Echo Canyon Wash

Letter of Map Revision

Technical Data Notebook

December 2003

Prepared For:

City of Phoenix

Prepared By:

AZTEC
www.aztec.us

3747 East Grove Street
Phoenix, AZ 85040
602-454-0402

City of Phoenix
STREET TRANSPORTATION DEPARTMENT

FLOOD CONTROL DISTRICT
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September 16, 2004

Andrea L. Ryon, P.E.
Michael Baker Jr., Inc.
3601 Eisenhower Avenue
Suite 600
Alexandria, VA 22304

IN REPLY TO:
Case No.: 04-09-0509P
Community: City of Phoenix and Town of Paradise Valley, AZ
Community No.: 040051 and 040049
316AD

ATTN: LOMR DEPOT

RE: LETTER OF MAP REVISION FOR ECHO CANYON WASH
CASE NO. 04-09-0509P
PANEL 04013C1690F, JULY 19, 2001

Dear Ms. Ryon:

This is a response to you request, dated March 22, 2004, for additional data to complete the review of the above-mentioned request to issue a letter of Map Revision (LOMR) for Echo Canyon Wash.

Item 1:

Digital data for mapping previously prepared for the ACDC Area Drainage Master Plan was obtained from the Flood Control District of Maricopa County. This data was used to include additional reach upstream of the study area, which is in the Town of Paradise Valley. Effective hydraulic model in this reach was not available from the Flood Control District of Maricopa County or the FEMA library.

Using the new mapping, cross sections were cut digitally in the upper reach at the same locations as the effective study and a hydraulic analysis was prepared using HEC-2 to replicate the effective floodplain upstream of the study area. The upper reach was then tied into the effective study at Section 1.40. With minor adjustments, the effective profile in the Paradise Valley reach was duplicated and is shown in the attached revised Table 2 of the report. Figure 6A was added to show the effective and revised Floodplain Delineation for the upper reach and the tie-in at Section 1.40. The revised HEC-2 model input/output files for the hydraulic analysis are included ini appendix F along with a CDROM.

City of Phoenix
STREET TRANSPORTATION DEPARTMENT

The downstream cross sections were realigned to replicate the effective study. The hydraulic analysis for determining the effective floodplain downstream of the project had already been incorporated into the analysis submitted with the exception of incorporating the position of the downstream sections (Sections 0.352, 0.356 and 0.37).

The downstream tie-in is shown in the revised exhibits 5 and 6, which also incorporates all other changes made in incorporating the revised hydraulic analysis.

Item 2:

The MT-2 Overview and Concurrence form for the Town of Paradise Valley is included with this submittal.

Item 3:

Notarized copies of the Public Notices by both the City of Phoenix and Town of Paradise Valley are included with this submittal.

Additional Information:

Table 4, Echo Wash – List of Structures in Floodplain Prior to Study has been revised. The revised Table 4 was faxed to Aditya Saini on September 15, 2004 by Larry Sibala, AZTEC Engineering Co., phone number 602-454-0402, fax number 602-454-0403. If you have any other questions, please contact this office at 602-262-4960.

Sincerely,

Hasan Mushtaq Ph.D., P. E., CFM
Floodplain Manager

Enclosures

Cc: Mr. Larry Sabala, P.E.
Mr. Williams Mead
Mr. Brian Cosson
Mr. Tim Murphy, P.E., CFM

200 West Washington Street, Fifth Floor, Phoenix, Arizona 85003 1611 602-262-6284 FAX: 602-495-2016
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TABLE 2
WATER SURFACE ELEVATION COMPARISON

SECTION NO. (River Mile from AC/DC Channel)	REGULATORY WSEL (ft)	DUPLICATE EFFECTIVE MODEL WSEL (ft)	ELEVATION DIFFERENCE (ft)	REVISED MODEL WSEL (ft)	ELEVATION DIFFERENCE (ft)
0.000	1246.90	1246.90	0.00	1246.90	0.00
0.003	1247.78	1247.78	0.00	1247.77	-0.01
0.026	1247.81	1247.81	0.00	1247.81	0.00
0.049	1247.85	1247.85	0.00	1247.84	-0.01
0.081	1247.87	1247.87	0.00	1247.87	0.00
0.117	1247.89	1247.89	0.00	1247.89	0.00
0.139	1247.89	1247.89	0.00	1247.89	0.00
0.172	1247.87	1247.87	0.00	1247.87	0.00
0.178	1249.07	1249.07	0.00	1249.07	0.00
0.188	1250.89	1250.89	0.00	1251.01	0.12
0.190	1252.17	1252.17	0.00	1252.24	0.07
0.206	1252.72	1252.72	0.00	1252.75	0.03
0.238	1252.75	1252.75	0.00	1252.81	0.06
0.240	1254.00	1254.00	0.00	1254.00	0.00
0.246	1254.67	1254.67	0.00	1254.63	-0.04
0.248	1256.09	1256.09	0.00	1256.07	-0.02
0.268	1256.23	1256.23	0.00	1256.22	-0.01
0.289	1256.28	1256.28	0.00	1256.27	-0.01
0.291	1256.50	1256.50	0.00	1256.49	-0.01
0.307	1256.20	1256.20	0.00	1256.39	0.19
0.320	1256.37	1256.37	0.00	1256.54	0.17
0.322	1257.40	1257.40	0.00	1257.43	0.03
0.336	1257.52	1257.52	0.00	1257.52	0.00
0.344	1257.49	1257.49	0.00	1257.55	0.06
0.352	1260.79	1260.79	0.00	1260.79	0.00
0.356	1261.81	1261.81	0.00	1262.10	0.29
0.361	1262.37	1262.37	0.00	1262.30	-0.07
0.370	1262.71	1262.71	0.00	1262.41	-0.30
0.373	1263.45	1263.45	0.00		
0.450				1266.51	
0.460	1265.61	1265.53	-0.08		
0.490				1269.20	
0.510	1271.09	1270.44	-0.65		
0.560	1270.40				
0.580				1272.93	
0.610				1275.09	
0.650				1277.46	
0.710	1278.72	1278.72	0.00	1278.85	0.13

WSEL = water surface elevation

TABLE 2
WATER SURFACE ELEVATION COMPARISON

SECTION NO. (River Mile from AC/DC Channel)	REGULATORY WSEL (ft)	DUPLICATE EFFECTIVE MODEL WSEL (ft)	ELEVATION DIFFERENCE (ft)	REVISED MODEL WSEL (ft)	ELEVATION DIFFERENCE (ft)
0.740	1278.70				
0.750				1282.55	
0.790				1284.30	
0.830				1284.98	
0.860				1286.02	
0.900				1287.22	
0.960				1291.02	
1.000				1292.93	
1.004				1293.08	
1.030				1293.33	
1.040	1293.10				
1.060				1294.49	
1.110				1298.35	
1.160				1299.94	
1.190	1298.00				
1.210				1301.65	
1.240				1302.43	
1.290				1304.19	
1.380				1307.49	
1.400				1308..79	
1.410	1308.00			1307.96	-0.04
1.430	1309.10			1309.26	0.16
1.490	1310.20			1310.25	0.05
1.540	1311.80			1311.79	-0.01
1.600	1314.60			1314.59	-0.01
1.710	1318.00			1317.98	-0.02
1.860	1323.10			1323.05	-0.05
2.020	1328.90			1328.88	-0.02

WSEL = water surface elevation

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BOSS RMS for AutoCAD (tm)
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Version : 2000

PROGRAM ORIGIN :

BOSS RMS for AutoCAD HEC-2 Analysis uses the standard 4.6.2 version of the U.S. Army Corps of Engineers Hydrologic Engineering Center HEC-2 Program for water-surface profile computations. This HEC-2 program was released on September 1990, last updated on August 1991.

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PROJECT DESCRIPTION :

PROJECT TITLE : ECHO CANYON LOMR
PROJECT NUMBER : AZ02079
DESCRIPTION : REVISED MODEL
ENGINEER : LARRY SIBALA, P.E.
DATE OF RUN : 9/13/2004
TIME OF RUN : 10:11 pm

```
T1      AZ02079
T2      ECHO CANYON LOMR
T3      REVISED MODEL
T4      COMBINATION MODEL TO INCLUDE PREVIOUS STUDY DOWNSTREAM TO MAKE ONE
T4      CONTINUOUS RUN UPSTREAM TO INCLUDE PARADISE VALLEY
```

JOB PARAMETERS :

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		2						6600	1246.9	
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	-1		-1				-1	-6		

USER-DEFINED SUMMARY TABLES (J3) :

150 110 200

REQUESTED CROSS-SECTION PRINTOUTS (J5) :

-10 -10

FRICTION LOSS EQUATION OPTION (J6) :

J6	IHLEQ	ICOPY	SUBDIV	STRTDS	RMILE
	1		0		

```
NC    0.035     0.035     0.035       0.1       0.3
X1        0         5         0       264
GR     1250         0      1243        19    1242.9       119      1243       222    1249.1       264

X1    0.003         6         0       282        20        24        18
GR   1250.2         0    1237.5        22    1236.6       119    1237.3       224    1237.2       244
GR     1249       282

NC     0.03      0.03      0.03       0.1       0.3
X1    0.026         5         0       364       177        68       118
GR     1255         0    1236.6        81      1237       210    1237.2       315    1252.1       364
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X1    0.049        6        0      429      130      150      125
GR   1252.5        0     1236       67     1237       80   1237.1      209     1237      340
GR   1253.1      429

X1    0.081        7        0      459      184      150      167
GR     1250        0   1236.1       62     1237       80   1237.2      148   1237.1      256
GR   1237.1      388   1253.3      459

X1    0.117        6        0      525      248      140      191
GR     1252        0   1236.1       66   1237.3       91   1237.1      271   1237.4      455
GR     1253      525

X1    0.139        6        0      522      234       13      115
GR   1252.5        0   1236.4      105   1237.9      140   1237.5      435   1237.7      448
GR   1253.1      522

NH        3    0.035       52     0.03      278    0.035      343
X1    0.172        7        0      343      263       60      174
GR   1253.3        0     1237       52   1236.7       71   1237.3       80   1237.4      186
GR   1237.3      278   1253.6      343

NH        3    0.035       47    0.016       62    0.035      322
X1    0.178        7        0       92       33      245       30
GR   1253.3        0   1237.8       47   1237.8       62   1247.3       92   1247.9      201
GR   1248.9      302   1253.9      322

NC                                 0.3      0.5
NH        5    0.035       48    0.016       61    0.035       87     0.03      303    0.025
NH      335
X1    0.188        7        0       87       51       55       54
X3       10                                                        1253.3   1250.9
GR   1253.3        0   1246.6       20   1239.1       48   1239.1       61   1250.9       87
GR   1248.6      303   1254.3      335

NH        5    0.035      147    0.016      160    0.035      185     0.03      400    0.035
NH      432
SB     1.25     1.56      2.6        0       13      0.1      360        3   1239.2   1239.1
X1     0.19       10      100      185       10       10       10
X2                          1   1248.1   1251.4
X3       10                                                        1253.2   1251.4
BT      -10       43     1255     1255       63     1254     1254       90   1253.5   1253.5
BT                100   1253.2   1253.2      120   1251.4   1248.1      147   1251.4   1248.1
BT                180   1251.4   1248.1      185   1251.4   1251.4      400   1248.6   1248.6
BT                432   1254.3   1254.3
GR     1255       43     1254       63   1253.5       90   1253.2      100   1249.2      117
GR   1239.2      147   1239.2      160   1251.4      185   1248.6      400   1254.3      432

NC                                 0.1      0.3
NH        6    0.035      136    0.016      150    0.035      171     0.03      383    0.035
NH      398     0.03      445
X1    0.206       11      100      171       87       87       87
GR     1256       41     1255       66     1254       80   1252.6      100   1241.3      136
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GR   1241.5      150    1248.1      171    1248.4      272    1249.1      383    1255.1      398
GR   1255.4      445

NH       5    0.035        47    0.016       60    0.035       78     0.03      220    0.035
NH     267
X1   0.238        7         0       78      173      168      168
GR   1255.2        0    1243.1       47   1243.5       60   1248.8       78   1248.4      160
GR   1249.2      220      1257      267

NH       5    0.035        48    0.016       62    0.035       86     0.03      248    0.035
NH     264
X1    0.24        7         0       86       10       12       11
GR    1257        0    1243.2       48   1243.3       62   1251.9       86   1252.6      172
GR   1252.7      248    1257.4      264

NC                                 0.3      0.5
NH       5    0.035        54    0.016       68    0.035       93     0.03      247    0.035
NH     276
X1   0.246        8         0       93       34       33       32
X3      10                                                        1252.1   1252.1
GR   1257.8        0   1254.66       26   1243.62       54   1243.6       68   1253.6       93
GR   1252.1      173    1252.6      247   1257.69      276

NH       6    0.035      253    0.016      267    0.035      293     0.03      445    0.035
NH     471     0.03      540
SB    1.25     1.56      2.6        0       14      0.1      329      2.5   1243.6   1243.6
X1   0.248       13      200      293       11       12       11
X2                         1   1252.1   1255.4
X3      10                                                        1252.1   1252.1
BT     -13       70     1260     1260       79     1259     1259      185   1258.9   1258.9
BT              200   1257.1   1257.1      226   1255.4   1252.1      253   1255.4   1252.1
BT              267   1255.4   1252.1      287   1255.4   1252.1      293   1255.4   1255.4
BT              320     1252     1252      445   1252.5   1252.5      471   1257.7   1257.7
BT              540     1259     1259
GR     1260       70     1259       79   1258.9      185   1257.1      200   1252.1      226
GR   1243.6      253   1243.66      267   1252.1      290   1255.4      293     1252      320
GR   1252.5      445    1257.7      471     1259      540

NC                                 0.1      0.3
NH       6    0.035        58    0.016       76    0.035       95     0.03      252    0.035
NH     273     0.03      358
X1   0.268        8         0       95      126       95      102
GR   1259.5        0    1245.5       58   1245.6       76   1251.84       95   1252.9      252
GR   1257.9      273      1258      290     1259      358

NC                                 0.3      0.5
NH       5    0.035        37    0.016       60    0.035       73     0.03      214    0.035
NH     242
X1   0.289       16         0       73      125      112      115
BT     -16        0    1260.6   1260.6       20   1261.2   1257.3       37   1261.8   1257.9
BT               60    1262.6   1258.7       73     1263   1259.1       80     1263   1259.1
BT               81      1263   1251.8     82.3     1263   1251.8       83     1263   1259.1
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BT                158      1263    1259.1      159      1263    1251.9     160.3      1263    1251.9
BT                161      1263    1259.1      214    1261.4    1257.5       228      1261    1257.3
BT                242    1260.6    1260.6
GR   1260.6         0    1257.3        20    1247.2        37    1246.9        60    1251.8        73
GR   1251.8        80    1251.8        81    1251.8      82.3    1251.8        83    1251.9       158
GR   1251.9       159    1251.9     160.3    1251.9       161    1252.5       214    1257.3       228
GR   1260.6       242

NH       5     0.035        36     0.016        60     0.035        73      0.03       209     0.035
NH     232
X1   0.291        16         0        73        10        12        10
BT     -16         0    1260.6    1260.6         8   1260.84    1256.9        36    1261.7    1257.8
BT                60    1262.4    1258.5        73    1262.8    1258.9        78   1262.97   1259.07
BT                79   1262.97   1251.85      80.3   1262.97   1251.85        81   1262.97   1259.07
BT               157   1263.01   1259.11       158   1263.01    1251.9    159.33   1263.01    1251.9
BT               160   1263.01   1259.11       209   1261.39    1257.5       224   1260.96    1257.1
BT               232    1260.5    1260.5
GR   1260.6         0    1256.9         8   1247.23        36   1246.95        60    1251.8        73
GR   1251.8        78   1251.85        79   1251.85      80.3   1251.85        81   1251.85       157
GR   1251.9       158    1251.9    159.33    1251.9       160    1252.4       209    1257.1       224
GR   1260.5       232

NC   0.035     0.035      0.03       0.1       0.3
NH       6     0.035      1036     0.016      1057     0.035      1067      0.03      1160     0.035
NH    1203      0.03      1260
X1   0.307         7      1000      1203        79        80        81
GR   1259.9      1000      1248      1036      1248      1057   1252.24      1067   1252.44      1160
GR   1258.9      1203      1259      1260

NH       6     0.035      1034     0.016      1057     0.035      1065      0.03      1143     0.035
NH    1162      0.03      1206
X1    0.32         7      1000      1162        70        40        75
GR   1259.8      1000    1248.7      1034      1249      1057    1252.1      1065      1252      1143
GR    1259      1162    1259.3      1206

NH       2     0.035      1162      0.03      1210
X1   0.322         6      1000      1162        25        30        25
GR   1259.8      1000    1248.9      1033    1249.1      1057    1249.9      1137   1259.04      1162
GR   1259.3      1210

NH       3     0.035      1134      0.03      1233     0.035      1260
X1   0.344         8      1090      1247       100        70       110
GR    1260      1060    1259.5      1090    1258.3      1100   1249.54      1134   1249.87      1233
GR   1259.1      1247      1260      1250      1261      1260

NC                                   0.1       0.3
NH       1     0.035      1495
X1   0.352         6      1200      1339        20        40        40
GR   1260.4      1000   1258.75      1200    1257.4      1222   1256.52      1263   1257.67      1339
GR   1261.4      1495

NC   0.035     0.035     0.035       0.1       0.3
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X1    0.356      17    1508.57   1626.41      20      24      25
GR     1264    1000       1264   1088.28    1262 1142.09    1260   1508.57    1258   1554.97
GR     1256 1602.37       1256   1609.85    1258 1619.18    1260   1626.41    1262   1960.76
GR     1262 2136.35       1264   2509.71    1264 2857.36    1262   2909.62    1262   2921.07
GR     1264 2939.43       1264   3070.52

NC    0.03    0.03      0.035
X1   0.361      22    1435.97   1663.97      20      30      20
X3       0                                        2898.97    1264
GR     1264 1007.01       1264   1076.39    1260.8 1435.97  1258.3   1495.97  1257.82   1509.97
GR   1256.6 1543.97     1256.64   1576.97  1257.75 1610.97  1259.4   1625.97  1261.35   1663.97
GR   1261.1 1707.97     1261.37   1760.97  1261.44 1796.97    1262   1846.69     1264   2438.19
GR     1264 2898.97       1262   2922.47     1262 2930.92    1264   2949.83     1264    3096.6
GR     1264 3117.88       1264   3159.85

NC   0.016   0.016     0.016
  Centerline of Stanford Rd.
Centerline of Stanford Rd.

X1    0.37      16       1226      1327       80      45      30
GR     1268  360.93       1268    363.16     1266  636.74    1264    883.72     1262    971.55
GR   1260.2    1173     1258.8      1226  1257.64    1267 1258.03    1300  1259.07      1327
GR   1261.7    1384    1262.73      1483  1262.83    1517    1264  1865.16     1266   2330.94
GR     1266 2472.04

NC      0.1     0.1      0.04       0.1      0.3
QT        1    5900
X1    0.45      14       2190      2625      170     540     420
GR     1270    1000       1268      1130     1270    1500    1270     1565     1268     1760
GR     1266    1840       1266      2190     1264    2290 1263.53     2425  1265.38     2525
GR   1266.1    2625       1268      2860     1270    2980    1272     3065

NC      0.1     0.1      0.04       0.1      0.3
X1    0.49      26    2869.65   2910.55      230     210     230
X3       0                                       3290    1277
GR     1280    1000       1278    1405.5     1276 1533.99    1274   1556.43     1272   2095.1
GR     1270 2267.36       1268   2633.05  1266.75 2869.65  1261.73   2884.38  1261.73   2901.75
GR   1265.2 2910.55       1268   3223.05   1269.5    3290    1268   3326.54     1268   3373.32
GR     1270 3451.82       1272   3550.23     1274 3665.22    1276   3731.92     1278    3864.7
GR     1280 3912.11       1282   4101.51     1282 4124.95    1280   4151.05     1278   4205.19
GR     1278 4240.12

NC     0.16    0.16      0.05       0.1      0.3
X1     0.58      19       2670      2740      470     520     450
GR     1282    1000       1280      1270     1278    1400    1276     1560     1276     1825
GR     1274    2130       1274      2240     1272    2645    1270     2670  1267.25   2680.5
GR   1262.7  2700.5    1263.25    2715.5  1266.65  2725.5    1268     2730     1270     2740
GR     1272    2900       1274      3020     1274    3490    1274     3515

NC                                    0.1      0.3
X1     0.61      18     2407.3      2470      270     150     180
GR     1284    1000       1282      1150     1280    1670    1278     2015     1276     2280
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```
GR   1273.7   2407.3   1264.85   2417.9   1265.84   2432.1   1271.1   2463.7   1272   2470
GR      1274     2735      1276     2900      1276     3240     1276     3300   1278   3390
GR      1280     3500      1282     3550      1284     3620

NC      0.16     0.16      0.05      0.1       0.3
X1      0.65       25      2320     2460       210      140      200
GR      1286     1000      1284     1045      1284     1300     1284     1485   1282   1610
GR      1280     1640      1278     1885      1276     2270     1274     2320 1271.9 2352.2
GR    1270.5   2369.4   1267.85   2376.5   1267.31     2385  1269.58   2400.2   1270   2410
GR      1272     2425      1274     2460      1276     2640     1278     2950   1278   3230
GR      1280     3390      1280     3450      1280     3550     1282     3570   1284   3600

NC                                  0.1       0.3
X1      0.71       18      2340     2448       350      250      295
GR      1288     1000      1286     1295      1284     1465     1284     1590   1282   1965
GR      1280     2060      1280     2290      1278     2340     1276     2360 1275.28 2375.5
GR    1269.8   2390.5   1270.58   2405.5   1277.49     2448     1278     2520   1280   2785
GR      1280     3105      1282     3190      1284     3420

NC                                  0.1       0.3
X1      0.75       23   2537.37     2595       225      300      230
GR      1288     1000      1288     1305      1286     1410     1286     1515   1284   1570
GR      1284     2085      1282     2110      1280     2400     1278     2460 1278.32 2537.37
GR    1277.9   2545.87   1273.27   2553.45   1272.95   2570.55   1276.76   2577.77   1278   2595
GR      1280     2600      1282     2700      1282     2980     1284     3060   1286   3115
GR      1288     3280      1290     3340      1292     3500

NC                                  0.1       0.3
X1      0.79       34   2970.26   3074.46       190      375      230
GR      1290   1019.41      1288   1389.87      1288  1507.08     1290   1679.62   1290 1715.71
GR      1288   1846.84      1286   2061.65      1286  2107.86     1286   2218.55   1284 2646.3
GR      1282   2761.77      1280   2778.47      1280  2800.63     1280   2970.26   1280 2970.26
GR    1278.3   3015.63    1277.9   3024.13   1273.27   3031.71   1272.95   3048.81 1276.76 3056.03
GR      1280   3062.26      1282   3074.46      1284  3200.69     1284   3260.84   1284 3310.56
GR      1286   3525.03      1288   3590.84      1290  3732.33     1292   3849.77   1294 3861.63
GR      1296   3925.36      1296   4046.79      1300  4158.14     1302   4219.52

NC                                  0.1       0.3
X1      0.83       20      2060   2146.9       135      250      220
GR      1290     1000      1288     1070      1288     1255     1286     1545   1284   1765
GR      1282     2060   1280.01   2074.5   1275.69   2104.7   1274.89     2125 1281.48 2146.9
GR      1282     2155      1284     2185      1284     2290     1284     2395   1286   2440
GR      1288     2620      1290     2670      1292     2820     1294     2900   1296   2975

NC                                  0.1       0.3
X1      0.86       27      2790     2920       105      290      180
GR      1298     1000      1296     1110      1294     1140     1292     1165   1290   1220
GR      1290     1880      1288     1980      1286     2600     1284     2790 1282.03 2802.5
GR    1275.8   2822.5   1275.03   2847.5   1279.51   2867.5     1282     2910   1284   2920
GR      1286     2940      1288     3090      1288     3240     1286     3310   1286   3330
GR      1288     3370      1290     3530      1292     3620     1294     3640   1296   3710
GR      1298     3740      1300     3770
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NC                                  0.1       0.3
X1     0.9       26     2540      2660       330       130       235
GR    1310     1000     1304      1075      1302      1095      1300      1155      1298      1235
GR    1296     1255     1294      1270      1292      1490      1290      2140      1288      2440
GR    1286     2540  1285.15    2552.7   1277.34      2570   1277.26    2581.9   1283.72      2608
GR    1284     2625     1286      2660      1288      2775      1288      3105      1288      3170
GR    1290     3260     1292      3330      1294      3455      1296      3480      1298      3482
GR    1300     3484

NC                                  0.1       0.3
X1    0.96       31   2409.5      2510       330       385       300
X3       0                        1485      1299      2880      1292
GR    1330     1000     1320      1070      1310      1170      1308      1190      1306      1275
GR    1304     1290     1302      1295      1300      1315      1298      1340      1296      1380
GR    1296     1485     1294      1605      1292      1740      1292      1785      1292      2300
GR    1290     2390  1289.88    2409.5   1278.52    2434.4   1278.65   2445.55   1287.07   2475.95
GR    1288     2490     1290      2510      1292      2720      1292      2880      1290      3010
GR    1290     3020     1292      3025      1294      3215      1296      3280      1298      3350
GR    1300     3400

NC                                  0.1       0.3
X1       1       24     2183      2305       160       160       230
GR    1320     1000     1318      1015      1316      1030      1314      1060      1312      1080
GR    1310     1090     1308      1115      1306      1155      1304      1190      1302      1200
GR    1300     1240     1298      1350      1296      1550      1294      1655      1292      2183
GR  1290.5  2198.85  1280.94   2229.13   1282.07    2260.9    1290.7   2287.15      1292      2305
GR    1294     2820     1296      3015      1298      3055      1300      3080

NC                                  0.3       0.5
X1   1.004       26  2244.41   2317.75        55        65        40
X3       0                     2244.41   1290.14   2317.75   1290.14
GR    1320     1000     1318      1015      1316      1030      1314      1060      1312      1080
GR    1310     1090     1308      1115      1306      1155      1304      1190      1302      1200
GR    1300     1240     1298      1350      1296      1550      1294      1655   1290.89   2244.41
GR  1282.1  2252.04  1281.69   2265.98    1281.4      2280   1282.16   2286.38   1281.84   2310.56
GR  1291.1  2317.75     1292      2340      1294      2840      1296      2975      1298      3030
GR    1300     3060

NC                                  0.3       0.5
SC   3.013      0.4      2.5       200         6        10    119.44      11.1   1281.44    1281.4
X1    1.03       24   2274.7   2362.71       100       100       118
X2                         2                1290.14
X3       0                     2274.7   1290.14   2362.71   1290.14
GR    1320     1031     1318      1051      1316      1066      1314      1096      1312      1121
GR    1310     1131     1308      1151      1306      1186      1304      1211      1302      1231
GR    1300     1331     1298      1421      1294      1671      1294      1861    1289.6    2274.7
GR  1281.4  2296.41  1282.12   2342.33      1289   2362.71      1289   2362.71      1292      2471
GR    1294     2581     1296      2866      1298      2934      1300      3011

NC    0.16     0.16     0.05       0.1       0.3
X1    1.06       34     2215   2278.14       230       130       190
```

GR	1330	1000	1328	1023	1326	1055	1324	1070	1322	1090
GR	1320	1100	1318	1115	1316	1130	1314	1160	1312	1190
GR	1310	1265	1308	1280	1306	1290	1304	1310	1302	1435
GR	1300	1675	1298	1725	1296	1940	1294	2150	1292	2215
GR	1291.3	2216.36	1285.24	2223.59	1285.43	2256.41	1290.67	2265	1294.11	2278.14
GR	1296	2310	1296	2500	1296	2600	1296	2670	1298	2705
GR	1300	2790	1302	2800	1304	2840	1306	2900		
NC				0.1	0.3					
X1	1.11	33	2060	2109.52	80	270	230			
GR	1330	1000	1328	1025	1326	1040	1324	1055	1322	1085
GR	1320	1155	1318	1170	1316	1180	1314	1200	1312	1210
GR	1310	1295	1308	1315	1306	1345	1304	1370	1304	1480
GR	1302	1540	1300	1720	1298	1725	1296	1885	1294	2060
GR	1293.2	2063.1	1287.07	2069.18	1287.84	2090.83	1295.17	2109.52	1295.28	2125.41
GR	1296	2275	1298	2325	1300	2420	1302	2760	1304	2815
GR	1306	2860	1308	2880	1310	2970				
NC				0.1	0.3					
X1	1.16	35	2090	2200	335	250	250			
GR	1390	1000	1380	1070	1370	1105	1360	1160	1350	1185
GR	1340	1295	1330	1378	1328	1395	1326	1408	1324	1415
GR	1320	1440	1318	1455	1316	1570	1314	1685	1312	1700
GR	1310	1705	1308	1760	1306	1770	1304	1850	1302	1920
GR	1302	1935	1300	2090	1297.87	2101.3	1289	2140.6	1288.8	2159.4
GR	1297.2	2189.5	1298	2200	1300	2368	1302	2625	1304	2784
GR	1306	2880	1308	2905	1310	2970	1312	2987	1314	3005
NC				0.1	0.3					
X1	1.21	40	2069.85	2192.27	310	235	260			
GR	1410	1000	1400	1066.05	1390	1098.38	1380	1182.46	1370	1227.77
GR	1360	1284.67	1350	1314.45	1340	1335.29	1338	1428.08	1336	1449.34
GR	1334	1458.59	1332	1494.39	1330	1515.92	1326	1547.71	1324	1661.37
GR	1322	1691.1	1320	1712.58	1318	1732.6	1316	1749.13	1314	1887.44
GR	1312	1905.12	1310	1960.31	1308.68	2069.85	1293.44	2142.41	1291.24	2149.47
GR	1291.1	2158.77	1291.5	2171.16	1298.08	2192.27	1300	2330.31	1302	2418.34
GR	1304	2613.24	1306	2828.94	1308	2888.84	1312	3003.35	1314	3026.63
GR	1316	3035.99	1318	3044.53	1320	3050.51	1322	3055.18	1324	3067.11
NC				0.1	0.3					
X1	1.24	21	1560.56	1641.73	140	105	130			
GR	1330	1000	1328	1100	1326	1105	1324	1165	1322	1235
GR	1320	1315	1318	1345	1316	1365	1314	1425	1311.56	1560.56
GR	1292.6	1584.83	1291.77	1590.84	1292.04	1609.16	1298.93	1641.73	1300	1680
GR	1302	1910	1304	1935	1306	2200	1308	2270	1310	2365
GR	1314	2425								
NC				0.1	0.3					
X1	1.29	20	1406.1	1478.73	265	70	240			
GR	1330	1000	1328	1030	1326	1040	1324	1054	1322	1165
GR	1320	1190	1318	1202	1316	1300	1316	1330	1313.92	1406.1
GR	1292.9	1434.16	1294.73	1457.06	1295.18	1465.85	1301.24	1478.73	1302	1658

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GR     1304      1880      1306      1980      1308      2120      1310      2200      1316      2265

NC                                    0.1       0.3
X1     1.38        24  1924.181  2017.271       660       175       465
GR   1329.7   1004.63  1327.768  1064.631  1325.768  1162.631  1323.768  1249.631  1321.768  1312.631
GR   1319.7  1319.631  1317.768  1414.631  1315.768  1504.631  1313.768  1516.631  1311.768  1614.631
GR   1309.7  1704.631  1307.768  1804.631  1306.468  1924.181  1296.858  1970.611  1296.348  1998.651
GR   1306.1  2017.271   1307.77   2126.28   1309.77   2277.91   1309.77   2277.91      1312   2329.14
GR      1314  2360.23      1316   2378.86      1318   2400.21      1320   2408.17

NC     0.06      0.06      0.04       0.3       0.5
QT        1      4900
X1      1.4        24  2068.02   2111.98       110         1       110
X3        0                       2070      1306      2110      1306
GR     1330      1000      1326      1125      1324      1200      1322      1250      1320      1390
GR     1318      1450      1316      1475      1314      1575      1312      1640      1310      1690
GR     1308      1720      1306      1770      1304      1890      1302      2030      1302   2068.02
GR   1297.4   2078.21   1296.97    2094.8   1296.95   2101.79      1302   2111.98      1302      2120
GR     1306      2125      1308      2360      1310      2520      1312      2565

NC     0.05      0.05      0.04       0.3       0.5
SC    3.013       0.4       2.5       350         6        10     81.83      11.3   1297.72   1296.95
X1     1.41        32   2121.17    2157.4        85        90        80
X2                            2                1305.89
X3        0                       2120      1306      2160      1306
GR     1330      1000      1330      1060      1328      1130      1326      1200      1324      1250
GR     1322      1320      1320      1400      1318      1450      1316      1540      1314      1610
GR     1312      1700      1310      1775      1308      1840      1306      1975    1305.8   2121.17
GR   1298.7    2122.5   1297.53    2129.7   1297.69   2138.26   1297.72      2145   1297.61    2149.9
GR   1299.1    2156.5   1305.43    2157.4      1308      2190      1310   2233.69      1310   2233.69
GR     1312    2347.8      1314   2423.12      1316   2465.77      1318      2493      1320   2506.28
GR     1322   2528.87      1324   2624.68

NC     0.05      0.05     0.035       0.1       0.3
  Section G
Section G

X1     1.43        27   1573.75    1653.9    122.79    210.09    242.56
GR     1318      1000      1316   1053.19      1314    1130.3      1312    1238.7      1310   1317.57
GR     1308   1379.41      1308   1395.06      1306   1573.75      1304   1579.04      1302   1585.02
GR     1300   1599.48      1300   1618.97      1302   1625.16      1304   1633.39      1306   1637.35
GR     1308   1646.02      1310    1653.9      1310   1678.41      1312   1707.58      1314   1740.59
GR     1316   1812.19      1318   1824.12      1320   1862.71      1322   1886.59      1326   1974.56
GR     1328   1986.32      1330   1997.44

NC     0.05      0.05     0.035       0.1       0.3
  Section H
Section H

X1     1.49        20   1158.09   1299.57    232.11    312.32    312.32
GR     1312      1000      1310    1077.2      1308   1158.09      1306   1178.69      1304   1195.68
GR     1304   1270.19      1306   1288.97      1308   1299.57      1310   1328.68      1310   1330.02
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 GR     1308    1352.66      1306    1390.45      1306    1410.18      1308    1427.32      1310     1435.2
 GR     1312    1447.21      1314    1455.27      1316    1474.58      1318     1642.6      1320    1652.77

 NC      0.1        0.1      0.05        0.1       0.3
   Section I
Section I

 X1     1.54         20   1210.56    1317.04     161.2     232.57    197.89
 GR     1316       1000      1316       1000      1314    1180.36      1312    1210.56      1308    1235.49
 GR     1306    1254.09      1306    1290.75      1308    1301.37      1310    1317.04      1312    1393.17
 GR     1314     1414.6      1316    1442.51      1318    1476.47      1320     1621.7      1322    1639.76
 GR     1324       1769      1326    1905.67      1328    1981.45      1330    2002.19      1330    2141.44

 NC     0.05       0.05     0.035        0.1       0.3
   Section J
Section J

 X1      1.6         17    1168.9    1365.27    244.21     314.35    271.35
 GR     1340       1000      1330    1118.28      1320     1168.9      1310    1196.12      1308    1214.17
 GR     1308    1266.03      1310    1279.53      1312    1300.54      1314     1315.3      1316    1327.95
 GR     1318     1342.9      1320    1365.27      1322    1535.88      1324    1550.45      1326    1730.04
 GR     1328    1775.33      1330    1835.25

 NC     0.05       0.05     0.035
 QT        1       3600
   Section K
Section K

 X1     1.71         18    1143.43       1264    755.51     634.79    705.17
 GR     1324       1000      1324    1108.74      1322    1143.43      1320    1152.75      1314    1178.34
 GR     1312    1187.95      1312       1206      1314    1232.74      1316       1264      1318     1343.6
 GR     1320    1436.51      1320    1440.93      1318    1471.24      1318    1511.22      1320    1554.45
 GR     1322    1579.35      1324     1627.2      1326    1727.08

 NC     0.05       0.05     0.035
   Section L
Section L

 X1     1.86         17    1100.64    1520.27    660.31     715.37    685.32
 GR     1330    1000.07      1328    1100.64      1324    1178.93      1322    1244.47      1320    1334.25
 GR     1320    1425.86      1322    1478.71      1324    1520.27      1326    1725.05      1328    1834.66
 GR     1328    1926.81      1326    1935.29      1324    1943.06      1324    1951.59      1326    1973.28
 GR     1328    1985.66      1330    2132.84

 NC     0.05       0.05      0.04
   Section M
Section M

 X1     2.02         22    1378.49    1502.97       818     735.45    684.84
 GR     1340       1000      1338    1021.94      1338    1041.57      1338    1092.36      1336    1128.75
 GR     1336     1229.2      1336     1260.2      1334    1311.34      1332     1357.4      1330    1378.49
 GR     1326    1392.94      1324    1414.36      1324    1428.63      1326    1442.78      1328    1502.97
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GR     1328    1605.87       1328    1664.57       1326     1677.13       1326     1715.21       1328     1722.69
GR     1330    1728.21       1332     1852.1
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STATUS: Friction loss equation index (IHLEQ) = 1. Therefore friction loss (HL) is calculated as a function of the profile type, which can vary from reach to reach. See documentation for further details.

SPECIAL NOTE :

An asterisk (*) to the left of the cross-section number indicates a special note is present in the SUMMARY OF WARNING AND STATUS MESSAGES section.

SUMMARY PRINTOUT TABLE 110 : ECHO CANYON LOMR
REVISED MODEL
AZ02079

	Cross-Section Number SECNO	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Energy Gradient Elevation (ft MSL) EG	Water Surface Top Width (ft) TOPWID	Left Overbank Flow (cfs) QLOB	Channel Flow (cfs) QCH	Right Overbank Flow (cfs) QROB	Encroach. Target Requested PERENC	Left Encroach. Station (ft) STENCL	Left Bank Station (ft) STCHL	Right Bank Station (ft) STCHR	Right Encroach. Station (ft) STENCR
	0.000	1246.90	0.00	1247.78	240.44	0.00	6600.00	0.00	0.00	0.00	0.00	264.00	0.00
*	0.003	1247.77	0.00	1247.87	273.85	0.00	6600.00	0.00	0.00	0.00	0.00	282.00	0.00
	0.026	1247.81	0.00	1247.89	318.25	0.00	6600.00	0.00	0.00	0.00	0.00	364.00	0.00
	0.049	1247.84	0.00	1247.90	380.97	0.00	6600.00	0.00	0.00	0.00	0.00	429.00	0.00
	0.081	1247.87	0.00	1247.91	425.60	0.00	6600.00	0.00	0.00	0.00	0.00	459.00	0.00
	0.117	1247.89	0.00	1247.92	484.93	0.00	6600.00	0.00	0.00	0.00	0.00	525.00	0.00
	0.139	1247.89	0.00	1247.93	466.94	0.00	6600.00	0.00	0.00	0.00	0.00	522.00	0.00
*	0.172	1247.87	0.00	1247.96	302.83	0.00	6600.00	0.00	0.00	0.00	0.00	343.00	0.00
*	0.178	1249.07	0.00	1250.64	289.87	0.00	5897.40	702.60	0.00	0.00	0.00	92.00	0.00
*	0.188	1251.01	0.00	1252.31	309.72	0.00	5584.90	1015.10	0.00	0.00	0.00	87.00	0.00
	0.190	1252.24	0.00	1252.95	316.44	0.00	4623.19	1976.81	0.00	0.00	100.00	185.00	0.00

	Cross-Section Number SECNO	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Energy Gradient Elevation (ft MSL) EG	Water Surface Top Width (ft) TOPWID	Left Overbank Flow (cfs) QLOB	Channel Flow (cfs) QCH	Right Overbank Flow (cfs) QROB	Encroach. Target Requested PERENC	Left Encroach. Station (ft) STENCL	Left Bank Station (ft) STCHL	Right Bank Station (ft) STCHR	Right Encroach. Station (ft) STENCR
*	0.206	1252.75	0.00	1253.10	294.40	0.04	2916.56	3683.40	0.00	0.00	100.00	171.00	0.00
*	0.238	1252.81	0.00	1253.45	232.49	0.00	3036.07	3563.93	0.00	0.00	0.00	78.00	0.00
*	0.240	1254.00	0.00	1255.54	241.99	0.00	5453.70	1146.30	0.00	0.00	0.00	86.00	0.00
*	0.246	1254.63	0.00	1256.07	232.49	0.00	4926.25	1673.75	0.00	0.00	0.00	93.00	0.00
*	0.248	1256.07	0.00	1256.58	257.64	0.00	4050.92	2549.08	0.00	0.00	200.00	293.00	0.00
	0.268	1256.22	0.00	1256.73	252.31	0.00	3735.75	2864.25	0.00	0.00	0.00	95.00	0.00
	0.289	1256.27	0.00	1257.07	203.27	0.00	3161.86	3438.14	0.00	0.00	0.00	73.00	0.00
	0.291	1256.49	0.00	1257.13	212.91	0.00	3271.75	3328.25	0.00	0.00	0.00	73.00	0.00
*	0.307	1256.39	0.00	1257.52	175.71	0.00	6600.00	0.00	0.00	0.00	1000.00	1203.00	0.00
	0.320	1256.54	0.00	1257.93	145.32	0.00	6600.00	0.00	0.00	0.00	1000.00	1162.00	0.00
*	0.322	1257.43	0.00	1258.07	150.39	0.00	6600.00	0.00	0.00	0.00	1000.00	1162.00	0.00
	0.344	1257.55	0.00	1258.30	141.73	0.00	6600.00	0.00	0.00	0.00	1090.00	1247.00	0.00
*	0.352	1260.79	0.00	1261.76	469.38	1062.04	4484.42	1053.54	0.00	0.00	1200.00	1339.00	0.00
*	0.356	1262.10	0.00	1262.78	1030.81	1327.34	4048.68	1223.98	0.00	0.00	1508.57	1626.41	0.00
	0.361	1262.30	0.00	1262.89	667.17	319.91	5782.84	497.26	2898.97	0.00	1435.97	1663.97	2898.97
*	0.370	1262.41	0.00	1263.28	498.31	2141.82	3790.95	667.23	0.00	0.00	1226.00	1327.00	0.00
*	0.450	1266.51	0.00	1267.26	856.75	219.49	5673.59	6.92	0.00	0.00	2190.00	2625.00	0.00
*	0.490	1269.20	0.00	1270.15	862.35	992.70	2809.05	2098.25	3290.00	0.00	2869.65	2910.55	3290.00
	0.580	1272.93	0.00	1274.54	499.68	117.33	5327.51	455.16	0.00	0.00	2670.00	2740.00	0.00
*	0.610	1275.09	0.00	1276.76	495.03	43.00	4899.00	958.00	0.00	0.00	2407.30	2470.00	0.00
*	0.650	1277.46	0.00	1277.95	878.91	219.41	5152.53	528.05	0.00	0.00	2320.00	2460.00	0.00
*	0.710	1278.85	0.00	1280.74	313.49	6.29	5755.09	138.62	0.00	0.00	2340.00	2448.00	0.00

	Cross-Section Number SECNO	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Energy Gradient Elevation (ft MSL) EG	Water Surface Top Width (ft) TOPWID	Left Overbank Flow (cfs) QLOB	Channel Flow (cfs) QCH	Right Overbank Flow (cfs) QROB	Encroach. Target Requested PERENC	Left Encroach. Station (ft) STENCL	Left Bank Station (ft) STCHL	Right Bank Station (ft) STCHR	Right Encroach. Station (ft) STENCR
*	0.750	1282.55	0.00	1283.53	898.95	1734.59	3860.37	305.04	0.00	0.00	2537.37	2595.00	0.00
*	0.790	1284.30	0.00	1284.76	759.75	1421.24	4358.07	120.69	0.00	0.00	2970.26	3074.46	0.00
	0.830	1284.98	0.00	1285.84	759.54	656.69	4995.23	248.08	0.00	0.00	2060.00	2146.90	0.00
	0.860	1286.02	0.00	1286.68	367.84	114.59	5773.37	12.04	0.00	0.00	2790.00	2920.00	0.00
*	0.900	1287.22	0.00	1288.93	251.12	32.29	5830.57	37.14	0.00	0.00	2540.00	2660.00	0.00
*	0.960	1291.02	0.00	1292.28	272.69	30.97	5839.97	29.06	1395.00	1485.00	2409.50	2510.00	2880.00
	1.000	1292.93	0.00	1293.72	605.37	44.04	5813.01	42.95	0.00	0.00	2183.00	2305.00	0.00
	1.004	1293.08	0.00	1293.88	778.69	252.02	5574.20	73.78	73.34	2244.41	2244.41	2317.75	2317.75
	1.030	1293.33	0.00	1293.88	612.05	327.98	5370.01	202.01	88.01	2274.70	2274.70	2362.71	2362.71
*	1.060	1294.49	0.00	1297.16	186.32	158.31	5741.20	0.49	0.00	0.00	2215.00	2278.14	0.00
*	1.110	1298.35	0.00	1299.29	617.41	1156.52	4026.44	717.04	0.00	0.00	2060.00	2109.52	0.00
	1.160	1299.94	0.00	1300.95	273.31	0.00	5783.34	116.66	0.00	0.00	2090.00	2200.00	0.00
	1.210	1301.65	0.00	1302.77	299.35	0.00	5316.31	583.69	0.00	0.00	2069.85	2192.27	0.00
	1.240	1302.43	0.00	1303.81	343.08	0.00	5368.58	531.42	0.00	0.00	1560.56	1641.73	0.00
	1.290	1304.19	0.00	1305.56	470.18	0.00	4925.51	974.49	0.00	0.00	1406.10	1478.73	0.00
	1.380	1307.49	0.00	1308.59	278.25	21.89	5842.88	35.22	0.00	0.00	1924.18	2017.27	0.00
*	1.400	1308.79	0.00	1309.07	714.60	1690.98	2540.61	668.41	40.00	2070.00	2068.02	2111.98	2110.00
*	1.410	1307.96	0.00	1309.16	346.76	1227.10	3590.33	82.57	40.00	2120.00	2121.17	2157.40	2160.00
	1.430	1309.26	0.00	1309.96	310.65	1133.60	3766.39	0.00	0.00	0.00	1573.75	1653.90	0.00
	1.490	1310.25	0.00	1310.60	368.98	140.04	3927.30	832.66	0.00	0.00	1158.09	1299.57	0.00
*	1.540	1311.79	0.00	1313.57	173.18	0.00	4781.67	118.33	0.00	0.00	1210.56	1317.04	0.00
*	1.600	1314.59	0.00	1315.48	135.40	0.00	4900.00	0.00	0.00	0.00	1168.90	1365.27	0.00

	Cross-Section Number SECNO	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Energy Gradient Elevation (ft MSL) EG	Water Surface Top Width (ft) TOPWID	Left Overbank Flow (cfs) QLOB	Channel Flow (cfs) QCH	Right Overbank Flow (cfs) QROB	Encroach. Target Requested PERENC	Left Encroach. Station (ft) STENCL	Left Bank Station (ft) STCHL	Right Bank Station (ft) STCHR	Right Encroach. Station (ft) STENCR
*	1.710	1317.98	0.00	1318.99	181.60	0.00	3422.86	177.14	0.00	0.00	1143.43	1264.00	0.00
	1.860	1323.05	0.00	1323.61	290.74	0.00	3600.00	0.00	0.00	0.00	1100.64	1520.27	0.00
	2.020	1328.88	0.00	1329.50	342.58	0.00	2408.95	1191.05	0.00	0.00	1378.49	1502.97	0.00

SUMMARY PRINTOUT TABLE 150 : ECHO CANYON LOMR
REVISED MODEL
AZ02079

	Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Top of Roadway Elevation (ft MSL) ELTRD	Max. Low Chord Elevation (ft MSL) ELLC	Minimum C. S. Elevation (ft MSL) ELMIN	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	Critical W. S. Elevation (ft MSL) CRIWS	Energy Gradient Elevation (ft MSL) EG	Energy Gradient Slope * 10,000 10K*S	Channel Mean Flow Velocity (ft/s) VCH	Cross-Section Area (sq ft) AREA	Index Q (0.01 * Convey.) .01K
	0.000	0.00	0.00	0.00	1242.90	6600.00	1246.90	1246.06	1247.78	56.72	7.54	874.86	876.37
*	0.003	18.00	0.00	0.00	1236.60	6600.00	1247.77	1240.00	1247.87	1.69	2.48	2658.60	5083.41
	0.026	118.00	0.00	0.00	1236.60	6600.00	1247.81	1239.79	1247.89	0.99	2.20	3006.76	6617.35
	0.049	125.00	0.00	0.00	1236.00	6600.00	1247.84	1239.56	1247.90	0.72	1.85	3560.91	7793.86
	0.081	167.00	0.00	0.00	1236.10	6600.00	1247.87	1239.36	1247.91	0.53	1.62	4073.94	9062.14
	0.117	191.00	0.00	0.00	1236.10	6600.00	1247.89	1239.21	1247.92	0.39	1.41	4692.60	10518.71
	0.139	115.00	0.00	0.00	1236.40	6600.00	1247.89	1239.80	1247.93	0.54	1.57	4197.52	8964.56
*	0.172	174.00	0.00	0.00	1236.70	6600.00	1247.87	1240.20	1247.96	1.29	2.36	2801.65	5816.08
*	0.178	30.00	0.00	0.00	1237.80	6600.00	1249.07	1249.07	1250.64	40.62	10.58	785.72	1035.54
*	0.188	54.00	0.00	0.00	1239.10	6600.00	1251.01	1251.01	1252.31	36.17	9.82	858.01	1097.48
	0.190	10.00	1251.40	1248.10	1239.20	6600.00	1252.24	0.00	1252.95	20.70	7.65	1125.39	1450.54
*	0.206	87.00	0.00	0.00	1241.30	6600.00	1252.75	1250.63	1253.10	9.72	5.45	1452.26	2117.13

	Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Top of Roadway Elevation (ft MSL) ELTRD	Max. Low Chord Elevation (ft MSL) ELLC	Minimum C. S. Elevation (ft MSL) ELMIN	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	Critical W. S. Elevation (ft MSL) CRIWS	Energy Gradient Elevation (ft MSL) EG	Energy Gradient Slope * 10,000 10K*S	Channel Mean Flow Velocity (ft/s) VCH	Cross-Section Area (sq ft) AREA	Index Q (0.01 * Convey.) .01K
*	0.238	168.00	0.00	0.00	1243.10	6600.00	1252.81	1251.25	1253.45	21.31	7.11	1052.29	1429.57
*	0.240	11.00	0.00	0.00	1243.20	6600.00	1254.00	1254.00	1255.54	44.87	10.76	762.78	985.25
*	0.246	32.00	0.00	0.00	1243.60	6600.00	1254.63	1254.63	1256.07	43.67	10.74	781.53	998.73
*	0.248	11.00	1255.40	1252.10	1243.60	6600.00	1256.07	0.00	1256.58	15.00	6.39	1209.43	1703.84
	0.268	102.00	0.00	0.00	1245.50	6600.00	1256.22	1254.40	1256.73	14.70	6.53	1198.69	1721.39
	0.289	115.00	1260.60	1260.60	1246.90	6600.00	1256.27	1255.07	1257.07	19.77	8.52	981.17	1484.41
	0.291	10.00	1260.50	1260.60	1246.95	6600.00	1256.49	1254.76	1257.13	16.40	7.39	1069.66	1629.53
*	0.307	81.00	0.00	0.00	1248.00	6600.00	1256.39	1255.37	1257.52	42.91	8.52	774.68	1007.49
	0.320	75.00	0.00	0.00	1248.70	6600.00	1256.54	1255.64	1257.93	45.56	9.47	696.77	977.79
*	0.322	25.00	0.00	0.00	1248.90	6600.00	1257.43	1254.14	1258.07	18.31	6.45	1023.62	1542.52
	0.344	110.00	0.00	0.00	1249.54	6600.00	1257.55	1254.61	1258.30	18.11	6.98	945.70	1550.71
*	0.352	40.00	0.00	0.00	1256.52	6600.00	1260.79	1260.79	1261.76	82.52	9.02	942.95	726.54
*	0.356	25.00	0.00	0.00	1256.00	6600.00	1262.10	1262.10	1262.78	52.83	8.08	1292.92	908.06
	0.361	20.00	0.00	0.00	1256.60	6600.00	1262.30	1261.70	1262.89	38.59	6.52	1190.62	1062.45
*	0.370	30.00	0.00	0.00	1257.64	6600.00	1262.41	1262.41	1263.28	13.40	8.88	987.08	1802.74
*	0.450	420.00	0.00	0.00	1263.53	5900.00	1266.51	1266.51	1267.26	157.92	7.04	1001.52	469.50
*	0.490	230.00	0.00	0.00	1261.73	5900.00	1269.20	1269.20	1270.15	82.31	11.10	1659.01	650.31
	0.580	450.00	0.00	0.00	1262.70	5900.00	1272.93	1272.49	1274.54	97.94	10.70	969.58	596.18
*	0.610	180.00	0.00	0.00	1264.85	5900.00	1275.09	1275.09	1276.76	120.21	11.35	1089.52	538.11
*	0.650	200.00	0.00	0.00	1267.31	5900.00	1277.46	1275.19	1277.95	36.25	5.98	1800.99	980.00
*	0.710	295.00	0.00	0.00	1269.80	5900.00	1278.85	1278.83	1280.74	178.97	11.16	651.63	441.02
*	0.750	230.00	0.00	0.00	1272.95	5900.00	1282.55	1282.23	1283.53	86.27	9.73	1734.69	635.20

	Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Top of Roadway Elevation (ft MSL) ELTRD	Max. Low Chord Elevation (ft MSL) ELLC	Minimum C. S. Elevation (ft MSL) ELMIN	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	Critical W. S. Elevation (ft MSL) CRIWS	Energy Gradient Elevation (ft MSL) EG	Energy Gradient Slope * 10,000 10K*S	Channel Mean Flow Velocity (ft/s) VCH	Cross-Section Area (sq ft) AREA	Index Q (0.01 * Convey.) .01K
*	0.790	230.00	0.00	0.00	1272.95	5900.00	1284.30	1282.18	1284.76	38.05	6.33	1928.52	956.51
	0.830	220.00	0.00	0.00	1274.89	5900.00	1284.98	1283.57	1285.84	55.18	8.08	1555.88	794.23
	0.860	180.00	0.00	0.00	1275.03	5900.00	1286.02	1283.12	1286.68	39.76	6.61	1087.63	935.66
*	0.900	235.00	0.00	0.00	1277.26	5900.00	1287.22	1286.92	1288.93	169.03	10.55	632.71	453.80
*	0.960	300.00	0.00	0.00	1278.52	5900.00	1291.02	1289.07	1292.28	81.41	9.04	744.43	653.92
	1.000	230.00	0.00	0.00	1280.94	5900.00	1292.93	1289.34	1293.72	48.75	7.20	1031.56	845.05
	1.004	40.00	0.00	0.00	1281.40	5900.00	1293.08	1288.45	1293.88	31.93	7.38	1386.27	1044.12
	1.030	118.00	1290.14	0.00	1281.40	5900.00	1293.33	0.00	1293.88	22.34	6.24	1700.99	1248.24
*	1.060	190.00	0.00	0.00	1285.24	5900.00	1294.49	1294.49	1297.16	167.53	13.28	543.38	455.83
*	1.110	230.00	0.00	0.00	1287.07	5900.00	1298.35	1297.62	1299.29	62.54	9.40	1755.19	746.05
	1.160	250.00	0.00	0.00	1288.80	5900.00	1299.94	1297.54	1300.95	64.43	8.16	868.15	735.03
	1.210	260.00	0.00	0.00	1291.10	5900.00	1301.65	1300.22	1302.77	73.54	8.92	1015.31	688.02
	1.240	130.00	0.00	0.00	1291.77	5900.00	1302.43	1301.03	1303.81	77.47	9.90	984.89	670.31
	1.290	240.00	0.00	0.00	1292.90	5900.00	1304.19	1303.59	1305.56	82.27	10.25	1204.52	650.49
	1.380	465.00	0.00	0.00	1296.35	5900.00	1307.49	1304.71	1308.59	58.13	8.43	804.35	773.83
*	1.400	110.00	0.00	0.00	1296.95	4900.00	1308.79	1307.59	1309.07	14.76	5.71	1849.29	1275.33
*	1.410	80.00	1305.89	0.00	1297.53	4900.00	1307.96	1307.96	1309.16	51.17	10.11	806.90	685.01
	1.430	242.56	0.00	0.00	1300.00	4900.00	1309.26	1308.26	1309.96	26.68	7.50	951.26	948.61
	1.490	312.32	0.00	0.00	1304.00	4900.00	1310.25	1308.17	1310.60	16.22	5.21	1193.24	1216.73
*	1.540	197.89	0.00	0.00	1306.00	4900.00	1311.79	1311.79	1313.57	199.49	10.86	501.19	346.93
*	1.600	271.35	0.00	0.00	1308.00	4900.00	1314.59	1313.02	1315.48	40.11	7.58	646.72	773.65
*	1.710	705.17	0.00	0.00	1312.00	3600.00	1317.98	1317.35	1318.99	58.60	8.22	494.57	470.26

Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Top of Roadway Elevation (ft MSL) ELTRD	Max. Low Chord Elevation (ft MSL) ELLC	Minimum C. S. Elevation (ft MSL) ELMIN	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	Critical W. S. Elevation (ft MSL) CRIWS	Energy Gradient Elevation (ft MSL) EG	Energy Gradient Slope * 10,000 10K*S	Channel Mean Flow Velocity (ft/s) VCH	Cross-Section Area (sq ft) AREA	Index Q (0.01 * Convey.) .01K
1.860	685.32	0.00	0.00	1320.00	3600.00	1323.05	1322.58	1323.61	74.86	5.97	602.83	416.08
2.020	684.84	0.00	0.00	1324.00	3600.00	1328.88	1328.59	1329.50	95.81	7.18	626.12	367.79

SUMMARY PRINTOUT TABLE 150 : ECHO CANYON LOMR
REVISED MODEL
AZ02079

	Cross-Section Number SECNO	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Profile (ft) DIFWSP	W.S. Elev Diff per Section (ft) DIFWSX	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Water Surface Top Width (ft) TOPWID	Channel Reach Length (ft) XLCH
	0.000	6600.00	1246.90	0.00	0.00	0.00	240.44	0.00
*	0.003	6600.00	1247.77	0.00	0.87	0.00	273.85	18.00
	0.026	6600.00	1247.81	0.00	0.04	0.00	318.25	118.00
	0.049	6600.00	1247.84	0.00	0.03	0.00	380.97	125.00
	0.081	6600.00	1247.87	0.00	0.02	0.00	425.60	167.00
	0.117	6600.00	1247.89	0.00	0.02	0.00	484.93	191.00
	0.139	6600.00	1247.89	0.00	0.00	0.00	466.94	115.00
*	0.172	6600.00	1247.87	0.00	-0.02	0.00	302.83	174.00
*	0.178	6600.00	1249.07	0.00	1.20	0.00	289.87	30.00
*	0.188	6600.00	1251.01	0.00	1.94	0.00	309.72	54.00
	0.190	6600.00	1252.24	0.00	1.23	0.00	316.44	10.00
*	0.206	6600.00	1252.75	0.00	0.51	0.00	294.40	87.00
*	0.238	6600.00	1252.81	0.00	0.06	0.00	232.49	168.00

	Cross-Section Number SECNO	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Profile (ft) DIFWSP	W.S. Elev Diff per Section (ft) DIFWSX	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Water Surface Top Width (ft) TOPWID	Channel Reach Length (ft) XLCH
*	0.240	6600.00	1254.00	0.00	1.19	0.00	241.99	11.00
*	0.246	6600.00	1254.63	0.00	0.63	0.00	232.49	32.00
*	0.248	6600.00	1256.07	0.00	1.44	0.00	257.64	11.00
	0.268	6600.00	1256.22	0.00	0.14	0.00	252.31	102.00
	0.289	6600.00	1256.27	0.00	0.06	0.00	203.27	115.00
	0.291	6600.00	1256.49	0.00	0.22	0.00	212.91	10.00
*	0.307	6600.00	1256.39	0.00	-0.10	0.00	175.71	81.00
	0.320	6600.00	1256.54	0.00	0.15	0.00	145.32	75.00
*	0.322	6600.00	1257.43	0.00	0.89	0.00	150.39	25.00
	0.344	6600.00	1257.55	0.00	0.12	0.00	141.73	110.00
*	0.352	6600.00	1260.79	0.00	3.24	0.00	469.38	40.00
*	0.356	6600.00	1262.10	0.00	1.31	0.00	1030.81	25.00
	0.361	6600.00	1262.30	0.00	0.20	0.00	667.17	20.00
*	0.370	6600.00	1262.41	0.00	0.11	0.00	498.31	30.00
*	0.450	5900.00	1266.51	0.00	4.11	0.00	856.75	420.00
*	0.490	5900.00	1269.20	0.00	2.68	0.00	862.35	230.00
	0.580	5900.00	1272.93	0.00	3.74	0.00	499.68	450.00
*	0.610	5900.00	1275.09	0.00	2.16	0.00	495.03	180.00
*	0.650	5900.00	1277.46	0.00	2.37	0.00	878.91	200.00
*	0.710	5900.00	1278.85	0.00	1.38	0.00	313.49	295.00
*	0.750	5900.00	1282.55	0.00	3.70	0.00	898.95	230.00
*	0.790	5900.00	1284.30	0.00	1.75	0.00	759.75	230.00

	Cross-Section Number SECNO	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Profile (ft) DIFWSP	W.S. Elev Diff per Section (ft) DIFWSX	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Water Surface Top Width (ft) TOPWID	Channel Reach Length (ft) XLCH
	0.830	5900.00	1284.98	0.00	0.68	0.00	759.54	220.00
	0.860	5900.00	1286.02	0.00	1.04	0.00	367.84	180.00
*	0.900	5900.00	1287.22	0.00	1.20	0.00	251.12	235.00
*	0.960	5900.00	1291.02	0.00	3.80	0.00	272.69	300.00
	1.000	5900.00	1292.93	0.00	1.91	0.00	605.37	230.00
	1.004	5900.00	1293.08	0.00	0.15	0.00	778.69	40.00
	1.030	5900.00	1293.33	0.00	0.25	0.00	612.05	118.00
*	1.060	5900.00	1294.49	0.00	1.16	0.00	186.32	190.00
*	1.110	5900.00	1298.35	0.00	3.86	0.00	617.41	230.00
	1.160	5900.00	1299.94	0.00	1.59	0.00	273.31	250.00
	1.210	5900.00	1301.65	0.00	1.71	0.00	299.35	260.00
	1.240	5900.00	1302.43	0.00	0.77	0.00	343.08	130.00
	1.290	5900.00	1304.19	0.00	1.77	0.00	470.18	240.00
	1.380	5900.00	1307.49	0.00	3.30	0.00	278.25	465.00
*	1.400	4900.00	1308.79	0.00	1.29	0.00	714.60	110.00
*	1.410	4900.00	1307.96	0.00	-0.82	0.00	346.76	80.00
	1.430	4900.00	1309.26	0.00	1.30	0.00	310.65	242.56
	1.490	4900.00	1310.25	0.00	0.98	0.00	368.98	312.32
*	1.540	4900.00	1311.79	0.00	1.54	0.00	173.18	197.89
*	1.600	4900.00	1314.59	0.00	2.80	0.00	135.40	271.35
*	1.710	3600.00	1317.98	0.00	3.39	0.00	181.60	705.17
	1.860	3600.00	1323.05	0.00	5.07	0.00	290.74	685.32

Cross-Section Number SECNO	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Profile (ft) DIFWSP	W.S. Elev Diff per Section (ft) DIFWSX	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Water Surface Top Width (ft) TOPWID	Channel Reach Length (ft) XLCH
2.020	3600.00	1328.88	0.00	5.82	0.00	342.58	684.84

SUMMARY OF WARNING AND STATUS MESSAGES :

Section 0.003, profile 1, conveyance change outside acceptable range.

Section 0.172, profile 1, conveyance change outside acceptable range.

Section 0.178, profile 1, critical depth assumed.

Section 0.178, profile 1, minimum specific energy.

Section 0.188, profile 1, critical depth assumed.

Section 0.188, profile 1, minimum specific energy.

Section 0.206, profile 1, conveyance change outside acceptable range.

Section 0.238, profile 1, conveyance change outside acceptable range.

Section 0.24, profile 1, critical depth assumed.

Section 0.24, profile 1, minimum specific energy.

Section 0.246, profile 1, critical depth assumed.

Section 0.246, profile 1, minimum specific energy.

Section 0.248, profile 1, hydraulic jump downstream.

Section 0.248, profile 1, conveyance change outside acceptable range.

Section 0.307, profile 1, conveyance change outside acceptable range.

Section 0.322, profile 1, conveyance change outside acceptable range.

Section 0.352, profile 1, critical depth assumed.

Section 0.352, profile 1, minimum specific energy.

Section 0.356, profile 1, critical depth assumed.

Section 0.356, profile 1, minimum specific energy.

Section 0.37, profile 1, critical depth assumed.

Section 0.37, profile 1, minimum specific energy.

Section 0.45, profile 1, critical depth assumed.

Section 0.45, profile 1, minimum specific energy.

Section 0.49, profile 1, critical depth assumed.

Section 0.49, profile 1, minimum specific energy.

Section 0.61, profile 1, critical depth assumed.

Section 0.61, profile 1, minimum specific energy.

Section 0.65, profile 1, conveyance change outside acceptable range.

Section 0.71, profile 1, conveyance change outside acceptable range.

Section 0.75, profile 1, conveyance change outside acceptable range.

Section 0.79, profile 1, conveyance change outside acceptable range.

Section 0.9, profile 1, conveyance change outside acceptable range.

Section 0.96, profile 1, conveyance change outside acceptable range.

Section 1.06, profile 1, critical depth assumed.

Section 1.06, profile 1, minimum specific energy.

Section 1.11, profile 1, conveyance change outside acceptable range.

Section 1.4, profile 1, conveyance change outside acceptable range.

Section 1.41, profile 1, critical depth assumed.

Section 1.41, profile 1, probable minimum specific energy.

Section 1.41, profile 1, 20 trials attempted to balance water surface elevation.

Section 1.54, profile 1, critical depth assumed.

Section 1.54, profile 1, minimum specific energy.

Section 1.6, profile 1, conveyance change outside acceptable range.

Section 1.71, profile 1, conveyance change outside acceptable range.

45 Warning and status message(s) generated

END OF OUTPUT

==========
BOSS RMS for AutoCAD (tm)
==========

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Version : 2000

PROGRAM ORIGIN :

BOSS RMS for AutoCAD HEC-2 Analysis uses the standard 4.6.2 version of the U.S. Army Corps of Engineers Hydrologic Engineering Center HEC-2 Program for water-surface profile computations. This HEC-2 program was released on September 1990, last updated on August 1991.

