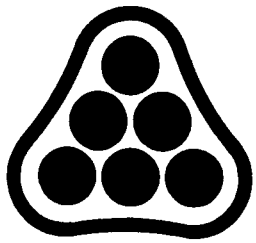

PROFESSIONAL
ENGINEERING
CONSULTANTS
PROFESSIONAL ASSOCIATION

DRAINAGE PLAN
AND
SUPPORTING CALCULATIONS

FOR
FAIRFIELD CLUB
AN ADDITION TO WICHITA, SEDGWICK COUNTY, KANSAS

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

OCTOBER 9, 1987

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

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Date 10-6-87 Page 1 of 1

Project Fairfield Club

Item Drainage Plan System 900

INTRODUCTION

Fairfield Club Addition is a proposed replat of portions of Fairfield Estates. The Drainage Plan for Fairfield Estates was submitted to the City on November 8, 1985. Due to the replat, Storm Sewer System No. 900 of the original Drainage Plan will be revised. These revisions will have little or no effect on the Detention Area #3 (Storm Water Drain No. 69). Therefore, this study will concentrate on proposed storm water sewer locations, sizes, etc. in these areas.

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Project Fairfield Club

Item Drainage Plan - System 900

I HYDROLOGY Use Rational Method. Q = cIA.

A. Determine "c"

Node	Soil Type	Land Use	C_2	C_{100}
902	D	Res. 1/8 Ac Lot	0.55	0.73
901	D	Res., 1/8 Ac. Lot	0.55	0.73
900	(End Section)			

B. Determine "I"

Node	t_c	I_2	I_{100}
902	15 min	3.83	7.37
901	15min	3.83	7.37
900	(End Section)		

C. Determine "A"

Node	Plan. Units	Area-SF	Area-Ac
902	1630	65,200	1.50
901	1794	71,760	1.65
900	(End Section)		

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Project Fairfield Club

Item Drainage Plan - System 900

D. Determine "Q"

2-year :

Node	C_2	I_2	A	Q_2
902	0.55	3.83	1.50	3.2
901	0.55	3.83	1.65	3.5
900	(End Section)			

100-year :

Node	C_{100}	I_{100}	A	Q_{100}
902	0.73	7.37	1.50	8.1
901	0.73	7.37	1.65	8.9
900	(End Section)			

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Project Fairfield Club

Item Drainage Plan - System 900

II FLOOD ROUTING / INLET SIZING

Node	Inlet Condition	L	$Q_{approach}$*	$Q_{intercept}$	Q_{bypass}	to Node
902	Sump	5'	8.1	8.1	0.0	–
901	Sump	5'	8.9	8.9	0.0	–
900	(End Section)					

* $Q_{approach} = Q_{100}$

† $Q_{intercept}$ = Q input into "Storm" Program

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Project Fairfield Club

Item Drainage Plan - System 900

III STREET FLOW - 2yr.

Node	Qapproach	Distribution	street slope	d	Comment
902	3.2	10% (NW) = 0.3	0.6%	0.12	OK
		90% (SE) = 2.9	0.7%	0.27	OK
901	3.5	50% (NW) = 1.7	0.6%	0.23	OK
		50% (SE) = 1.8	0.7%	0.22	OK
900	(End Section)				

IV STREET FLOW - 100 yr

Node	Contributing Areas		Q100	Qpipe	Qstreet	street slope	d	Comment
Approaching Nodes 902 & 901 From SE	90%	902 =	7.3					
	50%	901 =	4.5					
			11.8	0.0	11.8	0.7%	0.44	OK
Approaching Nodes 902 & 901 From NW	10%	902 =	0.8					
	50%	901 =	4.5					
			5.3	0.0	5.3	0.6%	0.35	OK

```
100 j,  179.0000  900    3    3    2
110 t,fairfield club addition
120 t,drainage plan
130 t,storm sewer system 900 analysis
140 i,  902     0.73     1.50     0.00     0.00     8.10    15.00   184.00
150 i,  901     0.73     1.65     0.00     0.00     8.90    15.00   184.00
160 m,  900   179.00
170 p,  902  901    40.00   18 0.013  10.00   0.00
180 p,  901  900   150.00   24 0.013  70.00   0.00
190 e
```

