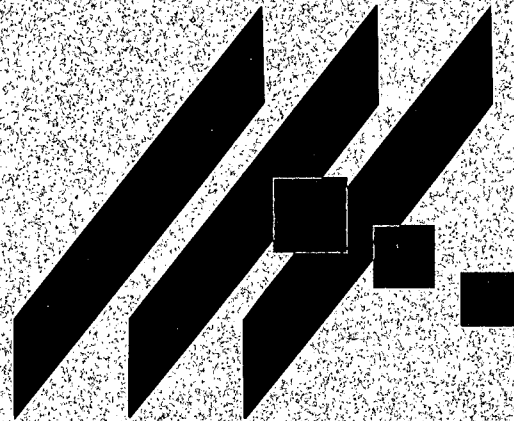




M K E C ENGINEERING CONSULTANTS, INC.



PRELIMINARY DRAINAGE REPORT  
FOR  
**BRIGHTON COURTS ADDITION**

APRIL 2003

# Preliminary Drainage Report for the Brighton Court Addition Wichita, Sedgwick County, Kansas

## Location

The subject property is in Wichita, Sedgwick County, Kansas. The proposed development is located south of 21<sup>st</sup> Street North and west of Webb Road. Wilson Estates Parkway borders the site to the south, Wilson Farms Third Addition to the west, Wilson Retirement Addition to the North, and Legacy Wilson Estates Addition to the East. The site was previously platted as portions of the Legacy Park Wilson Estates Addition, Wilson Farms Second Addition and Wilson Farms Third Addition. The site lies in the Northeast Quarter of Section 8, Township 27 South, Range 2 East. The dimensions of the property are approximately 1300 feet north to south and 470 feet east to west at the widest point. The area of the plat is 13.07 acres. The site is shown on the Andover, Kansas Quadrangle, located in Appendix A.

## Soils

According to the NRCS (SCS) Sedgwick County Soil Survey in Appendix B, the soil on the site is silty loam. The site comprises Irwin Silty Clay Loam, 1-6% slopes (la & lc - HSG "D") and Rosehill silty clay, 1-3% slopes (Rd - HSG "D"). The Hydrological Soil Group (HSG) used to select runoff coefficients is "D".

## Pre-developed Conditions

### *Current Development*

The site is an undeveloped, vacant lot.

### *Current Landform and Slope*

Slopes vary from 0.5% to 3.5%. An existing 8'x4' reinforced concrete box (RCB) under Wilson Estates Parkway is located in the southwest corner of the site. The RCB carries runoff from Northeast to southwest, away from the site. Elevations vary from 205' in the northwest corner of the site to 185' near the RCB.

### *Current Drainage Conditions*

According to the Federal Emergency Management Agency (FEMA), the site is in Zone C - areas of minimal flooding. The nearest Zone A (areas of 100-year flooding) is approximately 400 feet southwest of the site. (FIRM Panel 15, Wichita, Sedgwick County, Kansas, May 15, 1986) (shown in Appendix C).

### *Current Runoff Characteristics*

A natural channel crosses the site from the northeast to the southwest. An existing 8'x4' RCB carries runoff from the site under Wilson Estates Parkway. The box has an upstream

flow line of 181.5. Immediately downstream of the RCB is an existing pond with a normal pool elevation of 183.

The site was divided into watersheds for the purpose of sizing storm water sewer pipes and inlets. The Drainage Plan in Appendix D shows the watersheds and proposed storm water sewer. Four of the watersheds are offsite areas that drain onto this site. Area's "A", "C", and "E" sheet flow onto the site from surrounding additions. Area "G" flows onto the site through an existing storm water sewer system from the Legacy Wilson Estates Addition. The rational method was used to analyze each watershed shown in the Drainage and Utility Plan. Times of concentration ( $t_c$ ) were calculated using the FAA method. The spreadsheet in Appendix E displays the area, runoff coefficient (c), time of concentration ( $t_c$ ), and flow rate (Q) for the 2, 5, 10, and 100-year event for each watershed. Time of concentrations vary from 15 to 34 in undeveloped conditions. The total runoff from the site is 56.0 cfs in the 100-year event. Undeveloped runoff values are found in Table 1.

