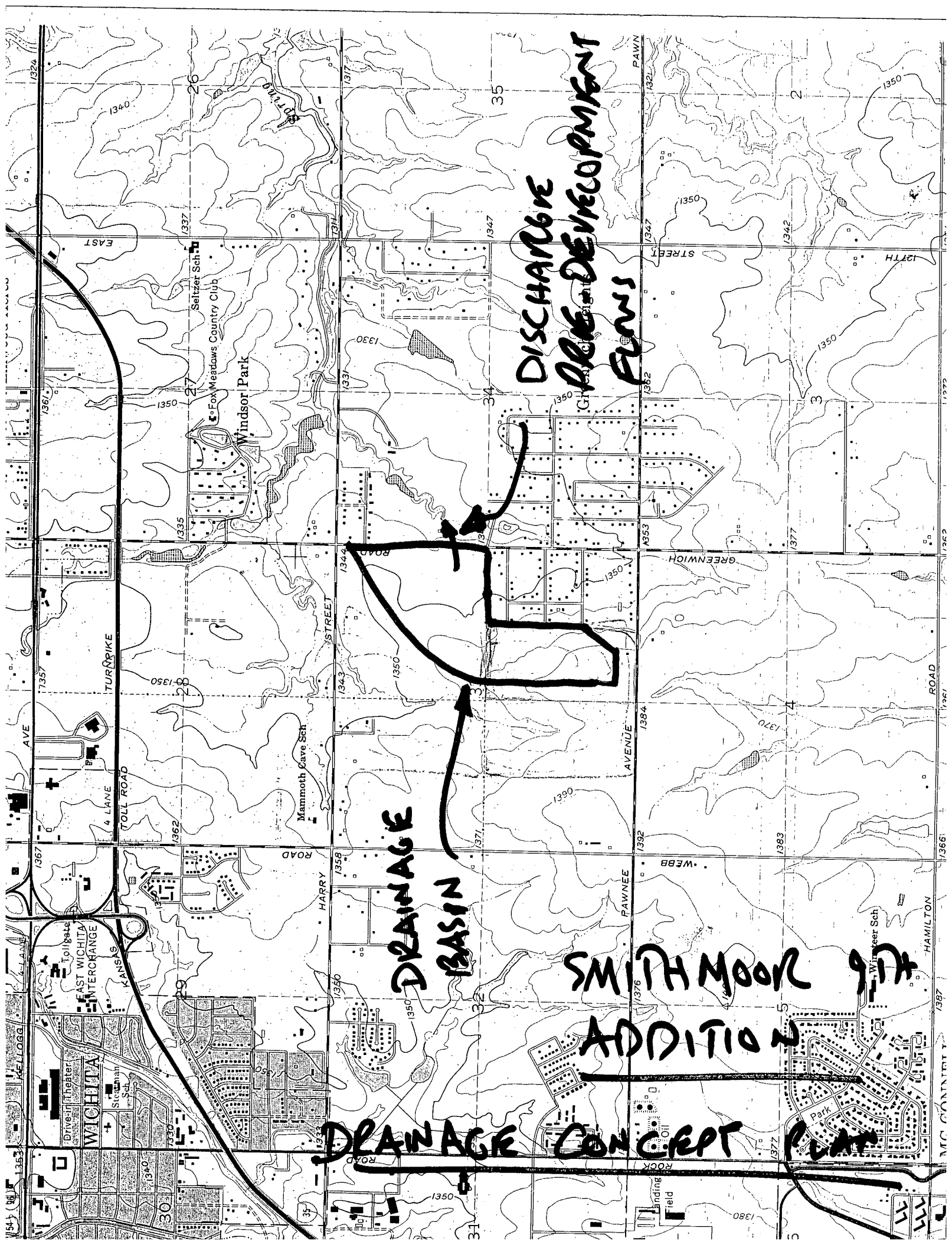


DRAINAGE PLAN
SMITHMOOR NINTH ADDITION
WICHITA, KANSAS
MARCH 1999

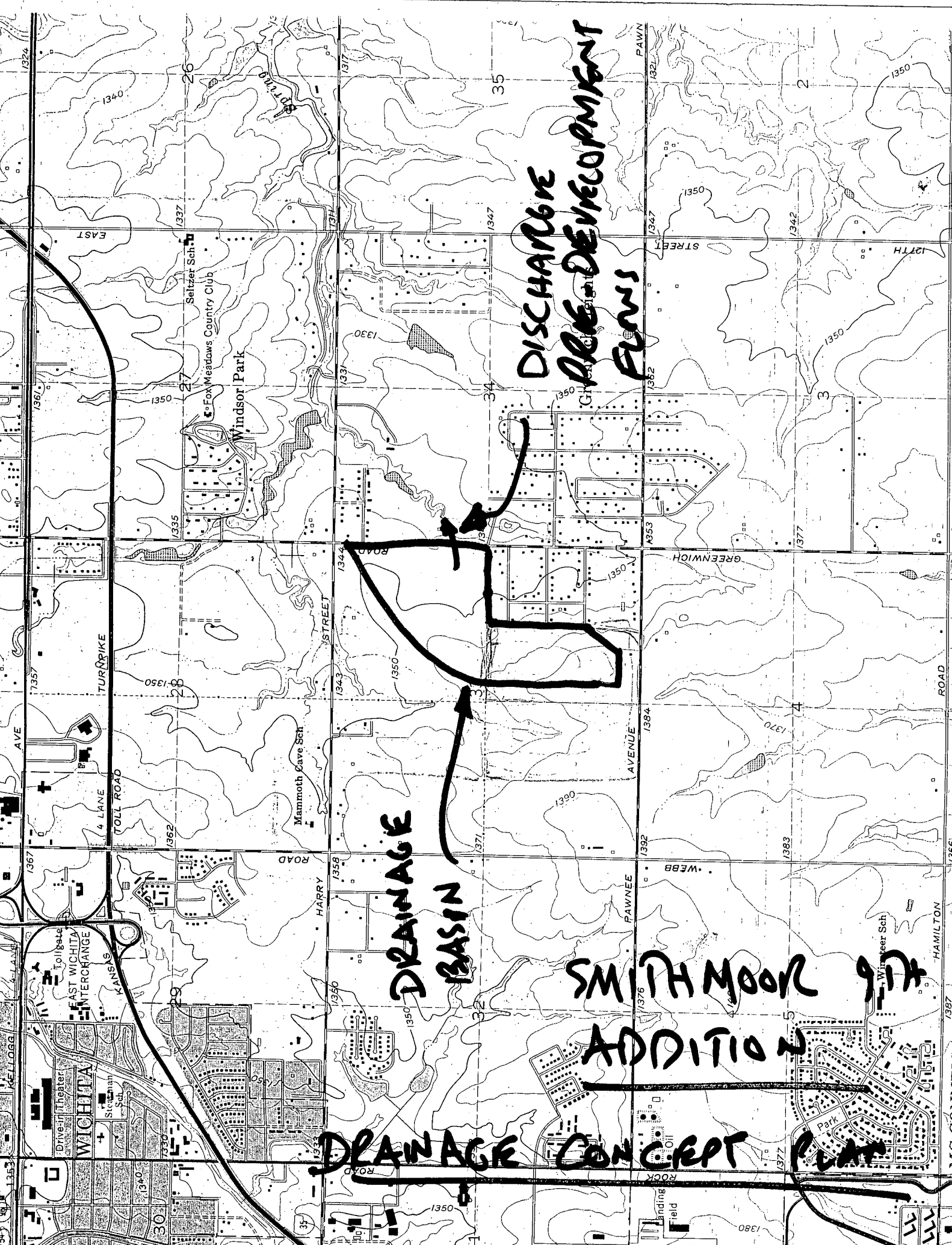


**DRAINAGE
BASIN**

**SMITH MOOR 9TH
ADDITION**

**DISCHARGE
AREA DEVELOPMENT
FLOWS**

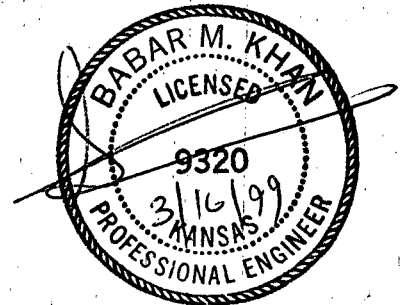
DRAINAGE CONCEPT PLAN



DRAINAGE PLAN

**SMITHMOOR NINTH ADDITION
TO WICHITA, SEDGWICK COUNTY, KANSAS**

**PROJECT NO.: 99-05
MARCH 1999**



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

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

Wednesday, March 17, 1999

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

Re: **Drainage Plan for Smithmoor Ninth Addition to Wichita, Sedgwick
County, Kansas**

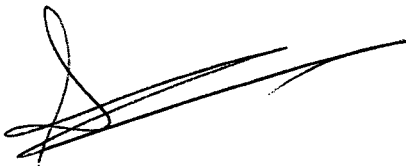
Dear Ms. Huang:

Attached please find the referenced drainage plan.

1.0 Summary: Smithmoor Ninth Addition is located in the Northeast quarter of Section 33, Township 27 South, Range 2 East, at the Southwest corner of Greenwich and Harry Street intersections. Off-site drainage flowing through this property includes residential areas in Smithmoor Fifth, Sixth, Seventh and Eight Additions, proposed commercial area located north of this addition and pasture land to the south of this addition. A drainage channel at approximately middle of Smithmoor Ninth Addition will convey the off-site drainage from south to a proposed detention pond. The pond is designed such that it will discharge flows equal to pre developed condition. Minor underground storm sewer improvements are also included.

Please call if you have questions.

Sincerely,
MUNICIPAL ENGINEERS, P.A.



Babar M. Khan, P.E., L.S.

3/14/99

DRAINAGE PLAN

SMITHMOOR NINTH ADDITION
WICHITA, SEDGWICK COUNTY,
KANSAS

2.0 HYDROLOGY :

- a. USE RATIONAL FORMULA FOR ON-SITE DRAINAGE CALCULATIONS.
- b. USE SCS FORMULA FOR OFF-SITE DRAINAGE CALCULATIONS.
- c. USE SCS FOR POND.

USE

$$\begin{aligned} C_2 &= 0.55 && \text{(DEVELOPED)} \\ C_{100} &= 0.78 && \text{(")} \end{aligned} \left\{ \text{SEE EXHIBIT A} \right\}$$
$$T_c = 15 \text{ MIN. (ON-SITE)}$$
$$\begin{aligned} i_2 &= 3.83" / \text{HR.} \\ i_{100} &= 7.37" / \text{HR.} \end{aligned} \left\{ \text{SEE EXHIBIT B} \right\}$$

EXHIBIT 'A'

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	<u>3.83</u>	4.56	5.22	6.06	6.78	<u>7.37</u>
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	<u>5.32</u>
32	2.02	2.57	3.10	3.63	4.25	4.79	<u>5.22</u>
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	<u>5.00</u>
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

EXHIBIT B

(3 pages)

~~ATTACHMENT B~~

DRAINAGE CRITERIA

CITY OF WICHITA, KANSAS

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

Land Use or rface Characteristics	Percent Impervious	Frequency			
		2	5	10	100
Business:					
Downtown Areas	95	0.84	0.85	0.87	0.91
Neighborhood Areas	70	0.68	<u>0.69</u>	0.73	0.80
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

6600 S-F

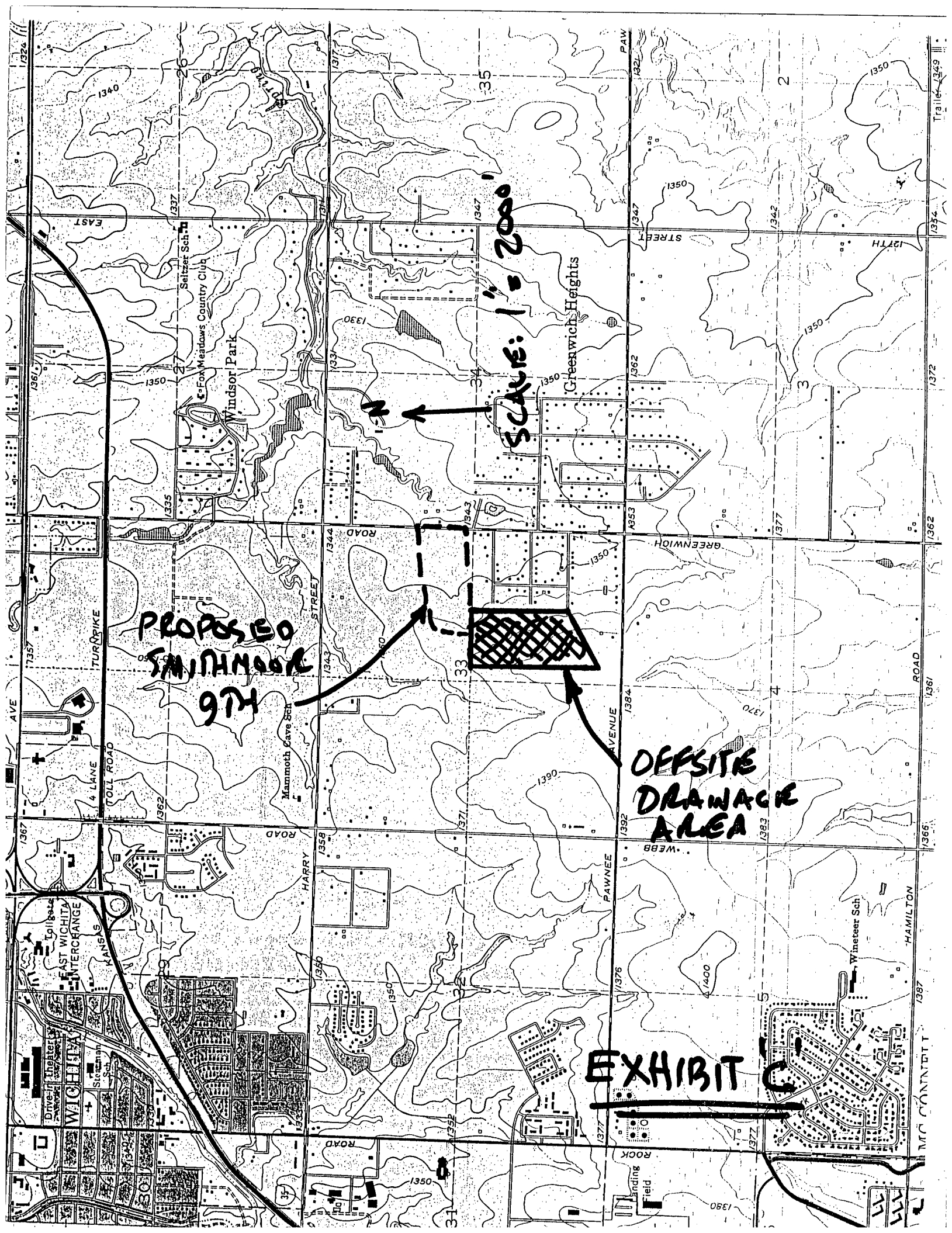
0.55 [0.57]

