FUNSTON ADDITION

DRAINAGE REPORT

POE & ASSOCIATES, INC.
CONSULTING ENGINEERS
5940 E. Central, Suite 200 ■ Wichita, KS 67208-4242
Phone 316/685-4114 ■ FAX 316/685-4444

OCTOBER 2009

CITY OF WICHITA

Public Works, Engineering Division
Final Drainage Plan Submittal Checklist

Reviewer: Timothy R. Austin, P.E. Date: 27 October 2008

Subdivision Name: Funston Addition Location: NE 1/4, Section 21-T28S-R1E

Total Land Area Of Ownership: 8.5 Acres

Type: ✓ Residential ✓ Commercial _____ Industrial _____ Recreation _____ Municipal _____ Other

Applicant: Southfork Investments, LLC Contact: Jay S. Maxwell, Member Phone #: (316) 219-8551

Engineer: Poe & Associates, Inc. Contact: Jason P. Dickman, P.E. Phone # (316) 685-4114

Please check the appropriate box: I = Included; NA = Non-Applicable; R= Required prior to development

(If "NA" is checked, an explanation must be entered)

	Applicant			Engr	
Tab 1. Project Narrative	**I**	**NA**	**Explanation / Location in Plan**	**I**	**NA**
A. Site Location Map, using USGS Map	✓			✓	
B. Discussion of development, existing conditions, and proposed impacts on stormwater, wetland, riparian, and flood plain	✓			✓	
C. Discussion of offsite conditions	✓			✓	
D. Summary of runoff calculations (pre/post development) No increase in peak discharge for all storm series	✓			✓	
E. Narrative description of the type and function of the permanent best management practices that are incorporated into the site design	✓			✓	
F. Copy of the plat	✓			✓	
G. Preliminary grading plan (The final grading plan shall be sealed, signed and dated prior to Engineering receiving the final sanitary sewer plans. One plan sheet and PDF shall be submitted to the Subdivision Engineer.)	✓			✓	
H. Professional Engineer seal, signature and date on cover of report	✓			✓	
I. CD of drainage plan in PDF format (one file) and one paper copy bound with this checklist included behind the cover	✓			✓	

	Applicant			Engr	
Tab 2. Existing Conditions Runoff Calculations	**I**	**NA**	**Explanation / Location in Plan**	**I**	**NA**
A. Copy of applicable orthophoto showing proposed project boundaries (preferable in color)	✓			✓	
B. Runoff Method (Rational, Hydrograph Method, or other approved methods by Engineering)	✓			✓	
C. Existing topography (no greater than 2-foot contours, 1-foot recommend)	✓			✓	
D. Total Site Area and Total Impervious Area (acres)	✓			✓	
E. Benchmarks used for site control	✓			✓	
F. Streams, creeks, and waterway labeled	✓			✓	
G. Predominant soils from USDA soil surveys, and/or on site soil borings	✓			✓	
H. Location and boundaries of natural features such as wetlands, lakes, and ponds with the normal water elevation noted	✓			✓	
I. Location of existing roads, buildings, parking lots and other impervious areas.	✓			✓	

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J. Location of existing utilities (e.g., water, sewer, gas, electric) and easements	✔			✔	
K. Location of existing conveyance systems such as storm drains, inlets, catch basins, channels, swales, and areas of overland flow	✔			✔	
L. Flow paths	✔			✔	
M. Location and dimensions of existing channels, bridges or culvert crossings	✔			✔	
N. Existing conditions hydrologic analysis for runoff rates, volumes and velocities showing methodologies used and supporting calculations (2, 5, 10, 25 & 100 year, 24-hour storm events) or Critical Duration	✔			✔	
O. Assumed pre-developed runoff curve numbers	✔			✔	
P. Existing time of concentrations used in calculations	✔			✔	
Q. Evaluate immediate downstream drainage capacity, not to exceed more than 0.25 miles downstream of site	✔			✔	
R. Existing structural elevations (e.g., invert of pipes, manholes, etc.)	✔			✔	
S. Cross-section data for open channels	✔			✔	
T. Ground water elevations, if applicable	✔			✔	

	Applicant			Engr	
Tab 3. Post-Development Hydrologic Analysis	**I**	**NA**	**Explanation / Location in Plan**	**I**	**NA**
A. Proposed (post-development) conditions hydrologic and hydraulic analysis for runoff rates, volumes, HGL, and velocities showing the methodologies used and supporting calculations for all applicable design storms (2, 5, 10, 25 & 100 year, 24-hour storm events)	✔			✔	
B. Proposed time of concentrations used in calculations	✔			✔	
C. Assumed post-developed runoff curve numbers	✔			✔	
D. Proposed contours for detention facilities (to equal area used in outlet rating curves)		✔			✔
E. Preliminary sizing calculations for stormwater controls including contributing drainage area, storage, and outlet configuration	✔			✔	
F. Stage-storage-discharge or outlet rating curves and inflow and outflow hydrographs for storage facilities	✔			✔	
G. Final analysis of potential upstream/downstream impact/effects of project, where necessary	✔			✔	
H. Existing and proposed structural elevations (e.g., invert of pipes, manholes, etc.)	✔			✔	
I. Design water surface elevations and normal pool elevation for ponds.		✔			✔
J. Typical detail for outlet structures, embankments, spillways, grade control structures, conveyance channels, etc. To include height, width, elevation, and/or diameter.	✔			✔	
K. Proposed limits of clearing and grading	✔			✔	
L. Location of existing and proposed roads, buildings, parking lots and other impervious areas.	✔			✔	
M. Location of existing and proposed utilities (e.g., water, sewer) and easements	✔			✔	
N. Location of existing and proposed conveyance systems such as storm drains, inlets, catch basins, channels, swales, and areas of overland flow	✔			✔	
O. Preliminary location and dimensions of proposed channel modifications, such as bridge or culvert crossings		✔			✔

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P. Preliminary selection and location of stormwater controls	✔			✔	
Q. Emergency overflow structure's flow path	✔			✔	
R. Detention facility provides one-foot of freeboard above the HWL and emergency outfall shown (top of berm elevation shown)		✔			✔
S. The 100-year 24-hour HWL delineated on the plan for detention pond		✔			✔
T. Lowest opening elevations table on the plat for structures located adjacent to channels or ponds		✔			✔
U. Stormwater Management Facilities located within a Reserve		✔			✔
V. Maintenance responsibility of stormwater management facility shall be specified in the platters text. (e.g. HOA, Lot Owners Association, or lot)	✔			✔	
W. Off-site drainage easements or agreements required, where necessary		✔			✔

	Applicant			Engr	
Tab 4. Floodplain Submittal	**I**	**NA**	**Explanation / Location in Plan**	**I**	**NA**
A. Provide source of flood profile		✔	No changes to floodplain or floodway limits		✔
B. Nearest base flood elevations		✔	No changes to floodplain or floodway limits		✔
C. Delineation of pre-developed regulatory floodplain/floodway limits		✔	No changes to floodplain or floodway limits		✔
D. Delineation of post-developed regulatory floodplain and floodway limits		✔	No changes to floodplain or floodway limits		✔
E. Floodplain boundary determination per elevation (project limits shown)		✔	No changes to floodplain or floodway limits		✔
F. Provide source of floodway data table and discharges		✔	No changes to floodplain or floodway limits		✔
G. Provide all hydrologic and hydraulic study information for site-specific floodplain studies, unnumbered Zone A area elevation determinations and flood plain map revisions or required permits		✔	No changes to floodplain or floodway limits		✔
H. Provide regulatory floodway and four natural profile models (10,50,100, and 500-yr) for existing and future watershed conditions		✔	No changes to floodplain or floodway limits		✔
I. Location of floodplain/floodway limits and relationship of site to upstream/downstream properties (floodplain limits to be per elevation and scaled location)		✔	No changes to floodplain or floodway limits		✔
J. Flood plains and floodways located within a Reserve, where necessary		✔			✔

	Applicant			Engr	
Tab 5. Federal, State and Local Permits (to be provided prior to construction unless otherwise specified)	**I/R**	**NA**	**Explanation / Location in Plan**	**I/R**	**NA**
A. US Army Corps of Engineers - Regulatory program permits (404 water quality certification)		✔	Not Required		✔
B. Kansas Department of Agriculture - Division of Water Resources Permits (Stream Obstruction, Channel Change, Flood Plain Fill, Levee, Water Appropriations, Dam safety permit, etc.)		✔	Not Required		✔
C. Federal Emergency Management Agency (FEMA) Letter of Map Changes (LOMA, LOMR, LOMR-f, CLOMR, etc.) Shall be included and approved when project modifies the limits of the floodway.		✔	Not Required		✔
D. Kansas Department of Transportation		✔	Not Required		✔
E. Sedgwick County Right-of-way Permit		✔	Not Required		✔

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Tab 1. Project Narrative

A. Site location map, using USGS Map

Funston Addition is an approximate 8.25-acre tract of land located in the Northeast Quarter of Section 21-T28S-R1E in the City Wichita, Sedgwick County, Kansas. The area includes un-platted tracts inside the City of Wichita. The site is bounded on the north by 47th Street South, on the east by Hydraulic Street, on the south by the Kansas Turnpike, and on the west by I-135. See Exhibit 1-1 for USGS Map, 1-2 for Aerial Photo of this area, and 1-3 for an Alta Survey of the property.

B. Discussion of development, existing conditions, and proposed impacts

The property is currently zoned to allow Single Family (SF-5) types of use (refer to Exhibit 1-4 for Zoning information). It is anticipated that this site will be developed as a General Commercial (GC) subdivision, which would be a mix of both commercial and residential areas. A Community Unit Plan (CUP 2008-40, DP-315, Exhibit 1-7) is also proposed for this site. Typically, assumptions for design flows in a commercial area include up to 85% impervious area and a residential area would include impervious areas of up to 65%. Detention ponds in this area are not proposed and do not currently exist.

Presently, Tracts 1, 2, & 3 were the sites for an elementary school that was recently cleared. Single-family homes occupied each of the remaining Tracts 4, 5, & 6. The entire area shall be vacant prior to any future development. As shown in the Drainage Plan (Exhibit 1-5), the site drainage is split into three areas. Run-off from each area takes overland routes to adjacent streets to the north, east, and west. Each of these streets contains underground storm sewer systems that all ultimately drain into the Arkansas River. According to the NRCS Soil Survey, the predominant soil type is a Canadian Fine Sandy Loam series material. See Exhibit 1-6 for NRCS Soil Survey map and information showing existing soil types and descriptions.

The site is not within a FEMA Floodway (refer to Exhibit 1-7 for proposed CUP and Exhibit 1-8 for FIRM Panel 0505E, Wichita, Sedgwick County, Kansas, February 2, 2007). No impact on storm water shall be addressed in the summary of runoff calculations text. The site does not contain wetland or riparian areas, and thus the development has no impact in that regard.

C. Discussion of off-site conditions

Multi-family and single-family areas are located around a majority of this site. Commercial and office warehouse uses lie to the northwest and south. To the south and west lie limited industrial uses. The original, modern land use for the site was a mixture of commercial, residential, and agricultural uses.

Total developed on-site drainage area equals 8.25 acres. The site is at the upper limit of three drainage basins and examination of those basins is outside the scope of this report. Land use

within the drainage basins varies from open space, limited/general industrial and commercial, and residential in character. The natural grades convey storm water away from the subject property. Storm water is presently conveyed off-site through the previously discussed storm water sewer systems (See Exhibit 1-5).

D. Summary of runoff calculations

	North Site Existing Conditions (24-Hour Storm)					North Site Proposed Conditions (24-Hour Storm)				
	CN= 92.0			Area(Ac)= 1.135		CN= 92.0			Area(Ac)= 1.187	
	2-Year	5-Year	10-Year	25-Year	100-Year	2-Year	5-Year	10-Year	25-Year	100-Year
Flow (cfs)	3.79	4.99	5.89	7.09	8.86	3.96	5.22	6.16	7.41	9.27

	East Site Existing Conditions (24-Hour Storm)					East Site Proposed Conditions (24-Hour Storm)				
	CN= 88.0			Area(Ac)= 2.191		CN= 92.0			Area(Ac)= 1.742	
	2-Year	5-Year	10-Year	25-Year	100-Year	2-Year	5-Year	10-Year	25-Year	100-Year
Flow (cfs)	6.47	8.81	10.57	12.91	16.39	5.81	7.66	9.04	10.87	13.60

	Southwest Site Existing Conditions (24-Hour Storm)					Southwest Site Proposed Conditions (24-Hour Storm)				
	CN= 69.0			Area(Ac)= 4.920		CN= 85.0			Area(Ac)= 5.318	
	2-Year	5-Year	10-Year	25-Year	100-Year	2-Year	5-Year	10-Year	25-Year	100-Year
Flow (cfs)	4.88	8.32	11.13	15.11	21.44	14.11	19.73	23.99	29.69	38.21

Using the SCS Method, calculations were made to determine the existing flows form this site (the complete flow information shown on Exhibit 1-9 as the Return Period Recap attached herewith). Both the existing and proposed site drainage is split into three areas as shown on the attached Drainage Plan, Exhibit 1-5. Off-site drainage is not considered, and does not enter this study site. Each area is evaluated based on existing and proposed conditions.

On-site time of concentration is estimated to be 15 minutes for all separate drainage areas. The only exception is the southwest existing area in which T_c is estimated to be approximately 22 minutes based upon the TR-55 method. On-site detention is not recommended for this development. It is assumed that immediate downstream capacities are adequate to handle current flows leaving this site. The final design of on-site drainage systems shall comply with current City of Wichita design criteria.

E. Narrative description of permanent best management practices

The contractor shall provide stabilized construction entrance prior to any street paving. A buffer of 10 feet of undisturbed native vegetation shall be maintained around perimeter of site where possible. Earthwork stockpiles shall be maintained away from any ponds. Fuel storage and refueling of equipment shall not be allowed around any ponds, drainage channels, or other waterways. Sediment barriers will be placed at storm sewer inlets and rock rip-rap at outlets. Sediment barriers (type determined by owner or contractor) shall be used to prevent sediment from flowing off site. Disturbed earth shall be stabilized where construction activity ceases for at least 21 days with owner's choice of mulch, temporary seed (Rye grass) during the planting season or other suitable BMP device. BMP devices shall be in place until there is a good stand of grass. Disturbed portions of the site where construction activities permanently cease shall be stabilized with permanent seed no later than 21 days after the last construction activity in that area (during the planting season only).

The permanent seed shall consist of fescue or grass chosen by the owner. BMP devices shall be used at back of curb/edge of pavement until vegetation is 75% established.

F. Copy of plat

A copy of the proposed CUP is attached as Exhibit 1-7.

G. Preliminary grading plan

Grading Plans currently not established. The Drainage Plan is found on Exhibit 1-5.

H. Professional Engineer Seal

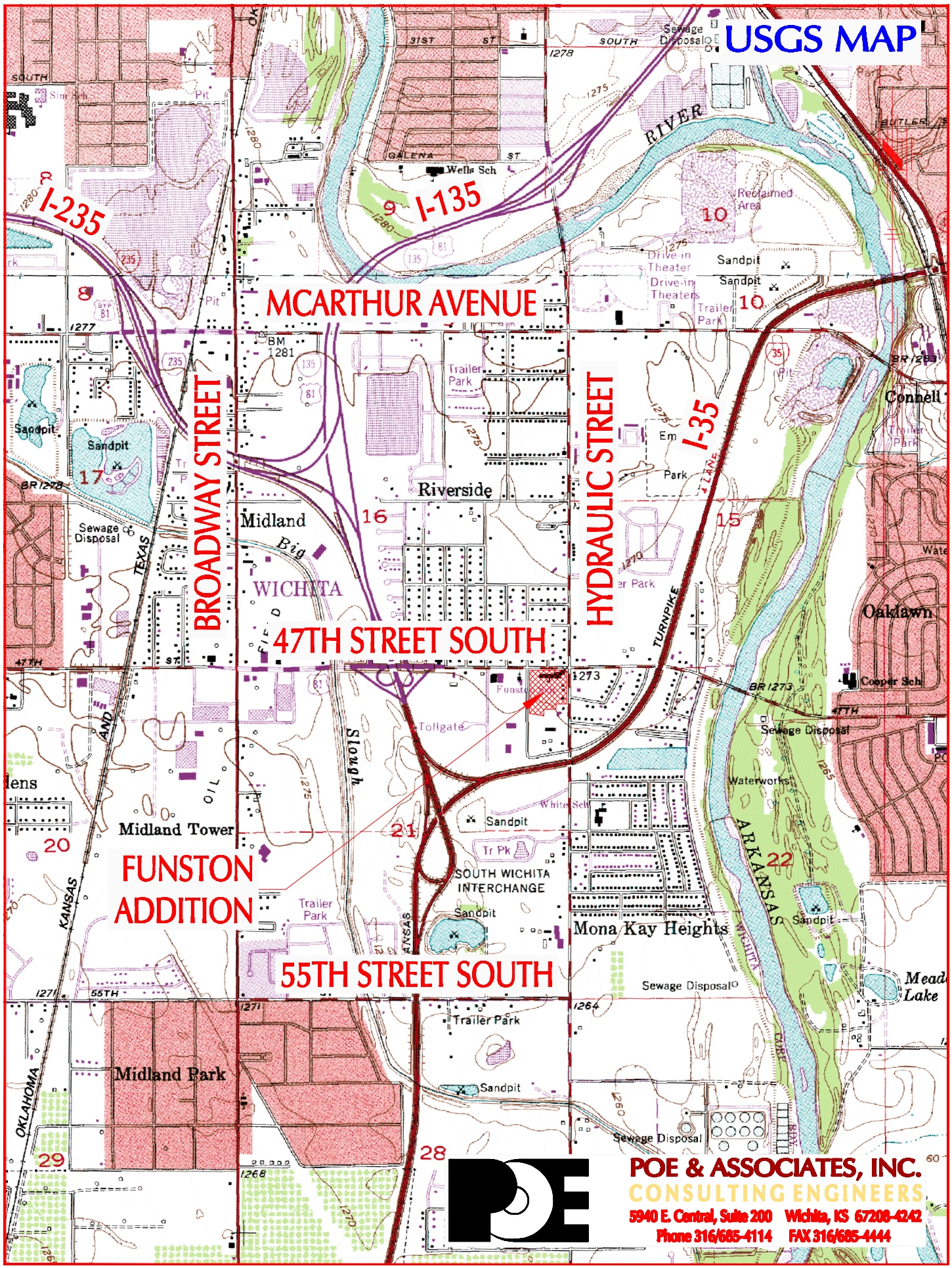
A signed and dated Professional Engineer's seal is located on the cover of this report.

I. CD of drainage plan

A CD of this report in full is attached herewith.

FUNSTON ADDITION

EXHIBIT 1-1


USGS MAP
MCARTHUR AVENUE
47TH STREET SOUTH
55TH STREET SOUTH
BROADWAY STREET
HYDRAULIC STREET
I-235
I-135
I-35
FUNSTON ADDITION
RIVER
Riverside
Midland
WICHITA
Midland Tower
Midland Park
Mona Kay Heights
Oaklawn
Connell
SOUTH WICHITA INTERCHANGE
Tollgate
Big Slough
ARKANSAS
TURNPIKE
Sewage Disposal
Trailer Park
Sandpit
Waterworks
Copper Sch
Wells Sch
Mead Lake
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FUNSTON ADDITION

EXHIBIT 1-2

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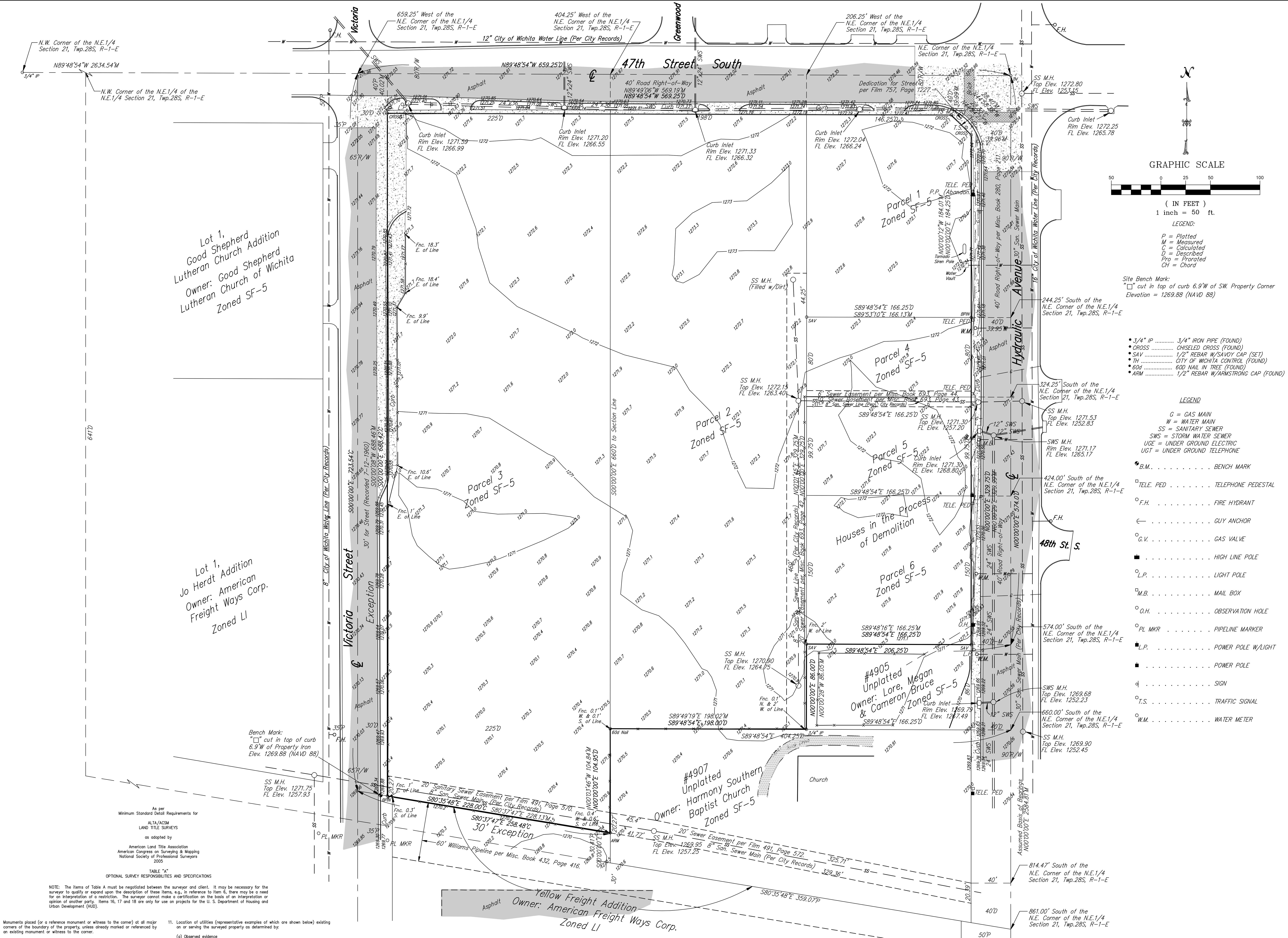
FUNSTON ADDITION

EXHIBIT 1-3

ALTA/ACSM LAND TITLE SURVEY

SW. Corner Hydraulic & 47th Street S. Wichita, Kansas



LEGEND:

P = Platted
M = Measured
C = Calculated
D = Described
Pro = Prorated
CH = Chord

Site Bench Mark:
"□" cut in top of curb 6.9'W of SW. Property Corner
Elevation = 1269.88 (NAVD 88)

- 3/4" IP .... 3/4" IRON PIPE (FOUND)
- CROSS .... CHISELED CROSS (FOUND)
- SAV .... 1/2" REBAR W/SAVOY CAP (SET)
- TH .... CITY OF WICHITA CONTROL (FOUND)
- 60d .... 60D NAIL IN TREE (FOUND)
- ARM .... 1/2" REBAR W/ARMSTRONG CAP (FOUND)

LEGEND

G = GAS MAIN
W = WATER MAIN
SS = SANITARY SEWER
SWS = STORM WATER SEWER
UGE = UNDER GROUND ELECTRIC
UGT = UNDER GROUND TELEPHONE

B.M. . . . . BENCH MARK
TELE. PED . . . . TELEPHONE PEDESTAL
F.H. . . . . FIRE HYDRANT
. . . . GUY ANCHOR
G.V. . . . . GAS VALVE
. . . . HIGH LINE POLE
L.P. . . . . LIGHT POLE
M.B. . . . . MAIL BOX
O.H. . . . . OBSERVATION HOLE
PL MKR . . . . PIPELINE MARKER
L.P. . . . . POWER POLE W/LIGHT
. . . . POWER POLE
. . . . SIGN
T.S. . . . . TRAFFIC SIGNAL
W.M. . . . . WATER METER

TO ALL PARTIES INTERESTED IN TITLE TO THE PREMISES SURVEYED:

Southfork Investment, L.L.C., a Kansas limited liability company
First American Title Insurance Company of Kansas

LEGAL DESCRIPTION:

Parcel 1

The East 206.25 feet of the North 244.25 feet of the Northeast Quarter of Section 21, Township 28 South, Range 1 East of the 6th P.M. Sedgwick County, Kansas, Except the East 40 feet thereof for road, Except beginning 40 feet South and 40 feet West of the Northeast corner of section 21, Township 28 South, Range 1 East of the 6th P.M. Sedgwick County, Kansas; thence West 40 feet, South of and parallel to the North line of said Section 21, a distance of 20.00 feet; thence Southeasterly a distance of 28.33 feet to a point 40.00 feet West of the East line of said section 21 and 20.00 feet South of the point of beginning; thence North 40.00 feet, West of and parallel to the East line of said Section 21, a distance of 20.00 feet to the point of beginning, subject to road rights-of-way of recorded on the North and East.

Parcel 2

The West 198 feet of the East 404.25 feet of the North 660 feet of the Northeast Quarter of Section 21, Township 28-S, Range 1 East of the 6th P.M. Sedgwick County, Kansas, subject to road rights-of-way of recorded on the North.

Parcel 3

The West 255 feet of the East 659.25 feet of the following described tract: Beginning at the Northeast corner of the Northeast Quarter of the Northeast Quarter of Section 21, Township 28-S, Range 1 East of the 6th P.M. Sedgwick County, Kansas; thence West to Northwest corner of said Northeast Quarter of the Northeast Quarter; thence South 641 feet; thence Southeast to a point on the East line of the said Northeast Quarter, 861 feet South of the Northeast corner of said Northeast Quarter; thence North 861 feet to beginning, Except therefrom the Southerly 30 feet thereof, and Except therefrom the Westerly 30 feet thereof, subject to road rights-of-way of recorded on the North.

Parcel 4

The North 80 feet of the East 206.25 feet of the South 415.75 feet of the North 660 feet of the East Half of the Northeast Quarter of Section 21, Township 28-S, Range 1 East of the 6th P.M. Sedgwick County, Kansas, subject to road rights-of-way of recorded on the East.

Parcel 5

The South 99.75 feet of the North 179.75 feet of the East 206.25 feet of the South 415.75 feet of the North 660 feet of the East Half of the Northeast Quarter of Section 21, Township 28-S, Range 1 East of the 6th P.M. Sedgwick County, Kansas, subject to road rights-of-way of recorded on the East.

Parcel 6

The North 150 feet of the South 236 feet of the East 206.25 feet of the North 660 feet of the Northeast Quarter of Section 21, Township 28-S, Range 1 East of the 6th P.M. Sedgwick County, Kansas, Except the East 40 feet thereof for road, subject to road rights-of-way of recorded on the East.

There are no encroachments on said parcel by buildings on the adjacent parcels.

The accompanying sketch is a true and correct exhibit of said survey.

State of Kansas)
) SS
Sedgwick County)

This is to certify that this map or plat and the survey on which it is based were made in accordance with the "Minimum Standard Detail Requirements for ALTA/ACSM Land Title Surveys," jointly established and adopted by ALTA and NSPS in 2005, and includes Items 1, 2, 3, 4, 5, 6, 7a, 7b1, 7b2, 7c, 8, 9, 10, 11b, 13, 14, and 17 of Table A thereof. Pursuant to the Accuracy Standards as adopted by ALTA and NSPS and in effect on the date of this certification, undersigned further certifies that in my professional opinion, as a land surveyor registered in the State of Kansas, the Relative Positional Accuracy of this survey does not exceed that which is specified therein.

Date: ____________________

____
Lenny D. Wood

NOTES:

1) RECORD INFORMATION: Title Commitment # 922628, #939145, #950322, #1012699, provided by First American Title.

2) BLANKET EASEMENT: Easement for pipeline right-of-way NE¼ of the NE¼ Section 21, Twp. 28 S. R-1-E per Book Misc. 165, Page 419.

3) AREA: (NET to R/W); 370,356.30 sq.ft.± 8.50 Acres±

4) FLOOD ZONE DESIGNATION: According to the National Flood Insurance Rate Map Community Panel No. 20173C0505E, effective February 2, 2007; the property shown hereon is located in Zone X (Unshaded).

5) SF-5 ZONING:
(1) Minimum lot size: 5,000 square feet
(2) Minimum lot width: 50 feet
(3) Minimum front setback: 25 feet
(4) Minimum rear setback: 20 feet, except that the rear setback may be reduced to five feet when adjacent to a platted reserve which has a minimum width of 20 feet, provided however, there shall be no encroachment into or over any utility easement
(5) Minimum interior side setback: six feet, except five feet if lot is below 6,000 square feet, and that one required side yard for a one-family dwelling may be reduced to as little as zero feet if setback lines are established that ensure a minimum of ten feet between structures on contiguous lots
(6) Minimum street side setback: 15 feet
(7) Maximum height: 35 feet

6) STREET RIGHT-OF-WAY: Right-of-way subject to requirements of Platting process.

NOTE:

Location of all utilities shown on this drawing, reflect the best information available, consisting of both field observation and information from the records of the various utility companies. Before completing any final design or beginning any excavation on this site, contact the appropriate utility companies for verification of the utility locations.

As per
Minimum Standard Detail Requirements for

ALTA/ACSM
LAND TITLE SURVEYS

as adopted by

American Land Title Association
American Congress on Surveying & Mapping
National Society of Professional Surveyors
2005

TABLE "A"
OPTIONAL SURVEY RESPONSIBILITIES AND SPECIFICATIONS

NOTE: The items of Table A must be negotiated between the surveyor and client. It may be necessary for the surveyor to qualify or expand upon the description of these items, e.g., in reference to Item 6, there may be a need for an interpretation of a restriction. The surveyor cannot make a certification on the basis of an interpretation or opinion of another party. Items 16, 17 and 18 are only for use on projects for the U. S. Department of Housing and Urban Development (HUD).

✓ 1. Monuments placed (or a reference monument or witness to the corner) at all major corners of the boundary of the property, unless already marked or referenced by an existing monument or witness to the corner.

✓ 2. Vicinity map showing the property surveyed in reference to nearby highway(s) or major street intersection(s).

✓ 3. Flood zone designation (with proper annotation based on Federal Flood Insurance Rate Maps or the state or local equivalent, by scaled map location and graphic plotting only.)

✓ 4. Gross land area (and other areas if specified by the client).

✓ 5. Contours and the datum of the elevations.

✓ 6. List setback, height, and floor space area restrictions disclosed by applicable zoning or building codes (beyond those required under paragraph 5d of these standards). If none, so state. The source of such information must be disclosed. See "Note" above.

✓ 7. (a) Exterior dimensions of all buildings at ground level

(b) Square footage of:
✓ (1) exterior footprint of all buildings at ground level
✓ (2) gross floor area of all buildings; or
___ (3) other areas to be defined by the client

✓ (c) Measured height of all buildings above grade at a defined location. If no defined location is provided, the point of measurement shall be shown.

✓ 8. Substantial, visible improvements (in addition to buildings) such as billboards, signs, parking structures, swimming pools, etc.

✓ 9. Parking areas and, if striped, the striping and the type (e.g.. handicapped, motorcycle, regular, etc.) and number of parking spaces.

✓ 10. Indication of access to public way on land such as curb cuts, driveways, and to and from waters adjoining the surveyed tract, such as boat slips, launches, piers and docks.

11. Location of utilities (representative examples of which are shown below) existing on or serving the surveyed property as determined by:

___ (a) Observed evidence

✓ (b) Observed evidence together with evidence from plans obtained from utility companies or provided by client, and markings by utility companies, and other appropriate sources (with reference as to the source of information)

- railroad tracks and sidings;
- manholes, catch basins, valve vaults or other surface indication of subterranean uses;
- wires and cables (including their function, if readily identifiable) crossing the surveyed premises, all poles on or within ten feet of the surveyed premises, and the dimensions of all crossmembers or overhangs affecting the surveyed premises; and
- utility company installations on the surveyed premises.

