

PROFESSIONAL
ENGINEERING
CONSULTANTS
PROFESSIONAL ASSOCIATION

**DRAINAGE PLAN
AND
SUPPORTING CALCULATIONS**

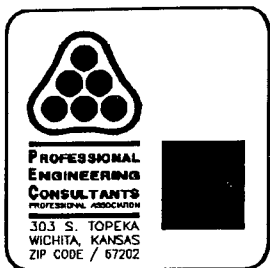
**FOR
KANSAS SURGERY AND RECOVERY CENTER ADDITION
WICHITA, KANSAS**

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

JUNE 4, 1993

303 S. TOPEKA
WICHITA, KANSAS 67202
(316) 262-2691
FAX (316) 262-3003

MEMO



TO: Michael E. Lindebak, P.E.

455 N. Main, 7th Floor

Wichita, KS 67202

ATTN: Vicky Huang, P.E.

PROJECT NO. 36-92223-1-3097

PROJECT: Kansas Surgery and

Recovery Center Addition Drainage Plan

DATE: June 4, 1993

COPIES TO:

FROM: Michael W. Berry, P.E.

REFERENCE: Drainage Plan Computations

PLEASE ADVISE IMMEDIATELY OF ANY MISCONCEPTIONS OR OMISSIONS YOU BELIEVE TO BE CONTAINED HEREIN.

Attached hereto are the computations for the referenced project.

The publication Interim Drainage and Storm Sewer Policy for Design Criteria and Documentation, City of Wichita, as revised 7/1/87, was used as the guideline for the hydrologic and hydraulic computations. This publication is hereinafter referred to as the "Design Manual."

Manual #1, as referenced herein, refers to Design of Urban Highway Drainage - The State of the Art, by Reitz & Jens, Inc., April 1980. Manual #2 refers to Drainage of Highway Pavements, Hydraulic Engineering Circular #12, by Tye Engineering, Inc., March 1984.

The analysis made herein is based on the available site data which includes 1"=100' topographic map with 2' contours, project plans for various improvements on adjacent lands, and the original Drainage Plans for the Tallgrass East 3rd Addition (1989).

HYDROLOGIC ANALYSIS FOR STORM WATER SEWERS

For storm sewer design, the Rational Method was used for hydrologic analysis in accordance with the Design Manual. Runoff coefficients were estimated based on tables provided in the Manual.

For this development, a uniform assumption of the minimum time of concentration value of 15 minutes was appropriate.

Travel time for flow-through defined channels, pipes, etc., for these basins was estimated on the basis of Manning's Equation.

Michael E. Lindebak, P.E.
Kansas Surgery and Recovery Center Addition Drainage Plan
June 4, 1993
Page 2

HYDRAULIC ANALYSIS FOR STORM WATER SEWERS

For each inlet, street flooding and inlet capacity was checked for the minor storm. Conveyance in the street was based on the modified Manning's Equation:

$$Q = 0.56 (Z/n) S^{1/2} d^{8/3} \text{ (Manual \#1)}$$

It was assumed that t_c for street flow was equal to t_c for pipe flow. This is a conservative assumption, as pipe velocities generally exceed gutter velocities.

For local streets, curb-deep flow is tolerable for the minor storm.

Inlet capacities were determined by the methods presented in Manual #2.

In this analysis, City of Wichita Type 1A inlets and 3/8 in./ft. street cross-slope were assumed to be utilized. Minimum walk grade was assumed as 0.3 feet above the top of curb, except as otherwise noted. The local street is assumed to have 6-5/8" standard curb and gutter.

All storm sewer systems serve residential and industrial areas. Therefore, the design minor storm has a recurrence interval of five years, and the major storm one hundred years. Systems are designed for the minor storm, with major storm overflows directed through pipes at sump locations to the ponds.

To simplify analysis, the following assumptions were made:

1. The time of concentration is identical for both the major and minor storm.
2. The street conveyance was analyzed using only the street width. Depths above the curb up to the walk grade were used, but the conveyance of the parking was neglected. In general, the parking area conveyance is quite small, due to the relatively higher "n" factor.

Hydraulic computations for the pipe systems were performed using PEC's Storm Program. This program uses Manning's Equation to calculate friction losses in pipes flowing full. Minor losses are computed by momentum principles at each structure. All pipes were assumed to be reinforced concrete with a Manning's "n" factor of 0.013. It is desirable to keep the hydraulic grade line approximately one foot below the top of curb elevations for the minor storm.

HYDRAULIC MODELS FOR DETENTION

The detention basin was sized in the original calculations for Tallgrass East 3rd Addition. The final grading data was input into a revised HEC-1 model. The HEC-1 computer run is included in the section "Proposed Developed Condition Model".

DRAINAGE MAP

A 1"=100' scale drainage map is included in a map pocket at the back of the report.

KANSAS SURGERY AND RECOVERY CENTER ADDITION
DRAINAGE PLAN
1-Jun-93

HYDROLOGY

Rational Method: $Q = CIA$

DETERMINE "C"

<u>Sub-Basin</u>	<u>Node</u>	<u>Soil Type</u>	<u>Hyd. Group</u>	<u>Land Use</u>	<u>5 Year C</u>	<u>100 Year C</u>
1A	105	Gb	D	Industrial	0.76	0.84
1B	110	Gb	D	Industrial	0.76	0.84
1C	120	Ce, Rd	25%C, 75%D	Industrial	0.76	0.84
1D	130	Ce, Rd	30%C, 70%D	Industrial	0.76	0.84
1E	140	Ce	C	Industrial	0.76	0.84
1F	150	Ce, Rd	50%C, 50%D	Industrial	0.76	0.84
1G	100	Gb, Rd	D	Industrial	0.76	0.84
1H	115	Gb, Rd	D	Apartments	0.73	0.86
1I	125	Ce, Rd	30%C, 70%D	Apartments	0.73	0.85
1J	135	Ce, Rd	50%C, 50%D	Apartments	0.73	0.84
2A	200	Gb	D	Apartments	0.73	0.86
2B	205	Gb, Rd	D	Apartments	0.73	0.86
2C	210	Rd	D	Apartments	0.73	0.86
2D	220	Ce, Rd	30%C, 70%D	Apartments	0.73	0.85

KANSAS SURGERY AND RECOVERY CENTER ADDITION
DRAINAGE PLAN
1-Jun-93

DETERMINE "I"

<u>Sub-Basin</u>	<u>Node</u>	<u>Tc (min.)</u>	<u>5 Year I</u>	<u>100 Year I</u>
1A	105	15	4.56	7.37
1B	110	15	4.56	7.37
1C	120	15	4.56	7.37
1D	130	15	4.56	7.37
1E	140	15	4.56	7.37
1F	150	15	4.56	7.37
1G	100	15	4.56	7.37
1H	115	15	4.56	7.37
1I	125	15	4.56	7.37
1J	135	15	4.56	7.37
2A	200	15	4.56	7.37
2B	205	15	4.56	7.37
2C	210	15	4.56	7.37
2D	220	15	4.56	7.37

KANSAS SURGERY AND RECOVERY CENTER ADDITION
DRAINAGE PLAN
1-Jun-93

DETERMINE "A"

<u>Sub-Basin</u>	<u>Node</u>	<u>Plan.Units</u>	<u>Area (SF)</u>	<u>Area (Ac.)</u>
1A	105	15.51	155100	3.56
1B	110	13.72	137200	3.15
1C	120	20.34	203400	4.67
1D	130	10.15	101500	2.33
1E	140	20.30	203000	4.66
1F	150	30.14	301400	6.92
1G	100	7.19	71900	1.65
1H	115	9.58	95800	2.20
1I	125	6.45	64500	1.48
1J	135	6.10	61000	1.40
2A	200	10.06	100600	2.31
2B	205	10.11	101100	2.32
2C	210	9.28	92800	2.13
2D	220	7.10	71000	1.63

KANSAS SURGERY AND RECOVERY CENTER ADDITION
DRAINAGE PLAN
1-Jun-93

DETERMINE "Q" (5 Year)

<u>Sub-Basin</u>	<u>Node</u>	<u>5 Year C</u>	<u>5 Year I</u>	<u>A (Ac.)</u>	<u>5 yr Q (cfs)</u>
1A	105	0.76	4.56	3.56	12.3
1B	110	0.76	4.56	3.15	10.9
1C	120	0.76	4.56	4.67	16.2
1D	130	0.76	4.56	2.33	8.1
1E	140	0.76	4.56	4.66	16.1
1F	150	0.76	4.56	6.92	24.0
1G	100	0.76	4.56	1.65	5.7
1H	115	0.73	4.56	2.20	7.3
1I	125	0.73	4.56	1.48	4.9
1J	135	0.73	4.56	1.40	4.7
2A	200	0.73	4.56	2.31	7.7
2B	205	0.73	4.56	2.32	7.7
2C	210	0.73	4.56	2.13	7.1
2D	220	0.73	4.56	1.63	5.4

KANSAS SURGERY AND RECOVERY CENTER ADDITION
DRAINAGE PLAN
1-Jun-93

DETERMINE "Q" (100 Year)

<u>Sub-Basin</u>	<u>Node</u>	<u>100 Year C</u>	<u>100 Year I</u>	<u>A (Ac.)</u>	<u>100 yr Q (cfs)</u>
1A	105	0.84	7.37	3.56	22.0
1B	110	0.84	7.37	3.15	19.5
1C	120	0.84	7.37	4.67	28.9
1D	130	0.84	7.37	2.33	14.4
1E	140	0.84	7.37	4.66	28.8
1F	150	0.84	7.37	6.92	42.8
1G	100	0.84	7.37	1.65	10.2
1H	115	0.86	7.37	2.20	13.9
1I	125	0.85	7.37	1.48	9.3
1J	135	0.84	7.37	1.40	8.7
2A	200	0.86	7.37	2.31	14.6
2B	205	0.86	7.37	2.32	14.7
2C	210	0.86	7.37	2.13	13.5
2D	220	0.85	7.37	1.63	10.2

