REVISED DRAINAGE PLAN
AND
SUPPORTING CALCULATIONS

PROFESSIONAL
ENGINEERING
CONSULTANTS
PROFESSIONAL ASSOCIATION

FOR

REFLECTION RIDGE COMMERCIAL

AN ADDITION TO WICHITA, SEDGWICK COUNTY, KANSAS

PREPARED BY
PROFESSIONAL ENGINEERING CONSULTANTS, P.A.
ENGINEERS
WICHITA, KANSAS

NOVEMBER 11, 1987

1440 EAST ENGLISH
WICHITA, KANSAS 67211
(316) 262-2691

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Project Reflection Ridge Commercial

Item Revised Drainage Plan

INTRODUCTION

The Drainage Plan for Reflection Ridge Commercial dated October 23, 1987 is hereby revised to include a storm water sewer along Ridge Road to intercept runoff from the commercial tracts. This system will be required when Ridge Road is improved.

A ditch system along Ridge Road will be required after the development of the commercial tracts but prior to Ridge Road Improvements. This is to be an interim system until Ridge Road is improved. The development plans for the commercial tracts should take into account the requirement for this ditch.

The west portion of this plat (Office Park Area) will continue to drain to a storm water sewer system which discharges into the lake in the proposed golf course. See the Reflection Ridge Drainage Plan for this information)

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Project Reflection Ridge Commercial

Item Revised Drainage Plan

I HYDROLOGY

Use Rational Formula $Q = cIA$

1. Determine "c"

Node	Soil Type	Hydrologic Group	Land Use	C_5
104	Fa	B	Commercial (Bldgs, Drives, Parking Lots)	0.87
103	Fa	B	"	0.87
102	Fa	B	"	0.87
101	Fa	B	"	0.87
100	(End Section)			

2. Determine "I"

Node	t_c	I_5
104	15	4.56
103	15	4.56
102	15	4.56
101	15	4.56
100	(End Section)	

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3 Determine "A"

Node	Plan. Units	Area - SF	Area - Ac
104	1454	232,640	5.34
103	1166	186,560	4.28
102	872	139,520	3.20
101	513	82,080	1.88
100	(End Section)		

4. Determine "Q_5"

Node	C_5	I_5	A	Q_5
104	0.87	4.56	5.34	21.2
103	0.87	4.56	4.28	17.0
102	0.87	4.56	3.20	12.7
101	0.87	4.56	1.88	7.5
100	(End Section)			

3/6

```
100 j,  134.6000  100    3    5    4
110 t,reflection ridge commercial addition
120 t,revised drainage plan (11-11-87)
130 t,storm water sewer system 100 analysis
140 i,  104     0.87     5.34     0.00     0.00    21.20    15.00   140.10
150 i,  103     0.87     4.28     0.00     0.00    17.00    15.00   139.70
160 i,  102     0.87     3.20     0.00     0.00    12.70    15.00   139.40
170 i,  101     0.87     1.88     0.00     0.00     7.50    15.00   139.10
180 m,  100   134.60
190 p,  104  103   370.00   36 0.013   0.00   0.00
200 p,  103  102   350.00   42 0.013   0.00   0.00
210 p,  102  101   370.00   42 0.013   0.00   0.00
220 p,  101  100  1380.00   48 0.013  90.00   0.00
230 e
```

4/6

Date: 11-11-1987
Time: 10:43:45

Input File: rrcomm100

reflection ridge commercial addition
revised drainage plan (11-11-87)
storm water sewer system 100 analysis

Storm Frequency = 5-Year

* * * HYDROLOGY * * *

Tributary Area									Hydrology Summation				Conduit Data				
Node	to Node	C	Area (Ac)	Slope (%)	Length (Ft)	TC(@) (Min)	I(@) (In/Hr)	Q(@) (CFS)	TC (Min)	I (In/Hr)	Q (CFS)	Sum Q (CFS)	Size	Velocity (Ft/Sec)	Length (Ft)	TT (Min)	TT+TC (Min)
104	103	0.87	5.34	0.00	0.0	15.00	5.22	21.20	15.00	5.22	21.20	21.20	36"	3.00	370.00	2.06	17.06
103	102	0.87	4.26	0.00	0.0	15.00	5.22	17.00	17.06	4.96	16.17	37.37	42"	3.88	350.00	1.50	18.56
102	101	0.87	3.20	0.00	0.0	15.00	5.22	12.70	18.56	4.80	11.69	49.06	42"	5.10	370.00	1.21	19.77
101	100	0.87	1.80	0.00	0.0	15.00	5.22	7.50	19.77	4.68	6.78	55.79	48"	4.44	1380.00	5.18	24.95

5/6

Date: 11-11-1987
Time: 10:43:45

Input File: rrcomm100

reflection ridge commercial addition
revised drainage plan (11-11-87)
storm water sewer system 100 analysis

Storm Frequency = 5-Year

* * * HYDRAULICS * * *

Node	Hyd-Slope (Ft/Ft)	Friction (Ft)	Bend (Ft)	Transition (Ft)	Manhole (Ft)	Deflection (Ft)	Junction (Ft)	Total (Ft)	Hyd-Gl Elevation	Desired Elevation	Diff. (Ft)
104	0.00101	0.3738	0.0000	0.0000	0.0000	0.0000	0.0000	0.3738	139.1261	140.1000	0.97
103	0.00138	0.4829	0.0000	0.0095	0.0000	0.0000	0.3101	0.8024	138.7585	139.7000	0.95
102	0.00238	0.8797	0.0000	0.0169	0.0000	0.0000	0.3489	1.2456	137.9499	139.4000	1.45
101	0.00151	2.0819	0.0000	0.0195	0.0000	0.0000	0.0029	2.1043	136.7043	139.1000	2.40
100	0.00000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	134.6000	134.6000	0.00

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Project Reflection Ridge Commercial

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II INLET SIZING

Node	Q_5	HW*	L	Qmax	Comment
104	21.2	0.92'	10'	22.0	OK
103	17.0	0.92'	10'	22.0	OK
102	12.0	0.92'	10'	22.0	OK
101	7.5	0.92'	5'	11.0	OK
100	(End Section)				

* To T.C.