**Table 1. Undeveloped Runoff.**

	2-Year (cfs)	5-Year (cfs)	10-Year (cfs)	100-Year (cfs)
Brighton Courts (no offsite)	10.1	14.9	23.9	56.0
To existing RCB 8'x4' (including offsite)	32.2	43.9	62.4	131.4

### Developed Conditions

#### *Proposed Development*

The site will develop as 38 residential lots with an average size of ¼ acre. A pond is proposed on the reserve in the southwest corner of the site.

#### *Proposed Landform and Slope*

Final slopes in the development have not been determined, but the minimum will be 0.5% within street right-of-way and 1-2% in back yards. The lot-grading plan is shown in Appendix F.

#### *Proposed Runoff Characteristics*

The same watersheds shown in Appendix D were used to analyze developed conditions. Times of concentration ( $t_c$ ) were calculated using the FAA method. The spreadsheet in Appendix E displays the area, runoff coefficient (c), time of concentration ( $t_c$ ), and flow rate (Q) for the 2, 5, 10, and 100-year event for each watershed under developed conditions. Time of concentrations vary from 15 to 26 in developed conditions. The total runoff from the site is 73.6 cfs in the 100-year event. Developed runoff values are found in Table 2. The proposed pond will not provide detention due to the size.

The existing RCB downstream of the site was analyzed using HY-8 modeling software. The HY-8 output is in Appendix G. The model conservatively used the 100-year elevation of the downstream pond to be the tailwater elevation of the RCB. The model showed that the box was able to handle a flow rate of 340 cfs before overtopping the road. This is significantly less than the proposed 100-year flow rate of 143.8 cfs to the RCB.

Storm water sewer pipes were sized based upon the flow rates calculated in the spreadsheet. Storm water is sized to convey a 100-year design event.

