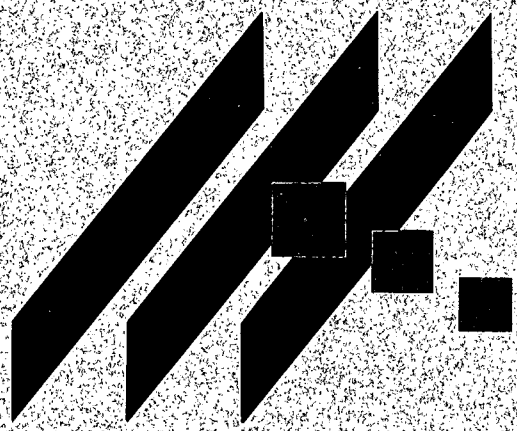
MKEC ENGINEERING CONSULTANTS, INC.



DRAINAGE REPORT

FOR

WICHITA HEIGHTS HIGH SCHOOL ADDITION

JULY 2002

411 N. WEBB ROAD • WICHITA, KS 67206 • 316 684 9600 • FAX 316 684 5100

Drainage Report for Wichita Heights High School Addition

Wichita, Kansas

Location

The subject property lies in the North half of the Northeast Quarter of Sec. 22, Township 26 South, Range 1 East. The property abuts 53rd Street North on the North and Hillside Ave. on the East. The properties to the West and South are currently undeveloped.

Soils

According to the NRCS (SCS) Sedgwick County Soil Survey, the drainage watershed is in the Farnum Series: farnum loam, with 1-3 percent slopes. The Hydrological Soil Group (HSG) for both soils is "B" (see soil survey in Appendix A).

Pre-developed Conditions

Current Development
The property is currently developed as Heights High School. This includes buildings, parking lots and sports facilities such as a football field, track, and baseball field. The total area of the property is approximately 76 acres.

Current Landform and Slope
The slopes in the area range between 1-2%. Elevations vary from 1375 ft in the northwest corner to 1358 ft in the southeast corner.

Current Drainage Conditions
No portion of the site is included in a regulatory floodplain. A copy of the effective FEMA map (FIRM Panel 150, Sedgwick County, June 3, 1986) is attached as Appendix B.

Current Runoff Characteristics
Runoff enters the site from approximately 17 acres North of 53rd Street and flows through a 4'x3' CMP under 53rd Street (see quadrangle map, Appendix C). The site is divided into three drainage areas. See Appendix D for drainage and utility map. Drainage area "A" comprises the western third of the property and drains to the west onto undeveloped land. Drainage area "B" covers the middle two-thirds of the property and drains into a drainage channel running north/south through the middle of the property. This drainage channel handles the water from the area North of 53rd Street along with the majority of the runoff from area "B." Drainage area "C" is

the eastern third of the property and drains to the east into a ditch on the west side of Hillside Ave.

Runoff from the existing high school roof is channeled through drain pipes and is released into the ditch on the west side of Hillside Avenue. Runoff from the current parking lot flows to the southeast corner of the site and eventually to the ditch along Hillside Ave.

The rational method was used to calculate current runoff through the site. Time of concentration values ranged from 20-54 minutes and were calculated using the FAA method. Runoff coefficients were determined from the soil type, percent impervious area, and slope. Values ranged from 0.20 to 0.54.

Table 1 shows the flow rates for 2, 5, 10, and 100 year events before development. The table displays the three drainage areas, the area North of 53rd Street and the total amount of water flowing through the middle drainage channel.

Table 1: Pre-development runoff.

Sub-Watershed	2-Year (cfs)	5-Year (cfs)	10-Year (cfs)	100-Year (cfs)
A	8.6	11.6	17.9	41.1
B	35.3	46.1	69.2	142.1
C	13.0	17.0	24.3	47.1
North of 53rd St.	5.1	7.3	12.0	29.3
Total through exist channel	28.1	39.3	59.5	131.9

Post-Developed Condition

Proposed Development

The property will be improved by an expansion to Heights High School. The addition will be on the northeast side of the building. Additional parking will be added to the west of the building, south of 53rd Street North.

