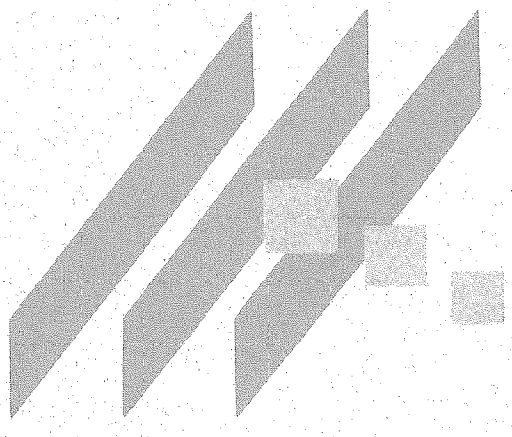
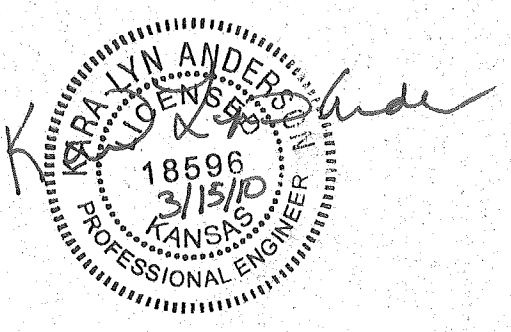
MKEC ENGINEERING CONSULTANTS, INC.





DRAINAGE REPORT

FOR

MOORINGS PLAZA III ADDITION
Wichita, Kansas

MARCH 2010

411 NORTH WEBB ROAD WICHITA, KS 67206 T 316.684.9600 F 316.684.5100

Davidson, Tim

From: Gene Rath [grath@Mkec.com]
Sent: Tuesday, April 20, 2010 2:55 PM
To: Davidson, Tim
Cc: Strahl, Neil; Kallman, Julianne; Lindebak, Scott; Greg Allison; Kara Anderson
Subject: RE: Comments: Moorings Plaza III - Drainage Report
Attachments: 08522_DUP Layout2-Layout1 (1)0001.pdf; 08522_LGP Layout2-Layout1 (1)0001.pdf; Submittal The Moorings Plaza III Addition - 08522a-REV20001.pdf

Tim:

Attached are revised drainage related sheets entitled 'Drainage and Utility Plan' and 'Lot Grading Plan'. Also attached is a revised Final Plat drawing. We believe we have addressed most of your comments and questions satisfactorily. I am responding to each of your bulleted items below as follows:

- The Lot Grading Plan has been revised. Minimum cross-slopes have been increased to 1%. There are elevations on lot corners and on curb and area inlets. Commercial lots are not draining onto residential lots. Escape routes are not specifically shown on these sheets but a note on the grading sheet and as well as verbiage in the drainage report indicate that the escape routes do not contemplate runoff traveling from commercial lots onto residential lots. Pad and VO elevations are not shown, however, per Greg Allison's discussions with Scott.
- Drainage easements are now shown on the plat.
- Drainage arrows have been added.
- Inlets are now shown on the commercial side of the joint lot lines of residential and commercial lots.
- I do not see the need for a cross-lot drainage agreement when we are not anticipating any runoff to be routed to other lots other than within a drainage or utility easement area. Maybe I am not understanding your request. If so, please further clarify where you are headed on this issue.
- The low points for the emergency overflow routes at the joint lot lines of residential and commercial lots are contemplated to be on the commercial lots. However, at this point we have not shown specific spot elevations for the low spots. It is out intent that the details of emergency overflow outlets be addressed at the time of design of improvements for each lot.

Please review and advise if there are any additional questions and/or comments.

Gene Rath

From: Davidson, Tim [mailto:TDavidson@wichita.gov]
Sent: Wednesday, March 24, 2010 3:52 PM
To: Gene Rath
Cc: Greg Allison; Strahl, Neil; Kallman, Julianne; Lindebak, Scott
Subject: Comments: Moorings Plaza III - Drainage Report

Gene,

Drainage comments for Moorings Plaza 3rd:

- Grading plan is not adequate. Minimum cross-lot slopes are not met; I am used to seeing rim elevations for area and curb inlets; I am also used to seeing PAD and VO information in order to check for emergency out issues and any glaring surcharge problems with the SWS; I also want to make sure the commercial lots are not draining onto the residential areas.
- Plat appears to be missing drainage easements along residential backyards on the east side of Harborlight Ct and west side of commercial lots 2 & 3, Blk 2.
- On the drainage plan, arrows for drainage should be drawn in basins L29-31.
- The SWS that is to serve the backyards on the east side of Harborlight Ct – the area inlets should be placed on the commercial lots since commercial lots are not to drain onto residential. Area inlets do appear to be on the commercial lots for the homes along the north side of Keywest.
- There needs to be a cross-lot drainage agreement for the residential lots to drain onto the commercial lots.
- The low points for the emergency out swale between the commercial and residential lots should be on the commercial side, and spot elevations for swale flow elevations should be shown.

Thanks,

Tim

DRAINAGE REPORT

FOR

MOORINGS PLAZA III ADDITION
Wichita, Kansas

MARCH 2010

Tab 0. Checklist

CITY OF WICHITA

Public Works, Engineering Division
Final Drainage Plan Submittal Checklist

Reviewer: City of Wichita Date: March 15, 2010

Subdivision Name: Moorings Plaza III Location: Wichita, Kansas

Total Land Area Of Ownership: 18.9 Acres

Type: ✔ Residential ____ Commercial ____ Industrial ____ Recreation ____ Municipal ____ Other

Applicant: CBB Northlakes, LLC Contact: Kurt Bachman Phone #: (316) 838-6789

Engineer: MKEC Engineering Consultants, Inc. Contact: Kara Anderson, P.E. Phone # (316) 684-9600

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	✔		Appendix 1.1		
B. Discussion of development, existing conditions, and proposed impacts on stormwater, wetland, riparian, and flood plain	✔		Tab 1 Text		
C. Discussion of offsite conditions	✔		Tab 1 Text		
D. Summary of runoff calculations (pre/post development) No increase in peak discharge for all storm series	✔		Tab 1 Text		
E. Narrative description of the type and function of the permanent best management practices that are incorporated into the site design	✔		Tab 1 Text		
F. Copy of the plat	✔		Appendix 1.2		
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.)	✔		Appendix 1.3		
H. Professional Engineer seal, signature and date on cover of report	✔		Cover		
I. CD of drainage plan in PDF format (one file) and one paper copy bound with this checklist included behind the cover	✔		Cover & Tab 0.		

	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)	✔		Appendix 2.1		
B. Runoff Method (Rational, Hydrograph Method, or other approved methods by Engineering)	✔		Tab 2 Text		
C. Existing topography (no greater than 2-foot contours, 1-foot recommend)	✔		Appendix 2.2		
D. Total Site Area and Total Impervious Area (acres)	✔		Tab 2 Text		
E. Benchmarks used for site control	✔		Appendix 2.1		
F. Streams, creeks, and waterway labeled	✔		Appendix 2.1		
G. Predominant soils from USDA soil surveys, and/or on site soil borings	✔		Tab 2 Text and Appendix 2.4		
H. Location and boundaries of natural features such as wetlands, lakes, and ponds with the normal water elevation noted	✔		Appendix 2.1		
I. Location of existing roads, buildings, parking lots and other impervious areas.	✔		Appendix 2.1		

Consulting Engineer Initials _____

J. Location of existing utilities (e.g., water, sewer, gas, electric) and easements	✔		Appendix 2.1		
K. Location of existing conveyance systems such as storm drains, inlets, catch basins, channels, swales, and areas of overland flow	✔		Appendix 2.1		
L. Flow paths	✔		Appendix 2.1		
M. Location and dimensions of existing channels, bridges or culvert crossings	✔		Appendix 2.1		
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	✔		Tab 2 Text		
O. Assumed pre-developed runoff curve numbers	✔		Appendix 2.6		
P. Existing time of concentrations used in calculations	✔		Appendix 2.6		
Q. Evaluate immediate downstream drainage capacity, not to exceed more than 0.25 miles downstream of site	✔		Tab 2 Text		
R. Existing structural elevations (e.g., invert of pipes, manholes, etc.)	✔		Appendix 2.6		
S. Cross-section data for open channels	✔		Tab 2 Text		
T. Ground water elevations, if applicable	✔		Tab 2 Text		

	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)	✔		Tab 3 Text and Appendix 2.5		
B. Proposed time of concentrations used in calculations	✔		Appendix 2.6		
C. Assumed post-developed runoff curve numbers	✔		Appendix 2.6		
D. Proposed contours for detention facilities (to equal area used in outlet rating curves)		✔	No detention facility on site		
E. Preliminary sizing calculations for stormwater controls including contributing drainage area, storage, and outlet configuration	✔		Appendix 3.2		
F. Stage-storage-discharge or outlet rating curves and inflow and outflow hydrographs for storage facilities		✔	No Storage facility on site		
G. Final analysis of potential upstream/downstream impact/effects of project, where necessary	✔		Tab 3 Text		
H. Existing and proposed structural elevations (e.g., invert of pipes, manholes, etc.)	✔		Appendix 3.1		
I. Design water surface elevations and normal pool elevation for ponds.		✔	No ponds on site		
J. Typical detail for outlet structures, embankments, spillways, grade control structures, conveyance channels, etc. To include height, width, elevation, and/or diameter.	✔		Appendix 3.1		
K. Proposed limits of clearing and grading	✔		Tab 3 Text		
L. Location of existing and proposed roads, buildings, parking lots and other impervious areas.	✔		Appendix 3.1		
M. Location of existing and proposed utilities (e.g., water, sewer) and easements	✔		Appendix 3.1		
N. Location of existing and proposed conveyance systems such as storm drains, inlets, catch basins, channels, swales, and areas of overland flow	✔		Appendix 3.1		
O. Preliminary location and dimensions of proposed channel modifications, such as bridge or culvert crossings		✔	No channel modifications		

Consulting Engineer Initials _____

P. Preliminary selection and location of stormwater controls	✔		Appendix 3.1		
Q. Emergency overflow structure's flow path	✔		Appendix 3.1		
R. Detention facility provides one-foot of freeboard above the HWL and emergency outfall shown (top of berm elevation shown)		✔	No detention pond on site		
S. The 100-year 24-hour HWL delineated on the plan for detention pond		✔	No detention pond on site		
T. Lowest opening elevations table on the plat for structures located adjacent to channels or ponds	✔		Tab 3 Text		
U. Stormwater Management Facilities located within a Reserve		✔	No detention pond on site		
V. Maintenance responsibility of stormwater management facility shall be specified in the platters text. (e.g. HOA, Lot Owners Association, or lot)	✔		Tab 3 Text		
W. Off-site drainage easements or agreements required, where necessary	✔		Tab 3 Text		

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

	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)		✔	No wetlands or jurisdictional water ways		
B. Kansas Department of Agriculture - Division of Water Resources Permits (Stream Obstruction, Channel Change, Flood Plain Fill, Levee, Water Appropriations, Dam safety permit, etc.)		✔	No jurisdictional waterways		
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.		✔	No FEMA floodplain		
D. Kansas Department of Transportation		✔	No KDOT roads		
E. Sedgwick County Right-of-way Permit		✔	No county roads		

Consulting Engineer Initials _____

Tab 1. Project Narrative

Location

The subject property is in the City of Wichita, Sedgwick County, Kansas. The proposed development is on Meridian Avenue, south of the intersection of Meridian Avenue and 53rd Street North. The site lies in the northeast quarter of Section 24, Township 26 South, Range 1 west. Moorings Plaza II borders the site to the east and Moorings 10th Addition borders the site to the west. The plat area is 18.9 acres. The site is shown on the USGS Map, Appendix 1.1.

Discussion of Development

Moorings Plaza III is currently undeveloped land. It will develop as 4 commercial lots, 1 multi-family residential lot and 40 residential lots. The residential lots are approximately 1/8 of an acre in size. The proposed site is shown on the plat, Appendix 1.2

Drainage Summary

Pre-Development

Moorings Plaza III currently drains from south to north into an existing drainage channel that flows from northwest to southeast and under Meridian Avenue. Pre-development flow rates to the existing channel are shown in Table 1.1.

Post-Development

Moorings Plaza III will continue to drain to the north into the existing drainage channel. The site was modeled in the Moorings 10th Drainage Report and the model was updated for this development. The detention provided in the Moorings 10th Addition accounted for this area being developed. Preliminary lot layout and grading are shown in the Preliminary Lot Grading Plan, Appendix 1.3.

Table 1.1. Comparison of Pre and Post-Development Flow Rates

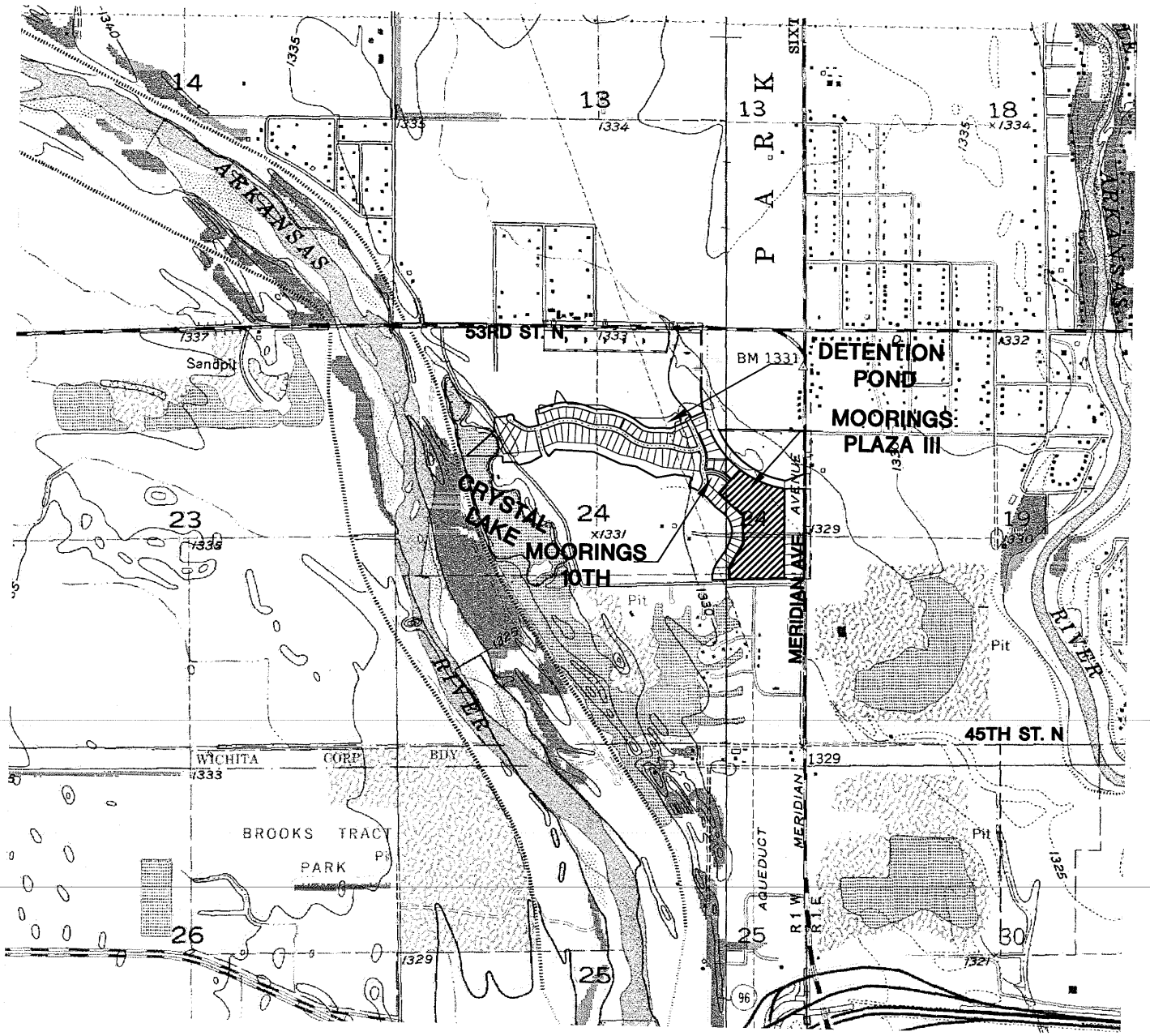
Description	Design Storm Flows (cfs)				
	2-Yr	5-Yr	10-Yr	25-Yr	100-Yr
Pre-project Flow to Channel	111	191	249	342	483
Post-project Flow to Channel	107	183	238	327	463

Best Management Practices

The site will be seeded or sodded after construction of grading and utilities are complete. During construction curb protection, inlet protection and other erosion protection devices will be used to prevent soil from leaving the site. The site will be seeded and sodded upon completion of construction. Riprap will protect storm sewer outfalls.

Appendix 1.1

USGS Quadrangle Map



SCALE 1:24 000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

N

CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

J:\Civil\06608_Plaza_III\Dwg\DRNG\08522_QUAD.DWG

MKEC ENGINEERING CONSULTANTS, INC.
411 N. WEBB ROAD
WICHITA, KS. 67206
316 - 684 - 9600

MOORINGS PLAZA III ADDITION
PROJECT NAME

QUAD MAP
SHEET TITLE

KLA	CMJ	GJA
DESIGN BY:	DRAWN BY:	CHECKED BY:
MARCH 2010	08522	1 / 1
DATE	JOB NO.	SHEET/OF

Appendix 1.2

Plat

FINAL PLAT

THE MOORINGS PLAZA III ADDITION

AN ADDITION TO WICHITA, SEDGWICK COUNTY, KANSAS

CERTIFICATE OF SURVEY

I, Gregory J. Allison, a registered land surveyor in Kansas, do hereby certify that I have been in responsible charge of surveying and platting of "THE MOORINGS PLAZA III ADDITION", an addition to Wichita, Sedgwick County, Kansas, into Lots, Blocks, a Reserve, and Streets, the same being accurately set forth in the accompanying plat and described herein:

A tract of land lying in a portion of the East Half, Section 24, Township 26 South, Range 1 West, of the 6th Principal Meridian, Wichita, Sedgwick County, Kansas; said tract being more particularly described as follows:
BEGINNING at the southeast corner of Lot 1, Block 1, The Moorings Tenth Addition, an addition to Wichita, Sedgwick County, Kansas, thence along the east lines of said addition for the next five (5) courses on a platted bearing of N01°36'24"W, 155.00 feet to the northeast corner of said Lot 1, said Block 1; thence N29°18'36"E, 360.06 feet to a northeasterly corner of Lot 6, said Block 1; thence N00°46'02"W, 352.85 feet to a northeasterly corner of Lot 10, said Block 1; thence N48°33'38"W, 428.14 feet to the northeast corner of Lot 15, said Block 1; thence N41°26'22"E, 415.48 feet to northeast corner of Lot 10, Block 2, of said addition being a point on a non-tangent curve to the left, being coincident with the south line of a 105' Drainage Dedication recorded Doc.#FLM-PG: 28868254; thence along said curve and said south line, 630.03 feet to the northwest corner of Lot 4, Block 2, The Moorings Plaza II Addition, an addition to Wichita, Sedgwick County, Kansas, said curve having a central angle of 28°35'23", a radius of 1262.63 feet, and a long chord distance of 623.52 feet, bearing S67°32'47"E; thence along the west line of said The Moorings Plaza II Addition, S00°46'02"E, 1158.51 feet to the southwest corner of Reserve "B" said The Moorings Plaza II Addition, being coincident with the north right-of-way line of Keywest Street; thence along said north right-of-way line, S88°23'36"W, 713.26 feet to the POINT OF BEGINNING.

Said tract CONTAINS: 822,615 square feet or 18.88 acres of land, more or less.

All streets, easements, setbacks, access controls, dedications, together with that portion of Drainage and Utility Easement recorded Doc.#/FLM-PG: 29050888, and that portion of Drainage Easement recorded Doc.#/FLM-PG: 28982154, all within the above described property are hereby vacated and replatted by virtue of K.S.A. 12-512(b).

I hereby certify that the details of this plat are correct to the best of my knowledge and belief this __ day of _____ 2010.

Gregory J. Allison, PE, LS #1257
MKEC Engineering Consultants, Inc.
411 North Webb Road
Wichita, Kansas 67206

BENCH MARKS

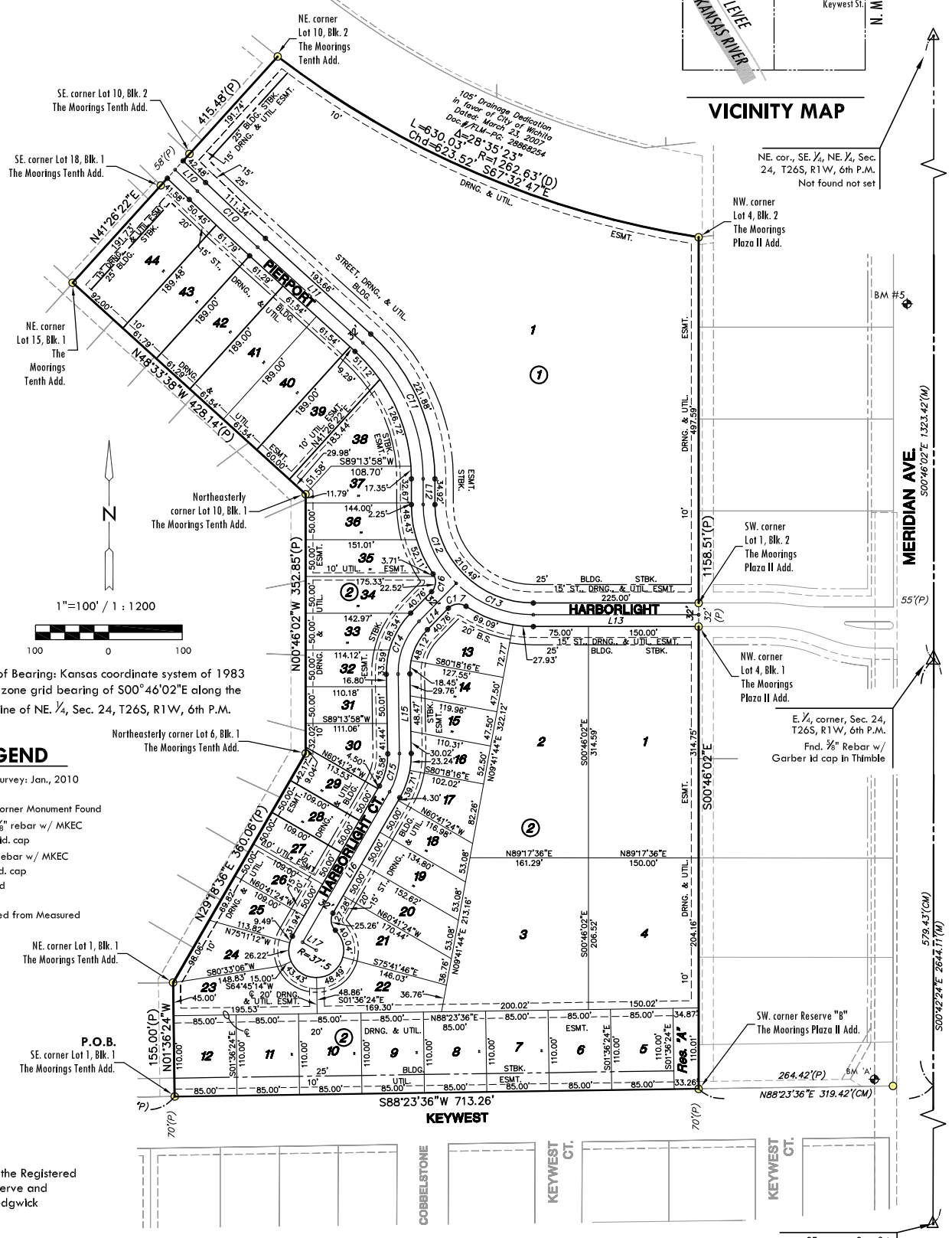
BM 'A' — City of Wichita disc northwest corner of Meridian and Keywest
Elev. = 1329.86 NAVD 88

BM #5 — Elev. = 1329.36 NGVD 29
Square cut at SW. corner of RCB; 46' feet west of centerline of Meridian Ave. and 668' N. of the E. ¼ corner, Sec. 24, T26S, R1W.
Elev. = 1328.69 NAVD 88
Elev. = 1328.19 NGVD 29

MINIMUM PAD ELEVATION *LOWEST OPENING*		
LOTS	BLK.	ELEVATION
1	1	1329.5 NAVD 88 1329.0 NGVD 29

NOTE

In association with ZON2009-18 "THE MOORINGS PLAZA III ADDITION" is subject to the conditions of Protective Overlay (PO-234).



Basis of Bearing: Kansas coordinate system of 1983 south zone grid bearing of S00°46'02"E along the E. Line of NE. ¼, Sec. 24, T26S, R1W, 6th P.M.

LEGEND

Date of Survey: Jan., 2010

- △ = Section corner Monument Found
- ○ = Found ⅝" rebar w/ MKEC CLS 39 id. cap
- ● = Set ⅝" Rebar w/ MKEC CLS 39 id. cap
- (M) = Measured
- (P) = Platted
- (CM) = Calculated from Measured
- (D) = Deeded

OWNER'S CERTIFICATE

Know all men by these presents that the undersigned property owner of the land above set forth in the Registered Land Surveyor's Certificate, has caused the same to be surveyed and platted into Lots, Blocks, a Reserve and Streets the same to be known as "THE MOORINGS PLAZA III ADDITION," an addition to Wichita, Sedgwick County, Kansas.

Easements for the construction and maintenance of public utilities and drainage, as indicated on the accompanying plat are hereby granted to the public. Private screening fences, walls, and associated appurtenances may cross drainage and or utility easements.

The streets are hereby dedicated to and for the use of the public.

Reserve "A" is platted for utilities confined by easements, sidewalks, landscaping, irrigation, signs, open space, monuments, public access to Lots 1, 2, 3, and 4, Block 1. The Reserve shall be owned and maintained by the developer and/or a Lot Owner's Association and are reserved for the stated uses.

A drainage plan has been developed for this plat. Drainage easements, rights-of-way, or reserves shall remain at established grades or as modified with the approval of the applicable City or County Engineer, and unobstructed to allow for the conveyance of storm water. According to the FEMA FIRM Map Panels 20173C0213E and 20173C0195E, dated February 7, 2007, the property is located within FEMA Zone X. Lot 1, Block 1, is required to adhere to the minimum pad elevations as shown on the Minimum Pad Elevations table.

Lots 1, 2, 3, 4, Block 2, shall have reciprocal cross lot access and utility easements by a private developers agreement or similar covenant by separate instrument.