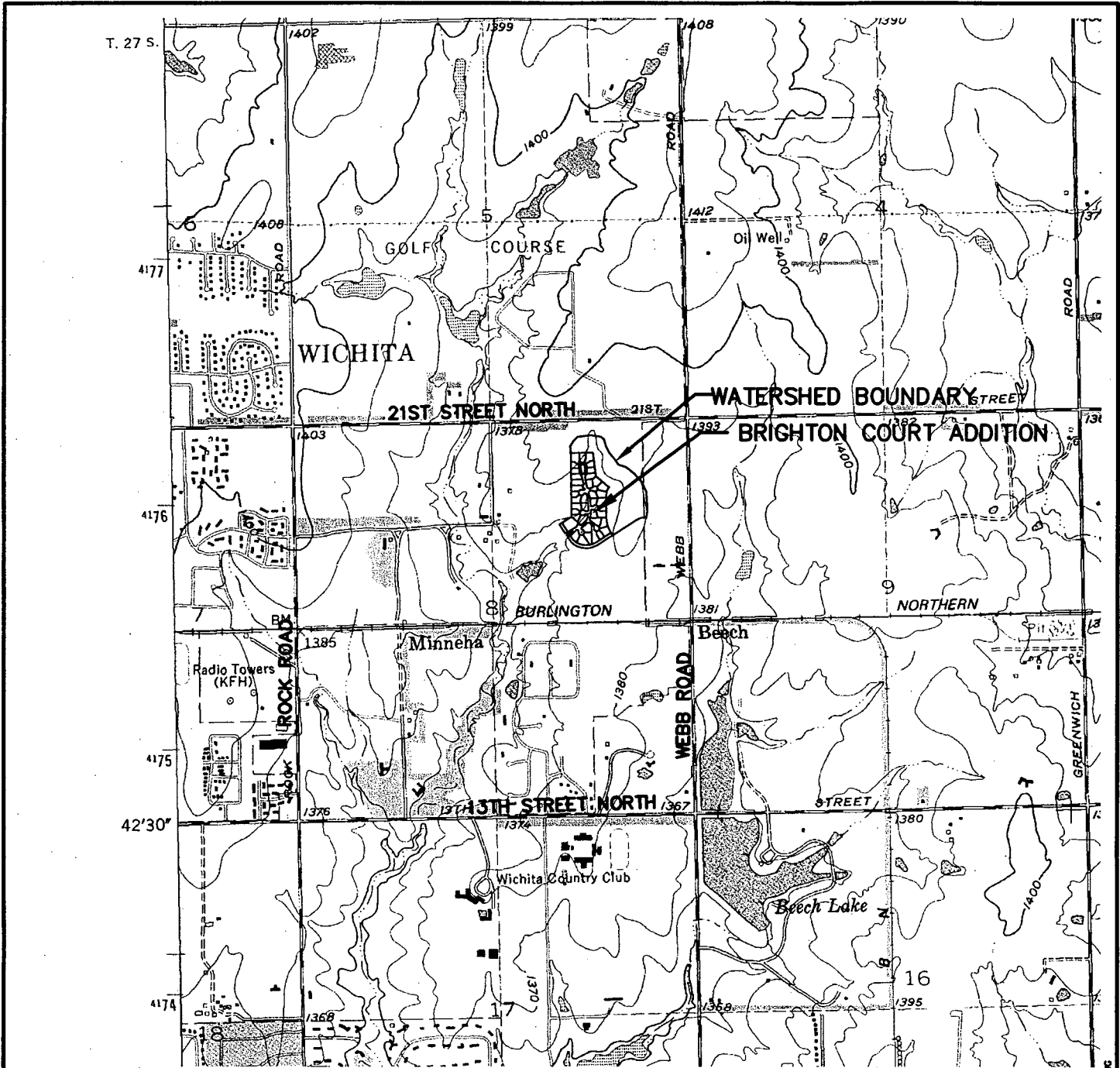
**Table 2. Developed Runoff.**

	2-Year (cfs)	5-Year (cfs)	10-Year (cfs)	100-Year (cfs)
Brighton Courts (no offsite)	19.2	25.7	35.9	73.6
To existing RCB 8'x4' (including offsite)	42.6	55.6	74.8	143.8

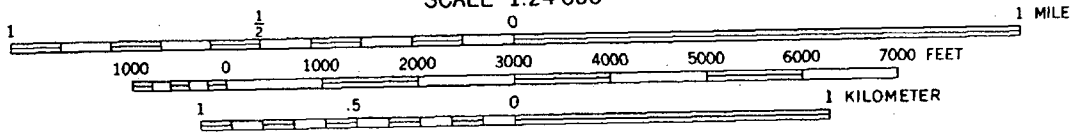
## Summary

Brighton Court Addition is a residential development covering 13 acres. It will consist of 38 residential lots and a reserve with a pond. The site was previously platted in the Legacy Park Wilson Estates, Wilson Farms Second, and Wilson Farms Third Additions, but is currently a vacant lot without any improvements. The site was analyzed under existing and proposed conditions using the rational method. Brighton Court Addition discharges into an existing 8'x4' RCB under Wilson Estates Parkway. Peak flow from the site in the 100-year event increases from 131.4 cfs to 143.8 cfs. The 12.4 cfs increase in runoff will have a negligible effect on the pond downstream. The existing box has a capacity of 340 cfs and will not be effected by the increased flow. Onsite storm water sewer has been sized to convey a 100-year design event from the site and offsite areas that drain onto the site.