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I Determine sizes of temporary ditch along west side of Ridge Road (ditch to be used when commercial area is developed, but prior to improvements to Ridge Road).

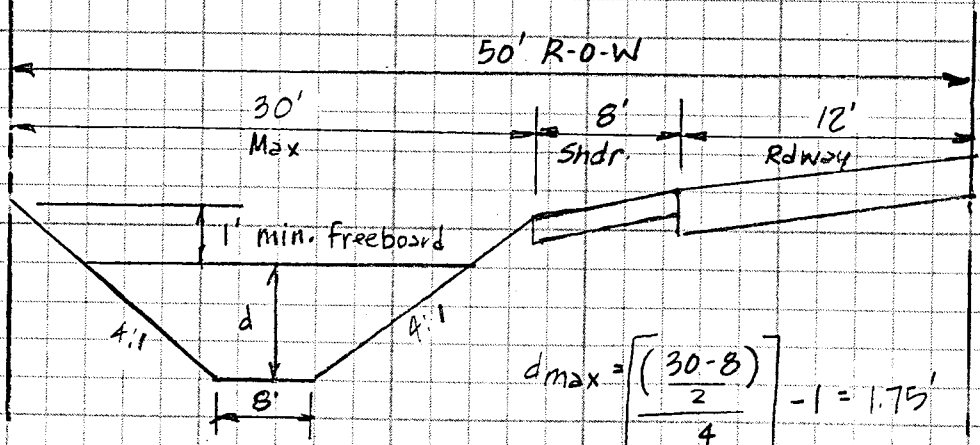
Reach No. 1 (Between Nodes 104-103)

$Q_5 = 21.2$ cfs

Use Mannings Equation $Q = \frac{1.486}{n} AR^{2/3} S^{1/2}$

where $Q = 21.2$
$n = 0.03$
$S = 0.001$ ft/ft

$$AR^{2/3} = \frac{Q \times n}{1.486 \times S^{1/2}} = \frac{21.2 \times 0.03}{1.486 \times 0.031623} = \frac{0.636}{0.04699} = 13.53$$



$$d_{max} = \left[\frac{(30-8)}{4}\right] - 1 = 1.75'$$

d	A	P	R	$R^{2/3}$	$AR^{2/3}$
1.0'	12.0	16.25	0.738	0.817	9.81
1.1'	13.64	17.07	0.799	0.861	11.75
1.2'	15.36	17.89	0.858	0.903	13.87 ←

USE $d = 1.2'$

$V = Q/A = \frac{21.2}{15.36} = 1.38$

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Reach No. 2 (Between Nodes 103 - 102)

$Q_5 = 21.2 + 17.0 = 38.2$ cfs

$$AR^{2/3} = \frac{Q \times n}{1.486 \times S^{1/2}} = \frac{38.2 \times 0.03}{1.486 \times 0.031623} = \frac{1.146}{0.04699} = 24.39$$

Use same section as reach No. 1

($d_{max} = 1.75'$)

d	A	P	R	$R^{2/3}$	$AR^{2/3}$	
1.5'	21.00	20.37	1.031	1.021	21.43	
1.6'	23.04	21.19	1.087	1.057	24.36	← USE d = 1.6'

$$V = \frac{Q}{A} = \frac{38.2}{23.04} = 1.66$$

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Project Reflection Ridge Commercial

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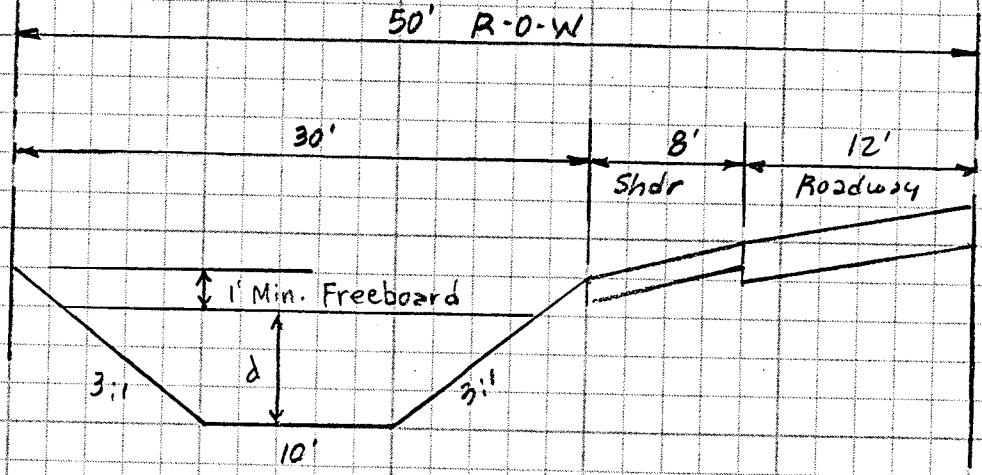
Reach No. 3 (Between Nodes 102-101)

