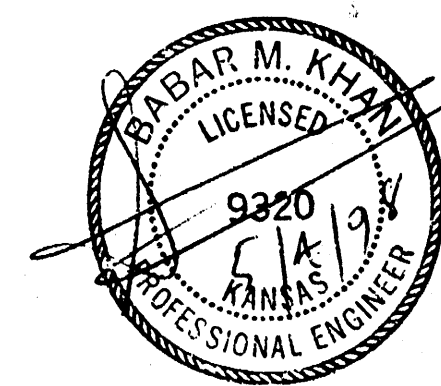


CITY OF WICHITA, KANSAS  
DRAINAGE PLAN  
FOR  
SMITHMOOR EIGHT ADDITION  
TO  
WICHITA, SEDGWICK COUNTY, KANSAS

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:

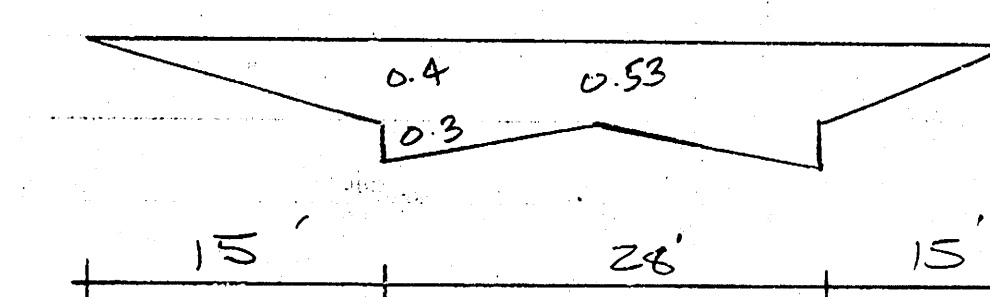
X-SLOPE =  $\frac{3}{8}''$  PER FT. = 0.03125  
 $Z = \frac{1}{0.03125} = 32$   
 $n(\text{ASPH.}) = 0.016$   
 $Z/n = \frac{32}{0.016} = 2,000$   
MIN SLOPE = 0.018  
 $d = 0.30$

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



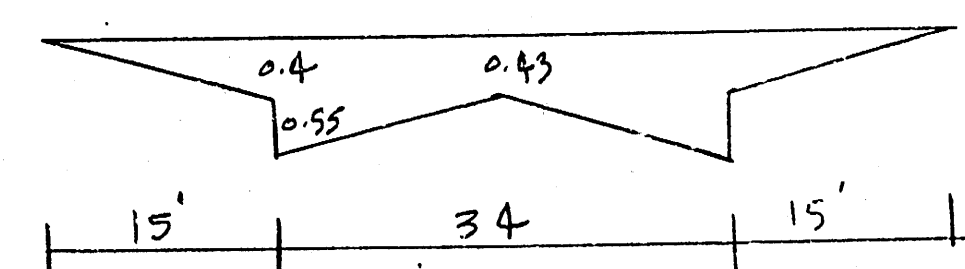
$n(\text{PARKING}) = 0.03$ ;  $n(\text{GUTTER}) = 0.013$   
 $n(\text{ASPH.}) = 0.016$   
 $n(\text{COMP.}) = \frac{(2 \times 15 \times 0.03 + 2 \times 25 \times 0.013 + 23 \times 0.016)}{58}$

$= 0.023$   
 $A = \frac{15 \times 0.4 \times 2}{2} + \frac{14 \times 0.3 \times 2}{2} + 0.53 \times 28$   
 $= 25.0 \text{ S.F.}$   
 $P = 58 \text{ FT.}$   
 $R = \frac{25}{58} = 0.43$   
 $S = 0.018$

$Q_{CAR} = 25 \times \frac{1.486}{0.023} \times 0.43 \times 0.018$   
 $= 123 \text{ CFS} > \text{ALL } Q_{100}$   
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

