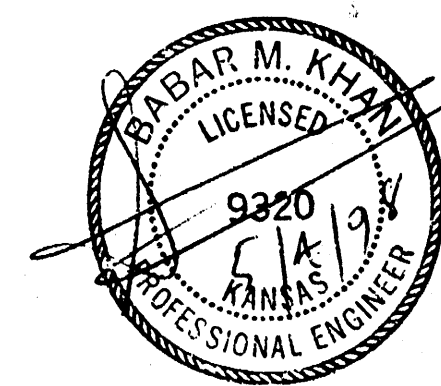


CITY OF WICHITA, KANSAS
DRAINAGE PLAN
FOR
SMITHMOOR EIGHT ADDITION
TO
WICHITA, SEDGWICK COUNTY, KANSAS

PROJECT NO.: 98-29 (MEPA)

MAY, 1998

MUNICIPAL ENGINEERS, P.A.
254 LAURA, SUITE 201, WICHITA, KANSAS 67211
(316) 262-3842 (TEL.), (316) 262-8634 (FAX)



May 4, 1998

Ms. Vicki Huang, P.E.
City Engineer's Office
City Hall - 7th Floor
455 North Main Street
Wichita Kansas 67202

Re: Drainage Plan - Smithmoor Eight Addition
Wichita, Sedgwick County, Kansas

Dear Ms. Huang:

Attached please find drainage plan for the referenced plat.

1.0 Introduction:

Smithmoor Eight Addition to Wichita, Sedgwick County, Kansas contains 26 lots. Twenty of these lots drain towards north and into a drainage basin for which storm sewers were constructed in Smithmoor Fourth Addition. Drainage calculations for these storm sewers were done in the drainage plan prepared for Smithmoor Fourth Addition. Six southerly lots of Smithmoor Eight Addition drain towards the south and will drain to a future drainage channel (Please refer to the overall development plan for this area).

Attached drainage calculations confirm adequacy of existing storm sewers.

Please review these and call me if you have questions.

Sincerely,
MUNICIPAL ENGINEERS, P.A.

[Signature]
Babar M. Khan, P.E., L.S.

254 Laura, Suite 201 • Wichita, Kansas 67211 • (316) 262-3842 • Fax (316) 262-8634
e-mail: mepa@southwind.net

MUNICIPAL ENGINEERS, P.A.
Civil Engineers & Land Surveyors

DRAINAGE PLAN
SMITHMOOR EIGHT ADDITION
ADDITION

2.0 HYDROLOGY:

USE RATIONAL METHOD:

SOL TYPE = I_a

HYDRO GROUP = D

LAND USE = SINGLE FAMILY

SIZE 6,600 S.F.

RUNOFF COEFFICIENTS:

$C_2 = 0.55$

$C_{100} = 0.78$

$T_c = 15 \text{ MIN.}$

$L_c = 3.83''$

$L_{100} = 7.37''$

ATTACHMENT D
DRAINAGE CRITERIA

CITY OF WICHITA, KANSAS

RECOMMENDED RUNOFF COEFFICIENTS FOR RATIONAL METHOD
AND PERCENT IMPERVIOUS FOR UNIT HYDROGRAPH METHOD

Land Use or Surface Characteristics	Percent Impervious	Frequency 2	Frequency 5	Frequency 10	Frequency 100
1. Business:					
Downtown Areas	95	0.84	0.85	0.87	0.91
Neighborhood Areas	70	0.68	0.69	0.75	0.80
2. Residential:					
Single Family (Soil Group D)					
1/8 Acre	50	0.57	0.61	0.66	0.79
1/4 Acre	38	0.50	0.54	0.59	0.76
1/3 Acre	30	0.46	0.50	0.55	0.73
1/2 Acre	25	0.42	0.48	0.56	0.72
3/4 Acre	22	0.42	0.46	0.55	0.71
1 Acre	20	0.41	0.45	0.54	0.71
Multi-Family (Soil Group D)					
Multi-Unit (detached)	60	0.62	0.66	0.72	0.82
Multi-Unit (attached)	65	0.64	0.68	0.73	0.83
Apartments	75	0.70	0.73	0.79	0.86
Single Family (Soil Group C)					
1/8 Acre	50	0.55	0.58	0.64	0.73
1/4 Acre	38	0.48	0.51	0.57	0.68
1/3 Acre	30	0.43	0.46	0.53	0.65
1/2 Acre	25	0.40	0.43	0.50	0.63
3/4 Acre	22	0.37	0.42	0.49	0.62
1 Acre	20	0.37	0.40	0.48	0.61
Multi-Family (Soil Group C)					
Multi-Unit (detached)	60	0.60	0.63	0.69	0.77
Multi-Unit (attached)	65	0.63	0.66	0.71	0.79
Apartments	75	0.68	0.72	0.77	0.83
Single Family (Soil Group B)					
1/8 Acre	50	0.52	0.54	0.59	0.67
1/4 Acre	38	0.44	0.46	0.52	0.61
1/3 Acre	30	0.39	0.41	0.47	0.57
1/2 Acre	25	0.36	0.38	0.44	0.54
3/4 Acre	22	0.34	0.36	0.42	0.52
1 Acre	20	0.33	0.35	0.40	0.51
Multi-Family (Soil Group B)					
Multi-Unit (detached)	60	0.58	0.60	0.65	0.72
Multi-Unit (attached)	65	0.61	0.64	0.68	0.75
Apartments	75	0.67	0.70	0.74	0.80