___ 12. Governmental Agency survey-related requirements as specified by the client.

✓ 13. Names of adjoining owners of platted lands.

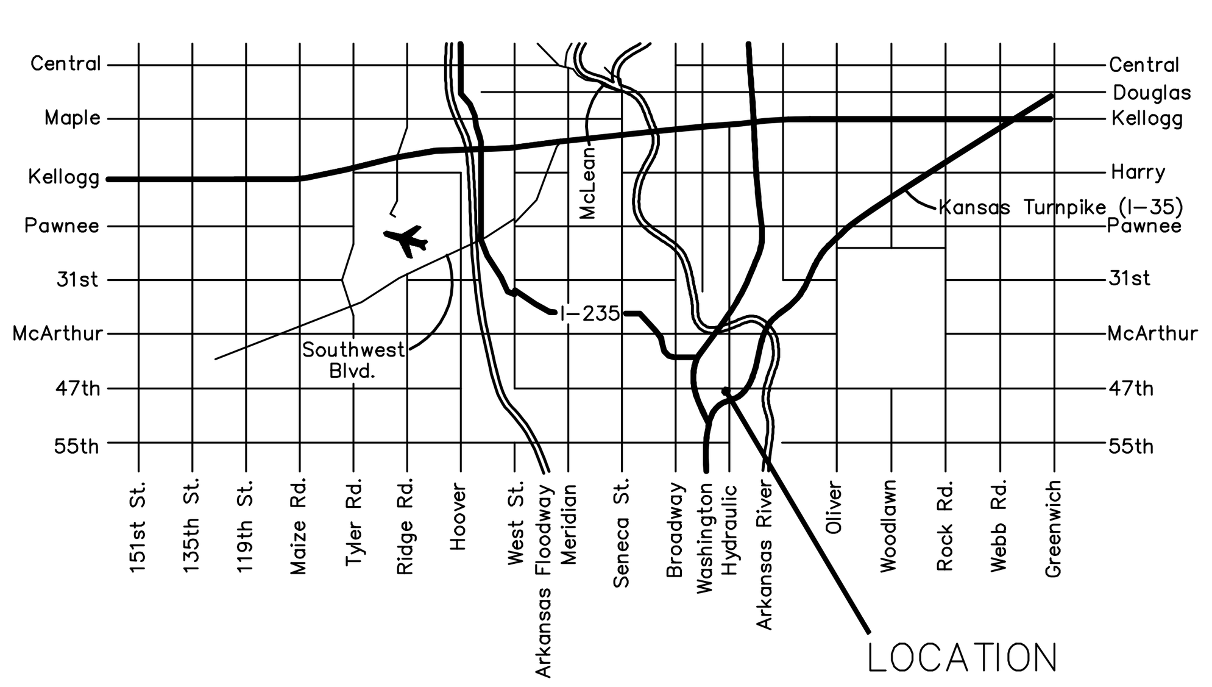
✓ 14. The distance to the nearest intersecting street as designated by the client

___ 15. Rectified orthophotography, photogrammetric mapping, laser scanning and other similar product, tools or technologies may be utilized as the basis for the location of certain features (excluding boundaries) where ground measurements are not otherwise necessary to locate those features to an appropriate and acceptable accuracy relative to the nearest boundary. The surveyor shall (a) discuss the ramifications of such methodologies (e.g. the potential accuracy and completeness of the data gathered thereby) with the title company, lender and client prior to the performance of the survey and, (b) place a note on the face of the survey explaining the source, date, relative accuracy and other relevant qualifications of any such data.

___ 16. Observable evidence of earth moving work, building construction or building additions within recent months.

✓ 17. Any changes in street right of way lines either completed or proposed, and available from the controlling jurisdiction. Observable evidence of recent street or sidewalk construction or repairs.

___ 18. Observable evidence of site use as a solid waste dump, sump or sanitary landfill.



LOCATION

Kansas One-Call 687-2470

PROJECT NO. 08HH09875 S

Savoy Company, P.A.
Land Surveyors

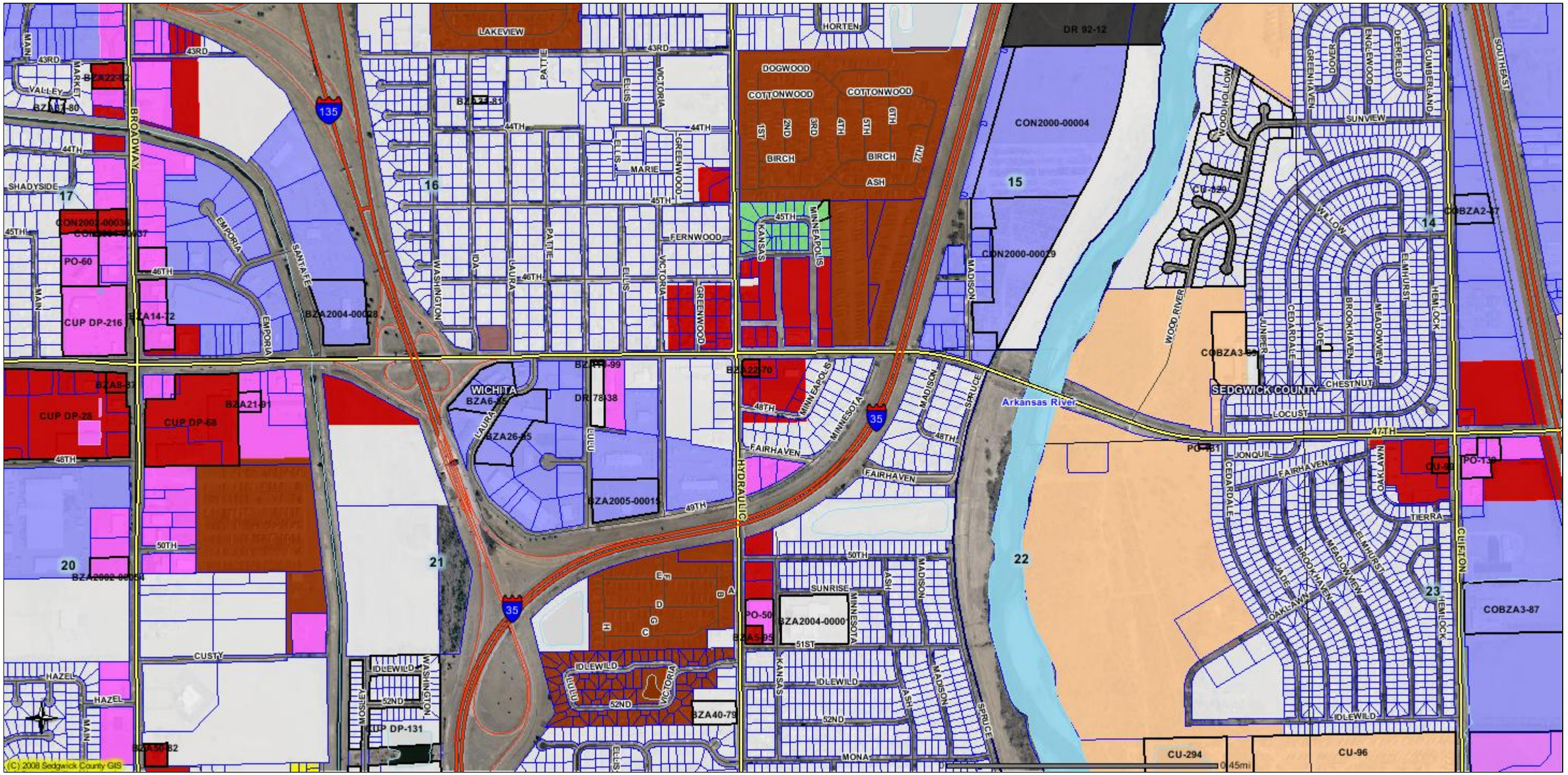
September, 3 2008

FUNSTON ADDITION

EXHIBIT 1-4

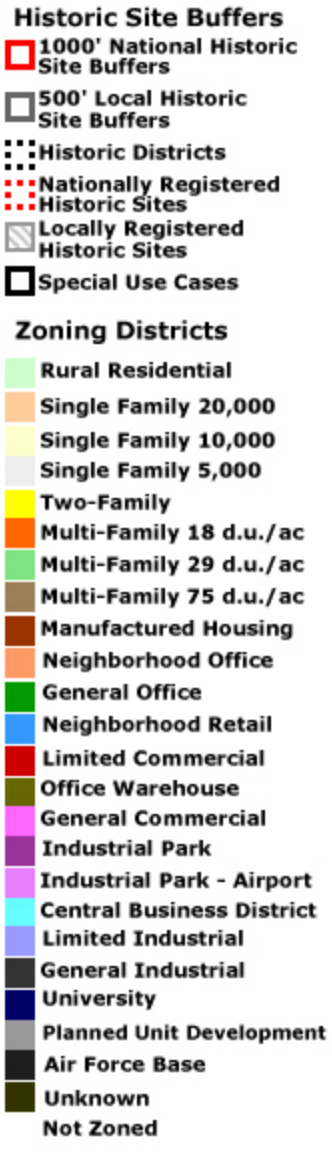
Sedgwick County Maps

Map Legend



Sedgwick County GIS

Geographic Information Services
Division of Information & Operations
www.sedgwickcounty.org/gis
525 N. Main, Suite 212, Wichita, KS 67203
Tel: 316.660.9290 Fax: 316.262.1174


Historic Site Buffers
1000' National Historic Site Buffers
500' Local Historic Site Buffers
Historic Districts
Nationally Registered Historic Sites
Locally Registered Historic Sites
Special Use Cases
Zoning Districts
Rural Residential
Single Family 20,000
Single Family 10,000
Single Family 5,000
Two-Family
Multi-Family 18 d.u./ac
Multi-Family 29 d.u./ac
Multi-Family 75 d.u./ac
Manufactured Housing
Neighborhood Office
General Office
Neighborhood Retail
Limited Commercial
Office Warehouse
General Commercial
Industrial Park
Industrial Park - Airport
Central Business District
Limited Industrial
General Industrial
University
Planned Unit Development
Air Force Base
Unknown
Not Zoned

FUNSTON ADDITION

EXHIBIT 1-5

DRAINAGE PLAN FOR
FUNSTON ADDITION
WICHITA, SEDGWICK COUNTY, KANSAS

LEGAL DESCRIPTION

Tract 1

The East 206.25 feet of the North 244.25 feet of the Northeast Quarter of Section 21, Township 28 South, Range 1 East of the 6th P.M. Sedgwick County, Kansas, Except the East 40 feet thereof for road, Except beginning 40 feet South and 40 feet West of the Northeast corner of section 21, Township 28 South, Range 1 East of the 6th P.M. Sedgwick County, Kansas; thence West 40 feet, South of and parallel to the North line of said Section 21, a distance of 20.00 feet; thence Southeasterly a distance of 28.33 feet to a point 40.00 feet West of the East line of said section 21 and 20.00 feet South of the point of beginning; thence North 40.00 feet, West of and parallel to the East line of said Section 21, a distance of 20.00 feet to the point of beginning, subject to road rights-of-way of recorded on the North and East.

Tract 2

The West 198 feet of the East 404.25 feet of the North 660 feet of the Northeast Quarter of Section 21, Township 28-S, Range 1 East of the 6th P.M. Sedgwick County, Kansas, subject to road rights-of-way of recorded on the North.

Tract 3

The West 255 feet of the East 659.25 feet of the following described tract: Beginning at the Northeast corner of the Northeast Quarter of the Northeast Quarter of Section 21, Township 28-S, Range 1 East of the 6th P.M. Sedgwick County, Kansas; thence West to Northwest corner of said Northeast Quarter of the Northeast Quarter; thence South 641 feet; thence Southeast to a point on the East line of the said Northeast Quarter, 861 feet South of the Northeast corner of said Northeast Quarter; thence North 861 feet to beginning, Except therefrom the Southerly 30 feet thereof, and Except therefrom the Westerly 30 feet thereof, subject to road rights-of-way of recorded on the North.

Tract 4

The North 80 feet of the East 206.25 feet of the South 415.75 feet of the North 660 feet of the East Half of the Northeast Quarter of Section 21, Township 28-S, Range 1 East of the 6th P.M. Sedgwick County, Kansas, subject to road rights-of-way of recorded on the East.

Tract 5

The South 99.75 feet of the North 179.75 feet of the East 206.25 feet of the South 415.75 feet of the North 660 feet of the East Half of the Northeast Quarter of Section 21, Township 28-S, Range 1 East of the 6th P.M. Sedgwick County, Kansas, subject to road rights-of-way of recorded on the East.

Tract 6

The North 150 feet of the South 236 feet of the East 206.25 feet of the North 660 feet of the Northeast Quarter of Section 21, Township 28-S, Range 1 East of the 6th P.M. Sedgwick County, Kansas, Except the East 40 feet thereof for road, subject to road rights-of-way of recorded on the East.

NOTES

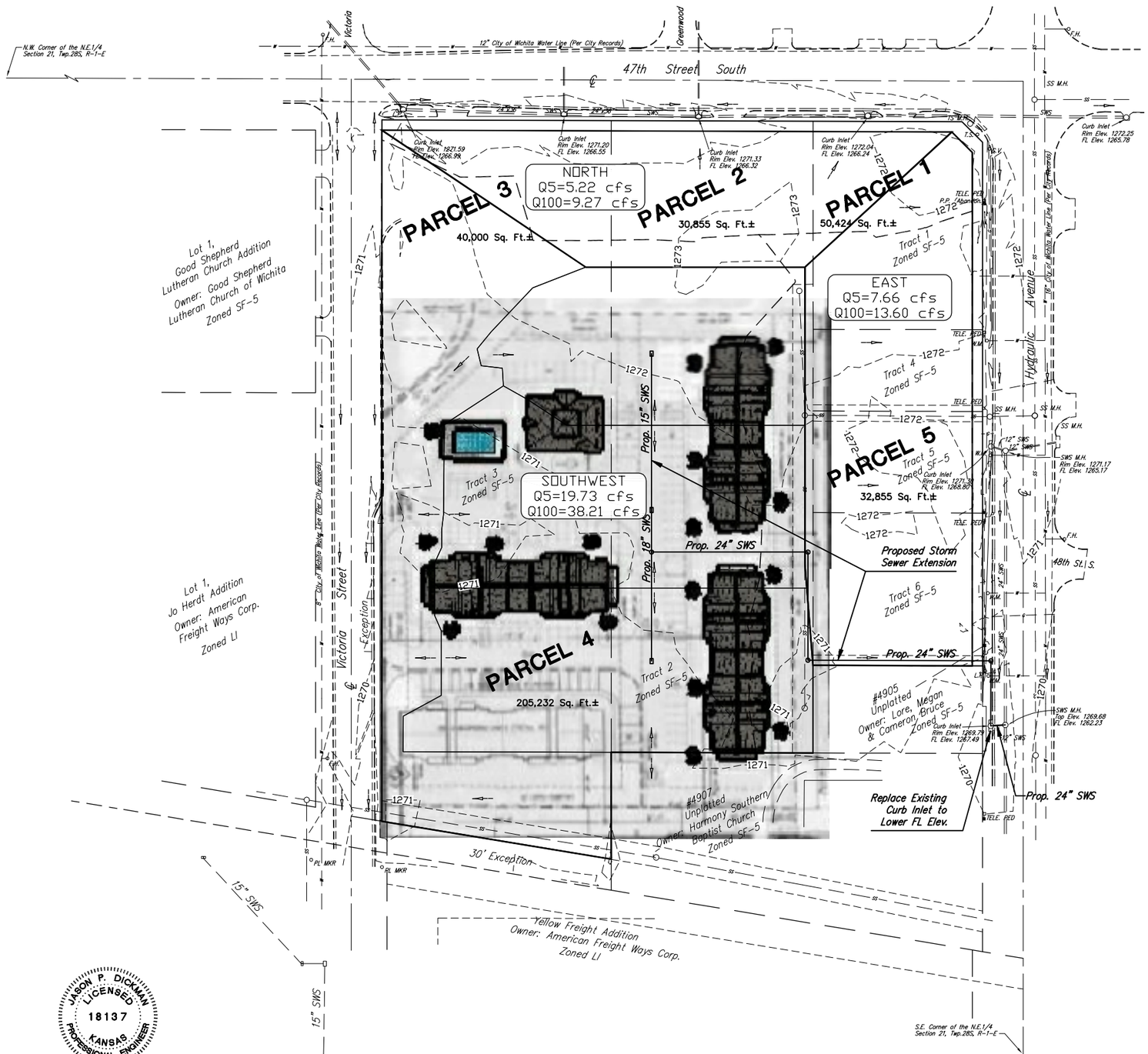
1. Cross-drainage agreement shall be required for any subsequent sub-divisions.
2. Storage required in the north and east shall be accomplished in the parking lots. The southwest area storage shall be in parking lots and storm sewer pipes. See Drainage Report for information.
3. Site grading and drainage plans to be designed by a licensed professional engineer.
4. Minimum Pad Elevation North & East = 1275.5 (MSL)
   Minimum Pad Elevation Southwest = 1275.0 (MSL)
5. Storm sewer easements will be provided only as needed to allow drainage to discharge across adjacent lots.
6. Any revised drainage plan must be approved by the appropriate governing body prior to building permits being issued.
7. Any storm water detention areas required may be revised when the final plans for the development are completed but the runoff amounts will be at or below the pre-development discharge rates. The filed final drainage report shall show discharge rates and stage/storage/discharge curves for any on-site detention areas.
8. Any detention areas may normally be dry and will be provided in future parking areas. A detailed grading plan will be provided at the time of development.

CALCULATION NOTES

1. Determination of Q's was made using the SCS method.
2. Curve Numbers weighted based on hydrologic soil groups.

Existing Conditions (24-Hour Storm)							
Site	Area	CN	2-Year	5-Year	10-Year	25-Year	100-Year
North	1.135	92.0	3.79	4.99	5.89	7.09	8.86
East	2.191	88.0	6.47	8.81	10.57	12.91	16.39
SW	4.920	69.0	4.88	8.32	11.13	15.11	21.44

Developed Conditions (24-Hour Storm)							
Site	Area	CN	2-Year	5-Year	10-Year	25-Year	100-Year
North	1.250	92.0	3.96	5.22	6.16	7.41	9.27
East	1.678	92.0	5.81	7.66	9.04	10.87	13.60
SW	5.318	85.0	14.11	19.73	23.99	29.69	38.21

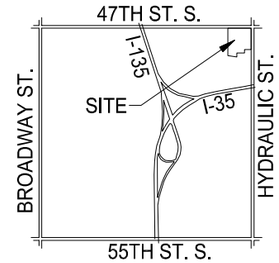


SCALE
60 0 60 120

LEGEND

G = GAS MAIN
W = WATER MAIN
SS = SANITARY SEWER
SWS = STORM WATER SEWER
UGE = UNDER GROUND ELECTRIC
UGT = UNDER GROUND TELEPHONE

- EXIST. DRAINAGE AREA
- PROP. DRAINAGE AREA
- B.M. BENCH MARK
- TELE. PED TELEPHONE PEDESTAL
- F.H. FIRE HYDRANT
- GUY ANCHOR
- G.V. GAS VALVE
- HIGH LINE POLE
- L.P. LIGHT POLE
- M.B. MAIL BOX
- O.H. OBSERVATION HOLE
- PL MKR PIPELINE MARKER
- L.P. POWER POLE W/LIGHT
- POWER POLE
- SIGN
- T.S. TRAFFIC SIGNAL
- W.M. WATER METER



LOCATION MAP
No Scale

BENCHMARK

BM #1 – Chiseled square in top of curb 6.9' W of SW. Property Corner Elevation = 1269.88 (NAVD 88)

JASON P. DICKMAN LICENSED 18137 KANSAS PROFESSIONAL ENGINEER

No.	Revision	Date	By	Approved

FUNSTON ADDITION
DRAINAGE PLAN
CITY OF WICHITA, KANSAS
JAMES L. ARMOUR P.E.- CITY ENGINEER

POE & ASSOCIATES, INC.
CONSULTING ENGINEERS
5940 E. Central, Suite 200 ■ Wichita, KS 67208-4242
Phone 316/685-4111 ■ FAX 316/685-4444

FINAL

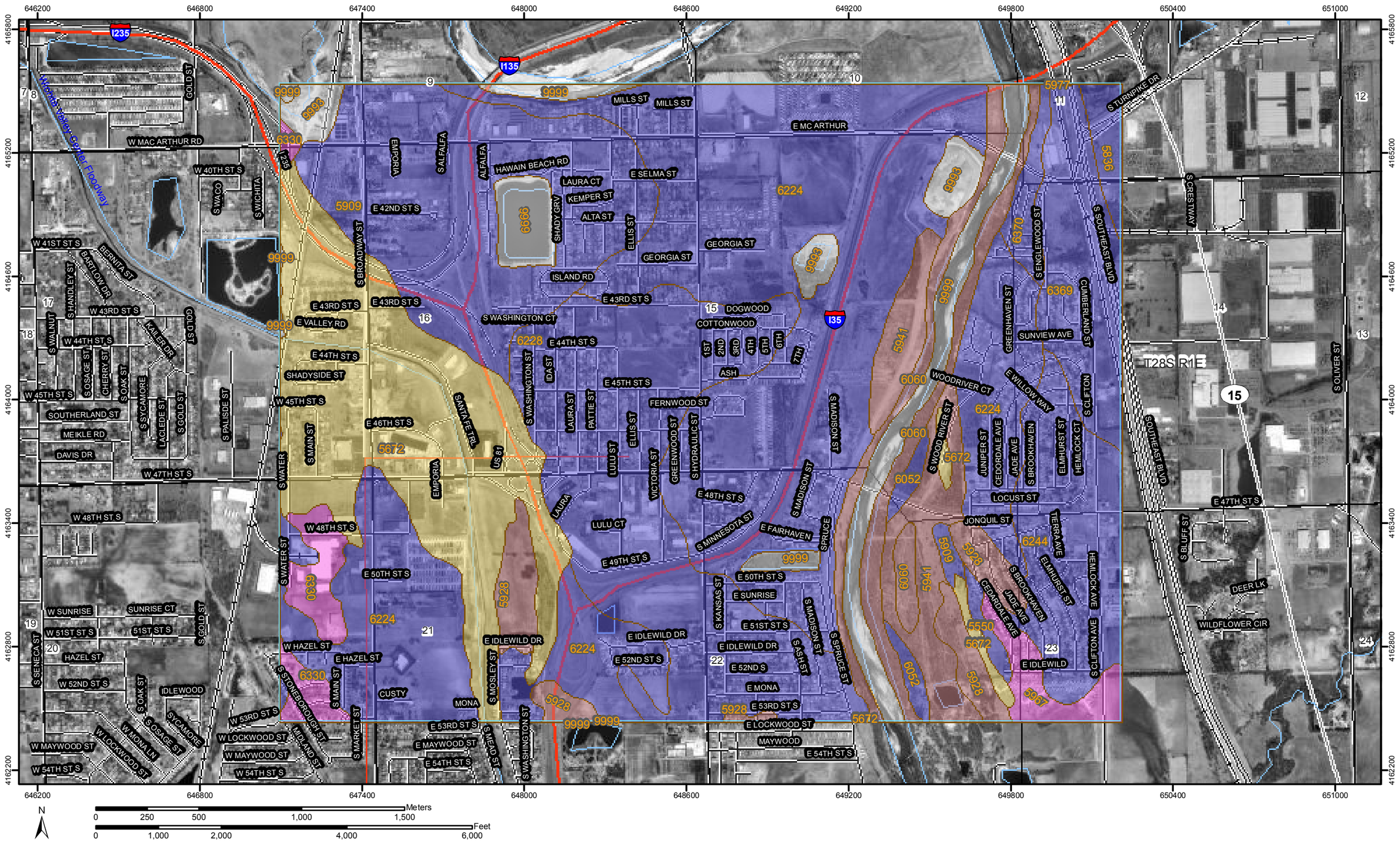
Designed By: J. Dickman
Drawn By: S. Schmidt
Drawing File: P:\858F-Funston\DA\DA Funston_Elem.dwg
Date: 10/7/2009

Sheet 1 of 1

FUNSTON ADDITION

EXHIBIT 1-6

Hydrologic Soil Group–Sedgwick County, Kansas
(Funston Addition Drainage)



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

Public Land Survey
- Township and Range
- Section

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails

Roads
- Interstate Highways
- US Routes
- State Highways
- Local Roads
- Other Roads

MAP INFORMATION

Original soil survey map sheets were prepared at publication scale. Viewing scale and printing scale, however, may vary from the original. Please rely on the bar scale on each map sheet for proper map measurements.

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

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

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

Date(s) aerial images were photographed: 3/20/1996

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

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Sedgwick County, Kansas				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
5550	Imano clay loam, occasionally flooded	B	9.3	0.3%
5672	Waldeck sandy loam, occasionally flooded	C	406.4	13.0%
5836	Urban land-Farnum complex, 0 to 3 percent slopes	B	22.5	0.7%
5909	Naron fine sandy loam, 0 to 1 percent slopes	B	351.0	11.2%
5928	Pratt loamy fine sand, 1 to 5 percent slopes	A	83.3	2.7%
5941	Pratt-Tivoli loamy fine sands, 5 to 15 percent slopes	A	107.3	3.4%
5967	Tabler silty clay loam, 0 to 1 percent slopes	D	36.8	1.2%
5977	Vanoss silt loam, 1 to 3 percent slopes	B	0.3	0.0%
6052	Elandco silt loam, occasionally flooded	B	16.9	0.5%
6060	Lincoln soils, frequently flooded	A	107.1	3.4%
6224	Canadian fine sandy loam, rarely flooded	B	1,022.6	32.7%
6228	Canadian-Waldeck fine sandy loams, rarely flooded	B	426.8	13.6%
6244	Elandco silt loam, rarely flooded	B	162.2	5.2%
6330	Carwile fine sandy loam, 0 to 1 percent slopes	D	53.4	1.7%
6369	Milan loam, 1 to 3 percent slopes	B	128.6	4.1%
6370	Milan loam, 3 to 6 percent slopes	B	24.1	0.8%
9993	Pits		45.5	1.5%
9999	Water		127.3	4.1%
Totals for Area of Interest (AOI)			3,131.2	100.0%

