

DRAINAGE REPORT

FOR

GREENWICH OFFICE PARK 2ND ADDITION
Wichita, Kansas

OCTOBER 2010

Tab 0. Checklist



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

Location

The subject property is in the City of Wichita, Sedgwick County, Kansas. The proposed development is north of 13th Street between Webb Road and Greenwich Road. It lies in the southwest quarter of the southeast quarter of Section 9, Township 27 South, Range 2 East. The plat area is 10.0 acres. The site is shown on the USGS Map, Appendix 1.1.

Discussion of Development

The site is currently undeveloped land that was platted as Lot 3 Block 1 of the Greenwich Office Park Addition. Lot 3 will be divided re-platted into 2 commercial lots and provide an access road from 13th Street North. The project will develop as a commercial land use as it was in the previously approved plat. This area was covered in the drainage report for Waterfront Commercial, Waterfront Residential, and Greenwich Office Park dated August 2007. This area is included in the 14 acres of the Greenwich Office Park that was platted at the time of the report. The developments covered in the drainage report include commercial and residential developments.

Drainage Summary

Pre-Development

There are approximately 794 acres drainage into the existing Beech lake. The site drains to an existing 5'x4' under 13th Street. The RCB has a capacity of 157 cfs according to the August 2007 drainage report. Pre-development flow rates for Beech Lake and to the 13th Street are shown in Table 1.1.

Post-Development

The site will develop for commercial use as was previously platted. The site will continue to drain in the directions that were intended at the time of the original plat. Flow rates for the site were calculated in the August 2007 drainage report for Waterfront Commercial, Waterfront Residential, and Greenwich Office Park. Location and sizes of an onsite storm water sewer system will be determined at the time the site plan is finalized. A comparison of pre-project and post-project flow rates to 13th Street are shown in Table 1.1. 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

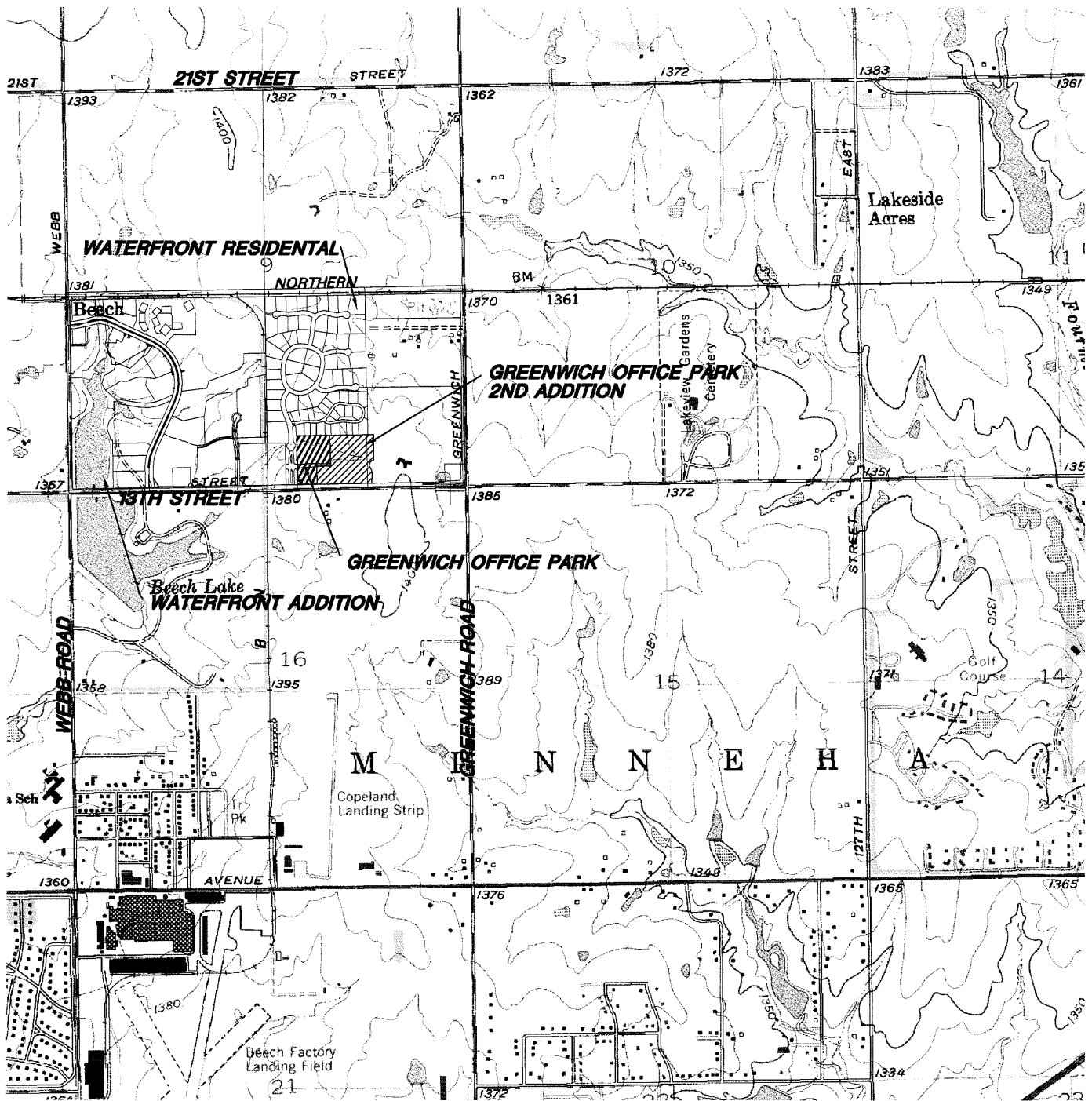
Description	Design Storm Flows (cfs)			
	2-Yr	5-Yr	10-Yr	100-Yr
Pre-Project to 13 th Street	78	117	143	239
Post-Project to 13 th Street	77	117	141	216
Pre-Project out of Beech Lake	224	396	527	1167
Post-Project out of Beech Lake	219	392	517	1111

