WRC NEVADA, INC.

RECEIVED
SEP 05 2000
WASHOE COUNTY
DEPT. OF WATER RESOURCES

Memorandum

To: Steve Walker
Washoe County Department of Water Resources

From: Mark Forest, P.E.
Brian Janes
WRC Nevada, Inc.

Subject: Evans Creek Block N Watershed Phase 1 Technical Memorandum Supplement

Date: September 1, 2000

Job No.: 3061/2

This memorandum is intended as a Supplement to the Evans Creek (Block N Watershed) Hydrologic Evaluation of Proposed Detention Site Phase 1 Technical Memorandum dated August 22nd. This information was completed after the submission of the Phase 1Technical Memorandum and was presented in the August 31st meeting of the Regional Water Planning Commission Advisory Committee on Evans Creek. The following information is included:

Existing Conditions HEC-1 Models
These models were prepared in the same manner as described in the Phase 1 Technical Memorandum. Sub-basin curve numbers were adjusted based on current aerial photos to reflect the current vegetation cover, and land use.

Revised Future Conditions HEC-1 Models
These models are currently in Appendix C of the Phase 1 Technical Memorandum and have been corrected for a minor error in curve number calculations in some of the sub-basins.

Revised Dam Inflow and Outflow Hydrographs
These 4 graphs of the existing and proposed conditions inflow and outflow hydrographs for the proposed dam, reflect the existing and revised future conditions HEC-1 models.

CONSULTING ENGINEERS
1575 DELUCCHI LANE • SUITE [redacted] • RENO, NEVADA 89502 • (702) 332-3737 • FAX (702) 332-3740 • wrcnv@worldnet.att.net

Revised Sub-basin Data
These data sheets show the corrected land use information used to estimate the curve numbers used in the HEC-1 models and replace Appendix B in the Phase 1 Technical Memorandum.

Final Meteorological Analysis
This analysis will replace the analysis in Appendix F of the Phase 1 Technical Memorandum. Text and Figures have been added by Ron Olson since the draft submittal.

USGS Regional Regression Calculations and Backup
These calculations were performed in accordance with the following reference and used in the August 22nd presentation for comparison.

Location	Existing Conditions HEC-1 Models		Proposed Conditions HEC-1 Models		USGS Regional Regression (Existing Cond)
	NOAA 2	NOAA 14	NOAA 2	NOAA 14	
Dam Site	897	1,076	1,349	1,616	-
McCarran Blvd	1,030	1,227	1,535	1,831	1,167
Sierra St	1,.210	1,422	1,756	2,073	1,307

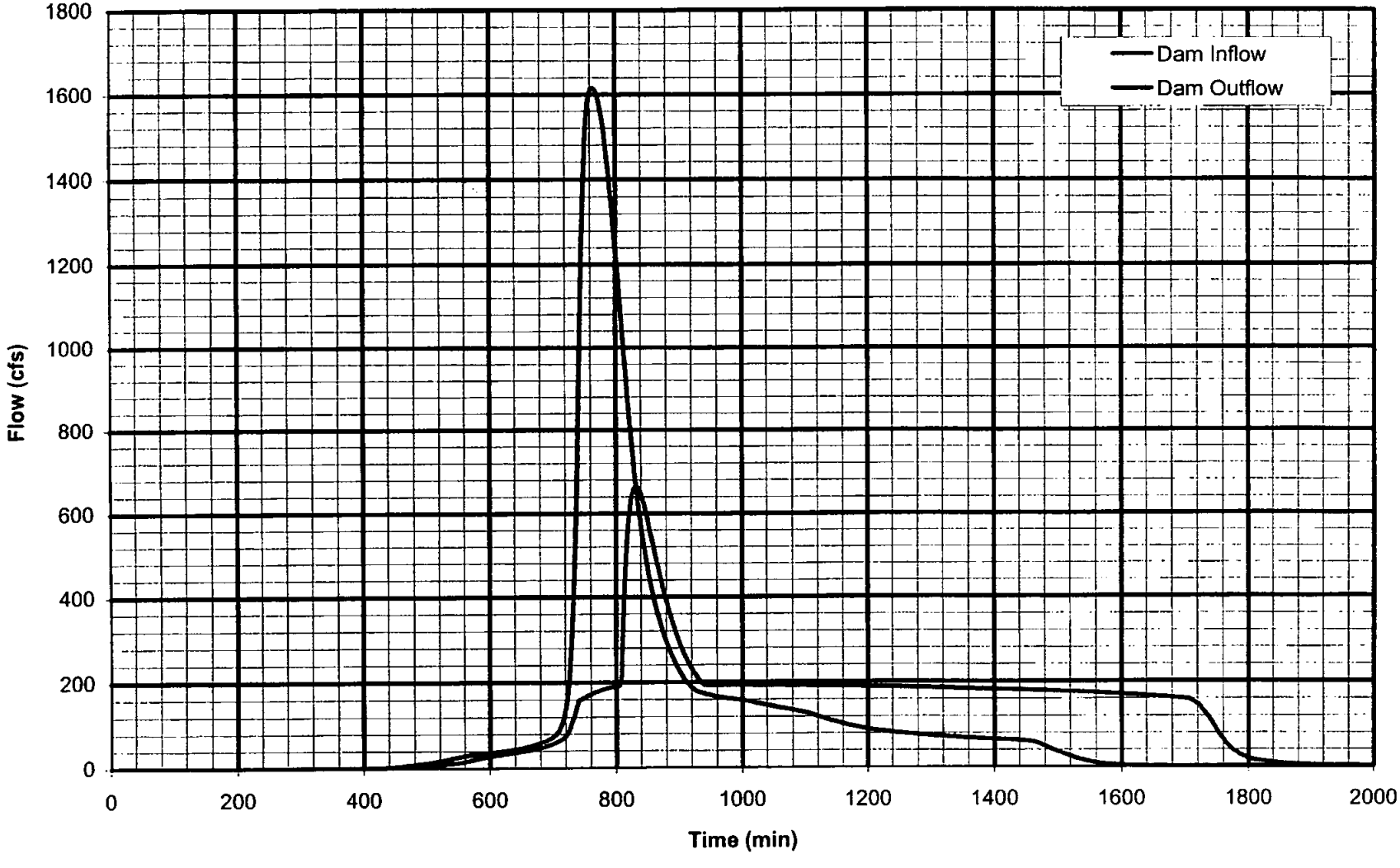
ADDITIONAL REFERENCES

U.S. Department of the Interior, U.S. Geological Survey. 1994. Methods for Estimating Magnitude and Frequency of Floods in the Southwestern United States.

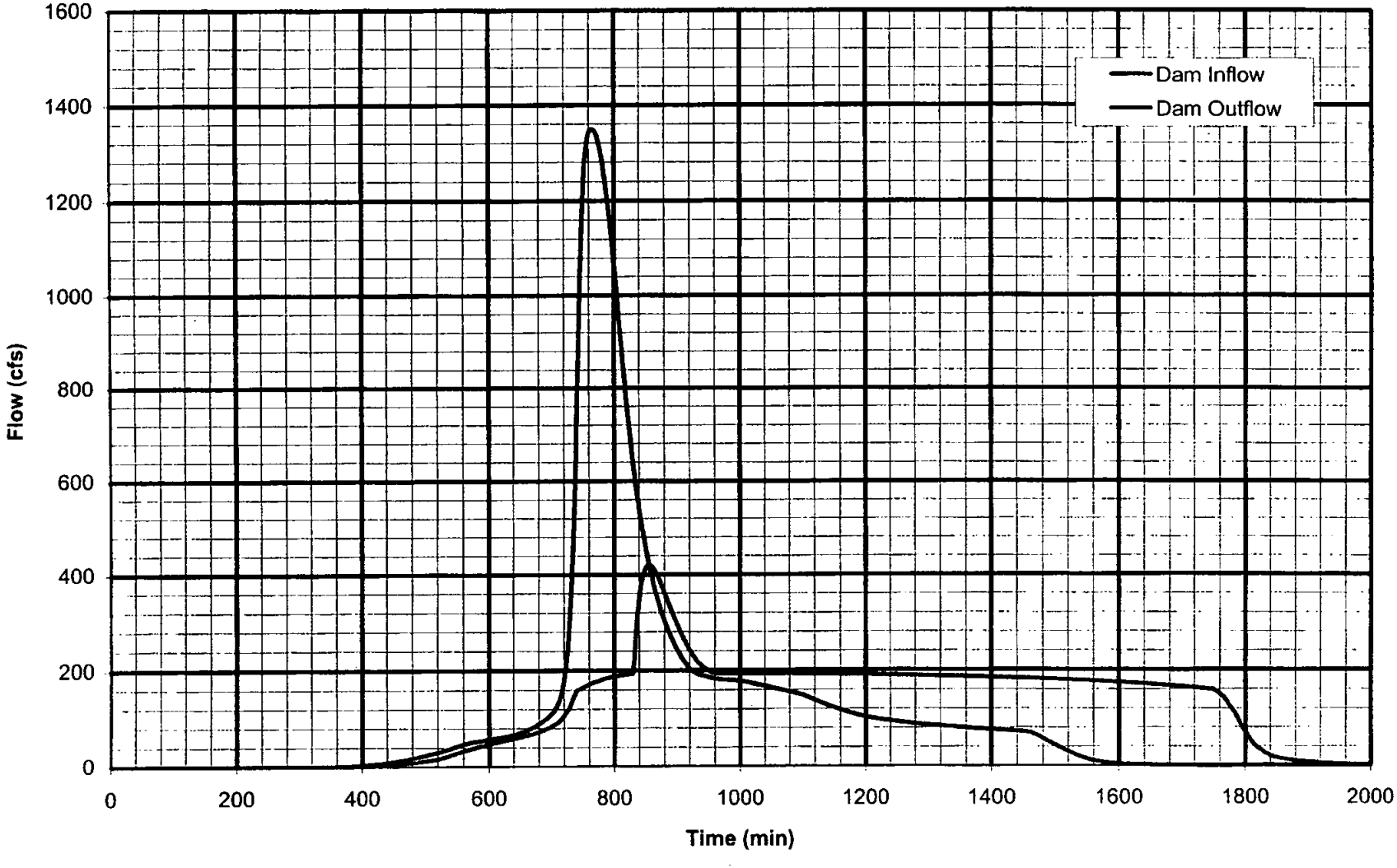
Mark E. Forest, P.E.
Principal Engineer

MEF

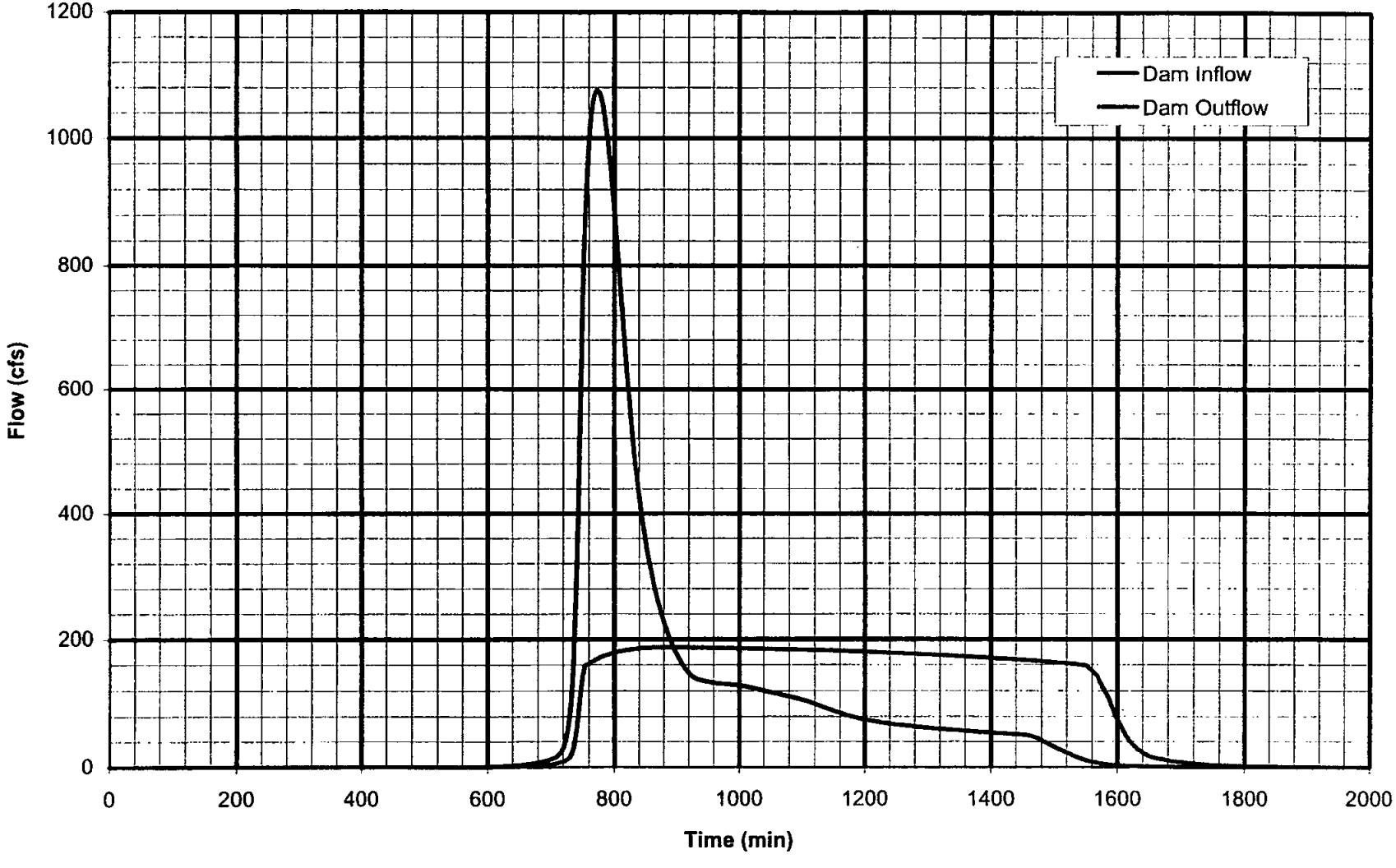
Future Conditions HEC-1 Model with NOAA 14 Rainfall



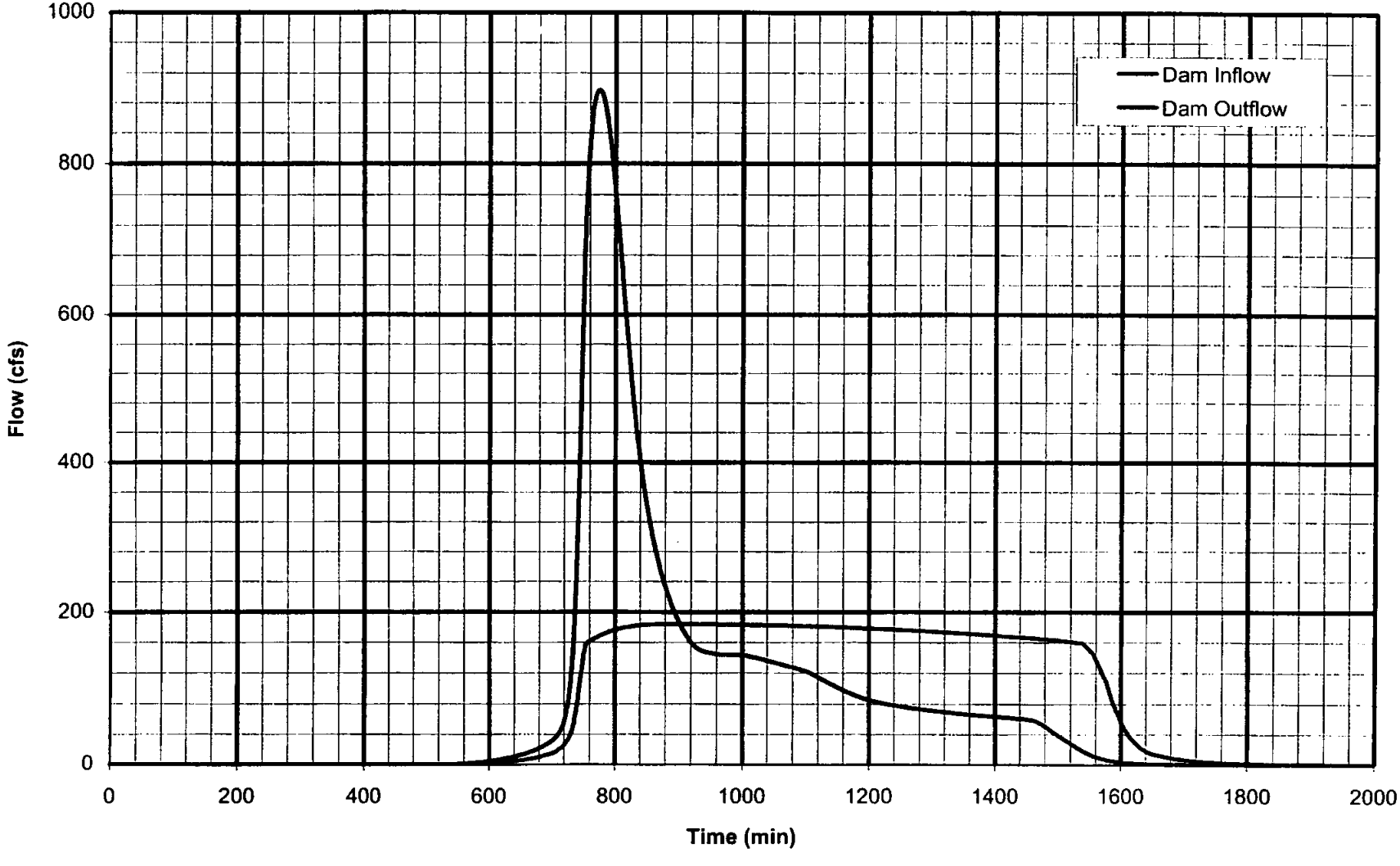
Future Conditions HEC-1 Model with NOAA Atlas 2 Rainfall



Existing Conditions HEC-1 Model with NOAA 14 Rainfall



Existing Conditions HEC-1 Model with NOAA Atlas 2 Rainfall



Existing Conditions HEC-1 Models

NOAA Atlas 2 Rainfall
No Dam

September 01, 2000

```
**************************************
*                                    *
*  FLOOD HYDROGRAPH PACKAGE (HEC-1)  *
*            JUN 1998                *
*          VERSION 4.1               *
*                                    *
*  RUN DATE  30AUG00  TIME 10:02:51  *
*                                    *
**************************************
```

```
**************************************
*                                    *
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*       609 SECOND STREET            *
*     DAVIS, CALIFORNIA 95616        *
*       (916) 756-1104               *
*                                    *
**************************************
```

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

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

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

HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
              *DIAGRAM
    1         ID   ===========================================================================
    2         ID   EVANS CREEK 100-YEAR 24 HOUR MODEL WITHOUT PROPOSED DAM      EXISTING
    3         ID                                                               CONDITIONS
    4         ID       - NOAA ATLAS 2 RAINFALL USED
    5         ID       - CURVE NUMBERS BASED ON FIELD INVESTIGATION AND CITY OF RENO LAND
    6         ID         DESIGNATIONS
    7         ID       - LAG TIMES BASED ON PROCEDURES IN WCHCDDM
    8         ID
    9         ID   FILE:  EVN02WOE.DAT
   10         ID   BY:  BAJ                                                    WRC NEVADA, INC.
   11         ID   DATE:  AUGUST 2000                                         RENO, NEVADA
   12         ID   ===========================================================================
   13         IT       2              0    1441
   14         IO       3
              *
   15         KK       E sub basin
   16         BA   1.291
   17         PH            .001    0.34    0.67    1.18    1.34    1.47    1.73    2.24    2.75
   18         LS             83
   19         UD    0.90
              *
   20         KK   RT-1A route sub basin E to sub basin A
   21         RD    1050  0.0133   0.030           TRAP      10       3
              *
   22         KK   RT-1B route sub basin E to sub basin A
   23         RD     430  0.0233   0.030           TRAP      30       2
              *
   24         KK   RT-1C route sub basin E to sub basin A
```

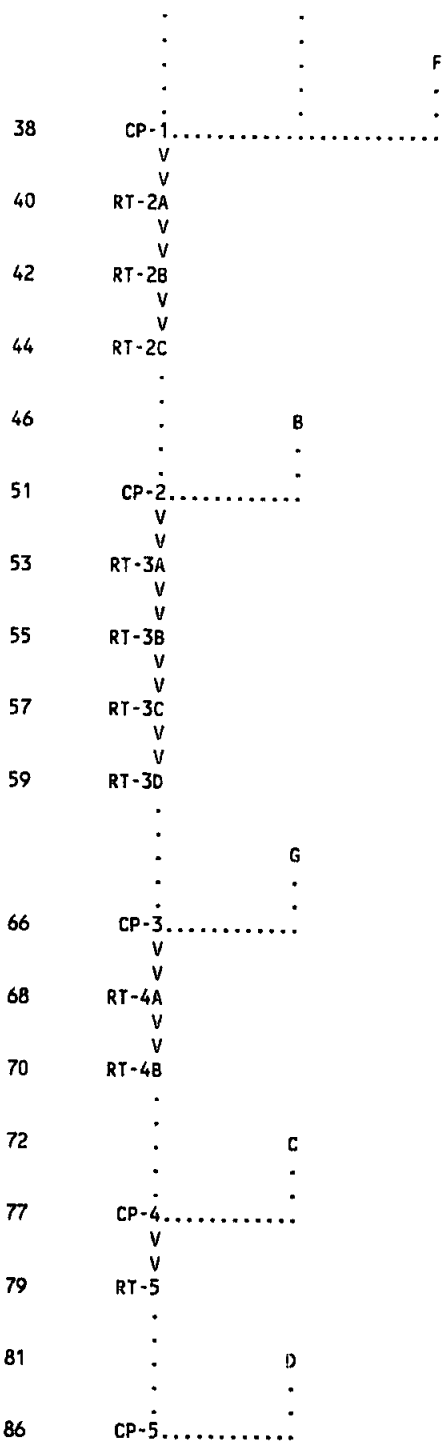
```
 25          RD     335  0.0119   0.030            TRAP      20       2
             *
             *  RT-1D route sub basin E to sub basin A
             *    240  0.0750   0.013            TRAP       6       2
             *

 26          KK   RT-1E route sub basin E to sub basin A
 27          RD    1005  0.0299   0.035            TRAP      20       3
             *

 28          KK       A sub basin
 29          BA   0.854
 30          PH            .001    0.35    0.68    1.19    1.36    1.49    1.76    2.29    2.82
 31          LS              80
 32          UD    0.79
             *
1                                        HEC-1 INPUT                                        PAGE  2

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

 33          KK       F sub basin
 34          BA   0.317
 35          PH            .001    0.35    0.68    1.19    1.36    1.49    1.76    2.29    2.82
 36          LS              76
 37          UD     .32
             *

 38          KK    CP-1 combine sub basins A, E, and F
 39          HC       3
             *

 40          KK   RT-2A route CP-1 to sub basin B
 41          RD     410  0.0293   0.035            TRAP      20       3
             *

 42          KK   RT-2B route CP-1 to sub basin B
 43          RD    1140  0.0123   0.045            TRAP      50       3
             *

 44          KK   RT-2C route CP-1 to sub basin B
 45          RD    2070  0.0251   0.040            TRAP      50       3
             *

 46          KK       B sub basin
 47          BA   0.538
 48          PH            .001    0.35    0.68    1.20    1.37    1.50    1.76    2.29    2.81
 49          LS              82
 50          UD     .43
             *

 51          KK    CP-2 combine CP-1 with sub basin B
 52          HC       2
             *

 53          KK   RT-3A route CP-2 to sub basin G
 54          RD    1640  0.0232   0.030            TRAP      50       3
             *

 55          KK   RT-3B route CP-2 to sub basin G
 56          RD     780  0.0179   0.035            TRAP      20       3
             *

 57          KK   RT-3C route CP-2 to sub basin G
 58          RD     655  0.0214   0.045            TRAP      20       3
             *

 59          KK   RT-3D route CP-2 to sub basin G
 60          RD    1555  0.0283   0.035            TRAP      20       3
             *
1                                        HEC-1 INPUT                                        PAGE  3
```

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

  61          KK       G sub basin
  62          BA   0.426
  63          PH            .001    0.35    0.69    1.21    1.38    1.51    1.78    2.30    2.81
  64          LS              77
  65          UD     .51
              *

  66          KK    CP-3 combine CP-2 with sub basin G
  67          HC       2
              *

  68          KK    RT-4A route CP-3 to sub basin C
  69          RD     2085  0.0240   0.040            TRAP      40       3
              *

  70          KK    RT-4B route CP-3 to sub basin C
  71          RD     1820  0.0264   0.050            TRAP      50      50
              *

  72          KK       C sub basin
  73          BA   0.396
  74          PH            .001    0.35    0.69    1.21    1.37    1.50    1.77    2.28    2.79
  75          LS              83
  76          UD     .61
              *

  77          KK    CP-4 combine CP-3 with sub basin C
  78          HC       2
              *

  79          KK    RT-5 route CP-4 to sub basin D
  80          RD     3450  0.0191   0.030            TRAP      50      50
              *

  81          KK       D sub basin
  82          BA   0.557
  83          PH            .001    0.35    0.68    1.20    1.37    1.49    1.75    2.26    2.76
  84          LS              84
  85          UD     0.59
              *

  86          KK    CP-5 combine CP-4 with sub basin D
  87          HC       2
              *
  88          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   15          E
               V
               V
   20       RT-1A
               V
               V
   22       RT-1B
               V
               V
   24       RT-1C
               V
               V
   26       RT-1E
               .
               .
               .          A
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
**********************************************
*                                            *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)        *
*             JUN  1998                      *
*          VERSION 4.1                       *
*                                            *
*    N DATE   30AUG00  TIME  10:02:51        *
*                                            *
**********************************************
```

```
**********************************************
*                                            *
*    U.S. ARMY CORPS OF ENGINEERS            *
*    HYDROLOGIC ENGINEERING CENTER           *
*          609 SECOND STREET                 *
*       DAVIS, CALIFORNIA 95616              *
*          (916) 756-1104                    *
*                                            *
**********************************************
```

```
                    ================================================================================
                    EVANS CREEK 100-YEAR 24 HOUR MODEL WITHOUT PROPOSED DAM      EXISTING
                                                                                 CONDITIONS
                        - NOAA ATLAS 2 RAINFALL USED
                        - CURVE NUMBERS BASED ON FIELD INVESTIGATION AND CITY OF RENO LAND
                          DESIGNATIONS
                        - LAG TIMES BASED ON PROCEDURES IN WCHCDDM

                    FILE:  EVN02WOE.DAT
                    BY:  BAJ                                                     WRC NEVADA, INC.
                    DATE:  AUGUST 2000                                           RENO, NEVADA
                    ================================================================================

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

   IT          HYDROGRAPH TIME DATA
                     NMIN          2  MINUTES IN COMPUTATION INTERVAL
                     IDATE     1   0  STARTING DATE
                     ITIME       0000  STARTING TIME
                       NQ        1441  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE     3   0  ENDING DATE
                    NDTIME       0000  ENDING TIME
                    ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL      .03 HOURS
                       TOTAL TIME BASE    48.00 HOURS

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


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


          **************
          *            *
15 KK     *          E *      sub basin
          *            *
          **************

             SUBBASIN RUNOFF DATA

16 BA          SUBBASIN CHARACTERISTICS
                     TAREA        1.29  SUBBASIN AREA

               PRECIPITATION DATA

17 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
                 .34     .67    1.18    1.34    1.47    1.73    2.24    2.75     .00     .00     .00     .00

                                                STORM AREA =      .00

   LS          SCS LOSS RATE
                     STRTL          .41  INITIAL ABSTRACTION
                    CRVNBR       83.00  CURVE NUMBER
```

RTIMP .00 PERCENT IMPERVIOUS AREA

JD SCS DIMENSIONLESS UNITGRAPH
TLAG .90 LAG

***

UNIT HYDROGRAPH
137 END-OF-PERIOD ORDINATES

7.	15.	25.	42.	59.	79.	101.	124.	152.	181.
211.	250.	290.	332.	379.	426.	469.	508.	548.	578.
606.	633.	648.	662.	674.	677.	679.	679.	677.	674.
662.	648.	633.	615.	598.	580.	560.	541.	518.	494.
469.	440.	411.	381.	356.	332.	309.	291.	274.	258.
243.	228.	215.	203.	190.	181.	172.	163.	154.	145.
137.	130.	122.	115.	107.	100.	95.	90.	85.	80.
75.	71.	67.	64.	60.	56.	52.	50.	47.	44.
42.	39.	36.	35.	33.	31.	29.	27.	26.	24.
23.	22.	20.	19.	18.	17.	16.	15.	14.	14.
13.	12.	11.	11.	10.	9.	9.	8.	8.	7.
7.	7.	7.	6.	6.	6.	5.	5.	5.	5.
4.	4.	4.	3.	3.	3.	3.	2.	2.	2.
2.	1.	1.	1.	1.	0.	0.			

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

HYDROGRAPH AT STATION E

TOTAL RAINFALL = 2.75, TOTAL LOSS = 1.50, TOTAL EXCESS = 1.25

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	48.00-HR
+	(CFS)	(HR)				
			(CFS)			
	401.	13.00	132.	43.	22.	22.
			(INCHES) .949	1.248	1.248	1.248
			(AC-FT) 65.	86.	86.	86.

CUMULATIVE AREA = 1.29 SQ MI

*** ***

```
**************
*            *
*     RT-1A  *
*            *
**************
```

20 KK route sub basin E to sub basin A

HYDROGRAPH ROUTING DATA

21 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	1050.	CHANNEL LENGTH
S	.0133	SLOPE
N	.030	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	10.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.59	1.42	1.87	525.00	401.21	781.17	1.25	9.36

```
                                           INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                         MAIN       1.59      1.42       2.00                 400.95    782.00      1.25


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .8593E+02 EXCESS= .0000E+00 OUTFLOW= .8593E+02 BASIN STORAGE= .7530E-03 PERCENT ERROR=     .0


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

                            HYDROGRAPH AT STATION    RT-1A

    PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR        24-HR        72-HR     48.00-HR
  +    (CFS)       (HR)
                             (CFS)
  +     401.      13.03                132.          43.          22.          22.
                           (INCHES)    .949        1.248        1.248        1.248
                            (AC-FT)     65.          86.          86.          86.

                          CUMULATIVE AREA =     1.29 SQ MI



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


               ***************
               *             *
   22 KK       *    RT-1B    *      route sub basin E to sub basin A
               *             *
               ***************

                 HYDROGRAPH ROUTING DATA

   23 RD           MUSKINGUM-CUNGE CHANNEL ROUTING
                            L         430.  CHANNEL LENGTH
                            S        .0233  SLOPE
                            N         .030  CHANNEL ROUGHNESS COEFFICIENT
                           CA          .00  CONTRIBUTING AREA
                        SHAPE         TRAP  CHANNEL SHAPE
                           WD        30.00  BOTTOM WIDTH OR DIAMETER
                            Z         2.00  SIDE SLOPE

                                                              ***
                                    COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                          COMPUTATION TIME STEP
                      ELEMENT    ALPHA       M         DT         DX        PEAK     TIME TO     VOLUME     MAXIMUM
                                                                                      PEAK                  CELERITY
                                                      (MIN)      (FT)      (CFS)     (MIN)       (IN)       (FPS)

                        MAIN      1.06      1.54        .70     215.00    400.86    782.49      1.25       10.26

                                           INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                        MAIN      1.06      1.54       2.00                 400.84    782.00      1.25


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .8594E+02 EXCESS= .0000E+00 OUTFLOW= .8594E+02 BASIN STORAGE= .4994E-03 PERCENT ERROR=     .0


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

                            HYDROGRAPH AT STATION    RT-1B
```

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
		(CFS)				
+ 401.	13.03		132.	43.	22.	22.
		(INCHES)	.949	1.248	1.248	1.248
		(AC-FT)	65.	86.	86.	86.

CUMULATIVE AREA = 1.29 SQ MI

*** ***

```
**************
*            *
*    RT-1C   *
*            *
**************
```

24 KK route sub basin E to sub basin A

HYDROGRAPH ROUTING DATA

25 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	335.	CHANNEL LENGTH
S	.0119	SLOPE
N	.030	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	20.00	BOTTOM WIDTH OR DIAMETER
Z	2.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.00	1.51	.63	167.50	400.76	782.61	1.25	8.92
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	1.00	1.51	2.00		400.64	782.00	1.25	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8594E+02 EXCESS= .0000E+00 OUTFLOW= .8594E+02 BASIN STORAGE= .3617E-03 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-1C

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
		(CFS)				
+ 401.	13.03		132.	43.	22.	22.
		(INCHES)	.949	1.248	1.248	1.248
		(AC-FT)	65.	86.	86.	86.

CUMULATIVE AREA = 1.29 SQ MI

*** ***

```
**************
*            *
26 KK     *     RT-1E  *      route sub basin E to sub basin A
*            *
**************

   HYDROGRAPH ROUTING DATA

27 RD        MUSKINGUM-CUNGE CHANNEL ROUTING
                    L      1005.  CHANNEL LENGTH
                    S      .0299  SLOPE
                    N       .035  CHANNEL ROUGHNESS COEFFICIENT
                   CA        .00  CONTRIBUTING AREA
                SHAPE       TRAP  CHANNEL SHAPE
                   WD      20.00  BOTTOM WIDTH OR DIAMETER
                    Z       3.00  SIDE SLOPE

                                                        ***
                              COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                      COMPUTATION TIME STEP
                 ELEMENT    ALPHA       M         DT        DX       PEAK    TIME TO      VOLUME     MAXIMUM
                                                                              PEAK                    CELERITY
                                                      (MIN)     (FT)     (CFS)    (MIN)       (IN)      (FPS)

                   MAIN       1.43      1.48       1.62    502.50    400.42   783.07       1.25      10.35

                                          INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                   MAIN       1.43      1.48       2.00              400.33   784.00       1.25

 NUITY SUMMARY (AC-FT) - INFLOW= .8594E+02 EXCESS= .0000E+00 OUTFLOW= .8594E+02 BASIN STORAGE= .8085E-03 PERCENT ERROR=     .0

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

                    HYDROGRAPH AT STATION    RT-1E

 PEAK FLOW     TIME                              MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                 (CFS)
+    400.     13.07                     132.         43.         22.         22.
                       (INCHES)        .949       1.248       1.248       1.248
                        (AC-FT)         65.         86.         86.         86.

                       CUMULATIVE AREA =    1.29 SQ MI


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


**************
*            *
28 KK     *          A  *      sub basin
*            *
**************

   SUBBASIN RUNOFF DATA

29 BA        SUBBASIN CHARACTERISTICS
                  TAREA         .85  SUBBASIN AREA

             PRECIPITATION DATA
```

```
-0 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
            .35     .68    1.19    1.36    1.49    1.76    2.29    2.82     .00     .00     .00     .00

                                              STORM AREA =      .00

31 LS       SCS LOSS RATE
                 STRTL         .50  INITIAL ABSTRACTION
                CRVNBR       80.00  CURVE NUMBER
                 RTIMP         .00  PERCENT IMPERVIOUS AREA

32 UD       SCS DIMENSIONLESS UNITGRAPH
                 TLAG         .79  LAG

                                                  ***

                                                UNIT HYDROGRAPH
                                            120 END-OF-PERIOD ORDINATES
            6.      13.      24.      39.      54.      73.      92.     116.     141.     169.
          203.     237.     277.     317.     354.     388.     421.     444.     467.     484.
          496.     507.     509.     511.     510.     508.     501.     489.     476.     461.
          447.     431.     414.     396.     375.     354.     330.     305.     280.     259.
          238.     223.     208.     194.     181.     169.     158.     147.     139.     131.
          123.     115.     108.     101.      95.      88.      82.      76.      71.      67.
           63.      59.      54.      51.      48.      45.      42.      39.      36.      34.
           32.      30.      27.      26.      24.      23.      21.      20.      19.      17.
           16.      15.      14.      13.      13.      12.      11.      10.      10.       9.
            8.       8.       7.       7.       6.       6.       6.       5.       5.       5.
            5.       4.       4.       4.       4.       3.       3.       3.       3.       2.
            2.       2.       2.       1.       1.       1.       1.       1.       0.       0.

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

                    HYDROGRAPH AT STATION        A

     TOTAL RAINFALL =     2.82, TOTAL LOSS =     1.70, TOTAL EXCESS =     1.12

   PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR      48.00-HR
+    (CFS)       (HR)
                                (CFS)
+      253.     12.90                      78.          26.          13.          13.
                                (INCHES)   .849        1.117        1.117        1.117
                                (AC-FT)     39.          51.          51.          51.

                    CUMULATIVE AREA =      .85 SQ MI

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

              ****************
              *              *
33 KK         *          F   *       sub basin
              *              *
              ****************

                SUBBASIN RUNOFF DATA

34 BA           SUBBASIN CHARACTERISTICS
                     TAREA         .32  SUBBASIN AREA

                PRECIPITATION DATA

35 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
            .35     .68    1.19    1.36    1.49    1.76    2.29    2.82     .00     .00     .00     .00
```

STORM AREA = .00

-S SCS LOSS RATE
STRTL .63 INITIAL ABSTRACTION
CRVNBR 76.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

37 UD SCS DIMENSIONLESS UNITGRAPH
TLAG .32 LAG

***

UNIT HYDROGRAPH
50 END-OF-PERIOD ORDINATES

14.	45.	85.	139.	210.	295.	368.	419.	448.	454.
451.	426.	395.	360.	316.	263.	217.	183.	155.	132.
114.	98.	84.	70.	60.	51.	44.	37.	31.	27.
23.	19.	17.	14.	12.	10.	9.	7.	6.	5.
5.	4.	4.	3.	3.	2.	2.	1.	1.	0.

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

HYDROGRAPH AT STATION F

TOTAL RAINFALL = 2.82, TOTAL LOSS = 1.92, TOTAL EXCESS = .90

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	48.00-HR
(CFS)	(HR)				
		(CFS)			
129.	12.40	24.	8.	4.	4.
		(INCHES) .691	.896	.896	.896
		(AC-FT) 12.	15.	15.	15.

CUMULATIVE AREA = .32 SQ MI

*** ***

38 KK
****
* *
* CP-1 *
* *
****
combine sub basins A, E, and F

39 HC HYDROGRAPH COMBINATION
ICOMP 3 NUMBER OF HYDROGRAPHS TO COMBINE

***

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

HYDROGRAPH AT STATION CP-1

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	48.00-HR
(CFS)	(HR)				
		(CFS)			
682.	12.93	233.	77.	38.	38.
		(INCHES) .879	1.157	1.157	1.157
		(AC-FT) 115.	152.	152.	152.

CUMULATIVE AREA = 2.46 SQ MI

*** ***

```
          ****************
          *              *
40 KK     *     RT-2A    *      route CP-1 to sub basin B
          *              *
          ****************

            HYDROGRAPH ROUTING DATA

41 RD         MUSKINGUM-CUNGE CHANNEL ROUTING
                        L       410.  CHANNEL LENGTH
                        S      .0293  SLOPE
                        N       .035  CHANNEL ROUGHNESS COEFFICIENT
                       CA        .00  CONTRIBUTING AREA
                    SHAPE       TRAP  CHANNEL SHAPE
                       WD      20.00  BOTTOM WIDTH OR DIAMETER
                        Z       3.00  SIDE SLOPE

                                                    ***
                          COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                  COMPUTATION TIME STEP
                ELEMENT    ALPHA        M         DT        DX       PEAK    TIME TO     VOLUME    MAXIMUM
                                                                              PEAK                  CELERITY
                                                     (MIN)     (FT)     (CFS)   (MIN)       (IN)      (FPS)

                  MAIN       1.41      1.48         .56    205.00    682.17   777.14       1.16      12.20

                                       INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                  MAIN       1.41      1.48        2.00               682.07   778.00       1.16

 'NUITY SUMMARY (AC-FT) - INFLOW= .1519E+03 EXCESS= .0000E+00 OUTFLOW= .1519E+03 BASIN STORAGE= .3331E-03 PERCENT ERROR=     .0

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

                        HYDROGRAPH AT STATION    RT-2A

  PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR       72-HR      48.00-HR
+   (CFS)       (HR)
                                (CFS)
+     682.      12.97           233.         77.         38.         38.
                            (INCHES)         .879       1.157       1.157       1.157
                              (AC-FT)         115.         152.        152.        152.

                        CUMULATIVE AREA =    2.46 SQ MI


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

          ****************
          *              *
42 KK     *     RT-2B    *      route CP-1 to sub basin B
          *              *
          ****************

            HYDROGRAPH ROUTING DATA

43 RD         MUSKINGUM-CUNGE CHANNEL ROUTING
                        L      1140.  CHANNEL LENGTH
                        S      .0123  SLOPE
                        N       .045  CHANNEL ROUGHNESS COEFFICIENT
                       CA        .00  CONTRIBUTING AREA
```

```
                    SHAPE        TRAP  CHANNEL SHAPE
                       WD       50.00  BOTTOM WIDTH OR DIAMETER
                        Z        3.00  SIDE SLOPE

                                                         ***
                              COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                   COMPUTATION TIME STEP
                 ELEMENT    ALPHA      M         DT        DX        PEAK     TIME TO     VOLUME     MAXIMUM
                                                                                PEAK                 CELERITY
                                                (MIN)     (FT)      (CFS)     (MIN)        (IN)       (FPS)

                   MAIN       .37     1.55       2.00    380.00     682.02    780.00       1.16       6.61

                                  INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                   MAIN       .37     1.55       2.00               682.02    780.00       1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1519E+03 EXCESS= .0000E+00 OUTFLOW= .1519E+03 BASIN STORAGE= .3076E-02 PERCENT ERROR=    .0


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

                     HYDROGRAPH AT STATION    RT-2B

   PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR       72-HR      48.00-HR
+    (CFS)       (HR)
                         (CFS)
+      682.      13.00              233.          77.         38.          38.
                       (INCHES)     .879        1.157       1.157        1.157
                        (AC-FT)     115.         152.        152.         152.

                     CUMULATIVE AREA =     2.46 SQ MI



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


            ***************
            *             *
  44 KK     *    RT-2C    *      route CP-1 to sub basin B
            *             *
            ***************

              HYDROGRAPH ROUTING DATA

  45 RD         MUSKINGUM-CUNGE CHANNEL ROUTING
                       L        2070.  CHANNEL LENGTH
                       S        .0251  SLOPE
                       N         .040  CHANNEL ROUGHNESS COEFFICIENT
                      CA          .00  CONTRIBUTING AREA
                   SHAPE         TRAP  CHANNEL SHAPE
                      WD        50.00  BOTTOM WIDTH OR DIAMETER
                       Z         3.00  SIDE SLOPE

                                                         ***
                              COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                   COMPUTATION TIME STEP
                 ELEMENT    ALPHA      M         DT        DX        PEAK     TIME TO     VOLUME     MAXIMUM
                                                                                PEAK                 CELERITY
                                                (MIN)     (FT)      (CFS)     (MIN)        (IN)       (FPS)

                   MAIN       .60     1.55       2.00    517.50     681.90    782.00       1.16       8.96
```

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.60	1.55	2.00	681.90	782.00	1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1519E+03 EXCESS= .0000E+00 OUTFLOW= .1520E+03 BASIN STORAGE= .3415E-02 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-2C

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	48.00-HR
+ (CFS)	(HR)				
		(CFS)			
+ 682.	13.03	233.	77.	38.	38.
		(INCHES) .879	1.157	1.157	1.157
		(AC-FT) 115.	152.	152.	152.

CUMULATIVE AREA = 2.46 SQ MI

*** ***

```
          ****************
          *              *
46 KK     *       B      *      sub basin
          *              *
          ****************
```

SUBBASIN RUNOFF DATA

47 BA SUBBASIN CHARACTERISTICS

TAREA	.54	SUBBASIN AREA

PRECIPITATION DATA

48 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
.35	.68	1.20	1.37	1.50	1.76	2.29	2.81	.00	.00	.00	.00

STORM AREA = .00

49 LS SCS LOSS RATE

STRTL	.44	INITIAL ABSTRACTION
CRVNBR	82.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

50 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.43	LAG

***

UNIT HYDROGRAPH
66 END-OF-PERIOD ORDINATES

13.	38.	71.	110.	162.	225.	298.	381.	451.	507.
548.	576.	580.	579.	569.	543.	513.	480.	443.	400.
349.	301.	261.	231.	204.	180.	160.	144.	128.	114.
101.	88.	78.	70.	61.	55.	48.	43.	38.	33.
29.	26.	23.	21.	18.	16.	14.	13.	11.	10.
9.	8.	7.	6.	6.	5.	5.	4.	4.	3.
3.	2.	2.	1.	1.	0.				

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

HYDROGRAPH AT STATION B

OTAL RAINFALL = 2.81, TOTAL LOSS = 1.58, TOTAL EXCESS = 1.23

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	48.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 269.	12.50		55.	18.	9.	9.
		(INCHES)	.950	1.231	1.231	1.231
		(AC-FT)	27.	35.	35.	35.

CUMULATIVE AREA = .54 SQ MI

*** ***

```
**************
*            *
*     CP-2   *
*            *
**************
```

51 KK combine CP-1 with sub basin B

52 HC HYDROGRAPH COMBINATION

ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

***

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

HYDROGRAPH AT STATION CP-2

FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	48.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 804.	12.90		286.	94.	47.	47.
		(INCHES)	.887	1.170	1.170	1.170
		(AC-FT)	142.	187.	187.	187.

CUMULATIVE AREA = 3.00 SQ MI

*** ***

```
**************
*            *
*     RT-3A  *
*            *
**************
```

53 KK route CP-2 to sub basin G

HYDROGRAPH ROUTING DATA

54 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	1640.	CHANNEL LENGTH
S	.0232	SLOPE
N	.030	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	50.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS

COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.77	1.55	2.00	820.00	803.93	776.00	1.17	11.15

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.77	1.55	2.00		803.93	776.00	1.17	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1873E+03 EXCESS= .0000E+00 OUTFLOW= .1873E+03 BASIN STORAGE= .2499E-02 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-3A

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
+	(CFS)	(HR)				
			(CFS)			
+	804.	12.93	286.	94.	47.	47.
			(INCHES) .887	1.171	1.171	1.171
			(AC-FT) 142.	187.	187.	187.

CUMULATIVE AREA = 3.00 SQ MI

*** ***

55 KK ********** * RT-3B * ********** route CP-2 to sub basin G

HYDROGRAPH ROUTING DATA

56 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	780.	CHANNEL LENGTH
S	.0179	SLOPE
N	.035	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	20.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.10	1.48	1.19	390.00	803.90	777.26	1.17	10.89

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.10	1.48	2.00		803.87	778.00	1.17	

.INUITY SUMMARY (AC-FT) - INFLOW= .1873E+03 EXCESS= .0000E+00 OUTFLOW= .1873E+03 BASIN STORAGE= .8561E-03 PERCENT ERROR= .0

```
      ***               ***               ***               ***               ***

                              HYDROGRAPH AT STATION    RT-3B

   PEAK FLOW      TIME                                 MAXIMUM AVERAGE FLOW
                                           6-HR         24-HR        72-HR      48.00-HR
 +   (CFS)        (HR)
                               (CFS)
 +     804.      12.97                     286.           94.          47.          47.
                             (INCHES)      .887         1.171        1.171        1.171
                              (AC-FT)      142.          187.         187.         187.

                            CUMULATIVE AREA =    3.00 SQ MI


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


              ***************
              *             *
   57 KK      *    RT-3C    *      route CP-2 to sub basin G
              *             *
              ***************

                HYDROGRAPH ROUTING DATA

   58 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                            L         655.  CHANNEL LENGTH
                            S        .0214  SLOPE
                            N         .045  CHANNEL ROUGHNESS COEFFICIENT
                           CA          .00  CONTRIBUTING AREA
                        SHAPE         TRAP  CHANNEL SHAPE
                           WD        20.00  BOTTOM WIDTH OR DIAMETER
                            Z         3.00  SIDE SLOPE

                                                                     ***
                                      COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                             COMPUTATION TIME STEP
                      ELEMENT    ALPHA       M          DT         DX        PEAK      TIME TO      VOLUME     MAXIMUM
                                                                                        PEAK                  CELERITY
                                                      (MIN)       (FT)      (CFS)      (MIN)        (IN)       (FPS)

                        MAIN        .94      1.48       1.12     327.50     803.70     778.84       1.17        9.76

                                                   INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                        MAIN        .94      1.48       2.00                803.48     778.00       1.17

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1873E+03 EXCESS= .0000E+00 OUTFLOW= .1873E+03 BASIN STORAGE= .7956E-03 PERCENT ERROR=     .0


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

                              HYDROGRAPH AT STATION    RT-3C

   PEAK FLOW      TIME                                 MAXIMUM AVERAGE FLOW
                                           6-HR         24-HR        72-HR      48.00-HR
 +   (CFS)        (HR)
                               (CFS)
 +     803.      12.97                     286.           94.          47.          47.
                             (INCHES)      .886         1.171        1.171        1.171
                              (AC-FT)      142.          187.         187.         187.
```

CUMULATIVE AREA = 3.00 SQ MI

*** ***

59 KK

****
* *
* RT-3D *
* *
****

route CP-2 to sub basin G

HYDROGRAPH ROUTING DATA

60 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	1555.	CHANNEL LENGTH
S	.0283	SLOPE
N	.035	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	20.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.39	1.48	2.00	777.50	803.56	780.00	1.17	12.71

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.39	1.48	2.00		803.56	780.00	1.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1873E+03 EXCESS= .0000E+00 OUTFLOW= .1873E+03 BASIN STORAGE= .1348E-02 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-3D

	PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
+	804.	13.00	(CFS)	286.	94.	47.	47.
			(INCHES)	.886	1.171	1.171	1.171
			(AC-FT)	142.	187.	187.	187.

CUMULATIVE AREA = 3.00 SQ MI

*** ***

41 KK

****
* *
* G *
* *
****

sub basin

```
              SUBBASIN RUNOFF DATA

     3A         SUBBASIN CHARACTERISTICS
                      TAREA          .43  SUBBASIN AREA

                PRECIPITATION DATA

 63 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
                  .35     .69    1.21    1.38    1.51    1.78    2.30    2.81     .00     .00     .00     .00

                                                  STORM AREA =      .00

 64 LS          SCS LOSS RATE
                      STRTL          .60  INITIAL ABSTRACTION
                     CRVNBR        77.00  CURVE NUMBER
                      RTIMP          .00  PERCENT IMPERVIOUS AREA

 65 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG          .51  LAG

                                                                ***

                                                        UNIT HYDROGRAPH
                                                   78 END-OF-PERIOD ORDINATES
                 7.        19.        36.        58.        82.       112.       148.       188.       235.       278.
               318.       346.       369.       384.       389.       390.       388.       378.       363.       345.
               327.       307.       283.       257.       227.       201.       177.       160.       144.       129.
               117.       106.        97.        88.        79.        72.        64.        57.        52.        47.
                42.        38.        35.        31.        28.        25.        23.        20.        19.        17.
                15.        14.        12.        11.        10.         9.         8.         7.         7.         6.
                 5.         5.         4.         4.         4.         3.         3.         3.         3.         2.
                 2.         2.         1.         1.         1.         1.         0.         0.

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

                    HYDROGRAPH AT STATION        G

   TOTAL RAINFALL =    2.81, TOTAL LOSS =    1.87, TOTAL EXCESS =     .94

 PEAK FLOW      TIME                      MAXIMUM AVERAGE FLOW
                                  6-HR       24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                          (CFS)
+     142.     12.60                33.         11.          5.          5.
                        (INCHES)   .730        .942        .942        .942
                         (AC-FT)    17.         21.         21.         21.

                      CUMULATIVE AREA =      .43 SQ MI



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


            ***************
            *             *
 66 KK      *     CP-3    *      combine CP-2 with sub basin G
            *             *
            ***************

 67 HC          HYDROGRAPH COMBINATION
                     ICOMP             2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                ***

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

                    HYDROGRAPH AT STATION     CP-3
```

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	48.00-HR
(CFS)	(HR)					
		(CFS)				
+ 897.	12.90		319.	105.	53.	53.
		(INCHES)	.865	1.142	1.142	1.142
		(AC-FT)	158.	209.	209.	209.

CUMULATIVE AREA = 3.43 SQ MI

*** ***

68 KK

****
* *
* RT-4A *
* *
****

route CP-3 to sub basin C

HYDROGRAPH ROUTING DATA

69 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	2085.	CHANNEL LENGTH
S	.0240	SLOPE
N	.040	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	40.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.70	1.54	2.00	695.00	897.25	778.00	1.14	10.23

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.70	1.54	2.00		897.25	778.00	1.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2087E+03 EXCESS= .0000E+00 OUTFLOW= .2087E+03 BASIN STORAGE= .3143E-02 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-4A

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	48.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 897.	12.97		319.	105.	53.	53.
		(INCHES)	.865	1.142	1.142	1.142
		(AC-FT)	158.	209.	209.	209.

CUMULATIVE AREA = 3.43 SQ MI

*** ***

```
          **************
          *            *
.0 KK     *     RT-4B  *      route CP-3 to sub basin C
          *            *
          **************

            HYDROGRAPH ROUTING DATA

71 RD         MUSKINGUM-CUNGE CHANNEL ROUTING
                        L       1820.  CHANNEL LENGTH
                        S       .0264  SLOPE
                        N        .050  CHANNEL ROUGHNESS COEFFICIENT
                       CA         .00  CONTRIBUTING AREA
                    SHAPE        TRAP  CHANNEL SHAPE
                       WD       50.00  BOTTOM WIDTH OR DIAMETER
                        Z       50.00  SIDE SLOPE

                                                    ***
                              COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                      COMPUTATION TIME STEP
                   ELEMENT    ALPHA       M         DT        DX       PEAK    TIME TO      VOLUME    MAXIMUM
                                                                                  PEAK                   CELERITY
                                                     (MIN)     (FT)     (CFS)    (MIN)        (IN)      (FPS)

                    MAIN        .69     1.36         2.00    303.33    897.23   782.00        1.14      5.16

                                          INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                    MAIN        .69     1.36         2.00              897.23   782.00        1.14

 NUITY SUMMARY (AC-FT) - INFLOW= .2087E+03 EXCESS= .0000E+00 OUTFLOW= .2087E+03 BASIN STORAGE= .2113E-02 PERCENT ERROR=     .0


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

                     HYDROGRAPH AT STATION    RT-4B

 PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR       72-HR      48.00-HR
+  (CFS)       (HR)
                          (CFS)
+    897.     13.03                    319.        105.         53.          53.
                        (INCHES)       .865       1.142       1.142        1.142
                        (AC-FT)         158.        209.        209.         209.

                     CUMULATIVE AREA =    3.43 SQ MI


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


          **************
          *            *
72 KK     *         C  *      sub basin
          *            *
          **************

            SUBBASIN RUNOFF DATA

73 BA         SUBBASIN CHARACTERISTICS
                    TAREA         .40  SUBBASIN AREA

              PRECIPITATION DATA
```

```
~' 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
                 .35     .69    1.21    1.37    1.50    1.77    2.28    2.79     .00     .00     .00     .00

                                              STORM AREA =      .00

  75 LS        SCS LOSS RATE
                    STRTL         .41  INITIAL ABSTRACTION
                   CRVNBR       83.00  CURVE NUMBER
                    RTIMP         .00  PERCENT IMPERVIOUS AREA

  76 UD        SCS DIMENSIONLESS UNITGRAPH
                     TLAG         .61  LAG

                                                 ***


                                             UNIT HYDROGRAPH
                                          93 END-OF-PERIOD ORDINATES
              5.         11.        22.        34.        49.        65.        84.       107.       133.       162.
            193.        220.       246.       265.       283.       293.       302.       304.       305.       303.
            299.        289.       279.       268.       255.       242.       227.       211.       192.       172.
            156.        140.       129.       117.       108.        98.        90.        83.        77.        71.
             65.         60.        55.        50.        45.        42.        39.        36.        32.        30.
             27.         25.        23.        21.        19.        18.        16.        15.        14.        12.
             11.         11.        10.         9.         8.         8.         7.         6.         6.         5.
              5.          4.         4.         4.         3.         3.         3.         3.         3.         2.
              2.          2.         2.         2.         1.         1.         1.         1.         1.         1.
              0.          0.         0.

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

                    HYDROGRAPH AT STATION          C

 'OTAL RAINFALL =     2.79, TOTAL LOSS =     1.51, TOTAL EXCESS =     1.28

 ..K FLOW      TIME                            MAXIMUM AVERAGE FLOW
                                   6-HR        24-HR        72-HR      48.00-HR
+   (CFS)      (HR)
                          (CFS)
+     168.     12.70                42.          14.           7.           7.
                        (INCHES)   .987        1.279        1.279        1.279
                         (AC-FT)    21.          27.          27.          27.

                     CUMULATIVE AREA =      .40 SQ MI



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


             ***************
             *             *
  77 KK      *     CP-4    *      combine CP-3 with sub basin C
             *             *
             ***************

  78 HC        HYDROGRAPH COMBINATION
                    ICOMP             2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                 ***

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

                    HYDROGRAPH AT STATION      CP-4

  PEAK FLOW     TIME                           MAXIMUM AVERAGE FLOW
                                   6-HR        24-HR        72-HR      48.00-HR
     FS)       (HR)
                          (CFS)
```

+	1030.	12.93		359.	119.	59.	59.
			(INCHES)	.872	1.156	1.156	1.156
			(AC-FT)	178.	236.	236.	236.

CUMULATIVE AREA = 3.82 SQ MI

*** ***

```
          **************
          *            *
 79 KK    *      RT-5  *      route CP-4 to sub basin D
          *            *
          **************
```

HYDROGRAPH ROUTING DATA

80 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	3450.	CHANNEL LENGTH
S	.0191	SLOPE
N	.030	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	50.00	BOTTOM WIDTH OR DIAMETER
Z	50.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.97	1.36	2.00	431.25	1029.60	782.00	1.16	6.92
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.97	1.36	2.00		1029.60	782.00	1.16	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2357E+03 EXCESS= .0000E+00 OUTFLOW= .2357E+03 BASIN STORAGE= .3552E-02 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-5

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR (CFS)	24-HR	72-HR	48.00-HR
+ 1030.	13.03		358.	119.	59.	59.
		(INCHES)	.872	1.156	1.156	1.156
		(AC-FT)	178.	236.	236.	236.

CUMULATIVE AREA = 3.82 SQ MI

*** ***

```
          **************
          *            *
```

```
   KK     *         D  *       sub basin
          *            *
          ***************

             SUBBASIN RUNOFF DATA

 82 BA       SUBBASIN CHARACTERISTICS
                   TAREA         .56  SUBBASIN AREA

             PRECIPITATION DATA

 83 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
               .35     .68    1.20    1.37    1.49    1.75    2.26    2.76     .00     .00     .00     .00

                                                STORM AREA =     .00

 84 LS       SCS LOSS RATE
                   STRTL         .38  INITIAL ABSTRACTION
                  CRVNBR       84.00  CURVE NUMBER
                   RTIMP         .00  PERCENT IMPERVIOUS AREA

 85 UD       SCS DIMENSIONLESS UNITGRAPH
                   TLAG         .59  LAG

                                                  ***

                                                UNIT HYDROGRAPH
                                            90 END-OF-PERIOD ORDINATES
                    7.      16.      33.      52.      74.     100.     129.     166.     205.     250.
                  296.     335.     371.     397.     419.     434.     441.     443.     442.     439.
                  425.     410.     393.     375.     355.     333.     309.     281.     252.     227.
                  203.     186.     169.     155.     141.     129.     119.     110.     101.      92.
                   85.      77.      70.      64.      59.      54.      49.      45.      41.      38.
                   34.      31.      29.      26.      24.      22.      20.      18.      17.      15.
                   14.      13.      12.      11.      10.       9.       8.       8.       7.       6.
                    6.       5.       5.       5.       4.       4.       4.       3.       3.       3.
                    2.       2.       2.       2.       1.       1.       1.       1.       0.       0.

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

                        HYDROGRAPH AT STATION        D

      TOTAL RAINFALL =     2.76, TOTAL LOSS =     1.44, TOTAL EXCESS =     1.32

    PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                              6-HR        24-HR        72-HR     48.00-HR
  +   (CFS)       (HR)
                                (CFS)
  +     251.     12.67                        61.          20.          10.          10.
                                (INCHES)    1.020        1.321        1.321        1.321
                                (AC-FT)        30.          39.          39.          39.

                        CUMULATIVE AREA =      .56 SQ MI


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


             ***************
             *             *
 86 KK       *      CP-5   *       combine CP-4 with sub basin D
             *             *
             ***************

    4C       HYDROGRAPH COMBINATION
                   ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
```

***

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

HYDROGRAPH AT STATION CP-5

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
		(CFS)				
1210.	12.97		416.	139.	69.	69.
		(INCHES)	.882	1.177	1.177	1.177
		(AC-FT)	206.	275.	275.	275.

