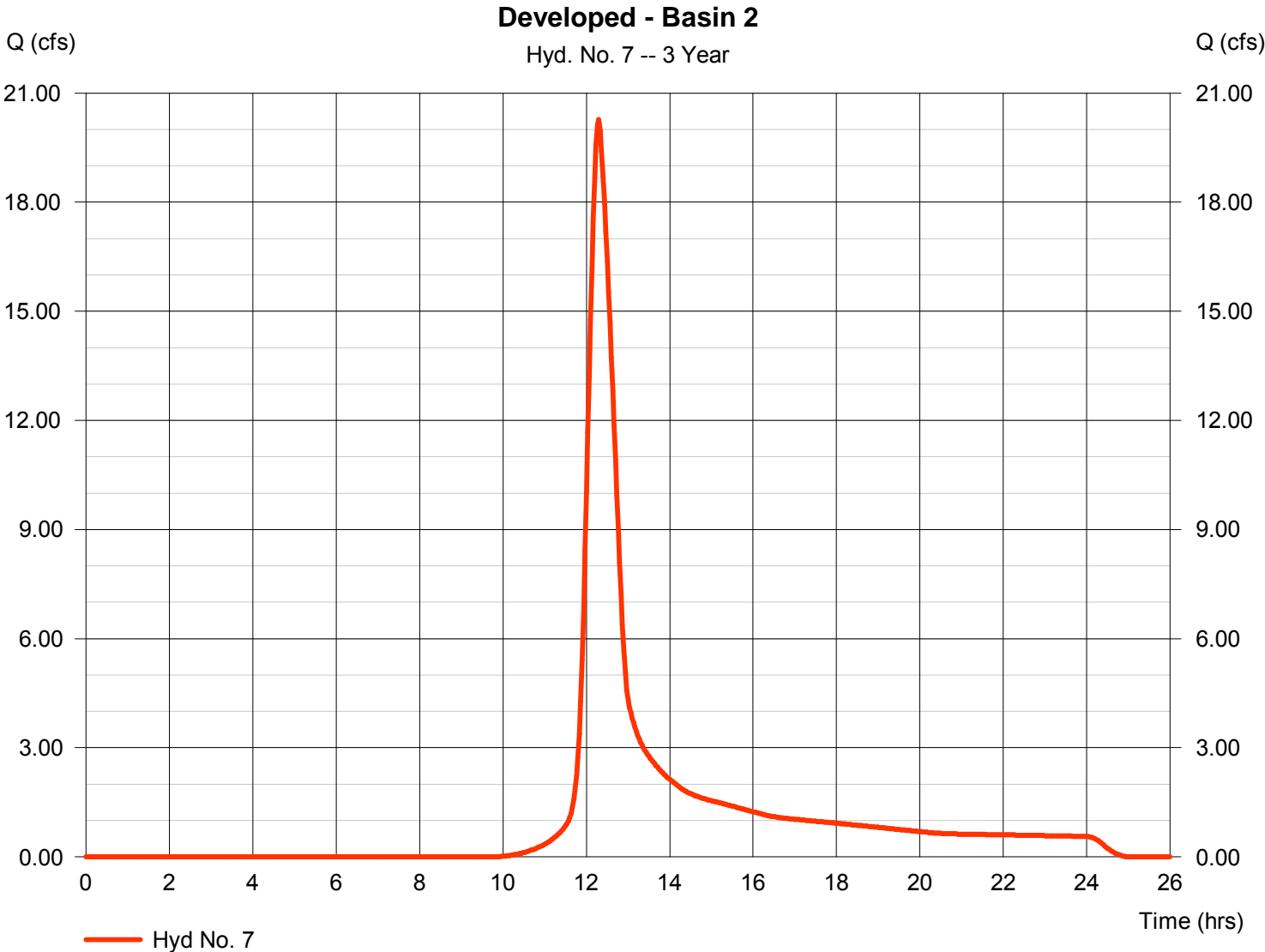
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 7

Developed - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 20.26 cfs
Storm frequency	= 3 yrs	Time to peak	= 12.30 hrs
Time interval	= 2 min	Hyd. volume	= 100,707 cuft
Drainage area	= 55.000 ac	Curve number	= 91
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 40.30 min
Total precip.	= 1.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

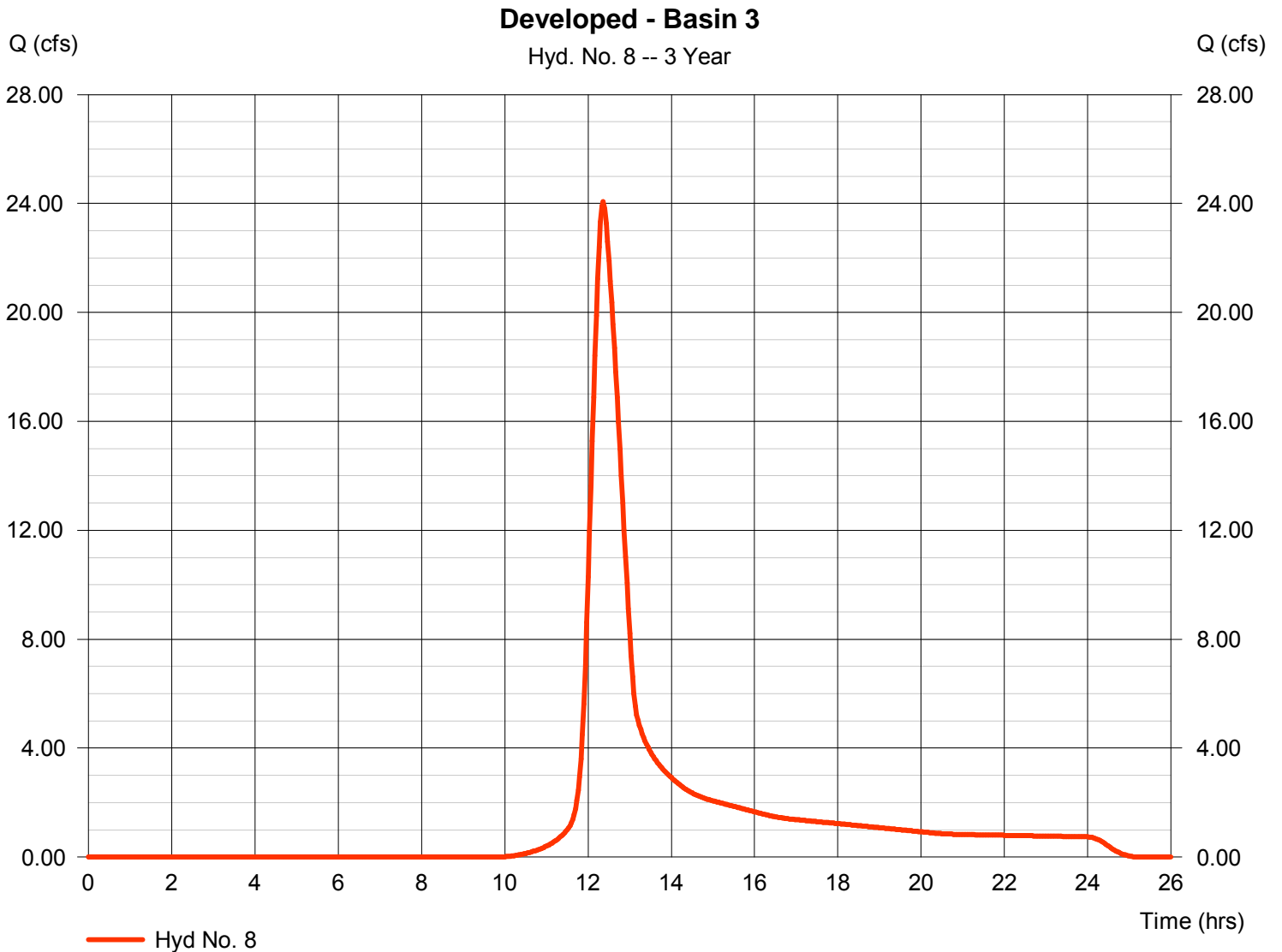
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 8

Developed - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 24.07 cfs
Storm frequency	= 3 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 132,472 cuft
Drainage area	= 73.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 44.10 min
Total precip.	= 1.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

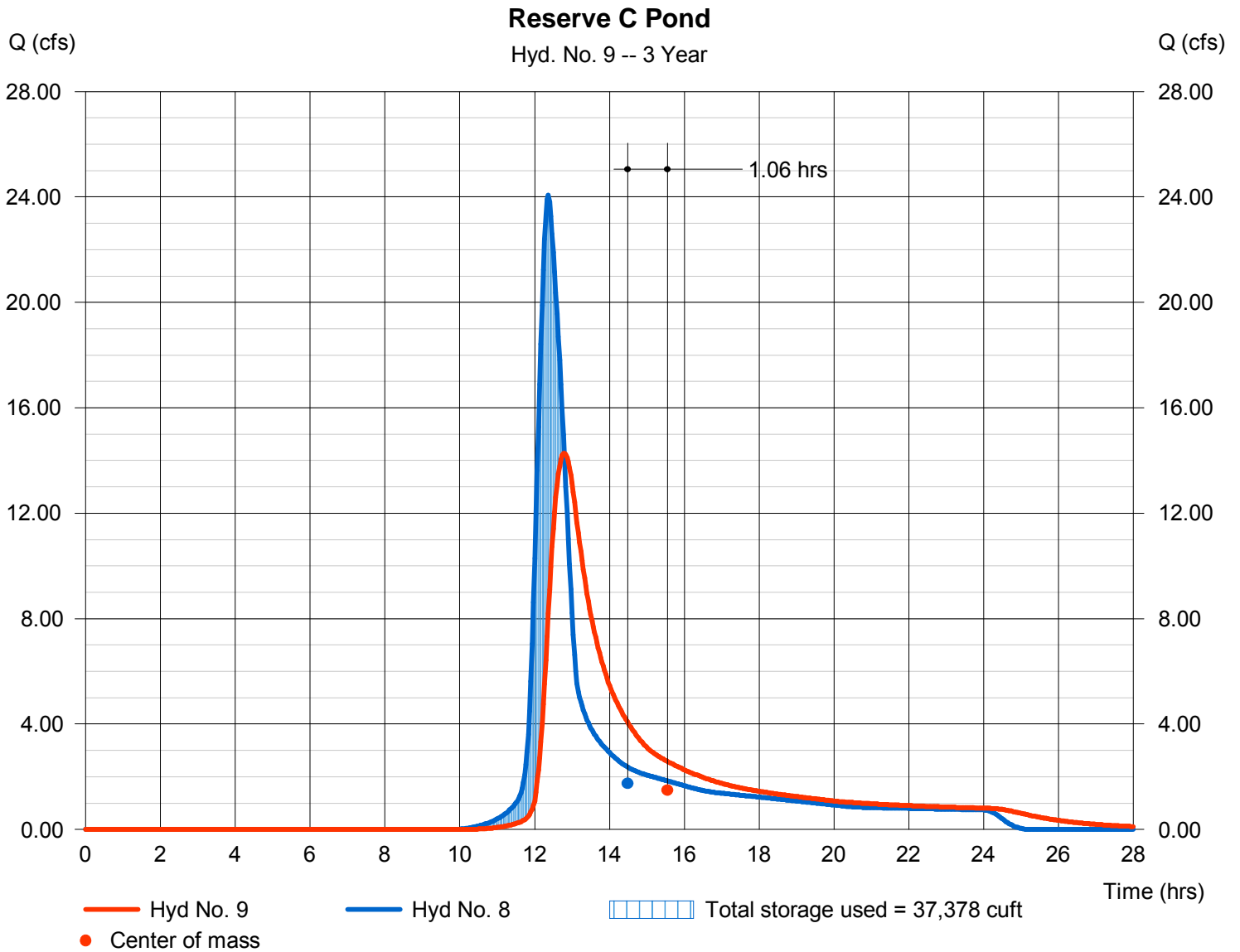
Tuesday, Nov 1, 2011

Hyd. No. 9

Reserve C Pond

Hydrograph type	= Reservoir	Peak discharge	= 14.28 cfs
Storm frequency	= 3 yrs	Time to peak	= 12.80 hrs
Time interval	= 2 min	Hyd. volume	= 132,466 cuft
Inflow hyd. No.	= 8 - Developed - Basin 3	Max. Elevation	= 1338.57 ft
Reservoir name	= Reserve C Pond	Max. Storage	= 37,378 cuft

Storage Indication method used.



Hydrograph Report

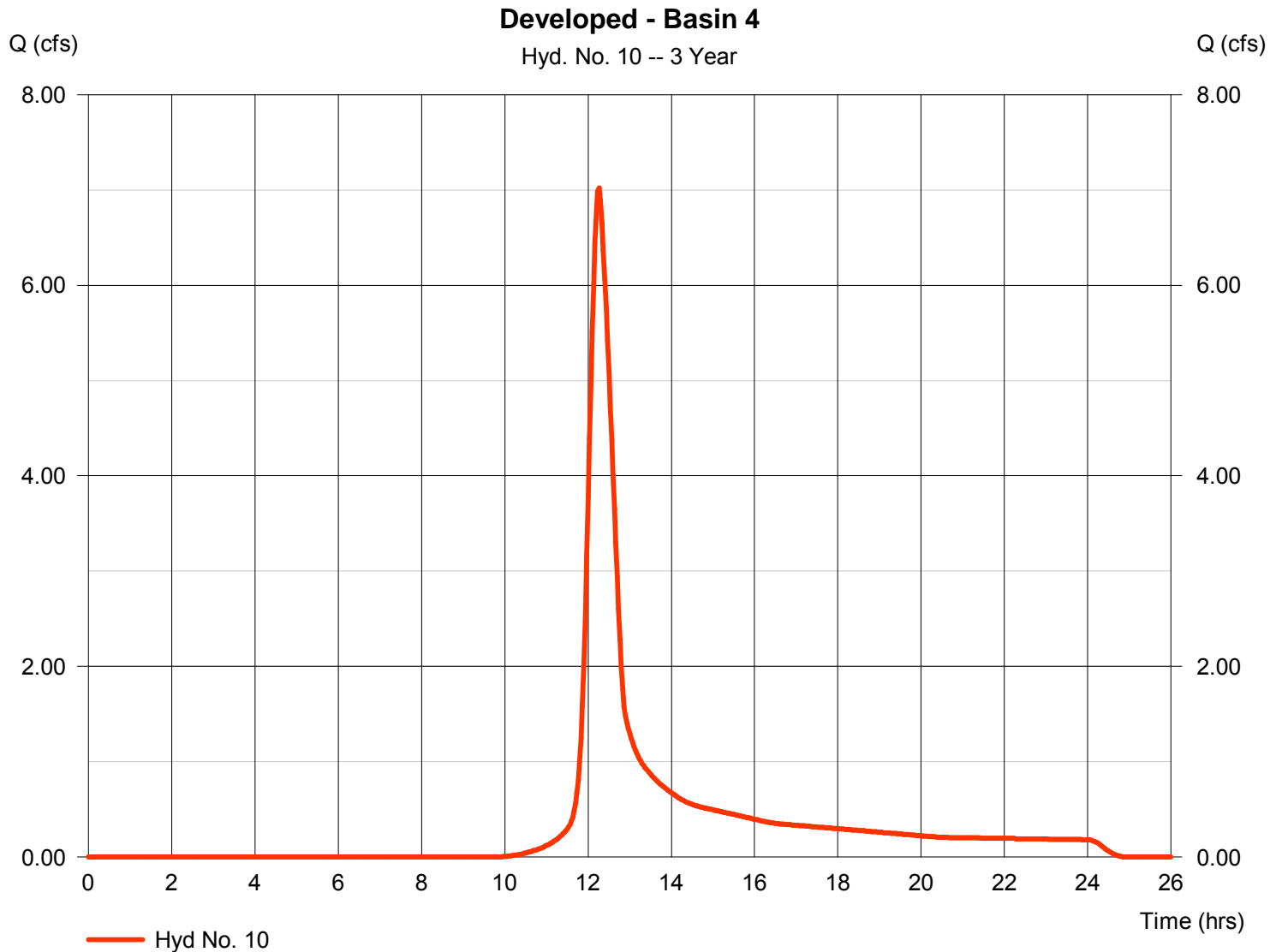
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 10

Developed - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 7.021 cfs
Storm frequency	= 3 yrs	Time to peak	= 12.27 hrs
Time interval	= 2 min	Hyd. volume	= 32,584 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1200 ft
Tc method	= LAG	Time of conc. (Tc)	= 35.00 min
Total precip.	= 1.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

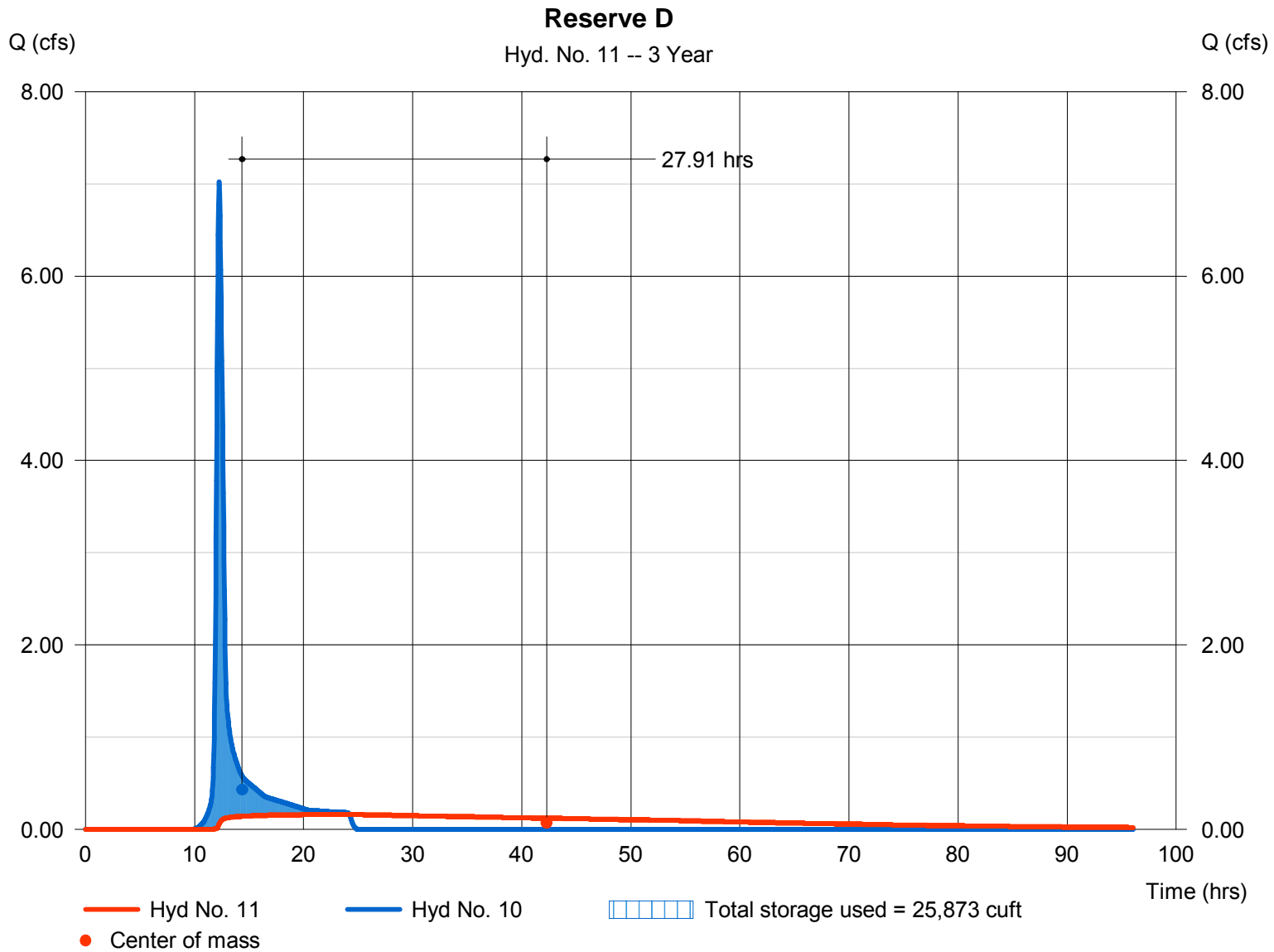
Tuesday, Nov 1, 2011

Hyd. No. 11

Reserve D

Hydrograph type	= Reservoir	Peak discharge	= 0.162 cfs
Storm frequency	= 3 yrs	Time to peak	= 24.17 hrs
Time interval	= 2 min	Hyd. volume	= 28,303 cuft
Inflow hyd. No.	= 10 - Developed - Basin 4	Max. Elevation	= 1333.64 ft
Reservoir name	= Reserve D	Max. Storage	= 25,873 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

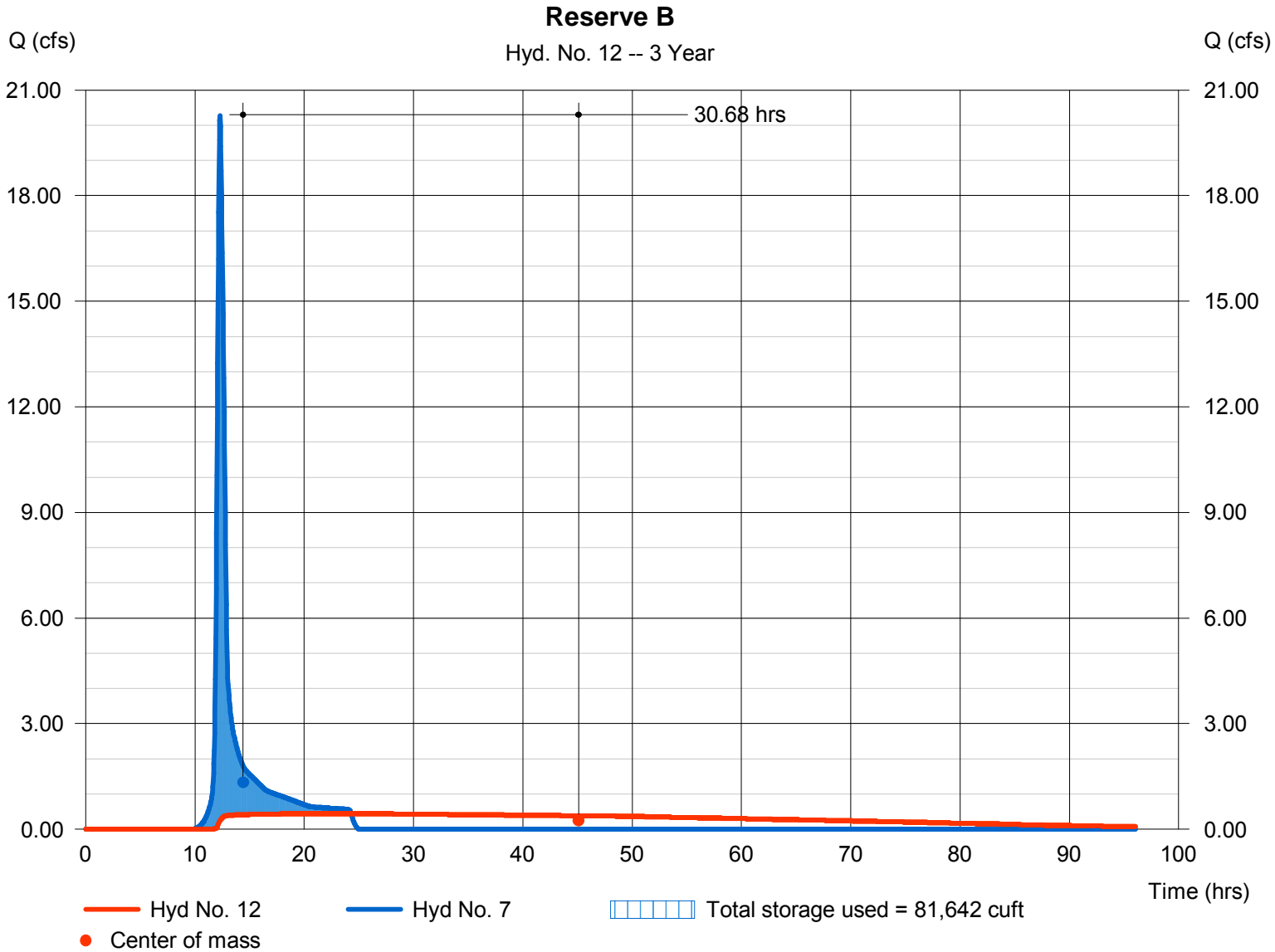
Tuesday, Nov 1, 2011

Hyd. No. 12

Reserve B

Hydrograph type	= Reservoir	Peak discharge	= 0.445 cfs
Storm frequency	= 3 yrs	Time to peak	= 24.27 hrs
Time interval	= 2 min	Hyd. volume	= 92,237 cuft
Inflow hyd. No.	= 7 - Developed - Basin 2	Max. Elevation	= 1335.36 ft
Reservoir name	= Reserve B	Max. Storage	= 81,642 cuft

Storage Indication method used.



Hydrograph Report

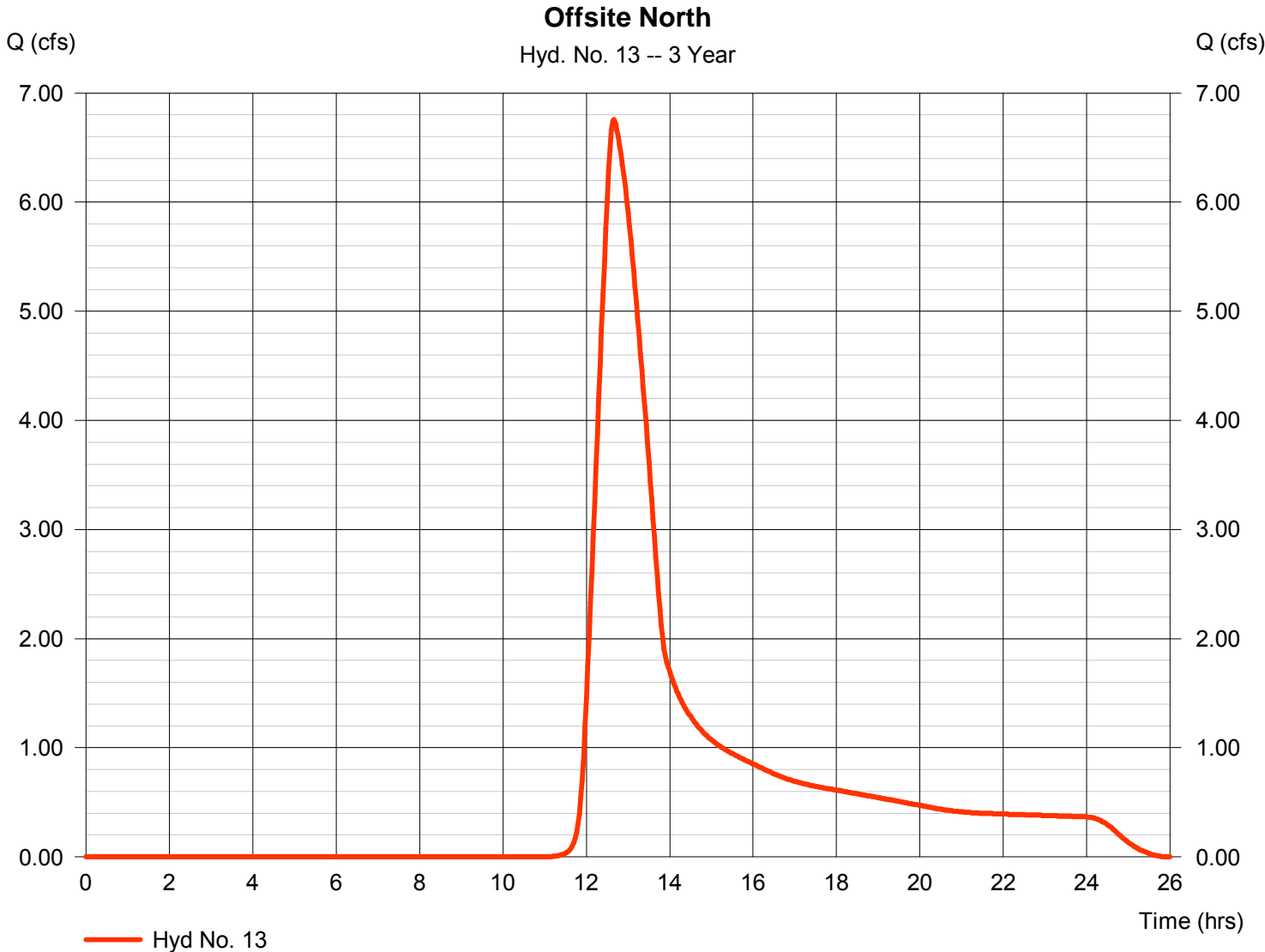
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 13

Offsite North

Hydrograph type	= SCS Runoff	Peak discharge	= 6.759 cfs
Storm frequency	= 3 yrs	Time to peak	= 12.67 hrs
Time interval	= 2 min	Hyd. volume	= 56,177 cuft
Drainage area	= 41.000 ac	Curve number	= 88
Basin Slope	= 0.3 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 74.50 min
Total precip.	= 1.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

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	65.78	2	724	208,842	-----	-----	-----	Existing Basin 1	
2	SCS Runoff	117.32	2	740	632,430	-----	-----	-----	Existing - Basin 2	
3	SCS Runoff	148.76	2	742	846,969	-----	-----	-----	Existing - Basin 3	
4	SCS Runoff	30.57	2	742	174,035	-----	-----	-----	Existing - Basin 4	
5	SCS Runoff	70.72	2	724	228,563	-----	-----	-----	Developed - Basin 1	
6	Reservoir	7.406	2	764	218,453	5	1343.34	135,258	Reserve A Pond	
7	SCS Runoff	141.18	2	736	698,386	-----	-----	-----	Developed - Basin 2	
8	SCS Runoff	168.23	2	740	918,672	-----	-----	-----	Developed - Basin 3	
9	Reservoir	88.99	2	768	918,665	8	1339.93	264,803	Reserve C Pond	
10	SCS Runoff	48.80	2	734	225,965	-----	-----	-----	Developed - Basin 4	
11	Reservoir	8.687	2	772	205,041	10	1335.43	132,102	Reserve D	
12	Reservoir	53.80	2	766	621,373	7	1337.79	365,467	Reserve B	
13	SCS Runoff	63.56	2	756	478,398	-----	-----	-----	Offsite North	
Total Site.gpw					Return Period: 5 Year			Tuesday, Nov 1, 2011		

Hydrograph Report

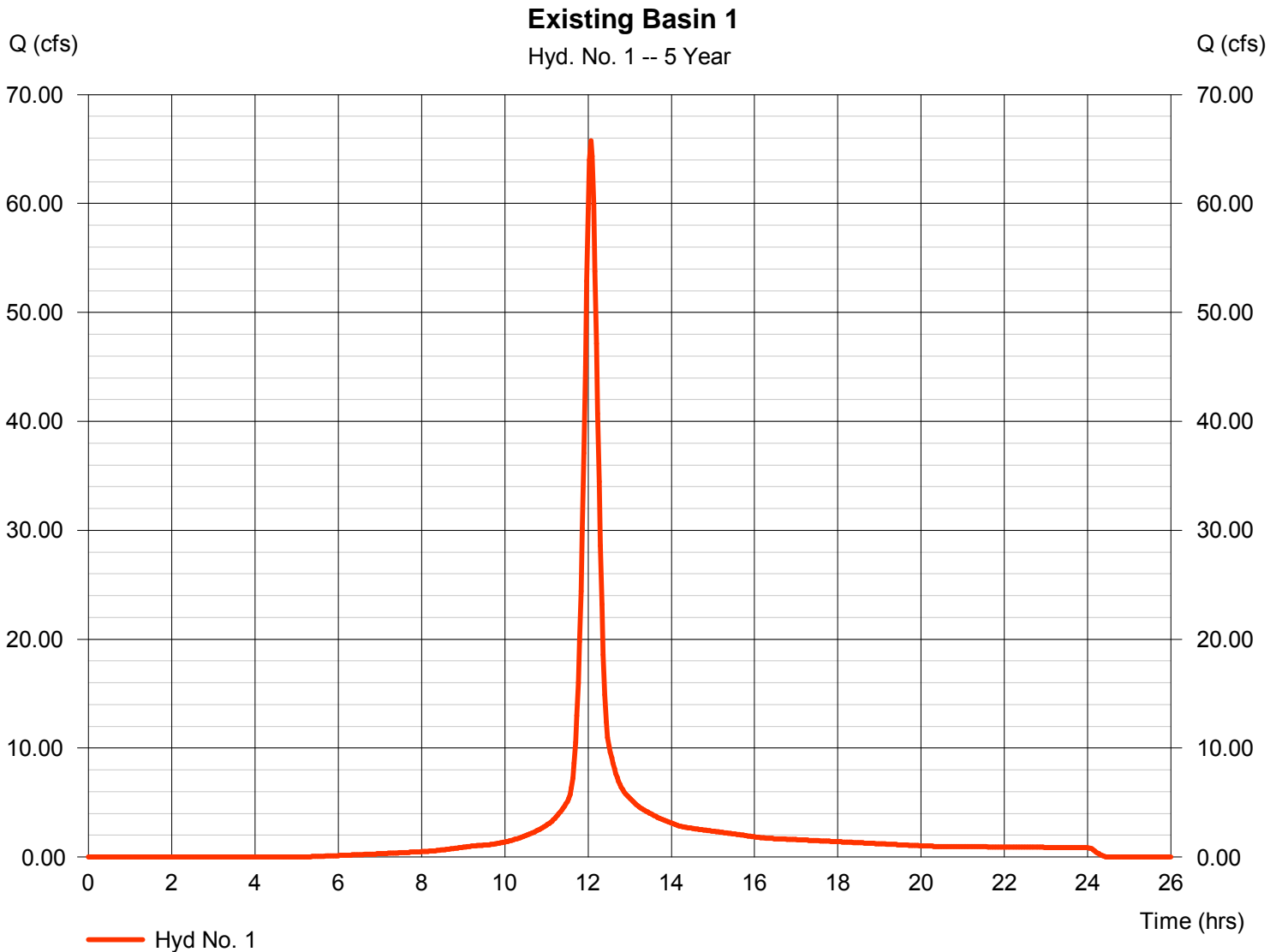
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 1

Existing Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 65.78 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 208,842 cuft
Drainage area	= 18.000 ac	Curve number	= 88
Basin Slope	= 0.7 %	Hydraulic length	= 600 ft
Tc method	= LAG	Time of conc. (Tc)	= 19.20 min
Total precip.	= 4.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

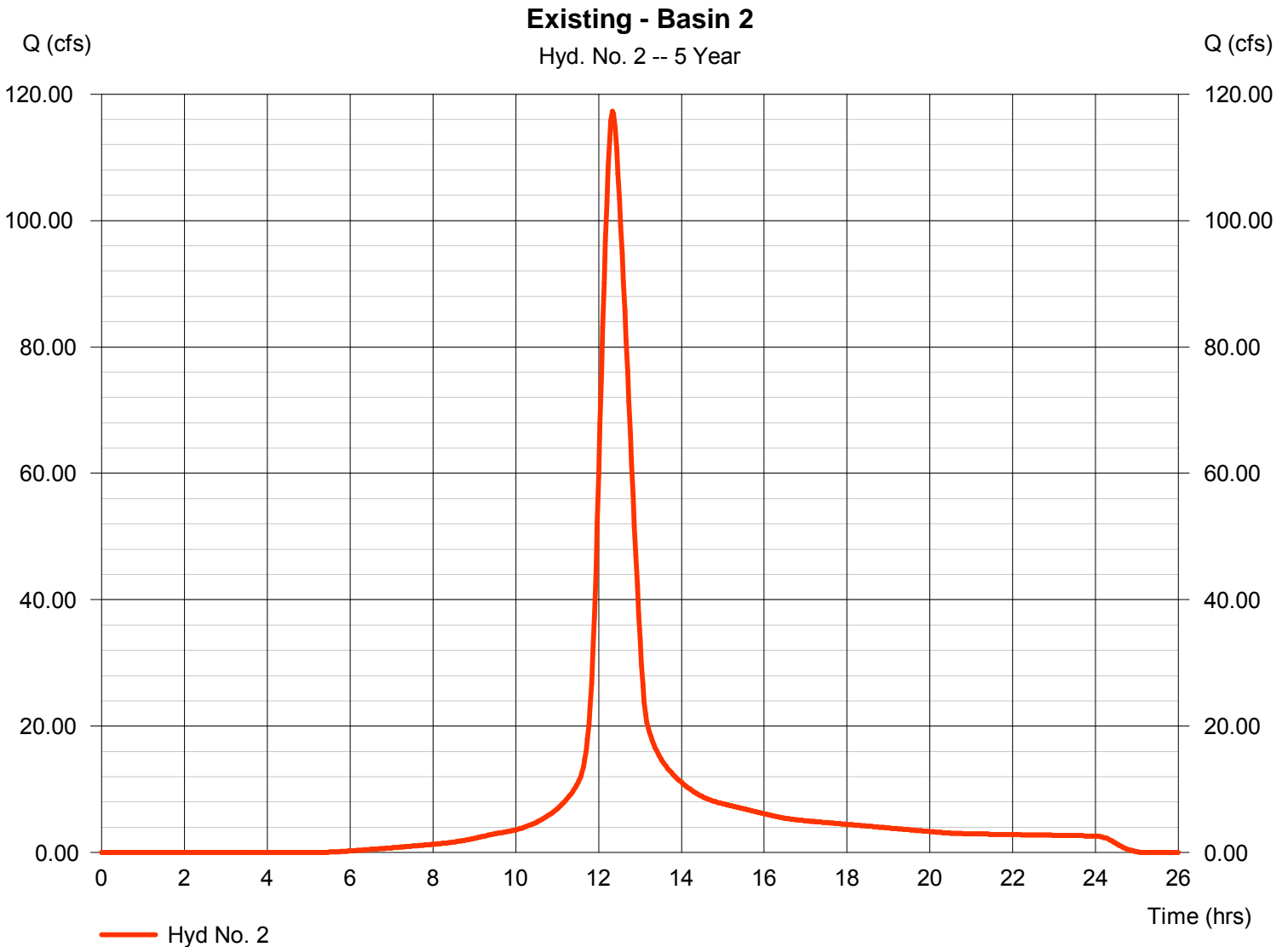
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 2

Existing - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 117.32 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.33 hrs
Time interval	= 2 min	Hyd. volume	= 632,430 cuft
Drainage area	= 55.000 ac	Curve number	= 88
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 45.40 min
Total precip.	= 4.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