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" = 2000'



**SECTION 9
TOWNSHIP 27
RANGE 2 EAST**

MKEC
ENGINEERING
CONSULTANTS, INC.

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

GREENWICH OFFICE PARK 2ND ADDITION
PROJECT NAME

QUAD MAP
SHEET TITLE

KLA DESIGN BY:	CMJ DRAWN BY:	GJA CHECKED BY:
OCTOBER 2010 DATE	07063 JOB NO.	1 / 1 SHEET/OF

Appendix 1.2

Plat

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 "GREENWICH OFFICE PARK SECOND ADDITION", an addition to Wichita, Sedgwick County, Kansas, into Lots, a Block, Reserves, and a Street, the same being accurately set forth in the accompanying plat and described herein:

Lot 3, Block 1, Greenwich Office Park Addition, an addition, to Wichita, Sedgwick County, Kansas, TOGETHER WITH, A tract of land lying in a portion of the Southeast Quarter of the Southeast Quarter, Section 9, Township 27 South, Range 2 East, of the 6th Principal Meridian, Wichita, Sedgwick County, Kansas, said tract being more particularly described as follows:

BEGINNING at the southeast corner of said Lot 3, thence on a Kansas coordinate system of 1983 south zone grid bearing of N00°54'24"W, along the east line of said Lot 3, being coincident with the west line of said Southeast Quarter of the Southeast Quarter, a distance of 645.00 feet to the northeast corner of said Lot 3; thence along an extended north line of said Lot 3, N88°53'46"E, 90.00 feet; thence S00°54'24"E, 343.02 feet to a point on a non-tangent curve to the right; thence along the said curve to the right 140.22 feet to a point on a curve to the left, said curve to the right having a central angle of 129°34'47", a radius of 62.00 feet, and a long chord distance of 112.19 feet, bearing S25°09'47"E; thence along the said curve to the left 58.65 feet, said curve having a central angle of 40°43'50", a radius of 82.50 feet, and a long chord distance of 57.42 feet, bearing S19°15'41"W; thence S03°55'17"E, 61.03 feet; thence S01°06'14"E, 84.76 feet; thence S01°06'14"E, 60.00 feet; thence S88°53'46"W, 120.00 feet; thence N00°54'24"W, 60.00 feet to the POINT OF BEGINNING.

CONTAINING: 436,618 square feet or 10.02 acres of land, more or less.

All reserves, streets, utility easements, building setbacks, and access controls, together with, a waterline easement recorded in Doc.#Flm/Pg. 28609201, together with, that part of a utility easement for sewer recorded in Doc.#Flm/Pg. 28929918, a contingent street dedication recorded in Film 378, Page 142, together with, a contingent dedication recorded in Doc.#Flm/Pg. together with all other public dedications 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

OWNER'S CERTIFICATE

Know all men by these presents that we the undersigned property owners of the land above set forth in the Registered Land Surveyor's Certificate, have caused the same to be surveyed and platted into Lots, a Block, Reserves, and a Street the same to be known as "GREENWICH OFFICE PARK SECOND 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.

The streets are hereby dedicated to and for the use of the public. All abutters rights of access to or from 13th Street over and across the south line of "GREENWICH OFFICE PARK SECOND ADDITION," are hereby granted to the appropriate governing body, as indicated hereon, Lot 1 shall have access locations per the access control note as stated hereon.

Reserves "A", "B", and "C" are platted for landscaping, irrigation, berming, monuments, signs, private drives, and utilities confined by easement(s). Reserve "A" is also platted as an access easement to Lots 1, and 2; access locations to be determined by separate agreement. The Reserves shall be owned and maintained by the owner(s) of Lots 1 and 2, Block 1, and or their successors, and or assigns, and or a Lot Owner's Association.

A drainage plan has been developed for this plat. All drainage easements, right-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.

Greenwich 13, L.L.C., a Kansas limited liability company

_____, Manager
George Laham, Manager

STATE OF KANSAS, SEDGWICK COUNTY} ss:

This instrument was acknowledged before me on ___ day of _____, 2010, by George Laham, Manager, Greenwich 13, L.L.C., 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.

SEAL

_____, Notary Public

My Term Expires: _____.