CBB NORTHLAKES, LLC, a Kansas limited liability company

_____, Member
Kurt Bachman, Member

_____, Member
Brad Bachman, Member

STATE OF KANSAS, SEDGWICK COUNTY} ss:

This instrument was acknowledged before me on ____ day of _____ , 2010, by Kurt Bachman and Brad Bachman, Members, CBB Northlakes, LLC, a Kansas limited liability company.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal, the day and year last above written.

Affix Seal

_____, Notary Public
Notary Public:

My Term Expires: _____.

COUNTY SURVEYOR

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

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

STREET CENTERLINE TABLE		
LINE	LENGTH	BEARING
L10	42.03	S46°57'33"E
L11	193.66	S48°33'38"E
L12	34.92	S00°46'02"E
L13	225.00	N89°13'58"E
L14	72.42	S43°37'26"W
L15	108.25	S01°46'59"E
L16	236.44	S29°18'36"W
L17	21.50	S60°41'24"E

CURVE TABLE					
CURVE	LENGTH	RADIUS	DELTA	CHORD	BEARING
C10	111.79	4000.00	1°36'05"	111.79	S47°45'36"E
C11	208.54	250.00	47°47'36"	202.54	N24°39'50"W
C12	119.40	150.00	45°36'32"	116.28	S23°34'18"E
C13	116.22	150.00	44°23'28"	113.33	S68°34'18"E
C14	79.25	100.00	45°24'25"	77.19	S20°55'14"W
C15	54.27	100.00	31°05'35"	53.60	N13°45'49"E
C16	26.23	19.00	79°05'40"	24.20	N04°04'36"E
C17	26.23	19.00	79°05'40"	24.20	S83°10'16"W

REGISTER OF DEEDS CERTIFICATE

STATE OF KANSAS, SEDGWICK COUNTY} ss:

This is to certify that this instrument was filed for record in the Register of Deeds office this ____ day of _____ , 2010, at _____ o'clock _M; and is duly recorded.

Affix Seal

_____, Register of Deeds
Bill Meek, Register of Deeds

Attest:

_____, Deputy
Tonya E. Buckingham, Deputy

PLANNING COMMISSION CERTIFICATE

This plat of "THE MOORINGS PLAZA III ADDITION" has been submitted to and approved by the Wichita-Sedgwick County Metropolitan Area Planning Commission, Wichita, Kansas.

Dated this ____ day of _____ , 2010

WICHITA-SEDGWICK COUNTY METROPOLITAN AREA PLANNING COMMISSION

_____, Chairman
G. Nelson VanFleet, Chairman

Attest:

_____, Secretary
John L. Schlegel, Secretary

Affix MAPC Seal

GOVERNING BODY CERTIFICATE

The dedications shown on this plat are hereby accepted and this plat is hereby approved by the governing body of the City of Wichita, Kansas.

Dated this ____ day of _____ , 2010

At the direction of the City Council.

_____, Mayor
Carl Brewer, Mayor

Attest:

_____, City Clerk
Karen Sublett, City Clerk

Affix Wichita, KS. Official Seal

TRANSFER RECORD

STATE OF KANSAS, SEDGWICK COUNTY} ss:

Entered on transfer record this ____ day of _____ , 2010

_____, County Clerk
Kelly B. Arnold, County Clerk

Affix Seal

MKEC ENGINEERING CONSULTANTS, INC.
411 N. WEBB ROAD
WICHITA, KS. 67206
316 - 684 - 9600

Appendix 1.3

Preliminary Grading Plan

DRAINAGE CHANNEL
100-YR WSEL=1326.0

PIERPORT

HARBORLIGHT

HARBORLIGHT CT.

R=37.5

KEYWEST

Res. "A"

32' (P)

58' (P)

LEGEND

- 6IN - CONIFEROUS TREE
- 3IN - DECIDUOUS TREE
- SN - SIGN
- PP - POWER POLE
- ELEC BOX - ELECTRIC BOX
- LP - LIGHT POLE
- FH - FIRE HYDRANT
- WV - WATER VALVE
- WM - WATER METER
- - SECTION CORNER
- BM - BENCHMARK
- - EASEMENT
- - BUILDING SETBACK
- - FENCE
- - STORM SEWER PIPE
- - WATER LINE
- - SANITARY SEWER LINE
- - GAS LINE
- - GAS PIPELINE
- - TELEPHONE LINE
- - UNDERGROUND ELEC.
- - OVERHEAD ELECTRIC
- - FIBER OPTIC CABLE !
- 78.0 - SPOT ELEVATIONS
- ***WO*** - WALKOUT
- ***VO*** - VIEWOUT
- ***NOVO*** - NO VIEWOUT
- ***WO*** * - WALKOUT WHICH MAY REQUIRE THICKER FOOTING AND/OR ENGINEERED FILL UNDER FOOTINGS

PAD=14XX.X
ADD X STEPS
TF=14XX.X
VO=14XX.X
= PROP. HOUSE ELEV.

PAD=14XX.X
ADD X STEPS
TF=14XX.X
VO=13XX.X
= EXIST. PLOT PLAN

R 1 W
53rd St. N.
PLAT LOCATION
24
Keywest St.
N. Meridian Ave.
T 26 S
LEVEE
ARKANSAS RIVER

VICINITY MAP

N

SCALE: 1"=50'
0 50 100 150

NOTE: ELEVATIONS ARE NGVD29

BENCH MARKS

BM 'A' - City of Wichita disc northwest corner of Meridian and Keywest
Elev. = 1329.36 (NGVD 29)

BM #5 - Square cut at SW. corner of RCB; 46' feet west of centerline of Meridian Ave. and 668' N. of the E. ¼ corner, Sec. 24, T26S, R1W.
Elev. = 1328.19 (NGVD 29)

MKEC ENGINEERING CONSULTANTS, INC.
411 N. WEBB ROAD
WICHITA, KS. 67206
316 - 684 - 9600

MOORINGS PLAZA III ADDITION
PROJECT NAME

LOT GRADING PLAN
SHEET TITLE

KLA	CMJ	GJA
DESIGN BY:	DRAWN BY:	CHECKED BY:
MARCH 2010	08522	1 / 1
DATE	JOB NO.	SHEET/OF

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Tab 2. Existing Conditions

Description

The site is 18.9 acres of which zero acres are impervious area under existing conditions. The site is shown on the aerial photograph, Appendix 2.1. The site is shown on the Existing Conditions Map in Appendix 2.2.

FEMA Floodplains

The platted area is located in Zone X, areas protected by levees from the 1% annual chance storm, as shown on the Sedgwick County February 2, 2007, Kansas FIRM Panels 195 & 213 of 700, Appendix 2.3. The Arkansas River is west of the site. The Arkansas River is in Zone A floodplain.

Soils

According to the NRCS (SCS) Sedgwick County Soil Survey, Appendix 2.4, soils on the site are:

- Tabler silty clay loam, 0 to 1 percent slopes, HSG "D"
- Imano clay loam, occasionally flooded, HSG "D"

Hydraulic Soil Group "D" was used for calculations for the basin which includes the site. Upstream of the site, the drainage area is primarily made up of Elandco silt loam, rarely flooded, HSG "B". Hydraulic Soil Group "B" was used for this basin.

Drainage Calculations

Runoff Method

The site was modeled using the SCS Hydrograph method in Hydraflow Hydrographs by AutoCAD 3D 2009, Appendix 2.5. The model was originally created for the *Moorings 10th Addition June 2007 Drainage Report.*

Rainfall

The rainfall information used is from the Kansas Department of Transportation Rainfall Depth Tables for Kansas Counties June 1997. The rainfall values used are shown in Table 2.1.

Table 2.1. 24-Hour Rainfall Depths.

	2-Yr	5-Yr	10-Yr	25-Yr	100-Yr
Sedgwick	3.50	4.53	5.24	6.24	7.80

Time of Concentration

Time of concentration was calculated using the FAA method. Weighted curve numbers were calculated to represent the land usage of the basins. Calculations are in Appendix 2.6.

Table 2.2. Existing Times of Concentration and Curve Numbers

Area	T_c	Curve Number
	minutes	
Offsite	380.8	71.4
To Outlet	56.7	81.0
To Pond	48.0	81.0
WS1	27.9	81.0
WS2	40.4	81.0
WS3	24.2	81.0
To Moorings North Pond	15.0	81.0

Curve Numbers

A weighted average of various land uses on site were used for each basin. The curve number used for pre-developed conditions is 81 for onsite and a weighted curve number of 71.4 for the offsite watershed. The curve numbers are shown in Table 2.2.

Drainage Patterns

The site is reasonably flat, but runoff from the site generally flows from south to north into an existing engineered channel that borders the site to the north. This channel has a 10-foot bottom and 3.5:1 side slopes and drains into an existing 12'x6' RCB. The channel has a drainage area of 1,315 acres according to calculations provided by Baughman in February 2007 and drains into 2-8'x4' RCBs as proposed on the Storm Water Drain #307 March 2007 plans by Baughman.

An existing storm water sewer system built with the Moorings 10th Addition is northwest of the site and conveys some runoff into the existing channel.

The basin was divided into the drainage areas as shown on the Basin Map, Appendix 2.7. Runoff from north of the site and from the adjacent Moorings Additions drains into the engineered channel. The site was modeled to determine the flow rate to the existing drainage channel. Pre-Development flow rates are shown in Table 2.3.

Table 2.3. Pre-Development Flow Rates

Description	Design Storm Flows (cfs)				
	2-Yr	**5-Yr**	**10-Yr**	**25-Yr**	**100-Yr**
Flow to Channel	111	191	249	342	483

Utilities

There is an existing 15-inch sanitary sewer line on the west side of Meridian. An 8-inch sanitary sewer line constructed with the Moorings 10th Addition borders the site to the west. Water was constructed with the Moorings 10th Addition in Pierport Street right-of-way.

Groundwater Elevations

Groundwater near 53rd Street North and Meridian Avenue is at an elevation of 1316.0 according to the City of Wichita Basement Construction Advisory Map. West of the site Crystal Lake in the Moorings 10th Addition has a groundwater elevation of 1324.9.

Appendix 2.1

Aerial Photograph

N

SCALE 1:24000

1 0 1/2 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0 5 1 KILOMETER

CONTOUR INTERVAL 10 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929

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411 N. WEBB ROAD
WICHITA, KS. 67206
316 - 684 - 9600

MOORINGS PLAZA III ADDITION
PROJECT NAME

AERIAL MAP
SHEET TITLE

KLA	CMJ	GJA
DESIGN BY:	DRAWN BY:	CHECKED BY:
MARCH 2010	08522	1 / 1
DATE	JOB NO.	SHEET/OF

Appendix 2.2

Existing Conditions Map

DRAINAGE CHANNEL
100-YR WSEL=1326.0

ZONED "SF-5"

ZONED "SF-5"

MOORINGS 10th ADDITION

MOORINGS PLAZA II

EXIST 42" SWS

EXIST 36" SWS

EXIST 8" WTR

EXIST 8" SAN.

EXIST 6" SAN.

1329

1330

1331

LEGEND

- 6IN - CONIFEROUS TREE
- 3IN - DECIDUOUS TREE
- SN - SIGN
- PP - POWER POLE
- ELEC BOX - ELECTRIC BOX
- LP - LIGHT POLE
- FH - FIRE HYDRANT
- WV - WATER VALVE
- WM - WATER METER
- - SECTION CORNER
- BM - BENCHMARK
- - EASEMENT
- - BUILDING SETBACK
- X X - FENCE
- - STORM SEWER PIPE
- W - WATER LINE
- - SANITARY SEWER LINE
- G - GAS LINE
- P - GAS PIPELINE
- UGT - TELEPHONE LINE
- UGE - UNDERGROUND ELEC.
- OHE - OVERHEAD ELECTRIC
- FOC - FIBER OPTIC CABLE
- - DRAINAGE SUB BASIN
- - DRAINAGE BASIN
- - FLOW ARROW
- A17 - AREA FOR SWS SIZING

R 1 W
53rd St. N.

PLAT LOCATION

24

Keywest St.

N. Meridian Ave.
T 26 S

LEVEE

ARKANSAS RIVER

VICINITY MAP

KEYWEST

WS3 BOUNDARY

N

SCALE: 1"=50'

0 50 100 150

NOTE: ELEVATIONS ARE NGVD29

BENCH MARKS

BM 'A' - City of Wichita disc northwest corner of Meridian and Keywest
Elev. = 1329.36 (NGVD 29)

BM #5 - Square cut at SW. corner of RCB; 46' feet west of centerline of Meridian Ave. and 668' N. of the E. ¼ corner, Sec. 24, T26S, R1W.
Elev. = 1328.19 (NGVD 29)

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316 - 684 - 9600

MOORINGS PLAZA III ADDITION
PROJECT NAME

EXISTING CONDITIONS
SHEET TITLE

KLA	CMJ	GJA
DESIGN BY:	DRAWN BY:	CHECKED BY:
MARCH 2010	08522	1 / 1
DATE	JOB NO.	SHEET/OF

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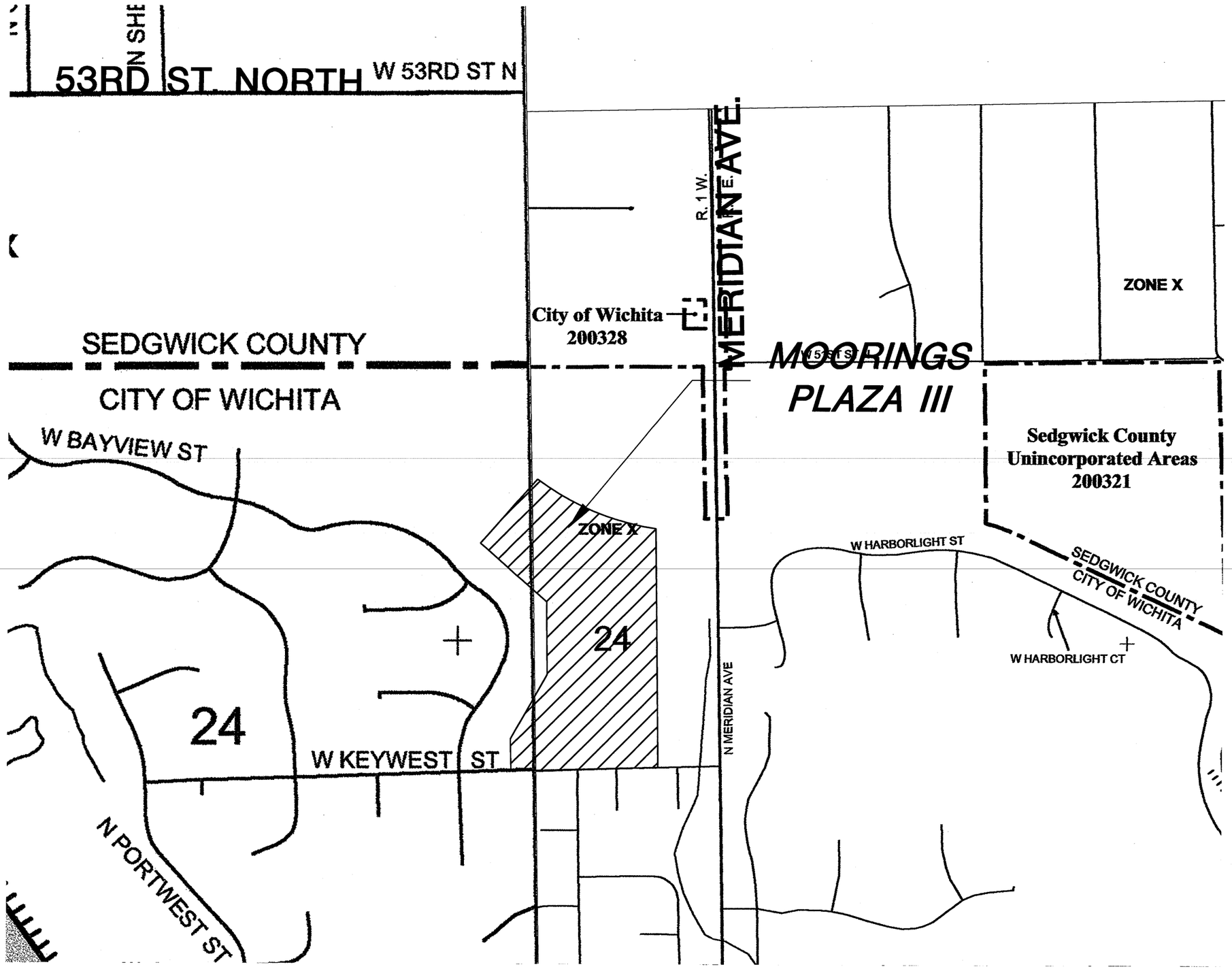
Appendix 2.3

Flood Insurance Rate Map (FIRM)



NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0213E

FIRM

FLOOD INSURANCE RATE MAP

SEDGWICK COUNTY, KANSAS
AND INCORPORATED AREAS

PANEL 213 OF 700

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
PARK CITY, CITY OF	200963	0213	E
SEDGWICK COUNTY	200321	0213	E
WICHITA, CITY OF	200328	0213	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
20173C0213E

EFFECTIVE DATE
FEBRUARY 2, 2007
Federal Emergency Management Agency

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

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MOORINGS PLAZA III ADDITION
PROJECT NAME

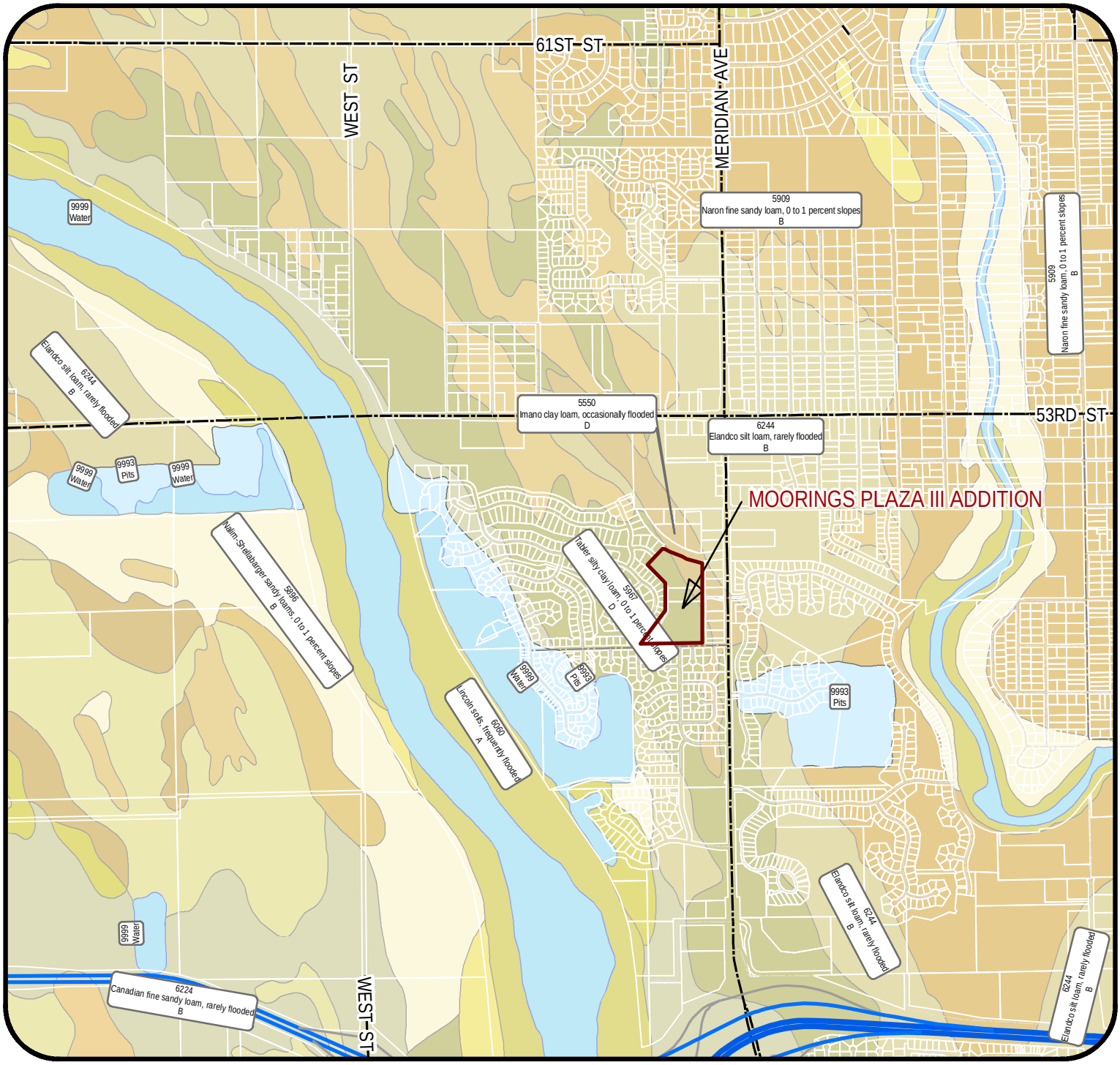
FIRM PANEL 195 & 213 OF 700
SEDGWICK COUNTY, KANSAS
SHEET TITLE

MKEC ENGINEERING CONSULTANTS, INC.
411 N. WEBB ROAD
WICHITA, KS. 67206
316 - 684 - 9600

KLA	CMJ	GJA
DESIGN BY:	DRAWN BY:	CHECKED BY:
MARCH 2010	08522	1 / 1
DATE	JOB NO.	SHEET/OF

Appendix 2.4

Soil Survey



1 0.5 0 1 Miles

1,000 500 0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000 Feet

1 0.5 0 1 Kilometers

J:\Civil\06608\PLAZA III\dwg\DRNG\nrcs-soil.mxd

MOORINGS PLAZA III ADDITION

Project Name:

Soil Survey - Sedgwick County, KS

Sheet Title:

MKEC ENGINEERING CONSULTANTS, INC.

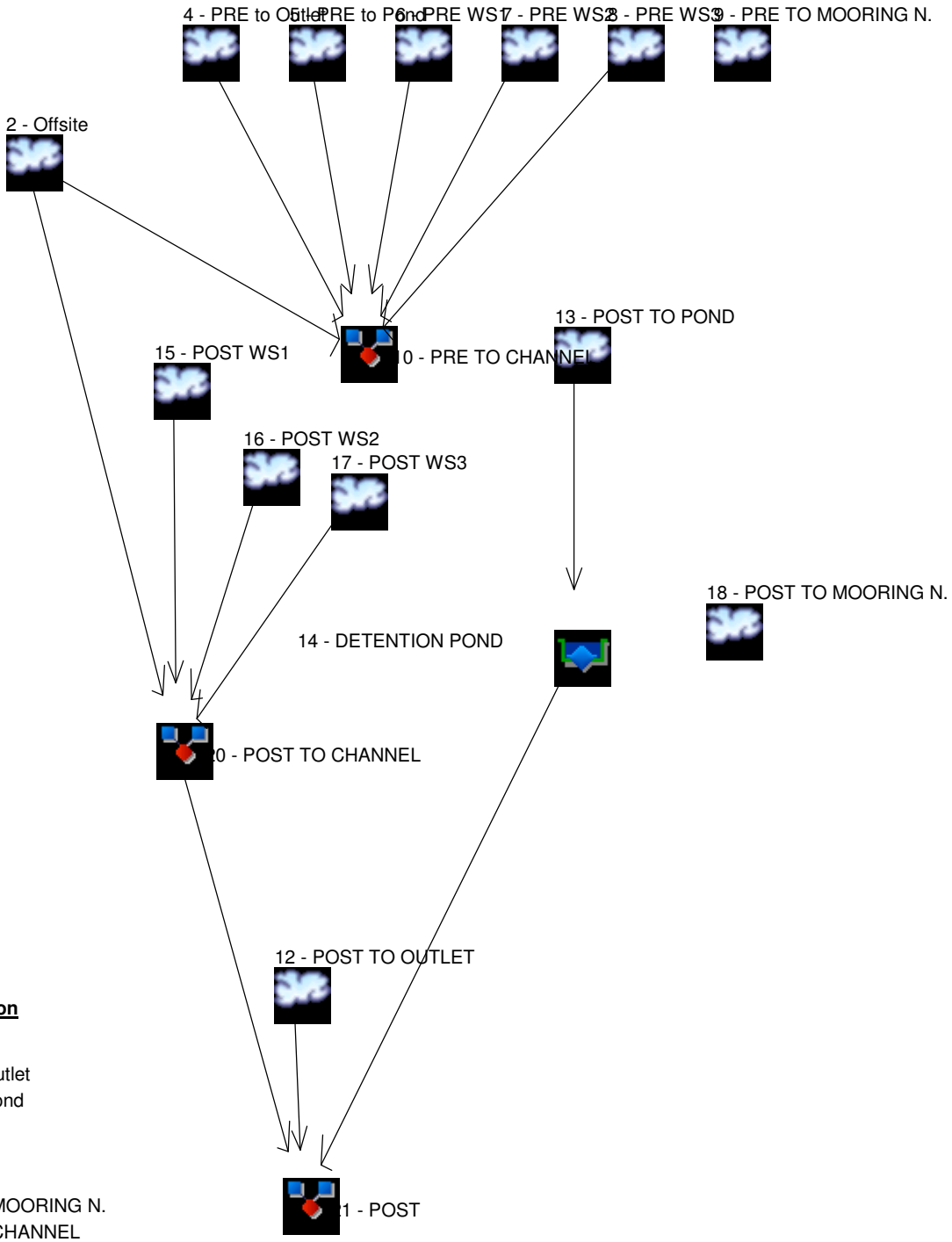
CMJ	MARCH 2010
Drawn By:	Date:
KLA/GJA	08522
Design / Review:	Job No.:

Appendix 2.5

Hydraflow Hydrographs Output

Watershed Model Schematic

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



Legend

Hyd.	Origin	Description
2	SCS Runoff	Offsite
4	SCS Runoff	PRE to Outlet
5	SCS Runoff	PRE to Pond
6	SCS Runoff	PRE WS1
7	SCS Runoff	PRE WS2
8	SCS Runoff	PRE WS3
9	SCS Runoff	PRE TO MOORING N.
10	Combine	PRE TO CHANNEL
12	SCS Runoff	POST TO OUTLET
13	SCS Runoff	POST TO POND
14	Reservoir	DETENTION POND
15	SCS Runoff	POST WS1
16	SCS Runoff	POST WS2
17	SCS Runoff	POST WS3
18	SCS Runoff	POST TO MOORING N.
20	Combine	POST TO CHANNEL
21	Combine	POST