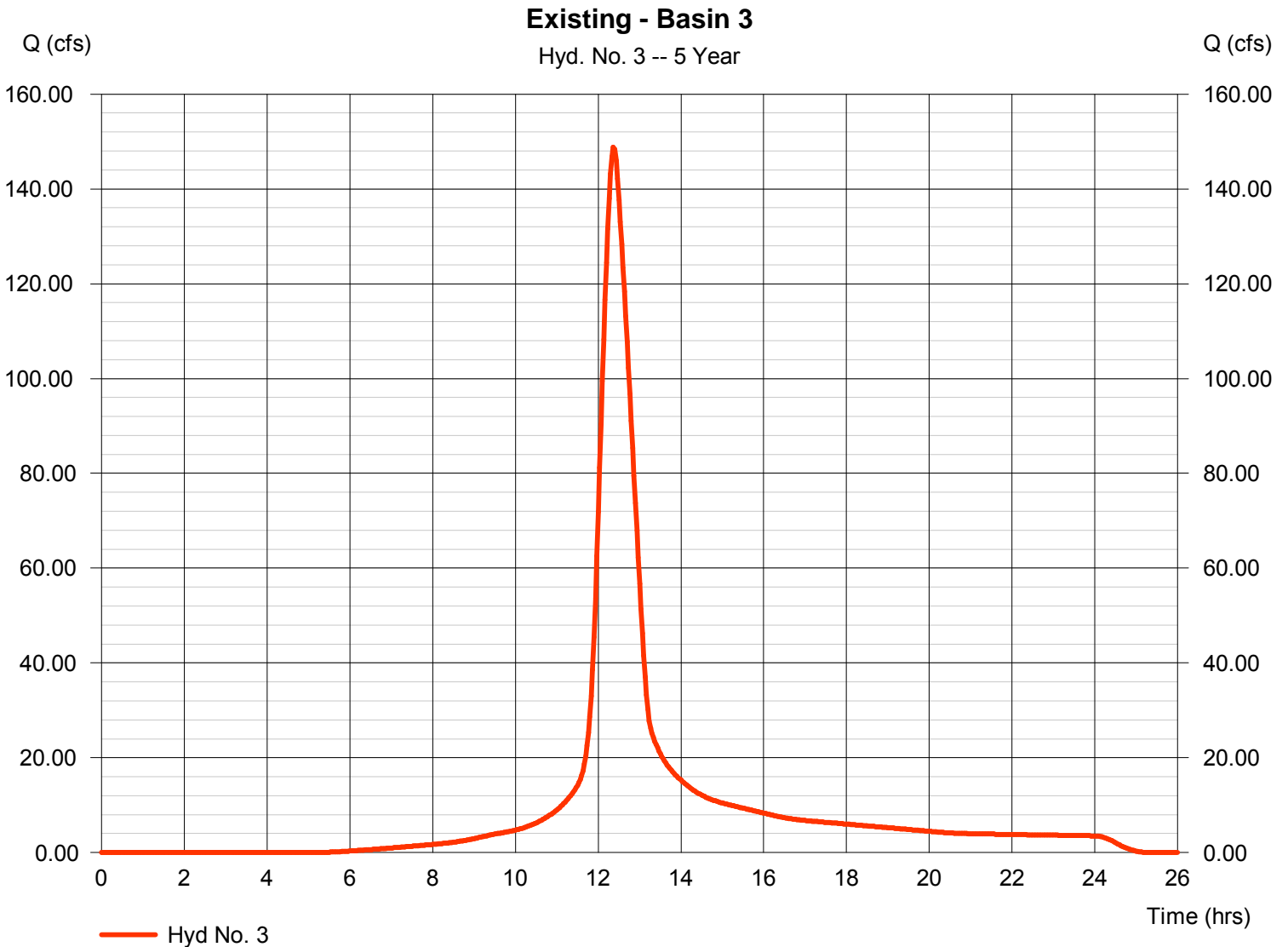
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 3

Existing - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 148.76 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 846,969 cuft
Drainage area	= 73.000 ac	Curve number	= 88
Basin Slope	= 0.6 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 49.90 min
Total precip.	= 4.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

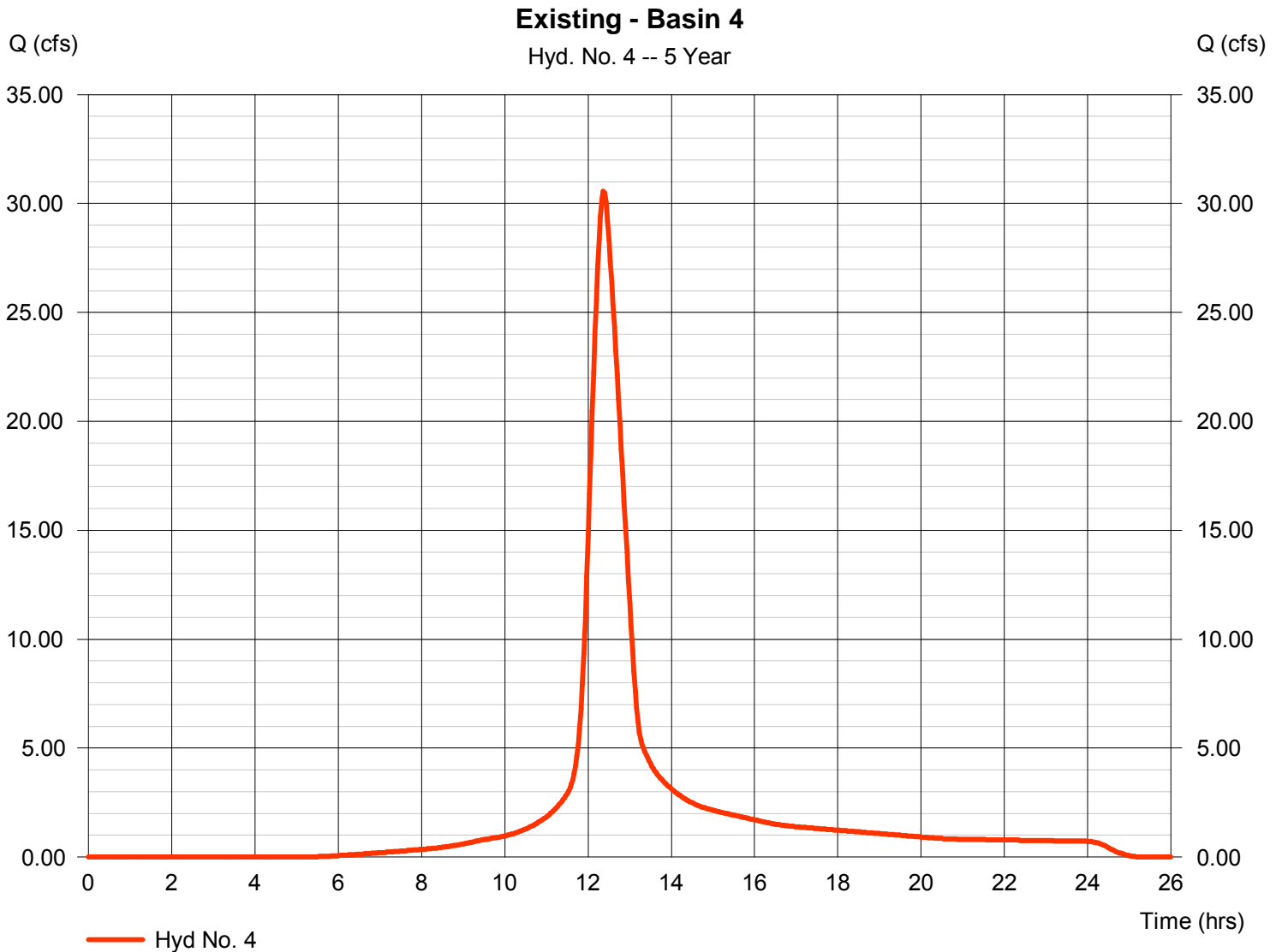
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 4

Existing - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 30.57 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 174,035 cuft
Drainage area	= 15.000 ac	Curve number	= 88
Basin Slope	= 0.4 %	Hydraulic length	= 1400 ft
Tc method	= LAG	Time of conc. (Tc)	= 50.00 min
Total precip.	= 4.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

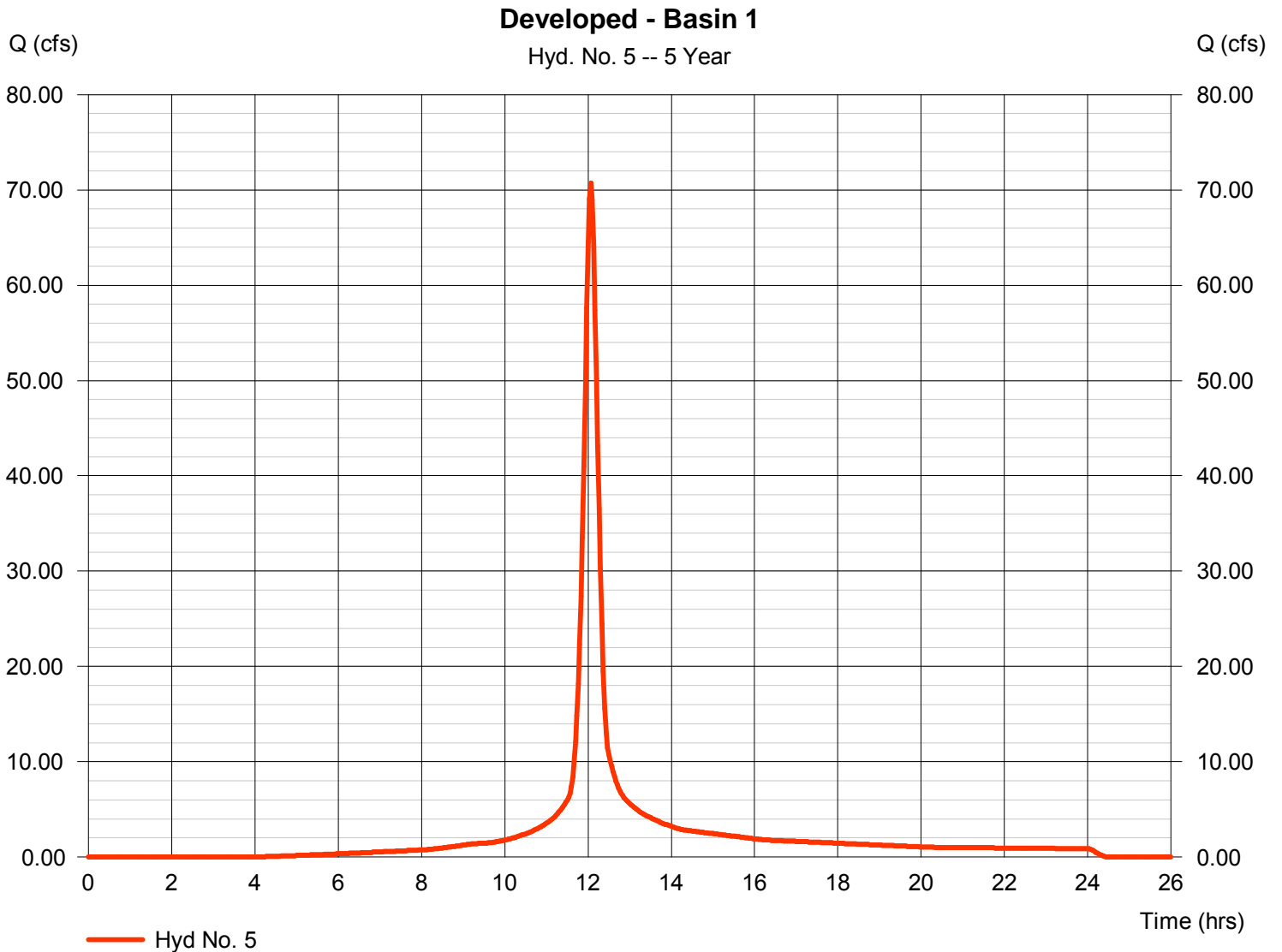
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Tuesday, Nov 1, 2011

Hyd. No. 5

Developed - Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 70.72 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 228,563 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 500 ft
Tc method	= LAG	Time of conc. (Tc)	= 17.40 min
Total precip.	= 4.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

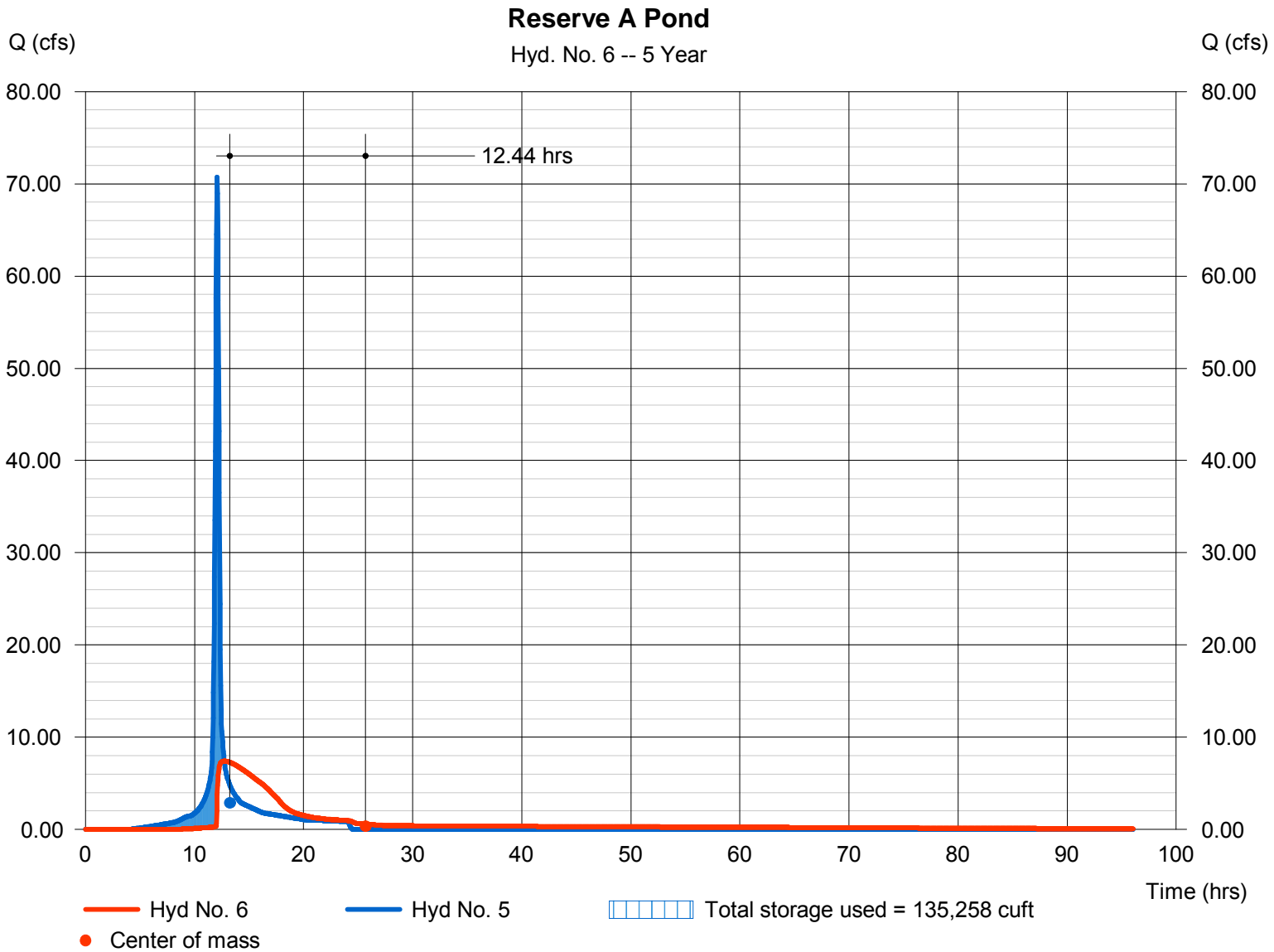
Tuesday, Nov 1, 2011

Hyd. No. 6

Reserve A Pond

Hydrograph type	= Reservoir	Peak discharge	= 7.406 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.73 hrs
Time interval	= 2 min	Hyd. volume	= 218,453 cuft
Inflow hyd. No.	= 5 - Developed - Basin 1	Max. Elevation	= 1343.34 ft
Reservoir name	= Reserve A	Max. Storage	= 135,258 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

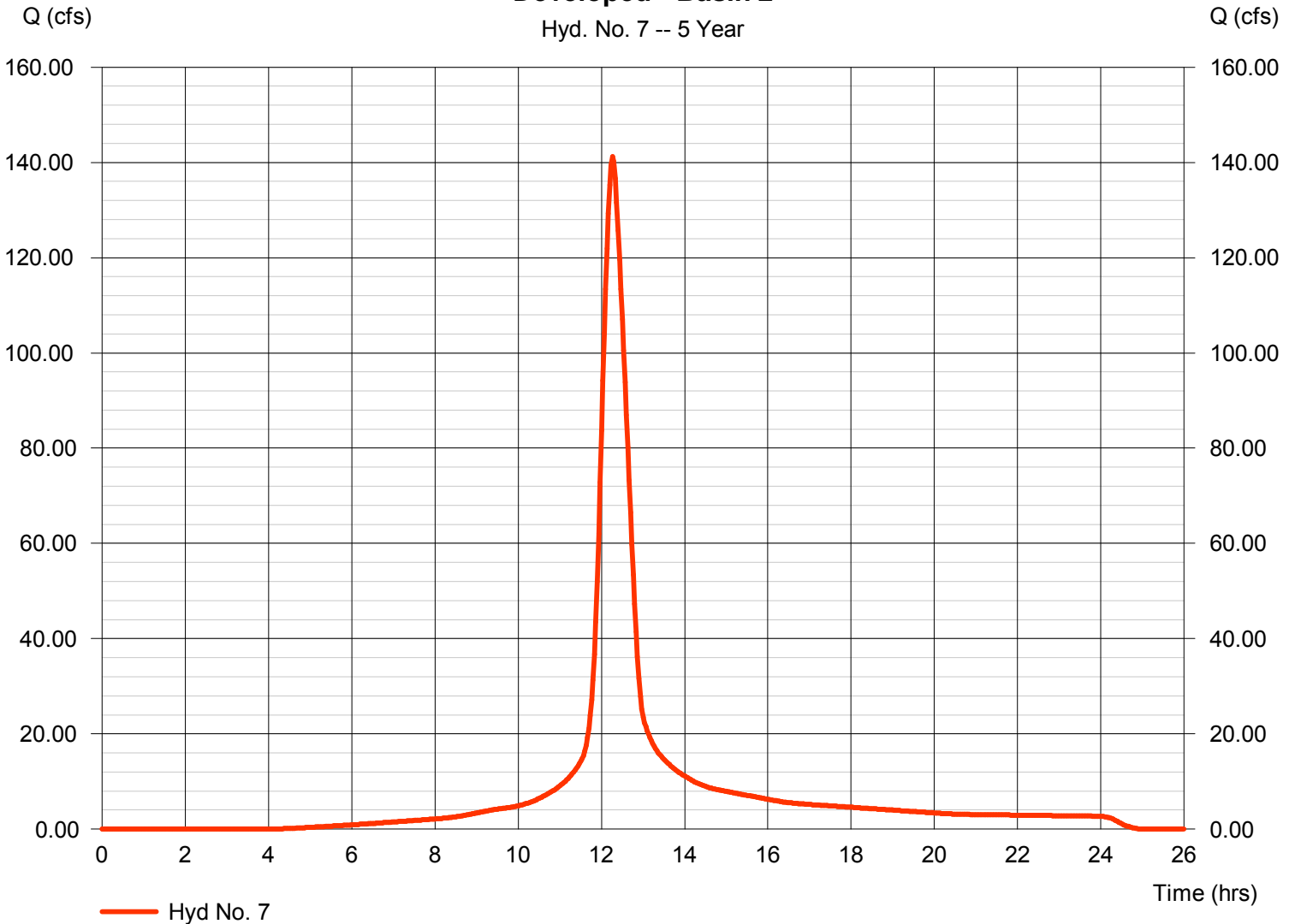
Hyd. No. 7

Developed - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 141.18 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.27 hrs
Time interval	= 2 min	Hyd. volume	= 698,386 cuft
Drainage area	= 55.000 ac	Curve number	= 91
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 40.30 min
Total precip.	= 4.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Developed - Basin 2

Hyd. No. 7 -- 5 Year



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

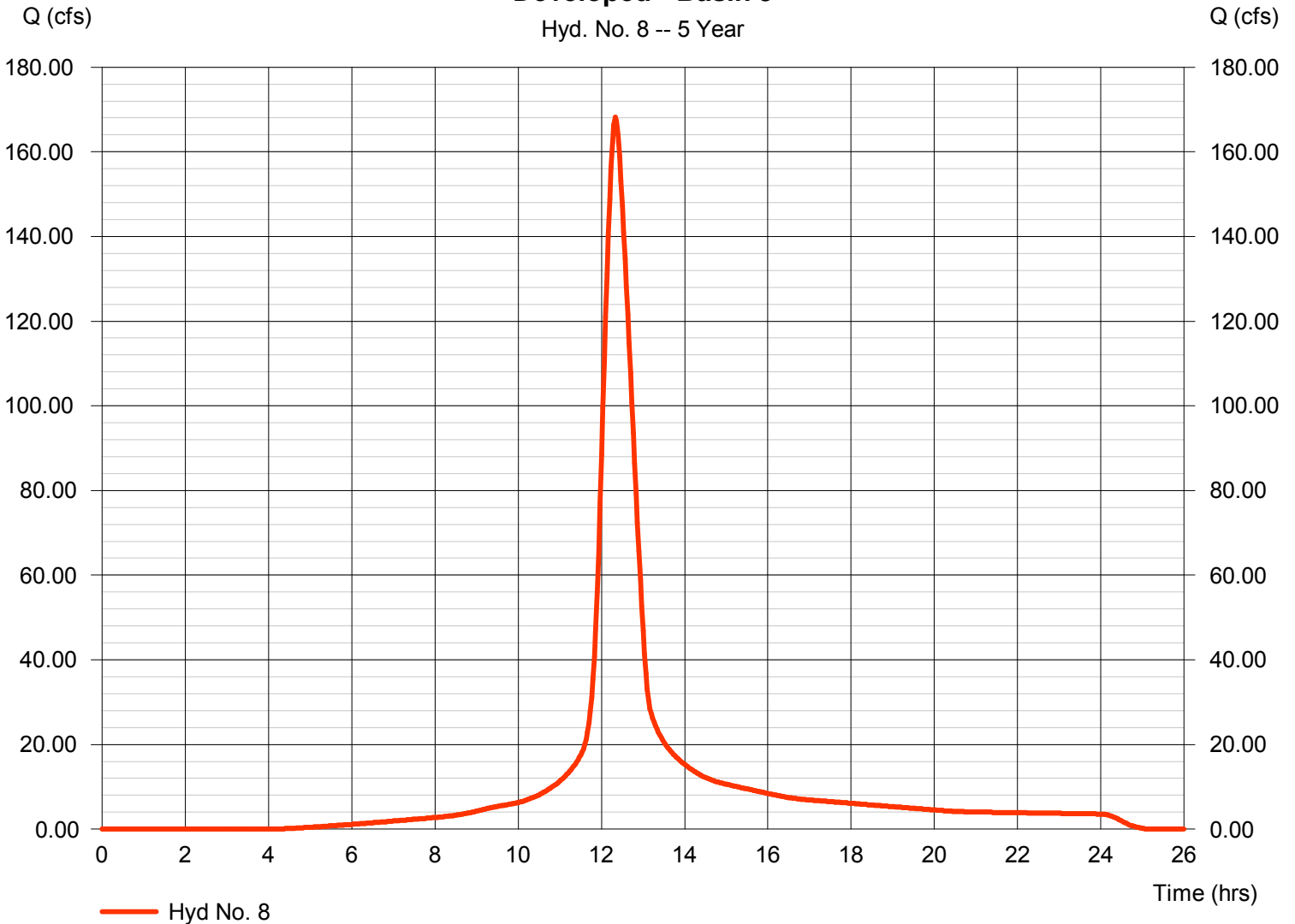
Hyd. No. 8

Developed - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 168.23 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.33 hrs
Time interval	= 2 min	Hyd. volume	= 918,672 cuft
Drainage area	= 73.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 44.10 min
Total precip.	= 4.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Developed - Basin 3

Hyd. No. 8 -- 5 Year



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

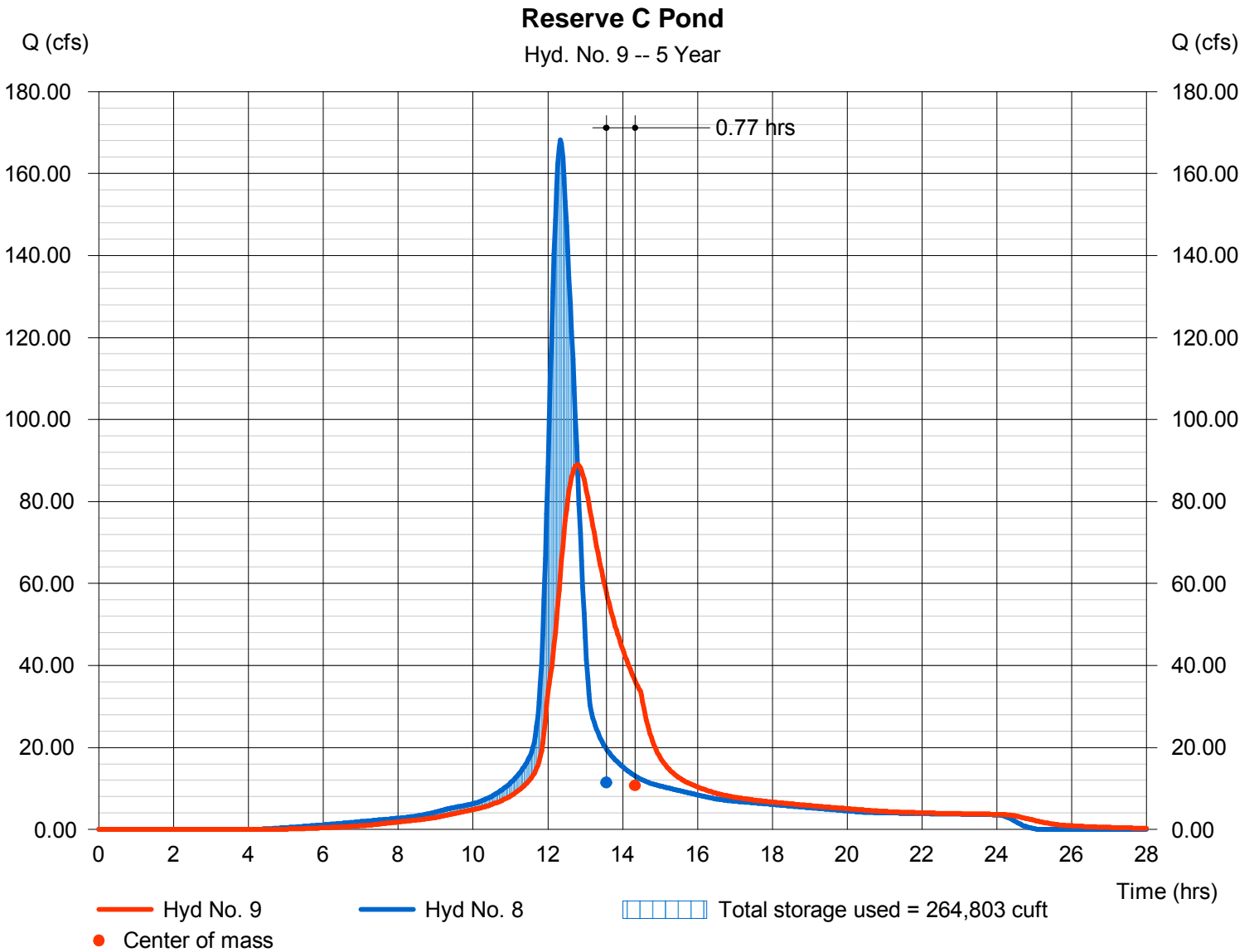
Tuesday, Nov 1, 2011

Hyd. No. 9

Reserve C Pond

Hydrograph type	= Reservoir	Peak discharge	= 88.99 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.80 hrs
Time interval	= 2 min	Hyd. volume	= 918,665 cuft
Inflow hyd. No.	= 8 - Developed - Basin 3	Max. Elevation	= 1339.93 ft
Reservoir name	= Reserve C Pond	Max. Storage	= 264,803 cuft

Storage Indication method used.



Hydrograph Report

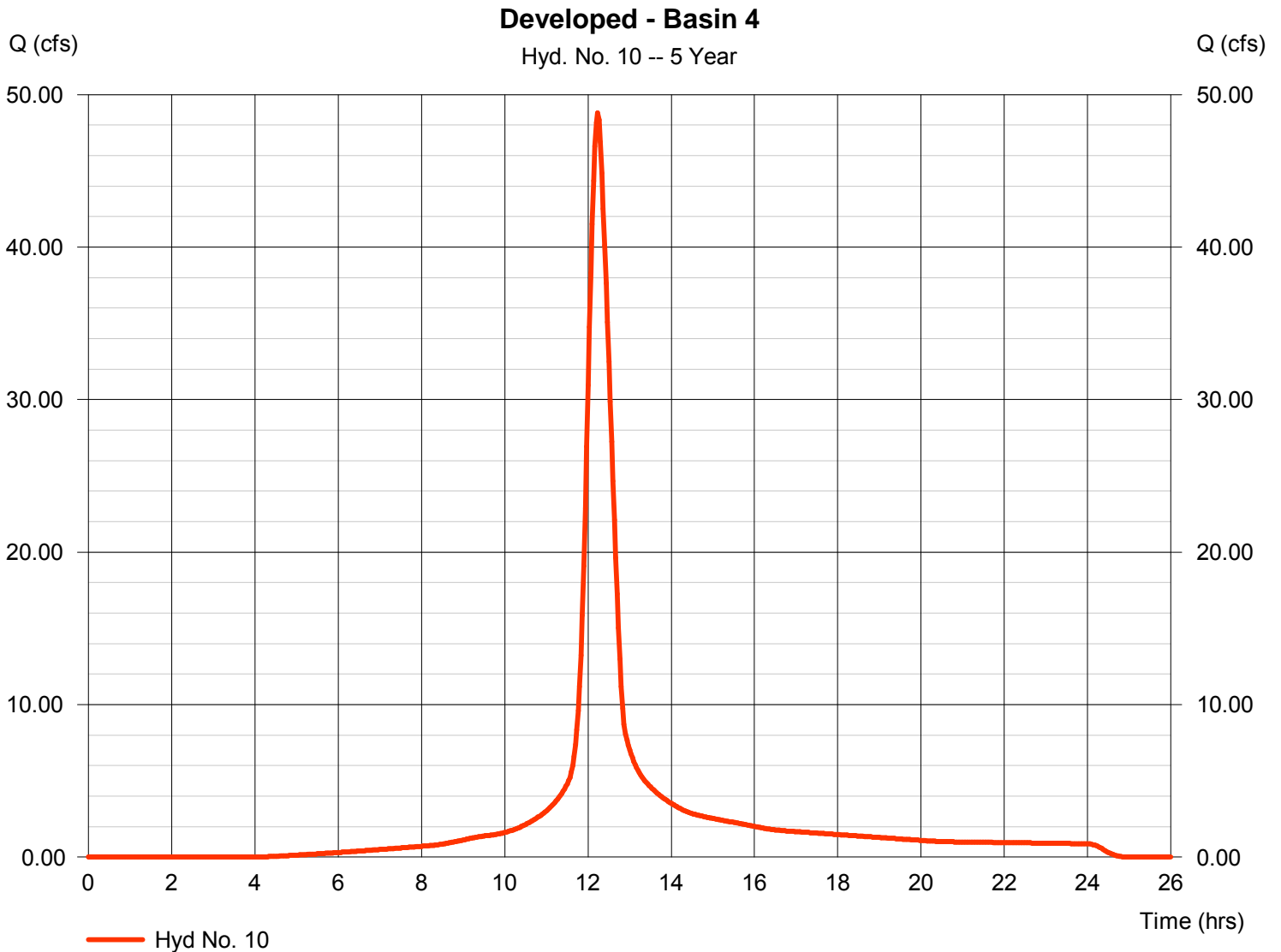
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 10

Developed - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 48.80 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.23 hrs
Time interval	= 2 min	Hyd. volume	= 225,965 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1200 ft
Tc method	= LAG	Time of conc. (Tc)	= 35.00 min
Total precip.	= 4.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

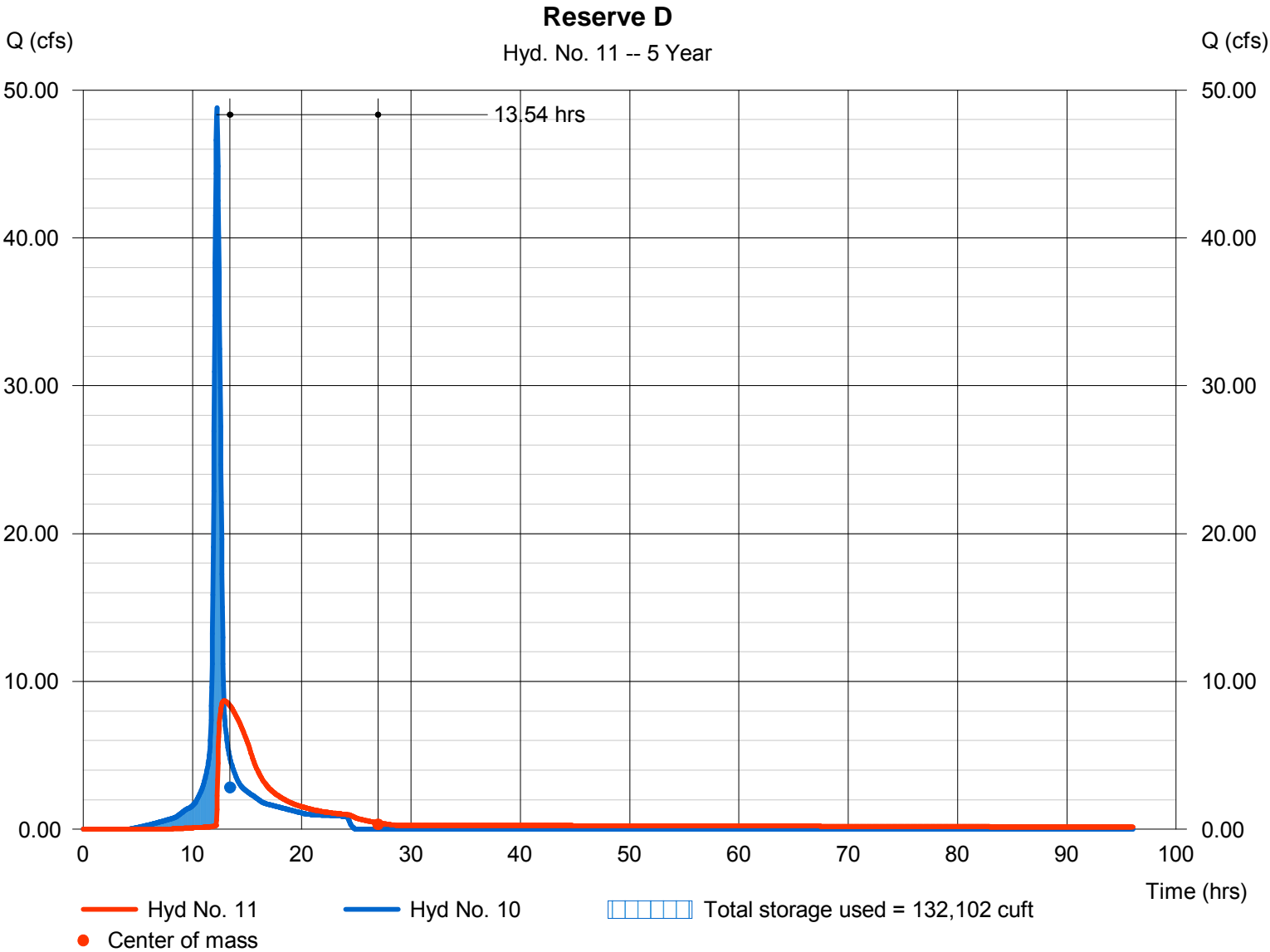
Tuesday, Nov 1, 2011

Hyd. No. 11

Reserve D

Hydrograph type	= Reservoir	Peak discharge	= 8.687 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.87 hrs
Time interval	= 2 min	Hyd. volume	= 205,041 cuft
Inflow hyd. No.	= 10 - Developed - Basin 4	Max. Elevation	= 1335.43 ft
Reservoir name	= Reserve D	Max. Storage	= 132,102 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

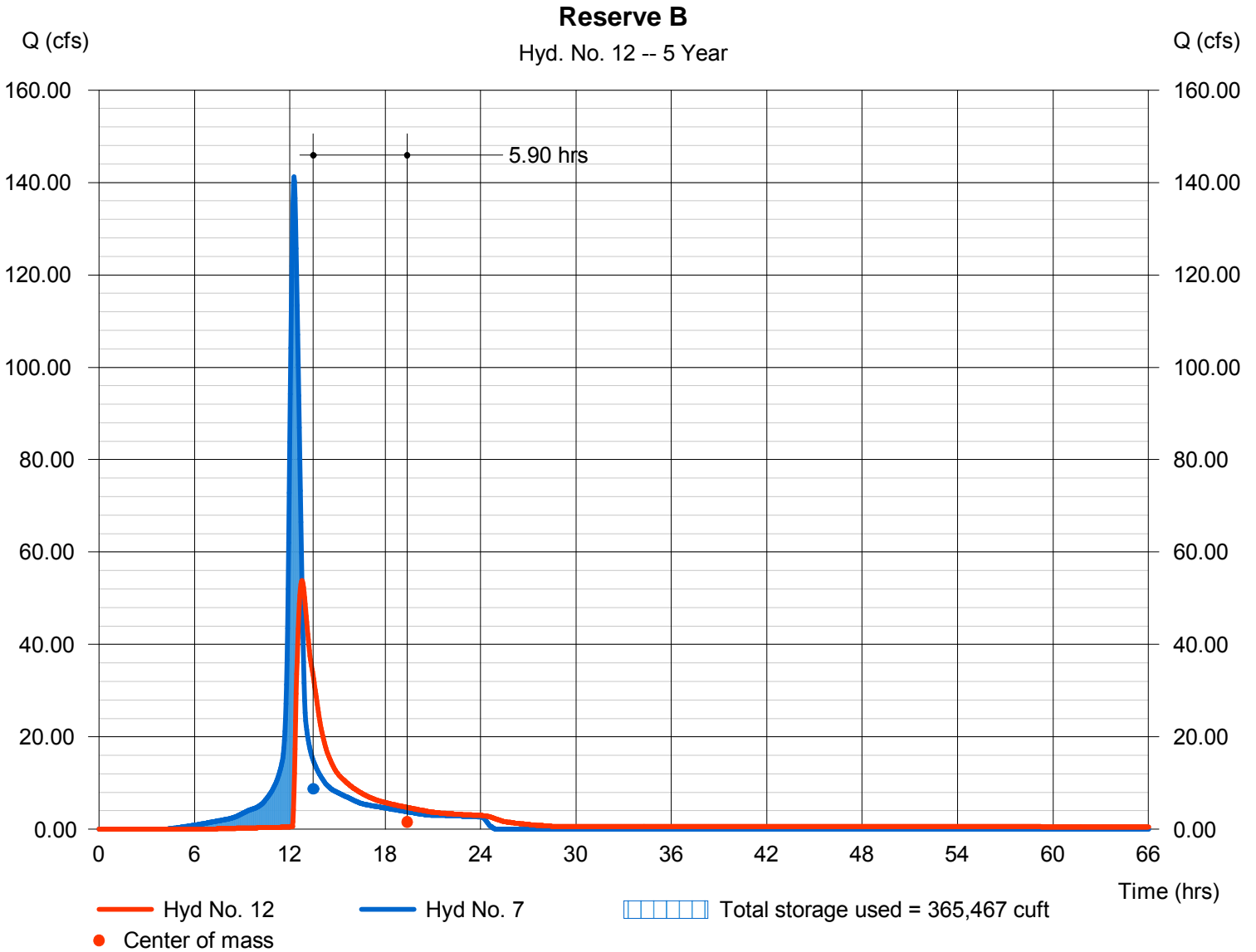
Tuesday, Nov 1, 2011

Hyd. No. 12

Reserve B

Hydrograph type	= Reservoir	Peak discharge	= 53.80 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.77 hrs
Time interval	= 2 min	Hyd. volume	= 621,373 cuft
Inflow hyd. No.	= 7 - Developed - Basin 2	Max. Elevation	= 1337.79 ft
Reservoir name	= Reserve B	Max. Storage	= 365,467 cuft

Storage Indication method used.