CUMULATIVE AREA = 4.38 SQ MI

1

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

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	E	401.	13.00	132.	43.	22.	1.29		
ROUTED TO	RT-1A	401.	13.03	132.	43.	22.	1.29		
ROUTED TO	RT-1B	401.	13.03	132.	43.	22.	1.29		
ROUTED TO	RT-1C	401.	13.03	132.	43.	22.	1.29		
ROUTED TO	RT-1E	400.	13.07	132.	43.	22.	1.29		
HYDROGRAPH AT	A	253.	12.90	78.	26.	13.	.85		
HYDROGRAPH AT	F	129.	12.40	24.	8.	4.	.32		
3 COMBINED AT	CP-1	682.	12.93	233.	77.	38.	2.46		
ROUTED TO	RT-2A	682.	12.97	233.	77.	38.	2.46		
ROUTED TO	RT-2B	682.	13.00	233.	77.	38.	2.46		
ROUTED TO	RT-2C	682.	13.03	233.	77.	38.	2.46		
HYDROGRAPH AT	B	269.	12.50	55.	18.	9.	.54		
2 COMBINED AT	CP-2	804.	12.90	286.	94.	47.	3.00		
ROUTED TO	RT-3A	804.	12.93	286.	94.	47.	3.00		
ROUTED TO	RT-3B	804.	12.97	286.	94.	47.	3.00		
ROUTED TO									

+		RT-3C	803.	12.97	286.	94.	47.	3.00
	ROUTED TO							
+		RT-3D	804.	13.00	286.	94.	47.	3.00
	HYDROGRAPH AT							
+		G	142.	12.60	33.	11.	5.	.43
	2 COMBINED AT							
+		CP-3	897.	12.90	319.	105.	53.	3.43
	ROUTED TO							
+		RT-4A	897.	12.97	319.	105.	53.	3.43
	ROUTED TO							
+		RT-4B	897.	13.03	319.	105.	53.	3.43
	HYDROGRAPH AT							
+		C	168.	12.70	42.	14.	7.	.40
	2 COMBINED AT							
+		CP-4	1030.	12.93	359.	119.	59.	3.82
	ROUTED TO							
+		RT-5	1030.	13.03	358.	119.	59.	3.82
	HYDROGRAPH AT							
+		D	251.	12.67	61.	20.	10.	.56
	2 COMBINED AT							
+		CP-5	1210.	12.97	416.	139.	69.	4.38

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
RT-1A	MANE	1.87	401.21	781.17	1.25	2.00	400.95	782.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8593E+02 EXCESS= .0000E+00 OUTFLOW= .8593E+02 BASIN STORAGE= .7530E-03 PERCENT ERROR= .0

RT-1B	MANE	.70	400.86	782.49	1.25	2.00	400.84	782.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8594E+02 EXCESS= .0000E+00 OUTFLOW= .8594E+02 BASIN STORAGE= .4994E-03 PERCENT ERROR= .0

RT-1C	MANE	.63	400.76	782.61	1.25	2.00	400.64	782.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8594E+02 EXCESS= .0000E+00 OUTFLOW= .8594E+02 BASIN STORAGE= .3617E-03 PERCENT ERROR= .0

RT-1E	MANE	1.62	400.42	783.07	1.25	2.00	400.33	784.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8594E+02 EXCESS= .0000E+00 OUTFLOW= .8594E+02 BASIN STORAGE= .8085E-03 PERCENT ERROR= .0

RT-2A	MANE	.56	682.17	777.14	1.16	2.00	682.07	778.00	1.16

'UITY SUMMARY (AC-FT) - INFLOW= .1519E+03 EXCESS= .0000E+00 OUTFLOW= .1519E+03 BASIN STORAGE= .3331E-03 PERCENT ERROR= .0

RT-2B	MANE	2.00	682.02	780.00	1.16	2.00	682.02	780.00	1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1519E+03 EXCESS= .0000E+00 OUTFLOW= .1519E+03 BASIN STORAGE= .3076E-02 PERCENT ERROR= .0

RT-2C	MANE	2.00	681.90	782.00	1.16	2.00	681.90	782.00	1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1519E+03 EXCESS= .0000E+00 OUTFLOW= .1520E+03 BASIN STORAGE= .3415E-02 PERCENT ERROR= .0

RT-3A	MANE	2.00	803.93	776.00	1.17	2.00	803.93	776.00	1.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1873E+03 EXCESS= .0000E+00 OUTFLOW= .1873E+03 BASIN STORAGE= .2499E-02 PERCENT ERROR= .0

RT-3B	MANE	1.19	803.90	777.26	1.17	2.00	803.87	778.00	1.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1873E+03 EXCESS= .0000E+00 OUTFLOW= .1873E+03 BASIN STORAGE= .8561E-03 PERCENT ERROR= .0

RT-3C	MANE	1.12	803.70	778.84	1.17	2.00	803.48	778.00	1.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1873E+03 EXCESS= .0000E+00 OUTFLOW= .1873E+03 BASIN STORAGE= .7956E-03 PERCENT ERROR= .0

RT-3D	MANE	2.00	803.56	780.00	1.17	2.00	803.56	780.00	1.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1873E+03 EXCESS= .0000E+00 OUTFLOW= .1873E+03 BASIN STORAGE= .1348E-02 PERCENT ERROR= .0

RT-4A	MANE	2.00	897.25	778.00	1.14	2.00	897.25	778.00	1.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2087E+03 EXCESS= .0000E+00 OUTFLOW= .2087E+03 BASIN STORAGE= .3143E-02 PERCENT ERROR= .0

RT-4B	MANE	2.00	897.23	782.00	1.14	2.00	897.23	782.00	1.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2087E+03 EXCESS= .0000E+00 OUTFLOW= .2087E+03 BASIN STORAGE= .2113E-02 PERCENT ERROR= .0

RT-5	MANE	2.00	1029.60	782.00	1.16	2.00	1029.60	782.00	1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2357E+03 EXCESS= .0000E+00 OUTFLOW= .2357E+03 BASIN STORAGE= .3552E-02 PERCENT ERROR= .0

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

Existing Conditions HEC-1 Models

NOAA Atlas 2 Rainfall
Dam Included

September 01, 2000

```
*****************************************
 ***************************************
                                      *                                      *
*                                     *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                    *    U.S. ARMY CORPS OF ENGINEERS
*                                     *                                      *
 *              JUN   1998             *                                    *    HYDROLOGIC ENGINEERING CENTER
*                                     *                                      *
 *           VERSION 4.1               *                                    *         609 SECOND STREET
*                                     *                                      *
 *                                     *                                    *       DAVIS, CALIFORNIA 95616
*                                     *                                      *
 *  RUN DATE   30AUG00  TIME  10:02:30   *                                  *          (916) 756-1104
*                                     *                                      *
 *                                     *                                    *
*                                     *                                      *
 *****************************************
*****************************************
```

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

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

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


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

              *DIAGRAM
    1         ID   ========================================================================
    2         ID   EVANS CREEK 100-YEAR 24 HOUR MODEL   EXISTING CONDITIONS
    3         ID
    4         ID       - NOAA ATLAS 2 RAINFALL USED
    5         ID       - CURVE NUMBERS BASED ON FIELD INVESTIGATION AND CITY OF RENO LAND
    6         ID         DESIGNATIONS
    7         ID       - LAG TIMES BASED ON PROCEDURES IN WCHCDDM
    8         ID       - DAM SPECS BASED ON EVANS CREEK WATERSHED PLAN AND ENVIRONMENTAL
    9         ID         ASSESSMENT DATED:  AUGUST 1994 (MODIFIED SQ AND SA CARDS)
   10         ID
   11         ID   FILE:  EVN02E.DAT
   12         ID   BY:  BAJ                                              WRC NEVADA, INC.
   13         ID   DATE:  AUGUST 2000                                    RENO, NEVADA
   14         ID   ========================================================================
   15         IT       2              0    1441
   16         IO       3
              *
   17         KK       E sub basin
   18         BA   1.291
   19         PH            .001    0.34    0.67    1.18    1.34    1.47    1.73    2.24    2.75
   20         LS             83
   21         UD    0.90
```

```
                *
22              KK   RT-1A route sub basin E to sub basin A
23              RD    1050  0.0133   0.030            TRAP      10       3
                *
24              KK   RT-1B route sub basin E to sub basin A
25              RD     430  0.0233   0.030            TRAP      30       2
                *
26              KK   RT-1C route sub basin E to sub basin A
27              RD     335  0.0119   0.030            TRAP      20       2
                *
                *  RT-1D route sub basin E to sub basin A
                *    240  0.0750   0.013             TRAP       6       2
                *
28              KK   RT-1E route sub basin E to sub basin A
29              RD    1005  0.0299   0.035            TRAP      20       3
                *
30              KK       A sub basin
31              BA   0.854
32              PH            .001    0.35    0.68    1.19    1.36    1.49    1.76    2.29    2.82
33              LS              80
34              UD   0.79
                *
1                                          HEC-1 INPUT                                          PAGE  2

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

35              KK       F sub basin
36              BA   0.317
37              PH            .001    0.35    0.68    1.19    1.36    1.49    1.76    2.29    2.82
38              LS              76
39              UD   0.32
                *
40              KK    CP-1 combine sub basins A, E, and F
41              HC       3
                *
42              KK   RT-2A route CP-1 to sub basin B
43              RD     410  0.0293   0.035            TRAP      20       3
                *
44              KK   RT-2B route CP-1 to sub basin B
45              RD    1140  0.0123   0.045            TRAP      50       3
                *
46              KK   RT-2C route CP-1 to sub basin B
47              RD    2070  0.0251   0.040            TRAP      50       3
                *
48              KK       B sub basin
49              BA   0.538
50              PH            .001    0.35    0.68    1.20    1.37    1.50    1.76    2.29    2.81
51              LS              82
52              UD   0.43
                *
53              KK    CP-2 combine CP-1 with sub basin B
54              HC       2
                *
55              KK   RT-3A route CP-2 to sub basin G
56              RD    1640  0.0232   0.030            TRAP      50       3
                *
57              KK   RT-3B route CP-2 to sub basin G
```

```
58          RD     780  0.0179   0.035           TRAP      20       3
            *

59          KK   RT-3C route CP-2 to sub basin G
60          RD     655  0.0214   0.045           TRAP      20       3
            *

61          KK   RT-3D route CP-2 to sub basin G
62          RD    1555  0.0283   0.035           TRAP      20       3
            *
```



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

63          KK       G sub basin
64          BA   0.426
65          PH             .001    0.35    0.69    1.21    1.38    1.51    1.78    2.30    2.81
66          LS              77
67          UD     .51
            *

68          KK    CP-3 combine CP-2 with sub basin G
69          KO       3                                21
70          HC       2
            *

71          KK     DAM EVANS CREEK DAM (PROPOSED)
72          KM         70 AC-FT OF SEDIMENT + 132 AC-FT OF WATER = 202 AC-FT OF STORAGE
73          KO       3                                21
74          RS       1    STOR      -1
            *      3     4.1     4.7    5.25       6     6.5     7.2     7.9     8.5     9.4
            *   10.1      11   11.75   12.75      14    15.2      18
75          SA    2.67    3.01    3.40    3.82    4.23    4.66    5.15    5.65    6.14    6.63
76          SA    7.15    7.68    8.36    9.19    9.89   10.61   11.54
            *   4796    4800    4802    4804    4806    4808    4810    4812    4814    4816
            *   4818    4820    4822    4824    4826    4828    4831
77          SE    4796    4798    4800    4802    4804    4806    4808    4810    4812    4814
78          SE    4816    4818    4820    4822    4824    4826    4828
79          SQ       0    16.4    46.5      65   109.4   143.8   159.2   162.9   166.6   170.1
80          SQ   173.6     177   180.3   183.6   186.8     190   193.1  1304.8  4522.4    9106
81          SE    4796  4796.5    4797 4797.25    4798    4799    4800    4802    4804    4806
82          SE    4808    4810    4812    4814    4816    4818    4820    4823    4827    4831
            *

83          KK   RT-4A route CP-3 to sub basin C
84          RD    2085  0.0240   0.040           TRAP      40       3
            *

85          KK   RT-4B route CP-3 to sub basin C
86          RD    1820  0.0264   0.050           TRAP      50      50
            *

87          KK       C sub basin
88          BA   0.396
89          PH             .001    0.35    0.69    1.21    1.37    1.50    1.77    2.28    2.79
90          LS              83
91          UD    0.61
            *

92          KK    CP-4 combine CP-3 with sub basin C
93          HC       2
            *
```



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

94          KK    RT-5 route CP-4 to sub basin D
95          RD    3450  0.0191   0.030           TRAP      50      50
            *
```

```
 96          KK      D sub basin
 97          BA   0.557
 98          PH           .001    0.35    0.68    1.20    1.37    1.49    1.75    2.26    2.76
 99          LS             84
100          UD   0.59
             *

101          KK    CP-5 combine CP-4 with sub basin D
102          HC      2
             *
103          ZZ
```

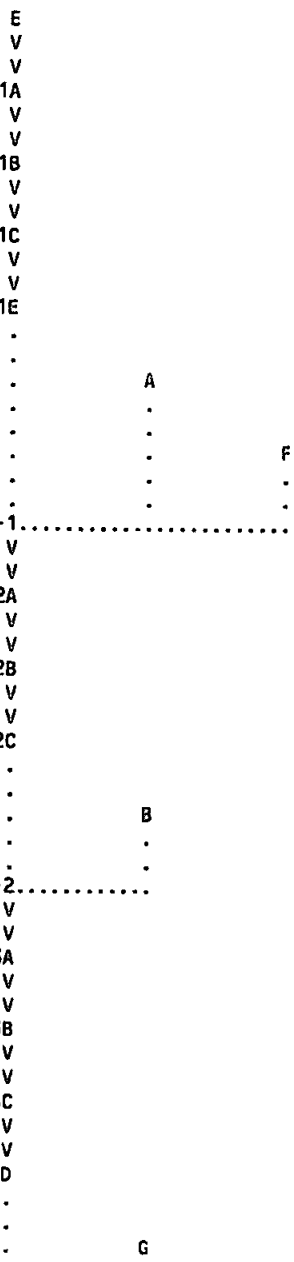
1

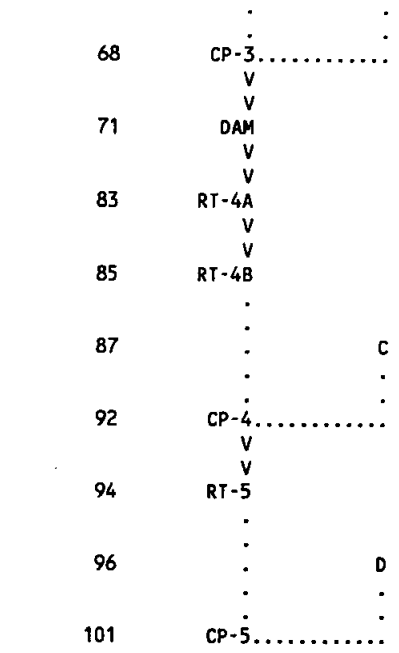
SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW





(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

FLOOD HYDROGRAPH PACKAGE (HEC-1)
JUN 1998
VERSION 4.1

RUN DATE 30AUG00 TIME 10:02:30

U.S. ARMY CORPS OF ENGINEERS
HYDROLOGIC ENGINEERING CENTER
609 SECOND STREET
DAVIS, CALIFORNIA 95616
(916) 756-1104

EVANS CREEK 100-YEAR 24 HOUR MODEL EXISTING CONDITIONS

- NOAA ATLAS 2 RAINFALL USED
- CURVE NUMBERS BASED ON FIELD INVESTIGATION AND CITY OF RENO LAND DESIGNATIONS
- LAG TIMES BASED ON PROCEDURES IN WCHCDDM
- DAM SPECS BASED ON EVANS CREEK WATERSHED PLAN AND ENVIRONMENTAL ASSESSMENT DATED: AUGUST 1994 (MODIFIED SQ AND SA CARDS)

FILE: EVN02E.DAT
BY: BAJ
DATE: AUGUST 2000

WRC NEVADA, INC.
RENO, NEVADA

16 IO OUTPUT CONTROL VARIABLES

IPRNT	3	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

```
  IT         HYDROGRAPH TIME DATA
                  NMIN            2  MINUTES IN COMPUTATION INTERVAL
                 IDATE      1     0  STARTING DATE
                 ITIME         0000  STARTING TIME
                    NQ         1441  NUMBER OF HYDROGRAPH ORDINATES
                NDDATE      3     0  ENDING DATE
                NDTIME         0000  ENDING TIME
                 ICENT           19  CENTURY MARK

               COMPUTATION INTERVAL     .03 HOURS
                    TOTAL TIME BASE   48.00 HOURS

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


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

              ***************
              *             *
 17 KK        *         E   *     sub basin
              *             *
              ***************

               SUBBASIN RUNOFF DATA

 18 BA           SUBBASIN CHARACTERISTICS
                       TAREA          1.29  SUBBASIN AREA

                 PRECIPITATION DATA

 19 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
                   .34     .67    1.18     1.34    1.47    1.73    2.24    2.75      .00     .00     .00     .00

                                                    STORM AREA =      .00

 20 LS           SCS LOSS RATE
                       STRTL           .41  INITIAL ABSTRACTION
                      CRVNBR         83.00  CURVE NUMBER
                       RTIMP           .00  PERCENT IMPERVIOUS AREA

 21 UD           SCS DIMENSIONLESS UNITGRAPH
                        TLAG           .90  LAG

                                                        ***


                                                   UNIT HYDROGRAPH
                                              137 END-OF-PERIOD ORDINATES
              7.        15.        25.        42.        59.        79.       101.       124.       152.       181.
            211.       250.       290.       332.       379.       426.       469.       508.       548.       578.
            606.       633.       648.       662.       674.       677.       679.       679.       677.       674.
            662.       648.       633.       615.       598.       580.       560.       541.       518.       494.
            469.       440.       411.       381.       356.       332.       309.       291.       274.       258.
            243.       228.       215.       203.       190.       181.       172.       163.       154.       145.
            137.       130.       122.       115.       107.       100.        95.        90.        85.        80.
             75.        71.        67.        64.        60.        56.        52.        50.        47.        44.
             42.        39.        36.        35.        33.        31.        29.        27.        26.        24.
             23.        22.        20.        19.        18.        17.        16.        15.        14.        14.
             13.        12.        11.        11.        10.         9.         9.         8.         8.         7.
              7.         7.         7.         6.         6.         6.         5.         5.         5.         5.
```

```
                         4.         4.         4.         3.         3.         3.         3.         2.         2.         2.
                         2.         1.         1.         1.         1.         0.         0.

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

                                  HYDROGRAPH AT STATION        E

            TOTAL RAINFALL =    2.75, TOTAL LOSS =    1.50, TOTAL EXCESS =    1.25

         PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                             6-HR        24-HR        72-HR     48.00-HR
       +   (CFS)       (HR)
                                   (CFS)
       +     401.     13.00                  132.         43.          22.          22.
                                 (INCHES)    .949        1.248        1.248        1.248
                                  (AC-FT)     65.          86.          86.          86.

                                 CUMULATIVE AREA =    1.29 SQ MI



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


                 ***************
                 *             *
   22 KK         *    RT-1A    *      route sub basin E to sub basin A
                 *             *
                 ***************

                    HYDROGRAPH ROUTING DATA

   23 RD              MUSKINGUM-CUNGE CHANNEL ROUTING
                               L        1050.  CHANNEL LENGTH
                               S        .0133  SLOPE
                               N         .030  CHANNEL ROUGHNESS COEFFICIENT
                              CA          .00  CONTRIBUTING AREA
                           SHAPE         TRAP  CHANNEL SHAPE
                              WD        10.00  BOTTOM WIDTH OR DIAMETER
                               Z         3.00  SIDE SLOPE
                                                                    ***
                                          COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                                COMPUTATION TIME STEP
                          ELEMENT    ALPHA        M         DT        DX       PEAK     TIME TO     VOLUME     MAXIMUM
                                                                                          PEAK                 CELERITY
                                                          (MIN)      (FT)     (CFS)     (MIN)        (IN)       (FPS)

                            MAIN       1.59      1.42       1.87    525.00    401.21     781.17       1.25       9.36

                                                    INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                            MAIN       1.59      1.42       2.00              400.95     782.00       1.25

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .8593E+02 EXCESS= .0000E+00 OUTFLOW= .8593E+02 BASIN STORAGE= .7530E-03 PERCENT ERROR=
.0


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

                                  HYDROGRAPH AT STATION    RT-1A

         PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                             6-HR        24-HR        72-HR     48.00-HR
       +   (CFS)       (HR)
```

```
                        (CFS)
      401.     13.03              132.        43.        22.         22.
                     (INCHES)     .949      1.248      1.248       1.248
                      (AC-FT)      65.        86.        86.         86.

                      CUMULATIVE AREA =     1.29 SQ MI



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


            ***************
            *             *
   24 KK    *    RT-1B    *       route sub basin E to sub basin A
            *             *
            ***************

              HYDROGRAPH ROUTING DATA

   25 RD        MUSKINGUM-CUNGE CHANNEL ROUTING
                            L        430.  CHANNEL LENGTH
                            S      .0233  SLOPE
                            N       .030  CHANNEL ROUGHNESS COEFFICIENT
                           CA        .00  CONTRIBUTING AREA
                        SHAPE       TRAP  CHANNEL SHAPE
                           WD      30.00  BOTTOM WIDTH OR DIAMETER
                            Z       2.00  SIDE SLOPE

                                                            ***
                               COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                        COMPUTATION TIME STEP
                ELEMENT    ALPHA       M        DT       DX       PEAK    TIME TO     VOLUME    MAXIMUM
                                                                            PEAK                CELERITY
                                              (MIN)     (FT)     (CFS)     (MIN)       (IN)      (FPS)

                  MAIN      1.06      1.54      .70   215.00    400.86    782.49      1.25      10.26


                                      INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                  MAIN      1.06      1.54     2.00             400.84    782.00      1.25

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .8594E+02 EXCESS= .0000E+00 OUTFLOW= .8594E+02 BASIN STORAGE= .4994E-03 PERCENT ERROR=
.0


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

                      HYDROGRAPH AT STATION     RT-1B

 PEAK FLOW     TIME                           MAXIMUM AVERAGE FLOW
                                  6-HR       24-HR      72-HR      48.00-HR
+   (CFS)      (HR)
                       (CFS)
+    401.     13.03               132.        43.        22.         22.
                    (INCHES)      .949      1.248      1.248       1.248
                     (AC-FT)       65.        86.        86.         86.

                     CUMULATIVE AREA =     1.29 SQ MI



 ** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
**
```

```
              ***************
              *             *
 26 KK        *    RT-1C    *     route sub basin E to sub basin A
              *             *
              ***************

                 HYDROGRAPH ROUTING DATA

 27 RD             MUSKINGUM-CUNGE CHANNEL ROUTING
                             L          335.  CHANNEL LENGTH
                             S         .0119  SLOPE
                             N          .030  CHANNEL ROUGHNESS COEFFICIENT
                            CA           .00  CONTRIBUTING AREA
                         SHAPE          TRAP  CHANNEL SHAPE
                            WD         20.00  BOTTOM WIDTH OR DIAMETER
                             Z          2.00  SIDE SLOPE

                                                                       ***
                                              COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                                     COMPUTATION TIME STEP
                              ELEMENT     ALPHA       M        DT        DX       PEAK    TIME TO     VOLUME    MAXIMUM
                                                                                            PEAK                CELERITY
                                                             (MIN)      (FT)      (CFS)    (MIN)        (IN)      (FPS)

                                MAIN       1.00      1.51       .63    167.50    400.76    782.61      1.25       8.92


                                                    INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                                MAIN       1.00      1.51      2.00              400.64    782.00      1.25

 ONTINUITY SUMMARY (AC-FT) - INFLOW= .8594E+02 EXCESS= .0000E+00 OUTFLOW= .8594E+02 BASIN STORAGE= .3617E-03 PERCENT ERROR=


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

                                  HYDROGRAPH AT STATION    RT-1C

   PEAK FLOW      TIME                             MAXIMUM AVERAGE FLOW
                                           6-HR         24-HR       72-HR      48.00-HR
 +   (CFS)        (HR)
                                (CFS)
 +     401.      13.03                     132.           43.         22.          22.
                              (INCHES)     .949         1.248       1.248        1.248
                               (AC-FT)      65.           86.         86.          86.

                             CUMULATIVE AREA =     1.29 SQ MI


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

              ***************
              *             *
 28 KK        *    RT-1E    *     route sub basin E to sub basin A
              *             *
              ***************

                 HYDROGRAPH ROUTING DATA

 29 RD             MUSKINGUM-CUNGE CHANNEL ROUTING
                             L         1005.  CHANNEL LENGTH
                             S         .0299  SLOPE
```

```
                          N         .035  CHANNEL ROUGHNESS COEFFICIENT
                         CA          .00  CONTRIBUTING AREA
                      SHAPE         TRAP  CHANNEL SHAPE
                         WD        20.00  BOTTOM WIDTH OR DIAMETER
                          Z         3.00  SIDE SLOPE

                                                             ***
                                   COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                         COMPUTATION TIME STEP
                   ELEMENT    ALPHA      M         DT        DX        PEAK     TIME TO      VOLUME     MAXIMUM
                                                                                 PEAK                   CELERITY
                                                  (MIN)     (FT)      (CFS)     (MIN)        (IN)        (FPS)

                    MAIN       1.43     1.48       1.62    502.50    400.42    783.07        1.25       10.35

                                            INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                    MAIN       1.43     1.48       2.00              400.33    784.00        1.25

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .8594E+02 EXCESS= .0000E+00 OUTFLOW= .8594E+02 BASIN STORAGE= .8085E-03 PERCENT ERROR=
 .0


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

                           HYDROGRAPH AT STATION    RT-1E

  PEAK FLOW      TIME                               MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR       72-HR      48.00-HR
+    (CFS)       (HR)
                           (CFS)
      400.       13.07                    132.         43.         22.          22.
                         (INCHES)         .949       1.248       1.248        1.248
                          (AC-FT)          65.         86.         86.          86.

                          CUMULATIVE AREA =     1.29 SQ MI



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


               ***************
               *             *
   30 KK       *      A      *     sub basin
               *             *
               ***************

                   SUBBASIN RUNOFF DATA

   31 BA             SUBBASIN CHARACTERISTICS
                          TAREA          .85   SUBBASIN AREA

                     PRECIPITATION DATA

   32 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
                       .35     .68    1.19     1.36    1.49    1.76    2.29    2.82       .00     .00     .00     .00

                                                    STORM AREA =      .00

   33 LS             SCS LOSS RATE
                          STRTL        .50   INITIAL ABSTRACTION
                          CRVNBR     80.00   CURVE NUMBER
```

```
                    RTIMP          .00  PERCENT IMPERVIOUS AREA

   34 UD         SCS DIMENSIONLESS UNITGRAPH
                    TLAG           .79  LAG

                                                          ***

                                                     UNIT HYDROGRAPH
                                                120 END-OF-PERIOD ORDINATES
                6.        13.        24.        39.        54.        73.        92.       116.       141.       169.
              203.       237.       277.       317.       354.       388.       421.       444.       467.       484.
              496.       507.       509.       511.       510.       508.       501.       489.       476.       461.
              447.       431.       414.       396.       375.       354.       330.       305.       280.       259.
              238.       223.       208.       194.       181.       169.       158.       147.       139.       131.
              123.       115.       108.       101.        95.        88.        82.        76.        71.        67.
               63.        59.        54.        51.        48.        45.        42.        39.        36.        34.
               32.        30.        27.        26.        24.        23.        21.        20.        19.        17.
               16.        15.        14.        13.        13.        12.        11.        10.        10.         9.
                8.         8.         7.         7.         6.         6.         6.         5.         5.         5.
                5.         4.         4.         4.         4.         3.         3.         3.         3.         2.
                2.         2.         2.         1.         1.         1.         1.         1.         0.         0.

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

                     HYDROGRAPH AT STATION        A

     TOTAL RAINFALL =    2.82, TOTAL LOSS =    1.70, TOTAL EXCESS =    1.12

   PEAK FLOW     TIME                      MAXIMUM AVERAGE FLOW
                                  6-HR        24-HR       72-HR     48.00-HR
 +   (CFS)       (HR)
                          (CFS)
 +     253.     12.90                78.          26.         13.          13.
                        (INCHES)    .849        1.117       1.117        1.117
                         (AC-FT)     39.          51.         51.          51.

                    CUMULATIVE AREA =      .85 SQ MI


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


             ***************
             *             *
   35 KK     *           F *      sub basin
             *             *
             ***************

               SUBBASIN RUNOFF DATA

   36 BA         SUBBASIN CHARACTERISTICS
                    TAREA          .32  SUBBASIN AREA

                 PRECIPITATION DATA

   37 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
                   .35     .68    1.19    1.36    1.49    1.76    2.29    2.82     .00     .00     .00     .00

                                                   STORM AREA =      .00

   38 LS         SCS LOSS RATE
                    STRTL          .63  INITIAL ABSTRACTION
                   CRVNBR        76.00  CURVE NUMBER
                    RTIMP          .00  PERCENT IMPERVIOUS AREA

   39 UD         SCS DIMENSIONLESS UNITGRAPH
```

```
                   TLAG          .32  LAG

                                                            ***

                                                 UNIT HYDROGRAPH
                                             50 END-OF-PERIOD ORDINATES
        14.        45.        85.       139.       210.       295.       368.       419.       448.       454.
       451.       426.       395.       360.       316.       263.       217.       183.       155.       132.
       114.        98.        84.        70.        60.        51.        44.        37.        31.        27.
        23.        19.        17.        14.        12.        10.         9.         7.         6.         5.
         5.         4.         4.         3.         3.         2.         2.         1.         1.         0.

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

                    HYDROGRAPH AT STATION        F

      TOTAL RAINFALL =    2.82, TOTAL LOSS =     1.92, TOTAL EXCESS =     .90

   PEAK FLOW     TIME                            MAXIMUM AVERAGE FLOW
                                        6-HR        24-HR       72-HR      48.00-HR
 +   (CFS)       (HR)
                             (CFS)
 +     129.      12.40                  24.           8.          4.          4.
                          (INCHES)     .691         .896        .896        .896
                           (AC-FT)      12.          15.         15.         15.

                          CUMULATIVE AREA =     .32 SQ MI


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

              ***************
              *             *
   40 KK      *     CP-1    *       combine sub basins A, E, and F
              *             *
              ***************

   41 HC          HYDROGRAPH COMBINATION
                       ICOMP            3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                            ***

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

                    HYDROGRAPH AT STATION     CP-1

   PEAK FLOW     TIME                            MAXIMUM AVERAGE FLOW
                                        6-HR        24-HR       72-HR      48.00-HR
 +   (CFS)       (HR)
                             (CFS)
 +     682.      12.93                 233.          77.         38.         38.
                          (INCHES)     .879        1.157       1.157       1.157
                           (AC-FT)     115.         152.        152.        152.

                          CUMULATIVE AREA =    2.46 SQ MI


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

              ***************
              *             *
   42 KK      *    RT-2A    *       route CP-1 to sub basin B
              *             *
```

```
           ***************

             HYDROGRAPH ROUTING DATA

  43 RD        MUSKINGUM-CUNGE CHANNEL ROUTING
                      L       410.  CHANNEL LENGTH
                      S      .0293  SLOPE
                      N       .035  CHANNEL ROUGHNESS COEFFICIENT
                     CA        .00  CONTRIBUTING AREA
                  SHAPE       TRAP  CHANNEL SHAPE
                     WD      20.00  BOTTOM WIDTH OR DIAMETER
                      Z       3.00  SIDE SLOPE

                                              ***
                          COMPUTED MUSKINGUM-CUNGE PARAMETERS
                              COMPUTATION TIME STEP
                ELEMENT   ALPHA     M       DT       DX      PEAK    TIME TO    VOLUME   MAXIMUM
                                                                      PEAK               CELERITY
                                          (MIN)     (FT)    (CFS)    (MIN)      (IN)     (FPS)

                  MAIN     1.41    1.48     .56   205.00   682.17   777.14      1.16     12.20

                             INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                  MAIN     1.41    1.48    2.00            682.07   778.00      1.16

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1519E+03 EXCESS= .0000E+00 OUTFLOW= .1519E+03 BASIN STORAGE= .3331E-03 PERCENT ERROR=
.0


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

                  HYDROGRAPH AT STATION     RT-2A

  PEAK FLOW    TIME                        MAXIMUM AVERAGE FLOW
                                  6-HR       24-HR      72-HR    48.00-HR
+   (CFS)      (HR)
                         (CFS)
+     682.    12.97                233.        77.        38.        38.
                       (INCHES)    .879      1.157      1.157      1.157
                        (AC-FT)    115.       152.       152.       152.

                     CUMULATIVE AREA =    2.46 SQ MI


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


           ***************
           *             *
  44 KK    *     RT-2B   *      route CP-1 to sub basin B
           *             *
           ***************

             HYDROGRAPH ROUTING DATA

  45 RD        MUSKINGUM-CUNGE CHANNEL ROUTING
                      L      1140.  CHANNEL LENGTH
                      S      .0123  SLOPE
                      N       .045  CHANNEL ROUGHNESS COEFFICIENT
                     CA        .00  CONTRIBUTING AREA
                  SHAPE       TRAP  CHANNEL SHAPE
                     WD      50.00  BOTTOM WIDTH OR DIAMETER
                      Z       3.00  SIDE SLOPE
```

```
                                                                      ***
                                    COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                           COMPUTATION TIME STEP
                     ELEMENT    ALPHA       M        DT       DX       PEAK    TIME TO     VOLUME    MAXIMUM
                                                                                 PEAK                CELERITY
                                                    (MIN)     (FT)     (CFS)    (MIN)       (IN)      (FPS)

                       MAIN       .37      1.55      2.00    380.00    682.02   780.00      1.16       6.61

                                           INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                       MAIN       .37      1.55      2.00              682.02   780.00      1.16

  CONTINUITY SUMMARY (AC-FT) - INFLOW= .1519E+03 EXCESS= .0000E+00 OUTFLOW= .1519E+03 BASIN STORAGE= .3076E-02 PERCENT ERROR=
 .0


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

                        HYDROGRAPH AT STATION    RT-2B

   PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR        24-HR       72-HR      48.00-HR
 +   (CFS)        (HR)
                            (CFS)
 +     682.      13.00                 233.         77.         38.         38.
                         (INCHES)      .879       1.157       1.157       1.157
                          (AC-FT)      115.        152.        152.        152.

                         CUMULATIVE AREA =    2.46 SQ MI


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

              ***************
              *             *
   46 KK      *    RT-2C    *      route CP-1 to sub basin 8
              *             *
              ***************

                HYDROGRAPH ROUTING DATA

   47 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                              L        2070.  CHANNEL LENGTH
                              S        .0251  SLOPE
                              N         .040  CHANNEL ROUGHNESS COEFFICIENT
                             CA          .00  CONTRIBUTING AREA
                          SHAPE         TRAP  CHANNEL SHAPE
                             WD        50.00  BOTTOM WIDTH OR DIAMETER
                              Z         3.00  SIDE SLOPE

                                                                      ***
                                    COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                           COMPUTATION TIME STEP
                     ELEMENT    ALPHA       M        DT       DX       PEAK    TIME TO     VOLUME    MAXIMUM
                                                                                 PEAK                CELERITY
                                                    (MIN)     (FT)     (CFS)    (MIN)       (IN)      (FPS)

                       MAIN       .60      1.55      2.00    517.50    681.90   782.00      1.16       8.96

                                           INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL
```

```
                    MAIN         .60       1.55       2.00              681.90    782.00       1.16

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1519E+03 EXCESS= .0000E+00 OUTFLOW= .1520E+03 BASIN STORAGE= .3415E-02 PERCENT ERROR=
.0


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

                        HYDROGRAPH AT STATION    RT-2C

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                         (CFS)
+     682.     13.03                  233.         77.         38.         38.
                       (INCHES)       .879       1.157       1.157       1.157
                       (AC-FT)        115.        152.        152.        152.

                       CUMULATIVE AREA =    2.46 SQ MI


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


           ***************
           *             *
  48 KK    *         B   *      sub basin
           *             *
           ***************

              SUBBASIN RUNOFF DATA

  49 BA         SUBBASIN CHARACTERISTICS
                      TAREA          .54  SUBBASIN AREA

                PRECIPITATION DATA

  50 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
                  .35     .68    1.20    1.37    1.50    1.76    2.29    2.81     .00     .00     .00     .00

                                                STORM AREA =     .00

  51 LS         SCS LOSS RATE
                      STRTL          .44  INITIAL ABSTRACTION
                     CRVNBR        82.00  CURVE NUMBER
                      RTIMP          .00  PERCENT IMPERVIOUS AREA

  52 UD         SCS DIMENSIONLESS UNITGRAPH
                      TLAG          .43  LAG

                                                      ***

                                                UNIT HYDROGRAPH
                                            66 END-OF-PERIOD ORDINATES
                  13.       38.       71.      110.      162.      225.      298.      381.      451.      507.
                 548.      574.      580.      579.      569.      543.      513.      480.      443.      400.
                 349.      301.      261.      231.      204.      180.      160.      144.      128.      114.
                 101.       88.       78.       70.       61.       55.       48.       43.       38.       33.
                  29.       26.       23.       21.       18.       16.       14.       13.       11.       10.
                   9.        8.        7.        6.        6.        5.        5.        4.        4.        3.
                   3.        2.        2.        1.        1.        0.

      ***             ***             ***             ***             ***
```

```
                                  HYDROGRAPH AT STATION        B

              TOTAL RAINFALL =     2.81, TOTAL LOSS =     1.58, TOTAL EXCESS =     1.23

           PEAK FLOW     TIME                               MAXIMUM AVERAGE FLOW
                                                  6-HR        24-HR       72-HR      48.00-HR
       +    (CFS)       (HR)
                                       (CFS)
       +     269.       12.50                      55.          18.          9.           9.
                                    (INCHES)      .950        1.231       1.231        1.231
                                     (AC-FT)       27.          35.         35.          35.

                                     CUMULATIVE AREA =      .54 SQ MI


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


                    ***************
                    *             *
          53 KK     *      CP-2   *       combine CP-1 with sub basin B
                    *             *
                    ***************

          54 HC          HYDROGRAPH COMBINATION
                               ICOMP             2   NUMBER OF HYDROGRAPHS TO COMBINE

                                                                             ***

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

                                  HYDROGRAPH AT STATION      CP-2

           PEAK FLOW     TIME                               MAXIMUM AVERAGE FLOW
                                                  6-HR        24-HR       72-HR      48.00-HR
       +    (CFS)       (HR)
                                       (CFS)
       +     804.       12.90                     286.          94.         47.          47.
                                    (INCHES)      .887        1.170       1.170        1.170
                                     (AC-FT)      142.         187.        187.         187.

                                     CUMULATIVE AREA =     3.00 SQ MI


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


                    ***************
                    *             *
          55 KK     *     RT-3A   *       route CP-2 to sub basin G
                    *             *
                    ***************

                   HYDROGRAPH ROUTING DATA

          56 RD        MUSKINGUM-CUNGE CHANNEL ROUTING
                                     L         1640.   CHANNEL LENGTH
                                     S         .0232   SLOPE
                                     N          .030   CHANNEL ROUGHNESS COEFFICIENT
                                    CA           .00   CONTRIBUTING AREA
                                 SHAPE          TRAP   CHANNEL SHAPE
                                    WD         50.00   BOTTOM WIDTH OR DIAMETER
                                     Z          3.00   SIDE SLOPE

                                                                            ***
```

```
                                              COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                                     COMPUTATION TIME STEP
                          ELEMENT     ALPHA         M           DT          DX         PEAK     TIME TO        VOLUME      MAXIMUM
                                                                                                 PEAK                      CELERITY
                                                              (MIN)        (FT)        (CFS)    (MIN)           (IN)        (FPS)

                            MAIN        .77        1.55        2.00       820.00      803.93    776.00          1.17        11.15


                                                           INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                            MAIN        .77        1.55        2.00                   803.93    776.00          1.17


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1873E+03 EXCESS= .0000E+00 OUTFLOW= .1873E+03 BASIN STORAGE= .2499E-02 PERCENT ERROR=
.0


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

                              HYDROGRAPH AT STATION    RT-3A

   PEAK FLOW     TIME                                   MAXIMUM AVERAGE FLOW
                                             6-HR         24-HR       72-HR      48.00-HR
 +    (CFS)      (HR)
                              (CFS)
 +      804.     12.93                       286.           94.         47.          47.
                           (INCHES)          .887         1.171       1.171        1.171
                            (AC-FT)          142.          187.        187.         187.

                             CUMULATIVE AREA =    3.00 SQ MI


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

                  ***************
                  *             *
    57 KK         *    RT-3B    *     route CP-2 to sub basin G
                  *             *
                  ***************

                     HYDROGRAPH ROUTING DATA

    58 RD              MUSKINGUM-CUNGE CHANNEL ROUTING
                                     L          780.  CHANNEL LENGTH
                                     S         .0179  SLOPE
                                     N          .035  CHANNEL ROUGHNESS COEFFICIENT
                                    CA           .00  CONTRIBUTING AREA
                                 SHAPE          TRAP  CHANNEL SHAPE
                                    WD         20.00  BOTTOM WIDTH OR DIAMETER
                                     Z          3.00  SIDE SLOPE

                                                                              ***
                                              COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                                     COMPUTATION TIME STEP
                          ELEMENT     ALPHA         M           DT          DX         PEAK     TIME TO        VOLUME      MAXIMUM
                                                                                                 PEAK                      CELERITY
                                                              (MIN)        (FT)        (CFS)    (MIN)           (IN)        (FPS)

                            MAIN       1.10        1.48        1.19       390.00      803.90    777.26          1.17        10.89


                                                           INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL
```

```
                    MAIN      1.10      1.48      2.00                803.87   778.00      1.17

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1873E+03 EXCESS= .0000E+00 OUTFLOW= .1873E+03 BASIN STORAGE= .8561E-03 PERCENT ERROR=
.0


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

                      HYDROGRAPH AT STATION     RT-3B

   PEAK FLOW      TIME                                MAXIMUM AVERAGE FLOW
                                         6-HR        24-HR       72-HR      48.00-HR
+    (CFS)        (HR)
                              (CFS)
+     804.       12.97                   286.          94.         47.         47.
                            (INCHES)     .887        1.171       1.171       1.171
                             (AC-FT)     142.         187.        187.        187.

                             CUMULATIVE AREA =    3.00 SQ MI


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


              ***************
              *             *
  59 KK       *    RT-3C    *     route CP-2 to sub basin G
              *             *
              ***************

               HYDROGRAPH ROUTING DATA

  60 RD         MUSKINGUM-CUNGE CHANNEL ROUTING
                          L        655.   CHANNEL LENGTH
                          S       .0214   SLOPE
                          N        .045   CHANNEL ROUGHNESS COEFFICIENT
                         CA         .00   CONTRIBUTING AREA
                      SHAPE        TRAP   CHANNEL SHAPE
                         WD       20.00   BOTTOM WIDTH OR DIAMETER
                          Z        3.00   SIDE SLOPE
                                                                         ***
                                   COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                        COMPUTATION TIME STEP
                  ELEMENT     ALPHA       M         DT       DX       PEAK     TIME TO     VOLUME     MAXIMUM
                                                                                 PEAK                 CELERITY
                                                   (MIN)     (FT)     (CFS)    (MIN)       (IN)       (FPS)

                   MAIN        .94      1.48       1.12    327.50    803.70   778.84       1.17       9.76

                                          INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                   MAIN        .94      1.48       2.00              803.48   778.00       1.17

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1873E+03 EXCESS= .0000E+00 OUTFLOW= .1873E+03 BASIN STORAGE= .7956E-03 PERCENT ERROR=
.0


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

                      HYDROGRAPH AT STATION     RT-3C
```

```
  PEAK FLOW     TIME                              MAXIMUM AVERAGE FLOW
                                        6-HR        24-HR       72-HR      48.00-HR
    (CFS)       (HR)
                            (CFS)
+      803.     12.97                   286.          94.         47.          47.
                          (INCHES)      .886        1.171       1.171        1.171
                           (AC-FT)      142.         187.        187.         187.

                          CUMULATIVE AREA =     3.00 SQ MI


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


             ***************
             *             *
  61 KK      *     RT-3D   *      route CP-2 to sub basin G
             *             *
             ***************

               HYDROGRAPH ROUTING DATA

  62 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                           L        1555.  CHANNEL LENGTH
                           S        .0283  SLOPE
                           N         .035  CHANNEL ROUGHNESS COEFFICIENT
                          CA          .00  CONTRIBUTING AREA
                       SHAPE         TRAP  CHANNEL SHAPE
                          WD        20.00  BOTTOM WIDTH OR DIAMETER
                           Z         3.00  SIDE SLOPE

                                                               ***
                                  COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                        COMPUTATION TIME STEP
                    ELEMENT    ALPHA      M        DT       DX       PEAK    TIME TO     VOLUME    MAXIMUM
                                                                               PEAK                CELERITY
                                                  (MIN)     (FT)     (CFS)    (MIN)       (IN)      (FPS)

                      MAIN      1.39     1.48      2.00    777.50   803.56    780.00      1.17      12.71

                                         INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                      MAIN      1.39     1.48      2.00             803.56    780.00      1.17

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1873E+03 EXCESS= .0000E+00 OUTFLOW= .1873E+03 BASIN STORAGE= .1348E-02 PERCENT ERROR=
.0


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

                          HYDROGRAPH AT STATION     RT-3D

  PEAK FLOW     TIME                              MAXIMUM AVERAGE FLOW
                                        6-HR        24-HR       72-HR      48.00-HR
+   (CFS)       (HR)
                            (CFS)
+      804.     13.00                   286.          94.         47.          47.
                          (INCHES)      .886        1.171       1.171        1.171
                           (AC-FT)      142.         187.        187.         187.

                          CUMULATIVE AREA =     3.00 SQ MI
```

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

              ***************
              *             *
   63 KK      *      G      *     sub basin
              *             *
              ***************

                SUBBASIN RUNOFF DATA

   64 BA          SUBBASIN CHARACTERISTICS
                        TAREA          .43   SUBBASIN AREA

                  PRECIPITATION DATA

   65 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
                    .35     .69    1.21    1.38    1.51    1.78    2.30    2.81     .00     .00     .00     .00

                                                      STORM AREA =      .00

   66 LS          SCS LOSS RATE
                        STRTL          .60   INITIAL ABSTRACTION
                       CRVNBR        77.00   CURVE NUMBER
                        RTIMP          .00   PERCENT IMPERVIOUS AREA

   67 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG          .51   LAG

                                                                ***

                                                        UNIT HYDROGRAPH
                                                    78 END-OF-PERIOD ORDINATES
                 7.        19.        36.        58.        82.       112.       148.       188.       235.       278.
               318.       346.       369.       384.       389.       390.       388.       378.       363.       345.
               327.       307.       283.       257.       227.       201.       177.       160.       144.       129.
               117.       106.        97.        88.        79.        72.        64.        57.        52.        47.
                42.        38.        35.        31.        28.        25.        23.        20.        19.        17.
                15.        14.        12.        11.        10.         9.         8.         7.         7.         6.
                 5.         5.         4.         4.         4.         3.         3.         3.         3.         2.
                 2.         2.         1.         1.         1.         1.         0.         0.

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

                        HYDROGRAPH AT STATION        G

        TOTAL RAINFALL =    2.81, TOTAL LOSS =     1.87, TOTAL EXCESS =      .94

      PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR        24-HR        72-HR      48.00-HR
   +   (CFS)        (HR)
                               (CFS)
   +      142.      12.60                  33.          11.           5.           5.
                             (INCHES)    .730         .942         .942         .942
                              (AC-FT)     17.          21.          21.          21.

                             CUMULATIVE AREA =       .43 SQ MI


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

             ***************
             *             *
   68 KK     *     CP-3    *     combine CP-2 with sub basin G
```

```
          *          *
          **************

 69 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          3  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE
                      IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                       IOUT         21  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2       1441  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT       .033  TIME INTERVAL IN HOURS


 70 HC          HYDROGRAPH COMBINATION
                      ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                          ***

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

                        HYDROGRAPH AT STATION     CP-3

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR      48.00-HR
+   (CFS)       (HR)
                          (CFS)
+     897.     12.90                319.         105.          53.          53.
                        (INCHES)     .865        1.142        1.142        1.142
                        (AC-FT)      158.         209.         209.         209.

                        CUMULATIVE AREA =    3.43 SQ MI


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


          **************
          *            *
 71 KK    *       DAM  *      EVANS CREEK DAM (PROPOSED)
          *            *
          **************
                              70 AC-FT OF SEDIMENT + 132 AC-FT OF WATER = 202 AC-FT OF STORAGE

 73 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          3  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE
                      IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                       IOUT         21  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2       1441  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT       .033  TIME INTERVAL IN HOURS


          HYDROGRAPH ROUTING DATA

 74 RS          STORAGE ROUTING
                      NSTPS          1  NUMBER OF SUBREACHES
                       ITYP       STOR  TYPE OF INITIAL CONDITION
                     RSVRIC      -1.00  INITIAL CONDITION
                          X        .00 WORKING R AND D COEFFICIENT

 75 SA              AREA        2.7       3.0       3.4       3.8       4.2       4.7       5.2       5.7       6.1       6.6
                                7.2       7.7       8.4       9.2       9.9      10.6      11.5

 77 SE          ELEVATION    4796.00   4798.00   4800.00   4802.00   4804.00   4806.00   4808.00   4810.00   4812.00   4814.00
                             4816.00   4818.00   4820.00   4822.00   4824.00   4826.00   4828.00
```

```
 79 SQ          DISCHARGE        0.       16.       47.       65.      109.      144.      159.      163.      167.      170.
                               174.      177.      180.      184.      187.      190.      193.     1305.     4522.      9106

 81 SE          ELEVATION    4796.00   4796.50   4797.00   4797.25   4798.00   4799.00   4800.00   4802.00   4804.00   4806.0
                             4808.00   4810.00   4812.00   4814.00   4816.00   4818.00   4820.00   4823.00   4827.00   4831.0

                                                                      ***

                                                   COMPUTED STORAGE-ELEVATION DATA

          STORAGE         .00      5.68     12.08     19.30     27.35     36.23     46.04     56.83     68.62     81.39
        ELEVATION     4796.00   4798.00   4800.00   4802.00   4804.00   4806.00   4808.00   4810.00   4812.00   4814.00

          STORAGE       95.16    109.99    126.03    143.57    162.65    183.14    205.28
        ELEVATION     4816.00   4818.00   4820.00   4822.00   4824.00   4826.00   4828.00

                                               COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE         .00      1.36      2.75      3.47      5.68      8.78     12.08     19.30     27.35     36.23
          OUTFLOW         .00     16.40     46.50     65.00    109.40    143.80    159.20    162.90    166.60    170.10
        ELEVATION     4796.00   4796.50   4797.00   4797.25   4798.00   4799.00   4800.00   4802.00   4804.00   4806.00

          STORAGE       46.04     56.83     68.62     81.39     95.16    109.99    126.03    143.57    152.93    162.65
          OUTFLOW      173.60    177.00    180.30    183.60    186.80    190.00    193.10    934.23   1304.80   2109.20
        ELEVATION     4808.00   4810.00   4812.00   4814.00   4816.00   4818.00   4820.00   4822.00   4823.00   4824.00

          STORAGE      183.14    193.98    205.28    242.08
          OUTFLOW     3718.00   4522.40   5668.30   9106.00
        ELEVATION     4826.00   4827.00   4828.00   4831.00

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

                          HYDROGRAPH AT STATION      DAM

  PEAK FLOW     TIME                              MAXIMUM AVERAGE FLOW
                                        6-HR        24-HR        72-HR      48.00-HR
    (CFS)       (HR)
                           (CFS)
+     184.     15.03                    182.        105.          53.          53.
                         (INCHES)       .495        1.142        1.142        1.142
                         (AC-FT)         90.        209.         209.         209.

 PEAK STORAGE   TIME                             MAXIMUM AVERAGE STORAGE
                                        6-HR        24-HR        72-HR      48.00-HR
+  (AC-FT)      (HR)
       84.     15.03                     77.         32.          16.          16.

  PEAK STAGE    TIME                              MAXIMUM AVERAGE STAGE
                                        6-HR        24-HR        72-HR      48.00-HR
+   (FEET)      (HR)
   4814.38     15.03                 4813.32      4803.65      4799.82      4799.82

                          CUMULATIVE AREA =    3.43 SQ MI


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


                **************
                *            *
 83 KK          *   RT-4A    *      route CP-3 to sub basin C
                *            *
                **************

                  HYDROGRAPH ROUTING DATA

 84 RD             MUSKINGUM-CUNGE CHANNEL ROUTING
                              L       2085.  CHANNEL LENGTH
```

```
                         S        .0240  SLOPE
                         N         .040  CHANNEL ROUGHNESS COEFFICIENT
                        CA          .00  CONTRIBUTING AREA
                     SHAPE         TRAP  CHANNEL SHAPE
                        WD        40.00  BOTTOM WIDTH OR DIAMETER
                         Z         3.00  SIDE SLOPE

                                                        ***
                                  COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                       COMPUTATION TIME STEP
                     ELEMENT     ALPHA       M        DT        DX       PEAK    TIME TO     VOLUME     MAXIMUM
                                                                                  PEAK                  CELERITY
                                                     (MIN)     (FT)      (CFS)   (MIN)       (IN)       (FPS)

                      MAIN         .70     1.54      2.00    347.50     184.21   908.00      1.14        5.89

                                       INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                      MAIN         .70     1.54      2.00               184.21   908.00      1.14

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .2087E+03 EXCESS= .0000E+00 OUTFLOW= .2087E+03 BASIN STORAGE= .3134E-02 PERCENT ERROR=
.0


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

                         HYDROGRAPH AT STATION    RT-4A

  PEAK FLOW      TIME                                   MAXIMUM AVERAGE FLOW
                                              6-HR        24-HR       72-HR     48.00-HR
     (CFS)       (HR)
                                (CFS)
+     184.      15.10                         182.         105.         53.          53.
                             (INCHES)         .495        1.142       1.142        1.142
                              (AC-FT)          90.         209.        209.         209.

                         CUMULATIVE AREA =    3.43 SQ MI



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

                ***************
                *             *
   85 KK        *    RT-4B    *     route CP-3 to sub basin C
                *             *
                ***************

                  HYDROGRAPH ROUTING DATA

   86 RD            MUSKINGUM-CUNGE CHANNEL ROUTING
                           L        1820.  CHANNEL LENGTH
                           S        .0264  SLOPE
                           N         .050  CHANNEL ROUGHNESS COEFFICIENT
                          CA          .00  CONTRIBUTING AREA
                       SHAPE         TRAP  CHANNEL SHAPE
                          WD        50.00  BOTTOM WIDTH OR DIAMETER
                           Z        50.00  SIDE SLOPE

                                                        ***
                                  COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                       COMPUTATION TIME STEP
                     ELEMENT     ALPHA       M        DT        DX       PEAK    TIME TO     VOLUME     MAXIMUM
                                                                                  PEAK                  CELERITY
```

			(MIN)	(FT)	(CFS)	(MIN)	(IN)	(FPS)
MAIN	.69	1.36	2.00	202.22	184.21	914.00	1.14	3.40

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.69	1.36	2.00		184.21	914.00	1.14	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2087E+03 EXCESS= .0000E+00 OUTFLOW= .2087E+03 BASIN STORAGE= .1968E-02 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-4B

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	48.00-HR
(CFS)	(HR)					
		(CFS)				
184.	15.23		182.	105.	53.	53.
		(INCHES)	.495	1.142	1.142	1.142
		(AC-FT)	90.	209.	209.	209.

CUMULATIVE AREA = 3.43 SQ MI

*** *

87 KK C sub basin

SUBBASIN RUNOFF DATA

88 BA SUBBASIN CHARACTERISTICS
TAREA .40 SUBBASIN AREA

PRECIPITATION DATA

89 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
.35	.69	1.21	1.37	1.50	1.77	2.28	2.79	.00	.00	.00	.00

STORM AREA = .00

90 LS SCS LOSS RATE
STRTL .41 INITIAL ABSTRACTION
CRVNBR 83.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

91 UD SCS DIMENSIONLESS UNITGRAPH
TLAG .61 LAG

***

UNIT HYDROGRAPH
93 END-OF-PERIOD ORDINATES

5.	11.	22.	34.	49.	65.	84.	107.	133.	162.
193.	220.	246.	265.	283.	293.	302.	304.	305.	303.

```
                 299.      289.      279.      268.      255.      242.      227.      211.      192.      172.
                 156.      140.      129.      117.      108.       98.       90.       83.       77.       71.
                  65.       60.       55.       50.       45.       42.       39.       36.       32.       30.
                  27.       25.       23.       21.       19.       18.       16.       15.       14.       12.
                  11.       11.       10.        9.        8.        8.        7.        6.        6.        5.
                   5.        4.        4.        4.        3.        3.        3.        3.        3.        2.
                   2.        2.        2.        2.        1.        1.        1.        1.        1.        1.
                   0.        0.        0.

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

                        HYDROGRAPH AT STATION        C

      TOTAL RAINFALL =     2.79, TOTAL LOSS =     1.51, TOTAL EXCESS =     1.28

    PEAK FLOW      TIME                              MAXIMUM AVERAGE FLOW
                                            6-HR        24-HR       72-HR      48.00-HR
  +    (CFS)       (HR)
                             (CFS)
  +      168.     12.70                       42.         14.          7.           7.
                           (INCHES)         .987        1.279       1.279        1.279
                            (AC-FT)          21.          27.         27.          27.

                           CUMULATIVE AREA =       .40 SQ MI


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

                 ***************
                 *             *
   92 KK         *     CP-4    *       combine CP-3 with sub basin C
                 *             *
                 ***************

   93 HC            HYDROGRAPH COMBINATION
                         ICOMP            2  NUMBER OF HYDROGRAPHS TO COMBINE

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

                        HYDROGRAPH AT STATION     CP-4

    PEAK FLOW      TIME                              MAXIMUM AVERAGE FLOW
                                            6-HR        24-HR       72-HR      48.00-HR
  +    (CFS)       (HR)
                             (CFS)
  +      323.     12.80                      214.        119.         59.          59.
                           (INCHES)         .521        1.156       1.156        1.156
                            (AC-FT)         106.         236.        236.         236.

                           CUMULATIVE AREA =      3.82 SQ MI


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

                 ***************
                 *             *
   94 KK         *     RT-5    *       route CP-4 to sub basin D
                 *             *
                 ***************

                   HYDROGRAPH ROUTING DATA
```

```
  95 RD        MUSKINGUM-CUNGE CHANNEL ROUTING
                         L        3450.  CHANNEL LENGTH
                         S        .0191  SLOPE
                         N         .030  CHANNEL ROUGHNESS COEFFICIENT
                        CA          .00  CONTRIBUTING AREA
                     SHAPE         TRAP  CHANNEL SHAPE
                        WD        50.00  BOTTOM WIDTH OR DIAMETER
                         Z        50.00  SIDE SLOPE

                                                           ***
                              COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                      COMPUTATION TIME STEP
                 ELEMENT    ALPHA     M        DT      DX       PEAK     TIME TO     VOLUME    MAXIMUM
                                                                           PEAK                CELERITY
                                             (MIN)    (FT)     (CFS)     (MIN)       (IN)      (FPS)

                  MAIN        .97    1.36      2.00   313.64   321.73    778.00       1.16       5.09

                                        INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                  MAIN        .97    1.36      2.00            321.73    778.00       1.16

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .2357E+03 EXCESS= .0000E+00 OUTFLOW= .2357E+03 BASIN STORAGE= .2900E-02 PERCENT ERROR=
.0


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

                    HYDROGRAPH AT STATION     RT-5

 PEAK FLOW    TIME                      MAXIMUM AVERAGE FLOW
                                 6-HR       24-HR      72-HR      48.00-HR
   (CFS)      (HR)
                      (CFS)
+    322.    12.97               214.        119.        59.         59.
                    (INCHES)     .521       1.156      1.156       1.156
                     (AC-FT)     106.        236.       236.        236.

                   CUMULATIVE AREA =     3.82 SQ MI


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


             ***************
             *             *
  96 KK      *      D      *     sub basin
             *             *
             ***************

               SUBBASIN RUNOFF DATA

  97 BA         SUBBASIN CHARACTERISTICS
                      TAREA          .56  SUBBASIN AREA

                PRECIPITATION DATA

  98 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
                  .35     .68    1.20    1.37    1.49    1.75    2.26    2.76      .00     .00     .00     .00

                                                   STORM AREA =      .00
```

```
    99 LS         SCS LOSS RATE
                        STRTL          .38  INITIAL ABSTRACTION
                       CRVNBR        84.00  CURVE NUMBER
                        RTIMP          .00  PERCENT IMPERVIOUS AREA

   100 UD         SCS DIMENSIONLESS UNITGRAPH
                         TLAG          .59  LAG

                                                                   ***

                                                             UNIT HYDROGRAPH
                                                        90 END-OF-PERIOD ORDINATES
             7.        16.        33.        52.        74.       100.       129.       166.       205.       250.
           296.       335.       371.       397.       419.       434.       441.       443.       442.       439.
           425.       410.       393.       375.       355.       333.       309.       281.       252.       227.
           203.       186.       169.       155.       141.       129.       119.       110.       101.        92.
            85.        77.        70.        64.        59.        54.        49.        45.        41.        38.
            34.        31.        29.        26.        24.        22.        20.        18.        17.        15.
            14.        13.        12.        11.        10.         9.         8.         8.         7.         6.
             6.         5.         5.         5.         4.         4.         4.         3.         3.         3.
             2.         2.         2.         2.         1.         1.         1.         1.         0.         0.

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

                                HYDROGRAPH AT STATION        D

        TOTAL RAINFALL =     2.76, TOTAL LOSS =     1.44, TOTAL EXCESS =     1.32

     PEAK FLOW     TIME                              MAXIMUM AVERAGE FLOW
                                            6-HR        24-HR       72-HR      48.00-HR
  +    (CFS)       (HR)
                               (CFS)
  +      251.     12.67                      61.          20.         10.          10.
                            (INCHES)        1.020        1.321       1.321        1.321
                             (AC-FT)         30.          39.         39.          39.

                              CUMULATIVE AREA =      .56 SQ MI


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


                 ***************
                 *             *
   101 KK        *     CP-5    *      combine CP-4 with sub basin D
                 *             *
                 ***************

   102 HC        HYDROGRAPH COMBINATION
                      ICOMP             2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                  ***

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

                                HYDROGRAPH AT STATION      CP-5

     PEAK FLOW     TIME                              MAXIMUM AVERAGE FLOW
                                            6-HR        24-HR       72-HR      48.00-HR
  +    (CFS)       (HR)
                               (CFS)
  +      531.     12.90                     267.         139.         69.          69.
                            (INCHES)        .567         1.177       1.177        1.177
                             (AC-FT)        132.         275.        275.         275.

                              CUMULATIVE AREA =     4.38 SQ MI
```

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

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
HYDROGRAPH AT	E	401.	13.00	132.	43.	22.	1.29		
ROUTED TO	RT-1A	401.	13.03	132.	43.	22.	1.29		
ROUTED TO	RT-1B	401.	13.03	132.	43.	22.	1.29		
ROUTED TO	RT-1C	401.	13.03	132.	43.	22.	1.29		
ROUTED TO	RT-1E	400.	13.07	132.	43.	22.	1.29		
HYDROGRAPH AT	A	253.	12.90	78.	26.	13.	.85		
HYDROGRAPH AT	F	129.	12.40	24.	8.	4.	.32		
3 COMBINED AT	CP-1	682.	12.93	233.	77.	38.	2.46		
ROUTED TO	RT-2A	682.	12.97	233.	77.	38.	2.46		
ROUTED TO	RT-2B	682.	13.00	233.	77.	38.	2.46		
ROUTED TO	RT-2C	682.	13.03	233.	77.	38.	2.46		
HYDROGRAPH AT	B	269.	12.50	55.	18.	9.	.54		
2 COMBINED AT	CP-2	804.	12.90	286.	94.	47.	3.00		
ROUTED TO	RT-3A	804.	12.93	286.	94.	47.	3.00		
ROUTED TO	RT-3B	804.	12.97	286.	94.	47.	3.00		
ROUTED TO	RT-3C	803.	12.97	286.	94.	47.	3.00		
ROUTED TO	RT-3D	804.	13.00	286.	94.	47.	3.00		
HYDROGRAPH AT	G	142.	12.60	33.	11.	5.	.43		
2 COMBINED AT	CP-3	897.	12.90	319.	105.	53.	3.43		
ROUTED TO	DAM	184.	15.03	182.	105.	53.	3.43	4814.38	15.03
ROUTED TO	RT-4A	184.	15.10	182.	105.	53.	3.43		

	ROUTED TO	RT-4B	184.	15.23	182.	105.	53.	3.43
	HYDROGRAPH AT	C	168.	12.70	42.	14.	7.	.40
+	2 COMBINED AT	CP-4	323.	12.80	214.	119.	59.	3.82
+	ROUTED TO	RT-5	322.	12.97	214.	119.	59.	3.82
+	HYDROGRAPH AT	D	251.	12.67	61.	20.	10.	.56
+	2 COMBINED AT	CP-5	531.	12.90	267.	139.	69.	4.38

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING

(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

						INTERPOLATED TO COMPUTATION INTERVAL			
ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
	RT-1A MANE	1.87	401.21	781.17	1.25	2.00	400.95	782.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8593E+02 EXCESS= .0000E+00 OUTFLOW= .8593E+02 BASIN STORAGE= .7530E-03 PERCENT ERROR= .0

	RT-1B MANE	.70	400.86	782.49	1.25	2.00	400.84	782.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8594E+02 EXCESS= .0000E+00 OUTFLOW= .8594E+02 BASIN STORAGE= .4994E-03 PERCENT ERROR= .0

	RT-1C MANE	.63	400.76	782.61	1.25	2.00	400.64	782.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8594E+02 EXCESS= .0000E+00 OUTFLOW= .8594E+02 BASIN STORAGE= .3617E-03 PERCENT ERROR= .0

RT-3C MANE	1.12	803.70	778.84	1.17	2.00	803.48	778.00	1.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1873E+03 EXCESS= .0000E+00 OUTFLOW= .1873E+03 BASIN STORAGE= .7956E-03 PERCENT ERROR= .0

RT-3D MANE	2.00	803.56	780.00	1.17	2.00	803.56	780.00	1.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1873E+03 EXCESS= .0000E+00 OUTFLOW= .1873E+03 BASIN STORAGE= .1348E-02 PERCENT ERROR= .0

RT-4A MANE	2.00	184.21	908.00	1.14	2.00	184.21	908.00	1.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2087E+03 EXCESS= .0000E+00 OUTFLOW= .2087E+03 BASIN STORAGE= .3134E-02 PERCENT ERROR=

RT-4B MANE	2.00	184.21	914.00	1.14	2.00	184.21	914.00	1.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2087E+03 EXCESS= .0000E+00 OUTFLOW= .2087E+03 BASIN STORAGE= .1968E-02 PERCENT ERROR= .0

RT-5 MANE	2.00	321.73	778.00	1.16	2.00	321.73	778.00	1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2357E+03 EXCESS= .0000E+00 OUTFLOW= .2357E+03 BASIN STORAGE= .2900E-02 PERCENT ERROR= .0

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

Existing Conditions HEC-1 Models

NOAA 14 Rainfall
No Dam

September 01, 2000

```
1*  ***************************************
    *                                     *
    *  _OOD HYDROGRAPH PACKAGE  (HEC-1)   *
    *            JUN  1998                *
    *          VERSION 4.1                *
    *                                     *
    *  RUN DATE  30AUG00  TIME  10:03:11  *
    *                                     *
    ***************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

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

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

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

1 HEC-1 INPUT PAGE 1

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

              *DIAGRAM
    1         ID   ===========================================================================
    2         ID   EVANS CREEK 100-YEAR 24 HOUR MODEL WITHOUT PROPOSED DAM      EXISTING
    3         ID                                                                CONDITIONS
    4         ID        - NOAA 14 RAINFALL USED
    5         ID        - CURVE NUMBERS BASED ON FIELD INVESTIGATION AND CITY OF RENO LAND
    6         ID          DESIGNATIONS
    7         ID        - LAG TIMES BASED ON PROCEDURES IN WCHCDDM
    8         ID
    9         ID   FILE:  EVN14WOE.DAT
   10         ID   BY:  BAJ                                                     WRC NEVADA, INC.
   11         ID   DATE:  AUGUST 2000                                          RENO, NEVADA
   12         ID   ===========================================================================
   13         IT       2              0    1441
   14         IO       3
              *
   15         KK       E sub basin
   16         BA   1.291
   17         PH            .001    0.48    0.87    1.45    1.58    1.68    1.90    2.33    2.75
   18         LS              83
   19         UD    0.90
              *
   20         KK   RT-1A route sub basin E to sub basin A
   21         RD    1050  0.0133   0.030           TRAP      10       3
              *
   22         KK   RT-1B route sub basin E to sub basin A
   23         RD     430  0.0233   0.030           TRAP      30       2
              *
   24         KK   RT-1C route sub basin E to sub basin A
```

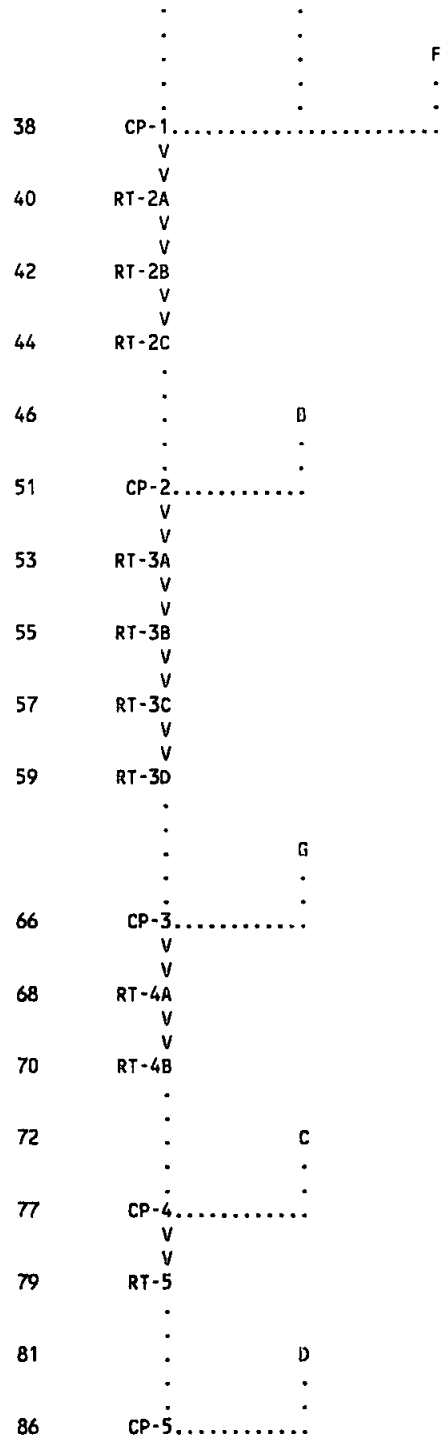
```
 25          RD     335  0.0119    0.030            TRAP      20       2
             *
             *  RT-1D route sub basin E to sub basin A
             *    240  0.0750    0.013            TRAP       6       2
             *

 26          KK   RT-1E route sub basin E to sub basin A
 27          RD    1005  0.0299    0.035            TRAP      20       3
             *

 28          KK       A sub basin
 29          BA   0.854
 30          PH            .001    0.48    0.87    1.45    1.61    1.73    1.99    2.45    2.91
 31          LS              80
 32          UD    0.79
             *
1                                      HEC-1 INPUT                                        PAGE  2

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

 33          KK       F sub basin
 34          BA   0.317
 35          PH            .001    0.48    0.87    1.45    1.60    1.71    1.94    2.43    2.91
 36          LS              76
 37          UD     .32
             *

 38          KK    CP-1 combine sub basins A, E, and F
 39          HC       3
             *

 40          KK   RT-2A route CP-1 to sub basin B
 41          RD     410  0.0293    0.035            TRAP      20       3
             *

 42          KK   RT-2B route CP-1 to sub basin B
 43          RD    1140  0.0123    0.045            TRAP      50       3
             *

 44          KK   RT-2C route CP-1 to sub basin B
 45          RD    2070  0.0251    0.040            TRAP      50       3
             *

 46          KK       B sub basin
 47          BA   0.538
 48          PH            .001    0.48    0.87    1.45    1.58    1.67    1.88    2.34    2.80
 49          LS              82
 50          UD     .43
             *

 51          KK    CP-2 combine CP-1 with sub basin B
 52          HC       2
             *

 53          KK   RT-3A route CP-2 to sub basin G
 54          RD    1640  0.0232    0.030            TRAP      50       3
             *

 55          KK   RT-3B route CP-2 to sub basin G
 56          RD     780  0.0179    0.035            TRAP      20       3
             *

 57          KK   RT-3C route CP-2 to sub basin G
 58          RD     655  0.0214    0.045            TRAP      20       3
             *

 59          KK   RT-3D route CP-2 to sub basin G
 60          RD    1555  0.0283    0.035            TRAP      20       3
             *
1                                      HEC-1 INPUT                                        PAGE  3
```

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

  61          KK       G sub basin
  62          BA   0.426
  63          PH            .001    0.48    0.87    1.45    1.56    1.64    1.81    2.27    2.73
  64          LS              77
  65          UD     .51
              *

  66          KK    CP-3 combine CP-2 with sub basin G
  67          HC       2
              *

  68          KK   RT-4A route CP-3 to sub basin C
  69          RD    2085  0.0240   0.040            TRAP      40       3
              *

  70          KK   RT-4B route CP-3 to sub basin C
  71          RD    1820  0.0264   0.050            TRAP      50      50
              *

  72          KK       C sub basin
  73          BA   0.396
  74          PH            .001    0.48    0.87    1.45    1.55    1.63    1.79    2.20    2.62
  75          LS              83
  76          UD     .61
              *

  77          KK    CP-4 combine CP-3 with sub basin C
  78          HC       2
              *

  79          KK    RT-5 route CP-4 to sub basin D
  80          RD    3450  0.0191   0.030            TRAP      50      50
              *

  81          KK       D sub basin
  82          BA   0.557
  83          PH            .001    0.48    0.87    1.45    1.54    1.60    1.74    2.09    2.44
  84          LS              84
  85          UD    0.59
              *

  86          KK    CP-5 combine CP-4 with sub basin D
  87          HC       2
              *
  88          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

  15           E
               V
               V
  20        RT-1A
               V
               V
  22        RT-1B
               V
               V
  24        RT-1C
               V
               V
  26        RT-1E
               .
               .
               .          A
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
**********************************************
*                                            *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)        *
*              JUN  1998                     *
*           VERSION 4.1                      *
*                                            *
*    DATE   30AUG00  TIME  10:03:11          *
*                                            *
**********************************************
```


```
**********************************************
*                                            *
*    U.S. ARMY CORPS OF ENGINEERS            *
*    HYDROLOGIC ENGINEERING CENTER           *
*          609 SECOND STREET                 *
*       DAVIS, CALIFORNIA 95616              *
*          (916) 756-1104                    *
*                                            *
**********************************************
```

```
                    ================================================================================
                    EVANS CREEK 100-YEAR 24 HOUR MODEL WITHOUT PROPOSED DAM      EXISTING
                                                                                 CONDITIONS
                        - NOAA 14 RAINFALL USED
                        - CURVE NUMBERS BASED ON FIELD INVESTIGATION AND CITY OF RENO LAND
                          DESIGNATIONS
                        - LAG TIMES BASED ON PROCEDURES IN WCHCDDM

                    FILE:  EVN14WOE.DAT
                    BY:  BAJ                                                     WRC NEVADA, INC.
                    DATE:  AUGUST 2000                                           RENO, NEVADA
                    ================================================================================

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

   IT          HYDROGRAPH TIME DATA
                     NMIN          2  MINUTES IN COMPUTATION INTERVAL
                     IDATE     1   0  STARTING DATE
                     ITIME      0000  STARTING TIME
                       NQ       1441  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE     3   0  ENDING DATE
                    NDTIME      0000  ENDING TIME
                    ICENT         19  CENTURY MARK

                  COMPUTATION INTERVAL     .03 HOURS
                       TOTAL TIME BASE   48.00 HOURS

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


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


          **************
          *            *
15 KK     *         E  *      sub basin
          *            *
          **************

             SUBBASIN RUNOFF DATA

16 BA          SUBBASIN CHARACTERISTICS
                    TAREA        1.29  SUBBASIN AREA

               PRECIPITATION DATA

17 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
                 .48     .87    1.45    1.58    1.68    1.90    2.33    2.75     .00     .00     .00     .00

                                                 STORM AREA =     .00

     S         SCS LOSS RATE
                    STRTL         .41  INITIAL ABSTRACTION
                    CRVNBR      83.00  CURVE NUMBER
```

RTIMP .00 PERCENT IMPERVIOUS AREA

JD SCS DIMENSIONLESS UNITGRAPH
TLAG .90 LAG

***

UNIT HYDROGRAPH
137 END-OF-PERIOD ORDINATES

7.	15.	25.	42.	59.	79.	101.	124.	152.	181.
211.	250.	290.	332.	379.	426.	469.	508.	548.	578.
606.	633.	648.	662.	674.	677.	679.	679.	677.	674.
662.	648.	633.	615.	598.	580.	560.	541.	518.	494.
469.	440.	411.	381.	356.	332.	309.	291.	274.	258.
243.	228.	215.	203.	190.	181.	172.	163.	154.	145.
137.	130.	122.	115.	107.	100.	95.	90.	85.	80.
75.	71.	67.	64.	60.	56.	52.	50.	47.	44.
42.	39.	36.	35.	33.	31.	29.	27.	26.	24.
23.	22.	20.	19.	18.	17.	16.	15.	14.	14.
13.	12.	11.	11.	10.	9.	9.	8.	8.	7.
7.	7.	7.	6.	6.	6.	5.	5.	5.	5.
4.	4.	4.	3.	3.	3.	3.	2.	2.	2.
2.	1.	1.	1.	1.	0.	0.			

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

HYDROGRAPH AT STATION E

TOTAL RAINFALL = 2.75, TOTAL LOSS = 1.50, TOTAL EXCESS = 1.25

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	48.00-HR
+ (CFS)	(HR)					
		(CFS)				
481.	13.00		141.	43.	22.	22.
		(INCHES)	1.016	1.248	1.248	1.248
		(AC-FT)	70.	86.	86.	86.

CUMULATIVE AREA = 1.29 SQ MI

*** ***

20 KK
RT-1A
route sub basin E to sub basin A

HYDROGRAPH ROUTING DATA

21 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	1050.	CHANNEL LENGTH
S	.0133	SLOPE
N	.030	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	10.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.59	1.42	1.77	525.00	480.56	781.56	1.25	9.87

```
                                             INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                        MAIN        1.59      1.42       2.00                480.25   782.00       1.25


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .8593E+02 EXCESS= .0000E+00 OUTFLOW= .8593E+02 BASIN STORAGE= .7598E-03 PERCENT ERROR=     .0


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

                          HYDROGRAPH AT STATION     RT-1A

   PEAK FLOW      TIME                           MAXIMUM AVERAGE FLOW
                                       6-HR        24-HR        72-HR      48.00-HR
+   (CFS)         (HR)
                            (CFS)
+     480.      13.03                  141.          43.         22.          22.
                          (INCHES)    1.016        1.248       1.248        1.248
                           (AC-FT)      70.          86.         86.          86.

