DRAINAGE PLAN

Ridge Port Commercial Park

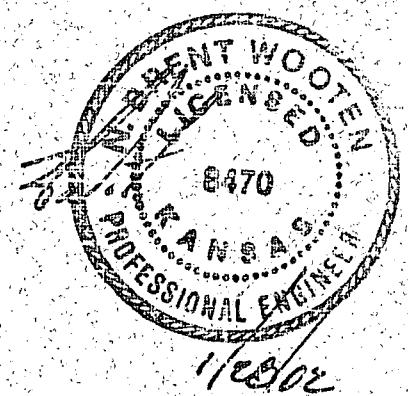
TO

WICHITA, SEDGWICK COUNTY, KANSAS

Prepared By

BAUGHMAN COMPANY, P.A.
ENGINEERING, SURVEYING & PLANNING
316/262-7271 FAX 316/262-0149 WICHITA, KANSAS 67211

January 28, 2002



DRAINAGE PLAN

Ridge Port Commercial Park

WICHITA, SEDGWICK COUNTY, KANSAS

INTRODUCTION

This report provides information and supporting documentation to support the "Drainage Plan" for the property located in Section 33, T-26-S, R-1-W in Wichita, Sedgwick County, Kansas.

The "Drainage Plan" being submitted herein in intended to serve as a guide for the design of streets, stormwater sewers, and site grading to the proposed development. Modifications to structures, pipes, etc. may be made as necessary during the final design in order to obtain the most economical design and construction possible.

INITIAL DATA

The existing topography of the plat is relatively flat, but drains from the north centrally point in the property to its boundary. The general concentration point of all drainage is at the Ridge Road Bridge, crossing the Big Slough North and the reinforced concrete box 400' south of the bridge. The total drainage area of the plat is 28.6 acres.

A portion of the property lies within the 100-yr and 500-yr floodplain per FEMA Federal Insurance Rate Map (FIRM), effective date April 8, 1999. The drainage plan sheet delineates the area between the two zones. Though the FIRM does not map the entire plat within the 100-yr floodplain, there is approximately 23 acres of land at or below the base flood elevation (B.F.E.) of a 141.9 city datum.

The existing soil types per S.C.S. "Soil Survey of Sedgwick County" is Canadian fine sandy loam, Lesho loam, Waldeck sandy loam, and Plevna fine sandy loam. These soils are classified in hydrologic group B, C, C and D in their respective order. The composite soil group type used to determine the existing runoff is a C.

The time of concentration (Tc) for the plat under existing conditions is determined from S.C.S method TR-55. The primary flow path used is from the north centrally point of the plat to the east property line. The total flow path is divided between 300 feet of sheet flow and 400 feet of shallow concentrated flow. The slope of the existing ground is approximately 0.0029 ft/ft. The roughness coefficient used for calculating sheet flow is a Manning's n, 0.06. This method determines a time of concentration of 30 minutes.

COMPUTATIONS

The drainage plan proposes one main system and three single inlet systems. The main system, which proposed to drain approximately 25.2 acres will discharge north and directly west of the existing bridge crossing the Big Slough North. The three single inlet systems with a drainage area of approximately one-acre each will discharge to the existing ditch in the Ridge Road street right-of-way. Each lot will be served with at least one inlet or have the ability to extend storm sewer to their site privately as their siteplan requires. The storm sewer system is designed to convey the 5-year storm event, with the 100-year storm contained within the lots. The minimum building pad set for the subdivision is two feet above the B.F.E. of the Big Slough North.

The Rational method is used to calculate the existing and developed runoff. The runoff coefficients used are per the City of Wichita Drainage Criteria, Attachment D. The runoff coefficients and rainfall intensity are as follows:

	Existing Conditions		Developed Conditions	
5-yr	"C"	0.27	"C"	0.85
	I in/hr	3.24	I in/hr	4.56
100-yr	"C"	0.51	"C"	0.91
	I in/hr	5.40	I in/hr	7.37

Table 1. Ridge Port Commercial Park Total Runoff Summary

Storm Event	Existing Conditions	Developed Conditions
5-Yr.	25 cfs	111 cfs
100-Yr.	79 cfs	192 cfs