Rating Options

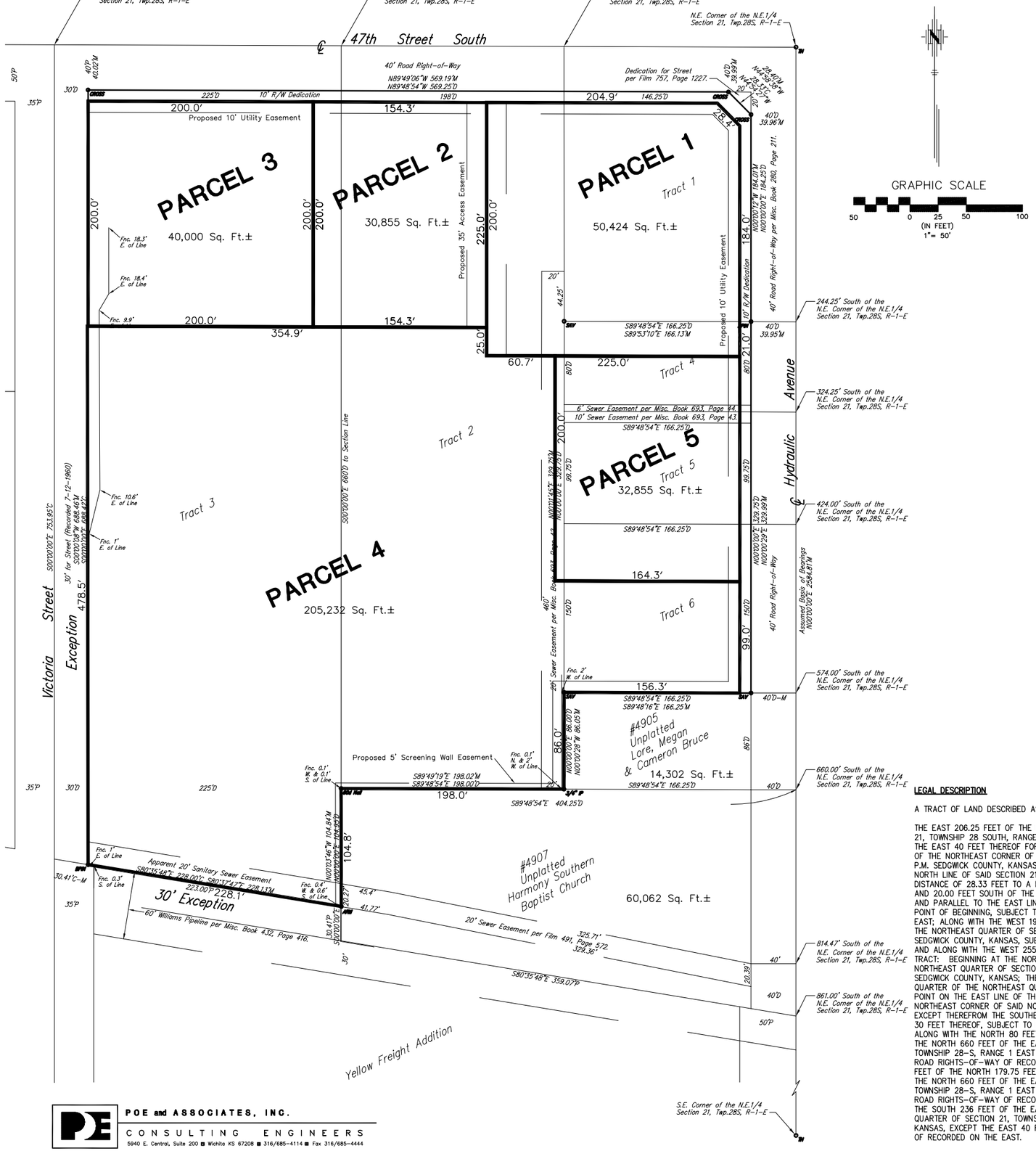
Aggregation Method: All Components

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

FUNSTON ADDITION

EXHIBIT 1-7



GENERAL PROVISIONS

1. THIS DEVELOPMENT CONTAINS 8.25 ACRES, MORE OR LESS.
2. THE DEVELOPMENT CONTAINS FIVE (5) PARCELS PERMITTING GENERAL COMMERCIAL USES. SEE PARCEL DESCRIPTION (GENERAL PROVISION NO. 27) FOR SPECIFIC USES.
3. ALL UTILITIES SHALL BE INSTALLED UNDERGROUND.
4. SIGNAGE WILL BE PERMITTED AS ALLOWED BY THE SIGN CODE, CITY CODE TITLE 24.04, WITH THE FOLLOWING ADDITIONAL CONDITIONS/LIMITATIONS:
   A. NO PORTABLE, OFF-SITE OR BILLBOARD SIGNS SHALL BE PERMITTED.
   B. ALL SIGNS: SHALL BE MONUMENT STYLE. NO POLE SIGNS SHALL BE PERMITTED.
   C. TEMPORARY ADVERTISING DECORATION OR BANNER-TYPE SIGNS AS ALLOWED BY THE SIGN CODE, EXCLUDING TINSEL OR PENNANT STREAMERS OR OTHER SIMILAR DECORATION, SHALL BE PERMITTED, BUT SHALL BE LIMITED TO NO MORE THAN 36 SQUARE FEET IN SIZE, TO NO MORE THAN 15 DAY PLACEMENTS, AND TO NO MORE THAN THREE SUCH BANNER OR ADVERTISING DECORATION SIGNS IN THE CUP AT ANY TIME. ANY ADVERTISING DECORATION OR BANNER SIGNS SHALL BE SECURELY ATTACHED TO A BUILDING, WALL OR FENCE.
5. ALL DRAINAGE WAYS AND DRAINAGE EASEMENTS SHALL BE CONFIRMED AT THE TIME OF PLATTING. A SPECIFIC LOT GRADING PLAN WILL BE PREPARED IN CONFORMANCE WITH THE GENERAL DRAINAGE CONCEPT PLAN FOR REVIEW PRIOR TO THE ISSUANCE OF A BUILDING PERMIT.
6. ANY OPEN SPACE, SIGNS, LOGOS, DRAINAGE FACILITIES, DRIVES OR PARKING AREAS CONTAINED WITHIN THE DESCRIBED PARCELS SHALL BE PRIVATELY OWNED AND MAINTAINED. IF MULTIPLE OWNERSHIP OCCURS AN AGREEMENT PROVIDING FOR THE MAINTENANCE OF RESERVES, OPEN SPACE, INTERNAL DRIVES, PARKING AREAS, DRAINAGE IMPROVEMENTS, ETC., SHALL BE FILED WITH THE PLAT.
7. PARKING SHALL BE PROVIDED IN ACCORDANCE WITH THE UNIFIED ZONING CODE OF THE CITY OF WICHITA. ALL PARKING AND DRIVES SHALL BE HARD SURFACED WITH CONCRETE OR ASPHALT.
8. FIRE LANES:
   A. FIRE LANES SHALL BE IN ACCORDANCE WITH THE APPROPRIATE FIRE CODE OF THE CITY OF WICHITA. NO PARKING SHALL BE ALLOWED IN SAID FIRE LANES, ALTHOUGH THEY MAY BE USED FOR PASSENGER LOADING AND UNLOADING.
   B. DURING BUILDING PERMIT REVIEW THE FIRE CHIEF OR HIS DESIGNATED REPRESENTATIVE SHALL REVIEW AND APPROVE THE SITE PLAN REGARDING FIRE LANE(S) AND FIRE HYDRANT LOCATION, PRIOR TO CONSTRUCTION.
9. ACCESS CONTROL: AS SHOWN ON THE RECORDED PLAT. IF THE ACCESS CONTROLS OF THE RECORDED PLAT ARE ALTERED BY AN APPROVED VACATION ORDER OF THE WICHITA CITY COUNCIL THE C.U.P. SHALL BE CONSIDERED TO HAVE BEEN ADJUSTED ACCORDINGLY.
10. CROSS LOT CIRCULATION AND INTERNAL ACCESS SHALL BE PROVIDED AT THE TIME OF PLATTING. AN INTERNAL CIRCULATION DRIVE SHALL PROVIDE CROSS-LOT ACCESS ALONG THE LINE BETWEEN OUT PARCELS; AND, ALSO THE MAIN PARCEL IF DEVELOPED WITH A COMMERCIAL USE.
11. THE TRANSFER OF TITLE ON ALL OR ANY PORTION OF THE LAND INCLUDED IN THE C.U.P. DOES NOT CONSTITUTE A TERMINATION OF THE PLAN OR ANY PORTION THEREOF, BUT SAID PLAN SHALL RUN WITH THE LAND AND BE BINDING UPON THE PRESENT OWNERS, THEIR SUCCESSORS AND ASSIGNS AND THEIR LESSEES UNLESS AMENDED. ANY MAJOR CHANGES IN THIS DEVELOPMENT PLAN SHALL BE SUBMITTED TO THE PLANNING COMMISSION FOR ITS CONSIDERATION.
12. NO DEVELOPMENT OF THE CUP SHALL OCCUR UNTIL MUNICIPAL WATER AND SEWER SERVICES HAVE BEEN EXTENDED TO SERVE THE SITE.
13. ALL LIGHTS SHALL BE SHIELDED TO REFLECT LIGHT DOWNWARD OR DIRECT LIGHT AWAY FROM RESIDENTIAL AREAS. LIGHT POLES ON PARCELS SHALL BE LIMITED TO 20 FEET IN HEIGHT. ALL PARKING LOT LIGHTING WITHIN THE CUP SHALL SHARE CONSISTENT DESIGN (I.E. FIXTURES, POLES, LAMP BASES). LIGHTING HEIGHT SHALL BE LIMITED TO 15 FEET WHEN WITHIN 100 FEET OF RESIDENTIAL ZONING.
14. TRASH RECEPTACLES SHALL BE APPROPRIATELY SCREENED TO REASONABLY HIDE THEM FROM GROUND VIEW. SCREENING SHALL BE CONSTRUCTED OF MATERIALS AND/OR LANDSCAPING COMPATIBLE WITH AND COMPLEMENTARY TO THE EXTERIOR OF THE BUILDINGS TO WHICH THE TRASH RECEPTACLE PROVIDES SERVICE. LOADING DOCKS AND SERVICE AREAS SHALL ALSO BE SCREENED FROM 47TH STREET NORTH AND HYDRAULIC AVE, WITH SCREENING WALLS AND/OR LANDSCAPING APPROVED BY THE PLANNING DIRECTOR.
15. ON ALL PARCELS ROOF-TOP EQUIPMENT SHALL BE SCREENED FROM GROUND LEVEL VIEW FROM ADJACENT RESIDENTIAL AREAS; NO ROOF-TOP FENCING ALLOWED.
16. DEVELOPMENT OF ALL PARCELS WITHIN THE CUP SHALL COMPLY WITH THE LANDSCAPE ORDINANCE OF THE CITY OF WICHITA. A LANDSCAPE PLAN SHALL BE PREPARED BY A STATE OF KANSAS REGISTERED LANDSCAPE ARCHITECT FOR THE REQUIRED LANDSCAPING, INDICATING THE TYPE, LOCATION AND SPECIFICATIONS OF ALL PLANT MATERIAL. THIS PLAN SHALL BE SUBMITTED TO THE PLANNING DEPARTMENT FOR THEIR REVIEW AND APPROVAL PRIOR TO ISSUANCE OF A BUILDING PERMIT.
17. A FINANCIAL GUARANTEE FOR THE PLANT MATERIAL APPROVED ON THE LANDSCAPE PLAN FOR THAT PORTION OF THE CUP BEING DEVELOPED SHALL BE REQUIRED PRIOR TO ISSUANCE OF ANY OCCUPANCY PERMIT, IF THE REQUIRED LANDSCAPING HAS NOT BEEN PLANTED.
18. ALL PARCELS IN THE CUP SHALL SHARE A SIMILAR OR COMPATIBLE PLANT PALETTE, AS DETERMINED BY THE REGISTERED LANDSCAPE ARCHITECT PREPARING REQUIRED PLAN.
19. ALL BUILDINGS OF THE SAME GENERAL LAND USE SHALL HAVE CONSISTENT EXTERIOR BUILDING MATERIALS WITH CONSISTENT ARCHITECTURAL CHARACTER, FORM, COLOR, AND TEXTURE. BUILDING WALLS SHALL BE BROKEN UP BY PROJECTIONS, RECESSES, CHANGES IN ROOF LINE, AND CHANGES IN COLORS, TEXTURES AND/OR MATERIALS, RELATING TO INTERIOR BUILDING FUNCTIONS WHERE FEASIBLE. BUILDINGS SHOULD HAVE A RECOGNIZABLE "BASE" AND "TOP".
20. BUILDINGS IN PARCELS ALONG THE ARTERIAL STREETS SHOULD BE SITED WITH A PRIMARY BUILDING FACADE ALONG THE STREET AND NO MORE THAN ONE DRIVING AISLE. MINIMUM SETBACK ALONG ARTERIAL STREETS MAY BE REDUCED TO A MINIMUM OF 20 FEET IF THE FRONT YARD AREA IS LANDSCAPED. A MINIMUM OF 50 PERCENT OF THE BUILDING FRONTAGE FACING THE ARTERIAL STREETS MUST HAVE WINDOWS OR DOOR OPENINGS.
21. GAS ISLANDS, ATMS, BANK DRIVE-THROUGH WINDOWS, OVERHEAD DOORS AND SIMILAR UTILITARIAN ITEMS SHALL BE SCREENED OR SITED BEHIND BUILDINGS TO MINIMIZE THEIR VIEW FROM THE STREET.
22. A SIX (6) FOOT HIGH MASONRY WALL SHALL BE CONSTRUCTED ALONG PARCEL 4 WHERE ADJACENT TO SF-5 RESIDENTIAL ZONING. EXCEPT THAT IF PARCEL 4 IS DEVELOPED WITH A RESIDENTIAL USE, THE WALL MAY BE SUBSTITUTED WITH A WOOD FENCE NO LESS THAN SIX FEET IN HEIGHT. NO UTILITIES SHALL BE PLACED WITHIN THE 5 FOOT WALL EASEMENT.
23. EXTENSIVE USE OF BACKLIT CANOPIES AND NEON OR FLUORESCENT TUBE LIGHTING ON BUILDINGS IS NOT PERMITTED.
24. THIS C.U.P. DOCUMENT IS GENERAL IN CHARACTER AND WILL REQUIRE THE SUBMISSION OF A SITE PLAN AND A LANDSCAPE PLAN FOR EACH PARCEL OR PORTION THEREOF. THIS SITE PLAN WILL REQUIRE ADMINISTRATIVE APPROVAL AT THE PLAN REVIEW STAGE PRIOR TO ISSUANCE OF A BUILDING PERMIT. THE SITE PLAN SHALL SHOW LAND USE RELATIONSHIPS, ACCESS POINTS AND/OR CONTROL SETBACKS, INTERIOR CIRCULATION, PARKING, SCREENING AND OTHER SIMILAR DESIGN CONSIDERATIONS.
25. THE DEVELOPMENT OF THIS PROPERTY SHALL PROCEED IN ACCORDANCE WITH THE DEVELOPMENT PLAN AS RECOMMENDED FOR APPROVAL BY THE PLANNING COMMISSION AND APPROVED BY THE GOVERNING BODY, AND ANY SUBSTANTIAL DEVIATION OF THE PLAN, AS DETERMINED BY THE ZONING ADMINISTRATOR AND THE DIRECTOR OF PLANNING, SHALL CONSTITUTE A VIOLATION OF THE BUILDING PERMIT AUTHORIZING CONSTRUCTION OF THE PROPOSED DEVELOPMENT.
26. THE FOLLOWING USES SHALL BE PROHIBITED IN ALL PARCELS: CEMETARY, CORRECTIONAL PLACEMENT RESIDENCES, NIGHT CLUB IN THE CITY. ANY USES ALLOWED ONLY BY CONDITIONAL USE SHALL NOT BE ALLOWED EXCEPT BY CUP AMENDMENT. THE FOLLOWING USES SHALL BE PROHIBITED WITHIN 200 FEET OF RESIDENTIALLY ZONED PROPERTY: SERVICE STATIONS, CONVENIENCE STORES WITH GAS ISLANDS, RESTAURANTS WITH DRIVE-IN OR DRIVE-THROUGH FACILITIES AND VEHICLE REPAIR. THERE SHALL BE NO OVERHEAD DOORS FOR AUTO SERVICES OR REPAIR USES FACING RESIDENTIAL DISTRICTS.
27. PARCEL DESCRIPTIONS:

PARCEL NO. 1
NET AREA – 50,424 SQ. FT. (1.16 ACRES)
MAXIMUM BUILDING COVERAGE – 15,127 SQ. FT. (30% MAX.)
TOTAL NUMBER OF BUILDINGS – 8
PARKING – SEE GENERAL PROVISION NUMBER 7
MAXIMUM BUILDING HEIGHT–35 FEET
GROSS FLOOR AREA RATIO: 35%

PARCEL NO. 2
NET AREA – 30,855 SQ. FT. (0.71 ACRES)
MAXIMUM BUILDING COVERAGE – 30%
TOTAL NUMBER OF BUILDINGS – 3
PARKING – SEE GENERAL PROVISION NUMBER 7
MAXIMUM BUILDING HEIGHT–35 FEET
GROSS FLOOR AREA RATIO: 30%

PARCEL NO. 3
NET AREA – 40,000 SQ. FT. (0.92 ACRES)
MAXIMUM BUILDING COVERAGE – 30%
TOTAL NUMBER OF BUILDINGS – 3
PARKING – SEE GENERAL PROVISION NUMBER 7
MAXIMUM BUILDING HEIGHT–35 FEET
GROSS FLOOR AREA RATIO: 30%

PARCEL NO. 4
NET AREA – 205,232 SQ. FT. (4.71 ACRES)
MAXIMUM BUILDING COVERAGE – 30%
TOTAL NUMBER OF BUILDINGS – 3
PARKING – SEE GENERAL PROVISION NUMBER 7
MAXIMUM BUILDING HEIGHT–35 FEET
GROSS FLOOR AREA RATIO: 30%

PARCEL NO. 5
NET AREA – 32,855 SQ. FT. (0.75 ACRES)
MAXIMUM BUILDING COVERAGE – 30%
TOTAL NUMBER OF BUILDINGS – 3
PARKING – SEE GENERAL PROVISION NUMBER 7
MAXIMUM BUILDING HEIGHT–35 FEET
GROSS FLOOR AREA RATIO: 30%

LEGAL DESCRIPTION

A TRACT OF LAND DESCRIBED AS FOLLOWS;

THE EAST 206.25 FEET OF THE NORTH 244.25 FEET OF THE NORTHEAST QUARTER OF SECTION 21, TOWNSHIP 28 SOUTH, RANGE 1 EAST OF THE 6TH P.M. SEDGWICK COUNTY, KANSAS, EXCEPT THE EAST 40 FEET THEREOF FOR ROAD, EXCEPT BEGINNING 40 FEET SOUTH AND 40 FEET WEST OF THE NORTHEAST CORNER OF SECTION 21, TOWNSHIP 28 SOUTH, RANGE 1 EAST OF THE 6TH P.M. SEDGWICK COUNTY, KANSAS; THENCE WEST 40 FEET, SOUTH OF AND PARALLEL TO THE NORTH LINE OF SAID SECTION 21, A DISTANCE OF 20.00 FEET; THENCE SOUTHEASTERLY A DISTANCE OF 28.33 FEET TO A POINT 40.00 FEET WEST OF THE EAST LINE OF SAID SECTION 21 AND 20.00 FEET SOUTH OF THE POINT OF BEGINNING; THENCE NORTH 40.00 FEET, WEST OF AND PARALLEL TO THE EAST LINE OF SAID SECTION 21, A DISTANCE OF 20.00 FEET TO THE POINT OF BEGINNING, SUBJECT TO ROAD RIGHTS-OF-WAY OF RECORDED ON THE NORTH AND EAST; ALONG WITH THE WEST 198 FEET OF THE EAST 404.25 FEET OF THE NORTH 660 FEET OF THE NORTHEAST QUARTER OF SECTION 21, TOWNSHIP 28-S, RANGE 1 EAST OF THE 6TH P.M. SEDGWICK COUNTY, KANSAS, SUBJECT TO ROAD RIGHTS-OF-WAY OF RECORDED ON THE NORTH; AND ALONG WITH THE WEST 255 FEET OF THE EAST 659.25 FEET OF THE FOLLOWING DESCRIBED TRACT: BEGINNING AT THE NORTHEAST CORNER OF THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 21, TOWNSHIP 28-S, RANGE 1 EAST OF THE 6TH P.M. SEDGWICK COUNTY, KANSAS; THENCE WEST TO NORTHWEST CORNER OF SAID NORTHEAST QUARTER OF THE NORTHEAST QUARTER; THENCE SOUTH 641 FEET; THENCE SOUTHEAST TO A POINT ON THE EAST LINE OF THE SAID NORTHEAST QUARTER, 861 FEET SOUTH OF THE NORTHEAST CORNER OF SAID NORTHEAST QUARTER; THENCE NORTH 861 FEET TO BEGINNING, EXCEPT THEREFROM THE SOUTHERLY 30 FEET THEREOF, AND EXCEPT THEREFROM THE WESTERLY 30 FEET THEREOF, SUBJECT TO ROAD RIGHTS-OF-WAY OF RECORDED ON THE NORTH; AND ALONG WITH THE NORTH 80 FEET OF THE EAST 206.25 FEET OF THE SOUTH 415.75 FEET OF THE NORTH 660 FEET OF THE EAST HALF OF THE NORTHEAST QUARTER OF SECTION 21, TOWNSHIP 28-S, RANGE 1 EAST OF THE 6TH P.M. SEDGWICK COUNTY, KANSAS, SUBJECT TO ROAD RIGHTS-OF-WAY OF RECORDED ON THE EAST; AND ALONG WITH THE SOUTH 99.75 FEET OF THE NORTH 179.75 FEET OF THE EAST 206.25 FEET OF THE SOUTH 415.75 FEET OF THE NORTH 660 FEET OF THE EAST HALF OF THE NORTHEAST QUARTER OF SECTION 21, TOWNSHIP 28-S, RANGE 1 EAST OF THE 6TH P.M. SEDGWICK COUNTY, KANSAS, SUBJECT TO ROAD RIGHTS-OF-WAY OF RECORDED ON THE EAST; AND ALONG WITH THE NORTH 150 FEET OF THE SOUTH 236 FEET OF THE EAST 206.25 FEET OF THE NORTH 660 FEET OF THE NORTHEAST QUARTER OF SECTION 21, TOWNSHIP 28-S, RANGE 1 EAST OF THE 6TH P.M. SEDGWICK COUNTY, KANSAS, EXCEPT THE EAST 40 FEET THEREOF FOR ROAD, SUBJECT TO ROAD RIGHTS-OF-WAY OF RECORDED ON THE EAST.

POE and ASSOCIATES, INC.
CONSULTING ENGINEERS
5940 E. Central, Suite 200 ■ Wichita KS 67208 ■ 316/685-4114 ■ Fax 316/685-4444

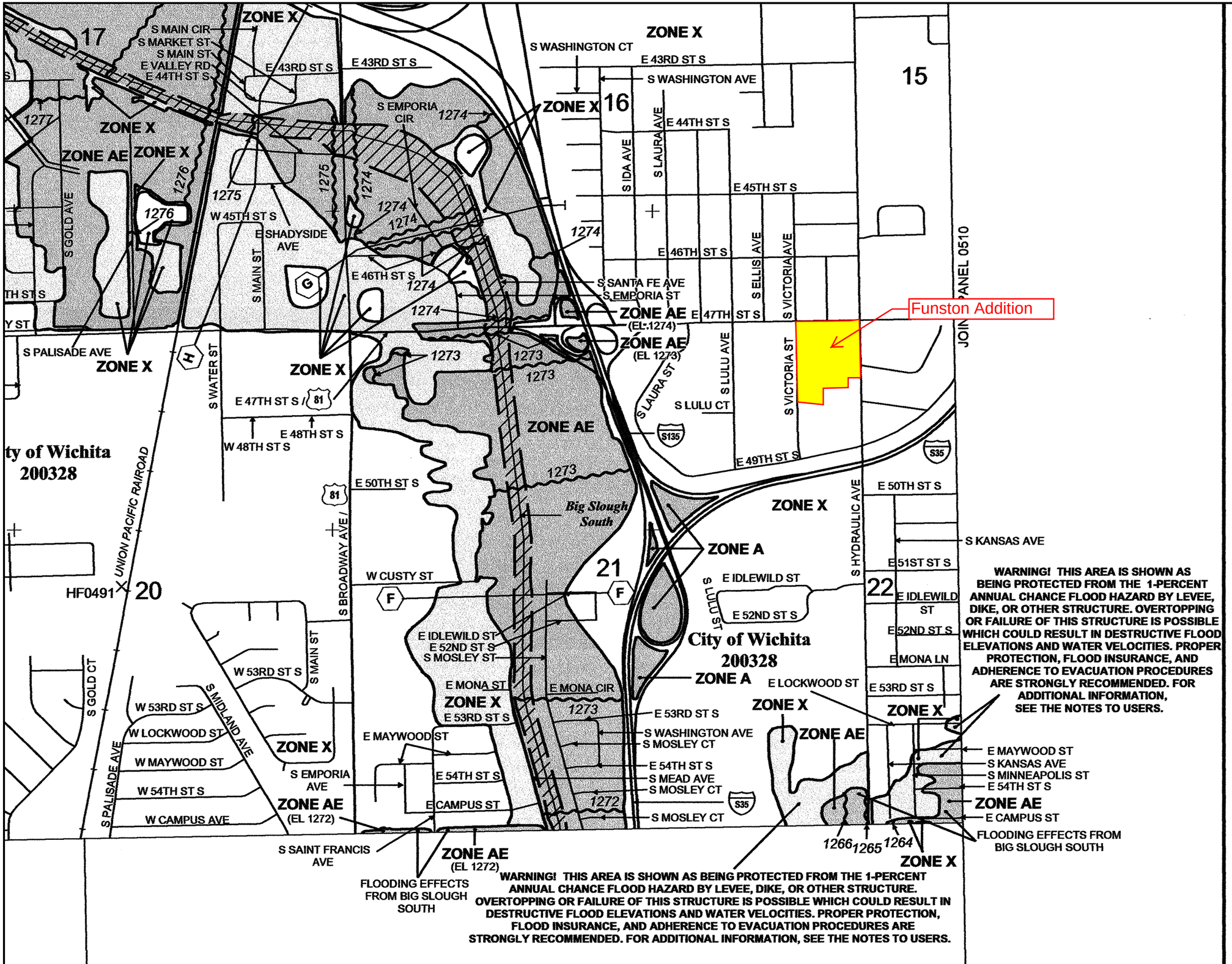
FUNSTON ADDITION

COMMUNITY UNIT PLAN (DP-315)

DATE OF PREPARATION 9/22/08

FUNSTON ADDITION

EXHIBIT 1-8



MAP SCALE 1" = 1000'

500 0 1000 2000

300 0 300

PANEL 0505E

FIRM

FLOOD INSURANCE RATE MAP

SEDGWICK COUNTY, KANSAS
AND INCORPORATED AREAS

PANEL 505 OF 700

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HAYSVILLE, CITY OF	200324	0505	E
SEDGWICK COUNTY	200321	0505	E
WICHITA, CITY OF	200328	0505	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
20173C0505E

EFFECTIVE DATE
FEBRUARY 2, 2007

Federal Emergency Management Agency

FUNSTON ADDITION

EXHIBIT 1-9

Hydrograph Return Period Recap

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

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	------	2.875	3.786	-------	4.993	5.893	7.085	7.975	8.862	N
2	SCS Runoff	------	4.726	6.468	-------	8.811	10.57	12.91	14.65	16.39	E
3	SCS Runoff	------	2.624	4.879	-------	8.323	11.13	15.11	18.23	21.44	SW

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	3.786	2	722	10,977	------	------	------	N
2	SCS Runoff	6.468	2	722	18,301	------	------	------	E
3	SCS Runoff	4.879	2	728	18,440	------	------	------	SW

Hydrograph Return Period Recap

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

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	------	3.007	3.959	-------	5.222	6.163	7.410	8.341	9.268	N
2	SCS Runoff	------	4.413	5.810	-------	7.663	9.044	10.87	12.24	13.60	E
3	SCS Runoff	------	9.986	14.11	-------	19.73	23.99	29.69	33.95	38.21	SW

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	3.959	2	722	11,480	------	------	------	N
2	SCS Runoff	5.810	2	722	16,847	------	------	------	E
3	SCS Runoff	14.11	2	722	39,596	------	------	------	SW

Tab 2. Existing Conditions Runoff Calculations

A. Copy of orthophotograph showing existing boundaries

See Exhibit 1-2 for aerial photograph showing existing site boundaries.

B. Runoff method

The runoff method used to determine storm water flows was the SCS method. Supporting data and calculation results are shown on Exhibit 2-1.

C. Existing topography

The existing topography is shown on the Drainage Plan as seen on Exhibit 1-5.

D. Total site area and total impervious area

The total area Funston Addition encompasses is 8.25 acres. The total impervious area for the developed condition, based on actual land use, is estimated at 85% of the north and east drainage areas. The southwest drainage area impervious area is estimated at 65%. Therefore, the total impervious area on the entire site could be 5.95 acres, or just over 72% of the site.

E. Benchmarks used for site control

The benchmark used for site control is shown on the Drainage Plan, which is Exhibit 1-5.

F. Streams, creeks, and waterways labeled

Exhibit 1-5 shows any water features within the site.

G. Predominate soils from USDA soil surveys

The predominant soil type is a Canadian Fine Sandy Loam (6224) series material, which is found in just over 95% of the property. The site also contains nearly 5% of Canadian-Waldeck fine sandy loams (6228) soil. See Exhibit 1-6 for NRCS Soil Survey map and information showing existing soil types and descriptions. The site soils are both classified as Hydrologic Group B soils. The Hydrologic Groups are used to select curve numbers for the runoff calculations in both the existing and developed conditions.

H. Location and boundaries of natural features

The site does not contain wetlands, lakes, or ponds.

I. Location of existing roads, buildings, parking lots, and other impervious areas

Currently, the property is being completely cleared for development. At the time of this report, only one structure remained for demolition. All undisturbed areas within the site have fair grass cover and minimal concentrations of trees and shrubs.

J. Location of existing utilities

Locates shall be called in prior to any excavation in this area. The site contains various utility connections along the north and east side of the property. A sanitary sewer line ties in between Tracts 4 & 5 and runs in an easement along the back line of the existing residential houses. The sanitary sewer main in located in Hydraulic Avenue, another line runs in an easement along the south line of the property. Water mains are found along the north edge of 47th Street South and the east edge of Hydraulic Avenue. Water and gas service lines cross Hydraulic Avenue to the east property line. Underground telephone, gas and electric are located within the right-of-way of Hydraulic Avenue as well. Light poles are located along the north and east property lines as well as a tornado siren about 120 feet south of the northeast property corner on the east line.

K. Location of existing conveyance systems

Flow within the site is carried by overland flow. Curb inlets along the south side of 47th Street South (4 inlets) and the west side of Hydraulic Avenue (2 inlets) drain a majority of the site once the runoff gets into the respective streets. The southwest area sheet drains west and south into the east gutter of Victoria Street.

L. Flow paths

The drainage plan shows the general flow paths for each drainage area in the basin. The site drainage is all collected in the current storm water sewer systems of the adjacent streets. The north and east areas drain by overland flow to 47th Street South and Hydraulic Avenue, respectively. As mentioned, the southwest area sheet drains west and south into the east gutter of Victoria Street.

M. Location and dimensions of existing channels, bridges or culvert crossings

No existing channels, bridges, or culverts on site.

N. Existing conditions hydrologic analysis

The analysis was completed using the SCS method. The 2, 5, 10, 25, & 100 year, 24-hour storm events were evaluated, and the information appears in Exhibit 2-1. The results are summarized in the following table.

	24-Hour Storm Flows (cfs)				
Area/Frequency	2-Year	5-Year	10-Year	25-Year	100-Year
North	3.79	4.99	5.89	7.09	8.86
East	6.47	8.81	10.57	12.91	16.39
Southwest	4.88	8.32	11.13	15.11	21.44

O. Assumed pre-developed runoff curve numbers

For the existing condition, the curve numbers were weighted based on area of their respective hydrologic soil groups over the site. The results are shown in the table below, to include those for the proposed condition as required by Tab 3, Section C.

EXISTING DRAINAGE AREAS			Hydrologic	Area		% of Area	CN
DA	Soil Information		Group	Square Feet	Acres	%	Existing
N	Canadian fine sandy loam, rarely flooded	6224	B	49443.08	1.135	13.76%	92.0
E	Canadian fine sandy loam, rarely flooded	6224	B	95443.81	2.191	26.57%	88.0
SW	Canadian fine sandy loam, rarely flooded	6224	B	196843.52	4.519	54.80%	69.0
	CanadianWaldeck fine sandy loams, rarely flooded	6228	B	17478.64	0.401	4.87%	69.0
			TOTALS	359209.05	8.246	100.00%	77.2

PROPOSED DRAINAGE AREAS			Hydrologic	Area		% of Area	CN
DA	Soil Information		Group	Square Feet	Acres	%	Proposed
N	Canadian fine sandy loam, rarely flooded	6224	B	51687.85	1.187	14.39%	92.0
E	Canadian fine sandy loam, rarely flooded	6224	B	75863.09	1.742	21.12%	92.0
SW	Canadian fine sandy loam, rarely flooded	6224	B	214177.39	4.917	59.63%	85.0
	Canadian-Waldeck fine sandy loams, rarely flooded	6228	B	17478.64	0.401	4.87%	85.0
			TOTALS	359206.97	8.246	100.00%	87.5

P. Existing times of concentration used in calculations

Area	T_c (min)
North	15.0
East	15.0
Southwest	21.9

Q. Evaluation of immediate downstream drainage capacity

The downstream capacity in the three systems surrounding the site shall be considered adequate to accommodate the current run-off flows exiting this site.

R. Existing structural elevations

See drainage plan for existing storm sewer elevations.

S. Cross-section data for open channels

Channels do not currently exist within this site.

T. Ground water elevations

This property is within a zone identified by the City Engineers' office as likely to have groundwater at some or all times within 10 feet of the ground surface elevation. Building with specially engineered foundations or with the lowest floor opening above groundwater is recommended, and owners seeking building permits on this property will be similarly advised. More detailed information on recorded groundwater elevations in the vicinity of this property is available in the City Engineers' office.