MORTGAGE CERTIFICATE

We INTRUST Bank, N.A. holders of a mortgage on a portion of the above described property, do hereby consent to the plat of "GREENWICH OFFICE PARK ADDITION."

INTRUST Bank, N.A.

_____, Executive Vice President
Gary D. Schmitt, Executive Vice President

This instrument was acknowledged before me on this ___ day of _____, 2010, by Gary D. Schmitt, Executive Vice President, INTRUST Bank, N.A.,

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

SEAL

_____, Notary Public

My Term Expires: _____.

PLANNING COMMISSION CERTIFICATE

This plat of "GREENWICH OFFICE PARK SECOND 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

_____, Chair
Debra Miller Stevens, Chair

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 City Seal

TRANSFER RECORD

STATE OF KANSAS, SEDGWICK COUNTY} ss:

Entered on transfer record this ___ day of _____, 2010

_____, County Clerk
Don Brace, County Clerk

Affix County Clerk Seal

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.

_____, Register of Deeds
Bill Meek, Register of Deeds

Attest: _____, Deputy
Tonya E. Buckingham, Deputy

Affix Register of Deeds Seal

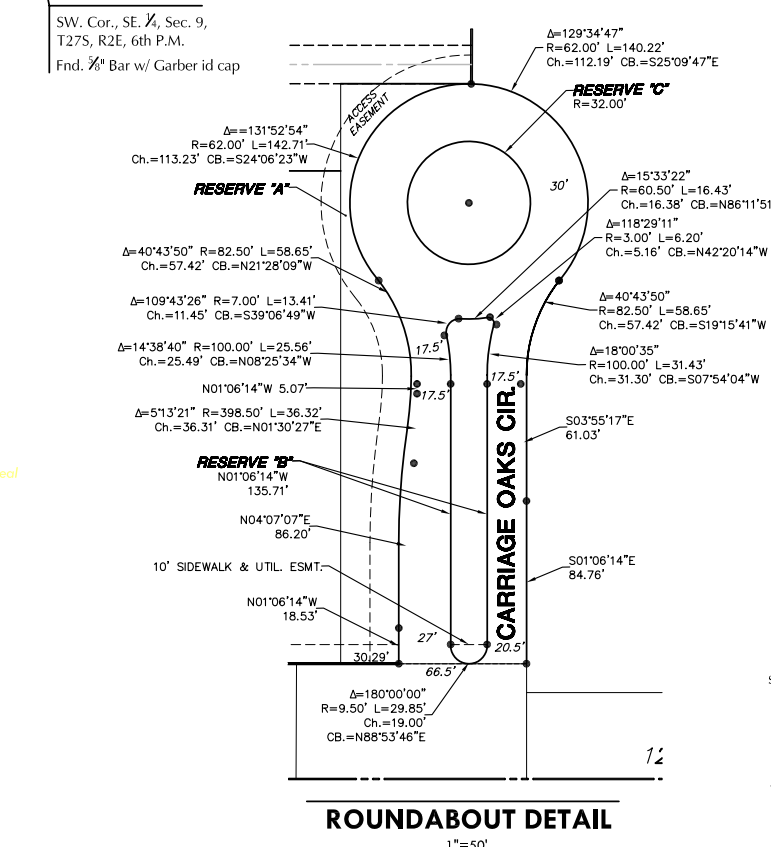
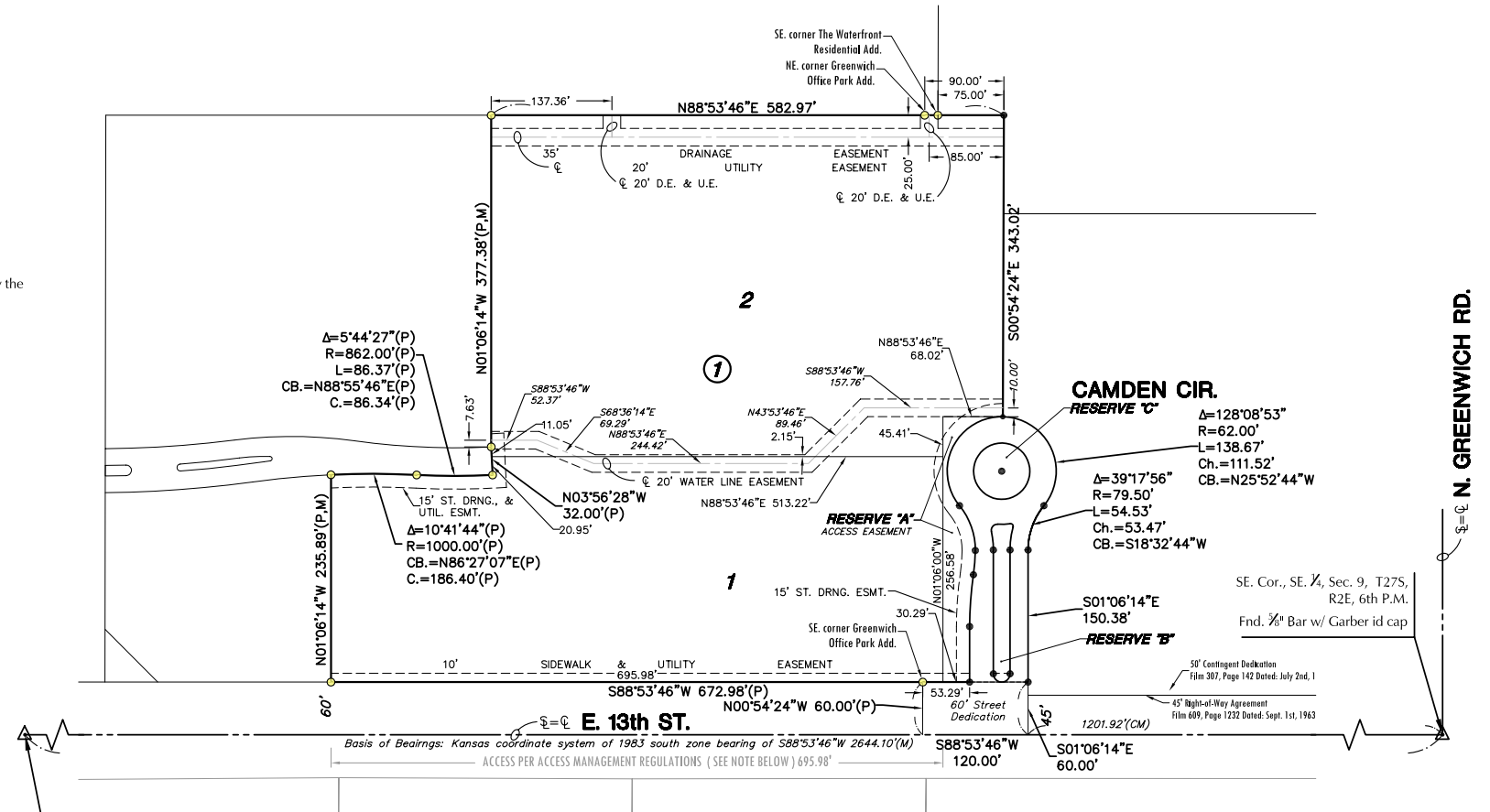
COUNTY SURVEYOR

