

DRAINAGE REPORT

FOR

MOORINGS PLAZA II ADDITION
Wichita, Kansas

OCTOBER 2008



Public Works, Engineering Division Final Drainage Plan Submittal Checklist

Reviewer: _____	Date: _____
Subdivision Name: _____	Location: _____
Total Land Area Of Ownership: _____ Acres	
Type: _____ Residential _____ Commercial _____ Industrial _____ Recreation _____ Municipal _____ Other	
Applicant: _____	Contact: _____ Phone #: _____
Engineer: _____	Contact: _____ Phone #: _____

Please check the appropriate box:

I = Included; NA = Non-Applicable; R= Required prior to development
(If "NA" is checked, an explanation must be entered)

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

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



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

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



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

Tab 4. Floodplain Submittal	Applicant			Engr	
	I	NA	Explanation / Location in Plan	I	NA
A. Provide source of flood profile					
B. Nearest base flood elevations					
C. Delineation of pre-developed regulatory floodplain/floodway limits					
D. Delineation of post-developed regulatory floodplain and floodway limits					
E. Floodplain boundary determination per elevation (project limits shown)					
F. Provide source of floodway data table and discharges					
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					
H. Provide regulatory floodway and four natural profile models (10,50,100, and 500-yr) for existing and future watershed conditions					
I. Location of floodplain/floodway limits and relationship of site to upstream/downstream properties (floodplain limits to be per elevation and scaled location)					
J. Flood plains and floodways located within a Reserve, where necessary					

Tab 5. Federal, State and Local Permits (to be provided prior to construction unless otherwise specified)	Applicant			Engr	
	I/R	NA	Explanation / Location in Plan	I/R	NA
A. US Army Corps of Engineers - Regulatory program permits (404 water quality certification)					
B. Kansas Department of Agriculture - Division of Water Resources Permits (Stream Obstruction, Channel Change, Flood Plain Fill, Levee, Water Appropriations, Dam safety permit, etc.)					
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.					
D. Kansas Department of Transportation					
E. Sedgwick County Right-of-way Permit					

Tab 1. Project Narrative

A. 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. Meridian Avenue borders the site to the east and Moorings 10th Addition is west of the site. The site is shown on the USGS Map, Figure 1.1.

B. Discussion of Development

Moorings Plaza II will be developed as fourteen commercial lots. The plat area is 18.2 acres.

C. Discussion of Offsite

Moorings 10th is west of Moorings Plaza II, North Meridian Avenue is to the east and 53rd Street is to the north.

D. Summary of Runoff

Drainage considerations for Mooring Plaza II were addressed when Moorings 10th Addition was platted. *Drainage Report for Moorings 10th Addition, Wichita, Kansas June 2007* should be referenced for runoff calculations. Moorings Plaza II is part of a larger common plan of development for this area. Detention for the 124.8 acres, which includes Mooring Plaza II, was accounted for in the Moorings 10th development. The pre- and post-development flow rates are shown below.

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	106	183	238	327	462

E. Best Management Practices

The site will be seeded or sodded after construction of grading and utilities are complete. During construction best management practices will be followed to comply with state and federal stormwater regulations.

F. Plat

The plat is included, Figure 1.2.

G. Preliminary Grading Plan

The preliminary lot grading plan is included, Figure 1.3.

H. Professional Engineer Seal

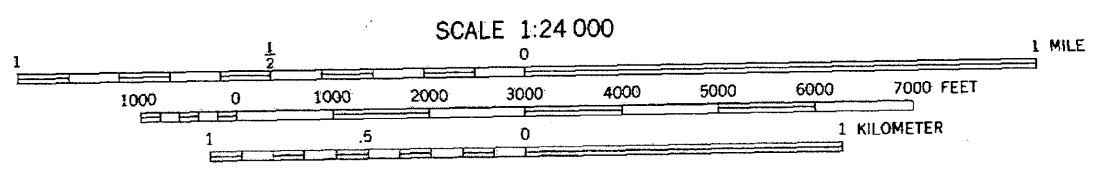
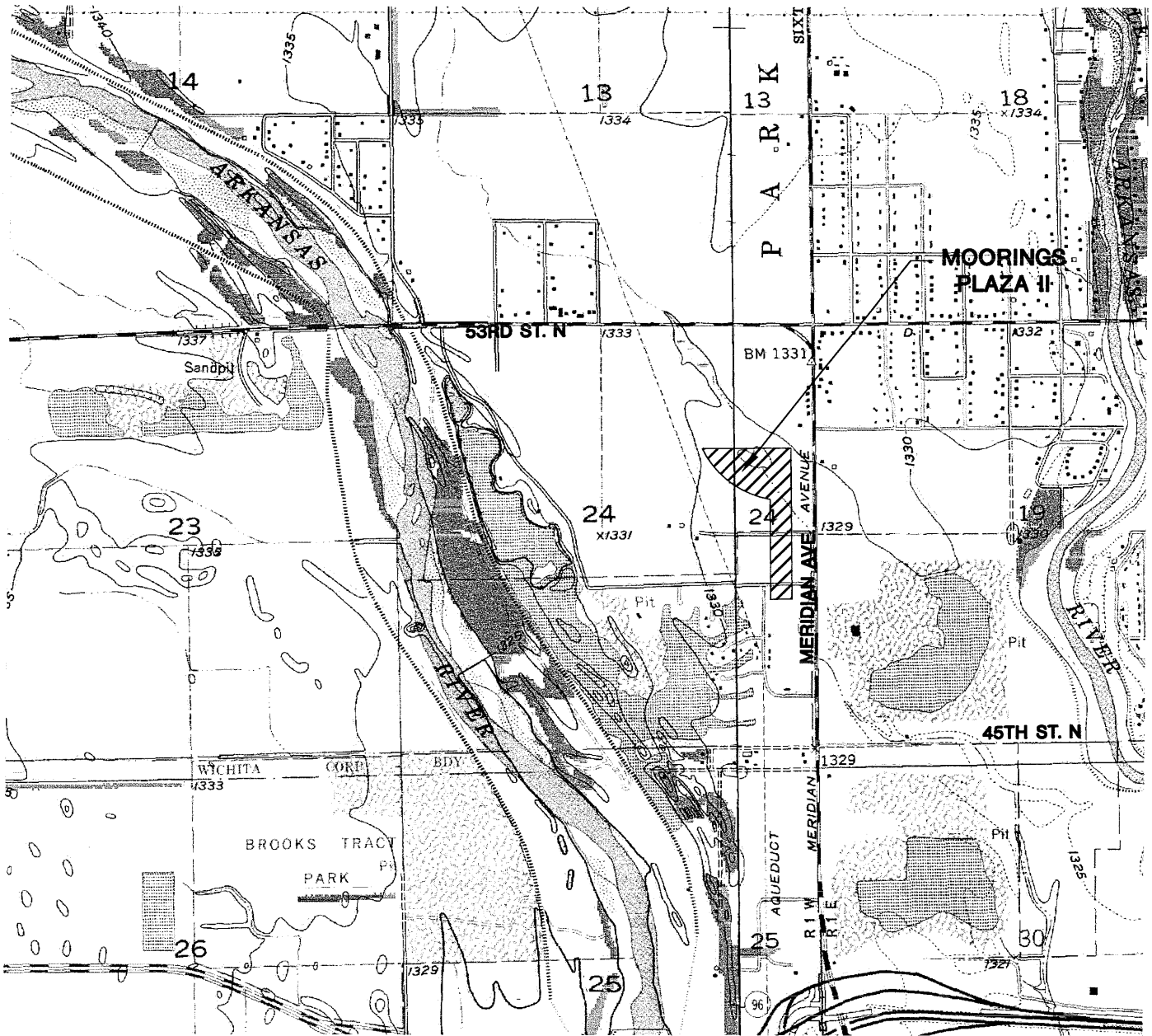
The cover of the report will be signed and dated.

