24

DRAINAGE REPORT
5080 NORTH 40TH STREET

December, 1984

Prepared for:
5060 Associates Limited Partnership

Submitted to:

City of Phoenix Engineering Department
Floodplain Management

Submitted by:

ANDERSON-NICHOLS & COMPANY, INC.
4120 North 20th Street
Phoenix, Arizona 85016

Registered Professional Engineer (Civil)
CERTIFICATE NO.
12204
WOODROW E.
SCOUTTEN
DATE SIGNED 12-4-84
Arizona U. S. A.

ANCo Project No. 4416-01

Registered Professional Engineer (Civil)
CERTIFICATE NO.
15290
GREGORY
SCHUELKE
Date Signed 12/4/84
ARIZONA, U.S.A.

0-00-1-12/84

DRAINAGE REPORT

5080 NORTH 40TH STREET

December, 1984

Prepared for:

5060 Associates Limited Partnership

Submitted to:

City of Phoenix Engineering Department
Floodplain Management

Submitted by:

ANDERSON-NICHOLS & COMPANY, INC.
4120 North 20th Street
Phoenix, Arizona 85016

Registered Professional Engineer (Civil)
CERTIFICATE NO. 12204
WOODROW C. SCOLTTEN
DATE SIGNED 12-4-84
Arizona U. S. A.

ANCo Project No. 4416-01

Registered Professional Engineer (Civil)
CERTIFICATE NO. 15290
GREGORY A. SCHULKE
Date Signed 12-14-84
ARIZONA, U.S.A.

Anderson-Nichols
4120 North 20th Street
Phoenix, Arizona 85016
(602) 957-3681

Woodrow C. Scoutten, P.E.
Vice President

December 4, 1984

Mr. Dave Burris, P.E.
City of Phoenix Floodplain Management Department
125 East Washington Street
Phoenix, Arizona 85004

Re: 5080 North 40th Street Project
ANCo #4416

Dear Mr. Burris:

We are herewith submitting for your review and approval, two copies of a drainage report for the proposed 5080 North 40th Street Project, located at the intersection of Echo Canyon Wash and the Arizona Canal. Also, included with this submittal are one copy of; the soils report for the site, the project site plan, and a typical elevation section of the building foundation structure.

If there are any questions concerning this report, please call.

Very truly yours,

ANDERSON-NICHOLS & COMPANY, INC.

Greg Schuelke

Greg Schuelke, P.E.
Project Engineer

GS/gb

cc: Randy Todd, Symington Company
Vince Territo, Cornoyer-Hedrick

TABLE OF CONTENTS

	PAGE
INTRODUCTION	1
FLOOD INSURANCE STUDY	2
SURFACE WATER HYDROLOGY	3
FUTURE WATERSHED CONDITIONS	4
PRE-DEVELOPMENT FLOODPLAIN	5
POST-DEVELOPMENT FLOODPLAIN	8
FLOODWAY	10
FINISH FLOOD ELEVATION	11
RETENTION CRITERIA	11
CONCLUSIONS	12
REFERENCES	13
	FOLLOWS PAGE
PLATE 1 - Vicinity Map	1
PLATE 2 - Existing Flood Insurance Map	2
PLATE 3 - Flood Profiles - Echo Canyon Wash	8

APPENDIX A

HEC-2 Pre-Development Documentation

HEC-2 Post-Development Documentation

APPENDIX B

Rating Curves for Echo Canyon Wash, Arizona Canal and Spillway No. 2

EXHIBIT 1 - Pre-Development 100 Year Floodplain

EXHIBIT 2 - Post-Development 100 Year Floodplain

Registered Professional Engineer (Civil) CERTIFICATE NO. 15290 GREGORY A. HUELKE Date Signed 12/4/80 ARIZONA, U.S.A.

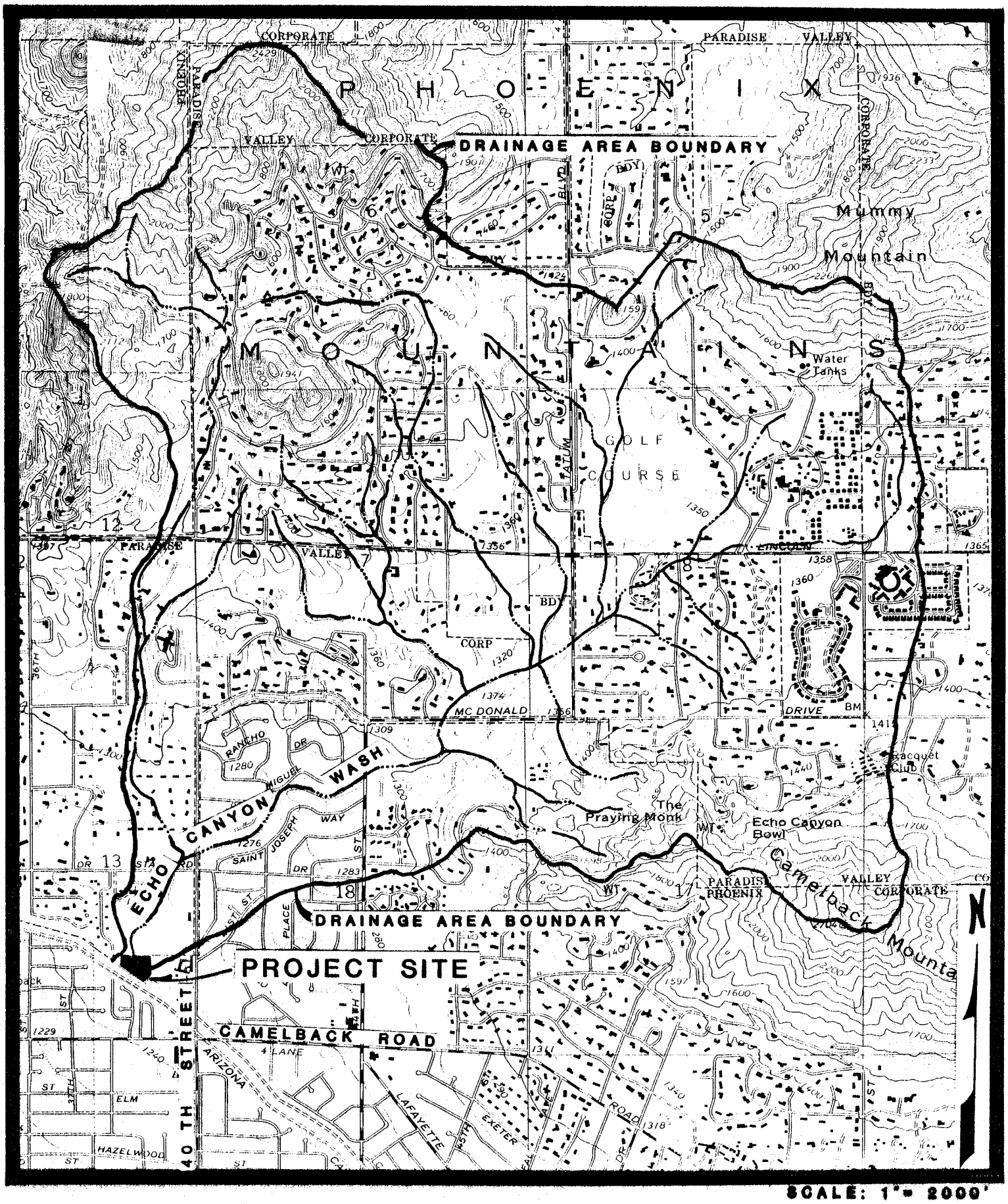
Registered Professional Engineer (Sanitary) CERTIFICATE NO. 12204 WOODROW C. SCOUTEN JR. DATE SIGNED 12-4-80 Arizona U. S. A.

INTRODUCTION

The proposed development, 5080 North 40th Street, is located on a site of approximately 1.9 acres in size, along the north side of the Arizona Cannal, west of 40th Street. The 5080 North 40th Street project is a proposed four-story office building with an adjacent 3-level parking garage. The site is located at the confluence of the Echo Canyon Wash (a.k.a. Cudia City Wash) and the Arizona Canal (see Vicinity Map). The site is presently undeveloped and unvegetated with the east half being a graded depression and the west half containing a fenced earth stock pile.

It is proposed that the four-story office building and a portion of the three-level garage be built on the east side of the site and elevated on piers above the existing depressed area which is the main flow channel for Echo Canyon Wash. Echo Canyon Wash would then flow under the proposed building structures.

This report addresses pre and post development conditions for Echo Canyon Wash as related to the proposed 5080 North 40th Street project. In addition, this report refects our understanding of the City of Phoenix Floodplain Department guideline for commercial developments in floodplains.



SCALE: 1" = 2000'

DRAINAGE REPORT
5080 N. 40TH STREET
LOCATION MAP
FIGURE 1

ANDERSON-NICHOLS & CO., INC.

FLOOD INSURANCE STUDY

The City of Phoenix is participating in the Federally sponsored Flood Insurance Program under the direction of the Federal Emergency Management Agency (FEMA). A Flood Insurance Study of Echo Canyon Wash has been completed for the City of Phoenix (Reference 1). Flood Insurance Rate Map, Panel 80 of 135, displays the results of this study (see Plate 2).

From conversations with and data obtained from the City of Phoenix Floodplain Department representatives, it is believed that the FEMA study is based on the results of an Army Corps of Engineer study. It is further believed that the Corps study was based on 7.5 minute quadrangle maps with a ten foot contour interval.

SOURCE: FLOOD BOUNDARY AND FLOODWAY MAPS:

PHOENIX, PANEL 80 OF 135
EFF. DATE: 12-4-79
PARADISE VALLEY, PANEL 15 OF 15
EFF. DATE: 6-1-80

KEY TO MAP

500-Year Flood Boundary
100-Year Flood Boundary
FLOODWAY FRINGE — FLOODWAY
100-Year Flood Boundary
500-Year Flood Boundary
Approximate 100-Year Flood Boundary
Cross Section Line — A — A
Elevation Reference Mark — RM7 ×
River Mile — • M1.5

NOTES TO USER

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Insurance Administration.

This map was prepared to support minimum flood plain management regulations; it may not show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For adjoining map panels, see separately printed Index To Map Panels.

SCALE: 1" = 1000'

DRAINAGE REPORT
5080 N. 40TH STREET
EXISTING FLOOD INSURANCE MAP
PLATE 2

ANDERSON-NICHOLS & CO., INC.

SURFACE WATER HYDROLOGY

The peak discharges for the 10 -, 50 -, and 100 year flood event were obtained from the Los Angeles Army Corps of Engineers via the City of Phoenix Floodplain Department. These values were also used in the FEMA report (Reference 1). The summary of discharges employed for the hydraulic analysis is presented below:

TABLE 1

SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (Sq. Mi.)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR
Echo Canyon Wash at Arizona Canal	5.13	2,000	4,600	6,600

FUTURE WATERSHED CONDITIONS

Two projects are proposed that will influence and potentially reduce the flood hazard associated with Echo Canyon Wash with respect to the 5080 Project.

Project No. 1 - Arizona Canal Diversion Channel
The Arizona Canal Diversion Channel (ACDC) is a flood control project sponsored by the Los Angeles Army Corps of Engineers with the Flood Control District of Maricopa County acting as a local agent. As we understand, the ACDC is presently proposed to terminate near the west boundary of the 5080 Project. It is our further understanding, that the ACDC serves as a 100 year flood control channel and will be designed to receive the flood waters from the Echo Canyon Wash and route the flow to the west.

Project No. 2 - Echo Canyon Flood Control/Sediment Basin
The Echo Canyon Flood Control/Sediment Basin is being designed by the Denver office of Simons-Li & Associates, under contract to the Los Angeles Army Corps of Engineers. The anticipated design of the flood control/sediment basin would be to intercept floodwaters from Echo Canyon Wash into a desilting basin north and adjacent of the 5080 Project and direct the floodwaters into the ACDC.

The exact time table for both projects have not been finalized at report preparation time. It is estimated that both projects would be completed in a 10 year time span.

PRE-DEVELOPMENT FLOODPLAIN

A hydraulic analysis was conducted utilizing the Corps of Engineers (COE) HEC-2 computer backwater program (reference 2). Cross-section data was obtained from topographic maps dated January, 1984, prepared at a scale of 1" = 50', and contour interval of 1 foot (reference 3). Manning's "n" values were based on observation of existing field conditions and City of Phoenix quarter-section aerial mapping (reference 4), engineering judgement, and Chow's handbook on open channel hydraulics (reference 5).

Starting water surface elevations were based on critical depth elevations for the main Echo Canyon Wash at the Arizona Canal and for the west breakout of Echo Canyon Wash. A hydraulic analysis was completed of the Arizona Canal and an emergency overflow spillway of the canal to determine whether the canal had any backwater effect on Echo Canyon Wash. Canal cross-section data from the Salt River Project (SRP) which was adjusted from SRP to City of Phoenix topographic datum, together with field measurements of the canal overflow spillway were obtained. This data was utilized to develop a combined rating curve of discharge vs. elevation for the canal and spillway (see Appendix B). The average flow in the Arizona Canal was estimated to be 550 cfs as determined from SRP canal data. The baseflow of 550 cfs was added to the various frequency discharges entering from Echo Canyon Wash to determine the water surface elevation in the canal for the combined flows. The canal water surface elevations were lower than critical depth in Echo Canyon Wash for all storm runoff events and, therefore, critical depth was considered to control.

A breakout of flow from the main Echo Canyon Wash occurs just upstream (north) of the subject study site for larger flows. An analysis of the amount of breakout flow to the west from the main channel was conducted. The breakout analysis involved computing water surface elevations at both channel cross-sections where the breakout was considered to initiate for a range of discharges. A combined rating curve of elevation vs. discharge was then developed for the main channel and breakout channel at this cross-section (see Appendix B).

PRE-DEVELOPMENT FLOODPLAIN (cont'd)

The amount of discharge conveyed by each channel was then determined for each flood event studied with the results shown in Table 2 below:

TABLE 2
SUMMARY OF EXISTING ECHO CANYON WASH
FLOW DISTRIBUTION AT STUDY AREA

LOCATION/DESCRIPTION	Peak Discharge (cfs)		
	10-YEAR	50-YEAR	100-YEAR
Combined Flow Above Breakout	2,000	4,600	6,600
Main Echo Canyon Wash	2,000	3,800	4,800
West Echo Canyon Breakout	0	800	1,800

The HEC-2 computer backwater program was then utilized to perform a hydraulic analysis of the main Echo Canyon Wash and the west breakout for the flow distribution described above. The HEC-2 computer input and output data are included in the Appendix A. The existing condition flood profiles and floodplain delineation are displayed on Plate 3 and Exhibit 1, respectively.

Some additional breakout was found to occur to the east of the main channel between Section 0.033 and 0.175 and to the west of the main channel between Section 0.107 and 0.211. Although a detailed investigation of this additional breakout was not conducted, this flow is considered ineffective for several reasons:

1. the breakout to the east appears to be constrained by buildings and associated grading such that the flow would pond with a portion re-entering the main channel near Section 0.033,

2. the breakout to the west above Section 0.107 would be limited because the slope of the ground in this area is very mild and in the same direction as channel flow, and

3. the assumption that this additional breakout was ineffective would be a conservative assumption in the analysis of the subject study area.

POST-DEVELOPMENT FLOODPLAIN

The post-development hydraulic analysis involved modeling the proposed buildings and piers within the existing floodplain along with grading improvements. The goal of this analysis was to show that the post-development floodplain would not increase flood hazards as compared to the pre-development floodplain.

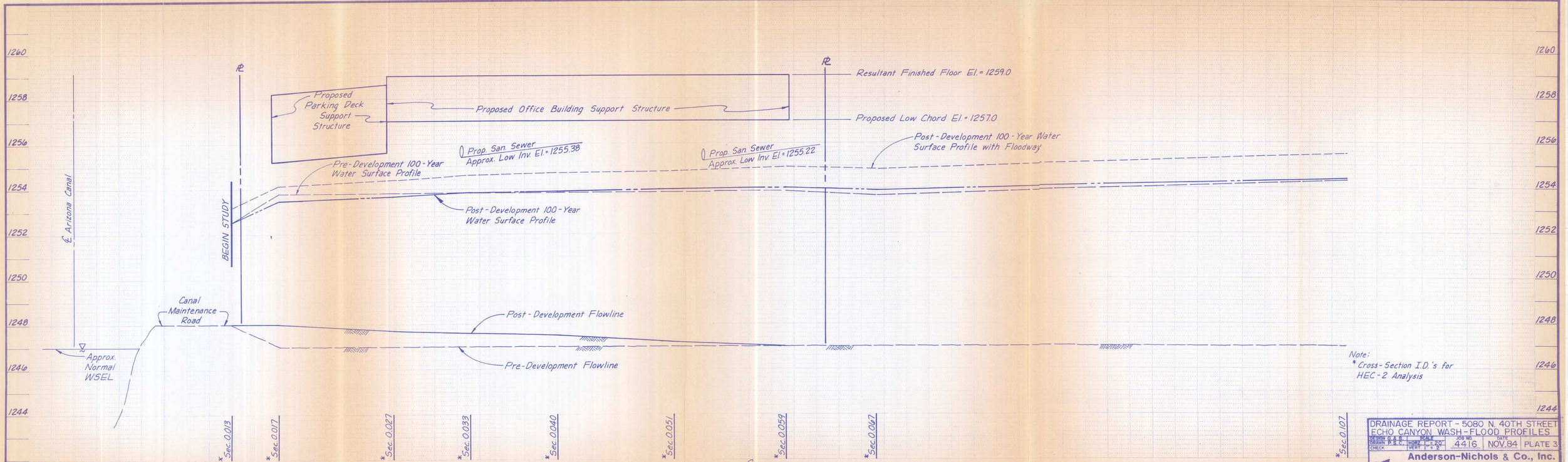
Cross-section for the proposed condition analysis were modeled showing the possible reduction in conveyance area resulting form the obstruction of the buildings and piers. In addition, the following conservative assumptions were used for the analysis of the proposed development;

1. Pier columns were either modeled at approximately 1.5 times the actual design width or the influence of adjacent pier columns, upstream or downstream of the cross section, were modeled to account for potential debris accumulation on piers. Exhibit 2 shows the areas blocked out as ineffective in the HEC-2 analysis.

2. In general, a free board of 1.5± feet has been proposed between the bottom of the elevated structural members and the post-development 100 year water surface profile to provide for possible floating debris. An exception to the 1.5 minimum free board occurs at two locations where proposed sanitary sewer conduits suspended under the support structure have less than 1.5 feet of free board (see Profiles, Plate 3 and Exhibit 2).

3. The possible breakout of flood-flow on the west side of the main channel between Section 0.107 and 0.175, as described in Pre-Development Floodplain, was not modeled for either the pre or post-development analysis. This assumption would yield a slightly higher, or conservative, water surface elevation than might actually occur.