STATE OF KANSAS, SEDGWICK COUNTY} ss:

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

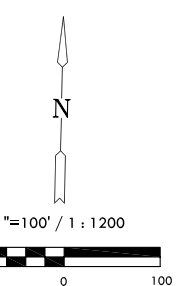
_____, Deputy County Surveyor
Tricia L. Robello, LS #1246
Deputy County Surveyor
Sedgwick County, Kansas

FINAL PLAT
GREENWICH OFFICE PARK SECOND ADDITION
AN ADDITION TO WICHITA, SEDGWICK COUNTY, KANSAS



LEGEND

- △ = Section Corner Monument Found
- = Found 3/8" rebar w/ MKEC CLS 39 id. cap unless otherwise annotated
- = Set 3/8" rebar w/ MKEC CLS 39 id. cap
- (M) = Measured
- (CM) = Calculated from measured
- (P) = Platted



Basis of Bearing: Kansas coordinate system of 1983 south zone grid bearing of S88°53'46"E along the S. line of SE 1/4, Sec. 9, T27S, R2E, 6th P.M.

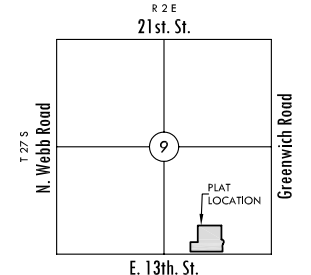
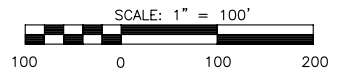
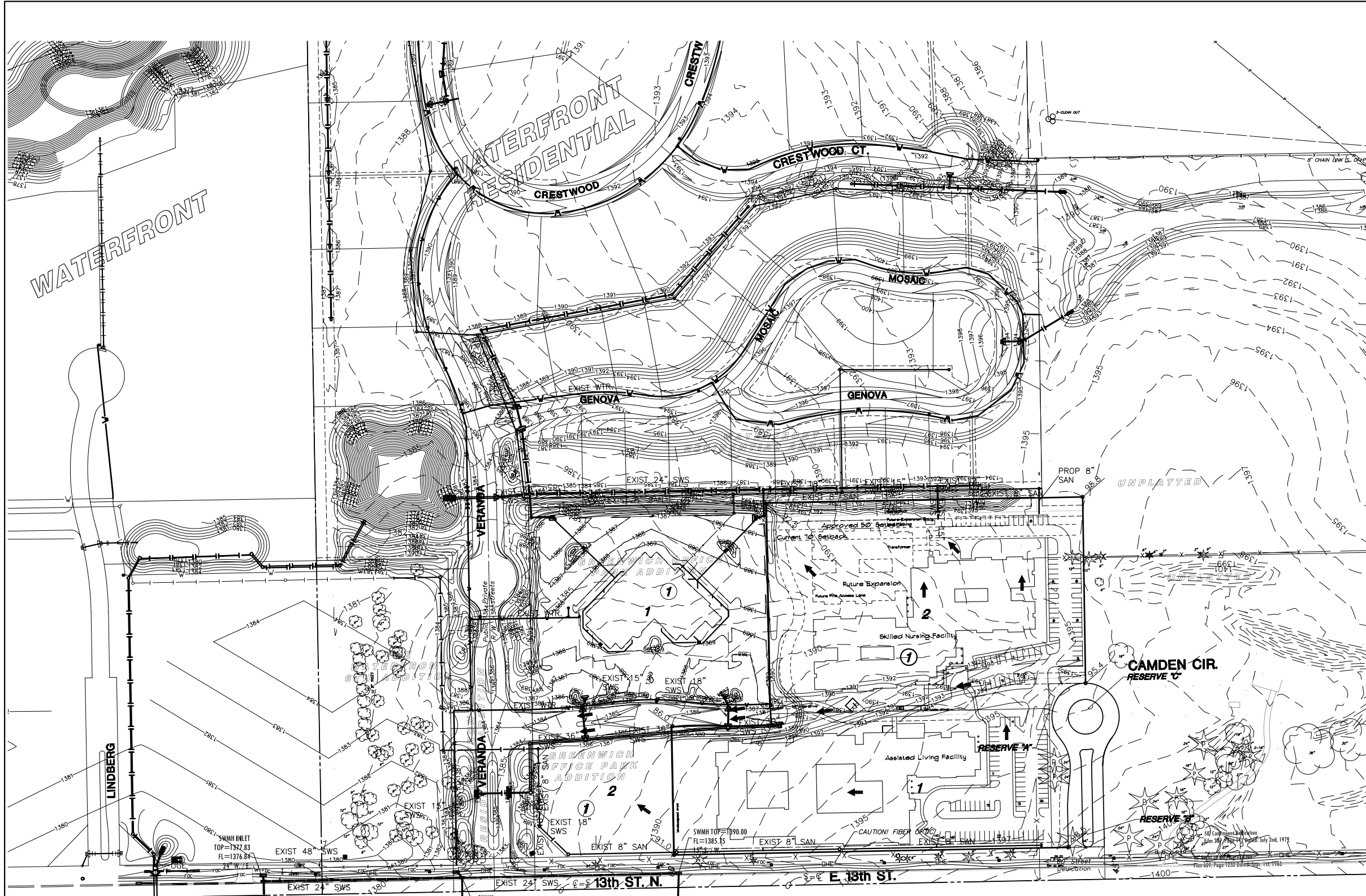
This plat is surveyed and platted on NAVD88 using Kansas state plane south zone coordinates, modified to the surface, having a combined adjustment scale factor of 1.000120014401728

N. GREENWICH RD.

Appendix 1.3

Preliminary Grading Plan

GREENWICH OFFICE PARK 2ND
WICHITA, KANSAS
LOT GRADING PLAN



VICINITY MAP

LEGEND

- ✖ - CONIFEROUS TREE
- - DECIDUOUS TREE
- SN - SIGN
- PH - 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
- S--- STORM SEWER PIPE
- W--- WATER LINE
- SS--- SANITARY SEWER LINE
- G--- GAS LINE
- P--- GAS PIPELINE
- T--- TELEPHONE LINE
- U--- UNDERGROUND ELEC.
- O--- OVERHEAD ELECTRIC
- F--- FIBER OPTIC CABLE
- 98.5 - ELEVATION
- - FLOW ARROW
- - - - - EXISTING CONTOURS
- _____ PROPOSED CONTOURS

DATE	October 10
REVISED	

DESIGN BY	KLA
DRAWN BY	CMJ
CHECKED BY	GJA

SHEET NUMBER	1
--------------	---

NOTE: PRIVATE ONSITE SWS LAYOUT AND SIZES WILL BE DETERMINED ONCE THE FINAL SITE LAYOUT IS DETERMINED.