FUNSTON ADDITION

EXHIBIT 2-1

Hydraflow Table of Contents

EXIST HYD.gpw

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Thursday, Oct 8, 2009

Hydrograph Return Period Recap

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

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	------	2.875	3.786	-------	4.993	5.893	7.085	7.975	8.862	N
2	SCS Runoff	------	4.726	6.468	-------	8.811	10.57	12.91	14.65	16.39	E
3	SCS Runoff	------	2.624	4.879	-------	8.323	11.13	15.11	18.23	21.44	SW

Hydrograph Summary Report

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

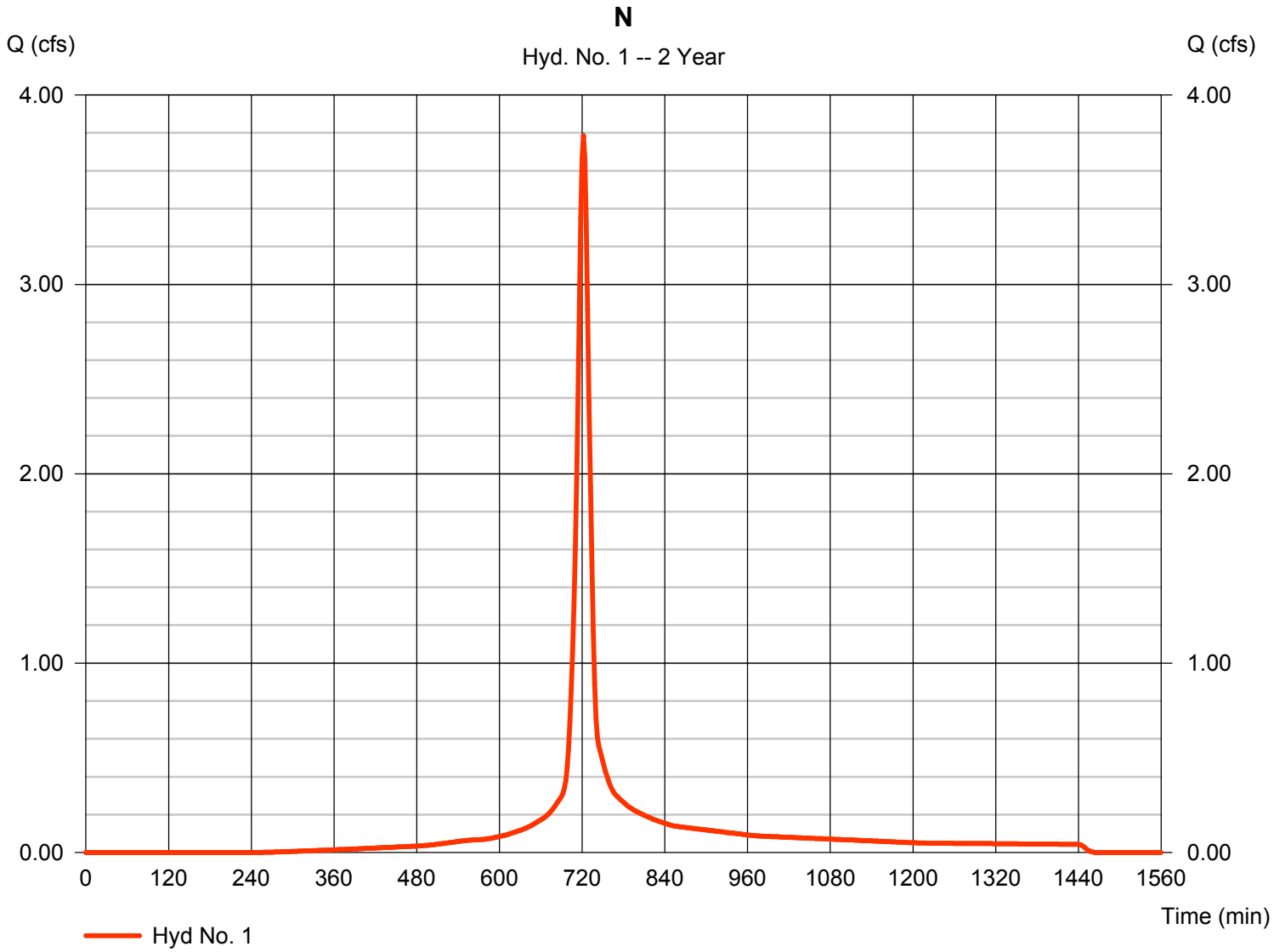
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	3.786	2	722	10,977	------	------	------	N
2	SCS Runoff	6.468	2	722	18,301	------	------	------	E
3	SCS Runoff	4.879	2	728	18,440	------	------	------	SW

Hydrograph Report

Hyd. No. 1

N

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.786 cfs
Storm frequency	=	2 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	10,977 cuft
Drainage area	=	1.135 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	3.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

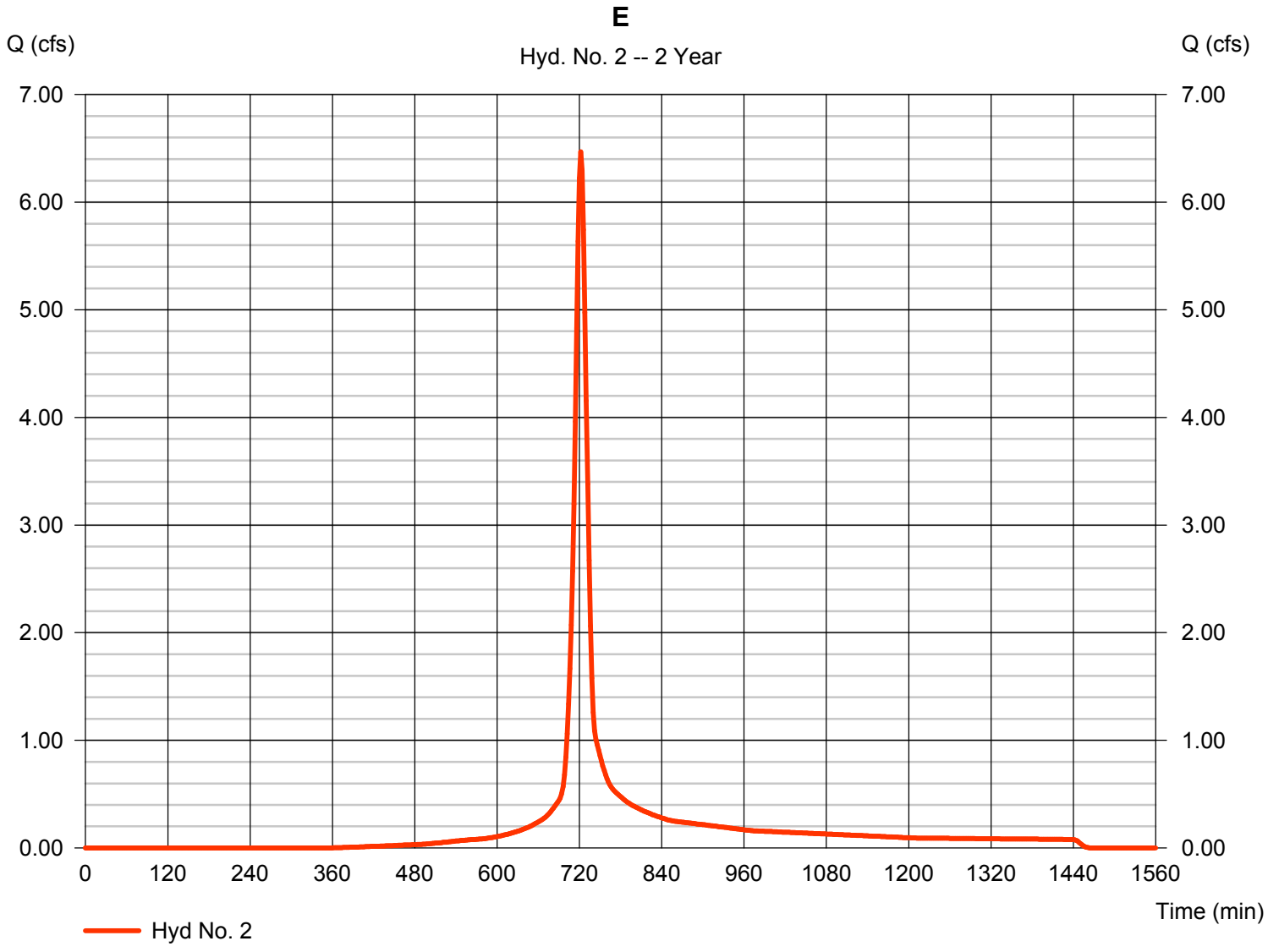


Hydrograph Report

Hyd. No. 2

E

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.468 cfs
Storm frequency	=	2 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	18,301 cuft
Drainage area	=	2.191 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	3.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

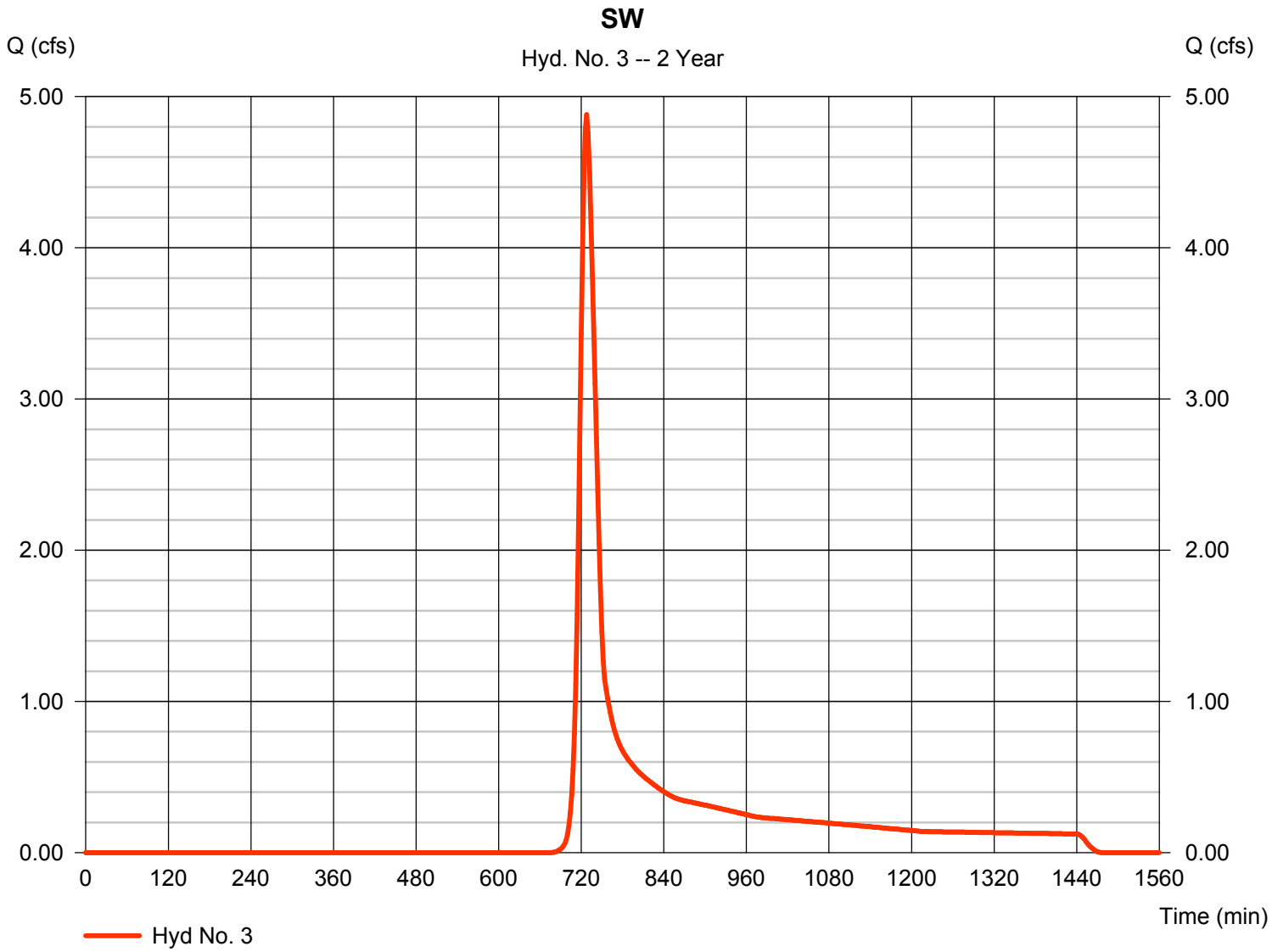


Hydrograph Report

Hyd. No. 3

SW

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.879 cfs
Storm frequency	=	2 yrs	Time to peak	=	728 min
Time interval	=	2 min	Hyd. volume	=	18,440 cuft
Drainage area	=	4.920 ac	Curve number	=	69
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	21.90 min
Total precip.	=	3.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 3

SW

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.050		0.011		0.011		
Flow length (ft)	= 300.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.60		0.00		0.00		
Land slope (%)	= 0.50		0.00		0.00		
Travel Time (min)	**= 16.08**	**+**	**0.00**	**+**	**0.00**	**=**	**16.08**
Shallow Concentrated Flow							
Flow length (ft)	= 400.00		0.00		0.00		
Watercourse slope (%)	= 0.50		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 1.14		0.00		0.00		
Travel Time (min)	**= 5.84**	**+**	**0.00**	**+**	**0.00**	**=**	**5.84**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.50		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 ..... 21.90 min

Hydrograph Summary Report

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

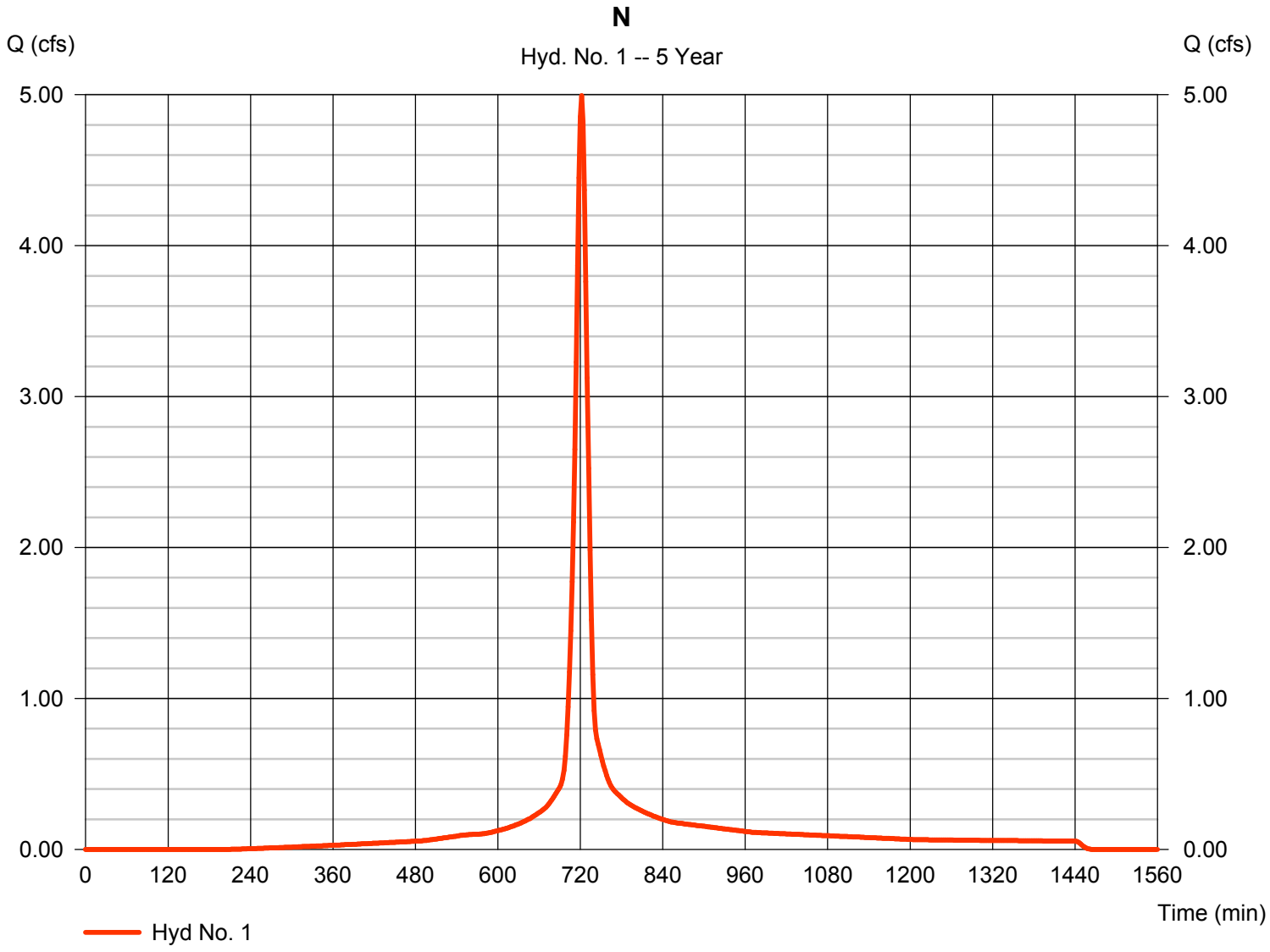
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	4.993	2	722	14,704	------	------	------	N
2	SCS Runoff	8.811	2	722	25,223	------	------	------	E
3	SCS Runoff	8.323	2	728	29,887	------	------	------	SW

Hydrograph Report

Hyd. No. 1

N

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.993 cfs
Storm frequency	=	5 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	14,704 cuft
Drainage area	=	1.135 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	4.56 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

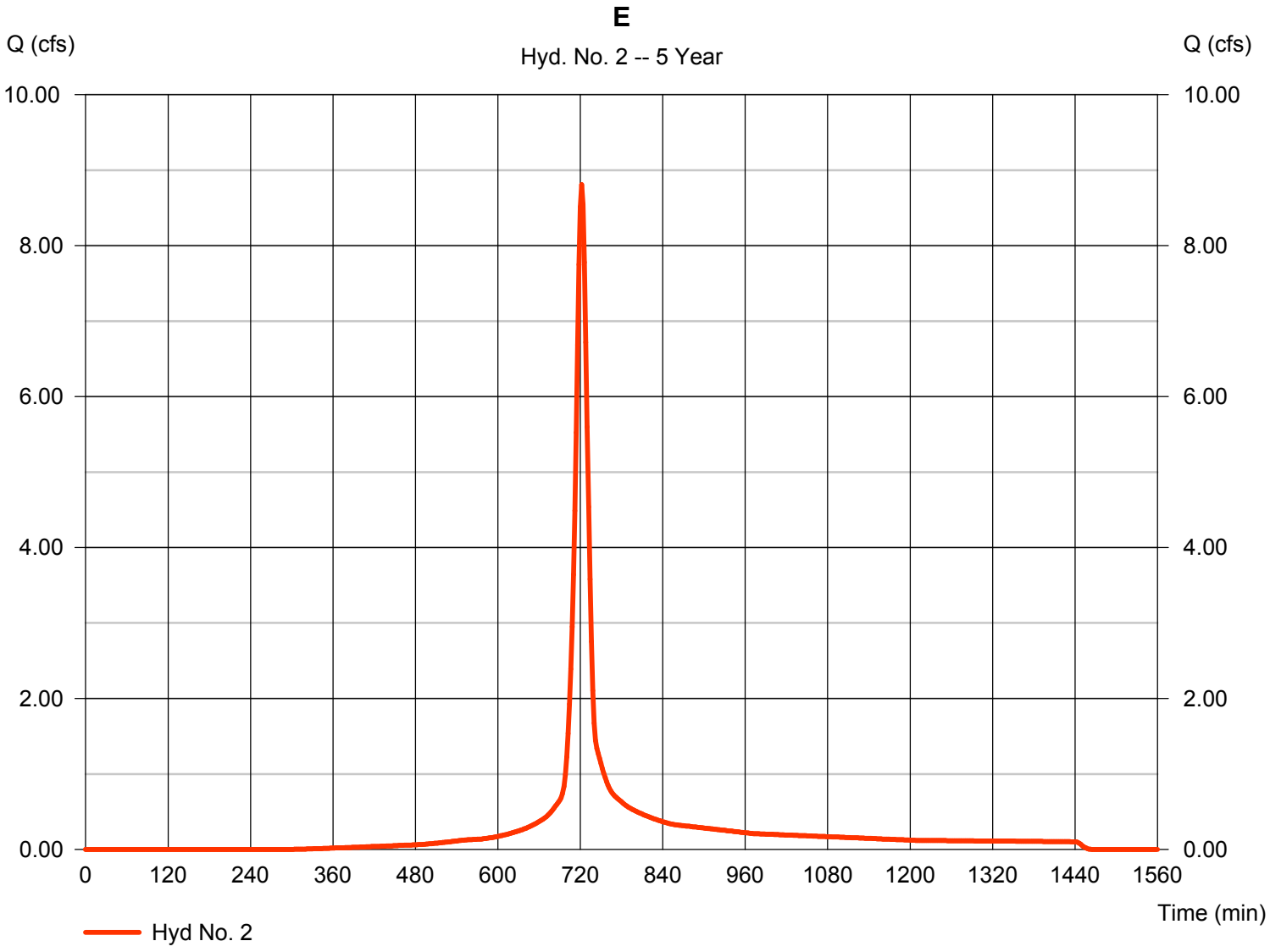


Hydrograph Report

Hyd. No. 2

E

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.811 cfs
Storm frequency	=	5 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	25,223 cuft
Drainage area	=	2.191 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	4.56 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

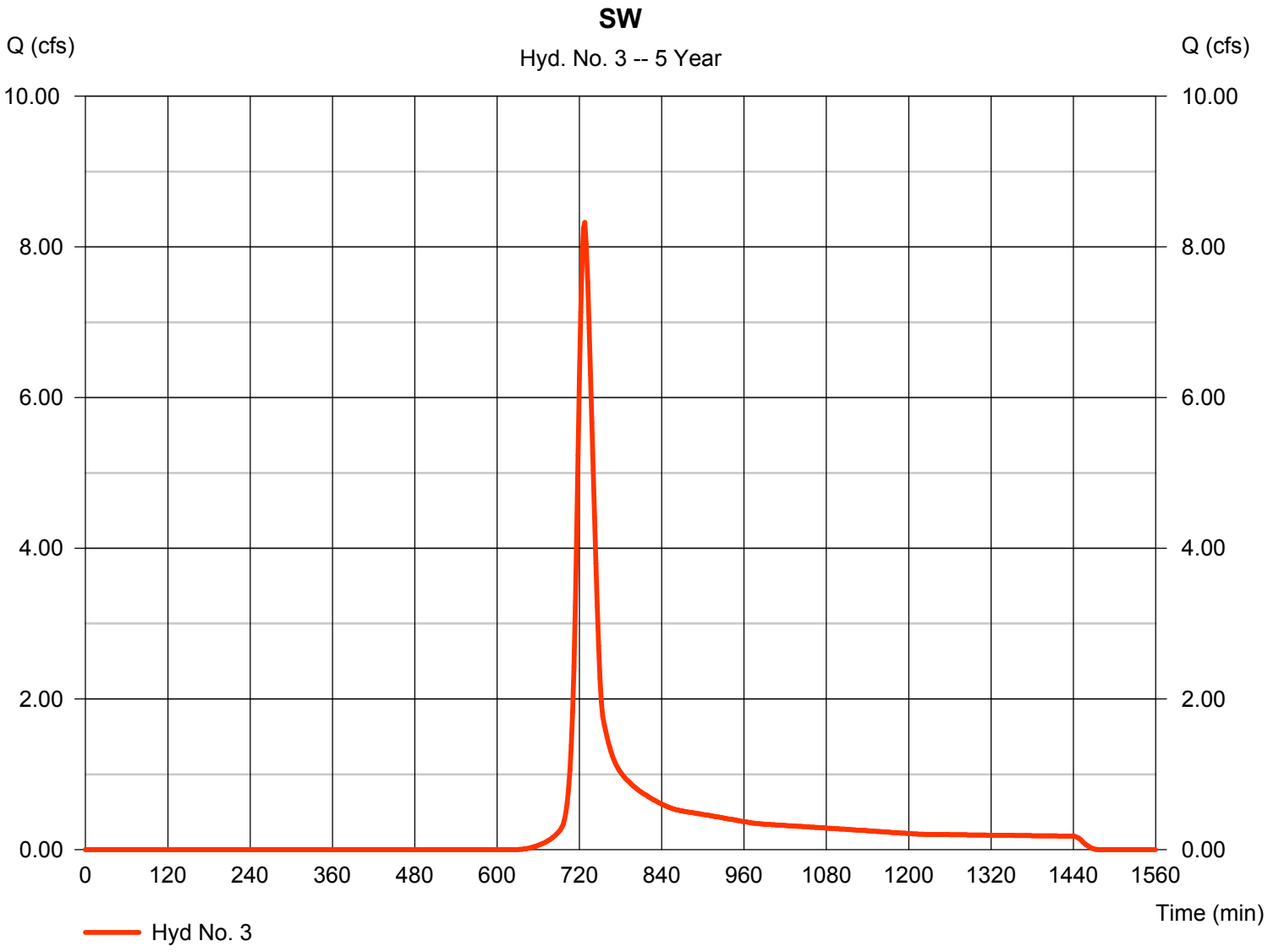


Hydrograph Report

Hyd. No. 3

SW

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.323 cfs
Storm frequency	=	5 yrs	Time to peak	=	728 min
Time interval	=	2 min	Hyd. volume	=	29,887 cuft
Drainage area	=	4.920 ac	Curve number	=	69
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	21.90 min
Total precip.	=	4.56 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Summary Report

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

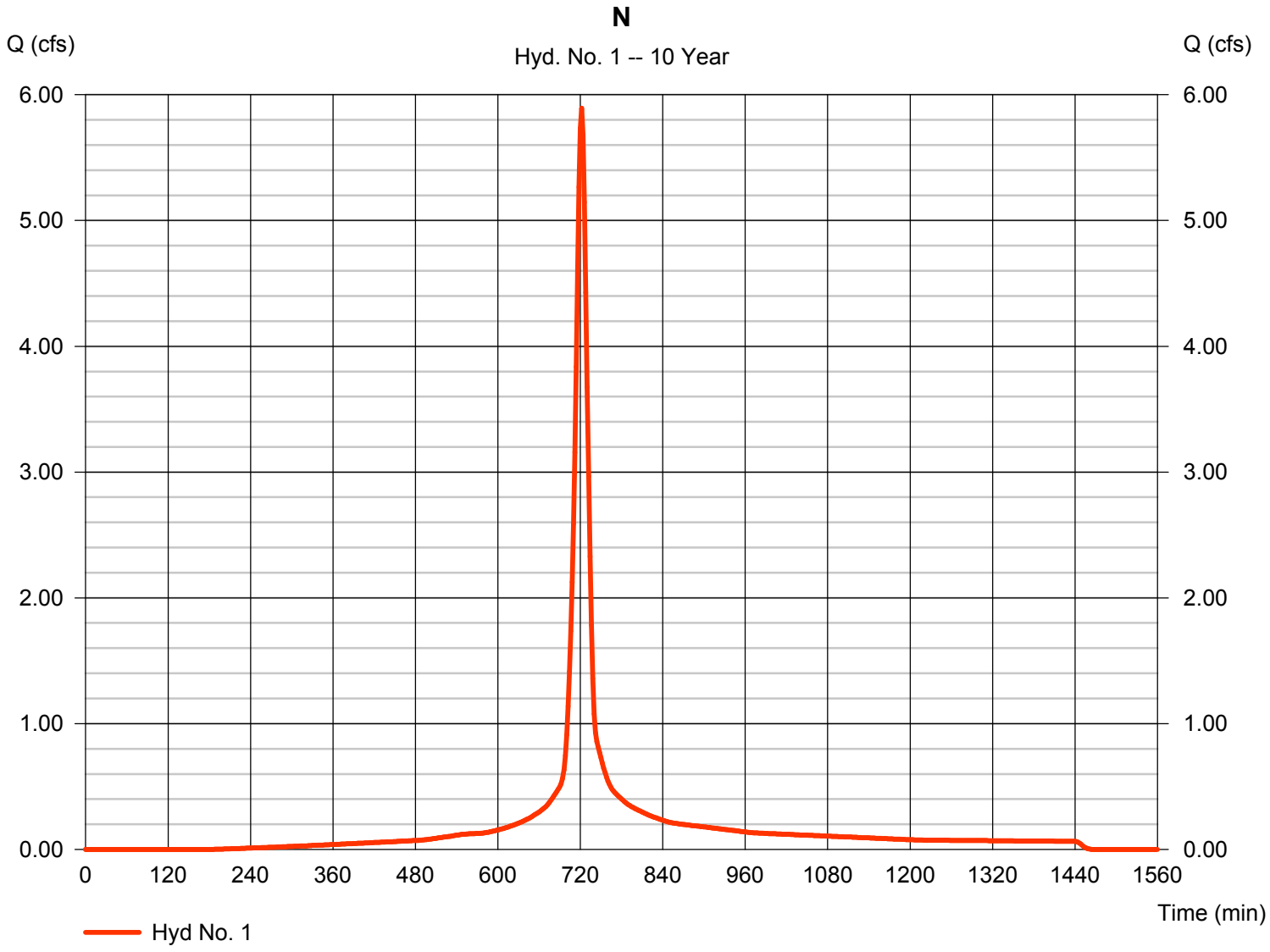
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	5.893	2	722	17,527	------	------	------	N
2	SCS Runoff	10.57	2	722	30,518	------	------	------	E
3	SCS Runoff	11.13	2	728	39,325	------	------	------	SW

Hydrograph Report

Hyd. No. 1

N

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.893 cfs
Storm frequency	=	10 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	17,527 cuft
Drainage area	=	1.135 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	5.28 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

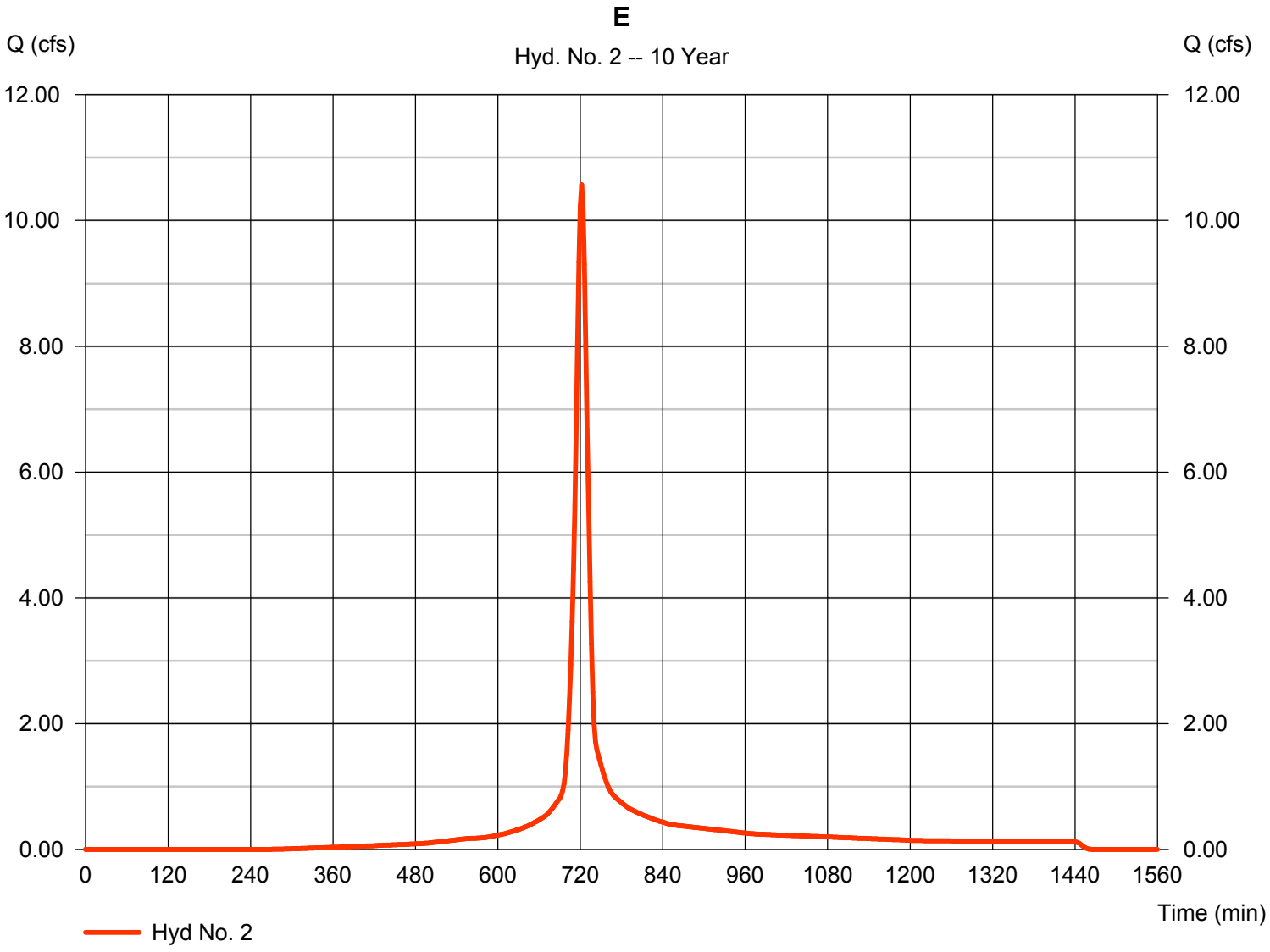


Hydrograph Report

Hyd. No. 2

E

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.57 cfs
Storm frequency	=	10 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	30,518 cuft
Drainage area	=	2.191 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	5.28 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

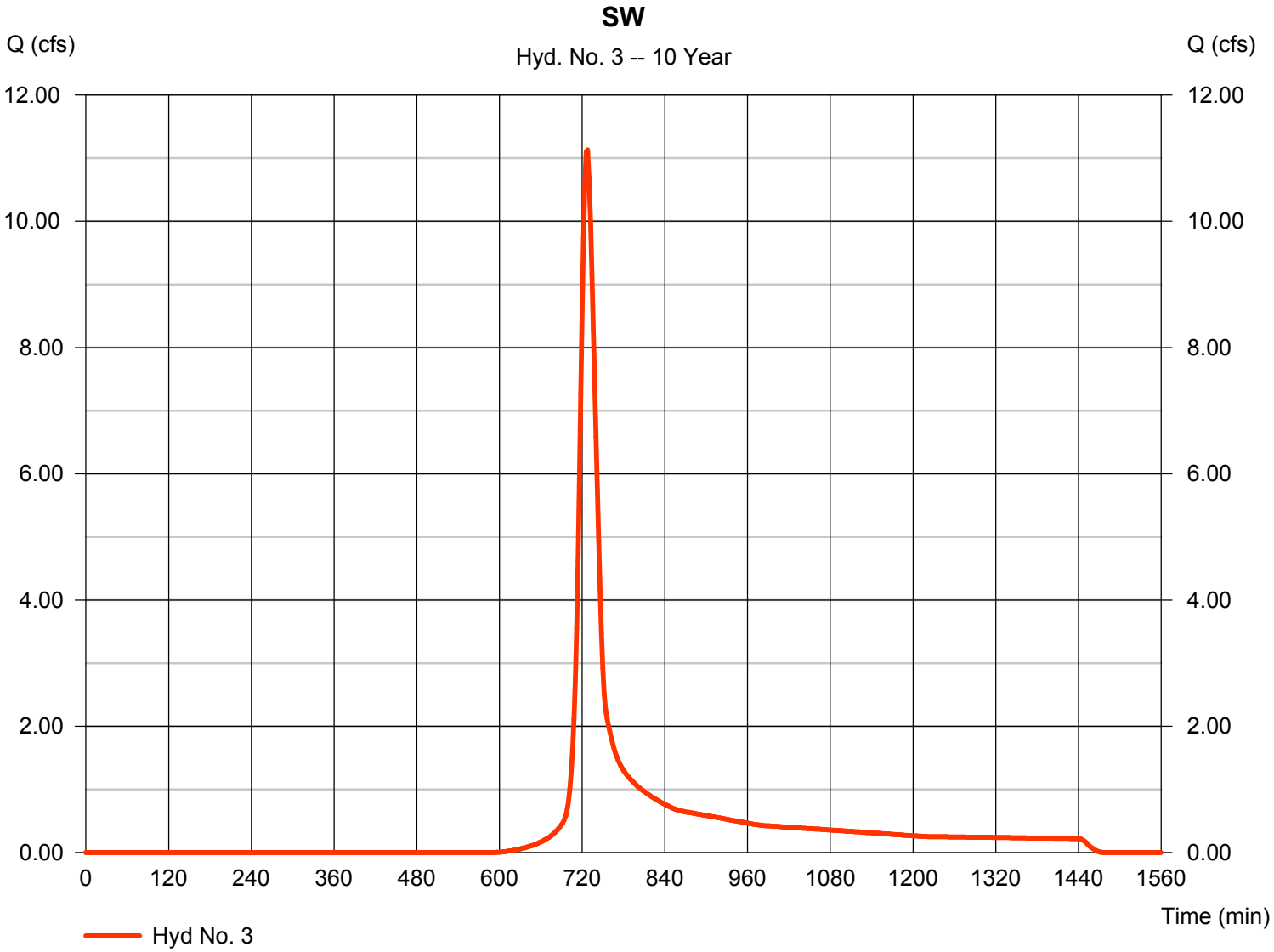


Hydrograph Report

Hyd. No. 3

SW

Hydrograph type	=	SCS Runoff	Peak discharge	=	11.13 cfs
Storm frequency	=	10 yrs	Time to peak	=	728 min
Time interval	=	2 min	Hyd. volume	=	39,325 cuft
Drainage area	=	4.920 ac	Curve number	=	69
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	21.90 min
Total precip.	=	5.28 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Summary Report