4. The Mannings 'n' value or friction coefficient of 0.030 for the channel was not changed within the study area for the post-development condition which modeled the individual concrete piers. The weighted 'n'


1260
1258
1256
1254
1252
1250
1248
1246
1244
℄ Arizona Canal
BEGIN STUDY
Proposed Parking Deck Support Structure
Proposed Office Building Support Structure
Resultant Finished Floor El. = 1259.0
Proposed Low Chord El. = 1257.0
Prop. San Sewer Approx. Low Inv. El. = 1255.38
Prop. San Sewer Approx. Low Inv. El. = 1255.22
Post-Development 100-Year Water Surface Profile with Floodway
Pre-Development 100-Year Water Surface Profile
Post-Development 100-Year Water Surface Profile
Canal Maintenance Road
Post-Development Flowline
Pre-Development Flowline
Approx. Normal WSEL
Note:
* Cross-Section I.D.'s for HEC-2 Analysis
*Sec. 0.013
*Sec. 0.017
*Sec. 0.027
*Sec. 0.033
*Sec. 0.040
*Sec. 0.051
*Sec. 0.059
*Sec. 0.067
*Sec. 0.107
STREAM DISTANCE IN MILES INCREASING UPSTREAM FROM ℄ OF ARIZONA CANAL
DRAINAGE REPORT - 5080 N. 40TH STREET
ECHO CANYON WASH - FLOOD PROFILES
DESIGN G.A.B.
DRAWN P.S.C.
CHECK
SCALE HORZ 1" = 20' VERT 1" = 2'
JOB NO. 4416
DATE NOV. 84
PLATE 3
Anderson-Nichols & Co., Inc.
CONSULTING ENGINEERS
PHOENIX, ARIZONA

POST-DEVELOPMENT FLOODPLAIN (cont'd)

value of 0.030 for the channel within the development was considered to remain unchanged from the pre-development condition. This assumption was made because any decreases in 'n' value resulting from modeling concrete piers ('n' = 0.016) would be offset by anticipated landscape improvements within the channel in the form of grass and/or crushed rock surface treatment.

The HEC-2 computer input and output data are included in Appendix A. The post-development condition flood profiles and floodplain delineation are displayed on Plate 3 and Exhibit 2, respectively.

The post-development HEC-2 analysis anticipated minimal landscaping and vegetation within the developed channel. Grass and/or crushed rock surface treatment within the developed channel was anticipated in the post-development analysis. However, the floodplain areas on the east and west edges of the channel, which were blocked out as ineffective in the HEC-2 analysis (see Exhibit 2), could be landscaped more extensively with trees, shrubs, etc. Also, it is anticipated that selected trees, with branches above the high water level, could be placed immediately upstream or downstream of the structure support columns without causing significant blockage to potential flood waters.

FLOODWAY

As indicated earlier in this report, a Flood Insurance Study (FIS) of Echo Canyon Wash has been completed for the City of Phoenix (Reference 1) and a floodway has been delineated through the study area (see Plate 2).

Although the Floodway Data Table of the FIS (Reference 1) did not address the floodway width in the vicinity of the study area, it was estimated to be 200 feet from the Flood Boundary Map (Plate 2).

The following explains the Flood Insurance Program definition of a floodway:

> The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment in order that the 100 year flood can be carried without substantial increased in flood heights. Minimum standards of the FEMA limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced.

As indicated in the pre-development floodplain analysis, a breakout or split of the floodflow was identified just upstream of the study area. This breakout reduced the amount of flow analyzed through the study area for the pre-development condition. An assumption of the floodway concept is that the total flow is restricted to the floodway limits (i.e. no splitflow or breakout occurs). The hydraulic effect of the proposed development for the floodway concept was therefore evaluated by assuming that the total Echo Canyon floodflows were restricted to the conveyance area under the proposed structures. The 100 year water surface profile for this floodway analysis is shown on the Flood Profiles, Plate 3, and documented in the HEC-2 analysis included in Appendix.

FINISH FLOOR ELEVATION

The proposed finish floor elevation for the office building is 1259.0. The proposed low finish floor elevation of the parking structure and entrance parking deck is 1258.0. Echo Canyon Wash has an average post-development 100 year water surface elevation of 1254 at the building site (see Exhibit 2).

RETENTION CRITERIA

On site retention is not proposed for the site. On site retention of runoff associated with the parcel would not make sense since the site is located in Echo Canyon Wash. Ultimately, the project on-site drainage would flow to the proposed Arizona Canal Diversion Channel (ACDC) - Desilting Basin north of the site.

CONCLUSIONS

This report serves to document the hydraulic analysis of the 100 year pre and post floodplain for Echo Canyon Wash as pertaining to the proposed 5080 North 40th Street Project.

The proposed post-development floodplain condition does not worsen existing floodplain conditions. The expected 100 year water surface elevations after development are basically the same as before development. It should also be noted that the following assumptions were employed in establishing post-development 100 year water surface elevations and building finished floor elevations:

1. piers widths were modeled by a factor of 1.5 larger or the projection of upstream and downstream pier widths combined were modeled.
2. the peak discharges were not reduced for probable upstream flow break-outs on the west side above Section 0.107.
3. a base flow of 550 cfs was assumed in the Arizona Canal for checking the control of the starting water elevations
4. a 1.5+ foot freeboard was provided between the 100 year highwater for the post-development condition and the low chord of the proposed structure.
5. a 1.0+ foot freeboard was provided between the 100 year highwater for the assumed floodway condition and the low chord of the proposed structure.
6. the Mannings 'n' value or friction coefficient for the channel within the development area was maintained at 0.030 as modeled for the pre-development condition. Any reduction in the weighted 'n' value resulting from modeling the concrete piers was considered offset, by a higher 'n' value anticipated for landscape improvements in the form of grass and/or crushed rock surface treatment within the channel.

This report provides the documentation and guidelines for improvements in Echo Canyon Wash. Should modifications be desired to the presented drainage scheme, a new drainage study should be completed serving to void and replace this report. All proposed alterations to the presented drainage scheme need to be coordinated with and approved by the City of Phoenix Floodplain Department.

REFERENCES

1. Flood Insurance Study, City of Phoenix, Arizona, Maricopa County. Federal Emergency Management Agency, June 1984.

2. HEC-2, Water Surface Profiles, Generalized Computer Program. U.S. Army Corps of Engineers, Davis, California, September 1982.

3. Topograhic Mapping, Flown March 1984, at an aerial scale of 1:3000 by Aerial Mapping Company, Phoenix. Datum, City of Phoenix.

4. City of Phoenix ¼-Section Aerial Photo No. 19-36, by Cooper Aerial Service, Tucson. Scale 1" = 100'. Flight Date July 9, 1982.

5. Open-Channel Hydraulics. Ven Te Chow, McGraw Hill Book Company, 1959.

APPENDIX A

1. HEC-2 INPUT AND OUTPUT - PRE-DEVELOPMENT DOCUMENTATION
   A) ECHO CANYON - MAIN CHANNEL FLOODPLAIN
   B) ECHO CANYON - WEST BREAKOUT FLOODPLAIN

2. HEC-2 INPUT AND OUTPUT - POST-DEVELOPMENT DOCUMENTATION
   A) ECHO CANYON - MAIN CHANNEL FLOODPLAIN
   B) ECHO CANYON - MAIN CHANNEL FLOODWAY CONCEPT

THIS RUN EXECUTED 4-Apr-84 12:31

```
*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MARC 1982
  ERROR CORR -  01,02,03,04,05
  MODIFICATION -  50,51,52,53,54,55
*****************************************************
```

1. HEC-2 INPUT AND OUTPUT - PRE-DEVELOPMENT DOCUMENTATION

A) ECHO CANYON - MAIN CHANNEL

```
0
T1      5090 NORTH 40TH STREET PROJECT   MARCH 1984    ANDERSON-NICHOLS AND CO.
T2      10  YEAR WATER SURFACE PROFILE (EXISTING)      4120 NORTH 20TH STREET
T3      ECHO CANYON WASH (CUDIA CITY WASH)            PHOENIX, AZ  85016 AN441601

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
     0.       2.        0.        0.  -1.000000    0.00      0.0       0.   1251.000   0.000

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
    1.000     0.000    -1.000     0.000     0.000     0.000     0.000     0.000     0.000    15.000

J3  VARIABLE CODES FOR SUMMARY PRINTOUT
    38.000    43.000     1.000     2.000    26.000    39.000    21.000    22.000    27.000    28.000

    53.000    54.000     0.000    38.000    13.000    14.000    15.000    55.000    26.000    56.000

    63.000     1.000    51.000     4.000    42.000    57.000     0.000    38.000    39.000    33.000

     3.000    10.000    11.000    12.000     5.000     7.000     8.000    16.000    17.000    18.000

J5  LPRNT     NUMSEC                    ********REQUESTED SECTION NUMBERS********
   -10.000   -10.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000

ET      0.000     7.100     7.100     7.100     0.000     0.000   912.000  1155.000     0.000     0.000
NC      0.035     0.035     0.030     0.100     0.300     0.000     0.000     0.000     0.000     0.000
QT      3.000  2000.000  3800.000  4800.000     0.000     0.000     0.000     0.000     0.000     0.000
        STARTING WATER SURFACE ELEVATION IS BASED ON CRITICAL DEPTH INTO ARIZONA
        CANAL.  THE CANAL WAS DETERMINED TO HAVE NO BACKWATER AFFECT ON WASH.
        CROSS-SECTION STATIONING FROM LEFT TO RIGHT LOOKING DOWNSTREAM WITH
        STATION 1000 AT DESIGNATED FLOWLINE.
        CROSS-SECTION ID NUMBERS PROCEED UPSTREAM IN RIVER MILES FROM CONFLUENCE
        WITH ARIZONA CANAL.
XI      0.013    14.000   916.000  1056.000     0.000     0.000     0.000   930.000  1250.000   940.000
GR   1256.000   912.000  1255.000   916.000  1253.000   923.000  1252.000  1036.000  1250.000  1045.000
GR   1249.000   948.000  1248.000   968.000  1242.000  1028.000  1249.000  1200.000     0.000     0.000
GR   1251.000  1056.000  1252.000  1119.000  1252.000  1183.000  1255.000     0.000     0.000     0.000
```

```
ET      0.000      7.100      7.100      7.100      7.100      0.000    907.000   1138.000      0.000      0.000
X1      0.017     15.000    912.000   1124.000     10.000     25.000     21.000      0.000      0.000      0.000
GR   1256.000    907.000   1255.000    912.000   1251.000    930.000   1250.000    936.000   1249.000    942.000
GR   1248.000    948.000   1247.000    980.000   1247.000   1038.000   1248.000   1070.000   1248.000   1124.000
GR   1249.000   1144.000   1250.000   1150.000   1251.000   1156.000   1252.000   1161.000   1255.000   1175.000

ET      0.000      7.100      7.100      7.100      0.000      0.000    868.000   1125.000      0.000      0.000
X1      0.027     11.000    892.000   1102.000     26.000     65.000     51.000      0.000      0.000      0.000
GR   1256.000    868.000   1255.000    892.000   1254.000    910.000   1249.000    923.000   1248.000    930.000
GR   1247.000    977.000   1247.000   1063.000   1248.000   1102.000   1249.000   1128.000   1250.000   1133.000
GR   1255.000   1152.000      0.000      0.000      0.000      0.000      0.000      0.000      0.000      0.000

ET      0.000      7.100      7.100      7.100      0.000      0.000    855.000   1116.000      0.000      0.000
X1      0.033     12.000    895.000   1105.000     36.000     30.000     34.000      0.000      0.000      0.000
GR   1254.000    855.000   1253.000    865.000   1253.000    895.000   1252.000    902.000   1250.000    910.000
GR   1249.000    913.000   1248.000    923.000   1247.000    967.000   1247.000   1063.000   1248.000   1105.000
GR   1249.000   1121.000   1254.000   1144.000      0.000      0.000      0.000      0.000      0.000      0.000

ET      0.000      7.100      7.100      7.100      0.000      0.000    880.000   1112.000      0.000      0.000
X1      0.040     10.000    888.000   1097.000     58.000     22.000     39.000      0.000      0.000      0.000
GR   1252.000    880.000   1251.000    888.000   1250.000    898.000   1249.000    902.000   1248.000    942.000
GR   1247.000    970.000   1247.000   1070.000   1248.000   1097.000   1249.000   1120.000   1255.000   1145.000

ET      0.000      7.100      7.100      7.100      0.000      0.000    888.000   1100.000      0.000      0.000
X1      0.051     11.000    898.000   1078.000     60.000     45.000     52.000      0.000      0.000      0.000
GR   1252.000    888.000   1251.000    872.000   1250.000    898.000   1249.000    902.000   1248.000    951.000
GR   1247.000    973.000   1247.000   1032.000   1248.000   1078.000   1249.000   1103.000   1250.000   1115.000
GR   1255.000   1135.000      0.000      0.000      0.000      0.000      0.000      0.000      0.000      0.000

ET      0.000      7.100      7.100      7.100      0.000      0.000    782.000   1082.000      0.000      0.000
X1      0.059     19.000    897.000   1085.000     58.000     45.000     50.000      0.000      0.000      0.000
GR   1253.000    742.000   1253.000    886.000   1250.000    897.000   1249.000    918.000   1248.000    945.000
GR   1247.000    965.000   1247.000   1015.000   1248.000   1058.000   1249.000   1085.000   1250.000   1090.000
GR   1254.000   1114.000   1254.000   1140.000   1252.000   1155.000   1251.500   1163.000   1251.500   1244.000
GR   1252.000   1260.000   1252.000   1368.000   1253.000   1373.000   1253.600   1407.000      0.000      0.000

NC      0.045      0.035      0.033      0.100      0.300      0.000      0.000      0.000      0.000      0.000
ET      0.000      7.100      7.100      7.100      0.000      0.000    745.000   1075.000      0.000      0.000
        SPLITFLOW CONDITION OCCURS AT SEC 0.067 (MAIN CHANNEL) AND SEC 0.080
        (WEST CHANNEL)  FLOW HAS BEEN REDUCED AT SEC. 0.067 FOR THIS SPLITFLOW
        SPLITFLOW AMT.  WAS DETERMINED FROM RATING CURVE ANALYSIS AT SEC 0.067
X1      0.067     19.000    970.000   1023.000     40.000     40.000     40.000      0.000      0.000      0.000
GR   1253.000    722.000   1252.000    813.000   1252.000    850.000   1252.000    877.000   1250.000    960.000
GR   1249.000    970.000   1248.000    981.000   1247.000    985.000   1247.000   1010.000   1248.000   1013.000
GR   1249.000   1023.000   1250.000   1030.000   1251.000   1059.000   1251.500   1075.000   1251.500   1172.000
GR   1252.000   1182.000   1252.000   1295.000   1293.000   1308.000   1293.500   1332.000      0.000      0.000

NC      0.045      0.045      0.033      0.100      0.300      0.000      0.000      0.000      0.000      0.000
ET      0.000      7.100      7.100      7.100      0.000      0.000    645.000   1110.000      0.000      0.000
QT      3.000   2000.000   4600.000   6600.000      0.000      0.000      0.000      0.000      0.000      0.000
```

X1	0.107	21.000	985.000	1055.000	110.000	240.000	210.000	0.000	0.000	0.000
GR	1252.000	640.000	1252.000	795.000	1254.000	800.000	1254.000	810.000	1253.000	820.000
GR	1253.000	850.000	1252.000	865.000	1251.000	895.000	1250.000	903.000	1248.000	912.000
GR	1248.000	935.000	1249.000	945.000	1249.000	975.000	1248.000	985.000	1247.000	1017.000
GR	1247.000	1045.000	1248.000	1055.000	1249.000	1060.000	1250.000	1068.000	1253.000	1082.000
GR	1253.600	1110.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	7.100	7.100	7.100	0.000	0.000	690.000	1150.000	0.000	0.000
X1	0.140	19.000	983.000	1012.000	165.000	155.000	172.000	0.000	0.000	0.000
GR	1253.000	523.000	1253.000	572.000	1252.700	618.000	1252.700	702.000	1253.000	745.000
GR	1252.000	772.000	1252.000	825.000	1252.000	887.000	1251.000	890.000	1250.000	907.000
GR	1249.000	915.000	1249.000	983.000	1248.000	995.000	1248.000	1005.000	1249.000	1012.000
GR	1250.000	1020.000	1250.000	1122.000	1253.000	1127.000	1253.500	1150.000	0.000	0.000
ET	0.000	7.100	7.100	7.100	0.000	0.000	720.000	1020.000	0.000	0.000
X1	0.175	16.000	980.000	1014.000	177.000	175.000	185.000	0.000	0.000	0.000
GR	1254.800	420.000	1254.900	668.000	1255.000	700.000	1255.600	718.000	1255.000	738.000
GR	1252.000	764.000	1252.000	786.000	1253.000	844.000	1253.000	858.000	1251.000	876.000
GR	1251.000	976.000	1250.000	980.000	1249.000	1005.000	1249.000	1012.000	1250.000	1014.000
GR	1254.000	1020.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	0.211	22.000	973.000	1023.000	190.000	192.000	192.000	0.000	0.000	0.000
GR	1258.000	608.000	1257.000	612.000	1256.000	670.000	1255.000	705.000	1255.000	750.000
GR	1254.000	755.000	1253.400	780.000	1253.400	797.000	1254.000	825.000	1255.000	850.000
GR	1255.300	915.000	1255.000	960.000	1253.000	973.000	1251.000	989.000	1250.000	1010.000
GR	1250.000	1018.000	1252.000	1023.000	1252.000	1070.000	1253.000	1077.000	1254.000	1088.000
GR	1255.000	1107.000	1255.700	1122.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	0.249	22.000	986.000	1040.000	200.000	200.000	200.000	0.000	0.000	0.000
GR	1260.000	690.000	1259.000	705.000	1257.000	714.000	1256.000	737.000	1256.000	772.000
GR	1255.000	840.000	1254.000	848.000	1254.000	860.000	1255.000	886.000	1256.000	922.000
GR	1256.000	963.000	1254.000	986.000	1253.000	996.000	1252.000	1000.000	1253.000	1009.000
GR	1254.000	1040.000	1253.500	1060.000	1254.000	1074.000	1255.000	1084.000	1256.000	1112.000
GR	1257.000	1120.000	1258.000	1132.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	0.280	20.000	982.000	1010.000	200.000	155.000	165.000	0.000	0.000	0.000
GR	1260.000	780.000	1259.000	783.000	1258.000	795.000	1257.000	847.000	1256.000	868.000
GR	1255.500	888.000	1255.500	920.000	1257.000	928.000	1258.000	940.000	1258.000	960.000
GR	1257.000	970.000	1255.000	982.000	1254.000	988.000	1253.000	1000.000	1254.000	1010.000
GR	1255.000	1040.000	1256.000	1052.000	1257.000	1074.000	1258.000	1080.000	1258.800	1088.000
X1	0.314	13.000	960.000	1006.000	180.000	176.000	180.000	0.000	0.000	0.000
GR	1260.000	710.000	1260.000	750.000	1259.000	765.000	1259.000	862.000	1258.000	870.000
GR	1258.000	943.000	1257.000	955.000	1256.000	960.000	1255.000	987.000	1255.000	1006.000
GR	1256.000	1025.000	1257.000	1032.000	1258.000	1054.000	0.000	0.000	0.000	0.000
EJ	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

