DRAINAGE PLAN

EASY CREDIT AUTO 2ND ADDITION

TO

WICHITA, SEDGWICK COUNTY, KANSAS

PREPARED BY

Baughman
ENGINEERING | SURVEYING | PLANNING
LANDSCAPE ARCHITECTURE

29 JUNE 2010
Revised 06 JULY 2010
Revised 13 JULY 2010

ENGINEERING | SURVEYING | PLANNING
LANDSCAPE ARCHITECTURE

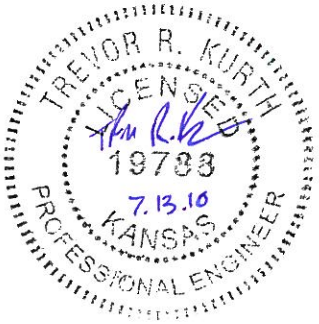
DRAINAGE PLAN
EASY CREDIT AUTO 2ND ADDITION

FINAL REPORT

Prepared by Baughman Company, P.A.

29 June 2010
Revised 06 July 2010
Revised 13 July 2010

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



REPORT CONTENTS

EXISTING CONDITIONS

The site is located on the west side of Broadway Avenue just north of 31st Street South, in Wichita, Sedgwick County, Kansas. The entire site is currently paved with asphalt and includes 2 buildings near the northern portion of the site. There are tree rows along the perimeter on all sides except the Broadway frontage. A sanitary sewer and associated easement divides the site into 4 sections. The site is relatively flat, although it appears the site currently sheet flows to the north, southwest, and west to the surrounding properties and to the Old Lawrence Road ROW. There is a low lying ponding area in the center of the site near the sanitary sewer manhole that appears to hold water. This area is approximately 8" deep and has a 12" PVC pipe that, based on flow line elevation shots, has inverse drainage. The pavement will overspill to the west and south at approximately 8" of depth. There is also a low area on this property near the southwest corner. It appears that the adjacent apartment complex to the south also drains to this area. The area is low lying and will pond water, however, it appears the larger storm events will overflow to the west and south.

PROPOSED CONDITIONS

The property is expected to remain as existing conditions with no additional grading or improvements. The site is currently used as a storage/car lot and is expected to continue in that aspect. All grades, internal and perimeter, are expected to remain as existing.

If the site is razed and major improvements are constructed in the future, the drainage paths / grading may need to be altered away from surrounding properties and to the Broadway and Old Lawrence ROWs, respectively. Since the property is currently fully paved, future development is not expected to require detention if redeveloped. However, any guidelines or changes in official City of Wichita policy will effect the future development of the site.

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

OFFSITE CONDITIONS

There does not appear to be any offsite drainage encroaching this property. This property sheet drains to the surrounding properties to the southwest, north, and west. The surrounding properties are currently developed. There are also open ditch sections along Old Lawrence Road that drain this area. There are low lying areas on the surrounding properties to the west and southwest that appear to hold water in the smaller storm events based on lidar topography.

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.

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

- Ø FLOW DATA
  - Areas per LIDAR data, USGS Quadrangle Sheet, Aerial Photos, and Site Visits
  - Rational Method used for Existing Flows ('C ' = 0.93)
  - Time of Concentration: Lag Method (minimum 15 min)

SITE CHARACTERISTICS

The current site consists of approximately 6.5 acres and is currently a paved car lot or storage area with associated out-buildings. The site is completely paved and is generally flat. It appears the site sheet flows to the surrounding developed areas to the southwest and north and to the Old Lawrence ROW to the west.
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 hydrograph method for the 2, 10, and 100 year storm events. A rational 'c ' coefficient of 0.93 was used for commercial/industrial areas with paved surfaces. The time of concentration was calculated using Lag Method with a minimum time of concentration of 15 minutes.
The lag method was used to calculate the Time of Concentration on this site. Based on a run length of 750 feet and a slope of approximately 0.67%, the Tc was calculated to be 14.6 min. The Tc, based on a recommendation from the City of Wichita, was also calculated using TR-55. When using TR-55, and applying a shallow concentrated flow pattern with a sheet flow pattern, the Tc is approximately 8.8 minutes. Please note, however, that there is no apparent channel or drainage path available on this site to apply the shallow concentrated flow pattern and its calculations. Also, when using a sheet flow value for the entire site – which is what the site appears to do – the Tc is approximately 11 minutes. Based on the numerous Tc calculations, the minimum Tc of 15 minutes was used, along with the Rational Method for calculating site runoff.
The site will produce approximately 45 cfs in the 100-year storm event.

DOWNSTREAM DRAINAGE CAPACITY

The site sheet flows as discussed above to the surrounding properties and to the adjacent street ROW to the west. The City of Wichita has expressed concerns of water ponding issues to the west along Old Lawrence Street. The surrounding areas are mostly paved and have been previously developed.

POST-DEVELOPMENT HYDROLOGIC ANALYSIS

DRAINAGE METHODS & STANDARDS

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

- Ø STORM SERIES
  - 24-hour; 2-yr,10-yr,100-yr Storm Events Modeled
  - Rational Method used for proposed flows
  - 'C' factor = 0.93 (Paved Commercial/Industrial Impervious Area)
  - Time of Concentration; Lag Method, minimum Tc = 15min

- Ø GRADING CONSTRAINTS
  - All lot grades matched and existing structures to remain

DETENTION FACILITIES

There is no detention proposed on this site at this time. The site is expected to remain as it is existing and is currently paved. No razing of the site is expected at this time. Currently, the site is completely paved as is the surrounding properties. If redeveloped or re-paved in the future, we do not anticipate any detention needed on the site – based on the current site being of current impervious cover with no real detention value. If, in the future, the City adopts more stringent re-development criteria(s) or water quality rules, then detention or water quality could be needed at that time.

DISCHARGE POINTS SUMMARY

The site sheet flows to the north and southwest and onto existing developed properties. It appears these areas then eventually drain to the Broadway and 31st St ROWs. There does not appear to be any defined 'discharge point' on these adjoining properties. There is a low area located on this property as well as to the properties to the south and west that appears to pond runoff. This area is expected to drain to the west and southwest during larger storm events.
The site also sheet flows to the west and into existing Old Lawrence Street ROW.

POTENTIAL UPSTREAM/DOWNSTREAM IMPACTS

Due to the site remaining as existing with no grade changes, there are not any potential impacts expected with the platting of this property.
There appears to be offsite runoff from the south near the southwest corner of the property. This area should continue to drain to this area if construction or redevelopment occurs. At that time, a suitable outlet or overflow should be achieved to drain this low-lying area. In the larger storm events it appears the runoff will flow west and south for relief from this area.

SOURCE OF FLOODPLAIN INFORMATION

The site lies within a FEMA Zone X - Shaded. The location of the property, on FEMA FIRM Panel 365 of 700 for Sedgwick County, Kansas, effective February 2, 2007, is attached as Exhibit 5.

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.

FEMA

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

KANSAS DEPT OF TRANSPORTATION

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

SEDGWICK COUNTY PERMITTING

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

EXHIBIT 1: Site Location Map

EXHIBIT 2: Aerial Photo Exhibit with Hand Topography

EXHIBIT 3: Plat – Half Scale

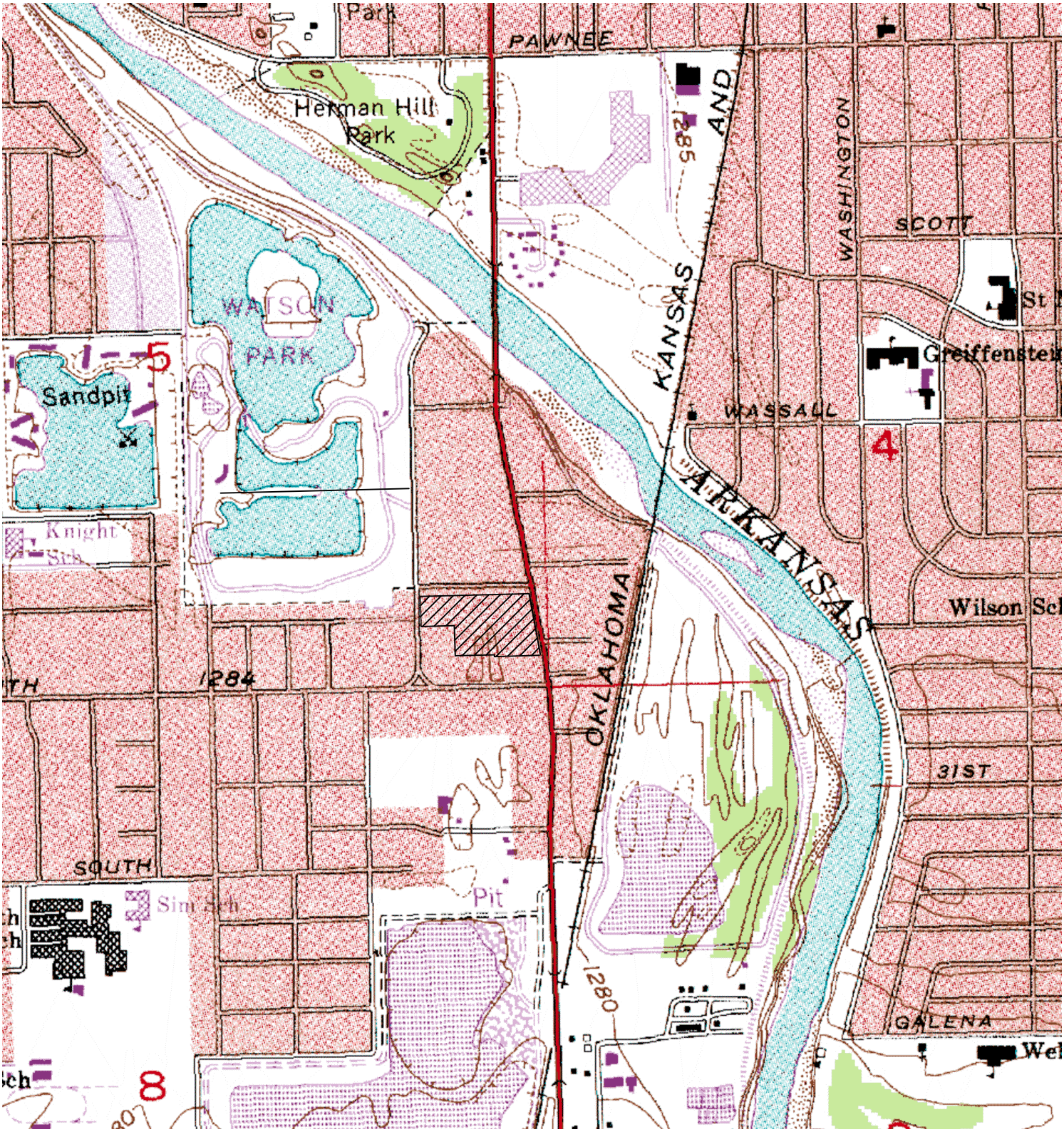
EXHIBIT 4: Drainage & Grading Plan – Half Scale

EXHIBIT 5: Floodplain Location (FIRM)

SITE LOCATION EXHIBIT

EASY CREDIT AUTO 2ND ADDITION

WICHITA, SEDGWICK COUNTY, KANSAS



0 500 1000

CONTOUR INTERVALS = 10 FOOT

EXHIBIT 1
EASY CREDIT AUTO 2ND ADDITION
29 June 2010

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

AERIAL EXHIBIT

EASY CREDIT AUTO 2ND ADDITION

WICHITA, SEDGWICK COUNTY, KANSAS

0 250 500

CONTOUR INTERVALS = 10 FOOT

EXHIBIT 2
EASY CREDIT AUTO 2ND ADDITION

29 June 2010

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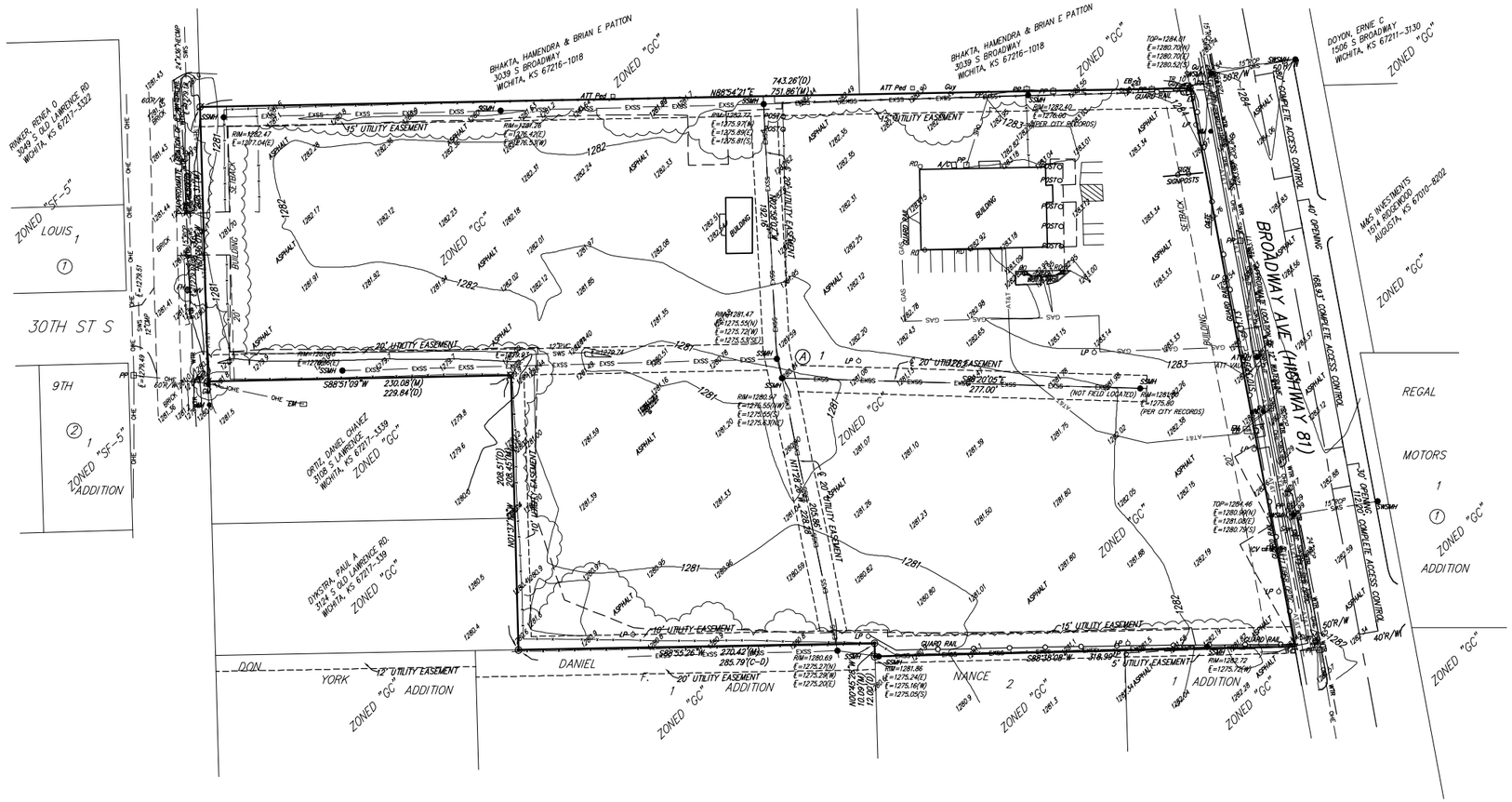
ONE-STEP FINAL PLAT