Date: 10-06-1987
Time: 11:06:18

Input File: fair900

6/7

fairfield club addition
drainage plan
storm sewer system 900 analysis

Storm Frequency = 100-Year

* * * HYDROLOGY * * *

Tributary Area									Hydrology Summation				Conduit Data				
Node	to Node	C	Area (Ac)	Slope (%)	Length (Ft)	TC(Ø) (Min)	I(Ø) (In/Hr)	Q(Ø) (CFS)	TC (Min)	I (In/Hr)	Q (CFS)	Sum Q (CFS)	Size	Velocity (Ft/Sec)	Length (Ft)	TT (Min)	TT+TC (Min)
902	901	Ø.73	1.50	Ø.ØØ	Ø.Ø	15.ØØ	8.97	8.1Ø	15.ØØ	8.97	8.1Ø	8.1Ø	18"	4.58	4Ø.ØØ	Ø.15	15.15
901	900	Ø.73	1.65	Ø.ØØ	Ø.Ø	15.ØØ	8.97	8.9Ø	15.15	8.94	8.87	16.97	24"	5.4Ø	15Ø.ØØ	Ø.46	15.61

Date: 10-06-1987
Time: 11:06:18

Input File: fair900

7/7

fairfield club addition
drainage plan
storm sewer system 900 analysis

Storm Frequency = 100-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)
902	0.00595	0.2378	0.0000	0.0000	0.0000	0.0000	0.0000	0.2378	180.8258	184.0000	3.17
901	0.00562	0.8437	0.0000	0.0127	0.0000	0.0117	0.7193	1.5879	180.5879	184.0000	3.41
900	0.00000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	179.0000	179.0000	0.00

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Project Fairfield Club

Item Drainage Plan - System 950

I HYDROLOGY Use Rational Method $Q = cIA$

A. Determine "c"

Node	Soil Type	Land Use	C_2	C_{100}
953	D	Res. 1/8 Ac. Lot	0.55	0.73
952	D	"	0.55	0.73
951	(Manhole)			
950	(End Section)			

B Determine "I"

Node	t_c	I_2	I_{100}
953	15	3.83	7.37
952	15	3.83	7.37
951	(Manhole)		
950	(End Section)		

C. Determine "A"

Node	Plan. Units	Area - SF	Area - Acres
953	2618	104,720	2.40
952	1764	70,560	1.62
951	(Manhole)		
950	(End Section)		

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Project Fairfield Club

Item Drainage Plan - System 950

D. Determine "Q"

2-year:

Node	C_2	I_2	A	Q_2
953	0.55	3.83	2.40	5.1
952	0.55	3.83	1.62	3.4
951	(Manhole)			
950	(End Section)			

100-year

Node	C_{100}	I_{100}	A	Q_{100}
953	0.73	7.37	2.40	12.9
952	0.73	7.37	1.62	8.7
951	(Manhole)			
950	(End Section)			

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Project Fairfield Club

Item Drainage Plan - System 950

II FLOOD ROUTING / INLET SIZING

Node	Inlet Condition	L	$Q_{approach}$*	$Q_{intercept}$≠	Q_{bypass}	to Node
953	Sump	5'	12.9	12.9	0.0	-
952	Sump	5'	8.7	8.7	0.0	-
951	(Manhole)					
950	(End Section)					

* $Q_{approach} = Q_{100}$

≠ $Q_{intercept}$ = Q input into "storm" program

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Date 10-6-87 Page 4 of 7

Project Fairfield Club

Item Drainage Plan - System 950

III STREET FLOW - 2-YEAR

Node	Qapproach	Distribution	street slope	d	Comment
953	5.1	50% (NE) = 2.6	0.6%	0.27'	OK
		50% (SE) = 2.5	0.7%	0.25'	OK
952	3.4	80% (NW) = 2.7	0.8%	0.26'	OK
		20% (NE) = 0.7	0.8%	0.16'	OK
951	(Manhole)				
950	(End Section)				