THIS RUN EXECUTED 4-Apr-84 12:32

```
*************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MARC 1982
  ERROR CORR -  01,02,03,04,05
  MODIFICATION -  50,51,52,53,54,55
*************************************************
```

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

ECHO CANYON WASH (CVDIA

SUMMARY PRINTOUT

	SECNO	Q	CWSEL	CRIWS	VCH	XLCH	STCHL	STCHR	STENCL	STENCR	SSTA	ENDST
*	0.013	2000.00	1250.65	1250.65	8.26	0.00	916.00	1056.00	912.00	1155.00	936.75	1052.15
*	0.013	3800.00	1252.02	1252.02	9.11	0.00	916.00	1056.00	912.00	1155.00	929.88	1155.00
*	0.013	4800.00	1252.55	1252.55	9.47	0.00	916.00	1056.00	912.00	1155.00	926.14	1155.00
	0.017	2000.00	1251.74	0.00	2.43	21.00	912.00	1124.00	907.00	1138.00	926.64	1138.00
	0.017	3800.00	1253.25	0.00	3.34	21.00	912.00	1124.00	907.00	1138.00	919.89	1138.00
	0.017	4800.00	1253.79	0.00	3.83	21.00	912.00	1124.00	907.00	1138.00	917.45	1138.00
	0.027	2000.00	1251.77	0.00	2.32	51.00	892.00	1102.00	868.00	1125.00	915.81	1125.00
	0.027	3800.00	1253.28	0.00	3.25	51.00	892.00	1102.00	868.00	1125.00	911.87	1125.00
	0.027	4800.00	1253.83	0.00	3.74	51.00	892.00	1102.00	868.00	1125.00	910.44	1125.00
	0.033	2000.00	1251.78	0.00	2.23	34.00	895.00	1105.00	855.00	1116.00	902.89	1116.00
	0.033	3800.00	1253.31	0.00	3.11	34.00	895.00	1105.00	855.00	1116.00	862.03	1116.00
	0.033	4800.00	1253.86	0.00	3.56	34.00	895.00	1105.00	855.00	1116.00	856.44	1116.00
	0.040	2000.00	1251.80	0.00	2.21	39.00	888.00	1097.00	880.00	1112.00	881.65	1112.00
	0.040	3800.00	1253.33	0.00	3.06	39.00	888.00	1097.00	880.00	1112.00	880.00	1112.00
	0.040	4800.00	1253.89	0.00	3.51	39.00	888.00	1097.00	880.00	1112.00	880.00	1112.00
	0.051	2000.00	1251.80	0.00	2.50	52.00	898.00	1078.00	888.00	1100.00	888.78	1100.00
	0.051	3800.00	1253.33	0.00	3.43	52.00	898.00	1078.00	888.00	1100.00	888.00	1100.00
	0.051	4800.00	1253.88	0.00	3.94	52.00	898.00	1078.00	888.00	1100.00	888.00	1100.00
	0.059	2000.00	1251.81	0.00	2.73	50.00	897.00	1085.00	782.00	1082.00	890.36	1082.00
	0.059	3800.00	1253.33	0.00	3.71	50.00	897.00	1085.00	782.00	1082.00	782.00	1082.00
	0.059	4800.00	1253.89	0.00	4.17	50.00	897.00	1085.00	782.00	1082.00	782.00	1082.00
*	0.067	2000.00	1251.33	1251.33	8.79	40.00	970.00	1023.00	745.00	1075.00	904.92	1069.47
	0.067	3800.00	1253.02	0.00	8.20	40.00	970.00	1023.00	745.00	1075.00	745.00	1075.00
	0.067	4800.00	1253.66	0.00	8.12	40.00	970.00	1023.00	745.00	1075.00	745.00	1075.00

Main Channel Discharge below West Breakout

	SECNO	Q	CWSEL	CRIWS	VCH	XLCH	STCHL	STCHR	STENCL	STENCR	SSTA	ENDST
	0.107	2000.00	1252.61	0.00	3.16	210.00	985.00	1055.00	645.00	1110.00	645.00	1080.15
	0.107	4600.00	1253.84	0.00	5.01	210.00	985.00	1055.00	645.00	1110.00	645.00	1110.00
	0.107	6600.00	1254.32	0.00	6.31	210.00	985.00	1055.00	645.00	1110.00	645.00	1110.00
	0.140	2000.00	1252.73	0.00	3.88	172.00	983.00	1012.00	690.00	1150.00	690.00	1126.55
	0.140	4600.00	1254.09	0.00	5.36	172.00	983.00	1012.00	690.00	1150.00	690.00	1150.00
	0.140	6600.00	1254.69	0.00	6.41	172.00	983.00	1012.00	690.00	1150.00	690.00	1150.00
*	0.175	2000.00	1252.76	1252.76	9.17	185.00	980.00	1014.00	720.00	1020.00	757.38	1018.14
	0.175	4600.00	1253.99	0.00	11.31	185.00	980.00	1014.00	720.00	1020.00	746.73	1019.99
	0.175	6600.00	1254.52	0.00	13.17	185.00	980.00	1014.00	720.00	1020.00	742.08	1020.00
	0.211	2000.00	1254.22	1254.12	8.26	192.00	973.00	1023.00	0.00	0.00	753.90	1092.19
*	0.211	4600.00	1255.62	1255.62	10.03	192.00	973.00	1023.00	0.00	0.00	683.31	1120.28
	0.211	6600.00	1256.42	0.00	10.20	192.00	973.00	1023.00	0.00	0.00	645.84	1122.00
	0.249	2000.00	1255.92	1255.83	7.82	200.00	986.00	1040.00	0.00	0.00	777.26	1109.83
	0.249	4600.00	1257.23	0.00	8.43	200.00	986.00	1040.00	0.00	0.00	712.98	1122.71
	0.249	6600.00	1257.71	0.00	9.75	200.00	986.00	1040.00	0.00	0.00	710.77	1128.62
	0.280	2000.00	1257.21	1257.20	9.54	165.00	982.00	1010.00	0.00	0.00	836.32	1075.23
*	0.280	4600.00	1258.48	1258.48	11.87	165.00	982.00	1010.00	0.00	0.00	789.30	1084.75
*	0.280	6600.00	1259.10	1259.10	13.28	165.00	982.00	1010.00	0.00	0.00	782.71	1088.00
	0.314	2000.00	1258.61	1258.57	8.66	180.00	960.00	1006.00	0.00	0.00	865.16	1054.00
*	0.314	4600.00	1260.03	1260.03	10.49	180.00	960.00	1006.00	0.00	0.00	710.00	1054.00
*	0.314	6600.00	1260.64	1260.64	11.88	180.00	960.00	1006.00	0.00	0.00	710.00	1054.00

Full Discharges above West Breakout

ECHO CANYON WASH (CUDIA

SUMMARY PRINTOUT

	SECNO	QLOB	QCH	QROB	VLOB	VCH	VROB	TELMX	CWSEL	DIFWSX	TOPWID	ELMIN	ALPHA
*	0.013	0.00	2000.00	0.00	0.00	8.26	0.00	1255.00	1250.65	0.00	115.40	1248.00	1.00
*	0.013	0.00	3725.03	74.97	0.00	9.11	2.26	1255.00	1252.02	0.00	225.12	1248.00	1.10
*	0.013	0.00	4521.29	278.71	0.00	9.47	3.24	1255.00	1252.55	0.00	228.85	1248.00	1.17
	0.017	0.00	1922.19	77.81	0.00	2.43	1.64	1255.00	1251.74	1.09	211.36	1247.00	1.02
	0.017	0.00	3646.55	153.45	0.00	3.34	2.24	1255.00	1253.25	1.23	218.11	1247.00	1.02
	0.017	0.00	4605.77	194.23	0.00	3.83	2.55	1255.00	1253.79	1.24	220.54	1247.00	1.02
	0.027	0.00	1882.08	117.92	0.00	2.32	1.54	1255.00	1251.77	0.03	209.19	1247.00	1.03
	0.027	0.00	3553.88	246.12	0.00	3.25	2.21	1255.00	1253.28	0.04	213.13	1247.00	1.02
	0.027	0.00	4483.59	316.41	0.00	3.74	2.55	1255.00	1253.83	0.04	214.56	1247.00	1.02
	0.033	0.00	1947.38	52.62	0.00	2.23	1.39	1254.00	1251.78	0.02	213.11	1247.00	1.02
	0.033	3.45	3691.07	105.48	0.37	3.11	1.94	1254.00	1253.31	0.03	253.97	1247.00	1.03
	0.033	22.83	4644.76	132.41	0.78	3.56	2.18	1254.00	1253.86	0.03	259.56	1247.00	1.05
	0.040	0.99	1922.09	76.92	0.39	2.21	1.48	1255.00	1251.80	0.01	230.35	1247.00	1.02
	0.040	16.09	3633.59	150.32	1.10	3.06	2.01	1255.00	1253.33	0.02	232.00	1247.00	1.03
	0.040	26.10	4583.91	189.98	1.37	3.51	2.28	1255.00	1253.89	0.02	232.00	1247.00	1.03
	0.051	8.25	1865.09	126.66	0.90	2.50	1.71	1255.00	1251.80	0.00	211.22	1247.00	1.03
	0.051	39.33	3507.26	253.40	1.62	3.43	2.36	1255.00	1253.33	0.00	212.00	1247.00	1.04
	0.051	58.19	4419.32	322.49	1.95	3.94	2.69	1255.00	1253.88	-0.01	212.00	1247.00	1.04
	0.059	5.20	1994.80	0.00	0.86	2.73	0.00	1253.60	1251.81	0.01	191.64	1247.00	1.01
	0.059	47.45	3752.55	0.00	0.87	3.71	0.00	1253.60	1253.33	0.00	300.00	1247.00	1.07
	0.059	145.78	4654.22	0.00	1.21	4.17	0.00	1253.60	1253.89	0.01	300.00	1247.00	1.12
*	0.067	149.84	1707.89	142.27	2.73	8.79	3.70	1293.50	1251.33	-0.48	164.56	1247.00	1.40
	0.067	884.66	2329.34	585.99	2.83	8.20	4.65	1293.50	1253.02	-0.31	330.00	1247.00	1.68
	0.067	1427.06	2587.33	785.61	3.11	8.12	4.92	1293.50	1253.66	-0.23	330.00	1247.00	1.61
	0.107	732.58	1173.58	93.84	1.55	3.16	1.53	1253.60	1252.61	1.28	375.71	1247.00	1.40
	0.107	2050.78	2296.98	252.24	2.39	5.01	2.30	1253.60	1253.84	0.82	453.06	1247.00	1.48
	0.107	3104.97	3104.58	390.45	3.05	6.31	2.87	1253.60	1254.32	0.66	465.00	1247.00	1.47
	0.140	858.27	495.99	645.74	2.08	3.88	2.08	1253.50	1252.73	0.12	390.90	1248.00	1.27
	0.140	2224.59	895.75	1479.66	2.76	5.36	3.04	1253.50	1254.09	0.25	460.00	1248.00	1.23
	0.140	3309.73	1182.63	2107.64	3.38	6.41	3.71	1253.50	1254.69	0.37	460.00	1248.00	1.20
*	0.175	931.75	1049.34	18.90	3.95	9.17	3.30	1254.00	1252.76	0.03	230.91	1249.00	1.63
	0.175	2782.58	1766.88	50.54	5.45	11.31	4.23	1254.00	1253.99	-0.10	273.26	1249.00	1.46
	0.175	4224.42	2298.04	77.54	6.63	13.17	5.11	1254.00	1254.52	-0.16	277.92	1249.00	1.39
	0.211	93.22	1349.89	556.89	1.98	8.26	4.46	1255.70	1254.22	1.46	203.74	1250.00	1.45
*	0.211	903.93	2342.17	1353.90	3.22	10.03	5.63	1255.70	1255.62	1.63	436.98	1250.00	1.68
	0.211	1959.21	2786.80	1853.99	3.74	10.20	5.80	1255.70	1256.42	1.89	476.16	1250.00	1.65

Main Channel Discharges below West Breakout

Full Discharges above West Breakout

	SECNO	QLOB	QCH	QROB	VLOB	VCH	VROB	TELMX	CWSEL	DIFWSX	TOPWID	ELMIN	ALPHA
	0.249	430.34	1124.09	445.58	3.14	7.82	4.46	1258.00	1255.92	1.70	287.90	1252.00	1.48
	0.249	1808.12	1805.99	985.89	3.83	8.43	4.93	1258.00	1257.23	1.61	409.73	1252.00	1.44
	0.249	2857.66	2348.66	1393.68	4.71	9.75	5.76	1258.00	1257.71	1.30	417.86	1252.00	1.38
	0.280	460.49	932.29	607.23	3.77	9.54	5.18	1258.80	1257.21	1.28	201.42	1253.00	1.53
*	0.280	1635.83	1582.44	1381.73	5.08	11.87	6.73	1258.80	1258.48	1.25	295.46	1253.00	1.47
*	0.280	2663.44	2002.09	1934.46	6.00	13.28	7.63	1258.80	1259.10	1.38	305.29	1253.00	1.41
	0.314	181.32	1318.59	500.09	2.61	8.66	5.10	1258.00	1258.61	1.40	188.84	1255.00	1.45
*	0.314	1250.05	2286.25	1063.69	3.93	10.49	6.39	1258.00	1260.03	1.56	344.00	1255.00	1.59
*	0.314	2247.25	2921.77	1430.98	4.78	11.88	7.31	1258.00	1260.64	1.54	344.00	1255.00	1.56

ECHO CANYON WASH (CUDIA

SUMMARY PRINTOUT

	SECND	XLCH	K*CHSL	EG	HV	HL	DLOSS	10K*S	VOL	DEPTH	K*XNL	K*XNCH	K*XNR
*	0.013	0.00	0.00	1251.71	1.06	0.00	0.00	103.89	0.00	2.65	35.00	30.00	35.00
*	0.013	0.00	0.00	1253.28	1.26	0.00	0.00	70.70	0.00	4.02	35.00	30.00	35.00
*	0.013	0.00	0.00	1253.87	1.32	0.00	0.00	64.72	0.00	4.55	35.00	30.00	35.00
	0.017	21.00	-47.62	1251.83	0.09	0.02	0.10	3.78	0.26	4.74	35.00	30.00	35.00
	0.017	21.00	-47.62	1253.42	0.17	0.03	0.11	4.87	0.39	6.25	35.00	30.00	35.00
	0.017	21.00	-47.62	1254.01	0.22	0.03	0.11	5.72	0.45	6.79	35.00	30.00	35.00
	0.027	51.00	0.00	1251.85	0.08	0.02	0.00	3.12	1.29	4.77	35.00	30.00	35.00
	0.027	51.00	0.00	1253.44	0.16	0.02	0.00	4.19	1.81	6.28	35.00	30.00	35.00
	0.027	51.00	0.00	1254.04	0.21	0.03	0.00	4.97	2.01	6.83	35.00	30.00	35.00
	0.033	34.00	0.00	1251.86	0.08	0.01	0.00	2.90	1.99	4.78	35.00	30.00	35.00
	0.033	34.00	0.00	1253.45	0.15	0.01	0.00	3.93	2.76	6.31	35.00	30.00	35.00
	0.033	34.00	0.00	1254.06	0.19	0.02	0.00	4.55	3.06	6.86	35.00	30.00	35.00
	0.040	39.00	0.00	1251.87	0.07	0.01	0.00	2.98	2.79	4.80	35.00	30.00	35.00
	0.040	39.00	0.00	1253.47	0.14	0.01	0.00	3.75	3.87	6.33	35.00	30.00	35.00
	0.040	39.00	0.00	1254.07	0.19	0.02	0.00	4.37	4.30	6.89	35.00	30.00	35.00
	0.051	52.00	0.00	1251.89	0.09	0.02	0.01	3.81	3.83	4.80	35.00	30.00	35.00
	0.051	52.00	0.00	1253.50	0.18	0.02	0.01	4.75	5.31	6.33	35.00	30.00	35.00
	0.051	52.00	0.00	1254.11	0.23	0.03	0.01	5.53	5.88	6.88	35.00	30.00	35.00
	0.059	50.00	0.00	1251.92	0.12	0.02	0.01	4.97	4.73	4.81	35.00	30.00	35.00
	0.059	50.00	0.00	1253.54	0.21	0.03	0.01	6.01	6.58	6.33	35.00	30.00	35.00
	0.059	50.00	0.00	1254.15	0.26	0.03	0.01	6.67	7.33	6.89	35.00	30.00	35.00
*	0.067	40.00	0.00	1252.38	1.05	0.05	0.28	67.99	5.20	4.33	45.00	33.00	35.00
	0.067	40.00	0.00	1253.74	0.72	0.05	0.15	35.66	7.40	6.02	45.00	33.00	35.00
	0.067	40.00	0.00	1254.32	0.66	0.05	0.12	30.08	8.33	6.66	45.00	33.00	35.00
	0.107	210.00	0.00	1252.72	0.11	0.25	0.09	5.33	7.50	5.61	45.00	33.00	45.00
	0.107	210.00	0.00	1254.08	0.24	0.29	0.05	10.14	11.32	6.84	45.00	33.00	45.00
	0.107	210.00	0.00	1254.69	0.37	0.34	0.03	14.63	12.96	7.32	45.00	33.00	45.00
	0.140	172.00	5.81	1252.84	0.11	0.12	0.00	10.35	10.82	4.73	45.00	33.00	45.00
	0.140	172.00	5.81	1254.28	0.19	0.19	0.00	13.79	16.76	6.09	45.00	33.00	45.00
	0.140	172.00	5.81	1254.96	0.27	0.26	0.01	17.30	19.33	6.69	45.00	33.00	45.00
*	0.175	185.00	5.41	1253.56	0.80	0.41	0.21	82.98	13.29	3.76	45.00	33.00	45.00
	0.175	185.00	5.41	1255.04	1.04	0.50	0.26	83.37	21.12	4.99	45.00	33.00	45.00
	0.175	185.00	5.41	1255.90	1.38	0.61	0.33	97.56	24.55	5.52	45.00	33.00	45.00
	0.211	192.00	5.21	1255.02	0.80	1.46	0.00	70.21	14.81	4.22	45.00	33.00	45.00
*	0.211	192.00	5.21	1256.59	0.97	1.40	0.01	64.47	24.26	5.62	45.00	33.00	45.00
	0.211	192.00	5.21	1257.31	0.89	1.36	0.05	53.99	28.81	6.42	45.00	33.00	45.00