                           CUMULATIVE AREA =     1.29 SQ MI


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


              ***************
              *             *
  22 KK       *    RT-1B    *       route sub basin E to sub basin A
              *             *
              ***************

                  HYDROGRAPH ROUTING DATA

  23 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                            L        430.  CHANNEL LENGTH
                            S       .0233  SLOPE
                            N        .030  CHANNEL ROUGHNESS COEFFICIENT
                           CA         .00  CONTRIBUTING AREA
                        SHAPE        TRAP  CHANNEL SHAPE
                           WD       30.00  BOTTOM WIDTH OR DIAMETER
                            Z        2.00  SIDE SLOPE

                                                                 ***
                                      COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                             COMPUTATION TIME STEP
                       ELEMENT     ALPHA       M          DT         DX         PEAK     TIME TO      VOLUME     MAXIMUM
                                                                                          PEAK                  CELERITY
                                                         (MIN)      (FT)       (CFS)      (MIN)        (IN)       (FPS)

                        MAIN        1.06      1.54         .66     215.00     480.17    781.73        1.25       10.93

                                             INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                        MAIN        1.06      1.54       2.00                480.16   782.00        1.25

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .8593E+02 EXCESS= .0000E+00 OUTFLOW= .8593E+02 BASIN STORAGE= .4992E-03 PERCENT ERROR=     .0


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

                          HYDROGRAPH AT STATION     RT-1B
```

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
		(CFS)				
+ 480.	13.03		141.	43.	22.	22.
		(INCHES)	1.016	1.248	1.248	1.248
		(AC-FT)	70.	86.	86.	86.

CUMULATIVE AREA = 1.29 SQ MI

*** ***

24 KK

****
* *
* RT-1C *
* *
****

route sub basin E to sub basin A

HYDROGRAPH ROUTING DATA

25 RD

MUSKINGUM-CUNGE CHANNEL ROUTING

L	335.	CHANNEL LENGTH
S	.0119	SLOPE
N	.030	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	20.00	BOTTOM WIDTH OR DIAMETER
Z	2.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.00	1.51	.59	167.50	480.03	782.53	1.25	9.48
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	1.00	1.51	2.00		479.95	782.00	1.25	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8594E+02 EXCESS= .0000E+00 OUTFLOW= .8594E+02 BASIN STORAGE= .3685E-03 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-1C

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
		(CFS)				
+ 480.	13.03		141.	43.	22.	22.
		(INCHES)	1.016	1.248	1.248	1.248
		(AC-FT)	70.	86.	86.	86.

CUMULATIVE AREA = 1.29 SQ MI

*** ***

```
          **************
          *            *
26 KK     *     RT-1E  *      route sub basin E to sub basin A
          *            *
          **************

             HYDROGRAPH ROUTING DATA

27 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                        L       1005.  CHANNEL LENGTH
                        S       .0299  SLOPE
                        N        .035  CHANNEL ROUGHNESS COEFFICIENT
                       CA         .00  CONTRIBUTING AREA
                    SHAPE        TRAP  CHANNEL SHAPE
                       WD       20.00  BOTTOM WIDTH OR DIAMETER
                        Z        3.00  SIDE SLOPE

                                                    ***
                                 COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                       COMPUTATION TIME STEP
                    ELEMENT    ALPHA       M         DT        DX       PEAK    TIME TO      VOLUME    MAXIMUM
                                                                                    PEAK                 CELERITY
                                                          (MIN)     (FT)     (CFS)    (MIN)       (IN)      (FPS)

                      MAIN       1.43      1.48       1.53    502.50    479.76   783.09       1.25      10.97

                                                 INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                      MAIN       1.43      1.48       2.00              479.45   784.00       1.25

    !UITY SUMMARY (AC-FT) - INFLOW= .8594E+02 EXCESS= .0000E+00 OUTFLOW= .8594E+02 BASIN STORAGE= .8343E-03 PERCENT ERROR=     .0


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

                        HYDROGRAPH AT STATION    RT-1E

 PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR       24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                    (CFS)
+    479.      13.07                      141.        43.         22.         22.
                  (INCHES)               1.016       1.248       1.248       1.248
                   (AC-FT)                 70.         86.         86.         86.

                   CUMULATIVE AREA =    1.29 SQ MI


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


          ***************
          *             *
28 KK     *         A   *      sub basin
          *             *
          ***************

             SUBBASIN RUNOFF DATA

29 BA          SUBBASIN CHARACTERISTICS
                    TAREA         .85  SUBBASIN AREA

               PRECIPITATION DATA
```

```
 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
            .48    .87    1.45    1.61    1.73    1.99    2.45    2.91     .00     .00     .00     .00

                                          STORM AREA =      .00

31 LS     SCS LOSS RATE
               STRTL         .50  INITIAL ABSTRACTION
              CRVNBR       80.00  CURVE NUMBER
               RTIMP         .00  PERCENT IMPERVIOUS AREA

32 UD     SCS DIMENSIONLESS UNITGRAPH
               TLAG         .79  LAG

                                          ***

                                        UNIT HYDROGRAPH
                                    120 END-OF-PERIOD ORDINATES
            6.     13.     24.     39.     54.     73.     92.    116.    141.    169.
          203.    237.    277.    317.    354.    388.    421.    444.    467.    484.
          496.    507.    509.    511.    510.    508.    501.    489.    476.    461.
          447.    431.    414.    396.    375.    354.    330.    305.    280.    259.
          238.    223.    208.    194.    181.    169.    158.    147.    139.    131.
          123.    115.    108.    101.     95.     88.     82.     76.     71.     67.
           63.     59.     54.     51.     48.     45.     42.     39.     36.     34.
           32.     30.     27.     26.     24.     23.     21.     20.     19.     17.
           16.     15.     14.     13.     13.     12.     11.     10.     10.      9.
            8.      8.      7.      7.      6.      6.      6.      5.      5.      5.
            5.      4.      4.      4.      4.      3.      3.      3.      3.      2.
            2.      2.      2.      1.      1.      1.      1.      1.      0.      0.

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

                    HYDROGRAPH AT STATION        A

 OTAL RAINFALL =    2.91, TOTAL LOSS =    1.73, TOTAL EXCESS =    1.18

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                          (CFS)
+     314.     12.90                   88.        27.         14.         14.
                          (INCHES)    .955       1.183       1.183       1.183
                          (AC-FT)     44.        54.         54.         54.

                    CUMULATIVE AREA =     .85 SQ MI

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

               ****************
               *              *
33 KK          *          F   *      sub basin
               *              *
               ****************

          SUBBASIN RUNOFF DATA

34 BA          SUBBASIN CHARACTERISTICS
               TAREA         .32  SUBBASIN AREA

          PRECIPITATION DATA

35 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
            .48    .87    1.45    1.60    1.71    1.94    2.43    2.91     .00     .00     .00     .00
```

```
                                        STORM AREA =      .00

   .S          SCS LOSS RATE
                    STRTL        .63  INITIAL ABSTRACTION
                   CRVNBR       76.00  CURVE NUMBER
                    RTIMP         .00  PERCENT IMPERVIOUS AREA

  37 UD          SCS DIMENSIONLESS UNITGRAPH
                    TLAG         .32  LAG

                                                ***

                                                UNIT HYDROGRAPH
                                            50 END-OF-PERIOD ORDINATES
              14.      45.      85.     139.     210.     295.     368.     419.     448.     454.
             451.     426.     395.     360.     316.     263.     217.     183.     155.     132.
             114.      98.      84.      70.      60.      51.      44.      37.      31.      27.
              23.      19.      17.      14.      12.      10.       9.       7.       6.       5.
               5.       4.       4.       3.       3.       2.       2.       1.       1.       0.

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

                        HYDROGRAPH AT STATION        F

    TOTAL RAINFALL =    2.91, TOTAL LOSS =    1.96, TOTAL EXCESS =     .95

  PEAK FLOW     TIME                              MAXIMUM AVERAGE FLOW
                                        6-HR        24-HR        72-HR     48.00-HR
+   (CFS)       (HR)
                          (CFS)
+     167.      12.40                   26.          8.           4.           4.
                         (INCHES)      .771         .955         .955         .955
                         (AC-FT)       13.          16.          16.          16.

                        CUMULATIVE AREA =     .32 SQ MI


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


            ***************
            *             *
  38 KK     *      CP-1   *      combine sub basins A, E, and F
            *             *
            ***************

  39 HC          HYDROGRAPH COMBINATION
                      ICOMP           3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                ***

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

                        HYDROGRAPH AT STATION     CP-1

  PEAK FLOW     TIME                              MAXIMUM AVERAGE FLOW
                                        6-HR        24-HR        72-HR     48.00-HR
+   (CFS)       (HR)
                          (CFS)
+     825.      12.93                  255.         79.          39.          39.
                         (INCHES)      .961        1.188        1.188        1.188
                         (AC-FT)       126.         156.         156.         156.

                        CUMULATIVE AREA =    2.46 SQ MI


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
```

```
          ****************
          *              *
 40 KK    *     RT-2A    *      route CP-1 to sub basin B
          *              *
          ****************

             HYDROGRAPH ROUTING DATA

 41 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                          L       410.  CHANNEL LENGTH
                          S      .0293  SLOPE
                          N       .035  CHANNEL ROUGHNESS COEFFICIENT
                         CA        .00  CONTRIBUTING AREA
                      SHAPE       TRAP  CHANNEL SHAPE
                         WD      20.00  BOTTOM WIDTH OR DIAMETER
                          Z       3.00  SIDE SLOPE

                                                          ***
                                  COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                       COMPUTATION TIME STEP
                    ELEMENT    ALPHA      M         DT        DX       PEAK    TIME TO     VOLUME    MAXIMUM
                                                                               PEAK                  CELERITY
                                                     (MIN)     (FT)     (CFS)    (MIN)       (IN)      (FPS)

                      MAIN      1.41      1.48        .53    205.00    824.88   776.80       1.19      12.98

                                              INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                      MAIN      1.41      1.48       2.00               824.43   778.00       1.19

 UITY SUMMARY (AC-FT) - INFLOW= .1560E+03 EXCESS= .0000E+00 OUTFLOW= .1560E+03 BASIN STORAGE= .3522E-03 PERCENT ERROR=    .0


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

                        HYDROGRAPH AT STATION    RT-2A

  PEAK FLOW     TIME                              MAXIMUM AVERAGE FLOW
                                          6-HR       24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                          (CFS)
+     824.     12.97                      255.         79.         39.         39.
                        (INCHES)          .961       1.188       1.188       1.188
                          (AC-FT)         126.        156.        156.        156.

                        CUMULATIVE AREA =    2.46 SQ MI


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

          ****************
          *              *
 42 KK    *     RT-2B    *      route CP-1 to sub basin B
          *              *
          ****************

             HYDROGRAPH ROUTING DATA

 43 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                          L      1140.  CHANNEL LENGTH
                          S      .0123  SLOPE
                          N       .045  CHANNEL ROUGHNESS COEFFICIENT
                         CA        .00  CONTRIBUTING AREA
```

```
                    SHAPE        TRAP  CHANNEL SHAPE
                      WD       50.00  BOTTOM WIDTH OR DIAMETER
                      Z         3.00  SIDE SLOPE

                                                ***
                          COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                  COMPUTATION TIME STEP
                ELEMENT    ALPHA       M         DT        DX       PEAK    TIME TO      VOLUME    MAXIMUM
                                                                              PEAK                   CELERITY
                                                  (MIN)     (FT)     (CFS)   (MIN)        (IN)      (FPS)

                  MAIN        .37      1.55       2.00    570.00    824.40   780.00        1.19       7.07

                                      INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                  MAIN        .37      1.55       2.00              824.40   780.00        1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1560E+03 EXCESS= .0000E+00 OUTFLOW= .1560E+03 BASIN STORAGE= .2808E-02 PERCENT ERROR=     .0


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

                       HYDROGRAPH AT STATION    RT-2B

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                  (CFS)
+    824.      13.00                255.         79.         39.         39.
                (INCHES)            .961       1.188       1.188       1.188
                 (AC-FT)            126.         156.        156.        156.

                 CUMULATIVE AREA =    2.46 SQ MI


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


          **************
          *           *
 44 KK    *     RT-2C *      route CP-1 to sub basin B
          *           *
          **************

             HYDROGRAPH ROUTING DATA

 45 RD         MUSKINGUM-CUNGE CHANNEL ROUTING
                       L       2070.  CHANNEL LENGTH
                       S       .0251  SLOPE
                       N        .040  CHANNEL ROUGHNESS COEFFICIENT
                      CA         .00  CONTRIBUTING AREA
                   SHAPE        TRAP  CHANNEL SHAPE
                      WD       50.00  BOTTOM WIDTH OR DIAMETER
                      Z         3.00  SIDE SLOPE

                                                ***
                          COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                  COMPUTATION TIME STEP
                ELEMENT    ALPHA       M         DT        DX       PEAK    TIME TO      VOLUME    MAXIMUM
                                                                              PEAK                   CELERITY
                                                  (MIN)     (FT)     (CFS)   (MIN)        (IN)      (FPS)

                  MAIN        .60      1.55       2.00    517.50    824.69   782.00        1.19       9.59
```

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.60	1.55	2.00	824.69	782.00	1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1560E+03 EXCESS= .0000E+00 OUTFLOW= .1560E+03 BASIN STORAGE= .4205E-02 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-2C

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	48.00-HR
+ (CFS)	(HR)				
		(CFS)			
+ 825.	13.03	255.	79.	39.	39.
		(INCHES) .961	1.188	1.188	1.188
		(AC-FT) 126.	156.	156.	156.

CUMULATIVE AREA = 2.46 SQ MI

*** ***

```
**************
*            *
*            *
*        3   *
*            *
**************
```

46 KK sub basin

SUBBASIN RUNOFF DATA

47 BA SUBBASIN CHARACTERISTICS

TAREA .54 SUBBASIN AREA

PRECIPITATION DATA

48 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
.48	.87	1.45	1.58	1.67	1.88	2.34	2.80	.00	.00	.00	.00

STORM AREA = .00

49 LS SCS LOSS RATE

STRTL .44 INITIAL ABSTRACTION
CRVNBR 82.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

50 UD SCS DIMENSIONLESS UNITGRAPH

TLAG .43 LAG

***

UNIT HYDROGRAPH
66 END-OF-PERIOD ORDINATES

13.	38.	71.	110.	162.	225.	298.	381.	451.	507.
548.	574.	580.	579.	569.	543.	513.	480.	443.	400.
349.	301.	261.	231.	204.	180.	160.	144.	128.	114.
101.	88.	78.	70.	61.	55.	48.	43.	38.	33.
29.	26.	23.	21.	18.	16.	14.	13.	11.	10.
9.	8.	7.	6.	6.	5.	5.	4.	4.	3.
3.	2.	2.	1.	1.	0.				

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

HYDROGRAPH AT STATION B

OTAL RAINFALL = 2.80, TOTAL LOSS = 1.58, TOTAL EXCESS = 1.22

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
(CFS)	(HR)					
		(CFS)				
327.	12.50		58.	18.	9.	9.
		(INCHES)	.995	1.223	1.223	1.223
		(AC-FT)	29.	35.	35.	35.

CUMULATIVE AREA = .54 SQ MI

*** ***

```
          **************
          *            *
51 KK     *      CP-2  *      combine CP-1 with sub basin B
          *            *
          **************
```

52 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

***

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

HYDROGRAPH AT STATION CP-2

FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
(CFS)	(HR)					
		(CFS)				
967.	12.90		310.	96.	48.	48.
		(INCHES)	.962	1.194	1.194	1.194
		(AC-FT)	154.	191.	191.	191.

CUMULATIVE AREA = 3.00 SQ MI

*** ***

```
          **************
          *            *
53 KK     *     RT-3A  *      route CP-2 to sub basin G
          *            *
          **************
```

HYDROGRAPH ROUTING DATA

54 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	1640.	CHANNEL LENGTH
S	.0232	SLOPE
N	.030	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	50.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.77	1.55	2.00	820.00	967.02	776.00	1.19	11.91

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.77	1.55	2.00		967.02	776.00	1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1911E+03 EXCESS= .0000E+00 OUTFLOW= .1911E+03 BASIN STORAGE= .2300E-02 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-3A

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	48.00-HR
+	(CFS)	(HR)					
			(CFS)				
+	967.	12.93		310.	96.	48.	48.
			(INCHES)	.962	1.194	1.194	1.194
			(AC-FT)	154.	191.	191.	191.

CUMULATIVE AREA = 3.00 SQ MI

* ***

55 KK — RT-3B — route CP-2 to sub basin G

HYDROGRAPH ROUTING DATA

56 RD — MUSKINGUM-CUNGE CHANNEL ROUTING

L	780.	CHANNEL LENGTH
S	.0179	SLOPE
N	.035	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
W	20.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.10	1.48	1.12	390.00	966.86	776.25	1.19	11.56

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.10	1.48	2.00		966.73	776.00	1.19

C...NUITY SUMMARY (AC-FT) - INFLOW= .1911E+03 EXCESS= .0000E+00 OUTFLOW= .1911E+03 BASIN STORAGE= .7437E-03 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-3B

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	48.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 967.	12.93		310.	96.	48.	48.
		(INCHES)	.962	1.194	1.194	1.194
		(AC-FT)	154.	191.	191.	191.

CUMULATIVE AREA = 3.00 SQ MI

*** ***

57 KK

****
* *
* RT-3C *
* *
****

route CP-2 to sub basin G

HYDROGRAPH ROUTING DATA

58 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	655.	CHANNEL LENGTH
S	.0214	SLOPE
N	.045	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	20.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.94	1.48	1.05	327.50	966.49	777.15	1.19	10.35

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.94	1.48	2.00		966.38	778.00	1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1911E+03 EXCESS= .0000E+00 OUTFLOW= .1911E+03 BASIN STORAGE= .7406E-03 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-3C

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	48.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 966.	12.97		310.	96.	48.	48.
		(INCHES)	.962	1.194	1.194	1.194
		(AC-FT)	154.	191.	191.	191.

CUMULATIVE AREA = 3.00 SQ MI

*** ***

59 KK RT-3D route CP-2 to sub basin G

HYDROGRAPH ROUTING DATA

60 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	1555.	CHANNEL LENGTH
S	.0283	SLOPE
N	.035	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	20.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.39	1.48	1.92	777.50	966.22	777.86	1.19	13.49
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	1.39	1.48	2.00		966.21	778.00	1.19	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1911E+03 EXCESS= .0000E+00 OUTFLOW= .1911E+03 BASIN STORAGE= .1442E-02 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-3D

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
		(CFS)				
966.	12.97		310.	96.	48.	48.
		(INCHES)	.962	1.194	1.194	1.194
		(AC-FT)	154.	191.	191.	191.

CUMULATIVE AREA = 3.00 SQ MI

*** ***

61 KK G sub basin

```
                SUBBASIN RUNOFF DATA

      BA          SUBBASIN CHARACTERISTICS
                       TAREA          .43  SUBBASIN AREA

                  PRECIPITATION DATA

   63 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
                    .48     .87    1.45    1.56    1.64    1.81    2.27    2.73     .00     .00     .00     .00

                                                     STORM AREA =      .00

   64 LS          SCS LOSS RATE
                       STRTL          .60  INITIAL ABSTRACTION
                      CRVNBR        77.00  CURVE NUMBER
                       RTIMP          .00  PERCENT IMPERVIOUS AREA

   65 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG          .51  LAG

                                                                  ***

                                                             UNIT HYDROGRAPH
                                                        78 END-OF-PERIOD ORDINATES
                   7.        19.        36.        58.        82.       112.       148.       188.       235.       278.
                 318.       346.       369.       384.       389.       390.       388.       378.       363.       345.
                 327.       307.       283.       257.       227.       201.       177.       160.       144.       129.
                 117.       106.        97.        88.        79.        72.        64.        57.        52.        47.
                  42.        38.        35.        31.        28.        25.        23.        20.        19.        17.
                  15.        14.        12.        11.        10.         9.         8.         7.         7.         6.
                   5.         5.         4.         4.         4.         3.         3.         3.         3.         2.
                   2.         2.         1.         1.         1.         1.         0.         0.

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

                          HYDROGRAPH AT STATION         G

     TOTAL RAINFALL =     2.73, TOTAL LOSS =     1.84, TOTAL EXCESS =      .89

   PEAK FLOW      TIME                            MAXIMUM AVERAGE FLOW
                                           6-HR        24-HR        72-HR      48.00-HR
+    (CFS)        (HR)
                            (CFS)
+      164.      12.60                      33.          10.           5.            5.
                          (INCHES)         .711         .888         .888          .888
                           (AC-FT)          16.          20.          20.           20.

                           CUMULATIVE AREA =      .43 SQ MI


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


             ***************
             *             *
   66 KK     *      CP-3   *      combine CP-2 with sub basin G
             *             *
             ***************

   67 HC          HYDROGRAPH COMBINATION
                       ICOMP            2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                  ***

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

                          HYDROGRAPH AT STATION     CP-3
```

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
1076.	12.90	(CFS)	342.	107.	53.	53.
		(INCHES)	.929	1.156	1.156	1.156
		(AC-FT)	170.	211.	211.	211.

CUMULATIVE AREA = 3.43 SQ MI

68 KK **RT-4A** route CP-3 to sub basin C

HYDROGRAPH ROUTING DATA

69 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	2085.	CHANNEL LENGTH
S	.0240	SLOPE
N	.040	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	40.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.70	1.54	2.00	695.00	1075.74	776.00	1.16	10.90

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.70	1.54	2.00		1075.74	776.00	1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2112E+03 EXCESS= .0000E+00 OUTFLOW= .2113E+03 BASIN STORAGE= .3348E-02 PERCENT ERROR= .0

HYDROGRAPH AT STATION RT-4A

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
1076.	12.93	(CFS)	342.	107.	53.	53.
		(INCHES)	.929	1.156	1.156	1.156
		(AC-FT)	170.	211.	211.	211.

CUMULATIVE AREA = 3.43 SQ MI

```
          **************
          *            *
70 KK     *     RT-4B  *      route CP-3 to sub basin C
          *            *
          **************

             HYDROGRAPH ROUTING DATA

71 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                        L       1820.  CHANNEL LENGTH
                        S       .0264  SLOPE
                        N        .050  CHANNEL ROUGHNESS COEFFICIENT
                       CA         .00  CONTRIBUTING AREA
                    SHAPE        TRAP  CHANNEL SHAPE
                       WD       50.00  BOTTOM WIDTH OR DIAMETER
                        Z       50.00  SIDE SLOPE

                                                    ***
                                 COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                          COMPUTATION TIME STEP
                ELEMENT    ALPHA       M          DT         DX       PEAK     TIME TO      VOLUME     MAXIMUM
                                                                               PEAK                    CELERITY
                                                    (MIN)      (FT)     (CFS)    (MIN)        (IN)       (FPS)

                  MAIN        .69      1.36        2.00     364.00   1075.52   780.00         1.16       5.41

                                          INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                  MAIN        .69      1.36        2.00              1075.52   780.00         1.16

    IUITY SUMMARY (AC-FT) - INFLOW= .2113E+03 EXCESS= .0000E+00 OUTFLOW= .2113E+03 BASIN STORAGE= .1974E-02 PERCENT ERROR=     .0

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

                        HYDROGRAPH AT STATION    RT-4B

 PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR       24-HR       72-HR      48.00-HR
+   (CFS)      (HR)
                          (CFS)
+    1076.     13.00                     342.        107.         53.         53.
                        (INCHES)          .928       1.156       1.156       1.156
                          (AC-FT)         170.        211.        211.        211.

                        CUMULATIVE AREA =    3.43 SQ MI


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


          **************
          *            *
72 KK     *         C  *      sub basin
          *            *
          **************

             SUBBASIN RUNOFF DATA

73 BA          SUBBASIN CHARACTERISTICS
                    TAREA         .40  SUBBASIN AREA

               PRECIPITATION DATA
```

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
.48	.87	1.45	1.55	1.63	1.79	2.20	2.62	.00	.00	.00	.00

STORM AREA = .00

75 LS SCS LOSS RATE

STRTL	.41	INITIAL ABSTRACTION
CRVNBR	83.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

76 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.61	LAG

***

UNIT HYDROGRAPH
93 END-OF-PERIOD ORDINATES

5.	11.	22.	34.	49.	65.	84.	107.	133.	162.
193.	220.	246.	265.	283.	293.	302.	304.	305.	303.
299.	289.	279.	268.	255.	242.	227.	211.	192.	172.
156.	140.	129.	117.	108.	98.	90.	83.	77.	71.
65.	60.	55.	50.	45.	42.	39.	36.	32.	30.
27.	25.	23.	21.	19.	18.	16.	15.	14.	12.
11.	11.	10.	9.	8.	8.	7.	6.	6.	5.
5.	4.	4.	4.	3.	3.	3.	3.	3.	2.
2.	2.	2.	2.	1.	1.	1.	1.	1.	1.
0.	0.	0.							

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

HYDROGRAPH AT STATION C

TAL RAINFALL = 2.62, TOTAL LOSS = 1.47, TOTAL EXCESS = 1.15

+	K FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
			(CFS)				
+	189.	12.70		40.	12.	6.	6.
			(INCHES)	.940	1.147	1.147	1.147
			(AC-FT)	20.	24.	24.	24.

CUMULATIVE AREA = .40 SQ MI

*** ***

77 KK CP-4 combine CP-3 with sub basin C

78 HC HYDROGRAPH COMBINATION

ICOMP	2	NUMBER OF HYDROGRAPHS TO COMBINE

***

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

HYDROGRAPH AT STATION CP-4

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
		(CFS)				

```
+    1227.     12.93                  380.        119.         59.         59.
                          (INCHES)     .923       1.155       1.155       1.155
                           (AC-FT)     188.        235.        235.        235.

                          CUMULATIVE AREA =    3.82 SQ MI


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


              **************
              *            *
  79 KK       *      RT-5  *      route CP-4 to sub basin D
              *            *
              **************

                 HYDROGRAPH ROUTING DATA

  80 RD            MUSKINGUM-CUNGE CHANNEL ROUTING
                             L       3450.  CHANNEL LENGTH
                             S       .0191  SLOPE
                             N        .030  CHANNEL ROUGHNESS COEFFICIENT
                            CA         .00  CONTRIBUTING AREA
                         SHAPE        TRAP  CHANNEL SHAPE
                            WD       50.00  BOTTOM WIDTH OR DIAMETER
                             Z       50.00  SIDE SLOPE

                                                    ***
                                  COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                        COMPUTATION TIME STEP
                       ELEMENT    ALPHA        M          DT         DX       PEAK     TIME TO      VOLUME     MAXIMUM
                                                                                          PEAK                    CELERITY
                                                                   (MIN)       (FT)     (CFS)      (MIN)        (IN)      (FPS)

                         MAIN        .97       1.36        2.00     431.25   1227.45     782.00        1.16       7.25

                                                 INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                         MAIN        .97       1.36        2.00              1227.45     782.00        1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2355E+03 EXCESS= .0000E+00 OUTFLOW= .2355E+03 BASIN STORAGE= .3158E-02 PERCENT ERROR=     .0


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

                        HYDROGRAPH AT STATION     RT-5

  PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                                6-HR        24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                          (CFS)
+    1227.      13.03                  380.        119.         59.         59.
                          (INCHES)     .923       1.155       1.155       1.155
                           (AC-FT)     188.        235.        235.        235.

                          CUMULATIVE AREA =    3.82 SQ MI


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


              **************
              *            *
```

```
** KK     *         D  *      sub basin
         *            *
         ***************

            SUBBASIN RUNOFF DATA

82 BA         SUBBASIN CHARACTERISTICS
                   TAREA         .56  SUBBASIN AREA

              PRECIPITATION DATA

83 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
                .48     .87    1.45    1.54    1.60    1.74    2.09    2.44     .00     .00     .00     .00

                                                 STORM AREA =     .00

84 LS         SCS LOSS RATE
                   STRTL         .38  INITIAL ABSTRACTION
                  CRVNBR       84.00  CURVE NUMBER
                   RTIMP         .00  PERCENT IMPERVIOUS AREA

85 UD         SCS DIMENSIONLESS UNITGRAPH
                   TLAG         .59  LAG

                                                  ***

                                                 UNIT HYDROGRAPH
                                              90 END-OF-PERIOD ORDINATES
                    7.      16.     33.     52.     74.    100.    129.    166.    205.    250.
                  296.     335.    371.    397.    419.    434.    441.    443.    442.    439.
                  425.     410.    393.    375.    355.    333.    309.    281.    252.    227.
                  203.     186.    169.    155.    141.    129.    119.    110.    101.     92.
                   85.      77.     70.     64.     59.     54.     49.     45.     41.     38.
                   34.      31.     29.     26.     24.     22.     20.     18.     17.     15.
                   14.      13.     12.     11.     10.      9.      8.      8.      7.      6.
                    6.       5.      5.      5.      4.      4.      4.      3.      3.      3.
                    2.       2.      2.      2.      1.      1.      1.      1.      0.      0.

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

                              HYDROGRAPH AT STATION        D

           TOTAL RAINFALL =    2.66, TOTAL LOSS =    1.37, TOTAL EXCESS =    1.07

         PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                              6-HR       24-HR       72-HR     48.00-HR
       +   (CFS)       (HR)
                         (CFS)
       +     270.     12.67                   54.         16.          8.          8.
                       (INCHES)              .901       1.070       1.070       1.070
                       (AC-FT)                27.         32.         32.         32.

                              CUMULATIVE AREA =     .56 SQ MI

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

         ***************
         *             *
86 KK    *      CP-5   *      combine CP-4 with sub basin D
         *             *
         ***************

 1C          HYDROGRAPH COMBINATION
                   ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
```

***

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

HYDROGRAPH AT STATION CP-5

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
		(CFS)				
1422.	12.97		429.	135.	67.	67.
		(INCHES)	.911	1.144	1.144	1.144
		(AC-FT)	213.	267.	267.	267.

CUMULATIVE AREA = 4.38 SQ MI

1

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

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	E	481.	13.00	141.	43.	22.	1.29		
ROUTED TO	RT-1A	480.	13.03	141.	43.	22.	1.29		
ROUTED TO	RT-1B	480.	13.03	141.	43.	22.	1.29		
ROUTED TO	RT-1C	480.	13.03	141.	43.	22.	1.29		
ROUTED TO	RT-1E	479.	13.07	141.	43.	22.	1.29		
HYDROGRAPH AT	A	314.	12.90	88.	27.	14.	.85		
HYDROGRAPH AT	F	167.	12.40	26.	8.	4.	.32		
3 COMBINED AT	CP-1	825.	12.93	255.	79.	39.	2.46		
ROUTED TO	RT-2A	824.	12.97	255.	79.	39.	2.46		
ROUTED TO	RT-2B	824.	13.00	255.	79.	39.	2.46		
ROUTED TO	RT-2C	825.	13.03	255.	79.	39.	2.46		
HYDROGRAPH AT	B	327.	12.50	58.	18.	9.	.54		
2 COMBINED AT	CP-2	967.	12.90	310.	96.	48.	3.00		
ROUTED TO	RT-3A	967.	12.93	310.	96.	48.	3.00		
ROUTED TO	RT-3B	967.	12.93	310.	96.	48.	3.00		
ROUTED TO									

+		RT-3C	966.	12.97	310.	96.	48.	3.00
	ROUTED TO							
+		RT-3D	966.	12.97	310.	96.	48.	3.00
	HYDROGRAPH AT							
+		G	164.	12.60	33.	10.	5.	.43
	2 COMBINED AT							
+		CP-3	1076.	12.90	342.	107.	53.	3.43
	ROUTED TO							
+		RT-4A	1076.	12.93	342.	107.	53.	3.43
	ROUTED TO							
+		RT-4B	1076.	13.00	342.	107.	53.	3.43
	HYDROGRAPH AT							
+		C	189.	12.70	40.	12.	6.	.40
	2 COMBINED AT							
+		CP-4	1227.	12.93	380.	119.	59.	3.82
	ROUTED TO							
+		RT-5	1227.	13.03	380.	119.	59.	3.82
	HYDROGRAPH AT							
+		D	270.	12.67	54.	16.	8.	.56
	2 COMBINED AT							
+		CP-5	1422.	12.97	429.	135.	67.	4.38

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
RT-1A	MANE	1.77	480.56	781.56	1.25	2.00	480.25	782.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8593E+02 EXCESS= .0000E+00 OUTFLOW= .8593E+02 BASIN STORAGE= .7598E-03 PERCENT ERROR= .0

RT-1B	MANE	.66	480.17	781.73	1.25	2.00	480.16	782.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8593E+02 EXCESS= .0000E+00 OUTFLOW= .8593E+02 BASIN STORAGE= .4992E-03 PERCENT ERROR= .0

RT-1C	MANE	.59	480.03	782.53	1.25	2.00	479.95	782.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8594E+02 EXCESS= .0000E+00 OUTFLOW= .8594E+02 BASIN STORAGE= .3685E-03 PERCENT ERROR= .0

RT-1E	MANE	1.53	479.76	783.09	1.25	2.00	479.45	784.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8594E+02 EXCESS= .0000E+00 OUTFLOW= .8594E+02 BASIN STORAGE= .8343E-03 PERCENT ERROR= .0

RT-2A	MANE	.53	824.88	776.80	1.19	2.00	824.43	778.00	1.19

VUITY SUMMARY (AC-FT) - INFLOW= .1560E+03 EXCESS= .0000E+00 OUTFLOW= .1560E+03 BASIN STORAGE= .3522E-03 PERCENT ERROR= .0

```
            RT-2B  MANE        2.00    824.40    780.00      1.19      2.00    824.40    780.00        1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1560E+03 EXCESS= .0000E+00 OUTFLOW= .1560E+03 BASIN STORAGE= .2808E-02 PERCENT ERROR=    .0

            RT-2C  MANE        2.00    824.69    782.00      1.19      2.00    824.69    782.00        1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1560E+03 EXCESS= .0000E+00 OUTFLOW= .1560E+03 BASIN STORAGE= .4205E-02 PERCENT ERROR=    .0

            RT-3A  MANE        2.00    967.02    776.00      1.19      2.00    967.02    776.00        1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1911E+03 EXCESS= .0000E+00 OUTFLOW= .1911E+03 BASIN STORAGE= .2300E-02 PERCENT ERROR=    .0

            RT-3B  MANE        1.12    966.86    776.25      1.19      2.00    966.73    776.00        1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1911E+03 EXCESS= .0000E+00 OUTFLOW= .1911E+03 BASIN STORAGE= .7437E-03 PERCENT ERROR=    .0

            RT-3C  MANE        1.05    966.49    777.15      1.19      2.00    966.38    778.00        1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1911E+03 EXCESS= .0000E+00 OUTFLOW= .1911E+03 BASIN STORAGE= .7406E-03 PERCENT ERROR=    .0

            RT-3D  MANE        1.92    966.22    777.86      1.19      2.00    966.21    778.00        1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1911E+03 EXCESS= .0000E+00 OUTFLOW= .1911E+03 BASIN STORAGE= .1442E-02 PERCENT ERROR=    .0

            RT-4A  MANE        2.00   1075.74    776.00      1.16      2.00   1075.74    776.00        1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2112E+03 EXCESS= .0000E+00 OUTFLOW= .2113E+03 BASIN STORAGE= .3348E-02 PERCENT ERROR=    .0

            RT-4B  MANE        2.00   1075.52    780.00      1.16      2.00   1075.52    780.00        1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2113E+03 EXCESS= .0000E+00 OUTFLOW= .2113E+03 BASIN STORAGE= .1974E-02 PERCENT ERROR=    .0

             RT-5  MANE        2.00   1227.45    782.00      1.16      2.00   1227.45    782.00        1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2355E+03 EXCESS= .0000E+00 OUTFLOW= .2355E+03 BASIN STORAGE= .3158E-02 PERCENT ERROR=    .0


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

Existing Conditions HEC-1 Models

NOAA 14 Rainfall
Dam Included

September 01, 2000

```
1*****************************************
*                                       *
*     .OOD HYDROGRAPH PACKAGE  (HEC-1)  *
*               JUN  1998               *
*             VERSION 4.1               *
*                                       *
*  RUN DATE   30AUG00  TIME  10:03:34   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

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

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

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

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
              *DIAGRAM
    1         ID   ======================================================================
    2         ID   EVANS CREEK 100-YEAR 24 HOUR MODEL   EXISTING CONDITIONS
    3         ID
    4         ID       - NOAA 14 RAINFALL USED
    5         ID       - CURVE NUMBERS BASED ON FIELD INVESTIGATION AND CITY OF RENO LAND
    6         ID         DESIGNATIONS
    7         ID       - LAG TIMES BASED ON PROCEDURES IN WCHCDDM
    8         ID       - DAM SPECS BASED ON EVANS CREEK WATERSHED PLAN AND ENVIRONMENTAL
    9         ID         ASSESSMENT DATED:  AUGUST 1994 (MODIFIED SQ AND SA CARDS)
   10         ID
   11         ID   FILE:  EVN14E.DAT
   12         ID   BY:  BAJ                                              WRC NEVADA, INC.
   13         ID   DATE:  AUGUST 2000                                    RENO, NEVADA
   14         ID   ======================================================================
   15         IT       2              0    1441
   16         IO       3
              *
   17         KK       E sub basin
   18         BA   1.291
   19         PH            .001    0.48    0.87    1.45    1.58    1.68    1.90    2.33    2.75
   20         LS             83
   21         UD    0.90
              *
   22         KK   RT-1A route sub basin E to sub basin A
   23         RD     1050  0.0133   0.030           TRAP      10       3
              *
   24         KK   RT-1B route sub basin E to sub basin A
   25         RD      430  0.0233   0.030           TRAP      30       2
              *
```

```
 26          KK   RT-1C route sub basin E to sub basin A
 27          RD     335  0.0119   0.030            TRAP      20       2
             *
             *  RT-1D route sub basin E to sub basin A
             *     240  0.0750   0.013            TRAP       6       2
             *

 28          KK   RT-1E route sub basin E to sub basin A
 29          RD    1005  0.0299   0.035            TRAP      20       3
             *

 30          KK       A sub basin
 31          BA   0.854
 32          PH            .001    0.48    0.87    1.45    1.61    1.73    1.99    2.45    2.91
 33          LS              80
 34          UD    0.79
             *
```



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

 35          KK       F sub basin
 36          BA   0.317
 37          PH            .001    0.48    0.87    1.45    1.60    1.71    1.94    2.43    2.91
 38          LS              76
 39          UD     .32
             *

 40          KK    CP-1 combine sub basins A, E, and F
 41          HC       3
             *

 42          KK   RT-2A route CP-1 to sub basin B
 43          RD     410  0.0293   0.035            TRAP      20       3
             *

 44          KK   RT-2B route CP-1 to sub basin B
 45          RD    1140  0.0123   0.045            TRAP      50       3
             *

 46          KK   RT-2C route CP-1 to sub basin B
 47          RD    2070  0.0251   0.040            TRAP      50       3
             *

 48          KK       B sub basin
 49          BA   0.538
 50          PH            .001    0.48    0.87    1.45    1.58    1.67    1.88    2.34    2.80
 51          LS              82
 52          UD     .43
             *

 53          KK    CP-2 combine CP-1 with sub basin B
 54          HC       2
             *

 55          KK   RT-3A route CP-2 to sub basin G
 56          RD    1640  0.0232   0.030            TRAP      50       3
             *

 57          KK   RT-3B route CP-2 to sub basin G
 58          RD     780  0.0179   0.035            TRAP      20       3
             *

 59          KK   RT-3C route CP-2 to sub basin G
 60          RD     655  0.0214   0.045            TRAP      20       3
             *

 61          KK   RT-3D route CP-2 to sub basin G
 62          RD    1555  0.0283   0.035            TRAP      20       3
```

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

  63      KK       G sub basin
  64      BA   0.426
  65      PH            .001    0.48    0.87    1.45    1.56    1.64    1.81    2.27    2.73
  66      LS              77
  67      UD     .51
          *
  68      KK    CP-3 combine CP-2 with sub basin G
  69      KO       3                              21
  70      HC       2
          *
  71      KK     DAM EVANS CREEK DAM (PROPOSED)
  72      KM         70 AC-FT OF SEDIMENT + 132 AC-FT OF WATER = 202 AC-FT OF STORAGE
  73      KO       3                              21
  74      RS       1    STOR      -1
          *      3     4.1     4.7    5.25       6     6.5     7.2     7.9     8.5     9.4
          *   10.1      11   11.75   12.75      14    15.2      18
  75      SA    2.67    3.01    3.40    3.82    4.23    4.66    5.15    5.65    6.14    6.63
  76      SA    7.15    7.68    8.36    9.19    9.89   10.61   11.54
          *   4796    4800    4802    4804    4806    4808    4810    4812    4814    4816
          *   4818    4820    4822    4824    4826    4828    4831
  77      SE    4796    4798    4800    4802    4804    4806    4808    4810    4812    4814
  78      SE    4816    4818    4820    4822    4824    4826    4828
  79      SQ       0    16.4    46.5      65   109.4   143.8   159.2   162.9   166.6   170.1
  80      SQ   173.6     177   180.3   183.6   186.8     190   193.1  1304.8  4522.4    9106
  81      SE    4796  4796.5    4797 4797.25    4798    4799    4800    4802    4804    4806
  82      SE    4808    4810    4812    4814    4816    4818    4820    4823    4827    4831
          *
  83      KK   RT-4A route CP-3 to sub basin C
  84      RD    2085  0.0240   0.040            TRAP      40       3
          *
  85      KK   RT-4B route CP-3 to sub basin C
  86      RD    1820  0.0264   0.050            TRAP      50      50
          *
  87      KK       C sub basin
  88      BA   0.396
  89      PH            .001    0.48    0.87    1.45    1.55    1.63    1.79    2.20    2.62
  90      LS              83
  91      UD     .61
          *
  92      KK    CP-4 combine CP-3 with sub basin C
  93      HC       2
          *
```

1


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

  94      KK    RT-5 route CP-4 to sub basin D
  95      RD    3450  0.0191   0.030            TRAP      50      50
          *
  96      KK       D sub basin
  97      BA   0.557
  98      PH            .001    0.48    0.87    1.45    1.54    1.60    1.74    2.09    2.44
  99      LS              84
 100      UD    0.59
          *
 101      KK    CP-5 combine CP-4 with sub basin D
```

```
          102          HC       2
                       *
          103          ZZ
1
               SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW
  NO.     (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   17           E
                V
                V
   22        RT-1A
                V
                V
   24        RT-1B
                V
                V
   26        RT-1C
                V
                V
   28        RT-1E
                .
                .
   30           .            A
                .            .
                .            .
   35           .            .            F
                .            .            .
                .            .            .
   40         CP-1.......................
                V
                V
              RT-2A
                V
                V
   44         RT-2B
                V
                V
   46         RT-2C
                .
                .
   48           .            B
                .            .
                .            .
   53         CP-2............
                V
                V
   55         RT-3A
                V
                V
   57         RT-3B
                V
                V
   59         RT-3C
                V
                V
   61         RT-3D
                .
                .
   63           .            G
                .            .
                .            .
   68         CP-3............
                V
                V
   71          DAM
                V
                V
              RT-4A
```

```
                V
                V
             RT-4B
                .
                .
  87            .           C
                .           .
                .           .
  92         CP-4............
                V
                V
  94         RT-5
                .
                .
  96            .           D
                .           .
                .           .
 101         CP-5............

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   30AUG00  TIME  10:03:34   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*        DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
                    ================================================================================
                    EVANS CREEK 100-YEAR 24 HOUR MODEL   EXISTING CONDITIONS

                        - NOAA 14 RAINFALL USED
                        - CURVE NUMBERS BASED ON FIELD INVESTIGATION AND CITY OF RENO LAND
                          DESIGNATIONS
                        - LAG TIMES BASED ON PROCEDURES IN WCHCDDM
                        - DAM SPECS BASED ON EVANS CREEK WATERSHED PLAN AND ENVIRONMENTAL
                          ASSESSMENT DATED:  AUGUST 1994 (MODIFIED SQ AND SA CARDS)

                    FILE:  EVN14E.DAT
                    BY:  BAJ                                                  WRC NEVADA, INC.
                    DATE:  AUGUST 2000                                        RENO, NEVADA
                    ================================================================================

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

    IT          HYDROGRAPH TIME DATA
                       NMIN          2  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1   0  STARTING DATE
                      ITIME        0000  STARTING TIME
                         NQ        1441  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      3   0  ENDING DATE
                     NDTIME        0000  ENDING TIME
                      ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL      .03 HOURS
                      TOTAL TIME BASE    48.00 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
```

```
                 STORAGE VOLUME        ACRE-FEET
                 SURFACE AREA          ACRES
                 TEMPERATURE           DEGREES FAHRENHEIT


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

               ***************
               *             *
   17 KK       *      E      *       sub basin
               *             *
               ***************

                 SUBBASIN RUNOFF DATA

   18 BA          SUBBASIN CHARACTERISTICS
                       TAREA          1.29  SUBBASIN AREA

                   PRECIPITATION DATA

   19 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
                    .48     .87    1.45    1.58    1.68    1.90    2.33    2.75     .00     .00     .00     .00

                                                    STORM AREA =     .00

   20 LS          SCS LOSS RATE
                       STRTL          .41  INITIAL ABSTRACTION
                      CRVNBR        83.00  CURVE NUMBER
                       RTIMP          .00  PERCENT IMPERVIOUS AREA

      D           SCS DIMENSIONLESS UNITGRAPH
                        TLAG          .90  LAG

                                                              ***


                                                        UNIT HYDROGRAPH
                                                   137 END-OF-PERIOD ORDINATES
               7.        15.        25.        42.        59.        79.       101.       124.       152.       181.
             211.       250.       290.       332.       379.       426.       469.       508.       548.       578.
             606.       633.       648.       662.       674.       677.       679.       679.       677.       674.
             662.       648.       633.       615.       598.       580.       560.       541.       518.       494.
             469.       440.       411.       381.       356.       332.       309.       291.       274.       258.
             243.       228.       215.       203.       190.       181.       172.       163.       154.       145.
             137.       130.       122.       115.       107.       100.        95.        90.        85.        80.
              75.        71.        67.        64.        60.        56.        52.        50.        47.        44.
              42.        39.        36.        35.        33.        31.        29.        27.        26.        24.
              23.        22.        20.        19.        18.        17.        16.        15.        14.        14.
              13.        12.        11.        11.        10.         9.         9.         8.         8.         7.
               7.         7.         7.         6.         6.         6.         5.         5.         5.         5.
               4.         4.         4.         3.         3.         3.         3.         2.         2.         2.
               2.         1.         1.         1.         1.         0.         0.

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

                          HYDROGRAPH AT STATION        E

      TOTAL RAINFALL =    2.75, TOTAL LOSS =    1.50, TOTAL EXCESS =    1.25

    PEAK FLOW      TIME                         MAXIMUM AVERAGE FLOW
                                       6-HR        24-HR       72-HR      48.00-HR
 +    (CFS)        (HR)
                            (CFS)
 +     481.       13.00                 141.          43.         22.          22.
                          (INCHES)     1.016       1.248       1.248       1.248
                           (AC-FT)       70.          86.         86.          86.

                          CUMULATIVE AREA =     1.29 SQ MI
```

```
*... *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
 22 KK    *     RT-1A  *      route sub basin E to sub basin A
          *            *
          **************

             HYDROGRAPH ROUTING DATA

 23 RD         MUSKINGUM-CUNGE CHANNEL ROUTING
                        L       1050.  CHANNEL LENGTH
                        S       .0133  SLOPE
                        N        .030  CHANNEL ROUGHNESS COEFFICIENT
                       CA         .00  CONTRIBUTING AREA
                    SHAPE        TRAP  CHANNEL SHAPE
                       WD       10.00  BOTTOM WIDTH OR DIAMETER
                        Z        3.00  SIDE SLOPE

                                                    ***
                                 COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                       COMPUTATION TIME STEP
                    ELEMENT    ALPHA       M          DT         DX       PEAK    TIME TO      VOLUME    MAXIMUM
                                                                                      PEAK                 CELERITY
                                                        (MIN)      (FT)     (CFS)   (MIN)        (IN)      (FPS)

                      MAIN       1.59      1.42        1.77     525.00    480.56   781.56        1.25      9.87

                                              INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                      MAIN       1.59      1.42        2.00               480.25   782.00        1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8593E+02 EXCESS= .0000E+00 OUTFLOW= .8593E+02 BASIN STORAGE= .7598E-03 PERCENT ERROR=     .0

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

                        HYDROGRAPH AT STATION    RT-1A

 PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR       24-HR       72-HR     48.00-HR
+  (CFS)       (HR)
                    (CFS)
+    480.     13.03                        141.        43.         22.         22.
                   (INCHES)               1.016       1.248       1.248       1.248
                   (AC-FT)                  70.         86.         86.         86.

                   CUMULATIVE AREA =    1.29 SQ MI

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

          **************
          *            *
 24 KK    *     RT-1B  *      route sub basin E to sub basin A
          *            *
          **************

             HYDROGRAPH ROUTING DATA
```

RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	430.	CHANNEL LENGTH
S	.0233	SLOPE
N	.030	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	30.00	BOTTOM WIDTH OR DIAMETER
Z	2.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.06	1.54	.66	215.00	480.17	781.73	1.25	10.93
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	1.06	1.54	2.00		480.16	782.00	1.25	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8593E+02 EXCESS= .0000E+00 OUTFLOW= .8593E+02 BASIN STORAGE= .4992E-03 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-1B

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
480.	13.03		141.	43.	22.	22.
		(INCHES)	1.016	1.248	1.248	1.248
		(AC-FT)	70.	86.	86.	86.

CUMULATIVE AREA = 1.29 SQ MI

*** ***

26 KK RT-1C route sub basin E to sub basin A

HYDROGRAPH ROUTING DATA

27 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	335.	CHANNEL LENGTH
S	.0119	SLOPE
N	.030	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	20.00	BOTTOM WIDTH OR DIAMETER
Z	2.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT	DX	PEAK	TIME TO PEAK	VOLUME	MAXIMUM CELERITY

			(MIN)	(FT)	(CFS)	(MIN)	(IN)	(FPS)
MAIN	1.00	1.51	.59	167.50	480.03	782.53	1.25	9.48

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.00	1.51	2.00		479.95	782.00	1.25	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8594E+02 EXCESS= .0000E+00 OUTFLOW= .8594E+02 BASIN STORAGE= .3685E-03 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-1C

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	48.00-HR
(CFS)	(HR)				
		(CFS)			
480.	13.03	141.	43.	22.	22.
		(INCHES) 1.016	1.248	1.248	1.248
		(AC-FT) 70.	86.	86.	86.

CUMULATIVE AREA = 1.29 SQ MI

*** ***

28 KK

****
* *
* RT-1E *
* *
****

route sub basin E to sub basin A

HYDROGRAPH ROUTING DATA

29 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	1005.	CHANNEL LENGTH
S	.0299	SLOPE
N	.035	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	20.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.43	1.48	1.53	502.50	479.76	783.09	1.25	10.97

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.43	1.48	2.00		479.45	784.00	1.25	

UITY SUMMARY (AC-FT) - INFLOW= .8594E+02 EXCESS= .0000E+00 OUTFLOW= .8594E+02 BASIN STORAGE= .8343E-03 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-1E

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	48.00-HR
+ (CFS)	(HR)				
		(CFS)			
+ 479.	13.07	141.	43.	22.	22.
		(INCHES) 1.016	1.248	1.248	1.248
		(AC-FT) 70.	86.	86.	86.

CUMULATIVE AREA = 1.29 SQ MI

*** ***

```
**********
*        *
*   A    *    sub basin
*        *
**********
```

30 KK

SUBBASIN RUNOFF DATA

31 BA SUBBASIN CHARACTERISTICS

TAREA	.85	SUBBASIN AREA

PRECIPITATION DATA

32 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
.48	.87	1.45	1.61	1.73	1.99	2.45	2.91	.00	.00	.00	.00

STORM AREA = .00

33 LS SCS LOSS RATE

STRTL	.50	INITIAL ABSTRACTION
CRVNBR	80.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

34 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.79	LAG

***

UNIT HYDROGRAPH
120 END-OF-PERIOD ORDINATES

6.	13.	24.	39.	54.	73.	92.	116.	141.	169.
203.	237.	277.	317.	354.	388.	421.	444.	467.	484.
496.	507.	509.	511.	510.	508.	501.	489.	476.	461.
447.	431.	414.	396.	375.	354.	330.	305.	280.	259.
238.	220.	208.	194.	181.	169.	158.	147.	139.	131.
123.	115.	108.	101.	95.	88.	82.	76.	71.	67.
63.	59.	54.	51.	48.	45.	42.	39.	36.	34.
32.	30.	27.	26.	24.	23.	21.	20.	19.	17.
16.	15.	14.	13.	13.	12.	11.	10.	10.	9.
8.	8.	7.	7.	6.	6.	6.	5.	5.	5.
5.	4.	4.	4.	4.	3.	3.	3.	3.	2.
2.	2.	2.	1.	1.	1.	1.	1.	0.	0.

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

HYDROGRAPH AT STATION A

'AL RAINFALL = 2.91, TOTAL LOSS = 1.73, TOTAL EXCESS = 1.18

```
 FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                6-HR       24-HR       72-HR     48.00-HR
+     S)      (HR)
                     (CFS)
+    314.     12.90                88.         27.         14.         14.
                   (INCHES)       .955       1.183       1.183       1.183
                    (AC-FT)         44.         54.         54.         54.

                   CUMULATIVE AREA =     .85 SQ MI


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


          **************
          *            *
 35 KK    *          F *      sub basin
          *            *
          **************

             SUBBASIN RUNOFF DATA

 36 BA         SUBBASIN CHARACTERISTICS
                    TAREA         .32  SUBBASIN AREA

               PRECIPITATION DATA

 37 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
                 .48     .87    1.45    1.60    1.71    1.94    2.43    2.91     .00     .00     .00     .00

                                                 STORM AREA =     .00

 LS            SCS LOSS RATE
                    STRTL         .63  INITIAL ABSTRACTION
                   CRVNBR       76.00  CURVE NUMBER
                    RTIMP         .00  PERCENT IMPERVIOUS AREA

 39 UD         SCS DIMENSIONLESS UNITGRAPH
                    TLAG         .32  LAG

                                                    ***

                                                UNIT HYDROGRAPH
                                            50 END-OF-PERIOD ORDINATES
                14.      45.      85.     139.     210.     295.     368.     419.     448.     454.
               451.     426.     395.     360.     316.     263.     217.     183.     155.     132.
               114.      98.      84.      70.      60.      51.      44.      37.      31.      27.
                23.      19.      17.      14.      12.      10.       9.       7.       6.       5.
                 5.       4.       4.       3.       3.       2.       2.       1.       1.       0.

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

                       HYDROGRAPH AT STATION       F

    TOTAL RAINFALL =    2.91, TOTAL LOSS =    1.96, TOTAL EXCESS =     .95

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                6-HR       24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                     (CFS)
+    167.     12.40                26.          8.          4.          4.
                   (INCHES)       .771        .955        .955        .955
                    (AC-FT)         13.         16.         16.         16.

                   CUMULATIVE AREA =     .32 SQ MI
```

```
 * *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **********
          *        *
 40 KK    *  CP-1  *      combine sub basins A, E, and F
          *        *
          **********

 41 HC        HYDROGRAPH COMBINATION
                   ICOMP          3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                        ***

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

                      HYDROGRAPH AT STATION     CP-1

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR     48.00-HR
+   (CFS)       (HR)
                                    (CFS)
+     825.     12.93                 255.         79.          39.          39.
                                  (INCHES)       .961        1.188        1.188        1.188
                                   (AC-FT)       126.         156.         156.         156.