IV STREET FLOW - 100 YEAR

Node(s)	Q100 Distribution		Qpipe	Qstreet	street slope	d	Comment
Approaching Node 953(E)	50% 953 =	6.5					
	20% 952 =	1.7					
		8.2	0.0	8.2	0.7%	0.40	OK
Approaching Node 953(N)	50% 953 =	6.5					
	80% 952 =	7.0					
		13.5	0.0	13.5	0.6%	0.48	OK
Approaching Node 952'	100% 953	12.9					
	100% 952	8.7					
		21.6	12.9	8.7	0.8%	0.39'	OK

```
100 j,  182.8000  950    3    4    3
110 t,fairfield club addition
120 t,drainage plan
130 t,storm water sewer system 950 analysis
140 i,  953     0.73     2.40     0.00     0.00    12.90    15.00   188.00
150 i,  952     0.73     1.62     0.00     0.00     8.70    15.00   186.00
160 m,  951   186.00
170 m,  950   182.80
180 p,  953  952   140.00   18 0.013  60.00   0.00
190 p,  952  951    65.00   27 0.013  90.00   0.00
200 p,  951  950   180.00   27 0.013  90.00   0.00
210 e
```

5/7

Date: 10-06-1987
Time: 13:35:11

Input File: fair950

fairfield club addition
drainage plan
storm water sewer system 950 analysis

6/7

Storm Frequency = 100-Year

* * * HYDROLOGY * * *

Tributary Area									Hydrology Summation				Conduit Data				
Node	to Node	C	Area (Ac)	Slope (%)	Length (Ft)	TC(Ø) (Min)	I(Ø) (In/Hr)	Q(Ø) (CFS)	TC (Min)	I (In/Hr)	Q (CFS)	Sum Q (CFS)	Size	Velocity (Ft/Sec)	Length (Ft)	TT (Min)	TT+TC (Min)
953	952	0.73	2.40	0.00	0.0	15.00	8.97	12.90	15.00	8.97	12.90	12.90	18"	7.30	140.00	0.32	15.32
952	951	0.73	1.62	0.00	0.0	15.00	8.97	8.70	15.32	8.90	8.63	21.53	27"	5.41	65.00	0.20	15.52
951	950	0.00	0.00	0.00	0.0	0.00	0.00	0.00	15.52	8.85	0.00	21.53	27"	5.41	180.00	0.55	16.07

Date: 10-06-1987
Time: 13:35:11

Input File: fair950

fairfield club addition
drainage plan
storm water sewer system 950 analysis

7/7

Storm Frequency = 100-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)
953	0.01508	2.1114	0.0000	0.0000	0.0000	0.0000	0.0000	2.1114	186.9912	188.0000	1.01
952	0.00483	0.3141	0.0000	0.0744	0.0000	0.2543	0.2926	0.9354	184.8798	186.0000	1.12
951	0.00483	0.8698	0.0000	0.0000	0.0228	0.2276	0.0242	1.1444	183.9444	186.0000	2.06
950	0.00000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	182.8000	182.8000	0.00