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
2	SCS Runoff	------	-------	103.26	-------	178.61	233.35	321.13	-------	454.92	Offsite
4	SCS Runoff	------	-------	5.844	-------	9.179	11.46	14.97	-------	20.10	PRE to Outlet
5	SCS Runoff	------	-------	38.75	-------	60.68	75.59	98.40	-------	131.46	PRE to Pond
6	SCS Runoff	------	-------	2.938	-------	4.574	5.682	7.373	-------	9.819	PRE WS1
7	SCS Runoff	------	-------	7.074	-------	11.08	13.80	17.96	-------	24.00	PRE WS2
8	SCS Runoff	------	-------	29.76	-------	46.33	57.55	74.69	-------	99.46	PRE WS3
9	SCS Runoff	------	-------	10.64	-------	16.47	20.41	26.42	-------	35.09	PRE TO MOORING N.
10	Combine	2, 4, 5, 6, 7, 8,	-------	110.82	-------	190.85	248.78	341.52	-------	482.57	PRE TO CHANNEL
12	SCS Runoff	------	-------	17.21	-------	24.39	29.09	36.13	-------	46.13	POST TO OUTLET
13	SCS Runoff	------	-------	94.56	-------	128.65	150.82	183.87	-------	230.81	POST TO POND
14	Reservoir	13	-------	94.93	-------	129.24	151.03	183.55	-------	226.33	DETENTION POND
15	SCS Runoff	------	-------	6.665	-------	8.937	10.41	12.62	-------	15.75	POST WS1
16	SCS Runoff	------	-------	17.99	-------	24.16	28.16	34.15	-------	42.65	POST WS2
17	SCS Runoff	------	-------	60.56	-------	83.99	99.25	122.03	-------	154.35	POST WS3
18	SCS Runoff	------	-------	16.42	-------	22.60	26.62	32.62	-------	41.13	POST TO MOORING N.
20	Combine	2, 15, 16, 17,	-------	106.05	-------	182.61	238.11	327.06	-------	462.50	POST TO CHANNEL
21	Combine	12, 14, 20	-------	194.98	-------	272.30	323.73	402.90	-------	516.37	POST

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 (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph description
2	SCS Runoff	103.26	6	1098	121.040	------	------	------	Offsite
4	SCS Runoff	5.844	6	804	2.574	------	------	------	PRE to Outlet
5	SCS Runoff	38.75	6	744	8.504	------	------	------	PRE to Pond
6	SCS Runoff	2.938	6	732	0.434	------	------	------	PRE WS1
7	SCS Runoff	7.074	6	744	1.553	------	------	------	PRE WS2
8	SCS Runoff	29.76	6	732	4.392	------	------	------	PRE WS3
9	SCS Runoff	10.64	6	726	1.161	------	------	------	PRE TO MOORING N.
10	Combine	110.82	6	1032	138.495	2, 4, 5, 6, 7, 8,	------	------	PRE TO CHANNEL
12	SCS Runoff	17.21	6	744	3.652	------	------	------	POST TO OUTLET
13	SCS Runoff	94.56	6	732	13.896	------	------	------	POST TO POND
14	Reservoir	94.93	6	732	13.896	13	1328.01	0.027	DETENTION POND
15	SCS Runoff	6.665	6	726	0.748	------	------	------	POST WS1
16	SCS Runoff	17.99	6	732	2.678	------	------	------	POST WS2
17	SCS Runoff	60.56	6	726	6.594	------	------	------	POST WS3
18	SCS Runoff	16.42	6	726	1.796	------	------	------	POST TO MOORING N.
20	Combine	106.05	6	1086	131.060	2, 15, 16, 17,	------	------	POST TO CHANNEL
21	Combine	194.98	6	732	148.609	12, 14, 20	------	------	POST

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 (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph description
2	SCS Runoff	178.61	6	1062	204.336	------	------	------	Offsite
4	SCS Runoff	9.179	6	798	3.941	------	------	------	PRE to Outlet
5	SCS Runoff	60.68	6	744	13.021	------	------	------	PRE to Pond
6	SCS Runoff	4.574	6	732	0.664	------	------	------	PRE WS1
7	SCS Runoff	11.08	6	744	2.377	------	------	------	PRE WS2
8	SCS Runoff	46.33	6	732	6.725	------	------	------	PRE WS3
9	SCS Runoff	16.47	6	726	1.778	------	------	------	PRE TO MOORING N.
10	Combine	190.85	6	1008	231.064	2, 4, 5, 6, 7, 8,	------	------	PRE TO CHANNEL
12	SCS Runoff	24.39	6	744	5.190	------	------	------	POST TO OUTLET
13	SCS Runoff	128.65	6	732	19.147	------	------	------	POST TO POND
14	Reservoir	129.24	6	732	19.147	13	1328.35	0.098	DETENTION POND
15	SCS Runoff	8.937	6	726	1.018	------	------	------	POST WS1
16	SCS Runoff	24.16	6	732	3.646	------	------	------	POST WS2
17	SCS Runoff	83.99	6	726	9.257	------	------	------	POST WS3
18	SCS Runoff	22.60	6	726	2.504	------	------	------	POST TO MOORING N.
20	Combine	182.61	6	1056	218.257	2, 15, 16, 17,	------	------	POST TO CHANNEL
21	Combine	272.30	6	732	242.594	12, 14, 20	------	------	POST

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 (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph description
2	SCS Runoff	233.35	6	1050	263.943	------	------	------	Offsite
4	SCS Runoff	11.46	6	798	4.877	------	------	------	PRE to Outlet
5	SCS Runoff	75.59	6	744	16.116	------	------	------	PRE to Pond
6	SCS Runoff	5.682	6	732	0.822	------	------	------	PRE WS1
7	SCS Runoff	13.80	6	744	2.942	------	------	------	PRE WS2
8	SCS Runoff	57.55	6	732	8.323	------	------	------	PRE WS3
9	SCS Runoff	20.41	6	726	2.200	------	------	------	PRE TO MOORING N.
10	Combine	248.78	6	1002	297.023	2, 4, 5, 6, 7, 8,	------	------	PRE TO CHANNEL
12	SCS Runoff	29.09	6	744	6.213	------	------	------	POST TO OUTLET
13	SCS Runoff	150.82	6	732	22.607	------	------	------	POST TO POND
14	Reservoir	151.03	6	732	22.607	13	1328.54	0.140	DETENTION POND
15	SCS Runoff	10.41	6	726	1.196	------	------	------	POST WS1
16	SCS Runoff	28.16	6	732	4.282	------	------	------	POST WS2
17	SCS Runoff	99.25	6	726	11.020	------	------	------	POST WS3
18	SCS Runoff	26.62	6	726	2.973	------	------	------	POST TO MOORING N.
20	Combine	238.11	6	1044	280.441	2, 15, 16, 17,	------	------	POST TO CHANNEL
21	Combine	323.73	6	732	309.260	12, 14, 20	------	------	POST

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 (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph description
2	SCS Runoff	321.13	6	1032	358.688	------	------	------	Offsite
4	SCS Runoff	14.97	6	792	6.323	------	------	------	PRE to Outlet
5	SCS Runoff	98.40	6	744	20.894	------	------	------	PRE to Pond
6	SCS Runoff	7.373	6	732	1.065	------	------	------	PRE WS1
7	SCS Runoff	17.96	6	744	3.814	------	------	------	PRE WS2
8	SCS Runoff	74.69	6	732	10.790	------	------	------	PRE WS3
9	SCS Runoff	26.42	6	726	2.852	------	------	------	PRE TO MOORING N.
10	Combine	341.52	6	990	401.575	2, 4, 5, 6, 7, 8,	------	------	PRE TO CHANNEL
12	SCS Runoff	36.13	6	744	7.763	------	------	------	POST TO OUTLET
13	SCS Runoff	183.87	6	732	27.819	------	------	------	POST TO POND
14	Reservoir	183.55	6	732	27.819	13	1328.82	0.198	DETENTION POND
15	SCS Runoff	12.62	6	726	1.463	------	------	------	POST WS1
16	SCS Runoff	34.15	6	732	5.238	------	------	------	POST WS2
17	SCS Runoff	122.03	6	726	13.686	------	------	------	POST WS3
18	SCS Runoff	32.62	6	726	3.680	------	------	------	POST TO MOORING N.
20	Combine	327.06	6	1026	379.074	2, 15, 16, 17,	------	------	POST TO CHANNEL
21	Combine	402.90	6	732	414.655	12, 14, 20	------	------	POST

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 (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph description
2	SCS Runoff	454.92	6	1020	501.861	------	------	------	Offsite
4	SCS Runoff	20.10	6	792	8.445	------	------	------	PRE to Outlet
5	SCS Runoff	131.46	6	744	27.907	------	------	------	PRE to Pond
6	SCS Runoff	9.819	6	732	1.423	------	------	------	PRE WS1
7	SCS Runoff	24.00	6	744	5.095	------	------	------	PRE WS2
8	SCS Runoff	99.46	6	732	14.412	------	------	------	PRE WS3
9	SCS Runoff	35.09	6	726	3.810	------	------	------	PRE TO MOORING N.
10	Combine	482.57	6	984	559.144	2, 4, 5, 6, 7, 8,	------	------	PRE TO CHANNEL
12	SCS Runoff	46.13	6	744	9.996	------	------	------	POST TO OUTLET
13	SCS Runoff	230.81	6	732	35.292	------	------	------	POST TO POND
14	Reservoir	226.33	6	732	35.292	13	1329.19	0.316	DETENTION POND
15	SCS Runoff	15.75	6	726	1.845	------	------	------	POST WS1
16	SCS Runoff	42.65	6	732	6.607	------	------	------	POST WS2
17	SCS Runoff	154.35	6	726	17.518	------	------	------	POST WS3
18	SCS Runoff	41.13	6	726	4.696	------	------	------	POST TO MOORING N.
20	Combine	462.50	6	1014	527.832	2, 15, 16, 17,	------	------	POST TO CHANNEL
21	Combine	516.37	6	732	573.120	12, 14, 20	------	------	POST

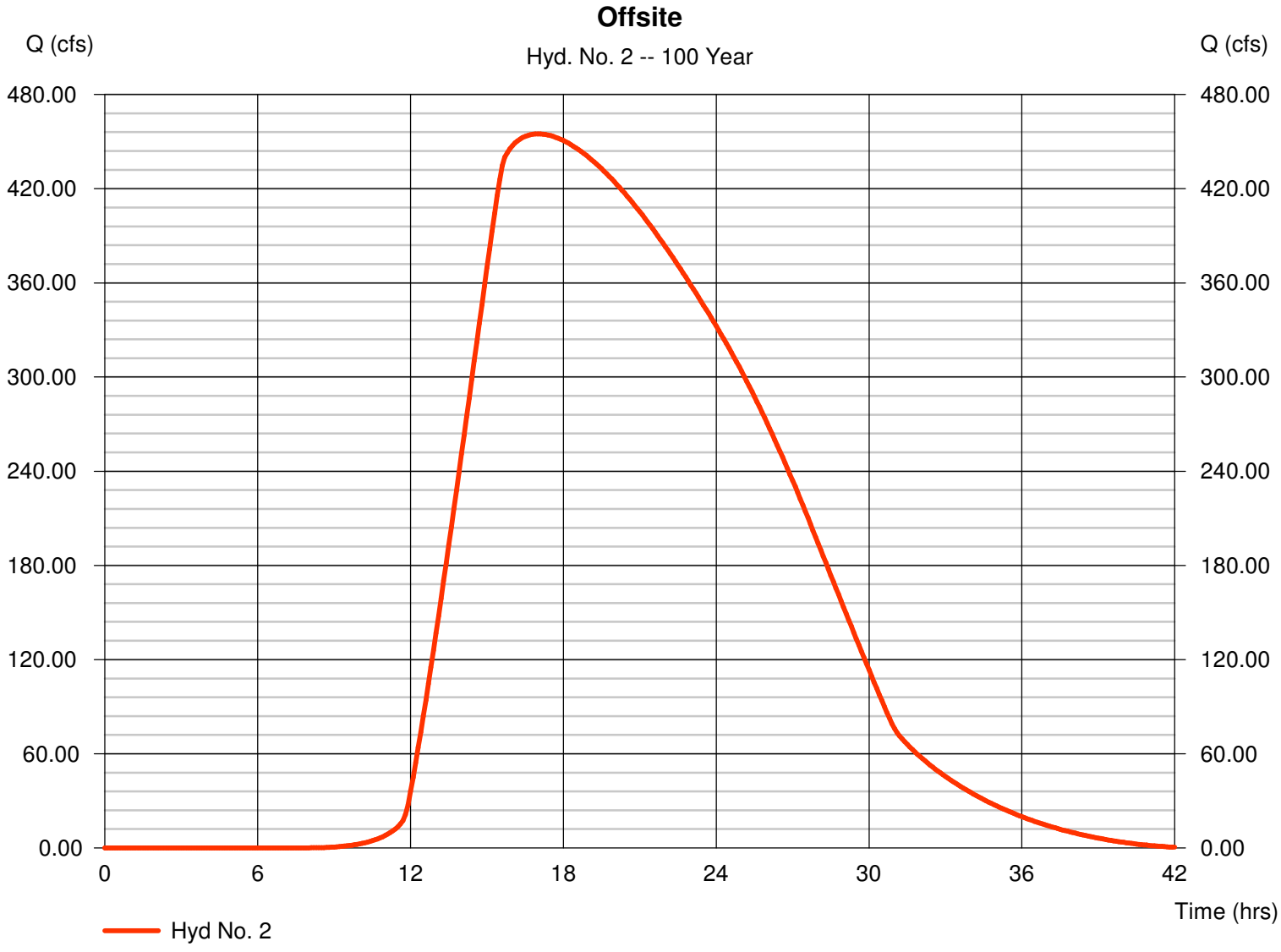
Hydrograph Report

Hyd. No. 2

Offsite

Hydrograph type	=	SCS Runoff	Peak discharge	=	454.92 cfs
Storm frequency	=	100 yrs	Time to peak	=	17.00 hrs
Time interval	=	6 min	Hyd. volume	=	501.861 acft
Drainage area	=	1350.000 ac	Curve number	=	71.4*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	380.80 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	256

* Composite (Area/CN) = [(1212.000 x 81) + (150.000 x 90)] / 1350.000

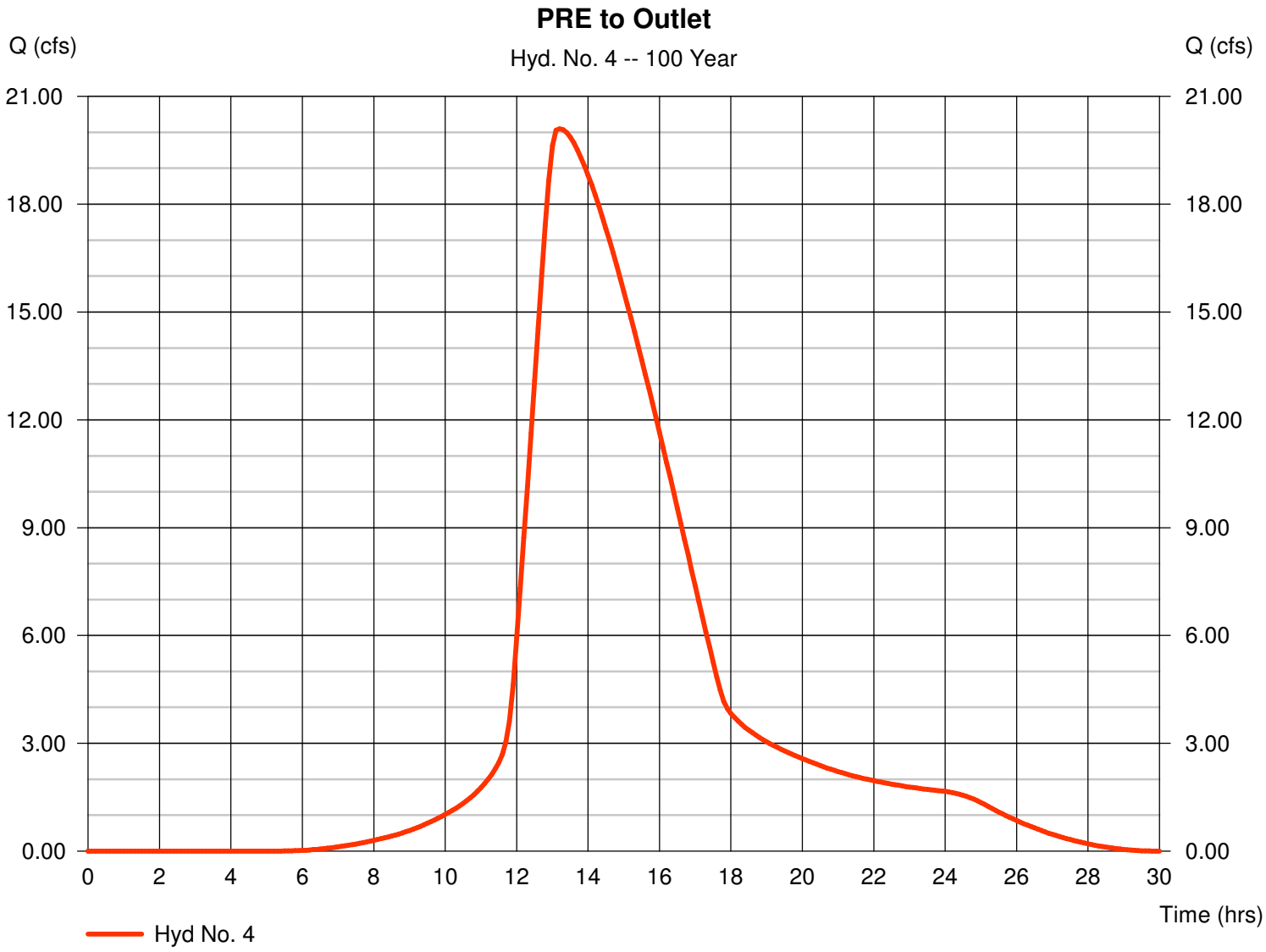


Hydrograph Report

Hyd. No. 4

PRE to Outlet

Hydrograph type	=	SCS Runoff	Peak discharge	=	20.10 cfs
Storm frequency	=	100 yrs	Time to peak	=	13.20 hrs
Time interval	=	6 min	Hyd. volume	=	8.445 acft
Drainage area	=	18.400 ac	Curve number	=	81
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	116.00 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	256

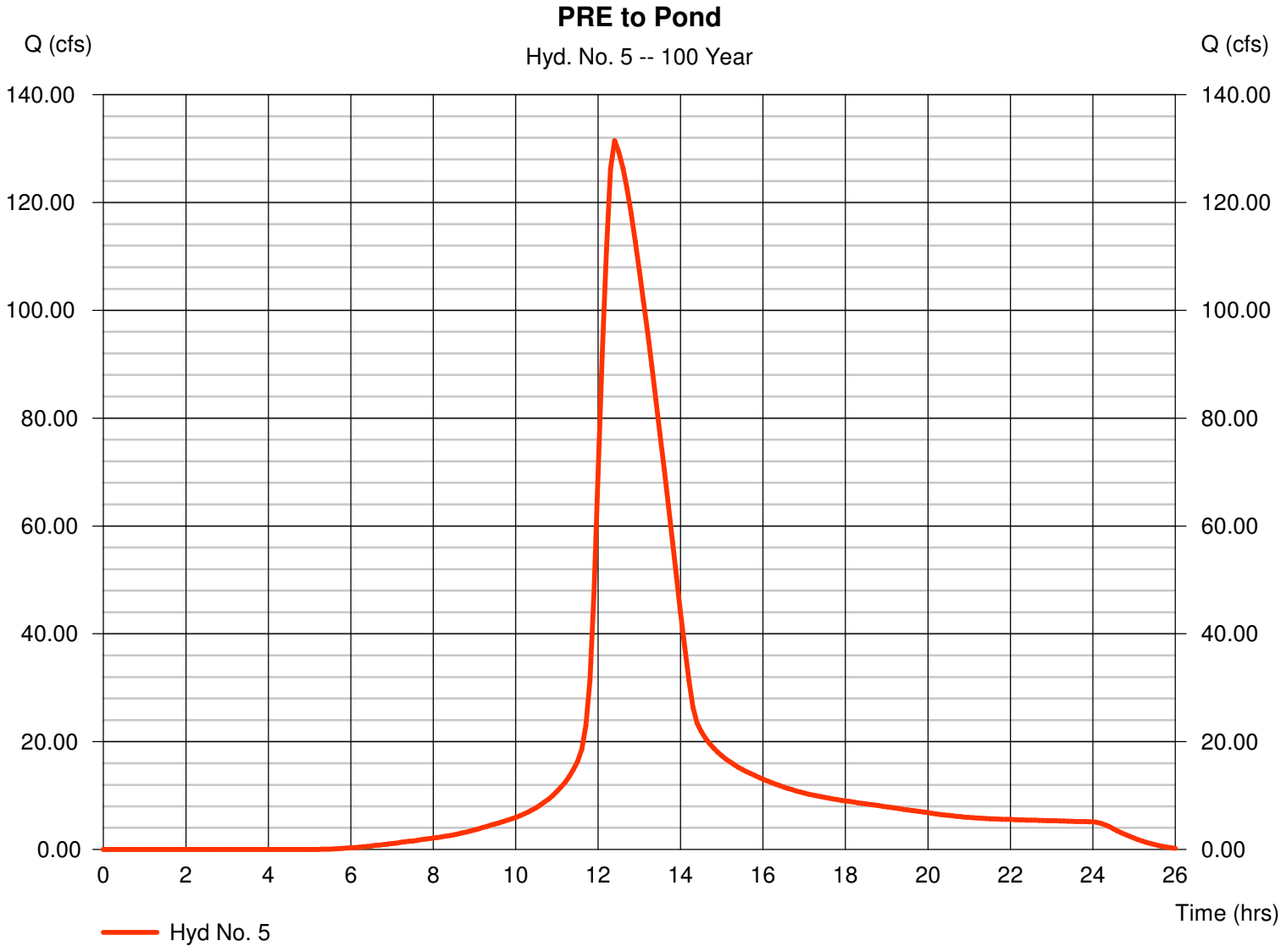


Hydrograph Report

Hyd. No. 5

PRE to Pond

Hydrograph type	=	SCS Runoff	Peak discharge	=	131.46 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.40 hrs
Time interval	=	6 min	Hyd. volume	=	27.907 acft
Drainage area	=	60.800 ac	Curve number	=	81
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	48.00 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	256

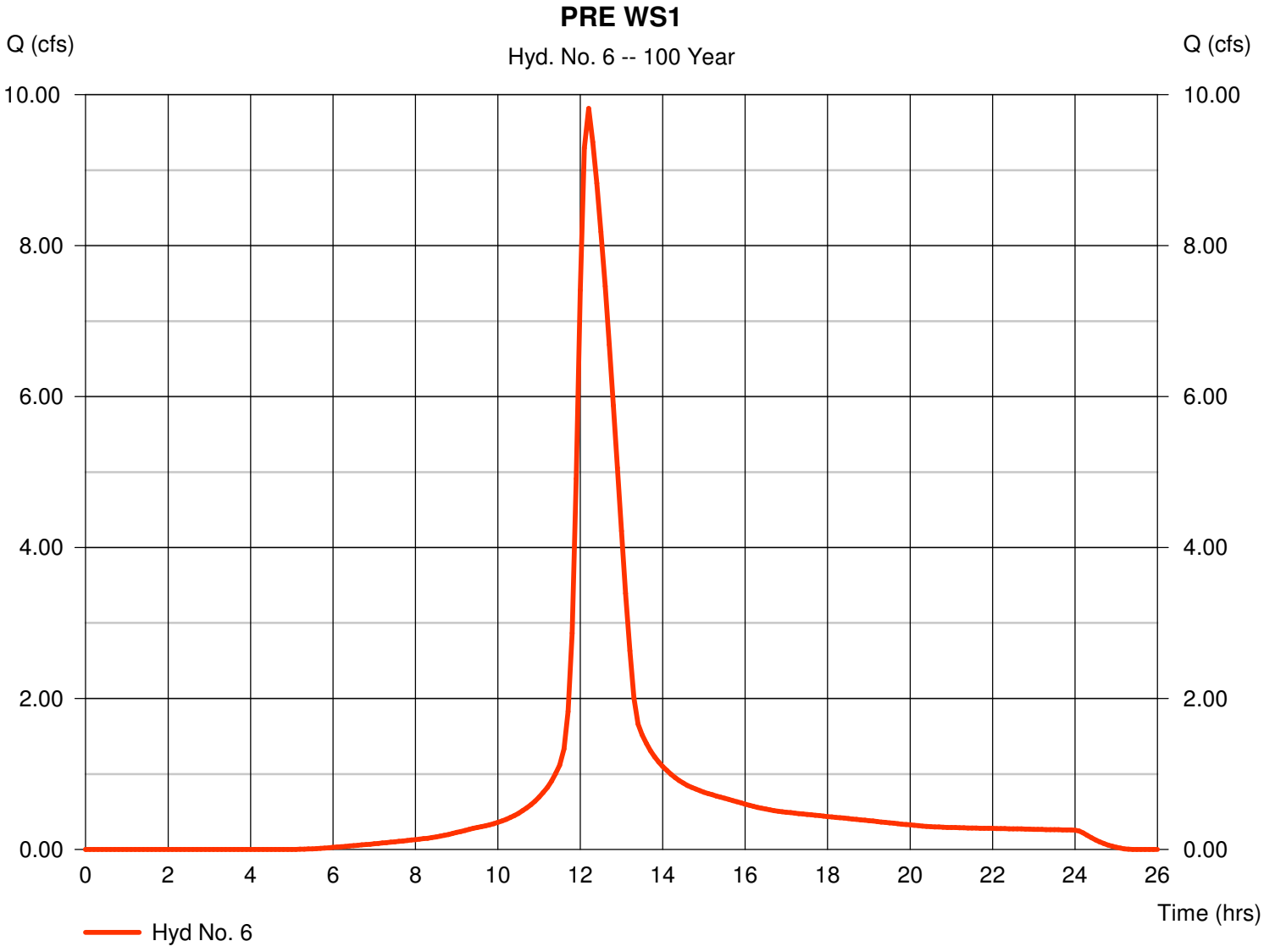


Hydrograph Report

Hyd. No. 6

PRE WS1

Hydrograph type	=	SCS Runoff	Peak discharge	=	9.819 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.20 hrs
Time interval	=	6 min	Hyd. volume	=	1.423 acft
Drainage area	=	3.100 ac	Curve number	=	81
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	27.90 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	256