0.78 [0.79]

3.0 RUNOFF

DRAINAGE BASIN	AREA (Ac.)	Q ₂ CFS	Q ₁₀₀ CFS
A	5.0	10.5	28.7
B	8.2	17.3	47.1
C	5.1	10.7	29.3
D	11.0	23.2	63.2
E	4.0	8.4	23.0
F(OFFSITE)*	45.9*	62.0*	148.9*

- * SEE ATTACHED EXHIBIT 'C' FOR DRAINAGE AREA
- * SEE ATTACHED EXHIBIT 'D' FOR RUNOFF CALCULATIONS
- * PRE-DEVELOPED CONDITIONS



**PROPOSED
SMITHNOOR
9TH**

**OFFSITE
DRAINAGE
AREA**

SCALE: 1" = 2000'



EXHIBIT C

Hydrograph Report

Hyd. No. 1

Proposed

Hydrograph type	= SCS Runoff	Peak discharge	= <u>62.06 cfs</u>
Storm frequency	= <u>2 yrs</u>	Time interval	= 2 min
Drainage area	= <u>45.9 ac</u>	Curve number	= 85
Basin Slope	= 1 %	Hydraulic length	= 2400 ft
Tc method	= LAG	Time of conc. (Tc)	= 54.3 min
Total precip.	= 3.83 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 381,470 cuft, 8.757 acft

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)
7.10	0.01	8.20	0.27	9.30	0.84	10.40	1.77
7.13	0.01	8.23	0.28	9.33	0.86	10.43	1.81
7.17	0.02	8.27	0.29	9.37	0.89	10.47	1.86
7.20	0.02	8.30	0.31	9.40	0.91	10.50	1.91
7.23	0.02	8.33	0.32	9.43	0.93	10.53	1.96
7.27	0.03	8.37	0.33	9.47	0.96	10.57	2.01
7.30	0.03	8.40	0.34	9.50	0.98	10.60	2.07
7.33	0.04	8.43	0.36	9.53	1.00	10.63	2.13
7.37	0.04	8.47	0.37	9.57	1.03	10.67	2.19
7.40	0.05	8.50	0.38	9.60	1.05	10.70	2.25
7.43	0.06	8.53	0.40	9.63	1.07	10.73	2.31
7.47	0.06	8.57	0.41	9.67	1.10	10.77	2.38
7.50	0.07	8.60	0.42	9.70	1.12	10.80	2.45
7.53	0.08	8.63	0.44	9.73	1.14	10.83	2.52
7.57	0.09	8.67	0.46	9.77	1.17	10.87	2.60
7.60	0.09	8.70	0.47	9.80	1.19	10.90	2.68
7.63	0.10	8.73	0.49	9.83	1.21	10.93	2.76
7.67	0.11	8.77	0.51	9.87	1.24	10.97	2.84
7.70	0.12	8.80	0.52	9.90	1.26	11.00	2.93
7.73	0.13	8.83	0.54	9.93	1.29	11.03	3.01
7.77	0.14	8.87	0.56	9.97	1.32	11.07	3.10
7.80	0.15	8.90	0.58	10.00	1.34	11.10	3.20
7.83	0.16	8.93	0.60	10.03	1.37	11.13	3.29
7.87	0.17	8.97	0.62	10.07	1.40	11.17	3.40
7.90	0.18	9.00	0.64	10.10	1.43	11.20	3.51
7.93	0.19	9.03	0.66	10.13	1.46	11.23	3.62
7.97	0.20	9.07	0.68	10.17	1.50	11.27	3.74
8.00	0.21	9.10	0.70	10.20	1.53	11.30	3.87
8.03	0.22	9.13	0.72	10.23	1.57	11.33	4.00
8.07	0.23	9.17	0.75	10.27	1.60	11.37	4.15
8.10	0.24	9.20	0.77	10.30	1.64	11.40	4.30
8.13	0.25	9.23	0.79	10.33	1.68	11.43	4.46
8.17	0.26	9.27	0.82	10.37	1.72	11.47	4.62

EXHIBIT 'D'

Continues on next page...

DATE: 1

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)
11.50 4.80	13.17 23.47	14.83 5.50	16.50 3.71
11.53 5.01	13.20 21.48	14.87 5.45	16.53 3.68
11.57 5.25	13.23 19.58	14.90 5.40	16.57 3.66
11.60 5.56	13.27 17.77	14.93 5.35	16.60 3.63
11.63 5.95	13.30 16.11	14.97 5.30	16.63 3.61
11.67 6.44	13.33 14.64	15.00 5.26	16.67 3.59
11.70 7.05	13.37 13.43	15.03 5.21	16.70 3.56
11.73 7.82	13.40 12.51	15.07 5.17	16.73 3.54
11.77 8.77	13.43 11.89	15.10 5.13	16.77 3.52
11.80 9.98	13.47 11.45	15.13 5.09	16.80 3.50
11.83 11.52	13.50 11.10	15.17 5.05	16.83 3.48
11.87 13.48	13.53 10.76	15.20 5.02	16.87 3.46
11.90 15.95	13.57 10.45	15.23 4.98	16.90 3.45
11.93 18.91	13.60 10.16	15.27 4.94	16.93 3.43
11.97 22.18	13.63 9.89	15.30 4.91	16.97 3.41
12.00 25.58	13.67 9.63	15.33 4.87	17.00 3.40
12.03 29.01	13.70 9.40	15.37 4.84	17.03 3.38
12.07 32.48	13.73 9.18	15.40 4.80	17.07 3.36
12.10 35.95	13.77 8.97	15.43 4.77	17.10 3.35
12.13 39.40	13.80 8.78	15.47 4.74	17.13 3.34
12.17 42.80	13.83 8.60	15.50 4.70	17.17 3.32
12.20 46.10	13.87 8.43	15.53 4.67	17.20 3.31
12.23 49.26	13.90 8.27	15.57 4.63	17.23 3.30
12.27 52.25	13.93 8.12	15.60 4.60	17.27 3.28
12.30 55.01	13.97 7.97	15.63 4.57	17.30 3.27
12.33 57.50	14.00 7.83	15.67 4.53	17.33 3.26
12.37 59.58	14.03 7.69	15.70 4.50	17.37 3.24
12.40 61.13	14.07 7.55	15.73 4.46	17.40 3.23
12.43 62.01	14.10 7.42	15.77 4.43	17.43 3.22
12.47 62.06 <<	14.13 7.30	15.80 4.40	17.47 3.21
12.50 61.32	14.17 7.17	15.83 4.36	17.50 3.20
12.53 60.07	14.20 7.06	15.87 4.33	17.53 3.18
12.57 58.60	14.23 6.94	15.90 4.29	17.57 3.17
12.60 57.05	14.27 6.83	15.93 4.26	17.60 3.16
12.63 55.42	14.30 6.73	15.97 4.23	17.63 3.15
12.67 53.73	14.33 6.62	16.00 4.19	17.67 3.13
12.70 51.97	14.37 6.53	16.03 4.16	17.70 3.12
12.73 50.16	14.40 6.43	16.07 4.12	17.73 3.11
12.77 48.29	14.43 6.34	16.10 4.09	17.77 3.10
12.80 46.37	14.47 6.25	16.13 4.06	17.80 3.09
12.83 44.40	14.50 6.17	16.17 4.02	17.83 3.07
12.87 42.39	14.53 6.09	16.20 3.99	17.87 3.06
12.90 40.35	14.57 6.01	16.23 3.96	17.90 3.05
12.93 38.27	14.60 5.93	16.27 3.92	17.93 3.04
12.97 36.16	14.63 5.86	16.30 3.89	17.97 3.02
13.00 34.02	14.67 5.79	16.33 3.86	18.00 3.01
13.03 31.88	14.70 5.73	16.37 3.83	18.03 3.00
13.07 29.74	14.73 5.67	16.40 3.80	18.07 2.99
13.10 27.61	14.77 5.61	16.43 3.77	18.10 2.97
13.13 25.52	14.80 5.55	16.47 3.74	18.13 2.96

Continues on next page...

EXHIBIT D

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)
18.17 2.95	19.83 2.33	21.50 1.95	23.17 1.83
18.20 2.94	19.87 2.31	21.53 1.95	23.20 1.83
18.23 2.93	19.90 2.30	21.57 1.94	23.23 1.82
18.27 2.91	19.93 2.29	21.60 1.94	23.27 1.82
18.30 2.90	19.97 2.28	21.63 1.94	23.30 1.82
18.33 2.89	20.00 2.26	21.67 1.94	23.33 1.82
18.37 2.88	20.03 2.25	21.70 1.93	23.37 1.81
18.40 2.86	20.07 2.24	21.73 1.93	23.40 1.81
18.43 2.85	20.10 2.23	21.77 1.93	23.43 1.81
18.47 2.84	20.13 2.21	21.80 1.93	23.47 1.81
18.50 2.83	20.17 2.20	21.83 1.93	23.50 1.80
18.53 2.81	20.20 2.19	21.87 1.92	23.53 1.80
18.57 2.80	20.23 2.18	21.90 1.92	23.57 1.80
18.60 2.79	20.27 2.17	21.93 1.92	23.60 1.80
18.63 2.78	20.30 2.15	21.97 1.92	23.63 1.79
18.67 2.76	20.33 2.14	22.00 1.91	23.67 1.79
18.70 2.75	20.37 2.13	22.03 1.91	23.70 1.79
18.73 2.74	20.40 2.12	22.07 1.91	23.73 1.79
18.77 2.73	20.43 2.11	22.10 1.91	23.77 1.78
18.80 2.72	20.47 2.10	22.13 1.90	23.80 1.78
18.83 2.70	20.50 2.09	22.17 1.90	23.83 1.78
18.87 2.69	20.53 2.08	22.20 1.90	23.87 1.78
18.90 2.68	20.57 2.07	22.23 1.90	23.90 1.77
18.93 2.67	20.60 2.06	22.27 1.89	23.93 1.77
18.97 2.65	20.63 2.06	22.30 1.89	23.97 1.77
19.00 2.64	20.67 2.05	22.33 1.89	24.00 1.77
19.03 2.63	20.70 2.04	22.37 1.89	24.03 1.76
19.07 2.62	20.73 2.04	22.40 1.88	24.07 1.75
19.10 2.60	20.77 2.03	22.43 1.88	24.10 1.73
19.13 2.59	20.80 2.02	22.47 1.88	24.13 1.71
19.17 2.58	20.83 2.02	22.50 1.88	24.17 1.69
19.20 2.57	20.87 2.01	22.53 1.87	24.20 1.66
19.23 2.55	20.90 2.01	22.57 1.87	24.23 1.62
19.27 2.54	20.93 2.00	22.60 1.87	24.27 1.59
19.30 2.53	20.97 2.00	22.63 1.87	24.30 1.54
19.33 2.52	21.00 1.99	22.67 1.86	24.33 1.50
19.37 2.50	21.03 1.99	22.70 1.86	24.37 1.44
19.40 2.49	21.07 1.99	22.73 1.86	24.40 1.39
19.43 2.48	21.10 1.98	22.77 1.86	24.43 1.33
19.47 2.47	21.13 1.98	22.80 1.85	24.47 1.26
19.50 2.45	21.17 1.98	22.83 1.85	24.50 1.19
19.53 2.44	21.20 1.97	22.87 1.85	24.53 1.12
19.57 2.43	21.23 1.97	22.90 1.85	24.57 1.04
19.60 2.42	21.27 1.97	22.93 1.84	24.60 0.97
19.63 2.40	21.30 1.96	22.97 1.84	24.63 0.90
19.67 2.39	21.33 1.96	23.00 1.84	24.67 0.83
19.70 2.38	21.37 1.96	23.03 1.84	24.70 0.76
19.73 2.36	21.40 1.96	23.07 1.83	24.73 0.70
19.77 2.35	21.43 1.95	23.10 1.83	24.77 0.64
19.80 2.34	21.47 1.95	23.13 1.83	24.80 0.58

Continues on next page...

EXHIBIT D PAGE 2

Hydrograph Discharge Table

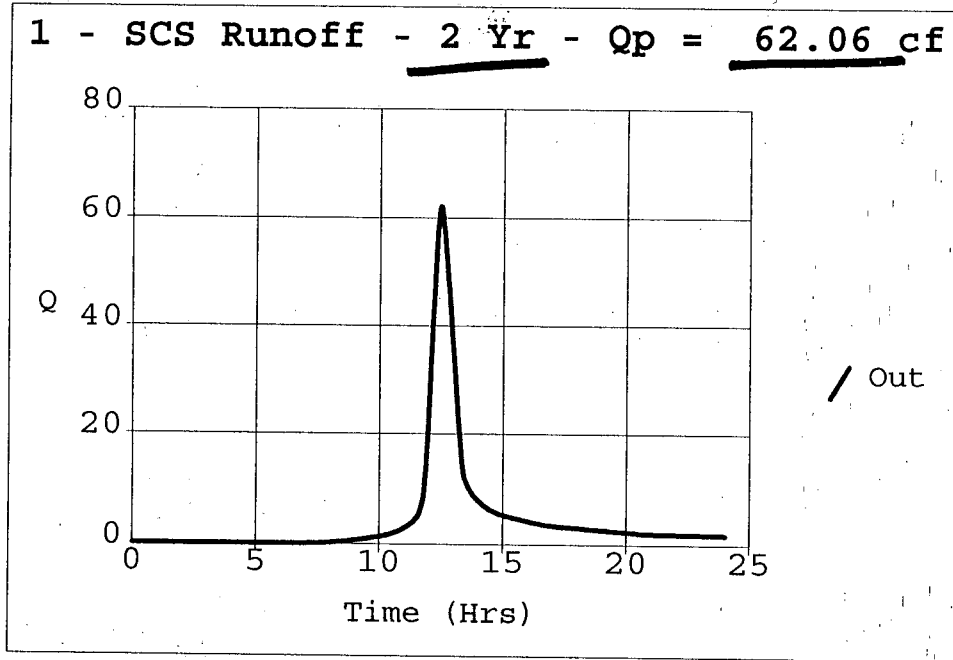
Time -- Outflow
(hrs cfs)

