SPRING RUN DETENTION PONDS

DESIGN REPORT

Prepared for:

CITY OF COLORADO SPRINGS
ENGINEERING DIVISION

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DESIGN REPORT

LOCATION AND DESCRIPTION

The Spring Run Detention Ponds project is located in the southwest portion of Colorado Springs, in the Broadmoor area. Spring Run is part of the Southwest Basin which also contains Cheyenne Run and Cheyenne Creek. The Spring Run Basin was described as Subbasin IV in the Southwest Area Master Drainage Study prepared by Lincoln DeVore in 1984.

The Spring Run basin begins at the crest of Cheyenne Mountain and flows in a northeasterly direction until it ends at Fountain Creek near Circle Blvd. This basin encompasses the Broadmoor golf course, in addition to much of the homes within the Broadmoor development area. It also includes the Southgate Shopping Center and Myron Stratton home within its boundaries.

The existing channel varies along its route from a broad grassed swale through the golf course to a well-defined rock lined channel near the Big Stratton Reservoir. The reservoir, which was originally built in 1888 as an irrigation pond, empties into a low-lying area adjacent to Lake Ave., referred to as Pond 1 in the Master Drainage Study. The flow crosses Lake Avenue via a 78" culvert and continues through another low-lying area referred to as exsting Pond 2. It then crosses Nevada Ave. through an 84" culvert. The flow then enters another natural depression referred to as Pond 3. At this point the flow enters an enclosed conduit system which conveys it to a concrete lined channel east of the shopping center.

PREVIOUS STUDIES

As mentioned in the previous section the Spring Run area has examined under the Southwest Area Master Drainage Study. This study examined ways of safely passing developed flows through the drainage system without causing flooding. The main recommendations of the study was to utilize the Big Stratton Reservoir in addition to the low-lying areas downstream of the reservoir to provide adequate stormwater storage to prevent flooding in the Stratton Meadows area which is directly downstream of the Southgate Shopping Center.

One of the existing low-lying areas which the original drainage study recommended preserving was an area located just east of Nevada Ave. and just upstream of the Southgate Shopping Center. This depression is referred to as Pond 3 in the 1984 Master Drainage Study. In 1986 a report was prepared by Drexel, Barrell & Co. regarding pond alterations at the Southgate Shopping Center for Myron Stratton Homes. The intent of the report was to examine detention alternatives in the area assuming that the Pond 3 be filled in to provide additional development area for the shopping center.

HYDROLOGY

A hydrologic analysis of the basin was performed to determine flows in accordance with current criteria. Flows were calculated in accordance with the City of Colorado Springs/El Paso County Drainage Criteria Manual for areas greater than 100 acres. The TR-20 program for Project Formulation Hydrology developed by the Soil Conservation Services was utilized to calculate the 100-year 24 hour and 2 hour storms. The rainfall amounts utilized in the calculations were as follows:

100-Year	
24 Hour	2 Hour
4.6"	2.92"

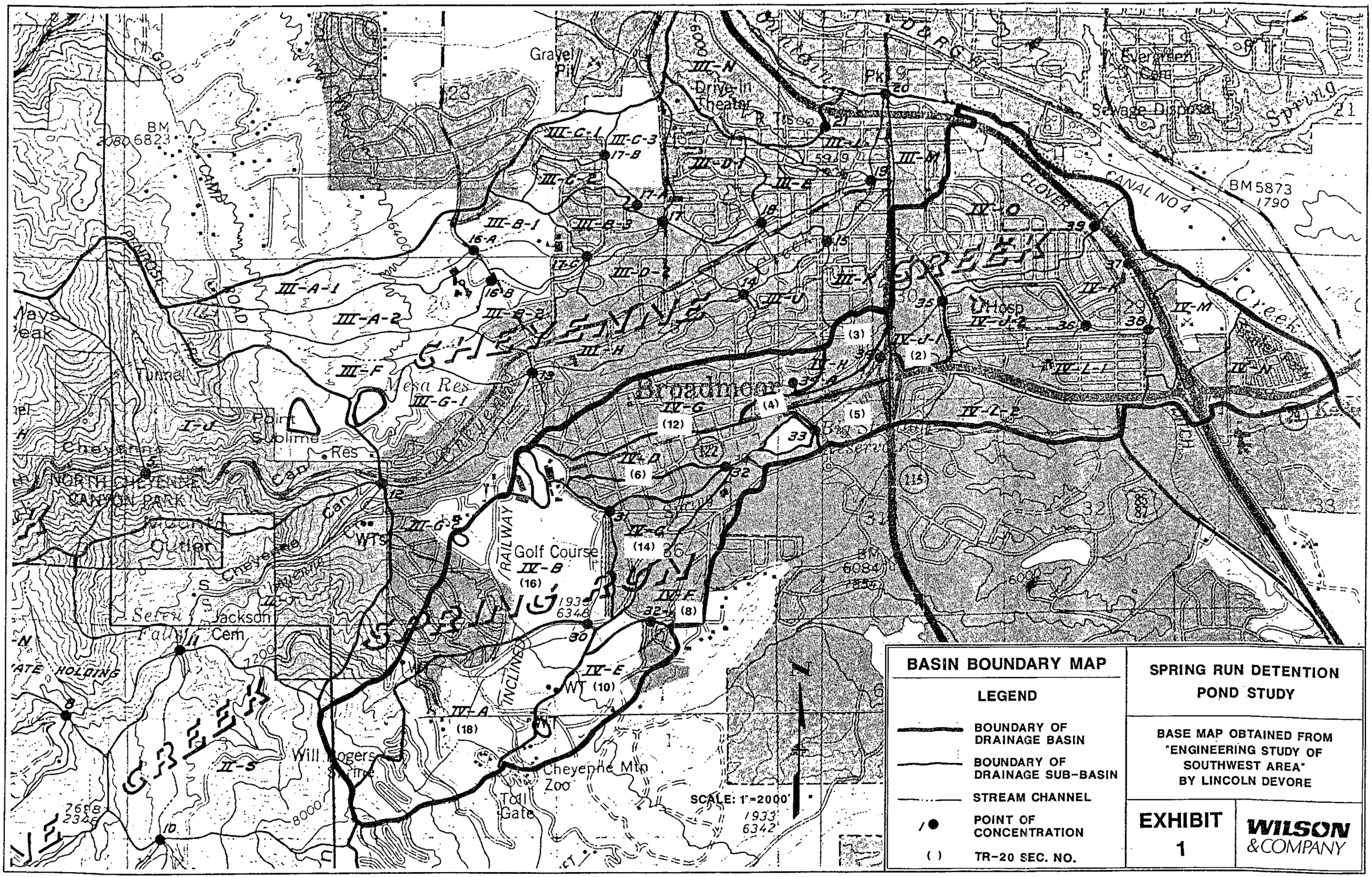
The time of concentration (T_C) used in the TR-20 calculations was determined by first calculating an initial overland flow time from the basin boundary to the street gutters. Then a travel time was calculated through the streets and channels to the design points shown on the Basin Map (Exhibit No. 1).

Soils information was obtained from the "Soil Survey of El Paso County Area, Colorado" prepared by the USDA, Soil Conservation Service. The hydrologic soil types are shown on the Hydrologic Soils Map (Exhibit No. 2). The following is a table of the soils located within the basin:

S.C.S. Soils

Map Number	Soil Type	Hydrologic Group
12	Bresser Sandy Loam	B
16/17	Chaseville Gravelly Sandy Loam	A
18	Chaseville-Midway Complex	A/D
28	Ellicott Loamy Coarse Sand	A
38	Jarre-Tecolote Complex	B
46	Kutler-Broadmoor-Rock Complex	D
47	Limon Clay	C
59	Nunn Clay Loam	C
82	Schamber-Razor Complex	A/C
86	Stoneham Sandy Loam	B
101	Ustic Torrifluvents	B

Existing land uses were determined from the Southwest Area Master Drainage Study along with field verification. The predominant land use throughout the basin is residential dwelling about 2 units per acre. The land uses are presented on the Land Use Map (Exhibit No. 3).



BASIN BOUNDARY MAP

LEGEND

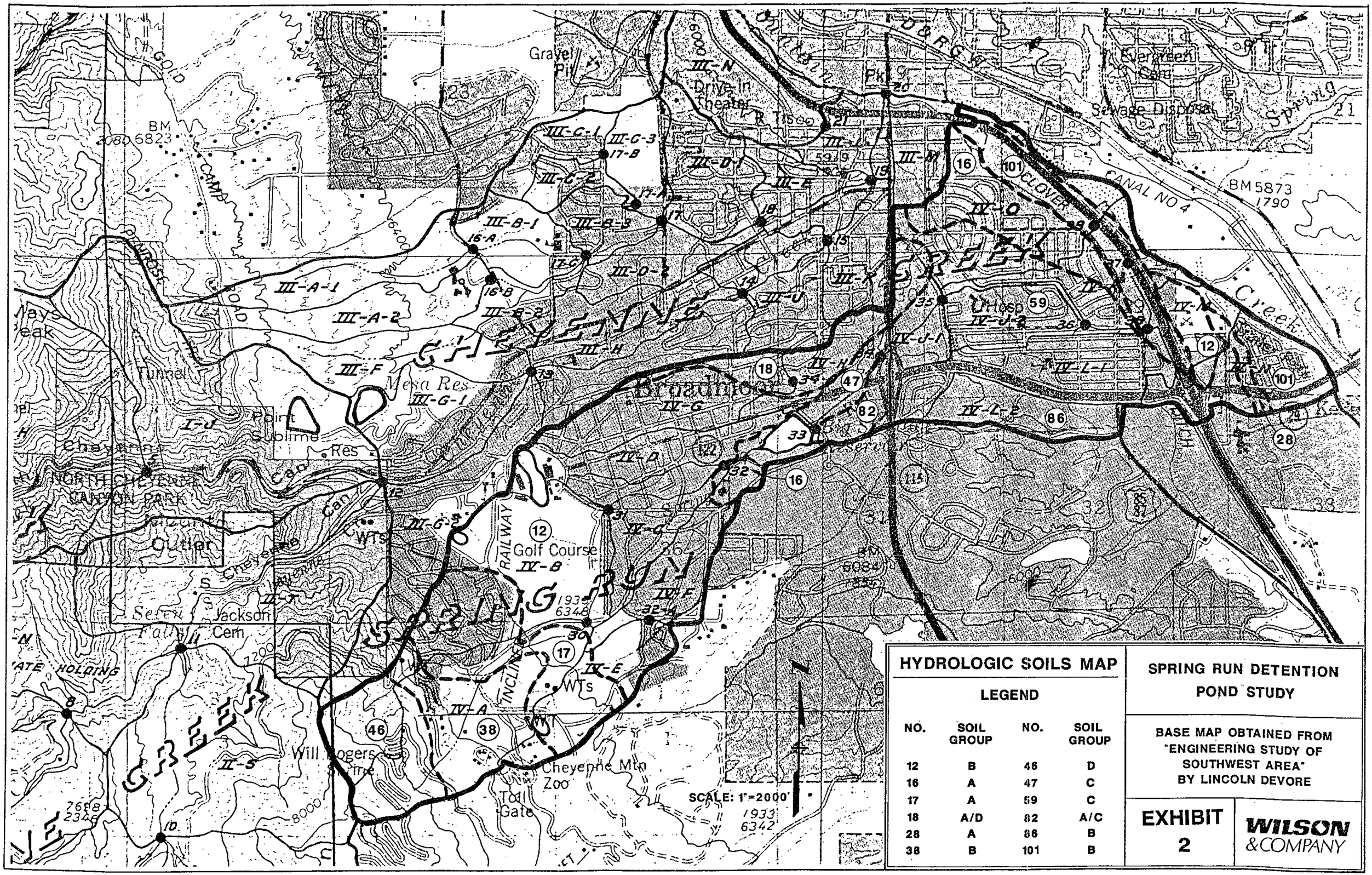
- BOUNDARY OF DRAINAGE BASIN
- BOUNDARY OF DRAINAGE SUB-BASIN
- STREAM CHANNEL
- POINT OF CONCENTRATION
- ( ) TR-20 SEC. NO.

SPRING RUN DETENTION POND STUDY

BASE MAP OBTAINED FROM "ENGINEERING STUDY OF SOUTHWEST AREA" BY LINCOLN DEVORE

EXHIBIT 1

WILSON & COMPANY



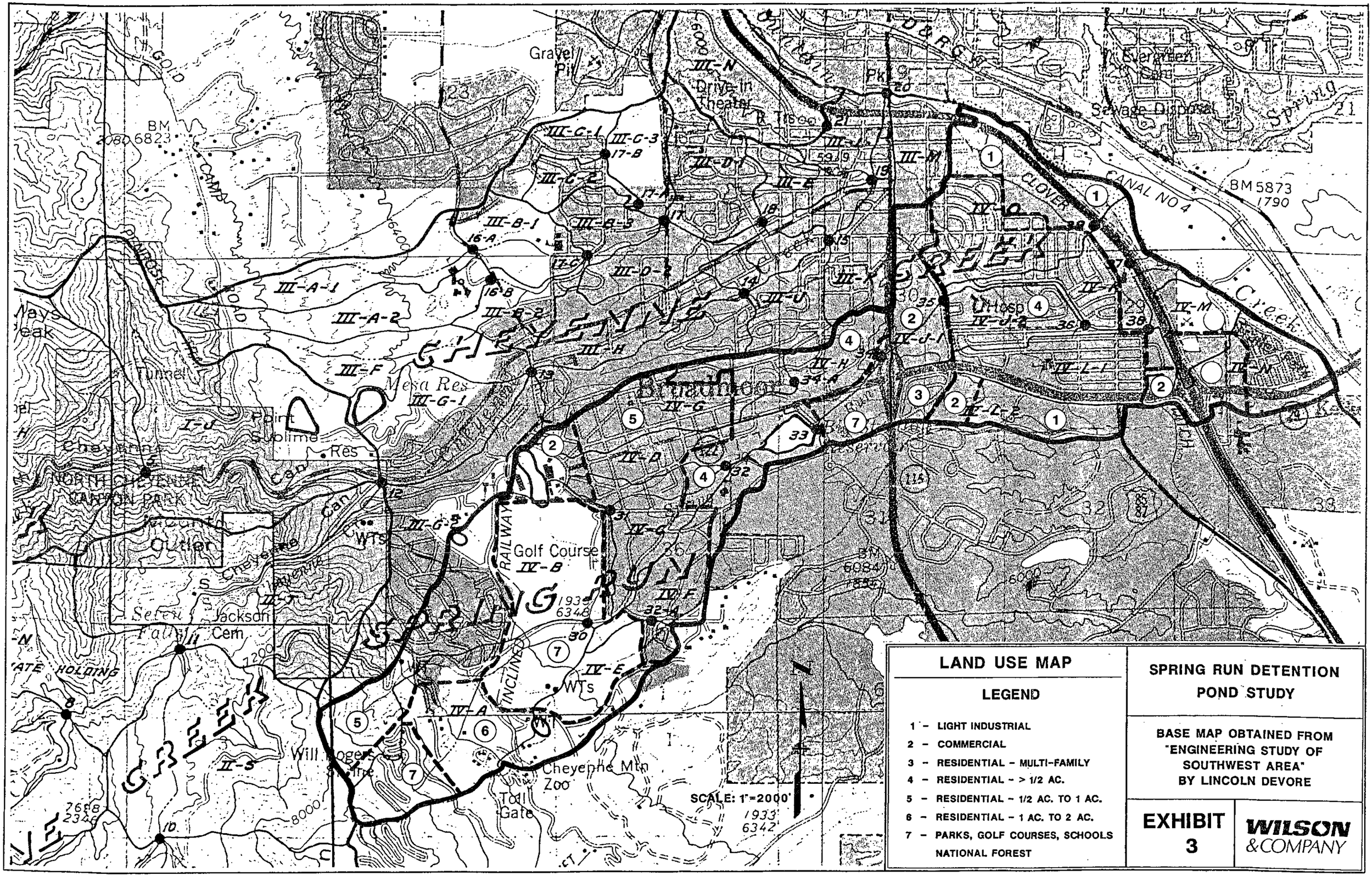
HYDROLOGIC SOILS MAP			
LEGEND			
NO.	SOIL GROUP	NO.	SOIL GROUP
12	B	46	D
16	A	47	C
17	A	59	C
18	A/D	82	A/C
28	A	86	B
38	B	101	B

SPRING RUN DETENTION POND STUDY

BASE MAP OBTAINED FROM "ENGINEERING STUDY OF SOUTHWEST AREA" BY LINCOLN DEVORE

EXHIBIT 2

WILSON & COMPANY



LAND USE MAP

LEGEND

1 – LIGHT INDUSTRIAL
2 – COMMERCIAL
3 – RESIDENTIAL – MULTI-FAMILY
4 – RESIDENTIAL – > 1/2 AC.
5 – RESIDENTIAL – 1/2 AC. TO 1 AC.
6 – RESIDENTIAL – 1 AC. TO 2 AC.
7 – PARKS, GOLF COURSES, SCHOOLS NATIONAL FOREST

SPRING RUN DETENTION POND STUDY

BASE MAP OBTAINED FROM "ENGINEERING STUDY OF SOUTHWEST AREA" BY LINCOLN DEVORE

EXHIBIT 3

WILSON & COMPANY

Curve Numbers (CN's) for the TR-20 program were calculated from the above soil and land use information. These curve numbers are included in the following table:

Hydrologic Data

Subbasin	TR-20 Sec. No.	Area Acres	Area Sq. Mi.	CN
4-A	18	309	0.48	73
4-B	16	407	0.64	74
4-C	14	113	0.18	70
4-D	6	135	0.21	78
4-E	10	130	0.20	69
4-F	8	160	0.25	74
4-G*	12	167	0.26	74.8
4-H1	5	51	0.08	74
4-H2	3	52	0.081	87
4-H3	4	29	0.046	77.5
4-J1	2	67	0.10	94

* Revised Area

After completion of the TR-20 computer analysis a comparison of flows was made between the flows computed in the 1984 Master Drainage Study and our flow numbers. This comparison is detailed in the following table:

100-Year Basin Flow Comparison

Subbasin	TR-20 Sec. No.	Lincoln DeVore 6 Hr.	Wilson & Company 2 Hr.	Wilson & Company 24 Hr.	
4-A	18	486	740	744	
4-B	16	677	885	898	
4-C	14	285	236	231	
4-D	6	399	301	320	
4-E	10	242	265	252	
4-F	8	242	290	287	
4-G	12	323	320	360	
4-H1	5			142	
4-H2	3	485		227	463
4-H3	4			94	
4-J1	2	278	288	320	

PROPOSED CONDITIONS

It was the purpose of this report to re-examine the flow routing through the Big Stratton Reservoir and the downstream drainage system to the Southgate Shopping Center. One part of the analysis was to examine what impact the elimination of the existing depression, just upstream of the shopping center, would have on the area west of Nevada Avenue.

As a result of the investigation it was determined that the existing depression area, described as Pond 3 in the original Lincoln DeVore Study, does provide about 50 Acre foot of temporary storage. This temporary storage area decreases the existing peak flow from 655 cfs to 382 cfs. If this storage area was replaced by an 84" closed conduit the resulting backwater at the Nevada Avenue culvert would increase from an elevation of 5990.4 to 5997.3. The existing residential development is currently protected by an abandoned roadway embankment with a maximum elevation of approximately 5992. Therefore, the elimination of Pond 3 without additional upstream detention would cause flooding within the existing residential area.

Based on the need for additional upstream detention several options were examined. The area directly below the dam was originally examined as a possible site for expanding storage volumes. However, due to the existing environmental considerations and deed restrictions, it was determined that the site should remain in its natural state. The area between Lake and Nevada Avenue does not contain enough available area to construct a detention facility large enough to mitigate the storm peaks.

The remaining alternative involves utilizing the existing Big Stratton Reservoir to provide additional storage area. The most economical way to accomplish this is to lower the storage volume needed. The initial calculations showed that by installing a pipe culvert in the existing emergency spillway area at an elevation of 6075 the downstream flow peaks could be reduced enough to compensate for losing the Pond 3 area.

In reviewing the proposed dam modifications with the State Engineers Office it was revealed that due to revisions in state dam criteria the Big Stratton Reservoir would have to safely pass the 1/2 probable maximum flood (PMF). This flow amounts to approximately 21,000 cfs of inflow. Under current spillway conditions, a storm of that magnitude would result in the dam being overtopped by about 2.5 feet.

Several different design scenarios were analyzed in order to pass the 1/2 PMF and still release the 100-Year flow at a reduced rate. The selected alternative requires the lake level to be lowered to an elevation of 6074 with a 48" pipe culvert added at the existing spillway location. In addition, the existing concrete spillway would need to be increased to 100 foot wide at its mouth with the spillway elevation lowered to an elevation of 6080.75. By utilizing this scenario the peak outflow would be reduced from the existing 100-Year flow of 812 cfs to 412 cfs. This, in turn, lowers the peak flow at Nevada Avenue from 779 cfs to 612 cfs with the respective elevations lowered from 5990.3 to 5985.4.

In addition to widening the spillway entrance to 100 foot wide, the existing 50 foot bridge would have to be replaced with a new 90 foot structure. Also, the spillway chute should be widened with a new, larger energy dissipator added at the bottom. All of these improvements can be accomplished within the existing property ownership and should not require additional embankment work on the downside face of the dam. The lowering of the lake elevation from 6080 to 6074 lowers the existing irrigation storage area by 80.4 acre-feet. This would only lower the water surface by approximately 1 foot from its present elevation.

Based on the above conceptual improvements the following costs were developed for discussional purposes (see plan sheet in back pocket for conceptual plan):

Conceptual Cost Summary

Item	Size	Cost
Spillway	90' x 48'	$ 260,000
Energy Dissipator	100' spillway, 50' chute	220,000
Misc. Downstream Channel Imp.	50' x 150'	150,000
	200'	75,000
	Subtotal	$ 705,000
	Contingencies (25%)	175,000
	TOTAL	$ 880,000

APPENDIX A -

TR-20 Output
Existing Conditions
Spillway Width = 50'
Spillway Elev. = 6,082.7
Lake Elev. = 6,080.0

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******************80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*******************

JOB TR-20                                              SUMMARY   NOPLOTS
ITLE 001  SPRING RUN  TR20 RUN  24 HR. 100 YR. STORM          IN-TR20EX.$
ITLE      TOTAL BASIN  FUTURE CONDITIONS W/ LAKE AT EL 6080   OUT-TR20EX.$0
5 RAINFL 7                 0.25
8              0.0000      0.0005      0.0015      0.0030      0.0045
8              0.0060      0.0080      0.0100      0.0120      0.0143
8              0.0165      0.0188      0.0210      0.0233      0.0255
8              0.0278      0.0320      0.0390      0.0460      0.0530
8              0.0600      0.0750      0.1000      0.4000      0.7000
8              0.7250      0.7500      0.7650      0.7800      0.7900
8              0.8000      0.8100      0.8200      0.8250      0.8300
8              0.8350      0.8400      0.8450      0.8500      0.8550
8              0.8600      0.8638      0.8675      0.8713      0.8750
8              0.8788      0.8825      0.8863      0.8900      0.8938
8              0.8975      0.9013      0.9050      0.9083      0.9115
8              0.9148      0.9180      0.9210      0.9240      0.9270
8              0.9300      0.9325      0.9350      0.9375      0.9400
8              0.9425      0.9450      0.9475      0.9500      0.9525
8              0.9550      0.9575      0.9600      0.9625      0.9650
8              0.9675      0.9700      0.9725      0.9750      0.9775
8              0.9800      0.9813      0.9825      0.9838      0.9850
8              0.9863      0.9875      0.9888      0.9900      0.9913
8              0.9925      0.9938      0.9950      0.9963      0.9975
8              0.9988      1.0000      1.0000      1.0000      1.0000
9 ENDTBL
2 XSECTN   002               1.0
8                         5956.00        0.0         0.0
8                         5956.68       50.0         8.64
8                         5957.00      100.0        14.01
8                         5958.30      500.0        44.22
8                         5959.21     1000.0        73.31
8                         5959.88     1500.0        99.05
8                         5960.40     2000.0       121.40
8                         5961.28     3000.0       164.40
8                         5962.00     4000.0       204.00
9 ENDTBL
2 XSECTN   003               1.0
8                         5978.0         0.0         0.0
8                         5978.4        10.0         4.26
8                         5979.3       100.0        20.34
8                         5981.0       500.0        66.00
8                         5982.1      1000.0       110.00
9 ENDTBL
2 XSECTN   004               1.0
8                         5970.00        0.0         0.0
8                         5970.34       50.0        10.65

**********************80-80 LIST OF INPUT DATA (CONTINUED)**********************

8                         5970.51      100.0        16.47
8                         5971.29      500.0        47.13
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8                    5971.89     1000.0      74.66
8                    5972.38     1500.0      99.74
8                    5972.78     2000.0     121.76
8                    5973.45     3000.0     162.78
8                    5974.00     4000.0     200.01
9 ENDTBL
2 XSECTN   004          1.0
8                    5970.00        0.0       0.0
8                    5970.34       50.0      10.65
8                    5970.51      100.0      16.47
8                    5971.29      500.0      47.13
8                    5971.89     1000.0      74.66
8                    5972.38     1500.0      99.74
8                    5972.78     2000.0     121.76
8                    5973.45     3000.0     162.78
8                    5974.00     4000.0     200.01
9 ENDTBL
2 XSECTN   005          1.0
8                    6003.0         0.0       0.0
8                    6003.6        50.0      13.45
8                    6003.8       100.0      22.37
8                    6004.7       500.0      73.56
8                    6005.3      1000.0     124.56
8                    6005.7      1500.0     167.06
9 ENDTBL
2 XSECTN   006          1.0
8                    6080.00        0.0       0.0
8                    6080.44       50.0      11.45
8                    6080.87      100.0      17.53
8                    6081.72      500.0      49.00
8                    6082.59     1000.0      78.04
8                    6083.26     1500.0     102.78
8                    6083.82     2000.0     124.63
8                    6084.80     3000.0     166.09
9 ENDTBL
2 XSECTN   008          1.0
8                    6080.00        0.0       0.0
8                    6080.65       50.0       7.37
8                    6080.98      100.0      11.71
8                    6082.41      500.0      35.73
8                    6083.46     1000.0      58.62
8                    6084.26     1500.0      78.90
9 ENDTBL
2 XSECTN   010          1.0
```



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8                    6246.00        0.0       0.0
8                    6246.35       50.0       7.65
8                    6246.52      100.0      11.87
8                    6247.32      500.0      35.04
8                    6247.92     1000.0      56.84
8                    6248.37     1500.0      75.54
9 ENDTBL
2 XSECTN   012          1.0
8                    6036.00        0.0       0.0
8                    6036.79       50.0       9.42
```

```
 8                    6037.17     100.0      15.09
 8                    6038.78     500.0      47.04
 8                    6039.90    1000.0      77.16
 8                    6040.79    1500.0     105.15
 9 ENDTBL
 2 XSECTN   014          1.0
 8                    6122.00       0.0       0.0
 8                    6122.57      50.0      12.44
 8                    6122.86     100.0      19.31
 8                    6124.16     500.0      57.07
 8                    6125.15    1000.0      92.58
 8                    6125.91    1500.0     123.96
 8                    6126.53    2000.0     152.34
 9 ENDTBL
 2 XSECTN   016          1.0
 8                    6180.00       0.0       0.0
 8                    6180.37      50.0      12.33
 8                    6180.55     100.0      19.40
 8                    6181.34     500.0      58.11
 8                    6181.93    1000.0      94.90
 8                    6182.36    1500.0     126.50
 8                    6182.72    2000.0     155.27
 9 ENDTBL
 2 XSECTN   018          1.0
 8                    6314.00       0.0       0.0
 8                    6314.27      50.0       8.32
 8                    6314.40     100.0      12.82
 8                    6315.03     500.0      36.05
 8                    6315.52    1000.0      57.21
 8                    6315.91    1500.0      75.55
 8                    6316.24    2000.0      92.21
 8                    6316.79    3000.0     122.43
 9 ENDTBL
 3 STRUCT     01          1.0
 8                    6080.00       0.0       0.0
 8                    6082.00       1.0      32.28
1
```



```
 8                    6084.00     438.0      68.07
 8                    6086.00    1240.0     106.17
 8                    6088.00    2278.0     145.87
 9 ENDTBL
 3 STRUCT     02          1.0
 8                    6003.0        0.0       0.0
 8                    6005.0       70.0       0.02
 8                    6007.0      120.0       0.30
 8                    6010.0      300.0       1.40
 8                    6014.0      500.0       6.35
 8                    6018.0      620.0      19.60
 8                    6022.0      750.0      35.00
 8                    6024.0     2500.0      46.00
 9 ENDTBL
 3 STRUCT     03          1.0
 8                    5970.0        0.0       0.0
 8                    5974.0      115.0       0.07
 8                    5977.0      260.0       0.90
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8                       5981.0       440.0        2.70
8                       5985.0       530.0        5.50
8                       5990.0       650.0       11.90
8                       5994.0       710.0       24.30
9 ENDTBL
3 STRUCT      04          1.0
8                       5949.0         0.0        0.0
8                       5955.0       253.0        0.23
8                       5960.0       283.0        2.30
8                       5965.0       311.0       10.30
8                       5970.0       338.0       24.10
8                       5975.0       361.0       39.50
8                       5980.0       385.0       56.70
8                       5982.0       394.0       63.90
8                       5984.0      1716.0       71.50
9 ENDTBL
3 STRUCT      05          1.0
8                       6036.0         0.0        0.0
8                       6038.0        51.0        1.6
8                       6040.0       144.0        3.24
8                       6042.0       265.0        4.92
8                       6044.0       407.0        6.64
8                       6046.0       569.0        8.04
9 ENDTBL
3 STRUCT      06          1.0
8                       5978.0         0.0        0.0
8                       5980.0        14.0        0.01
8                       5982.0        33.0        0.02
```

**********80-80 LIST OF INPUT DATA (CONTINUED)**********

```
8                       5984.0        45.0        0.16
8                       5986.0        64.0        0.73
8                       5988.0        83.0        1.98
8                       5990.0        95.0        3.76
8                       5992.0       110.0        6.23
8                       5994.0       500.0        9.60
9 ENDTBL
6 RUNOFF 1 018       7     0.480      73.0        0.322   1
6 REACH  3 016   7   5  3340.0
6 RUNOFF 1 016       7     0.640      74.0        0.424   1
6 ADDHYD 4 016   5 7 4                                    1
6 REACH  3 014   4   7  2900.0
6 RUNOFF 1 014       5     0.180      70.0        0.348   1
6 ADDHYD 4 014   7 5 4                                    1
6 REACH  3 006   4   7  5200.0
6 RUNOFF 1 006       5     0.210      78.0        0.500   1
6 ADDHYD 4 006   7 5 3                                    1
6 RUNOFF 1 010       7     0.200      69.0        0.332   1
6 REACH  3 008   7   5  3800.0
6 RUNOFF 1 008       7     0.250      74.0        0.582   1
6 ADDHYD 4 008   5 7 4                                    1
6 REACH  3 006   4   5  1900.0
6 ADDHYD 4 006   3 5 4                                    1
6 RESVOR 2    01 4   3  6080.00                          1 1   1
6 REACH  3 005   3   1  1800.0
6 RUNOFF 1 005       6     0.08       74.0        0.230   1
```

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  6 ADDHYD 4 005   1 6 7                                  1
  6 RESVOR 2    02 7   6  6003.0                         1 1   1
  6 REACH  3 004   6   2  1000.0
  6 RUNOFF 1 012       7     0.260      74.8        0.457  1
  6 RESVOR 2    05 7   6   6036.0                         1 1   1
  6 REACH  3 004   6   5  2400.0
  6 ADDHYD 4 004   2 5 7                                  1
  6 RUNOFF 1 003       5     0.081      87.0        0.220  1
  6 RESVOR 2    06 5   6   5978.0                         1 1   1
  6 ADDHYD 4 004   7 6 3                                  1
  6 RUNOFF 1 004       5     0.046      77.5        0.230  1
  6 ADDHYD 4 004   5 3 4                                  1
  6 RESVOR 2    03 4   6   5970.0                         1 1   1
  6 REACH  3 002   6   5   750.0
  6 RUNOFF 1 002       7     0.010      94.0        0.271  1
  6 ADDHYD 4 002   5 7 4                                  1
  6 RESVOR 2    04 4   6   5949.0                         1 1   1
    ENDATA
  7 INCREM 6               0.10
  7 COMPUT 7 01B      04     0.0         4.60        1.0    7 2  01  01
1



  ******************80-80 LIST OF INPUT DATA (CONTINUED)**********************

    ENDCMP 1
    ENDJOB 2

0*********************************END OF 80-80 LIST*********************************
1



  R20 XEQ  6/ 1/90    8:58       SPRING RUN  TR20 RUN  24 HR. 100 YR. STORM        IN-TR20EX.$                  JOB  1   PASS   1
      REV PC/09/83               TOTAL BASIN  FUTURE CONDITIONS W/ LAKE AT EL 6080  OUT-TR20EX.$0                         PAGE   1


  ILE NO.  1
0                                  COMPUTER PROGRAM FOR PROJECT FORMULATION - HYDROLOGY   USER NOTES

              THE USERS MANUAL FOR THIS PROGRAM IS THE MAY 1982 DRAFT OF TR-20.  CHANGES FROM THE 2/14/74 VERSION INCLUDE:

              REACH ROUTING - THE MODIFIED ATT-KIN ROUTING PROCEDURE REPLACES THE CONVEX METHOD.  INPUT DATA PREPARED FOR
                 PREVIOUS PROGRAM VERSIONS USING CONVEX ROUTING COEFFICIENTS WILL NOT RUN ON THIS VERSION.

                 THE PREFERRED TYPE OF DATA ENTRY IS CROSS SECTION DATA REPRESENTATIVE OF A REACH.  IT IS RECOMMENDED THAT
                 THE OPTIONAL CROSS SECTION DISCHARGE-AREA PLOTS BE OBTAINED WHENEVER NEW CROSS SECTION DATA IS ENTERED.
                 THE PLOTS SHOULD BE CHECKED FOR REASONABLENESS AND ADEQUACY OF INPUT DATA FOR THE COMPUTATION OF "N"
                 VALUES USED IN THE ROUTING PROCEDURE.

                 GUIDELINES FOR DETERMINING OR ANALYZING REACH LENGTHS AND COEFFICIENTS (X,M) ARE AVAILABLE IN THE USERS
                 MANUAL.  SUMMARY TABLE 2 DISPLAYS REACH ROUTING RESULTS AND ROUTING PARAMETERS FOR COMPARISON AND CHECKING.

              HYDROGRAPH GENERATION - THE PROCEDURE TO CALCULATE THE INTERNAL TIME INCREMENT AND PEAK TIME OF THE UNIT
                 HYDROGRAPH HAVE BEEN INPROVED.  PEAK DISCHARGES AND TIMES MAY DIFFER FROM THE PREVIOUS VERSION.  OUTPUT
                 HYDROGRAPHS ARE STILL INTERPOLATED, PRINTED, AND ROUTED AT THE USER SELECTED MAIN TIME INCREMENT.

              INTERMEDIATE PEAKS - METHOD ADDED TO PROVIDE DISCHARGES AT INTERMEDIATE POINTS WITHIN REACHES WITHOUT ROUTING.
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OTHER - THIS VERSION CONTAINS SOME ADDITIONS TO THE INPUT AND NUMEROUS MODIFICATIONS TO THE OUTPUT. USER OPTIONS HAVE BEEN MODIFIED AND AUGMENTED ON THE JOB RECORD, RAINTABLES ADDED, ERROR AND WARNING MESSAGES EXPANDED, AND THE SUMMARY TABLES COMPLETELY REVISED. THE HOLDOUT OPTION IS NOT OPERATIONAL AT THIS TIME.

PROGRAM QUESTIONS OR PROBLEMS SHOULD BE DIRECTED TO HYDRAULIC ENGINEERS AT THE SCS NATIONAL TECHNICAL CENTERS:

CHESTER, PA (NORTHEAST) -- 215-499-3933, FORT WORTH, TX (SOUTH) -- 334-5242 (FTS)
LINCOLN, NB (MIDWEST) -- 541-5318 (FTS), PORTLAND, OR (WEST) -- 423-4099 (FTS)
OR HYDROLOGY UNIT, ENGINEERING DIVISION, LANHAM, MD -- 436-7383 (FTS).