EASY CREDIT AUTO 2ND ADDITION

WICHITA, SEDGWICK COUNTY, KANSAS



0 50 100

DATE OF PREPARATION: 28 JUNE 2010
DATE OF TOPOGRAPH: 16 JUNE 2010
CONTOUR INTERVALS = 1 FOOT

OWNER:
EASY CREDIT AUTO SALES, INC.
333 S. EMPORIA
WICHITA, KS 67202
316-393-1360

BENCHMARK:
CROSS CUT ON CONCRETE BASE OF LIGHT POLE 152'± NORTH AND 3'± EAST OF SE CORNER OF THE PLAT.
ELEVATION = 1284.63 NAVD88

- s = ½" REBAR (FOUND)
- • = ½" REBAR W/ "BAUGHMAN" CAP (SET)
- ◉ = ½" REBAR (FOUND)
- ⊠ = AXEL (FOUND)
- ⊙ = 1/4" IRON (FOUND)
- ⊠ = CROSS (FOUND)

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

VICINITY MAP
SEC. 5, T28S, R1E

EB = Electric Box
FH = Fire Hydrant
GM = Gas Meter
Guy = Guy Anchor
ICV = Irrigation Control Valve - Valve Box
LP = Light Pole
PP = Power Pole
Sign = Sign
SSMH = Sanitary Sewer Manhole
ATTMH = ATT Manhole
ATT Ped = ATT Pedestal
SWSMH = Stormwater Sewer Manhole
TR = Tree
WM = Water Meter
WV = Water Valve

WATER LINE
SOUTHWESTERN BELL
GAS LINE
FENCE
OVERHEAD ELECTRIC LINE
SANITARY SEWER
UNDERGROUND ELECTRIC LINE

State of Kansas)
Sedgwick County) SS

We, Baughman Company, P.A., Surveyors in oforesaid county and state do hereby certify that we have surveyed and platted "EASY CREDIT AUTO 2ND ADDITION", Wichita, Sedgwick County, Kansas and that the accompanying plat is a true and correct exhibit of the property surveyed, described as a tract in the Southeast Quarter of Section 5, Township 28 South, Range 1 East of the 6th Principal Meridian, Sedgwick County, Kansas described as follows: Beginning at a point in the west line of New U.S. Highway No. 81, said point being 476.5 feet north and 125.465 feet west of the southeast corner of said Section 5; thence west parallel with the south line of said Section 5, a distance of 350 feet; thence north 208.5 feet; thence east 314.42 feet to a point in the west line of said Highway No. 81; thence southeasterly along the west line of said Highway a distance of 211.51 feet to the point of beginning, together with a tract in the Southeast Quarter of Section 5, Township 28 South, Range 1 East of the 6th Principal Meridian, Sedgwick County, Kansas described as follows: Beginning 268 feet north and 437.885 feet west of the southeast corner of said Southeast Quarter; thence west 466.415 feet; thence north 208.5 feet; thence east to a point 473.465 feet west and 476.5 feet north of the southeast corner of Section 5; thence southeasterly 211.51 feet to the place of beginning, EXCEPT the west 229.835 feet thereof, together with a tract in the Southeast Quarter of Section 5, Township 28 South, Range 1 East of the 6th Principal Meridian, Sedgwick County, Kansas described as follows: Beginning at a point 476.5 feet north and 904.3 feet west of the southwest corner of Section 4, Township 28 South, Range 1 East; thence north 208.5 feet; thence east 428.835 feet; thence south 208.5 feet; thence west to the place of beginning, together with a tract of land described as follows: beginning at a point in the west line of the New U.S. Highway No. 81, which is 268 feet north and 89.885 feet west of the southeast corner of Section 5, Township 28 South, Range 1 East of the 6th Principal Meridian, Sedgwick County, Kansas; thence west and parallel with the south line of said Section 5, a distance of 140 feet; thence northwesterly and parallel with the west line of said Highway No. 81, a distance of 211.51 feet; thence east 140 feet to a point in the west line of said Highway No. 81, said point being 125.465 feet west and 476.5 feet north of the southeast corner of said Section 5; thence southeasterly along the west line of said Highway No. 81, a distance of 211.51 feet to the point of beginning, together with a tract of land described as follows: beginning at a point 268 feet north and 229.885 feet west of the southeast corner of Section 5, Township 28 South, Range 1 East of the 6th Principal Meridian, Sedgwick County, Kansas; thence west parallel with the south line of said Section 5, a distance of 208 feet; thence northwesterly 211.51 feet to a point 476.5 feet north and 473.465 feet west of the southeast corner of said Section 5; thence east parallel to the south line of said Section 5, a distance of 208 feet; thence southeasterly 211.51 feet to the point of beginning, together with a tract of land described as follows: beginning at a point 256 feet north of the southeast corner of Section 5, Township 28 South, Range 1 East of the 6th Principal Meridian, Sedgwick County, Kansas; thence west parallel with the south line of said Section 5, a distance of 407 feet; thence north parallel with the east line of said Section 5, a distance of 12 feet; thence east parallel with the south line of said Section 5, a distance of 407 feet; thence south along the east line of said Section 5, a distance of 12 feet to the place of beginning, EXCEPT that part taken for highway as established in District Court Condemnation Case No. 75694.

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

Baughman Company, P.A.

_____, Surveyor
Michael G. Conrey

Know all men by these presents that we, the undersigned, have caused the land in the surveyors certificate to be platted into a Lot and a Block, to be known as "EASY CREDIT AUTO 2ND ADDITION", Wichita, Sedgwick County, Kansas. The utility easements are hereby granted as indicated for the construction and maintenance of all public utilities. 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.

Easy Credit Auto Sales, Inc., a Kansas corporation

_____, President
Sam Hudson

State of Kansas)
Sedgwick County) SS

The foregoing instrument acknowledged before me, this_____day of _____, 2010, by Sam Hudson, President of Easy Credit Auto Sales, Inc., a Kansas corporation, on behalf of the corporation.

_____ Notary Public

My App't. Exp. _____

This plat of "EASY CREDIT AUTO 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 _____, 2010.
Wichita-Sedgwick County Metropolitan Area Planning Commission

_____, Chair
G. Nelson Van Fleet

_____, Secretary
John L. Schlegel

This plat approved and all dedications shown hereon accepted by the City Council of the City of Wichita, Kansas, this_____day of _____, 2010.

_____, Mayor
Carl Brewer

_____, City Clerk
Karen Sublett

Entered on transfer record this_____day of _____, 2010.

_____, County Clerk
Kelly B. Arnold

State of Kansas)
Sedgwick County) SS

This is to certify that this plat has been filed for record in the office of the Register of Deeds, this_____day of_____, 2010 at_____o'clock__M; and is duly recorded.

_____, Register of Deeds
Bill Meek

_____, Deputy
Tonya Buckingham

Reviewed in accordance with K.S.A. 58-2005 on this_____day of _____, 2010.

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

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.

EASY CREDIT AUTO 2ND ADDITION

28 JUNE 2010

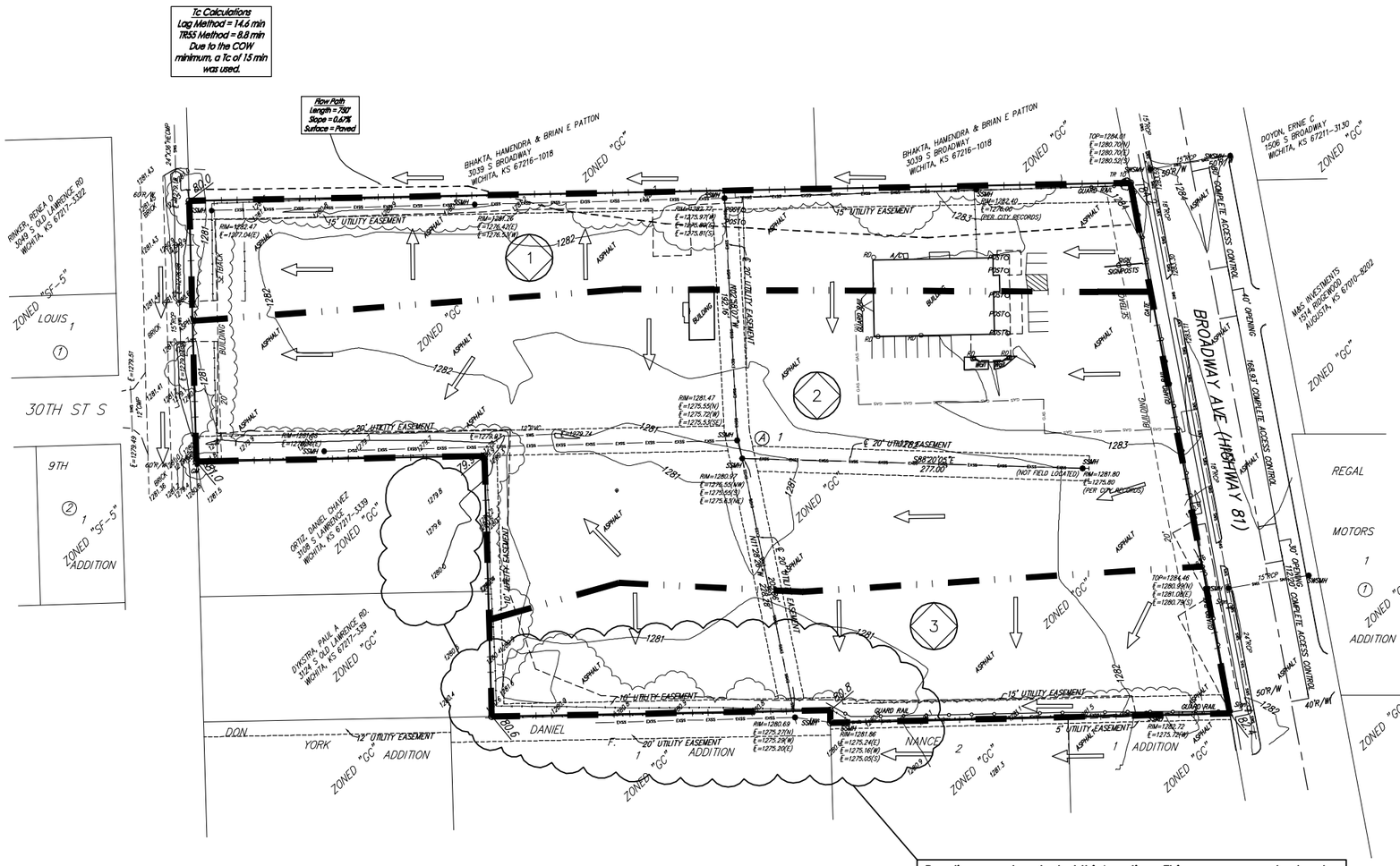
Baughman Company, P.A.
315 Ellis St Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

E:/PROJECTS/EASYCREDITAUTO2NDADDITION/EASYCREDIT2ND_OSF.DWGRKR

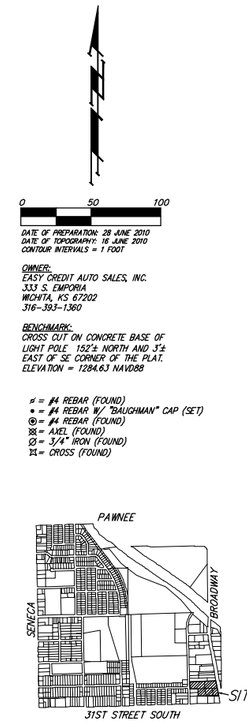
DRAINAGE & GRADING PLAN

EASY CREDIT AUTO 2ND ADDITION

WICHITA, SEDGWICK COUNTY, KANSAS



Ponding area located at this location. This area appears to stand runoff from a portion of the south property as well as onsite runoff. This area appears to drain to the south & west in larger storm events.