24.83	0.52
24.87	0.47
24.90	0.42
24.93	0.37
24.97	0.33
25.00	0.29
25.03	0.25
25.07	0.21
25.10	0.18
25.13	0.15
25.17	0.12
25.20	0.10
25.23	0.08
25.27	0.06
25.30	0.04
25.33	0.03
25.37	0.02

...End

EXHIBIT 'D', PAGE 4

1 - SCS Runoff - 2 Yr - $Q_p =$ 62.06 cf



Hydrograph Report

Hyd. No. 1

Proposed

Hydrograph type	= SCS Runoff	Peak discharge	= <u>148.86 cfs</u>
Storm frequency	= <u>100 yrs</u>	Time interval	= <u>2 min</u>
Drainage area	= <u>45.9 ac</u>	Curve number	= 85
Basin Slope	= 1 %	Hydraulic length	= 2400 ft
Tc method	= LAG	Time of conc. (Tc)	= 54.3 min
Total precip.	= 7.37 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 927,347 cuft, 21,289 acft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)
4.33 0.01	5.43 0.47	6.53 1.25	7.63 2.14
4.37 0.01	5.47 0.49	6.57 1.28	7.67 2.17
4.40 0.02	5.50 0.51	6.60 1.30	7.70 2.20
4.43 0.02	5.53 0.54	6.63 1.33	7.73 2.23
4.47 0.03	5.57 0.56	6.67 1.36	7.77 2.26
4.50 0.03	5.60 0.58	6.70 1.38	7.80 2.28
4.53 0.04	5.63 0.60	6.73 1.41	7.83 2.31
4.57 0.05	5.67 0.63	6.77 1.43	7.87 2.34
4.60 0.05	5.70 0.65	6.80 1.46	7.90 2.37
4.63 0.06	5.73 0.67	6.83 1.49	7.93 2.40
4.67 0.07	5.77 0.69	6.87 1.51	7.97 2.43
4.70 0.08	5.80 0.72	6.90 1.54	8.00 2.46
4.73 0.10	5.83 0.74	6.93 1.57	8.03 2.49
4.77 0.11	5.87 0.76	6.97 1.59	8.07 2.52
4.80 0.12	5.90 0.79	7.00 1.62	8.10 2.54
4.83 0.14	5.93 0.81	7.03 1.65	8.13 2.57
4.87 0.15	5.97 0.83	7.07 1.67	8.17 2.61
4.90 0.16	6.00 0.86	7.10 1.70	8.20 2.64
4.93 0.18	6.03 0.88	7.13 1.73	8.23 2.67
4.97 0.20	6.07 0.91	7.17 1.75	8.27 2.70
5.00 0.21	6.10 0.93	7.20 1.78	8.30 2.73
5.03 0.23	6.13 0.95	7.23 1.81	8.33 2.77
5.07 0.25	6.17 0.98	7.27 1.84	8.37 2.80
5.10 0.27	6.20 1.00	7.30 1.86	8.40 2.84
5.13 0.29	6.23 1.03	7.33 1.89	8.43 2.88
5.17 0.30	6.27 1.05	7.37 1.92	8.47 2.92
5.20 0.32	6.30 1.08	7.40 1.95	8.50 2.96
5.23 0.34	6.33 1.10	7.43 1.97	8.53 3.01
5.27 0.36	6.37 1.13	7.47 2.00	8.57 3.05
5.30 0.39	6.40 1.15	7.50 2.03	8.60 3.10
5.33 0.41	6.43 1.18	7.53 2.06	8.63 3.15
5.37 0.43	6.47 1.20	7.57 2.09	8.67 3.20
5.40 0.45	6.50 1.23	7.60 2.11	8.70 3.25

Continues on next page...

EXHIBIT D

PAGE 6

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)
8.73 3.31	10.40 7.02	12.07 83.05	13.73 19.81
8.77 3.36	10.43 7.15	12.10 91.19	13.77 19.36
8.80 3.42	10.47 7.29	12.13 99.22	13.80 18.94
8.83 3.48	10.50 7.43	12.17 107.07	13.83 18.54
8.87 3.54	10.53 7.57	12.20 114.64	13.87 18.17
8.90 3.61	10.57 7.72	12.23 121.81	13.90 17.81
8.93 3.67	10.60 7.88	12.27 128.50	13.93 17.47
8.97 3.74	10.63 8.05	12.30 134.59	13.97 17.15
9.00 3.81	10.67 8.22	12.33 139.94	14.00 16.84
9.03 3.88	10.70 8.40	12.37 144.31	14.03 16.53
9.07 3.95	10.73 8.58	12.40 147.38	14.07 16.24
9.10 4.02	10.77 8.77	12.43 148.86 <<	14.10 15.95
9.13 4.09	10.80 8.97	12.47 148.42	14.13 15.68
9.17 4.17	10.83 9.18	12.50 146.20	14.17 15.41
9.20 4.24	10.87 9.39	12.53 142.84	14.20 15.15
9.23 4.32	10.90 9.61	12.57 138.98	14.23 14.90
9.27 4.39	10.93 9.84	12.60 134.97	14.27 14.66
9.30 4.46	10.97 10.08	12.63 130.80	14.30 14.43
9.33 4.54	11.00 10.32	12.67 126.49	14.33 14.21
9.37 4.61	11.03 10.56	12.70 122.05	14.37 13.99
9.40 4.68	11.07 10.80	12.73 117.49	14.40 13.78
9.43 4.75	11.10 11.06	12.77 112.81	14.43 13.58
9.47 4.82	11.13 11.33	12.80 108.04	14.47 13.39
9.50 4.89	11.17 11.61	12.83 103.17	14.50 13.20
9.53 4.96	11.20 11.91	12.87 98.22	14.53 13.03
9.57 5.02	11.23 12.22	12.90 93.19	14.57 12.86
9.60 5.09	11.27 12.55	12.93 88.11	14.60 12.70
9.63 5.15	11.30 12.89	12.97 82.97	14.63 12.54
9.67 5.21	11.33 13.26	13.00 77.79	14.67 12.39
9.70 5.27	11.37 13.64	13.03 72.61	14.70 12.25
9.73 5.33	11.40 14.05	13.07 67.45	14.73 12.12
9.77 5.39	11.43 14.47	13.10 62.36	14.77 11.99
9.80 5.45	11.47 14.92	13.13 57.37	14.80 11.86
9.83 5.51	11.50 15.40	13.17 52.51	14.83 11.74
9.87 5.58	11.53 15.94	13.20 47.84	14.87 11.63
9.90 5.64	11.57 16.59	13.23 43.38	14.90 11.52
9.93 5.71	11.60 17.42	13.27 39.19	14.93 11.42
9.97 5.78	11.63 18.47	13.30 35.36	14.97 11.32
10.00 5.85	11.67 19.78	13.33 32.01	15.00 11.22
10.03 5.92	11.70 21.41	13.37 29.25	15.03 11.12
10.07 6.00	11.73 23.43	13.40 27.21	15.07 11.03
10.10 6.09	11.77 25.91	13.43 25.82	15.10 10.94
10.13 6.17	11.80 29.01	13.47 24.85	15.13 10.86
10.17 6.26	11.83 32.90	13.50 24.06	15.17 10.77
10.20 6.36	11.87 37.77	13.53 23.32	15.20 10.69
10.23 6.46	11.90 43.81	13.57 22.62	15.23 10.61
10.27 6.56	11.93 50.93	13.60 21.98	15.27 10.53
10.30 6.67	11.97 58.72	13.63 21.38	15.30 10.45
10.33 6.78	12.00 66.77	13.67 20.82	15.33 10.38
10.37 6.90	12.03 74.89	13.70 20.30	15.37 10.30

Continues on next page...

EXHIBIT 'D'

PAGE 7

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)
15.40 10.23	17.07 7.11	18.73 5.76	20.40 4.45
15.43 10.15	17.10 7.08	18.77 5.74	20.43 4.42
15.47 10.08	17.13 7.05	18.80 5.71	20.47 4.40
15.50 10.00	17.17 7.02	18.83 5.68	20.50 4.38
15.53 9.93	17.20 6.99	18.87 5.66	20.53 4.36
15.57 9.86	17.23 6.96	18.90 5.63	20.57 4.34
15.60 9.78	17.27 6.93	18.93 5.60	20.60 4.33
15.63 9.71	17.30 6.91	18.97 5.58	20.63 4.31
15.67 9.64	17.33 6.88	19.00 5.55	20.67 4.29
15.70 9.56	17.37 6.85	19.03 5.52	20.70 4.28
15.73 9.49	17.40 6.82	19.07 5.50	20.73 4.26
15.77 9.41	17.43 6.80	19.10 5.47	20.77 4.25
15.80 9.34	17.47 6.77	19.13 5.44	20.80 4.24
15.83 9.27	17.50 6.74	19.17 5.42	20.83 4.23
15.87 9.19	17.53 6.72	19.20 5.39	20.87 4.21
15.90 9.12	17.57 6.69	19.23 5.36	20.90 4.20
15.93 9.04	17.60 6.67	19.27 5.34	20.93 4.19
15.97 8.97	17.63 6.64	19.30 5.31	20.97 4.18
16.00 8.90	17.67 6.61	19.33 5.28	21.00 4.17
16.03 8.82	17.70 6.59	19.37 5.26	21.03 4.17
16.07 8.75	17.73 6.56	19.40 5.23	21.07 4.16
16.10 8.67	17.77 6.53	19.43 5.20	21.10 4.15
16.13 8.60	17.80 6.51	19.47 5.18	21.13 4.14
16.17 8.53	17.83 6.48	19.50 5.15	21.17 4.14
16.20 8.46	17.87 6.45	19.53 5.12	21.20 4.13
16.23 8.39	17.90 6.43	19.57 5.10	21.23 4.12
16.27 8.32	17.93 6.40	19.60 5.07	21.27 4.12
16.30 8.25	17.97 6.37	19.63 5.04	21.30 4.11
16.33 8.18	18.00 6.35	19.67 5.02	21.33 4.10
16.37 8.11	18.03 6.32	19.70 4.99	21.37 4.10
16.40 8.05	18.07 6.29	19.73 4.96	21.40 4.09
16.43 7.98	18.10 6.27	19.77 4.94	21.43 4.09
16.47 7.92	18.13 6.24	19.80 4.91	21.47 4.08
16.50 7.86	18.17 6.22	19.83 4.88	21.50 4.08
16.53 7.80	18.20 6.19	19.87 4.86	21.53 4.07
16.57 7.75	18.23 6.16	19.90 4.83	21.57 4.07
16.60 7.69	18.27 6.14	19.93 4.80	21.60 4.06
16.63 7.64	18.30 6.11	19.97 4.78	21.63 4.06
16.67 7.59	18.33 6.08	20.00 4.75	21.67 4.05
16.70 7.54	18.37 6.06	20.03 4.72	21.70 4.05
16.73 7.50	18.40 6.03	20.07 4.70	21.73 4.04
16.77 7.45	18.43 6.00	20.10 4.67	21.77 4.04
16.80 7.41	18.47 5.98	20.13 4.64	21.80 4.03
16.83 7.37	18.50 5.95	20.17 4.62	21.83 4.03
16.87 7.33	18.53 5.92	20.20 4.59	21.87 4.02
16.90 7.29	18.57 5.90	20.23 4.57	21.90 4.01
16.93 7.25	18.60 5.87	20.27 4.54	21.93 4.01
16.97 7.21	18.63 5.84	20.30 4.52	21.97 4.00
17.00 7.18	18.67 5.82	20.33 4.49	22.00 4.00
17.03 7.15	18.70 5.79	20.37 4.47	22.03 3.99

Continues on next page...

EXHIBIT 'D'

PAGE 8

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)
22.07 3.99	23.73 3.72	25.40 0.02
22.10 3.98	23.77 3.72	
22.13 3.98	23.80 3.71	
22.17 3.97	23.83 3.71	...End
22.20 3.97	23.87 3.70	
22.23 3.96	23.90 3.70	
22.27 3.96	23.93 3.69	
22.30 3.95	23.97 3.69	
22.33 3.95	24.00 3.68	
22.37 3.94	24.03 3.67	
22.40 3.94	24.07 3.64	
22.43 3.93	24.10 3.61	
22.47 3.93	24.13 3.57	
22.50 3.92	24.17 3.51	
22.53 3.91	24.20 3.45	
22.57 3.91	24.23 3.38	
22.60 3.90	24.27 3.30	
22.63 3.90	24.30 3.21	
22.67 3.89	24.33 3.12	
22.70 3.89	24.37 3.01	
22.73 3.88	24.40 2.89	
22.77 3.88	24.43 2.77	
22.80 3.87	24.47 2.63	
22.83 3.87	24.50 2.49	
22.87 3.86	24.53 2.34	
22.90 3.86	24.57 2.17	
22.93 3.85	24.60 2.02	
22.97 3.85	24.63 1.87	
23.00 3.84	24.67 1.72	
23.03 3.84	24.70 1.58	
23.07 3.83	24.73 1.45	
23.10 3.82	24.77 1.32	
23.13 3.82	24.80 1.20	
23.17 3.81	24.83 1.09	
23.20 3.81	24.87 0.98	
23.23 3.80	24.90 0.88	
23.27 3.80	24.93 0.78	
23.30 3.79	24.97 0.69	
23.33 3.79	25.00 0.60	
23.37 3.78	25.03 0.52	
23.40 3.78	25.07 0.45	
23.43 3.77	25.10 0.38	
23.47 3.77	25.13 0.31	
23.50 3.76	25.17 0.26	
23.53 3.76	25.20 0.21	
23.57 3.75	25.23 0.16	
23.60 3.75	25.27 0.12	
23.63 3.74	25.30 0.09	
23.67 3.73	25.33 0.06	
23.70 3.73	25.37 0.03	

EXHIBIT 'D'

PAGE 9

OFFSITE 100 Yr

- SCS Runoff - 100 Yr - Qp = 148.85 c

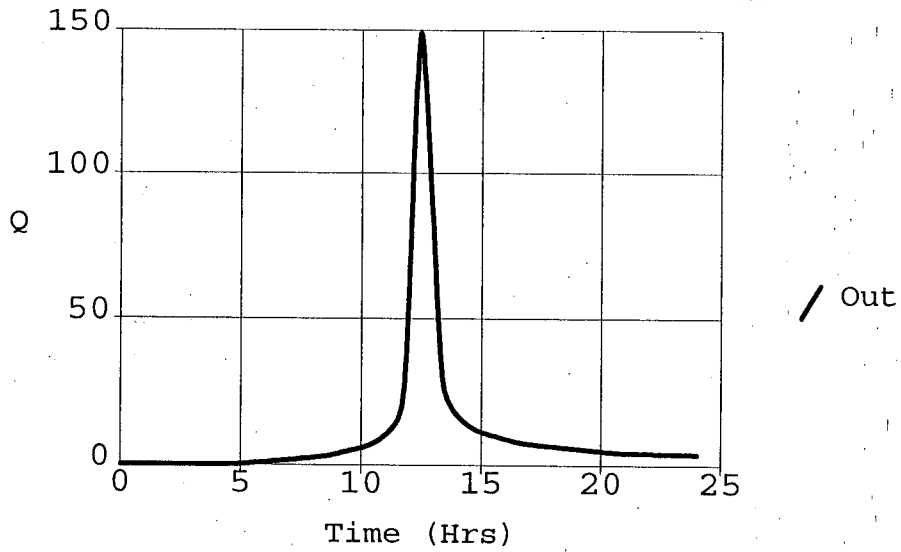


EXHIBIT D

PAGE 10

4.0 STREET FLOWS (2-YEAR)

a. USE $6\frac{5}{8}$ " \approx 6 ON MOUNT VERNON AND LONG LAKE.