Proposed Landform and Slope

The proposed development will not affect the overall landform slope and basic drainage patterns on the property. Slopes will continue to range from 1-2%.

Proposed Runoff Characteristics

The future runoff characteristics will remain similar to current patterns. Runoff will increase for drainage areas "B" and "C" due to more impervious area from the building and parking. Sub-watershed "B" will continue to drain to the middle of the property. Sub-watersheds "A" and "C" will continue to drain to the west and east respectively.

Runoff coefficients increased slightly and time of concentration values decreased slightly for post-developed conditions. Table 2 shows the post-development flow rates for 2, 5, 10, and 100 year events. Runoff increased for sub-watershed's "B" and "C", and therefore increased in the existing channel. Sub-watershed "A" remained unchanged.

Table 2: Post-development runoff.

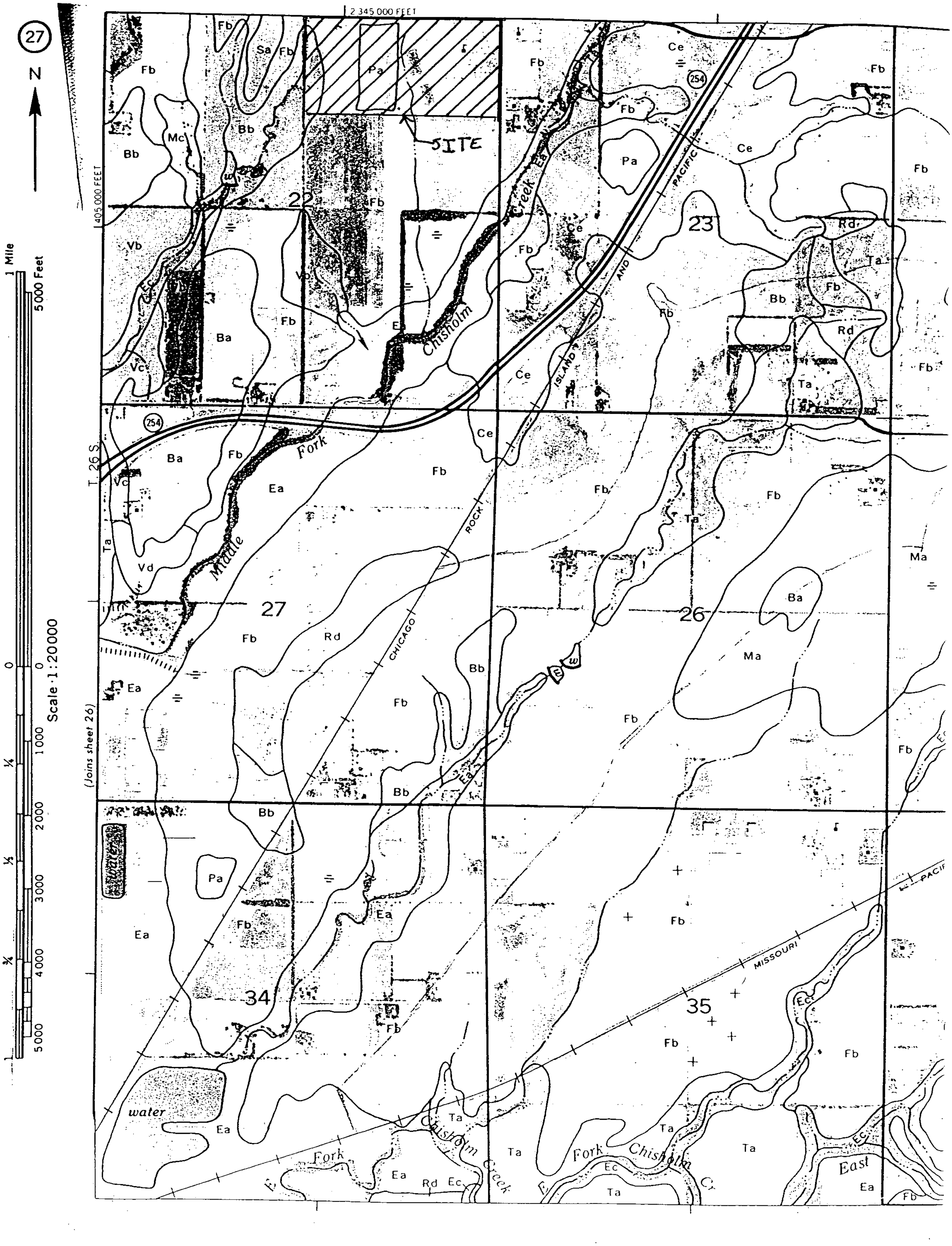
Sub-Watershed	2-Year (cfs)	5-Year (cfs)	10-Year (cfs)	100-Year (cfs)
A	8.6	11.6	17.9	41.1
B	39.7	51.6	72.5	150.1
C	16.2	21.5	28.8	52.6
North of 53rd St.	5.1	7.3	12.0	29.3
Total through exist channel	30.9	43.0	62.5	137.3