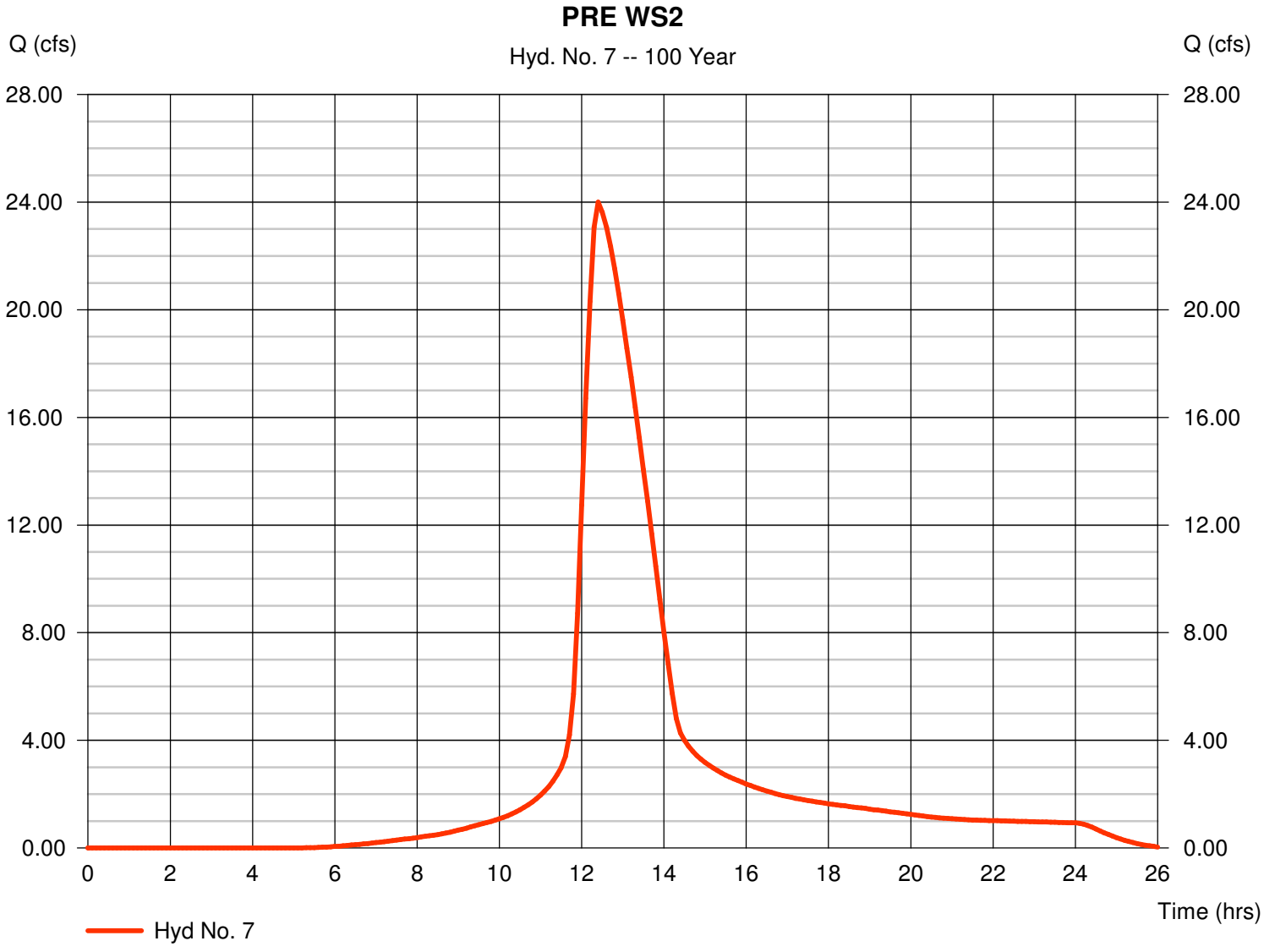


Hydrograph Report

Hyd. No. 7

PRE WS2

Hydrograph type	=	SCS Runoff	Peak discharge	=	24.00 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.40 hrs
Time interval	=	6 min	Hyd. volume	=	5.095 acft
Drainage area	=	11.100 ac	Curve number	=	81
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	40.40 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	256

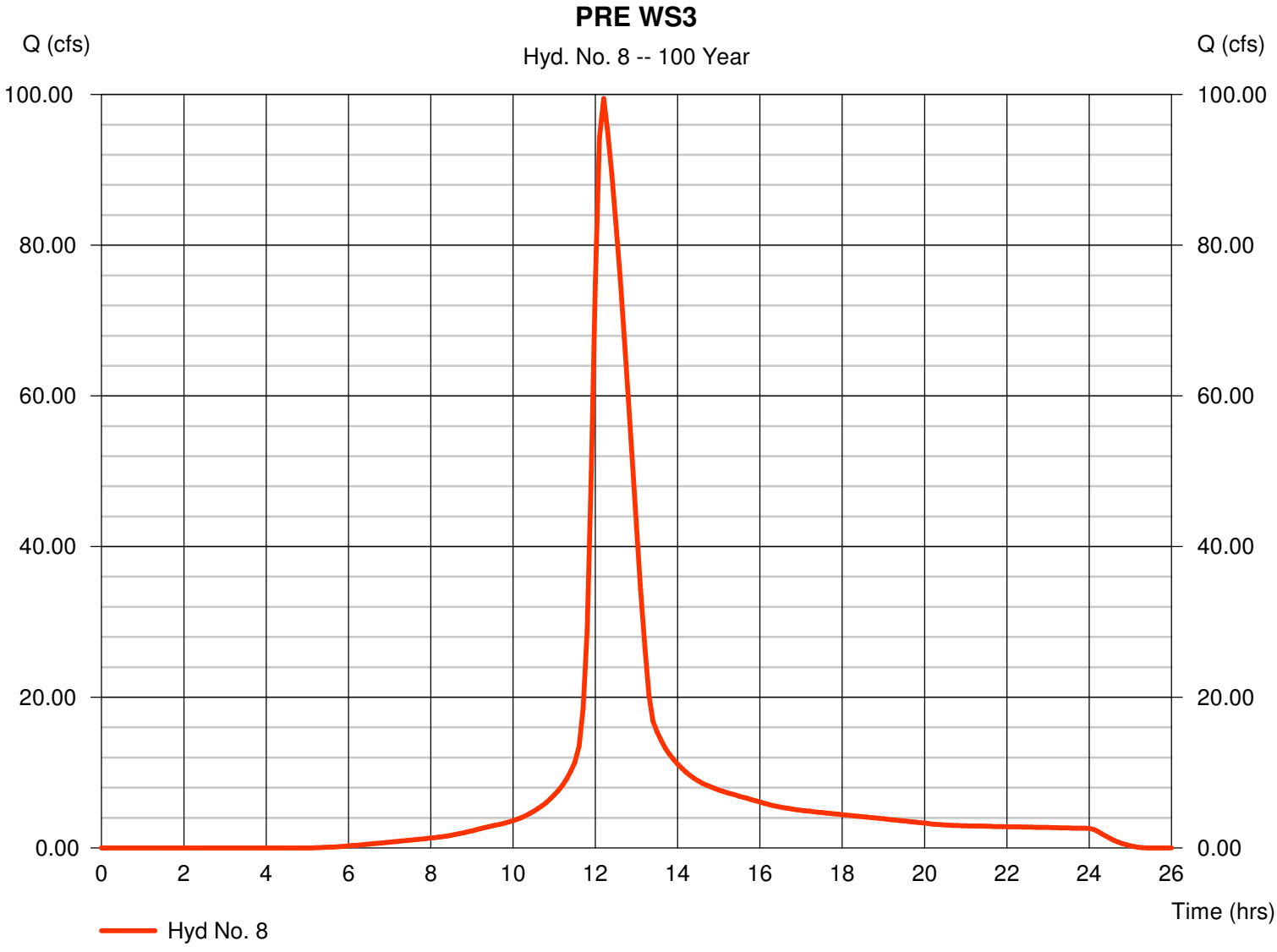


Hydrograph Report

Hyd. No. 8

PRE WS3

Hydrograph type	=	SCS Runoff	Peak discharge	=	99.46 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.20 hrs
Time interval	=	6 min	Hyd. volume	=	14.412 acft
Drainage area	=	31.400 ac	Curve number	=	81
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	24.20 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	256

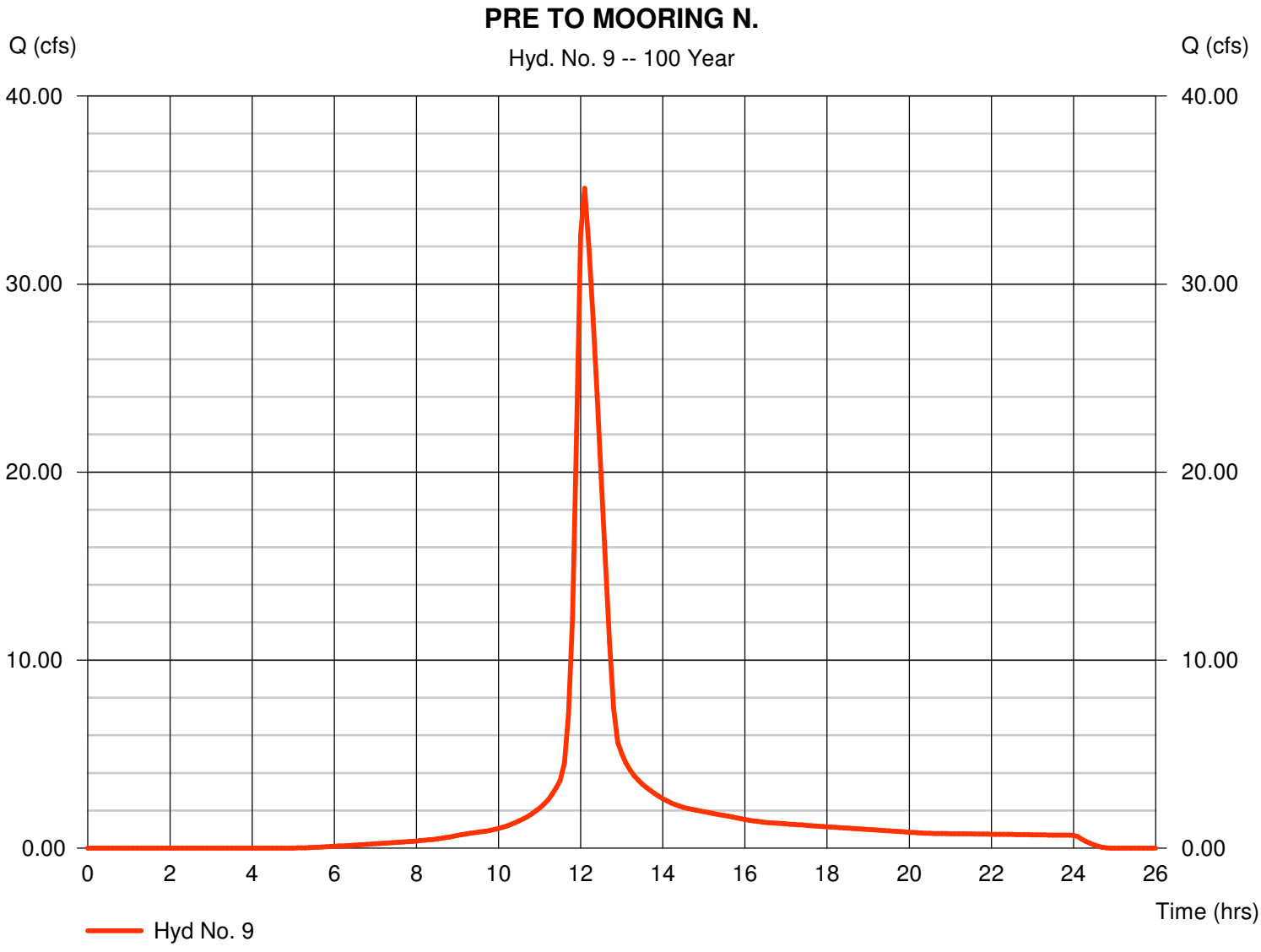


Hydrograph Report

Hyd. No. 9

PRE TO MOORING N.

Hydrograph type	=	SCS Runoff	Peak discharge	=	35.09 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.10 hrs
Time interval	=	6 min	Hyd. volume	=	3.810 acft
Drainage area	=	8.300 ac	Curve number	=	81
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	256

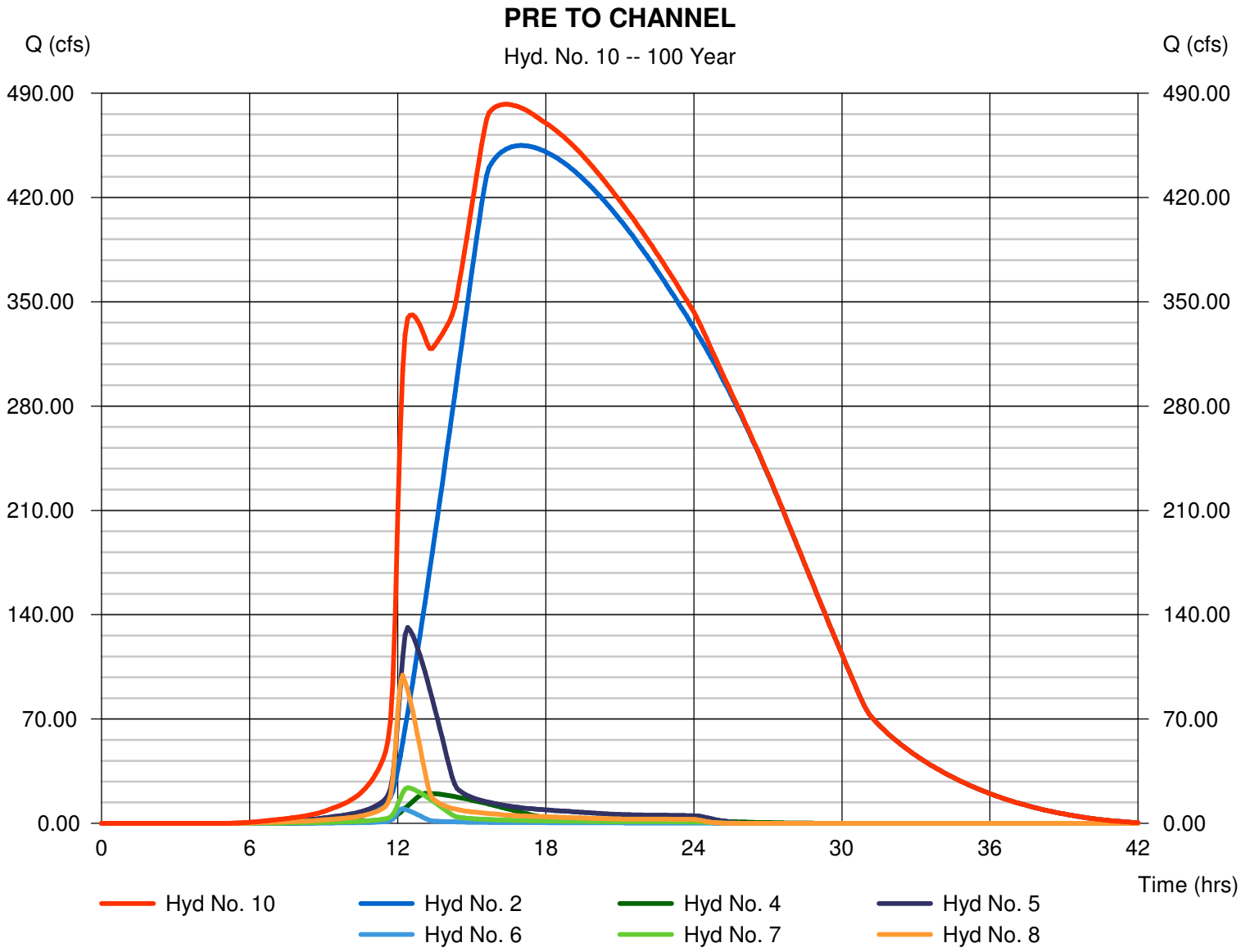


Hydrograph Report

Hyd. No. 10

PRE TO CHANNEL

Hydrograph type	=	Combine	Peak discharge	=	482.57 cfs
Storm frequency	=	100 yrs	Time to peak	=	16.40 hrs
Time interval	=	6 min	Hyd. volume	=	559.144 acft
Inflow hyds.	=	2, 4, 5, 6, 7, 8	Contrib. drain. area	=	1474.800 ac

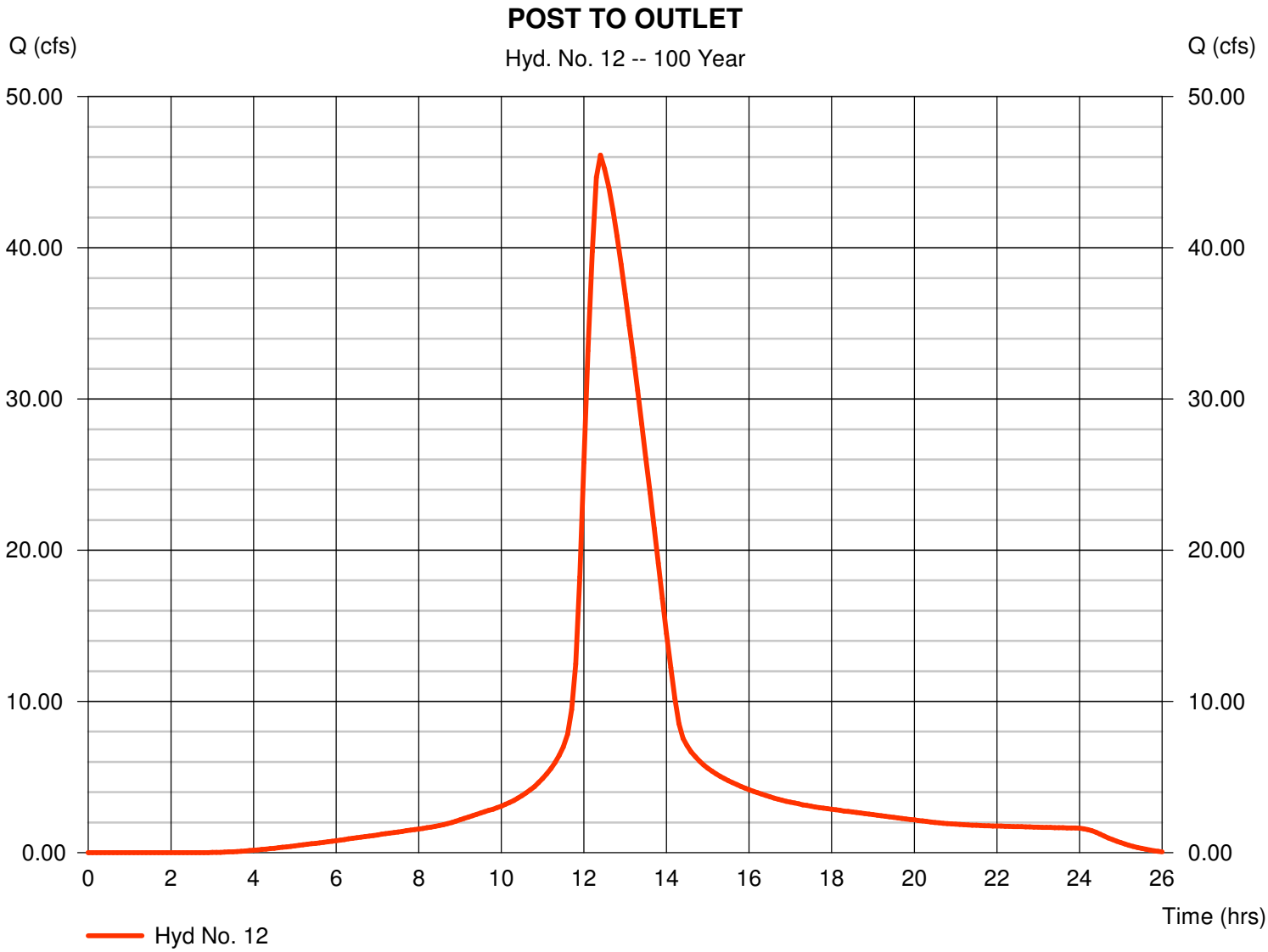


Hydrograph Report

Hyd. No. 12

POST TO OUTLET

Hydrograph type	=	SCS Runoff	Peak discharge	=	46.13 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.40 hrs
Time interval	=	6 min	Hyd. volume	=	9.996 acft
Drainage area	=	18.400 ac	Curve number	=	89.7
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	43.20 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	256

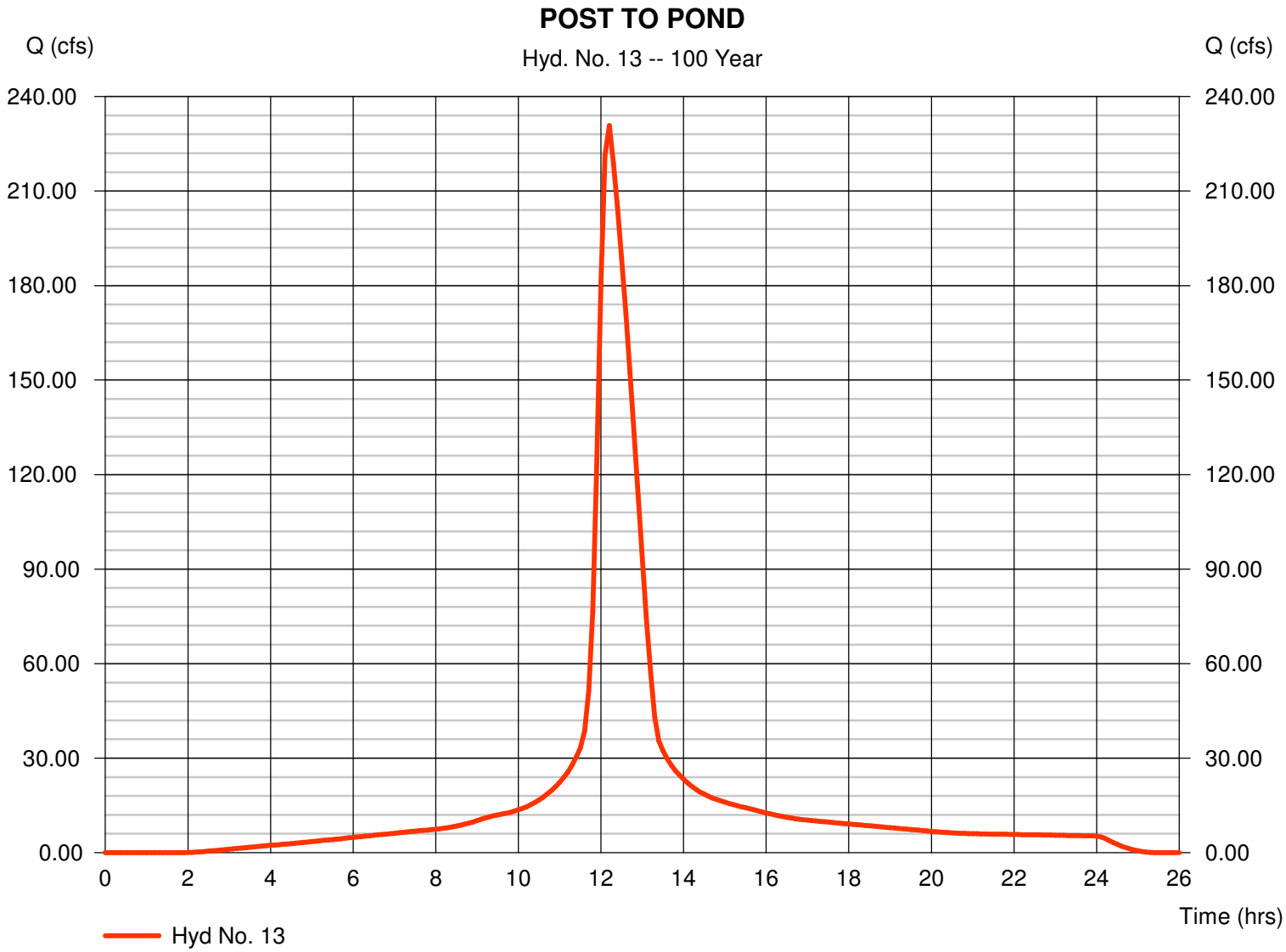


Hydrograph Report

Hyd. No. 13

POST TO POND

Hydrograph type	=	SCS Runoff	Peak discharge	=	230.81 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.20 hrs
Time interval	=	6 min	Hyd. volume	=	35.292 acft
Drainage area	=	60.800 ac	Curve number	=	93.5
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	25.00 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	256



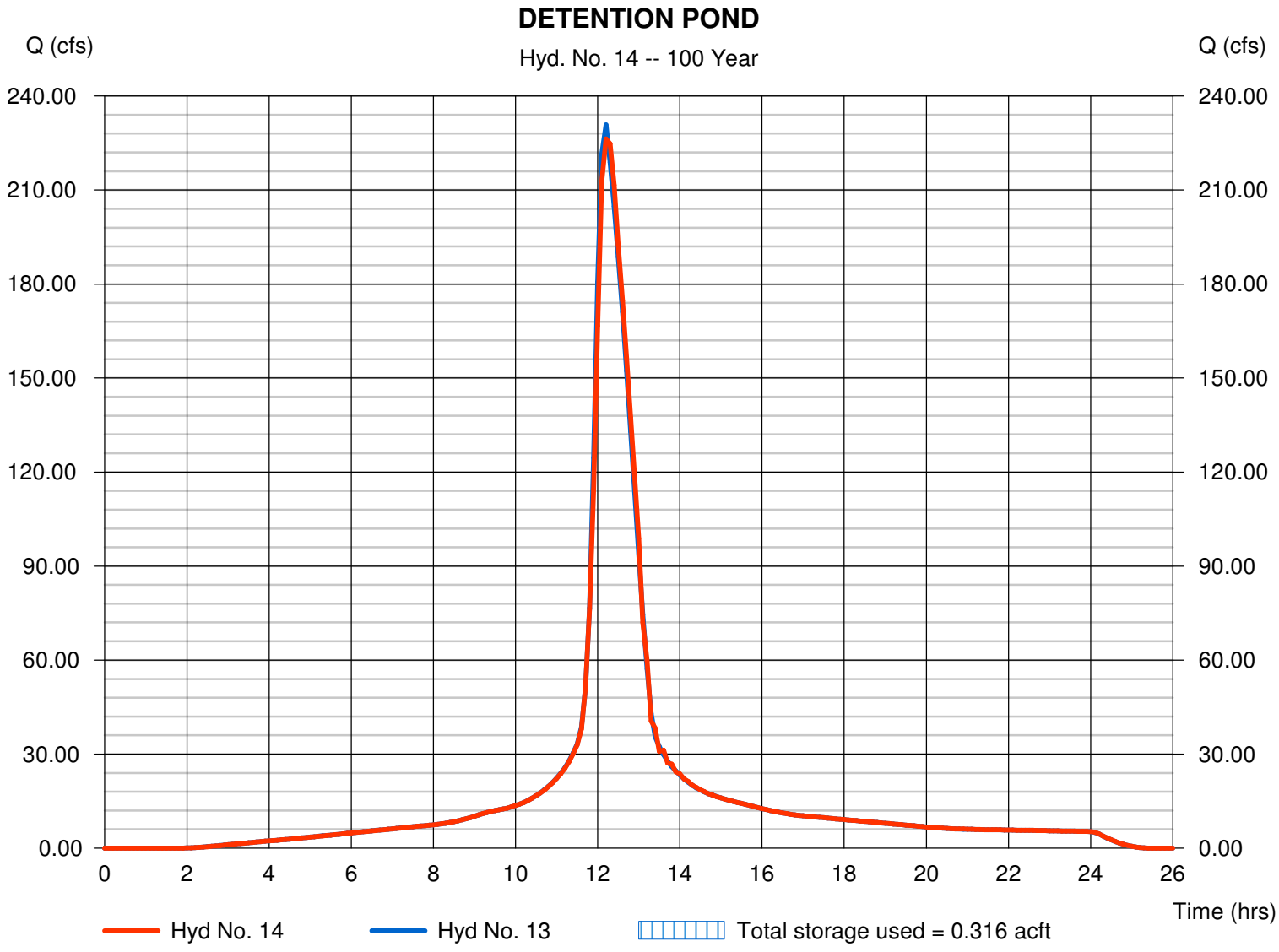
Hydrograph Report

Hyd. No. 14

DETENTION POND

Hydrograph type	=	Reservoir	Peak discharge	=	226.33 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.20 hrs
Time interval	=	6 min	Hyd. volume	=	35.292 acft
Inflow hyd. No.	=	13 - POST TO POND	Max. Elevation	=	1329.19 ft
Reservoir name	=	DETENTION POND 07-08 Contours	Max. Storage	=	0.316 acft

Storage Indication method used.



