GILA BEND - BUCKEYE HIGHWAY (SR 85)

GILA RIVER BRIDGES

PROJECT F-023-1-910

HYDRAULIC REPORT

ARIZONA DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

STRUCTURES SECTION

BRIDGE DRAINAGE SERVICES

JANUARY 1991

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ARIZONA DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

STRUCTURES SECTION

BRIDGE DRAINAGE SERVICES

JANUARY 1991

Registered Professional Engineer (Civil)
CERTIFICATE NO.
16970
DENNIS A.
CRANDALL
Date Signed 1/2/91
ARIZONA, U.S.A.

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PURPOSE

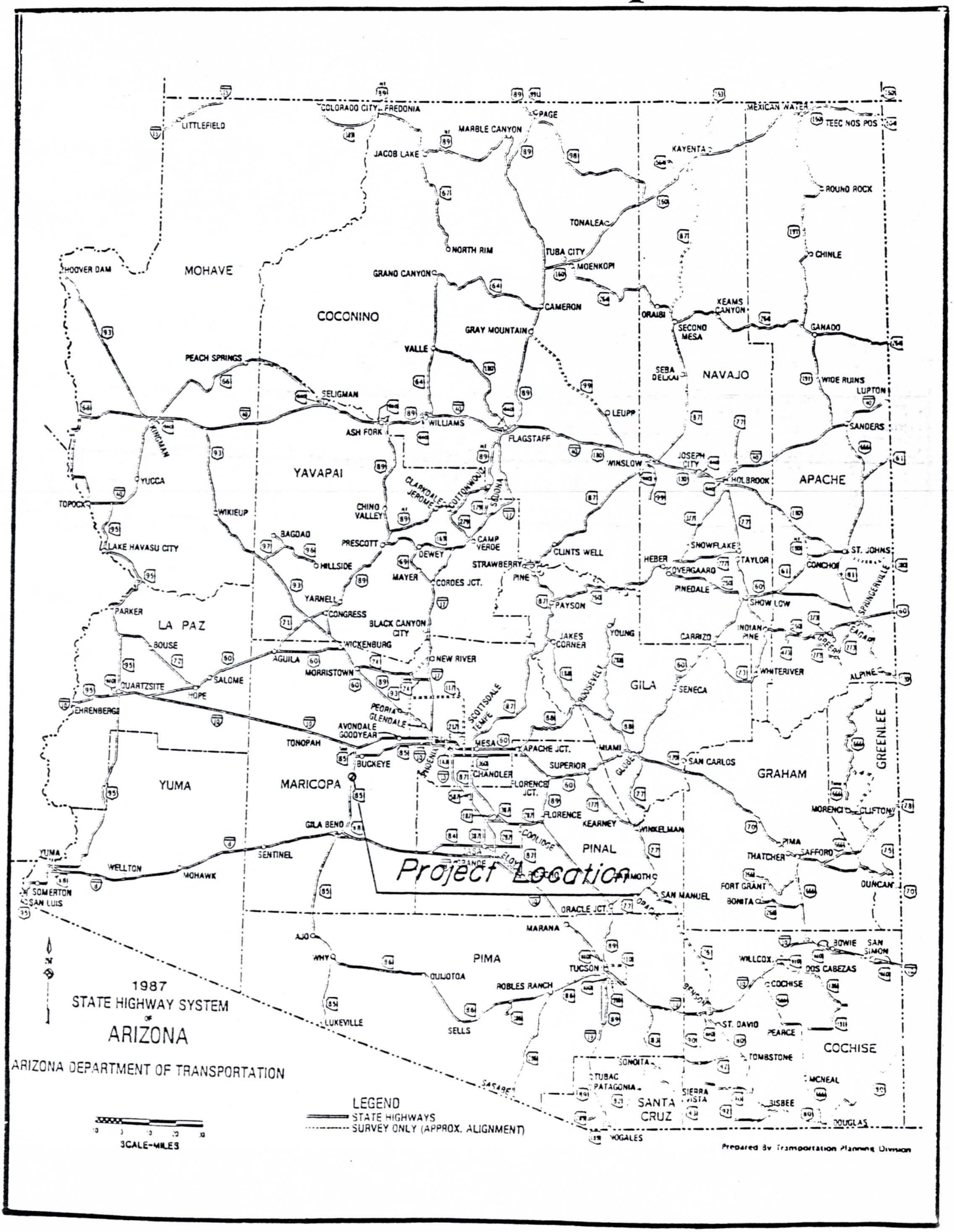
The existing 748′ long Gila River bridge has been closed to traffic three times in recent history due to floodwaters. These closures occurred in December 1978, February 1980, and October 1983. Since State Route 85 is a major route linking Interstate 8 and Interstate 10 and has a high traffic volume a new bridge across the Gila River with greater hydraulic capacity is desired.