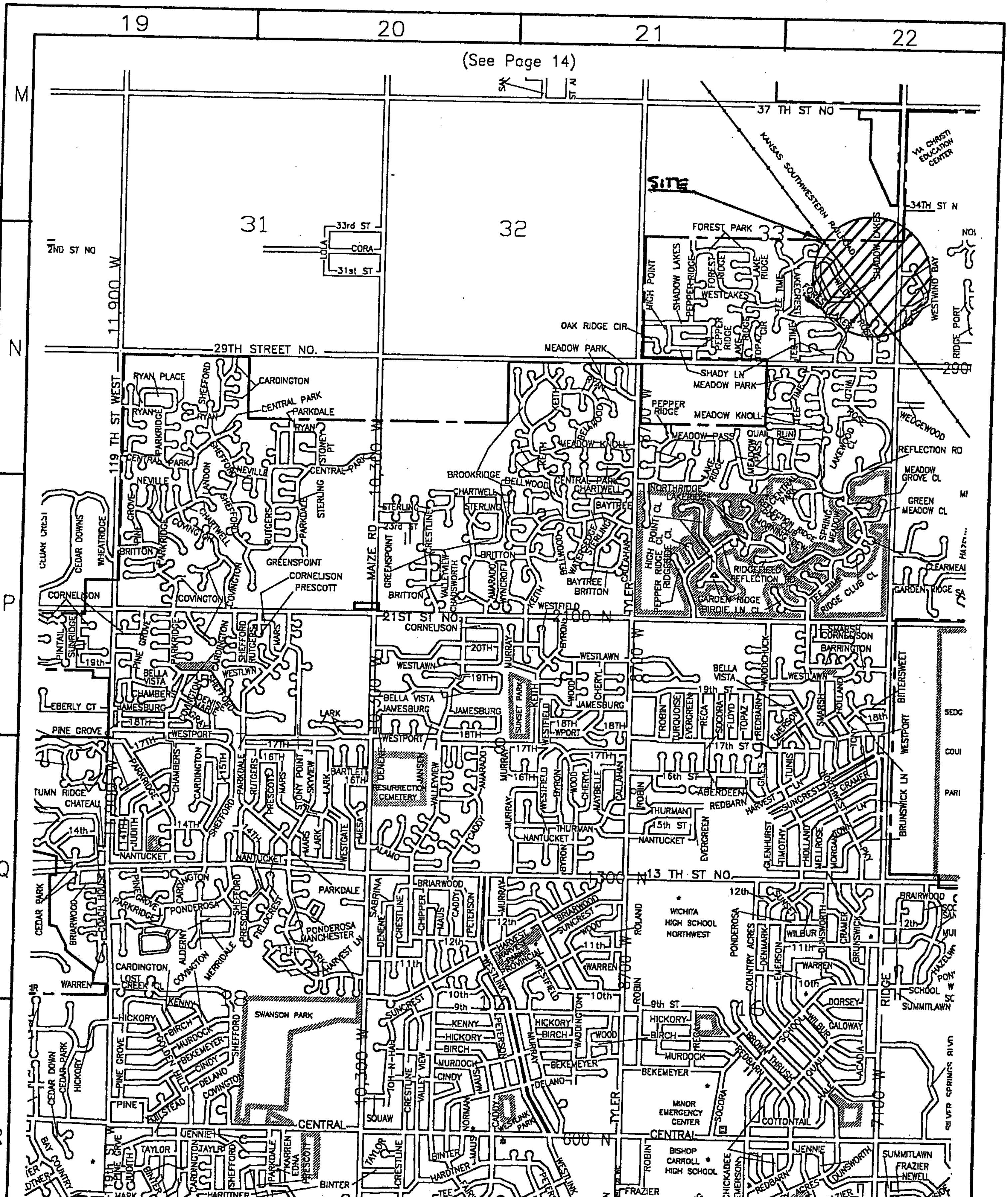
The 5-yr hydraulic grade line for the major storm sewer system was calculated using StormCad, by Haestad Methods. Profiles, pipe and node reports are found in subsequent pages in the report.

Basin's 2, 19 and 20 pipe sizes were designed assuming a non-pressurized system using Manning's equation. The pipe sizes were determined assuming that the pipe material used would be reinforced concrete and the slope of the pipe would meet the City's minimum required to reach cleansing velocity. The following table summarizes the capacities of the discharging pipes and the runoff rates at each inlet for the five-year storm event.

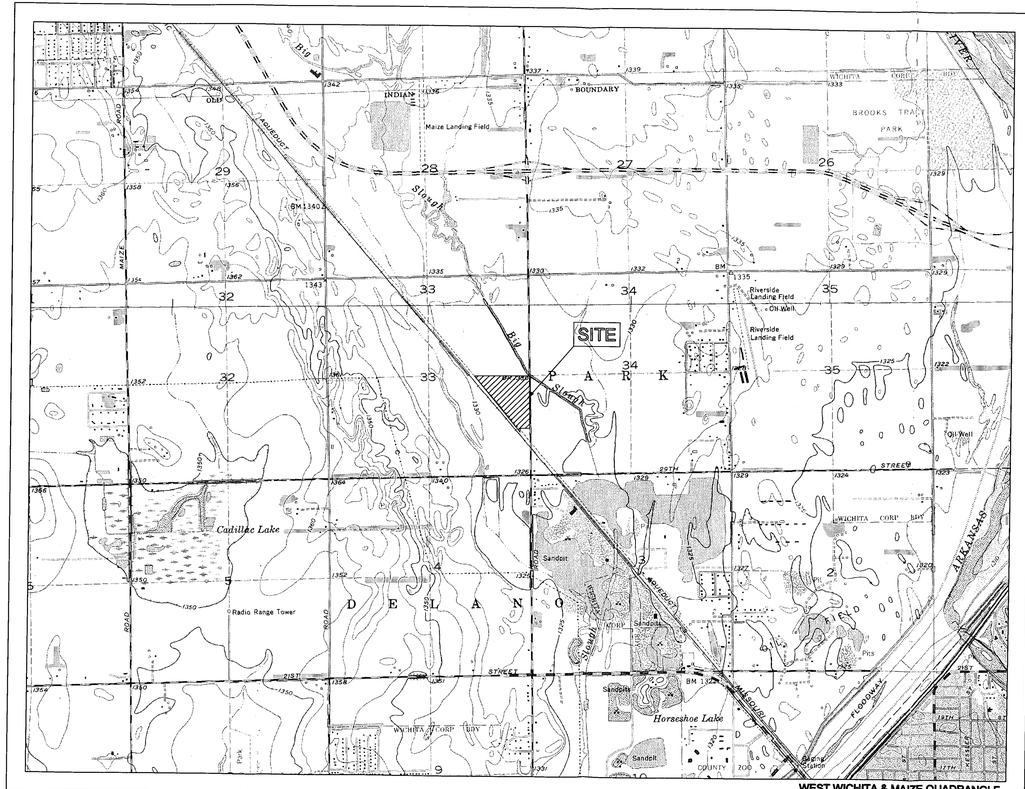
Table 2. Ridge Port Commercial Park (Pipe Sizing)

Basin I.D. / Pipe Size	Q (cfs) Capacity	Q (cfs) Developed
2 – 15" RCP	3.98 cfs	4.07 cfs
19 - 15" RCP	3.98 cfs	3.60 cfs
20 – 18" RCP	6.47 cfs	5.35 cfs

(See Page 14)