I. CD

A CD of the drainage report in PDF format is attached to the inside front cover of the bound report.

Figure 1.1

USGS Quadrangle Map



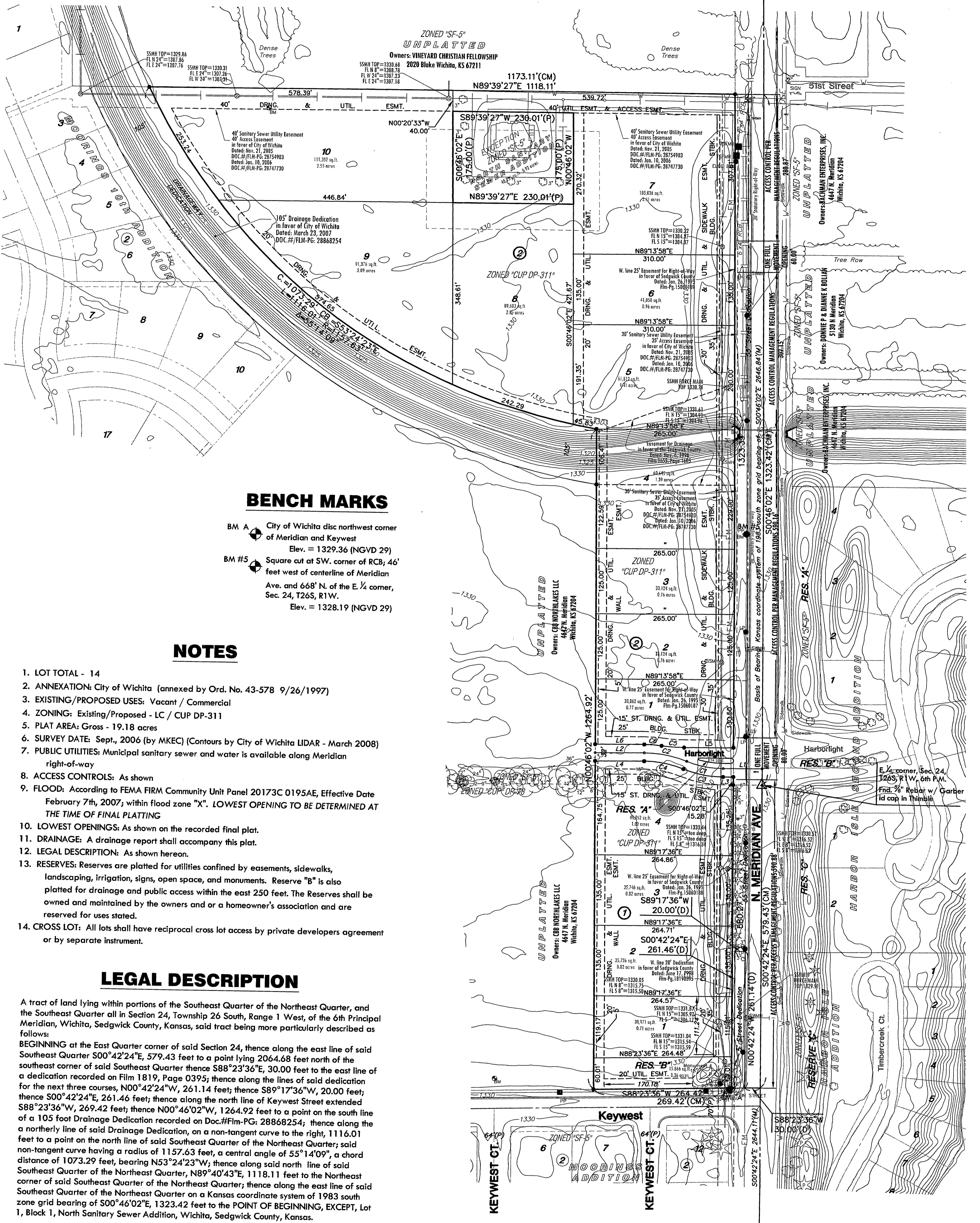
CONTOUR INTERVAL 10 FEET
 DOTTED LINES REPRESENT 5-FOOT CONTOURS
 NATIONAL GEODETIC VERTICAL DATUM OF 1929

MKEC ENGINEERING CONSULTANTS, INC. 411 N. WEBB ROAD WICHITA, KS. 67206 316-684-9600	MOORINGS PLAZA II PROJECT NAME	
	MAIZE & VALLEY CENTER QUADRANGLES SHEET TITLE	
TMH DESIGN BY:	CMJ DRAWN BY:	TMH CHECKED BY:
SEPTEMBER 2008 DATE	08523 JOB NO.	1 / 1 SHEET/OF

