ORIGINAL

HYDRAULIC ANALYSIS AT CHAPARRAL ROAD BRIDGE

by
Bill Jolly

A680.907

85 Rancho Del Sol
Gilbert, Arizona 85234
April 26, 1979

Property of
Flood Control District Library
Please return to
2801 W. Durango
Phoenix, AZ 85009

Flood Control District of Maricopa County
3335 West Durango
Phoenix, Arizona 85009

Attention: Nick Karan

Reference: Hydraulic Calculations Chaparral Road Bridge - Indian Bend Wash Greenbelt, FCD 79-02

Dear Mr. Karan:

The report of flow conditions at the referenced location is submitted herewith. The report addresses hydraulic parameters of the 30,000 cfs 100-year flood for Indian Bend Wash and recommends containment elevations through the reach studied. The study did not determine any major deficiencies in containment of the 100-year flow as a result of the new bridge. However, the topography available from the Corps of Engineers and the City of Scottsdale lacks sufficient detail for determining whether minor breakouts will occur. Once the results have been transmitted to the City of Scottsdale, the City should verify continuous containment by existing topography on the east bank and by review of construction plans for the west bank being built in conjunction with the bridge.

I will be happy to discuss the results once you have had the opportunity to review the report.

Sincerely,

B. R. Jolly

B. R. Jolly, P. E. Consulting Engineer

Enclosure

Analysis of Flows

in the

Vicinity of Chaparral Road Bridge

at

Indian Bend Wash, Scottsdale, Arizona

Prepared for the

Flood Control District of Maricopa County

by

B. R. Jolly, P. E., Consulting Engineer

85 Rancho Del Sol

Gilbert, Arizona 85234

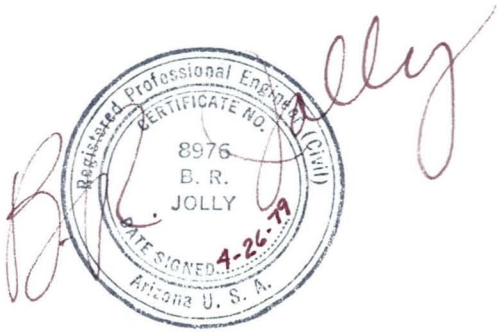
April 1979

TABLE OF CONTENTS

	Page Number
Definition of the Problem	1
Conditions and Assumptions	1
Method of Analysis	2
Results	3
Recommendations	6
Consideration of Low-Flows	6

List of Supplementary Data

Figure 1:	Flow Rate vs. Water Surface Elevation Right and Left Channels	4
Table 1:	Flow Conditions for Right and Left Channels	5
Table 2:	Low-Flow Channel Profiles for 3,300 cfs and 4,000 cfs Flows	7
Appendix A:	HEC-2 Program Output, Right Channel Flows of 2,600 cfs and 2,800 cfs	
Appendix B:	HEC-2 Program Output, Left Channel Flows of 27,200 cfs and 27,400 cfs	
Appendix C:	HEC-2 Program Output Low-Flow Values of 3,300 cfs and 4,000 cfs Contained Within Right Channel	



Definition of the Problem

The Indian Bend Wash Greenbelt is in the process of development into a flood channel capable of containing a 100-year flow of 30,000 cfs. Provisions are to be made, in addition, for a low-flow channel and bridge crossings of the low-flow channel at various locations including Chaparral Road, the subject of this analysis.

In construction of low-flow bridges within the Greenbelt, some modifications of 100-year flood flow characteristics are usually incurred. It is the joint responsibility of the Flood Control District of Maricopa County and the City of Scottsdale to determine the extent of these modifications and to take such additional action as may be necessary to assure future containment of the 30,000 cfs 100-year flood within the Greenbelt.

The expected effects of the Chaparral Road Bridge are of sufficient severity and complexity to require the detailed analysis via HEC-2 computerized modelling contained herein. Additionally, performance of the low-flow channel and bridge at their design flow is included because of its significance.

Conditions and Assumptions of Study

Hydraulic analysis by HEC-2 water surface profile calculations was performed for the 100-year flood flow of 30,000 cfs and for Chaparral Road Bridge low-flow hydraulics at flows of 3300 cfs and 4000 cfs. The water surface elevation of 1251.90 at Sta. 312+50, approximately 200 feet downstream of Chaparral Road, calculated by the Corps of Engineers in their HEC-2 analysis dated 05 December 1977 was adopted as the initial condition. This location is considered a sufficiently distant downstream location, given the channel configuration and roughness factors in the intervening channel, to produce accurate flow data through the Chaparral Road Bridge and reasonable open channel flow values throughout the reach, Sta. 312+50 to Sta. 319+00.

The reach lengths (cross-section locations) selected by Scottsdale City staff in their initial analysis were adopted for the analysis. This relatively high number of cross-sections can be made to quite accurately model channel conditions. However, the HEC-2 analysis and its output must be closely monitored to assure that model calculations are representative of flow conditions which can be reasonably expected in the field. Some adjustments in the cross-section data points were made to more adequately describe the channel configuration. Lower roughness values than those assumed by the Corps were used to match design roughness value to the more-frequent cross-sections. This less conservative approach is somewhat tempered by more frequent application of contraction or expansion loss factors inherent in increasing the number of cross-sections. The result is selection of more objective values for roughness coefficients and, therefore, a more accurate model.

The occurrence of trees in the channel is modelled by adjusting cross-section descriptions to delineate blockage due to trees. Roughness is

modelled by assuming a roughness coefficient somewhat lower than would be assumed if the trees were considered as increased roughness with no cross-section modifications. Although the blockage model produces less flow area, justifying lower roughness coefficients, it does not totally account for increased turbulence and hydraulic radius physically encountered. Therefore, roughness coefficients somewhat higher than represented by surface conditions between the trees are used.

Method of Analysis

Within the reach under consideration, Sta. 312+50 to 319+00, Hayden Road serves to effectively divide the flows into relatively independent channels. Conditions at Sta. 312+50 warrant considering this location as the upstream limit of undivided flow and using the water surface determined by the Corps as a starting value for this analysis.

In computing flow conditions through the subject reach assuming undivided flows, the effects of Hayden Road are severe. Generally from section to section, the proportions of flow left and right of Hayden Road vary widely. The depth of flow over Hayden Road and differential head between left and right flow areas required to transfer the flow differences back and forth across Hayden Road indicate that these lateral flows would be physically impossible. Undivided flow analysis is considered totally inconsistent with the increased frequency of cross-sections assumed.

For this reason the divided flow model was adopted. Although more complex and time consuming, the fidelity of the model to actual flow conditions and elimination of any artificial conservatism inherent in the undivided flow model warrant the added time and effort.

In their initial approach to the analysis, the City staff had generated data for profiles assuming divided flow analysis. Thus, only minor additional effort in adjusting the input data was required to utilize their divided flow model. The division of flows is assumed at the left top of bank of the low-flow channel. The right channel designation is for the area west of Hayden Road and left is east of Hayden Road.

In the divided flow model, successive profiles for various flows in the left and right channels are used to determine the single proportion of divided flows that produces an equal water surface elevation for both channels at an upstream reach where flows rejoin across Hayden Road in sufficient depth and reach length for the amount of lateral flow across Hayden Road to be reasonable, i.e., the change in flow required across Hayden Road between two successive cross-sections can physically occur.

The additional complicating factor in the analysis is the requirement to determine the effect of the Chaparral Road Bridge on flows in the area right of Hayden Road. The divided flow approach and the assumption of containment of right channel flows result in a bridge pressure flow solution for all the right channel flow and an open channel backwater solution for the left channel.

Results

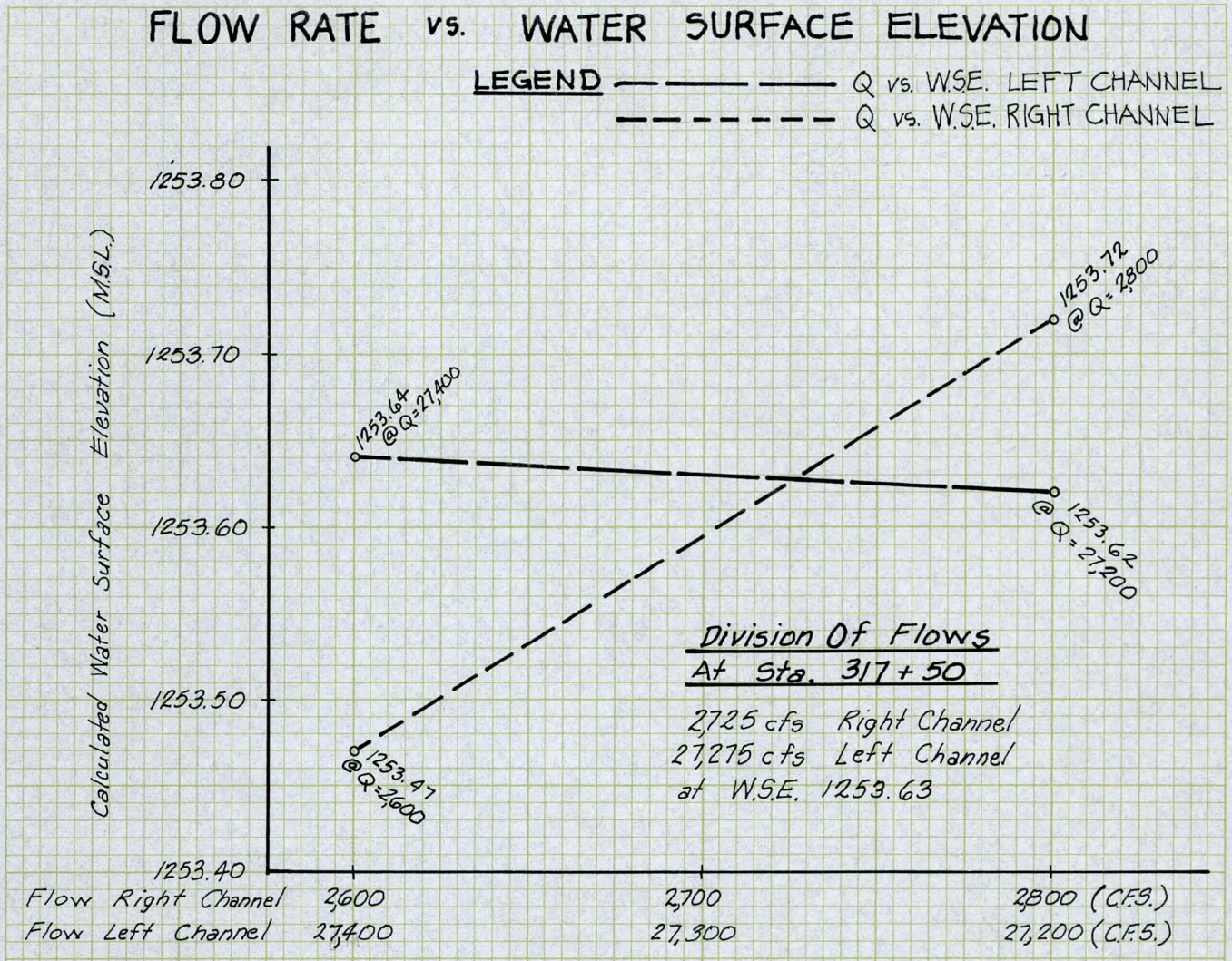
The divided flow analysis of the 30,000 cfs 100-year flow results in a flow of 2725 cfs in the right channel and 27,275 in the left channel determined at Sta. 317+50. This result is consistent with the flows of 2760 cfs in the right channel and 27,240 cfs in the left channel at Sta. 319+00 (See Figure 1, page 4). This reach is the first significant area for flows to cross Hayden Road and for the flow to be considered undivided. The difference of 35 cfs between the two stations is considered a very acceptable value for lateral flow across Hayden Road. Right channel analyses for 2600 cfs and 2800 cfs are shown in Appendix A. Corresponding left channel analyses for 27,200 cfs and 27,400 cfs flows are shown in Appendix B.

Table 1 shows interpolated values for the water surface profiles, energy grade lines and velocities for right and left channels. Of particular note are velocities calculated for Sta. 313+70 for the left channel flow.

Also of note is the fact that some flow should be expected to escape across the Chaparral Road Bridge through the ornamental iron guardrails. By custom, all types of guardrails are considered by the Corps to be totally blocked with debris. The particular guardrails utilized for the Chaparral Road Bridge will be more effective in catching debris than conventional horizontal rails. Therefore, flows which may occur through the guardrails are not considered significant.

FIGURE 1

FLOW RATE vs. WATER SURFACE ELEVATION



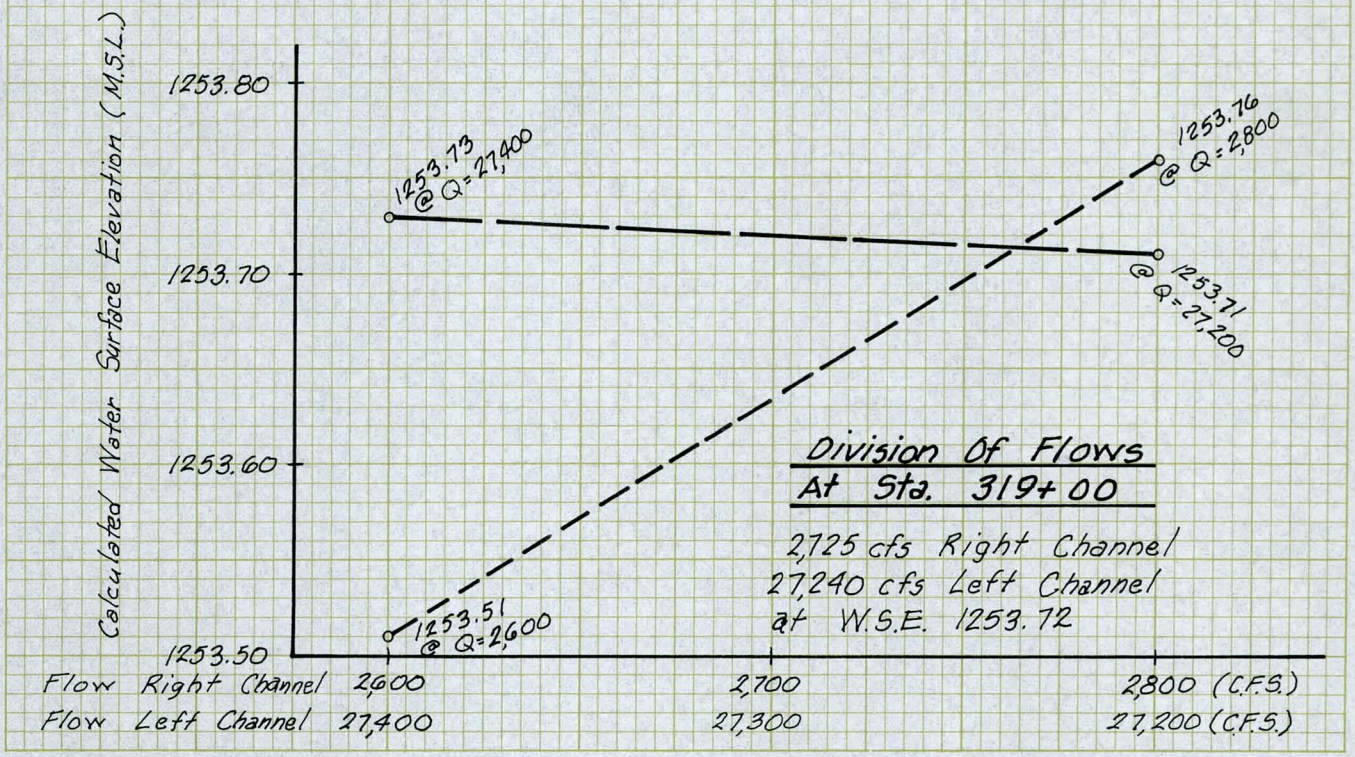


Table 1

Conditions for 27,275 cfs Flow Left Channel
and 2725 cfs Flow Right Channel

	Left Channel			Right Channel		
Sta.	W.S.E.	E.G.L.	Avg. Vel.	W.S.E.	E.G.L.	Avg. Vel.
312+50	1251.90	1252.22	4.54	1251.90	1251.98	2.32
313+10	1251.70	1252.52	7.29	1251.94	1251.99	1.93
313+70	1251.73	1253.07	9.27	1251.94	1252.01	2.17
314+13	1252.72	1253.44	6.75	1251.86	1252.07	3.64
314+23	1253.01	1253.50	5.62	1251.87	1252.08	3.64
Bridge 315+03	1253.14	1253.61	5.46	1253.54	1253.66	2.82
315+53	1253.28	1253.67	5.01	1253.60	1253.68	2.31
316+53	1253.40	1253.88	5.51	1253.62	1253.70	2.36
317+50	1253.63	1254.02	5.00	1253.63	1253.72	2.38
319+00*	1253.72	1254.21	5.59	1253.72	1253.81	2.32

* Flows revised at this section 27,240 cfs Left Channel 2760 cfs Right Channel

Note: Values are interpolated from HEC-2 computations for 27,200 cfs and 27,400 cfs Left Channel flows and 2,600 cfs and 2,800 cfs Right Channel flows, See Appendices A and B.