Hydrograph Report

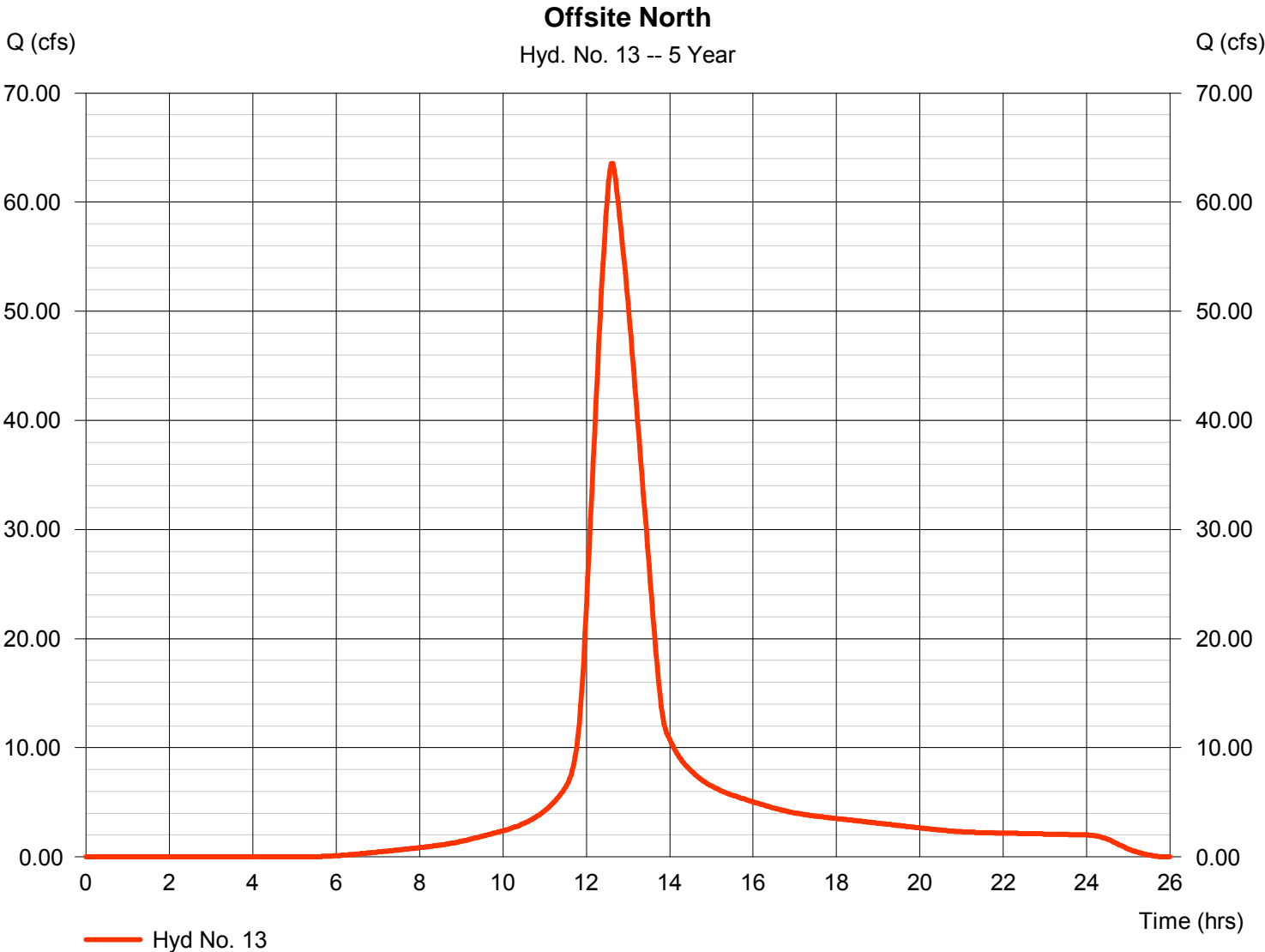
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 13

Offsite North

Hydrograph type	= SCS Runoff	Peak discharge	= 63.56 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.60 hrs
Time interval	= 2 min	Hyd. volume	= 478,398 cuft
Drainage area	= 41.000 ac	Curve number	= 88
Basin Slope	= 0.3 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 74.50 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® 2011 by Autodesk, Inc. v8

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	78.83	2	724	252,161	-----	-----	-----	Existing Basin 1
2	SCS Runoff	140.92	2	740	763,615	-----	-----	-----	Existing - Basin 2
3	SCS Runoff	178.72	2	742	1,022,655	-----	-----	-----	Existing - Basin 3
4	SCS Runoff	36.72	2	742	210,135	-----	-----	-----	Existing - Basin 4
5	SCS Runoff	83.69	2	724	272,889	-----	-----	-----	Developed - Basin 1
6	Reservoir	8.552	2	764	262,717	5	1343.76	162,403	Reserve A Pond
7	SCS Runoff	167.31	2	736	833,828	-----	-----	-----	Developed - Basin 2
8	SCS Runoff	199.42	2	740	1,096,836	-----	-----	-----	Developed - Basin 3
9	Reservoir	102.52	2	768	1,096,829	8	1340.12	318,476	Reserve C Pond
10	SCS Runoff	57.82	2	734	269,788	-----	-----	-----	Developed - Basin 4
11	Reservoir	10.17	2	772	248,712	10	1335.80	157,171	Reserve D
12	Reservoir	75.34	2	762	756,425	7	1338.14	410,763	Reserve B
13	SCS Runoff	76.43	2	756	577,631	-----	-----	-----	Offsite North
Total Site.gpw					Return Period: 10 Year			Tuesday, Nov 1, 2011	

Hydrograph Report

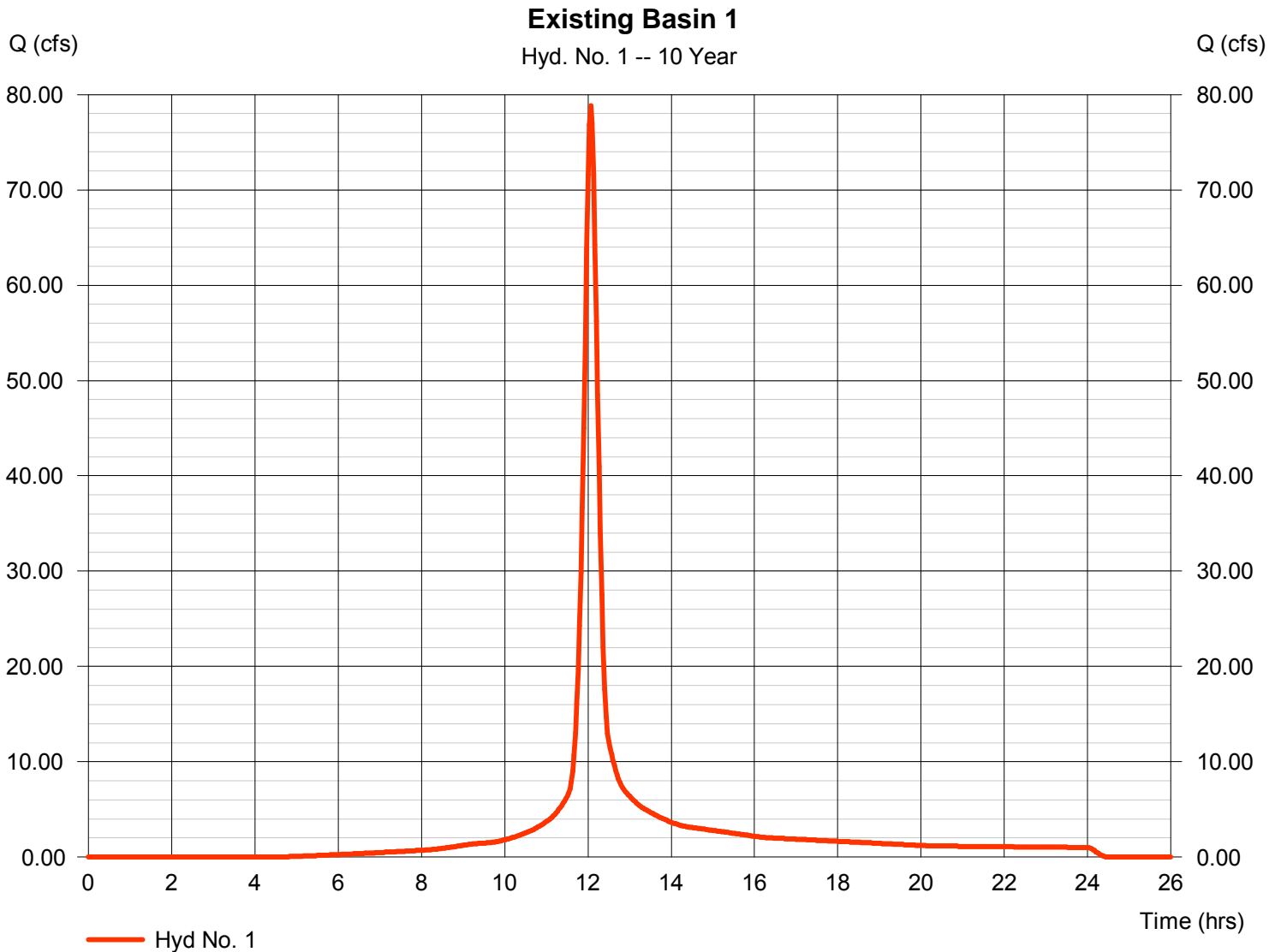
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 1

Existing Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 78.83 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 252,161 cuft
Drainage area	= 18.000 ac	Curve number	= 88
Basin Slope	= 0.7 %	Hydraulic length	= 600 ft
Tc method	= LAG	Time of conc. (Tc)	= 19.20 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

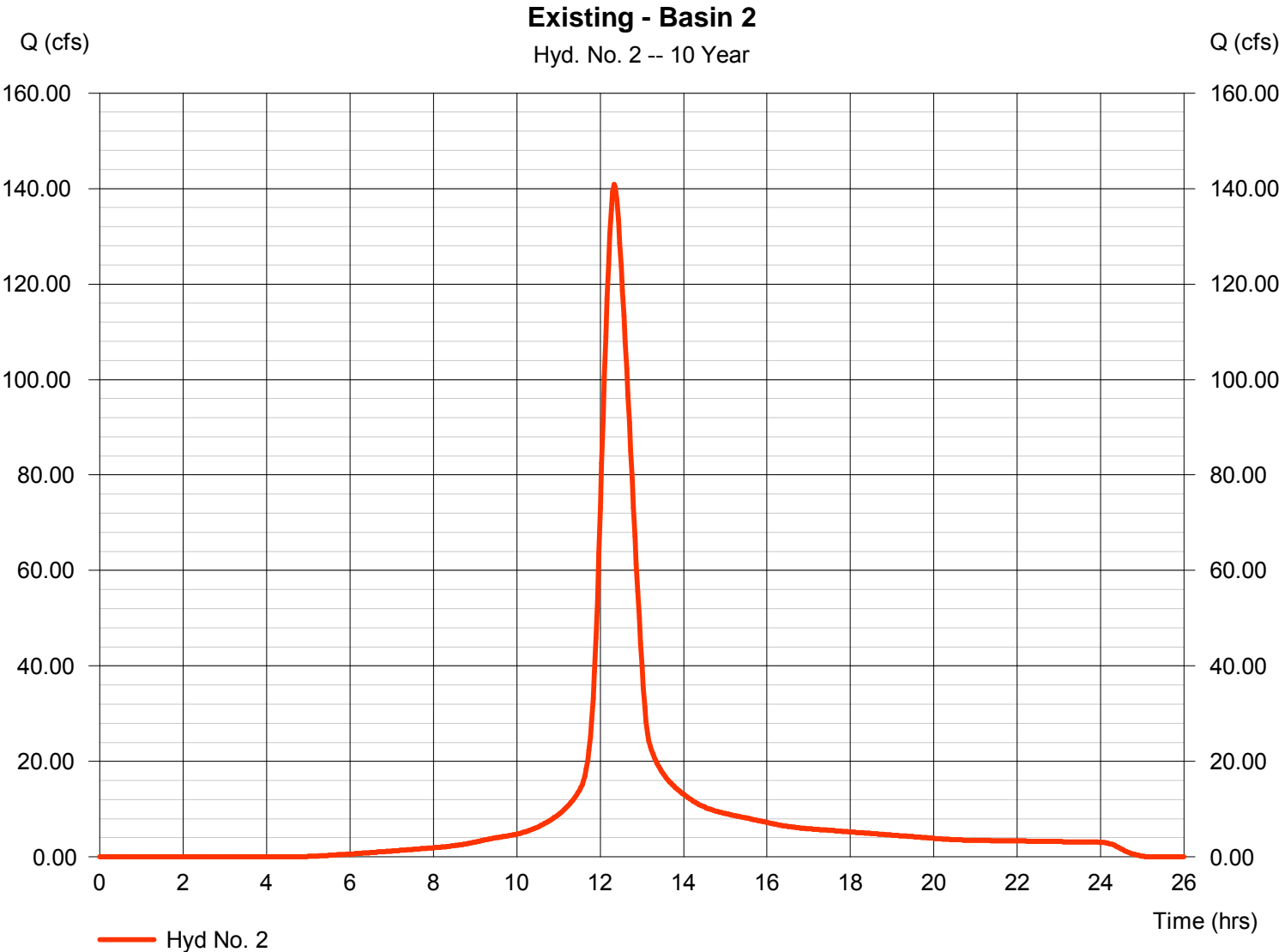


Hydrograph Report

Hyd. No. 2

Existing - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 140.92 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.33 hrs
Time interval	= 2 min	Hyd. volume	= 763,615 cuft
Drainage area	= 55.000 ac	Curve number	= 88
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 45.40 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

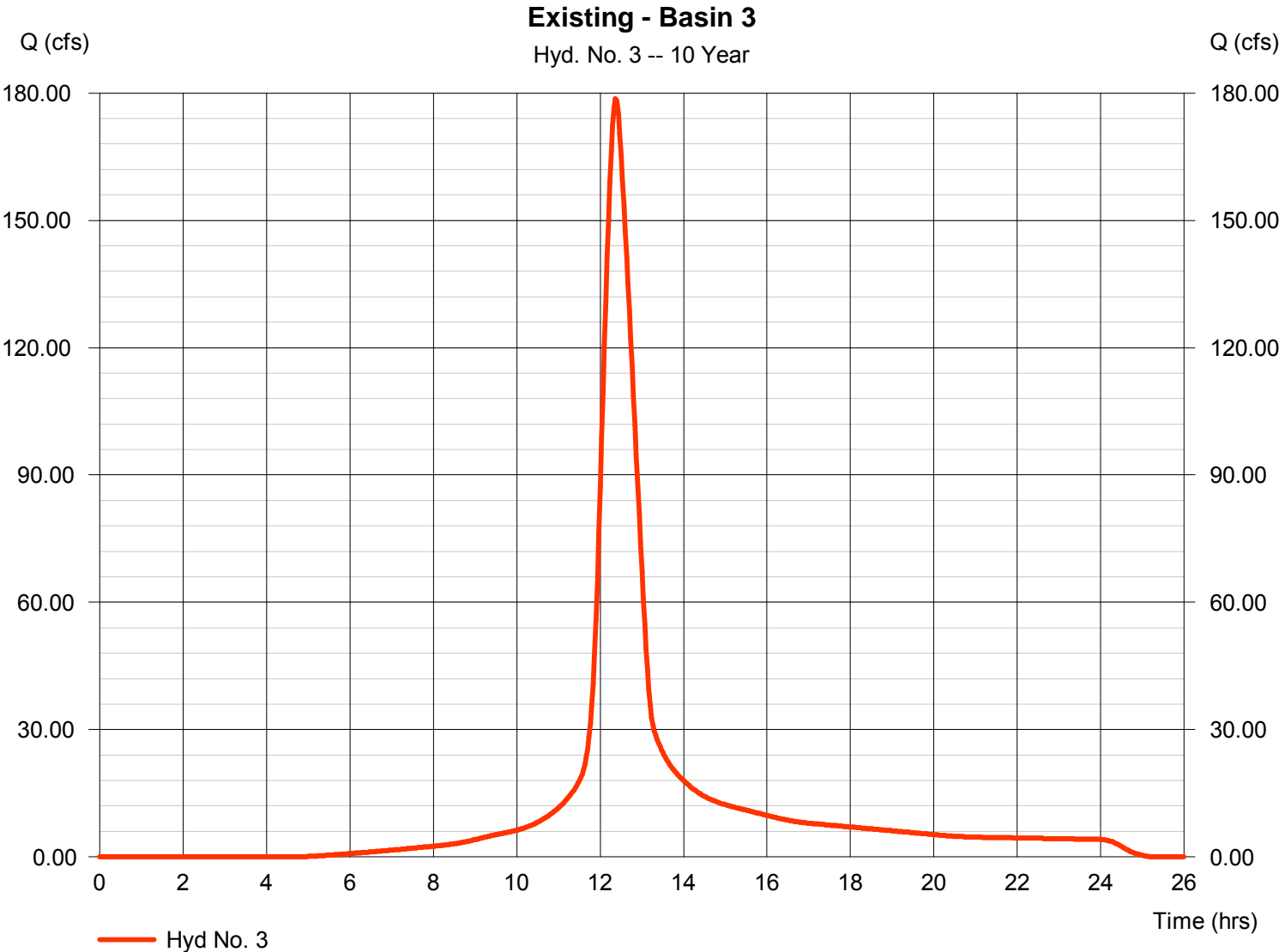


Hydrograph Report

Hyd. No. 3

Existing - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 178.72 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 1,022,655 cuft
Drainage area	= 73.000 ac	Curve number	= 88
Basin Slope	= 0.6 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 49.90 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

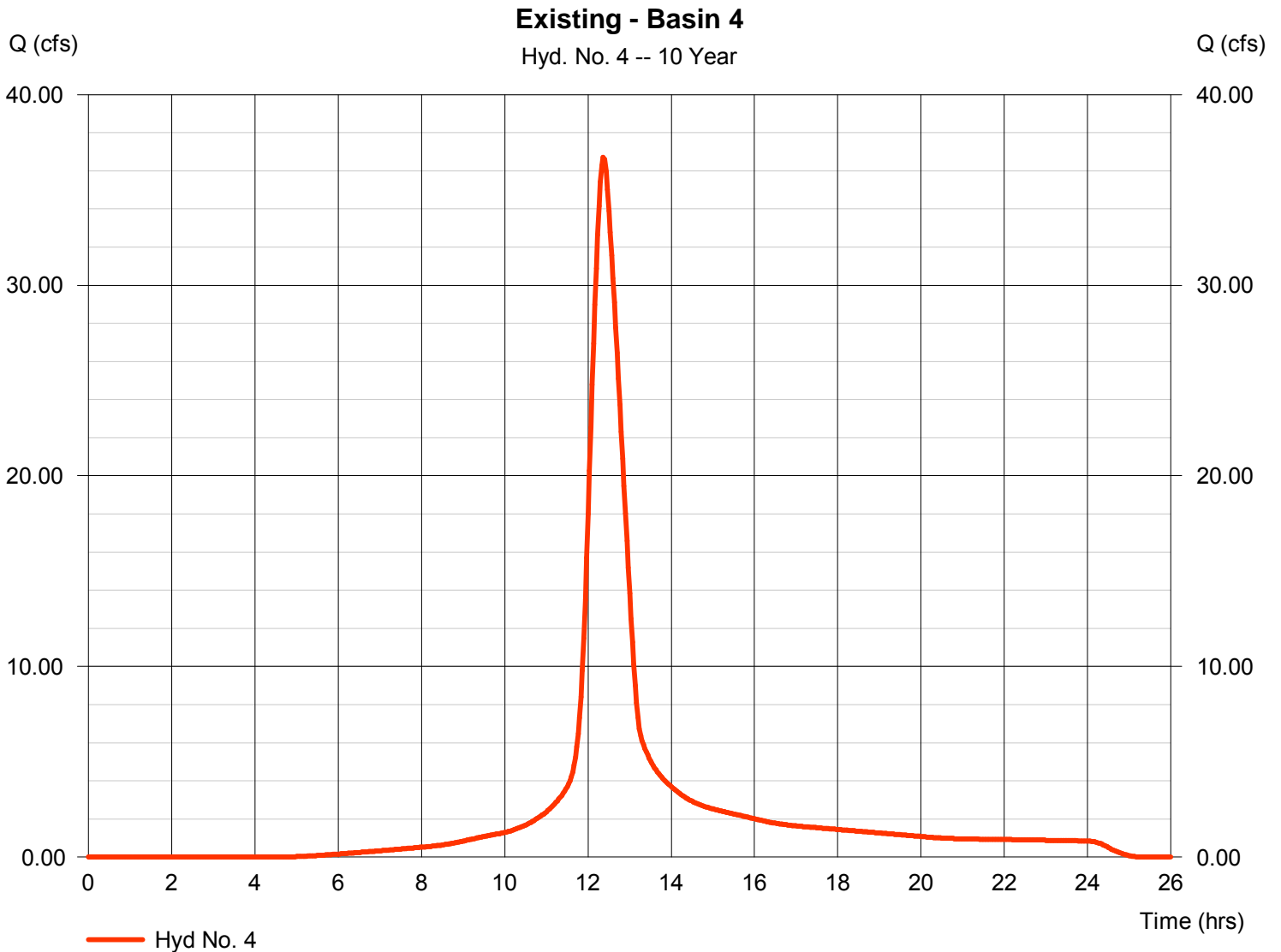
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 4

Existing - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 36.72 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 210,135 cuft
Drainage area	= 15.000 ac	Curve number	= 88
Basin Slope	= 0.4 %	Hydraulic length	= 1400 ft
Tc method	= LAG	Time of conc. (Tc)	= 50.00 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

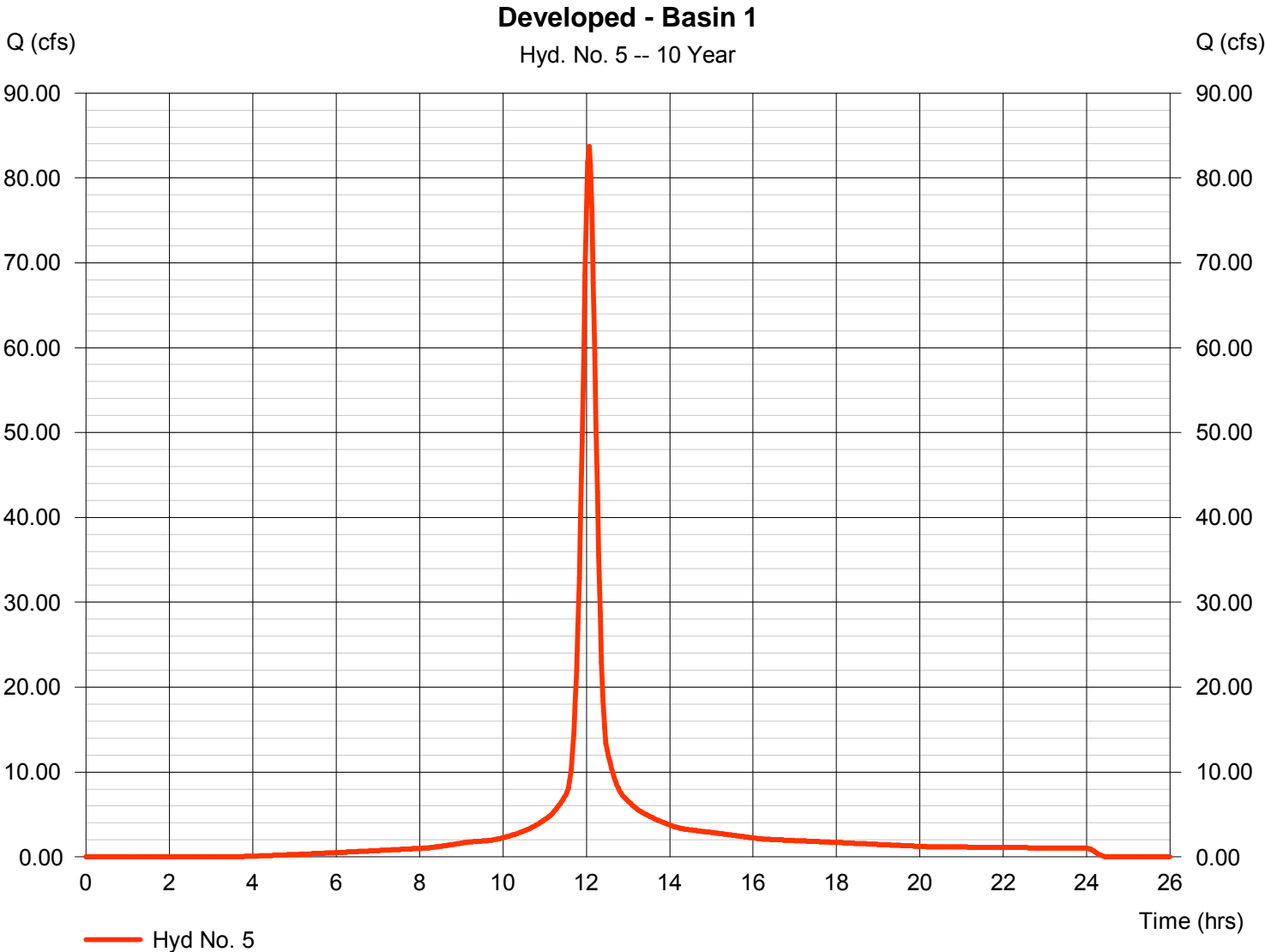


Hydrograph Report

Hyd. No. 5

Developed - Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 83.69 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 272,889 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 500 ft
Tc method	= LAG	Time of conc. (Tc)	= 17.40 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

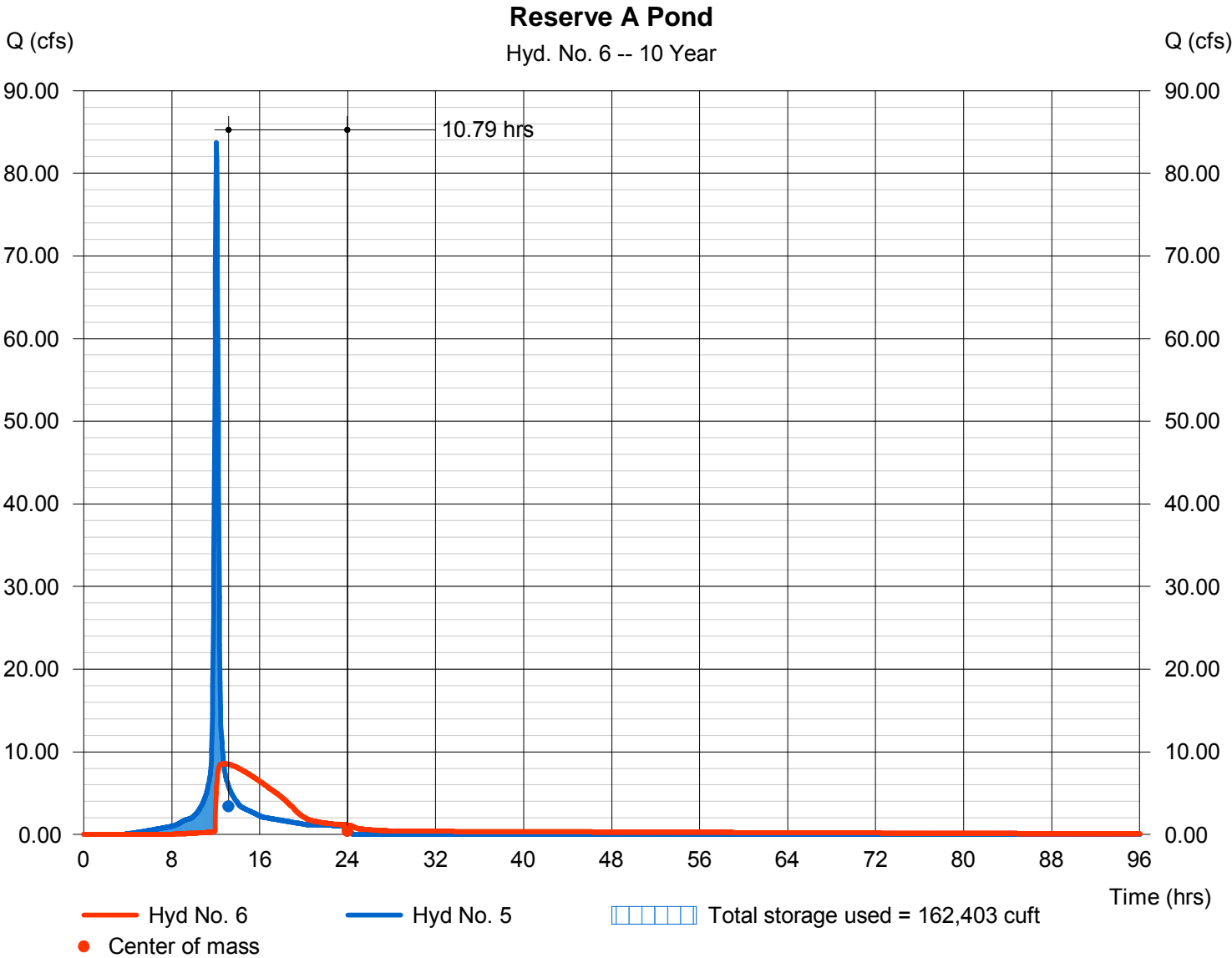
Tuesday, Nov 1, 2011

Hyd. No. 6

Reserve A Pond

Hydrograph type	= Reservoir	Peak discharge	= 8.552 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.73 hrs
Time interval	= 2 min	Hyd. volume	= 262,717 cuft
Inflow hyd. No.	= 5 - Developed - Basin 1	Max. Elevation	= 1343.76 ft
Reservoir name	= Reserve A	Max. Storage	= 162,403 cuft

Storage Indication method used.



Hydrograph Report

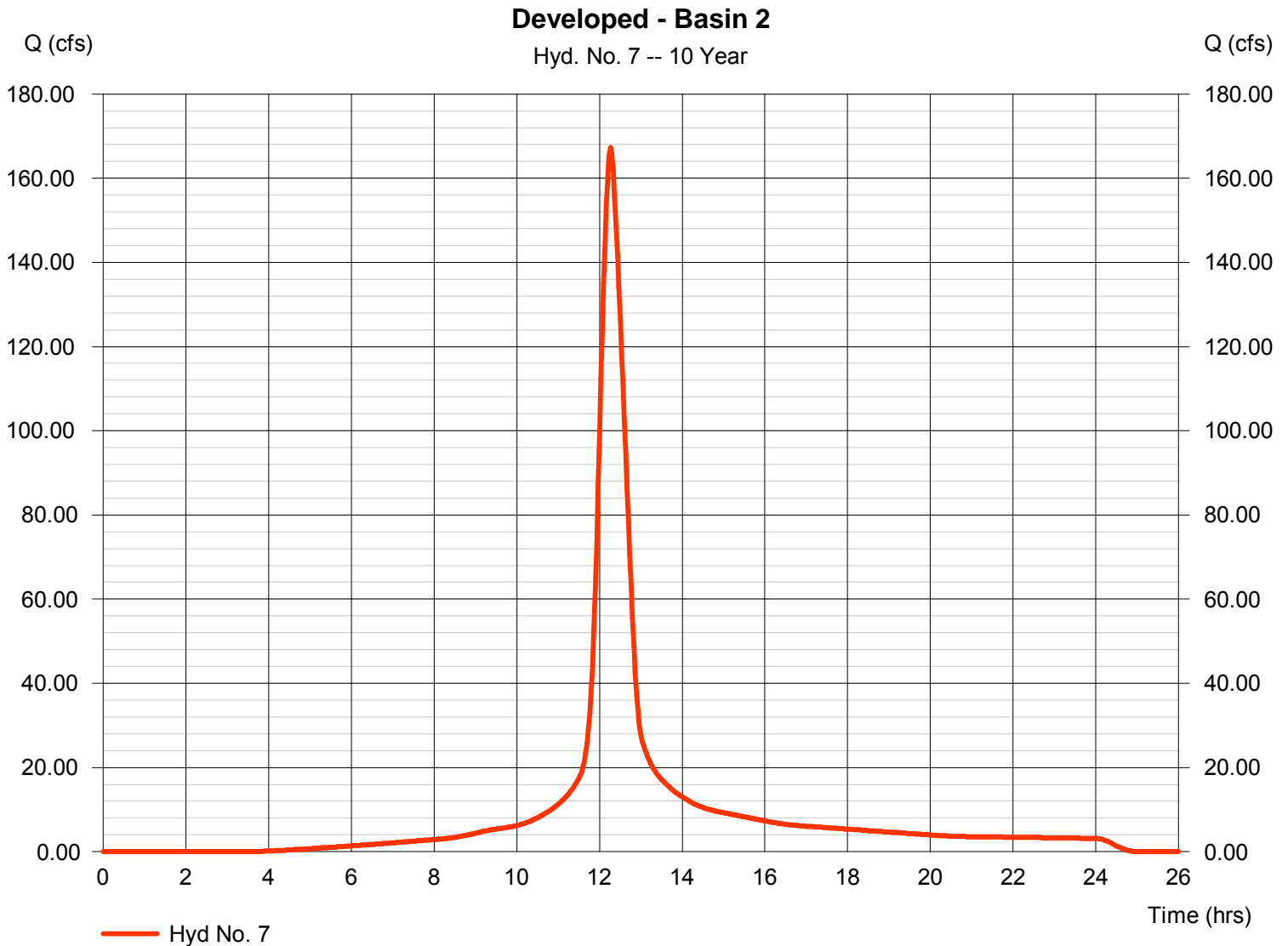
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 7

Developed - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 167.31 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.27 hrs
Time interval	= 2 min	Hyd. volume	= 833,828 cuft
Drainage area	= 55.000 ac	Curve number	= 91
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 40.30 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

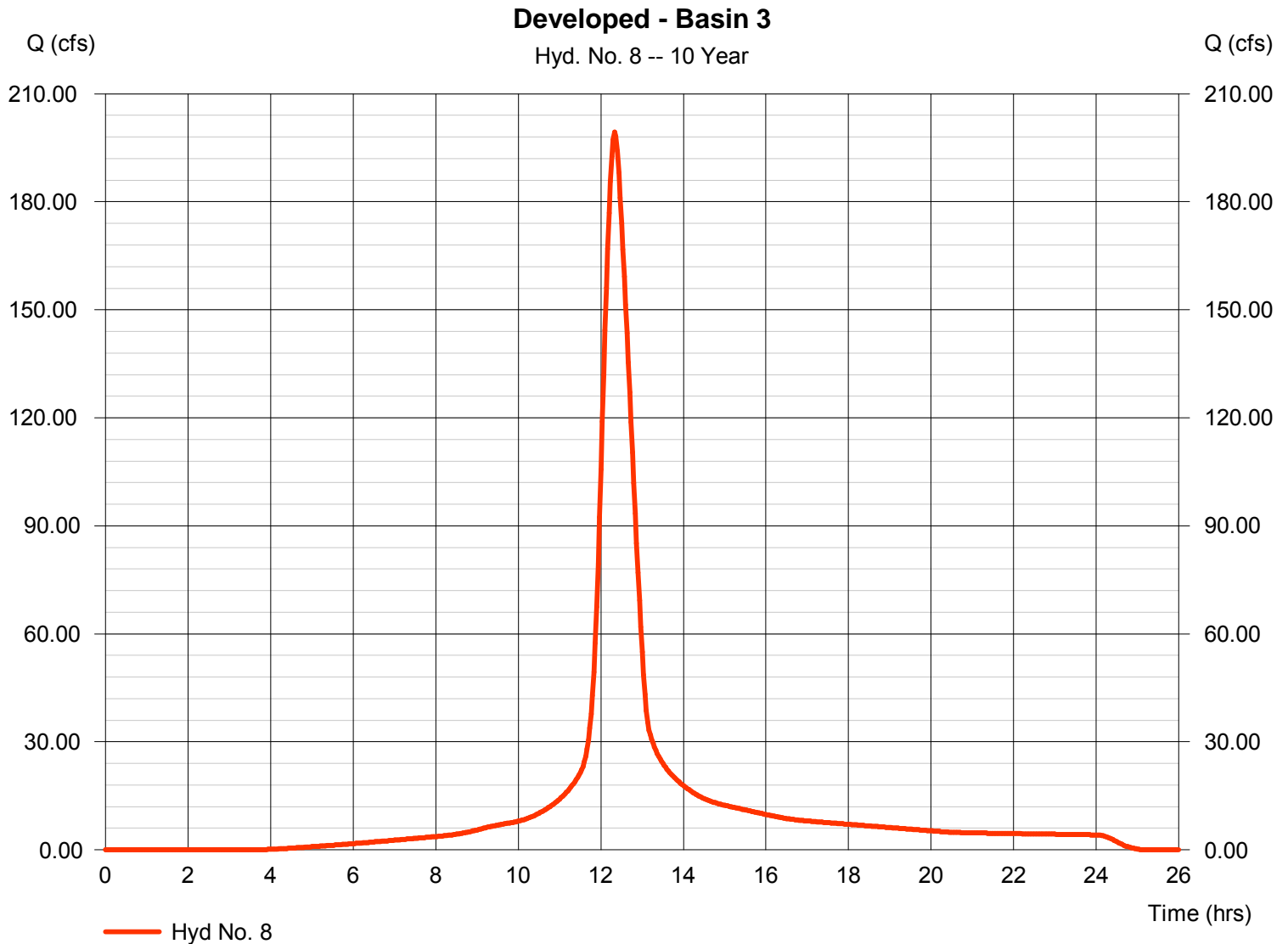
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 8

Developed - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 199.42 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.33 hrs
Time interval	= 2 min	Hyd. volume	= 1,096,836 cuft
Drainage area	= 73.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 44.10 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

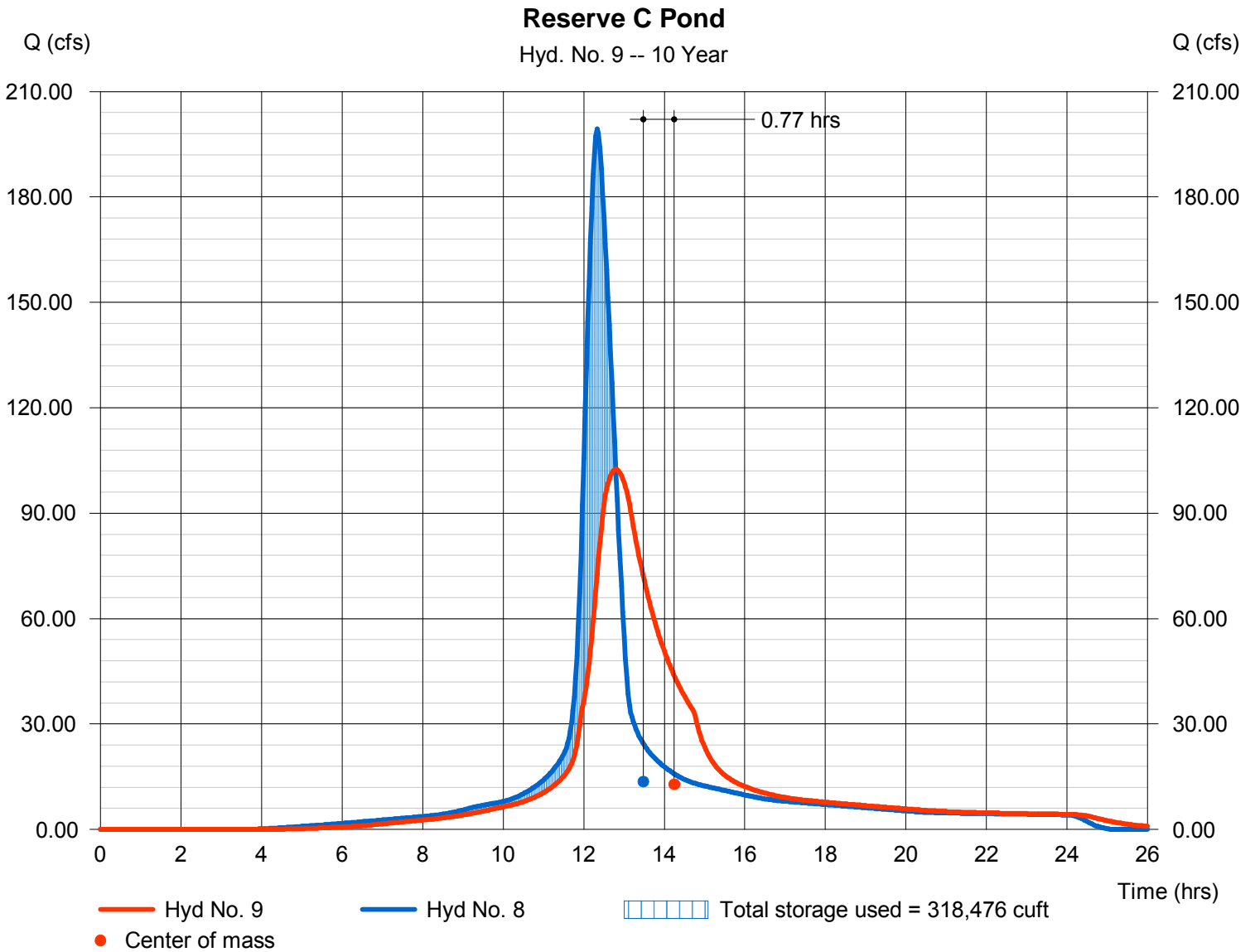
Tuesday, Nov 1, 2011

Hyd. No. 9

Reserve C Pond

Hydrograph type	= Reservoir	Peak discharge	= 102.52 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.80 hrs
Time interval	= 2 min	Hyd. volume	= 1,096,829 cuft
Inflow hyd. No.	= 8 - Developed - Basin 3	Max. Elevation	= 1340.12 ft
Reservoir name	= Reserve C Pond	Max. Storage	= 318,476 cuft

Storage Indication method used.