$Q_5 = 21.2 + 17.0 + 12.7 = 50.9$ cfs

$$AR^{2/3} = \frac{Q \times n}{1.486 \times S^{1/2}} = \frac{50.9 \times 0.03}{1.486 \times 0.031623} = \frac{1.527}{0.04699} = 32.50$$



$$d_{max} = \left[\frac{\left(\frac{30-10}{2}\right)}{3}\right] - 1 = 2.33'$$

d	A	P	R	$R^{2/3}$	$AR^{2/3}$	
1.5'	21.75	19.49	1.116	1.076	23.40	
1.6'	23.68	20.12	1.177	1.115	26.40	
1.7'	25.67	20.75	1.237	1.152	29.58	
1.8'	27.72	21.38	1.296	1.189	32.96	← USE d = 1.8'

$$V = \frac{Q}{A} = \frac{50.9}{27.72} = 1.84$$

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Reach No. 4 (Between Nodes 101 - 100)

$Q_5 = 21.2 + 17.0 + 12.7 + 7.5 = 58.4$ cfs

$$AR^{2/3} = \frac{Q \times n}{1.486 \times S^{1/2}} = \frac{58.4 \times 0.03}{1.486 \times 0.031623} = \frac{1.752}{0.04699} = 37.2$$

Use same section as Reach No. 3
(d max = 2.33')

d	A	P	R	$R^{2/3}$	$AR^{2/3}$	
1.8	27.72	21.38	1.296	1.189	32.96	
1.9	29.83	22.02	1.355	1.224	36.52	← USE d = 1.9'
2.0	32.00	22.65	1.413	1.259	40.29	

$V = Q/A = \frac{58.4}{29.83} = 1.96$

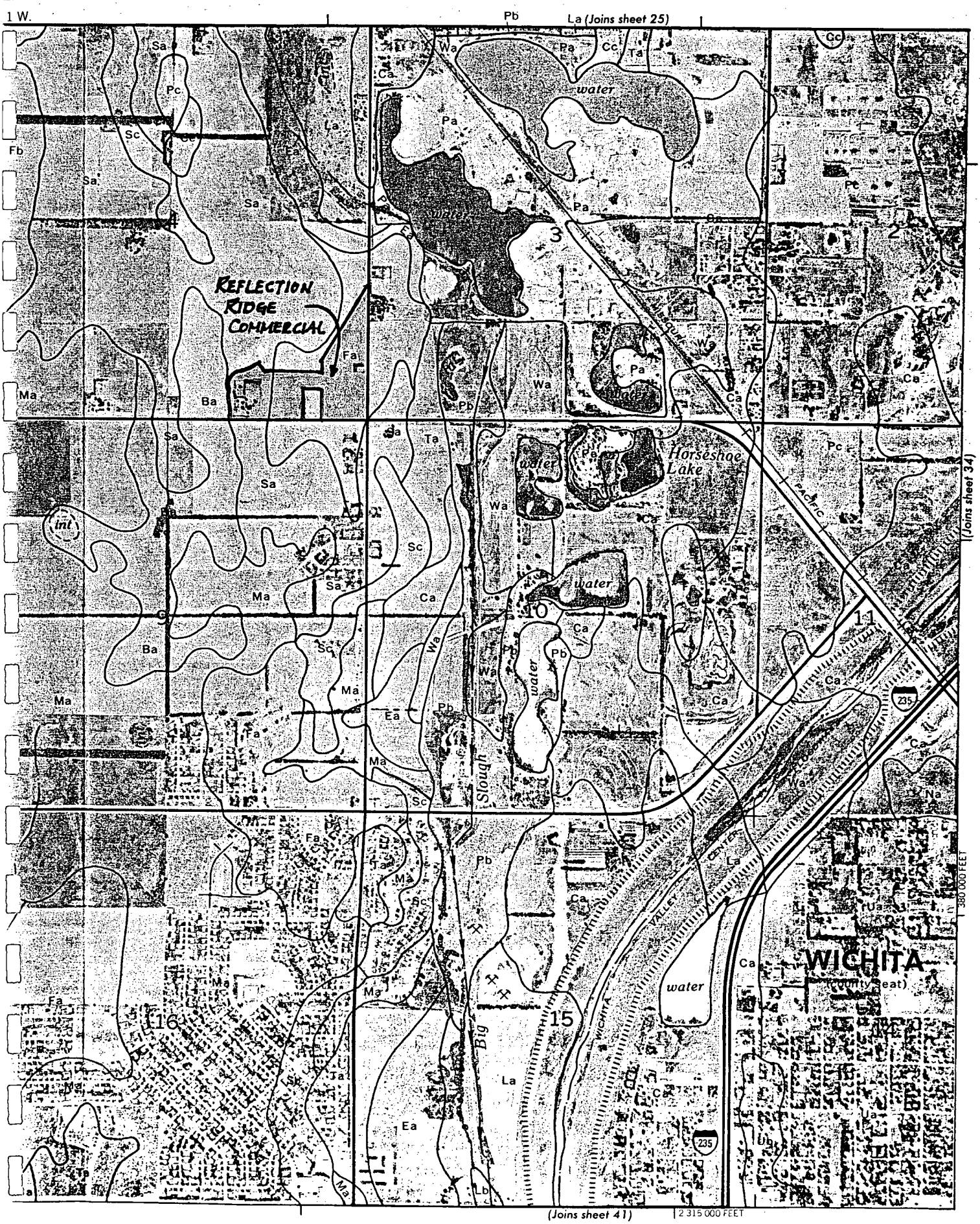

1 W.
Pb
La (Joins sheet 25)
REFLECTION RIDGE COMMERCIAL
Horseshoe Lake
water
Slough
Big
WICHITA
(County Seat)
PACIFIC
CENTER VALLEY
WICHITA
(Joins sheet 34)
(Joins sheet 41)
380 000 FEET
2 315 000 FEET
1 Mile
5000 Feet
N