PROGRAM CHANGES SINCE MAY 1982:

12/17/82 - CORRECT PEAK RATE FACTOR FOR USER ENTERED DIMHYD
CORRECT REACH ROUTING PEAK TRAVEL TIME PRINTED WITH FULLPRINT OPTION
5/02/83 - CORRECT COMPUTATIONS FOR ---
1. DIVISION OF BASEFLOW IN DIVERT OPERATION
2. HYDROGRAPH VOLUME SPLIT BETWEEN BASEFLOW AND ABOVE BASEFLOW
3. CROSS SECTION DATA PLOTTING POSITION
4. INTERMEDIATE PEAK WHEN "FROM" AREA IS LARGER THAN "THRU" AREA
5. STORAGE ROUTED REACH TRAVEL TIME FOR MULTIPEAK HYDROGRAPH
6. ORDERING "FLOW-FREQ" FILE FROM SUMMARY TABLE #3 DATA
7. BASEFLOW ENTERED WITH READHYD
8. LOW FLOW SPLIT DURING DIVERT PROCEDURE #2 WHEN SECTION RATINGS START AT DIFFERENT ELEVATIONS
ENHANCEMENTS ---
1. REPLACE USER MANUAL ERROR CODES (PAGE 4-9 TO 4-11) WITH MESSAGES
2. LABEL OUTPUT HYDROGRAPH FILES WITH CROSS SECTION/STRUCTURE, ALTERNATE AND STORM NO'S
09/01/83 - CORRECT INPUT AND OUTPUT ERRORS FOR INTERMEDIATE PEAKS
CORRECT COMBINATION OF RATING TABLES FOR DIVERT
CHECK REACH ROUTING PARAMETERS FOR ACCEPTABLE LIMITS
ELIMINATE MINIMUM REACH TRAVEL TIME WHEN ATT-KIN COEFFICIENT EQUALS ONE

XECUTIVE CONTROL OPERATION INCREM RECORD ID
MAIN TIME INCREMENT = .10 HOURS

XECUTIVE CONTROL OPERATION COMPUT RECORD ID
FROM XSECTION 18
TO STRUCTURE 4
STARTING TIME = .00 RAIN DEPTH = 4.60 RAIN DURATION= 1.00 RAIN TABLE NO.= 7 ANT. MOIST. COND= 2
ALTERNATE NO.= 1 STORM NO.= 1 MAIN TIME INCREMENT = .10 HOURS

PERATION RUNOFF CROSS SECTION 18

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.08	743.53	(RUNOFF)
7.94	39.45	(RUNOFF)
9.95	20.32	(RUNOFF)
12.84	15.64	(RUNOFF)
13.83	13.66	(RUNOFF)

14.92	12.60	(RUNOFF)
19.89	10.73	(RUNOFF)
23.83	5.51	(RUNOFF)

*** WARNING REACH 16 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION RUNOFF CROSS SECTION 16

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.13	898.12	(RUNOFF)
9.96	27.66	(RUNOFF)
12.90	21.26	(RUNOFF)
13.86	18.60	(RUNOFF)
19.88	14.58	(RUNOFF)
23.88	7.44	(RUNOFF)

OPERATION ADDHYD CROSS SECTION 16

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.17	1586.02	6182.42
9.96	47.90	6180.35
12.92	36.88	6180.27
13.90	32.24	6180.24
19.90	25.31	6180.19
23.90	12.92	6180.10

*** WARNING REACH 14 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

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OPERATION RUNOFF CROSS SECTION 14

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.10	231.40	(RUNOFF)
7.91	13.67	(RUNOFF)
9.95	7.07	(RUNOFF)
19.95	3.79	(RUNOFF)
23.84	1.94	(RUNOFF)

OPERATION ADDHYD CROSS SECTION 14

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.16	1798.36	6126.28
9.96	54.96	6122.60
12.91	42.34	6122.48
13.89	37.02	6122.42
19.91	29.08	6122.33
23.90	14.85	6122.17

*** WARNING REACH 6 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION RUNOFF CROSS SECTION 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.17	320.11	(RUNOFF)
9.96	9.87	(RUNOFF)
12.93	7.54	(RUNOFF)
19.95	5.15	(RUNOFF)
23.91	2.60	(RUNOFF)

OPERATION ADDHYD CROSS SECTION 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.25	2057.10	6083.88
10.01	64.73	6080.57
13.01	49.85	6080.44
13.98	43.59	6080.38
19.96	34.23	6080.30
23.98	17.43	6080.15

OPERATION RUNOFF CROSS SECTION 10

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.10	251.52	(RUNOFF)
7.95	14.84	(RUNOFF)
9.96	7.65	(RUNOFF)
19.90	4.10	(RUNOFF)
23.84	2.11	(RUNOFF)

*** WARNING REACH 8 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION RUNOFF CROSS SECTION 8

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.22	287.32	(RUNOFF)
9.96	10.78	(RUNOFF)
12.95	8.28	(RUNOFF)
19.88	5.69	(RUNOFF)
23.91	2.88	(RUNOFF)

OPERATION ADDHYD CROSS SECTION 8

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.21	532.08	6082.48
9.97	18.40	6080.24
12.95	14.20	6080.18
13.88	12.47	6080.16

19.90	9.79	6080.13
23.93	4.99	6080.06

*** WARNING REACH 6 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION ADDHYD CROSS SECTION 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.24	2581.41	6084.39
10.00	83.13	6080.73
13.00	64.05	6080.56
13.96	56.05	6080.49
19.95	44.03	6080.39
23.97	22.41	6080.20

OPERATION RESVOR STRUCTURE 1

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.64	812.09	6084.93
20.01	43.96	6082.20

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = 1.96 SQ.MI.

5.00	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.03	.12
6.00	DISCHG	.33	.74	116.54	346.01	583.56	750.22	806.66	801.81	766.99	717.34
7.00	DISCHG	661.48	605.44	552.68	504.07	459.07	425.68	402.30	380.23	359.79	341.05
8.00	DISCHG	323.99	308.48	294.19	280.43	266.40	251.93	237.46	223.56	210.53	198.51
9.00	DISCHG	187.51	177.50	168.42	160.19	152.75	146.02	139.94	134.46	129.51	125.04
10.00	DISCHG	121.01	117.37	114.02	110.79	107.48	104.04	100.57	97.20	94.03	91.12
11.00	DISCHG	88.46	86.05	83.84	81.84	80.03	78.43	76.97	75.65	74.44	73.37
12.00	DISCHG	72.42	71.57	70.78	70.07	69.44	68.89	68.40	67.94	67.52	67.16
13.00	DISCHG	66.85	66.57	66.28	65.92	65.45	64.85	64.16	63.44	62.73	62.08
14.00	DISCHG	61.50	60.96	60.44	59.91	59.34	58.75	58.14	57.56	57.02	56.52
15.00	DISCHG	56.06	55.65	55.24	54.79	54.21	53.50	52.71	51.91	51.13	50.41
16.00	DISCHG	49.75	49.14	48.58	48.08	47.63	47.22	46.86	46.53	46.23	45.96
17.00	DISCHG	45.72	45.51	45.32	45.14	44.99	44.85	44.73	44.62	44.52	44.44
18.00	DISCHG	44.36	44.30	44.24	44.19	44.14	44.10	44.07	44.04	44.02	44.00
19.00	DISCHG	43.98	43.97	43.96	43.95	43.95	43.95	43.94	43.95	43.95	43.95
20.00	DISCHG	43.96	43.95	43.89	43.60	42.93	41.85	40.47	38.98	37.50	36.10
21.00	DISCHG	34.82	33.63	32.53	31.52	30.61	29.81	29.08	28.41	27.78	27.23
22.00	DISCHG	26.76	26.32	25.91	25.53	25.20	24.92	24.66	24.42	24.18	23.98
23.00	DISCHG	23.82	23.67	23.52	23.38	23.26	23.17	23.08	22.99	22.90	22.83
24.00	DISCHG	22.78	22.72	22.58	22.20	21.42	20.23	18.79	17.26	15.75	14.32
25.00	DISCHG	12.99	11.77	10.65	9.64	8.72	7.88	7.12	6.44	5.82	5.26
26.00	DISCHG	4.76	4.30	3.89	3.51	3.18	2.87	2.59	2.35	2.12	1.92
27.00	DISCHG	1.73	1.57	1.42	1.28	1.16	1.05	1.00	1.00	1.00	1.00
28.00	DISCHG	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
29.00	DISCHG	1.00	1.00	1.00	1.00	1.00	1.00	.99	.99	.99	.99

RUNOFF VOLUME ABOVE BASEFLOW = 1.69 WATERSHED INCHES, 2138.05 CFS-HRS, 176.69 ACRE-FEET; BASEFLOW = .00 CFS

*** WARNING REACH 5 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION RUNOFF CROSS SECTION 5

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.03	141.86	(RUNOFF)
7.95	6.83	(RUNOFF)

OPERATION ADDHYD CROSS SECTION 5

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.03	142.30	6003.90
6.64	826.33	6005.09
19.95	45.80	6003.55

OPERATION RESVOR STRUCTURE 2

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
7.16	582.34	6016.74
19.95	45.80	6004.31

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = 2.04 SQ.MI.

5.00	DISCHG	.00	.00	.00	.00	.00	.00	1.00	17.71	59.08	85.16
6.00	DISCHG	116.72	132.77	153.98	257.79	352.30	448.08	511.96	534.04	552.92	567.32
7.00	DISCHG	576.85	581.63	582.06	578.72	572.21	563.33	553.04	541.85	529.94	517.47
8.00	DISCHG	504.62	466.24	420.58	383.65	353.15	327.26	304.62	255.99	227.32	211.68
9.00	DISCHG	199.38	188.53	178.73	169.86	161.83	154.56	148.00	142.07	136.71	131.88
10.00	DISCHG	127.53	123.52	119.70	115.91	112.44	109.00	105.52	102.10	98.83	95.75
11.00	DISCHG	92.90	90.31	87.98	85.85	83.91	82.16	80.59	79.19	77.92	76.76
12.00	DISCHG	75.71	74.78	73.96	73.22	72.53	71.91	71.37	70.90	70.47	70.07
13.00	DISCHG	69.37	69.27	68.64	68.39	67.72	67.22	66.42	65.83	65.05	64.45
14.00	DISCHG	63.78	63.26	62.63	62.10	61.49	60.92	60.29	59.74	59.17	58.69
15.00	DISCHG	58.22	57.75	57.17	56.64	56.04	55.32	54.53	53.73	52.95	52.23
16.00	DISCHG	51.56	50.96	50.40	49.90	49.44	49.04	48.67	48.34	48.04	47.77
17.00	DISCHG	47.53	47.32	47.13	46.95	46.80	46.66	46.54	46.43	46.34	46.25
18.00	DISCHG	46.18	46.11	46.05	46.00	45.96	45.92	45.89	45.86	45.84	45.82
19.00	DISCHG	45.80	45.79	45.78	45.77	45.77	45.77	45.77	45.77	45.77	45.78
20.00	DISCHG	45.78	45.61	45.16	44.67	43.92	42.79	41.43	39.96	38.49	37.06
21.00	DISCHG	35.75	34.57	33.49	32.49	31.56	30.73	30.00	29.35	28.75	28.17
22.00	DISCHG	27.67	27.23	26.85	26.49	26.13	25.82	25.57	25.35	25.13	24.91
23.00	DISCHG	24.72	24.58	24.46	24.32	24.18	24.07	23.99	23.92	23.85	23.75
24.00	DISCHG	23.68	23.45	22.92	22.33	21.50	20.29	18.84	17.31	15.80	14.37
25.00	DISCHG	13.04	11.81	10.69	9.67	8.75	7.91	7.15	6.46	5.84	5.28
26.00	DISCHG	4.77	4.31	3.90	3.52	3.19	2.88	2.60	2.35	2.13	1.92
27.00	DISCHG	1.74	1.57	1.42	1.28	1.16	1.05	1.00	1.00	1.00	1.00
28.00	DISCHG	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
29.00	DISCHG	1.00	1.00	1.00	1.00	1.00	1.00	.99	.99	.99	.99

RUNOFF VOLUME ABOVE BASEFLOW = 1.70 WATERSHED INCHES, 2243.79 CFS-HRS, 185.43 ACRE-FEET; BASEFLOW = .00 CFS

*** WARNING REACH 4 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PERATION RUNOFF CROSS SECTION 12

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.15	359.25	(RUNOFF)
9.96	11.43	(RUNOFF)
12.90	8.78	(RUNOFF)
13.86	7.69	(RUNOFF)
19.88	6.01	(RUNOFF)
23.89	3.06	(RUNOFF)

OPERATION RESVOR STRUCTURE 5

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.30	285.51	6042.29
13.01	8.74	6036.34
19.96	6.01	6036.24
23.96	3.04	6036.12

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = .26 SQ.MI.

5.00	DISCHG	.00	.00	.00	.00	.00	.00	.16	2.38	11.94	35.74
6.00	DISCHG	93.63	181.79	258.38	285.49	260.91	216.85	171.48	135.36	110.18	89.31
7.00	DISCHG	72.87	60.48	51.13	46.57	42.26	38.35	35.01	32.27	30.07	28.32
8.00	DISCHG	26.96	25.84	24.72	23.35	21.71	19.99	18.37	16.96	15.78	14.82
9.00	DISCHG	14.04	13.44	12.96	12.59	12.30	12.09	11.92	11.80	11.70	11.64
10.00	DISCHG	11.58	11.53	11.43	11.23	10.93	10.58	10.23	9.91	9.65	9.43
11.00	DISCHG	9.26	9.12	9.01	8.93	8.87	8.83	8.79	8.76	8.74	8.73
12.00	DISCHG	8.73	8.72	8.71	8.71	8.72	8.72	8.72	8.72	8.72	8.73
13.00	DISCHG	8.74	8.74	8.70	8.63	8.52	8.39	8.25	8.12	8.02	7.94
14.00	DISCHG	7.88	7.82	7.75	7.67	7.59	7.50	7.42	7.35	7.29	7.24
15.00	DISCHG	7.21	7.17	7.12	7.02	6.89	6.74	6.59	6.46	6.35	6.26
16.00	DISCHG	6.19	6.13	6.08	6.05	6.02	6.00	5.99	5.98	5.97	5.96
17.00	DISCHG	5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96
18.00	DISCHG	5.97	5.97	5.97	5.97	5.97	5.98	5.98	5.98	5.98	5.98
19.00	DISCHG	5.99	5.99	5.99	5.99	6.00	6.00	6.00	6.00	6.00	6.01
20.00	DISCHG	6.01	5.99	5.92	5.72	5.42	5.06	4.70	4.37	4.09	3.87
21.00	DISCHG	3.68	3.53	3.41	3.32	3.26	3.20	3.16	3.12	3.10	3.08
22.00	DISCHG	3.07	3.06	3.04	3.04	3.04	3.04	3.03	3.03	3.03	3.03
23.00	DISCHG	3.03	3.03	3.02	3.02	3.03	3.03	3.03	3.02	3.02	3.03
24.00	DISCHG	3.03	3.01	2.92	2.71	2.39	2.02	1.66	1.34	1.06	.84
25.00	DISCHG	.65	.51	.39	.30	.23	.18	.14	.11	.08	.06
26.00	DISCHG	.05	.04	.03	.02	.02	.01	.01	.01		

RUNOFF VOLUME ABOVE BASEFLOW = 2.11 WATERSHED INCHES, 354.26 CFS-HRS, 29.28 ACRE-FEET; BASEFLOW = .00 CFS

*** WARNING REACH 4 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION ADDHYD CROSS SECTION 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.61	683.51	5971.51
19.95	51.81	5970.35

PERATION RUNOFF CROSS SECTION 3

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.99	227.31	(RUNOFF)
7.90	8.72	(RUNOFF)
9.95	4.43	(RUNOFF)
19.86	2.24	(RUNOFF)
23.78	1.15	(RUNOFF)

PERATION RESVOR STRUCTURE 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.21	97.17	5990.29
7.40	9.77	5979.40
7.97	8.88	5979.27
9.95	4.42	5978.63
19.86	2.24	5978.32
23.79	1.15	5978.16

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = .08 SQ.MI.

5.00	DISCHG	.00	.00	.05	.33	1.12	2.49	20.39	46.73	64.83	78.42
6.00	DISCHG	88.21	94.75	97.14	95.73	92.63	89.08	85.48	80.48	72.71	65.72
7.00	DISCHG	54.79	44.06	12.06	7.86	9.77	8.09	9.17	8.38	8.94	8.56
8.00	DISCHG	8.83	7.84	6.02	4.78	4.59	4.38	4.42	4.36	4.39	4.37
9.00	DISCHG	4.39	4.38	4.39	4.39	4.39	4.39	4.39	4.39	4.40	4.40
10.00	DISCHG	4.40	4.20	3.73	3.45	3.36	3.28	3.29	3.32	3.34	3.31
11.00	DISCHG	3.28	3.28	3.32	3.34	3.31	3.28	3.29	3.33	3.34	3.32
12.00	DISCHG	3.29	3.29	3.33	3.35	3.32	3.29	3.30	3.33	3.35	3.33
13.00	DISCHG	3.29	3.22	3.05	2.96	2.91	2.86	2.86	2.90	2.92	2.89
14.00	DISCHG	2.86	2.81	2.73	2.68	2.67	2.67	2.67	2.67	2.67	2.67
15.00	DISCHG	2.67	2.58	2.39	2.27	2.24	2.23	2.23	2.22	2.23	2.23
16.00	DISCHG	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23
17.00	DISCHG	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23
18.00	DISCHG	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23
19.00	DISCHG	2.23	2.23	2.24	2.24	2.24	2.24	2.24	2.24	2.24	2.24
20.00	DISCHG	2.24	2.04	1.55	1.27	1.17	1.10	1.10	1.13	1.15	1.12
21.00	DISCHG	1.09	1.10	1.13	1.15	1.12	1.09	1.10	1.13	1.15	1.12
22.00	DISCHG	1.09	1.10	1.13	1.15	1.12	1.09	1.10	1.13	1.15	1.12
23.00	DISCHG	1.09	1.10	1.14	1.15	1.13	1.09	1.10	1.14	1.15	1.13
24.00	DISCHG	1.09	.88	.39	.11	.05	.01	.01	.00		

RUNOFF VOLUME ABOVE BASEFLOW = 3.20 WATERSHED INCHES, 167.02 CFS-HRS, 13.80 ACRE-FEET; BASEFLOW = .00 CFS

PERATION ADDHYD CROSS SECTION 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.59	768.97	5971.61
19.95	54.07	5970.35

PERATION RUNOFF CROSS SECTION 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.02	93.53	(RUNOFF)
7.95	4.25	(RUNOFF)

OPERATION ADDHYD CROSS SECTION 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.59	778.87	5971.62
19.95	55.20	5970.36

OPERATION RESVOR STRUCTURE 3

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
7.21	655.61	5990.37
19.95	55.19	5971.92

IME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = 2.43 SQ.MI.

5.00	DISCHG	.00	.00	.05	.30	1.05	2.37	20.76	78.79	143.58	213.91
6.00	DISCHG	296.83	382.41	450.19	487.02	532.88	563.05	593.10	618.26	637.20	650.37
7.00	DISCHG	653.08	654.98	655.61	655.14	654.28	652.98	651.21	646.20	636.67	626.48
8.00	DISCHG	615.71	602.54	584.77	563.11	539.35	505.00	466.69	411.71	325.63	276.32
9.00	DISCHG	241.60	218.63	205.81	195.56	186.55	178.47	171.21	164.68	158.80	153.52
10.00	DISCHG	148.77	144.33	139.85	135.34	131.13	127.18	123.30	119.52	115.90	109.68
11.00	DISCHG	107.76	104.15	102.38	99.71	98.02	95.89	94.47	92.93	91.78	90.49
12.00	DISCHG	89.44	88.45	87.70	86.96	86.26	85.58	85.05	84.62	84.23	83.80
13.00	DISCHG	83.10	82.78	82.04	81.40	80.72	79.86	79.08	78.27	77.54	76.71
14.00	DISCHG	76.02	75.29	74.56	73.80	73.15	72.43	71.77	71.09	70.51	69.94
15.00	DISCHG	69.46	68.82	67.94	67.10	66.35	65.45	64.53	63.58	62.70	61.87
16.00	DISCHG	61.13	60.46	59.86	59.32	58.83	58.40	58.02	57.67	57.37	57.09
17.00	DISCHG	56.85	56.63	56.43	56.26	56.11	55.97	55.85	55.74	55.65	55.56
18.00	DISCHG	55.49	55.43	55.37	55.32	55.28	55.24	55.21	55.19	55.17	55.15
19.00	DISCHG	55.14	55.13	55.12	55.12	55.12	55.12	55.12	55.12	55.13	55.14
20.00	DISCHG	55.14	54.72	53.52	52.36	51.22	49.63	47.91	46.15	44.43	42.74
21.00	DISCHG	41.18	39.84	38.68	37.62	36.58	35.64	34.86	34.22	33.61	32.99
22.00	DISCHG	32.41	31.97	31.62	31.28	30.89	30.53	30.27	30.09	29.90	29.65
23.00	DISCHG	29.41	29.26	29.19	29.09	28.91	28.75	28.67	28.65	28.61	28.48

24.00	DISCHG	28.35	27.84	26.54	25.28	24.08	22.45	20.65	18.78	16.99	15.32
25.00	DISCHG	13.80	12.42	11.17	10.05	9.05	8.15	7.34	6.62	5.97	5.38
26.00	DISCHG	4.86	4.38	3.96	3.57	3.23	2.92	2.63	2.38	2.14	1.94
27.00	DISCHG	1.75	1.58	1.43	1.29	1.17	1.06	1.00	1.00	1.00	1.00
28.00	DISCHG	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
29.00	DISCHG	1.00	1.00	1.00	1.00	1.00	1.00	.99	.99	.99	.99

RUNOFF VOLUME ABOVE BASEFLOW = 1.81 WATERSHED INCHES, 2834.08 CFS-HRS, 234.21 ACRE-FEET; BASEFLOW = .00 CFS

*** WARNING REACH 2 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PERATION RUNOFF CROSS SECTION 2

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.00	32.01	(RUNOFF)

PERATION ADDHYD CROSS SECTION 2

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
7.19	657.05	5958.59
19.95	55.48	5956.72

PERATION RESVOR STRUCTURE 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
8.73	382.39	5979.46
12.31	95.04	5951.25
12.51	89.15	5951.11
12.70	86.35	5951.05
12.89	84.82	5951.01
13.06	83.49	5950.98
19.95	55.47	5950.32

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = 2.44 SQ.MI.

4.00	DISCHG	.01	.02	.04	.07	.10	.13	.15	.17	.20	.22
5.00	DISCHG	.24	.30	.49	.89	1.81	3.44	21.54	83.72	160.72	234.13
6.00	DISCHG	257.57	270.29	284.62	290.24	296.71	304.00	311.51	316.28	321.31	326.51
7.00	DISCHG	331.76	336.95	341.12	345.00	348.81	352.56	356.25	359.85	363.17	366.26
8.00	DISCHG	369.20	371.96	374.51	376.81	378.82	380.47	381.68	382.35	382.20	381.27
9.00	DISCHG	379.88	378.17	376.27	374.26	372.17	370.00	367.77	365.49	363.16	360.78
10.00	DISCHG	358.21	355.62	353.01	350.37	347.71	345.04	342.35	339.64	336.60	333.01
11.00	DISCHG	329.42	325.84	322.28	318.74	315.22	311.73	306.13	300.08	294.17	288.40
12.00	DISCHG	282.02	260.25	76.59	94.92	82.02	89.13	83.58	86.34	83.91	84.80
13.00	DISCHG	83.30	83.41	82.45	81.91	81.15	80.36	79.52	78.75	77.99	77.20
14.00	DISCHG	76.45	75.76	74.99	74.24	73.56	72.87	72.18	71.53	70.91	70.36
15.00	DISCHG	69.85	69.25	68.37	67.49	66.73	65.86	64.91	63.98	63.08	62.26

16.00	DISCHG	61.50	60.82	60.21	59.67	59.17	58.74	58.35	58.00	57.69	57.41
17.00	DISCHG	57.16	56.94	56.75	56.57	56.41	56.28	56.15	56.04	55.95	55.86
18.00	DISCHG	55.79	55.72	55.67	55.62	55.57	55.54	55.51	55.48	55.46	55.44
19.00	DISCHG	55.43	55.42	55.41	55.41	55.41	55.41	55.41	55.41	55.42	55.43
20.00	DISCHG	55.43	55.07	53.91	52.64	51.52	49.97	48.24	46.50	44.77	43.08
21.00	DISCHG	41.48	40.12	38.95	37.88	36.84	35.88	35.08	34.43	33.83	33.21
22.00	DISCHG	32.62	32.16	31.80	31.47	31.08	30.71	30.44	30.26	30.08	29.83
23.00	DISCHG	29.58	29.42	29.34	29.25	29.08	28.91	28.82	28.80	28.76	28.65
24.00	DISCHG	28.51	28.05	26.80	25.42	24.23	22.65	20.85	18.99	17.18	15.51
25.00	DISCHG	13.96	12.56	11.30	10.17	9.15	8.24	7.43	6.69	6.04	5.44
26.00	DISCHG	4.91	4.43	4.00	3.61	3.26	2.95	2.66	2.41	2.17	1.96
27.00	DISCHG	1.77	1.60	1.45	1.31	1.18	1.07	1.00	1.00	1.00	1.00
28.00	DISCHG	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
29.00	DISCHG	1.00	1.00	1.00	1.00	1.00	1.00	.99	.99	.99	.99

RUNOFF VOLUME ABOVE BASEFLOW = 1.82 WATERSHED INCHES, 2863.25 CFS-HRS, 236.62 ACRE-FEET; BASEFLOW = .00 CFS

XECUTIVE CONTROL OPERATION ENDCMP RECORD ID

\+ COMPUTATIONS COMPLETED FOR PASS 1

XECUTIVE CONTROL OPERATION ENDJOB RECORD ID

UMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

ECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 1													
XSECTION 18	RUNOFF	.48	7	2	.10	.0	4.60	24.00	1.97	---	6.08	743.53	1549.0
XSECTION 16	REACH	.48	7	2	.10	.0	4.60	24.00	1.97	6181.60	6.19	723.22	1506.7
SECTION 16	RUNOFF	.64	7	2	.10	.0	4.60	24.00	2.05	---	6.13	898.12	1403.3
XSECTION 16	ADDHYD	1.12	7	2	.10	.0	4.60	24.00	2.01	6182.42	6.17	1586.02	1416.1
XSECTION 14	REACH	1.12	7	2	.10	.0	4.60	24.00	2.01	6126.02	6.17	1586.02	1416.1
.SECTION 14	RUNOFF	.18	7	2	.10	.0	4.60	24.00	1.74	---	6.10	231.40	1285.6
XSECTION 14	ADDHYD	1.30	7	2	.10	.0	4.60	24.00	1.98	6126.28	6.16	1798.36	1383.4
:SECTION 6	REACH	1.30	7	2	.10	.0	4.60	24.00	1.98	6083.56	6.27	1770.27	1361.7
SECTION 6	RUNOFF	.21	7	2	.10	.0	4.60	24.00	2.37	---	6.17	320.11	1524.3
XSECTION 6	ADDHYD	1.51	7	2	.10	.0	4.60	24.00	2.03	6083.88	6.25	2057.10	1362.3
SECTION 10	RUNOFF	.20	7	2	.10	.0	4.60	24.00	1.67	---	6.10	251.52	1257.6
XSECTION 8	REACH	.20	7	2	.10	.0	4.60	24.00	1.67	6081.50	6.21	245.26	1226.3

YSECTION	8	RUNOFF	.25	7	2	.10	.0	4.60	24.00	2.05	---	6.22	287.32	1149.3
SECTION	8	ADDHYD	.45	7	2	.10	.0	4.60	24.00	1.88	6082.48	6.21	532.08	1182.4
XSECTION	6	REACH	.45	7	2	.10	.0	4.60	24.00	1.88	6081.78	6.21	532.08	1182.4
SECTION	6	ADDHYD	1.96	7	2	.10	.0	4.60	24.00	2.00	6084.39	6.24	2581.41	1317.0
STRUCTURE	1	RESVOR	1.96	7	2	.10	.0	4.60	24.00	1.69	6084.93	6.64	812.09	414.3
XSECTION	5	REACH	1.96	7	2	.10	.0	4.60	24.00	1.69	6005.07	6.64	812.09	414.3
YSECTION	5	RUNOFF	.08	7	2	.10	.0	4.60	24.00	2.05	---	6.03	141.86	1773.2
SECTION	5	ADDHYD	2.04	7	2	.10	.0	4.60	24.00	1.70	6005.09	6.64	826.33	405.1
STRUCTURE	2	RESVOR	2.04	7	2	.10	.0	4.60	24.00	1.70	6016.74	7.16	582.34	285.5
SECTION	4	REACH	2.04	7	2	.10	.0	4.60	24.00	1.70	5971.39	7.16	582.34	285.5
ASECTION	12	RUNOFF	.26	7	2	.10	.0	4.60	24.00	2.11	---	6.15	359.25	1381.7
STRUCTURE	5	RESVOR	.26	7	2	.10	.0	4.60	24.00	2.11	6042.29	6.30	285.51	1098.1
SECTION	4	REACH	.26	7	2	.10	.0	4.60	24.00	2.11	5970.87	6.30	285.51	1098.1
XSECTION	4	ADDHYD	2.30	7	2	.10	.0	4.60	24.00	1.75	5971.51	6.61	683.51	297.2
YSECTION	3	RUNOFF	.08	7	2	.10	.0	4.60	24.00	3.20	---	5.99	227.31	2806.3
TRUCTURE	6	RESVOR	.08	7	2	.10	.0	4.60	24.00	3.20	5990.29	6.21	97.17	1199.7
XSECTION	4	ADDHYD	2.38	7	2	.10	.0	4.60	24.00	1.80	5971.61	6.59	768.97	323.0
XSECTION	4	RUNOFF	.05	7	2	.10	.0	4.60	24.00	2.34	---	6.02	93.53	2033.2
ASECTION	4	ADDHYD	2.43	7	2	.10	.0	4.60	24.00	1.81	5971.62	6.59	778.87	320.9
STRUCTURE	3	RESVOR	2.43	7	2	.10	.0	4.60	24.00	1.81	5990.37	7.21	655.61	270.1

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ TRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 1													
SECTION 2	REACH	2.43	7	2	.10	.0	4.60	24.00	1.81	5958.58	7.21	655.61	270.1
XSECTION 2	RUNOFF	.01	7	2	.10	.0	4.60	24.00	3.92	---	6.00	32.01	3200.9
YSECTION 2	ADDHYD	2.44	7	2	.10	.0	4.60	24.00	1.82	5958.59	7.19	657.05	269.6
TRUCTURE 4	RESVOR	2.44	7	2	.10	.0	4.60	24.00	1.82	5979.46	8.73	382.39	156.9

UMMARY TABLE 2 - SELECTED MODIFIED ATT-KIN REACH ROUTINGS IN ORDER OF STANDARD EXECUTIVE CONTROL INSTRUCTIONS
(A STAR(*) AFTER VOLUME ABOVE BASE(IN) INDICATES A HYDROGRAPH TRUNCATED AT A VALUE EXCEEDING BASE + 10% OF PEAK

A QUESTION MARK(?) AFTER COEFF.(C) INDICATES PARAMETERS OUTSIDE ACCEPTABLE LIMITS, SEE PREVIOUS WARNINGS)

XSEC ID	REACH LENGTH (FT)	HYDROGRAPH INFORMATION: INFLOW PEAK (CFS)	INFLOW TIME (HR)	OUTFLOW PEAK (CFS)	OUTFLOW TIME (HR)	OUTFLOW+ INTERV. PEAK (CFS)	OUTFLOW+ INTERV. TIME (HR)	BASE-FLOW (CFS)	ROUTING PARAMETERS: VOLUME ABOVE BASE (IN)	MAIN TIME INCR (HR)	ITER-ATION #	Q AND A EQUATION COEFF (X)	Q AND A EQUATION POWER (M)	LENGTH FACTOR (K*)	PEAK RATIO Q/I (Q*)	S/Q @PEAK (K) (SEC)	ATT-KIN COEFF (C)	TRAVEL TIME STOR-AGE (HR)	TRAVEL TIME KINE-MATIC (HR)
ALTERNATE 1 STORM 1																			
16	3340	740	6.1	723	6.2			0	1.97	.10	1	1.31	1.46	.043	.976	237	.86?	.10	.07
						1562	6.2												
14	2900	1562	6.2	1562	6.2			0	2.01	.10	0	1.45	1.44	.022	1.000	165	1.00?	.00	.00
						1755	6.2												
6	5200	1755	6.2	1746	6.3			0	1.98	.10	1	1.37	1.51	.031	.995	224	.87?	.10	.06
						2010	6.3												
8	3800	251	6.1	245	6.2			0	1.67	.10	1	2.62	1.47	.038	.975	228	.88?	.10	.06
						531	6.2												
6	1900	531	6.2	531	6.2			0	1.88	.10	0	1.09	1.57	.009	1.000	116	1.00?	.00	.00
						---	---												
5	1800	807	6.6	807	6.6			0	1.69	.10	0	1.56	1.34	.007	1.000	176	1.00?	.00	.00
						822	6.6												
4	1000	582	7.2	582	7.2			0	1.70	.10	0	1.33	1.54	.000	1.000	58	1.00?	.00	.00
						---	---												
4	2400	285	6.3	285	6.3			0	2.11	.10	0	1.24	1.56	.013	1.000	176	1.00?	.00	.00
						683	6.6												
2	750	656	7.2	656	7.2			0	1.81	.10	0	2.47	1.40	.000	1.000	44	1.00?	.00	.00
						657	7.2												

UMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ TRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1
STRUCTURE 6	.08	
ALTERNATE 1		97.17

	STRUCTURE	5	.26
	ALTERNATE	1	285.51
0	STRUCTURE	4	2.44
	ALTERNATE	1	382.39
0	STRUCTURE	3	2.43
	ALTERNATE	1	655.61
0	STRUCTURE	2	2.04
	ALTERNATE	1	582.34
	STRUCTURE	1	1.96
	ALTERNATE	1	812.09
	XSECTION	2	2.44
	ALTERNATE	1	657.05
	XSECTION	3	.08
	ALTERNATE	1	227.31
	XSECTION	4	2.43
	ALTERNATE	1	776.87
	XSECTION	5	2.04
	ALTERNATE	1	826.33
	XSECTION	6	1.96
	ALTERNATE	1	2581.41
0	XSECTION	8	.45
	ALTERNATE	1	532.08
0	XSECTION	10	.20
	ALTERNATE	1	251.52
0	XSECTION	12	.26
	ALTERNATE	1	359.25

UMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ TRUCTURE ID		DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1
XSECTION	14	1.30	
ALTERNATE	1		1798.36
0 XSECTION	16	1.12	
ALTERNATE	1		1586.02

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0 XSECTION   18         .48

  ------------------------
    ALTERNATE    1                743.53


  AIN - UNEXPECTED RECORD FOUND(IGNORED) >>>                                    <<<
1END OF  1 JOBS IN THIS RUN
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APPENDIX B -

TR-20 Output
Future Conditions
Spillway Width = 50'
Spillway Elev. = 6,082.7
Spillway Pipe = 48"
Lake Elev. = 6,075.0

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**********80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY**********

