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MASTER DRAINAGE REPORT
FOR
THE 160 ACRE COMBINED SCHOOL SITE
NORTH OF DOVE VALLEY ROAD BETWEEN
56TH STREET AND 60TH STREET
MARICOPA COUNTY, ARIZONA
CWW JOB NO. 870710

Collar, Williams & White Engineering

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FOR
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NORTH OF DOVE VALLEY ROAD BETWEEN
56TH STREET AND 60TH STREET
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PREPARED FOR

CAVE CREEK SCHOOL DISTRICT NO. 93
33060 NORTH 60TH STREET
CAVE CREEK, ARIZONA

Registered Professional Engineer (Civil)
CERTIFICATE NO. 1873
DONALD H. COLLAR
Date Signed 9/8/87
ARIZONA, U.S.A.

SUBMITTED BY

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Revised September, 1987

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EXHIBIT 2 - OFFSITE DRAINAGE AREAS
EXHIBIT 3 - ONSITE DRAINAGE AREAS
EXHIBIT 4 - 100 YEAR FLOODPLAIN LIMIT

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ARIZONA, U.S.A.

APPENDIX

APPENDIX I - PRECIPITATION DATA CALCULATION
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MASTER DRAINAGE REPORT
FOR
CAVE CREEK SCHOOL DISTRICT NO. 93

I. INTRODUCTION

This report presents the preliminary hydrology study for a combined 160 acre school site which belongs to Cave Creek School District No. 93. This site is located in the Southwest Quarter of Section 9, Township 5 North, Range 4 East, bounded by 60th Street, 56th Street, Dove Valley Road, and Seven Palms Drive. The school site encompasses the existing Black Mountain School, and the Cactus Shadows High School. A new middle school complex, and maintenance facilities are proposed to be constructed in the school site.

Except the existing school buildings, athletic fields, and parking spaces, the site is presently undeveloped, characterized by relatively lush native desert plants. The area slopes to the west with an average slope of two to three percent. Refer to Exhibit 1 for site location.

II. METHODS USED FOR COMPUTATION

The methods described in the following paragraphs were used for all the hydrologic computations in this study.

Peak Discharge

The SCS and Kinematic Wave methods in "Flood Hydrograph Package" (HEC-1), developed by the U.S. Army Corps of Engineers, were used to determine the peak rate of runoff for all drainage basins.

Design Frequency

A 100- year return frequency storm of 2- hour duration was used for all peak discharge calculations.

Time of Concentration

The formula and charts on Figure 2-7 in "Hydrologic Design for Highway Drainage in Arizona", prepared by ADOT, were used for the time of concentration calculations.

Curve Number

Surface soil characteristics which affect the rate of surface runoff in the study of watershed areas have been defined by the USDA, Soil Conservation Service (SCS), and were found in the report entitled "Soil Survey Aguila - Carefree Area, Parts of Maricopa and Pima Counties, Arizona". Approximately ten percent of the area is classified in Hydrologic Soil Group "B", sixty-five percent of the area is classified in Hydrologic Soil Group "C", and the remaining twenty-five percent is classified in Hydrologic Soil Group "D". Based on the percentage distribution of soil types in each drainage sub-basin, weighted curve numbers were determined for HEC-1 computations.

Precipitation and Runoff

The precipitation values for the 6 and 24 hour duration storms for return periods of 2, 5, 10, 25, 50 and 100 years were found from Maps A to D and Maps 1 to 8 in ADOT's "Hydrologic Design for Highway Drainage in Arizona". According to the procedures described in this manual, precipitation data for the 5-minute, 15-minute, 60-minute, and 2-hour duration, 100-year return frequency storms were calculated manually. The calculations are attached in Appendix I.

III. COMPUTATIONS FOR OFFSITE DRAINAGE AREAS

The site is subject to offsite flows generated on approximately 5.3 square miles to the east and northeast. These offsite drainage areas extend approximately 7.5 miles from the site towards the northeast. Offsite drainage areas were delineated on Exhibit 2 which is a combination of Cave Creek and Wild Cat Hill 7.5 minute Topographic Quadrangles.

The offsite drainage area slopes to the southwest with an average slope of two to four percent. Approximately seventy-five percent of the area is undeveloped native desert land, characterized by an estimated thirty percent cover density of desert plant species. The area was divided into five drainage sub-basins, as illustrated in Exhibit 2, surface runoff in sub-basins 1 to 4 contribute to two major washes (un-named) which enter the school site. The hydrologic data for these drainage sub-basins are shown in Table 1. The peak discharges of each offsite sub-basin were determined, and are listed in the following table. Refer to Appendix II-A for the HEC-1 output summary.

Drainage Area	Area (acres)	100 Year Peak Discharge (cfs)
1	176.6	466
2	437.1	938
3	1,300.5	1,463
4	1,382.4	1,640
5	76.2	199
6	4.5	17

IV. COMPUTATIONS FOR ONSITE DRAINAGE - PRE-DEVELOPMENT

As previously described, approximately 60 percent of the site is undeveloped, covered by an estimated density of about thirty percent desert plant species. Based on the terrain and topographical characteristics, the site was delineated into 16 drainage sub-basins. The hydrologic data for each sub-basin is shown in Table 2.

Two major washes (designated as No. 3, and No. 4 washes) enter the site from the northeast, and flow diagonally across the southern portion of the site. One smaller wash (designated as No. 5 wash) affects the site from the north. The locations of drainage sub-basins and runoff washes are illustrated on Exhibit 3. Surface runoff generated from the onsite drainage areas is generally sheet flow which contributes to the onsite washes and two major washes entering from offsite. The bottom and sideslopes of these washes are fairly erodible and transport large volumes of sediment during periods of runoff. Thus the washes frequently shift laterally developing split flow patterns. In order to better quantify the split flow patterns on the site, field measurements of existing washes were conducted by the Collar, Williams & White staff. The field data is attached in Appendix III. Peak discharges were computed for each sub-basin and are summarized in Table 3. The HEC-1 output summary of onsite drainage is attached in Appendix II-A.

V. COMPUTATIONS FOR ONSITE DRAINAGE AREAS - POST-DEVELOPMENT

The new middle school complex is proposed to be built in the northwest portion of the site. A transportation center will be constructed at the east-center portion of the site, located in sub-basin A. Since the total area of the proposed middle school site and the transportation center are relatively small, as compared to

the total onsite drainage area, the post-development peak discharge will only increase slightly. Sub-basins J, M, N, and A will be affected by the new building and parking space construction. Major portions of the site will not be subject to development activities, and runoff will not be affected.

The peak discharges for sub-basins J, M, N, and A were computed by adjusting the SCS Curve Number to a higher value (91) in the HEC-1 model. The 100-year, 2-hour storm discharges are shown in the following table. The HEC-1 output summary is attached in Appendix II-B.

Drainage Sub-basin	Area (acres)	Pre-development Peak Discharge (cfs)	Post-Development Peak Discharge (cfs)
J	7.1	36	41
M	5.5	28	31
N	6.8	25	33
A	5.6	23	30

VI. STORMWATER DETENTION COMPUTATION

Although slight, an increase in peak discharges will require that retention areas be provided to insure that the peak rate of outflow from the site is not greater than the peak rate of runoff under existing conditions. The required volume of retention areas for sub-basins J, M, N, and A were calculated based on the equation taken from "Design of Facilities to Manage Stormwater Runoff, Section 3, Design Procedures and Criteria, City of Scottsdale".

$$Vol = \frac{DA}{12} (Cd - Cu)$$

where

Vol: Retention basin volume, cu. ft.

D : Depth of rainfall, inches. (2.79 in. for 100-yr, 2-hr)

A : Development area, Sq. Ft.

Cd : Rational method coefficient for developed property.

Cu : Rational method coefficient for undeveloped property.

The calculations of the retention areas are summarized in the following table.

Drainage Sub-basin	Pre-development Curve Number	Pre-development Runoff Coeff.	Post-development Curve Number	Post-development Runoff Coeff.	Required Volume (cu. ft.)
J	88	0.58	91	0.67	6,472
M	88	0.58	91	0.67	5,013
N	85	0.51	91	0.67	11,019
A	85	0.51	91	0.67	9,074

The needed retention area can be located in the open space adjacent to the proposed building complex, or the proposed parking space adjacent to the building can be designed to function as the retention area. The exact locations of the retention areas will be determined during the final design phase.

VII. DRAINAGE IMPROVEMENT FACILITIES

The 100-year peak flows for major and minor washes entering and leaving the site are listed in the table shown below (refer to

Exhibit 3 for the locations of concentration points). These runoff rates provide the necessary information for future road improvement designs. For minor washes crossing the roads, dip sections with cut-off walls may be used. For the major washes, culverts or a combination of dip sections and culverts should be designed.

Concentration Point	100-Year Peak Discharge (cfs)
1	43
2	14
3	973
4	1,518
5	24
6	1,315
7	36
8	33
9	124
10	28
11	214
12	680
13	636
14	878
15	1,640
16	187
17	1,316

VIII. FLOODPLAIN ANALYSIS

Runoff values determined in the HEC-1 analysis were used to determine the 100-year floodplain limits. The U.S. Army Corps of Engineers HEC-2 Water Surface Profiles package was used to model the existing site conditions. The results of the analysis are contained in Appendix IV. The approximate floodplain limits are shown on Exhibit 4. The results show that most of the sites southern half will be

inundated with runoff from a 100 year storm. The depths of flow vary from about 3 to 5 feet in the channels to a few inches on the floodplain.

The proposed transportation center lies completely within the 100 year floodplain. Any construction will require that the finished floor elevations be raised approximately 1 to 2 feet above the existing ground elevations. Fill material within the floodplain will require erosion protection. Also some channelization may be required to maintain the existing channel capacities.

TABLE 1
CAVE CREEK SCHOOL DISTRICT
OFFSITE DRAINAGE BASIN

Drainage Basin	Area (acre)	Area (sq. mi)	Length (ft)	Elevation Drop(ft)	Slope (ft/ft)	Tc (hr)	T(lag) (hr)	Soil Group (%) B(82)	C(88)	D(91)	SCS CN
1	176.6	0.276	8800	374	0.0425	0.470	0.282	20	30	50	88
2	437.1	0.683	10400	266	0.0256	0.648	0.389	12	63	25	88
3	1300.5	2.032	24000	490	0.0204	1.344	0.807	10	85	5	85
4	1382.4	2.160	30000	650	0.0217	1.561	0.936	10	50	40	88
5	76.2	0.119	5000	130	0.0260	0.366	0.220	10	85	5	85
6	4.5	0.007	800	10	0.0125	0.121	0.072	10	85	5	85

Note:

$$Tc = \frac{L^{1.15}}{7700 * (H)^{0.38}}$$

$$T(lag) = 0.6 * Tc$$

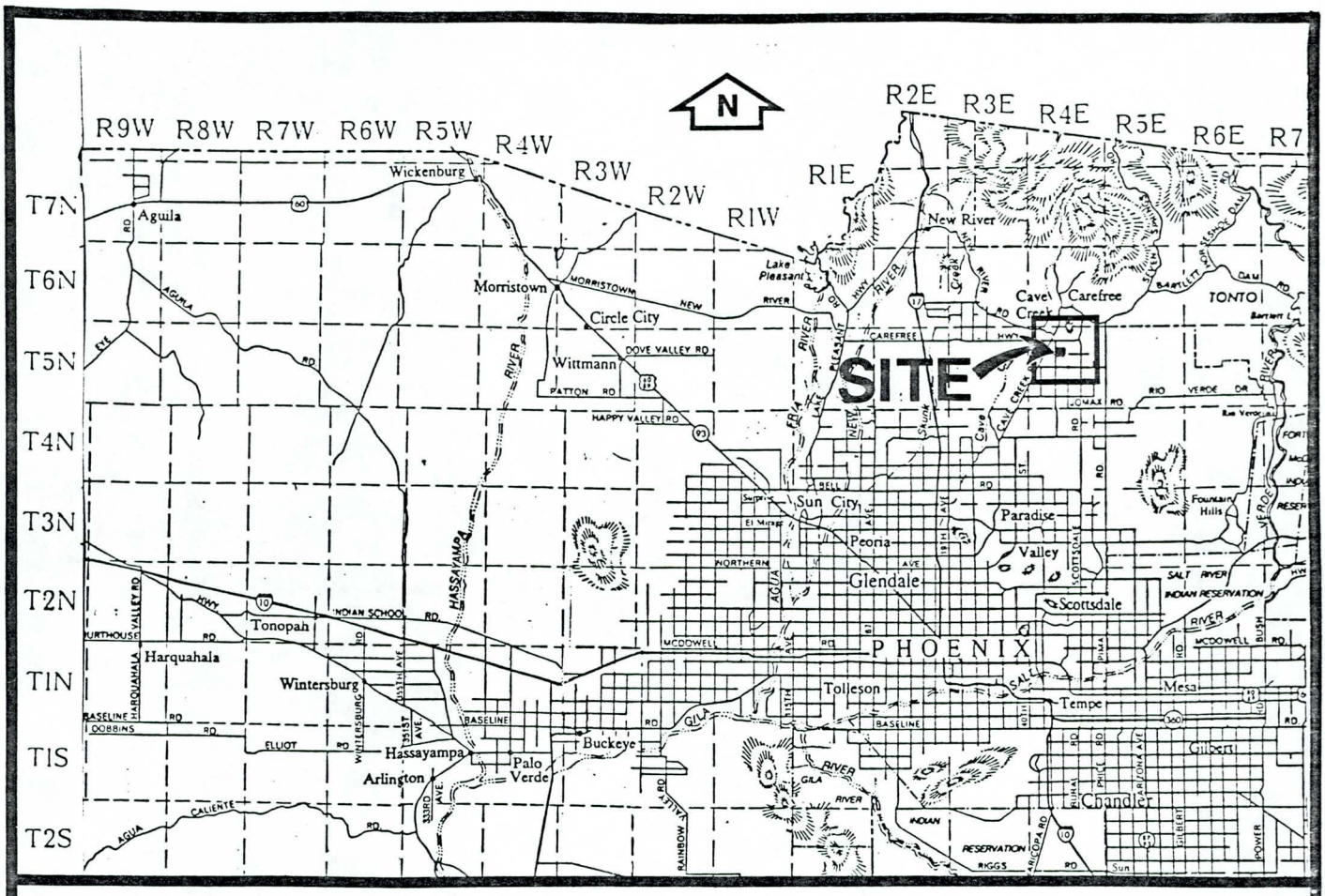
TABLE 2
CAVE CREEK SCHOOL DISTRICT
ONSITE DRAINAGE BASIN

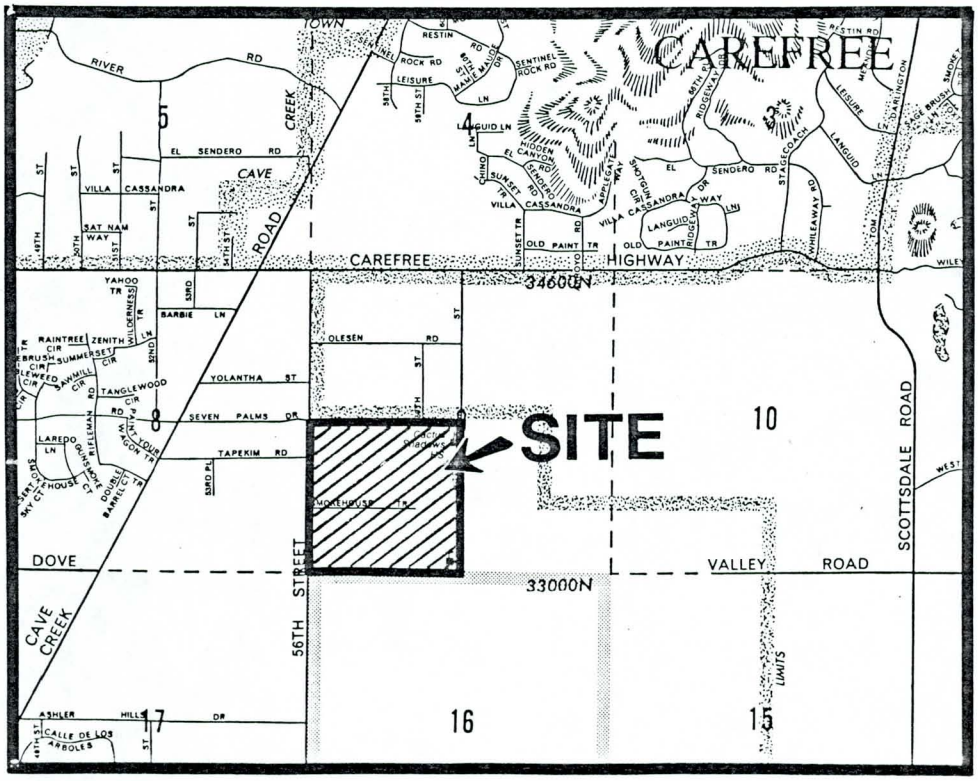
Drainage Basin	Area (acre)	Area (sq. mi)	Length (ft)	Elevation Drop(ft)	Slope (ft/ft)	Tc (hr)	T(lag) (hr)	SCS CN
A	5.6	0.0088	1280	28	0.0219	0.137	0.082	85
B	2.5	0.0039	800	13	0.0163	0.107	0.064	85
C	13.1	0.0205	2560	48	0.0188	0.248	0.149	85
D	17.4	0.0272	1240	20	0.0161	0.150	0.090	88
E	7.8	0.0122	1440	30	0.0208	0.153	0.092	85
F	2.8	0.0044	720	18	0.0250	0.084	0.050	85
G-1	7.4	0.0115	800	16	0.0200	0.099	0.059	91
G-2	2.4	0.0038	560	16	0.0286	0.066	0.039	88
H	5.7	0.0089	1080	24	0.0222	0.120	0.072	85
I	39.0	0.0609	3040	52	0.0171	0.293	0.176	90
J	7.1	0.0111	1040	29	0.0279	0.107	0.064	88
K	6.2	0.0097	965	24	0.0249	0.105	0.063	89
L	31.6	0.0494	2720	62	0.0228	0.241	0.145	89
M	5.5	0.0086	1040	28	0.0269	0.108	0.065	88
N	6.8	0.0106	1600	30	0.0188	0.173	0.104	85
P	1.6	0.0025	320	8	0.0250	0.045	0.027	85