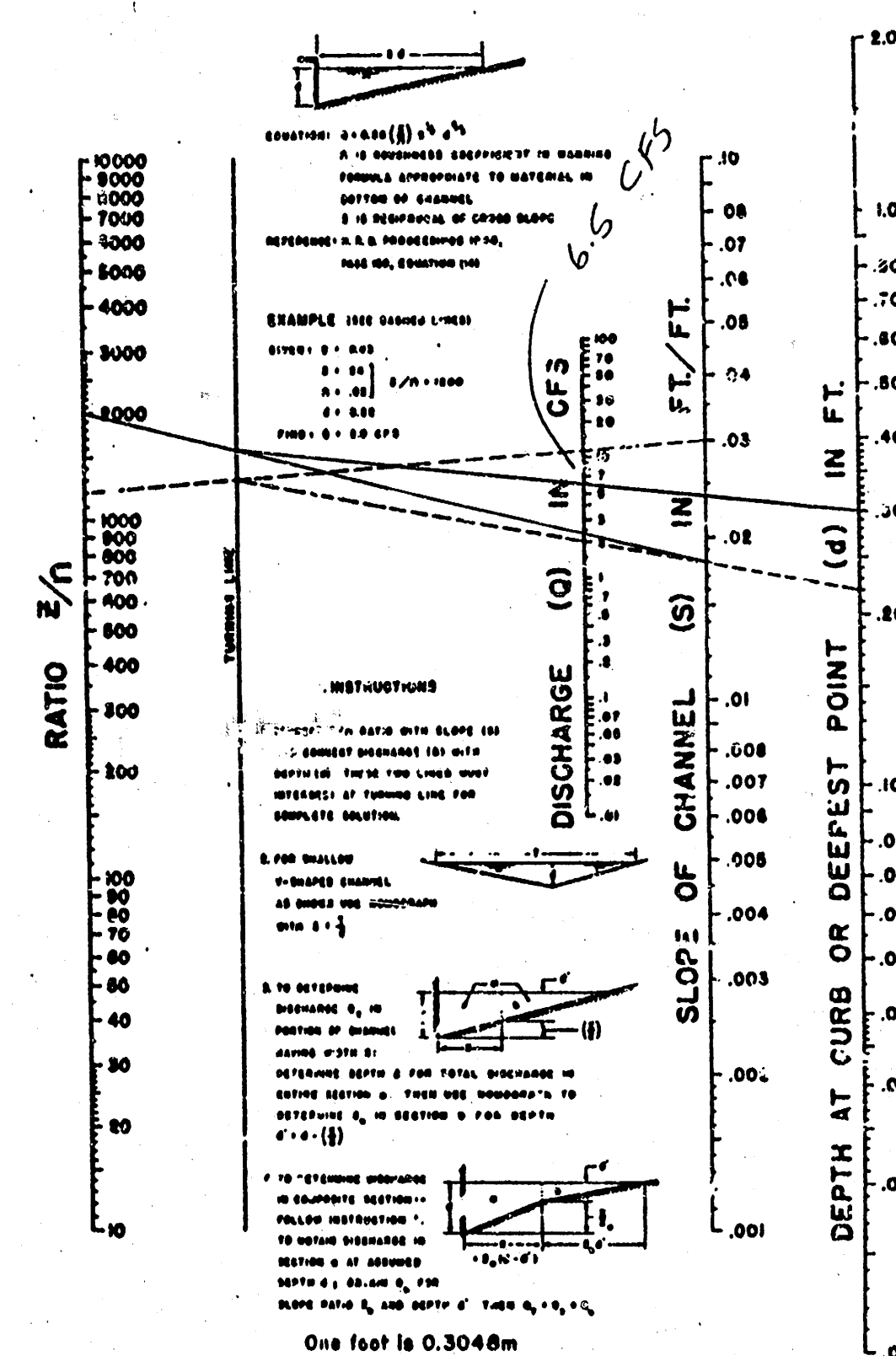


FIG. 5-1 (After FHWA)