The proposed replacement structures will provide a four lane, all-weather crossing of the Gila river. The northbound and southbound roadway centerlines are 70 feet apart and each bridge is 45′-2" wide. The proposed bridge length is 3625 long and the project is designed to be compatible with Federal Emergency Management Agency (FEMA) criteria.

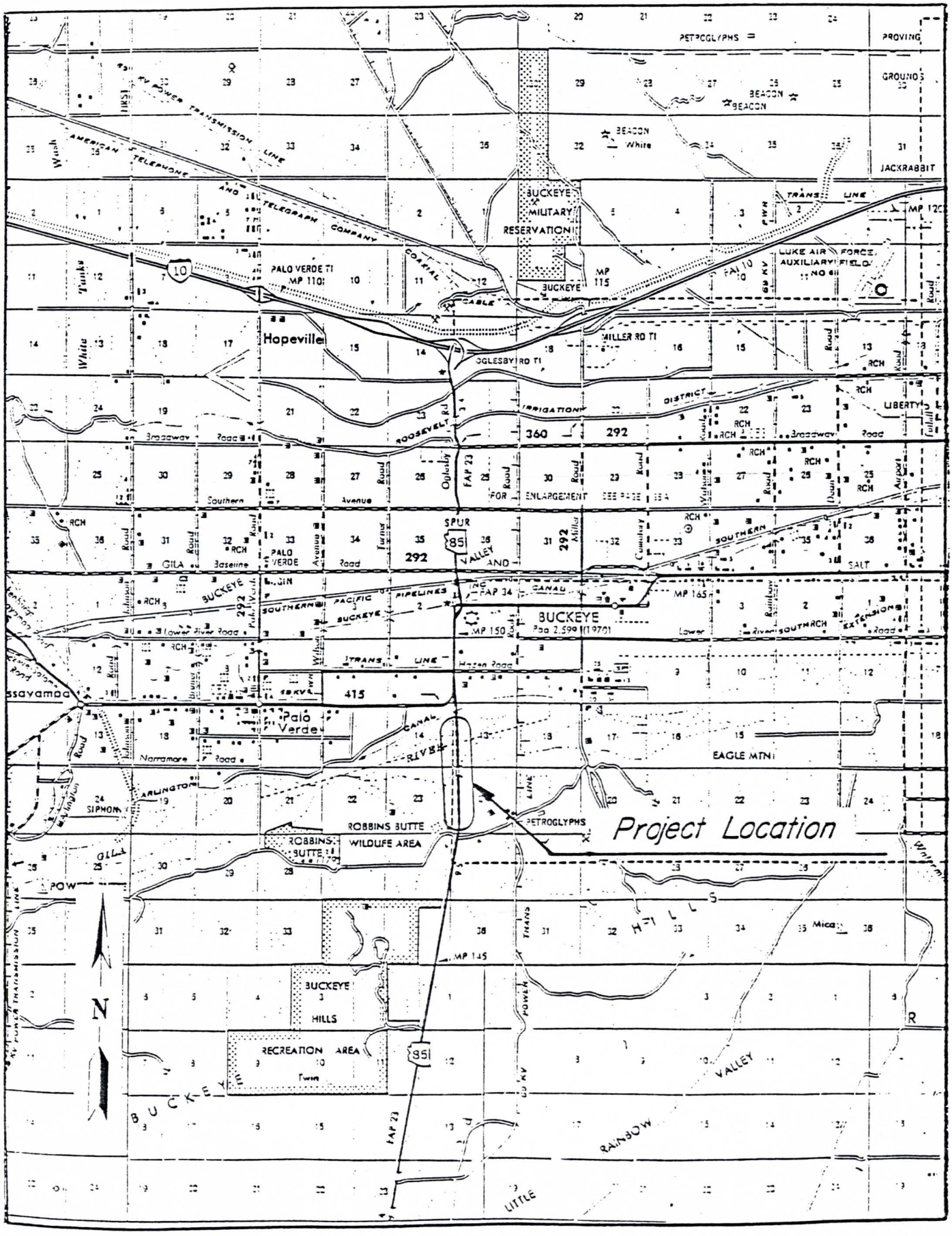
LOCATION

This project is located on State Route 85 southwest of the town of Buckeye, between milepoint 146.9 and milepoint 149.3. The proposed bridges are located between milepoint 147.74 and milepoint 148.43.

Location Map



Vicinity Map



HYDROLOGIC DATA

This reach of the Gila River is under the jurisdiction of the Flood Control District of Maricopa County (FCDMC) and a regulatory floodplain/floodway has been established. The regulatory discharges for this reach of the river were developed by the United States Army Corps of Engineers (USACOE) in 1982.

RETURN INTERVAL	DISCHARGE
10 year	88,000 cfs
50 year	195,000 cfs
100 year	245,000 cfs
500 year	350,000 cfs

These discharge values were used to design the new structures over the Gila River.

HYDRAULICS

The United States Army Corps of Engineers HEC-2 Water Surface Profiles computer program was used to calculate the water surface elevations for the 100 year event. The FEMA floodway model, developed by Dames and Moore for the Flood Control District of Maricopa County was used as the regulatory floodway. This model, along with a copy of the contour maps was provided to ADOT by the FCDMC.

The cross-section data from the FEMA model was modified to reflect the design conditions of the new structures. The modifications include the removal of the existing bridge and approaches and the effective flow areas of the new bridges. The bridges were modeled using the normal bridge method. This method utilizes GR data points to model bridge piers as well as the ground points at the bridge cross-sections. The computer program limits the number of GR data pairs to 100; 4 data pairs are required to model each pier. All twenty-seven; 8' diameter piers could not be modeled because of this limitation. Therefore; twenty-one, 11' diameter piers were modeled. The 21 modeled piers have a total obstructed width greater than the 27 actual piers.