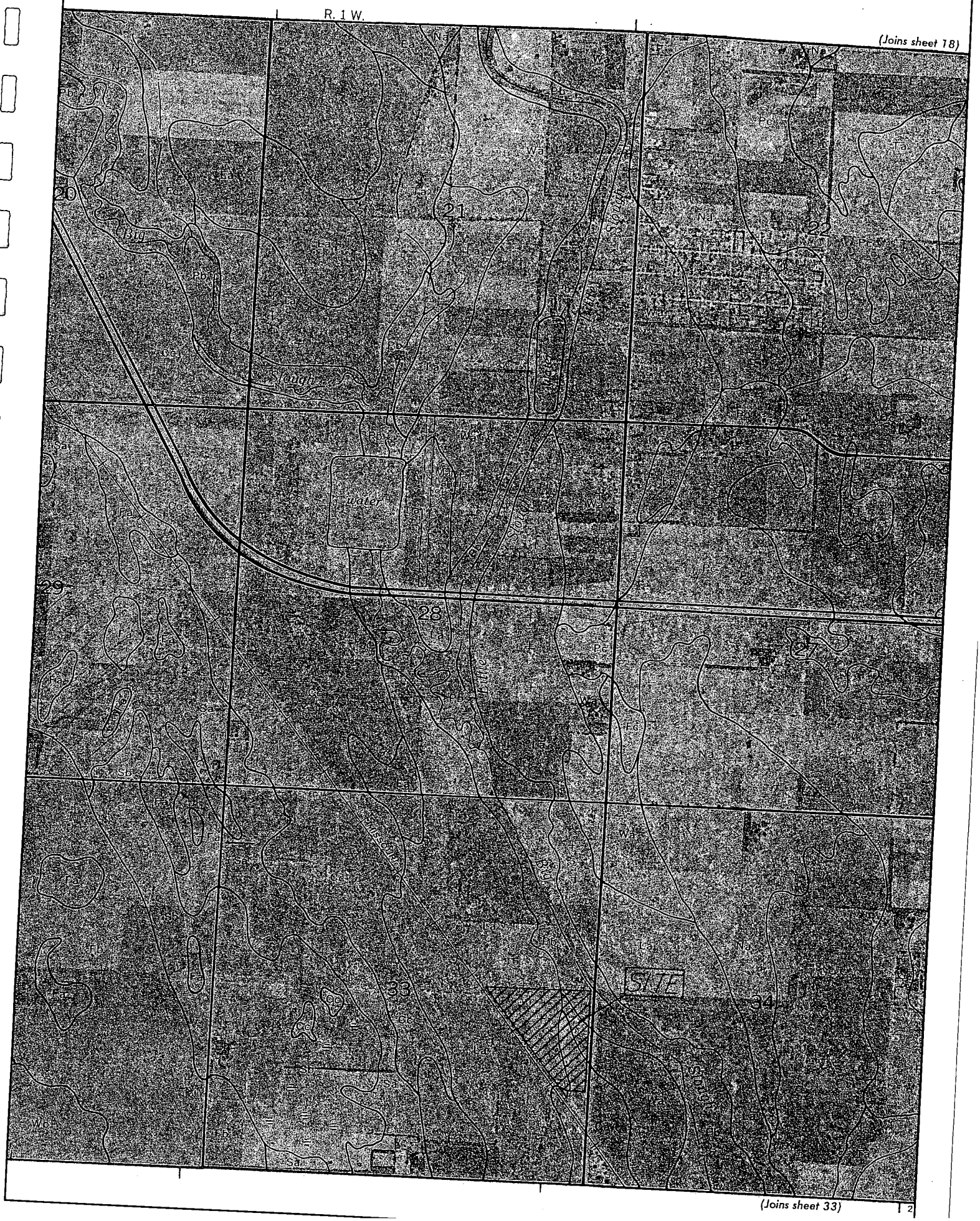
(See Page 28)



WEST WICHITA & MAIZE QUADRANGLE

LOCATION:
Ridge Port Commercial Park
WICHITA, SEDGWICK COUNTY, KANSAS

SEDGWICK COUNTY, KANSAS — SHEET NUMBER 25



Project Title: Ridge Port 2nd Addition
f:\hydro\projects\ridgeportcomm\sws.stm
01/28/02 11:37:35 AM

Baughman Company, P.A.
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Project Engineer: Baughman Company, P.A.
StormCAD v1.0