J:\Civil\07063\Drawg\Drng\07063_LGP.dwg

Tab 2. Existing Conditions

Description

The site is 10.0 acres of undeveloped ground previously platted for a commercial land use. The site is shown on the aerial photograph, Appendix 2.1.

FEMA Floodplains

There are no FEMA floodplains on site as shown on the Sedgwick County Kansas February 2, 2007 Map Number 20173C0379E, Appendix 2.2.

Soils

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

- Irwin silty clay loam, 1 to 3 percent slopes, HSG "D"
- Rosehill silty clay, 1 to 3 percent slopes, HSG "D"

Hydraulic Soil Group "D" was used for calculations for the basins.

Drainage Calculations

Runoff Method

The site was modeled using the SCS Hydrograph Method in TR-20 in the drainage report for Waterfront Commercial, Waterfront Residential, and Greenwich Office Park dated August 2007.

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 Concentrations

Time of concentration was calculated in the drainage report for Waterfront Commercial, Waterfront Residential, and Greenwich Office Park dated August 2007.

Curve Numbers

The curve number used for pre-developed conditions is 84.

Drainage Patterns

The site is in Basins 065 and 166 in the drainage report for Waterfront Commercial, Waterfront Residential, and Greenwich Office Park dated August 2007. Under existing conditions, the site drains in two directions. The portion of the site in Basin 065 drains to the north and into the Waterfront Residential Addition and into a detention pond in Waterfront Residential Addition. The

southern portion of the site drains to an existing storm water sewer system that flows to the east and to the 13th Street RCB. Pre development flow rates are shown in Table 2.2.