                      CUMULATIVE AREA =    2.46 SQ MI


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

          **********
          *        *
 42 KK    *  RT-2A *      route CP-1 to sub basin B
          *        *
          **********

     HYDROGRAPH ROUTING DATA

 43 RD     MUSKINGUM-CUNGE CHANNEL ROUTING
                 L       410.  CHANNEL LENGTH
                 S      .0293  SLOPE
                 N       .035  CHANNEL ROUGHNESS COEFFICIENT
                CA        .00  CONTRIBUTING AREA
             SHAPE       TRAP  CHANNEL SHAPE
                BD      20.00  BOTTOM WIDTH OR DIAMETER
                 Z       3.00  SIDE SLOPE

                                                  ***
                      COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                COMPUTATION TIME STEP
          ELEMENT    ALPHA      M          DT          DX        PEAK     TIME TO PEAK    VOLUME    MAXIMUM CELERITY
                                                     (MIN)       (FT)      (CFS)      (MIN)       (IN)       (FPS)
            MAIN      1.41     1.48         .53       205.00     824.88     776.80       1.19      12.98

                                INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

            MAIN      1.41     1.48        2.00                  824.43     778.00       1.19

UITY SUMMARY (AC-FT) - INFLOW= .1560E+03 EXCESS= .0000E+00 OUTFLOW= .1560E+03 BASIN STORAGE= .3522E-03 PERCENT ERROR=     .0
```

```
      ***             ***             ***             ***             ***

                              HYDROGRAPH AT STATION    RT-2A

       PEAK FLOW      TIME                                 MAXIMUM AVERAGE FLOW
                                              6-HR         24-HR         72-HR       48.00-HR
   +    (CFS)         (HR)
                                (CFS)
   +      824.       12.97                    255.           79.           39.            39.
                             (INCHES)         .961         1.188         1.188          1.188
                              (AC-FT)         126.          156.          156.           156.

                             CUMULATIVE AREA =     2.46 SQ MI


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

              ***************
              *             *
  44 KK       *     RT-2B   *       route CP-1 to sub basin B
              *             *
              ***************

                 HYDROGRAPH ROUTING DATA

  45 RD            MUSKINGUM-CUNGE CHANNEL ROUTING
                              L         1140.   CHANNEL LENGTH
                              S         .0123   SLOPE
                              N          .045   CHANNEL ROUGHNESS COEFFICIENT
                             CA           .00   CONTRIBUTING AREA
                          SHAPE          TRAP   CHANNEL SHAPE
                             WD         50.00   BOTTOM WIDTH OR DIAMETER
                              Z          3.00   SIDE SLOPE
                                                                     ***
                                       COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                              COMPUTATION TIME STEP
                        ELEMENT     ALPHA         M         DT         DX        PEAK      TIME TO       VOLUME      MAXIMUM
                                                                                             PEAK                    CELERITY
                                                          (MIN)       (FT)      (CFS)      (MIN)          (IN)        (FPS)

                          MAIN        .37       1.55       2.00     570.00     824.40     780.00          1.19         7.07

                                                     INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                          MAIN        .37       1.55       2.00                824.40     780.00          1.19

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1560E+03 EXCESS= .0000E+00 OUTFLOW= .1560E+03 BASIN STORAGE= .2808E-02 PERCENT ERROR=     .0


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

                              HYDROGRAPH AT STATION    RT-2B

       PEAK FLOW      TIME                                 MAXIMUM AVERAGE FLOW
                                              6-HR         24-HR         72-HR       48.00-HR
   +    (CFS)         (HR)
                                (CFS)
   +      824.       13.00                    255.           79.           39.            39.
                             (INCHES)         .961         1.188         1.188          1.188
                              (AC-FT)         126.          156.          156.           156.

                             CUMULATIVE AREA =     2.46 SQ MI
```

```
     * *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

              ***************
              *             *
  46 KK       *    RT-2C    *      route CP-1 to sub basin B
              *             *
              ***************

                HYDROGRAPH ROUTING DATA

  47 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                         L        2070.  CHANNEL LENGTH
                         S        .0251  SLOPE
                         N         .040  CHANNEL ROUGHNESS COEFFICIENT
                        CA          .00  CONTRIBUTING AREA
                     SHAPE         TRAP  CHANNEL SHAPE
                        WD        50.00  BOTTOM WIDTH OR DIAMETER
                         Z         3.00  SIDE SLOPE

                                                         ***
                               COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                    COMPUTATION TIME STEP
                  ELEMENT    ALPHA       M        DT       DX      PEAK    TIME TO     VOLUME    MAXIMUM
                                                                             PEAK                CELERITY
                                                (MIN)     (FT)     (CFS)    (MIN)       (IN)      (FPS)

                    MAIN       .60      1.55      2.00    517.50   824.69   782.00       1.19      9.59


                                         INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                    MAIN       .60      1.55      2.00             824.69   782.00       1.19

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1560E+03 EXCESS= .0000E+00 OUTFLOW= .1560E+03 BASIN STORAGE= .4205E-02 PERCENT ERROR=    .0


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

                       HYDROGRAPH AT STATION    RT-2C

  PEAK FLOW     TIME                         MAXIMUM AVERAGE FLOW
                                         6-HR       24-HR      72-HR     48.00-HR
+   (CFS)       (HR)
                        (CFS)
+     825.     13.03                     255.         79.        39.         39.
                      (INCHES)           .961       1.188      1.188       1.188
                       (AC-FT)           126.        156.       156.        156.

                      CUMULATIVE AREA =     2.46 SQ MI


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

              ***************
              *             *
  48 KK       *      B      *      sub basin
              *             *
              ***************

                SUBBASIN RUNOFF DATA

    BA          SUBBASIN CHARACTERISTICS
```

```
                    TAREA          .54  SUBBASIN AREA

               PRECIPITATION DATA

50 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
                 .48     .87    1.45    1.58    1.67    1.88    2.34    2.80     .00     .00     .00     .00

                                                STORM AREA =      .00

51 LS          SCS LOSS RATE
                    STRTL         .44  INITIAL ABSTRACTION
                   CRVNBR       82.00  CURVE NUMBER
                    RTIMP         .00  PERCENT IMPERVIOUS AREA

52 UD          SCS DIMENSIONLESS UNITGRAPH
                    TLAG         .43  LAG

                                                      ***

                                                   UNIT HYDROGRAPH
                                                66 END-OF-PERIOD ORDINATES
                13.      38.      71.     110.     162.     225.     298.     381.     451.     507.
               548.     574.     580.     579.     569.     543.     513.     480.     443.     400.
               349.     301.     261.     231.     204.     180.     160.     144.     128.     114.
               101.      88.      78.      70.      61.      55.      48.      43.      38.      33.
                29.      26.      23.      21.      18.      16.      14.      13.      11.      10.
                 9.       8.       7.       6.       6.       5.       5.       4.       4.       3.
                 3.       2.       2.       1.       1.       0.

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

                       HYDROGRAPH AT STATION        B

     TAL RAINFALL =    2.80, TOTAL LOSS =    1.58, TOTAL EXCESS =    1.22

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR      48.00-HR
+   (CFS)       (HR)
                          (CFS)
+     327.      12.50                  58.          18.           9.           9.
                        (INCHES)      .995        1.223        1.223        1.223
                         (AC-FT)        29.          35.          35.          35.

                       CUMULATIVE AREA =      .54 SQ MI


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


           ***************
           *             *
53 KK      *      CP-2   *      combine CP-1 with sub basin B
           *             *
           ***************

54 HC          HYDROGRAPH COMBINATION
                    ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                      ***

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

                       HYDROGRAPH AT STATION      CP-2

     FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR      48.00-HR
+    ..FS)    (HR)
```

```
                              (CFS)
+       67.      12.90                   310.          96.          48.          48.
                           (INCHES)      .962        1.194        1.194        1.194
                            (AC-FT)      154.         191.         191.         191.

                            CUMULATIVE AREA =     3.00 SQ MI



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


                ***************
                *             *
  55 KK         *    RT-3A    *       route CP-2 to sub basin G
                *             *
                ***************

                   HYDROGRAPH ROUTING DATA

  56 RD              MUSKINGUM-CUNGE CHANNEL ROUTING
                              L        1640.  CHANNEL LENGTH
                              S        .0232  SLOPE
                              N         .030  CHANNEL ROUGHNESS COEFFICIENT
                             CA          .00  CONTRIBUTING AREA
                          SHAPE         TRAP  CHANNEL SHAPE
                             WD        50.00  BOTTOM WIDTH OR DIAMETER
                              Z         3.00  SIDE SLOPE

                                                              ***
                                      COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                            COMPUTATION TIME STEP
                       ELEMENT     ALPHA        M          DT          DX        PEAK      TIME TO      VOLUME     MAXIMUM
                                                                                             PEAK                  CELERITY
                                                         (MIN)        (FT)       (CFS)      (MIN)        (IN)        (FPS)

                         MAIN        .77       1.55        2.00      820.00      967.02     776.00        1.19       11.91


                                           INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                         MAIN        .77       1.55        2.00                  967.02     776.00        1.19

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1911E+03 EXCESS= .0000E+00 OUTFLOW= .1911E+03 BASIN STORAGE= .2300E-02 PERCENT ERROR=     .0


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

                             HYDROGRAPH AT STATION     RT-3A

   PEAK FLOW      TIME                             MAXIMUM AVERAGE FLOW
                                          6-HR          24-HR        72-HR      48.00-HR
+     (CFS)       (HR)
                              (CFS)
+      967.      12.93                   310.          96.          48.          48.
                           (INCHES)      .962        1.194        1.194        1.194
                            (AC-FT)      154.         191.         191.         191.

                            CUMULATIVE AREA =     3.00 SQ MI



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


                ***************
```

```
            *            *
      K     *    RT-3B   *      route CP-2 to sub basin G
            *            *
            **************

               HYDROGRAPH ROUTING DATA

  58 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                           L        780.  CHANNEL LENGTH
                           S       .0179  SLOPE
                           N        .035  CHANNEL ROUGHNESS COEFFICIENT
                          CA         .00  CONTRIBUTING AREA
                       SHAPE        TRAP  CHANNEL SHAPE
                          WD       20.00  BOTTOM WIDTH OR DIAMETER
                           Z        3.00  SIDE SLOPE

                                                               ***
                                   COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                          COMPUTATION TIME STEP
                   ELEMENT    ALPHA        M         DT        DX      PEAK    TIME TO     VOLUME    MAXIMUM
                                                                                 PEAK                CELERITY
                                                   (MIN)      (FT)    (CFS)     (MIN)       (IN)      (FPS)

                     MAIN       1.10       1.48       1.12   390.00    966.86    776.25      1.19     11.56


                                          INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                     MAIN       1.10       1.48       2.00             966.73    776.00      1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1911E+03 EXCESS= .0000E+00 OUTFLOW= .1911E+03 BASIN STORAGE= .7437E-03 PERCENT ERROR=    .0


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

                         HYDROGRAPH AT STATION    RT-3B

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR    48.00-HR
+  (CFS)       (HR)
                          (CFS)
+    967.     12.93                  310.         96.         48.          48.
                       (INCHES)      .962       1.194       1.194        1.194
                        (AC-FT)      154.        191.        191.         191.

                        CUMULATIVE AREA =    3.00 SQ MI


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


            **************
            *            *
  59 KK     *    RT-3C   *      route CP-2 to sub basin G
            *            *
            **************

               HYDROGRAPH ROUTING DATA

  60 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                           L        655.  CHANNEL LENGTH
                           S       .0214  SLOPE
                           N        .045  CHANNEL ROUGHNESS COEFFICIENT
                          CA         .00  CONTRIBUTING AREA
                       SHAPE        TRAP  CHANNEL SHAPE
                          WD       20.00  BOTTOM WIDTH OR DIAMETER
```

```
                Z        3.00  SIDE SLOPE

                                                    ***
                        COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                COMPUTATION TIME STEP
     ELEMENT    ALPHA        M          DT         DX        PEAK     TIME TO      VOLUME     MAXIMUM
                                                                        PEAK                    CELERITY
                                                 (MIN)       (FT)      (CFS)     (MIN)        (IN)      (FPS)

      MAIN        .94       1.48        1.05     327.50     966.49    777.15        1.19      10.35

                                INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

      MAIN        .94       1.48        2.00                966.38    778.00        1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1911E+03 EXCESS= .0000E+00 OUTFLOW= .1911E+03 BASIN STORAGE= .7406E-03 PERCENT ERROR=     .0

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

                        HYDROGRAPH AT STATION    RT-3C

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                          (CFS)
+     966.      12.97               310.         96.         48.         48.
                        (INCHES)     .962        1.194       1.194       1.194
                        (AC-FT)      154.        191.        191.        191.

                      CUMULATIVE AREA =    3.00 SQ MI

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

          ****************
          *              *
 61 KK    *     RT-3D    *      route CP-2 to sub basin G
          *              *
          ****************

             HYDROGRAPH ROUTING DATA

 62 RD         MUSKINGUM-CUNGE CHANNEL ROUTING
                       L      1555.  CHANNEL LENGTH
                       S      .0283  SLOPE
                       N       .035  CHANNEL ROUGHNESS COEFFICIENT
                      CA        .00  CONTRIBUTING AREA
                   SHAPE       TRAP  CHANNEL SHAPE
                      BD      20.00  BOTTOM WIDTH OR DIAMETER
                       Z       3.00  SIDE SLOPE

                                                    ***
                        COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                COMPUTATION TIME STEP
     ELEMENT    ALPHA        M          DT         DX        PEAK     TIME TO      VOLUME     MAXIMUM
                                                                        PEAK                    CELERITY
                                                 (MIN)       (FT)      (CFS)     (MIN)        (IN)      (FPS)

      MAIN       1.39       1.48        1.92     777.50     966.22    777.86        1.19      13.49

                                INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL
```

```
                    MAIN        1.39       1.48       2.00              966.21    778.00       1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1911E+03 EXCESS= .0000E+00 OUTFLOW= .1911E+03 BASIN STORAGE= .1442E-02 PERCENT ERROR=     .0


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

                       HYDROGRAPH AT STATION     RT-3D

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                        (CFS)
+    966.     12.97                310.         96.         48.         48.
                      (INCHES)     .962        1.194       1.194       1.194
                       (AC-FT)     154.         191.        191.        191.

                       CUMULATIVE AREA =    3.00 SQ MI


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


          **************
          *            *
 63 KK    *          G *      sub basin
          *            *
          **************

             SUBBASIN RUNOFF DATA

      A        SUBBASIN CHARACTERISTICS
                    TAREA          .43  SUBBASIN AREA

               PRECIPITATION DATA

 65 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
                 .48     .87    1.45    1.56    1.64    1.81    2.27    2.73     .00     .00     .00     .00

                                                STORM AREA =     .00

 66 LS         SCS LOSS RATE
                    STRTL         .60  INITIAL ABSTRACTION
                   CRVNBR       77.00  CURVE NUMBER
                    RTIMP         .00  PERCENT IMPERVIOUS AREA

 67 UD         SCS DIMENSIONLESS UNITGRAPH
                    TLAG          .51  LAG

                                                    ***

                                                UNIT HYDROGRAPH
                                            78 END-OF-PERIOD ORDINATES
                  7.      19.      36.      58.      82.     112.     148.     188.     235.     278.
                318.     346.     369.     384.     389.     390.     388.     378.     363.     345.
                327.     307.     283.     257.     227.     201.     177.     160.     144.     129.
                117.     106.      97.      88.      79.      72.      64.      57.      52.      47.
                 42.      38.      35.      31.      28.      25.      23.      20.      19.      17.
                 15.      14.      12.      11.      10.       9.       8.       7.       7.       6.
                  5.       5.       4.       4.       4.       3.       3.       3.       3.       2.
                  2.       2.       1.       1.       1.       1.       0.       0.

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

                       HYDROGRAPH AT STATION        G
```

TOTAL RAINFALL = 2.73, TOTAL LOSS = 1.84, TOTAL EXCESS = .89

	FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	48.00-HR
+	(CFS)	(HR)					
			(CFS)				
+	164.	12.60		33.	10.	5.	5.
			(INCHES)	.711	.888	.888	.888
			(AC-FT)	16.	20.	20.	20.

CUMULATIVE AREA = .43 SQ MI

*** ***

68 KK — CP-3 — combine CP-2 with sub basin G

69 KO OUTPUT CONTROL VARIABLES

IPRNT	3	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	21	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	1441	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

C HYDROGRAPH COMBINATION

ICOMP	2	NUMBER OF HYDROGRAPHS TO COMBINE

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

HYDROGRAPH AT STATION CP-3

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	48.00-HR
+	(CFS)	(HR)					
			(CFS)				
+	1076.	12.90		342.	107.	53.	53.
			(INCHES)	.929	1.156	1.156	1.156
			(AC-FT)	170.	211.	211.	211.

CUMULATIVE AREA = 3.43 SQ MI

*** ***

71 KK — DAM — EVANS CREEK DAM (PROPOSED)

70 AC-FT OF SEDIMENT + 132 AC-FT OF WATER = 202 AC-FT OF STORAGE

73 KO OUTPUT CONTROL VARIABLES

IPRNT	3	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	21	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	1441	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

HYDROGRAPH ROUTING DATA

74 RS	STORAGE ROUTING										
	NSTPS	1	NUMBER OF SUBREACHES								
	ITYP	STOR	TYPE OF INITIAL CONDITION								
	RSVRIC	-1.00	INITIAL CONDITION								
	X	.00	WORKING R AND D COEFFICIENT								
75 SA	AREA	2.7	3.0	3.4	3.8	4.2	4.7	5.2	5.7	6.1	6.6
		7.2	7.7	8.4	9.2	9.9	10.6	11.5			
77 SE	ELEVATION	4796.00	4798.00	4800.00	4802.00	4804.00	4806.00	4808.00	4810.00	4812.00	4814.00
		4816.00	4818.00	4820.00	4822.00	4824.00	4826.00	4828.00			
79 SQ	DISCHARGE	0.	16.	47.	65.	109.	144.	159.	163.	167.	170.
		174.	177.	180.	184.	187.	190.	193.	1305.	4522.	9106.
81 SE	ELEVATION	4796.00	4796.50	4797.00	4797.25	4798.00	4799.00	4800.00	4802.00	4804.00	4806.00
		4808.00	4810.00	4812.00	4814.00	4816.00	4818.00	4820.00	4823.00	4827.00	4831.00

***

COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	5.68	12.08	19.30	27.35	36.23	46.04	56.83	68.62	81.39
ELEVATION	4796.00	4798.00	4800.00	4802.00	4804.00	4806.00	4808.00	4810.00	4812.00	4814.00
STORAGE	95.16	109.99	126.03	143.57	162.65	183.14	205.28			
ELEVATION	4816.00	4818.00	4820.00	4822.00	4824.00	4826.00	4828.00			

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	1.36	2.75	3.47	5.68	8.78	12.08	19.30	27.35	36.23
OUTFLOW	.00	16.40	46.50	65.00	109.40	143.80	159.20	162.90	166.60	170.10
ELEVATION	4796.00	4796.50	4797.00	4797.25	4798.00	4799.00	4800.00	4802.00	4804.00	4806.00
STORAGE	46.04	56.83	68.62	81.39	95.16	109.99	126.03	143.57	152.93	162.65
OUTFLOW	173.60	177.00	180.30	183.60	186.80	190.00	193.10	934.23	1304.80	2109.20
ELEVATION	4808.00	4810.00	4812.00	4814.00	4816.00	4818.00	4820.00	4822.00	4823.00	4824.00
STORAGE	183.14	193.98	205.28	242.08						
OUTFLOW	3718.00	4522.40	5668.30	9106.00						
ELEVATION	4826.00	4827.00	4828.00	4831.00						

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

HYDROGRAPH AT STATION DAM

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	48.00-HR
(CFS)	(HR)	(CFS)				
187.	14.90		185.	107.	53.	53.
		(INCHES)	.503	1.156	1.156	1.156
		(AC-FT)	92.	211.	211.	211.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	48.00-HR
(AC-FT)	(HR)					
98.	14.93		89.	36.	18.	18.

STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	48.00-HR
EET)	(HR)					

```
'**6.38     14.93              4815.06     4804.38     4800.19     4800.19

                    CUMULATIVE AREA =    3.43 SQ MI


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

          ****************
          *              *
 83 KK    *     RT-4A    *      route CP-3 to sub basin C
          *              *
          ****************

    HYDROGRAPH ROUTING DATA

 84 RD      MUSKINGUM-CUNGE CHANNEL ROUTING
                    L       2085.  CHANNEL LENGTH
                    S       .0240  SLOPE
                    N        .040  CHANNEL ROUGHNESS COEFFICIENT
                   CA         .00  CONTRIBUTING AREA
                SHAPE        TRAP  CHANNEL SHAPE
                   WD       40.00  BOTTOM WIDTH OR DIAMETER
                    Z        3.00  SIDE SLOPE

                                                    ***
                    COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                COMPUTATION TIME STEP
          ELEMENT    ALPHA       M         DT        DX       PEAK    TIME TO     VOLUME    MAXIMUM
                                                                       PEAK                  CELERITY
                                             (MIN)     (FT)     (CFS)   (MIN)       (IN)      (FPS)

            MAIN       .70      1.54       2.00    347.50    187.41   900.00       1.16       5.92

                                    INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

            MAIN       .70      1.54       2.00              187.41   900.00       1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2112E+03 EXCESS= .0000E+00 OUTFLOW= .2113E+03 BASIN STORAGE= .3037E-02 PERCENT ERROR=    .0

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

                    HYDROGRAPH AT STATION    RT-4A

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                          (CFS)
+     187.     15.00                185.        107.         53.         53.
                        (INCHES)     .503       1.156       1.156       1.156
                        (AC-FT)       92.         211.        211.        211.

                    CUMULATIVE AREA =    3.43 SQ MI


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

          ****************
          *              *
     K    *     RT-4B    *      route CP-3 to sub basin C
          *              *
          ****************
```

```
**************

   HYDROGRAPH ROUTING DATA

86 RD        MUSKINGUM-CUNGE CHANNEL ROUTING
                   L       1820.  CHANNEL LENGTH
                   S       .0264  SLOPE
                   N        .050  CHANNEL ROUGHNESS COEFFICIENT
                  CA         .00  CONTRIBUTING AREA
               SHAPE        TRAP  CHANNEL SHAPE
                  WD       50.00  BOTTOM WIDTH OR DIAMETER
                   Z       50.00  SIDE SLOPE

                                                        ***
                          COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                  COMPUTATION TIME STEP
     ELEMENT    ALPHA       M          DT         DX       PEAK    TIME TO     VOLUME    MAXIMUM
                                                                      PEAK                 CELERITY
                                        (MIN)      (FT)     (CFS)    (MIN)       (IN)      (FPS)

      MAIN        .69      1.36        2.00     202.22    187.41   908.00       1.16       3.41

                                  INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

      MAIN        .69      1.36        2.00                187.41   908.00       1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2113E+03 EXCESS= .0000E+00 OUTFLOW= .2113E+03 BASIN STORAGE= .1877E-02 PERCENT ERROR=     .0

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

                  HYDROGRAPH AT STATION    RT-4B

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                  6-HR        24-HR       72-HR      48.00-HR
+   (CFS)       (HR)
                 (CFS)
+     187.     15.10               185.        107.         53.         53.
               (INCHES)            .503       1.156       1.156       1.156
               (AC-FT)              92.         211.        211.        211.

               CUMULATIVE AREA =    3.43 SQ MI

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

          **************
          *            *
87 KK     *          C *      sub basin
          *            *
          **************

   SUBBASIN RUNOFF DATA

88 BA        SUBBASIN CHARACTERISTICS
                  TAREA         .40  SUBBASIN AREA

             PRECIPITATION DATA

89 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
               .48     .87    1.45    1.55    1.63    1.79    2.20    2.62     .00     .00     .00     .00
```

STORM AREA = .00

S SCS LOSS RATE
STRTL .41 INITIAL ABSTRACTION
CRVNBR 83.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

91 UD SCS DIMENSIONLESS UNITGRAPH
TLAG .61 LAG

***

UNIT HYDROGRAPH
93 END-OF-PERIOD ORDINATES

5.	11.	22.	34.	49.	65.	84.	107.	133.	162.
193.	220.	246.	265.	283.	293.	302.	304.	305.	303.
299.	289.	279.	268.	255.	242.	227.	211.	192.	172.
156.	140.	129.	117.	108.	98.	90.	83.	77.	71.
65.	60.	55.	50.	45.	42.	39.	36.	32.	30.
27.	25.	23.	21.	19.	18.	16.	15.	14.	12.
11.	11.	10.	9.	8.	8.	7.	6.	6.	5.
5.	4.	4.	4.	3.	3.	3.	3.	3.	2.
2.	2.	2.	2.	1.	1.	1.	1.	1.	1.
0.	0.	0.							

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

HYDROGRAPH AT STATION C

TOTAL RAINFALL = 2.62, TOTAL LOSS = 1.47, TOTAL EXCESS = 1.15

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	48.00-HR
+ (CFS)	(HR)					
		(CFS)				
89.	12.70		40.	12.	6.	6.
		(INCHES)	.940	1.147	1.147	1.147
		(AC-FT)	20.	24.	24.	24.

CUMULATIVE AREA = .40 SQ MI

*** ***

92 KK CP-4 combine CP-3 with sub basin C

93 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

***

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

HYDROGRAPH AT STATION CP-4

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	48.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 344.	12.80		214.	119.	59.	59.
		(INCHES)	.520	1.155	1.155	1.155
		(AC-FT)	106.	235.	235.	235.

CUMULATIVE AREA = 3.82 SQ MI

```
*. *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
 94 KK    *      RT-5  *      route CP-4 to sub basin D
          *            *
          **************

             HYDROGRAPH ROUTING DATA

 95 RD         MUSKINGUM-CUNGE CHANNEL ROUTING
                        L       3450.  CHANNEL LENGTH
                        S       .0191  SLOPE
                        N        .030  CHANNEL ROUGHNESS COEFFICIENT
                       CA         .00  CONTRIBUTING AREA
                    SHAPE        TRAP  CHANNEL SHAPE
                       WD       50.00  BOTTOM WIDTH OR DIAMETER
                        Z       50.00  SIDE SLOPE

                                                    ***
                                  COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                        COMPUTATION TIME STEP
                    ELEMENT    ALPHA       M         DT        DX       PEAK    TIME TO     VOLUME    MAXIMUM
                                                                                    PEAK                CELERITY
                                                      (MIN)     (FT)     (CFS)    (MIN)       (IN)      (FPS)

                      MAIN        .97      1.36       2.00    313.64    343.11   774.00       1.16      5.18

                                              INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                      MAIN        .97      1.36       2.00              343.11   774.00       1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2355E+03 EXCESS= .0000E+00 OUTFLOW= .2355E+03 BASIN STORAGE= .2727E-02 PERCENT ERROR=    .0

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

                        HYDROGRAPH AT STATION     RT-5

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                    (CFS)
+     343.      12.90                 214.        119.         59.         59.
                  (INCHES)            .520       1.155       1.155       1.155
                   (AC-FT)            106.        235.        235.        235.

                  CUMULATIVE AREA =    3.82 SQ MI

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

          **************
          *            *
 96 KK    *          D *      sub basin
          *            *
          **************

             SUBBASIN RUNOFF DATA
```

```
 98 BA          SUBBASIN CHARACTERISTICS
                     TAREA         .56  SUBBASIN AREA

                PRECIPITATION DATA

 98 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
                  .48     .87    1.45    1.54    1.60    1.74    2.09    2.44     .00     .00     .00     .00

                                                 STORM AREA =      .00

 99 LS          SCS LOSS RATE
                     STRTL         .38  INITIAL ABSTRACTION
                     CRVNBR      84.00  CURVE NUMBER
                     RTIMP         .00  PERCENT IMPERVIOUS AREA

100 UD          SCS DIMENSIONLESS UNITGRAPH
                     TLAG          .59  LAG

                                                  ***

                                                UNIT HYDROGRAPH
                                            90 END-OF-PERIOD ORDINATES
                    7.      16.      33.      52.      74.     100.     129.     166.     205.     250.
                  296.     335.     371.     397.     419.     434.     441.     443.     442.     439.
                  425.     410.     393.     375.     355.     333.     309.     281.     252.     227.
                  203.     186.     169.     155.     141.     129.     119.     110.     101.      92.
                   85.      77.      70.      64.      59.      54.      49.      45.      41.      38.
                   34.      31.      29.      26.      24.      22.      20.      18.      17.      15.
                   14.      13.      12.      11.      10.       9.       8.       8.       7.       6.
                    6.       5.       5.       5.       4.       4.       4.       3.       3.       3.
                    2.       2.       2.       2.       1.       1.       1.       1.       0.       0.

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

                          HYDROGRAPH AT STATION        D

      TOTAL RAINFALL =    2.44, TOTAL LOSS =     1.37, TOTAL EXCESS =     1.07

   PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR     48.00-HR
 +    (CFS)       (HR)
                              (CFS)
 +      270.     12.67                54.          16.           8.           8.
                              (INCHES)  .901        1.070        1.070        1.070
                              (AC-FT)   27.          32.          32.          32.

                          CUMULATIVE AREA =      .56 SQ MI


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


                ****************
                *              *
 101 KK         *      CP-5    *      combine CP-4 with sub basin D
                *              *
                ****************

 102 HC          HYDROGRAPH COMBINATION
                     ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                  ***

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

                          HYDROGRAPH AT STATION      CP-5
```

FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
574.	12.90		259.	135.	67.	67.
		(INCHES)	.549	1.144	1.144	1.144
		(AC-FT)	128.	267.	267.	267.

CUMULATIVE AREA = 4.38 SQ MI

1

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

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	E	481.	13.00	141.	43.	22.	1.29		
ROUTED TO	RT-1A	480.	13.03	141.	43.	22.	1.29		
ROUTED TO	RT-1B	480.	13.03	141.	43.	22.	1.29		
ROUTED TO	RT-1C	480.	13.03	141.	43.	22.	1.29		
ROUTED TO	RT-1E	479.	13.07	141.	43.	22.	1.29		
HYDROGRAPH AT	A	314.	12.90	88.	27.	14.	.85		
HYDROGRAPH AT	F	167.	12.40	26.	8.	4.	.32		
3 COMBINED AT	CP-1	825.	12.93	255.	79.	39.	2.46		
ROUTED TO	RT-2A	824.	12.97	255.	79.	39.	2.46		
ROUTED TO	RT-2B	824.	13.00	255.	79.	39.	2.46		
ROUTED TO	RT-2C	825.	13.03	255.	79.	39.	2.46		
HYDROGRAPH AT	B	327.	12.50	58.	18.	9.	.54		
2 COMBINED AT	CP-2	967.	12.90	310.	96.	48.	3.00		
ROUTED TO	RT-3A	967.	12.93	310.	96.	48.	3.00		
ROUTED TO	RT-3B	967.	12.93	310.	96.	48.	3.00		
ROUTED TO	RT-3C	966.	12.97	310.	96.	48.	3.00		
ROUTED TO	RT-3D	966.	12.97	310.	96.	48.	3.00		
HYDROGRAPH AT									

+		G	164.	12.60	33.	10.	5.	.43	
	2 COMBINED AT								
+		CP-3	1076.	12.90	342.	107.	53.	3.43	
	ROUTED TO								
+		DAM	187.	14.90	185.	107.	53.	3.43	
+									4816.38 14.93
	ROUTED TO								
+		RT-4A	187.	15.00	185.	107.	53.	3.43	
	ROUTED TO								
+		RT-4B	187.	15.10	185.	107.	53.	3.43	
	HYDROGRAPH AT								
+		C	189.	12.70	40.	12.	6.	.40	
	2 COMBINED AT								
+		CP-4	344.	12.80	214.	119.	59.	3.82	
	ROUTED TO								
+		RT-5	343.	12.90	214.	119.	59.	3.82	
	HYDROGRAPH AT								
+		D	270.	12.67	54.	16.	8.	.56	
	2 COMBINED AT								
+		CP-5	574.	12.90	259.	135.	67.	4.38	

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
RT-1A	MANE	1.77	480.56	781.56	1.25	2.00	480.25	782.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8593E+02 EXCESS= .0000E+00 OUTFLOW= .8593E+02 BASIN STORAGE= .7598E-03 PERCENT ERROR= .0

RT-1B	MANE	.66	480.17	781.73	1.25	2.00	480.16	782.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8593E+02 EXCESS= .0000E+00 OUTFLOW= .8593E+02 BASIN STORAGE= .4992E-03 PERCENT ERROR= .0

RT-1C	MANE	.59	480.03	782.53	1.25	2.00	479.95	782.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8594E+02 EXCESS= .0000E+00 OUTFLOW= .8594E+02 BASIN STORAGE= .3685E-03 PERCENT ERROR= .0

RT-1E	MANE	1.53	479.76	783.09	1.25	2.00	479.45	784.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8594E+02 EXCESS= .0000E+00 OUTFLOW= .8594E+02 BASIN STORAGE= .8343E-03 PERCENT ERROR= .0

RT-2A	MANE	.53	824.88	776.80	1.19	2.00	824.43	778.00	1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1560E+03 EXCESS= .0000E+00 OUTFLOW= .1560E+03 BASIN STORAGE= .3522E-03 PERCENT ERROR= .0

RT-2B	MANE	2.00	824.40	780.00	1.19	2.00	824.40	780.00	1.19

UITY SUMMARY (AC-FT) - INFLOW= .1560E+03 EXCESS= .0000E+00 OUTFLOW= .1560E+03 BASIN STORAGE= .2808E-02 PERCENT ERROR= .0

RT-2C	MANE	2.00	824.69	782.00	1.19	2.00	824.69	782.00	1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1560E+03 EXCESS= .0000E+00 OUTFLOW= .1560E+03 BASIN STORAGE= .4205E-02 PERCENT ERROR= .0

RT-3A	MANE	2.00	967.02	776.00	1.19	2.00	967.02	776.00	1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1911E+03 EXCESS= .0000E+00 OUTFLOW= .1911E+03 BASIN STORAGE= .2300E-02 PERCENT ERROR= .0

RT-3B	MANE	1.12	966.86	776.25	1.19	2.00	966.73	776.00	1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1911E+03 EXCESS= .0000E+00 OUTFLOW= .1911E+03 BASIN STORAGE= .7437E-03 PERCENT ERROR= .0

RT-3C	MANE	1.05	966.49	777.15	1.19	2.00	966.38	778.00	1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1911E+03 EXCESS= .0000E+00 OUTFLOW= .1911E+03 BASIN STORAGE= .7406E-03 PERCENT ERROR= .0

RT-3D	MANE	1.92	966.22	777.86	1.19	2.00	966.21	778.00	1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1911E+03 EXCESS= .0000E+00 OUTFLOW= .1911E+03 BASIN STORAGE= .1442E-02 PERCENT ERROR= .0

RT-4A	MANE	2.00	187.41	900.00	1.16	2.00	187.41	900.00	1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2112E+03 EXCESS= .0000E+00 OUTFLOW= .2113E+03 BASIN STORAGE= .3037E-02 PERCENT ERROR= .0

RT-4B	MANE	2.00	187.41	908.00	1.16	2.00	187.41	908.00	1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2113E+03 EXCESS= .0000E+00 OUTFLOW= .2113E+03 BASIN STORAGE= .1877E-02 PERCENT ERROR= .0

RT-5	MANE	2.00	343.11	774.00	1.16	2.00	343.11	774.00	1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2355E+03 EXCESS= .0000E+00 OUTFLOW= .2355E+03 BASIN STORAGE= .2727E-02 PERCENT ERROR= .0

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

REPLACES APPENDIX C - Proposed Conditions HEC-1 Models

NOAA Atlas 2 Rainfall
No Dam

September 01, 2000

```
1*  ****************************************
    *                                      *
    *  _OOD HYDROGRAPH PACKAGE  (HEC-1)    *
    *            JUN  1998                 *
    *          VERSION 4.1                 *
    *                                      *
    *  RUN DATE   30AUG00  TIME  10:10:41  *
    *                                      *
    ****************************************
```


```
    ****************************************
    *                                      *
    *   U.S. ARMY CORPS OF ENGINEERS       *
    *   HYDROLOGIC ENGINEERING CENTER      *
    *        609 SECOND STREET             *
    *      DAVIS, CALIFORNIA 95616         *
    *          (916) 756-1104              *
    *                                      *
    ****************************************
```


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

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

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


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

              *DIAGRAM
    1         ID   ===========================================================================
    2         ID   EVANS CREEK 100-YEAR 24 HOUR MODEL WITHOUT PROPOSED DAM      FUTURE
    3         ID                                                               CONDITIONS
    4         ID       - NOAA ATLAS 2 RAINFALL USED
    5         ID       - CURVE NUMBERS BASED ON FIELD INVESTIGATION AND CITY OF RENO LAND
    6         ID         DESIGNATIONS
    7         ID       - LAG TIMES BASED ON PROCEDURES IN WCHCDDM
    8         ID
    9         ID   FILE:  EVN02WOR.DAT
   10         ID   BY:  BAJ                                                    WRC NEVADA, INC.
   11         ID   DATE:  AUGUST 2000                                         RENO, NEVADA
   12         ID   ===========================================================================
   13         IT       2              0    1441
   14         IO       3
              *
   15         KK       E sub basin
   16         BA   1.291
   17         PH            .001    0.34    0.67    1.18    1.34    1.47    1.73    2.24    2.75
   18         LS              92
   19         UD    0.90
              *
   20         KK   RT-1A route sub basin E to sub basin A
   21         RD    1050  0.0133   0.030           TRAP      10       3
              *
   22         KK   RT-1B route sub basin E to sub basin A
   23         RD     430  0.0233   0.030           TRAP      30       2
              *
   24         KK   RT-1C route sub basin E to sub basin A
```

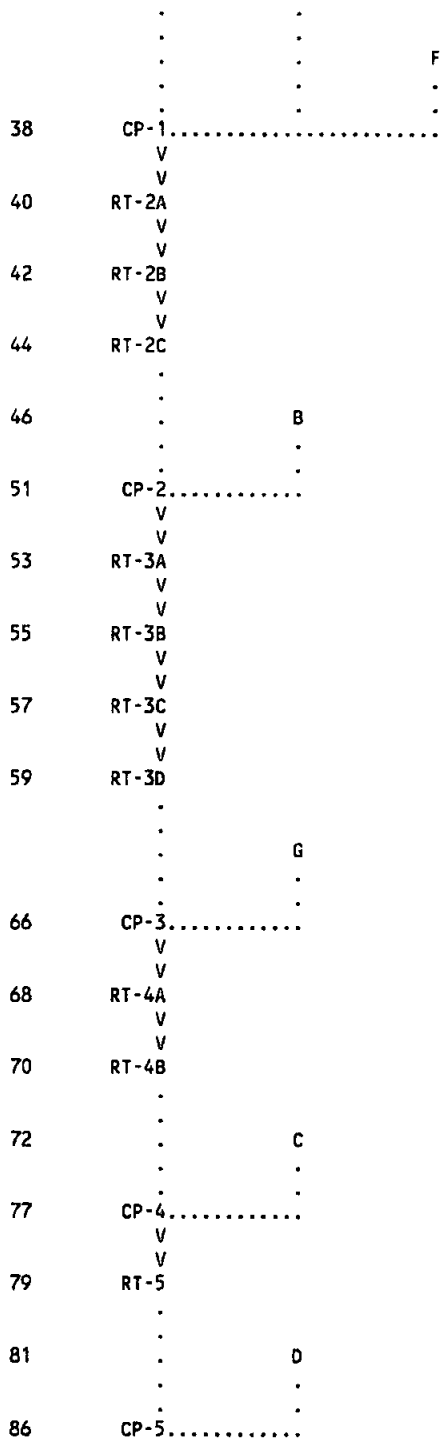
```
25          RD     335  0.0119   0.030            TRAP      20       2
            *
            *  RT-1D route sub basin E to sub basin A
            *    240  0.0750   0.013            TRAP       6       2
            *

26          KK   RT-1E route sub basin E to sub basin A
27          RD    1005  0.0299   0.035            TRAP      20       3
            *

28          KK       A sub basin
29          BA   0.854
30          PH            .001    0.35    0.68    1.19    1.36    1.49    1.76    2.29    2.82
31          LS              85
32          UD    0.79
            *
1                                      HEC-1 INPUT                                          PAGE  2

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

33          KK       F sub basin
34          BA   0.317
35          PH            .001    0.35    0.68    1.19    1.36    1.49    1.76    2.29    2.82
36          LS              87
37          UD     .30
            *

38          KK    CP-1 combine sub basins A, E, and F
39          HC       3
            *

40          KK   RT-2A route CP-1 to sub basin B
41          RD     410  0.0293   0.035            TRAP      20       3
            *

42          KK   RT-2B route CP-1 to sub basin B
43          RD    1140  0.0123   0.045            TRAP      50       3
            *

44          KK   RT-2C route CP-1 to sub basin B
45          RD    2070  0.0251   0.040            TRAP      50       3
            *

46          KK       B sub basin
47          BA   0.538
48          PH            .001    0.35    0.68    1.20    1.37    1.50    1.76    2.29    2.81
49          LS              89
50          UD     .42
            *

51          KK    CP-2 combine CP-1 with sub basin B
52          HC       2
            *

53          KK   RT-3A route CP-2 to sub basin G
54          RD    1640  0.0232   0.030            TRAP      50       3
            *

55          KK   RT-3B route CP-2 to sub basin G
56          RD     780  0.0179   0.035            TRAP      20       3
            *

57          KK   RT-3C route CP-2 to sub basin G
58          RD     655  0.0214   0.045            TRAP      20       3
            *

59          KK   RT-3D route CP-2 to sub basin G
60          RD    1555  0.0283   0.035            TRAP      20       3
            *
1                                      HEC-1 INPUT                                          PAGE  3
```

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

  61          KK       G sub basin
  62          BA   0.426
  63          PH            .001    0.35    0.69    1.21    1.38    1.51    1.78    2.30    2.81
  64          LS              85
  65          UD     .43
              *

  66          KK    CP-3 combine CP-2 with sub basin G
  67          HC       2
              *

  68          KK   RT-4A route CP-3 to sub basin C
  69          RD    2085  0.0240   0.040            TRAP      40       3
              *

  70          KK   RT-4B route CP-3 to sub basin C
  71          RD    1820  0.0264   0.050            TRAP      50      50
              *

  72          KK       C sub basin
  73          BA   0.396
  74          PH            .001    0.35    0.69    1.21    1.37    1.50    1.77    2.28    2.79
  75          LS              86
  76          UD     .57
              *

  77          KK    CP-4 combine CP-3 with sub basin C
  78          HC       2
              *

  79          KK    RT-5 route CP-4 to sub basin D
  80          RD    3450  0.0191   0.030            TRAP      50      50
              *

  81          KK       D sub basin
  82          BA   0.557
  83          PH            .001    0.35    0.68    1.20    1.37    1.49    1.75    2.26    2.76
  84          LS              84
  85          UD    0.59
              *

  86          KK    CP-5 combine CP-4 with sub basin D
  87          HC       2
              *
  88          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

  15          E
              V
              V
  20       RT-1A
              V
              V
  22       RT-1B
              V
              V
  24       RT-1C
              V
              V
  26       RT-1E
              .
              .
              .          A
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
**********************************************
*                                            *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)        *
*             JUN  1998                      *
*          VERSION 4.1                       *
*                                            *
*     DATE   30AUG00  TIME  10:10:41         *
*                                            *
**********************************************
```

```
**********************************************
*                                            *
*    U.S. ARMY CORPS OF ENGINEERS            *
*    HYDROLOGIC ENGINEERING CENTER           *
*         609 SECOND STREET                  *
*       DAVIS, CALIFORNIA 95616              *
*           (916) 756-1104                   *
*                                            *
**********************************************
```

```
                    ================================================================================
                    EVANS CREEK 100-YEAR 24 HOUR MODEL WITHOUT PROPOSED DAM      FUTURE
                                                                                 CONDITIONS
                        - NOAA ATLAS 2 RAINFALL USED
                        - CURVE NUMBERS BASED ON FIELD INVESTIGATION AND CITY OF RENO LAND
                          DESIGNATIONS
                        - LAG TIMES BASED ON PROCEDURES IN WCHCDDM

                    FILE:  EVN02WOR.DAT
                    BY:  BAJ                                                     WRC NEVADA, INC.
                    DATE:  AUGUST 2000                                           RENO, NEVADA
                    ================================================================================

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

   IT          HYDROGRAPH TIME DATA
                     NMIN          2  MINUTES IN COMPUTATION INTERVAL
                     IDATE     1   0  STARTING DATE
                     ITIME       0000  STARTING TIME
                       NQ        1441  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE     3   0  ENDING DATE
                    NDTIME       0000  ENDING TIME
                    ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL      .03 HOURS
                      TOTAL TIME BASE    48.00 HOURS

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


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


          **************
          *            *
15 KK     *          E *      sub basin
          *            *
          **************

             SUBBASIN RUNOFF DATA

16 BA          SUBBASIN CHARACTERISTICS
                     TAREA        1.29  SUBBASIN AREA

               PRECIPITATION DATA

17 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
                 .34     .67    1.18    1.34    1.47    1.73    2.24    2.75     .00     .00     .00     .00

                                                 STORM AREA =     .00

   `S          SCS LOSS RATE
                     STRTL          .17  INITIAL ABSTRACTION
                    CRVNBR        92.00  CURVE NUMBER
```

RTIMP .00 PERCENT IMPERVIOUS AREA

JD SCS DIMENSIONLESS UNITGRAPH
TLAG .90 LAG

***

UNIT HYDROGRAPH
137 END-OF-PERIOD ORDINATES

7.	15.	25.	42.	59.	79.	101.	124.	152.	181.
211.	250.	290.	332.	379.	426.	469.	508.	548.	578.
606.	633.	648.	662.	674.	677.	679.	679.	677.	674.
662.	648.	633.	615.	598.	580.	560.	541.	518.	494.
469.	440.	411.	381.	356.	332.	309.	291.	274.	258.
243.	228.	215.	203.	190.	181.	172.	163.	154.	145.
137.	130.	122.	115.	107.	100.	95.	90.	85.	80.
75.	71.	67.	64.	60.	56.	52.	50.	47.	44.
42.	39.	36.	35.	33.	31.	29.	27.	26.	24.
23.	22.	20.	19.	18.	17.	16.	15.	14.	14.
13.	12.	11.	11.	10.	9.	9.	8.	8.	7.
7.	7.	7.	6.	6.	6.	5.	5.	5.	5.
4.	4.	4.	3.	3.	3.	3.	2.	2.	2.
2.	1.	1.	1.	1.	0.	0.			

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

HYDROGRAPH AT STATION E

TOTAL RAINFALL = 2.75, TOTAL LOSS = .82, TOTAL EXCESS = 1.93

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	48.00-HR
+	(CFS)	(HR)				
			(CFS)			
+	626.	12.97	196.	67.	33.	33.
			(INCHES) 1.414	1.926	1.926	1.926
			(AC-FT) 97.	133.	133.	133.

CUMULATIVE AREA = 1.29 SQ MI

*** ***

```
**************
*            *
*     RT-1A  *
*            *
**************
```

20 KK route sub basin E to sub basin A

HYDROGRAPH ROUTING DATA

21 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	1050.	CHANNEL LENGTH
S	.0133	SLOPE
N	.030	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	10.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.59	1.42	1.64	525.00	625.47	778.89	1.93	10.67

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.59	1.42	2.00	625.04	780.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .7095E-03 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-1A

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	48.00-HR
(CFS)	(HR)				
		(CFS)			
625.	13.00	196.	67.	33.	33.
		(INCHES) 1.414	1.926	1.926	1.926
		(AC-FT) 97.	133.	133.	133.

CUMULATIVE AREA = 1.29 SQ MI

*** ***

```
**************
*            *
*     RT-1B  *
*            *
**************
```

22 KK route sub basin E to sub basin A

HYDROGRAPH ROUTING DATA

23 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	430.	CHANNEL LENGTH
S	.0233	SLOPE
N	.030	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	30.00	BOTTOM WIDTH OR DIAMETER
Z	2.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS

			COMPUTATION TIME STEP					
ELEMENT	ALPHA	M	DT	DX	PEAK	TIME TO PEAK	VOLUME	MAXIMUM CELERITY
			(MIN)	(FT)	(CFS)	(MIN)	(IN)	(FPS)
MAIN	1.06	1.54	.60	215.00	625.07	779.09	1.93	11.99

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.06	1.54	2.00	624.99	780.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .4836E-03 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-1B

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
		(CFS)				
625.	13.00		196.	67.	33.	33.
		(INCHES)	1.414	1.926	1.926	1.926
		(AC-FT)	97.	133.	133.	133.

CUMULATIVE AREA = 1.29 SQ MI

*** ***

```
**************
*            *
*     RT-1C  *
*            *
**************
```

24 KK route sub basin E to sub basin A

HYDROGRAPH ROUTING DATA

25 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	335.	CHANNEL LENGTH
S	.0119	SLOPE
N	.030	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	20.00	BOTTOM WIDTH OR DIAMETER
Z	2.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.00	1.51	.54	167.50	624.86	780.41	1.93	10.36
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	1.00	1.51	2.00		624.84	780.00	1.93	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .3866E-03 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-1C

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
		(CFS)				
625.	13.00		196.	67.	33.	33.
		(INCHES)	1.414	1.926	1.926	1.926
		(AC-FT)	97.	133.	133.	133.

CUMULATIVE AREA = 1.29 SQ MI

*** ***

```
          **************
          *            *
26 KK     *     RT-1E  *      route sub basin E to sub basin A
          *            *
          **************

             HYDROGRAPH ROUTING DATA

27 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                         L       1005.  CHANNEL LENGTH
                         S       .0299  SLOPE
                         N        .035  CHANNEL ROUGHNESS COEFFICIENT
                        CA         .00  CONTRIBUTING AREA
                     SHAPE        TRAP  CHANNEL SHAPE
                        WD       20.00  BOTTOM WIDTH OR DIAMETER
                         Z        3.00  SIDE SLOPE

                                                    ***
                                 COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                          COMPUTATION TIME STEP
                    ELEMENT    ALPHA       M          DT        DX       PEAK    TIME TO     VOLUME    MAXIMUM
                                                                                      PEAK                CELERITY
                                                                (MIN)      (FT)     (CFS)     (MIN)       (IN)      (FPS)

                      MAIN       1.43      1.48       1.40    502.50    624.64    780.99       1.93      11.95

                                                 INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                      MAIN       1.43      1.48       2.00              624.30    780.00       1.93

    NUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .9066E-03 PERCENT ERROR=     .0


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

                        HYDROGRAPH AT STATION    RT-1E

 PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR       24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                    (CFS)
+    624.     13.00                      196.         67.         33.         33.
                  (INCHES)               1.414       1.926       1.926       1.926
                   (AC-FT)                97.         133.        133.        133.

                   CUMULATIVE AREA =    1.29 SQ MI


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


          **************
          *            *
28 KK     *         A  *      sub basin
          *            *
          **************

             SUBBASIN RUNOFF DATA

29 BA          SUBBASIN CHARACTERISTICS
                    TAREA         .85  SUBBASIN AREA

               PRECIPITATION DATA
```

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
.35	.68	1.19	1.36	1.49	1.76	2.29	2.82	.00	.00	.00	.00

STORM AREA = .00

31 LS SCS LOSS RATE

STRTL	.35	INITIAL ABSTRACTION
CRVNBR	85.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

32 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.79	LAG

***

UNIT HYDROGRAPH
120 END-OF-PERIOD ORDINATES

6.	13.	24.	39.	54.	73.	92.	116.	141.	169.
203.	237.	277.	317.	354.	388.	421.	444.	467.	484.
496.	507.	509.	511.	510.	508.	501.	489.	476.	461.
447.	431.	414.	396.	375.	354.	330.	305.	280.	259.
238.	223.	208.	194.	181.	169.	158.	147.	139.	131.
123.	115.	108.	101.	95.	88.	82.	76.	71.	67.
63.	59.	54.	51.	48.	45.	42.	39.	36.	34.
32.	30.	27.	26.	24.	23.	21.	20.	19.	17.
16.	15.	14.	13.	13.	12.	11.	10.	10.	9.
8.	8.	7.	7.	6.	6.	6.	5.	5.	5.
5.	4.	4.	4.	4.	3.	3.	3.	3.	2.
2.	2.	2.	1.	1.	1.	1.	1.	0.	0.

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

HYDROGRAPH AT STATION A

.OTAL RAINFALL = 2.82, TOTAL LOSS = 1.38, TOTAL EXCESS = 1.44

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	48.00-HR
+	(CFS)	(HR)					
			(CFS)				
+	335.	12.87		100.	33.	17.	17.
			(INCHES)	1.087	1.438	1.438	1.438
			(AC-FT)	50.	66.	66.	66.

CUMULATIVE AREA = .85 SQ MI

*** ***

33 KK

```
**************
*            *
*          F *
*            *
**************
```

sub basin

SUBBASIN RUNOFF DATA

34 BA SUBBASIN CHARACTERISTICS

TAREA	.32	SUBBASIN AREA

PRECIPITATION DATA

35 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
.35	.68	1.19	1.36	1.49	1.76	2.29	2.82	.00	.00	.00	.00

```
                                        STORM AREA =     .00

   _S          SCS LOSS RATE
                    STRTL        .30  INITIAL ABSTRACTION
                   CRVNBR      87.00  CURVE NUMBER
                    RTIMP        .00  PERCENT IMPERVIOUS AREA

37 UD          SCS DIMENSIONLESS UNITGRAPH
                    TLAG        .30  LAG

                                                ***

                                              UNIT HYDROGRAPH
                                          47 END-OF-PERIOD ORDINATES
            16.      53.     101.     166.     252.     344.     417.     463.     482.     482.
           463.     429.     390.     342.     283.     230.     192.     161.     136.     117.
            99.      83.      69.      59.      50.      42.      35.      29.      25.      21.
            18.      15.      13.      11.       9.       7.       6.       5.       5.       4.
             3.       3.       2.       2.       1.       1.       0.

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

                      HYDROGRAPH AT STATION       F

   TOTAL RAINFALL =    2.82, TOTAL LOSS =    1.24, TOTAL EXCESS =    1.58

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     48.00-HR
+  (CFS)       (HR)
                        (CFS)
+    253.     12.33                 41.         13.          7.          7.
                       (INCHES)    1.197       1.583       1.583       1.583
                       (AC-FT)      20.         27.         27.         27.

                      CUMULATIVE AREA =     .32 SQ MI


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


          **************
          *            *
38 KK     *      CP-1  *      combine sub basins A, E, and F
          *            *
          **************

39 HC          HYDROGRAPH COMBINATION
                    ICOMP           3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                ***

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

                      HYDROGRAPH AT STATION     CP-1

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     48.00-HR
+  (CFS)       (HR)
                        (CFS)
+   1012.     12.90                337.        113.         57.         57.
                       (INCHES)    1.271       1.713       1.713       1.713
                       (AC-FT)      167.        225.        225.        225.

                      CUMULATIVE AREA =    2.46 SQ MI


** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
```

```
          ***************
          *             *
  . KK    *     RT-2A   *      route CP-1 to sub basin B
          *             *
          ***************

             HYDROGRAPH ROUTING DATA

 41 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                         L       410.  CHANNEL LENGTH
                         S      .0293  SLOPE
                         N       .035  CHANNEL ROUGHNESS COEFFICIENT
                        CA        .00  CONTRIBUTING AREA
                     SHAPE       TRAP  CHANNEL SHAPE
                        WD      20.00  BOTTOM WIDTH OR DIAMETER
                         Z       3.00  SIDE SLOPE

                                                    ***
                              COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                    COMPUTATION TIME STEP
                 ELEMENT    ALPHA       M         DT        DX       PEAK    TIME TO      VOLUME    MAXIMUM
                                                                              PEAK                    CELERITY
                                                    (MIN)     (FT)     (CFS)   (MIN)        (IN)      (FPS)

                   MAIN      1.41      1.48         .49    205.00   1011.89   774.66        1.71      13.86

                                          INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                   MAIN      1.41      1.48        2.00              1011.42   774.00        1.71

 '  'NUITY SUMMARY (AC-FT) - INFLOW= .2249E+03 EXCESS= .0000E+00 OUTFLOW= .2249E+03 BASIN STORAGE= .3533E-03 PERCENT ERROR=     .0

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

                        HYDROGRAPH AT STATION    RT-2A

   PEAK FLOW     TIME                              MAXIMUM AVERAGE FLOW
                                          6-HR       24-HR       72-HR     48.00-HR
 +    (CFS)       (HR)
                  (CFS)
 +    1011.     12.90                     337.        113.         57.         57.
                (INCHES)                 1.271       1.713       1.713       1.713
                 (AC-FT)                   167.        225.        225.        225.

                CUMULATIVE AREA =    2.46 SQ MI


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


          ***************
          *             *
  42 KK   *     RT-2B   *      route CP-1 to sub basin B
          *             *
          ***************

             HYDROGRAPH ROUTING DATA

 43 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                         L      1140.  CHANNEL LENGTH
                         S      .0123  SLOPE
                         N       .045  CHANNEL ROUGHNESS COEFFICIENT
                        CA        .00  CONTRIBUTING AREA
```

```
                       SHAPE        TRAP  CHANNEL SHAPE
                          WD       50.00  BOTTOM WIDTH OR DIAMETER
                           Z        3.00  SIDE SLOPE

                                                                  ***
                                      COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                             COMPUTATION TIME STEP
                    ELEMENT    ALPHA       M          DT        DX       PEAK    TIME TO      VOLUME     MAXIMUM
                                                                                   PEAK                  CELERITY
                                                     (MIN)      (FT)     (CFS)     (MIN)        (IN)       (FPS)

                      MAIN        .37     1.55        2.00    570.00   1011.24    776.00        1.71        7.60


                                            INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                      MAIN        .37     1.55        2.00             1011.24    776.00        1.71


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .2249E+03 EXCESS= .0000E+00 OUTFLOW= .2249E+03 BASIN STORAGE= .2648E-02 PERCENT ERROR=     .0


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

                            HYDROGRAPH AT STATION    RT-2B

   PEAK FLOW     TIME                            MAXIMUM AVERAGE FLOW
                                        6-HR         24-HR        72-HR       48.00-HR
+    (CFS)       (HR)
                             (CFS)
+    1011.       12.93                  337.          113.          57.           57.
                           (INCHES)    1.271         1.713        1.713         1.713
                            (AC-FT)     167.          225.         225.          225.

                           CUMULATIVE AREA =    2.46 SQ MI



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


              ***************
              *             *
   44 KK      *    RT-2C    *     route CP-1 to sub basin B
              *             *
              ***************

                HYDROGRAPH ROUTING DATA

   45 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                           L       2070.  CHANNEL LENGTH
                           S       .0251  SLOPE
                           N        .040  CHANNEL ROUGHNESS COEFFICIENT
                          CA         .00  CONTRIBUTING AREA
                       SHAPE        TRAP  CHANNEL SHAPE
                          WD       50.00  BOTTOM WIDTH OR DIAMETER
                           Z        3.00  SIDE SLOPE

                                                                  ***
                                      COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                             COMPUTATION TIME STEP
                    ELEMENT    ALPHA       M          DT        DX       PEAK    TIME TO      VOLUME     MAXIMUM
                                                                                   PEAK                  CELERITY
                                                     (MIN)      (FT)     (CFS)     (MIN)        (IN)       (FPS)

                      MAIN        .60     1.55        2.00    690.00   1011.38    780.00        1.71       10.31
```

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.60	1.55	2.00	1011.38	780.00	1.71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2249E+03 EXCESS= .0000E+00 OUTFLOW= .2249E+03 BASIN STORAGE= .3414E-02 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-2C

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	48.00-HR
+ (CFS)	(HR)				
		(CFS)			
+ 1011.	13.00	337.	113.	57.	57.
		(INCHES) 1.271	1.713	1.713	1.713
		(AC-FT) 167.	225.	225.	225.

CUMULATIVE AREA = 2.46 SQ MI

*** ***

46 KK B sub basin

SUBBASIN RUNOFF DATA

47 BA SUBBASIN CHARACTERISTICS
TAREA .54 SUBBASIN AREA

PRECIPITATION DATA

48 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
.35	.68	1.20	1.37	1.50	1.76	2.29	2.81	.00	.00	.00	.00

STORM AREA = .00

49 LS SCS LOSS RATE
STRTL .25 INITIAL ABSTRACTION
CRVNBR 89.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

50 UD SCS DIMENSIONLESS UNITGRAPH
TLAG .42 LAG

***

UNIT HYDROGRAPH
65 END-OF-PERIOD ORDINATES

14.	40.	75.	117.	171.	240.	319.	403.	476.	530.
568.	590.	595.	591.	573.	545.	513.	477.	434.	386.
332.	286.	251.	221.	194.	171.	153.	137.	121.	107.
93.	82.	73.	64.	57.	50.	44.	39.	34.	30.
27.	24.	21.	19.	16.	15.	13.	11.	10.	9.
8.	7.	6.	6.	5.	5.	4.	3.	3.	2.
2.	2.	1.	1.	0.					

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

HYDROGRAPH AT STATION B

JTAL RAINFALL = 2.81, TOTAL LOSS = 1.08, TOTAL EXCESS = 1.73

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 389.	12.47		75.	25.	13.	13.
		(INCHES)	1.299	1.729	1.729	1.729
		(AC-FT)	37.	50.	50.	50.

CUMULATIVE AREA = .54 SQ MI

*** ***

```
          **************
          *            *
51 KK     *      CP-2  *      combine CP-1 with sub basin B
          *            *
          **************
```

52 HC HYDROGRAPH COMBINATION

ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

***

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

HYDROGRAPH AT STATION CP-2

FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1195.	12.83		411.	138.	69.	69.
		(INCHES)	1.274	1.716	1.716	1.716
		(AC-FT)	204.	275.	275.	275.

CUMULATIVE AREA = 3.00 SQ MI

*** ***

```
          **************
          *            *
53 KK     *     RT-3A  *      route CP-2 to sub basin G
          *            *
          **************
```

HYDROGRAPH ROUTING DATA

54 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	1640.	CHANNEL LENGTH
S	.0232	SLOPE
N	.030	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	50.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS

COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.77	1.55	2.00	820.00	1195.29	772.00	1.72	12.84

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.77	1.55	2.00		1195.29	772.00	1.72	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2745E+03 EXCESS= .0000E+00 OUTFLOW= .2745E+03 BASIN STORAGE= .2517E-02 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-3A

	PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
+	1195.	12.87	(CFS)	411.	138.	69.	69.
			(INCHES)	1.274	1.716	1.716	1.716
			(AC-FT)	204.	275.	275.	275.

CUMULATIVE AREA = 3.00 SQ MI

** ***

```
55 KK     ***************
          *             *
          *     RT-3B   *      route CP-2 to sub basin G
          *             *
          ***************
```

HYDROGRAPH ROUTING DATA

```
56 RD     MUSKINGUM-CUNGE CHANNEL ROUTING
                L       780.  CHANNEL LENGTH
                S      .0179  SLOPE
                N       .035  CHANNEL ROUGHNESS COEFFICIENT
               CA        .00  CONTRIBUTING AREA
            SHAPE       TRAP  CHANNEL SHAPE
               BD      20.00  BOTTOM WIDTH OR DIAMETER
                Z       3.00  SIDE SLOPE
```

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.10	1.48	1.05	390.00	1195.09	772.31	1.72	12.37

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.10	1.48	2.00		1194.91	772.00	1.72	

.NUITY SUMMARY (AC-FT) - INFLOW= .2745E+03 EXCESS= .0000E+00 OUTFLOW= .2745E+03 BASIN STORAGE= .7846E-03 PERCENT ERROR= .0

```
     ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION    RT-3B

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR     48.00-HR
+   (CFS)       (HR)
                          (CFS)
+    1195.      12.87                411.         138.          69.          69.
                         (INCHES)     1.274        1.716        1.716        1.716
                         (AC-FT)      204.         275.         275.         275.

                        CUMULATIVE AREA =    3.00 SQ MI


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


            **************
            *            *
  57 KK     *     RT-3C  *      route CP-2 to sub basin G
            *            *
            **************

               HYDROGRAPH ROUTING DATA

  58 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                          L       655.  CHANNEL LENGTH
                          S      .0214  SLOPE
                          N       .045  CHANNEL ROUGHNESS COEFFICIENT
                         CA        .00  CONTRIBUTING AREA
                      SHAPE       TRAP  CHANNEL SHAPE
                         WD      20.00  BOTTOM WIDTH OR DIAMETER
                          Z       3.00  SIDE SLOPE

                                                    ***
                                 COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                          COMPUTATION TIME STEP
                      ELEMENT    ALPHA       M          DT         DX       PEAK     TIME TO      VOLUME     MAXIMUM
                                                                                        PEAK                    CELERITY
                                                                (MIN)      (FT)     (CFS)     (MIN)       (IN)      (FPS)

                        MAIN        .94      1.48         .98     327.50   1194.73    773.14       1.72      11.08


                                          INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                        MAIN        .94      1.48        2.00              1194.63    774.00       1.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2745E+03 EXCESS= .0000E+00 OUTFLOW= .2745E+03 BASIN STORAGE= .8545E-03 PERCENT ERROR=     .0


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

                        HYDROGRAPH AT STATION    RT-3C

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR     48.00-HR
+   (CFS)       (HR)
                          (CFS)
+    1195.      12.90                411.         138.          69.          69.
                         (INCHES)     1.274        1.716        1.716        1.716
                         (AC-FT)      204.         274.         274.         274.
```

CUMULATIVE AREA = 3.00 SQ MI

*** ***

59 KK RT-3D route CP-2 to sub basin G

HYDROGRAPH ROUTING DATA

60 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	1555.	CHANNEL LENGTH
S	.0283	SLOPE
N	.035	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
BD	20.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.39	1.48	1.79	777.50	1194.40	774.95	1.72	14.45
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	1.39	1.48	2.00		1193.94	774.00	1.72	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2745E+03 EXCESS= .0000E+00 OUTFLOW= .2745E+03 BASIN STORAGE= .1586E-02 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-3D

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
		(CFS)				
1194.	12.90		411.	138.	69.	69.
		(INCHES)	1.274	1.716	1.716	1.716
		(AC-FT)	204.	274.	274.	274.

CUMULATIVE AREA = 3.00 SQ MI

*** ***

61 KK G sub basin

```
              SUBBASIN RUNOFF DATA

       3A       SUBBASIN CHARACTERISTICS
                      TAREA          .43  SUBBASIN AREA

                PRECIPITATION DATA

     63 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
                  .35     .69    1.21    1.38    1.51    1.78    2.30    2.81     .00     .00     .00     .00

                                                     STORM AREA =      .00

     64 LS      SCS LOSS RATE
                      STRTL          .35  INITIAL ABSTRACTION
                     CRVNBR        85.00  CURVE NUMBER
                      RTIMP          .00  PERCENT IMPERVIOUS AREA

     65 UD      SCS DIMENSIONLESS UNITGRAPH
                       TLAG          .43  LAG

                                                                    ***

                                                             UNIT HYDROGRAPH
                                                        66 END-OF-PERIOD ORDINATES
               10.        30.        56.        87.       128.       178.       236.       301.       357.       401.
              434.       455.       459.       459.       451.       430.       406.       380.       351.       317.
              276.       239.       207.       183.       162.       143.       126.       114.       101.        90.
               80.        69.        62.        55.        48.        43.        38.        34.        30.        26.
               23.        21.        18.        16.        14.        13.        11.        10.         9.         8.
                7.         6.         5.         5.         4.         4.         4.         3.         3.         2.
                2.         2.         1.         1.         1.         0.