Main channel Discharges below West Breakout

Full Discharges above West Breakou

	SECNO	XLCH	K*CHSL	EG	HV	HL	OLOSS	10K*S	VOL	DEPTH	K*XNL	K*XNCH	K*XNR
	0 249	200 00	10.00	1256 56	0.63	1.52	0.02	82.09	16.45	3.92	45.00	33.00	45.00
	0 249	200.00	10.00	1257 83	0.60	1.20	0.04	56.16	28.03	5.23	45.00	33.00	45.00
	0.249	200 00	10.00	1258.50	0.78	1.18	0.01	64.29	33.88	5.71	45.00	33.00	45.00
	0 280	165 00	6 06	1258.04	0.84	1.42	0.06	85.41	17.89	4.21	45.00	33.00	45.00
*	0 280	165.00	6.06	1259.58	1.11	1.22	0.15	87.47	31.23	5.48	45.00	33.00	45.00
*	0 280	165 00	6 06	1260.42	1.32	1.36	0.16	92.97	37.91	6.10	45.00	33.00	45 00
	0.314	180.00	11.11	1259.48	0.88	1.43	0.01	74.90	19.24	3.61	45.00	33.00	45.00
*	0 314	180.00	11.11	1261.09	1.06	1.38	0.00	68.22	34.03	5.03	45.00	33.00	45.00
*	0 314	180.00	11 11	1261.91	1.27	1.48	0.01	74.46	41.53	5.64	45.00	33.00	45.00

SUMMARY OF ERRORS AND SPECIAL NOTES

```
CAUTION  SECNO=    0.013  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=    0.013  PROFILE= 2  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=    0.013  PROFILE= 3  CRITICAL DEPTH ASSUMED

CAUTION  SECNO=    0.067  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=    0.067  PROFILE= 1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION  SECNO=    0.067  PROFILE= 1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION  SECNO=    0.175  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=    0.175  PROFILE= 1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION  SECNO=    0.175  PROFILE= 1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION  SECNO=    0.211  PROFILE= 2  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=    0.211  PROFILE= 2  MINIMUM SPECIFIC ENERGY

CAUTION  SECNO=    0.280  PROFILE= 2  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=    0.280  PROFILE= 2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION  SECNO=    0.280  PROFILE= 2  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION  SECNO=    0.280  PROFILE= 3  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=    0.280  PROFILE= 3  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION  SECNO=    0.280  PROFILE= 3  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION  SECNO=    0.314  PROFILE= 2  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=    0.314  PROFILE= 2  MINIMUM SPECIFIC ENERGY
CAUTION  SECNO=    0.314  PROFILE= 3  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=    0.314  PROFILE= 3  MINIMUM SPECIFIC ENERGY
```

THIS RUN EXECUTED 3-Apr-84 16:40

1. HEC-2 INPUT AND OUTPUT - PRE-DEVELOPMENT DOCUMENTATION

B) ECHO CANYON - WEST BREAKOUT

```
**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MARC 1982
  ERROR CORR -  01,02,03,04,05
  MODIFICATION -  50,51,52,53,54,55
**************************************************

T1      5080 NORTH 40TH STREET PROJECT   MARCH 1984   ANDERSON-NICHOLS AND CO.
T2      50 -YEAR WATER SURFACE PROFILE AND FLOODPLAIN  4120 NORTH 20TH STREET
T3      ECHO CANYON WASH (CUDIA CITY WASH)             PHOENIX, AZ 85016 AN441601

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
      0.       2.        0.        0.   0.007000     0.00      0.0       0.   1253.000    0.000

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
    1.000     0.000    -1.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

   38.000    43.000     1.000     2.000    26.000    39.000    21.000    22.000    27.000    28.000

   53.000    54.000     0.000    38.000    13.000    14.000    15.000    55.000    26.000    56.000

   63.000     1.000    51.000     4.000    42.000    57.000     0.000    38.000    39.000    33.000

    3.000    10.000    11.000    12.000     5.000     7.000     8.000    16.000    17.000    18.000

J5  LPRNT     NUMSEC                    ********REQUESTED SECTION NUMBERS********

  -10.000   -10.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000

NC      0.033     0.033     0.033     0.100     0.300     0.000     0.000     0.000     0.000     0.000
GT      2.000   800.000  1800.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000
X1      0.048    11.000   924.000  1194.000     0.000     0.000     0.000     0.000     0.000     0.000
GR   1255.000   915.000  1252.000   920.000  1251.000   924.000  1250.000   970.000  1250.000  1010.000
GR   1250.000  1120.000  1250.000  1170.000  1251.000  1194.000  1252.000  1205.000  1253.000  1210.000
GR   1254.000  1237.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000

X1      0.060     9.000   918.000  1112.000   112.000    65.000   105.000     0.000     0.000     0.000
GR   1255.000   895.000  1252.000   902.000  1251.000   906.000  1250.500   918.000  1250.500  1112.000
GR   1251.000  1140.000  1252.000  1145.000  1253.000  1148.000  1254.000  1220.000     0.000     0.000

X1      0.075    10.000   921.000  1144.000    85.000    60.000    80.000     0.000     0.000     0.000
GR   1254.000   836.000  1254.000   914.000  1253.000   921.000  1252.000   925.000  1251.500   933.000
GR   1251.500  1013.000  1252.000  1031.000  1252.000  1140.000  1253.000  1144.000  1253.500  1200.000
```

3-Apr-84 16:40

X1	0.080	6.000	910.000	1142.000	30.000	30.000	30.000	0.000	0.000	0.000
GR	1251.500	910.000	1251.500	1007.000	1252.000	1016.000	1252.000	1130.000	1253.000	1142.000
GR	1253.600	1185.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
EJ	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

THIS RUN EXECUTED 3-Apr-84 16:40

```
**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MARC 1982
  ERROR CORR -  01,02,03,04,05
  MODIFICATION -  50,51,52,53,54,55
**************************************************
```

```
T1      5080 NORTH 40TH STREET PROJECT   MARCH 1984   ANDERSON-NICHOLS AND CO.
T2      100-YEAR WATER SURFACE PROFILE AND FLOODPLAIN  4120 NORTH 20TH STREET
T3      ECHO CANYON WASH (CUDIA CITY WASH)            PHOENIX, AZ 85016 AN441601
```

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	-10.	3.	0.	0.	0.007000	0.00	0.0	0.	1253.000	0.000
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	15.000	0.000	-1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

THIS RUN EXECUTED 3-Apr-84 16:40

```
*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MARC 1982
  ERROR CORR -  01,02,03,04,05
  MODIFICATION -  50,51,52,53,54,55
*****************************************************
```

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

ECHO CANYON WASH (CUDIA

SUMMARY PRINTOUT

	SECNO	Q	CWSEL	CRIWS	VCH	XLCH	STCHL	STCHR	STENCL	STENCR	SSTA	ENDST
	0.048	800.00	1251.00	0.00	3.40	0.00	924.00	1194.00	0.00	0.00	924.00	1194.00
	0.048	1800.00	1251.54	0.00	4.73	0.00	924.00	1194.00	0.00	0.00	921.86	1199.89
	0.060	800.00	1251.60	0.00	3.29	105.00	918.00	1112.00	0.00	0.00	903.59	1143.01
	0.060	1800.00	1252.19	0.00	4.69	105.00	918.00	1112.00	0.00	0.00	901.55	1145.58
*	0.075	800.00	1252.53	1252.53	4.93	80.00	921.00	1144.00	0.00	0.00	922.87	1142.13
*	0.075	1800.00	1253.07	1253.07	6.41	80.00	921.00	1144.00	0.00	0.00	920.52	1151.71
	0.080	800.00	1253.00	0.00	2.89	30.00	910.00	1142.00	0.00	0.00	910.00	1141.99
	0.080	1800.00	1253.68	0.00	4.08	30.00	910.00	1142.00	0.00	0.00	910.00	1185.00

ECHO CANYON WASH (CUDIA

SUMMARY PRINTOUT

	SECND	GLOB	QCH	QROB	VLOB	VCH	VROB	TELMX	CWSEL	DIFWSX	TOPWID	ELMIN	ALPHA
	0.048	0.00	800.00	0.00	0.00	3.40	0.00	1254.00	1251.00	0.00	270.00	1250.00	1.00
	0.048	0.88	1796.66	2.46	1.54	4.73	1.56	1254.00	1251.54	0.00	278.03	1250.00	1.01
	0.060	29.30	703.35	67.35	2.68	3.29	2.72	1254.00	1251.60	0.60	239.42	1250.50	1.01
	0.060	80.05	1540.66	179.29	3.97	4.69	4.08	1254.00	1252.19	0.65	244.04	1250.50	1.01
*	0.075	0.00	800.00	0.00	0.00	4.93	0.00	1253.50	1252.53	0.93	219.26	1251.50	1.00
*	0.075	0.00	1799.84	0.15	0.05	6.41	0.58	1253.50	1253.07	0.88	231.19	1251.50	1.00
	0.080	0.00	800.00	0.00	0.00	2.89	0.00	1251.50	1253.00	0.47	231.99	1251.50	1.00
	0.080	0.00	1776.44	23.56	0.00	4.08	1.42	1251.50	1253.68	0.61	275.00	1251.50	1.04

ECHO CANYON WASH (CUDIA

SUMMARY PRINTOUT

	SECNO	XLCH	K*CHSL	EG	HV	HL	DLOSS	10K*S	VOL	DEPTH	K*XNL	K*XNCH	K*XNR
	0.048	0.00	0.00	1251.18	0.18	0.00	0.00	68.79	0.00	1.00	33.00	33.00	33.00
	0.048	0.00	0.00	1251.88	0.35	0.00	0.00	70.17	0.00	1.54	33.00	33.00	33.00
	0.060	105.00	4.76	1251.76	0.16	0.58	0.00	46.87	0.57	1.10	33.00	33.00	33.00
	0.060	105.00	4.76	1252.51	0.33	0.63	0.00	53.57	0.91	1.69	33.00	33.00	33.00
*	0.075	80.00	12.50	1252.91	0.38	0.65	0.06	179.63	0.95	1.03	33.00	33.00	33.00
*	0.075	80.00	12.50	1253.71	0.64	0.66	0.09	149.15	1.52	1.57	33.00	33.00	33.00
	0.080	30.00	0.00	1253.13	0.13	0.19	0.02	32.96	1.10	1.50	33.00	33.00	33.00
	0.080	30.00	0.00	1253.94	0.26	0.19	0.04	35.86	1.78	2.18	33.00	33.00	33.00

SUMMARY OF ERRORS AND SPECIAL NOTES

```
CAUTION  SECNO=    0.075  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=    0.075  PROFILE= 1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION  SECNO=    0.075  PROFILE= 1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION  SECNO=    0.075  PROFILE= 2  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=    0.075  PROFILE= 2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION  SECNO=    0.075  PROFILE= 2  20 TRIALS ATTEMPTED TO BALANCE WSEL
```

```
1*****************************************************
 *  WATER SURFACE PROFILES                           *
 *  VERSION OF NOVEMBER 1976                         *
 *  UPDATED MAY 1984                                 *
 *                                                   *
 *  RUN DATE 30-Nov-84  TIME 14:42                   *
 *****************************************************
```

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

```
H     H  HHHHHHH  HHHHH          HHHHH
H     H  H       H    H        H     H
H     H  H       H              H     H
HHHHHHH  HHHH    H         HHHHH  HHHHH
H     H  H       H              H
H     H  H       H    H         H
H     H  HHHHHHH  HHHHH          HHHHHHH
```

```
1
30-Nov-84   14:42
```

2. HEC-2 Input and Output - Post-Development Documentation

A) Echo Canyon - Main Channel Floodplain

```
*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MAY  1984
  ERROR CODE -  01,02,03,04,05,06
  MODIFICATION -  50,51,52,53,54,55
*****************************************************

C
T1      5080 NORTH 40TH STREET PROJECT   OCTOBER 1984 ANDERSON NICHOLS AND CO.
T2      10  YEAR WATER SURFACE PROFILE (PROPOSED)      4120 NORTH 20TH STREET
T3      ECHO CANYON WASH (CUDIA CITY WASH)        PHOENIX  AZ 85016 AN441601

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    EVINS     Q         WSEL      FQ
       10.       2.        0.        0.  0.000000      0.00       0.0        0.  1249.800     0.000

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHSIM     ITRACE
     1.000     0.000    -1.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000

J3  VARIABLE CODES FOR SUMMARY PRINTOUT
     38.000    43.000     1.000     2.000    26.000    39.000    21.000    22.000    27.000    28.000

     53.000    54.000     0.000    38.000    13.000    14.000    15.000    55.000    26.000    56.000
```

```
      63.000     1.000    51.000     4.000    42.000    57.000     0.000    38.000    39.000    33.000

       3.000    10.000    11.000    12.000     5.000     7.000     8.000    16.000    17.000    18.000

35 IPRNT   NUMSEC                    *********REQUESTED SECTION NUMBERS*********

     -10.000   -10.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000

NC     0.035     0.035     0.030     0.100     0.300     0.000     0.000     0.000     0.000     0.000
QT     3.000  2000.000  3800.000  4800.000     0.000     0.000     0.000     0.000     0.000     0.000
ET     0.000     7.100     7.100     7.100     0.000     0.000   922.000  1178.000     0.000     0.000
       STARTING WATER SURFACE ELEVATION IS BASED ON CRITICAL DEPTH INTO ARIZONA
       CANAL. THE CANAL WAS DETERMINED TO HAVE NO BACKWATER AFFECT ON WASH.
       CROSS-SECTION STATIONING FROM LEFT TO RIGHT LOOKING DOWNSTREAM WITH
       STATION 1000 AT DESIGNATED FLOWLINE.
       CROSS-SECTION ID NUMBERS PROCEED UPSTREAM IN RIVER MILES FROM CONFLUENCE
       WITH ARIZONA CANAL.
X1     0.013    13.000   916.000  1056.000     0.000     0.000     0.000     0.000     0.000     0.000
GR  1256.000   912.000  1255.000   916.000  1253.000   920.000  1252.000   924.000  1250.000   937.000
GR  1249.000   946.000  1248.000   968.000  1248.000  1028.000  1249.000  1036.000  1250.000  1045.000
GR  1251.000  1056.000  1252.000  1119.000  1252.000  1183.000     0.000     0.000     0.000     0.000
1
30-Nov-84   14:42                                                                          PAGE    2

NC     0.035     0.035     0.030     0.000     0.000     0.000     0.000     0.000     0.000     0.000
X1     0.017    47.000   913.000  1156.000    10.000    25.000    21.000     0.000     0.000     0.000
GR  1256.000   913.000  1252.000   913.000  1251.000   919.000  1250.000   926.000  1249.500   928.000
GR  1256.000   928.000  1256.000   932.500  1249.000   932.500  1248.400   947.000  1256.000   947.000
GR  1256.000   951.500  1248.300   951.500  1248.000   957.000  1248.000   967.500  1256.000   967.500
GR  1256.000   972.000  1248.000   972.000  1248.000   985.000  1256.000   985.000  1256.000   989.500
GR  1248.000   989.500  1248.000  1005.000  1256.000  1005.000  1256.000  1009.500  1248.000  1009.500
GR  1248.000  1024.000  1256.000  1024.000  1256.000  1028.500  1248.000  1028.500  1248.000  1044.000
GR  1256.000  1044.000  1256.000  1055.000  1248.000  1055.000  1248.000  1066.000  1256.000  1066.000
GR  1256.000  1070.500  1248.000  1070.500  1249.000  1096.500  1256.000  1096.500  1256.000  1101.000
GR  1249.000  1101.000  1250.000  1126.000  1256.000  1126.000  1256.000  1130.500  1250.000  1130.500
GR  1251.000  1156.000  1256.000  1156.000     0.000     0.000     0.000     0.000     0.000     0.000

X1     0.027    45.000   890.000  1137.000    26.000    65.000    51.000     0.000     0.000     0.000
GR  1256.000   890.000  1252.000   890.000  1251.000   897.000  1249.800   906.000  1256.000   906.000
GR  1256.000   911.000  1249.000   911.000  1248.600   920.000  1256.000   920.000  1256.000   929.000
GR  1248.200   929.000  1247.900   942.500  1256.000   942.500  1256.000   950.000  1247.900   950.000
GR  1247.800   963.000  1256.000   963.000  1256.000   968.500  1247.800   968.500  1247.700   984.500
GR  1256.000   984.500  1256.000   988.000  1247.800   988.000  1247.700  1001.000  1256.000  1001.000
GR  1256.000  1007.000  1247.700  1007.000  1247.800  1020.000  1256.000  1020.000  1256.000  1026.000
GR  1247.800  1026.000  1248.000  1069.000  1256.000  1069.000  1256.000  1076.500  1248.500  1076.500
GR  1248.800  1089.000  1256.000  1089.000  1256.000  1092.000  1248.900  1092.000  1249.000  1099.000
GR  1256.000  1099.000  1256.000  1107.000  1249.500  1107.000  1250.500  1137.000  1256.000  1137.000

ET     0.000     7.100     7.100     7.100     0.000     0.000   875.000  1127.000     0.000     0.000
X1     0.033    42.000   870.000  1127.000    36.000    30.000    34.000     0.000     0.000     0.000
GR  1256.000   870.000  1252.000   870.000  1252.000   876.000  1250.000   892.000  1256.000   892.000
GR  1256.000   898.000  1249.500   898.000  1248.000   931.000  1256.000   931.000  1256.000   937.000
GR  1247.900   937.000  1247.800   945.000  1256.000   945.000  1256.000   955.000  1247.700   955.000
GR  1247.600   991.000  1256.000   991.000  1256.000   996.000  1247.600   996.000  1247.600  1019.000
GR  1256.000  1019.000  1256.000  1022.000  1247.700  1022.000  1247.700  1029.000  1247.700  1041.000
GR  1256.000  1041.000  1256.000  1047.000  1247.700  1047.000  1248.000  1064.000  1256.000  1064.000
GR  1256.000  1071.000  1248.000  1071.000  1248.500  1080.000  1248.500  1080.000  1248.500  1088.000
GR  1248.500  1088.000  1248.800  1093.000  1256.000  1093.000  1256.000  1101.000  1249.000  1101.000
GR  1250.000  1127.000  1256.000  1127.000     0.000     0.000     0.000     0.000     0.000     0.000

X1     0.040    37.000   878.000  1122.000    58.000    22.000    39.000     0.000     0.000     0.000
GR  1252.000   878.000  1252.000   885.000  1250.000   900.000  1256.000   900.000  1256.000   904.500
GR  1249.500   904.500  1249.000   909.000  1248.000   927.000  1256.000   927.000  1256.000   932.000
GR  1248.000   932.000  1247.700   959.000  1256.000   959.000  1256.000   964.000  1247.700   964.000
```

```
X1      0.040     37.000    878.000   1122.000     58.000     22.000     39.000      0.000      0.000      0.000
GR   1252.000    878.000   1252.000    885.000   1250.000    900.000   1256.000    900.000   1256.000    904.500
GR   1249.500    904.500   1249.000    909.000   1248.000    927.000   1256.000    927.000   1256.000    932.000
GR   1248.000    932.000   1247.700    959.000   1256.000    959.000   1256.000    964.000   1247.700    964.000
GR   1247.500    984.000   1256.000    984.000   1256.000    991.000   1247.500    991.000   1247.500   1021.000
GR   1256.000   1021.000   1256.000   1024.000   1247.500   1024.000   1247.700   1049.000   1256.000   1049.000
GR   1256.000   1052.500   1247.800   1052.500   1248.000   1077.000   1256.000   1077.000   1256.000   1080.000
GR   1248.000   1080.000   1248.500   1093.000   1256.000   1093.000   1256.000   1104.000   1249.000   1104.000
GR   1250.000   1122.000   1256.000   1122.000      0.000      0.000      0.000      0.000      0.000      0.000

X1      0.051     31.000    896.000   1106.000     60.000     45.000     52.000      0.000      0.000      0.000
GR   1252.000    896.000   1252.000    900.000   1251.000    905.000   1250.000    912.000   1256.000    912.000
GR   1256.000    916.500   1249.000    916.500   1247.900    938.000   1256.000    938.000   1256.000    942.500
GR   1247.900    942.500   1247.700    952.000   1247.600    966.500   1256.000    966.500   1256.000    972.000
GR   1247.500    972.000   1247.200    995.000   1256.000    995.000   1256.000   1001.000   1247.200   1001.000
GR   1247.500   1033.000   1247.700   1054.000   1256.000   1054.000   1256.000   1057.000   1247.700   1057.000
GR   1248.000   1081.000   1256.000   1081.000   1256.000   1084.000   1248.000   1084.000   1249.000   1106.000
1
30-Nov-84    14:42                                                                                          PAGE    3

GR   1256.000   1106.000      0.000      0.000      0.000      0.000      0.000      0.000      0.000      0.000

ET      0.000      7.100      7.100      7.100      0.000      0.000    782.000   1082.000      0.000      0.000
X1      0.059     28.000    893.000   1094.000     56.000     45.000     50.000      0.000      0.000      0.000
GR   1253.000    742.000   1252.000    887.000   1251.000    893.000   1250.000    903.000   1250.000    907.500
GR   1256.000    907.500   1256.000    912.000   1249.500    912.000   1247.900    933.000   1256.000    933.000
GR   1256.000    938.000   1247.900    938.000   1247.500    960.000   1256.000    960.000   1256.000    964.500
GR   1247.500    964.500   1247.000    982.000   1247.000    989.000   1256.000    989.000   1256.000    994.000
GR   1247.000    994.000   1247.000   1016.000   1247.500   1030.000   1248.000   1065.000   1249.000   1084.000
GR   1251.000   1094.000   1252.000   1100.000   1253.000   1108.000      0.000      0.000      0.000      0.000

BC      0.045      0.035      0.033      0.100      0.300      0.000      0.000      0.000      0.000      0.000
ET      0.000      7.100      7.100      7.100      0.000      0.000    745.000   1075.000      0.000      0.000
        SPLITFLOW CONDITION OCCURS AT SEC.0.067 (MAIN CHANNAL) AND SEC.0.080
        (WEST CHANNEL). FLOW HAS BEEN REDUCED AT SEC.0.067 FOR THIS SPLITFLOW
        SPLITFLOW AMT. WAS DETERMINED FROM RATING CURVE ANALYSIS AT SEC.0.067
X1      0.067     19.000    970.000   1023.000     40.000     40.000     40.000      0.000      0.000      0.000
GR   1253.000    722.000   1252.000    813.000   1252.000    850.000   1252.000    877.000   1250.000    960.000
GR   1249.000    970.000   1248.000    981.000   1247.000    985.000   1247.000   1010.000   1248.000   1013.000
GR   1249.000   1023.000   1250.000   1030.000   1251.000   1059.000   1251.500   1075.000   1251.500   1172.000
GR   1252.000   1182.000   1252.000   1295.000   1293.000   1308.000   1293.500   1332.000      0.000      0.000

BC      0.045      0.045      0.033      0.100      0.300      0.000      0.000      0.000      0.000      0.000
ET      0.000      7.100      7.100      7.100      0.000      0.000    645.000   1110.000      0.000      0.000
QT      3.000   2000.000   4600.000   4600.000      0.000      0.000      0.000      0.000      0.000      0.000
X1      0.107     21.000    985.000   1055.000    110.000    240.000    210.000      0.000      0.000      0.000
GR   1252.000    640.000   1252.000    795.000   1254.000    800.000   1254.000    810.000   1253.000    820.000
GR   1253.000    850.000   1252.000    865.000   1251.000    895.000   1250.000    903.000   1248.000    912.000
GR   1248.000    935.000   1249.000    945.000   1249.000    975.000   1248.000    985.000   1247.000   1017.000
GR   1247.000   1045.000   1248.000   1055.000   1249.000   1060.000   1250.000   1068.000   1253.000   1082.000
GR   1253.600   1110.000      0.000      0.000      0.000      0.000      0.000      0.000      0.000      0.000

ET      0.000      7.100      7.100      7.100      0.000      0.000    690.000   1150.000      0.000      0.000
X1      0.140     19.000    983.000   1012.000    165.000    155.000    172.000      0.000      0.000      0.000
GR   1253.000    523.000   1253.000    572.000   1252.700    618.000   1252.700    702.000   1253.000    745.000
GR   1252.000    772.000   1252.000    825.000   1252.000    887.000   1251.000    890.000   1250.000    907.000
GR   1249.000    915.000   1249.000    983.000   1248.000    995.000   1248.000   1005.000   1249.000   1012.000
GR   1250.000   1020.000   1250.000   1122.000   1253.000   1127.000   1253.500   1150.000      0.000      0.000
EJ      0.000      0.000      0.000      0.000      0.000      0.000      0.000      0.000      0.000      0.000
1
30-Nov-84    14:42                                                                                          PAGE    4
```