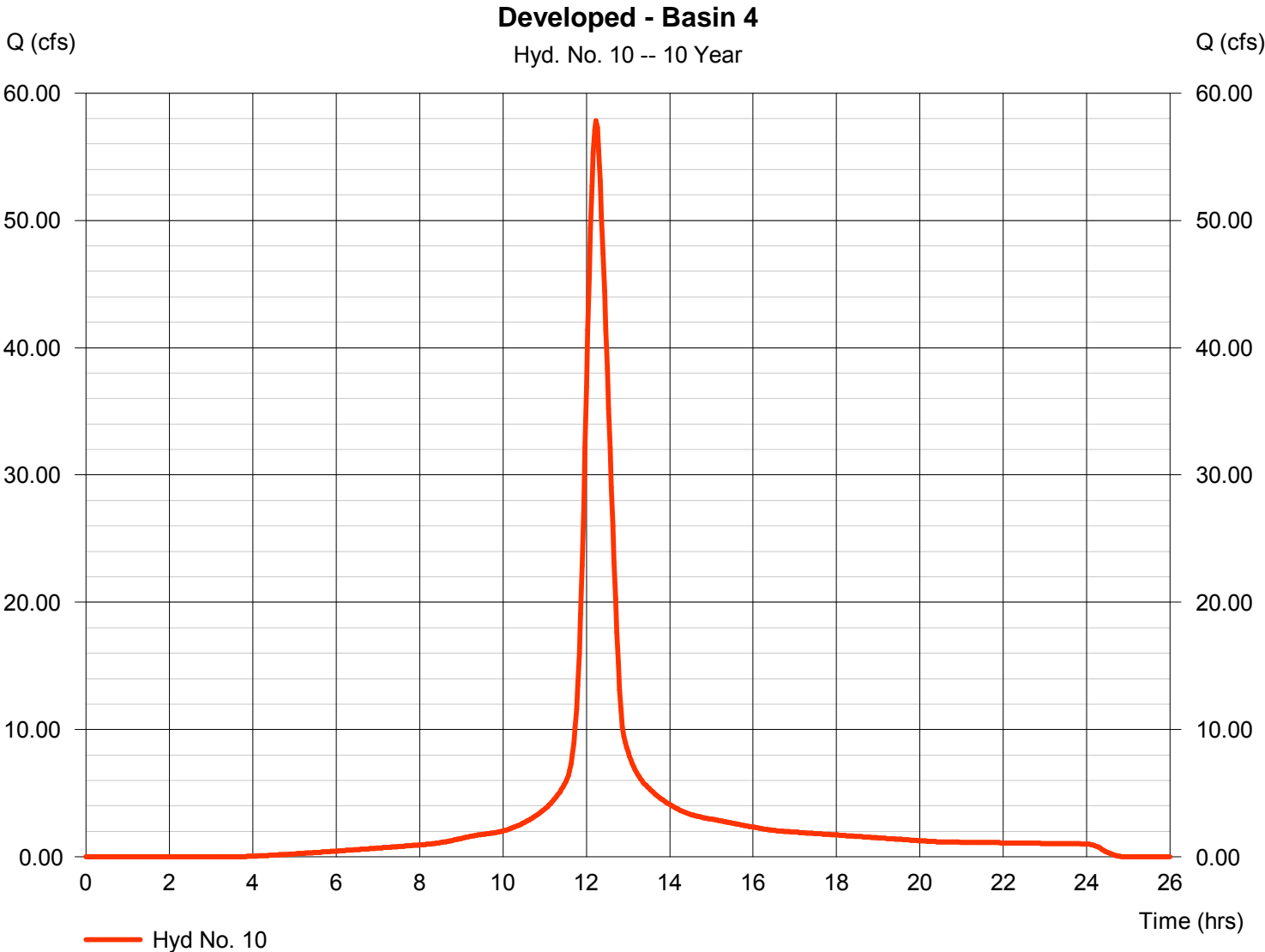


Hydrograph Report

Hyd. No. 10

Developed - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 57.82 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.23 hrs
Time interval	= 2 min	Hyd. volume	= 269,788 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1200 ft
Tc method	= LAG	Time of conc. (Tc)	= 35.00 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

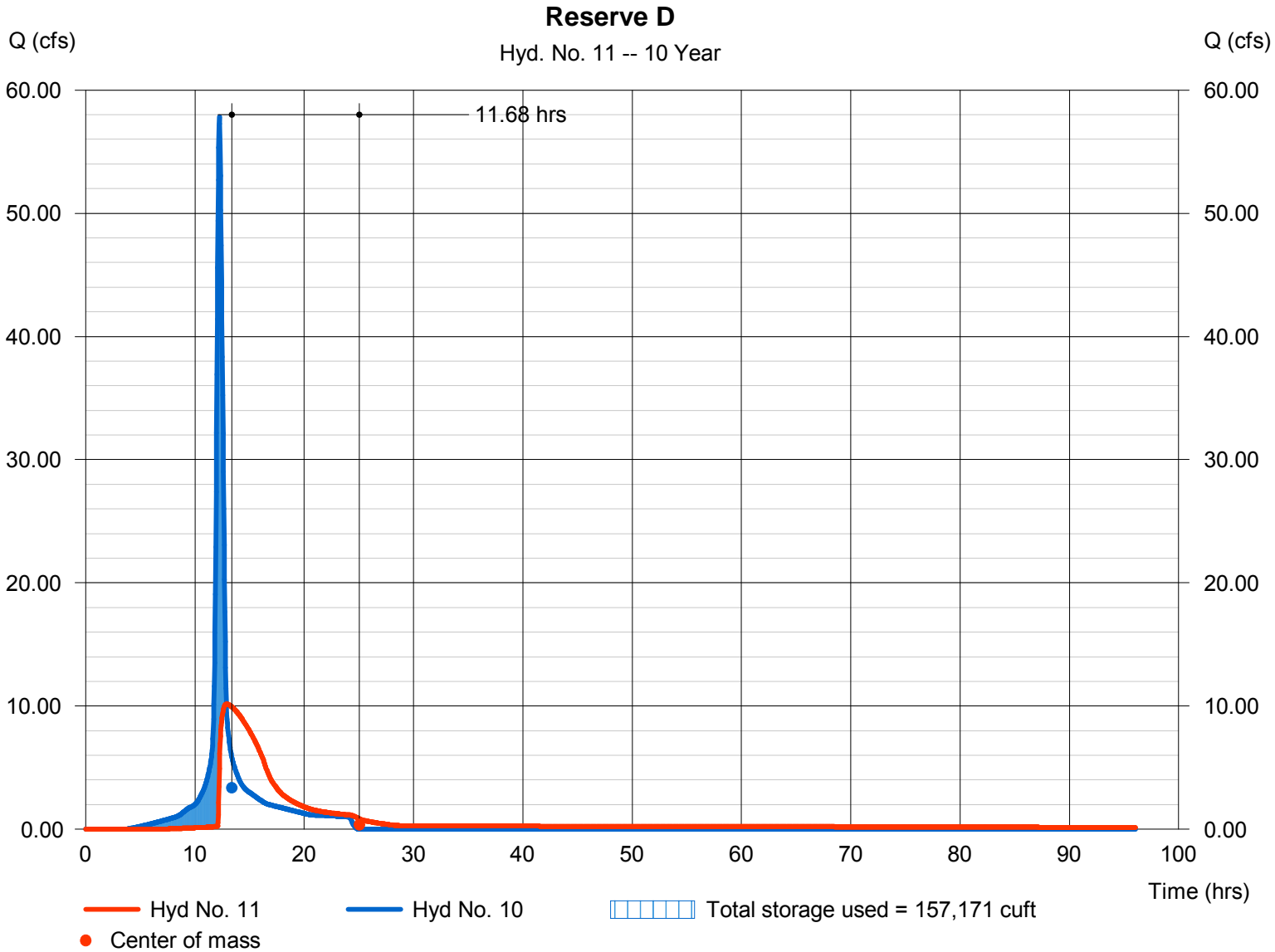
Tuesday, Nov 1, 2011

Hyd. No. 11

Reserve D

Hydrograph type	= Reservoir	Peak discharge	= 10.17 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.87 hrs
Time interval	= 2 min	Hyd. volume	= 248,712 cuft
Inflow hyd. No.	= 10 - Developed - Basin 4	Max. Elevation	= 1335.80 ft
Reservoir name	= Reserve D	Max. Storage	= 157,171 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

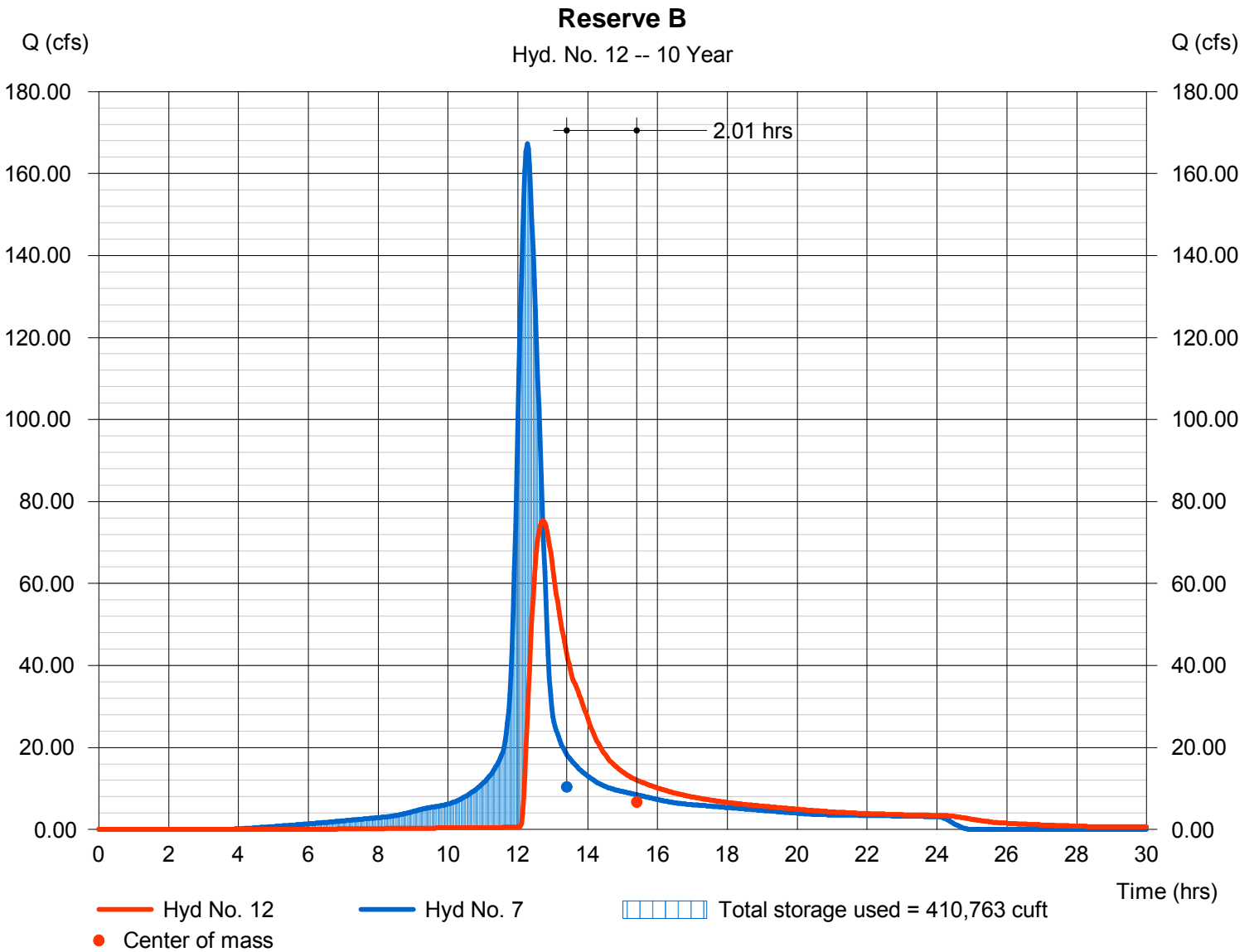
Tuesday, Nov 1, 2011

Hyd. No. 12

Reserve B

Hydrograph type	= Reservoir	Peak discharge	= 75.34 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.70 hrs
Time interval	= 2 min	Hyd. volume	= 756,425 cuft
Inflow hyd. No.	= 7 - Developed - Basin 2	Max. Elevation	= 1338.14 ft
Reservoir name	= Reserve B	Max. Storage	= 410,763 cuft

Storage Indication method used.



Hydrograph Report

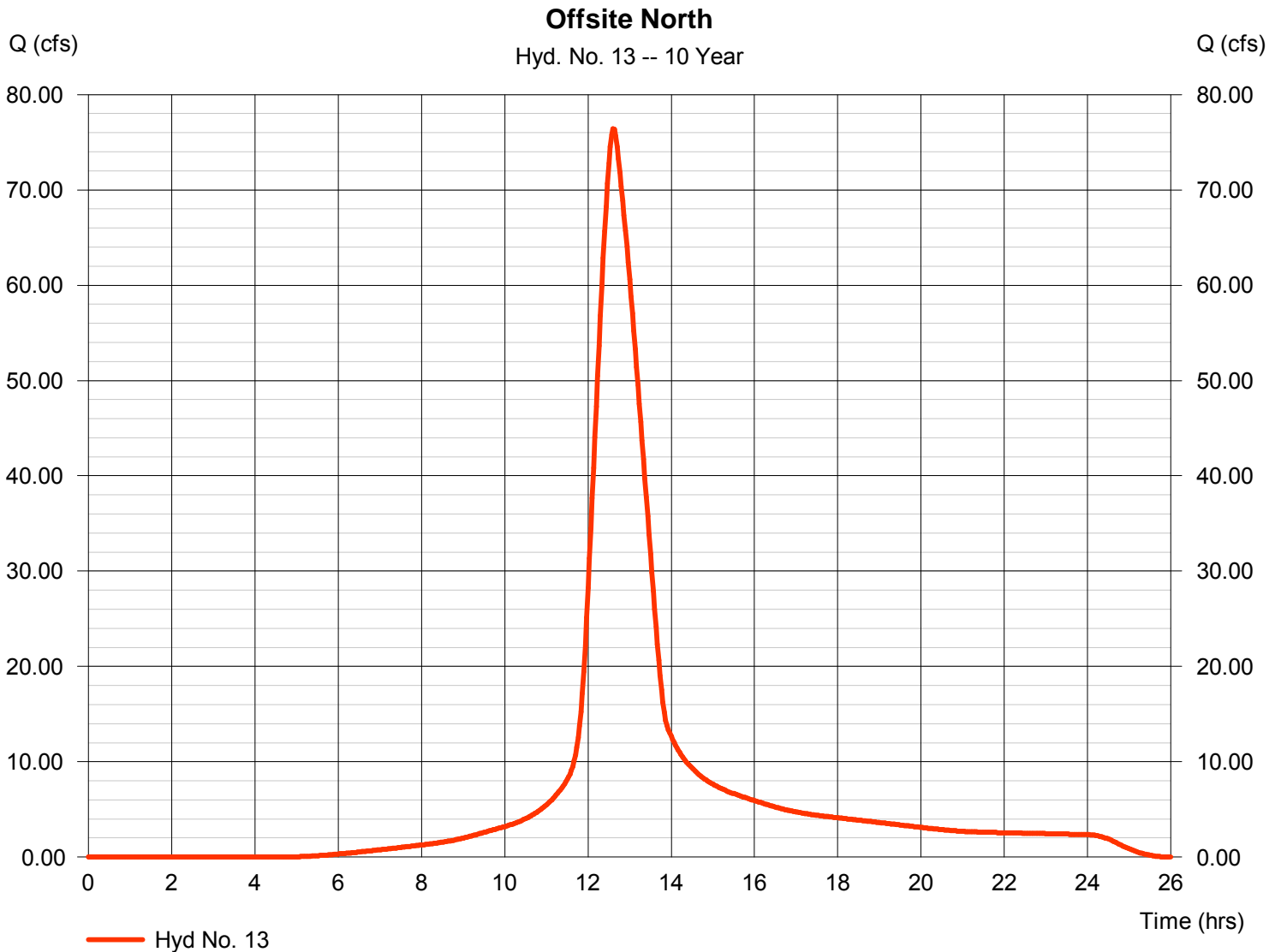
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 13

Offsite North

Hydrograph type	= SCS Runoff	Peak discharge	= 76.43 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.60 hrs
Time interval	= 2 min	Hyd. volume	= 577,631 cuft
Drainage area	= 41.000 ac	Curve number	= 88
Basin Slope	= 0.3 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 74.50 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

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	95.57	2	724	308,550	-----	-----	-----	Existing Basin 1
2	SCS Runoff	171.24	2	740	934,375	-----	-----	-----	Existing - Basin 2
3	SCS Runoff	217.22	2	742	1,251,344	-----	-----	-----	Existing - Basin 3
4	SCS Runoff	44.63	2	742	257,125	-----	-----	-----	Existing - Basin 4
5	SCS Runoff	100.27	2	724	330,302	-----	-----	-----	Developed - Basin 1
6	Reservoir	18.24	2	746	320,061	5	1344.18	190,462	Reserve A Pond
7	SCS Runoff	200.76	2	736	1,009,256	-----	-----	-----	Developed - Basin 2
8	SCS Runoff	239.34	2	740	1,327,597	-----	-----	-----	Developed - Basin 3
9	Reservoir	119.13	2	768	1,327,591	8	1340.34	390,805	Reserve C Pond
10	SCS Runoff	69.36	2	734	326,549	-----	-----	-----	Developed - Basin 4
11	Reservoir	11.64	2	774	305,305	10	1336.29	190,874	Reserve D
12	Reservoir	102.53	2	760	931,483	7	1338.57	466,715	Reserve B
13	SCS Runoff	92.98	2	756	706,802	-----	-----	-----	Offsite North
Total Site.gpw					Return Period: 25 Year			Tuesday, Nov 1, 2011	

Hydrograph Report

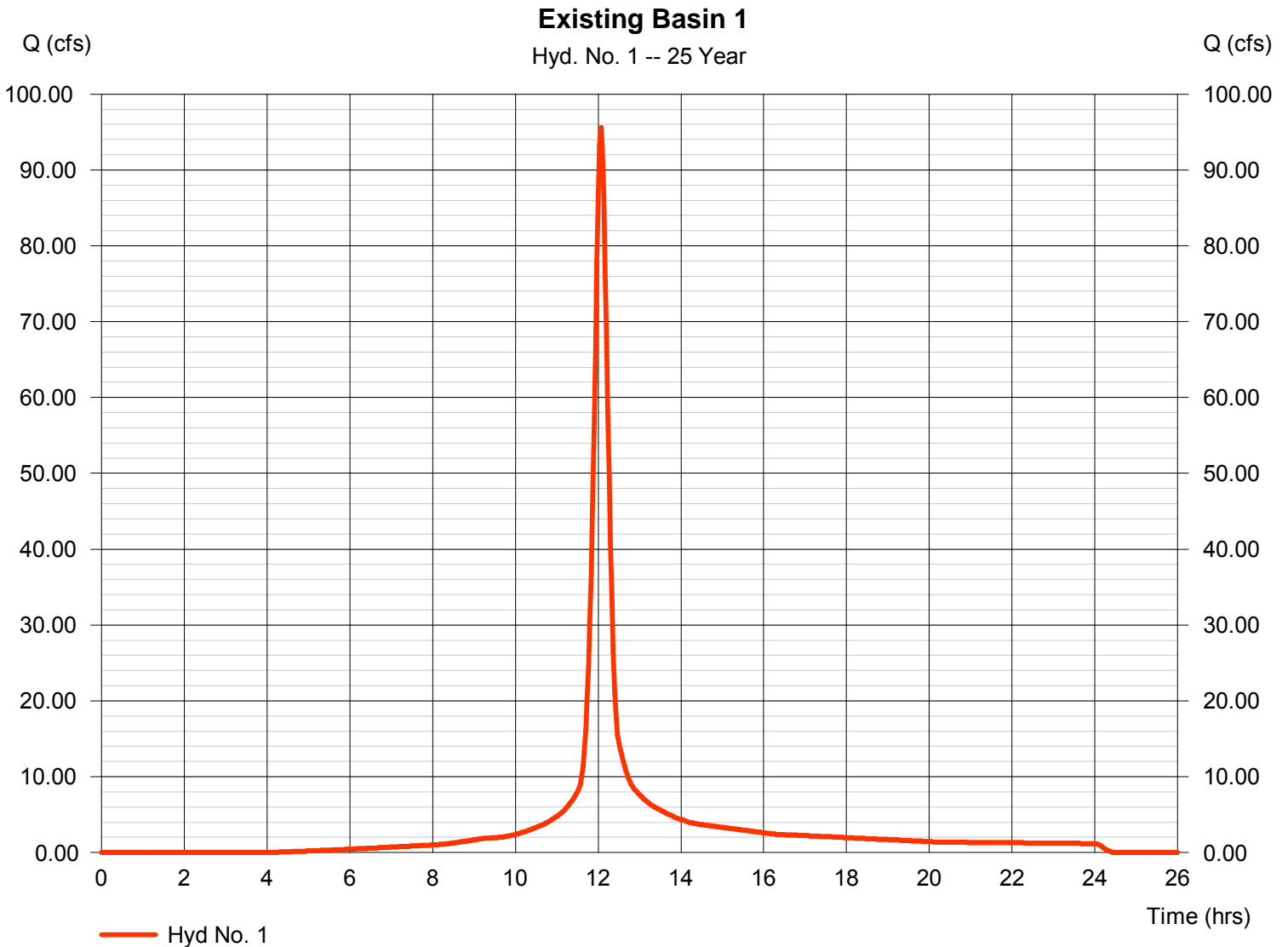
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 1

Existing Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 95.57 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 308,550 cuft
Drainage area	= 18.000 ac	Curve number	= 88
Basin Slope	= 0.7 %	Hydraulic length	= 600 ft
Tc method	= LAG	Time of conc. (Tc)	= 19.20 min
Total precip.	= 6.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

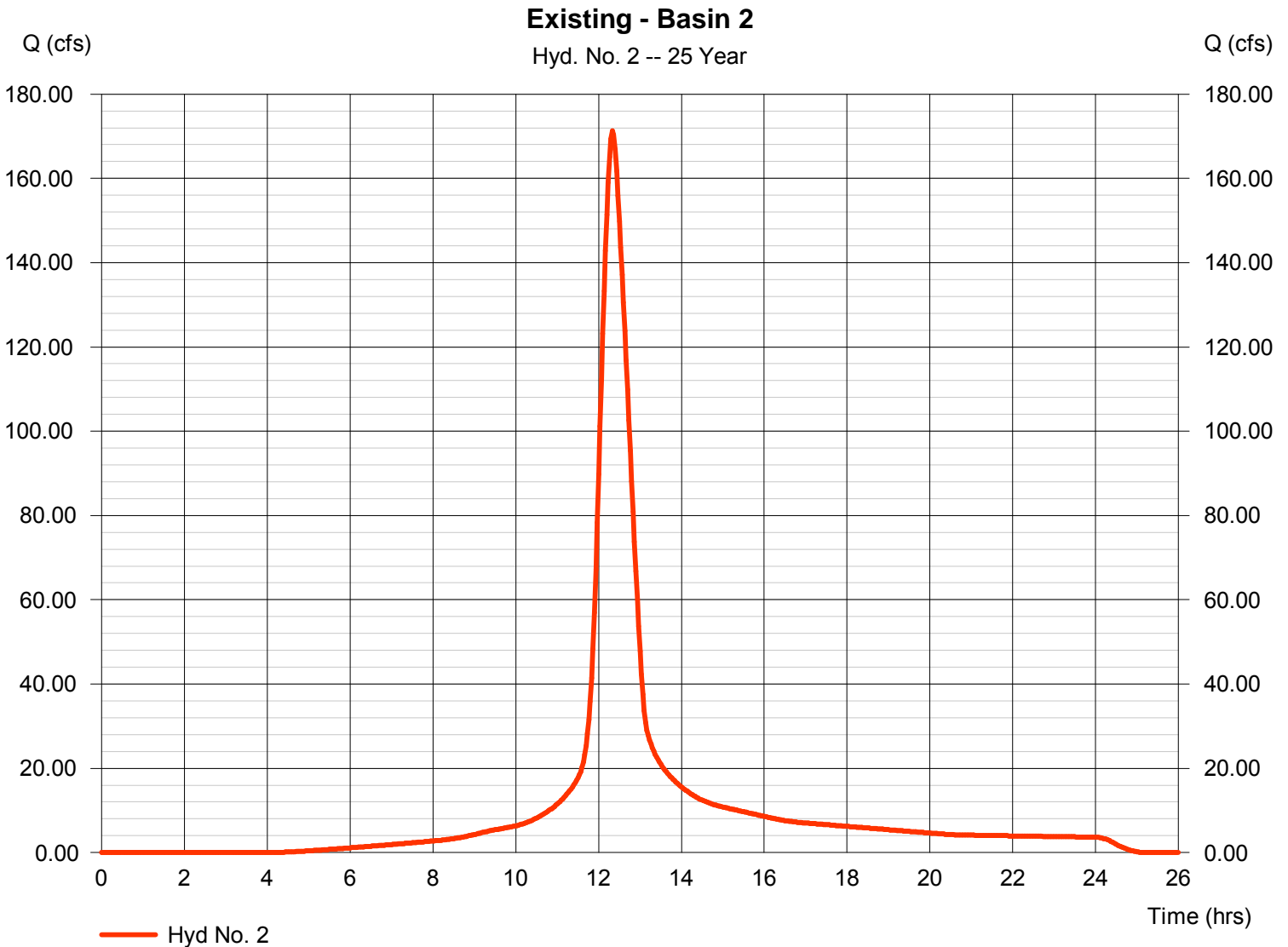
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 2

Existing - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 171.24 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.33 hrs
Time interval	= 2 min	Hyd. volume	= 934,375 cuft
Drainage area	= 55.000 ac	Curve number	= 88
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 45.40 min
Total precip.	= 6.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

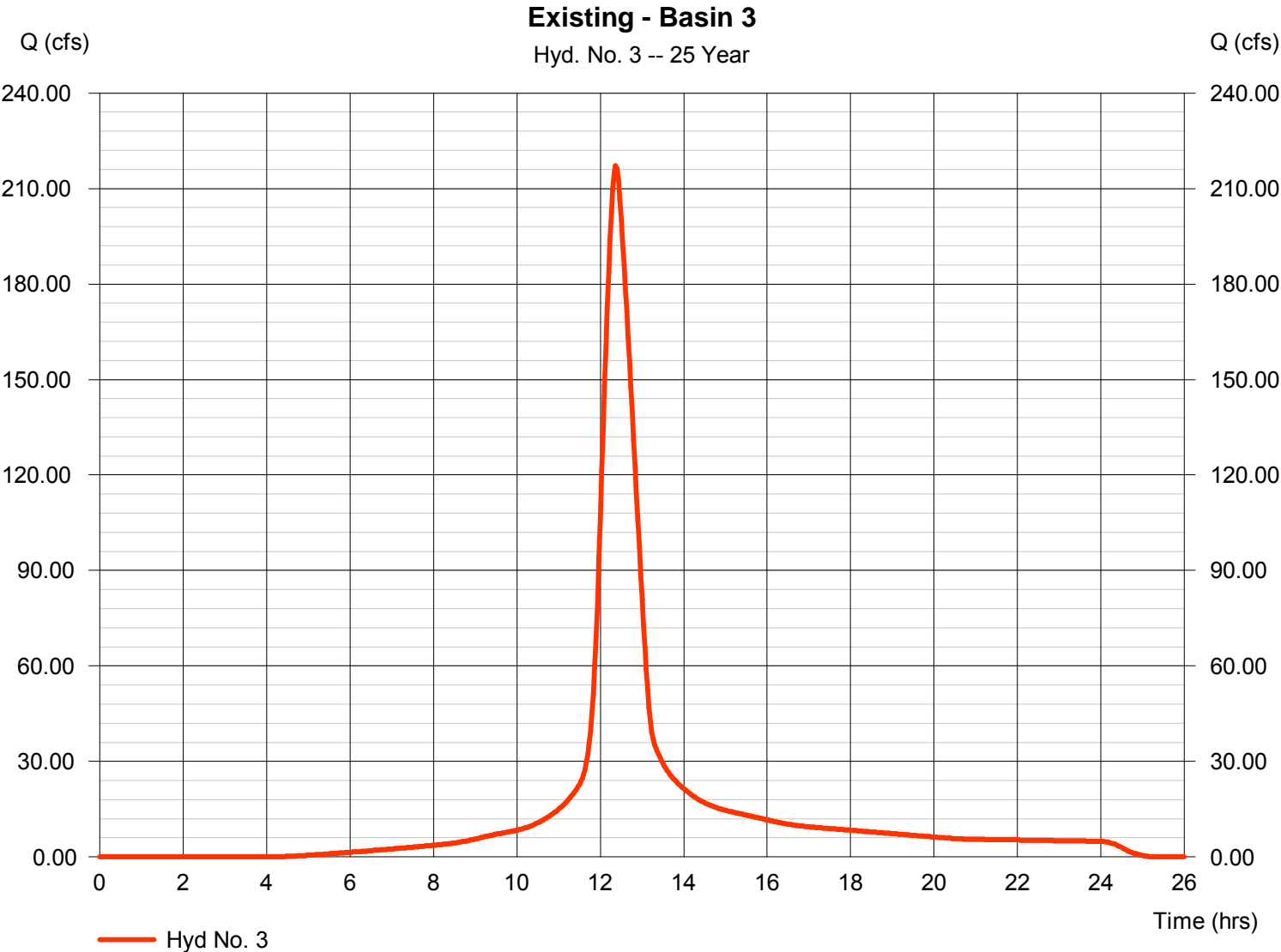
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 3

Existing - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 217.22 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 1,251,344 cuft
Drainage area	= 73.000 ac	Curve number	= 88
Basin Slope	= 0.6 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 49.90 min
Total precip.	= 6.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

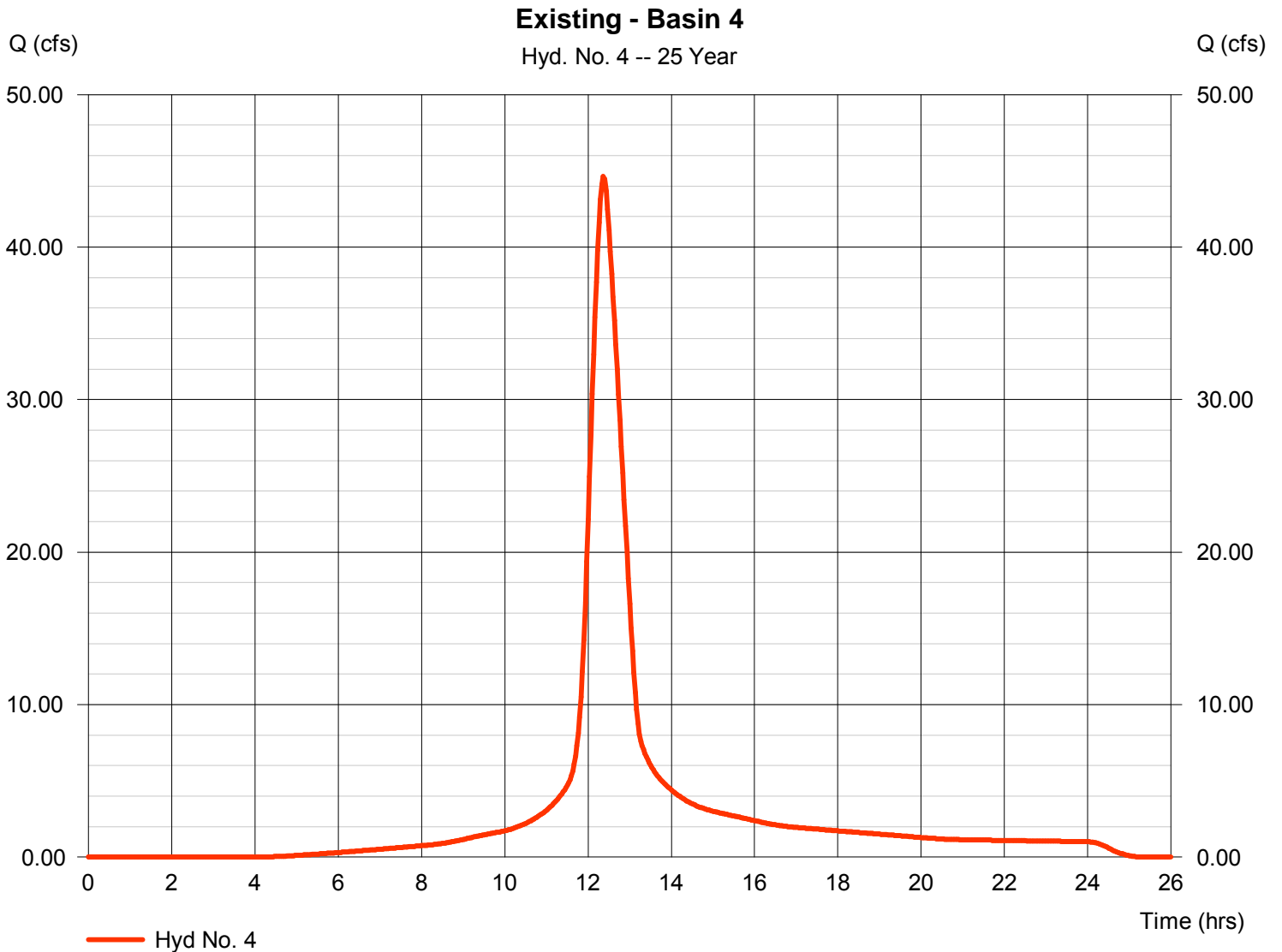
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 4