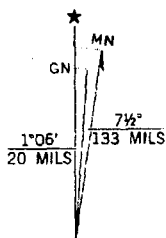
APPENDIX A  
QUADRANGLE MAP



SCALE 1:24 000



CONTOUR INTERVAL 10 FEET  
NATIONAL GEODETIC VERTICAL DATUM OF 1929



UTM GRID AND 1982 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET



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

**BRIGHTON COURT ADDITION**  
PROJECT NAME

**ANDOVER, KANSAS QUADRANGLE**  
SHEET TITLE

<b>KLA</b> DESIGN BY.	<b>KLA</b> DRAWN BY.	<b>GM</b> CHECKED BY.
<b>APRIL 2003</b> DATE	<b>02280</b> JOB NO.	<b>1 / 1</b> SHEET/OF

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APPENDIX B

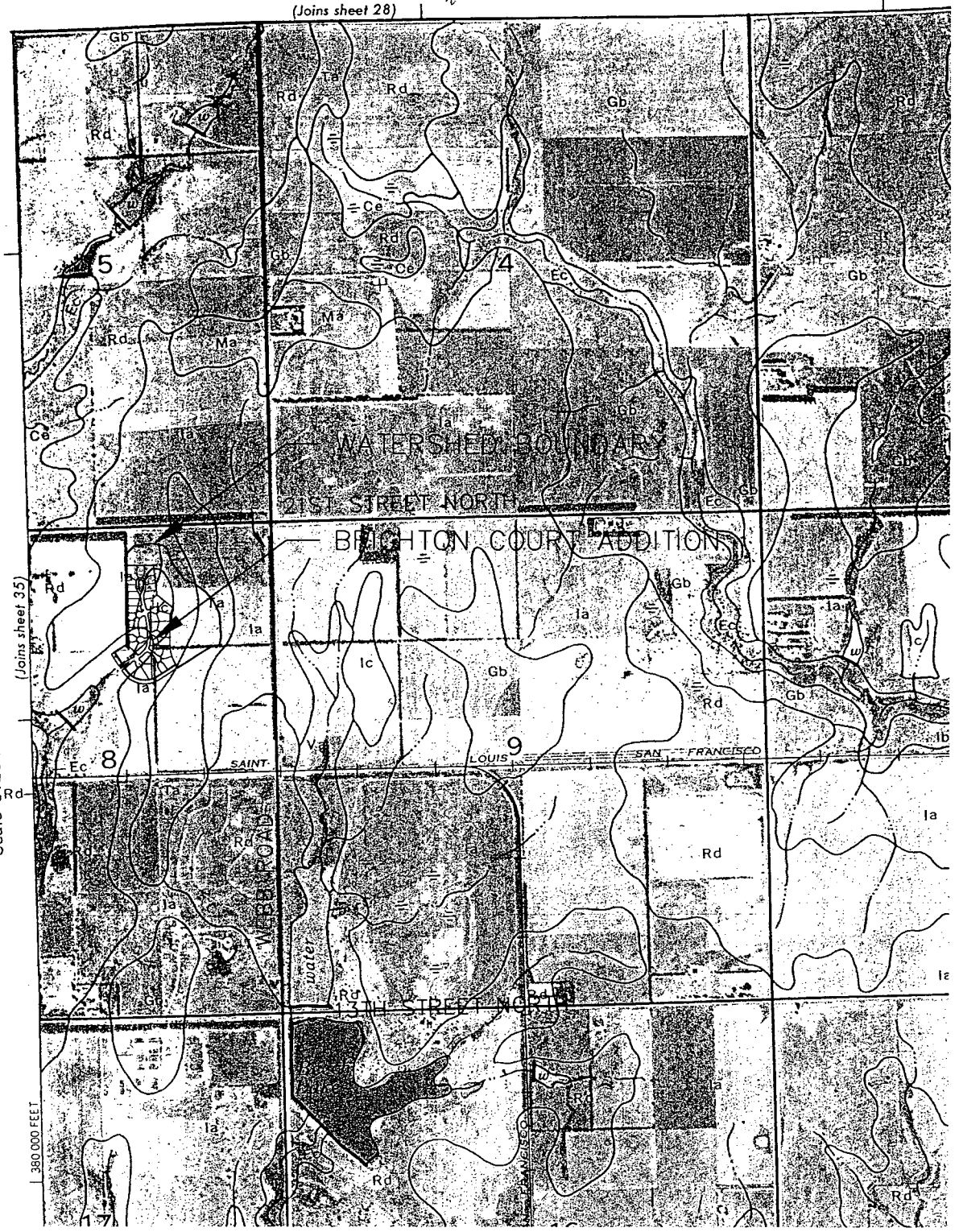
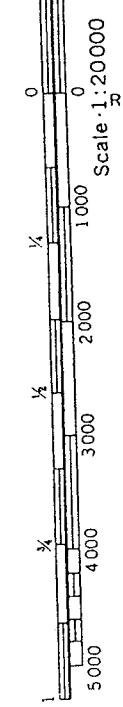
SOIL MAP