Note:

$$Tc = \frac{L^{1.15}}{7700 * (H)^{0.38}}$$

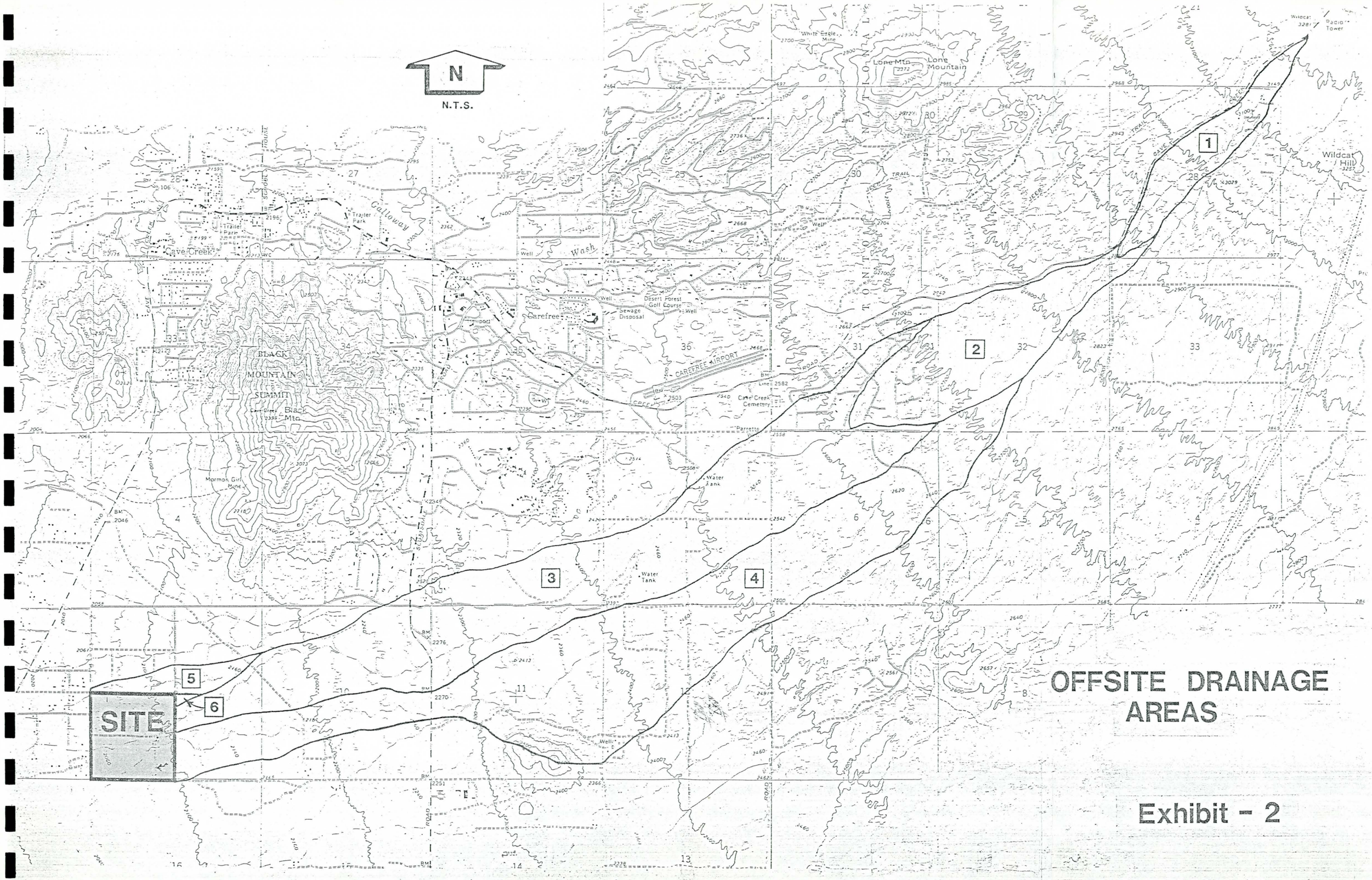
$$T(lag) = 0.6 * Tc$$





VICINITY MAP

Exhibit - 1



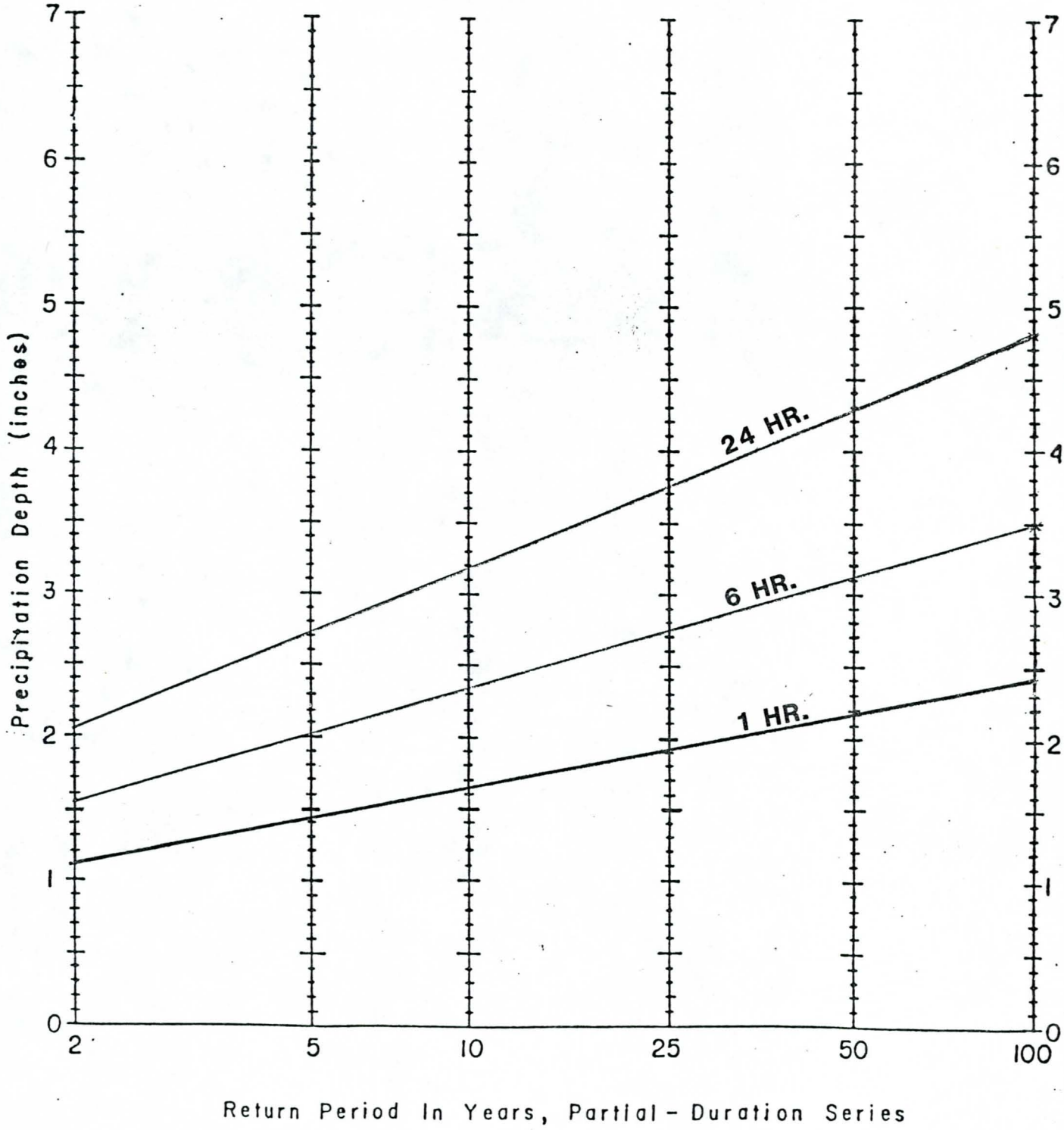
OFFSITE DRAINAGE AREAS

Exhibit - 2

APPENDIX I

PRECIPITATION DATA CALCULATION

Project No. 870122-1 Station _____



Precipitation Depth Versus Return Period for Partial-Duration Series

ADDENDUM to "HYDROLOGIC DESIGN FOR HIGHWAY DRAINAGE IN ARIZONA" April 1975

Steps to be used to determine precipitation values for various durations and return periods.

STEP 1. From the precipitation maps in the manual "Hydrologic Design for Highway Drainage in Arizona", determine the precipitation values for the 6 and 24 hour duration storms for return periods of 2, 5, 10, 25, 50 and 100 years. Tabulate these values in Table 1 in the column headed 'Map Values'

Return Period (Years)	Precipitation Values (inches)			
	6 hour duration		24 hour duration	
	Map Value	Corrected Value	Map Value	Corrected Value
2	1.55	1.55	2.0	2.05
5	2.0	2.02	2.8	2.72
10	2.35	2.35	3.2	3.18
25	2.8	2.75	3.8	3.75
50	3.1	3.11	4.2	4.29
100	3.4	3.50	4.8	4.80

NOTE: There is a possibility of making an error while reading the maps because, (1) a site is not easy to locate precisely on a series of 12 maps, (2) there may be some slight registration differences in printing, and (3) precise interpolation between isolines is difficult. In order to minimize any errors in reading the maps, these values should be plotted on the diagram "Precipitation Depth versus Return Period" Fig. 1.

2-year, 1-hour

$$Y_2 = -0.011 + 0.942 \left(\frac{1.55}{2.05}\right)^2 = 1.09 \text{ in.}$$

100-year, 1-hour

$$Y_{100} = 0.49 + 0.755 \left(\frac{3.5}{4.8}\right)^2 = 2.42 \text{ in.}$$

100-year, 2-hour

$$P_{100} = 0.341 \times (3.5) + 0.659 \times (2.42) = 2.79 \text{ in.}$$

100-year, 5-minute

$$P_5 = 0.29 \times 2.42 = 0.70 \text{ inc.}$$

100-year, 15-minute

$$P_{15} = 0.57 \times 2.42 = 1.38 \text{ in.}$$

APPENDIX II-A

OFFSITE DRAINAGE AREAS AND ONSITE DRAINAGE AREAS

HEC-1 OUTPUT, PRE-DEVELOPMENT

****

FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985

U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616

****

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

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

*** FREE ***
  1           ID   PROJECT NAME: CAVE CREEK SCHOOL DISTRICT
  2           ID   OFFSITE DRAINAGE CALCULATIONS TO THE PROJECT SITE
  3           ID   ONSITE SPLIT FLOWS AND DRAINAGE
  4           ID   100 YEAR - 2 HOUR PRECIPITATION EVENT
  5           ID   FILENAME:CAVCRK1
              *DIAGRAM
  6           IT       1 13APR87    1200     250
  7           IO       5

  8           KK    ODA1 OFFSITE SUBBASIN NO.1
  9           KM   SCC RUNOFF COMPUTATION
 10           BA   0.276
 11           PH                   0.70    1.38    2.42    2.79
 12           LS             88
 13           UD    0.28

 14           KK     RT1 CHANNEL ROUTING
 15           RK   10400  0.0256    0.04            TRAP      20       3

 16           KK    ODA2 OFFSITE SUBBASIN NO. 2
 17           BA   0.683
 18           UD    0.39

 19           KK    C1&2COMBINE HYDROGRAPHS
 20           KM   COMBINE ROUTED NO.1 WITH NO.2
 21           HC       2

 22           KK   RT1&2 CHANNEL ROUTING
 23           RK   24000  0.0204   0.040            TRAP      38     7.6

 24           KK    ODA3 OFFSITE SUBBASIN NO. 3
 25           BA   2.032
 26           LS             85
 27           UD   0.806

 28           KK   C12&3 COMBINE HYDROGRAPHS
 29           KM   COMBINE ROUTED (NO.1 + NO.2) WITH NO.3
 30           HC       2

 31           KK    DIV1
 32           DT    DVT1
 33           DI       0     100     300     600     800    1000    1250    1500    1750    2000
 34           DQ       0      31      93     186     248     310   387.5     465   542.5     620

 35           KK    DIV2
 36           DT    DVT2
 37           DI       0     100     400     700     900    1100    1400    1600    1800    2000
 38           DQ       0      58     232     406     522     638     812     928    1044    1160
```

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

  39          KK   RTRV1
  40          DR    DVT1

  41          KK  CD1&D2
  42          HC       2

  43          KK     RT3 CHANNEL ROUTING
  44          KM   ROUTE PORTIONS OF OFFSITE AREA 3 SPLITS
  45          RK    3040  0.0191   0.040           TRAP      30       2

  46          KK    ODA6 OFFSITE SUBBASIN NO. 6
  47          BA   0.007
  48          LS             85
  49          UD   0.100

  50          KK     RT6 CHANNEL ROUTING
  51          KM   ROUTE OFFSITE AREA 6 THROUGH I
  52          RK    3120  0.0186   0.040           TRAP       0       8

  53          KK     DAI ONSITE SUBBASIN 'I'
  54          BA   .0609
  55          LS             90
  56          UD    0.18

  57          KK    C3&I COMBINE HYDROGRAPHS
  58          KM   COMBINE ROUTED (NO.1,2,3,6) WITH 'I'
  59          HC       3

  60          KK   RTRV2
  61          DR    DVT2

  62          KK     RTA
  63          RK    1280  0.0219   0.040           TRAP      15       5

  64          KK     DAA ONSITE SUBBASIN 'A'
  65          BA   .0088
  66          LS             85
  67          UD    .082

  68          KK  CRTA+A
  69          HC       2

  70          KK    ODA4 OFFSITE SUBBASIN NO.4
  71          BA    2.16
  72          LS             88
  73          UD   0.936

  74          KK     RTB
  75          RK     800  0.0163   0.040           TRAP    19.5     5.6
```

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

  76          KK     DAB ONSITE SUBBASIN 'B'
  77          BA   .0039
  78          LS             85
  79          UD    .064

  80          KK    C4+B
  81          HC       2

  82          KK   CC4AB
  83          HC       2

  84          KK    DIV3
  85          DT    DVT3
  86          DI       0     100     500     800    1000    1200    1600    1900    2000    2200
  87          DQ       0      45     225     360     450     540     720     855     900     990

  88          KK     RTD
  89          RK    1160  0.0172   0.040           TRAP      21       5

  90          KK     DAD ONSITE SUBBASIN 'D'
  91          BA   .0272
  92          LS             88
  93          UD    .090

  94          KK   CMF+D
  95          HC       2

  96          KK    DIV4
  97          DT    DVT4
  98          DI       0     100     500     900    1100    1300    1700    2000    2200    2400
  99          DQ       0      71     355     639     781     923    1207    1420    1562    1704

 100          KK     RTE
 101          RK     880  0.0193    0.04           TRAP      10       7

 102          KK     DAE ONSITE SUBBASIN 'E'
 103          BA   .0122
 104          LS             85
 105          UD    .092