Recommendations

To date, no divided flow analysis has been utilized to determine containment elevations in the Indian Bend Wash Greenbelt. Standard requirements for bank elevations in previous undivided flow analyses throughout the Greenbelt are 2.5 feet freeboard for levees, zero freeboard for fill pads except in locations where high velocities warrant containing the energy gradient at or below fill pad elevations. This requirement was applied for the Continental Homes channelization south of Indian School Road where velocities of 8± ft/sec resulted from the channelization.

It is recommended that for the reach from Sta. 312+50 to Sta. 317+50 right channel water surface elevations govern right bank containment and left channel water surface elevations govern the left bank containment. Special velocity considerations should also be applied to the left bank between Sta. 312+50 and Sta. 314+13. It is recommended that energy gradient elevation be used as the containment requirement and that a field determination of containment elevations in this reach be made. Additionally, increased maintenance may be incurred at high flows because of excessive velocities. It should be noted that construction of Chaparral Road Bridge is, in part, the cause of excessive velocity near Sta. 313+70.

Development upstream of the subject reach will require extension of the hydraulic analysis presented herein. It is recommended that the calculated water surface elevation of 1253.72 at Sta. 319+00 be utilized as the initial value of the extended analysis. It is expected that the proper analysis of the reach will be somewhat more complex than that required for the Chaparral vicinity. The approach should be divided flow analysis, and inspection of cross-sections for the reach from Sta. 319+00 to McDonald Drive indicate that when lateral flows occur over Hayden Road, they may not occur in sufficient depth and differential head to allow assuming undivided flow. It is expected that in certain reaches the HEC-2 analysis may require manually calculated adjustments at each cross-section and that large differences in water surface elevation may be experienced between the right and left channel values in some cross-sections. The divided flow factor was not considered in the Corps of Engineers' HEC-2 analysis dated 05 DEC 77, and it is likely that previously unknown deficiencies will be found.

Consideration of Low-Flows

Analysis of the low-flow channel and bridge consist of two HEC-2 flow profiles for the 3,300 cfs design flow utilized by Scottsdale and for the 4,000 cfs used in design of all low-flow bridges in Indian Bend Wash downstream of Chaparral. The water surface elevation of 1249.7 at Sta. 312+50 assumed in the City's analysis was also used here. Because these runs were made in conjunction with multiple flow profiles there was no attempt to adjust the flow within the reach, but to verify the analysis submitted by the City. The flow profiles are shown in Table 2. These values should <u>not</u> be used for design, but rather the City's submittal of 3,300 cfs should be used.

Table 2 is presented mainly to show the effect of increasing the low-flow requirement from 3,300 to 4,000 cfs. The plans for Chaparral Road Bridge currently show containment of 3,300 cfs. It is apparent that mayor revision would be required to contain 4,000 cfs.

Table 2

Station	W.S.E., Q=3,300 cfs	W.S.E., Q=4,000 cfs
312+50	1249.70 assumed	1249.70 assumed
313+10	1249.91	1250.02
313+70	1249.94	1250.07
314+13	1249.78	1249.82
314+23	1249.81	1249.87
Bridge		
315+03	1252.15	1253.44*
315+53	1252.28	1253.58*
316+53	1252.33	1253.62*
317+50	1252.38	1253.66*
319+00	1252.48	1253.73*

*HEC-2 analysis artifically contains flows at the left edge of the low-flow channel. Per current bridge plans some flow would escape into the left channel across Hayden Road at 4,000 cfs flow.

APPENDIX A

Right Channel Computations

Registered Professional Engineer (Civil) CERTIFICATE NO. 8976 B. R. JOLLY DATE SIGNED 4-26-79 Arizona U. S. A.

B. R. Jolly

8

Rt OB & Channel Q=1900cfs to 3300cfs

```
**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUGCCOO
  ERRCR CCRR -  01,02
  MCDIFICATION -  50,51,52,53
**************************************************

T1 RUN CHAPARRAL CHANNEL AND RT OB
T2 FLOW RANGE 19COTO 3300 CFS AND LOW FLOW BRIDGE RUNS
T3 Q= 1900 CFS

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0.        2.        0.        0.  0.          0.        2.0       0.   251.900    0.

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      1.000     0.        0.        0.        0.        0.        0.        0.        0.        0.

NC      0.035     0.035     0.030     0.200     0.400     0.        0.        0.        0.        0.
QT     16.000  1900.000  2000.000  2100.000  2200.000  2300.000  2400.000  2500.000  2600.000  2800.000
QT   3000.000  3200.000  3300.000  3300.000  4000.000  4000.000     0.        0.        0.        0.

X1  31250.000    27.000  1156.000  1326.000     0.        0.        0.        0.        0.        0.
X3      0.        0.        0.     1156.000     0.        0.        0.        0.        0.        0.
GR    252.000     0.      252.000    55.000   250.000   146.000   248.000   204.000   246.000   211.000
GR    244.000   219.000   244.000   291.000   246.000   308.000   248.000   325.000   248.000   403.000
GR    246.000   462.000   244.000   479.000   244.000   844.000   246.000   851.000   248.000   911.000
GR    248.000  1156.000   244.400  1176.000   244.400  1286.000   250.000  1306.000   252.000  1326.000
GR    252.000  1426.000   250.000  1440.000   250.000  1576.000   251.500  1609.000   252.000  1713.000
GR    252.000  1858.000   253.000  1962.000     0.        0.        0.        0.        0.        0.

X1  31310.000    24.000  1160.000  1350.000    60.000    60.000    60.000     0.        0.        0.
X3      0.        0.        0.     1160.000     0.        0.        0.        0.        0.        0.
GR    252.900     0.      252.000    70.000   250.000   110.000   249.100   203.000   250.000   330.000
GR    253.000   380.000   250.000   440.000   248.000   535.000   246.000   620.000   244.000   640.000
GR    244.000   790.000   246.000   825.000   248.000   915.000   250.000   975.000   249.000  1045.000
GR    249.400  1110.000   250.000  1160.000   244.500  1185.000   244.500  1322.000   250.000  1350.000
GR    249.500  1405.000   250.000  1488.000   252.000  1580.000   254.000  1595.000     0.        0.

X1  31370.000    23.000  1163.000  1358.000    60.000    60.000    60.000     0.        0.        0.
X3      0.        0.        0.     1163.000     0.        0.        0.        0.        0.        0.
GR    253.000     0.      251.300    65.000   251.300    85.000   250.000   116.000   249.600   241.000
GR    250.000   316.000   252.500   373.000   253.700   431.000   249.700   476.000   250.400   538.000
GR    248.000   571.000   247.800   608.000   248.000   721.000   246.800   818.000   248.000  1023.000
GR    249.000  1075.000   249.400  1106.000   249.400  1163.000   249.000  1183.000   244.600  1203.000
GR    244.600  1338.000   250.000  1358.000   254.000  1493.000     0.        0.        0.        0.

X1  31413.000    27.000  1163.000  1300.000    43.000    43.000    43.000     0.        0.        0.
X3      0.        0.        0.     1163.000     0.        0.        0.        0.        0.        0.
GR    251.500     0.      249.100   100.000   250.000   210.000   253.000   234.000   252.000   255.000
GR    249.700   369.000   250.400   431.000   250.000   470.000   248.000   480.000   247.800   506.000
GR    248.000   572.000   260.000   572.100   260.000   642.000   247.500   642.100   246.800   729.000
GR    248.000   936.000   248.000   962.000   247.400   998.000   248.500  1045.000   249.000  1090.000
GR    249.000  1133.000   253.000  1134.000   253.000  1163.000   244.700  1163.100   244.700  1267.500
GR    253.000  1267.600   253.000  1300.000     0.        0.        0.        0.        0.        0.
```

X1	31423.000	20.000	1134.000	1300.000	10.000	10.000	10.000	0.	0.	0.
X3	0.	0.	0.	1134.000	0.	0.	0.	0.	0.	0.
GR	251.500	0.	250.230	100.000	249.800	200.000	249.000	300.000	248.670	400.000
GR	248.300	500.000	248.030	600.000	247.880	700.000	247.600	800.000	247.830	900.000
GR	248.360	1000.000	249.000	1098.000	249.200	1133.000	253.000	1134.000	253.000	1163.000
GR	244.700	1163.000	244.700	1267.500	253.000	1267.500	253.000	1300.000	253.000	1371.000
NC	0.020	0.020	0.020	0.	0.	0.	0.	0.	0.	0.
SB	0.900	1.500	3.000	0.	104.500	9.000	311.000	0.	245.100	244.700

X1	31503.000	0.	1134.000	1300.000	80.000	80.000	80.000	0.	0.	0.
X2	0.	0.	1.000	248.300	254.400	0.	0.	0.	0.	0.
X3	0.	0.	0.	1134.000	0.	0.	0.	0.	0.	0.
BT	4.000	1134.000	254.400	253.000	1163.000	254.400	253.000	1300.000	254.600	253.000
BT	1371.000	254.600	253.000	0.	0.	0.	0.	0.	0.	0.
NC	0.035	0.035	0.030	0.	0.	0.	0.	0.	0.	0.

X1	31553.000	56.000	1160.000	1327.000	50.000	50.000	50.000	0.	0.	0.
X3	0.	0.	0.	1160.000	0.	0.	0.	0.	0.	0.
GR	250.000	0.	250.000	135.000	249.800	162.000	249.800	210.000	249.100	260.000
GR	248.600	310.000	270.000	310.000	270.000	318.000	247.300	318.000	249.000	364.000
GR	248.700	414.000	248.000	461.000	247.600	496.000	247.100	496.000	246.900	512.000
GR	247.000	566.000	246.900	575.000	270.000	575.000	270.000	583.000	246.900	583.000
GR	247.400	613.000	247.800	664.000	247.800	677.000	270.000	677.000	270.000	681.000
GR	247.800	681.000	247.800	696.000	245.050	727.000	247.200	747.000	247.100	763.000
GR	270.000	763.000	270.000	767.000	247.100	767.000	247.200	813.000	247.000	865.000
GR	247.000	875.000	270.000	875.000	270.000	879.000	247.100	879.000	247.200	915.000
GR	247.400	965.000	247.500	976.000	270.000	976.000	270.000	980.000	247.500	980.000
GR	247.900	1000.000	248.970	1020.000	250.250	1110.000	253.000	1160.000	245.240	1193.000
GR	245.240	1215.000	270.000	1215.000	270.000	1217.000	245.240	1217.000	245.240	1303.000
GR	251.000	1327.000	0.	0.	0.	0.	0.	0.	0.	0.

X1	31653.000	34.000	960.000	1130.000	100.000	100.000	100.000	0.	0.	0.
X3	0.	0.	0.	960.000	0.	0.	0.	0.	0.	0.
GR	252.000	0.	252.000	20.000	250.000	38.000	250.000	88.000	248.000	197.000
GR	247.500	218.000	270.000	218.000	270.000	224.000	247.500	224.000	245.800	282.000
GR	245.800	397.000	246.000	413.000	246.500	510.000	270.000	510.000	270.000	518.000
GR	246.500	518.000	247.000	627.000	270.000	627.000	270.000	631.000	247.000	631.000
GR	247.500	697.000	248.000	710.000	249.000	790.000	249.720	810.000	251.160	900.000
GR	251.160	910.000	253.000	960.000	245.510	1000.000	245.510	1020.000	270.000	1020.000
GR	270.000	1022.000	245.510	1022.000	245.510	1110.000	251.000	1130.000	0.	0.

X1	31750.000	21.000	887.000	1060.000	97.000	97.000	97.000	0.	0.	0.
X3	0.	0.	0.	887.000	0.	0.	0.	0.	0.	0.
GR	254.000	0.	252.000	20.000	250.000	35.000	248.000	121.000	246.000	140.000
GR	245.800	152.000	245.800	430.000	246.000	450.000	246.000	500.000	245.800	510.000
GR	245.800	680.000	246.000	690.000	248.000	715.000	248.000	725.000	250.450	745.000
GR	252.000	835.000	252.000	845.000	253.000	887.000	245.770	936.000	245.770	1046.000
GR	251.000	1060.000	0.	0.	0.	0.	0.	0.	0.	0.
NC	0.030	0.	0.	0.	0.	0.	0.	0.	0.	0.