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PROJECT DESCRIPTION :

PROJECT TITLE : ECHO CANYON LOMR
PROJECT NUMBER : AZ02079
DESCRIPTION : REVISED MODEL
ENGINEER : LARRY SIBALA, P.E.
DATE OF RUN : 9/14/2004
TIME OF RUN : 0:41 am

```
T1      AZ02079
T2      ECHO CANYON LOMR
T3      REVISED MODEL
T4      COMBINATION MODEL TO INCLUDE PREVIOUS STUDY DOWNSTREAM TO MAKE ONE
T4      CONTINUOUS RUN UPSTREAM TO INCLUDE PARADISE VALLEY
T4      FLOODWAY RUN
```

JOB PARAMETERS :

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		2						6600	1246.9	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1		-1				-1	-6		

USER-DEFINED SUMMARY TABLES (J3) :

150 110 200

REQUESTED CROSS-SECTION PRINTOUTS (J5) :

-10 -10

FRICTION LOSS EQUATION OPTION (J6) :

J6	IHLEQ	ICOPY	SUBDIV	STRTDS	RMILE
	1		0		

```
NC    0.035     0.035     0.035       0.1       0.3
X1        0         5         0       264
GR     1250         0      1243        19    1242.9       119      1243       222    1249.1       264

ET                            7.1                                    4.2    278.06
X1    0.003         6         0       282        20        24        18
GR   1250.2         0    1237.5        22    1236.6       119    1237.3       224    1237.2       244
GR     1249       282

NC     0.03      0.03      0.03       0.1       0.3
ET                            7.1                                  31.63     349.9
```

```
X1    0.026       5       0     364     177      68     118
GR     1255       0  1236.6      81    1237     210  1237.2     315  1252.1     364

ET                         7.1                          18.92  399.92
X1    0.049       6       0     429     130     150     125
GR   1252.5       0    1236      67    1237      80  1237.1     209    1237     340
GR   1253.1     429

ET                         7.1                           9.54  435.17
X1    0.081       7       0     459     184     150     167
GR     1250       0  1236.1      62    1237      80  1237.2     148  1237.1     256
GR   1237.1     388  1253.3     459

ET                         7.1                          17.09  502.04
X1    0.117       6       0     525     248     140     191
GR     1252       0  1236.1      66  1237.3      91  1237.1     271  1237.4     455
GR     1253     525

ET                         7.1                          30.02     497
X1    0.139       6       0     522     234      13     115
GR   1252.5       0  1236.4     105  1237.9     140  1237.5     435  1237.7     448
GR   1253.1     522

NH        3   0.035      52    0.03     278   0.035     343
ET                         7.1                          17.32  320.16
X1    0.172       7       0     343     263      60     174
GR   1253.3       0    1237      52  1236.7      71  1237.3      80  1237.4     186
GR   1237.3     278  1253.6     343

NH        3   0.035      47   0.016      62   0.035     322
ET                         7.1                          12.82  302.69
X1    0.178       7       0      92      33     245      30
GR   1253.3       0  1237.8      47  1237.8      62  1247.3      92  1247.9     201
GR   1248.9     302  1253.9     322

NC                            0.3     0.5
NH        5   0.035      48   0.016      61   0.035      87    0.03     303   0.025
NH      335
ET                         7.1                           7.23  315.78
X1    0.188       7       0      87      51      55      54
X3       10                                                   1253.3  1250.9
GR   1253.3       0  1246.6      20  1239.1      48  1239.1      61  1250.9      87
GR   1248.6     303  1254.3     335

NH        5   0.035     147   0.016     160   0.035     185    0.03     400   0.035
NH      432
ET                         7.1                         104.37  420.05
SB     1.25    1.56     2.6       0      13     0.1     360       3  1239.2  1239.1
X1     0.19      10     100     185      10      10      10
X2                         1  1248.1  1251.4
X3       10                                                   1253.2  1251.4
BT      -10      43    1255    1255      63    1254    1254      90  1253.5  1253.5
```

```
BT                100    1253.2    1253.2       120    1251.4    1248.1       147    1251.4    1248.1
BT                180    1251.4    1248.1       185    1251.4    1251.4       400    1248.6    1248.6
BT                432    1254.3    1254.3
GR      1255       43      1254        63    1253.5        90    1253.2       100    1249.2       117
GR    1239.2      147    1239.2       160    1251.4       185    1248.6       400    1254.3       432

NC                                     0.1       0.3
NH         6    0.035       136     0.016       150     0.035       171      0.03       383     0.035
NH       398     0.03       445
ET                           7.1                                   98.23    392.06
X1     0.206       11       100       171        87        87        87
GR      1256       41      1255        66      1254        80    1252.6       100    1241.3       136
GR    1241.5      150    1248.1       171    1248.4       272    1249.1       383    1255.1       398
GR    1255.4      445

NH         5    0.035        47     0.016        60     0.035        78      0.03       220     0.035
NH       267
ET                           7.1                                    9.52    241.35
X1     0.238        7         0        78       173       168       168
GR    1255.2        0    1243.1        47    1243.5        60    1248.8        78    1248.4       160
GR    1249.2      220      1257       267

NH         5    0.035        48     0.016        62     0.035        86      0.03       248     0.035
NH       264
ET                           7.1                                   10.56    252.3
X1      0.24        7         0        86        10        12        11
GR      1257        0    1243.2        48    1243.3        62    1251.9        86    1252.6       172
GR    1252.7      248    1257.4       264

NC                                     0.3       0.5
NH         5    0.035        54     0.016        68     0.035        93      0.03       247     0.035
NH       276
ET                           7.1                                   25.94    148.37
X1     0.246        8         0        93        34        33        32
X3        10                                                               1252.1    1252.1
GR    1257.8        0  1254.66        26  1243.62        54    1243.6        68    1253.6        93
GR    1252.1      173    1252.6       247  1257.69       276

NH         6    0.035       253     0.016       267     0.035       293      0.03       445     0.035
NH       471     0.03       540
ET                           7.1                                   205.2    372.07
SB      1.25     1.56       2.6         0        14       0.1       329       2.5    1243.6    1243.6
X1     0.248       13       200       293        11        12        11
X2                            1    1252.1    1255.4
X3        10                                                               1252.1    1252.1
BT       -13       70      1260      1260        79      1259      1259       185    1258.9    1258.9
BT         200    1257.1    1257.1       226    1255.4    1252.1       253    1255.4    1252.1
BT         267    1255.4    1252.1       287    1255.4    1252.1       293    1255.4    1255.4
BT         320      1252      1252       445    1252.5    1252.5       471    1257.7    1257.7
BT         540      1259      1259
GR      1260       70      1259        79    1258.9       185    1257.1       200    1252.1       226
GR    1243.6      253  1243.66       267    1252.1       290    1255.4       293      1252       320
```

```
GR   1252.5      445    1257.7      471      1259      540

NC                          0.1      0.3
NH       6    0.035       58    0.016        76    0.035       95     0.03      252    0.035
NH     273     0.03      358
ET                        7.1                                13.56   170.37
X1   0.268        8        0       95       126       95      102
GR  1259.5        0   1245.5       58    1245.6       76  1251.84       95   1252.9      252
GR  1257.9      273     1258      290      1259      358

NC                          0.3      0.5
NH       5    0.035       37    0.016        60    0.035       73     0.03      214    0.035
NH     242
ET                        7.1                                21.72   155.03
X1   0.289       16        0       73       125      112      115
BT     -16        0   1260.6   1260.6        20   1261.2   1257.3       37   1261.8   1257.9
BT                60   1262.6   1258.7        73     1263   1259.1       80     1263   1259.1
BT                81     1263   1251.8      82.3     1263   1251.8       83     1263   1259.1
BT               158     1263   1259.1       159     1263   1251.9    160.3     1263   1251.9
BT               161     1263   1259.1       214   1261.4   1257.5      228     1261   1257.3
BT               242   1260.6   1260.6
GR  1260.6        0   1257.3       20   1247.2       37   1246.9       60   1251.8       73
GR  1251.8       80   1251.8       81   1251.8     82.3   1251.8       83   1251.9      158
GR  1251.9      159   1251.9    160.3   1251.9      161   1252.5      214   1257.3      228
GR  1260.6      242

NH       5    0.035       36    0.016        60    0.035       73     0.03      209    0.035
NH     232
ET                        7.1                                 9.15     150
X1   0.291       16        0       73        10       12       10
BT     -16        0   1260.6   1260.6         8   1260.84   1256.9       36   1261.7   1257.8
BT                60   1262.4   1258.5        73   1262.8   1258.9       78  1262.97  1259.07
BT                79  1262.97  1251.85      80.3  1262.97  1251.85       81  1262.97  1259.07
BT               157  1263.01  1259.11       158  1263.01   1251.9   159.33  1263.01   1251.9
BT               160  1263.01  1259.11       209  1261.39   1257.5      224  1260.96   1257.1
BT               232   1260.5   1260.5
GR  1260.6        0   1256.9        8  1247.23       36  1246.95       60   1251.8       73
GR  1251.8       78  1251.85       79  1251.85     80.3  1251.85       81  1251.85      157
GR  1251.9      158   1251.9   159.33   1251.9      160   1252.4      209   1257.1      224
GR  1260.5      232

NC   0.035    0.035     0.03      0.1      0.3
NH       6    0.035     1036    0.016     1057    0.035     1067     0.03     1160    0.035
NH    1203     0.03     1260
ET                       7.1                                 1000     1203
X1   0.307        7     1000     1203       79       80       81
GR  1259.9     1000     1248     1036     1248     1057  1252.24     1067  1252.44     1160
GR  1258.9     1203     1259     1260

NH       6    0.035     1034    0.016     1057    0.035     1065     0.03     1143    0.035
NH    1162     0.03     1206
ET                       7.1                                 1000     1150
```

```
X1     0.32        7      1000      1162        70        40        75
GR   1259.8     1000    1248.7      1034      1249      1057    1252.1      1065      1252      1143
GR     1259     1162    1259.3      1206

NH        2    0.035      1162      0.03      1210
ET                         7.1                                   1000      1162
X1    0.322        6      1000      1162        25        30        25
GR   1259.8     1000    1248.9      1033    1249.1      1057    1249.9      1137   1259.04      1162
GR   1259.3     1210

NH        3    0.035      1134      0.03      1233     0.035      1260
ET                         7.1                                   1090      1247
X1    0.344        8      1090      1247       100        70       110
GR     1260     1060    1259.5      1090    1258.3      1100   1249.54      1134   1249.87      1233
GR   1259.1     1247      1260      1250      1261      1260

NC                                    0.1       0.3
NH        1    0.035      1495
ET                         7.1                                   1190      1349
X1    0.352        6      1200      1339        20        40        40
GR   1260.4     1000   1258.75      1200    1257.4      1222   1256.52      1263   1257.67      1339
GR   1261.4     1495

NC    0.035    0.035     0.035       0.1       0.3
ET                         7.1                                 1301.78      1840
X1    0.356       17   1508.57   1626.41        20        24        25
GR     1264     1000      1264   1088.28      1262   1142.09      1260   1508.57      1258   1554.97
GR     1256  1602.37      1256   1609.85      1258   1619.18      1260   1626.41      1262   1960.76
GR     1262  2136.35      1264   2509.71      1264   2857.36      1262   2909.62      1262   2921.07
GR     1264  2939.43      1264   3070.52

NC     0.03     0.03     0.035
ET                         7.1                                   1400      1687
X1    0.361       22   1435.97   1663.97        20        30        20
X3        0                        1400      1264      1687      1264
GR     1264  1007.01      1264   1076.39    1260.8   1435.97    1258.3   1495.97   1257.82   1509.97
GR   1256.6  1543.97   1256.64   1576.97   1257.75   1610.97    1259.4   1625.97   1261.35   1663.97
GR   1261.1  1707.97   1261.37   1760.97   1261.44   1796.97      1262   1846.69      1264   2438.19
GR     1264  2898.97      1262   2922.47      1262   2930.92      1264   2949.83      1264    3096.6
GR     1264  3117.88      1264   3159.85

NC    0.016    0.016     0.016
ET                         7.1                                   1135      1405
  Centerline of Stanford Rd.
Centerline of Stanford Rd.

X1     0.37       16      1226      1327        80        45        30
GR     1268   360.93      1268    363.16      1266    636.74      1264    883.72      1262    971.55
GR   1260.2     1173    1258.8      1226   1257.64      1267   1258.03      1300   1259.07      1327
GR   1261.7     1384   1262.73      1483   1262.83      1517      1264   1865.16      1266   2330.94
GR     1266  2472.04
```

NC	0.1	0.1	0.04	0.1	0.3					
QT	2	5900	5900							
ET			7.1				2165	2520		
X1	0.45	14	2190	2525	170	540	420			
X3	0			2165	1269	2520	1269			
GR	1270	1000	1268	1130	1270	1500	1270	1565	1268	1760
GR	1266	1840	1266	2190	1264	2290	1263.53	2425	1265.38	2525
GR	1266.1	2625	1268	2860	1270	2980	1272	3065		
NC	0.1	0.1	0.04	0.1	0.3					
ET			7.1				2805	3055		
X1	0.49	26	2869.65	2910.55	230	210	230			
X3	0			2805	1277	3055	1277			
GR	1280	1000	1278	1405.5	1276	1533.99	1274	1556.43	1272	2095.1
GR	1270	2267.36	1268	2633.05	1266.75	2869.65	1261.73	2884.38	1261.73	2901.75
GR	1265.2	2910.55	1268	3223.05	1269.5	3290	1268	3326.54	1268	3373.32
GR	1270	3451.82	1272	3550.23	1274	3665.22	1276	3731.92	1278	3864.7
GR	1280	3912.11	1282	4101.51	1282	4124.95	1280	4151.05	1278	4205.19
GR	1278	4240.12								
NC	0.16	0.16	0.05	0.1	0.3					
ET			7.1				2600	2840		
X1	0.58	19	2670	2740	470	520	450			
X3	0			2600	1275	2840	1275			
GR	1282	1000	1280	1270	1278	1400	1276	1560	1276	1825
GR	1274	2130	1274	2240	1272	2645	1270	2670	1267.25	2680.5
GR	1262.7	2700.5	1263.25	2715.5	1266.65	2725.5	1268	2730	1270	2740
GR	1272	2900	1274	3020	1274	3490	1274	3515		
NC				0.1	0.3					
ET			7.1				2407.3	2617		
X1	0.61	18	2407.3	2470	270	150	180			
GR	1284	1000	1282	1150	1280	1670	1278	2015	1276	2280
GR	1273.7	2407.3	1264.85	2417.9	1265.84	2432.1	1271.1	2463.7	1272	2470
GR	1274	2735	1276	2900	1276	3240	1276	3300	1278	3390
GR	1280	3500	1282	3550	1284	3620				
NC	0.16	0.16	0.05	0.1	0.3					
ET			7.1				2330	2500		
X1	0.65	25	2352.2	2460	210	140	200			
X3	0			2330	1280	2500	1280			
GR	1286	1000	1284	1045	1284	1300	1284	1485	1282	1610
GR	1280	1640	1278	1885	1276	2270	1274	2320	1271.9	2352.2
GR	1270.5	2369.4	1267.85	2376.5	1267.31	2385	1269.58	2400.2	1270	2410
GR	1272	2425	1274	2460	1276	2640	1278	2950	1278	3230
GR	1280	3390	1280	3450	1280	3550	1282	3570	1284	3600
NC				0.1	0.3					
ET			7.1				2320	2448		
X1	0.71	18	2340	2448	350	250	295			
X3	0			2320	1283	2448	1283			
GR	1288	1000	1286	1295	1284	1465	1284	1590	1282	1965

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GR    1280      2060      1280      2290      1278      2340      1276      2360      1275.28   2375.5
GR    1269.8    2390.5    1270.58   2405.5    1277.49   2448      1278      2520      1280      2785
GR    1280      3105      1282      3190      1284      3420

NC                                  0.1       0.3
ET                          7.1                                   2450      2595
X1    0.75      23        2537.37   2595      225       300       230
X3    0                               2450      1285      2595      1285
GR    1288      1000      1288      1305      1286      1410      1286      1515      1284      1570
GR    1284      2085      1282      2110      1280      2400      1278      2460      1278.32   2537.37
GR    1277.9    2545.87   1273.27   2553.45   1272.95   2570.55   1276.76   2577.77   1278      2595
GR    1280      2600      1282      2700      1282      2980      1284      3060      1286      3115
GR    1288      3280      1290      3340      1292      3500

NC                                  0.1       0.3
ET                          7.1                                   2900      3200
X1    0.79      34        2970.26   3074.46   190       375       230
X3    0                               2900      1294      3200      1294
GR    1290      1019.41   1288      1389.87   1288      1507.08   1290      1679.62   1290      1715.71
GR    1288      1846.84   1286      2061.65   1286      2107.86   1286      2218.55   1284      2646.3
GR    1282      2761.77   1280      2778.47   1280      2800.63   1280      2970.26   1280      2970.26
GR    1278.3    3015.63   1277.9    3024.13   1273.27   3031.71   1272.95   3048.81   1276.76   3056.03
GR    1280      3062.26   1282      3074.46   1284      3200.69   1284      3260.84   1284      3310.56
GR    1286      3525.03   1288      3590.84   1290      3732.33   1292      3849.77   1294      3861.63
GR    1296      3925.36   1296      4046.79   1300      4158.14   1302      4219.52

NC                                  0.1       0.3
ET                          7.1                                   1920      2180
X1    0.83      20        2060      2146.9    135       250       220
GR    1290      1000      1288      1070      1288      1255      1286      1545      1284      1765
GR    1282      2060      1280.01   2074.5    1275.69   2104.7    1274.89   2125      1281.48   2146.9
GR    1282      2155      1284      2185      1284      2290      1284      2395      1286      2440
GR    1288      2620      1290      2670      1292      2820      1294      2900      1296      2975

NC                                  0.1       0.3
ET                          7.1                                   2790      2940
X1    0.86      27        2790      2920      105       290       180
X3    0                               2790      1290      2940      1290
GR    1298      1000      1296      1110      1294      1140      1292      1165      1290      1220
GR    1290      1880      1288      1980      1286      2600      1284      2790      1282.03   2802.5
GR    1275.8    2822.5    1275.03   2847.5    1279.51   2867.5    1282      2910      1284      2920
GR    1286      2940      1288      3090      1288      3240      1286      3310      1286      3330
GR    1288      3370      1290      3530      1292      3620      1294      3640      1296      3710
GR    1298      3740      1300      3770

NC                                  0.1       0.3
ET                          7.1                                   2460      2640
X1    0.9       26        2540      2608      330       130       235
X3    0                               2460      1293      2640      1293
GR    1310      1000      1304      1075      1302      1095      1300      1155      1298      1235
GR    1296      1255      1294      1270      1292      1490      1290      2140      1288      2440
GR    1286      2540      1285.15   2552.7    1277.34   2570      1277.26   2581.9    1283.72   2608
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GR     1284      2625      1286      2660      1288      2775      1288      3105      1288      3170
GR     1290      3260      1292      3330      1294      3455      1296      3480      1298      3482
GR     1300      3484

NC                                   0.1       0.3
ET                           7.1                                   2380      2540
X1     0.96        31    2409.5      2510       330       385       300
X3        0                          2380      1299      2540      1292
GR     1330      1000      1320      1070      1310      1170      1308      1190      1306      1275
GR     1304      1290      1302      1295      1300      1315      1298      1340      1296      1380
GR     1296      1485      1294      1605      1292      1740      1292      1785      1292      2300
GR     1290      2390   1289.88    2409.5   1278.52    2434.4   1278.65   2445.55   1287.07   2475.95
GR     1288      2490      1290      2510      1292      2720      1292      2880      1290      3010
GR     1290      3020      1292      3025      1294      3215      1296      3280      1298      3350
GR     1300      3400

NC                                   0.1       0.3
ET                           7.1                                   2160      2340
X1        1        24      2183      2305       160       160       230
GR     1320      1000      1318      1015      1316      1030      1314      1060      1312      1080
GR     1310      1090      1308      1115      1306      1155      1304      1190      1302      1200
GR     1300      1240      1298      1350      1296      1550      1294      1655      1292      2183
GR   1290.5   2198.85   1280.94   2229.13   1282.07    2260.9    1290.7   2287.15      1292      2305
GR     1294      2820      1296      3015      1298      3055      1300      3080

NC                                   0.3       0.5
ET                           7.1                                   2170      2330
X1    1.004        26   2244.41   2317.75        55        65        40
X3        0                          2170      1295      2330      1295
GR     1320      1000      1318      1015      1316      1030      1314      1060      1312      1080
GR     1310      1090      1308      1115      1306      1155      1304      1190      1302      1200
GR     1300      1240      1298      1350      1296      1550      1294      1655   1290.89   2244.41
GR   1282.1   2252.04   1281.69   2265.98    1281.4      2280   1282.16   2286.38   1281.84   2310.56
GR   1291.1   2317.75      1292      2340      1294      2840      1296      2975      1298      3030
GR     1300      3060

NC                                   0.3       0.5
ET                           7.1                                   2140      2404
SC    3.013       0.4       2.5       200         6        10    119.44      11.1   1281.44    1281.4
X1     1.03        24    2274.7   2362.71       100       100       118
X2                            2                 1290.14
X3        0                          2140      1295      2404      1295
GR     1320      1031      1318      1051      1316      1066      1314      1096      1312      1121
GR     1310      1131      1308      1151      1306      1186      1304      1211      1302      1231
GR     1300      1331      1298      1421      1294      1671      1294      1861   1289.6    2274.7
GR   1281.4   2296.41   1282.12   2342.33      1289   2362.71      1289   2362.71      1292      2471
GR     1294      2581      1296      2866      1298      2934      1300      3011

NC     0.16      0.16      0.05       0.1       0.3
ET                           7.1                                   2150      2305
X1     1.06        34      2215   2278.14       230       130       190
X3        0                          2150      1297      2305      1297
```

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GR     1330      1000      1328      1023      1326      1055      1324      1070      1322      1090
GR     1320      1100      1318      1115      1316      1130      1314      1160      1312      1190
GR     1310      1265      1308      1280      1306      1290      1304      1310      1302      1435
GR     1300      1675      1298      1725      1296      1940      1294      2150      1292      2215
GR   1291.3   2216.36   1285.24   2223.59   1285.43   2256.41   1290.67      2265   1294.11   2278.14
GR     1296      2310      1296      2500      1296      2600      1296      2670      1298      2705
GR     1300      2790      1302      2800      1304      2840      1306      2900

NC                                    0.1       0.3
ET                           7.1                            1900      2230
X1     1.11        33      2060   2109.52        80       270       230
GR     1330      1000      1328      1025      1326      1040      1324      1055      1322      1085
GR     1320      1155      1318      1170      1316      1180      1314      1200      1312      1210
GR     1310      1295      1308      1315      1306      1345      1304      1370      1304      1480
GR     1302      1540      1300      1720      1298      1725      1296      1885      1294      2060
GR   1293.2    2063.1   1287.07   2069.18   1287.84   2090.83   1295.17   2109.52   1295.28   2125.41
GR     1296      2275      1298      2325      1300      2420      1302      2760      1304      2815
GR     1306      2860      1308      2880      1310      2970

NC                                    0.1       0.3
ET                           7.1                            2090      2310
X1     1.16        35      2090      2200       335       250       250
GR     1390      1000      1380      1070      1370      1105      1360      1160      1350      1185
GR     1340      1295      1330      1378      1328      1395      1326      1408      1324      1415
GR     1320      1440      1318      1455      1316      1570      1314      1685      1312      1700
GR     1310      1705      1308      1760      1306      1770      1304      1850      1302      1920
GR     1302      1935      1300      2090   1297.87    2101.3      1289    2140.6    1288.8    2159.4
GR   1297.2    2189.5      1298      2200      1300      2368      1302      2625      1304      2784
GR     1306      2880      1308      2905      1310      2970      1312      2987      1314      3005

NC                                    0.1       0.3
ET                           7.1                            2060      2260
X1     1.21        40   2069.85   2192.27       310       235       260
GR     1410      1000      1400   1066.05      1390   1098.38      1380   1182.46      1370   1227.77
GR     1360   1284.67      1350   1314.45      1340   1335.29      1338   1428.08      1336   1449.34
GR     1334   1458.59      1332   1494.39      1330   1515.92      1326   1547.71      1324   1661.37
GR     1322    1691.1      1320   1712.58      1318    1732.6      1316   1749.13      1314   1887.44
GR     1312   1905.12      1310   1960.31   1308.68   2069.85   1293.44   2142.41   1291.24   2149.47
GR   1291.1   2158.77    1291.5   2171.16   1298.08   2192.27      1300   2330.31      1302   2418.34
GR     1304   2613.24      1306   2828.94      1308   2888.84      1312   3003.35      1314   3026.63
GR     1316   3035.99      1318   3044.53      1320   3050.51      1322   3055.18      1324   3067.11

NC                                    0.1       0.3
ET                           7.1                            1580      1750
X1     1.24        21   1560.56   1641.73       140       105       130
GR     1330      1000      1328      1100      1326      1105      1324      1165      1322      1235
GR     1320      1315      1318      1345      1316      1365      1314      1425   1311.56   1560.56
GR   1292.6   1584.83   1291.77   1590.84   1292.04   1609.16   1298.93   1641.73      1300      1680
GR     1302      1910      1304      1935      1306      2200      1308      2270      1310      2365
GR     1314      2425

NC                                    0.1       0.3
```

```
ET                                  7.1                                     1400      1700
X1      1.29        20      1406.1   1478.73      265        70      240
GR      1330      1000        1328      1030     1326      1040     1324      1054      1322      1165
GR      1320      1190        1318      1202     1316      1300     1316      1330   1313.92    1406.1
GR    1292.9   1434.16     1294.73   1457.06  1295.18   1465.85  1301.24   1478.73      1302      1658
GR      1304      1880        1306      1980     1308      2120     1310      2200      1316      2265

NC                                        0.1      0.3
ET                                  7.1                                     1900      2020
X1      1.38        24    1924.181  2017.271      660       175      465
GR    1329.7   1004.63    1327.768  1064.631 1325.768  1162.631 1323.768  1249.631  1321.768  1312.631
GR    1319.7  1319.631    1317.768  1414.631 1315.768  1504.631 1313.768  1516.631  1311.768  1614.631
GR    1309.7  1704.631    1307.768  1804.631 1306.468  1924.181 1296.858  1970.611  1296.348  1998.651
GR    1306.1  2017.271     1307.77   2126.28  1309.77   2277.91  1309.77   2277.91      1312   2329.14
GR      1314   2360.23        1316   2378.86     1318   2400.21     1320   2408.17

NC      0.06      0.06        0.04       0.3      0.5
QT         2      4900        4900
ET                                  7.1                                     1930      2140
X1       1.4        24    2068.02  2111.98      110         1      110
X3         0                            1930     1310      2140     1310
GR      1330      1000        1326      1125     1324      1200     1322      1250      1320      1390
GR      1318      1450        1316      1475     1314      1575     1312      1640      1310      1690
GR      1308      1720        1306      1770     1304      1890     1302      2030      1302   2068.02
GR    1297.4   2078.21     1296.97    2094.8  1296.95   2101.79     1302   2111.98      1302      2120
GR      1306      2125        1308      2360     1310      2520     1312      2565

NC      0.05      0.05        0.04       0.3      0.5
ET                                  7.1                                     1950      2160
SC     3.013       0.4         2.5       350        6        10    81.83      11.3   1297.72   1296.95
X1      1.41        32     2121.17    2157.4       85        90       80
X2                                  2                1305.89
X3         0                            1950     1310      2160     1310
GR      1330      1000        1330      1060     1328      1130     1326      1200      1324      1250
GR      1322      1320        1320      1400     1318      1450     1316      1540      1314      1610
GR      1312      1700        1310      1775     1308      1840     1306      1975    1305.8   2121.17
GR    1298.7    2122.5     1297.53    2129.7  1297.69   2138.26  1297.72      2145   1297.61    2149.9
GR    1299.1    2156.5     1305.43    2157.4     1308      2190     1310   2233.69      1310   2233.69
GR      1312    2347.8        1314   2423.12     1316   2465.77     1318      2493      1320   2506.28
GR      1322   2528.87        1324   2624.68

NC      0.05      0.05       0.035       0.1      0.3
ET                                  7.1                                     1420      1650
  Section G
Section G

X1      1.43        27    1573.75    1653.9   122.79    210.09   242.56
GR      1318      1000        1316   1053.19     1314    1130.3     1312   1238.7      1310   1317.57
GR      1308   1379.41        1308   1395.06     1306   1573.75     1304   1579.04      1302   1585.02
GR      1300   1599.48        1300   1618.97     1302   1625.16     1304   1633.39      1306   1637.35
GR      1308   1646.02        1310    1653.9     1310   1678.41     1312   1707.58      1314   1740.59
GR      1316   1812.19        1318   1824.12     1320   1862.71     1322   1886.59      1326   1974.56
```

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GR     1328    1986.32      1330    1997.44

NC     0.05       0.05     0.035       0.1       0.3
ET                           7.1                              1130       1330
  Section H
Section H

X1     1.49         20   1158.09   1299.57    232.11    312.32    312.32
GR     1312       1000      1310    1077.2      1308   1158.09      1306   1178.69      1304   1195.68
GR     1304    1270.19      1306   1288.97      1308   1299.57      1310   1328.68      1310   1330.02
GR     1308    1352.66      1306   1390.45      1306   1410.18      1308   1427.32      1310    1435.2
GR     1312    1447.21      1314   1455.27      1316   1474.58      1318    1642.6      1320   1652.77

NC      0.1        0.1      0.05       0.1       0.3
ET                           7.1                              1240       1360
  Section I
Section I

X1     1.54         20   1210.56   1317.04     161.2    232.57    197.89
GR     1316       1000      1316    1000        1314   1180.36      1312   1210.56      1308   1235.49
GR     1306    1254.09      1306   1290.75      1308   1301.37      1310   1317.04      1312   1393.17
GR     1314     1414.6      1316   1442.51      1318   1476.47      1320    1621.7      1322   1639.76
GR     1324       1769      1326   1905.67      1328   1981.45      1330   2002.19      1330   2141.44

NC     0.05       0.05     0.035       0.1       0.3
ET                           7.1                              1200       1310
  Section J
Section J

X1      1.6         17    1168.9   1365.27    244.21    314.35    271.35
GR     1340       1000      1330   1118.28      1320   1168.9      1310   1196.12      1308   1214.17
GR     1308    1266.03      1310   1279.53      1312   1300.54      1314    1315.3      1316   1327.95
GR     1318     1342.9      1320   1365.27      1322   1535.88      1324   1550.45      1326   1730.04
GR     1328    1775.33      1330   1835.25

NC     0.05       0.05     0.035
QT        2       3600      3600
ET                           7.1                              1170       1270
  Section K
Section K

X1     1.71         18   1143.43      1264    755.51    634.79    705.17
GR     1324       1000      1324   1108.74      1322   1143.43      1320   1152.75      1314   1178.34
GR     1312    1187.95      1312      1206      1314   1232.74      1316      1264      1318    1343.6
GR     1320    1436.51      1320   1440.93      1318   1471.24      1318   1511.22      1320   1554.45
GR     1322    1579.35      1324    1627.2      1326   1727.08