(27)(8) = 216
(21)(11) = 231

Effective flow areas upstream and downstream of the proposed structures were determined using 1.5:1 expansion and

contraction rates. These expansion and contraction rates are calculated using the equation:

$$\text{Tan Alpha} = 1 / (3 \times \text{FROUDE})$$

This equation is presented in the Bureau of Reclamation publication "Design of Small Dams". A copy of the appropriate pages of this publication, along with the calculation is included in the appendix to this report. The encroachment stations determined from the application of the expansion and contraction rates were established by using the FEMA study baseline.

The following table provides a comparison of floodway elevations and topwidths for the existing conditions and the proposed bridge structures. Downstream of the proposed bridges the water surface elevations are slightly higher (maximum of 0.22 feet at Section 202) because of the effective flow areas modeled. These increases are less than the allowable 1 foot increase in water surface elevation above the base flood elevations in the floodway area. These increased water surface elevations occur on public lands which are unlikely to ever be developed. Upstream of the proposed bridges, the water surface elevations are lower than the floodway elevations in the reach of river affected by the

HYDRAULICS (continued)

bridge. This reduction in water surface elevations was achieved by the removal of the existing bridge and the existing roadway approaches under the proposed bridges.

CONCLUSION

The cumulative rise in water surface elevation within the floodway limits is less than one foot over the base flood elevation. The design is in compliance with the floodplain regulations of Maricopa County and the State of Arizona. Modification to the FCDMC's channel upstream and downstream of the proposed bridges is not necessary.