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

                         HYDROGRAPH AT STATION         G

       TOTAL RAINFALL =    2.81, TOTAL LOSS =    1.38, TOTAL EXCESS =    1.43

     PEAK FLOW      TIME                             MAXIMUM AVERAGE FLOW
                                             6-HR        24-HR        72-HR      48.00-HR
 +     (CFS)        (HR)
                                 (CFS)
 +      253.       12.50                      50.          16.           8.            8.
                              (INCHES)      1.101        1.430        1.430         1.430
                               (AC-FT)        25.          32.          32.           32.

                              CUMULATIVE AREA =     .43 SQ MI


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

            ***************
            *             *
     66 KK  *      CP-3   *      combine CP-2 with sub basin G
            *             *
            ***************

     67 HC      HYDROGRAPH COMBINATION
                      ICOMP            2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                    ***

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

                         HYDROGRAPH AT STATION      CP-3
```

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
+ 1349.	12.73	(CFS)	461.	155.	77.	77.
		(INCHES)	1.251	1.680	1.680	1.680
		(AC-FT)	229.	307.	307.	307.

CUMULATIVE AREA = 3.43 SQ MI

*** ***

68 KK — RT-4A — route CP-3 to sub basin C

HYDROGRAPH ROUTING DATA

69 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	2085.	CHANNEL LENGTH
S	.0240	SLOPE
N	.040	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
W	40.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.70	1.54	2.00	695.00	1348.96	766.00	1.68	11.79
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.70	1.54	2.00		1348.96	766.00	1.68	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3070E+03 EXCESS= .0000E+00 OUTFLOW= .3070E+03 BASIN STORAGE= .3453E-02 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-4A

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
+ 1349.	12.77	(CFS)	461.	155.	77.	77.
		(INCHES)	1.251	1.680	1.680	1.680
		(AC-FT)	229.	307.	307.	307.

CUMULATIVE AREA = 3.43 SQ MI

*** ***

```
          **************
          *            *
,J KK     *     RT-4B  *      route CP-3 to sub basin C
          *            *
          **************

             HYDROGRAPH ROUTING DATA

71 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                        L       1820.  CHANNEL LENGTH
                        S       .0264  SLOPE
                        N        .050  CHANNEL ROUGHNESS COEFFICIENT
                       CA         .00  CONTRIBUTING AREA
                    SHAPE        TRAP  CHANNEL SHAPE
                       WD       50.00  BOTTOM WIDTH OR DIAMETER
                        Z       50.00  SIDE SLOPE

                                                    ***
                                  COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                          COMPUTATION TIME STEP
                    ELEMENT    ALPHA       M          DT         DX       PEAK     TIME TO      VOLUME     MAXIMUM
                                                                                      PEAK                    CELERITY
                                                        (MIN)      (FT)     (CFS)    (MIN)        (IN)       (FPS)

                      MAIN        .69      1.36        2.00     364.00   1348.89    772.00        1.68        5.75

                                                 INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                      MAIN        .69      1.36        2.00              1348.89    772.00        1.68

 'NUITY SUMMARY (AC-FT) - INFLOW= .3070E+03 EXCESS= .0000E+00 OUTFLOW= .3070E+03 BASIN STORAGE= .2120E-02 PERCENT ERROR=     .0


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

                        HYDROGRAPH AT STATION    RT-4B

 PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR       24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                          (CFS)
+    1349.     12.87                      461.        155.         77.         77.
                        (INCHES)         1.251       1.680       1.680       1.680
                         (AC-FT)          229.        307.        307.        307.

                        CUMULATIVE AREA =    3.43 SQ MI


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


          **************
          *            *
 72 KK    *         C  *      sub basin
          *            *
          **************

             SUBBASIN RUNOFF DATA

 73 BA         SUBBASIN CHARACTERISTICS
                     TAREA         .40  SUBBASIN AREA

               PRECIPITATION DATA
```

```
 74 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
                   .35     .69    1.21    1.37    1.50    1.77    2.28    2.79      .00     .00     .00     .00

                                                    STORM AREA =      .00

 75 LS           SCS LOSS RATE
                      STRTL         .33  INITIAL ABSTRACTION
                     CRVNBR       86.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

 76 UD           SCS DIMENSIONLESS UNITGRAPH
                      TLAG          .57  LAG

                                                             ***

                                                        UNIT HYDROGRAPH
                                                   87 END-OF-PERIOD ORDINATES
                6.       13.       26.       41.       57.       78.      100.      130.      160.      196.
              228.      258.      281.      302.      314.      323.      325.      325.      324.      316.
              305.      292.      279.      264.      248.      229.      208.      186.      167.      149.
              136.      124.      113.      102.       93.       86.       79.       72.       66.       60.
               55.       49.       45.       41.       38.       34.       31.       29.       26.       24.
               22.       20.       18.       16.       15.       13.       12.       11.       10.        9.
                9.        8.        7.        6.        6.        5.        5.        4.        4.        4.
                3.        3.        3.        3.        3.        2.        2.        2.        2.        1.
                1.        1.        1.        1.        1.        0.        0.

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

                         HYDROGRAPH AT STATION        C

   TOTAL RAINFALL =    2.79, TOTAL LOSS =    1.31, TOTAL EXCESS =    1.48

      FLOW      TIME                      MAXIMUM AVERAGE FLOW
                                  6-HR       24-HR       72-HR     48.00-HR
+   (CFS)      (HR)
                          (CFS)
+    206.     12.63                48.         16.          8.          8.
                        (INCHES)  1.136       1.484       1.484       1.484
                         (AC-FT)    24.         31.         31.         31.

                        CUMULATIVE AREA =      .40 SQ MI


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

               ***************
               *             *
 77 KK         *     CP-4    *       combine CP-3 with sub basin C
               *             *
               ***************

 78 HC          HYDROGRAPH COMBINATION
                     ICOMP              2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                             ***

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

                         HYDROGRAPH AT STATION      CP-4

  PEAK FLOW     TIME                      MAXIMUM AVERAGE FLOW
                                  6-HR       24-HR       72-HR     48.00-HR
+   (CFS)      (HR)
                          (CFS)
     535.     12.80               509.        171.         85.         85.
```

(INCHES)	1.238	1.660	1.660	1.660
(AC-FT)	252.	338.	338.	338.

CUMULATIVE AREA = 3.82 SQ MI

*** ***

```
          **************
          *            *
 79 KK    *      RT-5  *      route CP-4 to sub basin D
          *            *
          **************
```

HYDROGRAPH ROUTING DATA

80 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	3450.	CHANNEL LENGTH
S	.0191	SLOPE
N	.030	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	50.00	BOTTOM WIDTH OR DIAMETER
Z	50.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.97	1.36	2.00	492.86	1535.54	774.00	1.66	7.69

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.97	1.36	2.00		1535.54	774.00	1.66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3383E+03 EXCESS= .0000E+00 OUTFLOW= .3383E+03 BASIN STORAGE= .3153E-02 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-5

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
+	(CFS)	(HR)					
			(CFS)				
+	1536.	12.90		509.	171.	85.	85.
			(INCHES)	1.238	1.660	1.660	1.660
			(AC-FT)	252.	338.	338.	338.

CUMULATIVE AREA = 3.82 SQ MI

*** ***

```
          **************
          *            *
    KK    *        D   *      sub basin
```

```
*           *
***************

   SUBBASIN RUNOFF DATA

82 BA        SUBBASIN CHARACTERISTICS
                TAREA         .56  SUBBASIN AREA

             PRECIPITATION DATA

83 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
               .35     .68    1.20    1.37    1.49    1.75    2.26    2.76     .00     .00     .00     .00

                                                 STORM AREA =     .00

84 LS        SCS LOSS RATE
                STRTL         .38  INITIAL ABSTRACTION
               CRVNBR       84.00  CURVE NUMBER
                RTIMP         .00  PERCENT IMPERVIOUS AREA

85 UD        SCS DIMENSIONLESS UNITGRAPH
                TLAG         .59  LAG

                                                    ***

                                                UNIT HYDROGRAPH
                                            90 END-OF-PERIOD ORDINATES
                  7.      16.      33.      52.      74.     100.     129.     166.     205.     250.
                296.     335.     371.     397.     419.     434.     441.     443.     442.     439.
                425.     410.     393.     375.     355.     333.     309.     281.     252.     227.
                203.     186.     169.     155.     141.     129.     119.     110.     101.      92.
                 85.      77.      70.      64.      59.      54.      49.      45.      41.      38.
                 34.      31.      29.      26.      24.      22.      20.      18.      17.      15.
                 14.      13.      12.      11.      10.       9.       8.       8.       7.       6.
                  6.       5.       5.       5.       4.       4.       4.       3.       3.       3.
                  2.       2.       2.       2.       1.       1.       1.       1.       0.       0.

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

                      HYDROGRAPH AT STATION        D

    TOTAL RAINFALL =    2.76, TOTAL LOSS =    1.44, TOTAL EXCESS =    1.32

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                          (CFS)
+     251.     12.67                  61.         20.         10.         10.
                          (INCHES)  1.020       1.321       1.321       1.321
                          (AC-FT)     30.         39.         39.         39.

                      CUMULATIVE AREA =     .56 SQ MI


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


           ***************
           *             *
86 KK      *     CP-5    *     combine CP-4 with sub basin D
           *             *
           ***************

87 HC        HYDROGRAPH COMBINATION
                ICOMP         2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                    ***
```

	ROUTED TO							
N		RT-3D	1194.	12.90	411.	138.	69.	3.00
	HYDROGRAPH AT							
+		G	253.	12.50	50.	16.	8.	.43
	2 COMBINED AT							
+		CP-3	1349.	12.73	461.	155.	77.	3.43
	ROUTED TO							
+		RT-4A	1349.	12.77	461.	155.	77.	3.43
	ROUTED TO							
+		RT-4B	1349.	12.87	461.	155.	77.	3.43
	HYDROGRAPH AT							
+		C	206.	12.63	48.	16.	8.	.40
	2 COMBINED AT							
+		CP-4	1535.	12.80	509.	171.	85.	3.82
	ROUTED TO							
+		RT-5	1536.	12.90	509.	171.	85.	3.82
	HYDROGRAPH AT							
+		D	251.	12.67	61.	20.	10.	.56
	2 COMBINED AT							
+		CP-5	1756.	12.87	569.	190.	95.	4.38

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
RT-1A	MANE	1.64	625.47	778.89	1.93	2.00	625.04	780.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .7095E-03 PERCENT ERROR= .0

RT-1B	MANE	.60	625.07	779.09	1.93	2.00	624.99	780.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .4836E-03 PERCENT ERROR= .0

RT-1C	MANE	.54	624.86	780.41	1.93	2.00	624.84	780.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .3866E-03 PERCENT ERROR= .0

RT-1E	MANE	1.40	624.64	780.99	1.93	2.00	624.30	780.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .9066E-03 PERCENT ERROR= .0

RT-2A	MANE	.49	1011.89	774.66	1.71	2.00	1011.42	774.00	1.71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2249E+03 EXCESS= .0000E+00 OUTFLOW= .2249E+03 BASIN STORAGE= .3533E-03 PERCENT ERROR= .0

RT-2B	MANE	2.00	1011.24	776.00	1.71	2.00	1011.24	776.00	1.71

REPLACES APPENDIX C - Proposed Conditions HEC-1 Models

NOAA Atlas 2 Rainfall

Dam Included

September 01, 2000

```
*****************************************
*                                       *
*     LOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*               JUN   1998              *
*             VERSION 4.1               *
*                                       *
*  RUN DATE   30AUG00   TIME  10:06:58  *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

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

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

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


```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
              *DIAGRAM
    1         ID   ========================================================================
    2         ID   EVANS CREEK 100-YEAR 24 HOUR MODEL     FUTURE CONDITIONS
    3         ID
    4         ID       - NOAA ATLAS 2 RAINFALL USED
    5         ID       - CURVE NUMBERS BASED ON FIELD INVESTIGATION AND CITY OF RENO LAND
    6         ID         DESIGNATIONS
    7         ID       - LAG TIMES BASED ON PROCEDURES IN WCHCDDM
    8         ID       - DAM SPECS BASED ON EVANS CREEK WATERSHED PLAN AND ENVIRONMENTAL
    9         ID         ASSESSMENT DATED:  AUGUST 1994 (MODIFIED SQ AND SA CARDS)
   10         ID
   11         ID   FILE:  EVN02R.DAT
   12         ID   BY:  BAJ                                              WRC NEVADA, INC.
   13         ID   DATE:  AUGUST 2000                                    RENO, NEVADA
   14         ID   ========================================================================
   15         IT      2              0    1441
   16         IO      3
              *
   17         KK       E sub basin
   18         BA   1.291
   19         PH            .001    0.34    0.67    1.18    1.34    1.47    1.73    2.24    2.75
   20         LS             92
   21         UD    0.90
              *
   22         KK   RT-1A route sub basin E to sub basin A
   23         RD    1050  0.0133   0.030            TRAP      10       3
              *
   24         KK   RT-1B route sub basin E to sub basin A
   25         RD     430  0.0233   0.030            TRAP      30       2
              *
```

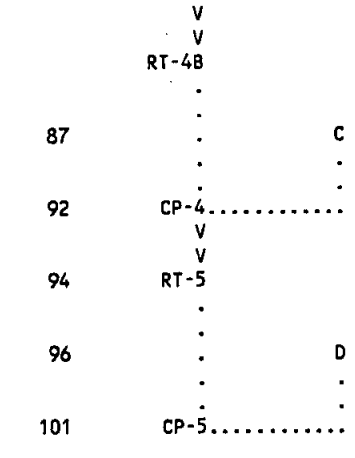
```
                                                                                                                    
  26          KK   RT-1C route sub basin E to sub basin A
  27          RD     335  0.0119   0.030            TRAP      20       2
              *
              *  RT-1D route sub basin E to sub basin A
              *    240  0.0750   0.013            TRAP       6       2
              *
  28          KK   RT-1E route sub basin E to sub basin A
  29          RD    1005  0.0299   0.035            TRAP      20       3
              *
  30          KK       A sub basin
  31          BA   0.854
  32          PH             .001    0.35    0.68    1.19    1.36    1.49    1.76    2.29    2.82
  33          LS               85
  34          UD    0.79
              *
1                                          HEC-1 INPUT                                          PAGE  2
 LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
  35          KK       F sub basin
  36          BA   0.317
  37          PH             .001    0.35    0.68    1.19    1.36    1.49    1.76    2.29    2.82
  38          LS               87
  39          UD     .30
              *
  40          KK    CP-1 combine sub basins A, E, and F
  41          HC       3
              *
  42          KK   RT-2A route CP-1 to sub basin B
  43          RD     410  0.0293   0.035            TRAP      20       3
              *
  44          KK   RT-2B route CP-1 to sub basin B
  45          RD    1140  0.0123   0.045            TRAP      50       3
              *
  46          KK   RT-2C route CP-1 to sub basin B
  47          RD    2070  0.0251   0.040            TRAP      50       3
              *
  48          KK       B sub basin
  49          BA   0.538
  50          PH             .001    0.35    0.68    1.20    1.37    1.50    1.76    2.29    2.81
  51          LS               89
  52          UD     .42
              *
  53          KK    CP-2 combine CP-1 with sub basin B
  54          HC       2
              *
  55          KK   RT-3A route CP-2 to sub basin G
  56          RD    1640  0.0232   0.030            TRAP      50       3
              *
  57          KK   RT-3B route CP-2 to sub basin G
  58          RD     780  0.0179   0.035            TRAP      20       3
              *
  59          KK   RT-3C route CP-2 to sub basin G
  60          RD     655  0.0214   0.045            TRAP      20       3
              *
  61          KK   RT-3D route CP-2 to sub basin G
  62          RD    1555  0.0283   0.035            TRAP      20       3
```

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

  63      KK       G sub basin
  64      BA   0.426
  65      PH            .001    0.35    0.69    1.21    1.38    1.51    1.78    2.30    2.81
  66      LS              85
  67      UD     .43
          *
  68      KK    CP-3 combine CP-2 with sub basin G
  69      KO       3                              21
  70      HC       2
          *
  71      KK     DAM EVANS CREEK DAM (PROPOSED)
  72      KM         70 AC-FT OF SEDIMENT + 132 AC-FT OF WATER = 202 AC-FT OF STORAGE
  73      KO       3                              21
  74      RS       1    STOR      -1
          *      3     4.1     4.7    5.25       6     6.5     7.2     7.9     8.5     9.4
          *   10.1      11   11.75   12.75      14    15.2      18
  75      SA    2.67    3.01    3.40    3.82    4.23    4.66    5.15    5.65    6.14    6.63
  76      SA    7.15    7.68    8.36    9.19    9.89   10.61   11.54
          *   4796    4800    4802    4804    4806    4808    4810    4812    4814    4816
          *   4818    4820    4822    4824    4826    4828    4831
  77      SE    4796    4798    4800    4802    4804    4806    4808    4810    4812    4814
  78      SE    4816    4818    4820    4822    4824    4826    4828
  79      SQ       0    16.4    46.5      65   109.4   143.8   159.2   162.9   166.6   170.1
  80      SQ   173.6     177   180.3   183.6   186.8     190   193.1  1304.8  4522.4    9106
  81      SE    4796  4796.5    4797 4797.25    4798    4799    4800    4802    4804    4806
  82      SE    4808    4810    4812    4814    4816    4818    4820    4823    4827    4831
          *
  83      KK   RT-4A route CP-3 to sub basin C
  84      RD    2085  0.0240   0.040            TRAP      40       3
          *
  85      KK   RT-4B route CP-3 to sub basin C
  86      RD    1820  0.0264   0.050            TRAP      50      50
          *
  87      KK       C sub basin
  88      BA   0.396
  89      PH            .001    0.35    0.69    1.21    1.37    1.50    1.77    2.28    2.79
  90      LS              86
  91      UD     .57
          *
  92      KK    CP-4 combine CP-3 with sub basin C
  93      HC       2
          *
```



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

  94      KK    RT-5 route CP-4 to sub basin D
  95      RD    3450  0.0191   0.030            TRAP      50      50
          *
  96      KK       D sub basin
  97      BA   0.557
  98      PH            .001    0.35    0.68    1.20    1.37    1.49    1.75    2.26    2.76
  99      LS              84
 100      UD    0.59
          *
 101      KK    CP-5 combine CP-4 with sub basin D
```

```
          102           HC       2
                        *
          103           ZZ
1
               SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE       (V) ROUTING          (--->) DIVERSION OR PUMP FLOW
   NO.       (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW
    17            E
                  V
                  V
    22         RT-1A
                  V
                  V
    24         RT-1B
                  V
                  V
    26         RT-1C
                  V
                  V
    28         RT-1E
                  .
                  .
    30            .           A
                  .           .
                  .           .
    35            .           .           F
                  .           .           .
                  .           .           .
    40          CP-1.........................
                  V
                  V
                RT-2A
                  V
                  V
    44          RT-2B
                  V
                  V
    46          RT-2C
                  .
                  .
    48            .           B
                  .           .
                  .           .
    53          CP-2............
                  V
                  V
    55          RT-3A
                  V
                  V
    57          RT-3B
                  V
                  V
    59          RT-3C
                  V
                  V
    61          RT-3D
                  .
                  .
    63            .           G
                  .           .
                  .           .
    68          CP-3............
                  V
                  V
    71           DAM
                  V
                  V
                RT-4A
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   30AUG00  TIME  10:06:58   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
================================================================================
EVANS CREEK 100-YEAR 24 HOUR MODEL     FUTURE CONDITIONS

    - NOAA ATLAS 2 RAINFALL USED
    - CURVE NUMBERS BASED ON FIELD INVESTIGATION AND CITY OF RENO LAND
      DESIGNATIONS
    - LAG TIMES BASED ON PROCEDURES IN WCHCDDM
    - DAM SPECS BASED ON EVANS CREEK WATERSHED PLAN AND ENVIRONMENTAL
      ASSESSMENT DATED:  AUGUST 1994 (MODIFIED SQ AND SA CARDS)

FILE:  EVN02R.DAT
BY:  BAJ                                                  WRC NEVADA, INC.
DATE:  AUGUST 2000                                        RENO, NEVADA
================================================================================

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

    IT          HYDROGRAPH TIME DATA
                      NMIN          2  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1    0  STARTING DATE
                     ITIME         0000  STARTING TIME
                        NQ         1441  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      3    0  ENDING DATE
                    NDTIME         0000  ENDING TIME
                     ICENT           19  CENTURY MARK

                   COMPUTATION INTERVAL      .03 HOURS
                        TOTAL TIME BASE    48.00 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
```

```
                STORAGE VOLUME        ACRE-FEET
                SURFACE AREA          ACRES
                TEMPERATURE           DEGREES FAHRENHEIT



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


             ***************
             *             *
  17 KK      *      E      *    sub basin
             *             *
             ***************

                SUBBASIN RUNOFF DATA

  18 BA           SUBBASIN CHARACTERISTICS
                        TAREA        1.29  SUBBASIN AREA

                  PRECIPITATION DATA

  19 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
                    .34     .67    1.18    1.34    1.47    1.73    2.24    2.75     .00     .00     .00     .00

                                                     STORM AREA =     .00

  20 LS           SCS LOSS RATE
                        STRTL         .17  INITIAL ABSTRACTION
                       CRVNBR       92.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

     'D           SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .90  LAG

                                                                  ***


                                                          UNIT HYDROGRAPH
                                                    137 END-OF-PERIOD ORDINATES
                   7.        15.        25.        42.        59.        79.       101.       124.       152.       181.
                 211.       250.       290.       332.       379.       426.       469.       508.       548.       578.
                 606.       633.       648.       662.       674.       677.       679.       679.       677.       674.
                 662.       648.       633.       615.       598.       580.       560.       541.       518.       494.
                 469.       440.       411.       381.       356.       332.       309.       291.       274.       258.
                 243.       228.       215.       203.       190.       181.       172.       163.       154.       145.
                 137.       130.       122.       115.       107.       100.        95.        90.        85.        80.
                  75.        71.        67.        64.        60.        56.        52.        50.        47.        44.
                  42.        39.        36.        35.        33.        31.        29.        27.        26.        24.
                  23.        22.        20.        19.        18.        17.        16.        15.        14.        14.
                  13.        12.        11.        11.        10.         9.         9.         8.         8.         7.
                   7.         7.         7.         6.         6.         6.         5.         5.         5.         5.
                   4.         4.         4.         3.         3.         3.         3.         2.         2.         2.
                   2.         1.         1.         1.         1.         0.         0.

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

                          HYDROGRAPH AT STATION        E

    TOTAL RAINFALL =    2.75, TOTAL LOSS =    .82, TOTAL EXCESS =    1.93

  PEAK FLOW      TIME                        MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     48.00-HR
+   (CFS)        (HR)
                             (CFS)
+     626.      12.97                 196.         67.         33.         33.
                           (INCHES)  1.414       1.926       1.926       1.926
                           (AC-FT)     97.        133.        133.        133.

                         CUMULATIVE AREA =    1.29 SQ MI
```

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
 22 KK    *     RT-1A  *      route sub basin E to sub basin A
          *            *
          **************

    HYDROGRAPH ROUTING DATA

 23 RD      MUSKINGUM-CUNGE CHANNEL ROUTING
                    L      1050.  CHANNEL LENGTH
                    S      .0133  SLOPE
                    N       .030  CHANNEL ROUGHNESS COEFFICIENT
                   CA        .00  CONTRIBUTING AREA
                SHAPE       TRAP  CHANNEL SHAPE
                   WD      10.00  BOTTOM WIDTH OR DIAMETER
                    Z       3.00  SIDE SLOPE

                                                    ***
                          COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                COMPUTATION TIME STEP
          ELEMENT    ALPHA      M         DT        DX       PEAK    TIME TO     VOLUME    MAXIMUM
                                                                PEAK                CELERITY
                                          (MIN)     (FT)     (CFS)    (MIN)       (IN)      (FPS)

            MAIN      1.59      1.42      1.64    525.00    625.47   778.89      1.93      10.67


                                  INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


            MAIN      1.59      1.42      2.00              625.04   780.00      1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .7095E-03 PERCENT ERROR=    .0


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

                    HYDROGRAPH AT STATION    RT-1A

 PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                  6-HR       24-HR       72-HR     48.00-HR
+   (CFS)      (HR)
                (CFS)
+    625.     13.00                196.        67.         33.         33.
                          (INCHES)  1.414       1.926       1.926       1.926
                          (AC-FT)    97.        133.        133.        133.

                    CUMULATIVE AREA =    1.29 SQ MI


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


          **************
          *            *
 24 KK    *     RT-1B  *      route sub basin E to sub basin A
          *            *
          **************

    HYDROGRAPH ROUTING DATA
```

```
25 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                            L          430.  CHANNEL LENGTH
                            S         .0233  SLOPE
                            N          .030  CHANNEL ROUGHNESS COEFFICIENT
                           CA           .00  CONTRIBUTING AREA
                        SHAPE          TRAP  CHANNEL SHAPE
                           WD         30.00  BOTTOM WIDTH OR DIAMETER
                            Z          2.00  SIDE SLOPE

                                                                ***
                                    COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                           COMPUTATION TIME STEP
                      ELEMENT     ALPHA       M           DT         DX        PEAK     TIME TO      VOLUME     MAXIMUM
                                                                                          PEAK                  CELERITY
                                                        (MIN)       (FT)      (CFS)      (MIN)        (IN)       (FPS)

                        MAIN       1.06      1.54         .60     215.00     625.07     779.09        1.93       11.99

                                           INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                        MAIN       1.06      1.54        2.00                624.99     780.00        1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .4836E-03 PERCENT ERROR=     .0


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

                           HYDROGRAPH AT STATION     RT-1B

 PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR        72-HR      48.00-HR
 .      S)       (HR)
                           (CFS)
+      625.     13.00                196.          67.          33.          33.
                         (INCHES)   1.414        1.926        1.926        1.926
                          (AC-FT)     97.         133.         133.         133.

                          CUMULATIVE AREA =      1.29 SQ MI


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


              ***************
              *             *
 26 KK        *    RT-1C    *       route sub basin E to sub basin A
              *             *
              ***************

                 HYDROGRAPH ROUTING DATA

 27 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                            L          335.  CHANNEL LENGTH
                            S         .0119  SLOPE
                            N          .030  CHANNEL ROUGHNESS COEFFICIENT
                           CA           .00  CONTRIBUTING AREA
                        SHAPE          TRAP  CHANNEL SHAPE
                           WD         20.00  BOTTOM WIDTH OR DIAMETER
                            Z          2.00  SIDE SLOPE

                                                                ***
                                    COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                           COMPUTATION TIME STEP
                      ELEMENT     ALPHA       M           DT         DX        PEAK     TIME TO      VOLUME     MAXIMUM
                                                                                          PEAK                  CELERITY
```

			(MIN)	(FT)	(CFS)	(MIN)	(IN)	(FPS)
MAIN	1.00	1.51	.54	167.50	624.86	780.41	1.93	10.36

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.00	1.51	2.00		624.84	780.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .3866E-03 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-1C

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	48.00-HR
(CFS)	(HR)				
		(CFS)			
625.	13.00	196.	67.	33.	33.
		(INCHES) 1.414	1.926	1.926	1.926
		(AC-FT) 97.	133.	133.	133.

CUMULATIVE AREA = 1.29 SQ MI

*** ***

```
**************
*            *
*     RT-1E  *
*            *
**************
```

28 KK route sub basin E to sub basin A

HYDROGRAPH ROUTING DATA

29 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	1005.	CHANNEL LENGTH
S	.0299	SLOPE
N	.035	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	20.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS

			COMPUTATION TIME STEP					
ELEMENT	ALPHA	M	DT	DX	PEAK	TIME TO PEAK	VOLUME	MAXIMUM CELERITY
			(MIN)	(FT)	(CFS)	(MIN)	(IN)	(FPS)
MAIN	1.43	1.48	1.40	502.50	624.64	780.99	1.93	11.95

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.43	1.48	2.00		624.30	780.00	1.93

UITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .9066E-03 PERCENT ERROR= .0

```
      ***                ***                ***                ***                ***

                                  HYDROGRAPH AT STATION     RT-1E

   PEAK FLOW      TIME                                MAXIMUM AVERAGE FLOW
                                               6-HR        24-HR        72-HR       48.00-HR
 +    (CFS)       (HR)
                                 (CFS)
 +      624.     13.00                         196.          67.          33.           33.
                              (INCHES)        1.414        1.926        1.926        1.926
                               (AC-FT)          97.         133.         133.         133.

                             CUMULATIVE AREA =     1.29 SQ MI


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


                 ***************
                 *             *
   30 KK         *      A      *      sub basin
                 *             *
                 ***************

                    SUBBASIN RUNOFF DATA

   31 BA              SUBBASIN CHARACTERISTICS
                            TAREA              .85   SUBBASIN AREA

                      PRECIPITATION DATA

   32 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
                        .35      .68     1.19     1.36      1.49      1.76      2.29      2.82       .00       .00       .00       .00

                                                           STORM AREA =       .00

   33 LS              SCS LOSS RATE
                            STRTL            .35   INITIAL ABSTRACTION
                           CRVNBR          85.00   CURVE NUMBER
                            RTIMP            .00   PERCENT IMPERVIOUS AREA

   34 UD              SCS DIMENSIONLESS UNITGRAPH
                             TLAG            .79   LAG

                                                                       ***

                                                              UNIT HYDROGRAPH
                                                        120 END-OF-PERIOD ORDINATES
                     6.        13.        24.        39.        54.        73.        92.       116.       141.       169.
                   203.       237.       277.       317.       354.       388.       421.       444.       467.       484.
                   496.       507.       509.       511.       510.       508.       501.       489.       476.       461.
                   447.       431.       414.       396.       375.       354.       330.       305.       280.       259.
                   238.       223.       208.       194.       181.       169.       158.       147.       139.       131.
                   123.       115.       108.       101.        95.        88.        82.        76.        71.        67.
                    63.        59.        54.        51.        48.        45.        42.        39.        36.        34.
                    32.        30.        27.        26.        24.        23.        21.        20.        19.        17.
                    16.        15.        14.        13.        13.        12.        11.        10.        10.         9.
                     8.         8.         7.         7.         6.         6.         6.         5.         5.         5.
                     5.         4.         4.         4.         4.         3.         3.         3.         3.         2.
                     2.         2.         2.         1.         1.         1.         1.         1.         0.         0.

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

                                  HYDROGRAPH AT STATION          A

          TAL RAINFALL =     2.82, TOTAL LOSS =     1.38, TOTAL EXCESS =     1.44
```

```
PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                   6-HR        24-HR        72-HR      48.00-HR
      S)      (HR)
                        (CFS)
+     335.    12.87                100.         33.          17.          17.
                      (INCHES)     1.087        1.438        1.438        1.438
                      (AC-FT)       50.          66.          66.          66.

                      CUMULATIVE AREA =     .85 SQ MI


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


          **************
          *            *
35 KK     *          F *      sub basin
          *            *
          **************

             SUBBASIN RUNOFF DATA

36 BA          SUBBASIN CHARACTERISTICS
                     TAREA         .32  SUBBASIN AREA

               PRECIPITATION DATA

37 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
                 .35     .68    1.19    1.36    1.49    1.76    2.29    2.82     .00     .00     .00     .00

                                                  STORM AREA =     .00

   -S          SCS LOSS RATE
                     STRTL         .30  INITIAL ABSTRACTION
                     CRVNBR      87.00  CURVE NUMBER
                     RTIMP         .00  PERCENT IMPERVIOUS AREA

39 UD          SCS DIMENSIONLESS UNITGRAPH
                     TLAG          .30  LAG

                                                    ***

                                                 UNIT HYDROGRAPH
                                              47 END-OF-PERIOD ORDINATES
                16.      53.     101.     166.     252.     344.     417.     463.     482.     482.
               463.     429.     390.     342.     283.     230.     192.     161.     136.     117.
                99.      83.      69.      59.      50.      42.      35.      29.      25.      21.
                18.      15.      13.      11.       9.       7.       6.       5.       5.       4.
                 3.       3.       2.       2.       1.       1.       0.

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

                   HYDROGRAPH AT STATION       F

  TOTAL RAINFALL =    2.82, TOTAL LOSS =    1.24, TOTAL EXCESS =    1.58

PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                   6-HR        24-HR        72-HR      48.00-HR
+  (CFS)      (HR)
                        (CFS)
+     253.    12.33                 41.         13.           7.           7.
                      (INCHES)     1.197        1.583        1.583        1.583
                      (AC-FT)       20.          27.          27.          27.

                      CUMULATIVE AREA =     .32 SQ MI
```

```
    * *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

              ***************
              *             *
  40 KK       *     CP-1    *     combine sub basins A, E, and F
              *             *
              ***************

  41 HC            HYDROGRAPH COMBINATION
                        ICOMP            3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                      ***

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

                              HYDROGRAPH AT STATION     CP-1

  PEAK FLOW      TIME                              MAXIMUM AVERAGE FLOW
                                           6-HR         24-HR        72-HR      48.00-HR
+    (CFS)        (HR)
                              (CFS)
+    1012.       12.90                     337.          113.          57.          57.
                          (INCHES)        1.271         1.713        1.713        1.713
                           (AC-FT)         167.          225.         225.         225.

                             CUMULATIVE AREA =     2.46 SQ MI


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

              ***************
              *             *
  42 KK       *    RT-2A    *     route CP-1 to sub basin B
              *             *
              ***************

                 HYDROGRAPH ROUTING DATA

  43 RD            MUSKINGUM-CUNGE CHANNEL ROUTING
                               L          410.  CHANNEL LENGTH
                               S         .0293  SLOPE
                               N          .035  CHANNEL ROUGHNESS COEFFICIENT
                              CA           .00  CONTRIBUTING AREA
                           SHAPE          TRAP  CHANNEL SHAPE
                              WD         20.00  BOTTOM WIDTH OR DIAMETER
                               Z          3.00  SIDE SLOPE

                                                                      ***
                                     COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                            COMPUTATION TIME STEP
                        ELEMENT     ALPHA       M          DT          DX         PEAK      TIME TO      VOLUME       MAXIMUM
                                                                                              PEAK                   CELERITY
                                                          (MIN)       (FT)        (CFS)      (MIN)        (IN)         (FPS)

                          MAIN       1.41      1.48         .49      205.00     1011.89     774.66        1.71         13.86

                                                INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                          MAIN       1.41      1.48        2.00                 1011.42     774.00        1.71

          UITY SUMMARY (AC-FT) - INFLOW= .2249E+03 EXCESS= .0000E+00 OUTFLOW= .2249E+03 BASIN STORAGE= .3533E-03 PERCENT ERROR=     .0
```

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

HYDROGRAPH AT STATION RT-2A

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
		(CFS)				
1011.	12.90		337.	113.	57.	57.
		(INCHES)	1.271	1.713	1.713	1.713
		(AC-FT)	167.	225.	225.	225.

CUMULATIVE AREA = 2.46 SQ MI

*** ***

```
**************
*            *
*     RT-2B  *
*            *
**************
```

route CP-1 to sub basin B

44 KK

HYDROGRAPH ROUTING DATA

45 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	1140.	CHANNEL LENGTH
S	.0123	SLOPE
N	.045	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	50.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.37	1.55	2.00	570.00	1011.24	776.00	1.71	7.60

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.37	1.55	2.00		1011.24	776.00	1.71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2249E+03 EXCESS= .0000E+00 OUTFLOW= .2249E+03 BASIN STORAGE= .2648E-02 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-2B

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
		(CFS)				
1011.	12.93		337.	113.	57.	57.
		(INCHES)	1.271	1.713	1.713	1.713
		(AC-FT)	167.	225.	225.	225.

CUMULATIVE AREA = 2.46 SQ MI

```
* *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ****************
          *              *
 46 KK    *     RT-2C    *      route CP-1 to sub basin B
          *              *
          ****************

     HYDROGRAPH ROUTING DATA

 47 RD       MUSKINGUM-CUNGE CHANNEL ROUTING
                    L      2070.  CHANNEL LENGTH
                    S      .0251  SLOPE
                    N       .040  CHANNEL ROUGHNESS COEFFICIENT
                   CA        .00  CONTRIBUTING AREA
                SHAPE       TRAP  CHANNEL SHAPE
                   WD      50.00  BOTTOM WIDTH OR DIAMETER
                    Z       3.00  SIDE SLOPE

                                                  ***
                              COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                        COMPUTATION TIME STEP
                 ELEMENT    ALPHA      M          DT        DX       PEAK     TIME TO      VOLUME     MAXIMUM
                                                                               PEAK                    CELERITY
                                                  (MIN)     (FT)     (CFS)    (MIN)        (IN)       (FPS)

                   MAIN       .60     1.55        2.00    690.00   1011.38   780.00        1.71       10.31

                                        INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                   MAIN       .60     1.55        2.00             1011.38   780.00        1.71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2249E+03 EXCESS= .0000E+00 OUTFLOW= .2249E+03 BASIN STORAGE= .3414E-02 PERCENT ERROR=     .0

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

                       HYDROGRAPH AT STATION    RT-2C

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR       72-HR      48.00-HR
+   (CFS)       (HR)
                                   (CFS)
+    1011.     13.00                337.         113.         57.         57.
                                (INCHES)       1.271        1.713       1.713       1.713
                                 (AC-FT)        167.         225.        225.        225.

                       CUMULATIVE AREA =    2.46 SQ MI

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


          ****************
          *              *
 48 KK    *       B      *      sub basin
          *              *
          ****************

     SUBBASIN RUNOFF DATA

     BA          SUBBASIN CHARACTERISTICS
```

```
                    TAREA          .54  SUBBASIN AREA

              PRECIPITATION DATA

  50 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
                .35     .68    1.20    1.37    1.50    1.76    2.29    2.81      .00     .00     .00     .00

                                                     STORM AREA =      .00

  51 LS       SCS LOSS RATE
                    STRTL          .25  INITIAL ABSTRACTION
                   CRVNBR        89.00  CURVE NUMBER
                    RTIMP          .00  PERCENT IMPERVIOUS AREA

  52 UD       SCS DIMENSIONLESS UNITGRAPH
                     TLAG          .42  LAG

                                                                 ***

                                                         UNIT HYDROGRAPH
                                                    65 END-OF-PERIOD ORDINATES
              14.        40.        75.       117.       171.       240.       319.       403.       476.       530.
             568.       590.       595.       591.       573.       545.       513.       477.       434.       386.
             332.       286.       251.       221.       194.       171.       153.       137.       121.       107.
              93.        82.        73.        64.        57.        50.        44.        39.        34.        30.
              27.        24.        21.        19.        16.        15.        13.        11.        10.         9.
               8.         7.         6.         6.         5.         5.         4.         3.         3.         2.
               2.         2.         1.         1.         0.

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

                     HYDROGRAPH AT STATION         B

     TAL RAINFALL =     2.81, TOTAL LOSS =     1.08, TOTAL EXCESS =     1.73

   PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                         6-HR         24-HR        72-HR       48.00-HR
 +   (CFS)        (HR)
                              (CFS)
 +     389.      12.47
                                          75.           25.          13.           13.
                            (INCHES)    1.299         1.729        1.729         1.729
                             (AC-FT)      37.           50.          50.           50.

                    CUMULATIVE AREA =       .54 SQ MI


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

            ***************
            *             *
  53 KK     *     CP-2    *      combine CP-1 with sub basin B
            *             *
            ***************

  54 HC           HYDROGRAPH COMBINATION
                      ICOMP            2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                 ***

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

                     HYDROGRAPH AT STATION      CP-2

        FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                         6-HR         24-HR        72-HR       48.00-HR
 +     (CFS)      (HR)
```

```
                                  (CFS)
          '95.      12.83                    411.         138.        69.          69.
                              (INCHES)     1.274        1.716       1.716        1.716
                               (AC-FT)      204.         275.        275.         275.

                              CUMULATIVE AREA =    3.00 SQ MI


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

                ***************
                *             *
   55 KK        *     RT-3A   *       route CP-2 to sub basin G
                *             *
                ***************

                   HYDROGRAPH ROUTING DATA

   56 RD              MUSKINGUM-CUNGE CHANNEL ROUTING
                                L       1640.  CHANNEL LENGTH
                                S       .0232  SLOPE
                                N        .030  CHANNEL ROUGHNESS COEFFICIENT
                               CA         .00  CONTRIBUTING AREA
                            SHAPE        TRAP  CHANNEL SHAPE
                               WD       50.00  BOTTOM WIDTH OR DIAMETER
                                Z        3.00  SIDE SLOPE

                                                                     ***
                                         COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                                COMPUTATION TIME STEP
                       ELEMENT     ALPHA        M          DT         DX         PEAK     TIME TO       VOLUME      MAXIMUM
                                                                                            PEAK                   CELERITY
                                                          (MIN)      (FT)       (CFS)      (MIN)        (IN)        (FPS)

                        MAIN        .77       1.55         2.00     820.00     1195.29    772.00        1.72       12.84

                                                INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                        MAIN        .77       1.55         2.00                1195.29    772.00        1.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2745E+03 EXCESS= .0000E+00 OUTFLOW= .2745E+03 BASIN STORAGE= .2517E-02 PERCENT ERROR=     .0


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

                              HYDROGRAPH AT STATION     RT-3A

     PEAK FLOW      TIME                              MAXIMUM AVERAGE FLOW
                                             6-HR        24-HR       72-HR       48.00-HR
 +     (CFS)        (HR)
                                 (CFS)
 +      1195.      12.87                     411.         138.        69.          69.
                              (INCHES)     1.274        1.716       1.716        1.716
                               (AC-FT)      204.         275.        275.         275.

                              CUMULATIVE AREA =    3.00 SQ MI


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

                ***************
```

```
          *           *
 K        *   RT-3B   *      route CP-2 to sub basin G
          *           *
          *************

     HYDROGRAPH ROUTING DATA

58 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                        L       780.  CHANNEL LENGTH
                        S      .0179  SLOPE
                        N       .035  CHANNEL ROUGHNESS COEFFICIENT
                       CA        .00  CONTRIBUTING AREA
                    SHAPE       TRAP  CHANNEL SHAPE
                       WD      20.00  BOTTOM WIDTH OR DIAMETER
                        Z       3.00  SIDE SLOPE

                                                                  ***
                                COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                      COMPUTATION TIME STEP
                ELEMENT    ALPHA      M         DT        DX       PEAK    TIME TO      VOLUME    MAXIMUM
                                                                      PEAK                         CELERITY
                                                  (MIN)     (FT)     (CFS)   (MIN)        (IN)      (FPS)

                  MAIN      1.10      1.48       1.05     390.00   1195.09  772.31       1.72      12.37

                                          INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                  MAIN      1.10      1.48       2.00              1194.91  772.00       1.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2745E+03 EXCESS= .0000E+00 OUTFLOW= .2745E+03 BASIN STORAGE= .7846E-03 PERCENT ERROR=    .0


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

                     HYDROGRAPH AT STATION    RT-3B

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR       72-HR     48.00-HR
+  (CFS)       (HR)
                 (CFS)
+   1195.     12.87                411.         138.         69.         69.
                (INCHES)           1.274        1.716       1.716       1.716
                (AC-FT)             204.         275.        275.        275.

                CUMULATIVE AREA =    3.00 SQ MI


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


          **************
          *            *
 59 KK    *    RT-3C   *      route CP-2 to sub basin G
          *            *
          **************

     HYDROGRAPH ROUTING DATA

60 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                        L       655.  CHANNEL LENGTH
                        S      .0214  SLOPE
                        N       .045  CHANNEL ROUGHNESS COEFFICIENT
                       CA        .00  CONTRIBUTING AREA
                    SHAPE       TRAP  CHANNEL SHAPE
                       WD      20.00  BOTTOM WIDTH OR DIAMETER
```

Z 3.00 SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.94	1.48	.98	327.50	1194.73	773.14	1.72	11.08

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.94	1.48	2.00		1194.63	774.00	1.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2745E+03 EXCESS= .0000E+00 OUTFLOW= .2745E+03 BASIN STORAGE= .8545E-03 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-3C

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
		(CFS)				
1195.	12.90		411.	138.	69.	69.
		(INCHES)	1.274	1.716	1.716	1.716
		(AC-FT)	204.	274.	274.	274.

CUMULATIVE AREA = 3.00 SQ MI

*** ***

61 KK ********** route CP-2 to sub basin G

HYDROGRAPH ROUTING DATA

62 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	1555.	CHANNEL LENGTH
S	.0283	SLOPE
N	.035	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	20.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.39	1.48	1.79	777.50	1194.40	774.95	1.72	14.45

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

```
                MAIN       1.39       1.48       2.00             1193.94    774.00      1.72


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2745E+03 EXCESS= .0000E+00 OUTFLOW= .2745E+03 BASIN STORAGE= .1586E-02 PERCENT ERROR=    .0


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

                  HYDROGRAPH AT STATION    RT-3D

   PEAK FLOW     TIME                         MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     48.00-HR
 +   (CFS)       (HR)
                           (CFS)
 +    1194.     12.90                   411.        138.         69.          69.
                         (INCHES)      1.274       1.716       1.716       1.716
                          (AC-FT)       204.        274.        274.        274.

                   CUMULATIVE AREA =     3.00 SQ MI



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


          ***************
          *             *
   63 KK  *      G      *      sub basin
          *             *
          ***************

            SUBBASIN RUNOFF DATA

     4        SUBBASIN CHARACTERISTICS
                 TAREA          .43   SUBBASIN AREA

              PRECIPITATION DATA

   65 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
                .35     .69    1.21    1.38    1.51    1.78    2.30    2.81     .00     .00     .00     .00

                                                STORM AREA =      .00

   66 LS      SCS LOSS RATE
                 STRTL          .35   INITIAL ABSTRACTION
                CRVNBR        85.00   CURVE NUMBER
                 RTIMP          .00   PERCENT IMPERVIOUS AREA

   67 UD      SCS DIMENSIONLESS UNITGRAPH
                  TLAG          .43   LAG

                                                       ***

                                                   UNIT HYDROGRAPH
                                             66 END-OF-PERIOD ORDINATES
             10.        30.        56.        87.       128.       178.       236.       301.       357.       401.
            434.       455.       459.       459.       451.       430.       406.       380.       351.       317.
            276.       239.       207.       183.       162.       143.       126.       114.       101.        90.
             80.        69.        62.        55.        48.        43.        38.        34.        30.        26.
             23.        21.        18.        16.        14.        13.        11.        10.         9.         8.
              7.         6.         5.         5.         4.         4.         4.         3.         3.         2.
              2.         2.         1.         1.         1.         0.

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

                  HYDROGRAPH AT STATION        G
```

TOTAL RAINFALL = 2.81, TOTAL LOSS = 1.38, TOTAL EXCESS = 1.43

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
		(CFS)	50.	16.	8.	8.
253.	12.50	(INCHES)	1.101	1.430	1.430	1.430
		(AC-FT)	25.	32.	32.	32.

CUMULATIVE AREA = .43 SQ MI

*** ***

68 KK — CP-3 — combine CP-2 with sub basin G

69 KO OUTPUT CONTROL VARIABLES

IPRNT	3	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	21	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	1441	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

C HYDROGRAPH COMBINATION

ICOMP	2	NUMBER OF HYDROGRAPHS TO COMBINE

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

HYDROGRAPH AT STATION CP-3

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
		(CFS)	461.	155.	77.	77.
1349.	12.73	(INCHES)	1.251	1.680	1.680	1.680
		(AC-FT)	229.	307.	307.	307.

CUMULATIVE AREA = 3.43 SQ MI

*** ***

71 KK — DAM — EVANS CREEK DAM (PROPOSED)

70 AC-FT OF SEDIMENT + 132 AC-FT OF WATER = 202 AC-FT OF STORAGE

73 KO OUTPUT CONTROL VARIABLES

IPRNT	3	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	21	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	1441	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

HYDROGRAPH ROUTING DATA

74 RS	STORAGE ROUTING										
	NSTPS	1	NUMBER OF SUBREACHES								
	ITYP	STOR	TYPE OF INITIAL CONDITION								
	RSVRIC	-1.00	INITIAL CONDITION								
	X	.00	WORKING R AND D COEFFICIENT								
75 SA	AREA	2.7	3.0	3.4	3.8	4.2	4.7	5.2	5.7	6.1	6.6
		7.2	7.7	8.4	9.2	9.9	10.6	11.5			
77 SE	ELEVATION	4796.00	4798.00	4800.00	4802.00	4804.00	4806.00	4808.00	4810.00	4812.00	4814.00
		4816.00	4818.00	4820.00	4822.00	4824.00	4826.00	4828.00			
79 SQ	DISCHARGE	0.	16.	47.	65.	109.	144.	159.	163.	167.	170.
		174.	177.	180.	184.	187.	190.	193.	1305.	4522.	9106.
81 SE	ELEVATION	4796.00	4796.50	4797.00	4797.25	4798.00	4799.00	4800.00	4802.00	4804.00	4806.00
		4808.00	4810.00	4812.00	4814.00	4816.00	4818.00	4820.00	4823.00	4827.00	4831.00

***

COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	5.68	12.08	19.30	27.35	36.23	46.04	56.83	68.62	81.39
ELEVATION	4796.00	4798.00	4800.00	4802.00	4804.00	4806.00	4808.00	4810.00	4812.00	4814.00
STORAGE	95.16	109.99	126.03	143.57	162.65	183.14	205.28			
ELEVATION	4816.00	4818.00	4820.00	4822.00	4824.00	4826.00	4828.00			

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	1.36	2.75	3.47	5.68	8.78	12.08	19.30	27.35	36.23
OUTFLOW	.00	16.40	46.50	65.00	109.40	143.80	159.20	162.90	166.60	170.10
ELEVATION	4796.00	4796.50	4797.00	4797.25	4798.00	4799.00	4800.00	4802.00	4804.00	4806.00
STORAGE	46.04	56.83	68.62	81.39	95.16	109.99	126.03	143.57	152.93	162.65
OUTFLOW	173.60	177.00	180.30	183.60	186.80	190.00	193.10	934.23	1304.80	2109.20
ELEVATION	4808.00	4810.00	4812.00	4814.00	4816.00	4818.00	4820.00	4822.00	4823.00	4824.00
STORAGE	183.14	193.98	205.28	242.08						
OUTFLOW	3718.00	4522.40	5668.30	9106.00						
ELEVATION	4826.00	4827.00	4828.00	4831.00						

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

HYDROGRAPH AT STATION DAM

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	48.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 420.	14.27		231.	154.	77.	77.
		(INCHES)	.628	1.676	1.680	1.680
		(AC-FT)	115.	306.	307.	307.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	48.00-HR
+ (AC-FT)	(HR)					
131.	14.27		124.	64.	32.	32.

STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	48.00-HR
+ (FEET)	(HR)					

70.61	14.27	4819.79	4809.33	4802.67	4802.67

CUMULATIVE AREA = 3.43 SQ MI

*** ***

83 KK — RT-4A — route CP-3 to sub basin C

HYDROGRAPH ROUTING DATA

84 RD — MUSKINGUM-CUNGE CHANNEL ROUTING

L	2085.	CHANNEL LENGTH
S	.0240	SLOPE
N	.040	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	40.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.70	1.54	2.00	521.25	420.41	858.00	1.68	7.85

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.70	1.54	2.00		420.41	858.00	1.68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3070E+03 EXCESS= .0000E+00 OUTFLOW= .3070E+03 BASIN STORAGE= .3080E-02 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-4A

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
+	(CFS)	(HR)				
			(CFS)			
+	420.	14.30	231.	154.	77.	77.
			(INCHES) .628	1.676	1.680	1.680
			(AC-FT) 115.	306.	307.	307.

CUMULATIVE AREA = 3.43 SQ MI

*** ***

RT-4B — route CP-3 to sub basin C

```
          ***************

             HYDROGRAPH ROUTING DATA

  86 RD        MUSKINGUM-CUNGE CHANNEL ROUTING
                         L        1820.  CHANNEL LENGTH
                         S        .0264  SLOPE
                         N         .050  CHANNEL ROUGHNESS COEFFICIENT
                        CA          .00  CONTRIBUTING AREA
                     SHAPE         TRAP  CHANNEL SHAPE
                        WD        50.00  BOTTOM WIDTH OR DIAMETER
                         Z        50.00  SIDE SLOPE

                                                                 ***
                                  COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                         COMPUTATION TIME STEP
                  ELEMENT    ALPHA       M         DT         DX       PEAK    TIME TO      VOLUME     MAXIMUM
                                                                                 PEAK                  CELERITY
                                                  (MIN)      (FT)      (CFS)    (MIN)        (IN)       (FPS)

                    MAIN       .69      1.36       2.00     260.00    420.67   866.00        1.68        4.23

                                        INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                    MAIN       .69      1.36       2.00               420.67   866.00        1.68

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .3070E+03 EXCESS= .0000E+00 OUTFLOW= .3070E+03 BASIN STORAGE= .1974E-02 PERCENT ERROR=     .0


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

                         HYDROGRAPH AT STATION    RT-4B

  PEAK FLOW     TIME                            MAXIMUM AVERAGE FLOW
                                        6-HR        24-HR       72-HR       48.00-HR
+   (CFS)       (HR)
                         (CFS)
+     421.     14.43                    231.         154.         77.          77.
                       (INCHES)         .628        1.676       1.680        1.680
                        (AC-FT)         115.         306.        307.         307.

                        CUMULATIVE AREA =     3.43 SQ MI


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

           ***************
           *             *
  87 KK    *       C     *      sub basin
           *             *
           ***************

              SUBBASIN RUNOFF DATA

  88 BA         SUBBASIN CHARACTERISTICS
                      TAREA          .40  SUBBASIN AREA

                PRECIPITATION DATA

  89 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
                  .35     .69    1.21    1.37    1.50    1.77    2.28    2.79     .00     .00     .00     .00
```

```
                                                        STORM AREA =     .00

      .S          SCS LOSS RATE
                        STRTL           .33  INITIAL ABSTRACTION
                       CRVNBR         86.00  CURVE NUMBER
                        RTIMP           .00  PERCENT IMPERVIOUS AREA

    91 UD         SCS DIMENSIONLESS UNITGRAPH
                         TLAG           .57  LAG

                                                                     ***

                                                               UNIT HYDROGRAPH
                                                          87 END-OF-PERIOD ORDINATES
                  6.        13.        26.        41.        57.        78.       100.       130.       160.       196.
                228.       258.       281.       302.       314.       323.       325.       325.       324.       316.
                305.       292.       279.       264.       248.       229.       208.       186.       167.       149.
                136.       124.       113.       102.        93.        86.        79.        72.        66.        60.
                 55.        49.        45.        41.        38.        34.        31.        29.        26.        24.
                 22.        20.        18.        16.        15.        13.        12.        11.        10.         9.
                  9.         8.         7.         6.         6.         5.         5.         4.         4.         4.
                  3.         3.         3.         3.         3.         2.         2.         2.         2.         1.
                  1.         1.         1.         1.         1.         0.         0.

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

                               HYDROGRAPH AT STATION        C

     TOTAL RAINFALL =    2.79, TOTAL LOSS =    1.31, TOTAL EXCESS =    1.48

   PEAK FLOW      TIME                             MAXIMUM AVERAGE FLOW
                                           6-HR         24-HR        72-HR       48.00-HR
+    (CFS)        (HR)
                              (CFS)
+       106.      12.63                     48.           16.           8.           8.
                           (INCHES)       1.136         1.484        1.484        1.484
                            (AC-FT)         24.           31.          31.          31.

                             CUMULATIVE AREA =      .40 SQ MI


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

                ***************
                *             *
    92 KK       *     CP-4    *       combine CP-3 with sub basin C
                *             *
                ***************

    93 HC        HYDROGRAPH COMBINATION
                       ICOMP             2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                     ***

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

                               HYDROGRAPH AT STATION     CP-4

   PEAK FLOW      TIME                             MAXIMUM AVERAGE FLOW
                                           6-HR         24-HR        72-HR       48.00-HR
+    (CFS)        (HR)
                              (CFS)
+       445.      14.40                    272.          170.          85.          85.
                           (INCHES)        .662         1.656        1.660        1.660
                            (AC-FT)        135.          338.         338.         338.

                             CUMULATIVE AREA =     3.82 SQ MI
```

```
* *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *             *
 94 KK    *      RT-5   *      route CP-4 to sub basin D
          *             *
          ***************

             HYDROGRAPH ROUTING DATA

 95 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                          L       3450.  CHANNEL LENGTH
                          S       .0191  SLOPE
                          N        .030  CHANNEL ROUGHNESS COEFFICIENT
                         CA         .00  CONTRIBUTING AREA
                      SHAPE        TRAP  CHANNEL SHAPE
                         WD       50.00  BOTTOM WIDTH OR DIAMETER
                          Z       50.00  SIDE SLOPE

                                                    ***
                                  COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                        COMPUTATION TIME STEP
                     ELEMENT    ALPHA       M         DT        DX       PEAK    TIME TO      VOLUME    MAXIMUM
                                                                                      PEAK                 CELERITY
                                                                (MIN)      (FT)     (CFS)     (MIN)       (IN)      (FPS)

                       MAIN        .97      1.36       2.00    345.00    445.67    872.00       1.66       5.54


                                              INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                       MAIN        .97      1.36       2.00              445.67    872.00       1.66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3383E+03 EXCESS= .0000E+00 OUTFLOW= .3383E+03 BASIN STORAGE= .2887E-02 PERCENT ERROR=    .0


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

                        HYDROGRAPH AT STATION     RT-5

  PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR       24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                          (CFS)
+     446.     14.53                      272.        170.         85.         85.
                       (INCHES)          .662       1.656       1.660       1.660
                        (AC-FT)          135.        338.        338.        338.

                        CUMULATIVE AREA =    3.82 SQ MI


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


          ***************
          *             *
 96 KK    *         D   *      sub basin
          *             *
          ***************

             SUBBASIN RUNOFF DATA

 .. BA          SUBBASIN CHARACTERISTICS
```

```
                    TAREA          .56  SUBBASIN AREA

               PRECIPITATION DATA

 98 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
                 .35     .68    1.20    1.37    1.49    1.75    2.26    2.76     .00     .00     .00     .00

                                                  STORM AREA =     .00

 99 LS         SCS LOSS RATE
                    STRTL          .38  INITIAL ABSTRACTION
                   CRVNBR        84.00  CURVE NUMBER
                    RTIMP          .00  PERCENT IMPERVIOUS AREA

100 UD         SCS DIMENSIONLESS UNITGRAPH
                    TLAG          .59  LAG

                                                  ***

                                                UNIT HYDROGRAPH
                                            90 END-OF-PERIOD ORDINATES
                    7.      16.     33.     52.     74.    100.    129.    166.    205.    250.
                  296.     335.    371.    397.    419.    434.    441.    443.    442.    439.
                  425.     410.    393.    375.    355.    333.    309.    281.    252.    227.
                  203.     186.    169.    155.    141.    129.    119.    110.    101.     92.
                   85.      77.     70.     64.     59.     54.     49.     45.     41.     38.
                   34.      31.     29.     26.     24.     22.     20.     18.     17.     15.
                   14.      13.     12.     11.     10.      9.      8.      8.      7.      6.
                    6.       5.      5.      5.      4.      4.      4.      3.      3.      3.
                    2.       2.      2.      2.      1.      1.      1.      1.      0.      0.

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

                         HYDROGRAPH AT STATION        D

          TOTAL RAINFALL =    2.76, TOTAL LOSS =    1.44, TOTAL EXCESS =    1.32

          PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR      48.00-HR
        +   (CFS)       (HR)
                                         (CFS)
        +     251.     12.67                61.          20.          10.          10.
                                       (INCHES)       1.020        1.321        1.321        1.321
                                       (AC-FT)          30.          39.          39.          39.