ATTACHMENT A
DRAINAGE CRITERIA MANUAL
CITY OF WICHITA, KANSAS

RAINFALL INTENSITY TABLE FOR SEDGWICK COUNTY, KANSAS

The following tabulation contains rainfall intensity in inches per hour as derived from ESSA Weather Bureau Technical Paper 40 Modified to NWS Hydro-35, 1977 During First Hour

DURATION IN MINUTES	1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
5	4.18	5.57	6.53	7.41	8.52	9.48	10.32
6	3.99	5.32	6.25	7.09	8.16	9.09	9.89
7	3.81	5.09	5.98	6.81	7.84	8.74	9.50
8	3.66	4.89	5.75	6.55	7.55	8.42	9.15
9	3.52	4.70	5.54	6.31	7.28	8.13	8.83
10	3.39	4.52	5.34	6.09	7.04	7.86	8.54
11	3.27	4.36	5.16	5.89	6.81	7.61	8.27
12	3.16	4.21	4.99	5.71	6.60	7.38	8.02
13	3.05	4.08	4.84	5.53	6.41	7.17	7.82
14	2.96	3.95	4.69	5.37	6.23	6.97	7.67
15	2.87	3.83	4.56	5.22	6.06	6.78	7.57
16	2.78	3.72	4.43	5.08	5.90	6.60	7.38
17	2.71	3.61	4.31	4.95	5.75	6.44	7.00
18	2.63	3.51	4.20	4.83	5.61	6.29	6.84
19	2.56	3.42	4.10	4.71	5.47	6.14	6.68
20	2.50	3.33	4.00	4.60	5.35	6.00	6.53
21	2.44	3.25	3.90	4.50	5.23	5.87	6.39
22	2.38	3.17	3.81	4.40	5.12	5.75	6.26
23	2.32	3.10	3.73	4.31	5.01	5.63	6.13
24	2.27	3.03	3.65	4.22	4.91	5.52	6.01
25	2.22	2.96	3.57	4.13	4.81	5.41	5.90
26	2.20	2.90	3.50	4.05	4.72	5.31	5.79
27	2.16	2.84	3.43	3.98	4.63	5.21	5.69
28	2.14	2.78	3.37	3.90	4.55	5.12	5.59
29	2.11	2.72	3.30	3.83	4.47	5.03	5.49
30	2.08	2.67	3.24	3.76	4.39	4.94	5.40
31	2.05	2.62	3.19	3.70	4.32	4.86	5.32
32	2.02	2.57	3.10	3.63	4.25	4.79	5.22
33	1.99	2.52	3.05	3.57	4.18	4.71	5.14
34	1.96	2.48	3.01	3.51	4.11	4.63	5.07
35	1.93	2.44	2.98	3.46	4.05	4.56	5.00
36	1.91	2.39	2.93	3.41	3.99	4.50	4.93
37	1.89	2.35	2.88	3.36	3.93	4.43	4.86
38	1.87	2.32	2.84	3.31	3.87	4.37	4.79
39	1.85	2.28	2.80	3.26	3.82	4.31	4.73
40	1.83	2.24	2.76	3.22	3.76	4.25	4.66
41	1.81	2.21	2.72	3.17	3.71	4.19	4.60
42	1.79	2.18	2.68	3.13	3.66	4.13	4.54
43	1.77	2.14	2.64	3.09	3.61	4.08	4.49
44	1.75	2.11	2.61	3.05	3.57	4.03	4.43
45	1.73	2.09	2.57	3.01	3.52	3.98	4.38

3.0 RUNOFF:

DRAINAGE BASIN	AREA (AC.)	Q_2 (CFS)	Q_{100} (CFS)
A	0.9	1.9	5.2
B	5.0	10.5	28.7
C	3.1	6.5	17.8
D	2.8	5.9	16.1
E	5.8	12.2	33.3
F	6.6	13.9	37.9
G	2.5	5.3	14.4
H	1.6	3.4	9.2
I	3.1	6.5	17.8

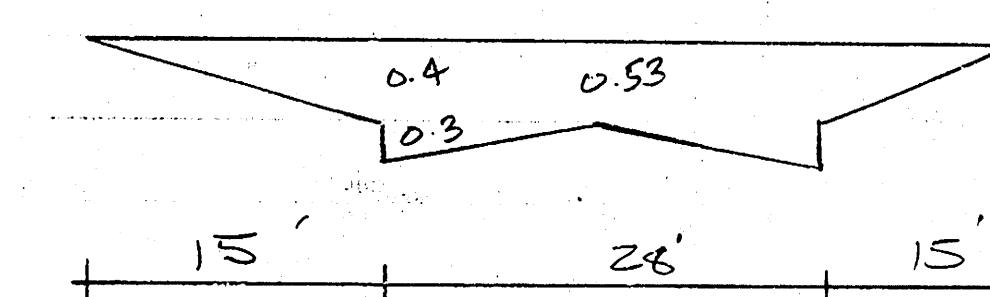
4.0 STREET FLOWS (2 YEARS):