JOB TR-20                                          SUMMARY   NOPLOTS
TLE 001  SPRING RUN  TR20 RUN  24 HR. 100 YR. STORM         IN-TR20EX
TLE      FUT COND W/ 48" @ 6075 & EXIST SPILLWAY    OUT-TR20EX.O
5 RAINFL 7                 0.25
R              0.0000     0.0005     0.0015     0.0030     0.0045
              0.0060     0.0080     0.0100     0.0120     0.0143
d             0.0165     0.0188     0.0210     0.0233     0.0255
8             0.0278     0.0320     0.0390     0.0460     0.0530
             0.0600     0.0750     0.1000     0.4000     0.7000
             0.7250     0.7500     0.7650     0.7800     0.7900
8             0.8000     0.8100     0.8200     0.8250     0.8300
             0.8350     0.8400     0.8450     0.8500     0.8550
             0.8600     0.8638     0.8675     0.8713     0.8750
8             0.8788     0.8825     0.8863     0.8900     0.8938
9             0.8975     0.9013     0.9050     0.9083     0.9115
             0.9148     0.9180     0.9210     0.9240     0.9270
d             0.9300     0.9325     0.9350     0.9375     0.9400
8             0.9425     0.9450     0.9475     0.9500     0.9525
             0.9550     0.9575     0.9600     0.9625     0.9650
             0.9675     0.9700     0.9725     0.9750     0.9775
8             0.9800     0.9813     0.9825     0.9838     0.9850
             0.9863     0.9875     0.9888     0.9900     0.9913
             0.9925     0.9938     0.9950     0.9963     0.9975
8             0.9988     1.0000     1.0000     1.0000     1.0000
9 ENDTBL
2 XSECTN   002             1.0
d                       5956.00        0.0        0.0
8                       5956.68       50.0       8.64
                        5957.00      100.0      14.01
                        5958.30      500.0      44.22
8                       5959.21     1000.0      73.31
9                       5959.88     1500.0      99.05
                        5960.40     2000.0     121.40
d                       5961.28     3000.0     164.40
8                       5962.00     4000.0     204.00
7 ENDTBL
2 XSECTN   004             1.0
8                       5995.00        0.0        0.0
                        5995.34       50.0      10.65
                        5995.51      100.0      16.47
8                       5996.29      500.0      47.13
9                       5996.89     1000.0      74.66
                        5997.38     1500.0      99.74
d                       5997.78     2000.0     121.76
8                       5998.45     3000.0     162.78
                        5999.00     4000.0     200.01

**********80-80 LIST OF INPUT DATA (CONTINUED)**********

) ENDTBL
2 XSECTN   005             1.0
```

```
                        6003.0       0.0       0.0
                        6003.6      50.0      13.45
                        6003.8     100.0      22.37
                        6004.7     500.0      73.56
                        6005.3    1000.0     124.56
                        6005.7    1500.0     167.06
ENDTBL
XSECTN   006              1.0
                        6080.00      0.0       0.0
                        6080.44     50.0      11.45
                        6080.87    100.0      17.53
                        6081.72    500.0      49.00
                        6082.59   1000.0      78.04
                        6083.26   1500.0     102.78
                        6083.82   2000.0     124.63
                        6084.80   3000.0     166.09
ENDTBL
XSECTN   008              1.0
                        6080.00      0.0       0.0
                        6080.65     50.0       7.37
                        6080.98    100.0      11.71
                        6082.41    500.0      35.73
                        6083.46   1000.0      58.62
                        6084.26   1500.0      78.90
ENDTBL
XSECTN   010              1.0
                        6246.00      0.0       0.0
                        6246.35     50.0       7.65
                        6246.52    100.0      11.87
                        6247.32    500.0      35.04
                        6247.92   1000.0      56.84
                        6248.37   1500.0      75.54
ENDTBL
XSECTN   012              1.0
                        6054.00      0.0       0.0
                        6054.79     50.0       9.42
                        6055.17    100.0      15.09
                        6056.78    500.0      47.04
                        6057.90   1000.0      77.16
                        6058.79   1500.0     105.15
ENDTBL
XSECTN   014              1.0
                        6122.00      0.0       0.0
                        6122.57     50.0      12.44
```



```
                        6122.86    100.0      19.31
                        6124.16    500.0      57.07
                        6125.15   1000.0      92.58
                        6125.91   1500.0     123.96
                        6126.53   2000.0     152.34
ENDTBL
XSECTN   016              1.0
                        6180.00      0.0       0.0
                        6180.37     50.0      12.33
                        6180.55    100.0      19.40
```

```
                        6181.34      500.0       58.11
                        6181.93     1000.0       94.90
                        6182.36     1500.0      126.50
                        6182.72     2000.0      155.27
 ENDTBL
 XSECTN   018             1.0
                        6314.00        0.0        0.0
                        6314.27       50.0        8.32
                        6314.40      100.0       12.82
                        6315.03      500.0       36.05
                        6315.52     1000.0       57.21
                        6315.91     1500.0       75.55
                        6316.24     2000.0       92.21
                        6316.79     3000.0      122.43
 ENDTBL
 STRUCT      01          1.0
                        6075.00        0.0        0.0
                        6076.00       11.0       12.50
                        6078.00       69.0       39.29
                        6080.00      119.0       68.38
                        6082.00      154.0      100.66
                        6084.00      600.0      136.45
                        6086.00     1410.0      174.55
                        6088.00     2460.0      214.25
 ENDTBL
 STRUCT      02          1.0
                        6003.0         0.0        0.0
                        6005.0        70.0        0.02
                        6007.0       120.0        0.30
                        6010.0       300.0        1.40
                        6014.0       500.0        6.35
                        6018.0       620.0       19.80
                        6022.0       750.0       35.00
                        6024.0      2500.0       46.00
 ENDTBL
 STRUCT      03          1.0
1


**********80-80 LIST OF INPUT DATA (CONTINUED)**********

                        5970.0         0.0        0.0
                        5974.0       115.0        0.07
                        5977.0       260.0        0.90
                        5981.0       440.0        2.70
                        5985.0       530.0        5.50
                        5990.0       650.0       11.90
                        5994.0       710.0       24.30
 ENDTBL
 STRUCT      04          1.0
                        5949.0         0.0        0.0
                        5955.0       253.0        0.23
                        5960.0       283.0        2.30
                        5965.0       311.0       10.30
                        5970.0       338.0       24.10
                        5975.0       361.0       39.50
                        5980.0       385.0       56.70
                        5982.0       394.0       63.90
                        5984.0      1716.0       71.50
```

```
ENDTBL
RUNOFF 1 018       7     0.480      73.0        0.322   1
REACH  3 016   7   5  3340.0
RUNOFF 1 016       7     0.640      74.0        0.424   1
ADDHYD 4 016   5 7 4                                    1
REACH  3 014   4   7  2900.0
RUNOFF 1 014       5     0.180      70.0        0.348   1
ADDHYD 4 014   7 5 4                                    1
REACH  3 006   4   7  5200.0
RUNOFF 1 006       5     0.210      78.0        0.500   1
ADDHYD 4 006   7 5 3                                    1
RUNOFF 1 010       7     0.200      69.0        0.332   1
REACH  3 008   7   5  3800.0
RUNOFF 1 008       7     0.250      74.0        0.582   1
ADDHYD 4 008   5 7 4                                    1
REACH  3 006   4   5  1900.0
ADDHYD 4 006   3 5 4                                    1
RESVOR 2    01 4   3  6075.00                          1 1   1
REACH  3 005   3   1  1800.0
RUNOFF 1 005       6     0.07       74.0        0.230   1
ADDHYD 4 005   1 6 7                                    1
RESVOR 2    02 7   6  6003.0                           1 1   1
REACH  3 004   6   7  1000.0
RUNOFF 1 004       5     0.150      83.0        0.230   1
ADDHYD 4 004   7 5 3                                    1
RUNOFF 1 012       7     0.240      74.0        0.457   1
REACH  3 004   7   5  2400.0
ADDHYD 4 004   3 5 7                                    1
```

**********80-80 LIST OF INPUT DATA (CONTINUED)**********