NC     0.05       0.05     0.035
ET                           7.1                              1300       1430
  Section L
Section L
```

X1	1.86	17	1100.64	1520.27	660.31	715.37	685.32			
GR	1330	1000.07	1328	1100.64	1324	1178.93	1322	1244.47	1320	1334.25
GR	1320	1425.86	1322	1478.71	1324	1520.27	1326	1725.05	1328	1834.66
GR	1328	1926.81	1326	1935.29	1324	1943.06	1324	1951.59	1326	1973.28
GR	1328	1985.66	1330	2132.84						
NC	0.05	0.05	0.04							
ET			7.1				1380	1500		

Section M
Section M

X1	2.02	22	1378.49	1502.97	818	735.45	684.84			
GR	1340	1000	1338	1021.94	1338	1041.57	1338	1092.36	1336	1128.75
GR	1336	1229.2	1336	1260.2	1334	1311.34	1332	1357.4	1330	1378.49
GR	1326	1392.94	1324	1414.36	1324	1428.63	1326	1442.78	1328	1502.97
GR	1328	1605.87	1328	1664.57	1326	1677.13	1326	1715.21	1328	1722.69
GR	1330	1728.21	1332	1852.1						

STATUS: Friction loss equation index (IHLEQ) = 1. Therefore friction loss (HL) is calculated as a function of the profile type, which can vary from reach to reach. See documentation for further details.

T1 AZ02079
T2 ECHO CANYON LOMR
T3 REVISED MODEL

JOB PARAMETERS :

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		3						6600	1247.9	
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	15		-1				-1	-6		

STATUS: Friction loss equation index (IHLEQ) = 1. Therefore friction loss (HL) is calculated as a function of the profile type, which can vary from reach to reach. See documentation for further details.

SPECIAL NOTE :

An asterisk (*) to the left of the cross-section number indicates a special note is present in the SUMMARY OF WARNING AND STATUS MESSAGES section.

SUMMARY PRINTOUT TABLE 110 : ECHO CANYON LOMR
REVISED MODEL
AZ02079

	Cross-Section Number SECNO	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Energy Gradient Elevation (ft MSL) EG	Water Surface Top Width (ft) TOPWID	Left Overbank Flow (cfs) QLOB	Channel Flow (cfs) QCH	Right Overbank Flow (cfs) QROB	Encroach. Target Requested PERENC	Left Encroach. Station (ft) STENCL	Left Bank Station (ft) STCHL	Right Bank Station (ft) STCHR	Right Encroach. Station (ft) STENCR
	0.000	1246.90	0.00	1247.78	240.44	0.00	6600.00	0.00	0.00	0.00	0.00	264.00	0.00
	0.000	1247.90	0.00	1248.44	250.04	0.00	6600.00	0.00	0.00	0.00	0.00	264.00	0.00
*	0.003	1247.77	0.00	1247.87	273.85	0.00	6600.00	0.00	0.00	0.00	0.00	282.00	0.00
*	0.003	1248.41	0.63	1248.49	273.86	0.00	6600.00	0.00	273.86	4.20	0.00	282.00	278.06
	0.026	1247.81	0.00	1247.89	318.25	0.00	6600.00	0.00	0.00	0.00	0.00	364.00	0.00
	0.026	1248.44	0.63	1248.50	318.27	0.00	6600.00	0.00	318.27	31.63	0.00	364.00	349.90
	0.049	1247.84	0.00	1247.90	380.97	0.00	6600.00	0.00	0.00	0.00	0.00	429.00	0.00
	0.049	1248.47	0.62	1248.51	381.00	0.00	6600.00	0.00	381.00	18.92	0.00	429.00	399.92
	0.081	1247.87	0.00	1247.91	425.60	0.00	6600.00	0.00	0.00	0.00	0.00	459.00	0.00
	0.081	1248.49	0.62	1248.52	425.63	0.00	6600.00	0.00	425.63	9.54	0.00	459.00	435.17
	0.117	1247.89	0.00	1247.92	484.93	0.00	6600.00	0.00	0.00	0.00	0.00	525.00	0.00
	0.117	1248.50	0.62	1248.53	484.95	0.00	6600.00	0.00	484.95	17.09	0.00	525.00	502.04
	0.139	1247.89	0.00	1247.93	466.94	0.00	6600.00	0.00	0.00	0.00	0.00	522.00	0.00
	0.139	1248.50	0.62	1248.54	466.98	0.00	6600.00	0.00	466.98	30.02	0.00	522.00	497.00
*	0.172	1247.87	0.00	1247.96	302.83	0.00	6600.00	0.00	0.00	0.00	0.00	343.00	0.00
*	0.172	1248.49	0.62	1248.56	302.84	0.00	6600.00	0.00	302.84	17.32	0.00	343.00	320.16
*	0.178	1249.07	0.00	1250.64	289.87	0.00	5897.40	702.60	0.00	0.00	0.00	92.00	0.00
*	0.178	1249.08	0.00	1250.63	289.87	0.00	5876.57	723.43	289.87	12.82	0.00	92.00	302.69
*	0.188	1251.01	0.00	1252.31	309.72	0.00	5584.90	1015.10	0.00	0.00	0.00	87.00	0.00
*	0.188	1251.00	-0.01	1252.31	308.55	0.00	5590.53	1009.47	308.55	7.23	0.00	87.00	315.78
	0.190	1252.24	0.00	1252.95	316.44	0.00	4623.19	1976.81	0.00	0.00	100.00	185.00	0.00

	Cross-Section Number SECNO	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Energy Gradient Elevation (ft MSL) EG	Water Surface Top Width (ft) TOPWID	Left Overbank Flow (cfs) QLOB	Channel Flow (cfs) QCH	Right Overbank Flow (cfs) QROB	Encroach. Target Requested PERENC	Left Encroach. Station (ft) STENCL	Left Bank Station (ft) STCHL	Right Bank Station (ft) STCHR	Right Encroach. Station (ft) STENCR
	0.190	1252.27	0.03	1252.94	315.68	0.00	4535.50	2064.50	315.68	104.37	100.00	185.00	420.05
*	0.206	1252.75	0.00	1253.10	294.40	0.04	2916.56	3683.40	0.00	0.00	100.00	171.00	0.00
*	0.206	1252.75	-0.01	1253.09	293.83	0.04	2918.31	3681.65	293.83	98.23	100.00	171.00	392.06
*	0.238	1252.81	0.00	1253.45	232.49	0.00	3036.07	3563.93	0.00	0.00	0.00	78.00	0.00
*	0.238	1252.82	0.00	1253.44	231.83	0.00	2989.92	3610.09	231.83	9.52	0.00	78.00	241.35
*	0.240	1254.00	0.00	1255.54	241.99	0.00	5453.70	1146.30	0.00	0.00	0.00	86.00	0.00
*	0.240	1253.96	-0.04	1255.54	241.74	0.00	5482.81	1117.19	241.74	10.56	0.00	86.00	252.30
*	0.246	1254.63	0.00	1256.07	232.49	0.00	4926.25	1673.75	0.00	0.00	0.00	93.00	0.00
*	0.246	1254.81	0.18	1257.21	122.43	0.00	6062.49	537.51	122.43	25.94	0.00	93.00	148.37
*	0.248	1256.07	0.00	1256.58	257.64	0.00	4050.92	2549.08	0.00	0.00	200.00	293.00	0.00
*	0.248	1256.46	0.38	1257.21	166.87	0.00	4947.91	1652.09	166.87	205.20	200.00	293.00	372.07
	0.268	1256.22	0.00	1256.73	252.31	0.00	3735.75	2864.25	0.00	0.00	0.00	95.00	0.00
	0.268	1256.65	0.43	1257.43	156.81	0.00	4605.23	1994.77	156.81	13.56	0.00	95.00	170.37
	0.289	1256.27	0.00	1257.07	203.27	0.00	3161.86	3438.14	0.00	0.00	0.00	73.00	0.00
	0.289	1256.74	0.47	1257.88	133.31	0.00	3725.66	2874.34	133.31	21.72	0.00	73.00	155.03
	0.291	1256.49	0.00	1257.13	212.91	0.00	3271.75	3328.25	0.00	0.00	0.00	73.00	0.00
	0.291	1257.01	0.51	1257.96	140.85	0.00	4076.97	2523.03	140.85	9.15	0.00	73.00	150.00
*	0.307	1256.39	0.00	1257.52	175.71	0.00	6600.00	0.00	0.00	0.00	1000.00	1203.00	0.00
	0.307	1257.44	1.05	1258.17	185.87	0.00	6600.00	0.00	203.00	1000.00	1000.00	1203.00	1203.00
	0.320	1256.54	0.00	1257.93	145.32	0.00	6600.00	0.00	0.00	0.00	1000.00	1162.00	0.00
	0.320	1257.47	0.93	1258.47	142.86	0.00	6600.00	0.00	150.00	1000.00	1000.00	1162.00	1150.00
*	0.322	1257.43	0.00	1258.07	150.39	0.00	6600.00	0.00	0.00	0.00	1000.00	1162.00	0.00
*	0.322	1258.02	0.59	1258.56	153.83	0.00	6600.00	0.00	162.00	1000.00	1000.00	1162.00	1162.00
	0.344	1257.55	0.00	1258.30	141.73	0.00	6600.00	0.00	0.00	0.00	1090.00	1247.00	0.00
	0.344	1258.11	0.56	1258.75	144.74	0.00	6600.00	0.00	157.00	1090.00	1090.00	1247.00	1247.00
*	0.352	1260.79	0.00	1261.76	469.38	1062.04	4484.42	1053.54	0.00	0.00	1200.00	1339.00	0.00
*	0.352	1261.12	0.34	1263.04	159.00	162.91	6155.52	281.57	159.00	1190.00	1200.00	1339.00	1349.00
*	0.356	1262.10	0.00	1262.78	1030.81	1327.34	4048.68	1223.98	0.00	0.00	1508.57	1626.41	0.00
*	0.356	1262.96	0.86	1263.28	538.22	1649.53	3333.02	1617.45	538.22	1301.78	1508.57	1626.41	1840.00

	Cross-Section Number SECNO	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Energy Gradient Elevation (ft MSL) EG	Water Surface Top Width (ft) TOPWID	Left Overbank Flow (cfs) QLOB	Channel Flow (cfs) QCH	Right Overbank Flow (cfs) QROB	Encroach. Target Requested PERENC	Left Encroach. Station (ft) STENCL	Left Bank Station (ft) STCHL	Right Bank Station (ft) STCHR	Right Encroach. Station (ft) STENCR
	0.361	1262.08	0.00	1262.96	287.00	159.73	6382.82	57.45	287.00	1400.00	1435.97	1663.97	1687.00
	0.361	1262.84	0.77	1263.41	287.00	266.37	6210.87	122.76	287.00	1400.00	1435.97	1663.97	1687.00
*	0.370	1262.37	0.00	1263.27	492.88	2116.21	3826.18	657.61	0.00	0.00	1226.00	1327.00	0.00
	0.370	1262.53	0.16	1263.65	270.00	1669.07	4165.20	765.73	270.00	1135.00	1226.00	1327.00	1405.00
*	0.450	1266.47	0.00	1267.54	355.00	13.99	5886.01	0.00	355.00	2165.00	2190.00	2525.00	2520.00
*	0.450	1266.48	0.01	1267.55	355.00	13.99	5886.01	0.00	355.00	2165.00	2190.00	2525.00	2520.00
*	0.490	1269.40	0.00	1271.19	250.00	461.63	3540.04	1898.32	250.00	2805.00	2869.65	2910.55	3055.00
*	0.490	1269.40	0.00	1271.19	250.00	461.65	3540.00	1898.35	250.00	2805.00	2869.65	2910.55	3055.00
	0.580	1273.86	0.00	1275.03	240.00	186.59	5204.73	508.68	240.00	2600.00	2670.00	2740.00	2840.00
	0.580	1273.86	0.00	1275.03	240.00	186.59	5204.73	508.68	240.00	2600.00	2670.00	2740.00	2840.00
	0.610	1275.14	0.00	1276.76	500.07	45.48	4879.01	975.50	0.00	0.00	2407.30	2470.00	0.00
*	0.610	1275.10	-0.04	1277.04	209.70	0.00	5154.24	745.76	209.70	2407.30	2407.30	2470.00	2617.00
*	0.650	1277.43	0.00	1278.31	170.00	187.76	5528.18	184.07	170.00	2330.00	2352.20	2460.00	2500.00
*	0.650	1277.74	0.31	1278.54	170.00	190.93	5511.93	197.14	170.00	2330.00	2352.20	2460.00	2500.00
*	0.710	1279.44	0.00	1281.03	128.00	22.00	5878.00	0.00	128.00	2320.00	2340.00	2448.00	2448.00
*	0.710	1279.65	0.22	1281.12	128.00	28.05	5871.95	0.00	128.00	2320.00	2340.00	2448.00	2448.00
	0.750	1282.45	0.00	1284.37	145.00	1110.66	4789.34	0.00	145.00	2450.00	2537.37	2595.00	2595.00
	0.750	1282.42	-0.03	1284.36	145.00	1107.04	4792.96	0.00	145.00	2450.00	2537.37	2595.00	2595.00
*	0.790	1285.20	0.00	1285.77	300.00	564.50	5084.07	251.43	300.00	2900.00	2970.26	3074.46	3200.00
*	0.790	1285.19	0.00	1285.76	300.00	564.33	5084.87	250.80	300.00	2900.00	2970.26	3074.46	3200.00
	0.830	1285.96	0.00	1286.43	889.66	991.65	4434.81	473.54	0.00	0.00	2060.00	2146.90	0.00
	0.830	1285.85	-0.11	1286.60	260.00	615.30	5147.44	137.27	260.00	1920.00	2060.00	2146.90	2180.00
	0.860	1286.40	0.00	1287.03	150.00	0.00	5881.23	18.76	150.00	2790.00	2790.00	2920.00	2940.00
	0.860	1286.64	0.24	1287.23	150.00	0.00	5877.01	22.98	150.00	2790.00	2790.00	2920.00	2940.00
*	0.900	1287.30	0.00	1289.88	164.95	39.55	5595.70	264.75	180.00	2460.00	2540.00	2608.00	2640.00
*	0.900	1287.31	0.01	1289.88	165.37	40.14	5594.63	265.23	180.00	2460.00	2540.00	2608.00	2640.00
*	0.960	1291.68	0.00	1292.69	160.00	48.42	5809.43	42.15	160.00	2380.00	2409.50	2510.00	2540.00
*	0.960	1291.67	0.00	1292.69	160.00	48.33	5809.60	42.07	160.00	2380.00	2409.50	2510.00	2540.00
	1.000	1293.13	0.00	1293.86	714.99	71.42	5758.91	69.66	0.00	0.00	2183.00	2305.00	0.00
	1.000	1293.11	-0.02	1293.88	180.00	15.70	5861.06	23.24	180.00	2160.00	2183.00	2305.00	2340.00

	Cross-Section Number SECNO	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Energy Gradient Elevation (ft MSL) EG	Water Surface Top Width (ft) TOPWID	Left Overbank Flow (cfs) QLOB	Channel Flow (cfs) QCH	Right Overbank Flow (cfs) QROB	Encroach. Target Requested PERENC	Left Encroach. Station (ft) STENCL	Left Bank Station (ft) STCHL	Right Bank Station (ft) STCHR	Right Encroach. Station (ft) STENCR
	1.004	1293.22	0.00	1294.07	160.00	136.48	5746.61	16.91	160.00	2170.00	2244.41	2317.75	2330.00
	1.004	1293.22	0.01	1294.08	160.00	137.13	5745.88	16.99	160.00	2170.00	2244.41	2317.75	2330.00
	1.030	1293.55	0.00	1294.07	264.00	393.36	5343.18	163.46	264.00	2140.00	2274.70	2362.71	2404.00
	1.030	1293.56	0.01	1294.08	264.00	394.25	5342.05	163.70	264.00	2140.00	2274.70	2362.71	2404.00
*	1.060	1294.41	0.00	1297.17	133.16	140.87	5758.87	0.26	155.00	2150.00	2215.00	2278.14	2305.00
*	1.060	1294.40	0.00	1297.17	133.11	140.46	5759.28	0.25	155.00	2150.00	2215.00	2278.14	2305.00
*	1.110	1298.38	0.00	1299.30	619.39	1169.63	4003.96	726.42	0.00	0.00	2060.00	2109.52	0.00
*	1.110	1298.36	-0.01	1299.56	330.00	991.17	4359.64	549.19	330.00	1900.00	2060.00	2109.52	2230.00
	1.160	1299.94	0.00	1300.95	272.33	0.00	5784.77	115.23	0.00	0.00	2090.00	2200.00	0.00
	1.160	1300.29	0.35	1301.18	220.00	0.00	5731.49	168.51	220.00	2090.00	2090.00	2200.00	2310.00
	1.210	1301.65	0.00	1302.76	299.82	0.00	5313.82	586.18	0.00	0.00	2069.85	2192.27	0.00
	1.210	1301.74	0.08	1302.96	157.10	0.00	5530.18	369.82	200.00	2060.00	2069.85	2192.27	2260.00
	1.240	1302.42	0.00	1303.81	343.00	0.00	5370.89	529.10	0.00	0.00	1560.56	1641.73	0.00
	1.240	1302.52	0.10	1304.09	170.00	0.00	5469.63	430.37	170.00	1580.00	1560.56	1641.73	1750.00
	1.290	1304.19	0.00	1305.56	470.19	0.00	4925.38	974.62	0.00	0.00	1406.10	1478.73	0.00
	1.290	1304.57	0.38	1305.81	281.42	0.00	4913.16	986.84	300.00	1400.00	1406.10	1478.73	1700.00
	1.380	1307.49	0.00	1308.59	278.38	21.94	5842.79	35.27	0.00	0.00	1924.18	2017.27	0.00
	1.380	1307.53	0.04	1308.64	120.00	14.83	5882.58	2.60	120.00	1900.00	1924.18	2017.27	2020.00
*	1.400	1308.74	0.00	1309.01	210.00	2188.58	2465.60	245.82	210.00	1930.00	2068.02	2111.98	2140.00
*	1.400	1308.79	0.05	1309.06	210.00	2194.36	2458.14	247.50	210.00	1930.00	2068.02	2111.98	2140.00
*	1.410	1307.79	0.00	1309.25	210.00	1095.40	3789.04	15.56	210.00	1950.00	2121.17	2157.40	2160.00
*	1.410	1307.90	0.12	1309.25	210.00	1165.49	3718.50	16.01	210.00	1950.00	2121.17	2157.40	2160.00
*	1.430	1309.44	0.00	1310.06	316.75	1218.18	3681.82	0.00	0.00	0.00	1573.75	1653.90	0.00
*	1.430	1309.37	-0.07	1310.08	230.00	1069.92	3830.08	0.00	230.00	1420.00	1573.75	1653.90	1650.00
	1.490	1310.31	0.00	1310.65	371.68	148.29	3909.54	842.17	0.00	0.00	1158.09	1299.57	0.00
	1.490	1310.25	-0.06	1310.84	200.00	113.83	4725.39	60.78	200.00	1130.00	1158.09	1299.57	1330.00
*	1.540	1311.77	0.00	1313.57	172.55	0.00	4783.54	116.46	0.00	0.00	1210.56	1317.04	0.00
*	1.540	1312.03	0.26	1314.17	120.00	0.00	4732.08	167.92	120.00	1240.00	1210.56	1317.04	1360.00
*	1.600	1314.59	0.00	1315.48	135.43	0.00	4900.00	0.00	0.00	0.00	1168.90	1365.27	0.00
*	1.600	1314.98	0.38	1315.90	110.00	0.00	4900.00	0.00	110.00	1200.00	1168.90	1365.27	1310.00

	Cross-Section Number SECNO	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Energy Gradient Elevation (ft MSL) EG	Water Surface Top Width (ft) TOPWID	Left Overbank Flow (cfs) QLOB	Channel Flow (cfs) QCH	Right Overbank Flow (cfs) QROB	Encroach. Target Requested PERENC	Left Encroach. Station (ft) STENCL	Left Bank Station (ft) STCHL	Right Bank Station (ft) STCHR	Right Encroach. Station (ft) STENCR
*	1.710	1317.98	0.00	1318.99	181.59	0.00	3422.88	177.12	0.00	0.00	1143.43	1264.00	0.00
*	1.710	1318.09	0.10	1319.21	100.00	0.00	3563.99	36.01	100.00	1170.00	1143.43	1264.00	1270.00
	1.860	1323.05	0.00	1323.61	290.75	0.00	3600.00	0.00	0.00	0.00	1100.64	1520.27	0.00
	1.860	1323.28	0.23	1324.46	130.00	0.00	3600.00	0.00	130.00	1300.00	1100.64	1520.27	1430.00
	2.020	1328.88	0.00	1329.50	342.58	0.00	2409.04	1190.96	0.00	0.00	1378.49	1502.97	0.00
	2.020	1329.76	0.88	1330.81	120.00	0.00	3600.00	0.00	120.00	1380.00	1378.49	1502.97	1500.00

SUMMARY PRINTOUT TABLE 150 : ECHO CANYON LOMR
---------- REVISED MODEL
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	Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Top of Roadway Elevation (ft MSL) ELTRD	Max. Low Chord Elevation (ft MSL) ELLC	Minimum C. S. Elevation (ft MSL) ELMIN	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	Critical W. S. Elevation (ft MSL) CRIWS	Energy Gradient Elevation (ft MSL) EG	Energy Gradient Slope * 10,000 10K*S	Channel Mean Flow Velocity (ft/s) VCH	Cross-Section Area (sq ft) AREA	Index Q (0.01 * Convey.) .01K
	0.000	0.00	0.00	0.00	1242.90	6600.00	1246.90	1246.06	1247.78	56.72	7.54	874.86	876.37
	0.000	0.00	0.00	0.00	1242.90	6600.00	1247.90	1246.06	1248.44	26.25	5.89	1120.10	1288.18
*	0.003	18.00	0.00	0.00	1236.60	6600.00	1247.77	1240.00	1247.87	1.69	2.48	2658.60	5083.41
*	0.003	18.00	0.00	0.00	1236.60	6600.00	1248.41	1240.01	1248.49	1.37	2.33	2831.60	5629.46
	0.026	118.00	0.00	0.00	1236.60	6600.00	1247.81	1239.79	1247.89	0.99	2.20	3006.76	6617.35
	0.026	118.00	0.00	0.00	1236.60	6600.00	1248.44	1239.78	1248.50	0.81	2.06	3206.25	7345.80
	0.049	125.00	0.00	0.00	1236.00	6600.00	1247.84	1239.56	1247.90	0.72	1.85	3560.91	7793.86
	0.049	125.00	0.00	0.00	1236.00	6600.00	1248.47	1239.56	1248.51	0.58	1.74	3798.24	8659.59
	0.081	167.00	0.00	0.00	1236.10	6600.00	1247.87	1239.36	1247.91	0.53	1.62	4073.94	9062.14
	0.081	167.00	0.00	0.00	1236.10	6600.00	1248.49	1239.35	1248.52	0.43	1.52	4337.61	10040.95
	0.117	191.00	0.00	0.00	1236.10	6600.00	1247.89	1239.21	1247.92	0.39	1.41	4692.60	10518.71
	0.117	191.00	0.00	0.00	1236.10	6600.00	1248.50	1239.23	1248.53	0.32	1.32	4991.37	11638.59
	0.139	115.00	0.00	0.00	1236.40	6600.00	1247.89	1239.80	1247.93	0.54	1.57	4197.52	8964.56
	0.139	115.00	0.00	0.00	1236.40	6600.00	1248.50	1239.81	1248.54	0.44	1.47	4484.48	9991.22

	Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Top of Roadway Elevation (ft MSL) ELTRD	Max. Low Chord Elevation (ft MSL) ELLC	Minimum C. S. Elevation (ft MSL) ELMIN	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	Critical W. S. Elevation (ft MSL) CRIWS	Energy Gradient Elevation (ft MSL) EG	Energy Gradient Slope * 10,000 10K*S	Channel Mean Flow Velocity (ft/s) VCH	Cross-Section Area (sq ft) AREA	Index Q (0.01 * Convey.) .01K
*	0.172	174.00	0.00	0.00	1236.70	6600.00	1247.87	1240.20	1247.96	1.29	2.36	2801.65	5816.08
*	0.172	174.00	0.00	0.00	1236.70	6600.00	1248.49	1240.22	1248.56	1.23	2.21	2988.82	5949.05
*	0.178	30.00	0.00	0.00	1237.80	6600.00	1249.07	1249.07	1250.64	40.62	10.58	785.72	1035.54
*	0.178	30.00	0.00	0.00	1237.80	6600.00	1249.08	1249.08	1250.63	42.63	10.54	786.78	1010.89
*	0.188	54.00	0.00	0.00	1239.10	6600.00	1251.01	1251.01	1252.31	36.17	9.82	858.01	1097.48
*	0.188	54.00	0.00	0.00	1239.10	6600.00	1251.00	1251.00	1252.31	36.54	9.84	855.03	1091.87
	0.190	10.00	1251.40	1248.10	1239.20	6600.00	1252.24	0.00	1252.95	20.70	7.65	1125.39	1450.54
	0.190	10.00	1251.40	1248.10	1239.20	6600.00	1252.27	0.00	1252.94	21.61	7.47	1134.46	1419.83
*	0.206	87.00	0.00	0.00	1241.30	6600.00	1252.75	1250.63	1253.10	9.72	5.45	1452.26	2117.13
*	0.206	87.00	0.00	0.00	1241.30	6600.00	1252.75	1250.64	1253.09	9.76	5.46	1450.39	2112.89
*	0.238	168.00	0.00	0.00	1243.10	6600.00	1252.81	1251.25	1253.45	21.31	7.11	1052.29	1429.57
*	0.238	168.00	0.00	0.00	1243.10	6600.00	1252.82	1251.25	1253.44	21.78	7.00	1053.20	1414.13
*	0.240	11.00	0.00	0.00	1243.20	6600.00	1254.00	1254.00	1255.54	44.87	10.76	762.78	985.25
*	0.240	11.00	0.00	0.00	1243.20	6600.00	1253.96	1253.96	1255.54	46.06	10.87	754.04	972.47
*	0.246	32.00	0.00	0.00	1243.60	6600.00	1254.63	1254.63	1256.07	43.67	10.74	781.53	998.73
*	0.246	32.00	0.00	0.00	1243.60	6600.00	1254.81	1254.81	1257.21	65.25	12.88	566.60	817.08
*	0.248	11.00	1255.40	1252.10	1243.60	6600.00	1256.07	0.00	1256.58	15.00	6.39	1209.43	1703.84
*	0.248	11.00	1255.40	1252.10	1243.60	6600.00	1256.46	0.00	1257.21	21.50	7.42	967.58	1423.30
	0.268	102.00	0.00	0.00	1245.50	6600.00	1256.22	1254.40	1256.73	14.70	6.53	1198.69	1721.39
	0.268	102.00	0.00	0.00	1245.50	6600.00	1256.65	1254.59	1257.43	19.78	7.59	949.10	1483.90
	0.289	115.00	1260.60	1260.60	1246.90	6600.00	1256.27	1255.07	1257.07	19.77	8.52	981.17	1484.41
	0.289	115.00	1260.60	1260.60	1246.90	6600.00	1256.74	1255.35	1257.88	28.98	9.42	788.50	1225.93
	0.291	10.00	1260.50	1260.60	1246.95	6600.00	1256.49	1254.76	1257.13	16.40	7.39	1069.66	1629.53
	0.291	10.00	1260.50	1260.60	1246.95	6600.00	1257.01	1255.19	1257.96	21.76	8.59	861.88	1414.89
*	0.307	81.00	0.00	0.00	1248.00	6600.00	1256.39	1255.37	1257.52	42.91	8.52	774.68	1007.49
	0.307	81.00	0.00	0.00	1248.00	6600.00	1257.44	1255.37	1258.17	22.70	6.84	964.25	1385.39
	0.320	75.00	0.00	0.00	1248.70	6600.00	1256.54	1255.64	1257.93	45.56	9.47	696.77	977.79
	0.320	75.00	0.00	0.00	1248.70	6600.00	1257.47	1255.62	1258.47	35.31	8.02	823.26	1110.63
*	0.322	25.00	0.00	0.00	1248.90	6600.00	1257.43	1254.14	1258.07	18.31	6.45	1023.62	1542.52
*	0.322	25.00	0.00	0.00	1248.90	6600.00	1258.02	1254.13	1258.56	14.23	5.92	1114.51	1749.82

	Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Top of Roadway Elevation (ft MSL) ELTRD	Max. Low Chord Elevation (ft MSL) ELLC	Minimum C. S. Elevation (ft MSL) ELMIN	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	Critical W. S. Elevation (ft MSL) CRIWS	Energy Gradient Elevation (ft MSL) EG	Energy Gradient Slope * 10,000 10K*S	Channel Mean Flow Velocity (ft/s) VCH	Cross-Section Area (sq ft) AREA	Index Q (0.01 * Convey.) .01K
	0.344	110.00	0.00	0.00	1249.54	6600.00	1257.55	1254.61	1258.30	18.11	6.98	945.70	1550.71
	0.344	110.00	0.00	0.00	1249.54	6600.00	1258.11	1254.61	1258.75	14.31	6.44	1025.53	1744.81
*	0.352	40.00	0.00	0.00	1256.52	6600.00	1260.79	1260.79	1261.76	82.52	9.02	942.95	726.54
*	0.352	40.00	0.00	0.00	1256.52	6600.00	1261.12	1261.12	1263.04	115.36	11.32	600.44	614.49
*	0.356	25.00	0.00	0.00	1256.00	6600.00	1262.10	1262.10	1262.78	52.83	8.08	1292.92	908.06
*	0.356	25.00	0.00	0.00	1256.00	6600.00	1262.96	1261.89	1263.28	19.37	5.53	1594.51	1499.49
	0.361	20.00	0.00	0.00	1256.60	6600.00	1262.08	1261.46	1262.96	56.93	7.62	896.13	874.70
	0.361	20.00	0.00	0.00	1256.60	6600.00	1262.84	1261.46	1263.41	28.67	6.14	1115.97	1232.61
*	0.370	30.00	0.00	0.00	1257.64	6600.00	1262.37	1262.37	1263.27	14.08	9.05	967.84	1758.87
	0.370	30.00	0.00	0.00	1257.64	6600.00	1262.53	1262.26	1263.65	14.73	9.49	818.73	1719.89
*	0.450	420.00	0.00	0.00	1263.53	5900.00	1266.47	1266.47	1267.54	182.40	8.32	719.08	436.86
*	0.450	420.00	0.00	0.00	1263.53	5900.00	1266.48	1266.47	1267.55	182.36	8.32	719.12	436.90
*	0.490	230.00	0.00	0.00	1261.73	5900.00	1269.40	1269.40	1271.19	117.48	13.54	934.69	544.35
*	0.490	230.00	0.00	0.00	1261.73	5900.00	1269.40	1269.40	1271.19	117.47	13.54	934.72	544.37
	0.580	450.00	0.00	0.00	1262.70	5900.00	1273.86	1272.24	1275.03	62.20	9.25	1036.01	748.08
	0.580	450.00	0.00	0.00	1262.70	5900.00	1273.86	1272.24	1275.03	62.20	9.25	1036.01	748.08
	0.610	180.00	0.00	0.00	1264.85	5900.00	1275.14	1275.03	1276.76	117.15	11.24	1107.74	545.11
*	0.610	180.00	0.00	0.00	1264.85	5900.00	1275.10	1274.79	1277.04	137.20	11.95	803.61	503.71
*	0.650	200.00	0.00	0.00	1267.31	5900.00	1277.43	1275.30	1278.31	55.65	7.76	947.01	790.88
*	0.650	200.00	0.00	0.00	1267.31	5900.00	1277.74	1275.30	1278.54	47.60	7.40	998.87	855.19
*	0.710	295.00	0.00	0.00	1269.80	5900.00	1279.44	1278.56	1281.03	129.65	10.15	600.09	518.15
*	0.710	295.00	0.00	0.00	1269.80	5900.00	1279.65	1278.56	1281.12	113.72	9.74	627.75	553.26
	0.750	230.00	0.00	0.00	1272.95	5900.00	1282.45	1281.82	1284.37	153.98	12.27	764.64	475.46
	0.750	230.00	0.00	0.00	1272.95	5900.00	1282.42	1281.82	1284.36	156.18	12.32	760.74	472.10
*	0.790	230.00	0.00	0.00	1272.95	5900.00	1285.20	1282.34	1285.77	33.82	6.50	1424.58	1014.49
*	0.790	230.00	0.00	0.00	1272.95	5900.00	1285.19	1282.32	1285.76	33.91	6.50	1423.08	1013.21
	0.830	220.00	0.00	0.00	1274.89	5900.00	1285.96	1283.33	1286.43	28.27	6.30	2365.68	1109.73
	0.830	220.00	0.00	0.00	1274.89	5900.00	1285.85	1283.48	1286.60	39.82	7.41	1275.79	934.93
	0.860	180.00	0.00	0.00	1275.03	5900.00	1286.40	1283.12	1287.03	34.30	6.37	951.26	1007.40
	0.860	180.00	0.00	0.00	1275.03	5900.00	1286.64	1283.12	1287.23	30.60	6.15	987.88	1066.54

	Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Top of Roadway Elevation (ft MSL) ELTRD	Max. Low Chord Elevation (ft MSL) ELLC	Minimum C. S. Elevation (ft MSL) ELMIN	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	Critical W. S. Elevation (ft MSL) CRIWS	Energy Gradient Elevation (ft MSL) EG	Energy Gradient Slope * 10,000 10K*S	Channel Mean Flow Velocity (ft/s) VCH	Cross-Section Area (sq ft) AREA	Index Q (0.01 * Convey.) .01K
*	0.900	235.00	0.00	0.00	1277.26	5900.00	1287.30	1287.30	1289.88	181.22	13.22	567.03	438.28
*	0.900	235.00	0.00	0.00	1277.26	5900.00	1287.31	1287.31	1289.88	180.33	13.20	568.42	439.35
*	0.960	300.00	0.00	0.00	1278.52	5900.00	1291.68	1289.07	1292.69	58.11	8.16	807.85	773.96
*	0.960	300.00	0.00	0.00	1278.52	5900.00	1291.67	1289.07	1292.69	58.18	8.16	807.46	773.50
	1.000	230.00	0.00	0.00	1280.94	5900.00	1293.13	1289.33	1293.86	43.11	6.91	1170.34	898.62
	1.000	230.00	0.00	0.00	1280.94	5900.00	1293.11	1289.33	1293.88	45.07	7.05	892.34	878.86
	1.004	40.00	0.00	0.00	1281.40	5900.00	1293.22	1288.45	1294.07	32.43	7.51	946.90	1036.09
	1.004	40.00	0.00	0.00	1281.40	5900.00	1293.22	1288.45	1294.08	32.34	7.50	948.17	1037.53
	1.030	118.00	1290.14	0.00	1281.40	5900.00	1293.55	0.00	1294.07	20.21	6.08	1479.59	1312.50
	1.030	118.00	1290.14	0.00	1281.40	5900.00	1293.56	0.00	1294.08	20.15	6.07	1481.49	1314.36
*	1.060	190.00	0.00	0.00	1285.24	5900.00	1294.41	1294.41	1297.17	175.73	13.49	519.26	445.07
*	1.060	190.00	0.00	0.00	1285.24	5900.00	1294.40	1294.40	1297.17	176.03	13.49	518.84	444.70
*	1.110	230.00	0.00	0.00	1287.07	5900.00	1298.38	1297.63	1299.30	60.91	9.30	1779.73	755.98
*	1.110	230.00	0.00	0.00	1287.07	5900.00	1298.36	1297.51	1299.56	72.63	10.15	1330.13	692.31
	1.160	250.00	0.00	0.00	1288.80	5900.00	1299.94	1297.54	1300.95	64.78	8.17	865.15	733.03
	1.160	250.00	0.00	0.00	1288.80	5900.00	1300.29	1297.55	1301.18	53.67	7.68	925.94	805.39
	1.210	260.00	0.00	0.00	1291.10	5900.00	1301.65	1300.22	1302.76	73.17	8.90	1018.16	689.74
	1.210	260.00	0.00	0.00	1291.10	5900.00	1301.74	1299.99	1302.96	76.50	9.15	820.35	674.58
	1.240	130.00	0.00	0.00	1291.77	5900.00	1302.42	1301.04	1303.81	77.74	9.91	982.71	669.17
	1.240	130.00	0.00	0.00	1291.77	5900.00	1302.52	1301.04	1304.09	83.76	10.42	797.21	644.67
	1.290	240.00	0.00	0.00	1292.90	5900.00	1304.19	1303.59	1305.56	82.25	10.25	1204.63	650.54
	1.290	240.00	0.00	0.00	1292.90	5900.00	1304.57	1303.45	1305.81	70.89	9.75	1133.17	700.75
	1.380	465.00	0.00	0.00	1296.35	5900.00	1307.49	1304.71	1308.59	58.11	8.43	804.59	773.99
	1.380	465.00	0.00	0.00	1296.35	5900.00	1307.53	1304.71	1308.64	57.96	8.45	722.50	774.94
*	1.400	110.00	0.00	0.00	1296.95	4900.00	1308.74	1304.98	1309.01	9.65	5.35	1438.13	1577.58
*	1.400	110.00	0.00	0.00	1296.95	4900.00	1308.79	1304.98	1309.06	9.42	5.31	1449.70	1596.24
*	1.410	80.00	1305.89	0.00	1297.53	4900.00	1307.79	1307.73	1309.25	60.50	10.86	670.54	629.99
*	1.410	80.00	1305.89	0.00	1297.53	4900.00	1307.90	1307.72	1309.25	55.99	10.53	694.81	654.84
*	1.430	242.56	0.00	0.00	1300.00	4900.00	1309.44	1308.25	1310.06	23.61	7.14	1006.13	1008.48
*	1.430	242.56	0.00	0.00	1300.00	4900.00	1309.37	1308.12	1310.08	25.88	7.50	896.35	963.29

	Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Top of Roadway Elevation (ft MSL) ELTRD	Max. Low Chord Elevation (ft MSL) ELLC	Minimum C. S. Elevation (ft MSL) ELMIN	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	Critical W. S. Elevation (ft MSL) CRIWS	Energy Gradient Elevation (ft MSL) EG	Energy Gradient Slope * 10,000 10K*S	Channel Mean Flow Velocity (ft/s) VCH	Cross-Section Area (sq ft) AREA	Index Q (0.01 * Convey.) .01K
	1.490	312.32	0.00	0.00	1304.00	4900.00	1310.31	1308.18	1310.65	15.48	5.12	1215.61	1245.43
	1.490	312.32	0.00	0.00	1304.00	4900.00	1310.25	1308.25	1310.84	23.43	6.26	844.95	1012.27
*	1.540	197.89	0.00	0.00	1306.00	4900.00	1311.77	1311.77	1313.57	201.70	10.90	498.72	345.02
*	1.540	197.89	0.00	0.00	1306.00	4900.00	1312.03	1312.03	1314.17	196.87	11.93	459.77	349.22
*	1.600	271.35	0.00	0.00	1308.00	4900.00	1314.59	1313.03	1315.48	40.04	7.57	647.15	774.40
*	1.600	271.35	0.00	0.00	1308.00	4900.00	1314.98	1313.12	1315.90	34.67	7.71	635.92	832.23
*	1.710	705.17	0.00	0.00	1312.00	3600.00	1317.98	1317.35	1318.99	58.61	8.22	494.55	470.24
*	1.710	705.17	0.00	0.00	1312.00	3600.00	1318.09	1317.20	1319.21	57.59	8.54	429.37	474.37
	1.860	685.32	0.00	0.00	1320.00	3600.00	1323.05	1322.58	1323.61	74.85	5.97	602.86	416.11
	1.860	685.32	0.00	0.00	1320.00	3600.00	1323.28	1322.97	1324.46	95.07	8.70	413.58	369.21
	2.020	684.84	0.00	0.00	1324.00	3600.00	1328.88	1328.59	1329.50	95.84	7.18	626.04	367.73
	2.020	684.84	0.00	0.00	1324.00	3600.00	1329.76	1329.10	1330.81	90.15	8.23	437.49	379.16

SUMMARY PRINTOUT TABLE 150 : ECHO CANYON LOMR
---------- REVISED MODEL
AZ02079

	Cross-Section Number SECNO	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Profile (ft) DIFWSP	W.S. Elev Diff per Section (ft) DIFWSX	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Water Surface Top Width (ft) TOPWID	Channel Reach Length (ft) XLCH
	0.000	6600.00	1246.90	0.00	0.00	0.00	240.44	0.00
	0.000	6600.00	1247.90	1.00	0.00	0.00	250.04	0.00
*	0.003	6600.00	1247.77	0.00	0.87	0.00	273.85	18.00
*	0.003	6600.00	1248.41	0.63	0.51	0.63	273.86	18.00
	0.026	6600.00	1247.81	0.00	0.04	0.00	318.25	118.00
	0.026	6600.00	1248.44	0.63	0.03	0.63	318.27	118.00
	0.049	6600.00	1247.84	0.00	0.03	0.00	380.97	125.00
	0.049	6600.00	1248.47	0.62	0.03	0.62	381.00	125.00

	Cross-Section Number SECNO	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Profile (ft) DIFWSP	W.S. Elev Diff per Section (ft) DIFWSX	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Water Surface Top Width (ft) TOPWID	Channel Reach Length (ft) XLCH
	0.081	6600.00	1247.87	0.00	0.02	0.00	425.60	167.00
	0.081	6600.00	1248.49	0.62	0.02	0.62	425.63	167.00
	0.117	6600.00	1247.89	0.00	0.02	0.00	484.93	191.00
	0.117	6600.00	1248.50	0.62	0.02	0.62	484.95	191.00
	0.139	6600.00	1247.89	0.00	0.00	0.00	466.94	115.00
	0.139	6600.00	1248.50	0.62	0.00	0.62	466.98	115.00
*	0.172	6600.00	1247.87	0.00	-0.02	0.00	302.83	174.00
*	0.172	6600.00	1248.49	0.62	-0.01	0.62	302.84	174.00
*	0.178	6600.00	1249.07	0.00	1.20	0.00	289.87	30.00
*	0.178	6600.00	1249.08	0.00	0.59	0.00	289.87	30.00
*	0.188	6600.00	1251.01	0.00	1.94	0.00	309.72	54.00
*	0.188	6600.00	1251.00	-0.01	1.93	-0.01	308.55	54.00
	0.190	6600.00	1252.24	0.00	1.23	0.00	316.44	10.00
	0.190	6600.00	1252.27	0.03	1.27	0.03	315.68	10.00
*	0.206	6600.00	1252.75	0.00	0.51	0.00	294.40	87.00
*	0.206	6600.00	1252.75	-0.01	0.48	-0.01	293.83	87.00
*	0.238	6600.00	1252.81	0.00	0.06	0.00	232.49	168.00
*	0.238	6600.00	1252.82	0.00	0.07	0.00	231.83	168.00
*	0.240	6600.00	1254.00	0.00	1.19	0.00	241.99	11.00
*	0.240	6600.00	1253.96	-0.04	1.15	-0.04	241.74	11.00
*	0.246	6600.00	1254.63	0.00	0.63	0.00	232.49	32.00
*	0.246	6600.00	1254.81	0.18	0.85	0.18	122.43	32.00
*	0.248	6600.00	1256.07	0.00	1.44	0.00	257.64	11.00
*	0.248	6600.00	1256.46	0.38	1.65	0.38	166.87	11.00
	0.268	6600.00	1256.22	0.00	0.14	0.00	252.31	102.00
	0.268	6600.00	1256.65	0.43	0.19	0.43	156.81	102.00
	0.289	6600.00	1256.27	0.00	0.06	0.00	203.27	115.00
	0.289	6600.00	1256.74	0.47	0.10	0.47	133.31	115.00
	0.291	6600.00	1256.49	0.00	0.22	0.00	212.91	10.00
	0.291	6600.00	1257.01	0.51	0.26	0.51	140.85	10.00

	Cross-Section Number SECNO	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Profile (ft) DIFWSP	W.S. Elev Diff per Section (ft) DIFWSX	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Water Surface Top Width (ft) TOPWID	Channel Reach Length (ft) XLCH
*	0.307	6600.00	1256.39	0.00	-0.10	0.00	175.71	81.00
	0.307	6600.00	1257.44	1.05	0.43	1.05	185.87	81.00
	0.320	6600.00	1256.54	0.00	0.15	0.00	145.32	75.00
	0.320	6600.00	1257.47	0.93	0.03	0.93	142.86	75.00
*	0.322	6600.00	1257.43	0.00	0.89	0.00	150.39	25.00
*	0.322	6600.00	1258.02	0.59	0.55	0.59	153.83	25.00
	0.344	6600.00	1257.55	0.00	0.12	0.00	141.73	110.00
	0.344	6600.00	1258.11	0.56	0.09	0.56	144.74	110.00
*	0.352	6600.00	1260.79	0.00	3.24	0.00	469.38	40.00
*	0.352	6600.00	1261.12	0.34	3.02	0.34	159.00	40.00
*	0.356	6600.00	1262.10	0.00	1.31	0.00	1030.81	25.00
*	0.356	6600.00	1262.96	0.86	1.84	0.86	538.22	25.00
	0.361	6600.00	1262.08	0.00	-0.02	0.00	287.00	20.00
	0.361	6600.00	1262.84	0.77	-0.12	0.77	287.00	20.00
*	0.370	6600.00	1262.37	0.00	0.29	0.00	492.88	30.00
	0.370	6600.00	1262.53	0.16	-0.32	0.16	270.00	30.00
*	0.450	5900.00	1266.47	0.00	4.10	0.00	355.00	420.00
*	0.450	5900.00	1266.48	0.01	3.95	0.01	355.00	420.00
*	0.490	5900.00	1269.40	0.00	2.93	0.00	250.00	230.00
*	0.490	5900.00	1269.40	0.00	2.92	0.00	250.00	230.00
	0.580	5900.00	1273.86	0.00	4.46	0.00	240.00	450.00
	0.580	5900.00	1273.86	0.00	4.46	0.00	240.00	450.00
	0.610	5900.00	1275.14	0.00	1.28	0.00	500.07	180.00
*	0.610	5900.00	1275.10	-0.04	1.24	-0.04	209.70	180.00
*	0.650	5900.00	1277.43	0.00	2.29	0.00	170.00	200.00
*	0.650	5900.00	1277.74	0.31	2.64	0.31	170.00	200.00
*	0.710	5900.00	1279.44	0.00	2.01	0.00	128.00	295.00
*	0.710	5900.00	1279.65	0.22	1.91	0.22	128.00	295.00
	0.750	5900.00	1282.45	0.00	3.01	0.00	145.00	230.00
	0.750	5900.00	1282.42	-0.03	2.77	-0.03	145.00	230.00

	Cross-Section Number SECNO	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Profile (ft) DIFWSP	W.S. Elev Diff per Section (ft) DIFWSX	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Water Surface Top Width (ft) TOPWID	Channel Reach Length (ft) XLCH
*	0.790	5900.00	1285.20	0.00	2.75	0.00	300.00	230.00
*	0.790	5900.00	1285.19	0.00	2.78	0.00	300.00	230.00
	0.830	5900.00	1285.96	0.00	0.76	0.00	889.66	220.00
	0.830	5900.00	1285.85	-0.11	0.66	-0.11	260.00	220.00
	0.860	5900.00	1286.40	0.00	0.44	0.00	150.00	180.00
	0.860	5900.00	1286.64	0.24	0.79	0.24	150.00	180.00
*	0.900	5900.00	1287.30	0.00	0.90	0.00	164.95	235.00
*	0.900	5900.00	1287.31	0.01	0.66	0.01	165.37	235.00
*	0.960	5900.00	1291.68	0.00	4.38	0.00	160.00	300.00
*	0.960	5900.00	1291.67	0.00	4.37	0.00	160.00	300.00
	1.000	5900.00	1293.13	0.00	1.45	0.00	714.99	230.00
	1.000	5900.00	1293.11	-0.02	1.44	-0.02	180.00	230.00
	1.004	5900.00	1293.22	0.00	0.09	0.00	160.00	40.00
	1.004	5900.00	1293.22	0.01	0.11	0.01	160.00	40.00
	1.030	5900.00	1293.55	0.00	0.33	0.00	264.00	118.00
	1.030	5900.00	1293.56	0.01	0.33	0.01	264.00	118.00
*	1.060	5900.00	1294.41	0.00	0.86	0.00	133.16	190.00
*	1.060	5900.00	1294.40	0.00	0.85	0.00	133.11	190.00
*	1.110	5900.00	1298.38	0.00	3.97	0.00	619.39	230.00
*	1.110	5900.00	1298.36	-0.01	3.96	-0.01	330.00	230.00
	1.160	5900.00	1299.94	0.00	1.56	0.00	272.33	250.00
	1.160	5900.00	1300.29	0.35	1.92	0.35	220.00	250.00
	1.210	5900.00	1301.65	0.00	1.72	0.00	299.82	260.00
	1.210	5900.00	1301.74	0.08	1.45	0.08	157.10	260.00
	1.240	5900.00	1302.42	0.00	0.77	0.00	343.00	130.00
	1.240	5900.00	1302.52	0.10	0.78	0.10	170.00	130.00
	1.290	5900.00	1304.19	0.00	1.77	0.00	470.19	240.00
	1.290	5900.00	1304.57	0.38	2.05	0.38	281.42	240.00
	1.380	5900.00	1307.49	0.00	3.30	0.00	278.38	465.00
	1.380	5900.00	1307.53	0.04	2.96	0.04	120.00	465.00

	Cross-Section Number SECNO	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Profile (ft) DIFWSP	W.S. Elev Diff per Section (ft) DIFWSX	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Water Surface Top Width (ft) TOPWID	Channel Reach Length (ft) XLCH
*	1.400	4900.00	1308.74	0.00	1.24	0.00	210.00	110.00
*	1.400	4900.00	1308.79	0.05	1.26	0.05	210.00	110.00
*	1.410	4900.00	1307.79	0.00	-0.95	0.00	210.00	80.00
*	1.410	4900.00	1307.90	0.12	-0.89	0.12	210.00	80.00
*	1.430	4900.00	1309.44	0.00	1.65	0.00	316.75	242.56
*	1.430	4900.00	1309.37	-0.07	1.47	-0.07	230.00	242.56
	1.490	4900.00	1310.31	0.00	0.87	0.00	371.68	312.32
	1.490	4900.00	1310.25	-0.06	0.88	-0.06	200.00	312.32
*	1.540	4900.00	1311.77	0.00	1.47	0.00	172.55	197.89
*	1.540	4900.00	1312.03	0.26	1.79	0.26	120.00	197.89
*	1.600	4900.00	1314.59	0.00	2.82	0.00	135.43	271.35
*	1.600	4900.00	1314.98	0.38	2.94	0.38	110.00	271.35
*	1.710	3600.00	1317.98	0.00	3.39	0.00	181.59	705.17
*	1.710	3600.00	1318.09	0.10	3.11	0.10	100.00	705.17
	1.860	3600.00	1323.05	0.00	5.07	0.00	290.75	685.32
	1.860	3600.00	1323.28	0.23	5.19	0.23	130.00	685.32
	2.020	3600.00	1328.88	0.00	5.82	0.00	342.58	684.84
	2.020	3600.00	1329.76	0.88	6.48	0.88	120.00	684.84

SUMMARY OF WARNING AND STATUS MESSAGES :

Section 0.003, profile 1, conveyance change outside acceptable range.

Section 0.003, profile 2, conveyance change outside acceptable range.

Section 0.172, profile 1, conveyance change outside acceptable range.

Section 0.172, profile 2, conveyance change outside acceptable range.

Section 0.178, profile 1, critical depth assumed.

Section 0.178, profile 1, minimum specific energy.

Section 0.178, profile 2, critical depth assumed.

Section 0.178, profile 2, minimum specific energy.

Section 0.188, profile 1, critical depth assumed.

Section 0.188, profile 1, minimum specific energy.

Section 0.188, profile 2, critical depth assumed.

Section 0.188, profile 2, minimum specific energy.

Section 0.206, profile 1, conveyance change outside acceptable range.

Section 0.206, profile 2, conveyance change outside acceptable range.

Section 0.238, profile 1, conveyance change outside acceptable range.

Section 0.238, profile 2, conveyance change outside acceptable range.

Section 0.24, profile 1, critical depth assumed.

Section 0.24, profile 1, minimum specific energy.

Section 0.24, profile 2, critical depth assumed.

Section 0.24, profile 2, minimum specific energy.

Section 0.246, profile 1, critical depth assumed.

Section 0.246, profile 1, minimum specific energy.

Section 0.246, profile 2, critical depth assumed.

Section 0.246, profile 2, minimum specific energy.

Section 0.248, profile 1, hydraulic jump downstream.

Section 0.248, profile 1, conveyance change outside acceptable range.

Section 0.248, profile 2, hydraulic jump downstream.

Section 0.248, profile 2, conveyance change outside acceptable range.

Section 0.307, profile 1, conveyance change outside acceptable range.

Section 0.322, profile 1, conveyance change outside acceptable range.