HAUF STREET @ CAP FOR  
SHILOA / BRANDON 5-10

## NOMOGRAPH FOR FLOW IN TRIANGULAR CHANNELS

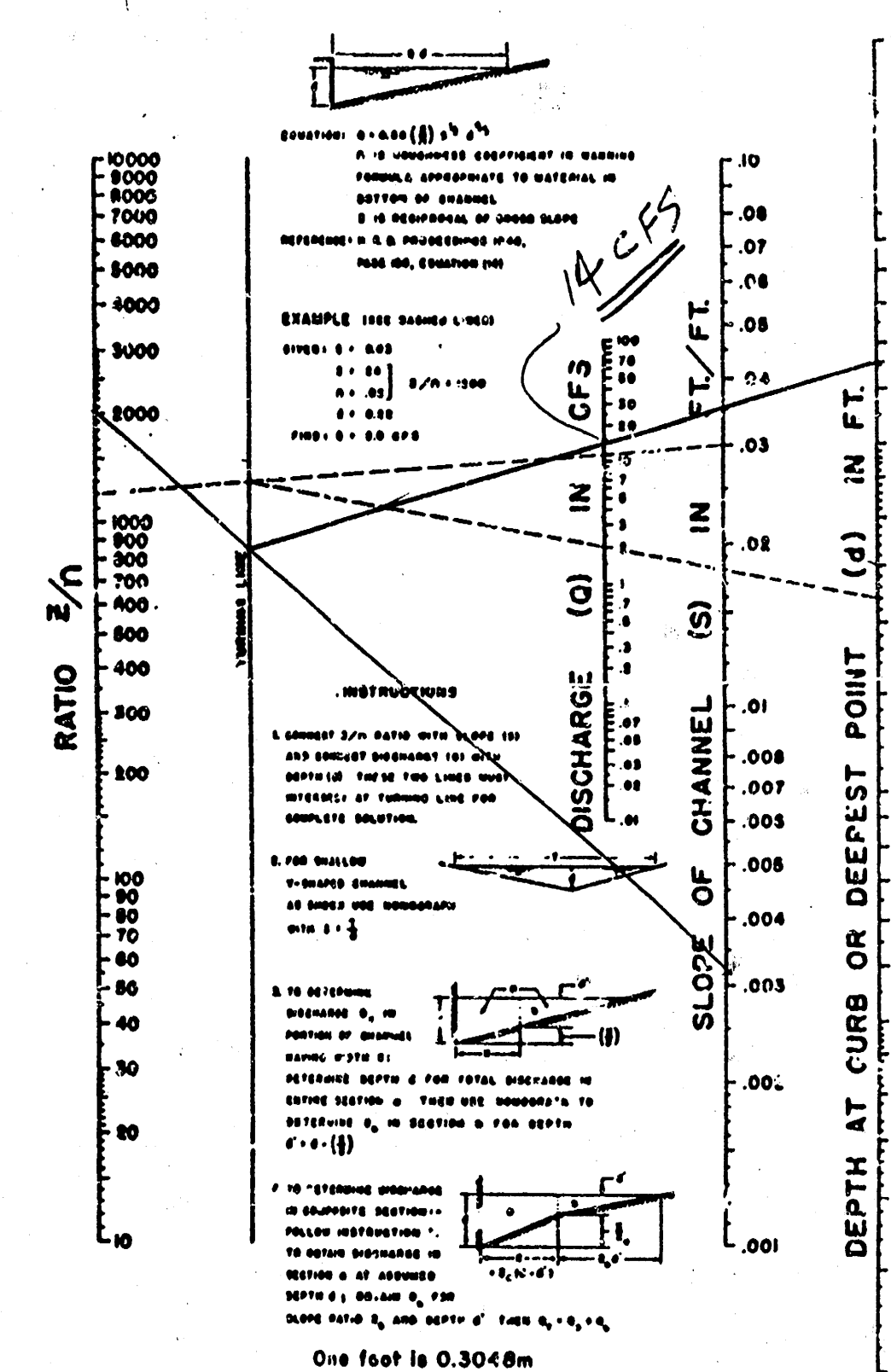


FIG. 5-1 (After FHWA)

GEN HALF STREET (HONEY TREE)

5-10

## 7.0 INLET SIZE

| NODE | Q <sub>2</sub> CFS | EXIST. INLET L | INLET COND. | Q <sub>MAX</sub> 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 <sub>2</sub> CFS | ΣQ <sub>L</sub> CFS | EXISTING PIPE      | Q <sub>CAP</sub> 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.   |