```
RESVOR 2    03 7   6   5970.0                          1 1   1
REACH  3 002   6   5   750.0
RUNOFF 1 002       7     0.010      94.0        0.271   1
ADDHYD 4 002   5 7 4                                    1
RESVOR 2    04 4   6   5949.0                          1 1   1
ENDATA
INCREM 6               0.10
COMPUT 7 018      04     0.0         4.60        1.0    7 2  01  01
ENDCMP 1
ENDJOB 2
```

**********END OF 80-80 LIST**********

FILE NO. 1

COMPUTER PROGRAM FOR PROJECT FORMULATION - HYDROLOGY USER NOTES

THE USERS MANUAL FOR THIS PROGRAM IS THE MAY 1982 DRAFT OF TR-20. CHANGES FROM THE 2/14/74 VERSION INCLUDE:

REACH ROUTING - THE MODIFIED ATT-KIN ROUTING PROCEDURE REPLACES THE CONVEX METHOD. INPUT DATA PREPARED FOR

PREVIOUS PROGRAM VERSIONS USING CONVEX ROUTING COEFFICIENTS WILL NOT RUN ON THIS VERSION.

THE PREFERRED TYPE OF DATA ENTRY IS CROSS SECTION DATA REPRESENTATIVE OF A REACH. IT IS RECOMMENDED THAT THE OPTIONAL CROSS SECTION DISCHARGE-AREA PLOTS BE OBTAINED WHENEVER NEW CROSS SECTION DATA IS ENTERED. THE PLOTS SHOULD BE CHECKED FOR REASONABLENESS AND ADEQUACY OF INPUT DATA FOR THE COMPUTATION OF "K" VALUES USED IN THE ROUTING PROCEDURE.

GUIDELINES FOR DETERMINING OR ANALYZING REACH LENGTHS AND COEFFICIENTS (X,M) ARE AVAILABLE IN THE USERS MANUAL. SUMMARY TABLE 2 DISPLAYS REACH ROUTING RESULTS AND ROUTING PARAMETERS FOR COMPARISON AND CHECKING.

HYDROGRAPH GENERATION - THE PROCEDURE TO CALCULATE THE INTERNAL TIME INCREMENT AND PEAK TIME OF THE UNIT HYDROGRAPH HAVE BEEN IMPROVED. PEAK DISCHARGES AND TIMES MAY DIFFER FROM THE PREVIOUS VERSION. OUTPUT HYDROGRAPHS ARE STILL INTERPOLATED, PRINTED, AND ROUTED AT THE USER SELECTED MAIN TIME INCREMENT.

INTERMEDIATE PEAKS - METHOD ADDED TO PROVIDE DISCHARGES AT INTERMEDIATE POINTS WITHIN REACHES WITHOUT ROUTING.

OTHER - THIS VERSION CONTAINS SOME ADDITIONS TO THE INPUT AND NUMEROUS MODIFICATIONS TO THE OUTPUT. USER OPTIONS HAVE BEEN MODIFIED AND AUGMENTED ON THE JOB RECORD, RAINTABLES ADDED, ERROR AND WARNING MESSAGES EXPANDED, AND THE SUMMARY TABLES COMPLETELY REVISED. THE HOLDOUT OPTION IS NOT OPERATIONAL AT THIS TIME.

PROGRAM QUESTIONS OR PROBLEMS SHOULD BE DIRECTED TO HYDRAULIC ENGINEERS AT THE SCS NATIONAL TECHNICAL CENTERS:

CHESTER, PA (NORTHEAST) -- 215-499-3933, FORT WORTH, TX (SOUTH) -- 334-5242 (FTS)
LINCOLN, NB (MIDWEST) -- 541-5318 (FTS), PORTLAND, OR (WEST) -- 423-4099 (FTS)
OR HYDROLOGY UNIT, ENGINEERING DIVISION, LANHAM, MD -- 436-7383 (FTS).

PROGRAM CHANGES SINCE MAY 1982:

12/17/82 - CORRECT PEAK RATE FACTOR FOR USER ENTERED DIMHYD
CORRECT REACH ROUTING PEAK TRAVEL TIME PRINTED WITH FULLPRINT OPTION
5/02/83 - CORRECT COMPUTATIONS FOR ---
1. DIVISION OF BASEFLOW IN DIVERT OPERATION
2. HYDROGRAPH VOLUME SPLIT BETWEEN BASEFLOW AND ABOVE BASEFLOW
3. CROSS SECTION DATA PLOTTING POSITION
4. INTERMEDIATE PEAK WHEN "FROM" AREA IS LARGER THAN "THRU" AREA
5. STORAGE ROUTED REACH TRAVEL TIME FOR MULTIPEAK HYDROGRAPH
6. ORDERING "FLOW-FREQ" FILE FROM SUMMARY TABLE #3 DATA
7. BASEFLOW ENTERED WITH READHYD
8. LOW FLOW SPLIT DURING DIVERT PROCEDURE #2 WHEN SECTION RATINGS START AT DIFFERENT ELEVATIONS
ENHANCEMENTS ---
1. REPLACE USER MANUAL ERROR CODES (PAGE 4-9 TO 4-11) WITH MESSAGES
2. LABEL OUTPUT HYDROGRAPH FILES WITH CROSS SECTION/STRUCTURE, ALTERNATE AND STORM NO'S
09/01/83 - CORRECT INPUT AND OUTPUT ERRORS FOR INTERMEDIATE PEAKS
CORRECT COMBINATION OF RATING TABLES FOR DIVERT
CHECK REACH ROUTING PARAMETERS FOR ACCEPTABLE LIMITS
ELIMINATE MINIMUM REACH TRAVEL TIME WHEN ATT-KIN COEFFICIENT EQUALS ONE

EXECUTIVE CONTROL OPERATION INCREM RECORD ID

MAIN TIME INCREMENT = .10 HOURS

(ECUTIVE CONTROL OPERATION COMPUT RECORD ID

\+ FROM XSECTION 18

\+ TO STRUCTURE 4

STARTING TIME = .00 RAIN DEPTH = 4.60 RAIN DURATION= 1.00 RAIN TABLE NO.= 7 ANT. MOIST. COND= 2

ALTERNATE NO.= 1 STORM NO.= 1 MAIN TIME INCREMENT = .10 HOURS

ERATION RUNOFF CROSS SECTION 18

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.08	743.53	(RUNOFF)
7.94	39.45	(RUNOFF)
9.95	20.32	(RUNOFF)
12.84	15.64	(RUNOFF)
13.83	13.66	(RUNOFF)
14.92	12.60	(RUNOFF)
19.89	10.73	(RUNOFF)
23.83	5.51	(RUNOFF)

*** WARNING REACH 16 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION RUNOFF CROSS SECTION 16

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.13	898.12	(RUNOFF)
9.96	27.66	(RUNOFF)
12.90	21.26	(RUNOFF)
13.86	18.60	(RUNOFF)
19.88	14.58	(RUNOFF)
23.88	7.44	(RUNOFF)

ERATION ADDHYD CROSS SECTION 16

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.17	1586.02	6182.42
9.96	47.90	6180.35
12.92	36.88	6180.27
13.90	32.24	6180.24
19.90	25.31	6180.19
23.90	12.92	6180.10

*** WARNING REACH 14 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

ERATION RUNOFF CROSS SECTION 14

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.10	231.40	(RUNOFF)
7.91	13.67	(RUNOFF)

9.95	7.07	(RUNOFF)
19.95	3.79	(RUNOFF)
23.84	1.94	(RUNOFF)

OPERATION ADDHYD CROSS SECTION 14

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.16	1798.36	6126.28
9.96	54.96	6122.60
12.91	42.34	6122.48
13.89	37.02	6122.42
19.91	29.08	6122.33
23.90	14.85	6122.17

*** WARNING REACH 6 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION RUNOFF CROSS SECTION 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.17	320.11	(RUNOFF)
9.96	9.87	(RUNOFF)
12.93	7.54	(RUNOFF)
19.95	5.15	(RUNOFF)
23.91	2.60	(RUNOFF)

OPERATION ADDHYD CROSS SECTION 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.25	2057.10	6083.88
10.01	64.73	6080.57
13.01	49.85	6080.44
13.98	43.59	6080.38
19.96	34.23	6080.30
23.98	17.43	6080.15

OPERATION RUNOFF CROSS SECTION 10

1

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.10	251.52	(RUNOFF)
7.95	14.84	(RUNOFF)
9.96	7.65	(RUNOFF)
19.90	4.10	(RUNOFF)
23.84	2.11	(RUNOFF)

*** WARNING REACH 8 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION RUNOFF CROSS SECTION 8

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.22	287.32	(RUNOFF)
9.96	10.78	(RUNOFF)
12.95	8.28	(RUNOFF)
19.88	5.69	(RUNOFF)
23.91	2.88	(RUNOFF)

OPERATION ADDHYD CROSS SECTION 8

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.21	532.08	6082.48
9.97	18.40	6080.24
12.95	14.20	6080.18
13.88	12.47	6080.16
19.90	9.79	6080.13
23.93	4.99	6080.06

*** WARNING REACH 6 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION ADDHYD CROSS SECTION 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.24	2581.41	6084.39
10.00	83.13	6080.73
13.00	64.05	6080.56
13.96	56.05	6080.49
19.95	44.03	6080.39
23.97	22.41	6080.20

OPERATION RESVOR STRUCTURE 1

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
7.17	271.36	6082.53

TIME(HRS)		FIRST HYDROGRAPH POINT = .00 HOURS			TIME INCREMENT = .10 HOURS				DRAINAGE AREA = 1.96 SQ.MI.		
5.00	DISCHG	.00	.00	.00	.00	.00	.00	.01	.14	.83	3.29
6.00	DISCHG	9.43	34.77	72.85	107.16	130.30	143.63	152.19	195.27	233.37	255.25
7.00	DISCHG	266.33	270.73	271.23	269.05	264.52	258.12	250.70	243.05	235.64	228.69
8.00	DISCHG	222.30	216.45	210.90	205.02	198.10	190.04	181.35	172.67	164.37	156.64
9.00	DISCHG	153.59	152.97	152.34	151.72	151.10	150.49	149.89	149.29	148.70	148.11
10.00	DISCHG	147.53	146.96	146.38	145.80	145.18	144.52	143.84	143.14	142.43	141.73
11.00	DISCHG	141.03	140.34	139.65	138.97	138.29	137.62	136.96	136.30	135.65	135.00
12.00	DISCHG	134.36	133.73	133.10	132.48	131.87	131.26	130.66	130.06	129.47	128.88
13.00	DISCHG	128.30	127.73	127.15	126.58	125.99	125.40	124.79	124.18	123.58	122.97
14.00	DISCHG	122.38	121.78	121.19	120.60	120.01	119.41	118.70	117.77	116.84	115.92
15.00	DISCHG	115.01	114.12	113.24	112.35	111.46	110.54	109.62	108.70	107.79	106.88
16.00	DISCHG	105.99	105.11	104.24	103.38	102.53	101.70	100.87	100.06	99.27	98.48
17.00	DISCHG	97.70	96.94	96.18	95.44	94.71	93.99	93.28	92.58	91.89	91.20

18.00	DISCHG	90.53	89.87	89.22	88.58	87.95	87.32	86.71	86.10	85.51	84.92
19.00	DISCHG	84.34	83.77	83.21	82.65	82.10	81.57	81.03	80.51	80.00	79.49
20.00	DISCHG	78.99	78.49	78.00	77.47	76.90	76.26	75.57	74.86	74.13	73.41
21.00	DISCHG	72.70	71.99	71.29	70.59	69.91	69.23	68.46	67.64	66.83	66.03
22.00	DISCHG	65.26	64.49	63.74	63.00	62.28	61.57	60.87	60.18	59.50	58.84
23.00	DISCHG	58.19	57.56	56.93	56.31	55.70	55.11	54.53	53.95	53.39	52.83
24.00	DISCHG	52.29	51.76	51.22	50.64	49.99	49.27	48.48	47.67	46.86	46.04
25.00	DISCHG	45.23	44.44	43.65	42.88	42.12	41.37	40.64	39.92	39.21	38.51
26.00	DISCHG	37.83	37.16	36.50	35.85	35.22	34.59	33.98	33.38	32.79	32.20
27.00	DISCHG	31.63	31.07	30.52	29.98	29.45	28.93	28.41	27.91	27.41	26.93
28.00	DISCHG	26.45	25.98	25.52	25.07	24.62	24.19	23.76	23.34	22.92	22.52
29.00	DISCHG	22.12	21.72	21.34	20.96	20.59	20.22	19.87	19.51	19.17	18.83

RUNOFF VOLUME ABOVE BASEFLOW = 1.84 WATERSHED INCHES, 2331.67 CFS-HRS, 192.69 ACRE-FEET; BASEFLOW = .00 CFS

*** WARNING REACH 5 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

ERATION RUNOFF CROSS SECTION 5

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.03	124.12	(RUNOFF)
7.95	5.98	(RUNOFF)

ERATION ADDHYD CROSS SECTION 5

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.05	128.95	6003.86
7.27	277.37	6004.20

ERATION RESVOR STRUCTURE 2
1

TR20 XEQ 6/ 1/90 8:46 SPRING RUN TR20 RUN 24 HR. 100 YR. STORM IN-TR20EX JOB 1 PASS 1
REV PC/09/83 FUT COND W/ 48" @ 6075 & EXIST SPILLWAY OUT-TR20EX.O PAGE 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.11	121.71	6007.03
7.35	276.49	6009.61

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = 2.03 SQ.MI.

5.00	DISCHG	.00	.00	.00	.00	.00	.00	.87	15.51	51.79	79.57
6.00	DISCHG	104.31	121.56	110.15	97.07	107.87	128.23	145.00	155.77	175.62	209.91
7.00	DISCHG	241.35	261.82	272.27	276.11	276.22	273.71	269.02	262.70	255.49	248.04
8.00	DISCHG	240.78	233.72	226.60	219.76	213.45	207.01	199.80	191.73	183.21	174.70
9.00	DISCHG	166.54	160.36	157.32	156.07	155.31	154.66	154.04	153.44	152.84	152.24
10.00	DISCHG	151.65	151.01	150.23	149.42	148.69	148.02	147.36	146.71	146.04	145.34
11.00	DISCHG	144.63	143.92	143.23	142.56	141.87	141.17	140.49	139.83	139.19	138.53
12.00	DISCHG	137.87	137.21	136.59	135.97	135.35	134.71	134.09	133.50	132.91	132.31
13.00	DISCHG	131.71	131.09	130.44	129.78	129.15	128.53	127.92	127.33	126.75	126.14
14.00	DISCHG	125.52	124.89	124.26	123.62	123.01	122.40	121.81	121.17	120.40	119.49
15.00	DISCHG	118.55	117.60	116.61	115.62	114.67	113.76	112.85	111.94	111.02	110.10
16.00	DISCHG	109.19	108.29	107.40	106.52	105.65	104.80	103.95	103.12	102.30	101.49
17.00	DISCHG	100.70	99.91	99.14	98.38	97.63	96.89	96.16	95.44	94.73	94.03

18.00	DISCHG	93.34	92.67	92.00	91.34	90.69	90.05	89.42	88.80	88.19	87.58
19.00	DISCHG	86.99	86.40	85.83	85.26	84.70	84.14	83.60	83.06	82.53	82.01
20.00	DISCHG	81.50	80.93	80.21	79.45	78.80	78.18	77.56	76.92	76.24	75.53
21.00	DISCHG	74.79	74.06	73.36	72.67	71.97	71.26	70.57	69.71	68.33	68.00
22.00	DISCHG	66.75	66.35	65.28	64.83	63.82	63.28	62.38	61.88	61.06	60.48
23.00	DISCHG	59.69	59.13	58.44	57.89	57.19	56.61	55.98	55.46	54.86	54.30
24.00	DISCHG	53.70	53.03	52.13	51.41	50.77	50.12	49.39	48.62	47.81	47.00
25.00	DISCHG	46.18	45.37	44.57	43.79	43.01	42.25	41.50	40.76	40.04	39.33
26.00	DISCHG	38.63	37.95	37.27	36.61	35.96	35.33	34.70	34.08	33.48	32.89
27.00	DISCHG	32.30	31.73	31.17	30.61	30.07	29.54	29.01	28.50	27.99	27.50
28.00	DISCHG	27.01	26.53	26.06	25.60	25.14	24.70	24.26	23.83	23.41	22.99
29.00	DISCHG	22.58	22.18	21.79	21.40	21.02	20.65	20.29	19.93	19.57	19.23

RUNOFF VOLUME ABOVE BASEFLOW = 1.85 WATERSHED INCHES, 2421.68 CFS-HRS, 200.13 ACRE-FEET; BASEFLOW = .00 CFS

*** WARNING REACH 4 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PERATION RUNOFF CROSS SECTION 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.01	369.01	(RUNOFF)
7.95	15.38	(RUNOFF)
9.95	7.74	(RUNOFF)
19.87	3.95	(RUNOFF)
23.79	2.04	(RUNOFF)

PERATION ADDHYD CROSS SECTION 4

TR20 XEQ 6/ 1/90 8:46 SPRING RUN TR20 RUN 24 HR. 100 YR. STORM IN-TR20EX JOB 1 PASS 1
REV PC/09/83 FUT COND W/ 48" @ 6075 & EXIST SPILLWAY OUT-TR20EX.0 PAGE 7

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.03	477.22	5996.25
7.33	292.22	5995.88

OPERATION RUNOFF CROSS SECTION 12

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.15	319.69	(RUNOFF)
9.96	10.37	(RUNOFF)
13.86	6.98	(RUNOFF)
19.88	5.47	(RUNOFF)
23.89	2.78	(RUNOFF)

*** WARNING REACH 4 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

PERATION ADDHYD CROSS SECTION 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.07	768.73	5996.61
7.22	320.61	5995.94

OPERATION RESVOR STRUCTURE 3

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.23	551.88	5985.91
7.38	316.74	5978.26

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = 2.42 SQ.MI.

5.00	DISCHG	.00	.00	.00	.00	.00	.29	19.68	121.18	218.58	355.25
6.00	DISCHG	467.65	530.14	550.89	544.71	515.58	468.06	400.79	319.60	281.12	272.36
7.00	DISCHG	282.69	298.54	310.43	315.88	316.68	314.72	310.95	305.75	299.42	292.39
8.00	DISCHG	285.11	277.32	267.90	256.03	242.28	232.85	224.53	216.18	207.55	198.83
9.00	DISCHG	190.34	182.90	177.81	175.18	173.90	173.12	172.47	171.86	171.27	170.69
10.00	DISCHG	170.11	169.31	167.88	166.05	164.37	162.98	161.89	161.03	160.30	159.58
11.00	DISCHG	158.81	158.04	157.34	156.71	156.05	155.33	154.60	153.95	153.35	152.73
12.00	DISCHG	152.03	151.34	150.72	150.15	149.56	148.90	148.23	147.64	147.11	146.54
13.00	DISCHG	145.91	145.18	144.25	143.21	142.21	141.29	140.49	139.82	139.24	138.64
14.00	DISCHG	137.97	137.25	136.45	135.60	134.81	134.08	133.42	132.77	132.07	131.24
15.00	DISCHG	130.33	129.30	128.02	126.59	125.24	124.05	122.98	121.99	121.02	120.08
16.00	DISCHG	119.15	118.24	117.34	116.45	115.57	114.40	113.18	112.63	111.60	110.95
17.00	DISCHG	110.04	109.35	108.51	107.80	107.02	106.30	105.56	104.85	104.14	103.45
18.00	DISCHG	102.76	102.09	101.42	100.76	100.11	99.48	98.85	98.23	97.62	97.02
19.00	DISCHG	96.43	95.84	95.27	94.70	94.14	93.59	93.05	92.52	91.99	91.47
20.00	DISCHG	90.95	89.96	88.04	86.15	84.71	83.51	82.62	81.88	81.20	80.40
21.00	DISCHG	79.57	78.80	78.15	77.51	76.78	76.00	75.28	74.51	73.24	72.72

1

22.00	DISCHG	71.64	70.93	70.22	69.52	68.78	67.90	67.23	66.54	66.01	65.21
23.00	DISCHG	64.52	63.78	63.29	62.68	62.06	61.32	60.74	60.21	59.73	59.10
24.00	DISCHG	58.46	57.26	55.17	53.24	51.89	50.73	49.79	48.86	47.99	47.11
25.00	DISCHG	46.28	45.44	44.64	43.84	43.07	42.30	41.55	40.82	40.09	39.38
26.00	DISCHG	38.68	38.00	37.32	36.66	36.01	35.37	34.75	34.13	33.52	32.93
27.00	DISCHG	32.35	31.77	31.21	30.65	30.11	29.58	29.05	28.54	28.03	27.53
28.00	DISCHG	27.05	26.57	26.10	25.63	25.18	24.73	24.29	23.86	23.44	23.02
29.00	DISCHG	22.61	22.21	21.82	21.43	21.05	20.68	20.31	19.95	19.60	19.25

RUNOFF VOLUME ABOVE BASEFLOW = 1.93 WATERSHED INCHES, 3011.73 CFS-HRS, 248.89 ACRE-FEET; BASEFLOW = .00 CFS

*** WARNING REACH 2 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION RUNOFF CROSS SECTION 2

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.00	32.01	(RUNOFF)

OPERATION ADDHYD CROSS SECTION 2

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.19	568.55	5958.42
7.38	317.96	5957.71

PERATION RESVOR STRUCTURE 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.73	317.05	5966.12
7.51	315.12	5965.76
9.91	194.20	5953.61
10.11	179.24	5953.25
10.30	170.47	5953.04
10.49	165.12	5952.92
10.68	162.23	5952.85

IME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = 2.43 SQ.MI.

4.00	DISCHG	.01	.02	.04	.07	.10	.13	.15	.17	.20	.22
5.00	DISCHG	.24	.30	.45	.62	.87	1.48	20.21	118.43	234.74	260.66
6.00	DISCHG	281.17	289.62	297.43	304.95	311.32	314.29	316.27	317.02	316.79	316.18
7.00	DISCHG	315.59	315.21	315.07	315.06	315.10	315.12	315.11	315.02	314.84	314.55
8.00	DISCHG	314.16	313.65	313.00	312.20	311.20	309.27	306.98	304.53	301.91	299.11
9.00	DISCHG	296.14	293.04	289.84	286.63	283.45	272.41	261.22	227.22	136.94	193.69
10.00	DISCHG	156.45	179.12	162.74	170.47	162.60	165.09	161.45	162.18	160.42	160.35
11.00	DISCHG	159.16	158.66	157.79	157.26	156.54	155.86	155.10	154.46	153.85	153.24
12.00	DISCHG	152.55	151.85	151.22	150.66	150.07	149.41	148.74	148.14	147.61	147.05
13.00	DISCHG	146.41	145.69	144.77	143.72	142.70	141.77	140.95	140.27	139.68	139.09

1

14.00	DISCHG	138.42	137.70	136.90	136.05	135.24	134.51	133.84	133.19	132.50	131.69
15.00	DISCHG	130.78	129.76	128.50	127.05	125.68	124.47	123.39	122.39	121.42	120.47
16.00	DISCHG	119.54	118.63	117.73	116.84	115.96	114.84	113.59	112.94	112.07	111.25
17.00	DISCHG	110.49	109.66	108.94	108.13	107.42	106.65	105.95	105.21	104.52	103.81
18.00	DISCHG	103.13	102.45	101.79	101.12	100.48	99.84	99.21	98.59	97.98	97.38
19.00	DISCHG	96.78	96.20	95.62	95.06	94.50	93.95	93.40	92.87	92.34	91.82
20.00	DISCHG	91.30	90.38	88.52	86.51	85.01	83.78	82.85	82.11	81.42	80.65
21.00	DISCHG	79.80	79.02	78.36	77.73	77.02	76.23	75.50	74.75	73.56	72.85
22.00	DISCHG	71.98	71.07	70.49	69.72	69.04	68.13	67.44	66.78	66.20	65.47
23.00	DISCHG	64.71	64.02	63.46	62.92	62.26	61.56	60.92	60.42	59.92	59.34
24.00	DISCHG	58.66	57.57	55.51	53.44	52.03	50.86	49.88	48.97	48.07	47.22
25.00	DISCHG	46.36	45.54	44.73	43.93	43.15	42.39	41.63	40.90	40.17	39.46
26.00	DISCHG	38.76	38.07	37.40	36.73	36.08	35.44	34.81	34.20	33.59	32.99
27.00	DISCHG	32.41	31.83	31.27	30.72	30.17	29.64	29.11	28.59	28.09	27.59
28.00	DISCHG	27.10	26.62	26.15	25.68	25.23	24.78	24.34	23.91	23.48	23.07
29.00	DISCHG	22.66	22.26	21.86	21.48	21.09	20.72	20.35	19.99	19.64	19.29

RUNOFF VOLUME ABOVE BASEFLOW = 1.94 WATERSHED INCHES, 3039.18 CFS-HRS, 251.16 ACRE-FEET; BASEFLOW = .00 CFS

XECUTIVE CONTROL OPERATION ENDCMP RECORD ID

COMPUTATIONS COMPLETED FOR PASS 1

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 1													
XSECTION 18	RUNOFF	.48	7	2	.10	.0	4.60	24.00	1.97	---	6.08	743.53	1549.0
XSECTION 16	REACH	.48	7	2	.10	.0	4.60	24.00	1.97	6181.60	6.19	723.22	1506.7
SECTION 16	RUNOFF	.64	7	2	.10	.0	4.60	24.00	2.05	---	6.13	898.12	1403.3
ASECTION 16	ADDHYD	1.12	7	2	.10	.0	4.60	24.00	2.01	6182.42	6.17	1586.02	1416.1
XSECTION 14	REACH	1.12	7	2	.10	.0	4.60	24.00	2.01	6126.02	6.17	1586.02	1416.1
SECTION 14	RUNOFF	.18	7	2	.10	.0	4.60	24.00	1.74	---	6.10	231.40	1285.6
XSECTION 14	ADDHYD	1.30	7	2	.10	.0	4.60	24.00	1.98	6126.28	6.16	1798.36	1383.4
YSECTION 6	REACH	1.30	7	2	.10	.0	4.60	24.00	1.98	6083.56	6.27	1770.27	1361.7
SECTION 6	RUNOFF	.21	7	2	.10	.0	4.60	24.00	2.37	---	6.17	320.11	1524.3
XSECTION 6	ADDHYD	1.51	7	2	.10	.0	4.60	24.00	2.03	6083.88	6.25	2057.10	1362.3
SECTION 10	RUNOFF	.20	7	2	.10	.0	4.60	24.00	1.67	---	6.10	251.52	1257.6
ASECTION 8	REACH	.20	7	2	.10	.0	4.60	24.00	1.67	6081.50	6.21	245.26	1226.3
XSECTION 8	RUNOFF	.25	7	2	.10	.0	4.60	24.00	2.05	---	6.22	287.32	1149.3
SECTION 8	ADDHYD	.45	7	2	.10	.0	4.60	24.00	1.88	6082.48	6.21	532.08	1182.4
SECTION 6	REACH	.45	7	2	.10	.0	4.60	24.00	1.88	6081.78	6.21	532.08	1182.4
YSECTION 6	ADDHYD	1.96	7	2	.10	.0	4.60	24.00	2.00	6084.39	6.24	2581.41	1317.0
TRUCTURE 1	RESVOR	1.96	7	2	.10	.0	4.60	24.00	1.84	6082.53	7.17	271.36	138.4
ASECTION 5	REACH	1.96	7	2	.10	.0	4.60	24.00	1.84	6004.19	7.29	271.10	138.3
XSECTION 5	RUNOFF	.07	7	2	.10	.0	4.60	24.00	2.05	---	6.03	124.12	1773.2
SECTION 5	ADDHYD	2.03	7	2	.10	.0	4.60	24.00	1.85	6004.20	7.27	277.37	136.6
STRUCTURE 2	RESVOR	2.03	7	2	.10	.0	4.60	24.00	1.85	6009.61	7.35	276.49	136.2
SECTION 4	REACH	2.03	7	2	.10	.0	4.60	24.00	1.85	5995.85	7.35	276.49	136.2
SECTION 4	RUNOFF	.15	7	2	.10	.0	4.60	24.00	2.82	---	6.01	369.01	2460.1
XSECTION 4	ADDHYD	2.18	7	2	.10	.0	4.60	24.00	1.92	5996.25	6.03	477.22	218.9
YSECTION 12	RUNOFF	.24	7	2	.10	.0	4.60	24.00	2.05	---	6.15	319.69	1332.0
ASECTION 4	REACH	.24	7	2	.10	.0	4.60	24.00	2.05	5995.94	6.15	319.69	1332.0
XSECTION 4	ADDHYD	2.42	7	2	.10	.0	4.60	24.00	1.93	5996.61	6.07	768.73	317.7
TRUCTURE 3	RESVOR	2.42	7	2	.10	.0	4.60	24.00	1.93	5985.91	6.23	551.88	228.0
SECTION 2	REACH	2.42	7	2	.10	.0	4.60	24.00	1.93	5958.39	6.23	551.88	228.0
XSECTION 2	RUNOFF	.01	7	2	.10	.0	4.60	24.00	3.92	---	6.00	32.01	3200.9
SECTION 2	ADDHYD	2.43	7	2	.10	.0	4.60	24.00	1.94	5958.42	6.19	568.55	234.0
STRUCTURE 4	RESVOR	2.43	7	2	.10	.0	4.60	24.00	1.94	5966.12	6.73	317.05	130.5

SUMMARY TABLE 2 - SELECTED MODIFIED ATT-KIN REACH ROUTINGS IN ORDER OF STANDARD EXECUTIVE CONTROL INSTRUCTIONS
(A STAR(*) AFTER VOLUME ABOVE BASE(IN) INDICATES A HYDROGRAPH TRUNCATED AT A VALUE EXCEEDING BASE + 10% OF PEAK
A QUESTION MARK(?) AFTER COEFF.(C) INDICATES PARAMETERS OUTSIDE ACCEPTABLE LIMITS, SEE PREVIOUS WARNINGS)

SEC ID	REACH LENGTH (FT)	HYDROGRAPH INFORMATION: INFLOW PEAK (CFS)	INFLOW TIME (HR)	OUTFLOW PEAK (CFS)	OUTFLOW TIME (HR)	OUTFLOW+ INTERV. PEAK (CFS)	INTERV. AREA TIME (HR)	BASE-FLOW (CFS)	ROUTING PARAMETERS: VOLUME ABOVE BASE (IN)	MAIN TIME INCR (HR)	ITER-ATION #	Q AND A EQUATION COEFF (X)	POWER (M)	LENGTH FACTOR (K*)	PEAK RATIO Q/I (Q*)	S/Q @PEAK (K) (SEC)	ATT-KIN COEFF (C)	TRAVEL TIME STOR-AGE (HR)	TRAVEL TIME KINE-MATIC (HR)
ALTERNATE 1 STORM 1																			
												1.31							
16	3340	740	6.1	723	6.2			0	1.97	.10	1		1.46	.043	.976	237	.86?	.10	.07
						1562	6.2												
												1.45							
14	2900	1562	6.2	1562	6.2			0	2.01	.10	0		1.44	.022	1.000	165	1.00?	.00	.00
						1755	6.2												
												1.37							
6	5200	1755	6.2	1746	6.3			0	1.98	.10	1		1.51	.031	.995	224	.89?	.10	.06
						2010	6.3												
												2.62							
8	3800	251	6.1	245	6.2			0	1.67	.10	1		1.47	.038	.975	228	.88?	.10	.06
						531	6.2												
												1.09							
6	1900	531	6.2	531	6.2			0	1.88	.10	0		1.57	.009	1.000	116	1.00?	.00	.00
						---	---												
												1.47							
5	1800	271	7.2	271	7.3			0	1.84	.10	1		1.36	.002	.999	229	.88?	.10	.06
						277	7.3												
												1.24							
4	1000	276	7.4	276	7.4			0	1.85	.10	0		1.56	.000	1.000	74	1.00?	.00	.00
						473	6.0												
												1.25							
4	2400	310	6.1	310	6.1			0	2.05	.10	0		1.56	.017	1.000	171	1.00?	.00	.00
						---	---												
												2.44							
2	750	551	6.2	551	6.2			0	1.93	.10	0		1.40	.000	1.000	46	1.00?	.00	.00
						568	6.2												

SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ STRUCTURE ID		DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1
STRUCTURE	4	2.43	
ALTERNATE	1		317.05
STRUCTURE	3	2.42	
ALTERNATE	1		551.88
STRUCTURE	2	2.03	
ALTERNATE	1		276.49
STRUCTURE	1	1.96	
ALTERNATE	1		271.36
XSECTION	2	2.43	
ALTERNATE	1		568.55
XSECTION	4	2.42	
ALTERNATE	1		768.73
XSECTION	5	2.03	
ALTERNATE	1		277.37
XSECTION	6	1.96	
ALTERNATE	1		2581.41
XSECTION	8	.45	
ALTERNATE	1		532.08
XSECTION	10	.20	
ALTERNATE	1		251.52
XSECTION	12	.24	
ALTERNATE	1		319.69
XSECTION	14	1.30	
ALTERNATE	1		1798.36
XSECTION	16	1.12	
ALTERNATE	1		1586.02
XSECTION	18	.48	
ALTERNATE	1		743.53

MAIN - UNEXPECTED RECORD FOUND(IGNORED) >>> <<<
END OF 1 JOBS IN THIS RUN

APPENDIX C -

TR-20 Output
Future Conditions
Spillway Width = 100'
Spillway Elev. = 6,080.75
Spillway Pipe = 48"
Lake Elev. = 6,074.0

**********80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY**********

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JOB TR-20                                                SUMMARY   NOPLOTS
TITLE 001  SPRING RUN  TR20 RUN  24 HR. 100 YR. STORM          IN-TR20P2.$
TITLE      FUT COND W/ 48" @ 6074 & 100'SW @ 80.75 & 54" @ RES & OUT-TR20P2.$0
 5 RAINFL 7                 0.25
 8              0.0000      0.0005      0.0015      0.0030      0.0045
 8              0.0060      0.0080      0.0100      0.0120      0.0143
 8              0.0165      0.0188      0.0210      0.0233      0.0255
 8              0.0278      0.0320      0.0390      0.0460      0.0530
 8              0.0600      0.0750      0.1000      0.4000      0.7000
 8              0.7250      0.7500      0.7650      0.7800      0.7900
 8              0.8000      0.8100      0.8200      0.8250      0.8300
 8              0.8350      0.8400      0.8450      0.8500      0.8550
 8              0.8600      0.8638      0.8675      0.8713      0.8750
 8              0.8788      0.8825      0.8863      0.8900      0.8938
 8              0.8975      0.9013      0.9050      0.9083      0.9115
 8              0.9148      0.9180      0.9210      0.9240      0.9270
 8              0.9300      0.9325      0.9350      0.9375      0.9400
 8              0.9425      0.9450      0.9475      0.9500      0.9525
 8              0.9550      0.9575      0.9600      0.9625      0.9650
 8              0.9675      0.9700      0.9725      0.9750      0.9775
 8              0.9800      0.9813      0.9825      0.9838      0.9850
 8              0.9863      0.9875      0.9888      0.9900      0.9913
 8              0.9925      0.9938      0.9950      0.9963      0.9975
 8              0.9988      1.0000      1.0000      1.0000      1.0000
 9 ENDTBL
 2 XSECTN   002              1.0
 8                        5956.00        0.0         0.0
 8                        5956.68       50.0         8.64
 8                        5957.00      100.0        14.01
 8                        5958.30      500.0        44.22
 8                        5959.21     1000.0        73.31
 8                        5959.88     1500.0        99.05
 8                        5960.40     2000.0       121.40
 8                        5961.28     3000.0       164.40
 8                        5962.00     4000.0       204.00
 9 ENDTBL
 2 XSECTN   004              1.0
 8                        5970.00        0.0         0.0
 8                        5970.34       50.0        10.65
 8                        5970.51      100.0        16.47
 8                        5971.29      500.0        47.13
 8                        5971.89     1000.0        74.66
 8                        5972.38     1500.0        99.74
 8                        5972.78     2000.0       121.76
 8                        5973.45     3000.0       162.78
 8                        5974.00     4000.0       200.01
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**********80-80 LIST OF INPUT DATA (CONTINUED)**********

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 9 ENDTBL
 2 XSECTN   005              1.0
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 8                    6003.0       0.0       0.0
 8                    6003.6      50.0      13.45
 8                    6003.8     100.0      22.37
 8                    6004.7     500.0      73.56
 8                    6005.3    1000.0     124.56
 8                    6005.7    1500.0     167.06
 9 ENDTBL
 2 XSECTN   006          1.0
 8                    6080.00       0.0       0.0
 8                    6080.44      50.0      11.45
 8                    6080.87     100.0      17.53
 8                    6081.72     500.0      49.00
 8                    6082.59    1000.0      78.04
 8                    6083.26    1500.0     102.78
 8                    6083.82    2000.0     124.63
 8                    6084.80    3000.0     166.09
 9 ENDTBL
 2 XSECTN   008          1.0
 8                    6080.00       0.0       0.0
 8                    6080.65      50.0       7.37
 8                    6080.98     100.0      11.71
 8                    6082.41     500.0      35.73
 8                    6083.46    1000.0      58.62
 8                    6084.26    1500.0      78.90
 9 ENDTBL
 2 XSECTN   010          1.0
 8                    6246.00       0.0       0.0
 8                    6246.35      50.0       7.65
 8                    6246.52     100.0      11.87
 8                    6247.32     500.0      35.04
 8                    6247.92    1000.0      56.84
 8                    6248.37    1500.0      75.54
 9 ENDTBL
 2 XSECTN   012          1.0
 8                    6054.00       0.0       0.0
 8                    6054.79      50.0       9.42
 8                    6055.17     100.0      15.09
 8                    6056.78     500.0      47.04
 8                    6057.90    1000.0      77.16
 8                    6058.79    1500.0     105.15
 9 ENDTBL
 2 XSECTN   014          1.0
 8                    6122.00       0.0       0.0
 8                    6122.57      50.0      12.44
1
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 8                    6122.86     100.0      19.31
 8                    6124.16     500.0      57.07
 8                    6125.15    1000.0      92.58
 8                    6125.91    1500.0     123.96
 8                    6126.53    2000.0     152.34
 9 ENDTBL
 2 XSECTN   016          1.0
 8                    6180.00       0.0       0.0
 8                    6180.37      50.0      12.33
 8                    6180.55     100.0      19.40
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 8                    6181.34     500.0      58.11
 8                    6181.93    1000.0      94.90
 8                    6182.36    1500.0     126.50
 8                    6182.72    2000.0     155.27
 9 ENDTBL
 2 XSECTN   018          1.0
 8                    6314.00       0.0       0.0
 8                    6314.27      50.0       8.32
 8                    6314.40     100.0      12.82
 8                    6315.03     500.0      36.05
 8                    6315.52    1000.0      57.21
 8                    6315.91    1500.0      75.55
 8                    6316.24    2000.0      92.21
 8                    6316.79    3000.0     122.43
 9 ENDTBL
 3 STRUCT     01          1.0
 8                    6074.00       0.0       0.0
 8                    6075.00      11.0      12.00
 8                    6076.00      24.0      24.50
 8                    6078.00      80.0      51.29
 8                    6080.00     125.0      80.38
 8                    6080.75     135.0      92.48
 8                    6082.00     593.0     112.66
 8                    6084.00    1996.0     148.45
 8                    6086.00    3934.0     186.55
 8                    6088.00    6266.0     226.25
 9 ENDTBL
 3 STRUCT     02          1.0
 8                    6003.0        0.0       0.0
 8                    6005.0       70.0       0.02
 8                    6007.0      120.0       0.30
 8                    6010.0      300.0       1.40
 8                    6014.0      500.0       6.35
 8                    6018.0      620.0      19.60
 8                    6022.0      750.0      35.00
 8                    6024.0     2500.0      46.00
1
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 9 ENDTBL
 3 STRUCT     03          1.0
 8                    5970.0        0.0       0.0
 8                    5974.0      115.0       0.07
 8                    5977.0      240.0       0.90
 8                    5981.0      440.0       2.70
 8                    5985.0      530.0       5.50
 8                    5990.0      650.0      11.90
 8                    5994.0      710.0      24.30
 9 ENDTBL
 3 STRUCT     04          1.0
 8                    5949.0        0.0       0.0
 8                    5955.0      253.0       0.23
 8                    5960.0      283.0       2.30
 8                    5965.0      311.0      10.30
 8                    5970.0      338.0      24.10
 8                    5975.0      361.0      39.50
 8                    5980.0      385.0      56.70
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 8                      5982.0      394.0       63.90
 8                      5984.0     1716.0       71.50
 9 ENDTBL
 3 STRUCT      05          1.0
 8                      6036.0        0.0        0.0
 8                      6038.0       51.0        1.6
 8                      6040.0      144.0        3.24
 8                      6042.0      265.0        4.92
 8                      6044.0      407.0        6.64
 8                      6046.0      569.0        8.04
 9 ENDTBL
 3 STRUCT      06          1.0
 8                      5978.0        0.0        0.0
 8                      5980.0       28.0        0.01
 8                      5982.0       80.0        0.02
 8                      5984.0      135.0        0.16
 8                      5986.0      192.0        0.73
 8                      5988.0      233.0        1.98
 8                      5990.0      270.0        3.78
 8                      5992.0      305.0        6.23
 8                      5994.0      700.0        9.60
 9 ENDTBL
 6 RUNOFF 1 018       7    0.480      73.0        0.322   1
 6 REACH  3 016   7   5  3340.0
 6 RUNOFF 1 016       7    0.640      74.0        0.424   1
 6 ADDHYD 4 016   5 7 4                                   1
 6 REACH  3 014   4   7  2900.0
 6 RUNOFF 1 014       5    0.180      70.0        0.348   1
1
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**********BO-BO LIST OF INPUT DATA (CONTINUED)**********

 6 ADDHYD 4 014   7 5 4                                   1
 6 REACH  3 006   4   7  5200.0
 6 RUNOFF 1 006       5    0.210      78.0        0.500   1
 6 ADDHYD 4 006   7 5 3                                   1
 6 RUNOFF 1 010       7    0.200      69.0        0.332   1
 6 REACH  3 008   7   5  3800.0
 6 RUNOFF 1 008       7    0.250      74.0        0.582   1
 6 ADDHYD 4 008   5 7 4                                   1
 6 REACH  3 006   4   5  1900.0
 6 ADDHYD 4 006   3 5 4                                   1
 6 RESVOR 2    01 4   3  6074.00                          1 1   1
 6 REACH  3 005   3   1  1800.0
 6 RUNOFF 1 005       6    0.08       74.0        0.230   1
 6 ADDHYD 4 005   1 6 7                                   1
 6 RESVOR 2    02 7   6  6003.0                           1 1   1
 6 REACH  3 004   6   2  1000.0
 6 RUNOFF 1 012       7    0.260      74.8        0.457   1
 6 RESVOR 2    05 7   6   6036.0                          1 1   1
 6 REACH  3 004   6   5  2400.0
 6 ADDHYD 4 004   2 5 7                                   1
 6 RUNOFF 1 003       5    0.081      87.0        0.220   1
 6 RESVOR 2    06 5   6   5978.0                          1 1   1
 6 ADDHYD 4 004   7 6 3                                   1
 6 RUNOFF 1 004       5    0.046      77.5        0.230   1
 6 ADDHYD 4 004   5 3 4                                   1
 6 RESVOR 2    03 4   6   5970.0                          1 1   1
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  6 REACH  3 002   6   5   750.0
  6 RUNOFF 1 002       7     0.010      94.0         0.271   1
  6 ADDHYD 4 002   5 7 4                                     1
  6 RESVOR 2    04 4   6    5949.0                           1 1   1
    ENDATA
  7 INCREM 6                 0.10
  7 COMPUT 7 018      04     0.0          4.60         1.0    7 2  01  01
    ENDCMP 1
    ENDJOB 2
0*********************************END OF 80-80 LIST**********************************
1
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TR20 XEQ 6/ 1/90 9:15 SPRING RUN TR20 RUN 24 HR. 100 YR. STORM IN-TR20P2.$ JOB 1 PASS 1
REV PC/09/83 FUT COND W/ 48" @ 6074 & 100'SW @ 80.75 & 54" @ RES 6 OUT-TR20P2.$O PAGE 1

FILE NO. 1

0 COMPUTER PROGRAM FOR PROJECT FORMULATION - HYDROLOGY USER NOTES

THE USERS MANUAL FOR THIS PROGRAM IS THE MAY 1982 DRAFT OF TR-20. CHANGES FROM THE 2/14/74 VERSION INCLUDE:

REACH ROUTING - THE MODIFIED ATT-KIN ROUTING PROCEDURE REPLACES THE CONVEX METHOD. INPUT DATA PREPARED FOR PREVIOUS PROGRAM VERSIONS USING CONVEX ROUTING COEFFICIENTS WILL NOT RUN ON THIS VERSION.

THE PREFERRED TYPE OF DATA ENTRY IS CROSS SECTION DATA REPRESENTATIVE OF A REACH. IT IS RECOMMENDED THAT THE OPTIONAL CROSS SECTION DISCHARGE-AREA PLOTS BE OBTAINED WHENEVER NEW CROSS SECTION DATA IS ENTERED. THE PLOTS SHOULD BE CHECKED FOR REASONABLENESS AND ADEQUACY OF INPUT DATA FOR THE COMPUTATION OF "M" VALUES USED IN THE ROUTING PROCEDURE.

GUIDELINES FOR DETERMINING OR ANALYZING REACH LENGTHS AND COEFFICIENTS (X,M) ARE AVAILABLE IN THE USERS MANUAL. SUMMARY TABLE 2 DISPLAYS REACH ROUTING RESULTS AND ROUTING PARAMETERS FOR COMPARISON AND CHECKING.

HYDROGRAPH GENERATION - THE PROCEDURE TO CALCULATE THE INTERNAL TIME INCREMENT AND PEAK TIME OF THE UNIT HYDROGRAPH HAVE BEEN IMPROVED. PEAK DISCHARGES AND TIMES MAY DIFFER FROM THE PREVIOUS VERSION. OUTPUT HYDROGRAPHS ARE STILL INTERPOLATED, PRINTED, AND ROUTED AT THE USER SELECTED MAIN TIME INCREMENT.

INTERMEDIATE PEAKS - METHOD ADDED TO PROVIDE DISCHARGES AT INTERMEDIATE POINTS WITHIN REACHES WITHOUT ROUTING.

OTHER - THIS VERSION CONTAINS SOME ADDITIONS TO THE INPUT AND NUMEROUS MODIFICATIONS TO THE OUTPUT. USER OPTIONS HAVE BEEN MODIFIED AND AUGMENTED ON THE JOB RECORD, RAINTABLES ADDED, ERROR AND WARNING MESSAGES EXPANDED, AND THE SUMMARY TABLES COMPLETELY REVISED. THE HOLDOUT OPTION IS NOT OPERATIONAL AT THIS TIME.

PROGRAM QUESTIONS OR PROBLEMS SHOULD BE DIRECTED TO HYDRAULIC ENGINEERS AT THE SCS NATIONAL TECHNICAL CENTERS:

CHESTER, PA (NORTHEAST) -- 215-499-3933, FORT WORTH, TX (SOUTH) -- 334-5242 (FTS)
LINCOLN, NB (MIDWEST) -- 541-5318 (FTS), PORTLAND, OR (WEST) -- 423-4099 (FTS)
OR HYDROLOGY UNIT, ENGINEERING DIVISION, LANHAM, MD -- 436-7383 (FTS).

PROGRAM CHANGES SINCE MAY 1982:

12/17/82 - CORRECT PEAK RATE FACTOR FOR USER ENTERED DIMHYD
CORRECT REACH ROUTING PEAK TRAVEL TIME PRINTED WITH FULLPRINT OPTION
5/02/83 - CORRECT COMPUTATIONS FOR ---
1. DIVISION OF BASEFLOW IN DIVERT OPERATION
2. HYDROGRAPH VOLUME SPLIT BETWEEN BASEFLOW AND ABOVE BASEFLOW
3. CROSS SECTION DATA PLOTTING POSITION
4. INTERMEDIATE PEAK WHEN "FROM" AREA IS LARGER THAN "THRU" AREA

5. STORAGE ROUTED REACH TRAVEL TIME FOR MULTIPEAK HYDROGRAPH
6. ORDERING "FLOW-FREQ" FILE FROM SUMMARY TABLE #3 DATA
7. BASEFLOW ENTERED WITH READHYD
8. LOW FLOW SPLIT DURING DIVERT PROCEDURE #2 WHEN SECTION RATINGS START AT DIFFERENT ELEVATIONS

ENHANCEMENTS ---

1. REPLACE USER MANUAL ERROR CODES (PAGE 4-9 TO 4-11) WITH MESSAGES
2. LABEL OUTPUT HYDROGRAPH FILES WITH CROSS SECTION/STRUCTURE, ALTERNATE AND STORM NO'S

09/01/83 - CORRECT INPUT AND OUTPUT ERRORS FOR INTERMEDIATE PEAKS
CORRECT COMBINATION OF RATING TABLES FOR DIVERT
CHECK REACH ROUTING PARAMETERS FOR ACCEPTABLE LIMITS
ELIMINATE MINIMUM REACH TRAVEL TIME WHEN ATT-KIN COEFFICIENT EQUALS ONE

I

EXECUTIVE CONTROL OPERATION INCREM RECORD ID
+ MAIN TIME INCREMENT = .10 HOURS

EXECUTIVE CONTROL OPERATION COMPUT RECORD ID
+ FROM XSECTION 18
+ TO STRUCTURE 4
STARTING TIME = .00 RAIN DEPTH = 4.60 RAIN DURATION= 1.00 RAIN TABLE NO.= 7 ANT. MOIST. COND= 2
ALTERNATE NO.= 1 STORM NO.= 1 MAIN TIME INCREMENT = .10 HOURS

OPERATION RUNOFF CROSS SECTION 18

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.08	743.53	(RUNOFF)
7.94	39.45	(RUNOFF)
9.95	20.32	(RUNOFF)
12.84	15.64	(RUNOFF)
13.83	13.66	(RUNOFF)
14.92	12.60	(RUNOFF)
19.89	10.73	(RUNOFF)
23.83	5.51	(RUNOFF)

*** WARNING REACH 16 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION RUNOFF CROSS SECTION 16

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.13	898.12	(RUNOFF)
9.96	27.66	(RUNOFF)
12.90	21.26	(RUNOFF)
13.86	18.60	(RUNOFF)
19.88	14.58	(RUNOFF)
23.88	7.44	(RUNOFF)

OPERATION ADDHYD CROSS SECTION 16

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.17	1586.02	6182.42
9.96	47.90	6180.35
12.92	36.88	6180.27
13.90	32.24	6180.24
19.90	25.31	6180.19
23.90	12.92	6180.10

*** WARNING REACH 14 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

1

OPERATION RUNOFF CROSS SECTION 14

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.10	231.40	(RUNOFF)
7.91	13.67	(RUNOFF)
9.95	7.07	(RUNOFF)
19.95	3.79	(RUNOFF)
23.84	1.94	(RUNOFF)

OPERATION ADDHYD CROSS SECTION 14

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.16	1798.36	6126.28
9.96	54.96	6122.60
12.91	42.34	6122.48
13.89	37.02	6122.42
19.91	29.08	6122.33
23.90	14.85	6122.17

*** WARNING REACH 6 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION RUNOFF CROSS SECTION 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.17	320.11	(RUNOFF)
9.96	9.87	(RUNOFF)
12.93	7.54	(RUNOFF)
19.95	5.15	(RUNOFF)
23.91	2.60	(RUNOFF)

OPERATION ADDHYD CROSS SECTION 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.25	2057.10	6083.88
10.01	64.73	6080.57
13.01	49.85	6080.44
13.98	43.59	6080.38
19.96	34.23	6080.30

23.98	17.43	6080.15

OPERATION RUNOFF CROSS SECTION 10

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.10	251.52	(RUNOFF)
7.95	14.84	(RUNOFF)
9.96	7.65	(RUNOFF)
19.90	4.10	(RUNOFF)
23.84	2.11	(RUNOFF)

*** WARNING REACH 8 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION RUNOFF CROSS SECTION 8

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.22	287.32	(RUNOFF)
9.96	10.78	(RUNOFF)
12.95	8.28	(RUNOFF)
19.88	5.69	(RUNOFF)
23.91	2.88	(RUNOFF)

OPERATION ADDHYD CROSS SECTION 8

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.21	532.08	6082.48
9.97	18.40	6080.24
12.95	14.20	6080.18
13.88	12.47	6080.16
19.90	9.79	6080.13
23.93	4.99	6080.06

*** WARNING REACH 6 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION ADDHYD CROSS SECTION 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.24	2581.41	6084.39
10.00	83.13	6080.73
13.00	64.05	6080.56
13.96	56.05	6080.49
19.95	44.03	6080.39
23.97	22.41	6080.20

OPERATION RESVOR STRUCTURE 1

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)

6.91 412.26 6081.51

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = 1.96 SQ.MI.

5.00	DISCHG	.00	.00	.00	.00	.00	.00	.01	.15	.86	3.43
6.00	DISCHG	9.82	22.98	59.91	96.16	123.06	134.18	280.48	365.51	403.02	412.24
7.00	DISCHG	404.71	388.69	369.34	348.69	327.12	305.17	284.10	264.98	248.25	233.92
8.00	DISCHG	221.84	211.67	202.77	193.87	183.67	172.03	159.91	148.38	138.02	134.76
9.00	DISCHG	134.42	134.07	133.72	133.37	133.03	132.69	132.35	132.01	131.68	131.34
10.00	DISCHG	131.02	130.69	130.36	130.02	129.66	129.26	128.84	128.41	127.98	127.54
11.00	DISCHG	127.10	126.67	126.23	125.80	125.38	124.92	124.13	123.36	122.59	121.84
12.00	DISCHG	121.10	120.37	119.64	118.93	118.22	117.53	116.85	116.17	115.51	114.85
13.00	DISCHG	114.20	113.56	112.93	112.29	111.64	110.97	110.29	109.61	108.93	108.26
14.00	DISCHG	107.59	106.94	106.29	105.63	104.98	104.32	103.66	103.00	102.36	101.71
15.00	DISCHG	101.08	100.45	99.83	99.20	98.56	97.90	97.24	96.56	95.90	95.23
16.00	DISCHG	94.57	93.92	93.28	92.65	92.02	91.40	90.79	90.19	89.60	89.01
17.00	DISCHG	88.43	87.86	87.30	86.74	86.19	85.65	85.12	84.59	84.07	83.56
18.00	DISCHG	83.05	82.55	82.06	81.57	81.09	80.61	80.15	79.57	78.96	78.36
19.00	DISCHG	77.77	77.19	76.61	76.05	75.50	74.96	74.43	73.91	73.40	72.89
20.00	DISCHG	72.40	71.91	71.42	70.90	70.31	69.65	68.93	68.17	67.41	66.65
21.00	DISCHG	65.90	65.15	64.42	63.69	62.98	62.28	61.59	60.92	60.25	59.59
22.00	DISCHG	58.95	58.33	57.70	57.09	56.49	55.91	55.33	54.76	54.20	53.65
23.00	DISCHG	53.11	52.58	52.06	51.55	51.04	50.55	50.07	49.59	49.12	48.66
24.00	DISCHG	48.20	47.76	47.31	46.81	46.25	45.62	44.92	44.20	43.47	42.74
25.00	DISCHG	42.02	41.30	40.60	39.91	39.22	38.55	37.89	37.24	36.60	35.98
26.00	DISCHG	35.36	34.76	34.16	33.58	33.00	32.43	31.88	31.33	30.80	30.27
27.00	DISCHG	29.75	29.24	28.74	28.25	27.76	27.29	26.82	26.36	25.91	25.47
28.00	DISCHG	25.03	24.60	24.18	23.88	23.68	23.48	23.28	23.08	22.88	22.68
29.00	DISCHG	22.49	22.30	22.11	21.92	21.73	21.54	21.36	21.18	20.99	20.81

RUNOFF VOLUME ABOVE BASEFLOW = 1.79 WATERSHED INCHES, 2265.42 CFS-HRS, 187.21 ACRE-FEET; BASEFLOW = .00 CFS

*** WARNING REACH 5 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION RUNOFF CROSS SECTION 5

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.03	141.86	(RUNOFF)
7.95	6.83	(RUNOFF)

OPERATION ADDHYD CROSS SECTION 5

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.05	147.08	6003.91
7.01	421.51	6004.52

OPERATION RESVOR STRUCTURE 2

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.10	137.68	6007.29
7.28	382.93	6011.66

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = 2.04 SQ.MI.

5.00	DISCHG	.00	.00	.00	.00	.00	.00	1.00	17.72	59.18	85.46
6.00	DISCHG	118.30	137.67	120.32	95.53	102.38	123.52	140.05	201.18	300.76	326.30
7.00	DISCHG	351.91	370.80	380.87	382.81	378.38	369.16	356.35	341.05	324.35	307.26
8.00	DISCHG	273.43	242.63	226.71	214.92	205.00	195.27	184.61	173.00	161.22	150.07
9.00	DISCHG	142.20	138.95	137.94	137.47	137.10	136.75	136.41	136.07	135.73	135.40
10.00	DISCHG	135.07	134.68	134.12	133.52	133.02	132.59	132.18	131.78	131.38	130.95
11.00	DISCHG	130.50	130.05	129.63	129.22	128.79	128.34	127.89	127.33	126.62	125.86
12.00	DISCHG	125.08	124.32	123.59	122.88	122.16	121.43	120.72	120.05	119.35	118.67
13.00	DISCHG	117.99	117.29	116.56	115.82	115.12	114.43	113.76	113.10	112.44	111.76
14.00	DISCHG	111.07	110.37	109.66	108.95	108.28	107.61	106.95	106.29	105.64	104.99
15.00	DISCHG	104.34	103.67	102.94	102.19	101.50	100.85	100.19	99.53	98.86	98.19
16.00	DISCHG	97.52	96.86	96.21	95.56	94.92	94.29	93.67	93.05	92.44	91.85
17.00	DISCHG	91.25	90.67	90.09	89.53	88.97	88.41	87.87	87.33	86.79	86.27
18.00	DISCHG	85.75	85.24	84.74	84.24	83.75	83.26	82.78	82.31	81.80	81.23
19.00	DISCHG	80.63	80.03	79.44	78.86	78.30	77.74	77.19	76.65	76.12	75.60
20.00	DISCHG	75.09	74.52	73.77	72.99	72.32	71.68	71.04	70.37	69.25	68.35
21.00	DISCHG	67.67	66.83	66.19	65.40	64.71	63.92	63.27	62.58	61.94	61.22
22.00	DISCHG	60.57	59.91	59.33	58.70	58.08	57.44	56.87	56.32	55.77	55.18
23.00	DISCHG	54.61	54.07	53.57	53.06	52.53	51.99	51.51	51.05	50.58	50.09
24.00	DISCHG	49.60	48.97	48.13	47.46	46.91	46.32	45.69	44.99	44.28	43.53
25.00	DISCHG	42.82	42.09	41.38	40.67	39.98	39.29	38.62	37.96	37.31	36.67
26.00	DISCHG	36.04	35.42	34.82	34.22	33.64	33.06	32.49	31.94	31.39	30.85
27.00	DISCHG	30.32	29.80	29.29	28.79	28.30	27.81	27.34	26.87	26.41	25.96
28.00	DISCHG	25.51	25.08	24.65	24.22	23.91	23.70	23.50	23.30	23.10	22.90
29.00	DISCHG	22.70	22.51	22.32	22.12	21.94	21.75	21.56	21.38	21.19	21.01

RUNOFF VOLUME ABOVE BASEFLOW = 1.80 WATERSHED INCHES, 2369.65 CFS-HRS, 195.83 ACRE-FEET; BASEFLOW = .00 CFS

*** WARNING REACH 4 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION RUNOFF CROSS SECTION 12

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.15	359.25	(RUNOFF)
9.96	11.43	(RUNOFF)
12.90	8.78	(RUNOFF)
13.86	7.69	(RUNOFF)
19.88	6.01	(RUNOFF)
23.89	3.06	(RUNOFF)

OPERATION RESVOR STRUCTURE 5
1

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.30	285.51	6042.29
13.01	8.74	6036.34
19.96	6.01	6036.24
23.96	3.04	6036.12

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = .26 SQ.MI.

5.00	DISCHG	.00	.00	.00	.00	.00	.00	.16	2.38	11.94	35.74
6.00	DISCHG	93.63	181.79	258.38	285.49	260.91	216.85	171.48	135.36	110.18	89.31
7.00	DISCHG	72.87	60.48	51.13	46.57	42.26	38.35	35.01	32.27	30.07	28.32
8.00	DISCHG	26.96	25.84	24.72	23.35	21.71	19.99	18.37	16.96	15.78	14.82
9.00	DISCHG	14.04	13.44	12.96	12.59	12.30	12.09	11.92	11.80	11.70	11.64
10.00	DISCHG	11.58	11.53	11.43	11.23	10.93	10.58	10.23	9.91	9.65	9.43
11.00	DISCHG	9.26	9.12	9.01	8.93	8.87	8.83	8.79	8.76	8.74	8.73
12.00	DISCHG	8.73	8.72	8.71	8.71	8.72	8.72	8.72	8.72	8.72	8.73
13.00	DISCHG	8.74	8.74	8.70	8.63	8.52	8.39	8.25	8.12	8.02	7.94
14.00	DISCHG	7.88	7.82	7.75	7.67	7.59	7.50	7.42	7.35	7.29	7.24
15.00	DISCHG	7.21	7.17	7.12	7.02	6.89	6.74	6.59	6.46	6.35	6.26
16.00	DISCHG	6.19	6.13	6.08	6.05	6.02	6.00	5.99	5.98	5.97	5.96
17.00	DISCHG	5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96
18.00	DISCHG	5.97	5.97	5.97	5.97	5.97	5.98	5.98	5.98	5.98	5.98
19.00	DISCHG	5.99	5.99	5.99	5.99	6.00	6.00	6.00	6.00	6.00	6.01
20.00	DISCHG	6.01	5.99	5.92	5.72	5.42	5.06	4.70	4.37	4.09	3.87
21.00	DISCHG	3.68	3.53	3.41	3.32	3.26	3.20	3.16	3.12	3.10	3.08
22.00	DISCHG	3.07	3.06	3.04	3.04	3.04	3.04	3.03	3.03	3.03	3.03
23.00	DISCHG	3.03	3.03	3.02	3.02	3.03	3.03	3.03	3.02	3.02	3.03
24.00	DISCHG	3.03	3.01	2.92	2.71	2.39	2.02	1.66	1.34	1.06	.84
25.00	DISCHG	.65	.51	.39	.30	.23	.18	.14	.11	.08	.06
26.00	DISCHG	.05	.04	.03	.02	.02	.01	.01	.01		

RUNOFF VOLUME ABOVE BASEFLOW = 2.11 WATERSHED INCHES, 354.26 CFS-HRS, 29.28 ACRE-FEET; BASEFLOW = .00 CFS

*** WARNING REACH 4 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION ADDHYD CROSS SECTION 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.26	382.50	5971.06
7.17	432.13	5971.16

OPERATION RUNOFF CROSS SECTION 3
1

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.99	227.31	(RUNOFF)
7.90	8.72	(RUNOFF)
9.95	4.43	(RUNOFF)
19.86	2.24	(RUNOFF)

23.78 1.15 (RUNOFF)

*** WARNING - STRUCTURE 6 DELTA T IS TOO LARGE. 0 /2 > S /DELTA T OCCURED 3 TIMES STARTING WITH POINT 65

OPERATION RESVOR STRUCTURE 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.06	198.24	5986.30
6.50	52.13	5980.93
6.70	36.98	5980.35
6.90	28.55	5980.02
7.10	22.95	5979.64
7.30	16.76	5979.20
7.50	14.14	5979.01
7.70	12.53	5978.90
7.90	11.42	5978.82
8.09	9.83	5978.70

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = .08 SQ.MI.

5.00	DISCHG	.00	.00	.06	.35	1.17	2.56	21.49	86.60	134.28	161.29
6.00	DISCHG	192.12	196.42	171.51	84.92	-3.38	52.13	-4.30	36.98	-4.24	28.51
7.00	DISCHG	.21	22.95	1.08	16.76	2.44	14.12	4.19	12.51	5.52	11.41
8.00	DISCHG	6.46	9.76	4.27	6.16	3.42	5.35	3.61	5.04	3.83	4.85
9.00	DISCHG	3.99	4.71	4.11	4.62	4.19	4.56	4.25	4.51	4.30	4.48
10.00	DISCHG	4.33	4.25	3.65	3.49	3.32	3.31	3.27	3.34	3.32	3.32
11.00	DISCHG	3.27	3.30	3.32	3.35	3.31	3.29	3.29	3.33	3.34	3.32
12.00	DISCHG	3.28	3.30	3.33	3.35	3.32	3.29	3.30	3.34	3.35	3.32
13.00	DISCHG	3.29	3.21	3.05	2.96	2.90	2.86	2.86	2.90	2.92	2.89
14.00	DISCHG	2.86	2.81	2.73	2.68	2.67	2.67	2.67	2.67	2.67	2.67
15.00	DISCHG	2.67	2.58	2.38	2.27	2.24	2.23	2.23	2.22	2.23	2.22
16.00	DISCHG	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23
17.00	DISCHG	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23
18.00	DISCHG	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23
19.00	DISCHG	2.23	2.23	2.24	2.24	2.24	2.24	2.24	2.24	2.24	2.24
20.00	DISCHG	2.24	2.02	1.53	1.27	1.17	1.10	1.11	1.13	1.15	1.12
21.00	DISCHG	1.09	1.10	1.14	1.15	1.12	1.09	1.10	1.14	1.15	1.12
22.00	DISCHG	1.09	1.10	1.14	1.15	1.12	1.09	1.10	1.14	1.15	1.12
23.00	DISCHG	1.09	1.10	1.14	1.15	1.12	1.09	1.10	1.14	1.15	1.12
24.00	DISCHG	1.09	.86	.37	.11	.04	.01	.00			

RUNOFF VOLUME ABOVE BASEFLOW = 3.33 WATERSHED INCHES, 173.91 CFS-HRS, 14.37 ACRE-FEET; BASEFLOW = .00 CFS

1

OPERATION ADDHYD CROSS SECTION 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.18	552.84	5971.35
6.48	395.45	5971.09
6.92	444.86	5971.18
7.11	454.38	5971.20
7.29	446.48	5971.19

OPERATION RUNOFF CROSS SECTION 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.02	93.53	(RUNOFF)
7.95	4.25	(RUNOFF)

OPERATION ADDHYD CROSS SECTION 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.14	612.20	5971.42
6.48	407.39	5971.11
6.92	451.15	5971.19
7.11	460.12	5971.21
7.29	450.92	5971.19

OPERATION RESVOR STRUCTURE 3

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.29	501.25	5983.72
7.28	442.74	5981.12

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = 2.43 SQ.MI.

5.00	DISCHG	.00	.00	.05	.32	1.09	2.44	21.73	113.79	171.68	267.11
6.00	DISCHG	367.22	455.55	488.95	501.17	484.68	462.23	435.60	381.12	391.25	416.82
7.00	DISCHG	431.93	440.20	442.26	442.72	441.83	435.32	421.14	404.61	387.28	368.64
8.00	DISCHG	345.03	314.51	286.68	265.27	249.09	234.55	220.11	206.92	193.96	181.25
9.00	DISCHG	170.40	163.03	159.31	157.52	156.56	155.84	155.29	154.77	154.33	153.90
10.00	DISCHG	153.51	152.97	152.04	150.84	149.75	148.79	147.94	147.19	146.52	145.86
11.00	DISCHG	145.18	144.55	144.00	143.51	143.01	142.49	141.98	141.47	140.87	140.15
12.00	DISCHG	139.36	138.57	137.83	137.14	136.43	135.68	134.94	134.26	133.61	132.93
13.00	DISCHG	132.22	131.46	130.58	129.63	128.70	127.80	126.95	126.16	125.41	124.65
14.00	DISCHG	123.85	123.04	122.19	121.32	120.50	119.71	118.95	118.21	117.49	116.78
15.00	DISCHG	116.08	115.34	113.70	112.67	111.81	110.97	110.17	109.37	108.60	107.83
16.00	DISCHG	107.09	106.37	105.67	104.99	104.32	103.67	103.03	102.41	101.79	101.19
17.00	DISCHG	100.59	100.01	99.43	98.86	98.30	97.75	97.20	96.67	96.14	95.61

1

18.00	DISCHG	95.10	94.59	94.09	93.59	93.10	92.62	92.14	91.67	91.17	90.60
19.00	DISCHG	90.00	89.41	88.82	88.25	87.68	87.13	86.58	86.05	85.52	85.00
20.00	DISCHG	84.49	83.63	82.12	80.70	79.58	78.47	77.47	76.50	75.19	73.96
21.00	DISCHG	73.06	72.08	71.34	70.53	69.69	68.84	68.10	67.47	66.80	66.07
22.00	DISCHG	65.31	64.68	64.10	63.53	62.85	62.18	61.59	61.09	60.56	59.95
23.00	DISCHG	59.32	58.78	58.33	57.85	57.28	56.71	56.22	55.81	55.37	54.85
24.00	DISCHG	54.31	53.38	51.75	50.40	49.45	48.43	47.43	46.40	45.42	44.45
25.00	DISCHG	43.54	42.67	41.83	41.03	40.27	39.53	38.81	38.12	37.44	36.78
26.00	DISCHG	36.14	35.51	34.89	34.29	33.70	33.11	32.54	31.99	31.43	30.89
27.00	DISCHG	30.36	29.84	29.33	28.83	28.34	27.85	27.37	26.90	26.44	25.99
28.00	DISCHG	25.55	25.11	24.68	24.26	23.93	23.71	23.51	23.31	23.11	22.91
29.00	DISCHG	22.72	22.52	22.33	22.14	21.95	21.76	21.58	21.39	21.21	21.03

RUNOFF VOLUME ABOVE BASEFLOW = 1.89 WATERSHED INCHES, 2961.32 CFS-HRS, 244.72 ACRE-FEET; BASEFLOW = .00 CFS

*** WARNING REACH 2 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION RUNOFF CROSS SECTION 2

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.00	32.01	(RUNOFF)

OPERATION ADDHYD CROSS SECTION 2

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.27	511.45	5958.32
7.27	444.04	5958.12

OPERATION RESVOR STRUCTURE 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
8.05	332.03	5960.89
10.41	191.89	5953.55
10.61	165.42	5952.92
10.81	153.93	5952.65
11.01	148.49	5952.52
11.20	145.63	5952.45
11.39	143.99	5952.41

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = 2.44 SQ.MI.

4.00	DISCHG	.01	.02	.04	.07	.10	.13	.15	.17	.20	.22
5.00	DISCHG	.24	.30	.49	.90	1.85	3.51	22.35	112.68	193.92	254.83
6.00	DISCHG	265.34	283.58	289.62	295.86	301.68	306.70	310.86	312.53	313.74	315.22
7.00	DISCHG	317.00	318.94	320.93	322.90	324.83	326.68	328.32	329.70	330.78	331.56
8.00	DISCHG	331.98	331.96	331.47	330.60	329.43	328.03	326.43	324.63	322.64	320.49
9.00	DISCHG	318.18	315.76	313.29	310.66	306.30	302.04	297.88	293.82	289.87	286.01

1

10.00	DISCHG	280.05	265.78	253.04	87.86	190.96	123.34	165.08	137.08	153.82	142.02
11.00	DISCHG	148.47	143.28	145.63	143.28	143.97	142.68	142.65	141.84	141.46	140.63
12.00	DISCHG	139.92	139.07	138.36	137.65	136.95	136.19	135.45	134.77	134.12	133.44
13.00	DISCHG	132.73	131.97	131.10	130.13	129.19	128.28	127.41	126.62	125.87	125.11
14.00	DISCHG	124.32	123.50	122.65	121.77	120.94	120.15	119.39	118.64	117.92	117.21
15.00	DISCHG	116.51	115.77	114.26	113.01	112.24	111.33	110.57	109.74	108.98	108.20
16.00	DISCHG	107.47	106.74	106.04	105.36	104.69	104.04	103.40	102.77	102.15	101.55
17.00	DISCHG	100.95	100.36	99.79	99.22	98.66	98.10	97.56	97.02	96.49	95.96
18.00	DISCHG	95.45	94.94	94.43	93.94	93.45	92.96	92.49	92.02	91.52	90.96
19.00	DISCHG	90.36	89.77	89.18	88.60	88.04	87.48	86.93	86.40	85.87	85.35
20.00	DISCHG	84.84	84.03	82.54	81.01	79.86	78.74	77.71	76.76	75.51	74.22
21.00	DISCHG	73.29	72.35	71.55	70.79	69.92	69.09	68.32	67.68	67.02	66.30
22.00	DISCHG	65.54	64.88	64.31	63.74	63.08	62.39	61.79	61.28	60.77	60.16
23.00	DISCHG	59.53	58.98	58.53	58.06	57.50	56.91	56.41	56.00	55.58	55.06
24.00	DISCHG	54.51	53.64	52.04	50.54	49.57	48.55	47.53	46.52	45.52	44.56
25.00	DISCHG	43.64	42.76	41.92	41.12	40.35	39.61	38.89	38.19	37.51	36.85

26.00	DISCHG	36.21	35.58	34.96	34.35	33.76	33.18	32.61	32.05	31.49	30.95
27.00	DISCHG	30.42	29.90	29.39	28.88	28.39	27.90	27.43	26.96	26.49	26.04
28.00	DISCHG	25.59	25.16	24.72	24.30	23.96	23.73	23.54	23.33	23.13	22.93
29.00	DISCHG	22.74	22.54	22.35	22.16	21.97	21.78	21.60	21.41	21.23	21.05

RUNOFF VOLUME ABOVE BASEFLOW = 1.89 WATERSHED INCHES, 2978.90 CFS-HRS, 246.16 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP RECORD ID

\+ COMPUTATIONS COMPLETED FOR PASS 1

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID

1

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 1													
XSECTION 18	RUNOFF	.48	7	2	.10	.0	4.60	24.00	1.97	---	6.08	743.53	1549.0
XSECTION 16	REACH	.48	7	2	.10	.0	4.60	24.00	1.97	6181.60	6.19	723.22	1506.7
XSECTION 16	RUNOFF	.64	7	2	.10	.0	4.60	24.00	2.05	---	6.13	898.12	1403.3
XSECTION 16	ADDHYD	1.12	7	2	.10	.0	4.60	24.00	2.01	6182.42	6.17	1586.02	1416.1
XSECTION 14	REACH	1.12	7	2	.10	.0	4.60	24.00	2.01	6126.02	6.17	1586.02	1416.1
XSECTION 14	RUNOFF	.18	7	2	.10	.0	4.60	24.00	1.74	---	6.10	231.40	1285.6
XSECTION 14	ADDHYD	1.30	7	2	.10	.0	4.60	24.00	1.98	6126.28	6.16	1798.36	1383.4
XSECTION 6	REACH	1.30	7	2	.10	.0	4.60	24.00	1.98	6083.56	6.27	1770.27	1361.7
XSECTION 6	RUNOFF	.21	7	2	.10	.0	4.60	24.00	2.37	---	6.17	320.11	1524.3
XSECTION 6	ADDHYD	1.51	7	2	.10	.0	4.60	24.00	2.03	6083.88	6.25	2057.10	1362.3
XSECTION 10	RUNOFF	.20	7	2	.10	.0	4.60	24.00	1.67	---	6.10	251.52	1257.6
XSECTION 8	REACH	.20	7	2	.10	.0	4.60	24.00	1.67	6081.50	6.21	245.26	1226.3
XSECTION 8	RUNOFF	.25	7	2	.10	.0	4.60	24.00	2.05	---	6.22	287.32	1149.3
XSECTION 8	ADDHYD	.45	7	2	.10	.0	4.60	24.00	1.88	6082.48	6.21	532.08	1182.4
XSECTION 6	REACH	.45	7	2	.10	.0	4.60	24.00	1.88	6081.78	6.21	532.08	1182.4
XSECTION 6	ADDHYD	1.96	7	2	.10	.0	4.60	24.00	2.00	6084.39	6.24	2581.41	1317.0
STRUCTURE 1	RESVOR	1.96	7	2	.10	.0	4.60	24.00	1.79	6081.51	6.91	412.26	210.3
XSECTION 5	REACH	1.96	7	2	.10	.0	4.60	24.00	1.79	6004.50	7.01	411.62	210.0
XSECTION 5	RUNOFF	.08	7	2	.10	.0	4.60	24.00	2.05	---	6.03	141.86	1773.2
XSECTION 5	ADDHYD	2.04	7	2	.10	.0	4.60	24.00	1.80	6004.52	7.01	421.51	206.6

STRUCTURE	2	RESVOR	2.04	7	2	.10	.0	4.60	24.00	1.80	6011.66	7.28	382.93	187.7
XSECTION	4	REACH	2.04	7	2	.10	.0	4.60	24.00	1.80	5971.06	7.28	382.93	187.7
XSECTION	12	RUNOFF	.26	7	2	.10	.0	4.60	24.00	2.11	---	6.15	359.25	1381.7
STRUCTURE	5	RESVOR	.26	7	2	.10	.0	4.60	24.00	2.11	6042.29	6.30	285.51	1098.1
XSECTION	4	REACH	.26	7	2	.10	.0	4.60	24.00	2.11	5970.87	6.30	285.51	1098.1
XSECTION	4	ADDHYD	2.30	7	2	.10	.0	4.60	24.00	1.84	5971.16	7.17	432.13	187.9
XSECTION	3	RUNOFF	.08	7	2	.10	.0	4.60	24.00	3.20	---	5.99	227.31	2806.3
STRUCTURE	6	RESVOR	.08	7	2	.10	.0	4.60	24.00	3.33	5986.30	6.06	198.24	2447.4
XSECTION	4	ADDHYD	2.38	7	2	.10	.0	4.60	24.00	1.89	5971.35	6.18	552.84	232.2
XSECTION	4	RUNOFF	.05	7	2	.10	.0	4.60	24.00	2.34	---	6.02	93.53	2033.2
XSECTION	4	ADDHYD	2.43	7	2	.10	.0	4.60	24.00	1.89	5971.42	6.14	612.20	252.2
STRUCTURE	3	RESVOR	2.43	7	2	.10	.0	4.60	24.00	1.89	5983.72	6.29	501.25	206.5

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID		STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 1														
XSECTION	2	REACH	2.43	7	2	.10	.0	4.60	24.00	1.89	5958.30	6.29	501.25	206.5
XSECTION	2	RUNOFF	.01	7	2	.10	.0	4.60	24.00	3.92	---	6.00	32.01	3200.9
XSECTION	2	ADDHYD	2.44	7	2	.10	.0	4.60	24.00	1.90	5958.32	6.27	511.45	209.9
STRUCTURE	4	RESVOR	2.44	7	2	.10	.0	4.60	24.00	1.89	5968.89	8.05	332.03	136.2

SUMMARY TABLE 2 - SELECTED MODIFIED ATT-KIN REACH ROUTINGS IN ORDER OF STANDARD EXECUTIVE CONTROL INSTRUCTIONS
(A STAR(*) AFTER VOLUME ABOVE BASE(IN) INDICATES A HYDROGRAPH TRUNCATED AT A VALUE EXCEEDING BASE + 10% OF PEAK
A QUESTION MARK(?) AFTER COEFF.(C) INDICATES PARAMETERS OUTSIDE ACCEPTABLE LIMITS, SEE PREVIOUS WARNINGS)

		HYDROGRAPH INFORMATION							ROUTING PARAMETERS									PEAK	
XSEC	REACH	INFLOW		OUTFLOW		OUTFLOW+ INTERV.AREA		BASE-	VOLUME ABOVE	MAIN TIME	ITER- ATION	Q AND A EQUATION			PEAK LENGTH	S/Q RATIO	ATT- @PEAK	KIN	TRAVEL TIME STOR-	KINE-
ID	LENGTH (FT)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	FLOW (CFS)	BASE (IN)	INCR (HR)	#	COEFF (X)	POWER (M)	FACTOR (K*)	Q/I (Q*)	(K) (SEC)	COEFF (C)	AGE (HR)	MATIC (HR)

ALTERNATE 1 STORM 1

+ ---------------------------

													1.31							
+	16	3340	740	6.1	723	6.2			0	1.97	.10	1		1.46	.043	.976	237	.86?	.10	.07
+							1562	6.2												
													1.45							
+	14	2900	1562	6.2	1562	6.2			0	2.01	.10	0		1.44	.022	1.000	165	1.00?	.00	.00
+							1755	6.2												
													1.37							
+	6	5200	1755	6.2	1746	6.3			0	1.98	.10	1		1.51	.031	.995	224	.89?	.10	.06
+							2010	6.3												
													2.62							
+	8	3800	251	6.1	245	6.2			0	1.67	.10	1		1.47	.038	.975	228	.88?	.10	.06
+							531	6.2												
													1.09							
+	6	1900	531	6.2	531	6.2			0	1.88	.10	0		1.57	.009	1.000	116	1.00?	.00	.00
+							---	---												
													1.48							
+	5	1800	412	6.9	411	7.0			0	1.79	.10	1		1.36	.003	.998	205	.93?	.10	.06
+							421	7.0												
													1.28							
+	4	1000	383	7.3	383	7.3			0	1.80	.10	0		1.55	.000	1.000	67	1.00?	.00	.00
+							---	---												
													1.24							
+	4	2400	285	6.3	285	6.3			0	2.11	.10	0		1.56	.013	1.000	176	1.00?	.00	.00
+							432	7.2												
													2.42							
+	2	750	501	6.3	501	6.3			0	1.89	.10	0		1.41	.000	1.000	47	1.00?	.00	.00
+							510	6.3												

1

SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS.......... 1
0 STRUCTURE 6	.08	
+----------------------------		
ALTERNATE 1		198.24
0 STRUCTURE 5	.26	
+----------------------------		
ALTERNATE 1		285.51
0 STRUCTURE 4	2.44	
+----------------------------		
ALTERNATE 1		332.03
0 STRUCTURE 3	2.43	
+----------------------------		
ALTERNATE 1		501.25
0 STRUCTURE 2	2.04	