Section 0.322, profile 2, conveyance change outside acceptable range.

Section 0.352, profile 1, critical depth assumed.

Section 0.352, profile 1, minimum specific energy.

Section 0.352, profile 2, critical depth assumed.

Section 0.352, profile 2, minimum specific energy.

Section 0.356, profile 1, critical depth assumed.

Section 0.356, profile 1, minimum specific energy.

Section 0.356, profile 2, conveyance change outside acceptable range.

Section 0.37, profile 1, critical depth assumed.

Section 0.37, profile 1, minimum specific energy.

Section 0.45, profile 1, critical depth assumed.

Section 0.45, profile 1, minimum specific energy.

Section 0.45, profile 2, conveyance change outside acceptable range.

Section 0.49, profile 1, critical depth assumed.

Section 0.49, profile 1, minimum specific energy.

Section 0.49, profile 2, critical depth assumed.

Section 0.49, profile 2, minimum specific energy.

Section 0.61, profile 2, conveyance change outside acceptable range.

Section 0.65, profile 1, conveyance change outside acceptable range.

Section 0.65, profile 2, conveyance change outside acceptable range.

Section 0.71, profile 1, conveyance change outside acceptable range.

Section 0.71, profile 2, conveyance change outside acceptable range.

Section 0.79, profile 1, conveyance change outside acceptable range.

Section 0.79, profile 2, conveyance change outside acceptable range.

Section 0.9, profile 1, critical depth assumed.

Section 0.9, profile 1, minimum specific energy.

Section 0.9, profile 2, critical depth assumed.

Section 0.9, profile 2, minimum specific energy.

Section 0.96, profile 1, conveyance change outside acceptable range.

Section 0.96, profile 2, conveyance change outside acceptable range.

Section 1.06, profile 1, critical depth assumed.

Section 1.06, profile 1, minimum specific energy.

Section 1.06, profile 2, critical depth assumed.

Section 1.06, profile 2, minimum specific energy.

Section 1.11, profile 1, conveyance change outside acceptable range.

Section 1.11, profile 2, conveyance change outside acceptable range.

Section 1.4, profile 1, conveyance change outside acceptable range.

Section 1.4, profile 2, conveyance change outside acceptable range.

Section 1.41, profile 1, probable minimum specific energy.

Section 1.41, profile 1, water surface elevation based upon the minimum difference.

Section 1.41, profile 1, 20 trials attempted to balance water surface elevation.

Section 1.41, profile 2, probable minimum specific energy.

Section 1.41, profile 2, water surface elevation based upon the minimum difference.

Section 1.41, profile 2, 20 trials attempted to balance water surface elevation.

Section 1.43, profile 1, conveyance change outside acceptable range.

Section 1.43, profile 2, conveyance change outside acceptable range.

Section 1.54, profile 1, critical depth assumed.

Section 1.54, profile 1, minimum specific energy.

Section 1.54, profile 2, critical depth assumed.

Section 1.54, profile 2, minimum specific energy.

Section 1.6, profile 1, conveyance change outside acceptable range.

Section 1.6, profile 2, conveyance change outside acceptable range.

Section 1.71, profile 1, conveyance change outside acceptable range.

Section 1.71, profile 2, conveyance change outside acceptable range.

84 Warning and status message(s) generated

SUMMARY PRINTOUT TABLE 200 : ECHO CANYON LOMR
---------- REVISED MODEL
AZ02079

Profile Number 2

Cross-Section Number	Floodway Width (ft)	Floodway Section Area (sq ft)	Floodway Mean Velocity (ft/s)	W. S. Elevation with Floodway (ft MSL)	W. S. Elevation without Floodway (ft MSL)	W. S. Elevation Diffrence (ft)
0.000	250.	1120.	5.9	1247.9	1246.9	1.0
0.003	274.	2832.	2.3	1248.4	1247.8	0.6
0.026	318.	3206.	2.1	1248.4	1247.8	0.6
0.049	381.	3798.	1.7	1248.4	1247.8	0.6
0.081	426.	4338.	1.5	1248.5	1247.9	0.6
0.117	485.	4991.	1.3	1248.5	1247.9	0.6
0.139	467.	4484.	1.5	1248.5	1247.9	0.6
0.172	303.	2989.	2.2	1248.5	1247.9	0.6
0.178	290.	787.	8.4	1249.1	1249.1	0.0
0.188	309.	855.	7.7	1251.0	1251.0	0.0
0.190	316.	1134.	5.8	1252.2	1252.2	0.0
0.206	294.	1450.	4.6	1252.8	1252.8	0.0
0.238	232.	1053.	6.3	1252.8	1252.8	0.0
0.240	242.	754.	8.8	1254.0	1254.0	0.0
0.246	122.	567.	11.6	1254.8	1254.6	0.2
0.248	167.	968.	6.8	1256.5	1256.1	0.4
0.268	157.	949.	7.0	1256.6	1256.2	0.4

0.289	133.	789.	8.4	1256.8	1256.3	0.5
0.291	141.	862.	7.7	1257.0	1256.5	0.5
0.307	186.	964.	6.8	1257.4	1256.4	1.0
0.320	143.	823.	8.0	1257.4	1256.5	0.9
0.322	154.	1115.	5.9	1258.0	1257.4	0.6
0.344	145.	1026.	6.4	1258.1	1257.5	0.6
0.352	159.	600.	11.0	1261.1	1260.8	0.3
0.356	538.	1595.	4.1	1263.0	1262.1	0.9
0.361	287.	1116.	5.9	1262.9	1262.1	0.8
0.370	270.	819.	8.1	1262.6	1262.4	0.2
0.450	355.	719.	8.2	1266.5	1266.5	0.0
0.490	250.	935.	6.3	1269.4	1269.4	0.0
0.580	240.	1036.	5.7	1273.9	1273.9	0.0
0.610	210.	804.	7.3	1275.1	1275.1	0.0
0.650	170.	999.	5.9	1277.7	1277.4	0.3
0.710	128.	628.	9.4	1279.6	1279.4	0.2
0.750	145.	761.	7.8	1282.4	1282.4	0.0
0.790	300.	1423.	4.1	1285.2	1285.2	0.0
0.830	260.	1276.	4.6	1285.9	1286.0	-0.1
0.860	150.	988.	6.0	1286.6	1286.4	0.2
0.900	165.	568.	10.4	1287.3	1287.3	0.0
0.960	160.	807.	7.3	1291.7	1291.7	0.0
1.000	180.	892.	6.6	1293.1	1293.1	0.0
1.004	160.	948.	6.2	1293.2	1293.2	0.0
1.030	264.	1481.	4.0	1293.5	1293.5	0.0

SUMMARY PRINTOUT TABLE 200 : ECHO CANYON LOMR
REVISED MODEL
AZ02079

Profile Number 2

Cross-Section Number	Floodway Width (ft)	Floodway Section Area (sq ft)	Floodway Mean Velocity (ft/s)	W. S. Elevation with Floodway (ft MSL)	W. S. Elevation without Floodway (ft MSL)	W. S. Elevation Diffrence (ft)
1.060	133.	519.	11.4	1294.4	1294.4	0.0
1.110	330.	1330.	4.4	1298.4	1298.4	0.0
1.160	220.	926.	6.4	1300.2	1299.9	0.3
1.210	157.	820.	7.2	1301.8	1301.7	0.1
1.240	170.	797.	7.4	1302.5	1302.4	0.1
1.290	281.	1133.	5.2	1304.6	1304.2	0.4
1.380	120.	723.	8.2	1307.5	1307.5	0.0
1.400	210.	1450.	3.4	1308.8	1308.7	0.1
1.410	210.	695.	7.1	1307.9	1307.8	0.1
1.430	230.	896.	5.5	1309.3	1309.4	-0.1
1.490	200.	845.	5.8	1310.2	1310.3	-0.1
1.540	120.	460.	10.7	1312.1	1311.8	0.3
1.600	110.	636.	7.7	1315.0	1314.6	0.4
1.710	100.	429.	8.4	1318.1	1318.0	0.1
1.860	130.	414.	8.7	1323.3	1323.1	0.2
2.020	120.	437.	8.2	1329.8	1328.9	0.9

END OF OUTPUT

FEDERAL EMERGENCY MANAGEMENT AGENCY

OVERVIEW & CONCURRENCE FORM

O.M.B No. 3067-0148
Expires September 30, 2005

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hour per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (3067-0148). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

A. REQUESTED RESPONSE FROM FEMA

This request is for a (check one):

☐ CLOMR: A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72).

☒ LOMR: A letter from FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See Parts 60 & 65 of the NFIP Regulations.)

B. OVERVIEW

1. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301	City of Katy	TX	480301	0005D	02/08/83
480287	Harris County	TX	48201C	0220G	09/28/90
040051	City of Phoenix	AZ	40051	1690E	7/19/01
040049	Town of Paradise Valley	AZ	40049	1690E	7/19/01

2. Flooding Source: Echo Canyon Wash
3. Project Name/Identifier: Echo Canyon, City of Phoenix, Project No. ST83130143
4. FEMA zone designations affected: (choices: A, AH, AO, A1-A30, A99, AE, AR, V, V1-V30, VE, B, C, D, X) A, AE
5. Basis for Request and Type of Revision:

a. The basis for this revision request is (check all that apply)

☒ Physical Change ☒ Improved Methodology/Data

☐ Regulatory Floodway Revision ☐ Other (Attach Description)

Note: A photograph and narrative description of the area of concern is not required, but is very helpful during review.

b. The area of revision encompasses the following types of flooding and structures (check all that apply)

Types of Flooding: ☒ Riverine ☐ Coastal ☐ Shallow Flooding (e.g., Zones AO and AH)

☐ Alluvial fan ☐ Lakes ☐ Other (Attach Description)

Structures: ☐ Channelization ☐ Levee/Floodwall ☒ Bridge/Culvert

☐ Dam ☐ Fill ☐ Other, Attach Description

C. REVIEW FEE

Has the review fee for the appropriate request category been included? ☐ Yes Fee amount: $_____

☐ No, Attach Explanation

Please see the FEMA Web site at http://www.fema.gov/fhm/frm_fees.shtm for Fee Amounts and Exemptions.

D. SIGNATURE

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Name: Larry Sibala, P.E.	Company: Aztec Engineering Co.
Mailing Address: 4561 E. McDowell Rd. Phoenix, AZ 85008-4505	Daytime Telephone No.: 602 454-0402 / Fax No.: 602 454-0403 / E-Mail Address: lsibala@aztec.us
Signature of Requester (required):	Date: 9/13/04

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirement that no fill be placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title: Bill Mead, Town Engineer		Telephone No.: 480 348-3529
Community Name: Town of Paradise Valley	Community Official's Signature (required):	Date: 9/13/04

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name:	License No.:	Expiration Date:
Company Name:	Telephone No.:	Fax No.:
Signature:		Date:

Ensure the forms that are appropriate to your revision request are included in your submittal.

Form Name and (Number)	Required if ...
☐ Riverine Hydrology and Hydraulics Form (Form 2)	New or revised discharges or water-surface elevations
☐ Riverine Structures Form (Form 3)	Channel is modified, addition/revision of bridge/culverts, addition/revision of levee/floodwall, addition/revision of dam
☐ Coastal Analysis Form (Form 4)	New or revised coastal elevations
☐ Coastal Structures Form (Form 5)	Addition/revision of coastal structure
☐ Alluvial Fan Flooding Form (Form 6)	Flood control measures on alluvial fans

Seal (Optional)

The City of Phoenix, under the authority of the National Flood Insurance Act of 1968 (P.L. 90-448), as amended and the Flood Protection Act of 1973 (P.L. 93-234) has contracted with Aztec Engineering to redelineate the existing flood hazard boundary for the Echo Canyon Wash, at approximately 47th St. to the East, 40th St to the West, Stanford Dr. to the South & McDonald Dr. to the North. The purpose of this study is to determine flood related hazard zones and delineate areas that may be subject to inundation during the 100-year storm event. The study and resulting mapping will be used for floodplain management purposes and submitted to the Federal Emergency Management Agency (FEMA) for flood insurance information and revision of Flood Insurance Rate Maps. This announcement is intended to inform all interested persons to bring any relevant technical information to the attention of the City of Phoenix staff at 602-262-4960. Your comments may also be addressed to: Mr. Chris C. Woolery, P. E., Aztec Engineering, 3747 E. Grove Street, Phoenix, Arizona 85040-3982 phone number 602-454-0402, Fax number 602-454-0403.
Published: March 20, 2003

AFFIDAVIT OF PUBLICATION

FLD INS/ECHO CANYON WASH

2 Reference/PO # 6300004400

Arizona Business Gazette
The business resource

PO BOX 194
Phoenix, Arizona 85001-0194
(602) 444-7300 FAX (602) 444-7364

STATE OF ARIZONA
COUNTY OF MARICOPA } SS.

Tom Bianco, being first duly sworn, upon oath deposes and says: That he is the legal advertising manager of the Arizona Business Gazette, a newspaper of general circulation in the county of Maricopa, State of Arizona, published weekly at Phoenix, Arizona, and that the copy hereto attached is a true copy of the advertisement published in the said paper on the dates indicated.

3/20/2003

Tom B

Sworn to before me this
20TH day of
MARCH A.D. 2003

OFFICIAL SEAL
MARILYN GREENWOOD
NOTARY PUBLIC-ARIZONA
MARICOPA COUNTY
My Comm. Expires May 23, 2003

Marilyn Greenwood
Notary Public

THE Tribune

Legal Advertising

120 W. First Avenue Mesa, Arizona 8521

Affidavit of Publication

Billing Account# 9262286

P.O. NUMBER: PENDING FLOODPLAIN DELINEATION

Invoice Number: 456614

Price: $ 89.56

STATE OF ARIZONA
County of Maricopa

I, Sharon Grzyb, Legal Clerk, acknowledge that the attached ad was published in a newspaper of general circulation. The dates of the publication are as follows: AUGUT 18, 25, 2004

The Tribune (East Valley & Scottsdale Edition)

Sharon Grzyb

Legal Clerk

Sharon Grzyb, personally appeared before me, whom I know personally to be the person who signed the above/attached document and he/she proved he/she signed it.
AUGUST 25, 2004

Dianna Nedd

Notary Public

OFFICIAL SEAL
DIANNA NEDD
NOTARY PUBLIC-ARIZONA
MARICOPA COUNTY
My Commission Expires Sept. 16, 2005

Pending Floodplain Delineation

The Town of Paradise Valley, under the authority of the National Flood Insurance Act of 1968 (P.L. 990-448), as amended and the Flood Protection Act of 1973 (P.O. 93-234) is preparing to redelineate the existing flood hazard boundary for an area bounded approximately by 51st Street and 47th Street on the East and West and by McDonald Drive and Lincoln Drive on the South and North. The floodplain/floodway revision work will be done along Echo Canyon Wash from 51st Street west to Stanford Drive. The purpose of the study is to use current mapping to determine the flood related hazard zones and delineate areas that may be subject to inundation during the 100-year storm event. The study and resulting mapping will be used for floodplain management purposes and submitted to the Federal Emergency Management Agency (FEMA) for flood insurance information and revision of the Flood Insurance Rate Maps.

This announcement is intended to inform all interested persons to bring any relevant technical information to the attention of William Charles Mead, P.E., Town of Paradise Valley, 6401 E. Lincoln Drive, Paradise Valley, AZ 85223.

August 18, 25, 2004/456614

Table 4
Echo Wash - List of Structures in Floodplain Prior to Study

Address		Finished Floor Elev	In	Out	Comments
4027	E. San Miguel Ave.	1270.08	☐	☑	Revised from 1st Submittal
4324	E. St. Joseph Way	1291.80	☐	☑	
4001	E. San Juan Ave.	1264.94	☑	☐	
4007	E. San Juan Ave.	1266.44	☑	☐	
4011	E. San Juan Ave.	1268.40	☑	☐	
4010	E. San Juan Ave.	1268.46	☑	☐	
4002	E. San Juan Ave.	1267.50	☐	☑	+1.0
4007	E. San Miguel Ave.	1268.44	☐	☑	-.4
4019	E. San Miguel Ave.	1269.64	☐	☑	
4031	E. San Miguel Ave.	1269.92	☑	☐	
4035	E. San Miguel Ave.	1269.50	☑	☐	
4039	E. San Miguel Ave.	1270.15	☑	☐	
4101	E. San Miguel Ave.	1271.84	☑	☐	
4107	E. San Miguel Ave.	1272.45	☑	☐	
4111	E. San Miguel Ave.	1274.60	☑	☐	
4119	E. San Miguel Ave.	1275.38	☑	☐	
4127	E. San Miguel Ave.	1276.69	☑	☐	
4129	E. San Miguel Ave.	1277.75	☑	☐	
4131	E. San Miguel Ave.	1279.45	☑	☐	
4019	E. San Miguel Ave.	1269.64	☐	☑	
4135	E. San Miguel Ave.	1280.56	☑	☐	
4149	E. San Miguel Ave.	1283.28	☑	☐	
4205	E. San Miguel Ave.	1283.44	☐	☑	
4301	E. San Miguel Ave.	1285.80	☐	☑	
4309	E. San Miguel Ave.	1285.94	☐	☑	+1.14
4315	E. San Miguel Ave.	1285.67	☑	☐	

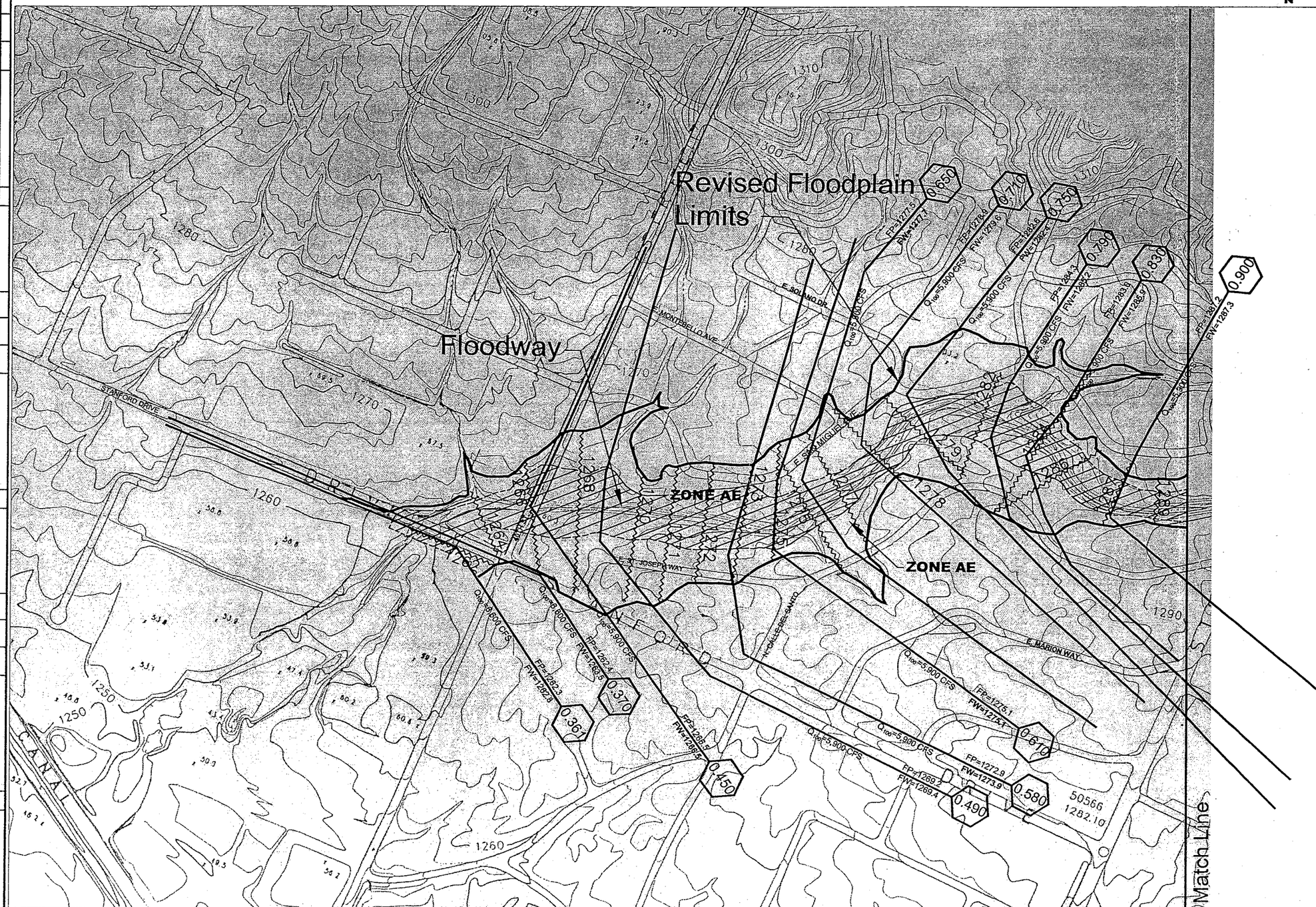
Address		Finished Floor Elev	In	Out	Comments
4319	E. San Miguel Ave.	1286.75	☑	☐	
4325	E. San Miguel Ave.	1287.18	☐	☐	
4333	E. San Miguel Ave.	1289.44	☑	☐	
4337	E. San Miguel Ave.	1290.80	☑	☐	
4347	E. San Miguel Ave.	1291.73	☑	☐	
4355	E. San Miguel Ave.	1292.85	☑	☐	
4364	E. San Miguel Ave.	1293.70	☐	☑	
4350	E. San Miguel Ave.	1292.66	☐	☑	
4144	E. San Miguel Ave.	1283.76	☑	☐	
4140	E. San Miguel Ave.	1282.35	☑	☐	
4122	E. San Miguel Ave.	1275.48	☑	☐	
4106	E. San Miguel Ave.	1273.48	☑	☐	
4042	E. San Miguel Ave.	1273.89	☐	☑	
4034	E. San Miguel Ave.	1272.36	☐	☑	
4130	E. Montebello Ave	1278.85	☑	☐	
4115	E. Montebello Ave	1277.04	☑	☐	
5509	N. 40th St.	1265.65	☑	☐	
5501	E. Stanford Dr.	1265.10	☑	☐	
5502	E. Stanford Dr.	1266.41	☑	☐	
4030	E. Stanford Dr.	1270.08	☐	☑	
4040	E. Stanford Dr.	1269.95	☐	☑	
5510	E. St. Joseph Way	1267.08	☑	☐	
4014	E. St. Joseph Way	1267.87	☑	☐	
4020	E. St. Joseph Way	1268.40	☑	☐	
4026	E. St. Joseph Way	1269.13	☑	☐	
4032	E. St. Joseph Way	1270.33	☑	☐	
4042	E. St. Joseph Way	1271.48	☑	☐	
4102	E. St. Joseph Way	1272.75	☑	☐	
4106	E. St. Joseph Way	1274.00	☑	☐	
4110	E. St. Joseph Way	1274.90	☐	☑	

Address		Finished Floor Elev	In	Out	Comments
4118	E. St. Joseph Way	1275.95	☐	☑	
4128	E. St. Joseph Way	1275.95	☑	☐	
4140	E. St. Joseph Way	1276.03	☑	☐	
4152	E. St. Joseph Way	1276.55	☑	☐	
4164	E. St. Joseph Way	1278.45	☑	☐	
4176	E. St. Joseph Way	1280.25	☐	☑	
4188	E. St. Joseph Way	1280.94	☐	☑	
4200	E. St. Joseph Way	1280.55	☑	☐	
4202	E. St. Joseph Way	1280.05	☑	☐	
4204	E. St. Joseph Way	1280.97	☑	☐	
4210	E. St. Joseph Way	1283.57	☑	☐	
4214	E. St. Joseph Way	1284.30	☑	☐	
4218	E. St. Joseph Way	1284.23	☑	☐	
4222	E. St. Joseph Way	1285.64	☑	☐	
4226	E. St. Joseph Way	1287.15	☐	☑	
4302	E. St. Joseph Way	1287.94	☐	☑	
4306	E. St. Joseph Way	1288.53	☐	☑	
4310	E. St. Joseph Way	1288.70	☐	☑	
4316	E. St. Joseph Way	1289.87	☐	☑	
4320	E. St. Joseph Way	1291.15	☐	☑	
4323	E. St. Joseph Way	1291.65	☐	☑	
4319	E. St. Joseph Way	1290.54	☐	☑	
4315	E. St. Joseph Way	1289.50	☐	☑	
4311	E. St. Joseph Way	1288.09	☐	☑	
4307	E. St. Joseph Way	1287.10	☐	☑	
4303	E. St. Joseph Way	1288.27	☐	☑	
4221	E. St. Joseph Way	1285.81	☐	☑	
4223	E. St. Joseph Way	1285.20	☐	☑	
4219	E. St. Joseph Way	1285.33	☐	☑	
4207	E. St. Joseph Way	1283.90	☐	☑	

Address		Finished Floor Elev	In	Out	Comments
4201	E. St. Joseph Way	1282.45	☐	☑	
4117	E. St. Joseph Way	1275.25	☐	☑	
4109	E. St. Joseph Way	1273.90	☐	☑	
4103	E. St. Joseph Way	1272.65	☐	☑	
4041	E. St. Joseph Way	1271.57	☐	☑	
4031	E. St. Joseph Way	1270.37	☑	☐	Revised from 1st Submittal
4022	E. St. Joseph Way	1268.35	☑	☐	
4179	E. St. Joseph Way	1280.41	☐	☑	
5718	N 44th St.	1292.60	☑	☐	
4324	N 44th St.	1290.35	☐	☑	
5705	N 44th St.	1292.90	☐	☑	
4402	E. Marion Way	1290.10	☐	☑	
4412	E. Marion Way	1290.37	☐	☑	
4426	E. Marion Way	1290.77	☐	☑	
4438	E. Marion Way	1292.60	☐	☑	
5616	N. 45th St.	1293.50	☐	☑	
5626	N. 45th St.	1294.80	☐	☑	
5825	N. 45th St.		☐	☑	No Structure
5625	N. 45th St.	1298.37	☐	☑	
5615	N. 45th St.	1297.20	☐	☑	
5818	N. 45th St.	1300.35	☐	☑	
5808	N. 45th St.	1307.38	☐	☑	
5802	N. 44th Pl.	1295.03	☑	☐	Revised from 1st Submittal
5812	N. 44th Pl.	1294.04	☑	☐	Revised from 1st Submittal
5822	N. 44th Pl.	1294.35	☑	☐	
5830	N. 44th Pl.	1294.70	☑	☐	
5823	N. 44th Pl.	1294.87	☑	☐	
5815	N. 44th Pl.	1296.86	☐	☑	
5801	N. 44th Pl.	1295.90	☐	☑	
4502	E. Solano Dr.	1297.55	☑	☐	

Address		Finished Floor Elev	In	Out	Comments
4510	E. Solano Dr.	1300.74	☐	☑	
4518	E. Solano Dr.	1280.01	☐	☑	
5840	N. 45th Pl.	1310.45	☐	☑	
5844	N. 45th Pl.	1313.45	☐	☑	
5850	N. 46th St.	1305.75	☐	☑	
4441	E. Palo Verde Dr.	1298.45	☑	☐	
4431	E. Palo Verde Dr.	1297.20	☑	☐	
4421	E. Palo Verde Dr.	1295.55	☑	☐	
4411	E. Palo Verde Dr.	1296.78	☑	☐	
4405	E. Palo Verde Dr.	1296.51	☐	☑	
4501	N. 45th Pl.	1298.85	☑	☐	
4509	N. 45th Pl.	1298.29	☑	☐	
5901	N. 45th Pl.	1301.42	☑	☐	
4519	N. 45th Pl.	1300.38	☑	☐	
4523	N. 45th Pl.	1302.27	☑	☐	
5921	N. 45th Pl.	1303.60	☑	☐	
5927	N. 45th Pl.	1304.70	☑	☐	
5920	N. 45th Pl.	1304.15	☐	☑	
5926	N. 45th Pl.	1305.26	☐	☑	
5930	N. 45th Pl.	1306.60	☐	☑	
4609	E. Palo Verde Dr.	1309.80	☐	☑	
4605	E. Palo Verde Dr.	1307.45	☐	☑	
4601	E. Palo Verde Dr.	1307.35	☑	☐	
4602	E. Palo Verde Dr.	1307.50	☑	☐	
4606	E. Palo Verde Dr.	1307.47	☐	☑	
4614	E. Palo Verde Dr.	1309.58	☐	☑	
4622	E. Palo Verde Dr.	1313.50	☐	☑	

ECHO CANYON WASH FLOODPLAIN DELINEATION
PHOENIX STREETS – MARICOPA COUNTY

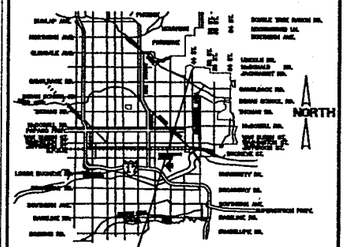


City of Phoenix
N

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
	ARIZ	02079			

AZTEC

DR: KL | DES: LS | CK: JCF | DATE: 10/03



VICINITY MAP

NOTE:
ALL CROSS SECTIONS ARE SHOWN IN THE TABLE OUTPUTS.
ALL SECTIONS NOT SHOWN FOR CLARITY.

LEGEND

- LIMITS OF 100 YEAR FLOODPLAIN
- LIMITS OF DUPLICATE EFFECTIVE FLOODPLAIN
- FLOODPLAIN WSE / FLOODWAY WSE (0.356) — CROSS SECTION & DESIGNATION
- Base Flood Elevation—Elevation in Feet
- FLOODWAY LIMITS

PER CITY OF PHOENIX ORDINANCE G-4396, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF YOUR CONTRACT WITH THE CITY OF PHOENIX.

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 40071 LARRY F. SIGALA ARIZONA, U.S.A.

602-263-1100
1-800-STAKE-IT

FLOODPLAIN DELINEATION
CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

ECHO CANYON WASH
STANFORD DRIVE TO MCDONALD DRIVE

DR: KL DATE: 8/04	DES: LS DATE: 8/04	CK: JCF DATE: 8/04	SHEET NO.	TOTAL SHEETS	AS BUILT
SCALE: 1"=200' HORIZONTAL 2' CONTOUR INTERVALS			1	3	

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

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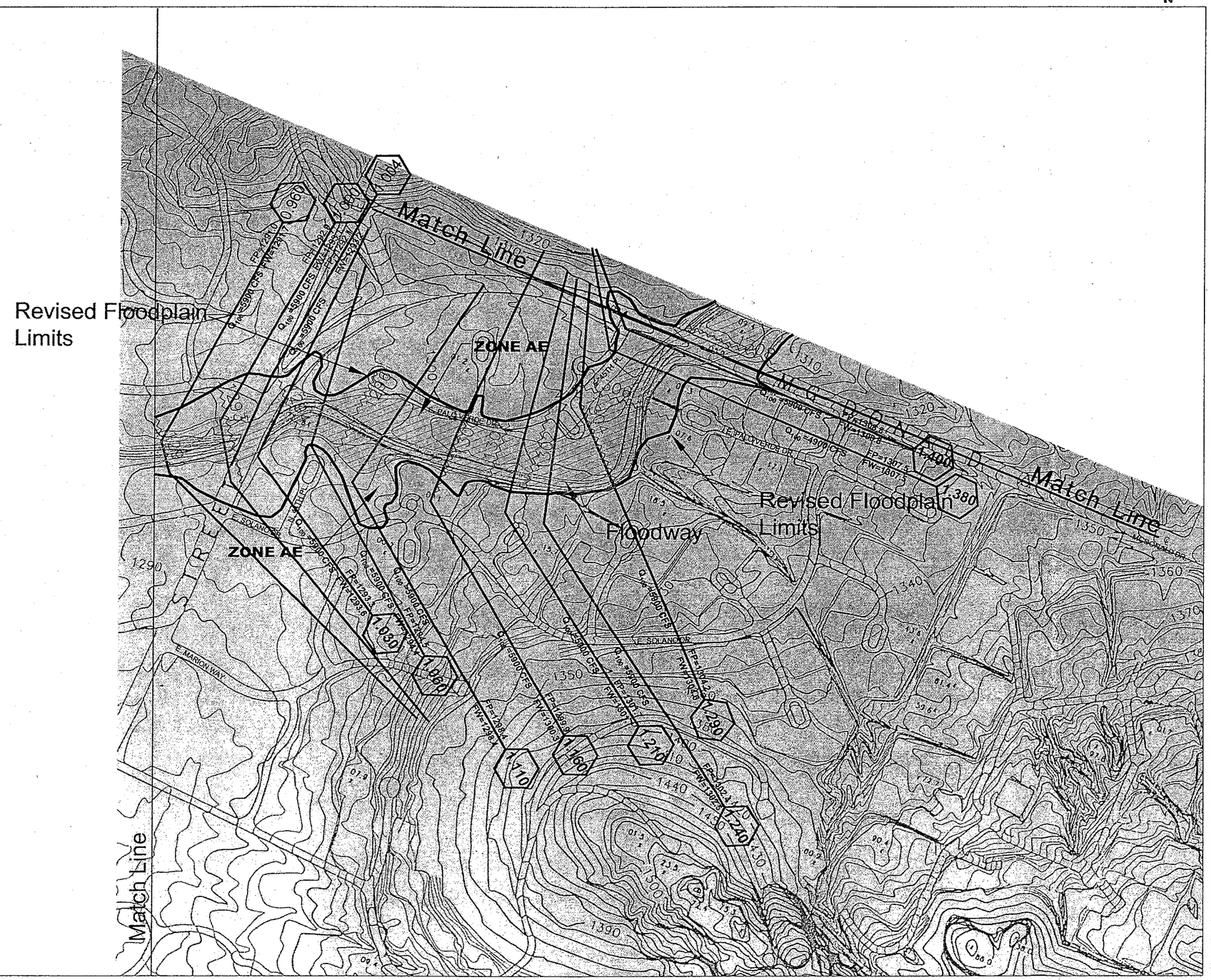
FIGURE 5

ECHO CANYON WASH FLOODPLAIN DELINEATION
PHOENIX STREETS – MARICOPA COUNTY

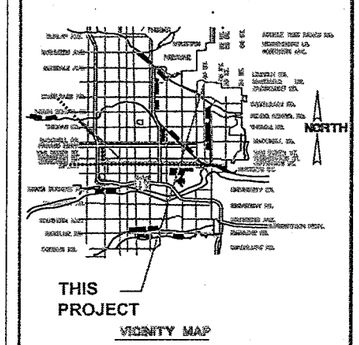


City of Phoenix
N

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
	ARIZ	02079			

AZTEC

DR: KL	DES: LS	CK: JCF	DATE: 10/03



NOTE:
ALL CROSS SECTIONS ARE SHOWN IN THE TABLE OUTPUTS.
ALL SECTIONS NOT SHOWN FOR CLARITY.

LEGEND

- LIMITS OF 100 YEAR FLOODPLAIN
- LIMITS OF DUPLICATE EFFECTIVE FLOODPLAIN
- FLOODPLAIN WSE / FLOODWAY WSE (0.356) CROSS SECTION & DESIGNATION
- Base Flood Elevation–Elevation in Feet
- FLOODWAY LIMITS

PER CITY OF PHOENIX ORDINANCE G-4396, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF YOUR CONTRACT WITH THE CITY OF PHOENIX.

40071 LARRY S. SIMKA

602-263-1100
1-800-STAKE-IT

FLOODPLAIN DELINEATION
CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT
ECHO CANYON WASH
STANFORD DRIVE TO MCDONALD DRIVE

DR: KL	DES: LS	CK: JCF	SHEET NO.	TOTAL SHEETS	AS BUILT
DATE: 8/04	DATE: 8/04	DATE: 8/04			
SCALE: 1"=200' HORIZONTAL, 2' CONTOUR INTERVALS			2	3	

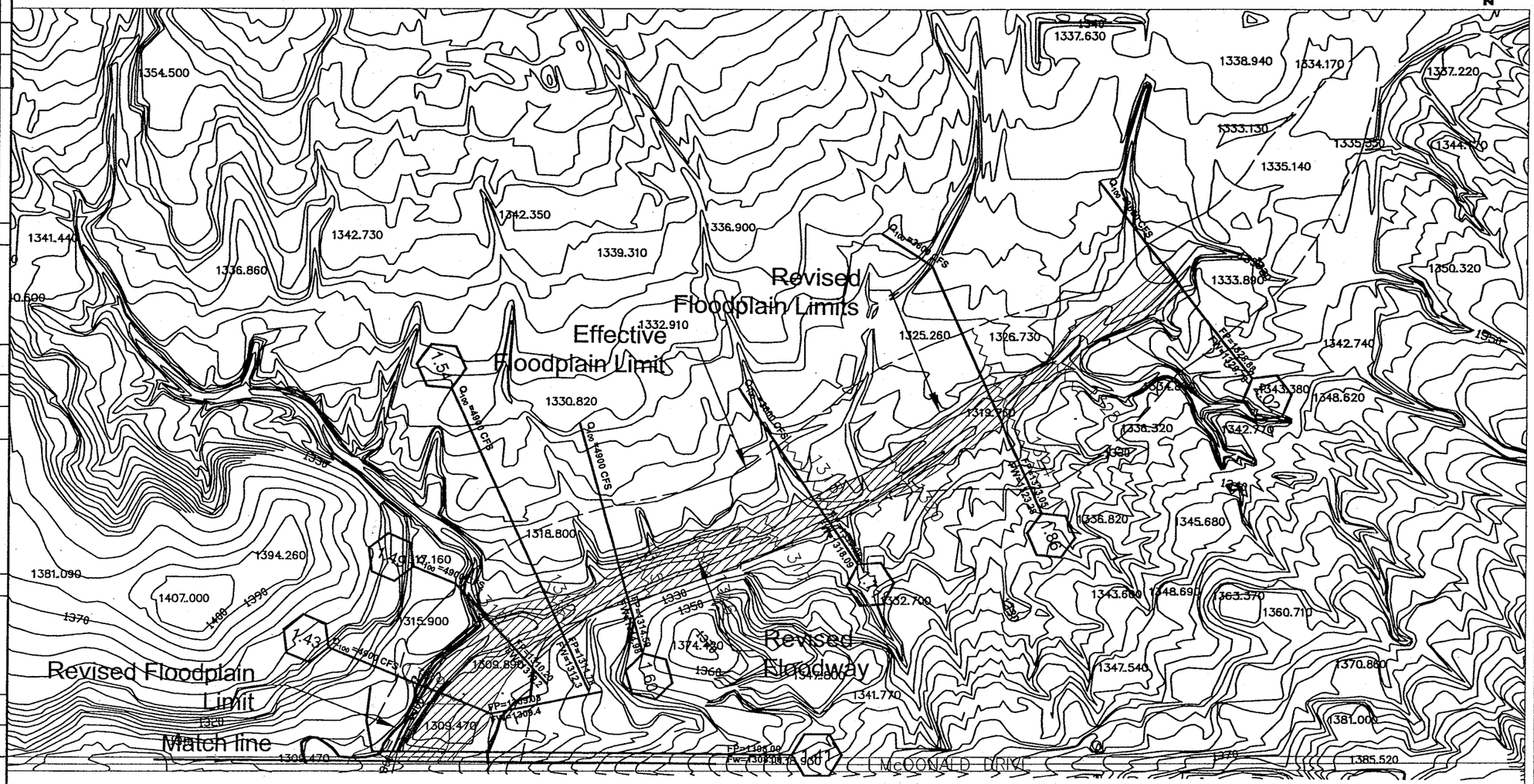
NO.	DESCRIPTION	REV BY	CKD BY	DATE

REVISION BY CITY OF PHOENIX

Sep 18, 2004 – 11:06pm

FIGURE 6

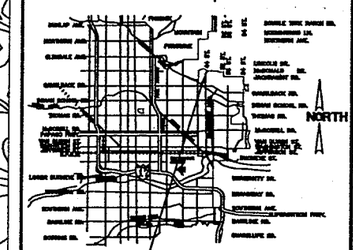
ECHO CANYON WASH FLOODPLAIN DELINEATION
PHOENIX STREETS – MARICOPA COUNTY



F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
	ARIZ	02079			

AZTEC

DR: KL	DES: LS	CK: JCF	DATE: 10/03



VICINITY MAP

NOTE:
ALL CROSS SECTIONS ARE SHOWN IN THE TABLE OUTPUTS.
ALL SECTIONS NOT SHOWN FOR CLARITY.

LEGEND

- LIMITS OF 100 YEAR FLOODPLAIN
- LIMITS OF DUPLICATE EFFECTIVE FLOODPLAIN
- FLOODPLAIN WSE / FLOODWAY WSE (0.356) — CROSS SECTION & DESIGNATION
- Base Flood Elevation–Elevation in Feet
- FLOODWAY LIMITS

PER CITY OF PHOENIX ORDINANCE G-4396, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF YOUR CONTRACT WITH THE CITY OF PHOENIX.

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 40071 LARRY F. SIBALA ARIZONA, U.S.A.

602-263-1100
1-800-STAKE-IT

FLOODPLAIN DELINEATION

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

ECHO CANYON WASH
McDONALD DRIVE TO ABOVE TATUM DRIVE

DR: DG	DES: LS	CK: JCF	SHEET NO.	TOTAL SHEETS	AS BUILT
DATE: 8/04	DATE: 8/04	DATE: 8/04			
SCALE: 1"=200' HORIZONTAL 2' CONTOUR INTERVALS					

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

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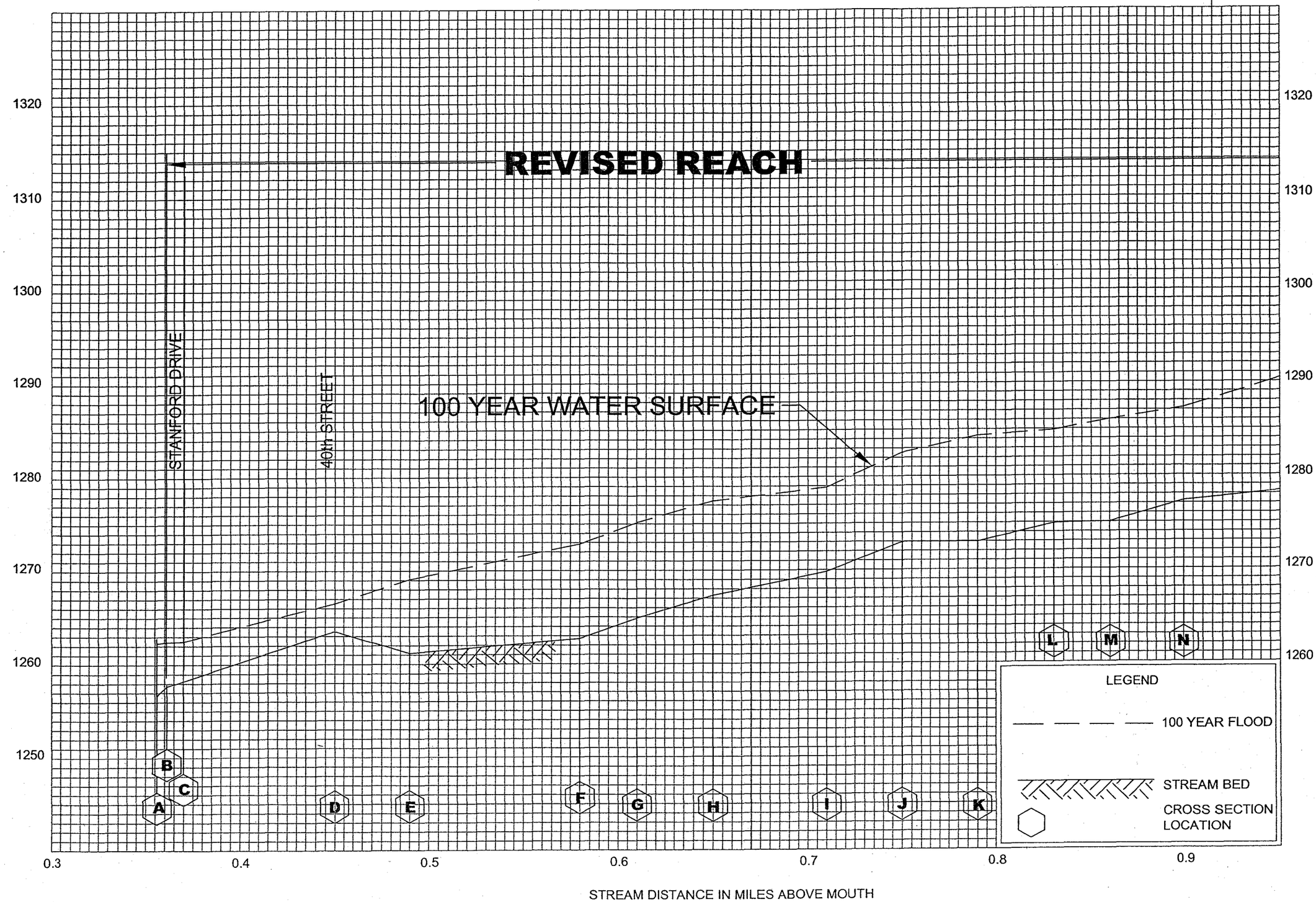
FIGURE 6A



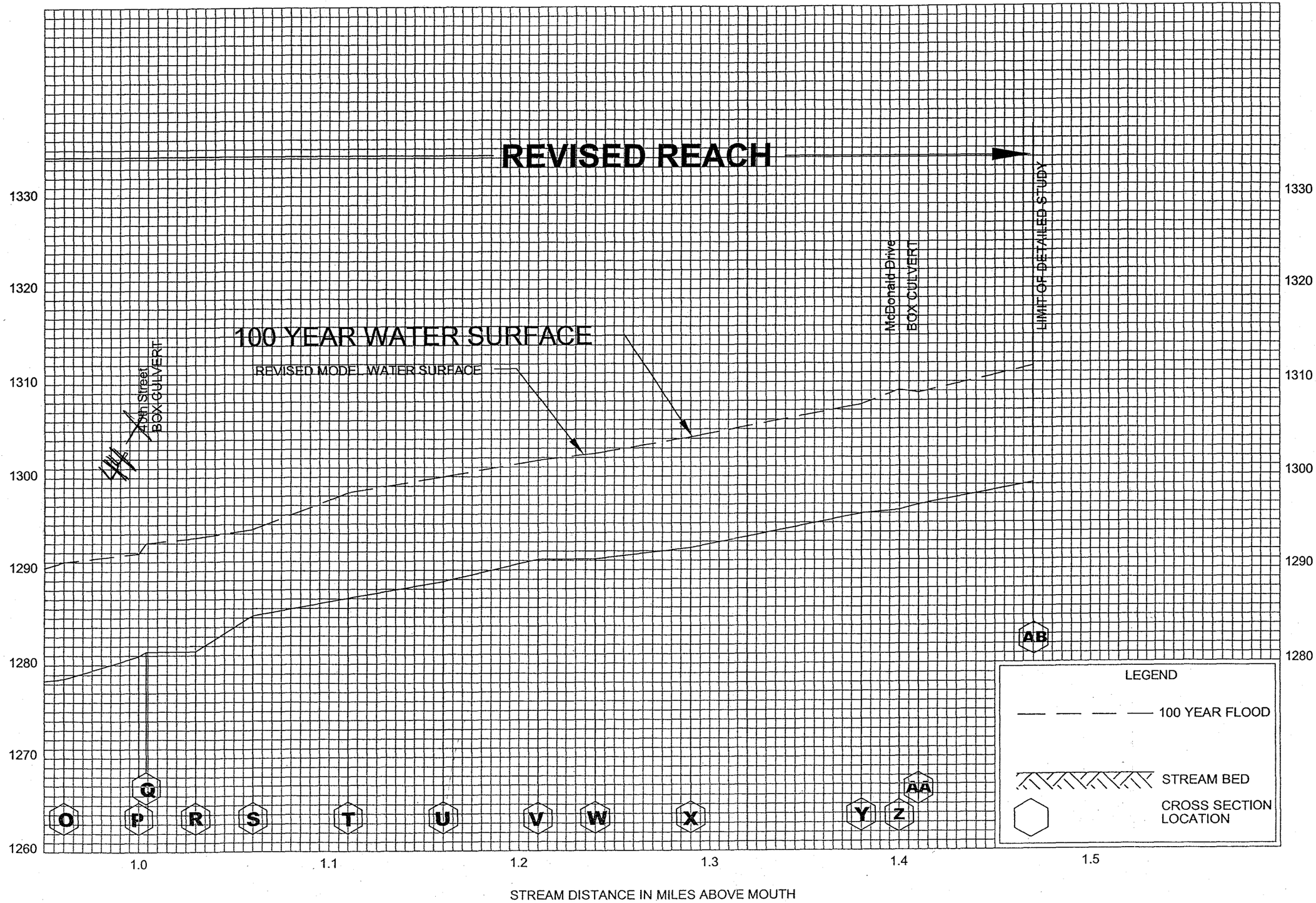
FLOOD PROFILES

ECHO CANYON WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND UNINCORPORATED AREAS

FIGURE 7



FLOOD PROFILES

ECHO CANYON WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND UNINCORPORATED AREAS

FIGURE 8

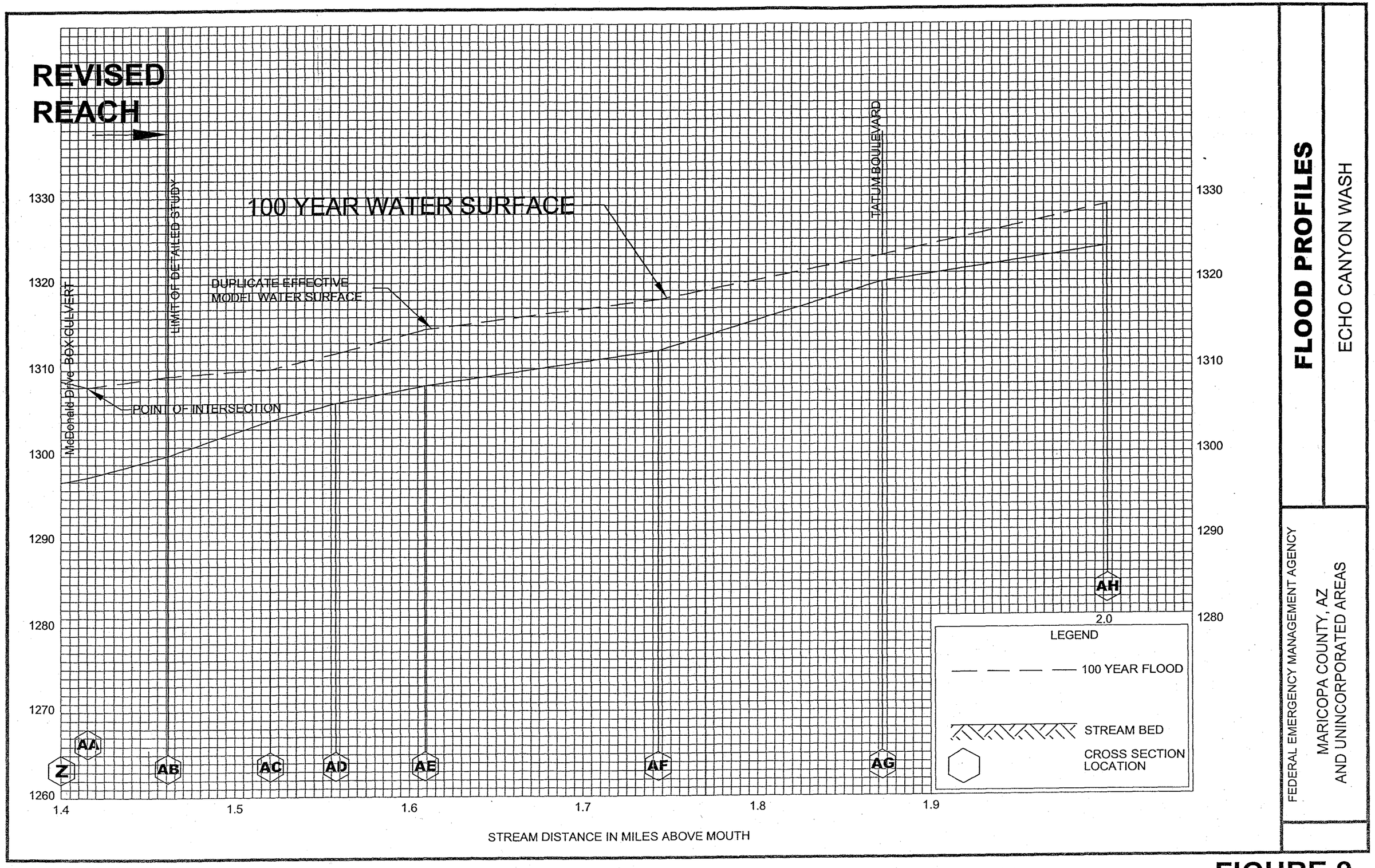

REVISED REACH
100 YEAR WATER SURFACE
DUPLICATE EFFECTIVE MODEL WATER SURFACE
POINT OF INTERSECTION
McDonald Drive BOX CULVERT
LIMIT OF DETAILED STUDY
TATUM BOULEVARD
1330
1320
1310
1300
1290
1280
1270
1260
1.4
1.5
1.6
1.7
1.8
1.9
2.0
Z
AA
AB
AC
AD
AE
AF
AG
AH
LEGEND
100 YEAR FLOOD
STREAM BED
CROSS SECTION LOCATION
STREAM DISTANCE IN MILES ABOVE MOUTH
FLOOD PROFILES
ECHO CANYON WASH
FEDERAL EMERGENCY MANAGEMENT AGENCY
MARICOPA COUNTY, AZ
AND UNINCORPORATED AREAS

FIGURE 9

REVISION BY CITY OF PHOENIX
NO. | DESCRIPTION | REV BY | CKD BY | DATE
REVISION BY CITY OF PHOENIX
NO. | DESCRIPTION | REV BY | CKD BY | DATE
REVISION BY CITY OF PHOENIX
NO. | DESCRIPTION | REV BY | CKD BY | DATE

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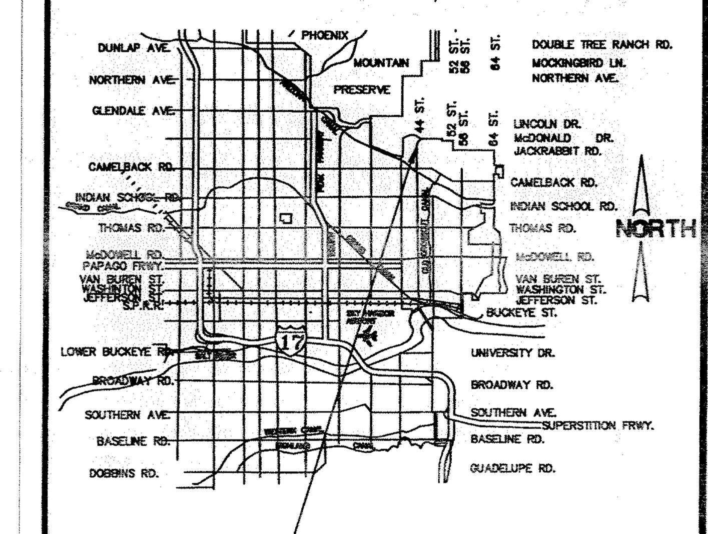
ECHO CANYON WASH FLOODPLAIN DELINEATION
PHOENIX STREETS – MARICOPA COUNTY

City of Phoenix
N

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
	ARIZ	02079			————

AZTEC 3747 E. Grove Street Phoenix, AZ 85040-3982 Tel(602)454-0402 Fax(602)454-0403 Web: aztec.us

DR: KL | DES: LS | CK: JCF | DATE: 10/03



THIS PROJECT

VICINITY MAP

NOTE:
ALL CROSS SECTIONS ARE SHOWN IN THE TABLE OUTPUTS.
ALL SECTIONS NOT SHOWN FOR CLARITY.

LEGEND

- LIMITS OF 100 YEAR FLOODPLAIN
- LIMITS OF DUPLICATE EFFECTIVE FLOODPLAIN
- FLOODPLAIN WSE / FLOODWAY WSE (0.356) CROSS SECTION & DESIGNATION
- Base Flood Elevation—Elevation in Feet
- FLOODWAY LIMITS

PER CITY OF PHOENIX ORDINANCE G-4396, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF YOUR CONTRACT WITH THE CITY OF PHOENIX.

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 40071 LARRY F. SIBALA Date Signed ARIZONA, U.S.A.

CALL TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES
602-263-1100
1-800-STAKE-IT
OUTSIDE MARICOPA COUNTY

FLOODPLAIN DELINEATION

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

ECHO CANYON WASH
STANFORD DRIVE TO MCDONALD DRIVE

DR: KL DATE: 8/04	DES: LS DATE: 8/04	CK: JCF DATE: 8/04	SHEET NO.	TOTAL SHEETS	AS BUILT
SCALE: 1"=200' HORIZONTAL 2' CONTOUR INTERVALS			2	3	

FIGURE 6

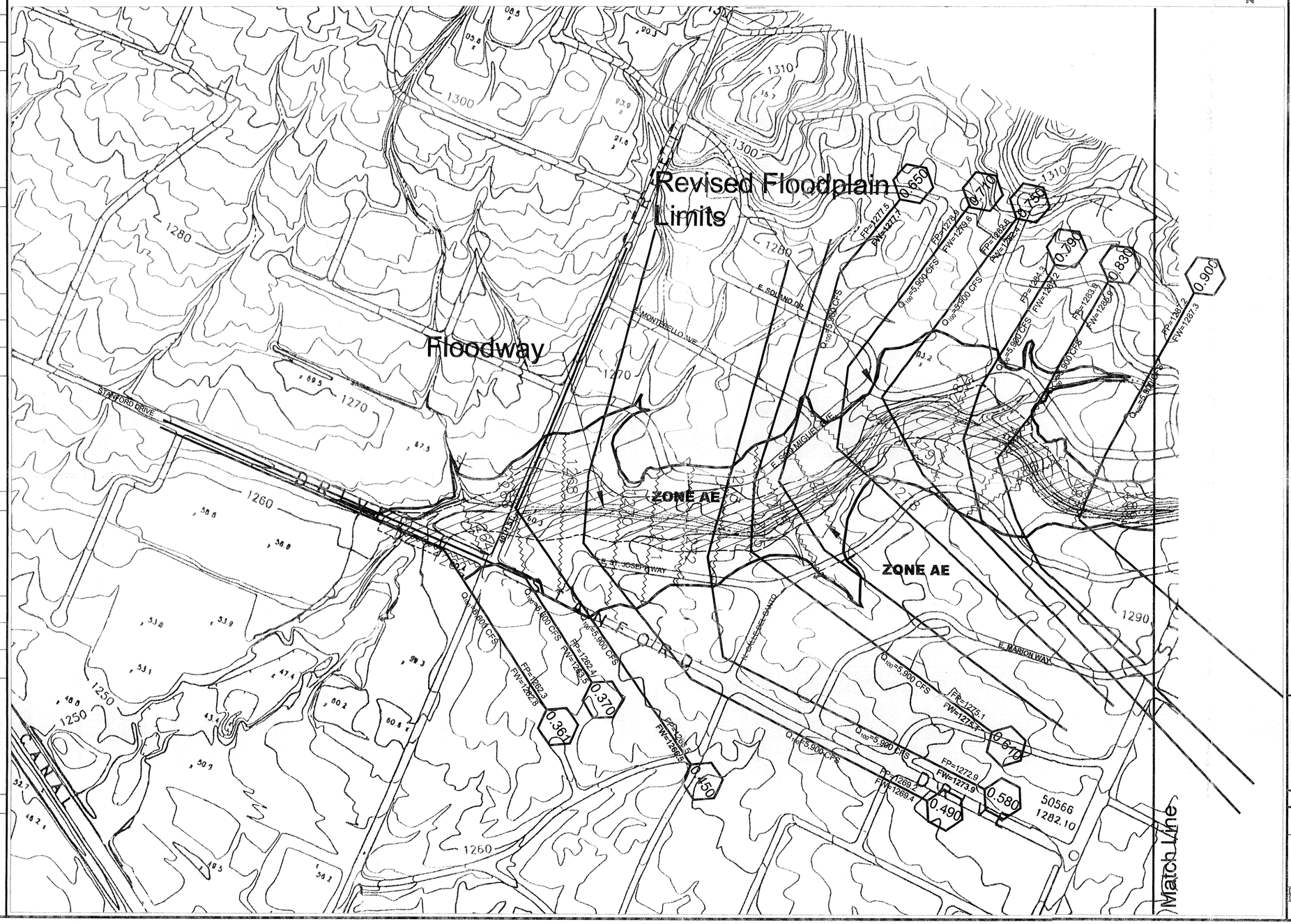
ECHO CANYON WASH FLOODPLAIN DELINEATION
PHOENIX STREETS – MARICOPA COUNTY

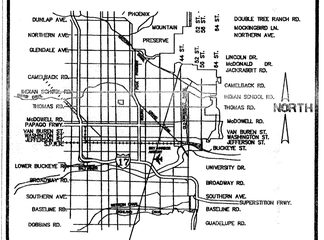
F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
	ARIZ	02079			

AZTEC 2401 E. Grove Street Phoenix, AZ 85040-7961 Tel:(602)454-9492 Fax:(602)454-5983 Web: aztecwc.com

DR: KL | DES: LS | CK: JCF | DATE: 10/03

City of Phoenix N





VICINITY MAP

NOTE:
ALL CROSS SECTIONS ARE SHOWN IN THE TABLE OUTPUTS.
ALL SECTIONS NOT SHOWN FOR CLARITY.

LEGEND

- LIMITS OF 100 YEAR FLOODPLAIN
- LIMITS OF DUPLICATE EFFECTIVE FLOODPLAIN
- FLOODPLAIN WSE / FLOODWAY WSE — 0.356 — CROSS SECTION & DESIGNATION
- Base Flood Elevation–Elevation in Feet
- FLOODWAY LIMITS

PER CITY OF PHOENIX ORDINANCE G-4396, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF YOUR CONTRACT WITH THE CITY OF PHOENIX.

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 40071 LARRY F. SEBALA ARIZONA, U.S.A. Date Signed 4/14/04

CALL TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE MARK STAKES 602-263-1100 1-800-STAKE-IT OUTSIDE MARICOPA COUNTY

FLOODPLAIN DELINEATION

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

ECHO CANYON WASH
STANFORD DRIVE TO MCDONALD DRIVE

DR: KL	DES: LS	CK: JCF	SHEET NO.	TOTAL SHEETS	AS BUILT
DATE: 8/04	DATE: 8/04	DATE: 8/04	1	3	

SCALE: 1"=200' HORIZONTAL 2' CONTOUR INTERVALS

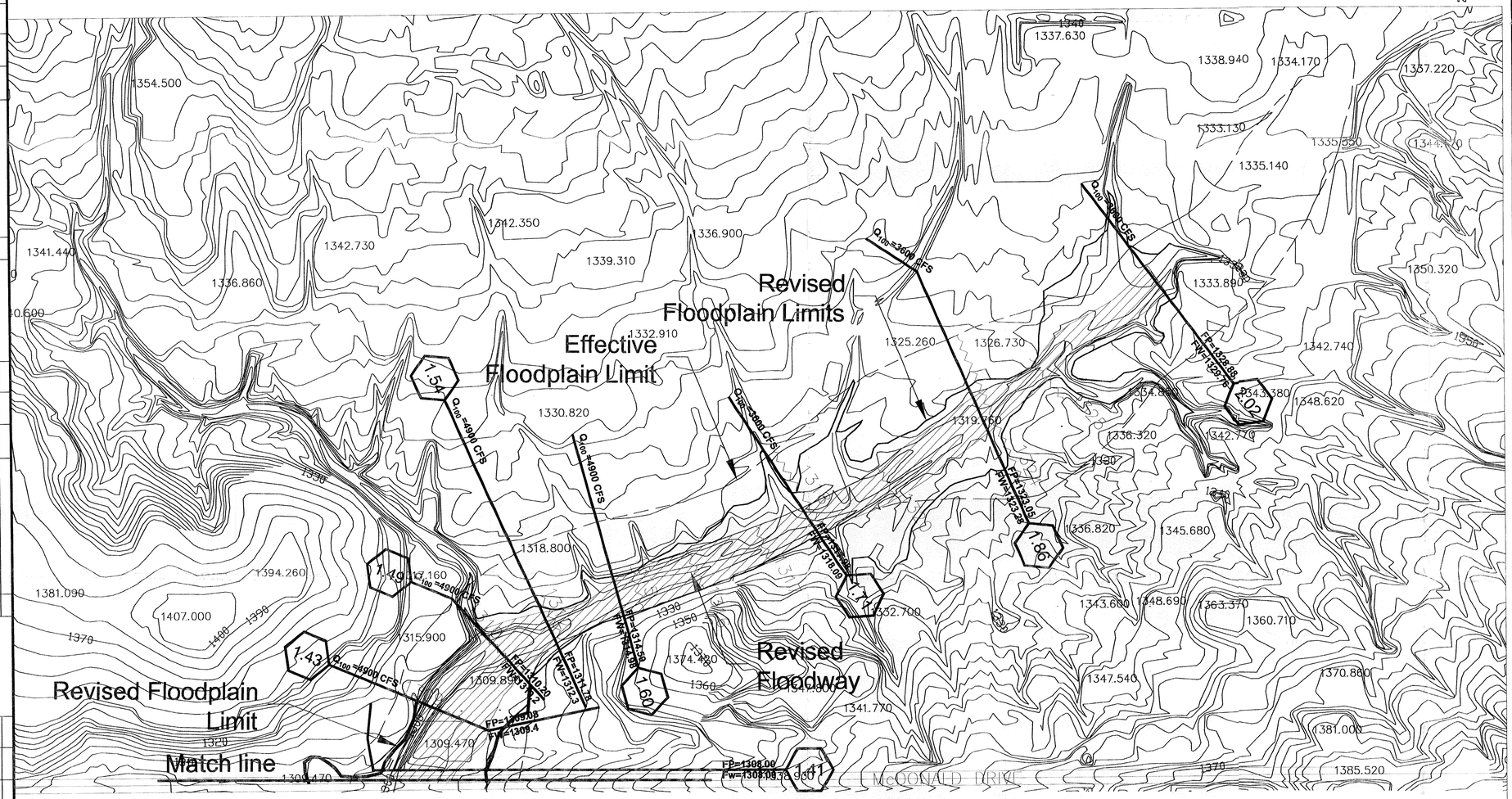
NO.	REVISION BY CITY OF PHOENIX DESCRIPTION	REV BY	CKD BY	DATE

Sep 14, 2004 – 7:52am

R:\PhoenixGrove\Projects\AZ02079\03\Tech\Report\Figures\Figure 5.dwg

FIGURE 5

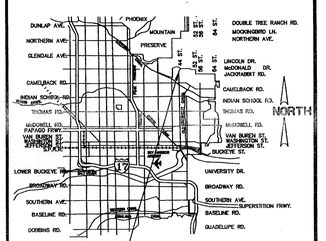
ECHO CANYON WASH FLOODPLAIN DELINEATION
PHOENIX STREETS – MARICOPA COUNTY



F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
	ARIZ	02079			

AZTEC
7411 E. Drive Street
Phoenix, Arizona 85260
(602)483-9400 - (602)
Fax (602)483-9465
www.aztec.net

DR: KL	DES: LS	CK: JCF	DATE: 10/03



VICINITY MAP

NOTE:
ALL CROSS SECTIONS ARE SHOWN IN THE TABLE OUTPUTS.
ALL SECTIONS NOT SHOWN FOR CLARITY.

LEGEND

- LIMITS OF 100 YEAR FLOODPLAIN
- LIMITS OF DUPLICATE EFFECTIVE FLOODPLAIN
- FLOODPLAIN WSE / FLOODWAY WSE — 0.356 — CROSS SECTION & DESIGNATION
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- FLOODWAY LIMITS

PER CITY OF PHOENIX ORDINANCE G-4396, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF YOUR CONTRACT WITH THE CITY OF PHOENIX.

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CALL TWO WORKING DAYS BEFORE YOU DIG AND FOR THE BLUE STAKES
602-263-1100
1-800-STAKE-IT
OUTSIDE MARICOPA COUNTY

FLOODPLAIN DELINEATION

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

ECHO CANYON WASH
McDONALD DRIVE TO ABOVE TATUM DRIVE

DR: DG	DES: LS	CK: JCF	SHEET NO.	TOTAL SHEETS	AS BUILT
DATE: 8/04	DATE: 8/04	DATE: 8/04			
SCALE: 1"=200' HORIZONTAL 2' CONTOUR INTERVALS			3	3	

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

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FIGURE 6A

City of Phoenix
STREET TRANSPORTATION DEPARTMENT

January 16, 2004

Ms. Andrea L. Ryon, P.E. Director
Engineering Division
Michael Baker Jr., Inc.
3601 Eisenhower Avenue, #600
Alexandria, VA. 22304-6465

RE: LETTER OF MAP REVISION FOR ECHO CANYON WASH, PHOENIX, MARICOPA, ARIZONA, FIRM PANEL 04013C1690F DATED JULY 19, 2001

Dear Ms. Ryan:

This is a request to issue a revision to the Flood Insurance Rate Map (FIRM) for Maricopa County, Arizona and Incorporated Areas. Pertinent information about the request is listed below:

Identifier:	LOMR request for Echo Canyon Wash from McDonald Drive to Stanford Drive
Flooding Source:	Echo Canyon Wash
FIRM Panel Affected:	04013C1690F

ITEMS:

1. A check for $4,200.
2. Technical Data Notebook.
3. FEMA MT-2 Forms.
4. Survey and Mapping Information.
5. Hydrology.
6. Hydraulics.
7. Copy of FIRM Panel 04013C1690F dated July 19, 2001. Figure 4.
8. Floodplain Delineation, Figures 5 & 6.
9. Flood Profile, Figures 7 & 8.
10. Duplicate Effective Model Input/Output, Appendix D.
11. Revised Model Input/Output, Appendix F.
12. 24" x 36" Workmaps, Appendix G.

If you have any technical questions regarding the submittal, please contact Mr. Larry Sibala, P.E., Aztec, 3747 East Grove Street, Phoenix, AZ. 85040, phone (602) 454-0402. If you have any other questions, please contact this office at 602-262-4960.

Sincerely,

Hasan Mushtaq, Ph.D., P.E., CFM
Floodplain Manager

Attachments

c: Mr. Sibala, P.E., Aztec
Mr. Cosson, Arizona Department of Water Resources
Mr. Murphy, P.E., CFM, Flood Control District of Maricopa County

City of Phoenix
FLOODPLAIN MANAGEMENT
STREET TRANSPORTATION DEPARTMENT
200 West Washington, 5th Floor
Phoenix, AZ 85003-1611

ADDRESS SERVICE REQUESTED

Mr. Tim Murphy, P.E., CFM
Flood Control District of Maricopa County
2801 West Durango
Phoenix, AZ. 85009

Echo Canyon Wash

Letter of Map Revision

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

Technical Data Notebook

December 2003

Registered Professional Engineer (Civil)
CERTIFICATE NO.
35542
JEFFREY C.
FORD
Date Signed 12-19-03
ARIZONA U.S.A.

Prepared For:

City of Phoenix

Prepared By:

AZTEC
www.aztec.us

3747 East Grove Street
Phoenix, AZ 85040
602-454-0402

Registered Professional Engineer (Civil)
CERTIFICATE NO.
40071
LARRY F.
SIBALA
Date Signed 12/19/03
ARIZONA, U.S.A.

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Registered Professional Engineer (Civil) CERTIFICATE NO. 35542 JEFFREY C. FORD Date Signed 12-19-03 ARIZONA U.S.A.

Registered Professional Engineer (Civil) CERTIFICATE NO. 40071 LARRY F. SIBALA Date Signed 12/19/03 ARIZONA, U.S.A.

AZTEC

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Appendix F Revised Model Output ..... 1 – through – 21
Appendix G 24" x 36' Copies of Figures 5 and 6
Appendix H Owner Notification ..... 1 through 2
Appendix I Digital Copies

Registered Professional Engineer (Civil) CERTIFICATE NO. 35542 JEFFREY C. FORD Date Signed 12-19-03 ARIZONA U.S.A.

Registered Professional Engineer (Civil) CERTIFICATE NO. 40071 LARRY F. SIBALA Date Signed 12/19/03 ARIZONA, U.S.A.

AZTEC

1.0 INTRODUCTION

1.1 Purpose and Authorization of Study

The purpose of this study is to obtain a Letter of Map Revision (LOMR) for the proposed floodplain/floodway of Echo Canyon Wash from Stanford Drive to McDonald Drive. The LOMR will be based on recent topography and a revised hydraulic analysis. There will be no revision to the existing hydrology.

This study and analysis was authorized by the Floodplain Management, Street Transportation Department, City of Phoenix.

1.2 Project Location

The project area is located in the City of Phoenix within Maricopa County as shown in Figure 1. The project is within Section 18, Township 2 North and Range 4 East. The study reach includes the area bounded by Stanford Drive on the south, McDonald Drive on the north, 40th Street on the west, and approximately 47th Street on the east as shown in Figure 2. Figure 3 provides an isometric view of the project area. Site photographs were taken and are included in Appendix A.

The project area is located within Zone AE of the FEMA Flood Insurance Rate Map (FIRM), Panel No. 04013C1690F, revised July 19, 2001. Zone AE is defined as "Special flood hazard areas inundated by 100-year flood, Base flood elevations determined." Figure 4 provides a copy of the FIRM Map for the project location

1.3 Floodplain History

1.3.1 Effective FIS

A search was done for the existing regulatory model through Echo Canyon Wash. This search included contacting the FEMA library, the City of Paradise Valley, and a search through existing information within the City of Phoenix. The only information available was a LOMR performed by Baker Engineering up through river mile station 0.71, dated August 7, 1996. This LOMR was submitted as part of the construction of the Arizona Canal/Diversion Channel (AC/DC) and the improvements at the Echo Canyon Wash junction with the AC/DC Channel. A copy of the LOMR is included in Appendix B.

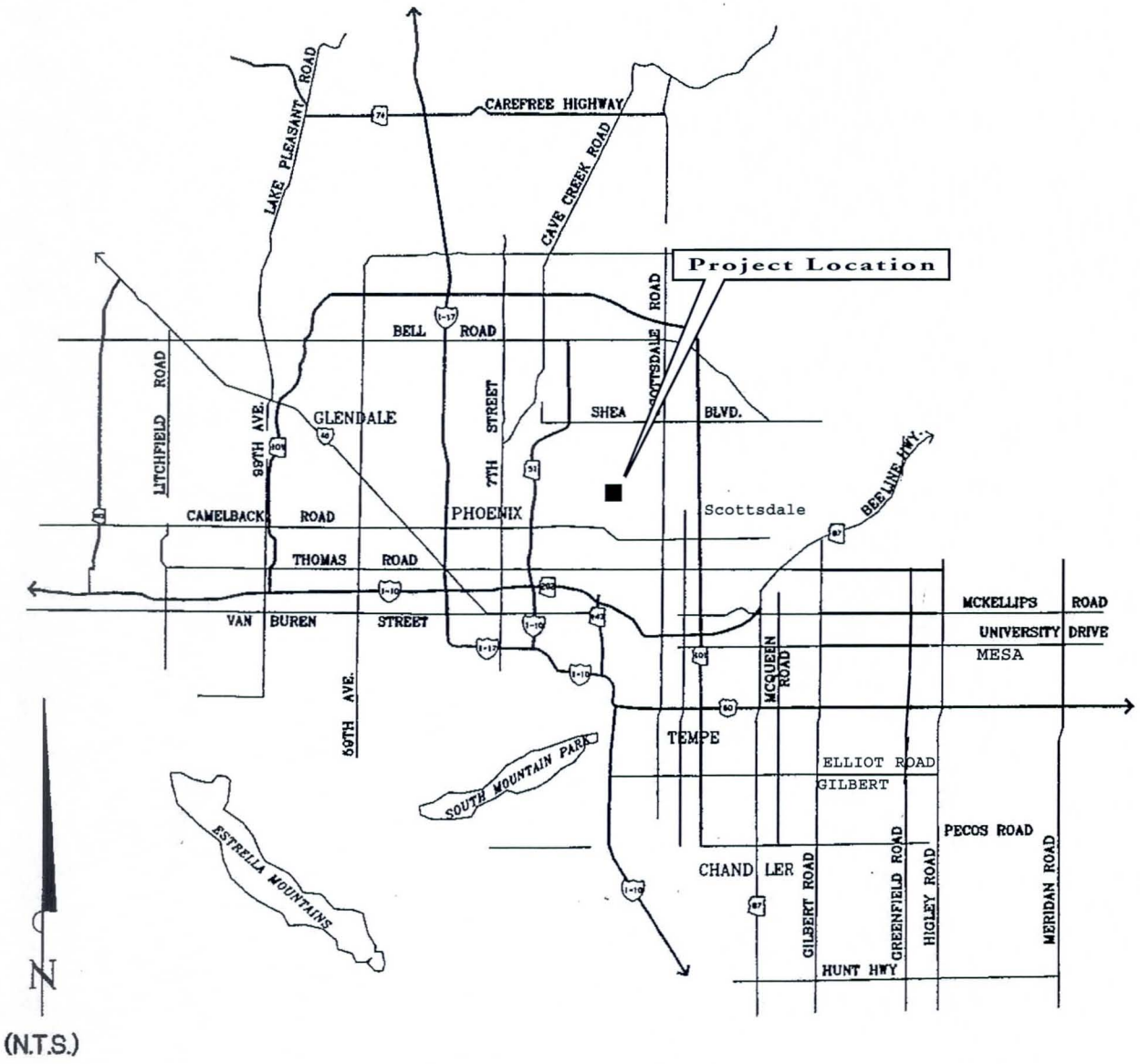

FIGURE 1: PROJECT LOCATION MAP

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Since 1992

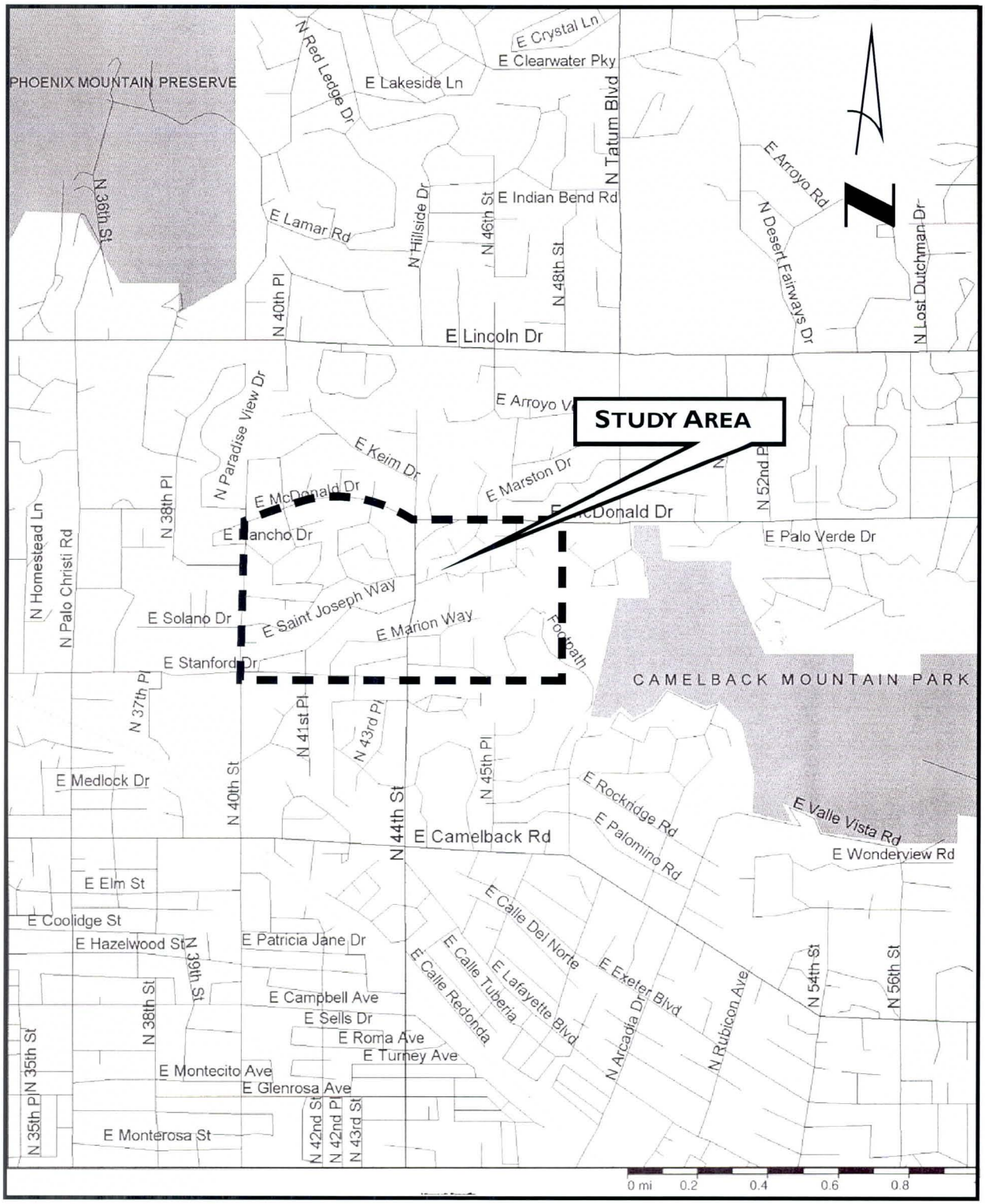


Figure 2: Site Map

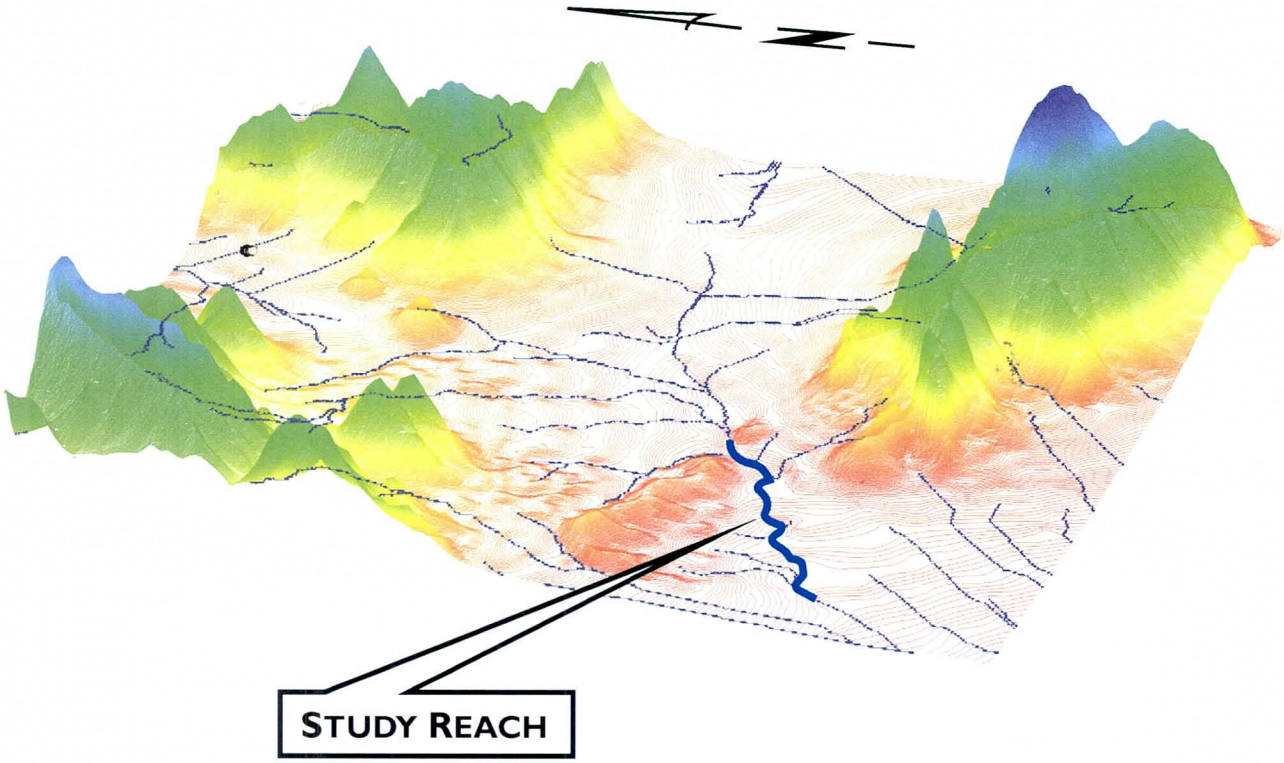
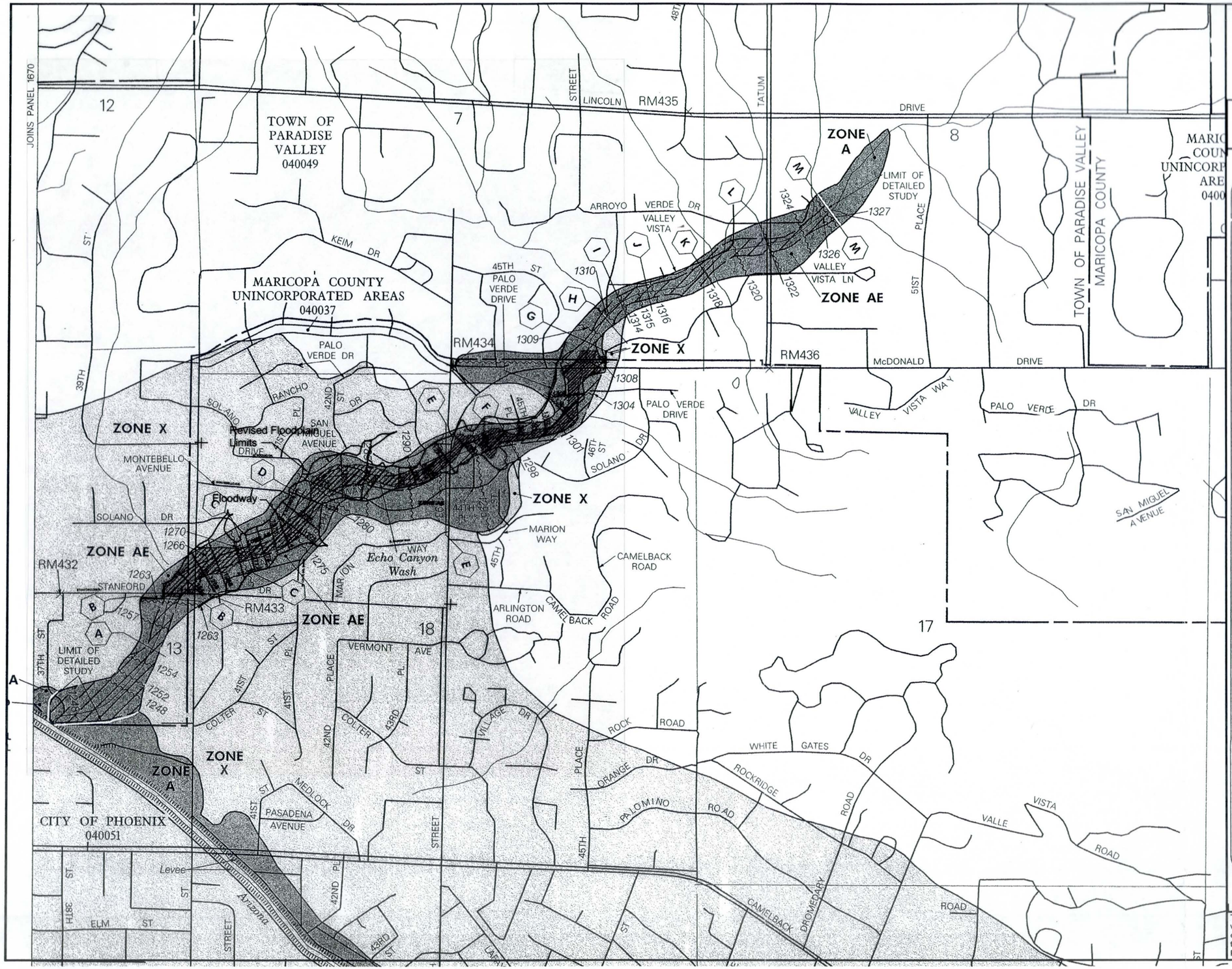


Figure 3: Oblique View of Project Area



APPROXIMATE SCALE IN FEET

1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 1690 OF 4350

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY, UNINCORPORATED AREAS	040037	1690	F
PARADISE VALLEY, TOWN OF	040049	1690	F
PHOENIX, CITY OF	040051	1690	F
SCOTTSDALE, CITY OF	045012	1690	F

MAP NUMBER 04013C1690 F

MAP REVISED: JULY 19, 2001

FIGURE 4

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

2.0 ABSTRACT AND FEMA FORMS

2.1 Study Documentation Abstract

2.1.1	Date Study Accepted	No Acceptance
2.1.2	Study Contractor	Aztec Engineering
	Contact (s)	Larry Sibala, P.E.
		Jeff Ford, P.E.
	Address:	3747 E. Grove St.
		Phoenix, AZ 85040-3982
	Phone / Fax	(602) 454-0402 / (602) 454-0403
	Email	lsibala@aztec.us
2.1.3	FEMA Technical Review Contractor	Unknown
	Contact (s)	
	Address	
	Phone	
2.1.4	FEMA Regional Reviewer	Unknown
	Phone	
2.1.5	State Technical Reviewer	Unknown
	Phone	
2.1.6	Local Technical Reviewer	Hasan Mushtaq, City of Phoenix
	Phone	(602) 262-4960
2.1.7	Reach Description	Echo Canyon Wash
2.1.8	Aerial Mapping Source	Kenney Aerial
	Phone	(602) 242-5588
	Flight Date / Contour Interval	November 15, 1990 / 1" = 400, 2' CI
2.1.9	Coordination of Peak Discharges	Used Existing FIS Discharges

2.2 FEMA Forms

Application for a Letter of Map Revision requires the use of the FEMA Form Series 81-89, MT-2 forms. The following is a list of the forms required for this submittal:

- MT-2, Form 1 - Overview and Concurrence Form
- MT-2, Form 2 - Riverine Hydrology and Hydraulics Form
- MT-2, Form 3 - Riverine Structures Form

FEDERAL EMERGENCY MANAGEMENT AGENCY

OVERVIEW & CONCURRENCE FORM

O.M.B No. 3067-0148
Expires September 30, 2005

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hour per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (3067-0148). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

A. REQUESTED RESPONSE FROM FEMA

This request is for a (check one):

☐ CLOMR: A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72).

☒ LOMR: A letter from FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See Parts 60 & 65 of the NFIP Regulations.)

B. OVERVIEW

1. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301	City of Katy	TX	480301	0005D	02/08/83
480287	Harris County	TX	48201C	0220G	09/28/90
040051	City of Phoenix.	AZ	40051	1690F	07/19/01

2. Flooding Source: Echo Canyon Wash

3. Project Name/Identifier: Echo Canyon, City of Phoenix, Project No. ST 83130143

4. FEMA zone designations affected: A, AE (choices: A, AH, AO, A1-A30, A99, AE, AR, V, V1-V30, VE, B, C, D, X)

5. Basis for Request and Type of Revision:

a. The basis for this revision request is (check all that apply)

☒ Physical Change ☒ Improved Methodology/Data

☐ Regulatory Floodway Revision ☐ Other (Attach Description)

Note: A photograph and narrative description of the area of concern is not required, but is very helpful during review.

b. The area of revision encompasses the following types of flooding and structures (check all that apply)