KANSAS SURGERY AND RECOVERY CENTER ADDITION
DRAINAGE PLAN
1-Jun-93

HYDRAULICS

FLOODED PAVEMENT WIDTHS USING 6 5/8" COMBINED CURB & GUTTER

5-Year Storm: Dry above the top of curb - Max. Depth d = 0.55
100-Year Storm: Dry above the right-of-way - Max. Depth d = 0.85

EQUATION : Allowable Q = 0.56(Z/n) S^(1/2) d^(8/3)

Z = Reciprocal of pavement cross-slope
n = Roughness coefficient
S = Longitudinal pavement slope (ft./ft.)
d = Maximum allowable depth

<u>Node</u>	<u>5-Year Q (cfs)</u>	<u>100-Year Q (cfs)</u>	<u>Z</u>	<u>n</u>	<u>S</u>	Allowable	
						<u>5-Year Q (cfs)</u>	<u>100-Year Q (cfs)</u>
100	5.7	10.2	32	0.016	0.0032	13.0	41.3
105	12.3	22.0	32	0.016	0.0032	13.0	41.3
110	10.9	19.5	32	0.016	0.0032	13.0	41.3
115	7.3	13.9	32	0.016	0.0032	13.0	41.3
120	16.2	28.9	32	0.016	0.0032	13.0	41.3
125	4.9	9.3	32	0.016	0.0132	26.4	84.0
130	8.1	14.4	32	0.016	0.0132	26.4	84.0
135	4.7	8.7	32	0.016	0.0200	32.5	103.4
140	16.1	28.8	32	0.016	0.0200	32.5	103.4

KANSAS SURGERY AND RECOVERY CENTER ADDITION
DRAINAGE PLAN
1-Jun-93

INLET CAPACITY Using a 3/8" per ft. x-slope (Sx)

<u>Sub-Basin</u>	<u>Node</u>	<u>Inlet Condition</u>	<u>Long. Pvmnt. Sl.</u>	<u>Qgutter (cfs)</u>	<u>Qintercept (cfs)</u>	<u>Qbypass (cfs)</u>	<u>Inlet Length</u>
1A	105	Grade	0.32%	9.0	6.2	2.8	10'
1B	110	Grade	0.32%	8.5	6.0	2.5	10'
1C	120	Grade	0.32%	15.7	8.6	7.1	10'
1D	130	Grade	1.32%	13.6	6.3	7.3	10'
1E	140	Grade	2.00%	17.7	6.5	11.2	10'
1G	100	Grade	0.32%	9.0	6.2	2.8	10'
1H	115	Grade	0.32%	15.6	8.6	7.0	10'
1I	125	Grade	1.32%	13.5	6.2	7.3	10'
1J	135	Grade	2.00%	17.7	6.5	11.2	10'
1F	150	Sump	0.00%	46.4	46.4	0.0	30'
2A	200	Sump	0.00%	7.7	7.7	0.0	* 4' x 4'
2B	205	Sump	0.00%	7.7	7.7	0.0	* 4' x 4'
2C	210	Sump	0.00%	7.1	7.1	0.0	* 4' x 4'
2D	215	Sump	0.00%	5.4	5.4	0.0	* 4' x 4'

* Grate inlet with dimension L' x W'

NOTE: Some gutter flow along the sub-basins over top the centerline crown and are either added to the flow approaching the adjacent inlets or balanced if both inlets flows are above centerline.

100 j,	192.0000	155	3	12	11			
110 t,	KANSAS SURGERY AND RECOVERY CENTER ADDITION							
120 t,	System 1 5 Year							
130 t,	JPS 6-3-93							
140 i,	100	0.00	0.00	0.00	0.00	6.20	15.00	224.00
150 i,	105	0.00	0.00	0.00	0.00	6.20	15.00	224.00
160 i,	110	0.00	0.00	0.00	0.00	6.00	15.00	223.50
170 i,	115	0.00	0.00	0.00	0.00	8.60	15.00	222.50
180 i,	120	0.00	0.00	0.00	0.00	8.60	15.00	222.50
190 i,	125	0.00	0.00	0.00	0.00	6.20	15.00	218.00
200 i,	130	0.00	0.00	0.00	0.00	6.30	15.00	218.00
210 i,	135	0.00	0.00	0.00	0.00	6.50	15.00	212.00
220 i,	140	0.00	0.00	0.00	0.00	6.50	15.00	212.00
230 m,	145	207.00						
240 i,	150	0.00	0.00	0.00	0.00	46.40	15.00	204.00
250 m,	155	192.00						
260 p,	100	105	30.00	18	0.013	90.00	0.00	
270 p,	105	110	145.00	24	0.013	40.00	0.00	
280 p,	110	120	335.00	30	0.013	10.00	0.00	
290 p,	115	120	30.00	15	0.013	90.00	0.00	
300 p,	120	130	335.00	30	0.013	30.00	0.00	
310 p,	125	130	30.00	15	0.013	75.00	0.00	
320 p,	130	140	300.00	30	0.013	30.00	0.00	
330 p,	135	140	30.00	15	0.013	105.00	0.00	
340 p,	140	145	190.00	30	0.013	30.00	0.00	
350 p,	145	150	120.00	30	0.013	30.00	0.00	
360 p,	150	155	100.00	36	0.013	0.00	0.00	
370 e								

Date: 06-03-1993
Time: 16:40:17

KANSAS SURGERY AND RECOVERY CENTER ADDITION
System 1 5 Year
JPS 6-3-93

Input File: C:\STORM\KSRCYS1.STM

Storm Frequency = 5-Year

*** HYDROLOGY ***

***** Tributary Area *****										***** Hydrology Summation *****				***** Conduit Data *****			
Node to	C	Area	Slope	Length	TC(0)	I(0)	Q(0)	TC	I	Q	Sum Q	Size	Velocity	Length	TT	TT+TC	
Node		(Ac)	(%)	(Ft)	(Min)	(In/Hr)	(CFS)	(Min)	(In/Hr)	(CFS)	(CFS)		(Ft/Sec)	(Ft)	(Min)	(Min)	
100	105	.00	.00	.00	.0	15.00	4.56	6.20	15.00	4.56	6.20	6.20	18"	3.51	30.00	.14	15.14
105	110	.00	.00	.00	.0	15.00	4.56	6.20	15.14	4.54	6.17	12.37	24"	3.94	145.00	.61	15.76
110	120	.00	.00	.00	.0	15.00	4.56	6.00	15.76	4.46	5.87	18.25	30"	3.72	335.00	1.50	17.26
115	120	.00	.00	.00	.0	15.00	4.56	8.60	15.00	4.56	8.60	8.60	15"	7.01	30.00	.07	15.07
120	130	.00	.00	.00	.0	15.00	4.56	8.60	17.26	4.28	8.08	34.43	30"	7.01	335.00	.80	18.05
125	130	.00	.00	.00	.0	15.00	4.56	6.20	15.00	4.56	6.20	6.20	15"	5.05	30.00	.10	15.10
130	140	.00	.00	.00	.0	15.00	4.56	6.30	18.05	4.19	5.80	45.95	30"	9.36	300.00	.53	18.59
135	140	.00	.00	.00	.0	15.00	4.56	6.50	15.00	4.56	6.50	6.50	15"	5.30	30.00	.09	15.09
140	145	.00	.00	.00	.0	15.00	4.56	6.50	18.59	4.14	5.90	57.78	30"	11.77	190.00	.27	18.86
145	150	.00	.00	.00	.0	.00	.00	.00	18.86	4.11	.00	57.78	30"	11.77	120.00	.17	19.03
150	155	.00	.00	.00	.0	15.00	4.56	46.40	19.03	4.09	41.68	99.46	36"	14.07	100.00	.12	19.15

06-03-1993

Date: 06-03-1993
Time: 16:40:17

Input File: C:\STORM\KSRCYS1.STM

KANSAS SURGERY AND RECOVERY CENTER ADDITION
System 1 5 Year
JPS 6-3-93

Storm Frequency = 5-Year

* * * H Y D R A U L I C S * * *

```

*****
Node   Hyd-Slope  Friction  Bend  Transition  Manhole  Deflection  Junction  Total  Hyd-Gl  Desired  Diff.
(Ft/Ft) (Ft)      (Ft)      (Ft)      (Ft)      (Ft)      (Ft)      (Ft)      (Ft)  - Elevation Elevation (Ft)
*****
100    .00348     .1045     .0000   .0000       .0000     .0000       .0000     .1045  217.6135  224.0000  6.39
105    .00299     .4339     .0000   .0050       .0000     .0956       .3584     .8928  217.5090  224.0000  6.49
110    .00198     .6631     .0000   .0053       .0000     .0455       .1600     .8739  216.6162  223.5000  6.88
115    .01772     .5317     .0000   .0000       .0000     .0000       .0000     .5317  216.2740  222.5000  6.23
120    .00705     2.3605    .0000   .0549       .0000     .0077       1.1233    3.5464  215.7423  222.5000  6.76
125    .00921     .2764     .0000   .0000       .0000     .0000       .0000     .2764  212.4723  218.0000  5.53
130    .01255     3.7657    .0000   .0597       .0000     .1022       1.1938    5.1214  212.1959  218.0000  5.80
135    .01012     .3037     .0000   .0000       .0000     .0000       .0000     .3037  207.3782  212.0000  4.62
140    .01984     3.7700    .0000   .0790       .0000     .1821       1.7211    5.7522  207.0745  212.0000  4.93
145    .01984     2.3811    .0000   .0000       .1076     .2878       .0994     2.8758  201.3223  207.0000  5.68
150    .02224     2.2236    .0000   .0923       .0000     .2878       3.8427    6.4464  198.4464  204.0000  5.55
155    .00000     .0000     .0000   .0000       .0000     .0000       .0000     .0000  192.0000  192.0000  .00
*****

```

100 j, 221.0000 120 3 4 3
 110 t, KANSAS SURGERY AND RECOVERY CENTER ADDITION
 120 t, System 1 First Leg
 130 t, JPS 6-3-93
 140 i, 100 0.00 0.00 0.00 0.00 6.20 15.00 224.00
 150 i, 105 0.00 0.00 0.00 0.00 6.20 15.00 224.00
 160 i, 110 0.00 0.00 0.00 0.00 6.00 15.00 223.50
 170 m, 120 221.00
 180 p, 100 105 30.00 18 0.013 90.00 0.00
 190 p, 105 110 145.00 24 0.013 40.00 0.00
 200 p, 110 120 335.00 30 0.013 10.00 0.00
 210 e