Table 2.2. Comparison of Pre and Post-Development Flow Rates

Description	Design Storm Flows (cfs)			
	2-Yr	5-Yr	10-Yr	100-Yr
Pre-Project to 13 th Street	78	117	143	239
Pre-Project out of Beech Lake	224	396	527	1167

Utilities

Existing sanitary sewer, water, and storm water sewer connections are already provided.

Groundwater Elevations

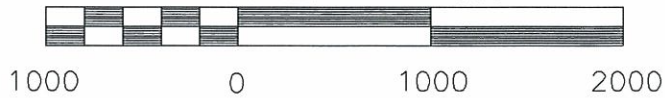
According to the Kansas Geological Survey Water Well Records, the static water level in the area ranges from 8 feet to 20 feet deep.

Appendix 2.1

Aerial Photograph



SCALE: 1" = 1000'



**SECTION 9
TOWNSHIP 27
RANGE 2 EAST**

MKEC
ENGINEERING
CONSULTANTS, INC.

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

GREENWICH OFFICE PARK 2ND ADDITION
PROJECT NAME

AERIAL MAP
SHEET TITLE

<i>KLA</i>	<i>CMJ</i>	<i>GJA</i>
DESIGN BY:	DRAWN BY:	CHECKED BY:

<i>OCTOBER 2010</i>	<i>07063</i>	<i>1 / 1</i>
DATE	JOB NO.	SHEET/OF

Appendix 2.2

Flood Insurance Rate Map (FIRM)

MKEC
ENGINEERING
CONSULTANTS, INC.