5-Yr

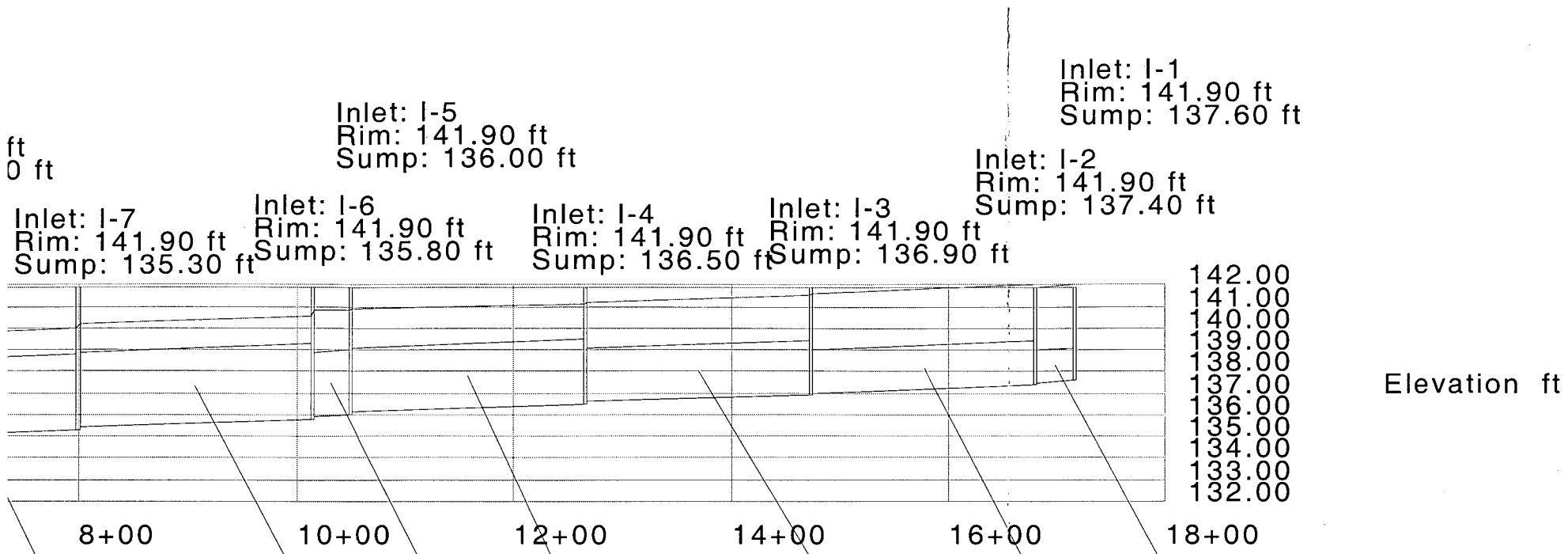
Pipe Report

Pipe Section	Upstream Node	Downstream Node	Discharge (cfs)	Constructed (ft/ft)	Length (ft)	Section Size	Mannings n	Upstream Invet (ft)	Downstream Invert (ft)	Upstream Ground (ft)	Downstream Ground (ft)	Upstream HGL (ft)	Downstream HGL (ft)
P-12	I-12	I-13	12.11	0.003195	313	24 inch	0.013	137.50	136.50	141.90	141.90	142.28	141.38
P-13	I-13	I-14	22.37	0.005556	36	30 inch	0.013	136.40	136.20	141.90	141.90	141.22	141.11
P-14	I-14	J-1	27.76	0.00297	101	36 inch	0.013	136.10	135.80	141.90	142.40	140.94	140.77
P-15	J-1	I-15	27.43	0.002206	136	36 inch	0.013	135.70	135.40	142.40	143.10	140.60	140.37
P-16	I-15	I-9	32.59	0.001481	405	36 inch	0.013	135.30	134.70	143.10	141.90	140.21	139.24
P-17	I-16	I-17	5.9	0.003241	216	18 inch	0.013	137.70	137.00	141.90	141.90	142.58	141.90
P-18	I-17	I-18	13.37	0.002857	35	24 inch	0.013	136.90	136.80	141.90	141.90	141.77	141.65
P-19	I-18	J-2	17.58	0.002299	87	30 inch	0.013	136.70	136.50	141.90	142.40	141.51	141.35
P-20	J-2	I-6	17.39	0.002212	226	30 inch	0.013	136.40	135.90	142.40	141.90	141.21	140.81
P-1	I-1	I-2	5.67	0.002778	36	18 inch	0.013	137.60	137.50	141.90	141.90	142.00	141.90
P-2	I-2	I-3	9.6	0.001942	206	24 inch	0.013	137.40	137.00	141.90	141.90	142.00	141.63
P-3	I-3	I-4	16.33	0.001442	208	30 inch	0.013	136.90	136.60	141.90	141.90	141.54	141.21
P-4	I-4	I-5	20.9	0.001852	216	36 inch	0.013	136.50	136.10	141.90	141.90	141.14	140.93
P-5	I-5	I-6	22.9	0.002778	36	36 inch	0.013	136.00	135.90	141.90	141.90	140.85	140.81
P-6	I-6	I-7	42.02	0.00186	215	42 inch	0.013	135.80	135.40	141.90	141.90	140.57	140.20
P-7	I-7	I-8	46.13	0.00181	221	42 inch	0.013	135.30	134.90	141.90	141.90	140.02	139.55
P-8	I-8	I-9	50.8	0.002703	37	42 inch	0.013	134.80	134.70	141.90	141.90	139.34	139.24
P-9	I-9	I-10	85.2	0.001026	195	54 inch	0.013	134.60	134.40	141.90	141.90	138.87	138.54
P-10	I-10	I-11	87.05	0.001351	222	54 inch	0.013	134.30	134.00	141.90	141.90	138.07	137.57
P-11	I-11	Outlet	87.67	0.015323	124	54 inch	0.013	133.90	132.00	141.90	141.90	136.64	133.98

5-Yr

Node Report

Node	Area (acres)	Runoff Coefficient	Tc (min)	Rainfall Intensity (in/hr)	Discharge (cfs)	Ground Elevation (ft)	HGL In (ft)	HGL Out (ft)
I-12	3.1	0.85	15	4.56	12.11	141.90	141.90	141.90
I-13	2.85	0.85	15	4.39	22.37	141.90	141.38	141.22
I-14	1.46	0.85	15	4.37	27.76	141.90	141.11	140.94
J-1	N/A	N/A	N/A	4.32	27.43	142.40	140.37	140.37
I-15	1.53	0.85	15	4.26	32.59	143.10	139.24	139.24
I-16	1.51	0.85	15	4.56	5.9	141.90	141.90	141.90
I-17	2.02	0.85	15	4.42	13.37	141.90	141.90	141.77
I-18	1.13	0.85	15	4.4	17.58	141.90	141.65	141.51
J-2	N/A	N/A	N/A	4.36	17.39	142.40	140.81	140.81
I-1	1.45	0.85	15	4.56	5.67	141.90	141.90	141.90
I-2	1.02	0.85	15	4.54	9.6	141.90	141.90	141.90
I-3	1.87	0.85	15	4.39	16.33	141.90	141.63	141.54
I-4	1.37	0.85	15	4.27	20.9	141.90	141.21	141.14
I-5	0.74	0.85	15	4.14	22.9	141.90	140.93	140.85
I-6	0.78	0.85	15	4.12	42.02	141.90	140.81	140.57
I-7	1.43	0.85	15	4.04	46.13	141.90	140.20	140.02
I-8	1.63	0.85	15	3.97	50.8	141.90	139.55	139.34
I-9	1.26	0.85	15	3.95	85.2	141.90	139.24	138.87
I-10	0.93	0.85	15	3.9	87.05	141.90	138.54	138.07
I-11	0.55	0.85	15	3.84	87.67	141.90	137.57	136.64
Outlet	N/A	N/A	N/A	3.83	N/A	141.90	134.10	134.10