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

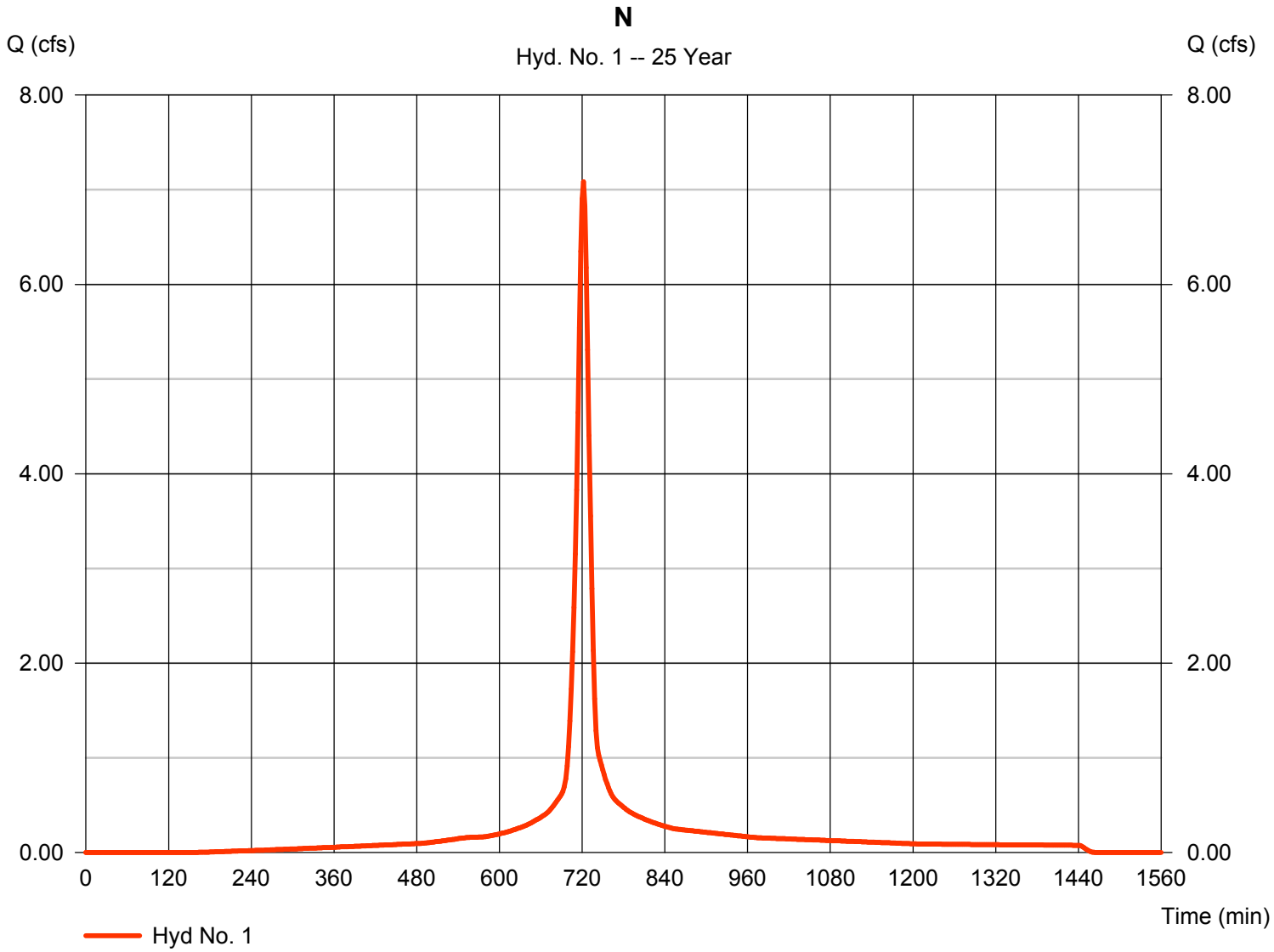
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	7.085	2	722	21,313	------	------	------	N
2	SCS Runoff	12.91	2	722	37,666	------	------	------	E
3	SCS Runoff	15.11	2	726	52,740	------	------	------	SW

Hydrograph Report

Hyd. No. 1

N

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.085 cfs
Storm frequency	=	25 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	21,313 cuft
Drainage area	=	1.135 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	6.24 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

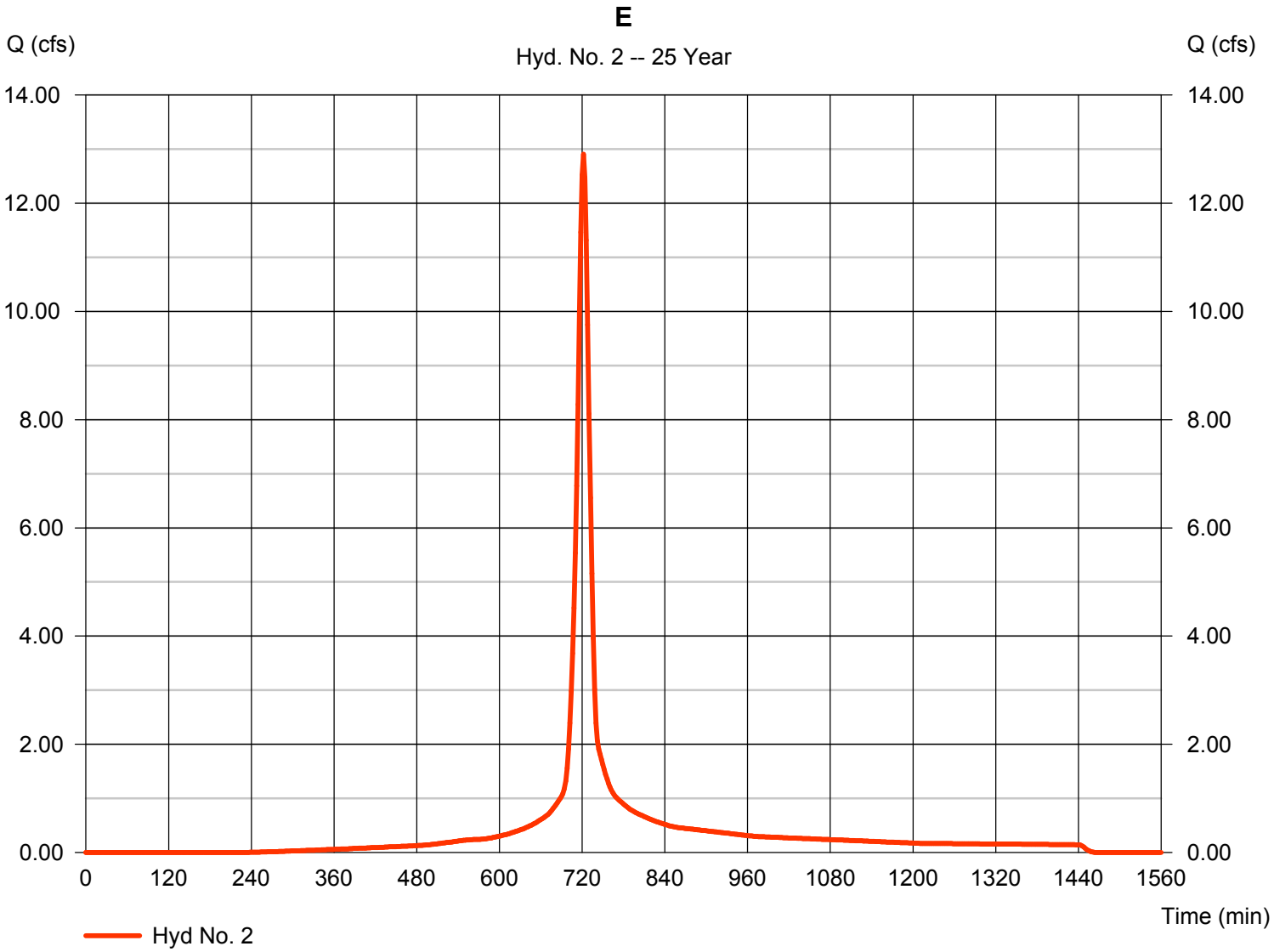


Hydrograph Report

Hyd. No. 2

E

Hydrograph type	=	SCS Runoff	Peak discharge	=	12.91 cfs
Storm frequency	=	25 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	37,666 cuft
Drainage area	=	2.191 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	6.24 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

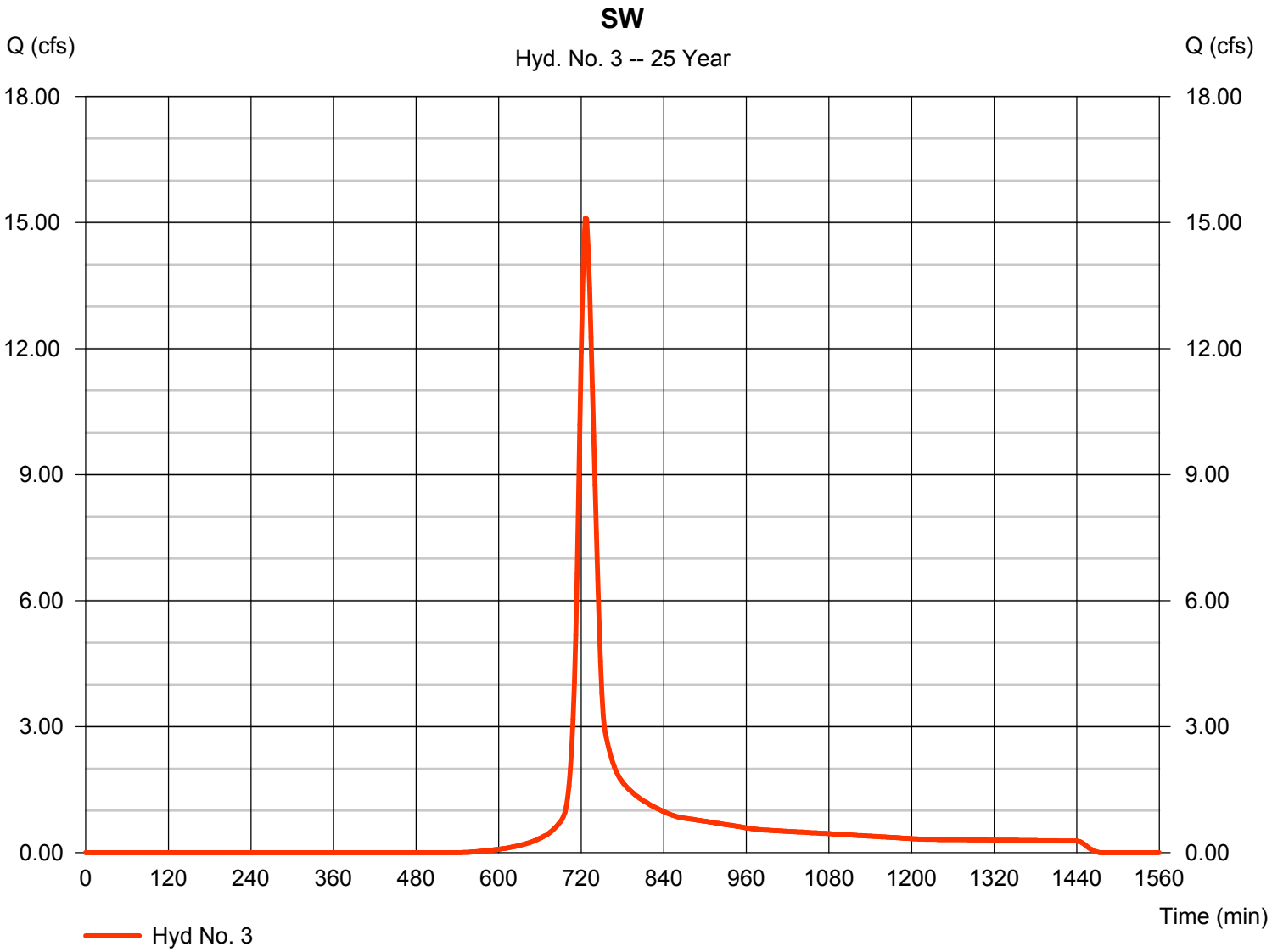


Hydrograph Report

Hyd. No. 3

SW

Hydrograph type	=	SCS Runoff	Peak discharge	=	15.11 cfs
Storm frequency	=	25 yrs	Time to peak	=	726 min
Time interval	=	2 min	Hyd. volume	=	52,740 cuft
Drainage area	=	4.920 ac	Curve number	=	69
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	21.90 min
Total precip.	=	6.24 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Summary Report

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

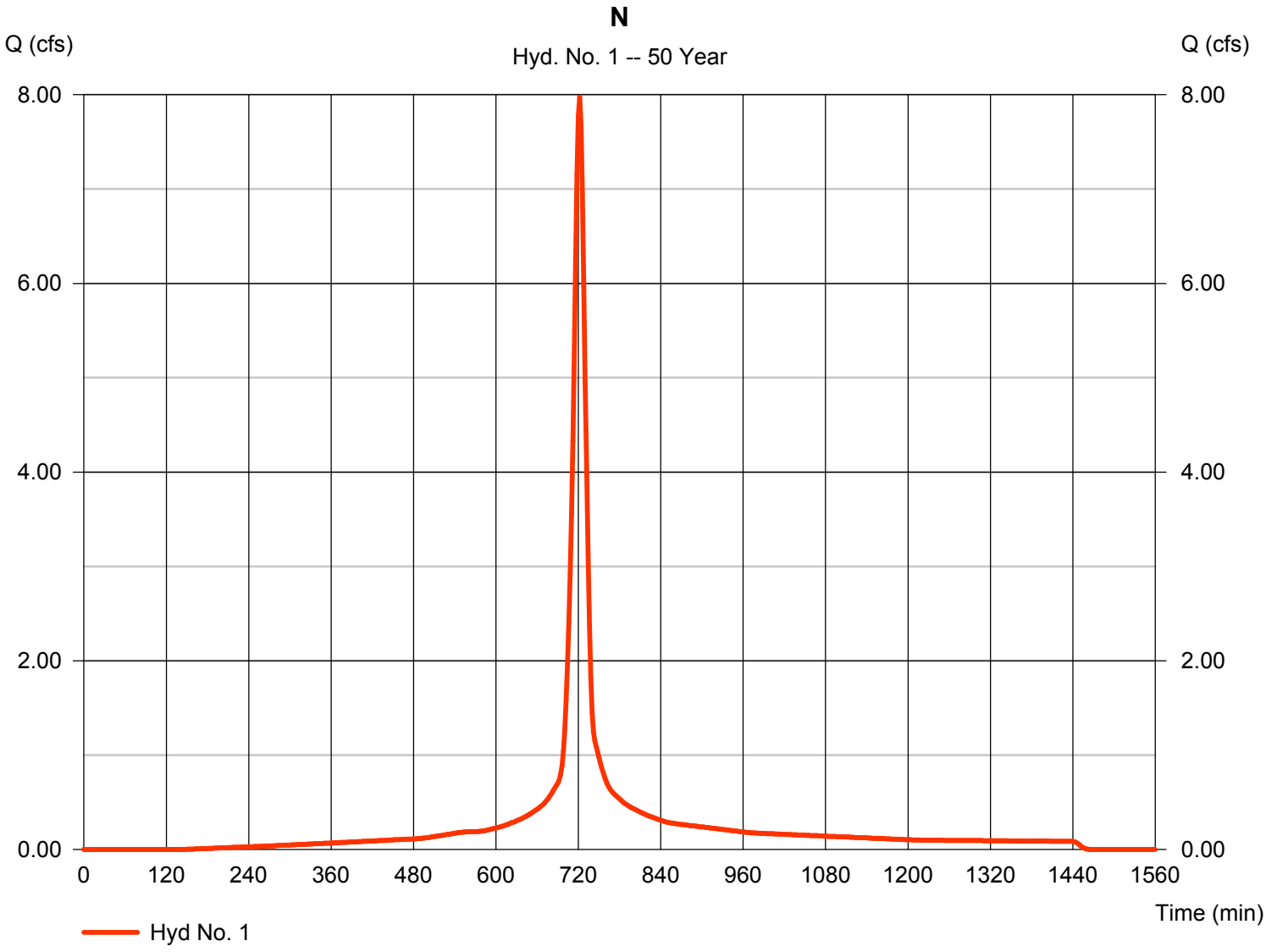
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	7.975	2	722	24,164	------	------	------	N
2	SCS Runoff	14.65	2	722	43,073	------	------	------	E
3	SCS Runoff	18.23	2	726	63,283	------	------	------	SW

Hydrograph Report

Hyd. No. 1

N

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.975 cfs
Storm frequency	=	50 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	24,164 cuft
Drainage area	=	1.135 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	6.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

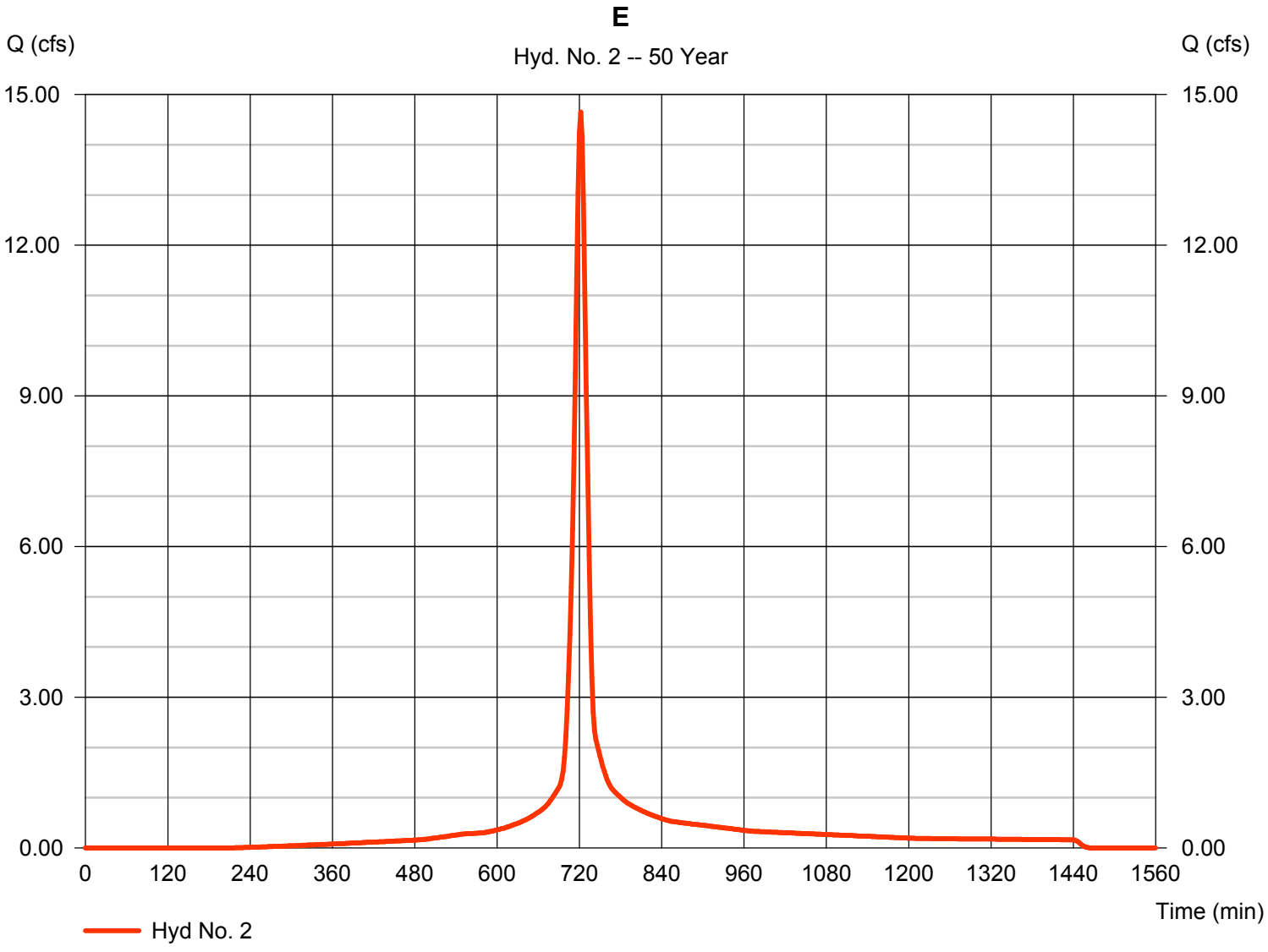


Hydrograph Report

Hyd. No. 2

E

Hydrograph type	=	SCS Runoff	Peak discharge	=	14.65 cfs
Storm frequency	=	50 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	43,073 cuft
Drainage area	=	2.191 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	6.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

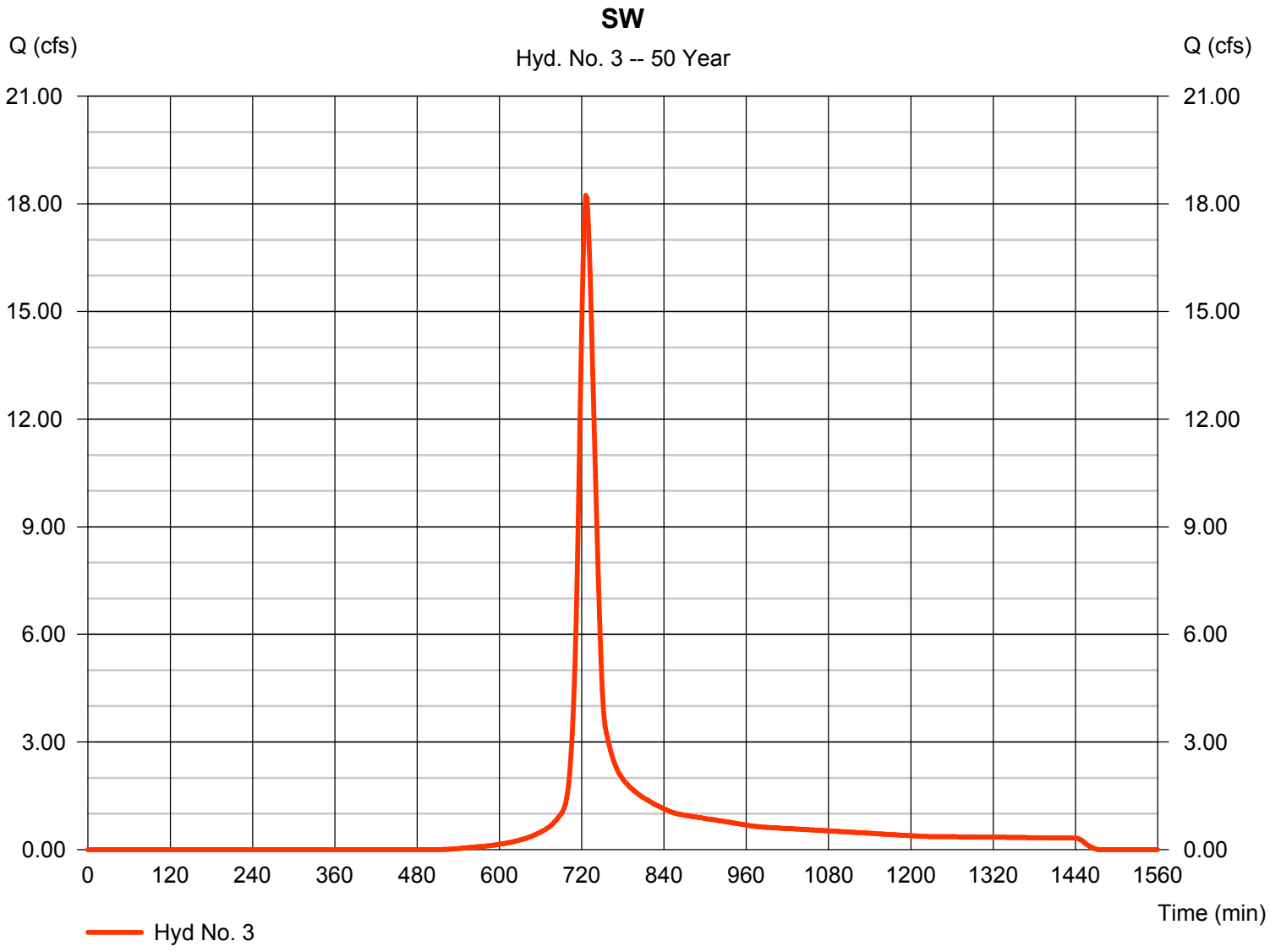


Hydrograph Report

Hyd. No. 3

SW

Hydrograph type	=	SCS Runoff	Peak discharge	=	18.23 cfs
Storm frequency	=	50 yrs	Time to peak	=	726 min
Time interval	=	2 min	Hyd. volume	=	63,283 cuft
Drainage area	=	4.920 ac	Curve number	=	69
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	21.90 min
Total precip.	=	6.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Summary Report

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

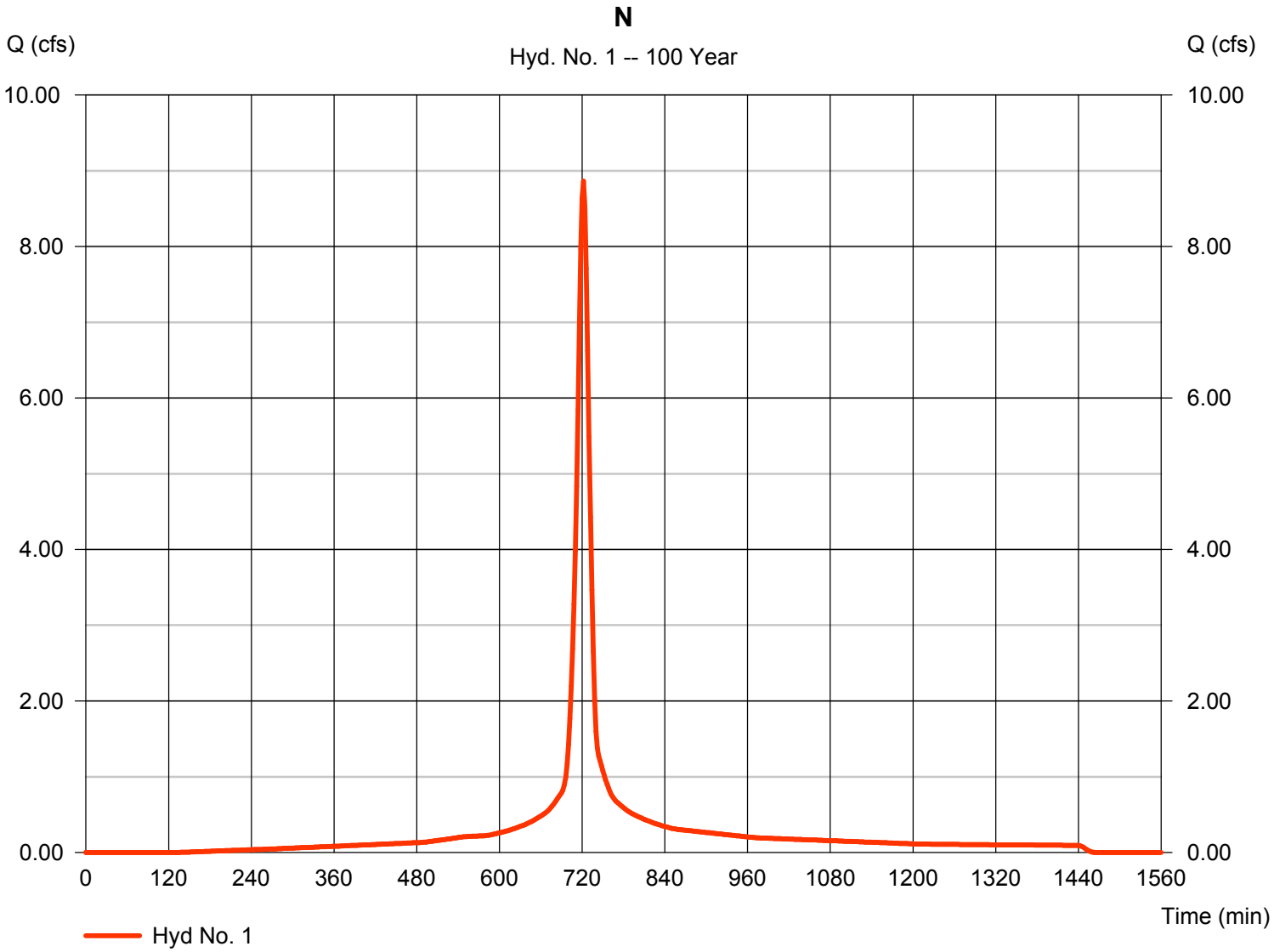
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	8.862	2	722	27,022	------	------	------	N
2	SCS Runoff	16.39	2	722	48,509	------	------	------	E
3	SCS Runoff	21.44	2	726	74,151	------	------	------	SW

Hydrograph Report

Hyd. No. 1

N

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.862 cfs
Storm frequency	=	100 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	27,022 cuft
Drainage area	=	1.135 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	7.68 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

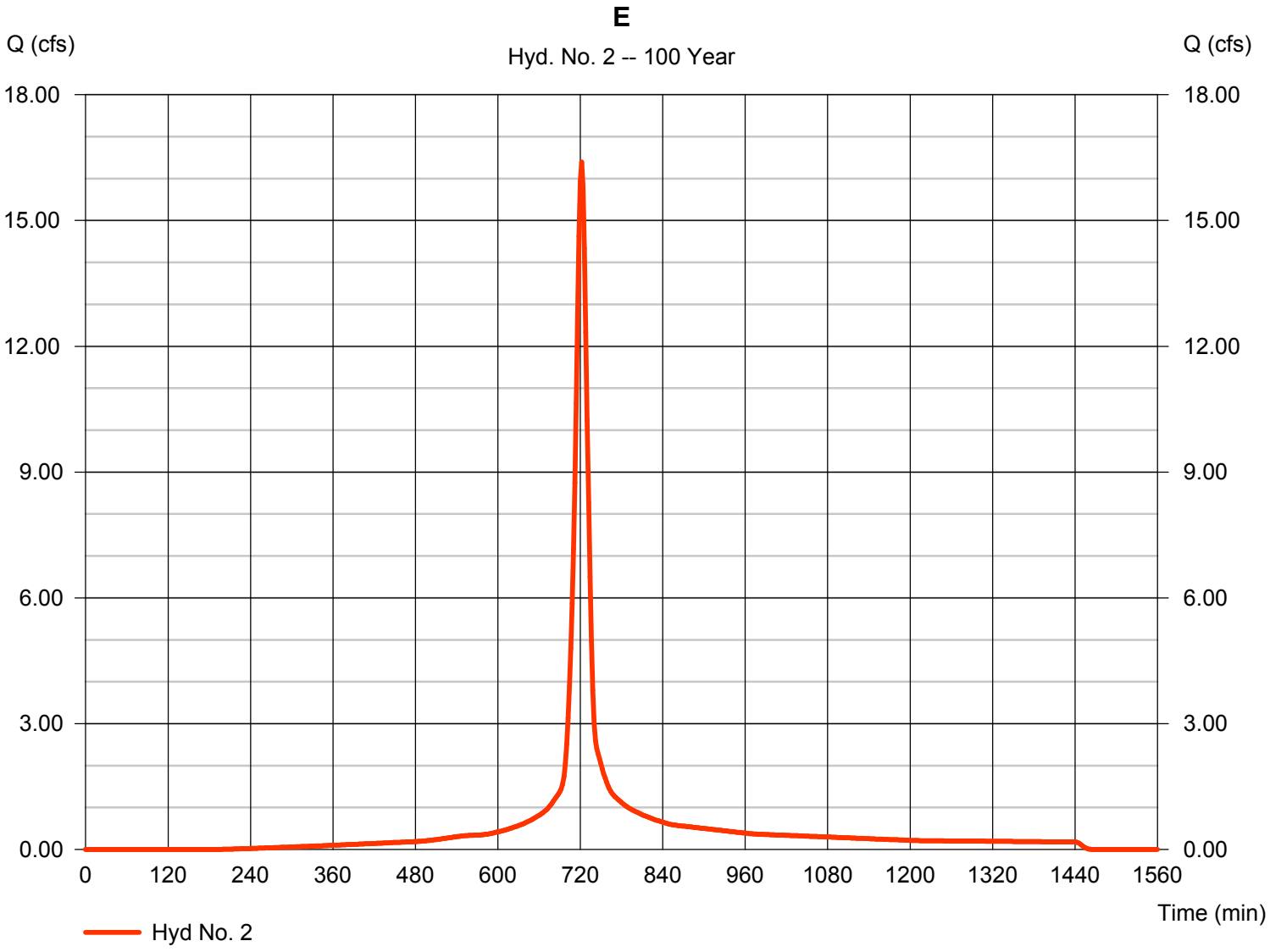


Hydrograph Report

Hyd. No. 2

E

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.39 cfs
Storm frequency	=	100 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	48,509 cuft
Drainage area	=	2.191 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	7.68 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