Summary

The site is approximately 76 acres of land at 53rd Street and Hillside Avenue. The high school will be expanded and additional parking added. Runoff will increase slightly and little change in drainage patterns is expected. Slopes range from 1-2% and the majority of the runoff flows to a drainage channel running north/south through the middle of the site.

Appendix A

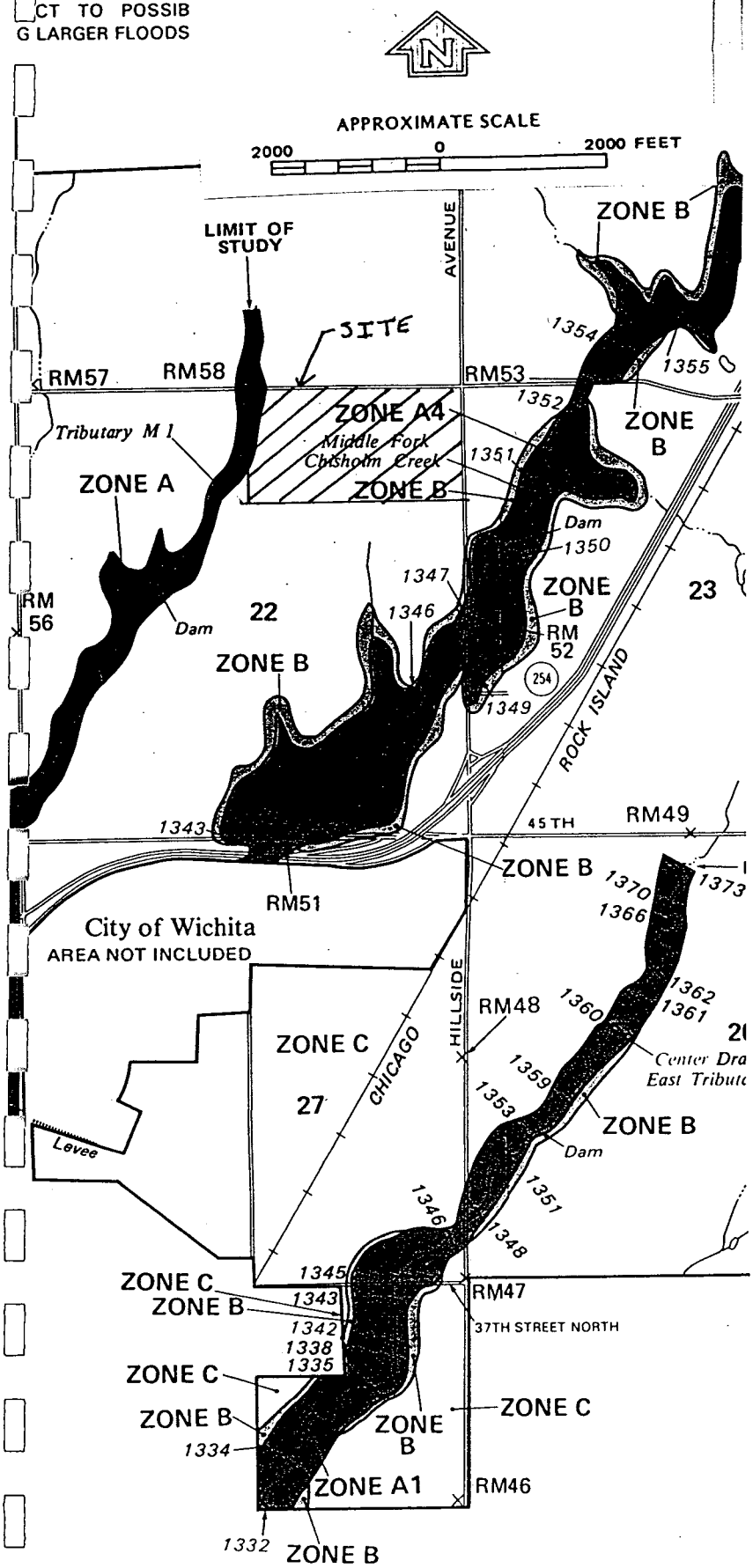
Soil Survey


27
N
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