HONEYCREEK HAS $6\frac{1}{8}''$ CURB.
X-SLOPE = $\frac{3}{8}''$ PER FT. = 0.03125
 $Z = \frac{1}{0.03125} = 32$
 $n(\text{ASPH.}) = 0.016$
 $Z/n = \frac{32}{0.016} = 2,000$
MIN SLOPE (S) = 0.032
 $d = 0.55$
HALF STREET
 $Q_{CAR} = 14 \text{ CFS} > Q_u \text{ FROM F.G. \& H.}$

SHILOH / BRANDON HAVE $3\frac{1}{2}''$ CURB:
X-SLOPE = $\frac{3}{8}''$ PER FT. = 0.03125
 $Z = \frac{1}{0.03125} = 32$
 $n(\text{ASPH.}) = 0.016$
 $Z/n = \frac{32}{0.016} = 2,000$
MIN SLOPE = 0.018
 $d = 0.30$
HALF STREET
 $Q_{CAR} = 6.5 \text{ CFS} > \frac{1}{2} Q_u \text{ FROM B \& E}$
 $> Q_u \text{ FROM C \& D}$
O.K.

5.0 STREET FLOW (100 YEAR)

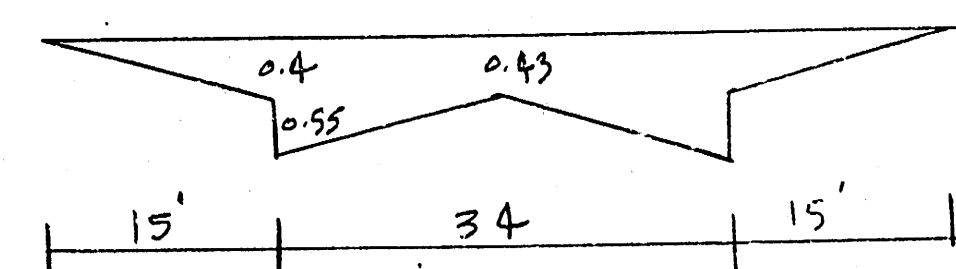
BRANDON AND SHILOH:
WALK GRADE = +0



$n(\text{PARKING}) = 0.03$; $n(\text{GUTTER}) = 0.013$
 $n(\text{ASPH.}) = 0.016$
 $n(\text{COMP.}) = \frac{(2 \times 15 \times 0.03 + 2 \times 2.5 \times 0.013 + 23 \times 0.016)}{58} = 0.023$
 $A = \frac{15 \times 0.4 \times 2}{2} + \frac{14 \times 0.3 \times 2}{2} + 0.53 \times 28 = 25.0 \text{ S.F.}$
 $P = 58 \text{ FT.}$
 $R = \frac{25}{58} = 0.43$
 $S = 0.018$
 $Q_{CAR} = 25 \times \frac{1.486}{0.023} \times 0.43 \times 0.018 = 123 \text{ CFS} > \text{ALL } Q_{100}$
O.K.

6.0 STREET FLOW (100 YEAR) (HONEY TREE)

WALK GRADE = +0.4'



$$\begin{aligned} n(\text{PARKING}) &= 0.03 \\ n(\text{GUTTER}) &= 0.013 \\ n(\text{ASPHALT}) &= 0.016 \end{aligned}$$

$$n(\text{COMP}) = \frac{(2 \times 14.5 \times 0.03) + (2 \times 3.05 \times 0.013) + 30 \times 0.016}{65.1}$$

$$n(\text{COMP}) = 0.022$$

$$A = \frac{2 \times 0.4 \times 15}{2} + \frac{2 \times 0.52 \times 17}{2} + 0.43 \times 34 = 29.5 \text{ s.f.}$$

$$P = 65.1$$

$$R = \frac{A}{P} = \frac{29.5}{65.1} = 0.45$$

$$S = 0.0032 \text{ (MIN.)}$$

$$Q_{\text{CAP}} = 29.5 \times \frac{1.486}{0.022} \times 0.45 \times 0.0032^{\frac{2}{3}} = 66.0 \text{ CFS}$$