```
+-------------------------
   ALTERNATE    1              382.93
0 STRUCTURE   1        1.96
+-------------------------
   ALTERNATE    1              412.26
) XSECTION    2        2.44
+-------------------------
   ALTERNATE    1              511.45
) XSECTION    3         .08
+-------------------------
   ALTERNATE    1              227.31
) XSECTION    4        2.43
+-------------------------
   ALTERNATE    1              612.20
0 XSECTION    5        2.04
+-------------------------
   ALTERNATE    1              421.51
0 XSECTION    6        1.96
+-------------------------
   ALTERNATE    1             2581.41
0 XSECTION    8         .45
+-------------------------
   ALTERNATE    1              532.08
0 XSECTION   10         .20
+-------------------------
   ALTERNATE    1              251.52
0 XSECTION   12         .26
+-------------------------
   ALTERNATE    1              359.25
1
```


SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

```
 XSECTION/          DRAINAGE
 STRUCTURE            AREA      STORM NUMBERS.....
   ID               (SQ MI)           1

0 XSECTION   14         1.30
+-------------------------
   ALTERNATE    1              1798.36
0 XSECTION   16         1.12
+-------------------------
   ALTERNATE    1              1586.02
0 XSECTION   18         .48
+-------------------------
   ALTERNATE    1               743.53
1END OF  1 JOBS IN THIS RUN
```

APPENDIX D -

TR-20 Output
Future Conditions
Spillway Width = 100'
Spillway Elev. = 6,080.75
Spillway Pipe = 48"
Lake Elev. = 6,074.0
Pond 3 Replaced With 84" Pipe

```
**********80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY**********

JOB TR-20                                          SUMMARY   NOPLOTS
 TLE 001  SPRING RUN  TR20 RUN  24 HR. 100 YR. STORM        IN-P2$RES4
 TLE      48" @ 6074 & 100'SW @ 90.75 & 54" @ RES 6 W/O RES4 OUT-P2$RES4.0
 5 RAINFL 7                0.25
 8              0.0000    0.0005    0.0015    0.0030    0.0045
 1              0.0060    0.0080    0.0100    0.0120    0.0143
 4              0.0165    0.0188    0.0210    0.0233    0.0255
 8              0.0278    0.0320    0.0390    0.0460    0.0530
 1              0.0600    0.0750    0.1000    0.4000    0.7000
 1              0.7250    0.7500    0.7650    0.7800    0.7900
 8              0.8000    0.8100    0.8200    0.8250    0.8300
 3              0.8350    0.8400    0.8450    0.8500    0.8550
 1              0.8600    0.8638    0.8675    0.8713    0.8750
 8              0.8788    0.8825    0.8863    0.8900    0.8938
 9              0.8975    0.9013    0.9050    0.9083    0.9115
 1              0.9148    0.9180    0.9210    0.9240    0.9270
 4              0.9300    0.9325    0.9350    0.9375    0.9400
 8              0.9425    0.9450    0.9475    0.9500    0.9525
 3              0.9550    0.9575    0.9600    0.9625    0.9650
 3              0.9675    0.9700    0.9725    0.9750    0.9775
 8              0.9800    0.9813    0.9825    0.9838    0.9850
 3              0.9863    0.9875    0.9888    0.9900    0.9913
 3              0.9925    0.9938    0.9950    0.9963    0.9975
 8              0.9988    1.0000    1.0000    1.0000    1.0000
 9 ENDTBL
 2 XSECTN   002             1.0
 4                       5956.00       0.0       0.0
 8                       5956.68      50.0      8.64
 3                       5957.00     100.0     14.01
 1                       5958.30     500.0     44.22
 8                       5959.21    1000.0     73.31
 9                       5959.88    1500.0     99.05
 3                       5960.40    2000.0    121.40
 8                       5961.28    3000.0    164.40
 8                       5962.00    4000.0    204.00
 7 ENDTBL
 2 XSECTN   004             1.0
 8                       5970.00       0.0       0.0
 3                       5970.34      50.0     10.65
 3                       5970.51     100.0     16.47
 8                       5971.29     500.0     47.13
 9                       5971.89    1000.0     74.66
 3                       5972.38    1500.0     99.74
 8                       5972.78    2000.0    121.76
 8                       5973.45    3000.0    162.78
 3                       5974.00    4000.0    200.01

**********80-80 LIST OF INPUT DATA (CONTINUED)**********

 7 ENDTBL
 2 XSECTN   005             1.0
```

```
                    6003.0        0.0        0.0
                    6003.6       50.0       13.45
                    6003.8      100.0       22.37
                    6004.7      500.0       73.56
                    6005.3     1000.0      124.56
                    6005.7     1500.0      167.06
 ENDTBL
 XSECTN   006          1.0
                    6080.00        0.0        0.0
                    6080.44       50.0       11.45
                    6080.87      100.0       17.53
                    6081.72      500.0       49.00
                    6082.59     1000.0       78.04
                    6083.26     1500.0      102.78
                    6083.82     2000.0      124.63
                    6084.80     3000.0      166.09
 ENDTBL
 XSECTN   008          1.0
                    6080.00        0.0        0.0
                    6080.65       50.0        7.37
                    6080.98      100.0       11.71
                    6082.41      500.0       35.73
                    6083.46     1000.0       58.62
                    6084.26     1500.0       78.90
 ENDTBL
 XSECTN   010          1.0
                    6246.00        0.0        0.0
                    6246.35       50.0        7.65
                    6246.52      100.0       11.87
                    6247.32      500.0       35.04
                    6247.92     1000.0       56.84
                    6248.37     1500.0       75.54
 ENDTBL
 XSECTN   012          1.0
                    6054.00        0.0        0.0
                    6054.79       50.0        9.42
                    6055.17      100.0       15.09
                    6056.78      500.0       47.04
                    6057.90     1000.0       77.16
                    6058.79     1500.0      105.15
 ENDTBL
 XSECTN   014          1.0
                    6122.00        0.0        0.0
                    6122.57       50.0       12.44

**********80-80 LIST OF INPUT DATA (CONTINUED)**********

                    6122.86      100.0       19.31
                    6124.16      500.0       57.07
                    6125.15     1000.0       92.58
                    6125.91     1500.0      123.96
                    6126.53     2000.0      152.34
 ENDTBL
 XSECTN   016          1.0
                    6180.00        0.0        0.0
                    6180.37       50.0       12.33
                    6180.55      100.0       19.40
```

```
                    6181.34      500.0       58.11
                    6181.93     1000.0       94.90
                    6182.36     1500.0      126.50
                    6182.72     2000.0      155.27
 ENDTBL
 XSECTN   018         1.0
                    6314.00        0.0        0.0
                    6314.27       50.0        8.32
                    6314.40      100.0       12.82
                    6315.03      500.0       36.05
                    6315.52     1000.0       57.21
                    6315.91     1500.0       75.55
                    6316.24     2000.0       92.21
                    6316.79     3000.0      122.43
 ENDTBL
 STRUCT     01         1.0
                    6074.00        0.0        0.0
                    6075.00       11.0       12.00
                    6076.00       24.0       24.50
                    6078.00       80.0       51.29
                    6080.00      125.0       80.38
                    6080.75      135.0       92.48
                    6082.00      593.0      112.66
                    6084.00     1996.0      148.45
                    6086.00     3934.0      186.55
                    6088.00     6266.0      226.25
 ENDTBL
 STRUCT     02         1.0
                    6003.0         0.0        0.0
                    6005.0        70.0        0.02
                    6007.0       120.0        0.30
                    6010.0       300.0        1.40
                    6014.0       500.0        6.35
                    6018.0       620.0       19.60
                    6022.0       750.0       35.00
                    6024.0      2500.0       46.00
1
```

**********BD-80 LIST OF INPUT DATA (CONTINUED)**********

```
 ENDTBL
 STRUCT     03         1.0
                    5970.0         0.0        0.0
                    5974.0       115.0        0.07
                    5977.0       260.0        0.90
                    5981.0       406.0        2.70
                    5985.0       425.0        5.50
                    5990.0       447.0       11.90
                    5994.0       463.0       24.30
 ENDTBL
 STRUCT     04         1.0
                    5949.0         0.0        0.0
                    5955.0       380.0        0.01
                    5960.0       406.0        0.02
                    5965.0       430.0        0.03
                    5970.0       450.0        0.04
                    5975.0       465.0        0.05
                    5980.0       475.0        0.06
```

```
                        5982.0       480.0        0.07
                        5984.0       485.0        0.08
ENDTBL
STRUCT      05            1.0
                        6036.0         0.0        0.0
                        6038.0        51.0        1.6
                        6040.0       144.0        3.24
                        6042.0       265.0        4.92
                        6044.0       407.0        6.64
                        6046.0       569.0        8.04
ENDTBL
STRUCT      06            1.0
                        5978.0         0.0        0.0
                        5980.0        28.0        0.01
                        5982.0        80.0        0.02
                        5984.0       135.0        0.16
                        5986.0       192.0        0.73
                        5988.0       233.0        1.98
                        5990.0       270.0        3.78
                        5992.0       305.0        6.23
                        5994.0       700.0        9.60
ENDTBL
RUNOFF 1 018       7     0.480      73.0        0.322   1
REACH  3 016   7   5  3340.0
RUNOFF 1 016       7     0.640      74.0        0.424   1
ADDHYD 4 016   5 7 4                                    1
REACH  3 014   4   7  2900.0
RUNOFF 1 014       5     0.180      70.0        0.348   1
```

```
**********80-80 LIST OF INPUT DATA (CONTINUED)**********

ADDHYD 4 014   7 5 4                                    1
REACH  3 006   4   7  5200.0
RUNOFF 1 006       5     0.210      78.0        0.500   1
ADDHYD 4 006   7 5 3                                    1
RUNOFF 1 010       7     0.200      69.0        0.332   1
REACH  3 008   7   5  3800.0
RUNOFF 1 008       7     0.250      74.0        0.582   1
ADDHYD 4 008   5 7 4                                    1
REACH  3 006   4   5  1900.0
ADDHYD 4 006   3 5 4                                    1
RESVOR 2    01 4   3  6074.00                          1 1   1
REACH  3 005   3   1  1800.0
RUNOFF 1 005       6     0.08       74.0        0.230   1
ADDHYD 4 005   1 6 7                                    1
RESVOR 2    02 7   6  6003.0                           1 1   1
REACH  3 004   6   2  1000.0
RUNOFF 1 012       7     0.260      74.8        0.457   1
RESVOR 2    05 7   6  6036.0                           1 1   1
REACH  3 004   6   5  2400.0
ADDHYD 4 004   2 5 7                                    1
RUNOFF 1 003       5     0.081      87.0        0.220   1
RESVOR 2    06 5   6  5978.0                           1 1   1
ADDHYD 4 004   7 6 3                                    1
RUNOFF 1 004       5     0.046      77.5        0.230   1
ADDHYD 4 004   5 3 4                                    1
RESVOR 2    03 4   6  5970.0                           1 1   1
```

```
  5 REACH  3 002   6   5   750.0
  , RUNOFF 1 002       7     0.010      94.0         0.271   1
  6 ADDHYD 4 002   5 7 4                                     1
  6 RESVOR 2    04 4   6    5949.0                           1 1   1
    ENDATA
  / INCREM 6                 0.10
  7 COMPUT 7 018      04     0.0          4.60         1.0    7 2  01  01
    ENDCMP 1
    ENDJOB 2
0**********************************END OF 80-80 LIST**********************************
!



 20 XEQ  6/ 1/90    9:38       SPRING RUN  TR20 RUN  24 HR. 100 YR. STORM         IN-P2$RES4                    JOB  1   PASS   1
     REV PC/09/83              48" @ 6074 & 100'SW @ 80.75 & 54" @ RES 6 W/D RES4 OUT-P2$RES4.0                          PAGE   1


  ILE NO.  1
0                                COMPUTER PROGRAM FOR PROJECT FORMULATION - HYDROLOGY   USER NOTES

          THE USERS MANUAL FOR THIS PROGRAM IS THE MAY 1982 DRAFT OF TR-20.  CHANGES FROM THE 2/14/74 VERSION INCLUDE:

          REACH ROUTING - THE MODIFIED ATT-KIN ROUTING PROCEDURE REPLACES THE CONVEX METHOD.  INPUT DATA PREPARED FOR
             PREVIOUS PROGRAM VERSIONS USING CONVEX ROUTING COEFFICIENTS WILL NOT RUN ON THIS VERSION.

             THE PREFERRED TYPE OF DATA ENTRY IS CROSS SECTION DATA REPRESENTATIVE OF A REACH.  IT IS RECOMMENDED THAT
             THE OPTIONAL CROSS SECTION DISCHARGE-AREA PLOTS BE OBTAINED WHENEVER NEW CROSS SECTION DATA IS ENTERED.
             THE PLOTS SHOULD BE CHECKED FOR REASONABLENESS AND ADEQUACY OF INPUT DATA FOR THE COMPUTATION OF "M"
             VALUES USED IN THE ROUTING PROCEDURE.

             GUIDELINES FOR DETERMINING OR ANALYZING REACH LENGTHS AND COEFFICIENTS (X,M) ARE AVAILABLE IN THE USERS
             MANUAL.  SUMMARY TABLE 2 DISPLAYS REACH ROUTING RESULTS AND ROUTING PARAMETERS FOR COMPARISON AND CHECKING.

          HYDROGRAPH GENERATION - THE PROCEDURE TO CALCULATE THE INTERNAL TIME INCREMENT AND PEAK TIME OF THE UNIT
             HYDROGRAPH HAVE BEEN IMPROVED.  PEAK DISCHARGES AND TIMES MAY DIFFER FROM THE PREVIOUS VERSION.  OUTPUT
             HYDROGRAPHS ARE STILL INTERPOLATED, PRINTED, AND ROUTED AT THE USER SELECTED MAIN TIME INCREMENT.

          INTERMEDIATE PEAKS - METHOD ADDED TO PROVIDE DISCHARGES AT INTERMEDIATE POINTS WITHIN REACHES WITHOUT ROUTING.

          OTHER - THIS VERSION CONTAINS SOME ADDITIONS TO THE INPUT AND NUMEROUS MODIFICATIONS TO THE OUTPUT.  USER
             OPTIONS HAVE BEEN MODIFIED AND AUGMENTED ON THE JOB RECORD, RAINTABLES ADDED, ERROR AND WARNING MESSAGES
             EXPANDED, AND THE SUMMARY TABLES COMPLETELY REVISED.  THE HOLDOUT OPTION IS NOT OPERATIONAL AT THIS TIME.

          PROGRAM QUESTIONS OR PROBLEMS SHOULD BE DIRECTED TO HYDRAULIC ENGINEERS AT THE SCS NATIONAL TECHNICAL CENTERS:

              CHESTER, PA (NORTHEAST)  -- 215-499-3933,      FORT WORTH, TX (SOUTH) -- 334-5242 (FTS)
              LINCOLN, NB (MIDWEST)    -- 541-5318 (FTS),    PORTLAND, OR (WEST)    -- 423-4099 (FTS)
              OR HYDROLOGY UNIT, ENGINEERING DIVISION, LANHAM, MD -- 436-7383 (FTS).