$$X\text{-SLOPE} = \frac{3}{8} \text{ "/FT} = 0.03125$$

$$Z = \frac{1}{0.03125} = 32$$

$$n = 0.016 \text{ (ASPHALT)}$$

$$\text{MIN. SLOPE (S)} = 1\% = \text{~~0.01~~ } 0.01$$

$$d = 0.55' \quad Z/n = \frac{32}{0.016} = 2000$$

HALF STREET (SEE EXHIBIT E-1)

$$Q_{CAP} = 24 \text{ CFS} > \text{ALL } Q_2$$

b. USE $3\frac{5}{8}$ " CURB FOR CUL-DE-SACS AND SMITHMOOR CIRCLE.

$$\text{MAX AREA IN CULDESAC} = 2.9 \text{ AC.}$$

$$Q_2 = 6.1 \text{ CFS MAX (OR 3.0 CFS HALF ST.)}$$

$$X\text{-SLOPE} = \frac{3}{8} \text{ "/FT} = 0.03125$$

$$Z = \frac{1}{0.03125} = 32$$

$$n = 0.016 \text{ (ASPHALT)}$$

$$Z/n = \frac{32}{0.016} = 2000$$

$$\text{SLOPE} = 0.032 \text{ (MIN.)}$$

$$d = 0.30$$

HALF STREET

$$Q_{CAP} = 2.7 \text{ CFS} \leq 3.0 \text{ CFS}$$

O.K.

(SEE EXHIBIT E-2)

NOMOGRAPH FOR FLOW IN TRIANGULAR CHANNELS

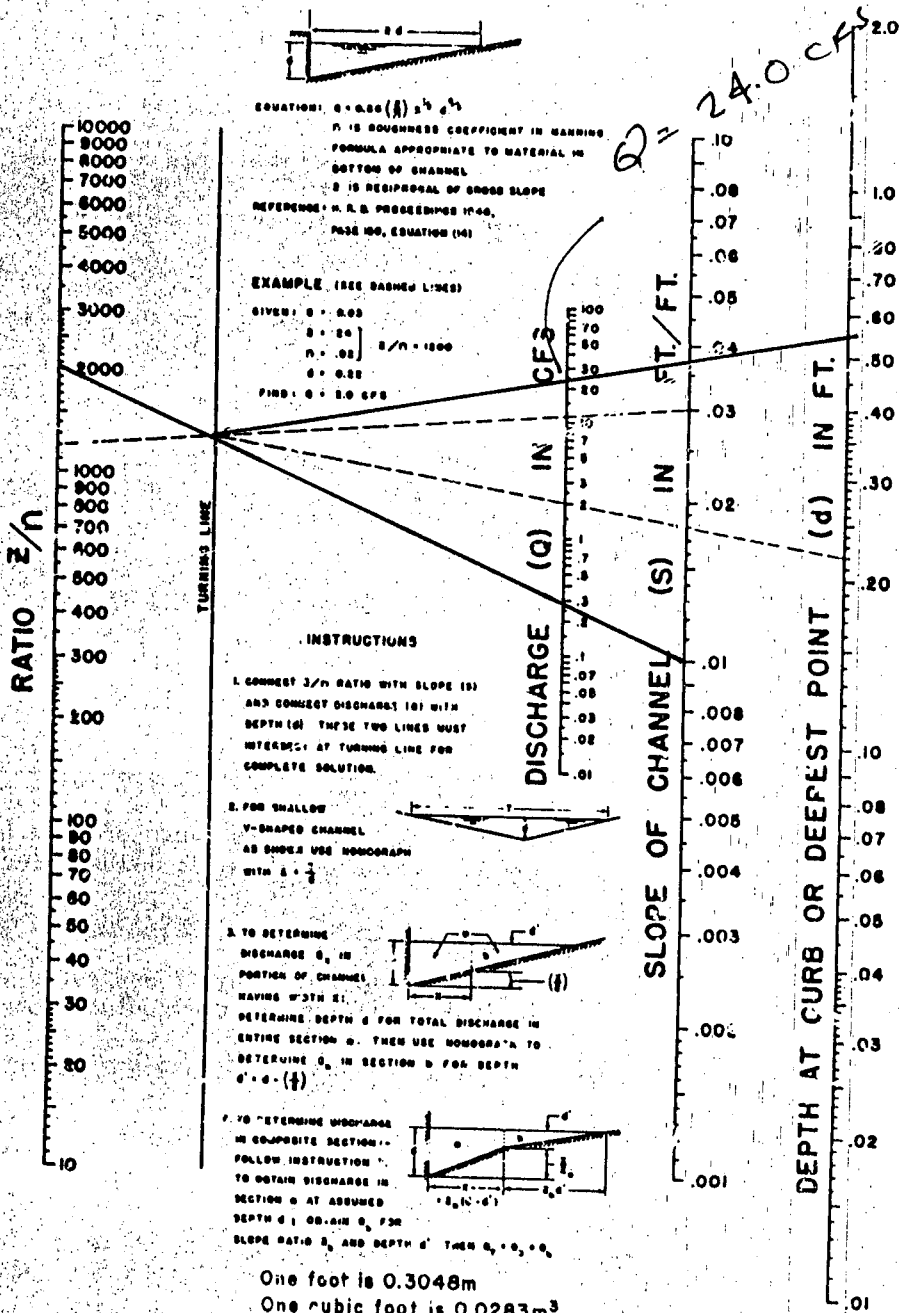


FIG. 5-1 (Adapted FHWA)

HALF STREET Q CAP FOR
 MT. VERNON & LONG LAKE
 5-10

EXHIBIT 'E-1'

NOMOGRAPH FOR FLOW IN TRIANGULAR CHANNELS

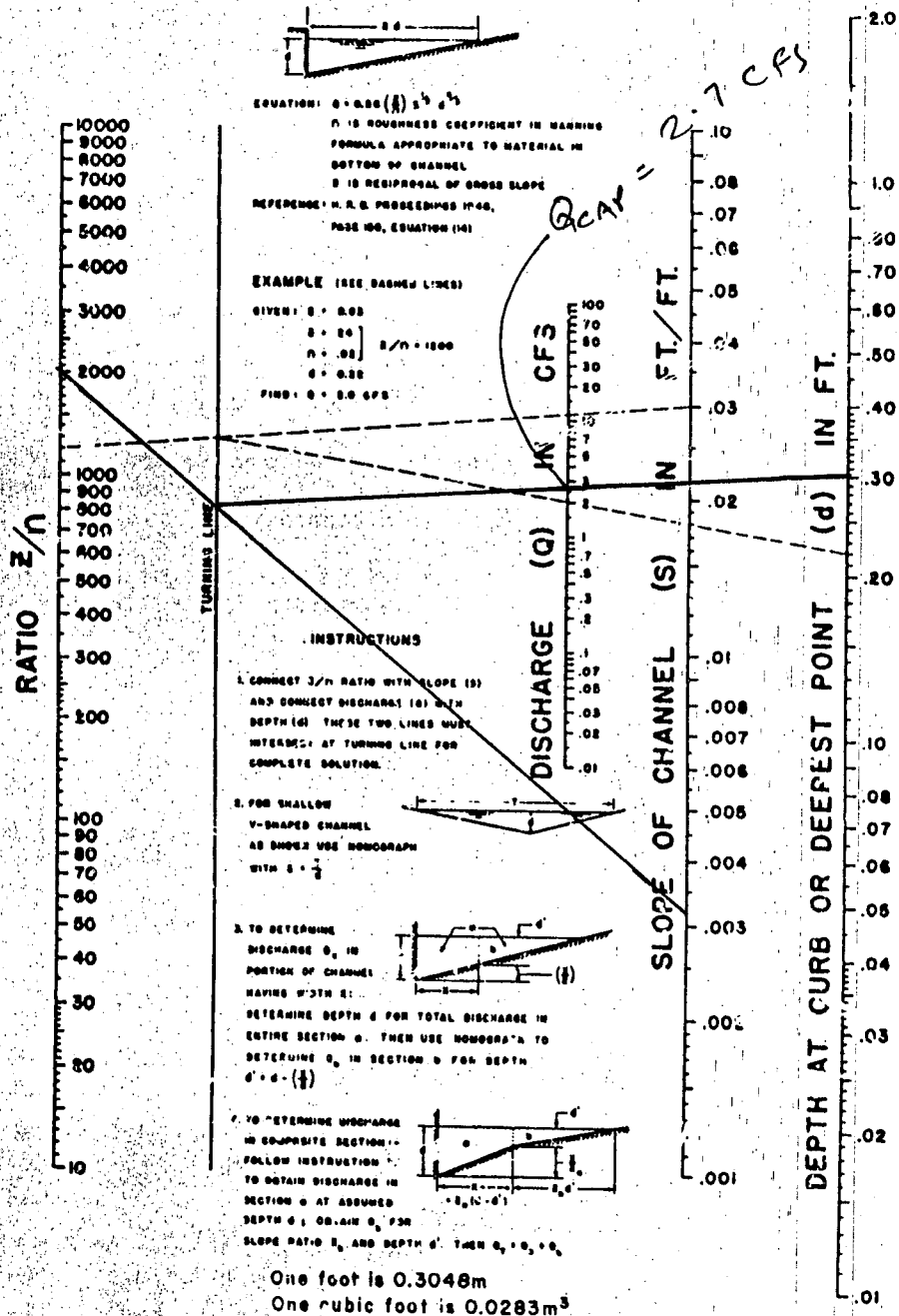
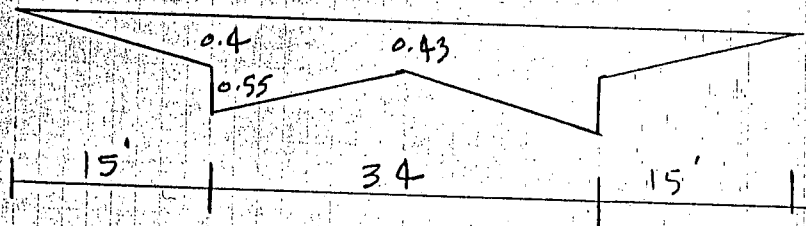


FIG. 5-1 (Adapted FHWA)

HALF STREET Q CAP FOR CULDEACS
 AND SMITHMOOR 5-10 CIR.
 EXHIBIT 'E-2'

S.O STREET FLOW (100 YEAR) (MOUNT VERNON)

WALK GRADE = + 0.4'



- n (PARKING) = 0.03
- n (GUTTER) = 0.013
- n (ASPHALT) = 0.016

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

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

$$A = \frac{2 \times 0.4 \times 15}{2} + \frac{2 \times 0.52 \times 17}{2} + 0.43 \times 34$$

$$= 29.5 \text{ s.f.}$$

$$P = 65.1$$

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

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

$$Q_{\text{CAP}} = 29.5 \times \frac{1.486}{0.022} \times 0.45^{\frac{2}{3}} \times 0.0032^{\frac{1}{2}}$$

$$Q_{\text{CAP}} = 66.0 \text{ cfs}$$

5.0 DRAINAGE CHANNEL:

FLOW IN CHANNEL NORTH OF MOUNT VERNON:

$$= \textcircled{F} + \textcircled{A} + \textcircled{B} + \textcircled{C}$$

$$Q_{100} = 148.9 + 28.7 + 47.1 + 29.3$$

$$= 254.0 \text{ CFS} \leftarrow$$

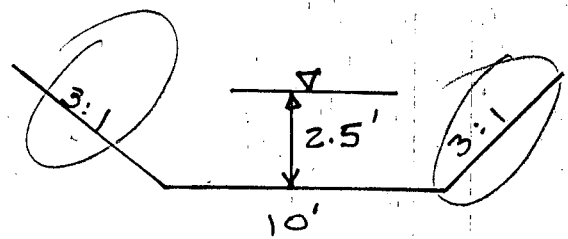
$$A = 43.8 \text{ SF}$$

$$P = 25.8$$

$$R = 1.7$$

$$S = 0.7\% = 0.007$$

$$n = 0.030$$



CHANNEL SECTION

$$Q_{CAP} = \frac{1.486}{0.030} \times 0.007^{\frac{1}{2}} \times 1.7^{\frac{2}{3}} \times 43.8$$

$$= 259.0 \text{ CFS} > Q_{100}$$

$$\text{CHANNEL WIDTH} = 2 \times 3 \times 3.5 + 10 + 4$$

INCLUDES 1' COVER \leftarrow WALKWAY \leftarrow

$$= 35'$$

7.0 DRAINAGE STRUCTURES IN CHANNEL.

a. STRUCTURE @ SMITHMOOR CROSSING.

$$Q_{100} = \textcircled{F} = 148.9 \text{ CFS}$$

$$HW = 5.0'$$

$$L = 50'$$

USE 2 - 36" PIPES

$$Q_{CAP} = 2 \times 70 = 140 \approx 148.9 \text{ CFS}$$

(SEE EXHIBIT 'F') O.K.

b. STRUCTURE @ MOUNT VERNON

$$Q_{100} = \textcircled{F'} + \textcircled{B} + \textcircled{C}$$

$$= 148.9 + 47.1 + 29.3$$

$$= 225.3 \text{ CFS}$$

USE 3 - 36" PIPES

$$Q_{CAP} = 3 \times 70 = 210 \approx 225.3$$

(SEE EXHIBIT 'F') O.K.