36

(Joins sheet 28)



1 Mile  
5000 Feet



**MKEC**  
ENGINEERING  
CONSULTANTS  
411 N. WEBB ROAD  
WICHITA, KS. 67208  
316-624-9600

**BRIGHTON COURT ADDITION**  
PROJECT NAME

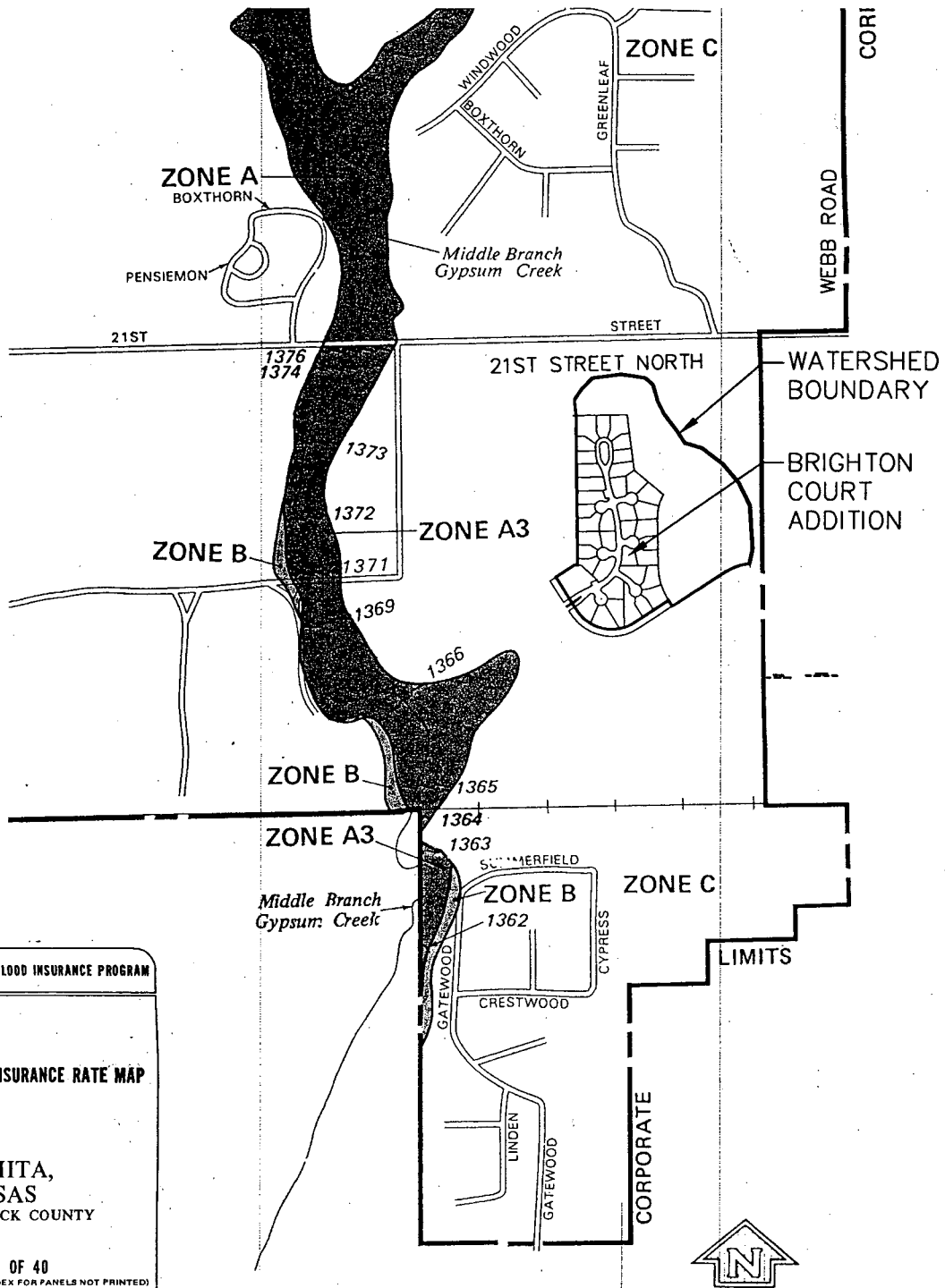
**ANDOVER, KANSAS QUADRANGLE**  
SHEET TITLE