THIS RUN EXECUTED 30-Nov-84 14:42

```
**************************************************
HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984
ERROR CODE -  01,02,03,04,05,06
```

```
                                                                                THIS RUN EXECUTED 30-Nov-84    14:42
*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MAY  1984
  ERROR CORR -  01,02,03,04,05,06
  MODIFICATION -  50,51,52,53,54,55
*****************************************************

T1      5080 NORTH 40TH STREET PROJECT OCTOBER 1984 ANDERSON-NICHOLS & CO.
T2      50-YEAR WATER SURFACE PROFILE (PROPOSED) 4120 NORTH 20TH STREET
T3      ECHO CANYON WASH (CUDIA CITY WASH)          PHOENIX, ARIZONA  AN 4416-01

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    NVINS     Q         WSEL      FQ

      10.       3.        0.        0.  0.000000      0.00      0.0       0.  1251.800     0.000

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

    2.000     0.000    -1.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000

1
30-Nov-84   14:42                                                                          PAGE    5


                                                                                THIS RUN EXECUTED 30-Nov-84    14:42
*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MAY  1984
  ERROR CORR -  01,02,03,04,05,06
  MODIFICATION -  50,51,52,53,54,55
*****************************************************

T1      5080 NORTH 40TH STREET PROJECT OCTOBER 1984 ANDERSON-NICHOLS & CO.
T2      100-YEAR WATER SURFACE PROFILE (PROPOSED) 4120 NORTH 20TH STREET
T3      ECHO CANYON WASH (CUDIA CITY WASH)          PHOENIX, ARIZONA  AN 4416

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    NVINS     Q         WSEL      FQ

      10.       4.        0.        0.  0.000000      0.00      0.0       0.  1252.000     0.000

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

   15.000     0.000    -1.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000

1
30-Nov-84   14:42                                                                          PAGE    6


                                                                                THIS RUN EXECUTED 30-Nov-84    14:42
*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MAY  1984
  ERROR CORR -  01,02,03,04,05,06
  MODIFICATION -  50,51,52,53,54,55
*****************************************************

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

ECHO CANYON WASH (CUDIA

SUMMARY PRINTOUT

     ECHO      Q      CWSEL     CRIWS     VCH       ALCH      STCHL     STCHR     NTENCL    STENCR    SSTA      ENDST
```

	SECNO	Q	CWSEL	CRIWS	VCH	XLCH	STCHL	STCHR	STENCL	STENCR	SSTA	ENDST
*	0.013	2000.00	1250.63	1250.63	8.15	0.00	916.00	1056.00	922.00	1178.00	932.92	1051.91
*	0.013	3800.00	1251.85	1251.85	9.40	0.00	916.00	1056.00	922.00	1178.00	925.00	1109.29
*	0.013	4800.00	1252.51	1252.51	9.27	0.00	916.00	1056.00	922.00	1178.00	922.00	1178.00
	0.017	2000.00	1251.60	0.00	3.83	21.00	913.00	1156.00	0.00	0.00	915.41	1156.00
	0.017	3800.00	1253.03	0.00	4.78	21.00	913.00	1156.00	0.00	0.00	913.00	1156.00
	0.017	4800.00	1253.48	0.00	5.44	21.00	913.00	1156.00	0.00	0.00	913.00	1156.00
	0.027	2000.00	1251.75	0.00	3.42	51.00	890.00	1137.00	0.00	0.00	891.76	1137.00
	0.027	3800.00	1253.19	0.00	4.45	51.00	890.00	1137.00	0.00	0.00	890.00	1137.00
	0.027	4800.00	1253.67	0.00	5.09	51.00	890.00	1137.00	0.00	0.00	890.00	1137.00
	0.033	2000.00	1251.84	0.00	2.95	84.00	870.00	1127.00	875.00	1127.00	877.28	1127.00
	0.033	3800.00	1253.32	0.00	3.90	84.00	870.00	1127.00	875.00	1127.00	875.00	1127.00
	0.033	4800.00	1253.84	0.00	4.45	84.00	870.00	1127.00	875.00	1127.00	875.00	1127.00
	0.040	2000.00	1251.89	0.00	2.82	39.00	878.00	1122.00	0.00	0.00	885.82	1122.00
	0.040	3800.00	1253.38	0.00	3.77	39.00	878.00	1122.00	0.00	0.00	878.00	1122.00
	0.040	4800.00	1253.91	0.00	4.30	39.00	878.00	1122.00	0.00	0.00	878.00	1122.00
	0.051	2000.00	1251.93	0.00	2.83	52.00	896.00	1106.00	0.00	0.00	900.32	1106.00
	0.051	3800.00	1253.43	0.00	3.88	52.00	896.00	1106.00	0.00	0.00	896.00	1106.00
	0.051	4800.00	1253.97	0.00	4.45	52.00	896.00	1106.00	0.00	0.00	896.00	1106.00
	0.059	2000.00	1251.96	0.00	2.91	50.00	893.00	1094.00	782.00	1082.00	887.19	1082.00
	0.059	3800.00	1253.49	0.00	3.84	50.00	893.00	1094.00	782.00	1082.00	782.00	1082.00
	0.059	4800.00	1254.07	0.00	4.25	50.00	893.00	1094.00	782.00	1082.00	782.00	1082.00
	0.067	2000.00	1251.49	1251.34	8.18	40.00	970.00	1023.00	745.00	1075.00	897.98	1074.83
	0.067	3800.00	1253.31	0.00	7.31	40.00	970.00	1023.00	745.00	1075.00	745.00	1075.00
	0.067	4800.00	1253.93	0.00	7.43	40.00	970.00	1023.00	745.00	1075.00	745.00	1075.00

SECNO	Q	CWSEL	CRIWS	VCH	XLCH	STCHL	STCHR	STENCL	STENCR	SSTA	ENDST
0.107	2000.00	1252.59	0.00	3.18	210.00	985.00	1055.00	645.00	1110.00	645.00	1080.07
0.107	4600.00	1253.92	0.00	4.91	210.00	985.00	1055.00	645.00	1110.00	645.00	1110.00
0.107	6600.00	1254.44	0.00	6.12	210.00	985.00	1055.00	645.00	1110.00	645.00	1110.00
0.140	2000.00	1252.71	0.00	3.92	172.00	983.00	1012.00	690.00	1150.00	690.00	1126.52
0.140	4600.00	1254.15	0.00	5.25	172.00	983.00	1012.00	690.00	1150.00	690.00	1150.00
0.140	6600.00	1254.78	0.00	6.25	172.00	983.00	1012.00	690.00	1150.00	690.00	1150.00

ECHO CANYON WASH (CUDIA

SUMMARY PRINTOUT

	SECNO	QLOB	QCH	QROB	VLOB	VCH	VROB	TELMX	CWSEL	DIFWSX	TOPWID	ELMIN	ALPHA
*	0.013	0.00	2000.00	0.00	0.00	8.15	0.00	1252.00	1250.63	0.00	118.99	1248.00	1.00
*	0.013	0.00	3751.27	48.73	0.00	9.40	2.16	1252.00	1251.85	0.00	184.28	1248.00	1.07
*	0.013	0.00	4519.37	280.63	0.00	9.27	2.99	1252.00	1252.51	0.00	256.00	1248.00	1.19
	0.017	0.00	2000.00	0.00	0.00	3.83	0.00	1256.00	1251.60	0.97	189.09	1248.00	1.00
	0.017	0.00	3800.00	0.00	0.00	4.78	0.00	1256.00	1253.03	1.18	191.50	1248.00	1.00
	0.017	0.00	4800.00	0.00	0.00	5.44	0.00	1256.00	1253.48	0.97	191.50	1248.00	1.00
	0.027	0.00	2000.00	0.00	0.00	3.42	0.00	1256.00	1251.75	0.15	184.24	1247.70	1.00
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4.78	0.00	1256.00	1253.03	1.18	191.50	1248.00	1.00
0.017	0.00	4800.00	0.00	0.00	5.44	0.00	1256.00	1253.48	0.97	191.50	1248.00	1.00
0.027	0.00	2000.00	0.00	0.00	3.42	0.00	1256.00	1251.75	0.15	184.24	1247.70	1.00
0.027	0.00	3800.00	0.00	0.00	4.45	0.00	1256.00	1253.19	0.16	186.00	1247.70	1.00
0.027	0.00	4800.00	0.00	0.00	5.09	0.00	1256.00	1253.67	0.19	186.00	1247.70	1.00
0.033	0.00	2000.00	0.00	0.00	2.95	0.00	1256.00	1251.84	0.09	198.72	1247.60	1.00
0.033	0.00	3800.00	0.00	0.00	3.90	0.00	1256.00	1253.32	0.13	201.00	1247.60	1.00
0.033	0.00	4800.00	0.00	0.00	4.45	0.00	1256.00	1253.84	0.17	201.00	1247.60	1.00
0.040	0.00	2000.00	0.00	0.00	2.82	0.00	1252.00	1251.89	0.05	194.18	1247.50	1.00
0.040	0.00	3800.00	0.00	0.00	3.77	0.00	1252.00	1253.38	0.06	202.00	1247.50	1.00
0.040	0.00	4800.00	0.00	0.00	4.30	0.00	1252.00	1253.91	0.08	202.00	1247.50	1.00
0.051	0.00	2000.00	0.00	0.00	2.83	0.00	1252.00	1251.93	0.04	179.18	1247.20	1.00
0.051	0.00	3800.00	0.00	0.00	3.88	0.00	1252.00	1253.43	0.05	183.50	1247.20	1.00
0.051	0.00	4800.00	0.00	0.00	4.45	0.00	1252.00	1253.97	0.05	183.50	1247.20	1.00
0.059	1.91	1998.09	0.00	0.68	2.91	0.00	1253.00	1251.96	0.03	175.81	1247.00	1.01
0.059	179.34	3620.66	0.00	1.39	3.84	0.00	1253.00	1253.49	0.06	281.00	1247.00	1.13
0.059	368.46	4431.54	0.00	1.89	4.25	0.00	1253.00	1254.07	-0.10	281.00	1247.00	1.13
0.067	171.48	1663.17	165.35	2.59	8.18	3.54	1293.50	1251.49	-0.47	176.85	1247.00	1.43
0.067	1004.30	2190.38	605.32	2.65	7.31	4.28	1293.50	1253.31	-0.18	330.00	1247.00	1.66
0.067	1532.41	2470.20	797.39	2.96	7.43	4.59	1293.50	1253.93	-0.14	330.00	1247.00	1.58
0.107	730.20	1176.15	93.65	1.56	3.18	1.54	1253.60	1252.59	1.10	375.32	1247.00	1.40
0.107	2070.34	2274.12	255.54	2.34	4.91	2.24	1253.60	1253.92	0.61	454.04	1247.00	1.48
0.107	3141.49	3061.31	397.19	2.97	6.12	2.79	1253.60	1254.44	0.51	465.00	1247.00	1.46
0.140	856.67	498.14	645.19	2.10	5.92	2.09	1253.50	1252.71	0.12	387.01	1248.00	1.27
0.140	2234.44	887.04	1478.52	2.71	5.25	2.99	1253.50	1254.15	0.23	460.00	1248.00	1.23
0.140	3325.20	1169.45	2105.35	3.31	6.25	3.62	1253.50	1254.78	0.34	460.00	1248.00	1.20

ECHO CANYON WASH (CUDIA

SUMMARY PRINTOUT

	BECNO	XLCE	K*CHSL	EG	HV	HL	OLOSS	10K*S	VOL	DEPTH	K*XNL	K*XNCE	K*XNR
*	0.013	0.00	0.00	1251.66	1.03	0.00	0.00	103.60	0.00	2.63	0.00	30.00	0.00
*	0.013	0.00	0.00	1253.20	1.35	0.00	0.00	81.76	0.00	3.85	0.00	30.00	35.00
*	0.013	0.00	0.00	1253.78	1.26	0.00	0.00	62.88	0.00	4.51	0.00	30.00	35.00
	0.017	21.00	0.00	1251.83	0.23	0.09	0.08	22.68	0.19	3.60	0.00	30.00	0.00
	0.017	21.00	0.00	1253.38	0.35	0.08	0.10	23.83	0.29	5.03	0.00	30.00	0.00
	0.017	21.00	0.00	1253.94	0.46	0.09	0.08	28.17	0.36	5.48	0.00	30.00	0.00
	0.027	51.00	-5.88	1251.93	0.18	0.10	0.00	15.66	0.83	4.05	0.00	30.00	0.00
	0.027	51.00	-5.88	1253.50	0.31	0.11	0.00	18.97	1.26	5.49	0.00	30.00	0.00
	0.027	51.00	-5.88	1254.08	0.40	0.13	0.01	22.73	1.43	5.97	0.00	30.00	0.00
	0.033	34.00	-2.94	1251.98	0.14	0.04	0.00	9.85	1.33	4.24	0.00	30.00	0.00
	0.033	34.00	-2.94	1253.56	0.24	0.05	0.01	12.19	1.97	5.72	0.00	30.00	0.00
	0.033	34.00	-2.94	1254.15	0.31	0.06	0.01	14.45	2.22	6.24	0.00	30.00	0.00
	0.040	39.00	-2.56	1252.01	0.12	0.04	0.00	8.39	1.95	4.39	0.00	30.00	0.00
	0.040	39.00	-2.56	1253.60	0.22	0.05	0.00	11.03	2.86	5.88	0.00	30.00	0.00
	0.040	39.00	-2.56	1254.20	0.29	0.05	0.00	13.12	3.20	6.41	0.00	30.00	0.00
	0.051	52.00	-5.77	1252.05	0.12	0.04	0.00	7.34	2.79	4.73	0.00	30.00	0.00
	0.051	52.00	-5.77	1253.66	0.23	0.06	0.00	10.17	4.05	6.23	0.00	30.00	0.00
	0.051	52.00	-5.77	1254.27	0.31	0.07	0.01	12.29	4.51	6.77	0.00	30.00	0.00
	0.059	50.00	-4.00	1252.00	0.13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