FIGURE 86

CULVERT CAPACITY
27 x 44-INCH ARCH
EQUIVALENT 36-INCH CIRCULAR

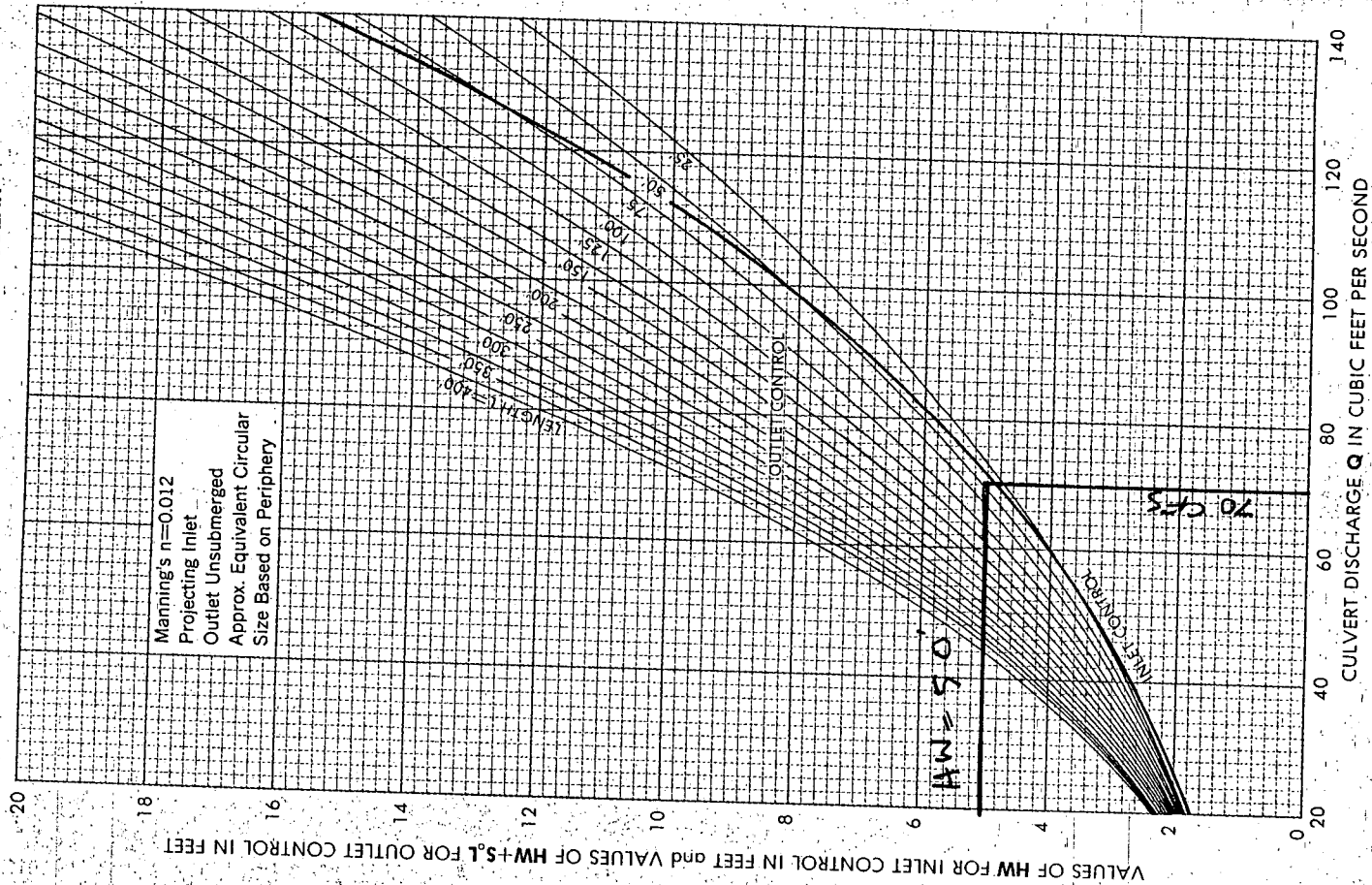
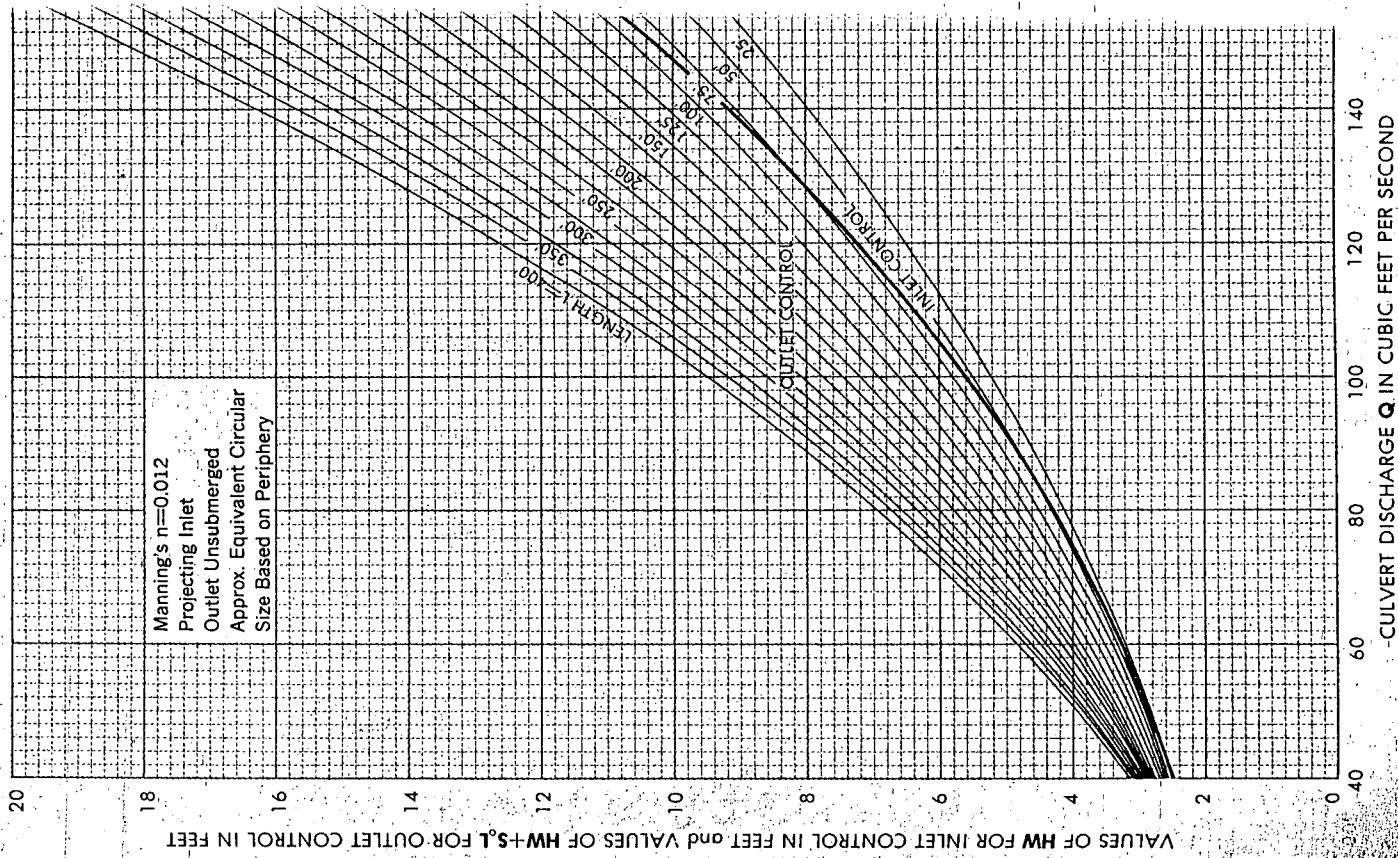


EXHIBIT F

FIGURE 87

CULVERT CAPACITY
31 x 51-INCH ARCH
EQUIVALENT 42-INCH CIRCULAR



8.0 INLET SIZE:

NODE	Q_2 CFS	L	INLET CONDITION	Q_{MAX} CFS	COMMENTS
100	17.3	10'	SUMP	22	O.K.
101	10.5	5'	"	11	"
102	10.7	5'	"	11	"
103	-	5'	"	11	"
10A	23.2	10'	"	22	"
105	8.4	5'	"	11	"

9.0 PIPE SIZE

FROM NODE	TO NODE	Q_2 CFS	$\leq Q_2$ CFS	PIPE	Q_{CAP} CFS	COMMENTS
100	101	17.3	17.3	21" PIPE @ 1.0% SLOPE	17 CFS	O.K.
101	OUTLET	10.5	27.8	24" PIPE @ 1.0% SLOPE	24 CFS	O.K.
102	103	10.7	10.7	18" PIPE @ 1.0% SLOPE	12 CFS	O.K.
103	OUTLET	-	10.7	18" PIPE @ 1.0% SLOPE	12 CFS	O.K.
104	105	23.2	23.2	24" PIPE @ 1.0% SLOPE	24 CFS	O.K.
105	OUTLET	8.4	31.6	27" PIPE @ 1.0% SLOPE	32 CFS	O.K.

10.0 POND

a. EXISTING CONDITIONS:

DRAINAGE AREA = 117.2 Ac.

SOIL HYDROGROUP = D

PASTURE OR RANGE

LAND, AVG. CONDITION

CN (SEE ATTACHED

EXHIBIT 'G') = 85

Q_{100} (PEAK) = 239.7 CFS

(SEE ATTACHED EXHIBIT H)

Runoff curve numbers for selected agricultural, suburban and urban land use. (Antecedent moisture condition II, and I_a = 0.25)

Land Use Description	Hydrologic Soil Group			
	A	B	C	D
Cultivated land ^{1/} : without conservation treatment	72	81	88	91
: with conservation treatment	62	71	78	81
Pasture or range land: poor condition	68	79	86	89
: good condition	39	51	74	80
Meadow: good condition	30	58	71	78
Wood or forest land: thin stand ^{2/} , poor cover, no mulch	45	66	77	83
good cover ^{2/}	25	35	70	77
Open Spaces, lawns, parks, golf courses, cemeteries, etc. good condition: grass cover on 75% or more of the area.	39	61	74	80
fair condition: grass cover on 50% to 75% of the area	49	69	79	84
Commercial and business areas (85% impervious)	89	92	94	95
Industrial districts (72% impervious)	81	88	91	93
Residential: ^{3/}				
Average lot size				
1/8 acre or less		Average % Impervious ^{4/}		
1/4 acre	65	77	85	90
1/3 acre	38	61	75	83
1/2 acre	30	57	72	81
1 acre	25	54	70	80
	20	51	68	79
Paved parking lots, roofs, driveways, etc. ^{5/}	98	98	98	98
Streets and roads:				
Paved with curbs and storm sewers ^{5/}	98	98	98	98
Paved with open ditches	81	89	92	94
Gravel	76	85	89	91
Dirt	72	82	87	89

AVG.
CN = 85

^{1/} For a more detailed description of agricultural land use curve numbers refer to S.C.S. National Engineering Handbook, Sec. 4, Hydrology, Chap. 9, Aug. 1972.

^{2/} Good cover is protected from grazing and litter and brush cover soil.

^{3/} Curve numbers are computed assuming the runoff from the house and driveway is directed toward the street with a minimum of roof water directed to lawns where additional infiltration could occur.

^{4/} The remaining pervious areas (lawn) are considered to be in good pasture condition for these curve numbers.

^{5/} In some warmer climates of the country a curve number of 95 may be used.

TABLE 3-4

(After Soil Conservation Service)

EXHIBIT 'G'

Hydrograph Report

Hyd. No. 1

Proposed

Hydrograph type = SCS Runoff
 Storm frequency = ~~100 yrs~~
 Drainage area = ~~117.2 ac~~
 Basin Slope = ~~.8 %~~
 Tc method = LAG
 Total precip. = 7.37 in
 Storm duration = 24 hrs

Peak discharge = 239.72 cfs
 Time interval = 2 min
 Curve number = 85
 Hydraulic length = 4800 ft
 Time of conc. (Tc) = 105.8 min
 Distribution = Type II
 Shape factor = 484

Total Volume = 2,376,088 cuft, 54,547 acft

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)
4.40	0.01	5.50	0.58	6.60	2.21	7.70	4.36
4.43	0.02	5.53	0.62	6.63	2.27	7.73	4.43
4.47	0.02	5.57	0.65	6.67	2.33	7.77	4.50
4.50	0.02	5.60	0.69	6.70	2.39	7.80	4.56
4.53	0.03	5.63	0.73	6.73	2.46	7.83	4.63
4.57	0.03	5.67	0.77	6.77	2.52	7.87	4.70
4.60	0.04	5.70	0.81	6.80	2.58	7.90	4.77
4.63	0.05	5.73	0.85	6.83	2.64	7.93	4.84
4.67	0.05	5.77	0.89	6.87	2.71	7.97	4.92
4.70	0.06	5.80	0.94	6.90	2.77	8.00	4.99
4.73	0.07	5.83	0.98	6.93	2.83	8.03	5.06
4.77	0.08	5.87	1.03	6.97	2.90	8.07	5.13
4.80	0.09	5.90	1.07	7.00	2.96	8.10	5.20
4.83	0.10	5.93	1.12	7.03	3.02	8.13	5.27
4.87	0.12	5.97	1.17	7.07	3.09	8.17	5.34
4.90	0.13	6.00	1.22	7.10	3.15	8.20	5.42
4.93	0.15	6.03	1.27	7.13	3.22	8.23	5.49
4.97	0.16	6.07	1.32	7.17	3.28	8.27	5.57
5.00	0.18	6.10	1.37	7.20	3.35	8.30	5.64
5.03	0.20	6.13	1.42	7.23	3.41	8.33	5.72
5.07	0.22	6.17	1.47	7.27	3.48	8.37	5.79
5.10	0.24	6.20	1.53	7.30	3.55	8.40	5.87
5.13	0.26	6.23	1.58	7.33	3.61	8.43	5.95
5.17	0.28	6.27	1.63	7.37	3.68	8.47	6.03
5.20	0.31	6.30	1.69	7.40	3.75	8.50	6.11
5.23	0.33	6.33	1.75	7.43	3.81	8.53	6.20
5.27	0.36	6.37	1.80	7.47	3.88	8.57	6.28
5.30	0.39	6.40	1.86	7.50	3.95	8.60	6.37
5.33	0.42	6.43	1.92	7.53	4.01	8.63	6.46
5.37	0.45	6.47	1.97	7.57	4.08	8.67	6.55
5.40	0.48	6.50	2.03	7.60	4.15	8.70	6.64
5.43	0.51	6.53	2.09	7.63	4.22	8.73	6.73
5.47	0.54	6.57	2.15	7.67	4.29	8.77	6.83

Continues on next page...