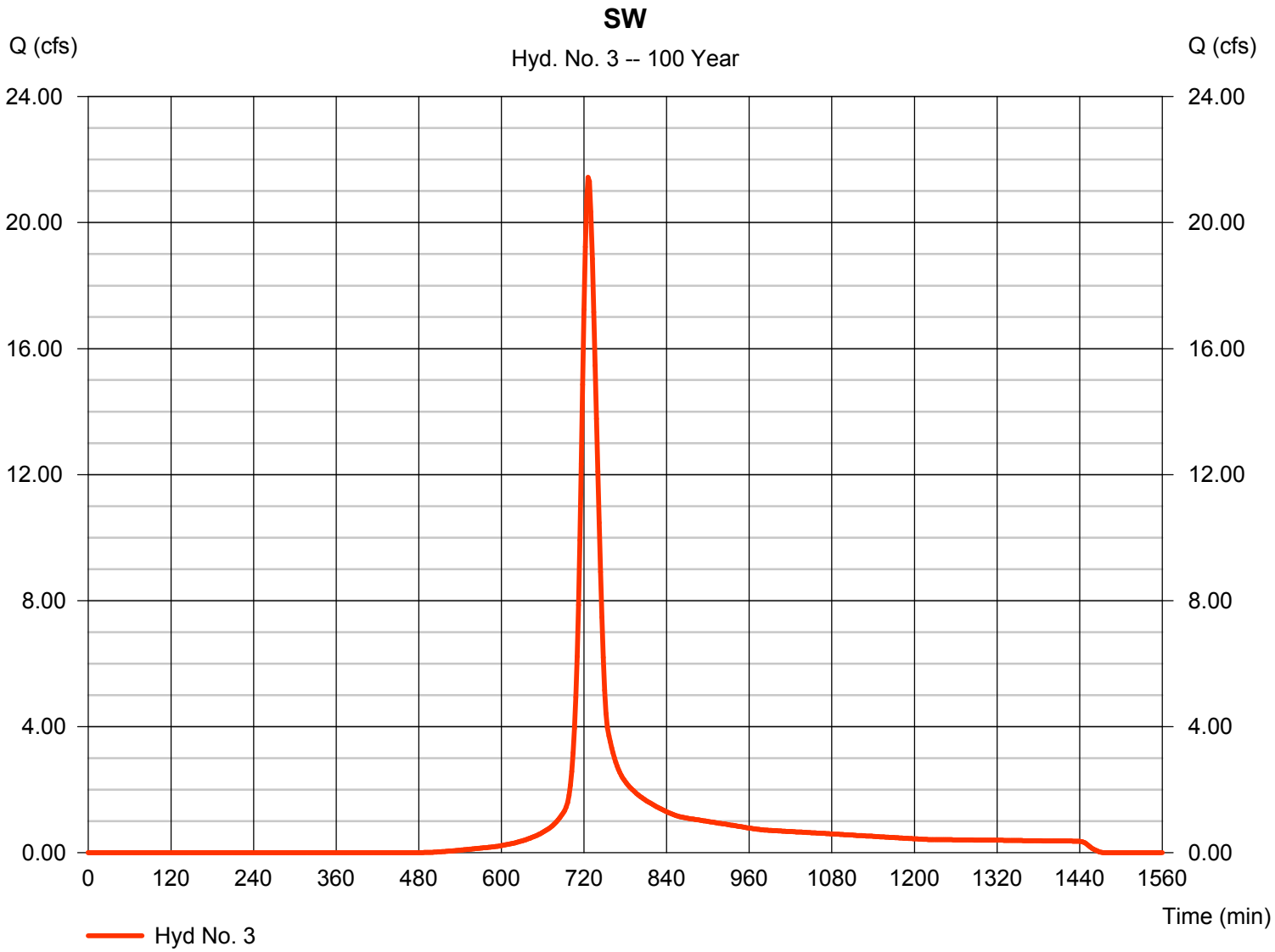


Hydrograph Report

Hyd. No. 3

SW

Hydrograph type	=	SCS Runoff	Peak discharge	=	21.44 cfs
Storm frequency	=	100 yrs	Time to peak	=	726 min
Time interval	=	2 min	Hyd. volume	=	74,151 cuft
Drainage area	=	4.920 ac	Curve number	=	69
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	21.90 min
Total precip.	=	7.68 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hydraflow Rainfall Report

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

File name: SampleFHA.idf

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5.69	4.61	3.89	3.38	2.99	2.69	2.44	2.24	2.07	1.93	1.81	1.70
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.57	5.43	4.65	4.08	3.65	3.30	3.02	2.79	2.59	2.42	2.27	2.15
10	7.24	6.04	5.21	4.59	4.12	3.74	3.43	3.17	2.95	2.77	2.60	2.46
25	8.25	6.95	6.03	5.34	4.80	4.38	4.02	3.73	3.48	3.26	3.07	2.91
50	9.04	7.65	6.66	5.92	5.34	4.87	4.49	4.16	3.88	3.65	3.44	3.25
100	9.83	8.36	7.30	6.50	5.87	5.36	4.94	4.59	4.29	4.03	3.80	3.60

Tc = time in minutes. Values may exceed 60.

Precip. file name: SedgwickCo.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	2.88	3.60	0.00	4.56	5.28	6.24	6.96	7.68
SCS 6-Hr	1.98	2.52	0.00	3.30	3.90	4.68	5.28	5.88
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Tab 3. Post-Development Hydrologic Analysis

A. Proposed conditions hydrologic and hydraulic analysis

The analysis was completed using the SCS Hydrograph method. The 2, 5, 10, 25, & 100 year, 24-hour storm events were evaluated. The information appears in Exhibit 3-1. The results are summarized in the following table.

	24-Hour Storm Flows (cfs)				
Area/Frequency	2-Year	5-Year	10-Year	25-Year	100-Year
North	3.96	5.22	6.16	7.41	9.27
East	5.81	7.66	9.04	10.87	13.60
Southwest	14.11	19.73	23.99	29.69	38.21

B. Proposed times of concentration used in calculations

Area	T_c (min)
North	15.0
East	15.0
Southwest	15.0

C. Assumed post-developed runoff curve numbers

See table shown in Tab 2, Section O for proposed curve numbers.

D. Proposed contours for detention facilities

Site detention is to be provided in parking areas.

E. Preliminary sizing calculations for storm water controls

Sizing for all storm water controls is shown in Exhibit 3-2.

F. Stage-storage-discharge curve and inflow/outflow hydrographs for storage facilities

Storage curve computed for the volume of water that could be stored above each of the three proposed grated area inlets. Areas to be flooded were confined to the parking lots as indicated on the preliminary site plan and were based on 0.5% slopes away from each inlet. The volume of storage in the pipe network was included in this volume. 6,454 cu. ft. was provided above the top of the north inlet, 8,762 cu. ft. at the center inlet and 9,324 at the south inlet. Peak flows to each of these inlets was then routed through these storage areas and combined to determine the pipe flows for the storm sewer design. The storm sewer pipes were sized to restrict the flow which determined the depth of ponding. This was limited to a maximum of 1.4 feet above the inlet tops. The hydraulic grade line of the complete system

was then computed using these computed flows for each of the design storms. The results are shown in Exhibit 3-2.

G. Final analysis of potential upstream/downstream impacts

No relevant impacts are noted from this analysis.

H. Existing and proposed structural elevations

Proposed elevations for all storm water controls is shown in Exhibit 3-2.

I. Design water surface elevations and normal pool elevations for ponds

Site does not contain any detention ponds. Maximum ponding within parking areas is set to 1.4' above the inlet tops.

J. Typical details for structures

Standard City of Wichita details.

K. Proposed limits of clearing and grading

Clearing and grading shall be done only as needed and will be established upon any submittal for site improvements.

L. Location of existing and proposed impervious areas

Existing impervious areas are shown on the site layout. New areas proposed are estimated for the purposes of this report.

M. Location of existing and proposed utilities and easements.

See Tab 2, Section J for discussion of existing utilities. The plat (Exhibit 1-3) shows current easements, which will be the location for any future utilities.

N. Location of existing and proposed conveyance systems

Existing conveyance systems are discussed in Tab 2, Section K. Proposed changes include adding grated inlets at sump areas in the proposed parking areas. This new storm sewer will drain through a new pipe network into the existing storm sewer system along Hydraulic Avenue. The drainage plan shows the location of the proposed changes. Any future storm sewer designs shall comply with the latest City of Wichita design criteria to convey any added site runoff.

O. Preliminary location and dimensions of proposed channel modifications

This development will not require/include any channel modifications.

P. Preliminary selection and location of storm water controls

Storm water controls will include appropriate inlet and pipe networks at locations to be finalized as part of the construction plans. The layouts are shown in Exhibit 3-2. When these networks are needed, they will convey the five-year storm at a minimum. Sump locations in specific drainage areas will have flows routed overland to other low points and carried through the remainder of the system.

Q. Emergency overflow structure's flow path

The emergency overflow still routes storm water between the north and west buildings.

R. Detention facility freeboard

Site does not contain any detention facilities.

S. The 100-year, 24-hour High Water Line

No HWL established for this site.

T. Lowest opening elevation table

The plat does not include a lowest opening elevation table.

U. Storm water management facilities located within a reserve

No facilities or construction activities are planned within any reserves.

V. Maintenance responsibility of storm water management facilities

The maintenance of storm water management facilities shall be the responsibility of the owner and shall be transferred to new owner upon the sale of any part thereof.

W. Off-site drainage easements or agreements

No off-site drainage easements or agreements required for this development.

FUNSTON ADDITION

EXHIBIT 3-1

Hydraflow Table of Contents

PROP HYD REV.gpw

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Thursday, Oct 8, 2009

Hydrograph Return Period Recap

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

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	------	3.007	3.959	-------	5.222	6.163	7.410	8.341	9.268	N
2	SCS Runoff	------	4.413	5.810	-------	7.663	9.044	10.87	12.24	13.60	E
3	SCS Runoff	------	9.986	14.11	-------	19.73	23.99	29.69	33.95	38.21	SW

Hydrograph Summary Report

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

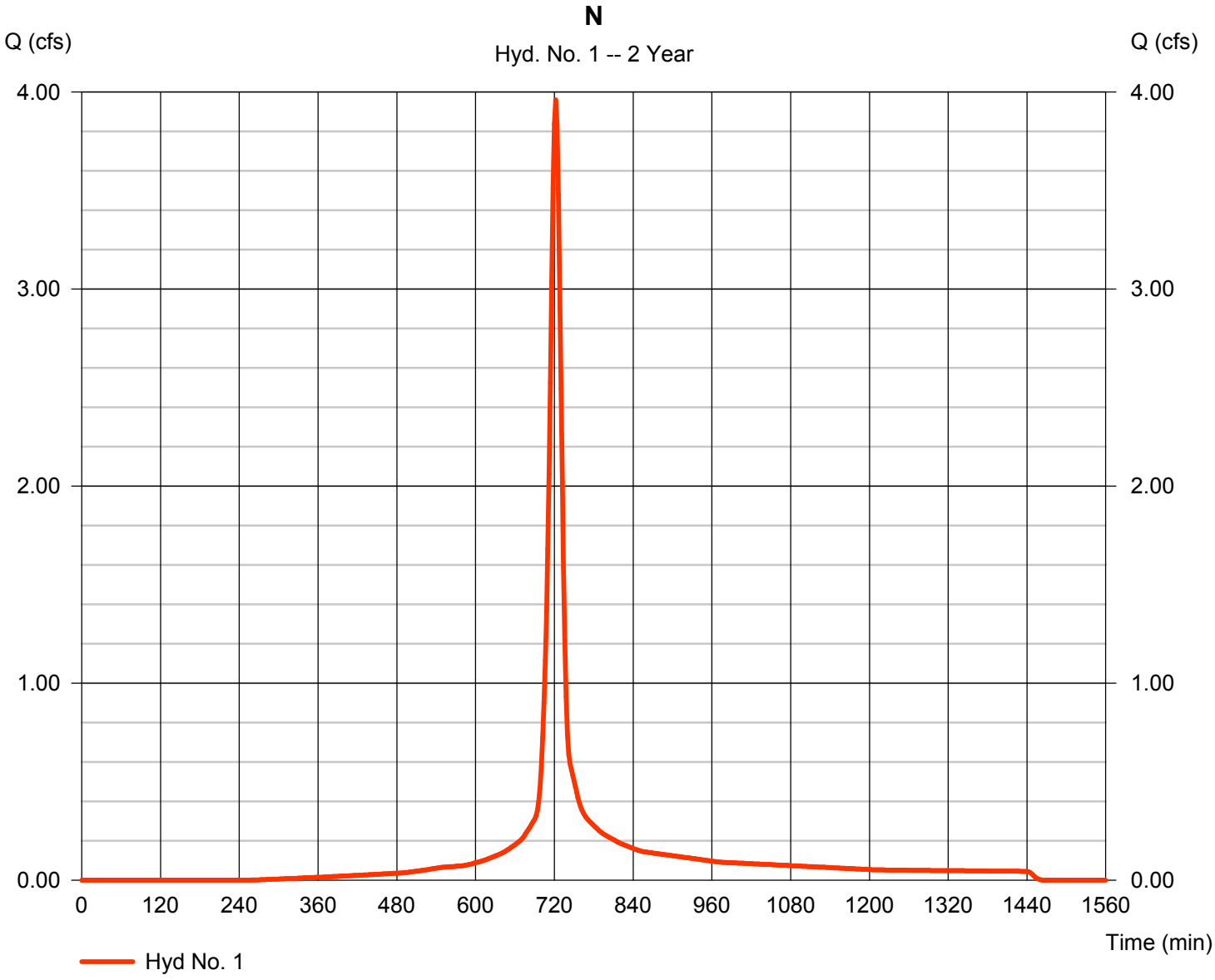
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	3.959	2	722	11,480	------	------	------	N
2	SCS Runoff	5.810	2	722	16,847	------	------	------	E
3	SCS Runoff	14.11	2	722	39,596	------	------	------	SW

Hydrograph Report

Hyd. No. 1

N

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.959 cfs
Storm frequency	=	2 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	11,480 cuft
Drainage area	=	1.187 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	3.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

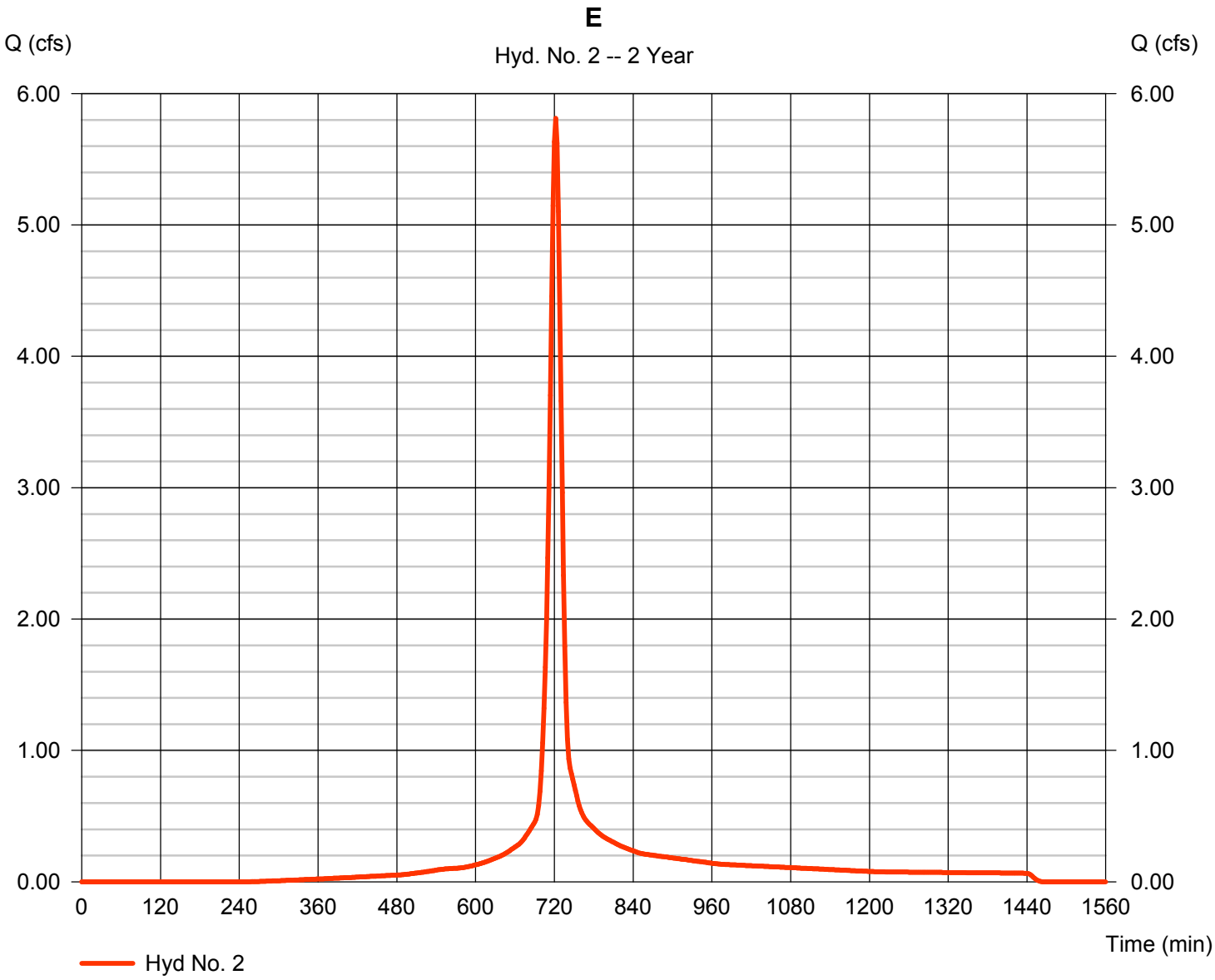


Hydrograph Report

Hyd. No. 2

E

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.810 cfs
Storm frequency	=	2 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	16,847 cuft
Drainage area	=	1.742 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	3.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

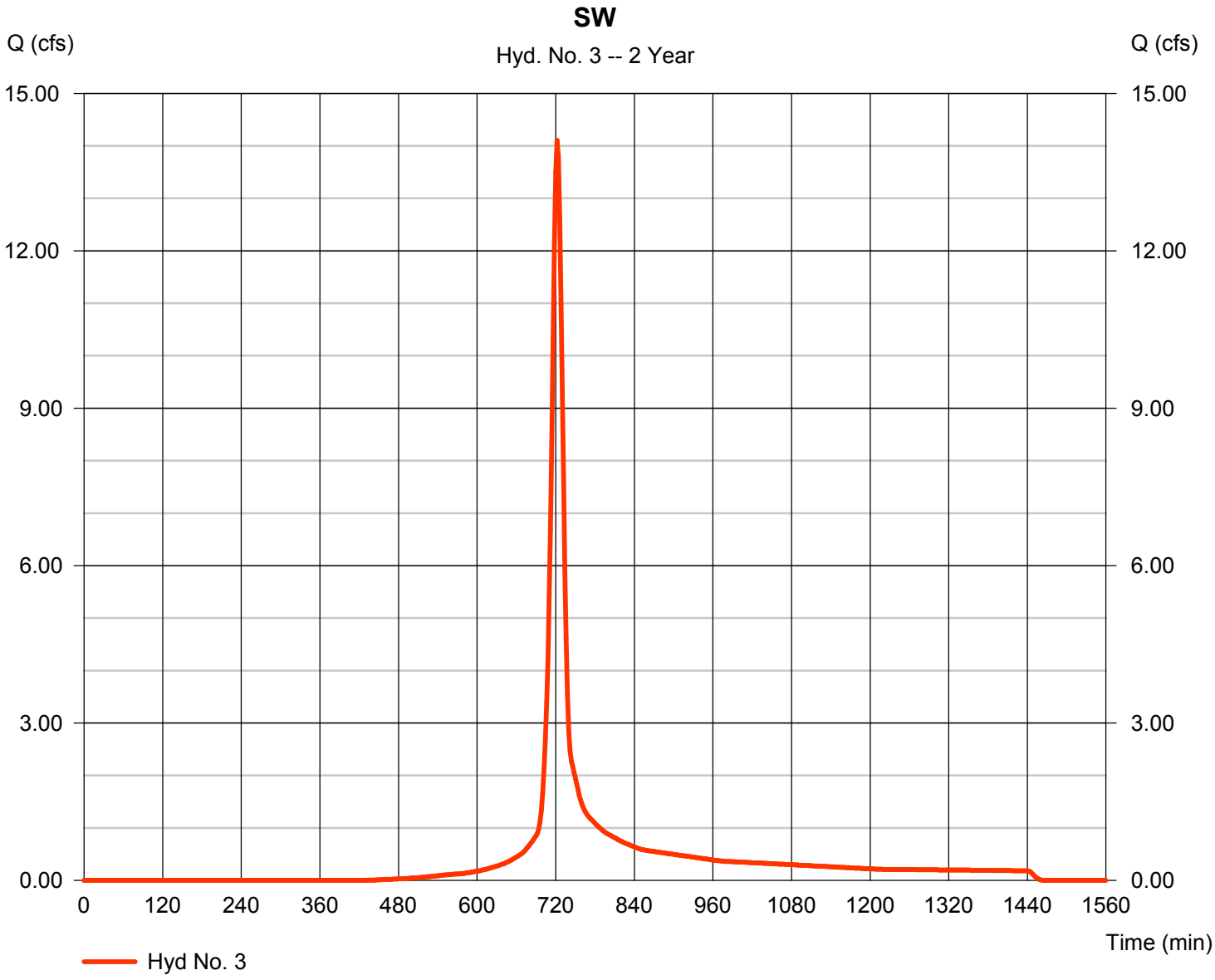


Hydrograph Report

Hyd. No. 3

SW

Hydrograph type	= SCS Runoff	Peak discharge	= 14.11 cfs
Storm frequency	= 2 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 39,596 cuft
Drainage area	= 5.318 ac	Curve number	= 85
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.00 min
Total precip.	= 3.60 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Summary Report

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

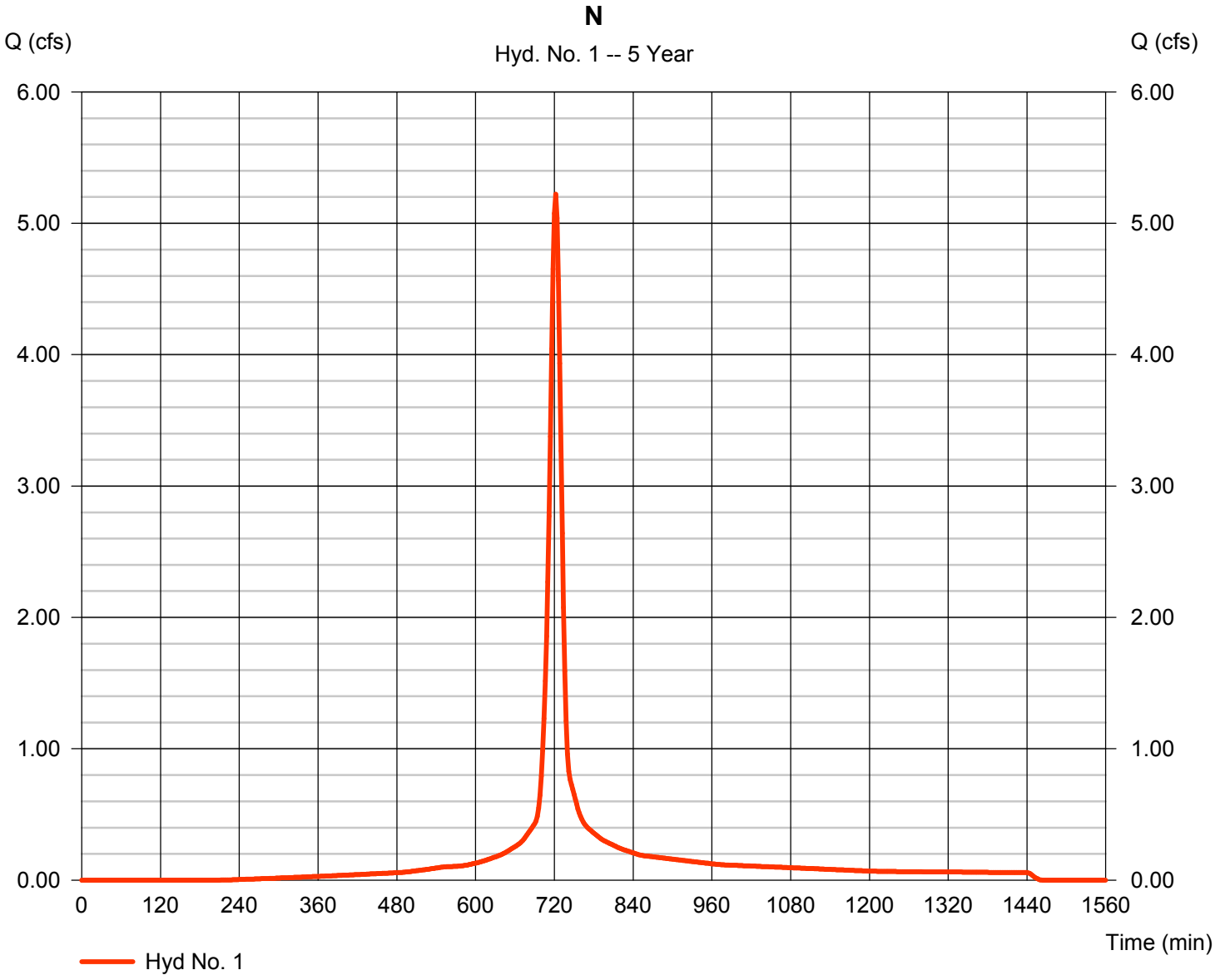
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	5.222	2	722	15,378	------	------	------	N
2	SCS Runoff	7.663	2	722	22,568	------	------	------	E
3	SCS Runoff	19.73	2	722	55,785	------	------	------	SW

Hydrograph Report

Hyd. No. 1

N

Hydrograph type	= SCS Runoff	Peak discharge	= 5.222 cfs
Storm frequency	= 5 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 15,378 cuft
Drainage area	= 1.187 ac	Curve number	= 92
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.00 min
Total precip.	= 4.56 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

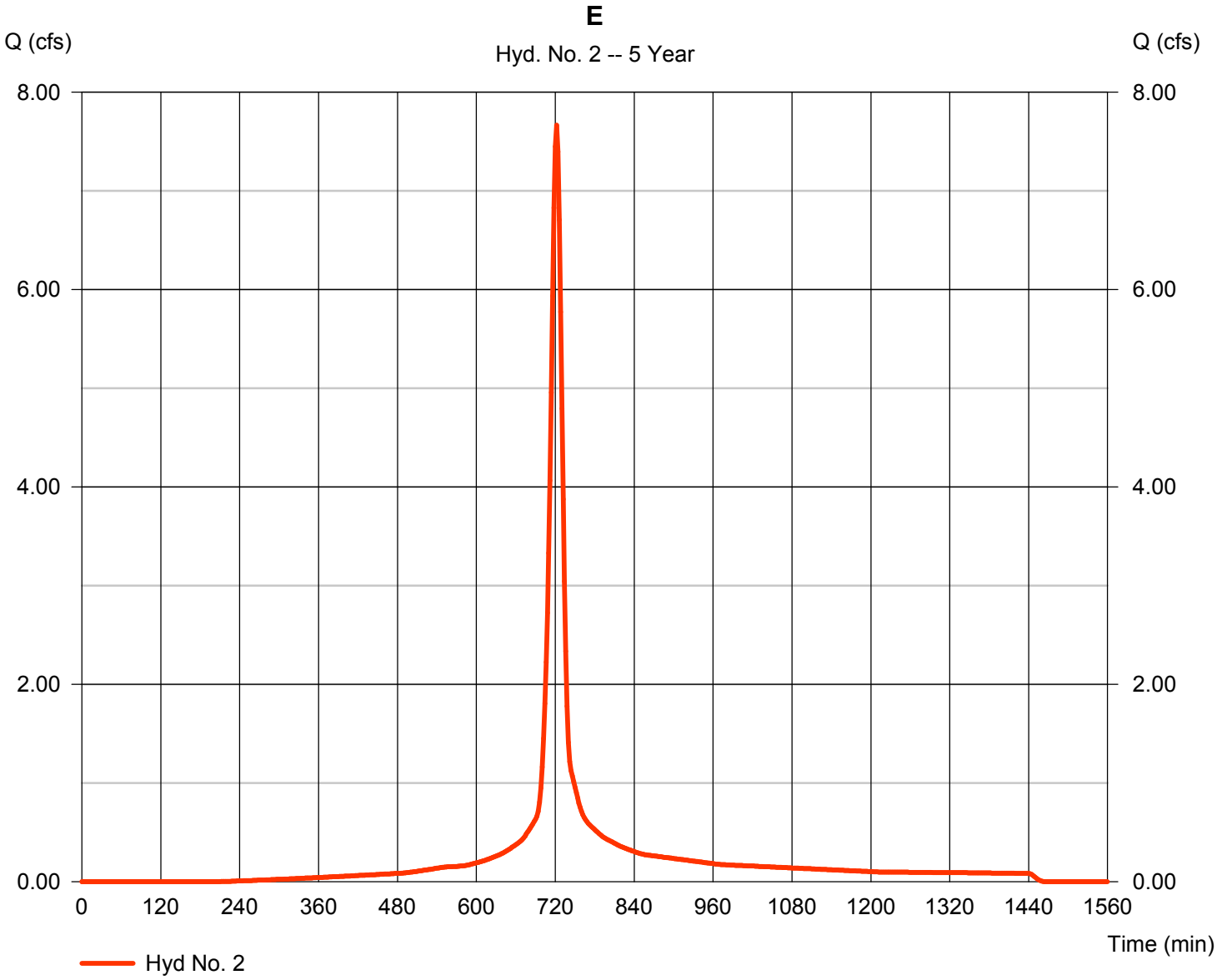


Hydrograph Report

Hyd. No. 2

E

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.663 cfs
Storm frequency	=	5 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	22,568 cuft
Drainage area	=	1.742 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	4.56 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

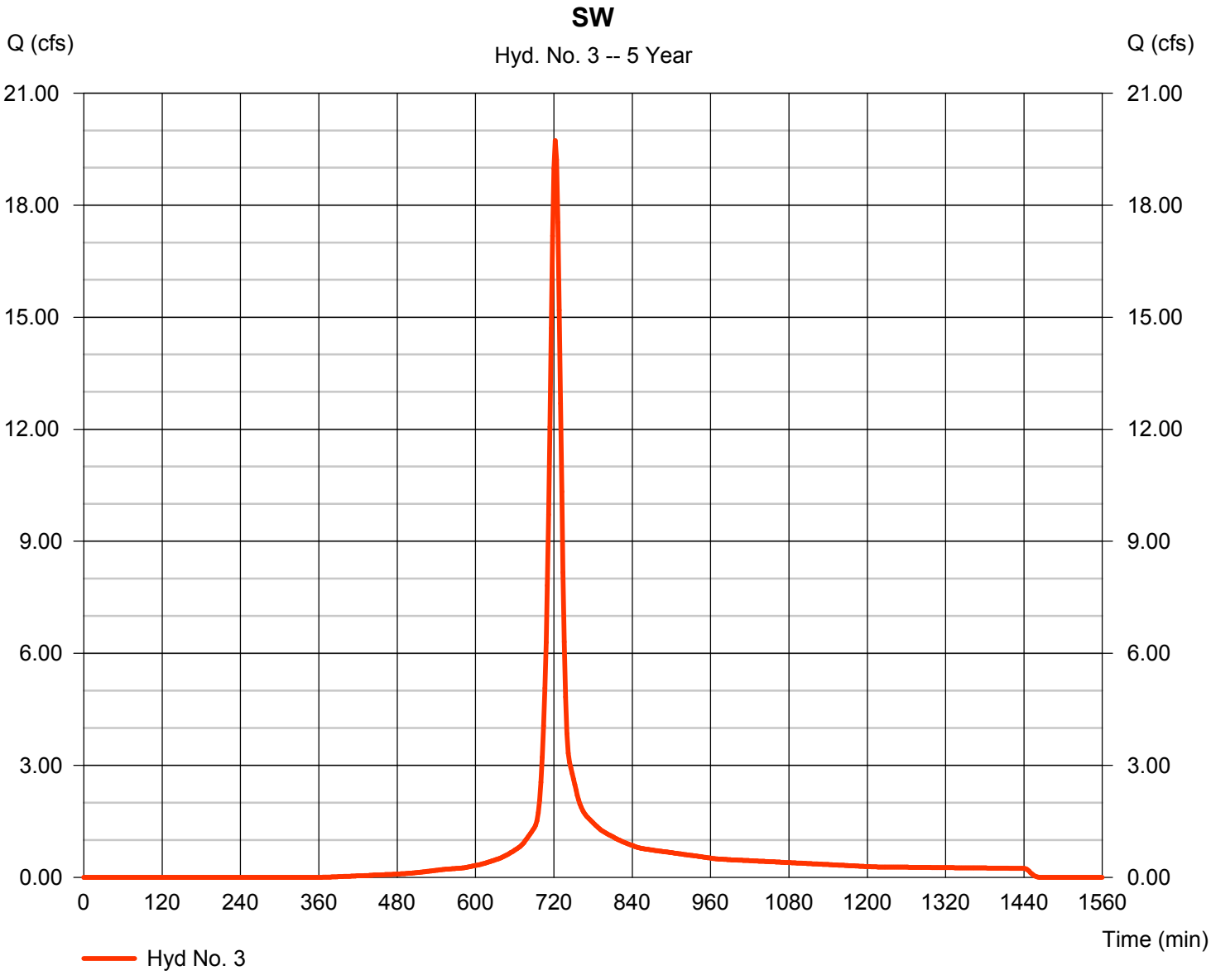


Hydrograph Report

Hyd. No. 3

SW

Hydrograph type	= SCS Runoff	Peak discharge	= 19.73 cfs
Storm frequency	= 5 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 55,785 cuft
Drainage area	= 5.318 ac	Curve number	= 85
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.00 min
Total precip.	= 4.56 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Summary Report