Input File: C:\STORM\KSRCSY11.STM

KANSAS SURGERY AND RECOVERY CENTER ADDITION
System 1 First Leg
JPS 6-3-93

Storm Frequency = 5-Year

*** HYDROLOGY ***

Tributary Area										Hydrology Summation				Conduit Data				
Node to Node	C	Area (Ac)	Slope (%)	Length (Ft)	TC(0) (Min)	I(0) (In/Hr)	Q(0) (CFS)	TC (Min)	I (In/Hr)	Q (CFS)	Sum Q (CFS)	Size	Velocity (Ft/Sec)	Length (Ft)	TT (Min)	TT+TC (Min)		
100	105	.00	.00	.00	.0	15.00	4.56	6.20	15.00	4.56	6.20	6.20	18"	3.51	30.00	.14	15.14	
105	110	.00	.00	.00	.0	15.00	4.56	6.20	15.14	4.54	6.17	12.37	24"	3.94	145.00	.61	15.76	
110	120	.00	.00	.00	.0	15.00	4.56	6.00	15.76	4.46	5.87	18.25	30"	3.72	335.00	1.50	17.26	

*** 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)
100	.00348	.1045	.0000	.0000	.0000	.0000	.0000	.1045	222.8712	224.0000	1.13
105	.00299	.4339	.0000	.0050	.0000	.0956	.3584	.8928	222.7667	224.0000	1.23
110	.00198	.6631	.0000	.0053	.0000	.0455	.1600	.8739	221.8739	223.5000	1.63
120	.00000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	221.0000	221.0000	.00

06-03-1993

100 j, 221.0000 120 3 2 1
110 t, KANSAS SURGERY AND RECOVERY CENTER ADDITION
120 t, System 1 Second Leg
130 t, JPS 6-3-93
140 i, 115 0.00 0.00 0.00 0.00 8.60 15.00 222.50
150 m, 120 221.00
160 p, 115 120 30.00 15 0.013 90.00 0.00
170 e

Date: 06-03-1993
Time: 16:16:29

Input File: C:\STORM\KSRCYS12.STM

KANSAS SURGERY AND RECOVERY CENTER ADDITION
System 1 Second Leg
JPS 6-3-93

Storm Frequency = 5-Year

*** HYDROLOGY ***

Tributary Area				Hydrology Summation				Conduit Data									
Node to Node	C	Area (Ac)	Slope (%)	Length (Ft)	TC(0) (Min)	I(0) (In/Hr)	Q(0) (CFS)	TC (Min)	I (In/Hr)	Q (CFS)	Sum Q (CFS)	Size	Velocity (Ft/Sec)	Length (Ft)	TT (Min)	TT+TC (Min)	
115	120	.00	.00	.00	.0	15.00	4.56	8.60	15.00	4.56	8.60	8.60	15"	7.01	30.00	.07	15.07

*** 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)
115	.01772	.5317	.0000	.0000	.0000	.0000	.0000	.5317	221.5317	222.5000	.97
120	.00000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	221.0000	221.0000	.00

100 j, 216.5000 130 3 3 2
 110 t, KANSAS SURGERY AND RECOVERY CENTER ADDITION
 120 t, System 1 Third Leg
 130 t, JPS 6-3-93
 140 i, 120 0.00 0.00 0.00 0.00 34.40 15.00 222.50
 150 m, 130 216.50
 160 i, 125 0.00 0.00 0.00 0.00 6.20 15.00 218.00
 170 p, 120 130 335.00 30 0.013 30.00 0.00
 180 p, 125 130 30.00 15 0.013 75.00 0.00
 190 e

Input File: C:\STORM\KSRCY13.STM

KANSAS SURGERY AND RECOVERY CENTER ADDITION
System 1 Third Leg
JPS 6-3-93

Storm Frequency = 5-Year

*** HYDROLOGY ***

*****										*****									
Tributary Area					Hydrology Summation					Conduit Data									
Node to	C	Area	Slope	Length	TC(0)	I(0)	Q(0)	TC	I	Q	Sum Q	Size	Velocity	Length	TT	TT+TC			
Node		(Ac)	(%)	(Ft)	(Min)	(In/Hr)	(CFS)	(Min)	(In/Hr)	(CFS)	(CFS)		(Ft/Sec)	(Ft)	(Min)	(Min)			
*****										*****									
120	130	.00	.00	.00	.0	15.00	4.56	34.40	15.00	4.56	34.40	34.40	30"	7.01	335.00	.80	15.80		
125	130	.00	.00	.00	.0	15.00	4.56	6.20	15.00	4.56	6.20	6.20	15"	5.05	30.00	.10	15.10		
*****										*****									

*** HYDRAULICS ***

Node	Hyd-Slope	Friction	Bend	Transition	Manhole	Deflection	Junction	Total	Hyd-Gl	Desired	Diff.	
	(Ft/Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	Elevation	Elevation	(Ft)	

120	.00703	2.3563	.0000	.0000	.0000	.0000	.0000	2.3563	218.8563	222.5000	3.64	
130	.00000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	216.5000	216.5000	.00	
125	.00921	.2764	.0000	.0000	.0000	.0000	.0000	.2764	216.7764	218.0000	1.22	

100 j, 210.5000 140 3 3 2
110 t, KANSAS SURGERY AND RECOVERY CENTER ADDITION
120 t, System 1 Fourth Leg
130 t, JPS 6-3-93
140 i, 130 0.00 0.00 0.00 0.00 46.00 15.00 218.00
150 m, 140 210.50
160 i, 135 0.00 0.00 0.00 0.00 6.50 15.00 212.00
170 p, 130 140 300.00 30 0.013 30.00 0.00
180 p, 135 140 30.00 15 0.013 110.00 0.00
190 e

Date: 06-03-1993
Time: 16:20:50

Input File: C:\STORM\KSRCY14.STM

KANSAS SURGERY AND RECOVERY CENTER ADDITION
System 1 Fourth Leg
JPS 6-3-93

Storm Frequency = 5-Year

*** HYDROLOGY ***

Tributary Area										Hydrology Summation				Conduit Data			
Node to Node	C	Area (Ac)	Slope (%)	Length (Ft)	TC(0) (Min)	I(0) (In/Hr)	Q(0) (CFS)	TC (Min)	I (In/Hr)	Q (CFS)	Sum Q (CFS)	Size	Velocity (Ft/Sec)	Length (Ft)	TT (Min)	TT+TC (Min)	
130 140	.00	.00	.00	.0	15.00	4.56	46.00	15.00	4.56	46.00	46.00	30"	9.37	300.00	.53	15.53	
135 140	.00	.00	.00	.0	15.00	4.56	6.50	15.00	4.56	6.50	6.50	15"	5.30	30.00	.09	15.09	

*** 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)
130	.01258	3.7732	.0000	.0000	.0000	.0000	.0000	3.7732	214.2732	218.0000	3.73
140	.00000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	210.5000	210.5000	.00
135	.01012	.3037	.0000	.0000	.0000	.0000	.0000	.3037	210.8037	212.0000	1.20

06-03-1993

100 j, 202.5000 150 3 3 2
110 t, KANSAS SURGERY AND RECOVERY CENTER ADDITION
120 t, System 1 Fifth Leg
130 t, JPS 6-3-93
140 i, 140 0.00 0.00 0.00 0.00 57.80 15.00 212.00
150 m, 145 207.00
160 m, 150 202.50
170 p, 140 145 190.00 30 0.013 30.00 0.00
180 p, 145 150 120.00 30 0.013 30.00 0.00
190 e

Date: 06-03-1993
Time: 16:22:24

Input File: C:\STORM\KSRCYSY15.SIM

KANSAS SURGERY AND RECOVERY CENTER ADDITION
System 1 Fifth Leg
JPS 6-3-93

Storm Frequency = 5-Year

*** HYDROLOGY ***

Tributary Area										Hydrology Summation				Conduit Data			
Node to Node	C	Area (Ac)	Slope (%)	Length (Ft)	TC(0) (Min)	I(0) (In/Hr)	Q(0) (CFS)	TC (Min)	I (In/Hr)	Q (CFS)	Sum Q (CFS)	Size	Velocity (Ft/Sec)	Length (Ft)	TT (Min)	TT+TC (Min)	
140	145	.00	.00	.00	.0	15.00	4.56	57.80	15.00	4.56	57.80	57.80	30"	11.77	190.00	.27	15.27
145	150	.00	.00	.00	.0	.00	.00	.00	15.27	4.52	.00	57.80	30"	11.77	120.00	.17	15.44

*** 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)
140	.01986	3.7729	.0000	.0000	.0000	.0000	.0000	3.7729	209.1510	212.0000	2.85
145	.01986	2.3829	.0000	.0000	.1076	.2880	.0995	2.8781	205.3781	207.0000	1.62
150	.00000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	202.5000	202.5000	.00

06-03-1993

100 j, 192.0000 155 3 2 1
110 t, KANSAS SURGERY AND RECOVERY CENTER ADDITION
120 t, System 1 Sixth Leg
130 t, JPS 6-3-93
140 i, 150 0.00 0.00 0.00 0.00 99.50 15.00 204.00
150 m, 155 192.00
160 p, 150 155 100.00 36 0.013 0.00 0.00
170 e

06-03-1993

Date: 06-03-1993
Time: 16:24:01

Input File: C:\STORM\KSRCYS16.STM

KANSAS SURGERY AND RECOVERY CENTER ADDITION
System 1 Sixth Leg
JPS 6-3-93

Storm Frequency = 5-Year

*** HYDROLOGY ***

Tributary Area				Hydrology Summation				Conduit Data									
Node to Node	C	Area (Ac)	Slope (%)	Length (Ft)	TC(0) (Min)	I(0) (In/Hr)	Q(0) (CFS)	TC (Min)	I (In/Hr)	Q (CFS)	Sum Q (CFS)	Size	Velocity (Ft/Sec)	Length (Ft)	TT (Min)	TT+TC (Min)	
150	155	.00	.00	.00	.0	15.00	4.56	99.50	15.00	4.56	99.50	99.50	36"	14.08	100.00	.12	15.12