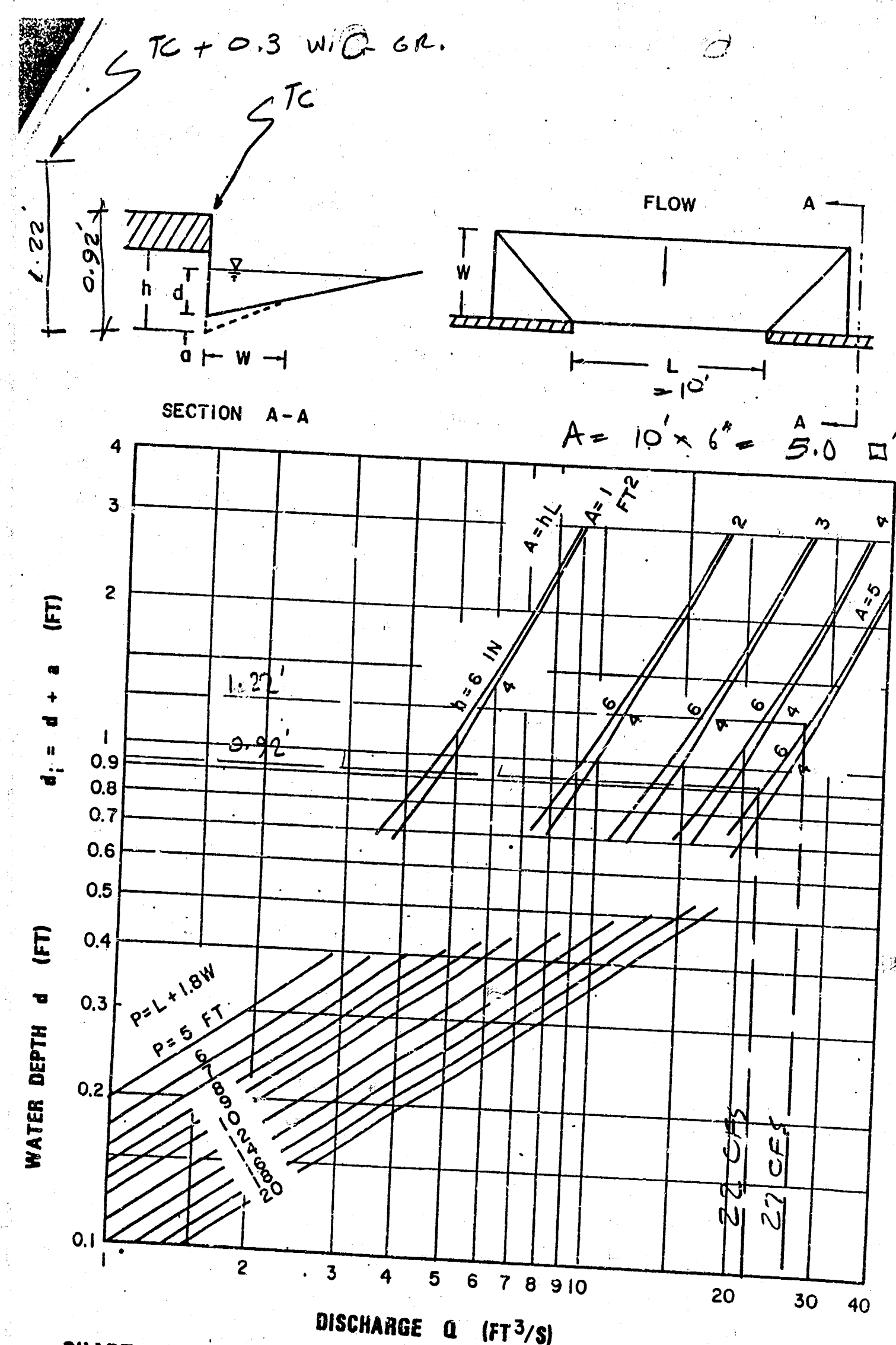


CHART 12. Depressed curb-opening inlet capacity in sump locations.

