ENGINEERING REPORT

FOR

LOWEST FLOOR DESIGN

FOR

BAREFOOT BAY
AN ADDITION
TO WICHITA, SEDGWICK COUNTY, KANSAS

FOR

CITY ENGINEER'S OFFICE
CITY OF WICHITA
MARCH 4, 1994

DEVELOPER: GRANDVIEW, INC.

PREPARED BY

PROFESSIONAL ENGINEERING CONSULTANTS, P.A.
ENGINEERS

WICHITA, KANSAS

PROFESSIONAL ENGINEERING CONSULTANTS
PROFESSIONAL ASSOCIATION

303 S. TOPEKA
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FAX (316) 262-3003

I. OBJECTIVE

The purpose of this report is to present the analysis performed to establish a design groundwater elevation for the Barefoot Bay plat. This analysis was requested by the Metropolitan Area Planning Commission (MAPC) at the time of plat approval. This report is prepared for review and approval by the City Engineer's Office.

II. PROJECT LOCATION

The Barefoot Bay plat lies in the N 1/2 of Section 3, T. 27 S., R. 1 W. in Sedgwick County, Kansas (see Figure 1). The property is being annexed to the City of Wichita. The property is a lake-front development being constructed around an existing lake. The lake was formed as a result of a sand extraction operation on this site, whereby excavation was made below the groundwater table. The resulting lake is fed both by the groundwater aquifer as well as the Big Slough.

III. HISTORICAL DATA

Except during runoff events, the water elevation in Barefoot Bay lake is determined normally by the groundwater table elevation. As measured by photogrammetric survey in 1986, the normal groundwater/lake elevation is 1319.3. As measured on February 24, 1994, after a prolonged wet season and a regional rise of the groundwater table as reported by various sources, the groundwater/lake elevation was 1319.25. The Owners of the lake report that the groundwater/lake elevation has fallen as low as elevation 1317.5.

During May 1994, and again in July 1994, floods were experienced in the Big Slough basin. In May, the lake water surface elevation reached an estimated elevation of 1324.5. This estimated elevation was established by review of the 1986 photogrammetric surveys at points where flows overtopped roadways, and has been verified with high water marks an existing cabin at the northwest corner of the lake. The outlet from the lake into the remainder of the Big Slough channel was through pipe culverts, which have subsequently been removed.

In the flood of July 1993, the lake elevation was not as high and no road overflows downstream of this lake were reported. The flood of record at this site is taken to be 1324.5. It should be noted that this elevation corresponds to the Base Flood Elevation reported in the Flood Insurance Study for Sedgwick County, Kansas, Profile 27P.

IV. HYDROLOGIC ANALYSIS

To evaluate the impact of flood contributions from the Big Slough, a stage-storage analysis was performed using the US Army Corps of Engineers HEC-1 computer package. Model parameters and assumptions are as follows:

Basin Area: 20 Sq. Mi.
Rainfall (100-Year, 24-Hour): 7.8 In.
Rainfall Distribution: Type II
Unit Hydrograph: SCS
Runoff Curve Number: 58 (Meadow, Hydrologic Soil Group B)
Lag: 9.0 Hr Computed, 9.5 Hr Used

It is recognized that much of the basin is actually cultivated land, and not all soils in the basin are Group C. However, considering the very flat topography and the existance of several ponds and lakes in the watershed which are unaccounted for, that the Runoff Curve Number used reasonably represents watershed conditions. The computed lag time was adjusted slightly to yield a peak flow rate from the model of 2398 cfs, compared to the FIRM published value of 2375 cfs.

The pond stage-storage computation was made by using the pond surface as shown by the 1986 photogrammetric mapping to be 120 acres, and assuming nearly vertical sides. During development of the project, additional water area will be constructed to create additional waterfront home sites and additional storage will be available. The outlet hydraulics are defined by orifice flow through the railroad trestle over the Big Slough, and weir flow over the railroad tracks (see Figure 2).

The results of the Computer modeling are included in Appendix 1. The peak stage in the lake due to these conditions is 1324.56.

V. CONCLUSIONS

The long-term groundwater elevation is 1319.3. Minimum requirement for the lowest floor elevation based on the MAPC criteria is 1323.3. Based on the observed estimated flood elevation and the computer model flood elevation, we recommend that a lowest floor elevation of 1324.5 be established. Figure 3 illustrates the relationship between building sites and the water elevation.

STATE OF KANSAS

FIG. 1.