0.051	52.00	-5.77	1252.05	0.12	0.04	0.00	7.34	2.79	4.73	0.00	30.00	0.00
0.051	52.00	-5.77	1253.66	0.23	0.06	0.00	10.17	4.05	6.23	0.00	30.00	0.00
0.051	52.00	-5.77	1254.27	0.31	0.07	0.01	12.29	4.51	6.77	0.00	30.00	0.00
0.059	50.00	-4.00	1252.09	0.13	0.04	0.00	6.89	3.59	4.96	35.00	30.00	0.00
0.059	50.00	-4.00	1253.71	0.22	0.05	0.00	8.52	5.24	6.49	35.00	30.00	0.00
0.059	50.00	-4.00	1254.33	0.26	0.05	0.00	9.42	5.85	7.07	35.00	30.00	0.00
0.067	40.00	0.00	1252.38	0.89	0.06	0.23	55.57	4.05	4.49	45.00	33.00	35.00
0.067	40.00	0.00	1253.86	0.55	0.06	0.10	26.36	6.11	6.31	45.00	33.00	35.00
0.067	40.00	0.00	1254.47	0.54	0.06	0.08	23.72	6.89	6.93	45.00	33.00	35.00
0.107	210.00	0.00	1252.70	0.11	0.24	0.08	5.42	6.41	5.59	45.00	33.00	45.00
0.107	210.00	0.00	1254.15	0.23	0.25	0.03	9.55	10.24	6.92	45.00	33.00	45.00
0.107	210.00	0.00	1254.78	0.34	0.29	0.02	13.46	11.76	7.44	45.00	33.00	45.00
0.140	172.00	5.81	1252.82	0.11	0.12	0.00	10.62	9.70	4.71	45.00	33.00	45.00
0.140	172.00	5.81	1254.34	0.18	0.18	0.00	13.02	15.81	6.15	45.00	33.00	45.00
0.140	172.00	5.81	1255.03	0.26	0.24	0.01	16.15	18.31	6.78	45.00	33.00	45.00

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 0.013 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 0.013 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 0.013 PROFILE= 3 CRITICAL DEPTH ASSUMED

THIS RUN EXECUTED 30-Nov-84 14:42

```
*************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MAY  1984
  ERROR CORR -  01,02,03,04,05,06
  MODIFICATION -  50,51,52,53,54,55
*************************************************
```

```
1*****************************************************
 *  WATER SURFACE PROFILES                           *
 *  VERSION OF NOVEMBER 1976                         *
 *  UPDATED MAY 1984                                 *
 *                                                   *
 *  RUN DATE 30-Nov-84  TIME 15:22                   *
 *****************************************************

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

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

1
30-Nov-84   15:22                                                    PAGE   1
```

2. HEC-2 INPUT AND OUTPUT - POST-DEVELOPMENT DOCUMENTATION

B) ECHO CANYON - MAIN CHANNEL FLOODWAY CONCEPT

```
*************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MAY  1984
  ERROR CORR -  01,02,03,04,05,06
  MODIFICATION -  50,51,52,53,54,55
*************************************************

C
T1      5080 NORTH 40TH STREET PROJECT   OCTOBER 1984 ANDERSON NICHOLS AND CO.
T2      10  YEAR WATER SURFACE PROFILE (PROPOSED)      4120 NORTH 20TH STREET
T3      ECHO CANYON WASH (CUDIA CITY WASH)       PHOENIX  AZ 85016 AN441601

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    NVINS     Q         WSEL      FQ

      10.       2.        0.        0.  0.000000      0.00       0.0       0.  1249.800    0.000

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     1.000     0.000    -1.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    38.000    43.000     1.000     2.000    26.000    39.000    21.000    22.000    27.000    28.000

    53.000    54.000     0.000    58.000    13.000    14.000    15.000    55.000    26.000    56.000

    63.000     1.000    51.000     4.000    42.000    57.000     0.000    38.000    39.000    33.000

     3.000    10.000    11.000    12.000     5.000     7.000     8.000    16.000    17.000    18.000
```

```
     63.000     1.000    51.000     4.000    42.000    57.000     0.000    38.000    39.000    33.000

      3.000    10.000    11.000    12.000     5.000     7.000     8.000    16.000    17.000    18.000

J5   LPRNT    NUMSEC                    ********REQUESTED SECTION NUMBERS********

    -10.000   -10.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000

NC      0.035     0.035     0.030     0.100     0.300     0.000     0.000     0.000     0.000     0.000
QT      3.000  2000.000  4600.000  4600.000     0.000     0.000     0.000     0.000     0.000     0.000
ET      0.000     7.100     7.100     7.100     0.000     0.000   922.000  1178.000     0.000     0.000
        STARTING WATER SURFACE ELEVATION IS BASED ON CRITICAL DEPTH INTO ARIZONA
        CANAL.  THE CANAL WAS DETERMINED TO HAVE NO BACKWATER AFFECT ON WASH.
        CROSS-SECTION STATIONING FROM LEFT TO RIGHT LOOKING DOWNSTREAM WITH
        STATION 1000 AT DESIGNATED FLOWLINE.
        CROSS-SECTION ID NUMBERS PROCEED UPSTREAM IN RIVER MILES FROM CONFLUENCE
        WITH ARIZONA CANAL.
X1      0.013    13.000   916.000  1056.000     0.000     0.000     0.000     0.000     0.000     0.000
GR   1256.000   912.000  1255.000   916.000  1253.000   920.000  1252.000   924.000  1250.000   937.000
GR   1249.000   946.000  1248.000   968.000  1248.000  1028.000  1249.000  1036.000  1250.000  1045.000
GR   1251.000  1056.000  1252.000  1119.000  1252.000  1183.000     0.000     0.000     0.000     0.000
1
30-Nov-84   15:22                                                                          PAGE    2

NC      0.035     0.035     0.030     0.000     0.000     0.000     0.000     0.000     0.000     0.000
X1      0.017    47.000   913.000  1156.000    10.000    25.000    21.000     0.000     0.000     0.000
GR   1256.000   913.000  1252.000   913.000  1251.000   919.000  1250.000   926.000  1249.500   928.000
GR   1256.000   928.000  1256.000   932.500  1249.000   932.500  1248.400   947.000  1256.000   947.000
GR   1256.000   951.500  1248.300   951.500  1248.000   957.000  1248.000   967.500  1256.000   967.500
GR   1256.000   972.000  1248.000   972.000  1248.000   985.000  1256.000   985.000  1256.000   989.500
GR   1248.000   989.500  1248.000  1005.000  1256.000  1005.000  1256.000  1009.500  1248.000  1009.500
GR   1248.000  1024.000  1256.000  1024.000  1256.000  1028.500  1248.000  1028.500  1248.000  1044.000
GR   1256.000  1044.000  1256.000  1055.000  1248.000  1055.000  1248.000  1066.000  1256.000  1066.000
GR   1256.000  1070.500  1248.000  1070.500  1249.000  1096.500  1256.000  1096.500  1256.000  1101.000
GR   1249.000  1101.000  1250.000  1126.000  1256.000  1126.000  1256.000  1130.500  1250.000  1130.500
GR   1251.000  1156.000  1256.000  1156.000     0.000     0.000     0.000     0.000     0.000     0.000

X1      0.027    45.000   890.000  1137.000    26.000    65.000    51.000     0.000     0.000     0.000
GR   1256.000   890.000  1252.000   890.000  1251.000   897.000  1249.800   906.000  1256.000   906.000
GR   1256.000   911.000  1249.000   911.000  1248.600   920.000  1256.000   920.000  1256.000   929.000
GR   1248.200   929.000  1247.900   942.500  1256.000   942.500  1256.000   950.000  1247.900   950.000
GR   1247.800   963.000  1256.000   963.000  1256.000   968.500  1247.800   968.500  1247.700   984.500
GR   1256.000   984.500  1256.000   988.000  1247.800   988.000  1247.700  1001.000  1256.000  1001.000
GR   1256.000  1007.000  1247.700  1007.000  1247.800  1020.000  1256.000  1020.000  1256.000  1026.000
GR   1247.800  1026.000  1248.000  1069.000  1256.000  1069.000  1256.000  1076.500  1248.500  1076.500
GR   1248.800  1089.000  1256.000  1089.000  1256.000  1092.000  1248.900  1092.000  1249.000  1099.000
GR   1256.000  1099.000  1256.000  1107.000  1249.500  1107.000  1250.500  1137.000  1256.000  1137.000

ET      0.000     7.100     7.100     7.100     0.000     0.000   875.000  1127.000     0.000     0.000
X1      0.033    42.000   870.000  1127.000    36.000    30.000    34.000     0.000     0.000     0.000
GR   1256.000   870.000  1252.000   870.000  1252.000   876.000  1250.000   892.000  1256.000   892.000
GR   1256.000   898.000  1249.500   898.000  1248.000   931.000  1256.000   931.000  1256.000   937.000
GR   1247.900   937.000  1247.800   945.000  1256.000   945.000  1256.000   955.000  1247.700   955.000
GR   1247.600   991.000  1256.000   991.000  1256.000   996.000  1247.600   996.000  1247.600  1019.000
GR   1256.000  1019.000  1256.000  1022.000  1247.700  1022.000  1247.700  1029.000  1247.700  1041.000
GR   1256.000  1041.000  1256.000  1047.000  1247.700  1047.000  1248.000  1064.000  1256.000  1064.000
GR   1256.000  1071.000  1248.000  1071.000  1248.500  1080.000  1248.500  1080.000  1248.500  1088.000
GR   1248.500  1088.000  1248.800  1093.000  1256.000  1093.000  1256.000  1101.000  1249.000  1101.000
GR   1250.000  1127.000  1256.000  1127.000     0.000     0.000     0.000     0.000     0.000     0.000

X1      0.040    37.000   878.000  1122.000    58.000    22.000    39.000     0.000     0.000     0.000
GR   1252.000   878.000  1252.000   885.000  1250.000   900.000  1256.000   900.000  1256.000   904.500
GR   1249.500   904.500  1249.000   909.000  1248.000   927.000  1256.000   927.000  1256.000   932.000
GR   1248.000   932.000  1247.700   959.000  1256.000   959.000  1256.000   964.000  1247.700   964.000
GR   1247.500   984.000  1256.000   984.000  1256.000   991.000  1247.500   991.000  1247.500  1021.000
GR   1256.000  1021.000  1256.000  1024.000  1247.500  1024.000  1247.700  1049.000  1256.000  1049.000
GR   1256.000  1052.500  1247.800  1052.500  1248.000  1077.000  1256.000  1077.000  1256.000  1080.000
```

```
GR   1248.000   932.000  1247.700   959.000  1256.000   959.000  1256.000   964.000  1247.700   964.000
GR   1247.500   984.000  1256.000   984.000  1256.000   991.000  1247.500   991.000  1247.500  1021.000
GR   1256.000  1021.000  1256.000  1024.000  1247.500  1024.000  1247.700  1049.000  1256.000  1049.000
GR   1256.000  1052.500  1247.800  1052.500  1248.000  1077.000  1256.000  1077.000  1256.000  1080.000
GR   1248.000  1080.000  1248.500  1093.000  1256.000  1093.000  1256.000  1104.000  1249.000  1104.000
GR   1250.000  1122.000  1256.000  1122.000     0.000     0.000     0.000     0.000     0.000     0.000

XI      0.051    31.000   896.000  1106.000    60.000    45.000    52.000     0.000     0.000     0.000
GR   1252.000   896.000  1252.000   900.000  1251.000   905.000  1250.000   912.000  1256.000   912.000
GR   1256.000   916.500  1249.000   916.500  1247.900   938.000  1256.000   938.000  1256.000   942.500
GR   1247.900   942.500  1247.700   952.000  1247.600   966.500  1256.000   966.500  1256.000   972.000
GR   1247.500   972.000  1247.200   995.000  1256.000   995.000  1256.000  1001.000  1247.200  1001.000
GR   1247.500  1033.000  1247.700  1054.000  1256.000  1054.000  1256.000  1057.000  1247.700  1057.000
GR   1248.000  1081.000  1256.000  1081.000  1256.000  1084.000  1248.000  1084.000  1249.000  1106.000
3
30-Nov-84   15:22                                                                          PAGE    3

GR   1256.000  1106.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000

ET      0.000     7.100     7.100     7.100     0.000     0.000   782.000  1082.000     0.000     0.000
XI      0.059    28.000   893.000  1094.000    56.000    45.000    50.000     0.000     0.000     0.000
GR   1253.000   842.000  1252.000   887.000  1251.000   893.000  1250.000   903.000  1250.000   907.500
GR   1256.000   907.500  1256.000   912.000  1249.500   912.000  1247.900   933.000  1256.000   933.000
GR   1256.000   938.000  1247.900   938.000  1247.500   960.000  1256.000   960.000  1256.000   964.500
GR   1247.500   964.500  1247.000   982.000  1247.000   989.000  1256.000   989.000  1256.000   994.000
GR   1247.000   994.000  1247.000  1016.000  1247.500  1030.000  1248.000  1065.000  1249.000  1084.000
GR   1251.000  1094.000  1252.000  1100.000  1253.000  1108.000     0.000     0.000     0.000     0.000

WC      0.045     0.035     0.033     0.100     0.300     0.000     0.000     0.000     0.000     0.000
ET      0.000     7.100     7.100     7.100     0.000     0.000   745.000  1075.000     0.000     0.000
        SPLITFLOW CONDITION OCCURS AT SEC.0.067 (MAIN CHANNAL) AND SEC.0.080
        (WEST CHANNEL). FLOW HAS BEEN REDUCED AT SEC.0.067 FOR THIS SPLITFLOW
        SPLITFLOW AMT. WAS DETERMINED FROM RATING CURVE ANALYSIS AT SEC.0.067
XI      0.067    19.000   970.000  1023.000    40.000    40.000    40.000     0.000     0.000     0.000
GR   1253.000   722.000  1252.000   813.000  1252.000   850.000  1252.000   877.000  1250.000   960.000
GR   1249.000   970.000  1248.000   981.000  1247.000   985.000  1247.000  1010.000  1248.000  1013.000
GR   1249.000  1023.000  1250.000  1030.000  1251.000  1059.000  1251.500  1075.000  1251.500  1172.000
GR   1252.000  1182.000  1252.000  1295.000  1293.000  1308.000  1293.500  1332.000     0.000     0.000

WC      0.045     0.045     0.033     0.100     0.300     0.000     0.000     0.000     0.000     0.000
ET      0.000     7.100     7.100     7.100     0.000     0.000   645.000  1110.000     0.000     0.000
QT      3.000  2000.000  4600.000  6600.000     0.000     0.000     0.000     0.000     0.000     0.000
XI      0.107    21.000   985.000  1055.000   110.000   240.000   210.000     0.000     0.000     0.000
GR   1252.000   640.000  1252.000   795.000  1254.000   800.000  1254.000   810.000  1253.000   820.000
GR   1253.000   850.000  1252.000   865.000  1251.000   895.000  1250.000   903.000  1248.000   912.000
GR   1248.000   935.000  1249.000   945.000  1249.000   975.000  1248.000   985.000  1247.000  1017.000
GR   1247.000  1045.000  1248.000  1055.000  1249.000  1060.000  1250.000  1068.000  1253.000  1082.000
GR   1253.600  1110.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000

ET      0.000     7.100     7.100     7.100     0.000     0.000   690.000  1150.000     0.000     0.000
XI      0.140    19.000   983.000  1012.000   165.000   155.000   172.000     0.000     0.000     0.000
GR   1253.000   523.000  1253.000   572.000  1252.700   618.000  1252.700   702.000  1253.000   745.000
GR   1252.000   772.000  1252.000   825.000  1252.000   887.000  1251.000   890.000  1250.000   907.000
GR   1249.000   915.000  1249.000   983.000  1248.000   995.000  1248.000  1005.000  1249.000  1012.000
GR   1250.000  1020.000  1250.000  1122.000  1253.000  1127.000  1253.500  1150.000     0.000     0.000
EJ      0.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000
1
30-Nov-84   15:22                                                                          PAGE    4


                                                                    THIS RUN EXECUTED 30-Nov-84   15:22
*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MAY  1984
  ERROR CORR -  01,02,03,04,05,06
  MODIFICATION -  50,51,52,53,54,55
*****************************************************
```

```
   53.000    1.000    51.000    4.000    42.000    57.000    0.000    38.000    39.000    33.000
*****************************************************

T1      5080 NORTH 40TH STREET PROJECT OCTOBER 1984 ANDERSON-NICHOLS & CO.
T2      50-YEAR WATER SURFACE PROFILE (PROPOSED) 4120 NORTH 20TH STREET
T3      ECHO CANYON WASH (CUDIA CITY WASH)          PHOENIX, ARIZONA  AN 4416-01

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC    NVINS     Q        WSEL      FQ

      10.       3.       0.       0.  0.000000     0.00      0.0       0.   1251.800    0.000

J2  NPROF    IPLOT    PRFVS    XSECV    XSECH     FN      ALLDC     IBW     CHNIM    ITRACE

    2.000    0.000   -1.000    0.000    0.000    0.000    0.000    0.000    0.000    0.000

1
30-Nov-84   15:22                                                                          PAGE    5


                                                                   THIS RUN EXECUTED 30-Nov-84    15:22
*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MAY  1984
  ERROR CORR -  01,02,03,04,05,06
  MODIFICATION -  50,51,52,53,54,55
*****************************************************

T1      5080 NORTH 40TH STREET PROJECT OCTOBER 1984 ANDERSON-NICHOLS & CO.
T2      100-YEAR WATER SURFACE PROFILE (PROPOSED) 4120 NORTH 20TH STREET
T3      ECHO CANYON WASH (CUDIA CITY WASH)          PHOENIX, ARIZONA  AN 4416

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC    NVINS     Q        WSEL      FQ

      10.       4.       0.       0.  0.000000     0.00      0.0       0.   1252.000    0.000

J2  NPROF    IPLOT    PRFVS    XSECV    XSECH     FN      ALLDC     IBW     CHNIM    ITRACE

   15.000    0.000   -1.000    0.000    0.000    0.000    0.000    0.000    0.000    0.000

1
30-Nov-84   15:22                                                                          PAGE    6


                                                                   THIS RUN EXECUTED 30-Nov-84    15:22
*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MAY  1984
  ERROR CORR -  01,02,03,04,05,06
  MODIFICATION -  50,51,52,53,54,55
*****************************************************

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

ECHO CANYON WASH (CUDIA

SUMMARY PRINTOUT

      SECNO      Q       CWSEL    CRIWS     VCH      XLCH     STCHL    STCHR    STENCL   STENCR    SSTA     ENDST

*     0.013   2000.00   1250.63  1250.63    8.15     0.00    916.00  1056.00   922.00  1178.00   932.92   3051.91
*     0.013   4600.00   1252.43  1252.43    9.16     0.00    916.00  1056.00   922.00  1178.00   922.28   1178.00
*     0.013   6600.00   1253.15  1253.15   10.24     0.00    916.00  1056.00   922.00  1178.00   922.00   1178.00
```