X1	31900.000	30.000	801.000	995.000	150.000	150.000	150.000	0.	0.	0.
X3	0.	0.	0.	801.000	0.	0.	0.	0.	0.	0.
GR	254.500	0.	254.000	5.000	250.000	24.000	248.000	75.000	246.000	90.000
GR	245.800	110.000	245.800	188.000	246.000	197.000	248.000	228.000	248.400	236.000
GR	270.000	236.000	270.000	244.000	248.400	244.000	248.000	278.000	247.500	284.000
GR	270.000	284.000	270.000	289.000	247.000	289.000	246.000	296.000	245.800	315.000
GR	245.800	635.000	246.000	640.000	246.000	660.000	251.570	680.000	252.900	770.000
GR	252.900	780.000	253.000	801.000	246.180	871.000	246.180	981.000	251.000	995.000
EJ	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

8

Rt.OB. & Channel

```
**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG0000
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
**************************************************

T1 RUN CHAPARRAL CHANNEL AND RT OB
T2 FLOW RANGE 1900TO 3300 CFS AND LOW FLOW BRIDGE RUNS
T3 Q= 2600 CFS

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ
       0.       9.       0.       0.  0.            0.      2.0      0.   251.900   0.
J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE
     8.000     0.       0.       0.       0.       0.       0.       0.       0.       0.
```

```
*PROF 8

CCHV=   0.200 CEHV=   0.400
*SECNO 31250.000

3265 DIVIDED FLOW
   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

3470 ENCROACHMENT STATIONS=    1156.0     1962.0  TYPE=      1  TARGET=   -1156.000
 31250.00      7.50    251.90      0.       251.90    251.97      0.07       0.         0.       248.00
    2600.        0.     2338.     262.        0.      1051.      326.        0.         0.       252.00
      0.         0.      2.22     0.81     0.035     0.030     0.035       0.       244.40     1156.00
 0.000184        0.        0.       0.         0         0         0       0.       434.50     1692.20

*SECNO 31310.000

3470 ENCROACHMENT STATIONS=    1160.0     1595.0  TYPE=      1  TARGET=   -1160.000
 31310.00      7.43    251.93      0.         0.      251.98      0.05      0.01       0.00       250.00
    2600.        0.     2333.     267.        0.      1267.      388.        2.         1.       250.00
     0.01        0.      1.84     0.69     0.035     0.030     0.035     0.030       244.50     1160.00
 0.000113       60.       60.      60.         2         0         0       0.       417.01     1577.01

*SECNO 31370.000

3470 ENCROACHMENT STATIONS=    1163.0     1493.0  TYPE=      1  TARGET=   -1163.000
 31370.00      7.33    251.93      0.         0.      252.00      0.07      0.01       0.01       249.40
    2600.        0.     2568.      32.        0.      1240.       63.        4.         1.       250.00
     0.02        0.      2.07     0.51     0.035     0.030     0.035     0.030       244.60     1163.00
 0.000152       60.       60.      60.         2         0         0       0.       260.21     1423.21

*SECNO 31413.000

3470 ENCROACHMENT STATIONS=    1163.0     1300.0  TYPE=      1  TARGET=   -1163.000
 31413.00      7.17    251.87      0.         0.      252.06      0.19      0.01       0.05       253.00
    2600.        0.     2600.       0.         0.       749.        0.        5.         1.    100000.00
     0.02        0.      3.47       0.      0.035     0.030     0.035     0.029       244.70     1163.01
 0.000421       43.       43.      43.         2         0         0       0.       104.57     1267.59

*SECNO 31423.000
   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

3470 ENCROACHMENT STATIONS=    1134.0     1371.0  TYPE=      1  TARGET=   -1134.000
 31423.00      7.17    251.87      0.         0.      252.06      0.19      0.00       0.00       253.00
    2600.        0.     2600.       0.         0.       749.        0.        5.         1.       253.00
     0.02        0.      3.47       0.      0.035     0.030     0.035     0.029       244.70     1163.00
 0.000421       10.       10.      10.         0         0         0       0.       104.50     1267.50

SPECIAL BRIDGE
```

```
SB  XK        XKOR      COFQ      RDLEN     BWC       BWP       BAREA     SS        ELCHU     ELCHD
     0.90      1.50      3.00      0.        104.50    9.00      311.00    0.        245.10    244.70

*SECNO 31503.000
3280 CROSS SECTION  31503.00 EXTENDED      0.38 FEET

PRESSURE FLOW

 EGPRS      EGLWC      H3        QWEIR     QPR       BAREA     TRAPEZOID     ELLC      ELTRD
                                                               AREA
   253.50     252.08     0.02      0.        2600.     311.      306.      248.30    254.40

3470 ENCROACHMENT STATIONS=    1134.0    1371.0  TYPE=     1  TARGET=   -1134.000
 31503.00     8.68    253.38    0.        0.        253.50    0.12      1.44      0.        253.00
    2600.      0.     2587.     13.       0.        931.      27.       7.        2.        253.00
     0.03      0.      2.78     0.49      0.020     0.020     0.020     0.026     244.70    1134.00
 0.000160     80.      80.      80.       2         0         0         0.        237.00    1371.00

*SECNO 31553.000

3265 DIVIDED FLOW
3280 CROSS SECTION  31553.00 EXTENDED      2.44 FEET

3470 ENCROACHMENT STATIONS=    1160.0    1327.0  TYPE=     1  TARGET=   -1160.000
 31553.00     8.20    253.44    0.        0.        253.52    0.08      0.01      0.01      253.00
    2600.      0.     2600.     0.        0.        1156.     0.        8.        2.        100000.00
     0.04      0.      2.25     0.        0.035     0.030     0.035     0.027     245.24    1160.00
 0.000180     50.      50.      50.       2         0         0         0.        165.00    1327.00

*SECNO 31653.000

3265 DIVIDED FLOW
3280 CROSS SECTION  31653.00 EXTENDED      2.46 FEET

3470 ENCROACHMENT STATIONS=     960.0    1130.0  TYPE=     1  TARGET=    -960.000
 31653.00     7.95    253.46    0.        0.        253.54    0.08      0.02      0.00      253.00
    2600.      0.     2600.     0.        0.        1130.     0.        11.       2.        100000.00
     0.05      0.      2.30     0.        0.035     0.030     0.035     0.028     245.51    960.00
 0.000198    100.     100.     100.       2         0         0         0.        168.00    1130.00

*SECNO 31750.000
3280 CROSS SECTION  31750.00 EXTENDED      2.47 FEET

3470 ENCROACHMENT STATIONS=     887.0    1060.0  TYPE=     1  TARGET=    -887.000
 31750.00     7.70    253.47    0.        0.        253.56    0.08      0.02      0.00      253.00
    2600.      0.     2600.     0.        0.        1119.     0.        13.       3.        100000.00
     0.06      0.      2.32     0.        0.035     0.030     0.035     0.028     245.77    887.00
 0.000189     97.      97.      97.       2         0         0         0.        173.00    1060.00

*SECNO 31900.000
3280 CROSS SECTION  31900.00 EXTENDED      2.51 FEET

   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
```

```
3470 ENCROACHMENT STATIONS=     801.0      995.0  TYPE=      1  TARGET=     -801.000
 31900.00      7.33    253.51      0.        0.     253.59      0.08      0.03      0.00    253.00
    2600.        0.     2600.       0.        0.     1149.        0.       17.        3. 100000.00
     0.08        0.      2.26       0.     0.030     0.030     0.035     0.028    246.18    801.00
 0.000200      150.      150.     150.         2         0         0        0.    194.00    995.00
```

PROFILE FOR STREAM 00 CFS

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-FT   244.      245.      246.      247.      248.      249.      250.      251.      252.      253.
    SECNO   CUMDIS-FT
 31250.00      0.  C  I     .         .         .         L         .         .         .        WE         M         .
              10.  C  I     .         .         .         .   L     .         .         .   R    WE         .   M     .
              20.  C  I     .         .         .         .         L .         .         .  R     WE         .   M     .
              30.  C   I    .         .         .         .         L .         .         R        WE         .     M   .
              40.  C   I    .         .         .         .         . L         .         R .      WE         .       M .
              50.  C   I    .         .         .         .         .     L     .   R     .        WE         .         M .
 31310.00     60.  C   I    .         .         .         .         .         L         .        WE         .         M
              70.  C   I    .         .         .         .         .         LR        .        WE         .         M
              80.  C   I    .         .         .         .         .         L R       .        WE         .         M
              90.  C    I   .         .         .         .         .         L R       .        WE         .         M
             100.  C    I   .         .         .         .         .       L R         .        WE         .         M
             110.  C    I   .         .         .         .         .         L R       .        WE         .         M
 31370.00    120.  C    I   .         .         .         .         .       L R         .        WE         .         M
             130.  C    I   .         .         .         .         .         . L       .        WE         .         M R
             140.  C    I   .         .         .         .         .         .         .L       WE         .     M   R
             150.  C     I  .         .         .         .         .         .         .        WE         .   M     R
             160.  C     I  .         .         .         .         .         .         .        W.E      L .M         R
 31413.00    170.  C     I  .         .         .         .         .         .         .        W.E        L         R
 31423.00    180.  C     I  .         .         .         .         .         .         .        W.E        L         .
             190.  C     I  .         .         .         .         .         .         .         .WE       L         .
             200.  C     I  .         .         .         .         .         .         .         . W E     L         .
             210.  C     I  .         .         .         .         .         .         .         .   W E   L         .
             220.  C     I  .         .         .         .         .         .         .         .     W E L         .
             230.  C     I  .         .         .         .         .         .         .         .       W E         .
             240.  C     I  .         .         .         .         .         .         .         .         WE        .
             250.  C     I  .         .         .         .         .         .         .         .         L WE      .
 31503.00    260.  C     I  .         .         .         .         .         .         .         .         L   WE    .
             270.  C      I .         .         .         .         .         .         .         .     M   L   WE    R
             280.  C       I.         .         .         .         .         .         .         . M       L   WE    R
             290.  C        I         .         .         .         .         .         .       M .         L   WE    R
             300.  C        .I        .         .         .         .         .         . M       .         L   WE    R
 31553.00    310.  C         . I      .         .         .         .         .         M         .         L   WE    R
             320.  C         .  I     .         .         .         .         .         M         .         L   WE    R
             330.  C         .  I     .         .         .         .         .         M         .         L   WE    R
             340.  C         .  I     .         .         .         .         .         M         .         L   WE    R
             350.  C         .  I     .         .         .         .         .         M         .         L   WE    R
             360.  C         .   I    .         .         .         .         .         M         .         L    E    R
             370.  C         .   I    .         .         .         .         .         M         .         L    E    R
             380.  C         .   I    .         .         .         .         .         M         .         L    E    R
             390.  C         .    I   .         .         .         .         .         M         .         L    E    R
             400.  C         .    I   .         .         .         .         .         M         .         L    E    R
 31653.00    410.  C         .    I   .         .         .         .         .         M         .         L    E    R
             420.  C         .    I   .         .         .         .         .         M         .         L    E    R
             430.  C         .     I  .         .         .         .         .         M         .         L    E    R
             440.  C         .     I  .         .         .         .         .         M         .         L    E    R
             450.  C         .     I  .         .         .         .         .         M         .         L    E    R
             460.  C         .     I  .         .         .         .         .         M         .         L   WE    R
             470.  C         .      I .         .         .         .         .         M         .         L   WE    R
             480.  C         .      I .         .         .         .         .         M         .         L   WE    R
             490.  C         .      I .         .         .         .         .         M         .         L   WE    R
 31750.00    500.  C         .       I.         .         .         .         .         M         .         L   WE    R
             510.  C         .       I.         .         .         .         .         M         .         L   WE    R
             520.  C         .       I.         .         .         .         .         M         .         L   WE    R
             530.  C         .        I         .         .         .         .         M         .         L   WE    R
             540.  C         .        I         .         .         .         .         M         .         L   WE    R
```

```
                    550.  C     .     I.    .     .     .     .     M     .     L     WE    R
                    560.  C     .     I.    .     .     .     .     M     .     L     WE    R
                    570.  C     .      I    .     .     .     .     M     .     L     WE    R
                    580.  C     .      I    .     .     .     .     M     .     L     WE    R
                    590.  C     .      I    .     .     .     .     M     .     L     WE    R
                    600.  C     .      I    .     .     .     .     M     .     L     WE    R
                    610.  C     .     .I    .     .     .     .     M     .     L     WE    R
                    620.  C     .     .I    .     .     .     .     M     .     L     WE    R
                    630.  C     .     .I    .     .     .     .     M     .     L     WE    R
                    640.  C     .      . I  .     .     .     .     M     .     L     WE    R
          31900.00  650.  C     .      . I  .     .     .     .     M     .     L     WE    R
```

```
**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG0000
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
**************************************************

T1 RUN CHAPARRAL CHANNEL AND RT OB
T2 FLOW RANGE 1900TO 3300 CFS AND LOW FLOW BRIDGE RUNS
T3 Q= 2800 CFS

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ

      0.      10.      0.       0.  0.            0.       2.0      0.   251.900  0.

J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE

      9.000   0.       0.       0.       0.       0.       0.       0.       0.       0.
```

```
*PROF 9

CCHV=   0.200 CEHV=   0.400
*SECNO 31250.000

3265 DIVIDED FLOW
   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

3470 ENCROACHMENT STATIONS=    1156.0    1962.0  TYPE=     1  TARGET=   -1156.000
 31250.00     7.50    251.90     0.      251.90    251.98     0.08      0.        0.      248.00
    2800.      0.     2518.     282.       0.      1051.     326.       0.        0.      252.00
      0.       0.      2.40     0.87     0.035     0.030    0.035      0.      244.40   1156.00
 0.000213      0.       0.       0.        0         0        0        0.      434.50   1692.20

*SECNO 31310.000

3470 ENCROACHMENT STATIONS=    1160.0    1595.0  TYPE=     1  TARGET=   -1160.000
 31310.00     7.44    251.94     0.        0.     252.00     0.06     0.01      0.01     250.00
    2800.      0.     2512.     288.       0.     1268.     389.       2.        1.      250.00
     0.01      0.      1.98     0.74     0.035     0.030    0.035    0.030    244.50   1160.00
 0.000130     60.      60.      60.        2         0        0       0.      417.27   1577.27

*SECNO 31370.000

3470 ENCROACHMENT STATIONS=    1163.0    1493.0  TYPE=     1  TARGET=   -1163.000
 31370.00     7.34    251.94     0.        0.     252.01     0.08     0.01      0.01     249.40
    2800.      0.     2765.      35.       0.     1241.      63.       4.        1.      250.00
     0.02      0.      2.23     0.55     0.035     0.030    0.035    0.030    244.60   1163.00
 0.000176     60.      60.      60.        2         0        0       0.      260.39   1423.39

*SECNO 31413.000

3470 ENCROACHMENT STATIONS=    1163.0    1300.0  TYPE=     1  TARGET=   -1163.000
 31413.00     7.16    251.86     0.        0.     252.08     0.22     0.01      0.06     253.00
    2800.      0.     2800.      0.        0.      749.       0.       5.        1. 100000.00
     0.02      0.      3.74     0.       0.035     0.030    0.035    0.029    244.70   1163.01
 0.000489     43.      43.      43.        2         0        0       0.      104.57   1267.59

*SECNO 31423.000
   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

3470 ENCROACHMENT STATIONS=    1134.0    1371.0  TYPE=     1  TARGET=   -1134.000
 31423.00     7.17    251.87     0.        0.     252.09     0.22     0.00      0.00     253.00
    2800.      0.     2800.      0.        0.      749.       0.       5.        1.      253.00
     0.02      0.      3.74     0.       0.035     0.030    0.035    0.029    244.70   1163.00
 0.000490     10.      10.      10.        0         0        0       0.      104.50   1267.50

SPECIAL BRIDGE
```

```
SB   XK        XKOR      COFQ      RDLEN     BWC       BWP       BAREA     SS        ELCHU     ELCHD
     0.90      1.50      3.00      0.        104.50    9.00      311.00    0.        245.10    244.70

*SECNO 31503.000
3280 CROSS SECTION  31503.00 EXTENDED      0.63 FEET

PRESSURE FLOW

 EGPRS     EGLWC     H3        QWEIR     QPR       BAREA     TRAPEZOID     ELLC      ELTRD
                                                              AREA
   253.76    252.11    0.02      0.        2800.     311.      306.      248.30    254.40

3470 ENCROACHMENT STATIONS=    1134.0    1371.0  TYPE=     1  TARGET=   -1134.000
 31503.00    8.93    253.63    0.        0.        253.76    0.12      1.67      0.        253.00
    2800.      0.     2769.     31.       0.        972.      45.       7.        2.        253.00
     0.03      0.      2.85     0.69      0.020     0.020     0.020     0.026     244.70    1134.00
 0.000159     80.      80.      80.       2         0         0         0.        237.00    1371.00

*SECNO 31553.000

3265 DIVIDED FLOW
3280 CROSS SECTION  31553.00 EXTENDED      2.69 FEET

3470 ENCROACHMENT STATIONS=    1160.0    1327.0  TYPE=     1  TARGET=   -1160.000
 31553.00    8.45    253.69    0.        0.        253.77    0.08      0.01      0.01      253.00
    2800.      0.     2800.     0.        0.        1197.     0.        8.        2.        100000.00
     0.03      0.      2.34     0.        0.035     0.030     0.035     0.027     245.24    1160.00
 0.000188     50.      50.      50.       2         0         0         0.        165.00    1327.00