AS — SHEET NUMBER 35

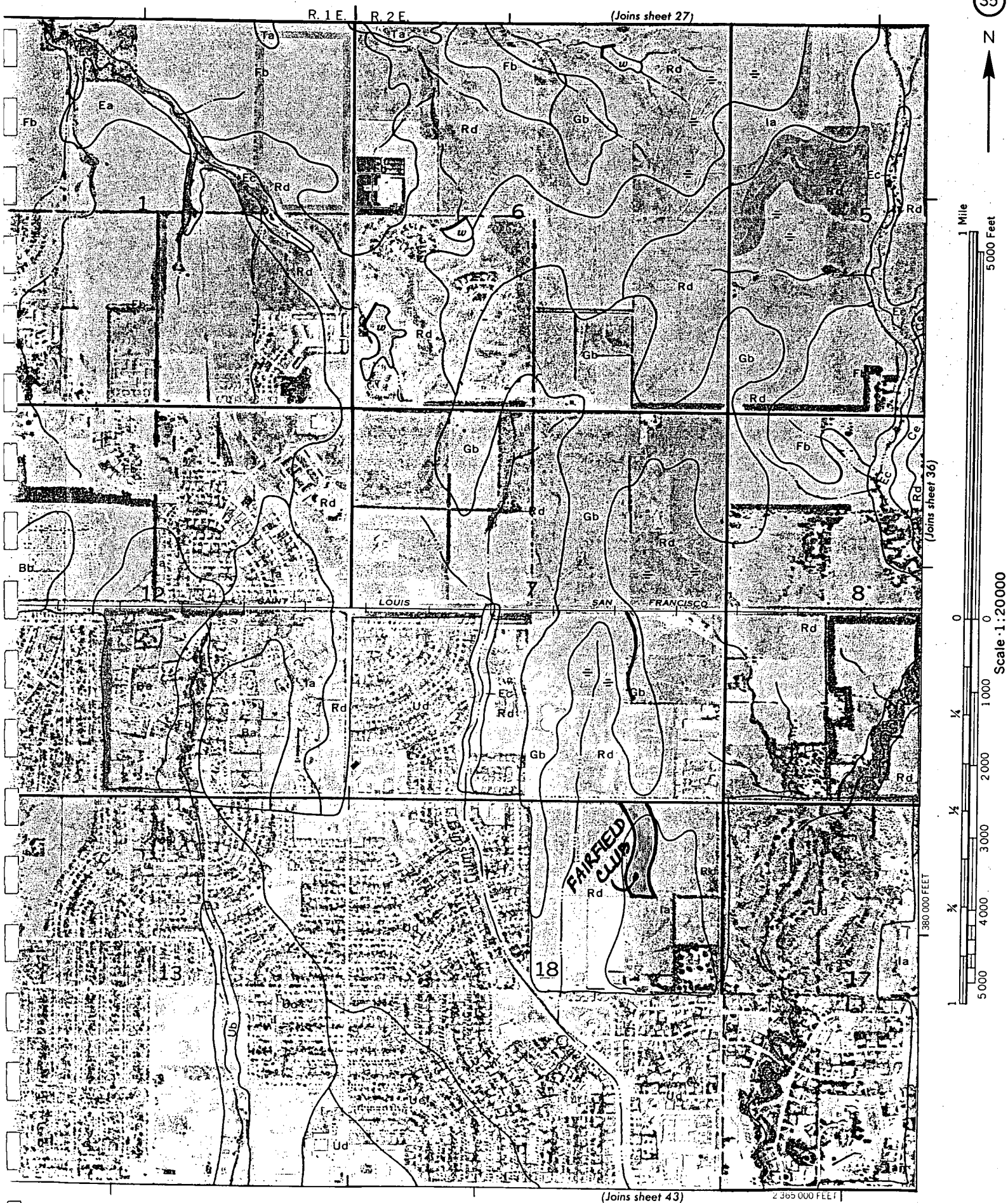


EXHIBIT NO. 1

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

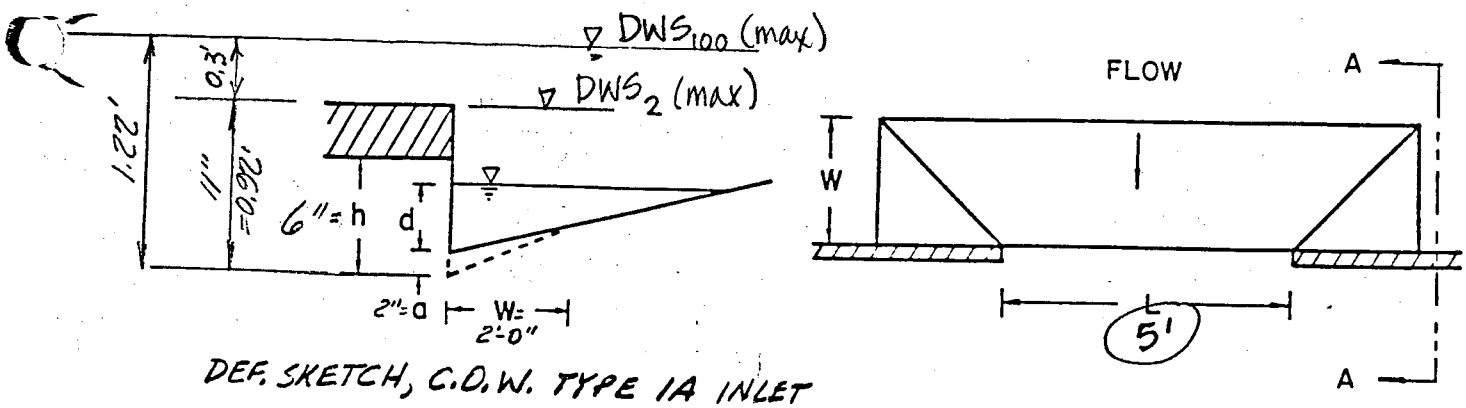
DURATION IN MINUTES	RETURN PERIODS OF 1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
5	4.18	5.57	6.53	7.41	8.52	9.48	10.32
6	3.99	5.32	6.25	7.09	8.16	9.09	9.89
7	3.81	5.09	5.99	6.81	7.84	8.74	9.50
8	3.66	4.89	5.75	6.55	7.55	8.42	9.15
9	3.52	4.70	5.54	6.31	7.28	8.13	8.83
10	3.39	4.52	5.34	6.09	7.04	7.86	8.54
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