¼
½
¾
2 345 000 FEET
405 000 FEET
SITE
T. 26 S.
(Joins sheet 26)
22
23
27
26
34
35
254
Middle Fork Chisholm Creek
East Fork Chisholm Creek
CHICAGO ROCK ISLAND AND PACIFIC
MISSOURI PACIFIC
water
Fb
Sa
Pa
Bb
Mc
Vb
Ec
Vc
Ba
Ea
Ce
Rd
Ta
Vd
Ma

Appendix B

FIRM Panel

THE ONE PERCENT
D BY LEVEE, DI
CT TO POSSIB
G LARGER FLOODS



NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

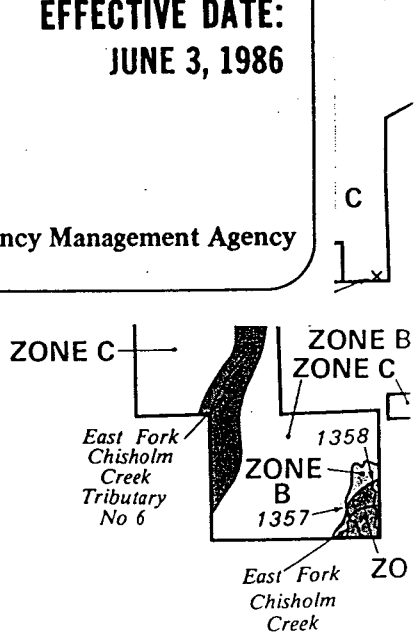
SEDGWICK COUNTY, KANSAS
(UNINCORPORATED AREAS)