*SECNO 31653.000

3265 DIVIDED FLOW
3280 CROSS SECTION  31653.00 EXTENDED      2.71 FEET

3470 ENCROACHMENT STATIONS=     960.0    1130.0  TYPE=     1  TARGET=    -960.000
 31653.00    8.20    253.71    0.        0.        253.80    0.09      0.02      0.00      253.00
    2800.      0.     2800.     0.        0.        1172.     0.        11.       2.        100000.00
     0.05      0.      2.39     0.        0.035     0.030     0.035     0.028     245.51    960.00
 0.000205    100.     100.     100.       2         0         0         0.        168.00    1130.00

*SECNO 31750.000
3280 CROSS SECTION  31750.00 EXTENDED      2.72 FEET

3470 ENCROACHMENT STATIONS=     887.0    1060.0  TYPE=     1  TARGET=    -887.000
 31750.00    7.95    253.72    0.        0.        253.82    0.09      0.02      0.00      253.00
    2800.      0.     2800.     0.        0.        1162.     0.        14.       3.        100000.00
     0.06      0.      2.41     0.        0.035     0.030     0.035     0.028     245.77    887.00
 0.000194     97.      97.      97.       2         0         0         0.        173.00    1060.00

*SECNO 31900.000
3280 CROSS SECTION  31900.00 EXTENDED      2.76 FEET

   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
```

```
3470 ENCROACHMENT STATIONS=      801.0      995.0  TYPE=      1  TARGET=     -801.000
 31900.00      7.58    253.76      0.         0.      253.85      0.08      0.03      0.00    253.00
    2800.        0.     2800.       0.         0.      1198.        0.       18.        3. 100000.00
     0.07        0.      2.34       0.      0.030      0.030     0.035     0.028    246.18    801.00
 0.000203      150.      150.      150.         2          0         0        0.    194.00    995.00
```

PROFILE FOR STREAM 00 CFS

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-FT   244.      245.      246.      247.      248.      249.      250.      251.      252.      253.
   SECNO   CUMDIS-FT
31250.00      0.  C  I     .         .         .         L         .         .         .        WE         M         .
             10.  C  I     .         .         .         .  L      .         .         .      R WE         .  M      .
             20.  C  I     .         .         .         .      L  .         .         .  R     WE         .   M     .
             30.  C     I  .         .         .         .         L         .         R        WE         .     M   .
             40.  C     I  .         .         .         .         .  L      .         .  R     WE         .       M .
             50.  C     I  .         .         .         .         .     L   .  R      .        WE         .        M.
31310.00     60.  C     I  .         .         .         .         .         L         .        WE         .         M
             70.  C     I  .         .         .         .         .        LR         .        WE         .         M
             80.  C     I  .         .         .         .         .       L R         .        WE         .         M
             90.  C      I .         .         .         .         .      L  R         .        WE         .         M
            100.  C      I .         .         .         .         .    L   R         .        WE         .         M
            110.  C      I .         .         .         .         .   L    R         .        WE         .         M
31370.00    120.  C      I .         .         .         .         .  L     R         .        WE         .         M
            130.  C      I .         .         .         .         .         . L       .        WE         .        M R
            140.  C      I .         .         .         .         .         .         .L       WE         .   M     R
            150.  C       I.         .         .         .         .         .         .        W.E        .  M      R
            160.  C       I .         .         .         .         .         .         .        W.E     L  .M        R
31413.00    170.  C       I .         .         .         .         .         .         .        W.E        L         R
31423.00    180.  C       I .         .         .         .         .         .         .        W.E        L         .
            190.  C       I .         .         .         .         .         .         .         .W E      L         .
            200.  C       I .         .         .         .         .         .         .         .  W E    L         .
            210.  C       I .         .         .         .         .         .         .         .    W E  L         .
            220.  C       I .         .         .         .         .         .         .         .     W EL         .
            230.  C       I .         .         .         .         .         .         .         .        WE         .
            240.  C       I .         .         .         .         .         .         .         .        L WE       .
            250.  C       I .         .         .         .         .         .         .         .        L   W E    .
31503.00    260.  C       I .         .         .         .         .         .         .         .        L     W E  .
            270.  C        I.         .         .         .         .         .         .         .     M  L     W E R
            280.  C         I.        .         .         .         .         .         .         . M      L      WE R
            290.  C          I        .         .         .         .         .         .       M .        L      WE R
            300.  C          .I       .         .         .         .         .         .   M     .        L      WE R
31553.00    310.  C          . I      .         .         .         .         .         M         .        L      WE R
            320.  C          .  I     .         .         .         .         .         M         .        L      WE R
            330.  C          .  I     .         .         .         .         .         M         .        L      WE R
            340.  C          .  I     .         .         .         .         .         M         .        L      WE R
            350.  C          .  I     .         .         .         .         .         M         .        L      WE R
            360.  C          .   I    .         .         .         .         .         M         .        L      WE R
            370.  C          .   I    .         .         .         .         .         M         .        L      WE R
            380.  C          .   I    .         .         .         .         .         M         .        L      WE R
            390.  C          .    I   .         .         .         .         .         M         .        L      WE R
            400.  C          .    I   .         .         .         .         .         M         .        L      WE R
31653.00    410.  C          .    I   .         .         .         .         .         M         .        L      WE R
            420.  C          .    I   .         .         .         .         .         M         .        L      WE R
            430.  C          .     I  .         .         .         .         .         M         .        L      WE R
            440.  C          .     I  .         .         .         .         .         M         .        L      WE R
            450.  C          .     I  .         .         .         .         .         M         .        L      WE R
            460.  C          .     I  .         .         .         .         .         M         .        L      WE R
            470.  C          .      I .         .         .         .         .         M         .        L      WE R
            480.  C          .      I .         .         .         .         .         M         .        L      WE R
            490.  C          .      I .         .         .         .         .         M         .        L      WE R
31750.00    500.  C          .       I.         .         .         .         .         M         .        L      WE R
            510.  C          .       I.         .         .         .         .         M         .        L      WE R
            520.  C          .       I.         .         .         .         .         M         .        L      WE R
            530.  C          .        I         .         .         .         .         M         .        L      WE R
            540.  C          .        I         .         .         .         .         M         .        L      WE R
```

```
                    560.  C   .   I.   .   .   .   .   M   .   L   WE R
                    570.  C   .   I    .   .   .   .   M   .   L   WE R
                    580.  C   .   I    .   .   .   .   M   .   L   WE R
                    590.  C   .   I    .   .   .   .   M   .   L   WE R
                    600.  C   .   I    .   .   .   .   M   .   L   WE R
                    610.  C   .   .I   .   .   .   .   M   .   L   WE R
                    620.  C   .   .I   .   .   .   .   M   .   L    E R
                    630.  C   .   .I   .   .   .   .   M   .   L    E R
                    640.  C   .   . I  .   .   .   .   M   .   L    E R
          31900.00  650.  C   .   . I  .   .   .   .   M   .   L   WER
```

APPENDIX B

Left Channel Computations

LEFT. OB 6

Q = 23,200 to 27,200 cfs

Registered Professional Engineer (Civil) CERTIFICATE NO. 8976 B. R. JOLLY DATE SIGNED 4-26-79 Arizona U. S. A.

```
*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG0000
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
*****************************************************

T1 RUN CHAPARRAL LT OB
T2 FLOW RANGE 23200 TO 27200 CFS
T3 RUN NO.  1 Q=23200

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0.      2.        0.        0.  0.            0.        2.0       0.    251.900   0.

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

    1.000     0.        0.        0.        0.        0.        0.        0.        0.        0.

NC      0.035     0.035     0.030     0.200     0.400     0.        0.        0.        0.        0.
QT     14.000 23200.000 23800.000 24200.000 24600.000 25000.000 25400.000 25800.000 26000.000 26200.000
QT  26400.000 26600.000 26800.000 27000.000 27200.000     0.        0.        0.        0.        0.

X1  31250.000    27.000  1156.000  1326.000     0.        0.        0.        0.        0.        0.
X3      0.        0.        0.        0.        0.  1156.000     0.        0.        0.        0.
GR    252.000     0.      252.000    55.000   250.000   146.000   248.000   204.000   246.000   211.000
GR    244.000   219.000   244.000   291.000   246.000   308.000   248.000   325.000   248.000   403.000
GR    246.000   462.000   244.000   479.000   244.000   844.000   246.000   851.000   248.000   911.000
GR    248.000  1156.000   244.400  1176.000   244.400  1286.000   250.000  1306.000   252.000  1326.000
GR    252.000  1426.000   250.000  1440.000   250.000  1576.000   251.500  1609.000   252.000  1713.000
GR    252.000  1858.000   253.000  1962.000     0.        0.        0.        0.        0.        0.

X1  31310.000    24.000  1160.000  1350.000    60.000    60.000    60.000     0.        0.        0.
X3      0.        0.        0.        0.        0.  1160.000     0.        0.        0.        0.
GR    252.900     0.      252.000    70.000   250.000   110.000   249.100   203.000   250.000   330.000
GR    253.000   380.000   250.000   440.000   248.000   535.000   246.000   620.000   244.000   640.000
GR    244.000   790.000   246.000   825.000   248.000   915.000   250.000   975.000   249.000  1045.000
GR    249.400  1110.000   250.000  1160.000   244.500  1135.000   244.500  1322.000   250.000  1350.000
GR    249.500  1405.000   250.000  1488.000   252.000  1580.000   254.000  1595.000     0.        0.

X1  31370.000    23.000  1163.000  1358.000    60.000    60.000    60.000     0.        0.        0.
X3      0.        0.        0.        0.        0.  1163.000     0.        0.        0.        0.
GR    253.000     0.      251.300    65.000   251.300    85.000   250.000   116.000   249.600   241.000
GR    250.000   316.000   252.500   373.000   253.700   431.000   249.700   476.000   250.400   538.000
GR    248.000   571.000   247.800   608.000   248.000   721.000   246.800   818.000   248.000  1023.000
GR    249.000  1075.000   249.400  1106.000   249.400  1163.000   249.000  1183.000   244.600  1203.000
GR    244.600  1338.000   250.000  1358.000   254.000  1493.000     0.        0.        0.        0.

X1  31413.000    27.000  1163.000  1300.000    43.000    43.000    43.000     0.        0.        0.
X3      0.        0.        0.        0.        0.  1163.000     0.        0.        0.        0.
GR    251.500     0.      249.100   100.000   250.000   210.000   253.000   234.000   252.000   255.000
GR    249.700   369.000   250.400   431.000   250.000   470.000   248.000   480.000   247.800   506.000
GR    248.000   572.000   260.000   572.100   260.000   642.000   247.500   642.100   246.800   729.000
GR    248.000   936.000   248.000   962.000   247.400   998.000   248.500  1045.000   249.000  1090.000
GR    249.000  1133.000   253.000  1134.000   253.000  1163.000   244.700  1163.100   244.700  1267.500
GR    253.000  1267.600   253.000  1300.000     0.        0.        0.        0.        0.        0.
```

52.59
1.83
54.42

X1	31423.000	20.000	1134.000	1300.000	10.000	10.000	10.000	0.	0.	0.
X3	0.	0.	0.	0.	0.	1134.000	0.	0.	0.	0.
GR	251.500	0.	250.230	100.000	249.800	200.000	249.000	300.000	248.670	400.000
GR	248.300	500.000	248.030	600.000	247.880	700.000	247.600	800.000	247.830	900.000
GR	248.360	1000.000	249.000	1098.000	249.200	1133.000	253.000	1134.000	253.000	1163.000
GR	244.700	1163.000	244.700	1267.500	253.000	1267.500	253.000	1300.000	253.000	1371.000
NC	0.020	0.020	0.020	0.	0.	0.	0.	0.	0.	0.
X1	31503.000	0.	1134.000	1300.000	80.000	80.000	80.000	0.	0.	0.
X3	0.	0.	0.	0.	0.	1134.000	0.	0.	0.	0.
NC	0.035	0.035	0.030	0.	0.	0.	0.	0.	0.	0.
X1	31553.000	56.000	1160.000	1327.000	50.000	50.000	50.000	0.	0.	0.
X3	0.	0.	0.	0.	0.	1160.000	0.	0.	0.	0.
GR	250.000	0.	250.000	135.000	249.800	162.000	249.800	210.000	249.100	260.000
GR	248.600	310.000	270.000	310.000	270.000	318.000	247.300	318.000	249.000	364.000
GR	248.700	414.000	248.000	461.000	247.600	496.000	247.100	496.000	246.900	512.000
GR	247.000	566.000	246.900	575.000	270.000	575.000	270.000	583.000	246.900	583.000
GR	247.400	613.000	247.800	664.000	247.800	677.000	270.000	677.000	270.000	681.000
GR	247.800	681.000	247.800	696.000	245.050	727.000	247.200	747.000	247.100	763.000
GR	270.000	763.000	270.000	767.000	247.100	767.000	247.200	813.000	247.000	865.000
GR	247.000	875.000	270.000	875.000	270.000	879.000	247.100	879.000	247.200	915.000
GR	247.400	965.000	247.500	976.000	270.000	976.000	270.000	980.000	247.500	980.000
GR	247.900	1000.000	248.970	1020.000	250.250	1110.000	253.000	1160.000	245.240	1193.000
GR	245.240	1215.000	270.000	1215.000	270.000	1217.000	245.240	1217.000	245.240	1303.000
GR	251.000	1327.000	0.	0.	0.	0.	0.	0.	0.	0.
X1	31653.000	34.000	960.000	1130.000	100.000	100.000	100.000	0.	0.	0.
X3	0.	0.	0.	0.	0.	960.000	0.	0.	0.	0.
GR	252.000	0.	252.000	20.000	250.000	38.000	250.000	88.000	248.000	197.000
GR	247.500	218.000	270.000	218.000	270.000	224.000	247.500	224.000	245.800	282.000
GR	245.800	397.000	246.000	413.000	246.500	510.000	270.000	510.000	270.000	518.000
GR	246.500	518.000	247.000	627.000	270.000	627.000	270.000	631.000	247.000	631.000
GR	247.500	697.000	248.000	710.000	249.000	790.000	249.720	810.000	251.160	900.000
GR	251.160	910.000	253.000	960.000	245.510	1000.000	245.510	1020.000	270.000	1020.000
GR	270.000	1022.000	245.510	1022.000	245.510	1110.000	251.000	1130.000	0.	0.
X1	31750.000	21.000	887.000	1060.000	97.000	97.000	97.000	0.	0.	0.
X3	0.	0.	0.	0.	0.	887.000	0.	0.	0.	0.
GR	254.000	0.	252.000	20.000	250.000	35.000	248.000	121.000	246.000	140.000
GR	245.800	152.000	245.800	430.000	246.000	450.000	246.000	500.000	245.800	510.000
GR	245.800	680.000	246.000	690.000	248.000	715.000	248.000	725.000	250.450	745.000
GR	252.000	835.000	252.000	845.000	253.000	887.000	245.770	936.000	245.770	1046.000
GR	251.000	1060.000	0.	0.	0.	0.	0.	0.	0.	0.
NC	0.030	0.	0.	0.	0.	0.	0.	0.	0.	0.
X1	31900.000	30.000	801.000	995.000	150.000	150.000	150.000	0.	0.	0.
X3	0.	0.	0.	0.	0.	801.000	0.	0.	0.	0.
GR	254.500	0.	254.000	5.000	250.000	24.000	248.000	75.000	246.000	90.000
GR	245.800	110.000	245.800	188.000	246.000	197.000	248.000	228.000	248.400	236.000
GR	270.000	236.000	270.000	244.000	248.400	244.000	248.000	278.000	247.500	284.000
GR	270.000	284.000	270.000	289.000	247.000	289.000	246.000	296.000	245.800	315.000
GR	245.800	635.000	246.000	640.000	246.000	660.000	251.570	680.000	252.900	770.000
GR	252.900	780.000	253.000	801.000	246.180	871.000	246.180	981.000	251.000	995.000
EJ	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

6

LEFT O.B.