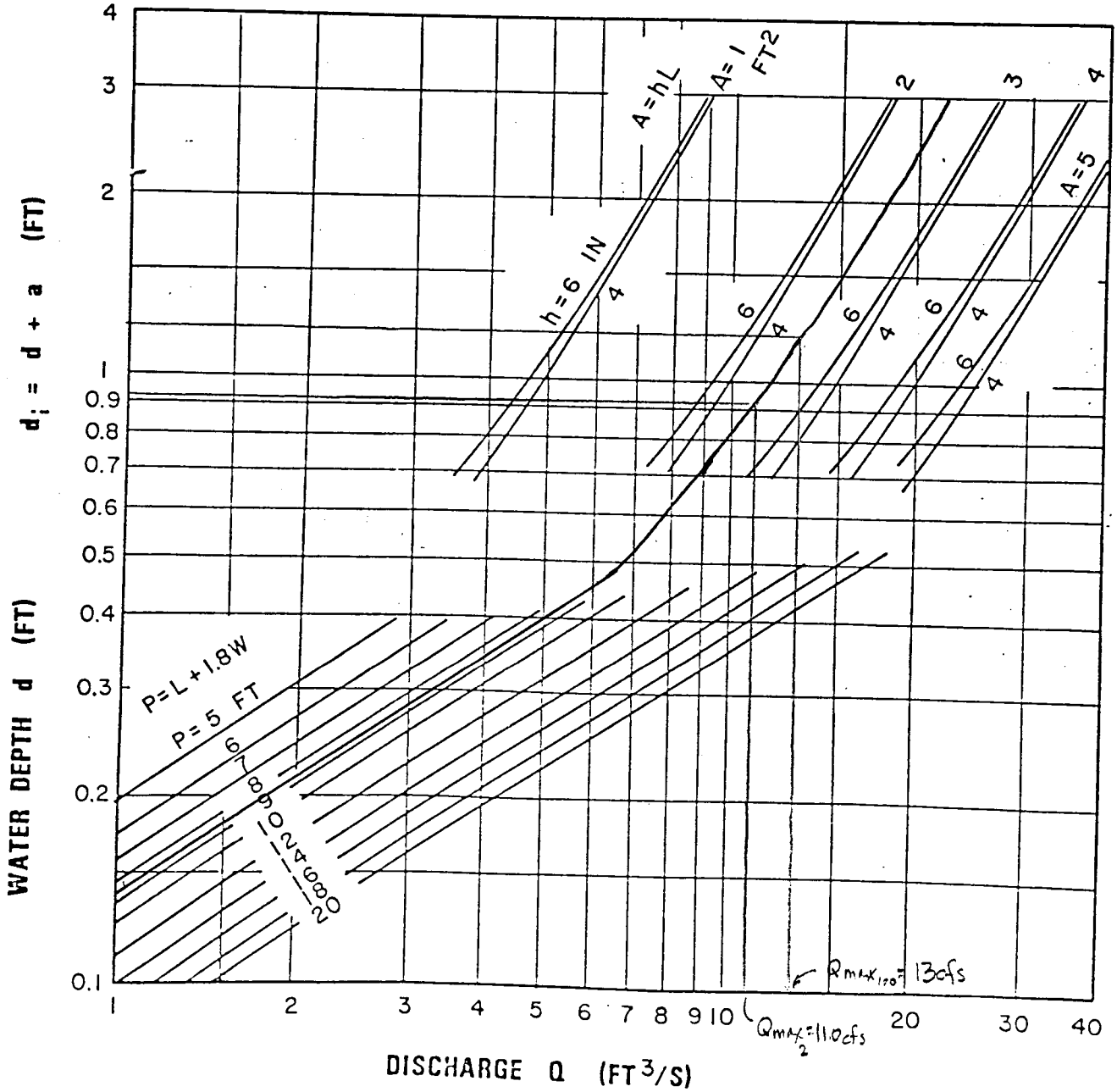


CHART 12. Depressed curb-opening inlet capacity in sump locations.