Existing - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 44.63 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 257,125 cuft
Drainage area	= 15.000 ac	Curve number	= 88
Basin Slope	= 0.4 %	Hydraulic length	= 1400 ft
Tc method	= LAG	Time of conc. (Tc)	= 50.00 min
Total precip.	= 6.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

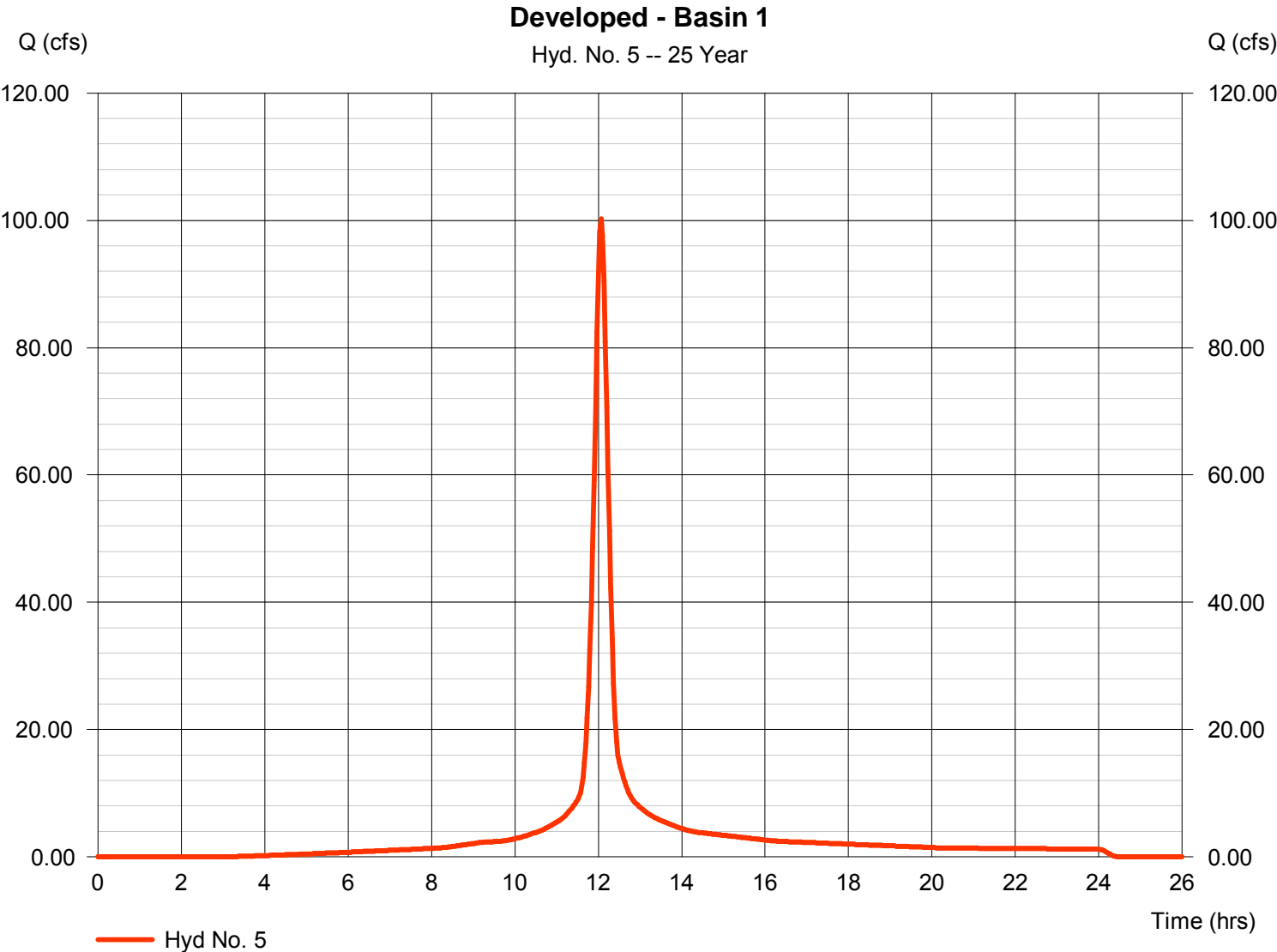
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 5

Developed - Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 100.27 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 330,302 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 500 ft
Tc method	= LAG	Time of conc. (Tc)	= 17.40 min
Total precip.	= 6.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

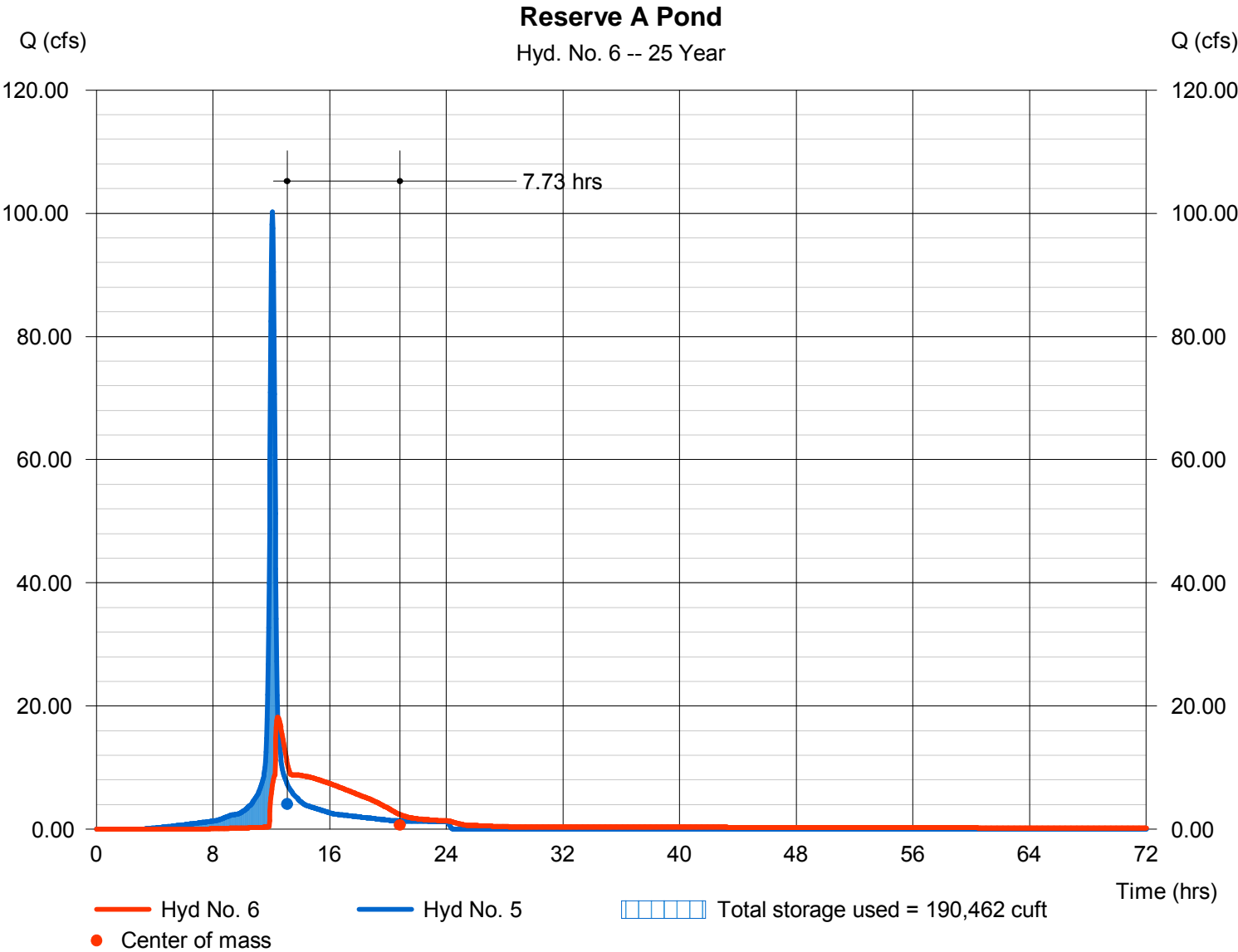
Tuesday, Nov 1, 2011

Hyd. No. 6

Reserve A Pond

Hydrograph type	= Reservoir	Peak discharge	= 18.24 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.43 hrs
Time interval	= 2 min	Hyd. volume	= 320,061 cuft
Inflow hyd. No.	= 5 - Developed - Basin 1	Max. Elevation	= 1344.18 ft
Reservoir name	= Reserve A	Max. Storage	= 190,462 cuft

Storage Indication method used.

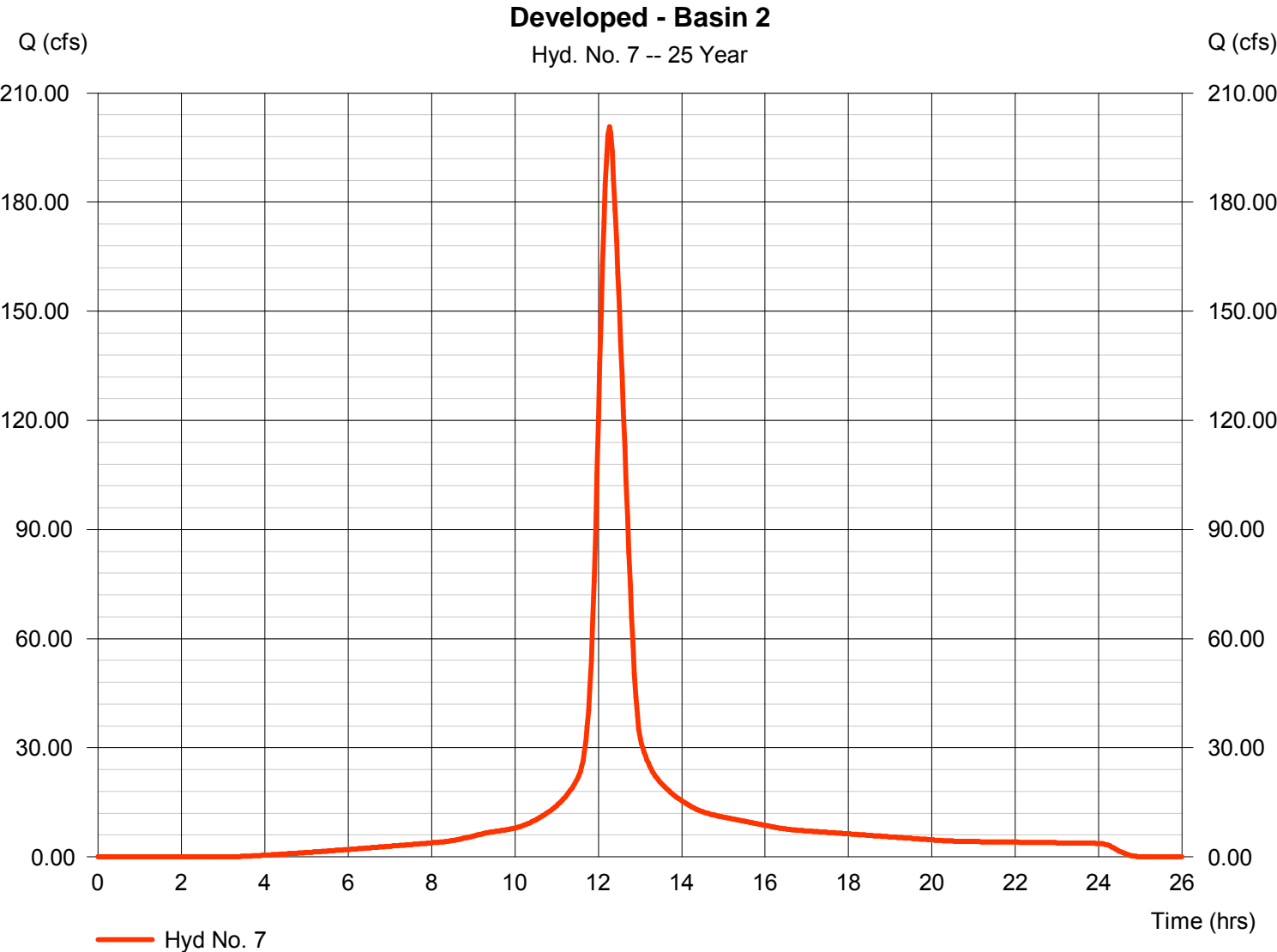


Hydrograph Report

Hyd. No. 7

Developed - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 200.76 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.27 hrs
Time interval	= 2 min	Hyd. volume	= 1,009,256 cuft
Drainage area	= 55.000 ac	Curve number	= 91
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 40.30 min
Total precip.	= 6.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

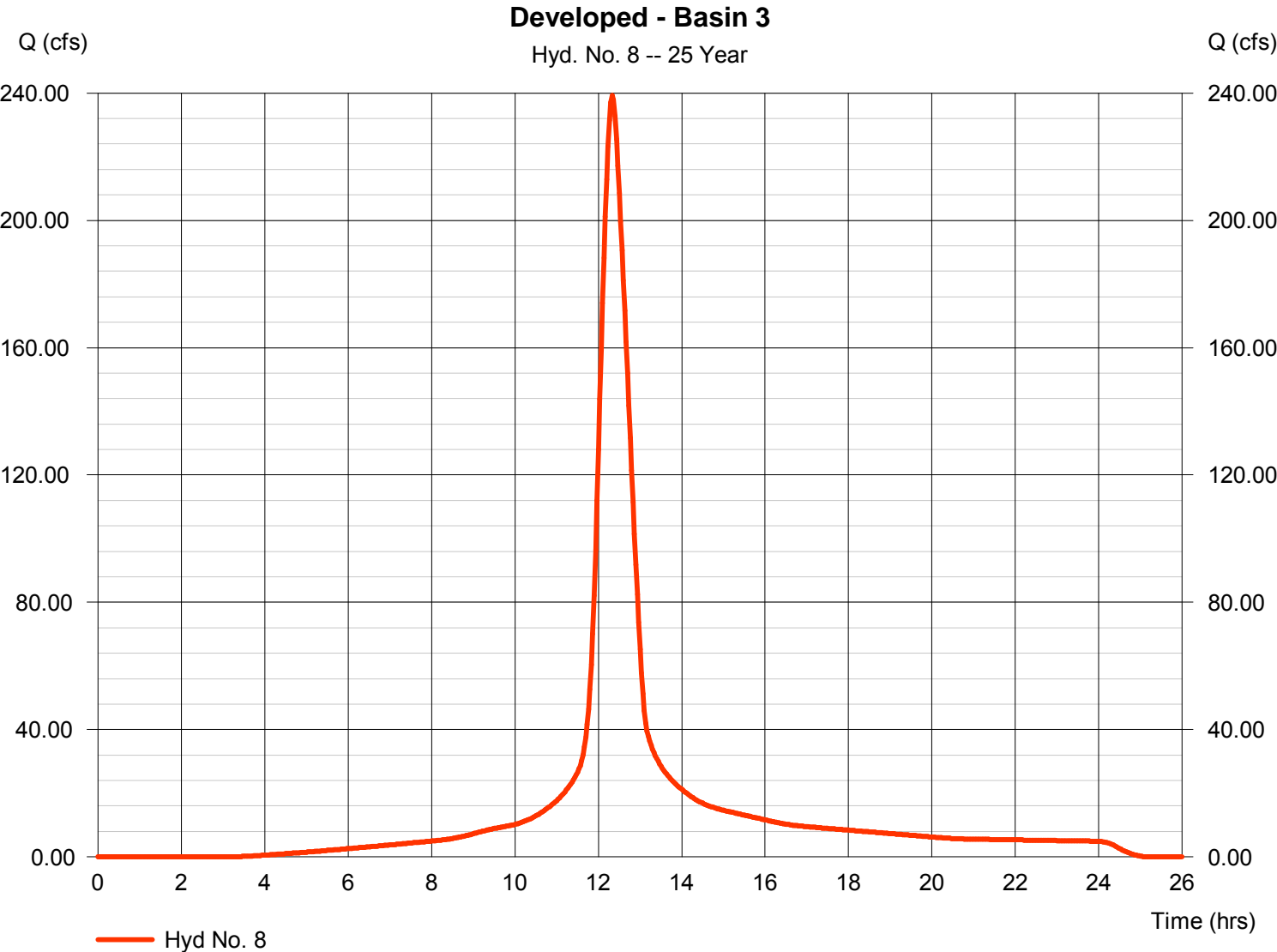
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 8

Developed - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 239.34 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.33 hrs
Time interval	= 2 min	Hyd. volume	= 1,327,597 cuft
Drainage area	= 73.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 44.10 min
Total precip.	= 6.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

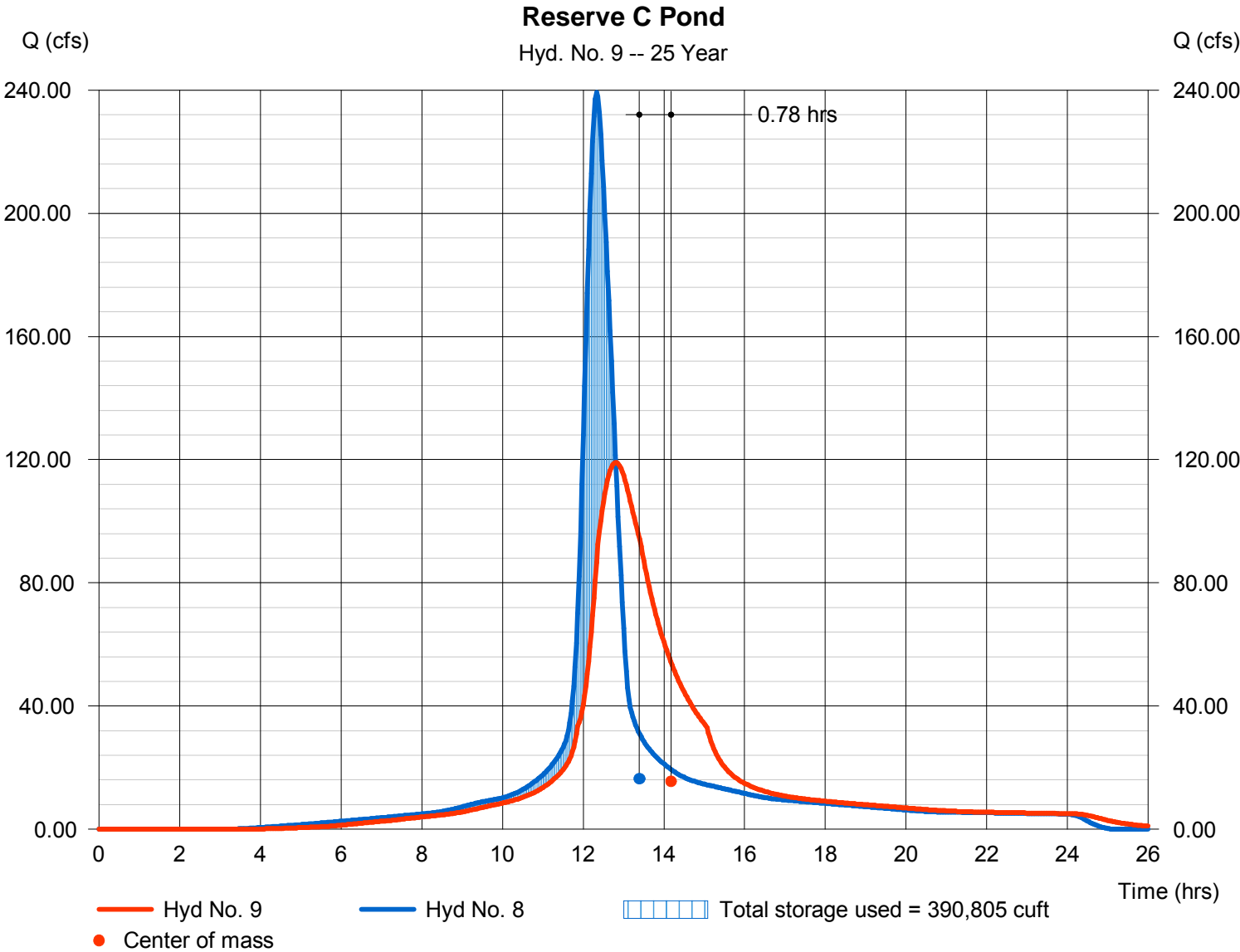
Tuesday, Nov 1, 2011

Hyd. No. 9

Reserve C Pond

Hydrograph type	= Reservoir	Peak discharge	= 119.13 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.80 hrs
Time interval	= 2 min	Hyd. volume	= 1,327,591 cuft
Inflow hyd. No.	= 8 - Developed - Basin 3	Max. Elevation	= 1340.34 ft
Reservoir name	= Reserve C Pond	Max. Storage	= 390,805 cuft

Storage Indication method used.

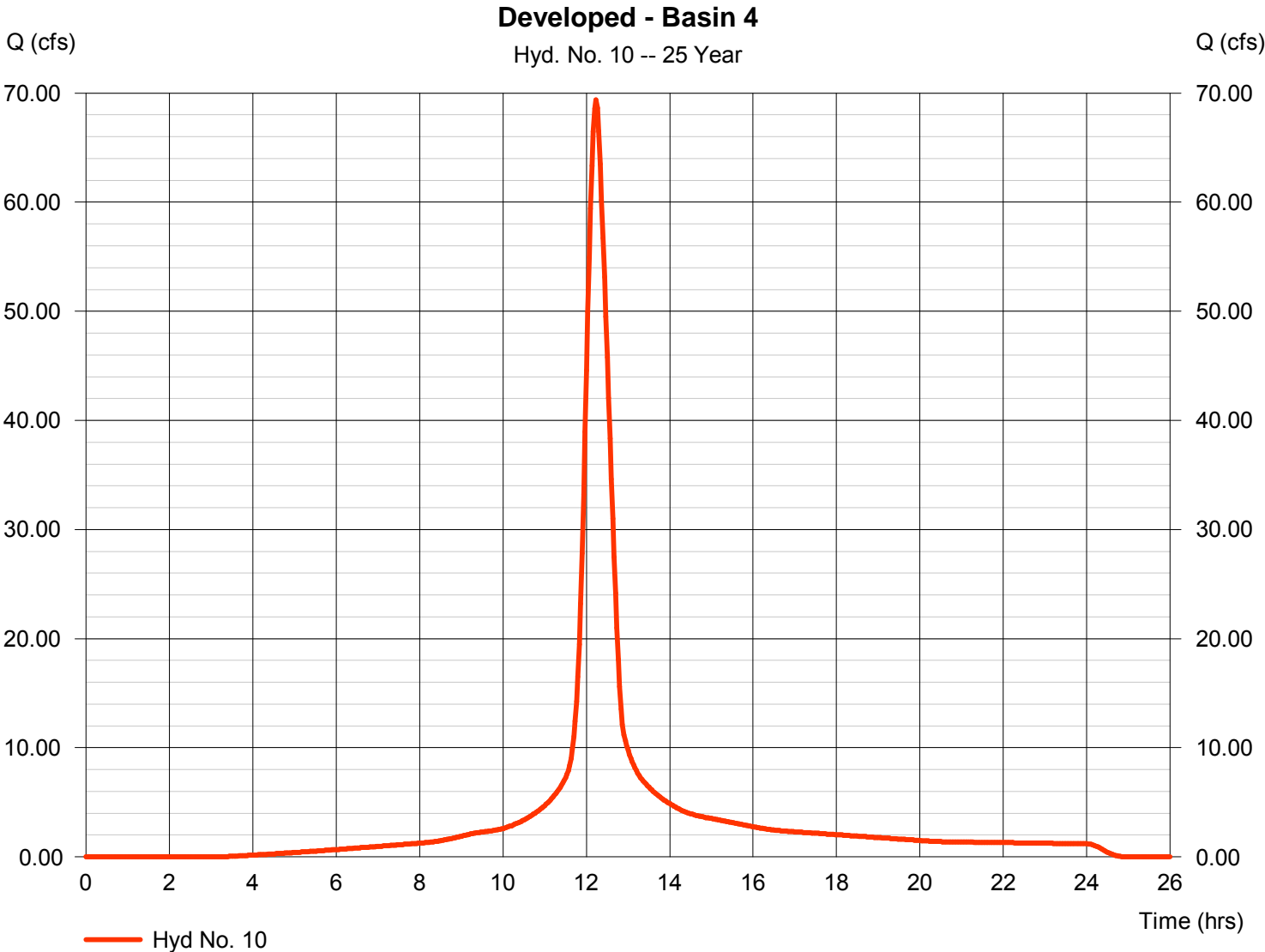


Hydrograph Report

Hyd. No. 10

Developed - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 69.36 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.23 hrs
Time interval	= 2 min	Hyd. volume	= 326,549 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1200 ft
Tc method	= LAG	Time of conc. (Tc)	= 35.00 min
Total precip.	= 6.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

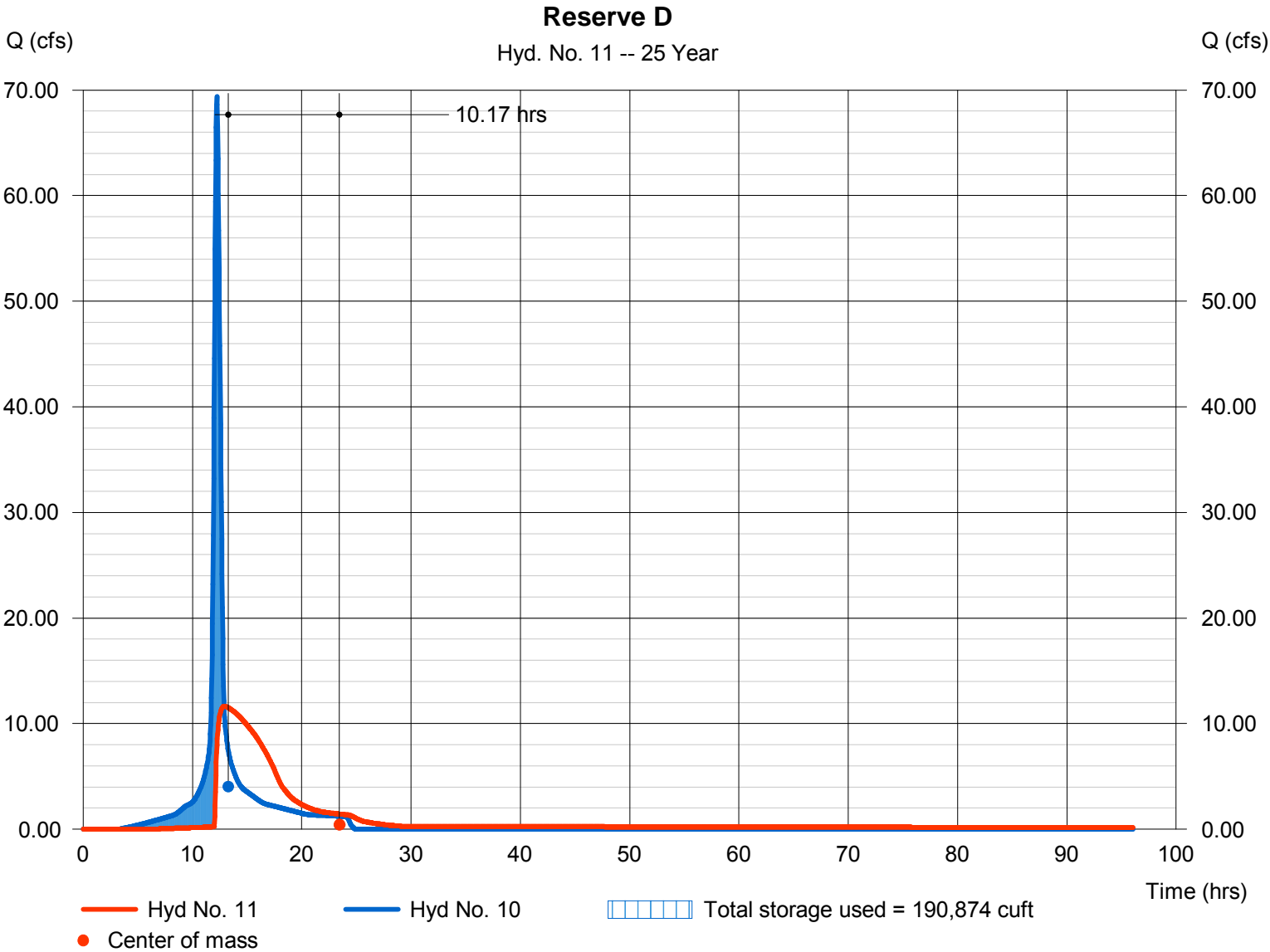
Tuesday, Nov 1, 2011

Hyd. No. 11

Reserve D

Hydrograph type	= Reservoir	Peak discharge	= 11.64 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.90 hrs
Time interval	= 2 min	Hyd. volume	= 305,305 cuft
Inflow hyd. No.	= 10 - Developed - Basin 4	Max. Elevation	= 1336.29 ft
Reservoir name	= Reserve D	Max. Storage	= 190,874 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

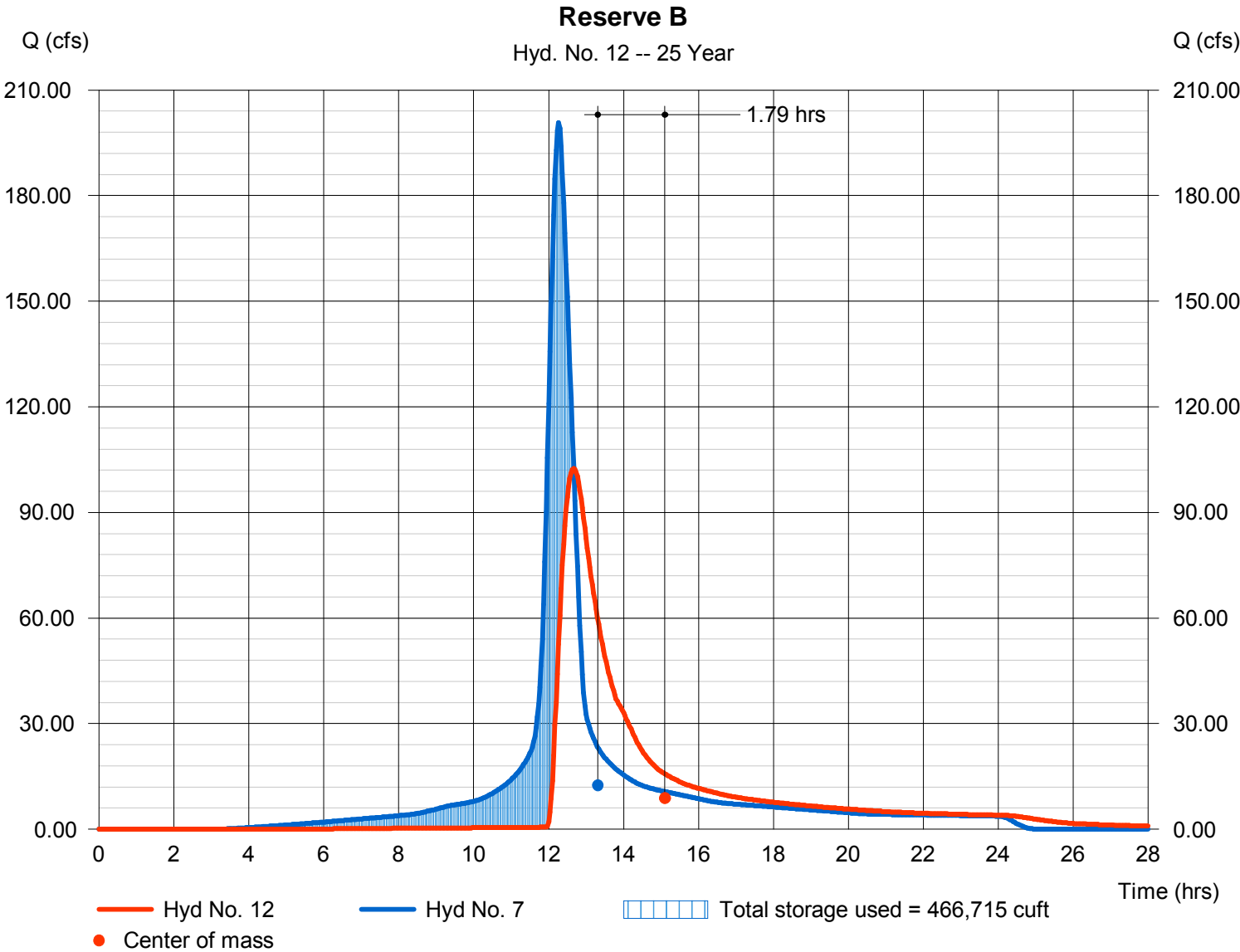
Tuesday, Nov 1, 2011

Hyd. No. 12

Reserve B

Hydrograph type	= Reservoir	Peak discharge	= 102.53 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.67 hrs
Time interval	= 2 min	Hyd. volume	= 931,483 cuft
Inflow hyd. No.	= 7 - Developed - Basin 2	Max. Elevation	= 1338.57 ft
Reservoir name	= Reserve B	Max. Storage	= 466,715 cuft

Storage Indication method used.