       PROGRAM CHANGES SINCE MAY 1982:

            12/17/82 - CORRECT PEAK RATE FACTOR FOR USER ENTERED DIMHYD
                       CORRECT REACH ROUTING PEAK TRAVEL TIME PRINTED WITH FULLPRINT OPTION
             5/02/83 - CORRECT COMPUTATIONS FOR ---
                             1. DIVISION OF BASEFLOW IN DIVERT OPERATION
                             2. HYDROGRAPH VOLUME SPLIT BETWEEN BASEFLOW AND ABOVE BASEFLOW
                             3. CROSS SECTION DATA PLOTTING POSITION
                             4. INTERMEDIATE PEAK WHEN "FROM" AREA IS LARGER THAN "THRU" AREA
```

5. STORAGE ROUTED REACH TRAVEL TIME FOR MULTIPEAK HYDROGRAPH
6. ORDERING "FLOW-FREQ" FILE FROM SUMMARY TABLE #3 DATA
7. BASEFLOW ENTERED WITH READHYD
8. LOW FLOW SPLIT DURING DIVERT PROCEDURE #2 WHEN SECTION RATINGS START AT DIFFERENT ELEVATIONS

ENHANCEMENTS ---

1. REPLACE USER MANUAL ERROR CODES (PAGE 4-9 TO 4-11) WITH MESSAGES
2. LABEL OUTPUT HYDROGRAPH FILES WITH CROSS SECTION/STRUCTURE, ALTERNATE AND STORM NO'S

09/01/83 - CORRECT INPUT AND OUTPUT ERRORS FOR INTERMEDIATE PEAKS
CORRECT COMBINATION OF RATING TABLES FOR DIVERT
CHECK REACH ROUTING PARAMETERS FOR ACCEPTABLE LIMITS
ELIMINATE MINIMUM REACH TRAVEL TIME WHEN ATT-KIN COEFFICIENT EQUALS ONE

XECUTIVE CONTROL OPERATION INCREM RECORD ID

MAIN TIME INCREMENT = .10 HOURS

XECUTIVE CONTROL OPERATION COMPUT RECORD ID

FROM XSECTION 18
TO STRUCTURE 4

STARTING TIME = .00 RAIN DEPTH = 4.60 RAIN DURATION= 1.00 RAIN TABLE NO.= 7 ANT. MOIST. COND= 2
ALTERNATE NO.= 1 STORM NO.= 1 MAIN TIME INCREMENT = .10 HOURS

JPERATION RUNOFF CROSS SECTION 18

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.08	743.53	(RUNOFF)
7.94	39.45	(RUNOFF)
9.95	20.32	(RUNOFF)
12.84	15.64	(RUNOFF)
13.83	13.66	(RUNOFF)
14.92	12.60	(RUNOFF)
19.89	10.73	(RUNOFF)
23.83	5.51	(RUNOFF)

*** WARNING REACH 16 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

'PERATION RUNOFF CROSS SECTION 16

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.13	898.12	(RUNOFF)
9.96	27.66	(RUNOFF)
12.90	21.26	(RUNOFF)
13.86	18.60	(RUNOFF)
19.88	14.58	(RUNOFF)
23.88	7.44	(RUNOFF)

PERATION ADDHYD CROSS SECTION 16

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.17	1586.02	6182.42
9.96	47.90	6180.35
12.92	36.88	6180.27
13.90	32.24	6180.24
19.90	25.31	6180.19
23.90	12.92	6180.10

*** WARNING REACH 14 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

1

OPERATION RUNOFF CROSS SECTION 14

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.10	231.40	(RUNOFF)
7.91	13.67	(RUNOFF)
9.95	7.07	(RUNOFF)
19.95	3.79	(RUNOFF)
23.84	1.94	(RUNOFF)

OPERATION ADDHYD CROSS SECTION 14

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.16	1798.36	6126.28
9.96	54.96	6122.60
12.91	42.34	6122.48
13.89	37.02	6122.42
19.91	29.08	6122.33
23.90	14.85	6122.17

*** WARNING REACH 6 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION RUNOFF CROSS SECTION 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.17	320.11	(RUNOFF)
9.96	9.87	(RUNOFF)
12.93	7.54	(RUNOFF)
19.95	5.15	(RUNOFF)
23.91	2.60	(RUNOFF)

OPERATION ADDHYD CROSS SECTION 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.25	2057.10	6083.88
10.01	64.73	6080.57
13.01	49.85	6080.44
13.98	43.59	6080.38
19.96	34.23	6080.30

23.98	17.43	6080.15

OPERATION RUNOFF CROSS SECTION 10

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.10	251.52	(RUNOFF)
7.95	14.84	(RUNOFF)
9.96	7.65	(RUNOFF)
19.90	4.10	(RUNOFF)
23.84	2.11	(RUNOFF)

*** WARNING REACH 8 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION RUNOFF CROSS SECTION 8

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.22	287.32	(RUNOFF)
9.96	10.78	(RUNOFF)
12.95	8.28	(RUNOFF)
19.88	5.69	(RUNOFF)
23.91	2.88	(RUNOFF)

OPERATION ADDHYD CROSS SECTION 8

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.21	532.08	6082.48
9.97	18.40	6080.24
12.95	14.20	6080.18
13.88	12.47	6080.16
19.90	9.79	6080.13
23.93	4.99	6080.06

*** WARNING REACH 6 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION ADDHYD CROSS SECTION 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.24	2581.41	6084.39
10.00	83.13	6080.73
13.00	64.05	6080.56
13.96	56.05	6080.49
19.95	44.03	6080.39
23.97	22.41	6080.20

OPERATION RESVOR STRUCTURE 1

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)

6.91 412.26 6081.51

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = 1.96 SQ.MI.

5.00	DISCHG	.00	.00	.00	.00	.00	.00	.01	.15	.86	3.43
6.00	DISCHG	9.82	22.98	59.91	96.16	123.06	134.18	280.48	365.51	403.02	412.24
7.00	DISCHG	404.71	388.69	369.34	348.69	327.12	305.17	284.10	264.98	248.25	233.92
8.00	DISCHG	221.84	211.67	202.77	193.87	183.67	172.03	159.91	148.38	138.02	134.76
9.00	DISCHG	134.42	134.07	133.72	133.37	133.03	132.69	132.35	132.01	131.68	131.34
10.00	DISCHG	131.02	130.69	130.36	130.02	129.66	129.26	128.84	128.41	127.98	127.54
11.00	DISCHG	127.10	126.67	126.23	125.80	125.38	124.92	124.13	123.36	122.59	121.84
12.00	DISCHG	121.10	120.37	119.64	118.93	118.22	117.53	116.85	116.17	115.51	114.85
13.00	DISCHG	114.20	113.56	112.93	112.29	111.64	110.97	110.29	109.61	108.93	108.26
14.00	DISCHG	107.59	106.94	106.29	105.63	104.98	104.32	103.66	103.00	102.36	101.71
15.00	DISCHG	101.08	100.45	99.83	99.20	98.56	97.90	97.24	96.56	95.90	95.23
16.00	DISCHG	94.57	93.92	93.28	92.65	92.02	91.40	90.79	90.19	89.60	89.01
17.00	DISCHG	88.43	87.86	87.30	86.74	86.19	85.65	85.12	84.59	84.07	83.56
18.00	DISCHG	83.05	82.55	82.06	81.57	81.09	80.61	80.15	79.57	78.96	78.36
19.00	DISCHG	77.77	77.19	76.61	76.05	75.50	74.96	74.43	73.91	73.40	72.89
20.00	DISCHG	72.40	71.91	71.42	70.90	70.31	69.65	68.93	68.17	67.41	66.65
21.00	DISCHG	65.90	65.15	64.42	63.69	62.98	62.28	61.59	60.92	60.25	59.59
22.00	DISCHG	58.95	58.33	57.70	57.09	56.49	55.91	55.33	54.76	54.20	53.65
23.00	DISCHG	53.11	52.58	52.06	51.55	51.04	50.55	50.07	49.59	49.12	48.66
24.00	DISCHG	48.20	47.76	47.31	46.81	46.25	45.62	44.92	44.20	43.47	42.74
25.00	DISCHG	42.02	41.30	40.60	39.91	39.22	38.55	37.89	37.24	36.60	35.98
26.00	DISCHG	35.36	34.76	34.16	33.58	33.00	32.43	31.88	31.33	30.80	30.27
27.00	DISCHG	29.75	29.24	28.74	28.25	27.76	27.29	26.82	26.36	25.91	25.47
28.00	DISCHG	25.03	24.60	24.18	23.88	23.68	23.48	23.28	23.08	22.88	22.68
29.00	DISCHG	22.49	22.30	22.11	21.92	21.73	21.54	21.36	21.18	20.99	20.81

RUNOFF VOLUME ABOVE BASEFLOW = 1.79 WATERSHED INCHES, 2265.42 CFS-HRS, 187.21 ACRE-FEET; BASEFLOW = .00 CFS

*** WARNING REACH 5 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION RUNOFF CROSS SECTION 5

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.03	141.86	(RUNOFF)
7.95	6.83	(RUNOFF)

OPERATION ADDHYD CROSS SECTION 5

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.05	147.08	6003.91
7.01	421.51	6004.52

OPERATION RESVOR STRUCTURE 2

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.10	137.68	6007.29
7.28	382.93	6011.66

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = 2.04 SQ.MI.

5.00	DISCHG	.00	.00	.00	.00	.00	.00	1.00	17.72	59.18	85.46
6.00	DISCHG	118.30	137.67	120.32	95.53	102.38	123.52	140.05	201.18	300.76	326.30
7.00	DISCHG	351.91	370.80	380.87	382.81	378.38	369.16	356.35	341.05	324.35	307.26
8.00	DISCHG	273.43	242.63	226.71	214.92	205.00	195.27	184.61	173.00	161.22	150.07
9.00	DISCHG	142.20	138.95	137.94	137.47	137.10	136.75	136.41	136.07	135.73	135.40
10.00	DISCHG	135.07	134.68	134.12	133.52	133.02	132.59	132.18	131.78	131.38	130.95
11.00	DISCHG	130.50	130.05	129.63	129.22	128.79	128.34	127.89	127.33	126.62	125.86
12.00	DISCHG	125.08	124.32	123.59	122.88	122.16	121.43	120.72	120.05	119.35	118.67
13.00	DISCHG	117.99	117.29	116.56	115.82	115.12	114.43	113.76	113.10	112.44	111.76
14.00	DISCHG	111.07	110.37	109.66	108.95	108.28	107.61	106.95	106.29	105.64	104.99
15.00	DISCHG	104.34	103.67	102.94	102.19	101.50	100.85	100.19	99.53	98.86	98.19
16.00	DISCHG	97.52	96.86	96.21	95.56	94.92	94.29	93.67	93.05	92.44	91.85
17.00	DISCHG	91.25	90.67	90.09	89.53	88.97	88.41	87.87	87.33	86.79	86.27
18.00	DISCHG	85.75	85.24	84.74	84.24	83.75	83.26	82.78	82.31	81.80	81.23
19.00	DISCHG	80.63	80.03	79.44	78.86	78.30	77.74	77.19	76.65	76.12	75.60
20.00	DISCHG	75.09	74.52	73.77	72.99	72.32	71.68	71.04	70.37	69.25	68.35
21.00	DISCHG	67.67	66.83	66.19	65.40	64.71	63.92	63.27	62.58	61.94	61.22
22.00	DISCHG	60.57	59.91	59.33	58.70	58.08	57.44	56.87	56.32	55.77	55.18
23.00	DISCHG	54.61	54.07	53.57	53.06	52.53	51.99	51.51	51.05	50.58	50.09
24.00	DISCHG	49.60	48.97	48.13	47.46	46.91	46.32	45.69	44.99	44.28	43.55
25.00	DISCHG	42.82	42.09	41.38	40.67	39.98	39.29	38.62	37.96	37.31	36.67
26.00	DISCHG	36.04	35.42	34.82	34.22	33.64	33.06	32.49	31.94	31.39	30.85
27.00	DISCHG	30.32	29.80	29.29	28.79	28.30	27.81	27.34	26.87	26.41	25.96
28.00	DISCHG	25.51	25.08	24.65	24.22	23.91	23.70	23.50	23.30	23.10	22.90
29.00	DISCHG	22.70	22.51	22.32	22.12	21.94	21.75	21.56	21.38	21.19	21.01

RUNOFF VOLUME ABOVE BASEFLOW = 1.80 WATERSHED INCHES, 2369.65 CFS-HRS, 195.83 ACRE-FEET; BASEFLOW = .00 CFS

*** WARNING REACH 4 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION RUNOFF CROSS SECTION 12

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.15	359.25	(RUNOFF)
9.96	11.43	(RUNOFF)
12.90	8.78	(RUNOFF)
13.86	7.69	(RUNOFF)
19.88	6.01	(RUNOFF)
23.89	3.06	(RUNOFF)

OPERATION RESVOR STRUCTURE 5

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.30	285.51	6042.29
13.01	8.74	6036.34
19.96	6.01	6036.24
23.96	3.04	6036.12

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = .26 SQ.MI.

5.00	DISCHG	.00	.00	.00	.00	.00	.00	.16	2.38	11.94	35.74
6.00	DISCHG	93.63	181.79	258.38	285.49	280.91	216.85	171.48	135.36	110.18	89.31
7.00	DISCHG	72.87	60.48	51.13	46.57	42.26	38.35	35.01	32.27	30.07	28.32
8.00	DISCHG	26.96	25.84	24.72	23.35	21.71	19.99	18.37	16.96	15.78	14.82
9.00	DISCHG	14.04	13.44	12.96	12.59	12.30	12.09	11.92	11.80	11.70	11.64
10.00	DISCHG	11.58	11.53	11.43	11.23	10.93	10.58	10.23	9.91	9.65	9.43
11.00	DISCHG	9.26	9.12	9.01	8.93	8.87	8.83	8.79	8.76	8.74	8.73
12.00	DISCHG	8.73	8.72	8.71	8.71	8.72	8.72	8.72	8.72	8.72	8.73
13.00	DISCHG	8.74	8.74	8.70	8.63	8.52	8.39	8.25	8.12	8.02	7.94
14.00	DISCHG	7.88	7.82	7.75	7.67	7.59	7.50	7.42	7.35	7.29	7.24
15.00	DISCHG	7.21	7.17	7.12	7.02	6.89	6.74	6.59	6.46	6.35	6.26
16.00	DISCHG	6.19	6.13	6.08	6.05	6.02	6.00	5.99	5.98	5.97	5.96
17.00	DISCHG	5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96
18.00	DISCHG	5.97	5.97	5.97	5.97	5.97	5.98	5.98	5.98	5.98	5.98
19.00	DISCHG	5.99	5.99	5.99	5.99	6.00	6.00	6.00	6.00	6.00	6.01
20.00	DISCHG	6.01	5.99	5.92	5.72	5.42	5.06	4.70	4.37	4.09	3.87
21.00	DISCHG	3.68	3.53	3.41	3.32	3.26	3.20	3.16	3.12	3.10	3.08
22.00	DISCHG	3.07	3.06	3.04	3.04	3.04	3.04	3.03	3.03	3.03	3.03
23.00	DISCHG	3.03	3.03	3.02	3.02	3.03	3.03	3.03	3.02	3.02	3.03
24.00	DISCHG	3.03	3.01	2.92	2.71	2.39	2.02	1.66	1.34	1.06	.84
25.00	DISCHG	.65	.51	.39	.30	.23	.18	.14	.11	.08	.06
26.00	DISCHG	.05	.04	.03	.02	.02	.01	.01	.01		

RUNOFF VOLUME ABOVE BASEFLOW = 2.11 WATERSHED INCHES, 354.26 CFS-HRS, 29.28 ACRE-FEET; BASEFLOW = .00 CFS

*** WARNING REACH 4 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION ADDHYD CROSS SECTION 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.26	382.50	5971.06
7.17	432.13	5971.16

OPERATION RUNOFF CROSS SECTION 3

1

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
5.99	227.31	(RUNOFF)
7.90	8.72	(RUNOFF)
9.95	4.43	(RUNOFF)
19.86	2.24	(RUNOFF)

23.78 1.15 (RUNOFF)

*** WARNING - STRUCTURE 6 DELTA T IS TOO LARGE. D /2 > S /DELTA T OCCURED 3 TIMES STARTING WITH POINT 65

OPERATION RESVOR STRUCTURE 6

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.06	198.24	5986.30
6.50	52.13	5980.93
6.70	36.98	5980.35
6.90	28.55	5980.02
7.10	22.95	5979.64
7.30	16.76	5979.20
7.50	14.14	5979.01
7.70	12.53	5978.90
7.90	11.42	5978.82
8.09	9.83	5978.70

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = .08 SQ.MI.

5.00	DISCHG	.00	.00	.06	.35	1.17	2.56	21.49	86.60	134.26	161.29
6.00	DISCHG	192.12	196.42	171.51	84.92	-3.38	52.13	-4.30	36.98	-4.24	28.51
7.00	DISCHG	.21	22.95	1.08	16.76	2.44	14.12	4.19	12.51	5.52	11.41
8.00	DISCHG	6.46	9.76	4.27	6.16	3.42	5.35	3.61	5.04	3.83	4.85
9.00	DISCHG	3.99	4.71	4.11	4.62	4.19	4.56	4.25	4.51	4.30	4.48
10.00	DISCHG	4.33	4.25	3.65	3.49	3.32	3.31	3.27	3.34	3.32	3.32
11.00	DISCHG	3.27	3.30	3.32	3.35	3.31	3.29	3.29	3.33	3.34	3.32
12.00	DISCHG	3.28	3.30	3.33	3.35	3.32	3.29	3.30	3.34	3.35	3.32
13.00	DISCHG	3.29	3.21	3.05	2.96	2.90	2.86	2.86	2.90	2.92	2.89
14.00	DISCHG	2.86	2.81	2.73	2.68	2.67	2.67	2.67	2.67	2.67	2.67
15.00	DISCHG	2.67	2.58	2.38	2.27	2.24	2.23	2.23	2.22	2.23	2.22
16.00	DISCHG	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23
17.00	DISCHG	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23
18.00	DISCHG	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23
19.00	DISCHG	2.23	2.23	2.24	2.24	2.24	2.24	2.24	2.24	2.24	2.24
20.00	DISCHG	2.24	2.02	1.53	1.27	1.17	1.10	1.11	1.13	1.15	1.12
21.00	DISCHG	1.09	1.10	1.14	1.15	1.12	1.09	1.10	1.14	1.15	1.12
22.00	DISCHG	1.09	1.10	1.14	1.15	1.12	1.09	1.10	1.14	1.15	1.12
23.00	DISCHG	1.09	1.10	1.14	1.15	1.12	1.09	1.10	1.14	1.15	1.12
24.00	DISCHG	1.09	.86	.37	.11	.04	.01	.00			

RUNOFF VOLUME ABOVE BASEFLOW = 3.33 WATERSHED INCHES, 173.91 CFS-HRS, 14.37 ACRE-FEET; BASEFLOW = .00 CFS

OPERATION ADDHYD CROSS SECTION 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.18	552.84	5971.35
6.48	395.45	5971.09
6.92	444.86	5971.18
7.11	454.38	5971.20
7.29	446.48	5971.19

OPERATION RUNOFF CROSS SECTION 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.02	93.53	(RUNOFF)
7.95	4.25	(RUNOFF)

OPERATION ADDHYD CROSS SECTION 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.14	612.20	5971.42
6.48	407.39	5971.11
6.92	451.15	5971.19
7.11	460.12	5971.21
7.29	450.92	5971.19

OPERATION RESVOR STRUCTURE 3

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.36	426.53	5985.35
7.47	424.36	5984.87

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = 2.43 SQ.MI.

5.00	DISCHG	.00	.00	.05	.32	1.09	2.44	21.73	113.79	176.95	273.97
6.00	DISCHG	350.39	410.80	421.01	426.32	426.44	425.39	422.22	418.23	417.08	417.89
7.00	DISCHG	419.14	420.58	422.13	423.34	424.19	424.32	423.69	422.12	419.66	416.28
8.00	DISCHG	411.63	400.06	334.90	293.61	266.47	238.17	219.35	205.57	192.54	179.84
9.00	DISCHG	169.16	162.14	158.82	157.27	156.43	155.75	155.22	154.71	154.28	153.85
10.00	DISCHG	153.46	152.92	151.94	150.71	149.63	148.68	147.84	147.11	146.44	145.78
11.00	DISCHG	145.11	144.48	143.94	143.45	142.95	142.43	141.92	141.41	140.81	140.08
12.00	DISCHG	139.27	138.48	137.75	137.06	136.35	135.59	134.86	134.18	133.53	132.85
13.00	DISCHG	132.14	131.38	130.49	129.53	128.60	127.70	126.85	126.07	125.33	124.56
14.00	DISCHG	123.77	122.95	122.10	121.23	120.40	119.62	118.87	118.13	117.41	116.70
15.00	DISCHG	116.01	115.26	113.61	112.74	111.76	111.01	110.14	109.39	108.58	107.84
16.00	DISCHG	107.08	106.38	105.67	104.99	104.32	103.68	103.03	102.41	101.79	101.19
17.00	DISCHG	100.59	100.01	99.43	98.86	98.30	97.75	97.20	96.67	96.14	95.61

1

18.00	DISCHG	95.10	94.59	94.09	93.59	93.10	92.62	92.14	91.67	91.17	90.60
19.00	DISCHG	90.00	89.41	88.82	88.25	87.68	87.13	86.58	86.05	85.52	85.00
20.00	DISCHG	84.49	83.63	82.12	80.70	79.58	78.47	77.47	76.50	75.19	73.96
21.00	DISCHG	73.06	72.08	71.34	70.53	69.69	68.84	68.10	67.47	66.80	66.07
22.00	DISCHG	65.31	64.68	64.10	63.53	62.85	62.18	61.59	61.09	60.56	59.95
23.00	DISCHG	59.32	58.78	58.33	57.85	57.28	56.71	56.22	55.81	55.37	54.85
24.00	DISCHG	54.31	53.38	51.75	50.40	49.45	48.43	47.43	46.40	45.42	44.45
25.00	DISCHG	43.54	42.67	41.83	41.03	40.27	39.53	38.81	38.12	37.44	36.78
26.00	DISCHG	36.14	35.51	34.89	34.29	33.70	33.11	32.54	31.99	31.43	30.89
27.00	DISCHG	30.36	29.84	29.33	28.83	28.34	27.85	27.37	26.90	26.44	25.99
28.00	DISCHG	25.55	25.11	24.68	24.26	23.93	23.71	23.51	23.31	23.11	22.91
29.00	DISCHG	22.72	22.52	22.33	22.14	21.95	21.76	21.58	21.39	21.21	21.03

RUNOFF VOLUME ABOVE BASEFLOW = 1.89 WATERSHED INCHES, 2962.33 CFS-HRS, 244.81 ACRE-FEET; BASEFLOW = .00 CFS

*** WARNING REACH 2 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION RUNOFF CROSS SECTION 2

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.00	32.01	(RUNOFF)

OPERATION ADDHYD CROSS SECTION 2

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.15	446.54	5958.13
7.46	425.54	5958.06

OPERATION RESVOR STRUCTURE 4

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.19	442.75	5968.19
6.37	434.71	5966.18
6.78	420.15	5962.95
7.43	425.75	5964.11
9.38	158.24	5951.50
9.59	156.97	5951.48
9.79	155.99	5951.46
9.99	155.15	5951.45
10.17	153.65	5951.43
10.37	151.24	5951.39

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .10 HOURS DRAINAGE AREA = 2.44 SQ.MI.

4.00	DISCHG	.01	.02	.04	.07	.10	.13	.15	.18	.20	.22
5.00	DISCHG	.24	.31	.52	.96	1.99	3.72	26.14	128.11	201.16	302.61
6.00	DISCHG	382.37	434.68	442.70	432.22	434.39	427.36	427.20	419.53	420.12	418.79

1

7.00	DISCHG	421.55	421.60	423.98	424.18	425.67	425.26	425.11	423.22	421.10	417.52
8.00	DISCHG	413.15	401.88	337.32	293.03	268.53	237.53	221.28	204.91	194.43	179.22
9.00	DISCHG	171.00	161.52	160.61	156.67	158.18	155.18	156.94	154.17	155.97	153.33
10.00	DISCHG	155.13	152.41	153.51	150.14	151.11	148.10	149.28	146.56	147.86	145.26
11.00	DISCHG	146.50	143.98	145.30	142.98	144.30	141.97	143.24	140.98	142.11	139.67
12.00	DISCHG	140.55	138.09	139.01	136.70	137.58	135.24	136.07	133.86	134.73	132.54
13.00	DISCHG	133.31	131.08	131.62	129.21	129.69	127.39	127.91	125.77	126.38	124.29
14.00	DISCHG	124.79	122.69	123.10	120.96	121.38	119.37	119.82	117.89	118.35	116.47
15.00	DISCHG	116.93	115.04	114.49	112.49	112.61	110.76	110.98	109.16	109.40	107.62
16.00	DISCHG	107.89	106.17	106.46	104.80	105.10	103.49	103.80	102.24	102.55	101.03
17.00	DISCHG	101.34	99.86	100.16	98.72	99.02	97.62	97.91	96.55	96.84	95.51
18.00	DISCHG	95.79	94.49	94.76	93.50	93.77	92.54	92.80	91.60	91.82	90.54
19.00	DISCHG	90.65	89.36	89.46	88.21	88.31	87.09	87.20	86.02	86.13	84.99
20.00	DISCHG	85.09	83.61	82.65	80.59	80.03	78.33	77.90	76.37	75.63	73.83
21.00	DISCHG	73.48	71.96	71.76	70.42	70.10	68.74	68.50	67.37	67.19	65.98
22.00	DISCHG	65.70	64.59	64.48	63.45	63.22	62.10	61.95	61.02	60.92	59.88

23.00	DISCHG	59.67	58.72	58.68	57.80	57.63	56.66	56.55	55.77	55.71	54.81
24.00	DISCHG	54.64	53.33	52.01	50.26	49.64	48.26	47.60	46.24	45.59	44.29
25.00	DISCHG	43.71	42.51	41.99	40.88	40.42	39.38	38.96	37.97	37.59	36.64
26.00	DISCHG	36.28	35.37	35.03	34.15	33.83	32.98	32.68	31.86	31.56	30.77
27.00	DISCHG	30.49	29.72	29.46	28.71	28.46	27.73	27.49	26.79	26.56	25.88
28.00	DISCHG	25.66	25.00	24.79	24.15	24.03	23.61	23.62	23.21	23.21	22.82
29.00	DISCHG	22.82	22.43	22.43	22.05	22.04	21.67	21.67	21.30	21.30	20.94

RUNOFF VOLUME ABOVE BASEFLOW = 1.90 WATERSHED INCHES, 2983.37 CFS-HRS, 246.55 ACRE-FEET; BASEFLOW = .00 CFS

XECUTIVE CONTROL OPERATION ENDCMP RECORD ID

COMPUTATIONS COMPLETED FOR PASS 1

XECUTIVE CONTROL OPERATION ENDJOB RECORD ID

UMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

ECTION/ TRUCTURE ID		STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 1														
XSECTION	18	RUNOFF	.48	7	2	.10	.0	4.60	24.00	1.97	---	6.08	743.53	1549.0
XSECTION	16	REACH	.48	7	2	.10	.0	4.60	24.00	1.97	6181.60	6.19	723.22	1506.7
SECTION	16	RUNOFF	.64	7	2	.10	.0	4.60	24.00	2.05	---	6.13	898.12	1403.3
SECTION	16	ADDHYD	1.12	7	2	.10	.0	4.60	24.00	2.01	6182.42	6.17	1586.02	1416.1
XSECTION	14	REACH	1.12	7	2	.10	.0	4.60	24.00	2.01	6126.02	6.17	1586.02	1416.1
SECTION	14	RUNOFF	.18	7	2	.10	.0	4.60	24.00	1.74	---	6.10	231.40	1285.6
XSECTION	14	ADDHYD	1.30	7	2	.10	.0	4.60	24.00	1.98	6126.28	6.16	1798.36	1383.4
XSECTION	6	REACH	1.30	7	2	.10	.0	4.60	24.00	1.98	6083.56	6.27	1770.27	1361.7
SECTION	6	RUNOFF	.21	7	2	.10	.0	4.60	24.00	2.37	---	6.17	320.11	1524.3
XSECTION	6	ADDHYD	1.51	7	2	.10	.0	4.60	24.00	2.03	6083.88	6.25	2057.10	1362.3
SECTION	10	RUNOFF	.20	7	2	.10	.0	4.60	24.00	1.67	---	6.10	251.52	1257.6
SECTION	8	REACH	.20	7	2	.10	.0	4.60	24.00	1.67	6081.50	6.21	245.26	1226.3
XSECTION	8	RUNOFF	.25	7	2	.10	.0	4.60	24.00	2.05	---	6.22	287.32	1149.3
SECTION	8	ADDHYD	.45	7	2	.10	.0	4.60	24.00	1.88	6082.48	6.21	532.08	1182.4
SECTION	6	REACH	.45	7	2	.10	.0	4.60	24.00	1.88	6081.78	6.21	532.08	1182.4
XSECTION	6	ADDHYD	1.96	7	2	.10	.0	4.60	24.00	2.00	6084.39	6.24	2581.41	1317.0
STRUCTURE	1	RESVOR	1.96	7	2	.10	.0	4.60	24.00	1.79	6081.51	6.91	412.26	210.3
XSECTION	5	REACH	1.96	7	2	.10	.0	4.60	24.00	1.79	6004.50	7.01	411.62	210.0

XSECTION	5	RUNOFF	.08	7	2	.10	.0	4.60	24.00	2.05	---	6.03	141.86	1773.2
SECTION	5	ADDHYD	2.04	7	2	.10	.0	4.60	24.00	1.80	6004.52	7.01	421.51	206.6
STRUCTURE	2	RESVOR	2.04	7	2	.10	.0	4.60	24.00	1.80	6011.66	7.28	382.93	187.7
SECTION	4	REACH	2.04	7	2	.10	.0	4.60	24.00	1.80	5971.06	7.28	382.93	187.7
XSECTION	12	RUNOFF	.26	7	2	.10	.0	4.60	24.00	2.11	---	6.15	359.25	1381.7
STRUCTURE	5	RESVOR	.26	7	2	.10	.0	4.60	24.00	2.11	6042.29	6.30	285.51	1098.1
SECTION	4	REACH	.26	7	2	.10	.0	4.60	24.00	2.11	5970.87	6.30	285.51	1098.1
XSECTION	4	ADDHYD	2.30	7	2	.10	.0	4.60	24.00	1.84	5971.16	7.17	432.13	187.9
XSECTION	3	RUNOFF	.08	7	2	.10	.0	4.60	24.00	3.20	---	5.99	227.31	2806.3
TRUCTURE	6	RESVOR	.08	7	2	.10	.0	4.60	24.00	3.33	5986.30	6.06	198.24	2447.4
ASECTION	4	ADDHYD	2.38	7	2	.10	.0	4.60	24.00	1.89	5971.35	6.18	552.84	232.2
XSECTION	4	RUNOFF	.05	7	2	.10	.0	4.60	24.00	2.34	---	6.02	93.53	2033.2
SECTION	4	ADDHYD	2.43	7	2	.10	.0	4.60	24.00	1.89	5971.42	6.14	612.20	252.2
STRUCTURE	3	RESVOR	2.43	7	2	.10	.0	4.60	24.00	1.89	5985.35	6.36	426.53	175.7

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 1													
XSECTION 2	REACH	2.43	7	2	.10	.0	4.60	24.00	1.89	5958.06	6.36	426.53	175.7
XSECTION 2	RUNOFF	.01	7	2	.10	.0	4.60	24.00	3.92	---	6.00	32.01	3200.9
XSECTION 2	ADDHYD	2.44	7	2	.10	.0	4.60	24.00	1.90	5958.13	6.15	446.54	183.2
STRUCTURE 4	RESVOR	2.44	7	2	.10	.0	4.60	24.00	1.90	5968.19	6.19	442.75	181.7

SUMMARY TABLE 2 - SELECTED MODIFIED ATT-KIN REACH ROUTINGS IN ORDER OF STANDARD EXECUTIVE CONTROL INSTRUCTIONS
(A STAR(*) AFTER VOLUME ABOVE BASE(IN) INDICATES A HYDROGRAPH TRUNCATED AT A VALUE EXCEEDING BASE + 10% OF PEAK
A QUESTION MARK(?) AFTER COEFF.(C) INDICATES PARAMETERS OUTSIDE ACCEPTABLE LIMITS, SEE PREVIOUS WARNINGS)

		HYDROGRAPH INFORMATION				ROUTING PARAMETERS							PEAK TRAVEL TIME	
XSEC	REACH	INFLOW	OUTFLOW+ OUTFLOW	INTERV.	AREA	VOLUME BASE- ABOVE	MAIN TIME	ITER- ATION	Q AND A EQUATION	LENGTH	PEAK RATIO	S/Q @PEAK	ATT- KIN	STOR-	KINE-

ID	LENGTH (FT)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	FLOW (CFS)	BASE (IN)	INCR (HR)	#	COEFF (X)	POWER (N)	FACTOR (K*)	Q/I (Q*)	(K) (SEC)	COEFF (C)	AGE (HR)	MATIC (HR)
ALTERNATE 1 STORM 1																			
												1.31							
16	3340	740	6.1	723	6.2			0	1.97	.10	1		1.46	.043	.976	237	.86?	.10	.07
						1562	6.2												
												1.45							
14	2900	1562	6.2	1562	6.2			0	2.01	.10	0		1.44	.022	1.000	165	1.00?	.00	.00
						1755	6.2												
												1.37							
6	5200	1755	6.2	1746	6.3			0	1.98	.10	1		1.51	.031	.995	224	.89?	.10	.06
						2010	6.3												
												2.62							
8	3800	251	6.1	245	6.2			0	1.67	.10	1		1.47	.038	.975	228	.88?	.10	.06
						531	6.2												
												1.09							
6	1900	531	6.2	531	6.2			0	1.88	.10	0		1.57	.009	1.000	116	1.00?	.00	.00
						---	---												
												1.46							
5	1800	412	6.9	411	7.0			0	1.79	.10	1		1.36	.003	.998	205	.93?	.10	.06
						421	7.0												
												1.28							
4	1000	383	7.3	383	7.3			0	1.80	.10	0		1.55	.000	1.000	67	1.00?	.00	.00
						---	---												
												1.24							
4	2400	285	6.3	285	6.3			0	2.11	.10	0		1.56	.013	1.000	176	1.00?	.00	.00
						432	7.2												
												2.40							
2	750	426	6.4	426	6.4			0	1.89	.10	0		1.41	.000	1.000	49	1.00?	.00	.00
						440	6.1												

SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1
0 STRUCTURE 6	.08	
ALTERNATE 1		198.24
0 STRUCTURE 5	.26	
ALTERNATE 1		285.51
0 STRUCTURE 4	2.44	
ALTERNATE 1		442.75
STRUCTURE 3	2.43	

	ALTERNATE	1	426.53
0 STRUCTURE	2	2.04	
	ALTERNATE	1	382.93
STRUCTURE	1	1.96	
	ALTERNATE	1	412.26
XSECTION	2	2.44	
	ALTERNATE	1	446.54
XSECTION	3	.08	
	ALTERNATE	1	227.31
XSECTION	4	2.43	
	ALTERNATE	1	612.20
XSECTION	5	2.04	
	ALTERNATE	1	421.51
0 XSECTION	6	1.96	
	ALTERNATE	1	2581.41
0 XSECTION	8	.45	
	ALTERNATE	1	532.08
0 XSECTION	10	.20	
	ALTERNATE	1	251.52
0 XSECTION	12	.26	
	ALTERNATE	1	359.25

SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ STRUCTURE ID		DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1
XSECTION	14	1.30	
ALTERNATE	1		1798.36
0 XSECTION	16	1.12	
ALTERNATE	1		1586.02
0 XSECTION	18	.48	
ALTERNATE	1		743.53

END OF 1 JOBS IN THIS RUN

APPENDIX E -

HEC-1 Output
Existing Conditions
1/2 Probable Maximum Flood
Spillway Width = 50'
Spillway Elev. = 6,082.7
Lake Elev. = 6,080.0

THIS HEC-1 VERSION CONTAINS ALL OPTIONS EXCEPT ECONOMICS, AND THE NUMBER OF PLANS ARE REDUCED TO 3


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

         1          ID              SPRING RUN NO.2 DAM   JOB NO.89-823
         2          ID              50% PROBABLE MAXIMUM FLOOD
         3          ID              EXISTING CONDITION
         4          ID              IN-HEC1EXA     OUT-HEC.OU2
*** FREE ***
         5          IT     10       0       0     200
         6          ID
         7          JR    PREC     .5

         8          KK    BASIN
         9          BA     1.96
        10          LS        0     73       0       0       0       0
        11          PH        0     .1       0    3.50   14.00   18.64   21.36   26.00   30.00   34.00
        12          PH    37.79  41.57
        13          UD      .16

        14          KK     DAM
        15          RS        1   ELEV    6073
        16          SA     10.6   11.3    12.1    12.9    13.9    15.2    17.1    18.7    19.4    20.3
        17          SA     21.1   22.3
        18          SE     6073   6074    6075    6076    6078    6080    6082    6084    6086    6088
        19          SE     6090   6092
        20          SS     6082     50     3.1     1.5
        21          ST     6090    350     3.1     1.5
        22          ZZ
```

****
FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
****

SPRING RUN NO.2 DAM JOB NO.89-823
50% PROBABLE MAXIMUM FLOOD
EXISTING CONDITION
IN-HEC1EXA OUT-HEC.OU2

6 IO OUTPUT CONTROL VARIABLES

IPRNT	0	PRINT CONTROL
IPLOT	0	PLOT CONTROL

```
                QSCAL          0.  HYDROGRAPH PLOT SCALE

   IT         HYDROGRAPH TIME DATA
                NMIN          10  MINUTES IN COMPUTATION INTERVAL
               IDATE      1    0  STARTING DATE
               ITIME        0000  STARTING TIME
                  NQ         200  NUMBER OF HYDROGRAPH ORDINATES
              NDDATE      2    0  ENDING DATE
              NDTIME        0910  ENDING TIME

            COMPUTATION INTERVAL      .17 HOURS
                 TOTAL TIME BASE   33.17 HOURS

      ENGLISH UNITS

   JP         MULTI-PLAN OPTION
                NPLAN          1  NUMBER OF PLANS

   JR         MULTI-RATIO OPTION
              RATIOS OF PRECIPITATION
              .50


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


         ***************
         *             *
 8 KK    *     BASIN   *
         *             *
         ***************

           SUBBASIN RUNOFF DATA

 9 BA        SUBBASIN CHARACTERISTICS
               TAREA        1.96  SUBBASIN AREA

             PRECIPITATION DATA

11 PH                          DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
             ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
             5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
               .00    3.50   14.00   18.64   21.36   26.00   30.00   34.00   37.79   41.57     .00     .00

                                              STORM AREA =     .10

10 LS        SCS LOSS RATE
               STRTL         .74  INITIAL ABSTRACTION
              CRVNBR       73.00  CURVE NUMBER
               RTIMP         .00  PERCENT IMPERVIOUS AREA

13 UD        SCS DIMENSIONLESS UNITGRAPH
               TLAG         .16  LAG

                                                    ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                UNIT HYDROGRAPH
```

7 END-OF-PERIOD ORDINATES

3042. 3073. 994. 329. 107. 37. 8.