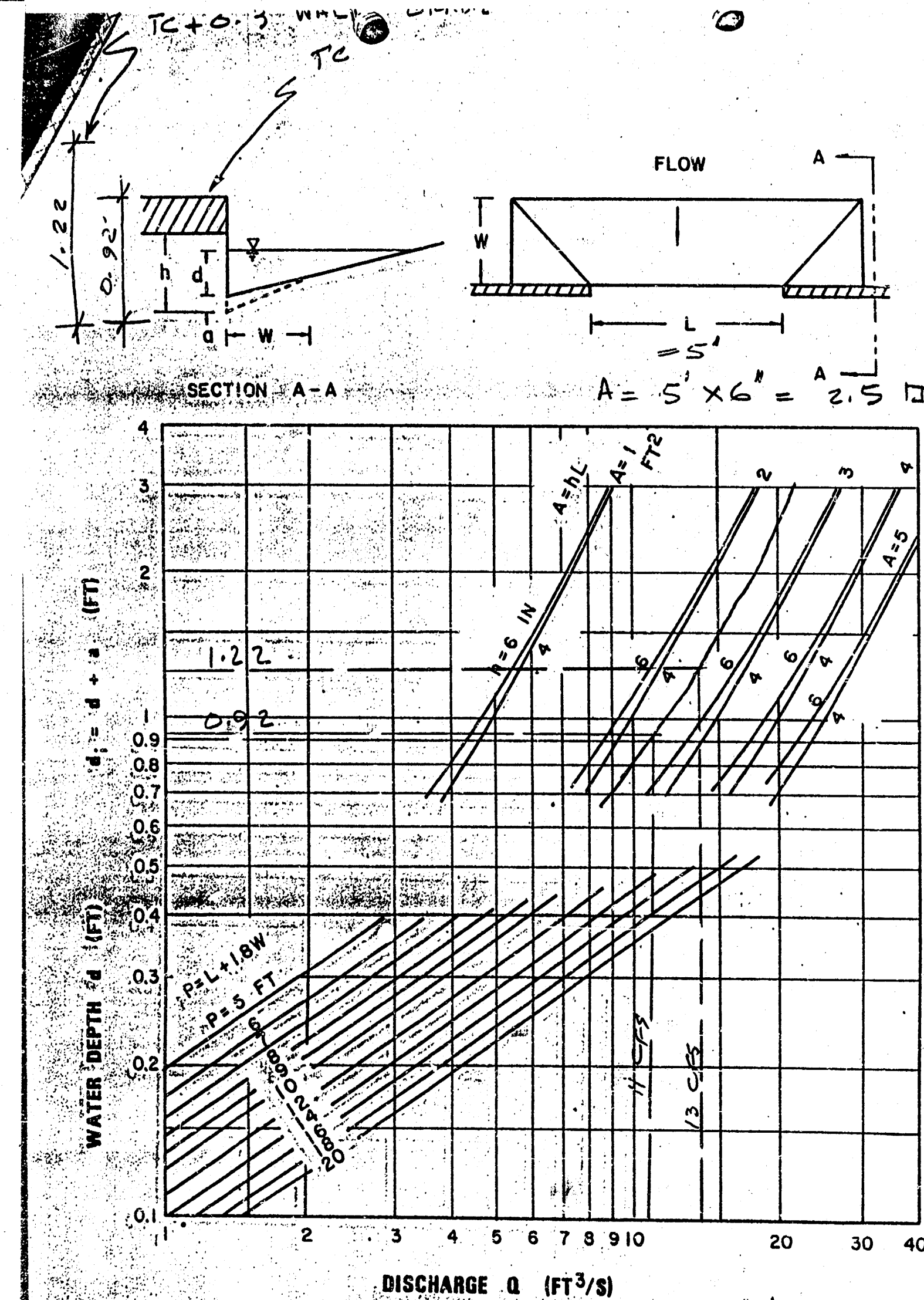
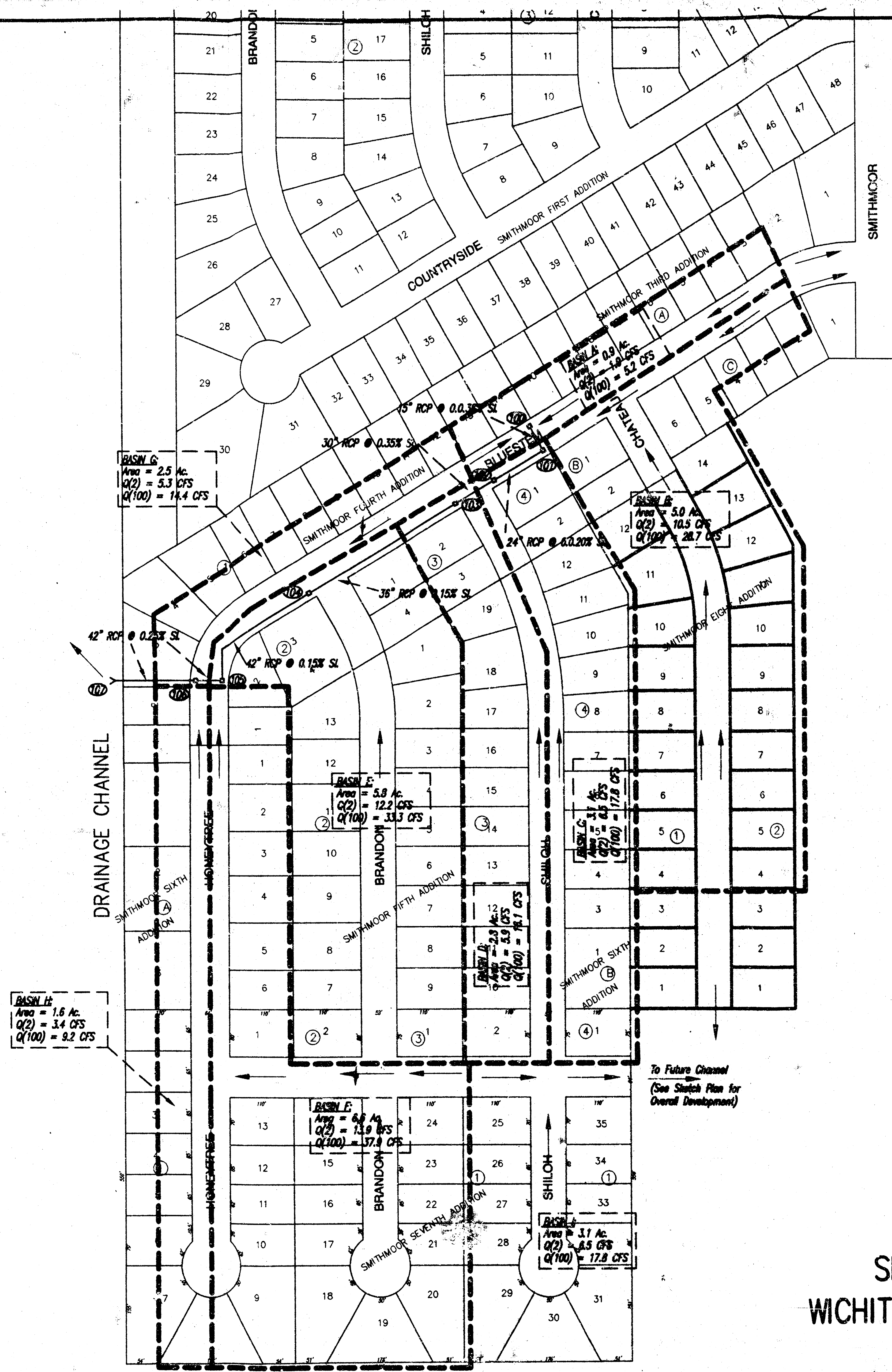
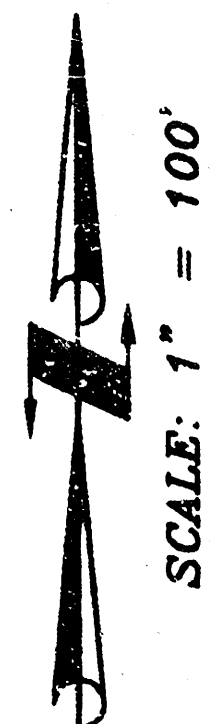
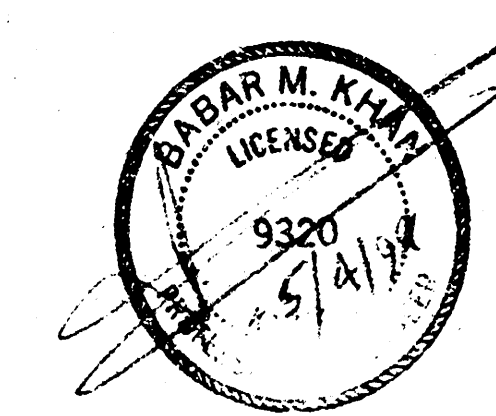