Pond No. 3 - DETENTION POND 07-08 Contours

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 1326.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	1326.50	00	0.000	0.000
0.50	1327.00	1,076	0.006	0.006
0.90	1328.00	3,227	0.020	0.026
1.90	1329.00	15,163	0.211	0.237
2.90	1329.40	30,389	0.523	0.760

Culvert / Orifice Structures

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

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 15.00	0.00	0.00	0.00
Crest El. (ft)	= 1326.50	1326.50	0.00	0.00
Weir Coeff.	= 3.33	0.92	3.33	3.33
Weir Type	= Rect	40 degV	---	---
Multi-Stage	= No	No	No	No

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

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0.000	1326.50	---	---	---	---	0.00	---	---	---	---	---	0.000
0.05	0.001	1326.55	---	---	---	---	0.56	0.00	---	---	---	---	0.560
0.10	0.001	1326.60	---	---	---	---	1.58	0.00	---	---	---	---	1.582
0.15	0.002	1326.65	---	---	---	---	2.90	0.01	---	---	---	---	2.911
0.20	0.002	1326.70	---	---	---	---	4.47	0.02	---	---	---	---	4.483
0.25	0.003	1326.75	---	---	---	---	6.24	0.03	---	---	---	---	6.273
0.30	0.004	1326.80	---	---	---	---	8.21	0.05	---	---	---	---	8.255
0.35	0.004	1326.85	---	---	---	---	10.34	0.07	---	---	---	---	10.41
0.40	0.005	1326.90	---	---	---	---	12.64	0.09	---	---	---	---	12.73
0.45	0.006	1326.95	---	---	---	---	15.08	0.13	---	---	---	---	15.20
0.50	0.006	1327.00	---	---	---	---	17.66	0.16	---	---	---	---	17.82
0.54	0.008	1327.04	---	---	---	---	19.82	0.20	---	---	---	---	20.02
0.58	0.010	1327.08	---	---	---	---	22.06	0.24	---	---	---	---	22.30
0.62	0.012	1327.12	---	---	---	---	24.38	0.28	---	---	---	---	24.66
0.66	0.014	1327.16	---	---	---	---	26.78	0.33	---	---	---	---	27.11
0.70	0.016	1327.20	---	---	---	---	29.25	0.38	---	---	---	---	29.63
0.74	0.018	1327.24	---	---	---	---	31.80	0.44	---	---	---	---	32.23
0.78	0.020	1327.28	---	---	---	---	34.41	0.50	---	---	---	---	34.91
0.82	0.022	1327.32	---	---	---	---	37.09	0.56	---	---	---	---	37.65
0.86	0.024	1327.36	---	---	---	---	39.84	0.63	---	---	---	---	40.47
0.90	0.026	1328.00	---	---	---	---	91.76	2.55	---	---	---	---	94.31
1.00	0.047	1328.10	---	---	---	---	101.09	2.99	---	---	---	---	104.08
1.10	0.068	1328.20	---	---	---	---	110.71	3.48	---	---	---	---	114.19
1.20	0.089	1328.30	---	---	---	---	120.63	4.02	---	---	---	---	124.65
1.30	0.110	1328.40	---	---	---	---	130.82	4.60	---	---	---	---	135.42
1.40	0.131	1328.50	---	---	---	---	141.28	5.23	---	---	---	---	146.51
1.50	0.153	1328.60	---	---	---	---	152.00	5.90	---	---	---	---	157.91
1.60	0.174	1328.70	---	---	---	---	162.99	6.63	---	---	---	---	169.62
1.70	0.195	1328.80	---	---	---	---	174.24	7.41	---	---	---	---	181.65
1.80	0.216	1328.90	---	---	---	---	185.72	8.25	---	---	---	---	193.97
1.90	0.237	1329.00	---	---	---	---	197.44	9.13	---	---	---	---	206.58
2.00	0.289	1329.10	---	---	---	---	209.41	10.07	---	---	---	---	219.48
2.10	0.342	1329.20	---	---	---	---	221.60	11.07	---	---	---	---	232.67
2.20	0.394	1329.30	---	---	---	---	234.04	12.12	---	---	---	---	246.16
2.30	0.446	1329.40	---	---	---	---	246.68	13.23	---	---	---	---	259.92
2.40	0.498	1329.50	---	---	---	---	259.55	14.40	---	---	---	---	273.95
2.50	0.551	1329.60	---	---	---	---	272.63	15.63	---	---	---	---	288.26
2.60	0.603	1329.70	---	---	---	---	285.92	16.93	---	---	---	---	302.85
2.70	0.655	1329.80	---	---	---	---	299.44	18.28	---	---	---	---	317.72

Continues on next page...

DETENTION POND 07-08 Contours

Stage / Storage / Discharge Table

Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
2.80	0.708	1329.90	---	---	---	---	313.15	19.70	---	---	---	---	332.85
2.90	0.760	1329.40	---	---	---	---	246.68	13.23	---	---	---	---	259.92

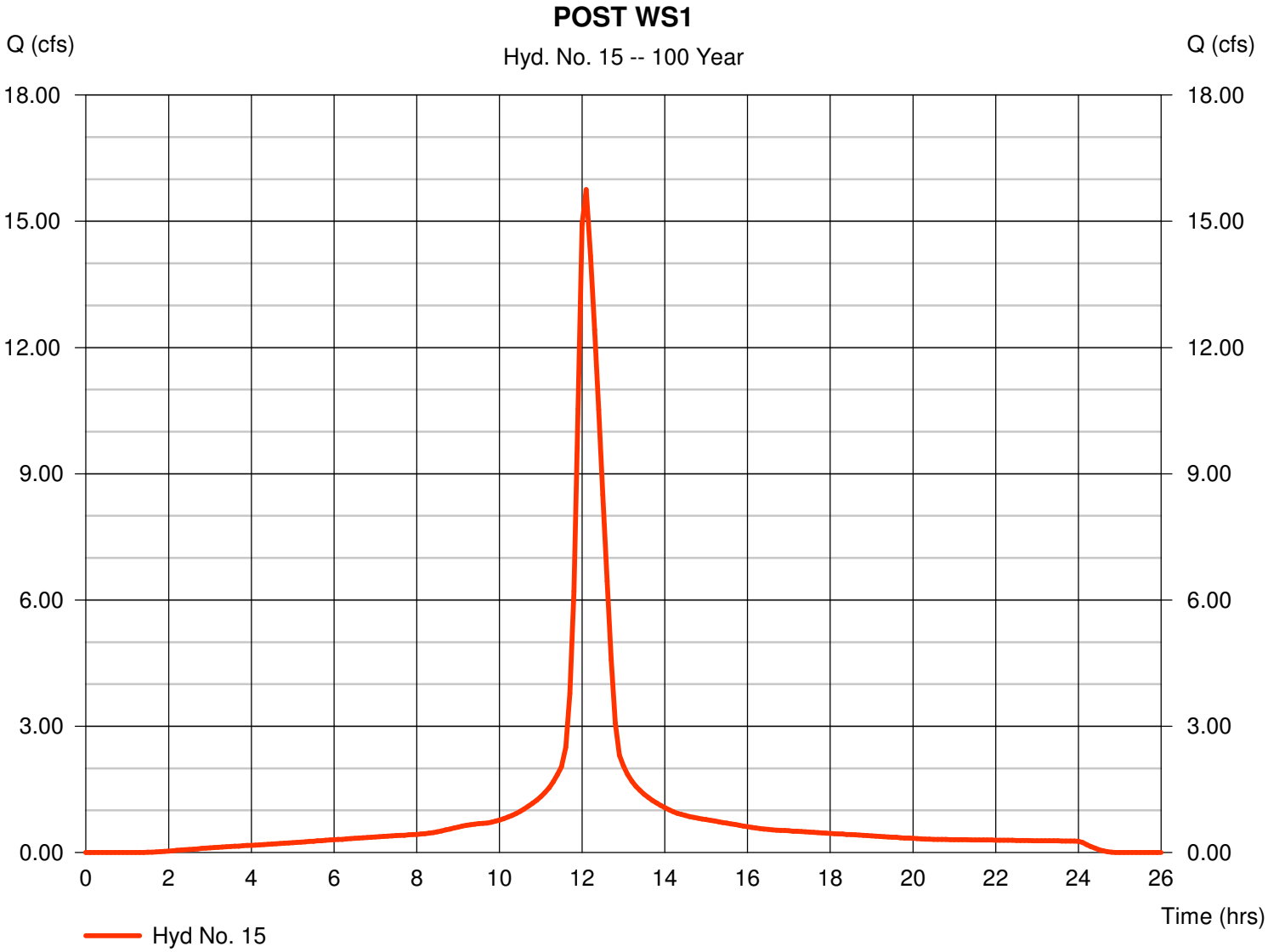
...End

Hydrograph Report

Hyd. No. 15

POST WS1

Hydrograph type	=	SCS Runoff	Peak discharge	=	15.75 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.10 hrs
Time interval	=	6 min	Hyd. volume	=	1.845 acft
Drainage area	=	3.100 ac	Curve number	=	95
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	256

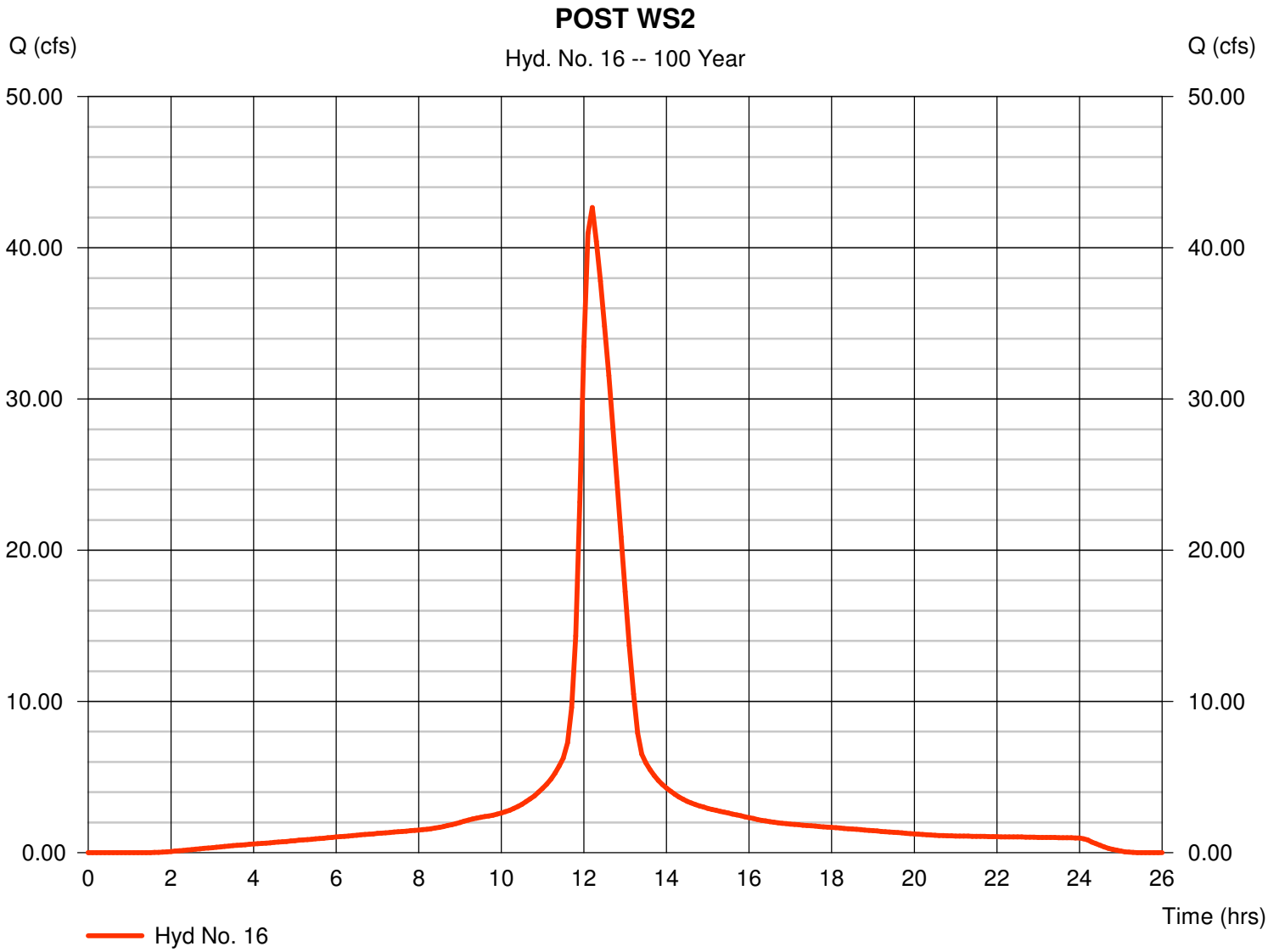


Hydrograph Report

Hyd. No. 16

POST WS2

Hydrograph type	=	SCS Runoff	Peak discharge	=	42.65 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.20 hrs
Time interval	=	6 min	Hyd. volume	=	6.607 acft
Drainage area	=	11.100 ac	Curve number	=	95
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	21.10 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	256

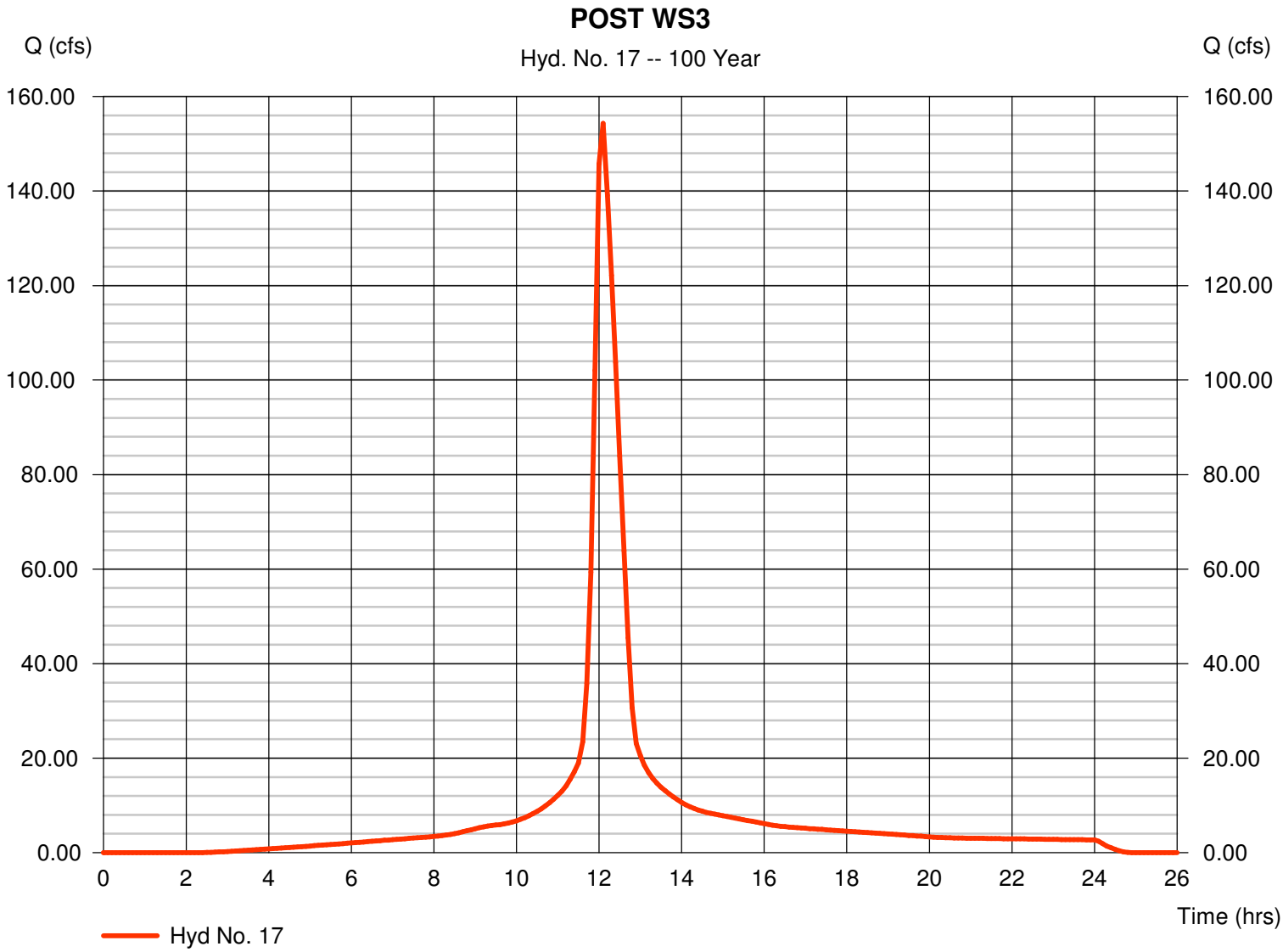


Hydrograph Report

Hyd. No. 17

POST WS3

Hydrograph type	=	SCS Runoff	Peak discharge	=	154.35 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.10 hrs
Time interval	=	6 min	Hyd. volume	=	17.518 acft
Drainage area	=	31.400 ac	Curve number	=	91.2
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	256

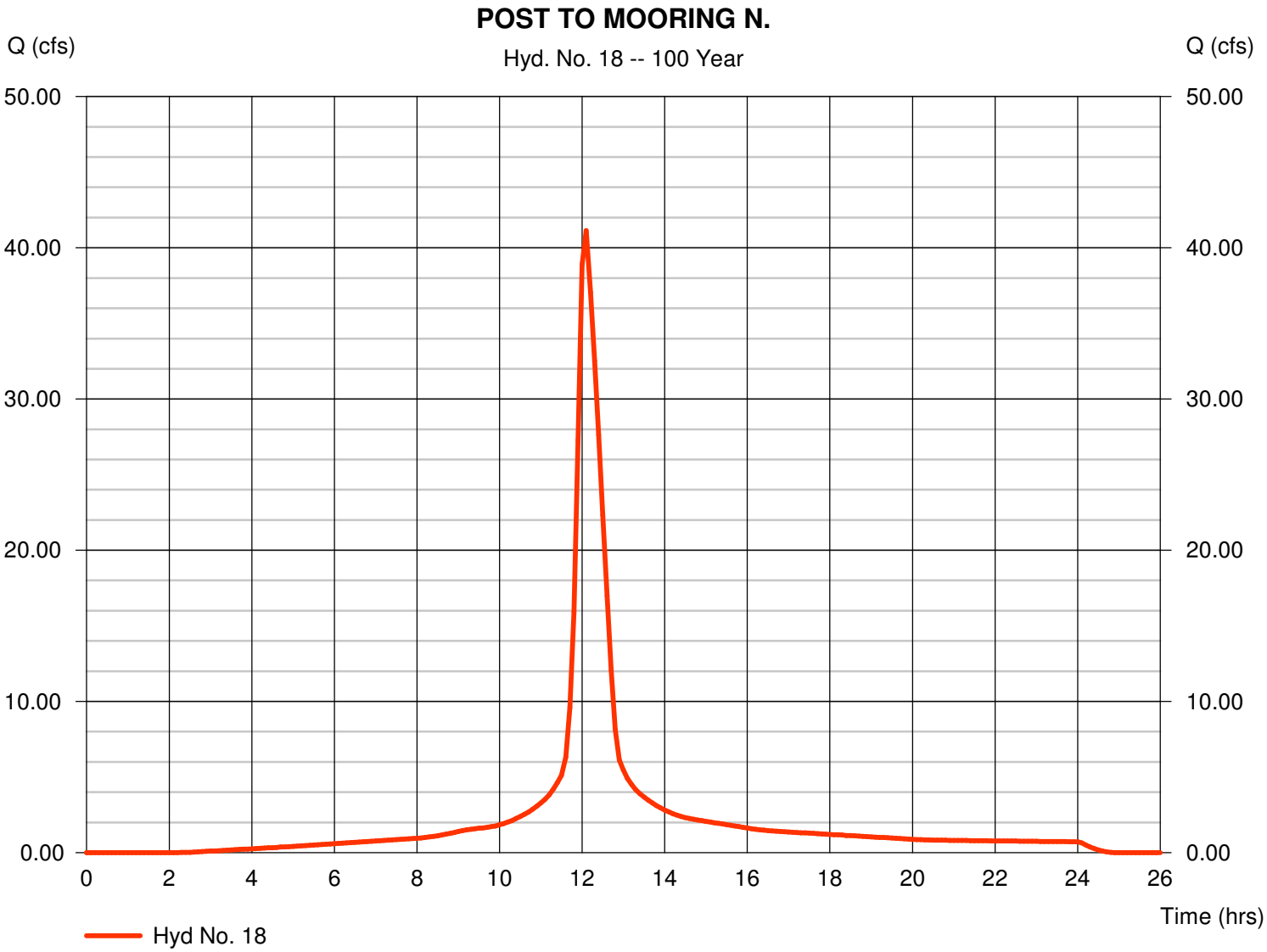


Hydrograph Report

Hyd. No. 18

POST TO MOORING N.

Hydrograph type	=	SCS Runoff	Peak discharge	=	41.13 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.10 hrs
Time interval	=	6 min	Hyd. volume	=	4.696 acft
Drainage area	=	8.300 ac	Curve number	=	92
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	256

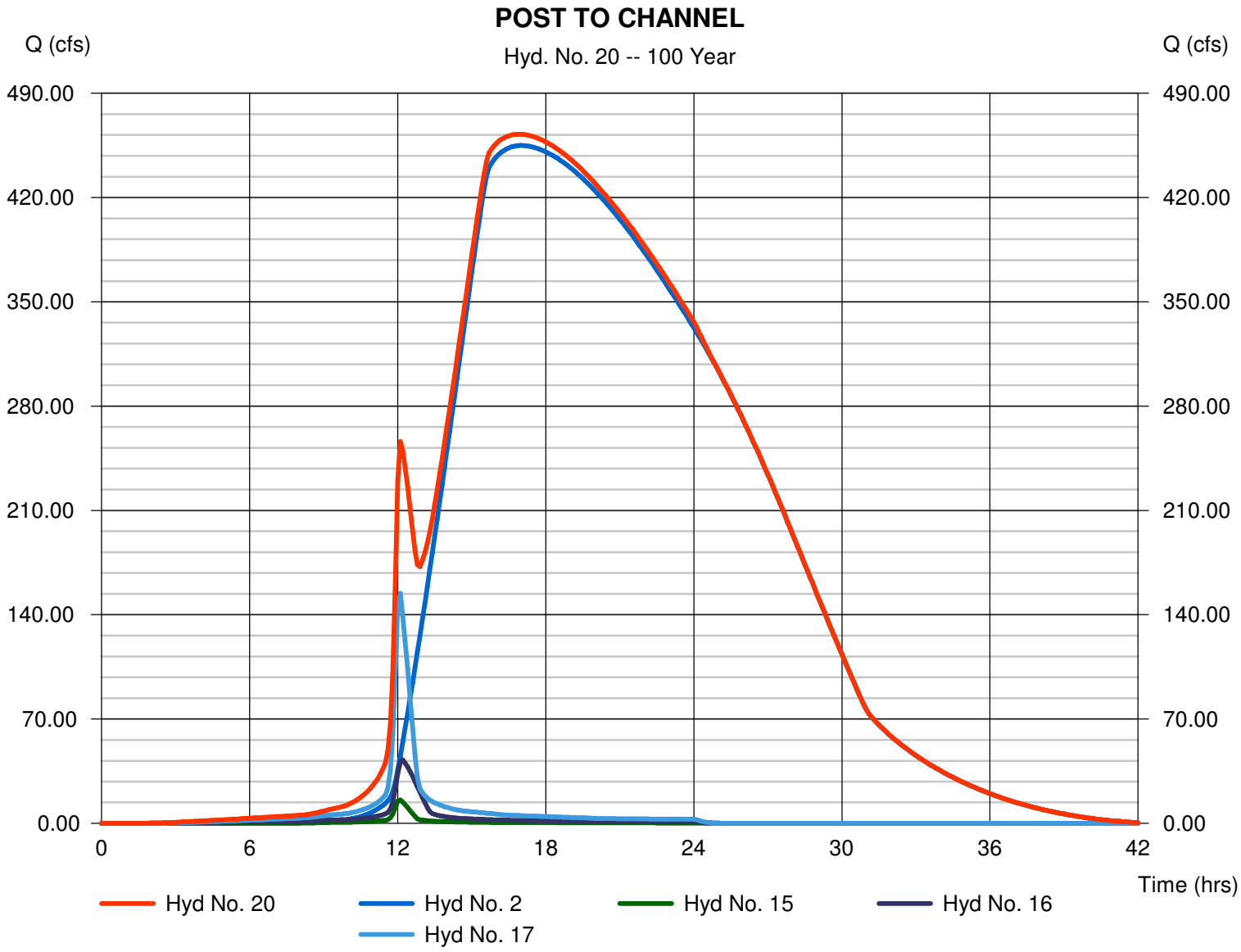


Hydrograph Report

Hyd. No. 20

POST TO CHANNEL

Hydrograph type	= Combine	Peak discharge	= 462.50 cfs
Storm frequency	= 100 yrs	Time to peak	= 16.90 hrs
Time interval	= 6 min	Hyd. volume	= 527.832 acft
Inflow hyds.	= 2, 15, 16, 17	Contrib. drain. area	= 1395.600 ac