Pipe: P-1
Up Invert: 137.60 ft
Dn Invert: 137.50 ft
Length: 36.00 ft
Size: 18 inch

Pipe: P-2
Up Invert: 137.40 ft
Dn Invert: 137.00 ft
Length: 206.00 ft
Size: 24 inch

Pipe: P-3
Up Invert: 136.90 ft
Dn Invert: 136.60 ft
Length: 208.00 ft
Size: 30 inch

Pipe: P-4
Up Invert: 136.50 ft
Dn Invert: 136.10 ft
Length: 216.00 ft
Size: 36 inch

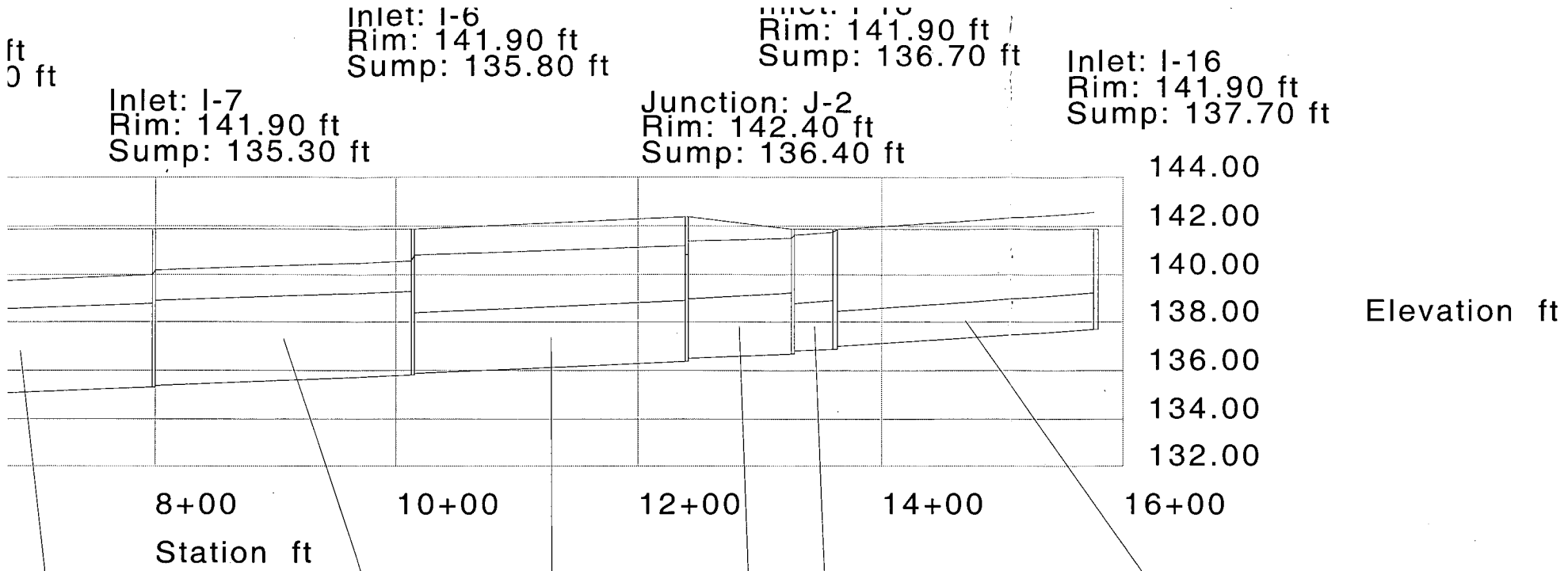
Pipe: P-5
Up Invert: 136.00 ft
Dn Invert: 135.90 ft
Length: 36.00 ft
Size: 36 inch

Pipe: P-6
Up Invert: 135.80 ft
Dn Invert: 135.40 ft
Length: 215.00 ft
Size: 42 inch

Pipe: P-7
Up Invert: 135.30 ft
Dn Invert: 134.90 ft
Length: 221.00 ft
Size: 42 inch

Pipe: P-8
Up Invert: 134.80 ft
Dn Invert: 134.70 ft
Length: 37.00 ft
Size: 42 inch

: P-9
ıvert: 134.60 ft
ıvert: 134.40 ft
th: 195.00 ft
: 54 inch



Pipe: P-7
Up Invert: 135.30 ft
Dn Invert: 134.90 ft
Length: 221.00 ft
Size: 42 inch