*** 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)
150	.02225	2.2254	.0000	.0000	.0000	.0000	.0000	2.2254	194.2254	204.0000	9.77
155	.00000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	192.0000	192.0000	.00

100 j,	192.0000	225	3	6	5				
110 t,	KANSAS SURGERY AND RECOVERY CENTER ADDITION								
120 t,	System 2 5 Year								
130 t,	JPS 6-3-93								
140 i,	200	0.00	0.00	0.00	0.00	7.70	15.00	224.00	
150 i,	205	0.00	0.00	0.00	0.00	7.70	15.00	219.00	
160 i,	210	0.00	0.00	0.00	0.00	7.10	15.00	217.50	
170 i,	215	0.00	0.00	0.00	0.00	5.40	15.00	210.00	
180 m,	220	203.00							
190 m,	225	192.00							
200 p,	200	205	300.00	18	0.013	0.00	0.00		
210 p,	205	210	300.00	24	0.013	0.00	0.00		
220 p,	210	215	300.00	24	0.013	0.00	0.00		
230 p,	215	220	300.00	24	0.013	30.00	0.00		
240 p,	220	225	100.00	24	0.013	0.00	0.00		
250 e									

Date: 06-03-1993
Time: 16:42:35

Input File: C:\STORM\KSRCYS2.STM

KANSAS SURGERY AND RECOVERY CENTER ADDITION
System 2 5 Year
JPS 6-3-93

Storm Frequency = 5-Year

*** HYDROLOGY ***

Tributary Area										Hydrology Summation				Conduit Data			
Node to Node	C	Area (Ac)	Slope (%)	Length (Ft)	TC(0) (Min)	I(0) (In/Hr)	Q(0) (CFS)	TC (Min)	I (In/Hr)	Q (CFS)	Sum Q (CFS)	Size	Velocity (Ft/Sec)	Length (Ft)	TT (Min)	TT+TC (Min)	
200 205	.00	.00	.00	.0	15.00	4.56	7.70	15.00	4.56	7.70	7.70	18"	4.36	300.00	1.15	16.15	
205 210	.00	.00	.00	.0	15.00	4.56	7.70	16.15	4.41	7.46	15.16	24"	4.82	300.00	1.04	17.18	
210 215	.00	.00	.00	.0	15.00	4.56	7.10	17.18	4.29	6.69	21.84	24"	6.95	300.00	.72	17.90	
215 220	.00	.00	.00	.0	15.00	4.56	5.40	17.90	4.21	4.99	26.83	24"	8.54	300.00	.59	18.49	
220 225	.00	.00	.00	.0	.00	.00	.00	18.49	4.15	.00	26.83	24"	8.54	100.00	.20	18.68	

*** 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)
200	.00537	1.6120	.0000	.0000	.0000	.0000	.0000	1.6120	205.9106	224.0000	18.09
205	.00449	1.3466	.0000	.0067	.0000	.0000	.5263	1.8795	204.2986	219.0000	14.70
210	.00932	2.7967	.0000	.0389	.0000	.0000	.8144	3.6501	202.4191	217.5000	15.08
215	.01407	4.2208	.0000	.0382	.0000	.0000	.8244	5.0834	198.7690	210.0000	11.23
220	.01407	1.4069	.0000	.0000	.0566	.1516	.0705	1.6856	193.6856	203.0000	9.31
225	.00000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	192.0000	192.0000	.00

100 j, 216.0000 210 3 3 2
110 t, KANSAS SURGERY AND RECOVERY CENTER ADDITION
120 t, System 2 First Leg
130 t, JPS 6-3-93
140 i, 200 0.00 0.00 0.00 0.00 7.70 15.00 224.00
150 i, 205 0.00 0.00 0.00 0.00 7.70 15.00 219.00
160 m, 210 216.00
170 p, 200 205 300.00 18 0.013 0.00 0.00
180 p, 205 210 300.00 24 0.013 0.00 0.00
190 e

Date: 06-03-1993
Time: 16:25:29

Input File: C:\STORM\KSRCY21.STM

KANSAS SURGERY AND RECOVERY CENTER ADDITION
System 2 First Leg
JPS 6-3-93

Storm Frequency = 5-Year

*** HYDROLOGY ***

Tributary Area										Hydrology Summation				Conduit Data			
Node to Node	C	Area (Ac)	Slope (%)	Length (Ft)	TC(0) (Min)	I(0) (In/Hr)	Q(0) (CFS)	TC (Min)	I (In/Hr)	Q (CFS)	Sum Q (CFS)	Size	Velocity (Ft/Sec)	Length (Ft)	TT (Min)	TT+TC (Min)	
200 205	.00	.00	.00	.0	15.00	4.56	7.70	15.00	4.56	7.70	7.70	18"	4.36	300.00	1.15	16.15	
205 210	.00	.00	.00	.0	15.00	4.56	7.70	16.15	4.41	7.46	15.16	24"	4.82	300.00	1.04	17.18	

*** 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)
200	.00537	1.6120	.0000	.0000	.0000	.0000	.0000	1.6120	219.4915	224.0000	4.51
205	.00449	1.3466	.0000	.0067	.0000	.0000	.5263	1.8795	217.8795	219.0000	1.12
210	.00000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	216.0000	216.0000	.00

100 j, 201.5000 220 3 3 2
110 t, KANSAS SURGERY AND RECOVERY CENTER ADDITION
120 t, System 2 Second Leg
130 t, JPS 6-3-93
140 i, 210 0.00 0.00 0.00 0.00 28.90 15.00 217.50
150 i, 215 0.00 0.00 0.00 0.00 5.40 15.00 210.00
160 m, 220 201.50
170 p, 210 215 300.00 24 0.013 0.00 0.00
180 p, 215 220 300.00 24 0.013 30.00 0.00
190 e

Date: 06-03-1993
Time: 16:27:06

Input File: C:\STORM\KSRCY22.STM

KANSAS SURGERY AND RECOVERY CENTER ADDITION
System 2 Second Leg
JPS 6-3-93

Storm Frequency = 5-Year

*** HYDROLOGY ***

*****										*****							
Tributary Area							Hydrology Summation				Conduit Data						
Node to	C	Area	Slope	Length	TC(0)	I(0)	Q(0)	TC	I	Q	Sum Q	Size	Velocity	Length	TT	TT+TC	
Node		(Ac)	(%)	(Ft)	(Min)	(In/Hr)	(CFS)	(Min)	(In/Hr)	(CFS)	(CFS)		(Ft/Sec)	(Ft)	(Min)	(Min)	

210	215	.00	.00	.00	.0	15.00	4.56	28.90	15.00	4.56	28.90	28.90	24"	9.20	300.00	.54	15.54
215	220	.00	.00	.00	.0	15.00	4.56	5.40	15.54	4.49	5.32	34.22	24"	10.89	300.00	.46	16.00

*** HYDRAULICS ***

Node	Hyd-Slope	Friction	Bend	Transition	Manhole	Deflection	Junction	Total	Hyd-Gl	Desired	Diff.	
	(Ft/Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	Elevation	Elevation	(Ft)	

210	.01632	4.8960	.0000	.0000	.0000	.0000	.0000	4.8960	214.4683	217.5000	3.03	
215	.02288	6.8634	.0000	.0528	.0000	.0000	1.1561	8.0724	209.5724	210.0000	.43	
220	.00000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	201.5000	201.5000	.00	

06-03-1993

100 j, 192.0000 225 3 2 1
110 t, KANSAS SURGERY AND RECOVERY CENTER ADDITION
120 t, System 2 Third Leg
130 t, JPS 6-3-93
140 i, 220 0.00 0.00 0.00 0.00 26.80 15.00 203.00
150 m, 225 192.00
160 p, 220 225 100.00 24 0.013 0.00 0.00
170 e

Date: 06-03-1993
Time: 16:28:46

Input File: C:\STORM\KSRCYSY23.STM

KANSAS SURGERY AND RECOVERY CENTER ADDITION
System 2 Third Leg
JFS 6-3-93

Storm Frequency = 5-Year

*** HYDROLOGY ***

Tributary Area										Hydrology Summation				Conduit Data			
Node to Node	C	Area (Ac)	Slope (%)	Length (Ft)	TC(0) (Min)	I(0) (In/Hr)	Q(0) (CFS)	TC (Min)	I (In/Hr)	Q (CFS)	Sum Q (CFS)	Size	Velocity (Ft/Sec)	Length (Ft)	TT (Min)	TT+TC (Min)	
220	225	.00	.00	.00	.0	15.00	4.56	26.80	15.00	4.56	26.80	26.80	24"	8.53	100.00	.20	15.20

*** 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)
220	.01403	1.4034	.0000	.0000	.0000	.0000	.0000	1.4034	193.4034	203.0000	9.60
225	.00000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	192.0000	192.0000	.00

```

*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* FEBRUARY 1981 *
* REVISED 02 AUG 88 *
*
* RUN DATE 05/26/1993 TIME 13:57:18 *
*
*****

```

```

*****
*
* U.S. ARMY CORPS OF ENGINEERS *
* THE HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET *
* DAVIS, CALIFORNIA 95616 *
* (916) 551-1748 *
*
*****

```

```

X X XXXXXX XXXX X
X X X X X XX
X X X X X X
XXXXXXXX XXXX X XXXX X
X X X X X X
X X X X X X
X X XXXXXX XXXX XXX

```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
 THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
 NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
 DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
 KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