                         CUMULATIVE AREA =     .56 SQ MI

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

                    ****************
                    *              *
101 KK              *      CP-5    *      combine CP-4 with sub basin D
                    *              *
                    ****************

102 HC         HYDROGRAPH COMBINATION
                    ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                  ***

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

                         HYDROGRAPH AT STATION      CP-5

          FLOW     TIME                          MAXIMUM AVERAGE FLOW
```

S)	(HR)		6-HR	24-HR	72-HR	48.00-HR
		(CFS)				
+ 612.	12.73		330.	190.	95.	95.
		(INCHES)	.701	1.613	1.617	1.617
		(AC-FT)	164.	377.	378.	378.

CUMULATIVE AREA = 4.38 SQ MI

1

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

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	E	626.	12.97	196.	67.	33.	1.29		
+	ROUTED TO	RT-1A	625.	13.00	196.	67.	33.	1.29		
+	ROUTED TO	RT-1B	625.	13.00	196.	67.	33.	1.29		
+	ROUTED TO	RT-1C	625.	13.00	196.	67.	33.	1.29		
+	ROUTED TO	RT-1E	624.	13.00	196.	67.	33.	1.29		
+	HYDROGRAPH AT	A	335.	12.87	100.	33.	17.	.85		
+	HYDROGRAPH AT	F	253.	12.33	41.	13.	7.	.32		
+	3 COMBINED AT	CP-1	1012.	12.90	337.	113.	57.	2.46		
+	ROUTED TO	RT-2A	1011.	12.90	337.	113.	57.	2.46		
+	ROUTED TO	RT-2B	1011.	12.93	337.	113.	57.	2.46		
+	ROUTED TO	RT-2C	1011.	13.00	337.	113.	57.	2.46		
+	HYDROGRAPH AT	B	389.	12.47	75.	25.	13.	.54		
+	2 COMBINED AT	CP-2	1195.	12.83	411.	138.	69.	3.00		
+	ROUTED TO	RT-3A	1195.	12.87	411.	138.	69.	3.00		
+	ROUTED TO	RT-3B	1195.	12.87	411.	138.	69.	3.00		
+	ROUTED TO	RT-3C	1195.	12.90	411.	138.	69.	3.00		
+	ROUTED TO	RT-3D	1194.	12.90	411.	138.	69.	3.00		
+	HYDROGRAPH AT	G	253.	12.50	50.	16.	8.	.43		

2 COMBINED AT									
	CP-3	1349.	12.73	461.	155.	77.	3.43		
ROUTED TO									
+	DAM	420.	14.27	231.	154.	77.	3.43		
+								4820.61	14.27
ROUTED TO									
+	RT-4A	420.	14.30	231.	154.	77.	3.43		
ROUTED TO									
+	RT-4B	421.	14.43	231.	154.	77.	3.43		
HYDROGRAPH AT									
+	C	206.	12.63	48.	16.	8.	.40		
2 COMBINED AT									
+	CP-4	445.	14.40	272.	170.	85.	3.82		
ROUTED TO									
+	RT-5	446.	14.53	272.	170.	85.	3.82		
HYDROGRAPH AT									
+	D	251.	12.67	61.	20.	10.	.56		
2 COMBINED AT									
+	CP-5	612.	12.73	330.	190.	95.	4.38		

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
RT-1A	MANE	1.64	625.47	778.89	1.93	2.00	625.04	780.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .7095E-03 PERCENT ERROR= .0

RT-1B	MANE	.60	625.07	779.09	1.93	2.00	624.99	780.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .4836E-03 PERCENT ERROR= .0

RT-1C	MANE	.54	624.86	780.41	1.93	2.00	624.84	780.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .3866E-03 PERCENT ERROR= .0

RT-1E	MANE	1.40	624.64	780.99	1.93	2.00	624.30	780.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .9066E-03 PERCENT ERROR= .0

RT-2A	MANE	.49	1011.89	774.66	1.71	2.00	1011.42	774.00	1.71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2249E+03 EXCESS= .0000E+00 OUTFLOW= .2249E+03 BASIN STORAGE= .3533E-03 PERCENT ERROR= .0

RT-2B	MANE	2.00	1011.24	776.00	1.71	2.00	1011.24	776.00	1.71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2249E+03 EXCESS= .0000E+00 OUTFLOW= .2249E+03 BASIN STORAGE= .2648E-02 PERCENT ERROR= .0

```
            RT-2C  MANE        2.00   1011.38   780.00      1.71      2.00   1011.38   780.00        1.71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2249E+03 EXCESS= .0000E+00 OUTFLOW= .2249E+03 BASIN STORAGE= .3414E-02 PERCENT ERROR=    .0

            RT-3A  MANE        2.00   1195.29   772.00      1.72      2.00   1195.29   772.00        1.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2745E+03 EXCESS= .0000E+00 OUTFLOW= .2745E+03 BASIN STORAGE= .2517E-02 PERCENT ERROR=    .0

            RT-3B  MANE        1.05   1195.09   772.31      1.72      2.00   1194.91   772.00        1.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2745E+03 EXCESS= .0000E+00 OUTFLOW= .2745E+03 BASIN STORAGE= .7846E-03 PERCENT ERROR=    .0

            RT-3C  MANE         .98   1194.73   773.14      1.72      2.00   1194.63   774.00        1.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2745E+03 EXCESS= .0000E+00 OUTFLOW= .2745E+03 BASIN STORAGE= .8545E-03 PERCENT ERROR=    .0

            RT-3D  MANE        1.79   1194.40   774.95      1.72      2.00   1193.94   774.00        1.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2745E+03 EXCESS= .0000E+00 OUTFLOW= .2745E+03 BASIN STORAGE= .1586E-02 PERCENT ERROR=    .0

            RT-4A  MANE        2.00    420.41   858.00      1.68      2.00    420.41   858.00        1.68

      UITY SUMMARY (AC-FT) - INFLOW= .3070E+03 EXCESS= .0000E+00 OUTFLOW= .3070E+03 BASIN STORAGE= .3080E-02 PERCENT ERROR=    .0

            RT-4B  MANE        2.00    420.67   866.00      1.68      2.00    420.67   866.00        1.68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3070E+03 EXCESS= .0000E+00 OUTFLOW= .3070E+03 BASIN STORAGE= .1974E-02 PERCENT ERROR=    .0

             RT-5  MANE        2.00    445.67   872.00      1.66      2.00    445.67   872.00        1.66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3383E+03 EXCESS= .0000E+00 OUTFLOW= .3383E+03 BASIN STORAGE= .2887E-02 PERCENT ERROR=    .0


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

REPLACES APPENDIX C - Proposed Conditions HEC-1 Models

NOAA 14 Rainfall
No Dam

September 01, 2000

```
*****************************************
*                                       *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*            JUN   1998                 *
*          VERSION 4.1                  *
*                                       *
* RUN DATE   30AUG00   TIME  10:18:08   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

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

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

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


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

              *DIAGRAM
    1         ID   ===========================================================================
    2         ID   EVANS CREEK 100-YEAR 24 HOUR MODEL WITHOUT PROPOSED DAM      FUTURE
    3         ID                                                               CONDITIONS
    4         ID       - NOAA 14 RAINFALL USED
    5         ID       - CURVE NUMBERS BASED ON FIELD INVESTIGATION AND CITY OF RENO LAND
    6         ID         DESIGNATIONS
    7         ID       - LAG TIMES BASED ON PROCEDURES IN WCHCDDM
    8         ID
    9         ID   FILE:  EVN14WOE.DAT
   10         ID   BY:  BAJ                                                    WRC NEVADA, INC.
   11         ID   DATE:  AUGUST 2000                                         RENO, NEVADA
   12         ID   ===========================================================================
   13         IT      2              0    1441
   14         IO      3
              *
   15         KK      E sub basin
   16         BA   1.291
   17         PH            .001    0.48    0.87    1.45    1.58    1.68    1.90    2.33    2.75
   18         LS             92
   19         UD    0.90
              *
   20         KK   RT-1A route sub basin E to sub basin A
   21         RD    1050  0.0133   0.030           TRAP      10       3
              *
   22         KK   RT-1B route sub basin E to sub basin A
   23         RD     430  0.0233   0.030           TRAP      30       2
              *
   24         KK   RT-1C route sub basin E to sub basin A
```

```
25          RD     335  0.0119   0.030            TRAP      20       2
            *
            *  RT-1D route sub basin E to sub basin A
            *    240  0.0750   0.013            TRAP       6       2
            *

26          KK   RT-1E route sub basin E to sub basin A
27          RD    1005  0.0299   0.035            TRAP      20       3
            *

28          KK       A sub basin
29          BA   0.854
30          PH             .001    0.48    0.87    1.45    1.61    1.73    1.99    2.45    2.91
31          LS               85
32          UD    0.79
            *
```



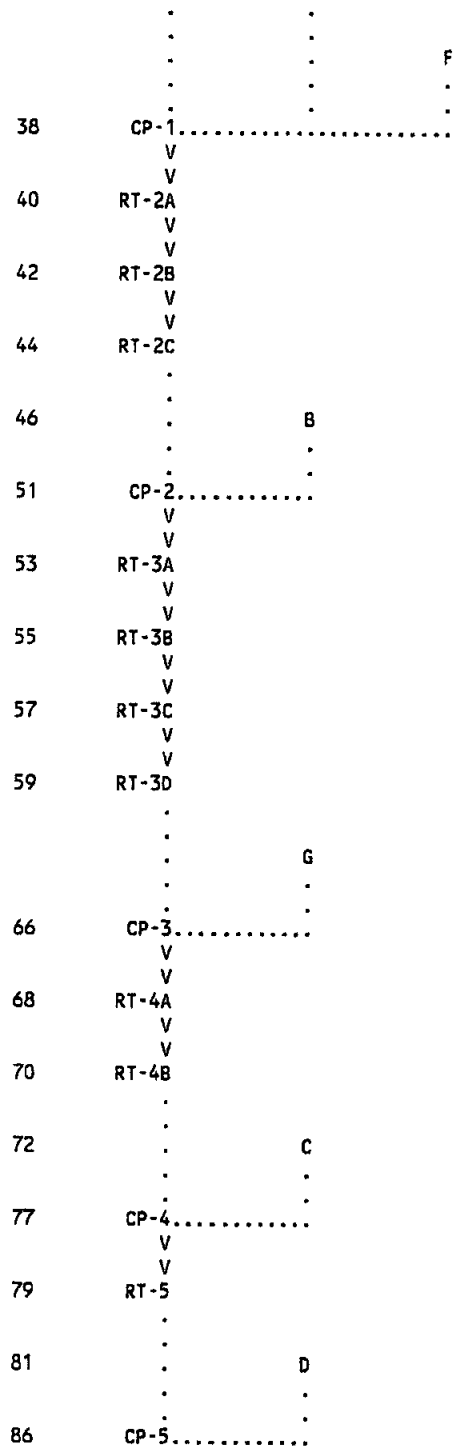
```
LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

33          KK       F sub basin
34          BA   0.317
35          PH             .001    0.48    0.87    1.45    1.60    1.71    1.94    2.43    2.91
36          LS               87
37          UD     .30
            *

38          KK    CP-1 combine sub basins A, E, and F
39          HC       3
            *

40          KK   RT-2A route CP-1 to sub basin B
41          RD     410  0.0293   0.035            TRAP      20       3
            *

42          KK   RT-2B route CP-1 to sub basin B
43          RD    1140  0.0123   0.045            TRAP      50       3
            *

44          KK   RT-2C route CP-1 to sub basin B
45          RD    2070  0.0251   0.040            TRAP      50       3
            *

46          KK       B sub basin
47          BA   0.538
48          PH             .001    0.48    0.87    1.45    1.58    1.67    1.88    2.34    2.80
49          LS               89
50          UD     .42
            *

51          KK    CP-2 combine CP-1 with sub basin B
52          HC       2
            *

53          KK   RT-3A route CP-2 to sub basin G
54          RD    1640  0.0232   0.030            TRAP      50       3
            *

55          KK   RT-3B route CP-2 to sub basin G
56          RD     780  0.0179   0.035            TRAP      20       3
            *

57          KK   RT-3C route CP-2 to sub basin G
58          RD     655  0.0214   0.045            TRAP      20       3
            *

59          KK   RT-3D route CP-2 to sub basin G
60          RD    1555  0.0283   0.035            TRAP      20       3
            *
```

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

  61          KK       G sub basin
  62          BA   0.426
  63          PH            .001    0.48    0.87    1.45    1.56    1.64    1.81    2.27    2.73
  64          LS              85
  65          UD     .43
              *

  66          KK    CP-3 combine CP-2 with sub basin G
  67          HC       2
              *

  68          KK    RT-4A route CP-3 to sub basin C
  69          RD     2085  0.0240   0.040            TRAP      40       3
              *

  70          KK    RT-4B route CP-3 to sub basin C
  71          RD     1820  0.0264   0.050            TRAP      50      50
              *

  72          KK       C sub basin
  73          BA   0.396
  74          PH            .001    0.48    0.87    1.45    1.55    1.63    1.79    2.20    2.62
  75          LS              86
  76          UD     .57
              *

  77          KK    CP-4 combine CP-3 with sub basin C
  78          HC       2
              *

  79          KK    RT-5 route CP-4 to sub basin D
  80          RD     3450  0.0191   0.030            TRAP      50      50
              *

  81          KK       D sub basin
  82          BA   0.557
  83          PH            .001    0.48    0.87    1.45    1.54    1.60    1.74    2.09    2.44
  84          LS              84
  85          UD     0.59
              *

  86          KK    CP-5 combine CP-4 with sub basin D
  87          HC       2
              *
  88          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   15          E
               V
               V
   20       RT-1A
               V
               V
   22       RT-1B
               V
               V
   24       RT-1C
               V
               V
   26       RT-1E
               .
               .
               .          A
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
**********************************************
*                                            *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)        *
*              JUN   1998                    *
*            VERSION 4.1                     *
*                                            *
*      DATE   30AUG00   TIME  10:18:08       *
*                                            *
**********************************************
```

```
**********************************************
*                                            *
*     U.S. ARMY CORPS OF ENGINEERS           *
*     HYDROLOGIC ENGINEERING CENTER          *
*           609 SECOND STREET                *
*        DAVIS, CALIFORNIA 95616             *
*             (916) 756-1104                 *
*                                            *
**********************************************
```

```
                    ================================================================================
                    EVANS CREEK 100-YEAR 24 HOUR MODEL WITHOUT PROPOSED DAM       FUTURE
                                                                                  CONDITIONS
                        - NOAA 14 RAINFALL USED
                        - CURVE NUMBERS BASED ON FIELD INVESTIGATION AND CITY OF RENO LAND
                          DESIGNATIONS
                        - LAG TIMES BASED ON PROCEDURES IN WCHCDDM

                    FILE:  EVN14WOE.DAT
                    BY:  BAJ                                                      WRC NEVADA, INC.
                    DATE:  AUGUST 2000                                            RENO, NEVADA
                    ================================================================================

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

   IT          HYDROGRAPH TIME DATA
                     NMIN          2  MINUTES IN COMPUTATION INTERVAL
                    IDATE      1   0  STARTING DATE
                    ITIME       0000  STARTING TIME
                       NQ       1441  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE      3   0  ENDING DATE
                   NDTIME       0000  ENDING TIME
                    ICENT         19  CENTURY MARK

                 COMPUTATION INTERVAL      .03 HOURS
                     TOTAL TIME BASE    48.00 HOURS

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


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


          **************
          *            *
15 KK     *          E *      sub basin
          *            *
          **************

             SUBBASIN RUNOFF DATA

16 BA          SUBBASIN CHARACTERISTICS
                    TAREA        1.29  SUBBASIN AREA

               PRECIPITATION DATA

17 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
                 .48     .87    1.45    1.58    1.68    1.90    2.33    2.75     .00     .00     .00     .00

                                                 STORM AREA =     .00

     S         SCS LOSS RATE
                    STRTL         .17  INITIAL ABSTRACTION
                   CRVNBR       92.00  CURVE NUMBER
```

```
                      RTIMP          .00  PERCENT IMPERVIOUS AREA

   JD          SCS DIMENSIONLESS UNITGRAPH
                      TLAG           .90  LAG

                                                   ***

                                              UNIT HYDROGRAPH
                                         137 END-OF-PERIOD ORDINATES
              7.        15.        25.        42.        59.        79.       101.       124.       152.       181.
            211.       250.       290.       332.       379.       426.       469.       508.       548.       578.
            606.       633.       648.       662.       674.       677.       679.       679.       677.       674.
            662.       648.       633.       615.       598.       580.       560.       541.       518.       494.
            469.       440.       411.       381.       356.       332.       309.       291.       274.       258.
            243.       228.       215.       203.       190.       181.       172.       163.       154.       145.
            137.       130.       122.       115.       107.       100.        95.        90.        85.        80.
             75.        71.        67.        64.        60.        56.        52.        50.        47.        44.
             42.        39.        36.        35.        33.        31.        29.        27.        26.        24.
             23.        22.        20.        19.        18.        17.        16.        15.        14.        14.
             13.        12.        11.        11.        10.         9.         9.         8.         8.         7.
              7.         7.         7.         6.         6.         6.         5.         5.         5.         5.
              4.         4.         4.         3.         3.         3.         3.         2.         2.         2.
              2.         1.         1.         1.         1.         0.         0.

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

                      HYDROGRAPH AT STATION         E

    TOTAL RAINFALL =      2.75, TOTAL LOSS =      .82, TOTAL EXCESS =     1.93

  PEAK FLOW       TIME                              MAXIMUM AVERAGE FLOW
                                             6-HR         24-HR        72-HR      48.00-HR
 +    (CFS)       (HR)
                                (CFS)
 +      753.      12.97                      213.          67.          33.          33.
                             (INCHES)       1.533        1.926        1.926        1.926
                              (AC-FT)        106.         133.         133.         133.

                              CUMULATIVE AREA =     1.29 SQ MI


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


              **************
              *            *
   20 KK      *    RT-1A   *       route sub basin E to sub basin A
              *            *
              **************

                HYDROGRAPH ROUTING DATA

   21 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                           L        1050.  CHANNEL LENGTH
                           S        .0133  SLOPE
                           N         .030  CHANNEL ROUGHNESS COEFFICIENT
                          CA          .00  CONTRIBUTING AREA
                       SHAPE         TRAP  CHANNEL SHAPE
                          WD        10.00  BOTTOM WIDTH OR DIAMETER
                           Z         3.00  SIDE SLOPE

                                                  ***
                                  COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                        COMPUTATION TIME STEP
                  ELEMENT    ALPHA       M         DT         DX        PEAK     TIME TO     VOLUME     MAXIMUM
                                                                                  PEAK                  CELERITY
                                                  (MIN)      (FT)      (CFS)     (MIN)       (IN)       (FPS)

                    MAIN      1.59      1.42       1.55     525.00    752.77     779.51       1.93       11.27
```

```
                                          INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                      MAIN      1.59      1.42      2.00             752.32    778.00      1.93

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .6782E-03 PERCENT ERROR=     .0


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

                         HYDROGRAPH AT STATION     RT-1A

  PEAK FLOW     TIME                             MAXIMUM AVERAGE FLOW
                                       6-HR        24-HR       72-HR      48.00-HR
+   (CFS)       (HR)
                           (CFS)
+     752.     12.97                   213.          67.         33.          33.
                         (INCHES)     1.533        1.926       1.926        1.926
                          (AC-FT)      106.         133.        133.         133.

                         CUMULATIVE AREA =     1.29 SQ MI


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

             **************
             *            *
   22 KK     *    RT-1B   *      route sub basin E to sub basin A
             *            *
             **************

                HYDROGRAPH ROUTING DATA

   23 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                           L         430.  CHANNEL LENGTH
                           S        .0233  SLOPE
                           N         .030  CHANNEL ROUGHNESS COEFFICIENT
                          CA          .00  CONTRIBUTING AREA
                       SHAPE         TRAP  CHANNEL SHAPE
                          WD        30.00  BOTTOM WIDTH OR DIAMETER
                           Z         2.00  SIDE SLOPE

                                                            ***
                                   COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                          COMPUTATION TIME STEP
                     ELEMENT    ALPHA       M        DT        DX       PEAK    TIME TO     VOLUME     MAXIMUM
                                                                                 PEAK                  CELERITY
                                                   (MIN)      (FT)     (CFS)    (MIN)        (IN)       (FPS)

                      MAIN      1.06      1.54       .56    215.00    752.33    778.80      1.93       12.79

                                          INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                      MAIN      1.06      1.54      2.00              752.19    780.00      1.93

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .4994E-03 PERCENT ERROR=     .0


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

                         HYDROGRAPH AT STATION     RT-1B
```

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	48.00-HR
(CFS)	(HR)					
		(CFS)				
+ 752.	13.00		213.	67.	33.	33.
		(INCHES)	1.534	1.926	1.926	1.926
		(AC-FT)	106.	133.	133.	133.

CUMULATIVE AREA = 1.29 SQ MI

*** ***

```
**************
*            *
*     RT-1C  *
*            *
**************
```

24 KK route sub basin E to sub basin A

HYDROGRAPH ROUTING DATA

25 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	335.	CHANNEL LENGTH
S	.0119	SLOPE
N	.030	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	20.00	BOTTOM WIDTH OR DIAMETER
Z	2.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.00	1.51	.51	167.50	752.05	779.96	1.93	11.02
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	1.00	1.51	2.00		752.04	780.00	1.93	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .3608E-03 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-1C

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	48.00-HR
(CFS)	(HR)					
		(CFS)				
+ 752.	13.00		213.	67.	33.	33.
		(INCHES)	1.534	1.926	1.926	1.926
		(AC-FT)	106.	133.	133.	133.

CUMULATIVE AREA = 1.29 SQ MI

** ***

```
          **************
          *            *
 26 KK    *     RT-1E  *      route sub basin E to sub basin A
          *            *
          **************

             HYDROGRAPH ROUTING DATA

 27 RD         MUSKINGUM-CUNGE CHANNEL ROUTING
                        L       1005.  CHANNEL LENGTH
                        S       .0299  SLOPE
                        N        .035  CHANNEL ROUGHNESS COEFFICIENT
                       CA         .00  CONTRIBUTING AREA
                    SHAPE        TRAP  CHANNEL SHAPE
                       WD       20.00  BOTTOM WIDTH OR DIAMETER
                        Z        3.00  SIDE SLOPE

                                                        ***
                                  COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                        COMPUTATION TIME STEP
                     ELEMENT    ALPHA       M         DT        DX       PEAK    TIME TO      VOLUME    MAXIMUM
                                                                                     PEAK                 CELERITY
                                                                (MIN)      (FT)     (CFS)     (MIN)       (IN)      (FPS)

                       MAIN       1.43      1.48       1.32    502.50    751.73    780.65       1.93      12.68


                                                 INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                       MAIN       1.43      1.48       2.00              751.38    780.00       1.93

    'NUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .8865E-03 PERCENT ERROR=     .0


     ***            ***            ***            ***      .     ***

                        HYDROGRAPH AT STATION    RT-1E

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                          (CFS)
+     751.     13.00                  213.         67.         33.         33.
                        (INCHES)     1.534       1.926       1.926       1.926
                         (AC-FT)       106.        133.        133.        133.

                        CUMULATIVE AREA =    1.29 SQ MI


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


          **************
          *            *
 28 KK    *         A  *      sub basin
          *            *
          **************

             SUBBASIN RUNOFF DATA

 29 BA         SUBBASIN CHARACTERISTICS
                     TAREA         .85  SUBBASIN AREA

               PRECIPITATION DATA
```

` 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
.48	.87	1.45	1.61	1.73	1.99	2.45	2.91	.00	.00	.00	.00

STORM AREA = .00

31 LS SCS LOSS RATE

STRTL	.35	INITIAL ABSTRACTION
CRVNBR	85.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

32 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.79	LAG

***

UNIT HYDROGRAPH
120 END-OF-PERIOD ORDINATES

6.	13.	24.	39.	54.	73.	92.	116.	141.	169.
203.	237.	277.	317.	354.	388.	421.	444.	467.	484.
496.	507.	509.	511.	510.	508.	501.	489.	476.	461.
447.	431.	414.	396.	375.	354.	330.	305.	280.	259.
238.	223.	208.	194.	181.	169.	158.	147.	139.	131.
123.	115.	108.	101.	95.	88.	82.	76.	71.	67.
63.	59.	54.	51.	48.	45.	42.	39.	36.	34.
32.	30.	27.	26.	24.	23.	21.	20.	19.	17.
16.	15.	14.	13.	13.	12.	11.	10.	10.	9.
8.	8.	7.	7.	6.	6.	6.	5.	5.	5.
5.	4.	4.	4.	4.	3.	3.	3.	3.	2.
2.	2.	2.	1.	1.	1.	1.	1.	0.	0.

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

HYDROGRAPH AT STATION A

TOTAL RAINFALL = 2.91, TOTAL LOSS = 1.40, TOTAL EXCESS = 1.51

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	48.00-HR
+	(CFS)	(HR)					
			(CFS)				
+	412.	12.87		112.	35.	17.	17.
			(INCHES)	1.220	1.513	1.513	1.513
			(AC-FT)	56.	69.	69.	69.

CUMULATIVE AREA = .85 SQ MI

*** ***

```
**************
*            *
*          F *      sub basin
*            *
**************
```

SUBBASIN RUNOFF DATA

34 BA SUBBASIN CHARACTERISTICS

TAREA	.32	SUBBASIN AREA

PRECIPITATION DATA

35 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
.48	.87	1.45	1.60	1.71	1.94	2.43	2.91	.00	.00	.00	.00

STORM AREA = .00

LS SCS LOSS RATE
STRTL .30 INITIAL ABSTRACTION
CRVNBR 87.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

37 UD SCS DIMENSIONLESS UNITGRAPH
TLAG .30 LAG

***

UNIT HYDROGRAPH
47 END-OF-PERIOD ORDINATES

16.	53.	101.	166.	252.	344.	417.	463.	482.	482.
463.	429.	390.	342.	283.	230.	192.	161.	136.	117.
99.	83.	69.	59.	50.	42.	35.	29.	25.	21.
18.	15.	13.	11.	9.	7.	6.	5.	5.	4.
3.	3.	2.	2.	1.	1.	0.			

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

HYDROGRAPH AT STATION F

TOTAL RAINFALL = 2.91, TOTAL LOSS = 1.25, TOTAL EXCESS = 1.66

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
+	(CFS)	(HR)					
			(CFS)				
+	320.	12.33		45.	14.	7.	7.
			(INCHES)	1.329	1.661	1.661	1.661
			(AC-FT)	22.	28.	28.	28.

CUMULATIVE AREA = .32 SQ MI

*** ***

****
* *
38 KK * CP-1 * combine sub basins A, E, and F
* *
****

39 HC HYDROGRAPH COMBINATION
ICOMP 3 NUMBER OF HYDROGRAPHS TO COMBINE

***

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

HYDROGRAPH AT STATION CP-1

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
+	(CFS)	(HR)					
			(CFS)				
+	1221.	12.90		370.	116.	58.	58.
			(INCHES)	1.397	1.749	1.749	1.749
			(AC-FT)	183.	230.	230.	230.

CUMULATIVE AREA = 2.46 SQ MI

* ***

```
          **************
          *            *
40 KK     *     RT-2A  *      route CP-1 to sub basin B
          *            *
          **************

            HYDROGRAPH ROUTING DATA

41 RD         MUSKINGUM-CUNGE CHANNEL ROUTING
                        L       410.  CHANNEL LENGTH
                        S      .0293  SLOPE
                        N       .035  CHANNEL ROUGHNESS COEFFICIENT
                       CA        .00  CONTRIBUTING AREA
                    SHAPE       TRAP  CHANNEL SHAPE
                       WD      20.00  BOTTOM WIDTH OR DIAMETER
                        Z       3.00  SIDE SLOPE

                                                    ***
                              COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                      COMPUTATION TIME STEP
                 ELEMENT    ALPHA      M         DT        DX       PEAK    TIME TO      VOLUME    MAXIMUM
                                                                              PEAK                   CELERITY
                                                  (MIN)     (FT)     (CFS)   (MIN)        (IN)      (FPS)

                   MAIN      1.41      1.48       .46     205.00   1220.36  774.30        1.75      14.72

                                          INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                   MAIN      1.41      1.48      2.00              1220.08  774.00        1.75

    NUITY SUMMARY (AC-FT) - INFLOW= .2296E+03 EXCESS= .0000E+00 OUTFLOW= .2296E+03 BASIN STORAGE= .3483E-03 PERCENT ERROR=     .0

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

                        HYDROGRAPH AT STATION    RT-2A

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                          (CFS)
+    1220.     12.90                  370.        116.         58.         58.
                          (INCHES)   1.397       1.749       1.749       1.749
                          (AC-FT)      183.        230.        230.        230.

                        CUMULATIVE AREA =    2.46 SQ MI


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


          **************
          *            *
42 KK     *     RT-2B  *      route CP-1 to sub basin B
          *            *
          **************

            HYDROGRAPH ROUTING DATA

43 RD         MUSKINGUM-CUNGE CHANNEL ROUTING
                        L      1140.  CHANNEL LENGTH
                        S      .0123  SLOPE
                        N       .045  CHANNEL ROUGHNESS COEFFICIENT
                       CA        .00  CONTRIBUTING AREA
```

```
                      SHAPE        TRAP  CHANNEL SHAPE
                         WD       50.00  BOTTOM WIDTH OR DIAMETER
                          Z        3.00  SIDE SLOPE

                                                         ***
                                  COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                         COMPUTATION TIME STEP
                    ELEMENT     ALPHA       M        DT        DX       PEAK     TIME TO      VOLUME      MAXIMUM
                                                                                   PEAK                   CELERITY
                                                   (MIN)      (FT)      (CFS)     (MIN)        (IN)        (FPS)

                      MAIN        .37      1.55      2.00    570.00   1219.99     776.00        1.75        8.13

                                         INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                      MAIN        .37      1.55      2.00             1219.99     776.00        1.75

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .2296E+03 EXCESS= .0000E+00 OUTFLOW= .2296E+03 BASIN STORAGE= .3045E-02 PERCENT ERROR=     .0


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

                        HYDROGRAPH AT STATION    RT-2B

  PEAK FLOW     TIME                             MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR       72-HR      48.00-HR
+   (CFS)       (HR)
                             (CFS)
+    1220.     12.93                      370.         116.         58.          58.
                          (INCHES)       1.397        1.749       1.749        1.749
                           (AC-FT)        183.         230.        230.         230.

                        CUMULATIVE AREA =     2.46 SQ MI



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


             ***************
             *             *
   44 KK     *     RT-2C   *       route CP-1 to sub basin B
             *             *
             ***************

               HYDROGRAPH ROUTING DATA

   45 RD         MUSKINGUM-CUNGE CHANNEL ROUTING
                          L       2070.  CHANNEL LENGTH
                          S       .0251  SLOPE
                          N        .040  CHANNEL ROUGHNESS COEFFICIENT
                         CA         .00  CONTRIBUTING AREA
                      SHAPE        TRAP  CHANNEL SHAPE
                         WD       50.00  BOTTOM WIDTH OR DIAMETER
                          Z        3.00  SIDE SLOPE

                                                         ***
                                  COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                         COMPUTATION TIME STEP
                    ELEMENT     ALPHA       M        DT        DX       PEAK     TIME TO      VOLUME      MAXIMUM
                                                                                   PEAK                   CELERITY
                                                   (MIN)      (FT)      (CFS)     (MIN)        (IN)        (FPS)

                      MAIN        .60      1.55      2.00    690.00   1219.59     778.00        1.75       11.03
```

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN .60 1.55 2.00 1219.59 778.00 1.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2296E+03 EXCESS= .0000E+00 OUTFLOW= .2296E+03 BASIN STORAGE= .3806E-02 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-2C

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	48.00-HR
+	(CFS)	(HR)				
			(CFS)			
+	1220.	12.97	370.	116.	58.	58.
			(INCHES) 1.397	1.749	1.749	1.749
			(AC-FT) 183.	230.	230.	230.

CUMULATIVE AREA = 2.46 SQ MI

*** ***

```
**************
*            *
*          B *      sub basin
*            *
**************
```

46 KK

SUBBASIN RUNOFF DATA

47 BA SUBBASIN CHARACTERISTICS

TAREA .54 SUBBASIN AREA

PRECIPITATION DATA

48 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
.48	.87	1.45	1.58	1.67	1.88	2.34	2.80	.00	.00	.00	.00

STORM AREA = .00

49 LS SCS LOSS RATE

STRTL .25 INITIAL ABSTRACTION

CRVNBR 89.00 CURVE NUMBER

RTIMP .00 PERCENT IMPERVIOUS AREA

50 UD SCS DIMENSIONLESS UNITGRAPH

TLAG .42 LAG

***

UNIT HYDROGRAPH
65 END-OF-PERIOD ORDINATES

14.	40.	75.	117.	171.	240.	319.	403.	476.	530.
568.	590.	595.	591.	573.	545.	513.	477.	434.	386.
332.	286.	251.	221.	194.	171.	153.	137.	121.	107.
93.	82.	73.	64.	57.	50.	44.	39.	34.	30.
27.	24.	21.	19.	16.	15.	13.	11.	10.	9.
8.	7.	6.	6.	5.	5.	4.	3.	3.	2.
2.	2.	1.	1.	0.					

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

HYDROGRAPH AT STATION B

JTAL RAINFALL = 2.80, TOTAL LOSS = 1.08, TOTAL EXCESS = 1.72

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
		(CFS)				
475.	12.47		80.	25.	12.	12.
		(INCHES)	1.377	1.720	1.720	1.720
		(AC-FT)	39.	49.	49.	49.

CUMULATIVE AREA = .54 SQ MI

*** ***

```
**************
*            *
*     CP-2   *
*            *
**************
```

combine CP-1 with sub basin B

52 HC HYDROGRAPH COMBINATION

ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

***

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

HYDROGRAPH AT STATION CP-2

FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
		(CFS)				
1435.	12.83		449.	141.	70.	70.
		(INCHES)	1.391	1.744	1.744	1.744
		(AC-FT)	223.	279.	279.	279.

CUMULATIVE AREA = 3.00 SQ MI

*** ***

```
**************
*            *
*     RT-3A  *
*            *
**************
```

route CP-2 to sub basin G

HYDROGRAPH ROUTING DATA

54 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	1640.	CHANNEL LENGTH
S	.0232	SLOPE
N	.030	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	50.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS

COMPUTATION TIME STEP

```
              ELEMENT    ALPHA       M          DT         DX        PEAK     TIME TO      VOLUME     MAXIMUM
                                                                               PEAK                   CELERITY
                                              (MIN)       (FT)      (CFS)     (MIN)        (IN)       (FPS)

                MAIN         .77      1.55       1.99     820.00    1435.00    771.53       1.74       13.71

                                   INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                MAIN         .77      1.55       2.00               1434.46    770.00       1.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2790E+03 EXCESS= .0000E+00 OUTFLOW= .2790E+03 BASIN STORAGE= .2557E-02 PERCENT ERROR=     .0


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

                 HYDROGRAPH AT STATION    RT-3A

 PEAK FLOW      TIME                            MAXIMUM AVERAGE FLOW
                                       6-HR        24-HR        72-HR       48.00-HR
+   (CFS)        (HR)
                              (CFS)
+    1434.      12.83                   449.         141.          70.          70.
                          (INCHES)     1.391        1.744        1.744        1.744
                           (AC-FT)      223.         279.         279.         279.

                          CUMULATIVE AREA =     3.00 SQ MI


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


           ***************
           *             *
 55 KK     *     RT-3B   *      route CP-2 to sub basin G
           *             *
           ***************

            HYDROGRAPH ROUTING DATA

 56 RD        MUSKINGUM-CUNGE CHANNEL ROUTING
                        L        780.  CHANNEL LENGTH
                        S       .0179  SLOPE
                        N        .035  CHANNEL ROUGHNESS COEFFICIENT
                       CA         .00  CONTRIBUTING AREA
                    SHAPE        TRAP  CHANNEL SHAPE
                       WD       20.00  BOTTOM WIDTH OR DIAMETER
                        Z        3.00  SIDE SLOPE

                                                     ***
                             COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                   COMPUTATION TIME STEP
              ELEMENT    ALPHA       M          DT         DX        PEAK     TIME TO      VOLUME     MAXIMUM
                                                                               PEAK                   CELERITY
                                              (MIN)       (FT)      (CFS)     (MIN)        (IN)       (FPS)

                MAIN        1.10      1.48        .99     390.00    1434.59    771.83       1.74       13.12

                                   INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                MAIN        1.10      1.48       2.00               1434.48    772.00       1.74

L   .NUITY SUMMARY (AC-FT) - INFLOW= .2790E+03 EXCESS= .0000E+00 OUTFLOW= .2790E+03 BASIN STORAGE= .8632E-03 PERCENT ERROR=     .0
```

```
      ***            ***            ***            ***            ***

                         HYDROGRAPH AT STATION    RT-3B

    PEAK FLOW     TIME                               MAXIMUM AVERAGE FLOW
                                         6-HR        24-HR       72-HR       48.00-HR
 +   (CFS)        (HR)
                              (CFS)
 +    1434.      12.87                   449.         141.         70.          70.
                           (INCHES)     1.391        1.744       1.744        1.744
                            (AC-FT)      223.         279.        279.         279.

                           CUMULATIVE AREA =    3.00 SQ MI


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

               ***************
               *             *
   57 KK       *    RT-3C    *      route CP-2 to sub basin G
               *             *
               ***************

                   HYDROGRAPH ROUTING DATA

   58 RD             MUSKINGUM-CUNGE CHANNEL ROUTING
                             L        655.  CHANNEL LENGTH
                             S       .0214  SLOPE
                             N        .045  CHANNEL ROUGHNESS COEFFICIENT
                            CA         .00  CONTRIBUTING AREA
                         SHAPE        TRAP  CHANNEL SHAPE
                            WD       20.00  BOTTOM WIDTH OR DIAMETER
                             Z        3.00  SIDE SLOPE

                                                               ***
                                       COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                              COMPUTATION TIME STEP
                         ELEMENT     ALPHA       M         DT         DX        PEAK     TIME TO      VOLUME     MAXIMUM
                                                                                           PEAK                 CELERITY
                                                          (MIN)      (FT)      (CFS)      (MIN)        (IN)       (FPS)

                           MAIN        .94      1.48        .93     327.50    1434.10     772.59       1.74       11.76

                                            INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                           MAIN        .94      1.48       2.00               1433.99     772.00       1.74

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .2790E+03 EXCESS= .0000E+00 OUTFLOW= .2790E+03 BASIN STORAGE= .6957E-03 PERCENT ERROR=     .0


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

                         HYDROGRAPH AT STATION    RT-3C

    PEAK FLOW     TIME                               MAXIMUM AVERAGE FLOW
                                         6-HR        24-HR       72-HR       48.00-HR
 +   (CFS)        (HR)
                              (CFS)
 +    1434.      12.87                   449.         141.         70.          70.
                           (INCHES)     1.391        1.744       1.744        1.744
                            (AC-FT)      223.         279.        279.         279.
```

CUMULATIVE AREA = 3.00 SQ MI

*** ***

59 KK — RT-3D — route CP-2 to sub basin G

HYDROGRAPH ROUTING DATA

60 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	1555.	CHANNEL LENGTH
S	.0283	SLOPE
N	.035	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	20.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	COMPUTATION TIME STEP M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.39	1.48	1.69	777.50	1433.37	774.64	1.74	15.32

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.39	1.48	2.00		1433.34	774.00	1.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2790E+03 EXCESS= .0000E+00 OUTFLOW= .2790E+03 BASIN STORAGE= .1348E-02 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-3D

	PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
+	1433.	12.90	(CFS)	449.	141.	70.	70.
			(INCHES)	1.391	1.744	1.744	1.744
			(AC-FT)	223.	279.	279.	279.

CUMULATIVE AREA = 3.00 SQ MI

*** ***

61 KK — G — sub basin

```
               SUBBASIN RUNOFF DATA

    BA           SUBBASIN CHARACTERISTICS
                       TAREA          .43  SUBBASIN AREA

                 PRECIPITATION DATA

   63 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
                   .48     .87    1.45    1.56    1.64    1.81    2.27    2.73     .00     .00     .00     .00

                                                      STORM AREA =      .00

   64 LS         SCS LOSS RATE
                       STRTL          .35  INITIAL ABSTRACTION
                      CRVNBR        85.00  CURVE NUMBER
                       RTIMP          .00  PERCENT IMPERVIOUS AREA

   65 UD         SCS DIMENSIONLESS UNITGRAPH
                        TLAG          .43  LAG

                                                                 ***

                                                          UNIT HYDROGRAPH
                                                      66 END-OF-PERIOD ORDINATES
              10.        30.        56.        87.       128.       178.       236.       301.       357.       401.
             434.       455.       459.       459.       451.       430.       406.       380.       351.       317.
             276.       239.       207.       183.       162.       143.       126.       114.       101.        90.
              80.        69.        62.        55.        48.        43.        38.        34.        30.        26.
              23.        21.        18.        16.        14.        13.        11.        10.         9.         8.
               7.         6.         5.         5.         4.         4.         4.         3.         3.         2.
               2.         2.         1.         1.         1.         0.

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

                    HYDROGRAPH AT STATION        G

   TOTAL RAINFALL =     2.73, TOTAL LOSS =     1.37, TOTAL EXCESS =     1.36

  PEAK FLOW      TIME                       MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR       48.00-HR
+   (CFS)        (HR)
                            (CFS)
+      299.      12.50                 51.          16.           8.             8.
                          (INCHES)   1.104        1.364        1.364          1.364
                           (AC-FT)     25.          31.          31.            31.

                    CUMULATIVE AREA =      .43 SQ MI


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

            ***************
            *             *
   66 KK    *     CP-3    *     combine CP-2 with sub basin G
            *             *
            ***************

   67 HC         HYDROGRAPH COMBINATION
                      ICOMP             2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                 ***

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

                    HYDROGRAPH AT STATION     CP-3
```

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	48.00-HR
+	(CFS)	(HR)					
			(CFS)				
+	1616.	12.73		499.	156.	78.	78.
			(INCHES)	1.354	1.696	1.696	1.696
			(AC-FT)	247.	310.	310.	310.

CUMULATIVE AREA = 3.43 SQ MI

*** ***

68 KK

****
* *
* RT-4A *
* *
****

route CP-3 to sub basin C

HYDROGRAPH ROUTING DATA

69 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	2085.	CHANNEL LENGTH
S	.0240	SLOPE
N	.040	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	40.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.70	1.54	2.00	695.00	1616.18	766.00	1.70	12.56

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.70	1.54	2.00		1616.18	766.00	1.70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3100E+03 EXCESS= .0000E+00 OUTFLOW= .3100E+03 BASIN STORAGE= .3374E-02 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-4A

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	48.00-HR
+	(CFS)	(HR)					
			(CFS)				
+	1616.	12.77		499.	156.	78.	78.
			(INCHES)	1.354	1.697	1.697	1.697
			(AC-FT)	247.	310.	310.	310.

CUMULATIVE AREA = 3.43 SQ MI

*** ***

```
          **************
          *            *
.0 KK     *     RT-4B  *      route CP-3 to sub basin C
          *            *
          **************

             HYDROGRAPH ROUTING DATA

71 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                        L       1820.  CHANNEL LENGTH
                        S       .0264  SLOPE
                        N        .050  CHANNEL ROUGHNESS COEFFICIENT
                       CA         .00  CONTRIBUTING AREA
                    SHAPE        TRAP  CHANNEL SHAPE
                       WD       50.00  BOTTOM WIDTH OR DIAMETER
                        Z       50.00  SIDE SLOPE

                                                                  ***
                                 COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                          COMPUTATION TIME STEP
                   ELEMENT    ALPHA       M         DT        DX       PEAK    TIME TO      VOLUME    MAXIMUM
                                                                          PEAK                         CELERITY
                                                     (MIN)     (FT)     (CFS)    (MIN)       (IN)      (FPS)

                    MAIN        .69      1.36       2.00    364.00   1615.98   770.00        1.70       6.03

                                              INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                    MAIN        .69      1.36       2.00             1615.98   770.00        1.70

    NUITY SUMMARY (AC-FT) - INFLOW= .3100E+03 EXCESS= .0000E+00 OUTFLOW= .3100E+03 BASIN STORAGE= .2006E-02 PERCENT ERROR=     .0

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

                       HYDROGRAPH AT STATION    RT-4B

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                              (CFS)
+    1616.      12.83                499.        156.         78.         78.
                             (INCHES)     1.354       1.697       1.697       1.697
                             (AC-FT)      247.        310.        310.        310.

                       CUMULATIVE AREA =    3.43 SQ MI


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


          **************
          *            *
72 KK     *          C *      sub basin
          *            *
          **************

             SUBBASIN RUNOFF DATA

73 BA          SUBBASIN CHARACTERISTICS
                    TAREA         .40  SUBBASIN AREA

               PRECIPITATION DATA
```

74 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
.48	.87	1.45	1.55	1.63	1.79	2.20	2.62	.00	.00	.00	.00

STORM AREA = .00

75 LS SCS LOSS RATE

STRTL	.33	INITIAL ABSTRACTION
CRVNBR	86.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

76 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.57	LAG

***

UNIT HYDROGRAPH
87 END-OF-PERIOD ORDINATES

6.	13.	26.	41.	57.	78.	100.	130.	160.	196.
228.	258.	281.	302.	314.	323.	325.	325.	324.	316.
305.	292.	279.	264.	248.	229.	208.	186.	167.	149.
136.	124.	113.	102.	93.	86.	79.	72.	66.	60.
55.	49.	45.	41.	38.	34.	31.	29.	26.	24.
22.	20.	18.	16.	15.	13.	12.	11.	10.	9.
9.	8.	7.	6.	6.	5.	5.	4.	4.	4.
3.	3.	3.	3.	3.	2.	2.	2.	2.	1.
1.	1.	1.	1.	1.	0.	0.			

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

HYDROGRAPH AT STATION C

TOTAL RAINFALL = 2.62, TOTAL LOSS = 1.28, TOTAL EXCESS = 1.34

	FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	48.00-HR
+	(CFS)	(HR)				
			(CFS)			
+	235.	12.63	47.	14.	7.	7.
			(INCHES) 1.100	1.342	1.342	1.342
			(AC-FT) 23.	28.	28.	28.

CUMULATIVE AREA = .40 SQ MI

*** ***

```
**************
*            *
*    CP-4    *
*            *
**************
```

77 KK combine CP-3 with sub basin C

78 HC HYDROGRAPH COMBINATION

ICOMP	2 NUMBER OF HYDROGRAPHS TO COMBINE

***

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

HYDROGRAPH AT STATION CP-4

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	48.00-HR
+	CFS)	(HR)				
			(CFS)			
+	831.	12.77	545.	171.	85.	85.

```
                          (INCHES)     1.326        1.660        1.660         1.660
                          (AC-FT)       270.         338.         338.          338.

                           CUMULATIVE AREA =     3.82 SQ MI


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

              ***************
              *             *
   79 KK      *      RT-5   *       route CP-4 to sub basin D
              *             *
              ***************

                 HYDROGRAPH ROUTING DATA

   80 RD           MUSKINGUM-CUNGE CHANNEL ROUTING
                            L        3450.  CHANNEL LENGTH
                            S        .0191  SLOPE
                            N         .030  CHANNEL ROUGHNESS COEFFICIENT
                           CA          .00  CONTRIBUTING AREA
                        SHAPE         TRAP  CHANNEL SHAPE
                           WD        50.00  BOTTOM WIDTH OR DIAMETER
                            Z        50.00  SIDE SLOPE

                                                               ***
                                      COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                            COMPUTATION TIME STEP
                     ELEMENT     ALPHA        M          DT          DX        PEAK     TIME TO      VOLUME     MAXIMUM
                                                                                           PEAK                  CELERITY
                                                       (MIN)        (FT)       (CFS)     (MIN)        (IN)       (FPS)

                       MAIN        .97       1.36        2.00      492.86     1831.41    772.00       1.66        8.05

                                            INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                       MAIN        .97       1.36        2.00                 1831.41    772.00       1.66

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .3383E+03 EXCESS= .0000E+00 OUTFLOW= .3383E+03 BASIN STORAGE= .2955E-02 PERCENT ERROR=     .0


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

                          HYDROGRAPH AT STATION      RT-5

    PEAK FLOW      TIME                           MAXIMUM AVERAGE FLOW
                                         6-HR        24-HR        72-HR       48.00-HR
 +    (CFS)        (HR)
                                (CFS)
 +    1831.      12.87                    545.         171.          85.          85.
                             (INCHES)    1.326        1.660        1.660        1.660
                             (AC-FT)      270.         338.         338.         338.

                          CUMULATIVE AREA =     3.82 SQ MI


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

              ***************
              *             *
      KK      *         D   *       sub basin
```

```
*               *
***************

      SUBBASIN RUNOFF DATA

82 BA      SUBBASIN CHARACTERISTICS
             TAREA         .56  SUBBASIN AREA

           PRECIPITATION DATA

83 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
             .48     .87    1.45    1.54    1.60    1.74    2.09    2.44     .00     .00     .00     .00

                                                STORM AREA =      .00

84 LS      SCS LOSS RATE
             STRTL         .38  INITIAL ABSTRACTION
             CRVNBR      84.00  CURVE NUMBER
             RTIMP         .00  PERCENT IMPERVIOUS AREA

85 UD      SCS DIMENSIONLESS UNITGRAPH
             TLAG          .59  LAG

                                                  ***

                                                UNIT HYDROGRAPH
                                            90 END-OF-PERIOD ORDINATES
              7.      16.     33.     52.     74.    100.    129.    166.    205.    250.
            296.     335.    371.    397.    419.    434.    441.    443.    442.    439.
            425.     410.    393.    375.    355.    333.    309.    281.    252.    227.
            203.     186.    169.    155.    141.    129.    119.    110.    101.     92.
             85.      77.     70.     64.     59.     54.     49.     45.     41.     38.
             34.      31.     29.     26.     24.     22.     20.     18.     17.     15.
             14.      13.     12.     11.     10.      9.      8.      8.      7.      6.
              6.       5.      5.      5.      4.      4.      4.      3.      3.      3.
              2.       2.      2.      2.      1.      1.      1.      1.      0.      0.

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

                    HYDROGRAPH AT STATION        D

    TOTAL RAINFALL =     2.44, TOTAL LOSS =     1.37, TOTAL EXCESS =     1.07

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR      48.00-HR
+   (CFS)       (HR)
                          (CFS)
+     270.      12.67                  54.          16.           8.           8.
                          (INCHES)    .901        1.070        1.070        1.070
                          (AC-FT)      27.          32.          32.          32.

                    CUMULATIVE AREA =      .56 SQ MI


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


           ***************
           *             *
86 KK      *      CP-5   *      combine CP-4 with sub basin D
           *             *
           ***************

87 HC      HYDROGRAPH COMBINATION
             ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                  ***
```

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

HYDROGRAPH AT STATION CP-5

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
		(CFS)				
2073.	12.83		598.	187.	93.	93.
		(INCHES)	1.269	1.585	1.585	1.585
		(AC-FT)	296.	370.	370.	370.

CUMULATIVE AREA = 4.38 SQ MI

1

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

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	E	753.	12.97	213.	67.	33.	1.29		
ROUTED TO	RT-1A	752.	12.97	213.	67.	33.	1.29		
ROUTED TO	RT-1B	752.	13.00	213.	67.	33.	1.29		
ROUTED TO	RT-1C	752.	13.00	213.	67.	33.	1.29		
ROUTED TO	RT-1E	751.	13.00	213.	67.	33.	1.29		
HYDROGRAPH AT	A	412.	12.87	112.	35.	17.	.85		
HYDROGRAPH AT	F	320.	12.33	45.	14.	7.	.32		
3 COMBINED AT	CP-1	1221.	12.90	370.	116.	58.	2.46		
ROUTED TO	RT-2A	1220.	12.90	370.	116.	58.	2.46		
ROUTED TO	RT-2B	1220.	12.93	370.	116.	58.	2.46		
ROUTED TO	RT-2C	1220.	12.97	370.	116.	58.	2.46		
HYDROGRAPH AT	B	475.	12.47	80.	25.	12.	.54		
2 COMBINED AT	CP-2	1435.	12.83	449.	141.	70.	3.00		
ROUTED TO	RT-3A	1434.	12.83	449.	141.	70.	3.00		
ROUTED TO	RT-3B	1434.	12.87	449.	141.	70.	3.00		
ROUTED TO	RT-3C	1434.	12.87	449.	141.	70.	3.00		

ROUTED TO	RT-3D	1433.	12.90	449.	141.	70.	3.00
HYDROGRAPH AT	G	299.	12.50	51.	16.	8.	.43
2 COMBINED AT	CP-3	1616.	12.73	499.	156.	78.	3.43
ROUTED TO	RT-4A	1616.	12.77	499.	156.	78.	3.43
ROUTED TO	RT-4B	1616.	12.83	499.	156.	78.	3.43
HYDROGRAPH AT	C	235.	12.63	47.	14.	7.	.40
2 COMBINED AT	CP-4	1831.	12.77	545.	171.	85.	3.82
ROUTED TO	RT-5	1831.	12.87	545.	171.	85.	3.82
HYDROGRAPH AT	D	270.	12.67	54.	16.	8.	.56
2 COMBINED AT	CP-5	2073.	12.83	598.	187.	93.	4.38

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
RT-1A	MANE	1.55	752.77	779.51	1.93	2.00	752.32	778.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .6782E-03 PERCENT ERROR= .0

RT-1B	MANE	.56	752.33	778.80	1.93	2.00	752.19	780.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .4994E-03 PERCENT ERROR= .0

RT-1C	MANE	.51	752.05	779.96	1.93	2.00	752.04	780.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .3608E-03 PERCENT ERROR= .0

RT-1E	MANE	1.32	751.73	780.65	1.93	2.00	751.38	780.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .8865E-03 PERCENT ERROR= .0

RT-2A	MANE	.46	1220.36	774.30	1.75	2.00	1220.08	774.00	1.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2296E+03 EXCESS= .0000E+00 OUTFLOW= .2296E+03 BASIN STORAGE= .3483E-03 PERCENT ERROR= .0

RT-2B	MANE	2.00	1219.99	776.00	1.75	2.00	1219.99	776.00	1.75

```
NUITY SUMMARY (AC-FT) - INFLOW= .2296E+03 EXCESS= .0000E+00 OUTFLOW= .2296E+03 BASIN STORAGE= .3045E-02 PERCENT ERROR=    .0

          RT-2C  MANE        2.00   1219.59    778.00      1.75      2.00   1219.59    778.00      1.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2296E+03 EXCESS= .0000E+00 OUTFLOW= .2296E+03 BASIN STORAGE= .3806E-02 PERCENT ERROR=    .0

          RT-3A  MANE        1.99   1435.00    771.53      1.74      2.00   1434.46    770.00      1.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2790E+03 EXCESS= .0000E+00 OUTFLOW= .2790E+03 BASIN STORAGE= .2557E-02 PERCENT ERROR=    .0

          RT-3B  MANE         .99   1434.59    771.83      1.74      2.00   1434.48    772.00      1.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2790E+03 EXCESS= .0000E+00 OUTFLOW= .2790E+03 BASIN STORAGE= .8632E-03 PERCENT ERROR=    .0

          RT-3C  MANE         .93   1434.10    772.59      1.74      2.00   1433.99    772.00      1.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2790E+03 EXCESS= .0000E+00 OUTFLOW= .2790E+03 BASIN STORAGE= .6957E-03 PERCENT ERROR=    .0

          RT-3D  MANE        1.69   1433.37    774.64      1.74      2.00   1433.34    774.00      1.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2790E+03 EXCESS= .0000E+00 OUTFLOW= .2790E+03 BASIN STORAGE= .1348E-02 PERCENT ERROR=    .0

          RT-4A  MANE        2.00   1616.18    766.00      1.70      2.00   1616.18    766.00      1.70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3100E+03 EXCESS= .0000E+00 OUTFLOW= .3100E+03 BASIN STORAGE= .3374E-02 PERCENT ERROR=    .0

          RT-4B  MANE        2.00   1615.98    770.00      1.70      2.00   1615.98    770.00      1.70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3100E+03 EXCESS= .0000E+00 OUTFLOW= .3100E+03 BASIN STORAGE= .2006E-02 PERCENT ERROR=    .0

          RT-5   MANE        2.00   1831.41    772.00      1.66      2.00   1831.41    772.00      1.66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3383E+03 EXCESS= .0000E+00 OUTFLOW= .3383E+03 BASIN STORAGE= .2955E-02 PERCENT ERROR=    .0


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

REPLACES APPENDIX C - Proposed Conditions HEC-1 Models

NOAA 14 Rainfall
Dam Included

September 01, 2000

```
*****************************************
*                                       *
*     _OOD HYDROGRAPH PACKAGE  (HEC-1)  *
*               JUN  1998               *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   30AUG00  TIME  10:14:27   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

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

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

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


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

              *DIAGRAM
    1         ID   ========================================================================
    2         ID   EVANS CREEK 100-YEAR 24 HOUR MODEL     FUTURE CONDITIONS
    3         ID
    4         ID       - NOAA 14 RAINFALL USED
    5         ID       - CURVE NUMBERS BASED ON FIELD INVESTIGATION AND CITY OF RENO LAND
    6         ID         DESIGNATIONS
    7         ID       - LAG TIMES BASED ON PROCEDURES IN WCHCDDM
    8         ID       - DAM SPECS BASED ON EVANS CREEK WATERSHED PLAN AND ENVIRONMENTAL
    9         ID         ASSESSMENT DATED:  AUGUST 1994 (MODIFIED SQ AND SA CARDS)
   10         ID
   11         ID   FILE:  EVN14E.DAT
   12         ID   BY:  BAJ                                                WRC NEVADA, INC.
   13         ID   DATE:  AUGUST 2000                                      RENO, NEVADA
   14         ID   ========================================================================
   15         IT      2              0    1441
   16         IO      3
              *

   17         KK      E sub basin
   18         BA   1.291
   19         PH           .001    0.48    0.87    1.45    1.58    1.68    1.90    2.33    2.75
   20         LS            92
   21         UD    0.90
              *

   22         KK   RT-1A route sub basin E to sub basin A
   23         RD    1050  0.0133   0.030           TRAP      10       3
              *

   24         KK   RT-1B route sub basin E to sub basin A
   25         RD     430  0.0233   0.030           TRAP      30       2
              *
```

```
26          KK   RT-1C route sub basin E to sub basin A
27          RD     335  0.0119   0.030            TRAP      20       2
            *
            *  RT-1D route sub basin E to sub basin A
            *    240  0.0750   0.013            TRAP       6       2
            *

28          KK   RT-1E route sub basin E to sub basin A
29          RD    1005  0.0299   0.035            TRAP      20       3
            *

30          KK       A sub basin
31          BA   0.854
32          PH             .001    0.48    0.87    1.45    1.61    1.73    1.99    2.45    2.91
33          LS               85
34          UD    0.79
            *
1                                        HEC-1 INPUT                                        PAGE  2

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

35          KK       F sub basin
36          BA   0.317
37          PH             .001    0.48    0.87    1.45    1.60    1.71    1.94    2.43    2.91
38          LS               87
39          UD     .30
            *

40          KK    CP-1 combine sub basins A, E, and F
41          HC       3
            *

42          KK   RT-2A route CP-1 to sub basin B
43          RD     410  0.0293   0.035            TRAP      20       3
            *

44          KK   RT-2B route CP-1 to sub basin B
45          RD    1140  0.0123   0.045            TRAP      50       3
            *

46          KK   RT-2C route CP-1 to sub basin B
47          RD    2070  0.0251   0.040            TRAP      50       3
            *

48          KK       B sub basin
49          BA   0.538
50          PH             .001    0.48    0.87    1.45    1.58    1.67    1.88    2.34    2.80
51          LS               89
52          UD     .42
            *

53          KK    CP-2 combine CP-1 with sub basin B
54          HC       2
            *

55          KK   RT-3A route CP-2 to sub basin G
56          RD    1640  0.0232   0.030            TRAP      50       3
            *

57          KK   RT-3B route CP-2 to sub basin G
58          RD     780  0.0179   0.035            TRAP      20       3
            *

59          KK   RT-3C route CP-2 to sub basin G
60          RD     655  0.0214   0.045            TRAP      20       3
            *

61          KK   RT-3D route CP-2 to sub basin G
62          RD    1555  0.0283   0.035            TRAP      20       3
```

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

  63      KK       G sub basin
  64      BA   0.426
  65      PH             .001    0.48    0.87    1.45    1.56    1.64    1.81    2.27    2.73
  66      LS               85
  67      UD     .43
          *
  68      KK     CP-3 combine CP-2 with sub basin G
  69      KO        3                              21
  70      HC        2
          *
  71      KK      DAM EVANS CREEK DAM (PROPOSED)
  72      KM          70 AC-FT OF SEDIMENT + 132 AC-FT OF WATER = 202 AC-FT OF STORAGE
  73      KO        3                              21
  74      RS        1    STOR      -1
          *       3     4.1     4.7    5.25       6     6.5     7.2     7.9     8.5     9.4
          *    10.1      11   11.75   12.75      14    15.2      18
  75      SA    2.67    3.01    3.40    3.82    4.23    4.66    5.15    5.65    6.14    6.63
  76      SA    7.15    7.68    8.36    9.19    9.89   10.61   11.54
          *    4796    4800    4802    4804    4806    4808    4810    4812    4814    4816
          *    4818    4820    4822    4824    4826    4828    4831
  77      SE    4796    4798    4800    4802    4804    4806    4808    4810    4812    4814
  78      SE    4816    4818    4820    4822    4824    4826    4828
  79      SQ       0    16.4    46.5      65   109.4   143.8   159.2   162.9   166.6   170.1
  80      SQ   173.6     177   180.3   183.6   186.8     190   193.1  1304.8  4522.4    9106
  81      SE    4796  4796.5    4797 4797.25    4798    4799    4800    4802    4804    4806
  82      SE    4808    4810    4812    4814    4816    4818    4820    4823    4827    4831
          *
  83      KK    RT-4A route CP-3 to sub basin C
  84      RD     2085  0.0240   0.040            TRAP      40       3
          *
  85      KK    RT-4B route CP-3 to sub basin C
  86      RD     1820  0.0264   0.050            TRAP      50      50
          *
  87      KK       C sub basin
  88      BA   0.396
  89      PH             .001    0.48    0.87    1.45    1.55    1.63    1.79    2.20    2.62
  90      LS               86
  91      UD     .57
          *
  92      KK     CP-4 combine CP-3 with sub basin C
  93      HC        2
          *
```



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

  94      KK     RT-5 route CP-4 to sub basin D
  95      RD     3450  0.0191   0.030            TRAP      50      50
          *
  96      KK       D sub basin
  97      BA   0.557
  98      PH             .001    0.48    0.87    1.45    1.54    1.60    1.74    2.09    2.44
  99      LS               84
 100      UD     0.59
          *
 101      KK     CP-5 combine CP-4 with sub basin D
```

```
          102          HC       2
                       *
          103          ZZ
1
               SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.     (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   17           E
                V
                V
   22        RT-1A
                V
                V
   24        RT-1B
                V
                V
   26        RT-1C
                V
                V
   28        RT-1E
                .
                .
   30           .            A
                .            .
                .            .
   35           .            .            F
                .            .            .
                .            .            .
   40         CP-1.......................
                V
                V
              RT-2A
                V
                V
   44         RT-2B
                V
                V
   46         RT-2C
                .
                .
   48           .            B
                .            .
                .            .
   53         CP-2...........
                V
                V
   55         RT-3A
                V
                V
   57         RT-3B
                V
                V
   59         RT-3C
                V
                V
   61         RT-3D
                .
                .
   63           .            G
                .            .
                .            .
   68         CP-3...........
                V
                V
   71          DAM
                V
                V
   .          RT-4A
```

```
                V
                V
             RT-4B
                .
                .
   87           .           C
                .           .
                .           .
   92        CP-4............
                V
                V
   94        RT-5
                .
                .
   96           .           D
                .           .
                .           .
  101        CP-5............

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   30AUG00  TIME  10:14:27   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
                    ================================================================================
                    EVANS CREEK 100-YEAR 24 HOUR MODEL     FUTURE CONDITIONS

                        - NOAA 14 RAINFALL USED
                        - CURVE NUMBERS BASED ON FIELD INVESTIGATION AND CITY OF RENO LAND
                          DESIGNATIONS
                        - LAG TIMES BASED ON PROCEDURES IN WCHCDDM
                        - DAM SPECS BASED ON EVANS CREEK WATERSHED PLAN AND ENVIRONMENTAL
                          ASSESSMENT DATED:  AUGUST 1994 (MODIFIED SQ AND SA CARDS)

                    FILE:  EVN14E.DAT
                    BY:  BAJ                                              WRC NEVADA, INC.
                    DATE:  AUGUST 2000                                    RENO, NEVADA
                    ================================================================================

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

     IT         HYDROGRAPH TIME DATA
                       NMIN          2  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1    0  STARTING DATE
                      ITIME         0000  STARTING TIME
                         NQ         1441  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      3    0  ENDING DATE
                     NDTIME         0000  ENDING TIME
                     ICENT           19  CENTURY MARK

                   COMPUTATION INTERVAL      .03 HOURS
                       TOTAL TIME BASE   48.00 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
```

STORAGE VOLUME ACRE-FEET
SURFACE AREA ACRES
TEMPERATURE DEGREES FAHRENHEIT

*** ***

****
* *
17 KK * E * sub basin
* *
****

SUBBASIN RUNOFF DATA

18 BA SUBBASIN CHARACTERISTICS
TAREA 1.29 SUBBASIN AREA

PRECIPITATION DATA

19 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
.48	.87	1.45	1.58	1.68	1.90	2.33	2.75	.00	.00	.00	.00

STORM AREA = .00

20 LS SCS LOSS RATE
STRTL .17 INITIAL ABSTRACTION
CRVNBR 92.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

ID SCS DIMENSIONLESS UNITGRAPH
TLAG .90 LAG

***

UNIT HYDROGRAPH
137 END-OF-PERIOD ORDINATES

7.	15.	25.	42.	59.	79.	101.	124.	152.	181.
211.	250.	290.	332.	379.	426.	469.	508.	548.	578.
606.	633.	648.	662.	674.	677.	679.	679.	677.	674.
662.	648.	633.	615.	598.	580.	560.	541.	518.	494.
469.	440.	411.	381.	356.	332.	309.	291.	274.	258.
243.	228.	215.	203.	190.	181.	172.	163.	154.	145.
137.	130.	122.	115.	107.	100.	95.	90.	85.	80.
75.	71.	67.	64.	60.	56.	52.	50.	47.	44.
42.	39.	36.	35.	33.	31.	29.	27.	26.	24.
23.	22.	20.	19.	18.	17.	16.	15.	14.	14.
13.	12.	11.	11.	10.	9.	9.	8.	8.	7.
7.	7.	7.	6.	6.	6.	5.	5.	5.	5.
4.	4.	4.	3.	3.	3.	3.	2.	2.	2.
2.	1.	1.	1.	1.	0.	0.			

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

HYDROGRAPH AT STATION E

TOTAL RAINFALL = 2.75, TOTAL LOSS = .82, TOTAL EXCESS = 1.93

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	48.00-HR
+	(CFS)	(HR)				
			(CFS)			
+	753.	12.97	213.	67.	33.	33.
			(INCHES) 1.533	1.926	1.926	1.926
			(AC-FT) 106.	133.	133.	133.

CUMULATIVE AREA = 1.29 SQ MI

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
 22 KK    *     RT-1A  *      route sub basin E to sub basin A
          *            *
          **************

    HYDROGRAPH ROUTING DATA

 23 RD       MUSKINGUM-CUNGE CHANNEL ROUTING
                    L       1050.  CHANNEL LENGTH
                    S       .0133  SLOPE
                    N        .030  CHANNEL ROUGHNESS COEFFICIENT
                   CA         .00  CONTRIBUTING AREA
                SHAPE        TRAP  CHANNEL SHAPE
                   WD       10.00  BOTTOM WIDTH OR DIAMETER
                    Z        3.00  SIDE SLOPE

                                                    ***
                              COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                      COMPUTATION TIME STEP
                 ELEMENT    ALPHA       M         DT        DX       PEAK    TIME TO      VOLUME    MAXIMUM
                                                                              PEAK                   CELERITY
                                                    (MIN)     (FT)     (CFS)    (MIN)       (IN)      (FPS)

                   MAIN       1.59      1.42       1.55    525.00    752.77   779.51       1.93      11.27

                                          INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                   MAIN       1.59      1.42       2.00              752.32   778.00       1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .6782E-03 PERCENT ERROR=    .0


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

                       HYDROGRAPH AT STATION    RT-1A

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                          (CFS)
+     752.     12.97                  213.         67.         33.         33.
                         (INCHES)     1.533       1.926       1.926       1.926
                          (AC-FT)       106.        133.        133.        133.

                       CUMULATIVE AREA =    1.29 SQ MI


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


          **************
          *            *
 24 KK    *     RT-1B  *      route sub basin E to sub basin A
          *            *
          **************

    HYDROGRAPH ROUTING DATA
```

```
-- RD         MUSKINGUM-CUNGE CHANNEL ROUTING
                         L        430.  CHANNEL LENGTH
                         S       .0233  SLOPE
                         N        .030  CHANNEL ROUGHNESS COEFFICIENT
                        CA         .00  CONTRIBUTING AREA
                     SHAPE        TRAP  CHANNEL SHAPE
                        WD       30.00  BOTTOM WIDTH OR DIAMETER
                         Z        2.00  SIDE SLOPE

                                                  ***
                               COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                    COMPUTATION TIME STEP
                  ELEMENT    ALPHA       M        DT       DX       PEAK    TIME TO     VOLUME    MAXIMUM
                                                                             PEAK                 CELERITY
                                                (MIN)     (FT)     (CFS)    (MIN)       (IN)      (FPS)

                    MAIN      1.06      1.54       .56   215.00    752.33   778.80      1.93      12.79

                                  INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                    MAIN      1.06      1.54      2.00             752.19   780.00      1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .4994E-03 PERCENT ERROR=     .0


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

                      HYDROGRAPH AT STATION    RT-1B

  PEAK FLOW      TIME                            MAXIMUM AVERAGE FLOW
                                         6-HR          24-HR       72-HR      48.00-HR
      S)         (HR)
                            (CFS)
 +      752.     13.00                    213.          67.         33.          33.
                         (INCHES)        1.534         1.926       1.926        1.926
                          (AC-FT)         106.          133.        133.         133.