VICINITY MAP
SEC. 5, T28S, R1E

0 50 100

DATE OF PREPARATION: 28 JUNE 2010
DATE OF TOPOGRAPHY: 16 JUNE 2010
CONTOUR INTERVALS = 1 FOOT

OWNER:
EASY CREDIT AUTO SALES, INC.
333 S. EMPORIA
WICHITA, KS 67202
316-393-1360

BENCHMARK:
CROSS CUT ON CONCRETE BASE OF LIGHT POLE 152'± NORTH AND 3'± EAST OF SE CORNER OF THE PLAT.
ELEVATION = 1284.63 NAVD88

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• = #4 REBAR W/ "BAUGHMAN" CAP (SET)
⊗ = #4 REBAR (FOUND)
⊠ = AXEL (FOUND)
Ø = 3/4" IRON (FOUND)
⋈ = CROSS (FOUND)

EB □ = Electric Box
GM ● = Gas Meter
Sign ○ = Sign
SSMH ● = Sanitary Sewer Manhole
SWSMH ● = Stormwater Sewer Manhole
TP ∩ = Tree

GAS LINE
FENCE
SANITARY SEWER LINE
UNDERGROUND ELECTRIC LINE

Total Site
Existing = Proposed
Area = 6.5 acres
Tc = 15 min
'C' = 0.93
Q_2 = 24 cfs
Q_5 = 28 cfs
Q_{10} = 32 cfs
Q_{25} = 36 cfs
Q_{100} = 44 cfs

NOTE: The entire site is currently paved (asphalt) with associated buildings and utilities. The existing conditions of this site are expected to remain with this plat and Drainage Plan.

The site lies within Zone X Shaded FEMA SFHA as of this date based on FEMA FIRM Panel 365 or 700 for Sedgwick County, Kansas; effective February 2, 2007.

1
Area = 1.47 acres
Tc = 15 min
'C' = 0.93
Q_2 = 5.2 cfs
Q_5 = 6.2 cfs
Q_{10} = 7.1 cfs
Q_{25} = 8.3 cfs
Q_{100} = 10 cfs

2
Area = 3.61 acres
Tc = 15 min
'C' = 0.93
Q_2 = 13 cfs
Q_5 = 15 cfs
Q_{10} = 18 cfs
Q_{25} = 20 cfs
Q_{100} = 25 cfs

3
Area = 1.39 acres
Tc = 15 min
'C' = 0.93
Q_2 = 5.0 cfs
Q_5 = 5.9 cfs
Q_{10} = 6.7 cfs
Q_{25} = 7.8 cfs
Q_{100} = 9.5 cfs

DRAINAGE & GRADING PLAN
EASY CREDIT AUTO 2ND ADDITION

REV 13 JULY 2010
REV 06 JULY 2010
28 JUNE 2010

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

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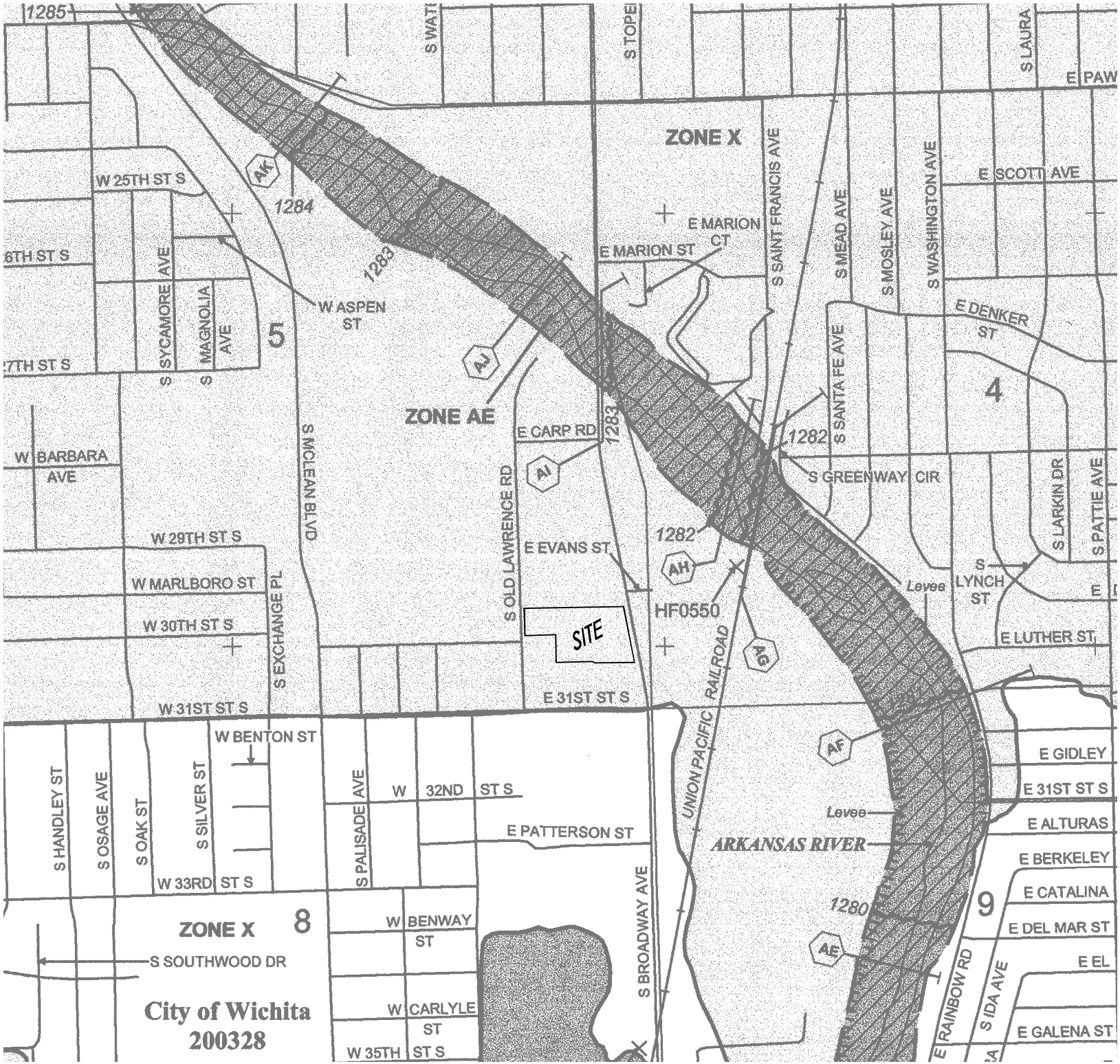


MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0365E

FIRM

FLOOD INSURANCE RATE MAP

SEDGWICK COUNTY, KANSAS
AND INCORPORATED AREAS

PANEL 365 OF 700

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SEDGWICK COUNTY	200321	0365	E
WICHITA, CITY OF	200328	0365	E

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

MAP NUMBER
20173C0365E

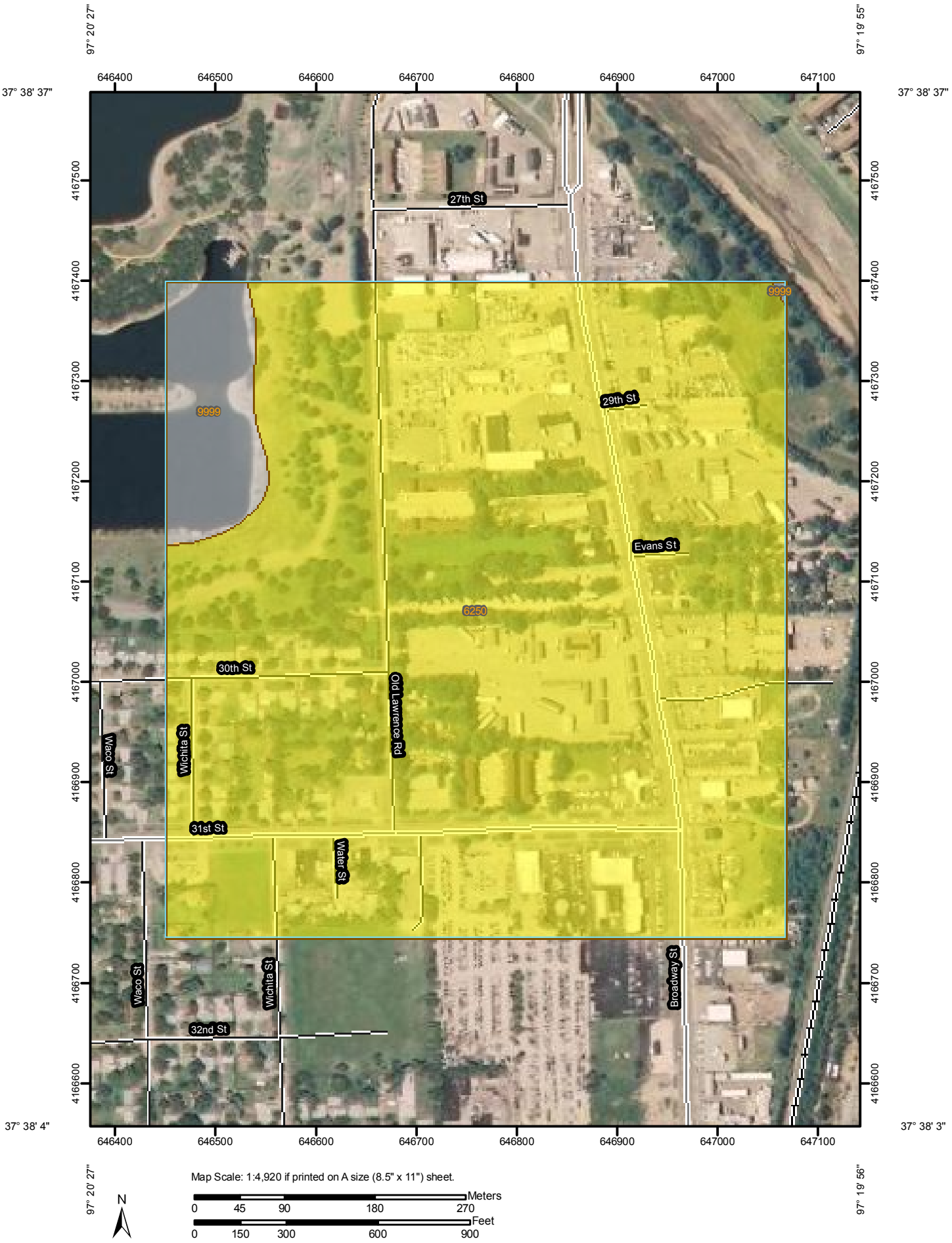
EFFECTIVE DATE
FEBRUARY 2, 2007
Federal Emergency Management Agency

SUPPORTING CALCULATIONS

APPENDIX A: USGS Soils Survey

APPENDIX B : HydraFlow Hydrographs
Site Flow and Tc Calculations

USGS Soils Survey


97° 20' 27"
97° 19' 55"
37° 38' 37"
37° 38' 4"
37° 38' 3"
646400
646500
646600
646700
646800
646900
647000
647100
4167500
4167400
4167300
4167200
4167100
4167000
4166900
4166800
4166700
4166600
9999
6250
27th St
29th St
Evans St
30th St
Old Lawrence Rd
Wichita St
Waco St
31st St
Water St
32nd St
Broadway St
Map Scale: 1:4,920 if printed on A size (8.5" x 11") sheet.
N
Meters
0 45 90 180 270
Feet
0 150 300 600 900

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Soil Ratings

- Excessively drained
- Somewhat excessively drained
- Well drained
- Moderately well drained
- Somewhat poorly drained
- Poorly drained
- Very poorly drained
- Not rated or not available

Political Features

- Cities

Water Features

- Oceans
- Streams and Canals

Transportation

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

MAP INFORMATION

Map Scale: 1:4,920 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 6, Dec 22, 2009

Date(s) aerial images were photographed: 6/20/2006

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.

Drainage Class

Drainage Class— Summary by Map Unit — Sedgwick County, Kansas				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
6250	Urban land-Canadian complex, 0 to 3 percent slopes	Well drained	94.0	94.3%
9999	Water		5.7	5.7%
Totals for Area of Interest			**99.7**	**100.0%**

Description

"Drainage class (natural)" refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized-excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. These classes are defined in the "Soil Survey Manual."

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

HydraFlow Hydrographs

Site Flow & Tc Calculations

Watershed Model Schematic

1 - Site Runoff (SCS)

2 - Site Runoff (Rational)

3 - Site Runoff - 15 min Tc

Legend

Hyd.	Origin	Description
1	SCS Runoff	Site Runoff (SCS)
2	Rational	Site Runoff (Rational)
3	Rational	Site Runoff - 15 min Tc

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	------	-------	14.70	-------	22.37	28.95	39.44	46.54	54.46	Site Runoff (SCS)
2	Rational	------	-------	28.95	-------	34.00	37.75	43.33	47.71	52.07	Site Runoff (Rational)
3	Rational	------	-------	23.52	-------	28.13	31.49	36.43	40.29	44.13	Site Runoff - 15 min Tc