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

GREENWICH OFFICE PARK 2ND

WICHITA, KANSAS

FIRM MAP

DATE
October 10

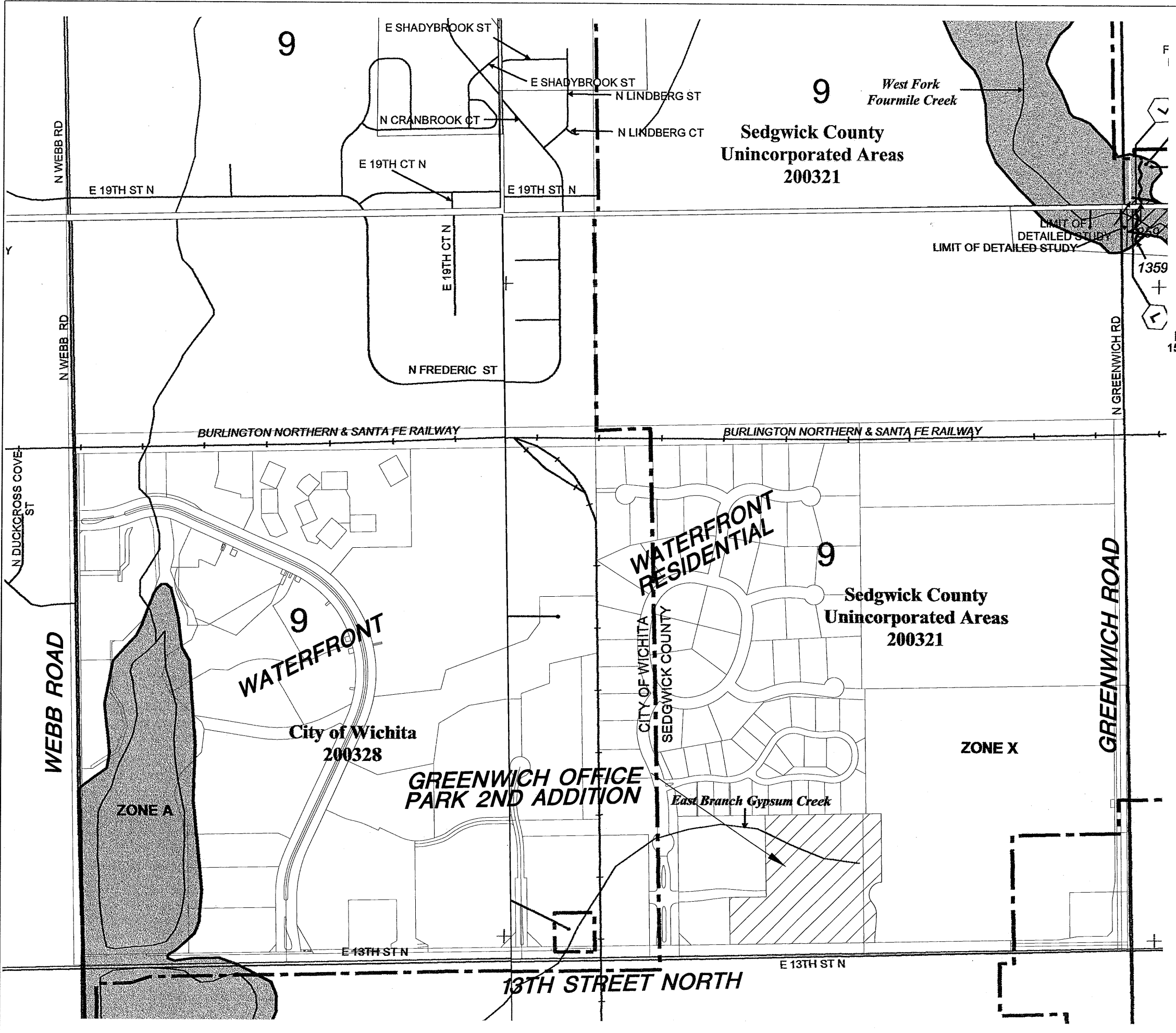
REVISED

DESIGN BY
KLA

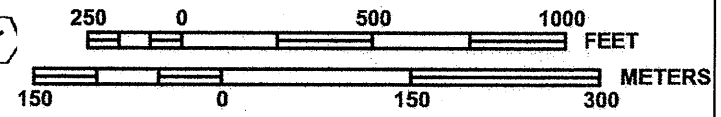
DRAWN BY
CMJ

CHECKED BY
GJA

SHEET NUMBER
1



MAP SCALE 1" = 500'



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0379E

FIRM
FLOOD INSURANCE RATE MAP

SEDGWICK COUNTY,
KANSAS
AND INCORPORATED AREAS

PANEL 379 OF 700
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SEDGWICK COUNTY	200321	0379	E
WICHITA, CITY OF	200328	0379	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
20173C0379E

EFFECTIVE DATE
FEBRUARY 2, 2007
Federal Emergency Management Agency

Appendix 2.3

Soil Survey

Tab 3. Post-Development Conditions

Description

The site is 10.0 acres that will develop as two lots for commercial usage.

Drainage Calculations

Runoff Method

The site was modeled using Hydraflow TR-20 in the drainage report for Waterfront Commercial, Waterfront Residential, and Greenwich Office Park dated August 2007.

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 were calculated in the drainage report for Waterfront Commercial, Waterfront Residential, and Greenwich Office Park dated August 2007.

Curve Numbers

Weighted curve numbers were calculated to represent the land usage of the basins. A curve number of 95 was used to represent the commercial development.

Drainage Patterns

The site will continue to drain in two directions. Basin 065 will continue to drain to the north into the Waterfront Residential Addition. The detention ponds and storm water sewer designed with this addition were designed to accept the developed flow rates from this site. Basin 166 will continue to drain to the southwest to an existing storm sewer system and to the RCB under 13th Street North. Post-project flow rates are shown in Table 3.2 below.

Table 3.2. Comparison of Pre and Post-Development Flow Rates

Description	Design Storm Flows (cfs)			
	2-Yr	5-Yr	10-Yr	100-Yr
Post-Project to 13 th Street	77	117	141	216
Post-Project out of Beech Lake	219	392	517	1111

Utilities

Storm Water Sewer

Once the site plan is determined, proposed storm sewer will tie into existing systems to convey the north portion of the site to the pond in the Waterfront Residential Addition. The southern portion of the site will tie into an existing system that flows to the west and then to the existing RCB under 13th Street North.

Water

An existing water line follows the north side of the entry. The site will connect to this water when the site develops.

Sanitary Sewer

An existing sanitary sewer line runs along the north side of the site and provides a connection for Lot 2. An existing sanitary line along the south side of the development provides sanitary sewer service for Lot 1.

Minimum Lowest Opening

There are no bodies of water adjacent to the site; therefore there are no minimum lowest openings for this plat.