Q=27,200cfs

```
*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG0000
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
*****************************************************

T1 RUN CHAPARRAL LT OB
T2 FLOW RANGE 23200 TO 27200 CFS
T3 RUN NO. 14 Q=27200

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
       0.      15.        0.        0.  0.            0.        2.0       0.   251.900     0.
J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
    15.000     0.        0.        0.        0.        0.        0.        0.        0.        0.
```

```
*PROF 14

CCHV=   0.200 CEHV=   0.400
*SECNO 31250.000
   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


3470 ENCROACHMENT STATIONS=       0.0    1156.0  TYPE=     1  TARGET=    1155.999
 31250.00     7.90    251.90      0.     251.90    252.22     0.32      0.        0.  100000.00
   27200.   27200.       0.       0.     6001.       0.       0.        0.        0. 100000.00
      0.      4.53      0.       0.     0.035     0.030    0.035      0.      244.00     59.55
 0.000982      0.        0.       0.       0         0        0        0.    1096.45   1156.00


*SECNO 31310.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=       0.0    1160.0  TYPE=     1  TARGET=    1159.999
 31310.00     7.70    251.70      0.       0.     252.52     0.82      0.10      0.20100000.00
   27200.   27200.       0.       0.     3739.       0.       0.        7.        1. 100000.00
      0.00     7.27      0.       0.     0.035     0.030    0.035     0.030    244.00     75.93
 0.003709     60.       60.      60.       2         0        0        0.    1036.52   1160.00

*SECNO 31370.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=       0.0    1163.0  TYPE=     1  TARGET=    1162.999
 31370.00     4.93    251.73      0.       0.     253.06     1.33      0.33      0.20100000.00
   27200.   27200.       0.       0.     2942.       0.       0.       11.        3. 100000.00
      0.00     9.24      0.       0.     0.035     0.030    0.035     0.030    246.80     48.39
 0.009334     60.       60.      60.       4         0        0        0.    1017.04   1163.00


*SECNO 31413.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=       0.0    1163.0  TYPE=     1  TARGET=    1162.999
 31413.00     5.91    252.71      0.       0.     253.42     0.71      0.24      0.12100000.00
   27200.   27200.       0.       0.     4032.       0.       0.       15.        4. 100000.00
      0.01     6.75      0.       0.     0.035     0.030    0.035     0.029    246.80      0.00
 0.003652     43.       43.      43.       5         0        0        0.    1055.64   1133.93


*SECNO 31423.000
3280 CROSS SECTION  31423.00 EXTENDED      0.00 FEET

   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

3470 ENCROACHMENT STATIONS=        0.0     1134.0  TYPE=      1  TARGET=     1133.999
 31423.00      5.40    253.00      0.        0.      253.49     0.49      0.03      0.04100000.00
   27200.    27200.       0.        0.     4839.       0.        0.       16.        4. 100000.00
     0.01      5.62      0.        0.     0.035     0.030     0.035     0.029    247.60      0.00
 0.002397       10.       10.       10.       3         0         0        0.     1134.00   1134.00

*SECNO 31503.000
3280 CROSS SECTION  31503.00 EXTENDED       0.13 FEET

3470 ENCROACHMENT STATIONS=        0.0     1134.0  TYPE=      1  TARGET=     1133.999
 31503.00      5.53    253.13      0.        0.      253.60     0.46      0.10      0.01100000.00
   27200.    27200.       0.        0.     4986.       0.        0.       25.        6. 100000.00
     0.01      5.45      0.        0.     0.020     0.020     0.020     0.026    247.60      0.00
 0.000711       80.       80.       80.       2         0         0        0.     1134.00   1134.00

*SECNO 31553.000

3265 DIVIDED FLOW
3280 CROSS SECTION  31553.00 EXTENDED       2.27 FEET

3470 ENCROACHMENT STATIONS=        0.0     1160.0  TYPE=      1  TARGET=     1159.999
 31553.00      8.22    253.27      0.        0.      253.66     0.39      0.05      0.01100000.00
   27200.    27200.       0.        0.     5434.       0.        0.       31.        8. 100000.00
     0.01      5.01      0.        0.     0.035     0.030     0.035     0.027    245.05      0.00
 0.001714       50.       50.       50.       4         0         0        0.     1128.00   1160.00

*SECNO 31653.000

3265 DIVIDED FLOW
3280 CROSS SECTION  31653.00 EXTENDED       2.39 FEET

3470 ENCROACHMENT STATIONS=        0.0      960.0  TYPE=      1  TARGET=      959.999
 31653.00      7.59    253.39      0.        0.      253.87     0.47      0.17      0.03100000.00
   27200.    27200.       0.        0.     4940.       0.        0.       43.       10. 100000.00
     0.02      5.51      0.        0.     0.035     0.030     0.035     0.028    245.80      0.00
 0.001698      100.      100.      100.       2         0         0        0.      942.00    960.00

*SECNO 31750.000
3280 CROSS SECTION  31750.00 EXTENDED       2.62 FEET

3470 ENCROACHMENT STATIONS=        0.0      887.0  TYPE=      1  TARGET=      886.999
 31750.00      7.82    253.62      0.        0.      254.01     0.39      0.13      0.02100000.00
   27200.    27200.       0.        0.     5453.       0.        0.       54.       12. 100000.00
     0.02      4.99      0.        0.     0.035     0.030     0.035     0.028    245.80      3.77
 0.001032       97.       97.       97.       2         0         0        0.      883.23    887.00

*SECNO 31900.000

3265 DIVIDED FLOW
3280 CROSS SECTION  31900.00 EXTENDED       2.71 FEET
```

```
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

 3470 ENCROACHMENT STATIONS=       0.0      801.0  TYPE=      1  TARGET=      800.999
 31900.00      7.91    253.71      0.        0.     254.20      0.48      0.15      0.04100000.00
   27200.    27200.       0.       0.     4873.       0.        0.        72.       15. 100000.00
     0.03      5.58       0.       0.     0.030     0.030     0.035     0.028    245.80      6.37
 0.000946     150.      150.     150.         2         0         0        0.    781.63    801.00
```

PROFILE FOR STREAM 0. 14 Q=27200

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-FT	244.	245.	246.	247.	248.	249.	250.	251.	252.	253.
SECNO	CUMDIS-FT									
31250.00	0. I								W. E	M L
	10. I								W. E	. M L
	20. I								W . E	. M L
	30. I								W . E	. M L
	40. I								W . E	. M L
	50. I								W . E	. M L
31310.00	60. I								W . E	. L
	70. C	I							W . E	. L
	80. C	I.							W . E	. L
	90. C	. I							W . E	. L
	100. C	.	I.						W . E.	L
	110. C	.	. I						W . E	L
31370.00	120. C	.	.	I .					W . . E	L
	130. C	.	.	I .					W . E	M L
	140. C	.	.	I .					. W . E	M L
	150. C	.	.	I .					. W . E	L
	160. C	.	.	I .					. W . M	E L
31413.00	170. C	.	.	I .					. W M	E L
31423.00	180. C	.	.	.	I .				. W	E L
	190. C	.	.	.	I .				. W	E L
	200. C	.	.	.	I .				. W	E L
	210. C	.	.	.	I .				. W	E L
	220. C	.	.	.	I .				. MW	E L
	230. C	.	.	.	I .				. MW	E L
	240. C	.	.	.	I .				. MW	E L
	250. C	.	.	.	I .				. MW	E L
31503.00	260. C	.	.	.	I .				. MW	E L
	270. C	.	.	.I	.				. M . W	E L
	280. C	.	. I	.	.				. M . W	E L
	290. C	.	.I	.	.				M . . W	E L
	300. C	. I	.	.	.				M . . W	E L
31553.00	310. C	I	.	.	.			M	. . W	E L
	320. C	.I	.	.	.			M	. . W	E L
	330. C	. I	.	.	.			M	. . W	E L
	340. C	. I	.	.	.			M	. . W	E L
	350. C	. I	.	.	.			M	. . W	E L
	360. C	. I	.	.	.			M	. . W	E L
	370. C	. I	.	.	.			M	. . W	E L
	380. C	. I	.	.	.			M	. . W	E L
	390. C	. I	.	.	.			M	. . W	E L
	400. C	. I	.	.	.			M	. . W	E L
31653.00	410. C	.	I .	.	.			M	. . W	EL
	420. C	.	I .	.	.			M	. . W	EL
	430. C	.	I .	.	.			M	. . W	EL
	440. C	.	I .	.	.			M	. . W	EL
	450. C	.	I .	.	.			M	. . W	EL
	460. C	.	I .	.	.			M	. . W	EL
	470. C	.	I .	.	.			M	. . W	E
	480. C	.	I .	.	.			M	. . W	E
	490. C	.	I .	.	.			M	. . W	E
31750.00	500. C	.	I .	.	.			M	. . W	E
	510. C	.	I .	.	.			M	. . W	E
	520. C	.	I .	.	.			M	. . W	E
	530. C	.	I .	.	.			M	. . W	E
	540. C	.	I .	.	.			M	. . W	E

```
                550.  C     .     I .     .     .     .     .     M     .     .     W   E
                560.  C     .     I .     .     .     .     .     M     .     .      W  E
                570.  C     .     I .     .     .     .     .     M     .     .      W  E
                580.  C     .     I .     .     .     .     .     M     .     .      W  E
                590.  C     .     I .     .     .     .     .     M     .     .      W  E
                600.  C     .     I .     .     .     .     .     M     .     .      W  E
                610.  C     .     I .     .     .     .     .     M     .     .      W  E
                620.  C     .     I .     .     .     .     .     M     .     .      W  E
                630.  C     .     I .     .     .     .     .     M     .     .      W  E
                640.  C     .     I .     .     .     .     .     M     .     .      W  E
     31900.00   650.  C     .     I .     .     .     .     .     M     .     .      W  E
```

LEFT O.B. 7

Q=27,300 to 28,100cfs

```
*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG0000
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
*****************************************************

T1 RUN CHAPARRAL LT OB
T2 FLOW RANGE   27300 TO 28100 CFS
T3 RUN NO. 1  Q=28100 CFS

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0.       2.        0.        0.  0.            0.        2.0       0.   251.900     0.

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     1.000      0.        0.        0.        0.        0.        0.        0.        0.        0.

NC     0.035     0.035     0.030     0.200     0.400     0.        0.        0.        0.        0.
QT     9.000 28100.000 28000.000 27900.000 27800.000 27700.000 27600.000 27500.000 27400.000 27300.000


X1  31250.000    27.000  1156.000  1326.000     0.        0.        0.        0.        0.        0.
X3      0.        0.        0.        0.        0.     1156.000     0.        0.        0.        0.
GR    252.000     0.      252.000    55.000   250.000   146.000   248.000   204.000   246.000   211.000
GR    244.000   219.000   244.000   291.000   246.000   308.000   248.000   325.000   248.000   403.000
GR    246.000   462.000   244.000   479.000   244.000   844.000   246.000   851.000   248.000   911.000
GR    248.000  1156.000   244.400  1176.000   244.400  1286.000   250.000  1306.000   252.000  1326.000
GR    252.000  1426.000   250.000  1440.000   250.000  1576.000   251.500  1609.000   252.000  1713.000
GR    252.000  1858.000   253.000  1962.000     0.        0.        0.        0.        0.        0.


X1  31310.000    24.000  1160.000  1350.000    60.000    60.000    60.000     0.        0.        0.
X3      0.        0.        0.        0.        0.     1160.000     0.        0.        0.        0.
GR    252.900     0.      252.000    70.000   250.000   110.000   249.100   203.000   250.000   330.000
GR    253.000   380.000   250.000   440.000   248.000   535.000   246.000   620.000   244.000   640.000
GR    244.000   790.000   246.000   825.000   248.000   915.000   250.000   975.000   249.000  1045.000
GR    249.400  1110.000   250.000  1160.000   244.500  1185.000   244.500  1322.000   250.000  1350.000
GR    249.500  1405.000   250.000  1488.000   252.000  1580.000   254.000  1595.000     0.        0.


X1  31370.000    23.000  1163.000  1358.000    60.000    60.000    60.000     0.        0.        0.
X3      0.        0.        0.        0.        0.     1163.000     0.        0.        0.        0.
GR    253.000     0.      251.300    65.000   251.300    85.000   250.000   116.000   249.600   241.000
GR    250.000   316.000   252.500   373.000   253.700   431.000   249.700   476.000   250.400   538.000
GR    248.000   571.000   247.800   608.000   248.000   721.000   246.800   818.000   248.000  1023.000
GR    249.000  1075.000   249.400  1106.000   249.400  1163.000   249.000  1183.000   244.600  1203.000
GR    244.600  1338.000   250.000  1358.000   254.000  1493.000     0.        0.        0.        0.


X1  31413.000    27.000  1163.000  1300.000    43.000    43.000    43.000     0.        0.        0.
X3      0.        0.        0.        0.        0.     1163.000     0.        0.        0.        0.
GR    251.500     0.      249.100   100.000   250.000   210.000   253.000   234.000   252.000   255.000
GR    249.700   369.000   250.400   431.000   250.000   470.000   248.000   480.000   247.800   506.000
GR    248.000   572.000   260.000   572.100   260.000   642.000   247.500   642.100   246.800   729.000
GR    248.000   936.000   248.000   962.000   247.400   998.000   248.500  1045.000   249.000  1090.000
GR    249.000  1133.000   253.000  1134.000   253.000  1163.000   244.700  1163.100   244.700  1267.500
GR    253.000  1267.600   253.000  1300.000     0.        0.        0.        0.        0.        0.


X1  31423.000    20.000  1134.000  1300.000    10.000    10.000    10.000     0.        0.        0.
```