 106          KK  CRTE+E
 107          HC       2

 108          KK   RTRV3
 109          DR    DVT3

 110          KK     RTC
 111          RK    2000  0.0185    0.04           TRAP      17     6.5
```

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

 112          KK     DAC ONSITE SUBBASIN 'C'
 113          BA   .0205
 114          LS             85
 115          UD    .149

 116          KK  CRTC+C
 117          HC       2

 118          KK   CE+C+
 119          HC       2

 120          KK   RTRV4
 121          DR    DVT4

 122          KK     RTF
 123          RK     200  0.0150    0.04           TRAP      13     4.9

 124          KK     DAF ONSITE SUBBASIN 'F'
 125          BA   .0044
 126          LS             85
 127          UD    .050

 128          KK CDVT4+F
 129          HC       2
 130          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

  8       ODA1
            V
            V
 14        RT1
            .
            .
 16         .        ODA2
            .          .
            .          .
 19      C1&2............
            V
            V
 22      RT1&2
            .
            .
 24         .        ODA3
            .          .
            .          .
 28      C12&3...........
            .
            .
 32         .------->    DVT1
 31      DIV1
            .
            .
 36         .------->    DVT2
 35      DIV2
            .
            .
 40         .          .<-------    DVT1
 39         .       RTRV1
            .          .
            .          .
 41     CD1&D2...........
            V
            V
 43        RT3
            .
            .
 46         .        ODA6
            .          V
            .          V
 50         .         RT6
            .          .
            .          .
 53         .          .         DAI
            .          .          .
            .          .          .
 57      C3&I........................
            .
            .
 61         .          .<-------    DVT2
 60         .       RTRV2
            .          V
            .          V
 62         .         RTA
            .          .
```

```
64          .          .        DAA
            .          .          .
            .          .          .
68          .     CRTA+A............
            .          .
            .          .
70          .          .       ODA4
            .          .          V
            .          .          V
74          .          .        RTB
            .          .          .
            .          .          .
76          .          .          .        DAB
            .          .          .          .
            .          .          .          .
80          .          .       C4+B............
            .          .          .
            .          .          .
82          .     CC4AB............
            .          .
            .          .
85          .          .-------)    DVT3
84          .      DIV3
            .          V
            .          V
88          .       RTD
            .          .
            .          .
90          .          .        DAD
            .          .          .
            .          .          .
94          .     CMF+D............
            .          .
            .          .
97          .          .-------)    DVT4
96          .      DIV4
            .          V
            .          V
100         .       RTE
            .          .
            .          .
102         .          .        DAE
            .          .          .
            .          .          .
106         .     CRTE+E............
            .          .
            .          .
109         .          .          .(-------    DVT3
108         .          .     RTRV3
            .          .          V
            .          .          V
110         .          .       RTC
            .          .          .
            .          .          .
112         .          .          .        DAC
            .          .          .          .
            .          .          .          .
116         .          .    CRTC+C............
            .          .          .
            .          .          .
118         .     CE+C+............
            .          .
            .          .
121         .          .          .(-------    DVT4
120         .          .     RTRV4
```

```
                .         .        V
122             .         .      RTF
                .         .        .
                .         .        .
124             .         .        .        DAF
                .         .        .         .
                .         .        .         .
128             .         .   CDVT4+F............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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	ODA1	466.	1.33	70.	70.	70.	.28		
ROUTED TO	RT1	386.	1.62	69.	69.	69.	.28		
HYDROGRAPH AT	ODA2	938.	1.47	173.	173.	173.	.68		
2 COMBINED AT	C1&2	1253.	1.55	242.	242.	242.	.96		
ROUTED TO	RT1&2	909.	2.27	222.	222.	222.	.96		
HYDROGRAPH AT	ODA3	1463.	1.95	441.	441.	441.	2.03		
2 COMBINED AT	C12&3	2193.	2.18	663.	663.	663.	2.99		
DIVERSION TO	DVT1	680.	2.18	205.	205.	205.	2.99		
HYDROGRAPH AT	DIV1	1514.	2.18	457.	457.	457.	2.99		
DIVERSION TO	DVT2	878.	2.18	265.	265.	265.	2.99		
HYDROGRAPH AT	DIV2	636.	2.18	192.	192.	192.	2.99		
HYDROGRAPH AT	RTRV1	680.	2.18	205.	205.	205.	.00		
2 COMBINED AT	CD1&D2	1316.	2.18	397.	397.	397.	2.99		
ROUTED TO	RT3	1308.	2.23	394.	394.	394.	2.99		
HYDROGRAPH AT	ODA6	17.	1.13	2.	2.	2.	.01		
ROUTED TO	RT6	13.	1.38	2.	2.	2.	.01		
HYDROGRAPH AT	DAI	144.	1.22	17.	17.	17.	.06		
3 COMBINED AT	C3&I	1315.	2.22	412.	412.	412.	3.06		
HYDROGRAPH AT	RTRV2	878.	2.18	265.	265.	265.	.00		
ROUTED TO	RTA	877.	2.20	264.	264.	264.	.00		
HYDROGRAPH AT	DAA	23.	1.12	2.	2.	2.	.01		
2 COMBINED AT	CRTA+A	877.	2.20	266.	266.	266.	.01		
HYDROGRAPH AT	ODA4	1640.	2.07	541.	541.	541.	2.16		
ROUTED TO	RTB	1639.	2.08	541.	541.	541.	2.16		
HYDROGRAPH AT	DAB	11.	1.10	1.	1.	1.	.00		
2 COMBINED AT	C4+B	1640.	2.08	541.	541.	541.	2.16		
2 COMBINED AT	CC4AB	2493.	2.15	808.	808.	808.	2.17		
DIVERSION TO	DVT3	1122.	2.15	363.	363.	363.	2.17		

HYDROGRAPH AT	DIV3	1371.	2.15	444.	444.	444.	2.17
ROUTED TO	RTD	1370.	2.17	443.	443.	443.	2.17
HYDROGRAPH AT	DAD	79.	1.12	7.	7.	7.	.03
2 COMBINED AT	CMF+D	1371.	2.17	450.	450.	450.	2.20
DIVERSION TO	DVT4	974.	2.17	320.	320.	320.	2.20
HYDROGRAPH AT	DIV4	398.	2.17	131.	131.	131.	2.20
ROUTED TO	RTE	397.	2.18	130.	130.	130.	2.20
HYDROGRAPH AT	DAE	30.	1.12	3.	3.	3.	.01
2 COMBINED AT	CRTE+E	398.	2.18	133.	133.	133.	2.21
HYDROGRAPH AT	RTRV3	1122.	2.15	363.	363.	363.	.00
ROUTED TO	RTC	1119.	2.20	362.	362.	362.	.00
HYDROGRAPH AT	DAC	42.	1.18	5.	5.	5.	.02
2 COMBINED AT	CRTC+C	1121.	2.20	367.	367.	367.	.02
2 COMBINED AT	CE+C+	1518.	2.20	500.	500.	500.	2.23
HYDROGRAPH AT	RTRV4	974.	2.17	320.	320.	320.	.00
ROUTED TO	RTF	973.	2.18	320.	320.	320.	.00
HYDROGRAPH AT	DAF	13.	1.08	1.	1.	1.	.00
2 COMBINED AT	CDVT4+F	973.	2.18	321.	321.	321.	.00

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

****

FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985

U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616

****

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

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

*** FREE ***
  1           ID   PROJECT NAME: CAVE CREEK SCHOOL DISTRICT
  2           ID   OFFSITE DRAINAGE CALCULATIONS TO THE PROJECT SITE
  3           ID   AND ONSITE DRAINAGE
  4           ID   100 YEAR - 2 HOUR PRECIPITATION EVENT
  5           ID   FILENAME:CAVCRK2
              *DIAGRAM
  6           IT       1 13APR87    1200     250
  7           IO       5

  8           KK    ODA5 OFFSITE SUBBASIN NO.5
  9           BA    .119
 10           PH                   0.70    1.38    2.42    2.79
 11           LS             85
 12           UD     .22

 13           KK     DAN ONSITE SUBBASIN 'N'
 14           BA   .0106
 15           LS             85
 16           UD    .104

 17           KK    C5+N
 18           HC       2

 19           KK   DAG-1 ONSITE SUBBASIN 'G-1'
 20           BA   .0115
 21           LS             91
 22           UD    .059

 23           KK   DAG-2 ONSITE SUBBASIN 'G-2'
 24           BA   .0038
 25           LS             88
 26           UD    .039

 27           KK     DAM ONSITE SUBBASIN 'M'
 28           BA   .0086
 29           LS             88
 30           UD    .065

 31           KK     DAL ONSITE SUBBASIN 'L'
 32           BA   .0494
 33           LS             89
 34           UD    .145

 35           KK     DAK ONSITE SUBBASIN 'K'
 36           BA   .0097
 37           LS             89
 38           UD    .063

 39           KK     DAJ ONSITE SUBBASIN 'J'
 40           BA   .0111
 41           LS             88
 42           UD    .064
```

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

  43          KK     DAH ONSITE SUBBASIN 'H'
  44          BA   .0089
  45          LS              85
  46          UD    .072

  47          KK     DAP ONSITE SUBBASIN 'P'
  48          BA   .0025
  49          LS              85
  50          UD    .027
  51          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

  8       ODA5
            .
            .
 13         .        DAN
            .         .
            .         .
 17       C5+N............
            .
            .
 19         .      DAG-1
            .         .
            .         .
 23         .         .      DAG-2
            .         .         .
            .         .         .
 27         .         .         .      DAM
            .         .         .       .
            .         .         .       .
 31         .         .         .       .      DAL
            .         .         .       .       .
            .         .         .       .       .
 35         .         .         .       .       .      DAK
            .         .         .       .       .       .
            .         .         .       .       .       .
 39         .         .         .       .       .       .      DAJ
            .         .         .       .       .       .       .
            .         .         .       .       .       .       .
 43         .         .         .       .       .       .       .      DAH
            .         .         .       .       .       .       .       .
            .         .         .       .       .       .       .       .
 47         .         .         .       .       .       .       .       .      DAP
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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	ODA5	199.	1.27	26.	26.	26.	.12		
HYDROGRAPH AT	DAN	25.	1.13	2.	2.	2.	.01		
2 COMBINED AT	C5+N	214.	1.27	28.	28.	28.	.13		
HYDROGRAPH AT	DAG-1	43.	1.08	3.	3.	3.	.01		
HYDROGRAPH AT	DAG-2	14.	1.07	1.	1.	1.	.00		
HYDROGRAPH AT	DAM	28.	1.08	2.	2.	2.	.01		
HYDROGRAPH AT	DAL	124.	1.18	13.	13.	13.	.05		
HYDROGRAPH AT	DAK	33.	1.08	3.	3.	3.	.01		
HYDROGRAPH AT	DAJ	36.	1.08	3.	3.	3.	.01		
HYDROGRAPH AT	DAH	24.	1.10	2.	2.	2.	.01		
HYDROGRAPH AT	DAP	8.	1.05	1.	1.	1.	.00		

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

****

FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985

U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616

****

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

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

*** FREE ***
  1           ID   PROJECT NAME: CAVE CREEK SCHOOL DISTRICT
  2           ID   OFFSITE DRAINAGE CALCULATIONS TO THE PROJECT SITE
  3           ID   ONSITE SPLIT FLOWS AND DRAINAGE  POST-DEV.
  4           ID   100 YEAR - 2 HOUR PRECIPITATION EVENT
  5           ID   FILENAME:CAVCRK1P
              *DIAGRAM
  6           IT       1 13APR87    1200     250
  7           IO       5

  8           KK    ODA1 OFFSITE SUBBASIN NO.1
  9           KM   SCC RUNOFF COMPUTATION
 10           BA   0.276
 11           PH                  0.70    1.38    2.42    2.79
 12           LS             88
 13           UD    0.28

 14           KK     RT1 CHANNEL ROUTING
 15           RK   10400  0.0256    0.04            TRAP      20       3

 16           KK    ODA2 OFFSITE SUBBASIN NO. 2
 17           BA   0.683
 18           UD    0.39

 19           KK    C1&2COMBINE HYDROGRAPHS
 20           KM   COMBINE ROUTED NO.1 WITH NO.2
 21           HC       2

 22           KK   RT1&2 CHANNEL ROUTING
 23           RK   24000  0.0204   0.040            TRAP      38     7.6

 24           KK    ODA3 OFFSITE SUBBASIN NO. 3
 25           BA   2.032
 26           LS             85
 27           UD   0.806

 28           KK   C12&3 COMBINE HYDROGRAPHS
 29           KM   COMBINE ROUTED (NO.1 + NO.2) WITH NO.3
 30           HC       2

 31           KK    DIV1
 32           DT    DVT1
 33           DI       0     100     300     600     800    1000    1250    1500    1750    2000
 34           DQ       0      31      93     186     248     310   387.5     465   542.5     620

 35           KK    DIV2
 36           DT    DVT2
 37           DI       0     100     400     700     900    1100    1400    1600    1800    2000
 38           DQ       0      58     232     406     522     638     812     928    1044    1160
```

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

 39           KK   RTRV1
 40           DR    DVT1

 41           KK  CD1&D2
 42           HC       2

 43           KK     RT3 CHANNEL ROUTING
 44           KM   ROUTE PORTIONS OF OFFSITE AREA 3 SPLITS
 45           RK    3040  0.0191   0.040           TRAP      30       2

 46           KK    ODA6 OFFSITE SUBBASIN NO. 6
 47           BA   0.007
 48           LS             85
 49           UD   0.100

 50           KK     RT6 CHANNEL ROUTING
 51           KM   ROUTE OFFSITE AREA 6 THROUGH I
 52           RK    3120  0.0186   0.040           TRAP       0       8

 53           KK     DAI ONSITE SUBBASIN 'I'
 54           BA   .0609
 55           LS             90
 56           UD    0.18

 57           KK    C3&I COMBINE HYDROGRAPHS
 58           KM   COMBINE ROUTED (NO.1,2,3,6) WITH 'I'
 59           HC       3

 60           KK   RTRV2
 61           DR    DVT2

 62           KK     RTA
 63           RK    1280  0.0219   0.040           TRAP      15       5

 64           KK     DAA ONSITE SUBBASIN 'A'
 65           BA   .0088
 66           LS             91
 67           UD    .082

 68           KK  CRTA+A
 69           HC       2

 70           KK    ODA4 OFFSITE SUBBASIN NO.4
 71           BA    2.16
 72           LS             88
 73           UD   0.936

 74           KK     RTB
 75           RK     800  0.0163   0.040           TRAP    19.5     5.6
```

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

  76          KK     DAB ONSITE SUBBASIN 'B'
  77          BA   .0039
  78          LS             85
  79          UD    .064

  80          KK    C4+B
  81          HC       2

  82          KK   CC4AB
  83          HC       2

  84          KK    DIV3
  85          DT    DVT3
  86          DI       0     100     500     800    1000    1200    1600    1900    2000    2200
  87          DQ       0      45     225     360     450     540     720     855     900     990

  88          KK     RTD
  89          RK    1160  0.0172   0.040           TRAP      21       5

  90          KK     DAD ONSITE SUBBASIN 'D'
  91          BA   .0272
  92          LS             88
  93          UD    .090

  94          KK   CMF+D
  95          HC       2

  96          KK    DIV4
  97          DT    DVT4
  98          DI       0     100     500     900    1100    1300    1700    2000    2200    2400
  99          DQ       0      71     355     639     781     923    1207    1420    1562    1704

 100          KK     RTE
 101          RK     880  0.0193    0.04           TRAP      10       7

 102          KK     DAE ONSITE SUBBASIN 'E'
 103          BA   .0122
 104          LS             85
 105          UD    .092

 106          KK  CRTE+E
 107          HC       2

 108          KK   RTRV3
 109          DR    DVT3

 110          KK     RTC
 111          RK    2000  0.0185    0.04           TRAP      17     6.5
```

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

 112          KK     DAC ONSITE SUBBASIN 'C'
 113          BA   .0205
 114          LS             85
 115          UD    .149

 116          KK  CRTC+C
 117          HC       2

 118          KK   CE+C+
 119          HC       2

 120          KK   RTRV4
 121          DR    DVT4

 122          KK     RTF
 123          RK     200  0.0150    0.04           TRAP      13     4.9

 124          KK     DAF ONSITE SUBBASIN 'F'
 125          BA   .0044
 126          LS             85
 127          UD    .050

 128          KK CDVT4+F
 129          HC       2
 130          ZZ
```

```
                 SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

  8         ODA1
              V
              V
 14          RT1
              .
              .
 16           .        ODA2
              .          .
              .          .
 19         C1&2............
              V
              V
 22        RT1&2
              .
              .
 24           .        ODA3
              .          .
              .          .
 28        C12&3............
              .
              .
 32           .------->    DVT1
 31         DIV1
              .
              .
 36           .------->    DVT2
 35         DIV2
              .
              .
 40           .          .<-------    DVT1
 39           .       RTRV1
              .          .
              .          .
 41       CD1&D2............
              V
              V
 43          RT3
              .
              .
 49           .        ODA6
              .          V
              .          V
 50           .         RT6
              .          .
              .          .
 53           .          .        DAI
              .          .          .
              .          .          .
 57         C3&I........................
              .
              .
 61           .          .<-------    DVT2
 60           .       RTRV2
              .          V
              .          V
 62           .         RTA
```

```
.          .
64         .          .        DAA
           .          .          .
           .          .          .
68         .     CRTA+A............
           .          .
           .          .
70         .          .       ODA4
           .          .          V
           .          .          V
74         .          .        RTB
           .          .          .
           .          .          .
76         .          .          .        DAB
           .          .          .          .
           .          .          .          .
80         .          .       C4+B............
           .          .          .
           .          .          .
82         .     CC4AB............
           .          .
           .          .
85         .          .-------)    DVT3
84         .       DIV3
           .          V
           .          V
88         .       RTD
           .          .
           .          .
90         .          .        DAD
           .          .          .
           .          .          .
94         .     CMF+D............
           .          .
           .          .
97         .          .-------)    DVT4
96         .       DIV4
           .          V
           .          V
100        .       RTE
           .          .
           .          .
102        .          .        DAE
           .          .          .
           .          .          .
106        .     CRTE+E............
           .          .
           .          .
109        .          .          .(-------    DVT3
108        .          .      RTRV3
           .          .          V
           .          .          V
110        .          .        RTC
           .          .          .
           .          .          .
112        .          .          .        DAC
           .          .          .          .
           .          .          .          .
116        .          .     CRTC+C............
           .          .          .
           .          .          .
118        .     CE+C+............
           .          .
           .          .
121        .          .          .(-------    DVT4
120                      RTRV4
```

```
                .          .          V
                .          .          V
  122           .          .        RTF
                .          .          .
                .          .          .
  124           .          .          .        DAF
                .          .          .          .
                .          .          .          .
  128           .          .    CDVT4+F............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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	ODA1	466.	1.33	70.	70.	70.	.28		
ROUTED TO	RT1	386.	1.62	69.	69.	69.	.28		
HYDROGRAPH AT	ODA2	938.	1.47	173.	173.	173.	.68		
2 COMBINED AT	C1&2	1253.	1.55	242.	242.	242.	.96		
ROUTED TO	RT1&2	909.	2.27	222.	222.	222.	.96		
HYDROGRAPH AT	ODA3	1463.	1.95	441.	441.	441.	2.03		
2 COMBINED AT	C12&3	2193.	2.18	663.	663.	663.	2.99		
DIVERSION TO	DVT1	680.	2.18	205.	205.	205.	2.99		
HYDROGRAPH AT	DIV1	1514.	2.18	457.	457.	457.	2.99		
DIVERSION TO	DVT2	878.	2.18	265.	265.	265.	2.99		
HYDROGRAPH AT	DIV2	636.	2.18	192.	192.	192.	2.99		
HYDROGRAPH AT	RTRV1	680.	2.18	205.	205.	205.	.00		
2 COMBINED AT	CD1&D2	1316.	2.18	397.	397.	397.	2.99		
ROUTED TO	RT3	1308.	2.23	394.	394.	394.	2.99		
HYDROGRAPH AT	ODA6	17.	1.13	2.	2.	2.	.01		
ROUTED TO	RT6	13.	1.38	2.	2.	2.	.01		
HYDROGRAPH AT	DAI	144.	1.22	17.	17.	17.	.06		
3 COMBINED AT	C3&I	1315.	2.22	412.	412.	412.	3.06		
HYDROGRAPH AT	RTRV2	878.	2.18	265.	265.	265.	.00		
ROUTED TO	RTA	877.	2.20	264.	264.	264	.00		
HYDROGRAPH AT	DAA	30.	1.10	3.	3.	3.	.01		
2 COMBINED AT	CRTA+A	877.	2.20	267.	267.	267.	.01		
HYDROGRAPH AT	ODA4	1640.	2.07	541.	541.	541.	2.16		
ROUTED TO	RTB	1639.	2.08	541.	541.	541.	2.16		
HYDROGRAPH AT	DAB	11.	1.10	1.	1.	1.	.00		
2 COMBINED AT	C4+B	1640.	2.08	541.	541.	541.	2.16		
2 COMBINED AT	CC4AB	2493.	2.15	808.	808.	808.	2.17		
DIVERSION TO	DVT3	1122.	2.15	364.	364.	364.	2.17		

HYDROGRAPH AT	DIV3	1371.	2.15	445.	445.	445.	2.17
ROUTED TO	RTD	1370.	2.17	444.	444.	444.	2.17
HYDROGRAPH AT	DAD	79.	1.12	7.	7.	7.	.03
2 COMBINED AT	CMF+D	1371.	2.17	451.	451.	451.	2.20
DIVERSION TO	DVT4	974.	2.17	320.	320.	320.	2.20
HYDROGRAPH AT	DIV4	398.	2.17	131.	131.	131.	2.20
ROUTED TO	RTE	397.	2.18	130.	130.	130.	2.20
HYDROGRAPH AT	DAE	30.	1.12	3.	3.	3.	.01
2 COMBINED AT	CRTE+E	398.	2.18	133.	133.	133.	2.21
HYDROGRAPH AT	RTRV3	1122.	2.15	364.	364.	364.	.00
ROUTED TO	RTC	1119.	2.20	362.	362.	362.	.00
HYDROGRAPH AT	DAC	42.	1.18	5.	5.	5.	.02
2 COMBINED AT	CRTC+C	1121.	2.20	367.	367.	367.	.02
2 COMBINED AT	CE+C+	1518.	2.20	500.	500.	500.	2.23
HYDROGRAPH AT	RTRV4	974.	2.17	320.	320.	320.	.00
ROUTED TO	RTF	973.	2.18	320.	320.	320.	.00
HYDROGRAPH AT	DAF	13.	1.08	1.	1.	1.	.00
2 COMBINED AT	CDVT4+F	973.	2.18	321.	321.	321.	.00

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

APPENDIX II-B

ONSITE DRAINAGE AREAS

HEC-1 OUTPUT, POST-DEVELOPMENT

****

FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985

U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616

****

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

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

*** FREE ***
           1          ID   PROJECT NAME: CAVE CREEK SCHOOL DISTRICT
           2          ID   OFFSITE DRAINAGE CALCULATIONS TO THE PROJECT SITE
           3          ID   AND ONSITE DRAINAGE  POST-DEV.
           4          ID   100 YEAR - 2 HOUR PRECIPITATION EVENT
           5          ID   FILENAME:CAVCRK2P
                      *DIAGRAM
           6          IT       1 13APR87    1200     250
           7          IO       5

           8          KK    ODA5 OFFSITE SUBBASIN NO.5
           9          BA    .119
          10          PH                   0.70    1.38    2.42    2.79
          11          LS             85
          12          UD     .22

          13          KK     DAN ONSITE SUBBASIN 'N'
          14          BA   .0106
          15          LS             91
          16          UD    .104

          17          KK    C5+N
          18          HC       2

          19          KK   DAG-1 ONSITE SUBBASIN 'G-1'
          20          BA   .0115
          21          LS             91
          22          UD    .059

          23          KK   DAG-2 ONSITE SUBBASIN 'G-2'
          24          BA   .0038
          25          LS             88
          26          UD    .039

          27          KK     DAM ONSITE SUBBASIN 'M'
          28          BA   .0086
          29          LS             91
          30          UD    .065

          31          KK     DAL ONSITE SUBBASIN 'L'
          32          BA   .0494
          33          LS             89
          34          UD    .145

          35          KK     DAK ONSITE SUBBASIN 'K'
          36          BA   .0097
          37          LS             89
          38          UD    .063

          39          KK     DAJ ONSITE SUBBASIN 'J'
          40          BA   .0111
          41          LS             91
          42          UD    .064
```