Figure 1.2

Plat

SE corner NE 1/4, NE 1/4,
Sec. 24, T26S, R1W, 6th P.M.
not found not set



BENCH MARKS

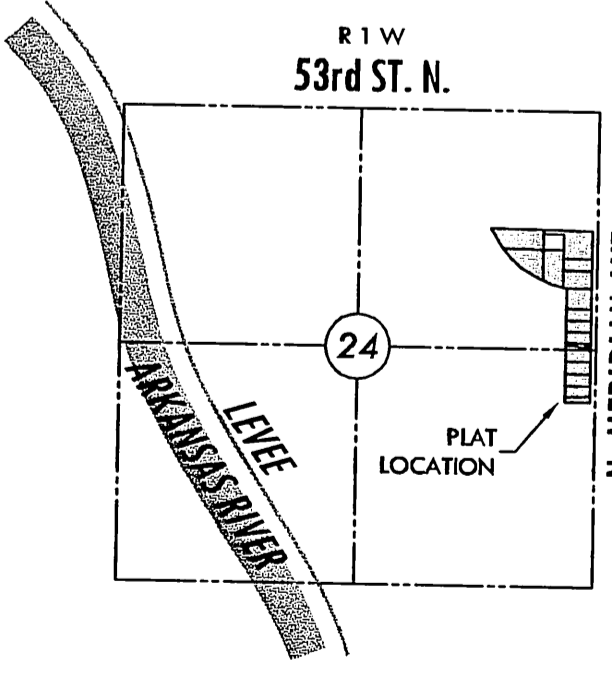
- BM A City of Wichita disc northwest corner of Meridian and Keywest
Elev. = 1329.36 (NGVD 29)
- BM #5 Square cut at SW. corner of RCB; 46' feet west of centerline of Meridian Ave. and 668' N. of the E. 1/4 corner, Sec. 24, T26S, R1W.
Elev. = 1328.19 (NGVD 29)

NOTES

1. LOT TOTAL - 14
2. ANNEXATION: City of Wichita (annexed by Ord. No. 43-578 9/26/1997)
3. EXISTING/PROPOSED USES: Vacant / Commercial
4. ZONING: Existing/Proposed - LC / CUP DP-311
5. PLAT AREA: Gross - 19.18 acres
6. SURVEY DATE: Sept., 2006 (by MKEC) (Contours by City of Wichita LIDAR - March 2008)
7. PUBLIC UTILITIES: Municipal sanitary sewer and water is available along Meridian right-of-way
8. ACCESS CONTROLS: As shown
9. FLOOD: According to FEMA FIRM Community Unit Panel 20173C 0195AE, Effective Date February 7th, 2007; within flood zone "X". LOWEST OPENING TO BE DETERMINED AT THE TIME OF FINAL PLATTING
10. LOWEST OPENINGS: As shown on the recorded final plat.
11. DRAINAGE: A drainage report shall accompany this plat.
12. LEGAL DESCRIPTION: As shown hereon.
13. RESERVES: Reserves are platted for utilities confined by easements, sidewalks, landscaping, irrigation, signs, open space, and monuments. Reserve "B" is also platted for drainage and public access within the east 250 feet. The Reserves shall be owned and maintained by the owners and or a homeowner's association and are reserved for uses stated.
14. CROSS LOT: All lots shall have reciprocal cross lot access by private developers agreement or by separate instrument.

LEGAL DESCRIPTION

A tract of land lying within portions of the Southeast Quarter of the Northeast Quarter, and the Southeast Quarter all in 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 East Quarter corner of said Section 24, thence along the east line of said Southeast Quarter S00°42'24"E, 579.43 feet to a point lying 2064.68 feet north of the southeast corner of said Southeast Quarter thence S88°23'36"E, 30.00 feet to the east line of a dedication recorded on Film 1819, Page 0395; thence along the lines of said dedication for the next three courses, N00°42'24"W, 261.14 feet; thence S89°17'36"W, 20.00 feet; thence S00°42'24"E, 261.46 feet; thence along the north line of Keywest Street extended S88°23'36"W, 269.42 feet; thence N00°46'02"W, 1264.92 feet to a point on the south line of a 105 foot Drainage Dedication recorded on Doc.#FIM-PG: 28868254; thence along the a northerly line of said Drainage Dedication, on a non-tangent curve to the right, 1116.01 feet to a point on the north line of said Southeast Quarter of the Northeast Quarter; said non-tangent curve having a radius of 1157.63 feet, a central angle of 55°14'09", a chord distance of 1073.29 feet, bearing N53°24'23"W; thence along said north line of said Southeast Quarter of the Northeast Quarter, N89°40'43"E, 1118.11 feet to the Northeast corner of said Southeast Quarter of the Northeast Quarter; thence along the east line of said Southeast Quarter of the Northeast Quarter on a Kansas coordinate system of 1983 south zone grid bearing of S00°46'02"E, 1323.42 feet to the POINT OF BEGINNING, EXCEPT, Lot 1, Block 1, North Sanitary Sewer Addition, Wichita, Sedgwick County, Kansas.

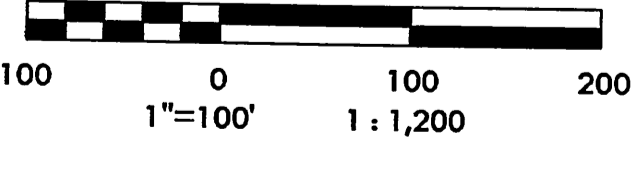


VICINITY MAP

LEGEND

- CONIFEROUS TREE
- DECIDUOUS TREE
- SIGN
- POWER POLE
- ELECTRIC BOX
- LIGHT POLE
- FIRE HYDRANT
- WATER VALVE
- WATER METER
- SECTION CORNER
- BENCHMARK
- EASEMENT
- BUILDING SETBACK
- FENCE
- STORM SEWER PIPE
- WATER LINE
- SANITARY SEWER LINE
- GAS LINE
- GAS PIPELINE
- TELEPHONE LINE
- UNDERGROUND ELEC.
- OVERHEAD ELECTRIC
- FORCED MAIN SEWER

SE corner, Sec. 24,
T26S, R1W, 6th P.M.
Fnd. 3/8" Rebar w/ MKEC
CLS 39' id cap in Thimble



PRELIMINARY PLAT

A portion of Sec. 24, T26S, R1W, 6th P.M.

THE MOORINGS PLAZA II

OWNERS / DEVELOPER: CBB NORTHLAKES LLC Attn: Kurt and Brad Bachman 4647 N. Meridian Ave. Wichita, KS, 67204 (316) 838-6789

Date submitted: Sept. 29th
Subdivision Hearing: Oct. 16th

MKEC
ENGINEERING
CONSULTANTS, INC.