Types of Flooding: ☒ Riverine ☐ Coastal ☐ Shallow Flooding (e.g., Zones AO and AH)

☐ Alluvial fan ☐ Lakes ☐ Other (Attach Description)

Structures: ☐ Channelization ☐ Levee/Floodwall ☒ Bridge/Culvert

☐ Dam ☐ Fill ☐ Other, Attach Description

C. REVIEW FEE

Has the review fee for the appropriate request category been included? ☒ Yes Fee amount: $ 4,000.00

☐ No, Attach Explanation

Please see the FEMA Web site at http://www.fema.gov/mit/tsd/frm_fees.htm **for Fee Amounts and Exemptions.**

D. SIGNATURE

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Name: Larry Sibala, P.E.	Company: AZTEC Engineering Co.	
Mailing Address: 3747 E. Grove St. Phoenix, AZ 85040	Daytime Telephone No.: 602-454-0402	Fax No.: 602-454-0403
	E-Mail Address: lsibala@aztec.us	
Signature of Requester (required): Larry L. Sibala		Date: 12/19/03

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirement that no fill be placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title: Hasan Mushtaq, City of Phoenix Floodplain Manager		Telephone No.: 602-262-4960
Community Name: City of Phoenix	Community Official's Signature (required): Hmushtaq	Date: 1/16/04

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: Al Reece	License No.: AZ 25396	Expiration Date: 3/31/2004
Company Name: AZTEC Engineering Co.	Telephone No.: 602-458-9270	Fax No.: 602-458-9359
Signature: Alan D. Reece		Date: 12/18/03

Ensure the forms that are appropriate to your revision request are included in your submittal.

Form Name and (Number)	Required if ...
☒ Riverine Hydrology and Hydraulics Form (Form 2)	New or revised discharges or water-surface elevations
☐ Riverine Structures Form (Form 3)	Channel is modified, addition/revision of bridge/culverts, addition/revision of levee/floodwall, addition/revision of dam
☐ Coastal Analysis Form (Form 4)	New or revised coastal elevations
☐ Coastal Structures Form (Form 5)	Addition/revision of coastal structure
☐ Alluvial Fan Flooding Form (Form 6)	Flood control measures on alluvial fans

Seal (Optional)

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
Expires September 30, 2005

PAPERWORK REDUCTION ACT

Public reporting burden for this form is estimated to average 3 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (3067-0148). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

Flooding Source:
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☒ Not revised (skip to section 2) ☐ No existing analysis ☐ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

3. Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☐ Precipitation/Runoff Model [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☐ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.)	Proposed/Revised
Downstream Limit	Section immediately Downstream of Stanford Dr.	(B) 0.370	1262.71	1262.48
Upstream Limit	U.S. Face of culvert at McDonald Drive	(BB) 1.41	1308.0	1308.01

2. Hydraulic Method Used

Hydraulic Analysis HEC-2 [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/fhm/frm_soft.shtm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name: DUPEFFECHO	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name:	Floodway File Name:
Revised or Post-Project Conditions Model	Natural File Name: REVECHO	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/fhm/en_modl.shtm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

O.M.B. No. 3067-0148
Expires September 30, 2005

PAPERWORK REDUCTION ACT

Public reporting burden for this form is estimated to average 7 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (3067-0148). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

Flooding Source:
Note: Fill out one form for each flooding source studied

A. GENERAL

Complete the appropriate section(s) for each Structure listed below:

Channelization ..... complete Section B
Bridge/Culvert ..... complete Section C
Dam..... complete Section D
Levee/Floodwall ..... complete Section E
Sediment Transport..... complete Section F (if required)

Description Of Structure

1. **Name of Structure:**

Type (check one): ☐ Channelization ☒ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure: 44th St. crossing Echo Wash

Downstream Limit/Cross Section: 1.00

Upstream Limit/Cross Section: 1.03

2. **Name of Structure:**

Type (check one): ☐ Channelization ☒ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure: McDonald Dr. crossing Echo Wash

Downstream Limit/Cross Section: 1.38

Upstream Limit/Cross Section: 1.41

3. **Name of Structure:**

Type (check one) ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure:

Downstream Limit/Cross Section:

Upstream Limit/Cross Section:

NOTE: For more structures, attach additional pages as needed.

B. CHANNELIZATION

Flooding Source:

Name of Structure:

1. Accessory Structures

The channelization includes (check one):

- ☐ Levees [Attach Section E (Levee/Floodwall)]
- ☐ Superelevated sections
- ☐ Debris basin/detention basin
- ☐ Other (Describe):
- ☐ Drop structures
- ☐ Transitions in cross sectional geometry
- ☐ Energy dissipator

2. Drawing Checklist

Attach the plans of the channelization certified by a registered professional engineer, as described in the instructions.

3. Hydraulic Considerations

The channel was designed to carry (cfs) and/or the -year flood.

The design elevation in the channel is based on (check one):

☐ Subcritical flow ☐ Critical flow ☐ Supercritical flow ☐ Energy grade line

If there is the potential for a hydraulic jump at the following locations, check all that apply and attach an explanation of how the hydraulic jump is controlled without affecting the stability of the channel.

☐ Inlet to channel ☐ Outlet of channel ☐ At Drop Structures ☐ At Transitions
☐ Other locations (specify):

4. Sediment Transport Considerations

Was sediment transport considered? ☐ Yes ☐ No If Yes, then fill out Section F (Sediment Transport).
If No, then attach your explanation for why sediment transport was not considered.

C. BRIDGE/CULVERT

Flooding Source: Echo Wash

Name of Structure: Culvert at 44th St.

1. This revision reflects (check one):

- ☒ New bridge/culvert not modeled in the FIS
- ☐ Modified bridge/culvert previously modeled in the FIS
- ☐ New analysis of bridge/culvert previously modeled in the FIS

HEC 2 Special Culvert

2. ~~Hydraulic model used to analyze the structure (e.g., HEC-2 with special bridge routine, WSPRO, HY8):~~
If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structures. Attach justification.

3. Attach plans of the structures certified by a registered professional engineer. The plan detail and information should include the following (check the information that has been provided):

- ☒ Dimensions (height, width, span, radius, length)
- ☒ Shape (culverts only)
- ☒ Material
- ☒ Beveling or Rounding
- ☒ Wing Wall Angle
- ☒ Skew Angle
- ☒ Distances Between Cross Sections
- ☒ Erosion Protection
- ☒ Low Chord Elevations – Upstream and Downstream
- ☒ Top of Road Elevations – Upstream and Downstream
- ☒ Structure Invert Elevations – Upstream and Downstream
- ☒ Stream Invert Elevations – Upstream and Downstream
- ☒ Cross-Section Locations

4. Sediment Transport Considerations

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport).
If No, then attach your explanation for why sediment transport was not considered.

B. CHANNELIZATION

Flooding Source:

Name of Structure:

1. Accessory Structures

The channelization includes (check one):

- ☐ Levees [Attach Section E (Levee/Floodwall)]
- ☐ Superelevated sections
- ☐ Debris basin/detention basin
- ☐ Other (Describe):
- ☐ Drop structures
- ☐ Transitions in cross sectional geometry
- ☐ Energy dissipator

2. Drawing Checklist

Attach the plans of the channelization certified by a registered professional engineer, as described in the instructions.

3. Hydraulic Considerations

The channel was designed to carry (cfs) and/or the -year flood.

The design elevation in the channel is based on (check one):

☐ Subcritical flow ☐ Critical flow ☐ Supercritical flow ☐ Energy grade line

If there is the potential for a hydraulic jump at the following locations, check all that apply and attach an explanation of how the hydraulic jump is controlled without affecting the stability of the channel.

☐ Inlet to channel ☐ Outlet of channel ☐ At Drop Structures ☐ At Transitions
☐ Other locations (specify):

4. Sediment Transport Considerations

Was sediment transport considered? ☐ Yes ☐ No If Yes, then fill out Section F (Sediment Transport).
If No, then attach your explanation for why sediment transport was not considered.

C. BRIDGE/CULVERT

Flooding Source: Echo Wash

Name of Structure: Culvert at McDonald Drive

1. This revision reflects (check one):

- ☒ New bridge/culvert not modeled in the FIS
- ☐ Modified bridge/culvert previously modeled in the FIS
- ☐ New analysis of bridge/culvert previously modeled in the FIS

HEC 2 Special Culvert

2. ~~Hydraulic model used to analyze the structure (e.g., HEC-2 with special bridge routine, WSPRO, HY8):~~
If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structures. Attach justification.

3. Attach plans of the structures certified by a registered professional engineer. The plan detail and information should include the following (check the information that has been provided):

- ☒ Dimensions (height, width, span, radius, length)
- ☒ Shape (culverts only)
- ☒ Material
- ☒ Beveling or Rounding
- ☒ Wing Wall Angle
- ☒ Skew Angle
- ☒ Distances Between Cross Sections
- ☒ Erosion Protection
- ☒ Low Chord Elevations – Upstream and Downstream
- ☒ Top of Road Elevations – Upstream and Downstream
- ☒ Structure Invert Elevations – Upstream and Downstream
- ☒ Stream Invert Elevations – Upstream and Downstream
- ☒ Cross-Section Locations

4. Sediment Transport Considerations

Was sediment transport considered? ☐ Yes ☐ No If yes, then fill out Section F (Sediment Transport).
If No, then attach your explanation for why sediment transport was not considered.

C. Bridge/Culvert

4. Sediment Transport Considerations

Sediment Transport was not considered in the analysis because there was no indication from the existing conditions that there was a potential for major sediment deposition due to upstream conditions. The bounding area upstream of the project area is fully developed and Echo Wash has been cut off from historic contributing areas.

D. DAM

Flooding Source:

Name of Structure:

1. This request is for (check one): ☐ Existing dam ☐ New dam ☐ Modification of existing dam
2. The dam was designed by (check one): ☐ Federal agency ☐ State agency ☐ Local government agency

   ☐ Private organization Name of the agency or organization:
3. Does the project involve revised hydrology? ☐ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).
4. Does the submittal include debris/sediment yield analysis? ☐ Yes ☐ No

   If yes, then fill out Section F (Sediment Transport).
   If No, then attach your explanation for why debris/sediment analysis was not considered.
5. Does the Base Flood Elevation behind the dam or downstream of the dam change?

   ☐ Yes ☐ No If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

Stillwater Elevation Behind the Dam

FREQUENCY (% annual chance)	FIS	REVISED
10-year (10%)		
50-year (2%)		
100-year (1%)		
500-year (0.2%)		
Normal Pool Elevation		

6. Please attach a copy of the formal Operation and Maintenance Plan

E. LEVEE/FLOODWALL

1. System Elements

a. This Levee/Floodwall analysis is based on (check one):

☐ upgrading of an existing levee/floodwall system
☐ a newly constructed levee/floodwall system
☐ reanalysis of an existing levee/floodwall system

b. Levee elements and locations are (check one):

☐ earthen embankment, dike, berm, etc.	Station	to
☐ structural floodwall	Station	to
☐ Other (describe):	Station	to

c. Structural Type (check one):

☐ monolithic cast-in place reinforced concrete
☐ reinforced concrete masonry block
☐ sheet piling
☐ Other (describe):

d. Has this levee/floodwall system been certified by a Federal agency to provide protection from the base flood?

☐ Yes ☐ No

If Yes, by which agency?

e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

1. Plan of the levee embankment and floodwall structures. Sheet Numbers:
2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers:
3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. Sheet Numbers:
4. A layout detail for the embankment protection measures. Sheet Numbers:
5. Location, layout, and size and shape of the levee embankment features, foundation treatment, floodwall structure, closure structures, and pump stations. Sheet Numbers:

2. Freeboard

a. The minimum freeboard provided above the BFE is:

Riverine

3.0 feet or more at the downstream end and throughout	☐ Yes	☐ No
3.5 feet or more at the upstream end	☐ Yes	☐ No
4.0 feet within 100 feet upstream of all structures and/or constrictions	☐ Yes	☐ No

Coastal

1.0 foot above the height of the one percent wave associated with the 1%-annual-chance stillwater surge elevation or maximum wave runup (whichever is greater).	☐ Yes	☐ No
2.0 feet above the 1%-annual-chance stillwater surge elevation	☐ Yes	☐ No

2. Freeboard (continued)

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Paragraph 65.10(b)(1)(ii) of the NFIP Regulations.

If No is answered to any of the above, please attach an explanation.

b. Is there an indication from historical records that ice-jamming can affect the BFE? ☐ Yes ☐ No

If Yes, provide ice-jam analysis profile and evidence that the minimum freeboard discussed above still exists.

3. Closures

a. Openings through the levee system (check one): ☐ exists ☐ does not exist

If opening exists, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device

(Extend table on an added sheet as needed and reference)

Note: Geotechnical and geologic data

In addition to the required detailed analysis reports, data obtained during field and laboratory investigations and used in the design analysis for the following system features should be submitted in a tabulated summary form. (Reference U.S. Army Corps of Engineers [USACE] EM-1110-2-1906 Form 2086.)

4. Embankment Protection

a. The maximum levee slope landside is:

b. The maximum levee slope floodside is:

c. The range of velocities along the levee during the base flood is: (min.) to (max.)

d. Embankment material is protected by (describe what kind):

e. Riprap Design Parameters (check one): ☐ Velocity ☐ Tractive stress
Attach references

Reach		Sideslope	Flow Depth	Velocity	Curve or Straight	Stone Riprap			Depth of Toedown
						D_{100}	D_{50}	Thickness	
Sta	to								
Sta	to								
Sta	to								
Sta	to								
Sta	to								
Sta	to								

(Extend table on an added sheet as needed and reference each entry)

4. Embankment Protection (continued)

f. Is a bedding/filter analysis and design attached? ☐ Yes ☐ No

g. Describe the analysis used for other kinds of protection used (include copies of the design analysis):

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

a. Identify locations and describe the basis for selection of critical location for analysis:

☐ Overall height: Sta. ; height ft.

☐ Limiting foundation soil strength:

Sta. , depth to

strength ϕ = degrees, c = psf

slope: SS = (h) to (v)

(Repeat as needed on an added sheet for additional locations)

b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):

c. Summary of stability analysis results:

Case	Loading Conditions	Critical Safety Factor	Criteria (Min.)
I	End of construction		1.3
II	Sudden drawdown		1.0
III	Critical flood stage		1.4
IV	Steady seepage at flood stage		1.4
VI	Earthquake (Case I)		1.0

(Reference: USACE EM-1110-2-1913 Table 6-1)

d. Was a seepage analysis for the embankment performed? ☐ Yes ☐ No

If Yes, describe methodology used:

e. Was a seepage analysis for the foundation performed? ☐ Yes ☐ No

f. Were uplift pressures at the embankment landside toe checked? ☐ Yes ☐ No

g. Were seepage exit gradients checked for piping potential? ☐ Yes ☐ No

h. The duration of the base flood hydrograph against the embankment is hours.

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability

a. Describe analysis submittal based on Code (check one):

☐ UBC (1988) or ☐ Other (specify):

b. Foundation scour protection is provided check box

☐ Overturning ☐ Sliding If not, explain:

c. Loading included in the analyses were:

☐ Lateral earth @ P_A = psf; P_p = psf

☐ Surcharge-Slope @ ☐ surface psf

☐ Wind @ P_w = psf

☐ Seepage (Uplift); ☐ Earthquake @ P_{eq} = %g

☐ 1%-annual-chance significant wave height: ft.

☐ 1%-annual-chance significant wave period: sec.

d. Summary of Stability Analysis Results: Factors of Safety.

Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	Criteria (Min)		Sta	To	Sta	To
	Overturn	Sliding	Overturn	Sliding	Overturn	Sliding
Dead & Wind	1.5	1.5				
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)

(Note: Extend table on an added sheet as needed and reference)

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. Foundation scour protection ☐ is, ☐ is not provided. If provided, attach explanation and supporting documentation:

Attach engineering analysis to support construction plans.

7. Settlement

a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin? ☐ Yes ☐ No

b. The computed range of settlement is ft. to ft.

c. Settlement of the levee crest is determined to be primarily from :

☐ Foundation consolidation
☐ Embankment compression
☐ Other (Describe):

d. Differential settlement of floodwalls ☐ has ☐ has not been accommodated in the structural design and construction.

Attach engineering analysis to support construction plans.

8. Interior Drainage

a. Specify size of each interior watershed:

Draining to pressure conduit: acres
Draining to ponding area: acres

b. Relationships Established

Ponding elevation vs. storage	☐ Yes	☐ No
Ponding elevation vs. gravity flow	☐ Yes	☐ No
Differential head vs. gravity flow	☐ Yes	☐ No

c. The river flow duration curve is enclosed: ☐ Yes ☐ No

d. Specify the discharge capacity of the head pressure conduit: cfs

e. Which flooding conditions were analyzed?

• Gravity flow (Interior Watershed)	☐ Yes	☐ No
• Common storm (River Watershed)	☐ Yes	☐ No
• Historical ponding probability	☐ Yes	☐ No
• Coastal wave overtopping	☐ Yes	☐ No

If No for any of the above, attach explanation.

f. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. ☐ Yes ☐ No

If No, attach explanation.

g. The rate of seepage through the levee system for the base flood is cfs

h. The length of levee system used to drive this seepage rate in item g: ft.

8. Interior Drainage (continued)

i. Will pumping plants be used for interior drainage? ☐ Yes ☐ No

If Yes, include the number of pumping plants:
For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps		
The ponding storage capacity		
The maximum pumping rate		
The maximum pumping head		
The pumping starting elevation		
The pumping stopping elevation		
Is the discharge facility protected?		
Is there a flood warning plan?		
How much time is available between warning and flooding?		

Will the operation be automatic? ☐ Yes ☐ No

If the pumps are electric, are there backup power sources? ☐ Yes ☐ No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all interior watersheds that result in flooding.

9. Other Design Criteria

a. The following items have been addressed as stated:

Liquefaction ☐ is ☐ is not a problem
Hydrocompaction ☐ is ☐ is not a problem
Heave differential movement due to soils of high shrink/swell ☐ is ☐ is not a problem

b. For each of these problems, state the basic facts and corrective action taken:

Attach supporting documentation

c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure?
☐ Yes ☐ No

Attach supporting documentation

d. Sediment Transport Considerations:

Was sediment transport considered? ☐ Yes ☐ No If Yes, then fill out Section F (Sediment Transport).
If No, then attach your explanation for why sediment transport was not considered.

E. LEVEE/FLOODWALL (CONTINUED)

10. Operational Plan And Criteria

    a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No

    b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations? ☐ Yes ☐ No

    c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations? ☐ Yes ☐ No

    If the answer is No to any of the above, please attach supporting documentation.

11. Maintenance Plan

    a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No
    If No, please attach supporting documentation.

12. Operations and Maintenance Plan

    Please attach a copy of the formal Operations and Maintenance Plan for the levee/floodwall.

F. SEDIMENT TRANSPORT

Flooding Source:

Name of Structure:

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge: Volume acre-feet

Debris load associated with the base flood discharge: Volume acre-feet

Sediment transport rate (percent concentration by volume)

Method used to estimate sediment transport:

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

Method used to estimate scour and/or deposition:

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport:
Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.

3.0 SURVEY AND MAPPING INFORMATION

3.1 Field Survey Information

Horizontal and vertical surveys for this project were performed by AZTEC and were conducted in March, April, and July, 2003. The survey was performed under the direct supervision of Alan D. Reece, R.L.S. (AZ RLS No. 25396). The survey work included establishment of a horizontal and vertical control net and topographic surveys.

3.2 Topographic Mapping

Two-foot contour interval topographic mapping compiled to a horizontal scale accuracy of 1 inch equals 400 feet was used based on information obtained as a part of the ACDC Area Drainage Master Plan. The flight date for the aerial topography was November 15, 1990 and was flown by Kenney Aerial.

The coordinate grid is based on the North American Datum of 1927 (NAD 27), Central Zone of Arizona State Plane Coordinate System. Elevations are based upon the National Geodetic Vertical Datum of 1929 (NGVD 29). The conversion factor to the North American Vertical Datum of 1988 (NAVD 88) is +1.92'. The primary control for the survey was based on the City of Phoenix horizontal and vertical datum. Field notes of the survey are provided in Appendix C.

4.0 HYDROLOGY

4.1 General

No new hydrology was developed for this study. Existing peak discharges published in the current Flood Insurance Study (FIS) were used without change. The 100-year peak discharges for the subject reach of Echo Canyon Wash are summarized in Table 1 below.

Table 1
Summary of FIS Discharges

Location	River Mile	Drainage Area (sq mi)	Peak 100-Yr Discharge (cfs)
At Mouth	0	5.1	6,600
200 feet east of 40th Street	0.49	4.3	5,900
At McDonald Drive	1.04	3.5	4,900
At Tatum	1.86	1.9	3,600

5.0 HYDRAULICS

5.1 Method Description

The U.S. Army Corps of Engineers computer program, HEC-2 (version 4.6.2 , released August 1991) was used with the program BOSS RMS (River Modeling System) for AutoCad to analyze the 100-year floodplain conditions along Echo Wash and to develop the models for the project site. Three hydraulic models are included in this report: the Duplicate Effective Model, the Revised Model, and the Revised Floodway Model.

5.1.1 Duplicate Effective Model

A duplicate effective model was prepared using data available from the FEMA library. This model is included in Appendix D. The duplicate effective model starts at the ACDC channel and terminates just west of 44th Street. The FIRM dated July 19, 2001 (Figure 4) terminates just to the south of Lincoln Drive. This LOMR study ties into the previous effective flood at Section 0.71 or Section "D". The data from Table 5 of the FIS, "Floodway Data", was used for the effective flood upstream. This reach includes Sections "E" through "M" on the FIRM . Table 2 compares the results of the FIS effective model, the duplicate effective model, and the revised model.

5.1.2 Revised Model

AZTEC performed a detailed hydraulic analysis of the study reach using survey data collected by AZTEC survey crews beginning at Stanford Drive, where Echo Wash crosses in a dip, and continuing upstream to just about 290 feet north of McDonald Drive. Survey data of the wash included top of bank and toe of bank elevation shots about every 250 feet. This data was then combined with scaled points off of topographic maps prepared by Kaminski Hubbard Engineering, Incorporated as part of the Arizona Canal Diversion Channel Area Drainage Master Study, Phase 1. Cross sections were then plotted and oriented to be perpendicular to expected streamlines during a 100-year event.

The concrete box culverts at 40th Street and McDonald Drive were also added to the model. As-builts for these box culverts are included in Appendix E.

The starting downstream water surface elevation (WSEL) and discharge were set to the FIS values as boundary conditions for the existing conditions model. To initiate the hydraulic modeling, the revised model starts with a known regulatory water surface.

The revised reach ties back into the effective flood at the section above McDonald Drive where the 100-year water surface is 1308.00 and the revised water surface is 1308.01. The revised model is included in Appendix F.

TABLE 2
WATER SURFACE ELEVATION COMPARISON

SECTION NO. (River Mile from AC/DC Channel)	REGULATORY WSEL (ft)	DUPLICATE EFFECTIVE MODEL WSEL (ft)	ELEVATION DIFFERENCE (ft)	REVISED MODEL WSEL (ft)	ELEVATION DIFFERENCE (ft)
0.000	1246.90	1246.90	0.00	1246.90	0.00
0.003	1247.78	1247.78	0.00	1247.77	-0.01
0.026	1247.81	1247.81	0.00	1247.81	0.00
0.049	1247.85	1247.85	0.00	1247.84	-0.01
0.081	1247.87	1247.87	0.00	1247.87	0.00
0.117	1247.89	1247.89	0.00	1247.89	0.00
0.139	1247.89	1247.89	0.00	1247.89	0.00
0.172	1247.87	1247.87	0.00	1247.87	0.00
0.178	1249.07	1249.07	0.00	1249.07	0.00
0.188	1250.89	1250.89	0.00	1251.01	0.12
0.190	1252.17	1252.17	0.00	1252.24	0.07
0.206	1252.72	1252.72	0.00	1252.75	0.03
0.238	1252.75	1252.75	0.00	1252.81	0.06
0.240	1254.00	1254.00	0.00	1254.00	0.00
0.246	1254.67	1254.67	0.00	1254.63	-0.04
0.248	1256.09	1256.09	0.00	1256.07	-0.02
0.268	1256.23	1256.23	0.00	1256.22	-0.01
0.289	1256.28	1256.28	0.00	1256.27	-0.01
0.291	1256.50	1256.50	0.00	1256.49	-0.01
0.307	1256.20	1256.20	0.00	1256.25	0.05
0.320	1256.37	1256.37	0.00	1256.39	0.02
0.322	1257.40	1257.40	0.00	1257.41	0.01
0.336	1257.52	1257.52	0.00	1257.52	0.00
0.344	1257.49	1257.49	0.00	1257.50	0.01
0.352	1260.79	1260.79	0.00	1260.79	0.00
0.356	1261.81	1261.81	0.00	1261.85	0.04
0.361	1262.37	1262.37	0.00	1261.99	-0.38
0.370	1262.71	1262.71	0.00	1262.48	-0.23
0.373	1263.45	1263.45	0.00		
0.450				1266.52	
0.460	1265.61	1265.53	-0.08		
0.490				1269.10	
0.510	1271.09	1270.44	-0.65		
0.560	1270.40				
0.580				1272.84	
0.610				1275.13	
0.650				1277.45	
0.710	1278.72	1278.72	0.00	1278.85	0.13

WSEL = water surface elevation

TABLE 2
WATER SURFACE ELEVATION COMPARISON

SECTION NO. (River Mile from AC/DC Channel)	REGULATORY WSEL (ft)	DUPLICATE EFFECTIVE MODEL WSEL (ft)	ELEVATION DIFFERENCE (ft)	REVISED MODEL WSEL (ft)	ELEVATION DIFFERENCE (ft)
0.740	1278.70				
0.750				1282.55	
0.790				1284.31	
0.830				1284.87	
0.860				1286.00	
0.900				1287.22	
0.960				1291.02	
1.000				1292.91	
1.004				1293.06	
1.030				1293.58	
1.040	1293.10				
1.060				1294.48	
1.110				1298.35	
1.160				1299.94	
1.190	1298.00				
1.210				1301.65	
1.240				1302.43	
1.290				1304.19	
1.380				1307.57	
1.400				1309.27	
1.410	1308.00			1308.01	

WSEL = water surface elevation

5.2 Work Study Maps

Work maps are provided with this TDN and are shown in Figures 5 and 6 and are included in Appendix G.

5.3 Parameter Estimation

5.3.1 Roughness Coefficients

The Manning 'n' Coefficients used in this study are similar to those in previous studies to provide continuity and to reflect increased GR (ground) data available. Coefficients used were:

Feature	n
Roadways	.016
Concrete box culverts	.013
Grass over banks with trees	.1 to .16
Natural wash bottom	.04 to .05

The over banks in the study area had extremely dense vegetation. The trees along the channel were very thick and were approximately 15 to 20 feet tall. This justified the use of higher coefficients in the over banks.

5.3.2 Expansion and Contraction Coefficients

Coefficients for expansion and contraction of 0.1 and 0.3, respectively, were used throughout the study reach, except through the box culverts. Coefficients for expansion and contraction of 0.3 and 0.5, respectively, were used through the box culverts.

5.4 Cross Section Description

New cross section data were generated for the entire reach, from river mile 0.352 (just downstream of East Stanford Drive through river mile 1.47 (upstream of McDonald Drive) using the two-foot contour interval mapping from Kaminski Hubbard and AZTEC survey data. AZTEC crews surveyed the wash prism at intervals averaging 250 feet, taking elevations at the top and toe of the banks of the wash. The cross section geometry was then completed by plotting each surveyed section on the topographic map and scaling off the distance and elevation off of the topographic map. The cross sections were oriented to be perpendicular to the predominant flow path.

5.5 Modeling Considerations

5.5.1 Hydraulic Jump and Drop Analysis

No significant hydraulic jumps are expected to occur in the study reach and there are no drops present. Most flows for the 100-year flood are expected to remain near or below critical energy. All flows are considered stable based on the criteria set forth in the State Standard.

5.5.2 Culverts

Two concrete box culverts (CBC) presently exist within the study reach. One is located at 44th Street and the other at McDonald Drive. The culvert at 44th Street is situated at a 45° skew to the roadway and is comprised of a triple-barrel box measuring 10' wide by 6' high and 120' in length. The CBC at McDonald Drive is at a 30° skew to the roadway and is also a three-barrel box, measuring 10' wide by 6' high and 82' in length.

The culverts were modeled in HEC-2 using the special culvert method. The following table illustrates the input used to model both culverts:

Table 3
HEC-2 Special Culvert Input

Culvert Data	44th Street	McDonald Drive
Culvert Mannings "n"	.013	.013
Entrance Loss Coefficient	0.4	0.4
Height	6	6
Number of Barrels	3	3
Box Opening Width	10	10
Length	119.4	81.8
Downstream Invert	1281.4	1296.95
Upstream Invert	1281.44	1297.72
FHWA Data		
Chart Number	11	11
Scale Number	1	3
Roadway Data		
Elevation	1290.14	1305.89
Length	200	350
Weir Flow Coefficient	2.5	2.5

5.5.3 Ineffective Flow Areas

Ineffective flow areas were set to model a one-to-one contraction of the flows into the culverts and to constrain the effective flow area to the culvert opening for the cross section bounding the bridge.

5.6 Floodway Modeling

Floodway encroachments are analyzed for the study reach for the 100-year flow of the revised model. The encroachments were set at or near the same locations as those indicated in the current FIS floodway.

5.7 Special Problems

There are no special problems to report.

5.7.1 Errors and Warning Messages

There are no modeling error messages and the warnings primarily deal with the defaulting of calculations to critical depth and minimum specific energy.

5.8 Final Results

Results are presented in Table 2.

The 100-year water surface resulting from this study is delineated on Figures 5 and 6. The revised flood profile is shown in Figures 7 and 8. Tabulation of the water surface elevations for the revised flood is shown in Table 2 and a printout of the revised model is included in Appendix F. The water surface elevation for a surveyed cross section just upstream of McDonald Drive is 1308.01. The effective floodwater surface elevation shown in the FIRM is 1308.00, which is a vertical difference of 0.01 feet.

There were 143 structures within the floodplain prior to this study. As a result of the revised detailed delineation, 72 structures were removed from the floodplain. A complete list of all the structures impacted by this application is shown in Table 4. The list shows the address of each structure and its status, whether or not the structure is within the revised floodplain limits. Addresses for structures that remain within the 100-year floodplain are shown with the "in" box checked. If the structure was in before the analysis and is now outside of the limits, then the "out" box is checked. No new structures were added to the floodplain.

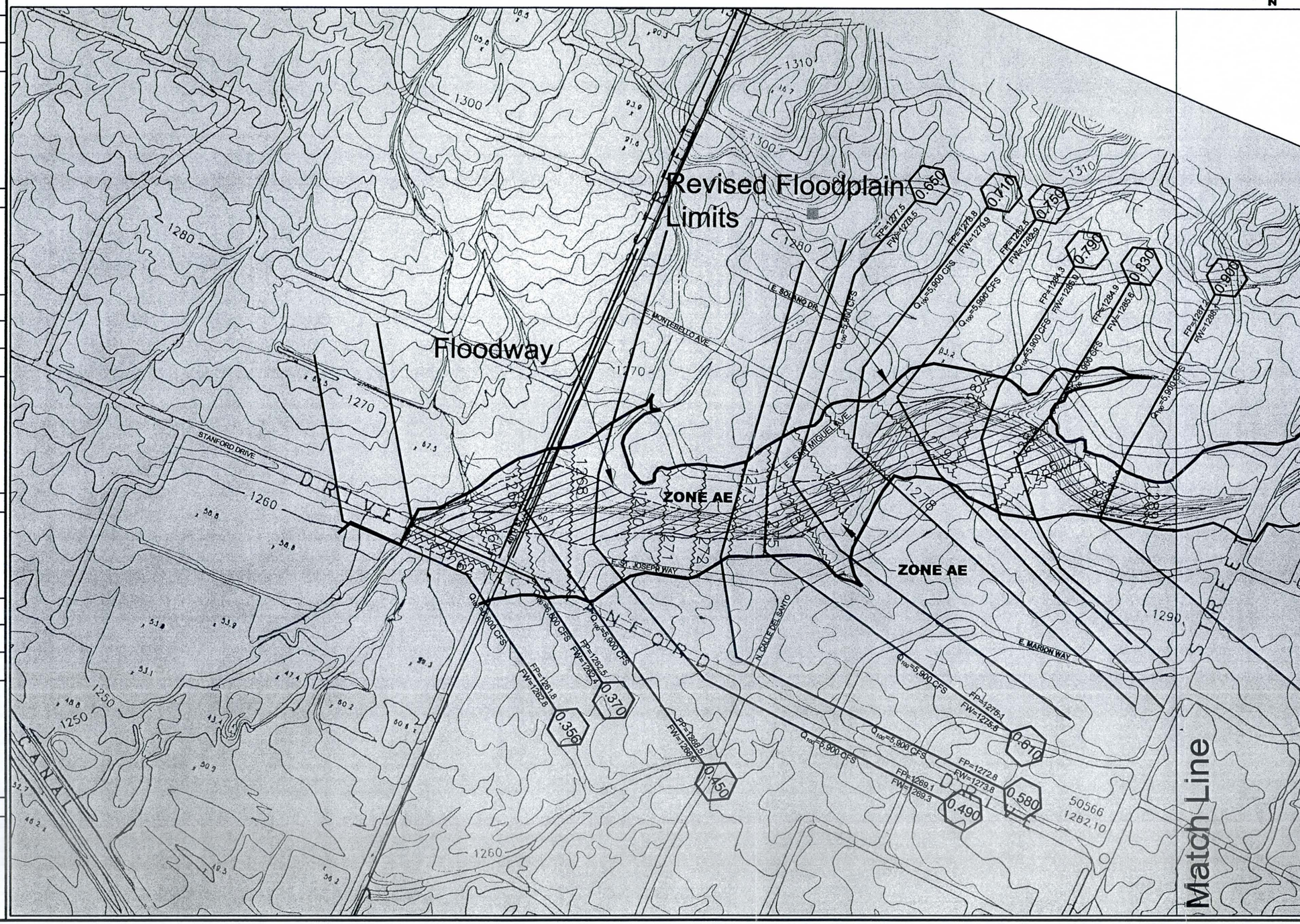
One structure, located at 4007 E. San Miguel Avenue that was previously out of the floodplain, has not been added to the floodplain because of several reasons: any flooding that would occur for this structure would be because of water backing up through a drainage easement; the depth of this tailwater is less than 0.5'; and a masonry wall contains this flow within the drainage easement, and would provide sufficient protection.

A copy of the notification provided to each of the residences prior to the field survey and the notification to the public posted in the local paper is included in Appendix H.

5.8.1 HEC-2 Files and Output

Table 5 provides a summary of the project files and associated plans for the HEC-2 analysis. Detailed outputs for each of these plans are included in Appendices D and F. Electronic files are included on CD in Appendix I.

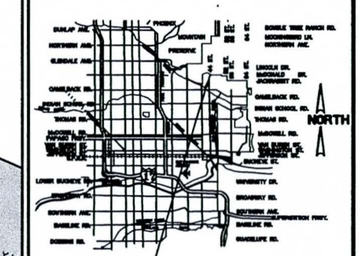
ECHO CANYON WASH FLOODPLAIN DELINEATION
PHOENIX STREETS – MARICOPA COUNTY



F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
	ARIZ	02079			

AZTEC

DR: KL	DES: LS	CK: JCF	DATE: 10/03



VICINITY MAP

NOTE:
ALL CROSS SECTIONS ARE SHOWN IN THE TABLE OUTPUTS.
ALL SECTIONS NOT SHOWN FOR CLARITY.

LEGEND

- LIMITS OF 100 YEAR FLOODPLAIN
- LIMITS OF DUPLICATE EFFECTIVE FLOODPLAIN
- FLOODPLAIN WSE / FLOODWAY WSE — 0.356 — CROSS SECTION & DESIGNATION
- Base Flood Elevation–Elevation in Feet
- FLOODWAY LIMITS

PER CITY OF PHOENIX ORDINANCE G–4396, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF YOUR CONTRACT WITH THE CITY OF PHOENIX.

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 40071 LARRY F. SIBALA ARIZONA, U.S.A.

602-263-1100
1-800-STAKE-IT

FLOODPLAIN DELINEATION

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

ECHO CANYON WASH
STANFORD DRIVE TO MCDONALD DRIVE

DR: KL DATE: 12/03	DES: LS DATE: 9/03	CK: JCF DATE: 12/03	SHEET NO.	TOTAL SHEETS	AS BUILT
SCALE: 1"=100' HORIZONTAL 2' CONTOUR INTERVALS			1	2	

FIGURE 5

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

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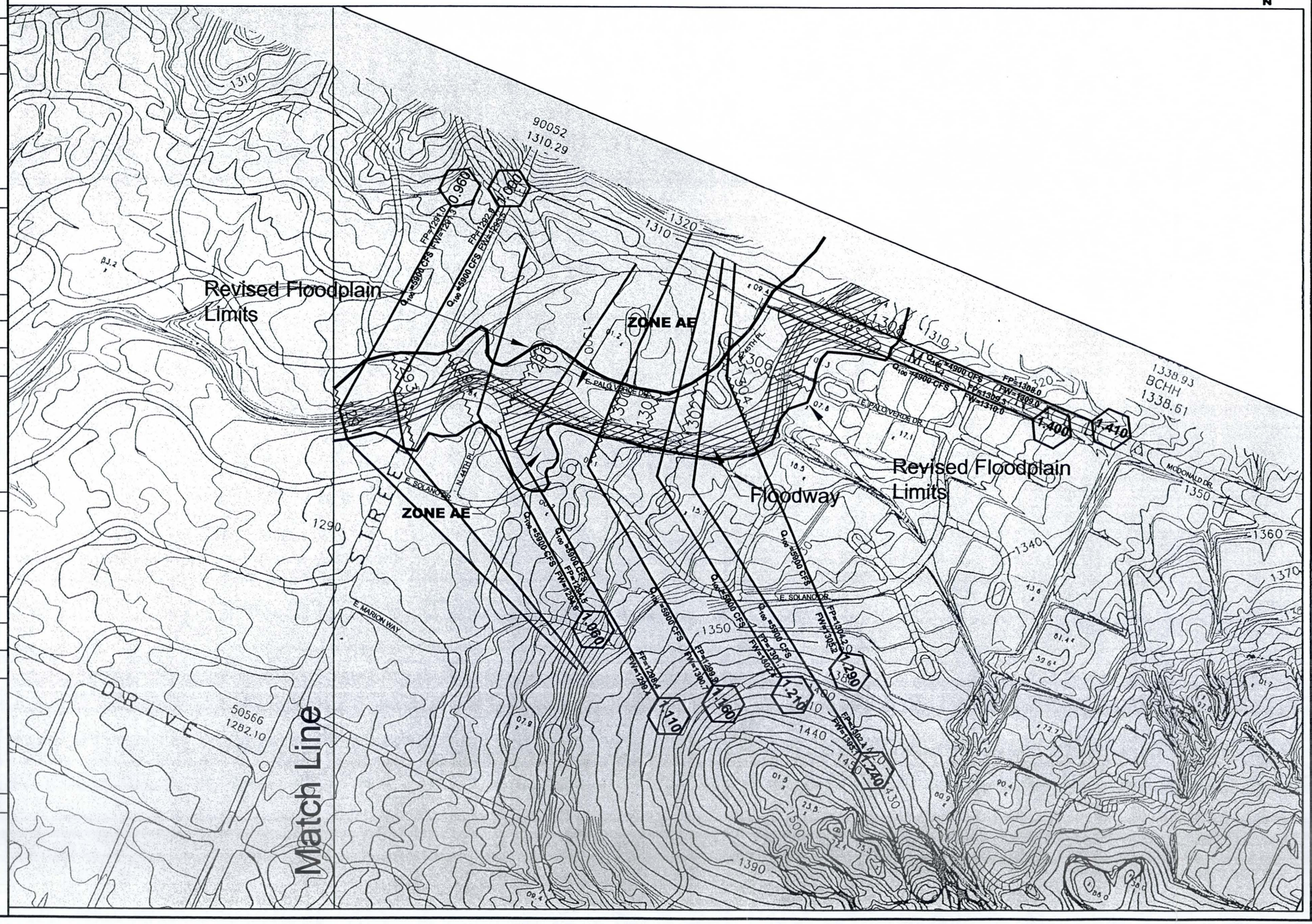
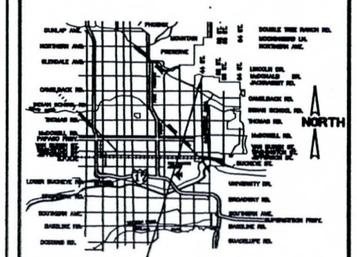
ECHO CANYON WASH FLOODPLAIN DELINEATION
PHOENIX STREETS – MARICOPA COUNTY



F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
	ARIZ	02079			

AZTEC

DR: KL	DES: LS	CK: JCF	DATE: 10/03



VICINITY MAP

NOTE:
ALL CROSS SECTIONS ARE SHOWN IN THE TABLE OUTPUTS.
ALL SECTIONS NOT SHOWN FOR CLARITY.

LEGEND

- LIMITS OF 100 YEAR FLOODPLAIN
- LIMITS OF DUPLICATE EFFECTIVE FLOODPLAIN
- FLOODPLAIN WSE / FLOODWAY WSE — 0.356 — CROSS SECTION & DESIGNATION
- Base Flood Elevation–Elevation in Feet
- FLOODWAY LIMITS

PER CITY OF PHOENIX ORDINANCE G–4396, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF YOUR CONTRACT WITH THE CITY OF PHOENIX.

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 40071 LARRY F. SIBALA ARIZONA, U.S.A.

602-263-1100
1-800-STAKE-IT

FLOODPLAIN DELINEATION
CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT
ECHO CANYON WASH
STANFORD DRIVE TO MCDONALD DRIVE

DR: KL DATE: 12/3	DES: LS DATE: 9/3	CK: JCF DATE: 12/03	SHEET NO.	TOTAL SHEETS	AS BUILT
SCALE: 1"=100' HORIZONTAL 2' CONTOUR INTERVALS			2	2	

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

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

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

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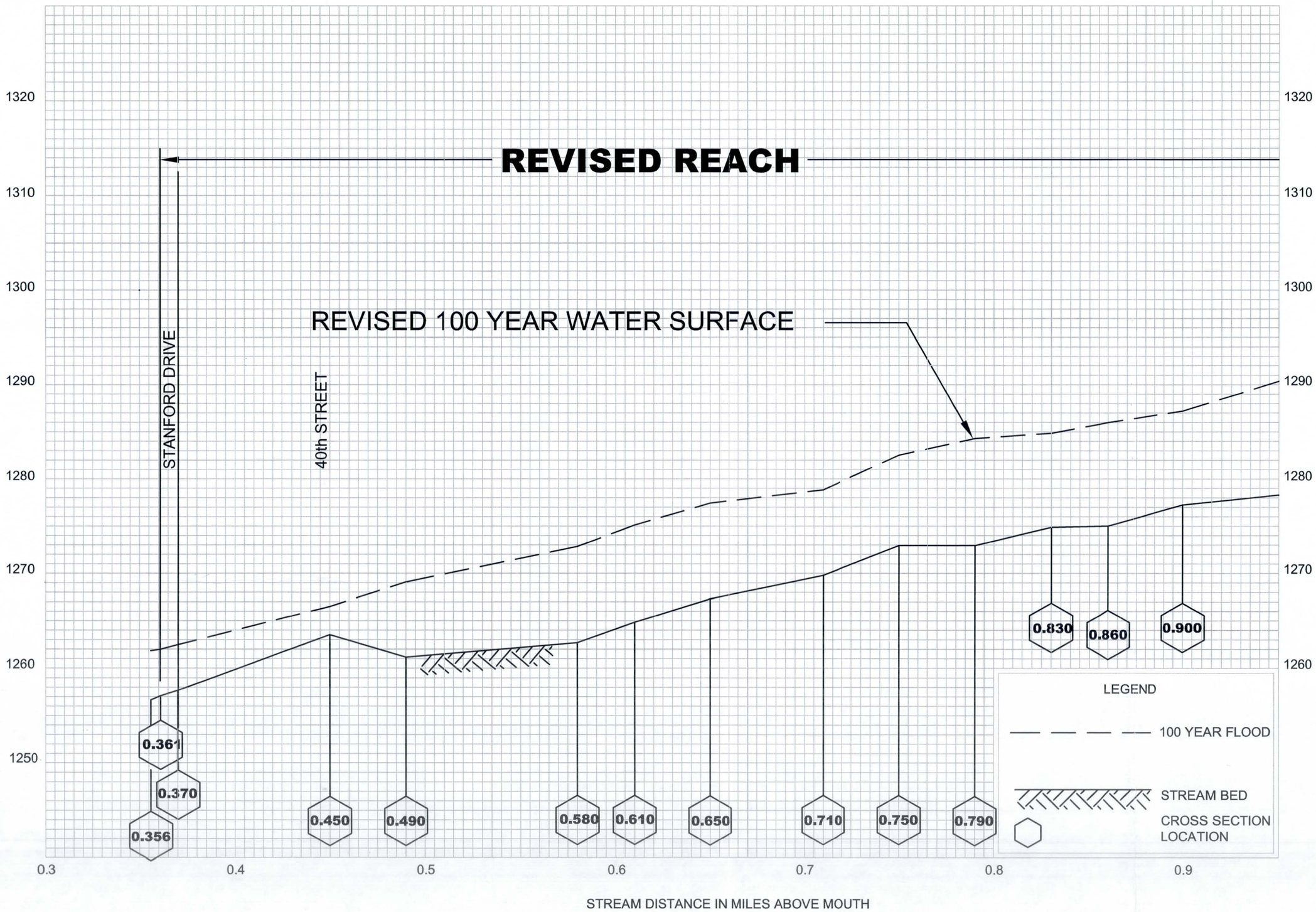
FIGURE 6



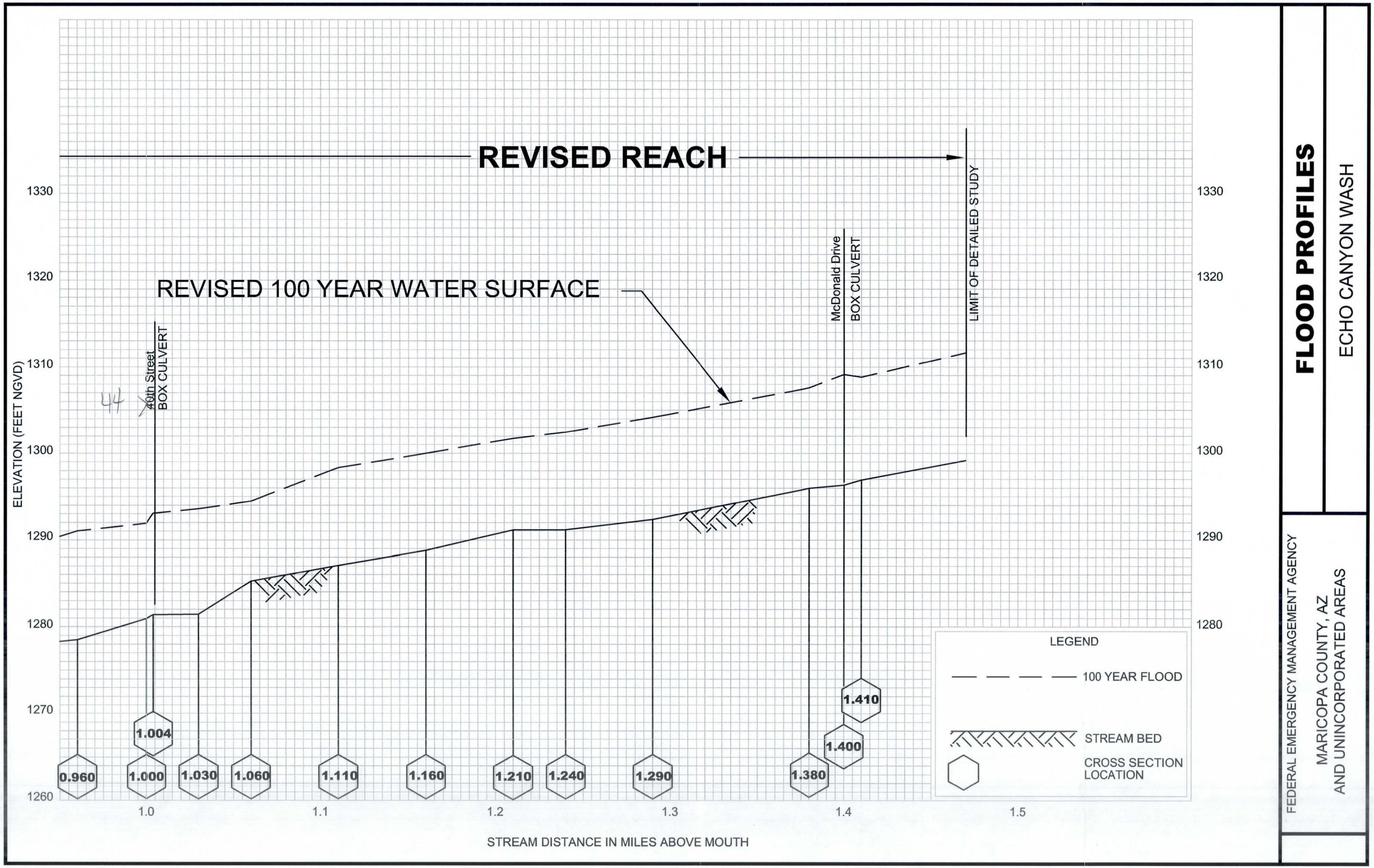
FLOOD PROFILES

ECHO CANYON WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND UNINCORPORATED AREAS

FIGURE 7



44

FLOOD PROFILES

ECHO CANYON WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND UNINCORPORATED AREAS

FIGURE 8

Table 4