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

  43          KK     DAH ONSITE SUBBASIN 'H'
  44          BA   .0089
  45          LS              85
  46          UD    .072

  47          KK     DAP ONSITE SUBBASIN 'P'
  48          BA   .0025
  49          LS              85
  50          UD    .027
  51          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

  8         ODA5
               .
               .
 13            .        DAN
               .          .
               .          .
 17         C5+N............
               .
               .
 19            .      DAG-1
               .          .
               .          .
 23            .          .      DAG-2
               .          .          .
               .          .          .
 27            .          .          .        DAM
               .          .          .          .
               .          .          .          .
 31            .          .          .          .        DAL
               .          .          .          .          .
               .          .          .          .          .
 35            .          .          .          .          .        DAK
               .          .          .          .          .          .
               .          .          .          .          .          .
 39            .          .          .          .          .          .        DAJ
               .          .          .          .          .          .          .
               .          .          .          .          .          .          .
 43            .          .          .          .          .          .          .        DAH
               .          .          .          .          .          .          .          .
               .          .          .          .          .          .          .          .
 47            .          .          .          .          .          .          .          .        DAP
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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	ODA5	199.	1.27	26.	26.	26.	.12		
HYDROGRAPH AT	DAN	33.	1.13	3.	3.	3.	.01		
2 COMBINED AT	C5+N	218.	1.27	29.	29.	29.	.13		
HYDROGRAPH AT	DAG-1	43.	1.08	3.	3.	3.	.01		
HYDROGRAPH AT	DAG-2	14.	1.07	1.	1.	1.	.00		
HYDROGRAPH AT	DAM	31.	1.08	3.	3.	3.	.01		
HYDROGRAPH AT	DAL	124.	1.18	13.	13.	13.	.05		
HYDROGRAPH AT	DAK	33.	1.08	3.	3.	3.	.01		
HYDROGRAPH AT	DAJ	41.	1.08	3.	3.	3.	.01		
HYDROGRAPH AT	DAH	24.	1.10	2.	2.	2.	.01		
HYDROGRAPH AT	DAP	8.	1.05	1.	1.	1.	.00		

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

APPENDIX III

ON SITE WASHES FIELD MEASUREMENT DATA

Appendix III
Cave School District No. 93
Onsite Wash Field Measurement Data

Location +	Bottom Width (ft)	Depth (in)	Side Slope, Z (ft/ft)	Channel* Slope (ft/ft)	Manning's* n
b	16.0	14.0	5.1	0.0143	0.04
c	19.5	17.0	5.6	0.0154	0.04
d	16.5	9.5	6.3	0.0125	0.04
e	16.8	11.0	6.5	0.0222	0.04
f	20.8	12.0	5.0	0.0133	0.04
g	20.5	6.0	14.0	0.0167	0.04
h	9.5	6.0	7.0	0.0220	0.04
i	13.0	11.0	4.8	0.0250	0.04
j	74.0	18.0	14.7	0.0182	0.04
k	18.0	12.0	7.0	0.0200	0.04
l	15.0	33.0	1.8	0.0200	0.04
m	18.0	22.0	1.1	0.0200	0.04
n	13.0	33.0	2.0	0.0200	0.04
p	38.0	19.0	7.6	0.0200	0.04

Note: * Not determined with field measurements.
+ Refer to Exhibit 3 for locations.

APPENDIX IV

FLOOD PLAIN ANALYSIS

HEC-2 OUTPUT

```
*****************************************************
*  WATER SURFACE PROFILES                           *
*  VERSION OF NOVEMBER 1976                         *
*  UPDATED MAY 1984                                 *
*  IBM-PC-XT VERSION AUGUST 1985                    *
*  RUN DATE  09-02-87   TIME  13:06:33               *
*****************************************************
```


```
*************************************
*  U.S. ARMY CORPS OF ENGINEERS     *
*  THE HYDROLOGIC ENGINEERING CENTER *
*  609 SECOND STREET, SUITE D       *
*  DAVIS, CALIFORNIA 95616          *
  *  (916) 440-2105 (FTS) 448-2105
*************************************
```


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

THIS RUN EXECUTED 09-02-87

```
**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MAY  1984
  ERROR CORR -  01,02,03,04,05,06
  MODIFICATION -  50,51,52,53,54,55,56
  IBM-PC-XT VERSION AUGUST 1985
**************************************************
```

```
T1     CAVE CREEK SCHOOL DISTRICT HEC-2 ANALYSIS
T2     WATER SURFACE ELEVATIONS FOR EXISTING WASHES
T3     FILE NAME: CCSCH

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0.       2.       0.       0. -1.000000      .00       .0       0.    58.000      .000

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

    -1.000      .000      .000      .000      .000      .000    -1.000      .000      .000      .000

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    150.000      .000      .000      .000      .000      .000      .000      .000      .000      .000

NC      .040      .040      .040      .100      .300      .000      .000      .000      .000      .000
QT     1.000  2861.000      .000      .000      .000      .000      .000      .000      .000      .000
X1    20.000    81.000      .000  1054.000      .000      .000      .000      .000      .000      .000
GR    52.400      .000    52.800    20.000    52.000    32.000    51.000    48.000    50.000    52.000
GR    49.700    58.000    49.700    66.000    50.000    72.000    51.000    80.000    52.000    84.000
GR    52.200    88.000    52.000    92.000    51.700   104.000    52.000   116.000    52.200   132.000
GR    52.000   146.000    51.800   166.000    51.300   178.000    52.000   190.000    52.200   204.000
GR    52.000   246.000    51.200   262.000    52.000   272.000    52.200   280.000    52.000   290.000
GR    51.000   296.000    50.500   304.000    51.000   308.000    52.000   312.000    52.500   326.000
GR    52.000   346.000    51.300   354.000    52.000   370.000    52.300   386.000    52.000   402.000
GR    51.000   406.000    50.000   408.000    49.900   412.000    50.000   416.000    51.000   448.000
GR    52.000   470.000    53.000   494.000    54.000   510.000    55.000   540.000    55.100   546.000
GR    55.000   550.000    55.000   556.000    54.000   576.000    53.000   620.000    53.000   628.000
GR    54.000   650.000    55.000   674.000    56.000   700.000    56.000   714.000    55.000   744.000
GR    54.000   756.000    53.000   772.000    52.600   780.000    53.000   788.000    54.000   828.000
GR    54.200   840.000    54.000   858.000    54.400   866.000    54.000   892.000    53.000   896.000
GR    52.000   900.000    51.800   914.000    52.000   926.000    52.100   934.000    52.000   940.000
GR    51.800   946.000    52.000   960.000    53.000   974.000    53.300   990.000    53.000  1000.000
GR    52.800  1008.000    53.000  1016.000    54.000  1024.000    55.000  1036.000    56.000  1042.000
GR    56.500  1054.000      .000      .000      .000      .000      .000      .000      .000      .000

X1    30.000    83.000      .000  1090.000   100.000    55.000    80.000      .000      .000      .000
GR    55.600      .000    55.000    18.000    54.000    64.000    54.000    68.000    53.000    74.000
GR    53.800    80.000    53.000    83.000    52.000    88.000    51.700    90.000    52.000    92.000
GR    53.000    94.000    54.000    98.000    54.100   102.000    54.000   106.000    53.000   112.000
GR    52.000   114.000    51.600   118.000    51.600   124.000    52.000   128.000    53.000   134.000
GR    54.000   138.000    54.100   156.000    54.100   180.000    54.000   190.000    53.000   194.000
GR    52.500   204.000    53.000   210.000    54.000   220.000    54.100   232.000    54.000   246.000
GR    53.000   280.000    54.000   304.000    54.300   320.000    54.000   334.000    53.300   366.000
```

GR	53.700	390.000	53.000	426.000	52.000	438.000	51.300	466.000	52.000	480.000
GR	52.300	488.000	52.000	500.000	52.000	510.000	53.000	524.000	54.000	540.000
GR	55.000	566.000	55.900	590.000	55.000	608.000	55.000	622.000	55.600	648.000
GR	55.000	670.000	54.300	680.000	55.000	690.000	56.000	704.000	56.000	710.000
GR	56.300	730.000	56.000	750.000	55.000	764.000	54.000	780.000	54.000	794.000
GR	53.000	806.000	53.000	816.000	54.000	840.000	55.000	870.000	55.500	884.000
GR	55.500	890.000	55.000	916.000	54.000	930.000	53.000	936.000	52.700	958.000
GR	53.000	970.000	54.000	980.000	55.000	996.000	55.400	1008.000	55.000	1020.000
GR	54.000	1026.000	53.600	1032.000	54.000	1036.000	54.000	1044.000	55.000	1054.000
GR	56.000	1060.000	57.000	1068.000	57.200	1090.000	.000	.000	.000	.000
X1	40.000	55.000	.000	1036.000	180.000	12.000	170.000	.000	.000	.000
GR	58.000	.000	57.000	17.000	56.000	31.000	55.000	40.000	56.000	49.000
GR	56.600	66.000	56.000	77.000	55.000	88.000	56.000	94.000	57.000	170.000
GR	55.000	180.000	54.500	188.000	55.000	196.000	56.000	200.000	57.000	210.000
GR	56.000	238.000	55.000	307.000	54.000	364.000	53.000	396.000	52.000	424.000
GR	53.000	440.000	53.600	454.000	53.000	468.000	54.000	474.000	55.000	500.000
GR	56.000	522.000	56.300	538.000	56.000	572.000	56.400	592.000	56.000	632.000
GR	57.000	660.000	56.000	682.000	55.800	688.000	56.000	696.000	56.000	712.000
GR	55.000	728.000	54.000	734.000	53.200	748.000	54.000	765.000	55.000	784.000
GR	56.000	824.000	56.000	842.000	55.000	868.000	54.000	872.000	53.000	886.000
GR	53.000	902.000	54.000	916.000	55.000	930.000	55.700	942.000	55.000	954.000
GR	54.000	968.000	55.000	984.000	56.000	1000.000	57.000	1010.000	58.000	1036.000
X1	50.000	63.000	.000	1066.000	176.000	102.000	134.000	.000	.000	.000
GR	60.200	.000	60.000	12.000	60.500	18.000	60.000	24.000	59.000	42.000
GR	58.300	76.000	59.000	122.000	58.500	134.000	59.000	146.000	60.000	162.000
GR	60.200	200.000	60.000	214.000	60.000	232.000	59.700	248.000	60.000	260.000
GR	58.000	270.000	57.000	286.000	58.000	300.000	59.000	304.000	60.000	310.000
GR	60.000	334.000	59.000	356.000	58.000	382.000	57.000	396.000	58.000	404.000
GR	59.000	426.000	59.400	440.000	59.000	460.000	58.000	482.000	57.000	494.000
GR	56.000	516.000	55.000	524.000	54.500	528.000	55.000	532.000	56.000	544.000
GR	57.000	580.000	57.000	590.000	59.000	626.000	60.000	654.000	59.000	680.000
GR	58.000	694.000	57.000	714.000	56.600	722.000	57.000	732.000	58.000	740.000
GR	58.000	752.000	57.700	774.000	58.000	796.000	58.300	820.000	58.000	840.000
GR	57.000	862.000	56.000	870.000	55.400	892.000	55.900	900.000	55.400	910.000
GR	55.500	942.000	56.000	948.000	57.000	952.000	58.000	966.000	57.500	1000.000
GR	58.000	1024.000	59.000	1046.000	60.200	1066.000	.000	.000	.000	.000
X1	60.000	47.000	.000	1064.000	190.000	272.000	250.000	.000	.000	.000
GR	65.000	.000	64.000	40.000	63.000	80.000	62.400	90.000	63.000	104.000
GR	63.700	142.000	63.000	160.000	62.000	176.000	61.700	188.000	62.000	194.000
GR	63.000	274.000	63.300	290.000	63.000	308.000	62.600	346.000	63.000	360.000
GR	63.200	374.000	63.000	380.000	61.000	388.000	60.400	396.000	61.000	404.000
GR	61.000	420.000	62.000	436.000	63.000	456.000	64.000	484.000	64.300	506.000
GR	64.000	516.000	61.000	546.000	60.000	564.000	59.000	582.000	58.200	592.000
GR	59.000	608.000	60.000	620.000	63.000	670.000	63.000	720.000	62.000	744.000
GR	61.000	760.000	62.000	776.000	63.000	840.000	62.000	888.000	62.800	900.000
GR	62.000	928.000	61.000	972.000	60.000	976.000	59.700	982.000	60.000	1006.000
GR	64.000	1046.000	65.000	1064.000	.000	.000	.000	.000	.000	.000

