8/8/89

OK
Requested an as-built plan for channel Improvements

FLOOD PLAIN STUDY

Paul Kierow

FOR

CHANNELIZATION OF SKUNK CREEK
AT
51ST AVENUE CROSSING

FOR

CITY OF PHOENIX
ENGINEERING DEPARTMENT

PROJECT NO. P-876029

JUNE 14, 1989

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Flood Plain Study for Channelization of Skunk Creek at 51st Avenue Crossing

June 14, 1989

Prepared for:
City of Phoenix
Engineering Department
Project No. P-876029

Prepared by:
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RGA #88084

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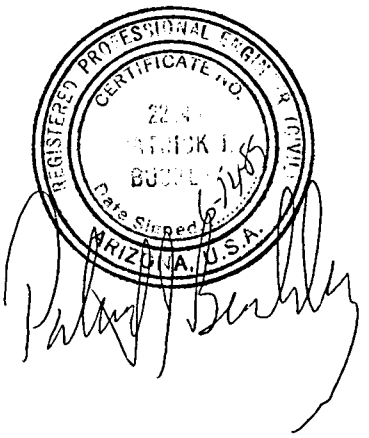


RGA #88084

FLOOD PLAIN STUDY
FOR
CHANNELIZATION OF SKUNK CREEK
AT
51ST AVENUE CROSSING

1.0 INTRODUCTION

1.1 Purpose of Study

To obtain, develop and evaluate pertinent hydrologic studies for the project area and to provide recommendations for the roadway crossing of Skunk Creek.

2.0 AREA STUDIED AND DOWNSTREAM CONDITIONS

2.1 Site Description

The study concerns the portion of Skunk Creek at 51st Avenue located in Section 28 and 29, Township 4 North Range 2 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona which is from the FEMA Study Section 280.4 to Section 310.55. The centerline of 51st Avenue is approximately Section 291.9.

2.2 Scope of Study

Establish a roadway crossing of Skunk Creek at 51st Avenue which will not constrict flows above that permitted by FEMA regulations.

2.3 Background Data

The City of Phoenix has contracted for design of paving improvements of 51st Avenue from Union Hills Drive to Beardsley Road (Index No. P-876029, Work Order No. 57989). Within the past several years, the hydrologic conditions of the watershed upstream of the study reach have changed significantly. Major flood control improvements influencing the Skunk Creek hydrology include: Adobe Dam, Central Arizona Project Levee and Skunk Creek Channelizations near Interstate 17.

Adobe Dam, a flood retarding structure on Skunk Creek located approximately 1.5 miles upstream from the site was completed in 1982 by the U.S. Army Corps of Engineers (COE). The Central Arizona Canal Levee has also been recently completed by the Bureau of Reclamation. Both have reduced the potential magnitude of floods on the Skunk Creek Watershed. Due to these improvements, the COE has re-established discharge-frequency relationships on Skunk Creek. Additionally, COE has re-delineated the Skunk Creek flood plain.

3.0 ENGINEERING METHODS

3.1 Assumed Flows

The hydrologic data obtained from COE and the Maricopa County Flood Control District is summarized in Table 1 below:

Table 1. Summary of Discharges

Skunk Creek at 51st Avenue
100 year Flood-Present Development: 8,750 cfs
100 year Flood-Future Development: 10,400 cfs

The discharges established by the COE for the FEMA flood plain delineation are based on the present hydrologic conditions (Exhibit 1 A). In addition, the COE has developed discharges based on projected future hydrologic conditions which assumes urbanization (complete development) of the watershed (Exhibit 1 B).

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of Skunk Creek were carried out to determine the effects of the proposed roadway crossing of the existing flood plain.

Water surface elevations for floods of the selected recurrence intervals were computed through the use of the U.S. Army Corps of Engineers HEC-2 Step Backwater Computer Program (Reference 2). Structural geometry and elevation data for the proposed bridge at 51st Avenue were obtained from a preliminary design plan (Exhibit 2). Locations of selected cross sections used in the hydraulic analysis are shown on Exhibits 1A, and 1B, and Figure 1.

Hydraulic roughness coefficients (Manning's "n") were selected on the basis of field inspection and engineering judgement. These values are shown in Table 2.

Table 2 - Summary of Manning's "n" Values

Existing Condition	Left Over Bank	Channel	Right Over Bank
Sec. 280.4 to 296.3	0.045	0.035	0.045
Sec. 306.55 to 310.53 (Overland Hills)	0.030	0.030	0.030
Proposed Channelized Condition			
Sec. 288.1 to 299.4	0.045	0.030	0.045

The starting water surface elevations for the backwater analysis through the study reach were obtained by the slope area method. The energy grade line slope is estimated and an initial water surface elevation is used. The resulting water surface elevation was then compared to published data from Flood Insurance Study for Maricopa County (Reference 1).

3.2.2 Present Condition Modelling

The hydraulic analysis presented in this study (Computer Printout 1) is duplicated from the work performed by the COE (Reference 1). Another analysis was made incorporating cross section data at Sections 285.7, 291.1, 296.3 and 299.4 using additional survey information obtained for this project, and cross section data of Overland Hills Subdivision Sections 306.55 to 310.55 (Computer Printout 2).

3.2.3 Modelling with Proposed Channelized Condition

The present development hydraulic model (computer printout 2) was modified within the study reach, by adding six sections (Section 288.1 to 299.1) to describe proposed channelization and bridge geometry (Computer Printout 3).

The design of the channel and bridge improvements shall be based upon the following parameters established by the MCFCD and Flood Plain Management Division of the City of Phoenix.

(a) The channel to be designed for the present development 100-year discharge with a minimum of one (1) foot of freeboard.
(b) The bridge to be designed for the present development 100-year discharge with a minimum of two (2) feet of freeboard.
(c) The channel to provide a minimum of 0.5 feet freeboard for the future development 100-year discharge.
(d) The bridge to provide a minimum of 1.5 feet freeboard for the future development 100-year discharge.

An additional HEC-2 Analysis was performed for the proposed channelization condition modelling the future development 100-year discharge (Computer Printout 4).

A Floodway Data Table, Table 3, is presented to show the difference between the natural (existing floodway) and proposed channelization water surface elevations (WSELS). The proposed channelization has not increased the WSELS for the 100-year flood (base-flood).

The flood plain profiles for the 100-year discharge for the present development is presented in this study (Exhibit 1 A). Floodway Data is also presented (See Table 4) to show the base-flood WSELS for present and future development flows and minimum channel and low chord bridge elevations.

Table 3
Skunk Creek Floodway Data
Proposed Channelization
(Based on Present Development 100-year Flood)

Base Flood - Present Development Water Surface Elevation (WSEL)					Difference in WSELS Proposed Channelization (3)	
Station (1)	Original COE Study	Revised COE Study (2)	Proposed W/O Floodway	Channelization With Floodway	W/O Floodway	With Floodway
280.4	1289.28	1289.28	1289.27	1289.71	-0.01	0.43
285.7	1291.74	1290.57	1290.57	1291.06	0	0.49
288.1*			1291.02	1291.02		
290.8*			1293.52	1293.52		
291.1	1295.87	1293.05				
291.4*			1293.56	1293.56		
292.4*			1293.82	1293.82		
292.7*			1294.69	1294.69		
296.3	1298.68	1298.13	1295.68	1295.68	-2.45	-2.45
299.4*		1299.43	1298.51	1298.51	-0.92	-0.92
301.6	1300.37	1300.54	1300.44	1300.38	-0.10	-0.16
306.55		1301.59	1301.55	1301.67	-0.04	0.08
306.90	1302.21	1301.68	1301.64	1301.76	-0.04	0.08
308.05		1301.94	1301.91	1302.00	-0.03	0.06
310.55		1302.40	1302.38	1302.44	-0.02	0.04

(1) Stream distances in stations, increasing upstream from confluence with New River.
(2) Revised COE Study includes additional survey data at Section 291.1 and data of channelization at Overland Hills Subdivision.
(3) The difference between base water surface elevations (WSELS) from the Revised COE Study and the Proposed Channelization Study.

*Added cross-section used to evaluate proposed channelization.

Table 4

Skunk Creek Floodway Data
Proposed Channelization
For Present and Future Development 100-Year Flood with Encroachments

Cross-Section Sta.(1)	Present Development WSELS	Future Development WSELS	Proposed Channel Bank Elevation (2)	Present Development Freeboard	Future Development Freeboard
288.1	1291.0	1291.7	1292.2	1.2	0.5
290.8	1293.5	1294.2	1294.7	1.2	0.5
*291.4	1293.6	1294.3	1296.5 (3)	2.9	2.2
*292.4	1293.8	1294.5	1296.5 (3)	2.7	2.0
292.7	1294.7	1295.6	1296.1	1.4	0.5
296.3	1295.7	1296.4	1296.9	1.2	0.5
299.4	1298.5	1299.2	1299.7	1.2	0.5

(1) Cross-sections in stations, increasing upstream from confluence with New River.

(2) Minimum recommended within the limit of the proposed channelization.

(3) Minimum recommended for low chord of bridge structure.

*Cross-section at 51st Avenue crossing.

4.0 BRIDGE VERSUS BOX CULVERT

4.1 The hydraulic evaluations represent a 2-span bridge with a 110 foot bottom channel width with 1.5 to 1 side slopes. The proposed channelization represents a 110 foot wide bottom channel with a 3 to 1 side slope. To determine the most economical structure, several bridge sections were considered as well as the size of a box culvert that would be required to pass a flow of 8750 cfs and 10,400 cfs (present and future 100 year flows). The size of the box culvert that would pass the flow and not exceed existing water surface elevations is 15 - 10' x 8' or 13' - 12' x 8' CBC. (See Attachment #1.) Relative cost comparisons of three bridge sections spanning 150' and the 13 - 12' x 8' box culvert were prepared and included in Attachment 2. The cost comparisons are based on current construction prices without considering costs "common to" all bridge schemes. The 13 - 12' x 8' box culvert has substantially more concrete than a 2-span bridge structure and therefore will cost more.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of this Study, it can be concluded that:

(a) A 100-year flood can be safely conveyed through the study reach by the proposed bridge and channelization in accordance with the FEMA Guidelines.

(b) The water surface elevations for the channelization condition are at or below the maximum elevations established by the COE Flood Plain Study.

(c) The channel and bridge improvements will provide uniform floodway through the study reach.

(d) A box culvert alternative would be more expensive than the 2-span bridge structure.

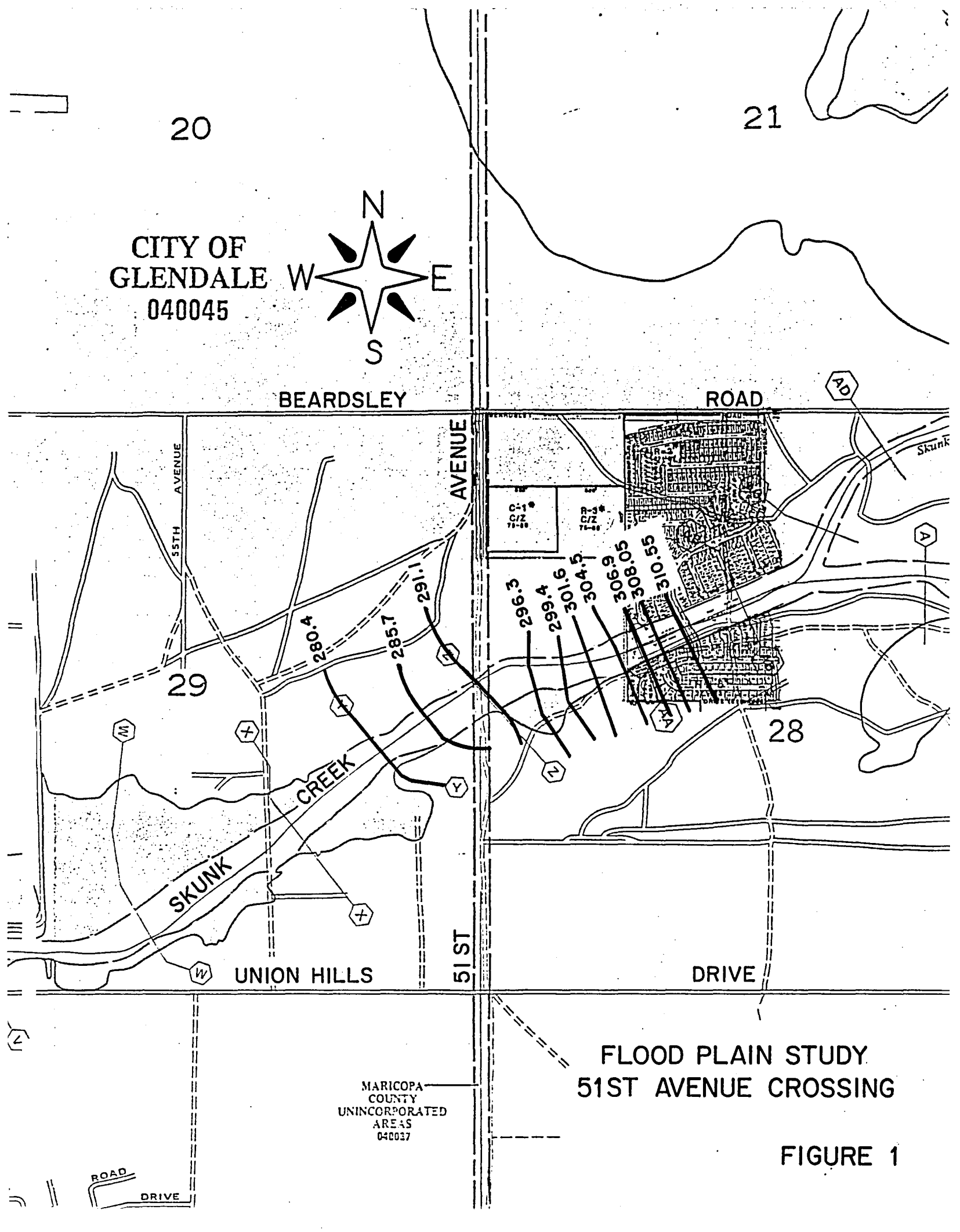
(e) A 2-span bridge structure spanning 150'-0 is recommended for the 51st Avenue crossing of Skunk Creek.

6.0 BIBLIOGRAPHY AND REFERENCES

1. Federal Emergency Management Agency, Flood Insurance Study, Maricopa County, Arizona and Incorporated Areas, April 15, 1988.

2. U.S. Army Corps of Engineers, Hydrologic Engineering Center, "HEC-2 Water Surface Profiles, Generalized Computer Program," Davis, California - November, 1976.

3. Van Loo & Patel Consulting Engineers, Inc., 100-year Flood Plain Study for Channelization of Overland Hills, Phoenix, AZ, March, 1985.



FLOOD PLAIN STUDY
51ST AVENUE CROSSING

FIGURE 1

COMPUTER PRINTOUT 1

EXISTING COE SKUNK CREEK STUDY

```
3280 CROSS SECTION    222.60 EXTENDED       .18 FEET


3301 HV CHANGED MORE THAN HVINS

  222.60     7.58  1260.18  1258.58      .00  1261.17      .99     2.82      .06  1260.00
   9570.       0.    9503.     67.       0.    1187.      96.     822.     181.   1260.00
     .87      .00     8.01     .70     .045     .035     .045     .000  1252.60  9890.00
 .004279     430.     530.     560.       2        8        0      .00   761.84 10651.84
0.
FLOW DISTRIBUTION FOR SECNO=    222.60          CWSEL=   1260.18

STA=    9890.   10130.   10220.   10250.   10310.   10380.   10470.   10540.   10650.   10652.
  PER Q=     99.3       .1       .0       .1       .1       .1       .1       .1       .0
   AREA=   1186.8     16.6      5.5     11.1     12.9     16.6     12.9     20.3       .2
    VEL=      8.0       .7       .7       .7       .7       .7       .7       .7       .4


1
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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


CCHV=    .300 CEHV=    .500
*SECNO 227.900

3265 DIVIDED FLOW

   227.90     8.36  1262.36  1260.04      .00  1263.04      .68     1.77      .09  1262.00
    9520.       6.    9309.    206.      10.    1391.     181.     839.     190.   1262.50
      .90      .55     6.69     1.14     .045     .035     .045     .000  1254.00  9823.65
 .002682     450.     530.     550.       2       15        0      .00   748.42 10627.09
0
FLOW DISTRIBUTION FOR SECNO=    227.90          CWSEL=   1262.36

STA=    9824.    9880.   10140.   10170.   10180.   10250.   10600.   10627.
  PER Q=       .1     97.8       .7       .3       .0     1.2       .0
   AREA=     10.2   1391.4     33.5     13.6      3.0    126.4      4.9
    VEL=       .5      6.7      1.9      2.1       .5       .9       .5

*SECNO 231.100

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1267.00 ELREA=     1264.00

   231.10     7.66  1264.16  1264.16      .00  1265.39     1.22     1.42      .27  1266.00
    9310.       0.    8418.    1092.       0.     900.     323.     850.     195.   1266.00
```

```
      .91      .00     9.36     3.38     .045     .035     .045     .000  1236.50  9920.02
  .008762     180.     320.     300.        0       15        0      .00   547.98 10536.86
0
FLOW DISTRIBUTION FOR SECNO=    231.10          CWSEL=   1264.16

STA=    9920.   10200.   10250.   10500.   10537.
  PER Q=     68.5      1.0     10.5       .0
   AREA=    899.7     29.3    291.0      3.0
    VEL=      9.4      3.3      3.4       .6

1
 01/16/89    17:00:44                                                                    PAGE   43


   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


CCHV=    .300 CEHV=    .500
[redacted]

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3370 NORMAL BRIDGE,NRD= 14 MIN ELTRD= 1265.30 MAX ELLC= 1268.10

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1266.00 ELREA=     1264.00

          59TH AVENUE BRIDGE
   231.20     7.50  1264.00  1264.00      .00  1266.23     2.23      .03      .50  1266.00
    9510.       0.    9510.       0.       0.     793.       0.     850.     195.   1264.00
      .91      .00    11.99      .00     .045     .020     .045     .000  1256.50  9920.00
  .003627       5.       5.       5.        0        9        0   -24.91   105.81 10035.00
0
FLOW DISTRIBUTION FOR SECNO=    231.20          CWSEL=   1264.00

STA=    9920.   10035.
  PER Q=    100.0
   AREA=    792.9
    VEL=     12.0

*SECNO 231.500

3265 DIVIDED FLOW


3370 NORMAL BRIDGE,NRD= 14 MIN ELTRD= 1265.30 MAX ELLC= 1268.30


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1266.20 ELREA=     1264.20
```

```
   231.50     7.40  1264.09  1264.06      .00  1266.39     2.30      .13      .03  1266.20
    9510.       0.    9510.       0.       0.     782.       0.     850.     195.   1264.20
      .91      .00    12.16      .00     .045     .020     .045     .000  1256.70  9920.00
  .003768      35.      35.      35.        2       10        0   -22.43   105.81 10035.00
0
1
 01/16/89    17:00:44                                                                    PAGE   44


   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


 FLOW DISTRIBUTION FOR SECNO=    231.50          CWSEL=   1264.09

 STA=    9920.   10035.
   PER Q=    100.0
    AREA=    782.2
     VEL=     12.2

 CCHV=    .300 CEHV=    .500
 *SECNO 231.600

 3301 HV CHANGED MORE THAN HVINS


 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1267.50 ELREA=     1265.30

   231.60     9.61  1266.21  1262.39      .00  1266.89      .68      .01      .49  1266.00
    9510.       0.    8594.     916.       0.    1239.     733.     850.     195.   1264.50
      .91      .00     6.94     1.25     .045     .035     .045     .000  1256.60  9910.00
  .001538       5.       5.       5.        3       15        0      .00   960.97 10870.97
0
 FLOW DISTRIBUTION FOR SECNO=    231.60          CWSEL=   1266.21

 STA=    9910.   10050.   10810.   10871.
   PER Q=     90.4      9.6       .0
    AREA=   1238.7    727.1      6.3
     VEL=      6.9      1.3       .3

 CCHV=    .100 CEHV=    .300
 *SECNO 233.000

 3301 HV CHANGED MORE THAN HVINS

 7165 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
   233.00     9.33  1266.73  1266.73      .00  1268.19     1.46      .36      .23  1266.00
    9460.     314.    8806.     340.     185.     877.     253.     856.     197.   1265.40
      .91     1.70    10.04     1.34     .045     .035     .055     .000  1257.40  9673.50
  .004248     200.     150.     120.        0        8        0      .00   777.63 10451.12
0
 FLOW DISTRIBUTION FOR SECNO=    233.00          CWSEL=   1266.73

 STA=    9673.    9710.    9945.   10070.   10451.
```

```
  PER Q=      .2      3.2     93.1      3.6
   AREA=    13.3    171.6    877.3    253.5
    VEL=     1.1      1.7     10.0      1.3

1
 01/16/89    17:00:44                                                                                    PAGE   45


   SECNO    DEPTH    CWSEL    CRIWS    WSELK    EG       HV       HL       CLOSS    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 238.300

 3301 HV CHANGED MORE THAN HVINS


 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1269.50 ELREA=     1269.00

   238.30     9.34  1269.34  1266.51      .00  1269.78      .45     1.49      .10  1269.50
    9400.       0.    7773.    1627.       0.    1325.    1200.     877.     209.   1269.00
      .94      .00     5.87     1.36     .045     .035     .055     .000  1260.00  9920.55
  .002077     500.     530.     420.        3       12        0      .00  1370.04 11290.59
0
 FLOW DISTRIBUTION FOR SECNO=    238.30          CWSEL=   1269.34

 STA=    9921.   10170.   10200.   10870.   11291.
   PER Q=     82.7       .3     14.2      2.8
    AREA=   1325.1     25.1    894.6    280.8
     VEL=      5.9      1.1      1.5       .9

 *SECNO 243.600

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1272.00 ELREA=     1274.80

   243.60     6.24  1270.24  1270.24      .00  1272.54     2.30     2.11      .56  1272.00
    9340.       0.    9340.       0.       0.     767.       0.     897.     217.   1274.80
      .95      .00    12.18      .00     .045     .035     .055     .000  1264.00  9952.86
  .010883     500.     530.     490.        0       14        0      .00   167.01 10119.87
0
 FLOW DISTRIBUTION FOR SECNO=    243.60          CWSEL=   1270.24

 STA=    9953.   10160.
   PER Q=    100.0
    AREA=    767.0
     VEL=     12.2

1
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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


CCHV=    .100 CEHV=    .300
*SECNO 248.900

3301 HV CHANGED MORE THAN HVINS

   248.90     8.87  1274.87  1274.72      .00  1275.53      .66      2.82      .16  1274.70
    9280.       1.    6003.    3276.       4.     761.    1357.      913.     226.   1274.00
      .98      .37     7.89     2.41     .045     .035     .045     .000  1266.00  9873.73
  .003258     550.     530.     460.        3       15        0      .00  1386.79 11260.51
0
FLOW DISTRIBUTION FOR SECNO=    248.90          CWSEL=   1274.87

STA=    9674.    9920.   10048.   10135.   10162.   10220.   10400.   10500.   11230.   11261.
  PER Q=      .0     64.7     10.2      5.2      3.3      2.9      6.5      6.9       .2
   AREA=     4.0    760.9    249.8    104.5    108.6    156.9    348.7    374.9     13.3
    VEL=      .4      7.9      3.8      4.6      2.9      1.7      1.7      1.7      1.1

*SECNO 254.100
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   254.10     9.18  1277.18  1277.18      .00  1278.05      .87      1.58      .06  1276.60
    9220.      15.    6109.    3095.      18.     678.    1214.      932.     238.   1274.00
      .99      .87     9.01     2.55     .045     .035     .045     .000  1268.00  9838.06
  .003596     550.     520.     350.        0        8        0      .00  1492.09 11360.15
0
FLOW DISTRIBUTION FOR SECNO=    254.10          CWSEL=   1277.18

STA=    9688.    9950.   10050.   10152.   10175.   10185.   10230.   10385.   10455.   10630.   11300.   11380.
  PER Q=      .2     66.3     15.0      3.4       .8       .6       .4       .9      4.9      7.5       .0
   AREA=    17.9    678.3    324.2     73.1     21.8     32.8     43.1     51.0    206.2    454.3      7.1
    VEL=      .9      9.0      4.3      4.3      3.3      1.6       .8      1.6      2.2      1.5       .4

*SECNO 259.300
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   259.30     6.48  1279.48  1279.48      .00  1280.20      .71      2.00      .02  1278.50
    9160.     404.    6407.    2349.     196.     605.     971.      955.     254.   1278.00
     1.02     2.06     7.96     2.42     .045     .035     .045     .000  1273.00  9612.81
  .004189     530.     520.     510.        0       14        0      .00  1276.33 10889.14
0
1
 01/16/89    17:00:44                                                                          PAGE   47


   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


FLOW DISTRIBUTION FOR SECNO=    259.30          CWSEL=   1279.48
```

```
STA=    9613.    9700.    9830.    9868.   10030.   10100.   10205.   10370.   10570.   10889.
  PER Q=      .2      3.0      1.3     69.9      3.2      3.5      5.5      9.0      4.5
   AREA=    21.1    128.0     46.9    805.0    103.9    129.6    203.7    296.9    236.9
    VEL=      .8      2.1      2.5      8.0      2.8      2.5      2.5      2.8      1.8

*SECNO 264.600
   264.60     5.92  1281.92  1281.44      .00  1282.37      .45     2.15      .03  1280.50
    9100.     350.    6143.    2607.     196.     985.     847.     979.     268.  1281.00
     1.04     1.79     6.24     3.08     .045     .035     .045     .000  1276.00  9618.90
  .004141     560.     530.     470.        2       10        0      .00  1092.76 10711.65
0
FLOW DISTRIBUTION FOR SECNO=    264.60          CWSEL=   1281.92

STA=    9619.    9840.    9920.   10205.   10300.   10630.   10712.
  PER Q=      1.4      2.4     67.5      4.0     22.9      1.8
   AREA=    101.8     93.7    985.1    135.0    634.0     78.4
    VEL=      1.3      2.4      6.2      2.7      3.3      2.1

*SECNO 269.900
   269.90     7.43  1283.43  1281.30      .00  1283.92      .49     1.53      .01  1282.20
    9040.     333.    8155.     552.     173.    1382.     303.    1001.     278.  1282.00
     1.07     1.92     5.90     1.82     .045     .035     .045     .000  1276.00  9702.87
  .002207     540.     530.     465.        3       12        0      .00   652.68 10355.55
0
FLOW DISTRIBUTION FOR SECNO=    269.90          CWSEL=   1283.43

STA=    9703.    9710.    9800.    9830.   10100.   10220.   10270.   10356.
  PER Q=      .1      2.8      .8     90.2      3.7      1.6      .8
   AREA=     5.1    128.3     39.8   1392.0    171.1     71.3     61.0
    VEL=     1.2      2.0      1.9      5.9      2.0      2.0      1.2

*SECNO 275.100
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   275.10     7.61  1286.61  1286.61      .00  1287.55      .93     1.76      .13  1286.50
    8980.    2505.    6334.     141.     683.     708.      78.    1021.     287.  1286.40
     1.09     3.66     8.94     1.81     .045     .035     .045     .000  1279.00  9428.77
  .005937     520.     520.     540.        0       13        0      .00   792.76 10221.53
0
1
 01/16/89    17:00:44                                                                    PAGE   48


   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


FLOW DISTRIBUTION FOR SECNO=    275.10          CWSEL=   1286.61

STA=    9429.    9556.    9700.    9765.    9910.    9935.   10090.   10100.   10220.   10222.
  PER Q=      .5      9.0      9.1      9.1       .1     70.5       .1     1.5       .0
   AREA=    38.9    232.1    169.8    233.7      9.0    709.3      4.1    73.4       .5
    VEL=     1.2      3.5      4.8      3.5      1.3      8.9      1.4     1.8      1.1

*SECNO 280.400
```

```
3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1287.30 ELREA=     1291.00

   280.40     7.68  1289.28  1288.05      .00  1289.90      .63     2.33      .03  1287.30
    8920.    1214.    7706.       0.     301.    1158.       0.    1039.     294.   1291.00
     1.11     4.03     6.65      .00     .045     .035     .045     .000  1281.60  9782.74
  .003394     520.     530.     540.        2       11        0      .00   364.21 10146.94
0
FLOW DISTRIBUTION FOR SECNO=    280.40          CWSEL=   1289.28

STA=    9783.    9795.    9865.    9885.   10170.
  PER Q=       .6     10.9      2.1     86.4
   AREA=     20.1    228.9     52.4   1158.3
    VEL=      2.6      4.2      3.7      6.7

*SECNO 285.700

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1290.00 ELREA=     1293.20

   285.70     5.04  1291.74  1291.41      .00  1292.86     1.12     2.81      .15  1290.00
    8800.    2706.    6094.       0.     406.     662.       0.    1054.     298.   1293.20
     1.13     6.66     9.20      .00     .045     .035     .045     .000  1286.70  9721.01
  .009471     530.     530.     530.        1       14        0      .00   357.69 10078.70
0
FLOW DISTRIBUTION FOR SECNO=    285.70          CWSEL=   1291.74

STA=    9721.    9750.    9790.    9800.    9865.    9880.   10170.
  PER Q=       .8      3.7      1.9     21.4      2.9     69.2
   AREA=     25.2     69.6     27.4    243.1     41.1    662.3
    VEL=      2.9      4.6      6.2      7.7      6.3      9.2

*SECNO 291.100
1
 01/16/89    17:00:44                                                                    PAGE   49


   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


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1296.00 ELREA=     1296.00

          51TH AVENUE EXTENTION
   291.10     5.87  1295.87  1295.02      .00  1296.76      .89     3.88      .02  1296.00
    8750.       0.    8750.       0.       0.    1158.       0.    1068.     302.   1296.00
     1.15      .00     7.56      .00     .045     .035     .045     .000  1290.00  9721.57
  .005709     540.     535.     540.        3        5        0      .00   318.22 10039.79
0
FLOW DISTRIBUTION FOR SECNO=    291.10          CWSEL=   1295.87

STA=    9722.   10040.
  PER Q=    100.0
   AREA=   1157.8
    VEL=      7.6

*SECNO 296.300
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```
3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1296.50 ELREA=     1299.60

   296.30     5.68  1298.68  1297.63      .00  1299.22      .55     2.43      .03  1296.50
    8700.    2493.    6207.       0.     670.     935.       0.    1083.     308.   1299.60
     1.17     3.72     6.64      .00     .045     .035     .045     .000  1293.00  9352.08
  .004169     330.     528.     680.        3       13        0      .00   735.82 10087.90
0
FLOW DISTRIBUTION FOR SECNO=    296.30          CWSEL=   1298.68

STA=    9352.    9450.    9590.    9675.    9682.    9705.    9730.    9840.   10090.
  PER Q=       .4      1.8      1.1       .8      7.4      5.4     11.8     71.3
   AREA=     33.1     94.5     57.4     18.7    107.5     91.9    266.8    935.3
    VEL=      1.0      1.6      1.6      3.7      6.0      5.1      3.9      6.6

*SECNO 301.600

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1298.00 ELREA=     1301.50

   301.60     6.37  1300.37  1298.55      .00  1301.01      .64     1.75      .03  1298.00
    8650.     495.    8165.       0.     192.    1240.       0.    1102.     315.   1301.50
     1.20     2.53     6.58      .00     .045     .035     .045     .000  1294.00  9761.47
  .002632     560.     530.     440.        3       15        0      .00   353.41 10114.88
0
1
 01/16/89    17:00:44                                                                    PAGE   50


   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


FLOW DISTRIBUTION FOR SECNO=    301.60          CWSEL=   1300.37

STA=    9761.    9840.    9880.   10130.
  PER Q=      2.3      3.3     94.4
   AREA=     97.2     94.6   1240.0
    VEL=      2.1      3.0      6.6

*SECNO 306.900

3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1304.00 ELREA=     1303.80

   306.90     5.21  1302.21  1301.95      .00  1303.70     1.50     2.44      .26  1304.00
    8600.       0.    8600.       0.       0.     876.       0.    1116.     318.   1303.80
     1.21      .00     9.82      .00     .045     .035     .045     .000  1297.00  9886.88
  .010086     540.     530.     500.        2       15        0      .00   250.06 10136.94
0
FLOW DISTRIBUTION FOR SECNO=    306.90          CWSEL=   1302.21

STA=    9887.   10190.
  PER Q=    100.0
   AREA=    876.0
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    VEL=      9.8

*SECNO 312.200

3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1306.70 ELREA=     1306.80

   312.20     7.13  1306.13  1304.46      .00  1306.63      .49     2.82      .10  1306.70
    8500.       0.    8500.       0.       0.    1508.       0.    1131.     322.   1306.80
     1.24      .00     5.64      .00     .045     .035     .045     .000  1299.00  9898.11
  .003266     490.     530.     560.        2        8        0      .00   423.54 10311.65
0
FLOW DISTRIBUTION FOR SECNO=    312.20          CWSEL=   1306.13

STA=    9868.   10320.
  PER Q=    100.0
   AREA=   1508.3
    VEL=      5.6


1
 01/16/89    17:00:44                                                                          PAGE   51


   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 317.500
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   317.50     6.41  1308.41  1308.41      .00  1309.33      .92     2.42      .13  1308.00
    8450.       7.    5289.    3154.       7.     613.     539.    1146.     327.   1308.20
     1.26      .98     8.62     5.85     .045     .035     .045     .000  1302.00  9899.32
  .007285     560.     530.     465.        0       17        0      .00   430.77 10330.10
0
FLOW DISTRIBUTION FOR SECNO=    317.50          CWSEL=   1308.41

STA=    9899.    9935.   10100.   10140.   10170.   10200.   10240.   10310.   10325.   10330.
  PER Q=      .1     62.6       .2      1.8      7.7     12.9     13.8       .9       .0
   AREA=     7.3    613.3     12.3     42.2    102.2    156.3    203.5     21.1      1.0
    VEL=     1.0      8.6      1.3      3.5      6.4      7.0      5.7      3.5      1.0

*SECNO 322.600

3301 HV CHANGED MORE THAN HVINS

          SCATTER WASH CONFLUENCE
   322.60     8.14  1310.14  1307.35      .00  1310.32      .18      .91      .07  1310.00
    8400.       0.    8400.       0.       2.    2477.       0.    1167.     333.   1310.00
     1.30      .16     3.39      .16     .045     .035     .045     .000  1302.00  9795.30
  .000819     610.     510.     430.        3       10        0      .00   558.85 10354.15
0
FLOW DISTRIBUTION FOR SECNO=    322.60          CWSEL=   1310.14
```