$$Q_{\text{CAP}} = 66.0 \text{ CFS} > \text{ALL } Q_{100} \text{ O.K.}$$

NOMOGRAPH FOR FLOW IN TRIANGULAR CHANNELS

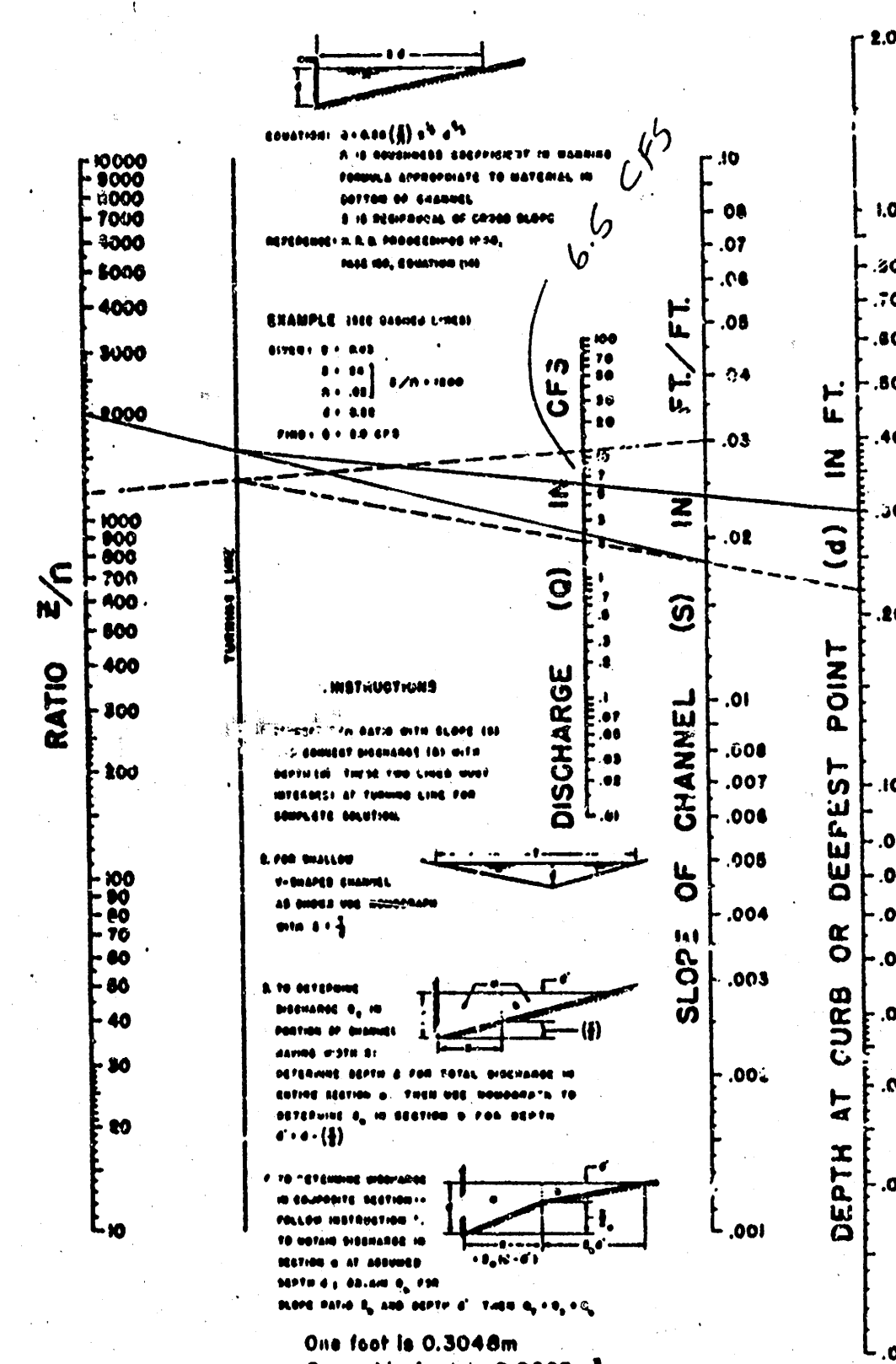


FIG. 5-1 (After FHWA)