Hydrograph Report

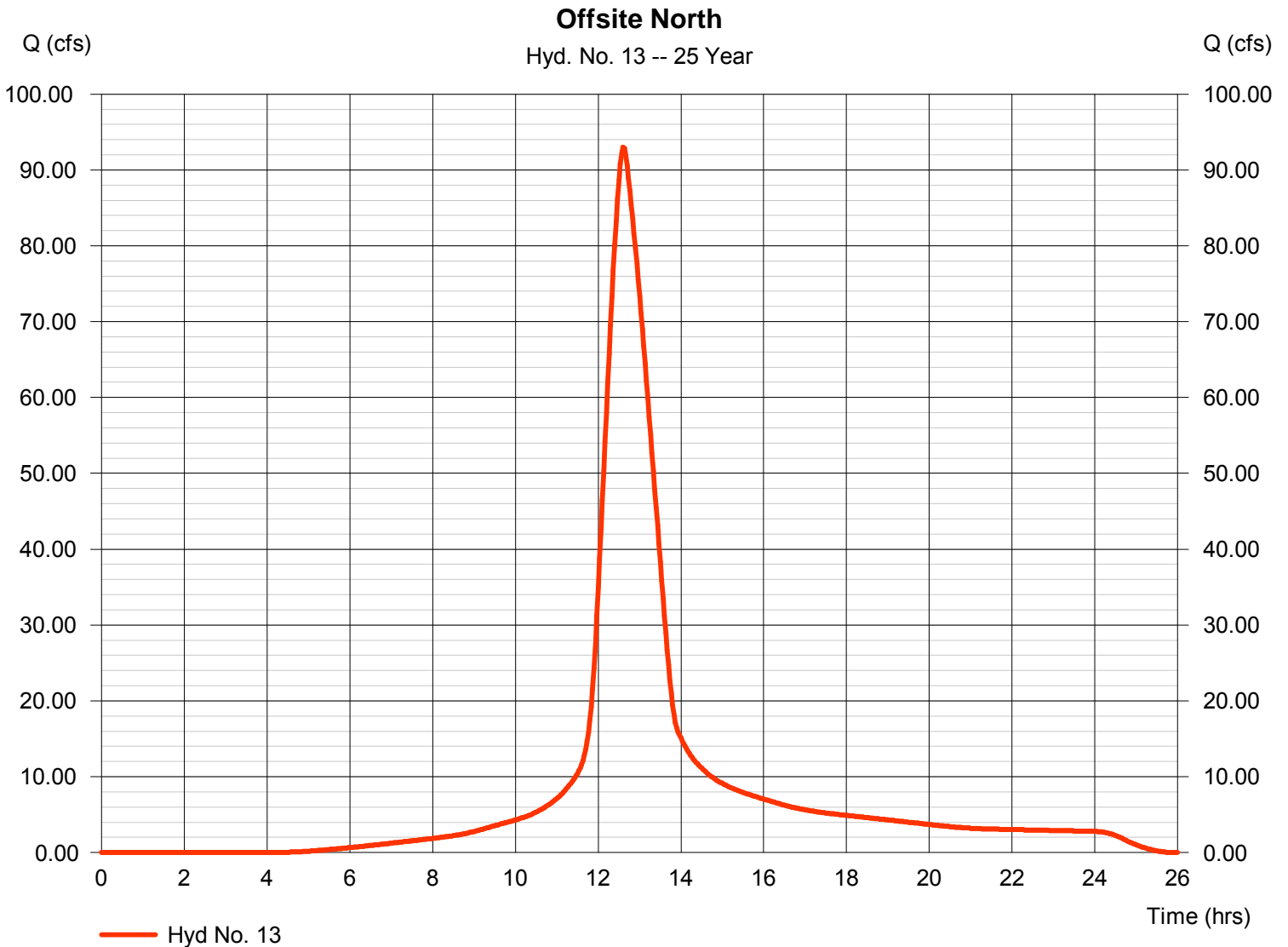
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 13

Offsite North

Hydrograph type	= SCS Runoff	Peak discharge	= 92.98 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.60 hrs
Time interval	= 2 min	Hyd. volume	= 706,802 cuft
Drainage area	= 41.000 ac	Curve number	= 88
Basin Slope	= 0.3 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 74.50 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® 2011 by Autodesk, Inc. v8

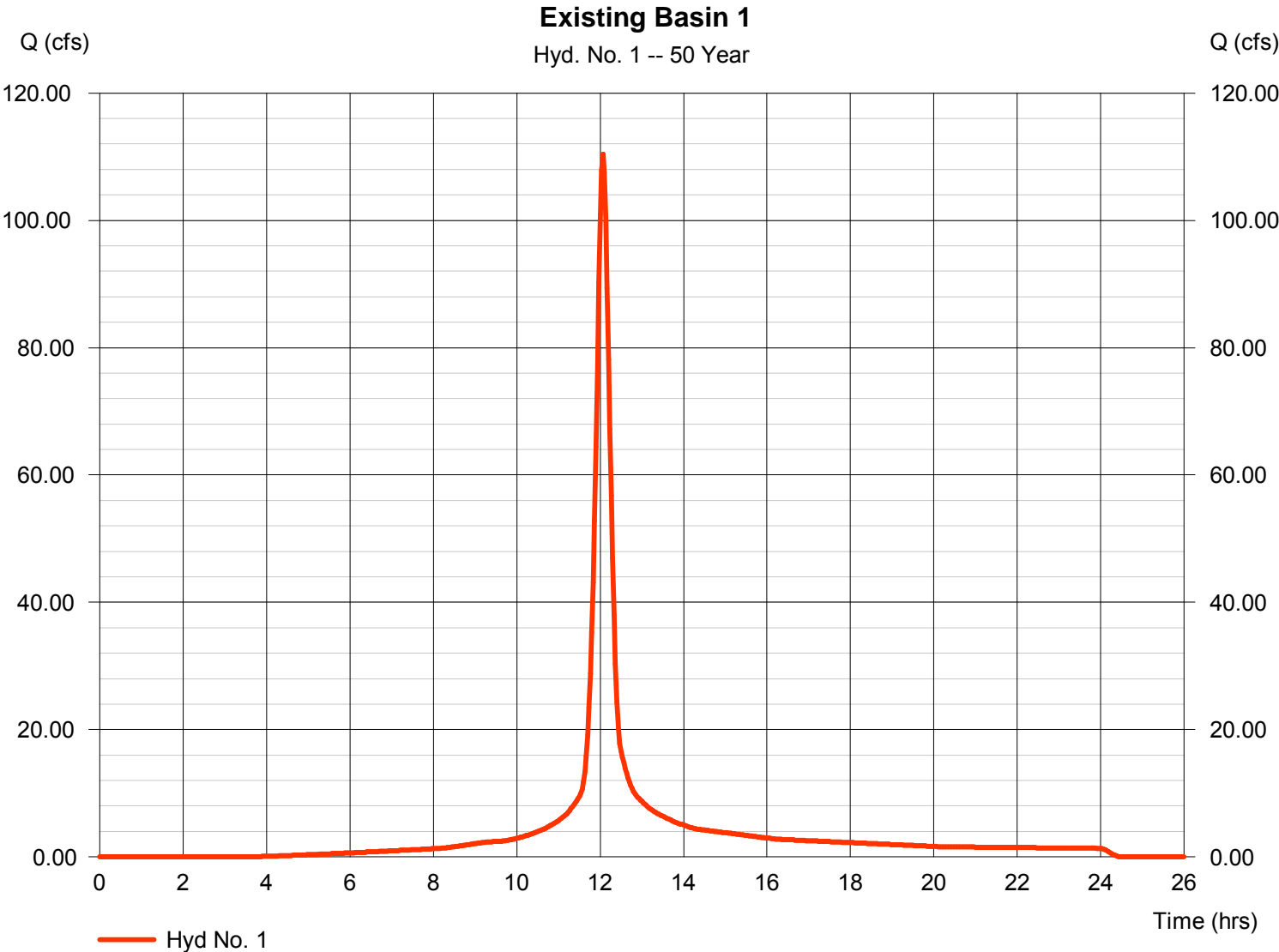
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description	
1	SCS Runoff	110.40	2	724	359,131	-----	-----	-----	Existing Basin 1	
2	SCS Runoff	198.12	2	740	1,087,546	-----	-----	-----	Existing - Basin 2	
3	SCS Runoff	251.35	2	742	1,456,476	-----	-----	-----	Existing - Basin 3	
4	SCS Runoff	51.65	2	742	299,276	-----	-----	-----	Existing - Basin 4	
5	SCS Runoff	114.93	2	724	381,609	-----	-----	-----	Developed - Basin 1	
6	Reservoir	28.73	2	742	371,321	5	1344.48	211,443	Reserve A Pond	
7	SCS Runoff	230.35	2	736	1,166,029	-----	-----	-----	Developed - Basin 2	
8	SCS Runoff	274.65	2	740	1,533,819	-----	-----	-----	Developed - Basin 3	
9	Reservoir	134.62	2	768	1,533,814	8	1340.54	455,307	Reserve C Pond	
10	SCS Runoff	79.57	2	734	377,273	-----	-----	-----	Developed - Basin 4	
11	Reservoir	12.76	2	774	355,902	10	1336.72	221,642	Reserve D	
12	Reservoir	126.59	2	758	1,087,986	7	1338.93	513,724	Reserve B	
13	SCS Runoff	107.66	2	756	822,668	-----	-----	-----	Offsite North	
Total Site.gpw					Return Period: 50 Year			Tuesday, Nov 1, 2011		

Hydrograph Report

Hyd. No. 1

Existing Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 110.40 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 359,131 cuft
Drainage area	= 18.000 ac	Curve number	= 88
Basin Slope	= 0.7 %	Hydraulic length	= 600 ft
Tc method	= LAG	Time of conc. (Tc)	= 19.20 min
Total precip.	= 6.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

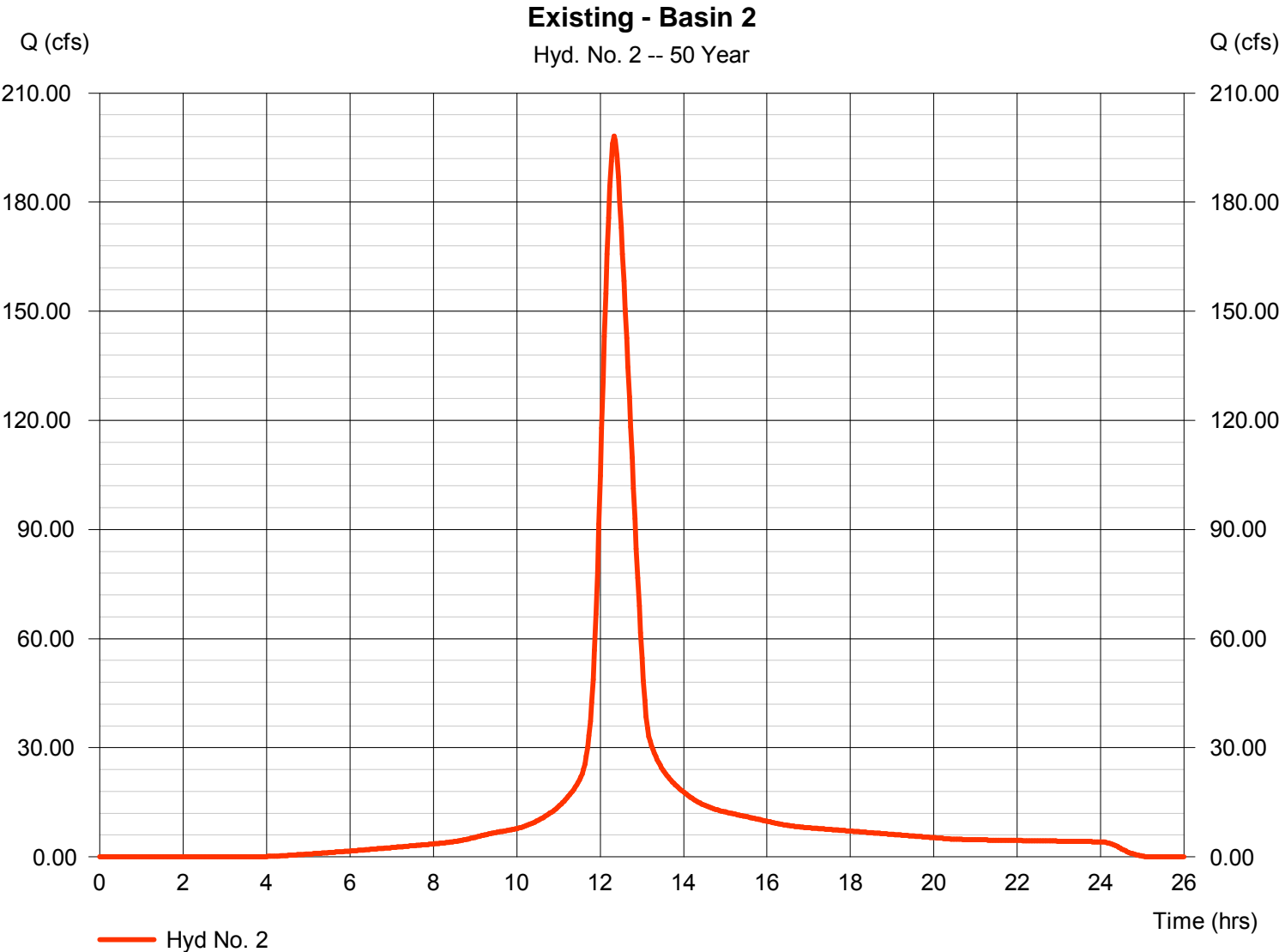


Hydrograph Report

Hyd. No. 2

Existing - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 198.12 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.33 hrs
Time interval	= 2 min	Hyd. volume	= 1,087,546 cuft
Drainage area	= 55.000 ac	Curve number	= 88
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 45.40 min
Total precip.	= 6.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

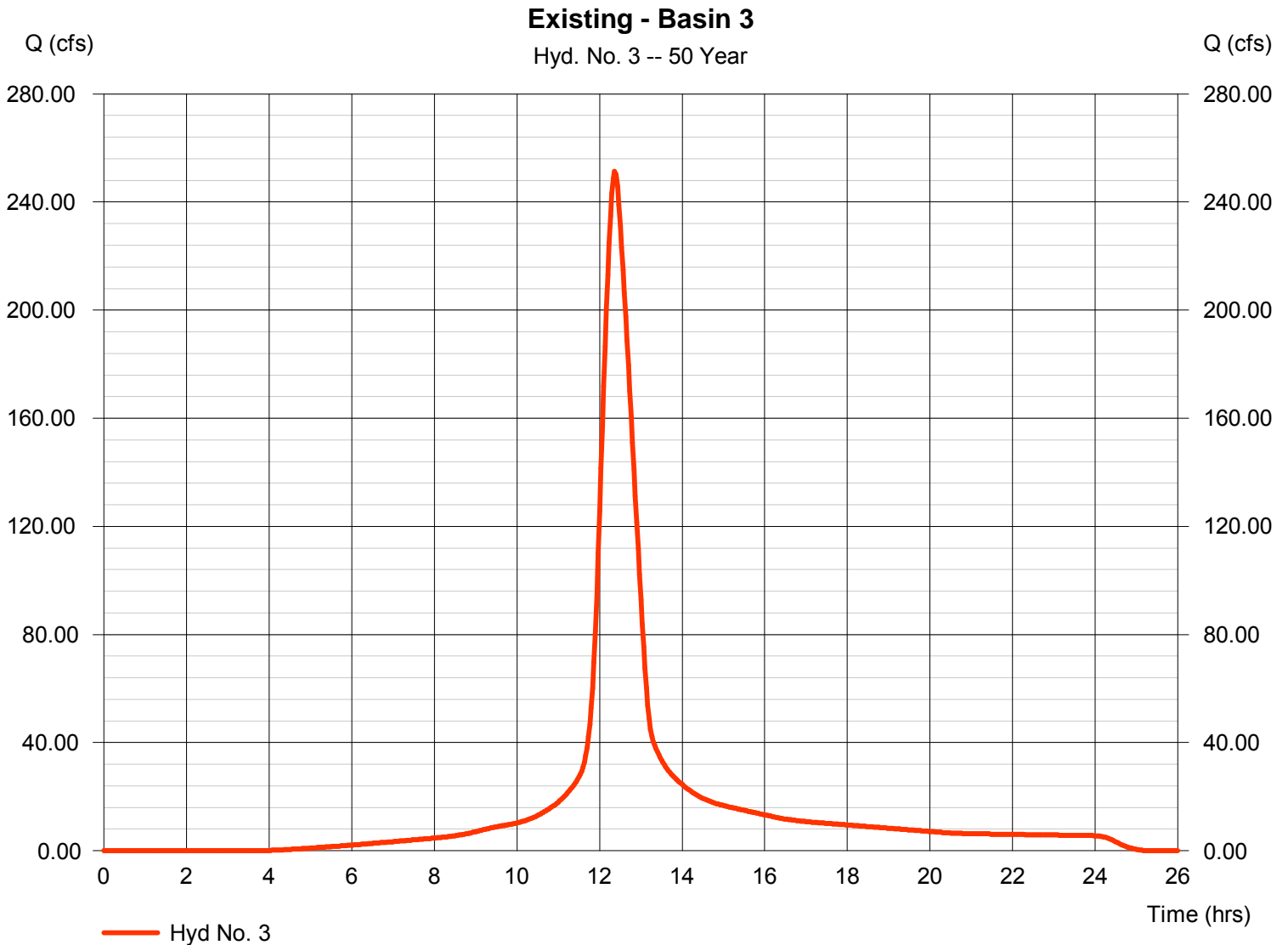
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 3

Existing - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 251.35 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 1,456,476 cuft
Drainage area	= 73.000 ac	Curve number	= 88
Basin Slope	= 0.6 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 49.90 min
Total precip.	= 6.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

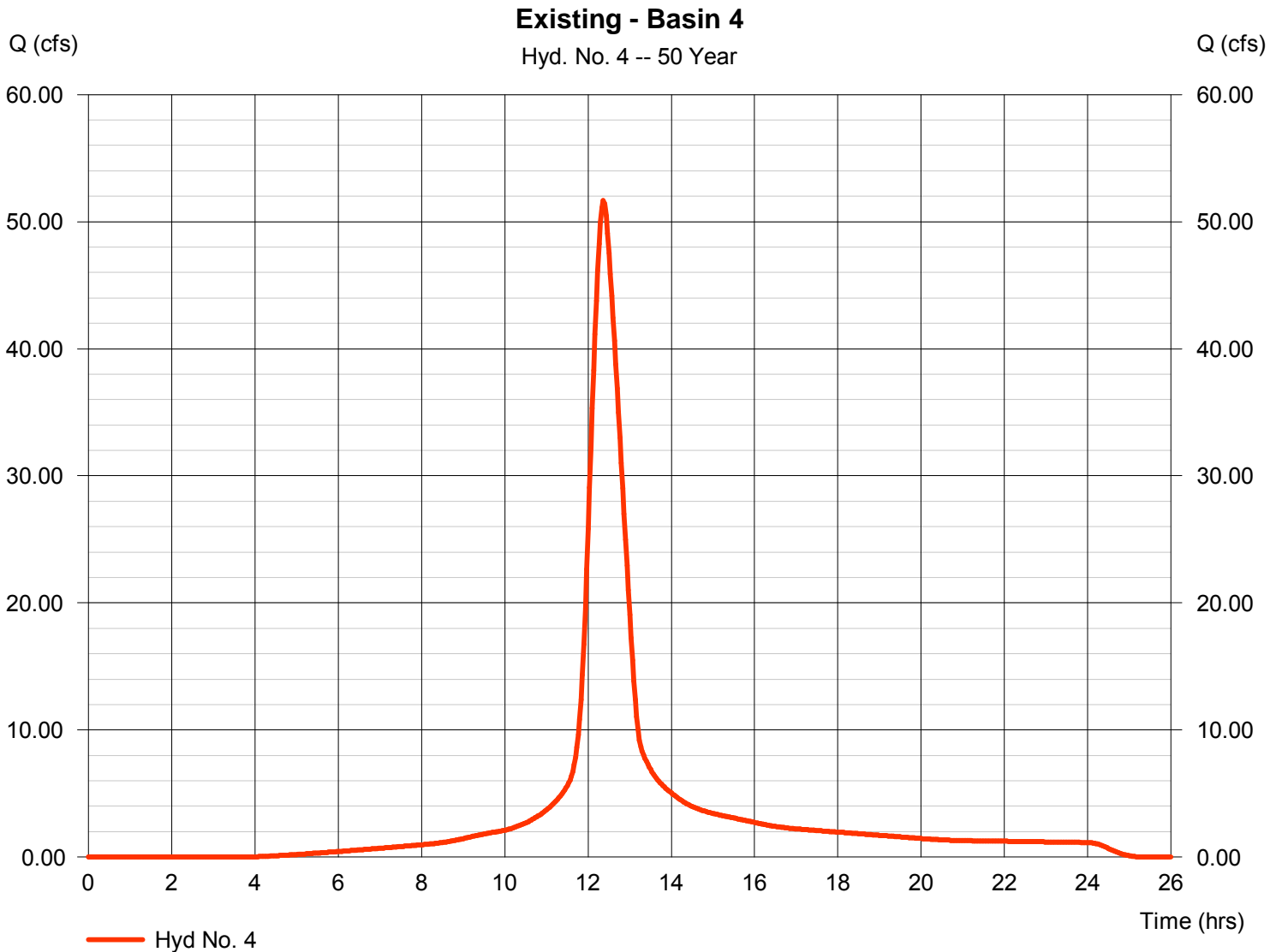
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 4

Existing - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 51.65 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 299,276 cuft
Drainage area	= 15.000 ac	Curve number	= 88
Basin Slope	= 0.4 %	Hydraulic length	= 1400 ft
Tc method	= LAG	Time of conc. (Tc)	= 50.00 min
Total precip.	= 6.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

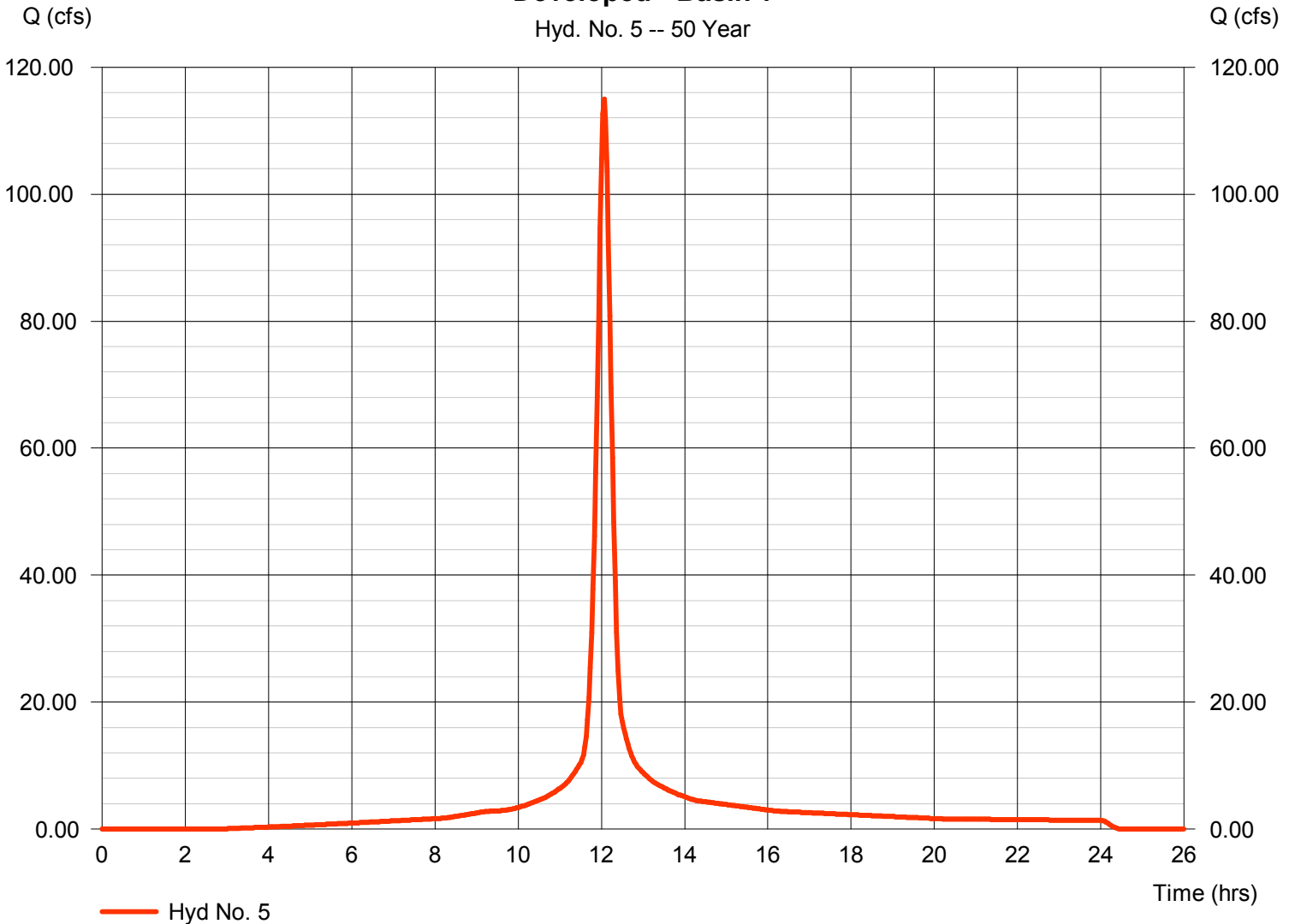
Hyd. No. 5

Developed - Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 114.93 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 381,609 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 500 ft
Tc method	= LAG	Time of conc. (Tc)	= 17.40 min
Total precip.	= 6.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Developed - Basin 1

Hyd. No. 5 -- 50 Year



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

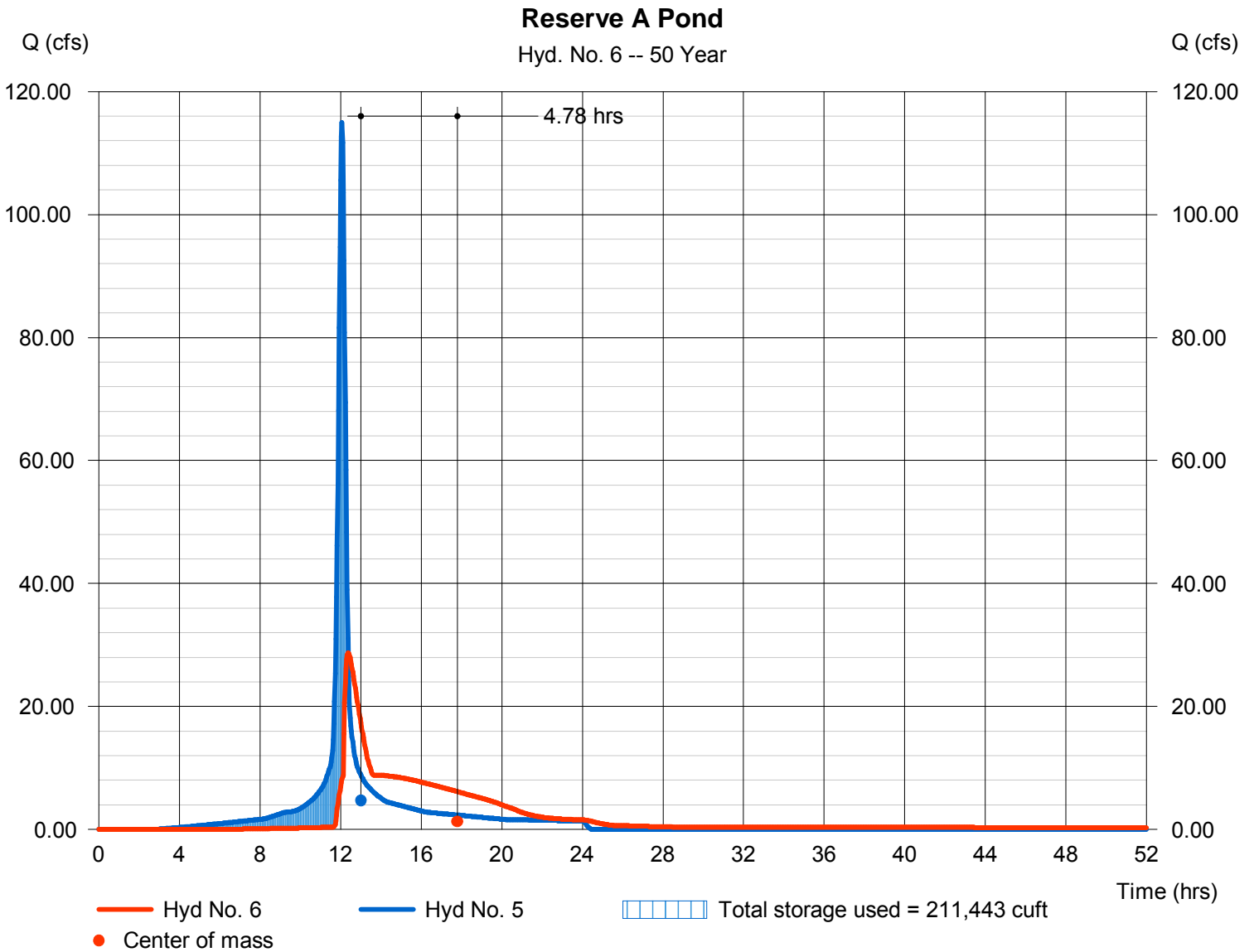
Tuesday, Nov 1, 2011

Hyd. No. 6

Reserve A Pond

Hydrograph type	= Reservoir	Peak discharge	= 28.73 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 371,321 cuft
Inflow hyd. No.	= 5 - Developed - Basin 1	Max. Elevation	= 1344.48 ft
Reservoir name	= Reserve A	Max. Storage	= 211,443 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

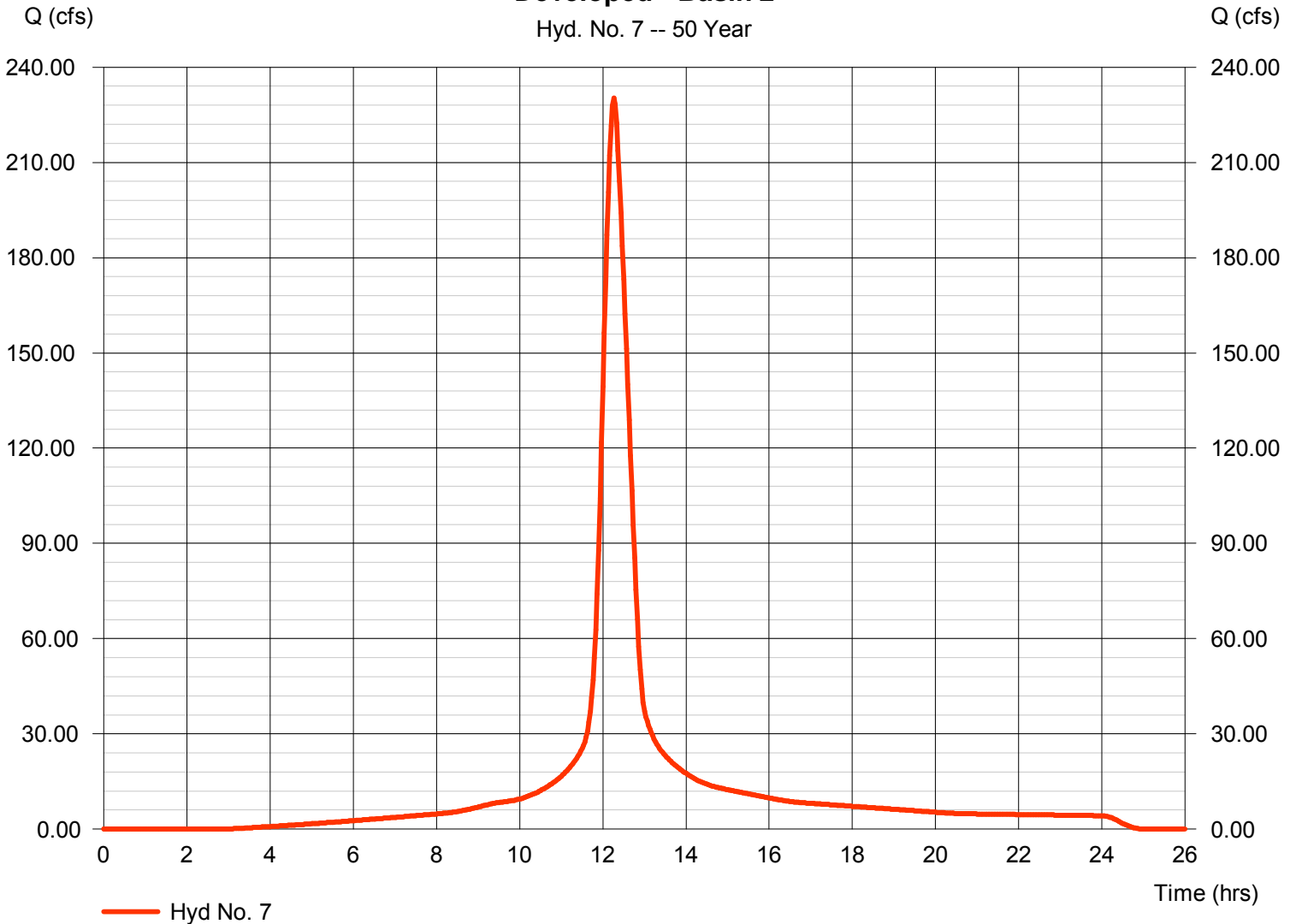
Hyd. No. 7

Developed - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 230.35 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.27 hrs
Time interval	= 2 min	Hyd. volume	= 1,166,029 cuft
Drainage area	= 55.000 ac	Curve number	= 91
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 40.30 min
Total precip.	= 6.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Developed - Basin 2

Hyd. No. 7 -- 50 Year



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

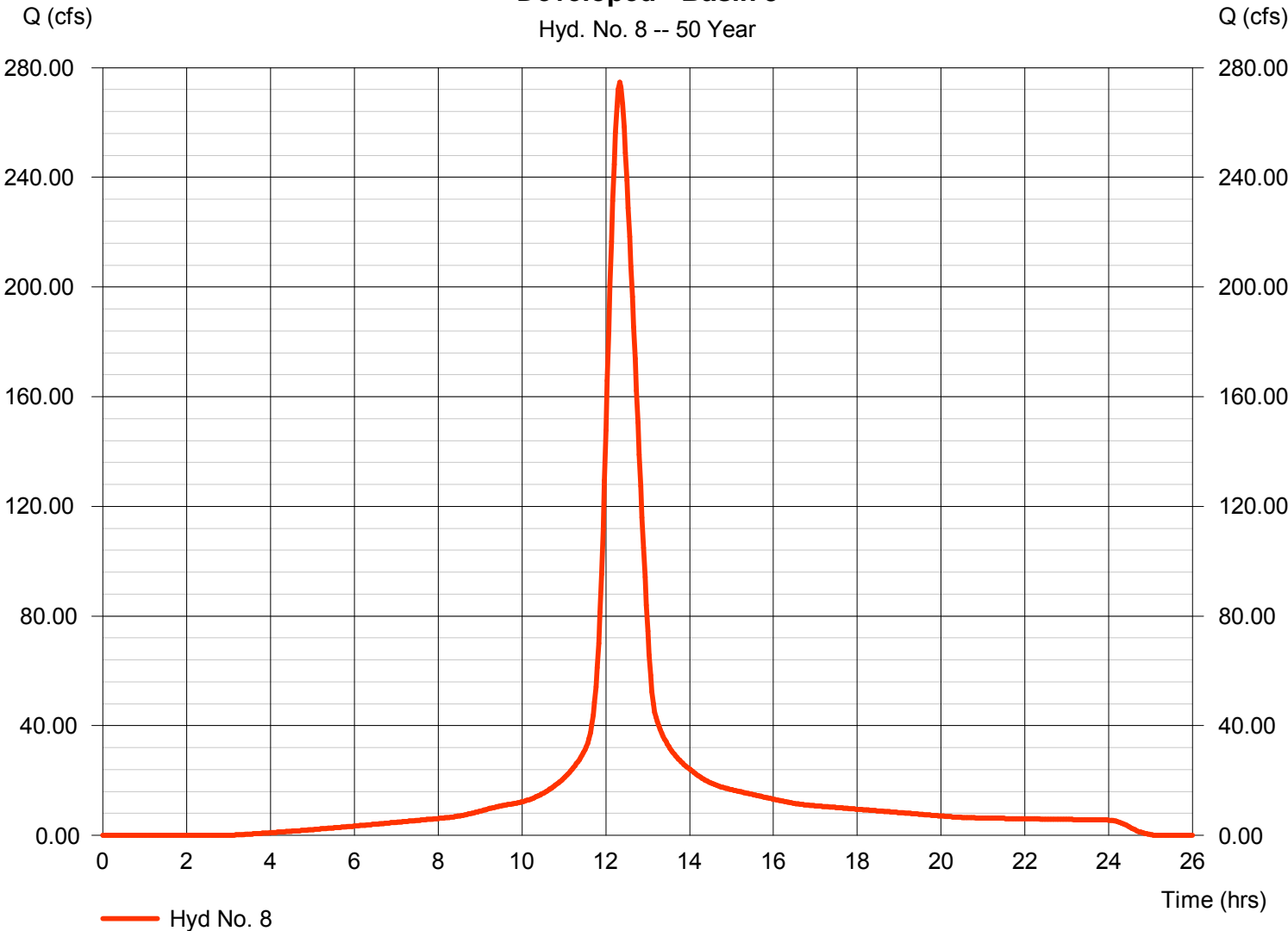
Hyd. No. 8

Developed - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 274.65 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.33 hrs
Time interval	= 2 min	Hyd. volume	= 1,533,819 cuft
Drainage area	= 73.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 44.10 min
Total precip.	= 6.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Developed - Basin 3

Hyd. No. 8 -- 50 Year



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

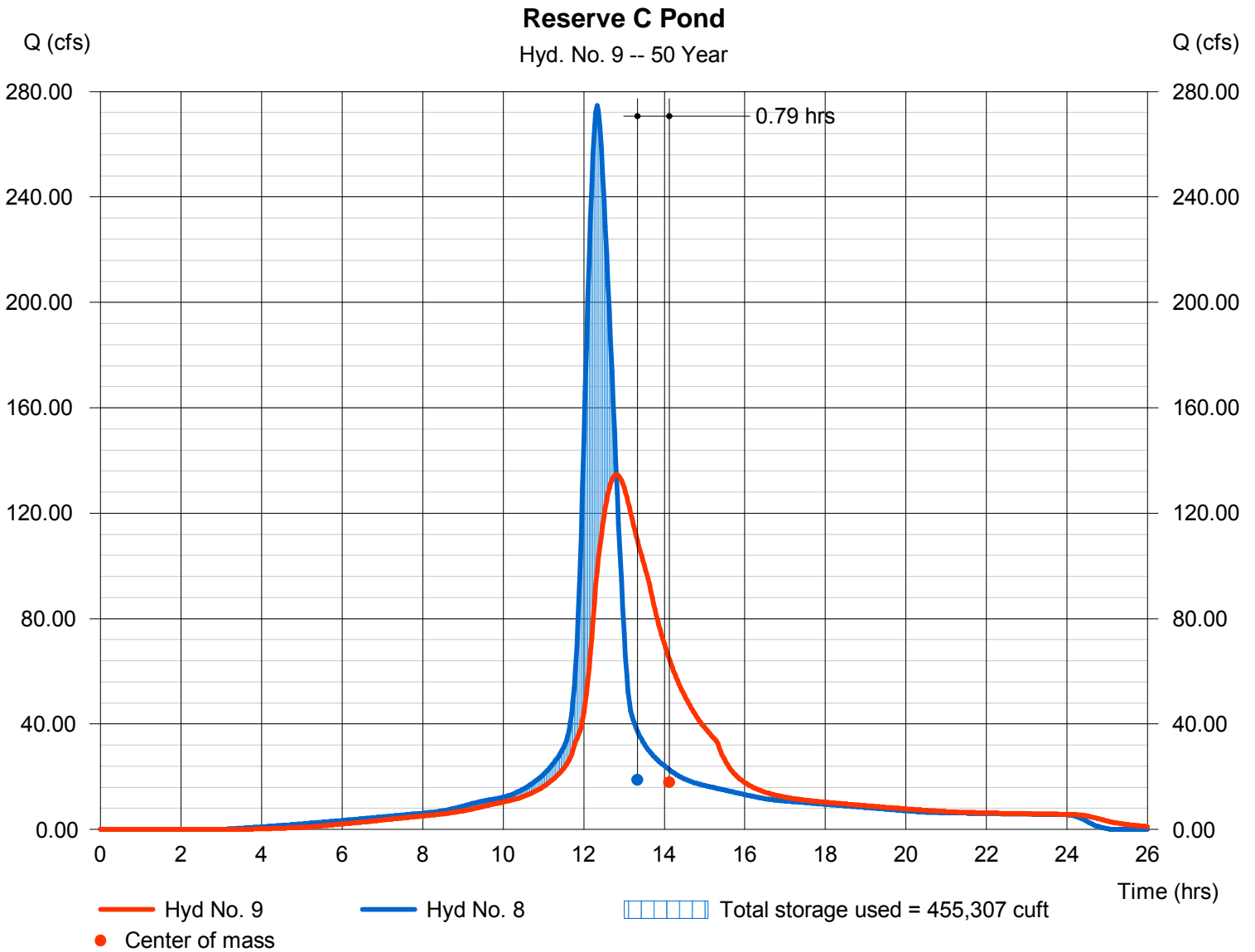
Tuesday, Nov 1, 2011

Hyd. No. 9

Reserve C Pond

Hydrograph type	= Reservoir	Peak discharge	= 134.62 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.80 hrs
Time interval	= 2 min	Hyd. volume	= 1,533,814 cuft
Inflow hyd. No.	= 8 - Developed - Basin 3	Max. Elevation	= 1340.54 ft
Reservoir name	= Reserve C Pond	Max. Storage	= 455,307 cuft

Storage Indication method used.