EXHIBIT NO. 1

SOIL LEGEND

SYMBOL	HYDROLOGIC GROUP	NAME
Aa	B	Albion-Shellabarger sandy loams, 1 to 4 percent slopes
Ab	B	Albion and Shellabarger sandy loans, 7 to 15 percent slopes
Ba	C	Blanket silt loam, 0 to 1 percent slopes
Bb	C	Blanket silt loan, 1 to 3 percent slopes
Ca	B	Canadian fine sandy loan
Cb	B	Canadian-Waldeck fine sandy loams
Cc	D	Carwile fine sandy loam
Cd	B	Clark-Ost clay loams, 1 to 4 percent slopes
Ce	C	Clime silty clay, 3 to 6 percent slopes
Ea	B	Elandco silt loam
Eb	B	Elandco silt loam, occasionally flooded
Ec	B	Elandco silt loam, frequently flooded
Fa	B	Farnum loam, 0 to 1 percent slopes
Fb	B	Farnum loam, 1 to 3 percent slopes
Fc	B	Farnum loam, sandy substratum, 0 to 1 percent slopes
Ga	D	Goessel silty clay, 0 to 1 percent slopes
Gb	D	Goessel silty clay, 1 to 2 percent slopes
Ia	D	Irwin silty clay loam, 1 to 3 percent slopes
Ib	D	Irwin silty clay loam, 3 to 6 percent slopes
Ic	D	Irwin silty clay loam, 2 to 6 percent slopes, eroded
La	C	Lesho loam
Lb	A	Lincoln soils
Ma	B	Milan loam, 1 to 3 percent slopes
Mb	B	Milan form, 3 to 6 percent slopes
Mc	B	Milan clay loam, 2 to 6 percent slopes, eroded
Na	B	Naron fine sandy loam
Oc	D	Owens clay loam, 1 to 3 percent slopes
Od	D	Owens-Rock outcrop complex, 3 to 10 percent slopes
Pa		Pits
Pb	D	Plevna fine sandy loam
Pc	A	Pratt loamy fine sand, undulating
Pd	A	Pratt-Tivoli complex, rolling
Ra	D	Renfrow silty clay loam, 1 to 3 percent slopes
Rb	D	Renfrow silty clay loam, 3 to 6 percent slopes
Rc	D	Renfrow-Owens clay loams, 1 to 4 percent slopes
Rd	D	Rosehill silty clay, 1 to 3 percent slopes
Sa	B	Shellabarger sandy loam, 1 to 3 percent slopes
Sb	B	Shellabarger sandy loam, 3 to 6 percent slopes
Sc	B	Shellabarger sandy loam, 3 to 6 percent slopes, eroded
Ta	D	Tabler silty clay loam
Tb	D	Tabler-Drummond complex
Ua	B	Urban land-Canadian complex
Ub	B	Urban land-Elandco complex
Uc	B	Urban land-Farnum complex, 0 to 3 percent slopes
Ud	D	Urban land-Irwin complex, 1 to 3 percent slopes
Ue	D	Urban land-Tabler complex
Va	B	Vanoss silt loam, 0 to 1 percent slopes
Vb	B	Vanoss silt loam, 1 to 3 percent slopes
Vc	B	Vanoss silt loam, 3 to 6 percent slopes
Vd	B	Vanoss silt loam, 3 to 6 percent slopes, eroded
Ve	D	Vernon sandy loam, 1 to 3 percent slopes
Vf	D	Vernon sandy loam, 3 to 6 percent lopes
Wa	C	Waldeck sandy loam
Wb	D	Waurika silt loam

(3 pages)

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	5	10	100
1. Business:					
Downtown Areas	95	0.84	0.85	0.87	0.91
Neighborhood Areas	70	0.68	0.69	0.73	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	0.62	0.76
1/3 Acre	30	0.46	0.50	0.59	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	0.39	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