COMPUTER PRINTOUT 2

PRESENT CONDITION MODELLING

```
1*****************************************************
 *  WATER SURFACE PROFILES                           *
 *  VERSION OF NOVEMBER 1976                         *
 *  UPDATED MAY 1984                                 *
 *  IBM-PC-XT VERSION                                *
 *  RUN DATE  05/04/89  TIME  15:37:54               *
 *****************************************************
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 ***********************************
 *  U.S. ARMY CORPS OF ENGINEERS
 *  THE HYDROLOGIC ENGINEERING CENTE
 *  609 SECOND STREET, SUITE D
 *  DAVIS, CALIFORNIA 95616
 *  (916) 440-2105 (FTS) 448-2105
 ***********************************
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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
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1
 05/04/89    15:37:55                                                                    PAGE    1
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THIS RUN EXECUTED 05/04/89 15:37:55

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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 APRIL 1985
*************************************************
```

```
C
T1 SKUNK CREEK EXISTING CONDITION
T2 59TH AVE TO OVERLAND HILLS
T3       SKUNK CREEK EXIST       TOPO 10/5/88 11/20/81 2/4/80 6/6/74

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ

      0.       4.       0.       0.   .002682      .00       .0       0.  1262.400    .000

J2  NPROF    IPLOT    PRFVS    XSECV    XSECH     FN      ALLDC    IBW      CHNIM    ITRACE

     1.000     .000   -1.000     .000     .000     .000   -1.000     .000     .000   15.000

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    38.000   43.000    1.000   53.000   54.000    4.000  200.000     .000     .000     .000


QT     4.000  2120.000  5700.000  9520.000  9520.000     .000     .000     .000     .000     .000
NC      .045     .045     .035     .300     .500     .000     .000     .000     .000     .000
ET   227.900     .000     .000     .000    9.100     .000     .000     .000  9860.000 10150.000
         ALL STATIONS IN FEET ABOVE NEW RIVER STA 227.90=STA 227+90
```

```
          DATA FOR THIS ANALYSIS IS BASED ON COE INPUT AND VERIFIED
          BY COE OUTPUT INFORMATION AS OF 11/19/84, EXCEPT FOR
          RECENT CHANNELIZATION OF SKUNK CREEK THROUGH OVERLAND
          HILLS - CROSS SECTIONS 306.55 TO 310.55
X1    227.900    20.000  9880.000 10140.000      .000      .000      .000      .000      .000      .000
GR   1262.500  9800.000  1262.500  9801.000  1262.500  9802.000  1262.000  9880.000  1260.000  9925.000
GR   1258.000  9935.000  1256.000  9990.000  1254.000 10020.000  1254.000 10040.000  1256.000 10050.000
GR   1256.000 10130.000  1262.500 10140.000  1260.000 10170.000  1262.000 10180.000  1263.500 10200.000
GR   1262.000 10250.000  1262.000 10600.000  1264.000 10750.000  1266.000 11000.000  1268.000 11020.000

QT      4.000  2120.000  5700.000  9510.000  9510.000      .000      .000      .000      .000      .000
ET    231.100      .000      .000      .000     9.100      .000      .000      .000  9930.000 10060.000
X1    231.100    17.000  9920.000 10200.000   180.000   300.000   320.000      .000      .000      .000
X3     10.000      .000      .000      .000      .000      .000      .000  1267.000  1264.000      .000
GR   1269.000  7900.000  1269.000  7960.000  1269.000  7970.000  1267.000  9340.000  1266.000  9500.000
GR   1266.000  9870.000  1266.000  9920.000  1256.500  9920.100  1256.500 10000.000  1256.500 10034.900
GR   1264.000 10035.000  1264.000 10150.000  1266.000 10200.000  1262.000 10250.000  1264.000 10500.000
GR   1266.000 10950.000  1268.000 11300.000      .000      .000      .000      .000      .000      .000
1
 05/04/89    15:37:55                                                                          PAGE    2


QT      4.000  2120.000  5700.000  9510.000  9510.000      .000      .000      .000      .000      .000
NC      .045      .045      .020      .300      .500      .000      .000      .000      .000      .000
ET    231.200      .000      .000      .000     9.100      .000      .000      .000  9920.000 10035.000
          59TH AVENUE BRIDGE
X1    231.200    36.000  9920.000 10035.000     5.000     5.000     5.000      .000      .000      .000
X3     10.000      .000      .000      .000      .000      .000      .000      .000      .000      .000
BT     14.000  9490.000  1267.500  1264.000  9650.000  1268.000  1265.000  9760.000  1269.000  1266.000
BT   9920.000  1269.000  1268.100 10035.000  1269.000  1268.100 10055.000  1269.000  1264.000 10130.000
BT   1268.000  1264.000 10165.000  1267.000  1266.000 10205.000  1266.000  1266.000 10255.000  1265.500
BT   1262.000 10355.000  1265.300  1264.000 10530.000  1266.000  1264.000 10800.000  1266.000  1265.300
BT  11235.000  1268.000  1268.000      .000      .000      .000      .000      .000      .000      .000
GR   1269.000  7970.000  1267.000  9340.000  1264.000  9490.000  1265.000  9650.000  1266.000  9760.000
GR   1266.000  9870.000  1266.000  9920.000  1256.500  9920.010  1256.500  9938.700  1268.100  9938.710
GR   1268.100  9941.000  1256.500  9941.010  1256.500  9963.700  1268.100  9963.710  1268.100  9966.000
GR   1256.500  9966.010  1256.500  9988.700  1268.100  9988.710  1268.100  9991.000  1256.500  9991.010
GR   1256.500 10013.700  1268.100 10013.710  1268.100 10016.000  1256.500 10016.010  1256.500 10034.990
GR   1264.000 10035.000  1264.000 10055.000  1264.000 10130.000  1266.000 10165.000  1266.000 10205.000
GR   1262.000 10255.000  1262.700 10355.000  1264.000 10530.000  1265.300 10800.000  1266.000 10950.000
GR   1268.000 11235.000      .000      .000      .000      .000      .000      .000      .000      .000

QT      4.000  2120.000  5700.000  9510.000  9510.000      .000      .000      .000      .000      .000
ET    231.500      .000      .000      .000     9.100      .000      .000      .000  9920.000 10035.000
X1    231.500      .000      .000      .000    35.000    35.000    35.000      .000      .000      .000
X2      .000      .000      .000      .000      .000      .000     1.000      .000      .000      .000
X3     10.000      .000      .000      .000      .000      .000      .000      .000      .000      .000

NC      .045      .045      .035      .300      .500      .000      .000      .000      .000      .000
ET    231.600      .000      .000      .000     9.100      .000      .000      .000  9933.000 10060.000
X1    231.600    12.000  9910.000 10050.000     5.000     5.000     5.000      .000      .000      .000
X3     10.000      .000      .000      .000      .000      .000      .000  1267.500  1265.300      .000
GR   1268.000  9350.000  1268.000  9515.000  1267.400  9560.000  1266.000  9630.000  1266.000  9910.000
GR   1256.600  9920.000  1256.600 10035.000  1264.500 10050.000  1266.000 10810.000  1268.000 11400.000
GR   1270.000 11410.000  1272.000 11620.000      .000      .000      .000      .000      .000      .000

QT      4.000  2120.000  5700.000  9460.000  9460.000      .000      .000      .000      .000      .000
```

NC	.045	.055	.035	.100	.300	.000	.000	.000	.000	.000
ET	233.000	.000	.000	.000	9.100	.000	.000	.000	9900.000	10200.000
X1	233.000	12.000	9945.000	10070.000	200.000	120.000	150.000	.000	.000	.000
GR	1272.000	8300.000	1270.000	9100.000	1268.000	9610.000	1266.000	9710.000	1266.000	9945.000
GR	1257.400	9975.000	1257.400	10030.000	1265.400	10070.000	1268.000	10815.000	1268.000	11410.000
GR	1270.000	11420.000	1272.000	11650.000	.000	.000	.000	.000	.000	.000
QT	4.000	2120.000	5700.000	9400.000	9400.000	.000	.000	.000	.000	.000
ET	238.300	.000	.000	.000	9.100	.000	.000	.000	9910.000	10200.000
X1	238.300	20.000	9920.000	10170.000	500.000	420.000	530.000	.000	.000	.000
X3	10.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
GR	1272.500	7900.000	1272.000	7901.000	1272.000	7902.000	1272.000	7903.000	1272.000	7904.000
GR	1271.000	9295.000	1271.000	9550.000	1270.100	9570.000	1270.000	9635.000	1268.500	9690.000
GR	1269.000	9825.000	1269.500	9920.000	1262.000	9945.000	1260.000	10020.000	1260.000	10040.000
GR	1268.000	10110.000	1269.000	10170.000	1268.000	10200.000	1268.000	10870.000	1270.000	11500.000

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QT	4.000	2080.000	5500.000	9340.000	9340.000	.000	.000	.000	.000	.000
ET	243.600	.000	.000	.000	9.100	.000	.000	.000	9918.000	10130.000
X1	243.600	19.000	9900.000	10160.000	500.000	490.000	530.000	.000	.000	.000
X3	10.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
GR	1276.000	8160.000	1276.000	8161.000	1276.000	8162.000	1276.000	8600.000	1274.000	9000.000
GR	1272.800	9595.000	1272.000	9650.000	1272.000	9900.000	1270.000	9960.000	1264.000	9980.000
GR	1264.000	10065.000	1274.800	10160.000	1272.000	10185.000	1270.000	10280.000	1268.600	10480.000
GR	1270.000	10900.000	1272.000	11650.000	1272.800	11730.000	1274.000	11950.000	.000	.000
QT	4.000	2080.000	5500.000	9280.000	9280.000	.000	.000	.000	.000	.000
→ NC	.045	.045	.035	.100	.300	.000	.000	.000	.000	.000
ET	248.900	.000	.000	.000	9.100	.000	.000	.000	9910.000	10200.000
X1	248.900	13.000	9920.000	10048.000	550.000	460.000	530.000	.000	.000	.000
X3	10.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
GR	1276.400	9290.000	1276.000	9570.000	1274.700	9920.000	1266.000	9962.000	1266.000	10000.000
GR	1274.000	10348.000	1270.000	10135.000	1272.000	10162.000	1274.000	10220.000	1274.000	10400.000
GR	1274.000	10800.000	1274.000	11230.000	1276.000	11300.000	.000	.000	.000	.000
QT	4.000	2080.000	5500.000	9220.000	9220.000	.000	.000	.000	.000	.000
ET	254.100	.000	.000	.000	9.100	.000	.000	.000	9945.000	10300.000
X1	254.100	16.000	9950.000	10050.000	550.000	350.000	520.000	.000	.000	.000
X3	10.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
GR	1280.000	9700.000	1278.000	9800.000	1276.600	9950.000	1270.000	9965.000	1268.000	9975.000
GR	1270.000	10025.000	1274.000	10050.000	1274.000	10152.000	1274.000	10175.000	1276.000	10185.000
GR	1276.900	10230.000	1276.900	10385.000	1276.000	10455.000	1276.000	10630.000	1277.000	11300.000
GR	1278.000	11750.000	.000	.000	.000	.000	.000	.000	.000	.000
QT	4.000	2080.000	5500.000	9160.000	9160.000	.000	.000	.000	.000	.000
ET	259.300	.000	.000	.000	9.100	.000	.000	.000	9865.000	10300.000
X1	259.300	15.000	9868.000	10030.000	530.000	510.000	520.000	.000	.000	.000
X3	10.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
GR	1280.000	9520.000	1279.000	9700.000	1278.000	9830.000	1278.500	9868.000	1278.000	9890.000
GR	1273.000	9930.000	1273.000	10010.000	1274.000	10022.000	1278.000	10030.000	1278.000	10100.000
GR	1278.500	10205.000	1278.000	10370.000	1278.000	10570.000	1280.000	11000.000	1282.000	11050.000
QT	4.000	2080.000	5500.000	9100.000	9100.000	.000	.000	.000	.000	.000
ET	264.600	.000	.000	.000	9.100	.000	.000	.000	9905.000	10200.000
X1	264.600	17.000	9920.000	10205.000	580.000	470.000	530.000	.000	.000	.000

X3	10.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
GR	1284.000	9198.000	1284.000	9199.000	1284.000	9200.000	1282.000	9600.000	1281.000	9840.000
GR	1280.500	9920.000	1278.000	9940.000	1277.000	9955.000	1278.000	9980.000	1278.000	10040.000
GR	1276.000	10075.000	1276.000	10100.000	1280.000	10120.000	1281.000	10205.000	1280.000	10300.000
GR	1280.000	10630.000	1284.000	10800.000	.000	.000	.000	.000	.000	.000
QT	4.000	2080.000	5500.000	9040.000	9040.000	.000	.000	.000	.000	.000
ET	269.900	.000	.000	.000	9.100	.000	.000	.000	9830.000	10113.000
X1	269.900	15.000	9830.000	10100.000	540.000	465.000	530.000	.000	.000	.000
X3	10.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
GR	1286.000	9270.000	1284.700	9470.000	1284.000	9760.000	1282.000	9710.000	1282.000	9800.000
GR	1282.200	9830.000	1280.000	9910.000	1276.000	9920.000	1276.000	10055.000	1280.000	10065.000
GR	1282.000	10100.000	1282.000	10220.000	1282.000	10270.000	1284.000	10390.000	1286.000	10680.000

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QT	4.000	2080.000	5300.000	8980.000	8980.000	.000	.000	.000	.000	.000
ET	275.100	.000	.000	.000	9.100	.000	.000	.000	9800.000	10150.000
X1	275.100	20.000	9935.000	10090.000	500.000	540.000	520.000	.000	.000	.000
X3	10.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
GR	1290.000	9100.000	1288.000	9140.000	1286.000	9556.000	1284.000	9700.000	1284.000	9765.000
GR	1286.000	9910.000	1286.500	9935.000	1280.000	9955.000	1279.000	9985.000	1279.000	10020.000
GR	1280.000	10025.000	1284.000	10040.000	1286.000	10070.000	1286.400	10090.000	1286.000	10100.000
GR	1286.000	10220.000	1288.000	10225.000	1288.000	10370.000	1290.000	10500.000	1290.000	10580.000
QT	4.000	2080.000	5300.000	8920.000	8920.000	.000	.000	.000	.000	.000
ET	280.400	.000	.000	.000	9.100	.000	.000	.000	9880.000	10159.000
X1	280.400	20.000	9885.000	10170.000	520.000	540.000	530.000	.000	.000	.000
X3	10.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
GR	1292.000	9000.000	1290.000	9500.000	1290.000	9550.000	1290.000	9595.000	1290.000	9780.000
GR	1286.000	9795.000	1286.000	9865.000	1287.300	9885.000	1286.000	9900.000	1282.000	9940.000
GR	1281.600	10015.000	1282.000	10020.000	1286.000	10050.000	1288.000	10090.000	1288.000	10130.000
GR	1291.000	10170.000	1290.000	10315.000	1290.000	10320.000	1290.000	10370.000	1290.500	10425.000
QT	4.000	2080.000	5300.000	8800.000	8800.000	.000	.000	.000	.000	.000
	SECTION 285.7 - UPDATED SURVEY INFO.									
X1	285.700	10.000	9710.000	10170.000	530.000	530.000	530.000	.000	.000	.000
X3	10.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
GR	1296.000	8700.000	1294.000	9200.000	1291.000	9710.000	1290.000	9730.000	1284.200	9770.000
GR	1284.200	10050.000	1286.000	10080.000	1290.000	10110.000	1292.000	10170.000	1294.000	10500.000
QT	4.000	2080.000	5300.000	8750.000	8750.000	.000	.000	.000	.000	.000
	51TH AVENUE EXTENTION - UPDATED SURVEY INFO.									
X1	291.100	28.000	9720.000	10057.000	540.000	540.000	540.000	.000	.000	.000
X3	10.000	.000	.000	.000	.000	.000	.000	1296.000	1296.000	.000
GR	1300.000	8250.000	1298.000	8730.000	1296.000	9205.000	1295.500	9400.000	1294.000	9565.000
GR	1293.000	9720.000	1292.000	9768.000	1291.000	9795.000	1291.000	9843.000	1291.000	9860.000
GR	1290.000	9916.000	1289.000	9951.000	1289.000	9969.000	1287.000	9986.000	1286.300	10000.000
GR	1287.000	10007.000	1288.000	10014.000	1289.000	10022.000	1296.000	10057.000	1296.000	10060.000
GR	1296.000	10282.000	1297.000	10347.000	1297.000	10410.000	1294.000	10930.000	1296.000	10975.000
GR	1296.000	11105.000	1298.000	11170.000	1300.000	12150.000	.000	.000	.000	.000
QT	4.000	2040.000	5100.000	8700.000	8700.000	.000	.000	.000	.000	.000
ET	296.300	.000	.000	.000	9.100	.000	.000	.000	9800.000	.000
X1	296.300	16.000	9840.000	10090.000	330.000	680.000	528.000	.000	.000	.000
X3	10.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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GR   1300.000   9160.000   1298.000   9450.000   1298.000   9570.000   1298.000   9675.000   1294.000   9682.000
GR   1294.000   9705.000   1296.000   9730.000   1296.500   9840.000   1296.000   9960.000   1293.000   9990.000
GR   1292.000  10008.000   1291.000  10033.000   1292.000  10058.000   1293.000  10075.000   1299.600  10090.000
GR   1300.000  10500.000       .000       .000       .000       .000       .000       .000       .000       .000

          SECTION 299.4 - ADDED SECTION USING NEW SURVEY DATA
X1    299.400     25.000   9859.000   9980.000    310.000    310.000    310.000       .000       .000       .000
X3     10.000       .000       .000       .000       .000       .000       .000       .000       .000       .000
GR   1299.800   9600.000   1299.300   9650.000   1294.200   9660.000   1294.100   9668.000   1302.000   9691.000
GR   1300.200   9714.000   1299.600   9744.000   1296.400   9762.000   1296.400   9770.000   1296.200   9778.000
GR   1295.800   9826.000   1295.500   9859.000   1293.900   9869.000   1292.600   9880.000   1292.200   9890.000
GR   1292.000   9892.000   1292.000   9906.000   1292.200   9907.000   1292.900   9918.000   1292.000   9947.000
GR   1292.400   9949.000   1293.500   9960.000   1295.200   9968.000   1300.700   9980.000   1302.500  10018.000
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QT      4.000   2040.000   5100.000   8650.000   8650.000       .000       .000       .000       .000       .000
ET    301.600       .000       .000       .000      9.100       .000       .000       .000   9870.000       .000
X1    301.600     13.000   9880.000  10130.000    250.000    130.000    220.000       .000       .000       .000
X3     10.000       .000       .000       .000       .000       .000       .000       .000       .000       .000
GR   1302.000   9375.000   1301.500   9735.000   1300.000   9770.000   1298.000   9840.000   1298.000   9880.000
GR   1296.000   9890.000   1294.000   9965.000   1294.000  10040.000   1296.000  10080.000   1296.000  10100.000
GR   1300.000  10110.000   1301.500  10130.000   1302.000  10550.000       .000       .000       .000       .000

QT      4.000   2040.000   5100.000   8600.000   8600.000       .000       .000       .000       .000       .000
NC       .030       .030       .030       .100       .300       .020       .000       .020       .000       .000
          BEGIN OVERLAND HILLS
X1    306.550      4.000   9849.000  10151.000    505.000    465.000    495.000       .000       .000       .000
GR   1305.400   9849.000   1296.380   9880.000   1296.380  10120.000   1305.400  10151.000       .000       .000

X1    306.900       .000   9849.000  10151.000     35.000     35.000     35.000       .000       .020       .000

X1    308.050       .000   9849.000  10151.000    115.000    115.000    115.000       .000       .080       .000

X1    310.550       .000   9849.000  10151.000    250.000    250.000    250.000       .000       .250       .000
EJ       .000       .000       .000       .000       .000       .000       .000       .000       .000       .000
*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
1
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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



CCHV=    .300 CEHV=    .500
*SECNO 227.900

3265 DIVIDED FLOW

          ALL STATIONS IN FEET ABOVE NEW RIVER STA 227.90=STA 227+90
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        DATA FOR THIS ANALYSIS IS BASED ON COE INPUT AND VERIFIED
        BY COE OUTPUT INFORMATION AS OF 11/19/84, EXCEPT FOR
        RECENT CHANNELIZATION OF SKUNK CREEK THROUGH OVERLAND
        HILLS - CROSS SECTIONS 306.55 TO 310.55
   227.90     8.34  1262.34  1260.05  1262.40  1263.03      .69      .00      .00  1262.00
    9520.       5.    9322.     193.       9.    1386.     172.       0.       0.   1262.50
      .00      .53     6.73     1.13     .045     .035     .045     .000  1254.00  9827.17
  .002727       0.       0.       0        0       14        3      .00   741.84 10625.40
0
FLOW DISTRIBUTION FOR SECNO=    227.90          CWSEL=   1262.34

STA=    9827.    9880.   10140.   10170.   10180.   10250.   10600.   10625.
  PER Q=       .0     97.9       .7       .3       .0     1.0       .0
   AREA=      8.9   1385.6     32.8     13.4      2.7    118.5      4.3
    VEL=       .5      6.7      1.9      2.1       .5       .8       .5

*SECNO 231.100

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1267.00 ELREA=     1264.00

   231.10     7.66  1264.16  1264.16      .00  1265.39     1.22     1.43      .27  1266.00
    9510.       0.    8418.    1092.       0.     900.     323.      10.       4.   1266.00
      .01      .00     9.36     3.38     .045     .035     .045     .000  1256.50  9920.02
  .008759     180.     320.     300.        0       15        0      .00   548.08 10536.94
0
1
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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


FLOW DISTRIBUTION FOR SECNO=    231.10          CWSEL=   1264.16

STA=    9920.   10200.   10250.   10500.   10537.
  PER Q=     88.5      1.0     10.5       .0
   AREA=    899.8     29.3    291.0      3.0
    VEL=      9.4      3.3      3.4       .6

CCHV=    .300 CEHV=    .500
*SECNO 231.200

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS
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3370 NORMAL BRIDGE,NRD= 14 MIN ELTRD= 1265.30 MAX ELLC= 1268.10

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1266.00 ELREA=     1264.00

          59TH AVENUE BRIDGE
   231.20      7.50  1264.00  1264.00      .00  1266.23     2.23      .03      .51  1266.00
    9510.        0.    9510.       0.       0.     793.       0.      10.       5.   1264.00
      .01       .00    11.99      .00     .045     .020     .045     .000  1256.50  9920.00
  .003627        5.       5.       5.        0        9        0   -24.91   105.81 10035.00
0
 FLOW DISTRIBUTION FOR SECNO=    231.20          CWSEL=   1264.00

 STA=    9920.   10035.
   PER Q=    100.0
    AREA=    792.9
     VEL=     12.0

 *SECNO 231.500

 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


 3370 NORMAL BRIDGE,NRD= 14 MIN ELTRD= 1265.30 MAX ELLC= 1268.30


 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1266.20 ELREA=     1264.20

    231.50      7.40  1264.09  1264.06      .00  1266.39     2.30      .13      .03  1266.20
    9510.        0.    9510.       0.       0.     782.       0.      11.       5.   1264.20
      .01       .00    12.16      .00     .045     .020     .045     .000  1256.70  9920.00
  .003768       35.      35.      35.        2       10        0   -22.43   105.81 10035.00
0
 FLOW DISTRIBUTION FOR SECNO=    231.50          CWSEL=   1264.09

 STA=    9920.   10035.
   PER Q=    100.0
    AREA=    782.2
     VEL=     12.2

 CCHV=    .300 CEHV=    .500
 *SECNO 231.600

 3301 HV CHANGED MORE THAN HVINS
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3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1267.50 ELREA=     1265.30

   231.60     9.61  1266.21  1262.39      .00  1266.89      .68      .01      .49  1266.00
    9510.       0.    8594.     916.       0.    1239.     733.      11.       5.   1264.50
      .01      .00     6.94     1.25     .045     .035     .045     .000  1256.60  9910.00
  .001538       5.       5.       5.        3       15        0      .00   960.97 10870.97
0
FLOW DISTRIBUTION FOR SECNO=    231.60          CWSEL=   1266.21

STA=    9910.   10050.   10810.   10871.
  PER Q=     90.4      9.6       .0
   AREA=   1238.7    727.1      6.3
    VEL=      6.9      1.3       .3

CCHV=    .100 CEHV=    .300
*SECNO 233.000
1
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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



3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   233.00     9.33  1266.73  1266.73      .00  1268.19     1.46      .36      .23  1266.00
    9460.     314.    8806.     340.     165.     877.     253.      16.       7.   1265.40
      .02     1.70    10.04     1.34     .045     .035     .055     .000  1257.40  9673.50
  .004248     200.     150.     120.        0        8        0      .00   777.63 10451.12
0
FLOW DISTRIBUTION FOR SECNO=    233.00          CWSEL=   1266.73

STA=    9673.    9710.    9945.   10070.   10451.
  PER Q=       .2      3.2     93.1      3.6
   AREA=     13.3    171.6    877.3    253.5
    VEL=      1.1      1.7     10.0      1.3