<i>KLA</i>	<i>KLA</i>	<i>GJA</i>
DESIGN BY.	DRAWN BY.	CHECKED BY.
APRIL 2003	02280	1 / 1
DATE	JOB NO.	SHEET/OF

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APPENDIX C

FIRM



NATIONAL FLOOD INSURANCE PROGRAM


**FIRM**  
FLOOD INSURANCE RATE MAP

CITY OF  
WICHITA,  
KANSAS  
SEDGWICK COUNTY


PANEL 15 OF 40  
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER  
200328 0015-BP

EFFECTIVE DATE:  
MAY 15, 1986



Federal Emergency Management Agency



**MKEC**  
ENGINEERING  
CONSULTANTS  
411 N. WEBB ROAD  
WICHITA, KS. 67204  
316 - 684 - 9600

**BRIGHTON COURT ADDITION**  
PROJECT NAME

**FLOOD INSURANCE RATE MAP**  
**WICHITA, KANSAS - PANEL 15 OF 40**  
SHEET TITLE

KLA DESIGN BY:	KLA DRAWN BY:	GJA CHECKED BY:
APRIL 2003 DATE	02280 JOB NO.	1 / 1 SHEET/OF

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**APPENDIX D**

**DRAINAGE & UTILITY PLAN**

APPENDIX E  
DRAINAGE CALCULATIONS

4/14/03

DRAINAGE ANALYSIS SUMMARY  
Brighton Court Addition  
Soil Group D

Area ID	Area ac	C2	C5	C10	C100	Elev Max	Elev Min	Flow Length	Tc2 min	Tc5 min	Tc10 min	Tc100 min	I2 in/hr	I5 in/hr	I10 in/hr	I100 in/hr	Q2 cfs	Q5 cfs	Q10 cfs	Q100 cfs	Inlet Size in	Pipe Size in	Min Slope %	COMMENTS	
<b>Undeveloped</b>																									
A - Offsite	1.3	0.68	0.69	0.73	0.80	206.0	204.0	200	15	15	15	15	3.83	4.56	5.22	7.37	3.49	4.22	5.11	7.90					
B	0.5	0.30	0.35	0.45	0.65	205.0	201.0	200	22	21	18	15	3.17	4.00	4.85	7.37	0.50	0.74	1.18	2.54					
C - Offsite	2.2	0.68	0.69	0.73	0.80	203.0	198.0	300	15	15	15	15	3.83	4.56	5.22	7.37	5.81	7.02	8.50	13.15					
D	0.4	0.30	0.35	0.45	0.65	201.0	198.0	250	21	20	17	15	3.25	4.00	4.85	7.37	0.42	0.60	0.96	2.08					
E - Offsite	1.5	0.68	0.69	0.73	0.80	204.0	198.0	300	15	15	15	15	3.83	4.56	5.22	7.37	3.96	4.78	5.79	8.96					
F	0.3	0.30	0.35	0.45	0.65	198.0	196.0	210	21	20	17	15	3.25	4.10	4.85	7.37	0.33	0.49	0.76	1.63					
G - Offsite	7.9	0.64	0.68	0.73	0.83	203.0	197.0	500	17	16	15	15	3.61	4.56	5.22	7.37	18.34	24.62	30.26	48.57					
H	0.8	0.30	0.35	0.45	0.65	196.0	194.0	300	28	24	17	15	2.67	3.37	4.22	7.18	0.65	0.96	1.54	3.78					