Land Use or Surface Characteristics	Percent Impervious	Frequency 2	5	10	100
Single Family (Soil Group A)					
1/8 Acre	50	0.47	0.50	0.54	0.60
1/4 Acre	38	0.39	0.41	0.45	0.52
1/3 Acre	30	0.33	0.35	0.39	0.47
1/2 Acre	25	0.30	0.31	0.35	0.44
3/4 Acre	22	0.28	0.29	0.33	0.42
1 Acre	20	0.26	0.28	0.32	0.40
Multi-Family (Soil Group A)					
Multi-Unit (detached)	60	0.55	0.57	0.61	0.67
Multi-Unit (attached)	65	0.58	0.60	0.64	0.70
Apartments	75	0.65	0.68	0.72	0.77
3. Industrial:					
Light Areas	70	0.68	0.69	0.73	0.80
Heavy Areas	80	0.74	0.76	0.79	0.84
4. Playgrounds:	15	0.33	0.35	0.42	0.55
5. Schools:	40	0.49	0.51	0.56	0.66
6. Railroad Yard Areas:	30	0.43	0.45	0.50	0.62
7. Undeveloped Urban Areas: Offsite Flow Analysis (when land use not defined)	45	0.52	0.54	0.59	0.68
8. Streets:					
Paved	99	0.87	0.88	0.90	0.93
Gravel	00	0.24	0.26	0.33	0.48
9. Drive, Parking Lots and Walks:	96	0.87	0.87	0.88	0.89
10. Roofs:	90	0.80	0.85	0.90	0.93
11. Urban Lawn Areas (See Note No. 1 below):					
Soil Group A					
Slope less than 1%	00	0.08	0.09	0.13	0.23
Slope 1% to 4%	00	0.12	0.13	0.17	0.27
Slope more than 4%	00	0.16	0.17	0.21	0.31
Soil Group B					
Slope less than 1%	00	0.16	0.18	0.24	0.37
Slope 1% to 4%	00	0.20	0.22	0.28	0.41
Slope more than 4%	00	0.24	0.26	0.32	0.45
Soil Group C					
Slope less than 1%	00	0.24	0.27	0.35	0.51
Slope 1% to 4%	00	0.26	0.29	0.37	0.53
Slope more than 4%	00	0.28	0.31	0.39	0.55

Land Use or Surface Characteristics	Percent Impervious	Frequency 2	5	10	100
Soil Group D					
Slope less than 1%	00	0.28	0.33	0.43	0.63
Slope 1% to 4%	00	0.30	0.35	0.45	0.65
Slope more than 4%	00	0.32	0.37	0.47	0.67

Note No. 1: Coefficients shown in the above table are for pervious open space areas with thick turf which includes pervious areas in parks and cemeteries. Coefficients shown above must be increased 0.02 for use with agricultural pasture areas. Coefficients shown above must be reduced by 0.04 for use with agricultural cultivated areas. Group A soils are well-drained, coarse textured sands with high infiltration rates. Group B soils are moderately well-drained, moderately coarse textured soils with moderate infiltration rates. Group C soils are moderately poor-drained, moderately fine textured soils with slow infiltration rates. Group D soils are poor-drained, fine textured soils with very slow infiltration rates.

GENERAL NOTE: These Rational Formula Coefficients may not be valid for basins 320 acres or larger.

April 15, 1986

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

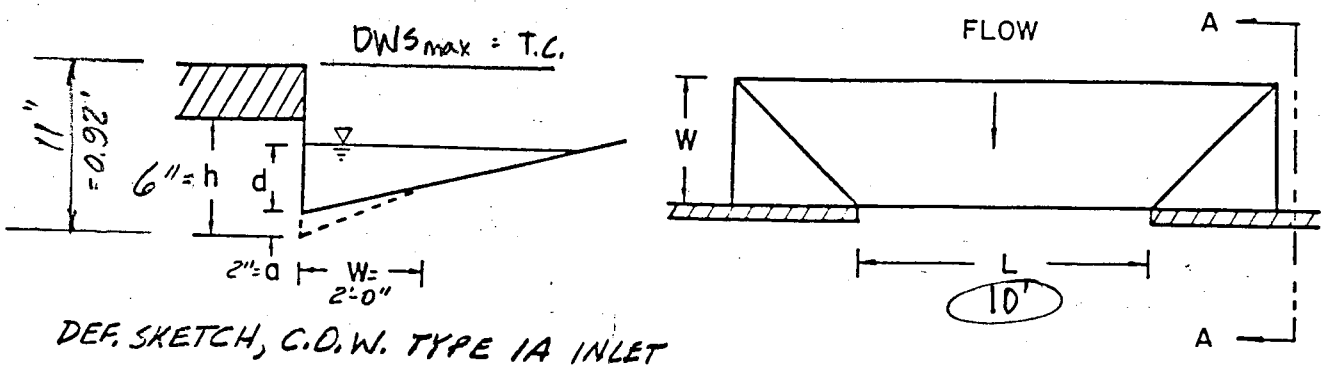
DURATION IN MINUTES	RETURN PERIODS OF 1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
5	4.18	5.57	6.53	7.41	8.52	9.48	10.32
6	3.99	5.32	6.25	7.09	8.16	9.09	9.89
7	3.81	5.09	5.99	6.81	7.84	8.74	9.50
8	3.66	4.89	5.75	6.55	7.55	8.42	9.15
9	3.52	4.70	5.54	6.31	7.28	8.13	8.83
10	3.39	4.52	5.34	6.09	7.04	7.86	8.54
11	3.27	4.36	5.16	5.89	6.81	7.61	8.27
12	3.18	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	7.79
14	2.96	3.95	4.69	5.37	6.23	6.97	7.57
15	2.87	3.83	4.56	5.22	6.06	6.78	7.37
16	2.78	3.72	4.43	5.08	5.90	6.60	7.18
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	2.08	2.57	3.01	3.52	3.98	4.38