*SECNO 238.300

3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1269.50 ELREA=     1269.00

   238.30     9.34  1269.34  1266.51      .00  1269.78      .45     1.49      .10  1269.50
    9400.       0.    7773.    1627.       0.    1325.    1200.      38.      18.   1269.00
      .04      .00     5.87     1.36     .045     .035     .055     .000  1260.00  9920.55
  .002077     500.     530.     420.        3       12        0      .00  1370.04 11290.59
0
FLOW DISTRIBUTION FOR SECNO=    238.30          CWSEL=   1269.34
```

```
STA=    9921.   10170.   10200.   10870.   11291.
  PER Q=     82.7       .3     14.2      2.8
   AREA=   1325.1     25.1    894.6    280.8
    VEL=      5.9      1.1      1.5       .9

*SECNO 243.600

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
1
 05/04/89    15:37:55                                                                                                PAGE   10


   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


3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1272.00 ELREA=     1274.80

   243.60     6.24  1270.24  1270.24      .00  1272.54     2.30     2.11      .56  1272.00
    9340.       0.    9340.       0.       0.     767.       0.      57.      27.   1274.80
      .06      .00    12.18      .00     .045     .035     .055     .000  1264.00  9952.86
  .010883     500.     530.     490.        0       14        0      .00   167.01 10119.87
0
FLOW DISTRIBUTION FOR SECNO=    243.60          CWSEL=   1270.24

STA=    9953.   10160.
  PER Q=    100.0
   AREA=    767.0
    VEL=     12.2

CCHV=    .100 CEHV=    .300
*SECNO 248.900

3301 HV CHANGED MORE THAN HVINS

   248.90     8.87  1274.87  1274.72      .00  1275.53      .66     2.82      .16  1274.70
    9280.       1.    6003.    3276.       4.     761.    1357.      74.      36.   1274.00
      .08      .37     7.89     2.41     .045     .035     .045     .000  1266.00  9873.73
  .003258     550.     530.     460.        3       15        0      .00  1386.79 11260.51
0
FLOW DISTRIBUTION FOR SECNO=    248.90          CWSEL=   1274.87

STA=    9874.    9920.   10048.   10135.   10162.   10220.   10400.   10600.   11230.   11261.
  PER Q=       .0     64.7     10.2      5.2      3.3      2.9      6.5      6.9       .2
   AREA=      4.0    760.9    249.8    104.5    108.6    156.9    348.7    374.9     13.3
    VEL=       .4      7.9      3.8      4.6      2.9      1.7      1.7      1.7      1.1

*SECNO 254.100
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   254.10     9.18  1277.18  1277.18      .00  1278.05      .87     1.58      .06  1276.60
    9220.      15.    6109.    3095.      18.     678.    1214.      93.      48.   1274.00
```

```
      .10      .87     9.01     2.55     .045     .035     .045     .000  1268.00  9888.06
  .003596     550.     520.     350.        0        8        0      .00  1492.09 11380.15
0
1
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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


FLOW DISTRIBUTION FOR SECNO=    254.10          CWSEL=   1277.18

STA=    9888.    9950.   10050.   10152.   10175.   10185.   10230.   10385.   10455.   10630.   11300.   11380.
  PER Q=       .2     66.3     15.0      3.4       .8       .6       .4       .9     4.9      7.5       .0
   AREA=     17.9    678.3    324.2     73.1     21.8     32.8     43.1     51.0    206.2    454.3      7.1
    VEL=       .9      9.0      4.3      4.3      3.3      1.6       .8      1.6      2.2      1.5       .4

*SECNO 259.300
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   259.30     6.48  1279.48  1279.48      .00  1280.20      .71     2.00      .02  1278.50
    9160.     404.    6407.    2349.     196.     805.     971.     116.      64.  1278.00
      .12     2.06     7.96     2.42     .045     .035     .045     .000  1273.00  9612.81
  .004189     530.     520.     510.        0       14        0      .00  1276.33 10889.14
0
FLOW DISTRIBUTION FOR SECNO=    259.30          CWSEL=   1279.48

STA=    9613.    9700.    9830.    9868.   10030.   10100.   10205.   10370.   10570.   10889.
  PER Q=       .2      3.0      1.3     69.9      3.2      3.5      5.5      9.0      4.5
   AREA=     21.1    128.0     46.9    805.0    103.9    129.6    203.7    296.9    236.9
    VEL=       .8      2.1      2.5      8.0      2.8      2.5      2.5      2.8      1.8

*SECNO 264.600
   264.60     5.92  1281.92  1281.44      .00  1282.37      .45     2.15      .03  1280.50
    9100.     350.    6143.    2607.     196.     985.     847.     139.      78.  1281.00
      .15     1.79     6.24     3.08     .045     .035     .045     .000  1276.00  9618.90
  .004141     580.     530.     470.        2       10        0      .00  1092.76 10711.65
0
FLOW DISTRIBUTION FOR SECNO=    264.60          CWSEL=   1281.92

STA=    9619.    9840.    9920.   10205.   10300.   10630.   10712.
  PER Q=      1.4      2.4     67.5      4.0     22.9      1.8
   AREA=    101.8     93.7    985.1    135.0    634.0     78.4
    VEL=      1.3      2.4      6.2      2.7      3.3      2.1

*SECNO 269.900
   269.90     7.43  1283.43  1281.30      .00  1283.92      .49     1.53      .01  1282.20
    9040.     333.    8155.     552.     173.    1382.     303.     162.      68.  1282.00
      .18     1.92     5.90     1.82     .045     .035     .045     .000  1276.00  9702.67
  .002207     540.     530.     465.        3       12        0      .00   652.68 10335.55
0
1
 05/04/89    15:37:55                                                                          PAGE   12
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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     XML      XNCH     XNR      WTN      ELMIN      SSTA
   SLOPE    XLOBL    XLCH     XLOBR    ITRIAL   IDC      ICONT    CORAR    TOPWID     ENDST


FLOW DISTRIBUTION FOR SECNO=    269.90          CWSEL=   1283.43

STA=    9703.    9710.    9800.    9830.   10100.   10220.   10270.   10356.
  PER Q=       .1      2.8       .8     90.2      3.7      1.6       .8
   AREA=      5.1    128.3     39.8   1362.0    171.1     71.3     61.0
    VEL=      1.2      2.0      1.9      5.9      2.0      2.0      1.2

*SECNO 275.100
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   275.10     7.61  1286.61  1286.61      .00  1287.55      .93     1.76      .13  1286.50
    8980.    2505.    6334.     141.     683.     708.      78.     182.      97.   1286.40
      .20     3.66     8.94     1.81     .045     .035     .045     .000  1279.00  9428.77
  .005937     500.     520.     540.        0       13        0      .00   792.76 10221.53
0
FLOW DISTRIBUTION FOR SECNO=    275.10          CWSEL=   1286.61

STA=    9429.    9556.    9700.    9765.    9910.    9935.   10090.   10100.   10220.   10222.
  PER Q=       .5      9.0      9.1      9.1       .1     70.5       .1      1.5       .0
   AREA=     38.9    232.1    169.8    233.7      9.0    708.3      4.1     73.4       .5
    VEL=      1.2      3.5      4.8      3.5      1.3      8.9      1.4      1.8      1.1

*SECNO 280.400

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1287.30 ELREA=     1291.00

   280.40     7.68  1289.28  1288.05      .00  1289.90      .63     2.33      .03  1287.30
    8920.    1214.    7706.       0.     301.    1158.       0.     199.     104.   1291.00
      .22     4.03     6.65      .00     .045     .035     .045     .000  1281.60  9782.74
  .003394     520.     530.     540.        2       11        0      .00   364.21 10146.94
0
FLOW DISTRIBUTION FOR SECNO=    280.40          CWSEL=   1289.28

STA=    9783.    9795.    9865.    9885.   10170.
  PER Q=       .6     10.9      2.1     86.4
   AREA=     20.1    228.9     52.4   1158.3
    VEL=      2.6      4.2      3.7      6.7

*SECNO 285.700
1
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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     XML      XNCH     XNR      WTN      ELMIN      SSTA
   SLOPE    XLOBL    XLCH     XLOBR    ITRIAL   IDC      ICONT    CORAR    TOPWID     ENDST


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1291.00 ELREA=     1292.00
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          SECTION 285.7 - UPDATED SURVEY INFO.
   285.70     6.37  1290.57  1287.17      .00  1290.83      .25      .88      .04  1291.00
    8800.       0.    8800.       0.       0.    2172.       0.     222.     109.   1292.00
      .25      .00     4.05      .00     .045     .035     .045     .000  1284.20  9718.57
  .000983     530.     530.     530.        2       18        0      .00   408.57 10127.14
0
 FLOW DISTRIBUTION FOR SECNO=    285.70          CWSEL=   1290.57

 STA=    9719.   10170.
   PER Q=    100.0
    AREA=   2172.3
     VEL=      4.1

 *SECNO 291.100

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1296.00 ELREA=     1296.00

          51TH AVENUE EXTENTION - UPDATED SURVEY INFO.
   291.10     6.75  1293.05  1293.05      .00  1294.53     1.48     1.31      .37  1293.00
    8750.       0.    8750.       0.       0.     896.       0.     241.     113.   1296.00
      .27      .00     9.77      .00     .045     .035     .045     .000  1286.30  9720.00
  .013577     540.     540.     540.        0        8        0      .00   322.26 10042.26
0
 FLOW DISTRIBUTION FOR SECNO=    291.10          CWSEL=   1293.05

 STA=    9720.   10057.
   PER Q=    100.0
    AREA=    895.9
     VEL=      9.8

 *SECNO 296.300
1
 05/04/89    15:37:55                                                                    PAGE   14


    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



 3301 HV CHANGED MORE THAN HVINS


 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1296.50 ELREA=     1299.60

   296.30     7.13  1298.13  1297.41      .00  1298.90      .77     4.30      .07  1296.50
    8700.    1900.    6792.       0.     427.     894.       0.     253.     118.   1299.60
      .29     4.47     7.60      .00     .045     .035     .045     .000  1291.00  9430.58
  .005794     330.     528.     680.        4        9        0      .00   656.00 10086.67
0
 FLOW DISTRIBUTION FOR SECNO=    296.30          CWSEL=   1298.13
```

```
STA=    9431.    9590.    9675.    9682.    9705.    9730.    9840.   10090.
  PER Q=       .1       .1       .7      7.1      4.8      9.1     78.1
   AREA=     20.0     11.4     14.9     95.1     78.3    207.2    893.9
    VEL=       .6       .7      3.8      6.5      5.4      3.8      7.6

*SECNO 299.400

3265 DIVIDED FLOW


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1295.50 ELREA=     1300.70

          SECTION 299.4 - ADDED SECTION USING NEW SURVEY DATA
   299.40     7.43  1299.43  1298.29      .00  1300.42      .99     1.45      .07  1295.50
    8700.    2190.    6510.       0.     476.     736.       0.     262.     121.   1300.70
      .30     4.61     8.85      .00     .045     .035     .045     .000  1292.00  9637.06
  .003860     310.     310.     310.        3       12        0      .00   278.72  9977.23
0
FLOW DISTRIBUTION FOR SECNO=    299.40          CWSEL=   1299.43

STA=    9637.    9660.    9668.    9684.    9762.    9770.    9778.    9826.    9859.    9980.
  PER Q=      1.1      3.0      1.8       .8      1.2      1.3      8.8      7.1     74.8
   AREA=     27.6     42.2     41.3     25.8     24.2     25.0    164.6    124.7    735.5
    VEL=      3.6      6.2      3.8      2.7      4.3      4.4      4.7      5.0      8.9

*SECNO 301.600
1
 05/04/89    15:37:55                                                                                PAGE   15


   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



3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1298.00 ELREA=     1301.50

   301.60     6.54  1300.54  1298.55      .00  1301.13      .59      .67      .04  1298.00
    8650.     537.    8113.       0.     213.    1281.       0.     269.     123.   1301.50
      .31     2.52     6.33      .00     .045     .035     .045     .000  1294.00  9757.39
  .002361     250.     220.     130.        2       14        0      .00   359.81 10117.20
0
FLOW DISTRIBUTION FOR SECNO=    301.60          CWSEL=   1300.54

STA=    9757.    9770.    9840.    9880.   10130.
  PER Q=       .0      2.7      3.5     93.8
   AREA=      3.4    107.8    101.6   1281.2
    VEL=       .7      2.1      3.0      6.3

CCHV=    .100 CEHV=    .300
*SECNO 306.550
          BEGIN OVERLAND HILLS
   306.55     5.21  1301.59  1299.73      .00  1302.23      .64     1.08      .01  1305.40
    8600.       0.    8600.       0.       0.    1344.       0.     285.     127.   1305.40
      .33      .00     6.40      .00     .030     .030     .030     .000  1296.38  9862.09
```

```
  .002033     505.     495.     465.        3       11        0      .00   275.82 10137.91
0
 FLOW DISTRIBUTION FOR SECNO=    306.55          CWSEL=   1301.59

 STA=    9862.   10151.
   PER Q=    100.0
    AREA=   1344.2
     VEL=      6.4

 *SECNO 306.900
    306.90      5.28  1301.68  1299.75      .00  1302.30      .62      .07      .00  1305.42
     8600.        0.    8600.       0.       0.    1360.       0.     286.     127.   1305.42
       .34       .00     6.32      .00     .030     .030     .030     .000  1296.40   9861.89
  .001960       35.      35.      35.        0       14        0      .00   276.21 10138.11
0
 FLOW DISTRIBUTION FOR SECNO=    306.90          CWSEL=   1301.68

 STA=    9862.   10151.
   PER Q=    100.0
    AREA=   1359.9
     VEL=      6.3

1
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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 308.050
    308.05      5.46  1301.94  1299.83      .00  1302.52      .58      .21      .00  1305.50
     8600.        0.    8600.       0.       0.    1413.       0.     290.     128.   1305.50
       .34       .00     6.09      .00     .030     .030     .030     .000  1296.40   9861.23
  .001737      115.     115.     115.        2       14        0      .00   277.53 10138.77
0
 FLOW DISTRIBUTION FOR SECNO=    308.05          CWSEL=   1301.94

 STA=    9861.   10151.
   PER Q=    100.0
    AREA=   1412.9
     VEL=      6.1

 *SECNO 310.550
    310.55      5.67  1302.40  1300.08      .00  1302.93      .53      .41      .00  1305.75
     8600.        0.    8600.       0.       0.    1472.       0.     298.     129.   1305.75
       .35       .00     5.84      .00     .030     .030     .030     .000  1296.73   9860.51
  .001527      250.     250.     250.        0       14        0      .00   278.99 10139.49
0
 FLOW DISTRIBUTION FOR SECNO=    310.55          CWSEL=   1302.40

 STA=    9861.   10151.
   PER Q=    100.0
    AREA=   1471.8
     VEL=      5.8
```

1

THIS RUN EXECUTED 05/04/89 15:39:19

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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 APRIL 1985
**************************************************


T1 SKUNK CREEK EXISTING CONDITION
T2 59TH AVE TO OVERLAND HILLS
T3        LAST PROFILE EXIST      TOPO 10/5/88 11/20/81 2/4/80 6/6/74

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0.        5.        0.        0.   .002682      .00       .0        0.  1262.400     .000

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

    15.000     .000      .000      .000      .000      .000    -1.000     .000      .000    15.000
```

1


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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 2

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV=    .300 CEHV=    .500
*SECNO 227.900

3265 DIVIDED FLOW


3470 ENCROACHMENT STATIONS=    9880.0   10150.0  TYPE=     1  TARGET=     270.000
          ALL STATIONS IN FEET ABOVE NEW RIVER STA 227.90=STA 227+90
          DATA FOR THIS ANALYSIS IS BASED ON COE INPUT AND VERIFIED
          BY COE OUTPUT INFORMATION AS OF 11/19/84, EXCEPT FOR
          RECENT CHANNELIZATION OF SKUNK CREEK THROUGH OVERLAND
          HILLS - CROSS SECTIONS 306.55 TO 310.55
   227.90     8.43  1262.43  1260.05  1262.34  1263.14      .71      .00      .00  1262.00
    9520.       0.     9517.       3.       0.    1410.       4.       0.       0.  1262.50
      .00      .00      6.75      .85     .045     .035     .045     .000  1254.00  9880.00
  .002689       0.       0.       0.        0       19        3      .00   269.10 10150.00
0
```

```
FLOW DISTRIBUTION FOR SECNO=    227.90          CWSEL=   1262.43

STA=    9880.   10140.   10150.
  PER Q=    100.0       .0
   AREA=   1410.1      3.5
    VEL=      6.7       .9

*SECNO 231.100

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=    9930.0   10060.0  TYPE=     1  TARGET=     130.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1267.00 ELREA=     1264.00

   231.10     6.32  1262.82  1262.82  1264.16  1266.01     3.19     1.56     1.24100000.00
    9510.       0.    9510.       0.       0.     663.       0.       8.       1. 100000.00
      .01      .00    14.34      .00     .045     .035     .045     .000  1256.50  9930.00
  .011352     180.     320.     300.        0       14        0      .00   104.98 10034.98
0
1
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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


FLOW DISTRIBUTION FOR SECNO=    231.10          CWSEL=   1262.82

STA=    9930.   10200.
  PER Q=    100.0
   AREA=    663.2
    VEL=     14.3

CCHV=    .300 CEHV=    .500
*SECNO 231.200

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3370 NORMAL BRIDGE,NRD= 14 MIN ELTRD= 1265.30 MAX ELLC= 1268.10


3470 ENCROACHMENT STATIONS=    9920.0   10035.0  TYPE=     1  TARGET=     115.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1266.00 ELREA=   100000.00

          59TH AVENUE BRIDGE
   231.20     7.84  1264.34  1262.79  1264.00  1266.38     2.04      .03      .34  1266.00
```

```
    9510.       0.    9510.       0.       0.     829.       0.       8.       1. 100000.00
      .01      .00    11.47      .00     .045     .020     .045     .000  1256.50  9920.00
  .003205       5.       5.       5.       16       15        0      .00   105.81 10035.00
0
 FLOW DISTRIBUTION FOR SECNO=    231.20          CWSEL=   1264.34

 STA=    9920.   10035.
   PER Q=    100.0
    AREA=    829.1
     VEL=     11.5

 *SECNO 231.500

 3265 DIVIDED FLOW

1
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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



 3370 NORMAL BRIDGE,NRD= 14 MIN ELTRD= 1265.30 MAX ELLC= 1268.30


 3470 ENCROACHMENT STATIONS=    9920.0   10035.0  TYPE=     1  TARGET=     115.000

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1266.20 ELREA=   100000.00

    231.50      7.73  1264.43  1262.99  1264.09  1266.53     2.10      .11      .03  1266.20
    9510.       0.    9510.       0.       0.     817.       0.       8.       1. 100000.00
      .01      .00    11.63      .00     .045     .020     .045     .000  1256.70  9920.00
  .003334      35.      35.      35.        3       15        0      .00   105.81 10035.00
0
 FLOW DISTRIBUTION FOR SECNO=    231.50          CWSEL=   1264.43

 STA=    9920.   10035.
   PER Q=    100.0
    AREA=    817.4
     VEL=     11.6

 CCHV=    .300 CEHV=    .500
 *SECNO 231.600

 3470 ENCROACHMENT STATIONS=    9933.0   10060.0  TYPE=     1  TARGET=     127.000

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1267.50 ELREA=     1265.30

    231.60      8.47  1265.07  1262.91  1266.21  1266.69     1.62      .02      .14100000.00
    9510.       0.    9510.       0.       0.     931.       0.       8.       1.   1264.50
      .01      .00    10.21      .00     .045     .035     .045     .000  1256.60  9933.00
  .004078       5.       5.       5.        3       15        0      .00   117.00 10050.00
0
 FLOW DISTRIBUTION FOR SECNO=    231.60          CWSEL=   1265.07
```

```
STA=    9933.   10050.
  PER Q=    100.0
   AREA=    931.3
    VEL=     10.2

CCHV=    .100 CEHV=    .300
1
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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 233.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=    9900.0   10200.0  TYPE=     1  TARGET=     300.000
   233.00     7.93  1265.33  1265.33  1266.73  1268.14     2.81      .91      .36  1266.00
    9460.       0.    9460.       0.       0.     703.       0.      11.       2.   1265.40
      .01      .00    13.45      .00     .045     .035     .055     .000  1257.40  9947.33
  .009949     200.     150.     120.        0       10        0      .00   122.33 10069.66
0
FLOW DISTRIBUTION FOR SECNO=    233.00          CWSEL=   1265.33

STA=    9947.   10070.
  PER Q=    100.0
   AREA=    703.2
    VEL=     13.5

*SECNO 238.300

3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=    9910.0   10200.0  TYPE=     1  TARGET=     290.000
   238.30     9.87  1269.87  1266.56  1269.34  1270.51      .63     2.15      .22  1269.50
    9400.       3.    9335.      62.       4.    1459.      41.      25.       4.   1269.00
      .03      .81     6.40     1.50     .045     .035     .055     .000  1260.00  9910.00
  .002178     500.     530.     420.        2       12        0      .00   290.00 10200.00
0
FLOW DISTRIBUTION FOR SECNO=    238.30          CWSEL=   1269.87

STA=    9910.    9920.   10170.   10200.
  PER Q=       .0     99.3       .7
   AREA=      4.0   1459.4     41.2
    VEL=       .8      6.4      1.5

*SECNO 243.600
1
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```
3470 ENCROACHMENT STATIONS=    9945.0   10300.0  TYPE=     1  TARGET=     355.000
   254.10     9.11  1277.11  1276.55  1277.18  1278.53     1.43     2.52      .04  1276.60
    9220.       3.    7128.    2089.       2.     671.     453.      64.      13.   1274.00
      .08     1.37    10.62     4.61     .045     .035     .045     .000  1268.00  9945.00
  .005072     550.     520.     350.        3        5        0      .00   355.00 10300.00
0
FLOW DISTRIBUTION FOR SECNO=    254.10          CWSEL=   1277.11

STA=    9945.    9950.   10050.   10152.   10175.   10185.   10230.   10300.
  PER Q=       .0     77.3     17.2      3.9       .9       .6       .1
   AREA=      2.4    671.1    316.8     71.4     21.1     29.5     14.4
    VEL=      1.4     10.6      5.0      5.0      3.8      1.8       .8

*SECNO 259.300

3470 ENCROACHMENT STATIONS=    9865.0   10300.0  TYPE=     1  TARGET=     435.000
   259.30     7.01  1280.01  1279.50  1279.48  1280.98      .98     2.40      .05  1278.50
    9160.      10.    7625.    1525.       5.     890.     482.      79.      18.   1278.00
      .10     2.16     8.57     3.17     .045     .035     .045     .000  1273.00  9865.00
  .004250     530.     520.     510.        2       16        0      .00   435.00 10300.00
0
FLOW DISTRIBUTION FOR SECNO=    259.30          CWSEL=   1280.01

STA=    9865.    9868.   10030.   10100.   10205.   10300.
  PER Q=       .1     83.2      5.3      6.3      5.1
   AREA=      4.6    889.6    140.5    184.5    156.8
    VEL=      2.2      8.6      3.4      3.1      3.0

*SECNO 264.600

3470 ENCROACHMENT STATIONS=    9905.0   10200.0  TYPE=     1  TARGET=     295.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1280.50 ELREA=   100000.00

   264.60     6.51  1282.51  1281.59  1281.92  1283.46      .95     2.48      .00  1280.50
    9100.     103.    8997.       0.      30.    1146.       0.      94.      22. 100000.00
      .12     3.47     7.85      .00     .045     .035     .045     .000  1276.00  9905.00
  .005272     560.     530.     470.        2       15        0      .00   295.00 10200.00
0
1
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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


FLOW DISTRIBUTION FOR SECNO=    264.60          CWSEL=   1282.51

STA=    9905.    9920.   10205.
  PER Q=      1.1     98.9
   AREA=     29.5   1146.4
    VEL=      3.5      7.8

*SECNO 269.900
```

```
3470 ENCROACHMENT STATIONS=    9830.0   10113.0  TYPE=     1  TARGET=     283.000
   269.90     8.41  1284.41  1281.32  1283.43  1284.87      .46     1.36      .05  1282.20
    9040.       0.    8976.      64.       0.    1647.      31.     111.      26.   1282.00
      .14      .00     5.45     2.06     .045     .035     .045     .000  1276.00  9830.00
  .001508     540.     530.     465.        2       11        0      .00   283.00 10113.00
0
FLOW DISTRIBUTION FOR SECNO=    269.90          CWSEL=   1284.41

STA=    9830.   10100.   10113.
  PER Q=     99.3       .7
   AREA=   1646.5     31.3
    VEL=      5.5      2.1

*SECNO 275.100

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=    9800.0   10150.0  TYPE=     1  TARGET=     350.000
   275.10     7.97  1286.97  1286.97  1286.61  1288.52     1.55     1.48      .33  1286.50
    8980.     808.    8020.     152.     208.     764.      56.     127.      29.   1286.40
      .16     3.88    10.50     2.70     .045     .035     .045     .000  1279.00  9800.00
  .007398     500.     520.     540.        0       12        0      .00   350.00 10150.00
0
FLOW DISTRIBUTION FOR SECNO=    275.10          CWSEL=   1286.97

STA=    9800.    9910.    9935.   10090.   10100.   10150.
  PER Q=      8.5       .5     89.3       .2      1.5
   AREA=    190.2     18.0    763.9      7.7     48.5
    VEL=      4.0      2.3     10.5      2.4      2.7

1
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         OLOB      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 280.400

3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=    9880.0   10159.0  TYPE=     1  TARGET=     279.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1287.30 ELREA=   100000.00

   280.40     8.55  1290.15  1287.85  1289.28  1290.78      .63     2.16      .09  1287.30
    8920.      38.    8882.       0.      15.    1394.       0.     142.      33. 100000.00
      .18     2.52     6.37      .00     .045     .035     .045     .000  1281.60  9880.00
  .002580     520.     530.     540.        3       12        0      .00   278.66 10158.66
0
```

```
FLOW DISTRIBUTION FOR SECNO=    280.40          CWSEL=   1290.15

STA=    9880.    9885.   10170.
  PER Q=        .4      99.6
   AREA=      15.1    1393.7
    VEL=       2.5       6.4

*SECNO 285.700

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1291.00 ELREA=     1292.00

          SECTION 285.7 - UPDATED SURVEY INFO.
   285.70     7.07  1291.27  1287.17  1290.57  1291.47      .20      .65      .04  1291.00
    8800.       1.    8799.       0.       6.    2469.       0.     166.      38.   1292.00
      .22      .23     3.56      .00     .045     .035     .045     .000  1284.20  9664.35
  .000704     530.     530.     530.        2       22        0      .00   483.71 10148.06
0
FLOW DISTRIBUTION FOR SECNO=    285.70          CWSEL=   1291.27

STA=    9664.    9710.   10170.
  PER Q=        .0     100.0
   AREA=       6.1    2468.6
    VEL=        .2       3.6

*SECNO 291.100
1
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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



3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1296.00 ELREA=     1296.00

          51TH AVENUE EXTENTION - UPDATED SURVEY INFO.
   291.10     6.92  1293.22  1293.22  1293.05  1294.54     1.32      .97      .34  1293.00
    8750.       0.    8750.       0.       0.     949.       0.     187.      43.   1296.00
      .24      .00     9.22      .00     .045     .035     .045     .000  1286.30  9720.00
  .011252     540.     540.     540.        0        6        0      .00   323.08 10043.08
0
FLOW DISTRIBUTION FOR SECNO=    291.10          CWSEL=   1293.22

STA=    9720.   10057.
  PER Q=     100.0
   AREA=     948.8
    VEL=       9.2

*SECNO 296.300
```

```
3470 ENCROACHMENT STATIONS=    9800.0   10500.0  TYPE=     1  TARGET=   -9800.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1296.50 ELREA=     1299.60

   296.30     7.24  1298.24  1297.82  1298.13  1299.49     1.25     4.95      .01  1296.50
    8700.     315.    8385.       0.      73.     921.       0.     199.      46.   1299.60
      .26     4.29     9.11      .00     .045     .035     .045     .000  1291.00  9800.00
  .008017     330.     528.     680.        3        5        0      .00   286.91 10086.91
0
FLOW DISTRIBUTION FOR SECNO=    296.30          CWSEL=   1298.24

STA=    9800.    9840.   10090.
  PER Q=      3.6     96.4
   AREA=     73.3    920.6
    VEL=      4.3      9.1

*SECNO 299.400
1
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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

3280 CROSS SECTION    299.40 EXTENDED       .32 FEET


3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1295.50 ELREA=     1300.70

          SECTION 299.4 - ADDED SECTION USING NEW SURVEY DATA
   299.40     8.11  1300.11  1298.29  1299.43  1300.84      .72     1.29      .05  1295.50
    8700.    2452.    6248.       0.     613.     817.       0.     207.      49.   1300.70
      .27     4.00     7.64      .00     .045     .035     .045     .000  1292.00  9600.00
  .002547     310.     310.     310.        2       12        0      .00   346.16  9978.73
0
FLOW DISTRIBUTION FOR SECNO=    299.40          CWSEL=   1300.11

STA=    9600.    9650.    9660.    9668.    9686.    9744.    9762.    9770.    9778.    9826.    9859.    9980.
  PER Q=       .4      1.3      3.0      2.0       .1      1.2      1.4      1.4      9.7      7.7     71.8
   AREA=     28.4     33.7     47.7     52.7      6.7     38.1     29.7     30.5    197.7    147.4    817.5
    VEL=      1.1      3.5      5.5      3.3       .7      2.7      4.0      4.1      4.3      4.5      7.6

*SECNO 301.600

3470 ENCROACHMENT STATIONS=    9870.0   10550.0  TYPE=     1  TARGET=   -9870.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1298.00 ELREA=     1301.50

   301.60     6.75  1300.75  1298.48  1300.54  1301.39      .64      .55      .01  1298.00
```

```
    8650.      74.    8576.       0.      28.    1333.       0.     214.      50.   1301.50
      .28     2.68     6.43      .00     .045     .035     .045     .000  1294.00  9870.00
  .002349     250.     220.     130.       2       11        0      .00   250.10 10120.10
0
 FLOW DISTRIBUTION FOR SECNO=    301.60          CWSEL=   1300.75