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

Fairfield Club

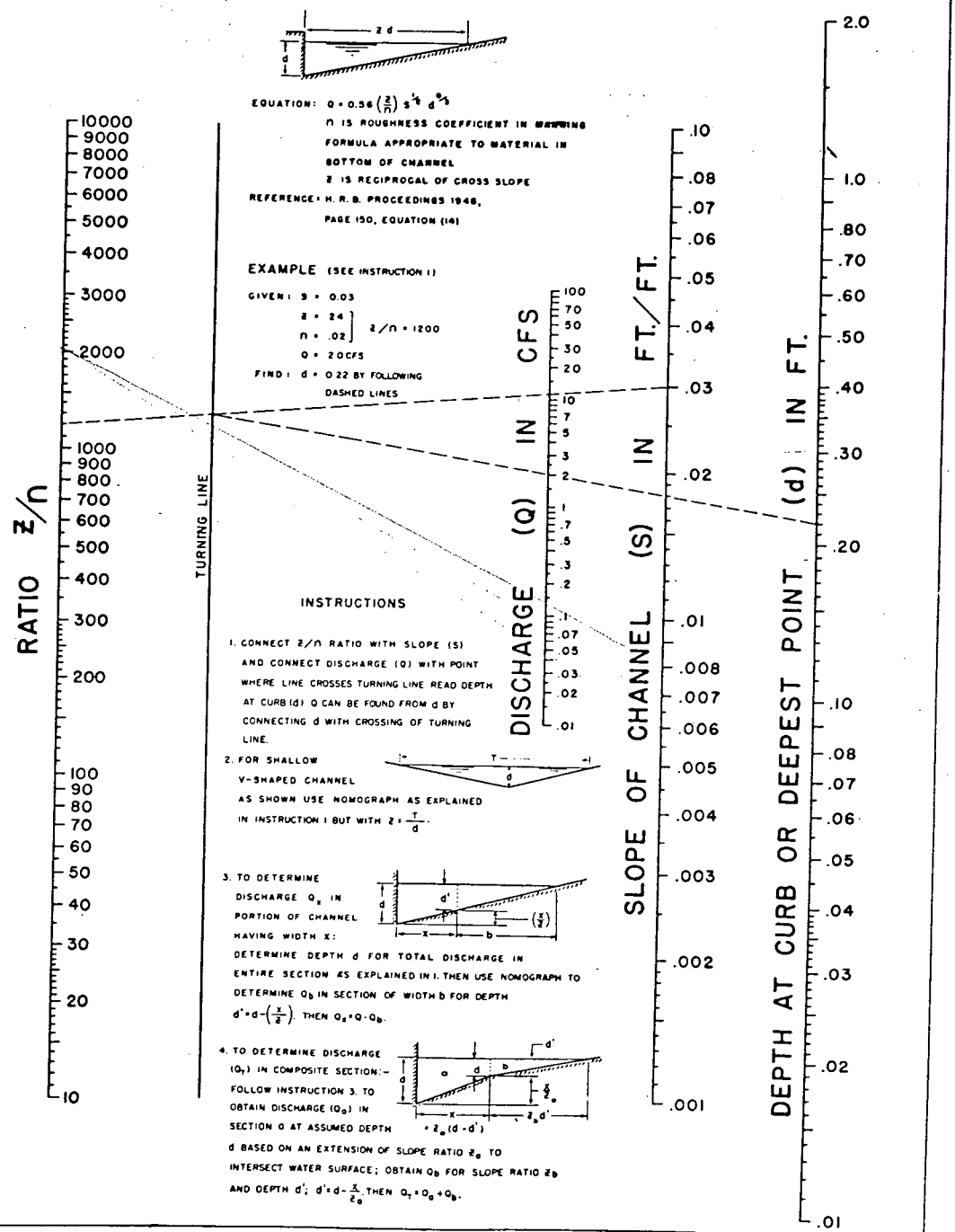
X-Slope = 3/8"/1 = 0.03125 '/'

z = 1/x-Sl = 1/0.03125 = 32.0

n = 0.016

z/n = 32.0/0.016 = 2000

Chart 1



BUREAU OF PUBLIC ROADS
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NOMOGRAPH FOR FLOW IN TRIANGULAR CHANNELS