QT	1.000	3834.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	65.000	81.000	.000	1238.000	100.000	125.000	120.000	.000	.000	.000
GR	66.000	.000	66.300	20.000	66.000	30.000	65.100	36.000	66.000	56.000
GR	66.200	64.000	66.000	68.000	65.000	72.000	64.800	78.000	65.000	84.000
GR	66.000	96.000	66.000	108.000	65.500	138.000	66.000	154.000	66.100	172.000
GR	66.000	182.000	65.300	194.000	66.000	208.000	65.000	226.000	64.000	236.000
GR	65.000	240.000	65.000	246.000	64.200	296.000	65.000	326.000	66.000	352.000
GR	65.000	376.000	64.000	388.000	63.000	396.000	62.800	400.000	63.000	402.000
GR	63.000	414.000	63.000	420.000	62.800	424.000	63.000	428.000	64.000	434.000
GR	65.000	480.000	65.000	492.000	64.300	532.000	65.000	572.000	65.000	584.000
GR	64.000	586.000	63.000	590.000	62.700	596.000	63.000	610.000	64.000	638.000
GR	64.000	640.000	65.000	654.000	66.000	686.000	66.100	692.000	66.000	698.000
GR	65.000	708.000	64.000	720.000	63.000	740.000	62.000	754.000	61.300	758.000
GR	62.000	766.000	63.000	786.000	64.000	808.000	63.000	834.000	62.000	842.000
GR	61.000	846.000	60.900	848.000	61.000	851.000	62.000	861.000	63.000	877.000
GR	64.000	893.000	65.000	913.000	64.400	953.000	65.000	977.000	65.400	1017.000
GR	65.000	1053.000	65.500	1091.000	65.000	1133.000	64.000	1143.000	63.000	1148.000
GR	61.900	1154.000	62.500	1162.000	62.000	1173.000	62.000	1199.000	65.000	1214.000
GR	66.000	1238.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	70.000	82.000	930.000	2168.000	74.000	70.000	40.000	.000	.000	.000
GR	68.000	930.000	67.400	970.000	67.700	1000.000	68.000	1018.000	68.200	1026.000
GR	68.000	1032.000	67.000	1038.000	67.000	1044.000	68.000	1052.000	68.100	1056.000
GR	68.000	1064.000	67.700	1070.000	67.900	1078.000	68.000	1086.000	67.000	1094.000
GR	66.000	1102.000	67.000	1108.000	67.500	1114.000	67.000	1120.000	66.000	1128.000
GR	67.000	1138.000	66.000	1144.000	66.800	1154.000	66.000	1160.000	67.000	1180.000
GR	67.300	1196.000	67.000	1210.000	67.000	1230.000	68.000	1264.000	67.000	1280.000
GR	66.000	1292.000	65.000	1314.000	65.400	1320.000	65.000	1326.000	66.000	1352.000
GR	65.000	1370.000	64.000	1378.000	65.000	1384.000	65.800	1410.000	65.200	1440.000
GR	66.000	1500.000	64.000	1510.000	63.700	1534.000	64.000	1544.000	65.000	1560.000
GR	65.000	1568.000	66.000	1588.000	66.600	1612.000	66.000	1622.000	65.000	1636.000
GR	64.000	1662.000	63.000	1678.000	62.000	1684.000	63.000	1698.000	64.000	1714.000
GR	64.200	1740.000	64.000	1756.000	62.000	1778.000	61.300	1784.000	62.000	1788.000
GR	63.000	1802.000	65.000	1814.000	65.300	1830.000	65.000	1872.000	66.000	1920.000
GR	66.200	1940.000	66.000	1966.000	66.300	1988.000	66.000	2012.000	65.000	2026.000
GR	63.000	2044.000	63.500	2058.000	63.000	2066.000	62.800	2080.000	63.000	2088.000
GR	64.000	2094.000	64.600	2104.000	64.000	2126.000	63.300	2138.000	64.000	2150.000
GR	65.000	2158.000	67.000	2168.000	.000	.000	.000	.000	.000	.000
X1	80.000	71.000	.000	1066.000	174.000	148.000	140.000	.000	.000	.000
GR	70.000	.000	70.300	12.000	70.000	20.000	69.000	26.000	70.000	46.000
GR	70.500	60.000	70.000	96.000	69.700	138.000	70.000	150.000	70.300	168.000
GR	70.000	186.000	69.300	200.000	69.500	232.000	69.000	282.000	68.000	298.000
GR	69.000	320.000	69.200	348.000	69.000	362.000	67.000	366.000	67.300	380.000
GR	67.000	388.000	66.700	394.000	67.000	398.000	67.400	410.000	67.000	420.000
GR	68.000	424.000	68.900	440.000	68.000	474.000	67.000	480.000	66.200	488.000
GR	67.000	496.000	66.200	504.000	67.000	510.000	68.000	520.000	68.700	536.000
GR	68.000	576.000	67.000	606.000	68.000	630.000	68.200	646.000	68.000	654.000
GR	67.000	668.000	66.000	686.000	65.000	700.000	66.000	712.000	67.000	732.000
GR	68.000	744.000	69.000	762.000	69.200	774.000	69.000	790.000	68.000	800.000
GR	67.000	804.000	66.000	816.000	67.000	828.000	68.000	842.000	68.000	864.000
GR	66.000	870.000	65.300	888.000	66.000	894.000	67.000	904.000	67.000	918.000
GR	64.000	934.000	65.800	940.000	66.000	954.000	67.000	960.000	67.300	966.000

GR	67.000	970.000	65.700	982.000	67.000	992.000	68.000	998.000	69.000	1046.000
GR	70.000	1066.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	90.000	65.000	.000	1098.000	120.000	90.000	120.000	.000	.000	.000
GR	72.000	.000	72.400	30.000	72.000	38.000	71.000	56.000	72.000	61.000
GR	72.300	72.000	72.000	100.000	72.300	108.000	72.000	126.000	71.800	138.000
GR	72.000	148.000	72.000	186.000	71.000	234.000	70.800	260.000	71.000	278.000
GR	71.000	296.000	70.700	314.000	71.000	330.000	71.500	360.000	71.000	368.000
GR	70.000	372.000	69.400	384.000	70.000	392.000	70.400	402.000	70.000	412.000
GR	69.500	420.000	70.000	426.000	70.800	440.000	70.000	500.000	70.000	520.000
GR	69.500	556.000	70.000	580.000	71.000	600.000	72.000	634.000	71.000	648.000
GR	71.800	668.000	71.500	692.000	71.000	716.000	70.000	724.000	70.000	744.000
GR	68.700	762.000	70.000	768.000	70.500	780.000	70.000	788.000	69.200	798.000
GR	70.000	824.000	70.200	830.000	70.000	838.000	68.000	844.000	67.700	860.000
GR	68.000	874.000	69.000	888.000	71.200	892.000	70.000	904.000	70.400	930.000
GR	70.000	944.000	69.000	974.000	69.400	994.000	69.000	1010.000	67.700	1018.000
GR	68.000	1028.000	70.000	1040.000	70.000	1060.000	71.000	1086.000	72.000	1098.000
X1	100.000	44.000	.000	1004.000	160.000	160.000	116.000	.000	.000	.000
GR	75.000	.000	74.000	14.000	74.600	40.000	74.000	48.000	73.400	64.000
GR	74.000	72.000	74.800	84.000	74.500	146.000	74.000	210.000	73.000	254.000
GR	72.700	310.000	73.000	340.000	73.400	352.000	73.000	366.000	73.500	374.000
GR	73.000	380.000	71.000	390.000	71.000	404.000	72.000	420.000	73.000	432.000
GR	72.000	488.000	72.000	504.000	71.200	550.000	72.000	606.000	73.000	660.000
GR	74.000	692.000	73.000	718.000	72.000	740.000	71.100	762.000	72.000	772.000
GR	73.000	780.000	72.700	812.000	73.000	832.000	71.000	848.000	70.000	858.000
GR	69.800	870.000	70.000	882.000	73.000	896.000	73.600	914.000	73.000	938.000
GR	72.200	960.000	73.000	974.000	74.000	982.000	75.000	1004.000	.000	.000
X1	110.000	53.000	.000	986.000	144.000	110.000	156.000	.000	.000	.000
GR	77.000	.000	76.000	32.000	75.800	40.000	76.000	56.000	76.300	70.000
GR	76.000	84.000	75.400	90.000	76.000	98.000	75.600	102.000	76.000	114.000
GR	77.000	140.000	77.200	164.000	77.000	188.000	76.600	210.000	77.000	240.000
GR	76.000	280.000	76.000	306.000	76.700	388.000	76.000	404.000	75.000	408.000
GR	74.300	424.000	74.300	440.000	75.000	452.000	76.000	502.000	75.700	536.000
GR	76.000	568.000	75.000	588.000	76.000	618.000	77.000	636.000	77.300	688.000
GR	77.000	700.000	76.000	718.000	75.000	728.000	74.700	732.000	75.000	738.000
GR	75.500	750.000	75.000	758.000	74.000	764.000	75.000	776.000	76.000	796.000
GR	76.500	820.000	76.000	838.000	75.000	868.000	72.200	882.000	73.000	902.000
GR	76.000	912.000	76.300	930.000	76.000	940.000	75.000	950.000	74.400	956.000
GR	75.000	960.000	76.000	968.000	77.000	986.000	.000	.000	.000	.000
X1	120.000	59.000	.000	1150.000	340.000	216.000	210.000	.000	.000	.000
GR	82.000	.000	79.000	92.000	78.200	140.000	79.000	210.000	79.200	220.000
GR	79.000	230.000	78.800	234.000	79.000	238.000	79.300	246.000	79.000	260.000
GR	79.300	274.000	79.000	282.000	78.000	290.000	78.800	304.000	78.500	324.000
GR	79.000	332.000	79.000	354.000	78.700	366.000	79.000	376.000	79.300	424.000
GR	79.000	444.000	79.300	492.000	79.000	506.000	78.000	510.000	77.000	516.000
GR	77.300	528.000	78.000	536.000	78.200	550.000	78.000	560.000	77.000	566.000
GR	78.000	574.000	77.700	590.000	78.000	628.000	77.000	634.000	78.000	640.000
GR	79.000	670.000	80.000	686.000	80.200	718.000	80.000	734.000	79.400	772.000
GR	80.000	792.000	81.200	844.000	80.000	878.000	79.200	908.000	79.500	942.000
GR	79.000	998.000	78.000	1012.000	77.000	1016.000	76.000	1022.000	75.300	1028.000
GR	75.100	1044.000	76.000	1050.000	78.000	1062.000	77.000	1068.000	76.500	1072.000

GR	77.000	1078.000	78.000	1080.000	81.000	1124.000	82.000	1150.000	.000	.000
X1	130.000	49.000	.000	876.000	410.000	230.000	170.000	.000	.000	.000
GR	83.000	.000	82.000	36.000	81.800	40.000	82.000	48.000	81.700	54.000
GR	82.000	58.000	83.000	72.000	83.400	106.000	83.000	142.000	82.000	172.000
GR	81.000	186.000	80.200	198.000	81.000	212.000	81.400	220.000	81.000	226.000
GR	80.200	240.000	80.800	254.000	80.000	264.000	79.300	272.000	80.000	280.000
GR	81.000	292.000	81.300	304.000	81.000	322.000	81.500	368.000	81.000	396.000
GR	80.700	416.000	81.000	440.000	82.000	472.000	83.000	508.000	83.400	536.000
GR	83.000	560.000	82.000	642.000	81.000	650.000	79.000	668.000	79.000	674.000
GR	77.600	680.000	77.700	700.000	78.000	704.000	79.000	708.000	80.000	716.000
GR	81.000	734.000	81.400	742.000	81.000	754.000	80.400	768.000	81.000	776.000
GR	82.000	796.000	81.000	830.000	82.000	844.000	83.000	876.000	.000	.000
X1	140.000	50.000	.000	860.000	190.000	174.000	220.000	.000	.000	.000
GR	87.000	.000	84.000	52.000	85.000	60.000	85.600	90.000	85.000	106.000
GR	84.300	118.000	84.300	134.000	85.000	142.000	85.600	160.000	85.000	182.000
GR	84.000	208.000	84.600	218.000	84.000	224.000	83.400	230.000	84.000	234.000
GR	85.000	240.000	85.300	246.000	85.000	254.000	85.000	274.000	84.000	284.000
GR	81.700	296.000	84.000	302.000	85.000	324.000	85.000	342.000	84.400	346.000
GR	85.000	352.000	85.300	366.000	85.000	384.000	84.600	404.000	84.600	426.000
GR	85.000	450.000	86.000	536.000	86.400	564.000	86.000	598.000	85.000	608.000
GR	81.000	624.000	82.000	638.000	82.600	648.000	82.000	654.000	81.000	658.000
GR	81.700	668.000	81.000	676.000	81.200	688.000	84.000	702.000	84.600	726.000
GR	84.000	738.000	84.500	778.000	85.000	800.000	86.000	840.000	87.000	860.000
X1	150.000	50.000	.000	996.000	248.000	152.000	145.000	.000	.000	.000
GR	90.000	.000	88.000	36.000	87.000	92.000	86.700	104.000	87.000	116.000
GR	87.000	150.000	86.800	172.000	87.000	214.000	88.000	256.000	87.000	270.000
GR	86.700	276.000	86.800	292.000	87.000	296.000	88.000	306.000	88.000	324.000
GR	87.000	344.000	87.000	358.000	86.200	368.000	87.000	384.000	86.900	398.000
GR	87.000	404.000	88.000	450.000	87.800	482.000	88.000	496.000	87.400	520.000
GR	88.000	534.000	88.800	586.000	88.000	616.000	87.000	630.000	86.000	654.000
GR	86.600	684.000	86.000	694.000	84.000	700.000	83.600	704.000	84.000	720.000
GR	85.000	724.000	86.000	730.000	86.400	740.000	86.000	752.000	83.000	764.000
GR	83.300	786.000	84.000	792.000	85.000	800.000	86.000	804.000	87.000	832.000
GR	88.000	900.000	88.000	920.000	87.700	956.000	88.000	980.000	90.000	996.000
X1	160.000	49.000	.000	976.000	220.000	212.000	230.000	.000	.000	.000
GR	92.000	.000	91.300	70.000	91.800	108.000	91.000	122.000	90.000	150.000
GR	89.000	154.000	90.000	162.000	89.200	190.000	90.000	212.000	91.000	234.000
GR	91.600	246.000	91.000	286.000	90.300	302.000	91.000	322.000	90.000	360.000
GR	89.000	372.000	88.900	390.000	89.000	394.000	90.000	398.000	90.600	410.000
GR	90.000	460.000	90.000	506.000	91.000	540.000	92.000	604.000	92.700	670.000
GR	92.000	690.000	91.000	706.000	90.000	712.000	89.000	718.000	87.800	724.000
GR	89.000	728.000	89.600	746.000	89.000	756.000	87.000	764.000	86.800	770.000
GR	87.000	776.000	88.000	780.000	88.500	786.000	88.500	796.000	89.000	804.000
GR	90.000	820.000	90.200	828.000	90.000	840.000	89.000	852.000	86.000	866.000
GR	87.000	884.000	90.000	894.000	91.000	936.000	92.000	976.000	.000	.000

X1	170.000	55.000	.000	880.000	238.000	196.000	220.000	.000	.000	.000
GR	95.000	.000	95.000	18.000	94.000	22.000	93.900	28.000	94.000	32.000
GR	94.000	54.000	93.000	68.000	92.700	80.000	93.000	96.000	93.000	110.000
GR	94.000	142.000	94.000	164.000	93.000	170.000	92.000	174.000	92.000	190.000
GR	93.000	200.000	93.100	212.000	93.000	230.000	92.000	254.000	93.000	260.000
GR	93.300	268.000	93.000	274.000	92.600	284.000	93.000	292.000	93.000	300.000
GR	92.600	320.000	93.000	334.000	92.000	346.000	91.400	362.000	92.000	366.000
GR	92.000	378.000	92.400	470.000	93.000	518.000	93.500	534.000	93.600	552.000
GR	93.000	594.000	92.000	620.000	91.800	624.000	92.000	646.000	92.500	668.000
GR	92.000	684.000	90.000	694.000	89.800	698.000	90.000	704.000	92.000	718.000
GR	90.000	736.000	92.000	750.000	93.000	762.000	94.000	790.000	93.000	806.000
GR	93.000	820.000	90.000	828.000	90.000	842.000	94.000	866.000	95.000	880.000
X1	180.000	51.000	.000	980.000	180.000	196.000	120.000	.000	.000	.000
GR	98.000	.000	96.000	32.000	96.600	50.000	96.000	70.000	97.000	106.000
GR	97.200	128.000	97.000	148.000	96.000	158.000	94.000	168.000	94.500	176.000
GR	94.300	186.000	95.000	192.000	95.000	200.000	94.600	210.000	95.000	222.000
GR	95.800	238.000	95.000	290.000	96.000	338.000	96.200	344.000	96.000	348.000
GR	95.000	352.000	95.000	364.000	94.000	382.000	95.000	388.000	96.000	432.000
GR	95.600	496.000	96.000	560.000	95.000	640.000	95.300	662.000	95.000	678.000
GR	94.800	686.000	95.000	700.000	94.000	706.000	93.000	710.000	92.700	714.000
GR	93.000	724.000	94.000	730.000	94.600	756.000	94.000	776.000	93.000	790.000
GR	92.400	796.000	92.200	808.000	93.000	812.000	94.000	816.000	95.000	824.000
GR	96.000	842.000	97.000	870.000	97.000	916.000	96.300	930.000	97.000	948.000
GR	98.000	980.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	190.000	47.000	.000	810.000	224.000	156.000	210.000	.000	.000	.000
GR	100.000	.000	99.000	48.000	97.000	58.000	96.700	64.000	97.000	74.000
GR	98.000	82.000	98.400	88.000	98.000	94.000	97.000	98.000	96.600	102.000
GR	96.600	110.000	97.000	116.000	99.000	124.000	99.400	158.000	99.000	202.000
GR	98.400	224.000	99.000	252.000	99.000	266.000	97.000	270.000	96.800	280.000
GR	97.000	288.000	99.000	298.000	98.000	308.000	97.600	312.000	98.000	316.000
GR	99.000	320.000	99.200	328.000	99.000	336.000	98.000	384.000	98.000	396.000
GR	98.200	460.000	99.000	492.000	99.700	532.000	99.000	566.000	99.000	574.000
GR	98.000	600.000	97.000	618.000	96.000	624.000	95.500	634.000	96.000	650.000
GR	96.000	672.000	97.000	690.000	97.300	706.000	97.000	720.000	98.000	750.000
GR	99.000	774.000	100.000	810.000	.000	.000	.000	.000	.000	.000
X1	200.000	57.000	.000	836.000	170.000	270.000	260.000	.000	.000	.000
GR	103.000	.000	102.000	22.000	101.000	38.000	100.000	42.000	99.000	44.000
GR	98.800	54.000	99.000	62.000	100.000	66.000	100.500	74.000	100.000	80.000
GR	99.000	84.000	98.200	88.000	99.000	92.000	100.000	100.000	101.000	102.000
GR	102.000	118.000	101.100	170.000	102.000	250.000	102.000	262.000	102.300	270.000
GR	102.000	274.000	100.000	278.000	99.800	282.000	100.000	288.000	100.000	296.000
GR	102.000	304.000	102.000	320.000	102.200	334.000	102.000	340.000	101.000	348.000
GR	102.000	360.000	102.300	372.000	102.000	396.000	101.800	424.000	102.000	450.000
GR	101.800	458.000	102.000	468.000	102.300	490.000	102.000	512.000	100.000	530.000
GR	100.000	538.000	99.000	544.000	98.700	550.000	99.000	554.000	99.000	570.000
GR	100.000	574.000	101.000	578.000	101.700	612.000	101.500	628.000	102.000	650.000
GR	102.000	682.000	102.300	692.000	102.300	704.000	102.000	710.000	101.000	724.000
GR	102.000	760.000	103.000	836.000	.000	.000	.000	.000	.000	.000