X3	0.	0.	0.	0.	0.	1134.000	0.	0.	0.	0.
GR	251.500	0.	250.230	100.000	249.800	200.000	249.000	300.000	248.670	400.000
GR	248.300	500.000	248.030	600.000	247.880	700.000	247.600	800.000	247.830	900.000
GR	248.360	1000.000	249.000	1098.000	249.200	1133.000	253.000	1134.000	253.000	1163.000
GR	244.700	1163.000	244.700	1267.500	253.000	1267.500	253.000	1300.000	253.000	1371.000
NC	0.020	0.020	0.020	0.	0.	0.	0.	0.	0.	0.
X1	31503.000	0.	1134.000	1300.000	80.000	80.000	80.000	0.	0.	0.
X3	0.	0.	0.	0.	0.	1134.000	0.	0.	0.	0.
NC	0.035	0.035	0.030	0.	0.	0.	0.	0.	0.	0.
X1	31553.000	56.000	1160.000	1327.000	50.000	50.000	50.000	0.	0.	0.
X3	0.	0.	0.	0.	0.	1160.000	0.	0.	0.	0.
GR	250.000	0.	250.000	135.000	249.800	162.000	249.800	210.000	249.100	260.000
GR	248.600	310.000	270.000	310.000	270.000	318.000	247.300	318.000	249.000	364.000
GR	248.700	414.000	248.000	461.000	247.600	496.000	247.100	496.000	246.900	512.000
GR	247.000	566.000	246.900	575.000	270.000	575.000	270.000	583.000	246.900	583.000
GR	247.400	613.000	247.800	664.000	247.800	677.000	270.000	677.000	270.000	681.000
GR	247.800	681.000	247.800	696.000	245.050	727.000	247.200	747.000	247.100	763.000
GR	270.000	763.000	270.000	767.000	247.100	767.000	247.200	813.000	247.000	865.000
GR	247.000	875.000	270.000	875.000	270.000	879.000	247.100	879.000	247.200	915.000
GR	247.400	965.000	247.500	976.000	270.000	976.000	270.000	980.000	247.500	980.000
GR	247.900	1000.000	248.970	1020.000	250.250	1110.000	253.000	1160.000	245.240	1193.000
GR	245.240	1215.000	270.000	1215.000	270.000	1217.000	245.240	1217.000	245.240	1303.000
GR	251.000	1327.000	0.	0.	0.	0.	0.	0.	0.	0.
X1	31653.000	34.000	960.000	1130.000	100.000	100.000	100.000	0.	0.	0.
X3	0.	0.	0.	0.	0.	960.000	0.	0.	0.	0.
GR	252.000	0.	252.000	20.000	250.000	38.000	250.000	88.000	248.000	197.000
GR	247.500	218.000	270.000	218.000	270.000	224.000	247.500	224.000	245.800	282.000
GR	245.800	397.000	246.000	413.000	246.500	510.000	270.000	510.000	270.000	518.000
GR	246.500	518.000	247.000	627.000	270.000	627.000	270.000	631.000	247.000	631.000
GR	247.500	697.000	248.000	710.000	249.000	790.000	249.720	810.000	251.160	900.000
GR	251.160	910.000	253.000	960.000	245.510	1000.000	245.510	1020.000	270.000	1020.000
GR	270.000	1022.000	245.510	1022.000	245.510	1110.000	251.000	1130.000	0.	0.
X1	31750.000	21.000	887.000	1060.000	97.000	97.000	97.000	0.	0.	0.
X3	0.	0.	0.	0.	0.	887.000	0.	0.	0.	0.
GR	254.000	0.	252.000	20.000	250.000	35.000	248.000	121.000	246.000	140.000
GR	245.800	152.000	245.800	430.000	246.000	450.000	246.000	500.000	245.800	510.000
GR	245.800	680.000	246.000	690.000	248.000	715.000	248.000	725.000	250.450	745.000
GR	252.000	835.000	252.000	845.000	253.000	887.000	245.770	936.000	245.770	1046.000
GR	251.000	1060.000	0.	0.	0.	0.	0.	0.	0.	0.
NC	0.030	0.	0.	0.	0.	0.	0.	0.	0.	0.
X1	31900.000	30.000	801.000	995.000	150.000	150.000	150.000	0.	0.	0.
X3	0.	0.	0.	0.	0.	801.000	0.	0.	0.	0.
GR	254.500	0.	254.000	5.000	250.000	24.000	248.000	75.000	246.000	90.000
GR	245.800	110.000	245.800	188.000	246.000	197.000	248.000	228.000	248.400	236.000
GR	270.000	236.000	270.000	244.000	248.400	244.000	248.000	278.000	247.500	284.000
GR	270.000	284.000	270.000	289.000	247.000	289.000	246.000	296.000	245.800	315.000
GR	245.800	635.000	246.000	640.000	246.000	660.000	251.570	680.000	252.900	770.000
GR	252.900	780.000	253.000	801.000	246.180	871.000	246.180	981.000	251.000	995.000
EJ	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

LEFT O.B.
Q=27,400 cfs

```
*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG0000
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
*****************************************************

T1 RUN CHAPARRAL LT OB
T2 FLOW RANGE   27300 TO 28100 CFS
T3 RUN NO. 8  Q=27400 CFS

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
       0.       9.        0.        0.  0.           0.        2.0       0.   251.900     0.
J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
     8.000      0.        0.        0.        0.        0.        0.        0.        0.        0.
```

```
*PROF 8

CCHV=   0.200 CEHV=   0.400
*SECNO 31250.000
   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

3470 ENCROACHMENT STATIONS=       0.0    1156.0  TYPE=     1  TARGET=    1155.999
 31250.00     7.90    251.90      0.     251.90    252.22      0.32      0.        0.  100000.00
   27400.    27400.      0.       0.     6001.       0.        0.        0.        0.  100000.00
      0.      4.57      0.       0.     0.035     0.030     0.035     0.      244.00    59.55
 0.000997      0.        0.       0.       0         0         0       0.    1096.45  1156.00

*SECNO 31310.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=       0.0    1160.0  TYPE=     1  TARGET=    1159.999
 31310.00     7.70    251.70      0.       0.      252.53      0.84      0.10      0.20100000.00
   27400.    27400.      0.       0.     3736.       0.        0.        7.        1. 100000.00
     0.00     7.33      0.       0.     0.035     0.030     0.035     0.030    244.00    76.01
 0.003774      60.       60.      60.       2         0         0       0.    1036.31  1160.00

*SECNO 31370.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=       0.0    1163.0  TYPE=     1  TARGET=    1162.999
 31370.00     4.93    251.73      0.       0.      253.08      1.35      0.34      0.21100000.00
   27400.    27400.      0.       0.     2939.       0.        0.       11.        3. 100000.00
     0.00     9.32      0.       0.     0.035     0.030     0.035     0.030    246.80    48.50
 0.009500      60.       60.      60.       4         0         0       0.    1016.83  1163.00

*SECNO 31413.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=       0.0    1163.0  TYPE=     1  TARGET=    1162.999
 31413.00     5.94    252.74      0.       0.      253.45      0.71      0.24      0.13100000.00
   27400.    27400.      0.       0.     4055.       0.        0.       15.        4. 100000.00
     0.01     6.76      0.       0.     0.035     0.030     0.035     0.029    246.80     0.00
 0.003640      43.       43.      43.       5         0         0       0.    1056.30  1133.93

*SECNO 31423.000
3280 CROSS SECTION  31423.00 EXTENDED      0.03 FEET

   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

3470 ENCROACHMENT STATIONS=        0.0     1134.0  TYPE=      1  TARGET=     1133.999
 31423.00      5.43    253.03      0.        0.      253.52      0.49      0.03      0.04100000.00
   27400.    27400.       0.        0.     4864.        0.        0.       16.        4. 100000.00
     0.01      5.63      0.        0.     0.035     0.030     0.035     0.029    247.60      0.00
 0.002392      10.       10.       10.        3         0         0        0.     1134.00   1134.00

*SECNO 31503.000
3280 CROSS SECTION  31503.00 EXTENDED       0.16 FEET

3470 ENCROACHMENT STATIONS=        0.0     1134.0  TYPE=      1  TARGET=     1133.999
 31503.00      5.56    253.16      0.        0.      253.62      0.46      0.10      0.01100000.00
   27400.    27400.       0.        0.     5011.        0.        0.       25.        6. 100000.00
     0.01      5.47      0.        0.     0.020     0.020     0.020     0.026    247.60      0.00
 0.000710      80.       80.       80.        2         0         0        0.     1134.00   1134.00

*SECNO 31553.000

3265 DIVIDED FLOW
3280 CROSS SECTION  31553.00 EXTENDED       2.29 FEET

3470 ENCROACHMENT STATIONS=        0.0     1160.0  TYPE=      1  TARGET=     1159.999
 31553.00      8.25    253.30      0.        0.      253.69      0.39      0.05      0.01100000.00
   27400.    27400.       0.        0.     5459.        0.        0.       31.        8. 100000.00
     0.01      5.02      0.        0.     0.035     0.030     0.035     0.027    245.05      0.00
 0.001715      50.       50.       50.        4         0         0        0.     1128.00   1160.00

*SECNO 31653.000

3265 DIVIDED FLOW
3280 CROSS SECTION  31653.00 EXTENDED       2.41 FEET

3470 ENCROACHMENT STATIONS=        0.0      960.0  TYPE=      1  TARGET=      959.999
 31653.00      7.62    253.42      0.        0.      253.89      0.47      0.17      0.03100000.00
   27400.    27400.       0.        0.     4960.        0.        0.       43.       10. 100000.00
     0.02      5.52      0.        0.     0.035     0.030     0.035     0.028    245.80      0.00
 0.001701      100.      100.      100.        2         0         0        0.      942.00    960.00

*SECNO 31750.000
3280 CROSS SECTION  31750.00 EXTENDED       2.65 FEET

3470 ENCROACHMENT STATIONS=        0.0      887.0  TYPE=      1  TARGET=      886.999
 31750.00      7.84    253.64      0.        0.      254.03      0.39      0.13      0.02100000.00
   27400.    27400.       0.        0.     5472.        0.        0.       54.       12. 100000.00
     0.02      5.01      0.        0.     0.035     0.030     0.035     0.028    245.80      3.54
 0.001036      97.       97.       97.        2         0         0        0.      883.46    887.00

*SECNO 31900.000

3265 DIVIDED FLOW
3280 CROSS SECTION  31900.00 EXTENDED       2.73 FEET
```

```
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

 3470 ENCROACHMENT STATIONS=       0.0      801.0  TYPE=      1  TARGET=      800.999
 31900.00      7.93    253.73      0.        0.     254.22      0.49      0.15      0.04100000.00
   27400.    27400.        0.       0.     4890.       0.        0.       72.       15. 100000.00
     0.03      5.60       0.       0.     0.030     0.030     0.035     0.028    245.80      6.26
 0.000950      150.      150.     150.         2         0         0       0.    781.74    801.00
```

PROFILE FOR STREAM 0. 8 Q=27400 CFS

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-FT   244.      245.      246.      247.      248.      249.      250.      251.      252.      253.
   SECNO   CUMDIS-FT
31250.00      0.  I         .         .         .         .         .         .         .        W. E       M         L
             10.  I         .         .         .         .         .         .         .        W.  E      . M       L
             20.  I         .         .         .         .         .         .         .       W .  E      .  M      L
             30.  I         .         .         .         .         .         .         .       W .   E     .    M    L
             40.  I         .         .         .         .         .         .         .       W .   E     .      M  L
             50.  I         .         .         .         .         .         .         .     W   .    E    .       M L
31310.00     60.  I         .         .         .         .         .         .         .     W   .    E    .         L
             70.  C     I   .         .         .         .         .         .         .     W   .     E   .         L
             80.  C       I.          .         .         .         .         .         .     W   .      E  .         L
             90.  C         .   I     .         .         .         .         .         .     W   .       E .         L
            100.  C         .       I.          .         .         .         .         .     W   .        E.         L
            110.  C         .         .   I     .         .         .         .         .     W   .         E         L
31370.00    120.  C         .         .       I .         .         .         .         .     W   .         .E        L
            130.  C         .         .       I .         .         .         .         .         W         . E     M L
            140.  C         .         .       I .         .         .         .         .         . W       .  E M    L
            150.  C         .         .       I .         .         .         .         .         .   W     .   E     L
            160.  C         .         .       I .         .         .         .         .         .     W  .M  E      L
31413.00    170.  C         .         .       I .         .         .         .         .         .     W  M    E     L
31423.00    180.  C         .         .         .       I .         .         .         .         .         W    E     L
            190.  C         .         .         .       I .         .         .         .         .         W    E     L
            200.  C         .         .         .       I .         .         .         .         .         MW   E     L
            210.  C         .         .         .       I .         .         .         .         .         MW    E    L
            220.  C         .         .         .       I .         .         .         .         .         MW    E    L
            230.  C         .         .         .       I .         .         .         .         .         MW    E    L
            240.  C         .         .         .       I .         .         .         .         .         MW    E    L
            250.  C         .         .         .       I .         .         .         .         .         MW    E    L
31503.00    260.  C         .         .         .       I .         .         .         .         .         M W   E    L
            270.  C         .         .         .I        .         .         .         .         .     M   . W   E    L
            280.  C         .         .     I   .         .         .         .         .         . M     . W   E    L
            290.  C         .         .I        .         .         .         .         .         M .     . W    E   L
            300.  C         .       I .         .         .         .         .         .     M   .         .  W   E  L
31553.00    310.  C         I         .         .         .         .         .         M         .         .  W   E  L
            320.  C         .I        .         .         .         .         .         M         .         .  W   E  L
            330.  C         . I       .         .         .         .         .         M         .         .  W   E  L
            340.  C         .  I      .         .         .         .         .         M         .         .  W    E L
            350.  C         .  I      .         .         .         .         .         M         .         .  W    E L
            360.  C         .   I     .         .         .         .         .         M         .         .   W   E L
            370.  C         .    I    .         .         .         .         .         M         .         .   W   E L
            380.  C         .     I   .         .         .         .         .         M         .         .   W   E L
            390.  C         .     I   .         .         .         .         .         M         .         .   W    EL
            400.  C         .      I  .         .         .         .         .         M         .         .   W    EL
31653.00    410.  C         .       I .         .         .         .         .         M         .         .   W    EL
            420.  C         .       I .         .         .         .         .         M         .         .   W    EL
            430.  C         .       I .         .         .         .         .         M         .         .     W  EL
            440.  C         .       I .         .         .         .         .         M         .         .     W  EL
            450.  C         .       I .         .         .         .         .         M         .         .     W  EL
            460.  C         .       I .         .         .         .         .         M         .         .     W   E
            470.  C         .       I .         .         .         .         .         M         .         .      W  E
            480.  C         .       I .         .         .         .         .         M         .         .      W  E
            490.  C         .       I .         .         .         .         .         M         .         .      W  E
31750.00    500.  C         .       I .         .         .         .         .         M         .         .      W  E
            510.  C         .       I .         .         .         .         .         M         .         .       W E
            520.  C         .       I .         .         .         .         .         M         .         .       W E
            530.  C         .       I .         .         .         .         .         M         .         .       W E
            540.  C         .       I .         .         .         .         .         M         .         .       W E
```

	550.	C	.	I	.	.	.	.	.	M	.	.	W E
	560.	C	.	I	.	.	.	.	.	M	.	.	W E
	570.	C	.	I	.	.	.	.	.	M	.	.	W E
	580.	C	.	I	.	.	.	.	.	M	.	.	W E
	590.	C	.	I	.	.	.	.	.	M	.	.	W E
	600.	C	.	I	.	.	.	.	.	M	.	.	W E
	610.	C	.	I	.	.	.	.	.	M	.	.	W E
	620.	C	.	I	.	.	.	.	.	M	.	.	W E
	630.	C	.	I	.	.	.	.	.	M	.	.	W E
	640.	C	.	I	.	.	.	.	.	M	.	.	W E
31900.00	650.	C	.	I	.	.	.	.	.	M	.	.	W E

APPENDIX C

Low Flow Computations

8

Rt. O.B. & Channel
Q = 3300 cfs Low Flow

Registered Professional Engineer (Civil)
CERTIFICATE NO. 8976
B. R. JOLLY
DATE SIGNED 4-26-79
Arizona U. S. A.

```
**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG0000
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
**************************************************

T1 RUN CHAPARRAL CHANNEL AND RT OB
T2 FLOW RANGE 1900TO 3300 CFS AND LOW FLOW BRIDGE RUNS
T3 Q= 3300 CFS          LOW FLOW

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0.       14.       0.        0.  0.            0.        2.0       0.    249.700   0.