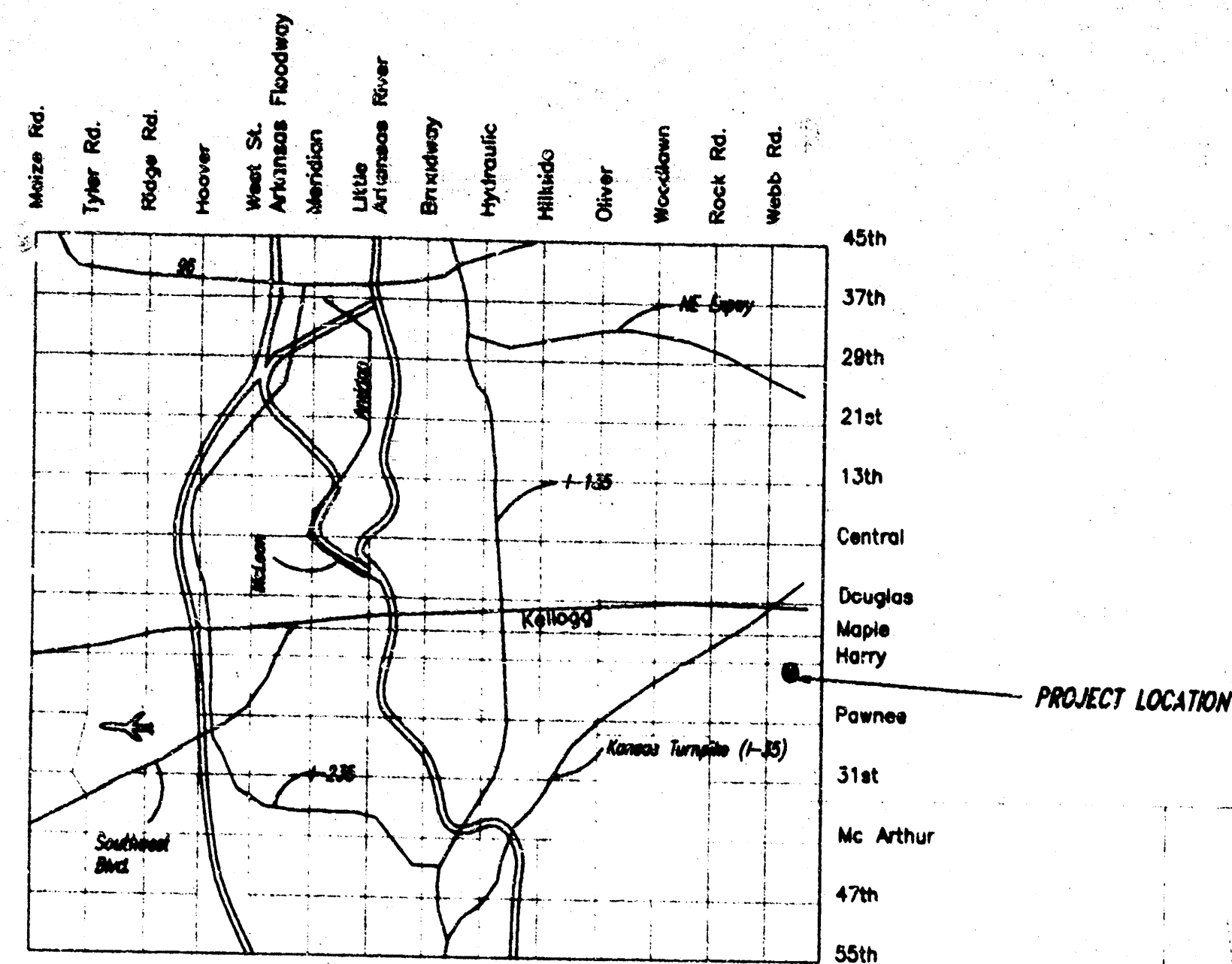
CHART 12. Depressed curb-opening inlet capacity in sump locations.