HEC-1 INPUT

PAGE 1

```

LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1         ID   KANSAS SURGERY & RECOVERY CTR ADD DRAINAGE PLAN
2         ID   PEC PROJECT NO 36-92223-1-3097
3         ID   STAGE STORAGE ANALYSIS --- 100 YR
4         ID   PROFESSIONAL ENGINEERING CONSULTANTS, P.A.
5         ID   COMPUTED BY M.W.BERRY, P.E. 05/26/93
6         ID   FILENAME="A:\MISCHEC1\KSSURG.HEC" DISKNAME="MWB01"

*** LIST ***

7         *DIAGRAM
8         IT   15 26MAY93  1000  0 26MAY93  1630
          IO   0      2      0

9         KK   INFLO INFLOW HYDROGRAPH FOR DEVELOPED CONDITIONS
10        BA  0.207
11        IN   15 26MAY93  1045
12        QI   20      30      35      50      90      425      975      280      150      105
13        QI   80      70      60      55      50      47      44      41      39      38
14        QI   37      36      35      34

15        KK   POND1
16        RS   1      ELEV  192.0  0
17        SA   3.77  5.22  6.19  7.13
18        SE   192.0  194.0  196.0  198.0
19        SQ   0      36      102      187      288      402
20        SE   192.0  193.0  194.0  195.0  196.0  197.0
21        ZZ
    
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT
LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW
NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW
9 INFLO
V
V
15 POND1

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* FEBRUARY 1981
* REVISED 02 AUG 88
*
* RUN DATE 05/26/1993 TIME 13:57:18
*
*****
```

```
*****
*
* U.S. ARMY CORPS OF ENGINEERS
* THE HYDROLOGIC ENGINEERING CENTER
* 609 SECOND STREET
* DAVIS, CALIFORNIA 95616
* (916) 551-1748
*
*****
```

KANSAS SURGERY & RECOVERY CTR ADD DRAINAGE PLAN
 PEC PROJECT NO 36-92223-1-3097
 STAGE STORAGE ANALYSIS --- 100 YR
 PROFESSIONAL ENGINEERING CONSULTANTS, P.A.
 COMPUTED BY M.W.BERRY, P.E. 05/26/93
 FILENAME="A:\MISCHEC1\KSSURG.HEC" DISKNAME="MWB01"

```
8 IO      OUTPUT CONTROL VARIABLES
          IPRNT      0 PRINT CONTROL
          IPLOT      2 PLOT CONTROL
          QSCAL      0. HYDROGRAPH PLOT SCALE

IT        HYDROGRAPH TIME DATA
          NMIN      15 MINUTES IN COMPUTATION INTERVAL
          IDATE     26MAY93 STARTING DATE
          ITIME     1000 STARTING TIME
          NQ        27 NUMBER OF HYDROGRAPH ORDINATES
          NDDATE    26MAY93 ENDING DATE
          NDTIME    1630 ENDING TIME
          ICENT     19 CENTURY MARK

          COMPUTATION INTERVAL .25 HOURS
          TOTAL TIME BASE     6.50 HOURS
```

ENGLISH UNITS
 DRAINAGE AREA SQUARE MILES
 PRECIPITATION DEPTH INCHES
 LENGTH, ELEVATION FEET
 FLOW CUBIC FEET PER SECOND
 STORAGE VOLUME ACRE-FEET
 SURFACE AREA ACRES
 TEMPERATURE DEGREES FAHRENHEIT

*** ** ** ** **

```
*****
*
9 KK      *      INFLO *      INFLOW HYDROGRAPH FOR DEVELOPED CONDITIONS
*      *
*****
```

```
11 IN     TIME DATA FOR INPUT TIME SERIES
          JXMIN     15 TIME INTERVAL IN MINUTES
          JXDATE    26MAY93 STARTING DATE
          JXTIME    1045 STARTING TIME
```

SUBBASIN RUNOFF DATA

```
10 BA     SUBBASIN CHARACTERISTICS
          TAREA     .21 SUBBASIN AREA
```

HYDROGRAPH AT STATION INFLO

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
26	MAY	1000	1	20.	*	26	MAY	1145	8	90.	*	26	MAY	1330	15	70.	*	26	MAY	1515	22	39.
26	MAY	1015	2	20.	*	26	MAY	1200	9	425.	*	26	MAY	1345	16	60.	*	26	MAY	1530	23	38.

26 MAY 1030	3	20.	*	26 MAY 1215	10	975.	*	26 MAY 1400	17	55.	*	26 MAY 1545	24	37.
26 MAY 1045	4	20.	*	26 MAY 1230	11	280.	*	26 MAY 1415	18	50.	*	26 MAY 1600	25	36.
26 MAY 1100	5	30.	*	26 MAY 1245	12	150.	*	26 MAY 1430	19	47.	*	26 MAY 1615	26	35.
26 MAY 1115	6	35.	*	26 MAY 1300	13	105.	*	26 MAY 1445	20	44.	*	26 MAY 1630	27	34.
26 MAY 1130	7	50.	*	26 MAY 1315	14	80.	*	26 MAY 1500	21	41.	*			
			*				*				*			

PEAK FLOW + (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW				
		6-HR	24-HR	72-HR	6.50-HR	
		(CFS)	117.	110.	110.	110.
+ 975.	2.25	(INCHES)	5.276	5.351	5.351	5.351
		(AC-FT)	58.	59.	59.	59.
CUMULATIVE AREA =			.21 SQ MI			

STATION	INFLO	(O) OUTFLOW												
		0.	100.	200.	300.	400.	500.	600.	700.	800.	900.	1000.	0.	0.
DAHRMN PER														
261000	1.0													
261015	2.0													
261030	3.0													
261045	4.0													
261100	5.0													
261115	6.0													
261130	7.0													
261145	8.0													
261200	9.0													
261215	10.0													
261230	11.0													
261245	12.0													
261300	13.0													
261315	14.0													
261330	15.0													
261345	16.0													
261400	17.0													
261415	18.0													
261430	19.0													
261445	20.0													
261500	21.0													
261515	22.0													
261530	23.0													
261545	24.0													
261600	25.0													
261615	26.0													
261630	27.0													

*** **

 * *
 15 KK * POND1 *
 * *

HYDROGRAPH ROUTING DATA

16 RS STORAGE ROUTING
 NSTPS 1 NUMBER OF SUBREACHES
 ITYP ELEV TYPE OF INITIAL CONDITION
 RSVRIC 192.00 INITIAL CONDITION
 X .00 WORKING R AND D COEFFICIENT

17 SA AREA 3.8 5.2 6.2 7.1

18 SE ELEVATION 192.00 194.00 196.00 198.00

19 SQ DISCHARGE 0. 36. 102. 187. 288. 402.

20 SE ELEVATION 192.00 193.00 194.00 195.00 196.00 197.00

COMPUTED STORAGE-ELEVATION DATA

STORAGE .00 8.95 20.35 33.66
 ELEVATION 192.00 194.00 196.00 198.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE .00 4.11 8.95 14.41 20.35 26.77 33.66
 OUTFLOW .00 36.00 102.00 187.00 288.00 402.00 516.00
 ELEVATION 192.00 193.00 194.00 195.00 196.00 197.00 198.00

HYDROGRAPH AT STATION POND1

HYDROGRAPH AT STATION POND1																				

* * * * *																				
DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
* * * * *																				
26	MAY	1000	1	0.	.0	192.0	26	MAY	1215	10	254.	18.4	195.7	26	MAY	1430	19	88.	7.9	193.8
26	MAY	1015	2	3.	.4	192.1	26	MAY	1230	11	369.	24.9	196.7	26	MAY	1445	20	77.	7.1	193.6
26	MAY	1030	3	6.	.7	192.2	26	MAY	1245	12	321.	22.2	196.3	26	MAY	1500	21	69.	6.5	193.5
26	MAY	1045	4	8.	1.0	192.2	26	MAY	1300	13	262.	18.8	195.7	26	MAY	1515	22	62.	6.0	193.4
26	MAY	1100	5	11.	1.3	192.3	26	MAY	1315	14	211.	15.8	195.2	26	MAY	1530	23	56.	5.6	193.3
26	MAY	1115	6	15.	1.7	192.4	26	MAY	1330	15	172.	13.4	194.8	26	MAY	1545	24	51.	5.2	193.2
26	MAY	1130	7	19.	2.2	192.5	26	MAY	1345	16	142.	11.5	194.5	26	MAY	1600	25	48.	5.0	193.2
26	MAY	1145	8	28.	3.2	192.8	26	MAY	1400	17	119.	10.0	194.2	26	MAY	1615	26	45.	4.7	193.1
26	MAY	1200	9	80.	7.4	193.7	26	MAY	1415	18	101.	8.8	194.0	26	MAY	1630	27	42.	4.6	193.1
* * * * *																				

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	6.50-HR
+ (CFS)	(HR)				
+ 369.	2.50	(CFS)	110.	101.	101.
		(INCHES)	4.925	4.937	4.937
		(AC-FT)	54.	55.	55.
PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	6.50-HR
+ (AC-FT)	(HR)				
+ 25.	2.50		9.	8.	8.
PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	6.50-HR
+ (FEET)	(HR)				
+ 196.71	2.50		193.87	193.73	193.73

CUMULATIVE AREA = .21 SQ MI

DAHRMN PER	STATION		(I) INFLOW, (O) OUTFLOW					(S) STORAGE					
	0.	200.	400.	600.	800.	1000.	0.	10.	20.	30.	0.	0.	0.
261000 10I							S						
261015 20I							S						
261030 30I							S						
261045 40I							S						
261100 5.OI							S						
261115 6.OI							S						
261130 7.0 I							S						
261145 8.0 I							S						
261200 9. 0			I				S						
261215 10.		0				I.		S					
261230 11.		I	0					S		S.			
261245 12.		I	0					S		S			
261300 13.	I	0						S		S.			
261315 14.	I	0						S		S			
261330 15.	I	0.						S		S			
261345 16.	I	0						S		S			
261400 17.	I	0						S		S			
261415 18.	I	0						S		S			
261430 19.	I	0						S		S			
261445 20.	I	0						S		S			
261500 21.	IO.							S		S			
261515 22.	IO							S		S			
261530 23.	IO							S		S			
261545 24.	IO							S		S			
261600 25.	I							S		S			
261615 26.	I							S		S			
261630 27.	-I							S		S			