HAUF STREET @ CAP FOR
SHILOA / BRANDON 5-10

NOMOGRAPH FOR FLOW IN TRIANGULAR CHANNELS

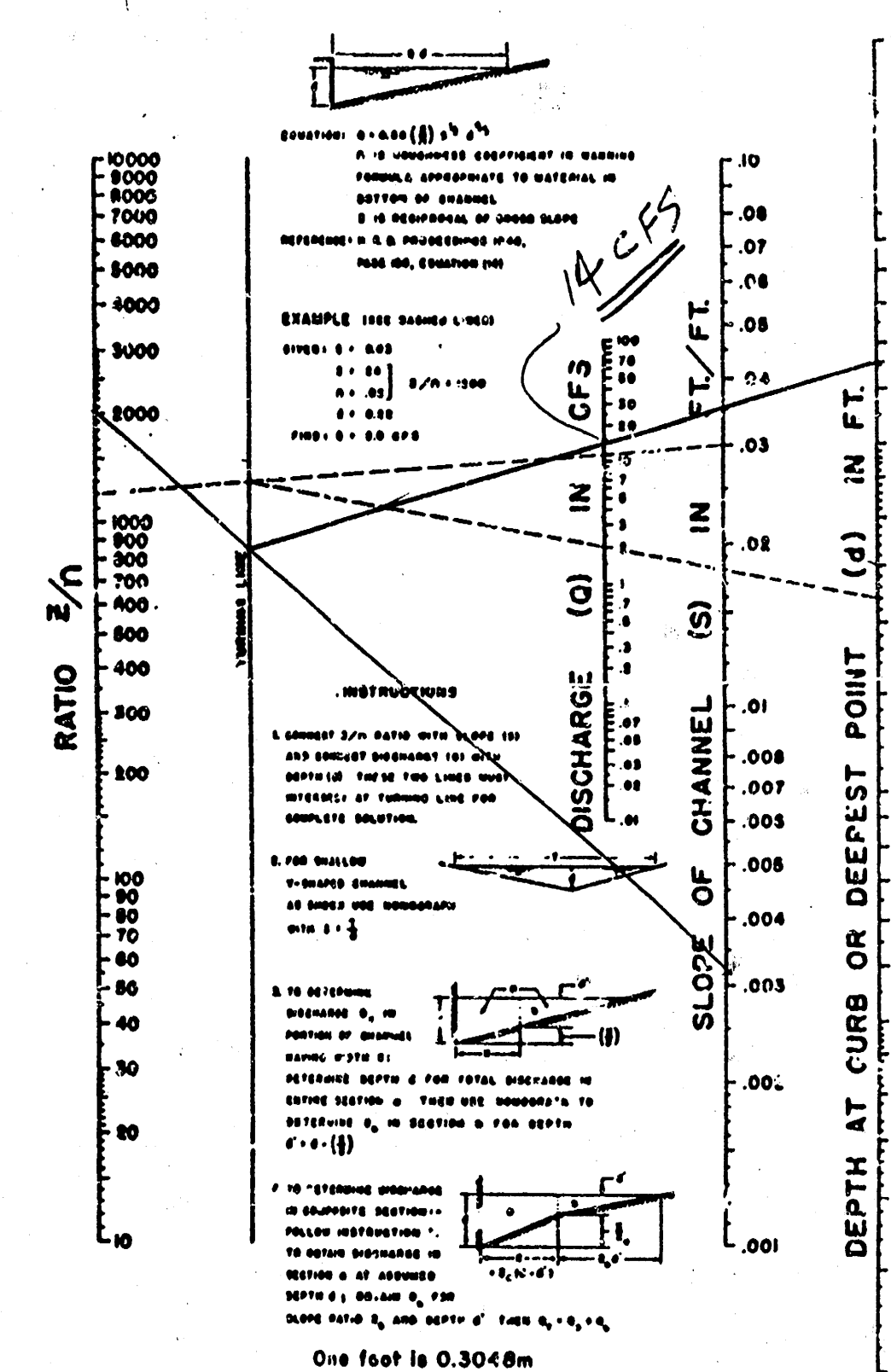


FIG. 5-1 (After FHWA)

GENP HALF STREET (HONEY TREE)

5-10

7.0 INLET SIZE

NODE	Q ₂ CFS	EXIST. INLET L	INLET COND.	Q _{MAX} CFS	REMARK
100	1.9	5'	SUMP	11	O.K.
101	10.5	10'	"	22	"
102	6.5	5'	"	11	"
103	5.9	5'	"	11	"
104	12.2	10'	"	22	"
105	13.9	10'	"	22	"
106	8.7	10'	"	22	"

8.0 PIPE SIZE

FROM NODE	TO NODE	Q ₂ CFS	ΣQ _L CFS	EXISTING PIPE	Q _{CAP} CFS	REMARK
100	101	1.9	1.9	15" RCP @ 0.38% SL	4.0	O.K.
101	102	10.5	12.4	24" RCP @ 0.20% SL	10.5	O.K.
102	103	6.5	18.9	30" RCP @ 0.35% SL	25.0	O.K.
103	104	5.9	24.8	36" RCP @ 0.15% SL	28.0	O.K.
104	105	12.2	37.0	42" RCP @ 0.15% SL	42.0	O.K.
105	106	13.9	50.9	42" RCP @ 0.25% SL	54.0	O.K.
106	107	8.7+3.4	59.6	42" RCP @ 0.25% SL	54.0	O.K.