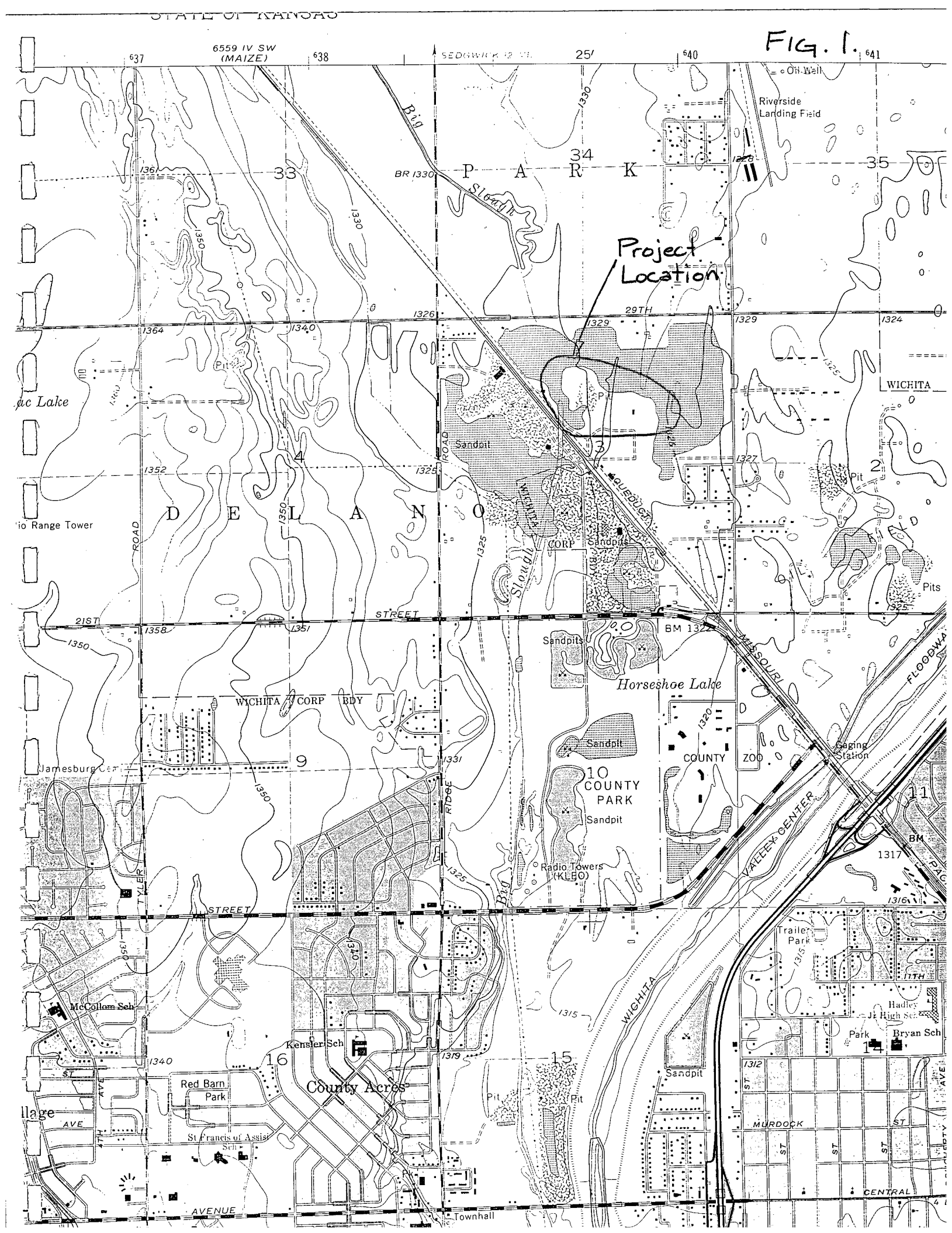
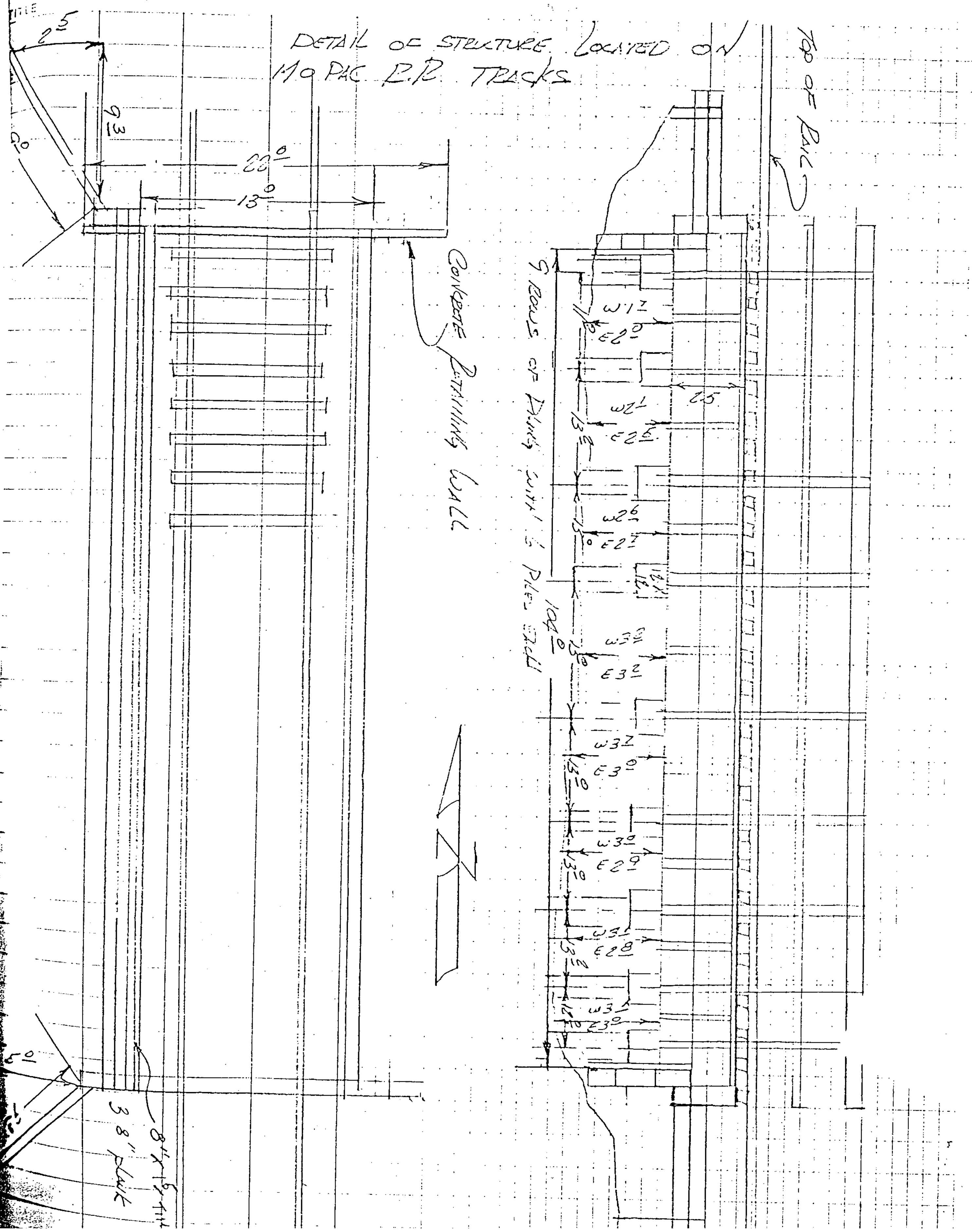


FIG. 2

PARTY CHIEF R. BECKETT D.C.A D.A — PROJ NO. BIG SLOUGH / FEMA STUDY /

DATE 4 DEC 30 — WEATHER 45° OVERCAST

DETAIL OF STRUCTURE LOCATED ON MO PAC R.R TRACKS



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*****************************************
*                                       *
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*             FEBRUARY 1981             *
*           REVISED 02 AUG 88           *
*                                       *
*  RUN DATE  03/02/1994  TIME  12:12:32 *
*                                       *
*****************************************
```


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


```
X    X  XXXXXXX  XXXXX          X
X    X  X       X    X        XX
X    X  X       X             X
XXXXXXX  XXXX   X       XXXXX  X
X    X  X       X             X
X    X  X       X    X        X
X    X  XXXXXXX  XXXXX        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

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                                        HEC-1 INPUT                                        PAGE  1

         LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

           1           ID       BAREFOOT BAY STUDY
           2           ID       PROJ NO 36-93444-2051
           3           ID       ANALYSIS OF POND SOUTH OF 29TH & NORTH OF KSW RR
           4           ID       5 10 50 100-YR 24-HR STORM
           5           ID       PROFESSIONAL ENGINEERING CONSULTANTS, P.A.
           6           ID       WICHITA, KANSAS
           7           ID       MWB  03/1/94
           8           ID       FILE:BSLOO2.HEC
*** LIST ***
*** FREE ***
                       *DIAGRAM
           9           IT     30 01MAR94    0600     100
          10           IN     30 01MAR94    0600
          11           IO      3       0
          12           JR   PREC  0.5769  0.6795  0.8974  1.0000
                       *
                       *      BIG SLOUGH DRAIN BASIN - UNDEV., MEADOW, TYPE B SOIL
                       *

          13           KK   29TH
          14           BA    20.
          15           PB    7.8
          16           PC   0.08    0.09    0.10    0.11    0.12   0.133   0.147   0.163   0.181   0.204
          17           PC  0.235   0.283   0.663   0.735   0.772   0.799   0.820   0.835   0.850   0.865
          18           PC  0.880   0.890   0.900   0.910   0.916   0.925   0.934   0.943   0.952   0.958
          19           PC  0.964   0.970   0.976   0.982   0.988   0.994   1.000
          20           LS      0      58       0
          21           UD   9.50
                       *
                       *      BAREFOOT BAY POND - BANK EL=1326; STATIC POOL = 1319
                       *      ORIFICE FLOW THRU RR TRESTLE USED FOR FLOOD ROUTING
                       *