RUNOFF SUMMARY
 FLOW IN CUBIC FEET PER SECOND
 TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
+									
+	HYDROGRAPH AT								
	INFLO	975.	2.25	117.	110.	110.	.21		
+	ROUTED TO								
+	POND1	369.	2.50	110.	101.	101.	.21	196.71	2.50

*** NORMAL END OF HEC-1 ***

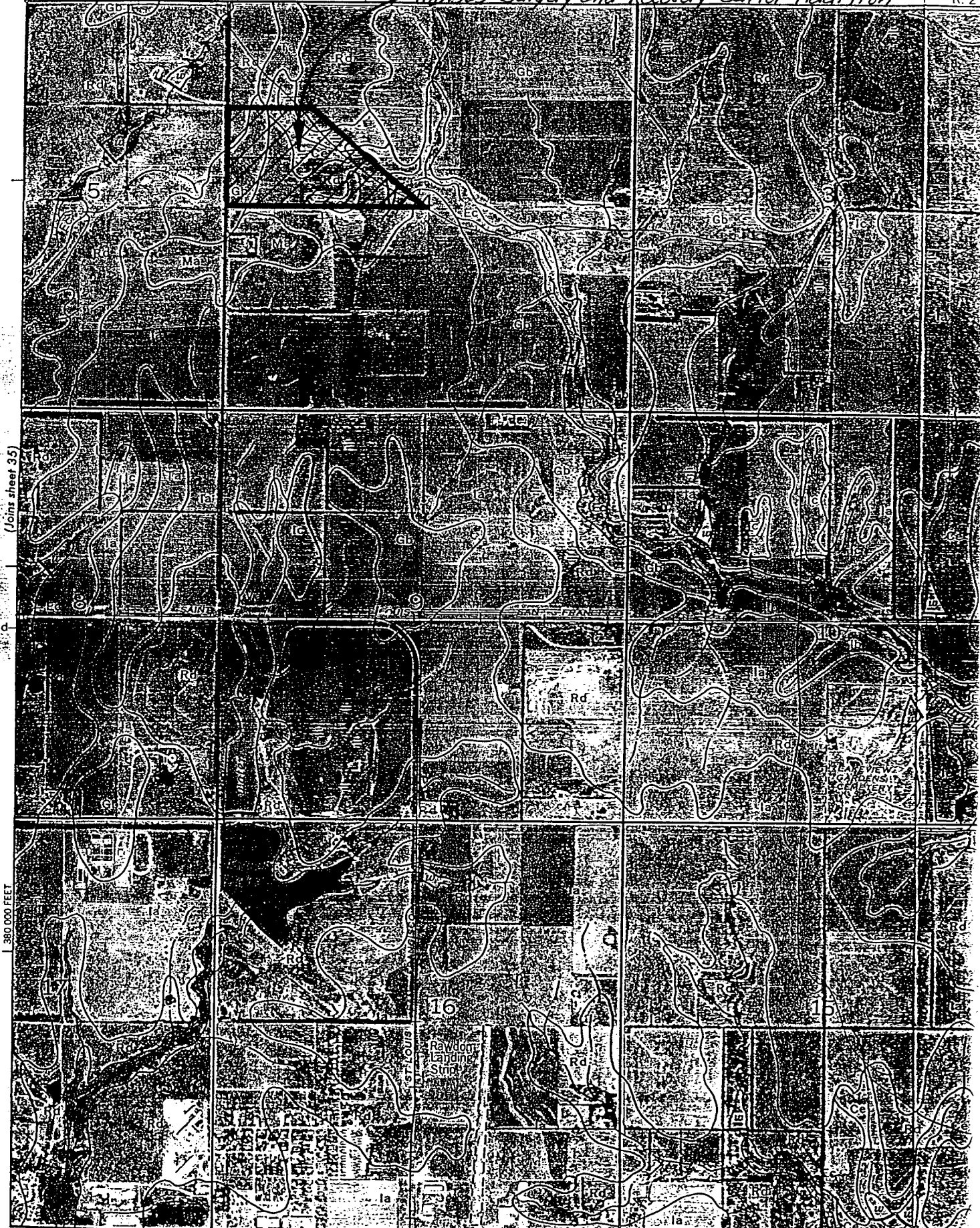
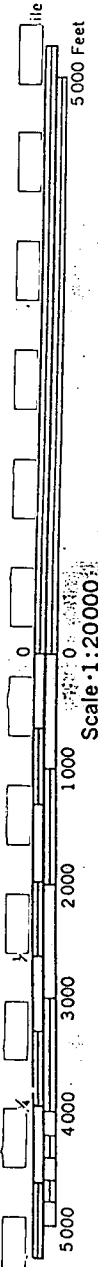
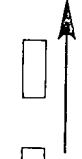
(Joins sheet 28)

Kansas Surgery and Recovery Center Addition

R. 2 E

36

N



(Joins sheet 35)

(Joins sheet 44) | 2 370 000 FEET

EXHIBIT NO. 1

SOIL LEGEND

<u>SYMBOL</u>	<u>HYDROLOGIC GROUP</u>	<u>NAME</u>
Aa	B	Albion-Shellabarger sandy loams, 1 to 4 percent slopes
Ab	B	Albion and Shellabarger sandy loams, 7 to 15 percent slopes
Ba	C	Blanket silt loam, 0 to 1 percent slopes
Bb	C	Blanket silt loam, 1 to 3 percent slopes
Ca	B	Canadian fine sandy loam
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	Cline 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 slopes
Wa	C	Waldeck sandy loam

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:					
<u>Single Family (Soil Group D)</u>					
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
<u>Multi-Family (Soil Group D)</u>					
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
<u>Single Family (Soil Group C)</u>					
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
<u>Multi-Family (Soil Group C)</u>					
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
<u>Single-Family (Soil Group B)</u>					
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
<u>Multi-Family (Soil Group B)</u>					
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 face Characteristics	Percent Impervious	Frequency			
		<u>2</u>	<u>5</u>	<u>10</u>	<u>100</u>
<u>Single Family (Soil Group A)</u>					
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
<u>Multi-Family (Soil Group A)</u>					
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
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):					
<u>Soil Group A</u>					
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
<u>Soil Group B</u>					
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
<u>Soil Group C</u>					
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			
		<u>2</u>	<u>5</u>	<u>10</u>	<u>100</u>
<u>Soil Group D</u>					
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

T_c

DURATION IN MINUTES	RETURN PERIODS OF						100-YR
	1-YR	2-YR	5-YR	10-YR	25-YR	50-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

707

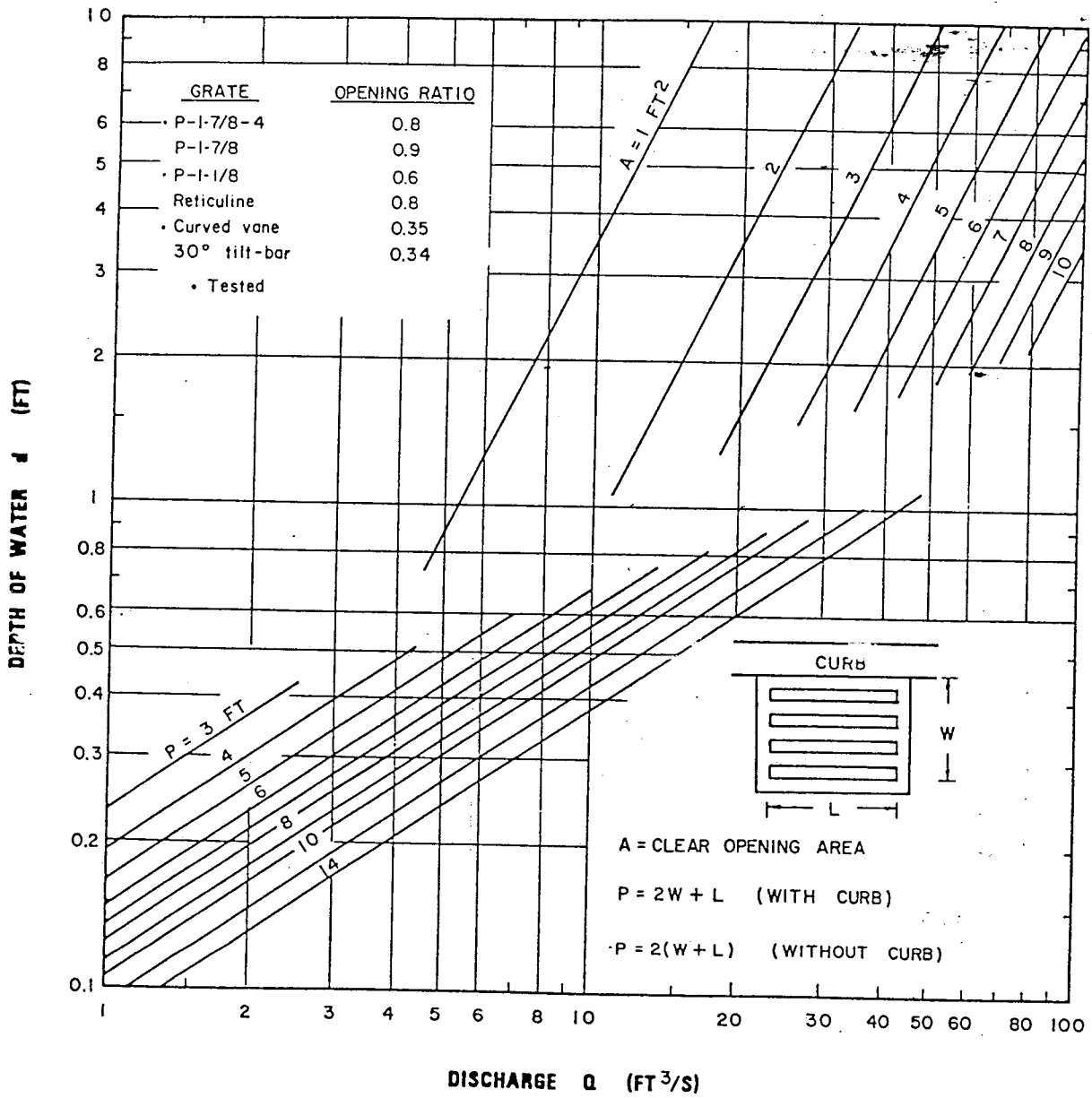


CHART 11. Grate inlet capacity in sump conditions.