H-1

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)
8.80	6.93	10.47	14.60
8.83	7.03	10.50	14.82
8.87	7.13	10.53	15.06
8.90	7.23	10.57	15.30
8.93	7.34	10.60	15.55
8.97	7.45	10.63	15.81
9.00	7.56	10.67	16.07
9.03	7.68	10.70	16.35
9.07	7.80	10.73	16.63
9.10	7.92	10.77	16.92
9.13	8.05	10.80	17.23
9.17	8.17	10.83	17.54
9.20	8.30	10.87	17.86
9.23	8.43	10.90	18.20
9.27	8.57	10.93	18.55
9.30	8.70	10.97	18.90
9.33	8.84	11.00	19.27
9.37	8.98	11.03	19.64
9.40	9.12	11.07	20.02
9.43	9.27	11.10	20.42
9.47	9.41	11.13	20.84
9.50	9.56	11.17	21.27
9.53	9.71	11.20	21.72
9.57	9.85	11.23	22.19
9.60	10.00	11.27	22.68
9.63	10.16	11.30	23.19
9.67	10.31	11.33	23.72
9.70	10.46	11.37	24.28
9.73	10.62	11.40	24.87
9.77	10.77	11.43	25.48
9.80	10.93	11.47	26.12
9.83	11.09	11.50	26.79
9.87	11.25	11.53	27.52
9.90	11.42	11.57	28.34
9.93	11.58	11.60	29.28
9.97	11.75	11.63	30.39
10.00	11.92	11.67	31.71
10.03	12.09	11.70	33.28
10.07	12.26	11.73	35.15
10.10	12.43	11.77	37.36
10.13	12.61	11.80	40.05
10.17	12.79	11.83	43.33
10.20	12.97	11.87	47.34
10.23	13.16	11.90	52.22
10.27	13.35	11.93	57.90
10.30	13.55	11.97	64.09
10.33	13.75	12.00	70.51
10.37	13.95	12.03	77.00
10.40	14.16	12.07	83.56
10.43	14.37	12.10	90.21
		12.13	96.91
		12.17	103.66
		12.20	110.45
		12.23	117.27
		12.27	124.12
		12.30	130.99
		12.33	137.88
		12.37	144.77
		12.40	151.66
		12.43	158.54
		12.47	165.40
		12.50	172.25
		12.53	179.06
		12.57	185.85
		12.60	192.54
		12.63	199.11
		12.67	205.48
		12.70	211.60
		12.73	217.38
		12.77	222.77
		12.80	227.68
		12.83	232.02
		12.87	235.61
		12.90	238.24
		12.93	239.68
		12.97	239.72 <<
		13.00	238.46
		13.03	236.35
		13.07	233.86
		13.10	231.24
		13.13	228.48
		13.17	225.60
		13.20	222.59
		13.23	219.47
		13.27	216.25
		13.30	212.92
		13.33	209.50
		13.37	206.00
		13.40	202.42
		13.43	198.76
		13.47	195.04
		13.50	191.26
		13.53	187.43
		13.57	183.56
		13.60	179.65
		13.63	175.70
		13.67	171.71
		13.70	167.69
		13.73	163.64
		13.77	159.55
		13.80	155.44
		13.83	151.30
		13.87	147.13
		13.90	142.93
		13.93	138.71
		13.97	134.47
		14.00	130.21
		14.03	125.94
		14.07	121.66
		14.10	117.37
		14.13	113.07
		14.17	108.76
		14.20	104.45
		14.23	100.14
		14.27	95.83
		14.30	91.51
		14.33	87.20
		14.37	82.92
		14.40	78.67
		14.43	74.49
		14.47	70.40
		14.50	66.43
		14.53	62.60
		14.57	58.94
		14.60	55.49
		14.63	52.32
		14.67	49.51
		14.70	47.13
		14.73	45.28
		14.77	43.91
		14.80	42.86
		14.83	41.95
		14.87	41.08
		14.90	40.27
		14.93	39.49
		14.97	38.76
		15.00	38.07
		15.03	37.42
		15.07	36.80
		15.10	36.22
		15.13	35.67
		15.17	35.14
		15.20	34.65
		15.23	34.17
		15.27	33.72
		15.30	33.28
		15.33	32.86
		15.37	32.46
		15.40	32.06
		15.43	31.68

Continues on next page...

H-2

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)
15.47 31.31	17.13 20.43	18.80 15.88	20.47 12.48
15.50 30.96	17.17 20.30	18.83 15.81	20.50 12.42
15.53 30.61	17.20 20.16	18.87 15.74	20.53 12.36
15.57 30.28	17.23 20.03	18.90 15.67	20.57 12.30
15.60 29.95	17.27 19.91	18.93 15.61	20.60 12.23
15.63 29.64	17.30 19.78	18.97 15.54	20.63 12.17
15.67 29.33	17.33 19.66	19.00 15.47	20.67 12.11
15.70 29.03	17.37 19.54	19.03 15.40	20.70 12.05
15.73 28.74	17.40 19.42	19.07 15.33	20.73 11.99
15.77 28.46	17.43 19.30	19.10 15.27	20.77 11.94
15.80 28.18	17.47 19.19	19.13 15.20	20.80 11.88
15.83 27.92	17.50 19.08	19.17 15.13	20.83 11.82
15.87 27.65	17.53 18.97	19.20 15.06	20.87 11.77
15.90 27.39	17.57 18.86	19.23 14.99	20.90 11.71
15.93 27.14	17.60 18.76	19.27 14.92	20.93 11.66
15.97 26.89	17.63 18.66	19.30 14.86	20.97 11.61
16.00 26.65	17.67 18.55	19.33 14.79	21.00 11.56
16.03 26.42	17.70 18.46	19.37 14.72	21.03 11.51
16.07 26.18	17.73 18.36	19.40 14.65	21.07 11.46
16.10 25.95	17.77 18.26	19.43 14.58	21.10 11.42
16.13 25.73	17.80 18.17	19.47 14.52	21.13 11.37
16.17 25.51	17.83 18.08	19.50 14.45	21.17 11.33
16.20 25.29	17.87 17.99	19.53 14.38	21.20 11.28
16.23 25.08	17.90 17.90	19.57 14.31	21.23 11.24
16.27 24.87	17.93 17.81	19.60 14.24	21.27 11.20
16.30 24.67	17.97 17.72	19.63 14.17	21.30 11.16
16.33 24.46	18.00 17.64	19.67 14.11	21.33 11.12
16.37 24.26	18.03 17.56	19.70 14.04	21.37 11.09
16.40 24.07	18.07 17.47	19.73 13.97	21.40 11.05
16.43 23.88	18.10 17.39	19.77 13.90	21.43 11.02
16.47 23.69	18.13 17.31	19.80 13.83	21.47 10.98
16.50 23.50	18.17 17.23	19.83 13.76	21.50 10.95
16.53 23.31	18.20 17.16	19.87 13.70	21.53 10.92
16.57 23.13	18.23 17.08	19.90 13.63	21.57 10.88
16.60 22.95	18.27 17.00	19.93 13.56	21.60 10.85
16.63 22.78	18.30 16.93	19.97 13.49	21.63 10.83
16.67 22.60	18.33 16.86	20.00 13.42	21.67 10.80
16.70 22.43	18.37 16.78	20.03 13.35	21.70 10.77
16.73 22.26	18.40 16.71	20.07 13.29	21.73 10.74
16.77 22.10	18.43 16.64	20.10 13.22	21.77 10.72
16.80 21.93	18.47 16.57	20.13 13.15	21.80 10.69
16.83 21.77	18.50 16.50	20.17 13.08	21.83 10.67
16.87 21.61	18.53 16.43	20.20 13.01	21.87 10.64
16.90 21.46	18.57 16.36	20.23 12.95	21.90 10.62
16.93 21.30	18.60 16.29	20.27 12.88	21.93 10.60
16.97 21.15	18.63 16.22	20.30 12.81	21.97 10.58
17.00 21.00	18.67 16.15	20.33 12.75	22.00 10.55
17.03 20.85	18.70 16.08	20.37 12.68	22.03 10.53
17.07 20.71	18.73 16.01	20.40 12.61	22.07 10.51
17.10 20.57	18.77 15.95	20.43 12.55	22.10 10.49

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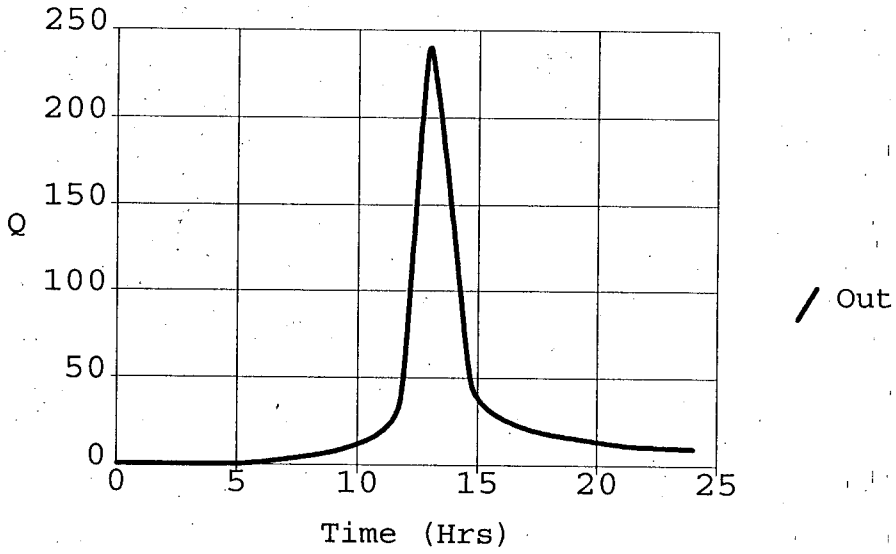
Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)
22.13 10.48	23.80 9.76	25.47 3.40
22.17 10.46	23.83 9.75	25.50 3.23
22.20 10.44	23.87 9.74	25.53 3.07
22.23 10.42	23.90 9.72	25.57 2.91
22.27 10.40	23.93 9.71	25.60 2.76
22.30 10.39	23.97 9.70	25.63 2.61
22.33 10.37	24.00 9.68	25.67 2.46
22.37 10.36	24.03 9.66	25.70 2.32
22.40 10.34	24.07 9.63	25.73 2.18
22.43 10.32	24.10 9.60	25.77 2.05
22.47 10.31	24.13 9.56	25.80 1.92
22.50 10.29	24.17 9.51	25.83 1.79
22.53 10.28	24.20 9.46	25.87 1.67
22.57 10.27	24.23 9.40	25.90 1.56
22.60 10.25	24.27 9.33	25.93 1.45
22.63 10.24	24.30 9.26	25.97 1.34
22.67 10.22	24.33 9.18	26.00 1.23
22.70 10.21	24.37 9.09	26.03 1.14
22.73 10.20	24.40 9.00	26.07 1.04
22.77 10.18	24.43 8.90	26.10 0.95
22.80 10.17	24.47 8.79	26.13 0.86
22.83 10.16	24.50 8.68	26.17 0.78
22.87 10.14	24.53 8.56	26.20 0.70
22.90 10.13	24.57 8.43	26.23 0.63
22.93 10.12	24.60 8.30	26.27 0.56
22.97 10.10	24.63 8.16	26.30 0.49
23.00 10.09	24.67 8.01	26.33 0.43
23.03 10.07	24.70 7.86	26.37 0.37
23.07 10.06	24.73 7.70	26.40 0.32
23.10 10.05	24.77 7.53	26.43 0.27
23.13 10.03	24.80 7.36	26.47 0.22
23.17 10.02	24.83 7.18	26.50 0.18
23.20 10.01	24.87 7.00	26.53 0.15
23.23 9.99	24.90 6.80	26.57 0.11
23.27 9.98	24.93 6.61	26.60 0.09
23.30 9.97	24.97 6.40	26.63 0.06
23.33 9.95	25.00 6.19	26.67 0.04
23.37 9.94	25.03 5.97	26.70 0.02
23.40 9.93	25.07 5.75	26.73 0.01
23.43 9.91	25.10 5.53	
23.47 9.90	25.13 5.31	
23.50 9.89	25.17 5.10	...End
23.53 9.87	25.20 4.90	
23.57 9.86	25.23 4.69	
23.60 9.84	25.27 4.50	
23.63 9.83	25.30 4.30	
23.67 9.82	25.33 4.11	
23.70 9.80	25.37 3.93	
23.73 9.79	25.40 3.75	
23.77 9.78	25.43 3.57	

H-4

EXISTING

- SCS Runoff - 100 Yr - $Q_p = 239.71$ c



H-5

b - RESERVOIR (STAGE - STORAGE)

STAGE (ft)	ELEVATION (ft)	CONTOUR AREA Sq ft	INCR. STORAGE cuft	TOTAL STORAGE
0	34	65,700	0	0
1	35	70,700	68,200	68,200
2	36	75,700	73,200	141,400
3	37	80,900	78,300	219,700
4	38	86,100	83,500	303,200
5	39	91,400	88,750	391,950
6	40	96,900	94,150	486,100
7	41	102,500	99,700	585,800
8	42	107,900	105,200	691,000
9	43	113,600	110,750	801,750
10	44	119,350	116,450	918,200

c - OUTLET STRUCTURE

USE 10' WEIR

$$Q = CLH^{3/2}$$

$$C = 3.0$$

$$L = 10.0$$

H

Q discharge

1.0

26.8

CFS

2.0

101.5

CFS

3.0

238.6

CFS

4.0

449.9

CFS

D. POST-DEVELOPMENT FLOWS:

USE	AREA	CN
PASTURE (OFFSITE)	45.9 AC	85
SINGLE FAMILY	57.9 AC	91
COMMERCIAL	13.4 AC.	95

$$\text{WEIGHTED CN} = 88$$

$$Q_{100} = 278.8 \text{ CFS}$$

(SEE EXHIBIT I)

E. ROUTING THROUGH DETENTION POND.

ROUTE 100 YEAR POST-DEVELOPMENT FLOW
THROUGH DETENTION POND

$$\text{PEAK FLOW DISCHARGE} = 246.9 \text{ CFS}$$

$$\underline{\quad} = 239.7 \text{ (EXISTING)}$$

O.K.