          22           KK    POND
          23           KO       0       2
          24           RS       1    ELEV  1319.0
          25           SA    120.    121.
          26           SE   1319.  1326.0
          27           SL  1321.5    284.    0.67     0.5
          28           SS  1325.9  1000.0     2.5     1.5
          29           ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (.) CONNECTOR (---->) DIVERSION OR PUMP FLOW (<----) RETURN OF DIVERTED OR PUMPED FLOW

```
  13      29TH
            V
            V
  22      POND
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*            FEBRUARY 1981             *
*          REVISED 02 AUG 88           *
*                                      *
*  RUN DATE  03/02/1994  TIME  12:12:32 *
*                                      *
****************************************
```


```
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*    U.S. ARMY CORPS OF ENGINEERS      *
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*        DAVIS, CALIFORNIA 95616       *
*           (916) 551-1748             *
*                                      *
****************************************
```


```
                        BAREFOOT BAY STUDY
                        PROJ NO 36-93444-2051
                        ANALYSIS OF POND SOUTH OF 29TH & NORTH OF KSW RR
                        5 10 50 100-YR 24-HR STORM
                        PROFESSIONAL ENGINEERING CONSULTANTS, P.A.
                        WICHITA, KANSAS
                        MWB  03/1/94
                        FILE:BSL002.HEC

 11 IO          OUTPUT CONTROL VARIABLES
                     IPRNT          3  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                      NMIN         30  MINUTES IN COMPUTATION INTERVAL
                     IDATE     1MAR94  STARTING DATE
                     ITIME       0600  STARTING TIME
                        NQ        100  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE     3MAR94  ENDING DATE
                    NDTIME       0730  ENDING TIME
                     ICENT         19  CENTURY MARK

                  COMPUTATION INTERVAL      .50 HOURS
                      TOTAL TIME BASE    49.50 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

    JP          MULTI-PLAN OPTION
                     NPLAN          1  NUMBER OF PLANS

    JR          MULTI-RATIO OPTION
                    RATIOS OF PRECIPITATION
                    .58       .68       .90      1.00


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
 13 KK     *     29TH   *
           *            *
           **************

 10 IN          TIME DATA FOR INPUT TIME SERIES
                     JXMIN         30  TIME INTERVAL IN MINUTES
                    JXDATE     1MAR94  STARTING DATE
                    JXTIME        600  STARTING TIME

              SUBBASIN RUNOFF DATA

 14 BA          SUBBASIN CHARACTERISTICS
                     TAREA      20.00  SUBBASIN AREA

                PRECIPITATION DATA

 15 PB               STORM       7.80  BASIN TOTAL PRECIPITATION
```

16 PI INCREMENTAL PRECIPITATION PATTERN

.01	.01	.01	.01	.01	.01	.02	.02	.02	.03
.05	.38	.07	.04	.03	.02	.01	.02	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01				

20 LS SCS LOSS RATE

STRTL	1.45	INITIAL ABSTRACTION
CRVNBR	58.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

21 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	9.50 LAG

***

UNIT HYDROGRAPH
97 END-OF-PERIOD ORDINATES

15.	32.	67.	104.	149.	197.	258.	324.	405.	490.
587.	679.	760.	832.	888.	934.	965.	984.	989.	989.
984.	965.	934.	901.	865.	826.	785.	738.	687.	628.
567.	514.	464.	426.	390.	359.	329.	303.	278.	259.
240.	222.	204.	188.	173.	158.	144.	134.	123.	113.
104.	96.	89.	81.	74.	68.	63.	57.	53.	49.
45.	41.	38.	35.	32.	30.	27.	25.	23.	21.
20.	18.	17.	15.	14.	13.	12.	11.	10.	10.
9.	8.	8.	7.	7.	6.	5.	5.	4.	4.
3.	3.	2.	2.	1.	1.	0.			

TOTAL RAINFALL = 7.80, TOTAL LOSS = 4.83, TOTAL EXCESS = 2.97

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	49.50-HR
+	(CFS)	(HR)				
			(CFS)			
+	2398.	17.00	2311.	1474.	772.	772.
			(INCHES) 1.075	2.742	2.960	2.960
			(AC-FT) 1146.	2925.	3157.	3157.

CUMULATIVE AREA = 20.00 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION 29TH
FOR PLAN 1, RATIO = .58

TOTAL RAINFALL = 4.50, TOTAL LOSS = 3.60, TOTAL EXCESS = .90

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	49.50-HR
+	(CFS)	(HR)				
			(CFS)			
+	705.	18.50	682.	447.	235.	235.
			(INCHES) .317	.832	.902	.902
			(AC-FT) 338.	887.	962.	962.

CUMULATIVE AREA = 20.00 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION 29TH
FOR PLAN 1, RATIO = .68

TOTAL RAINFALL = 5.30, TOTAL LOSS = 3.96, TOTAL EXCESS = 1.34

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	49.50-HR
+	(CFS)	(HR)				
			(CFS)			
+	1054.	18.00	1019.	662.	348.	348.
			(INCHES) .474	1.231	1.333	1.333
			(AC-FT) 505.	1313.	1422.	1422.

CUMULATIVE AREA = 20.00 SQ MI

*** *** *** *** ***

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                       HYDROGRAPH AT STATION     29TH
                         FOR PLAN 1, RATIO =  .90

     TOTAL RAINFALL =    7.00, TOTAL LOSS =    4.59, TOTAL EXCESS =    2.41

   PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                  6-HR        24-HR       72-HR      49.50-HR
 +   (CFS)       (HR)
                         (CFS)
 +    1933.     17.50             1865.       1196.        626.        626.
                       (INCHES)    .867       2.224       2.402       2.402
                        (AC-FT)    925.       2372.       2562.       2562.

                        CUMULATIVE AREA =    20.00 SQ MI


       ***           ***           ***           ***           ***

                       HYDROGRAPH AT STATION     29TH
                         FOR PLAN 1, RATIO = 1.00

     TOTAL RAINFALL =    7.80, TOTAL LOSS =    4.83, TOTAL EXCESS =    2.97

   PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                  6-HR        24-HR       72-HR      49.50-HR
 +   (CFS)       (HR)
                         (CFS)
 +    2398.     17.00             2311.       1474.        772.        772.
                       (INCHES)   1.075       2.742       2.960       2.960
                        (AC-FT)   1146.       2925.       3157.       3157.

                        CUMULATIVE AREA =    20.00 SQ MI


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


              **************
              *            *
   22 KK      *      POND  *
              *            *
              **************

   23 KO         OUTPUT CONTROL VARIABLES
                        IPRNT            3  PRINT CONTROL
                        IPLOT            2  PLOT CONTROL
                        QSCAL           0.  HYDROGRAPH PLOT SCALE

               HYDROGRAPH ROUTING DATA

   24 RS         STORAGE ROUTING
                        NSTPS            1  NUMBER OF SUBREACHES
                         ITYP         ELEV  TYPE OF INITIAL CONDITION
                       RSVRIC      1319.00  INITIAL CONDITION
                            X          .00  WORKING R AND D COEFFICIENT

   25 SA                 AREA        120.0      121.0

   26 SE         ELEVATION     1319.00   1326.00

   27 SL         LOW-LEVEL OUTLET
                        ELEVL      1321.50  ELEVATION AT CENTER OF OUTLET
                        CAREA       284.00  CROSS-SECTIONAL AREA
                         COQL          .67  COEFFICIENT
                         EXPL          .50  EXPONENT OF HEAD