ATTACHMENT A CONTINUED
Page 2

DURATION IN MINUTES	RETURN PERIODS OF 1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
46	1.70	2.05	2.54	2.97	3.48	3.93	4.33
47	1.67	2.02	2.50	2.93	3.44	3.88	4.28
48	1.66	2.00	2.47	2.90	3.39	3.84	4.23
49	1.64	1.97	2.44	2.86	3.35	3.79	4.18
50	1.61	1.95	2.41	2.83	3.32	3.75	4.13
51	1.59	1.92	2.38	2.79	3.28	3.71	4.09
52	1.56	1.89	2.35	2.76	3.24	3.67	4.05
53	1.54	1.86	2.33	2.73	3.20	3.63	4.00
54	1.52	1.84	2.30	2.70	3.17	3.59	3.96
55	1.50	1.81	2.27	2.67	3.14	3.55	3.92
56	1.47	1.79	2.25	2.64	3.10	3.51	3.88
57	1.45	1.76	2.22	2.61	3.07	3.48	3.84
58	1.43	1.74	2.20	2.59	3.04	3.44	3.81
59	1.42	1.72	2.18	2.56	3.01	3.41	3.77
60	1.40	1.69	2.15	2.53	2.98	3.37	3.73
61	1.38	1.67	2.13	2.51	2.95	3.34	3.70
62	1.36	1.65	2.11	2.48	2.92	3.31	3.67
63	1.34	1.63	2.09	2.46	2.89	3.28	3.63
64	1.33	1.61	2.07	2.44	2.86	3.25	3.60
65	1.31	1.59	2.05	2.41	2.84	3.22	3.57
66	1.30	1.57	2.03	2.39	2.81	3.19	3.54
67	1.28	1.56	2.01	2.37	2.79	3.16	3.51
68	1.26	1.54	1.99	2.35	2.76	3.13	3.48
69	1.25	1.52	1.97	2.33	2.74	3.10	3.45
70	1.24	1.50	1.95	2.31	2.71	3.08	3.42
71	1.22	1.49	1.93	2.28	2.69	3.05	3.39
72	1.21	1.47	1.92	2.26	2.67	3.02	3.36
73	1.20	1.46	1.90	2.25	2.64	3.00	3.34
74	1.18	1.44	1.88	2.23	2.63	2.98	3.31
75	1.17	1.43	1.86	2.21	2.61	2.95	3.29
76	1.16	1.41	1.85	2.19	2.58	2.93	3.26
77	1.15	1.40	1.83	2.17	2.55	2.90	3.24
78	1.13	1.38	1.82	2.15	2.53	2.88	3.22
79	1.12	1.37	1.80	2.14	2.50	2.86	3.19
80	1.11	1.36	1.79	2.12	2.48	2.84	3.16
81	1.10	1.34	1.77	2.10	2.46	2.82	3.13
82	1.09	1.33	1.76	2.08	2.43	2.79	3.10
83	1.08	1.32	1.74	2.06	2.41	2.76	3.07
84	1.07	1.31	1.73	2.04	2.39	2.74	3.04
85	1.06	1.30	1.72	2.02	2.37	2.71	3.01
86	1.05	1.28	1.70	2.00	2.34	2.69	2.99
87	1.04	1.27	1.69	1.99	2.32	2.66	2.96
88	1.03	1.26	1.68	1.97	2.30	2.64	2.93
89	1.02	1.25	1.68	1.95	2.28	2.62	2.91
90	1.01	1.24	1.66	1.93	2.26	2.59	2.88

DURATION IN MINUTES	RETURN PERIODS OF 1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
91	1.00	1.23	1.65	1.92	2.24	2.57	2.86
92	1.00	1.22	1.63	1.90	2.22	2.55	2.83
93	0.99	1.21	1.62	1.89	2.20	2.53	2.81
94	0.98	1.20	1.61	1.87	2.19	2.51	2.79
95	0.97	1.19	1.59	1.85	2.17	2.49	2.76
96	0.96	1.18	1.58	1.84	2.15	2.46	2.74
97	0.96	1.17	1.57	1.82	2.13	2.44	2.72
98	0.95	1.16	1.56	1.81	2.12	2.42	2.70
99	0.94	1.15	1.54	1.80	2.10	2.41	2.67
100	0.93	1.14	1.53	1.78	2.08	2.39	2.65
101	0.93	1.13	1.52	1.77	2.07	2.39	2.65
102	0.92	1.13	1.51	1.75	2.05	2.35	2.61
103	0.91	1.12	1.50	1.74	2.04	2.33	2.59
104	0.90	1.11	1.49	1.73	2.02	2.31	2.57
105	0.90	1.10	1.47	1.72	2.01	2.30	2.55
106	0.89	1.09	1.46	1.70	1.99	2.28	2.54
107	0.88	1.09	1.45	1.69	1.98	2.26	2.52
108	0.88	1.08	1.44	1.68	1.96	2.25	2.50
109	0.87	1.07	1.43	1.67	1.95	2.23	2.48
110	0.87	1.06	1.42	1.65	1.93	2.21	2.46
111	0.86	1.06	1.41	1.64	1.92	2.20	2.45
112	0.85	1.05	1.40	1.63	1.91	2.18	2.43
113	0.85	1.04	1.39	1.62	1.89	2.17	2.41
114	0.84	1.03	1.38	1.61	1.88	2.15	2.40
115	0.84	1.03	1.37	1.60	1.87	2.14	2.38
116	0.83	1.02	1.36	1.59	1.86	2.12	2.36
117	0.82	1.01	1.36	1.58	1.84	2.11	2.35
118	0.82	1.01	1.35	1.57	1.83	2.09	2.33
119	0.81	1.00	1.34	1.56	1.82	2.08	2.32
120	0.81	0.99	1.33	1.55	1.81	2.07	2.30