PANEL 150 OF 300

COMMUNITY-PANEL NUMBER
200321 0150 A

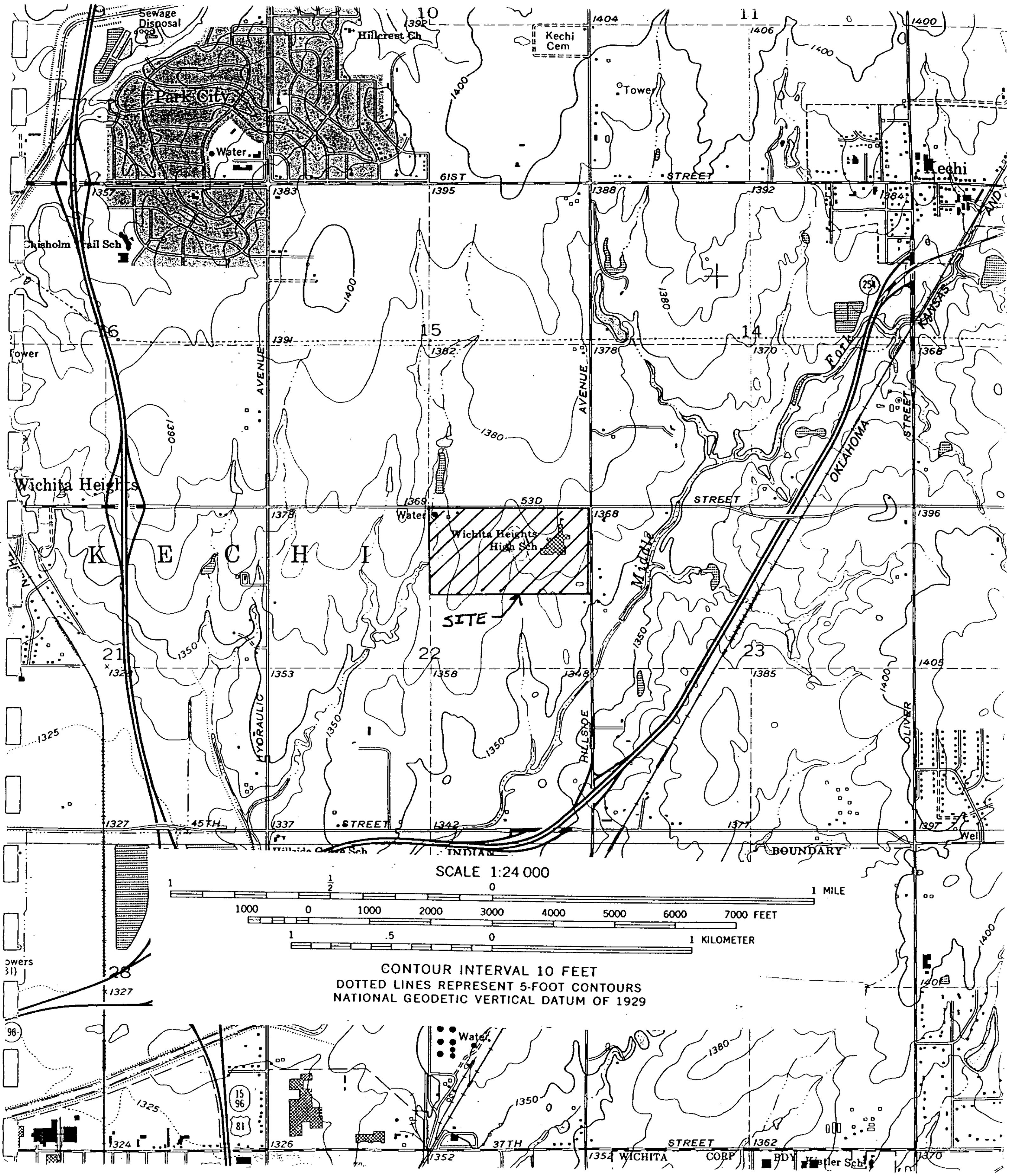
EFFECTIVE DATE:
JUNE 3, 1986

Federal Emergency Management Agency



Appendix C

Quadrangle


Sewage Disposal
Hillcrest Ch
Kechi Cem
Park City
Water
Tower
Kechi
61ST STREET
Chisholm Trail Sch
Wichita Heights
K E C H I
53D STREET
Water
Wichita Heights High Sch
SITE
AVENUE
HYDRAULIC
HILLSIDE
OLIVER STREET
OKLAHOMA
KANSAS
Middle Fork
45TH STREET
Hillside Grove Sch
INDIAN BOUNDARY
SCALE 1:24 000
1 MILE
7000 FEET
1 KILOMETER
CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929
37TH STREET
WICHITA CORP BDY
Kistler Sch
Water