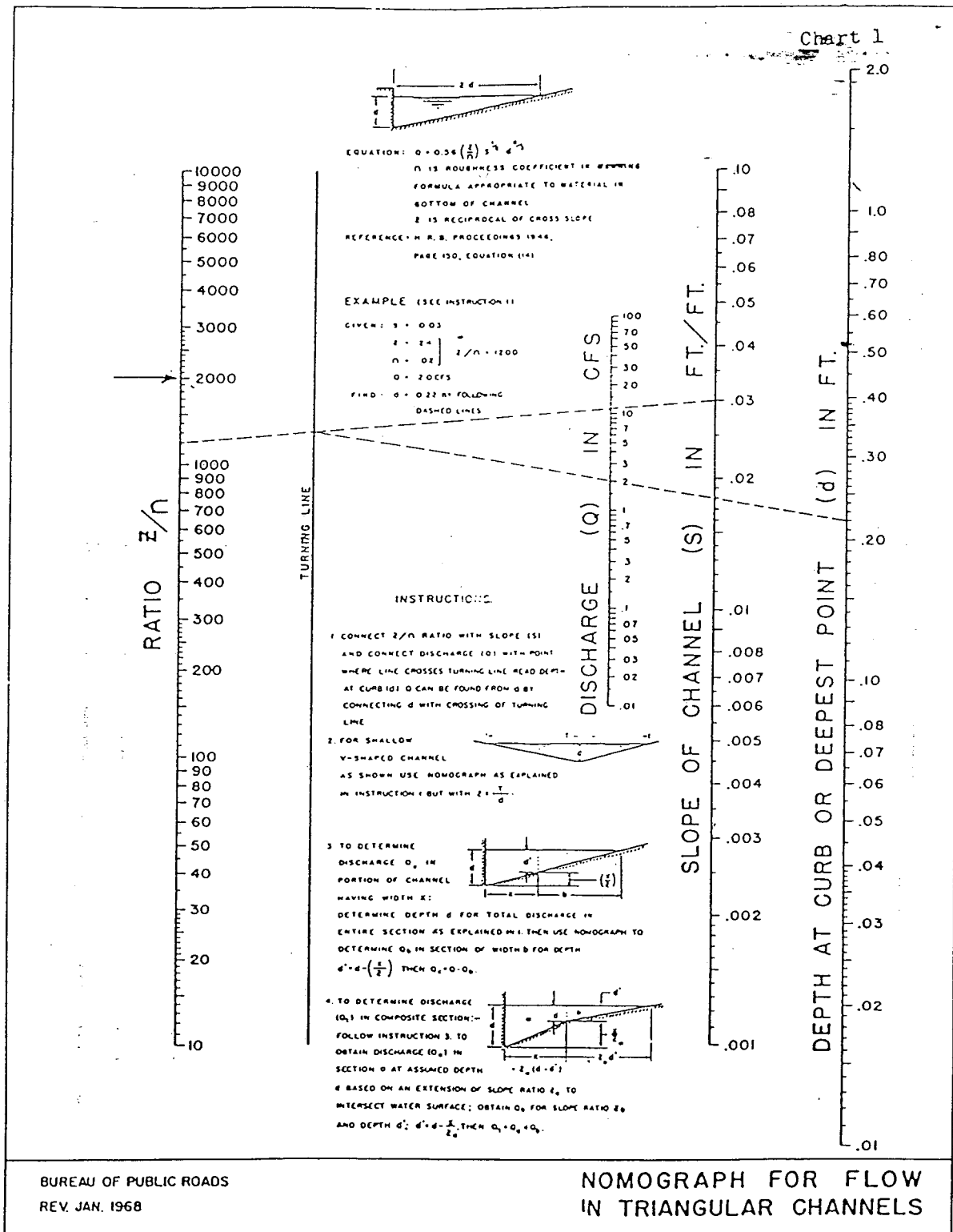
FROM: HEC-12, DRAINAGE OF HIGHWAY PAVEMENTS, FHWA, MAR 1984

Cross-Slope = $3/8$ "/ft = 0.03125 "/ft

$Z = 1/\text{cross-slope} = 1/0.03125 = 32$

$n = 0.016$

$Z/n = 32/0.016 = 2000$



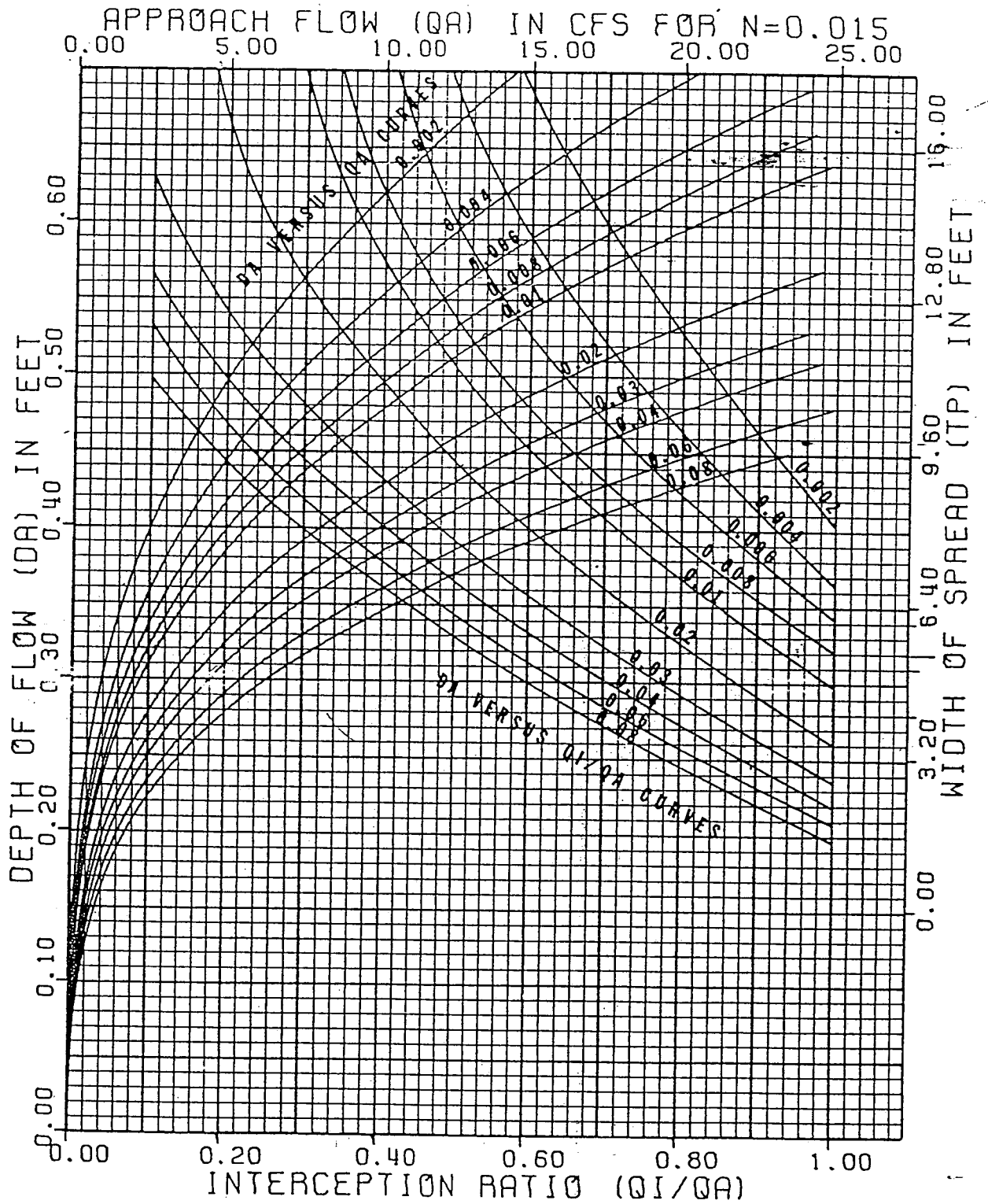


FIGURE A-8 DESIGN CURVES FOR SHC TYPE-22 STORM WATER INLET: $L_0 = 9$ FEET AND $S_x = 1/32$.