Appendix 3.1

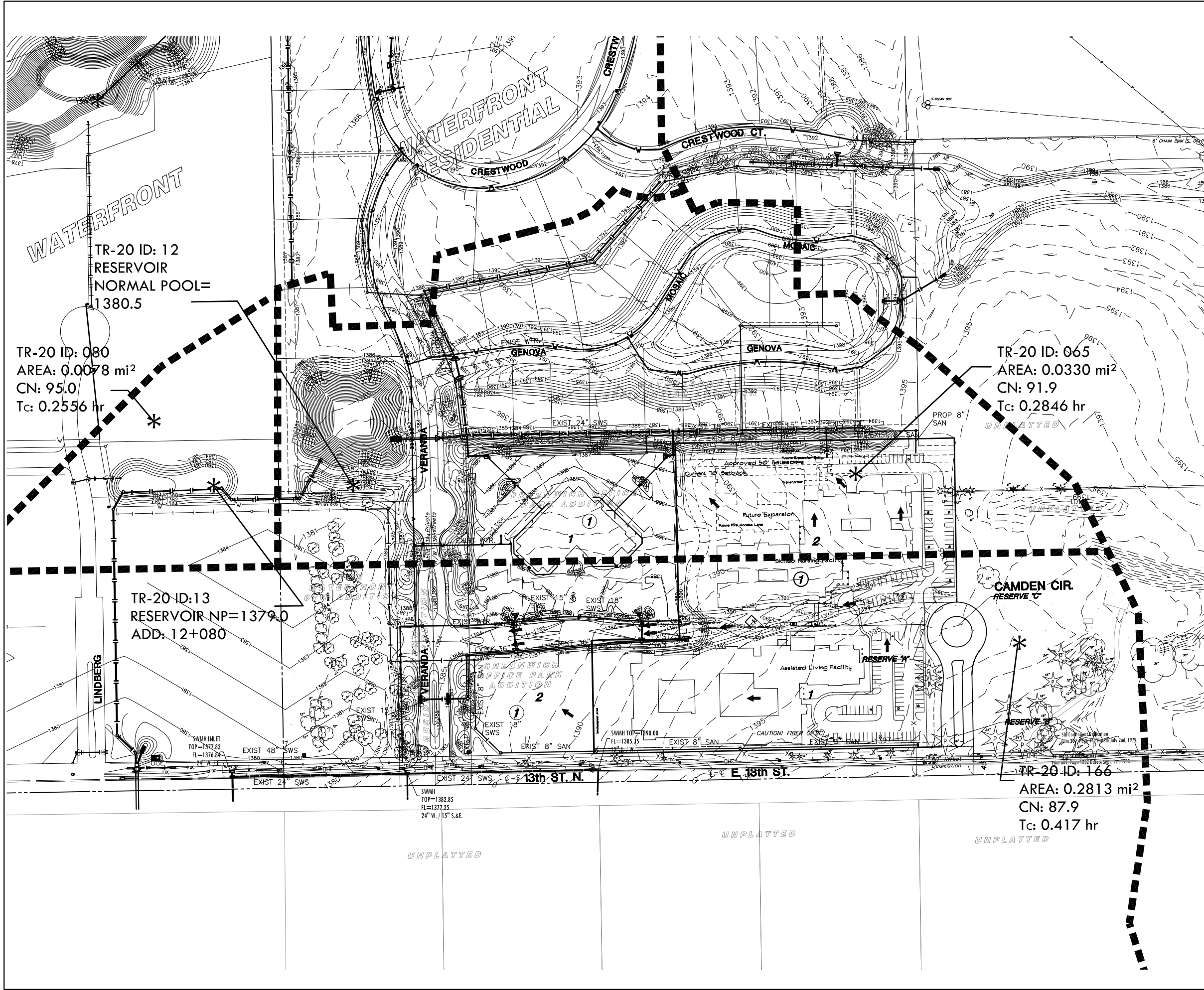
Drainage and Utility Plan

GREENWICH OFFICE PARK 2ND
WICHITA, KANSAS
DRAINAGE PLAN

DATE
October 10
REVISED

DESIGN BY
KLA
DRAWN BY
CMJ
CHECKED BY
GJA

SHEET NUMBER
1



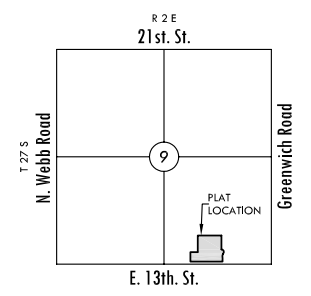
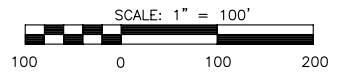
TR-20 ID: 12
RESERVOIR
NORMAL POOL=
1380.5

TR-20 ID: 080
AREA: 0.0078 mi²
CN: 95.0
Tc: 0.2556 hr

TR-20 ID:13
RESERVOIR NP=1379.0
ADD: 12+080

TR-20 ID: 065
AREA: 0.0330 mi²
CN: 91.9
Tc: 0.2846 hr

TR-20 ID: 166
AREA: 0.2813 mi²
CN: 87.9
Tc: 0.417 hr



VICINITY MAP

LEGEND

- BIN - CONIFEROUS TREE
- BIN - DECIDUOUS TREE
- SN - SIGN
- PP - POWER POLE
- ELEC BOX - ELECTRIC BOX
- LP - LIGHT POLE
- FH - FIRE HYDRANT
- WV - WATER VALVE
- WM - WATER METER
- SC - SECTION CORNER
- BM - BENCHMARK
- E - EASEMENT
- BS - BUILDING SETBACK
- F - FENCE
- SSW - STORM SEWER PIPE
- W - WATER LINE
- SSW - SANITARY SEWER LINE
- G - GAS LINE
- GP - GAS PIPELINE
- TEL - TELEPHONE LINE
- UEL - UNDERGROUND ELEC.
- OEL - OVERHEAD ELECTRIC
- FOC - FIBER OPTIC CABLE
- DSB - DRAINAGE SUB BASIN
- DB - DRAINAGE BASIN
- FA - FLOW ARROW
- A17 - AREA FOR SWS SIZING
- EC - EXISTING CONTOURS
- PC - PROPOSED CONTOURS

NOTE: PRIVATE ONSITE SWS LAYOUT AND SIZES WILL BE DETERMINED ONCE THE FINAL SITE LAYOUT IS DETERMINED.

J:\Civil\07063\Drawg\Drng\07063_DUP.dwg

Tab 4. Floodplain Submittal

There are no FEMA floodplains on this site.

Tab 5. Permits

US Army Corps of Engineers

There are blue lines on the USGS Quadrangle map on the site. Therefore no permit will be 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.