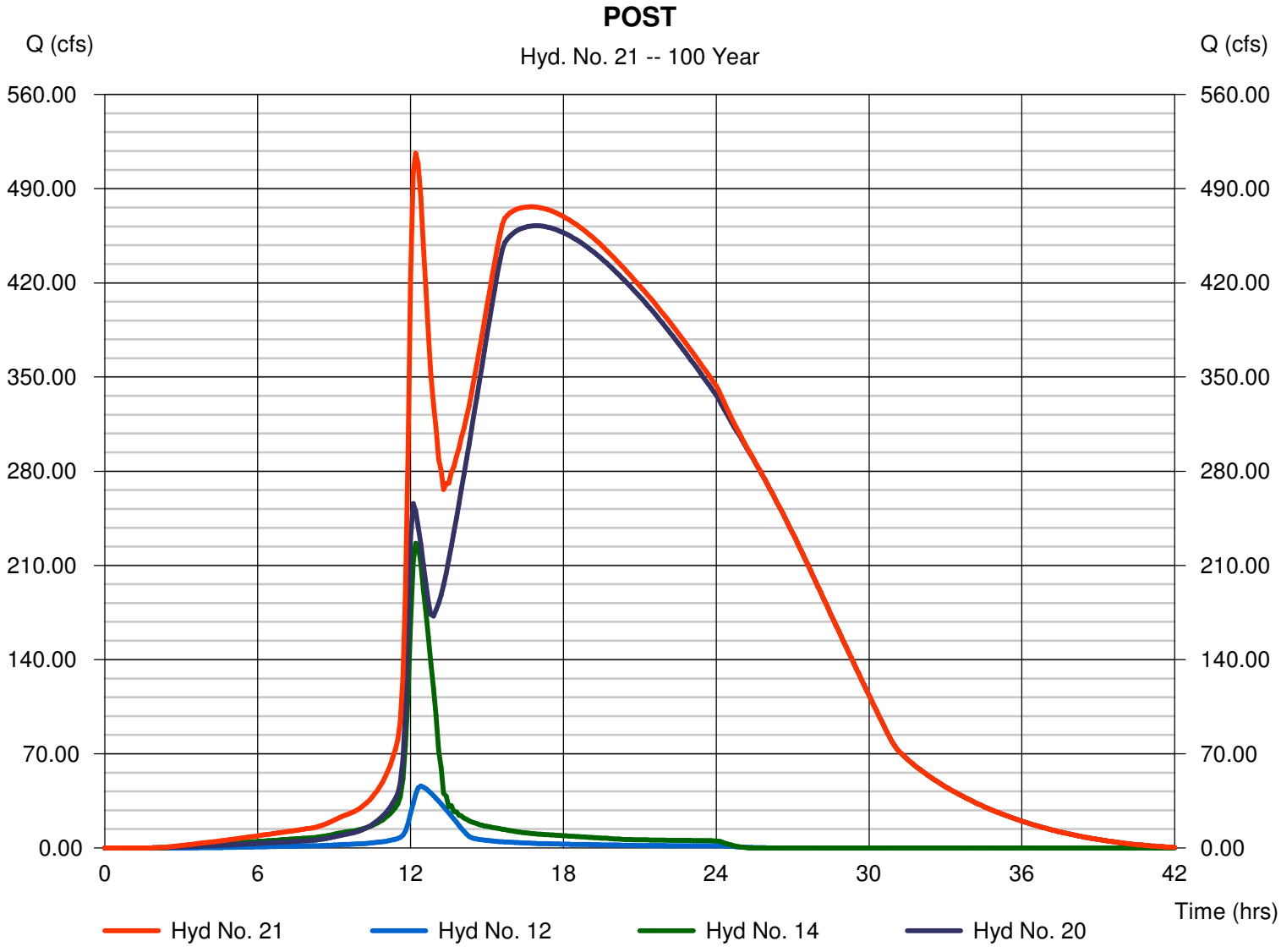


Hydrograph Report

Hyd. No. 21

POST

Hydrograph type	= Combine	Peak discharge	= 516.37 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.20 hrs
Time interval	= 6 min	Hyd. volume	= 573.120 acft
Inflow hyds.	= 12, 14, 20	Contrib. drain. area	= 18.400 ac



Appendix 2.6

Time of Concentration and Curve Number Calculations

Time of Concentration Calculations by the FAA method

The Moorings 10th Addition

Project Number 06608

$$T_c = \frac{(1.1-C)L^{1/2}}{100\ S^{1/3}}$$

Area Name	Land Use	Soil Group	Maximum Elevation	Minimum Elevation	Length (L)	Rational Runoff Coefficient, C				Time of Concentration (min), T_c				Time of Concentration (hr), T_c				CN	Area acres
						2-Year	5-Year	10-Year	100-Year	2-Year	5-Year	10-Year	100-Year	2-Year	5-Year	10-Year	100-Year		
Offsite Watershed	*Residential - 1/3 Acre*	*B*	*1353.0*	*1330.0*	*16,125*	0.39	0.41	0.47	0.57	310.6	301.8	275.6	231.8	5.18	5.03	4.59	3.86	71.44	1350.00
PRE-PROJECT																			
To Outlet	*Agricultural - Pasture - Slopes 1-4%*	*D*	*1337.8*	*1330.0*	*1,569*	0.32	0.37	0.47	0.67	70.2	65.7	56.7	38.7	1.17	1.10	0.95	0.65	81.00	18.40
To Pond	*Agricultural - Cultivated - Slopes <1%*	*D*	*1335.1*	*1330.5*	*902*	0.24	0.29	0.39	0.59	58.2	54.8	48.0	34.5	0.97	0.91	0.80	0.58	82.81	60.80
WS1	*Agricultural - Cultivated - Slopes <1%*	*D*	*1332.0*	*1329.0*	*396*	0.24	0.29	0.39	0.59	33.8	31.8	27.9	20.0	0.56	0.53	0.46	0.33	81.00	3.10
WS2	*Agricultural - Cultivated - Slopes <1%*	*D*	*1332.1*	*1329.0*	*626*	0.24	0.29	0.39	0.59	49.0	46.1	40.4	29.0	0.82	0.77	0.67	0.48	81.00	11.10
WS3	*Agricultural - Cultivated - Slopes 1-4%*	*D*	*1338.0*	*1329.0*	*535*	0.26	0.31	0.41	0.61	29.4	27.7	24.2	17.2	0.49	0.46	0.40	0.29	81.00	31.40
To Mooring N. Addition Pond	*Agricultural - Pasture - Slopes 1-4%*	*D*	*1335.0*	*1320.0*	*130*	0.32	0.37	0.47	0.67	15.0	15.0	15.0	15.0	0.25	0.25	0.25	0.25	92.00	8.30
POST-PROJECT																			
To outlet	*Residential - 1/4 Acre*	*D*	*1337.8*	*1330.0*	*1,569*	0.50	0.54	0.62	0.76	54.0	50.4	43.2	30.6	0.90	0.84	0.72	0.51	89.74	18.40
To Pond	*Industrial - Light*	*D*	*1335.1*	*1330.5*	*902*	0.68	0.69	0.73	0.80	28.4	27.7	25.0	20.3	0.47	0.46	0.42	0.34	93.45	60.80
WS1	*Business - Neighborhood*	*D*	*1332.0*	*1329.0*	*396*	0.68	0.69	0.73	0.80	16.5	16.1	15.0	15.0	0.28	0.27	0.25	0.25	95.00	3.10
WS2	*Business - Neighborhood*	*D*	*1332.1*	*1329.0*	*626*	0.68	0.69	0.73	0.80	23.9	23.3	21.1	17.1	0.40	0.39	0.35	0.28	95.00	11.10
WS3	*Industrial - Light*	*D*	*1338.0*	*1329.0*	*535*	0.68	0.69	0.73	0.80	15.0	15.0	15.0	15.0	0.25	0.25	0.25	0.25	91.20	31.40
To Mooring N. Addition Pond	*Industrial - Light*	*D*				0.68	0.69	0.73	0.80	15.0	15.0	15.0	15.0	0.25	0.25	0.25	0.25	92.00	8.30

Project Name:
Project Number:
Basin: Pre Project Offsite

Total Area = 1350.0 Acres
Total Area = 2.1094 sq. mi.
Composite Curve Number = 71.44

Land Use	Percent Impervious	Area/CN Hydrological Soil Group			
		A	B	C	D
Cultivated land without conservation treatment	0	72	81	88	91
Cultivated land with conservation treatement	0	62	1200.0 71	78	81
Pasture or range land - poor condition	0	68	79	86	89
Pasture or range land - good condition	0	39	61	74	80
Meadow - good condition	0	30	58	71	78
Wood or Forest land - thin stand, poor cover, no mulch	0	45	66	77	83
Wood or Forest land - good cover	0	25	55	70	77
Open spaces - good condition - grass cover on 75% or more of area	0	39	61	74	80
Open spaces - fair condition - grass cover on 50-75% of area	0	49	69	79	84
WCC -weighted curve number APWA method	-				75.5
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential - 1/8 acre or less	65	77	85	90	92
Residential - 1/4 acre	38	61	150.0 75	83	87
Residentail - 1/3 acre	30	57	72	81	86
Residential - 1/2 acre	25	54	70	80	85
Residential - 1 acre	20	51	68	79	84
Paved Parking lots, roofs, driveways, etc.	-	98	98	98	98
Streets and roads - paved with curbs and storm sewers	-	98	98	98	98
Streets and roads - gravel	-	76	85	89	91
Streets and roads - dirt	-	72	82	87	89
Lake/Pond	100	100	100	100	100

Project Name: The Moorings
Project Number:
Basin: Post Project WS1

Total Area = 2.9 Acres
Total Area = 0.0045 sq. mi.
Composite Curve Number = 81.00

Land Use	Percent Impervious	Area/CN Hydrological Soil Group			
		A	B	C	D
Cultivated land without conservation treatment	0	72	81	88	91
Cultivated land with conservation treatement	0	62	71	78	2.9 81
Pasture or range land - poor condition	0	68	79	86	89
Pasture or range land - good condition	0	39	61	74	80
Meadow - good condition	0	30	58	71	78
Wood or Forest land - thin stand, poor cover, no mulch	0	45	66	77	83
Wood or Forest land - good cover	0	25	55	70	77
Open spaces - good condition - grass cover on 75% or more of area	0	39	61	74	80
Open spaces - fair condition - grass cover on 50-75% of area	0	49	69	79	84
WCC -weighted curve number APWA method	-				75.7
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential - 1/8 acre or less	65	77	85	90	92
Residential - 1/4 acre	38	61	75	83	87
Residentail - 1/3 acre	30	57	72	81	86
Residential - 1/2 acre	25	54	70	80	85
Residential - 1 acre	20	51	68	79	84
Paved Parking lots, roofs, driveways, etc.	-	98	98	98	98
Streets and roads - paved with curbs and storm sewers	-	98	98	98	98
Streets and roads - gravel	-	76	85	89	91
Streets and roads - dirt	-	72	82	87	89
Lake/Pond	100	100	100	100	100

Project Name: The Moorings
Project Number:
Basin: Pre Project WS2

Total Area = 68.6 Acres
Total Area = 0.1072 sq. mi.
Composite Curve Number = 81.00

Land Use	Percent Impervious	Area/CN Hydrological Soil Group			
		A	B	C	D
Cultivated land without conservation treatment	0	72	81	88	91
Cultivated land with conservation treatement	0	62	71	78	68.6 81
Pasture or range land - poor condition	0	68	79	86	89
Pasture or range land - good condition	0	39	61	74	80
Meadow - good condition	0	30	58	71	78
Wood or Forest land - thin stand, poor cover, no mulch	0	45	66	77	83
Wood or Forest land - good cover	0	25	55	70	77
Open spaces - good condition - grass cover on 75% or more of area	0	39	61	74	80
Open spaces - fair condition - grass cover on 50-75% of area	0	49	69	79	84
WCC -weighted curve number APWA method					80.8
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential - 1/8 acre or less	65	77	85	90	92
Residential - 1/4 acre	38	61	75	83	87
Residentail - 1/3 acre	30	57	72	81	86
Residential - 1/2 acre	25	54	70	80	85
Residential - 1 acre	20	51	68	79	84
Paved Parking lots, roofs, driveways, etc.	-	98	98	98	98
Streets and roads - paved with curbs and storm sewers	-	98	98	98	98
Streets and roads - gravel	-	76	85	89	91
Streets and roads - dirt	-	72	82	87	89
Lake/Pond	100	100	100	100	100

Project Name: The Moorings
Project Number:
Basin: Post Project WS3

Total Area = 8.4 Acres
Total Area = 0.0131 sq. mi.
Composite Curve Number = 81.00

Land Use	Percent Impervious	Area/CN Hydrological Soil Group			
		A	B	C	D
Cultivated land without conservation treatment	0	72	81	88	91
Cultivated land with conservation treatement	0	62	71	78	8.4 81
Pasture or range land - poor condition	0	68	79	86	89
Pasture or range land - good condition	0	39	61	74	80
Meadow - good condition	0	30	58	71	78
Wood or Forest land - thin stand, poor cover, no mulch	0	45	66	77	83
Wood or Forest land - good cover	0	25	55	70	77
Open spaces - good condition - grass cover on 75% or more of area	0	39	61	74	80
Open spaces - fair condition - grass cover on 50-75% of area	0	49	69	79	84
WCC -weighted curve number APWA method					81.3
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential - 1/8 acre or less	65	77	85	90	92
Residential - 1/4 acre	38	61	75	83	87
Residentail - 1/3 acre	30	57	72	81	86
Residential - 1/2 acre	25	54	70	80	85
Residential - 1 acre	20	51	68	79	84
Paved Parking lots, roofs, driveways, etc.	-	98	98	98	98
Streets and roads - paved with curbs and storm sewers	-	98	98	98	98
Streets and roads - gravel	-	76	85	89	91
Streets and roads - dirt	-	72	82	87	89
Lake/Pond	100	100	100	100	100

Project Name: The Moorings
Project Number:
Basin: Post Project WS4

Total Area = 11.1 Acres
Total Area = 0.0173 sq. mi.
Composite Curve Number = 81.00

Land Use	Percent Impervious	Area/CN Hydrological Soil Group			
		A	B	C	D
Cultivated land without conservation treatment	0	72	81	88	91
Cultivated land with conservation treatement	0	62	71	78	11.1 81
Pasture or range land - poor condition	0	68	79	86	89
Pasture or range land - good condition	0	39	61	74	80
Meadow - good condition	0	30	58	71	78
Wood or Forest land - thin stand, poor cover, no mulch	0	45	66	77	83
Wood or Forest land - good cover	0	25	55	70	77
Open spaces - good condition - grass cover on 75% or more of area	0	39	61	74	80
Open spaces - fair condition - grass cover on 50-75% of area	0	49	69	79	84
WCC -weighted curve number APWA method					81.3
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential - 1/8 acre or less	65	77	85	90	92
Residential - 1/4 acre	38	61	75	83	87
Residentail - 1/3 acre	30	57	72	81	86
Residential - 1/2 acre	25	54	70	80	85
Residential - 1 acre	20	51	68	79	84
Paved Parking lots, roofs, driveways, etc.	-	98	98	98	98
Streets and roads - paved with curbs and storm sewers	-	98	98	98	98
Streets and roads - gravel	-	76	85	89	91
Streets and roads - dirt	-	72	82	87	89
Lake/Pond	100	100	100	100	100

Project Name: The Moorings
Project Number:
Basin: Post Project WS5

Total Area = 33.9 Acres
Total Area = 0.0530 sq. mi.
Composite Curve Number = 81.00

Land Use	Percent Impervious	Area/CN Hydrological Soil Group			
		A	B	C	D
Cultivated land without conservation treatment	0	72	81	88	91
Cultivated land with conservation treatement	0	62	71	78	33.9 81
Pasture or range land - poor condition	0	68	79	86	89
Pasture or range land - good condition	0	39	61	74	80
Meadow - good condition	0	30	58	71	78
Wood or Forest land - thin stand, poor cover, no mulch	0	45	66	77	83
Wood or Forest land - good cover	0	25	55	70	77
Open spaces - good condition - grass cover on 75% or more of area	0	39	61	74	80
Open spaces - fair condition - grass cover on 50-75% of area	0	49	69	79	84
WCC -weighted curve number APWA method					81.3
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential - 1/8 acre or less	65	77	85	90	92
Residential - 1/4 acre	38	61	75	83	87
Residentail - 1/3 acre	30	57	72	81	86
Residential - 1/2 acre	25	54	70	80	85
Residential - 1 acre	20	51	68	79	84
Paved Parking lots, roofs, driveways, etc.	-	98	98	98	98
Streets and roads - paved with curbs and storm sewers	-	98	98	98	98
Streets and roads - gravel	-	76	85	89	91
Streets and roads - dirt	-	72	82	87	89
Lake/Pond	100	100	100	100	100

Project Name: The Moorings
Project Number:
Basin: Pre Project outlet

Total Area = 18.4 Acres
Total Area = 0.0288 sq. mi.
Composite Curve Number = 81.00

Land Use	Percent Impervious	Area/CN Hydrological Soil Group			
		A	B	C	D
Cultivated land without conservation treatment	0	72	81	88	91
Cultivated land with conservation treatement	0	62	71	78	18.4 81
Pasture or range land - poor condition	0	68	79	86	89
Pasture or range land - good condition	0	39	61	74	80
Meadow - good condition	0	30	58	71	78
Wood or Forest land - thin stand, poor cover, no mulch	0	45	66	77	83
Wood or Forest land - good cover	0	25	55	70	77
Open spaces - good condition - grass cover on 75% or more of area	0	39	61	74	80
Open spaces - fair condition - grass cover on 50-75% of area	0	49	69	79	84
WCC -weighted curve number APWA method	-				75.7
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential - 1/8 acre or less	65	77	85	90	92
Residential - 1/4 acre	38	61	75	83	87
Residentail - 1/3 acre	30	57	72	81	86
Residential - 1/2 acre	25	54	70	80	85
Residential - 1 acre	20	51	68	79	84
Paved Parking lots, roofs, driveways, etc.	-	98	98	98	98
Streets and roads - paved with curbs and storm sewers	-	98	98	98	98
Streets and roads - gravel	-	76	85	89	91
Streets and roads - dirt	-	72	82	87	89
Lake/Pond	100	100	100	100	100

Project Name: The Moorings
Project Number:
Basin: Pre Project Pond

Total Area = 60.8 Acres
Total Area = 0.0950 sq. mi.
Composite Curve Number = 82.81

Land Use	Percent Impervious	Area/CN Hydrological Soil Group			
		A	B	C	D
Cultivated land without conservation treatment	0	72	81	88	91
Cultivated land with conservation treatement	0	62	71	78	55.0 81
Pasture or range land - poor condition	0	68	79	86	89
Pasture or range land - good condition	0	39	61	74	80
Meadow - good condition	0	30	58	71	78
Wood or Forest land - thin stand, poor cover, no mulch	0	45	66	77	83
Wood or Forest land - good cover	0	25	55	70	77
Open spaces - good condition - grass cover on 75% or more of area	0	39	61	74	80
Open spaces - fair condition - grass cover on 50-75% of area	0	49	69	79	84
WCC -weighted curve number APWA method					80.8
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential - 1/8 acre or less	65	77	85	90	92
Residential - 1/4 acre	38	61	75	83	87
Residentail - 1/3 acre	30	57	72	81	86
Residential - 1/2 acre	25	54	70	80	85
Residential - 1 acre	20	51	68	79	84
Paved Parking lots, roofs, driveways, etc.	-	98	98	98	98
Streets and roads - paved with curbs and storm sewers	-	98	98	98	98
Streets and roads - gravel	-	76	85	89	91
Streets and roads - dirt	-	72	82	87	89
Lake/Pond	100	100	100	100	5.8 100

Project Name: The Moorings
Project Number:
Basin: Pre Project WS1

Total Area = 3.1 Acres
Total Area = 0.0048 sq. mi.
Composite Curve Number = 81.00

Land Use	Percent Impervious	Area/CN Hydrological Soil Group			
		A	B	C	D
Cultivated land without conservation treatment	0	72	81	88	91
Cultivated land with conservation treatement	0	62	71	78	3.1 81
Pasture or range land - poor condition	0	68	79	86	89
Pasture or range land - good condition	0	39	61	74	80
Meadow - good condition	0	30	58	71	78
Wood or Forest land - thin stand, poor cover, no mulch	0	45	66	77	83
Wood or Forest land - good cover	0	25	55	70	77
Open spaces - good condition - grass cover on 75% or more of area	0	39	61	74	80
Open spaces - fair condition - grass cover on 50-75% of area	0	49	69	79	84
WCC -weighted curve number APWA method					81.3
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential - 1/8 acre or less	65	77	85	90	92
Residential - 1/4 acre	38	61	75	83	87
Residentail - 1/3 acre	30	57	72	81	86
Residential - 1/2 acre	25	54	70	80	85
Residential - 1 acre	20	51	68	79	84
Paved Parking lots, roofs, driveways, etc.	-	98	98	98	98
Streets and roads - paved with curbs and storm sewers	-	98	98	98	98
Streets and roads - gravel	-	76	85	89	91
Streets and roads - dirt	-	72	82	87	89
Lake/Pond	100	100	100	100	100

Project Name: The Moorings
Project Number:
Basin: Pre Project WS 2

Total Area = 11.1 Acres
Total Area = 0.0173 sq. mi.
Composite Curve Number = 81.00

Land Use	Percent Impervious	Area/CN Hydrological Soil Group			
		A	B	C	D
Cultivated land without conservation treatment	0	72	81	88	91
Cultivated land with conservation treatement	0	62	71	78	11.1 81
Pasture or range land - poor condition	0	68	79	86	89
Pasture or range land - good condition	0	39	61	74	80
Meadow - good condition	0	30	58	71	78
Wood or Forest land - thin stand, poor cover, no mulch	0	45	66	77	83
Wood or Forest land - good cover	0	25	55	70	77
Open spaces - good condition - grass cover on 75% or more of area	0	39	61	74	80
Open spaces - fair condition - grass cover on 50-75% of area	0	49	69	79	84
WCC -weighted curve number APWA method					81.3
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential - 1/8 acre or less	65	77	85	90	92
Residential - 1/4 acre	38	61	75	83	87
Residentail - 1/3 acre	30	57	72	81	86
Residential - 1/2 acre	25	54	70	80	85
Residential - 1 acre	20	51	68	79	84
Paved Parking lots, roofs, driveways, etc.	-	98	98	98	98
Streets and roads - paved with curbs and storm sewers	-	98	98	98	98
Streets and roads - gravel	-	76	85	89	91
Streets and roads - dirt	-	72	82	87	89
Lake/Pond	100	100	100	100	100

Project Name: The Moorings
Project Number:
Basin: Pre Project WS3

Total Area = 31.4 Acres
Total Area = 0.0491 sq. mi.
Composite Curve Number = 81.00

Land Use	Percent Impervious	Area/CN Hydrological Soil Group			
		A	B	C	D
Cultivated land without conservation treatment	0	72	81	88	91
Cultivated land with conservation treatement	0	62	71	78	31.4 81
Pasture or range land - poor condition	0	68	79	86	89
Pasture or range land - good condition	0	39	61	74	80
Meadow - good condition	0	30	58	71	78
Wood or Forest land - thin stand, poor cover, no mulch	0	45	66	77	83
Wood or Forest land - good cover	0	25	55	70	77
Open spaces - good condition - grass cover on 75% or more of area	0	39	61	74	80
Open spaces - fair condition - grass cover on 50-75% of area	0	49	69	79	84
WCC -weighted curve number APWA method					81.3
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential - 1/8 acre or less	65	77	85	90	92
Residential - 1/4 acre	38	61	75	83	87
Residentail - 1/3 acre	30	57	72	81	86
Residential - 1/2 acre	25	54	70	80	85
Residential - 1 acre	20	51	68	79	84
Paved Parking lots, roofs, driveways, etc.	-	98	98	98	98
Streets and roads - paved with curbs and storm sewers	-	98	98	98	98
Streets and roads - gravel	-	76	85	89	91
Streets and roads - dirt	-	72	82	87	89
Lake/Pond	100	100	100	100	100

Project Name: The Moorings
Project Number:
Basin: Pre To Moorings N. Addition Pond

Total Area = 8.3 Acres
Total Area = 0.0130 sq. mi.
Composite Curve Number = 81.00

Land Use	Percent Impervious	Area/CN Hydrological Soil Group			
		A	B	C	D
Cultivated land without conservation treatment	0	72	81	88	91
Cultivated land with conservation treatement	0	62	71	78	8.3 81
Pasture or range land - poor condition	0	68	79	86	89
Pasture or range land - good condition	0	39	61	74	80
Meadow - good condition	0	30	58	71	78
Wood or Forest land - thin stand, poor cover, no mulch	0	45	66	77	83
Wood or Forest land - good cover	0	25	55	70	77
Open spaces - good condition - grass cover on 75% or more of area	0	39	61	74	80
Open spaces - fair condition - grass cover on 50-75% of area	0	49	69	79	84
WCC -weighted curve number APWA method					81.3
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential - 1/8 acre or less	65	77	85	90	92
Residential - 1/4 acre	38	61	75	83	87
Residentail - 1/3 acre	30	57	72	81	86
Residential - 1/2 acre	25	54	70	80	85
Residential - 1 acre	20	51	68	79	84
Paved Parking lots, roofs, driveways, etc.	-	98	98	98	98
Streets and roads - paved with curbs and storm sewers	-	98	98	98	98
Streets and roads - gravel	-	76	85	89	91
Streets and roads - dirt	-	72	82	87	89
Lake/Pond	100	100	100	100	100

Project Name: The Moorings
Project Number:
Basin: Post Project outlet

Total Area = 18.4 Acres
Total Area = 0.0288 sq. mi.
Composite Curve Number = 89.74