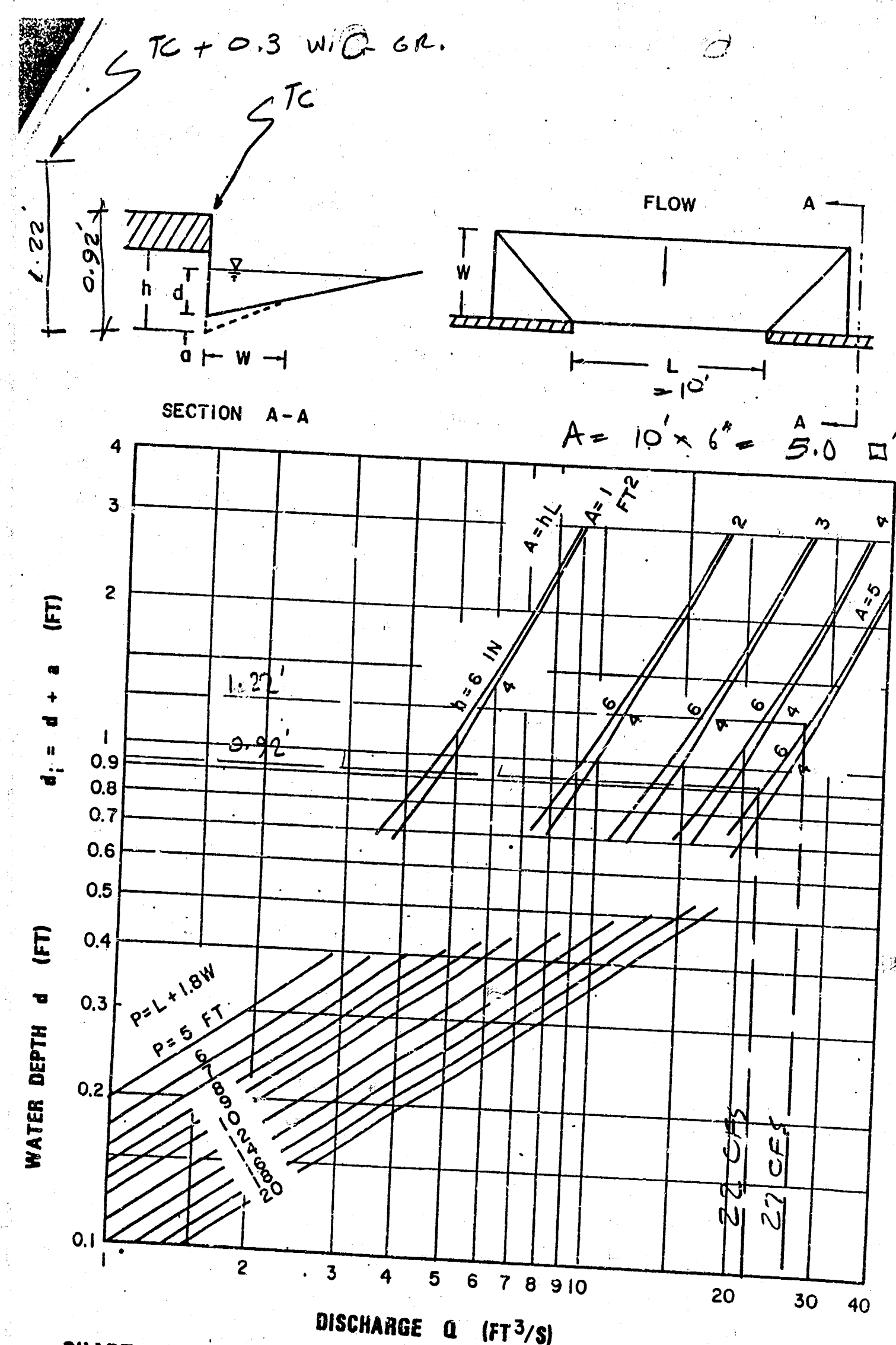


CHART 12. Depressed curb-opening inlet capacity in sump locations.