Appendix D

Drainage and Utility Plan

Appendix E

Calculations

DRAINAGE ANALYSIS SUMMARY
Wichita Heights High School Addition
Soil Group B

Area ID	Area ac	Accum. 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
Pre-Development																					
A	17.31		0.20	0.22	0.28	0.41	1375.00	1365.00	620.00	34	34	31	26	2.48	3.05	3.70	5.79	8.59	11.62	17.93	41.09
B	43.80		0.33	0.35	0.42	0.55	1375.00	1360.00	900.00	35	34	31	25	2.44	3.01	3.76	5.90	35.27	46.14	69.17	142.13
C	14.78		0.35	0.37	0.43	0.54	1370.00	1363.00	650.00	34	33	30	25	2.52	3.10	3.83	5.90	13.04	16.95	24.34	47.09
North of 53rd St.	17.22		0.16	0.18	0.24	0.37	1380.00	1370.00	1000.00	54	52	49	42	1.86	2.35	2.90	4.60	5.12	7.28	11.99	29.31
Total through exist channel	61.02		0.28	0.30	0.37	0.50	1380.00	1360.00	1900.00	63	62	56	46	1.63	2.13	2.64	4.33	28.05	39.26	59.48	131.90
													Total A+B+C+North					62.01	82.00	123.43	259.62
Post-Development																					
A	17.31		0.20	0.22	0.28	0.41	1375.00	1365.00	620.00	34	34	31	26	2.48	3.05	3.70	5.79	8.59	11.62	17.93	41.09
B	43.80		0.36	0.38	0.44	0.57	1375.00	1360.00	900.00	34	33	30	24	2.52	3.10	3.76	6.01	39.74	51.60	72.46	150.05
C	14.78		0.41	0.44	0.49	0.58	1370.00	1363.00	650.00	31	30	27	23	2.67	3.30	3.98	6.13	16.18	21.46	28.82	52.55
North of 53rd St.	17.22		0.16	0.18	0.24	0.37	1380.00	1370.00	1000.00	54	52	49	42	1.86	2.35	2.90	4.60	5.12	7.28	11.99	29.31
Total through exist channel	61.02		0.30	0.32	0.38	0.51	1380.00	1360.00	1900.00	61	60	55	45	1.67	2.18	2.67	4.38	30.93	43.04	62.49	137.26
													Total A+B+C+North					69.63	91.96	131.20	273.00

Appendix F

Sanitary Sewer Extension Plan

VICINITY MAP

LEGEND

- ● POLE – POLE
- GATE
- TRAF MH – TRAFFIC MANHOLE
- SPK – SPRINKLER HEAD
- WALL
- LP – LIGHT POLE
- FH – FIRE HYDRANT
- WV – WATER VALVE
- WM – WATER METER
- ICV – IRRIGATION VALVE
- GRATE INLET
- TR – TELEPHONE RISER
- INLET
- STORM SEWER PIPE
- WATER LINE
- SANITARY SEWER LINE
- GAS LINE
- TELEPHONE LINE
- UNDERGROUND ELECTRIC
- OVERHEAD TELEPHONE
- OVERHEAD ELECTRIC
- UNDERGROUND FIBER OPTICS
- GM – GAS METER
- YLG – GROUND YARD LIGHT
- YLP – YARD LIGHT ON POLE
- ELECT MH – ELECTRIC MANHOLE
- SIG LIGHT – SIGNAL LIGHT
- 6IN – CONIFEROUS TREE & DIAMETER
- 3IN – DECIDUOUS TREE & DIAMETER
- SN – SIGN
- BUSH
- PP – POWER POLE & GUY ANCHOR
- KGE – ELECTRIC BOX
- CO – SEWER CLEANOUT
- EDGE OF TREES
- FENCE
- BM – BENCHMARK
- SWMH – STORM WATER MANHOLE
- SSMH – SANITARY SEWER MANHOLE
- SWB – TELEPHONE MANHOLE
- △ – SECTION CORNER
- ● – 5/8" REBAR/MKEC CLS #39 SET
- ◉ – PROPERY CORNER FOUND

BENCHMARK

BM #1– 60d Nail at guy pole ±65' SE. of Section corner at Hillside and 53rd Street North.
Elev.=1367.41 NGVD 180.01 (City Datum)

BM #2– R.R. Spike in the SW. face guy pole at the NE. corner of the intersection of Hillside & 53rd Street North.
Elev.=1369.46 NGVD 182.06 (City Datum)

BM #3– " " cut top of RCP E. end of drive S. side of 53rd St. N. ±400' East of 1/4 corner, NW. corner of site.
Elev.=1373.80 NGVD 186.40 (City Datum)

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

HEIGHTS HIGH SCHOOL ADDITION
PROJECT NAME

SANITARY SEWER EXTENSION PLAN
SHEET TITLE

DK	DM	DK
DESIGN BY:	DRAWN BY:	CHECKED BY:
JULY 2002	SAN–EXT	1 / 1
DATE	JOB NO.	SHEET/OF