Land Use	Percent Impervious	Area/CN Hydrological Soil Group			
		A	B	C	D
Cultivated land without conservation treatment	0	72	81	88	91
Cultivated land with conservation treatement	0	62	71	78	81
Pasture or range land - poor condition	0	68	79	86	89
Pasture or range land - good condition	0	39	61	74	80
Meadow - good condition	0	30	58	71	78
Wood or Forest land - thin stand, poor cover, no mulch	0	45	66	77	83
Wood or Forest land - good cover	0	25	55	70	77
Open spaces - good condition - grass cover on 75% or more of area	0	39	61	74	80
Open spaces - fair condition - grass cover on 50-75% of area	0	49	69	79	84
WCC -weighted curve number APWA method	-				75.7
Commercial and business	85	89	92	94	6.3 95
Industrial	72	81	88	91	93
Residential - 1/8 acre or less	65	77	85	90	92
Residential - 1/4 acre	38	61	75	83	12.1 87
Residentail - 1/3 acre	30	57	72	81	86
Residential - 1/2 acre	25	54	70	80	85
Residential - 1 acre	20	51	68	79	84
Paved Parking lots, roofs, driveways, etc.	-	98	98	98	98
Streets and roads - paved with curbs and storm sewers	-	98	98	98	98
Streets and roads - gravel	-	76	85	89	91
Streets and roads - dirt	-	72	82	87	89
Lake/Pond	100	100	100	100	100

Project Name: The Moorings
Project Number:
Basin: Post Project Pond

Total Area = 60.8 Acres
Total Area = 0.0950 sq. mi.
Composite Curve Number = 93.45

Land Use	Percent Impervious	Area/CN Hydrological Soil Group			
		A	B	C	D
Cultivated land without conservation treatment	0	72	81	88	91
Cultivated land with conservation treatement	0	62	71	78	81
Pasture or range land - poor condition	0	68	79	86	89
Pasture or range land - good condition	0	39	61	74	80
Meadow - good condition	0	30	58	71	78
Wood or Forest land - thin stand, poor cover, no mulch	0	45	66	77	83
Wood or Forest land - good cover	0	25	55	70	77
Open spaces - good condition - grass cover on 75% or more of area	0	39	61	74	80
Open spaces - fair condition - grass cover on 50-75% of area	0	49	69	79	84
WCC -weighted curve number APWA method					80.8
Commercial and business	85	89	92	94	13.9 95
Industrial	72	81	88	91	93
Residential - 1/8 acre or less	65	77	85	90	41.1 92
Residential - 1/4 acre	38	61	75	83	87
Residentail - 1/3 acre	30	57	72	81	86
Residential - 1/2 acre	25	54	70	80	85
Residential - 1 acre	20	51	68	79	84
Paved Parking lots, roofs, driveways, etc.	-	98	98	98	98
Streets and roads - paved with curbs and storm sewers	-	98	98	98	98
Streets and roads - gravel	-	76	85	89	91
Streets and roads - dirt	-	72	82	87	89
Lake/Pond	100	100	100	100	5.8 100

Project Name: The Moorings
Project Number:
Basin: Post Project WS1

Total Area = 3.1 Acres
Total Area = 0.0048 sq. mi.
Composite Curve Number = 95.00

Land Use	Percent Impervious	Area/CN Hydrological Soil Group			
		A	B	C	D
Cultivated land without conservation treatment	0	72	81	88	91
Cultivated land with conservation treatement	0	62	71	78	81
Pasture or range land - poor condition	0	68	79	86	89
Pasture or range land - good condition	0	39	61	74	80
Meadow - good condition	0	30	58	71	78
Wood or Forest land - thin stand, poor cover, no mulch	0	45	66	77	83
Wood or Forest land - good cover	0	25	55	70	77
Open spaces - good condition - grass cover on 75% or more of area	0	39	61	74	80
Open spaces - fair condition - grass cover on 50-75% of area	0	49	69	79	84
WCC -weighted curve number APWA method					81.3
Commercial and business	85	89	92	94	3.1 95
Industrial	72	81	88	91	93
Residential - 1/8 acre or less	65	77	85	90	92
Residential - 1/4 acre	38	61	75	83	87
Residentail - 1/3 acre	30	57	72	81	86
Residential - 1/2 acre	25	54	70	80	85
Residential - 1 acre	20	51	68	79	84
Paved Parking lots, roofs, driveways, etc.	-	98	98	98	98
Streets and roads - paved with curbs and storm sewers	-	98	98	98	98
Streets and roads - gravel	-	76	85	89	91
Streets and roads - dirt	-	72	82	87	89
Lake/Pond	100	100	100	100	100

Project Name: The Moorings
Project Number:
Basin: Post Project WS2

Total Area = 11.1 Acres
Total Area = 0.0173 sq. mi.
Composite Curve Number = 95.00

Land Use	Percent Impervious	Area/CN Hydrological Soil Group			
		A	B	C	D
Cultivated land without conservation treatment	0	72	81	88	91
Cultivated land with conservation treatement	0	62	71	78	81
Pasture or range land - poor condition	0	68	79	86	89
Pasture or range land - good condition	0	39	61	74	80
Meadow - good condition	0	30	58	71	78
Wood or Forest land - thin stand, poor cover, no mulch	0	45	66	77	83
Wood or Forest land - good cover	0	25	55	70	77
Open spaces - good condition - grass cover on 75% or more of area	0	39	61	74	80
Open spaces - fair condition - grass cover on 50-75% of area	0	49	69	79	84
WCC -weighted curve number APWA method					81.3
Commercial and business	85	89	92	94	11.1 95
Industrial	72	81	88	91	93
Residential - 1/8 acre or less	65	77	85	90	92
Residential - 1/4 acre	38	61	75	83	87
Residentail - 1/3 acre	30	57	72	81	86
Residential - 1/2 acre	25	54	70	80	85
Residential - 1 acre	20	51	68	79	84
Paved Parking lots, roofs, driveways, etc.	-	98	98	98	98
Streets and roads - paved with curbs and storm sewers	-	98	98	98	98
Streets and roads - gravel	-	76	85	89	91
Streets and roads - dirt	-	72	82	87	89
Lake/Pond	100	100	100	100	100

Project Name: The Moorings
Project Number:
Basin: Post Project WS3

Total Area = 31.4 Acres
Total Area = 0.0491 sq. mi.
Composite Curve Number = 91.20

Land Use	Percent Impervious	Area/CN Hydrological Soil Group			
		A	B	C	D
Cultivated land without conservation treatment	0	72	81	88	91
Cultivated land with conservation treatement	0	62	71	78	81
Pasture or range land - poor condition	0	68	79	86	89
Pasture or range land - good condition	0	39	61	74	80
Meadow - good condition	0	30	58	71	78
Wood or Forest land - thin stand, poor cover, no mulch	0	45	66	77	83
Wood or Forest land - good cover	0	25	55	70	77
Open spaces - good condition - grass cover on 75% or more of area	0	39	61	74	80
Open spaces - fair condition - grass cover on 50-75% of area	0	49	69	79	84
WCC -weighted curve number APWA method					81.3
Commercial and business	85	89	92	94	10.4 95
Industrial	72	81	88	91	93
Residential - 1/8 acre or less	65	77	85	90	10.6 92
Residential - 1/4 acre	38	61	75	83	8.3 87
Residentail - 1/3 acre	30	57	72	81	86
Residential - 1/2 acre	25	54	70	80	2.1 85
Residential - 1 acre	20	51	68	79	84
Paved Parking lots, roofs, driveways, etc.	-	98	98	98	98
Streets and roads - paved with curbs and storm sewers	-	98	98	98	98
Streets and roads - gravel	-	76	85	89	91
Streets and roads - dirt	-	72	82	87	89
Lake/Pond	100	100	100	100	100

Project Name: The Moorings
Project Number:
Basin: Post To Moorings N. Addition Pond

Total Area = 8.3 Acres
Total Area = 0.0130 sq. mi.
Composite Curve Number = 92.00

Land Use	Percent Impervious	Area/CN Hydrological Soil Group			
		A	B	C	D
Cultivated land without conservation treatment	0	72	81	88	91
Cultivated land with conservation treatement	0	62	71	78	81
Pasture or range land - poor condition	0	68	79	86	89
Pasture or range land - good condition	0	39	61	74	80
Meadow - good condition	0	30	58	71	78
Wood or Forest land - thin stand, poor cover, no mulch	0	45	66	77	83
Wood or Forest land - good cover	0	25	55	70	77
Open spaces - good condition - grass cover on 75% or more of area	0	39	61	74	80
Open spaces - fair condition - grass cover on 50-75% of area	0	49	69	79	84
WCC -weighted curve number APWA method					81.3
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential - 1/8 acre or less	65	77	85	90	8.3 92
Residential - 1/4 acre	38	61	75	83	87
Residentail - 1/3 acre	30	57	72	81	86
Residential - 1/2 acre	25	54	70	80	85
Residential - 1 acre	20	51	68	79	84
Paved Parking lots, roofs, driveways, etc.	-	98	98	98	98
Streets and roads - paved with curbs and storm sewers	-	98	98	98	98
Streets and roads - gravel	-	76	85	89	91
Streets and roads - dirt	-	72	82	87	89
Lake/Pond	100	100	100	100	100

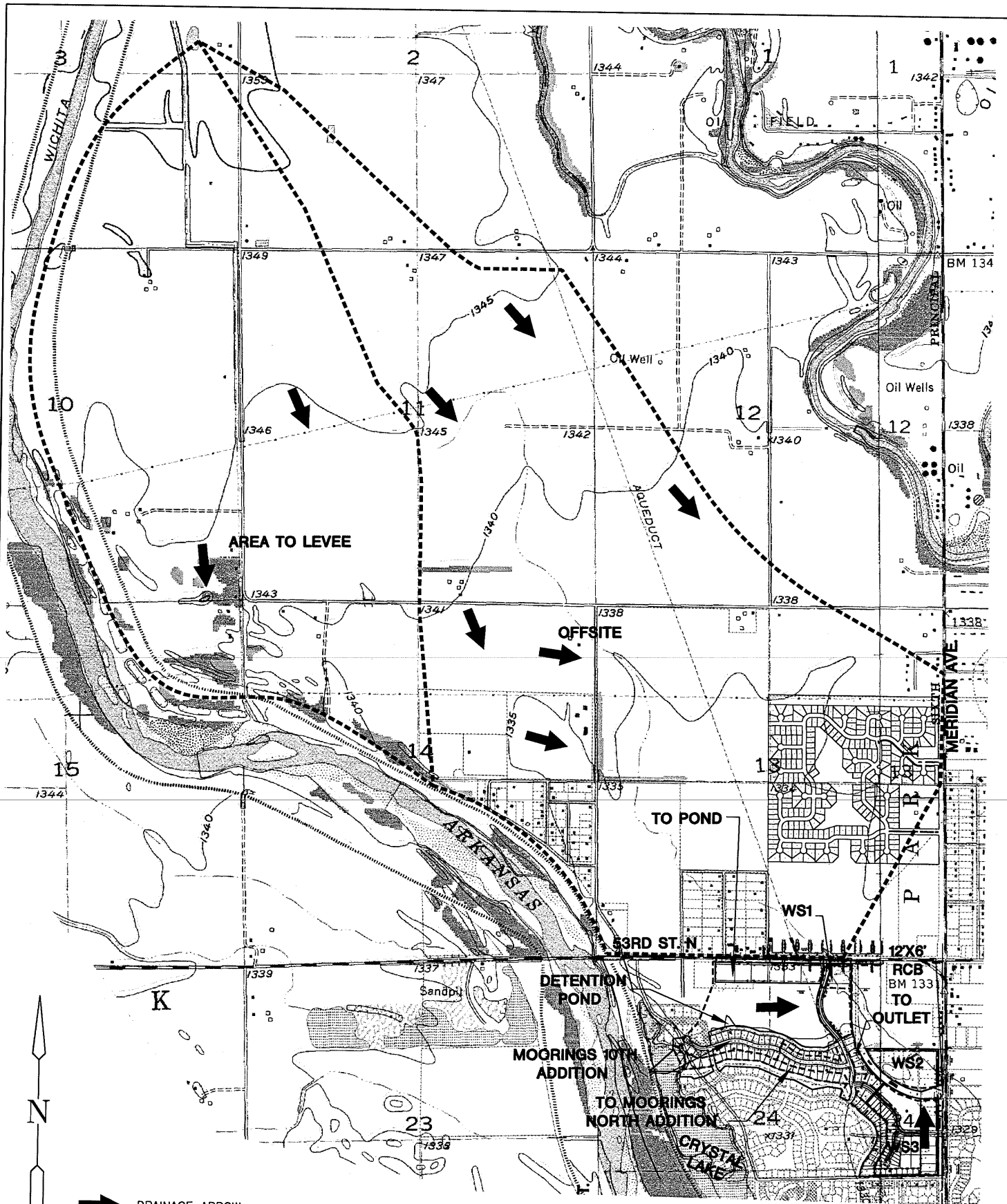
Project Name: The Moorings
Project Number:
Basin: Post Undetained NW

Total Area = 3.0 Acres
Total Area = 0.0047 sq. mi.
Composite Curve Number = 95.00

Land Use	Percent Impervious	Area/CN Hydrological Soil Group			
		A	B	C	D
Cultivated land without conservation treatment	0	72	81	88	91
Cultivated land with conservation treatement	0	62	71	78	81
Pasture or range land - poor condition	0	68	79	86	89
Pasture or range land - good condition	0	39	61	74	80
Meadow - good condition	0	30	58	71	78
Wood or Forest land - thin stand, poor cover, no mulch	0	45	66	77	83
Wood or Forest land - good cover	0	25	55	70	77
Open spaces - good condition - grass cover on 75% or more of area	0	39	61	74	80
Open spaces - fair condition - grass cover on 50-75% of area	0	49	69	79	84
WCC -weighted curve number APWA method					81.3
Commercial and business	85	89	92	94	3.0 95
Industrial	72	81	88	91	93
Residential - 1/8 acre or less	65	77	85	90	92
Residential - 1/4 acre	38	61	75	83	87
Residentail - 1/3 acre	30	57	72	81	86
Residential - 1/2 acre	25	54	70	80	85
Residential - 1 acre	20	51	68	79	84
Paved Parking lots, roofs, driveways, etc.	-	98	98	98	98
Streets and roads - paved with curbs and storm sewers	-	98	98	98	98
Streets and roads - gravel	-	76	85	89	91
Streets and roads - dirt	-	72	82	87	89
Lake/Pond	100	100	100	100	100

Appendix 2.7

Basin Map



J:\Civil\06608_Plaza_III\Dwg\DRNG\08522_BASIN MAP.dwg

MKEC ENGINEERING CONSULTANTS, INC.
411 N. WEBB ROAD
WICHITA, KS. 67206
316 - 684 - 9600

MOORINGS PLAZA III
PROJECT NAME

BASIN MAP
SHEET TITLE

KLA	CMJ	GJA
DESIGN BY:	DRAWN BY:	CHECKED BY:

MARCH 2010	08522	1 / 1
DATE	JOB NO.	SHEET/OF

Tab 3. Post-Development Conditions

Description

The site is 18.9 acres which will be developed as commercial and multi-family residential. Pierport Street will be extended to Harborlight. Harborlight Court will provide access to duplex homes. The entire site will be cleared and graded.

Drainage Calculations

Runoff Method

The site was modeled using the SCS Hydrograph method in Hydraflow Hydrographs by AutoCAD 3D 2009, Appendix 2.5. The model was originally created for the *Moorings 10th Addition June 2007 Drainage Report.* The model contains both the existing conditions and post-development model.

Rainfall

The rainfall information used is from the Kansas Department of Transportation Rainfall Depth Tables for Kansas Counties June 1997. The rainfall values used are shown in Table 3.1.

Table 3.1. 24-Hour Rainfall Depths.

	2-Yr	5-Yr	10-Yr	25-Yr	100-Yr
Sedgwick	3.50	4.53	5.24	6.24	7.80

Time of Concentration

Time of concentration was calculated using the FAA method. Calculations are in Appendix 2.6.

Table 3.2. Proposed Time of Concentrations

Area	T_c minutes	Curve Number
Offsite	380.8	71.4
To Outlet	43.2	89.7
To Pond	25.0	93.5
WS1	15.0	95.0
WS2	21.1	95.0
WS3	15.0	91.2
To Moorings North Pond	15.0	92.0

Curve Numbers

Weighted curve numbers were calculated to represent the land usage of the basins. The curve number for WS3 was increased from 90.5 as shown in the Moorings 10th Drainage Report to 91.2

to accommodate the increase in more dense development. A curve number of 95 was used to represent the commercial portion of the drainage basin. For the multi-family residential 92 was used. There are also ¼ acre and ½ acre residential lots in the basin from the Moorings 10th. The curve numbers are shown in Table 3.2.

Drainage Patterns

The site is reasonably flat, but runoff from the site will continue to flow from south to north into the existing engineered channel that borders the site to the north. Storm water sewer will convey the runoff to this channel. Lot 1 Block 1 will flow directly into the channel or will provide onsite storm water sewer at the time it develops. Onsite drainage patterns can be found on the Drainage and Utility Plan, Appendix 3.1. Basin boundaries are found in the Basin Map, Appendix 2.7. Flow from the site into the channel will not increase from existing conditions prior to the Moorings 10th plat. Detention constructed with the Moorings 10th Addition was designed with this area developed. No additional detention is required to maintain or decrease flow rates from pre-development conditions.

Table 3.3. Pre-Development Flow Rates

Description	Design Storm Flows (cfs)				
	2-Yr	**5-Yr**	**10-Yr**	**25-Yr**	**100-Yr**
Flow to Channel	107	183	238	327	463

Utilities

Storm Water Sewer

Proposed storm water sewer will convey runoff from the development to the north and into the drainage channel. An end section will outlet into the channel near the northeast corner of the site. The system along the west boundary of the site will flow to the north and will tie into an existing system before it outlets into the channel. Pipe sizing calculations were done using Hydraflow Storm Sewers by AutoCAD 2009, Appendix 3.2. The proposed utilities are shown on the Drainage and Utility Plan, Appendix 3.1. The storm water sewer system has been sized to convey the 2-year design storm. Emergency escape routes will be designed to allow surface flow of storms larger than the pipe system can handle. Escape routes will be maintained on the north side and the east side of Lot 1 to direct excess storm water to the channel.

Water

A proposed water system will tie into existing water in Pierport and Harborlight Streets and will service Harborlight Ct. Lots 1, 2, 3, and 4 Block 2 will be marked as both 4 building sites and also one building site. The current plan does not show water service to lots 3 and lots 4. In the event that the lots are separated, an easement by separate instrument and a water line will run between lots 1 and 2 to service lots 3 and 4.

Sanitary Sewer

The lots along the west edge of the plat will be serviced by the existing sanitary sewer system in the Moorings 10th Addition. Sanitary sewer will be provided for the remaining lots and will flow to the existing sanitary sewer north of the site.

Minimum Lowest Opening

The only lot adjacent to the drainage channel is Lot 1 Block 1. The 100-year water surface elevation in this channel is 1326.0 according to the Moorings 10th Drainage report. The minimum lowest opening for that lot is set at 1329.0.

Appendix 3.1

Drainage and Utility Plan

INL TOP=1328.43
FL OUT=1321.30
FL IN=1321.80

INL TOP=1328.43
FL OUT=1321.87
FL IN=1321.97

EXIST 42" SWS 100-YR

EXIST 36" SWS 100-YR

EXIST 36" SWS 100-YR

PROP 18" SWS 100-YR

PROP 8" WTR

PROP 15" SWS 100-YR

L13
AREA= 0.5 AC

DRAINAGE CHANNEL
100-YR WSEL=1326.0

PROP 8" SAN

PROP 15" SWS 100-YR

PROP 8" WTR

L16
AREA= 0.4 AC

PROP 15" SWS 100-YR

L14
AREA= 0.8 AC

PROP 30" SWS 100-YR

SSMH TOP=1329.3
FL NW 8"=1319.94
FL SE 8"=1320.04

L7
AREA= 0.9 AC

L15
AREA= 0.5 AC

PROP 36" SWS 100-YR

EXIST 8" SAN

SSMH TOP=1329.8
FL NW 8"=1320.87
FL S 8"=1320.97

L8
AREA= 0.9 AC

L42
AREA= 0.3 AC

L43
AREA= 0.4 AC

PROP 24" SWS 100-YR

EXIST 8" SAN

PROP 8" WTR

PROP 15" SWS 100-YR

L27
AREA= 0.9 AC

L28
AREA= 1.1 AC

PROP 42" SWS 100-YR

PROP 8" SAN

PROP 8" WTR

PROP 18" SWS 100-YR

PROP 8" SAN

L9
AREA= 0.5 AC

L41
AREA= 0.4 AC

L38
AREA= 0.3 AC

L40
AREA= 0.4 AC

L29
AREA= 0.8 AC

PROP 18" SWS 100-YR

EXIST 8" SAN

PROP 8" SAN

PROP 15" SWS 100-YR

SSMH TOP=1329.6
FL N 8"=1322.00
FL SW 8"=1322.10

L10
AREA= 0.6 AC

L39
AREA= 0.4 AC

L30
AREA= 1.2 AC

PROP 36" SWS 100-YR

EXIST 8" SAN

PROP 18" SWS 100-YR

PROP 8" WTR

PROP 8" SAN

PROP 18" SWS 100-YR

L11
AREA= 0.6 AC

L37
AREA= 1.2 AC

L44
AREA= 0.7 AC

L31
AREA= 1.0 AC

PROP 30" SWS 100-YR

EXIST 8" SAN

PROP 18" SWS 100-YR

PROP 8" SWR

PROP 8" SAN

PROP 15" SWS 100-YR

SSMH TOP=1330.2
FL NE 8"=1323.18
FL S 8"=1323.28

L12
AREA= 0.6 AC

L36
AREA= 0.3 AC

L35
AREA= 0.3 AC

L34
AREA= 0.4 AC

L33
AREA= 0.4 AC

L32
AREA= 0.4 AC

PROP 24" SWS 100-YR

PROP 8" SAN

PROP 30" SWS 100-YR

PROP 8" SAN

PROP 8" SAN

PROP 30" SWS 100-YR

EXIST 8" SAN

SSMH TOP=1329.5
FL N 8"=1323.80

HARBORLIGHT

HARBORLIGHT CT.

MOORINGS 10TH ADDITION

MOORINGS PLAZA II

Res. "A"

KEYWEST

SN NO OUTLET

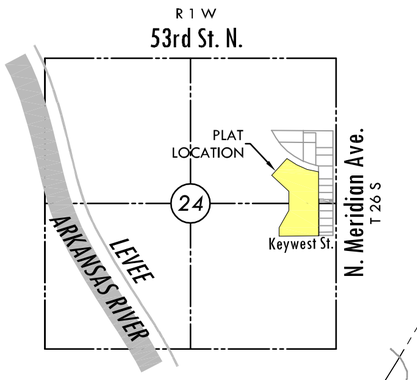
TSFMR

WS3 BOUNDARY

BM

LEGEND

- 6IN - CONIFEROUS TREE
- 3IN - DECIDUOUS TREE
- SN - SIGN
- PP - POWER POLE
- ELEC BOX - ELECTRIC BOX
- LP - LIGHT POLE
- FH - FIRE HYDRANT
- WV - WATER VALVE
- WM - WATER METER
- - SECTION CORNER
- BM - BENCHMARK
- - EASEMENT
- - BUILDING SETBACK
- - FENCE
- - STORM SEWER PIPE
- - WATER LINE
- - SANITARY SEWER LINE
- - GAS LINE
- - GAS PIPELINE
- - TELEPHONE LINE
- - UNDERGROUND ELEC.
- - OVERHEAD ELECTRIC
- - FIBER OPTIC CABLE
- - DRAINAGE SUB BASIN
- - DRAINAGE BASIN
- - FLOW ARROW
- A17 - AREA FOR SWS SIZING



VICINITY MAP

N

SCALE: 1"=50'
0 50 100 150

NOTE: ELEVATIONS ARE NGVD29

BENCH MARKS

BM 'A' - City of Wichita disc northwest corner of Meridian and Keywest
Elev. = 1329.36 (NGVD 29)

BM #5 - Square cut at SW. corner of RCB; 46' feet west of centerline of Meridian Ave. and 668' N. of the E. ¼ corner, Sec. 24, T26S, R1W.
Elev. = 1328.19 (NGVD 29)

MKEC ENGINEERING CONSULTANTS, INC.
411 N. WEBB ROAD
WICHITA, KS. 67206
316 - 684 - 9600

MOORINGS PLAZA III ADDITION
PROJECT NAME

DRAINAGE & UTILITY PLAN
SHEET TITLE

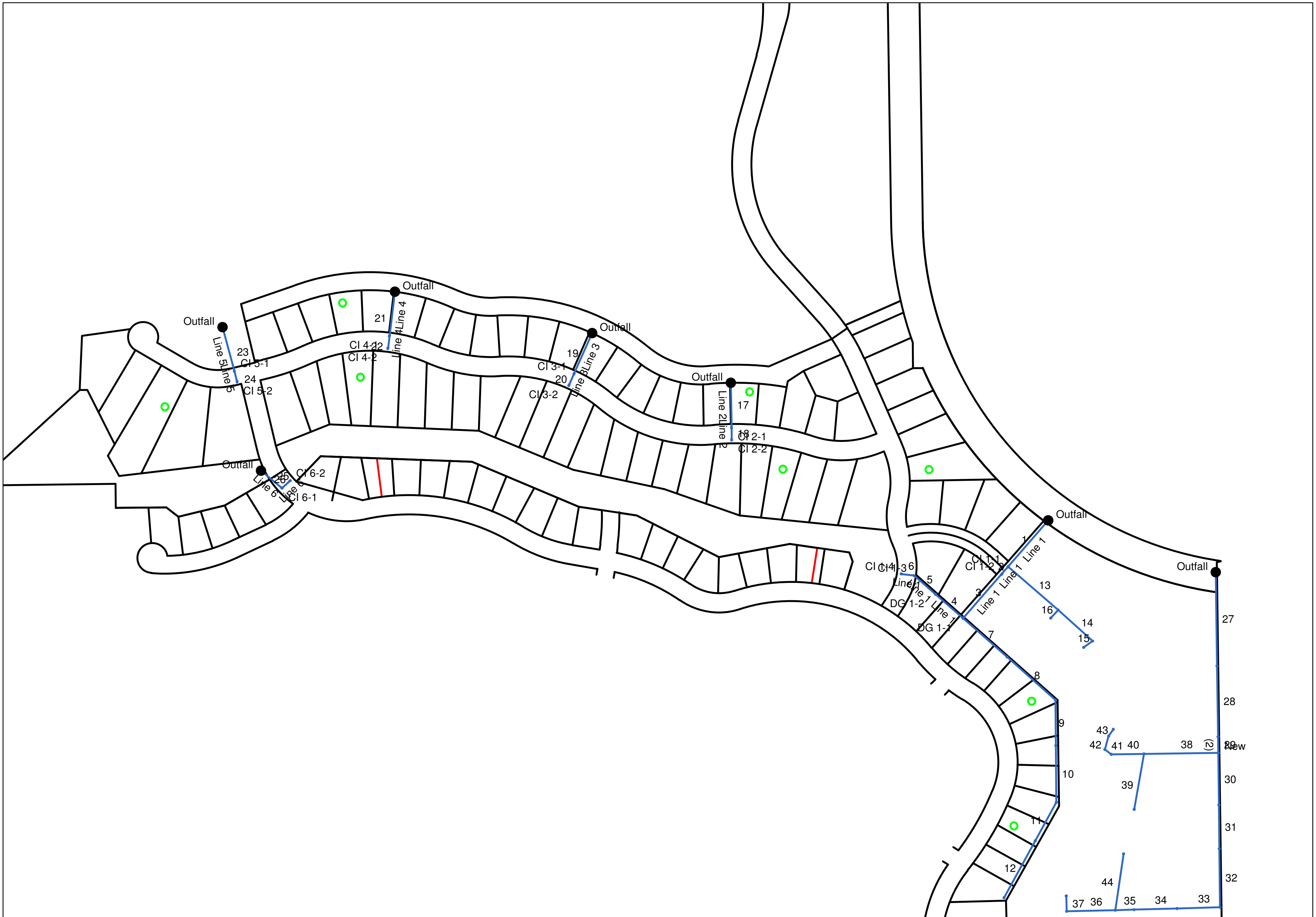
KLA	CMJ	GJA
DESIGN BY:	DRAWN BY:	CHECKED BY:
MARCH 2010	08522	1 / 1
DATE	JOB NO.	SHEET/OF