MAXIMUM WATER SURFACE ELEVATION

$$= \underline{\underline{1343.03}}$$

Hydrograph Report

Hyd. No. 1

Proposed

Hydrograph type = SCS Runoff
 Storm frequency = ~~100 yrs~~
 Drainage area = 117.2 ac
 Basin Slope = .8 %
 Tc method = LAG
 Total precip. = 7.37 in
 Storm duration = 24 hrs

Peak discharge = ~~278.75 cfs~~
 Time interval = 2 min
 Curve number = 88
 Hydraulic length = 4800 ft
 Time of conc. (Tc) = 94.8 min
 Distribution = Type II
 Shape factor = 484

Total Volume = 2,544,104 cuft, 58.405 acft

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)
3.53	0.01	4.63	0.68	5.73	2.49	6.83	4.75
3.57	0.01	4.67	0.72	5.77	2.56	6.87	4.83
3.60	0.02	4.70	0.77	5.80	2.62	6.90	4.90
3.63	0.02	4.73	0.81	5.83	2.68	6.93	4.97
3.67	0.03	4.77	0.86	5.87	2.75	6.97	5.04
3.70	0.03	4.80	0.90	5.90	2.81	7.00	5.12
3.73	0.04	4.83	0.95	5.93	2.88	7.03	5.19
3.77	0.05	4.87	0.99	5.97	2.95	7.07	5.26
3.80	0.06	4.90	1.04	6.00	3.01	7.10	5.34
3.83	0.07	4.93	1.09	6.03	3.08	7.13	5.41
3.87	0.08	4.97	1.14	6.07	3.15	7.17	5.49
3.90	0.09	5.00	1.19	6.10	3.21	7.20	5.56
3.93	0.10	5.03	1.25	6.13	3.28	7.23	5.64
3.97	0.12	5.07	1.30	6.17	3.35	7.27	5.71
4.00	0.13	5.10	1.35	6.20	3.42	7.30	5.79
4.03	0.15	5.13	1.41	6.23	3.48	7.33	5.86
4.07	0.17	5.17	1.46	6.27	3.55	7.37	5.94
4.10	0.19	5.20	1.52	6.30	3.62	7.40	6.01
4.13	0.21	5.23	1.58	6.33	3.69	7.43	6.09
4.17	0.23	5.27	1.63	6.37	3.76	7.47	6.16
4.20	0.25	5.30	1.69	6.40	3.83	7.50	6.24
4.23	0.28	5.33	1.75	6.43	3.90	7.53	6.31
4.27	0.31	5.37	1.81	6.47	3.97	7.57	6.39
4.30	0.33	5.40	1.87	6.50	4.04	7.60	6.47
4.33	0.36	5.43	1.93	6.53	4.11	7.63	6.54
4.37	0.39	5.47	1.99	6.57	4.18	7.67	6.62
4.40	0.43	5.50	2.05	6.60	4.25	7.70	6.70
4.43	0.46	5.53	2.11	6.63	4.32	7.73	6.77
4.47	0.49	5.57	2.17	6.67	4.39	7.77	6.85
4.50	0.53	5.60	2.24	6.70	4.46	7.80	6.93
4.53	0.57	5.63	2.30	6.73	4.54	7.83	7.01
4.57	0.60	5.67	2.36	6.77	4.61	7.87	7.08
4.60	0.64	5.70	2.43	6.80	4.68	7.90	7.16

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I-1

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)
7.93	7.24	9.60	13.36	11.27	28.47	12.93	270.02
7.97	7.32	9.63	13.54	11.30	29.10	12.97	266.28
8.00	7.39	9.67	13.71	11.33	29.76	13.00	262.38
8.03	7.47	9.70	13.89	11.37	30.46	13.03	258.31
8.07	7.55	9.73	14.07	11.40	31.18	13.07	254.09
8.10	7.63	9.77	14.26	11.43	31.95	13.10	249.73
8.13	7.71	9.80	14.44	11.47	32.75	13.13	245.23
8.17	7.79	9.83	14.62	11.50	33.58	13.17	240.61
8.20	7.87	9.87	14.81	11.53	34.50	13.20	235.87
8.23	7.95	9.90	14.99	11.57	35.54	13.23	231.02
8.27	8.03	9.93	15.18	11.60	36.76	13.27	226.08
8.30	8.12	9.97	15.37	11.63	38.20	13.30	221.05
8.33	8.20	10.00	15.56	11.67	39.92	13.33	215.94
8.37	8.29	10.03	15.75	11.70	42.00	13.37	210.76
8.40	8.38	10.07	15.94	11.73	44.47	13.40	205.52
8.43	8.46	10.10	16.14	11.77	47.43	13.43	200.23
8.47	8.56	10.13	16.34	11.80	51.02	13.47	194.90
8.50	8.65	10.17	16.54	11.83	55.42	13.50	189.53
8.53	8.75	10.20	16.75	11.87	60.81	13.53	184.10
8.57	8.84	10.23	16.97	11.90	67.37	13.57	178.64
8.60	8.94	10.27	17.19	11.93	75.00	13.60	173.14
8.63	9.05	10.30	17.41	11.97	83.35	13.63	167.62
8.67	9.15	10.33	17.64	12.00	91.98	13.67	162.06
8.70	9.26	10.37	17.88	12.03	100.69	13.70	156.48
8.73	9.37	10.40	18.13	12.07	109.49	13.73	150.88
8.77	9.48	10.43	18.38	12.10	118.34	13.77	145.26
8.80	9.60	10.47	18.65	12.13	127.25	13.80	139.63
8.83	9.72	10.50	18.92	12.17	136.21	13.83	133.98
8.87	9.85	10.53	19.20	12.20	145.21	13.87	128.32
8.90	9.98	10.57	19.48	12.23	154.23	13.90	122.66
8.93	10.11	10.60	19.78	12.27	163.27	13.93	116.99
8.97	10.24	10.63	20.09	12.30	172.32	13.97	111.33
9.00	10.38	10.67	20.41	12.33	181.37	14.00	105.66
9.03	10.53	10.70	20.74	12.37	190.40	14.03	100.03
9.07	10.67	10.73	21.08	12.40	199.42	14.07	94.45
9.10	10.83	10.77	21.44	12.43	208.40	14.10	88.95
9.13	10.98	10.80	21.80	12.47	217.27	14.13	83.58
9.17	11.14	10.83	22.18	12.50	225.97	14.17	78.37
9.20	11.30	10.87	22.58	12.53	234.40	14.20	73.36
9.23	11.46	10.90	22.98	12.57	242.46	14.23	68.58
9.27	11.63	10.93	23.40	12.60	250.07	14.27	64.08
9.30	11.79	10.97	23.84	12.63	257.13	14.30	59.95
9.33	11.96	11.00	24.29	12.67	263.53	14.33	56.30
9.37	12.13	11.03	24.74	12.70	269.16	14.37	53.25
9.40	12.30	11.07	25.21	12.73	273.76	14.40	50.89
9.43	12.48	11.10	25.70	12.77	277.05	14.43	49.17
9.47	12.65	11.13	26.20	12.80	278.75 <<	14.47	47.87
9.50	12.83	11.17	26.73	12.83	278.56	14.50	46.74
9.53	13.00	11.20	27.28	12.87	276.62	14.53	45.68
9.57	13.18	11.23	27.86	12.90	273.57	14.57	44.68

Continues on next page...

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Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)
14.60	43.73	16.27	24.55
14.63	42.84	16.30	24.36
14.67	41.99	16.33	24.17
14.70	41.20	16.37	23.98
14.73	40.45	16.40	23.79
14.77	39.74	16.43	23.60
14.80	39.07	16.47	23.42
14.83	38.43	16.50	23.24
14.87	37.83	16.53	23.05
14.90	37.25	16.57	22.88
14.93	36.71	16.60	22.70
14.97	36.19	16.63	22.53
15.00	35.69	16.67	22.35
15.03	35.20	16.70	22.19
15.07	34.74	16.73	22.02
15.10	34.29	16.77	21.85
15.13	33.86	16.80	21.69
15.17	33.44	16.83	21.53
15.20	33.04	16.87	21.38
15.23	32.65	16.90	21.23
15.27	32.27	16.93	21.08
15.30	31.91	16.97	20.93
15.33	31.56	17.00	20.79
15.37	31.22	17.03	20.65
15.40	30.89	17.07	20.52
15.43	30.57	17.10	20.38
15.47	30.26	17.13	20.25
15.50	29.96	17.17	20.13
15.53	29.67	17.20	20.00
15.57	29.38	17.23	19.88
15.60	29.10	17.27	19.76
15.63	28.83	17.30	19.64
15.67	28.57	17.33	19.53
15.70	28.31	17.37	19.42
15.73	28.05	17.40	19.31
15.77	27.81	17.43	19.20
15.80	27.56	17.47	19.10
15.83	27.32	17.50	19.00
15.87	27.09	17.53	18.90
15.90	26.86	17.57	18.80
15.93	26.64	17.60	18.70
15.97	26.42	17.63	18.61
16.00	26.20	17.67	18.52
16.03	25.98	17.70	18.43
16.07	25.77	17.73	18.34
16.10	25.56	17.77	18.25
16.13	25.35	17.80	18.17
16.17	25.15	17.83	18.08
16.20	24.95	17.87	18.00
16.23	24.75	17.90	17.92
		17.93	17.84
		17.97	17.76
		18.00	17.68
		18.03	17.60
		18.07	17.53
		18.10	17.45
		18.13	17.38
		18.17	17.30
		18.20	17.23
		18.23	17.16
		18.27	17.09
		18.30	17.02
		18.33	16.95
		18.37	16.88
		18.40	16.81
		18.43	16.73
		18.47	16.66
		18.50	16.59
		18.53	16.52
		18.57	16.45
		18.60	16.38
		18.63	16.31
		18.67	16.24
		18.70	16.17
		18.73	16.10
		18.77	16.03
		18.80	15.96
		18.83	15.89
		18.87	15.82
		18.90	15.75
		18.93	15.68
		18.97	15.61
		19.00	15.54
		19.03	15.47
		19.07	15.40
		19.10	15.33
		19.13	15.26
		19.17	15.19
		19.20	15.12
		19.23	15.05
		19.27	14.98
		19.30	14.91
		19.33	14.84
		19.37	14.77
		19.40	14.70
		19.43	14.63
		19.47	14.56
		19.50	14.49
		19.53	14.42
		19.57	14.35
		19.60	14.28
		19.63	14.21
		19.67	14.14
		19.70	14.07
		19.73	14.00
		19.77	13.93
		19.80	13.86
		19.83	13.79
		19.87	13.72
		19.90	13.65
		19.93	13.58
		19.97	13.51
		20.00	13.44
		20.03	13.37
		20.07	13.29
		20.10	13.22
		20.13	13.15
		20.17	13.08
		20.20	13.02
		20.23	12.95
		20.27	12.88
		20.30	12.81
		20.33	12.74
		20.37	12.67
		20.40	12.61
		20.43	12.54
		20.47	12.48
		20.50	12.41
		20.53	12.35
		20.57	12.29
		20.60	12.22
		20.63	12.16
		20.67	12.10
		20.70	12.05
		20.73	11.99
		20.77	11.93
		20.80	11.88
		20.83	11.82
		20.87	11.77
		20.90	11.72
		20.93	11.67
		20.97	11.62
		21.00	11.58
		21.03	11.53
		21.07	11.49
		21.10	11.45
		21.13	11.40
		21.17	11.36
		21.20	11.33
		21.23	11.29

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Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)
21.27 11.25	22.93 10.30	24.60 8.08	26.27 0.11
21.30 11.22	22.97 10.28	24.63 7.90	26.30 0.08
21.33 11.19	23.00 10.27	24.67 7.71	26.33 0.05
21.37 11.15	23.03 10.25	24.70 7.51	26.37 0.03
21.40 11.12	23.07 10.24	24.73 7.31	26.40 0.02
21.43 11.09	23.10 10.23	24.77 7.09	
21.47 11.06	23.13 10.21	24.80 6.87	
21.50 11.03	23.17 10.20	24.83 6.63	...End
21.53 11.01	23.20 10.18	24.87 6.39	
21.57 10.98	23.23 10.17	24.90 6.14	
21.60 10.95	23.27 10.16	24.93 5.88	
21.63 10.93	23.30 10.14	24.97 5.63	
21.67 10.90	23.33 10.13	25.00 5.38	
21.70 10.88	23.37 10.11	25.03 5.14	
21.73 10.86	23.40 10.10	25.07 4.90	
21.77 10.84	23.43 10.09	25.10 4.67	
21.80 10.82	23.47 10.07	25.13 4.45	
21.83 10.80	23.50 10.06	25.17 4.23	
21.87 10.78	23.53 10.04	25.20 4.02	
21.90 10.76	23.57 10.03	25.23 3.81	
21.93 10.74	23.60 10.02	25.27 3.61	
21.97 10.72	23.63 10.00	25.30 3.41	
22.00 10.70	23.67 9.99	25.33 3.22	
22.03 10.69	23.70 9.97	25.37 3.03	
22.07 10.67	23.73 9.96	25.40 2.85	
22.10 10.65	23.77 9.95	25.43 2.68	
22.13 10.64	23.80 9.93	25.47 2.51	
22.17 10.62	23.83 9.92	25.50 2.35	
22.20 10.61	23.87 9.90	25.53 2.19	
22.23 10.59	23.90 9.89	25.57 2.04	
22.27 10.58	23.93 9.88	25.60 1.89	
22.30 10.56	23.97 9.86	25.63 1.75	
22.33 10.55	24.00 9.85	25.67 1.61	
22.37 10.53	24.03 9.82	25.70 1.49	
22.40 10.52	24.07 9.79	25.73 1.36	
22.43 10.51	24.10 9.75	25.77 1.24	
22.47 10.49	24.13 9.70	25.80 1.13	
22.50 10.48	24.17 9.64	25.83 1.02	
22.53 10.46	24.20 9.58	25.87 0.92	
22.57 10.45	24.23 9.50	25.90 0.82	
22.60 10.44	24.27 9.42	25.93 0.73	
22.63 10.42	24.30 9.32	25.97 0.64	
22.67 10.41	24.33 9.22	26.00 0.56	
22.70 10.39	24.37 9.11	26.03 0.49	
22.73 10.38	24.40 8.99	26.07 0.42	
22.77 10.37	24.43 8.86	26.10 0.35	
22.80 10.35	24.47 8.72	26.13 0.29	
22.83 10.34	24.50 8.57	26.17 0.24	
22.87 10.32	24.53 8.42	26.20 0.19	
22.90 10.31	24.57 8.26	26.23 0.15	

I-4

Hydrograph Report

Hyd. No. 2

Hydrograph type = Reservoir
 Storm frequency = 100 yrs
 Inflow hyd. No. = 1
 Max. Elevation = 43.04 ft

Peak discharge = 246.93 cfs
 Time interval = 2 min
 Reservoir name = pond
 Max. Storage = 806,145 cuft

Storage Indication method used.