X1	210.000	60.000	.000	892.000	40.000	74.000	90.000	.000	.000	.000
GR	104.000	.000	103.000	22.000	102.000	30.000	101.000	50.000	100.000	68.000
GR	100.000	74.000	99.600	94.000	100.000	98.000	101.000	108.000	102.000	126.000
GR	102.000	142.000	102.500	164.000	102.000	186.000	103.000	264.000	104.000	314.000
GR	103.000	318.000	102.000	322.000	101.500	330.000	101.500	338.000	102.000	342.000
GR	103.000	346.000	104.000	356.000	104.100	368.000	104.000	384.000	103.000	390.000
GR	102.000	404.000	103.000	410.000	104.000	430.000	103.700	460.000	104.000	494.000
GR	104.000	512.000	103.800	520.000	104.000	532.000	103.000	556.000	102.000	564.000
GR	101.000	568.000	101.000	574.000	100.600	580.000	101.000	584.000	102.000	588.000
GR	103.000	592.000	104.000	622.000	103.000	644.000	102.000	652.000	101.000	658.000
GR	102.000	668.000	103.000	672.000	103.200	680.000	103.000	686.000	102.900	696.000
GR	103.000	710.000	104.000	750.000	103.000	758.000	103.000	764.000	103.600	780.000
GR	103.000	792.000	102.500	802.000	103.000	842.000	104.000	876.000	104.300	892.000
QT	1.000	2194.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	220.000	51.000	.000	598.000	120.000	110.000	120.000	.000	.000	.000
GR	106.000	.000	105.000	10.000	104.000	34.000	103.000	38.000	102.800	44.000
GR	103.000	62.000	104.000	74.000	105.000	96.000	104.500	104.000	104.800	114.000
GR	104.000	126.000	103.700	128.000	104.000	132.000	105.000	138.000	105.500	148.000
GR	105.200	158.000	105.500	188.000	105.000	208.000	104.000	214.000	103.500	216.000
GR	104.000	220.000	105.000	226.000	105.000	238.000	105.600	256.000	105.000	270.000
GR	104.000	274.000	103.000	278.000	102.100	286.000	103.000	296.000	104.000	300.000
GR	105.000	312.000	105.200	330.000	105.000	346.000	104.000	362.000	103.000	366.000
GR	102.200	382.000	103.000	386.000	104.000	388.000	105.000	392.000	105.200	400.000
GR	105.000	412.000	104.700	434.000	105.000	442.000	105.400	456.000	105.200	464.000
GR	105.500	480.000	105.000	496.000	104.600	510.000	105.000	540.000	106.000	582.000
GR	106.700	598.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	230.000	43.000	.000	466.000	120.000	30.000	50.000	.000	.000	.000
GR	106.300	.000	106.000	4.000	105.000	18.000	104.700	22.000	105.000	24.000
GR	106.000	28.000	107.000	32.000	106.500	56.000	107.000	86.000	107.000	88.000
GR	106.800	106.000	107.000	118.000	106.000	132.000	105.000	162.000	104.000	170.000
GR	103.000	176.000	102.700	182.000	103.000	184.000	104.000	186.000	105.000	188.000
GR	106.000	210.000	106.200	230.000	106.000	242.000	105.000	250.000	104.000	260.000
GR	103.000	268.000	103.000	272.000	104.000	274.000	105.000	278.000	106.000	288.000
GR	105.400	304.000	106.000	318.000	106.100	322.000	106.000	326.000	105.700	330.000
GR	106.000	336.000	106.300	344.000	106.000	356.000	105.000	368.000	105.000	376.000
GR	106.000	428.000	107.000	456.000	107.100	466.000	.000	.000	.000	.000
QT	1.000	1316.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	240.000	31.000	.000	314.000	90.000	72.000	80.000	.000	.000	.000
GR	107.300	.000	107.000	18.000	106.000	36.000	105.000	38.000	104.000	40.000
GR	103.900	44.000	104.000	48.000	105.000	52.000	106.000	54.000	107.000	66.000
GR	107.300	76.000	107.000	86.000	107.000	96.000	108.000	138.000	107.000	160.000
GR	106.000	164.000	105.000	168.000	105.200	172.000	105.000	174.000	104.700	178.000
GR	105.000	180.000	106.000	188.000	107.000	196.000	108.000	212.000	108.400	224.000
GR	108.000	240.000	107.800	244.000	108.000	248.000	108.300	258.000	108.000	270.000
GR	107.300	314.000	.000	.000	.000	.000	.000	.000	.000	.000

QT	1.000	680.000	.000	.000	.000	.000	.000	.000	.000	.000
X1	250.000	11.000	.000	120.000	70.000	60.000	66.000	.000	.000	.000
GR	109.500	.000	109.000	18.000	108.000	28.000	107.000	30.000	106.000	34.000
GR	105.700	40.000	106.000	48.000	107.000	56.000	108.000	68.000	109.000	82.000
GR	110.000	120.000	.000	.000	.000	.000	.000	.000	.000	.000
EJ	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS


CCHV=    .100 CEHV=    .300
*SECNO 20.000

3265 DIVIDED FLOW

3280 CROSS SECTION     20.00 EXTENDED       .26 FEET

3720 CRITICAL DEPTH ASSUMED
    20.00     2.96     52.66     52.66     58.00     53.11      .46       .00       .00     52.40
    2861.       0.     2861.       0.        0.       528.       0.        0.        0.      56.50
      .00      .00      5.42      .00      .040      .040      .040      .000     49.70       .00
  .022565       0.        0.        0.        0         16        0       .00    550.85    969.22


*SECNO 30.000

3265 DIVIDED FLOW

    30.00     2.99     54.29     54.15      .00      54.61      .32      1.48       .01     55.60
    2861.       0.     2861.       0.        0.       634.       0.        1.        1.      57.20
      .00      .00      4.52      .00      .040      .040      .040      .000     51.30     50.62
 .015382      100.       80.       55.        2         10        0       .00    650.78   1046.91


*SECNO 40.000

3265 DIVIDED FLOW

    40.00     3.89     55.89     55.11      .00      56.07      .18      1.45       .01     58.00
    2861.       0.     2861.       0.        0.       835.       0.        4.        4.      58.00
      .02      .00      3.43      .00      .040      .040      .040      .000     52.00     32.02
 .005412      180.      170.       12.        3          8        0       .00    593.50    998.18


*SECNO 50.000

3265 DIVIDED FLOW
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  SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
  Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
  TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
  SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST


7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
    50.00      3.47     57.97     57.97       .00     58.52       .54      1.31       .11     60.20
    2861.        0.     2861.        0.        0.      483.        0.        6.        5.     60.20
      .02       .00      5.92       .00      .040      .040      .040      .000     54.50    270.40
  .022559      176.      134.      102.         0        12         0       .00    441.66   1022.79


*SECNO 60.000

3265 DIVIDED FLOW

    60.00      4.23     62.43     62.13       .00     62.81       .38      4.28       .02     65.00
    2861.        0.     2861.        0.        0.      578.        0.        9.        8.     65.00
      .04       .00      4.95       .00      .040      .040      .040      .000     58.20     89.37
  .013429      190.      250.      272.         3         8         0       .00    468.81   1030.38


*SECNO 65.000

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
    65.00      3.62     64.52     64.52       .00     65.16       .64      2.12       .08     66.00
    3834.        0.     3834.        0.        0.      599.        0.       11.        9.     66.00
      .04       .00      6.40       .00      .040      .040      .040      .000     60.90    230.77
  .022247      100.      120.      125.         0        15         0       .00    480.36   1211.61


*SECNO 70.000

3265 DIVIDED FLOW

    70.00      4.17     65.47     65.24       .00     65.90       .42       .72       .02     68.00
    3834.        0.     3834.        0.        0.      734.        0.       11.       10.     67.00
      .05       .00      5.22       .00      .040      .040      .040      .000     61.30   1303.54
  .014755       74.       40.       70.         3         8         0       .00    588.60   2160.38


*SECNO 80.000
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  SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
  Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
  TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
  SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST


3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
    80.00      4.10     68.10     68.10       .00     68.75       .66      2.58       .07     70.00
    3834.        0.     3834.        0.        0.      590.        0.       13.       11.     70.00
      .05       .00      6.50       .00      .040      .040      .040      .000     64.00    296.42
  .023708      174.      140.      148.         0         5         0       .00    484.62   1002.73

*SECNO 90.000

3265 DIVIDED FLOW

    90.00      3.19     70.89     70.83       .00     71.37       .48      2.60       .02     72.00
    3834.        0.     3834.        0.        0.      693.        0.       15.       13.     72.00
      .06       .00      5.54       .00      .040      .040      .040      .000     67.70    248.08
  .019807      120.      120.       90.         2        16         0       .00    633.98   1083.18

*SECNO 100.000

3265 DIVIDED FLOW

   100.00      3.47     73.27     73.22       .00     73.76       .49      2.39       .00     75.00
    3834.        0.     3834.        0.        0.      685.        0.       17.       15.     75.00
      .06       .00      5.60       .00      .040      .040      .040      .000     69.80    241.89
  .021470      160.      116.      160.         3         8         0       .00    655.13    976.20

*SECNO 110.000

3265 DIVIDED FLOW

   110.00      4.40     76.60     76.48       .00     77.02       .42      3.25       .01     77.00
    3834.        0.     3834.        0.        0.      734.        0.       20.       17.     77.00
      .07       .00      5.22       .00      .040      .040      .040      .000     72.20     12.87
  .020285      144.      156.      110.         3        11         0       .00    746.52    978.76

*SECNO 120.000
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  SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     BANK ELEV
  Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA     LEFT/RIGHT
  TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
  SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST


3265 DIVIDED FLOW

  120.00     4.60     79.70     79.42       .00     79.95       .25      2.91       .02     82.00
   3834.       0.     3834.       0.        0.      956.        0.       24.       21.     82.00
     .09      .00      4.01       .00      .040      .040      .040      .000     75.10     70.49
 .010065     340.      210.      216.         5         6         0       .00    855.63   1104.95

*SECNO 130.000

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  130.00     4.38     81.98     81.98       .00     82.55       .58      2.39       .10     83.00
   3834.       0.     3834.       0.        0.      628.        0.       27.       24.     83.00
     .09      .00      6.10       .00      .040      .040      .040      .000     77.60     36.47
 .020962     410.      170.      230.         0        10         0       .00    518.97    843.67

*SECNO 140.000

3265 DIVIDED FLOW

  140.00     4.60     85.60     85.32       .00     85.91       .32      3.33       .03     87.00
   3834.       0.     3834.       0.        0.      849.        0.       30.       27.     87.00
     .11      .00      4.52       .00      .040      .040      .040      .000     81.00     24.31
 .011448     190.      220.      174.         3         6         0       .00    698.59    823.90

*SECNO 150.000

3265 DIVIDED FLOW

  150.00     4.63     87.63     87.52       .00     88.14       .51      2.17       .06     90.00
   3834.       0.     3834.       0.        0.      669.        0.       33.       29.     90.00
     .12      .00      5.73       .00      .040      .040      .040      .000     83.00     56.59
 .020438     248.      145.      152.         3         5         0       .00    595.42    874.99

*SECNO 160.000
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        QLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST


3265 DIVIDED FLOW

   160.00     5.07     91.07     90.70      .00     91.40      .33      3.24      .02     92.00
    3834.      0.      3834.      0.        0.      831.       0.       37.      32.      92.00
      .13     .00       4.61     .00      .040     .040     .040      .000    86.00    120.76
  .010298    220.      230.      212.       3        5        0       .00    611.88    938.83

*SECNO 170.000

3265 DIVIDED FLOW

   170.00     3.75     93.55     93.31      .00     93.87      .32      2.46      .00     95.00
    3834.      0.      3834.      0.        0.      848.       0.       41.      35.      95.00
      .14     .00       4.52     .00      .040     .040     .040      .000    89.80     60.32
  .012219    238.      220.      196.       4       18        0       .00    731.03    863.29

*SECNO 180.000

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   180.00     3.80     96.00     96.00      .00     96.55      .55      2.11      .07     98.00
    3834.      0.      3834.      0.        0.      644.       0.       43.      37.      98.00
      .15     .00       5.96     .00      .040     .040     .040      .000    92.20     31.95
  .027438    180.      120.      196.       0        8        0       .00    674.65    842.09

*SECNO 190.000

3265 DIVIDED FLOW

   190.00     3.89     99.39     98.85      .00     99.65      .27      3.07      .03    100.00
    3834.      0.      3834.      0.        0.      922.       0.       47.      41.     100.00
      .16     .00       4.16     .00      .040     .040     .040      .000    95.50     29.49
  .009068    224.      210.      156.       4       15        0       .00    722.37    787.88

*SECNO 200.000
   200.00     4.21    102.41    102.22      .00    102.77      .36      3.09      .03    103.00
    3834.      0.      3834.      0.        0.      798.       0.       52.      45.     103.00
      .18     .00       4.80     .00      .040     .040     .040      .000    98.20     12.91
  .016251    170.      260.      270.       3        8        0       .00    778.49    791.40
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 210.000

3265 DIVIDED FLOW

210.00	4.07	103.67	103.41	.00	104.01	.34	1.24	.00	104.00
3834.	0.	3834.	0.	0.	822.	0.	54.	47.	104.30
.18	.00	4.66	.00	.040	.040	.040	.000	99.60	7.20
.011749	40.	90.	74.	1	10	0	.00	657.64	864.87

*SECNO 220.000

3265 DIVIDED FLOW

220.00	3.28	105.38	105.34	.00	105.78	.40	1.75	.02	106.00
2194.	0.	2194.	0.	0.	432.	0.	55.	48.	106.70
.19	.00	5.08	.00	.040	.040	.040	.000	102.10	6.26
.022807	120.	120.	110.	0	16	0	.00	500.53	555.73

*SECNO 230.000

3265 DIVIDED FLOW

3280 CROSS SECTION 230.00 EXTENDED .15 FEET

230.00	3.75	106.45	106.43	.00	107.02	.57	1.19	.05	106.30
2194.	0.	2194.	0.	0.	363.	0.	56.	49.	107.10
.19	.00	6.04	.00	.040	.040	.040	.000	102.70	.00
.024862	120.	50.	30.	2	11	0	.00	344.73	440.62

*SECNO 240.000

3265 DIVIDED FLOW

3280 CROSS SECTION 240.00 EXTENDED .84 FEET

240.00	4.23	108.13	107.73	.00	108.38	.25	1.33	.03	107.30
1316.	0.	1316.	0.	0.	328.	0.	57.	49.	107.30
.20	.00	4.01	.00	.040	.040	.040	.000	103.90	.00
.009719	90.	80.	72.	1	5	0	.00	283.37	314.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 250.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

250.00	3.07	108.77	108.77	.00	109.60	.83	.81	.17	109.50
680.	0.	680.	0.	0.	93.	0.	57.	50.	110.00
.20	.00	7.30	.00	.040	.040	.040	.000	105.70	20.28
.021065	70.	66.	60.	0	15	0	.00	58.52	78.80

PROFILE FOR STREAM ILE NAME: CCSCH

PLOTTED POINTS (BY PRIORITY)-E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA

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ELEVATION   40.      50.      60.      70.      80.      90.      100.     110.     120.     130.
   SECNO   CUMDIS