Hydrograph Report

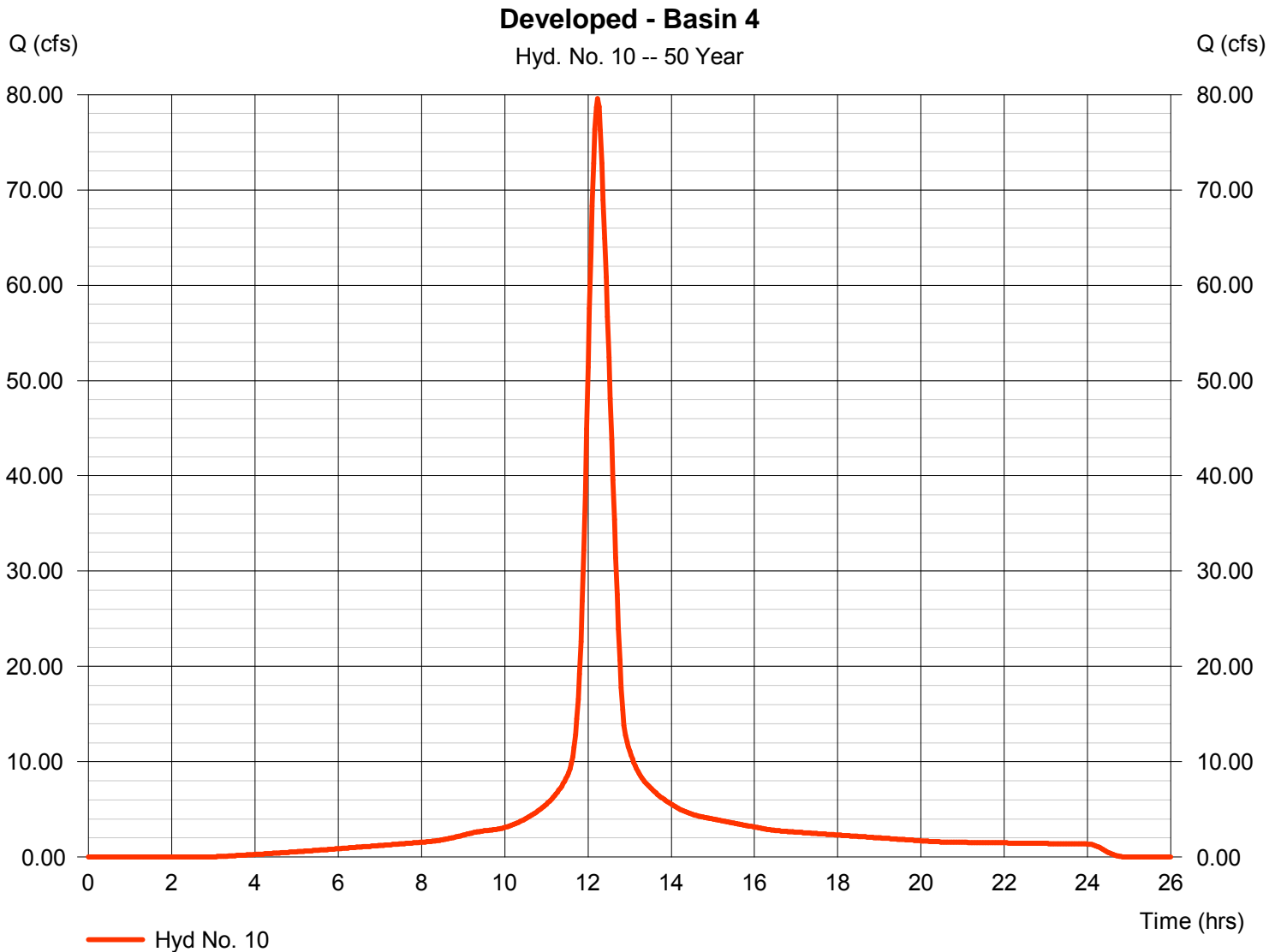
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 10

Developed - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 79.57 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.23 hrs
Time interval	= 2 min	Hyd. volume	= 377,273 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1200 ft
Tc method	= LAG	Time of conc. (Tc)	= 35.00 min
Total precip.	= 6.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

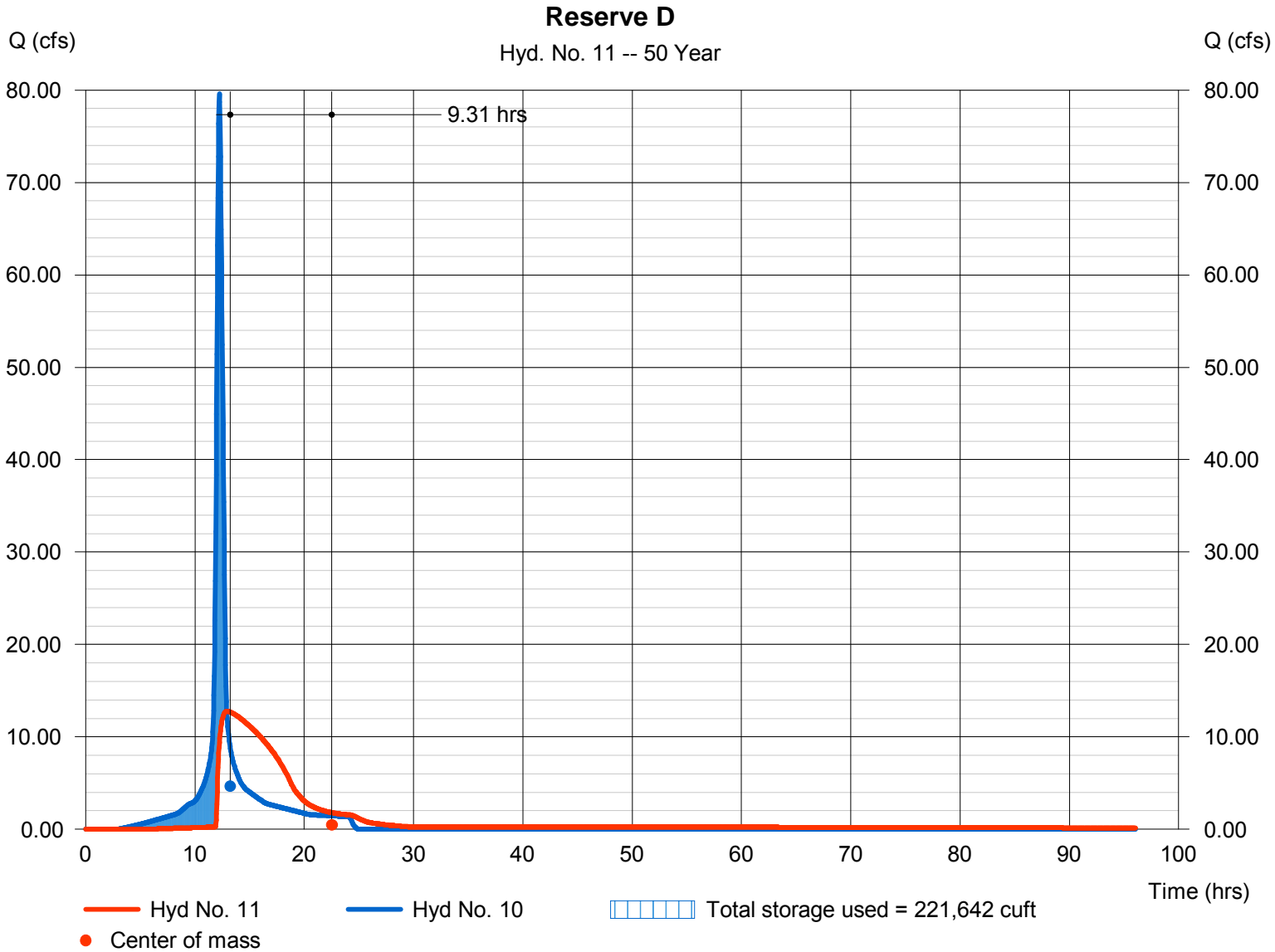
Tuesday, Nov 1, 2011

Hyd. No. 11

Reserve D

Hydrograph type	= Reservoir	Peak discharge	= 12.76 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.90 hrs
Time interval	= 2 min	Hyd. volume	= 355,902 cuft
Inflow hyd. No.	= 10 - Developed - Basin 4	Max. Elevation	= 1336.72 ft
Reservoir name	= Reserve D	Max. Storage	= 221,642 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

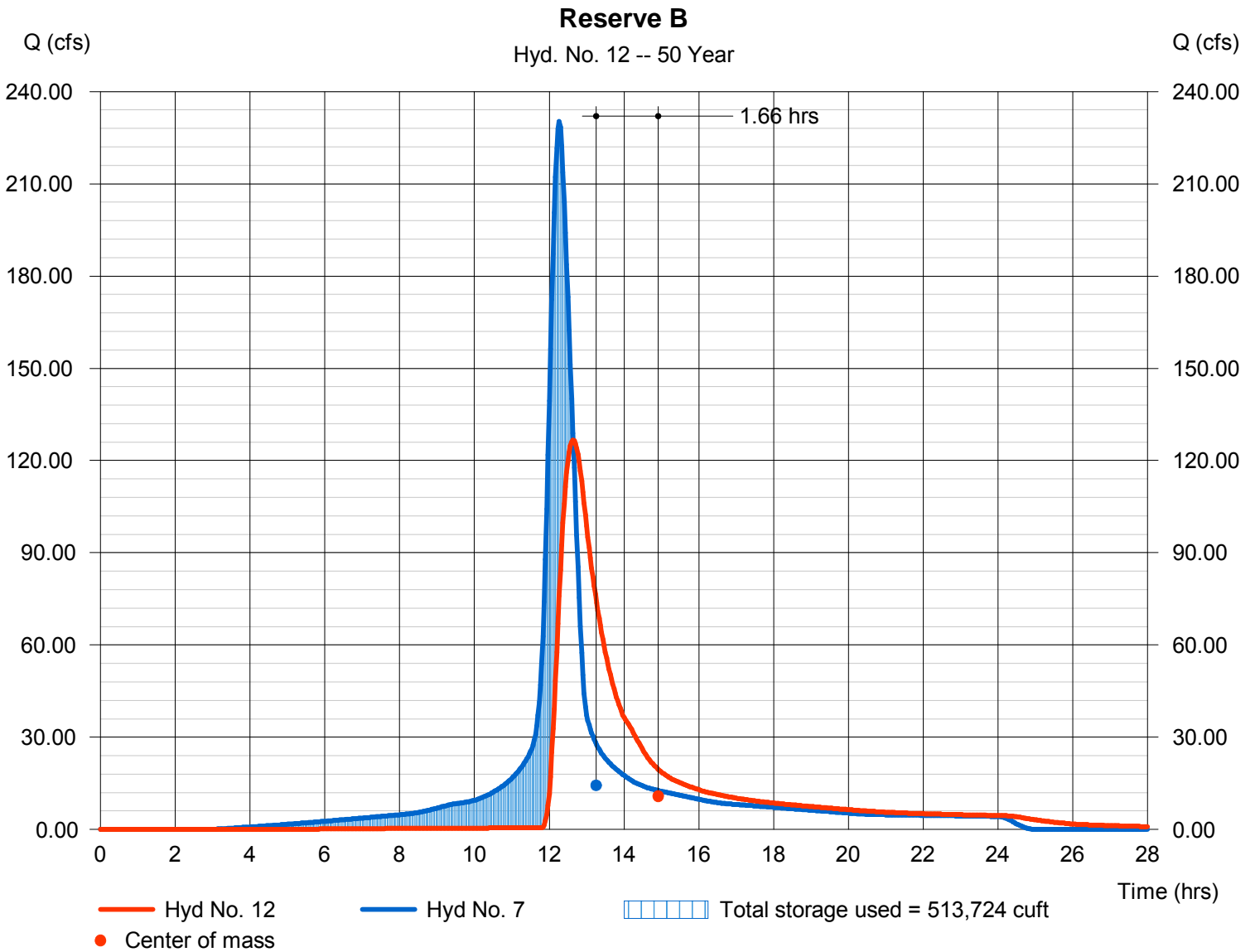
Tuesday, Nov 1, 2011

Hyd. No. 12

Reserve B

Hydrograph type	= Reservoir	Peak discharge	= 126.59 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.63 hrs
Time interval	= 2 min	Hyd. volume	= 1,087,986 cuft
Inflow hyd. No.	= 7 - Developed - Basin 2	Max. Elevation	= 1338.93 ft
Reservoir name	= Reserve B	Max. Storage	= 513,724 cuft

Storage Indication method used.



Hydrograph Report

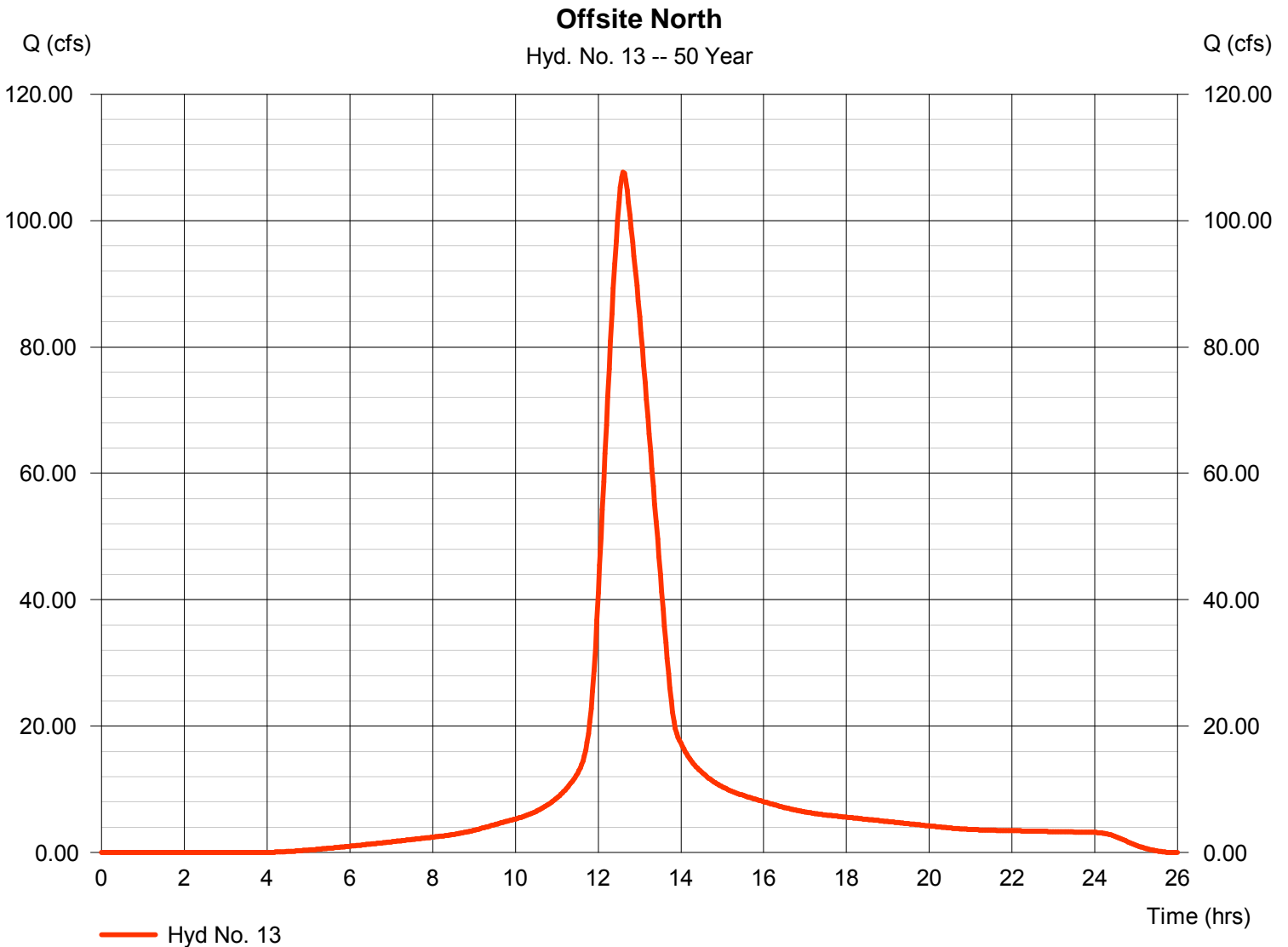
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 13

Offsite North

Hydrograph type	= SCS Runoff	Peak discharge	= 107.66 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.60 hrs
Time interval	= 2 min	Hyd. volume	= 822,668 cuft
Drainage area	= 41.000 ac	Curve number	= 88
Basin Slope	= 0.3 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 74.50 min
Total precip.	= 6.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

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	127.01	2	724	416,398	-----	-----	-----	Existing Basin 1
2	SCS Runoff	228.25	2	740	1,260,967	-----	-----	-----	Existing - Basin 2
3	SCS Runoff	289.61	2	742	1,688,724	-----	-----	-----	Existing - Basin 3
4	SCS Runoff	59.51	2	742	346,998	-----	-----	-----	Existing - Basin 4
5	SCS Runoff	131.35	2	724	439,545	-----	-----	-----	Developed - Basin 1
6	Reservoir	37.84	2	742	429,211	5	1344.83	235,325	Reserve A Pond
7	SCS Runoff	263.49	2	736	1,343,053	-----	-----	-----	Developed - Basin 2
8	SCS Runoff	314.22	2	740	1,766,682	-----	-----	-----	Developed - Basin 3
9	Reservoir	152.71	2	768	1,766,676	8	1340.76	527,570	Reserve C Pond
10	SCS Runoff	91.01	2	734	434,550	-----	-----	-----	Developed - Basin 4
11	Reservoir	13.88	2	776	413,056	10	1337.20	256,555	Reserve D
12	Reservoir	152.61	2	758	1,264,749	7	1339.30	563,628	Reserve B
13	SCS Runoff	124.12	2	756	953,851	-----	-----	-----	Offsite North
Total Site.gpw					Return Period: 100 Year			Tuesday, Nov 1, 2011	

Hydrograph Report

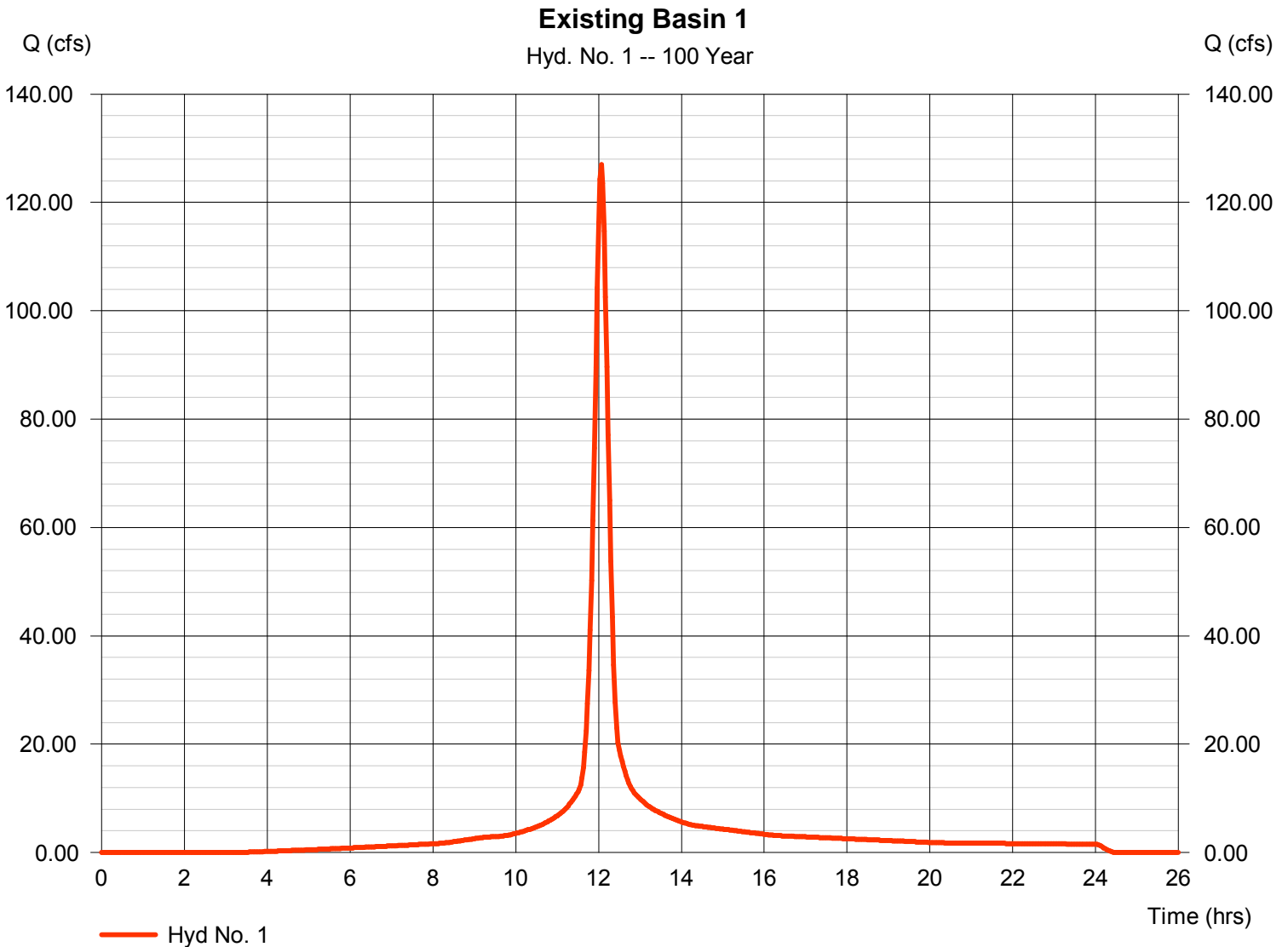
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 1

Existing Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 127.01 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 416,398 cuft
Drainage area	= 18.000 ac	Curve number	= 88
Basin Slope	= 0.7 %	Hydraulic length	= 600 ft
Tc method	= LAG	Time of conc. (Tc)	= 19.20 min
Total precip.	= 7.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

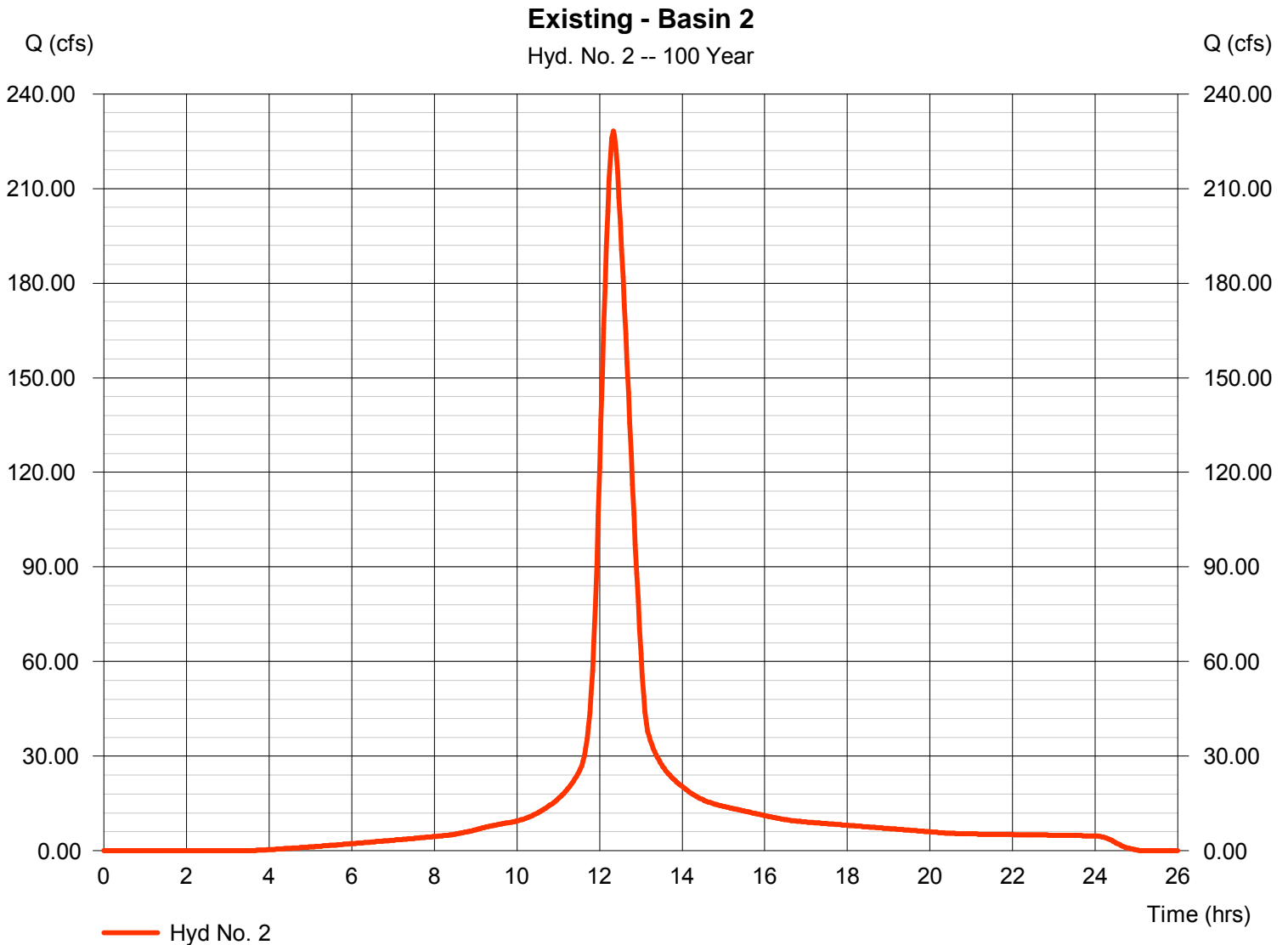
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 2

Existing - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 228.25 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.33 hrs
Time interval	= 2 min	Hyd. volume	= 1,260,967 cuft
Drainage area	= 55.000 ac	Curve number	= 88
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 45.40 min
Total precip.	= 7.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

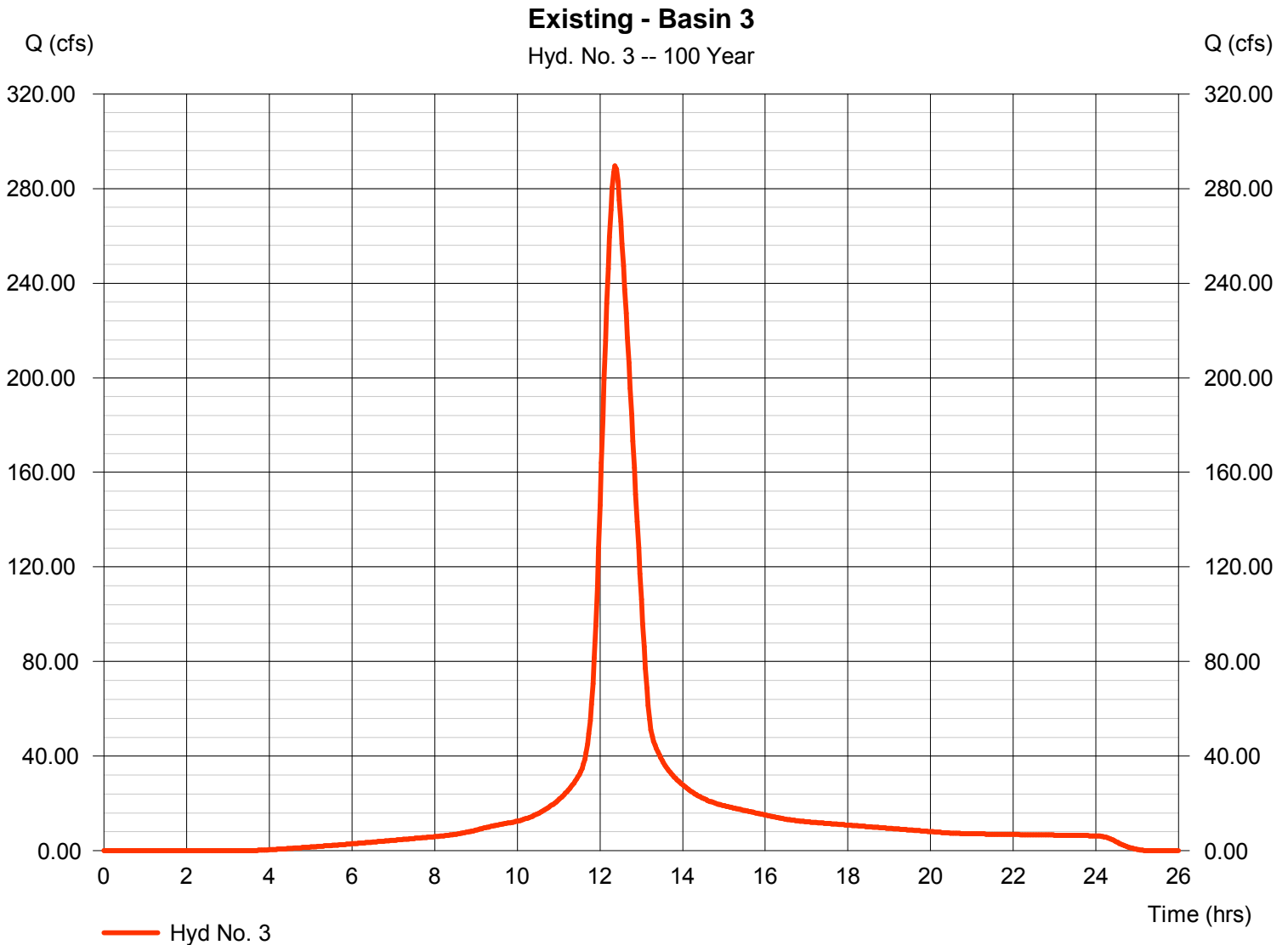
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 3

Existing - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 289.61 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 1,688,724 cuft
Drainage area	= 73.000 ac	Curve number	= 88
Basin Slope	= 0.6 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 49.90 min
Total precip.	= 7.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

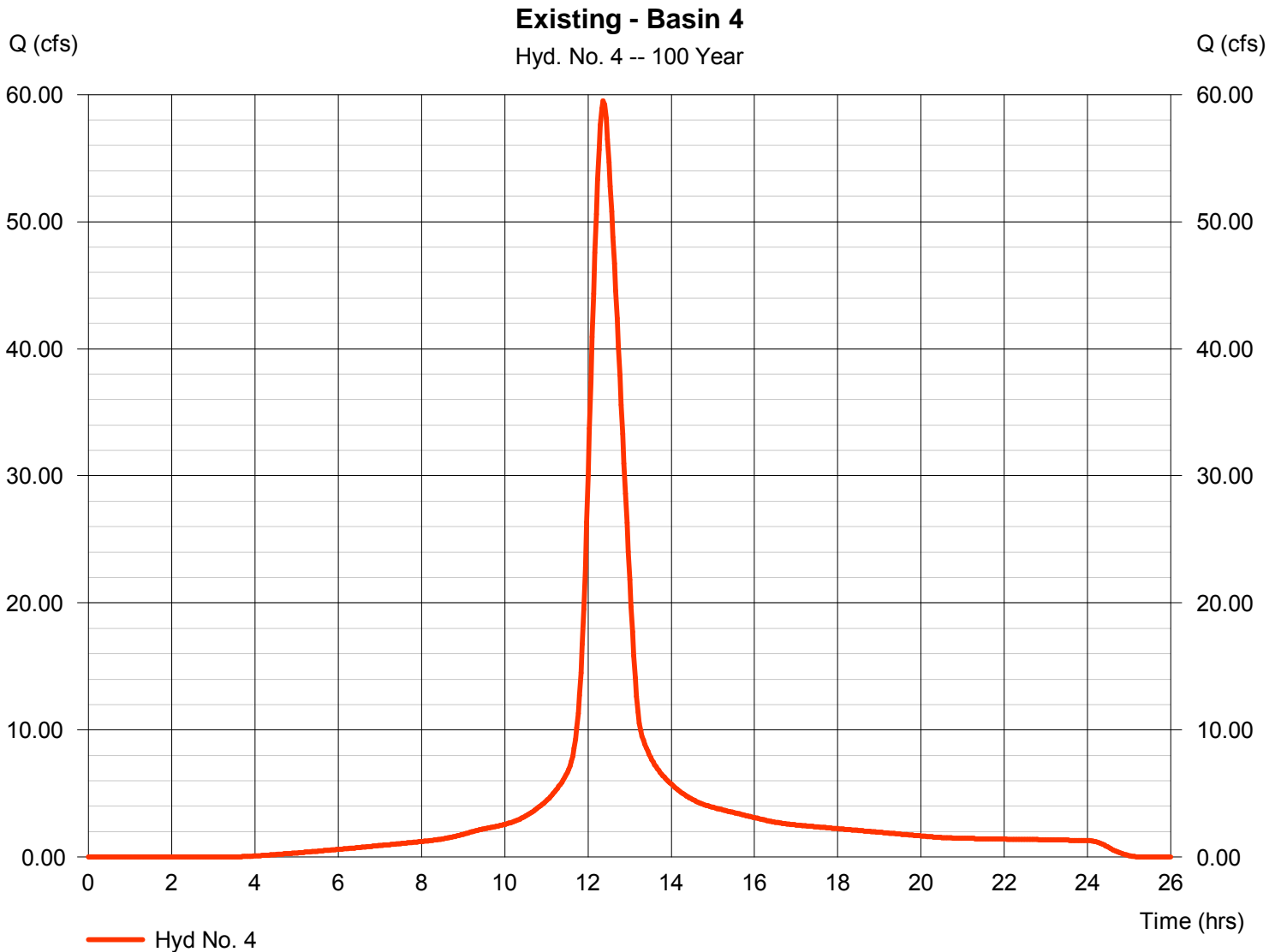
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 4

Existing - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 59.51 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 346,998 cuft
Drainage area	= 15.000 ac	Curve number	= 88
Basin Slope	= 0.4 %	Hydraulic length	= 1400 ft
Tc method	= LAG	Time of conc. (Tc)	= 50.00 min
Total precip.	= 7.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

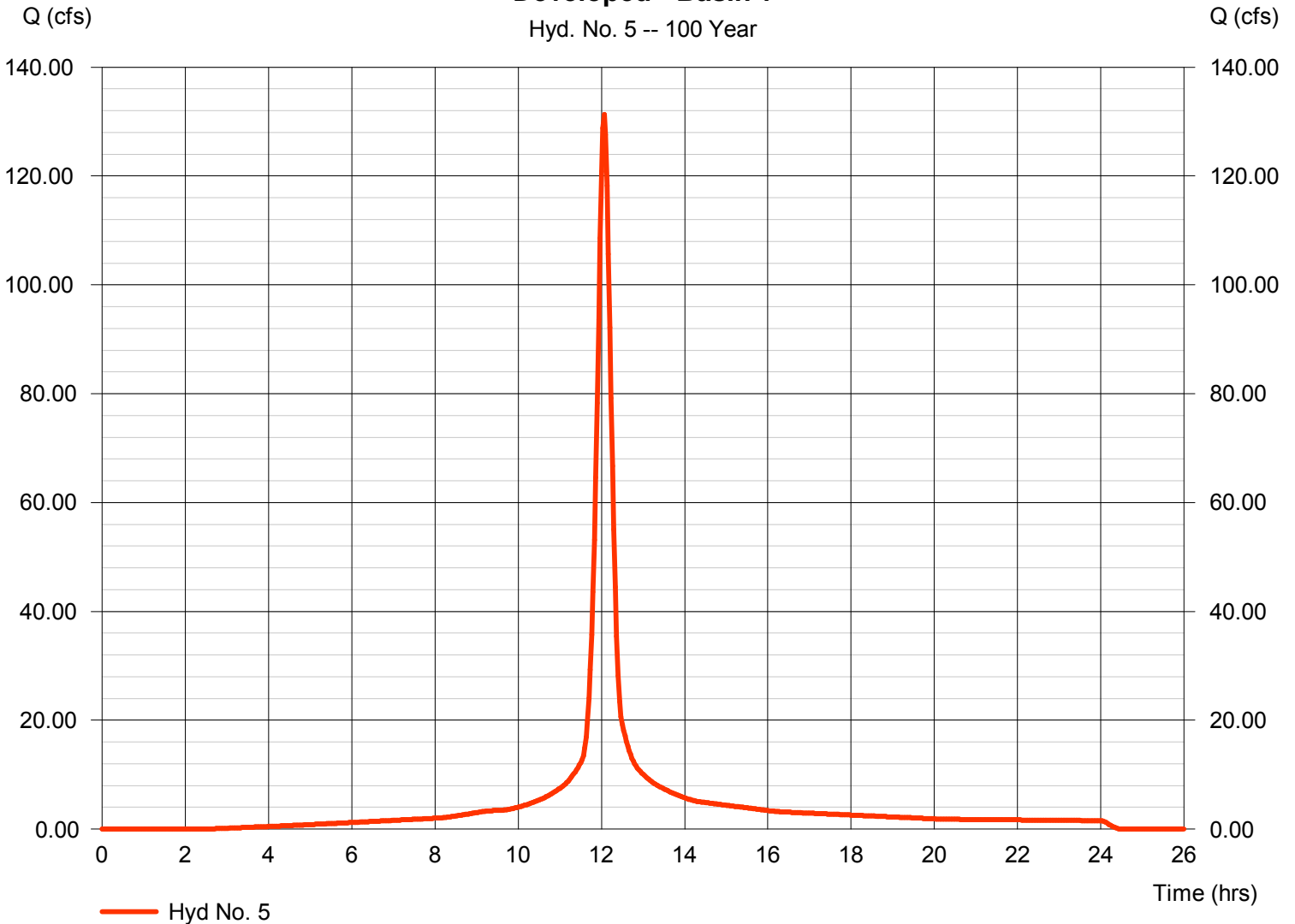
Hyd. No. 5

Developed - Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 131.35 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 439,545 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 500 ft
Tc method	= LAG	Time of conc. (Tc)	= 17.40 min
Total precip.	= 7.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Developed - Basin 1

Hyd. No. 5 -- 100 Year



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

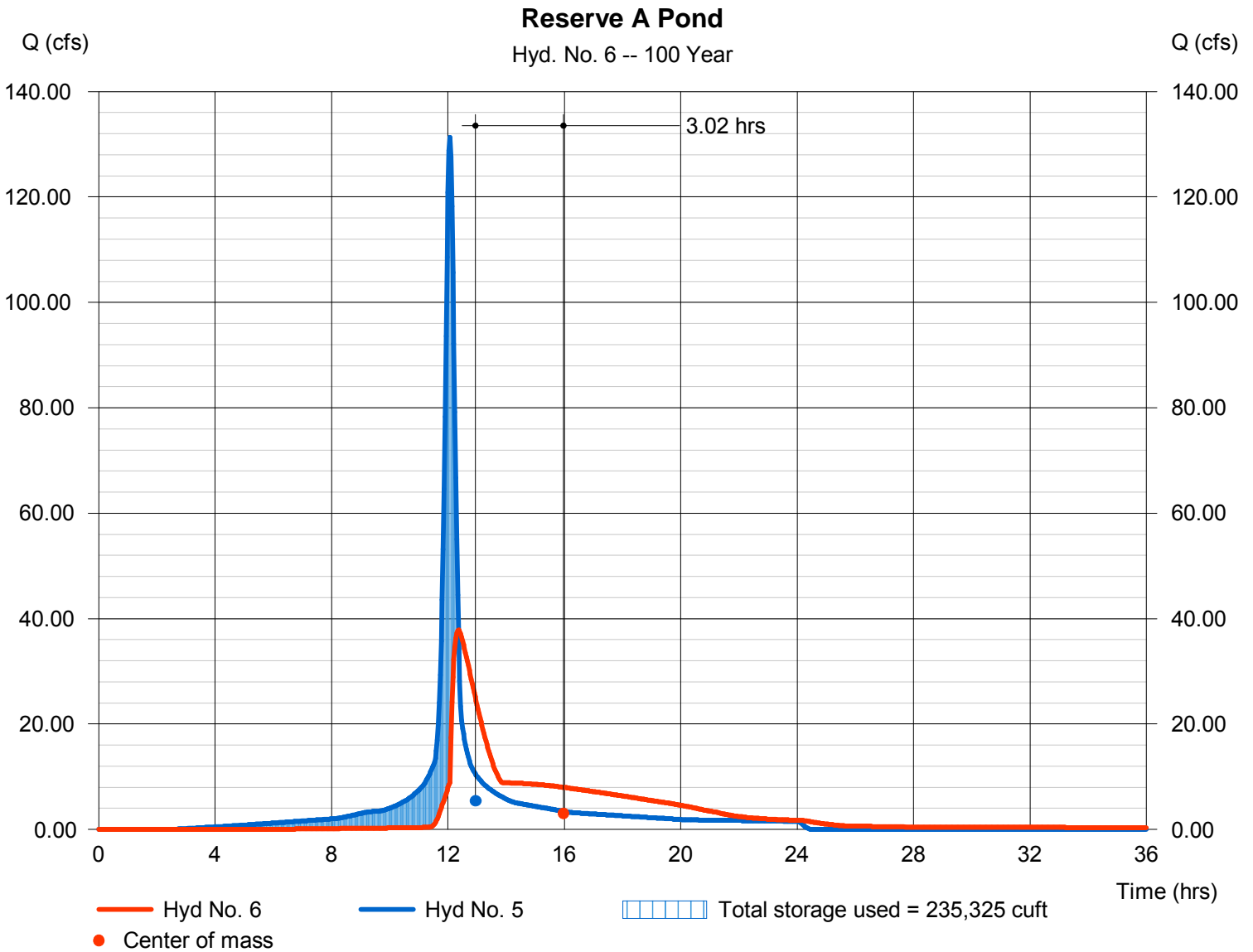
Tuesday, Nov 1, 2011

Hyd. No. 6

Reserve A Pond

Hydrograph type	= Reservoir	Peak discharge	= 37.84 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 429,211 cuft
Inflow hyd. No.	= 5 - Developed - Basin 1	Max. Elevation	= 1344.83 ft
Reservoir name	= Reserve A	Max. Storage	= 235,325 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