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

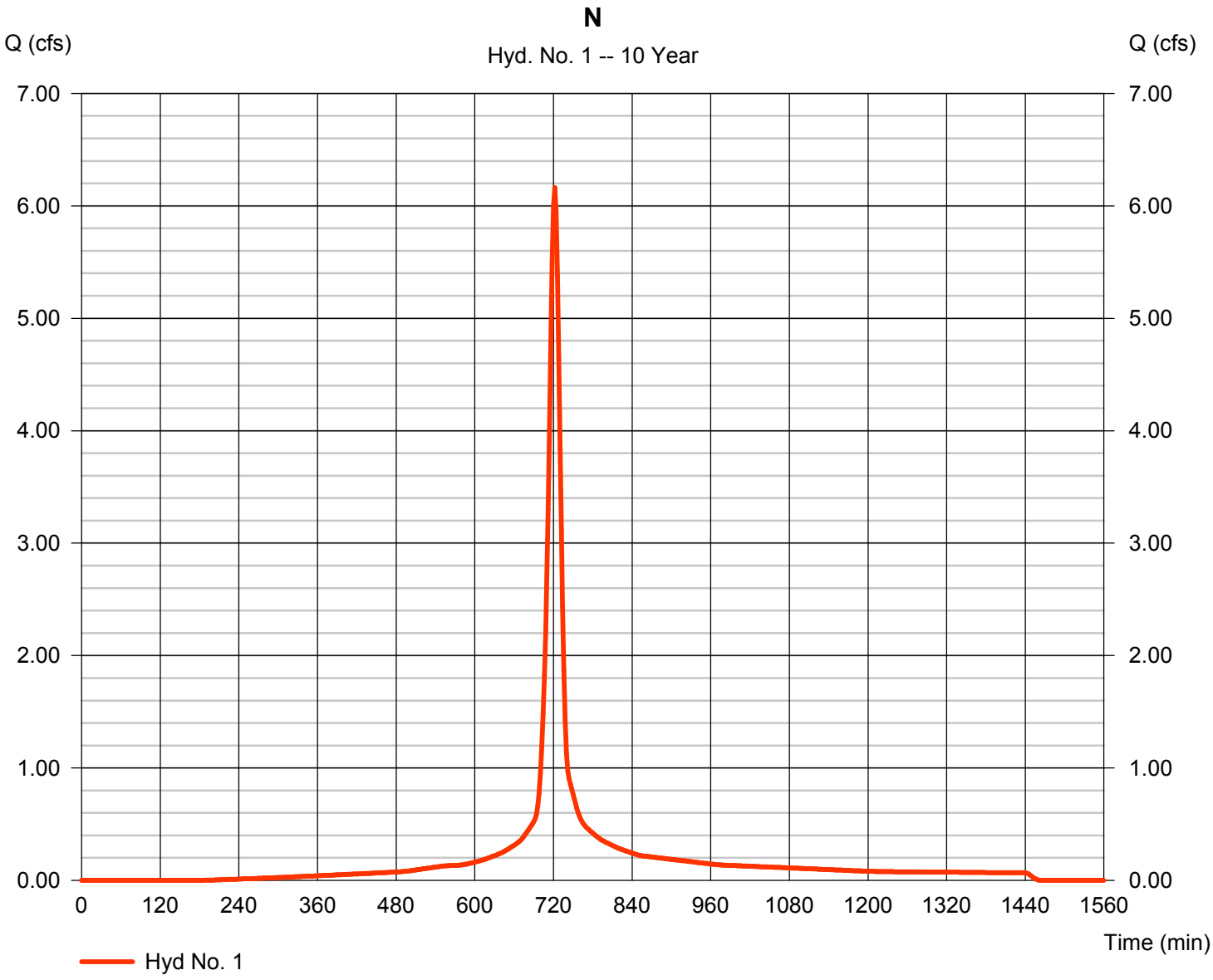
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	6.163	2	722	18,330	------	------	------	N
2	SCS Runoff	9.044	2	722	26,900	------	------	------	E
3	SCS Runoff	23.99	2	722	68,280	------	------	------	SW

Hydrograph Report

Hyd. No. 1

N

Hydrograph type	= SCS Runoff	Peak discharge	= 6.163 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 18,330 cuft
Drainage area	= 1.187 ac	Curve number	= 92
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.00 min
Total precip.	= 5.28 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

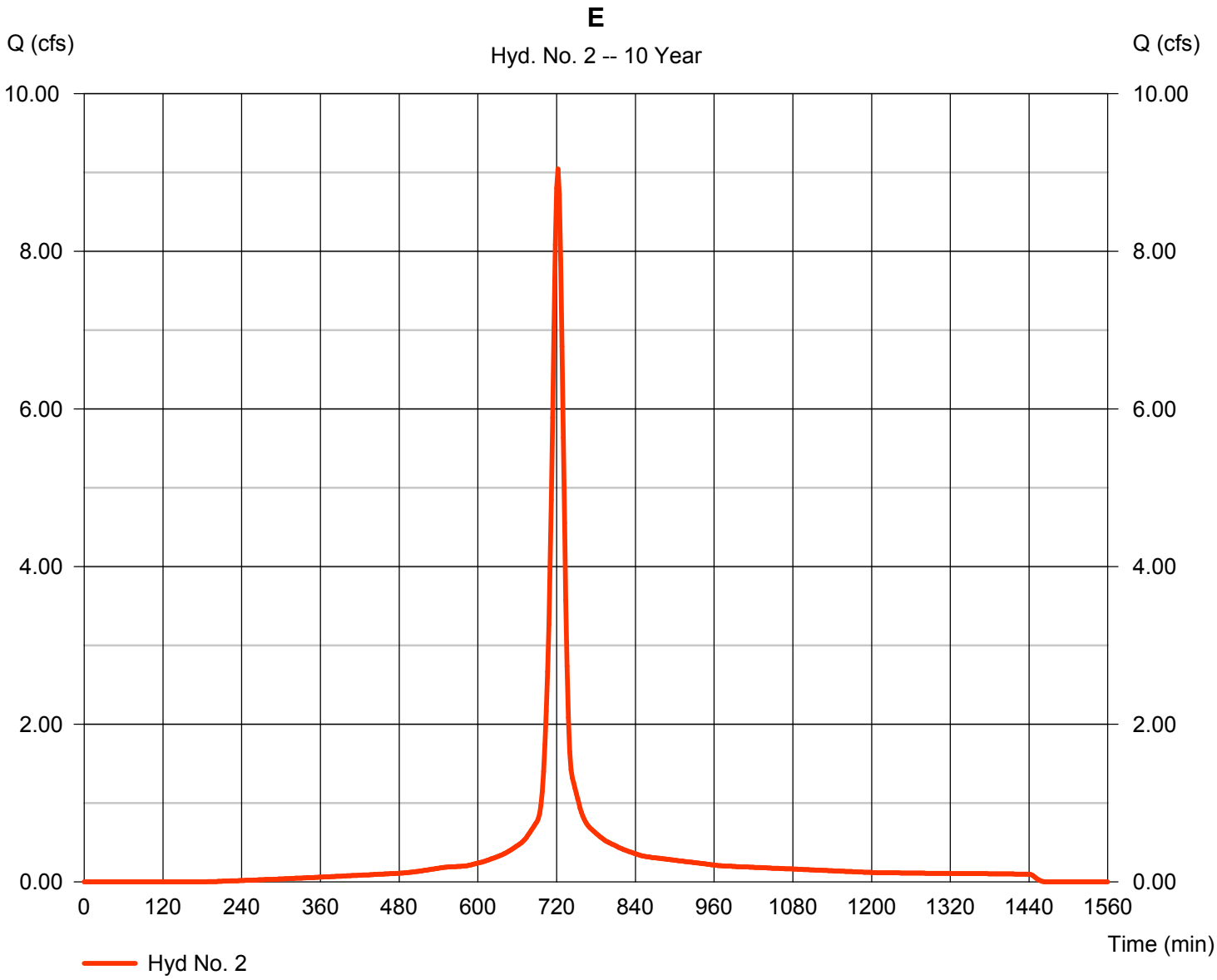


Hydrograph Report

Hyd. No. 2

E

Hydrograph type	=	SCS Runoff	Peak discharge	=	9.044 cfs
Storm frequency	=	10 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	26,900 cuft
Drainage area	=	1.742 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	5.28 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

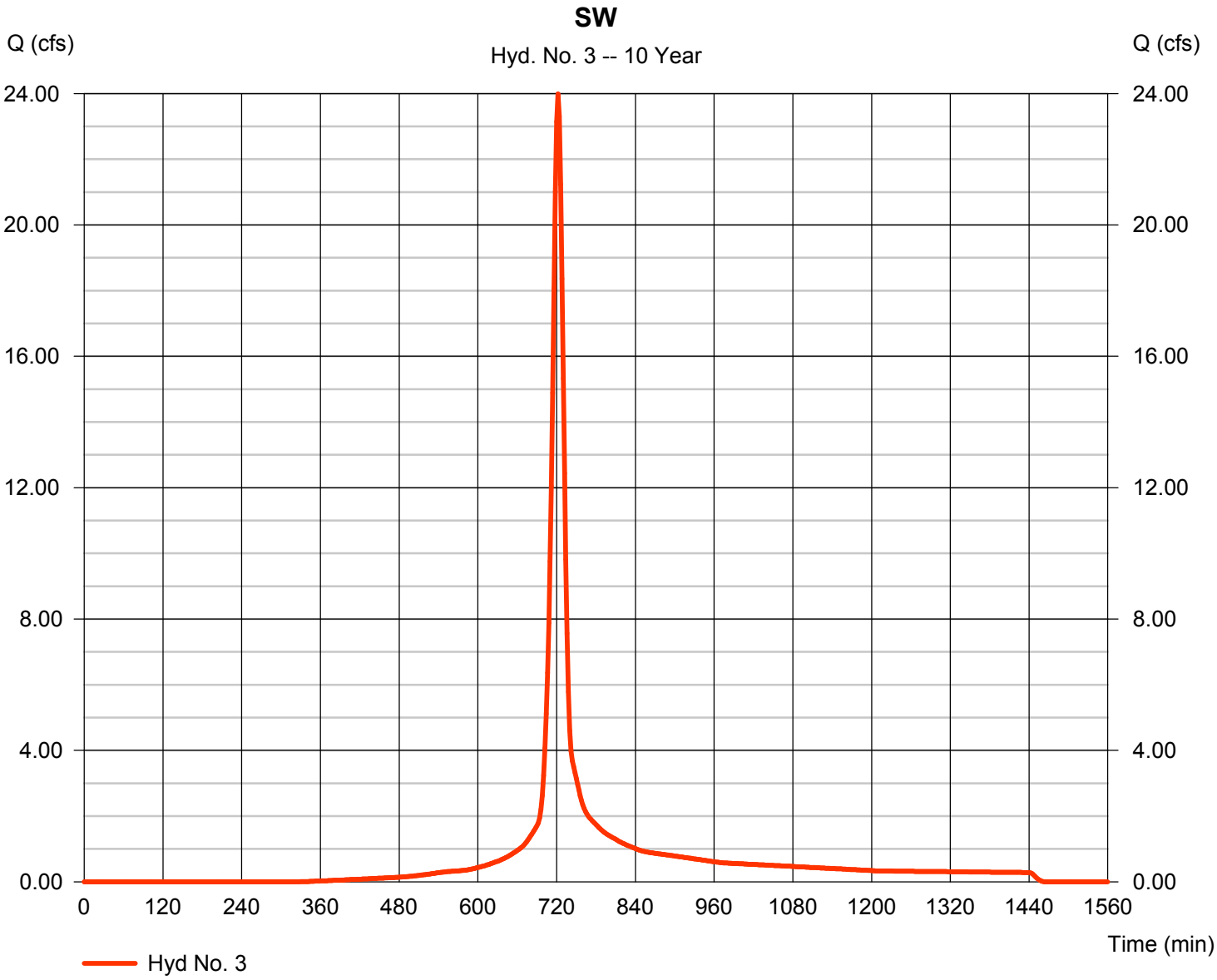


Hydrograph Report

Hyd. No. 3

SW

Hydrograph type	= SCS Runoff	Peak discharge	= 23.99 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 68,280 cuft
Drainage area	= 5.318 ac	Curve number	= 85
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.00 min
Total precip.	= 5.28 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Summary Report

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

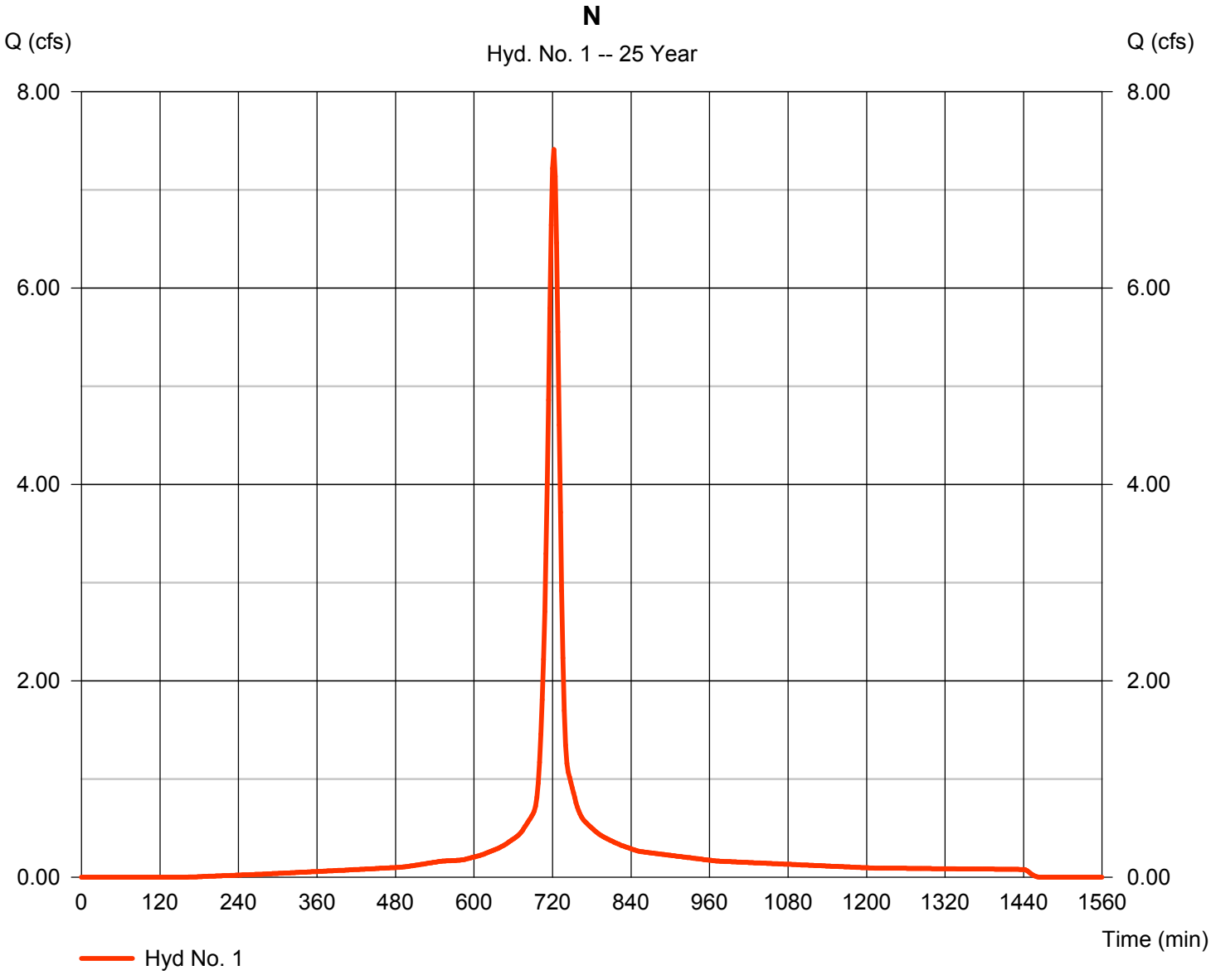
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	7.410	2	722	22,289	------	------	------	N
2	SCS Runoff	10.87	2	722	32,711	------	------	------	E
3	SCS Runoff	29.69	2	722	85,250	------	------	------	SW

Hydrograph Report

Hyd. No. 1

N

Hydrograph type	= SCS Runoff	Peak discharge	= 7.410 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 22,289 cuft
Drainage area	= 1.187 ac	Curve number	= 92
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.00 min
Total precip.	= 6.24 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

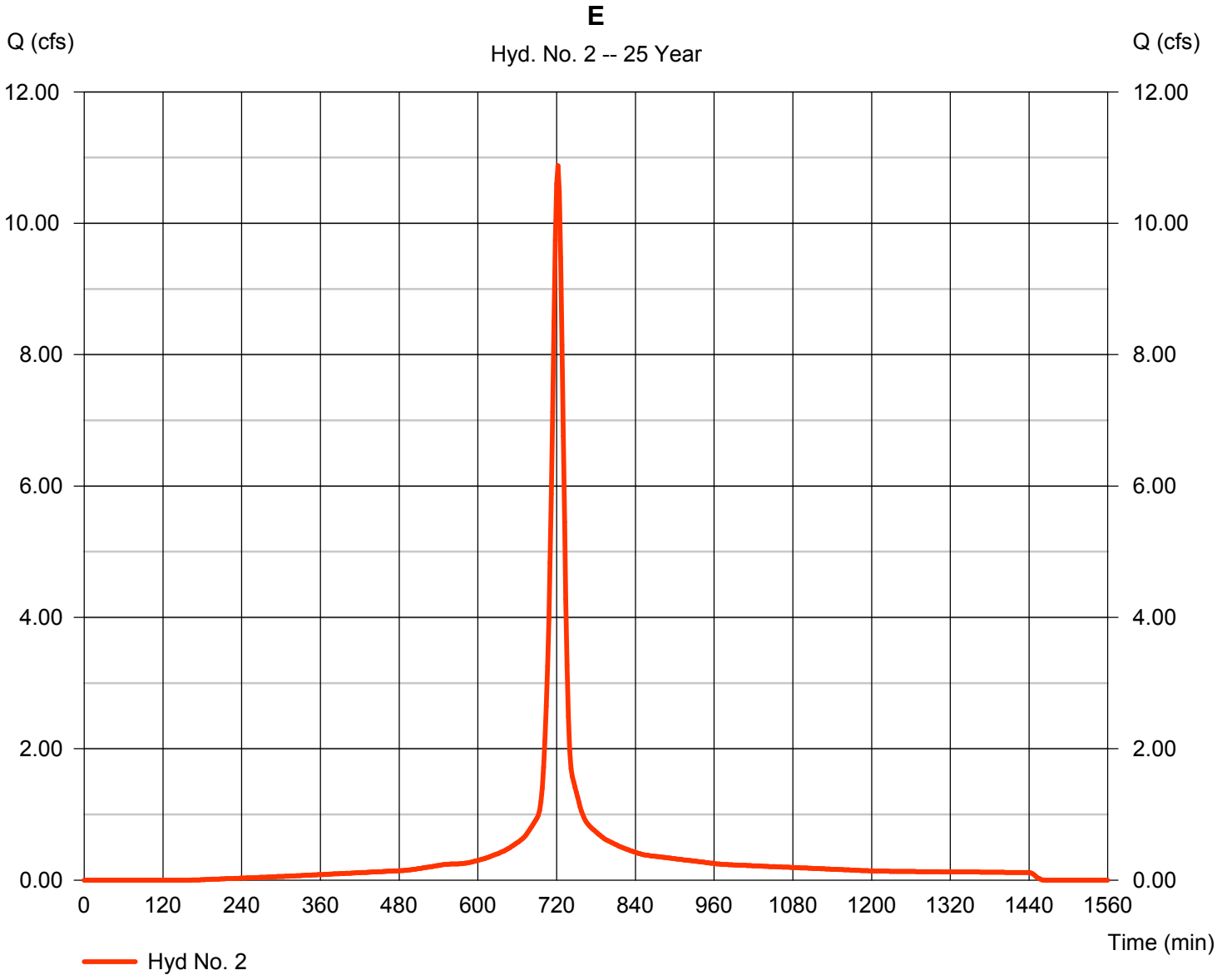


Hydrograph Report

Hyd. No. 2

E

Hydrograph type	= SCS Runoff	Peak discharge	= 10.87 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 32,711 cuft
Drainage area	= 1.742 ac	Curve number	= 92
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.00 min
Total precip.	= 6.24 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

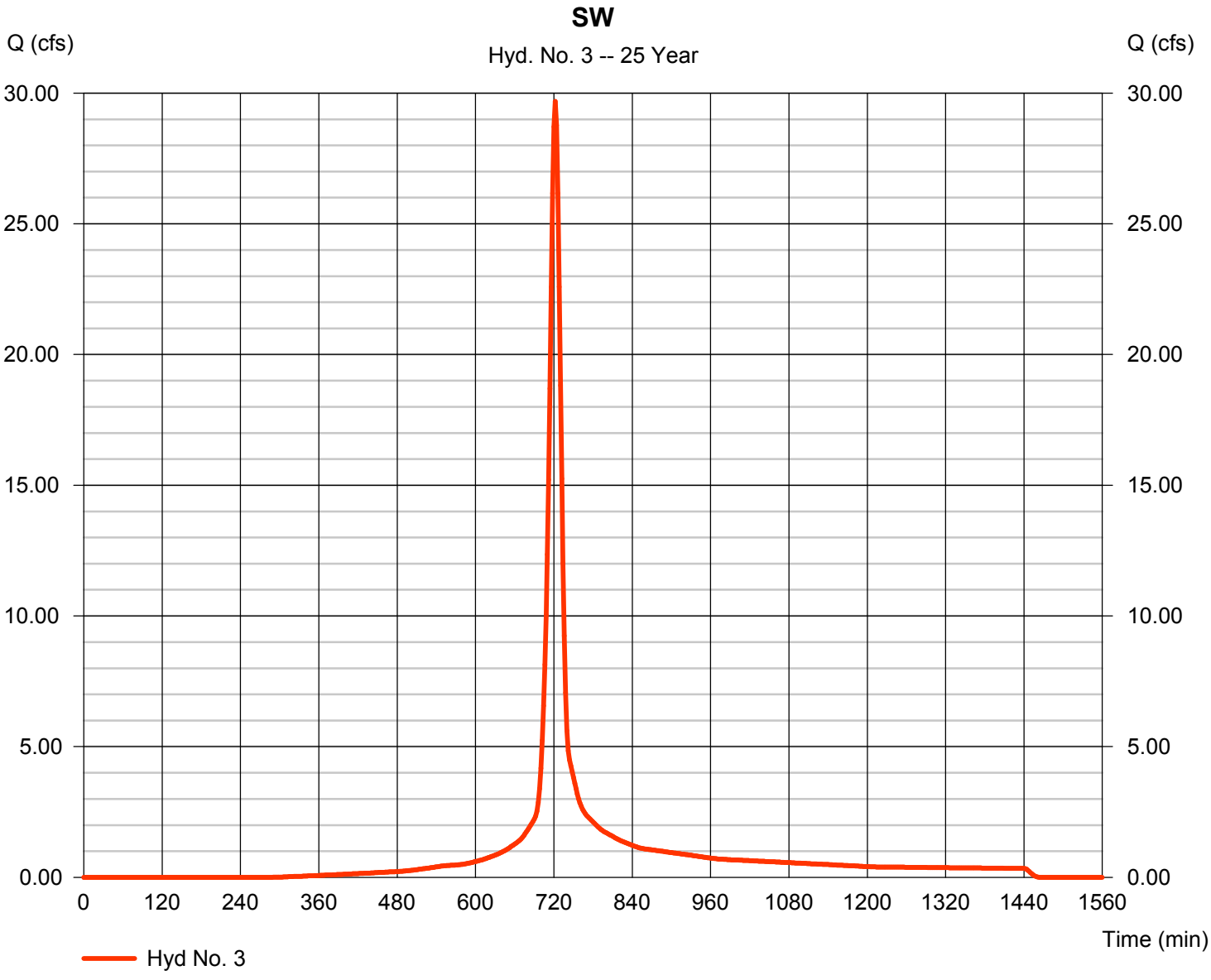


Hydrograph Report

Hyd. No. 3

SW

Hydrograph type	= SCS Runoff	Peak discharge	= 29.69 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 85,250 cuft
Drainage area	= 5.318 ac	Curve number	= 85
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.00 min
Total precip.	= 6.24 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Summary Report

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

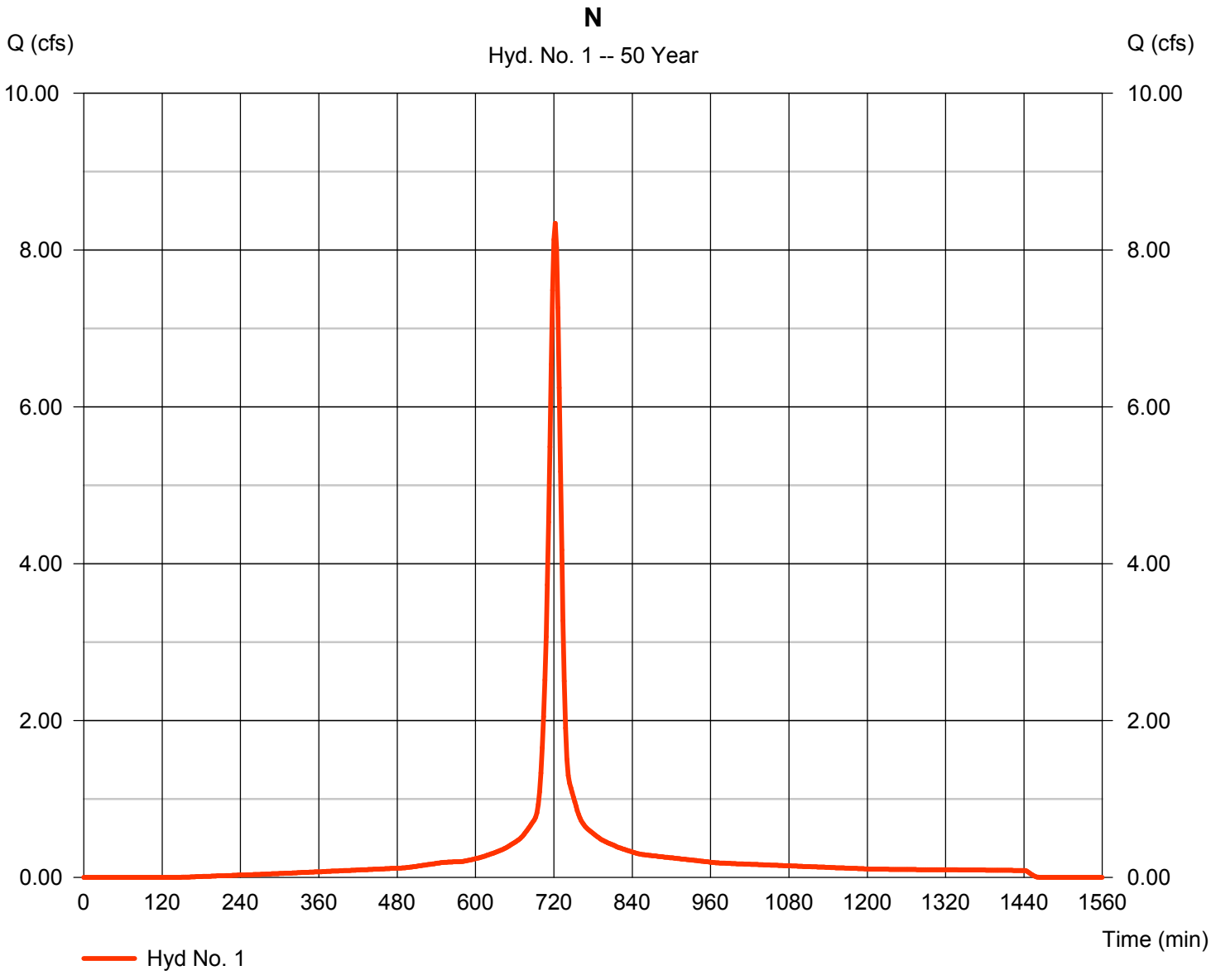
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	8.341	2	722	25,271	------	------	------	N
2	SCS Runoff	12.24	2	722	37,086	------	------	------	E
3	SCS Runoff	33.95	2	722	98,143	------	------	------	SW

Hydrograph Report

Hyd. No. 1

N

Hydrograph type	= SCS Runoff	Peak discharge	= 8.341 cfs
Storm frequency	= 50 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 25,271 cuft
Drainage area	= 1.187 ac	Curve number	= 92
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.00 min
Total precip.	= 6.96 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

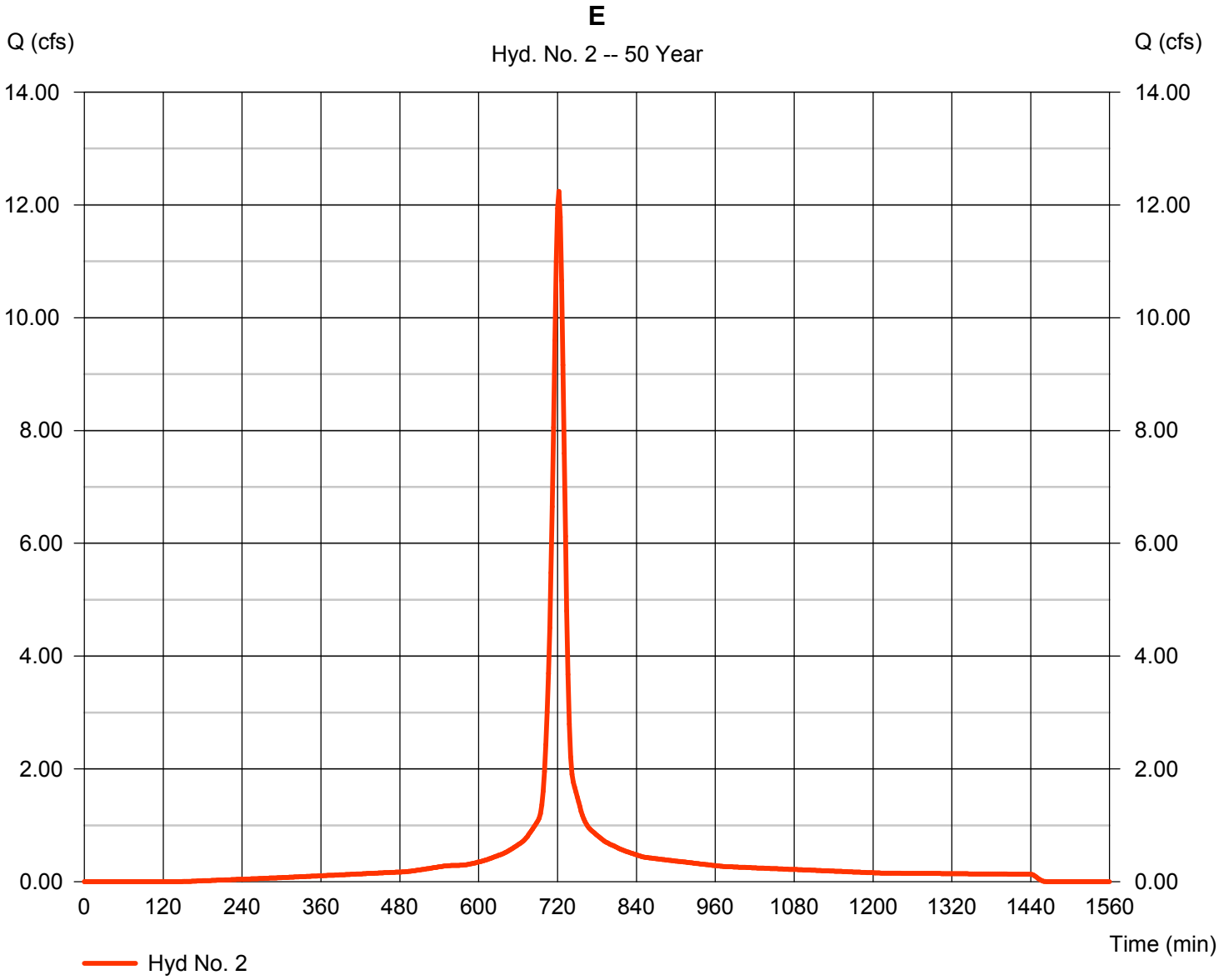


Hydrograph Report

Hyd. No. 2

E

Hydrograph type	= SCS Runoff	Peak discharge	= 12.24 cfs
Storm frequency	= 50 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 37,086 cuft
Drainage area	= 1.742 ac	Curve number	= 92
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.00 min
Total precip.	= 6.96 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