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

    13.000    0.        0.        0.        0.        0.        0.        0.        0.        0.
```

```
*PRCF 13

CCHV=   0.200 CEHV=   0.400
*SECNO 31250.000
   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

3470 ENCROACHMENT STATIONS=    1156.0    1962.0  TYPE=     1  TARGET=   -1156.000
 31250.00      5.30    249.70      0.      249.70    250.04      0.34      0.        0.      248.00
    3300.        0.     3300.      0.        0.       703.       0.        0.        0.      252.00
       0.        0.      4.69      0.      0.035     0.030     0.035      0.      244.40    1156.00
 0.001162        0.        0.      0.        0         0         0        0.      148.93    1304.93

*SECNO 31310.000

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS=    1160.0    1595.0  TYPE=     1  TARGET=   -1160.000
 31310.00      5.41    249.91      0.        0.      250.12      0.22      0.05      0.03     250.00
    3300.        0.     3291.      9.        0.       881.      23.        1.        0.      250.00
     0.00        0.      3.73     0.40     0.035     0.030     0.035     0.030    244.50    1160.43
 0.000735       60.       60.     60.        2         0         0        0.      301.21    1472.43

*SECNO 31370.000

3470 ENCROACHMENT STATIONS=    1163.0    1493.0  TYPE=     1  TARGET=   -1163.000
 31370.00      5.34    249.94      0.        0.      250.18      0.23      0.05      0.01     249.40
    3300.        0.     3300.      0.        0.       852.       0.        2.        1.      250.00
     0.01        0.      3.87      0.      0.035     0.030     0.035     0.030    244.60    1163.00
 0.000865       60.       60.     60.        2         0         0        0.      194.79    1357.79

*SECNO 31413.000

3470 ENCROACHMENT STATIONS=    1163.0    1300.0  TYPE=     1  TARGET=   -1163.000
 31413.00      5.08    249.78      0.        0.      250.38      0.60      0.05      0.15     253.00
    3300.        0.     3300.      0.        0.       531.       0.        3.        1. 100000.00
     0.01        0.      6.22      0.      0.035     0.030     0.035     0.029    244.70    1163.04
 0.002042       43.       43.     43.        2         0         0        0.      104.52    1267.56

*SECNO 31423.000
   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

3470 ENCROACHMENT STATIONS=    1134.0    1371.0  TYPE=     1  TARGET=   -1134.000
 31423.00      5.11    249.81      0.        0.      250.40      0.59      0.02      0.00     253.00
    3300.        0.     3300.      0.        0.       534.       0.        3.        1.      253.00
     0.01        0.      6.18      0.      0.035     0.030     0.035     0.029    244.70    1163.00
 0.002008       10.       10.     10.        2         0         0        0.      104.50    1267.50

SPECIAL BRIDGE
```

```
    0.90      1.50      3.00      0.      104.50      9.00    311.00      0.      245.10    244.70

*SECNO 31503.000
PRESSURE FLOW

 EGPRS      EGLWC      H3       QWEIR      QPR       BAREA   TRAPEZOID      ELLC      ELTRD
                                                              AREA
  252.43    250.51     0.14       0.      3300.      311.      306.      248.30    254.40

3470 ENCROACHMENT STATIONS=    1134.0    1371.0  TYPE=     1  TARGET=   -1134.000
 31503.00     7.45   252.15      0.        0.     252.43     0.28      2.03      0.      253.00
    3300.      0.    3300.       0.        0.      779.       0.        4.        1.     253.00
     0.02      0.     4.24       0.      0.020    0.020    0.020     0.026   244.70   1163.00
 0.000267     80.      80.      80.        2        0        0        0.     104.50   1267.50

*SECNO 31553.000

3265 DIVIDED FLOW
3280 CROSS SECTION  31553.00 EXTENDED      1.29 FEET

3470 ENCROACHMENT STATIONS=    1160.0    1327.0  TYPE=     1  TARGET=   -1160.000
 31553.00     7.04   252.28      0.        0.     252.47     0.18      0.02      0.02    253.00
    3300.      0.    3300.       0.        0.      967.       0.        5.        1. 100000.00
     0.02      0.     3.41       0.      0.035    0.030    0.035     0.027   245.24   1163.04
 0.000501     50.      50.      50.        2        0        0        0.     161.96   1327.00

*SECNO 31653.000

3265 DIVIDED FLOW
3280 CROSS SECTION  31653.00 EXTENDED      1.33 FEET

3470 ENCROACHMENT STATIONS=     960.0    1130.0  TYPE=     1  TARGET=    -960.000
 31653.00     6.82   252.33      0.        0.     252.52     0.19      0.05      0.00    253.00
    3300.      0.    3300.       0.        0.      942.       0.        8.        2. 100000.00
     0.03      0.     3.50       0.      0.035    0.030    0.035     0.028   245.51    963.58
 0.000553    100.     100.     100.        2        0        0        0.     164.41   1130.00

*SECNO 31750.000
3280 CROSS SECTION  31750.00 EXTENDED      1.38 FEET

3470 ENCROACHMENT STATIONS=     887.0    1060.0  TYPE=     1  TARGET=    -887.000
 31750.00     6.61   252.38      0.        0.     252.58     0.20      0.05      0.00    253.00
    3300.      0.    3300.       0.        0.      931.       0.       10.        2. 100000.00
     0.04      0.     3.54       0.      0.035    0.030    0.035     0.028   245.77    891.20
 0.000537     97.      97.      97.        2        0        0        0.     168.79   1060.00

*SECNO 31900.000
3280 CROSS SECTION  31900.00 EXTENDED      1.48 FEET

   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

3470 ENCROACHMENT STATIONS=     801.0     995.0  TYPE=     1  TARGET=    -801.000
 31900.00     6.30   252.48      0.        0.     252.66     0.19      0.08      0.00    253.00
```

3300.	0.	3300.	0.	0.	950.	0.	13.	3.	100000.00
0.05	0.	3.47	0.	0.030	0.030	0.035	0.028	246.18	806.38
0.000579	150.	150.	150.	2	0	0	0.	188.62	995.00

PROFILE FOR STREAM 00 CFS LOW FLOW

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-FT   244.      245.      246.      247.      248.      249.      250.      251.      252.      253.
   SECNO   CUMDIS-FT
31250.00     0.  C  I     .         .         .         L         .         W  E         .         R         M         .
            10.  C  I     .         .         .         .  L      .         W  .E        .         R  .         .  M      .
            20.  C  I     .         .         .         .      L  .         W .E        .  R      .         .   M     .
            30.  C   I    .         .         .         .         L         W .E        R         .         .    M    .
            40.  C   I    .         .         .         .         .  L      W .E     R  .         .         .     M   .
            50.  C   I    .         .         .         .         .      L W.E R        .         .         .      M  .
31310.00    60.  C   I    .         .         .         .         .        WLE        .         .         .        M
            70.  C   I    .         .         .         .         .        WRE        .         .         .        M
            80.  C   I    .         .         .         .         .       LWRE        .         .         .        M
            90.  C    I   .         .         .         .         .      L WR E       .         .         .        M
           100.  C    I   .         .         .         .         .    L  WR E        .         .         .        M
           110.  C    I   .         .         .         .         .   L   WR E        .         .         .        M
31370.00   120.  C    I   .         .         .         .         .  L    WR E        .         .         .        M
           130.  C    I   .         .         .         .         .        W. E        .         .         .      M R
           140.  C    I   .         .         .         .         .        W.  E       .L        .         .    M   R
           150.  C     I  .         .         .         .         .       W .  E       .         L.        .  M     R
           160.  C     I  .         .         .         .         .       W .   E      .         .      L  .M       R
31413.00   170.  C     I  .         .         .         .         .       W .   E      .         .         L         R
31423.00   180.  C     I  .         .         .         .         .       W .   E      .         .         L         .
           190.  C     I  .         .         .         .         .        .W    E     .         .         L         .
           200.  C     I  .         .         .         .         .         .   W   E.        .         L         .
           210.  C     I  .         .         .         .         .         .     W  . E      .         L         .
           220.  C     I  .         .         .         .         .         .        W   E    .         L         .
           230.  C     I  .         .         .         .         .         .         . W   E  .         L         .
           240.  C     I  .         .         .         .         .         .         .    W  E.         L         .
           250.  C     I  .         .         .         .         .         .         .        W. E      L         .
31503.00   260.  C     I  .         .         .         .         .         .         .         .W  E     L         .
           270.  C      I .         .         .         .         .         .         .         . W E M   L         R
           280.  C       I.         .         .         .         .         .         .         . W E     L         R
           290.  C        I         .         .         .         .         .         .       M . W  E    L         R
           300.  C        .I        .         .         .         .         .         .   M     .  W E    L         R
31553.00   310.  C        . I       .         .         .         .         .         M         .  W E    L         R
           320.  C        .  I      .         .         .         .         .         M         .  W E    L         R
           330.  C        .  I      .         .         .         .         .         M         .  W E    L         R
           340.  C        .  I      .         .         .         .         .         M         .  W E    L         R
           350.  C        .  I      .         .         .         .         .         M         .  W E    L         R
           360.  C        .   I     .         .         .         .         .         M         .  W E    L         R
           370.  C        .   I     .         .         .         .         .         M         .  W E    L         R
           380.  C        .   I     .         .         .         .         .         M         .  W E    L         R
           390.  C        .    I    .         .         .         .         .         M         .  W E    L         R
           400.  C        .    I    .         .         .         .         .         M         .  W E    L         R
31653.00   410.  C        .    I    .         .         .         .         .         M         .  W E    L         R
           420.  C        .    I    .         .         .         .         .         M         .  W E    L         R
           430.  C        .     I   .         .         .         .         .         M         .  W E    L         R
           440.  C        .     I   .         .         .         .         .         M         .  W E    L         R
           450.  C        .     I   .         .         .         .         .         M         .   WE    L         R
           460.  C        .     I   .         .         .         .         .         M         .   W E   L         R
           470.  C        .      I  .         .         .         .         .         M         .   W E   L         R
           480.  C        .      I  .         .         .         .         .         M         .   W E   L         R
           490.  C        .      I  .         .         .         .         .         M         .   W E   L         R
31750.00   500.  C        .       I .         .         .         .         .         M         .   W E   L         R
           510.  C        .       I .         .         .         .         .         M         .   W E   L         R
           520.  C        .       I .         .         .         .         .         M         .   W E   L         R
           530.  C        .        I.         .         .         .         .         M         .   W E   L         R
           540.  C        .        I.         .         .         .         .         M         .   W E   L         R
```

```
                550.  C     .   I.    .    .    .    .   M    .  W E   L      R
                560.  C     .   I.    .    .    .    .   M    .  W E   L      R
                570.  C     .    I    .    .    .    .   M    .  W E   L      R
                580.  C     .    I    .    .    .    .   M    .  W E   L      R
                590.  C     .    I    .    .    .    .   M    .  W E   L      R
                600.  C     .    I    .    .    .    .   M    .  W E   L      R
                610.  C     .   .I    .    .    .    .   M    .   WE   L      R
                620.  C     .   .I    .    .    .    .   M    .   WE   L      R
                630.  C     .   .I    .    .    .    .   M    .   WE   L      R
                640.  C     .    . I  .    .    .    .   M    .   WE   L      R
319C0.00        650.  C     .    . I  .    .    .    .   M    .  W E   L      R
```

9

Rt.O.B. & Channel
Q=4000 cfs low flow

```
**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG0000
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
**************************************************

T1 RUN CHAPARRAL CHANNEL AND RT OB
T2 FLOW RANGE 1900TO 3300 CFS AND LOW FLOW BRIDGE RUNS
T3 Q= 4000 CFS                    LOW FLOW

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
      0.        0.        0.        0.  0.          0.       -1.0     4000.    249.700     0.

NC    0.035     0.035     0.030     0.200     0.400     0.        0.        0.        0.        0.

X1  31250.000   27.000    1156.000  1326.000  0.        0.        0.        0.        0.        0.
X3    0.        0.        0.        1156.000  0.        0.        0.        0.        0.        0.
GR  252.000     0.        252.000   55.000    250.000   146.000   248.000   204.000   246.000   211.000
GR  244.000     219.000   244.000   291.000   246.000   308.000   248.000   325.000   248.000   403.000
GR  246.000     462.000   244.000   479.000   244.000   844.000   246.000   851.000   248.000   911.000
GR  248.000     1156.000  244.400   1176.000  244.400   1286.000  250.000   1306.000  252.000   1326.000
GR  252.000     1426.000  250.000   1440.000  250.000   1576.000  251.500   1609.000  252.000   1713.000
GR  252.000     1858.000  253.000   1962.000  0.        0.        0.        0.        0.        0.

X1  31310.000   24.000    1160.000  1350.000  60.000    60.000    60.000    0.        0.        0.
X3    0.        0.        0.        1160.000  0.        0.        0.        0.        0.        0.
GR  252.900     0.        252.000   70.000    250.000   110.000   249.100   203.000   250.000   330.000
GR  253.000     380.000   250.000   440.000   248.000   535.000   246.000   620.000   244.000   640.000
GR  244.000     790.000   246.000   825.000   248.000   915.000   250.000   975.000   249.000   1045.000
GR  249.400     1110.000  250.000   1160.000  244.500   1185.000  244.500   1322.000  250.000   1350.000
GR  249.500     1405.000  250.000   1488.000  252.000   1580.000  254.000   1595.000  0.        0.

X1  31370.000   23.000    1163.000  1358.000  60.000    60.000    60.000    0.        0.        0.
X3    0.        0.        0.        1163.000  0.        0.        0.        0.        0.        0.
GR  253.000     0.        251.300   65.000    251.300   85.000    250.000   116.000   249.600   241.000
GR  250.000     316.000   252.500   373.000   253.700   431.000   249.700   476.000   250.400   538.000
GR  248.000     571.000   247.800   608.000   248.000   721.000   246.800   818.000   248.000   1023.000
GR  249.000     1075.000  249.400   1106.000  249.400   1163.000  249.000   1183.000  244.600   1203.000
GR  244.600     1338.000  250.000   1358.000  254.000   1493.000  0.        0.        0.        0.

X1  31413.000   27.000    1163.000  1300.000  43.000    43.000    43.000    0.        0.        0.
X3    0.        0.        0.        1163.000  0.        0.        0.        0.        0.        0.
GR  251.500     0.        249.100   100.000   250.000   210.000   253.000   234.000   252.000   255.000
GR  249.700     369.000   250.400   431.000   250.000   470.000   248.000   480.000   247.800   506.000
GR  248.000     572.000   260.000   572.100   260.000   642.000   247.500   642.100   246.800   729.000
GR  248.000     936.000   248.000   962.000   247.400   998.000   248.500   1045.000  249.000   1090.000
GR  249.000     1133.000  253.000   1134.000  253.000   1163.000  244.700   1163.100  244.700   1267.500
GR  253.000     1267.600  253.000   1300.000  0.        0.        0.        0.        0.        0.

X1  31423.000   20.000    1134.000  1300.000  10.000    10.000    10.000    0.        0.        0.
X3    0.        0.        0.        1134.000  0.        0.        0.        0.        0.        0.
GR  251.500     0.        250.230   100.000   249.800   200.000   249.000   300.000   248.670   400.000
GR  248.300     500.000   248.030   600.000   247.880   700.000   247.600   800.000   247.830   900.000
GR  248.360     1000.000  249.000   1098.000  249.200   1133.000  253.000   1134.000  253.000   1163.000
GR  244.700     1163.000  244.700   1267.500  253.000   1267.500  253.000   1300.000  253.000   1371.000
```