I	2.0	0.30	0.35	0.45	0.65	203.0	194.0	300	28	23	16	15	2.84	3.50	4.40	7.37	1.68	2.41	3.90	9.44					
J	1.4	0.30	0.35	0.45	0.65	203.0	194.0	300	28	26	23	16	2.84	3.50	4.40	7.37	1.20	1.73	2.79	6.75					
K	0.6	0.30	0.35	0.45	0.65	205.0	201.0	200	22	21	18	15	3.17	4.00	4.85	7.37	0.54	0.80	1.27	2.73					
L	1.2	0.30	0.35	0.45	0.65	201.0	195.0	300	22	21	18	15	3.25	4.00	4.85	7.37	1.12	1.61	2.56	5.51					
M	0.5	0.30	0.35	0.45	0.65	194.0	192.0	160	17	16	15	15	3.72	4.56	5.22	7.37	0.57	0.81	1.20	2.44					
N	2.6	0.30	0.35	0.45	0.65	199.0	191.0	300	19	18	16	15	3.42	4.20	5.22	7.37	2.67	3.82	6.11	12.46					
O	0.8	0.30	0.35	0.45	0.65	194.0	191.0	300	28	27	23	16	2.78	3.50	4.31	7.37	0.70	1.03	1.63	4.02					
P	0.6	0.30	0.35	0.45	0.65	192.0	185.0	160	15	15	15	15	3.83	4.56	5.22	7.37	0.68	0.94	1.39	2.83					
Q	1.6	0.30	0.35	0.45	0.65	200.0	190.0	700	34	32	27	19	2.52	3.19	3.98	6.68	1.21	1.79	2.87	6.95					
Onsite - B+D+F+H+I+J+K+L+M+N+O+P+Q	13.4	0.30	0.35	0.45	0.65			34	32	27	19	2.52	3.19	3.98	6.68	10.09	14.91	23.91	57.97						
Total to RCB	24.8	0.49	0.53	0.60	0.74			30	28	24	17	2.67	3.37	4.22	7.18	32.22	43.89	62.45	131.39						
<b>Developed</b>																									
A - Offsite	1.3	0.68	0.69	0.73	0.80	206.0	204.0	200	15	15	15	15	3.83	4.56	5.22	7.37	3.49	4.22	5.11	7.90					
B	0.5	0.41	0.45	0.54	0.71	205.0	201.0	200	19	18	15	15	3.42	4.31	5.22	7.37	0.74	1.03	1.49	2.77					
A+B	1.9	0.60	0.62	0.68	0.77			19	18	15	15	15	3.42	4.31	5.22	7.37	3.96	5.01	6.00	10.67					
C - Offsite	2.2	0.68	0.69	0.73	0.80	203.0	198.0	300	15	15	15	15	3.83	4.56	5.22	7.37	5.81	7.02	8.50	13.15					
D	0.4	0.41	0.45	0.54	0.71	201.0	198.0	250	18	17	15	15	3.51	4.31	5.22	7.37	0.62	0.83	1.21	2.25					
A+B+C+D	4.5	0.62	0.64	0.69	0.78			19	18	15	15	15	3.42	4.31	5.22	7.37	9.65	12.46	16.31	28.07					
E - Offsite	1.5	0.68	0.69	0.73	0.80	204.0	196.0	300	15	15	15	15	3.83	4.56	5.22	7.37	3.96	4.78	5.79	8.96					
F	0.3	0.41	0.45	0.54	0.71	198.0	190.0	210	18	17	15	15	3.51	4.31	5.22	7.37	0.49	0.66	0.96	1.78					
A+B+C+D+E+F	6.4	0.72	0.74	0.80	0.91			18	18	15	15	15	3.42	4.31	5.22	7.37	15.75	20.40	26.70	42.77					