Echo Wash - List of Structures in Floodplain Prior to Study

Address		*Finished Floor Elev*	*In*	*Out*	*Comments*
4027	E. San Miguel Ave.	1270.08	☑	☐	
4324	E. St. Joseph Way	1291.80	☐	☑	
4001	E. San Juan Ave.	1264.94	☑	☐	
4007	E. San Juan Ave.	1266.44	☑	☐	
4011	E. San Juan Ave.	1268.40	☑	☐	
4010	E. San Juan Ave.	1268.46	☑	☐	
4002	E. San Juan Ave.	1267.50	☐	☑	+1.0
4007	E. San Miguel Ave.	1268.44	☐	☑	-.56
4019	E. San Miguel Ave.	1269.64	☐	☑	
4031	E. San Miguel Ave.	1269.92	☑	☐	
4035	E. San Miguel Ave.	1269.50	☑	☐	
4039	E. San Miguel Ave.	1270.15	☑	☐	
4101	E. San Miguel Ave.	1271.84	☑	☐	
4107	E. San Miguel Ave.	1272.45	☑	☐	
4111	E. San Miguel Ave.	1274.60	☑	☐	
4119	E. San Miguel Ave.	1275.38	☑	☐	
4127	E. San Miguel Ave.	1276.69	☑	☐	
4129	E. San Miguel Ave.	1277.75	☑	☐	
4131	E. San Miguel Ave.	1279.45	☑	☐	
4019	E. San Miguel Ave.	1269.64	☐	☑	
4135	E. San Miguel Ave.	1280.56	☑	☐	
4149	E. San Miguel Ave.	1283.28	☑	☐	
4205	E. San Miguel Ave.	1283.44	☐	☑	
4301	E. San Miguel Ave.	1285.80	☐	☑	
4309	E. San Miguel Ave.	1285.94	☐	☑	+1.14
4315	E. San Miguel Ave.	1285.67	☑	☐	

Address		Finished Floor Elev	In	Out	Comments
4319	E. San Miguel Ave.	1286.75	☑	☐	
4325	E. San Miguel Ave.	1287.18	☐	☐	
4333	E. San Miguel Ave.	1289.44	☑	☐	
4337	E. San Miguel Ave.	1290.80	☑	☐	
4347	E. San Miguel Ave.	1291.73	☑	☐	
4355	E. San Miguel Ave.	1292.85	☑	☐	
4364	E. San Miguel Ave.	1293.70	☐	☑	
4350	E. San Miguel Ave.	1292.66	☐	☑	
4144	E. San Miguel Ave.	1283.76	☑	☐	
4140	E. San Miguel Ave.	1282.35	☑	☐	
4122	E. San Miguel Ave.	1275.48	☑	☐	
4106	E. San Miguel Ave.	1273.48	☑	☐	
4042	E. San Miguel Ave.	1273.89	☐	☑	
4034	E. San Miguel Ave.	1272.36	☐	☑	
4130	E. Montebello Ave	1278.85	☑	☐	
4115	E. Montebello Ave	1277.04	☑	☐	
5509	N. 40th St.	1265.65	☑	☐	
5501	E. Stanford Dr.	1265.10	☑	☐	
5502	E. Stanford Dr.	1266.41	☑	☐	
4030	E. Stanford Dr.	1270.08	☐	☑	
4040	E. Stanford Dr.	1269.95	☐	☑	
5510	E. St. Joseph Way	1267.08	☑	☐	
4014	E. St. Joseph Way	1267.87	☑	☐	
4020	E. St. Joseph Way	1268.40	☑	☐	
4026	E. St. Joseph Way	1269.13	☑	☐	
4032	E. St. Joseph Way	1270.33	☑	☐	
4042	E. St. Joseph Way	1271.48	☑	☐	
4102	E. St. Joseph Way	1272.75	☑	☐	
4106	E. St. Joseph Way	1274.00	☑	☐	
4110	E. St. Joseph Way	1274.90	☐	☑	

Address		Finished Floor Elev	In	Out	Comments
4118	E. St. Joseph Way	1275.95	☐	☑	
4128	E. St. Joseph Way	1275.95	☑	☐	
4140	E. St. Joseph Way	1276.03	☑	☐	
4152	E. St. Joseph Way	1276.55	☑	☐	
4164	E. St. Joseph Way	1278.45	☑	☐	
4176	E. St. Joseph Way	1280.25	☐	☑	
4188	E. St. Joseph Way	1280.94	☐	☑	
4200	E. St. Joseph Way	1280.55	☑	☐	
4202	E. St. Joseph Way	1280.05	☑	☐	
4204	E. St. Joseph Way	1280.97	☑	☐	
4210	E. St. Joseph Way	1283.57	☑	☐	
4214	E. St. Joseph Way	1284.30	☑	☐	
4218	E. St. Joseph Way	1284.23	☑	☐	
4222	E. St. Joseph Way	1285.64	☑	☐	
4226	E. St. Joseph Way	1287.15	☐	☑	
4302	E. St. Joseph Way	1287.94	☐	☑	
4306	E. St. Joseph Way	1288.53	☐	☑	
4310	E. St. Joseph Way	1288.70	☐	☑	
4316	E. St. Joseph Way	1289.87	☐	☑	
4320	E. St. Joseph Way	1291.15	☐	☑	
4323	E. St. Joseph Way	1291.65	☐	☑	
4319	E. St. Joseph Way	1290.54	☐	☑	
4315	E. St. Joseph Way	1289.50	☐	☑	
4311	E. St. Joseph Way	1288.09	☐	☑	
4307	E. St. Joseph Way	1287.10	☐	☑	
4303	E. St. Joseph Way	1288.27	☐	☑	
4221	E. St. Joseph Way	1285.81	☐	☑	
4223	E. St. Joseph Way	1285.20	☐	☑	
4219	E. St. Joseph Way	1285.33	☐	☑	
4207	E. St. Joseph Way	1283.90	☐	☑	

Address		Finished Floor Elev	In	Out	Comments
4201	E. St. Joseph Way	1282.45	☐	☑	
4117	E. St. Joseph Way	1275.25	☐	☑	
4109	E. St. Joseph Way	1273.90	☐	☑	
4103	E. St. Joseph Way	1272.65	☐	☑	
4041	E. St. Joseph Way	1271.57	☐	☑	
4031	E. St. Joseph Way	1270.37	☐	☑	
4022	E. St. Joseph Way	1268.35	☑	☐	
4179	E. St. Joseph Way	1280.41	☐	☑	
5718	N 44th St.	1292.60	☑	☐	
4324	N 44th St.	1290.35	☐	☑	
5705	N 44th St.	1292.90	☐	☑	
4402	E. Marion Way	1290.10	☐	☑	
4412	E. Marion Way	1290.37	☐	☑	
4426	E. Marion Way	1290.77	☐	☑	
4438	E. Marion Way	1292.60	☐	☑	
5616	N. 45th St.	1293.50	☐	☑	
5626	N. 45th St.	1294.80	☐	☑	
5825	N. 45th St.		☐	☑	No Structure
5625	N. 45th St.	1298.37	☐	☑	
5615	N. 45th St.	1297.20	☐	☑	
5818	N. 45th St.	1300.35	☐	☑	
5808	N. 45th St.	1307.38	☐	☑	
5802	N. 44th Pl.	1295.03	☐	☑	
5812	N. 44th Pl.	1294.04	☐	☑	
5822	N. 44th Pl.	1294.35	☑	☐	
5830	N. 44th Pl.	1294.70	☑	☐	
5823	N. 44th Pl.	1294.87	☑	☐	
5815	N. 44th Pl.	1296.86	☐	☑	
5801	N. 44th Pl.	1295.90	☐	☑	
4502	E. Solano Dr.	1297.55	☑	☐	

Address		Finished Floor Elev	In	Out	Comments
4510	E. Solano Dr.	1300.74	☐	☑	
4518	E. Solano Dr.	1280.01	☐	☑	
5840	N. 45th Pl.	1310.45	☐	☑	
5844	N. 45th Pl.	1313.45	☐	☑	
5850	N. 46th St.	1305.75	☐	☑	
4441	E. Palo Verde Dr.	1298.45	☑	☐	
4431	E. Palo Verde Dr.	1297.20	☑	☐	
4421	E. Palo Verde Dr.	1295.55	☑	☐	
4411	E. Palo Verde Dr.	1296.78	☑	☐	
4405	E. Palo Verde Dr.	1296.51	☐	☑	
4501	N. 45th Pl.	1298.85	☑	☐	
4509	N. 45th Pl.	1298.29	☑	☐	
5901	N. 45th Pl.	1301.42	☑	☐	
4519	N. 45th Pl.	1300.38	☑	☐	
4523	N. 45th Pl.	1302.27	☑	☐	
5921	N. 45th Pl.	1303.60	☑	☐	
5927	N. 45th Pl.	1304.70	☑	☐	
5920	N. 45th Pl.	1304.15	☐	☑	
5926	N. 45th Pl.	1305.26	☐	☑	
5930	N. 45th Pl.	1306.60	☐	☑	
4609	E. Palo Verde Dr.	1309.80	☐	☑	
4605	E. Palo Verde Dr.	1307.45	☐	☑	
4601	E. Palo Verde Dr.	1307.35	☑	☐	
4602	E. Palo Verde Dr.	1307.50	☑	☐	
4606	E. Palo Verde Dr.	1307.47	☐	☑	
4614	E. Palo Verde Dr.	1309.58	☐	☑	
4622	E. Palo Verde Dr.	1313.50	☐	☑	

Table 5
Summary of Project Files for LOMR Submittal

Modeling Condition	HEC-2 File Name	Appendix for Output
Duplicate Effective	DupeffEcho	D
Revised Model	RevEcho	F

APPENDIX A

PHOTOGRAPHS

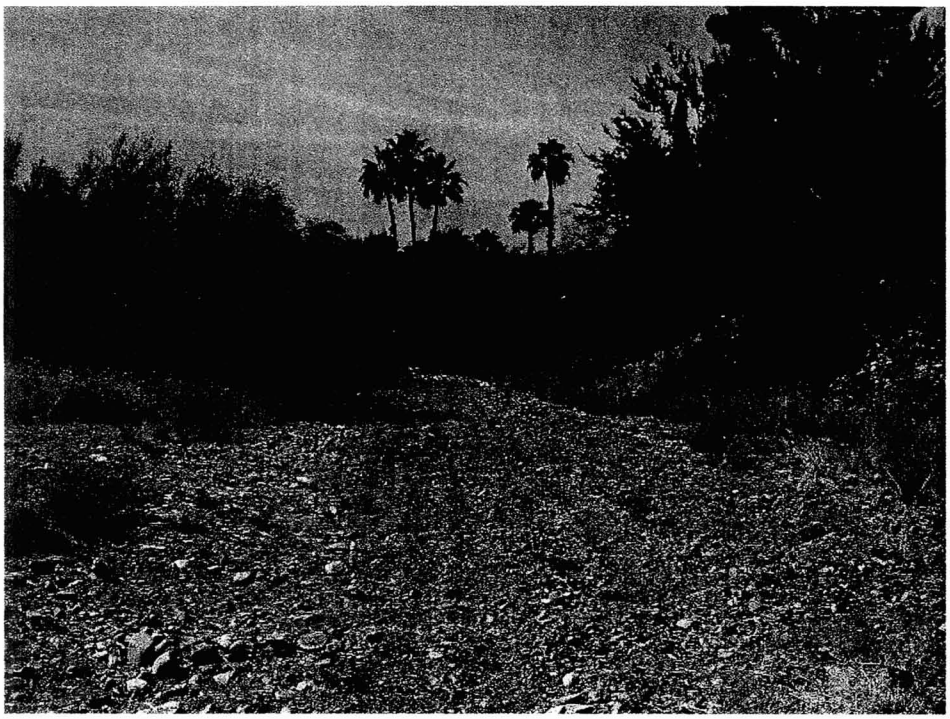


Photo 1 Echo Canyon Wash
View of channel downstream of box culvert @ McDonald Dr.

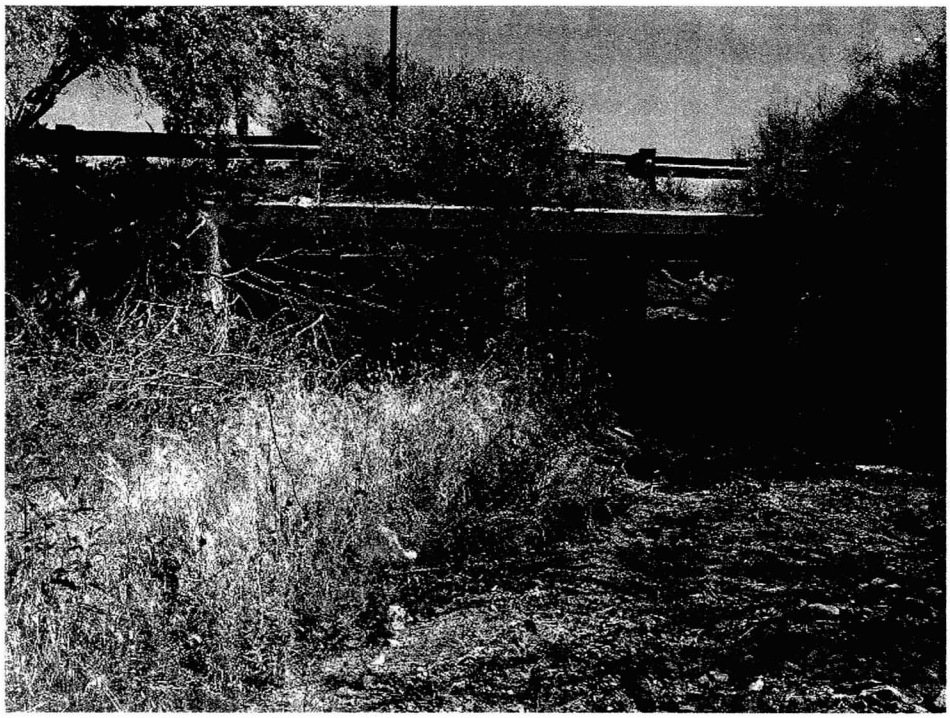


Photo 2 Echo Canyon Wash
View of the right downstream face of the triple barrel box culvert @ McDonald Dr.

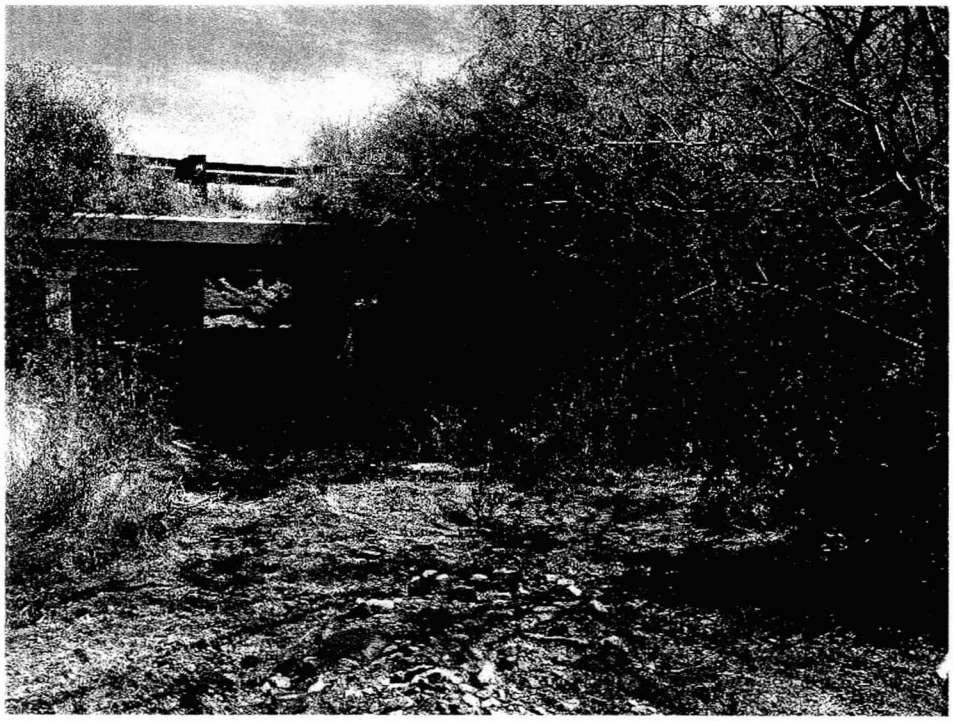


Photo 3 Echo Canyon Wash
View of the downstream face of three barrel culvert crossing beneath McDonald Drive

Photo 4 Echo Canyon Wash
Right downstream side of box culvert @ McDonald Dr.

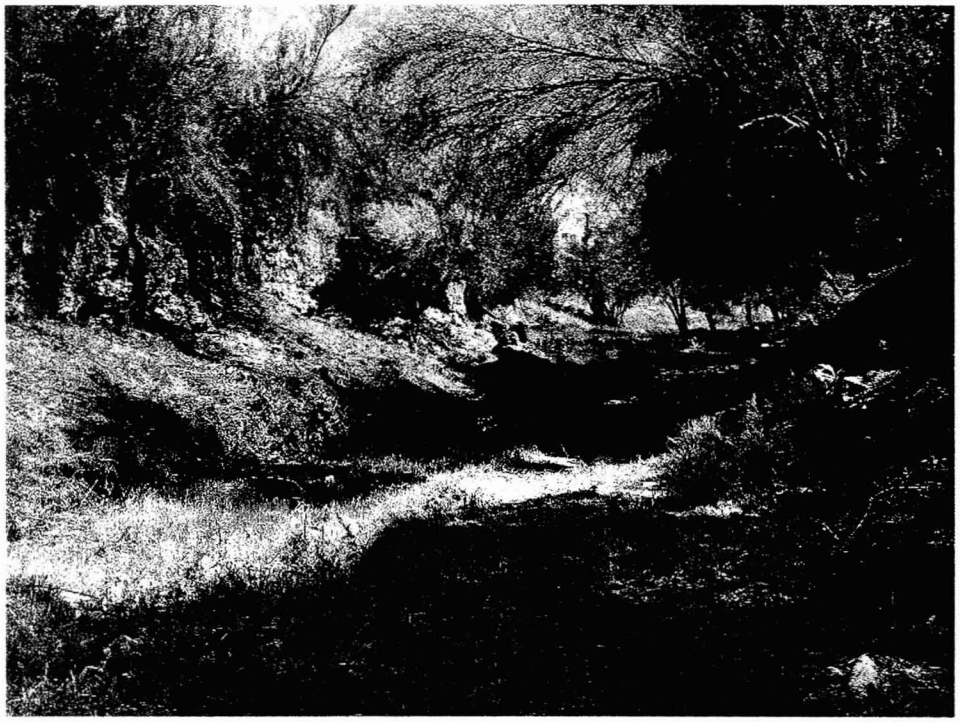


Photo 5 Echo Canyon Wash
View of channel upstream of the box culvert crossing McDonald Drive.

Photo 6 Echo Canyon Wash
View of the upstream face of the box culvert crossing McDonald Drive.

Photo 7 Echo Canyon Wash
View of the left upstream side of the box culvert crossing McDonald Dr.

Photo 8 Echo Canyon Wash
View of the right upstream side of the box culvert crossing McDonald Dr.

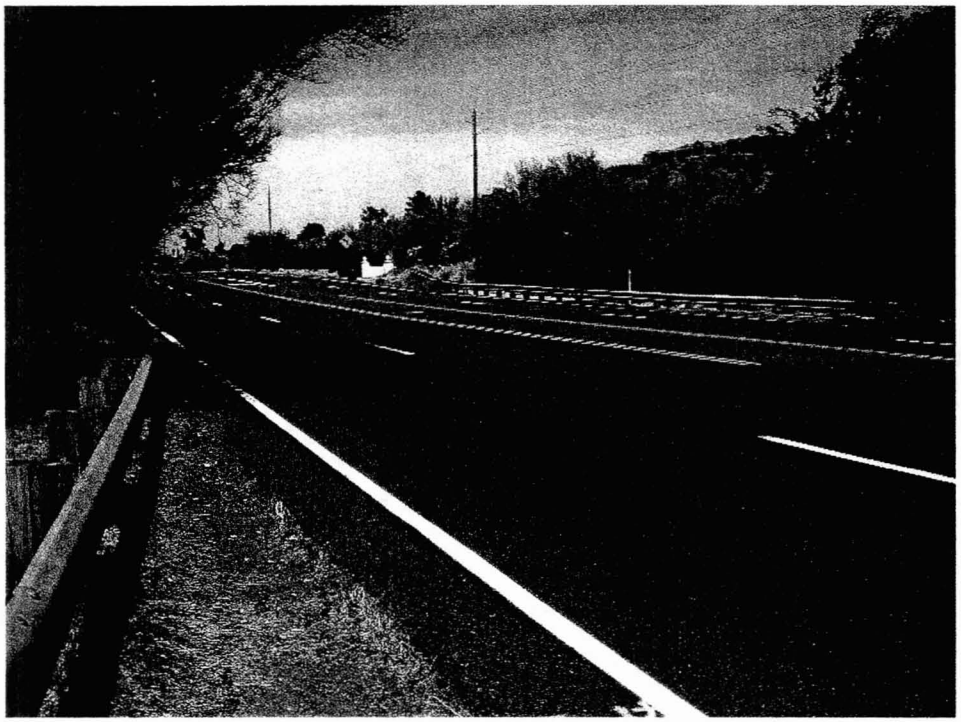


Photo 9 Echo Canyon Wash
View of McDonald Dr. roadway above the box culvert looking west.

Photo 10 Echo Canyon Wash
View of McDonald Dr. roadway above the box culvert looking east.

Photo 11 Echo Canyon Wash
View of the channel upstream of the box culvert at 44th St.

Photo 12 Echo Canyon Wash
View of the upstream face of the three barrel box culvert at 44th St.

Photo 13 Echo Canyon Wash
View of the left upstream side of the box culvert crossing at 44th st.

Photo 14 Echo Canyon Wash
View of the right upstream side of the box culvert crossing at 44th st.

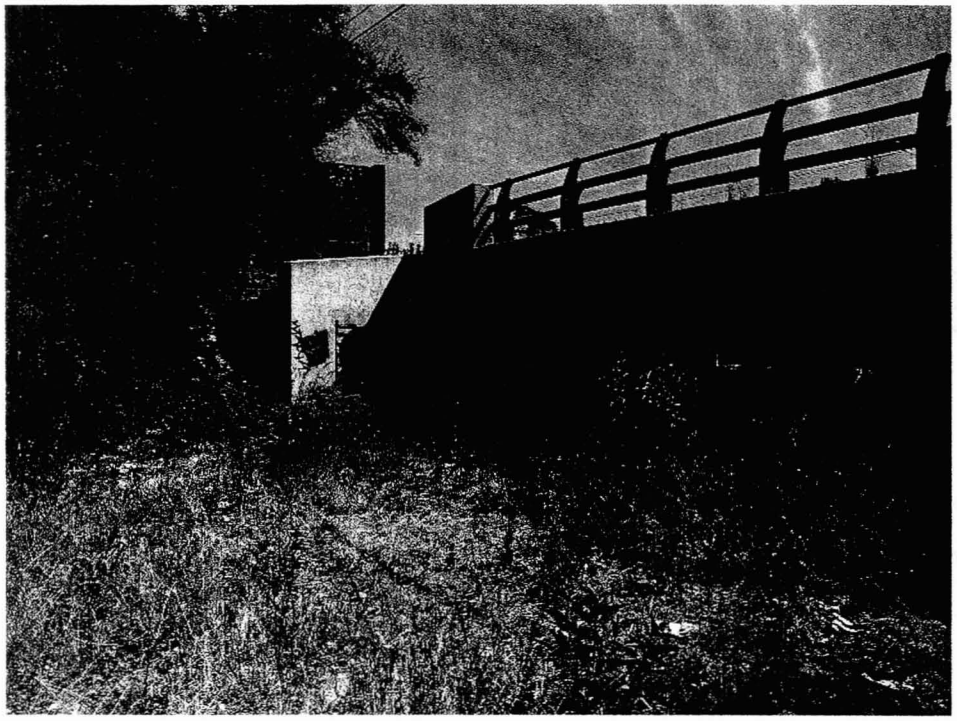


Photo 15 Echo Canyon Wash
View of the right downstream side of the box culvert crossing 44th St.

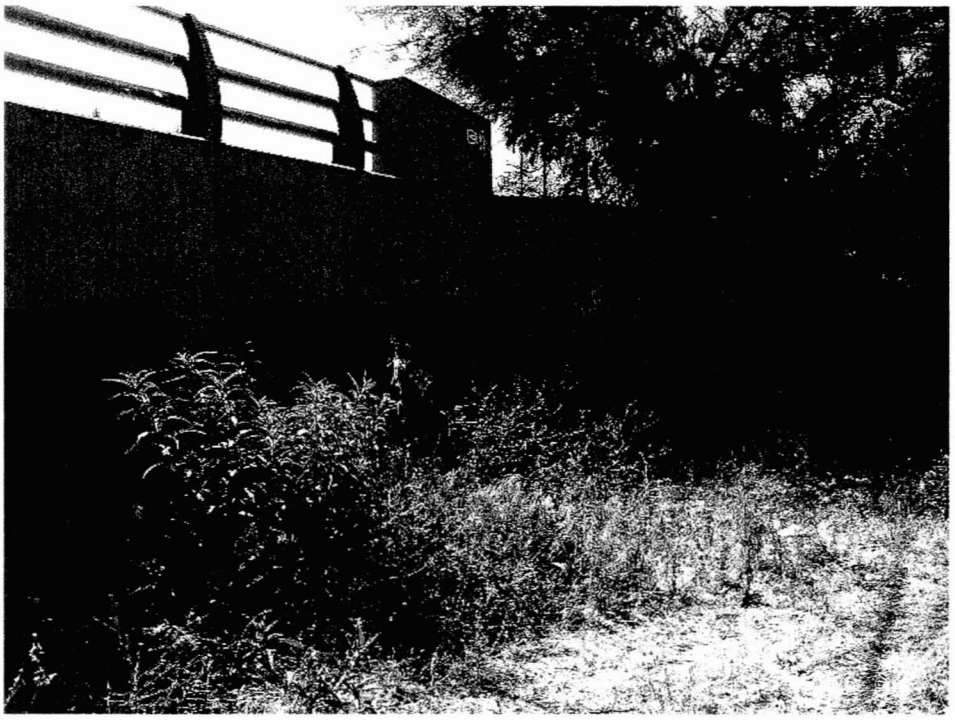


Photo 16 Echo Canyon Wash
View of the left downstream side of the box culvert crossing 44th St.

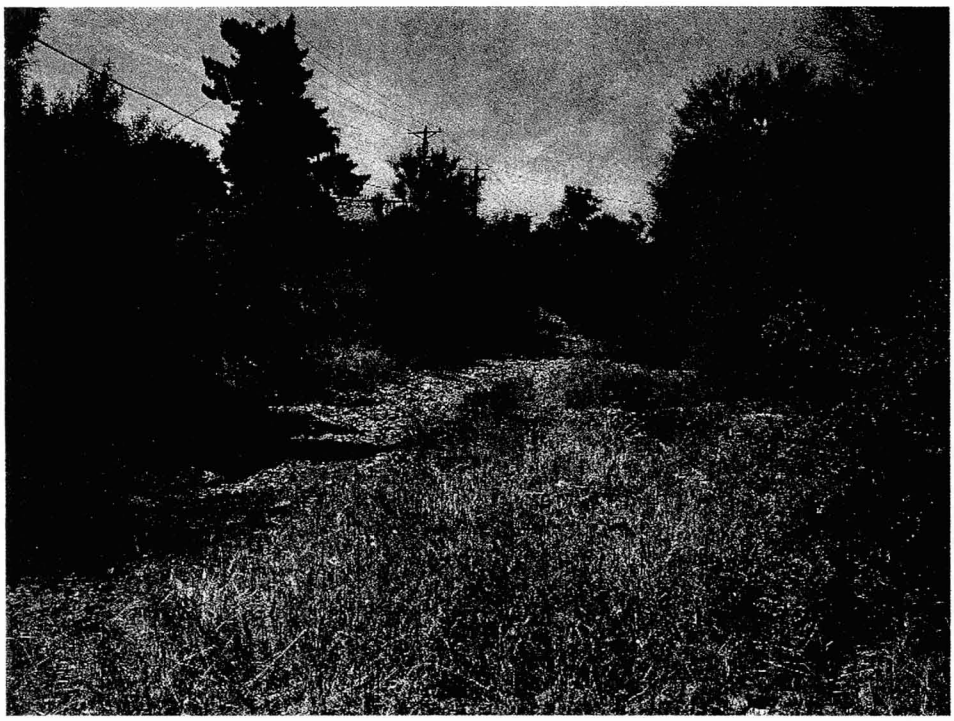


Photo 17 Echo Canyon Wash
View of the channel downstream of the box culvert at 44th St.

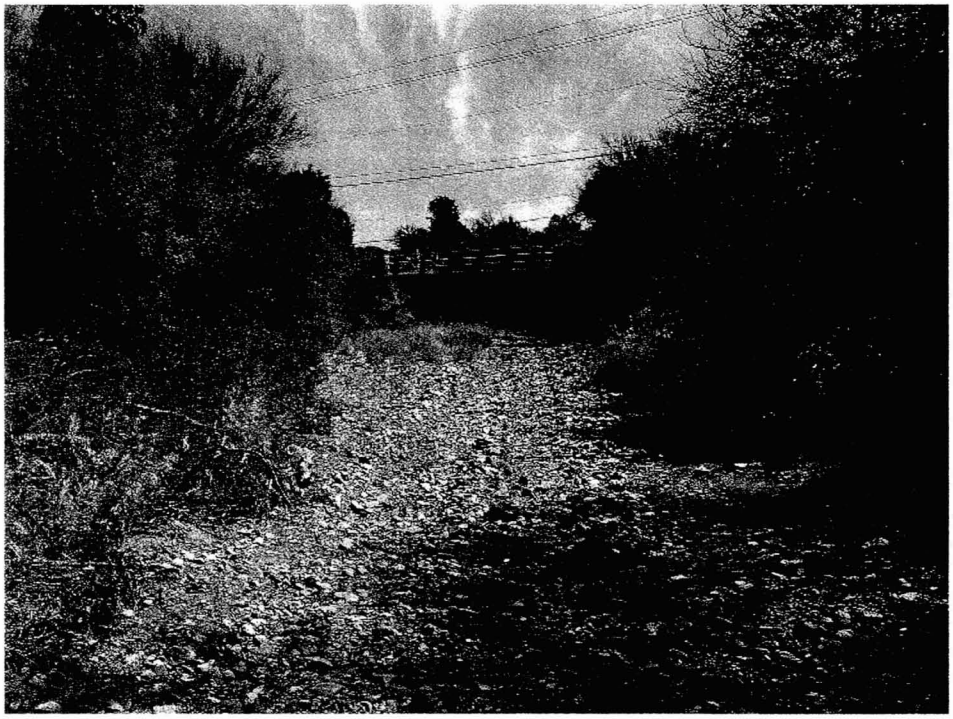


Photo 18 Echo Canyon Wash
View of the downstream side of the box culvert crossing 44th St.

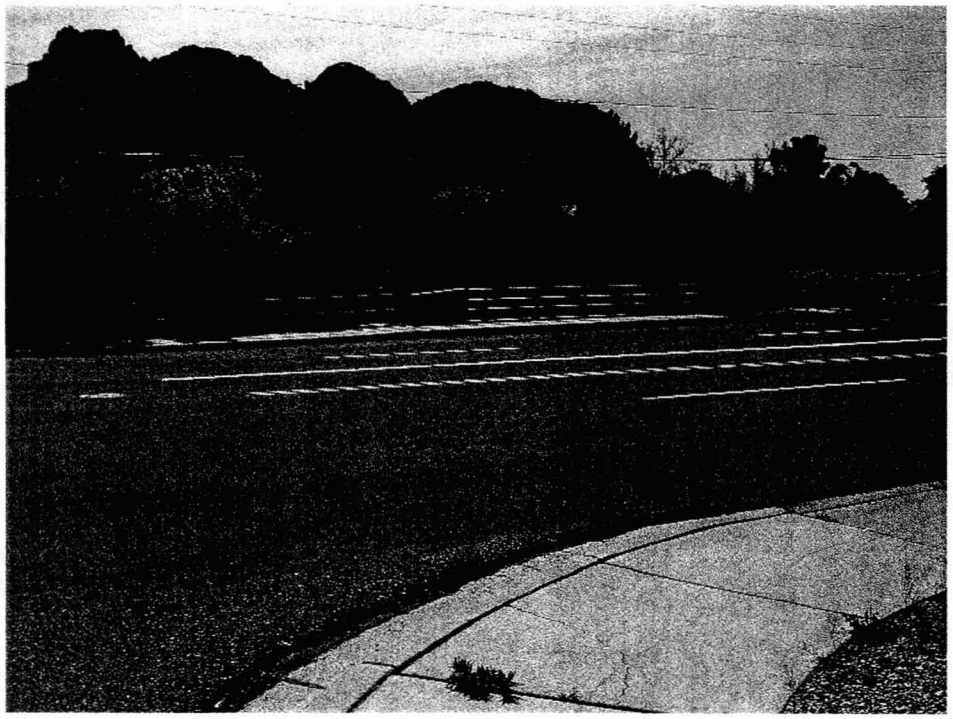


Photo 19 Echo Canyon Wash
View of the roadway above the three barrel box culvert at 44th St. looking east.

Photo 20 Echo Canyon Wash
View of the roadway above the three barrel box culvert at 44th St. looking west.

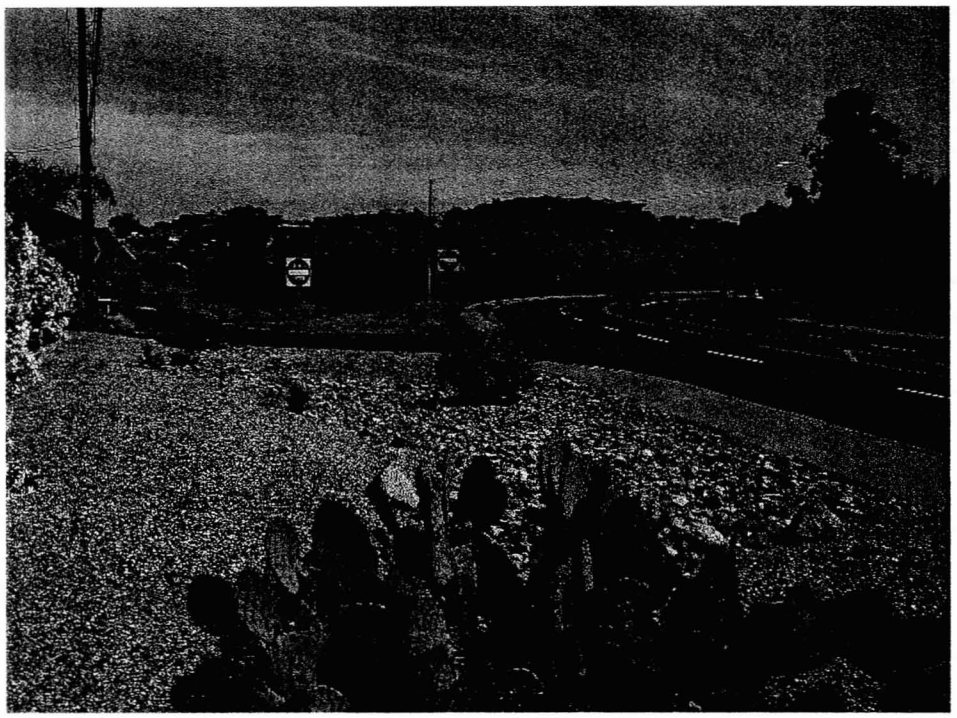


Photo 21 Echo Canyon Wash
View of 44th St. curving into McDonald Dr. north of the culvert crossing.

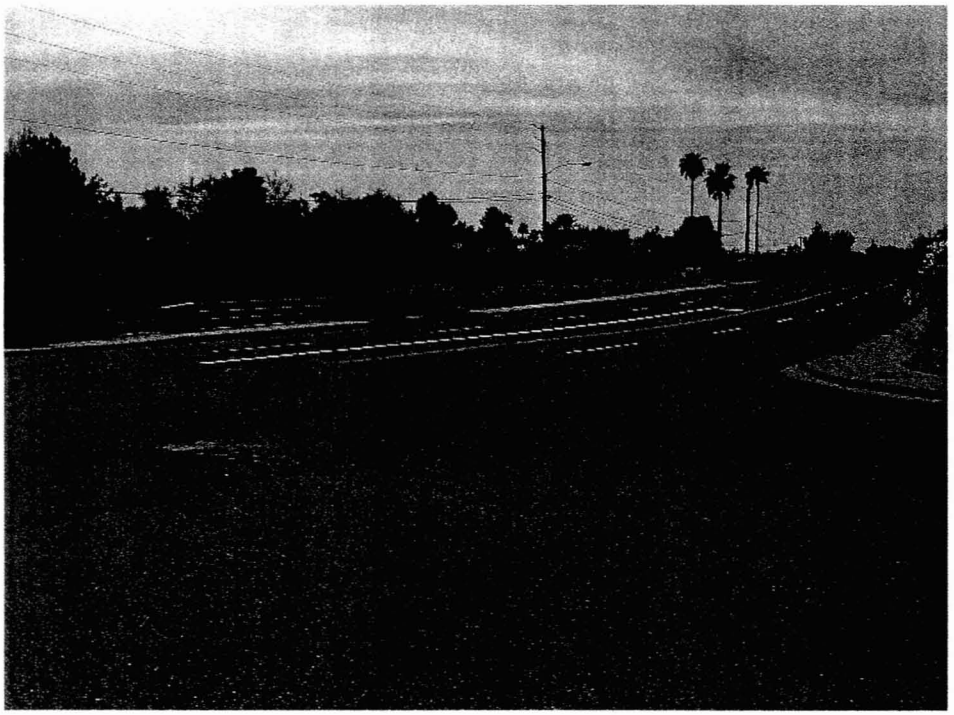


Photo 22 Echo Canyon Wash
View of 44th St. from the same position as Photo 21 looking southeast at the culvert crossing.

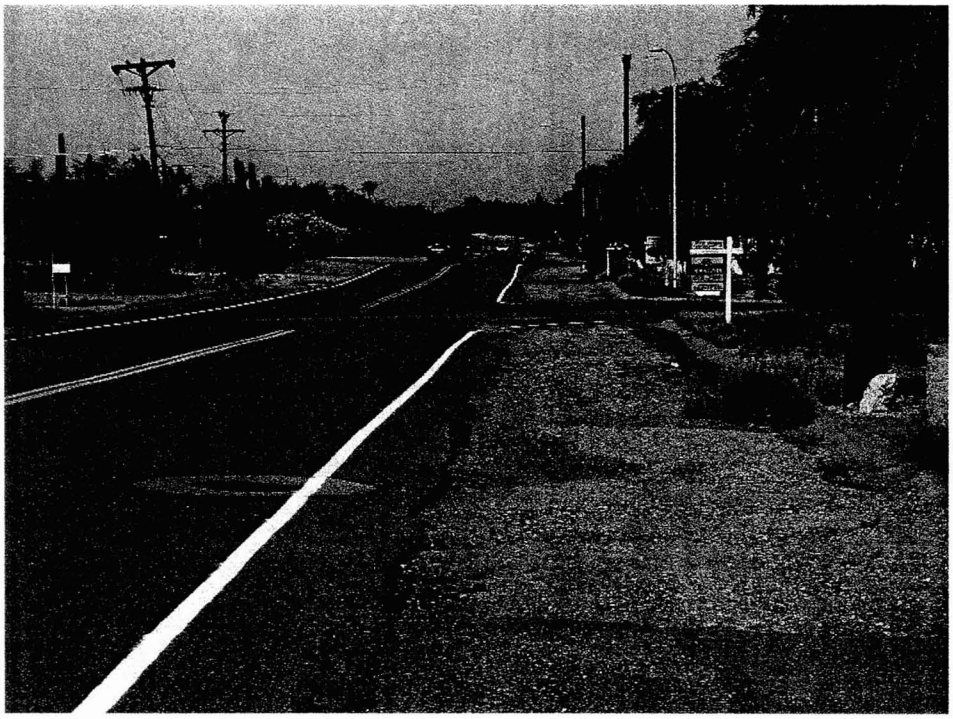


Photo 23 Echo Canyon Wash
View of Stanford Dr. looking west near the intersection with E. Marion Way.

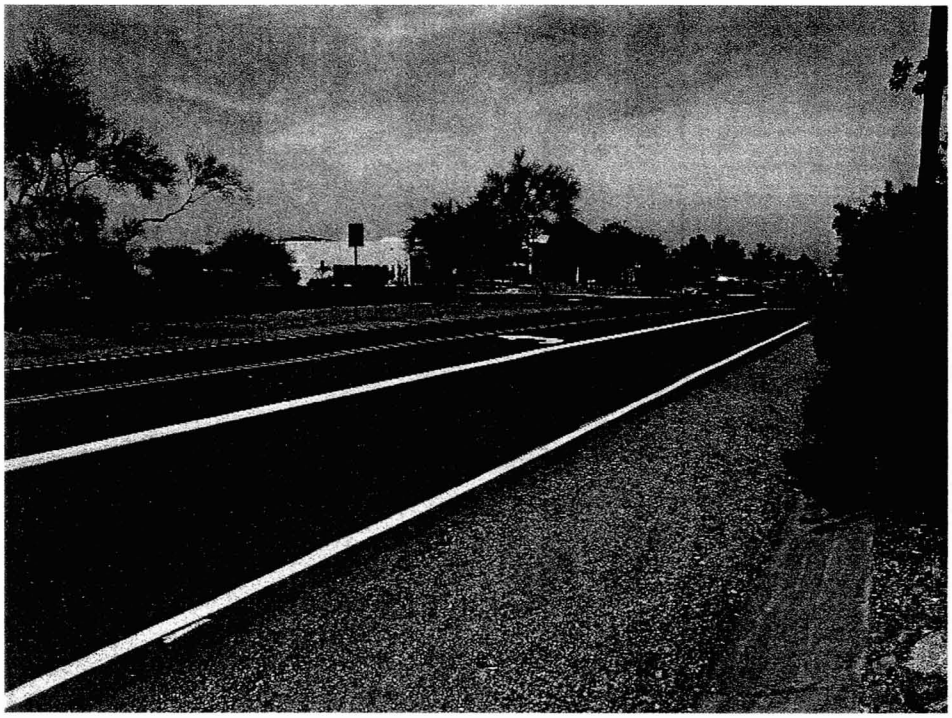


Photo 24 Echo Canyon Wash
View of the intersection of 40th St. and E. Stanford Dr. looking southwest.

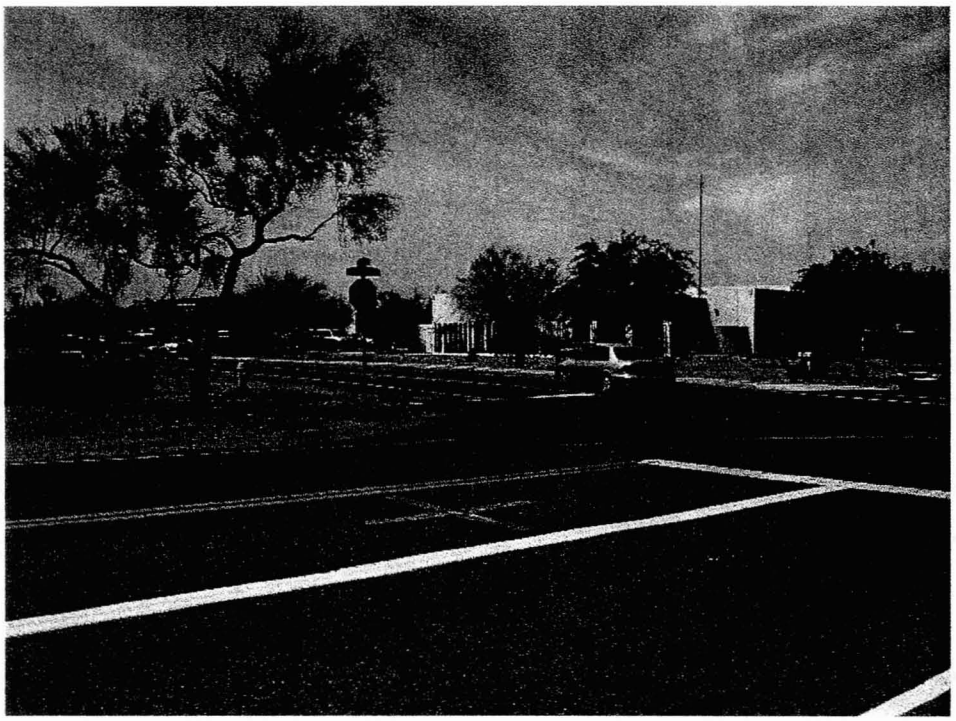


Photo 25 Echo Canyon Wash
View of the intersection of 40th St. and E. Stanford Dr. looking southwest.

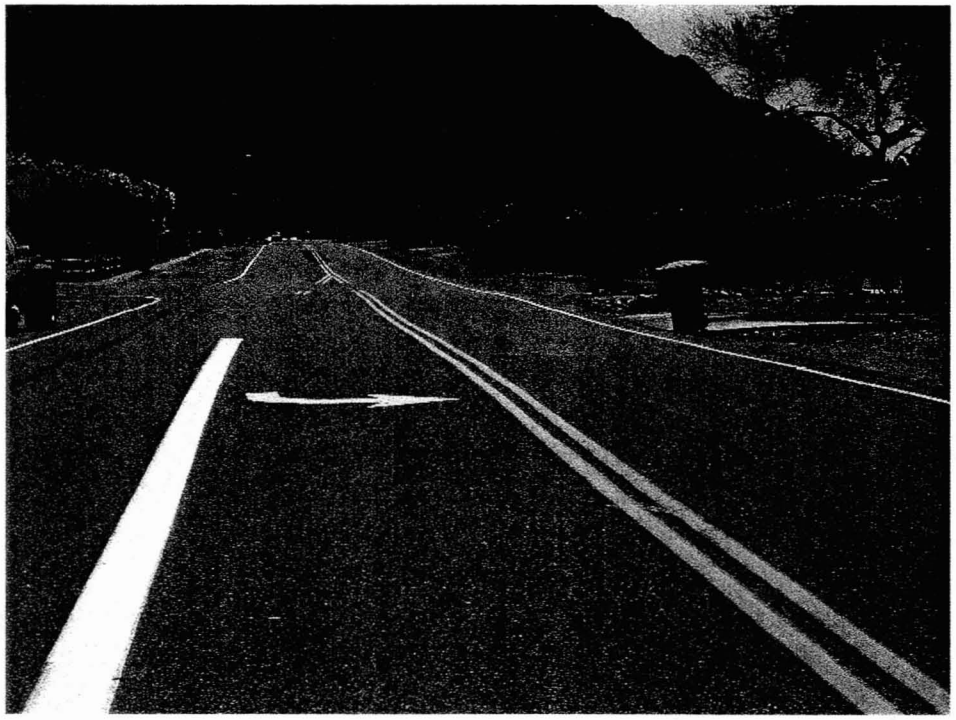


Photo 26 Echo Canyon Wash
View of Stanford Dr. looking east.

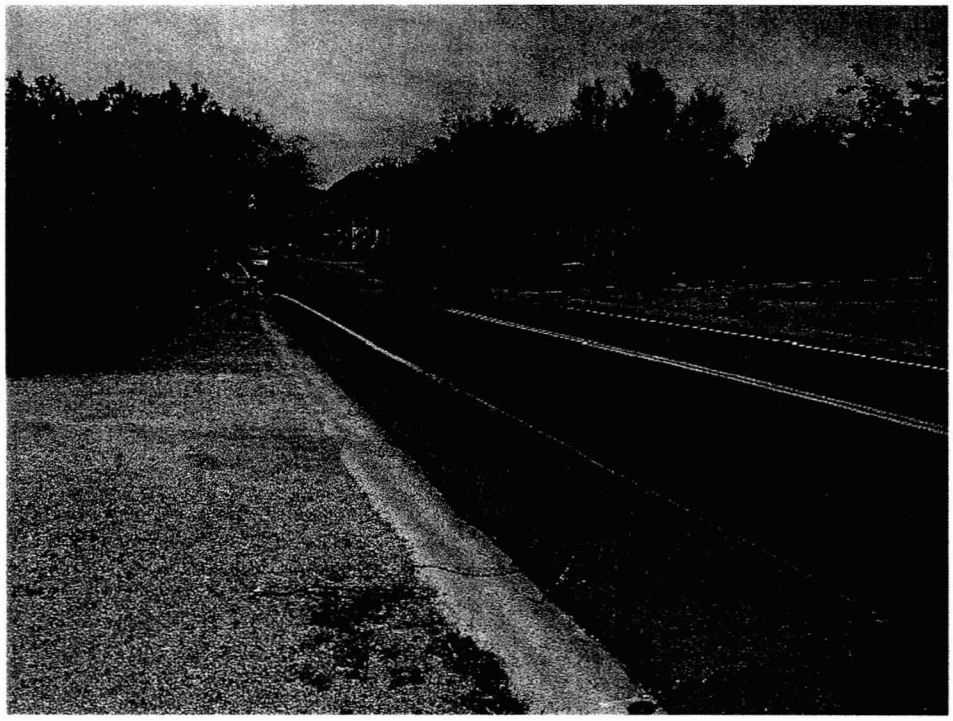


Photo 27 Echo Canyon Wash
View of the dip crossing at 40th St. north of E. Stanford Dr.

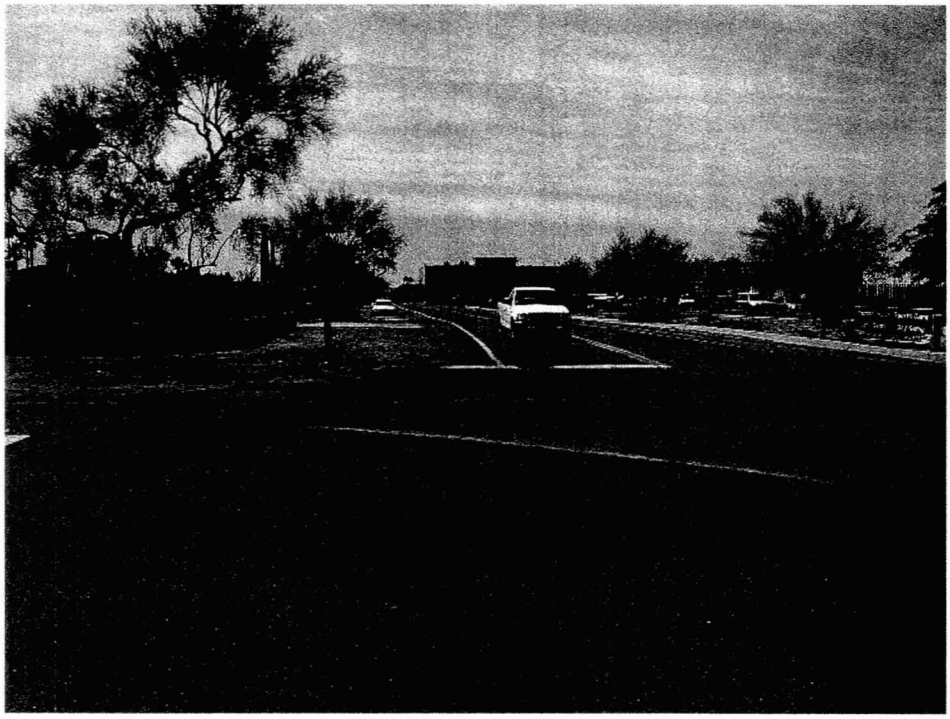


Photo 28 Echo Canyon Wash
View looking south at the intersection of E Stanford Dr. and 40th St.

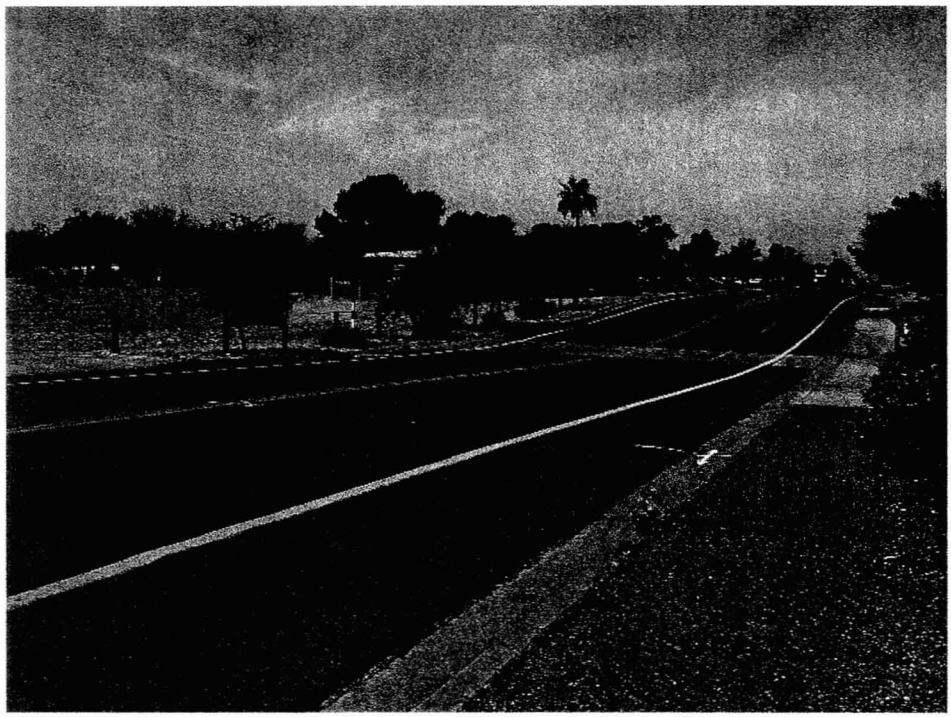


Photo 29 Echo Canyon Wash
View of the dip crossing west of 40 th St. on E. Stanford Dr.

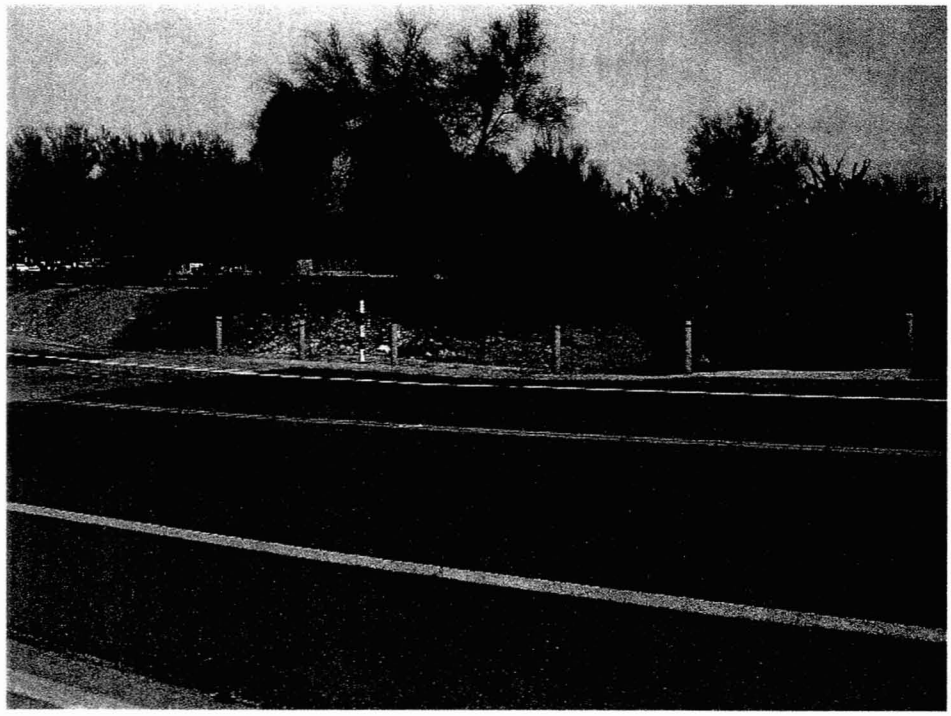


Photo 30 Echo Canyon Wash
View of the channel coming into the dip crossing at E. Stanford Dr.

Photo 31 Echo Canyon Wash
View of the channel upstream of the dip crossing on E Stanford Dr.

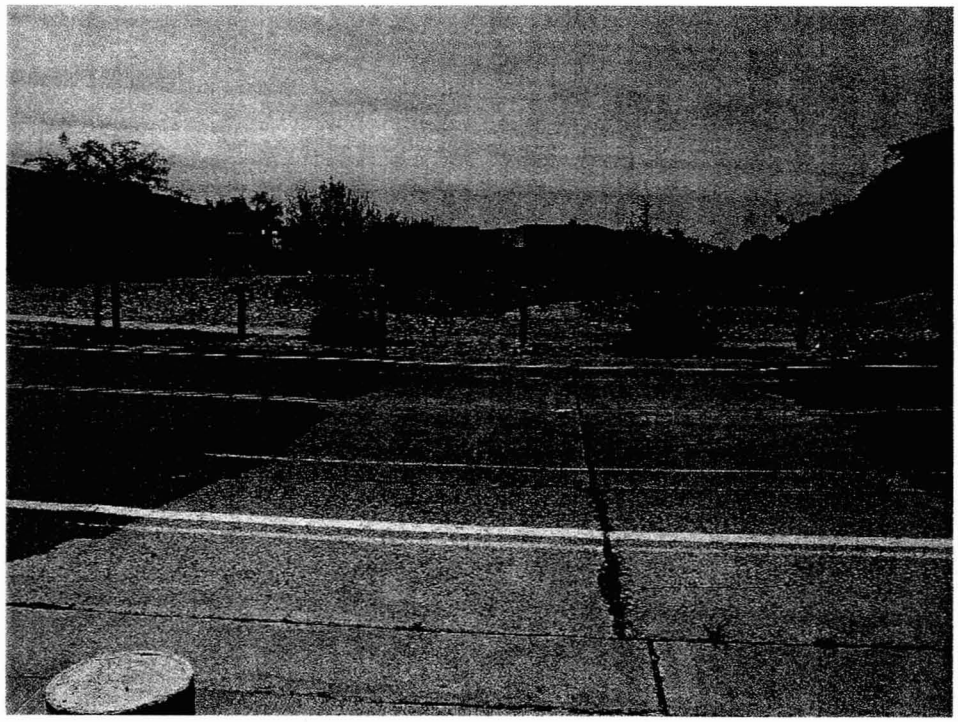


Photo 32 Echo Canyon Wash
View of the dip crossing on E Stanford Dr. looking south.

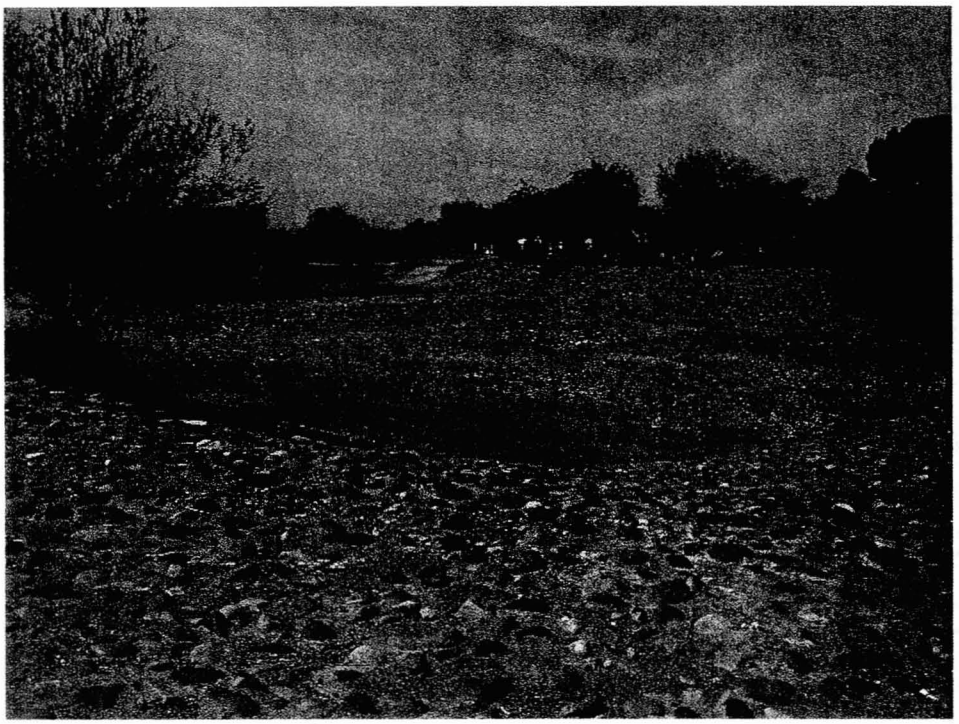


Photo 33 Echo Canyon Wash
View of stilling basin south of E. Stanford Dr.

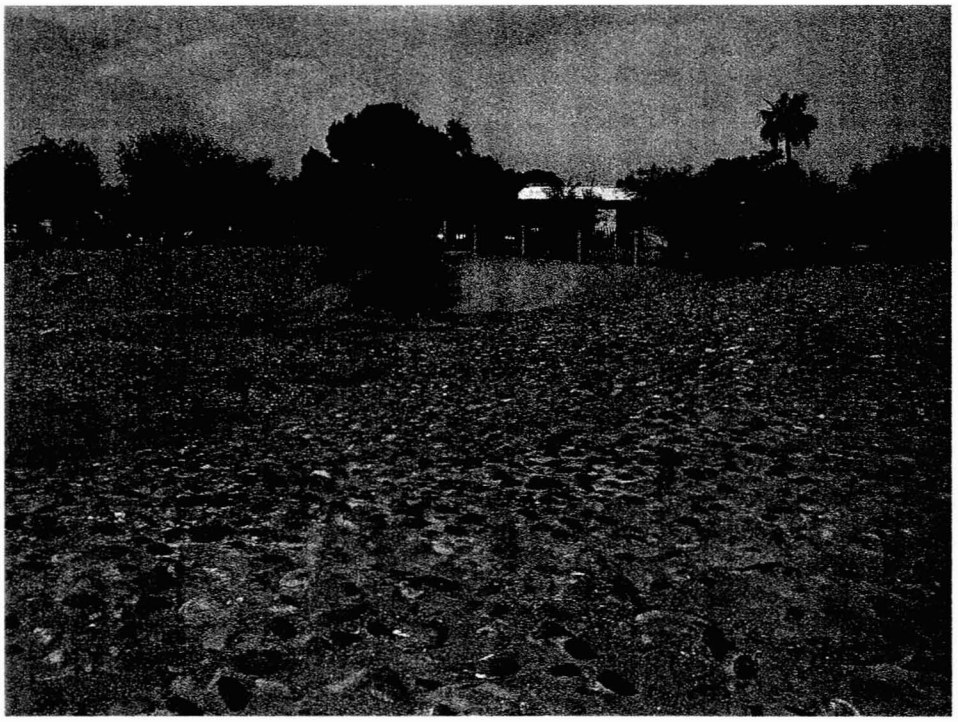


Photo 34 Echo Canyon Wash
Panning west from same position as Photo 33, looking west.

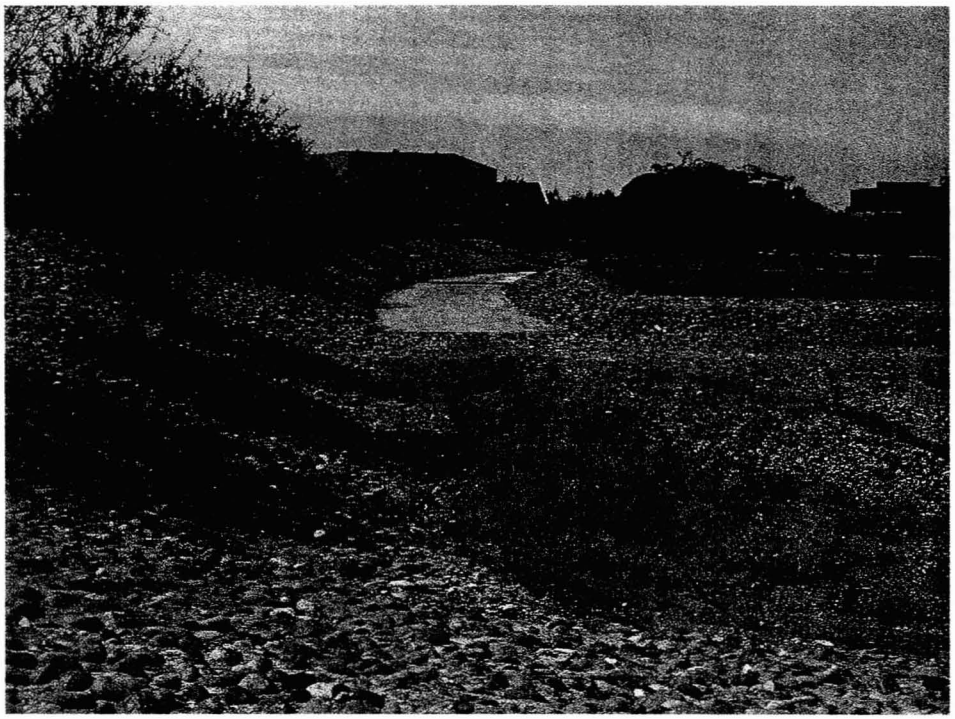


Photo 35 Echo Canyon Wash
View of channelization downstream of the stilling basin.

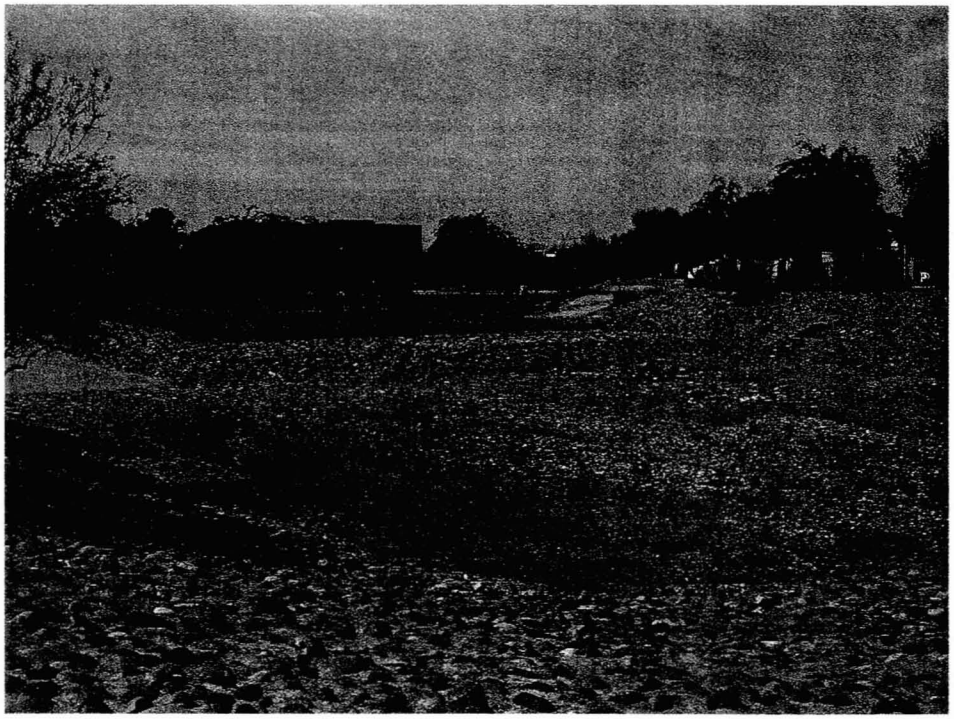
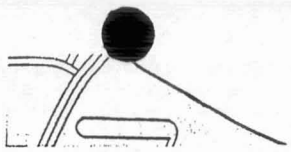


Photo 36 Echo Canyon Wash
View of the stilling basin south of E. Stanford Dr.

APPENDIX B

1996 LOMR



MAP LEGEND

Revised 100-Year Floodplain

APPROXIMATE SCALE IN FEET

1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 1670 OF 4350

CONTAINING

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY,			
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

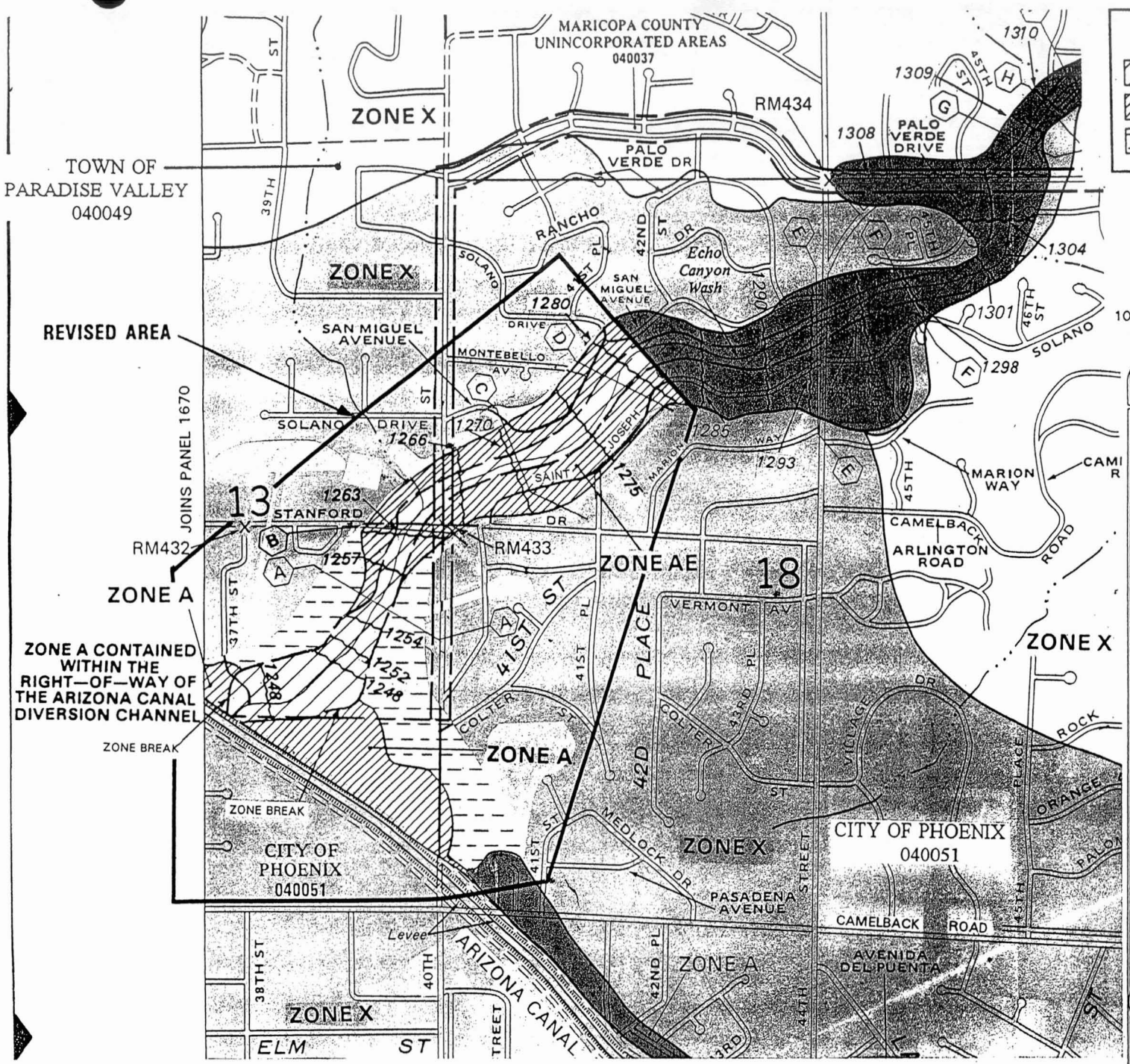
REVISED TO REFLECT LOMR DATED AUG 07 1996

MAP NUMBER
04013C1670 E

MAP REVISED:
SEPTEMBER 30, 1995

Federal Emergency Management Agency

CITY OF PHOENIX
TOWN OF PARADISE VALLEY
CLAREMONT STREET
TOWN OF PARADISE VALLEY
040049
36TH
PALO VERDE DRIVE
33RD ST
ZONE X
BETHANY HOME ROAD
JOINS PANEL 1690
30TH STREET
Levee
ZONE A
SAN MIGUEL AV
(PALO CRISTI ROAD)
ZONE A CONTAINED WITHIN THE RIGHT—OF—WAY OF THE ARIZONA CANAL DIVERSION CHANNEL
ARIZONA CANAL
ZONE X
REVISED AREA
RM430
STANFORD
RM431
DRIVE
14
13
Levee
OREGON AVE
ST
ZONE A
ZONE X
ST
34TH
ST
36TH
37TH
CITY OF PHOENIX
040051



MAP LEGEND

- Revised Floodway
- Revised 100–Year Floodplain
- Revised 500–Year Floodplain

APPROXIMATE SCALE IN FEET

1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 1690 OF 4350

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
[illegible]	[illegible]	[illegible]	E
[illegible]	[illegible]	[illegible]	E
PARADISE VALLEY, TOWN OF	040049	[illegible]	E
[illegible]	040051	1690	E
[illegible]	045012	[illegible]	[illegible]

REVISED TO REFLECT LOMR DATED AUG 07 1996

MAP NUMBER
04013C1690 E

MAP REVISED:
SEPTEMBER 30, 1995

Federal Emergency Management Agency

FEDERAL EMERGENCY MANAGMENT AGENCY

WATER SURFACE ELEVATION CHECK

COMMUNITY NAME	FLOODIND SOURCE	PROJECT NAME /IDENTIFIER
Maricopa County	Echo Canyon Wash	Cudia City Wash, Sediment Basin

	EFFECTIVE			DUPLICATE EFFECTIVE			CORRECTED EFFECTIVE			EXISTING/PRE-PROJECT			REVISED/PROJECT		
SECNO	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]
0				50.05	50.10	0.05							46.90	41.90	1.00
0.003													47.78	48.41	0.64
0.02				51.29	51.26	-0.03									
0.026													47.81	48.44	0.63
0.049													47.85	48.47	0.63
0.081													47.87	48.49	0.62
0.117													47.89	48.51	0.62
0.139													47.89	48.51	0.62
0.172													47.87	48.49	0.62
0.178													49.07	49.03	-0.04
0.188													50.89	50.88	-0.01
0.190													52.17	52.16	-0.01
0/206													52.72	52.72	0.00

COMMENTS:

1-100-year (natural) Water Surface Elevation 2-Encroachment (floodway) Water Surface Elevation 3-Surcharge Value

Include all cross sections in the models between tie-in points. Any interpolated values should be indicated in parentheses.

Sheet 1 of 3

FEDERAL EMERGENCY MANAGMENT AGENCY

WATER SURFACE ELEVATION CHECK

COMMUNITY NAME	FLOODIND SOURCE	PROJECT NAME /IDENTIFIER
Maricopa County	Echo Canyon Wash	Cudia City Wash, Sediment Basin

	EFFECTIVE			DUPLICATE EFFECTIVE			CORRECTED EFFECTIVE			EXISTING/PRE-PROJECT			REVISED/PROJECT		
SECNO	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]
0.23				57.07	58.63	1.56									
0.238													52.75	52.74	-0.01
0.240													54.00	53.96	-0.03
0.246													54.67	54.83	0.16
0.248													56.09	57.06	0.97
0.268													56.23	57.18	0.95
0.289													56.28	57.19	0.91
0.291													56.50	57.96	0.96
0.307													56.20	56.89	0.69
0.320													56.37	57.12	0.76
0.322													57.40	58.36	0.96
0.336													57.52	58.49	0.98
0.344													57.49	58.50	1.01

COMMENTS:

1-100-year (natural) Water Surface Elevation 2-Encroachment (floodway) Water Surface Elevation 3-Surcharge Value

Include all cross sections in the models between tie-in points. Any interpolated values should be indicated in parentheses.

FEDERAL EMERGENCY MANAGMENT AGENCY

WATER SURFACE ELEVATION CHECK

COMMUNITY NAME	FLOODIND SOURCE	PROJECT NAME /IDENTIFIER
Maricopa County	Echo Canyon Wash	Cudia City Wash, Sediment Basin

	EFFECTIVE			DUPLICATE EFFECTIVE			CORRECTED EFFECTIVE			EXISTING/PRE-PROJECT			REVISED/PROJECT		
SECNO	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]
0.352													60.79	61.31	0.52
0.356													61.81	61.89	0.08
0.361													62.37	62.61	0.24
0.37				65.67	64.54	-1.13									
0.370													62.71	63.03	0.32
0.373													63.45	64.32	0.88
0.46													65.61	66.42	0.81
0.51				70.58	73.93	3.35							71.09	73.27	2.18

COMMENTS:

Cross-section 0.37 on duplicate effective model is approximately 170' upstream of cross-sectiomn 0.373 on revised model

The revised HEC-2 model used the same floodway width of 73.0 at x-section 0.51 which resulted in a surcharge of 2.18'.

1-100-year (natural) Water Surface Elevation 2-Encroachment (floodway) Water Surface Elevation 3-Surcharge Value

Include all cross sections in the models between tie-in points. Any interpolated values should be indicated in parentheses.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Dreamy Draw Wash East								
A	0.04	250[2]	--[3]	--[3]	1,242.0	1,242.0	1,242.9	0.9
Echo Canyon Wash								
A	0.27	157	1,035	6.4	1,256.2	1,256.2	1,257.1	0.9
B	0.37	170	615	10.7	1,263.4	1,263.4	1,264.0	0.6
C	0.56	73	618	9.5	1,270.4	1,270.4	1,271.4	1.0
D	0.74[4]	205	1,172	5.0	1,278.7	1,278.7	1,279.6	0.9
E	1.04	210	1,501	3.9	1,293.1	1,293.1	1,293.5	0.4
F	1.19	180	1,169	5.0	1,298.0	1,298.0	1,298.3	0.3
G	1.43	150	635	7.8	1,308.4	1,308.4	1,308.9	0.5
H	1.49	150	377	11.9	1,310.2	1,310.2	1,310.7	0.5
I	1.54	150	734	6.1	1,314.4	1,314.4	1,314.4	0.0
J	1.60	150	774	5.8	1,316.1	1,316.1	1,316.1	0.0
K	1.71	150	729	6.2	1,317.6	1,317.6	1,318.0	0.4
L	1.86	150	451	8.0	1,321.9	1,321.9	1,322.8	0.9
M	2.02	150	609	4.9	1,327.5	1,327.5	1,327.5	0.0
Flynn Lane Wash								
A	0.05	350	--[3]	--[3]	1,244.3	1,244.3	1,244.7	0.4
B	0.21	250	--[3]	--[3]	1,259.8	1,259.8	1,259.9	0.1
C	0.34	200	--[3]	--[3]	1,272.5	1,272.5	1,273.0	0.5
D	0.53	400	--[3]	--[3]	1,290.1	1,290.1	1,291.1	1.0

REVISED DATA

[1]Miles Above Mouth [2]Combined Floodway for Dreamy Draw Wash East and Myrtle Avenue Wash
[3]Data Not Available
[4]Station 0.740 previously shown as station 0.710; subsequent cross sections require addition of 0.030 miles

REVISED TO REFLECT LOMR DATED AUG 07 1996

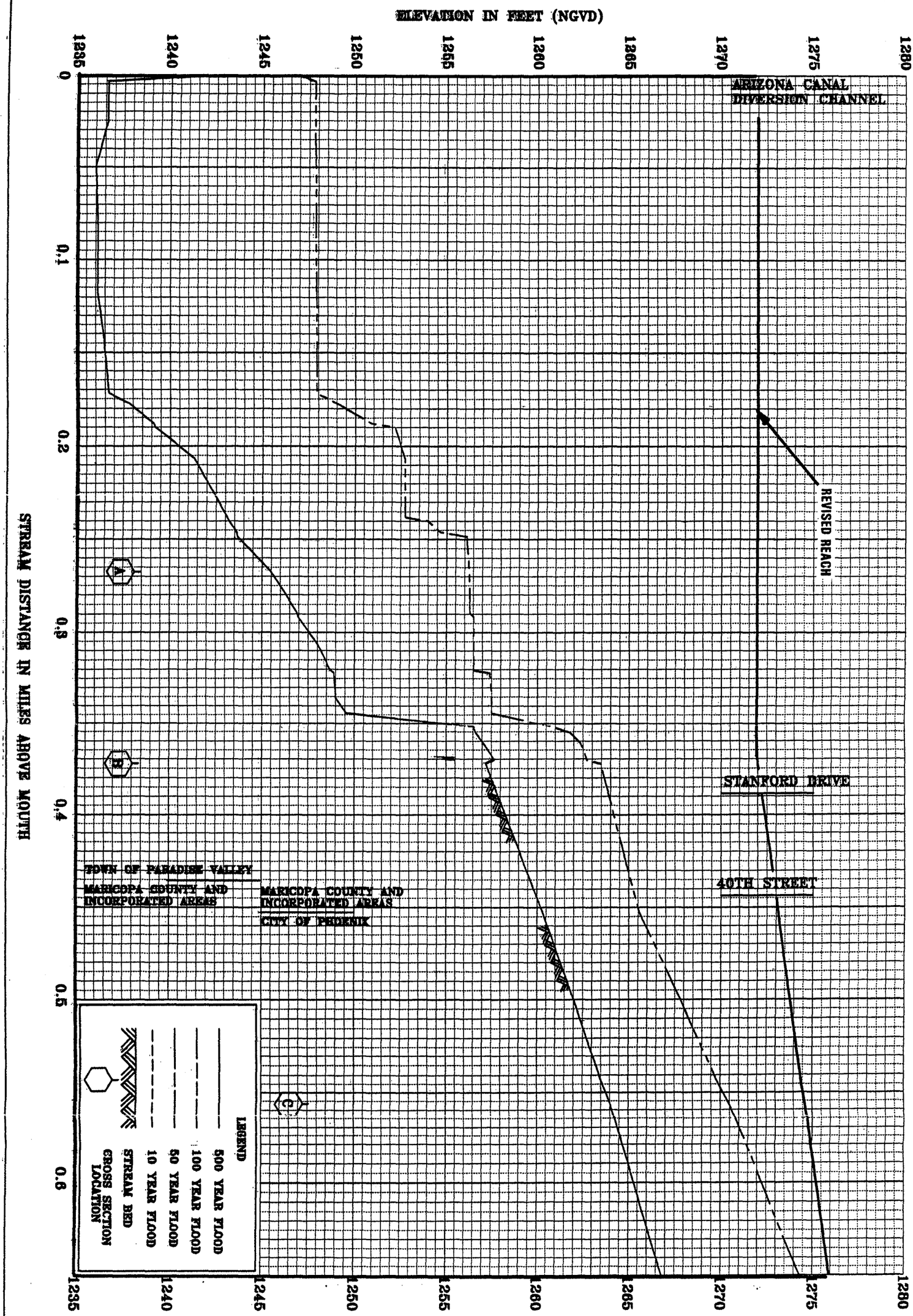
TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

FLOODWAY DATA

DREAMY DRAW WASH EAST - ECHO CANYON WASH - FLYNN LANE WASH



134P

FEDERAL EMERGENCY MANAGEMENT AGENCY

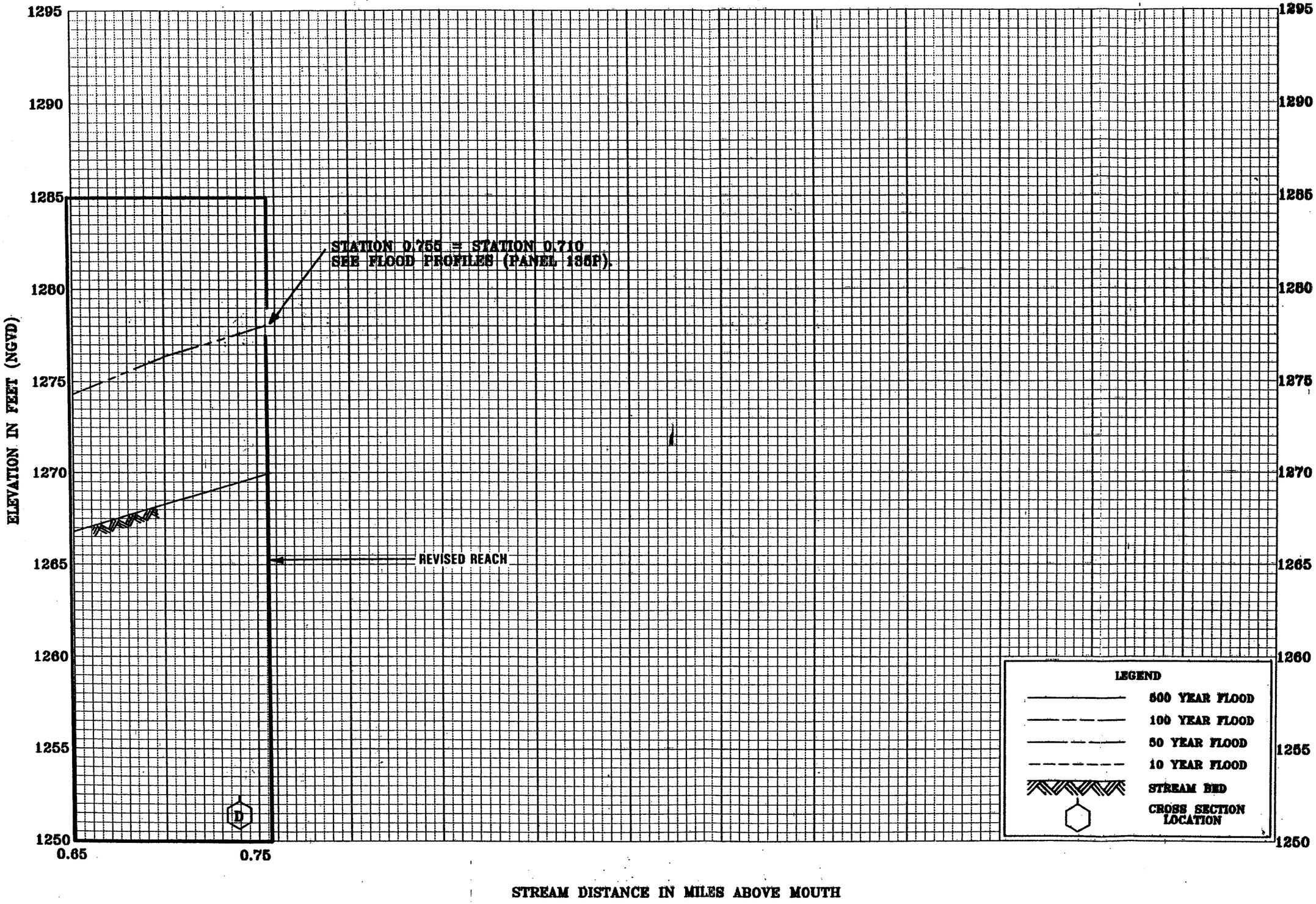
MARICOPA COUNTY, AZ

AND UNINCORPORATED AREAS

FLOOD PROFILES

ECHO CANYON WASH

REVISED TO REFLECT LOMR DATED AUG 07 1996



REVISED TO REFLECT LOMR DATED AUG 07 1990

FLOOD PROFILES

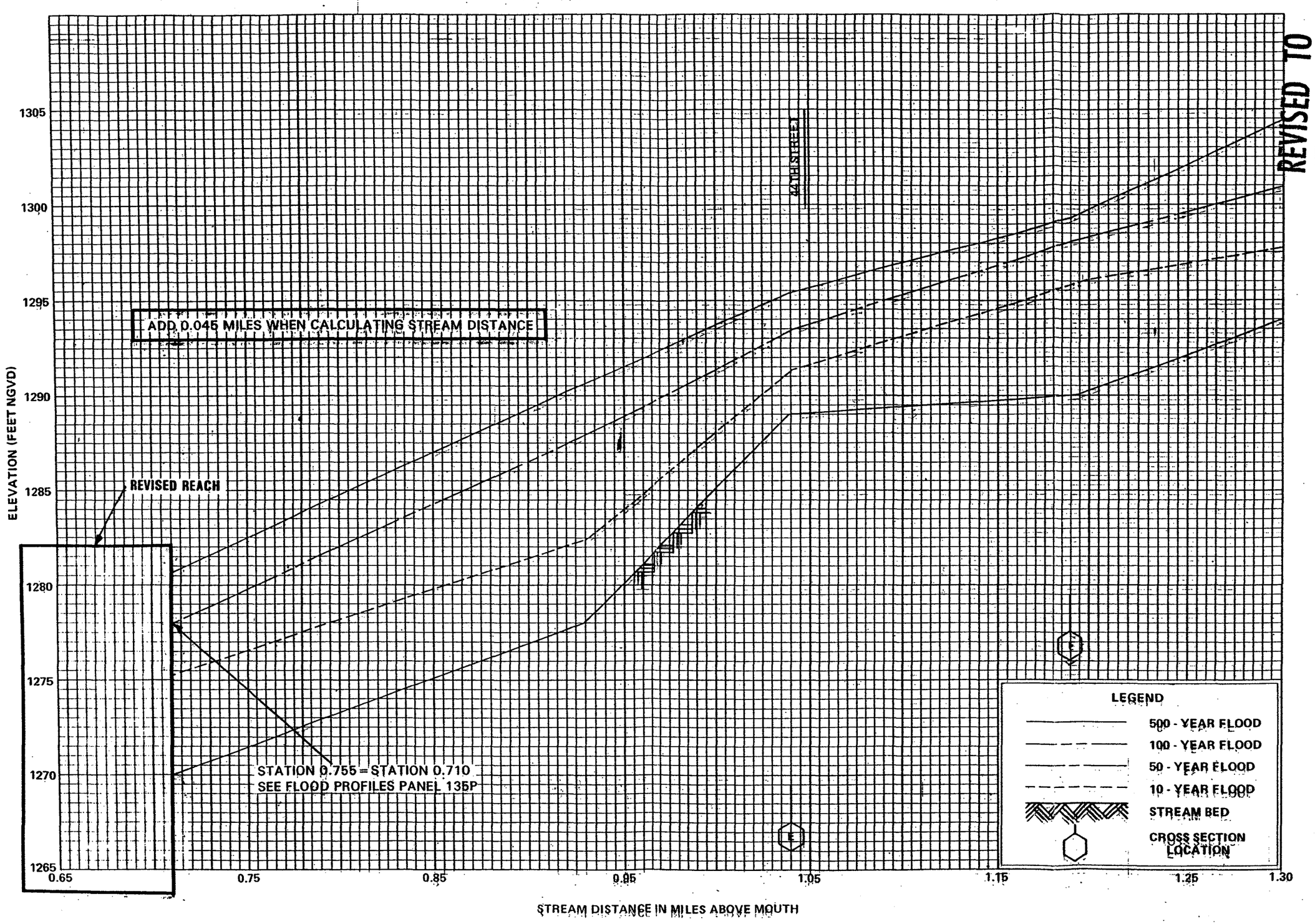
ECHO CANYON WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND UNINCORPORATED AREAS

134PA



REVISED TO REFLECT LOMR DATED AUG 07 1996

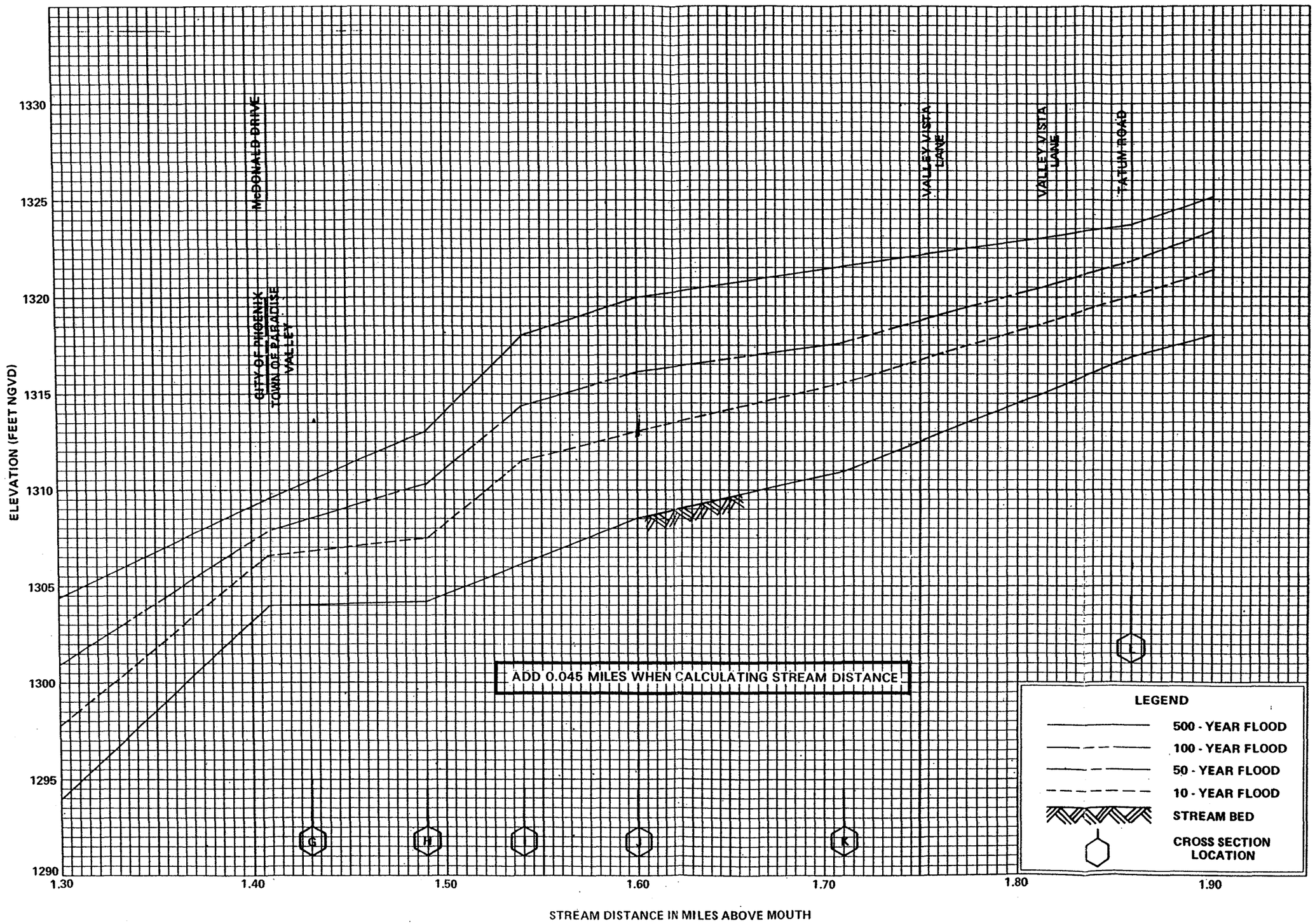
FLOOD PROFILES

ECHO CANYON WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

135P



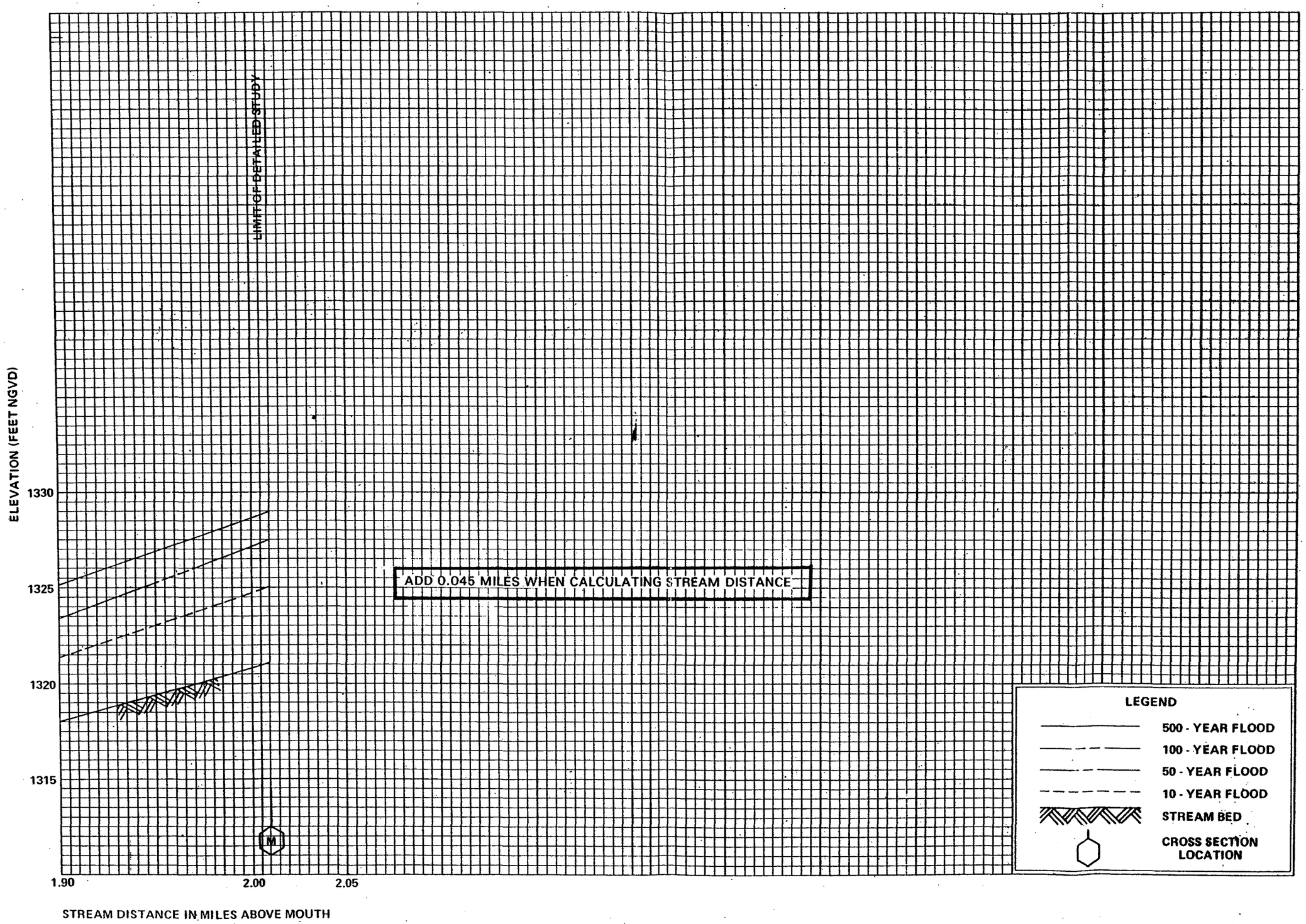
REVISED TO REFLECT LOMR DATED AUG 07 1996

FLOOD PROFILES

ECHO CANYON WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS



REVISED TO REFLECT LOMR DATED AUG 07 1996

FLOOD PROFILES

ECHO CANYON WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

APPENDIX C

SURVEY FIELD NOTES

ECHO CANYON WASH
AZTEC JOB NO. AZ 02079/03

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
25396
ALAN D.
REECE
Date Signed 11/19/03
ARIZONA, U.S.A.

3-10-03
SUNNY 75°

Rob D.
Gary M.

RTK GPS
BASE FILE : EC-031003B
ROVER : EC-031003R
CSYS : AZ CENTRAL
GPS UNIT = 2
CHANNEL = Ø

BASE @ PAPAGO ANT = 1.312m = 4.304'

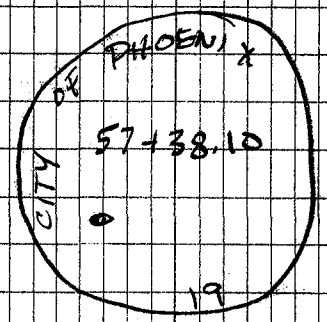
NGS Superseded Values

LAT 33-27-57.49040N
Long 111-57-16.66460 W
OHT 1384.70

CKC GUN
OUT 0.08
LT 0.01
CUT 0.005

Rec LAT 33-27-42.00230 N
Long 111-57-05.37140 W
OHT 1314.97

3-10-03

	LOCATE
C18	FND – ℄ OF SEC 18, BC/HH AT 44TH ST & MC DONALD.
	
NE 19	FND – C.O.P. BC/HH @ PROJECTED ℄ OF Camelback Rd FROM W. & ℄ OF Camelhead Rd (HAS punch MARK)
C19	FND – C.O.P. BC/HH (w/ punch) AT 44TH ST & Campbell

3-11-03
SUNNY 70-80°
ROB D
GARY M.

BASE FILE: EC-03110313
POVE FILE: EC-03110312

SHIFT VALUE(+) N 47.378 E = 199816.472
BASE @ N18 ANF = 1.321 = 4.334'

SHIFTED 27 VALUES N 918112.678
E 678768.582
C.O.P ELV = 1310.285

CKC C18 OUT 0.16
RT 0.18
OUT 0.06

Rec (SHIFTED) N 915574.678
E 678723.432
OHT 1282.018

X365

MEASURED N 915574.666
E 678762.459
OHT 1282.713

FND - BC 1/HH @ 44TH ST & McDONNELL

FND - USGS BC IN 6" DIAM (0.7' HIGH) METAL SLEEVE (PIPE), 5.5' N. OF S.E. STOP LIGHT POLE AT 44TH ST & STANFORD.

GEODETIC SURVEY
X 365
1967
BENCH MARK U.S. COAST & GEOD. SURV.

3-11-03

K474

MEASURED { N 917110.504
E 678708.258
OHT 1291.459 }

BEGIN ℄ Road SHOTS, (100')
(101 – 196)

FND – NGS BENCH MARK IN Bridge
Abutment (S.W. CORNER) AT
JUST SOUTH OF 44TH ST & SAN Miguel

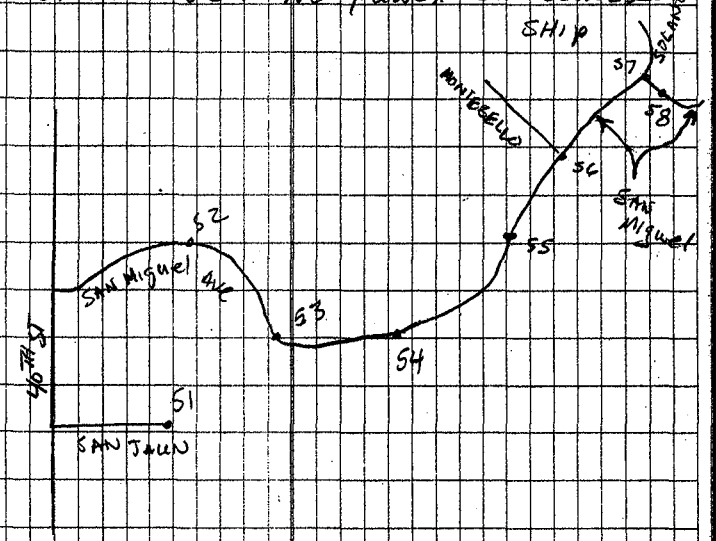
VERTICAL CONTROL MARK
K474
1981

3-11-03

STREET MONUMENTS

51		BC	FLUSH	NO PUNCH
52		BC	FLUSH	NO PUNCH
53		BC	FLUSH	PUNCH
54		BC	FLUSH	PUNCH
55		"	"	
56		"	"	
57		"	"	
58		"	"	
59	C.O.P	BC	FLUSH	PUNCH
60	"		"	PUNCH
61		BC	FLUSH	NO PUNCH

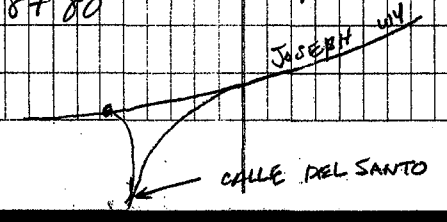
– IN CULDESAC, E. OF 40TH ST ON SAN JUAN AVE. NO PUNCH OR OWNERSHIP



FWD – C.O.P. BC FLUSH @ 44TH ST & SAN MIGUEL
13+30'.70

FWD – AT 44TH ST & JOSEPH WAY
8+80

–

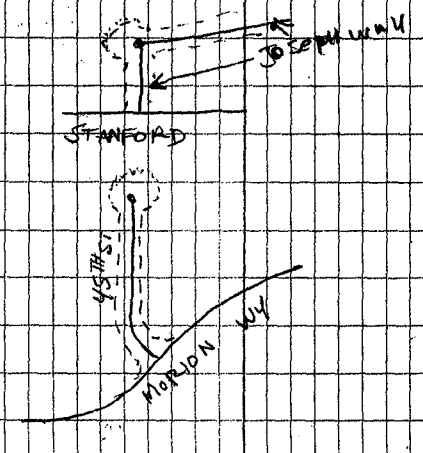


7/340

3-11-03

62		BC FLUSH	PUNCH	
63		BC FLUSH	PUNCH	
64		BC FLUSH	PUNCH	

— AT



45TH ST & SOLANO DR.

3-12-03

BASE FILE : EC-03 1203B
ROVER EC-03 1203R

BASE @ N18 ANT = 1.283 ± 4.21

CKC K474

IN 0.04
RT 0.04
CUT 0.01

CUT ℄ Road SHOTS
(197 - 214)

WASH X-SECTION SHOTS
(301 - 320)

3-19-03

Roto D.
Gary M

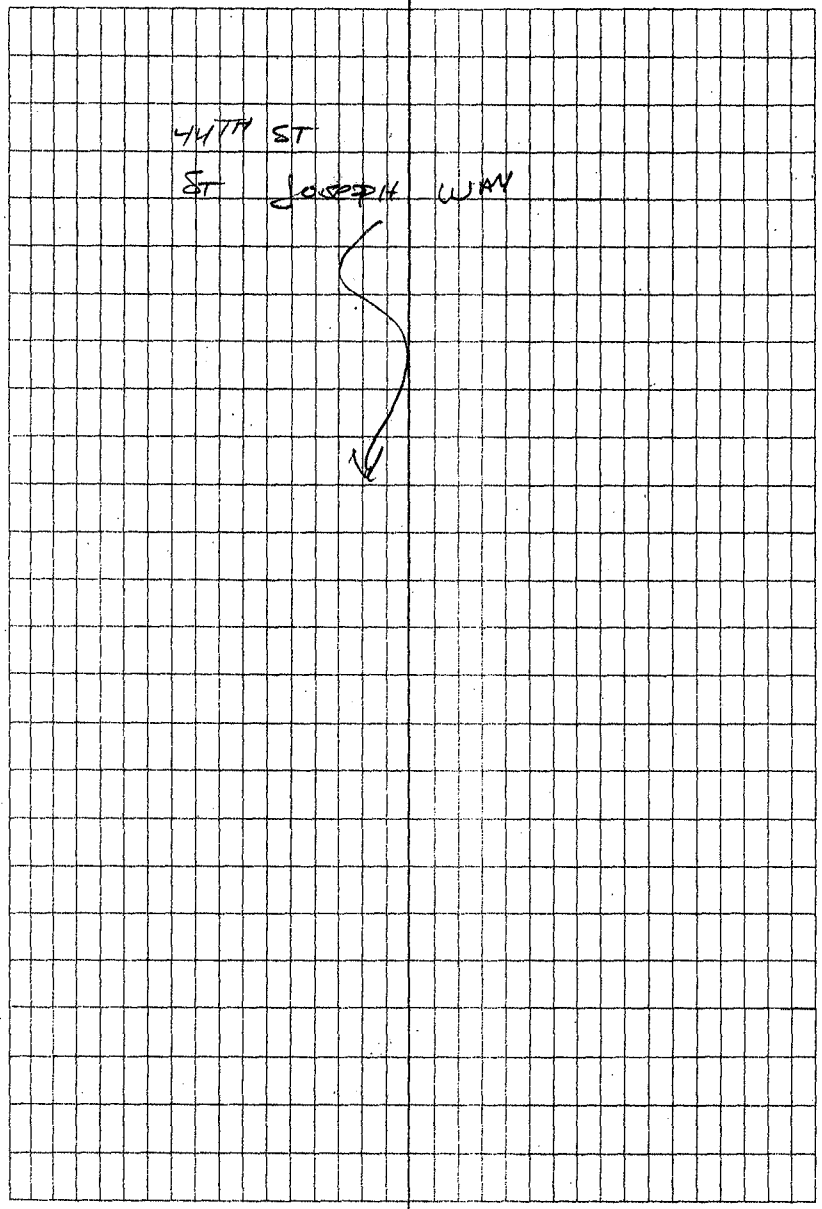
	F.F. ELVS.			
117	Set 1266.49		House #	
116		ck 6.16		
			4010	68.46
			4011	68.40
			4007	66.44
113	63.53			
114		ck 5.35		
			4001	64.94
119	1270.75			
118		ck 7.15		
			4027	70.08
			4034	72.30
			4031	69.92
			4035	69.50
120	1269.67			
121		70.95		
			4039	70.15
			4042	73.89
			4101	71.84

SAN JUAN

SAN Miguel

134	1282.42				
135		3.16			
			4144	83.71	San Miguel
			4149	83.10	
139	1282.98				
137		4.27			
			4205	83.44	
			4301	85.72	
SET 139A	86.16				T.p. Top of Curb
			4309	85.94	
			4315	85.67	
			4319	86.75	
			4325	87.18	
			~~4333~~	~~89.05~~	
SET 139B	89.10				T.P.
140		90.84			
			4333	89.44	
			4337	90.80	
141	1292.06				
142		93.10			
			4347	91.73	
			4350	92.66	
			4355	92.85	
			4364	93.70	

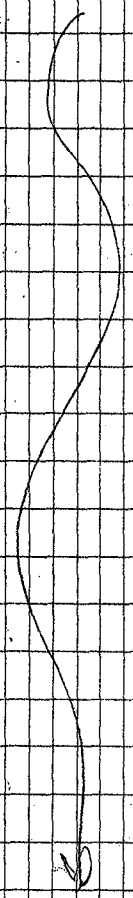
146	1292.33				
145		2.53			
			5718	92.60	
			4324	91.80	
			4323	91.65	
			4320	91.15	
147	1290.58				
149		88.20			
			4319	90.54	
			4316	89.87	
149	88.17				
			4315	89.50	
			4310	88.70	
150	1287.42				
			4311	88.09	
			4307	87.10	
			4306	88.53	
151	1286.70				
152		5.78			
			4303	88.27	
			4302	87.94	



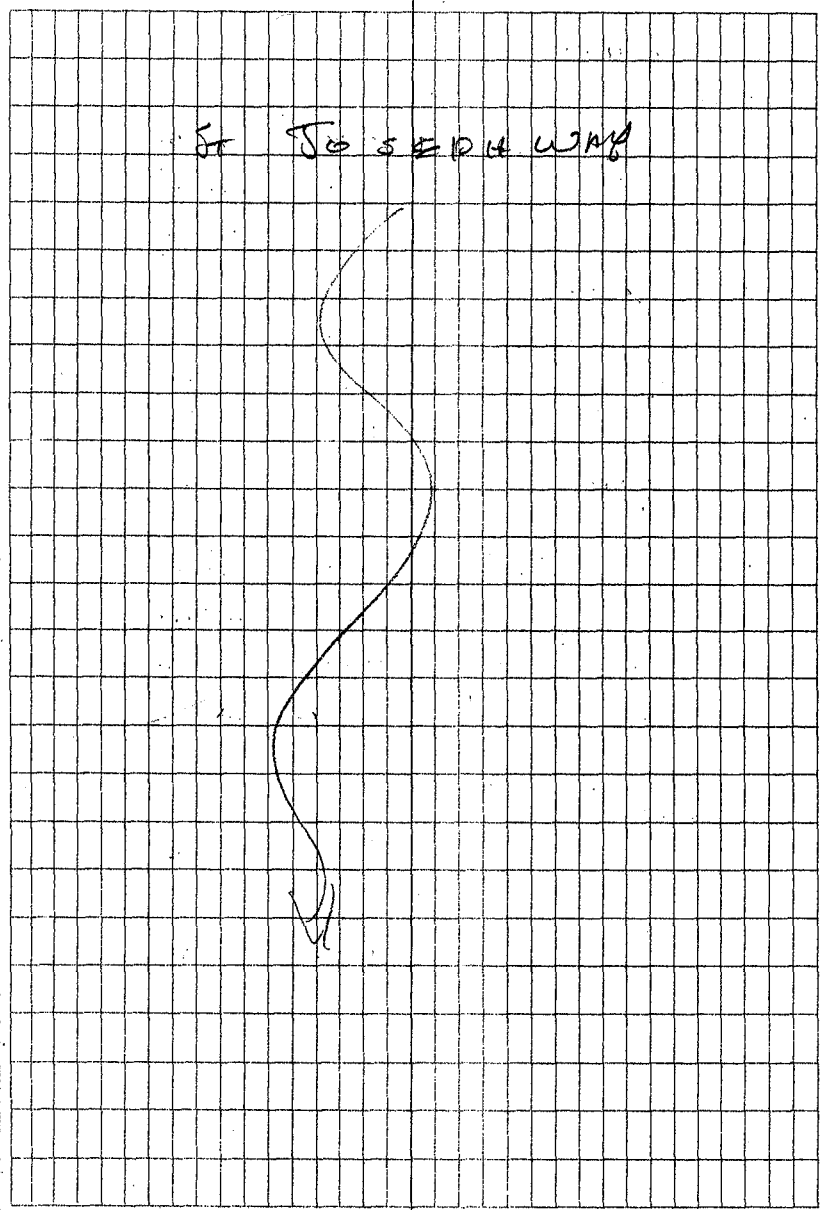
3-19-03

			House#	
152	1285.79			
154		4.12		
			4221	85.81
			4223	85.20
			4226	87.15
154	1284.09			
			4222	85.64
			4219	85.33
155	1283.13			
156		2.41	4218	84.23
155			4214	84.30
158	80.64			
			4210	83.57
			4207	83.90
157	81.42			
			4204	80.97
158	1280.64			
			4202	80.05
			4200	80.55
			4201	82.45

ST. JOSEPH WAY

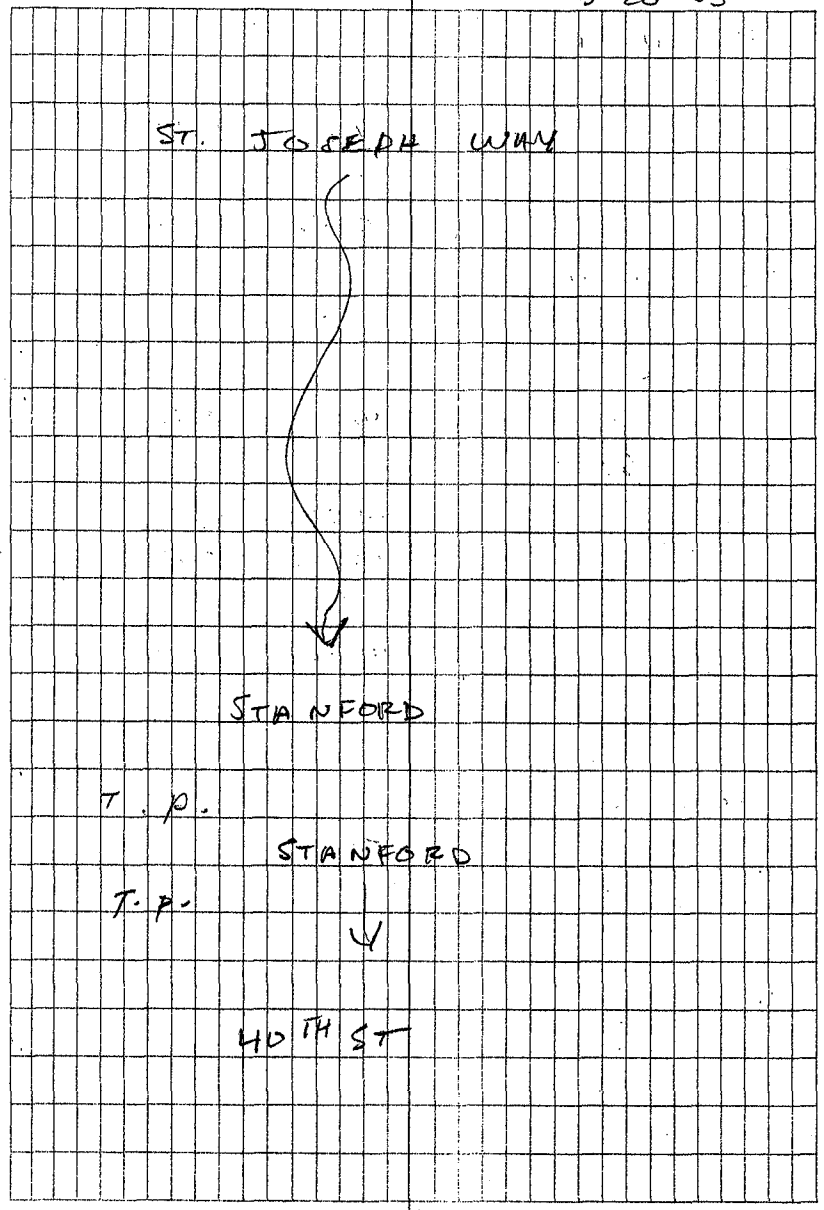


			House#	
161	1278.25			
160		9.15		
			4188	80.94
			4179	80.41
			4176	80.25
162	1277.65			
			4164	78.45
			4152	76.55
			4140	76.03
168	1274.72			
167		5.25		
			4128	75.95
			4118	75.95
			4117	75.25
			4110	74.90
170	1272.94			
			4106	74.00
			4109	73.90
			4102	72.75
			4103	72.65

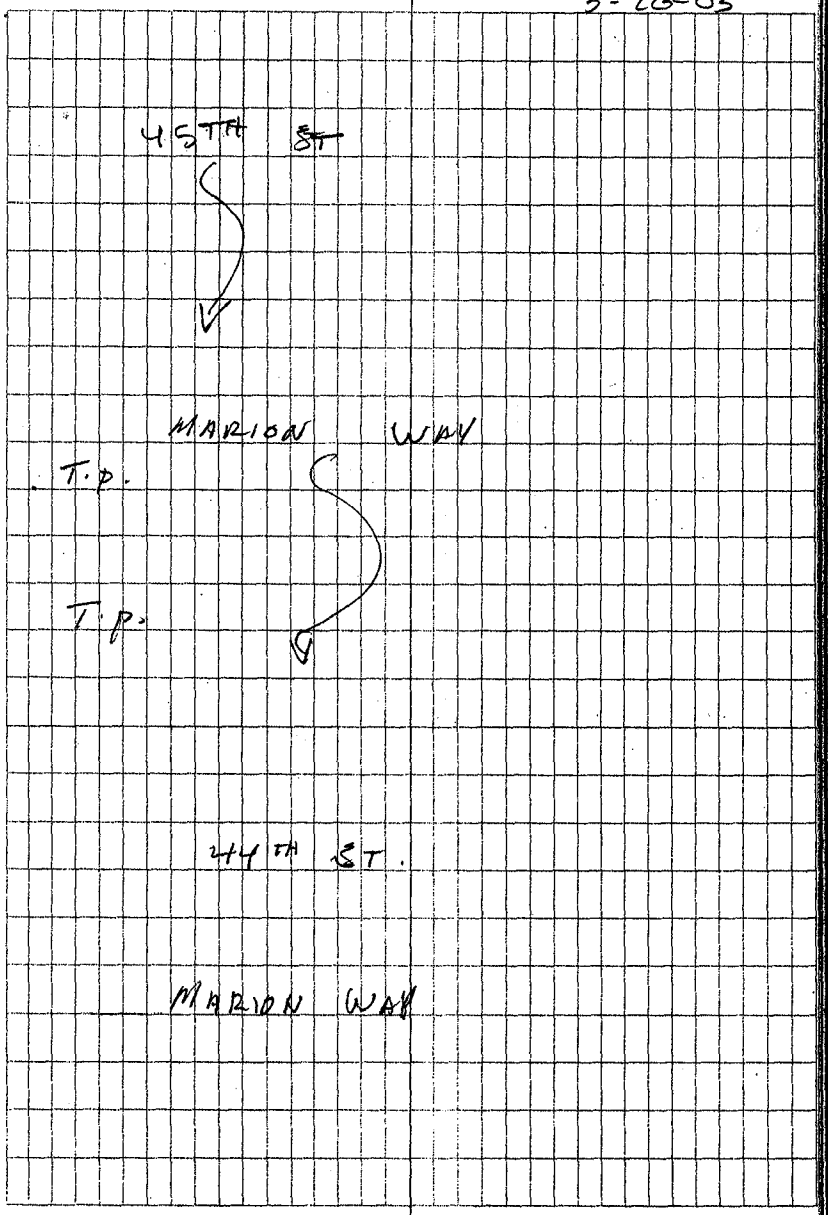


3-20-03

	Rec	CK	House #	F.F
171	1271.61			
172		70.36		
			4042	71.48
			4041	71.57
			4032	70.33
173	1269.25			
			4026	69.13
			4031	70.37
175	1267.24			
			4020	68.40
			4014	67.87
			5502	66.41
176	66.32	6.28	5510	67.08
			4022	68.35
176A	7.40			
			4030	70.08
176B	1268.59			
			4040	69.95
110	63.33			
			5501	65.10
			5509	65.65



181	1295.13			
182		6.67		
			5626	94.80
			5625	98.37
			5616	93.50
180	94.42			
			5615	97.20
179	94.26			
			4438	92.60
179 A	90.51			
			4426	90.77
			4412	90.37
179 B	1289.15			
			4402	90.10
65	89.61	9.65		
205	1291.06			
205A	92.30			
			5705	92.90
			4324	1290.35



186	1293.23				
			5801	95.90	
			5802	95.03	
			5830	94.70	
196	1293.88				
			5823	94.87	
			5815	96.86	
			5812	94.04	
			5822	94.35	
195	3.75	3.60			
190	1297.24				
			4502	97.55	
			4518	80.01	
191	1299.06				
192	0.58	0.72	5808	1301.38	
			5818	1300.35	
			4510	1300.74	
193	0.28	0.31			
191A	1308.07				
			~~5836~~		
			5540	1310.35	
			5844	1313.45	
191B	1317.04				
191C	1325.99				
191D	1325.54				

44TH PL

SOLANO DR.
45TH ST

T.P.
45TH PL
* SHOULD BE 5840
45TH PL
T.P.

191 F	1306.99			
			5850	1305.75
203	1306.43			
202		4.45		
			5930	1306.60
			5926	05.26
			5920	04.15
201	1302.88			
			5927	1304.70
			5921	1303.60
200	1301.72			
			4523	1302.27
			4519	1300.38
			4515	1301.42
200 A	1299.60		4509	1298.29
			4501	1298.85
			4441	1298.45
			4431	1297.20
200 B	1296.34			
			4411	1296.73
			4405	1296.51
			4421	1295.55

46TH ST.

45TH PL

45TH PL.

* TAKES PLACE OF 5901

~~TP.~~

PALO VERDE

3-20-03

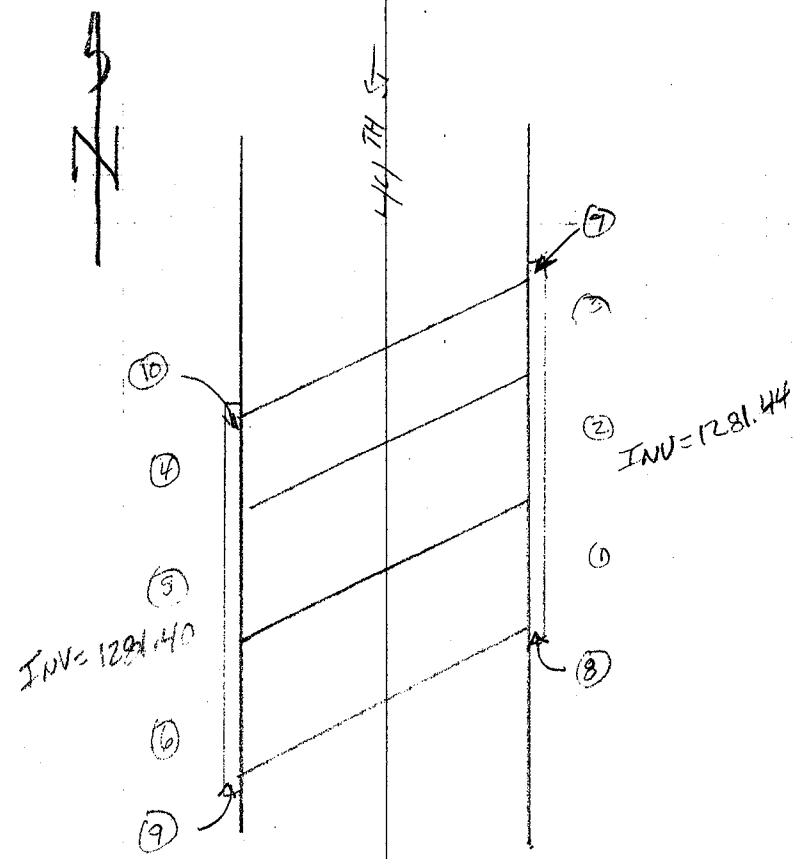
198	1305.94			
			4605	1307.45
			4601	1307.35
			4602	1307.50
			4606	1307.47
199	1302.53		4611	1309.80
			4614	1309.58
197	1300.46		4622	1313.50

Palo Verde Dr

\# 4609 on map.

Lele				1290.14	
	5.58	1295.72			
1 INV			14.30	1281.42	Avg.
2			14.28	81.44	.44
3			14.27	81.45	
4			14.35	81.37	Avg.
5			14.28	81.44	.40
6			14.33	81.39	
Top HdWL					
7			5.22	1290.50	
8			5.36	90.36	
9			4.28	91.44	
10			4.15	91.57	
ZID			4.55	91.17	✓

Triple Box Culvert
6'H X 10 W



21 / 340

3-31-03
SUNNY 79°

Rob D.
Gary M.
Bryan B

	GPS	FILES	2079-033103 R&B		
	CS45	AZCENTRAL			
BASE @	N18		ANT	1.150	4.76
OKC	N474		IN	0.03	
			RT	0.025	
			FIL	0.10	
	X - SECTIONS				
331 -	365				

BC/HH @ 44TH ST & McDONALD

BC ON S.W. CORNER OF BRIDGE 44TH ST & ELDO CANYON WASH.

71		PK/SHINER		
	(m) grid	N	918114.492	
		E	680030.095	
		OHT	1306.439	
	grnd		918261.3[illegible]	
			680138.90	
			1306.44	
66	grnd		917321.89	
			677860.44	
			1290.14	
68 (N18)	grnd		917259.576	
			678[illegible].15	
			1310.22	
69 (N474)	grnd		917257.24	
			678816.85	
			1291.46	

SET PK & SHINER C & McDONALD & ECHO CANYON WASH

23/340

03-31-03

TDS X-SECTIONS
FILE : 033103T.CRS
CTL : 2079C.CRS

TC	66		HI 5.09	(HI 0.010)
BSC	68	(N18)	HT: 6.37	
CKC	69	(N47)		

NOTHING SHOT

TDS Section D
File: 040103T.CRS
Control: 2079C.CRS

(366-392)

04-01-03

π Gary M
Φ Rob D
Misc. Tom B.

70-85° sunny

T@ 66 HI 5.06

FS@ 68 (N18) HT 6.37 (H: 0.05 V: -0.04)

FS@ 69 (N474) HR 4.85 (rand: 0.074 cut: 0.022)

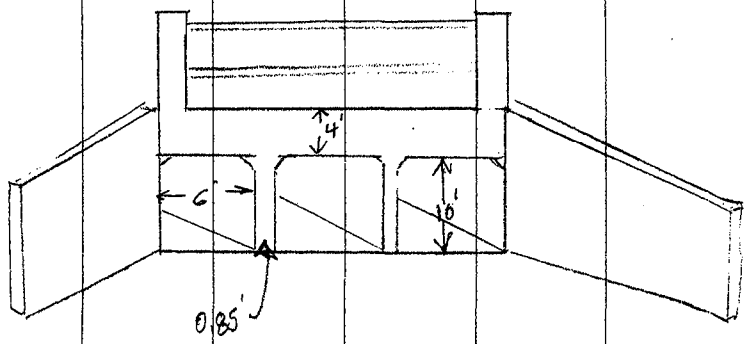
Defaut Rod HT: 4.85
#371 12.85 Rod HT
#382 4.85 " "

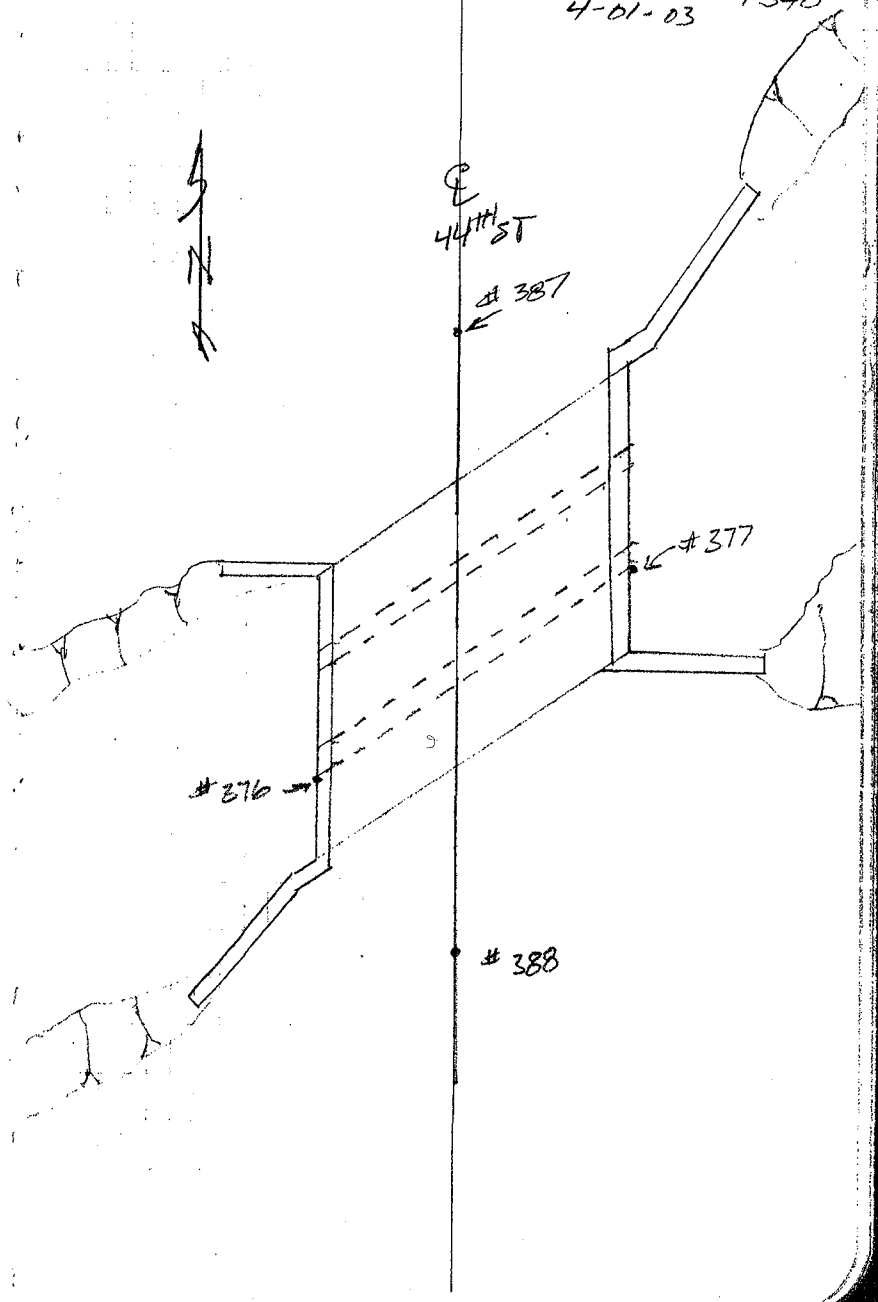
366	WL ST	Top of Wing Wall
376	ML ST	N Interior Wall
387	ML1 ST	℄ 44TH ST

Alignment of South Box

4-01-03

44TH ST & E.C.W.





4-01-03

Cont

TC 71			Hi	5.11	
BSC 68	(N18)		HT	4.73	(N: -0.016 H: -0.28)
		(393 - 427)			
403	INV	Not Center of Box			
404	MAST	E. interior wall of			
426	MAIST	Center line McDonald			

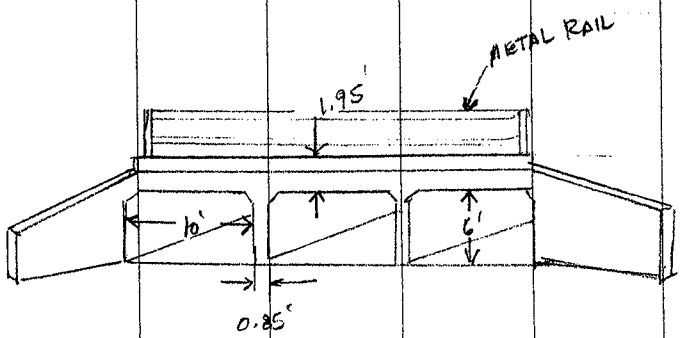
π Gary M.
φ Rob D.
Mid. Tom B

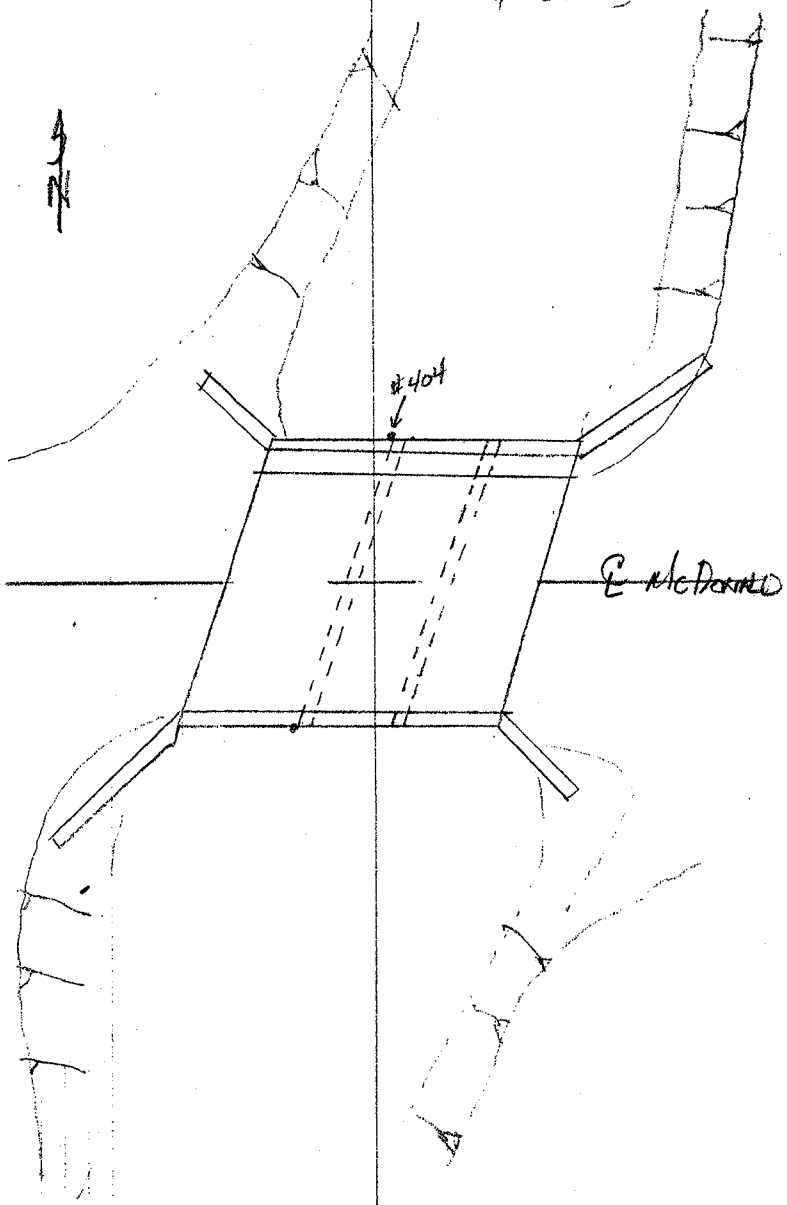
Default Rod HT 4.85
#394 5.85 Rod HT
#397 4.85 " "
#401 12.85 " "
W. Box Culvert Alignment only

#411 4.85 Rod HT
#413 3.50 " "
#414 9.85 " "
#416 8.85 " "
#418 11.85 " "
#421 4.85 " "
#423 7.85 " "
#425 13.85 " "
#426 4.85 " "

4-01-03

McDONALD DR. & E.C. (1)





5-6-03

Additional Cross sections
FILES: 2079-050603 A & B
C SYS: Az Central, NAD 83

BASE @	N 18		4.88	1.487	BC/HH AT McDowell & 44TH St
CL @	N 474		IN	0.03	
			RT	0.03	
			FL	0.02	
	(428	— 477)			
#440	Top	EL =	1271.1		
446	Top	EL	1274.3		

29/340

5-7-03

Rob D.

Gary M.

	Cont.	Additional X-Sections			
		2079-050703 B FK			
BASEG	N18		ANT-	4.50	
CKC	N474		Cant	0.01	
			Ft	0.02	
			Cut	0.08	
	(478 — 508)				

AZ02079.03 ECHO CANYON

FEMA F.F. ELEV.'s

AZTEC GPS #3 : LEICA SR530

BASE FILE = 2079-0701038

ROVER FILE = 2079-0701038R

GAF = ~~1.0006~~ N/A

EAST @ N18

ANT. HT = 1.187 (m)

3.90 (ft) 3.894 (ft)

	START	STOP
GDOP	2.8	2.7
# SAT	7/7	7/7
TIME	6:52a	12:51pm

ROVER

K474 (-0.063, -0.055, -0.04) BEST WE COULD 0.03 AVG.

C 18 (+0.109, -0.169, -0.09)

570 CR (-0.040, -0.016, +0.030)

M. WORMLEY
C. INSELMAN

7-01-03

30/340

THESE ARE 83 GRID COORDS!

TO GET TO NAD 27 GRID COORDS, SHIFT

N = 83 GRID − 47.378

E = 83 GRID − 199816.472

EL = CITY of PHOENIX VERTICAL DATUM

N18

lat 33° 31' 25.6357" N

long 111° 59' 10.8058" W

EHght 1213.209

TOGGLED

REF. 4/340 for COORDS

N 918112.678

E. 678768.582

EL. 1310.285

K474

UNDER LARGE PALO VERDE ... "GOOD CHECK"

N- 917110.504

E- 678708.258

EL- 1291.459

Ref. 5/340 for COORDS

C 18

44th St. & STANFORD

N- 915574.678

E- 678723.432

EL- 1282.018

Ref. 4/340

AZ02079.03

ECHO CANYON
FEMA ELEV'S
(Cont)

7-01-03

M. WORMLEY
C INSELMAN

31/340

STORE POINTS = 550 – 555

PT	CODE	DESCRIPTION
K474	BC/FL	

FOR INFORMATION OF TO REPORT DAMAGE WRITE
VERTICAL CONTROL MARK
K474
1981
THE DIRECTOR
NATIONAL GEODETIC SURVEY
WASHINGTON D.C.

PT	CODE	DESCRIPTION
C-18		MARICOPA COUNTY BC/HH
550	MON	BC/FL NO DESCRIBING FEAT. 40th ST 100± EAST ON SAN MIGUEL AVE.
570	MON	BC/FL NO DESCRIBING FEATURES 40th ST 300± E. on San Miguel

550
N - 916506.063
E - 676221.373
EL - 1267.601

570
N - 916475.057
E - 676497.847
EL - 1271.201

NAD 83 GRID

A20207 9.03 ECHO CANYON FEMA ELEVS

7-01-03

M. WORMLEY
C. INSELMAN

32/340

E. SAN MIGUEL

ADDRESS	GPS Recorded PT	ELEV.	DESCRIPTION
4002 SAN JUAN AVE (4004 ST.)	556	1267.87	HIGH GRND
	557	1266.25	LOW GRND
(558 Bldg) >		1267.50	FINISH FLOOR
4004 E. SAN MIGUEL	559	1272.85	H.G.
	560	1267.56	L.G.
(560)		1269.67	F.F.
4007	562	1268.40	H.G.
	563	1267.13	L.G.
(550)		1268.44	F.F.
4010	564	1272.03	H.G.
	565	1267.54	L.G.
(550)		1269.92	F.F.
4016	566	1270.72	H.G.
	567	1267.68	L.G.
(550)		1270.34	F.F.

STORE POINTS = 556 – 574

* NOTE • PROPERTY 4002 HAS BEAUTY MOUND IN BACKYARD @ a HIGHER ELEV. THAN "556" – ACCESS NOT PERMITTED @ THIS TIME, NO ONE HOME!

A020279.03 ECHO CANYON FEMA ELEV (cont)

7-01-03

M. WORMLEY
C. INSELMAN

EL SAN MIGUEL

ADDRESS	PT	ELEV	DESCRIPTION
4019	568	1270.81	H.G.
	569	1268.35	L.G.
570		1269.64	F.F.
* 4024	571	1272.57	H.G.
	572	1268.20	L.G.
	(SEE 336/340) *	1271.54	F.F.
✓ 4034	573	1273.81	H.G.
	574	1269.76	L.G.
570		1272.355	F.F.
		(1272.3 Record	F.F.)

A20207 9.03

ECHO CANYON
LEVEL LOOP TO
LOWEST F.F.

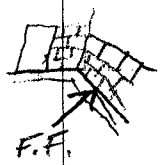
7-01-03

M. WORMLEY
C. INSELMAN

31/340

558 = 1266.239
561 = 1267.324
550 = 1267.601
570 = 1271.201

PT	BS +	HI	FS -	ELEV	DESCRIPTION
558				Record 1266.239	
	5.467				
		1271.706			
4002			4.205	1267.501	- FINISH FLOOR HOME 4002 N. 40th ST., COULD NOT GET TO DOOR WAY, BUT FOLLOWED CONC. FOUNDATION OUT TO WHERE WE COULD SHOT.
	4.433				
		1271.934			
558			5.694	1266.240	
				Σ = +0.001	
550				Record 1267.601	
	4.746				
		1272.347			
4007			3.912	1268.435	- FINISH FLOOR ELEV. HOME 4007 E. SAN MIGUEL
4004			2.675	1269.672	
	2.269				
		1271.941			
550			4.337	1267.604	
				Σ = +0.003	



A202079.03

ECHO CANYON
LEVEL LOOP
(cont)

7-01-03

M. WORMLEY
C. INSELMAN

35/340

PT	BS+	HI	FS-	ELEV.	DESCRIPTION
550				1267.601 (Record)	
	5.613				
		1273.214			
4010			3.291	1269.923	- FINISH FLOOR ELEVATION HOME 4010
	3.070				
		1272.993			
550			5.391	1267.602	
				Σ = +0.001	
550				(Record) 1267.601	
	7.235				
		1274.836			
4016			4.493	1270.343	HOME 4016 - FINISH FLOOR ELEVATION, COULD NOT GET TO DOOR, FOLLOWED CONC. FOUNDATION TO WHERE WE COULD SHOOT IT.
4019			5.198	1269.638	
570			3.657	1271.179	(Record 1271.201) -0.022
	1.513				
		1272.692			
550			5.081	1267.611	
				Σ = +0.010	

A202079.03 ECHO CANYON 7-01-03 M. WORMLEY C. INSELMAN 36/340

LEVEL LOOP (cont)

PT	BS+	HI	FS-	ELEV		DESCRIPTION
570				1271.201		
	4.629					
		1275.830				
4024			3.281	1272.54		- FINISH FLOOR ELEV. HOME 4024 CHECK ✓ INSIDE of HOME HAS 2 LIVING ROOMS that DROP 1.0' ↓ IN ELEVATION, ONE OF THE 2 LIVING ROOMS LEADS TO THE BACK PATIO DOOR WHICH IS ALSO 1.0' ↓ LOWER!
	3.060					
		1275.609				
570			4.407	1271.202		
				Σ=+0.001		
570				1271.201		
	4.942					
		1276.143				
4034			3.788	1272.355	(Rec 1272.3)	- FINISH FLOOR ELEVATION ✓ 4034
	3.418					
		1275.773				
570			4.571	1271.202		
				Σ=+0.001		

A202079.03

ECHO CANYON
FEMA ELEVATIONS
(cont)

7-01-03

M. WORALES
C. INSELMAN

STORE POINTS = 575-582

PT	CODE	DESCRIPTION
575	MON	BC/FL "CITY of PHOENIX"
576	MON	BC/FL "CITY of PHOENIX"

576 N- 917024.875
E- 677362.745
EL- 1281.448
} NAD 83 GRID

ADDRESS	GPS RECORDED PT	ELEV	DESCRIPTION
4140	577	1283.28	HIGH GROUND
	578	1280.44	LOW GROUND
(576)		1282.35	FINISH FLOOR
4144	579	1283.71	H.G.
	580	1281.75	L.G.
(576)		1283.76	F.F
4149	581	1279.43	H.G.
	582	1284.22	L.G.
(576)		1283.28	F.F.

AZ0302 9.03 ECHO CANYON LEVEL LOOP TO LOWEST FINISH FLOOR 7-01-03 M. WORMLEY C. INSELMAN

38/340

PT	BS+	HI	FS-	ELEV	DESCRIPTION
576				1281.448	
	-5.295				
		-1286.743			
4140			-4.393	-1282.350	- FINISH FLOOR ELEVATION HOME 4140
	-4.063				
		-1286.413			
576			-4.966	-1281.447	-1.001
	-6.160				
		-1287.607			
4144			-3.850	-1283.757	- FINISH FLOOR ELEVATION HOME. 4144
4149			-4.330	-1283.277	- FINISH FLOOR ELEVATION HOME 4149 (SHOT ON TILE INSIDE FRONT DOOR)
	-4.085				
		-1287.362			
576			-5.918	1281.444	

Σ = -0.004

AZ0207.3 ECHO CANYON

FEMA FF ELEV'S CONT.

7-2-03

M. WORMLEY
C. INSELMAN

39/340

AZTEC GPS #3 LEICA SR530

BASE FILE 2079-070203B

ROVER FILE [illegible]

SAF: N/A

BASE @ N18

ANT. HGHT. 1.219 (m)

3.98 (ft.) 3.999 (ft.)

	START	STOP
GDOP	3.4	2.2
SATS	6 6/6	8 8/8
TIME	6:15a	10:15a

ROVER ✓

576 (+0.011, +0.007, -0.04)

570 (-0.028, -0.016, +0.001)

THESE ARE 83 GRID COORDS

TO GET NAD27 GRID COORDS, SHIFT

N: 83 GRID - 47.378

E: 83 GRID - 199816.472

EL: CITY OF PHOENIX VERT. DATUM

N18

lat 33°31 25.6357 N

long 111°59 10.8058" W

Height. 1213.209

TOGGLED

N. 918112.678

E. 678768.582

EL. 1310.285

REF. 4/340 FOR COORDS

576 - Ref 37/340

570 - Ref. 31/340

AZ020079.03 ECHO CANYON
SHOOT MONUMENTS

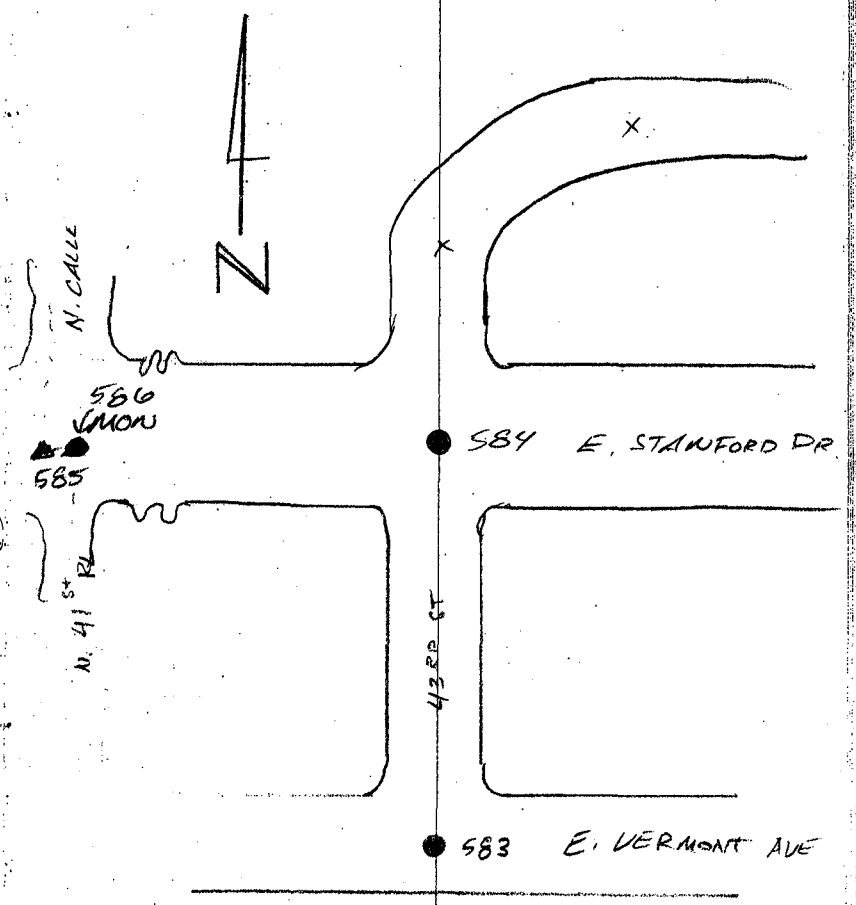
7-02-03

M. WORMLEY
C. INSELMAN

40/340

PT	CODE	DESCRIPTION
583	MON	- BC/FL "CITY of PHOENIX"
584	MON	- 3/4" OPEN TOP PIPE NO DESCRIBING FEAT. 0.2' ↓ BELOW ASPHALT
585	PK	- PK NAIL w/NO DESCRIBE FEAT. @ 41st PL & E. STANFORD DR. N. CALLE DEL SANTO WAY (I BELIEVE IT REFERENCES a PIN)
586	MON	- 3/4" OPEN TOP PIPE NO DESCRIBING FEAT. 0.6' ↓ BELOW ASPHALT
587	BM	=1283.781
604	BM	=1292.787

STORE POINTS = 583 — 586



A020279.03

ECHO CANYON
FEMA ELEVATIONS

7-02-03

M. WORMLEY
C. INSELMAN

41/340

ADDRESS	PT	ELEV.	DESCRIPTION
5825 N. 42nd ST.	588	1286.24	HIGH GROUND
: SAN MIGUEL	589	1283.81	LOW GROUND
587		1285.54	FINISH FLOOR
E. SAN MIGUEL			
4205	590	1285.34	H.G.
	591	1282.15	L.G.
587		1283.51	F.F.
4208	592	1286.78	H.G.
	593	1282.75	LG.
587		1286.40	FF.
4212	594	1287.01	HG.
	595	1282.51	LG.
587		1285.66	F.F.

A202079.02

ECHO CANYON
FEMA ELEVS. (cont)

7-02-03

M. WORMLEY
C. INSELMAN

ADDRESS	PT	ELEV	DESCRIPTION
4301	596	1286.05	H.G.
E. SAN. MIGUEL	597	1280.45	L.G.
587		1285.80	F.F.
E. SAN MIGUEL			
4306	598	1288.04	H.G.
587	599	1284.31	L.G.
		1287.82	F.F.
4309	600	1287.85	H.G.
	601	1283.93	L.G.
587		1286.01	F.F.
4314	602	1288.28	H.G.
	603	1286.69	L.G.
587		1288.82	F.F.
4364	605	1295.53	H.G.
	606	1291.59	L.G.
600		1293.71	F.F.

A2020A.03 ECHO CANYON

LEVEL LOOP to LOW F.F.

7-02-03

M. WORMLEY
C. INGELMAN

43/340

PT	BS+	HT	FS-	ELEV	DESCRIPTION
587				1283.781	MARKER [X] @ B.O.C.
	-4.115				
		-1287.896			
4212			-2.240	-1285.656	- FINISH FLOOR ELEVATION HOME 4212 E. SAN MIGUEL
~~4301~~			-2.092	1285.804	
	-2.178				
		-1287.982			
587 ✓			-4.201	-1283.781	
				Σ = 0.000	
587				1283.781	
	-4.404				
		-1288.185			
4205			-4.675	-1283.510	- FINISH FLOOR @ OVERHANG DOORWAY EAT.
4208			-1.789	-1286.396	
	-1.983				
		-1288.379			
587 ✓			-4.595	-1283.784	
				Σ = +0.003	

A202079.03 ECHO CANYON LEVEL LOOP (cont) 7-02-03 M. WORMLEY C. INSELMAN

PT	BS+	HI	FS-	ELEV	DESCRIPTION
587				1283.781	
	5.710				
		1289.491			
5825			3.950	1285.541	FINISH FLOOR ELEV, SHOT ON TOP of TILE OUTSIDE. HOME 5825 N. 42ND ST.
	3.652				
		1289.193			
587			5.410	1283.783	
				Σ = +0.002	
587				1283.781	
	7.904				
		1291.685			
4306			3.863	1287.822	FINISH FLOOR ELEV. SHOT @ TOP of CONC. PAD UNDER OVERHANG DUE TO NO ACCESS TO DOOR HOME 4306
4309			5.674	1286.011	
	5.370				
		1291.381			
587			7.604	1283.777	FINISH FLOOR ELEV. SHOT @ CONC. PAD @ FRONT DOOR NEXT TO DOOR.
				Σ = -0.004	

A202079.03 ECHO CANYON LEVEL LOOP (cont) 7-02-03 M. GORMEY C. INSELMAN

PT	BS+	HI	FS-	ELEV	DESCRIPTION
587				1283.781	
	-8.143				
		1291.924			
			-3.102	1288.822	- FINISH FLOOR ELEV. HOME E. SAN MIGUEL 4314
4314					
	-3.384				
		1292.206			
			-8.420	1283.786	
587				Σ = +0.005	
604				1292.787	
	-5.844				
		1298.631			
			-4.917	1293.714	- FINISH FLOOR ELEV. HOME. E. SAN. MIGUEL 4364
4364					
	-4.582				
		1298.296			
			-5.509	1292.787	
604				Σ = 0.000	

APPENDIX D

DUPLICATE EFFECTIVE MODEL OUTPUT

==========
BOSS RMS for AutoCAD (tm)
==========

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Version : 2000

PROGRAM ORIGIN :

BOSS RMS for AutoCAD HEC-2 Analysis uses the standard 4.6.2 version of the U.S. Army Corps of Engineers Hydrologic Engineering Center HEC-2 Program for water-surface profile computations. This HEC-2 program was released on September 1990, last updated on August 1991.

DISCLAIMER :

BOSS RMS for AutoCAD is a complex program which requires engineering expertise to use correctly. BOSS International assumes absolutely no responsibility for the correct use of this program. All results obtained should be carefully examined by an experienced professional engineer to determine if they are reasonable and accurate.

Although BOSS International has endeavored to make BOSS RMS for AutoCAD error free, the program is not and cannot be certified as infallible. Therefore, BOSS International makes no warranty, either implicit or explicit, as to the correct performance or accuracy of this software.

In no event shall BOSS International be liable to anyone for special, collateral, incidental, or consequential damages in connection with or arising out of purchase or use of this software. Thesole and exclusive liability to BOSS International, regardless of the form of action, shall not exceed the purchase price of this software.

PROJECT DESCRIPTION :

PROJECT TITLE : ECHO CANYON LOMR
PROJECT NUMBER : AZ02079
DESCRIPTION : DUPLICATE EFFECTIVE MODEL
ENGINEER : LARRY SIBALA, P.E.
DATE OF RUN : 12/04/2003
TIME OF RUN : 2:28 pm