 STA=    9870.    9880.   10130.
   PER Q=        .9     99.1
    AREA=      27.6   1333.1
     VEL=       2.7      6.4


1
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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


 CCHV=    .100 CEHV=    .300
 *SECNO 306.550
           BEGIN OVERLAND HILLS
    306.55     5.44  1301.82  1299.73  1301.59  1302.40      .58     1.00      .01  1305.40
     8600.       0.    8600.       0.       0.    1407.       0.     230.      53.   1305.40
       .30      .00     6.11      .00     .030     .030     .030     .000  1296.38  9861.30
   .001759     505.     493.     465.       2        8        0      .00   277.39 10138.70
0
 FLOW DISTRIBUTION FOR SECNO=    306.55          CWSEL=   1301.82

 STA=    9861.   10151.
   PER Q=    100.0
    AREA=   1407.3
     VEL=      6.1

 *SECNO 306.900
    306.90     5.49  1301.89  1299.75  1301.68  1302.46      .57      .06      .00  1305.42
     8600.       0.    8600.       0.       0.    1422.       0.     231.      53.   1305.42
       .30      .00     6.05      .00     .030     .030     .030     .000  1296.40  9861.13
   .001703      35.      35.      35.       0       14        0      .00   277.75 10138.87
0
 FLOW DISTRIBUTION FOR SECNO=    306.90          CWSEL=   1301.89

 STA=    9861.   10151.
   PER Q=    100.0
    AREA=   1421.6
     VEL=      6.0

 *SECNO 308.050
    308.05     5.63  1302.11  1299.83  1301.94  1302.65      .54      .19      .00  1305.50
     8600.       0.    8600.       0.       0.    1461.       0.     235.      54.   1305.50
       .31      .00     5.88      .00     .030     .030     .030     .000  1296.48  9860.63
   .001561     115.     115.     115.       2       14        0      .00   278.73 10139.37
0
 FLOW DISTRIBUTION FOR SECNO=    308.05          CWSEL=   1302.11

 STA=    9861.   10151.
```

```
 PER Q=    100.0
  AREA=   1461.4
   VEL=      5.9

1
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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 310.550
   310.55     5.79  1302.52  1300.08  1302.40  1303.03      .51      .37      .00  1305.75
    8600.      0.    8600.       0.       0.    1505.       0.     244.      56.   1305.75
      .32     .00     5.71      .00     .030     .030     .030     .000  1296.73  9860.09
  .001422    250.     250.     250.        0       14        0      .00   279.81 10139.91
0
 FLOW DISTRIBUTION FOR SECNO=    310.55          CWSEL=   1302.52

 STA=    9860.   10151.
  PER Q=    100.0
   AREA=   1505.5
    VEL=      5.7

1
 PROFILE FOR STREAM    LAST PROFILE EXIST


 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


 ELEVATION  1250.     1260.     1270.     1280.     1290.     1300.     1310.     1320.     1330.     1340.
    SECNO   CUMDIS

   227.90     0.  .  I     C WE    M .        .        .        .        .        .        .        .        .
             50.  .  I     C W E   M .        .        .        .        .        .        .        .        L
            100.  .   I    .C WE   M .        .        .        .        .        .        .        .        L
            150.  .   I    .C WE   M .        .        .        .        .        .        .        .        L
            200.  .    I   . CW E  M .        .        .        .        .        .        .        .        L
            250.  .    I   . CW E  M .        .        .        .        .        .        .        .        L
            300.  .    I   .  W  E M .        .        .        .        .        .        .        .        L
   231.10   350.  .     I  .  W  E M .        .        .        .        .        .        .        .        L
   231.20   400.  .     I  .  CW E M .        .        .        .        .        .        .        .        R
   231.50   450.  .     I  .  CW LEM .        .        .        .        .        .        .        .        R
   231.60   500.  .     I  .  C W E  . M      .        .        .        .        .        .        .        L
   233.00   550.  .     I  .    WL E . M      .        .        .        .        .        .        .        .
            600.  .      I .    CW E . M      .        .        .        .        .        .        .        .
            650.  .      I .     WL E. M      .        .        .        .        .        .        .        .
            700.  .      I .     CW E.M       .        .        .        .        .        .        .        .
            750.  .      I .     CW E.M       .        .        .        .        .        .        .        .
            800.  .       I.     CWLE.M       .        .        .        .        .        .        .        .
            850.  .       I.     CRWE.M       .        .        .        .        .        .        .        .
            900.  .       I.     C W EM       .        .        .        .        .        .        .        .
            950.  .       I.     C RWE        .        .        .        .        .        .        .        .
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        1000. .        I     C RWE        .        .        .        .        .        .        .        .
238.30  1050. .        I      C RWE       .        .        .        .        .        .        .        .
        1100. .        I      C  WE       .        .        .        .        .        .        .        L
        1150. .        .I     C  WE       .        .        .        .        .        .        .        L
        1200. .        .I      C WE       .        .        .        .        .        .        .        L
        1250. .        . I     C WEM      .        .        .        .        .        .        .        L
        1300. .        . I     C W E      .        .        .        .        .        .        .        L
        1350. .        . I      C.WE      .        .        .        .        .        .        .        L
        1400. .        .  I     C.WEM     .        .        .        .        .        .        .        L
        1450. .        .  I     C.WEM     .        .        .        .        .        .        .        L
        1500. .        .  I      CWEM     .        .        .        .        .        .        .        L
        1550. .        .   I     CW EM    .        .        .        .        .        .        .        L
243.60  1600. .        .   I     CW EM    .        .        .        .        .        .        .        L
        1650. .        .   I     .W EM    .        .        .        .        .        .        .        L
        1700. .        .   I     .CWEM    .        .        .        .        .        .        .        L
        1750. .        .    I    .CW EM   .        .        .        .        .        .        .        L
        1800. .        .    I    . W EM   .        .        .        .        .        .        .        L
        1850. .        .    I    . CWEM   .        .        .        .        .        .        .        L
        1900. .        .    I    . CW E   .        .        .        .        .        .        .        L
        1950. .        .    I    .  W E   .        .        .        .        .        .        .        L
        2000. .        .     I   .  CWEM  .        .        .        .        .        .        .        L
        2050. .        .     I   .   WEM  .        .        .        .        .        .        .        L
        2100. .        .     I   .   W E  .        .        .        .        .        .        .        L
248.90  2150. .        .     I   .   CWE  .        .        .        .        .        .        .        .
        2200. .        .     I   .   CWE  .        .        .        .        .        .        .        .
        2250. .        .     I   .   RWE  .        .        .        .        .        .        .        .
        2300. .        .      I  .   RW E .        .        .        .        .        .        .        .
        2350. .        .      I  .   RCWE .        .        .        .        .        .        .        .
        2400. .        .      I  .   RCWE .        .        .        .        .        .        .        .
        2450. .        .      I  .   R WE .        .        .        .        .        .        .        .
        2500. .        .      I  .   R WME .       .        .        .        .        .        .        .
        2550. .        .       I .   R CWE .       .        .        .        .        .        .        .
        2600. .        .       I .   R CWE .       .        .        .        .        .        .        .
254.10  2650. .        .       I .   R  WME.       .        .        .        .        .        .        .
        2700. .        .       I .   R  WME.       .        .        .        .        .        .        .
        2750. .        .        I.    R CWE.       .        .        .        .        .        .        .
        2800. .        .        I.    R CWE.       .        .        .        .        .        .        .
        2850. .        .         I     RLWEM       .        .        .        .        .        .        .
        2900. .        .         I     R CWE       .        .        .        .        .        .        .
        2950. .        .         .I    R CWE       .        .        .        .        .        .        .
        3000. .        .         .I     RLWEM      .        .        .        .        .        .        .
        3050. .        .         . I    RLWEM      .        .        .        .        .        .        .
        3100. .        .         . I    RLCWE      .        .        .        .        .        .        .
259.30  3150. .        .         .  I    RLWEM     .        .        .        .        .        .        .
        3200. .        .         .  I     LWEM     .        .        .        .        .        .        R
        3250. .        .         .   I    LWEM     .        .        .        .        .        .        R
        3300. .        .         .   I    LCWEM    .        .        .        .        .        .        R
        3350. .        .         .   I    LCWEM    .        .        .        .        .        .        R
        3400. .        .         .   I    LCWEM    .        .        .        .        .        .        R
        3450. .        .         .    I    LWEM    .        .        .        .        .        .        R
        3500. .        .         .    I    LCWE    .        .        .        .        .        .        R
        3550. .        .         .    I    LCWEM   .        .        .        .        .        .        R
        3600. .        .         .     I   LCWEM   .        .        .        .        .        .        R
        3650. .        .         .     I   LCWEM   .        .        .        .        .        .        R
264.60  3700. .        .         .     I   .LCEM   .        .        .        .        .        .        R
        3750. .        .         .     I   .LCWE   .        .        .        .        .        .        R
        3800. .        .         .     I   .LCWE   .        .        .        .        .        .        R
        3850. .        .         .     I   .LCWEM  .        .        .        .        .        .        R
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        3900.  .         .         .    I   .C WEM    .         .         .         .         .         .         R
        3950.  .         .         .    I   .C WEM    .         .         .         .         .         .         R
        4000.  .         .         .    I   .C  EM    .         .         .         .         .         .         R
        4050.  .         .         .    I   .CL EM    .         .         .         .         .         .         R
        4100.  .         .         .    I   .CL WEM   .         .         .         .         .         .         R
        4150.  .         .         .    I   .CL WEM   .         .         .         .         .         .         R
        4200.  .         .         .    I   .CL WEM   .         .         .         .         .         .         R
269.90  4250.  .         .         .    I   .CL WEM   .         .         .         .         .         .         .
        4300.  .         .         .    I   . CL EM   .         .         .         .         .         .         .
        4350.  .         .         .     I  . CL WEM  .         .         .         .         .         .         .
        4400.  .         .         .     I  .  C WEM  .         .         .         .         .         .         .
        4450.  .         .         .     I  .  CLWE M .         .         .         .         .         .         .
        4500.  .         .         .     I  .   C WEM .         .         .         .         .         .         .
        4550.  .         .         .      I .    CWEM .         .         .         .         .         .         .
        4600.  .         .         .      I .    CWE M.         .         .         .         .         .         .
        4650.  .         .         .      I .    RW EM.         .         .         .         .         .         .
        4700.  .         .         .       I.     CWEM.         .         .         .         .         .         .
275.10  4750.  .         .         .       I.     RW EM         .         .         .         .         .         .
        4800.  .         .         .       I.      W EM         .         .         .         .         .         R
        4850.  .         .         .       I.      CWEM         .         .         .         .         .         R
        4900.  .         .         .        I      CWEM         .         .         .         .         .         R
        4950.  .         .         .        I      CWEM         .         .         .         .         .         R
        5000.  .         .         .        I      CW E         .         .         .         .         .         R
        5050.  .         .         .        I      C WE         .         .         .         .         .         R
        5100.  .         .         .        .I     LCWE         .         .         .         .         .         R
        5150.  .         .         .        .I     LCWE         .         .         .         .         .         R
        5200.  .         .         .        .I     LC E         .         .         .         .         .         R
        5250.  .         .         .        .I     LC WE        .         .         .         .         .         R
280.40  5300.  .         .         .        . I    LC WE        .         .         .         .         .         R
        5350.  .         .         .        . I     C WE        .         .         .         .         .         R
        5400.  .         .         .        . I     C WE        .         .         .         .         .         R
        5450.  .         .         .        . I     C WE        .         .         .         .         .         R
        5500.  .         .         .        .  I    CL.EM       .         .         .         .         .         R
        5550.  .         .         .        .  I    CL.EM       .         .         .         .         .         R
        5600.  .         .         .        .  I   C L.EM       .         .         .         .         .         R
        5650.  .         .         .        .  I   C  LE M      .         .         .         .         .         R
        5700.  .         .         .        .   I  C  LE M      .         .         .         .         .         R
        5750.  .         .         .        .   I  C  LE M      .         .         .         .         .         R
285.70  5800.  .         .         .        .   I  C  .ER M     .         .         .         .         .         .
        5850.  .         .         .        .   I   C .WE  M    .         .         .         .         .         .
        5900.  .         .         .        .    I  C .LER M    .         .         .         .         .         .
        5950.  .         .         .        .    I   C. ER  M   .         .         .         .         .         .
        6000.  .         .         .        .    I   C. WE  M   .         .         .         .         .         .
        6050.  .         .         .        .    I    C WER  M  .         .         .         .         .         .
        6100.  .         .         .        .    I    .CWER  M  .         .         .         .         .         .
        6150.  .         .         .        .     I   .CLE R  M .         .         .         .         .         .
        6200.  .         .         .        .     I   . CWER  M .         .         .         .         .         .
        6250.  .         .         .        .     I   . CWER   M.         .         .         .         .         .
        6300.  .         .         .        .     I   .  WE R   M         .         .         .         .         .
291.10  6350.  .         .         .        .     I   .  W ER   M         .         .         .         .         .
        6400.  .         .         .        .      I  .  LWER   M         .         .         .         .         .
        6450.  .         .         .        .      I  .   WE R  M         .         .         .         .         .
        6500.  .         .         .        .       I .   LWER  M         .         .         .         .         .
        6550.  .         .         .        .       I .   LWER  M         .         .         .         .         .
        6600.  .         .         .        .        I.    CWER M         .         .         .         .         .
        6650.  .         .         .        .        I.    LWER M         .         .         .         .         .
        6700.  .         .         .        .        I.    LCWE M         .         .         .         .         .
        6750.  .         .         .        .         I     LWERM         .         .         .         .         .
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         6800.  .         .         .         .         I     LW EM        .         .         .         .         .
         6850.  .         .         .         .         .I    L WEM        .         .         .         .         .
  296.30 6900.  .         .         .         .         .I     LWER        .         .         .         .         .
         6950.  .         .         .         .         .I    L CWE        .         .         .         .         .
         7000.  .         .         .         .         .I    L CWE        .         .         .         .         .
         7050.  .         .         .         .         .I    L CWE        .         .         .         .         .
         7100.  .         .         .         .         . I   L CWE        .         .         .         .         .
         7150.  .         .         .         .         . I   L C WE       .         .         .         .         .
  299.40 7200.  .         .         .         .         . I   L C WE       .         .         .         .         .
         7250.  .         .         .         .         . I   L C WE       .         .         .         .         .
         7300.  .         .         .         .         .  I   LC WE       .         .         .         .         .
         7350.  .         .         .         .         .  I   LC .E       .         .         .         .         .
  301.60 7400.  .         .         .         .         .   I   C .ER      .         .         .         .         .
         7450.  .         .         .         .         .   I    C.ER      .         .         .         .         .
         7500.  .         .         .         .         .   I    C.WEM     .         .         .         .         .
         7550.  .         .         .         .         .    I   CLWER     .         .         .         .         .
         7600.  .         .         .         .         .    I   C.WER     .         .         .         .         .
         7650.  .         .         .         .         .    I   C.WERM    .         .         .         .         .
         7700.  .         .         .         .         .    I   C.WE R    .         .         .         .         .
         7750.  .         .         .         .         .     I  C. ELR    .         .         .         .         .
         7800.  .         .         .         .         .     I  C. E LR   .         .         .         .         .
         7850.  .         .         .         .         .     I   C E  L   .         .         .         .         .
  306.55 7900.  .         .         .         .         .     I   C E  L   .         .         .         .         .
  306.90 7950.  .         .         .         .         .     I   C E  L   .         .         .         .         .
         8000.  .         .         .         .         .     I   C WE L   .         .         .         .         .
  308.05 8050.  .         .         .         .         .     I   C WE  L  .         .         .         .         .
         8100.  .         .         .         .         .      I  C WE  L  .         .         .         .         .
         8150.  .         .         .         .         .      I  C WE  L  .         .         .         .         .
         8200.  .         .         .         .         .      I  C WE  L  .         .         .         .         .
         8250.  .         .         .         .         .      I  C WE  L  .         .         .         .         .
  310.55 8300.  .         .         .         .         .      I  C  E  L  .         .         .         .         .
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THIS RUN EXECUTED 05/04/89 15:40:30

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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 APRIL 1985
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

SKUNK CREEK EXIST

SUMMARY PRINTOUT

SECNO	Q	CWSEL	SSTA	ENDST	TOPWID
227.900	9520.00	1262.34	9827.17	10625.40	741.84
227.900	9520.00	1262.43	9880.00	10150.00	269.10

*	231.100	9510.00	1264.16	9920.02	10536.94	548.08
*	231.100	9510.00	1262.82	9930.00	10034.98	104.98
*	231.200	9510.00	1264.00	9920.00	10035.00	105.81
	231.200	9510.00	1264.34	9920.00	10035.00	105.81
	231.500	9510.00	1264.09	9920.00	10035.00	105.81
	231.500	9510.00	1264.43	9920.00	10035.00	105.81
	231.600	9510.00	1266.21	9910.00	10870.97	960.97
	231.600	9510.00	1265.07	9933.00	10050.00	117.00
*	233.000	9460.00	1266.73	9673.50	10451.12	777.63
*	233.000	9460.00	1265.33	9947.33	10069.66	122.33
	238.300	9400.00	1269.34	9920.55	11290.59	1370.04
	238.300	9400.00	1269.87	9910.00	10200.00	290.00
*	243.600	9340.00	1270.24	9952.86	10119.87	167.01
	243.600	9340.00	1271.16	9925.34	10127.94	202.60
	248.900	9280.00	1274.87	9873.73	11260.51	1386.79
	248.900	9280.00	1274.69	9920.07	10200.00	279.93
*	254.100	9220.00	1277.18	9888.06	11380.15	1492.09
	254.100	9220.00	1277.11	9945.00	10300.00	355.00
*	259.300	9160.00	1279.48	9612.81	10889.14	1276.33
	259.300	9160.00	1280.01	9865.00	10300.00	435.00

1

	SECNO	Q	CWSEL	SSTA	ENDST	TOPWID
	264.600	9100.00	1281.92	9618.90	10711.65	1092.76
	264.600	9100.00	1282.51	9905.00	10200.00	295.00
	269.900	9040.00	1283.43	9702.87	10355.55	652.68
	269.900	9040.00	1284.41	9830.00	10113.00	283.00
*	275.100	8980.00	1286.61	9428.77	10221.53	792.76
*	275.100	8980.00	1286.97	9800.00	10150.00	350.00
	280.400	8920.00	1289.28	9782.74	10146.94	364.21
	280.400	8920.00	1290.15	9880.00	10158.66	278.66
	285.700	8800.00	1290.57	9718.57	10127.14	408.57
	285.700	8800.00	1291.27	9664.35	10148.06	483.71
*	291.100	8750.00	1293.05	9720.00	10042.26	322.26
*	291.100	8750.00	1293.22	9720.00	10043.08	323.08
	296.300	8700.00	1298.13	9430.58	10086.67	656.08
	296.300	8700.00	1298.24	9800.00	10086.91	286.91

299.400	8700.00	1299.43	9637.06	9977.23	278.72
299.400	8700.00	1300.11	9600.00	9978.73	346.16
301.600	8650.00	1300.54	9757.39	10117.20	359.81
301.600	8650.00	1300.75	9870.00	10120.10	250.10
306.550	8600.00	1301.59	9862.09	10137.91	275.82
306.550	8600.00	1301.82	9861.30	10138.70	277.39
306.900	8600.00	1301.68	9861.89	10138.11	276.21
306.900	8600.00	1301.89	9861.13	10138.87	277.75
308.050	8600.00	1301.94	9861.23	10138.77	277.53
308.050	8600.00	1302.11	9860.63	10139.37	278.73
310.550	8600.00	1302.40	9860.51	10139.49	278.99
310.550	8600.00	1302.52	9860.09	10139.91	279.81

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SUMMARY OF ERRORS AND SPECIAL NOTES

```
CAUTION  SECNO=   231.100  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   231.100  PROFILE= 1  MINIMUM SPECIFIC ENERGY
CAUTION  SECNO=   231.100  PROFILE= 2  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   231.100  PROFILE= 2  MINIMUM SPECIFIC ENERGY

CAUTION  SECNO=   231.200  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   231.200  PROFILE= 1  MINIMUM SPECIFIC ENERGY

CAUTION  SECNO=   233.000  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   233.000  PROFILE= 1  MINIMUM SPECIFIC ENERGY
CAUTION  SECNO=   233.000  PROFILE= 2  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   233.000  PROFILE= 2  MINIMUM SPECIFIC ENERGY

CAUTION  SECNO=   243.600  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   243.600  PROFILE= 1  MINIMUM SPECIFIC ENERGY

CAUTION  SECNO=   254.100  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   254.100  PROFILE= 1  MINIMUM SPECIFIC ENERGY

CAUTION  SECNO=   259.300  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   259.300  PROFILE= 1  MINIMUM SPECIFIC ENERGY

CAUTION  SECNO=   275.100  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   275.100  PROFILE= 1  MINIMUM SPECIFIC ENERGY
CAUTION  SECNO=   275.100  PROFILE= 2  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   275.100  PROFILE= 2  MINIMUM SPECIFIC ENERGY

CAUTION  SECNO=   291.100  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   291.100  PROFILE= 1  MINIMUM SPECIFIC ENERGY
CAUTION  SECNO=   291.100  PROFILE= 2  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   291.100  PROFILE= 2  MINIMUM SPECIFIC ENERGY
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05/04/89 15:37:55 PAGE 33

FLOODWAY DATA, SKUNK CREEK EXIST
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WATER SURFACE ELEVATION WITHOUT FLOODWAY	DIFFERENCE
227.900	270.	1414.	6.7	1262.4	1262.3	.1
231.100	105.	663.	14.3	1263.0	1264.2	-1.2
231.200	115.	829.	11.5	1264.3	1264.0	.3
231.500	115.	817.	11.6	1264.4	1264.1	.3
231.600	117.	931.	10.2	1265.2	1266.2	-1.0
233.000	122.	703.	13.5	1265.4	1266.7	-1.3
238.300	290.	1505.	6.2	1269.8	1269.3	.5
243.600	203.	936.	10.0	1271.1	1270.2	.9
248.900	280.	1148.	8.1	1274.8	1274.9	-.1
254.100	355.	1127.	8.2	1277.2	1277.2	.0
259.300	435.	1376.	6.7	1280.0	1279.5	.5
264.600	295.	1176.	7.7	1282.5	1281.9	.6
269.900	283.	1678.	5.4	1284.4	1283.4	1.0
275.100	350.	1028.	8.7	1287.0	1286.6	.4
280.400	279.	1409.	6.3	1290.2	1289.3	.9
285.700	484.	2475.	3.6	1291.3	1290.6	.7
291.100	323.	949.	9.2	1293.3	1293.1	.2
296.300	287.	994.	8.8	1298.2	1298.1	.1
299.400	379.	1430.	6.1	1300.1	1299.4	.7
301.600	250.	1361.	6.4	1300.7	1300.5	.2
306.550	277.	1407.	6.1	1301.8	1301.6	.2
306.900	278.	1422.	6.0	1301.9	1301.7	.2
308.050	279.	1461.	5.9	1302.1	1301.9	.2
310.550	280.	1505.	5.7	1302.5	1302.4	.1

1

05/04/89 15:40:37 PAGE 1

THIS RUN EXECUTED 05/04/89 15:40:37

```
**************************************************
  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 APRIL 1985
**************************************************
```

COMPUTER PRINTOUT 3

PROPOSED CHANNELIZATION WITH PRESENT FLOW

```
1*****************************************************
 *  WATER SURFACE PROFILES                           *
 *  VERSION OF NOVEMBER 1976                         *
 *  UPDATED MAY 1984                                 *
 *  IBM-PC-XT VERSION                                *
 *  RUN DATE  05/22/89  TIME  17:46:03               *
 *****************************************************
```

```
*********************************
* U.S. ARMY CORPS OF ENGINEERS
* THE HYDROLOGIC ENGINEERING CENTE
* 609 SECOND STREET, SUITE D
* DAVIS, CALIFORNIA 95616
* (916) 440-2105 (FTS) 448-2125
*********************************
```

```
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
```

1

05/22/89 17:46:04 PAGE 1

THIS RUN EXECUTED 05/22/89 17:46:25

```
*************************************************
  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 APRIL 1985
*************************************************
```

```
C
T1 SKUNK CREEK AT 51ST AVE
T2 SECTION 280.4 TO 310.55
T3       SKUNK CREEK PROPOSED    TOPO 10/5/88 11/20/81 2/4/80 6/6/74

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0.        4.        0.        0.   .003394       .00        .0        0.  1289.800      .000

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      1.000      .000    -1.000      .000      .000      .000    -1.000      .000      .000    15.000

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38.000    43.000     1.000    53.000    54.000     4.000   110.000   200.000      .000      .000


QT      4.000   2080.000   5300.000   8920.000   6920.000       .000       .000       .000       .000       .000
NC       .045       .045       .035       .100       .300       .070       .000       .000       .000       .000
ET    280.400       .000       .000       .000      9.100       .000       .000       .000   9880.000  10159.000
          DATA FOR THIS ANALYSIS IS BASED ON COE INPUT AND VERIFIED
```

```
          BY COE OUTPUT INFORMATION AS OF 11/19/84, EXCEPT FOR
          RECENT CHANNELIZATION OF SKUNK CREEK THROUGH OVERLAND
          HILLS - CROSS SECTIONS 306.55 TO 310.55
          ADD PROPOSED CHANNELIZATION SECTION 288.1 TO 299.4
X1     280.400     20.000   9885.000  10170.000       .000       .000       .000       .000       .000       .000
X3      10.000       .000       .000       .000       .000       .000       .000       .000       .000       .000
GR    1292.000   9000.000  1290.000   9500.000  1290.000   9550.000  1290.000   9595.000  1290.000   9780.000
GR    1286.000   9795.000  1286.000   9865.000  1287.300   9885.000  1286.000   9900.000  1282.000   9940.000
GR    1281.600  10015.000  1282.000  10020.000  1286.000  10050.000  1288.000  10090.000  1288.000  10130.000
GR    1291.000  10170.000  1290.000  10315.000  1290.000  10320.000  1290.000  10370.000  1290.500  10425.000

QT       4.000   2080.000  5300.000   8800.000  8800.000       .000       .000       .000       .000       .000
X1     285.700     10.000  9710.000  10170.000   530.000   530.000   530.000       .000       .000       .000
X3      10.000       .000       .000       .000       .000       .000       .000       .000       .000       .000
GR    1296.000   8900.000  1294.000   9200.000  1291.000   9710.000  1290.000   9730.000  1284.200   9770.000
GR    1284.200  10050.000  1286.000  10080.000  1290.000  10110.000  1292.000  10170.000  1294.000  10560.000

NC       .045       .045       .030       .100       .300       .000       .000       .000       .000       .000
          BEGIN PROPOSED CHANNELIZATION
X1     288.100      4.000  9925.000  10095.000   240.000   240.000   240.000       .000       .000       .000
GR    1295.500   9925.000  1285.500   9955.000  1285.500  10065.000  1295.500  10095.000       .000       .000
1
 05/22/89    17:46:04                                                                                    PAGE    2


X1     290.800      4.000  9897.500  10067.500   270.000   270.000   270.000       .000       .000       .000
GR    1296.500   9897.500  1286.500   9927.500  1286.500  10037.500  1296.500  10067.500       .000       .000

NC       .045       .045       .030       .300       .500       .000       .000       .000       .000       .000
QT       4.000   2080.000  5300.000   8750.000  8750.000       .000       .000       .000       .000       .000
X1     291.400     16.000  9912.500  10052.500    60.000    60.000    60.000       .000       .000       .000
X3      10.000       .000       .000       .000       .000       .000       .000       .000       .000       .000
GR    1300.000   8250.000  1298.000   8730.000  1296.800   9205.000  1296.800   9912.500  1286.800   9927.500
GR    1286.800  10037.500  1296.800  10052.500  1296.800  10068.000  1296.800  10282.000  1297.000  10347.000
GR    1297.000  10410.000  1294.000  10930.000  1296.000  10975.000  1296.000  11105.000  1298.000  11170.000
GR    1300.000  12150.000       .000       .000       .000       .000       .000       .000       .000       .000

QT       4.000   2080.000  5300.000   8750.000  8750.000       .000       .000       .000       .000       .000
          51TH AVENUE BRIDGE
X1     292.400     10.000  9905.000  10055.000    74.000    74.000    74.000       .000       .000       .000
BT      -6.000   9905.000  1301.000   1298.000  9914.000   1301.000  1298.000   9980.500  1301.000   1298.000
BT       .000   9980.600  1301.000   1287.300  9982.400   1301.000  1287.300   9982.500  1301.000   1298.000
BT       .000  10050.600  1301.000   1298.000 10055.000   1301.000  1298.000       .000       .000       .000
GR    1296.300   9905.000  1296.300   9914.000  1287.300   9927.500  1287.300   9980.500  1287.300   9980.600
GR    1287.300   9982.400  1287.300   9982.500  1287.300  10037.500  1296.000  10050.600  1296.000  10055.000

NC       .045       .045       .030       .100       .300       .000       .000       .000       .000       .000
QT       4.000   2080.000  5300.000   8750.000  8750.000       .000       .000       .000       .000       .000
X1     292.700      4.000  9900.500  10064.500    30.000    30.000    30.000       .000       .000       .000
GR    1296.500   9900.500  1287.500   9927.500  1287.500  10037.500  1296.500  10064.500       .000       .000

X1     296.300      4.000  9928.000  10092.000   360.000   360.000   360.000       .000       .000       .000
GR    1298.900   9928.000  1289.900   9955.000  1289.900  10065.000  1298.900  10092.000       .000       .000

NC       .045       .045       .035       .100       .300       .000       .000       .000       .000       .000
QT       4.000   2040.000  5100.000   8700.000  8700.000       .000       .000       .000       .000       .000
X1     299.400     25.000  9859.000   9983.000   310.000   310.000   310.000       .000       .000       .000
```