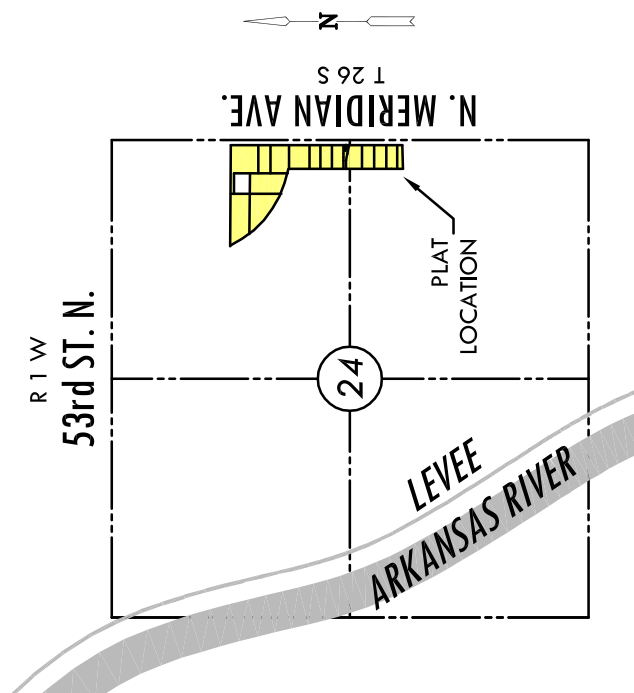
411 N. WEBB ROAD
WICHITA, K.S. 67206
316-684-9600

D:\Projects\2008\2008_09\2008_09_29\2008_09_29_001.PLT

Figure 1.3

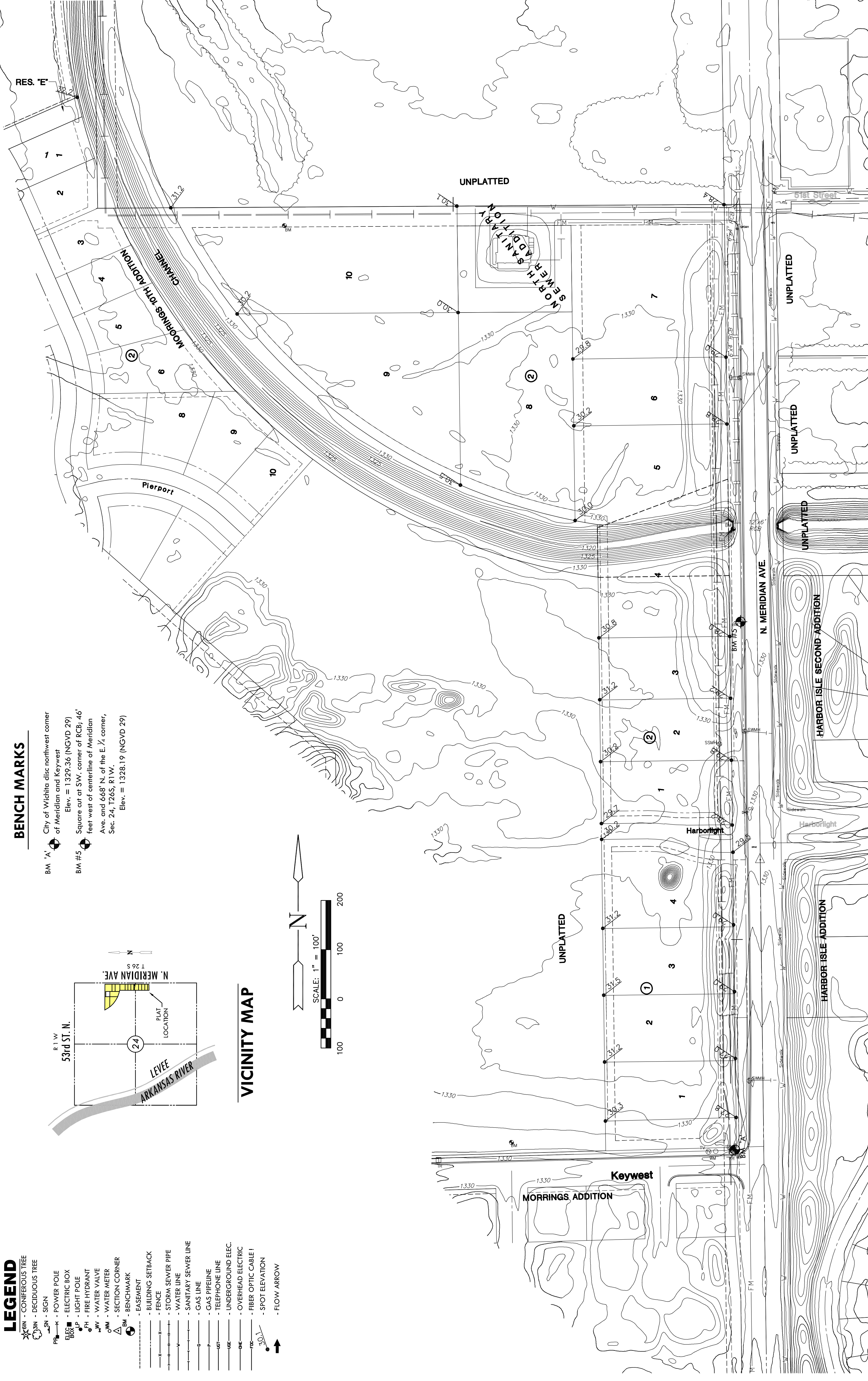
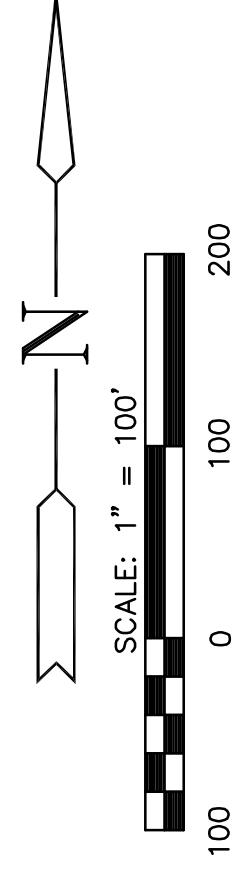
Preliminary Grading Plan

- LEGEND**
- CONIFEROUS TREE
 - DECIDUOUS TREE
 - SIGN
 - POWER POLE
 - ELECTRIC BOX
 - LIGHT POLE
 - FIRE HYDRANT
 - WATER VALVE
 - WATER METER
 - SECTION CORNER
 - 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 I
 - SPOT ELEVATION
 - FLOW ARROW



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 PCB, 46' feet west of centerline of Meridian Ave. and 668' N. of the E. 1/4 corner, Sec. 24, T26S, R1W. Elev. = 1328.19 (NGVD 29)



MORRINGS PLAZA II
LOT GRADING PLAN

MOORINGS PLAZA II
 WICHITA, KANSAS

DATE
 OCTOBER 2008

REVISED

DESIGN BY
 TMH

DRAWN BY
 CMJ

CHECKED BY
 GJA

SHEET NUMBER

1

MKEC
 ENGINEERING
 CONSULTANTS, INC.