NC	0.020	0.020	0.020	0.	0.	0.	0.	0.	0.	0.
SB	0.900	1.500	3.000	0.	104.500	9.000	311.000	0.	245.100	244.700
X1	31503.000	0.	1134.000	1300.000	80.000	80.000	80.000	0.	0.	0.
X2	0.	0.	1.000	248.300	254.400	0.	0.	0.	0.	0.
X3	0.	0.	0.	1134.000	0.	0.	0.	0.	0.	0.
BT	4.000	1134.000	254.400	253.000	1163.000	254.400	253.000	1300.000	254.600	253.000
BT	1371.000	254.600	253.000	0.	0.	0.	0.	0.	0.	0.
NC	0.035	0.035	0.030	0.	0.	0.	0.	0.	0.	0.
X1	31553.000	56.000	1160.000	1327.000	50.000	50.000	50.000	0.	0.	0.
X3	0.	0.	0.	1160.000	0.	0.	0.	0.	0.	0.
GR	250.000	0.	250.000	135.000	249.800	162.000	249.800	210.000	249.100	260.000
GR	248.600	310.000	270.000	310.000	270.000	318.000	247.300	318.000	249.000	364.000
GR	248.700	414.000	248.000	461.000	247.600	496.000	247.100	496.000	246.900	512.000
GR	247.000	566.000	246.900	575.000	270.000	575.000	270.000	583.000	246.900	583.000
GR	247.400	613.000	247.800	664.000	247.800	677.000	270.000	677.000	270.000	681.000
GR	247.800	681.000	247.800	696.000	245.050	727.000	247.200	747.000	247.100	763.000
GR	270.000	763.000	270.000	767.000	247.100	767.000	247.200	813.000	247.000	865.000
GR	247.000	875.000	270.000	875.000	270.000	879.000	247.100	879.000	247.200	915.000
GR	247.400	965.000	247.500	976.000	270.000	976.000	270.000	980.000	247.500	980.000
GR	247.900	1000.000	248.970	1020.000	250.250	1110.000	253.000	1160.000	245.240	1193.000
GR	245.240	1215.000	270.000	1215.000	270.000	1217.000	245.240	1217.000	245.240	1303.000
GR	251.000	1327.000	0.	0.	0.	0.	0.	0.	0.	0.
X1	31653.000	34.000	960.000	1130.000	100.000	100.000	100.000	0.	0.	0.
X3	0.	0.	0.	960.000	0.	0.	0.	0.	0.	0.
GR	252.000	0.	252.000	20.000	250.000	38.000	250.000	88.000	248.000	197.000
GR	247.500	218.000	270.000	218.000	270.000	224.000	247.500	224.000	245.800	282.000
GR	245.800	397.000	246.000	413.000	246.500	510.000	270.000	510.000	270.000	518.000
GR	246.500	518.000	247.000	627.000	270.000	627.000	270.000	631.000	247.000	631.000
GR	247.500	697.000	248.000	710.000	249.000	790.000	249.720	810.000	251.160	900.000
GR	251.160	910.000	253.000	960.000	245.510	1000.000	245.510	1020.000	270.000	1020.000
GR	270.000	1022.000	245.510	1022.000	245.510	1110.000	251.000	1130.000	0.	0.
X1	31750.000	21.000	887.000	1060.000	97.000	97.000	97.000	0.	0.	0.
X3	0.	0.	0.	887.000	0.	0.	0.	0.	0.	0.
GR	254.000	0.	252.000	20.000	250.000	35.000	248.000	121.000	246.000	140.000
GR	245.800	152.000	245.800	430.000	246.000	450.000	246.000	500.000	245.800	510.000
GR	245.800	680.000	246.000	690.000	248.000	715.000	248.000	725.000	250.450	745.000
GR	252.000	835.000	252.000	845.000	253.000	887.000	245.770	936.000	245.770	1046.000
GR	251.000	1060.000	0.	0.	0.	0.	0.	0.	0.	0.
NC	0.030	0.	0.	0.	0.	0.	0.	0.	0.	0.
X1	31900.000	30.000	801.000	995.000	150.000	150.000	150.000	0.	0.	0.
X3	0.	0.	0.	801.000	0.	0.	0.	0.	0.	0.
GR	254.500	0.	254.000	5.000	250.000	24.000	248.000	75.000	246.000	90.000
GR	245.800	110.000	245.800	188.000	246.000	197.000	248.000	228.000	248.400	236.000
GR	270.000	236.000	270.000	244.000	248.400	244.000	248.000	278.000	247.500	284.000
GR	270.000	284.000	270.000	289.000	247.000	289.000	246.000	296.000	245.800	315.000
GR	245.800	635.000	246.000	640.000	246.000	660.000	251.570	680.000	252.900	770.000
GR	252.900	780.000	253.000	801.000	246.180	871.000	246.180	981.000	251.000	995.000
EJ	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

```
*PROF 1

CCHV=   0.200 CEHV=   0.400
*SECNO 31250.000
   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

3470 ENCROACHMENT STATIONS=    1156.0    1962.0  TYPE=     1  TARGET=   -1156.000
 31250.00      5.30    249.70      0.      249.70    250.20     0.50      0.        0.      248.00
   4000.        0.     4000.       0.        0.       703.      0.        0.        0.      252.00
     0.         0.      5.69      0.      0.035     0.030    0.035      0.      244.40    1156.00
 0.001708       0.       0.       0.        0         0        0        0.      148.93    1304.93

*SECNO 31310.000

3470 ENCROACHMENT STATIONS=    1160.0    1595.0  TYPE=     1  TARGET=   -1160.000
 31310.00      5.52    250.02      0.        0.      250.32     0.30     0.08      0.04     250.00
   4000.        0.     3979.      21.        0.       903.      37.       1.        0.      250.00
     0.00       0.      4.41      0.56    0.035     0.030    0.035    0.030      244.50    1160.00
 0.000999      60.      60.       60.        2         0        0        0.      328.94    1488.94

*SECNO 31370.000

3470 ENCROACHMENT STATIONS=    1163.0    1493.0  TYPE=     1  TARGET=   -1163.000
 31370.00      5.47    250.07      0.        0.      250.39     0.32     0.06      0.01     249.40
   4000.        0.     4000.       0.        0.       877.      0.        2.        1.      250.00
     0.01       0.      4.56      0.01    0.035     0.030    0.035    0.030      244.60    1163.00
 0.001158      60.      60.       60.        2         0        0        0.      197.38    1360.38

*SECNO 31413.000

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=    1163.0    1300.0  TYPE=     1  TARGET=   -1163.000
 31413.00      5.12    249.82      0.        0.      250.69     0.87     0.08      0.22     253.00
   4000.        0.     4000.       0.        0.       535.      0.        3.        1. 100000.00
     0.01       0.      7.48      0.      0.035     0.030    0.035    0.029      244.70    1163.04
 0.002922      43.      43.       43.        2         0        0        0.      104.52    1267.56

*SECNO 31423.000
   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

3470 ENCROACHMENT STATIONS=    1134.0    1371.0  TYPE=     1  TARGET=   -1134.000
 31423.00      5.17    249.87      0.        0.      250.72     0.85     0.03      0.00     253.00
   4000.        0.     4000.       0.        0.       540.      0.        3.        1.      253.00
     0.01       0.      7.41      0.      0.035     0.030    0.035    0.029      244.70    1163.00
 0.002840      10.      10.       10.        2         0        0        0.      104.50    1267.50
```

```
SB   XK        XKOR      COFQ      RDLEN     BWC       BWP       BAREA     SS        ELCHU     ELCHD
     0.90      1.50      3.00      0.        104.50    9.00      311.00    0.        245.10    244.70

*SECNO 31503.000
3280 CROSS SECTION  31503.00 EXTENDED      0.45 FEET

3301 HV CHANGED MORE THAN HVINS
PRESSURE FLOW

 EGPRS     EGLWC     H3        QWEIR     QPR       BAREA     TRAPEZOID AREA    ELLC      ELTRD
 253.72    250.90    0.26      0.        4000.     311.      306.              248.30    254.40

3470 ENCROACHMENT STATIONS=    1134.0    1371.0  TYPE=     1  TARGET=   -1134.000
 31503.00    8.74   253.44    0.        0.        253.72    0.28      3.00      0.        253.00
    4000.    0.     3974.     26.       0.        941.      32.       5.        1.        253.00
     0.01    0.     4.22      0.82      0.020     0.020     0.020     0.026     244.70    1134.00
 0.000364    80.    80.       80.       2         0         0         0.        237.00    1371.00

*SECNO 31553.000

3265 DIVIDED FLOW
3280 CROSS SECTION  31553.00 EXTENDED      2.58 FEET

3470 ENCROACHMENT STATIONS=    1160.0    1327.0  TYPE=     1  TARGET=   -1160.000
 31553.00    8.34   253.58    0.        0.        253.76    0.18      0.02      0.02      253.00
    4000.    0.     4000.     0.        0.        1179.     0.        6.        1.        100000.00
     0.02    0.     3.39      0.        0.035     0.030     0.035     0.027     245.24    1160.00
 0.000402    50.    50.       50.       2         0         0         0.        165.00    1327.00

*SECNO 31653.000

3265 DIVIDED FLOW
3280 CROSS SECTION  31653.00 EXTENDED      2.62 FEET

3470 ENCROACHMENT STATIONS=     960.0    1130.0  TYPE=     1  TARGET=    -960.000
 31653.00    8.11   253.62    0.        0.        253.80    0.19      0.04      0.00      253.00
    4000.    0.     4000.     0.        0.        1157.     0.        9.        2.        100000.00
     0.03    0.     3.46      0.        0.035     0.030     0.035     0.028     245.51    960.00
 0.000435    100.   100.      100.      0         0         0         0.        168.00    1130.00

*SECNO 31750.000
3280 CROSS SECTION  31750.00 EXTENDED      2.66 FEET

3470 ENCROACHMENT STATIONS=     887.0    1060.0  TYPE=     1  TARGET=    -887.000
 31750.00    7.89   253.66    0.        0.        253.84    0.19      0.04      0.00      253.00
    4000.    0.     4000.     0.        0.        1151.     0.        11.       2.        100000.00
     0.03    0.     3.48      0.        0.035     0.030     0.035     0.028     245.77    887.00
 0.000409    97.    97.       97.       0         0         0         0.        173.00    1060.00

*SECNO 31900.000
3280 CROSS SECTION  31900.00 EXTENDED      2.73 FEET

 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
 SLOPE     XLOBL     XLCH      XLOB
```

```
3470 ENCROACHMENT STATIONS=     801.0     995.0  TYPE=     1  TARGET=    -801.000
 31900.00     7.55   253.73     0.        0.     253.91     0.17      0.06      0.00   253.00
    4000.       0.    4000.      0.        0.     1192.      0.        15.        3. 100000.00
     0.05       0.     3.36      0.     0.030     0.030    0.035     0.028    246.18   801.00
 0.000421     150.     150.     150.        1         0        0       0.     194.00   995.00
```

PROFILE FOR STREAM 00 CFS LO

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-FT   244.      245.      246.      247.      248.      249.      250.      251.      252.      253.
   SECNO   CUMDIS-FT
31250.00     0.  C  I     .         .         .         L         .      W . E        .         R         M         .
            10.  C  I     .         .         .         . L       .      W . E        .      R  .         . M       .
            20.  C  I     .         .         .         .   L     .      W . E        .   R     .         .  M      .
            30.  C   I    .         .         .         .     L         W.  E        R         .         .    M    .
            40.  C   I    .         .         .         .       . L     W.  E   R    .         .         .      M  .
            50.  C   I    .         .         .         .         .   L W   E        .         .         .       M .
31310.00    60.  C   I    .         .         .         .         .     W   E        .         .         .         M
            70.  C   I    .         .         .         .         .    LW   E        .         .         .         M
            80.  C   I    .         .         .         .         .  L W   E        .         .         .         M
            90.  C    I   .         .         .         .         .  L W    E       .         .         .         M
           100.  C    I   .         .         .         .         .    L RW   E      .         .         .         M
           110.  C    I   .         .         .         .         .   L RW   E      .         .         .         M
31370.00   120.  C    I   .         .         .         .         .  L  RW   E      .         .         .         M
           130.  C    I   .         .         .         .         .       W L  E     .         .         .       M R
           140.  C    I   .         .         .         .         .       W    E   .L         .         .    M    R
           150.  C     I  .         .         .         .         .      W.     E   .         L.         .  M      R
           160.  C     I  .         .         .         .         .      W .      E .         .         .    L  .M    R
31413.00   170.  C     I  .         .         .         .         .      W .      E .         .         .      L      R
31423.00   180.  C     I  .         .         .         .         .       W.      E .         .         .      L      .
           190.  C     I  .         .         .         .         .         .  W      .E        .         .      L      .
           200.  C     I  .         .         .         .         .         .      W .    E    .         .      L      .
           210.  C     I  .         .         .         .         .         .        . W     E .         .      L      .
           220.  C     I  .         .         .         .         .         .        .      W   . E        .      L      .
           230.  C     I  .         .         .         .         .         .        .        .W    E      .      L      .
           240.  C     I  .         .         .         .         .         .        .        .     W      E      .      .
           250.  C     I  .         .         .         .         .         .        .        .        .      W  E      .
31503.00   260.  C     I  .         .         .         .         .         .        .        .        .      L    W E  .
           270.  C      I .         .         .         .         .         .        .        .        .  M   L    W E  R
           280.  C       I.         .         .         .         .         .        .        . M      L    W E  R
           290.  C        I         .         .         .         .         .        .      M .        L    W E  R
           300.  C        .I        .         .         .         .         .        .   M    .        L     W E R
31553.00   310.  C        . I       .         .         .         .         .        M        .        L     W E R
           320.  C        .  I      .         .         .         .         .        M        .        L     W E R
           330.  C        .  I      .         .         .         .         .        M        .        L     W E R
           340.  C        .  I      .         .         .         .         .        M        .        L     W E R
           350.  C        .  I      .         .         .         .         .        M        .        L     W E R
           360.  C        .   I     .         .         .         .         .        M        .        L     W E R
           370.  C        .   I     .         .         .         .         .        M        .        L     W E R
           380.  C        .   I     .         .         .         .         .        M        .        L     W E R
           390.  C        .    I    .         .         .         .         .        M        .        L     W E R
           400.  C        .    I    .         .         .         .         .        M        .        L     W E R
31653.00   410.  C        .    I    .         .         .         .         .        M        .        L     W E R
           420.  C        .    I    .         .         .         .         .        M        .        L     W E R
           430.  C        .     I   .         .         .         .         .        M        .        L     W E R
           440.  C        .     I   .         .         .         .         .        M        .        L     W E R
           450.  C        .     I   .         .         .         .         .        M        .        L     W E R
           460.  C        .     I   .         .         .         .         .        M        .        L     W E R
           470.  C        .      I  .         .         .         .         .        M        .        L     W E R
           480.  C        .      I  .         .         .         .         .        M        .        L     W E R
           490.  C        .      I  .         .         .         .         .        M        .        L      WE R
31750.00   500.  C        .       I .         .         .         .         .        M        .        L      WE R
           510.  C        .       I .         .         .         .         .        M        .        L      WE R
           520.  C        .       I .         .         .         .         .        M        .        L      WE R
           530.  C        .        I.         .         .         .         .        M        .        L      W ER
           540.  C        .        I.         .         .         .         .        M        .        L      W ER
```

```
                550.  C     .     I.    .     .     .     .     M     .     L     W ER
                560.  C     .     I.    .     .     .     .     M     .     L     W ER
                570.  C     .      I    .     .     .     .     M     .     L     W ER
                580.  C     .      I    .     .     .     .     M     .     L     W ER
                590.  C     .      I    .     .     .     .     M     .     L     W ER
                600.  C     .      I    .     .     .     .     M     .     L     W ER
                610.  C     .      .I   .     .     .     .     M     .     L     W ER
                620.  C     .      .I   .     .     .     .     M     .     L     W ER
                630.  C     .      .I   .     .     .     .     M     .     L     W ER
                640.  C     .      . I  .     .     .     .     M     .     L     W ER
      31900.00  650.  C     .      . I  .     .     .     .     M     .     L     W ER
```