Hydrograph Summary Report

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

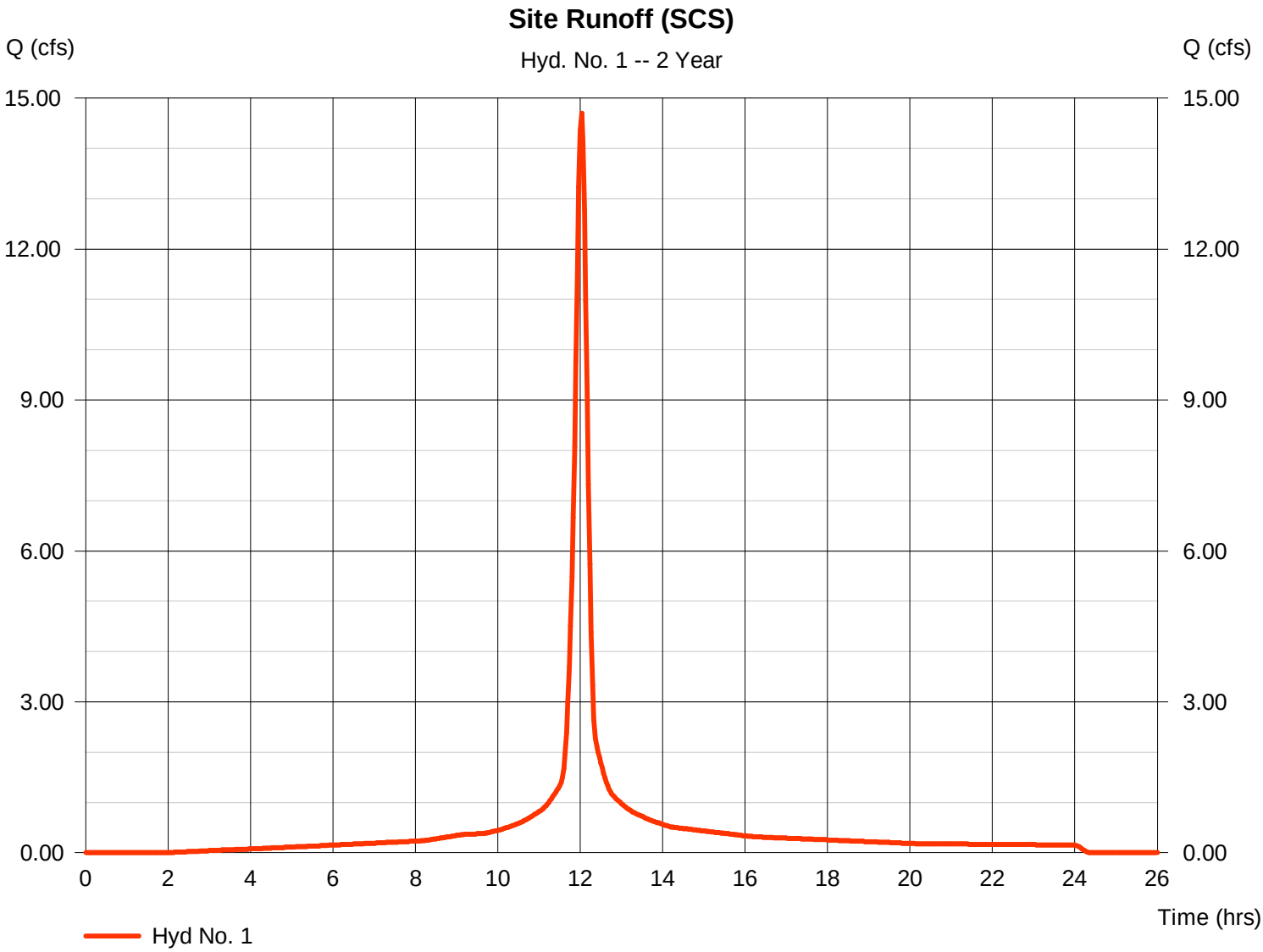
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	14.70	2	722	45,383	------	------	------	Site Runoff (SCS)
2	Rational	28.95	1	9	15,634	------	------	------	Site Runoff (Rational)
3	Rational	23.52	1	15	21,164	------	------	------	Site Runoff - 15 min Tc

Hydrograph Report

Hyd. No. 1

Site Runoff (SCS)

Hydrograph type	=	SCS Runoff	Peak discharge	=	14.70 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	45,383 cuft
Drainage area	=	6.500 ac	Curve number	=	98
Basin Slope	=	0.7 %	Hydraulic length	=	750 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.64 min
Total precip.	=	2.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

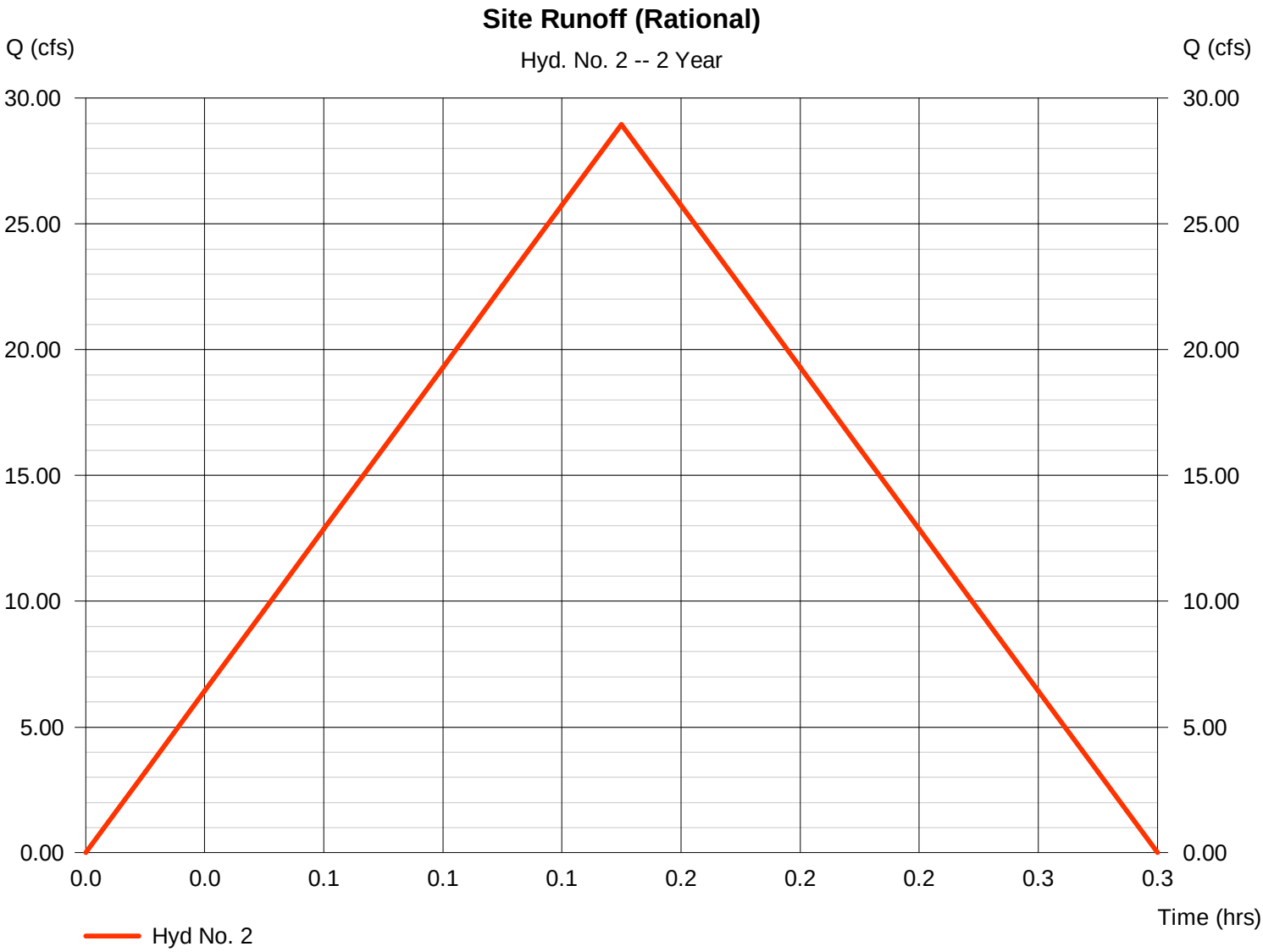


Hydrograph Report

Hyd. No. 2

Site Runoff (Rational)

Hydrograph type	=	Rational	Peak discharge	=	28.95 cfs
Storm frequency	=	2 yrs	Time to peak	=	0.15 hrs
Time interval	=	1 min	Hyd. volume	=	15,634 cuft
Drainage area	=	6.500 ac	Runoff coeff.	=	0.93
Intensity	=	4.789 in/hr	Tc by TR55	=	9.00 min
IDF Curve	=	wich_IDF.IDF	Asc/Rec limb fact	=	1/1



TR55 Tc Worksheet

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

Hyd. No. 2

Site Runoff (Rational)

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.011		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	2.20		0.00		0.00		
Land slope (%)	=	0.67		0.00		0.00		
Travel Time (min)	**=**	**2.26**	**+**	**0.00**	**+**	**0.00**	**=**	**2.26**
Shallow Concentrated Flow								
Flow length (ft)	=	650.00		0.00		0.00		
Watercourse slope (%)	=	0.67		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	1.66		0.00		0.00		
Travel Time (min)	**=**	**6.51**	**+**	**0.00**	**+**	**0.00**	**=**	**6.51**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 9.00 min

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jul 6, 2010

Hyd. No. 3

Site Runoff - 15 min Tc

Hydrograph type	= Rational	Peak discharge	= 23.52 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 21,164 cuft
Drainage area	= 6.500 ac	Runoff coeff.	= 0.93
Intensity	= 3.890 in/hr	Tc by User	= 15.00 min
IDF Curve	= wich_IDF.IDF	Asc/Rec limb fact	= 1/1

Hydrograph Summary Report

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

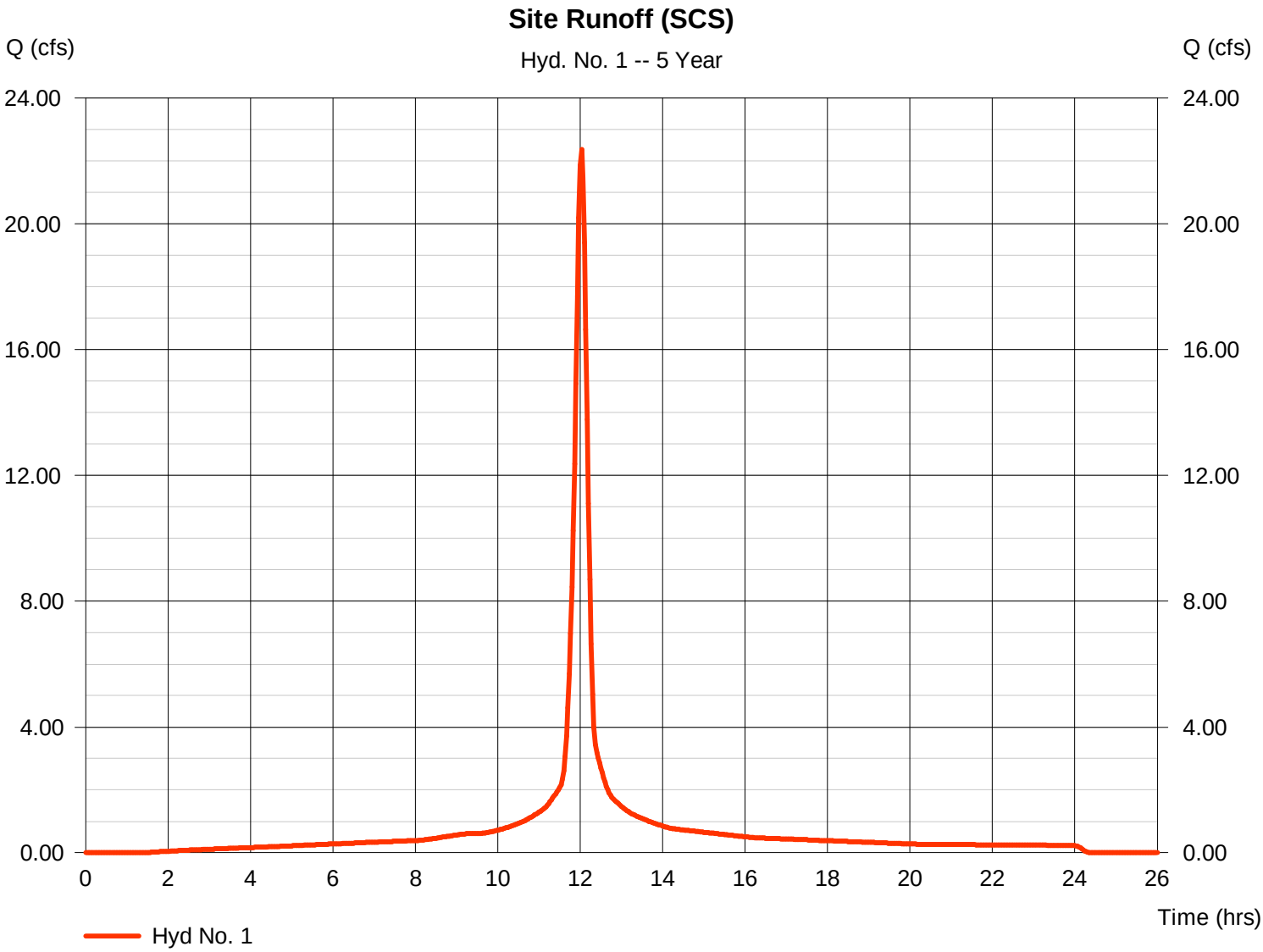
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	22.37	2	722	70,560	------	------	------	Site Runoff (SCS)
2	Rational	34.00	1	9	18,359	------	------	------	Site Runoff (Rational)
3	Rational	28.13	1	15	25,314	------	------	------	Site Runoff - 15 min Tc

Hydrograph Report

Hyd. No. 1

Site Runoff (SCS)

Hydrograph type	=	SCS Runoff	Peak discharge	=	22.37 cfs
Storm frequency	=	5 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	70,560 cuft
Drainage area	=	6.500 ac	Curve number	=	98
Basin Slope	=	0.7 %	Hydraulic length	=	750 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.64 min
Total precip.	=	3.30 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

Hyd. No. 2

Site Runoff (Rational)