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

J:\Civil\06608\Plaza II\dwg\06608_lgp.dwg

Tab 2. Existing Conditions Runoff Calculations

A. Orthophotograph

The aerial photograph is included, Figure 2.1.

B. Runoff Method

The site was modeled using the SCS Hydrograph method in Hydraflow Hydrographs 2004 by Intelisolve, see *Drainage Report for Moorings 10th Addition, Wichita, Kansas June 2007*.

C. Existing Topography

The site is extremely flat with slopes less than 1%. Elevations on the site are around 1330 feet. The existing topography is shown in the *Drainage Report for Moorings 10th Addition, Wichita, Kansas June 2007*.

D. Site Areas

The Moorings Plaza II Addition is 19.2 acres. The site is currently undeveloped agricultural land.

E. Benchmarks

Benchmarks used for site control are included on the plat, Figure 1.2.

F. Streams, Creeks, and Waterways

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, Figure 2.2. The Arkansas River is adjacent to the west property line. The Arkansas River is in Zone A floodplain. A levee runs parallel to the river, west of the property. Another channel drains from northwest to southeast between the lots. Improvements for this channel are proposed by others.

G. Soils

According to the NRCS (SCS) Sedgwick County Soil Survey, Figure 2.3, soils on the site are:

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

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.

H. Natural Features

An engineered drainage way south of the proposed commercial area. The property is currently undeveloped agricultural land.

I. Location of Existing Impervious Areas

Currently the site is undeveloped agricultural land with no impervious area.

J. Location of Existing Utilities

There is an existing 15-inch sanitary sewer line on the west side of Meridian Avenue and a 24-inch line just north of the proposed commercial area. A force main from the North Sanitary Sewer Addition is runs parallel to the existing sanitary sewer line. There is an existing water line on the east side of Meridian Avenue and within the utility easement north the Moorings Plaza II site.

K. Location of Existing Conveyance Systems

There are existing storm sewer inlets along the west side of North Meridian Avenue. There is a drainage channel that crosses the site flowing to the south and east. This channel has a 10-foot bottom and 3.5:1 side slopes.

L. Flow Paths

Flow paths are shown in the *Drainage Report for Moorings 10th Addition, Wichita, Kansas June 2007*

M. Location and Sizes of Existing Structures

There are no existing structures in the area identified on the plat as Moorings Plaza II Addition. The channel drains into existing an existing 12'x6' RCB. There is a 6x4 reinforced concrete box (RCB) on the west side of Meridian approximately 370 feet north of the existing 12'x6' RCB.

N. Existing Conditions Hydrologic Analysis

The site was divided into drainage areas as shown on the pre-project drainage boundary drawing, Figure 2.5. These drainage areas include the offsite area and also area west and south of the site. All of these basins drain into the channel that runs through the site.

The resulting pre-project flows are reported in the table below. Runoff calculations are in *Drainage Report for Moorings 10th Addition, Wichita, Kansas June 2007*.

Pre-Development Flowrates

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

O. Pre-Developed Runoff Curve Numbers

The curve number used for pre-developed conditions is 81 for onsite and a weighted curve number of 71.4 for the offsite watershed.

P. Existing Time of Concentration

The times of concentration for pre-development conditions are shown in the following table. Time of concentration calculations are in *Drainage Report for Moorings 10th Addition, Wichita, Kansas June 2007*.

Existing Times of Concentration

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

Q. Downstream Drainage Capacity

The channel east of the site is being modified by others and will be designed to accommodate post-project flows from Moorings Plaza II Addition.

R. Existing Structural Elevations

There are no existing structures on site.

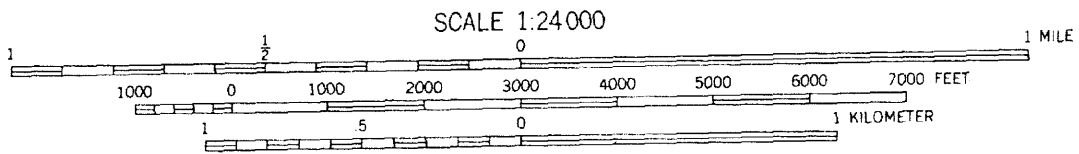
S. Open Channels

The channel through the site has a drainage area of 1,350 acres according to plans from Baughman. An additional area drains south to the levee and would be blocked from entering the river by the levee and blocked from entering the channel by 53rd Street. Existing 42" pipes with flap gates carry flow from this area into the Arkansas River.

T. Groundwater Elevations

Groundwater in the area is at an elevation ranging from 1321.0 west of the site to 1316.0 near the site. The groundwater elevation of Crystal Lake is 1324.9.

Figure 2.1
Orthophotograph



CONTOUR INTERVAL 10 FEET
 NATIONAL GEODETIC VERTICAL DATUM OF 1929

MKEC
 ENGINEERING
 CONSULTANTS, INC.