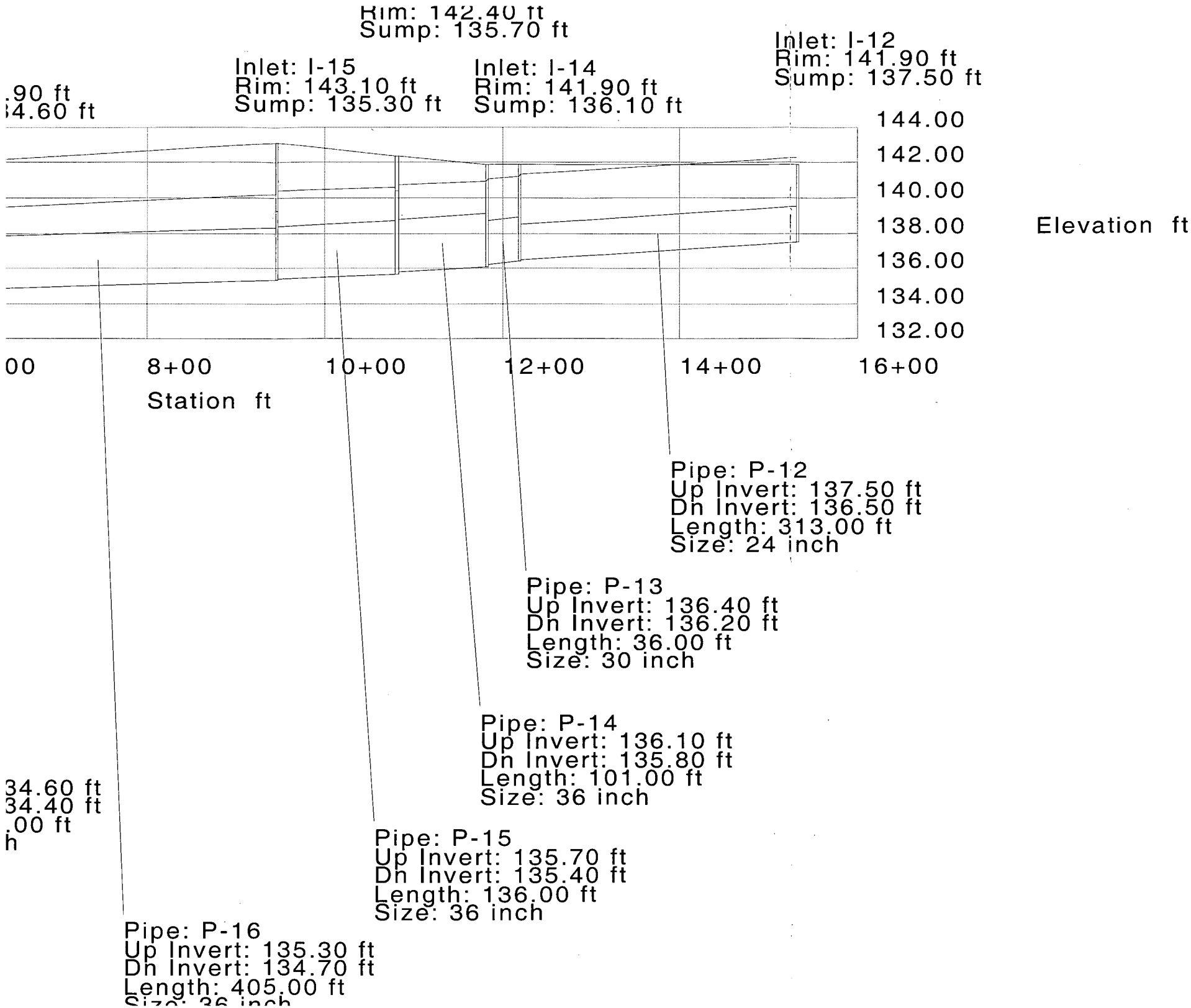
Pipe: P-6
Up Invert: 135.80 ft
Dn Invert: 135.40 ft
Length: 215.00 ft
Size: 42 inch

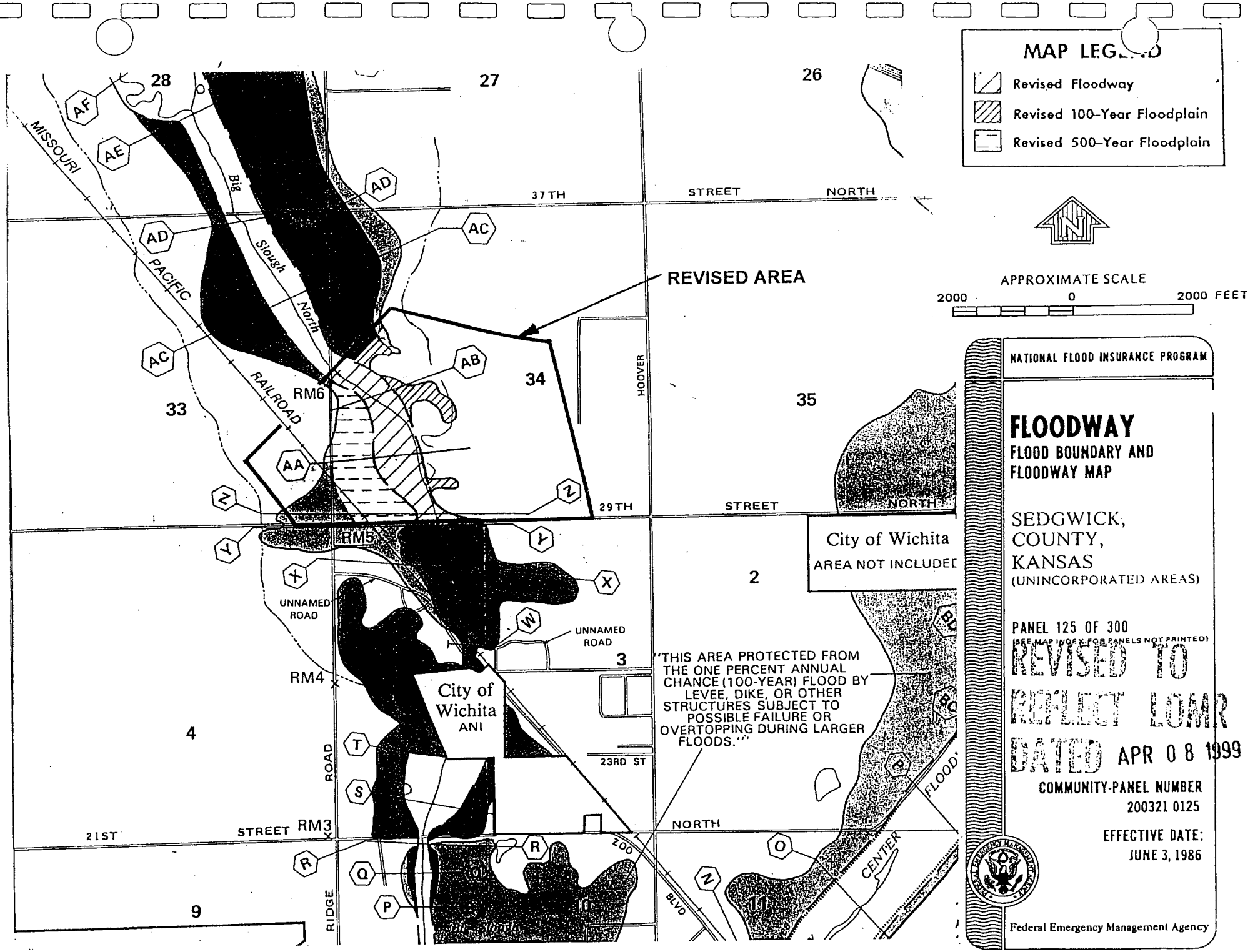
Pipe: P-20
Up Invert: 136.40 ft
Dn Invert: 135.90 ft
Length: 226.00 ft
Size: 30 inch