```
X3     10.000      .000      .000      .000      .000      .000      .000      .000      .000      .000
GR   1299.600   9600.000   1299.300   9630.000   1294.200   9660.000   1294.100   9668.000   1302.000   9691.000
GR   1300.200   9714.000   1299.600   9744.000   1296.400   9762.000   1296.400   9770.000   1296.200   9778.000
GR   1295.800   9826.000   1295.500   9859.000   1293.900   9869.000   1292.600   9880.000   1292.200   9890.000
GR   1292.000   9892.000   1292.000   9906.000   1292.200   9907.000   1292.900   9918.000   1292.000   9947.000
GR   1292.400   9949.000   1293.500   9960.000   1295.200   9966.000   1300.700   9980.000   1302.500  10018.000

Q1      4.000   2040.000   5100.000   8650.000   8650.000      .000      .000      .000      .000      .000
ET    301.600      .000      .000      .000      9.100      .000      .000      .000   9870.000      .000
X1    301.600     13.000   9890.000  10130.000    250.000    130.000    227.000      .000      .000      .000
X3     10.000      .000      .000      .000      .000      .000      .000      .000      .000      .000
GR   1302.000   9875.000   1301.500   9735.000   1300.000   9770.000   1298.000   9840.000   1298.000   9880.000
GR   1296.000   9890.000   1294.000   9965.000   1294.000  10040.000   1296.000  10080.000   1296.000  10100.000
GR   1300.000  10110.000   1301.500  10130.000   1302.000  10550.000      .000      .000      .000      .000

QT      4.000   2040.000   5100.000   8600.000   8600.000      .000      .000      .000      .000      .000
NC      .030      .030      .030      .120      .300      .000      .000      .000      .000      .000
1
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X1    306.550      4.000   9849.000  10151.000    505.000    465.000    495.000      .000      .000      .000
GR   1305.400   9849.000   1296.380   9880.000   1296.380  10120.000   1305.400  10151.000      .000      .000

          BEGIN OVERLAND HILLS
X1    306.900      .000   9849.000  10151.000     35.000     35.000     35.000      .000      .000      .000

X1    308.050      .000   9849.000  10151.000    115.000    115.000    115.000      .000      .000      .000

X1    310.550      .000   9849.000  10151.000    250.000    250.000    250.000      .000      .250      .000
EJ      .000      .000      .000      .000      .000      .000      .000      .000      .000      .000
*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
1
 05/22/89    17:46:04                                                                                PAGE    4


   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        NL        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



CCHV=    .100 CEHV=    .300
*SECNO 280.400

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1287.30 ELREA=     1291.00

          DATA FOR THIS ANALYSIS IS BASED ON COE INPUT AND VERIFIED
          BY COE OUTPUT INFORMATION AS OF 11/19/84, EXCEPT FOR
          RECENT CHANNELIZATION OF SKUNK CREEK THROUGH OVERLAND
          HILLS - CROSS SECTIONS 306.55 TO 310.55
          ADD PROPOSED CHANNELIZATION SECTION 288.1 TO 299.4
   280.40     7.67  1289.27  1287.79  1289.80  1289.90      .63      .20      .00  1287.30
    8920.    1214.     7706.       0.     301.    1158.       0.       0.       0.   1291.00
      .00     4.03     6.65      .00     .045     .035     .045     .020  1281.60  9782.74
```

```
  .003396      0.      0.      0.      0      17       5     .20   364.19 10146.93
0
 FLOW DISTRIBUTION FOR SECNO=   280.40          CWSEL=   1269.27

 STA=    9783.    9795.    9865.    9885.   10170.
   PER Q=       .6     10.9      2.1     86.4
    AREA=     20.0    228.9     52.4   1158.1
     VEL=      2.6      4.2      3.7      6.7

 *SECNO 285.700

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1291.00 ELREA=     1292.00

    285.70     6.37  1290.57  1287.17      .00  1292.62      .26      .69      .04  1291.00
     8800.       0.    8800.       0.       0.    2170.       0.      22.       5.   1292.00
       .04      .00     4.06      .00     .045     .035     .045     .000  1284.20  9718.68
   .002986     530.     530.     530.        2       18        0      .00   408.30 10126.98
0
 FLOW DISTRIBUTION FOR SECNO=   285.70          CWSEL=   1290.57

 STA=    9719.   10170.
   PER Q=    100.0
    AREA=   2170.1
     VEL=      4.1

 CCHV=    .100 CEHV=    .300
1
  05/22/89    17:46:04                                                                  PAGE    5


    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        CLOSS    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 288.100

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
          BEGIN PROPOSED CHANNELIZATION
    288.10     5.52  1291.02  1291.02      .00  1293.48     2.46      .52      .66  1295.50
     8800.       0.    8800.       0.       0.     699.       0.      30.       6.   1295.50
       .04      .00    12.59      .00     .045     .030     .045     .000  1285.50  9938.44
   .007932     240.     240.     240.        0       11        0      .00   143.13 10081.56
0
 FLOW DISTRIBUTION FOR SECNO=   288.10          CWSEL=   1291.02

 STA=    9938.   10095.
   PER Q=    100.0
    AREA=    698.8
     VEL=     12.6

 *SECNO 290.800

 3301 HV CHANGED MORE THAN HVINS
```

```
   290.80     7.02  1293.52  1292.02      .00  1294.94     1.42     1.35      .10  1296.50
    8800.       0.    8800.       0.       0.     921.       0.      35.       7.   1296.50
      .05      .00     9.56      .00     .045     .030     .045     .000  1286.50  9906.42
  .003441     270.     270.     270.        2        5        0      .00   152.15 10058.58
0
 FLOW DISTRIBUTION FOR SECNO=    290.80          CWSEL=   1293.52

 STA=    9906.   10068.
   PER Q=    100.0
    AREA=    920.9
     VEL=      9.6

 CCHV=    .300 CEHV=    .500
 *SECNO 291.400

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1296.80 ELREA=     1296.80

   291.40     6.76  1293.56  1292.44      .00  1295.36     1.80      .23      .19  1296.80
    8750.       0.    8750.       0.       0.     812.       0.      36.       7.   1296.80
      .05      .00    10.77      .00     .045     .030     .045     .000  1286.80  9917.36
  .004291      60.      60.      60.        2       15        0      .00   130.29 10047.64
0
1
 05/22/89    17:46:04                                                                    PAGE    6

   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      AL OB     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


 FLOW DISTRIBUTION FOR SECNO=    291.40          CWSEL=   1293.56

 STA=    9917.   10053.
   PER Q=    100.0
    AREA=    812.3
     VEL=     10.8

 *SECNO 292.400

 3370 NORMAL BRIDGE,NRD=  8 MIN ELTRD= 1301.00 MAX ELLC= 1298.00

           51TH AVENUE BRIDGE
   292.40     6.52  1293.82  1293.02      .00  1295.83     2.01      .36      .11  1296.30
    8750.       0.    8750.       0.       0.     769.       0.      38.       8.   1296.00
      .05      .00    11.38      .00     .045     .030     .045     .000  1287.30  9917.72
  .005699      74.      74.      74.        2       12        0   -12.13   129.59 10047.32
0
 FLOW DISTRIBUTION FOR SECNO=    292.40          CWSEL=   1293.82

 STA=    9918.   10055.
   PER Q=    100.0
    AREA=    768.8
     VEL=     11.4

 CCHV=    .100 CEHV=    .300
```

```
*SECNO 292.700

3301 HV CHANGED MORE THAN HVINS

   292.70     7.19  1294.69  1293.01      .00  1296.02     1.33      .12      .07  1296.50
    8750.       0.    8750.       0.       0.     945.       0.      38.       8.   1296.50
      .05      .00     9.26      .00     .045     .030     .045     .000  1287.50  9905.96
  .003152      30.      30.      30.        3       11        0      .00   153.09 10059.04
0
 FLOW DISTRIBUTION FOR SECNO=    292.70          CWSEL=   1294.69

 STA=    9906.   10065.
   PER Q=    100.0
    AREA=    944.7
     VEL=      9.3

1
  05/22/89    17:46:04                                                                    PAGE    7


    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 296.300

 3301 HV CHANGED MORE THAN HVINS

   296.30     5.78  1295.68  1295.40      .00  1297.87     2.19     1.59      .26  1298.90
    8750.       0.    8750.       0.       0.     737.       0.      45.       9.   1298.90
      .06      .00    11.88      .00     .045     .030     .045     .000  1289.90  9937.65
  .006678     360.     360.     360.        3       15        0      .00   144.71 10082.35
0
 FLOW DISTRIBUTION FOR SECNO=    296.30          CWSEL=   1295.68

 STA=    9938.   10092.
   PER Q=    100.0
    AREA=    736.7
     VEL=     11.9

 CCHV=    .100 CEHV=    .300
 *SECNO 299.400

 3265 DIVIDED FLOW


 3301 HV CHANGED MORE THAN HVINS


 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1295.50 ELREA=     1300.70

   299.40     6.51  1298.51  1298.26      .00  1300.07     1.56     2.14      .06  1295.50
    8700.    1818.    6882.       0.     344.     628.       0.      51.      10.   1300.70
      .07     5.29    10.95      .00     .045     .035     .045     .000  1292.00  9651.54
  .007119     310.     310.     310.        2        8        0      .00   254.44  9975.23
0
```

```
FLOW DISTRIBUTION FOR SECNO=    299.40          CWSEL=   1298.51

STA=    9652.    9660.    9668.    9681.    9762.    9770.    9778.    9826.    9859.    9980.
  PER Q=       .9      3.0      1.5       .4       .9      1.0      7.1      6.1     79.1
   AREA=     18.3     34.9     28.4     12.6     16.9     17.7    120.7     94.5    628.3
    VEL=      4.3      7.4      4.6      2.9      4.6      4.7      5.2      5.6     11.0

*SECNO 301.600
1
 05/22/89    17:46:04                                                                          PAGE    8


   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



3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1298.00 ELREA=     1301.50

   301.60     6.44  1300.44  1298.55      .00  1301.06      .62      .89      .09  1298.00
    8650.     506.    8144.       0.     200.    1257.       0.      57.      12.   1301.50
      .08     2.53     6.48      .00     .045     .035     .045     .000  1294.00  9759.79
  .002516     250.     220.     130.        2       19        0      .00   356.04 10115.83
0
FLOW DISTRIBUTION FOR SECNO=    301.60          CWSEL=   1300.44

STA=    9760.    9770.    9840.    9880.   10130.
  PER Q=       .0      2.5      3.4     94.1
   AREA=      2.2    100.6     97.5   1236.9
    VEL=       .6      2.1      3.0      6.5

CCHV=    .100 CEHV=    .300
*SECNO 306.550
   306.55     5.17  1301.55  1299.73      .00  1302.20      .65     1.13      .01  1305.40
    8600.       0.    8600.       0.       0.    1333.       0.      73.      16.   1305.40
      .10      .00     6.45      .00     .030     .030     .030     .000  1296.38  9862.22
  .002087     505.     495.     465.        3       11        0      .00   275.55 10137.78
0
FLOW DISTRIBUTION FOR SECNO=    306.55          CWSEL=   1301.55

STA=    9862.   10151.
  PER Q=    100.0
   AREA=   1333.2
    VEL=      6.5

*SECNO 306.900
          BEGIN OVERLAND HILLS
   306.90     5.24  1301.64  1299.75      .00  1302.27      .63      .07      .00  1305.42
    8600.       0.    8600.       0.       0.    1350.       0.      74.      16.   1305.42
      .10      .00     6.37      .00     .030     .030     .030     .000  1296.40  9862.02
  .002007      35.      35.      35.        0       14        0      .00   275.96 10137.98
0
1
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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


FLOW DISTRIBUTION FOR SECNO=    306.90          CWSEL=   1301.64

STA=    9862.   10151.
  PER Q=    100.0
   AREA=   1349.7
    VEL=      6.4

*SECNO 308.050
   308.05     5.43  1301.91  1299.83      .00  1302.49      .58      .22      .00  1305.50
    8600.       0.    8600.       0.       0.    1404.       0.      78.      16.   1305.50
      .11      .00     6.12      .00     .030     .030     .030     .000  1296.48  9861.34
  .001770     115.     115.     115.        2       14        0      .00   277.32 10138.66
0
FLOW DISTRIBUTION FOR SECNO=    308.05          CWSEL=   1301.91

STA=    9861.   10151.
  PER Q=    100.0
   AREA=   1404.4
    VEL=      6.1

*SECNO 310.550
   310.55     5.65  1302.38  1300.08      .00  1302.91      .53      .41      .00  1305.75
    8600.       0.    8600.       0.       0.    1466.       0.      86.      18.   1305.75
      .12      .00     5.87      .00     .030     .030     .030     .000  1296.73  9860.58
  .001545     250.     250.     250.        0       14        0      .00   278.05 10139.42
0
FLOW DISTRIBUTION FOR SECNO=    310.55          CWSEL=   1302.38

STA=    9861.   10151.
  PER Q=    100.0
   AREA=   1466.2
    VEL=      5.9

1
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                                                                THIS RUN EXECUTED 05/22/89   17:46:40
**************************************************
  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 APRIL 1985
**************************************************


T1 SKUNK CREEK AT 51ST AVE
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T2 SECTION 280.4 TO 310.55
T3        LAST PROFILE PROPOSED   TOPO 10/5/80 11/20/81 2/4/80 6/6/74

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0.        5.        0.        0.   .003394      .00       .0        0.  1289.800      .000

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

    15.000      .000      .000      .000      .000      .000    -1.000      .000      .000    15.000

1
 05/22/89    17:46:04                                                                                PAGE   11


   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        CLOSS   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 2

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV=    .100 CEHV=    .300
*SECNO 280.400

3470 ENCROACHMENT STATIONS=    9880.0   10159.0  TYPE=     1  TARGET=     279.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1287.30 ELREA=   100000.00

          DATA FOR THIS ANALYSIS IS BASED ON COE INPUT AND VERIFIED
          BY COE OUTPUT INFORMATION AS OF 11/19/84, EXCEPT FOR
          RECENT CHANNELIZATION OF SKUNK CREEK THROUGH OVERLAND
          HILLS - CROSS SECTIONS 306.55 TO 310.55
          ADD PROPOSED CHANNELIZATION SECTION 288.1 TO 299.4
   280.40     8.11  1289.71  1287.89  1289.27  1290.46      .75      .00      .00  1287.30
    8920.      35.    8885.       0.      13.    1276.       0.       0.       0. 100000.00
      .00     2.69     6.96      .00     .045     .035     .045     .000  1281.60  9880.00
  .003369       0.       0.       0.        0       15        4      .00   272.85 10152.85
0
FLOW DISTRIBUTION FOR SECNO=    280.40          CWSEL=   1289.71

STA=    9880.    9885.   10170.
  PER Q=        .4     99.6
   AREA=      12.9   1275.7
    VEL=       2.7      7.0

*SECNO 285.700

3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1291.00 ELREA=     1292.00

   285.70     6.86  1291.06  1287.18  1290.57  1291.28      .21      .76      .05  1291.00
    8800.       0.    8800.       0.       0.    2379.       0.      22.       4.   1292.00
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      .04      .09     3.70      .00     .045     .035     .045     .000  1284.20  9699.38
   .000782     530.     530.     530.        2       18        0      .00   442.50 10141.80
0
1
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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


 FLOW DISTRIBUTION FOR SECNO=    285.70          CWSEL=   1291.06

 STA=    9699.    9710.   10170.
   PER Q=        .0    100.0
    AREA=        .3   2378.9
     VEL=        .1      3.7

 CCHV=    .100 CEHV=    .300
 *SECNO 288.100

 3301 HV CHANGED MORE THAN HVINS

 7165 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
          BEGIN PROPOSED CHANNELIZATION
    288.10     5.52  1291.02  1291.02  1291.02  1293.48     2.47      .44      .69  1295.50
     8800.       0.    8800.       0.       0.     698.       0.      31.       6.   1295.50
       .05      .00    12.61      .00     .045     .030     .045     .000  1285.50  9938.45
   .007960     240.     240.     240.        0       15        0      .00   143.10 10081.55
0
 FLOW DISTRIBUTION FOR SECNO=    288.10          CWSEL=   1291.02

 STA=    9938.   10095.
   PER Q=    100.0
    AREA=    698.0
     VEL=     12.6

 *SECNO 290.800

 3301 HV CHANGED MORE THAN HVINS

    290.80     7.02  1293.52  1292.02  1293.52  1294.94     1.42     1.35      .11  1296.50
     8800.       0.    8800.       0.       0.     921.       0.      36.       7.   1296.50
       .05      .00     9.55      .00     .045     .030     .045     .000  1286.50  9906.41
   .003436     270.     270.     270.        2        5        0      .00   102.17 10058.59
0
 FLOW DISTRIBUTION FOR SECNO=    290.80          CWSEL=   1293.52

 STA=    9906.   10068.
   PER Q=    100.0
    AREA=    921.4
     VEL=      9.6

1
 05/22/89    17:46:04                                                                    PAGE   13
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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


 CCHV=    .300 CEHV=    .500
 *SECNO 291.400

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1296.80 ELREA=     1296.80

    291.40     6.76  1293.56  1292.44  1293.56  1295.36     1.80      .23      .19  1296.80
     8750.       0.    8750.       0.       0.     813.       0.      37.       7.   1296.80
       .05      .00    10.76      .00     .045     .030     .045     .000  1286.80  9917.35
   .004286      60.      60.      60.        2       15        0      .00   130.29 10047.65
0
 FLOW DISTRIBUTION FOR SECNO=    291.40          CWSEL=   1293.56

 STA=    9917.   10053.
   PER Q=    100.0
    AREA=    812.8
     VEL=     10.8

 *SECNO 292.400

 3370 NORMAL BRIDGE,NRD=  8 MIN ELTRD= 1301.00 MAX ELLC= 1298.00

           51TH AVENUE BRIDGE
    292.40     6.52  1293.82  1293.02  1293.82  1295.83     2.01      .36      .11  1296.30
     8750.       0.    8750.       0.       0.     769.       0.      38.       7.   1296.00
       .06      .00    11.38      .00     .045     .030     .045     .000  1287.30  9917.72
   .005695      74.      74.      74.        2       12        0   -12.14   129.60 10047.32
0
 FLOW DISTRIBUTION FOR SECNO=    292.40          CWSEL=   1293.82

 STA=    9918.   10055.
   PER Q=    100.0
    AREA=    768.9
     VEL=     11.4

 CCHV=    .100 CEHV=    .300
 *SECNO 292.700

 3301 HV CHANGED MORE THAN HVINS

    292.70     7.19  1294.69  1293.01  1294.69  1296.02     1.33      .12      .07  1296.50
     8750.       0.    8750.       0.       0.     945.       0.      39.       7.   1296.50
       .06      .00     9.26      .00     .045     .030     .045     .000  1287.50  9905.95
   .003149      30.      30.      30.        3       11        0      .00   153.10 10059.05
0
1
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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
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   TIME     VLOB     VCH      VROB     XNL      XNCH     XNR      WTN      ELMIN    SSTA
   SLOPE    XLOBL    XLCH     XLOBR    ITRIAL   IDC      ICONT    CORAR    TOPWID   ENDST


FLOW DISTRIBUTION FOR SECNO=    292.70          CWSEL=   1294.69

STA=    9926.   10065.
  PER Q=    100.0
   AREA=    944.9
    VEL=      9.3

*SECNO 296.300

3301 HV CHANGED MORE THAN HVINS

   296.30     5.78  1295.68  1295.40  1295.68  1297.87     2.19     1.59      .26  1298.90
    8750.       0.    8750.       0.       0.     737.       0.      46.       9.   1298.90
      .07      .00    11.88      .00     .045     .030     .045     .000  1289.90  9937.64
  .006676     360.     360.     360.        3       15        0      .00   144.71 10082.36
0
FLOW DISTRIBUTION FOR SECNO=    296.30          CWSEL=   1295.68

STA=    9938.   10092.
  PER Q=    100.0
   AREA=    736.8
    VEL=     11.9

CCHV=    .100 CEHV=    .300
*SECNO 299.400

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1295.50 ELREA=     1300.70

   299.40     6.51  1298.51  1298.26  1298.51  1300.07     1.56     2.14      .06  1295.50
    8700.    1818.    6882.       0.     344.     628.       0.      52.      10.   1300.70
      .07     5.29    10.95      .00     .045     .035     .045     .000  1292.00  9651.54
  .007121     310.     310.     310.        2        8        0      .00   254.43  9975.23
0
FLOW DISTRIBUTION FOR SECNO=    299.40          CWSEL=   1298.51

STA=    9652.    9660.    9668.    9681.    9762.    9770.    9778.    9826.    9859.    9980.
  PER Q=      .9      3.0      1.5       .4       .9      1.0      7.1      6.1     79.1
   AREA=    18.2     34.9     28.4     12.6     16.9     17.7    120.7     94.5    628.2
    VEL=     4.3      7.4      4.6      2.9      4.6      4.7      5.2      5.6     11.0

1
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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
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*SECNO 301.600

3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=    9870.0   10550.0  TYPE=     1  TARGET=   -9870.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1298.00 ELREA=     1301.50

   301.60     6.38  1300.38  1298.47  1300.44  1301.12      .73      .96      .08  1298.00
    8650.      65.    8585.       0.      24.    1244.       0.      58.      11.   1301.50
      .08     2.74     6.90      .00     .045     .035     .045     .000  1294.00  9870.00
  .002881     250.     220.     130.        2       19        0      .00   245.11 10115.11
0
 FLOW DISTRIBUTION FOR SECNO=    301.60          CWSEL=   1300.38

 STA=    9870.    9880.   10130.
   PER Q=       .8     99.2
    AREA=     23.8   1244.2
     VEL=      2.7      6.9

 CCHV=    .100 CEHV=    .300
 *SECNO 306.550
   306.55     5.29  1301.67  1299.73  1301.55  1302.29      .62     1.16      .01  1305.40
    8600.       0.    8600.       0.       0.    1365.       0.      73.      14.   1305.40
      .11      .00     6.30      .00     .030     .030     .030     .000  1296.38  9861.83
  .001937     505.     495.     465.        2       11        0      .00   276.34 10138.17
0
 FLOW DISTRIBUTION FOR SECNO=    306.55          CWSEL=   1301.67

 STA=    9862.   10151.
   PER Q=    100.0
    AREA=   1365.0
     VEL=      6.3

 *SECNO 306.900
          BEGIN OVERLAND HILLS
   306.90     5.36  1301.76  1299.75  1301.64  1302.36      .60      .07      .00  1305.42
    8600.       0.    8600.       0.       0.    1384.       0.      74.      15.   1305.42
      .11      .00     6.21      .00     .030     .030     .030     .000  1296.40  9861.59
  .001832      35.      35.      35.        0       14        0      .00   276.82 10138.41
0
1
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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


 FLOW DISTRIBUTION FOR SECNO=    306.90          CWSEL=   1301.76

 STA=    9862.   10151.
   PER Q=    100.0
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   AREA=   1384.4
    VEL=      6.2

 *SECNO 308.050
   308.05     5.52  1302.00  1299.83  1301.91  1302.56      .56      .20      .00  1305.50
    8600.       0.    8600.       0.       0.    1430.       0.      78.      15.   1305.50
      .11      .00     6.01      .00     .030     .030     .030     .000  1296.48  9861.02
  .001672     115.     115.     115.        2       14        0      .00   277.96 10138.98
0
 FLOW DISTRIBUTION FOR SECNO=    308.05          CWSEL=   1302.00

 STA=    9861.   10151.
   PER Q=    100.0
    AREA=   1430.1
     VEL=      6.0

 *SECNO 310.550
   310.55     5.71  1302.44  1300.08  1302.38  1302.96      .52      .39      .00  1305.75
    8600.       0.    8600.       0.       0.    1483.       0.      86.      17.   1305.75
      .12      .00     5.80      .00     .030     .030     .030     .000  1296.73  9860.37
  .001490     250.     250.     250.        0       14        0      .00   279.27 10139.63
0
 FLOW DISTRIBUTION FOR SECNO=    310.55          CWSEL=   1302.44

 STA=    9860.   10151.
   PER Q=    100.0
    AREA=   1483.1
     VEL=      5.8

1
 PROFILE FOR STREAM    LAST PROFILE PROPOSED


 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


 ELEVATION  1280.     1285.     1290.     1295.     1300.     1305.     1310.     1315.     1320.     1325.
     SECNO   CUMDIS

   283.40     0.  .  I      .   LC  W.E       .         .         .         .         .         .         .         R
             50.  .  I      .   LC   WEM      .         .         .         .         .         .         .         R
            100.  .  I      .    C   WEM      .         .         .         .         .         .         .         R
            150.  .   I     .   C L  WE M     .         .         .         .         .         .         .         R
            200.  .   I     .   C L  W E M    .         .         .         .         .         .         .         R
            250.  .    I    .   C  L .WE M    .         .         .         .         .         .         .         R
            300.  .    I    .   C   L.WE  M   .         .         .         .         .         .         .         R
            350.  .     I   .   C   L.WE   M  .         .         .         .         .         .         .         R
            400.  .     I   .   C    LWE   M  .         .         .         .         .         .         .         R
            450.  .      I  .   C    .LE    M .         .         .         .         .         .         .         R
            500.  .      I  .  C     . E     M .         .         .         .         .         .         .         R
   285.70   550.  .      I  .  C     . WER   M .         .         .         .         .         .         .         .
            600.  .       I.    C   . WELR   M.         .         .         .         .         .         .         .
            650.  .       I.      C . W E LR M.         .         .         .         .         .         .         .
            700.  .        I       C. W  E  L M         .         .         .         .         .         .         .
            750.  .         .I       .CW   E   LM        .         .         .         .         .         .         .
   288.10   800.  .         .I       . W    E  .L        .         .         .         .         .         .         .
            850.  .         .I       . CW    E .L        .         .         .         .         .         .         .
```

```
          900.  .        . I       .  CW   E . L       .        .        .        .        .        .        .
          950.  .        . I       .  C W   E. L       .        .        .        .        .        .        .
         1000.  .        . I       .   C W  E. L       .        .        .        .        .        .        .
  290.80 1050.  .        .  I      .   C  W  E  L      .        .        .        .        .        .        .
  291.40 1100.  .        .   I     .    C W  .E  L     M        .        .        .        .        .        .
         1150.  .        .   I     .     CW  .E L M    .        .        .        .        .        .        .
  292.40 1200.  .        .    I    .     C W . EL      .        .        .        .        .        .        .
  292.70 1250.  .        .    I    .     C  W. EL      .        .        .        .        .        .        .
         1300.  .        .     I   .      C  W  EL     .        .        .        .        .        .        .
         1350.  .        .     I   .      C  W  EL     .        .        .        .        .        .        .
         1400.  .        .      I  .       C W   EL    .        .        .        .        .        .        .
         1450.  .        .       I .        CW   E L   .        .        .        .        .        .        .
         1500.  .        .       I .        C.W   EL   .        .        .        .        .        .        .
         1550.  .        .        I.         CW   E L  .        .        .        .        .        .        .
  296.30 1600.  .        .         I         .W    E L .        .        .        .        .        .        .
         1650.  .        .         I         . W   ELR .        .        .        .        .        .        .
         1700.  .        .        .I         .  W  LEMR.        .        .        .        .        .        .
         1750.  .        .        . I        .   WL  EMR        .        .        .        .        .        .
         1800.  .        .        .  I       .  LCW   ER        .        .        .        .        .        .
         1850.  .        .        .  I       . L  CW  E.R       .        .        .        .        .        .
  299.40 1900.  .        .        .   I      .L     W  ER       .        .        .        .        .        .
         1950.  .        .        .    I     . L    CW .ER      .        .        .        .        .        .
         2000.  .        .        .     I    .  L   C W.ER      .        .        .        .        .        .
         2050.  .        .        .      I   .   L  C  W EM     .        .        .        .        .        .
  301.60 2100.  .        .        .       I .     LC  .WERM     .        .        .        .        .        .
         2150.  .        .        .       I .      C  .WE RM    .        .        .        .        .        .
         2200.  .        .        .        I.      C L.W E R    .        .        .        .        .        .
         2250.  .        .        .        I.       C L WE RM   .        .        .        .        .        .
         2300.  .        .        .         I       C . WE  RM  .        .        .        .        .        .
         2350.  .        .        .         I       C . WE   R  .        .        .        .        .        .
         2400.  .        .        .        .I       C . W EL  R .        .        .        .        .        .
         2450.  .        .        .        .I        C.  WE L  R.        .        .        .        .        .
         2500.  .        .        .        . I       C.  WE   LR.        .        .        .        .        .
         2550.  .        .        .        . I       C.  WE    LR        .        .        .        .        .
  306.55 2600.  .        .        .        .  I      C.  W E    .L       .        .        .        .        .
  306.90 2650.  .        .        .        .  I       C   WE    .L       .        .        .        .        .
         2700.  .        .        .        .  I       C   WE    .L       .        .        .        .        .
  308.05 2750.  .        .        .        .  I       C   WE    .L       .        .        .        .        .
         2800.  .        .        .        .  I       C   WE    .L       .        .        .        .        .
         2850.  .        .        .        .  I       C   WE    .L       .        .        .        .        .
         2900.  .        .        .        .  I       C    WE   .L       .        .        .        .        .
         2950.  .        .        .        .  I       C    WE   .L       .        .        .        .        .
  310.55 3000.  .        .        .        .  I       C    WE   . L      .        .        .        .        .
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1

05/22/89 17:46:04 PAGE 17

THIS RUN EXECUTED 05/22/89 17:47:10

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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 APRIL 1985
**************************************************
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