   28 SS         SPILLWAY
                         CREL      1325.90  SPILLWAY CREST ELEVATION
                        SPWID      1000.00  SPILLWAY WIDTH
                         COQW         2.50  WEIR COEFFICIENT
                         EXPW         1.50  EXPONENT OF HEAD

                                                   ***

                                        COMPUTED STORAGE-ELEVATION DATA

            STORAGE          .00    843.50
```

ELEVATION	1319.00	1326.00								

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	.00	4144.52	3977.06	3822.63	3679.74	3547.14	3423.74	3308.67	3201.07
ELEVATION	1319.00	1321.50	1328.88	1328.29	1327.77	1327.31	1326.90	1326.53	1326.20	1325.90
OUTFLOW	3210.43	3215.21	3221.47	3229.15	3238.65	3249.87	3263.10	3278.50	3296.05	3316.26
ELEVATION	1325.91	1325.92	1325.93	1325.93	1325.94	1325.95	1325.96	1325.97	1325.99	1326.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	300.45	843.50	1192.07
OUTFLOW	.00	.00	3316.26	16978.22
ELEVATION	1319.00	1321.50	1326.00	1328.88

*** *** *** *** ***

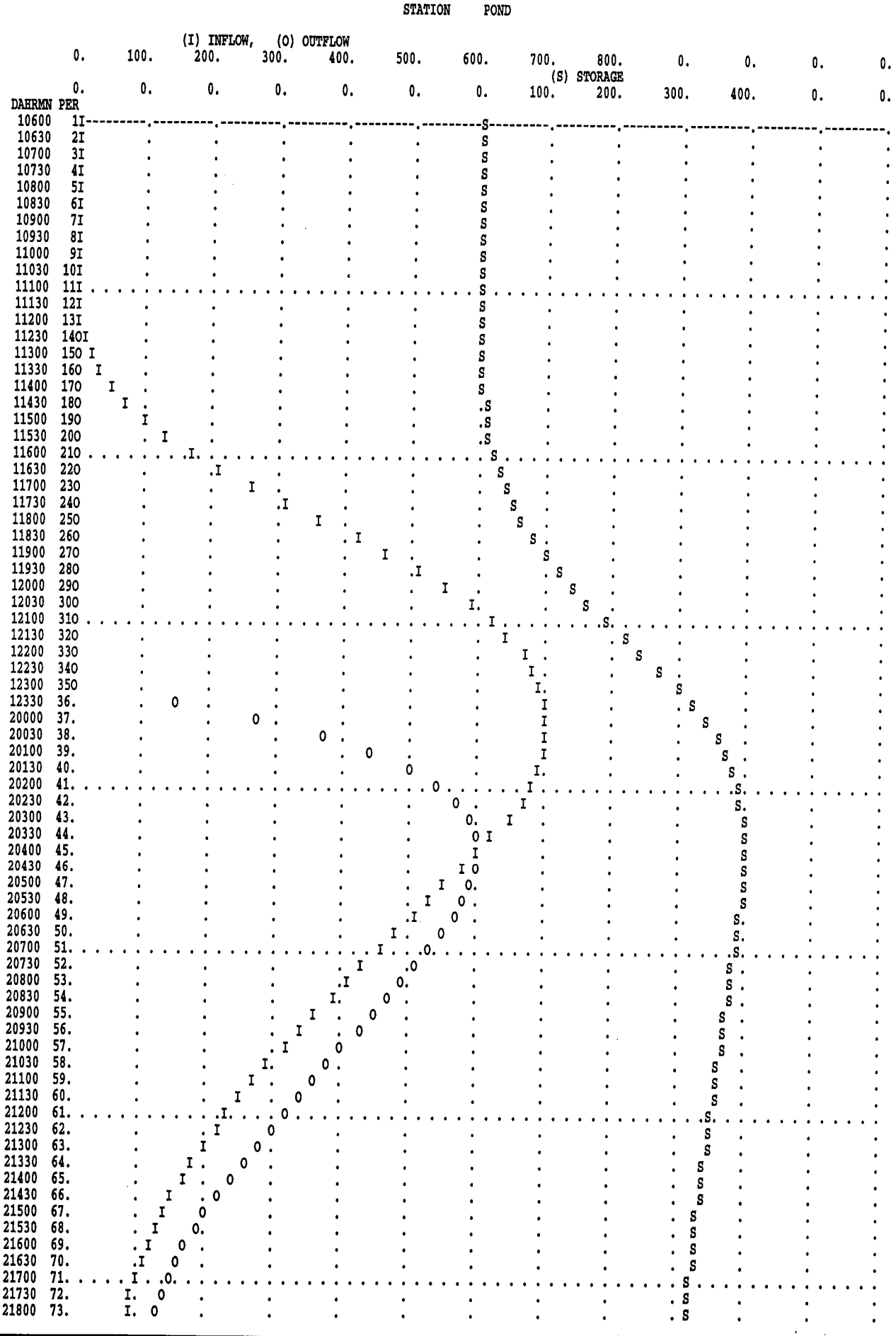
HYDROGRAPH AT STATION POND
FOR PLAN 1, RATIO = .58

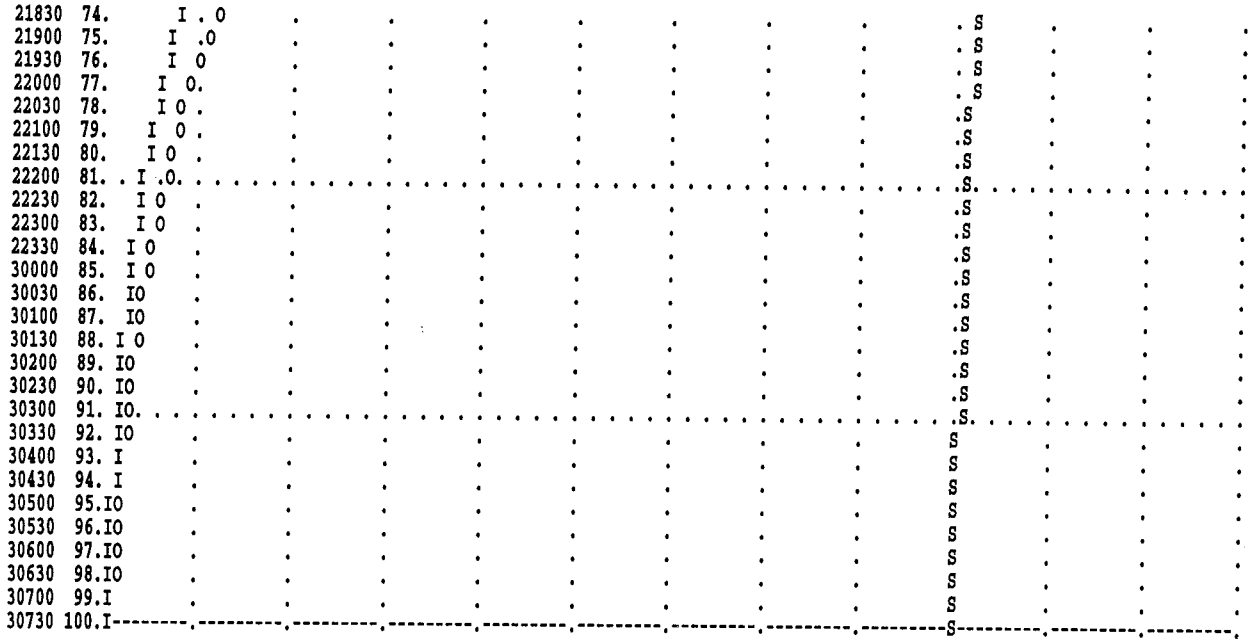
PEAK FLOW + (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	49.50-HR
		(CFS)				