*	0.013	2000.00	1250.63	1250.63	8.15	0.00	916.00	1056.00	922.00	1178.00	932.92	1051.91
*	0.013	4600.00	1252.43	1252.43	9.16	0.00	916.00	1056.00	922.00	1178.00	922.28	1178.00
*	0.013	6600.00	1253.15	1253.15	10.24	0.00	916.00	1056.00	922.00	1178.00	922.00	1178.00
	0.017	2000.00	1251.60	0.00	3.83	21.00	913.00	1156.00	0.00	0.00	915.41	1156.00
	0.017	4600.00	1253.40	0.00	5.31	21.00	913.00	1156.00	0.00	0.00	913.00	1156.00
	0.017	6600.00	1254.14	0.00	6.55	21.00	913.00	1156.00	0.00	0.00	913.00	1156.00
	0.027	2000.00	1251.75	0.00	3.42	51.00	890.00	1137.00	0.00	0.00	891.76	1137.00
	0.027	4600.00	1253.58	0.00	4.97	51.00	890.00	1137.00	0.00	0.00	890.00	1137.00
	0.027	6600.00	1254.40	0.00	6.12	51.00	890.00	1137.00	0.00	0.00	890.00	1137.00
	0.033	2000.00	1251.84	0.00	2.95	34.00	870.00	1127.00	875.00	1127.00	877.28	1127.00
	0.033	4600.00	1253.74	0.00	4.34	34.00	870.00	1127.00	875.00	1127.00	875.00	1127.00
	0.033	6600.00	1254.64	0.00	5.32	34.00	870.00	1127.00	875.00	1127.00	875.00	1127.00
	0.040	2000.00	1251.89	0.00	2.82	39.00	878.00	1122.00	0.00	0.00	885.82	1122.00
	0.040	4600.00	1253.81	0.00	4.20	39.00	878.00	1122.00	0.00	0.00	878.00	1122.00
	0.040	6600.00	1254.73	0.00	5.15	39.00	878.00	1122.00	0.00	0.00	878.00	1122.00
	0.051	2000.00	1251.93	0.00	2.83	52.00	896.00	1106.00	0.00	0.00	900.32	1106.00
	0.051	4600.00	1253.86	0.00	4.34	52.00	896.00	1106.00	0.00	0.00	896.00	1106.00
	0.051	6600.00	1254.79	0.00	5.37	52.00	896.00	1106.00	0.00	0.00	896.00	1106.00
	0.059	2000.00	1251.96	0.00	2.91	50.00	893.00	1094.00	782.00	1082.00	887.19	1082.00
	0.059	4600.00	1253.96	0.00	4.17	50.00	893.00	1094.00	782.00	1082.00	782.00	1082.00
	0.059	6600.00	1254.98	0.00	4.85	50.00	893.00	1094.00	782.00	1082.00	782.00	1082.00
	0.067	2000.00	1251.49	1251.34	8.18	40.00	970.00	1023.00	745.00	1075.00	897.98	1074.83
	0.067	4600.00	1253.81	0.00	7.40	40.00	970.00	1023.00	745.00	1075.00	745.00	1075.00
	0.067	6600.00	1254.89	0.00	7.72	40.00	970.00	1023.00	745.00	1075.00	745.00	1075.00

SECNO	Q	CWSEL	CRIWS	WCE	ELCE	STCHL	STCHR	STENCL	STENCR	SSTA	ENDST
0.107	2000.00	1252.59	0.00	3.18	210.00	985.00	1055.00	645.00	1110.00	645.00	1080.07
0.107	4600.00	1254.42	0.00	4.29	210.00	985.00	1055.00	645.00	1110.00	645.00	1110.00
0.107	6600.00	1255.47	0.00	4.80	210.00	985.00	1055.00	645.00	1110.00	645.00	1110.00
0.140	2000.00	1252.71	0.00	3.92	172.00	983.00	1012.00	690.00	1150.00	690.00	1126.52
0.140	4600.00	1254.58	0.00	4.61	172.00	983.00	1012.00	690.00	1150.00	690.00	1150.00
0.140	6600.00	1255.63	0.00	5.03	172.00	983.00	1012.00	690.00	1150.00	690.00	1150.00

ECHO CANYON WASH (CUDIA

SUMMARY PRINTOUT

	SECNO	QLOB	QCE	QROB	VLOB	VCE	VROB	TELMX	CWSEL	DIFWSX	TOPWID	ELMIN	ALPHA
*	0.013	0.00	2000.00	0.00	0.00	8.15	0.00	1252.00	1250.63	0.00	118.99	1248.00	1.00
*	0.013	0.00	4363.84	236.16	0.00	9.16	2.82	1252.00	1252.43	0.00	255.71	1248.00	1.19
*	0.013	0.00	5868.26	731.74	0.00	10.24	4.26	1252.00	1253.15	0.00	256.00	1248.00	1.21
	0.017	0.00	2000.00	0.00	0.00	3.83	0.00	1256.00	1251.60	0.97	189.09	1248.00	1.00
	0.017	0.00	4600.00	0.00	0.00	5.31	0.00	1256.00	1253.40	0.97	191.50	1248.00	1.00
	0.017	0.00	6600.00	0.00	0.00	6.55	0.00	1256.00	1254.14	0.99	191.50	1248.00	1.00
	0.027	0.00	2000.00	0.00	0.00	3.42	0.00	1256.00	1251.75	0.15	184.24	1247.70	1.00
	0.027	0.00	4600.00	0.00	0.00	4.97	0.00	1256.00	1253.58	0.19	186.00	1247.70	1.00
	0.027	0.00	6600.00	0.00	0.00	6.12	0.00	1256.00	1254.40	0.26	186.00	1247.70	1.00

0.027	0.00	2000.00	0.00	0.00	3.42	0.00	1256.00	1251.75	0.15	184.24	1247.70	1.0
0.027	0.00	4600.00	0.00	0.00	4.97	0.00	1256.00	1253.58	0.19	186.00	1247.70	1.0
0.027	0.00	6600.00	0.00	0.00	6.12	0.00	1256.00	1254.40	0.26	186.00	1247.70	1.0
0.033	0.00	2000.00	0.00	0.00	2.95	0.00	1256.00	1251.84	0.09	198.72	1247.60	1.0
0.033	0.00	4600.00	0.00	0.00	4.34	0.00	1256.00	1253.74	0.16	201.00	1247.60	1.0
0.033	0.00	6600.00	0.00	0.00	5.32	0.00	1256.00	1254.64	0.23	201.00	1247.60	1.0
0.040	0.00	2000.00	0.00	0.00	2.82	0.00	1252.00	1251.89	0.05	194.18	1247.50	1.0
0.040	0.00	4600.00	0.00	0.00	4.20	0.00	1252.00	1253.81	0.07	202.00	1247.50	1.0
0.040	0.00	6600.00	0.00	0.00	5.15	0.00	1252.00	1254.73	0.10	202.00	1247.50	1.0
0.051	0.00	2000.00	0.00	0.00	2.83	0.00	1252.00	1251.93	0.04	179.18	1247.20	1.0
0.051	0.00	4600.00	0.00	0.00	4.34	0.00	1252.00	1253.86	0.05	183.50	1247.20	1.0
0.051	0.00	6600.00	0.00	0.00	5.37	0.00	1252.00	1254.79	0.06	183.50	1247.20	1.0
0.059	1.91	1998.09	0.00	0.68	2.91	0.00	1253.00	1251.96	0.03	175.81	1247.00	1.0
0.059	327.66	4272.34	0.00	1.80	4.17	0.00	1253.00	1253.96	0.09	281.00	1247.00	1.1
0.059	783.59	5816.41	0.00	2.65	4.85	0.00	1253.00	1254.98	0.19	281.00	1247.00	1.1
0.067	171.48	1663.17	165.35	2.59	8.18	3.54	1293.50	1251.49	-0.47	176.85	1247.00	1.4
0.067	1425.01	2415.50	759.49	2.90	7.40	4.53	1293.50	1253.81	-0.14	330.00	1247.00	1.6
0.067	2510.15	2959.42	1130.43	3.42	7.72	5.06	1293.50	1254.89	-0.09	330.00	1247.00	1.4
0.107	730.20	1176.15	93.65	1.56	3.18	1.54	1253.60	1252.59	1.10	375.32	1247.00	1.4
0.107	2185.65	2138.25	476.11	2.08	4.29	1.95	1253.60	1254.42	0.61	465.00	1247.00	1.4
0.107	3405.75	2745.83	448.42	2.42	4.80	2.26	1253.60	1255.47	0.58	465.00	1247.00	1.4
0.140	856.67	498.14	645.19	2.10	3.92	2.09	1253.50	1252.71	0.12	387.01	1248.00	1.2
0.140	2293.53	835.60	1470.87	2.42	4.61	2.66	1253.50	1254.58	0.16	460.00	1248.00	1.2
0.140	3449.89	1065.58	2084.53	2.75	5.03	2.98	1253.50	1255.63	0.17	460.00	1248.00	1.1

ECHO CANYON WASH (CUDIA

SUMMARY PRINTOUT

	SECNO	XLCH	K*CHSL	EG	HV	HL	OLOSS	10K*S	VOL	DEPTH	K*XNL	K*XNCH	K*XN
*	0.013	0.00	0.00	1251.66	1.03	0.00	0.00	103.60	0.00	2.63	0.00	30.00	0.0
*	0.013	0.00	0.00	1253.67	1.24	0.00	0.00	63.08	0.00	4.43	0.00	30.00	35.0
*	0.013	0.00	0.00	1254.63	1.48	0.00	0.00	62.28	0.00	5.15	0.00	30.00	35.0
	0.017	21.00	0.00	1251.83	0.23	0.09	0.08	22.68	0.19	3.60	0.00	30.00	0.0
	0.017	21.00	0.00	1253.83	0.44	0.08	0.08	27.30	0.35	5.40	0.00	30.00	0.0
	0.017	21.00	0.00	1254.81	0.67	0.10	0.08	36.32	0.43	6.14	0.00	30.00	0.0
	0.027	51.00	-5.88	1251.93	0.18	0.10	0.00	15.66	0.83	4.05	0.00	30.00	0.0
	0.027	51.00	-5.88	1253.97	0.38	0.12	0.01	21.99	1.40	5.88	0.00	30.00	0.0
	0.027	51.00	-5.88	1254.98	0.58	0.17	0.01	29.46	1.65	6.70	0.00	30.00	0.0
	0.033	34.00	-2.94	1251.98	0.14	0.04	0.00	9.85	1.33	4.24	0.00	30.00	0.0
	0.033	34.00	-2.94	1254.03	0.29	0.06	0.01	14.01	2.17	6.14	0.00	30.00	0.0
	0.033	34.00	-2.94	1255.08	0.44	0.08	0.01	18.35	2.56	7.04	0.00	30.00	0.0
	0.040	39.00	-2.56	1252.01	0.12	0.04	0.00	8.39	1.95	4.39	0.00	30.00	0.0
	0.040	39.00	-2.56	1254.09	0.27	0.05	0.00	12.71	3.14	6.31	0.00	30.00	0.0
	0.040	39.00	-2.56	1255.15	0.41	0.07	0.00	16.69	3.69	7.23	0.00	30.00	0.0
	0.051	52.00	-5.77	1252.05	0.12	0.04	0.00	7.34	2.79	4.73	0.00	30.00	0.0
	0.051	52.00	-5.77	1254.16	0.29	0.06	0.01	11.83	4.42	6.66	0.00	30.00	0.0
	0.051	52.00	-5.77	1255.24	0.45	0.08	0.01	15.86	5.18	7.59	0.00	30.00	0.0
	0.059	50.00	-4.00	1252.09	0.13	0.04	0.00	6.89	3.59	4.96	35.00	30.00	0.0
	0.059	50.00	-4.00	1254.21	0.25	0.05	0.00	9.26	5.74	6.96	35.00	30.00	0.0

0.051	52.00	-5.77	1255.24	0.45	0.08	0.01	15.86	5.18	7.59	0.00	30.00	0.0
0.059	50.00	-4.00	1252.09	0.13	0.04	0.00	6.89	3.59	4.96	35.00	30.00	0.0
0.059	50.00	-4.00	1254.21	0.25	0.05	0.00	9.26	5.74	6.96	35.00	30.00	0.0
0.059	50.00	-4.00	1255.32	0.34	0.07	0.01	10.73	6.77	7.98	35.00	30.00	0.0
0.067	40.00	0.00	1252.38	0.89	0.06	0.23	55.57	4.05	4.49	45.00	33.00	35.0
0.067	40.00	0.00	1254.35	0.54	0.06	0.09	24.18	6.74	6.81	45.00	33.00	35.0
0.067	40.00	0.00	1255.44	0.55	0.06	0.07	21.24	8.07	7.89	45.00	33.00	35.0
0.107	210.00	0.00	1252.70	0.11	0.24	0.08	5.42	6.41	5.59	45.00	33.00	45.0
0.107	210.00	0.00	1254.59	0.17	0.20	0.04	6.62	11.53	7.42	45.00	33.00	45.0
0.107	210.00	0.00	1255.67	0.20	0.19	0.04	6.93	14.24	8.47	45.00	33.00	45.0
0.140	172.00	5.81	1252.82	0.11	0.12	0.00	10.62	9.70	4.71	45.00	33.00	45.0
0.140	172.00	5.81	1254.72	0.14	0.13	0.00	9.13	17.90	6.58	45.00	33.00	45.0
0.140	172.00	5.81	1255.80	0.17	0.13	0.00	8.86	22.42	7.63	45.00	33.00	45.0

SUMMARY OF ERRORS AND SPECIAL NOTES

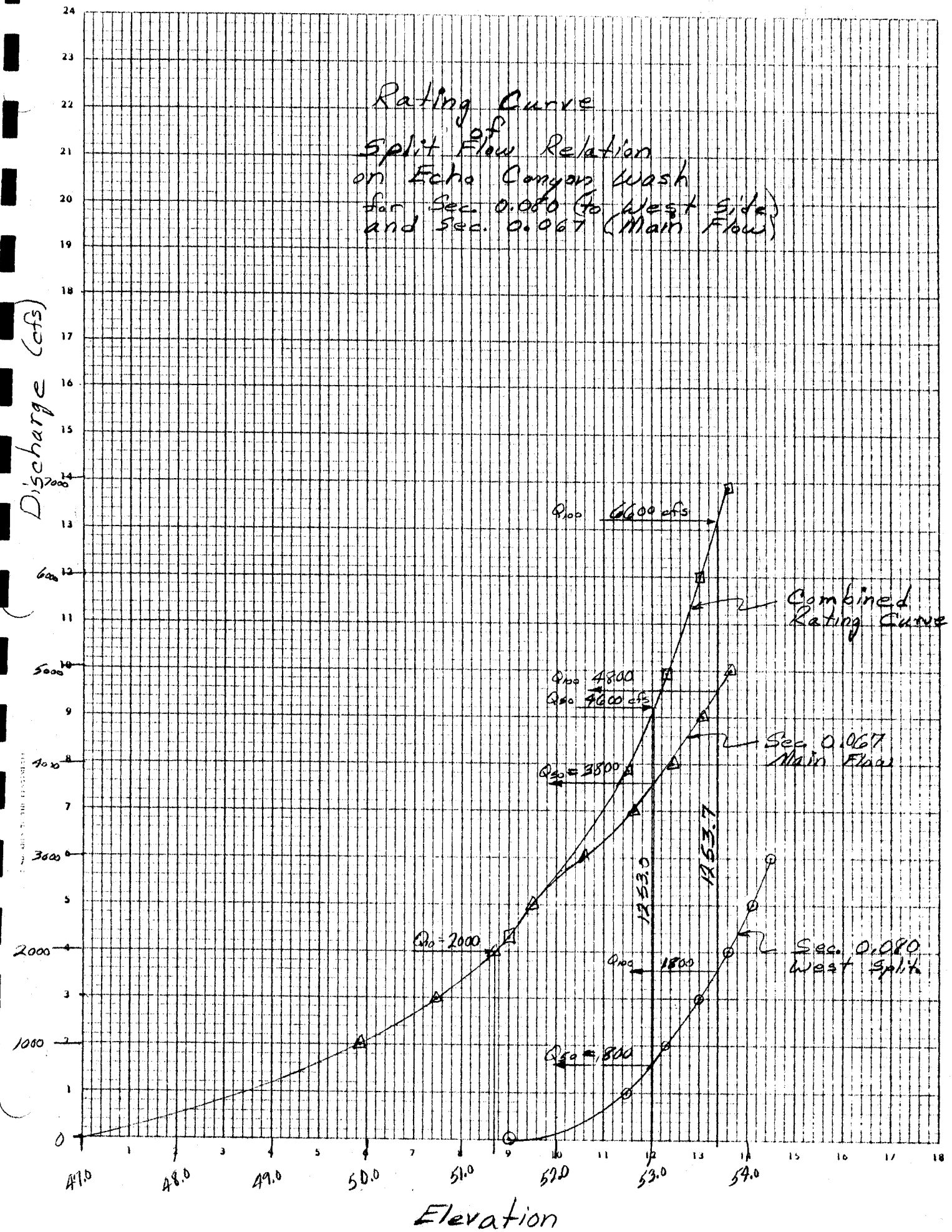
```
CAUTION SECNO=    0.013  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    0.013  PROFILE= 2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    0.013  PROFILE= 3  CRITICAL DEPTH ASSUMED
```


THIS RUN EXECUTED 30-Nov-84 15:22

```
*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MAY  1984
  ERROR CODE -  01,02,03,04,05,06
  MODIFICATION -  50,51,52,53,54,55
*****************************************************
```

APPENDIX B

1. RATING CURVES FOR ECHO CANYON WASH, ARIZONA CANAL, AND SPILLWAY NO. 2


Rating Curve
Split Flow Relation
on Echo Canyon Wash
for Sec. 0.080 (To West Side)
and Sec. 0.067 (Main Flow)
Discharge (cfs)
Elevation
Q100 6600 cfs
Combined Rating Curve
Q100 4800
Q50 4600 cfs
Sec. 0.067 Main Flow
Q50 = 3800
1253.7
1253.0
Q10 = 2000
Q100 1800
Sec. 0.080 West Split
Q50 = 1800
47.0
48.0
49.0
50.0
51.0
52.0
53.0
54.0
0
1000
2000
3000
4000
5000
6000
7000

Anderson-Nichols & Company, Inc.