Pipe: P-19
Up Invert: 136.70 ft
Dn Invert: 136.50 ft
Length: 87.00 ft
Size: 30 inch

Pipe: P-18
Up Invert: 136.90 ft
Dn Invert: 136.80 ft
Length: 35.00 ft
Size: 24 inch

Pipe: P-17
Up Invert: 137.70 ft
Dn Invert: 137.00 ft
Length: 216.00 ft
Size: 18 inch


Rim: 142.40 ft
Sump: 135.70 ft
Inlet: I-12
Rim: 141.90 ft
Sump: 137.50 ft
Inlet: I-15
Rim: 143.10 ft
Sump: 135.30 ft
Inlet: I-14
Rim: 141.90 ft
Sump: 136.10 ft
.90 ft
34.60 ft
144.00
142.00
140.00
138.00
136.00
134.00
132.00
Elevation ft
00
8+00
10+00
12+00
14+00
16+00
Station ft
Pipe: P-12
Up Invert: 137.50 ft
Dn Invert: 136.50 ft
Length: 313.00 ft
Size: 24 inch
Pipe: P-13
Up Invert: 136.40 ft
Dn Invert: 136.20 ft
Length: 36.00 ft
Size: 30 inch
Pipe: P-14
Up Invert: 136.10 ft
Dn Invert: 135.80 ft
Length: 101.00 ft
Size: 36 inch
34.60 ft
34.40 ft
.00 ft
h
Pipe: P-15
Up Invert: 135.70 ft
Dn Invert: 135.40 ft
Length: 136.00 ft
Size: 36 inch
Pipe: P-16
Up Invert: 135.30 ft
Dn Invert: 134.70 ft
Length: 405.00 ft


MAP LEGEND
Revised Floodway
Revised 100-Year Floodplain
Revised 500-Year Floodplain
APPROXIMATE SCALE
2000 0 2000 FEET
REVISED AREA
NATIONAL FLOOD INSURANCE PROGRAM
FLOODWAY
FLOOD BOUNDARY AND FLOODWAY MAP
SEDGWICK, COUNTY, KANSAS
(UNINCORPORATED AREAS)
PANEL 125 OF 300
(SEE MAP INDEX FOR PANELS NOT PRINTED)
REVISED TO REFLECT LOMR DATED APR 0 8 1999
COMMUNITY-PANEL NUMBER
200321 0125
EFFECTIVE DATE:
JUNE 3, 1986
Federal Emergency Management Agency
City of Wichita
AREA NOT INCLUDED
City of Wichita
ANI
"THIS AREA PROTECTED FROM THE ONE PERCENT ANNUAL CHANCE (100-YEAR) FLOOD BY LEVEE, DIKE, OR OTHER STRUCTURES SUBJECT TO POSSIBLE FAILURE OR OVERTOPPING DURING LARGER FLOODS."
MISSOURI
PACIFIC
RAILROAD
Big
Slough
North
HOOVER
37TH STREET NORTH
29TH STREET NORTH
21ST STREET
RIDGE ROAD
ZOO BLVD
CENTER
23RD ST
UNNAMED ROAD
UNNAMED ROAD
RM6
RM5
RM4
RM3
AA
AB
AC
AD
AE
AF
N
P
Q
R
S
T
W
X
Y
Z
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27
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33
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35
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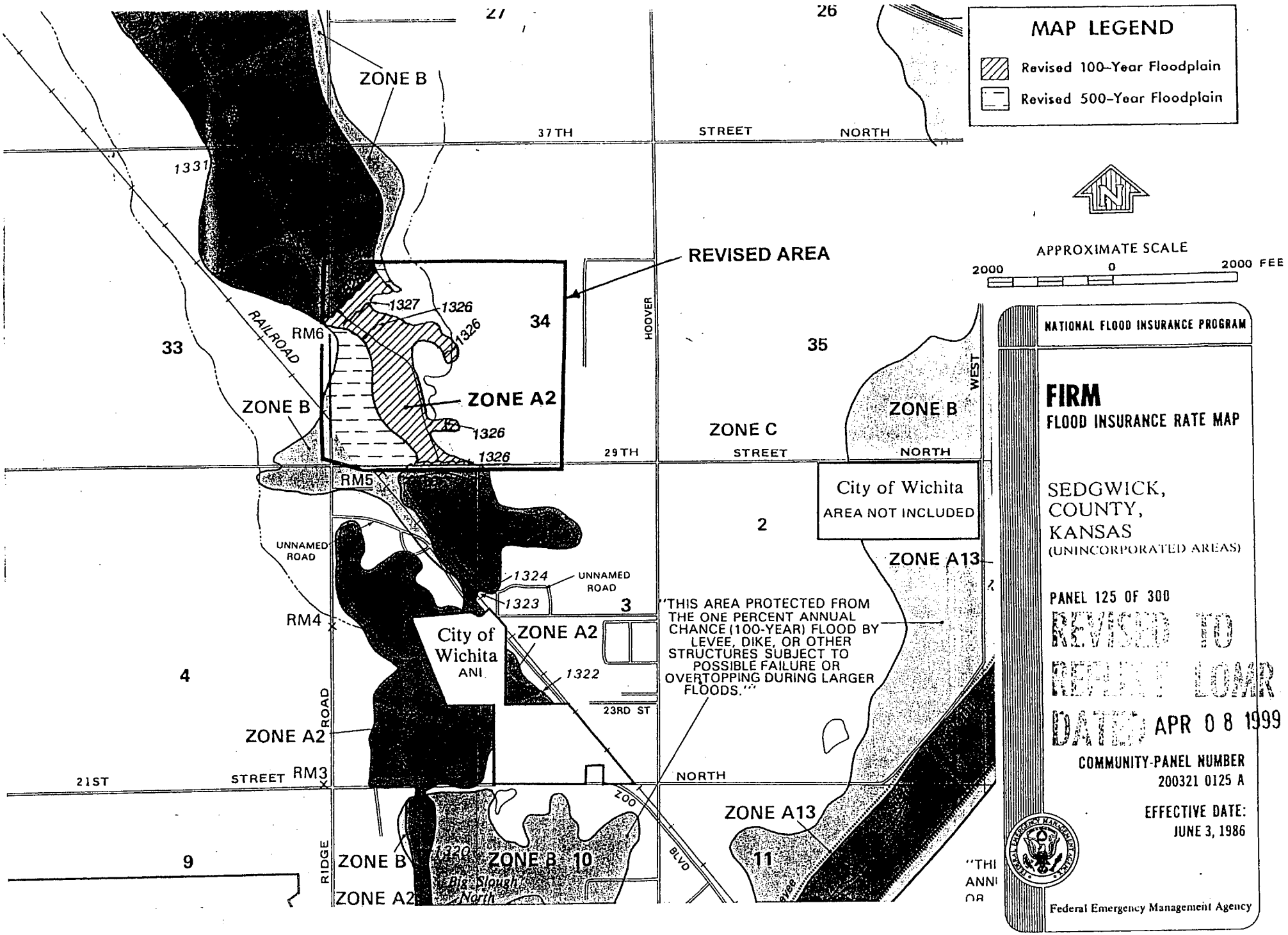
9
10
11