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

MOORINGS PLAZA II

PROJECT NAME

AERIAL MAP

SHEET TITLE

DESIGN BY: **TMH**

DRAWN BY: **CMJ**

CHECKED BY: **TMH**

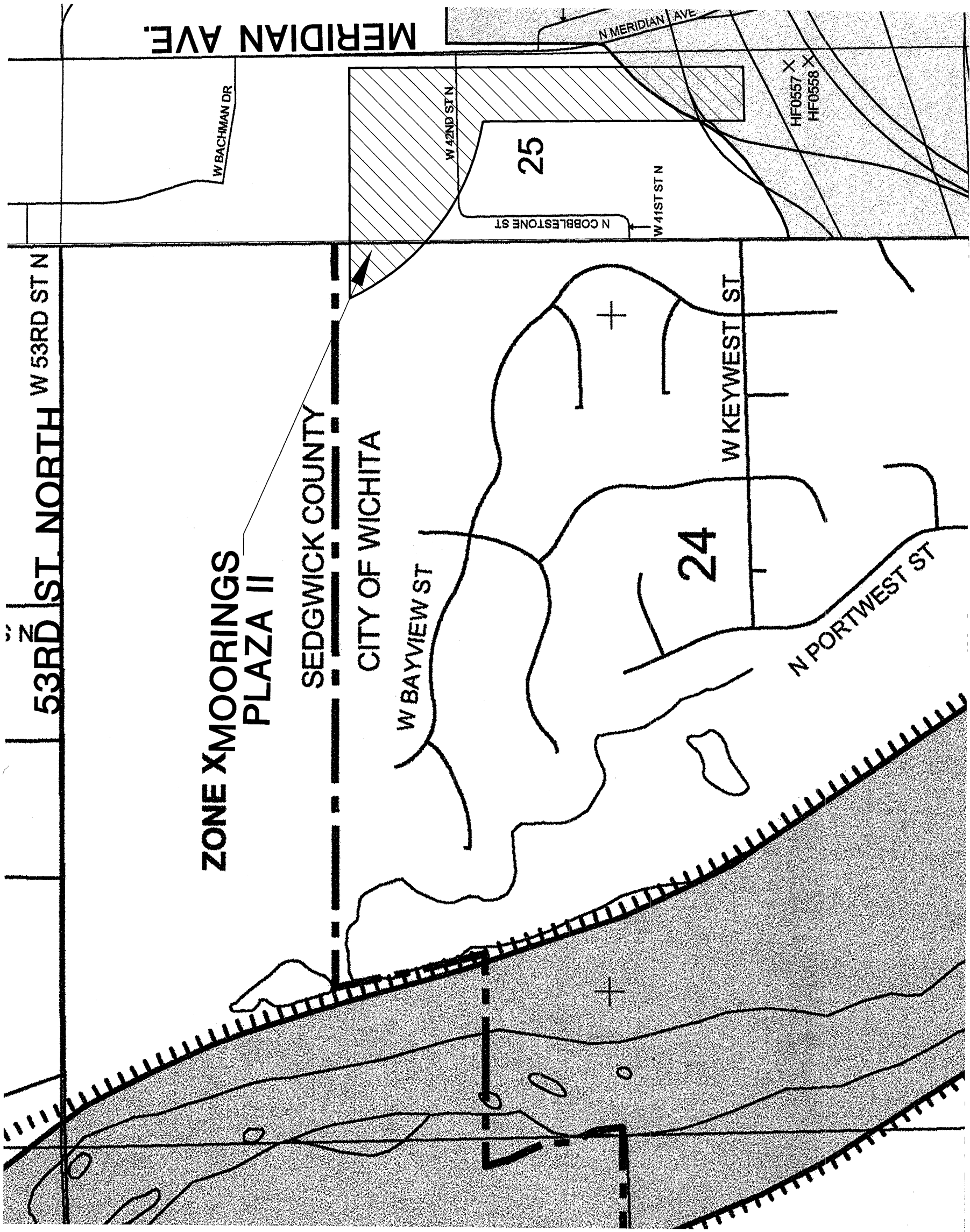
DATE: **SEPTEMBER 2008**

JOB NO.: **08523**

SHEET/OF: **1 / 1**

Figure 2.2

FIRM



NFP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0213E

FIRM
FLOOD INSURANCE RATE MAP
SEDGWICK COUNTY,
KANSAS
AND INCORPORATED AREAS

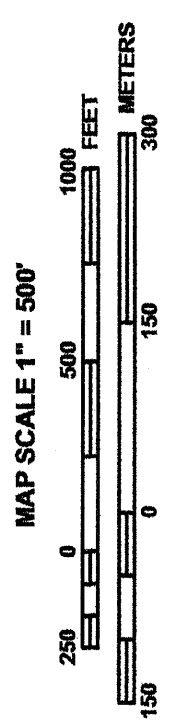
PANEL 213 OF 700
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:
COMMUNITY: CITY OF SEDGWICK COUNTY, WICHITA, CITY OF
NUMBERS: PANEL SUBJECTS
213 E
0213 E
20028 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.

FEDERAL EMERGENCY MANAGEMENT AGENCY

MAP NUMBER: 20173C0213E
EFFECTIVE DATE: FEBRUARY 2, 2007



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

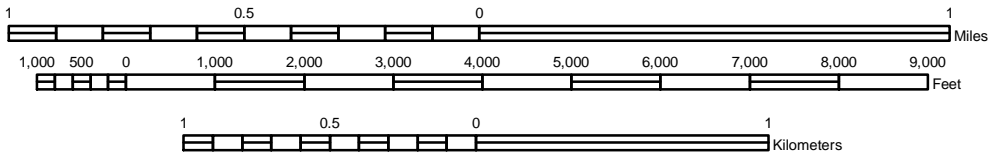
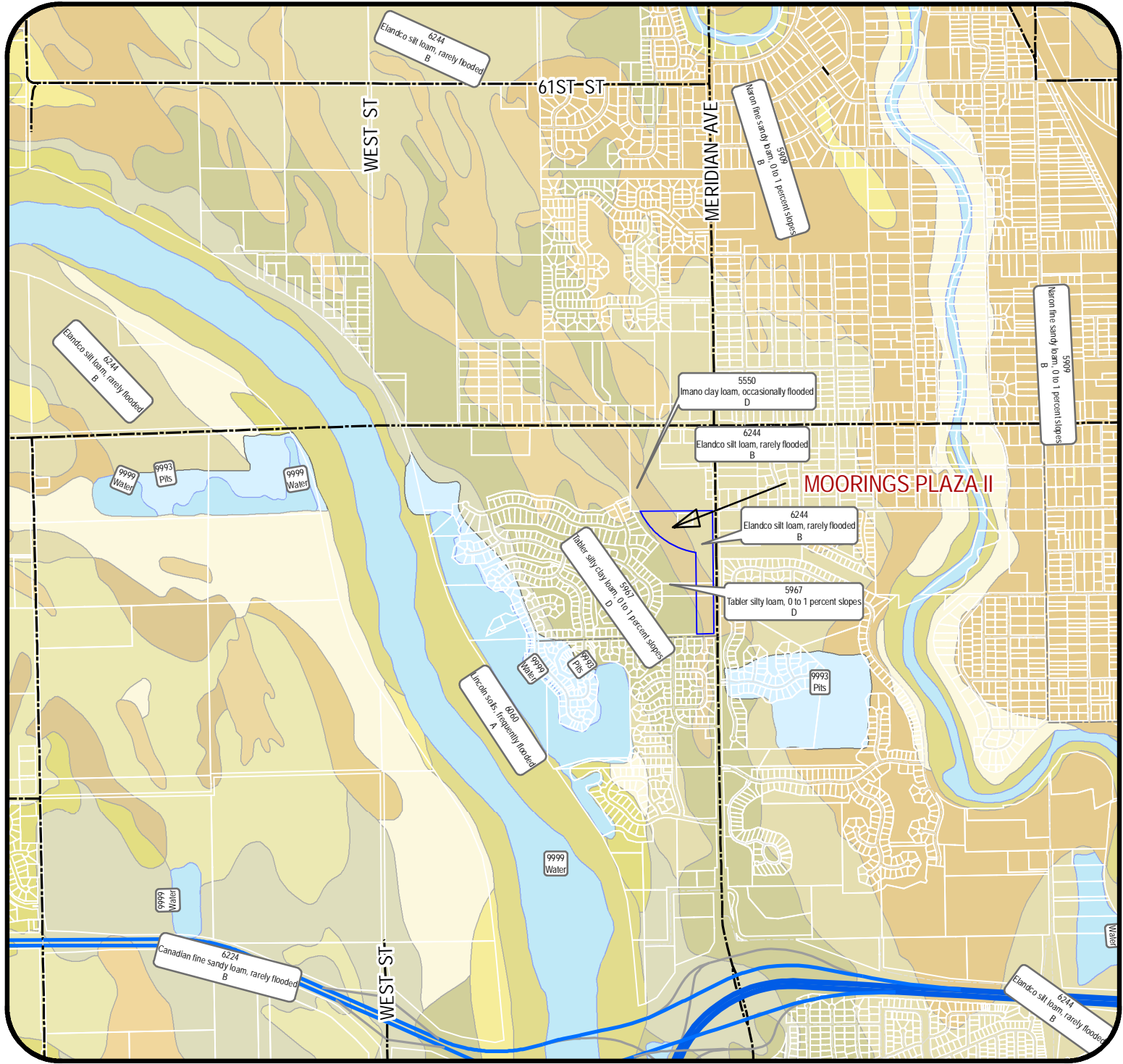
PROJECT NAME: MOORINGS PLAZA II
FIRM PANEL 195 & 213 OF 700
SEDGWICK COUNTY, KANSAS