603.	22.00		570.	322.	161.	161.
		(INCHES)	.265	.598	.618	.618
		(AC-FT)	283.	638.	659.	659.

PEAK STORAGE + (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	49.50-HR
399.	22.00	394.	353.	243.	243.

PEAK STAGE + (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	49.50-HR
1322.32	22.00	1322.27	1321.94	1321.02	1321.02

CUMULATIVE AREA = 20.00 SQ MI


STATION POND
(I) INFLOW, (O) OUTFLOW
0. 100. 200. 300. 400. 500. 600. 700. 800. 0. 0. 0. 0.
0. 0. 0. 0. 0. 0. 0. 100. 200. 300. 400. 0. 0.
(S) STORAGE
DAHRMN PER


21830 74. I . O S
21900 75. I .O S
21930 76. I O S
22000 77. I O. S
22030 78. I O . S
22100 79. I O . S
22130 80. I O . S
22200 81. I .O. S
22230 82. I O S
22300 83. I O S
22330 84. I O S
30000 85. I O S
30030 86. IO S
30100 87. IO S
30130 88. I O S
30200 89. IO S
30230 90. IO S
30300 91. IO. S
30330 92. IO S
30400 93. I S
30430 94. I S
30500 95.IO S
30530 96.IO S
30600 97.IO S
30630 98.IO S
30700 99.I S
30730 100.I S

*** *** *** *** ***

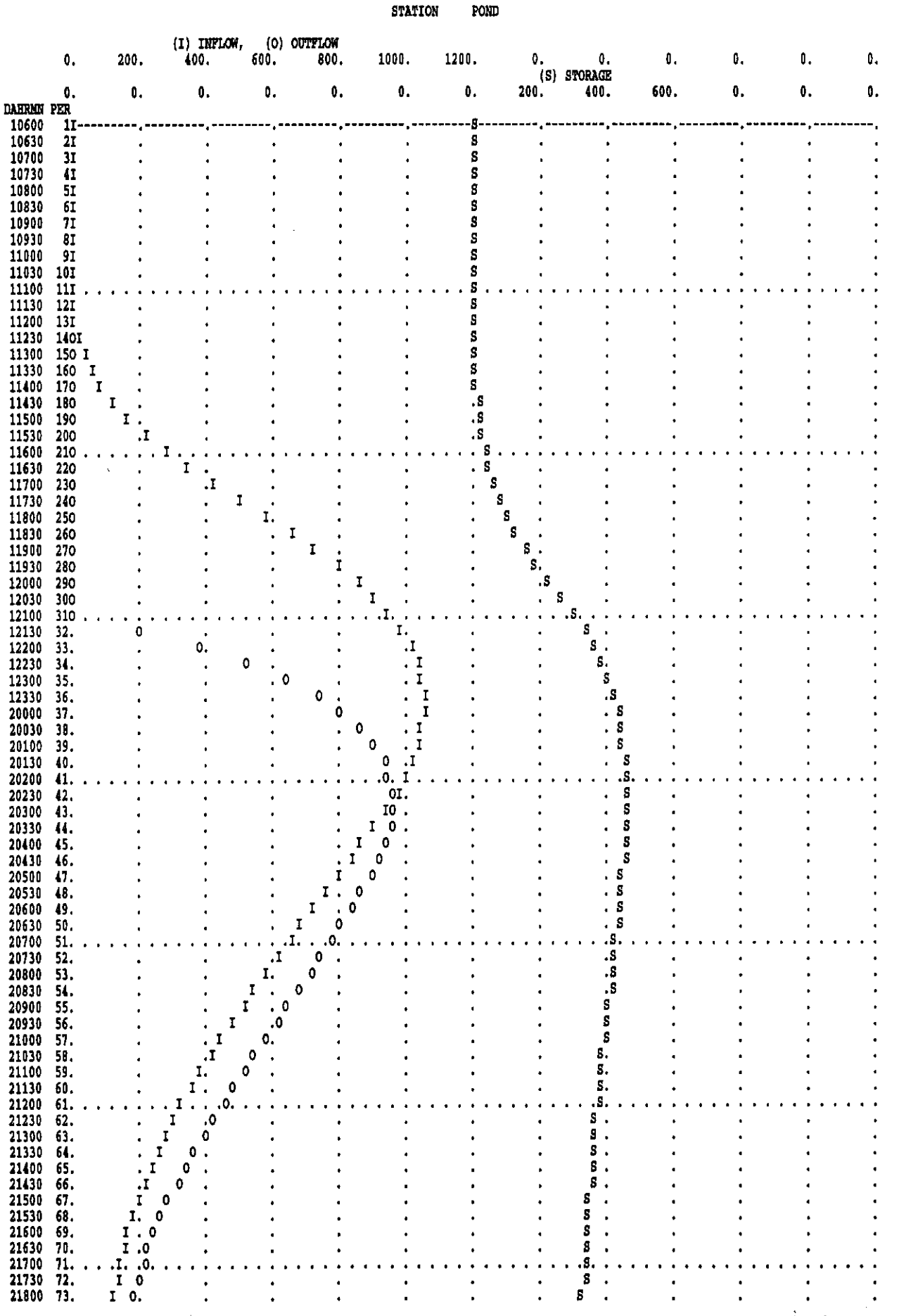
HYDROGRAPH AT STATION POND
FOR PLAN 1, RATIO = .68

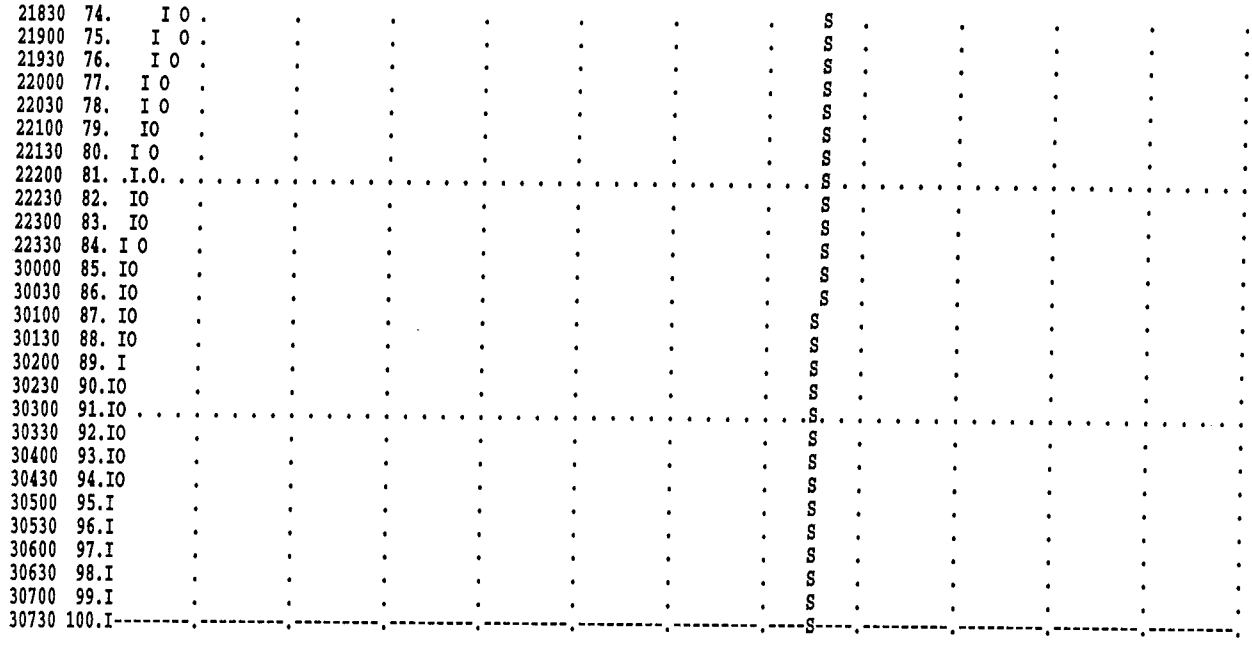
PEAK FLOW + (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	49.50-HR
		(CFS)				
+ 959.	21.00		912.	541.	273.	273.
		(INCHES)	.424	1.007	1.049	1.049
		(AC-FT)	452.	1074.	1118.	1118.