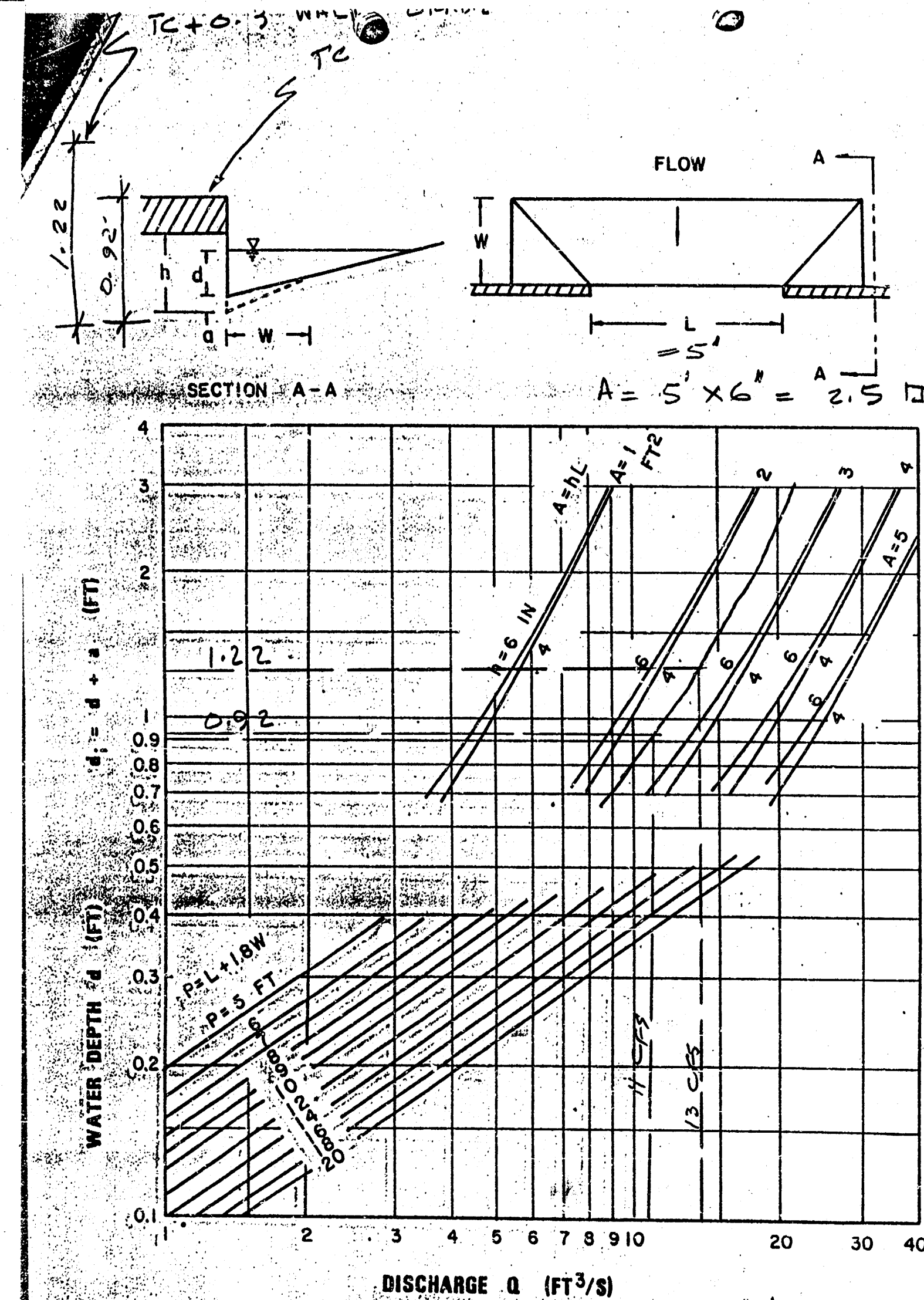
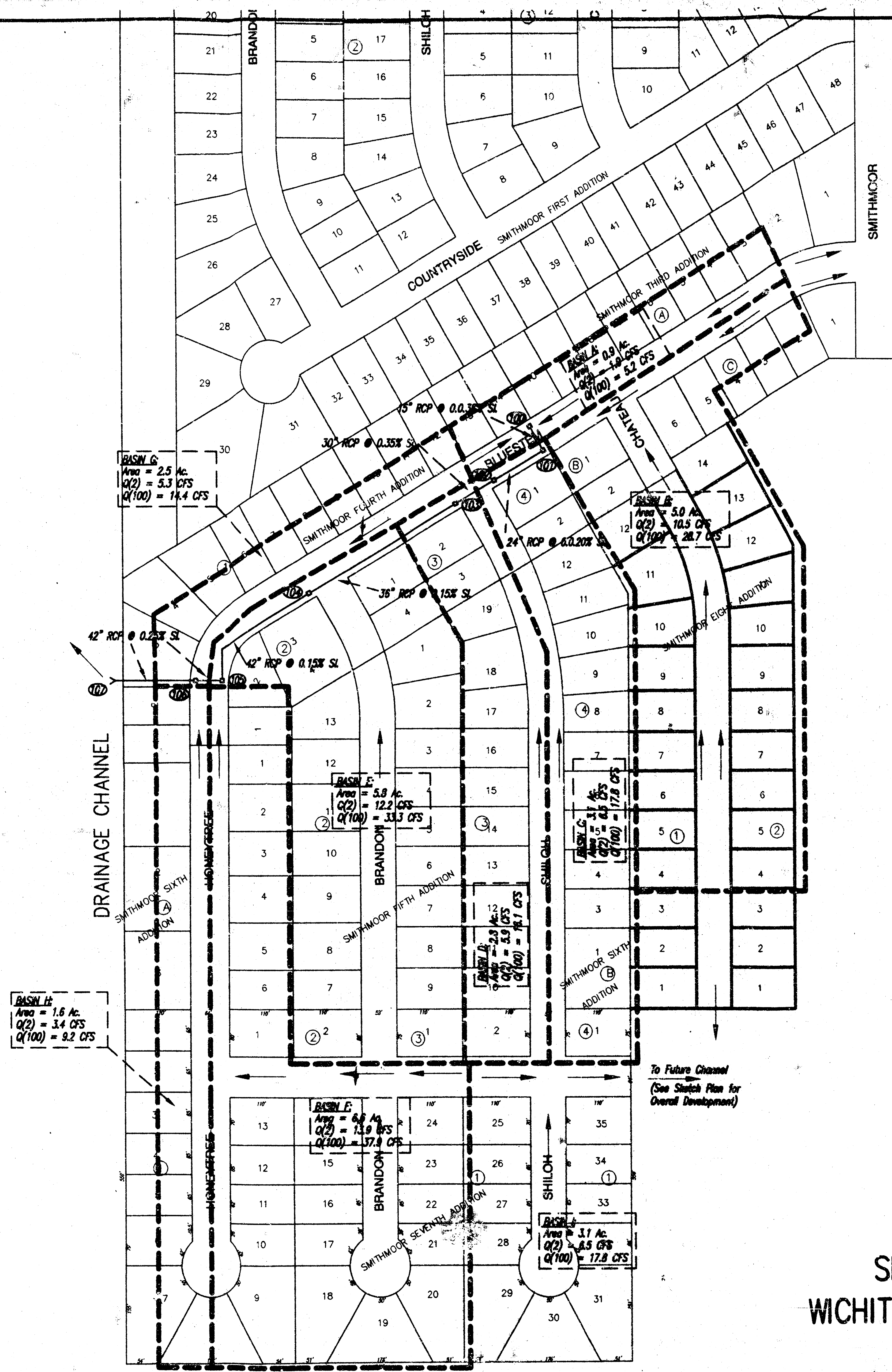
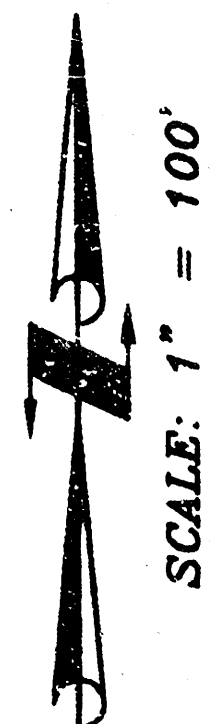
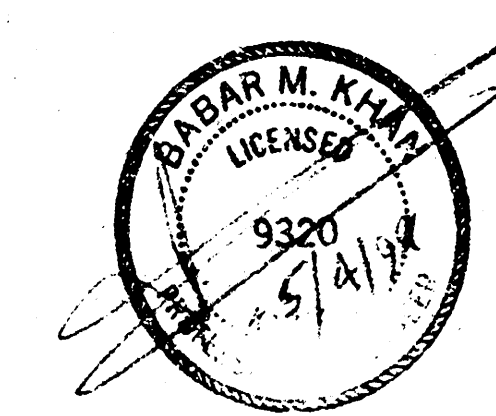