Hydrograph type	=	Rational	Peak discharge	=	34.00 cfs
Storm frequency	=	5 yrs	Time to peak	=	0.15 hrs
Time interval	=	1 min	Hyd. volume	=	18,359 cuft
Drainage area	=	6.500 ac	Runoff coeff.	=	0.93
Intensity	=	5.624 in/hr	Tc by TR55	=	9.00 min
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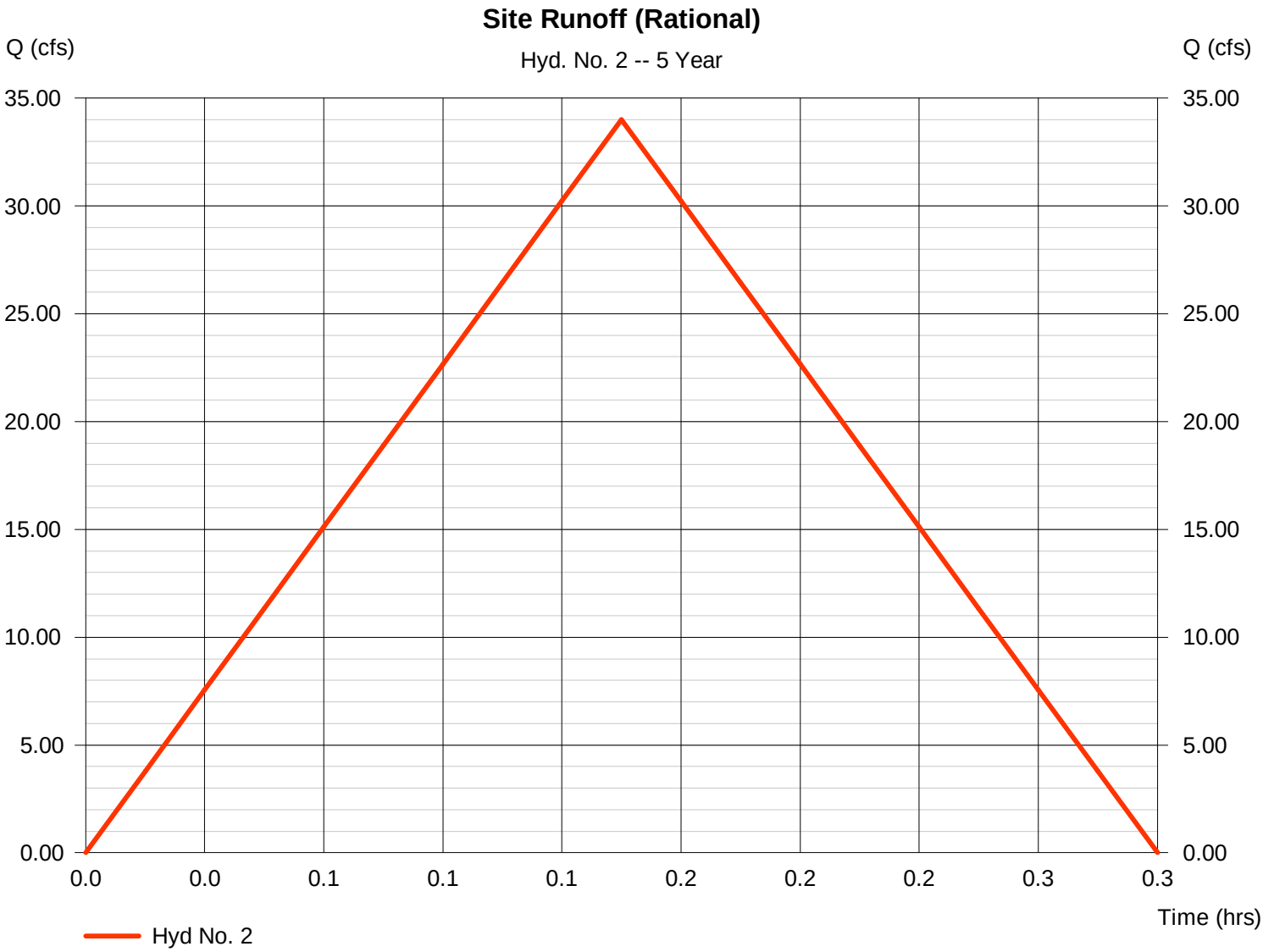


Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jul 6, 2010

Hyd. No. 3

Site Runoff - 15 min Tc

Hydrograph type	=	Rational	Peak discharge	=	28.13 cfs
Storm frequency	=	5 yrs	Time to peak	=	0.25 hrs
Time interval	=	1 min	Hyd. volume	=	25,314 cuft
Drainage area	=	6.500 ac	Runoff coeff.	=	0.93
Intensity	=	4.653 in/hr	Tc by User	=	15.00 min
IDF Curve	=	wich_IDF.IDF	Asc/Rec limb fact	=	1/1

Hydrograph Summary Report

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

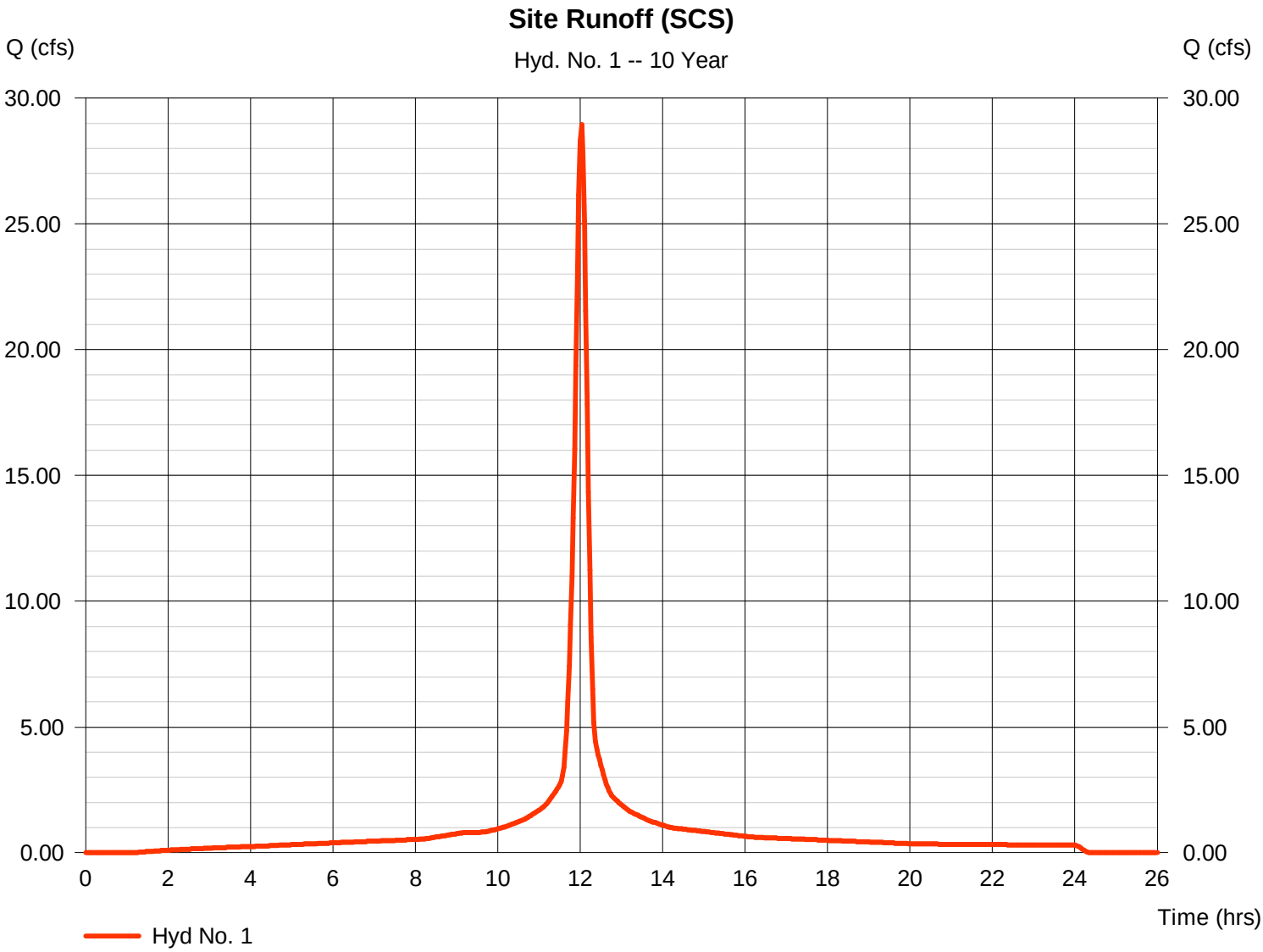
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	28.95	2	722	92,355	------	------	------	Site Runoff (SCS)
2	Rational	37.75	1	9	20,386	------	------	------	Site Runoff (Rational)
3	Rational	31.49	1	15	28,341	------	------	------	Site Runoff - 15 min Tc

Hydrograph Report

Hyd. No. 1

Site Runoff (SCS)

Hydrograph type	=	SCS Runoff	Peak discharge	=	28.95 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	92,355 cuft
Drainage area	=	6.500 ac	Curve number	=	98
Basin Slope	=	0.7 %	Hydraulic length	=	750 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.64 min
Total precip.	=	4.25 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

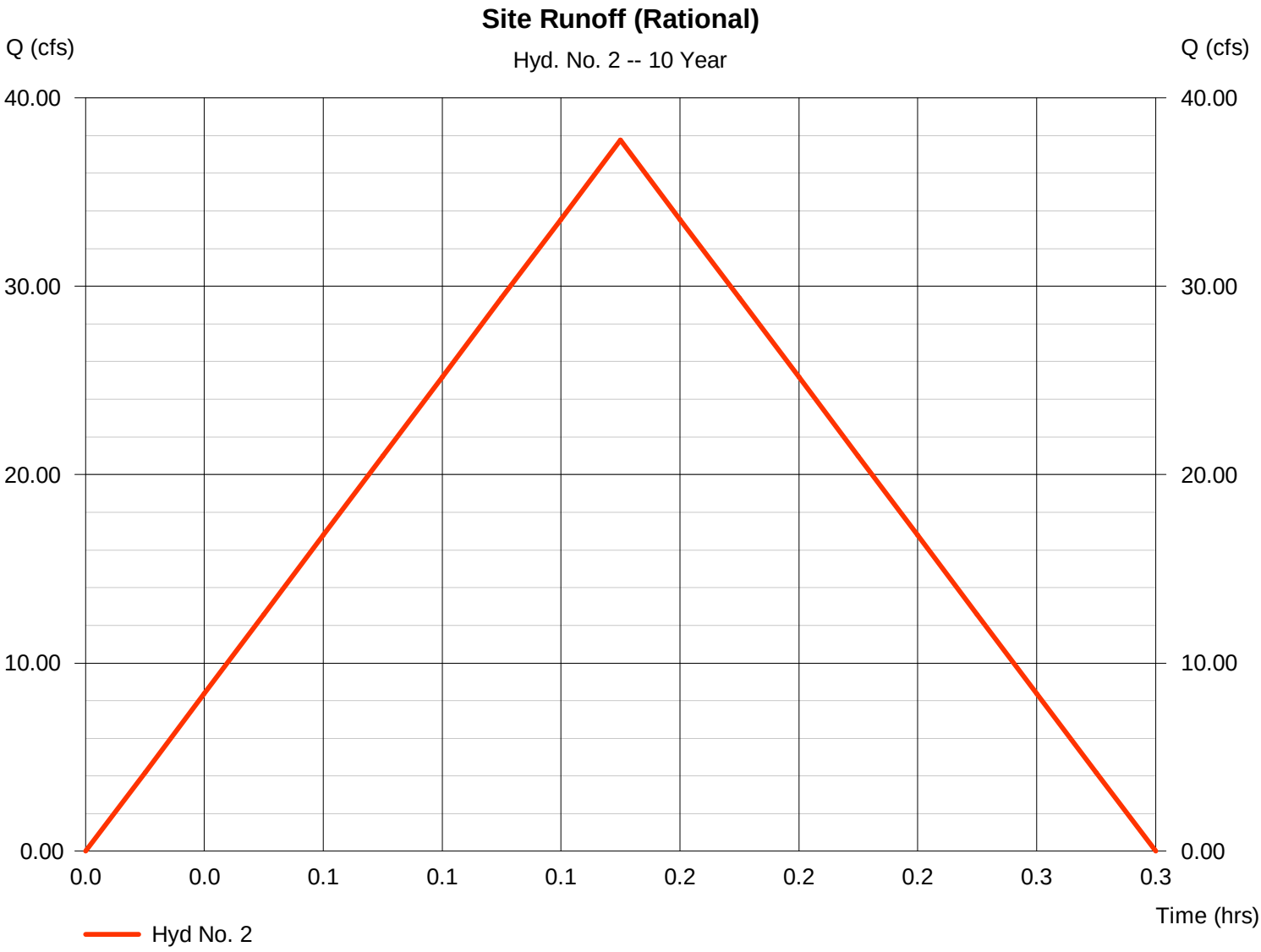


Hydrograph Report

Hyd. No. 2

Site Runoff (Rational)

Hydrograph type	=	Rational	Peak discharge	=	37.75 cfs
Storm frequency	=	10 yrs	Time to peak	=	0.15 hrs
Time interval	=	1 min	Hyd. volume	=	20,386 cuft
Drainage area	=	6.500 ac	Runoff coeff.	=	0.93
Intensity	=	6.245 in/hr	Tc by TR55	=	9.00 min
IDF Curve	=	wich_IDF.IDF	Asc/Rec limb fact	=	1/1