PEAK STORAGE + (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	49.50-HR
457.	21.00	450.	389.	269.	269.

PEAK STAGE + (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	49.50-HR
1322.80	21.00	1322.74	1322.23	1321.24	1321.24

CUMULATIVE AREA = 20.00 SQ MI


STATION POND
(I) INFLOW, (O) OUTFLOW
0. 200. 400. 600. 800. 1000. 1200.
0. 0. 0. 0. 0. 0. 0.
0. 0. 0. 0. 0. 0. 0.
(S) STORAGE
0. 0. 200. 400. 600. 0. 0.
DAHRMN PER


21830 74. I O S
21900 75. I O S
21930 76. I O S
22000 77. I O S
22030 78. I O S
22100 79. IO S
22130 80. I O S
22200 81. .I.O. S
22230 82. IO S
22300 83. IO S
22330 84. I O S
30000 85. IO S
30030 86. IO S
30100 87. IO S
30130 88. IO S
30200 89. I S
30230 90.IO S
30300 91.IO S.
30330 92.IO S
30400 93.IO S
30430 94.IO S
30500 95.I S
30530 96.I S
30600 97.I S
30630 98.I S
30700 99.I S
30730 100.I S

*** *** *** *** ***

HYDROGRAPH AT STATION POND
FOR PLAN 1, RATIO = .90

PEAK FLOW + (CFS)	TIME (HR)
1814.	20.00

PEAK STORAGE + (AC-FT)	TIME (HR)
598.	20.00

PEAK STAGE + (FEET)	TIME (HR)
1323.96	20.00

MAXIMUM AVERAGE FLOW

	6-HR	24-HR	72-HR	49.50-HR
(CFS)	1739.	1081.	552.	552.
(INCHES)	.808	2.011	2.115	2.115
(AC-FT)	862.	2145.	2256.	2256.

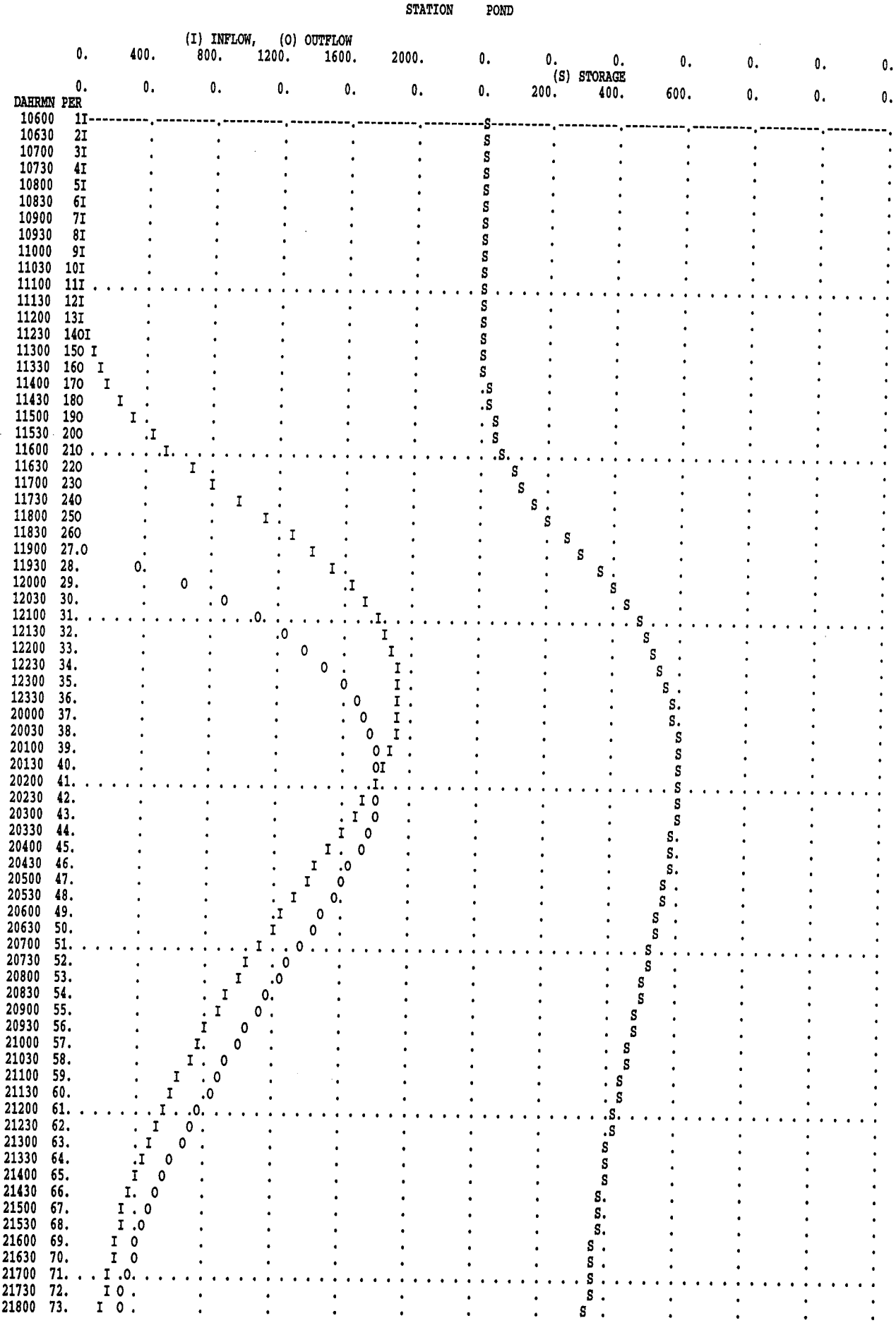
MAXIMUM AVERAGE STORAGE