CHART 12. Depressed curb-opening inlet capacity in sump locations.



DRAINAGE PLAN SMITHMOOR EIGHT ADDITION WICHITA, SEDGWICK COUNTY, KANSAS



- NOTES**
1. All storm sewers shown are existing.
 2. Refer to preliminary plans for Smithmoor third, fourth, fifth, sixth, seventh & eight additions for topographic information.



SCALE : 1" = 50'

Legal Description

Beginning at the Northeast corner of Lot 12, Block 4, Smithmoor Fifth Addition to Wichita, Sedgwick County, Kansas; thence bearing S 30°17'40" E, along the easterly line of said Smithmoor Fifth Addition, a distance of 127.50 feet; thence continuing along the East line of said Smithmoor Fifth Addition at a bearing of S 00°00'00" W, a distance of 654.81 feet to the Southeast corner of said Smithmoor Fifth Addition; thence bearing N 80°00'00" E, a distance of 278.00 feet; thence bearing N 00°00'09" E, a distance of 732.11 feet; thence bearing N 30°17'40" W, a distance of 221.00 feet to a point on the Southeasterly line of Smithmoor Third Addition to Wichita, Sedgwick County, Kansas; thence bearing S 59°42'20" W along the Southeasterly line of said Smithmoor Third Addition, a distance of 168.00 feet; thence bearing S 30°17'40" E a distance of 20.00 feet; thence bearing S 59°42'20" E, along the Southeasterly line of said Smithmoor Third Addition, a distance of 111.03 feet to the point of beginning.

Subdivider

Smith & Company
P.O. Box 780595
Wichita, Kansas 67278

Surveyor/Engineer

Babar M. Khan P.E., L.S.
Municipal Engineers, P.A.
254-Laura, Suite 201
Wichita, Kansas 67211

ARMED
DAMAGE

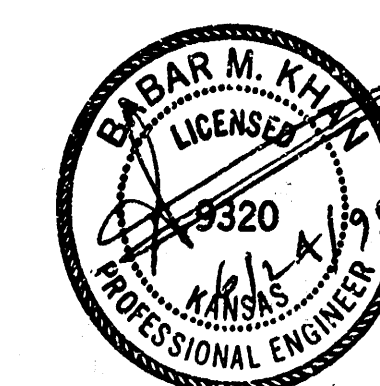
LEGEND

13639 *Finished Ground Elevation (Bottom of Finished Floor)*

1362.8 Spot Elevation (Finished)

BENCHMARK:

BM #1. S. Rim of MH # 43-13-3, Located at SE corner of Lot 1, Block 4, Smithmoor Fifth Addition Wichita, Segwick County, Kansas.
Elevation = 1,384.64



LOT GRADING PLAN
SMITHMOOR EIGHT ADDITION
TO
WICHITA, SEDGWICK COUNTY, KANSAS

MUNICIPAL ENGINEERS, P.A.
254-LAURA, SUITE 201
WICHITA, KANSAS 67211
316-262-3842