DURATION IN HOURS	RETURN PERIODS OF 1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
2	0.81	0.99	1.33	1.55	1.81	2.07	2.30
3	0.59	0.72	0.97	1.13	1.32	1.51	1.68
4	0.47	0.58	0.78	0.91	1.06	1.21	1.35
5	0.40	0.49	0.66	0.77	0.89	1.02	1.14
6	0.35	0.42	0.57	0.67	0.78	0.89	0.99
8	0.28	0.34	0.46	0.53	0.62	0.71	0.79
10	0.23	0.29	0.39	0.45	0.52	0.60	0.67
12	0.20	0.25	0.33	0.39	0.45	0.52	0.58
18	0.15	0.18	0.24	0.28	0.33	0.38	0.42
24	0.12	0.15	0.20	0.23	0.27	0.31	0.34



DEF. SKETCH, C.O.W. TYPE 1A INLET

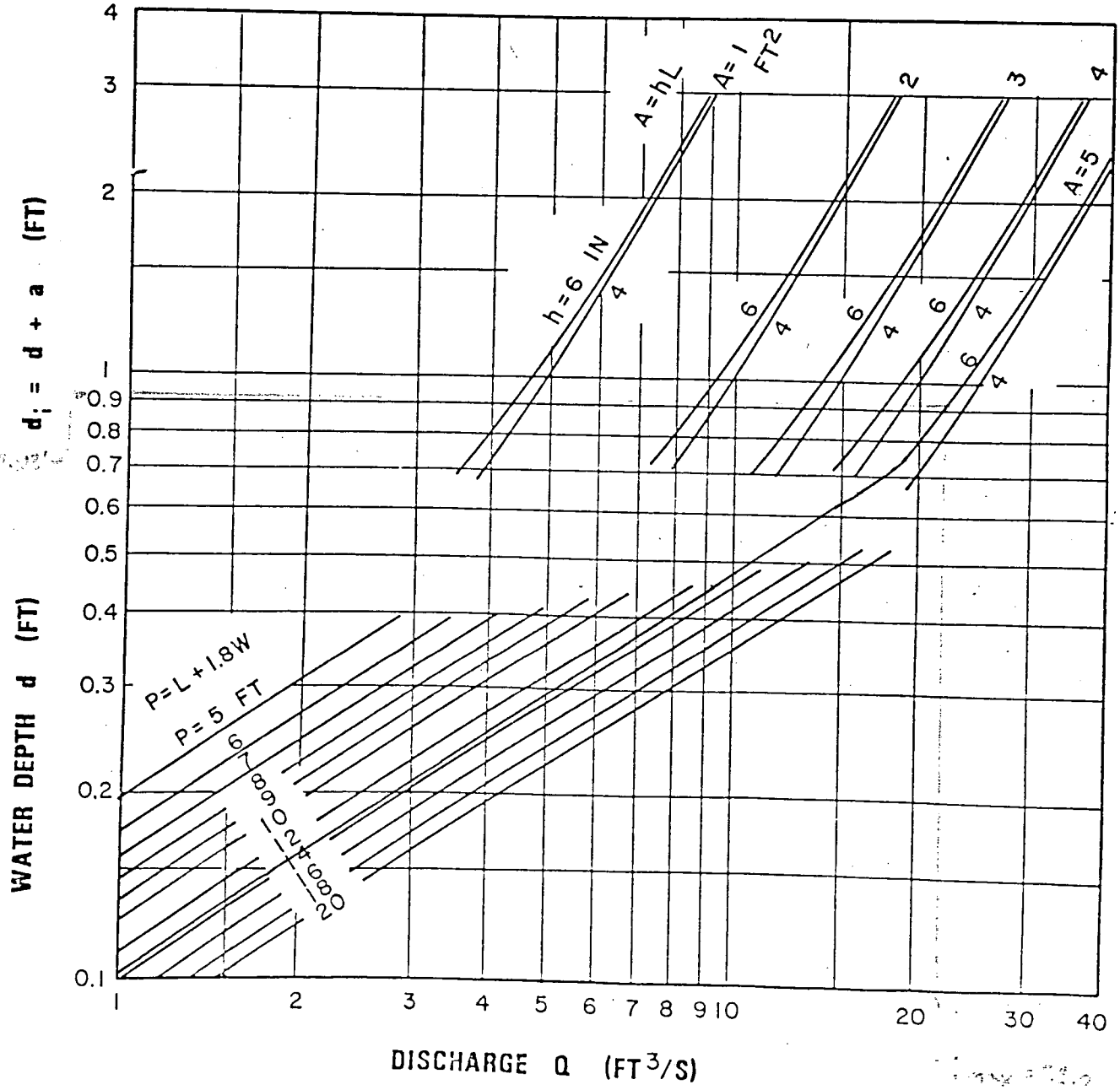
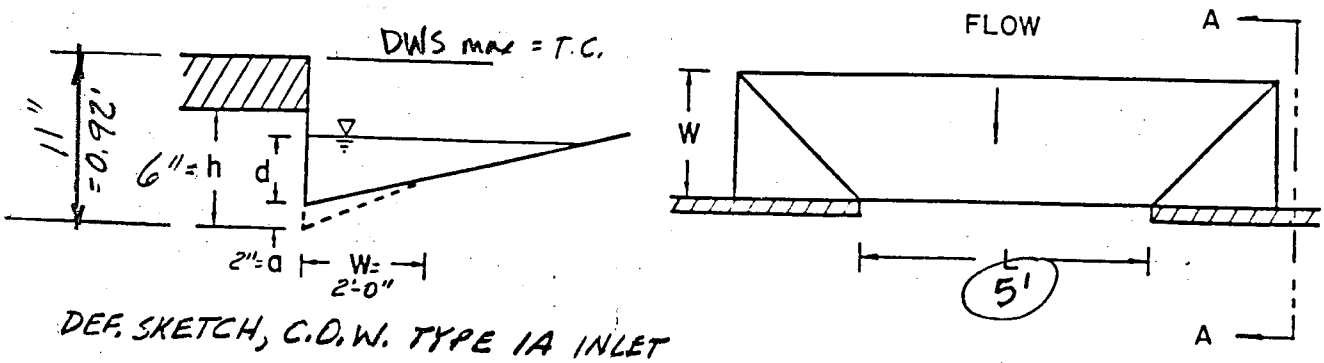