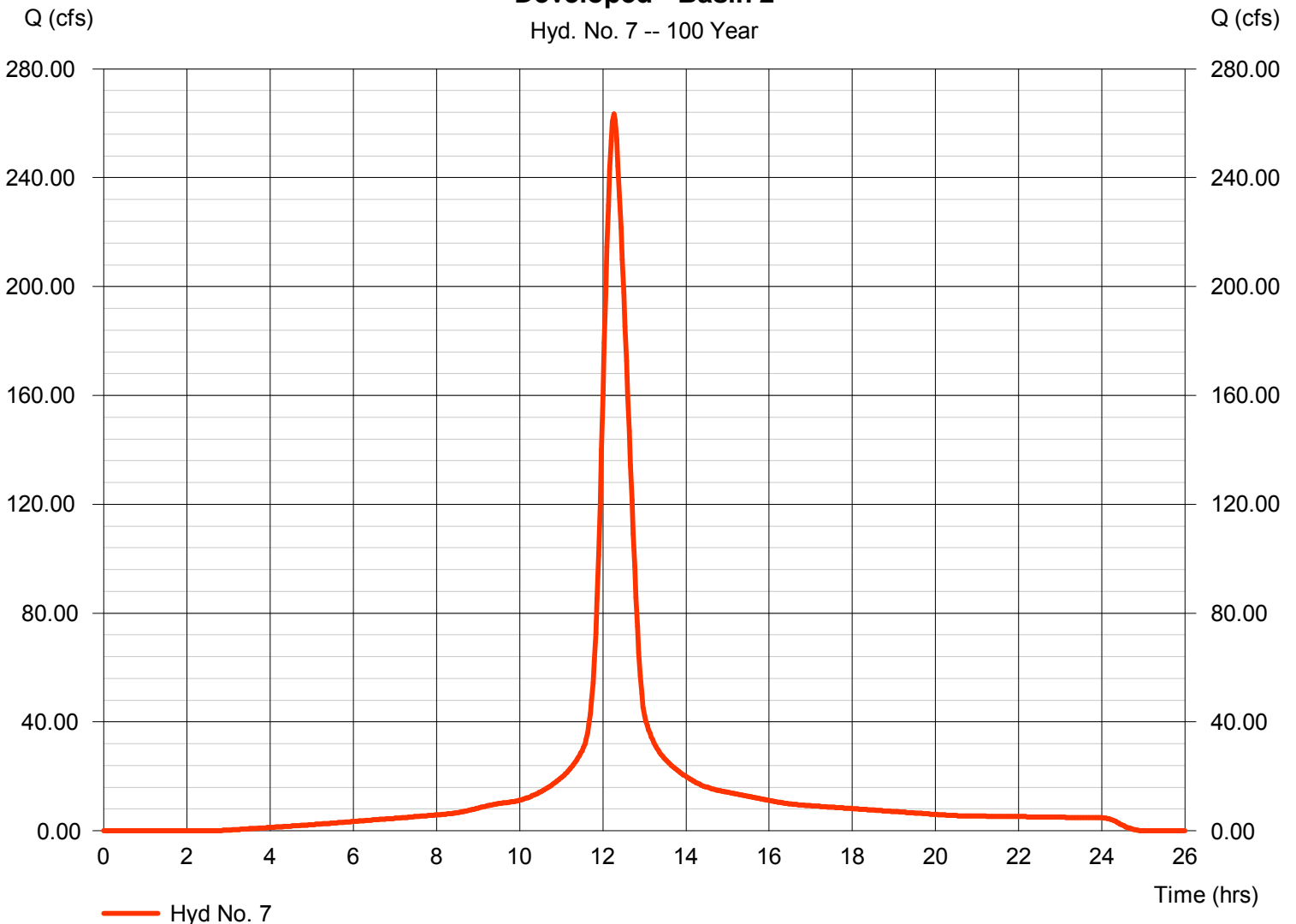
Hyd. No. 7

Developed - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 263.49 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.27 hrs
Time interval	= 2 min	Hyd. volume	= 1,343,053 cuft
Drainage area	= 55.000 ac	Curve number	= 91
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 40.30 min
Total precip.	= 7.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Developed - Basin 2

Hyd. No. 7 -- 100 Year



Hydrograph Report

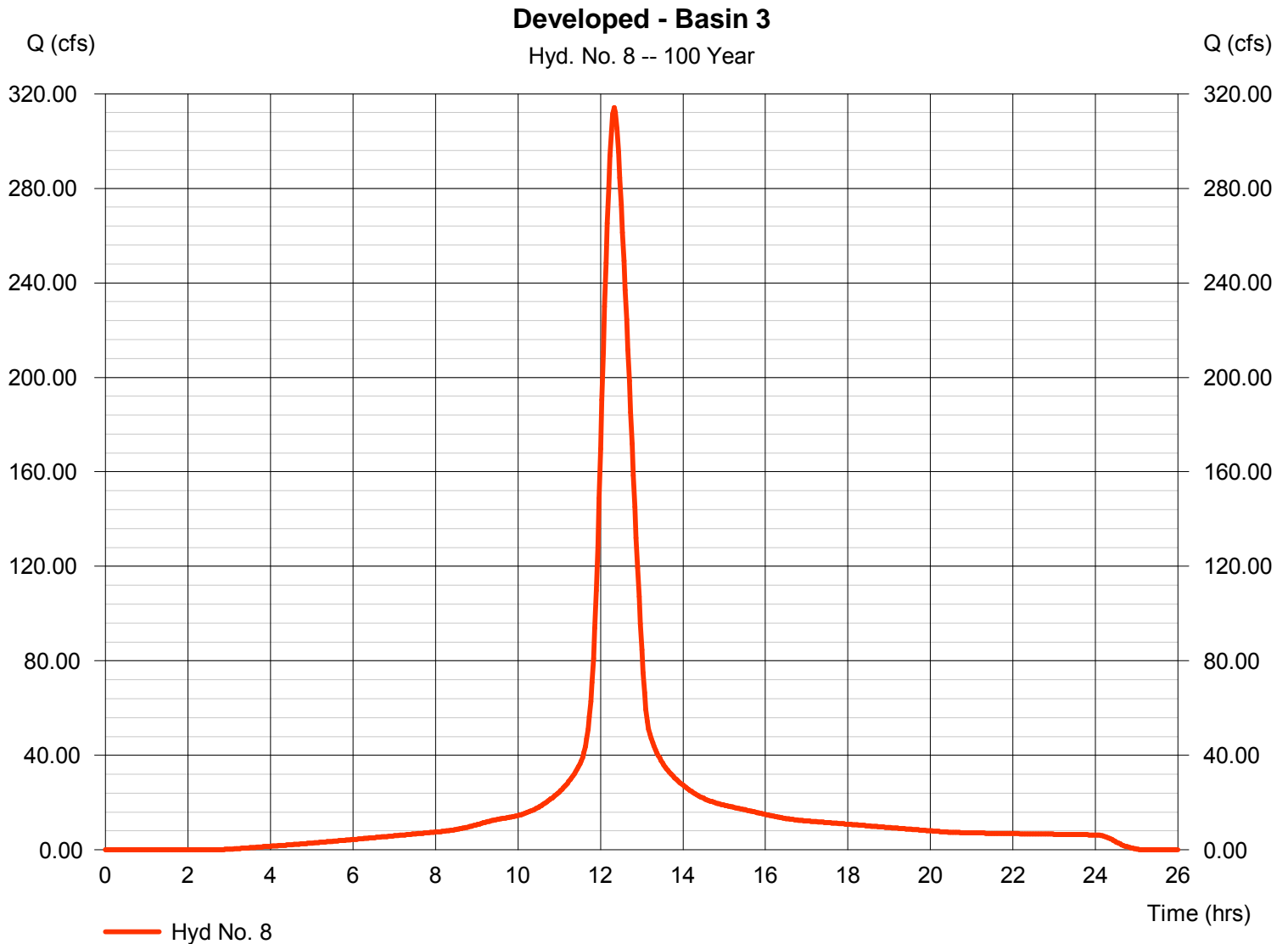
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 8

Developed - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 314.22 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.33 hrs
Time interval	= 2 min	Hyd. volume	= 1,766,682 cuft
Drainage area	= 73.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 44.10 min
Total precip.	= 7.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

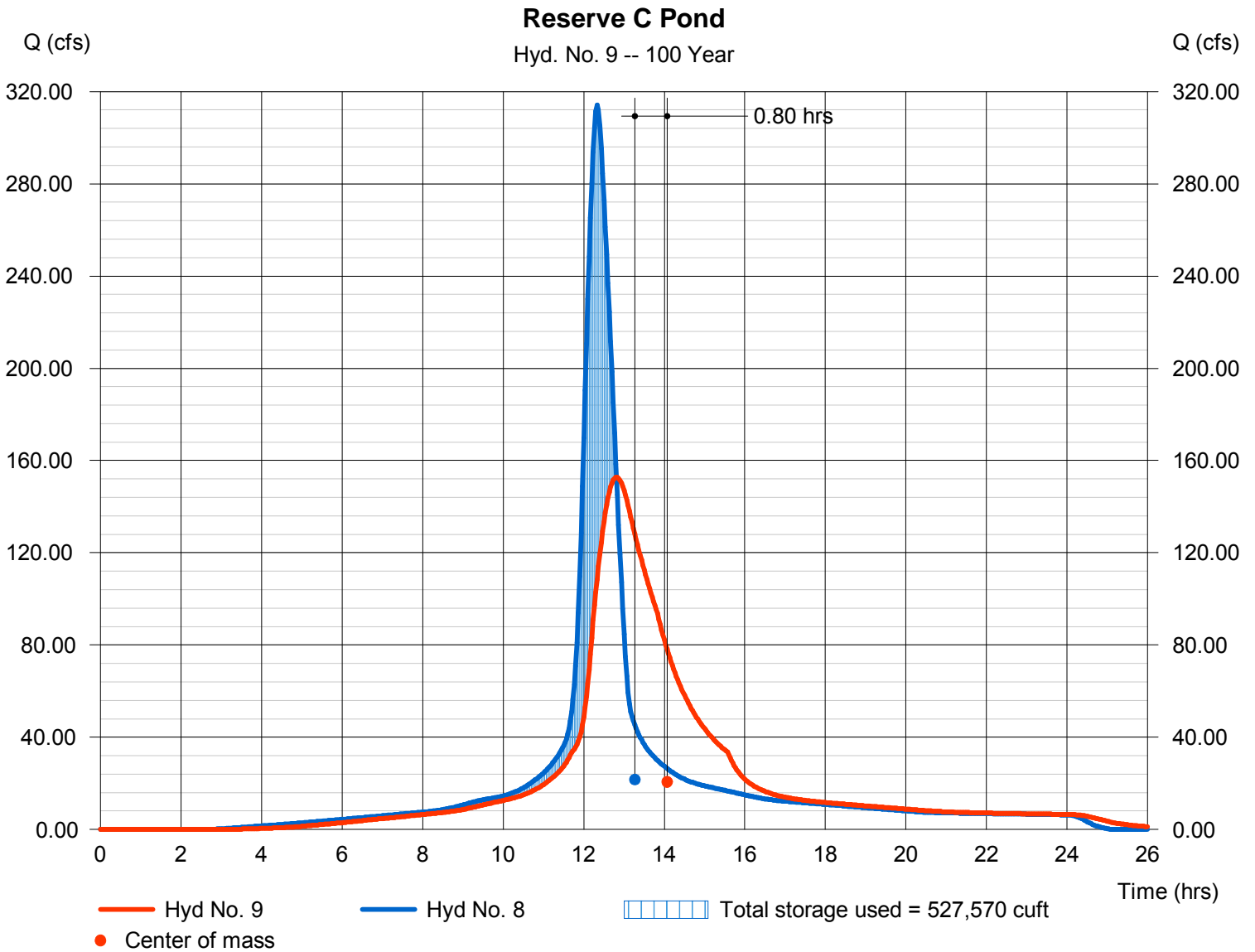
Tuesday, Nov 1, 2011

Hyd. No. 9

Reserve C Pond

Hydrograph type	= Reservoir	Peak discharge	= 152.71 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.80 hrs
Time interval	= 2 min	Hyd. volume	= 1,766,676 cuft
Inflow hyd. No.	= 8 - Developed - Basin 3	Max. Elevation	= 1340.76 ft
Reservoir name	= Reserve C Pond	Max. Storage	= 527,570 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

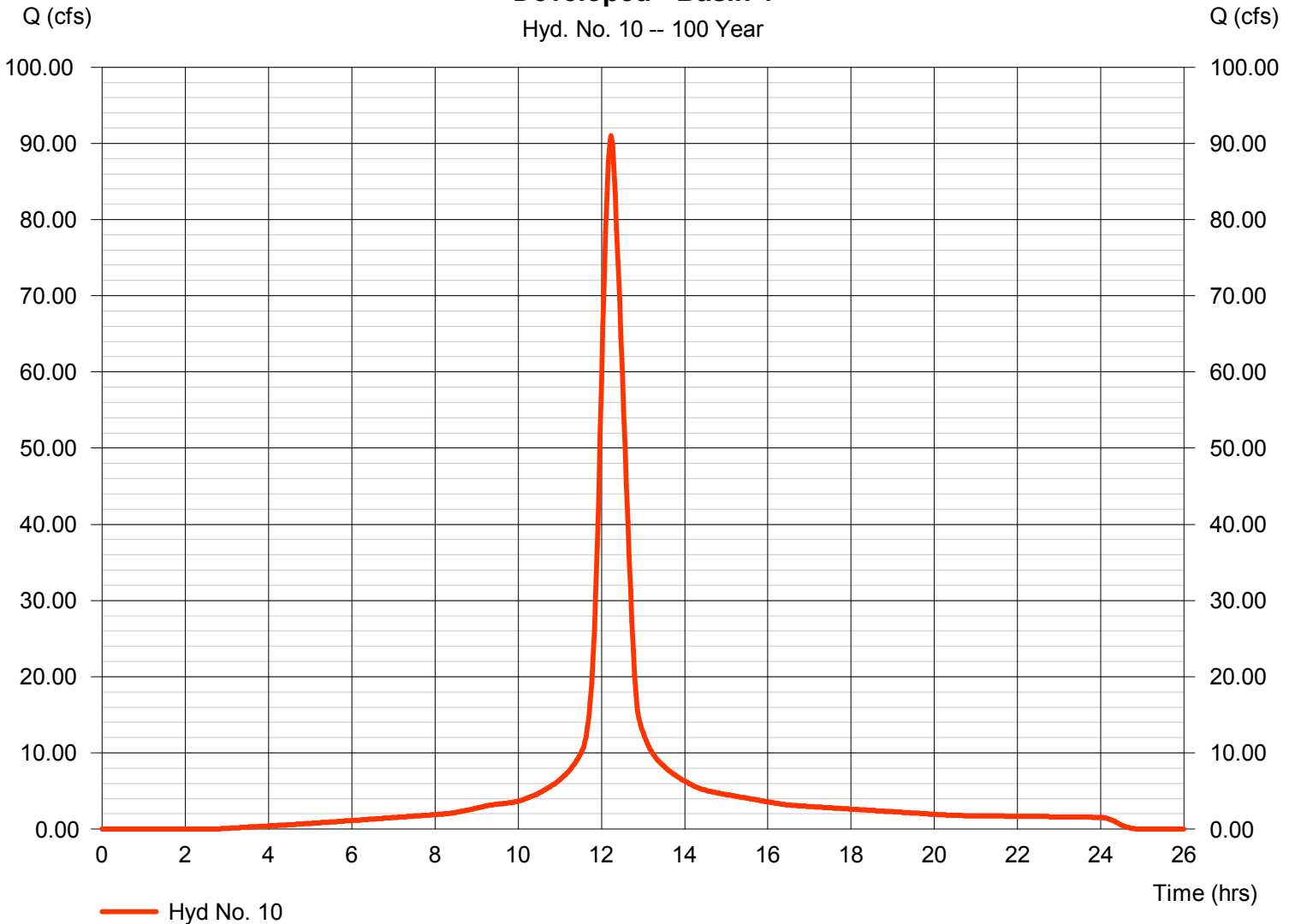
Hyd. No. 10

Developed - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 91.01 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.23 hrs
Time interval	= 2 min	Hyd. volume	= 434,550 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1200 ft
Tc method	= LAG	Time of conc. (Tc)	= 35.00 min
Total precip.	= 7.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Developed - Basin 4

Hyd. No. 10 -- 100 Year



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

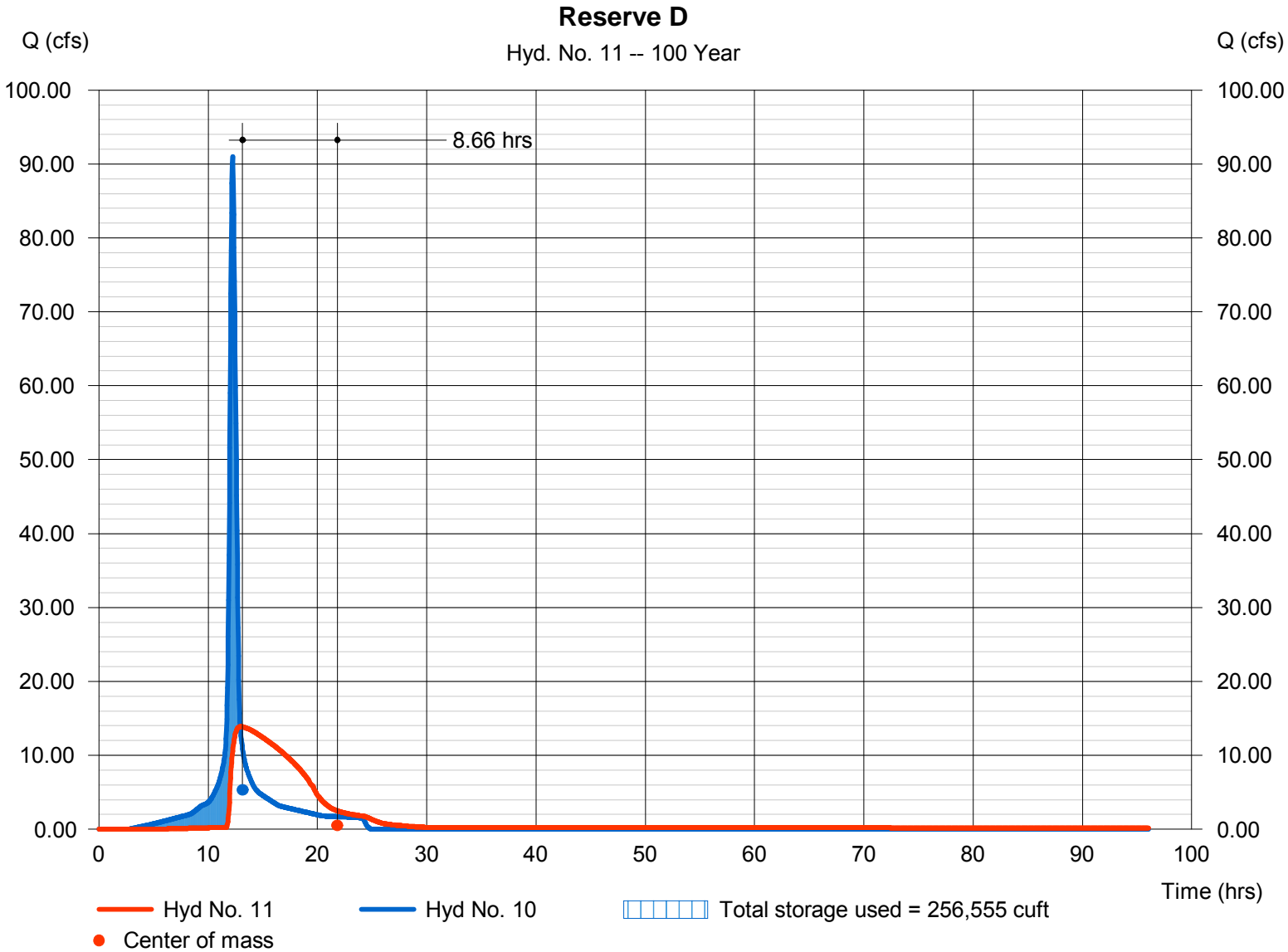
Tuesday, Nov 1, 2011

Hyd. No. 11

Reserve D

Hydrograph type	= Reservoir	Peak discharge	= 13.88 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.93 hrs
Time interval	= 2 min	Hyd. volume	= 413,056 cuft
Inflow hyd. No.	= 10 - Developed - Basin 4	Max. Elevation	= 1337.20 ft
Reservoir name	= Reserve D	Max. Storage	= 256,555 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

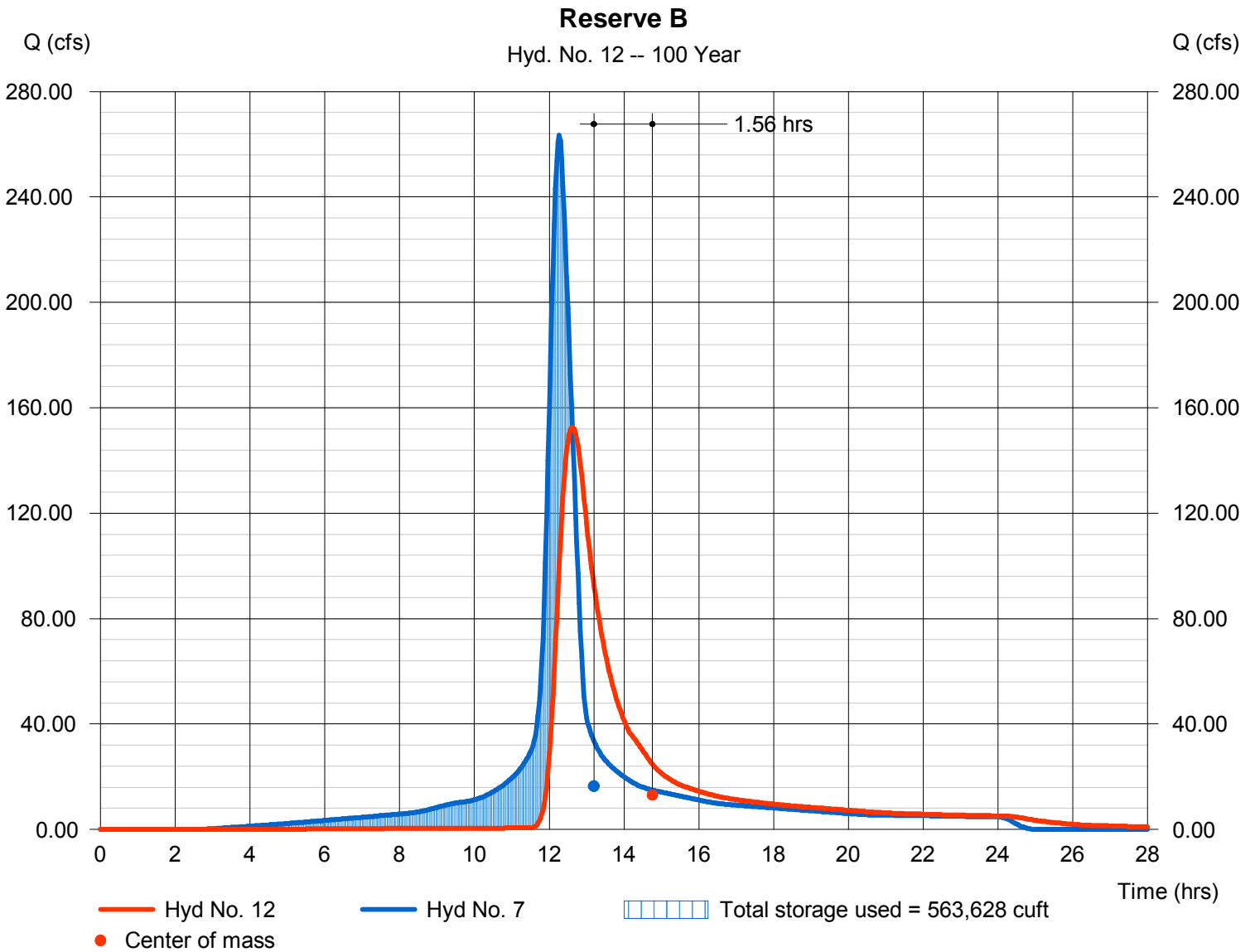
Tuesday, Nov 1, 2011

Hyd. No. 12

Reserve B

Hydrograph type	= Reservoir	Peak discharge	= 152.61 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.63 hrs
Time interval	= 2 min	Hyd. volume	= 1,264,749 cuft
Inflow hyd. No.	= 7 - Developed - Basin 2	Max. Elevation	= 1339.30 ft
Reservoir name	= Reserve B	Max. Storage	= 563,628 cuft

Storage Indication method used.



Hydrograph Report

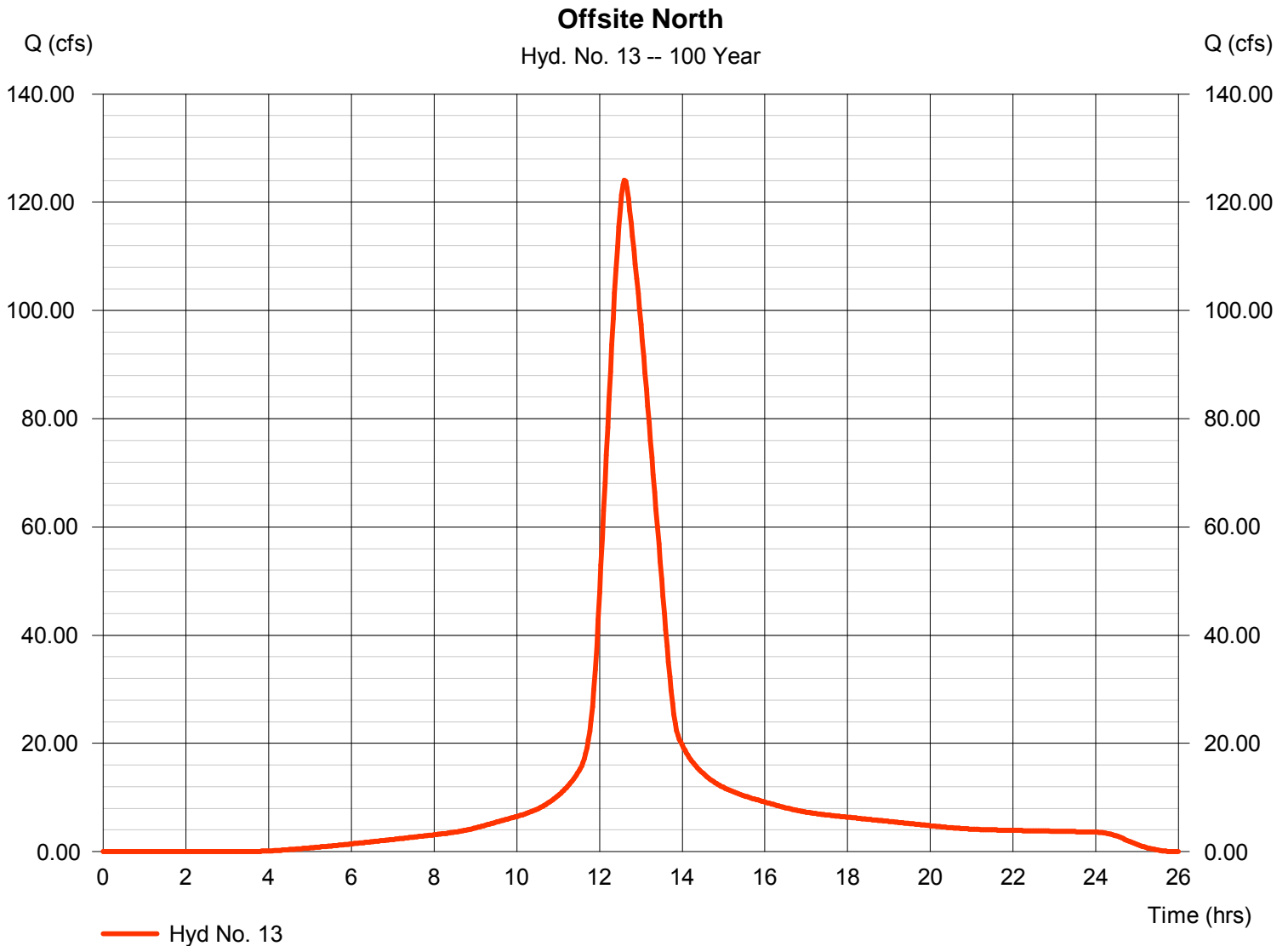
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

Hyd. No. 13

Offsite North

Hydrograph type	= SCS Runoff	Peak discharge	= 124.12 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.60 hrs
Time interval	= 2 min	Hyd. volume	= 953,851 cuft
Drainage area	= 41.000 ac	Curve number	= 88
Basin Slope	= 0.3 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 74.50 min
Total precip.	= 7.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Tuesday, Nov 1, 2011

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

$$\text{Intensity} = B / (T_c + D)^E$$

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

T_c = 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

Watershed Model Schematic	1
Hydrograph Return Period Recap	2
1 - Year	
Summary Report.....	3
Hydrograph Reports.....	4
Hydrograph No. 1, SCS Runoff, Existing Basin 1.....	4
Hydrograph No. 2, SCS Runoff, Existing - Basin 2.....	5
Hydrograph No. 3, SCS Runoff, Existing - Basin 3.....	6
Hydrograph No. 4, SCS Runoff, Existing - Basin 4.....	7
Hydrograph No. 5, SCS Runoff, Developed - Basin 1.....	8
Hydrograph No. 6, Reservoir, Reserve A Pond.....	9
Pond Report - Reserve A.....	10
Hydrograph No. 7, SCS Runoff, Developed - Basin 2.....	11
Hydrograph No. 8, SCS Runoff, Developed - Basin 3.....	12
Hydrograph No. 9, Reservoir, Reserve C Pond.....	13
Pond Report - Reserve C Pond.....	14
Hydrograph No. 10, SCS Runoff, Developed - Basin 4.....	15
Hydrograph No. 11, Reservoir, Reserve D.....	16
Pond Report - Reserve D.....	17
Hydrograph No. 12, Reservoir, Reserve B.....	18
Pond Report - Reserve B.....	19
Hydrograph No. 13, SCS Runoff, Offsite North.....	20
2 - Year	
Summary Report.....	21
Hydrograph Reports.....	22
Hydrograph No. 1, SCS Runoff, Existing Basin 1.....	22
Hydrograph No. 2, SCS Runoff, Existing - Basin 2.....	23
Hydrograph No. 3, SCS Runoff, Existing - Basin 3.....	24
Hydrograph No. 4, SCS Runoff, Existing - Basin 4.....	25
Hydrograph No. 5, SCS Runoff, Developed - Basin 1.....	26
Hydrograph No. 6, Reservoir, Reserve A Pond.....	27
Hydrograph No. 7, SCS Runoff, Developed - Basin 2.....	28
Hydrograph No. 8, SCS Runoff, Developed - Basin 3.....	29
Hydrograph No. 9, Reservoir, Reserve C Pond.....	30
Hydrograph No. 10, SCS Runoff, Developed - Basin 4.....	31
Hydrograph No. 11, Reservoir, Reserve D.....	32
Hydrograph No. 12, Reservoir, Reserve B.....	33
Hydrograph No. 13, SCS Runoff, Offsite North.....	34
3 - Year	
Summary Report.....	35
Hydrograph Reports.....	36
Hydrograph No. 1, SCS Runoff, Existing Basin 1.....	36
Hydrograph No. 2, SCS Runoff, Existing - Basin 2.....	37
Hydrograph No. 3, SCS Runoff, Existing - Basin 3.....	38

Hydrograph No. 4, SCS Runoff, Existing - Basin 4.....	39
Hydrograph No. 5, SCS Runoff, Developed - Basin 1.....	40
Hydrograph No. 6, Reservoir, Reserve A Pond.....	41
Hydrograph No. 7, SCS Runoff, Developed - Basin 2.....	42
Hydrograph No. 8, SCS Runoff, Developed - Basin 3.....	43
Hydrograph No. 9, Reservoir, Reserve C Pond.....	44
Hydrograph No. 10, SCS Runoff, Developed - Basin 4.....	45
Hydrograph No. 11, Reservoir, Reserve D.....	46
Hydrograph No. 12, Reservoir, Reserve B.....	47
Hydrograph No. 13, SCS Runoff, Offsite North.....	48

5 - Year

Summary Report.....	49
Hydrograph Reports.....	50
Hydrograph No. 1, SCS Runoff, Existing Basin 1.....	50
Hydrograph No. 2, SCS Runoff, Existing - Basin 2.....	51
Hydrograph No. 3, SCS Runoff, Existing - Basin 3.....	52
Hydrograph No. 4, SCS Runoff, Existing - Basin 4.....	53
Hydrograph No. 5, SCS Runoff, Developed - Basin 1.....	54
Hydrograph No. 6, Reservoir, Reserve A Pond.....	55
Hydrograph No. 7, SCS Runoff, Developed - Basin 2.....	56
Hydrograph No. 8, SCS Runoff, Developed - Basin 3.....	57
Hydrograph No. 9, Reservoir, Reserve C Pond.....	58
Hydrograph No. 10, SCS Runoff, Developed - Basin 4.....	59
Hydrograph No. 11, Reservoir, Reserve D.....	60
Hydrograph No. 12, Reservoir, Reserve B.....	61
Hydrograph No. 13, SCS Runoff, Offsite North.....	62

10 - Year

Summary Report.....	63
Hydrograph Reports.....	64
Hydrograph No. 1, SCS Runoff, Existing Basin 1.....	64
Hydrograph No. 2, SCS Runoff, Existing - Basin 2.....	65
Hydrograph No. 3, SCS Runoff, Existing - Basin 3.....	66
Hydrograph No. 4, SCS Runoff, Existing - Basin 4.....	67
Hydrograph No. 5, SCS Runoff, Developed - Basin 1.....	68
Hydrograph No. 6, Reservoir, Reserve A Pond.....	69
Hydrograph No. 7, SCS Runoff, Developed - Basin 2.....	70
Hydrograph No. 8, SCS Runoff, Developed - Basin 3.....	71
Hydrograph No. 9, Reservoir, Reserve C Pond.....	72
Hydrograph No. 10, SCS Runoff, Developed - Basin 4.....	73
Hydrograph No. 11, Reservoir, Reserve D.....	74
Hydrograph No. 12, Reservoir, Reserve B.....	75
Hydrograph No. 13, SCS Runoff, Offsite North.....	76

25 - Year

Summary Report.....	77
Hydrograph Reports.....	78
Hydrograph No. 1, SCS Runoff, Existing Basin 1.....	78
Hydrograph No. 2, SCS Runoff, Existing - Basin 2.....	79

Hydrograph No. 3, SCS Runoff, Existing - Basin 3.....	80
Hydrograph No. 4, SCS Runoff, Existing - Basin 4.....	81
Hydrograph No. 5, SCS Runoff, Developed - Basin 1.....	82
Hydrograph No. 6, Reservoir, Reserve A Pond.....	83
Hydrograph No. 7, SCS Runoff, Developed - Basin 2.....	84
Hydrograph No. 8, SCS Runoff, Developed - Basin 3.....	85
Hydrograph No. 9, Reservoir, Reserve C Pond.....	86
Hydrograph No. 10, SCS Runoff, Developed - Basin 4.....	87
Hydrograph No. 11, Reservoir, Reserve D.....	88
Hydrograph No. 12, Reservoir, Reserve B.....	89
Hydrograph No. 13, SCS Runoff, Offsite North.....	90

50 - Year

Summary Report.....	91
Hydrograph Reports.....	92
Hydrograph No. 1, SCS Runoff, Existing Basin 1.....	92
Hydrograph No. 2, SCS Runoff, Existing - Basin 2.....	93
Hydrograph No. 3, SCS Runoff, Existing - Basin 3.....	94
Hydrograph No. 4, SCS Runoff, Existing - Basin 4.....	95
Hydrograph No. 5, SCS Runoff, Developed - Basin 1.....	96
Hydrograph No. 6, Reservoir, Reserve A Pond.....	97
Hydrograph No. 7, SCS Runoff, Developed - Basin 2.....	98
Hydrograph No. 8, SCS Runoff, Developed - Basin 3.....	99
Hydrograph No. 9, Reservoir, Reserve C Pond.....	100
Hydrograph No. 10, SCS Runoff, Developed - Basin 4.....	101
Hydrograph No. 11, Reservoir, Reserve D.....	102
Hydrograph No. 12, Reservoir, Reserve B.....	103
Hydrograph No. 13, SCS Runoff, Offsite North.....	104

100 - Year

Summary Report.....	105
Hydrograph Reports.....	106
Hydrograph No. 1, SCS Runoff, Existing Basin 1.....	106
Hydrograph No. 2, SCS Runoff, Existing - Basin 2.....	107
Hydrograph No. 3, SCS Runoff, Existing - Basin 3.....	108
Hydrograph No. 4, SCS Runoff, Existing - Basin 4.....	109
Hydrograph No. 5, SCS Runoff, Developed - Basin 1.....	110
Hydrograph No. 6, Reservoir, Reserve A Pond.....	111
Hydrograph No. 7, SCS Runoff, Developed - Basin 2.....	112
Hydrograph No. 8, SCS Runoff, Developed - Basin 3.....	113
Hydrograph No. 9, Reservoir, Reserve C Pond.....	114
Hydrograph No. 10, SCS Runoff, Developed - Basin 4.....	115
Hydrograph No. 11, Reservoir, Reserve D.....	116
Hydrograph No. 12, Reservoir, Reserve B.....	117
Hydrograph No. 13, SCS Runoff, Offsite North.....	118

IDF Report.....	119
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Drainage Plan
1:150 Scale