# 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.



SITE LOCATION MAP  
N.T.S.

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 90°00'00" E, a distance of 278.00 feet; thence bearing N 00°00'00" 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 Southeastly line of Smithmoor Third Addition to Wichita, Sedgwick County, Kansas; thence bearing S 59°42'20" W along the Southeastly 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 Southeastly line of said Smithmoor Third Addition, a distance of 111.03 feet to the point of beginning.

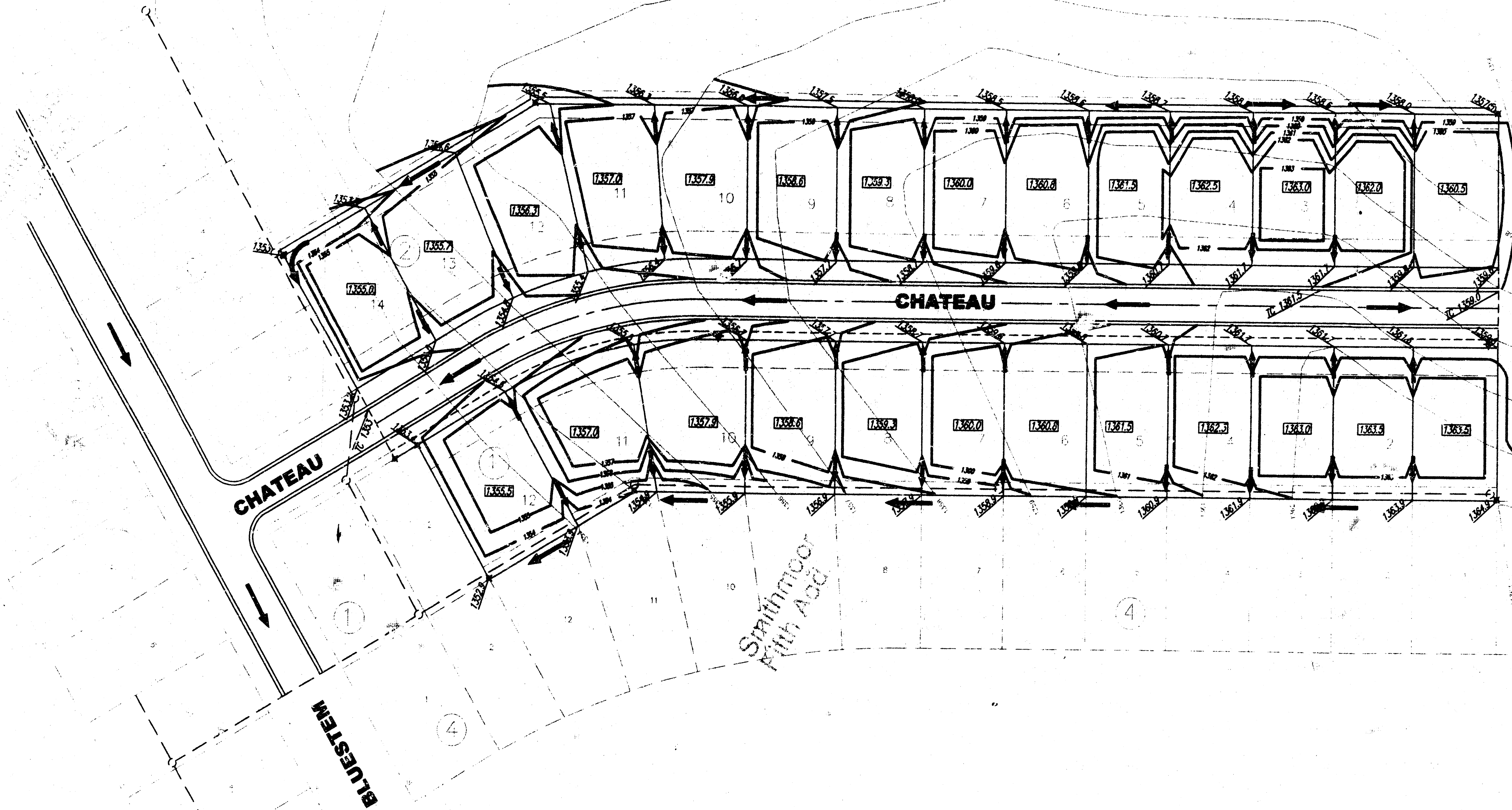
#### Subdivider

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

APPROVED  
DRAINAGE PLAN



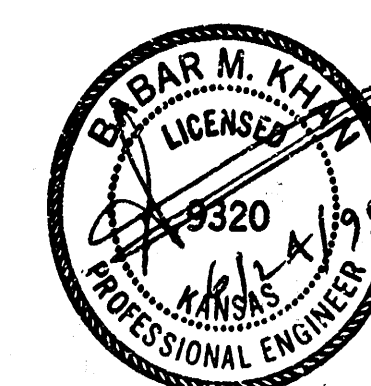
## LOT GRADING PLAN SMITHMOOR EIGHT ADDITION TO WICHITA, SEDGWICK COUNTY, KANSAS

#### LEGEND

- 1357.0 Finished Ground Elevation (Bottom of Finished Floor)
- 1357.8 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, Sedgwick County, Kansas.  
Elevation = 1354.64



**ME** MUNICIPAL ENGINEERS, P.A.  
254-Laura, Suite 201  
Wichita, Kansas 67211  
316-262-3842