SKUNK CREEK PROPOSED

SUMMARY PRINTOUT

	SECNO	Q	CWSEL	SSTA	ENDST	TOPWID
	280.400	8920.00	1289.27	9782.74	10146.93	364.19
	280.400	8920.00	1289.71	9880.00	10152.85	272.85
	285.700	8800.00	1290.57	9718.68	10126.98	408.30
	285.700	8800.00	1291.06	9699.38	10141.88	442.50
*	288.100	8800.00	1291.02	9938.44	10081.56	143.13
*	288.100	8800.00	1291.02	9938.45	10081.55	143.10
	290.800	8800.00	1293.52	9906.42	10058.58	152.15
	290.800	8800.00	1293.52	9906.41	10058.59	152.17
	291.400	8750.00	1293.56	9917.36	10047.64	130.29
	291.400	8750.00	1293.56	9917.35	10047.65	130.29
	292.400	8750.00	1293.82	9917.72	10047.32	129.59
	292.400	8750.00	1293.82	9917.72	10047.32	129.60
	292.700	8750.00	1294.69	9905.96	10059.04	153.09
	292.700	8750.00	1294.69	9905.95	10059.05	153.10
	296.300	8750.00	1295.68	9937.65	10082.35	144.71
	296.300	8750.00	1295.68	9937.64	10082.36	144.71
	299.400	8700.00	1298.51	9651.54	9975.23	254.44
	299.400	8700.00	1298.51	9651.54	9975.23	254.43
	301.600	8650.00	1300.44	9759.79	10115.83	356.04
	301.600	8650.00	1300.38	9870.00	10115.11	245.11
	306.550	8600.00	1301.55	9862.22	10137.78	275.55
	306.550	8600.00	1301.67	9861.83	10138.17	276.34

1

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	SECNO	Q	CWSEL	SSTA	ENDST	TOPWID
	306.900	8600.00	1301.64	9862.02	10137.98	275.96
	306.900	8600.00	1301.76	9861.59	10138.41	276.82
	308.050	8600.00	1301.91	9861.34	10138.66	277.32
	308.050	8600.00	1302.00	9861.02	10138.98	277.96
	310.550	8600.00	1302.38	9860.58	10139.42	278.85
	310.550	8600.00	1302.44	9860.37	10139.63	279.27

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SKUNK CREEK PROPOSED

SUMMARY PRINTOUT TABLE 110

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENC
	280.400	1289.27	-.53	1289.90	364.19	1213.91	7706.09	.00	.00	.00	9885.00	10170.00	.0
	280.400	1289.71	.44	1290.46	272.85	34.65	8885.35	.00	279.00	9880.00	9885.00	10170.00	10159.0
	285.700	1290.57	.00	1290.82	408.30	.00	8800.00	.00	.00	.00	9710.00	10170.00	.0
	285.700	1291.06	.50	1291.28	442.50	.03	8799.97	.00	.00	.00	9710.00	10170.00	.0
*	288.100	1291.02	.00	1293.48	143.13	.00	8800.00	.00	.00	.00	9925.00	10095.00	.0
*	288.100	1291.02	-.01	1293.48	143.10	.00	8800.00	.00	.00	.00	9925.00	10095.00	.0
	290.800	1293.52	.00	1294.94	152.15	.00	8800.00	.00	.00	.00	9897.50	10067.50	.0
	290.800	1293.52	.00	1294.94	152.17	.00	8800.00	.00	.00	.00	9897.50	10067.50	.0
	291.400	1293.56	.00	1295.36	130.29	.00	8750.00	.00	.00	.00	9912.50	10052.50	.0
	291.400	1293.56	.00	1295.36	130.29	.00	8750.00	.00	.00	.00	9912.50	10052.50	.0
	292.400	1293.82	.00	1295.83	129.59	.00	8750.00	.00	.00	.00	9905.00	10055.00	.0
	292.400	1293.82	.00	1295.83	129.60	.00	8750.00	.00	.00	.00	9905.00	10055.00	.0
	292.700	1294.69	.00	1296.02	153.09	.00	8750.00	.00	.00	.00	9900.50	10064.50	.0
	292.700	1294.69	.00	1296.02	153.10	.00	8750.00	.00	.00	.00	9900.50	10064.50	.0
	296.300	1295.68	.00	1297.87	144.71	.00	8750.00	.00	.00	.00	9928.00	10092.00	.0
	296.300	1295.68	.00	1297.87	144.71	.00	8750.00	.00	.00	.00	9928.00	10092.00	.0
	299.400	1298.51	.00	1300.07	254.44	1818.06	6881.94	.00	.00	.00	9859.00	9980.00	.0
	299.400	1298.51	.00	1300.07	254.43	1817.89	6882.11	.00	.00	.00	9859.00	9980.00	.0
	301.600	1300.44	.00	1301.06	356.04	506.13	8143.87	.00	.00	.00	9880.00	10130.00	.0
	301.600	1300.38	-.05	1301.12	245.11	65.37	8564.63	.00	-9870.00	9870.00	9880.00	10130.00	10050.0
	306.550	1301.55	.00	1302.20	275.55	.00	8600.00	.00	.00	.00	9849.00	10151.00	.0
	306.550	1301.67	.12	1302.29	276.34	.00	8600.00	.00	.00	.00	9849.00	10151.00	.0
	306.900	1301.64	.00	1302.27	275.96	.00	8600.00	.00	.00	.00	9849.00	10151.00	.0
	306.900	1301.76	.12	1302.36	276.82	.00	8600.00	.00	.00	.00	9849.00	10151.00	.0
	308.050	1301.91	.00	1302.49	277.32	.00	8600.00	.00	.00	.00	9849.00	10151.00	.0
	308.050	1302.00	.09	1302.56	277.96	.00	8600.00	.00	.00	.00	9849.00	10151.00	.0
	310.550	1302.38	.00	1302.91	278.85	.00	8600.00	.00	.00	.00	9849.00	10151.00	.0
	310.550	1302.44	.06	1302.96	279.27	.00	8600.00	.00	.00	.00	9849.00	10151.00	.0

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SUMMARY OF ERRORS AND SPECIAL NOTES

```
CAUTION  SECNO=   288.100  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   288.100  PROFILE= 1  MINIMUM SPECIFIC ENERGY
CAUTION  SECNO=   288.100  PROFILE= 2  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   288.100  PROFILE= 2  MINIMUM SPECIFIC ENERGY
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1

05/22/89 17:46:04 PAGE 21

FLOODWAY DATA, SKUNK CREEK PROPOSED
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WATER SURFACE ELEVATION WITHOUT FLOODWAY	DIFFERENCE
280.400	273.	1289.	6.9	1289.7	1289.3	.4
285.700	443.	2379.	3.7	1291.1	1290.6	.5
288.100	143.	698.	12.6	1291.0	1291.0	.0
290.800	152.	921.	9.6	1293.5	1293.5	.0
291.400	130.	813.	10.8	1293.6	1293.6	.0
292.400	130.	769.	11.4	1293.8	1293.8	.0
292.700	153.	945.	9.3	1294.7	1294.7	.0
296.300	145.	737.	11.9	1295.7	1295.7	.0
299.400	324.	972.	8.9	1298.5	1298.5	.0
301.600	245.	1268.	6.8	1300.4	1300.4	.0
306.550	276.	1365.	6.3	1301.7	1301.6	.1
306.900	277.	1384.	6.2	1301.7	1301.6	.1
308.050	278.	1430.	6.0	1302.0	1301.9	.1
310.550	279.	1483.	5.8	1302.5	1302.4	.1

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05/22/89 17:47:16 PAGE 1

THIS RUN EXECUTED 05/22/89 17:47:16

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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 APRIL 1985
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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


3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=    9918.0   10130.0  TYPE=     1  TARGET=     212.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=   100000.00 ELREA=   100000.00

   243.60     7.16  1271.16  1270.23  1270.24  1272.70     1.54     1.92      .27100000.00
    9340.       0.    9340.       0.       0.     936.       0.      39.       7. 100000.00
      .05      .00     9.97      .00     .045     .035     .055     .000  1264.00  9925.34
  .007227     500.     530.     490.        4       14        0      .00   202.60 10127.94
0
 FLOW DISTRIBUTION FOR SECNO=    243.60          CWSEL=   1271.16

 STA=    9925.   10160.
   PER Q=    100.0
    AREA=    936.5
     VEL=     10.0

 CCHV=    .100 CEHV=    .300
 *SECNO 248.900

 3470 ENCROACHMENT STATIONS=    9910.0   10200.0  TYPE=     1  TARGET=     290.000

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1274.70 ELREA=     1274.00

   248.90     8.69  1274.69  1274.09  1274.87  1275.97     1.28     3.24      .03  1274.70
    9280.       0.    7320.    1960.       0.     737.     410.      52.      10.   1274.00
      .06      .00     9.93     4.78     .045     .035     .045     .000  1266.00  9920.07
  .005381     550.     530.     460.        3        8        0      .00   279.93 10200.00
0
 FLOW DISTRIBUTION FOR SECNO=    248.90          CWSEL=   1274.69

 STA=    9920.   10048.   10135.   10162.   10200.
   PER Q=     78.9     11.8      6.2      3.2
    AREA=    737.1    233.7     99.5     77.2
     VEL=      9.9      4.7      5.8      3.8

 *SECNO 254.100
1
 05/04/89    15:37:55                                                                    PAGE   23


   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
```

COMPUTER PRINTOUT 4

PROPOSED CHANNELIZATION WITH FUTURE FLOW

```
1*****************************************************
 *  WATER SURFACE PROFILES                           *
 *  VERSION OF NOVEMBER 1976                         *
 *  UPDATED MAY 1984                                 *
 *  IBM-PC-XT VERSION                                *
 *  RUN DATE  05/22/89  TIME  17:47:42               *
 *****************************************************
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 ***********************************
 *  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
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1

05/22/89 17:47:42 PAGE 1

THIS RUN EXECUTED 05/22/89 17:47:43

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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 APRIL 1985
*************************************************
```

C
T1 SKUNK CREEK AT 51ST AVE
T2 SECTION 280.4 TO 310.55
T3 SKUNK FUTURE FLOW TOPO 10/5/88 11/20/81 2/4/80 6/6/74

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	6.	0.	0.	.003394	.00	.0	0.	1289.800	.000

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1.000	.000	-1.000	.000	.000	.000	-1.000	.000	.000	15.000

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

38.000	43.000	1.000	53.000	54.000	4.000	110.000	200.000	.000	.000

QT	6.000	2080.000	5300.000	8920.000	8920.000	10500.000	10500.000	.000	.000	.000
NC	.045	.045	.035	.100	.300	.000	.000	.000	.000	.000
ET	280.400	.000	.000	.000	.000	.000	9.100	.000	9880.000	10159.000

DATA FOR THIS ANALYSIS IS BASED ON COE INPUT AND VERIFIED

```
          BY COE OUTPUT INFORMATION AS OF 11/19/84, EXCEPT FOR
          CHANNELIZATION OF SKUNK CREEK THROUGH OVERLAND HILLS
          CROSS SECTIONS 306.55 TO 310.55
          ADD PROPOSED CHANNELIZATION SECTIONS 268.1 TO 299.4
X1    280.400     20.000   9885.000  10170.000      .000      .000      .000      .000      .000      .000
X3     10.000      .000      .000      .000      .000      .000      .000      .000      .000      .000
GR   1292.000   9200.000   1290.000   9500.000   1290.000   9550.000   1290.000   9595.000   1290.000   9790.000
GR   1286.000   9795.000   1286.000   9865.000   1287.300   9885.000   1286.000   9900.000   1282.000   9940.000
GR   1281.600  10015.000   1282.000  10020.000   1286.000  10050.000   1288.000  10090.000   1288.000  10130.000
GR   1291.000  10170.000   1290.000  10315.000   1290.000  10320.000   1290.000  10370.000   1290.500  10425.000

QT      6.000   2080.000   5300.000   8800.000   8800.000  10500.000  10500.000      .000      .000      .000
X1    285.700     10.000   9710.000  10170.000    530.000    530.000    530.000      .000      .000      .000
X3     10.000      .000      .000      .000      .000      .000      .000      .000      .000      .000
GR   1296.000   8900.000   1294.000   9200.000   1291.000   9710.000   1290.000   9730.000   1284.200   9770.000
GR   1284.200  10050.000   1286.000  10080.000   1290.000  10110.000   1292.000  10170.000   1294.000  10580.000

NC      .045      .045      .030      .100      .300      .000      .000      .000      .000      .000
          BEGIN PROPOSED CHANNELIZATION SECTIONS
X1    288.100      4.000   9925.000  10095.000    240.000    240.000    240.000      .000      .000      .000
GR   1295.500   9925.000   1285.500   9955.000   1285.500  10065.000   1295.500  10095.000      .000      .000
1
 05/22/89    17:47:42                                                                                  PAGE    2

X1    290.800      4.000   9897.500  10067.500    270.000    270.000    270.000      .000      .000      .000
GR   1296.500   9897.500   1286.500   9927.500   1286.500  10037.500   1296.500  10067.500      .000      .000

NC      .045      .045      .030      .300      .500      .000      .000      .000      .000      .000
QT      6.000   2080.000   5300.000   8750.000   8750.000  10400.000  10400.000      .000      .000      .000
X1    291.400     16.000   9912.500  10052.500     60.000     60.000     60.000      .000      .000      .000
X3     10.000      .000      .000      .000      .000      .000      .000      .000      .000      .000
GR   1300.000   8250.000   1298.000   8730.000   1296.800   9205.000   1296.800   9912.500   1286.800   9927.500
GR   1286.800  10037.500   1296.800  10052.500   1296.800  10068.000   1296.800  10282.000   1297.000  10347.000
GR   1297.000  10410.000   1294.000  10930.000   1296.000  10975.000   1296.000  11105.000   1298.000  11170.000
GR   1300.000  12150.000      .000      .000      .000      .000      .000      .000      .000      .000

QT      6.000   2080.000   5300.000   8750.000   8750.000  10400.000  10400.000      .000      .000      .000
          51TH AVENUE BRIDGE
X1    292.400     10.000   9905.000  10055.000     74.000     74.000     74.000      .000      .000      .000
BT     -8.000   9905.000   1301.000   1298.000   9914.000   1301.000   1298.000   9980.500   1301.000   1298.000
BT      .000   9980.600   1301.000   1287.300   9982.400   1301.000   1287.300   9982.500   1301.000   1298.000
BT      .000  10050.600   1301.000   1298.000  10055.000   1301.000   1298.000      .000      .000      .000
GR   1296.300   9905.000   1296.300   9914.000   1287.300   9927.500   1287.300   9980.500   1287.300   9980.600
GR   1287.300   9982.400   1287.300   9982.500   1287.300  10037.500   1296.000  10050.600   1296.000  10055.000

NC      .045      .045      .030      .100      .300      .000      .000      .000      .000      .000
QT      6.000   2080.000   5300.000   8750.000   8750.000  10400.000  10400.000      .000      .000      .000
X1    292.700      4.000   9900.500  10064.500     30.000     30.000     30.000      .000      .000      .000
GR   1296.500   9900.500   1287.500   9927.500   1287.500  10037.500   1296.500  10064.500      .000      .000

X1    296.300      4.000   9928.000  10092.000    360.000    360.000    360.000      .000      .000      .000
GR   1298.900   9928.000   1289.900   9955.000   1289.900  10065.000   1298.900  10092.000      .000      .000

NC      .045      .045      .035      .100      .300      .000      .000      .000      .000      .000
QT      6.000   2040.000   5100.000   8700.000   8700.000  10400.000  10400.000      .000      .000      .000
X1    299.400     25.000   9859.000   9980.000    310.000    310.000    310.000      .000      .000      .000
```

```
X3     10.000      .000      .000      .000      .000      .000      .000      .000      .000      .000
GR   1299.800   9600.000   1299.300   9650.000   1294.200   9660.000   1294.100   9668.000   1302.000   9691.000
GR   1300.200   9714.000   1299.600   9744.000   1296.400   9762.000   1296.400   9770.000   1296.200   9778.000
GR   1295.800   9826.000   1295.500   9859.000   1293.900   9869.000   1292.600   9880.000   1292.200   9890.000
GR   1292.000   9892.000   1292.000   9906.000   1292.200   9907.000   1292.900   9918.000   1292.000   9947.000
GR   1292.400   9949.000   1293.500   9960.000   1295.200   9968.000   1300.700   9980.000   1302.500  10018.000

QT      6.000   2040.000   5100.000   8650.000   8650.000  10400.000  10400.000      .000      .000      .000
ET    301.600      .000      .000      .000      .000      .000      9.100      .000   9870.000      .000
X1    301.600     13.000   9880.000  10130.000    250.000    130.000    220.000      .000      .000      .000
X3     10.000      .000      .000      .000      .000      .000      .000      .000      .000      .000
GR   1302.000   9375.000   1301.500   9735.000   1300.000   9770.000   1298.000   9840.000   1298.000   9880.000
GR   1296.000   9890.000   1294.000   9965.000   1294.000  10040.000   1296.000  10080.000   1296.000  10100.000
GR   1300.000  10110.000   1301.500  10130.000   1302.000  10550.000      .000      .000      .000      .000

QT      6.000   2040.000   5100.000   8600.000   8600.000  10300.000  10300.000      .000      .000      .000
NC       .030      .030      .030      .100      .300      .000      .000      .000      .000      .000
1
 05/22/89    17:47:42                                                                                PAGE    3


X1    306.550      4.000   9849.000  10151.000    505.000    465.000    495.000      .000      .000      .000
GR   1305.400   9849.000   1296.380   9880.000   1296.380  10120.000   1305.400  10151.000      .000      .000

          BEGIN OVERLAND HILLS
X1    306.900      .000   9849.000  10151.000     35.000     35.000     35.000      .000      .020      .000

X1    308.050      .000   9849.000  10151.000    115.000    115.000    115.000      .000      .080      .000

X1    310.550      .000   9849.000  10151.000    250.000    250.000    250.000      .000      .250      .000
EJ       .000      .000      .000      .000      .000      .000      .000      .000      .000      .000
1
 05/22/89    17:47:42                                                                                PAGE    4


   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 280.400

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1287.30 ELREA=     1291.00

          DATA FOR THIS ANALYSIS IS BASED ON COE INPUT AND VERIFIED
          BY COE OUTPUT INFORMATION AS OF 11/19/84, EXCEPT FOR
          CHANNELIZATION OF SKUNK CREEK THROUGH OVERLAND HILLS
          CROSS SECTIONS 306.55 TO 310.55
          ADD PROPOSED CHANNELIZATION SECTIONS 288.1 TO 299.4
   280.40     8.11  1289.71  1288.22  1289.90  1290.41      .70      .00      .00  1287.30
   10500.    1529.     6971.       0.     347.    1274.       0.       0.       0.   1291.00
      .00     4.41     7.04      .00     .045     .035     .045     .022  1281.60  9781.09
```

```
  .003446      0.      0.      0.       0      15       3     .00   371.69 10152.78
0
 FLOW DISTRIBUTION FOR SECNO=    280.40          CWSEL=   1269.71

 STA=    9781.    9795.    9865.    9885.   10170.
   PER Q=       .7     11.5      2.4     85.4
    AREA=     25.8    259.6     61.2   1274.3
     VEL=      2.9      4.6      4.1      7.0

 *SECNO 285.700

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1291.00 ELREA=     1292.00

    285.70     6.90  1291.10  1287.53      .00  1291.40      .30      .95      .04  1291.00
    10500.       0.   10500.       0.       1.    2394.       0.      24.       5.   1292.00
       .03      .15     4.39      .00     .045     .035     .045     .002  1284.20  9693.29
  .001093     530.     530.     530.        2       18        0      .00   449.65 10142.95
0
 FLOW DISTRIBUTION FOR SECNO=    285.70          CWSEL=   1291.10

 STA=    9693.    9710.   10170.
   PER Q=       .0    100.0
    AREA=       .8   2394.4
     VEL=       .1      4.4

1
  05/22/89    17:47:42                                                                                                PAGE    5


    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


 CCHV=    .100 CEHV=    .300
 *SECNO 288.100

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
          BEGIN PROPOSED CHANNELIZATION SECTIONS
  . 288.10     6.17  1291.67  1291.67      .00  1294.39     2.73      .55      .73  1295.50
    10500.       0.   10500.       0.       0.     792.       0.      33.       7.   1295.50
       .04      .00     13.25      .00     .045     .030     .045     .000  1285.50  9936.50
  .007711     240.     240.     240.        0       11        0      .00   147.00 10083.50
0
 FLOW DISTRIBUTION FOR SECNO=    288.10          CWSEL=   1291.67

 STA=    9937.   10095.
   PER Q=    100.0
    AREA=    792.3
     VEL=     13.3

 *SECNO 290.800

 3301 HV CHANGED MORE THAN HVINS
```

```
   290.80     7.74  1294.24  1292.67      .00  1295.85     1.61     1.35      .11  1296.30
   10500.       0.   10500.       0.       0.    1032.       0.      39.       8.   1296.50
      .05      .00    10.18      .00     .045     .030     .045     .000  1286.50  9904.27
  .003489     270.     270.     270.        3        5        0      .00   156.46 10060.73
0
 FLOW DISTRIBUTION FOR SECNO=    290.80          CWSEL=   1294.24

 STA=    9904.   10068.
   PER Q=    100.0
    AREA=   1031.5
     VEL=     10.2

 CCHV=    .300 CEHV=    .500
 *SECNO 291.400

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1296.80 ELREA=     1296.80

1
  05/22/89    17:47:42                                                                    PAGE    6

    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

   291.40     7.45  1294.25  1293.11      .00  1296.31     2.06      .23      .22  1296.80
   10400.       0.   10400.       0.       0.     903.       0.      40.       8.   1296.80
      .05      .00    11.51      .00     .045     .030     .045     .000  1286.80  9916.32
  .004363      60.      60.      60.        2       15        0      .00   132.36 10048.68
0
 FLOW DISTRIBUTION FOR SECNO=    291.40          CWSEL=   1294.25

 STA=    9916.   10053.
   PER Q=    100.0
    AREA=    903.4
     VEL=     11.5

 *SECNO 292.400

 3370 NORMAL BRIDGE,NRD=  8 MIN ELTRD= 1301.00 MAX ELLC= 1298.00

          51TH AVENUE BRIDGE
   292.40     7.21  1294.51  1293.68      .00  1296.79     2.28      .37      .11  1296.30
   10400.       0.   10400.       0.       0.     858.       0.      42.       8.   1296.00
      .05      .00    12.13      .00     .045     .030     .045     .000  1287.30  9916.69
  .005793      74.      74.      74.        2       15        0   -13.47   131.67 10048.35
0
 FLOW DISTRIBUTION FOR SECNO=    292.40          CWSEL=   1294.51

 STA=    9917.   10055.
   PER Q=    100.0
    AREA=    857.5
     VEL=     12.1

 CCHV=    .100 CEHV=    .300
```

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*SECNO 292.700

3301 HV CHANGED MORE THAN HVINS

   292.70     8.06  1295.56  1293.64      .00  1297.20     1.43      .12      .00  1296.50
   10400.       0.   10400.       0.       0.    1082.       0.      42.       8.   1296.50
      .05      .00     9.61      .00     .045     .030     .045     .000  1287.50  9903.31
  .002968      30.      30.      30.        4       11        0      .00   158.38 10061.69
0
1
 05/22/89    17:47:42                                                                    PAGE    7


   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


FLOW DISTRIBUTION FOR SECNO=    292.70          CWSEL=   1295.56

STA=    9903.   10065.
  PER Q=    100.0
   AREA=   1082.1
    VEL=      9.6

*SECNO 296.300

3301 HV CHANGED MORE THAN HVINS

   296.30     6.52  1296.42  1296.03      .00  1298.77     2.36     1.50      .28  1298.90
   10400.       0.   10400.       0.       0.     844.       0.      50.       9.   1298.90
      .06      .00    12.32      .00     .045     .030     .045     .000  1289.90  9935.45
  .006242     360.     360.     360.        3       15        0      .00   149.10 10084.55
0
FLOW DISTRIBUTION FOR SECNO=    296.30          CWSEL=   1296.42

STA=    9935.   10392.
  PER Q=    100.0
   AREA=    844.3
    VEL=     12.3

CCHV=    .100 CEHV=    .300
*SECNO 299.400

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1295.50 ELREA=     1300.70

   299.40     7.23  1299.23  1298.73      .00  1300.79     1.56     1.94      .08  1295.50
   10400.    2529.    7871.       0.     445.     712.       0.      57.      11.   1300.70
      .07     5.68    11.06      .00     .045     .035     .045     .000  1292.00  9650.14
  .006259     310.     310.     310.        3        8        0      .00   263.50  9976.79
0
```

```
FLOW DISTRIBUTION FOR SECNO=    299.40          CWSEL=   1299.23

STA=    9650.    9660.    9668.    9683.    9762.    9770.    9778.    9826.    9859.    9980.
  PER Q=      1.1      3.0      1.7       .7      1.1      1.2      8.5      6.9     75.7
   AREA=     24.8     40.6     38.3     22.5     22.6     23.4    155.0    118.1    711.9
    VEL=      4.5      7.7      4.7      3.3      5.2      5.3      5.7      6.1     11.1

1
 05/22/89    17:47:42                                                                          PAGE    8


   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 301.600

3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1298.00 ELREA=     1301.50

   301.60     7.05  1301.05  1299.04      .00  1301.72      .67      .05      .09  1298.00
   10400.     826.     9574.       0.     280.    1406.       0.      65.      13.   1301.50
      .08     2.95     6.81      .00     .045     .035     .045     .000  1294.00  9745.28
  .002505     250.     220.     130.        2       19        0      .00   378.84 10124.12
0
FLOW DISTRIBUTION FOR SECNO=    301.60          CWSEL=   1301.05

STA=    9745.    9770.    9840.    9880.   10130.
  PER Q=       .1      3.7      4.1     92.1
   AREA=     13.1    144.2    122.4   1406.1
    VEL=      1.1      2.7      3.5      6.8

CCHV=    .100 CEHV=    .300
*SECNO 306.550
   306.55     5.76  1302.14  1300.15      .00  1302.87      .74     1.13      .02  1305.40
   10300.       0.   10300.       0.       0.    1495.       0.      83.      16.   1305.40
      .10      .00     6.89      .00     .030     .030     .030     .000  1296.38  9860.22
  .002083     505.     495.     465.        3       11        0      .00   279.57 10139.78
0
FLOW DISTRIBUTION FOR SECNO=    306.55          CWSEL=   1302.14

STA=    9860.   10151.
  PER Q=    100.0
   AREA=   1495.4
    VEL=      6.9

*SECNO 306.900
          BEGIN OVERLAND HILLS
   306.90     5.82  1302.22  1300.17      .00  1302.95      .72      .07      .00  1305.42
   10300.       0.   10300.       0.       0.    1512.       0.      84.      17.   1305.42
      .10      .00     6.81      .00     .030     .030     .030     .000  1296.40  9860.01
  .002012      35.      35.      35.        0       14        0      .00   279.97 10139.99
0
1
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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


FLOW DISTRIBUTION FOR SECNO=    306.90          CWSEL=   1302.22

STA=    9860.   10151.
  PER Q=    100.0
   AREA=   1512.0
    VEL=      6.8

*SECNO 308.050
   308.05      6.02  1302.50  1300.25      .00  1303.17      .67      .22      .01  1305.50
   10300.       0.   10300.       0.       0.    1569.       0.      88.      17.   1305.50
      .10      .00      6.56      .00     .030     .030     .030     .000  1296.48  9859.31
  .001790     115.     115.     115.        2       14        0      .00   281.38 10140.69
0
FLOW DISTRIBUTION FOR SECNO=    308.05          CWSEL=   1302.50

STA=    9859.   10151.
  PER Q=    100.0
   AREA=   1569.3
    VEL=      6.6

*SECNO 310.550
   310.55      6.23  1302.98  1300.50      .00  1303.59      .62      .42      .01  1305.75
   10300.       0.   10300.       0.       0.    1633.       0.      97.      19.   1305.75
      .11      .00      6.31      .00     .030     .030     .030     .000  1296.73  9858.54
  .001580     250.     250.     250.        0       14        0      .00   282.92 10141.46
0
FLOW DISTRIBUTION FOR SECNO=    310.55          CWSEL=   1302.98