                      CUMULATIVE AREA =     1.29 SQ MI



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


            ***************
            *             *
 26 KK      *    RT-1C    *        route sub basin E to sub basin A
            *             *
            ***************

              HYDROGRAPH ROUTING DATA

 27 RD        MUSKINGUM-CUNGE CHANNEL ROUTING
                         L        335.  CHANNEL LENGTH
                         S       .0119  SLOPE
                         N        .030  CHANNEL ROUGHNESS COEFFICIENT
                        CA         .00  CONTRIBUTING AREA
                     SHAPE        TRAP  CHANNEL SHAPE
                        WD       20.00  BOTTOM WIDTH OR DIAMETER
                         Z        2.00  SIDE SLOPE

                                                  ***
                               COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                    COMPUTATION TIME STEP
                  ELEMENT    ALPHA       M        DT       DX       PEAK    TIME TO     VOLUME    MAXIMUM
                                                                             PEAK                 CELERITY
```

		(MIN)	(FT)	(CFS)	(MIN)	(IN)	(FPS)
MAIN	1.00	1.51	.51	167.50	752.05	779.96	1.93	11.02

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.00	1.51	2.00		752.04	780.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .3608E-03 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-1C

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	48.00-HR
+ (CFS)	(HR)	(CFS)			
+ 752.	13.00	213.	67.	33.	33.
		(INCHES) 1.534	1.926	1.926	1.926
		(AC-FT) 106.	133.	133.	133.

CUMULATIVE AREA = 1.29 SQ MI

*** ***

```
**************
*            *
*     RT-1E  *
*            *
**************
```

28 KK route sub basin E to sub basin A

HYDROGRAPH ROUTING DATA

29 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	1005.	CHANNEL LENGTH
S	.0299	SLOPE
N	.035	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	20.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.43	1.48	1.32	502.50	751.73	780.65	1.93	12.68

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.43	1.48	2.00		751.38	780.00	1.93

NUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .8865E-03 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-1E

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
+	(CFS)	(HR)				
		(CFS)				
+	751.	13.00	213.	67.	33.	33.
		(INCHES)	1.534	1.926	1.926	1.926
		(AC-FT)	106.	133.	133.	133.

CUMULATIVE AREA = 1.29 SQ MI

*** ***

30 KK

****
* *
* A *
* *
****

sub basin

SUBBASIN RUNOFF DATA

31 BA SUBBASIN CHARACTERISTICS

TAREA .85 SUBBASIN AREA

PRECIPITATION DATA

32 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
.48	.87	1.45	1.61	1.73	1.99	2.45	2.91	.00	.00	.00	.00

STORM AREA = .00

33 LS SCS LOSS RATE

STRTL .35 INITIAL ABSTRACTION
CRVNBR 85.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

34 UD SCS DIMENSIONLESS UNITGRAPH

TLAG .79 LAG

***

UNIT HYDROGRAPH
120 END-OF-PERIOD ORDINATES

6.	13.	24.	39.	54.	73.	92.	116.	141.	169.
203.	237.	277.	317.	354.	388.	421.	444.	467.	484.
496.	507.	509.	511.	510.	508.	501.	489.	476.	461.
447.	431.	414.	396.	375.	354.	330.	305.	280.	259.
238.	223.	208.	194.	181.	169.	158.	147.	139.	131.
123.	115.	108.	101.	95.	88.	82.	76.	71.	67.
63.	59.	54.	51.	48.	45.	42.	39.	36.	34.
32.	30.	27.	26.	24.	23.	21.	20.	19.	17.
16.	15.	14.	13.	13.	12.	11.	10.	10.	9.
8.	8.	7.	7.	6.	6.	6.	5.	5.	5.
5.	4.	4.	4.	4.	3.	3.	3.	3.	2.
2.	2.	2.	1.	1.	1.	1.	1.	0.	0.

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

HYDROGRAPH AT STATION A

TAL RAINFALL = 2.91, TOTAL LOSS = 1.40, TOTAL EXCESS = 1.51

```
   * FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     48.00-HR
     CFS)     (HR)
                        (CFS)
+    412.    12.87                  112.         35.         17.         17.
                       (INCHES)    1.220       1.513       1.513       1.513
                       (AC-FT)       56.         69.         69.         69.

                       CUMULATIVE AREA =     .85 SQ MI


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


          **************
          *            *
35 KK     *          F *      sub basin
          *            *
          **************

             SUBBASIN RUNOFF DATA

36 BA          SUBBASIN CHARACTERISTICS
                    TAREA         .32  SUBBASIN AREA

               PRECIPITATION DATA

37 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
                 .48     .87    1.45    1.60    1.71    1.94    2.43    2.91     .00     .00     .00     .00

                                                 STORM AREA =     .00

__ LS          SCS LOSS RATE
                    STRTL         .30  INITIAL ABSTRACTION
                   CRVNBR       87.00  CURVE NUMBER
                    RTIMP         .00  PERCENT IMPERVIOUS AREA

39 UD          SCS DIMENSIONLESS UNITGRAPH
                    TLAG         .30  LAG

                                                    ***

                                                UNIT HYDROGRAPH
                                              47 END-OF-PERIOD ORDINATES
                16.       53.      101.      166.      252.      344.      417.      463.      482.      482.
               463.      429.      390.      342.      283.      230.      192.      161.      136.      117.
                99.       83.       69.       59.       50.       42.       35.       29.       25.       21.
                18.       15.       13.       11.        9.        7.        6.        5.        5.        4.
                 3.        3.        2.        2.        1.        1.        0.

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

                      HYDROGRAPH AT STATION       F

   TOTAL RAINFALL =    2.91, TOTAL LOSS =    1.25, TOTAL EXCESS =    1.66

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                        (CFS)
+    320.    12.33                   45.         14.          7.          7.
                       (INCHES)    1.329       1.661       1.661       1.661
                       (AC-FT)       22.         28.         28.         28.

                       CUMULATIVE AREA =     .32 SQ MI
```

```
** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
 40 KK    *     CP-1   *      combine sub basins A, E, and F
          *            *
          **************

 41 HC         HYDROGRAPH COMBINATION
                    ICOMP          3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                          ***

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

                      HYDROGRAPH AT STATION     CP-1

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR     48.00-HR
+   (CFS)       (HR)
                               (CFS)
+    1221.      12.90                370.         116.          58.          58.
                              (INCHES)  1.397        1.749        1.749        1.749
                              (AC-FT)   183.         230.         230.         230.

                      CUMULATIVE AREA =    2.46 SQ MI


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

          **************
          *            *
 42 KK    *     RT-2A  *      route CP-1 to sub basin B
          *            *
          **************

    HYDROGRAPH ROUTING DATA

 43 RD       MUSKINGUM-CUNGE CHANNEL ROUTING
                    L       410.  CHANNEL LENGTH
                    S      .0293  SLOPE
                    N       .035  CHANNEL ROUGHNESS COEFFICIENT
                   CA        .00  CONTRIBUTING AREA
                SHAPE       TRAP  CHANNEL SHAPE
                   WD      20.00  BOTTOM WIDTH OR DIAMETER
                    Z       3.00  SIDE SLOPE

                                                          ***
                          COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                  COMPUTATION TIME STEP
      ELEMENT    ALPHA      M          DT         DX       PEAK     TIME TO      VOLUME     MAXIMUM
                                                                      PEAK                    CELERITY
                                       (MIN)      (FT)     (CFS)    (MIN)        (IN)       (FPS)

        MAIN      1.41      1.48         .46     205.00   1220.36   774.30        1.75       14.72

                                  INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

        MAIN      1.41      1.48        2.00              1220.08   774.00        1.75

NUITY SUMMARY (AC-FT) - INFLOW= .2296E+03 EXCESS= .0000E+00 OUTFLOW= .2296E+03 BASIN STORAGE= .3483E-03 PERCENT ERROR=     .0
```

```
      ***               ***               ***               ***              ***

                                HYDROGRAPH AT STATION     RT-2A

   PEAK FLOW       TIME                                  MAXIMUM AVERAGE FLOW
                                               6-HR         24-HR        72-HR        48.00-HR
 +   (CFS)         (HR)
                                 (CFS)
 +     1220.       12.90                       370.          116.          58.            58.
                              (INCHES)        1.397         1.749         1.749          1.749
                               (AC-FT)         183.          230.          230.           230.

                              CUMULATIVE AREA =     2.46 SQ MI


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

                **************
                *            *
   44 KK        *    RT-2B   *      route CP-1 to sub basin B
                *            *
                **************

                   HYDROGRAPH ROUTING DATA

   45 RD             MUSKINGUM-CUNGE CHANNEL ROUTING
                              L        1140.  CHANNEL LENGTH
                              S        .0123  SLOPE
                              N         .045  CHANNEL ROUGHNESS COEFFICIENT
                             CA          .00  CONTRIBUTING AREA
                          SHAPE         TRAP  CHANNEL SHAPE
                             WD        50.00  BOTTOM WIDTH OR DIAMETER
                              Z         3.00  SIDE SLOPE

                                                                ***
                                          COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                                 COMPUTATION TIME STEP
                         ELEMENT     ALPHA       M          DT         DX        PEAK      TIME TO       VOLUME      MAXIMUM
                                                                                            PEAK                     CELERITY
                                                           (MIN)      (FT)      (CFS)      (MIN)         (IN)        (FPS)

                           MAIN        .37      1.55        2.00     570.00    1219.99     776.00        1.75         8.13


                                                 INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                           MAIN        .37      1.55        2.00               1219.99     776.00        1.75


CONTINUITY SUMMARY (AC-FT) - INFLOW= .2296E+03 EXCESS= .0000E+00 OUTFLOW= .2296E+03 BASIN STORAGE= .3045E-02 PERCENT ERROR=     .0


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

                                HYDROGRAPH AT STATION     RT-2B

   PEAK FLOW       TIME                                  MAXIMUM AVERAGE FLOW
                                               6-HR         24-HR        72-HR        48.00-HR
 +   (CFS)         (HR)
                                 (CFS)
 +     1220.       12.93                       370.          116.          58.            58.
                              (INCHES)        1.397         1.749         1.749          1.749
                               (AC-FT)         183.          230.          230.           230.

                              CUMULATIVE AREA =     2.46 SQ MI
```

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
 46 KK    *     RT-2C  *      route CP-1 to sub basin B
          *            *
          **************

             HYDROGRAPH ROUTING DATA

 47 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                          L       2070.  CHANNEL LENGTH
                          S       .0251  SLOPE
                          N        .040  CHANNEL ROUGHNESS COEFFICIENT
                         CA         .00  CONTRIBUTING AREA
                      SHAPE        TRAP  CHANNEL SHAPE
                         WD       50.00  BOTTOM WIDTH OR DIAMETER
                          Z        3.00  SIDE SLOPE

                                                    ***
                                 COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                          COMPUTATION TIME STEP
                    ELEMENT    ALPHA       M          DT         DX       PEAK     TIME TO      VOLUME     MAXIMUM
                                                                                      PEAK                    CELERITY
                                                        (MIN)      (FT)     (CFS)    (MIN)        (IN)       (FPS)

                      MAIN       .60      1.55        2.00      690.00   1219.59    778.00       1.75       11.03

                                                INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                      MAIN       .60      1.55        2.00                1219.59    778.00       1.75

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .2296E+03 EXCESS= .0000E+00 OUTFLOW= .2296E+03 BASIN STORAGE= .3806E-02 PERCENT ERROR=     .0


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

                        HYDROGRAPH AT STATION    RT-2C

   PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR       72-HR      48.00-HR
 +    (CFS)       (HR)
                          (CFS)
 +     1220.     12.97                370.        116.        58.          58.
                        (INCHES)      1.397       1.749       1.749        1.749
                         (AC-FT)      183.        230.        230.         230.

                        CUMULATIVE AREA =    2.46 SQ MI


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

          **************
          *            *
 48 KK    *          B *      sub basin
          *            *
          **************

             SUBBASIN RUNOFF DATA

     BA          SUBBASIN CHARACTERISTICS
```

```
                    TAREA          .54  SUBBASIN AREA

               PRECIPITATION DATA

50 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
                 .48     .87    1.45    1.58    1.67    1.88    2.34    2.80     .00     .00     .00     .00

                                                STORM AREA =      .00

51 LS          SCS LOSS RATE
                    STRTL          .25  INITIAL ABSTRACTION
                   CRVNBR        89.00  CURVE NUMBER
                    RTIMP          .00  PERCENT IMPERVIOUS AREA

52 UD          SCS DIMENSIONLESS UNITGRAPH
                    TLAG          .42  LAG

                                                      ***

                                                   UNIT HYDROGRAPH
                                                65 END-OF-PERIOD ORDINATES
                    14.       40.       75.      117.      171.      240.      319.      403.      476.      530.
                   568.      590.      595.      591.      573.      545.      513.      477.      434.      386.
                   332.      286.      251.      221.      194.      171.      153.      137.      121.      107.
                    93.       82.       73.       64.       57.       50.       44.       39.       34.       30.
                    27.       24.       21.       19.       16.       15.       13.       11.       10.        9.
                     8.        7.        6.        6.        5.        5.        4.        3.        3.        2.
                     2.        2.        1.        1.        0.

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

                         HYDROGRAPH AT STATION        B

          JTAL RAINFALL =     2.80, TOTAL LOSS =     1.08, TOTAL EXCESS =     1.72

       PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR      48.00-HR
     +   (CFS)       (HR)
                        (CFS)
     +     475.     12.47                  80.          25.          12.          12.
                     (INCHES)             1.377        1.720        1.720        1.720
                     (AC-FT)                39.          49.          49.          49.

                         CUMULATIVE AREA =      .54 SQ MI


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


               **************
               *            *
53 KK          *      CP-2  *      combine CP-1 with sub basin B
               *            *
               **************

54 HC          HYDROGRAPH COMBINATION
                    ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                      ***

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

                         HYDROGRAPH AT STATION      CP-2

          FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR      48.00-HR
     +   .CFS)       (HR)
```

		(CFS)				
35.	12.83		449.	141.	70.	70.
		(INCHES)	1.391	1.744	1.744	1.744
		(AC-FT)	223.	279.	279.	279.

CUMULATIVE AREA = 3.00 SQ MI

*** ***

55 KK

****
* *
* RT-3A *
* *
****

route CP-2 to sub basin G

HYDROGRAPH ROUTING DATA

56 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	1640.	CHANNEL LENGTH
S	.0232	SLOPE
N	.030	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	50.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.77	1.55	1.99	820.00	1435.00	771.53	1.74	13.71
			INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL					
MAIN	.77	1.55	2.00		1434.46	770.00	1.74	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2790E+03 EXCESS= .0000E+00 OUTFLOW= .2790E+03 BASIN STORAGE= .2557E-02 PERCENT ERROR= .0

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

HYDROGRAPH AT STATION RT-3A

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1434.	12.83		449.	141.	70.	70.
		(INCHES)	1.391	1.744	1.744	1.744
		(AC-FT)	223.	279.	279.	279.

CUMULATIVE AREA = 3.00 SQ MI

*** ***

****

```
          *           *
    :K    *    RT-3B  *     route CP-2 to sub basin G
          *           *
          ***************

             HYDROGRAPH ROUTING DATA

 58 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                         L       780.  CHANNEL LENGTH
                         S      .0179  SLOPE
                         N       .035  CHANNEL ROUGHNESS COEFFICIENT
                        CA        .00  CONTRIBUTING AREA
                     SHAPE       TRAP  CHANNEL SHAPE
                        WD      20.00  BOTTOM WIDTH OR DIAMETER
                         Z       3.00  SIDE SLOPE

                                                          ***
                                  COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                        COMPUTATION TIME STEP
                    ELEMENT    ALPHA       M         DT        DX      PEAK    TIME TO      VOLUME    MAXIMUM
                                                                                  PEAK                 CELERITY
                                                      (MIN)     (FT)    (CFS)    (MIN)       (IN)      (FPS)

                      MAIN       1.10      1.48        .99    390.00  1434.59   771.83       1.74      13.12


                                              INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                      MAIN       1.10      1.48       2.00             1434.48   772.00       1.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2790E+03 EXCESS= .0000E+00 OUTFLOW= .2790E+03 BASIN STORAGE= .8632E-03 PERCENT ERROR=     .0


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

                        HYDROGRAPH AT STATION    RT-3B

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     48.00-HR
+   (CFS)      (HR)
                      (CFS)
+    1434.     12.87                449.        141.         70.         70.
                     (INCHES)      1.391       1.744       1.744       1.744
                      (AC-FT)       223.        279.        279.        279.

                     CUMULATIVE AREA =    3.00 SQ MI


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


          ***************
          *           *
 59 KK    *    RT-3C  *     route CP-2 to sub basin G
          *           *
          ***************

             HYDROGRAPH ROUTING DATA

 60 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                         L       655.  CHANNEL LENGTH
                         S      .0214  SLOPE
                         N       .045  CHANNEL ROUGHNESS COEFFICIENT
                        CA        .00  CONTRIBUTING AREA
                     SHAPE       TRAP  CHANNEL SHAPE
                        WD      20.00  BOTTOM WIDTH OR DIAMETER
```

```
                        Z        3.00  SIDE SLOPE

                                                    ***
                              COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                   COMPUTATION TIME STEP
                  ELEMENT    ALPHA      M        DT        DX       PEAK    TIME TO     VOLUME    MAXIMUM
                                                                              PEAK                CELERITY
                                               (MIN)      (FT)     (CFS)    (MIN)       (IN)      (FPS)

                   MAIN        .94     1.48       .93    327.50   1434.10   772.59      1.74      11.76

                                    INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                   MAIN        .94     1.48      2.00             1433.99   772.00      1.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2790E+03 EXCESS= .0000E+00 OUTFLOW= .2790E+03 BASIN STORAGE= .6957E-03 PERCENT ERROR=     .0


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

                      HYDROGRAPH AT STATION    RT-3C

  PEAK FLOW      TIME                            MAXIMUM AVERAGE FLOW
                                        6-HR        24-HR       72-HR      48.00-HR
+   (CFS)        (HR)
                        (CFS)
+    1434.      12.87                   449.         141.         70.          70.
                     (INCHES)          1.391        1.744       1.744        1.744
                       (AC-FT)          223.         279.        279.         279.

                      CUMULATIVE AREA =     3.00 SQ MI


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

            ***************
            *             *
  61 KK     *    RT-3D    *      route CP-2 to sub basin G
            *             *
            ***************

              HYDROGRAPH ROUTING DATA

  62 RD         MUSKINGUM-CUNGE CHANNEL ROUTING
                        L        1555.  CHANNEL LENGTH
                        S        .0283  SLOPE
                        N         .035  CHANNEL ROUGHNESS COEFFICIENT
                       CA          .00  CONTRIBUTING AREA
                    SHAPE         TRAP  CHANNEL SHAPE
                       WD        20.00  BOTTOM WIDTH OR DIAMETER
                        Z         3.00  SIDE SLOPE
                                                    ***
                              COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                   COMPUTATION TIME STEP
                  ELEMENT    ALPHA      M        DT        DX       PEAK    TIME TO     VOLUME    MAXIMUM
                                                                              PEAK                CELERITY
                                               (MIN)      (FT)     (CFS)    (MIN)       (IN)      (FPS)

                   MAIN       1.39     1.48      1.69    777.50   1433.37   774.64      1.74      15.32

                                    INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL
```

```
                    MAIN        1.39       1.48       2.00            1433.34    774.00       1.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2790E+03 EXCESS= .0000E+00 OUTFLOW= .2790E+03 BASIN STORAGE= .1348E-02 PERCENT ERROR=     .0


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

                        HYDROGRAPH AT STATION     RT-3D

 PEAK FLOW     TIME                              MAXIMUM AVERAGE FLOW
                                        6-HR        24-HR       72-HR      48.00-HR
+   (CFS)       (HR)
                          (CFS)
+    1433.     12.90                    449.        141.         70.          70.
                        (INCHES)       1.391       1.744       1.744        1.744
                         (AC-FT)       223.        279.        279.         279.

                        CUMULATIVE AREA =    3.00 SQ MI


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


           **************
           *            *
  63 KK    *          G *      sub basin
           *            *
           **************

              SUBBASIN RUNOFF DATA

      JA        SUBBASIN CHARACTERISTICS
                      TAREA          .43  SUBBASIN AREA

                PRECIPITATION DATA

  65 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
                  .48     .87    1.45    1.56    1.64    1.81    2.27    2.73     .00     .00     .00     .00

                                                STORM AREA =     .00

  66 LS         SCS LOSS RATE
                      STRTL          .35  INITIAL ABSTRACTION
                     CRVNBR        85.00  CURVE NUMBER
                      RTIMP          .00  PERCENT IMPERVIOUS AREA

  67 UD         SCS DIMENSIONLESS UNITGRAPH
                      TLAG          .43  LAG

                                                    ***

                                                UNIT HYDROGRAPH
                                            66 END-OF-PERIOD ORDINATES
                    10.       30.       56.       87.      128.      178.      236.      301.      357.      401.
                   434.       455.      459.      459.     451.      430.      406.      380.      351.      317.
                   276.       239.      207.      183.     162.      143.      126.      114.      101.       90.
                    80.       69.       62.       55.      48.       43.       38.       34.       30.       26.
                    23.       21.       18.       16.      14.       13.       11.       10.        9.        8.
                     7.        6.        5.        5.       4.        4.        4.        3.        3.        2.
                     2.        2.        1.        1.       1.        0.

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

                        HYDROGRAPH AT STATION         G
```

TOTAL RAINFALL = 2.73, TOTAL LOSS = 1.37, TOTAL EXCESS = 1.36

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
+	(CFS)	(HR)					
			(CFS)				
+	299.	12.50		51.	16.	8.	8.
			(INCHES)	1.104	1.364	1.364	1.364
			(AC-FT)	25.	31.	31.	31.

CUMULATIVE AREA = .43 SQ MI

*** ***

```
**************
*            *
*      CP-3  *
*            *
**************
```

68 KK combine CP-2 with sub basin G

69 KO OUTPUT CONTROL VARIABLES

IPRNT	3	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	21	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	1441	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

IC HYDROGRAPH COMBINATION

ICOMP	2	NUMBER OF HYDROGRAPHS TO COMBINE

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

HYDROGRAPH AT STATION CP-3

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	48.00-HR
+	(CFS)	(HR)					
			(CFS)				
+	1616.	12.73		499.	156.	78.	78.
			(INCHES)	1.354	1.696	1.696	1.696
			(AC-FT)	247.	310.	310.	310.

CUMULATIVE AREA = 3.43 SQ MI

*** ***

```
**************
*            *
*      DAM   *
*            *
**************
```

71 KK EVANS CREEK DAM (PROPOSED)

70 AC-FT OF SEDIMENT + 132 AC-FT OF WATER = 202 AC-FT OF STORAGE

73 KO OUTPUT CONTROL VARIABLES

IPRNT	3	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	21	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	1441	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.033	TIME INTERVAL IN HOURS

HYDROGRAPH ROUTING DATA

74 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	STOR	TYPE OF INITIAL CONDITION
RSVRIC	-1.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

75 SA	AREA	2.7	3.0	3.4	3.8	4.2	4.7	5.2	5.7	6.1	6.6
		7.2	7.7	8.4	9.2	9.9	10.6	11.5			
77 SE	ELEVATION	4796.00	4798.00	4800.00	4802.00	4804.00	4806.00	4808.00	4810.00	4812.00	4814.00
		4816.00	4818.00	4820.00	4822.00	4824.00	4826.00	4828.00			
79 SQ	DISCHARGE	0.	16.	47.	65.	109.	144.	159.	163.	167.	170.
		174.	177.	180.	184.	187.	190.	193.	1305.	4522.	9106.
81 SE	ELEVATION	4796.00	4796.50	4797.00	4797.25	4798.00	4799.00	4800.00	4802.00	4804.00	4806.00
		4808.00	4810.00	4812.00	4814.00	4816.00	4818.00	4820.00	4823.00	4827.00	4831.00

***

COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	5.68	12.08	19.30	27.35	36.23	46.04	56.83	68.62	81.39
ELEVATION	4796.00	4798.00	4800.00	4802.00	4804.00	4806.00	4808.00	4810.00	4812.00	4814.00
STORAGE	95.16	109.99	126.03	143.57	162.65	183.14	205.28			
ELEVATION	4816.00	4818.00	4820.00	4822.00	4824.00	4826.00	4828.00			

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	1.36	2.75	3.47	5.68	8.78	12.08	19.30	27.35	36.23
OUTFLOW	.00	16.40	46.50	65.00	109.40	143.80	159.20	162.90	166.60	170.10
ELEVATION	4796.00	4796.50	4797.00	4797.25	4798.00	4799.00	4800.00	4802.00	4804.00	4806.00
STORAGE	46.04	56.83	68.62	81.39	95.16	109.99	126.03	143.57	152.93	162.65
OUTFLOW	173.60	177.00	180.30	183.60	186.80	190.00	193.10	934.23	1304.80	2109.20
ELEVATION	4808.00	4810.00	4812.00	4814.00	4816.00	4818.00	4820.00	4822.00	4823.00	4824.00
STORAGE	183.14	193.98	205.28	242.08						
OUTFLOW	3718.00	4522.40	5668.30	9106.00						
ELEVATION	4826.00	4827.00	4828.00	4831.00						

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

HYDROGRAPH AT STATION DAM

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	48.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 664.	13.87		274.	156.	78.	78.
		(INCHES)	.745	1.695	1.696	1.696
		(AC-FT)	136.	310.	310.	310.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	48.00-HR
+ (AC-FT)	(HR)					
137.	13.87		124.	60.	30.	30.

STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	48.00-HR
(FEET)	(HR)					

```
 71.27     13.87              4819.76     4808.57     4802.28     4802.28

                    CUMULATIVE AREA =    3.43 SQ MI


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

          **************
          *            *
 83 KK    *     RT-4A  *      route CP-3 to sub basin C
          *            *
          **************

            HYDROGRAPH ROUTING DATA

 84 RD        MUSKINGUM-CUNGE CHANNEL ROUTING
                       L       2085.  CHANNEL LENGTH
                       S       .0240  SLOPE
                       N        .040  CHANNEL ROUGHNESS COEFFICIENT
                      CA         .00  CONTRIBUTING AREA
                   SHAPE        TRAP  CHANNEL SHAPE
                      WD       40.00  BOTTOM WIDTH OR DIAMETER
                       Z        3.00  SIDE SLOPE

                                                  ***
                              COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                        COMPUTATION TIME STEP
                 ELEMENT    ALPHA       M         DT        DX       PEAK    TIME TO     VOLUME    MAXIMUM
                                                                              PEAK                  CELERITY
                                                    (MIN)     (FT)     (CFS)    (MIN)       (IN)      (FPS)

                    MAIN        .70      1.54       2.00    521.25    663.97   834.00       1.70      9.21

                                          INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                    MAIN        .70      1.54       2.00               663.97   834.00       1.70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3100E+03 EXCESS= .0000E+00 OUTFLOW= .3100E+03 BASIN STORAGE= .3106E-02 PERCENT ERROR=     .0


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

                        HYDROGRAPH AT STATION    RT-4A

  PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR       24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                          (CFS)
+     664.      13.90                     274.        156.         78.         78.
                        (INCHES)          .745       1.695       1.697       1.697
                         (AC-FT)          136.        310.        310.        310.

                        CUMULATIVE AREA =    3.43 SQ MI


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

          **************
          *            *
      KK  *     RT-4B  *      route CP-3 to sub basin C
          *            *
```

```
**************

   HYDROGRAPH ROUTING DATA

86 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                        L       1820.  CHANNEL LENGTH
                        S       .0264  SLOPE
                        N        .050  CHANNEL ROUGHNESS COEFFICIENT
                       CA         .00  CONTRIBUTING AREA
                    SHAPE        TRAP  CHANNEL SHAPE
                       WD       50.00  BOTTOM WIDTH OR DIAMETER
                        Z       50.00  SIDE SLOPE

                                                    ***
                                  COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                       COMPUTATION TIME STEP
                     ELEMENT    ALPHA       M         DT        DX       PEAK    TIME TO      VOLUME    MAXIMUM
                                                                                     PEAK                 CELERITY
                                                        (MIN)     (FT)     (CFS)   (MIN)        (IN)      (FPS)

                       MAIN        .69      1.36       2.00    303.33    664.72   840.00        1.70      4.77

                                              INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                       MAIN        .69      1.36       2.00              664.72   840.00        1.70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3100E+03 EXCESS= .0000E+00 OUTFLOW= .3100E+03 BASIN STORAGE= .1865E-02 PERCENT ERROR=     .0

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

                        HYDROGRAPH AT STATION    RT-4B

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                          (CFS)
+     665.     14.00                274.        156.         78.         78.
                         (INCHES)    .745       1.695       1.697       1.697
                         (AC-FT)     136.        310.        310.        310.

                        CUMULATIVE AREA =    3.43 SQ MI

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

          **************
          *            *
87 KK     *          C *      sub basin
          *            *
          **************

   SUBBASIN RUNOFF DATA

88 BA          SUBBASIN CHARACTERISTICS
                    TAREA         .40  SUBBASIN AREA

               PRECIPITATION DATA

89 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
                 .48     .87    1.45    1.55    1.63    1.79    2.20    2.62     .00     .00     .00     .00
```

STORM AREA = .00

-S SCS LOSS RATE
STRTL .33 INITIAL ABSTRACTION
CRVNBR 86.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

91 UD SCS DIMENSIONLESS UNITGRAPH
TLAG .57 LAG

***

UNIT HYDROGRAPH
87 END-OF-PERIOD ORDINATES

6.	13.	26.	41.	57.	78.	100.	130.	160.	196.
228.	258.	281.	302.	314.	323.	325.	325.	324.	316.
305.	292.	279.	264.	248.	229.	208.	186.	167.	149.
136.	124.	113.	102.	93.	86.	79.	72.	66.	60.
55.	49.	45.	41.	38.	34.	31.	29.	26.	24.
22.	20.	18.	16.	15.	13.	12.	11.	10.	9.
9.	8.	7.	6.	6.	5.	5.	4.	4.	4.
3.	3.	3.	3.	3.	2.	2.	2.	2.	1.
1.	1.	1.	1.	1.	0.	0.			

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

HYDROGRAPH AT STATION C

TOTAL RAINFALL = 2.62, TOTAL LOSS = 1.28, TOTAL EXCESS = 1.34

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	48.00-HR
+ (CFS)	(HR)					
		(CFS)				
235.	12.63		47.	14.	7.	7.
		(INCHES)	1.100	1.342	1.342	1.342
		(AC-FT)	23.	28.	28.	28.

CUMULATIVE AREA = .40 SQ MI

*** ***

****
* *
92 KK * CP-4 * combine CP-3 with sub basin C
* *
****

93 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

***

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

HYDROGRAPH AT STATION CP-4

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	48.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 689.	14.00		313.	170.	85.	85.
		(INCHES)	.762	1.658	1.660	1.660
		(AC-FT)	155.	338.	338.	338.

CUMULATIVE AREA = 3.82 SQ MI

```
** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          ***************
          *             *
 94 KK    *      RT-5   *      route CP-4 to sub basin D
          *             *
          ***************

             HYDROGRAPH ROUTING DATA

 95 RD         MUSKINGUM-CUNGE CHANNEL ROUTING
                        L       3450.  CHANNEL LENGTH
                        S       .0191  SLOPE
                        N        .030  CHANNEL ROUGHNESS COEFFICIENT
                       CA         .00  CONTRIBUTING AREA
                    SHAPE        TRAP  CHANNEL SHAPE
                       WD       50.00  BOTTOM WIDTH OR DIAMETER
                        Z       50.00  SIDE SLOPE

                                                          ***
                                  COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                           COMPUTATION TIME STEP
                    ELEMENT    ALPHA       M         DT        DX       PEAK    TIME TO      VOLUME    MAXIMUM
                                                                                    PEAK                 CELERITY
                                                        (MIN)     (FT)     (CFS)   (MIN)        (IN)      (FPS)

                      MAIN        .97      1.36       2.00    383.33    693.53   848.00       1.66      6.22


                                                 INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL


                      MAIN        .97      1.36       2.00              693.53   848.00       1.66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3383E+03 EXCESS= .0000E+00 OUTFLOW= .3383E+03 BASIN STORAGE= .2871E-02 PERCENT ERROR=     .0


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

                        HYDROGRAPH AT STATION     RT-5

  PEAK FLOW     TIME                              MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR       72-HR     48.00-HR
+   (CFS)       (HR)
                  (CFS)
+    694.     14.13                       313.        170.         85.         85.
                (INCHES)                  .762       1.658       1.660       1.660
                (AC-FT)                   155.        338.        338.        338.

                CUMULATIVE AREA =    3.82 SQ MI


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


          ***************
          *             *
 96 KK    *         D   *      sub basin
          *             *
          ***************

             SUBBASIN RUNOFF DATA

 .. BA         SUBBASIN CHARACTERISTICS
```

```
                TAREA         .56  SUBBASIN AREA

            PRECIPITATION DATA

 98 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
              .48     .87    1.45    1.54    1.60    1.74    2.09    2.44     .00     .00     .00     .00

                                                STORM AREA =      .00

 99 LS          SCS LOSS RATE
                     STRTL         .38  INITIAL ABSTRACTION
                    CRVNBR       84.00  CURVE NUMBER
                     RTIMP         .00  PERCENT IMPERVIOUS AREA

100 UD          SCS DIMENSIONLESS UNITGRAPH
                     TLAG         .59  LAG

                                                    ***

                                                UNIT HYDROGRAPH
                                            90 END-OF-PERIOD ORDINATES
                  7.      16.      33.      52.      74.     100.     129.     166.     205.     250.
                296.     335.     371.     397.     419.     434.     441.     443.     442.     439.
                425.     410.     393.     375.     355.     333.     309.     281.     252.     227.
                203.     186.     169.     155.     141.     129.     119.     110.     101.      92.
                 85.      77.      70.      64.      59.      54.      49.      45.      41.      38.
                 34.      31.      29.      26.      24.      22.      20.      18.      17.      15.
                 14.      13.      12.      11.      10.       9.       8.       8.       7.       6.
                  6.       5.       5.       5.       4.       4.       4.       3.       3.       3.
                  2.       2.       2.       2.       1.       1.       1.       1.       0.       0.

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

                        HYDROGRAPH AT STATION        D

     TOTAL RAINFALL =     2.44, TOTAL LOSS =     1.37, TOTAL EXCESS =     1.07

   PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR        24-HR        72-HR      48.00-HR
 +    (CFS)       (HR)
                          (CFS)
 +      270.     12.67                   54.          16.           8.           8.
                         (INCHES)       .901        1.070        1.070        1.070
                         (AC-FT)         27.          32.          32.          32.

                        CUMULATIVE AREA =      .56 SQ MI


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


            **************
            *            *
 101 KK     *      CP-5  *      combine CP-4 with sub basin D
            *            *
            **************

 102 HC          HYDROGRAPH COMBINATION
                     ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                    ***

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

                        HYDROGRAPH AT STATION      CP-5

    ..K FLOW     TIME                          MAXIMUM AVERAGE FLOW
```

			6-HR	24-HR	72-HR	48.00-HR
^S)	(HR)					
		(CFS)				
+ 718.	14.13		363.	186.	93.	93.
		(INCHES)	.772	1.583	1.585	1.585
		(AC-FT)	180.	370.	370.	370.

CUMULATIVE AREA = 4.38 SQ MI

1

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

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	E	753.	12.97	213.	67.	33.	1.29		
+	ROUTED TO	RT-1A	752.	12.97	213.	67.	33.	1.29		
+	ROUTED TO	RT-1B	752.	13.00	213.	67.	33.	1.29		
+	ROUTED TO	RT-1C	752.	13.00	213.	67.	33.	1.29		
+	ROUTED TO	RT-1E	751.	13.00	213.	67.	33.	1.29		
	HYDROGRAPH AT	A	412.	12.87	112.	35.	17.	.85		
+	HYDROGRAPH AT	F	320.	12.33	45.	14.	7.	.32		
+	3 COMBINED AT	CP-1	1221.	12.90	370.	116.	58.	2.46		
+	ROUTED TO	RT-2A	1220.	12.90	370.	116.	58.	2.46		
+	ROUTED TO	RT-2B	1220.	12.93	370.	116.	58.	2.46		
+	ROUTED TO	RT-2C	1220.	12.97	370.	116.	58.	2.46		
+	HYDROGRAPH AT	B	475.	12.47	80.	25.	12.	.54		
+	2 COMBINED AT	CP-2	1435.	12.83	449.	141.	70.	3.00		
+	ROUTED TO	RT-3A	1434.	12.83	449.	141.	70.	3.00		
+	ROUTED TO	RT-3B	1434.	12.87	449.	141.	70.	3.00		
+	ROUTED TO	RT-3C	1434.	12.87	449.	141.	70.	3.00		
+	ROUTED TO	RT-3D	1433.	12.90	449.	141.	70.	3.00		
	HYDROGRAPH AT	G	299.	12.50	51.	16.	8.	.43		

2 COMBINED AT									
	CP-3	1616.	12.73	499.	156.	78.	3.43		
ROUTED TO									
+	DAM	664.	13.87	274.	156.	78.	3.43		
+								4821.27	13.87
ROUTED TO									
+	RT-4A	664.	13.90	274.	156.	78.	3.43		
ROUTED TO									
+	RT-4B	665.	14.00	274.	156.	78.	3.43		
HYDROGRAPH AT									
+	C	235.	12.63	47.	14.	7.	.40		
2 COMBINED AT									
+	CP-4	689.	14.00	313.	170.	85.	3.82		
ROUTED TO									
+	RT-5	694.	14.13	313.	170.	85.	3.82		
HYDROGRAPH AT									
+	D	270.	12.67	54.	16.	8.	.56		
2 COMBINED AT									
+	CP-5	718.	14.13	363.	186.	93.	4.38		

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
RT-1A	MANE	1.55	752.77	779.51	1.93	2.00	752.32	778.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .6782E-03 PERCENT ERROR= .0

RT-1B	MANE	.56	752.33	778.80	1.93	2.00	752.19	780.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .4994E-03 PERCENT ERROR= .0

RT-1C	MANE	.51	752.05	779.96	1.93	2.00	752.04	780.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .3608E-03 PERCENT ERROR= .0

RT-1E	MANE	1.32	751.73	780.65	1.93	2.00	751.38	780.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+03 EXCESS= .0000E+00 OUTFLOW= .1326E+03 BASIN STORAGE= .8865E-03 PERCENT ERROR= .0

RT-2A	MANE	.46	1220.36	774.30	1.75	2.00	1220.08	774.00	1.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2296E+03 EXCESS= .0000E+00 OUTFLOW= .2296E+03 BASIN STORAGE= .3483E-03 PERCENT ERROR= .0

RT-2B	MANE	2.00	1219.99	776.00	1.75	2.00	1219.99	776.00	1.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2296E+03 EXCESS= .0000E+00 OUTFLOW= .2296E+03 BASIN STORAGE= .3045E-02 PERCENT ERROR= .0

RT-2C	MANE	2.00	1219.59	778.00	1.75	2.00	1219.59	778.00	1.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2296E+03 EXCESS= .0000E+00 OUTFLOW= .2296E+03 BASIN STORAGE= .3806E-02 PERCENT ERROR= .0

RT-3A	MANE	1.99	1435.00	771.53	1.74	2.00	1434.46	770.00	1.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2790E+03 EXCESS= .0000E+00 OUTFLOW= .2790E+03 BASIN STORAGE= .2557E-02 PERCENT ERROR= .0

RT-3B	MANE	.99	1434.59	771.83	1.74	2.00	1434.48	772.00	1.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2790E+03 EXCESS= .0000E+00 OUTFLOW= .2790E+03 BASIN STORAGE= .8632E-03 PERCENT ERROR= .0

RT-3C	MANE	.93	1434.10	772.59	1.74	2.00	1433.99	772.00	1.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2790E+03 EXCESS= .0000E+00 OUTFLOW= .2790E+03 BASIN STORAGE= .6957E-03 PERCENT ERROR= .0

RT-3D	MANE	1.69	1433.37	774.64	1.74	2.00	1433.34	774.00	1.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2790E+03 EXCESS= .0000E+00 OUTFLOW= .2790E+03 BASIN STORAGE= .1348E-02 PERCENT ERROR= .0

RT-4A	MANE	2.00	663.97	834.00	1.70	2.00	663.97	834.00	1.70

NUITY SUMMARY (AC-FT) - INFLOW= .3100E+03 EXCESS= .0000E+00 OUTFLOW= .3100E+03 BASIN STORAGE= .3106E-02 PERCENT ERROR= .0

RT-4B	MANE	2.00	664.72	840.00	1.70	2.00	664.72	840.00	1.70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3100E+03 EXCESS= .0000E+00 OUTFLOW= .3100E+03 BASIN STORAGE= .1865E-02 PERCENT ERROR= .0

RT-5	MANE	2.00	693.53	848.00	1.66	2.00	693.53	848.00	1.66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3383E+03 EXCESS= .0000E+00 OUTFLOW= .3383E+03 BASIN STORAGE= .2871E-02 PERCENT ERROR= .0

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

Existing Conditions

Watershed Data

September 01, 2000

Evans Creek

HYDROLOGIC ANALYSIS
EXISTING CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: **A**

Measured= 546.7 acres
0.854 sq. miles

Watershed Slope:

Length=	12485 ft
Lc =	6905 ft
Elev. Low	4946 ft
Elev. high	5621 ft
Height=	675 ft
Slope=	5.41%
Slope=	285.5 ft/mile

Curve Number Estimate:

HSG	AREA	% OF TOTAL	LAND USE/COVER TYPE	CURVE NO.	K VALUE	SOIL TYPE
D	120.8	22%	40% Sage/Grass	74	0.09	
C	40.6	7%	40% Sage/Grass	69	0.09	
C	38.9	7%	60% Sage/Grass	59	0.09	
D	26.6	5%	60% Sage/Grass	65	0.09	
D/NR	45.3	8%	Streets/Right of Way	95	0.05	
C	13.3	2%	Streets/Right of Way	95	0.05	
D	19.7	4%	20% Sage/Grass	84	0.09	
D	20.5	4%	30% Sage/Grass	79	0.09	
C	8.5	2%	60% Sage/Grass	59	0.09	
D	43.7	8%	7 Units/Acre	92	0.05	
D/NR	41.7	8%	Mixed Residential	92	0.05	
D	10.7	2%	Pinyon-Juniper-Poor	89	0.15	
C	10.9	2%	60% Sage/Grass	59	0.09	
C	0.3	0%	Parks and Recreation	75	0.10	
NR	1.1	0%	Parks and Recreation	81	0.10	
D	12.3	2%	Industrial	93	0.05	
D	65.9	12%	10% Sage/Grass	89	0.08	
C	22.1	4%	10% Sage/Grass	84	0.08	
C	3.8	1%	Pinyon-Juniper-Poor	85	0.15	
TOTAL	546.7	100%	COMPOSITE	**80**	**0.08**	

Evans Creek

HYDROLOGIC ANALYSIS
EXISTING CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: **A**

Lag Time Estimate: (Washoe County HCDDM Criteria)

Initial Overland Time (ti)

R	Length (ft)	Slope (%)	Ti (min)
0.6690	500	16	6.9

Channel Reach Travel Time (Upland Method)

Slope=	5 %	
Ave Vel=	2.25 ft/sec	Figure 701 WCHCDDM (Alluvial Fans Western Regions)
Tt=	88.8 min	
Tc=Ti+Tt=	95.7 min	
[illegible]		(Tc=L/180+10 urbanized basins check)

Lag Time (USBR Method)

TLAG=	0.99 hours

Evans Creek

HYDROLOGIC ANALYSIS
EXISTING CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: **B**

Measured= 344.0 acres
0.538 sq. miles

Watershed Slope:

Length=	6425 ft
Lc =	2050 ft
Elev. Low	4868 ft
Elev. high	5370 ft
Height=	502 ft
Slope=	7.81%
Slope=	412.5 ft/mile

Curve Number Estimate:

HSG	AREA	% OF TOTAL	LAND USE/COVER TYPE	CURVE NO.	K VALUE	SOIL TYPE
D/NR	24.3	7%	Streets/Right of Way	95	0.05	
C	0.1	0%	30% Sage/Grass	74	0.09	
D	94.3	27%	30% Sage/Grass	79	0.09	
D	12.4	4%	50% Sage/Grass	70	0.09	
C	0.2	0%	60% Sage/Grass	58	0.09	
D/NR	15.6	5%	60% Sage/Grass	79	0.09	
D/NR	13.7	4%	Commercial	95	0.05	
D	15.4	4%	Rock Outcrop	94	0.04	
D	25.8	8%	Single Family Res.	86	0.07	
D	5.4	2%	Mixed Residential	92	0.05	
D/NR	56.4	16%	40% Sage/Grass	75	0.09	
C	9.0	3%	40% Sage/Grass	68	0.09	
D	65.7	19%	1/3 Acre Residential	86	0.07	
D	5.4	2%	Pinyon-Juniper-Poor	89	0.15	
C	0.3	0%	Pinyon-Juniper-Poor	85	0.15	
TOTAL	344.0	100%	COMPOSITE	**82**	**0.08**	

Evans Creek

HYDROLOGIC ANALYSIS
EXISTING CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: **B**

Lag Time Estimate: (Washoe County HCDDM Criteria)

Initial Overland Time (ti)

R	Length (ft)	Slope (%)	Ti (min)
0.6975	500	16.4	6.4

Channel Reach Travel Time (Upland Method)

Slope=	7.1 %	
Ave Vel=	2.70 ft/sec	Figure 701 WCHCDDM (Alluvial Fans Western Regions)
Tt=	36.6 min	
Tc=Ti+Tt=	43.0 min	
Tc=	45.7 min	(Tc=L/180+10 urbanized basins check)
Lag Time=	0.43 hours	

Lag Time (USBR Method)

TLAG= 0.50 hours

Evans Creek

HYDROLOGIC ANALYSIS
EXISTING CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: **C**

Measured= 253.6 acres
0.396 sq. miles

Watershed Slope:

Length=	6360 ft
Lc =	3675 ft
Elev. Low	4660 ft
Elev. high	5310 ft
Height=	650 ft
Slope=	10.22%
Slope=	539.6 ft/mile

Curve Number Estimate:

HSG	AREA	% OF TOTAL	LAND USE/COVER TYPE	CURVE NO.	K VALUE	SOIL TYPE
D	8.0	3%	Rock Outcrop	94	0.04	
D	136.2	54%	20% Sage/Grass	84	0.09	
C	6.2	2%	20% Sage/Grass	79	0.09	
D	3.7	1%	Commercial	95	0.05	
D	27.0	11%	50% Sage/Grass	70	0.09	
D	20.0	8%	Pasture-Good	80	0.10	
D	0.7	0%	30% Sage/Grass	79	0.08	
D	0.5	0%	50% Sage/Grass	70	0.09	
D	13.3	5%	20% Sage/Grass	84	0.09	
D	34.0	13%	7 Units/Acre	92	0.05	
D	2.7	1%	50% Sage/Grass	70	0.08	
D	1.3	1%	Streets/Right of Way	95	0.05	
TOTAL	253.6	100%	COMPOSITE	**83**	**0.08**	

Evans Creek

HYDROLOGIC ANALYSIS
EXISTING CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: **C**

Lag Time Estimate: (Washoe County HCDDM Criteria)

Initial Overland Time (ti)

R	Length (ft)	Slope (%)	Ti (min)
0.7120	500	18.8	5.9

Channel Reach Travel Time (Upland Method)

Slope=	9.5	%	
Ave Vel=	3.20	ft/sec	Figure 701 WCHCDDM (Alluvial Fans Western Regions)
Tt=	30.5	min	
Tc=Ti+Tt=	36.4	min	
Tc=	45.3	min	(Tc=L/180+10 urbanized basins check)
Lag Time=	0.36	hours	

Lag Time (USBR Method)

LAG=[illegible]

Evans Creek

HYDROLOGIC ANALYSIS
EXISTING CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: **D**

Measured= 356 acres
0.557 sq. miles

Watershed Slope:

Length=	8745 ft
Lc =	3650 ft
Elev. Low	4594 ft
Elev. high	5148 ft
Height=	554 ft
Slope=	6.34%
Slope=	334.5 ft/mile

Curve Number Estimate:

HSG	AREA	% OF TOTAL	LAND USE/COVER TYPE	CURVE NO.	K VALUE	SOIL TYPE
D	105.4	30%	20% Sage/Grass	84	0.08	
D/NR	35.7	10%	Mixed Residential	92	0.05	
D	10.4	3%	20% Sage/Grass	84	0.09	
D/NR	163.5	46%	Pasture-Good	80	0.1	
D	0.1	0%	Commercial	95	0.05	
D	41.1	12%	Streets/Right of Way	95	0.05	
TOTAL	356.2	100%	COMPOSITE	**84**	**0.08**	

Evans Creek

HYDROLOGIC ANALYSIS
EXISTING CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: **D**

Lag Time Estimate: (Washoe County HCDDM Criteria)

Initial Overland Time (ti)

R	Length (ft)	Slope (%)	Ti (min)
0.7219	500	6.8	8.0

Channel Reach Travel Time (Upland Method)

Slope=	6.25 %	
Ave Vel=	2.50 ft/sec	Figure 701 WCHCDDM (Alluvial Fans Western Regions)
Tt=	55.0 min	
Tc=Ti+Tt=	63.0 min	
[redacted]		(Tc=L/180+10 urbanized basins check)

Lag Time (USBR Method)

TLAG=	0.74 hours

Evans Creek

HYDROLOGIC ANALYSIS
EXISTING CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: **E**

Measured= 826 acres
1.291 sq. miles

Watershed Slope:

Length=	14400 ft
Lc =	8565 ft
Elev. Low	5022 ft
Elev. high	5306 ft
Height=	284 ft
Slope=	1.97%
Slope=	104.1 ft/mile

Curve Number Estimate:

HSG	AREA	% OF TOTAL	LAND USE/COVER TYPE	CURVE NO.	K VALUE	SOIL TYPE
D/NR	27.9	3%	Industrial	93	0.05	
D/NR	0.0	0%	Mixed Residential	92	0.05	
D/NR	192.3	23%	Special Planning	93	0.05	
C	36.8	4%	40% Sage/Grass	68	0.09	
D	325.3	39%	40% Sage/Grass	75	0.09	
D	11.8	1%	50% Sage/Grass	70	0.09	
C	18.4	2%	50% Sage/Grass	63	0.09	
D	17.7	2%	60% Sage/Grass	65	0.09	
C	6.4	1%	60% Sage/Grass	58	0.09	
D	15.2	2%	20% Sage/Grass	84	0.09	
C	77.0	9%	Special Planning	91	0.05	
C	22.8	3%	Streets/Right of Way	94	0.05	
D	74.5	9%	Streets/Right of Way	95	0.05	
TOTAL	826.1	100%	COMPOSITE	**83**	**0.07**	

Evans Creek

HYDROLOGIC ANALYSIS
EXISTING CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: **E**

Lag Time Estimate: (Washoe County HCDDM Criteria)

Initial Overland Time (ti)

R	Length (ft)	Slope (%)	Ti (min)
0.7028	500	8	8.0

Channel Reach Travel Time (Upland Method)

Slope=	1.8	%	
Ave Vel=	1.40	ft/sec	Figure 701 WCHCDDM (Alluvial Fans Western Regions)
Tt=	165.5	min	
Tc=Ti+Tt=	173.5	min	
[redacted]			(Tc=L/180+10 urbanized basins check)

Lag Time (USBR Method)

TLAG=	1.19	hours

Evans Creek

HYDROLOGIC ANALYSIS
EXISTING CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: F

Measured= 203 acres
0.317 sq. miles

Watershed Slope:

Length=	4935 ft
Lc =	2565 ft
Elev. Low	4968 ft
Elev. high	5456 ft
Height=	488 ft
Slope=	9.89%
Slope=	522.1 ft/mile

Curve Number Estimate:

HSG	AREA	% OF TOTAL	LAND USE/COVER TYPE	CURVE NO.	K VALUE	SOIL TYPE
D	5.4	3%	Rock Outcrop	94	0.04	
D	41.2	20%	40% Sage/Grass	75	0.09	
D	21.8	11%	1/3 Acre Residential	86	0.07	
D	3.2	2%	Single Family Res.	86	0.07	
D	10.8	5%	Mixed Residential	92	0.05	
D	7.6	4%	10% Sage/Grass	89	0.08	
D	7.7	4%	Pinyon-Juniper-Poor	89	0.15	
D	5.5	3%	30% Sage/Grass	80	0.09	
D	45.0	22%	60% Sage/Grass	65	0.09	
D	46.9	23%	50% Sage/Grass	70	0.08	
D	7.6	4%	Streets/Right of Way	95	0.05	
TOTAL	202.7	100%	COMPOSITE	**76**	**0.08**	

Evans Creek

HYDROLOGIC ANALYSIS
EXISTING CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: F

Lag Time Estimate: (Washoe County HCDDM Criteria)

Initial Overland Time (ti)

R	Length (ft)	Slope (%)	Ti (min)
0.6176	500	21.6	7.0

Channel Reach Travel Time (Upland Method)

Slope=	8.6 %	
Ave Vel=	3.00 ft/sec	Figure 701 WCHCDDM (Alluvial Fans Western Regions)
Tt=	24.6 min	
Tc=Ti+Tt=	31.6 min	
Tc=	37.4 min	(Tc=L/180+10 urbanized basins check)
Lag Time=	0.62 hours	

Lag Time (USBR Method)

TLAG=	0.50 hours

Evans Creek

HYDROLOGIC ANALYSIS
EXISTING CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: **G**

Measured= 272 acres
0.426 sq. miles

Watershed Slope:

Length=	5310 ft
Lc =	2385 ft
Elev. Low	4758 ft
Elev. high	5350 ft
Height=	592 ft
Slope=	11.15%
Slope=	588.7 ft/mile

Curve Number Estimate:

HSG	AREA	% OF TOTAL	LAND USE/COVER TYPE	CURVE NO.	K VALUE	SOIL TYPE
D	30.4	11%	Rock Outcrop	94	0.04	
D	35.3	13%	20% Sage/Grass	84	0.09	
D/NR	22.1	8%	30% Sage/Grass	79	0.09	
C	4.1	2%	30% Sage/Grass	74	0.09	
C	9.9	4%	40% Sage/Grass	68	0.09	
D/NR	19.1	7%	40% Sage/Grass	75	0.09	
C	0.3	0%	50% Sage/Grass	63	0.09	
D	92.2	34%	50% Sage/Grass	70	0.09	
D	1.6	1%	Streets/Right of Way	95	0.05	
C	5.7	2%	Pinyon-Juniper-Poor	85	0.15	
D/NR	0.9	0%	Pinyon-Juniper-Poor	89	0.15	
D	9.7	4%	50% Sage/Grass	70	0.09	
C	4.1	2%	40% Sage/Grass	68	0.09	
D	3.1	1%	7 Units/Acre	92	0.05	
D	30.7	11%	30% Sage/Grass	79	0.09	
D	3.2	1%	50% Sage/Grass	70	0.08	
TOTAL	272.4	100%	COMPOSITE	**77**	**0.09**	

Evans Creek

HYDROLOGIC ANALYSIS
EXISTING CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: **G**

Lag Time Estimate: (Washoe County HCDDM Criteria)

Initial Overland Time (ti)

R	Length (ft)	Slope (%)	Ti (min)
0.6305	500	14	7.8

Channel Reach Travel Time (Upland Method)

Slope=	10.9 %	
Ave Vel=	3.25 ft/sec	Figure 701 WCHCDDM (Alluvial Fans Western Regions)
Tt=	24.7 min	
Tc=Ti+Tt=	32.5 min	
Tc=	39.5 min	(Tc=L/180+10 urbanized basins check)
Lag Time=	0.33 hours	

Lag Time (USBR Method)

[redacted]

Replaces Appendix B - Proposed Conditions

Watershed Data

September 01, 2000

Evans Creek

HYDROLOGIC ANALYSIS
FUTURE LAND USE CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: **A**

Measured= 546.7 acres
0.854 sq. miles

Watershed Slope:

Length=	12485 ft
Lc =	6905 ft
Elev. Low	4946 ft
Elev. high	5621 ft
Height=	675 ft
Slope=	5.41%
Slope=	285.5 ft/mile

Curve Number Estimate:

HSG	AREA	% OF TOTAL	LAND USE/COVER TYPE	CURVE NO.	K VALUE	SOIL TYPE
D	40.1	7%	40% Sage/Grass	74	0.09	
C	30.4	6%	40% Sage/Grass	69	0.09	
C	35.8	7%	60% Sage/Grass	59	0.09	
D	1.7	0%	60% Sage/Grass	65	0.09	
D/NR	45.3	8%	Streets/Right of Way	95	0.05	
C	13.3	2%	Streets/Right of Way	95	0.05	
D	1.5	0%	Commercial	95	0.05	
D	18.0	3%	Special Planning	93	0.05	
C	8.5	2%	Special Planning	91	0.05	
D	43.7	8%	7 Units/Acre	92	0.05	
D/NR	65.4	12%	Mixed Residential	92	0.05	
D	132.0	24%	Single Family Res.	86	0.07	
C	24.2	4%	Single Family Res.	81	0.07	
C	0.3	0%	Parks and Recreation	75	0.1	
NR	1.1	0%	Parks and Recreation	81	0.1	
D	33.9	6%	Industrial	93	0.05	
D	25.6	5%	10% Sage/Grass	89	0.08	
C	22.1	4%	10% Sage/Grass	84	0.08	
C	3.8	1%	Pinyon-Juniper-Poor	85	0.15	
TOTAL	546.7	100%	COMPOSITE	**85**	**0.07**	

Evans Creek

HYDROLOGIC ANALYSIS
FUTURE LAND USE CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: **A**

Lag Time Estimate: (Washoe County HCDDM Criteria)

Initial Overland Time (ti)

R	Length (ft)	Slope (%)	Ti (min)
0.7331	500	16	5.9

Channel Reach Travel Time (Upland Method)

Slope=	5 %	
Ave Vel=	2.25 ft/sec	Figure 701 WCHCDDM (Alluvial Fans Western Regions)
Tt=	88.8 min	
Tc=Ti+Tt=	94.6 min	
Tc=	[illegible] min	(Tc=L/180+10 urbanized basins check)
Lag Time=	[illegible] hours	

Lag Time (USBR Method)

TLAG= 0.85 hours

Evans Creek

HYDROLOGIC ANALYSIS
FUTURE LAND USE CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: **B**

Measured= 344.0 acres
0.538 sq. miles

Watershed Slope:

Length=	6425 ft
Lc =	2050 ft
Elev. Low	4868 ft
Elev. high	5370 ft
Height=	502 ft
Slope=	7.81%
Slope=	412.5 ft/mile

Curve Number Estimate:

HSG	AREA	% OF TOTAL	LAND USE/COVER TYPE	CURVE NO.	K VALUE	SOIL TYPE
D/NR	24.3	7%	Streets/Right of Way	95	0.05	
C	0.1	0%	30% Sage/Grass	74	0.09	
D	2.9	1%	30% Sage/Grass	79	0.09	
C	0.2	0%	Special Planning	91	0.05	
D/NR	39.2	11%	Special Planning	93	0.05	
D/NR	13.7	4%	Commercial	95	0.05	
D	15.4	4%	Rock Outcrop	94	0.04	
D	126.8	37%	Single Family Res.	86	0.07	
D/NR	46.4	13%	Mixed Residential	92	0.05	
C	9.0	3%	Mixed Residential	90	0.05	
D	65.7	19%	1/3 Acre Residential	86	0.07	
C	0.3	0%	Pinyon-Juniper-Poor	85	0.15	
TOTAL	344.0	100%	COMPOSITE	**89**	**0.06**	

Evans Creek

HYDROLOGIC ANALYSIS
FUTURE LAND USE CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: **B**

Lag Time Estimate: (Washoe County HCDDM Criteria)

Initial Overland Time (ti)

R	Length (ft)	Slope (%)	Ti (min)
0.7848	500	16.4	5.0

Channel Reach Travel Time (Upland Method)

Slope=	7.1 %	
Ave Vel=	2.70 ft/sec	Figure 701 WCHCDDM (Alluvial Fans Western Regions)
Tt=	36.6 min	
Tc=Ti+Tt=	41.6 min	
Tc=	45.7 min	(Tc=L/180+10 urbanized basins check)
Lag Time=	0.42 hours	

Lag Time (USBR Method)

TLAG=	0.39 hours

Evans Creek

HYDROLOGIC ANALYSIS
FUTURE LAND USE CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: C

Measured= 253.6 acres
0.396 sq. miles

Watershed Slope:

Length=	6360 ft
Lc =	3675 ft
Elev. Low	4660 ft
Elev. high	5310 ft
Height=	650 ft
Slope=	10.22%
Slope=	539.6 ft/mile

Curve Number Estimate:

HSG	AREA	% OF TOTAL	LAND USE/COVER TYPE	CURVE NO.	K VALUE	SOIL TYPE
D	8.0	3%	Rock Outcrop	94	0.04	
D	117.8	46%	20% Sage/Grass	84	0.09	
C	6.2	2%	20% Sage/Grass	79	0.09	
D	3.7	1%	Commercial	95	0.05	
D	45.4	18%	Single Family Res.	86	0.07	
D	20.0	8%	Pasture-Good	80	0.1	
D	0.7	0%	30% Sage/Grass	79	0.08	
D	0.5	0%	50% Sage/Grass	70	0.09	
D	13.3	5%	Mixed Residential	92	0.05	
D	34.0	13%	7 Units/Acre	92	0.05	
D	2.7	1%	50% Sage/Grass	70	0.08	
D	1.3	1%	Streets/Right of Way	95	0.05	
TOTAL	253.6	100%	COMPOSITE	**86**	**0.08**	

Evans Creek

HYDROLOGIC ANALYSIS
FUTURE LAND USE CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: C

Lag Time Estimate: (Washoe County HCDDM Criteria)

Initial Overland Time (ti)

R	Length (ft)	Slope (%)	Ti (min)
0.7420	500	18.8	5.4

Channel Reach Travel Time (Upland Method)

Slope=	9.5	%	
Ave Vel=	3.20	ft/sec	Figure 701 WCHCDDM (Alluvial Fans Western Regions)
Tt=	30.5	min	
Tc=Ti+Tt=	35.9	min	
Tc=	45.3	min	(Tc=L/180+10 urbanized basins check)
Lag Time=	0.36	hours	

Lag Time (USBR Method)

TLAG= [illegible] hours

Evans Creek

HYDROLOGIC ANALYSIS
FUTURE LAND USE CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: **D**

Measured= 356 acres
0.557 sq. miles

Watershed Slope:

Length=	8745 ft
Lc =	3650 ft
Elev. Low	4594 ft
Elev. high	5148 ft
Height=	554 ft
Slope=	6.34%
Slope=	334.5 ft/mile

Curve Number Estimate:

HSG	AREA	% OF TOTAL	LAND USE/COVER TYPE	CURVE NO.	K VALUE	SOIL TYPE
D	105.4	30%	20% Sage/Grass	84	0.08	
D/NR	35.7	10%	Mixed Residential	92	0.05	
D	10.4	3%	20% Sage/Grass	84	0.09	
D/NR	163.5	46%	Pasture-Good	80	0.1	
D	0.1	0%	Commercial	95	0.05	
D	41.1	12%	Streets/Right of Way	95	0.05	
TOTAL	356.2	100%	COMPOSITE	**84**	**0.08**	

Evans Creek

HYDROLOGIC ANALYSIS
FUTURE LAND USE CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: **D**

Lag Time Estimate: (Washoe County HCDDM Criteria)

Initial Overland Time (ti)

R	Length (ft)	Slope (%)	Ti (min)
0.7219	500	6.8	8.0

Channel Reach Travel Time (Upland Method)

Slope=	6.25 %	
Ave Vel=	2.50 ft/sec	Figure 701 WCHCDDM (Alluvial Fans Western Regions)
Tt=	55.0 min	
Tc=Ti+Tt=	63.0 min	
Tc=[illegible]	[illegible]	(Tc=L/180+10 urbanized basins check)
Equil Tc=	0.69 hours	

Lag Time (USBR Method)

TLAG= 0.74 hours

Evans Creek

HYDROLOGIC ANALYSIS
FUTURE LAND USE CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: **E**

Measured= 826 acres
1.291 sq. miles

Watershed Slope:

Length=	14400 ft
Lc =	8565 ft
Elev. Low	5022 ft
Elev. high	5306 ft
Height=	284 ft
Slope=	1.97%
Slope=	104.1 ft/mile

Curve Number Estimate:

HSG	AREA	% OF TOTAL	LAND USE/COVER TYPE	CURVE NO.	K VALUE	SOIL TYPE
D/NR	27.9	3%	Industrial	93	0.05	
D/NR	14.5	2%	Mixed Residential	92	0.05	
D/NR	539.1	65%	Special Planning	93	0.05	
C	8.1	1%	40% Sage/Grass	68	0.09	
D	8.6	1%	40% Sage/Grass	75	0.09	
C	130.6	16%	Special Planning	91	0.05	
C	22.8	3%	Streets/Right of Way	94	0.05	
D	74.5	9%	Streets/Right of Way	95	0.05	
TOTAL	826.1	100%	COMPOSITE	**92**	**0.05**	

Evans Creek

HYDROLOGIC ANALYSIS
FUTURE LAND USE CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: **E**

Lag Time Estimate: (Washoe County HCDDM Criteria)

Initial Overland Time (ti)

R	Length (ft)	Slope (%)	Ti (min)
0.8302	500	8	5.4

Channel Reach Travel Time (Upland Method)

Slope=	1.8 %	
Ave Vel=	1.40 ft/sec	Figure 701 WCHCDDM (Alluvial Fans Western Regions)
Tt=	165.5 min	
Tc=Ti+Tt=	170.9 min	
Tc=Ti+Tt=	180.9 min	(Tc=L/180+10 urbanized basins check)
Lag time=	0.90 hours	

Lag Time (USBR Method)

TLAG= 0.85 hours

Evans Creek

HYDROLOGIC ANALYSIS
FUTURE LAND USE CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: F

Measured= 203 acres
0.317 sq. miles

Watershed Slope:

Length=	4935 ft
Lc =	2565 ft
Elev. Low	4968 ft
Elev. high	5456 ft
Height=	488 ft
Slope=	9.89%
Slope=	522.1 ft/mile

Curve Number Estimate:

HSG	AREA	% OF TOTAL	LAND USE/COVER TYPE	CURVE NO.	K VALUE	SOIL TYPE
D	5.4	3%	Rock Outcrop	94	0.04	
D	0.1	0%	40% Sage/Grass	75	0.09	
D	21.8	11%	1/3 Acre Residential	86	0.07	
D	159.7	79%	Single Family Res.	86	0.07	
D	10.8	5%	Mixed Residential	92	0.05	
D	2.8	1%	10% Sage/Grass	89	0.08	
D	0.5	0%	50% Sage/Grass	70	0.08	
D	1.6	1%	Streets/Right of Way	95	0.05	
TOTAL	202.7	100%	COMPOSITE	**87**	**0.07**	

Evans Creek

HYDROLOGIC ANALYSIS
FUTURE LAND USE CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: F

Lag Time Estimate: (Washoe County HCDDM Criteria)

Initial Overland Time (ti)

R	Length (ft)	Slope (%)	Ti (min)
0.7531	500	21.6	5.0

Channel Reach Travel Time (Upland Method)

Slope=	8.6 %	
Ave Vel=	3.00 ft/sec	Figure 701 WCHCDDM (Alluvial Fans Western Regions)
Tt=	24.6 min	
Tc=Ti+Tt=	37.6 min	
Tc=	37.4 min	(Tc=L/180+10 urbanized basins check)
Lag time=	0.60 hours	

Lag Time (USBR Method)

TLAG= 0.41 hours

Evans Creek

HYDROLOGIC ANALYSIS
FUTURE LAND USE CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: **G**

Measured= 272 acres
0.426 sq. miles

Watershed Slope:

Length=	5310 ft
Lc =	2385 ft
Elev. Low	4758 ft
Elev. high	5350 ft
Height=	592 ft
Slope=	11.15%
Slope=	588.7 ft/mile

Curve Number Estimate:

HSG	AREA	% OF TOTAL	LAND USE/COVER TYPE	CURVE NO.	K VALUE	SOIL TYPE
D	30.4	11%	Rock Outcrop	94	0.04	
D	11.3	4%	20% Sage/Grass	84	0.09	
D/NR	22.1	8%	30% Sage/Grass	79	0.09	
C	4.1	2%	30% Sage/Grass	74	0.09	
C	8.0	3%	40% Sage/Grass	68	0.09	
D/NR	5.0	2%	40% Sage/Grass	75	0.09	
C	0.3	0%	50% Sage/Grass	63	0.09	
D	21.6	8%	50% Sage/Grass	70	0.09	
D	1.6	1%	Streets/Right of Way	95	0.05	
C	5.7	2%	Pinyon-Juniper-Poor	85	0.15	
D/NR	0.9	0%	Pinyon-Juniper-Poor	89	0.15	
D	23.8	9%	Mixed Residential	92	0.05	
C	6.0	2%	Mixed Residential	90	0.05	
D	3.1	1%	7 Units/Acre	92	0.05	
D	125.3	46%	Single Family Res.	86	0.07	
D	3.2	1%	50% Sage/Grass	70	0.08	
TOTAL	272.4	100%	COMPOSITE	**85**	**0.07**	

Evans Creek

HYDROLOGIC ANALYSIS
FUTURE LAND USE CONDITIONS

WRCN:3061
By:BAJ

Watershed Area: **G**

Lag Time Estimate: (Washoe County HCDDM Criteria)

Initial Overland Time (ti)

R	Length (ft)	Slope (%)	Ti (min)
0.7263	500	14	6.2

Channel Reach Travel Time (Upland Method)

Slope=	10.9 %	
Ave Vel=	3.25 ft/sec	Figure 701 WCHCDDM (Alluvial Fans Western Regions)
Tt=	24.7 min	
Tc=Ti+Tt=	30.9 min	
Tc=	39.5 min	(Tc=L/180+10 urbanized basins check)
Lag Time=	0.31 hours	

Lag Time (USBR Method)

TLAG= [illegible] = 0.46 hours

Replaces Appendix F

Meteorological Analysis

September 01, 2000

POTENTIAL PEAK RAINFALL INTENSITIES FOR SMALL DRAINAGE BASINS OF NORTHWEST RENO, NEVADA

EVENS CREEK FLOOD CONTROL PLAN
- METEOROLOGICAL ANALYSIS -

Prepared for: WRC NEVADA, INC
1575 Delucchi Lane, Suite 222
Reno, Nevada 89502

Prepared by: Ronald S. Olson, Meteorologist
(Retired National Weather Service)

Mountain West Weather
345 Sangre Circle
Reno, Nevada 89511

August 2000

EVENS CREEK FLOOD CONTROL PLAN
- METEOROLOGICAL ANALYSIS -

TABLE OF CONTENTS

1.0 INTRODUCTION

The purpose of this report is to review the potential peak rainfall intensities and associated flood potential for small drainage basins in the Reno, Nevada area. Comparisons between winter storm potential and summer convective storm (thunderstorms) potential will be discussed. Local and regional historical precipitation and stream gage records will be reviewed to arrive at known peak intensities for different duration storms in the Reno, Nevada area. Available precipitation networks, both past and current will be described, including problems associated with lack of data. Rainfall distribution for winter storms and summer convective storms will be compared. This will include a brief discussion of topographical effects, moisture sources, and other factors effecting the rainfall distribution in the Reno area.