  20.00      0.  .        I LE   R .        .        .        .        .        .        .        .
            20.  .        I  E   R .        .        .        .        .        .        .        .
            40.  .        .I WE  R .        .        .        .        .        .        .        .
            60.  .        .I  EL R .        .        .        .        .        .        .        .
  30.00     80.  .        .I  WELR .        .        .        .        .        .        .        .
           100.  .        .I  WELR .        .        .        .        .        .        .        .
           120.  .        .I  CELR .        .        .        .        .        .        .        .
           140.  .        . I CELR .        .        .        .        .        .        .        .
           160.  .        . I  E LR .        .        .        .        .        .        .        .
           180.  .        . I  E LR .        .        .        .        .        .        .        .
           200.  .        . I  WELR .        .        .        .        .        .        .        .
           220.  .        . I  CE L .        .        .        .        .        .        .        .
           240.  .        . I  CE L .        .        .        .        .        .        .        .
  40.00    260.  .        . I  CE L .        .        .        .        .        .        .        .
           280.  .        . I   E L .        .        .        .        .        .        .        .
           300.  .        .  I  CE L.        .        .        .        .        .        .        .
           320.  .        .  I  CE L.        .        .        .        .        .        .        .
           340.  .        .  I   WEL.        .        .        .        .        .        .        .
           360.  .        .   I  WE L        .        .        .        .        .        .        .
           380.  .        .   I   E L        .        .        .        .        .        .        .
  50.00    400.  .        .    I  WEL        .        .        .        .        .        .        .
           420.  .        .    I  WE.L       .        .        .        .        .        .        .
           440.  .        .    I   E.L       .        .        .        .        .        .        .
           460.  .        .    I   WEL       .        .        .        .        .        .        .
           480.  .        .     I  WE L      .        .        .        .        .        .        .
           500.  .        .     I   E L      .        .        .        .        .        .        .
           520.  .        .     I   WE L     .        .        .        .        .        .        .
           540.  .        .      I  WE L     .        .        .        .        .        .        .
           560.  .        .      I  .E L     .        .        .        .        .        .        .
           580.  .        .      I  .WE L    .        .        .        .        .        .        .
           600.  .        .      I  .CE L    .        .        .        .        .        .        .
           620.  .        .       I . E L    .        .        .        .        .        .        .
  60.00    640.  .        .       I . WE L   .        .        .        .        .        .        .
           660.  .        .        I.  E L   .        .        .        .        .        .        .
           680.  .        .        I.  WEL   .        .        .        .        .        .        .
           700.  .        .         I  WE L  .        .        .        .        .        .        .
           720.  .        .         I   E L  .        .        .        .        .        .        .
           740.  .        .         I   WEL  .        .        .        .        .        .        .
  65.00    760.  .        .         .I   EL  .        .        .        .        .        .        .
           780.  .        .         .I   WEL .        .        .        .        .        .        .
  70.00    800.  .        .         .I   WERL .        .        .        .        .        .        .
           820.  .        .         . I   ERL .        .        .        .        .        .        .
           840.  .        .         . I   WERL.        .        .        .        .        .        .
           860.  .        .         . I   CERL.        .        .        .        .        .        .
           880.  .        .         .  I   WEL.        .        .        .        .        .        .
           900.  .        .         .  I   WEL.        .        .        .        .        .        .
           920.  .        .         .   I   E L        .        .        .        .        .        .
  80.00    940.  .        .         .   I   WEL        .        .        .        .        .        .
           960.  .        .         .    I   EL        .        .        .        .        .        .
           980.  .        .         .    I   WEL       .        .        .        .        .        .
          1000.  .        .         .     I  WEL       .        .        .        .        .        .
          1020.  .        .         .     I   EL       .        .        .        .        .        .
          1040.  .        .         .      I  WEL      .        .        .        .        .        .
  90.00   1060.  .        .         .       I .EL      .        .        .        .        .        .
          1080.  .        .         .       I .WEL     .        .        .        .        .        .
          1100.  .        .         .       I . EL     .        .        .        .        .        .
          1120.  .        .         .        I. WEL    .        .        .        .        .        .
          1140.  .        .         .        I. CEL    .        .        .        .        .        .
          1160.  .        .         .         I  E L   .        .        .        .        .        .
 100.00   1180.  .        .         .         I  WEL   .        .        .        .        .        .
          1200.  .        .         .         I   EL   .        .        .        .        .        .
          1220.  .        .         .         I   WEL  .        .        .        .        .        .
          1240.  .        .         .         .I  CEL  .        .        .        .        .        .
          1260.  .        .         .         .I   EL  .        .        .        .        .        .
          1280.  .        .         .         .I   WE  .        .        .        .        .        .
          1300.  .        .         .         . I   EL .        .        .        .        .        .
          1320.  .        .         .         . I   WE .        .        .        .        .        .
 110.00   1340.  .        .         .         . I   CE .        .        .        .        .        .
          1360.  .        .         .         . I    E .        .        .        .        .        .
          1380.  .        .         .         .  I   WE .        .        .        .        .        .
          1400.  .        .         .         .  I   WE .        .        .        .        .        .
          1420.  .        .         .         .  I    EL.        .        .        .        .        .
          1440.  .        .         .         .   I   EL.        .        .        .        .        .
          1460                                     I   WEI
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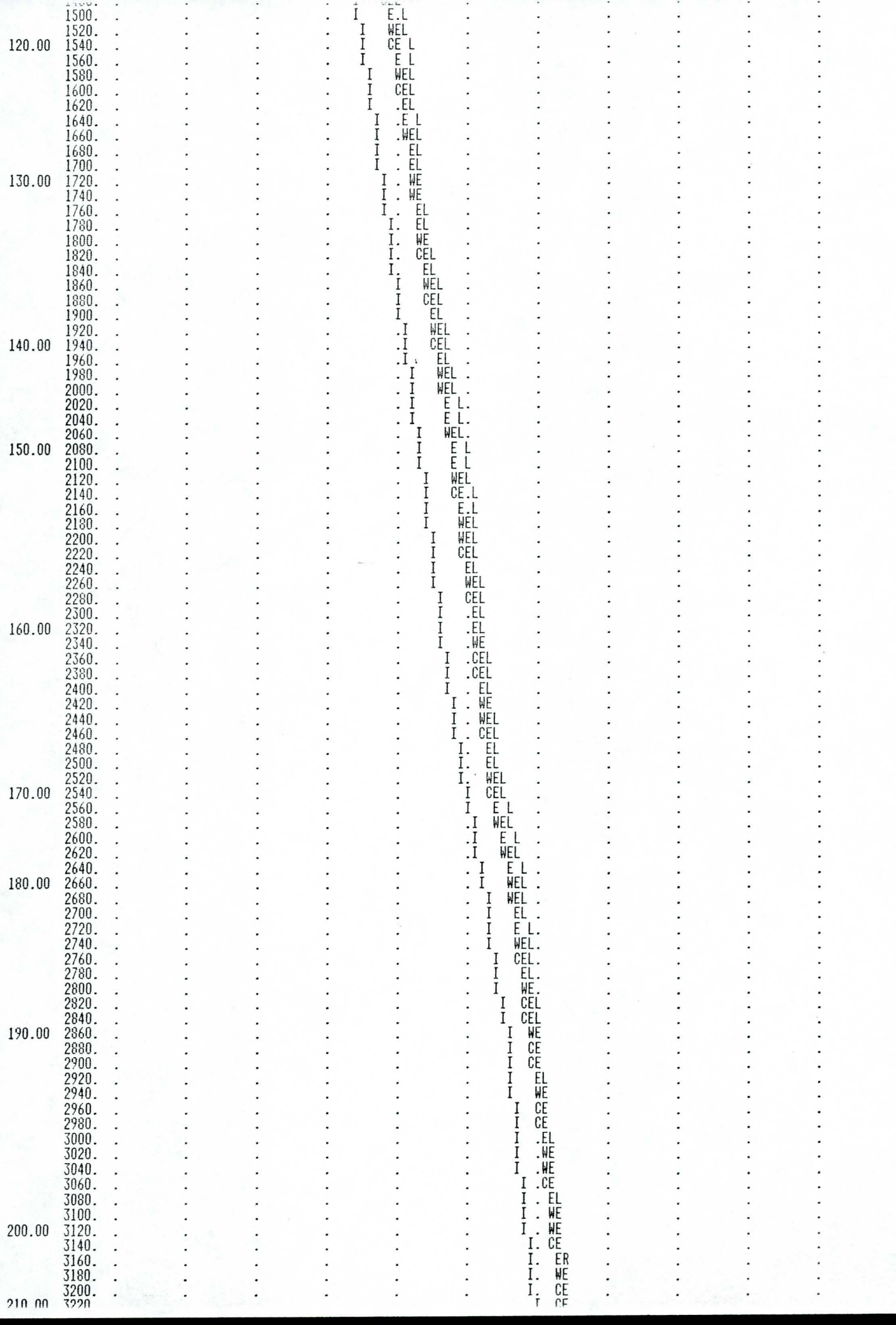
1500.
1520.
120.00 1540.
1560.
1580.
1600.
1620.
1640.
1660.
1680.
1700.
130.00 1720.
1740.
1760.
1780.
1800.
1820.
1840.
1860.
1880.
1900.
1920.
140.00 1940.
1960.
1980.
2000.
2020.
2040.
2060.
150.00 2080.
2100.
2120.
2140.
2160.
2180.
2200.
2220.
2240.
2260.
2280.
2300.
160.00 2320.
2340.
2360.
2380.
2400.
2420.
2440.
2460.
2480.
2500.
2520.
170.00 2540.
2560.
2580.
2600.
2620.
2640.
180.00 2660.
2680.
2700.
2720.
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2760.
2780.
2800.
2820.
2840.
190.00 2860.
2880.
2900.
2920.
2940.
2960.
2980.
3000.
3020.
3040.
3060.
3080.
3100.
200.00 3120.
3140.
3160.
3180.
3200.
210.00 3220.

```
        3240. .         .         .         .         .         .         I  LR       .         .         .         .
        3260. .         .         .         .         .         .         I   WE      .         .         .         .
        3280. .         .         .         .         .         .         .I  CER     .         .         .         .
        3300. .         .         .         .         .         .         .I   ER     .         .         .         .
        3320. .         .         .         .         .         .         . I  EL     .         .         .         .
220.00  3340. .         .         .         .         .         .         . I  WER    .         .         .         .
        3360. .         .         .         .         .         .         . I   ER    .         .         .         .
230.00  3380. .         .         .         .         .         .         .  I  WE    .         .         .         .
        3400. .         .         .         .         .         .         .  I   E    .         .         .         .
        3420. .         .         .         .         .         .         .  I   WE   .         .         .         .
        3440. .         .         .         .         .         .         .   I  CE   .         .         .         .
240.00  3460. .         .         .         .         .         .         .   I  LE   .         .         .         .
        3480. .         .         .         .         .         .         .   I   WE. .         .         .         .
        3500. .         .         .         .         .         .         .    I  CE. .         .         .         .
250.00  3520. .         .         .         .         .         .         .     I  WE .         .         .         .
```

THIS RUN EXECUTED 09-02-87

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**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MAY  1984
  ERROR CORR -  01,02,03,04,05,06
  MODIFICATION -  50,51,52,53,54,55,56
  IBM-PC-XT VERSION AUGUST 1985
**************************************************
```

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

ILE NAME: CCSCH

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
*	20.000	.00	.00	.00	49.70	2861.00	52.66	52.66	53.11	225.65	5.42	528.23	190.46
	30.000	80.00	.00	.00	51.30	2861.00	54.29	54.15	54.61	153.82	4.52	633.50	230.68
	40.000	170.00	.00	.00	52.00	2861.00	55.89	55.11	56.07	54.12	3.43	834.97	388.92
*	50.000	134.00	.00	.00	54.50	2861.00	57.97	57.97	58.52	225.59	5.92	483.40	190.48
	60.000	250.00	.00	.00	58.20	2861.00	62.43	62.13	62.81	134.29	4.95	578.46	246.89
*	65.000	120.00	.00	.00	60.90	3834.00	64.52	64.52	65.16	222.47	6.40	598.77	257.05
	70.000	40.00	.00	.00	61.30	3834.00	65.47	65.24	65.90	147.55	5.22	734.32	315.63
*	80.000	140.00	.00	.00	64.00	3834.00	68.10	68.10	68.75	237.08	6.50	589.95	249.00
	90.000	120.00	.00	.00	67.70	3834.00	70.89	70.83	71.37	198.07	5.54	692.62	272.43
	100.000	116.00	.00	.00	69.80	3834.00	73.27	73.22	73.76	214.70	5.60	684.66	261.66
	110.000	156.00	.00	.00	72.20	3834.00	76.60	76.48	77.02	202.85	5.22	733.93	269.19
	120.000	210.00	.00	.00	75.10	3834.00	79.70	79.42	79.95	100.65	4.01	956.40	382.16
*	130.000	170.00	.00	.00	77.60	3834.00	81.98	81.98	82.55	209.62	6.10	628.33	264.81
	140.000	220.00	.00	.00	81.00	3834.00	85.60	85.32	85.91	114.48	4.52	848.91	358.33
	150.000	145.00	.00	.00	83.00	3834.00	87.63	87.52	88.14	204.38	5.73	669.01	268.18
	160.000	230.00	.00	.00	86.00	3834.00	91.07	90.70	91.40	102.98	4.61	831.19	377.81
	170.000	220.00	.00	.00	89.80	3834.00	93.55	93.31	93.87	122.19	4.52	847.55	346.85

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
*	180.000	120.00	.00	.00	92.20	3834.00	96.00	96.00	96.55	274.38	5.96	643.67	231.46
	190.000	210.00	.00	.00	95.50	3834.00	99.39	98.85	99.65	90.68	4.16	922.38	402.61
	200.000	260.00	.00	.00	98.20	3834.00	102.41	102.22	102.77	162.51	4.80	798.04	300.75
	210.000	90.00	.00	.00	99.60	3834.00	103.67	103.41	104.01	117.49	4.66	822.02	353.72
	220.000	120.00	.00	.00	102.10	2194.00	105.38	105.34	105.78	228.07	5.08	432.27	145.28
	230.000	50.00	.00	.00	102.70	2194.00	106.45	106.43	107.02	248.62	6.04	363.08	139.14
	240.000	80.00	.00	.00	103.90	1316.00	108.13	107.73	108.38	97.19	4.01	328.18	133.49
*	250.000	66.00	.00	.00	105.70	680.00	108.77	108.77	109.60	210.65	7.30	93.11	46.85

ILE NAME: CCSCH

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	20.000	2861.00	52.66	.00	.00	-5.34	550.85	.00
	30.000	2861.00	54.29	.00	1.63	.00	650.78	80.00
	40.000	2861.00	55.89	.00	1.60	.00	593.50	170.00
*	50.000	2861.00	57.97	.00	2.09	.00	441.66	134.00
	60.000	2861.00	62.43	.00	4.46	.00	468.81	250.00
*	65.000	3834.00	64.52	.00	2.09	.00	480.36	120.00
	70.000	3834.00	65.47	.00	.95	.00	588.60	40.00
*	80.000	3834.00	68.10	.00	2.62	.00	484.62	140.00
	90.000	3834.00	70.89	.00	2.79	.00	633.98	120.00
	100.000	3834.00	73.27	.00	2.38	.00	655.13	116.00
	110.000	3834.00	76.60	.00	3.32	.00	746.52	156.00
	120.000	3834.00	79.70	.00	3.10	.00	855.63	210.00
*	130.000	3834.00	81.98	.00	2.28	.00	518.97	170.00
	140.000	3834.00	85.60	.00	3.62	.00	698.59	220.00
	150.000	3834.00	87.63	.00	2.04	.00	595.42	145.00
	160.000	3834.00	91.07	.00	3.44	.00	611.88	230.00
	170.000	3834.00	93.55	.00	2.48	.00	731.03	220.00
*	180.000	3834.00	96.00	.00	2.46	.00	674.65	120.00
	190.000	3834.00	99.39	.00	3.38	.00	722.37	210.00
	200.000	3834.00	102.41	.00	3.03	.00	778.49	260.00
	210.000	3834.00	103.67	.00	1.26	.00	657.64	90.00
	220.000	2194.00	105.38	.00	1.71	.00	500.53	120.00
	230.000	2194.00	106.45	.00	1.07	.00	344.73	50.00
	240.000	1316.00	108.13	.00	1.68	.00	283.37	80.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	250.000	680.00	108.77	.00	.65	.00	58.52	66.00

SUMMARY OF ERRORS AND SPECIAL NOTES

```
CAUTION  SECNO=    20.000  PROFILE= 1  CRITICAL DEPTH ASSUMED

CAUTION  SECNO=    50.000  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=    50.000  PROFILE= 1  MINIMUM SPECIFIC ENERGY

CAUTION  SECNO=    65.000  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=    65.000  PROFILE= 1  MINIMUM SPECIFIC ENERGY

CAUTION  SECNO=    80.000  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=    80.000  PROFILE= 1  MINIMUM SPECIFIC ENERGY

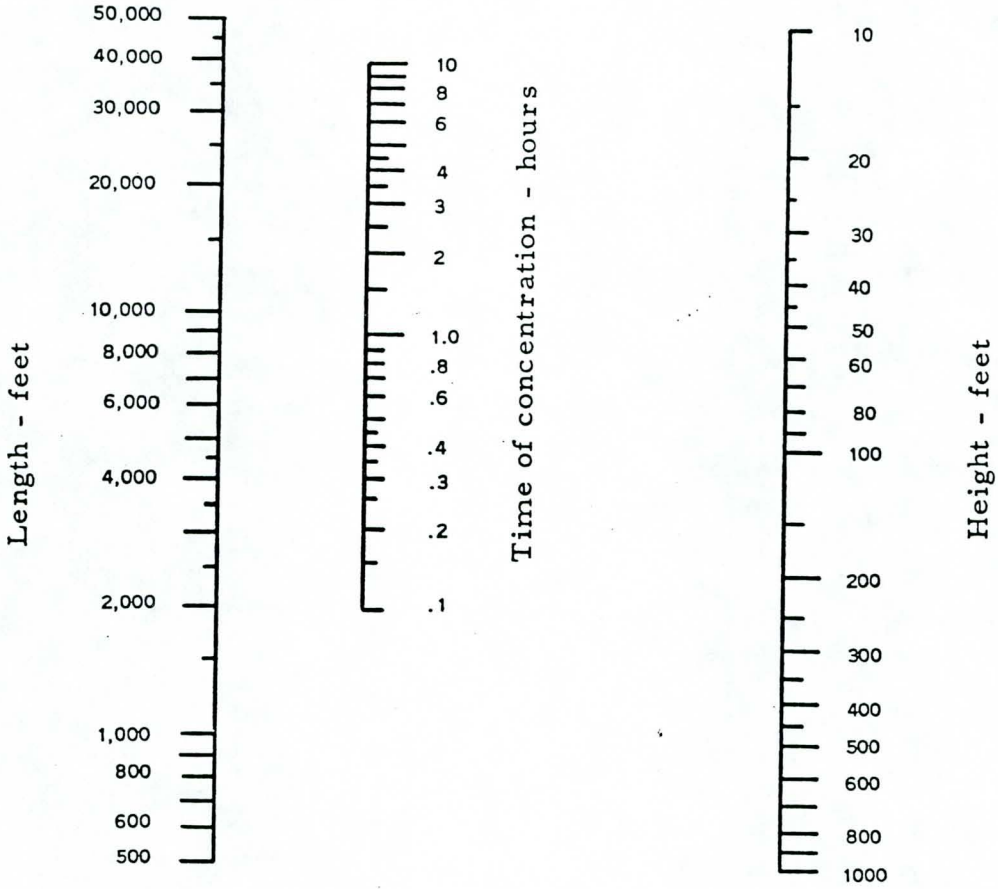
CAUTION  SECNO=   130.000  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   130.000  PROFILE= 1  MINIMUM SPECIFIC ENERGY