```
T1      AZ02079
T2      ECHO CANYON LOMR
T3      DUPLICATE EFFECTIVE MODEL
T4      MA08100H.HC2 MODEL RECEIVED FROM FEMA AS THE EFFECTIVE MODEL.
T4      DATA FOR SECTIONS U.S. OF .71 ARE NON EXISTANT
```

JOB PARAMETERS :

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		2						6600	46.9	
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1		-1				-1	-6		

USER-DEFINED SUMMARY TABLES (J3) :

```
     1       34       27       28       31       32       33                150
   200
```

REQUESTED CROSS-SECTION PRINTOUTS (J5) :

```
   -10      -10

NC    0.035    0.035    0.035      0.1      0.3
ET                      7.1                                  8.41     248.85
X1        0        5        0      264
GR       50        0       43       19     42.9      119       43        222     49.1      264

ET                      7.1                                  4.2     278.06
X1    0.003        6        0      282       20       24       18
GR     50.2        0     37.5       22     36.6      119     37.3        224     37.2      244
GR       49      282

NC     0.03     0.03     0.03      0.1      0.3
ET                      7.1                                 31.63      349.9
X1    0.026        5        0      364      177       68      118
GR       55        0     36.6       81       37      210     37.2        315     52.1      364

ET                      7.1                                 18.92     399.92
X1    0.049        6        0      429      130      150      125
GR     52.5        0       36       67       37       80     37.1        209       37      340
GR     53.1      429
```

ET			7.1				9.54	435.17		
X1	0.081	7	0	459	184	150	167			
GR	50	0	36.1	62	37	80	37.2	148	37.1	256
GR	37.1	388	53.3	459						
ET			7.1				17.09	502.04		
X1	0.117	6	0	525	248	140	191			
GR	52	0	36.1	66	37.3	91	37.1	271	37.4	455
GR	53	525								
ET			7.1				30.02	497		
X1	0.139	6	0	522	234	13	115			
GR	52.5	0	36.4	105	37.9	140	37.5	435	37.7	448
GR	53.1	522								
NH	3	0.035	52	0.03	278	0.035	343			
ET			7.1				17.32	320.16		
X1	0.172	7	0	343	263	60	174			
GR	53.3	0	37	52	36.7	71	37.3	80	37.4	186
GR	37.3	278	53.6	343						
NH	3	0.035	47	0.016	62	0.035	322			
ET			7.1				12.82	302.69		
X1	0.178	7	0	92	33	245	30			
GR	53.3	0	37.8	47	37.8	62	47.3	92	47.9	201
GR	48.9	302	53.9	322						
NC				0.3	0.5					
NH	5	0.035	48	0.016	61	0.035	87	0.03	303	0.025
NH	335									
ET			7.1				7.23	315.78		
X1	0.188	7	0	87	51	55	54			
X3	10							48.1	48.1	
GR	53.3	0	46.6	20	39.1	48	39.1	61	50.9	87
GR	48.6	303	54.3	335						
NH	5	0.035	147	0.016	160	0.035	185	0.03	400	0.035
NH	432									
ET			7.11				104.37	420.05		
SB	1.25	1.56	2.6	0	13	0.1	360	3	39.2	39.1
X1	0.19	10	100	185	10	10	10			
X2			1	48.1	51.4					
X3	10							48.1	48.1	
BT	-10	43	55	55	63	54	54	90	53.5	53.5
BT		100	53.2	53.2	120	51.4	48.1	147	51.4	48.1
BT		180	51.4	48.1	185	51.4	51.4	400	48.6	48.6
BT		432	54.3	54.3						
GR	55	43	54	63	53.5	90	53.2	100	49.2	117
GR	39.2	147	39.2	160	51.4	185	48.6	400	54.3	432
NC				0.1	0.3					
NH	6	0.035	136	0.016	150	0.035	171	0.03	383	0.035

NH	398	0.03	445							
ET			7.1				98.23	392.06		
X1	0.206	11	100	171	87	87	87			
GR	56	41	55	66	54	80	52.6	100	41.3	136
GR	41.5	150	48.1	171	48.4	272	49.1	383	55.1	398
GR	55.4	445								
NH	5	0.035	47	0.016	60	0.035	78	0.03	220	0.035
NH	267									
ET			7.1				9.52	241.35		
X1	0.238	7	0	78	173	168	168			
GR	55.2	0	43.1	47	43.5	60	48.8	78	48.4	160
GR	49.21	220	57	267						
NH	5	0.035	48	0.016	62	0.035	86	0.03	248	0.035
NH	264									
ET			7.1				10.56	252.3		
X1	0.24	7	0	86	10	12	11			
GR	57	0	43.2	48	43.3	62	51.9	86	52.6	172
GR	52.7	248	57.4	264						
NC				0.3	0.5					
NH	5	0.035	54	0.016	68	0.035	93	0.03	247	0.035
NH	276									
ET			7.1				25.94	148.37		
X1	0.246	8	0	93	34	33	32			
X3	10							52.1	52.1	
GR	57.85	0	54.66	26	43.62	54	43.6	68	53.6	93
GR	52.18	173	52.6	247	57.69	276				
NH	6	0.035	253	0.016	267	0.035	293	0.03	445	0.035
NH	471	0.03	540							
ET			7.11				205.2	372.07		
SB	1.25	1.56	2.6	0	14	0.1	329	2.5	43.6	43.6
X1	0.248	13	200	293	11	12	11			
X2			1	52.1	55.4					
X3	10							52.1	52.1	
BT	-13	70	60	60	79	59	59	185	58.9	58.9
BT		200	57.1	57.1	226	55.4	52.1	253	55.4	52.1
BT		267	55.4	52.1	287	55.4	52.1	293	55.4	55.4
BT		320	52	52	445	52.5	52.5	471	57.7	57.7
BT		540	59	59						
GR	60	70	59	79	58.9	185	57.1	200	52.1	226
GR	43.63	253	43.66	267	52.1	290	55.4	293	52	320
GR	52.5	445	57.7	471	59	540				
NC				0.1	0.3					
NH	6	0.035	58	0.016	76	0.035	95	0.03	252	0.035
NH	273	0.03	358							
ET			7.1				13.56	170.57		
X1	0.268	8	0	95	126	95	102			
GR	59.5	0	45.5	58	45.6	76	51.84	95	52.9	252

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GR     57.9       273        58       290        59       358

NC                                     0.3       0.5
NH        5     0.035        37     0.016        60     0.035        73      0.03       214     0.035
NH      242
ET                           7.11                                    21.72    155.03
X1    0.289        16         0        73       125       112       115
BT      -16         0      60.6      60.6        20      61.2      57.3        37      61.8      57.9
BT                 60      62.6      58.7        73        63      59.1        80        63      59.1
BT                 81        63      51.8      82.3        63      51.8        83        63      59.1
BT                158        63      59.1       159        63      51.9     160.3        63      51.9
BT                161        63      59.1       214      61.4      57.5       228        61      57.3
BT                242      60.6      60.6
GR     60.6         0      57.3        20      47.2        37      46.9        60      51.8        73
GR     51.8        80      51.8        81      51.8      82.3      51.8        83      51.9       158
GR     51.9       159      51.9     160.3      51.9       161      52.5       214      57.3       228
GR     60.6       242

NH        5     0.035        36     0.016        60     0.035        73      0.03       209     0.035
NH      232
ET                           7.11                                     9.15       150
X1    0.291        16         0        73        10        12        10
BT      -16         0      60.6      60.6         8     60.84      56.9        36      61.7      57.8
BT                 60      62.4      58.5        73      62.8      58.9        78     62.97     59.07
BT                 79     62.97     51.85      80.3     62.97     51.85        81     62.97     59.07
BT                157     63.01     59.11       158     63.01      51.9    159.33     63.01      51.9
BT                160     63.01     59.11       209     61.39      57.5       224     60.96      57.1
BT                232      60.5      60.5
GR     60.6         0      56.9         8     47.23        36     46.95        60      51.8        73
GR    51.85        78     51.85        79     51.85      80.3     51.85        81     51.85       157
GR     51.9       158      51.9    159.33      51.9       160      52.4       209      57.1       224
GR     60.5       232

NC                                     0.1       0.3
NH        6     0.035        36     0.016        57     0.035        67      0.03       160     0.035
NH      203      0.03       260
ET                           7.1                                     11.2    117.73
X1    0.307         7         0        67        79        80        81
GR     59.9         0        48        36        48        57     52.24        67     52.44       160
GR     58.9       203        59       260

NH        6     0.035        34     0.016        57     0.035        65      0.03       143     0.035
NH      162      0.03       206
ET                           7.1                                     10.52    109.85
X1     0.32         7         0        65        68        74        73
GR     59.8         0      48.7        34        49        57      52.1        65        52       143
GR       59       162      59.3       206

NH        2     0.035       162      0.03       210
ET                           7.1                                       35       125
X1    0.322         6         0       162         7         7         7
GR    59.82         0      48.9        33      49.1        57      49.9       137     59.04       162
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GR     59.3       210

NH        3     0.035        34     0.022       135     0.035       167
ET                           7.1                                      35       125
X1    0.336         5         0       167        62        53        73
GR     59.9         0        49        34     49.37        86      49.9       135      59.7       167

NH        4     0.035       134      0.03       233     0.035       247      0.03       260
ET                           7.1                                     135       225
X1    0.344         8       100       247        44        56        45
GR       60        60      59.5        90      58.3       100     49.54       134     49.87       233
GR     59.1       247        60       250        61       260

NC    0.035     0.035     0.035
ET                           7.1                                     200       339
X1    0.352         6       200       339        39        43        41
GR     60.4         0     58.75       200      57.4       222     56.52       263     57.67       339
GR     61.4       495

NC     0.03      0.03     0.035
ET                           7.1                                     212       352
X1    0.356        15       220       350        26        18        20
GR       62         0      61.3        57     60.83       111      60.8       160      58.3       220
GR    57.82       234     56.63       268     56.64       301     57.75       335      59.4       350
GR    61.35       388     61.17       432     61.37       485     61.44       521        62       600

NC    0.035     0.035     0.035
ET                           7.1                                     220       334
X1    0.361        14       220       334        24        30        27
GR    62.29         0     61.81        56      61.4       111     60.71       161     59.71       195
GR    58.72       220     57.68       243     57.07       267     57.57       297     59.64       334
GR    61.79       384     62.49       431     62.71       484     62.85       520

NC    0.016     0.016     0.016
ET                           7.1                                     205       320
X1     0.37        13       226       327        50        48        50
GR    62.63         0     62.04        56     61.46       109     60.96       159     60.21       173
GR    58.88       226     57.64       267     58.03       300     59.07       327     61.77       384
GR    62.47       430     62.73       483     62.83       517

NC    0.016     0.016     0.016
ET                           7.1                                     185       355
X1    0.373        12       227       335        12        14        13
GR    63.14         0     62.39        54     61.88       107     61.65       157      60.5       193
GR    57.55       227     57.22       268      62.8       288     63.22       335     63.33       382
GR    63.94       430     64.05       483

NC      0.1       0.1      0.04
QT        2      5900      5900
ET                           7.1                                     793       923
X1     0.46        10       840       915       440       400       420
GR       66       200        64       580        63       650        62       840        61       860
```

GR	60.3	870	61	900	62	915	64	1000	66	1100
NC	0.16	0.16	0.05							
ET			7.1				1922	1995		
X1	0.51	14	1922	1995	650	450	550			
GR	80	1000	70	1810	68	1870	66	1922	64	1930
GR	64	1976	66	1995	68	2105	70	2155	72	2440
GR	74	2840	76	3150	78	3380	80	3510		
ET			7.1				1635	1840		
X1	0.71	10	1700	1775	700	800	1060			
GR	80	1000	76	1660	74	1700	72	1712	70	1730
GR	72	1760	74	1775	76	1840	78	1920	80	2050
T1	AZ02079									
T2	ECHO CANYON LOMR									
T3	DUPLICATE EFFECTIVE MODEL									

JOB PARAMETERS :

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		3						6600	47.9	
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	15		-1				-1	-6		

SPECIAL NOTE :

An asterisk (*) to the left of the cross-section number indicates a special note is present in the SUMMARY OF WARNING AND STATUS MESSAGES section.

SUMMARY PRINTOUT : ECHO CANYON LOMR
DUPLICATE EFFECTIVE MODEL
AZ02079

	Computed W. S. Elevation (ft MSL) CWSEL	Index Q (0.01 * Convey.) .01K	Left Encroach. Station (ft) STENCL	Right Encroach. Station (ft) STENCR	Left Encroach. Elevation (ft MSL) ELENCL	Right Encroach. Elevation (ft MSL) ELENCR	Channel Slope * 1,000 K*CHSL
	46.900	876.37	0.00	0.00	0.00	0.00	0.00
	47.900	1306.34	8.41	248.85	100000.00	100000.00	0.00
*	47.776	5085.84	0.00	0.00	0.00	0.00	-350.00
*	48.412	5635.51	4.20	278.06	100000.00	100000.00	-350.00
	47.814	6620.66	0.00	0.00	0.00	0.00	0.00
	48.445	7354.20	31.63	349.90	100000.00	100000.00	0.00
	47.848	7797.87	0.00	0.00	0.00	0.00	-4.80
	48.474	8669.57	18.92	399.92	100000.00	100000.00	-4.80
	47.872	9066.73	0.00	0.00	0.00	0.00	0.60
	48.494	10052.21	9.54	435.17	100000.00	100000.00	0.60
	47.892	10524.03	0.00	0.00	0.00	0.00	0.00
	48.511	11651.71	17.09	502.04	100000.00	100000.00	0.00
	47.891	8969.44	0.00	0.00	0.00	0.00	2.61
	48.511	10003.16	30.02	497.00	100000.00	100000.00	2.61
*	47.872	5817.08	0.00	0.00	0.00	0.00	1.72
*	48.493	6306.04	17.32	320.16	100000.00	100000.00	1.72
*	49.072	1035.47	0.00	0.00	0.00	0.00	36.67
*	49.038	1023.84	12.82	302.69	100000.00	100000.00	36.67
*	50.887	1047.32	0.00	0.00	0.00	0.00	24.07
*	50.902	1042.24	7.23	315.78	100000.00	100000.00	24.07
	52.172	1414.83	0.00	0.00	0.00	0.00	10.00

	Computed W. S. Elevation (ft MSL) CWSEL	Index Q (0.01 * Convey.) .01K	Left Encroach. Station (ft) STENCL	Right Encroach. Station (ft) STENCR	Left Encroach. Elevation (ft MSL) ELENCL	Right Encroach. Elevation (ft MSL) ELENCR	Channel Slope * 1,000 K*CHSL
	52.217	1380.62	104.37	420.05	100000.00	100000.00	10.00
*	52.723	2096.02	0.00	0.00	0.00	0.00	24.14
*	52.719	2093.08	98.23	392.06	100000.00	100000.00	24.14
*	52.749	1400.04	0.00	0.00	0.00	0.00	10.71
*	52.752	1386.45	9.52	241.35	100000.00	100000.00	10.71
*	53.996	984.08	0.00	0.00	0.00	0.00	9.09
*	53.959	971.12	10.56	252.30	100000.00	100000.00	9.09
*	54.667	1004.10	0.00	0.00	0.00	0.00	12.50
*	54.816	801.32	25.94	148.37	100000.00	100000.00	12.50
*	56.090	1709.70	0.00	0.00	0.00	0.00	2.73
*	57.065	1655.17	205.20	372.07	100000.00	100000.00	2.73
	56.230	1728.62	0.00	0.00	0.00	0.00	18.33
	57.194	1698.55	13.56	170.57	100000.00	100000.00	18.33
	56.281	1488.75	0.00	0.00	0.00	0.00	12.17
	57.228	1429.71	21.72	155.03	100000.00	100000.00	12.17
	56.500	1632.46	0.00	0.00	0.00	0.00	5.00
	57.457	1581.34	9.15	150.00	100000.00	100000.00	5.00
*	56.196	1020.96	0.00	0.00	0.00	0.00	12.96
*	56.956	929.85	11.20	117.73	100000.00	100000.00	12.96
	56.366	970.26	0.00	0.00	0.00	0.00	9.59
	57.226	914.92	10.52	109.85	100000.00	100000.00	9.59
*	57.405	1535.07	0.00	0.00	0.00	0.00	28.57
*	58.328	1315.90	35.00	125.00	100000.00	100000.00	28.57
	57.516	2004.81	0.00	0.00	0.00	0.00	1.37
*	58.462	2135.26	35.00	125.00	100000.00	100000.00	1.37
	57.488	1530.46	0.00	0.00	0.00	0.00	12.00
*	58.469	1478.05	135.00	225.00	100000.00	100000.00	12.00
*	60.789	727.46	0.00	0.00	0.00	0.00	170.24
*	61.313	602.52	200.00	339.00	100000.00	100000.00	170.24

	Computed W. S. Elevation (ft MSL) CWSEL	Index Q (0.01 * Convey.) .01K	Left Encroach. Station (ft) STENCL	Right Encroach. Station (ft) STENCR	Left Encroach. Elevation (ft MSL) ELENCL	Right Encroach. Elevation (ft MSL) ELENCR	Channel Slope * 1,000 K*CHSL
*	61.812	892.48	0.00	0.00	0.00	0.00	5.50
	61.894	725.62	212.00	352.00	100000.00	100000.00	5.50
*	62.370	808.39	0.00	0.00	0.00	0.00	16.30
*	62.606	609.17	220.00	334.00	100000.00	100000.00	16.30
*	62.707	1901.34	0.00	0.00	0.00	0.00	11.40
*	63.026	1359.29	205.00	320.00	100000.00	100000.00	11.40
*	63.445	1399.22	0.00	0.00	0.00	0.00	-32.31
*	64.038	1412.00	185.00	355.00	100000.00	100000.00	-32.31
*	65.527	644.55	0.00	0.00	0.00	0.00	7.33
*	66.057	482.43	793.00	923.00	100000.00	100000.00	7.33
	70.435	573.76	0.00	0.00	0.00	0.00	6.73
*	72.839	679.05	1922.00	1995.00	100000.00	100000.00	6.73
	78.722	744.93	0.00	0.00	0.00	0.00	5.66
	79.649	841.12	1635.00	1840.00	100000.00	100000.00	5.66

SUMMARY PRINTOUT TABLE 150 : ECHO CANYON LOMR
---------- DUPLICATE EFFECTIVE MODEL
AZ02079

	Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Top of Roadway Elevation (ft MSL) ELTRD	Max. Low Chord Elevation (ft MSL) ELLC	Minimum C. S. Elevation (ft MSL) ELMIN	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	Critical W. S. Elevation (ft MSL) CRIWS	Energy Gradient Elevation (ft MSL) EG	Energy Gradient Slope * 10,000 10K*S	Channel Mean Flow Velocity (ft/s) VCH	Cross-Section Area (sq ft) AREA	Index Q (0.01 * Convey.) .01K
	0.000	0.00	0.00	0.00	42.90	6600.00	46.90	46.06	47.78	56.72	7.54	874.85	876.37
	0.000	0.00	0.00	0.00	42.90	6600.00	47.90	46.06	48.44	25.53	5.92	1115.29	1306.34
*	0.003	18.00	0.00	0.00	36.60	6600.00	47.78	40.00	47.87	1.68	2.48	2659.42	5085.84
*	0.003	18.00	0.00	0.00	36.60	6600.00	48.41	40.01	48.50	1.37	2.33	2833.48	5635.51
	0.026	118.00	0.00	0.00	36.60	6600.00	47.81	39.79	47.89	0.99	2.19	3007.75	6620.66
	0.026	118.00	0.00	0.00	36.60	6600.00	48.44	39.78	48.51	0.81	2.06	3208.51	7354.20

	Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Top of Roadway Elevation (ft MSL) ELTRD	Max. Low Chord Elevation (ft MSL) ELLC	Minimum C. S. Elevation (ft MSL) ELMIN	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	Critical W. S. Elevation (ft MSL) CRIWS	Energy Gradient Elevation (ft MSL) EG	Energy Gradient Slope * 10,000 10K*S	Channel Mean Flow Velocity (ft/s) VCH	Cross-Section Area (sq ft) AREA	Index Q (0.01 * Convey.) .01K
	0.049	125.00	0.00	0.00	36.00	6600.00	47.85	39.56	47.90	0.72	1.85	3562.12	7797.87
	0.049	125.00	0.00	0.00	36.00	6600.00	48.47	39.56	48.52	0.58	1.74	3800.92	8669.57
	0.081	167.00	0.00	0.00	36.10	6600.00	47.87	39.36	47.91	0.53	1.62	4075.29	9066.73
	0.081	167.00	0.00	0.00	36.10	6600.00	48.49	39.35	48.53	0.43	1.52	4340.59	10052.21
	0.117	191.00	0.00	0.00	36.10	6600.00	47.89	39.21	47.92	0.39	1.41	4694.13	10524.03
	0.117	191.00	0.00	0.00	36.10	6600.00	48.51	39.23	48.54	0.32	1.32	4994.80	11651.71
	0.139	115.00	0.00	0.00	36.40	6600.00	47.89	39.80	47.93	0.54	1.57	4199.03	8969.44
	0.139	115.00	0.00	0.00	36.40	6600.00	48.51	39.81	48.54	0.44	1.47	4487.75	10003.16
*	0.172	174.00	0.00	0.00	36.70	6600.00	47.87	40.20	47.96	1.29	2.36	2801.98	5817.08
*	0.172	174.00	0.00	0.00	36.70	6600.00	48.49	40.22	48.57	1.10	2.21	2989.94	6306.04
*	0.178	30.00	0.00	0.00	37.80	6600.00	49.07	49.07	50.64	40.63	10.58	785.66	1035.47
*	0.178	30.00	0.00	0.00	37.80	6600.00	49.04	49.04	50.64	41.56	10.68	775.87	1023.84
*	0.188	54.00	0.00	0.00	39.10	6600.00	50.89	50.89	52.31	39.71	10.20	819.06	1047.32
*	0.188	54.00	0.00	0.00	39.10	6600.00	50.90	50.90	52.30	40.10	10.15	823.53	1042.24
	0.190	10.00	51.40	48.10	39.20	6600.00	52.17	0.00	52.91	21.76	7.81	1103.08	1414.83
	0.190	10.00	51.40	48.10	39.20	6600.00	52.22	0.00	52.91	22.85	7.58	1116.80	1380.62
*	0.206	87.00	0.00	0.00	41.30	6600.00	52.72	50.61	53.07	9.92	5.49	1443.02	2096.02
*	0.206	87.00	0.00	0.00	41.30	6600.00	52.72	50.62	53.07	9.94	5.49	1441.73	2093.08
*	0.238	168.00	0.00	0.00	43.10	6600.00	52.75	51.26	53.40	22.22	7.23	1037.48	1400.04
*	0.238	168.00	0.00	0.00	43.10	6600.00	52.75	51.26	53.40	22.66	7.14	1038.31	1386.45
*	0.240	11.00	0.00	0.00	43.20	6600.00	54.00	54.00	55.54	44.98	10.77	761.99	984.08
*	0.240	11.00	0.00	0.00	43.20	6600.00	53.96	53.96	55.54	46.19	10.89	753.11	971.12
*	0.246	32.00	0.00	0.00	43.60	6600.00	54.67	54.67	56.10	43.20	10.70	784.07	1004.10
*	0.246	32.00	0.00	0.00	43.60	6600.00	54.82	54.82	57.22	67.84	12.87	565.80	801.32
*	0.248	11.00	55.40	52.10	43.63	6600.00	56.09	0.00	56.59	14.90	6.37	1212.63	1709.70
*	0.248	11.00	55.40	52.10	43.63	6600.00	57.07	0.00	57.68	15.90	6.66	1069.75	1655.17
	0.268	102.00	0.00	0.00	45.50	6600.00	56.23	54.41	56.74	14.58	6.51	1202.19	1728.62
	0.268	102.00	0.00	0.00	45.50	6600.00	57.19	54.60	57.84	15.10	6.89	1037.26	1698.55
	0.289	115.00	60.60	60.60	46.90	6600.00	56.28	55.07	57.07	19.65	8.50	983.11	1488.75
	0.289	115.00	60.60	60.60	46.90	6600.00	57.23	55.38	58.22	21.31	8.86	852.31	1429.71

	Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Top of Roadway Elevation (ft MSL) ELTRD	Max. Low Chord Elevation (ft MSL) ELLC	Minimum C. S. Elevation (ft MSL) ELMIN	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	Critical W. S. Elevation (ft MSL) CRIWS	Energy Gradient Elevation (ft MSL) EG	Energy Gradient Slope * 10,000 10K*S	Channel Mean Flow Velocity (ft/s) VCH	Cross-Section Area (sq ft) AREA	Index Q (0.01 * Convey.) .01K
	0.291	10.00	60.50	60.60	46.95	6600.00	56.50	54.76	57.14	16.35	7.38	1070.95	1632.46
	0.291	10.00	60.50	60.60	46.95	6600.00	57.46	55.19	58.28	17.42	7.96	925.12	1581.34
*	0.307	81.00	0.00	0.00	48.00	6600.00	56.20	55.67	57.55	41.79	10.70	740.28	1020.96
*	0.307	81.00	0.00	0.00	48.00	6600.00	56.96	56.41	58.82	50.38	11.69	613.60	929.85
	0.320	73.00	0.00	0.00	48.70	6600.00	56.37	55.86	57.94	46.27	11.22	671.91	970.26
	0.320	73.00	0.00	0.00	48.70	6600.00	57.23	56.56	59.24	52.04	12.09	587.42	914.92
*	0.322	7.00	0.00	0.00	48.90	6600.00	57.40	54.14	58.05	18.49	6.47	1020.19	1535.07
*	0.322	7.00	0.00	0.00	48.90	6600.00	58.33	54.82	59.36	25.16	8.16	809.18	1315.90
	0.336	73.00	0.00	0.00	49.00	6600.00	57.52	54.22	58.16	10.84	6.43	1027.23	2004.81
*	0.336	73.00	0.00	0.00	49.00	6600.00	58.46	54.84	59.47	9.55	8.06	819.36	2135.26
	0.344	45.00	0.00	0.00	49.54	6600.00	57.49	54.61	58.26	18.60	7.04	937.21	1530.46
*	0.344	45.00	0.00	0.00	49.54	6600.00	58.47	55.18	59.55	19.94	8.36	789.77	1478.05
*	0.352	41.00	0.00	0.00	56.52	6600.00	60.79	60.79	61.76	82.31	9.01	943.82	727.46
*	0.352	41.00	0.00	0.00	56.52	6600.00	61.31	61.31	63.39	119.99	11.57	570.25	602.52
*	0.356	20.00	0.00	0.00	56.63	6600.00	61.81	61.81	62.75	54.69	8.55	952.65	892.48
	0.356	20.00	0.00	0.00	56.63	6600.00	61.89	61.52	63.63	82.73	10.65	628.62	725.62
*	0.361	27.00	0.00	0.00	57.07	6600.00	62.37	62.37	63.46	66.66	9.36	878.69	808.39
*	0.361	27.00	0.00	0.00	57.07	6600.00	62.61	62.61	64.98	117.38	12.37	533.45	609.17
*	0.370	50.00	0.00	0.00	57.64	6600.00	62.71	62.50	63.60	12.05	8.79	958.20	1901.34
*	0.370	50.00	0.00	0.00	57.64	6600.00	63.03	63.03	65.38	23.58	12.60	540.48	1359.29
*	0.373	13.00	0.00	0.00	57.22	6600.00	63.45	63.45	64.62	22.25	9.32	771.92	1399.22
*	0.373	13.00	0.00	0.00	57.22	6600.00	64.04	64.04	65.90	21.85	10.37	615.33	1412.00
*	0.460	420.00	0.00	0.00	60.30	5900.00	65.53	65.21	66.26	83.79	9.23	1545.39	644.55
*	0.460	420.00	0.00	0.00	60.30	5900.00	66.06	66.06	68.42	149.57	13.29	592.28	482.43
	0.510	550.00	0.00	0.00	64.00	5900.00	70.44	69.83	71.66	105.74	10.13	1179.34	573.76
*	0.510	550.00	0.00	0.00	64.00	5900.00	72.84	70.22	74.25	75.49	9.54	618.24	679.05
	0.710	1060.00	0.00	0.00	70.00	5900.00	78.72	77.73	79.60	62.73	8.58	1682.01	744.93
	0.710	1060.00	0.00	0.00	70.00	5900.00	79.65	77.42	80.54	49.20	8.26	1172.21	841.12

SUMMARY PRINTOUT TABLE 150 : ECHO CANYON LOMR
---------- DUPLICATE EFFECTIVE MODEL
AZ02079

	Cross-Section Number SECNO	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Profile (ft) DIFWSP	W.S. Elev Diff per Section (ft) DIFWSX	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Water Surface Top Width (ft) TOPWID	Channel Reach Length (ft) XLCH
	0.000	6600.00	46.90	0.00	0.00	0.00	240.44	0.00
	0.000	6600.00	47.90	1.00	0.00	1.00	240.44	0.00
*	0.003	6600.00	47.78	0.00	0.88	0.00	273.86	18.00
*	0.003	6600.00	48.41	0.64	0.51	0.64	273.86	18.00
	0.026	6600.00	47.81	0.00	0.04	0.00	318.27	118.00
	0.026	6600.00	48.44	0.63	0.03	0.63	318.27	118.00
	0.049	6600.00	47.85	0.00	0.03	0.00	381.00	125.00
	0.049	6600.00	48.47	0.63	0.03	0.63	381.00	125.00
	0.081	6600.00	47.87	0.00	0.02	0.00	425.63	167.00
	0.081	6600.00	48.49	0.62	0.02	0.62	425.63	167.00
	0.117	6600.00	47.89	0.00	0.02	0.00	484.96	191.00
	0.117	6600.00	48.51	0.62	0.02	0.62	484.95	191.00
	0.139	6600.00	47.89	0.00	0.00	0.00	466.98	115.00
	0.139	6600.00	48.51	0.62	0.00	0.62	466.98	115.00
*	0.172	6600.00	47.87	0.00	-0.02	0.00	302.84	174.00
*	0.172	6600.00	48.49	0.62	-0.02	0.62	302.84	174.00
*	0.178	6600.00	49.07	0.00	1.20	0.00	289.87	30.00
*	0.178	6600.00	49.04	-0.03	0.55	-0.03	289.63	30.00
*	0.188	6600.00	50.89	0.00	1.82	0.00	307.39	54.00
*	0.188	6600.00	50.90	0.01	1.86	0.01	308.55	54.00
	0.190	6600.00	52.17	0.00	1.28	0.00	315.74	10.00
	0.190	6600.00	52.22	0.05	1.32	0.05	315.68	10.00
*	0.206	6600.00	52.72	0.00	0.55	0.00	293.87	87.00
*	0.206	6600.00	52.72	0.00	0.50	0.00	293.80	87.00
*	0.238	6600.00	52.75	0.00	0.03	0.00	231.85	168.00

	Cross-Section Number SECNO	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Profile (ft) DIFWSP	W.S. Elev Diff per Section (ft) DIFWSX	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Water Surface Top Width (ft) TOPWID	Channel Reach Length (ft) XLCH
*	0.238	6600.00	52.75	0.00	0.03	0.00	231.83	168.00
*	0.240	6600.00	54.00	0.00	1.25	0.00	241.96	11.00
*	0.240	6600.00	53.96	-0.04	1.21	-0.04	241.71	11.00
*	0.246	6600.00	54.67	0.00	0.67	0.00	232.83	32.00
*	0.246	6600.00	54.82	0.15	0.86	0.15	122.43	32.00
*	0.248	6600.00	56.09	0.00	1.42	0.00	257.79	11.00
*	0.248	6600.00	57.07	0.98	2.25	0.98	166.87	11.00
	0.268	6600.00	56.23	0.00	0.14	0.00	252.42	102.00
	0.268	6600.00	57.19	0.96	0.13	0.96	157.01	102.00
	0.289	6600.00	56.28	0.00	0.05	0.00	203.31	115.00
	0.289	6600.00	57.23	0.95	0.03	0.95	133.31	115.00
	0.291	6600.00	56.50	0.00	0.22	0.00	212.95	10.00
	0.291	6600.00	57.46	0.96	0.23	0.96	140.85	10.00
*	0.307	6600.00	56.20	0.00	-0.30	0.00	173.81	81.00
*	0.307	6600.00	56.96	0.76	-0.50	0.76	106.53	81.00
	0.320	6600.00	56.37	0.00	0.17	0.00	144.33	73.00
	0.320	6600.00	57.23	0.86	0.27	0.86	99.33	73.00
*	0.322	6600.00	57.40	0.00	1.04	0.00	150.22	7.00
*	0.322	6600.00	58.33	0.92	1.10	0.92	90.00	7.00
	0.336	6600.00	57.52	0.00	0.11	0.00	152.43	73.00
*	0.336	6600.00	58.46	0.95	0.13	0.95	90.00	73.00
	0.344	6600.00	57.49	0.00	-0.03	0.00	141.41	45.00
*	0.344	6600.00	58.47	0.98	0.01	0.98	90.00	45.00
*	0.352	6600.00	60.79	0.00	3.30	0.00	469.46	41.00
*	0.352	6600.00	61.31	0.52	2.84	0.52	139.00	41.00
*	0.356	6600.00	61.81	0.00	1.02	0.00	558.24	20.00
	0.356	6600.00	61.89	0.08	0.58	0.08	140.00	20.00
*	0.361	6600.00	62.37	0.00	0.56	0.00	422.94	27.00
*	0.361	6600.00	62.61	0.24	0.71	0.24	114.00	27.00

	Cross-Section Number SECNO	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Profile (ft) DIFWSP	W.S. Elev Diff per Section (ft) DIFWSX	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Water Surface Top Width (ft) TOPWID	Channel Reach Length (ft) XLCH
*	0.370	6600.00	62.71	0.00	0.34	0.00	476.64	50.00
*	0.370	6600.00	63.03	0.32	0.42	0.32	115.00	50.00
*	0.373	6600.00	63.45	0.00	0.74	0.00	391.06	13.00
*	0.373	6600.00	64.04	0.59	1.01	0.59	170.00	13.00
*	0.460	5900.00	65.53	0.00	2.08	0.00	785.79	420.00
*	0.460	5900.00	66.06	0.53	2.02	0.53	130.00	420.00
	0.510	5900.00	70.44	0.00	4.91	0.00	442.79	550.00
*	0.510	5900.00	72.84	2.40	6.78	2.40	73.00	550.00
	0.710	5900.00	78.72	0.00	8.29	0.00	756.08	1060.00
	0.710	5900.00	79.65	0.93	6.81	0.93	205.00	1060.00

SUMMARY OF WARNING AND STATUS MESSAGES :

Section 0.003, profile 1, conveyance change outside acceptable range.

Section 0.003, profile 2, conveyance change outside acceptable range.

Section 0.172, profile 1, conveyance change outside acceptable range.

Section 0.172, profile 2, conveyance change outside acceptable range.

Section 0.178, profile 1, critical depth assumed.

Section 0.178, profile 1, minimum specific energy.

Section 0.178, profile 2, critical depth assumed.

Section 0.178, profile 2, minimum specific energy.

Section 0.188, profile 1, critical depth assumed.

Section 0.188, profile 1, minimum specific energy.

Section 0.188, profile 2, critical depth assumed.

Section 0.188, profile 2, minimum specific energy.

Section 0.206, profile 1, conveyance change outside acceptable range.

Section 0.206, profile 2, conveyance change outside acceptable range.

Section 0.238, profile 1, conveyance change outside acceptable range.

Section 0.238, profile 2, conveyance change outside acceptable range.

Section 0.24, profile 1, critical depth assumed.

Section 0.24, profile 1, minimum specific energy.

Section 0.24, profile 2, critical depth assumed.

Section 0.24, profile 2, minimum specific energy.

Section 0.246, profile 1, critical depth assumed.

Section 0.246, profile 1, minimum specific energy.

Section 0.246, profile 2, critical depth assumed.

Section 0.246, profile 2, minimum specific energy.

Section 0.248, profile 1, hydraulic jump downstream.

Section 0.248, profile 1, conveyance change outside acceptable range.

Section 0.248, profile 2, hydraulic jump downstream.

Section 0.248, profile 2, conveyance change outside acceptable range.

Section 0.307, profile 1, conveyance change outside acceptable range.

Section 0.307, profile 2, conveyance change outside acceptable range.

Section 0.322, profile 1, conveyance change outside acceptable range.

Section 0.322, profile 2, conveyance change outside acceptable range.

Section 0.336, profile 2, conveyance change outside acceptable range.

Section 0.344, profile 2, conveyance change outside acceptable range.

Section 0.352, profile 1, critical depth assumed.

Section 0.352, profile 1, minimum specific energy.

Section 0.352, profile 2, critical depth assumed.

Section 0.352, profile 2, minimum specific energy.

Section 0.356, profile 1, critical depth assumed.

Section 0.356, profile 1, minimum specific energy.

Section 0.361, profile 1, critical depth assumed.

Section 0.361, profile 1, minimum specific energy.

Section 0.361, profile 2, critical depth assumed.

Section 0.361, profile 2, minimum specific energy.

Section 0.37, profile 1, conveyance change outside acceptable range.

Section 0.37, profile 2, critical depth assumed.

Section 0.37, profile 2, minimum specific energy.

Section 0.373, profile 1, critical depth assumed.

Section 0.373, profile 1, minimum specific energy.

Section 0.373, profile 2, critical depth assumed.

Section 0.373, profile 2, minimum specific energy.

Section 0.46, profile 1, conveyance change outside acceptable range.

Section 0.46, profile 2, critical depth assumed.

Section 0.46, profile 2, minimum specific energy.

Section 0.51, profile 2, conveyance change outside acceptable range.

55 Warning and status message(s) generated

SUMMARY PRINTOUT TABLE 200 : ECHO CANYON LOMR
---------- DUPLICATE EFFECTIVE MODEL
AZ02079

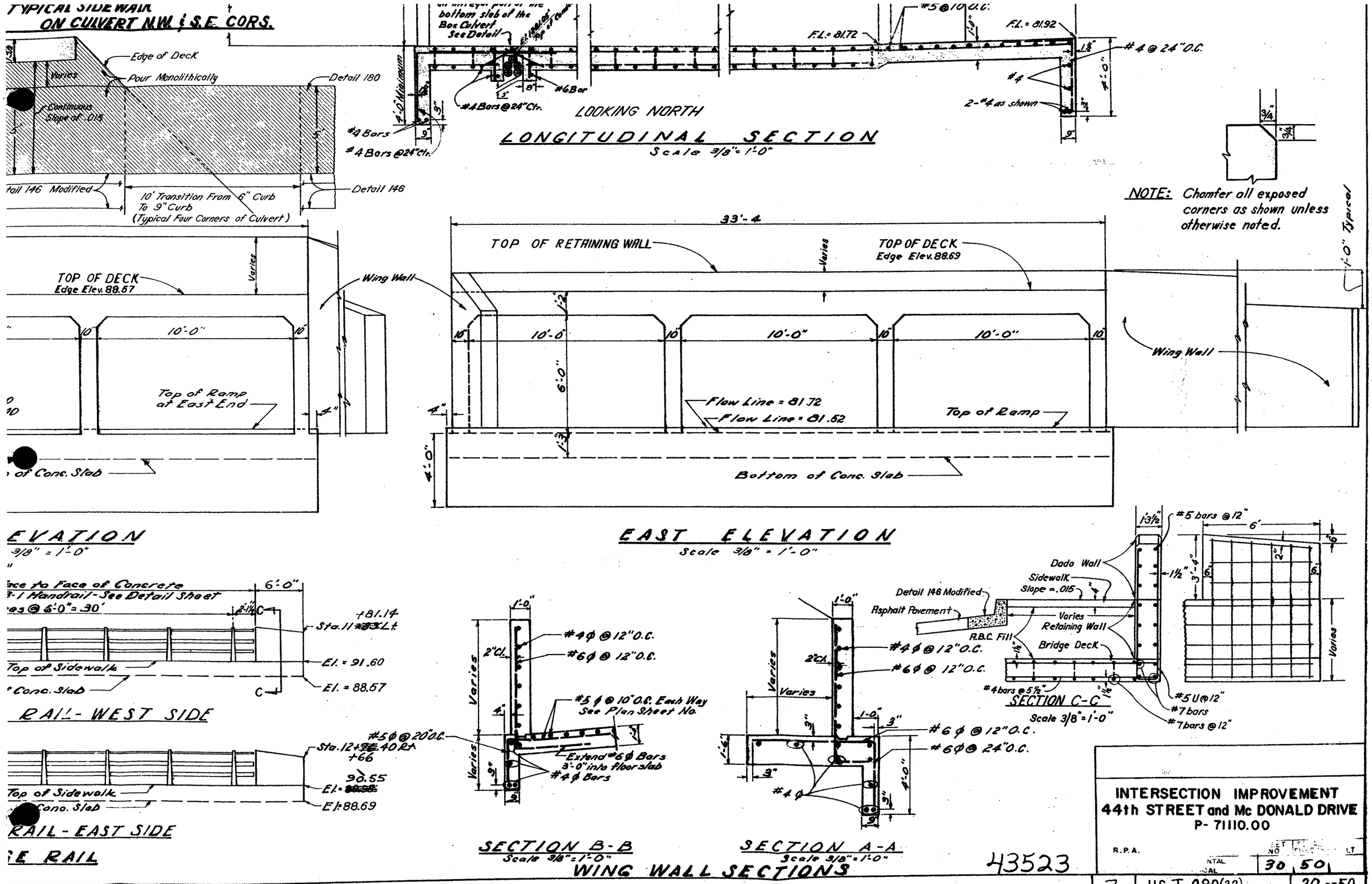
Profile Number 2

Cross-Section Number	Floodway Width (ft)	Floodway Section Area (sq ft)	Floodway Mean Velocity (ft/s)	W. S. Elevation with Floodway (ft MSL)	W. S. Elevation without Floodway (ft MSL)	W. S. Elevation Diffrence (ft)
0.000	240.	1115.	5.9	47.9	46.9	1.0
0.003	274.	2833.	2.3	48.4	47.8	0.6
0.026	318.	3209.	2.1	48.4	47.8	0.6
0.049	381.	3801.	1.7	48.4	47.8	0.6
0.081	426.	4341.	1.5	48.5	47.9	0.6
0.117	485.	4995.	1.3	48.5	47.9	0.6
0.139	467.	4488.	1.5	48.5	47.9	0.6
0.172	303.	2990.	2.2	48.5	47.9	0.6
0.178	290.	776.	8.5	49.1	49.1	0.0
0.188	309.	824.	8.0	50.9	50.9	0.0
0.190	316.	1117.	5.9	52.2	52.2	0.0
0.206	294.	1442.	4.6	52.7	52.7	0.0
0.238	232.	1038.	6.4	52.7	52.7	0.0
0.240	242.	753.	8.8	54.0	54.0	0.0
0.246	122.	566.	11.7	54.8	54.7	0.1
0.248	167.	1070.	6.2	57.1	56.1	1.0
0.268	157.	1037.	6.4	57.2	56.2	1.0
0.289	133.	852.	7.7	57.2	56.3	0.9
0.291	141.	925.	7.1	57.5	56.5	1.0
0.307	107.	614.	10.8	57.0	56.2	0.8
0.320	99.	587.	11.2	57.3	56.4	0.9
0.322	90.	809.	8.2	58.3	57.4	0.9
0.336	90.	819.	8.1	58.4	57.5	0.9
0.344	90.	790.	8.4	58.5	57.5	1.0
0.352	139.	570.	11.6	61.3	60.8	0.5
0.356	140.	629.	10.5	61.9	61.8	0.1
0.361	114.	533.	12.4	62.6	62.4	0.2
0.370	115.	540.	12.2	63.0	62.7	0.3
0.373	170.	615.	10.7	64.0	63.4	0.6
0.460	130.	592.	10.0	66.0	65.5	0.5
0.510	73.	618.	9.5	72.8	70.4	2.4
0.710	205.	1172.	5.0	79.6	78.7	0.9

END OF OUTPUT

APPENDIX E

BOX CULVERT AS-BUILTS

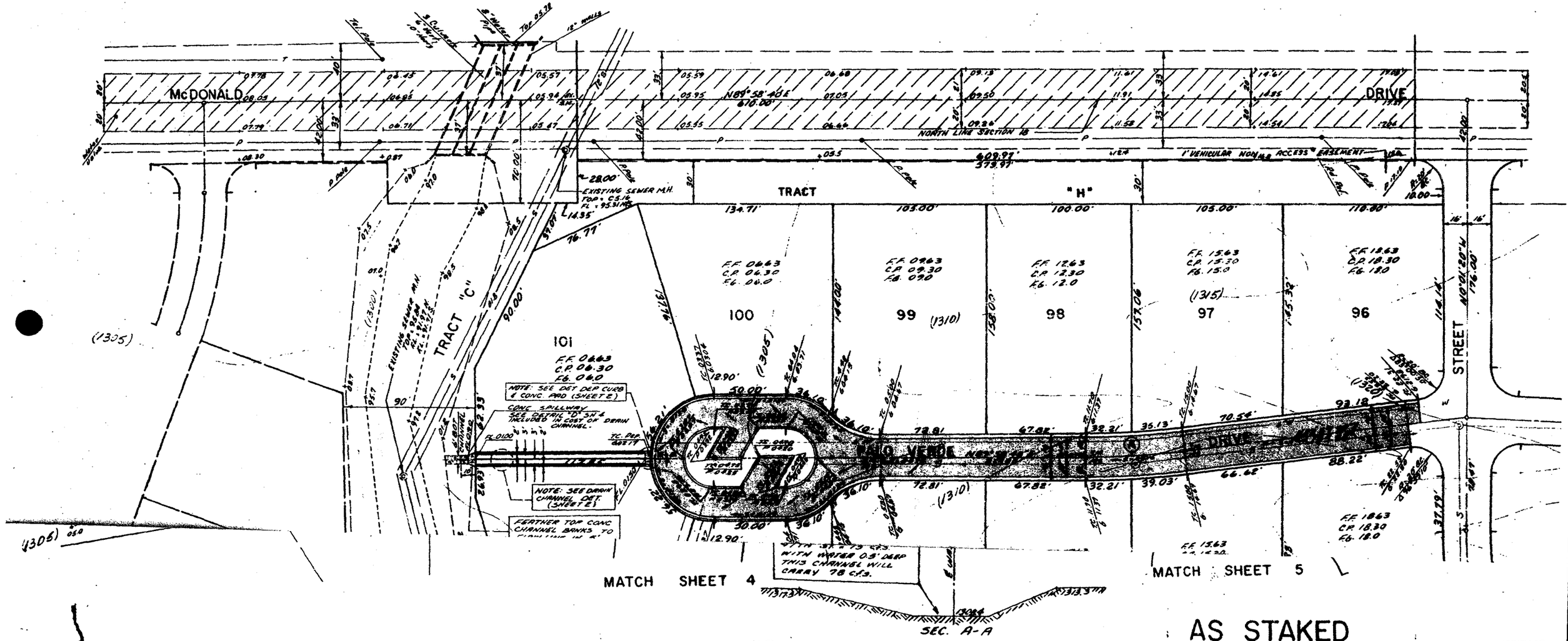


43523

INTERSECTION IMPROVEMENT
44th STREET and Mc DONALD DRIVE
P-71110.00

R.P.A.

7	US-T-980(32)	30 of 50


McDONALD DRIVE
NORTH LINE SECTION 18
1' VEHICULAR NON-ACCESS EASEMENT
TRACT "H"
EXISTING SEWER M.H.
TRACT "C"
101
100
99
98
97
96
NOTE: SEE DET DEP CURB & CONC. PAD (SHEET 2)
CONC. SPILLWAY SEE DETAIL "D" SH 4 INCLUDED IN COST OF DRAIN CHANNEL.
NOTE: SEE DRAIN CHANNEL DET. (SHEET 2)
FEATHER TOP CONC CHANNEL BANKS TO
WITH WATER 0.5' DEEP THIS CHANNEL WILL CARRY 78 c.f.s.
SEC. A-A
MATCH SHEET 4
MATCH SHEET 5
STREET
AS STAKED
HERITAGE
SHEET 7

APPENDIX F

REVISED MODEL OUTPUT

==========
BOSS RMS for AutoCAD (tm)
==========

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Version : 2000

PROGRAM ORIGIN :

BOSS RMS for AutoCAD HEC-2 Analysis uses the standard 4.6.2 version of the U.S. Army Corps of Engineers Hydrologic Engineering Center HEC-2 Program for water-surface profile computations. This HEC-2 program was released on September 1990, last updated on August 1991.

DISCLAIMER :

BOSS RMS for AutoCAD is a complex program which requires engineering expertise to use correctly. BOSS International assumes absolutely no responsibility for the correct use of this program. All results obtained should be carefully examined by an experienced professional engineer to determine if they are reasonable and accurate.

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PROJECT DESCRIPTION :

PROJECT TITLE : ECHO CANYON LOMR
PROJECT NUMBER : AZ02079
DESCRIPTION : REVISED MODEL
ENGINEER : LARRY SIBALA, P.E.
DATE OF RUN : 12/18/2003
TIME OF RUN : 2:14 pm

```
T1      AZ02079
T2      ECHO CANYON LOMR
T3      REVISED MODEL
T4      COMBINATION MODEL TO INCLUDE PREVIOUS STUDY DOWNSTREAM TO MAKE ONE
T4      CONTINUOUS RUN UPSTREAM TO ABOVE MCDONALD DRIVE
```

JOB PARAMETERS :

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		2						6600	1246.9	
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1		-1				-1	-6		

USER-DEFINED SUMMARY TABLES (J3) :

```
    150                 110                 200
```

REQUESTED CROSS-SECTION PRINTOUTS (J5) :

```
    -10       -10
```

FRICTION LOSS EQUATION OPTION (J6) :

J6	IHLEQ	ICOPY	SUBDIV	STRTDS	RMILE
	1		0		

```
NC    0.035     0.035     0.035       0.1       0.3
X1        0         5         0       264
GR     1250         0      1243        19    1242.9       119      1243       222    1249.1       264

ET                           7.1                                     4.2    278.06
X1    0.003         6         0       282        20        24        18
GR   1250.2         0    1237.5        22    1236.6       119    1237.3       224    1237.2       244
GR     1249       282

NC     0.03      0.03      0.03       0.1       0.3
ET                           7.1                                   31.63     349.9
X1    0.026         5         0       364       177        68       118
```

GR	1255	0	1236.6	81	1237	210	1237.2	315	1252.1	364
ET			7.1				18.92	399.92		
X1	0.049	6	0	429	130	150	125			
GR	1252.5	0	1236	67	1237	80	1237.1	209	1237	340
GR	1253.1	429								
ET			7.1				9.54	435.17		
X1	0.081	7	0	459	184	150	167			
GR	1250	0	1236.1	62	1237	80	1237.2	148	1237.1	256
GR	1237.1	388	1253.3	459						
ET			7.1				17.09	502.04		
X1	0.117	6	0	525	248	140	191			
GR	1252	0	1236.1	66	1237.3	91	1237.1	271	1237.4	455
GR	1253	525								
ET			7.1				30.02	497		
X1	0.139	6	0	522	234	13	115			
GR	1252.5	0	1236.4	105	1237.9	140	1237.5	435	1237.7	448
GR	1253.1	522								
NH	3	0.035	52	0.03	278	0.035	343			
ET			7.1				17.32	320.16		
X1	0.172	7	0	343	263	60	174			
GR	1253.3	0	1237	52	1236.7	71	1237.3	80	1237.4	186
GR	1237.3	278	1253.6	343						
NH	3	0.035	47	0.016	62	0.035	322			
ET			7.1				12.82	302.69		
X1	0.178	7	0	92	33	245	30			
GR	1253.3	0	1237.8	47	1237.8	62	1247.3	92	1247.9	201
GR	1248.9	302	1253.9	322						
NC				0.3	0.5					
NH	5	0.035	48	0.016	61	0.035	87	0.03	303	0.025
NH	335									
ET			7.1				7.23	315.78		
X1	0.188	7	0	87	51	55	54			
X3	10							1253.3	1250.9	
GR	1253.3	0	1246.6	20	1239.1	48	1239.1	61	1250.9	87
GR	1248.6	303	1254.3	335						
NH	5	0.035	147	0.016	160	0.035	185	0.03	400	0.035
NH	432									
ET			7.1				104.37	420.05		
SB	1.25	1.56	2.6	0	13	0.1	360	3	1239.2	1239.1
X1	0.19	10	100	185	10	10	10			
X2			1	1248.1	1251.4					
X3	10							1253.2	1251.4	
BT	-10	43	1255	1255	63	1254	1254	90	1253.5	1253.5
BT		100	1253.2	1253.2	120	1251.4	1248.1	147	1251.4	1248.1

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BT                180     1251.4     1248.1       185     1251.4     1251.4       400     1248.6     1248.6
BT                432     1254.3     1254.3
GR     1255        43       1254         63    1253.5         90     1253.2       100     1249.2        117
GR   1239.2       147     1239.2        160    1251.4        185     1248.6       400     1254.3        432

NC                                      0.1       0.3
NH        6     0.035        136      0.016       150      0.035        171      0.03        383      0.035
NH      398      0.03        445
ET                             7.1                                    98.23    392.06
X1    0.206        11        100        171        87        87         87
GR     1256        41       1255         66      1254        80     1252.6       100     1241.3        136
GR   1241.5       150     1248.1        171    1248.4       272     1249.1       383     1255.1        398
GR   1255.4       445

NH        5     0.035         47      0.016        60      0.035         78      0.03        220      0.035
NH      267
ET                             7.1                                     9.52    241.35
X1    0.238         7          0         78       173       168        168
GR   1255.2         0     1243.1         47    1243.5        60     1248.8        78     1248.4        160
GR   1249.2       220       1257        267

NH        5     0.035         48      0.016        62      0.035         86      0.03        248      0.035
NH      264
ET                             7.1                                    10.56    252.3
X1     0.24         7          0         86        10        12         11
GR     1257         0     1243.2         48    1243.3        62     1251.9        86     1252.6        172
GR   1252.7       248     1257.4        264

NC                                      0.3       0.5
NH        5     0.035         54      0.016        68      0.035         93      0.03        247      0.035
NH      276
ET                             7.1                                    25.94    148.37
X1    0.246         8          0         93        34        33         32
X3       10                                                          1252.1     1252.1
GR   1257.8         0   1254.66         26   1243.62        54     1243.6        68     1253.6         93
GR   1252.1       173    1252.6        247   1257.69       276

NH        6     0.035        253      0.016       267      0.035        293      0.03        445      0.035
NH      471      0.03        540
ET                             7.1                                   205.2    372.07
SB     1.25      1.56        2.6         0        14       0.1        329      2.5     1243.6     1243.6
X1    0.248        13        200       293        11        12         11
X2                              1    1252.1    1255.4
X3       10                                                          1252.1     1252.1
BT      -13        70       1260      1260        79      1259       1259       185     1258.9     1258.9
BT                200     1257.1    1257.1       226    1255.4     1252.1       253     1255.4     1252.1
BT                267     1255.4    1252.1       287    1255.4     1252.1       293     1255.4     1255.4
BT                320       1252      1252       445    1252.5     1252.5       471     1257.7     1257.7
BT                540       1259      1259
GR     1260        70       1259        79    1258.9       185     1257.1       200     1252.1        226
GR   1243.6       253    1243.66       267    1252.1       290     1255.4       293       1252        320
GR   1252.5       445     1257.7       471      1259       540
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NC                                  0.1       0.3
NH      6    0.035       58    0.016        76    0.035        95      0.03       252    0.035
NH    273     0.03      358
ET                       7.1                                   13.56    170.37
X1  0.268        8        0       95      126       95       102
GR 1259.5        0   1245.5       58   1245.6       76   1251.84       95    1252.9       252
GR 1257.9      273     1258      290     1259      358

NC                                  0.3       0.5
NH      5    0.035       37    0.016        60    0.035        73      0.03       214    0.035
NH    242
ET                       7.1                                   21.72    155.03
X1  0.289       16        0       73      125      112       115
BT    -16        0   1260.6   1260.6       20   1261.2    1257.3       37    1261.8    1257.9
BT               60   1262.6   1258.7       73     1263    1259.1       80      1263    1259.1
BT               81     1263   1251.8     82.3     1263    1251.8       83      1263    1259.1
BT              158     1263   1259.1      159     1263    1251.9    160.3      1263    1251.9
BT              161     1263   1259.1      214   1261.4    1257.5      228      1261    1257.3
BT              242   1260.6   1260.6
GR 1260.6        0   1257.3       20   1247.2       37    1246.9       60    1251.8       73
GR 1251.8       80   1251.8       81   1251.8     82.3    1251.8       83    1251.9      158
GR 1251.9      159   1251.9    160.3   1251.9      161    1252.5      214    1257.3      228
GR 1260.6      242

NH      5    0.035       36    0.016        60    0.035        73      0.03       209    0.035
NH    232
ET                       7.1                                    9.15      150
X1  0.291       16        0       73       10       12        10
BT    -16        0   1260.6   1260.6        8   1260.84    1256.9       36    1261.7    1257.8
BT               60   1262.4   1258.5       73   1262.8    1258.9       78   1262.97   1259.07
BT               79  1262.97  1251.85     80.3  1262.97   1251.85       81   1262.97   1259.07
BT              157  1263.01  1259.11      158  1263.01    1251.9   159.33   1263.01    1251.9
BT              160  1263.01  1259.11      209  1261.39    1257.5      224   1260.96    1257.1
BT              232   1260.5   1260.5
GR 1260.6        0   1256.9        8  1247.23       36   1246.95       60    1251.8       73
GR 1251.8       78  1251.85       79  1251.85     80.3   1251.85       81   1251.85      157
GR 1251.9      158   1251.9   159.33   1251.9      160    1252.4      209    1257.1      224
GR 1260.5      232

NC                                  0.1       0.3
NH      6    0.035       36    0.016        57    0.035        67      0.03       160    0.035
NH    203     0.03      260
ET                       7.1                                    11.2    117.73
X1  0.307        7        0       67       79       80        81
GR 1259.9        0     1248       36     1248       57   1252.24       67   1252.44       160
GR 1258.9      203     1259      260

NH      6    0.035       34    0.016        57    0.035        65      0.03       143    0.035
NH    162     0.03      206
ET                       7.1                                    10.52    109.85
X1   0.32        7        0       65       68       74        73
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GR   1259.8        0    1248.7       34     1249       57    1252.1       65     1252      143
GR     1259      162    1259.3      206

NH         2    0.035       162     0.03      210
ET                         7.1                              35      125
X1     0.322        6         0      162        7        7        7
GR   1259.8        0    1248.9       33   1249.1       57   1249.9      137  1259.04      162
GR   1259.3      210

NH         3    0.035        34    0.022      135    0.035      167
ET                         7.1                              35      125
X1     0.336        5         0      167       62       53       73
GR   1259.9        0     1249       34  1249.37       86   1249.9      135   1259.7      167

NH         4    0.035       134     0.03      233    0.035      247     0.03      260
ET                         7.1                             135      225
X1     0.344        8       100      247       44       56       45
GR     1260       60    1259.5       90   1258.3      100  1249.54      134  1249.87      233
GR   1259.1      247      1260      250     1261      260

NC     0.035    0.035    0.035
ET                         7.1                             170      339
X1     0.352        6       200      339       39       43       41
GR   1260.4        0   1258.75      200   1257.4      222  1256.52      263  1257.67      339
GR   1261.4      495

NC     0.035    0.035    0.035      0.1       0.3
ET                         7.1                            1000     1600
X1     0.356       14      1220     1350       26       20       18
GR     1262     1000    1261.3     1057  1260.83     1111   1260.8     1160   1258.3     1220
GR   1257.8     1234   1256.63     1268  1256.64     1301  1257.75     1335   1259.4     1350
GR   1261.3     1388   1261.37     1485  1261.44     1521     1262     1600

NC     0.035    0.035    0.035
ET                         7.1                          1147.45     1334
X1     0.361       11      1220     1334       24       30       27
GR   1262.3     1000    1261.4     1056  1260.71     1111  1259.71     1161  1258.72     1220
GR   1257.6     1243   1257.07     1267  1259.64     1334  1261.79     1384  1262.49     1431
GR   1262.3     1520

NC     0.016    0.016    0.016
ET                         7.1                          1155.92  1341.02
X1      0.37       14      1226     1327       50       48       50
GR   1262.6     1000   1262.04     1056  1261.46     1109  1260.96     1159  1260.21     1173
GR   1258.8     1226   1257.64     1267  1258.03     1300  1259.07     1327  1261.77     1384
GR   1262.4     1430   1262.73     1483  1262.73     1483  1262.83     1517

NC       0.1      0.1     0.04      0.1       0.3
NH         3      0.1     2190     0.04      2425    0.016     3065
QT         1     5900
ET                         7.1                             2190     2625
X1      0.45       14     2190     2625       170      540      420
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GR     1270       1000       1268       1130       1270       1500       1270       1565       1268       1760
GR     1266       1840       1266       2190       1264       2290    1263.53       2425    1265.38       2525
GR   1266.1       2625       1268       2860       1270       2980       1272       3065

NC      0.1        0.1       0.04        0.1        0.3
ET                            7.1                                     2748.79     3165.6
X1     0.49         20     2876.6     2917.5        230        210        230
GR     1280       1000       1278       1390       1276       1530       1274       1555       1272       2100
GR     1270       2225       1268       2640    1266.75     2876.6    1261.73    2891.33    1261.17     2908.7
GR   1265.2     2917.5       1268       3230       1268       3335       1268       3380       1270       3480
GR     1272       3560       1274       3660       1276       3710       1278       3840       1280       3890

NC     0.16       0.16       0.05        0.1        0.3
ET                            7.1                                        2670    2765.93
X1     0.58         19       2670       2740        470        520        450
GR     1282       1000       1280       1270       1278       1400       1276       1560       1276       1825
GR     1274       2130       1274       2240       1272       2645       1270       2670    1267.25     2680.5
GR   1262.7     2700.5    1263.25     2715.5    1266.65     2725.5       1268       2730       1270       2740
GR     1272       2900       1274       3020       1274       3490       1274       3515

NC                                       0.1        0.3
ET                            7.1                                     2407.3     2576.13
X1     0.61         18     2407.3       2470        270        150        180
GR     1284       1000       1282       1150       1280       1670       1278       2015       1276       2280
GR   1273.7     2407.3    1264.85     2417.9    1265.84     2432.1     1271.1     2463.7       1272       2470
GR     1274       2735       1276       2900       1276       3240       1276       3300       1278       3390
GR     1280       3500       1282       3550       1284       3620

NC     0.16       0.16       0.05        0.1        0.3
ET                            7.1                                        2320    2537.91
X1     0.65         25       2320       2460        210        140        200
GR     1286       1000       1284       1045       1284       1300       1284       1485       1282       1610
GR     1280       1640       1278       1885       1276       2270       1274       2320     1271.9     2352.2
GR   1270.5     2369.4    1267.85     2376.5    1267.31       2385    1269.58     2400.2       1270       2410
GR     1272       2425       1274       2460       1276       2640       1278       2950       1278       3230
GR     1280       3390       1280       3450       1280       3550       1282       3570       1284       3600

NC                                       0.1        0.3
ET                            7.1                                        2340       2448
X1     0.71         18       2340       2448        350        250        295
GR     1288       1000       1286       1295       1284       1465       1284       1590       1282       1965
GR     1280       2060       1280       2290       1278       2340       1276       2360    1275.28     2375.5
GR   1269.8     2390.5    1270.58     2405.5    1277.49       2448       1278       2520       1280       2785
GR     1280       3105       1282       3190       1284       3420

NC                                       0.1        0.3
ET                            7.1                                     2324.63     2609.46
X1     0.75         23    2537.37       2595        225        300        230
GR     1288       1000       1288       1305       1286       1410       1286       1515       1284       1570
GR     1284       2085       1282       2110       1280       2400       1278       2460    1278.32    2537.37
GR   1277.9    2545.87    1273.27    2553.45    1272.95    2570.55    1276.76    2577.77       1278       2595
GR     1280       2600       1282       2700       1282       2980       1284       3060       1286       3115
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GR     1288       3280       1290       3340       1292       3500

NC                                     0.1        0.3
ET                            7.1                                  2054.94    2761.6
X1     0.79         19       2190       2280        190        375        230
GR     1290       1000       1288       1110       1286       1335       1286       1370       1286       1560
GR     1284       1885       1282       2010       1280       2030       1280       2190    1278.32    2235.37
GR   1277.9    2243.87    1273.27    2251.45    1272.95    2268.55    1276.76    2275.77       1280       2280
GR     1282       2295       1284       3410       1284       3550       1286       3720

NC                                     0.1        0.3
ET                            7.1                                  1939.24    2146.9
X1     0.83         20       2060     2146.9        135        250        220
GR     1290       1000       1288       1070       1288       1255       1286       1545       1284       1765
GR     1282       2060    1280.01     2074.5    1275.69     2104.7    1274.89       2125    1281.48     2146.9
GR     1282       2155       1284       2185       1284       2290       1284       2395       1286       2440
GR     1288       2620       1290       2670       1292       2820       1294       2900       1296       2975

NC                                     0.1        0.3
ET                            7.1                                     2790       2920
X1     0.86         27       2790       2920        105        290        180
GR     1298       1000       1296       1110       1294       1140       1292       1165       1290       1220
GR     1290       1880       1288       1980       1286       2600       1284       2790    1282.03     2802.5
GR   1275.8     2822.5    1275.03     2847.5    1279.51     2867.5       1282       2910       1284       2920
GR     1286       2940       1288       3090       1288       3240       1286       3310       1286       3330
GR     1288       3370       1290       3530       1292       3620       1294       3640       1296       3710
GR     1298       3740       1300       3770

NC                                     0.1        0.3
ET                            7.1                                     2540       2660
X1      0.9         26       2540       2660        330        130        235
GR     1310       1000       1304       1075       1302       1095       1300       1155       1298       1235
GR     1296       1255       1294       1270       1292       1490       1290       2140       1288       2440
GR     1286       2540    1285.15     2552.7    1277.34       2570    1277.26     2581.9    1283.72       2608
GR     1284       2625       1286       2660       1288       2775       1288       3105       1288       3170
GR     1290       3260       1292       3330       1294       3455       1296       3480       1298       3482
GR     1300       3484

NC                                     0.1        0.3
ET                            7.1                                  2409.5       2510
X1     0.96         31     2409.5       2510        330        385        300
GR     1330       1000       1320       1070       1310       1170       1308       1190       1306       1275
GR     1304       1290       1302       1295       1300       1315       1298       1340       1296       1380
GR     1296       1485       1294       1605       1292       1740       1292       1785       1292       2300
GR     1290       2390    1289.88     2409.5    1278.52     2434.4    1278.65    2445.55    1287.07    2475.95
GR     1288       2490       1290       2510       1292       2720       1292       2880       1290       3010
GR     1290       3020       1292       3025       1294       3215       1296       3280       1298       3350
GR     1300       3400

NC                                     0.1        0.3
ET                            7.1                                     2183       2305
X1        1         24       2183       2305        160        160        230
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GR     1320       1000       1318       1015       1316       1030       1314       1060       1312       1080
GR     1310       1090       1308       1115       1306       1155       1304       1190       1302       1200
GR     1300       1240       1298       1350       1296       1550       1294       1655       1292       2183
GR   1290.5    2198.85    1280.94    2229.13    1282.07     2260.9     1290.7    2287.15       1292       2305
GR     1294       2820       1296       3015       1298       3055       1300       3080

NC                                       0.6        0.8
ET                            7.1                                     2228.24    2317.75
X1    1.004         26    2244.41    2317.75         55         65         40
GR     1320       1000       1318       1015       1316       1030       1314       1060       1312       1080
GR     1310       1090       1308       1115       1306       1155       1304       1190       1302       1200
GR     1300       1240       1298       1350       1296       1550       1294       1655    1290.89    2244.41
GR   1282.1    2252.04    1281.69    2265.98     1281.4       2280    1282.16    2286.38    1281.84    2310.56
GR   1291.1    2317.75       1292       2340       1294       2840       1296       2975       1298       3030
GR     1300       3060

ET                            7.1                                        2200       2440
SC    3.013        0.4        2.5        200          6         10     119.44       11.1    1281.44     1281.4
X1     1.03         25       2200       2440        100        100        118
X2                            2                  1290.14
GR     1320       1000       1318       1020       1316       1035       1314       1065       1312       1090
GR     1310       1100       1308       1120       1306       1155       1304       1180       1302       1200
GR     1300       1300       1298       1390       1296       1565       1294       1640       1294       1830
GR     1292       2200    1289.86    2243.57    1281.44    2265.41    1282.12    2311.33       1289    2331.71
GR     1292       2440       1294       2550       1296       2835       1298       2900       1300       2980

NC     0.16       0.16       0.05        0.1        0.3
ET                            7.1                                        2215    2278.14
X1     1.06         34       2215    2278.14        230        130        190
GR     1330       1000       1328       1023       1326       1055       1324       1070       1322       1090
GR     1320       1100       1318       1115       1316       1130       1314       1160       1312       1190
GR     1310       1265       1308       1280       1306       1290       1304       1310       1302       1435
GR     1300       1675       1298       1725       1296       1940       1294       2150       1292       2215
GR   1291.3    2216.36    1285.24    2223.59    1285.43    2256.41    1290.67       2265    1294.11    2278.14
GR     1296       2310       1296       2500       1296       2600       1296       2670       1298       2705
GR     1300       2790       1302       2800       1304       2840       1306       2900

NC                                       0.1        0.3
ET                            7.1                                     1891.26    2223.31
X1     1.11         33       2060    2109.52         80        270        230
GR     1330       1000       1328       1025       1326       1040       1324       1055       1322       1085
GR     1320       1155       1318       1170       1316       1180       1314       1200       1312       1210
GR     1310       1295       1308       1315       1306       1345       1304       1370       1304       1480
GR     1302       1540       1300       1720       1298       1725       1296       1885       1294       2060
GR   1293.2     2063.1    1287.07    2069.18    1287.84    2090.83    1295.17    2109.52    1295.28    2125.41
GR     1296       2275       1298       2325       1300       2420       1302       2760       1304       2815
GR     1306       2860       1308       2880       1310       2970