2.0 HISTORICAL FLOODS

An excellent summary of flooding in the Nevada portion of the Truckee River Basin was prepared by Henz Meteorological Services as part of their " HMS Report 91-7" for Washoe County. The study documented 38 winter flood events and 38 summer flood events during the period from 1867 to 1991. Since 1900 there has been an average of about 3 documented significant winter floods on the Truckee River and its larger tributaries in western Nevada per decade with a little over half of the floods occurring since 1950. Since 1900 there has been an average of about 3 ½ documented summer floods per decade on the Truckee River tributaries in western Nevada. About 85 percent of them occurred since 1950. However, this figure is quite likely misleading. Better reporting and increased development in the area flood plains in recent years gives the false impression that their has been a significant increase in summer thunderstorm floods. Newspaper accounts, Corp of Engineer Reports, Soil Conservation Reports, and other summaries indicate that severity of recorded summer thunderstorm floods were often greater prior to 1972 in the area surrounding Reno. For these reasons one must be careful in reading any trends into these numbers. All that can be said for certain, based on the Henz historical flood summary for the Reno area, is that there is a significant flood threat to much of the area both from winter storm events and summer convective thunderstorms.

3.0 RAIN GAGE NETWORKS

At the turn of the 20th century official rain gage measurements for Reno were being made at the University of Nevada (UNR) campus. Official rain measurements for Reno were taken in downtown Reno from 1905 to 1942. Observations at the UNR campus have continued intermittently since 1905. In 1931 official weather records were also taken at the Reno (Hubbard Field at that time) airport. There is an 11 year overlap period where records were being maintained both downtown and at the airport. Official Reno weather records continue to be taken at the Reno Tahoe International airport to this day.

Throughout the 20th century the number of cooperative climate stations continued to grow. *(See appendix 1 for the distribution of climate stations including rain gage sites in the Reno area.)* Nearly all of these rain gages are manually read gages that do not provide short term rainfall intensity information.

In the 1960s the National Weather Service (NWS) installed a recording rain gage on the Mount Rose Highway at the highway maintenance station near Sky Tavern. It was later moved to near the Christmas Tree restaurant. The Desert Research Institute (DRI) began taking precipitation measurements in the 1960s at several sites along the Mount Rose highway from highway 395 to Incline Village. Other sites included northwest Reno and a location south of Verdi. Many of these sites had recording precipitation gages. In the 1970s the Soil Conservation Service (SCS) began installing remote reporting precipitation gages and snow pillows. There are now five of these sites in the Carson Range from near Heavenly Valley to the north end of the Carson Range west southwest of downtown Reno. Until recently these gages usually reported one to four times per day.

In 1986 the first ALERT sites were installed by Carson City. Carson City installed nine ALERT precipitation gages. They range in elevation from 4710 feet, the valley floor, up to 8400 feet at a site near Snow Valley Peak. These ALERT sites automatically report precipitation via radio telemetry whenever one millimeter of rain (or melted snow) falls at a site. Thus, they provide a good record of precipitation intensity throughout any storm. In 1987 Washoe County, Reno, and Sparks began installing an ALERT network. Initially there were about 25 sites. Site locations included the foothill areas surrounding the Truckee Meadows, high elevations of the Carson Range and the Verdi Range and a few locations in the upper Truckee basin. **One of the sites, East Peavine, is located only about one mile west of the Evens Creek drainage basin at an elevation of 5740 feet.** This network is currently in the process of a major expansion. Many of the original and the new ALERT sites report temperature every half hour. This is to help forecasters determine the snow level in realtime. Some sites also report changes in stream levels.

Many other weather monitoring networks have been installed in the last 12 years or so by organizations such as Washoe County Air Pollution, Nevada Department of Transportation, DRI, ski areas, and a few other private organizations. However, only a few of these provide short term precipitation intensity data.

In summary precipitation data over west central Nevada was extremely limited during the first two thirds of the 20th century. Recorded data which could provide short term intensity records was even rarer. During the last third of the century there has been a gradual increase in precipitation recording sites. At this time the combination of networks is nearing the point where we can get a pretty good picture of precipitation distribution and intensities associated with winter storms. To get a better overall picture of what is happening with precipitation produced by summer convective storms we will have to rely on the additional information from the NWS Doppler radar which was installed on Virginia Peak, near Pyramid Lake, in 1995.

4.0 WINTER PRECIPITATION AND FLOODS

Winter storms in the Reno area are generally large in scale (synoptic). They generally produce the highest mid (greater than 3 hours) and long term (1 to many days) rainfall intensities. Typically a long fetch of west to southwest wind flow aloft will spread air with considerably higher than normal precipitable water into the western slopes of the Sierra Nevada. If the moisture is deep enough and the dynamics of the storm strong enough in the vicinity of the Truckee River Basin then heavy rain will spread east of the Sierra crest. At times these conditions can linger over the area for an extended period. These storms can produce widespread and long durations of heavy rain over much of the Truckee Basin.

The distribution of the heaviest winter rains is strongly influenced by the elevation, slope, and aspect of the area terrain. Although there is considerable variation from storm to storm, on average, annual precipitation distribution can be used as a rough first guess for individual winter storm distribution. *See Appendix 9.3.* The last two major winter heavy rain storms gives some indication of the variation in precipitation distribution in the area. Maximum 24 hour precipitation totals were considerably higher over the Truckee Meadows and surrounding foothills during the February 1986 storm than they were during the January 1-2, 1997 storm, while the upper Truckee subbasins received greater 24 hour rain totals in 1997. The 1997 storm also caused greater runoff from high elevation snowmelt than in 1986. The rain/snow level was above 10,000 feet elevation during the peak of the 1997 storm while during the peak of the 1986 storm it was around 8500 feet.

5.0 SUMMER CONVECTIVE STORMS

The Reno area is generally west of the area most effected by what is commonly called the summer monsoon in the southwestern United States. Thus, on average it has less total summer thunderstorms and less cloudburst producing thunderstorms than areas to the east and southeast. Yet, with the right synoptic scale summer pattern very moist air can be drawn north and northwest over the area from moisture sources as far away as the Gulf of Mexico and the Sea of Cortez. In rare situations tropical air masses from remnants of hurricanes which develop off the west coast of Mexico can spread northward over California and Nevada. The best example of this was the tropical cyclone of September 11-12, 1918 when over two inches of rain fell in the Reno area and 5 to 7 inches fell in the Sacramento Valley. *See Appendix 9.4 .*

Summer convective storms can produce much higher intensity rain events for short periods of time than winter storms. Given a long enough record all peak short term rainfall intensity records in the general vicinity of Reno for events up to around 3 hours are produced by summertime convective storms. The shorter the duration time period the greater the difference in peak rainfall intensity between summer convective storms and winter storms.

Generally thunderstorms will form over the higher elevations first. However, there is much less correlation to elevation for summer convective storms than there is for winter storms. Often the

heaviest rain falls as the storms move off the mountains. At times the storms form in other areas not directly related to the mountains, e.g., outflow boundaries from other thunderstorms, or low level convergence lines where often westerly winds blowing down the eastern slopes of the Sierra interact with the more moist south to southeast flow east of the Sierra. At this time there is still not enough data to provide a good map of summertime thunderstorm distribution in the area. With the increase in automatically reporting and data logger equipped rain gages in the area and continuous coverage from radar in the area we should gradually get a better picture of thunderstorm distribution over west central Nevada. However, since the frequency of flood producing events is relatively low it will likely take many decades before we begin to have a realistic picture of what subbasins in the Truckee Meadows may be more at risk from intense convective rain events climatologically.

The following is a sampling of a few of the more intense convective rainfall events measured by the rain gages in the local ALERT network over the last ten years:

6/29/00

Virginia Foothill (upper).... 0.71" of rain fell in about 40 minutes.
Heavier rain was apparent to the south of the gage.
Mud and rock slides occurred on portions of Geiger Grade and Toll Road. Some damage occurred at a road construction site on the lower portion of Toll Road.

9/23/99

West Grays Creek...0.98" of rain fell in about 1 hour.
Remote area...no known damage.

8/4/91

Virginia Foothills (upper)...1.06" of rain fell in about 1 hour.
Peak intensity* was calculated to be 8.47 in/hr.

Steamboat Creek at Rhodes Road...0.75" of rain fell in less than 1 hour.
Peak intensity* was calculated to be 6.86 in/hr.

Bailey Creek...0.71" of rain in less than 1 hour.
Peak intensity* was calculated to be 4.65 in/hr.

The peak intensity rates were calculated from the ALERT data by Kennedy/Jenks Consultants as part of their February 29, 1992 study of the storm for Washoe County. These peak intensities generally lasted less than 2 minutes.

There was damage in the Jumbo Grade area of Washoe Valley from this storm.

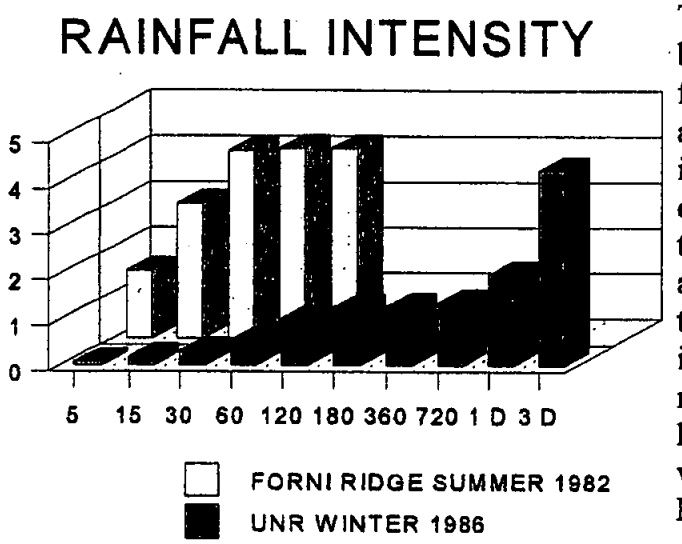
6.0 COMPARISON OF WINTER STORM AND SUMMER CONVECTIVE RAINFALL INTENSITIES

The following is a brief discussion of how different scale weather features interact to enhance precipitation over west central Nevada. In the winter mid scale features (meso scale) embedded in the larger storms (synoptic scale) often significantly enhance precipitation intensity over areas the size of the Truckee River basin. These features can also contribute to additional instability and convection within winter storms. Although rare in this area, this type of winter convection can even produce thunderstorms within the winter rain or even snow storm. Similarly more widespread and prolonged areas of thunderstorms can be produced by meso scale (mid scale) weather features. Most often these meso scale features rotate around a high pressure center aloft which in the summer is often located near the four corners area (CO, NM, AZ, and UT). At times there are also meso scale features which rotate around low pressure centers aloft located off the California coast. These types of weather patterns can help produce significant rainfall events in the Reno area.

This study will compare rainfall intensities and basin/subbasin runoff from an historical perspective. Comparison of winter storm and summer convective storm historic events over west central Nevada provides insight into the differences in potential flood levels for the Truckee Basin and various size subbasins in the area. Forni Ridge is a recording gage located above U.S. Highway 50 just west of Echo Summit. On June 18, 1982 this gage record 4.17 inches of rain in one hour. Of that 4.06 inches fell in just 27 minutes, 3.07 inches in 18 minutes and 1.81 inches in 6 minutes. Although this site is located near the crest of the Sierra there is no meteorological reason to believe these intensities or even greater ones are impossible in the area surrounding Reno. To support this assumption we can compare other historical events east of the Sierra. On August 15, 1965 more than 5 inches of rain fell in less 6 hours at Incline Lake, near the Mt. Rose highway. This convective storm produced significant flooding on both the Incline Village side and in Galena (Pleasant Valley), and adjacent drainages on the east side of the Carson Range. On July 28, 1982 a series of thunderstorms produced extensive flooding on the Yerington Indian Reservation, northwest of Yerington. A bucket survey (total rainfall estimates made from cans an other containers found in the area during a follow-up storm review by the NWS and USGS in the area) estimated up to 6 inches of rain fell in the area. Personal interviews and available radar information suggest most of the rain fell in about 2 hours. Even at the Reno Cannon International Airport, commonly considered one of the driest areas in the vicinity, 1.76 inches of rain was measured in less than six hours and 1.54 inches in less than 2 hours on May 17, 1987. Further east in the northern Great Basin 4.13 inches of rain was measured at the Elko airport in about 2 hours on August 27, 1971.

By comparison peak hourly rainfall rates in the Truckee Meadows during the February 1986 storm was only about 0.25 inch per hour. During the January 1, 1997 storm the peak hourly rainfall rate in the wettest portion of the basin, around Squaw Valley and Alpine Meadows ski areas, was only a little over 0.50 inch per hour. Even when you include an estimated snowmelt from this area the total equivalent rainfall would amount to around 0.75 inch.

The records from these relatively recent winter and summer storms suggests that we should expect hourly rainfall rates that may potentially be as much as eight times greater during summer convective storms than from major winter storms in the vicinity of northwest Reno. Greater multiples should be considered for time frames less than an hour.



To further emphasize the difference between these historical (and also potential future) summer convective storms in this area and the February 1986 storm, the 4.17 inches of rain that fell at Forni Ridge in one hour is comparable to the 4.25 inches that fell at the UNR gage in 3 days in 1986 and the 4.50 inches that fell in 10 days at the Reno airport in Feb 1986. The 3.07 inches that fell at Forni Ridge in just 18 minutes is comparable to the maximum 24 hour precipitation amount that fell over the wetter foothill areas around the Truckee Meadows in February 1986.

7.0 EFFECTS OF WINTER STORMS AND SUMMER CONVECTIVE STORMS ON LARGE vs SMALL SIZED DRAINAGE BASINS IN WESTERN NEVADA

Summer convective storms in the western Great Basin do not last long enough or cover a large enough area to produce flooding on main stem rivers such as the Truckee River. As you get down to subbasins the size of Whites Creek, rains from summer convective storms can cover enough of the subbasin and last long enough that the likelihood of peak flows from thunderstorms exceeds peak flows from winter storms. Of course winter storms will produce much larger storm volumes than any summer convective storm. Some of the most severe flood events will occur when "thunderstorm training" occurs. That is, meteorological conditions and terrain combine to keep convective rain storms developing and moving over the same area for an extended time. As you get down to subbasins of only a few square miles or less, even a single thunderstorm that is moving very slowly can cover enough of the basin and last long enough to produce significant flooding.

The peak recorded flow on Galena Creek of 4730 cubic feet per second (cfs) is from a summer convective storm on 7/20/56. Another summer thunderstorm on 8/15/65 produced a peak flow of 3670 cfs on Galena Creek. Galena Creek has a drainage area of about 8.5 square miles. By comparison the peak flow on Galena Creek in January 1997 was 2610 cfs (including a large amount of snowmelt runoff) and in February 1986 it was 94 cfs.

The peak recorded flow on Whites Creek of 2,280 cfs is from a summer convective storm on 8/15/65. Whites Creek has a drainage area of 14.6 square miles. The estimated peak flow on Whites Creek on January 1, 1997 was 180 cfs and on January 2, 1997 was 225 cfs. There were no measurements on Whites Creek during the February 1986 storm.

Steamboat Creek at Rhodes Road U.S.G.S. gage has a drainage area of 39.3 square miles. At this site the basin is large enough that the highest recorded flows are from winter type storms. On 2/17/86 the peak flow was estimated to be 3,600 cfs. On 1/1/97 the peak flow was 2090 cfs.

It should be noted that the peak flow produced by these major winter storms on the much larger Steamboat Creek at Rhodes Road basin is still less then the peak flows created by summer thunderstorms on the smaller Galena Creek subbasin.

Based on limited historical data in this area it appears that the crossover point between peak flows in Reno area subbasins occurs roughly between 20 and 25 square miles. The crossover point being where the percent of areal coverage and the duration of very intense convective storms is insufficient to produce flows exceeding those of the much less intense, but widespread and longer lasting winter storms.

8.0 Flood Threat to Evens Creek in Northwest Reno

Historically, it appears to be quite clear that the greatest peak flows in small subbasin, especially those as small as Evens Creek in northwest Reno, is from summer convective summer storms. Potentially summer convective storms can cause peak flows that far exceed those produced by winter storms, such as occurred in February 1986.

Rainfall and streamflow information in the vicinity of Evens creek is very limited. There was a U.S.G.S. gage on the adjacent Peavine Creek from 1963 though 1974. Peak flow during that time was 32 cfs on March 3, 1967. There was no significant summer flows on Peavine Creek during the period of record. The two closest ALERT gages to the Evens Creek drainage are "Peavine East", lcoated about one mile west at an elevation of 5740 feet, and "Peavine Mogul", located just south of the summit of Peavine at an elevation of 7860 feet. The measured peak 24 hour rainfall at both sites fell during the January 1997 storm. Peavine Mogul received 2.04 inches of rain on the 1st and another 1.58 inches on the 2nd. Peavine East recorded 0.96 inches of rain on the 1st before malfunctioning. Unfortunately neither site was in existence in 1986. In February 1986, 4.25 inches of rain was measured at a manually read precipitation gage located at UNR over a 72 hour period from 8 a.m. on the 16th to 8 a.m. on the 19th. Dr. Harold Klieforth, Professor Emeritus, Desert Research Institute, measured 2.11 inches of rain in a 24 hour period on Feb. 17, 1986. This is the greatest 24 hour rainfall at this location since Dr. Klieforth began keeping records at his home in northwest Reno. The greatest 24 hour rainfall produced by summer thunderstorms at Dr. Klieforth's residence is 1.06 inches in July 1984. Again, this is for a period of record from 1965 to the present (August 2000).

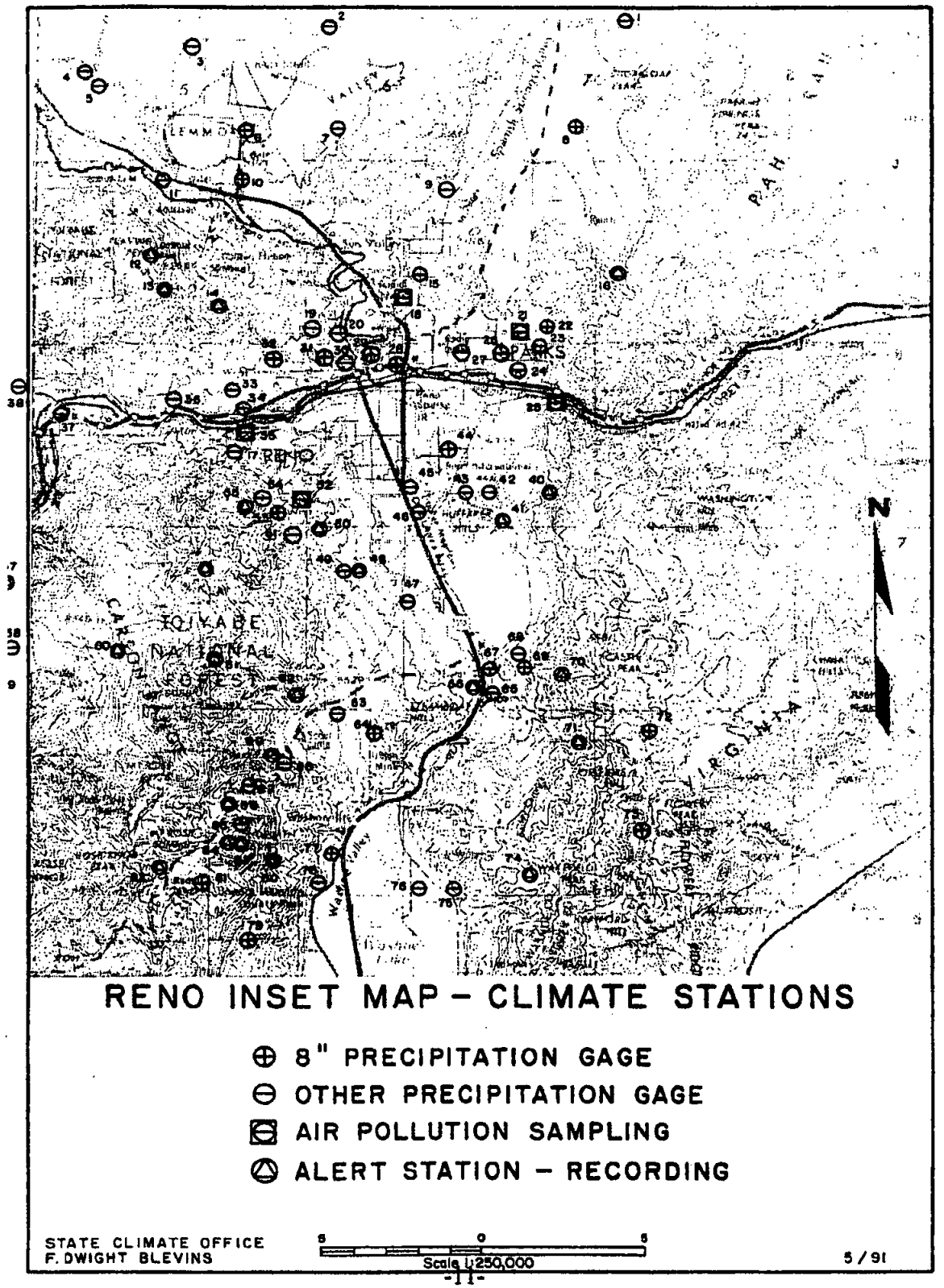
The Corp of Engineers, U.S.G.S., and others have concluded that the February 1986 flood in the Reno area was approximately a 100 year event. That is, the odds of it happening in any one year are approximately 1 in 100. One could assume the flood on Evens Creek in February 1986 was approximately a 100 year event for floods produced by winter storms.

Historically there have been enough documented floods produced by summer convective storms within and near the Truckee River Basin to comfortably assume there will be many more flood events on smaller subbasins within the area surrounding Reno during the next 100 years, and that many of them will significantly exceed peak flows that were produced on those subbasins by the February 1986 winter storm. Even in the last 25 year, which historically appears to be a period of fewer than normal very heavy convective rain storms, there are a number of records of short term rainfall that have at least approached the values of short term rainfall intensities used by WRC Nevada in their Evens Creek calculations. The events listed in Appendix 9.5 are from apparently random locations including the eastern foothills, the eastern mountains, the western mountains (including Peavine Mountain), and near the center of the Truckee Meadows. At this time there is no apparent evidence to suggest an area such as Evens Creek is any less likely than any of these areas to receive short term rainfall intensities in the future equal to those used by WCR Nevada. With the increased number of recording rain gages and the much improved radar coverage in this area it will still take years to develop a better climatology of thunderstorm distribution and frequency in the area surrounding Reno and longer yet to begin to develop an understanding of the favored areas and expected frequency of extreme flood producing summer convective storms (similar to the August 15, 1965 storm) in this area.

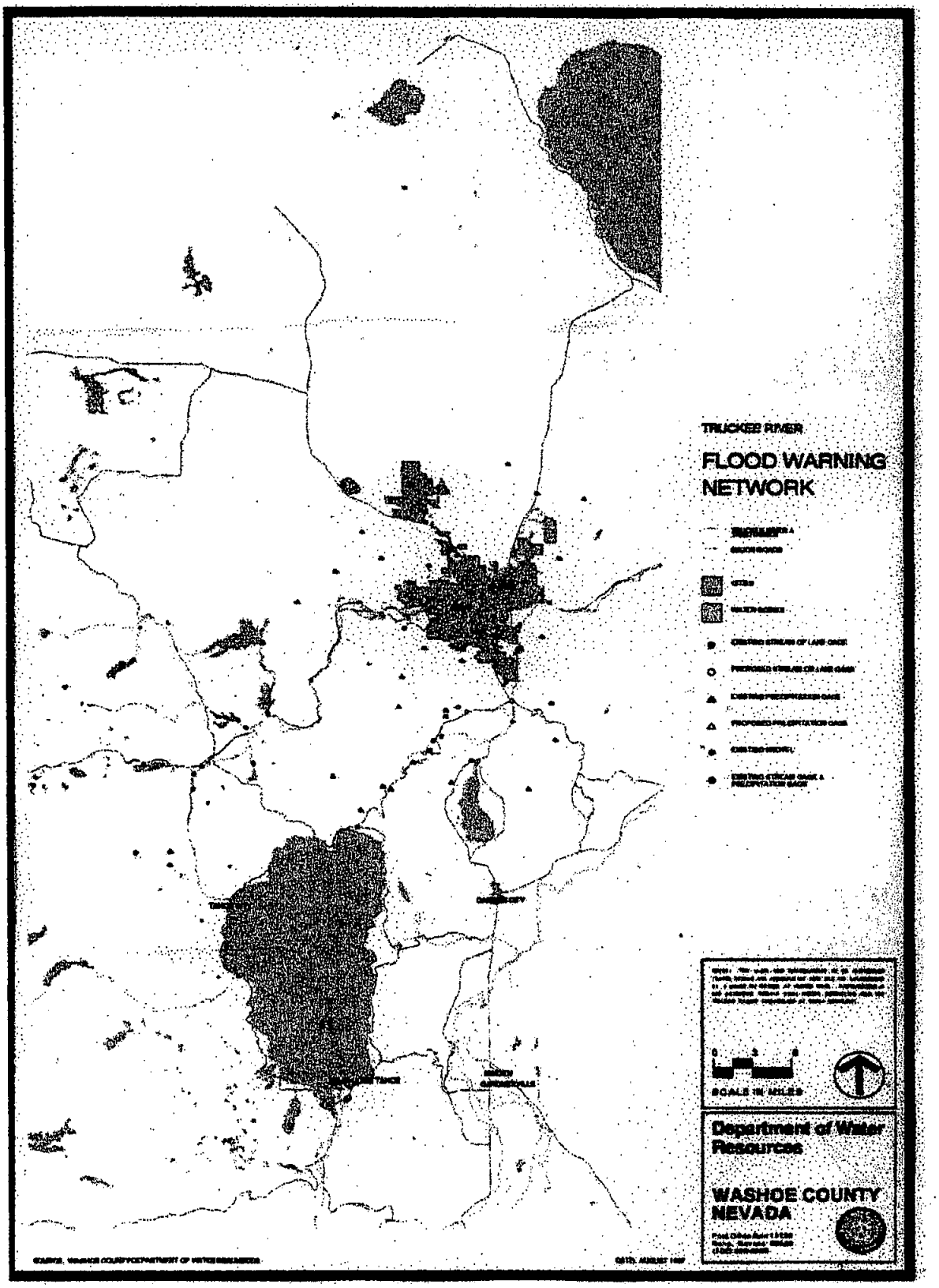
We should keep in mind, that in the time frame of our lifetime, even frequency relationships based on much better data than we have for the Evens Creek area can be misleading. For example, there have been no significant floods from summer convective storms on Galena Creek in the last 30 years. Yet there were five significant floods produced by summer convective storms on Galena Creek between 1952 and 1967.

9.0 APPENDIX

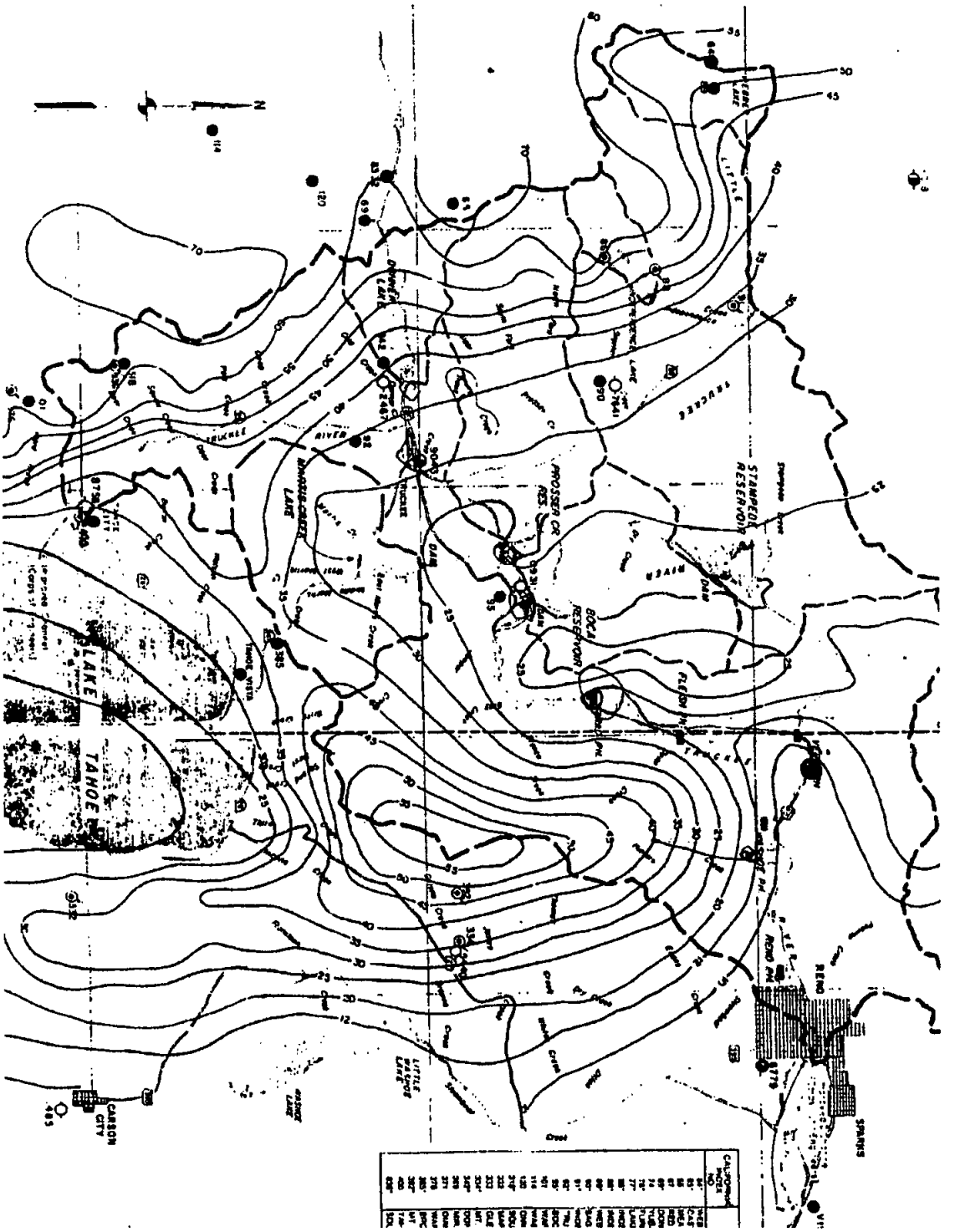
9.1 Reno Climate Stations



9.2 ALERT Sites 1998



9.3 Approximate Annual Rainfall (Corp of Engineers, Sacramento)



9.4 Tropical Cyclone Example

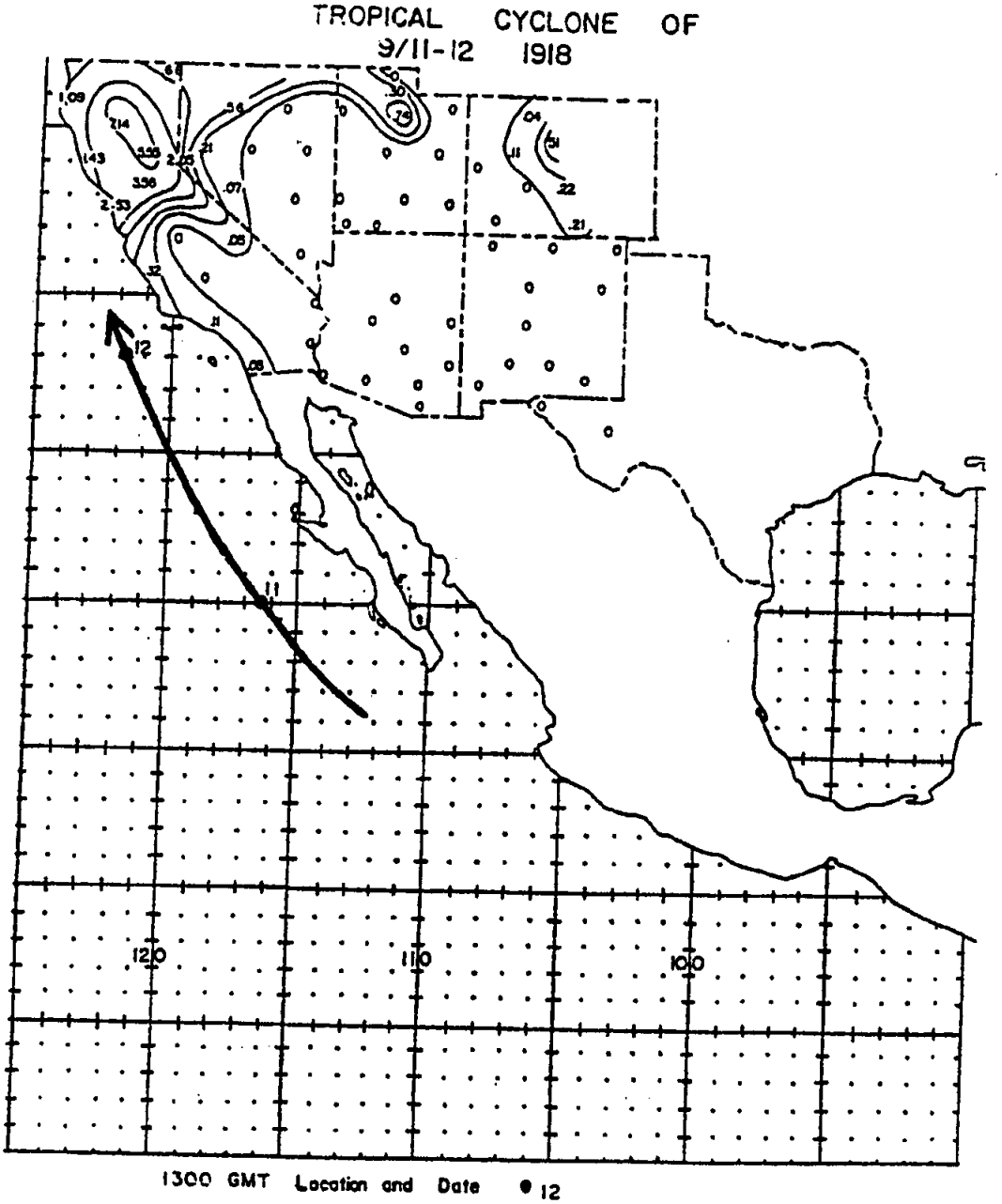


Figure 15. Track of the Tropical Cyclone of September 11-12, 1918 and associated rainfall in the Southwest. Precipitation totals are in inches and the isohyets are drawn at .01, .25, .50, 1.00, 2.00, and 5.00 inches.

9.5 SUMMARY OF SOME RECENT RAINFALL EVENT
(Measured in the vicinity of the Truckee Meadows)

15 minute events:

0.53" 8/4/91 Virginia Foothills, Upper
0.51" 9/23/99 Gray Creek, West
0.43" 6/29/00 Virginia Foothill, Upper
0.36" 7/18/95 Peavine-Mogul (0.71" in 32 minutes)

1 hour events:

1.42" 6/19/77 Virginia Foothill, Lower (Approximately 1 hour)
1.06" 8/4/00 Virginia Foothills, Upper
0.98" 9/23/99 Gray Creek, West
0.96" 8/4/91 Virginia Foothills, Upper

3 hour events:

1.55" 5/17/87 Reno Airport, NWS (1.54" in less than 2 hours)

1 day* events:

3.31" 2/17/86 Virginia Foothills, Lower
3.04" 2/17/86 Stead Fire Station

3 day* events:

7.85" 2/16-19/86 Stead Fire Station

* Does not include normally wetter sites above 5000 feet along the Carson and Verdi mountain ranges. Rainfall amount in these areas ranged up to 5" or more in 24 hours and 10" or more in 72 hours during the February 1986 storm.

10.0 REFERENCES

1. Sacramento District Corps of Engineers, Flood Plain Information, Steamboat Creek and Tributaries, Steamboat and Pleasant Valleys, Nevada, June 1972.

2. Sacramento District Corps of Engineers, Flood Plain Information, Southwest Foothill Streams, Reno, Nevada, June 1974.

3. Sacramento District Corps of Engineers, Hydrology, Truckee River, California and Nevada, February 1980.

4. Henz Meteorological Services, HMS Report 91-7, Sept. 1991.

5. Kennedy-Jenks Consultants, WashoeValley Flood Damage Investigation, Washoe County, Nevada, February 1992, Reno, Nevada.

6. John H. Humphrey, Ph.D., P.E., Washoe County Flood Control Master Plan Meteorological Analysis, April 4, 1994.

7. Nimbus Engineers, Hydrologic Analysis of Sliver Lake and Lemmon Valley Playas, for Federal Emergency Management Agency, December 1987, Reno, Nevada.

8. U.S.G.S., Water Resources Data-Nevada, multiple years.

9. National Weather Service Forecast Office Reno, Nevada, Numerous Historical Precipitation Reports and Data Summaries, August 2000.

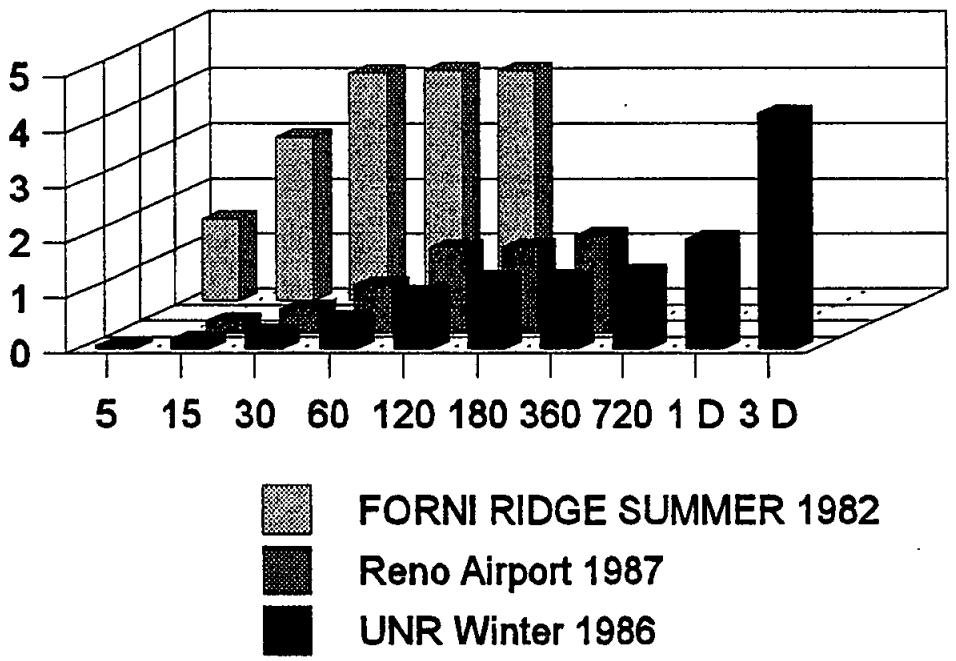
10. Western Region Climate Center, Desert Research Institute, University of Nevada, Precipitation Summaries, Jim Ashby and Dr. Harold Klieforth, August 2000.

11. Washoe County Department of Water Resources, Reno, Nevada, ALERT Network Precipitation Data, August 2000.

12. Washoe County Department of Water Resources, Reno, Nevada, Whites Creek Stream flow Records, Personal Communication with Ed Evens, August 2000.

13. NCDC, NOAA, NNDC Online Retrieval, Hourly Data, Reno, Nevada, May 1987

RAINFALL INTENSITY



Historical Peavine Floods

July 14, 1955...Peavine Creek, evens Creek: Northwest and downtown Reno

A sudden thunderstorm produced severe flash flooding on these drainages, which were fire-denuded and overgrazed. Approximately 40 homes in northwest Reno were hit by the flash flood after the 250 cfs capacity culvert along Peavine Creek failed to hold. The Orr ditch also overflowed causing large amounts of mud to be deposited on East Forth and East Fifth Streets, and extended as far east as Virginia and West Second Streets.

July 20, 1956...Peavine Creek, Northwest and Downtown Reno

The same convective storm that caused severe flooding on Galena Creek and three deaths on the Mount Rose Highway dumped heavy rain on Peavine Mountain, and brought about the most disastrous flood ever seen off the mountains south slopes. The flash flood destroyed homes, yards, and streets in northwest Reno and flooded businesses in the northwest portion of downtown. The same areas that were hit in the July 14, 1955 event were hit again, but this flood was worse, with flood waters reaching Lake and Second Streets downtown. Many downtown businesses were flooded (about $739,000 damage in 1956 dollars).

USGS Regional Regression

Calculations and Backup

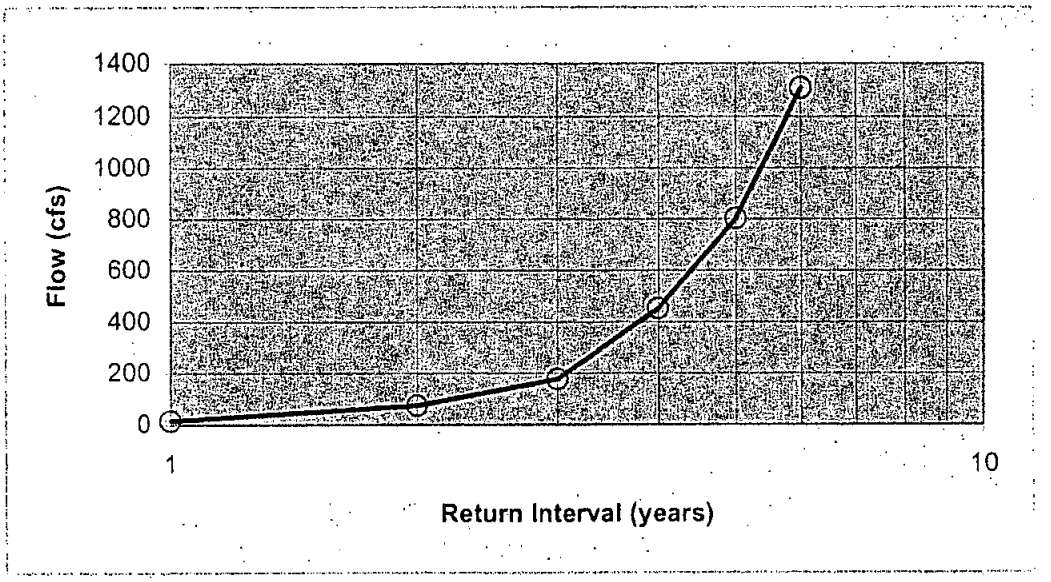
September 01, 2000

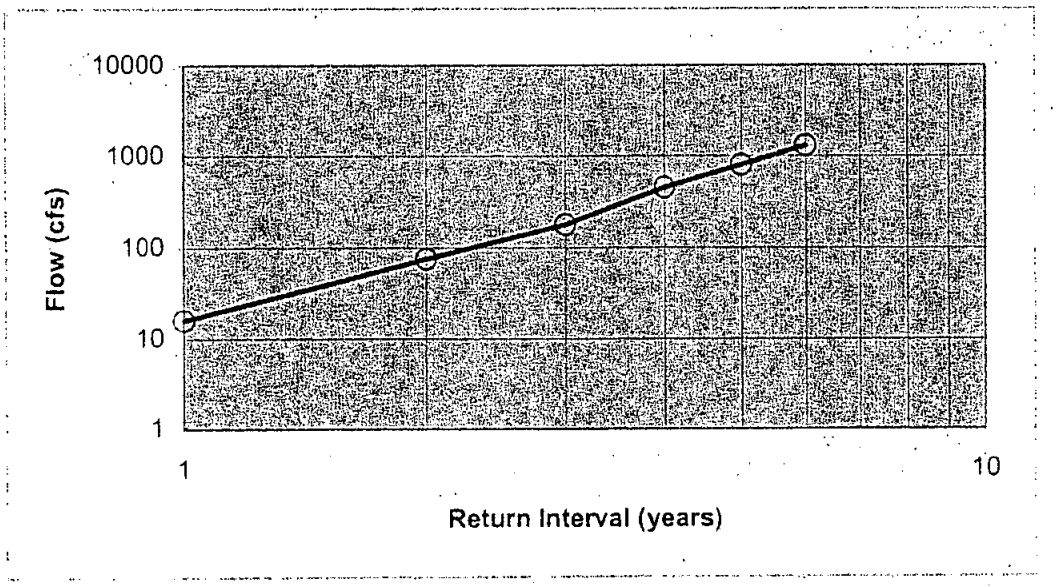
USGS REGIONAL REGRESSION EQUATIONS
Region 5

Calculated for area of Evans Creek
Block N watershed contributing
to Sierra St (CP-5 in HEC-1 models)

Area =	4.4	sq mi
Elev =	5000	ft (mean)
Lat =	39.573	decimal degrees

RESULTS		
2 Year	16	cfs
5 Year	76	cfs
10 Year	178	cfs
25 Year	453	cfs
50 Year	803	cfs
100 Year	1307	cfs



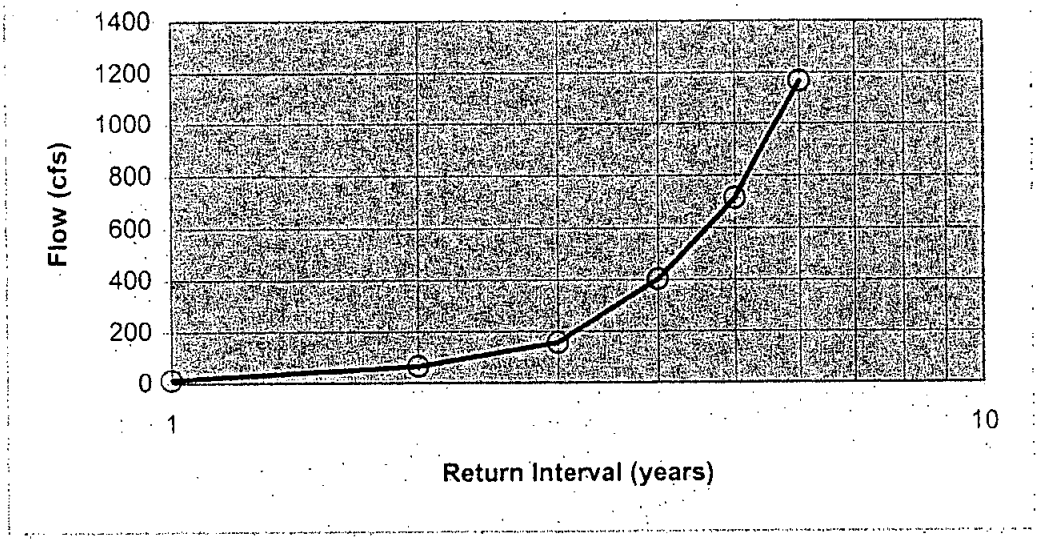


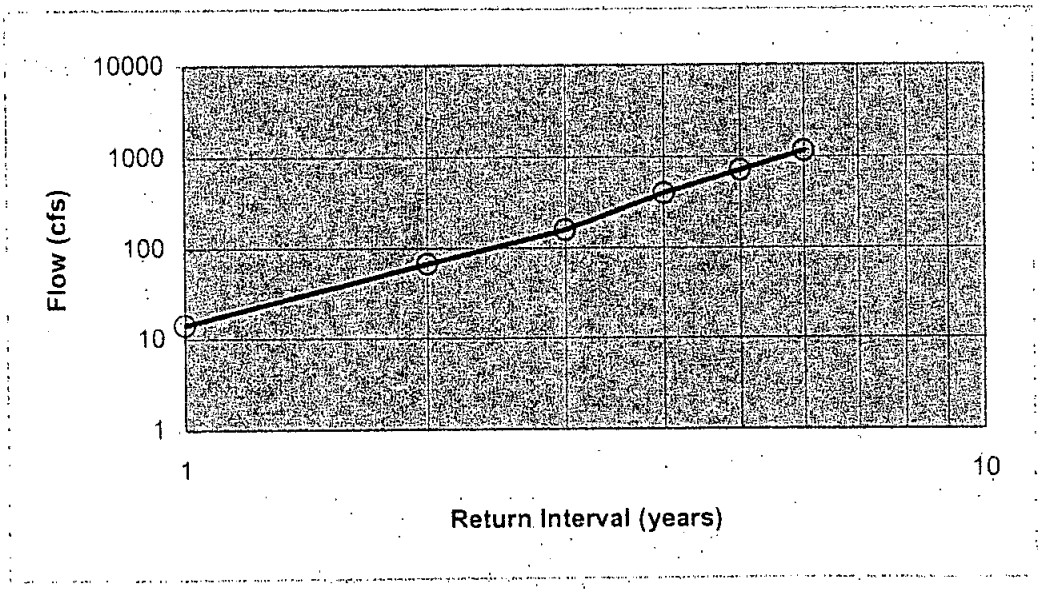
USGS REGIONAL REGRESSION EQUATIONS
Region 5

Calculated for area of Evans Creek
Block N watershed contributing
to McCarran Blvd (CP-4 in HEC-1 models)

Area =	3.8	sq mi
Elev =	5000	ft (mean)
Lat =	39.5759	decimal degrees

RESULTS		
2 Year	14	cfs
5 Year	67	cfs
10 Year	158	cfs
25 Year	402	cfs
50 Year	715	cfs
100 Year	1167	cfs





Methods for Estimating Magnitude and Frequency of Floods in the Southwestern United States

By BLAKEMORE E. THOMAS, H.W. HJALMARSON, and S.D. WALTEMEYER

U.S. GEOLOGICAL SURVEY
Open-File Report 93—419

Prepared in cooperation with the
COLORADO DEPARTMENT OF HIGHWAYS,
ARIZONA DEPARTMENT OF TRANSPORTATION,
CALIFORNIA DEPARTMENT OF TRANSPORTATION,
IDAHO DEPARTMENT OF TRANSPORTATION,
NEVADA DEPARTMENT OF TRANSPORTATION,
NEW MEXICO STATE HIGHWAY AND TRANSPORTATION DEPARTMENT,
OREGON DEPARTMENT OF TRANSPORTATION,
TEXAS DEPARTMENT OF TRANSPORTATION, and
UTAH DEPARTMENT OF TRANSPORTATION

Tucson, Arizona
1994

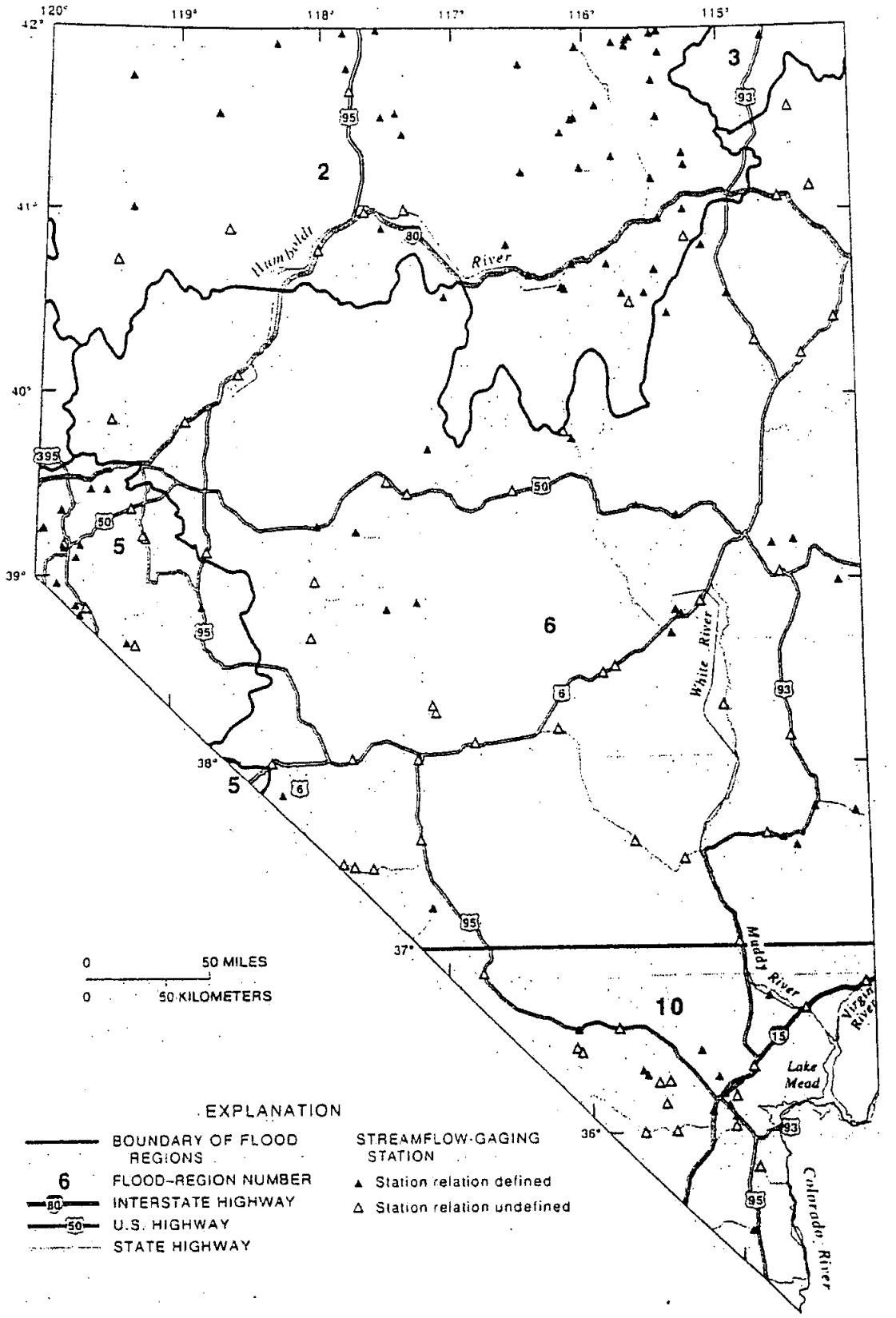


Figure 12. Flood regions in Nevada.

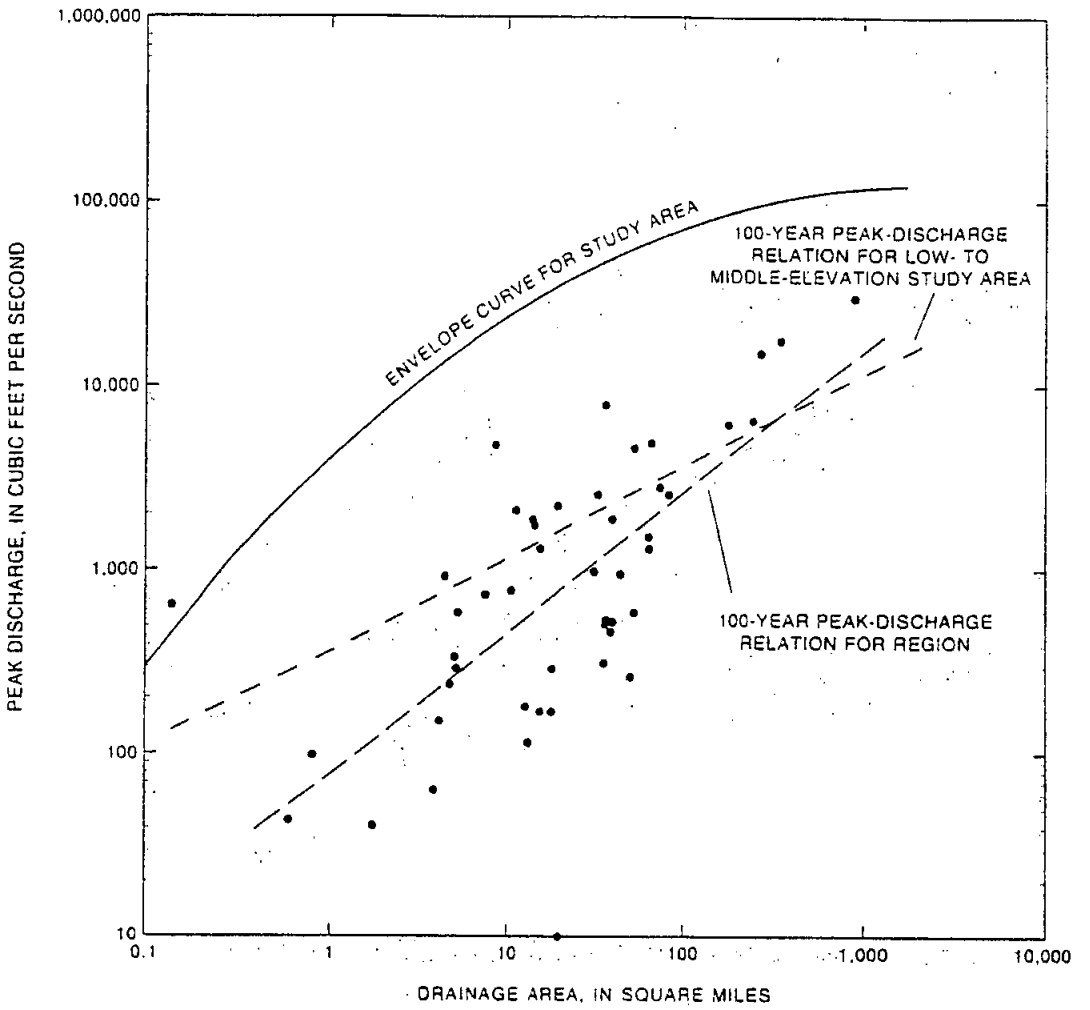


Figure 28. Relations between 100-year peak discharge and drainage area and plot of maximum peak discharge of record and drainage area for gaged sites in the Eastern Sierras Region 5.

Table 9. Generalized least-squares regression equations for estimating regional flood-frequency relations for the Eastern Sierras Region 5

Equation: Q, peak discharge, in cubic feet per second; AREA, drainage area, in square miles; ELEV, mean basin elevation, in feet; and LAT, latitude of site, in decimal degrees. Data were based on 37 stations. Average number of years of systematic record is 31.

Recurrence interval, in years	Equation	Average standard error of prediction, in percent	Equivalent years of record
2	$Q=0.0333AREA^{0.853}(ELEV/1{,}000)^{2.68}[(LAT-28)/10]^{4.1}$	135	0.21
5	$Q=2.42AREA^{0.823}(ELEV/1{,}000)^{1.01}[(LAT-28)/10]^{4.1}$	101	.73
10	$Q=28.0AREA^{0.826}[(LAT-28)/10]^{4.3}$	84	1.69
25	$Q=426AREA^{0.812}(ELEV/1{,}000)^{-1.10}[(LAT-28)/10]^{4.3}$	87	2.62
50	$Q=2{,}030AREA^{0.798}(ELEV/1{,}000)^{-1.71}[(LAT-28)/10]^{4.4}$	91	3.26
100	$Q=7{,}000AREA^{0.782}(ELEV/1{,}000)^{-2.18}[(LAT-28)/10]^{4.6}$	95	3.80