DESIGN BY: CMJ
CHECKED BY: TMH
DATE: SEPTEMBER 2008
JOB NO.: 08523
SHEET OF: 1 / 1

J:\C:\11\06608\Plaza II\dwg\Drwg\06608FIRM.dwg

Figure 2.3

Soil Survey



J:\Civil\06608\Plaza II.dwg\DRNG\trcs-soil.mxd

MOORINGS PLAZA II
 Project Name:
Soil Survey - Sedgwick County, KS
 Sheet Title:



CMJ	Oct. 2008
Drawn By:	Date:
TMH/KLA	08523
Design / Review:	Job No.:

Tab 3. Post-Development Hydrologic Analysis

A. Proposed Conditions Hydrologic and Hydraulic Analysis

The post-project drainage boundaries are shown in the *Drainage Report for Moorings 10th Addition, Wichita, Kansas June 2007*. Hydraflow Hydrographs, 2004 by Intelisolve was used to complete the hydrologic analysis for Moorings Plaza II Addition. The runoff calculations are in *Drainage Report for Moorings 10th Addition, Wichita, Kansas June 2007* and the resulting flows are in the table below.

Post-Development Flow Rates

Description	Design Storm Flows (cfs)				
	2-Yr	5-Yr	10-Yr	25-Yr	100-Yr
Flow to Channel	106	183	238	327	462

For the 100-year storm, under developed conditions, Baughman reported a flow of 370 cfs reaching 53rd St. N. from the north watershed. The decrease in flow from pre to post development is from the detention that is provided upstream. Due to different modeling software and details of the detention, we were unable to reproduce the detention in our modeling, thus the pre-project flow rate was used.

B. Proposed Time of Concentration

The time of concentration was calculated using the FAA method. The following table shows the post-development time of concentrations. Time of concentration calculations are in *Drainage Report for Moorings 10th Addition, Wichita, Kansas June 2007*.

Proposed Time of Concentrations

Area	T _c	Curve Number
	minutes	
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	90.5
To Moorings North Pond	15.0	92.0

C. Assumed Post-Developed Curve Numbers

A weighted curve number was used for each watershed. Curve number calculations are in *Drainage Report for Moorings 10th Addition, Wichita, Kansas June 2007*.

D. Proposed Contours for Detention

A dry detention basin was proposed for the Moorings 10th Addition, this detention adequately serves this development. Contours for this proposed detention are in *Drainage Report for Moorings 10th Addition, Wichita, Kansas June 2007*.

E. Preliminary SWS Sizing Calculations

Stormsewer is not proposed for this development.

F. Stage-Storage-Discharge

The stage-storage-discharge for the Moorings 10th dry detention pond is in *Drainage Report for Moorings 10th Addition, Wichita, Kansas June 2007*.

G. Analysis of upstream/downstream impact

Runoff flows for all design storms remain the same or decrease from pre to post-development; therefore, upstream/downstream impacts are unchanged from current conditions.

H. Existing and Proposed Structural Elevations

There are no existing structures on site. Where applicable, minimum pad elevations will be set 3 feet above the 100-year water surface elevation. When feasible, current grade will dictate structural elevations.

I. Pond Design Elevations

Pond design elevations for the Moorings 10th pond are in *Drainage Report for Moorings 10th Addition, Wichita, Kansas June 2007*.

J. Structure Details

Storm sewer is proposed for the site.

K. Limits of Clearing and Grading

The entire site will be cleared and graded.

L. Location of Impervious Areas

The commercial developments will be a large portion impervious area, but the exact area will not be determined until a site plan has been developed.

M. Location of Utilities

Proposed utilities are shown on the drainage and utility plan, Figure 3.1.

N. Location of Conveyance Systems

Final grading will direct flow overland to the channel.

O. Location of Channel Modifications

The channel that runs between the proposed lots is being modified by others.

P. Selection and Location of Stormwater Controls

Stormwater controls consist of grading the site to drain to the channel. The detention pond in Moorings 10th adequately controls flows from this site.

Q. Emergency Overflow

Emergency overflows will be directed toward the channel.

R. Freeboard

The detention pond design for the pond in Moorings 10th will include a 1-foot freeboard for added safety.