NC                                       0.1        0.3
ET                            7.1                                        2090       2200
X1     1.16         35       2090       2200        335        250        250
GR     1390       1000       1380       1070       1370       1105       1360       1160       1350       1185
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GR     1340       1295       1330       1378       1328       1395       1326       1408       1324       1415
GR     1320       1440       1318       1455       1316       1570       1314       1685       1312       1700
GR     1310       1705       1308       1760       1306       1770       1304       1850       1302       1920
GR     1302       1935       1300       2090    1297.87     2101.3       1289     2140.6     1288.8     2159.4
GR   1297.2     2189.5       1298       2200       1300       2368       1302       2625       1304       2784
GR     1306       2880       1308       2905       1310       2970       1312       2987       1314       3005

NC                                       0.1        0.3
ET                            7.1                              1559.54    1716.23
X1     1.21         24    1559.54    1681.96        310        235        260
GR     1330       1000       1328       1010       1326       1025       1324       1150       1322       1185
GR     1320       1200       1318       1220       1316       1235       1314       1380       1312       1395
GR     1310       1450    1308.68    1559.54    1293.44     1632.1    1291.24    1639.16    1291.15    1648.46
GR   1291.5    1660.85    1298.08    1681.96       1300       1820       1302       1890       1304       2070
GR     1306       2290       1308       2335       1310       2425       1318       2480

NC                                       0.1        0.3
ET                            7.1                              1560.56    1679.11
X1     1.24         21    1560.56    1641.73        140        105        130
GR     1330       1000       1328       1100       1326       1105       1324       1165       1322       1235
GR     1320       1315       1318       1345       1316       1365       1314       1425    1311.56    1560.56
GR   1292.6    1584.83    1291.77    1590.84    1292.04    1609.16    1298.93    1641.73       1300       1680
GR     1302       1910       1304       1935       1306       2200       1308       2270       1310       2365
GR     1314       2425

NC                                       0.1        0.3
ET                            7.1                               1406.1    1613.91
X1     1.29         20     1406.1    1478.73        265         70        240
GR     1330       1000       1328       1030       1326       1040       1324       1054       1322       1165
GR     1320       1190       1318       1202       1316       1300       1316       1330    1313.92     1406.1
GR   1292.9    1434.16    1294.73    1457.06    1295.18    1465.85    1301.24    1478.73       1302       1658
GR     1304       1880       1306       1980       1308       2120       1310       2200       1316       2265

NC                                       0.1        0.3
ET                            7.1                              1919.55    2012.64
X1     1.38         18    1919.55    2012.64        660        175        465
GR     1330       1000       1328       1060       1326       1158       1324       1245       1322       1308
GR     1320       1315       1318       1410       1316       1500       1314       1512       1312       1610
GR     1310       1700       1308       1800     1306.7    1919.55    1297.09    1965.98    1296.58    1994.02
GR   1306.4    2012.64       1308       2160       1310       2354

NC                                       0.6        0.8
QT        1       4900
ET                            7.1                               1800    2222.03
X1      1.4         24    2068.02    2111.98        110          1        110
GR     1330       1000       1326       1125       1324       1200       1322       1250       1320       1390
GR     1318       1450       1316       1475       1314       1575       1312       1640       1310       1690
GR     1308       1720       1306       1770       1304       1890       1302       2030       1302    2068.02
GR   1297.4    2078.21    1296.97     2094.8    1296.95    2101.79       1302    2111.98       1302       2120
GR     1306       2125       1308       2360       1310       2520       1312       2565

ET                            7.1                               1900     2157.4
```

SC	3.013	0.4	2.5	350	6	10	81.83	11.3	1297.72	1296.95
X1	1.41	24	2121.17	2157.4	85	90	80			
X2			2		1305.89					
GR	1330	1000	1330	1060	1328	1130	1326	1200	1324	1250
GR	1322	1320	1320	1400	1318	1450	1316	1540	1314	1610
GR	1312	1700	1310	1775	1308	1840	1306	1975	1305.8	2121.17
GR	1298.7	2122.5	1297.53	2129.7	1297.69	2138.26	1297.72	2145	1297.61	2149.9
GR	1299.1	2156.5	1305.43	2157.4	1308	2190	1310	2510		

STATUS: Friction loss equation index (IHLEQ) = 1. Therefore friction loss (HL) is calculated as a function of the profile type, which can vary from reach to reach. See documentation for further details.

T1 AZ02079
T2 ECHO CANYON LOMR
T3 REVISED MODEL

JOB PARAMETERS :

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		3						6600	1247.9	
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	15		-1				-1	-6		

STATUS: Friction loss equation index (IHLEQ) = 1. Therefore friction loss (HL) is calculated as a function of the profile type, which can vary from reach to reach. See documentation for further details.

SPECIAL NOTE :

An asterisk (*) to the left of the cross-section number indicates a special note is present in the SUMMARY OF WARNING AND STATUS MESSAGES section.

SUMMARY PRINTOUT TABLE 110 : ECHO CANYON LOMR
REVISED MODEL
AZ02079

	Cross-Section Number SECNO	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Energy Gradient Elevation (ft MSL) EG	Water Surface Top Width (ft) TOPWID	Left Overbank Flow (cfs) QLOB	Channel Flow (cfs) QCH	Right Overbank Flow (cfs) QROB	Encroach. Target Requested PERENC	Left Encroach. Station (ft) STENCL	Left Bank Station (ft) STCHL	Right Bank Station (ft) STCHR	Right Encroach. Station (ft) STENCR
	0.000	1246.90	0.00	1247.78	240.44	0.00	6600.00	0.00	0.00	0.00	0.00	264.00	0.00
	0.000	1247.90	0.00	1248.44	250.04	0.00	6600.00	0.00	0.00	0.00	0.00	264.00	0.00
*	0.003	1247.77	0.00	1247.87	273.85	0.00	6600.00	0.00	0.00	0.00	0.00	282.00	0.00
*	0.003	1248.41	0.63	1248.49	273.86	0.00	6600.00	0.00	273.86	4.20	0.00	282.00	278.06
	0.026	1247.81	0.00	1247.89	318.25	0.00	6600.00	0.00	0.00	0.00	0.00	364.00	0.00
	0.026	1248.44	0.63	1248.50	318.27	0.00	6600.00	0.00	318.27	31.63	0.00	364.00	349.90
	0.049	1247.84	0.00	1247.90	380.97	0.00	6600.00	0.00	0.00	0.00	0.00	429.00	0.00
	0.049	1248.47	0.62	1248.51	381.00	0.00	6600.00	0.00	381.00	18.92	0.00	429.00	399.92
	0.081	1247.87	0.00	1247.91	425.60	0.00	6600.00	0.00	0.00	0.00	0.00	459.00	0.00
	0.081	1248.49	0.62	1248.52	425.63	0.00	6600.00	0.00	425.63	9.54	0.00	459.00	435.17
	0.117	1247.89	0.00	1247.92	484.93	0.00	6600.00	0.00	0.00	0.00	0.00	525.00	0.00
	0.117	1248.50	0.62	1248.53	484.95	0.00	6600.00	0.00	484.95	17.09	0.00	525.00	502.04
	0.139	1247.89	0.00	1247.93	466.94	0.00	6600.00	0.00	0.00	0.00	0.00	522.00	0.00
	0.139	1248.50	0.62	1248.54	466.98	0.00	6600.00	0.00	466.98	30.02	0.00	522.00	497.00
*	0.172	1247.87	0.00	1247.96	302.83	0.00	6600.00	0.00	0.00	0.00	0.00	343.00	0.00
*	0.172	1248.49	0.62	1248.56	302.84	0.00	6600.00	0.00	302.84	17.32	0.00	343.00	320.16
*	0.178	1249.07	0.00	1250.64	289.87	0.00	5897.40	702.60	0.00	0.00	0.00	92.00	0.00
*	0.178	1249.08	0.00	1250.63	289.87	0.00	5876.57	723.43	289.87	12.82	0.00	92.00	302.69
*	0.188	1251.01	0.00	1252.31	309.72	0.00	5584.90	1015.10	0.00	0.00	0.00	87.00	0.00
*	0.188	1251.00	-0.01	1252.31	308.55	0.00	5590.53	1009.47	308.55	7.23	0.00	87.00	315.78
	0.190	1252.24	0.00	1252.95	316.44	0.00	4623.19	1976.81	0.00	0.00	100.00	185.00	0.00

	Cross-Section Number SECNO	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Energy Gradient Elevation (ft MSL) EG	Water Surface Top Width (ft) TOPWID	Left Overbank Flow (cfs) QLOB	Channel Flow (cfs) QCH	Right Overbank Flow (cfs) QROB	Encroach. Target Requested PERENC	Left Encroach. Station (ft) STENCL	Left Bank Station (ft) STCHL	Right Bank Station (ft) STCHR	Right Encroach. Station (ft) STENCR
	0.190	1252.27	0.03	1252.94	315.68	0.00	4535.50	2064.50	315.68	104.37	100.00	185.00	420.05
*	0.206	1252.75	0.00	1253.10	294.40	0.04	2916.56	3683.40	0.00	0.00	100.00	171.00	0.00
*	0.206	1252.75	-0.01	1253.09	293.83	0.04	2918.31	3681.65	293.83	98.23	100.00	171.00	392.06
*	0.238	1252.81	0.00	1253.45	232.49	0.00	3036.07	3563.93	0.00	0.00	0.00	78.00	0.00
*	0.238	1252.82	0.00	1253.44	231.83	0.00	2989.92	3610.09	231.83	9.52	0.00	78.00	241.35
*	0.240	1254.00	0.00	1255.54	241.99	0.00	5453.70	1146.30	0.00	0.00	0.00	86.00	0.00
*	0.240	1253.96	-0.04	1255.54	241.74	0.00	5482.81	1117.19	241.74	10.56	0.00	86.00	252.30
*	0.246	1254.63	0.00	1256.07	232.49	0.00	4926.25	1673.75	0.00	0.00	0.00	93.00	0.00
*	0.246	1254.81	0.18	1257.21	122.43	0.00	6062.49	537.51	122.43	25.94	0.00	93.00	148.37
*	0.248	1256.07	0.00	1256.58	257.64	0.00	4050.92	2549.08	0.00	0.00	200.00	293.00	0.00
*	0.248	1256.46	0.38	1257.21	166.87	0.00	4947.91	1652.09	166.87	205.20	200.00	293.00	372.07
	0.268	1256.22	0.00	1256.73	252.31	0.00	3735.75	2864.25	0.00	0.00	0.00	95.00	0.00
	0.268	1256.65	0.43	1257.43	156.81	0.00	4605.23	1994.77	156.81	13.56	0.00	95.00	170.37
	0.289	1256.27	0.00	1257.07	203.27	0.00	3161.86	3438.14	0.00	0.00	0.00	73.00	0.00
	0.289	1256.74	0.47	1257.88	133.31	0.00	3725.66	2874.34	133.31	21.72	0.00	73.00	155.03
	0.291	1256.49	0.00	1257.13	212.91	0.00	3271.75	3328.25	0.00	0.00	0.00	73.00	0.00
	0.291	1257.01	0.51	1257.96	140.85	0.00	4076.97	2523.03	140.85	9.15	0.00	73.00	150.00
*	0.307	1256.25	0.00	1257.56	174.39	0.00	3558.10	3041.90	0.00	0.00	0.00	67.00	0.00
*	0.307	1256.47	0.22	1258.72	106.53	0.00	4533.34	2066.66	106.53	11.20	0.00	67.00	117.73
	0.320	1256.39	0.00	1257.95	144.50	0.00	3465.13	3134.87	0.00	0.00	0.00	65.00	0.00
	0.320	1257.01	0.61	1259.18	99.33	0.00	4334.52	2265.48	99.33	10.52	0.00	65.00	109.85
*	0.322	1257.41	0.00	1258.06	150.30	0.00	6600.00	0.00	0.00	0.00	0.00	162.00	0.00
*	0.322	1258.27	0.86	1259.32	90.00	0.00	6600.00	0.00	90.00	35.00	0.00	162.00	125.00
	0.336	1257.52	0.00	1258.16	152.46	0.00	6600.00	0.00	0.00	0.00	0.00	167.00	0.00
*	0.336	1258.40	0.88	1259.42	90.00	0.00	6600.00	0.00	90.00	35.00	0.00	167.00	125.00
	0.344	1257.50	0.00	1258.26	141.45	0.00	6600.00	0.00	0.00	0.00	100.00	247.00	0.00
*	0.344	1258.42	0.92	1259.51	90.00	0.00	6600.00	0.00	90.00	135.00	100.00	247.00	225.00
*	0.352	1260.79	0.00	1261.76	469.46	1063.49	4482.60	1053.91	0.00	0.00	200.00	339.00	0.00
*	0.352	1261.16	0.37	1262.99	169.00	512.17	6087.83	0.00	169.00	170.00	200.00	339.00	339.00

	Cross-Section Number SECNO	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Energy Gradient Elevation (ft MSL) EG	Water Surface Top Width (ft) TOPWID	Left Overbank Flow (cfs) QLOB	Channel Flow (cfs) QCH	Right Overbank Flow (cfs) QROB	Encroach. Target Requested PERENC	Left Encroach. Station (ft) STENCL	Left Bank Station (ft) STCHL	Right Bank Station (ft) STCHR	Right Encroach. Station (ft) STENCR
*	0.356	1261.85	0.00	1262.83	565.75	1060.59	5158.67	380.73	0.00	0.00	1220.00	1350.00	0.00
*	0.356	1262.82	0.97	1263.20	600.00	1487.23	4154.55	958.22	600.00	1000.00	1220.00	1350.00	1600.00
*	0.361	1261.99	0.00	1263.15	378.67	1998.66	4304.84	296.51	0.00	0.00	1220.00	1334.00	0.00
*	0.361	1262.14	0.14	1263.71	186.55	1709.60	4890.40	0.00	186.55	1147.45	1220.00	1334.00	1334.00
*	0.370	1262.48	0.00	1263.56	431.83	1725.34	4150.14	724.52	0.00	0.00	1226.00	1327.00	0.00
*	0.370	1262.36	-0.12	1264.09	185.10	1502.73	4765.55	331.72	185.10	1155.92	1226.00	1327.00	1341.02
*	0.450	1266.52	0.00	1267.27	857.83	153.01	5716.20	30.79	0.00	0.00	2190.00	2625.00	0.00
*	0.450	1266.57	0.05	1267.55	435.00	0.00	6600.00	0.00	435.00	2190.00	2190.00	2625.00	2625.00
*	0.490	1269.10	0.00	1270.04	1023.62	895.07	2825.80	2179.13	0.00	0.00	2876.60	2917.50	0.00
*	0.490	1269.34	0.24	1270.78	416.81	749.76	3455.57	2394.67	416.81	2748.79	2876.60	2917.50	3165.60
	0.580	1272.84	0.00	1274.53	475.68	103.24	5367.01	429.74	0.00	0.00	2670.00	2740.00	0.00
	0.580	1273.81	0.97	1275.79	95.93	0.00	6405.68	194.32	95.93	2670.00	2670.00	2740.00	2765.93
*	0.610	1275.13	0.00	1276.76	500.58	45.74	4877.02	977.25	0.00	0.00	2407.30	2470.00	0.00
	0.610	1275.82	0.69	1277.81	168.83	0.00	5764.13	835.87	168.83	2407.30	2407.30	2470.00	2576.13
*	0.650	1277.45	0.00	1277.94	875.43	217.64	5156.87	525.49	0.00	0.00	2320.00	2460.00	0.00
*	0.650	1278.42	0.97	1278.99	217.91	0.00	6191.41	408.59	217.91	2320.00	2320.00	2460.00	2537.91
*	0.710	1278.85	0.00	1280.74	313.54	6.30	5755.00	138.70	0.00	0.00	2340.00	2448.00	0.00
*	0.710	1279.96	1.11	1281.63	108.00	0.00	6600.00	0.00	108.00	2340.00	2340.00	2448.00	2448.00
*	0.750	1282.55	0.00	1283.53	898.94	1734.51	3860.54	304.96	0.00	0.00	2537.37	2595.00	0.00
	0.750	1282.90	0.36	1284.27	284.83	1892.05	4621.63	86.31	284.83	2324.63	2537.37	2595.00	2609.46
*	0.790	1284.31	0.00	1284.67	1740.98	1124.66	3804.14	971.20	0.00	0.00	2190.00	2280.00	0.00
*	0.790	1285.04	0.74	1285.45	706.66	986.46	4363.67	1249.87	706.66	2054.94	2190.00	2280.00	2761.60
	0.830	1284.87	0.00	1285.80	744.71	615.81	5062.55	221.65	0.00	0.00	2060.00	2146.90	0.00
*	0.830	1285.54	0.67	1286.69	207.66	597.40	6002.60	0.00	207.66	1939.24	2060.00	2146.90	2146.90
	0.860	1286.00	0.00	1286.67	362.63	112.75	5775.42	11.83	0.00	0.00	2790.00	2920.00	0.00
	0.860	1286.87	0.87	1287.57	130.00	0.00	6600.00	0.00	130.00	2790.00	2790.00	2920.00	2920.00
*	0.900	1287.22	0.00	1288.93	250.71	32.07	5831.04	36.89	0.00	0.00	2540.00	2660.00	0.00
*	0.900	1288.16	0.94	1289.69	120.00	0.00	6600.00	0.00	120.00	2540.00	2540.00	2660.00	2660.00
*	0.960	1291.02	0.00	1292.26	351.85	30.94	5812.73	56.33	0.00	0.00	2409.50	2510.00	0.00
	0.960	1291.36	0.33	1292.82	100.50	0.00	6600.00	0.00	100.50	2409.50	2409.50	2510.00	2510.00

	Cross-Section Number SECNO	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Energy Gradient Elevation (ft MSL) EG	Water Surface Top Width (ft) TOPWID	Left Overbank Flow (cfs) QLOB	Channel Flow (cfs) QCH	Right Overbank Flow (cfs) QROB	Encroach. Target Requested PERENC	Left Encroach. Station (ft) STENCL	Left Bank Station (ft) STCHL	Right Bank Station (ft) STCHR	Right Encroach. Station (ft) STENCR
	1.000	1292.91	0.00	1293.71	594.29	41.65	5817.72	40.63	0.00	0.00	2183.00	2305.00	0.00
	1.000	1293.47	0.57	1294.36	122.00	0.00	6600.00	0.00	122.00	2183.00	2183.00	2305.00	2305.00
	1.004	1293.06	0.00	1293.87	768.92	246.50	5582.65	70.85	0.00	0.00	2244.41	2317.75	0.00
	1.004	1293.61	0.55	1294.66	89.51	43.76	6556.24	0.00	89.51	2228.24	2244.41	2317.75	2317.75
	1.030	1293.58	0.00	1293.87	619.45	86.75	5787.46	25.79	0.00	0.00	2200.00	2440.00	0.00
*	1.030	1294.37	0.79	1294.66	240.00	0.00	6600.00	0.00	240.00	2200.00	2200.00	2440.00	2440.00
*	1.060	1294.48	0.00	1297.16	184.37	155.77	5743.79	0.44	0.00	0.00	2215.00	2278.14	0.00
*	1.060	1294.57	0.10	1298.11	63.14	0.00	6600.00	0.00	63.14	2215.00	2215.00	2278.14	2278.14
*	1.110	1298.35	0.00	1299.30	617.66	1158.18	4023.59	718.23	0.00	0.00	2060.00	2109.52	0.00
*	1.110	1299.32	0.97	1300.30	332.05	1338.80	4532.66	728.54	332.05	1891.26	2060.00	2109.52	2223.31
	1.160	1299.94	0.00	1300.95	273.28	0.00	5783.38	116.61	0.00	0.00	2090.00	2200.00	0.00
	1.160	1300.75	0.81	1301.81	110.00	0.00	6600.00	0.00	110.00	2090.00	2090.00	2200.00	2200.00
	1.210	1301.65	0.00	1302.77	284.68	0.00	5322.24	577.76	0.00	0.00	1559.54	1681.96	0.00
	1.210	1302.32	0.67	1303.71	126.41	0.00	6333.43	266.58	156.69	1559.54	1559.54	1681.96	1716.23
	1.240	1302.43	0.00	1303.82	343.18	0.00	5366.13	533.87	0.00	0.00	1560.56	1641.73	0.00
	1.240	1303.13	0.70	1304.85	107.76	0.00	6337.97	262.03	118.55	1560.56	1560.56	1641.73	1679.11
	1.290	1304.19	0.00	1305.56	470.21	0.00	4925.18	974.82	0.00	0.00	1406.10	1478.73	0.00
	1.290	1305.18	0.98	1306.65	196.14	0.00	5667.27	932.73	207.81	1406.10	1406.10	1478.73	1613.91
	1.380	1307.57	0.00	1308.72	280.37	14.60	5853.13	32.27	0.00	0.00	1919.55	2012.64	0.00
	1.380	1308.43	0.86	1309.61	93.09	0.00	6600.00	0.00	93.09	1919.55	1919.55	2012.64	2012.64
*	1.400	1309.27	0.00	1309.50	760.72	1917.25	2550.89	431.86	0.00	0.00	2068.02	2111.98	0.00
*	1.400	1310.01	0.74	1310.40	422.03	2620.77	3495.99	483.23	422.03	1800.00	2068.02	2111.98	2222.03
*	1.410	1308.01	0.00	1309.89	351.50	623.99	4227.59	48.42	0.00	0.00	2121.17	2157.40	0.00
*	1.410	1308.97	0.96	1311.18	257.40	1367.69	5232.31	0.00	257.40	1900.00	2121.17	2157.40	2157.40

SUMMARY PRINTOUT TABLE 150 : ECHO CANYON LOMR
REVISED MODEL
AZ02079

	Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Top of Roadway Elevation (ft MSL) ELTRD	Max. Low Chord Elevation (ft MSL) ELLC	Minimum C. S. Elevation (ft MSL) ELMIN	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	Critical W. S. Elevation (ft MSL) CRIWS	Energy Gradient Elevation (ft MSL) EG	Energy Gradient Slope * 10,000 10K*S	Channel Mean Flow Velocity (ft/s) VCH	Cross-Section Area (sq ft) AREA	Index Q (0.01 * Convey.) .01K
	0.000	0.00	0.00	0.00	1242.90	6600.00	1246.90	1246.06	1247.78	56.72	7.54	874.86	876.37
	0.000	0.00	0.00	0.00	1242.90	6600.00	1247.90	1246.06	1248.44	26.25	5.89	1120.10	1288.18
*	0.003	18.00	0.00	0.00	1236.60	6600.00	1247.77	1240.00	1247.87	1.69	2.48	2658.60	5083.41
*	0.003	18.00	0.00	0.00	1236.60	6600.00	1248.41	1240.01	1248.49	1.37	2.33	2831.60	5629.46
	0.026	118.00	0.00	0.00	1236.60	6600.00	1247.81	1239.79	1247.89	0.99	2.20	3006.76	6617.35
	0.026	118.00	0.00	0.00	1236.60	6600.00	1248.44	1239.78	1248.50	0.81	2.06	3206.25	7345.80
	0.049	125.00	0.00	0.00	1236.00	6600.00	1247.84	1239.56	1247.90	0.72	1.85	3560.91	7793.86
	0.049	125.00	0.00	0.00	1236.00	6600.00	1248.47	1239.56	1248.51	0.58	1.74	3798.24	8659.59
	0.081	167.00	0.00	0.00	1236.10	6600.00	1247.87	1239.36	1247.91	0.53	1.62	4073.94	9062.14
	0.081	167.00	0.00	0.00	1236.10	6600.00	1248.49	1239.35	1248.52	0.43	1.52	4337.61	10040.95
	0.117	191.00	0.00	0.00	1236.10	6600.00	1247.89	1239.21	1247.92	0.39	1.41	4692.60	10518.71
	0.117	191.00	0.00	0.00	1236.10	6600.00	1248.50	1239.23	1248.53	0.32	1.32	4991.37	11638.59
	0.139	115.00	0.00	0.00	1236.40	6600.00	1247.89	1239.80	1247.93	0.54	1.57	4197.52	8964.56
	0.139	115.00	0.00	0.00	1236.40	6600.00	1248.50	1239.81	1248.54	0.44	1.47	4484.48	9991.22
*	0.172	174.00	0.00	0.00	1236.70	6600.00	1247.87	1240.20	1247.96	1.29	2.36	2801.65	5816.08
*	0.172	174.00	0.00	0.00	1236.70	6600.00	1248.49	1240.22	1248.56	1.23	2.21	2988.82	5949.05
*	0.178	30.00	0.00	0.00	1237.80	6600.00	1249.07	1249.07	1250.64	40.62	10.58	785.72	1035.54
*	0.178	30.00	0.00	0.00	1237.80	6600.00	1249.08	1249.08	1250.63	42.63	10.54	786.78	1010.89
*	0.188	54.00	0.00	0.00	1239.10	6600.00	1251.01	1251.01	1252.31	36.17	9.82	858.01	1097.48
*	0.188	54.00	0.00	0.00	1239.10	6600.00	1251.00	1251.00	1252.31	36.54	9.84	855.03	1091.87
	0.190	10.00	1251.40	1248.10	1239.20	6600.00	1252.24	0.00	1252.95	20.70	7.65	1125.39	1450.54
	0.190	10.00	1251.40	1248.10	1239.20	6600.00	1252.27	0.00	1252.94	21.61	7.47	1134.46	1419.83
*	0.206	87.00	0.00	0.00	1241.30	6600.00	1252.75	1250.63	1253.10	9.72	5.45	1452.26	2117.13
*	0.206	87.00	0.00	0.00	1241.30	6600.00	1252.75	1250.64	1253.09	9.76	5.46	1450.39	2112.89
*	0.238	168.00	0.00	0.00	1243.10	6600.00	1252.81	1251.25	1253.45	21.31	7.11	1052.29	1429.57

	Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Top of Roadway Elevation (ft MSL) ELTRD	Max. Low Chord Elevation (ft MSL) ELLC	Minimum C. S. Elevation (ft MSL) ELMIN	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	Critical W. S. Elevation (ft MSL) CRIWS	Energy Gradient Elevation (ft MSL) EG	Energy Gradient Slope * 10,000 10K*S	Channel Mean Flow Velocity (ft/s) VCH	Cross-Section Area (sq ft) AREA	Index Q (0.01 * Convey.) .01K
*	0.238	168.00	0.00	0.00	1243.10	6600.00	1252.82	1251.25	1253.44	21.78	7.00	1053.20	1414.13
*	0.240	11.00	0.00	0.00	1243.20	6600.00	1254.00	1254.00	1255.54	44.87	10.76	762.78	985.25
*	0.240	11.00	0.00	0.00	1243.20	6600.00	1253.96	1253.96	1255.54	46.06	10.87	754.04	972.47
*	0.246	32.00	0.00	0.00	1243.60	6600.00	1254.63	1254.63	1256.07	43.67	10.74	781.53	998.73
*	0.246	32.00	0.00	0.00	1243.60	6600.00	1254.81	1254.81	1257.21	65.25	12.88	566.60	817.08
*	0.248	11.00	1255.40	1252.10	1243.60	6600.00	1256.07	0.00	1256.58	15.00	6.39	1209.43	1703.84
*	0.248	11.00	1255.40	1252.10	1243.60	6600.00	1256.46	0.00	1257.21	21.50	7.42	967.58	1423.30
	0.268	102.00	0.00	0.00	1245.50	6600.00	1256.22	1254.40	1256.73	14.70	6.53	1198.69	1721.39
	0.268	102.00	0.00	0.00	1245.50	6600.00	1256.65	1254.59	1257.43	19.78	7.59	949.10	1483.90
	0.289	115.00	1260.60	1260.60	1246.90	6600.00	1256.27	1255.07	1257.07	19.77	8.52	981.17	1484.41
	0.289	115.00	1260.60	1260.60	1246.90	6600.00	1256.74	1255.35	1257.88	28.98	9.42	788.50	1225.93
	0.291	10.00	1260.50	1260.60	1246.95	6600.00	1256.49	1254.76	1257.13	16.40	7.39	1069.66	1629.53
	0.291	10.00	1260.50	1260.60	1246.95	6600.00	1257.01	1255.19	1257.96	21.76	8.59	861.88	1414.89
*	0.307	81.00	0.00	0.00	1248.00	6600.00	1256.25	1255.67	1257.56	40.17	10.53	750.77	1041.37
*	0.307	81.00	0.00	0.00	1248.00	6600.00	1256.47	1256.47	1258.72	64.23	12.97	561.17	823.53
	0.320	73.00	0.00	0.00	1248.70	6600.00	1256.39	1255.86	1257.95	45.43	11.14	676.15	979.21
	0.320	73.00	0.00	0.00	1248.70	6600.00	1257.01	1256.57	1259.18	58.29	12.58	566.05	864.49
*	0.322	7.00	0.00	0.00	1248.90	6600.00	1257.41	1254.14	1258.06	18.43	6.46	1021.37	1537.47
*	0.322	7.00	0.00	0.00	1248.90	6600.00	1258.27	1254.82	1259.32	25.66	8.21	804.02	1302.87
	0.336	73.00	0.00	0.00	1249.00	6600.00	1257.52	1254.22	1258.16	10.82	6.42	1027.75	2006.20
*	0.336	73.00	0.00	0.00	1249.00	6600.00	1258.40	1254.84	1259.42	9.75	8.11	813.99	2113.54
	0.344	45.00	0.00	0.00	1249.54	6600.00	1257.50	1254.61	1258.26	18.54	7.03	938.28	1533.01
*	0.344	45.00	0.00	0.00	1249.54	6600.00	1258.42	1255.18	1259.51	20.31	8.41	785.12	1464.50
*	0.352	41.00	0.00	0.00	1256.52	6600.00	1260.79	1260.79	1261.76	82.30	9.01	943.86	727.50
*	0.352	41.00	0.00	0.00	1256.52	6600.00	1261.16	1261.16	1262.99	113.40	11.10	616.85	619.79
*	0.356	18.00	0.00	0.00	1256.63	6600.00	1261.85	1261.85	1262.83	56.59	8.75	966.30	877.36
*	0.356	18.00	0.00	0.00	1256.63	6600.00	1262.82	1261.84	1263.20	19.19	5.80	1548.21	1506.62
*	0.361	27.00	0.00	0.00	1257.07	6600.00	1261.99	1261.99	1263.15	85.29	9.70	825.00	714.67
*	0.361	27.00	0.00	0.00	1257.07	6600.00	1262.14	1262.01	1263.71	99.92	10.61	664.81	660.25

	Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Top of Roadway Elevation (ft MSL) ELTRD	Max. Low Chord Elevation (ft MSL) ELLC	Minimum C. S. Elevation (ft MSL) ELMIN	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	Critical W. S. Elevation (ft MSL) CRIWS	Energy Gradient Elevation (ft MSL) EG	Energy Gradient Slope * 10,000 10K*S	Channel Mean Flow Velocity (ft/s) VCH	Cross-Section Area (sq ft) AREA	Index Q (0.01 * Convey.) .01K
*	0.370	50.00	0.00	0.00	1257.64	6600.00	1262.48	1262.48	1263.56	15.13	9.55	867.86	1696.74
*	0.370	50.00	0.00	0.00	1257.64	6600.00	1262.36	1262.36	1264.09	21.98	11.29	643.92	1407.71
*	0.450	420.00	0.00	0.00	1263.53	5900.00	1266.52	1266.52	1267.27	73.52	7.07	1007.18	688.11
*	0.450	420.00	0.00	0.00	1263.53	6600.00	1266.57	1266.57	1267.55	44.54	7.94	830.73	988.98
*	0.490	230.00	0.00	0.00	1261.17	5900.00	1269.10	1269.10	1270.04	80.24	11.01	1768.17	658.65
*	0.490	230.00	0.00	0.00	1261.17	6600.00	1269.34	1269.34	1270.78	105.86	12.97	1306.28	641.46
	0.580	450.00	0.00	0.00	1262.70	5900.00	1272.84	1272.49	1274.53	103.77	10.92	924.99	579.18
	0.580	450.00	0.00	0.00	1262.70	6600.00	1273.81	1272.33	1275.79	102.80	11.44	654.45	650.96
*	0.610	180.00	0.00	0.00	1264.85	5900.00	1275.13	1275.13	1276.76	116.84	11.23	1109.57	545.82
	0.610	180.00	0.00	0.00	1264.85	6600.00	1275.82	1275.22	1277.81	124.43	12.08	839.48	591.67
*	0.650	200.00	0.00	0.00	1267.31	5900.00	1277.45	1275.20	1277.94	36.50	6.00	1792.21	976.52
*	0.650	200.00	0.00	0.00	1267.31	6600.00	1278.42	1275.44	1278.99	33.75	6.22	1305.24	1135.99
*	0.710	295.00	0.00	0.00	1269.80	5900.00	1278.85	1278.83	1280.74	178.92	11.16	651.74	441.08
*	0.710	295.00	0.00	0.00	1269.80	6600.00	1279.96	1278.89	1281.63	123.66	10.39	635.48	593.50
*	0.750	230.00	0.00	0.00	1272.95	5900.00	1282.55	1282.23	1283.53	86.29	9.73	1734.47	635.14
	0.750	230.00	0.00	0.00	1272.95	6600.00	1282.90	1282.09	1284.27	104.57	11.08	1264.34	645.41
*	0.790	230.00	0.00	0.00	1272.95	5900.00	1284.31	1282.31	1284.67	31.19	5.97	3117.29	1056.36
*	0.790	230.00	0.00	0.00	1272.95	6600.00	1285.04	1282.98	1285.45	29.50	6.20	2670.53	1215.12
	0.830	220.00	0.00	0.00	1274.89	5900.00	1284.87	1283.55	1285.80	59.76	8.32	1471.68	763.22
*	0.830	220.00	0.00	0.00	1274.89	6600.00	1285.54	1283.75	1286.69	66.02	9.01	1042.46	812.27
	0.860	180.00	0.00	0.00	1275.03	5900.00	1286.00	1283.12	1286.67	40.02	6.62	1083.31	932.59
	0.860	180.00	0.00	0.00	1275.03	6600.00	1286.87	1283.50	1287.57	36.91	6.70	984.48	1086.33
*	0.900	235.00	0.00	0.00	1277.26	5900.00	1287.22	1286.92	1288.93	169.53	10.56	631.76	453.14
*	0.900	235.00	0.00	0.00	1277.26	6600.00	1288.16	1287.23	1289.69	122.21	9.92	665.42	597.02
*	0.960	300.00	0.00	0.00	1278.52	5900.00	1291.02	1289.07	1292.26	80.56	9.00	790.31	657.33
	0.960	300.00	0.00	0.00	1278.52	6600.00	1291.36	1289.63	1292.82	90.85	9.71	679.61	692.44
	1.000	230.00	0.00	0.00	1280.94	5900.00	1292.91	1289.35	1293.71	49.35	7.23	1018.82	839.86
	1.000	230.00	0.00	0.00	1280.94	6600.00	1293.47	1289.81	1294.36	49.79	7.55	874.03	935.31
	1.004	40.00	0.00	0.00	1281.40	5900.00	1293.06	1288.45	1293.87	32.26	7.41	1369.09	1038.81
	1.004	40.00	0.00	0.00	1281.40	6600.00	1293.61	1288.92	1294.66	38.81	8.25	837.90	1059.49

	Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Top of Roadway Elevation (ft MSL) ELTRD	Max. Low Chord Elevation (ft MSL) ELLC	Minimum C. S. Elevation (ft MSL) ELMIN	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	Critical W. S. Elevation (ft MSL) CRIWS	Energy Gradient Elevation (ft MSL) EG	Energy Gradient Slope * 10,000 10K*S	Channel Mean Flow Velocity (ft/s) VCH	Cross-Section Area (sq ft) AREA	Index Q (0.01 * Convey.) .01K
	1.030	118.00	1290.14	0.00	1281.44	5900.00	1293.58	0.00	1293.87	22.32	4.36	1627.71	1248.72
*	1.030	118.00	1290.14	0.00	1281.44	6600.00	1294.37	0.00	1294.66	19.09	4.35	1517.35	1510.51
*	1.060	190.00	0.00	0.00	1285.24	5900.00	1294.48	1294.48	1297.16	168.99	13.32	540.42	453.85
*	1.060	190.00	0.00	0.00	1285.24	6600.00	1294.57	1294.57	1298.11	225.88	15.09	437.43	439.15
*	1.110	230.00	0.00	0.00	1287.07	5900.00	1298.35	1297.62	1299.30	62.33	9.39	1758.28	747.30
*	1.110	230.00	0.00	0.00	1287.07	6600.00	1299.32	1297.77	1300.30	55.62	9.51	1648.28	884.96
	1.160	250.00	0.00	0.00	1288.80	5900.00	1299.94	1297.54	1300.95	64.44	8.16	868.05	734.97
	1.160	250.00	0.00	0.00	1288.80	6600.00	1300.75	1298.03	1301.81	59.38	8.28	796.83	856.50
	1.210	260.00	0.00	0.00	1291.15	5900.00	1301.65	1300.23	1302.77	73.80	8.93	1003.68	686.79
	1.210	260.00	0.00	0.00	1291.15	6600.00	1302.32	1300.34	1303.71	79.24	9.64	793.94	741.42
	1.240	130.00	0.00	0.00	1291.77	5900.00	1302.43	1301.03	1303.82	77.20	9.89	987.19	671.51
	1.240	130.00	0.00	0.00	1291.77	6600.00	1303.13	1301.20	1304.85	82.39	10.71	729.34	727.14
	1.290	240.00	0.00	0.00	1292.90	5900.00	1304.19	1303.59	1305.56	82.24	10.25	1204.80	650.61
	1.290	240.00	0.00	0.00	1292.90	6600.00	1305.18	1303.68	1306.65	76.22	10.49	1033.60	755.96
	1.380	465.00	0.00	0.00	1296.58	5900.00	1307.57	1304.95	1308.72	62.87	8.64	774.82	744.12
	1.380	465.00	0.00	0.00	1296.58	6600.00	1308.43	1305.43	1309.61	57.95	8.71	757.57	867.01
*	1.400	110.00	0.00	0.00	1296.95	4900.00	1309.27	1305.38	1309.50	13.70	5.27	2959.26	1323.74
*	1.400	110.00	0.00	0.00	1296.95	6600.00	1310.01	1306.32	1310.40	20.73	6.77	2718.44	1449.54
*	1.410	80.00	1305.89	0.00	1297.53	4900.00	1308.01	1308.01	1309.89	109.09	11.85	843.19	469.14
*	1.410	80.00	1305.89	0.00	1297.53	6600.00	1308.97	1308.89	1311.18	134.69	13.36	1021.68	568.68

SUMMARY PRINTOUT TABLE 150 : ECHO CANYON LOMR
---------- REVISED MODEL
AZ02079

	Cross-Section Number SECNO	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Profile (ft) DIFWSP	W.S. Elev Diff per Section (ft) DIFWSX	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Water Surface Top Width (ft) TOPWID	Channel Reach Length (ft) XLCH
	0.000	6600.00	1246.90	0.00	0.00	0.00	240.44	0.00
	0.000	6600.00	1247.90	1.00	0.00	0.00	250.04	0.00
*	0.003	6600.00	1247.77	0.00	0.87	0.00	273.85	18.00
*	0.003	6600.00	1248.41	0.63	0.51	0.63	273.86	18.00
	0.026	6600.00	1247.81	0.00	0.04	0.00	318.25	118.00
	0.026	6600.00	1248.44	0.63	0.03	0.63	318.27	118.00
	0.049	6600.00	1247.84	0.00	0.03	0.00	380.97	125.00
	0.049	6600.00	1248.47	0.62	0.03	0.62	381.00	125.00
	0.081	6600.00	1247.87	0.00	0.02	0.00	425.60	167.00
	0.081	6600.00	1248.49	0.62	0.02	0.62	425.63	167.00
	0.117	6600.00	1247.89	0.00	0.02	0.00	484.93	191.00
	0.117	6600.00	1248.50	0.62	0.02	0.62	484.95	191.00
	0.139	6600.00	1247.89	0.00	0.00	0.00	466.94	115.00
	0.139	6600.00	1248.50	0.62	0.00	0.62	466.98	115.00
*	0.172	6600.00	1247.87	0.00	-0.02	0.00	302.83	174.00
*	0.172	6600.00	1248.49	0.62	-0.01	0.62	302.84	174.00
*	0.178	6600.00	1249.07	0.00	1.20	0.00	289.87	30.00
*	0.178	6600.00	1249.08	0.00	0.59	0.00	289.87	30.00
*	0.188	6600.00	1251.01	0.00	1.94	0.00	309.72	54.00
*	0.188	6600.00	1251.00	-0.01	1.93	-0.01	308.55	54.00
	0.190	6600.00	1252.24	0.00	1.23	0.00	316.44	10.00
	0.190	6600.00	1252.27	0.03	1.27	0.03	315.68	10.00
*	0.206	6600.00	1252.75	0.00	0.51	0.00	294.40	87.00
*	0.206	6600.00	1252.75	-0.01	0.48	-0.01	293.83	87.00
*	0.238	6600.00	1252.81	0.00	0.06	0.00	232.49	168.00

	Cross-Section Number SECNO	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Profile (ft) DIFWSP	W.S. Elev Diff per Section (ft) DIFWSX	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Water Surface Top Width (ft) TOPWID	Channel Reach Length (ft) XLCH
*	0.238	6600.00	1252.82	0.00	0.07	0.00	231.83	168.00
*	0.240	6600.00	1254.00	0.00	1.19	0.00	241.99	11.00
*	0.240	6600.00	1253.96	-0.04	1.15	-0.04	241.74	11.00
*	0.246	6600.00	1254.63	0.00	0.63	0.00	232.49	32.00
*	0.246	6600.00	1254.81	0.18	0.85	0.18	122.43	32.00
*	0.248	6600.00	1256.07	0.00	1.44	0.00	257.64	11.00
*	0.248	6600.00	1256.46	0.38	1.65	0.38	166.87	11.00
	0.268	6600.00	1256.22	0.00	0.14	0.00	252.31	102.00
	0.268	6600.00	1256.65	0.43	0.19	0.43	156.81	102.00
	0.289	6600.00	1256.27	0.00	0.06	0.00	203.27	115.00
	0.289	6600.00	1256.74	0.47	0.10	0.47	133.31	115.00
	0.291	6600.00	1256.49	0.00	0.22	0.00	212.91	10.00
	0.291	6600.00	1257.01	0.51	0.26	0.51	140.85	10.00
*	0.307	6600.00	1256.25	0.00	-0.25	0.00	174.39	81.00
*	0.307	6600.00	1256.47	0.22	-0.54	0.22	106.53	81.00
	0.320	6600.00	1256.39	0.00	0.15	0.00	144.50	73.00
	0.320	6600.00	1257.01	0.61	0.54	0.61	99.33	73.00
*	0.322	6600.00	1257.41	0.00	1.02	0.00	150.30	7.00
*	0.322	6600.00	1258.27	0.86	1.26	0.86	90.00	7.00
	0.336	6600.00	1257.52	0.00	0.11	0.00	152.46	73.00
*	0.336	6600.00	1258.40	0.88	0.13	0.88	90.00	73.00
	0.344	6600.00	1257.50	0.00	-0.02	0.00	141.45	45.00
*	0.344	6600.00	1258.42	0.92	0.01	0.92	90.00	45.00
*	0.352	6600.00	1260.79	0.00	3.29	0.00	469.46	41.00
*	0.352	6600.00	1261.16	0.37	2.74	0.37	169.00	41.00
*	0.356	6600.00	1261.85	0.00	1.06	0.00	565.75	18.00
*	0.356	6600.00	1262.82	0.97	1.66	0.97	600.00	18.00
*	0.361	6600.00	1261.99	0.00	0.15	0.00	378.67	27.00
*	0.361	6600.00	1262.14	0.14	-0.68	0.14	186.55	27.00

	Cross-Section Number SECNO	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Profile (ft) DIFWSP	W.S. Elev Diff per Section (ft) DIFWSX	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Water Surface Top Width (ft) TOPWID	Channel Reach Length (ft) XLCH
*	0.370	6600.00	1262.48	0.00	0.49	0.00	431.83	50.00
*	0.370	6600.00	1262.36	-0.12	0.22	-0.12	185.10	50.00
*	0.450	5900.00	1266.52	0.00	4.04	0.00	857.83	420.00
*	0.450	6600.00	1266.57	0.05	4.21	0.05	435.00	420.00
*	0.490	5900.00	1269.10	0.00	2.58	0.00	1023.62	230.00
*	0.490	6600.00	1269.34	0.24	2.77	0.24	416.81	230.00
	0.580	5900.00	1272.84	0.00	3.74	0.00	475.68	450.00
	0.580	6600.00	1273.81	0.97	4.47	0.97	95.93	450.00
*	0.610	5900.00	1275.13	0.00	2.29	0.00	500.58	180.00
	0.610	6600.00	1275.82	0.69	2.01	0.69	168.83	180.00
*	0.650	5900.00	1277.45	0.00	2.32	0.00	875.43	200.00
*	0.650	6600.00	1278.42	0.97	2.60	0.97	217.91	200.00
*	0.710	5900.00	1278.85	0.00	1.39	0.00	313.54	295.00
*	0.710	6600.00	1279.96	1.11	1.53	1.11	108.00	295.00
*	0.750	5900.00	1282.55	0.00	3.70	0.00	898.94	230.00
	0.750	6600.00	1282.90	0.36	2.95	0.36	284.83	230.00
*	0.790	5900.00	1284.31	0.00	1.76	0.00	1740.98	230.00
*	0.790	6600.00	1285.04	0.74	2.14	0.74	706.66	230.00
	0.830	5900.00	1284.87	0.00	0.56	0.00	744.71	220.00
*	0.830	6600.00	1285.54	0.67	0.49	0.67	207.66	220.00
	0.860	5900.00	1286.00	0.00	1.13	0.00	362.63	180.00
	0.860	6600.00	1286.87	0.87	1.33	0.87	130.00	180.00
*	0.900	5900.00	1287.22	0.00	1.21	0.00	250.71	235.00
*	0.900	6600.00	1288.16	0.94	1.29	0.94	120.00	235.00
*	0.960	5900.00	1291.02	0.00	3.80	0.00	351.85	300.00
	0.960	6600.00	1291.36	0.33	3.20	0.33	100.50	300.00
	1.000	5900.00	1292.91	0.00	1.88	0.00	594.29	230.00
	1.000	6600.00	1293.47	0.57	2.12	0.57	122.00	230.00
	1.004	5900.00	1293.06	0.00	0.16	0.00	768.92	40.00
	1.004	6600.00	1293.61	0.55	0.14	0.55	89.51	40.00

	Cross-Section Number SECNO	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Profile (ft) DIFWSP	W.S. Elev Diff per Section (ft) DIFWSX	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Water Surface Top Width (ft) TOPWID	Channel Reach Length (ft) XLCH
	1.030	5900.00	1293.58	0.00	0.52	0.00	619.45	118.00
*	1.030	6600.00	1294.37	0.79	0.76	0.79	240.00	118.00
*	1.060	5900.00	1294.48	0.00	0.90	0.00	184.37	190.00
*	1.060	6600.00	1294.57	0.10	0.20	0.10	63.14	190.00
*	1.110	5900.00	1298.35	0.00	3.88	0.00	617.66	230.00
*	1.110	6600.00	1299.32	0.97	4.75	0.97	332.05	230.00
	1.160	5900.00	1299.94	0.00	1.59	0.00	273.28	250.00
	1.160	6600.00	1300.75	0.81	1.43	0.81	110.00	250.00
	1.210	5900.00	1301.65	0.00	1.71	0.00	284.68	260.00
	1.210	6600.00	1302.32	0.67	1.57	0.67	126.41	260.00
	1.240	5900.00	1302.43	0.00	0.78	0.00	343.18	130.00
	1.240	6600.00	1303.13	0.70	0.81	0.70	107.76	130.00
	1.290	5900.00	1304.19	0.00	1.76	0.00	470.21	240.00
	1.290	6600.00	1305.18	0.98	2.04	0.98	196.14	240.00
	1.380	5900.00	1307.57	0.00	3.38	0.00	280.37	465.00
	1.380	6600.00	1308.43	0.86	3.25	0.86	93.09	465.00
*	1.400	4900.00	1309.27	0.00	1.70	0.00	760.72	110.00
*	1.400	6600.00	1310.01	0.74	1.58	0.74	422.03	110.00
*	1.410	4900.00	1308.01	0.00	-1.26	0.00	351.50	80.00
*	1.410	6600.00	1308.97	0.96	-1.04	0.96	257.40	80.00

SUMMARY OF WARNING AND STATUS MESSAGES :

Section 0.003, profile 1, conveyance change outside acceptable range.

Section 0.003, profile 2, conveyance change outside acceptable range.

Section 0.172, profile 1, conveyance change outside acceptable range.

Section 0.172, profile 2, conveyance change outside acceptable range.

Section 0.178, profile 1, critical depth assumed.

Section 0.178, profile 1, minimum specific energy.

Section 0.178, profile 2, critical depth assumed.

Section 0.178, profile 2, minimum specific energy.

Section 0.188, profile 1, critical depth assumed.

Section 0.188, profile 1, minimum specific energy.

Section 0.188, profile 2, critical depth assumed.

Section 0.188, profile 2, minimum specific energy.

Section 0.206, profile 1, conveyance change outside acceptable range.

Section 0.206, profile 2, conveyance change outside acceptable range.

Section 0.238, profile 1, conveyance change outside acceptable range.

Section 0.238, profile 2, conveyance change outside acceptable range.

Section 0.24, profile 1, critical depth assumed.

Section 0.24, profile 1, minimum specific energy.

Section 0.24, profile 2, critical depth assumed.

Section 0.24, profile 2, minimum specific energy.

Section 0.246, profile 1, critical depth assumed.

Section 0.246, profile 1, minimum specific energy.

Section 0.246, profile 2, critical depth assumed.

Section 0.246, profile 2, minimum specific energy.

Section 0.248, profile 1, hydraulic jump downstream.

Section 0.248, profile 1, conveyance change outside acceptable range.

Section 0.248, profile 2, hydraulic jump downstream.

Section 0.248, profile 2, conveyance change outside acceptable range.

Section 0.307, profile 1, conveyance change outside acceptable range.

Section 0.307, profile 2, critical depth assumed.

Section 0.307, profile 2, minimum specific energy.

Section 0.322, profile 1, conveyance change outside acceptable range.

Section 0.322, profile 2, conveyance change outside acceptable range.

Section 0.336, profile 2, conveyance change outside acceptable range.

Section 0.344, profile 2, conveyance change outside acceptable range.

Section 0.352, profile 1, critical depth assumed.

Section 0.352, profile 1, minimum specific energy.

Section 0.352, profile 2, critical depth assumed.

Section 0.352, profile 2, minimum specific energy.

Section 0.356, profile 1, critical depth assumed.

Section 0.356, profile 1, minimum specific energy.

Section 0.356, profile 2, conveyance change outside acceptable range.

Section 0.361, profile 1, critical depth assumed.

Section 0.361, profile 1, minimum specific energy.

Section 0.361, profile 2, conveyance change outside acceptable range.

Section 0.37, profile 1, critical depth assumed.

Section 0.37, profile 1, minimum specific energy.

Section 0.37, profile 2, critical depth assumed.

Section 0.37, profile 2, minimum specific energy.

Section 0.45, profile 1, critical depth assumed.

Section 0.45, profile 1, minimum specific energy.

Section 0.45, profile 2, critical depth assumed.

Section 0.45, profile 2, minimum specific energy.

Section 0.49, profile 1, critical depth assumed.

Section 0.49, profile 1, minimum specific energy.

Section 0.49, profile 2, critical depth assumed.

Section 0.49, profile 2, minimum specific energy.

Section 0.61, profile 1, critical depth assumed.

Section 0.61, profile 1, minimum specific energy.

Section 0.65, profile 1, conveyance change outside acceptable range.

Section 0.65, profile 2, conveyance change outside acceptable range.

Section 0.71, profile 1, conveyance change outside acceptable range.

Section 0.71, profile 2, conveyance change outside acceptable range.

Section 0.75, profile 1, conveyance change outside acceptable range.

Section 0.79, profile 1, conveyance change outside acceptable range.

Section 0.79, profile 2, conveyance change outside acceptable range.

Section 0.83, profile 2, conveyance change outside acceptable range.

Section 0.9, profile 1, conveyance change outside acceptable range.

Section 0.9, profile 2, conveyance change outside acceptable range.

Section 0.96, profile 1, conveyance change outside acceptable range.

Section 1.03, profile 2, conveyance change outside acceptable range.

Section 1.06, profile 1, critical depth assumed.

Section 1.06, profile 1, minimum specific energy.

Section 1.06, profile 2, critical depth assumed.

Section 1.06, profile 2, minimum specific energy.

Section 1.11, profile 1, conveyance change outside acceptable range.

Section 1.11, profile 2, conveyance change outside acceptable range.

Section 1.4, profile 1, conveyance change outside acceptable range.

Section 1.4, profile 2, conveyance change outside acceptable range.

Section 1.41, profile 1, critical depth assumed.

Section 1.41, profile 1, probable minimum specific energy.

Section 1.41, profile 1, 20 trials attempted to balance water surface elevation.

Section 1.41, profile 2, probable minimum specific energy.

Section 1.41, profile 2, water surface elevation based upon the minimum difference.

Section 1.41, profile 2, 20 trials attempted to balance water surface elevation.

85 Warning and status message(s) generated

SUMMARY PRINTOUT TABLE 200 : ECHO CANYON LOMR
---------- REVISED MODEL
AZ02079

Profile Number 2

Cross-Section Number	Floodway Width (ft)	Floodway Section Area (sq ft)	Floodway Mean Velocity (ft/s)	W. S. Elevation with Floodway (ft MSL)	W. S. Elevation without Floodway (ft MSL)	W. S. Elevation Diffrence (ft)
0.000	250.	1120.	5.9	1247.9	1246.9	1.0
0.003	274.	2832.	2.3	1248.4	1247.8	0.6
0.026	318.	3206.	2.1	1248.4	1247.8	0.6
0.049	381.	3798.	1.7	1248.4	1247.8	0.6
0.081	426.	4338.	1.5	1248.5	1247.9	0.6
0.117	485.	4991.	1.3	1248.5	1247.9	0.6
0.139	467.	4484.	1.5	1248.5	1247.9	0.6
0.172	303.	2989.	2.2	1248.5	1247.9	0.6
0.178	290.	787.	8.4	1249.1	1249.1	0.0
0.188	309.	855.	7.7	1251.0	1251.0	0.0
0.190	316.	1134.	5.8	1252.2	1252.2	0.0
0.206	294.	1450.	4.6	1252.8	1252.8	0.0
0.238	232.	1053.	6.3	1252.8	1252.8	0.0
0.240	242.	754.	8.8	1254.0	1254.0	0.0
0.246	122.	567.	11.6	1254.8	1254.6	0.2
0.248	167.	968.	6.8	1256.5	1256.1	0.4

0.268	157.	949.	7.0	1256.6	1256.2	0.4
0.289	133.	789.	8.4	1256.8	1256.3	0.5
0.291	141.	862.	7.7	1257.0	1256.5	0.5
0.307	107.	561.	11.8	1256.4	1256.2	0.2
0.320	99.	566.	11.7	1257.0	1256.4	0.6
0.322	90.	804.	8.2	1258.3	1257.4	0.9
0.336	90.	814.	8.1	1258.4	1257.5	0.9
0.344	90.	785.	8.4	1258.4	1257.5	0.9
0.352	169.	617.	10.7	1261.2	1260.8	0.4
0.356	600.	1548.	4.3	1262.8	1261.8	1.0
0.361	187.	665.	9.9	1262.1	1262.0	0.1
0.370	185.	644.	10.2	1262.4	1262.5	-0.1
0.450	435.	831.	7.9	1266.6	1266.5	0.1
0.490	417.	1306.	5.1	1269.3	1269.1	0.2
0.580	96.	654.	10.1	1273.8	1272.8	1.0
0.610	169.	839.	7.9	1275.8	1275.1	0.7
0.650	218.	1305.	5.1	1278.5	1277.5	1.0
0.710	108.	635.	10.4	1279.9	1278.8	1.1
0.750	285.	1264.	5.2	1282.9	1282.5	0.4
0.790	707.	2671.	2.5	1285.0	1284.3	0.7
0.830	208.	1042.	6.3	1285.6	1284.9	0.7
0.860	130.	984.	6.7	1286.9	1286.0	0.9
0.900	120.	665.	9.9	1288.1	1287.2	0.9
0.960	100.	680.	9.7	1291.3	1291.0	0.3
1.000	122.	874.	7.6	1293.5	1292.9	0.6
1.004	90.	838.	7.9	1293.7	1293.1	0.6

SUMMARY PRINTOUT TABLE 200 : ECHO CANYON LOMR
---------- REVISED MODEL
AZ02079

Profile Number 2

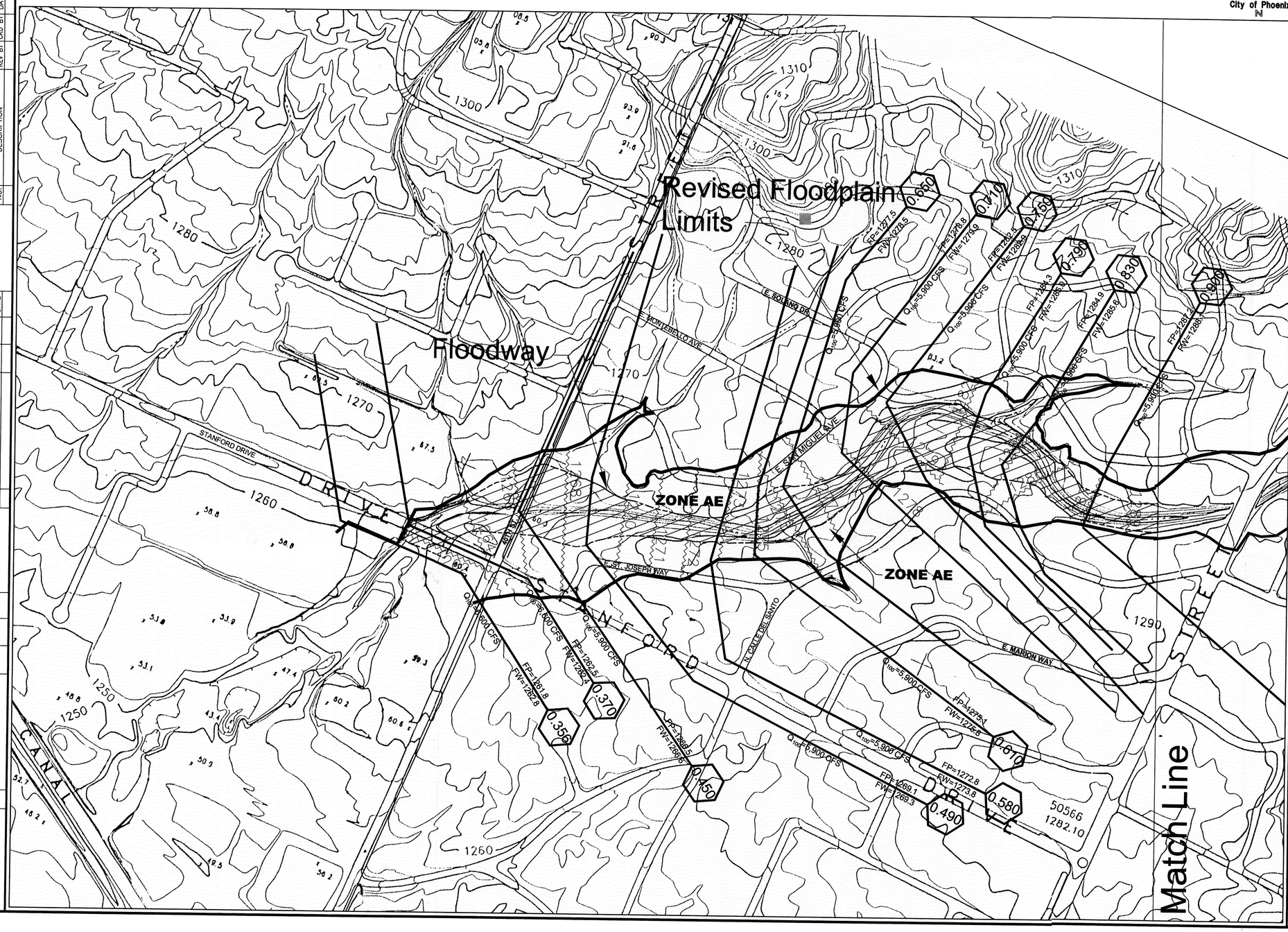
Cross-Section Number	Floodway Width (ft)	Floodway Section Area (sq ft)	Floodway Mean Velocity (ft/s)	W. S. Elevation with Floodway (ft MSL)	W. S. Elevation without Floodway (ft MSL)	W. S. Elevation Diffrence (ft)
1.030	240.	1517.	4.3	1294.4	1293.6	0.8
1.060	63.	437.	15.1	1294.6	1294.5	0.1
1.110	332.	1648.	4.0	1299.4	1298.4	1.0
1.160	110.	797.	8.3	1300.7	1299.9	0.8
1.210	126.	794.	8.3	1302.4	1301.7	0.7
1.240	108.	729.	9.0	1303.1	1302.4	0.7
1.290	196.	1034.	6.4	1305.2	1304.2	1.0
1.380	93.	758.	8.7	1308.5	1307.6	0.9
1.400	422.	2718.	2.4	1310.0	1309.3	0.7
1.410	257.	1022.	6.5	1309.0	1308.0	1.0

END OF OUTPUT

APPENDIX G

24" X 36" COPIES OF FIGURES 5 AND 6

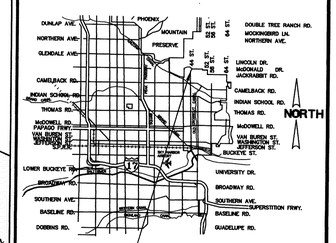
ECHO CANYON WASH FLOODPLAIN DELINEATION
PHOENIX STREETS – MARICOPA COUNTY



F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
	ARIZ	02079			

AZTEC

DR: KL	DES: LS	CK: JCF	DATE: 10/03



VICINITY MAP

NOTE:
ALL CROSS SECTIONS ARE SHOWN IN THE TABLE OUTPUTS.
ALL SECTIONS NOT SHOWN FOR CLARITY.

LEGEND

- LIMITS OF 100 YEAR FLOODPLAIN
- LIMITS OF DUPLICATE EFFECTIVE FLOODPLAIN
- FLOODPLAIN WSE / FLOODWAY WSE (0.356) — CROSS SECTION & DESIGNATION
- Base Flood Elevation– Elevation in Feet
- FLOODWAY LIMITS

PER CITY OF PHOENIX ORDINANCE G-4396, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF YOUR CONTRACT WITH THE CITY OF PHOENIX.

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 40071 LARRY F. SIBALA Date Signed ARIZONA, U.S.A.

CALL TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 602-263-1100 1-800-STAKE-IT OUTSIDE MARICOPA COUNTY

FLOODPLAIN DELINEATION

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

ECHO CANYON WASH
STANFORD DRIVE TO MCDONALD DRIVE

DR: KL	DES: LS	CK: JCF	SHEET NO.	TOTAL SHEETS	AS BUILT
DATE: 12/3	DATE: 9/13	DATE: 12/03	1	2	
SCALE: 1"=100' HORIZONTAL, 2' CONTOUR INTERVALS					

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

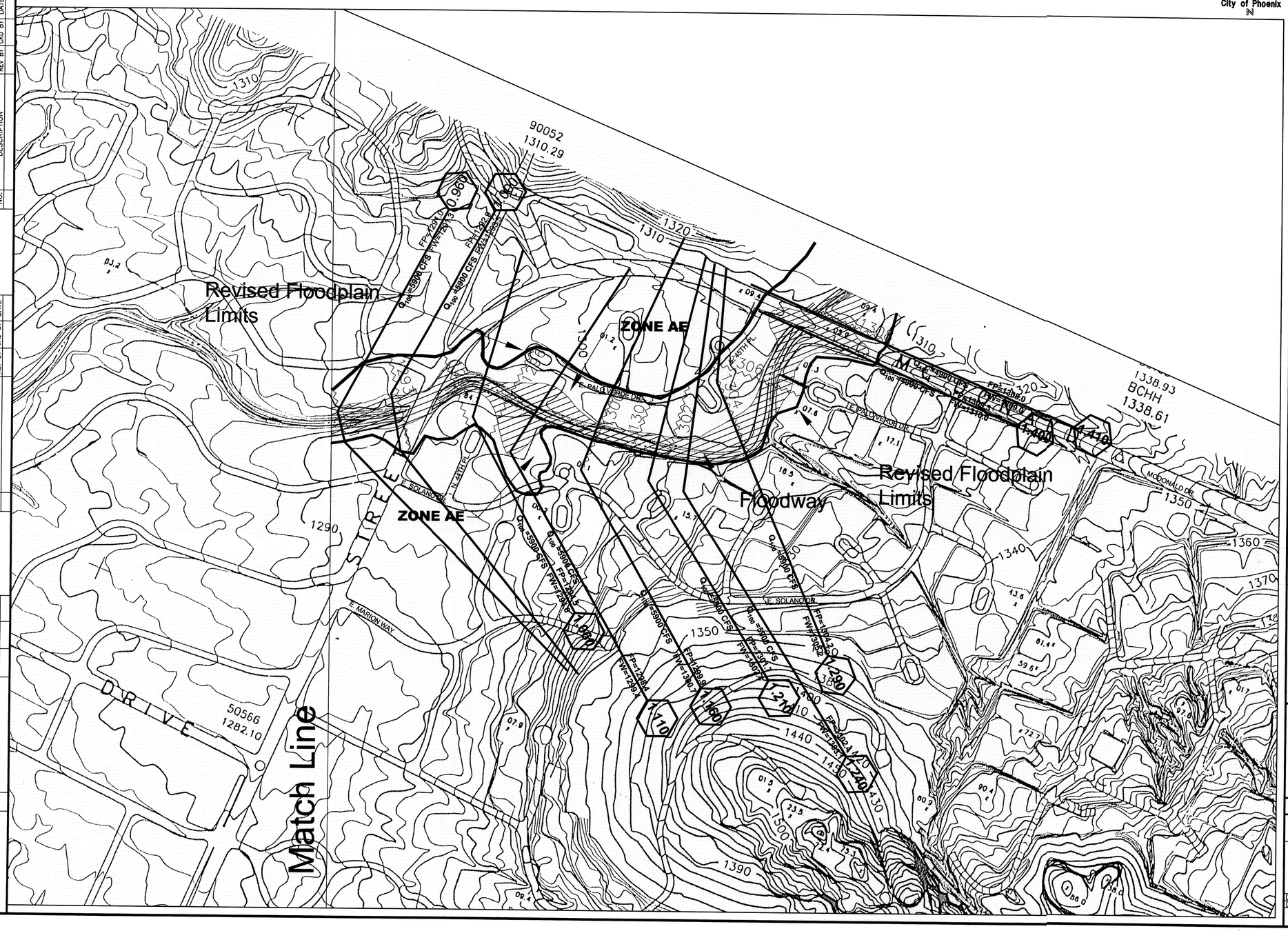
NO.	DESCRIPTION	REV BY	CKD BY	DATE
	REVISION BY CITY OF PHOENIX			

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

R:\PhoenixGrove\Projects\KZ02079\03\Tech\Report\Figures\Figure 5.dwg Dec 19, 2003 – 2:04pm

FIGURE 5

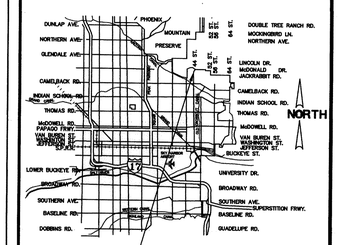
ECHO CANYON WASH FLOODPLAIN DELINEATION
PHOENIX STREETS – MARICOPA COUNTY



F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL	AS BUILT
	ARIZ	02079			

AZTEC

DR: KL	DES: LS	CK: JCF	DATE: 10/03



VICINITY MAP

NOTE:
ALL CROSS SECTIONS ARE SHOWN IN THE TABLE OUTPUTS.
ALL SECTIONS NOT SHOWN FOR CLARITY.

LEGEND

- LIMITS OF 100 YEAR FLOODPLAIN
- LIMITS OF DUPLICATE EFFECTIVE FLOODPLAIN
- FLOODPLAIN WSE / FLOODWAY WSE — 0.356 — CROSS SECTION & DESIGNATION
- Base Flood Elevation–Elevation in Feet
- FLOODWAY LIMITS

PER CITY OF PHOENIX ORDINANCE G-4396, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF YOUR CONTRACT WITH THE CITY OF PHOENIX.

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 40071 LARRY F. SIBALA Date Signed 12/19 ARIZONA, U.S.A.

CALL TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 602-263-1100 1-800-STAKE-IT OUTSIDE MARICOPA COUNTY

FLOODPLAIN DELINEATION

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

ECHO CANYON WASH
STANFORD DRIVE TO MCDONALD DRIVE

DR: KL	DES: LS	CK: JCF	SHEET NO.	TOTAL SHEETS	AS BUILT
DATE: 12/3	DATE: 9/13	DATE: 12/03			
SCALE: 1"=100' HORIZONTAL 2' CONTOUR INTERVALS			2	2	

NO.	DESCRIPTION	REV BY	CKD BY	DATE

REVISION BY CITY OF PHOENIX

R:\PhoenixGrove\Projects\AZ02079\03\Tech\Report\Figures\Figure 6.dwg Dec 19, 2003 – 1:07pm

FIGURE 6

APPENDIX H

OWNER NOTIFICATION

City of Phoenix

STREET TRANSPORTATION DEPARTMENT

March 17, 2003

RE: RIGHT OF ENTRY FOR SURVEYING PURPOSES
ELEVATION CERTIFICATE PROGRAM

Dear Property Owner:

The City of Phoenix has contracted with Aztec Engineering to perform a detailed survey between 47 Street to the East, 40th Street to the West, Stanford Drive to the South and McDonald Drive to the North. The purpose of the study is to prepare Elevation Certificates for properties identified within the Echo Canyon Wash 100-year floodplain. This floodplain is shown on the Flood Insurance Rate Map (FIRM) Panel 04013C1690F dated July 19, 2001. According to the Maricopa County Assessor's Office, you own one or more parcels of land within the limits of the study area.

The intent of this letter is to notify you of the commencement of activities in support of the above-mentioned survey work. In order to perform these surveys, it may be necessary to enter your property. This activity should not result in any inconvenience or damage to your property. If you have any objections to the entry onto your property, you must notify Mr. Hasan Mushtaq, Ph.D., P.E., C.F.M. of the City of Phoenix at 602-262-4960, or Mr. Chris Woolery, P. E., Aztec Engineering at 602-454-0402. Otherwise, it will be assumed that you consent to the entry onto your property. Aztec Engineering will start survey work 48 hrs after you receive this letter.

The survey information will be utilized to determine if your particular property qualifies for a Letter of Map Amendment (LOMA) through the Federal Emergency Management Agency (FEMA). The LOMA application process will be performed at no cost to the property owners through the Floodplain Management Section of the Street Transportation Department. If approved, it will no longer be a federal requirement for you to carry flood insurance for your property.

If you have any questions regarding this study, please contact this office at 602-262-4960.

Sincerely,

Hasan Mushtaq, Ph.D., P. E., C. F. M.
Floodplain Manager

c: Mr. Callow
Mr. Blakley
Mr. Acuna

200 West Washington Street, Fifth Floor, Phoenix, Arizona 85003 1611 602-262-6284 FAX: 602-495-2016
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City of Phoenix

STREET TRANSPORTATION DEPARTMENT

17 de marzo, 2003

Asunto: El derecho de acceso para los procesos de estudio de levantamiento
Programa de CertificadosdeElevación

Querido dueño de casa:

El municipio de Phoenix tiene un contrato con Aztec Engineering, para hacer un estudio de levantamientode elevación de terrenos en áreas de inundación. El área de estudio se extiende desde la calle 47 al Este, de la calle 40 al Oeste, de Stanford Drive al Sur, y de McDonald Drive al Norte. La razón del estudio es para preparar Certificados de Elevación para las propiedades que están en la zona de inundación que se llama Echo Canyon Wash. Esta zona de inundación esta demarcada en el mapa de FIRM (Flood Insurance Rate Map) y en el pánel 04013C1690F con fecha del19 de Julio del 2001. De acuerdo a la oficina de Registros del Condado de Maricopa (Maricopa County Assessor's Office), ud. tiene una o varias parcelasde terreno en este área del estudio.

El motivo de esta carta es para informarle de las actividades que se realizarán para el estudio de levantamiento. Para hacer el estudio, puede ser necesario entrar a su propiedad. Sin embargo, las actividades no resultarán en inconveniencias o daños a su propiedad. Sí Ud. Tiene alguna-objeción con la entrada o acceso a su propiedad, tiene que notificar al Señor Hasan Mushtaq, Ph.D., P.E., C.F.M., del municipio de Phoenix (602-262-4960) o al Señor Chris Woolery, P.E. de Aztec Engineering(602-454-0402). Sí no nos informa, vamos a asumir que tenemos permiso parar entrar a su propiedad. Aztec Engineering va a comenzar el estudio de levantamiento 48 horas después de que Ud. reciba esta carta.

La información del estudio determinará si su propiedad o propiedades califican para un Certificado de Revisión del Mapa (Letter of Map Ammendment, LOMA) mapa expedido por la Agencia Federal para el Manejo de Emergencias-(Federal Emergency Management Agency). El proceso de aplicación para el certificado de Revisión se realizará sin ningún costo para los propietarios de terrenos cuando éstos se procesan a través de la Sección de Manejo de Inundaciones del Departamento de Vías y Transporte. Si se aprueba dicho Certificado para su propiedad, ya no será un requisito federal que Ud. mantenga un seguro de inundación para su propiedad.

Sí tiene preguntas sobre el estudio o esta carta, por favor llame por teléfono a esta oficina al número 602-262-4960.

Atentamente,

Hasan Mushtaq, Ph.D., P.E., C.F.M.
Gerente de Áreas de Inundación

200 West Washington Street, Fifth Floor, Phoenix, Arizona 85003 1611 602-262-6284 FAX: 602-495-2016
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APPENDIX I

DIGITAL FILES