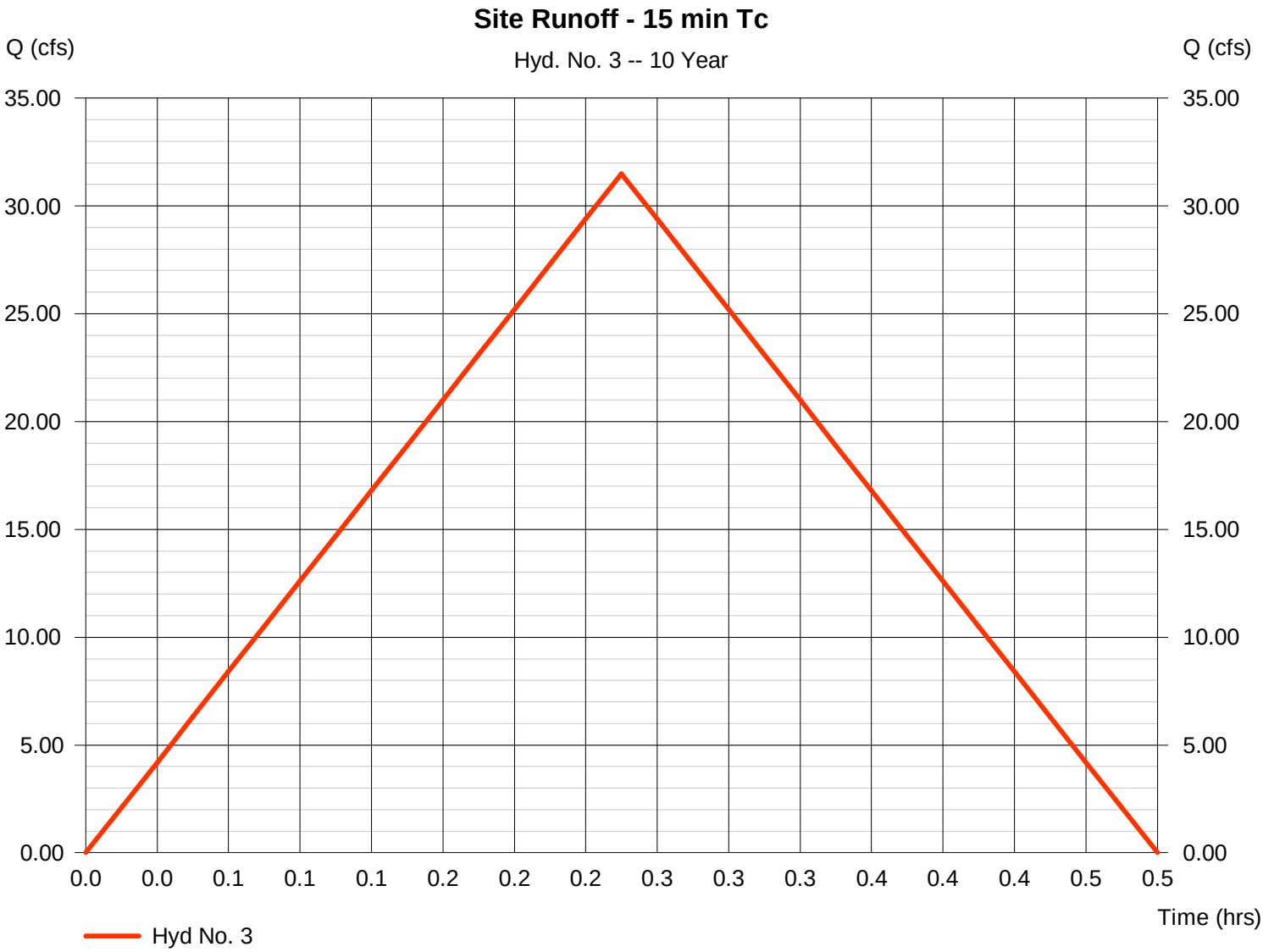


Hydrograph Report

Hyd. No. 3

Site Runoff - 15 min Tc

Hydrograph type	= Rational	Peak discharge	= 31.49 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 28,341 cuft
Drainage area	= 6.500 ac	Runoff coeff.	= 0.93
Intensity	= 5.209 in/hr	Tc by User	= 15.00 min
IDF Curve	= wich_IDF.IDF	Asc/Rec limb fact	= 1/1



Hydrograph Summary Report

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

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	39.44	2	722	127,267	------	------	------	Site Runoff (SCS)
2	Rational	43.33	1	9	23,400	------	------	------	Site Runoff (Rational)
3	Rational	36.43	1	15	32,783	------	------	------	Site Runoff - 15 min Tc

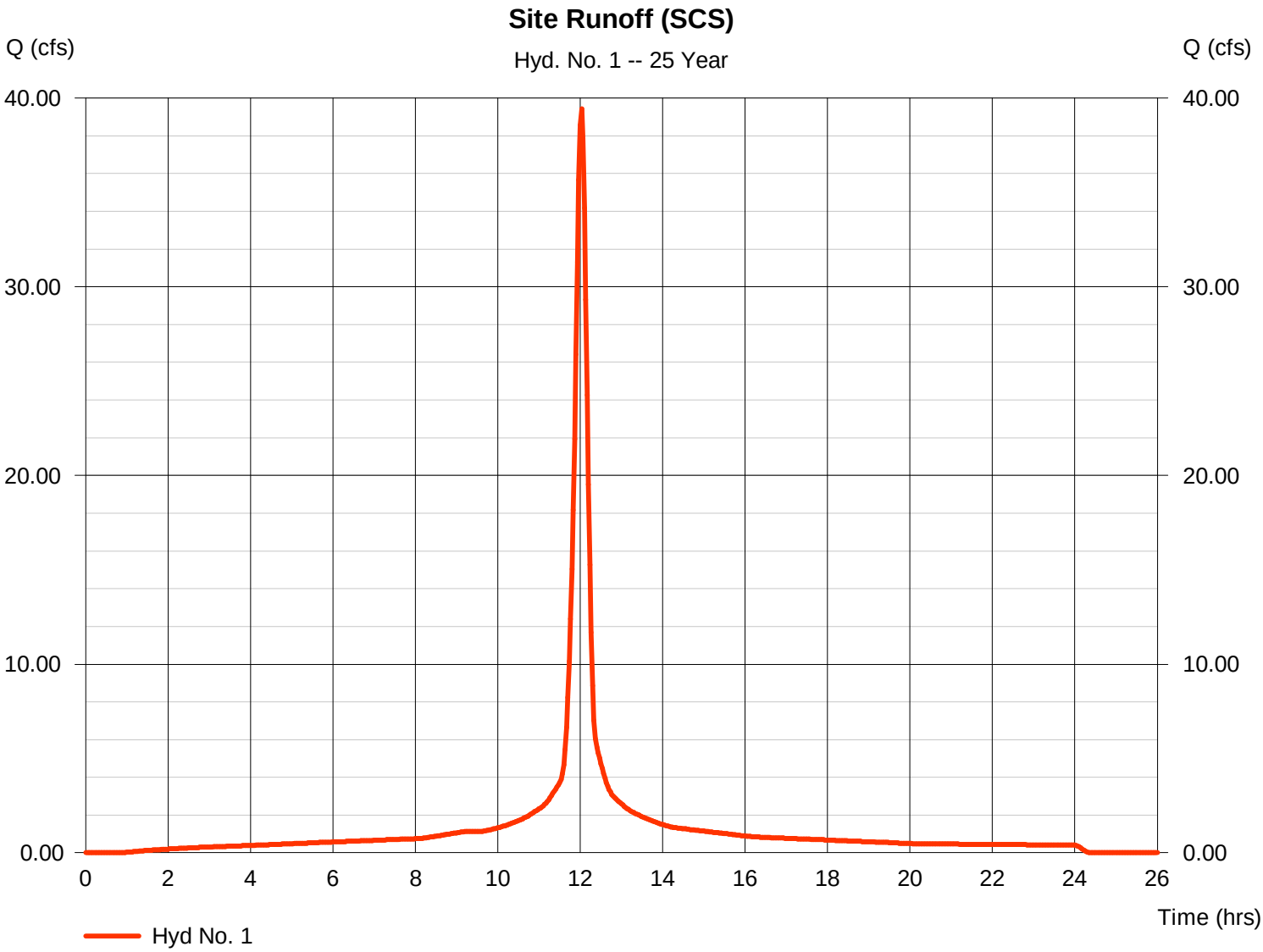
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jul 6, 2010

Hyd. No. 1

Site Runoff (SCS)

Hydrograph type	=	SCS Runoff	Peak discharge	=	39.44 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	127,267 cuft
Drainage area	=	6.500 ac	Curve number	=	98
Basin Slope	=	0.7 %	Hydraulic length	=	750 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.64 min
Total precip.	=	5.77 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



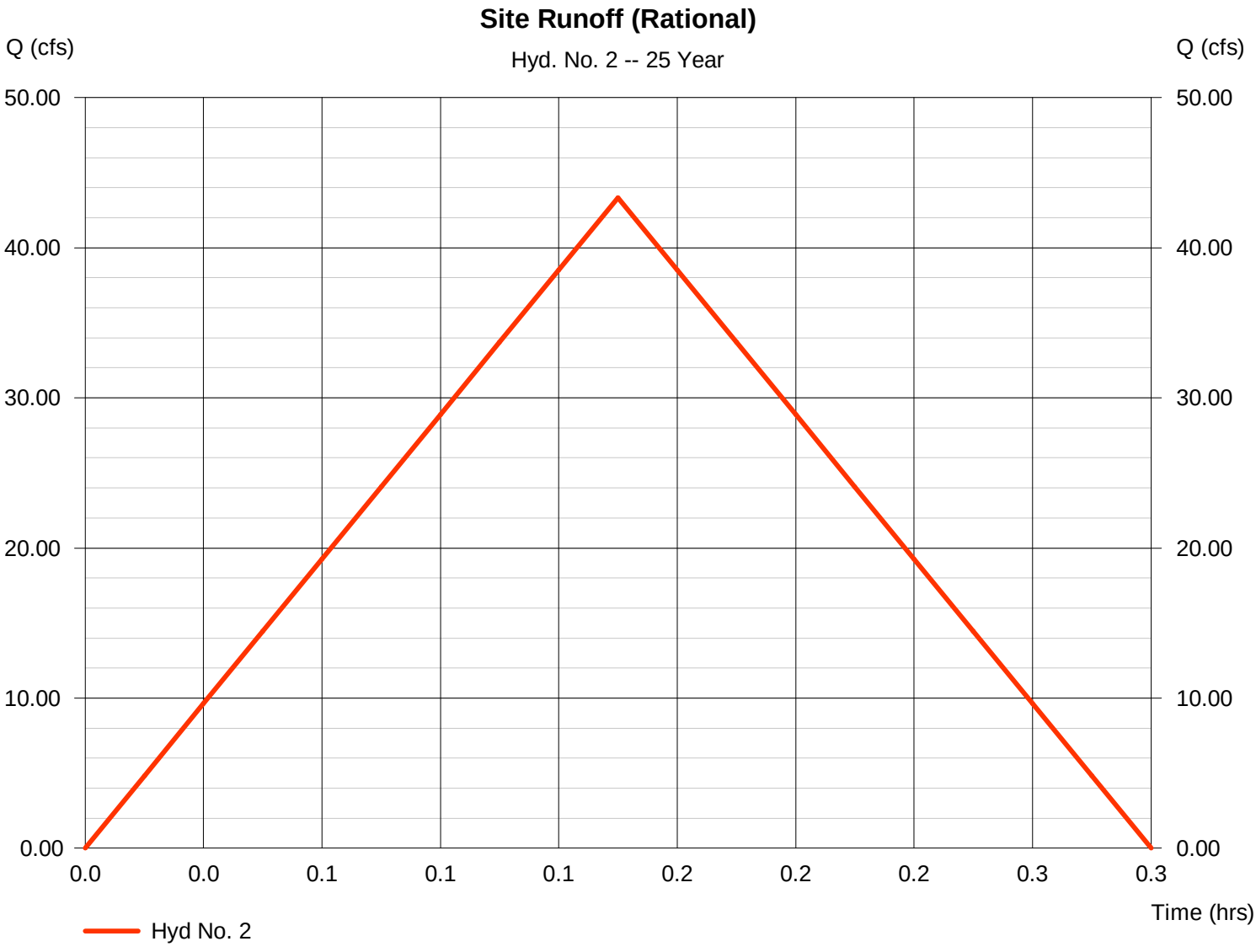
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jul 6, 2010

Hyd. No. 2

Site Runoff (Rational)

Hydrograph type	=	Rational	Peak discharge	=	43.33 cfs
Storm frequency	=	25 yrs	Time to peak	=	0.15 hrs
Time interval	=	1 min	Hyd. volume	=	23,400 cuft
Drainage area	=	6.500 ac	Runoff coeff.	=	0.93
Intensity	=	7.168 in/hr	Tc by TR55	=	9.00 min
IDF Curve	=	wich_IDF.IDF	Asc/Rec limb fact	=	1/1



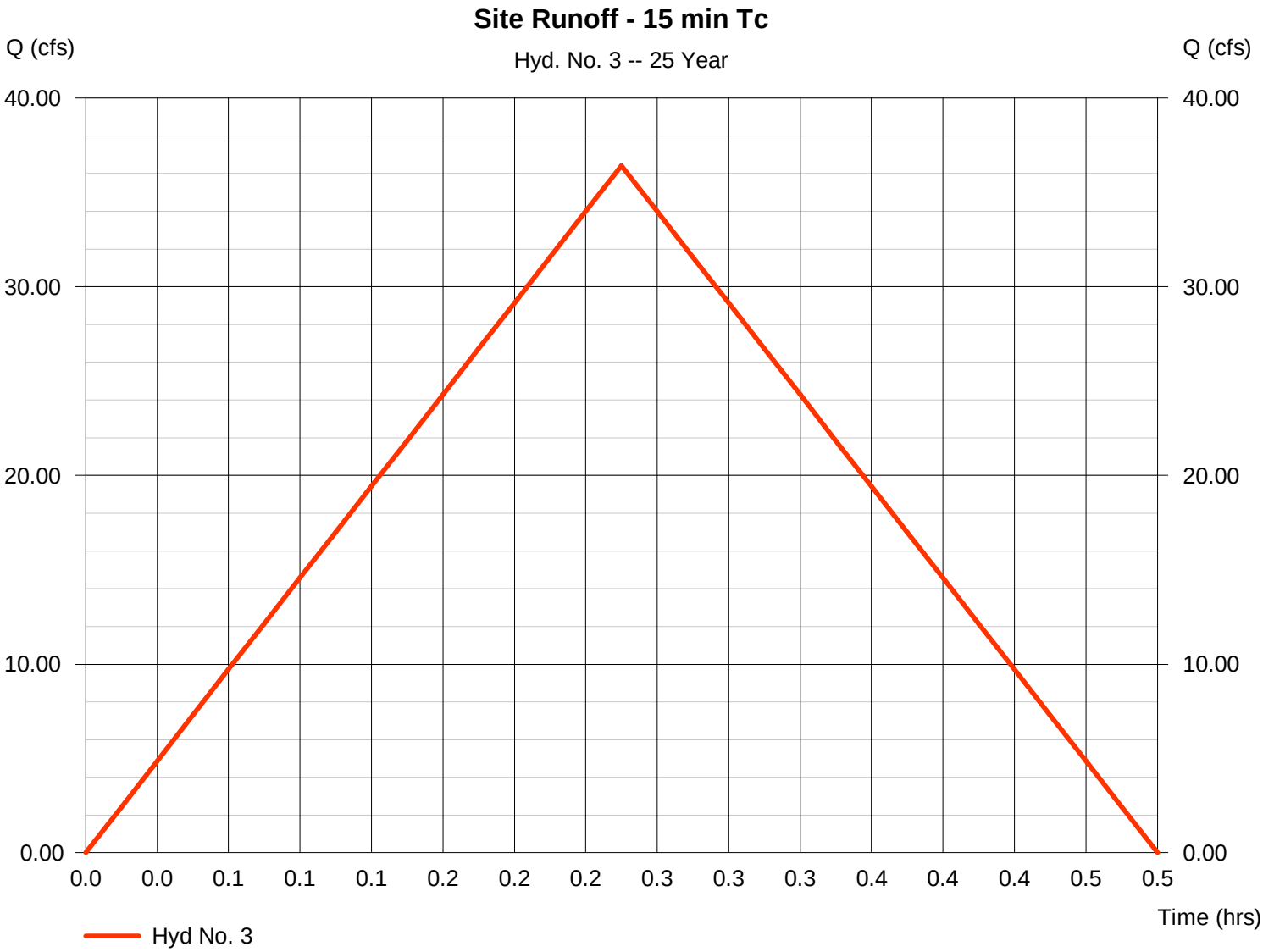
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jul 6, 2010