CAUTION  SECNO=   180.000  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   180.000  PROFILE= 1  MINIMUM SPECIFIC ENERGY

CAUTION  SECNO=   250.000  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   250.000  PROFILE= 1  MINIMUM SPECIFIC ENERGY
```

APPENDIX

FIGURES



$$T_c = \frac{L^{1.15}}{7700\ H^{.38}}$$

T_c = time of concentration - hours
L = length of drainage area - feet
H = elevation - feet

Fig. 2-7

TIME OF CONCENTRATION
FOR
DRAINAGE AREAS GREATER THAN 10 SQ. MILES

Soil Conservation Service

RUNOFF COEFFICIENT "C" FOR THE RATIONAL METHOD
USING SCS CURVE NUMBERS AND PRECIPITATION DATA

This figure is a graphic representation of the information provided in paragraphs 6a and 6b of Section I, Part J of the December 1973 Hydrologic and Hydraulic Training Session Manual prepared by the Arizona Highway Department to supplement its manual titled "Hydrologic Design for Highway Drainage in Arizona."

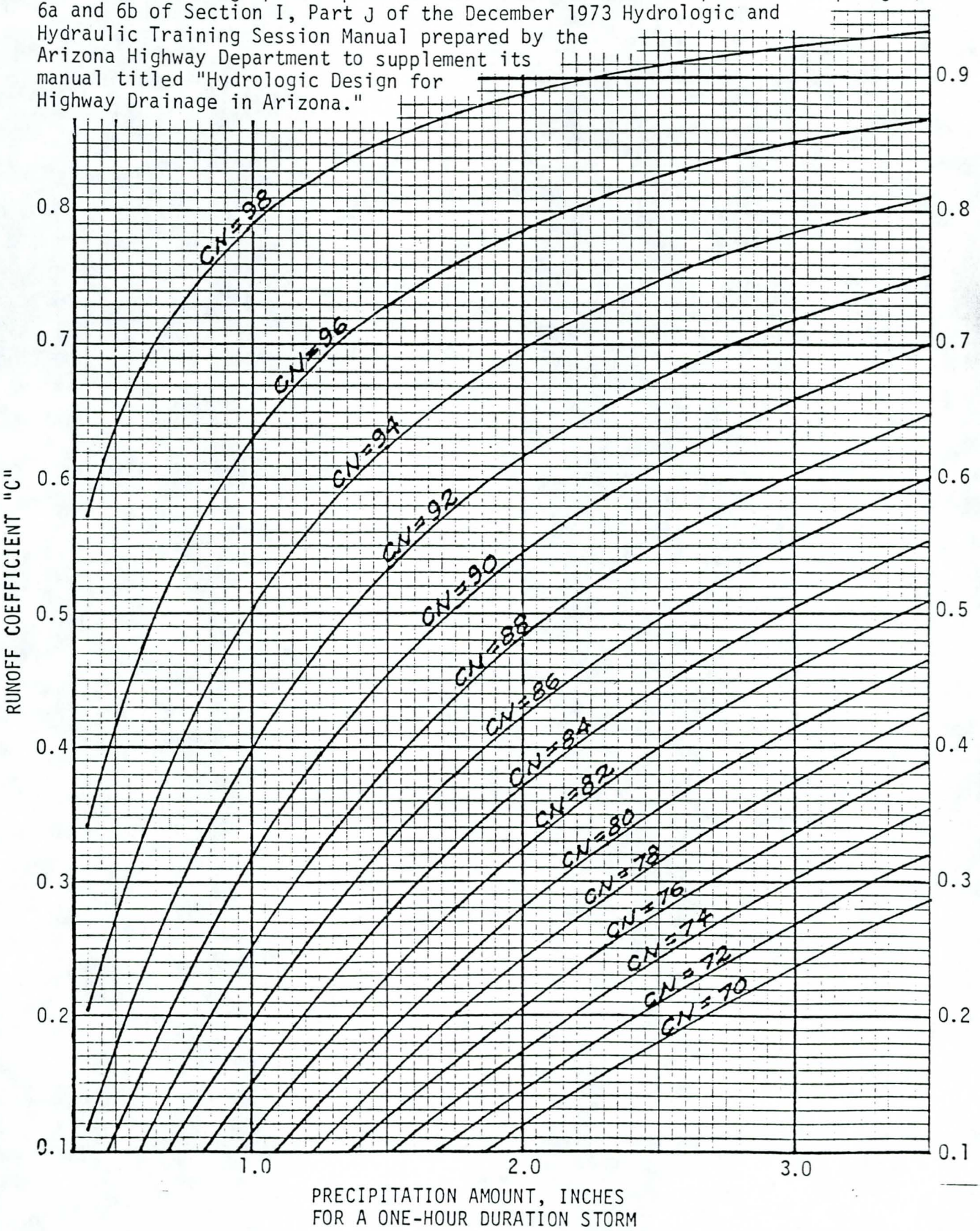


FIGURE 2-21

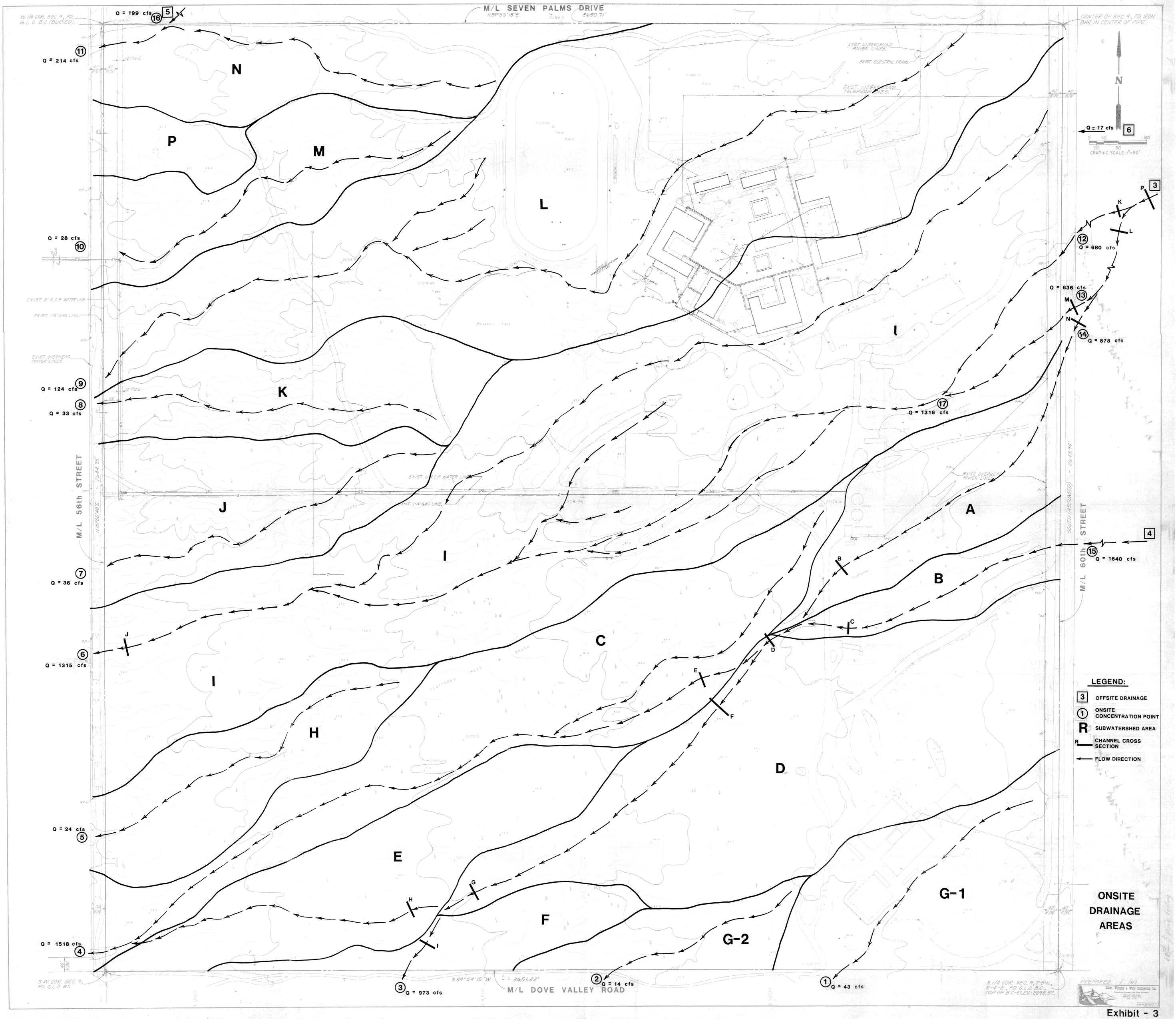
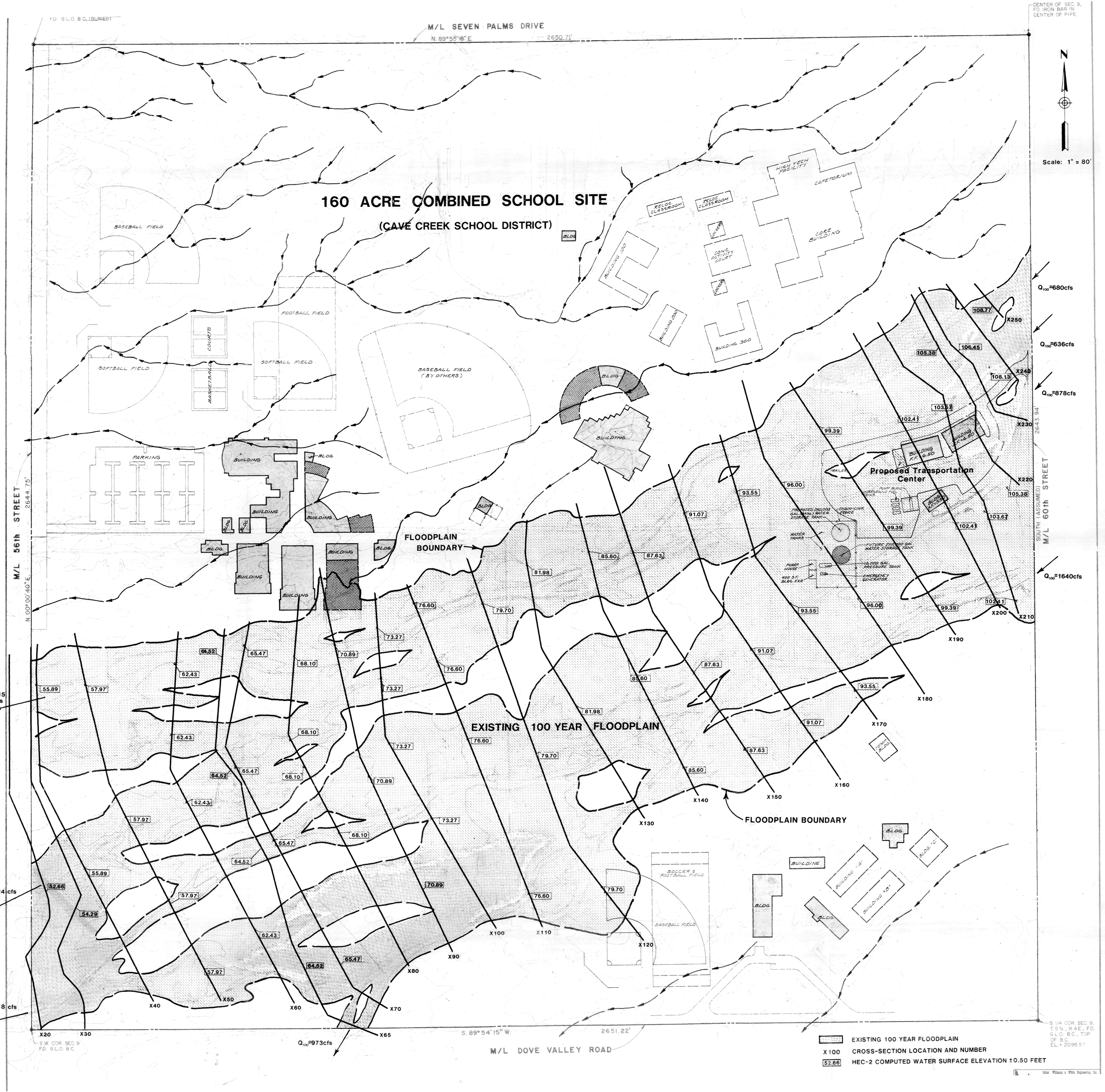

M/L SEVEN PALMS DRIVE
N.89°55'18"E.
2650.71'
W. 1/4 COR. SEC. 9, FD. G.L.O. B.C. (BURIED).
CENTER OF SEC. 9, FD. IRON BAR IN CENTER OF PIPE.
Q = 199 cfs
Q = 214 cfs
Q = 28 cfs
Q = 124 cfs
Q = 33 cfs
Q = 36 cfs
Q = 1315 cfs
Q = 24 cfs
Q = 1518 cfs
Q = 973 cfs
Q = 14 cfs
Q = 43 cfs
Q = 1640 cfs
Q = 1316 cfs
Q = 878 cfs
Q = 636 cfs
Q = 680 cfs
Q = 17 cfs
EXIST. UNDERGROUND POWER LINES.
EXIST. ELECTRIC TRAIN.
EXIST. UNDERGROUND TELEPHONE LINES.
EXIST. 8" A.C.P. WATER LINE
EXIST. 1 1/4" GAS LINE.
EXIST. OVERHEAD POWER LINES.
EXIST. 4" A.C.P. WATER LINE
EXIST. 1 1/4" GAS LINE.
EXIST. OVERHEAD POWER LINE
M/L 56th STREET
N.00°00'40"E.
2644.75'
M/L 60th STREET
SOUTH (ASSUMED)
2643.94'
S.89°54'15"W.
2651.22'
M/L DOVE VALLEY ROAD
S.W. COR. SEC. 9, FD. G.L.O. B.C.
S.1/4 COR. SEC. 9, T.5N., R.4E., FD. G.L.O. B.C. TOP OF B.C. ELEV.: 2093.57.
GRAPHIC SCALE: 1" = 80'
N
P
M
L
K
J
I
H
C
B
A
D
E
F
G-1
G-2
LEGEND:
OFFSITE DRAINAGE
ONSITE CONCENTRATION POINT
SUBWATERSHED AREA
CHANNEL CROSS SECTION
FLOW DIRECTION
ONSITE DRAINAGE AREAS
PREPARED: 1/87

Exhibit - 3


160 ACRE COMBINED SCHOOL SITE
(CAVE CREEK SCHOOL DISTRICT)
M/L SEVEN PALMS DRIVE
N. 89°55'18" E.
2650.71'
F.D. G.L.O. B.C. (BURIED)
CENTER OF SEC. 9, F.D. IRON BAR IN CENTER OF PIPE
N
Scale: 1" = 80'
BASEBALL FIELD
FOOTBALL FIELD
SOFTBALL FIELD
SOFTBALL FIELD
BASKETBALL COURTS
BASEBALL FIELD (BY OTHERS)
PARKING
BUILDING
BLDG.
HIGH TECH FACILITY
CAFETORIUM
CORE BUILDING
RELOC. CLASSROOM
RELOC. CLASSROOM
CONC. ACTIVITY COURT
BUILDING 100
BUILDING 200
BUILDING 300
Proposed Transportation Center
BUILDING F.F. 6.50
BUILDING F.F. 6.50
TRAILER
PUMP ISLAND
UNDERGROUND FUEL TANKS
PROPOSED 250,000 GAL. MAIN WATER STORAGE TANK
CHAIN-LINK FENCE
WATER TANKS
FUTURE 250,000 GAL. WATER STORAGE TANK
PUMP HOUSE
10,000 GAL. PRESSURE TANK
400 S.F. BLDG. EXR.
EMERGENCY GENERATOR
TEMP. BLDG.
FLOODPLAIN BOUNDARY
EXISTING 100 YEAR FLOODPLAIN
FLOODPLAIN BOUNDARY
SOCCER & FOOTBALL FIELD
BASEBALL FIELD
BUILDING "A"
BUILDING "B"
BLDG. "C"
M/L 56th STREET
N. 00°00'40" E.
2644.75'
M/L 60th STREET
SOUTH (ASSUMED)
2643.94'
M/L DOVE VALLEY ROAD
S. 89°54'15" W.
2651.22'
S.W. COR. SEC. 9 F.D. G.L.O. B.C.
S. 1/4 COR. SEC. 9, T.5 N., R.4 E., F.D. G.L.O. B.C., TOP OF B.C. EL. = 2095.57
Q_{100}=680cfs
Q_{100}=636cfs
Q_{100}=878cfs
Q_{100}=1640cfs
Q_{100}=1315 cfs
Q_{100}=24 cfs
Q_{100}=1518 cfs
Q_{100}=973cfs
X20
X30
X40
X50
X60
X65
X70
X80
X90
X100
X110
X120
X130
X140
X150
X160
X170
X180
X190
X200
X210
X220
X230
X240
X250
108.77
106.45
105.38
108.13
103.67
102.41
99.39
96.00
93.55
91.07
87.63
85.60
81.98
79.70
76.60
73.27
70.89
68.10
65.47
64.52
62.43
57.97
55.89
54.29
52.66
EXISTING 100 YEAR FLOODPLAIN
X100 CROSS-SECTION LOCATION AND NUMBER
52.66 HEC-2 COMPUTED WATER SURFACE ELEVATION ±0.50 FEET
Fuller Williams & White Engineering Inc.