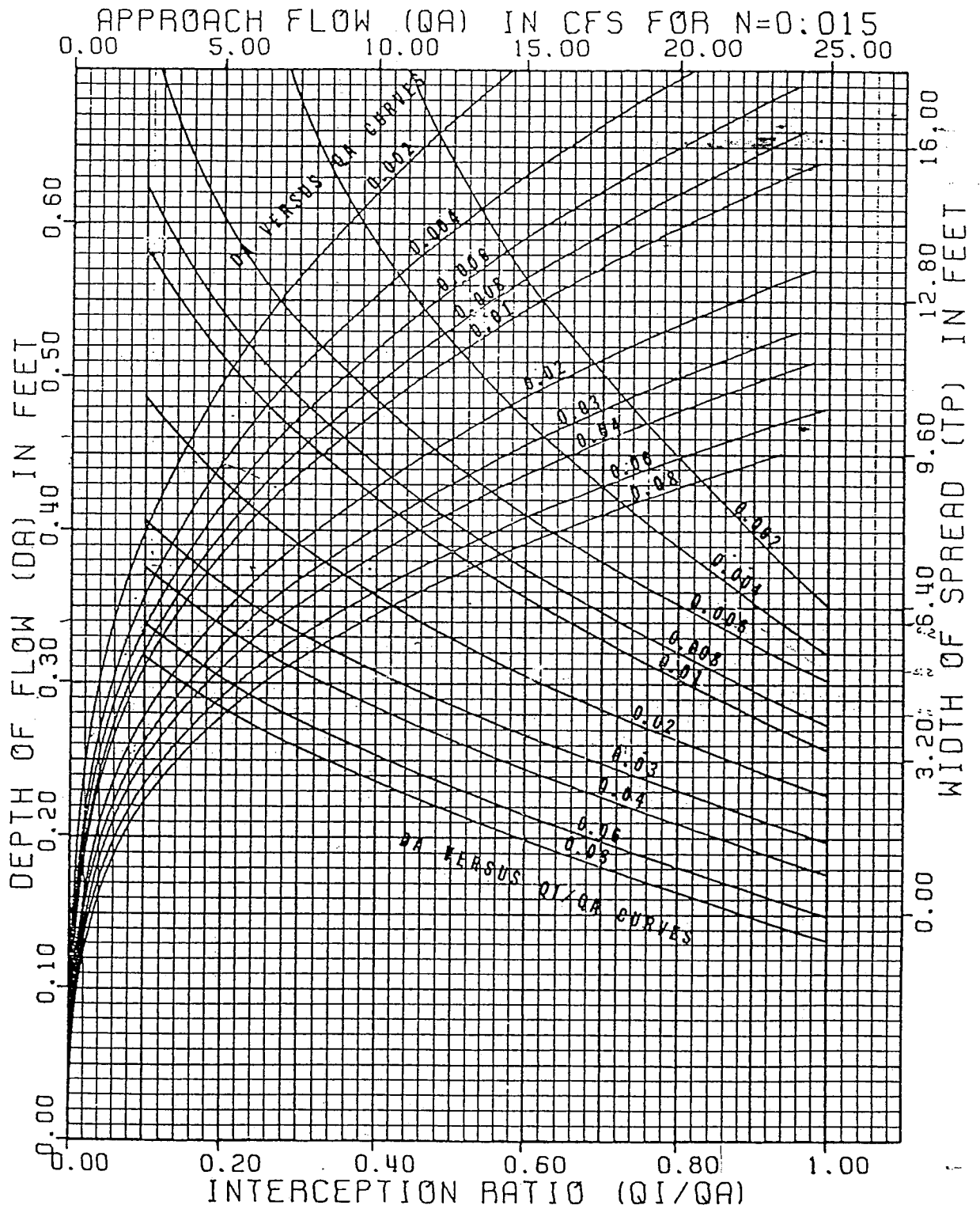


FIGURE A-7 DESIGN CURVES FOR SHC TYPE-22 STORM WATER INLET: $L_0 = 4$ FEET AND $S_x = 1/32$.

3-29-93

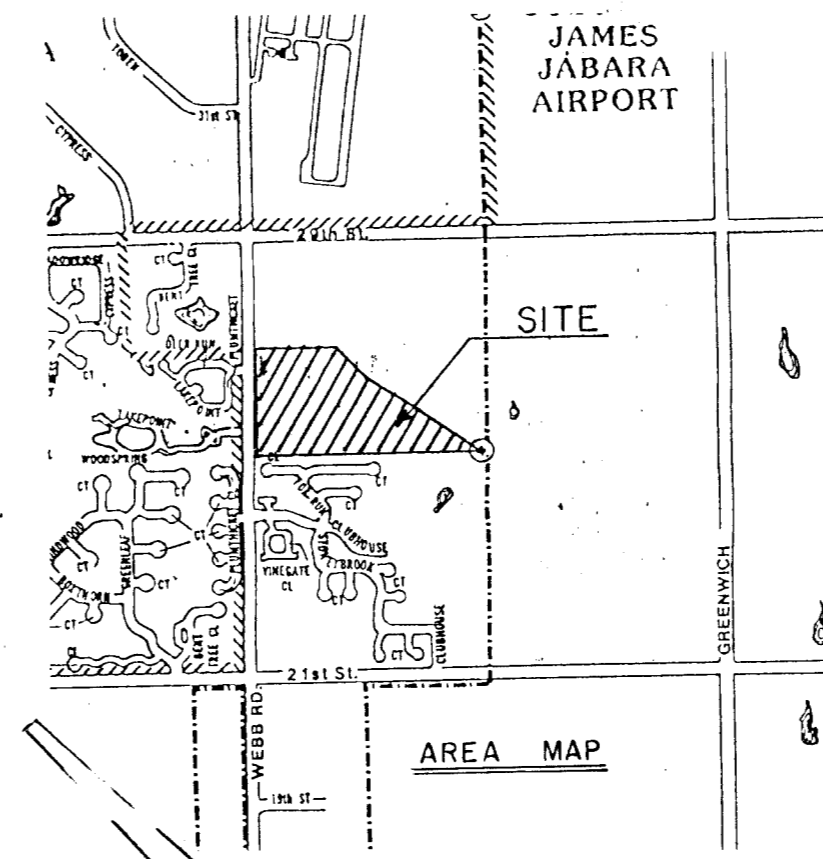
DRAINAGE PLAN

KANSAS SURGERY AND RECOVERY CENTER ADDITION

OWNERS: KANSAS SURGERY AND RECOVERY CENTER, L.P.
 % DAVID G. CROCKETT
 1005 N. MARKET, WICHITA, KANSAS 67214
 JOSEPH MEDICAL CENTER, INC.
 % ROBERT L. HEATH
 700 FOURTH FINANCIAL CENTER
 WICHITA, KANSAS 67202

ENGINEER: PROFESSIONAL ENGINEERING CONSULTANTS, P.A.
 303 S. TOPEKA, WICHITA, KANSAS 67202

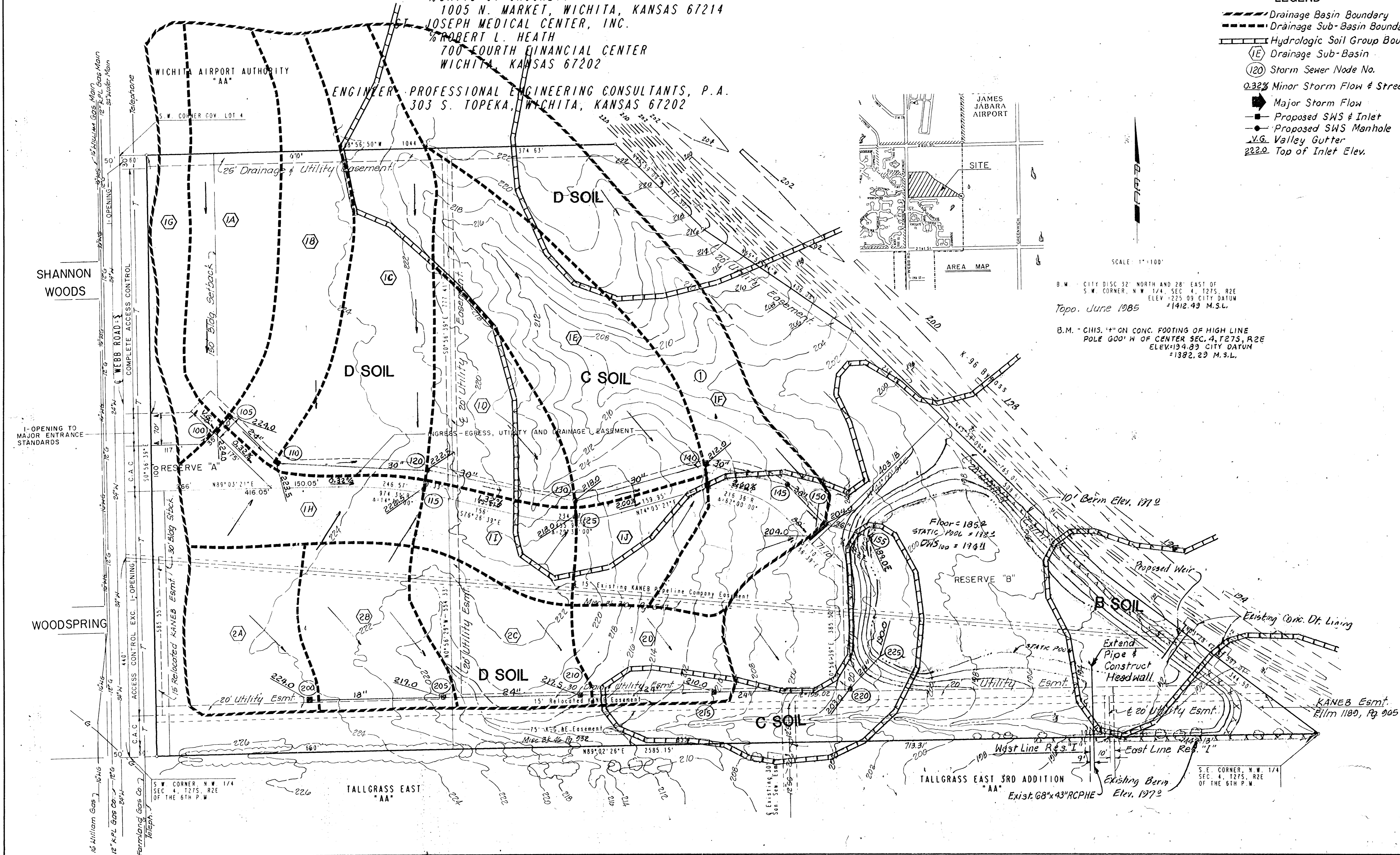
- LEGEND**
- Drainage Basin Boundary
 - Drainage Sub-Basin Boundary
 - Hydrologic Soil Group Boundary
 - (IE) Drainage Sub-Basin
 - (120) Storm Sewer Node No.
 - 0.32% Minor Storm Flow & Street Grade
 - Major Storm Flow
 - Proposed SWS # Inlet
 - Proposed SWS Manhole
 - V.G. Valley Gutter
 - 222.0 Top of Inlet Elev.



SCALE: 1"=100'

B.M. - CITY DISC 32' NORTH AND 28' EAST OF
 S.W. CORNER, N.W. 1/4, SEC. 4, T27S, R2E
 ELEV: 225.09 CITY DATUM
 Topo. June 1985 = 1412.49 M.S.L.

B.M. - CHIS. 4" ON CONC. FOOTING OF HIGH LINE
 POLE 600' W OF CENTER SEC. 4, T27S, R2E
 ELEV: 194.89 CITY DATUM
 = 1382.29 M.S.L.



61493
 229