Hyd. No. 3

Site Runoff - 15 min Tc

Hydrograph type	= Rational	Peak discharge	= 36.43 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 32,783 cuft
Drainage area	= 6.500 ac	Runoff coeff.	= 0.93
Intensity	= 6.026 in/hr	Tc by User	= 15.00 min
IDF Curve	= wich_IDF.IDF	Asc/Rec limb fact	= 1/1



Hydrograph Summary Report

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

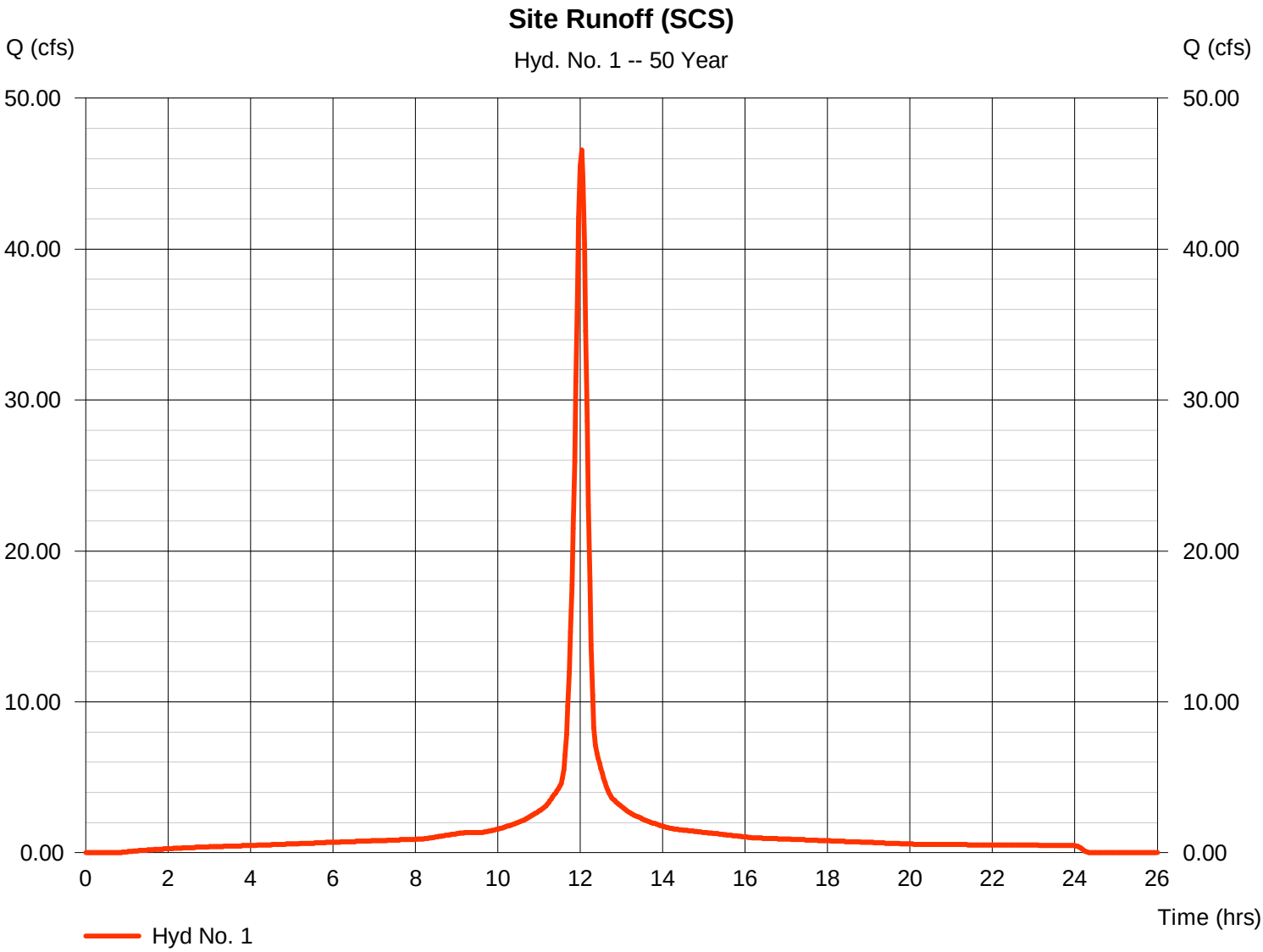
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	46.54	2	722	150,938	------	------	------	Site Runoff (SCS)
2	Rational	47.71	1	9	25,763	------	------	------	Site Runoff (Rational)
3	Rational	40.29	1	15	36,260	------	------	------	Site Runoff - 15 min Tc

Hydrograph Report

Hyd. No. 1

Site Runoff (SCS)

Hydrograph type	=	SCS Runoff	Peak discharge	=	46.54 cfs
Storm frequency	=	50 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	150,938 cuft
Drainage area	=	6.500 ac	Curve number	=	98
Basin Slope	=	0.7 %	Hydraulic length	=	750 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.64 min
Total precip.	=	6.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

Hyd. No. 2

Site Runoff (Rational)

Hydrograph type	=	Rational	Peak discharge	=	47.71 cfs
Storm frequency	=	50 yrs	Time to peak	=	0.15 hrs
Time interval	=	1 min	Hyd. volume	=	25,763 cuft
Drainage area	=	6.500 ac	Runoff coeff.	=	0.93
Intensity	=	7.892 in/hr	Tc by TR55	=	9.00 min
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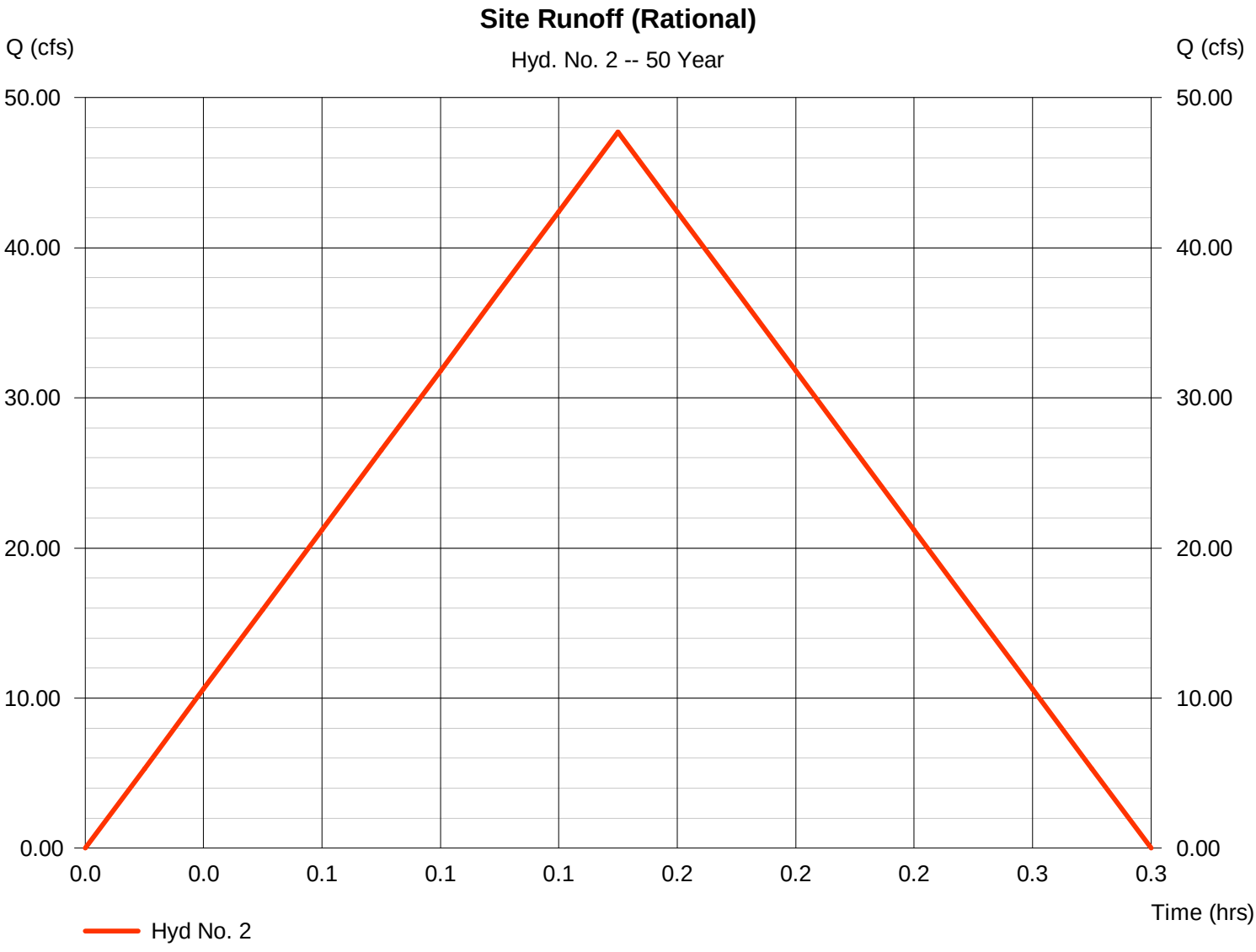


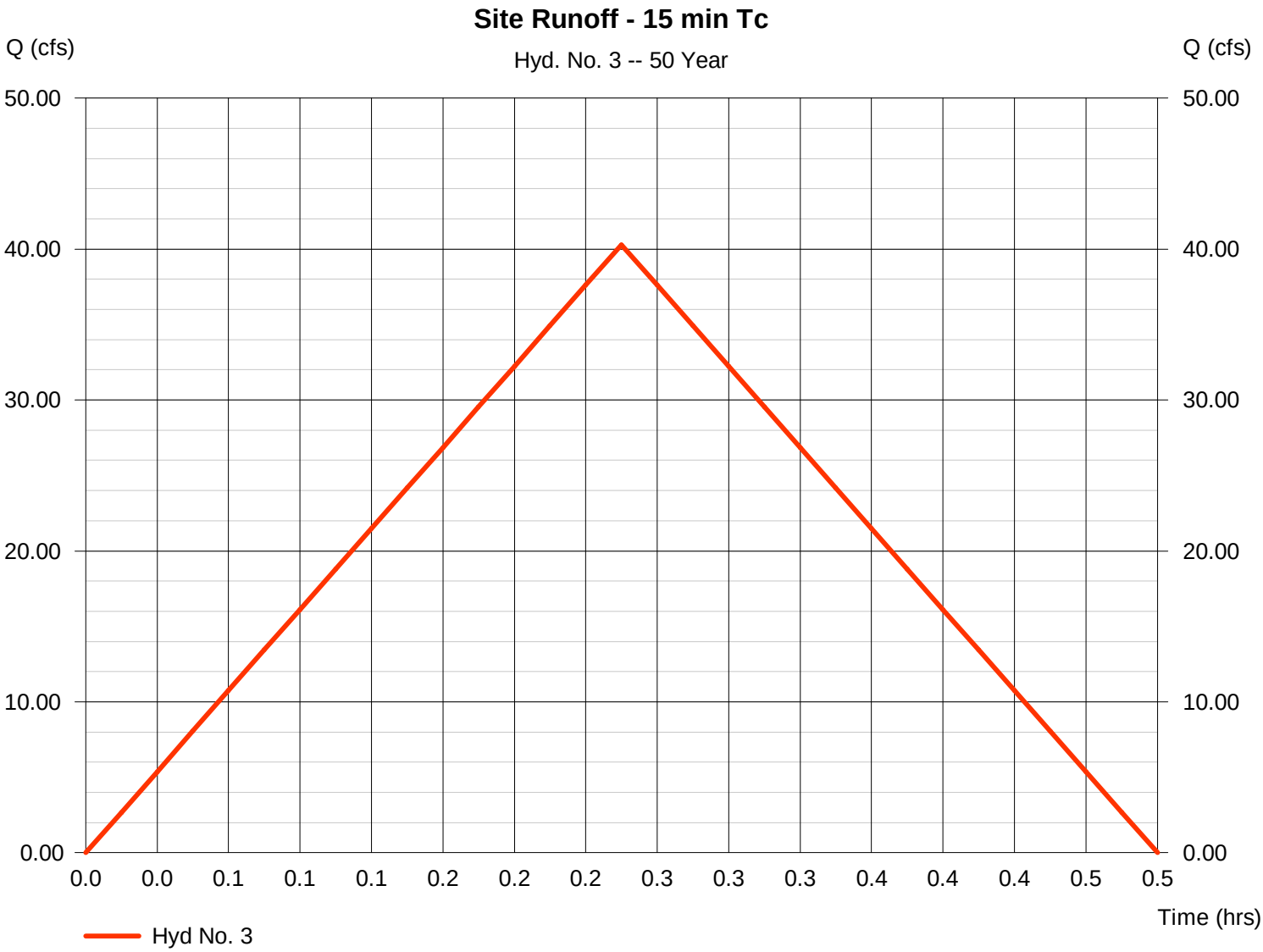
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jul 6, 2010