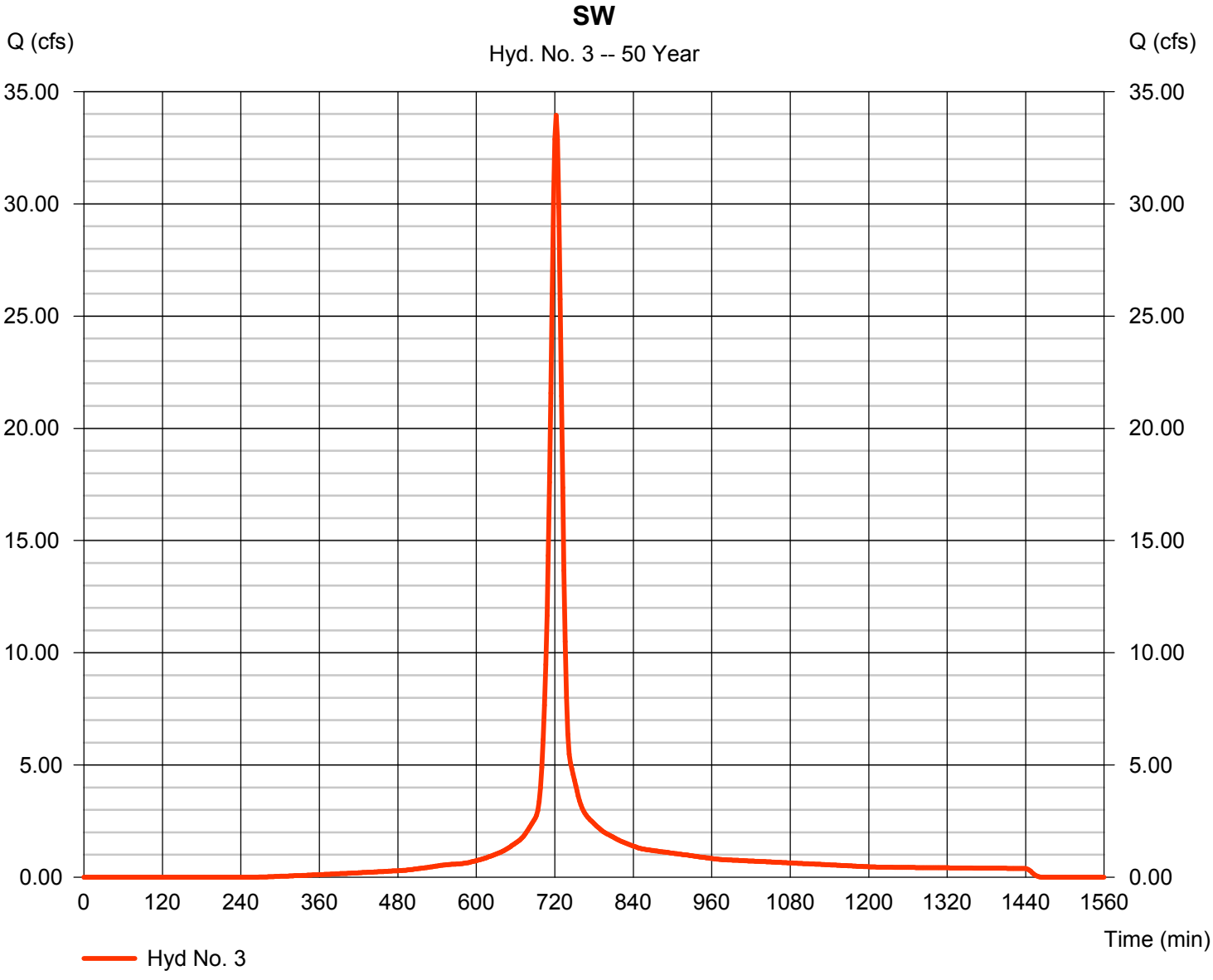


Hydrograph Report

Hyd. No. 3

SW

Hydrograph type	= SCS Runoff	Peak discharge	= 33.95 cfs
Storm frequency	= 50 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 98,143 cuft
Drainage area	= 5.318 ac	Curve number	= 85
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.00 min
Total precip.	= 6.96 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Summary Report

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

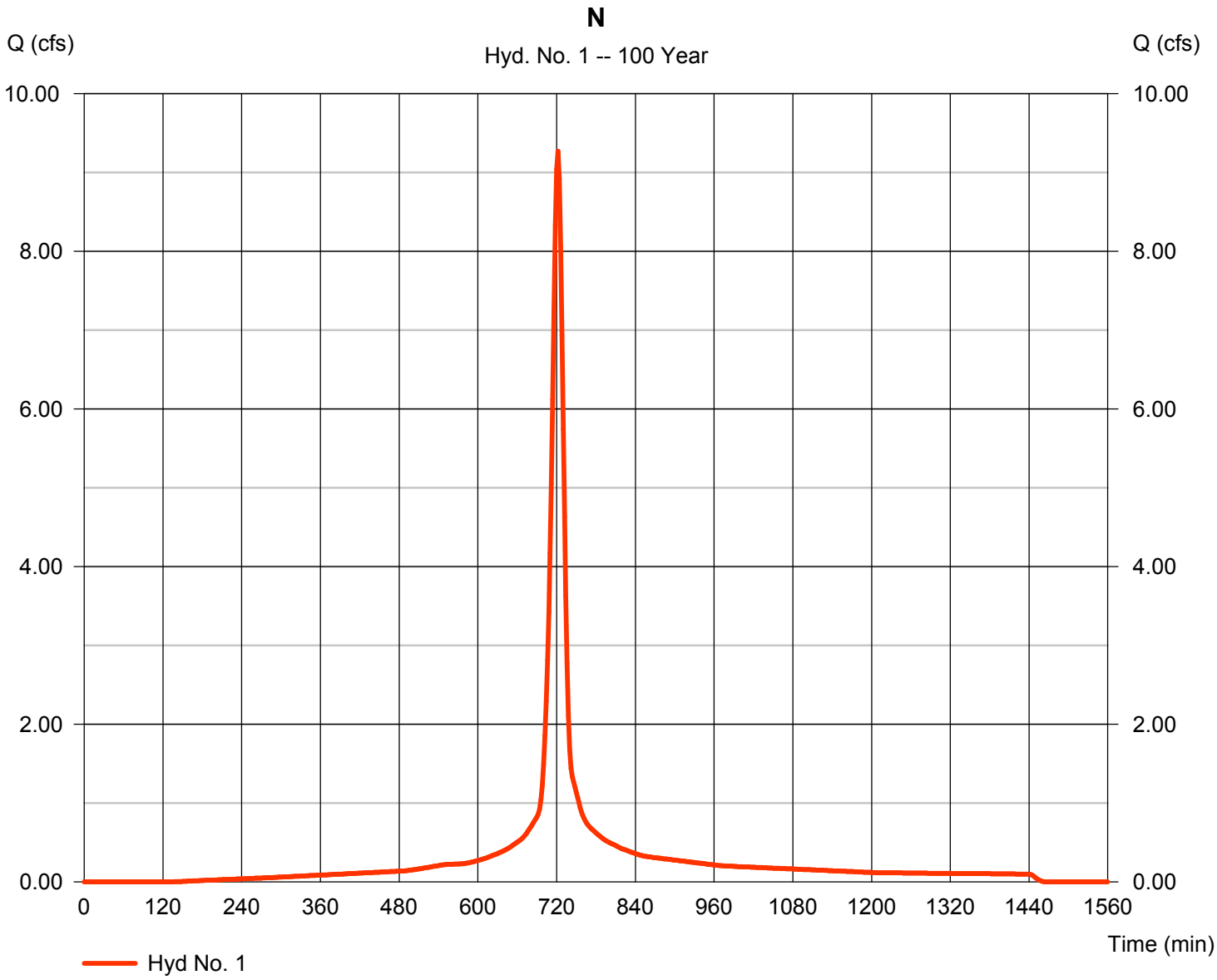
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	9.268	2	722	28,260	------	------	------	N
2	SCS Runoff	13.60	2	722	41,473	------	------	------	E
3	SCS Runoff	38.21	2	722	111,140	------	------	------	SW

Hydrograph Report

Hyd. No. 1

N

Hydrograph type	=	SCS Runoff	Peak discharge	=	9.268 cfs
Storm frequency	=	100 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	28,260 cuft
Drainage area	=	1.187 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	7.68 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

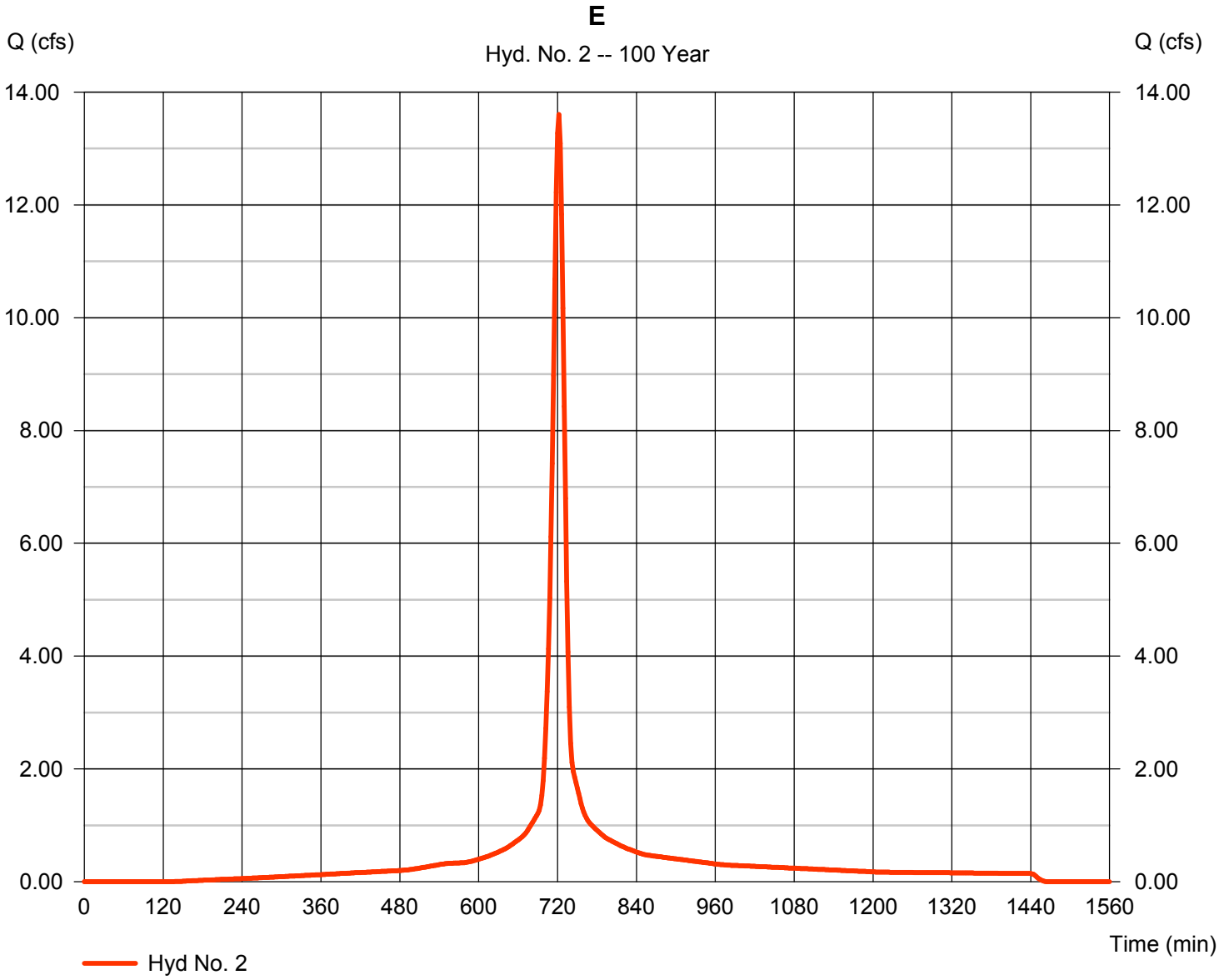


Hydrograph Report

Hyd. No. 2

E

Hydrograph type	= SCS Runoff	Peak discharge	= 13.60 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 41,473 cuft
Drainage area	= 1.742 ac	Curve number	= 92
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.00 min
Total precip.	= 7.68 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

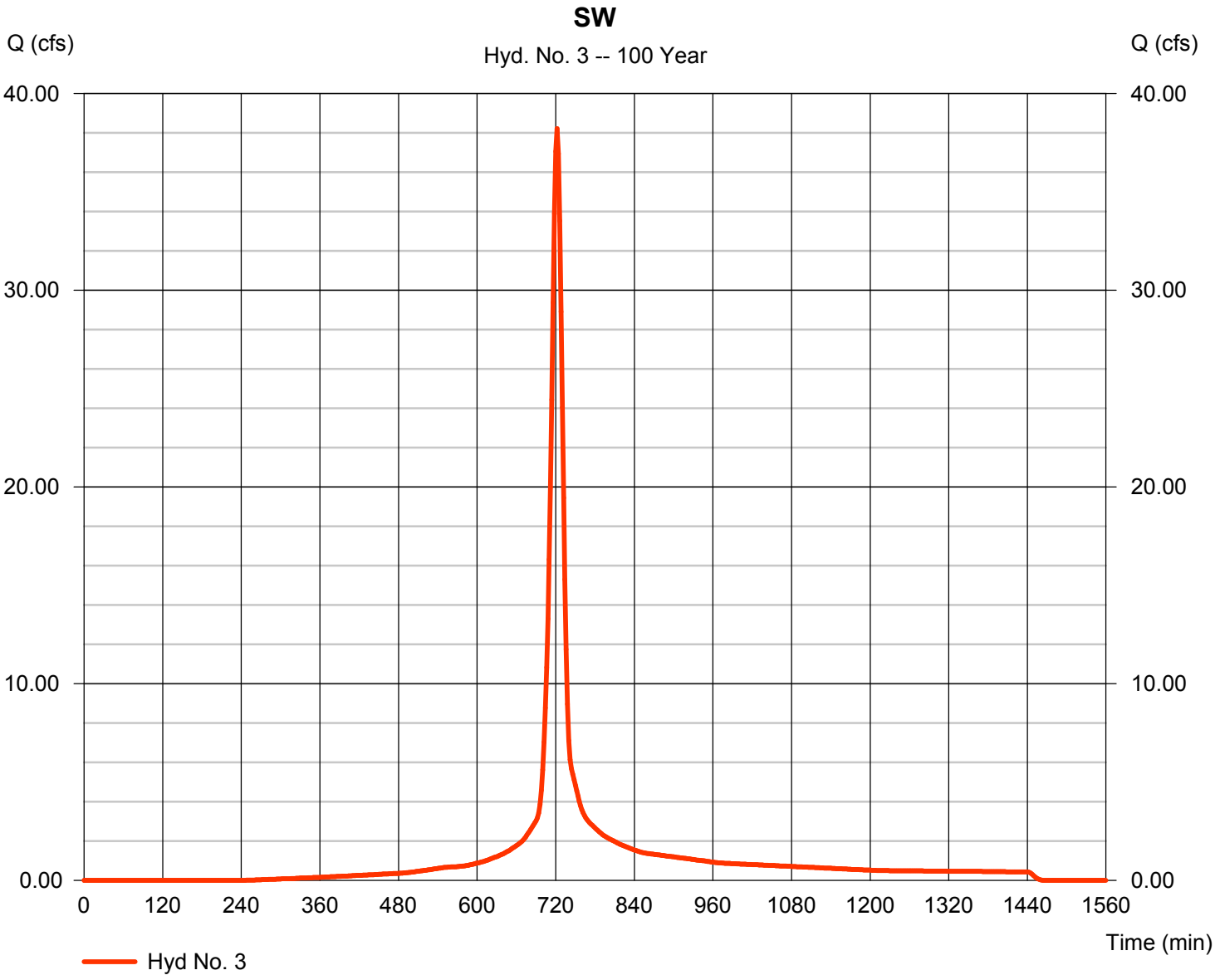


Hydrograph Report

Hyd. No. 3

SW

Hydrograph type	= SCS Runoff	Peak discharge	= 38.21 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 111,140 cuft
Drainage area	= 5.318 ac	Curve number	= 85
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.00 min
Total precip.	= 7.68 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydraflow Rainfall Report

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

File name: SampleFHA.idf

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5.69	4.61	3.89	3.38	2.99	2.69	2.44	2.24	2.07	1.93	1.81	1.70
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.57	5.43	4.65	4.08	3.65	3.30	3.02	2.79	2.59	2.42	2.27	2.15
10	7.24	6.04	5.21	4.59	4.12	3.74	3.43	3.17	2.95	2.77	2.60	2.46
25	8.25	6.95	6.03	5.34	4.80	4.38	4.02	3.73	3.48	3.26	3.07	2.91
50	9.04	7.65	6.66	5.92	5.34	4.87	4.49	4.16	3.88	3.65	3.44	3.25
100	9.83	8.36	7.30	6.50	5.87	5.36	4.94	4.59	4.29	4.03	3.80	3.60

Tc = time in minutes. Values may exceed 60.

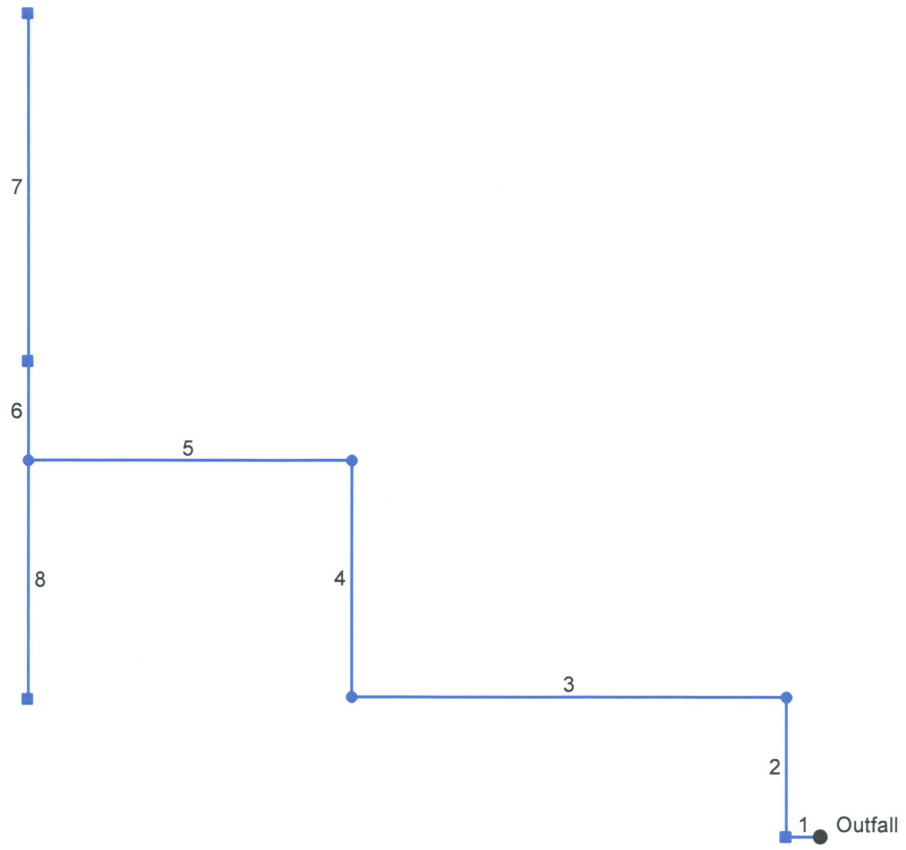
Precip. file name: SedgwickCo.pcp

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	2.88	3.60	0.00	4.56	5.28	6.24	6.96	7.68
SCS 6-Hr	1.98	2.52	0.00	3.30	3.90	4.68	5.28	5.88
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	0.00	0.00	0.00	0.00	0.00	0.00	0.00

FUNSTON ADDITION

EXHIBIT 3-2

Storm Sewer to Hydraulic



Project File: storm sewer 2.stm	Number of lines: 8	Date: 05-20-2009

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1		20.45	24	Cir	15.000	1262.23	1262.29	0.400	1263.87	1264.13	1.07	1265.20	End	Curb-Horiz
2		20.45	24	Cir	62.000	1262.39	1262.64	0.403	1265.20*	1265.70*	0.66	1266.36	1	Manhole
3		20.45	24	Cir	190.000	1262.74	1263.50	0.400	1266.36*	1267.92*	0.66	1268.57	2	Manhole
4		20.45	24	Cir	105.000	1263.60	1264.42	0.781	1268.57*	1269.43*	0.66	1270.09	3	Manhole
5		20.45	24	Cir	142.000	1264.52	1265.09	0.401	1270.09*	1271.25*	0.66	1271.91	4	Manhole
6		11.92	18	Cir	44.000	1265.59	1265.77	0.409	1271.91*	1272.48*	0.35	1272.83	5	DropGrate
7		6.48	18	Cir	155.000	1266.02	1266.64	0.400	1272.83*	1273.42*	0.21	1273.63	6	DropGrate
8		8.86	18	Cir	106.000	1265.59	1266.01	0.396	1271.91*	1272.67*	0.39	1273.06	5	DropGrate

Storm Sewer to Hydraulic | Number of lines: 8 | Run Date: 05-20-2009

NOTES: Return period = 100 Yrs. ; *Surcharged (HGL above crown).

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

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	7.391	2	722	21,521	------	------	------	Sub 4
2	Reservoir	6.478	2	726	21,520	1	1273.27	2,762	Pipe 7
3	SCS Runoff	9.952	2	722	28,979	------	------	------	Sub 5
4	Combine	15.91	2	724	50,499	2, 3	------	------	Pond 2 Inflow
5	Reservoir	11.92	2	730	50,498	4	1272.97	6,452	Pipe 6
6	SCS Runoff	10.10	2	722	29,405	------	------	------	Sub 6
7	Reservoir	8.893	2	726	28,470	6	1272.22	5,115	Pipe 8
8	Combine	20.46	2	728	78,967	5, 7	------	------	Pipe 5

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1		17.03	24	Cir	15.000	1262.23	1262.29	0.400	1263.87	1263.99	0.84	1264.82	End	Curb-Horiz
2		17.03	24	Cir	62.000	1262.39	1262.64	0.403	1264.82*	1265.18*	0.46	1265.63	1	Manhole
3		17.03	24	Cir	190.000	1262.74	1263.50	0.400	1265.63*	1266.71*	0.46	1267.17	2	Manhole
4		17.03	24	Cir	105.000	1263.60	1264.42	0.781	1267.17*	1267.76*	0.46	1268.22	3	Manhole
5		17.03	24	Cir	142.000	1264.52	1265.09	0.401	1268.22*	1269.03*	0.46	1269.48	4	Manhole
6		10.57	18	Cir	44.000	1265.59	1265.77	0.409	1269.48*	1269.93*	0.28	1270.21	5	DropGrate
7		4.78	18	Cir	155.000	1266.02	1266.64	0.400	1270.21*	1270.53*	0.11	1270.64	6	DropGrate
8		6.55	18	Cir	106.000	1265.59	1266.01	0.396	1269.48*	1269.90*	0.21	1270.11	5	DropGrate

Storm Sewer to Hydraulic | Number of lines: 8 | Run Date: 05-20-2009

NOTES: Return period = 25 Yrs. ; *Surcharged (HGL above crown).

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

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	5.593	2	722	16,055	------	------	------	Sub 4
2	Reservoir	4.777	2	726	16,055	1	1273.19	2,249	Pipe 7
3	SCS Runoff	7.531	2	722	21,619	------	------	------	Sub 5
4	Combine	11.89	2	724	37,674	2, 3	------	------	Pond 2 Inflow
5	Reservoir	10.57	2	728	37,673	4	1272.66	4,340	Pipe 6
6	SCS Runoff	7.642	2	722	21,937	------	------	------	Sub 6
7	Reservoir	6.551	2	726	21,002	6	1272.13	4,431	Pipe 8
8	Combine	17.03	2	728	58,675	5, 7	------	------	Pipe 5

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1		14.02	24	Cir	15.000	1262.23	1262.29	0.400	1263.87	1263.92	0.61	1264.53	End	Curb-Horiz
2		14.02	24	Cir	62.000	1262.39	1262.64	0.403	1264.53*	1264.77*	0.31	1265.08	1	Manhole
3		14.02	24	Cir	190.000	1262.74	1263.50	0.400	1265.08*	1265.81*	0.31	1266.12	2	Manhole
4		14.02	24	Cir	105.000	1263.60	1264.42	0.781	1266.12*	1266.52*	0.31	1266.83	3	Manhole
5		14.02	24	Cir	142.000	1264.52	1265.09	0.401	1266.83*	1267.38*	0.31	1267.69	4	Manhole
6		8.66	18	Cir	44.000	1265.59	1265.77	0.409	1267.69*	1267.99*	0.19	1268.17	5	DropGrate
7		3.91	18	Cir	155.000	1266.02	1266.64	0.400	1268.17*	1268.39*	0.08	1268.47	6	DropGrate
8		5.39	18	Cir	106.000	1265.59	1266.01	0.396	1267.69*	1267.97*	0.14	1268.11	5	DropGrate

Storm Sewer to Hydraulic | Number of lines: 8 | Run Date: 05-20-2009

NOTES: Return period = 10 Yrs. ; *Surcharged (HGL above crown).

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

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	4.692	2	722	13,367	------	------	------	Sub 4
2	Reservoir	3.906	2	726	13,367	1	1273.14	1,974	Pipe 7
3	SCS Runoff	6.318	2	722	18,000	------	------	------	Sub 5
4	Combine	9.849	2	724	31,366	2, 3	------	------	Pond 2 Inflow
5	Reservoir	8.665	2	728	31,366	4	1272.57	3,793	Pipe 6
6	SCS Runoff	6.411	2	722	18,264	------	------	------	Sub 6
7	Reservoir	5.390	2	726	17,330	6	1272.08	4,057	Pipe 8
8	Combine	14.02	2	728	48,695	5, 7	------	------	Pipe 5

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1		11.33	24	Cir	15.000	1262.23	1262.29	0.400	1263.87	1263.90	0.41	1264.31	End	Curb-Horiz
2		11.33	24	Cir	62.000	1262.39	1262.64	0.403	1264.31	1264.42	0.23	1264.65	1	Manhole
3		11.33	24	Cir	190.000	1262.74	1263.50	0.400	1264.65	1265.04	0.30	1265.34	2	Manhole
4		11.33	24	Cir	105.000	1263.60	1264.42	0.781	1265.34	1265.61	n/a	1265.61 j	3	Manhole
5		11.33	24	Cir	142.000	1264.52	1265.09	0.401	1265.86	1266.43	0.40	1266.83	4	Manhole
6		7.00	18	Cir	44.000	1265.59	1265.77	0.409	1266.89	1267.07	0.14	1267.21	5	DropGrate
7		3.20	18	Cir	155.000	1266.02	1266.64	0.400	1267.21	1267.42	0.18	1267.61	6	DropGrate
8		4.33	18	Cir	106.000	1265.59	1266.01	0.396	1266.83	1267.00	0.19	1267.19	5	DropGrate

Storm Sewer to Hydraulic | Number of lines: 8 | Run Date: 05-20-2009

NOTES: Return period = 5 Yrs. ; j - Line contains hyd. jump.

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

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	3.905	2	722	11,052	------	------	------	Sub 4
2	Reservoir	3.197	2	728	11,052	1	1273.09	1,716	Pipe 7
3	SCS Runoff	5.258	2	722	14,882	------	------	------	Sub 5
4	Combine	8.128	2	724	25,934	2, 3	------	------	Pond 2 Inflow
5	Reservoir	7.001	2	728	25,933	4	1272.50	3,289	Pipe 6
6	SCS Runoff	5.335	2	722	15,101	------	------	------	Sub 6
7	Reservoir	4.330	2	728	14,166	6	1272.03	3,711	Pipe 8
8	Combine	11.33	2	728	40,100	5, 7	------	------	Pipe 5

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1		7.16	24	Cir	15.000	1262.23	1262.29	0.400	1263.87	1263.88	0.17	1264.05	End	Curb-Horiz
2		7.16	24	Cir	62.000	1262.39	1262.64	0.403	1264.05	1264.08	0.14	1264.22	1	Manhole
3		7.16	24	Cir	190.000	1262.74	1263.50	0.400	1264.22	1264.52	0.31	1264.83	2	Manhole
4		7.16	24	Cir	105.000	1263.60	1264.42	0.781	1264.83	1265.37	n/a	1265.37 j	3	Manhole
5		7.16	24	Cir	142.000	1264.52	1265.09	0.401	1265.52	1266.09	0.32	1266.41	4	Manhole
6		4.48	18	Cir	44.000	1265.59	1265.77	0.409	1266.49	1266.67	0.13	1266.80	5	DropGrate
7		2.07	18	Cir	155.000	1266.02	1266.64	0.400	1266.80	1267.19	0.19	1267.38	6	DropGrate
8		2.70	18	Cir	106.000	1265.59	1266.01	0.396	1266.41	1266.66	0.21	1266.87	5	DropGrate

Storm Sewer to Hydraulic | Number of lines: 8 | Run Date: 05-20-2009

NOTES: Return period = 2 Yrs. ; j - Line contains hyd. jump.

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2008 by Autodesk, Inc. v6.052

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	2.679	2	722	7,520	------	------	------	Sub 4
2	Reservoir	2.065	2	728	7,519	1	1273.02	1,292	Pipe 7
3	SCS Runoff	3.607	2	722	10,126	------	------	------	Sub 5
4	Combine	5.402	2	724	17,645	2, 3	------	------	Pond 2 Inflow
5	Reservoir	4.482	2	730	17,644	4	1272.37	2,438	Pipe 6
6	SCS Runoff	3.660	2	722	10,275	------	------	------	Sub 6
7	Reservoir	2.697	2	728	9,340	6	1271.94	3,065	Pipe 8
8	Combine	7.159	2	730	26,984	5, 7	------	------	Pipe 5

Tab 4. Floodplain Submittal

A. Source of flood profile

Not applicable to this development.

B. Nearest base flood elevations

Not applicable to this development.

C. Delineation of pre-developed regulatory floodplain/floodway limits

Not applicable to this development.

D. Delineation of post-developed regulatory floodplain/floodway limits

Not applicable to this development.

E. Floodplain boundary determination per elevation

Not applicable to this development.

F. Provide source of floodway data table and discharges

Not applicable to this development.

G. Provide all hydrologic and hydraulic study information for site-specific floodplain studies

Not applicable to this development.

H. Provide regulatory floodway and four natural profile models (10, 50, 100, & 500-yr) for existing and future watershed conditions

Not applicable to this development.

I. Location of floodplain/floodway limits and relationship of site to upstream/ downstream properties

Not applicable to this development.

J. Floodplains and floodways located within a Reserve

Not applicable to this development.

Tab 5. Federal, State, and Local Permits

A. US Army Corps of Engineers – Regulatory Program Permits

Not applicable to this development.

B. Kansas Department of Agriculture – Division of Water Resources Permits

Not applicable to this development.

C. Federal Emergency Management Agency (FEMA) Letter of Map Changes

Not applicable to this development.

D. Kansas Department of Transportation

Not applicable to this development.

E. Sedgwick County Right-of-Way Permit

Not applicable to this development.