****

HYDROGRAPH AT STATION BASIN

****

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0000	1	.00	.00	.00	0.	*	1		1640	101	2.33	.07	2.26	17443.
1		0010	2	.03	.03	.00	0.	*	1		1650	102	3.55	.08	3.46	20913.
1		0020	3	.03	.03	.00	0.	*	1		1700	103	1.77	.03	1.74	19309.
1		0030	4	.03	.03	.00	0.	*	1		1710	104	.92	.02	.90	12642.
1		0040	5	.03	.03	.00	0.	*	1		1720	105	.79	.01	.77	8351.
1		0050	6	.03	.03	.00	0.	*	1		1730	106	.69	.01	.68	6399.
1		0100	7	.03	.03	.00	0.	*	1		1740	107	.51	.01	.50	5020.
1		0110	8	.03	.03	.00	0.	*	1		1750	108	.46	.01	.45	4039.
1		0120	9	.03	.03	.00	0.	*	1		1800	109	.42	.01	.42	3513.
1		0130	10	.03	.03	.00	0.	*	1		1810	110	.33	.00	.33	2994.
1		0140	11	.03	.03	.00	0.	*	1		1820	111	.31	.00	.30	2569.
1		0150	12	.03	.03	.00	0.	*	1		1830	112	.29	.00	.28	2324.
1		0200	13	.03	.03	.00	0.	*	1		1840	113	.27	.00	.27	2153.
1		0210	14	.03	.03	.00	0.	*	1		1850	114	.26	.00	.25	2019.
1		0220	15	.03	.03	.00	0.	*	1		1900	115	.24	.00	.24	1907.
1		0230	16	.03	.03	.00	0.	*	1		1910	116	.23	.00	.23	1810.
1		0240	17	.03	.03	.00	0.	*	1		1920	117	.22	.00	.22	1724.
1		0250	18	.03	.03	.00	0.	*	1		1930	118	.21	.00	.21	1648.
1		0300	19	.03	.03	.00	0.	*	1		1940	119	.15	.00	.15	1413.
1		0310	20	.03	.03	.00	0.	*	1		1950	120	.14	.00	.14	1187.
1		0320	21	.03	.03	.00	0.	*	1		2000	121	.14	.00	.13	1085.
1		0330	22	.03	.03	.00	0.	*	1		2010	122	.13	.00	.13	1024.
1		0340	23	.03	.03	.00	0.	*	1		2020	123	.13	.00	.12	980.
1		0350	24	.03	.03	.00	0.	*	1		2030	124	.12	.00	.12	943.
1		0400	25	.03	.03	.00	0.	*	1		2040	125	.12	.00	.12	911.
1		0410	26	.03	.03	.00	1.	*	1		2050	126	.11	.00	.11	881.
1		0420	27	.04	.03	.00	4.	*	1		2100	127	.11	.00	.11	853.
1		0430	28	.04	.03	.00	8.	*	1		2110	128	.11	.00	.11	827.
1		0440	29	.04	.04	.00	14.	*	1		2120	129	.10	.00	.10	803.
1		0450	30	.04	.04	.00	22.	*	1		2130	130	.10	.00	.10	781.
1		0500	31	.04	.04	.00	29.	*	1		2140	131	.10	.00	.10	760.
1		0510	32	.04	.04	.01	36.	*	1		2150	132	.10	.00	.10	740.
1		0520	33	.04	.04	.01	43.	*	1		2200	133	.09	.00	.09	721.
1		0530	34	.05	.04	.01	50.	*	1		2210	134	.09	.00	.09	703.
1		0540	35	.05	.04	.01	57.	*	1		2220	135	.09	.00	.09	687.
1		0550	36	.05	.04	.01	64.	*	1		2230	136	.09	.00	.09	671.
1		0600	37	.05	.04	.01	72.	*	1		2240	137	.07	.00	.07	623.
1		0610	38	.05	.04	.01	79.	*	1		2250	138	.07	.00	.07	577.
1		0620	39	.05	.04	.01	86.	*	1		2300	139	.07	.00	.07	554.
1		0630	40	.05	.04	.01	94.	*	1		2310	140	.07	.00	.07	538.
1		0640	41	.05	.04	.01	101.	*	1		2320	141	.07	.00	.07	526.
1		0650	42	.05	.04	.02	109.	*	1		2330	142	.07	.00	.07	515.
1		0700	43	.05	.03	.02	116.	*	1		2340	143	.07	.00	.07	505.
1		0710	44	.05	.03	.02	124.	*	1		2350	144	.06	.00	.06	495.
1		0720	45	.05	.03	.02	132.	*	2		0000	145	.06	.00	.06	485.
1		0730	46	.05	.03	.02	140.	*	2		0010	146	.06	.00	.06	476.
1		0740	47	.05	.03	.02	148.	*	2		0020	147	.06	.00	.06	468.
1		0750	48	.06	.03	.02	156.	*	2		0030	148	.06	.00	.06	460.
1		0800	49	.06	.03	.02	165.	*	2		0040	149	.06	.00	.06	452.

1	0810	50	.06	.03	.02	173.	*	2	0050	150	.06	.00	.06	444.
1	0820	51	.06	.03	.02	182.	*	2	0100	151	.06	.00	.06	437.
1	0830	52	.06	.03	.03	191.	*	2	0110	152	.06	.00	.06	429.
1	0840	53	.06	.03	.03	200.	*	2	0120	153	.06	.00	.05	423.
1	0850	54	.06	.03	.03	209.	*	2	0130	154	.05	.00	.05	416.
1	0900	55	.06	.03	.03	219.	*	2	0140	155	.05	.00	.05	410.
1	0910	56	.06	.03	.03	229.	*	2	0150	156	.05	.00	.05	403.
1	0920	57	.06	.03	.03	239.	*	2	0200	157	.05	.00	.05	397.
1	0930	58	.07	.03	.03	249.	*	2	0210	158	.05	.00	.05	392.
1	0940	59	.07	.03	.04	260.	*	2	0220	159	.05	.00	.05	386.
1	0950	60	.07	.03	.04	271.	*	2	0230	160	.05	.00	.05	381.
1	1000	61	.07	.03	.04	282.	*	2	0240	161	.05	.00	.05	375.
1	1010	62	.07	.03	.04	294.	*	2	0250	162	.05	.00	.05	370.
1	1020	63	.07	.03	.04	306.	*	2	0300	163	.05	.00	.05	365.
1	1030	64	.07	.03	.04	319.	*	2	0310	164	.05	.00	.05	361.
1	1040	65	.09	.03	.05	352.	*	2	0320	165	.05	.00	.05	356.
1	1050	66	.09	.03	.05	386.	*	2	0330	166	.05	.00	.05	351.
1	1100	67	.09	.03	.06	409.	*	2	0340	167	.05	.00	.05	347.
1	1110	68	.09	.03	.06	429.	*	2	0350	168	.05	.00	.04	343.
1	1120	69	.10	.03	.06	448.	*	2	0400	169	.04	.00	.04	339.
1	1130	70	.10	.03	.06	467.	*	2	0410	170	.04	.00	.04	334.
1	1140	71	.10	.03	.07	488.	*	2	0420	171	.04	.00	.04	330.
1	1150	72	.10	.03	.07	509.	*	2	0430	172	.04	.00	.04	327.
1	1200	73	.11	.03	.07	531.	*	2	0440	173	.04	.00	.04	303.
1	1210	74	.11	.03	.08	554.	*	2	0450	174	.04	.00	.04	279.
1	1220	75	.11	.03	.08	579.	*	2	0500	175	.04	.00	.03	270.
1	1230	76	.12	.03	.08	605.	*	2	0510	176	.03	.00	.03	264.
1	1240	77	.12	.03	.09	633.	*	2	0520	177	.03	.00	.03	261.
1	1250	78	.12	.03	.09	663.	*	2	0530	178	.03	.00	.03	258.
1	1300	79	.13	.03	.10	695.	*	2	0540	179	.03	.00	.03	255.
1	1310	80	.13	.03	.10	729.	*	2	0550	180	.03	.00	.03	252.
1	1320	81	.14	.03	.11	766.	*	2	0600	181	.03	.00	.03	249.
1	1330	82	.14	.03	.11	807.	*	2	0610	182	.03	.00	.03	247.
1	1340	83	.21	.05	.16	984.	*	2	0620	183	.03	.00	.03	244.
1	1350	84	.22	.05	.17	1175.	*	2	0630	184	.03	.00	.03	242.
1	1400	85	.23	.04	.18	1287.	*	2	0640	185	.03	.00	.03	239.
1	1410	86	.24	.04	.19	1379.	*	2	0650	186	.03	.00	.03	237.
1	1420	87	.25	.04	.20	1470.	*	2	0700	187	.03	.00	.03	234.
1	1430	88	.26	.04	.22	1568.	*	2	0710	188	.03	.00	.03	232.
1	1440	89	.28	.04	.23	1677.	*	2	0720	189	.03	.00	.03	230.
1	1450	90	.30	.04	.25	1800.	*	2	0730	190	.03	.00	.03	228.
1	1500	91	.32	.04	.27	1943.	*	2	0740	191	.03	.00	.03	225.
1	1510	92	.41	.05	.35	2276.	*	2	0750	192	.03	.00	.03	223.
1	1520	93	.44	.05	.39	2655.	*	2	0800	193	.03	.00	.03	221.
1	1530	94	.48	.05	.43	2977.	*	2	0810	194	.03	.00	.03	219.
1	1540	95	.66	.07	.59	3664.	*	2	0820	195	.03	.00	.03	217.
1	1550	96	.74	.07	.67	4465.	*	2	0830	196	.03	.00	.03	215.
1	1600	97	.85	.07	.78	5219.	*	2	0840	197	.03	.00	.03	213.
1	1610	98	1.67	.11	1.56	8058.	*	2	0850	198	.03	.00	.03	211.
1	1620	99	1.91	.10	1.81	11385.	*	2	0900	199	.03	.00	.03	210.
1	1630	100	2.76	.11	2.65	15536.	*	2	0910	200	.03	.00	.03	208.
							*							

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TOTAL RAINFALL = 35.71, TOTAL LOSS = 4.08, TOTAL EXCESS = 31.63

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	33.17-HR
(CFS)	(HR)				
		(CFS)			

20913.	16.83		5187.	1643.	1205.	1205.
		(INCHES)	24.605	31.181	31.592	31.592
		(AC-FT)	2572.	3259.	3302.	3302.

CUMULATIVE AREA = 1.96 SQ MI

HYDROGRAPH AT STATION BASIN
PLAN 1, RATIO = .50

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0000	1	.00	.00	.00	0.	1		1640	101	1.17	.11	1.06	8031.
1		0010	2	.01	.01	.00	0.	1		1650	102	1.77	.13	1.64	9800.
1		0020	3	.01	.01	.00	0.	1		1700	103	.89	.06	.83	9135.
1		0030	4	.01	.01	.00	0.	1		1710	104	.46	.03	.43	6018.
1		0040	5	.01	.01	.00	0.	1		1720	105	.39	.02	.37	3994.
1		0050	6	.01	.01	.00	0.	1		1730	106	.35	.02	.33	3073.
1		0100	7	.01	.01	.00	0.	1		1740	107	.25	.01	.24	2416.
1		0110	8	.01	.01	.00	0.	1		1750	108	.23	.01	.22	1948.
1		0120	9	.01	.01	.00	0.	1		1800	109	.21	.01	.20	1696.
1		0130	10	.01	.01	.00	0.	1		1810	110	.17	.01	.16	1447.
1		0140	11	.01	.01	.00	0.	1		1820	111	.15	.01	.15	1242.
1		0150	12	.02	.02	.00	0.	1		1830	112	.14	.01	.14	1125.
1		0200	13	.02	.02	.00	0.	1		1840	113	.13	.01	.13	1043.
1		0210	14	.02	.02	.00	0.	1		1850	114	.13	.01	.12	978.
1		0220	15	.02	.02	.00	0.	1		1900	115	.12	.01	.12	924.
1		0230	16	.02	.02	.00	0.	1		1910	116	.12	.00	.11	878.
1		0240	17	.02	.02	.00	0.	1		1920	117	.11	.00	.11	836.
1		0250	18	.02	.02	.00	0.	1		1930	118	.11	.00	.10	800.
1		0300	19	.02	.02	.00	0.	1		1940	119	.07	.00	.07	686.
1		0310	20	.02	.02	.00	0.	1		1950	120	.07	.00	.07	576.
1		0320	21	.02	.02	.00	0.	1		2000	121	.07	.00	.07	527.
1		0330	22	.02	.02	.00	0.	1		2010	122	.07	.00	.06	498.
1		0340	23	.02	.02	.00	0.	1		2020	123	.06	.00	.06	476.
1		0350	24	.02	.02	.00	0.	1		2030	124	.06	.00	.06	459.
1		0400	25	.02	.02	.00	0.	1		2040	125	.06	.00	.06	443.
1		0410	26	.02	.02	.00	0.	1		2050	126	.06	.00	.05	428.
1		0420	27	.02	.02	.00	0.	1		2100	127	.06	.00	.05	415.
1		0430	28	.02	.02	.00	0.	1		2110	128	.05	.00	.05	402.
1		0440	29	.02	.02	.00	0.	1		2120	129	.05	.00	.05	391.
1		0450	30	.02	.02	.00	0.	1		2130	130	.05	.00	.05	380.
1		0500	31	.02	.02	.00	0.	1		2140	131	.05	.00	.05	370.
1		0510	32	.02	.02	.00	0.	1		2150	132	.05	.00	.05	360.
1		0520	33	.02	.02	.00	0.	1		2200	133	.05	.00	.05	351.
1		0530	34	.02	.02	.00	0.	1		2210	134	.05	.00	.04	342.
1		0540	35	.02	.02	.00	0.	1		2220	135	.04	.00	.04	334.
1		0550	36	.02	.02	.00	0.	1		2230	136	.04	.00	.04	327.
1		0600	37	.02	.02	.00	0.	1		2240	137	.04	.00	.04	303.
1		0610	38	.02	.02	.00	0.	1		2250	138	.04	.00	.04	281.
1		0620	39	.02	.02	.00	0.	1		2300	139	.04	.00	.03	270.
1		0630	40	.02	.02	.00	0.	1		2310	140	.04	.00	.03	262.
1		0640	41	.02	.02	.00	0.	1		2320	141	.03	.00	.03	256.
1		0650	42	.03	.03	.00	0.	1		2330	142	.03	.00	.03	251.
1		0700	43	.03	.03	.00	1.	1		2340	143	.03	.00	.03	246.
1		0710	44	.03	.03	.00	3.	1		2350	144	.03	.00	.03	241.

1	0720	45	.03	.03	.00	5.	*	2	0000	145	.03	.00	.03	237.
1	0730	46	.03	.03	.00	8.	*	2	0010	146	.03	.00	.03	232.
1	0740	47	.03	.03	.00	11.	*	2	0020	147	.03	.00	.03	228.
1	0750	48	.03	.03	.00	14.	*	2	0030	148	.03	.00	.03	224.
1	0800	49	.03	.03	.00	17.	*	2	0040	149	.03	.00	.03	220.
1	0810	50	.03	.03	.00	20.	*	2	0050	150	.03	.00	.03	216.
1	0820	51	.03	.03	.00	23.	*	2	0100	151	.03	.00	.03	213.
1	0830	52	.03	.03	.00	26.	*	2	0110	152	.03	.00	.03	209.
1	0840	53	.03	.03	.00	29.	*	2	0120	153	.03	.00	.03	206.
1	0850	54	.03	.03	.00	33.	*	2	0130	154	.03	.00	.03	203.
1	0900	55	.03	.03	.01	36.	*	2	0140	155	.03	.00	.03	200.
1	0910	56	.03	.03	.01	40.	*	2	0150	156	.03	.00	.03	197.
1	0920	57	.03	.03	.01	44.	*	2	0200	157	.03	.00	.03	194.
1	0930	58	.03	.03	.01	48.	*	2	0210	158	.03	.00	.02	191.
1	0940	59	.03	.03	.01	52.	*	2	0220	159	.03	.00	.02	188.
1	0950	60	.03	.03	.01	56.	*	2	0230	160	.03	.00	.02	186.
1	1000	61	.03	.03	.01	60.	*	2	0240	161	.02	.00	.02	183.
1	1010	62	.04	.03	.01	65.	*	2	0250	162	.02	.00	.02	181.
1	1020	63	.04	.03	.01	69.	*	2	0300	163	.02	.00	.02	178.
1	1030	64	.04	.03	.01	74.	*	2	0310	164	.02	.00	.02	176.
1	1040	65	.04	.03	.01	84.	*	2	0320	165	.02	.00	.02	174.
1	1050	66	.04	.03	.01	95.	*	2	0330	166	.02	.00	.02	171.
1	1100	67	.05	.03	.01	103.	*	2	0340	167	.02	.00	.02	169.
1	1110	68	.05	.03	.02	111.	*	2	0350	168	.02	.00	.02	167.
1	1120	69	.05	.03	.02	119.	*	2	0400	169	.02	.00	.02	165.
1	1130	70	.05	.03	.02	127.	*	2	0410	170	.02	.00	.02	163.
1	1140	71	.05	.03	.02	135.	*	2	0420	171	.02	.00	.02	161.
1	1150	72	.05	.03	.02	144.	*	2	0430	172	.02	.00	.02	159.
1	1200	73	.05	.03	.02	153.	*	2	0440	173	.02	.00	.02	148.
1	1210	74	.05	.03	.02	163.	*	2	0450	174	.02	.00	.02	136.
1	1220	75	.06	.03	.02	173.	*	2	0500	175	.02	.00	.02	132.
1	1230	76	.06	.03	.03	184.	*	2	0510	176	.02	.00	.02	129.
1	1240	77	.06	.03	.03	196.	*	2	0520	177	.02	.00	.02	127.
1	1250	78	.06	.03	.03	208.	*	2	0530	178	.02	.00	.02	126.
1	1300	79	.06	.03	.03	222.	*	2	0540	179	.02	.00	.02	124.
1	1310	80	.07	.03	.03	236.	*	2	0550	180	.02	.00	.02	123.
1	1320	81	.07	.03	.04	252.	*	2	0600	181	.02	.00	.02	122.
1	1330	82	.07	.03	.04	269.	*	2	0610	182	.02	.00	.02	120.
1	1340	83	.10	.05	.06	334.	*	2	0620	183	.02	.00	.02	119.
1	1350	84	.11	.05	.06	405.	*	2	0630	184	.02	.00	.02	118.
1	1400	85	.11	.05	.06	451.	*	2	0640	185	.02	.00	.02	117.
1	1410	86	.12	.05	.07	491.	*	2	0650	186	.02	.00	.02	116.
1	1420	87	.12	.05	.07	532.	*	2	0700	187	.02	.00	.01	114.
1	1430	88	.13	.05	.08	576.	*	2	0710	188	.02	.00	.01	113.
1	1440	89	.14	.05	.09	626.	*	2	0720	189	.02	.00	.01	112.
1	1450	90	.15	.05	.10	682.	*	2	0730	190	.02	.00	.01	111.
1	1500	91	.16	.05	.11	747.	*	2	0740	191	.01	.00	.01	110.
1	1510	92	.20	.06	.14	889.	*	2	0750	192	.01	.00	.01	109.
1	1520	93	.22	.06	.16	1053.	*	2	0800	193	.01	.00	.01	108.
1	1530	94	.24	.07	.18	1198.	*	2	0810	194	.01	.00	.01	107.
1	1540	95	.33	.08	.25	1501.	*	2	0820	195	.01	.00	.01	106.
1	1550	96	.37	.09	.28	1859.	*	2	0830	196	.01	.00	.01	105.
1	1600	97	.42	.09	.33	2211.	*	2	0840	197	.01	.00	.01	104.
1	1610	98	.83	.15	.68	3493.	*	2	0850	198	.01	.00	.01	103.
1	1620	99	.96	.14	.82	5037.	*	2	0900	199	.01	.00	.01	102.
1	1630	100	1.38	.16	1.22	7033.	*	2	0910	200	.01	.00	.01	102.
							*							

****

TOTAL RAINFALL = 17.86, TOTAL LOSS = 3.78, TOTAL EXCESS = 14.08

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	33.17-HR
+ (CFS)	(HR)					
		(CFS)				
9800.	16.83		2364.	739.	536.	536.
		(INCHES)	11.214	14.026	14.058	14.058
		(AC-FT)	1172.	1466.	1469.	1469.

CUMULATIVE AREA = 1.96 SQ MI

*** ***

```
          ***************
          *             *
14 KK     *       DAM   *
          *             *
          ***************
```

HYDROGRAPH ROUTING DATA

15 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	ELEV	TYPE OF INITIAL CONDITION
RSVRIC	6073.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

16 SA AREA	10.6	11.3	12.1	12.9	13.9	15.2	17.1	18.7	19.4	20.3
	21.1	22.3								

18 SE ELEVATION	6073.00	6074.00	6075.00	6076.00	6078.00	6080.00	6082.00	6084.00	6086.00	6088.00
	6090.00	6092.00								

20 SS SPILLWAY

CREL	6082.00	SPILLWAY CREST ELEVATION
SPWID	50.00	SPILLWAY WIDTH
COQW	3.10	WEIR COEFFICIENT
EXPW	1.50	EXPONENT OF HEAD

21 ST TOP OF DAM

TOPEL	6090.00	ELEVATION AT TOP OF DAM
DAMWID	350.00	DAM WIDTH
COQD	3.10	WEIR COEFFICIENT
EXPD	1.50	EXPONENT OF HEAD

***

COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	10.95	22.65	35.14	61.94	91.03	123.31	159.10	197.20	236.89
ELEVATION	6073.00	6074.00	6075.00	6076.00	6078.00	6080.00	6082.00	6084.00	6086.00	6088.00
STORAGE	278.29	321.68								
ELEVATION	6090.00	6092.00								

COMPUTED OUTFLOW-ELEVATION DATA

(EXCLUDING FLOW OVER DAM)

OUTFLOW	.00	.00	.84	6.73	22.70	53.76	105.03	181.59	288.24	430.24
ELEVATION	6073.00	6082.00	6082.03	6082.12	6082.28	6082.49	6082.77	6083.11	6083.51	6083.98
OUTFLOW	612.69	840.46	1118.56	1452.25	1846.36	2306.17	2836.47	3442.59	4129.27	4901.53
ELEVATION	6084.50	6085.09	6085.73	6086.44	6087.22	6088.05	6088.94	6089.90	6090.92	6092.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

(INCLUDING FLOW OVER DAM)

STORAGE	.00	10.95	22.65	35.14	61.94	91.03	123.31	123.84	125.43	128.09
OUTFLOW	.00	.00	.00	.00	.00	.00	.00	.84	6.73	22.70
ELEVATION	6073.00	6074.00	6075.00	6076.00	6078.00	6080.00	6082.00	6082.03	6082.12	6082.28
STORAGE	131.85	136.74	142.80	150.07	158.63	159.10	168.49	179.62	192.05	197.20
OUTFLOW	53.76	105.03	181.59	288.24	430.24	438.41	612.69	840.46	1118.56	1240.00
ELEVATION	6082.49	6082.77	6083.11	6083.51	6083.98	6084.00	6084.50	6085.09	6085.73	6086.00
STORAGE	205.86	221.11	236.89	237.89	256.24	276.21	278.29	297.95	321.68	
OUTFLOW	1452.25	1846.36	2278.03	2306.17	2836.47	3442.59	3507.25	5086.59	7970.37	
ELEVATION	6086.44	6087.22	6088.00	6088.05	6088.94	6089.90	6090.00	6090.92	6092.00	

****

HYDROGRAPH AT STATION DAM
PLAN 1, RATIO = .50

****

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	6073.0	1		1110	68	0.	14.7	6074.3	1		2220	135	383.	155.9	6083.8
1		0010	2	0.	.0	6073.0	1		1120	69	0.	16.3	6074.5	1		2230	136	372.	155.2	6083.8
1		0020	3	0.	.0	6073.0	1		1130	70	0.	17.9	6074.6	1		2240	137	360.	154.5	6083.8
1		0030	4	0.	.0	6073.0	1		1140	71	0.	19.7	6074.8	1		2250	138	347.	153.7	6083.7
1		0040	5	0.	.0	6073.0	1		1150	72	0.	21.7	6074.9	1		2300	139	332.	152.8	6083.7
1		0050	6	0.	.0	6073.0	1		1200	73	0.	23.7	6075.1	1		2310	140	319.	152.0	6083.6
1		0100	7	0.	.0	6073.0	1		1210	74	0.	25.9	6075.3	1		2320	141	308.	151.3	6083.6
1		0110	8	0.	.0	6073.0	1		1220	75	0.	28.2	6075.5	1		2330	142	297.	150.6	6083.5
1		0120	9	0.	.0	6073.0	1		1230	76	0.	30.6	6075.6	1		2340	143	288.	150.0	6083.5
1		0130	10	0.	.0	6073.0	1		1240	77	0.	33.2	6075.9	1		2350	144	279.	149.5	6083.5
1		0140	11	0.	.0	6073.0	1		1250	78	0.	36.0	6076.1	2		0000	145	272.	149.0	6083.5
1		0150	12	0.	.0	6073.0	1		1300	79	0.	39.0	6076.3	2		0010	146	265.	148.5	6083.4
1		0200	13	0.	.0	6073.0	1		1310	80	0.	42.1	6076.5	2		0020	147	258.	148.1	6083.4
1		0210	14	0.	.0	6073.0	1		1320	81	0.	45.5	6076.8	2		0030	148	252.	147.7	6083.4
1		0220	15	0.	.0	6073.0	1		1330	82	0.	49.0	6077.1	2		0040	149	247.	147.4	6083.4
1		0230	16	0.	.0	6073.0	1		1340	83	0.	53.2	6077.4	2		0050	150	242.	147.0	6083.3
1		0240	17	0.	.0	6073.0	1		1350	84	0.	58.2	6077.7	2		0100	151	237.	146.7	6083.3
1		0250	18	0.	.0	6073.0	1		1400	85	0.	64.1	6078.2	2		0110	152	232.	146.4	6083.3
1		0300	19	0.	.0	6073.0	1		1410	86	0.	70.6	6078.6	2		0120	153	228.	146.1	6083.3
1		0310	20	0.	.0	6073.0	1		1420	87	0.	77.6	6079.1	2		0130	154	224.	145.8	6083.3
1		0320	21	0.	.0	6073.0	1		1430	88	0.	85.3	6079.6	2		0140	155	220.	145.5	6083.3
1		0330	22	0.	.0	6073.0	1		1440	89	0.	93.6	6080.2	2		0150	156	216.	145.2	6083.2
1		0340	23	0.	.0	6073.0	1		1450	90	0.	102.6	6080.7	2		0200	157	212.	145.0	6083.2
1		0350	24	0.	.0	6073.0	1		1500	91	0.	112.5	6081.4	2		0210	158	209.	144.7	6083.2
1		0400	25	0.	.0	6073.0	1		1510	92	1.	123.7	6082.0	2		0220	159	205.	144.5	6083.2

1	0410	26	0.	.0	6073.0	*	1	1520	93	101.	136.4	6082.8	*	2	0230	160	202.	144.3	6083.2
1	0420	27	0.	.0	6073.0	*	1	1530	94	276.	149.3	6083.5	*	2	0240	161	199.	144.1	6083.2
1	0430	28	0.	.0	6073.0	*	1	1540	95	500.	162.5	6084.2	*	2	0250	162	196.	143.8	6083.2
1	0440	29	0.	.0	6073.0	*	1	1550	96	783.	176.9	6084.9	*	2	0300	163	193.	143.6	6083.2
1	0450	30	0.	.0	6073.0	*	1	1600	97	1116.	192.0	6085.7	*	2	0310	164	190.	143.4	6083.1
1	0500	31	0.	.0	6073.0	*	1	1610	98	1618.	212.4	6086.8	*	2	0320	165	188.	143.2	6083.1
1	0510	32	0.	.0	6073.0	*	1	1620	99	2454.	243.1	6088.3	*	2	0330	166	185.	143.1	6083.1
1	0520	33	0.	.0	6073.0	*	1	1630	100	3786.	283.3	6090.2	*	2	0340	167	183.	142.9	6083.1
1	0530	34	0.	.0	6073.0	*	1	1640	101	6866.	313.3	6091.6	*	2	0350	168	180.	142.7	6083.1
1	0540	35	0.	.0	6073.0	*	1	1650	102	8859.	328.1	6092.3	*	2	0400	169	178.	142.5	6083.1
1	0550	36	0.	.0	6073.0	*	1	1700	103	9457.	332.2	6092.5	*	2	0410	170	176.	142.4	6083.1
1	0600	37	0.	.0	6073.0	*	1	1710	104	7613.	319.0	6091.9	*	2	0420	171	173.	142.2	6083.1
1	0610	38	0.	.0	6073.0	*	1	1720	105	5254.	299.5	6091.0	*	2	0430	172	171.	142.0	6083.1
1	0620	39	0.	.0	6073.0	*	1	1730	106	3924.	285.2	6090.3	*	2	0440	173	168.	141.8	6083.1
1	0630	40	0.	.0	6073.0	*	1	1740	107	3342.	272.9	6089.7	*	2	0450	174	164.	141.5	6083.0
1	0640	41	0.	.0	6073.0	*	1	1750	108	2941.	259.7	6089.1	*	2	0500	175	159.	141.1	6083.0
1	0650	42	0.	.0	6073.0	*	1	1800	109	2564.	246.9	6088.5	*	2	0510	176	154.	140.8	6083.0
1	0700	43	0.	.0	6073.0	*	1	1810	110	2239.	235.5	6087.9	*	2	0520	177	150.	140.4	6083.0
1	0710	44	0.	.0	6073.0	*	1	1820	111	1954.	225.1	6087.4	*	2	0530	178	146.	140.1	6083.0
1	0720	45	0.	.1	6073.0	*	1	1830	112	1716.	216.2	6087.0	*	2	0540	179	143.	139.9	6082.9
1	0730	46	0.	.2	6073.0	*	1	1840	113	1526.	208.8	6086.6	*	2	0550	180	140.	139.6	6082.9
1	0740	47	0.	.3	6073.0	*	1	1850	114	1374.	202.7	6086.3	*	2	0600	181	137.	139.4	6082.9
1	0750	48	0.	.5	6073.0	*	1	1900	115	1253.	197.7	6086.0	*	2	0610	182	135.	139.2	6082.9
1	0800	49	0.	.7	6073.1	*	1	1910	116	1155.	193.6	6085.8	*	2	0620	183	132.	139.0	6082.9
1	0810	50	0.	.9	6073.1	*	1	1920	117	1074.	190.1	6085.6	*	2	0630	184	130.	138.9	6082.9
1	0820	51	0.	1.2	6073.1	*	1	1930	118	1005.	187.1	6085.5	*	2	0640	185	128.	138.7	6082.9
1	0830	52	0.	1.5	6073.1	*	1	1940	119	936.	184.0	6085.3	*	2	0650	186	127.	138.5	6082.9
1	0840	53	0.	1.9	6073.2	*	1	1950	120	856.	180.4	6085.1	*	2	0700	187	125.	138.4	6082.9
1	0850	54	0.	2.3	6073.2	*	1	2000	121	779.	176.7	6084.9	*	2	0710	188	123.	138.3	6082.9
1	0900	55	0.	2.8	6073.3	*	1	2010	122	712.	173.5	6084.8	*	2	0720	189	121.	138.1	6082.9
1	0910	56	0.	3.3	6073.3	*	1	2020	123	657.	170.8	6084.6	*	2	0730	190	120.	138.0	6082.8
1	0920	57	0.	3.9	6073.4	*	1	2030	124	613.	168.5	6084.5	*	2	0740	191	119.	137.9	6082.8
1	0930	58	0.	4.5	6073.4	*	1	2040	125	575.	166.5	6084.4	*	2	0750	192	117.	137.8	6082.8
1	0940	59	0.	5.2	6073.5	*	1	2050	126	543.	164.9	6084.3	*	2	0800	193	116.	137.7	6082.8
1	0950	60	0.	5.9	6073.6	*	1	2100	127	516.	163.4	6084.2	*	2	0810	194	115.	137.6	6082.8
1	1000	61	0.	6.7	6073.6	*	1	2110	128	492.	162.1	6084.2	*	2	0820	195	114.	137.5	6082.8
1	1010	62	0.	7.6	6073.7	*	1	2120	129	471.	160.9	6084.1	*	2	0830	196	112.	137.4	6082.8
1	1020	63	0.	8.5	6073.8	*	1	2130	130	453.	159.9	6084.0	*	2	0840	197	111.	137.3	6082.8
1	1030	64	0.	9.5	6073.9	*	1	2140	131	436.	159.0	6084.0	*	2	0850	198	110.	137.2	6082.8
1	1040	65	0.	10.6	6074.0	*	1	2150	132	421.	158.1	6083.9	*	2	0900	199	109.	137.1	6082.8
1	1050	66	0.	11.8	6074.1	*	1	2200	133	407.	157.3	6083.9	*	2	0910	200	108.	137.0	6082.8
1	1100	67	0.	13.2	6074.2	*	1	2210	134	395.	156.6	6083.9	*						
						*							*						

****

PEAK OUTFLOW IS 9457. AT TIME 17.00 HOURS

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	33.17-HR
(CFS)	(HR)					
		(CFS)				
9457.	17.00		2276.	672.	486.	486.
		(INCHES)	10.798	12.757	12.757	12.757
		(AC-FT)	1129.	1334.	1334.	1334.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	33.17-HR
(AC-FT)	(HR)				
332.	17.00	217.	135.	98.	98.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	33.17-HR
(FEET)	(HR)				
6092.47	17.00	6086.93	6082.32	6079.75	6079.75

CUMULATIVE AREA = 1.96 SQ MI

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

					RATIOS APPLIED TO PRECIPITATION
OPERATION	STATION	AREA	PLAN		RATIO 1
					.50
HYDROGRAPH AT					
	BASIN	1.96	1	FLOW	9800.
				TIME	16.83
ROUTED TO					
	DAM	1.96	1	FLOW	9457.
				TIME	17.00

** PEAK STAGES IN FEET **
1 STAGE 6092.47
TIME 17.00

SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	6073.00	6082.00	6090.00
STORAGE	0.	123.	278.
OUTFLOW	0.	0.	3507.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.50	6092.47	2.47	332.	9457.	1.17	17.00	.00

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

APPENDIX F -

HEC-1 Output
Future Conditions
1/2 Probable Maximum Flood
Spillway Width = 100'
Spillway Elev. = 6,080.75
Spillway Pipe = 48"
Lake Elev. = 6,074.0

THIS HEC-1 VERSION CONTAINS ALL OPTIONS EXCEPT ECONOMICS, AND THE NUMBER OF PLANS ARE REDUCED TO 3

HEC-1 INPUT PAGE 1

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

        1           ID              SPRING RUN NO.2 DAM   JOB NO.89-823
        2           ID              50% PROBABLE MAXIMUM FLOOD
        3           ID              PROPOSED CONDITION WITH 48"OUTLET AND 100'SPILLWAY
        4           ID              IN-HEC1P2      OUT-HEC.P2O
*** FREE ***
        5           IT     10       0       0     200
        6           IO
        7           JR    PREC      .5

        8           KK    BASIN
        9           BA    1.96
       10           LS       0      73       0       0       0       0
       11           PH       0      .1       0    3.50   14.00   18.64   21.36   26.00   30.00   34.00
       12           PH   37.79   41.57
       13           UD     .16

       14           KK     DAM
       15           RS       1    ELEV    6074
       16           SA    12.0    12.1    12.9    13.9    15.2    17.1    18.7    19.4    20.3    21.1
       17           SA    22.3
       18           SE    6074    6075    6076    6078    6080    6082    6084    6086    6088    6090
       19           SE    6092
       20           SL    6076    12.6     .68      .5
       21           SS 6080.75     100     3.1     1.5
       22           ST    6090     350     3.1     1.5
       23           ZZ
```

1
****
FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
****

SPRING RUN NO.2 DAM JOB NO.89-823
50% PROBABLE MAXIMUM FLOOD
PROPOSED CONDITION WITH 48"OUTLET AND 100'SPILLWAY
IN-HEC1P2 OUT-HEC.P2O

6 IO OUTPUT CONTROL VARIABLES
IPRNT 0 PRINT CONTROL

```
                IPLOT          0  PLOT CONTROL
                QSCAL          0.  HYDROGRAPH PLOT SCALE

  IT        HYDROGRAPH TIME DATA
              NMIN          10  MINUTES IN COMPUTATION INTERVAL
              IDATE      1    0  STARTING DATE
              ITIME        0000  STARTING TIME
                NQ          200  NUMBER OF HYDROGRAPH ORDINATES
             NDDATE      2    0  ENDING DATE
             NDTIME        0910  ENDING TIME

          COMPUTATION INTERVAL     .17 HOURS
              TOTAL TIME BASE   33.17 HOURS

     ENGLISH UNITS

  JP        MULTI-PLAN OPTION
              NPLAN          1  NUMBER OF PLANS

  JR        MULTI-RATIO OPTION
            RATIOS OF PRECIPITATION
            .50


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


      ***************
      *             *
8 KK  *     BASIN   *
      *             *
      ***************

        SUBBASIN RUNOFF DATA

 9 BA     SUBBASIN CHARACTERISTICS
              TAREA       1.96  SUBBASIN AREA

          PRECIPITATION DATA

11 PH                          DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
          ..... HYDRO-35 .....   ............... TP-40 ...............  ........... TP-49 ...........
          5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
            .00    3.50   14.00   18.64   21.36   26.00   30.00   34.00   37.79   41.57     .00     .00

                                          STORM AREA =     .10

10 LS     SCS LOSS RATE
              STRTL        .74  INITIAL ABSTRACTION
             CRVNBR      73.00  CURVE NUMBER
              RTIMP        .00  PERCENT IMPERVIOUS AREA

13 UD     SCS DIMENSIONLESS UNITGRAPH
              TLAG        .16  LAG

                                                  ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG
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UNIT HYDROGRAPH
7 END-OF-PERIOD ORDINATES

3042. 3073. 994. 329. 107. 37. 8.