Hyd. No. 3

Site Runoff - 15 min Tc

Hydrograph type	= Rational	Peak discharge	= 40.29 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 36,260 cuft
Drainage area	= 6.500 ac	Runoff coeff.	= 0.93
Intensity	= 6.665 in/hr	Tc by User	= 15.00 min
IDF Curve	= wich_IDF.IDF	Asc/Rec limb fact	= 1/1



Hydrograph Summary Report

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

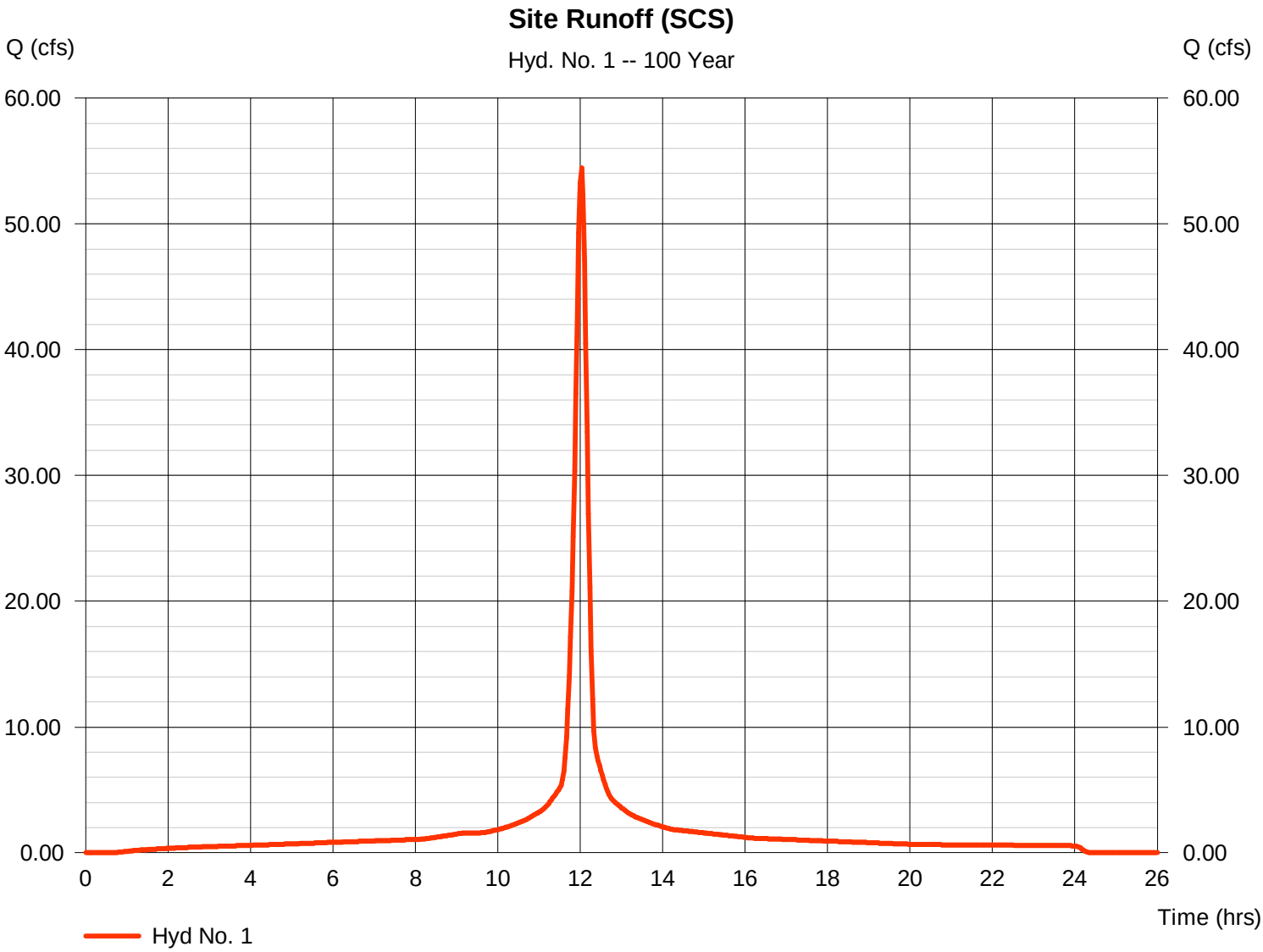
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	54.46	2	722	177,375	------	------	------	Site Runoff (SCS)
2	Rational	52.07	1	9	28,119	------	------	------	Site Runoff (Rational)
3	Rational	44.13	1	15	39,721	------	------	------	Site Runoff - 15 min Tc

Hydrograph Report

Hyd. No. 1

Site Runoff (SCS)

Hydrograph type	=	SCS Runoff	Peak discharge	=	54.46 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	177,375 cuft
Drainage area	=	6.500 ac	Curve number	=	98
Basin Slope	=	0.7 %	Hydraulic length	=	750 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.64 min
Total precip.	=	7.95 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

Hyd. No. 2

Site Runoff (Rational)

Hydrograph type	=	Rational	Peak discharge	=	52.07 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.15 hrs
Time interval	=	1 min	Hyd. volume	=	28,119 cuft
Drainage area	=	6.500 ac	Runoff coeff.	=	0.93
Intensity	=	8.614 in/hr	Tc by TR55	=	9.00 min
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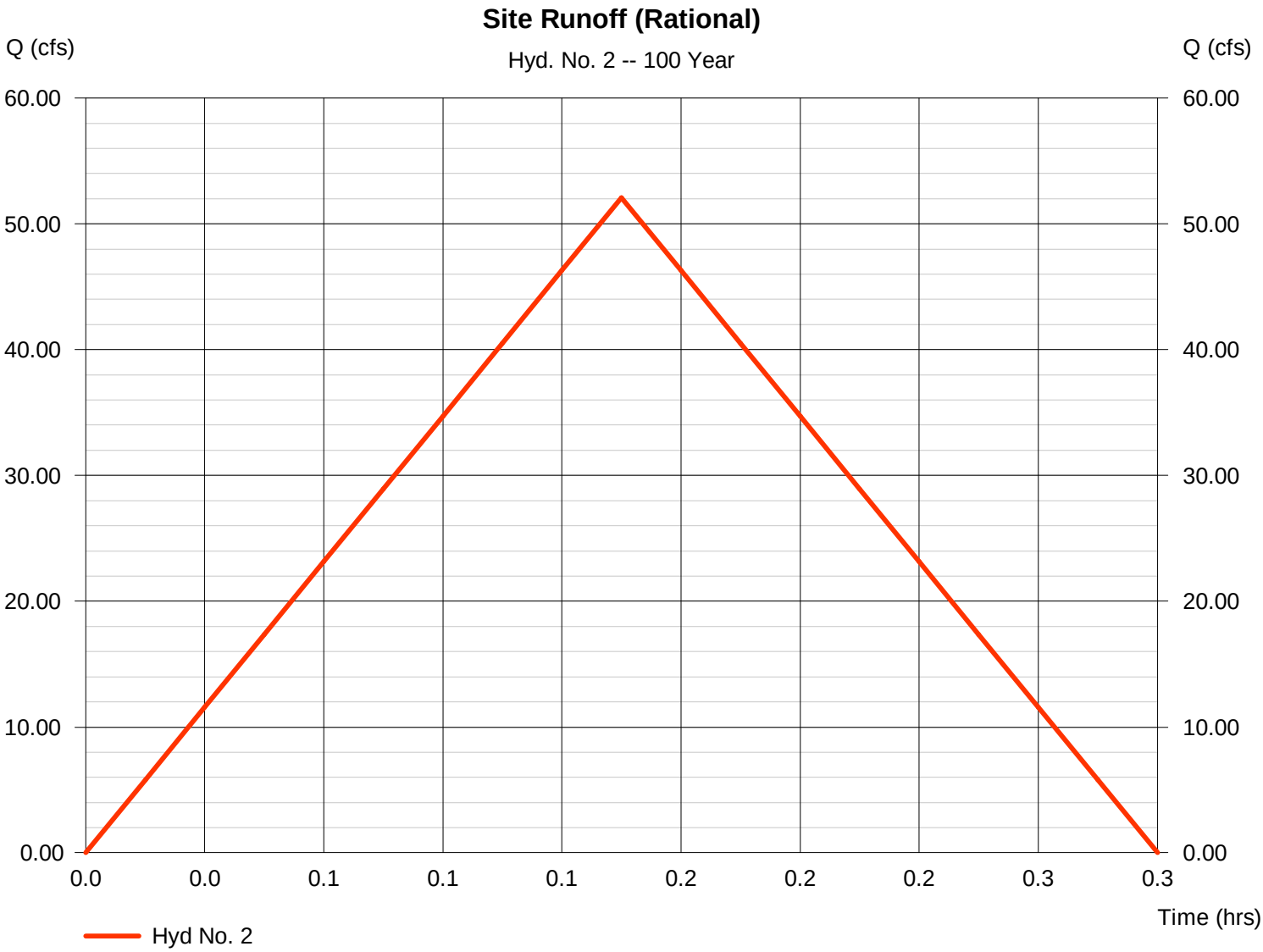

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Jul 6, 2010

Hyd. No. 3

Site Runoff - 15 min Tc

Hydrograph type	= Rational	Peak discharge	= 44.13 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 39,721 cuft
Drainage area	= 6.500 ac	Runoff coeff.	= 0.93
Intensity	= 7.301 in/hr	Tc by User	= 15.00 min
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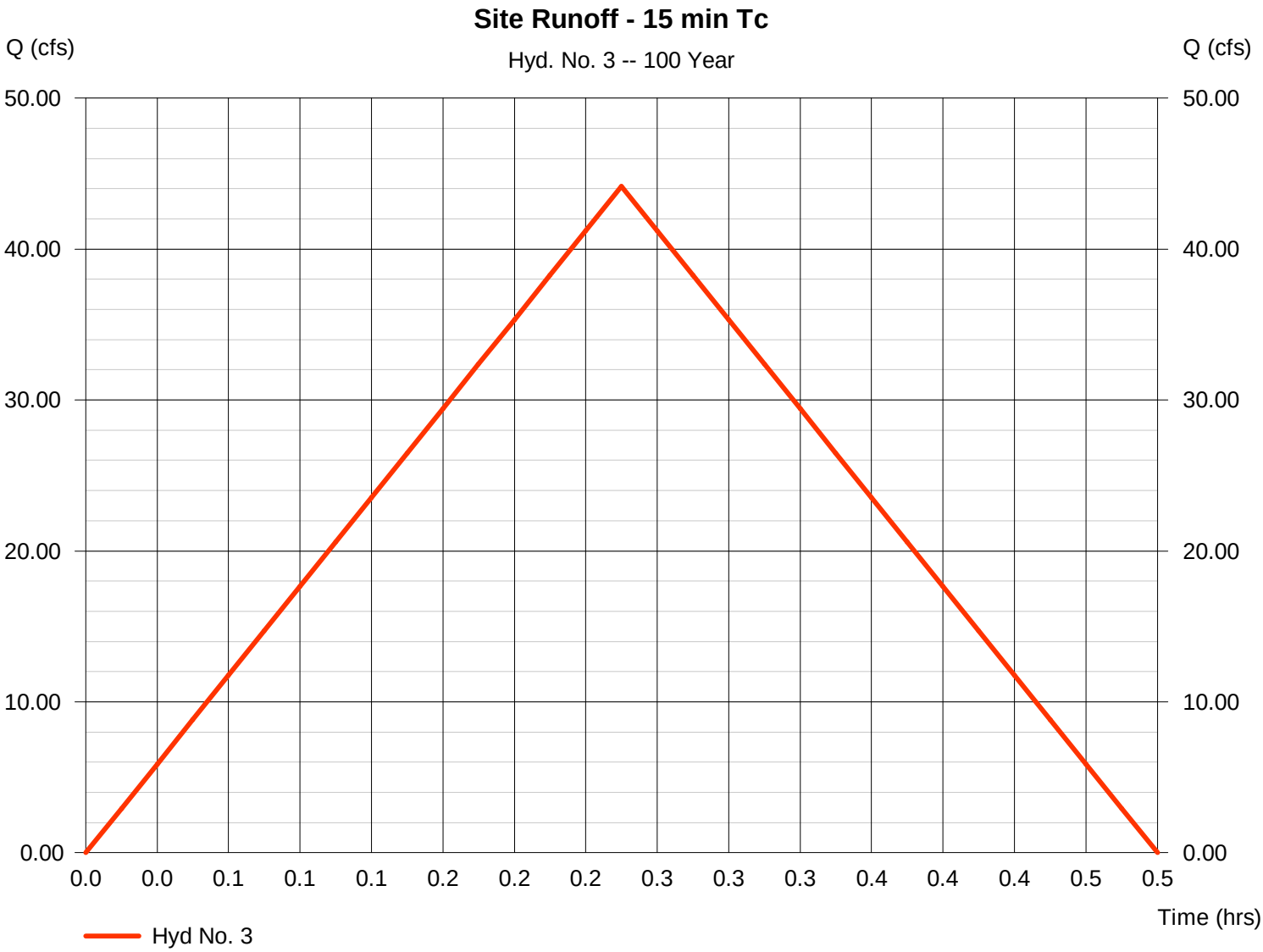

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Site Flow.gpw

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