Total Volume = 2,058,002 cuft, 47,245 acft

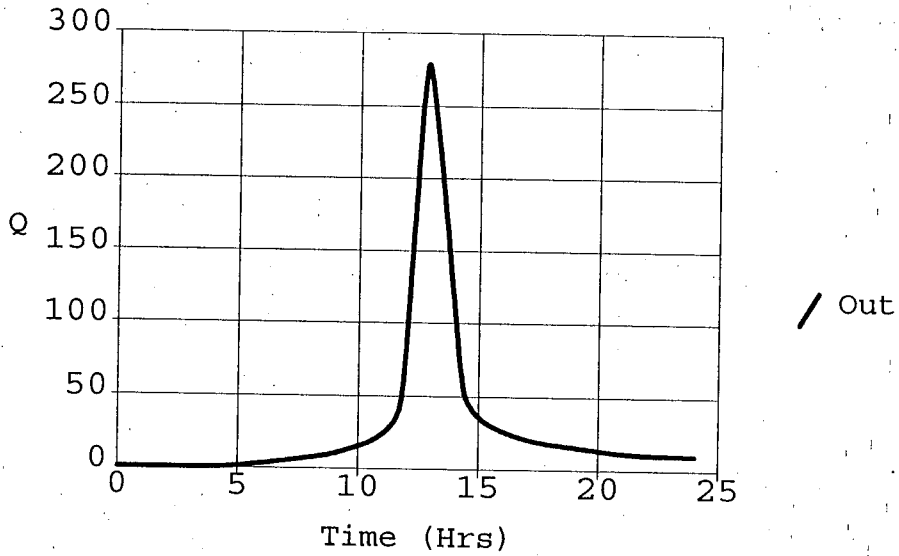
Hydrograph Discharge Table

Time (hrs)	Inflow (cfs)	Elevation (ft)	Culv. A (cfs)	Culv. B (cfs)	Culv. C (cfs)	Weir A (cfs)	Weir B (cfs)	Weir C (cfs)	Outflow (cfs)
12.33	181.37	40.15	----	----	----	----	----	----	4.10
12.37	190.40	40.37	----	----	----	----	----	----	9.91
12.40	199.42	40.59	----	----	----	----	----	----	15.83
12.43	208.40	40.81	----	----	----	----	----	----	21.84
12.47	217.27	41.03	----	----	----	----	----	----	29.40
12.50	225.97	41.24	----	----	----	----	----	----	44.97
12.53	234.40	41.45	----	----	----	----	----	----	59.97
12.57	242.46	41.64	----	----	----	----	----	----	74.42
12.60	250.07	41.83	----	----	----	----	----	----	88.34
12.63	257.13	42.01	----	----	----	----	----	----	102.25
12.67	263.53	42.17	----	----	----	----	----	----	124.24
12.70	269.16	42.31	----	----	----	----	----	----	144.01
12.73	273.76	42.44	----	----	----	----	----	----	161.74
12.77	277.05	42.55	----	----	----	----	----	----	177.56
12.80	278.75 <<	42.66	----	----	----	----	----	----	191.52
12.83	278.56	42.74	----	----	----	----	----	----	203.64
12.87	276.62	42.82	----	----	----	----	----	----	213.93
12.90	273.57	42.88	----	----	----	----	----	----	222.44
12.93	270.02	42.93	----	----	----	----	----	----	229.30
12.97	266.28	42.97	----	----	----	----	----	----	234.71
13.00	262.38	43.00	----	----	----	----	----	----	238.83
13.03	258.31	43.02	----	----	----	----	----	----	242.96
13.07	254.09	43.03	----	----	----	----	----	----	245.55
13.10	249.73	43.04	----	----	----	----	----	----	246.79
13.13	245.23	43.04 <<	----	----	----	----	----	----	246.93 <<
13.17	240.61	43.03	----	----	----	----	----	----	246.14
13.20	235.87	43.03	----	----	----	----	----	----	244.60
13.23	231.02	43.02	----	----	----	----	----	----	242.42
13.27	226.08	43.00	----	----	----	----	----	----	239.71
13.30	221.05	42.99	----	----	----	----	----	----	237.26
13.33	215.94	42.97	----	----	----	----	----	----	234.65
13.37	210.76	42.95	----	----	----	----	----	----	231.69
13.40	205.52	42.92	----	----	----	----	----	----	228.41
13.43	200.23	42.90	----	----	----	----	----	----	224.86
13.47	194.90	42.87	----	----	----	----	----	----	221.06
13.50	189.53	42.84	----	----	----	----	----	----	217.05
13.53	184.10	42.81	----	----	----	----	----	----	212.84

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- SCS Runoff - 100 Yr - $Q_p = 278.74$ c



I-6

Reservoir Report

Reservoir No. 9

pond

Culvert / Orifice Structures

	[A]	[B]	[C]
Rise (in)	= 0.0	0.0	0.0
Span (in)	= 0.0	0.0	0.0
No. Barrels	= 0	0	0
Invert El. (ft)	= 0.00	0.00	0.00
Length (ft)	= 0.0	0.0	0.0
Slope (%)	= 0.00	0.00	0.00
N-Value	= .000	.000	.000
Orif. Coeff.	= 0.00	0.00	0.00
Multi-Stage	= ----		

Weir Structures

	[A]	[B]	[C]
Crest Len (ft)	= 0.0	0.0	0.0
Crest El. (ft)	= 0.00	0.00	0.00
Weir Coeff.	= 0.00	0.00	0.00
Eqn. Exp.	= 0.00	0.00	0.00
Multi-Stage	=		

Tailwater Elevation = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage (ft)	Storage (cuft)	Elevation (ft)	Culv. A (cfs)	Culv. B (cfs)	Culv. C (cfs)	Weir A (cfs)	Weir B (cfs)	Weir C (cfs)	Discharge (cfs)
0.0	00	34.00	---	---	---	---	---	---	0.00
0.1	6,820	34.10	---	---	---	---	---	---	0.00
0.2	13,640	34.20	---	---	---	---	---	---	0.00
0.3	20,460	34.30	---	---	---	---	---	---	0.00
0.4	27,280	34.40	---	---	---	---	---	---	0.00
0.5	34,100	34.50	---	---	---	---	---	---	0.00
0.6	40,920	34.60	---	---	---	---	---	---	0.00
0.7	47,740	34.70	---	---	---	---	---	---	0.00
0.8	54,560	34.80	---	---	---	---	---	---	0.00
0.9	61,380	34.90	---	---	---	---	---	---	0.00
1.0	68,200	35.00	---	---	---	---	---	---	0.00
1.1	75,520	35.10	---	---	---	---	---	---	0.00
1.2	82,840	35.20	---	---	---	---	---	---	0.00
1.3	90,160	35.30	---	---	---	---	---	---	0.00
1.4	97,480	35.40	---	---	---	---	---	---	0.00
1.5	104,800	35.50	---	---	---	---	---	---	0.00
1.6	112,120	35.60	---	---	---	---	---	---	0.00
1.7	119,440	35.70	---	---	---	---	---	---	0.00
1.8	126,760	35.80	---	---	---	---	---	---	0.00
1.9	134,080	35.90	---	---	---	---	---	---	0.00
2.0	141,400	36.00	---	---	---	---	---	---	0.00
2.1	149,230	36.10	---	---	---	---	---	---	0.00
2.2	157,060	36.20	---	---	---	---	---	---	0.00
2.3	164,890	36.30	---	---	---	---	---	---	0.00
2.4	172,720	36.40	---	---	---	---	---	---	0.00

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J-1

Stage / Storage / Discharge Table

Stage (ft)	Storage (cuft)	Elevation (ft)	Culv. A (cfs)	Culv. B (cfs)	Culv. C (cfs)	Weir A (cfs)	Weir B (cfs)	Weir C (cfs)	Discharge (cfs)
2.5	180,550	36.50	---	---	---	---	---	---	0.00
2.6	188,380	36.60	---	---	---	---	---	---	0.00
2.7	196,210	36.70	---	---	---	---	---	---	0.00
2.8	204,040	36.80	---	---	---	---	---	---	0.00
2.9	211,870	36.90	---	---	---	---	---	---	0.00
3.0	219,700	37.00	---	---	---	---	---	---	0.00
3.1	228,050	37.10	---	---	---	---	---	---	0.00
3.2	236,400	37.20	---	---	---	---	---	---	0.00
3.3	244,750	37.30	---	---	---	---	---	---	0.00
3.4	253,100	37.40	---	---	---	---	---	---	0.00
3.5	261,450	37.50	---	---	---	---	---	---	0.00
3.6	269,800	37.60	---	---	---	---	---	---	0.00
3.7	278,150	37.70	---	---	---	---	---	---	0.00
3.8	286,500	37.80	---	---	---	---	---	---	0.00
3.9	294,850	37.90	---	---	---	---	---	---	0.00
4.0	303,200	38.00	---	---	---	---	---	---	0.00
4.1	312,075	38.10	---	---	---	---	---	---	0.00
4.2	320,950	38.20	---	---	---	---	---	---	0.00
4.3	329,825	38.30	---	---	---	---	---	---	0.00
4.4	338,700	38.40	---	---	---	---	---	---	0.00
4.5	347,575	38.50	---	---	---	---	---	---	0.00
4.6	356,450	38.60	---	---	---	---	---	---	0.00
4.7	365,325	38.70	---	---	---	---	---	---	0.00
4.8	374,200	38.80	---	---	---	---	---	---	0.00
4.9	383,075	38.90	---	---	---	---	---	---	0.00
5.0	391,950	39.00	---	---	---	---	---	---	0.00
5.1	401,365	39.10	---	---	---	---	---	---	0.00
5.2	410,780	39.20	---	---	---	---	---	---	0.00
5.3	420,195	39.30	---	---	---	---	---	---	0.00
5.4	429,610	39.40	---	---	---	---	---	---	0.00
5.5	439,025	39.50	---	---	---	---	---	---	0.00
5.6	448,440	39.60	---	---	---	---	---	---	0.00
5.7	457,855	39.70	---	---	---	---	---	---	0.00
5.8	467,270	39.80	---	---	---	---	---	---	0.00
5.9	476,685	39.90	---	---	---	---	---	---	0.00
6.0	486,100	40.00	---	---	---	---	---	---	0.00
6.1	496,070	40.10	---	---	---	---	---	---	0.00
6.2	506,040	40.20	---	---	---	---	---	---	2.70
6.3	516,010	40.30	---	---	---	---	---	---	5.40
6.4	525,980	40.40	---	---	---	---	---	---	8.10
6.5	535,950	40.50	---	---	---	---	---	---	10.80
6.6	545,920	40.60	---	---	---	---	---	---	13.50
6.7	555,890	40.70	---	---	---	---	---	---	16.20
6.8	565,860	40.80	---	---	---	---	---	---	18.90
6.9	575,830	40.90	---	---	---	---	---	---	21.60
7.0	585,800	41.00	---	---	---	---	---	---	24.30
7.1	596,320	41.10	---	---	---	---	---	---	27.00
7.2	606,840	41.20	---	---	---	---	---	---	34.40
7.3	617,360	41.30	---	---	---	---	---	---	41.80
7.4	627,880	41.40	---	---	---	---	---	---	49.20
									56.60

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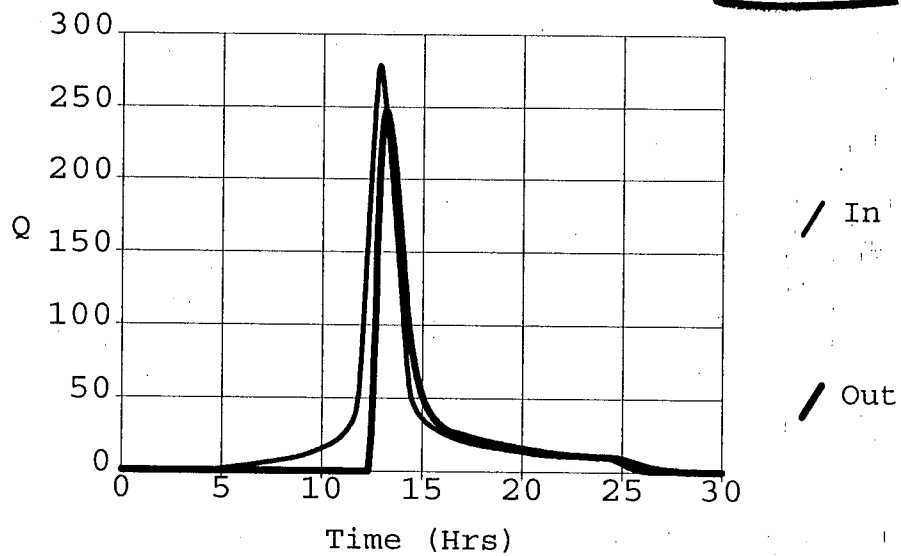
Continues on next page...

Stage / Storage / Discharge Table

Stage (ft)	Storage (cuft)	Elevation (ft)	Culv. A (cfs)	Culv. B (cfs)	Culv. C (cfs)	Weir A (cfs)	Weir B (cfs)	Weir C (cfs)	Discharge (cfs)
7.5	638,400	41.50	---	---	---	---	---	---	64.00
7.6	648,920	41.60	---	---	---	---	---	---	71.40
7.7	659,440	41.70	---	---	---	---	---	---	78.80
7.8	669,960	41.80	---	---	---	---	---	---	86.20
7.9	680,480	41.90	---	---	---	---	---	---	93.60
8.0	691,000	42.00	---	---	---	---	---	---	101.00
8.1	702,075	42.10	---	---	---	---	---	---	114.80
8.2	713,150	42.20	---	---	---	---	---	---	128.60
8.3	724,225	42.30	---	---	---	---	---	---	142.40
8.4	735,300	42.40	---	---	---	---	---	---	156.20
8.5	746,375	42.50	---	---	---	---	---	---	170.00
8.6	757,450	42.60	---	---	---	---	---	---	183.80
8.7	768,525	42.70	---	---	---	---	---	---	197.60
8.8	779,600	42.80	---	---	---	---	---	---	211.40
8.9	790,675	42.90	---	---	---	---	---	---	225.20
9.0	801,750	43.00	---	---	---	---	---	---	239.00
9.1	813,395	43.10	---	---	---	---	---	---	260.00
9.2	825,040	43.20	---	---	---	---	---	---	281.00
9.3	836,685	43.30	---	---	---	---	---	---	302.00
9.4	848,330	43.40	---	---	---	---	---	---	323.00
9.5	859,975	43.50	---	---	---	---	---	---	344.00
9.6	871,620	43.60	---	---	---	---	---	---	365.00
9.7	883,265	43.70	---	---	---	---	---	---	386.00
9.8	894,910	43.80	---	---	---	---	---	---	407.00
9.9	906,555	43.90	---	---	---	---	---	---	428.00
10.0	918,200	44.00	---	---	---	---	---	---	449.00

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- Reservoir - 100 Yr - $Q_p = 246.92$ c



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