STA=    9859.   10151.
  PER Q=    100.0
   AREA=   1632.7
    VEL=      6.3

1
```


THIS RUN EXECUTED 05/22/89 17:48:19

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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 APRIL 1985
**************************************************


T1 SKUNK CREEK AT 51ST AVE
```

```
T2 SECTION 260.4 TO 310.55
T3        LAST PROFILE FUTURE     TOPO 10/5/89 11/20/81 2/4/80 6/6/74

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0.       7.        0.        0.   .003394       .20       .0        0.  1289.800      .000

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IZW       CHNIM     ITRACE

    15.000     .000      .000      .000      .000      .000    -1.000     .000      .000    15.000

1
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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 2

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV=    .100 CEHV=    .300
*SECNO 280.400

3470 ENCROACHMENT STATIONS=    9880.0   10159.0  TYPE=     1  TARGET=     279.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1287.30 ELREA=   100000.00

          DATA FOR THIS ANALYSIS IS BASED ON COE INPUT AND VERIFIED
          BY COE OUTPUT INFORMATION AS OF 11/19/84, EXCEPT FOR
          CHANNELIZATION OF SKUNK CREEK THROUGH OVERLAND HILLS
          CROSS SECTIONS 306.55 TO 310.55
          ADD PROPOSED CHANNELIZATION SECTIONS 288.1 TO 299.4
   280.40     8.63  1290.23  1288.42  1289.71  1291.07      .85      .00      .00  1287.30
   10500.      45.   10455.       0.      15.    1415.       0.       0.       0. 100000.00
     .00     2.92     7.39      .00     .045     .035     .045     .000  1281.60  9880.00
  .003408       0.       0.       0.        0       15        4      .00   279.00 10159.00
0
FLOW DISTRIBUTION FOR SECNO=    280.40          CWSEL=   1290.23

STA=    9880.    9885.   10170.
  PER Q=       .4     99.6
   AREA=     15.4   1414.6
    VEL=      2.9      7.4

*SECNO 285.700

3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1291.00 ELREA=     1292.00

   285.70     7.47  1291.67  1287.53  1291.10  1291.91      .24      .78      .06  1291.00
   10500.      17.   10483.       0.      38.    2647.       0.      25.       5.   1292.00
```

```
      .04      .46     3.96      .00     .045     .035     .045     .000  1284.20  9595.91
  .000821     530.     530.     530.        2       10        0      .00   564.23 10160.13
0
1
 05/22/89    17:47:42                                                                          PAGE   12


   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


 FLOW DISTRIBUTION FOR SECNO=    285.70          CWSEL=   1291.67

 STA=    9596.    9710.   10170.
   PER Q=       .2     99.8
    AREA=     38.3   2647.4
     VEL=       .5      4.0

 CCHV=    .100 CFHV=    .300
 *SECNO 288.100

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
          BEGIN PROPOSED CHANNELIZATION SECTIONS
   288.10     6.17  1291.67  1291.67  1291.67  1294.39     2.73      .45      .75  1295.50
   10500.       0.   10500.       0.       0.     792.       0.      35.       7.   1295.50
      .04      .00    13.25      .00     .045     .030     .045     .000  1285.50  9936.50
  .007713     240.     240.     240.        0       15        0      .00   146.99 10083.50
0
 FLOW DISTRIBUTION FOR SECNO=    288.10          CWSEL=   1291.67

 STA=    9937.   10095.
   PER Q=    100.0
    AREA=    792.2
     VEL=     13.3

 *SECNO 290.800

 3301 HV CHANGED MORE THAN HVINS

   290.80     7.74  1294.24  1292.67  1294.24  1295.85     1.61     1.35      .11  1296.50
   10500.       0.   10500.       0.       0.    1032.       0.      40.       8.   1296.50
      .05      .00    10.18      .00     .045     .030     .045     .000  1286.50  9904.27
  .023489     270.     270.     270.        3        5        0      .00   156.46 10060.73
0
 FLOW DISTRIBUTION FOR SECNO=    290.80          CWSEL=   1294.24

 STA=    9904.   10068.
   PER Q=    100.0
    AREA=   1031.5
     VEL=     10.2


1
 05/22/89    17:47:42                                                                          PAGE   13
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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


CCHV=    .300 CEHV=    .500
*SECNO 291.400

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1296.80 ELREA=     1296.80

   291.40     7.45  1294.25  1293.11  1294.25  1296.31     2.06      .23      .22  1296.80
   10400.      0.   10400.       0.       0.     903.       0.      42.       8.   1296.80
      .05     .00    11.51      .00     .045     .030     .045     .000  1286.60  9916.32
  .004362     60.      60.      60.        2       15        0      .00   132.37 10048.68
0
 FLOW DISTRIBUTION FOR SECNO=    291.40          CWSEL=   1294.25

 STA=    9916.   10053.
   PER Q=    100.0
    AREA=    903.4
     VEL=     11.5

 *SECNO 292.400

 3370 NORMAL BRIDGE,NRD=  8 MIN ELTRD= 1301.00 MAX ELLC= 1298.00

          51TH AVENUE BRIDGE
   292.40     7.21  1294.51  1293.68  1294.51  1296.79     2.28      .37      .11  1296.30
   10400.      0.   10400.       0.       0.     858.       0.      43.       8.   1296.00
      .05     .00    12.13      .00     .045     .030     .045     .000  1287.30  9916.69
  .005791     74.      74.      74.        2       15        0   -13.47   131.67 10048.35
0
 FLOW DISTRIBUTION FOR SECNO=    292.40          CWSEL=   1294.51

 STA=    9917.   10055.
   PER Q=    100.0
    AREA=    857.6
     VEL=     12.1

 CCHV=    .100 CEHV=    .300
 *SECNO 292.700

 3301 HV CHANGED MORE THAN HVINS

   292.70     8.06  1295.56  1293.64  1295.56  1297.00     1.43      .12      .08  1296.50
   10400.      0.   10400.       0.       0.    1082.       0.      44.       9.   1296.50
      .05     .00     9.61      .00     .045     .030     .045     .000  1287.50  9903.31
  .002968     30.      30.      30.        4       11        0      .00   158.38 10061.69
0
1
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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


FLOW DISTRIBUTION FOR SECNO=    292.70          CWSEL=   1295.56

STA=    9903.   10065.
  PER Q=    100.0
   AREA=   1082.0
    VEL=      9.6

*SECNO 296.300

3301 HV CHANGED MORE THAN HVINS

   296.30     6.52  1296.42  1296.03  1296.42  1298.77     2.36     1.50      .20  1298.90
   10400.       0.   10400.       0.       0.     844.       0.      52.      10.   1298.90
      .06      .00    12.32      .00     .045     .030     .045     .000  1289.90  9935.45
  .006242     360.     360.     360.        3       15        0      .00   149.10 10084.55
0
FLOW DISTRIBUTION FOR SECNO=    296.30          CWSEL=   1296.42

STA=    9935.   10092.
  PER Q=    100.0
   AREA=    844.3
    VEL=     12.3

CCHV=    .100 CEHV=    .300
*SECNO 299.400

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1295.50 ELREA=     1300.70

   299.40     7.23  1299.23  1298.73  1299.23  1300.79     1.56     1.94      .08  1295.50
   10400.    2529.    7871.       0.     445.     712.       0.      59.      11.   1300.70
      .07     5.68    11.06      .00     .045     .035     .045     .000  1292.00  9650.14
  .006260     310.     310.     310.        3        8        0      .00   263.50  9976.79
0
FLOW DISTRIBUTION FOR SECNO=    299.40          CWSEL=   1299.23

STA=    9650.    9660.    9668.    9683.    9762.    9770.    9778.    9826.    9859.    9980.
  PER Q=      1.1      3.0      1.7       .7      1.1      1.2      8.5      6.9     75.7
   AREA=     24.8     40.6     38.3     22.5     22.6     23.4    155.0    118.1    711.9
    VEL=      4.5      7.7      4.7      3.3      5.2      5.3      5.7      6.1     11.1

1
 05/22/89    17:47:42                                                                    PAGE   15


   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
```

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*SECNO 301.600

3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=    9870.0   10550.0  TYPE=     1  TARGET=   -9870.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=     1298.00 ELREA=     1301.50

   301.60     6.95  1300.95  1298.94  1301.05  1301.81      .86      .95      .07  1298.00
   10400.      94.   10306.       0.      30.    1381.       0.      65.      13.   1301.50
      .08     3.17     7.46      .00     .045     .035     .045     .000  1294.00  9870.00
  .003062     250.     220.     130.        2       19        0      .00   252.73 10122.73
0
 FLOW DISTRIBUTION FOR SECNO=    301.60          CWSEL=   1300.95

 STA=    9870.    9880.   10130.
   PER Q=        .9     99.1
    AREA=      29.6   1300.7
     VEL=       3.2      7.5

 CCHV=    .100 CEHV=    .300
 *SECNO 306.550
   306.55     5.93  1302.31  1300.15  1302.14  1303.00      .69     1.17      .02  1305.40
   10300.       0.   10300.       0.       0.    1543.       0.      82.      16.   1305.40
      .10      .00     6.69      .00     .030     .030     .030     .000  1296.38  9859.63
  .001887     505.     495.     465.        2       11        0      .00   280.73 10140.37
0
 FLOW DISTRIBUTION FOR SECNO=    306.55          CWSEL=   1302.31

 STA=    9860.   10151.
   PER Q=    100.0
    AREA=   1543.0
     VEL=      6.7

 *SECNO 306.900
          BEGIN OVERLAND HILLS
   306.90     5.99  1302.39  1300.17  1302.22  1303.07      .68      .06      .00  1305.42
   10300.       0.   10300.       0.       0.    1562.       0.      84.      16.   1305.42
      .10      .00     6.59      .00     .030     .030     .030     .000  1296.40  9859.40
  .001816      35.      35.      35.        0       14        0      .00   281.20 10140.60
0
1
 05/22/89    17:47:42                                                                    PAGE   16


   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


 FLOW DISTRIBUTION FOR SECNO=    306.90          CWSEL=   1302.39

 STA=    9859.   10151.
   PER Q=    100.0
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    AREA=   1562.0
     VEL=      6.6

 *SECNO 308.050
    308.05     6.15  1302.63  1300.25  1302.50  1303.27      .64      .20      .00  1305.50
    10300.       0.   10300.       0.       0.    1606.       0.      88.      17.   1305.50
       .11      .00     6.41      .00     .030     .030     .030     .000  1296.48  9850.86
   .001663     115.     115.     115.        2       14        0      .00   282.28 10141.14
0
 FLOW DISTRIBUTION FOR SECNO=    308.05          CWSEL=   1302.63

 STA=    9859.   10151.
   PER Q=    100.0
    AREA=   1606.2
     VEL=      6.4

 *SECNO 310.550
    310.55     6.34  1303.07  1300.50  1302.98  1303.67      .60      .40      .00  1305.75
    10300.       0.   10300.       0.       0.    1658.       0.      97.      18.   1305.75
       .12      .00     6.21      .00     .030     .030     .030     .000  1296.73  9858.23
   .001504     250.     250.     250.        0       14        0      .00   283.55 10141.77
0
 FLOW DISTRIBUTION FOR SECNO=    310.55          CWSEL=   1303.07

 STA=    9858.   10151.
   PER Q=    100.0
    AREA=   1658.4
     VEL=      6.2

1
 PROFILE FOR STREAM    LAST PROFILE FUTURE


 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


 ELEVATION  1280.     1285.     1290.     1295.     1300.     1305.     1310.     1315.     1320.     1325.
     SECNO   CUMDIS

    280.40     0.  .  I      .    L C  WME      .         .         .         .         .         .         .         R
              50.  .   I     .    L C  .WE      .         .         .         .         .         .         .         R
             100.  .   I     .     LC  .WE      .         .         .         .         .         .         .         R
             150.  .    I    .     CL  .W E     .         .         .         .         .         .         .         R
             200.  .    I    .     CL  . WEM    .         .         .         .         .         .         .         R
             250.  .     I   .     C L . WEM    .         .         .         .         .         .         .         R
             300.  .     I   .     C  L. WE M   .         .         .         .         .         .         .         R
             350.  .      I  .     C  L. WE  M  .         .         .         .         .         .         .         R
             400.  .      I  .    C    L  E  M  .         .         .         .         .         .         .         R
             450.  .       I .    C    .L WE  M .         .         .         .         .         .         .         R
             500.  .       I .    C    . LWE   M .         .         .         .         .         .         .         R
    283.70   550.  .       I .    C    . LWE   M .         .         .         .         .         .         .         .
             600.  .        I.      C  .  WLE   M.         .         .         .         .         .         .         .
             650.  .        I.        C.  W  ER M.         .         .         .         .         .         .         .
             700.  .         I         C  W   EL M         .         .         .         .         .         .         .
             750.  .         .I        . CW    E LM        .         .         .         .         .         .         .
    288.10   800.  .         .I        .  W    E.L         .         .         .         .         .         .         .
             850.  .         .I        .   W   E.L         .         .         .         .         .         .         .
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          900.  .        . I       .  CW    E L       .        .        .        .        .        .        .
          950.  .        . I       .  C W   E L       .        .        .        .        .        .        .
         1000.  .        . I       .   C W  .EL       .        .        .        .        .        .        .
  290.80 1050.  .        .  I      .   C  W . EL      .        .        .        .        .        .        .
  291.40 1100.  .        .   I     .    C  W.  EL     M        .        .        .        .        .        .
         1150.  .        .   I     .     C W.  E M    .        .        .        .        .        .        .
  292.40 1200.  .        .    I    .     C W. RLE     .        .        .        .        .        .        .
  292.70 1250.  .        .    I    .     C  .W LE     .        .        .        .        .        .        .
         1300.  .        .     I   .      C .W  E     .        .        .        .        .        .        .
         1350.  .        .     I   .       C. W LE    .        .        .        .        .        .        .
         1400.  .        .      I  .       C. W  E    .        .        .        .        .        .        .
         1450.  .        .       I .        C W   E   .        .        .        .        .        .        .
         1500.  .        .       I .        .CW   E   .        .        .        .        .        .        .
         1550.  .        .        I.        .C W   E  .        .        .        .        .        .        .
  296.30 1600.  .        .         I        . CW    E .        .        .        .        .        .        .
         1650.  .        .         I        .  CW  LE .        .        .        .        .        .        .
         1700.  .        .        .I        .   CWL ME.        .        .        .        .        .        .
         1750.  .        .        . I       .    CW  ER        .        .        .        .        .        .
         1800.  .        .        .  I      .  L  W  ME        .        .        .        .        .        .
         1850.  .        .        .  I      . L   CW M.E       .        .        .        .        .        .
  299.40 1900.  .        .        .   I     .L     CW MRE      .        .        .        .        .        .
         1950.  .        .        .    I    . L     CW.ME      .        .        .        .        .        .
         2000.  .        .        .     I   .  L    C W RE     .        .        .        .        .        .
         2050.  .        .        .      I  .   L   C .WRE     .        .        .        .        .        .
  301.60 2100.  .        .        .       I .     L C . WRE    .        .        .        .        .        .
         2150.  .        .        .       I .      LC . W EM   .        .        .        .        .        .
         2200.  .        .        .        I.       CL. W ER   .        .        .        .        .        .
         2250.  .        .        .        I.        CL  WERM  .        .        .        .        .        .
         2300.  .        .        .         I        C. LW ERM .        .        .        .        .        .
         2350.  .        .        .         I        C.  W E R .        .        .        .        .        .
         2400.  .        .        .        .I        C.   WE  R .        .        .        .        .        .
         2450.  .        .        .        .I         C   WEL  R.        .        .        .        .        .
         2500.  .        .        .         . I       C   W E LR.        .        .        .        .        .
         2550.  .        .        .         . I       C   W E  LR        .        .        .        .        .
  306.55 2600.  .        .        .         .  I      C    WE   .L       .        .        .        .        .
  306.90 2650.  .        .        .         .  I      C    WE   .L       .        .        .        .        .
         2700.  .        .        .         .  I      C    WE   .L       .        .        .        .        .
  308.05 2750.  .        .        .         .  I      .C   W E  .L       .        .        .        .        .
         2800.  .        .        .         .  I      .C   W E  .L       .        .        .        .        .
         2850.  .        .        .         .  I      .C    WE  .L       .        .        .        .        .
         2900.  .        .        .         .  I      .C    WE  .L       .        .        .        .        .
         2950.  .        .        .         .  I      .C    WE  .L       .        .        .        .        .
  310.55 3000.  .        .        .         .  I      .C    WE  . L      .        .        .        .        .
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THIS RUN EXECUTED 05/22/89 17:48:50

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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 APRIL 1985
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

SKUNK FUTURE FLOW

SUMMARY PRINTOUT

	SECNO	Q	CWSEL	SSTA	ENDST	TOPWID
	280.400	10500.00	1289.71	9781.09	10152.78	371.69
	280.400	10500.00	1290.23	9880.00	10159.00	279.00
	285.700	10500.00	1291.10	9693.29	10142.95	449.65
	285.700	10500.00	1291.67	9595.91	10160.13	564.23
*	288.100	10500.00	1291.67	9936.50	10083.50	147.00
*	288.100	10500.00	1291.67	9936.50	10083.50	146.99
	290.800	10500.00	1294.24	9904.27	10060.73	156.46
	290.800	10500.00	1294.24	9904.27	10060.73	156.46
	291.400	10400.00	1294.25	9916.32	10048.68	132.36
	291.400	10400.00	1294.25	9916.32	10048.68	132.37
	292.400	10400.00	1294.51	9916.69	10048.35	131.67
	292.400	10400.00	1294.51	9916.69	10048.35	131.67
	292.700	10400.00	1295.56	9903.31	10061.69	158.38
	292.700	10400.00	1295.56	9903.31	10061.69	158.38
	296.300	10400.00	1296.42	9935.45	10084.55	149.10
	296.300	10400.00	1296.42	9935.45	10084.55	149.10
	299.400	10400.00	1299.23	9650.14	9976.79	263.50
	299.400	10400.00	1299.23	9650.14	9976.79	263.50
	301.600	10400.00	1301.05	9745.28	10124.12	378.84
	301.600	10400.00	1300.95	9870.00	10122.73	252.73
	306.550	10300.00	1302.14	9860.22	10139.78	279.57
	306.550	10300.00	1302.31	9859.63	10140.37	280.73

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SECNO	Q	CWSEL	SSTA	ENDST	TOPWID
306.900	10300.00	1302.22	9860.01	10139.99	279.97
306.900	10300.00	1302.39	9859.40	10140.60	281.20
308.050	10300.00	1302.50	9859.31	10140.69	281.38
308.050	10300.00	1302.63	9858.86	10141.14	282.28
310.550	10300.00	1302.98	9858.54	10141.46	282.92
310.550	10300.00	1303.07	9858.23	10141.77	283.55

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SKUNK FUTURE FLOW

SUMMARY PRINTOUT TABLE 110

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENC
	280.400	1289.71	-.09	1290.41	371.69	1528.92	8971.08	.00	.00	.00	9885.00	10170.00	.0
	280.400	1290.23	.52	1291.07	279.00	45.17	10454.83	.00	279.00	9880.00	9885.00	10170.00	10159.0
	285.700	1291.10	.00	1291.40	449.65	.12	10499.88	.00	.00	.00	9710.00	10170.00	.0
	285.700	1291.67	.57	1291.91	564.23	17.49	10482.51	.00	.00	.00	9710.00	10170.00	.0
*	288.100	1291.67	.00	1294.39	147.00	.00	10500.00	.00	.00	.00	9925.00	10095.00	.0
*	288.100	1291.67	.00	1294.39	146.99	.00	10500.00	.00	.00	.00	9925.00	10095.00	.0
	290.800	1294.24	.00	1295.85	156.46	.00	10500.00	.00	.00	.00	9897.50	10067.50	.0
	290.800	1294.24	.00	1295.85	156.46	.00	10500.00	.00	.00	.00	9897.50	10067.50	.0
	291.400	1294.25	.00	1296.31	132.36	.00	10400.00	.00	.00	.00	9912.50	10052.50	.0
	291.400	1294.25	.00	1296.31	132.37	.00	10400.00	.00	.00	.00	9912.50	10052.50	.0
	292.400	1294.51	.00	1296.79	131.67	.00	10400.00	.00	.00	.00	9905.00	10055.00	.0
	292.400	1294.51	.00	1296.79	131.67	.00	10400.00	.00	.00	.00	9905.00	10055.00	.0
	292.700	1295.56	.00	1297.00	158.38	.00	10400.00	.00	.00	.00	9900.50	10064.50	.0
	292.700	1295.56	.00	1297.00	158.38	.00	10400.00	.00	.00	.00	9900.50	10064.50	.0
	296.300	1296.42	.00	1298.77	149.10	.00	10400.00	.00	.00	.00	9928.00	10092.00	.0
	296.300	1296.42	.00	1298.77	149.10	.00	10400.00	.00	.00	.00	9928.00	10092.00	.0
	299.400	1299.23	.00	1300.79	263.50	2528.99	7871.01	.00	.00	.00	9859.00	9980.00	.0
	299.400	1299.23	.00	1300.79	263.50	2528.93	7871.06	.00	.00	.00	9859.00	9980.00	.0
	301.600	1301.05	.00	1301.72	378.84	826.01	9573.99	.00	.00	.00	9880.00	10130.00	.0
	301.600	1300.95	-.10	1301.81	252.73	93.57	10306.43	.00	-9870.00	9870.00	9880.00	10130.00	10159.0
	306.550	1302.14	.00	1302.87	279.57	.00	10300.00	.00	.00	.00	9849.00	10151.00	.0
	306.550	1302.31	.17	1303.00	280.73	.00	10300.00	.00	.00	.00	9849.00	10151.00	.0
	306.900	1302.22	.00	1302.95	279.97	.00	10300.00	.00	.00	.00	9849.00	10151.00	.0
	306.900	1302.39	.17	1303.07	281.20	.00	10300.00	.00	.00	.00	9849.00	10151.00	.0
	308.050	1302.50	.00	1303.17	281.38	.00	10300.00	.00	.00	.00	9849.00	10151.00	.0
	308.050	1302.63	.13	1303.27	282.28	.00	10300.00	.00	.00	.00	9849.00	10151.00	.0
	310.550	1302.98	.00	1303.59	282.92	.00	10300.00	.00	.00	.00	9849.00	10151.00	.0
	310.550	1303.07	.09	1303.67	283.55	.00	10300.00	.00	.00	.00	9849.00	10151.00	.0

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SUMMARY OF ERRORS AND SPECIAL NOTES

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CAUTION  SECNO=   288.100  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   288.100  PROFILE= 1  MINIMUM SPECIFIC ENERGY
CAUTION  SECNO=   288.100  PROFILE= 2  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   288.100  PROFILE= 2  MINIMUM SPECIFIC ENERGY
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05/22/89 17:47:42 PAGE 21

FLOODWAY DATA, SKUNK FUTURE FLOW
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
280.400	279.	1430.	7.3	1290.2	1289.7	.5
285.700	564.	2686.	3.9	1291.7	1291.1	.6
288.100	147.	792.	13.3	1291.7	1291.7	.0
290.800	156.	1032.	10.2	1294.2	1294.2	.0
291.400	132.	903.	11.5	1294.3	1294.3	.0
292.400	132.	858.	12.1	1294.5	1294.5	.0
292.700	158.	1082.	9.6	1295.6	1295.6	.0
296.300	149.	844.	12.3	1296.4	1296.4	.0
299.400	327.	1157.	9.0	1299.2	1299.2	.0
301.600	253.	1410.	7.4	1301.0	1301.0	.0
306.550	281.	1543.	6.7	1302.3	1302.1	.2
306.900	281.	1562.	6.6	1302.4	1302.2	.2
308.050	282.	1606.	6.4	1302.6	1302.5	.1
310.550	284.	1658.	6.2	1303.1	1303.0	.1

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05/22/89 17:48:56 PAGE 1

THIS RUN EXECUTED 05/22/89 17:48:56

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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 APRIL 1985
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EXHIBIT 1 A

PRESENT 100-YEAR FLOOD PROFILE

116581

51 ST AVENUE
PHOENIX STREETS-MARICOPA CO.
UNION HILLS DRIVE TO BEARDSLEY ROAD

F.H.W.A. REGION	STATE	PROJ. NO	SHEET NO	TOTAL SHEETS	AS BUILT
9	ARIZ	P-876029			

CONSULTING ENGINEER

DES.	DR.	CK.	DATE
PJB	JST	RTH	6/14/89

rga engineering corporation
2633 East Indian School Road
Suite 401
Phoenix, Arizona 85015-6741
(602) 957-6191

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 24 10013 BY ARIZONA U.S.A.

REVISION BY CITY OF PHOENIX

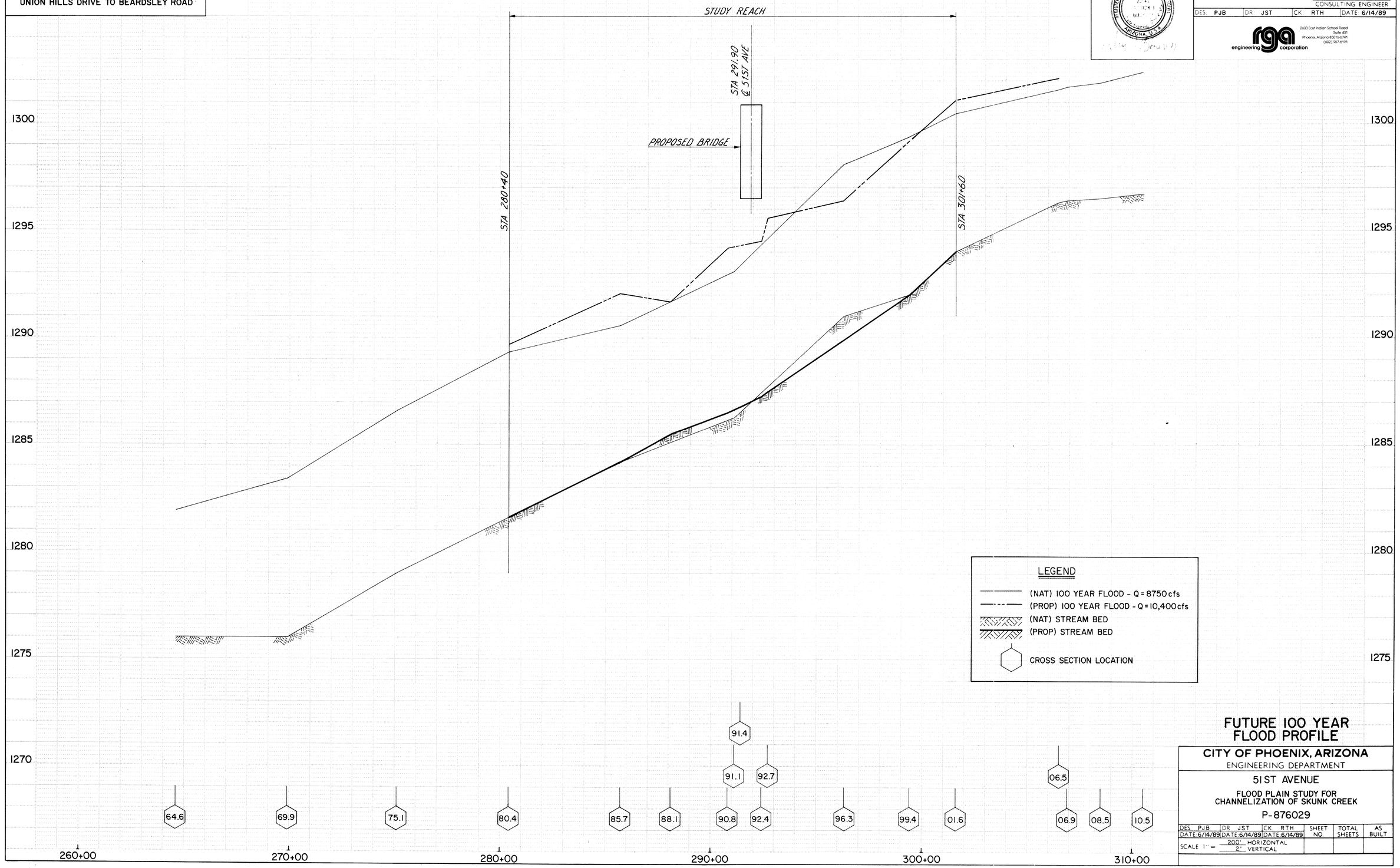
NO.	DESCRIPTION	REV. BY	CKD. BY	DATE

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV. BY	CKD. BY	DATE

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV. BY	CKD. BY	DATE



FUTURE 100 YEAR FLOOD PROFILE

CITY OF PHOENIX, ARIZONA
ENGINEERING DEPARTMENT

51ST AVENUE

FLOOD PLAIN STUDY FOR CHANNELIZATION OF SKUNK CREEK

P-876029

DES. PJB	DR. JST	CK. RTH	SHEET NO	TOTAL SHEETS	AS BUILT
DATE 6/14/89	DATE 6/14/89	DATE 6/14/89			

SCALE 1" = 200' HORIZONTAL / 2' VERTICAL

EXHIBIT 1b

EXHIBIT 1 B

FUTURE 100-YEAR FLOOD PROFILE

116581

51 ST AVENUE
PHOENIX STREETS-MARICOPA CO.
UNION HILLS DRIVE TO BEARDSLEY ROAD

F.H.W.A. REGION	STATE	PROJ. NO	SHEET NO	TOTAL SHEETS	AS BUILT
9	ARIZ	P-876029			

CONSULTING ENGINEER
DES: PJB | DR: JST | CK: RTH | DATE 6/14/89

rga engineering corporation
2633 East Indian School Road
Suite 401
Phoenix, Arizona 85016-6741
(602) 957-6191

REGISTERED PROFESSIONAL ENGINEER (CIVIL) ARIZONA, U.S.A.