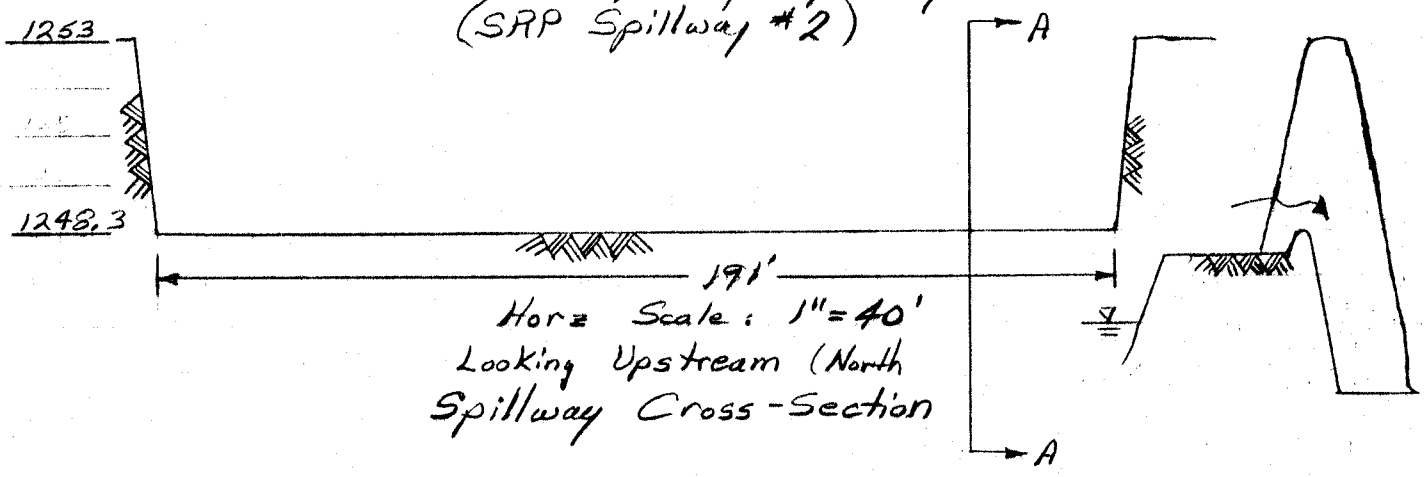
Subject 5080 N. 40TH Street
A-N # 4416-01

Sheet No. ____ of ____
Date 4/2/84
Computed GAS
Checked ____
Revised 10/10/84

JOB NO.

SQUARES 1/4 IN. SCALE

Arizona Canal near Echo Canyon Wash
Overflow Spillway Capacity Data
(SRP Spillway #2)



Horz Scale: 1" = 40'
Looking Upstream (North
Spillway Cross-Section

Section A-A

Use Weir Equation; $Q = CLH^{3/2}$
Let C = 3.3 based on Table 5-13, p. 5-44, Brater and King Handbook and associated article

Elevation	depth-H (ft)	$Q = CLH^{3/2}$
1248.3	0.0	0
1249.0	0.7	369
1249.5	1.2	829
1250.0	1.7	1397
1250.5	2.2	2057
1251.0	2.7	2796
1251.5	3.2	3608
1252.0	3.7	4485
1252.5	4.2	5425
1253.0	4.7	6422

Anderson-Nichols & Company, Inc.

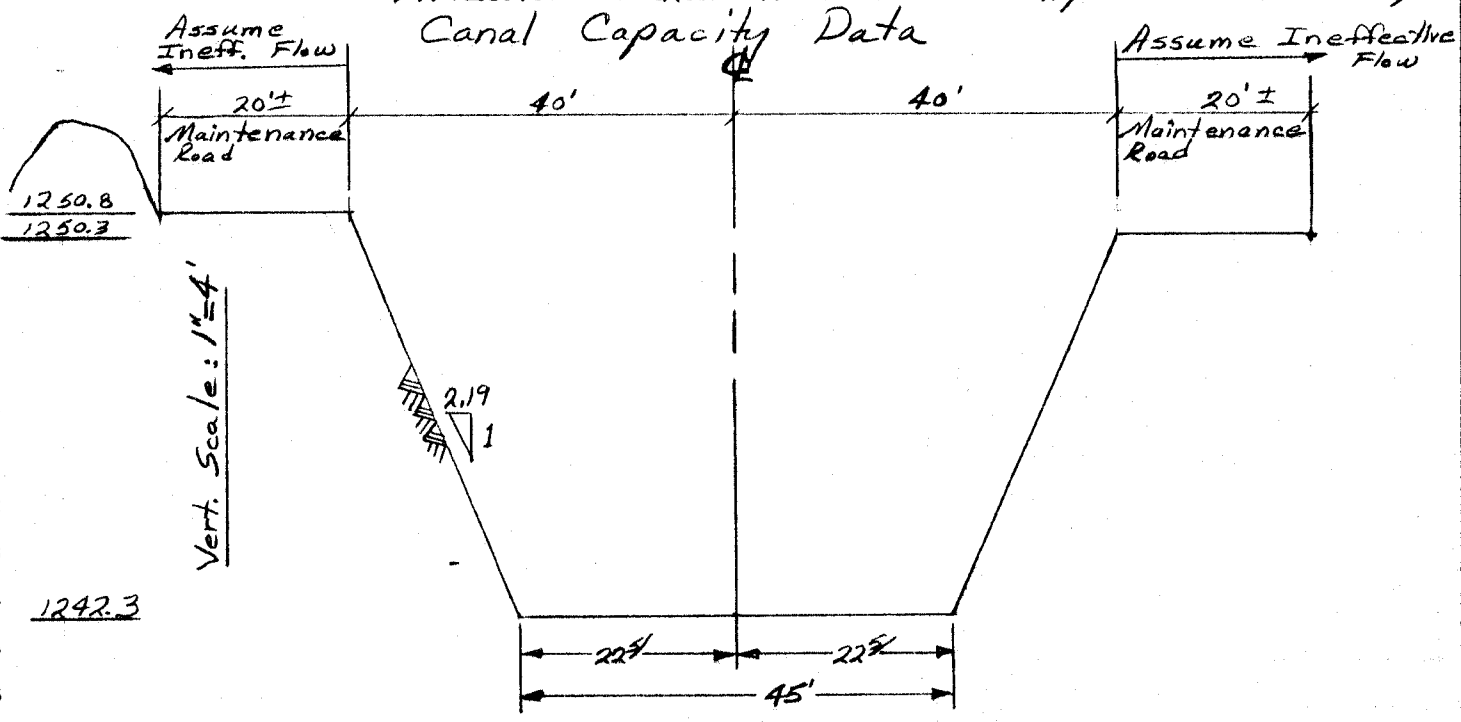
Subject 5080 N 40TH Street
A-N #4416-01

Sheet No. ____ of ____
Date 4/2/84
Computed GAS
Checked ____
Revised 10/10/84

JOB NO.

SQUARES 1/4 IN. SCALE

Arizona Canal near Echo Canyon Wash (40TH St.)
Canal Capacity Data



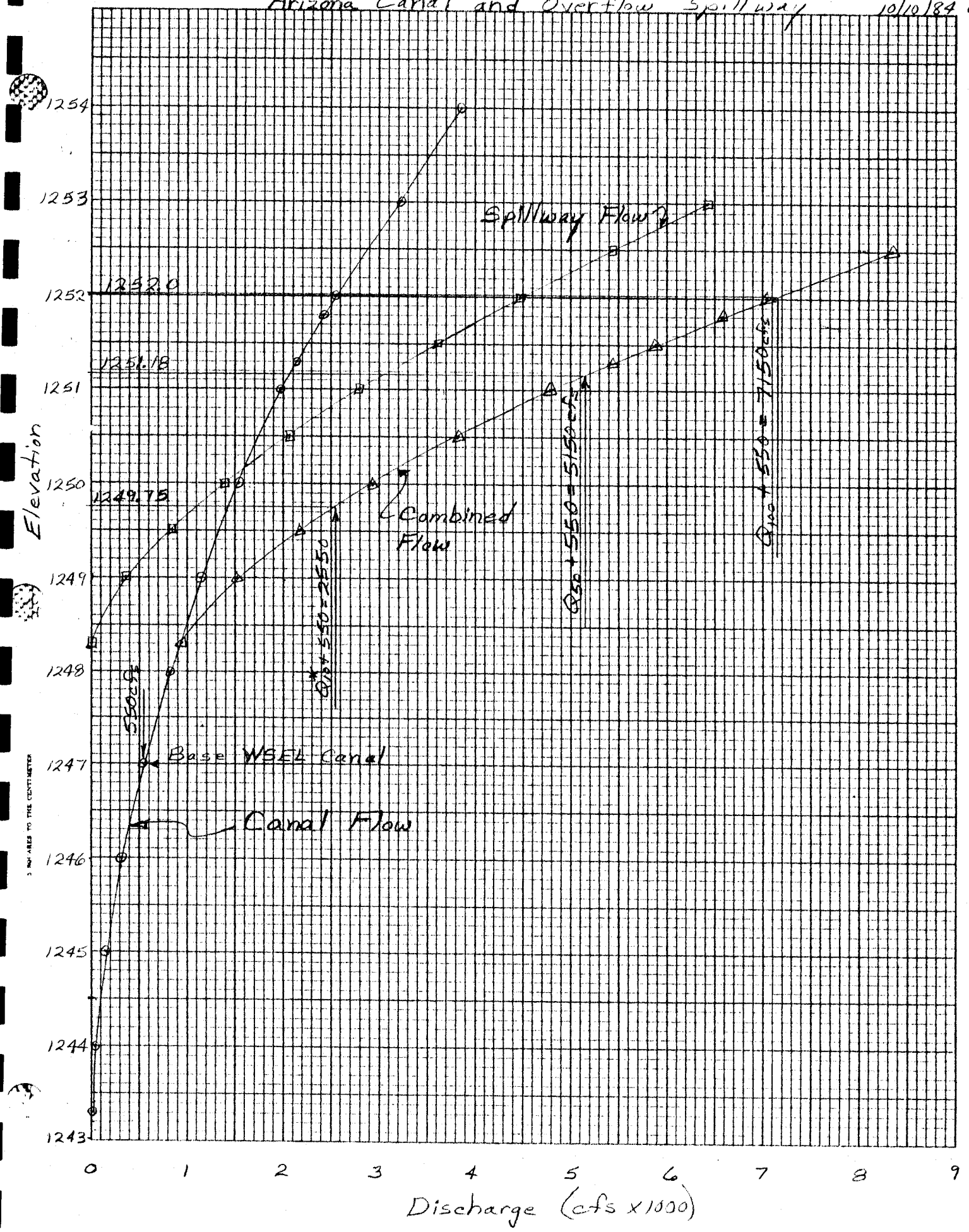
Horz. Scale: 1"=20'
Looking Downstream
Typical Canal Cross-Section

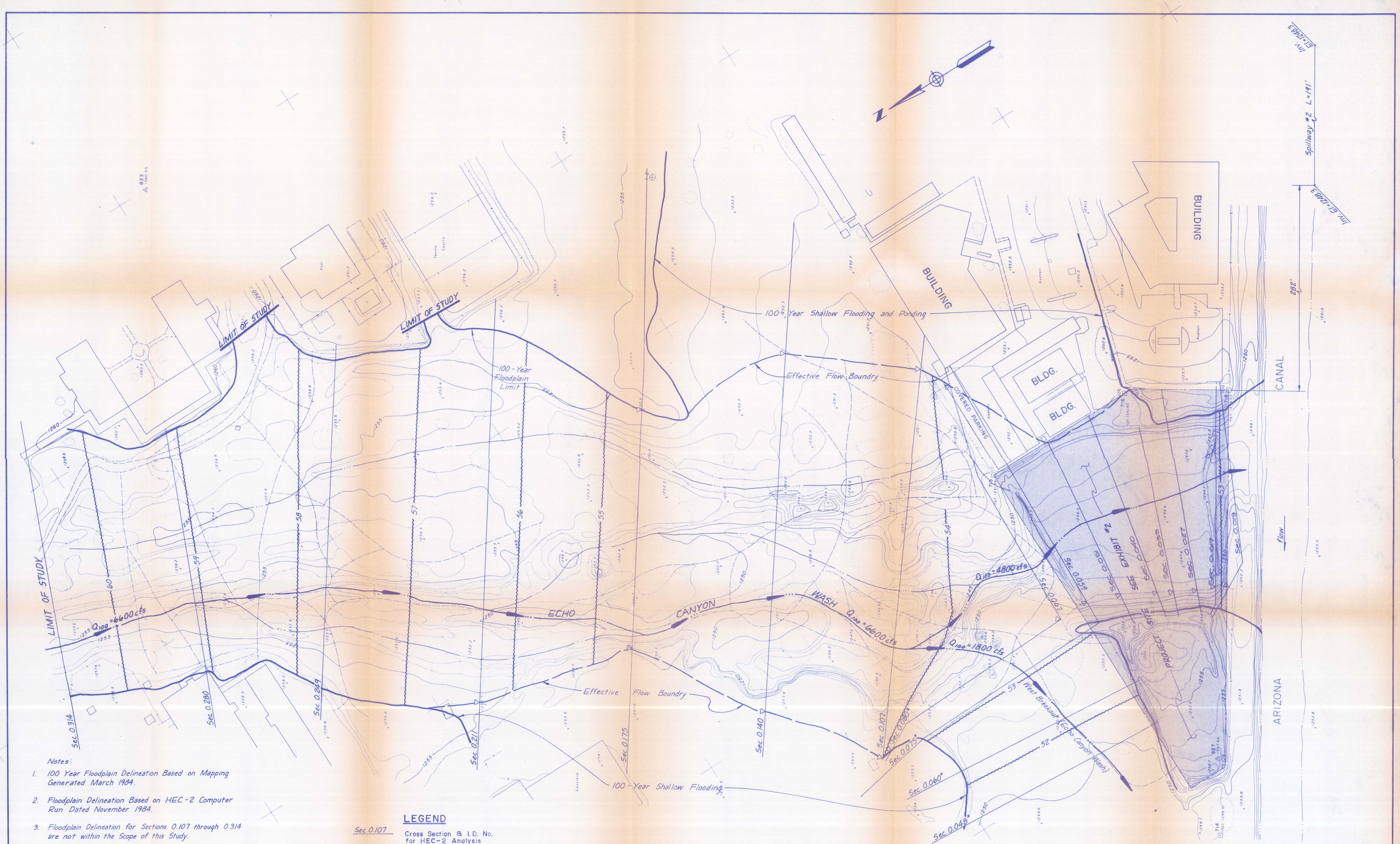
Average slope between 32ND St. & 40TH St. = 0.0004 '/FT.
Manning's 'n' value used for unlined canal = 0.024

Elev.	d (Normal) (feet)	b (feet)	'n'	S '/FT.	A feet²	P feet	Q (cfs)	V (fps)
1243.3	0.0	45	0.024	0.0004	0.0	0.0	0.0	0.0
1244.0	0.7				32.6	48.1	31.2	1.0
1245.0	1.7				82.8	52.4	140.0	1.7
1246.0	2.7				137.4	56.8	308.3	2.2
1247.0	3.7				196.5	61.2	533.1	2.7
1248.0	4.7				259.9	65.6	811.7	3.1
1249.0	5.7				327.7	70.0	1144.6	3.5
1250.0	6.7				399.8	74.3	1532.9	3.8
1251.0	7.7				476.3	78.7	1976.0	4.1
1251.3	8.0				500.2	80.0	2120.7	4.2
1251.8	8.5				540.2	80.0	2411.6	4.5
1252.0	8.7				556.2	80.0	2532.0	4.6
1253.0	9.7				636.2	80.0	3215.4	5.1
1254.0	10.7				716.2	80.0	3862.3	5.4

RATING CURVE

Arizona Canal and Overflow Spillway 10/10/84 GAS





Notes:

1. 100 Year Floodplain Delineation Based on Mapping Generated March 1984.
2. Floodplain Delineation Based on HEC-2 Computer Run Dated November 1984.
3. Floodplain Delineation for Sections 0.107 through 0.314 are not within the Scope of this Study.
4. * Indicates Cross-Sections for West Breakout of Echo Canyon Wash.
5. Mapping Source; Aerial Mapping Co., Mapping Datumn; City of Phoenix, Benchmark - Brass Cap in H.H., El = 1247.93 @ 40th Street and Camelback.

LEGEND

Sec. 0.107	Cross Section & I.D. No. for HEC-2 Analysis
▽	Effective Flow Boundary for HEC-2 Analysis
⟵	Flowline & Flow Direction
~54~	100 Year Highwater Elevation

EXHIBIT I

DRAINAGE REPORT - 5080 N. 40TH STREET
PRE-DEVELOPMENT 100 YEAR FLOODPLAIN

DESIGN B.A.S.	SCALE	JOB NO.	DATE	SHEET
DRAWN P.S.C.	HORZ 1" = 50'	4416-01	NOV. 84	1 OF 1
CHECK D.E.W.	VERT —			

Anderson-Nichols & Co., Inc.
CONSULTING ENGINEERS
PHOENIX, ARIZONA

LEGEND

Sec. 0.027	– Cross-Section for HEC-2 Analysis
●	– Proposed Structure Support Column Locations
▭	– Areas Blocked Out from Cross-Sections in HEC-2 Analysis
▽	Effective Flow Boundary for HEC-2 Analysis
—···—	Flowline and Direction
— 1252 —	Proposed Contour Elevation
WSE=53.50	Post-Development 100 Year Water Surface Elevations

Notes:

1. *Mapping Source; Aerial Mapping Co.*
2. *Mapping Datumn; City of Phoenix, Benchmark-Brass Cap in H.H., El. = 1247.93 @ 40th Street and Camelback*

EXHIBIT 2

DRAINAGE REPORT - 5080 N. 40TH STREET

POST-DEVELOPMENT 100 YEAR FLOODPLAIN

DESIGN G.A.S.	SCALE	JOB NO.	DATE	SHEET
DRAWN P.S.C.	HORZ 1" = 20'	4416-01	NOV. 84	1 OF 1
CHECK D.E.W.	VERT ——			

LFE CORPORATION

Anderson-Nichols & Co., Inc.

CONSULTING ENGINEERS

PHOENIX, ARIZONA