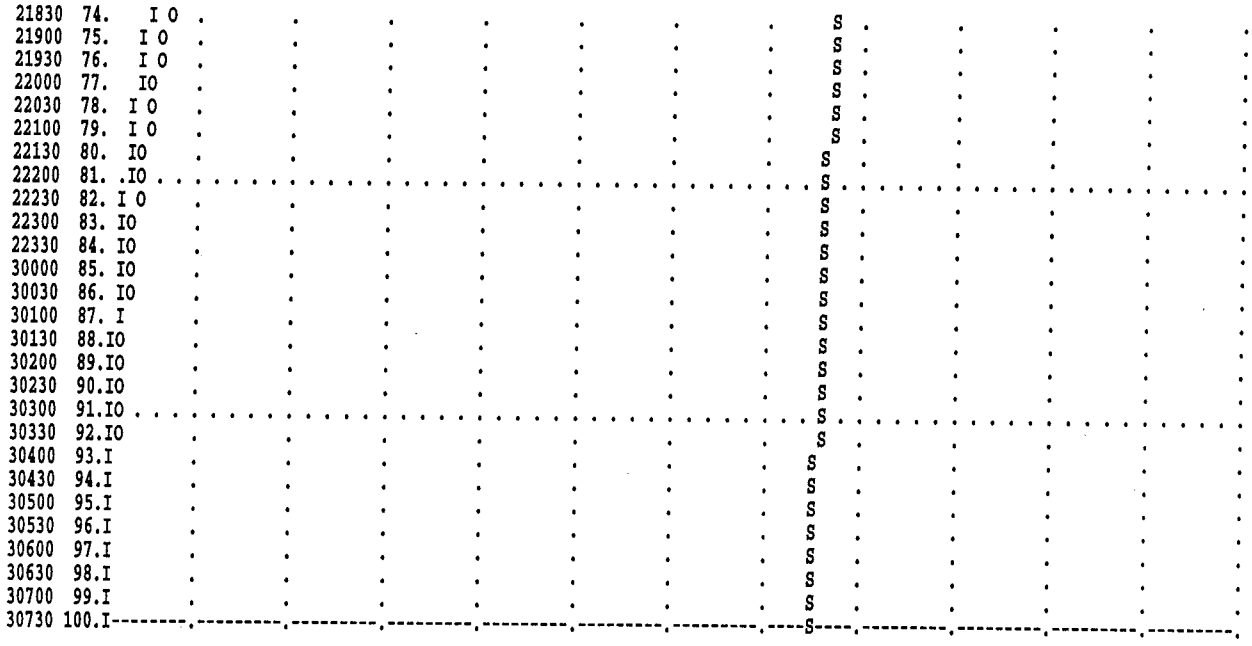
	6-HR	24-HR	72-HR	49.50-HR
	585.	478.	324.	324.

MAXIMUM AVERAGE STAGE

	6-HR	24-HR	72-HR	49.50-HR
	1323.86	1322.97	1321.69	1321.69

CUMULATIVE AREA = 20.00 SQ MI


STATION POND
(I) INFLOW, (O) OUTFLOW
(S) STORAGE
0. 400. 800. 1200. 1600. 2000.
0. 200. 400. 600.
DAHRMN PER


21830 74. I O
21900 75. I O
21930 76. I O
22000 77. IO
22030 78. I O
22100 79. I O
22130 80. IO
22200 81. .IO
22230 82. I O
22300 83. IO
22330 84. IO
30000 85. IO
30030 86. IO
30100 87. I
30130 88.IO
30200 89.IO
30230 90.IO
30300 91.IO
30330 92.IO
30400 93.I
30430 94.I
30500 95.I
30530 96.I
30600 97.I
30630 98.I
30700 99.I
30730 100.I

*** *** *** *** ***

HYDROGRAPH AT STATION POND
FOR PLAN 1, RATIO = 1.00

PEAK FLOW + (CFS)	TIME (HR)
2258.	19.50

PEAK STORAGE + (AC-FT)	TIME (HR)
670.	19.50

PEAK STAGE + (FEET)	TIME (HR)
1324.56	19.50

MAXIMUM AVERAGE FLOW

	6-HR	24-HR	72-HR	49.50-HR
(CFS)	2166.	1361.	697.	697.
(INCHES)	1.007	2.531	2.672	2.672
(AC-FT)	1074.	2700.	2850.	2850.

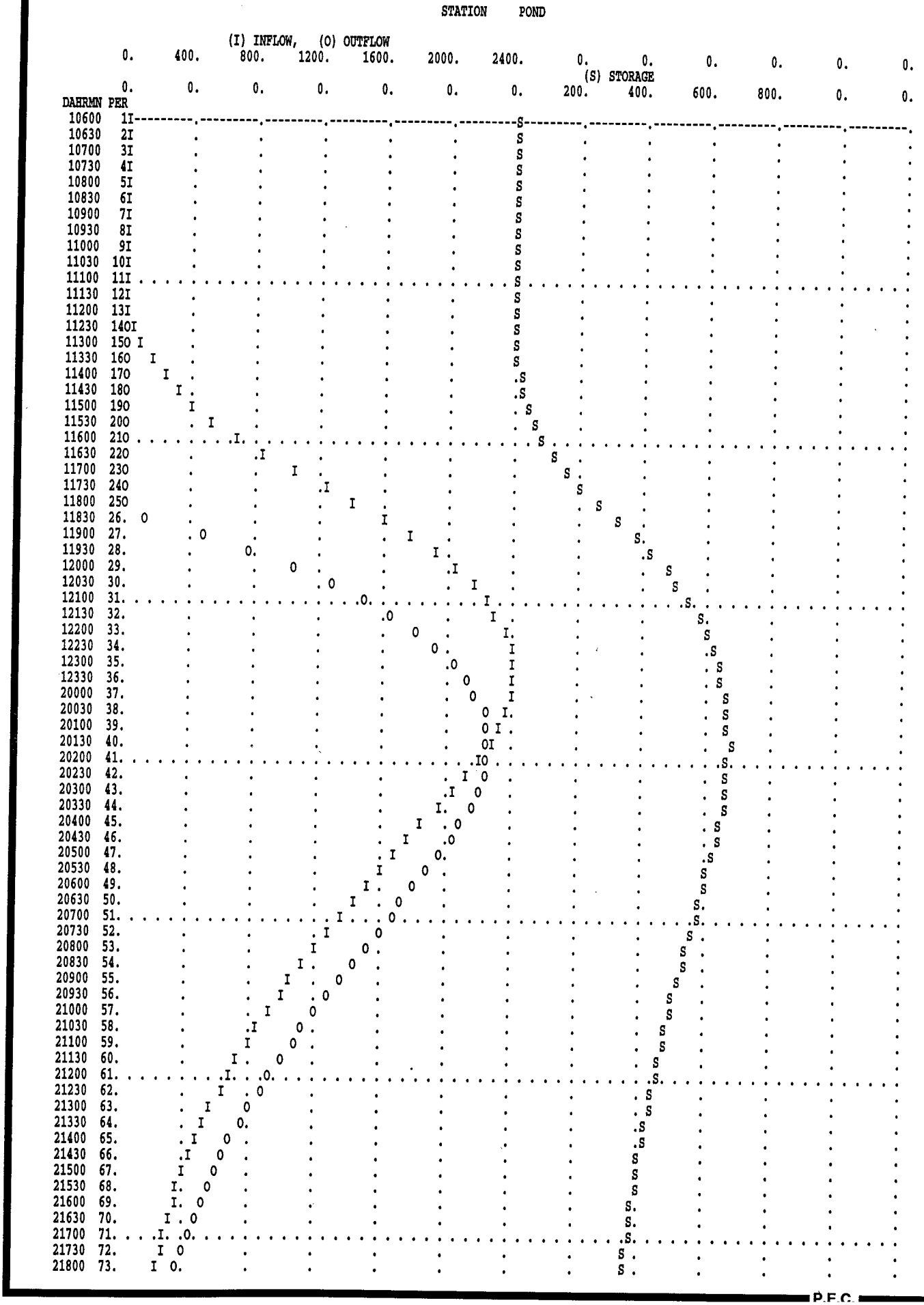
MAXIMUM AVERAGE STORAGE

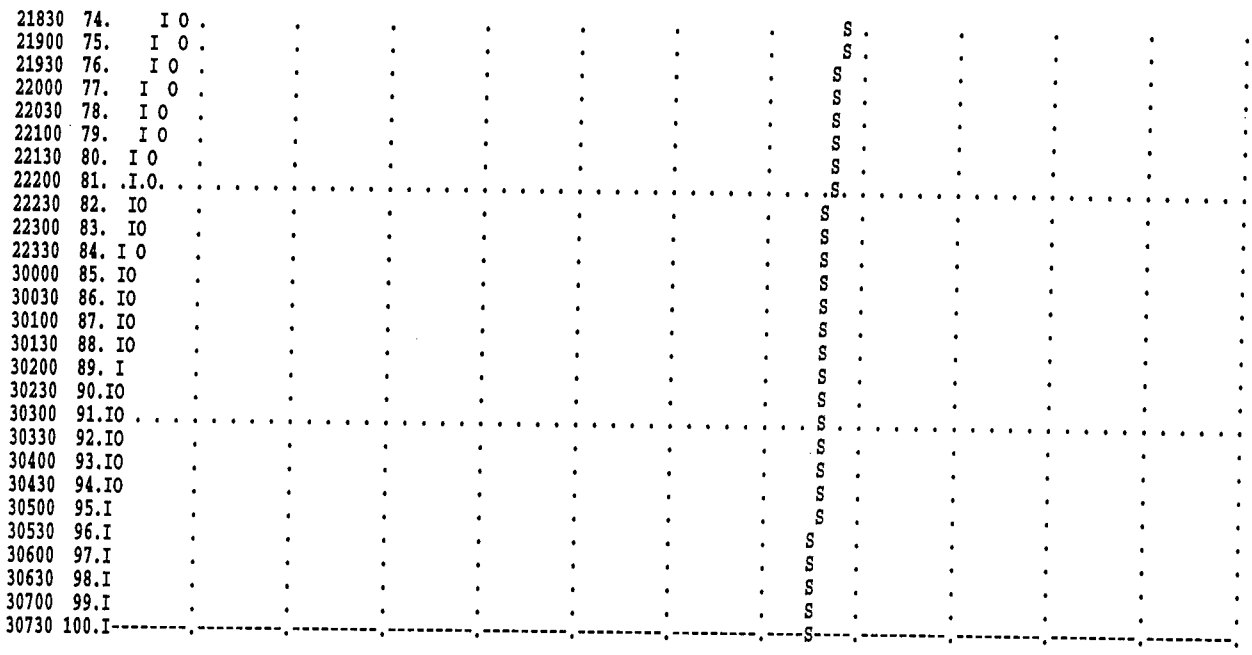
6-HR	24-HR	72-HR	49.50-HR
655.	523.	350.	350.

MAXIMUM AVERAGE STAGE

6-HR	24-HR	72-HR	49.50-HR
1324.44	1323.35	1321.91	1321.91

CUMULATIVE AREA = 20.00 SQ MI


STATION POND