REVISION BY CITY OF PHOENIX

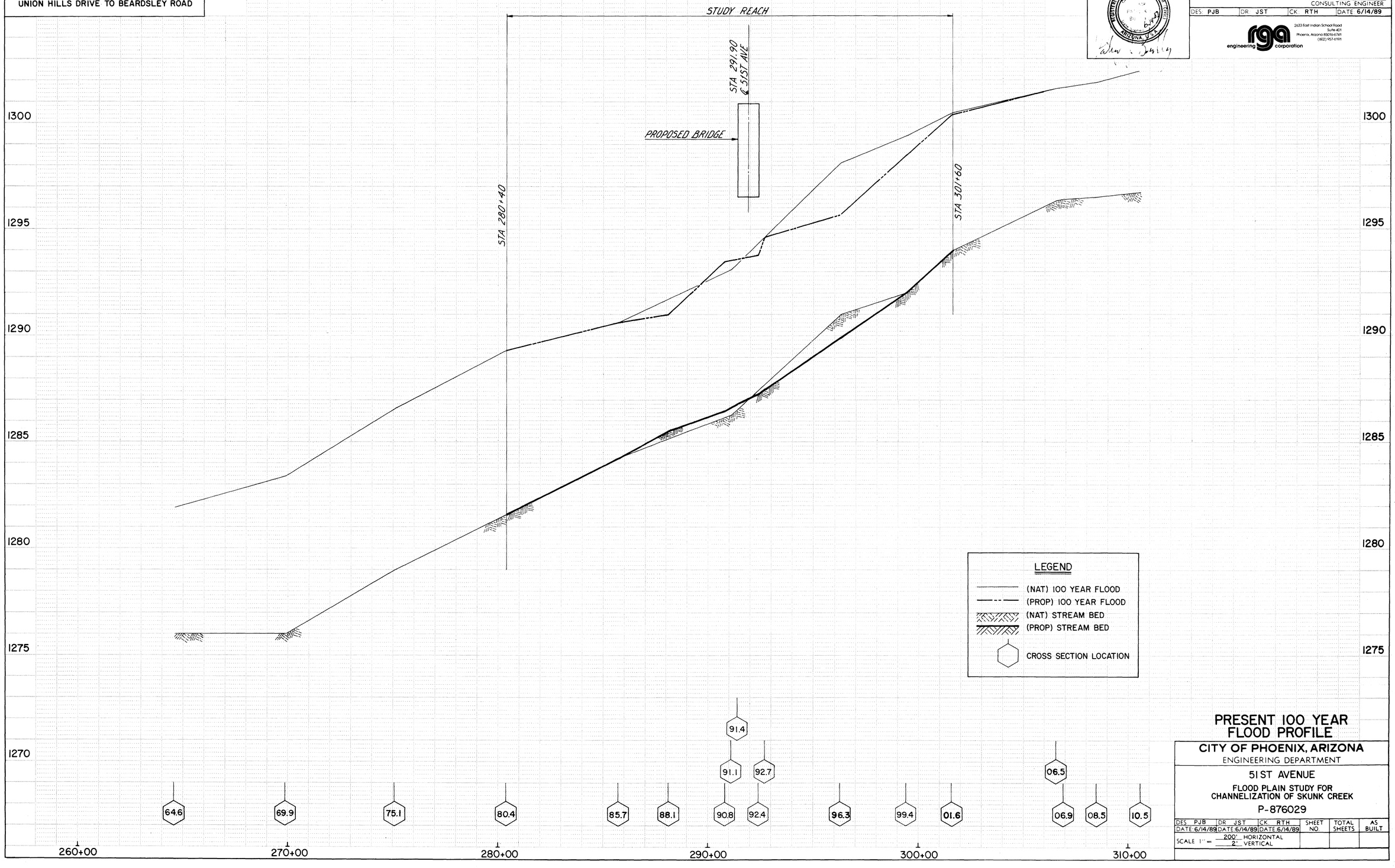
NO.	DESCRIPTION	REV. BY	CKD. BY	DATE

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV. BY	CKD. BY	DATE

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV. BY	CKD. BY	DATE



PRESENT 100 YEAR FLOOD PROFILE

CITY OF PHOENIX, ARIZONA
ENGINEERING DEPARTMENT

51 ST AVENUE

FLOOD PLAIN STUDY FOR CHANNELIZATION OF SKUNK CREEK

P-876029

DES. PJB	DR. JST	CK. RTH	SHEET NO.	TOTAL SHEETS	AS BUILT
DATE: 6/14/89	DATE: 6/14/89	DATE: 6/14/89			

SCALE 1" = 200' HORIZONTAL, 2' VERTICAL

EXHIBIT 1a

EXHIBIT 2

PRELIMINARY PLAN OF PROPOSED BRIDGE

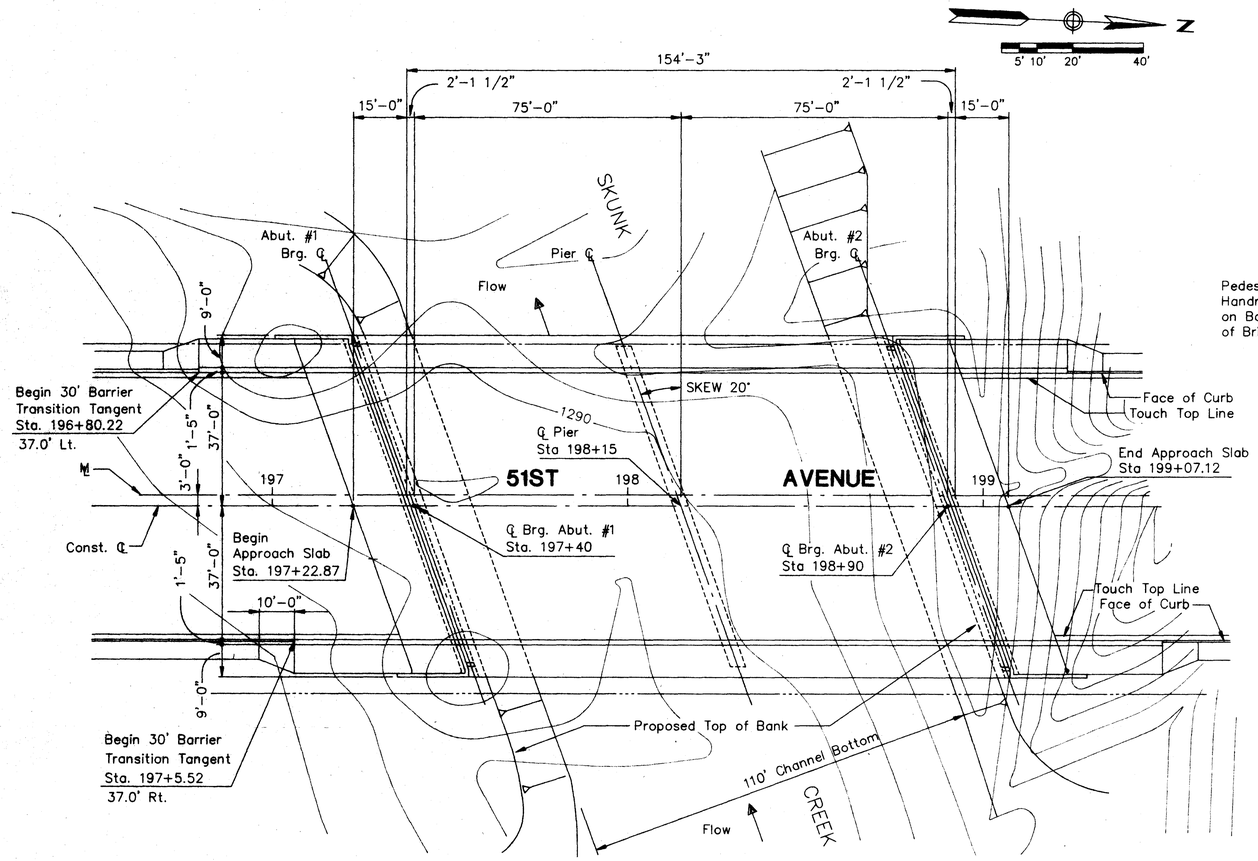
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	AZ.	P-876029			

CONSULTING ENGINEER

DESIGN PJB	DRAWN RHM	CHECK RTH	DATE 6/14/89

rge engineering corporation
2633 East Indian School Road
Suite 401
Phoenix, Arizona 85016-6741
(602) 957-6181

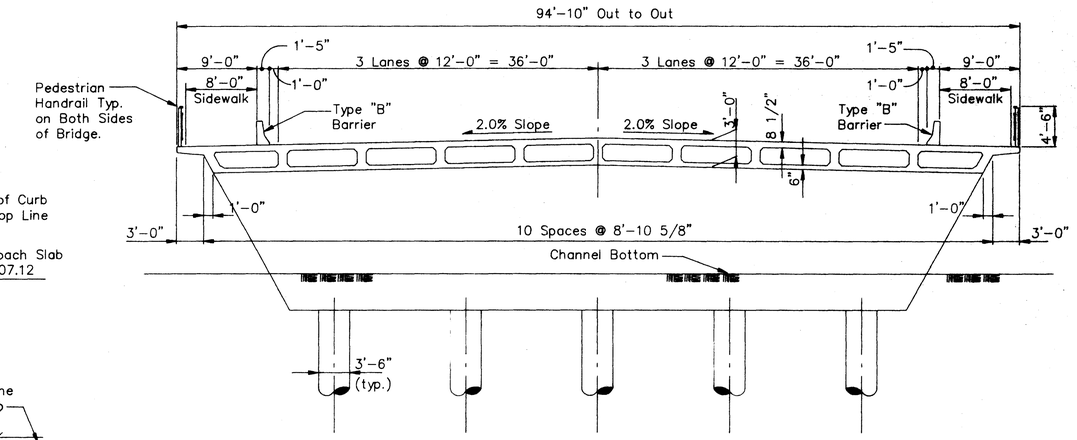
REGISTERED PROFESSIONAL ENGINEER CERTIFICATE NO. 22,4-- PATRICK J. BUCKLEY ARIZONA U.S.A.



BRIDGE LOCATION PLAN

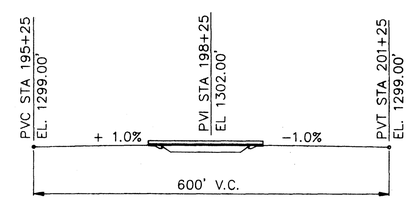
New 2-Span Post Tension Concrtet Box Girder.
SKEW: 20° Lt.

Scale: 1" = 20.0'



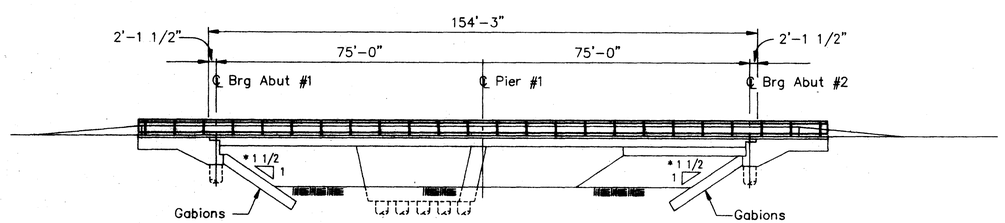
TYPICAL BRIDGE SECTION

Scale: 1/8" = 1'-0"



51ST AVENUE PROFILE GRADE

Scale: 1" = 100.0'



* Channel 110' Bottom Width w/ 1 1/2:1 Sideslope At Bridge.

BRIDGE ELEVATION

Scale: 1" = 20.0'

HYDRAULIC INFORMATION

Q_{100}	=	8750 cfs
V_{100}	=	9.0 ft/sec
WS ELEV.	=	1293.82'

REVISION BY CITY OF PHOENIX				
NO.	DESCRIPTION	REV. BY	CHK. BY	DATE

BRIDGE LOCATION, SECTION, AND ELEVATION.

CITY OF PHOENIX, ARIZONA
ENGINEERING DEPARTMENT

51 ST AVENUE

FLOOD PLAIN STUDY FOR CHANNELIZATION OF SKUNK CREEK

P-876029

DR RHM	DES PJB	CK RTH	SHEET NO.	TOTAL SHEETS	AS BUILT
DATE 6/14/89	DATE 6/14/89	DATE 6/14/89			
SCALE : AS SHOWN					

EXHIBIT 2

ATTACHMENT 1

BOX CULVERT DESIGN

PROJECT: 51ST AVE.
RGA #88084

STATION: 291+90
SHEET 1 OF 2

CULVERT DESIGN FORM
DESIGNER / DATE: RJB / 5/23/89
REVIEWER / DATE: ____ / ____

HYDROLOGICAL DATA

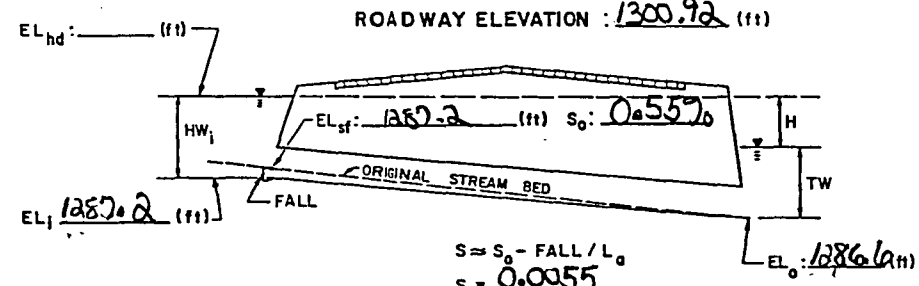
SEE ADD'L. SHTS.

- ☐ METHOD: ____
- ☐ DRAINAGE AREA: ____ ☐ STREAM SLOPE: 0.4%
- ☐ CHANNEL SHAPE: TRAPEZOIDAL
- ☐ ROUTING: ____ ☐ OTHER: ____

DESIGN FLOWS/TAILWATER

R.I. (YEARS)	FLOW (cfs)	TW (ft)
PRESENT 100	8750	7.42
FUTURE 100	10400	8.17

ROADWAY ELEVATION: 1300.92 (ft)



$S \approx S_o - FALL / L_a$
$S = 0.0055$
$L_a = 110$

CULVERT DESCRIPTION: MATERIAL - SHAPE - SIZE - ENTRANCE	TOTAL FLOW Q (cfs)	FLOW PER BARREL Q/N (1)	HEADWATER CALCULATIONS: INLET CONTROL HW_i/D (2)	HW_i	FALL (3)	EL_hi (4)	OUTLET CONTROL TW (5)	d_c	(d_c+D)/2	h_o (6)	k_e	H (7)	EL_ho (8)	CONTROL HEADWATER ELEVATION	OUTLET VELOCITY	COMMENTS
11-10x8	8750	795	1.25	10	–	1297.2	7.4	5.8	6.9	7.4	0.2	2.1	1296.1	1297.2		UNACCEPTABLE
9-12x8	8750	972	1.28	10.2	–	1297.4	7.4	5.9	7.0	7.4	0.2	2.3	1296.3	1297.4		"
11-10x8	10,400	946	1.5	12.0	–	1299.3	8.2	6.5	7.25	8.2	0.2	3.1	1297.9	1299.3		"
9-12x8	10,400	1156	2.5	20	–	1307.3	8.2	6.5	7.25	8.2	0.2	2.9	1297.7	1307.3		"

TECHNICAL FOOTNOTES:

(1) USE Q/NB FOR BOX CULVERTS

(2) $HW_i/D = HW/D$ OR HW_t/D FROM DESIGN CHARTS

(3) $FALL = HW_i - (EL_{hd} - EL_{sf})$; FALL IS ZERO FOR CULVERTS ON GRADE

(4) $EL_{hi} = HW_i + EL_i$ (INVERT OF INLET CONTROL SECTION)

(5) TW BASED ON DOWN STREAM CONTROL OR FLOW DEPTH IN CHANNEL.

(6) h_o = TW or $(d_c + D/2)$ (WHICHEVER IS GREATER)

(7) $H = \left[1 + k_e + (29n^2 L)/R^{1.33}\right] V^2/2g$

(8) $EL_{ho} = EL_o + H + h_o$

SUBSCRIPT DEFINITIONS:

a. APPROXIMATE
f. CULVERT FACE
hd. DESIGN HEADWATER
hi. HEADWATER IN INLET CONTROL
ho. HEADWATER IN OUTLET CONTROL
i. INLET CONTROL SECTION
o. OUTLET
sf. STREAMBED AT CULVERT FACE
tw. TAILWATER

COMMENTS / DISCUSSION:

HW WITH BRIDGE: $HW_{PRESENT} = 1293.8$
$HW_{FUTURE} = 1294.5$
HW of EXIST COE REPORT = 1295.9

CULVERT BARREL SELECTED:

SIZE: ____
SHAPE: ____
MATERIAL: ____
ENTRANCE: ____

PROJECT: 51ST AVE
RGA #88084

STATION: 291.90
SHEET 2 OF 2

CULVERT DESIGN FORM
DESIGNER / DATE: PJB / 5/23/89
REVIEWER / DATE: / /

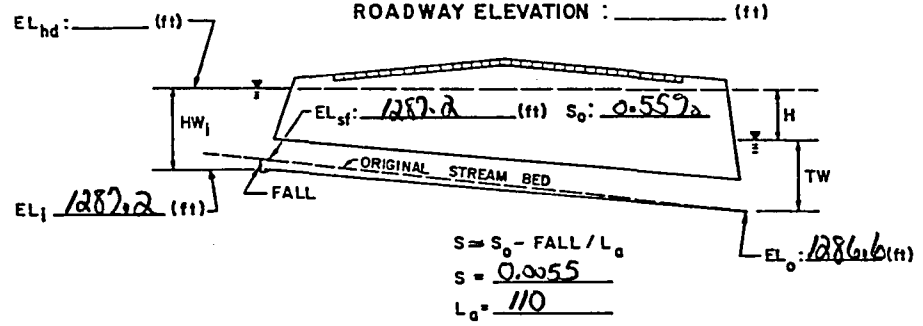
HYDROLOGICAL DATA

SEE ADD'L. SHTS.

- ☐ METHOD:
- ☐ DRAINAGE AREA: ☐ STREAM SLOPE:
- ☐ CHANNEL SHAPE:
- ☐ ROUTING: ☐ OTHER:

DESIGN FLOWS/TAILWATER

R.I. (YEARS)	FLOW (cfs)	TW (ft)
Present 100	8750	7.42
Future 100	10400	8.17



CULVERT DESCRIPTION: MATERIAL - SHAPE - SIZE - ENTRANCE	TOTAL FLOW Q (cfs)	FLOW PER BARREL Q/N (1)	HEADWATER CALCULATIONS: INLET CONTROL HW_i/D (2)	HW_i	FALL (3)	EL_hi (4)	OUTLET CONTROL TW (5)	d_c	(d_c+D)/2	h_o (6)	k_e	H (7)	EL_ho (8)	CONTROL HEADWATER ELEVATION	OUTLET VELOCITY	COMMENTS
15- 10x8	8750	583	1.01	8.1	–	1295.3	7.42	4.75	6.4	7.42	0.2	1.15	1295.2	1295.3	7.3	
13- 12x8	8750	673	0.99	7.9	–	1295.1	7.42	4.75	6.4	7.42	0.2	1.1	1295.1	1295.1	7.0	
15- 10x8	10400	693	1.13	9.0	–	1296.2	8.17	5.32	6.66	8.17	0.2	1.5	1296.3	1296.3	8.7	
13- 12x8	10400	800	1.11	8.9	–	1296.1	8.17	5.18	6.59	8.17	0.2	1.45	1296.2	1296.2	8.3	

TECHNICAL FOOTNOTES:

(1) USE Q/NB FOR BOX CULVERTS

(2) $HW_i/D = HW/D$ OR HW_i/D FROM DESIGN CHARTS

(3) $FALL = HW_i - (EL_{hd} - EL_{sf})$; FALL IS ZERO FOR CULVERTS ON GRADE

(4) $EL_{hi} = HW_i + EL_i$ (INVERT OF INLET CONTROL SECTION)

(5) TW BASED ON DOWN STREAM CONTROL OR FLOW DEPTH IN CHANNEL.

(6) h_o = TW or $(d_c + D/2)$ (WHICHEVER IS GREATER)

(7) $H = \left[1 + k_e + (29 n^2 L)/R^{1.33}\right] V^2/2g$

(8) $EL_{ho} = EL_o + H + h_o$

SUBSCRIPT DEFINITIONS:

a. APPROXIMATE
f. CULVERT FACE
hd. DESIGN HEADWATER
hi. HEADWATER IN INLET CONTROL
ho. HEADWATER IN OUTLET CONTROL
i. INLET CONTROL SECTION
o. OUTLET
sf. STREAMBED AT CULVERT FACE
tw TAILWATER

COMMENTS / DISCUSSION:

THIS DESIGN WOULD NOT RAISE THE ORIGINAL HEADWATER AND SHALL BE USED TO COMPARE TO BRIDGE OPTION. BRIDGE OPTION LOWERS THE HEADWATER BY 1.3 FEET.

CULVERT BARREL SELECTED:

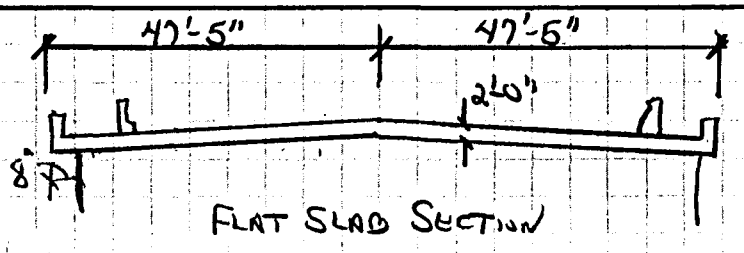
SIZE: 13- 12x8
SHAPE: BOX CULVERT
MATERIAL:
ENTRANCE:

ATTACHMENT 2

COST OF BRIDGE AND BOX CULVERT

engineering corporation

project 51ST AVE BRIDGE no. 88084
client CITY OF PHOENIX design DJB date 5/23/89
subject PRELIMINARY DESIGN & COSTS checked _____ date _____



FLAT SLAB SECTION

FLAT SLAB SECTION
SPAN - 150' OR 165'
3 SPAN

150' SPAN - HGL = 1293.8'
LOW CHORD - 1296.5'
LOW ELEV - 1298.5'

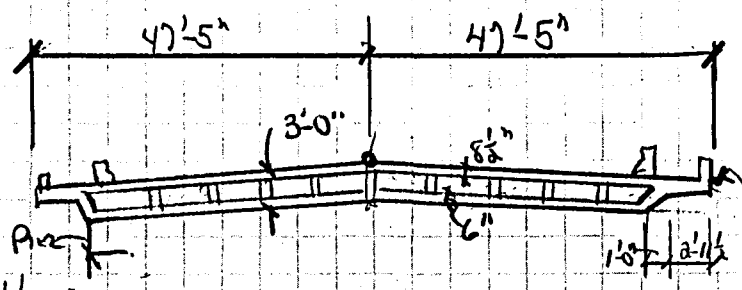
165' SPAN - HGL - 1293.77
LOW CHORD - 1295.8
LOW ELEV - 1297.8

VOL = 47.42 * 2 * 2.0 * 150' = 1053 CY
1053 * $250 = $263,250

PIER - 1.5' * 93.5' * 12.0' * 2 = 125 CY
(2 REQD) 125 * $250 = $31,250

DRILLED SHAFT - 40' LENGTH * 8 SHAFTS PER PIER * 2 = 640'
3'-6" - $75/LF 640' * 75 = $48,000

SUPERSTRUCTURE COST = $342,500



POST-TENSION BOX GIRDER
2-SPAN - 75' = 150'-0"

HGL 150' SPAN - 1293.8
LOW CHORD 1296.5
LOW ELEV. 1299.5

743.3 * $365/CY = $271,304.5

VOL:
TOP SLAB 0.71' * 47.42' * 2 * 150' = 374.1 CY
BOT SLAB 0.5 * 43.46' * 2 * 150' = 241.4 CY
WEB 11 * 1.0 * 1.79 * 150' = 109.4 CY
OVERHANG 2.96 * 0.25 * 150 = 4.0 CY
PIER BM 5.0 * 1.79 * 43.46 = 14.4 CY

TOTAL = 743.3 CY
= DUE TO HIGHER CONCRETE UNIT COST FOR FORMING COMPARING FLAT SLAB AND BOX GIRDER WOULD BE ABOUT SAME FOR SLAB CONCRETE COSTS. WHERE THIS OPTION WOULD SAVE IS LESS CONC. FOR PIER AND DRILLED SHAFTS.

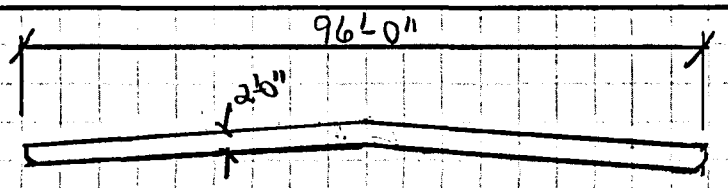
PIER: 2.0 * 39.5 * 2 * 12.0 = 70 CY.
(ONE REQD) 70 * $250/CY = $17,500

DRILLED SHAFTS - 40' LENGTH * 7 SHAFTS
@ PIER = 280' * $75/LF = $21,000

SUPERSTRUCTURE COST = $309,804.50
+ FORMWORK

engineering corporation

project 51ST AVE BRIDGE no. 88084
client CITY OF PHOENIX design RJB date 5/23/89
subject PRELIMINARY DESIGN & COSTS checked _____ date _____



PRESTRESSED BOX BEAM
SPAN - 3 @ 55' = 165'-0"
3 @ 50' = 150'-0"

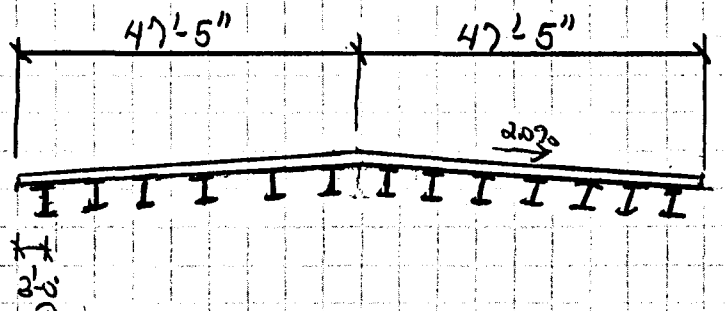
BEAMS
3 * 50 * $74 * 24 = $266,400 x 1.15 = 306,360 (GENERAL'S MARKUP)

0.33 * 165 * 98'D = 197.6 CY * 250/CY = $49,400

PIER 2 EA = 125 CY * 250 = $31,250

D.S = 640' x $75/LF = $48,000

SUPERSTRUCTURE COSTS = $435,010



PRESTRESSED TYPE III BEAMS
SPAN 2 - 75'

DEPTH = 3.75 + 0.67 = 4.42'

BEAMS:
2 * 12 * 75' * $80/LF * 1.15 = $165,600

SLAB
0.67 * 47.42 * 2 * 150' = 353 CY

353 CY * $225/CY = $79,425

PIER ONE EA = $17,500

D.S = $21,000

SUPERSTRUCTURE COST = $283,525

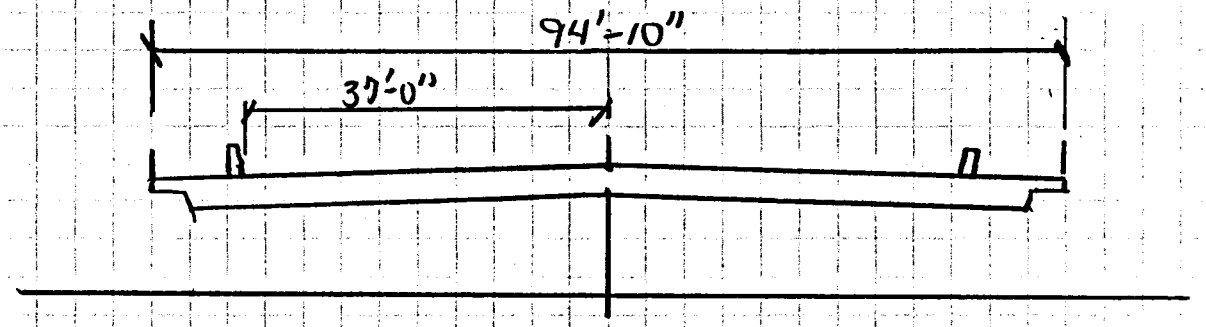
∴ THIS ALTERNATIVE least expensive but structural depth MAYBE TOO MUCH.

HGL - 1293.8
LOW CHORD - 1296.5
LOW ELEV. - 1300.92
℄ ELEV. - 1301.9

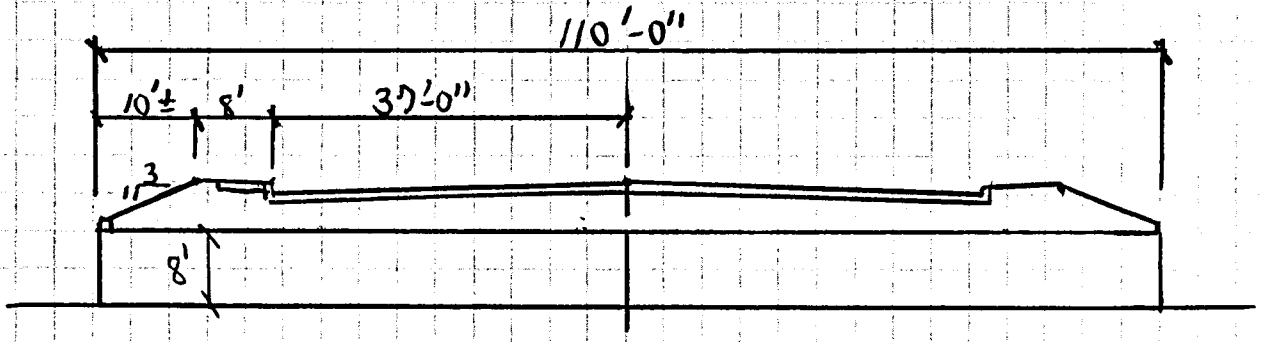
∴ USE THIS OPTION IF ROADWAY CAN BE 1301.90 AT ℄ ROADWAY

engineering corporation

project 51ST AVE. BRIDGE no. 88084
client CITY OF PHOENIX design PJB date 5/23/89
subject PRELIMINARY DESIGN & COST checked _____ date _____



TYP. BRIDGE SECTION



TYP. BOX CULVERT

engineering corporation

project 51ST AVE BRIDGE no. 88084
client CITY OF PHOENIX design RIB date 5/23/89
subject PRELIMINARY DESIGN & COST checked _____ date _____

BOX CULVERT ALTERNATIVE:

COMPARE COSTS OF A BOX CULVERT DESIGN TO BRIDGE OPTION. HYDRAULICALLY 13-12x8 BOX CULVERT WOULD RESULT IN A HEADWATER ELEVATION OF 1295.1 feet. THE TWO 75' SPAN BRIDGE WOULD RESULT IN A HEADWATER ELEVATION OF 1293.8. THE EXISTING COE STUDY HAS A HGL AT ℄ 51ST AVE OF 1295.87. THESE OPTIONS WILL BE COMPARED COSTWISE. IT IS THOUGHT THAT THE BRIDGE WILL COST LESS. IF NOT CLOSER COMPARISON WILL BE MADE.

13-12x8 CBC * 110' BOX CULV. CONCRETE COST = $200/CY
BOX CULV. REINF = $0.40/lb

QUANTITY:

C- SIX 8.964 CY/LF * 110 = 986
C SIX 8.964 CY/LF * 110 = 986
C (SLAB ONLY) ONE T=12½" 2.25' * 12' 1.0 CY/LF * 110 = 110 TOTAL CONC = 2,082 CY
C 20° INLET WALL 25.35 + 12 BARS * 1.79 CY = 46.8 CY
C 20° OUTLET WALL 33.82 + 12 BARS * 3.17 CY = 71.9 CY TOTAL 2,200.7 CY

CONC. COST = 2,200.7 CY * 2 = 440,140 >> BRIDGE COST

THE CONC QUANTITY IS MUCH LARGER THAN WILL BE REQUIRED FOR BRIDGE ∴ BRIDGE WILL COST LESS - USE 2 SPAN BRIDGE