CHART 12. Depressed curb-opening inlet capacity in sump locations.

FROM: HEC-12, DRAINAGE OF HIGHWAY PAVEMENTS, F.H.W.A., MAR., 1984



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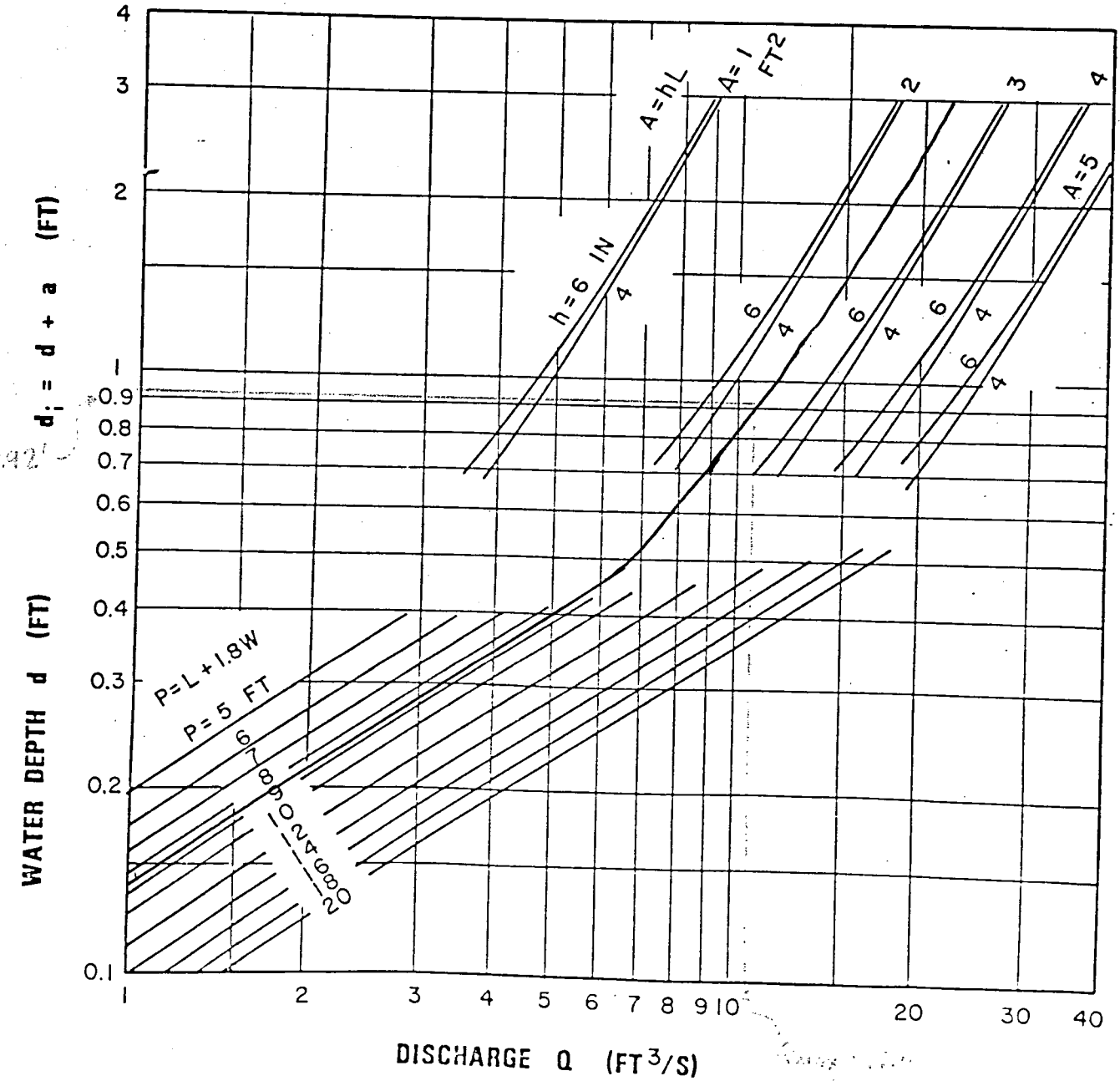

CHART 12. Depressed curb-opening inlet capacity in sump locations.

FROM: HEC-12, DRAINAGE OF HIGHWAY PAVEMENTS, F.H.W.A., MAR., 1984