S. 100-Year High Water Line

Moorings Plaza II Addition is located in areas without a determined 100-year water surface elevation. The 100-year design flow was run through a Flowmaster model of the typical channel cross-section. This model of the channel was used to calculate a 100-year water surface elevation of 1326.0 in the channel adjacent to the property. Calculations are in *Drainage Report for Moorings 10th Addition, Wichita, Kansas June 2007*.

T. Lowest Openings

The lowest opening for lots adjacent to the channel will be 1329.0. All other lots will be graded to maintain at least 0.5% slope in the streets.

U. Stormwater Management Facilities

The detention corridor in Moorings 10th and the channel is located within a reserve.

V. Maintenance Responsibility

The maintenance of the reserve will be the responsibility of the owner.

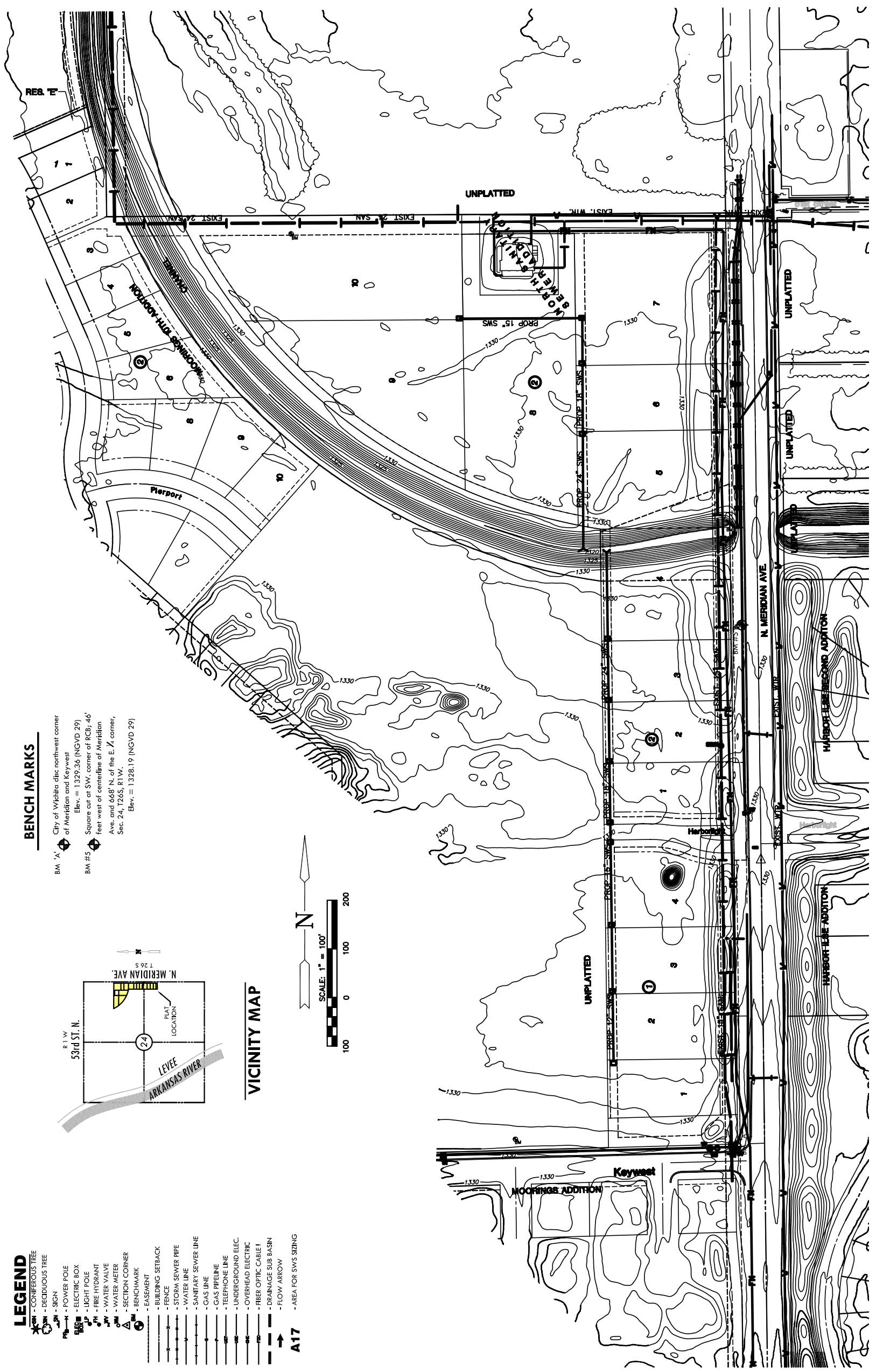
W. Offsite-Drainage Easements

Not applicable to Moorings Plaza II Addition.

Figure 3.1

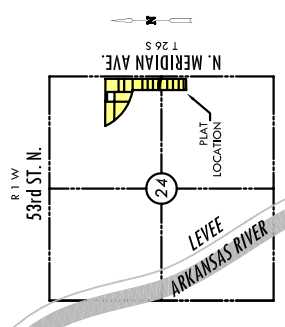
Drainage and Utility Plan

J:\Civil\06608\Plaza\I\dwg\Drng\06608-dwp.dwg



BENCH MARKS

- BM #1 - City of Wichita disc northwest corner of Meridian and Keywest
Elev. = 1329.36 (NGVD 29)
- BM #5 - Square cut at SW corner of RCB; 40' feet west of centerline of Meridian Ave. and 668' N. of the E. X corner, Sec. 24, T26S, R1W.
Elev. = 1328.19 (NGVD 29)



VICINITY MAP



LEGEND

- CONFEROUS TREE
- DECIDUOUS TREE
- SIGN
- POWER POLE
- ELECTRIC BOX
- LIGHT POLE
- FIRE HYDRANT
- WATER VALVE
- WATER METER
- SECTION CORNER
- 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 1
- DRAINAGE SUB BASIN
- FLOW ARROW
- AREA FOR SWS SIZING

A17

Tab 4. Floodplain Submittal

Not applicable to Moorings Plaza II Addition.

Tab 5. Permits

A. *US Army Corps of Engineers*

Not applicable to Moorings Plaza II Addition.

B. *Kansas Department of Agriculture*

Not applicable to Moorings Plaza II Addition.

C. *Federal Emergency Agency (FEMA)*

Not applicable to Moorings Plaza II Addition.

D. *Kansas Department of Transportation*

Not applicable to Moorings Plaza II Addition.

E. *Sedgwick County Right-of-way Permit*

Not applicable to Moorings Plaza II Addition.