J:\Civil\06608_Plaza_III\Dwg\DRNG\08522_DUP.dwg

Appendix 3.2

Hydraflow Storm Sewers

Moorings 10th



Project File: Moorings PIII SWS 100-Yr 3-10.stm	Number of lines: 44	Date: 03-15-2010

Hydraflow Storm Sewers Extension v6.066

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	Line 1	42.23	42	Cir	204.000	1320.90	1321.30	0.196	1323.40	1323.91	0.70	1324.61	End	Curb-Horiz
2	Line 1	33.41	36	Cir	33.000	1321.80	1321.87	0.212	1324.80	1324.87	0.17	1325.04	1	Curb-Horiz
3	Line 1	29.60	36	Cir	194.000	1322.12	1322.53	0.211	1325.04	1325.37	0.64	1326.01	2	DropGrate
4	Line 1	10.88	15	Cir	122.000	1324.03	1324.63	0.492	1326.01*	1329.48*	0.61	1330.09	3	DropGrate
5	Line 1	9.48	15	Cir	94.000	1324.63	1325.24	0.649	1330.38*	1332.41*	0.85	1333.26	4	Curb-Horiz
6	Line 1	5.95	15	Cir	42.000	1322.53	1322.70	0.405	1333.83*	1334.18*	0.37	1334.55	5	Curb-Horiz
7		16.77	30	Cir	194.192	1321.70	1322.48	0.402	1326.11*	1326.44*	0.09	1326.53	3	DropGrate
8		13.25	30	Cir	215.047	1322.48	1323.34	0.400	1326.60*	1326.82*	0.13	1326.95	7	DropGrate
9		9.46	24	Cir	151.796	1323.59	1324.20	0.402	1326.95*	1327.22*	0.07	1327.29	8	DropGrate
10		7.39	18	Cir	188.225	1324.70	1325.45	0.398	1327.29*	1328.22*	0.22	1328.44	9	DropGrate
11		5.66	18	Cir	145.445	1325.20	1325.78	0.399	1328.56*	1328.98*	0.08	1329.06	10	DropGrate
12		2.92	15	Cir	216.038	1326.03	1326.89	0.398	1329.13*	1329.57*	0.09	1329.66	11	DropGrate
13		9.93	18	Cir	219.871	1321.15	1322.03	0.400	1324.61*	1326.58*	0.74	1327.32	1	Curb-Horiz
14		5.80	15	Cir	154.164	1322.15	1322.77	0.402	1327.46*	1328.71*	0.52	1329.23	13	Curb-Horiz
15		2.43	15	Cir	35.969	1322.85	1322.99	0.389	1329.51*	1329.56*	0.06	1329.63	14	Curb-Horiz
16		1.94	15	Cir	35.978	1323.05	1323.19	0.389	1327.77*	1327.80*	0.04	1327.84	13	Curb-Horiz
17	Line 2	10.57	18	Cir	148.000	1327.50	1329.00	1.014	1329.70*	1331.20*	0.28	1331.48	End	Curb-Horiz
18	Line 2	5.31	15	Cir	41.000	1329.25	1329.46	0.512	1331.75*	1332.02*	0.29	1332.31	17	Curb-Horiz
19	Line 3	11.28	18	Cir	148.000	1327.50	1329.00	1.014	1329.70*	1331.41*	0.32	1331.73	End	Curb-Horiz
20	Line 3	5.66	15	Cir	41.000	1329.25	1329.46	0.512	1332.03*	1332.34*	0.33	1332.67	19	Curb-Horiz
21	Line 4	11.28	18	Cir	148.000	1327.50	1329.00	1.014	1329.70*	1331.41*	0.32	1331.73	End	Curb-Horiz
22	Line 4	5.66	15	Cir	41.000	1329.25	1329.51	0.634	1332.03*	1332.34*	0.33	1332.67	21	Curb-Horiz
23	Line 5	12.34	18	Cir	151.000	1327.50	1329.01	1.000	1329.70*	1331.79*	0.38	1332.17	End	Curb-Horiz
24	Line 5	9.63	15	Cir	36.000	1329.26	1329.44	0.500	1332.17*	1332.97*	0.96	1333.93	23	Curb-Horiz

Moorings 10th | Number of lines: 44 | Run Date: 03-15-2010

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

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
25	Line 6	4.84	15	Cir	91.000	1322.55	1327.75	5.714	1323.43	1328.63	n/a	1329.30 i	End	Curb-Horiz
26	Line 6	2.69	15	Cir	36.000	1327.75	1327.98	0.639	1329.30*	1329.36*	0.07	1329.44	25	Curb-Horiz
27		49.22	42	Cir	311.820	1320.90	1321.52	0.199	1323.40	1324.46	0.25	1324.71	End	DropGrate
28		46.39	42	Cir	235.118	1321.60	1322.07	0.200	1324.71	1325.15	0.21	1325.36	27	Curb-Horiz
29	(2)	41.55	42	Cir	53.591	1321.57	1321.68	0.205	1325.48*	1325.58*	0.43	1326.01	28	Curb-Horiz
30		28.13	36	Cir	173.771	1321.70	1322.05	0.201	1326.05*	1326.36*	0.12	1326.49	29	DropGrate
31		22.81	36	Cir	144.358	1321.60	1321.89	0.201	1326.57*	1326.74*	0.08	1326.82	30	DropGrate
32		18.41	30	Cir	194.699	1322.40	1322.79	0.200	1326.82*	1327.21*	0.33	1327.54	31	DropGrate
33		16.73	30	Cir	142.406	1322.30	1322.59	0.204	1327.58*	1327.82*	0.09	1327.91	32	DropGrate
34		14.99	30	Cir	143.478	1322.70	1323.27	0.397	1327.94*	1328.13*	0.07	1328.21	33	DropGrate
35		13.04	24	Cir	62.270	1323.80	1324.05	0.401	1328.21*	1328.41*	0.40	1328.82	34	DropGrate
36		8.01	24	Cir	161.327	1323.85	1324.50	0.403	1328.98*	1329.19*	0.15	1329.34	35	DropGrate
37		6.45	18	Cir	50.746	1324.80	1325.00	0.394	1329.34*	1329.53*	0.21	1329.74	36	Curb-Horiz
38		11.48	24	Cir	246.830	1321.70	1322.69	0.401	1326.09*	1326.73*	0.31	1327.04	29	DropGrate
39		2.15	15	Cir	187.003	1322.95	1323.70	0.401	1327.20*	1327.40*	0.05	1327.45	38	DropGrate
40		7.95	18	Cir	108.452	1322.94	1324.18	1.143	1327.04*	1327.66*	0.31	1327.97	38	Curb-Horiz
41		5.85	15	Cir	26.868	1324.18	1324.29	0.409	1327.97*	1328.19*	0.51	1328.69	40	Curb-Horiz
42		3.75	15	Cir	46.546	1324.29	1324.48	0.408	1328.90*	1329.06*	0.08	1329.14	41	Curb-Horiz
43		2.15	15	Cir	27.473	1324.48	1324.59	0.400	1329.24*	1329.27*	0.05	1329.31	42	Curb-Horiz
44		3.76	15	Cir	189.313	1324.35	1325.11	0.401	1328.94*	1329.58*	0.15	1329.73	35	DropGrate

Moorings 10th

Number of lines: 44

Run Date: 03-15-2010

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

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert El Dn (ft)	Line slope (%)	Invert El Up (ft)	Line size (in)	Line shape	N value (n)	J-loss coeff (K)	Inlet/ Rim El (ft)	
1	End	204.000	131.000	Curb	0.00	2.00	0.59	22.3	1320.90	0.20	1321.30	42	Cir	0.013	1.50	1328.80	Line 1
2	1	33.000	0.000	Curb	0.00	2.00	0.59	22.3	1321.80	0.21	1321.87	36	Cir	0.013	0.50	1328.80	Line 1
3	2	194.000	0.000	DrGrt	0.00	6.30	0.59	67.3	1322.12	0.21	1322.53	36	Cir	0.013	2.25	1327.00	Line 1
4	3	122.000	90.000	DrGrt	0.00	0.50	0.59	15.0	1324.03	0.49	1324.63	15	Cir	0.013	0.50	1327.70	Line 1
5	4	94.000	0.000	Curb	0.00	1.20	0.59	32.6	1324.63	0.65	1325.24	15	Cir	0.013	0.92	1329.00	Line 1
6	5	42.000	-34.000	Curb	0.00	2.00	0.59	34.4	1322.53	0.40	1322.70	15	Cir	0.013	1.00	1329.00	Line 1
7	3	194.192	-89.447	DrGrt	0.00	0.90	0.66	15.0	1321.70	0.40	1322.48	30	Cir	0.013	0.50	1330.00	
8	7	215.047	0.000	DrGrt	0.00	0.90	0.66	15.0	1322.48	0.40	1323.34	30	Cir	0.013	1.17	1330.00	
9	8	151.796	47.931	DrGrt	0.00	0.50	0.66	15.0	1323.59	0.40	1324.20	24	Cir	0.013	0.50	1330.00	
10	9	188.225	0.000	DrGrt	0.00	0.40	0.66	15.0	1324.70	0.40	1325.45	18	Cir	0.013	0.81	1330.00	
11	10	145.445	29.179	DrGrt	0.00	0.60	0.66	15.0	1325.20	0.40	1325.78	18	Cir	0.013	0.50	1330.00	
12	11	216.038	0.000	DrGrt	0.00	0.60	0.66	15.0	1326.03	0.40	1326.89	15	Cir	0.013	1.00	1330.00	
13	1	219.871	-90.134	Curb	0.00	0.50	0.66	15.0	1321.15	0.40	1322.03	18	Cir	0.013	1.50	1330.00	
14	13	154.164	1.214	Curb	0.00	0.70	0.66	15.0	1322.15	0.40	1322.77	15	Cir	0.013	1.50	1330.00	
15	14	35.969	101.804	Curb	0.00	0.50	0.66	15.0	1322.85	0.39	1322.99	15	Cir	0.013	1.00	1330.00	
16	13	35.978	91.214	Curb	0.00	0.40	0.66	15.0	1323.05	0.39	1323.19	15	Cir	0.013	1.00	1330.00	
17	End	148.000	89.000	Curb	0.00	1.50	0.59	24.1	1327.50	1.01	1329.00	18	Cir	0.013	0.50	1333.60	Line 2
18	17	41.000	0.000	Curb	0.00	1.50	0.59	24.1	1329.25	0.51	1329.46	15	Cir	0.013	1.00	1333.60	Line 2
19	End	148.000	114.000	Curb	0.00	1.60	0.59	24.1	1327.50	1.01	1329.00	18	Cir	0.013	0.50	1333.60	Line 3
20	19	41.000	0.000	Curb	0.00	1.60	0.59	24.1	1329.25	0.51	1329.46	15	Cir	0.013	1.00	1333.60	Line 3
21	End	148.000	97.000	Curb	0.00	1.60	0.59	24.1	1327.50	1.01	1329.00	18	Cir	0.013	0.50	1333.60	Line 4
22	21	41.000	0.000	Curb	0.00	1.60	0.59	24.1	1329.25	0.63	1329.51	15	Cir	0.013	1.00	1333.60	Line 4
23	End	151.000	75.000	Curb	0.00	0.80	0.59	25.6	1327.50	1.00	1329.01	18	Cir	0.013	0.50	1333.60	Line 5

Moorings 10th | Number of lines: 44 | Date: 03-15-2010

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert El Dn (ft)	Line slope (%)	Invert El Up (ft)	Line size (in)	Line shape	N value (n)	J-loss coeff (K)	Inlet/ Rim El (ft)	
24	23	36.000	0.000	Curb	0.00	2.80	0.59	25.6	1329.26	0.50	1329.44	15	Cir	0.013	1.00	1333.60	Line 5
25	End	91.000	40.000	Curb	0.00	0.50	0.59	15.0	1322.55	5.71	1327.75	15	Cir	0.013	1.49	1332.00	Line 6
26	25	36.000	-83.000	Curb	0.00	0.50	0.73	15.0	1327.75	0.64	1327.98	15	Cir	0.013	1.00	1332.00	Line 6
27	End	311.820	89.226	DrGrt	0.00	0.90	0.73	15.0	1320.90	0.20	1321.52	42	Cir	0.013	0.50	1330.00	
28	27	235.118	0.006	Curb	0.00	1.10	0.73	15.0	1321.60	0.20	1322.07	42	Cir	0.013	0.50	1330.00	
29	28	53.591	0.000	Curb	0.00	0.80	0.73	15.0	1321.57	0.21	1321.68	42	Cir	0.013	1.50	1330.00	(2)
30	29	173.771	0.094	DrGrt	0.00	1.20	0.73	15.0	1321.70	0.20	1322.05	36	Cir	0.013	0.50	1330.00	
31	30	144.358	-0.005	DrGrt	0.00	1.00	0.73	15.0	1321.60	0.20	1321.89	36	Cir	0.013	0.50	1330.00	
32	31	194.699	0.109	DrGrt	0.00	0.40	0.73	15.0	1322.40	0.20	1322.79	30	Cir	0.013	1.50	1330.00	
33	32	142.406	88.878	DrGrt	0.00	0.40	0.73	15.0	1322.30	0.20	1322.59	30	Cir	0.013	0.50	1330.00	
34	33	143.478	0.103	DrGrt	0.00	0.40	0.73	15.0	1322.70	0.40	1323.27	30	Cir	0.013	0.50	1330.00	
35	34	62.270	-0.033	DrGrt	0.00	0.30	0.73	15.0	1323.80	0.40	1324.05	24	Cir	0.013	1.50	1330.00	
36	35	161.327	0.383	DrGrt	0.00	0.30	0.73	15.0	1323.85	0.40	1324.50	24	Cir	0.013	1.50	1330.00	
37	36	50.746	90.000	Curb	0.00	1.20	0.73	15.0	1324.80	0.39	1325.00	18	Cir	0.013	1.00	1330.00	
38	29	246.830	90.005	DrGrt	0.00	0.30	0.73	15.0	1321.70	0.40	1322.69	24	Cir	0.013	1.48	1330.00	
39	38	187.003	-79.300	DrGrt	0.00	0.40	0.73	15.0	1322.95	0.40	1323.70	15	Cir	0.013	1.00	1330.00	
40	38	108.452	0.000	Curb	0.00	0.40	0.73	15.0	1322.94	1.14	1324.18	18	Cir	0.013	0.98	1330.00	
41	40	26.868	36.759	Curb	0.00	0.40	0.73	15.0	1324.18	0.41	1324.29	15	Cir	0.013	1.43	1330.00	
42	41	46.546	69.961	Curb	0.00	0.30	0.73	15.0	1324.29	0.41	1324.48	15	Cir	0.013	0.56	1330.00	
43	42	27.473	18.665	Curb	0.00	0.40	0.73	15.0	1324.48	0.40	1324.59	15	Cir	0.013	1.00	1330.00	
44	35	189.313	100.000	DrGrt	0.00	0.70	0.73	15.0	1324.35	0.40	1325.11	15	Cir	0.013	1.00	1330.00	

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Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	204.000	2.00	20.00	0.59	1.18	12.22	22.3	68.6	3.5	42.23	44.55	5.62	42	0.20	1320.90	1321.30	1323.40	1323.91	1326.00	1328.80	Line 1
2	1	33.000	2.00	15.90	0.59	1.18	9.65	22.3	68.4	3.5	33.41	30.71	4.73	36	0.21	1321.80	1321.87	1324.80	1324.87	1328.80	1328.80	Line 1
3	2	194.000	6.30	13.90	0.59	3.72	8.47	67.3	67.3	3.5	29.60	30.66	4.25	36	0.21	1322.12	1322.53	1325.04	1325.37	1328.80	1327.00	Line 1
4	3	122.000	0.50	3.70	0.59	0.30	2.18	15.0	35.2	5.0	10.88	4.53	8.87	15	0.49	1324.03	1324.63	1326.01	1329.48	1327.00	1327.70	Line 1
5	4	94.000	1.20	3.20	0.59	0.71	1.89	32.6	34.6	5.0	9.48	5.20	7.73	15	0.65	1324.63	1325.24	1330.38	1332.41	1327.70	1329.00	Line 1
6	5	42.000	2.00	2.00	0.59	1.18	1.18	34.4	34.4	5.0	5.95	4.11	4.85	15	0.40	1322.53	1322.70	1333.83	1334.18	1329.00	1329.00	Line 1
7	3	194.192	0.90	3.90	0.66	0.59	2.57	15.0	20.1	6.5	16.77	25.99	3.42	30	0.40	1321.70	1322.48	1326.11	1326.44	1327.00	1330.00	
8	7	215.047	0.90	3.00	0.66	0.59	1.98	15.0	18.9	6.7	13.25	25.94	2.70	30	0.40	1322.48	1323.34	1326.60	1326.82	1330.00	1330.00	
9	8	151.796	0.50	2.10	0.66	0.33	1.39	15.0	18.1	6.8	9.46	14.34	3.01	24	0.40	1323.59	1324.20	1326.95	1327.22	1330.00	1330.00	
10	9	188.225	0.40	1.60	0.66	0.26	1.06	15.0	17.0	7.0	7.39	6.63	4.18	18	0.40	1324.70	1325.45	1327.29	1328.22	1330.00	1330.00	
11	10	145.445	0.60	1.20	0.66	0.40	0.79	15.0	16.2	7.1	5.66	6.63	3.20	18	0.40	1325.20	1325.78	1328.56	1328.98	1330.00	1330.00	
12	11	216.038	0.60	0.60	0.66	0.40	0.40	15.0	15.0	7.4	2.92	4.07	2.38	15	0.40	1326.03	1326.89	1329.13	1329.57	1330.00	1330.00	
13	1	219.871	0.50	2.10	0.66	0.33	1.39	15.0	16.1	7.2	9.93	6.64	5.62	18	0.40	1321.15	1322.03	1324.61	1326.58	1328.80	1330.00	
14	13	154.164	0.70	1.20	0.66	0.46	0.79	15.0	15.2	7.3	5.80	4.10	4.73	15	0.40	1322.15	1322.77	1327.46	1328.71	1330.00	1330.00	
15	14	35.969	0.50	0.50	0.66	0.33	0.33	15.0	15.0	7.4	2.43	4.03	1.98	15	0.39	1322.85	1322.99	1329.51	1329.56	1330.00	1330.00	
16	13	35.978	0.40	0.40	0.66	0.26	0.26	15.0	15.0	7.4	1.94	4.03	1.58	15	0.39	1323.05	1323.19	1327.77	1327.80	1330.00	1330.00	
17	End	148.000	1.50	3.00	0.59	0.89	1.77	24.1	24.3	6.0	10.57	10.57	5.98	18	1.01	1327.50	1329.00	1329.70	1331.20	1330.00	1333.60	Line 2
18	17	41.000	1.50	1.50	0.59	0.89	0.89	24.1	24.1	6.0	5.31	4.62	4.33	15	0.51	1329.25	1329.46	1331.75	1332.02	1333.60	1333.60	Line 2
19	End	148.000	1.60	3.20	0.59	0.94	1.89	24.1	24.3	6.0	11.28	10.57	6.38	18	1.01	1327.50	1329.00	1329.70	1331.41	1330.00	1333.60	Line 3
20	19	41.000	1.60	1.60	0.59	0.94	0.94	24.1	24.1	6.0	5.66	4.62	4.62	15	0.51	1329.25	1329.46	1332.03	1332.34	1333.60	1333.60	Line 3
21	End	148.000	1.60	3.20	0.59	0.94	1.89	24.1	24.3	6.0	11.28	10.57	6.38	18	1.01	1327.50	1329.00	1329.70	1331.41	1330.00	1333.60	Line 4
22	21	41.000	1.60	1.60	0.59	0.94	0.94	24.1	24.1	6.0	5.66	5.14	4.62	15	0.63	1329.25	1329.51	1332.03	1332.34	1333.60	1333.60	Line 4
23	End	151.000	0.80	3.60	0.59	0.47	2.12	25.6	25.8	5.8	12.34	10.50	6.98	18	1.00	1327.50	1329.01	1329.70	1331.79	1330.00	1333.60	Line 5

Moorings 10th

Number of lines: 44

Run Date: 03-15-2010

NOTES: Intensity = 62.28 / (Inlet time + 10.10) ^ 0.66; Return period = 100 Yrs. ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
24	23	36.000	2.80	2.80	0.59	1.65	1.65	25.6	25.6	5.8	9.63	4.57	7.85	15	0.50	1329.26	1329.44	1332.17	1332.97	1333.60	1333.60	Line 5
25	End	91.000	0.50	1.00	0.59	0.30	0.66	15.0	15.2	7.3	4.84	15.44	5.24	15	5.71	1322.55	1327.75	1323.43	1328.63	1325.00	1332.00	Line 6
26	25	36.000	0.50	0.50	0.73	0.37	0.37	15.0	15.0	7.4	2.69	5.16	2.19	15	0.64	1327.75	1327.98	1329.30	1329.36	1332.00	1332.00	Line 6
27	End	311.820	0.90	10.90	0.73	0.66	7.96	15.0	22.6	6.2	49.22	44.86	6.20	42	0.20	1320.90	1321.52	1323.40	1324.46	1332.00	1330.00	
28	27	235.118	1.10	10.00	0.73	0.80	7.30	15.0	21.3	6.4	46.39	44.98	5.15	42	0.20	1321.60	1322.07	1324.71	1325.15	1330.00	1330.00	
29	28	53.591	0.80	8.90	0.73	0.58	6.50	15.0	21.0	6.4	41.55	45.60	4.32	42	0.21	1321.57	1321.68	1325.48	1325.58	1330.00	1330.00	(2)
30	29	173.771	1.20	5.90	0.73	0.88	4.31	15.0	20.0	6.5	28.13	29.94	3.98	36	0.20	1321.70	1322.05	1326.05	1326.36	1330.00	1330.00	
31	30	144.358	1.00	4.70	0.73	0.73	3.43	15.0	19.2	6.6	22.81	29.89	3.23	36	0.20	1321.60	1321.89	1326.57	1326.74	1330.00	1330.00	
32	31	194.699	0.40	3.70	0.73	0.29	2.70	15.0	18.1	6.8	18.41	18.36	3.75	30	0.20	1322.40	1322.79	1326.82	1327.21	1330.00	1330.00	
33	32	142.406	0.40	3.30	0.73	0.29	2.41	15.0	17.3	6.9	16.73	18.50	3.41	30	0.20	1322.30	1322.59	1327.58	1327.82	1330.00	1330.00	
34	33	143.478	0.40	2.90	0.73	0.29	2.12	15.0	16.5	7.1	14.99	25.85	3.05	30	0.40	1322.70	1323.27	1327.94	1328.13	1330.00	1330.00	
35	34	62.270	0.30	2.50	0.73	0.22	1.83	15.0	16.2	7.1	13.04	14.33	4.15	24	0.40	1323.80	1324.05	1328.21	1328.41	1330.00	1330.00	
36	35	161.327	0.30	1.50	0.73	0.22	1.10	15.0	15.3	7.3	8.01	14.36	2.55	24	0.40	1323.85	1324.50	1328.98	1329.19	1330.00	1330.00	
37	36	50.746	1.20	1.20	0.73	0.88	0.88	15.0	15.0	7.4	6.45	6.59	3.65	18	0.39	1324.80	1325.00	1329.34	1329.53	1330.00	1330.00	
38	29	246.830	0.30	2.20	0.73	0.22	1.61	15.0	16.2	7.1	11.48	14.32	3.65	24	0.40	1321.70	1322.69	1326.09	1326.73	1330.00	1330.00	
39	38	187.003	0.40	0.40	0.73	0.29	0.29	15.0	15.0	7.4	2.15	4.09	1.75	15	0.40	1322.95	1323.70	1327.20	1327.40	1330.00	1330.00	
40	38	108.452	0.40	1.50	0.73	0.29	1.10	15.0	15.6	7.3	7.95	11.23	4.50	18	1.14	1322.94	1324.18	1327.04	1327.66	1330.00	1330.00	
41	40	26.868	0.40	1.10	0.73	0.29	0.80	15.0	15.4	7.3	5.85	4.13	4.77	15	0.41	1324.18	1324.29	1327.97	1328.19	1330.00	1330.00	
42	41	46.546	0.30	0.70	0.73	0.22	0.51	15.0	15.2	7.3	3.75	4.13	3.05	15	0.41	1324.29	1324.48	1328.90	1329.06	1330.00	1330.00	
43	42	27.473	0.40	0.40	0.73	0.29	0.29	15.0	15.0	7.4	2.15	4.09	1.75	15	0.40	1324.48	1324.59	1329.24	1329.27	1330.00	1330.00	
44	35	189.313	0.70	0.70	0.73	0.51	0.51	15.0	15.0	7.4	3.76	4.09	3.07	15	0.40	1324.35	1325.11	1328.94	1329.58	1330.00	1330.00	

Moorings 10th | Number of lines: 44 | Run Date: 03-15-2010

NOTES: Intensity = 62.28 / (Inlet time + 10.10) ^ 0.66; Return period = 100 Yrs. ; c = cir e = ellip b = box

Tab 4. Floodplain Submittal

There are no FEMA floodplains on this site.

Tab 5. Permits

US Army Corps of Engineers

There are no wetlands on site, therefore no permits are required.

Kansas Department of Agriculture

The site does not change any waterways or provide detention, therefore division of water resources permits.

Federal Emergency Agency (FEMA)

There are no FEMA floodplains on site, therefore no LOMC applications are required.

Kansas Department of Transportation

There are no state highways on site.

Sedgwick County Right-of-way Permit

Not applicable to Moorings Plaza III Addition.