G - Offsite	7.9	0.64	0.68	0.73	0.83	203.0	197.0	500	17	16	15	15	3.61	4.56	5.22	7.37	18.34	24.62	30.26	48.57					
H	0.8	0.41	0.45	0.54	0.71	196.0	194.0	300	28	24	21	15	2.96	3.65	4.50	7.37	0.68	1.33	1.97	4.24					
G+H	8.8	0.62	0.66	0.71	0.82			28	24	21	15	15	2.96	3.65	4.50	7.37	16.02	21.04	28.05	52.81					
A+B+C+D+E+F+G+H	15.1	0.66	0.69	0.75	0.86			28	24	21	15	15	2.96	3.65	4.50	7.37	29.85	38.32	51.06	95.58					
I	2.0	0.57	0.61	0.66	0.79	203.0	194.0	300	18	17	15	15	3.51	4.31	5.22	7.37	3.94	5.18	6.79	11.47					
A+B+C+D+E+F+G+H+I	17.1	0.65	0.68	0.74	0.85			18	17	15	15	15	2.96	3.65	4.50	7.37	32.98	42.70	56.82	107.05					
J	1.4	0.57	0.61	0.66	0.79	203.0	194.0	300	18	17	15	15	3.51	4.31	5.22	7.37	2.82	3.71	4.86	8.21					
A+B+C+D+E+F+G+H+I+J	18.5	0.64	0.68	0.73	0.84			28	24	21	15	15	2.96	3.65	4.50	7.37	35.36	45.84	61.10	115.26					
K	0.6	0.41	0.45	0.54	0.71	203.0	201.0	200	19	18	15	15	3.42	4.31	5.22	7.37	0.80	1.11	1.61	2.98					
L	1.2	0.41	0.45	0.54	0.71	201.0	195.0	300	19	18	15	15	3.51	4.31	5.22	7.37	1.65	2.23	3.24	6.02					
K+L	1.7	0.41	0.45	0.54	0.71			19	18	15	15	15	3.42	4.31	5.22	7.37	2.41	3.34	4.85	9.00					
A+B+C+D+E+F+G+H+I+J+K+L	20.2	0.63	0.66	0.72	0.83			28	24	21	15	15	2.96	3.65	4.50	7.37	37.44	48.67	65.28	124.26					
M	0.5	0.41	0.45	0.54	0.71	194.0	192.0	160	15	15	15	15	3.83	4.56	5.22	7.37	0.80	1.05	1.44	2.67					
N	2.6	0.57	0.61	0.66	0.79	199.0	191.0	300	15	15	15	15	3.83	4.56	5.22	7.37	5.68	7.23	8.96	15.14					
O	0.8	0.57	0.61	0.66	0.79	194.0	191.0	300	15	15	15	15	3.83	4.56	5.22	7.37	1.68	2.21	2.89	4.89					
N+O	3.4	0.57	0.61	0.66	0.79			19	17	16	15	15	3.51	4.31	5.22	7.37	6.68	9.04	11.85	20.03					
P	0.6	0.30	0.35	0.45	0.65	192.0	185.0	160	19	17	16	15	3.51	4.31	5.22	7.37	0.62	0.89	1.39	2.83					
Q	1.6	0.41	0.45	0.54	0.71	200.0	190.0	700	28	24	21	15	2.96	3.65	4.50	7.37	2.30	3.10	4.51	8.37					
Onsite - B+D+F+H+I+J+K+L+M+N+O+P+Q	13.4	0.41	0.45	0.54	0.71			28	24	21	15	15	2.96	3.65	4.50	7.37	19.24	25.09	35.88	73.62					
Total to RCB	24.8	0.58	0.61	0.67	0.79			26	24	21	15	15	2.96	3.65	4.50	7.37	42.58	55.59	74.80	143.82					

APPENDIX F

GRADING PLAN

APPENDIX G

HV-8 OUTPUT