MAP LEGEND
Revised 100-Year Floodplain
Revised 500-Year Floodplain
APPROXIMATE SCALE
2000 0 2000 FEE
REVISED AREA
ZONE B
ZONE A2
ZONE C
ZONE A13
ZONE B
ZONE A2
ZONE B
ZONE A2
ZONE B
ZONE A13
City of Wichita
AREA NOT INCLUDED
City of Wichita
ANI
"THIS AREA PROTECTED FROM THE ONE PERCENT ANNUAL CHANCE (100-YEAR) FLOOD BY LEVEE, DIKE, OR OTHER STRUCTURES SUBJECT TO POSSIBLE FAILURE OR OVERTOPPING DURING LARGER FLOODS."
37TH STREET NORTH
29TH STREET NORTH
21ST STREET
23RD ST
RAILROAD
HOOVER
WEST
ROAD
RIDGE
ZOO BLVD
UNNAMED ROAD
UNNAMED ROAD
RM6
RM5
RM4
RM3
1331
1327
1326
1326
1326
1326
1324
1323
1322
1320
"Big Slough" North
NORTH
RIVER
27
26
34
35
33
2
3
4
9
10
11
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
SEDGWICK, COUNTY, KANSAS
(UNINCORPORATED AREAS)
PANEL 125 OF 300
REVISED TO REFLECT LOMR
DATED: APR 0 8 1999
COMMUNITY-PANEL NUMBER
200321 0125 A
EFFECTIVE DATE:
JUNE 3, 1986
Federal Emergency Management Agency

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
BIG SLOUGH NORTH								
M	11,487	197	1168	3.5	1317.1	1317.1	1317.5	0.4
N	11,887	681	1140	3.6	1317.7	1317.7	1318.0	0.3
O	13,437	659	2650	1.6	1319.0	1319.0	1319.1	0.1
P	15,417	192	774	5.3	1319.7	1319.7	1319.7	0.0
Q	15,942	318	1391	3.0	1320.7	1320.7	1320.7	0.0
R	16,491	165	973	3.5	1320.9	1320.9	1320.9	0.0
S	17,144	886	2288	1.5	1321.5	1321.5	1321.8	0.3
T	17,943	1285[2]	2123	1.6	1322.3	1322.3	1323.0	0.7
Z	22,605	730	1224	1.9	1325.7	1325.7	1325.9	0.2
AA	23,693	720	6403	0.4	1325.8	1325.8	1326.1	0.3
AB	25,073	323	2992	0.8	1325.8	1325.8	1326.1	0.3
AC	27,324	762	2202	1.1	1330.0	1330.0	1330.9	0.9
AD	28,846	604	1565	1.5	1331.0	1331.0	1332.0	1.0
AE	30,882	600	1829	1.3	1332.7	1332.7	1333.7	1.0
AF	33,742	741	1325	1.4	1334.0	1334.0	1334.8	0.8
AG	35,486	151	880	2.2	1337.1	1337.1	1337.8	0.7
AH	39,318	930	2487	0.7	1337.2	1337.2	1338.2	1.0
AI	42,108	236	704	2.6	1338.1	1338.1	1338.6	0.5
AJ	42,978	240	969	1.9	1339.8	1339.8	1340.8	1.0
AK	48,418	264	1048	1.8	1342.9	1342.9	1343.7	0.8
AL	49,418	409	1243	1.5	1343.5	1343.5	1344.3	0.8
AM	51,693	56	350	5.3	1346.0	1346.0	1346.3	0.3

REVISED DATA

[1]FEET ABOVE MOUTH
[2]THIS WIDTH EXTENDS WITHIN AREA NOT INCLUDED

REVISED TO REFLECT LOMR DATED APR 08 1999

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEDGWICK COUNTY, KS
(UNINCORPORATED AREAS)

FLOODWAY DATA

BIG SLOUGH NORTH

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEDGWICK COUNTY, KS

(UNINCORPORATED AREAS)

28P

FLOOD PROFILES

BIG SLOUGH NORTH

APR 0 8 199