(I) INFLOW, (O) OUTFLOW
(S) STORAGE
DAHRMN PER

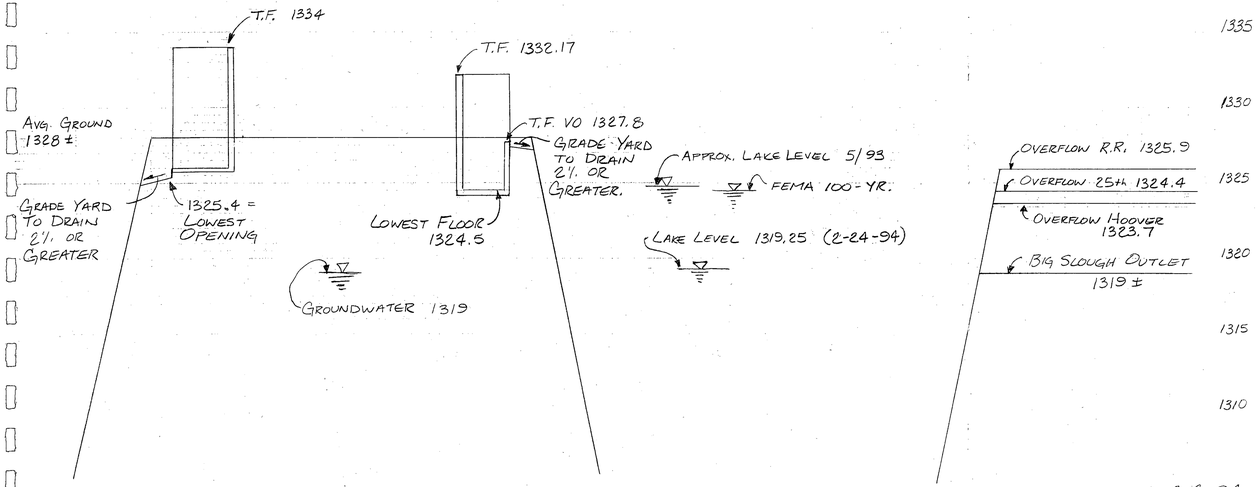

21830 74. I O
21900 75. I O
21930 76. I O
22000 77. I O
22030 78. I O
22100 79. I O
22130 80. I O
22200 81. I.O.
22230 82. IO
22300 83. IO
22330 84. I O
30000 85. IO
30030 86. IO
30100 87. IO
30130 88. IO
30200 89. I
30230 90.IO
30300 91.IO
30330 92.IO
30400 93.IO
30430 94.IO
30500 95.I
30530 96.I
30600 97.I
30630 98.I
30700 99.I
30730 100.I

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 .58	RATIO 2 .68	RATIO 3 .90	RATIO 4 1.00
HYDROGRAPH AT								
+	29TH	20.00	1	FLOW	705.	1054.	1933.	2398.
				TIME	18.50	18.00	17.50	17.00
ROUTED TO								
+	POND	20.00	1	FLOW	603.	959.	1814.	2258.
				TIME	22.00	21.00	20.00	19.50
			** PEAK STAGES IN FEET **					
			1	STAGE	1322.32	1322.80	1323.96	1324.56
				TIME	22.00	21.00	20.00	19.50

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

FIG. 3


T.F. 1334
T.F. 1332.17
AVG. GROUND 1328 ±
T.F. VO 1327.8
GRADE YARD TO DRAIN 2% OR GREATER.
APPROX. LAKE LEVEL 5/93
FEMA 100-YR.
GRADE YARD TO DRAIN 2% OR GREATER
1325.4 = LOWEST OPENING
LOWEST FLOOR 1324.5
LAKE LEVEL 1319.25 (2-24-94)
GROUNDWATER 1319

1335
1330
1325
1320
1315
1310
OVERFLOW R.R. 1325.9
OVERFLOW 25th 1324.4
OVERFLOW HOOVER 1323.7
BIG SLOUGH OUTLET 1319 ±

3-3-94