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HYDROGRAPH AT STATION BASIN

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DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0000	1	.00	.00	.00	0.	*	1		1640	101	2.33	.07	2.26	17443.
1		0010	2	.03	.03	.00	0.	*	1		1650	102	3.55	.08	3.46	20913.
1		0020	3	.03	.03	.00	0.	*	1		1700	103	1.77	.03	1.74	19309.
1		0030	4	.03	.03	.00	0.	*	1		1710	104	.92	.02	.90	12642.
1		0040	5	.03	.03	.00	0.	*	1		1720	105	.79	.01	.77	8351.
1		0050	6	.03	.03	.00	0.	*	1		1730	106	.69	.01	.68	6399.
1		0100	7	.03	.03	.00	0.	*	1		1740	107	.51	.01	.50	5020.
1		0110	8	.03	.03	.00	0.	*	1		1750	108	.46	.01	.45	4039.
1		0120	9	.03	.03	.00	0.	*	1		1800	109	.42	.01	.42	3513.
1		0130	10	.03	.03	.00	0.	*	1		1810	110	.33	.00	.33	2994.
1		0140	11	.03	.03	.00	0.	*	1		1820	111	.31	.00	.30	2569.
1		0150	12	.03	.03	.00	0.	*	1		1830	112	.29	.00	.28	2324.
1		0200	13	.03	.03	.00	0.	*	1		1840	113	.27	.00	.27	2153.
1		0210	14	.03	.03	.00	0.	*	1		1850	114	.26	.00	.25	2019.
1		0220	15	.03	.03	.00	0.	*	1		1900	115	.24	.00	.24	1907.
1		0230	16	.03	.03	.00	0.	*	1		1910	116	.23	.00	.23	1810.
1		0240	17	.03	.03	.00	0.	*	1		1920	117	.22	.00	.22	1724.
1		0250	18	.03	.03	.00	0.	*	1		1930	118	.21	.00	.21	1648.
1		0300	19	.03	.03	.00	0.	*	1		1940	119	.15	.00	.15	1413.
1		0310	20	.03	.03	.00	0.	*	1		1950	120	.14	.00	.14	1187.
1		0320	21	.03	.03	.00	0.	*	1		2000	121	.14	.00	.13	1085.
1		0330	22	.03	.03	.00	0.	*	1		2010	122	.13	.00	.13	1024.
1		0340	23	.03	.03	.00	0.	*	1		2020	123	.13	.00	.12	980.
1		0350	24	.03	.03	.00	0.	*	1		2030	124	.12	.00	.12	943.
1		0400	25	.03	.03	.00	0.	*	1		2040	125	.12	.00	.12	911.
1		0410	26	.03	.03	.00	1.	*	1		2050	126	.11	.00	.11	881.
1		0420	27	.04	.03	.00	4.	*	1		2100	127	.11	.00	.11	853.
1		0430	28	.04	.03	.00	8.	*	1		2110	128	.11	.00	.11	827.
1		0440	29	.04	.04	.00	14.	*	1		2120	129	.10	.00	.10	803.
1		0450	30	.04	.04	.00	22.	*	1		2130	130	.10	.00	.10	781.
1		0500	31	.04	.04	.00	29.	*	1		2140	131	.10	.00	.10	760.
1		0510	32	.04	.04	.01	36.	*	1		2150	132	.10	.00	.10	740.
1		0520	33	.04	.04	.01	43.	*	1		2200	133	.09	.00	.09	721.
1		0530	34	.05	.04	.01	50.	*	1		2210	134	.09	.00	.09	703.
1		0540	35	.05	.04	.01	57.	*	1		2220	135	.09	.00	.09	687.
1		0550	36	.05	.04	.01	64.	*	1		2230	136	.09	.00	.09	671.
1		0600	37	.05	.04	.01	72.	*	1		2240	137	.07	.00	.07	623.
1		0610	38	.05	.04	.01	79.	*	1		2250	138	.07	.00	.07	577.
1		0620	39	.05	.04	.01	86.	*	1		2300	139	.07	.00	.07	554.
1		0630	40	.05	.04	.01	94.	*	1		2310	140	.07	.00	.07	538.
1		0640	41	.05	.04	.01	101.	*	1		2320	141	.07	.00	.07	526.
1		0650	42	.05	.04	.02	109.	*	1		2330	142	.07	.00	.07	515.
1		0700	43	.05	.03	.02	116.	*	1		2340	143	.07	.00	.07	505.
1		0710	44	.05	.03	.02	124.	*	1		2350	144	.06	.00	.06	495.
1		0720	45	.05	.03	.02	132.	*	2		0000	145	.06	.00	.06	485.
1		0730	46	.05	.03	.02	140.	*	2		0010	146	.06	.00	.06	476.
1		0740	47	.05	.03	.02	148.	*	2		0020	147	.06	.00	.06	468.
1		0750	48	.06	.03	.02	156.	*	2		0030	148	.06	.00	.06	460.

1	0800	49	.06	.03	.02	165.	*	2	0040	149	.06	.00	.06	452.
1	0810	50	.06	.03	.02	173.	*	2	0050	150	.06	.00	.06	444.
1	0820	51	.06	.03	.02	182.	*	2	0100	151	.06	.00	.06	437.
1	0830	52	.06	.03	.03	191.	*	2	0110	152	.06	.00	.06	429.
1	0840	53	.06	.03	.03	200.	*	2	0120	153	.06	.00	.05	423.
1	0850	54	.06	.03	.03	209.	*	2	0130	154	.05	.00	.05	416.
1	0900	55	.06	.03	.03	219.	*	2	0140	155	.05	.00	.05	410.
1	0910	56	.06	.03	.03	229.	*	2	0150	156	.05	.00	.05	403.
1	0920	57	.06	.03	.03	239.	*	2	0200	157	.05	.00	.05	397.
1	0930	58	.07	.03	.03	249.	*	2	0210	158	.05	.00	.05	392.
1	0940	59	.07	.03	.04	260.	*	2	0220	159	.05	.00	.05	386.
1	0950	60	.07	.03	.04	271.	*	2	0230	160	.05	.00	.05	381.
1	1000	61	.07	.03	.04	282.	*	2	0240	161	.05	.00	.05	375.
1	1010	62	.07	.03	.04	294.	*	2	0250	162	.05	.00	.05	370.
1	1020	63	.07	.03	.04	306.	*	2	0300	163	.05	.00	.05	365.
1	1030	64	.07	.03	.04	319.	*	2	0310	164	.05	.00	.05	361.
1	1040	65	.09	.03	.05	352.	*	2	0320	165	.05	.00	.05	356.
1	1050	66	.09	.03	.05	386.	*	2	0330	166	.05	.00	.05	351.
1	1100	67	.09	.03	.06	409.	*	2	0340	167	.05	.00	.05	347.
1	1110	68	.09	.03	.06	429.	*	2	0350	168	.05	.00	.04	343.
1	1120	69	.10	.03	.06	448.	*	2	0400	169	.04	.00	.04	339.
1	1130	70	.10	.03	.06	467.	*	2	0410	170	.04	.00	.04	334.
1	1140	71	.10	.03	.07	488.	*	2	0420	171	.04	.00	.04	330.
1	1150	72	.10	.03	.07	509.	*	2	0430	172	.04	.00	.04	327.
1	1200	73	.11	.03	.07	531.	*	2	0440	173	.04	.00	.04	303.
1	1210	74	.11	.03	.08	554.	*	2	0450	174	.04	.00	.04	279.
1	1220	75	.11	.03	.08	579.	*	2	0500	175	.04	.00	.03	270.
1	1230	76	.12	.03	.08	605.	*	2	0510	176	.03	.00	.03	264.
1	1240	77	.12	.03	.09	633.	*	2	0520	177	.03	.00	.03	261.
1	1250	78	.12	.03	.09	663.	*	2	0530	178	.03	.00	.03	258.
1	1300	79	.13	.03	.10	695.	*	2	0540	179	.03	.00	.03	255.
1	1310	80	.13	.03	.10	729.	*	2	0550	180	.03	.00	.03	252.
1	1320	81	.14	.03	.11	766.	*	2	0600	181	.03	.00	.03	249.
1	1330	82	.14	.03	.11	807.	*	2	0610	182	.03	.00	.03	247.
1	1340	83	.21	.05	.16	984.	*	2	0620	183	.03	.00	.03	244.
1	1350	84	.22	.05	.17	1175.	*	2	0630	184	.03	.00	.03	242.
1	1400	85	.23	.04	.18	1287.	*	2	0640	185	.03	.00	.03	239.
1	1410	86	.24	.04	.19	1379.	*	2	0650	186	.03	.00	.03	237.
1	1420	87	.25	.04	.20	1470.	*	2	0700	187	.03	.00	.03	234.
1	1430	88	.26	.04	.22	1568.	*	2	0710	188	.03	.00	.03	232.
1	1440	89	.28	.04	.23	1677.	*	2	0720	189	.03	.00	.03	230.
1	1450	90	.30	.04	.25	1800.	*	2	0730	190	.03	.00	.03	228.
1	1500	91	.32	.04	.27	1943.	*	2	0740	191	.03	.00	.03	225.
1	1510	92	.41	.05	.35	2276.	*	2	0750	192	.03	.00	.03	223.
1	1520	93	.44	.05	.39	2655.	*	2	0800	193	.03	.00	.03	221.
1	1530	94	.48	.05	.43	2977.	*	2	0810	194	.03	.00	.03	219.
1	1540	95	.66	.07	.59	3664.	*	2	0820	195	.03	.00	.03	217.
1	1550	96	.74	.07	.67	4465.	*	2	0830	196	.03	.00	.03	215.
1	1600	97	.85	.07	.78	5219.	*	2	0840	197	.03	.00	.03	213.
1	1610	98	1.67	.11	1.56	8058.	*	2	0850	198	.03	.00	.03	211.
1	1620	99	1.91	.10	1.81	11385.	*	2	0900	199	.03	.00	.03	210.
1	1630	100	2.76	.11	2.65	15536.	*	2	0910	200	.03	.00	.03	208.
							*							

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TOTAL RAINFALL = 35.71, TOTAL LOSS = 4.08, TOTAL EXCESS = 31.63

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	33.17-HR
+ (CFS)	(HR)				

		(CFS)				
20913.	16.83		5187.	1643.	1205.	1205.
		(INCHES)	24.605	31.181	31.592	31.592
		(AC-FT)	2572.	3259.	3302.	3302.

CUMULATIVE AREA = 1.96 SQ MI

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HYDROGRAPH AT STATION BASIN
PLAN 1, RATIO = .50

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DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0000	1	.00	.00	.00	0.	*	1		1640	101	1.17	.11	1.06	8031.
1		0010	2	.01	.01	.00	0.	*	1		1650	102	1.77	.13	1.64	9800.
1		0020	3	.01	.01	.00	0.	*	1		1700	103	.89	.06	.83	9135.
1		0030	4	.01	.01	.00	0.	*	1		1710	104	.46	.03	.43	6018.
1		0040	5	.01	.01	.00	0.	*	1		1720	105	.39	.02	.37	3994.
1		0050	6	.01	.01	.00	0.	*	1		1730	106	.35	.02	.33	3073.
1		0100	7	.01	.01	.00	0.	*	1		1740	107	.25	.01	.24	2416.
1		0110	8	.01	.01	.00	0.	*	1		1750	108	.23	.01	.22	1948.
1		0120	9	.01	.01	.00	0.	*	1		1800	109	.21	.01	.20	1696.
1		0130	10	.01	.01	.00	0.	*	1		1810	110	.17	.01	.16	1447.
1		0140	11	.01	.01	.00	0.	*	1		1820	111	.15	.01	.15	1242.
1		0150	12	.02	.02	.00	0.	*	1		1830	112	.14	.01	.14	1125.
1		0200	13	.02	.02	.00	0.	*	1		1840	113	.13	.01	.13	1043.
1		0210	14	.02	.02	.00	0.	*	1		1850	114	.13	.01	.12	978.
1		0220	15	.02	.02	.00	0.	*	1		1900	115	.12	.01	.12	924.
1		0230	16	.02	.02	.00	0.	*	1		1910	116	.12	.00	.11	878.
1		0240	17	.02	.02	.00	0.	*	1		1920	117	.11	.00	.11	836.
1		0250	18	.02	.02	.00	0.	*	1		1930	118	.11	.00	.10	800.
1		0300	19	.02	.02	.00	0.	*	1		1940	119	.07	.00	.07	686.
1		0310	20	.02	.02	.00	0.	*	1		1950	120	.07	.00	.07	576.
1		0320	21	.02	.02	.00	0.	*	1		2000	121	.07	.00	.07	527.
1		0330	22	.02	.02	.00	0.	*	1		2010	122	.07	.00	.06	498.
1		0340	23	.02	.02	.00	0.	*	1		2020	123	.06	.00	.06	476.
1		0350	24	.02	.02	.00	0.	*	1		2030	124	.06	.00	.06	459.
1		0400	25	.02	.02	.00	0.	*	1		2040	125	.06	.00	.06	443.
1		0410	26	.02	.02	.00	0.	*	1		2050	126	.06	.00	.05	428.
1		0420	27	.02	.02	.00	0.	*	1		2100	127	.06	.00	.05	415.
1		0430	28	.02	.02	.00	0.	*	1		2110	128	.05	.00	.05	402.
1		0440	29	.02	.02	.00	0.	*	1		2120	129	.05	.00	.05	391.
1		0450	30	.02	.02	.00	0.	*	1		2130	130	.05	.00	.05	380.
1		0500	31	.02	.02	.00	0.	*	1		2140	131	.05	.00	.05	370.
1		0510	32	.02	.02	.00	0.	*	1		2150	132	.05	.00	.05	360.
1		0520	33	.02	.02	.00	0.	*	1		2200	133	.05	.00	.05	351.
1		0530	34	.02	.02	.00	0.	*	1		2210	134	.05	.00	.04	342.
1		0540	35	.02	.02	.00	0.	*	1		2220	135	.04	.00	.04	334.
1		0550	36	.02	.02	.00	0.	*	1		2230	136	.04	.00	.04	327.
1		0600	37	.02	.02	.00	0.	*	1		2240	137	.04	.00	.04	303.
1		0610	38	.02	.02	.00	0.	*	1		2250	138	.04	.00	.04	281.
1		0620	39	.02	.02	.00	0.	*	1		2300	139	.04	.00	.03	270.
1		0630	40	.02	.02	.00	0.	*	1		2310	140	.04	.00	.03	262.
1		0640	41	.02	.02	.00	0.	*	1		2320	141	.03	.00	.03	256.
1		0650	42	.03	.03	.00	0.	*	1		2330	142	.03	.00	.03	251.
1		0700	43	.03	.03	.00	1.	*	1		2340	143	.03	.00	.03	246.

1	0710	44	.03	.03	.00	3.	*	1	2350	144	.03	.00	.03	241.
1	0720	45	.03	.03	.00	5.	*	2	0000	145	.03	.00	.03	237.
1	0730	46	.03	.03	.00	8.	*	2	0010	146	.03	.00	.03	232.
1	0740	47	.03	.03	.00	11.	*	2	0020	147	.03	.00	.03	228.
1	0750	48	.03	.03	.00	14.	*	2	0030	148	.03	.00	.03	224.
1	0800	49	.03	.03	.00	17.	*	2	0040	149	.03	.00	.03	220.
1	0810	50	.03	.03	.00	20.	*	2	0050	150	.03	.00	.03	216.
1	0820	51	.03	.03	.00	23.	*	2	0100	151	.03	.00	.03	213.
1	0830	52	.03	.03	.00	26.	*	2	0110	152	.03	.00	.03	209.
1	0840	53	.03	.03	.00	29.	*	2	0120	153	.03	.00	.03	206.
1	0850	54	.03	.03	.00	33.	*	2	0130	154	.03	.00	.03	203.
1	0900	55	.03	.03	.01	36.	*	2	0140	155	.03	.00	.03	200.
1	0910	56	.03	.03	.01	40.	*	2	0150	156	.03	.00	.03	197.
1	0920	57	.03	.03	.01	44.	*	2	0200	157	.03	.00	.03	194.
1	0930	58	.03	.03	.01	48.	*	2	0210	158	.03	.00	.02	191.
1	0940	59	.03	.03	.01	52.	*	2	0220	159	.03	.00	.02	188.
1	0950	60	.03	.03	.01	56.	*	2	0230	160	.03	.00	.02	186.
1	1000	61	.03	.03	.01	60.	*	2	0240	161	.02	.00	.02	183.
1	1010	62	.04	.03	.01	65.	*	2	0250	162	.02	.00	.02	181.
1	1020	63	.04	.03	.01	69.	*	2	0300	163	.02	.00	.02	178.
1	1030	64	.04	.03	.01	74.	*	2	0310	164	.02	.00	.02	176.
1	1040	65	.04	.03	.01	84.	*	2	0320	165	.02	.00	.02	174.
1	1050	66	.04	.03	.01	95.	*	2	0330	166	.02	.00	.02	171.
1	1100	67	.05	.03	.01	103.	*	2	0340	167	.02	.00	.02	169.
1	1110	68	.05	.03	.02	111.	*	2	0350	168	.02	.00	.02	167.
1	1120	69	.05	.03	.02	119.	*	2	0400	169	.02	.00	.02	165.
1	1130	70	.05	.03	.02	127.	*	2	0410	170	.02	.00	.02	163.
1	1140	71	.05	.03	.02	135.	*	2	0420	171	.02	.00	.02	161.
1	1150	72	.05	.03	.02	144.	*	2	0430	172	.02	.00	.02	159.
1	1200	73	.05	.03	.02	153.	*	2	0440	173	.02	.00	.02	148.
1	1210	74	.05	.03	.02	163.	*	2	0450	174	.02	.00	.02	136.
1	1220	75	.06	.03	.02	173.	*	2	0500	175	.02	.00	.02	132.
1	1230	76	.06	.03	.03	184.	*	2	0510	176	.02	.00	.02	129.
1	1240	77	.06	.03	.03	196.	*	2	0520	177	.02	.00	.02	127.
1	1250	78	.06	.03	.03	208.	*	2	0530	178	.02	.00	.02	126.
1	1300	79	.06	.03	.03	222.	*	2	0540	179	.02	.00	.02	124.
1	1310	80	.07	.03	.03	236.	*	2	0550	180	.02	.00	.02	123.
1	1320	81	.07	.03	.04	252.	*	2	0600	181	.02	.00	.02	122.
1	1330	82	.07	.03	.04	269.	*	2	0610	182	.02	.00	.02	120.
1	1340	83	.10	.05	.06	334.	*	2	0620	183	.02	.00	.02	119.
1	1350	84	.11	.05	.06	405.	*	2	0630	184	.02	.00	.02	118.
1	1400	85	.11	.05	.06	451.	*	2	0640	185	.02	.00	.02	117.
1	1410	86	.12	.05	.07	491.	*	2	0650	186	.02	.00	.02	116.
1	1420	87	.12	.05	.07	532.	*	2	0700	187	.02	.00	.01	114.
1	1430	88	.13	.05	.08	576.	*	2	0710	188	.02	.00	.01	113.
1	1440	89	.14	.05	.09	626.	*	2	0720	189	.02	.00	.01	112.
1	1450	90	.15	.05	.10	682.	*	2	0730	190	.02	.00	.01	111.
1	1500	91	.16	.05	.11	747.	*	2	0740	191	.01	.00	.01	110.
1	1510	92	.20	.06	.14	889.	*	2	0750	192	.01	.00	.01	109.
1	1520	93	.22	.06	.16	1053.	*	2	0800	193	.01	.00	.01	108.
1	1530	94	.24	.07	.18	1198.	*	2	0810	194	.01	.00	.01	107.
1	1540	95	.33	.08	.25	1501.	*	2	0820	195	.01	.00	.01	106.
1	1550	96	.37	.09	.28	1859.	*	2	0830	196	.01	.00	.01	105.
1	1600	97	.42	.09	.33	2211.	*	2	0840	197	.01	.00	.01	104.
1	1610	98	.83	.15	.68	3493.	*	2	0850	198	.01	.00	.01	103.
1	1620	99	.96	.14	.82	5037.	*	2	0900	199	.01	.00	.01	102.
1	1630	100	1.38	.16	1.22	7033.	*	2	0910	200	.01	.00	.01	102.
							*							

****

TOTAL RAINFALL = 17.86, TOTAL LOSS = 3.78, TOTAL EXCESS = 14.08

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	33.17-HR
(CFS)	(HR)					
		(CFS)				
+ 9800.	16.83		2364.	739.	536.	536.
		(INCHES)	11.214	14.026	14.058	14.058
		(AC-FT)	1172.	1466.	1469.	1469.

CUMULATIVE AREA = 1.96 SQ MI

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          ***************
          *             *
14 KK     *       DAM   *
          *             *
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HYDROGRAPH ROUTING DATA

15 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	ELEV	TYPE OF INITIAL CONDITION
RSVRIC	6074.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

16 SA AREA 12.0 12.1 12.9 13.9 15.2 17.1 18.7 19.4 20.3 21.1 22.3

18 SE ELEVATION 6074.00 6075.00 6076.00 6078.00 6080.00 6082.00 6084.00 6086.00 6088.00 6090.00 6092.00

20 SL LOW-LEVEL OUTLET

ELEVL	6076.00	ELEVATION AT CENTER OF OUTLET
CAREA	12.60	CROSS-SECTIONAL AREA
COOL	.68	COEFFICIENT
EXPL	.50	EXPONENT OF HEAD

21 SS SPILLWAY

CREL	6080.75	SPILLWAY CREST ELEVATION
SPWID	100.00	SPILLWAY WIDTH
COOW	3.10	WEIR COEFFICIENT
EXPW	1.50	EXPONENT OF HEAD

22 ST TOP OF DAM

TOPEL	6090.00	ELEVATION AT TOP OF DAM
DAMWID	350.00	DAM WIDTH
COOD	3.10	WEIR COEFFICIENT
EXPD	1.50	EXPONENT OF HEAD

***

COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	12.05	24.55	51.34	80.43	112.71	148.50	186.60	226.30	267.69
ELEVATION	6074.00	6075.00	6076.00	6078.00	6080.00	6082.00	6084.00	6086.00	6088.00	6090.00
STORAGE	311.09									
ELEVATION	6092.00									

COMPUTED OUTFLOW-ELEVATION DATA

(EXCLUDING FLOW OVER DAM)

OUTFLOW	.00	.00	94.15	99.43	105.33	111.97	119.51	128.14	138.11	149.76
ELEVATION	6074.00	6076.00	6077.88	6078.09	6078.35	6078.66	6079.02	6079.48	6080.04	6080.75
OUTFLOW	167.03	262.71	504.46	959.80	1696.63	2782.75	4285.43	6272.37	8811.99	11972.29
ELEVATION	6080.88	6081.24	6081.81	6082.60	6083.62	6084.85	6086.31	6087.99	6089.88	6092.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

(INCLUDING FLOW OVER DAM)

STORAGE	.00	12.05	24.55	49.64	51.34	52.65	56.24	60.59	65.92	72.58
OUTFLOW	.00	.00	.00	94.15	97.18	99.43	105.33	111.97	119.51	128.14
ELEVATION	6074.00	6075.00	6076.00	6077.88	6078.00	6078.09	6078.35	6078.66	6079.02	6079.48
STORAGE	80.43	81.03	92.09	94.23	99.95	109.50	112.71	123.20	141.45	148.50
OUTFLOW	137.43	138.11	149.76	167.03	262.71	504.46	601.56	959.80	1696.63	2010.65
ELEVATION	6080.00	6080.04	6080.75	6080.88	6081.24	6081.81	6082.00	6082.60	6083.62	6084.00
STORAGE	164.62	186.60	192.65	226.02	226.30	265.22	267.69	311.09		
OUTFLOW	2782.75	3946.37	4285.43	6272.37	6289.62	8811.99	8978.27	15041.14		
ELEVATION	6084.85	6086.00	6086.31	6087.99	6088.00	6089.88	6090.00	6092.00		

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HYDROGRAPH AT STATION DAM
PLAN 1, RATIO = .50

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	6074.0	*	1		1110	68	0.	14.7	6075.2	*	1		2220	135	362.	104.3	6081.5
1		0010	2	0.	.0	6074.0	*	1		1120	69	0.	16.3	6075.3	*	1		2230	136	353.	103.9	6081.5
1		0020	3	0.	.0	6074.0	*	1		1130	70	0.	18.0	6075.5	*	1		2240	137	342.	103.5	6081.5
1		0030	4	0.	.0	6074.0	*	1		1140	71	0.	19.8	6075.6	*	1		2250	138	328.	102.9	6081.4
1		0040	5	0.	.0	6074.0	*	1		1150	72	0.	21.7	6075.8	*	1		2300	139	313.	102.3	6081.4
1		0050	6	0.	.0	6074.0	*	1		1200	73	0.	23.7	6075.9	*	1		2310	140	300.	101.7	6081.3
1		0100	7	0.	.0	6074.0	*	1		1210	74	21.	25.7	6076.1	*	1		2320	141	290.	101.2	6081.3
1		0110	8	0.	.0	6074.0	*	1		1220	75	34.	27.7	6076.2	*	1		2330	142	280.	100.8	6081.3
1		0120	9	0.	.0	6074.0	*	1		1230	76	43.	29.6	6076.4	*	1		2340	143	272.	100.4	6081.3
1		0130	10	0.	.0	6074.0	*	1		1240	77	50.	31.6	6076.5	*	1		2350	144	265.	100.1	6081.2
1		0140	11	0.	.0	6074.0	*	1		1250	78	57.	33.6	6076.7	*	2		0000	145	259.	99.8	6081.2
1		0150	12	0.	.0	6074.0	*	1		1300	79	63.	35.7	6076.9	*	2		0010	146	253.	99.5	6081.2
1		0200	13	0.	.0	6074.0	*	1		1310	80	69.	37.9	6077.0	*	2		0020	147	248.	99.2	6081.2
1		0210	14	0.	.0	6074.0	*	1		1320	81	75.	40.3	6077.2	*	2		0030	148	243.	99.0	6081.2
1		0220	15	0.	.0	6074.0	*	1		1330	82	81.	42.8	6077.4	*	2		0040	149	238.	98.7	6081.2
1		0230	16	0.	.0	6074.0	*	1		1340	83	87.	45.8	6077.6	*	2		0050	150	234.	98.5	6081.1
1		0240	17	0.	.0	6074.0	*	1		1350	84	94.	49.6	6077.9	*	2		0100	151	229.	98.3	6081.1
1		0250	18	0.	.0	6074.0	*	1		1400	85	102.	54.1	6078.2	*	2		0110	152	225.	98.1	6081.1

1	0300	19	0.	.0	6074.0	*	1	1410	86	110.	59.1	6078.6	*	2	0120	153	222.	97.8	6081.1
1	0310	20	0.	.0	6074.0	*	1	1420	87	118.	64.6	6078.9	*	2	0130	154	218.	97.6	6081.1
1	0320	21	0.	.0	6074.0	*	1	1430	88	126.	70.5	6079.3	*	2	0140	155	214.	97.4	6081.1
1	0330	22	0.	.0	6074.0	*	1	1440	89	133.	77.0	6079.8	*	2	0150	156	211.	97.2	6081.1
1	0340	23	0.	.0	6074.0	*	1	1450	90	142.	84.1	6080.2	*	2	0200	157	208.	97.0	6081.1
1	0350	24	0.	.0	6074.0	*	1	1500	91	150.	92.0	6080.7	*	2	0210	158	205.	96.9	6081.0
1	0400	25	0.	.0	6074.0	*	1	1510	92	271.	100.4	6081.3	*	2	0220	159	202.	96.7	6081.0
1	0410	26	0.	.0	6074.0	*	1	1520	93	478.	108.6	6081.8	*	2	0230	160	199.	96.5	6081.0
1	0420	27	0.	.0	6074.0	*	1	1530	94	704.	115.9	6082.2	*	2	0240	161	196.	96.3	6081.0
1	0430	28	0.	.0	6074.0	*	1	1540	95	953.	123.0	6082.6	*	2	0250	162	193.	96.2	6081.0
1	0440	29	0.	.0	6074.0	*	1	1550	96	1257.	130.9	6083.0	*	2	0300	163	191.	96.0	6081.0
1	0450	30	0.	.0	6074.0	*	1	1600	97	1602.	139.3	6083.5	*	2	0310	164	188.	95.8	6081.0
1	0500	31	0.	.0	6074.0	*	1	1610	98	2195.	152.5	6084.2	*	2	0320	165	186.	95.7	6081.0
1	0510	32	0.	.0	6074.0	*	1	1620	99	3251.	173.7	6085.3	*	2	0330	166	184.	95.5	6081.0
1	0520	33	0.	.0	6074.0	*	1	1630	100	4792.	201.5	6086.8	*	2	0340	167	181.	95.4	6081.0
1	0530	34	0.	.0	6074.0	*	1	1640	101	6402.	228.1	6088.1	*	2	0350	168	179.	95.2	6080.9
1	0540	35	0.	.0	6074.0	*	1	1650	102	7959.	252.4	6089.3	*	2	0400	169	177.	95.0	6080.9
1	0550	36	0.	.0	6074.0	*	1	1700	103	8910.	266.7	6090.0	*	2	0410	170	175.	94.9	6080.9
1	0600	37	0.	.0	6074.0	*	1	1710	104	8072.	254.1	6089.4	*	2	0420	171	173.	94.7	6080.9
1	0610	38	0.	.0	6074.0	*	1	1720	105	6197.	224.8	6087.9	*	2	0430	172	171.	94.6	6080.9
1	0620	39	0.	.0	6074.0	*	1	1730	106	4641.	198.9	6086.6	*	2	0440	173	168.	94.4	6080.9
1	0630	40	0.	.0	6074.0	*	1	1740	107	3586.	180.0	6085.7	*	2	0450	174	165.	94.0	6080.9
1	0640	41	0.	.0	6074.0	*	1	1750	108	2843.	165.8	6084.9	*	2	0500	175	161.	93.6	6080.8
1	0650	42	0.	.0	6074.0	*	1	1800	109	2327.	155.3	6084.4	*	2	0510	176	157.	93.2	6080.8
1	0700	43	0.	.0	6074.0	*	1	1810	110	1961.	147.4	6083.9	*	2	0520	177	154.	92.9	6080.8
1	0710	44	0.	.0	6074.0	*	1	1820	111	1673.	140.9	6083.6	*	2	0530	178	151.	92.5	6080.8
1	0720	45	0.	.1	6074.0	*	1	1830	112	1452.	135.7	6083.3	*	2	0540	179	150.	92.2	6080.8
1	0730	46	0.	.2	6074.0	*	1	1840	113	1290.	131.7	6083.1	*	2	0550	180	149.	91.8	6080.7
1	0740	47	0.	.3	6074.0	*	1	1850	114	1170.	128.7	6082.9	*	2	0600	181	149.	91.4	6080.7
1	0750	48	0.	.5	6074.0	*	1	1900	115	1078.	126.3	6082.8	*	2	0610	182	149.	91.0	6080.7
1	0800	49	0.	.7	6074.1	*	1	1910	116	1005.	124.4	6082.7	*	2	0620	183	148.	90.6	6080.7
1	0810	50	0.	.9	6074.1	*	1	1920	117	946.	122.8	6082.6	*	2	0630	184	148.	90.2	6080.6
1	0820	51	0.	1.2	6074.1	*	1	1930	118	896.	121.5	6082.5	*	2	0640	185	147.	89.8	6080.6
1	0830	52	0.	1.5	6074.1	*	1	1940	119	836.	119.8	6082.4	*	2	0650	186	147.	89.4	6080.6
1	0840	53	0.	1.9	6074.2	*	1	1950	120	757.	117.5	6082.3	*	2	0700	187	147.	89.0	6080.6
1	0850	54	0.	2.4	6074.2	*	1	2000	121	680.	115.2	6082.1	*	2	0710	188	146.	88.5	6080.5
1	0900	55	0.	2.8	6074.2	*	1	2010	122	619.	113.3	6082.0	*	2	0720	189	146.	88.0	6080.5
1	0910	56	0.	3.3	6074.3	*	1	2020	123	573.	111.8	6081.9	*	2	0730	190	145.	87.6	6080.5
1	0920	57	0.	3.9	6074.3	*	1	2030	124	536.	110.6	6081.9	*	2	0740	191	145.	87.1	6080.4
1	0930	58	0.	4.6	6074.4	*	1	2040	125	507.	109.6	6081.8	*	2	0750	192	144.	86.6	6080.4
1	0940	59	0.	5.2	6074.4	*	1	2050	126	484.	108.8	6081.8	*	2	0800	193	144.	86.1	6080.4
1	0950	60	0.	6.0	6074.5	*	1	2100	127	464.	108.1	6081.7	*	2	0810	194	143.	85.7	6080.3
1	1000	61	0.	6.8	6074.6	*	1	2110	128	447.	107.5	6081.7	*	2	0820	195	143.	85.2	6080.3
1	1010	62	0.	7.6	6074.6	*	1	2120	129	431.	106.9	6081.7	*	2	0830	196	142.	84.7	6080.3
1	1020	63	0.	8.5	6074.7	*	1	2130	130	417.	106.4	6081.6	*	2	0840	197	142.	84.1	6080.2
1	1030	64	0.	9.5	6074.8	*	1	2140	131	405.	105.9	6081.6	*	2	0850	198	141.	83.6	6080.2
1	1040	65	0.	10.6	6074.9	*	1	2150	132	393.	105.5	6081.6	*	2	0900	199	140.	83.1	6080.2
1	1050	66	0.	11.8	6075.0	*	1	2200	133	382.	105.0	6081.5	*	2	0910	200	140.	82.6	6080.1
1	1100	67	0.	13.2	6075.1	*	1	2210	134	372.	104.6	6081.5	*						
						*							*						

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PEAK OUTFLOW IS 8910. AT TIME 17.00 HOURS

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	33.17-HR
+ (CFS)	(HR)				
		(CFS)			
+ 8910.	17.00	2320.	700.	506.	506.

	(INCHES)	11.005	13.276	13.276	13.276
	(AC-FT)	1150.	1388.	1388.	1388.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	33.17-HR
(AC-FT)	(HR)				
267.	17.00	149.	93.	67.	67.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	33.17-HR
(FEET)	(HR)				
6089.95	17.00	6083.96	6080.59	6078.78	6078.78

CUMULATIVE AREA = 1.96 SQ MI

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

					RATIOS APPLIED TO PRECIPITATION
OPERATION	STATION	AREA	PLAN		RATIO 1
					.50
HYDROGRAPH AT					
	BASIN	1.96	1	FLOW	9800.
				TIME	16.83
ROUTED TO					
	DAM	1.96	1	FLOW	8910.
				TIME	17.00

** PEAK STAGES IN FEET **
1 STAGE 6089.95
TIME 17.00

SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DAM

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	6074.00	6080.75	6090.00
STORAGE	0.	92.	268.
OUTFLOW	0.	150.	8978.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.50	6089.95	.00	267.	8910.	.00	17.00	.00

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