REFERENCES

1. Chow, Ven Te, "Open Channel Hydraulics", McGraw-Hill, 1959.

2. Colorado State University, Civil Engineering Section, "Backwater Effects of Piers and Abutments", by H.K. Liu, J.N. Bradley, and E.J. Plate, Report CER57HKL10, October,1957

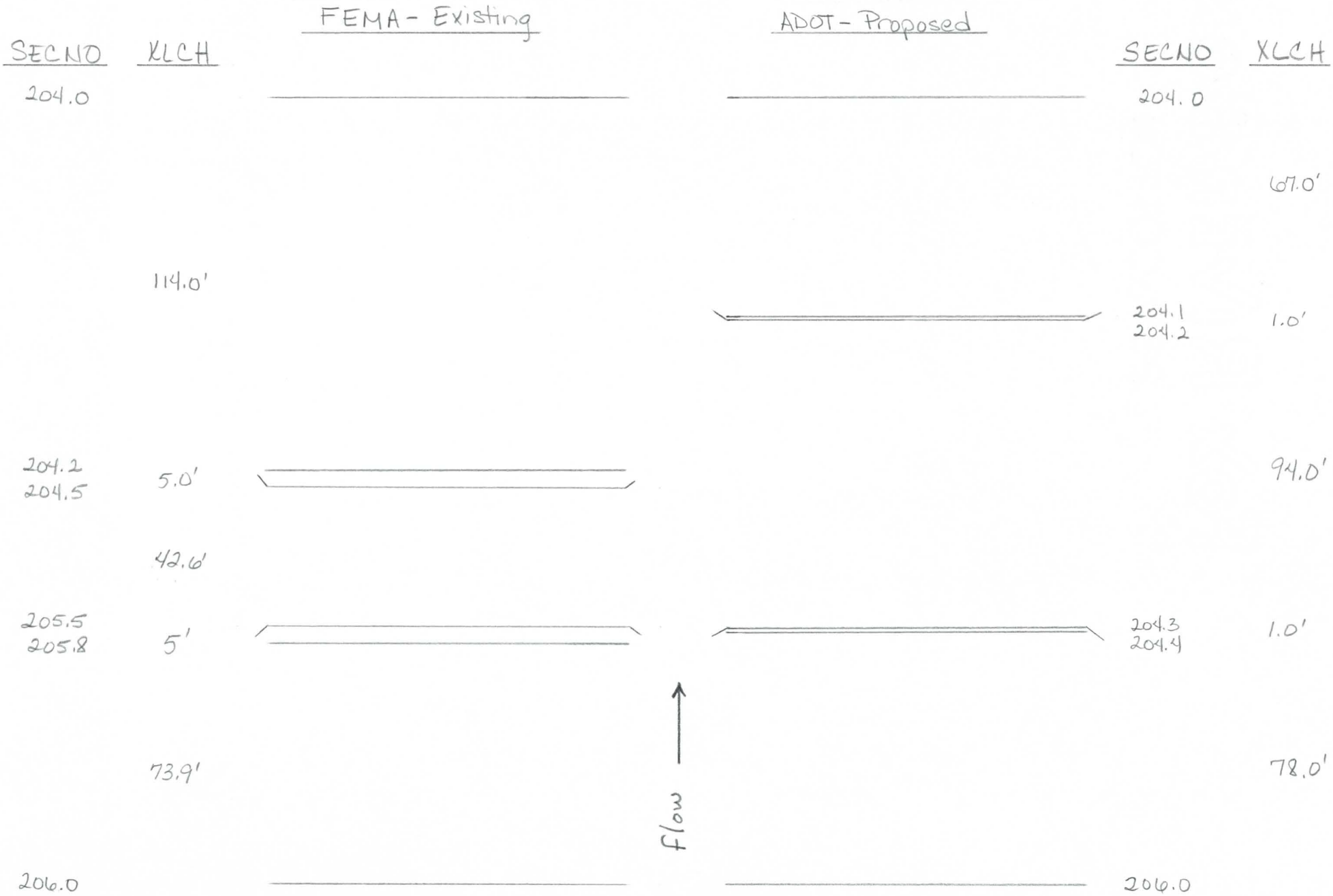
3. Dames & Moore, "Final Report, Floodplain Delineation for a 30-Mile Reach of the Gila River, Arizona, for the Flood Control District of Maricopa County", October 20, 1988.

4. U. S. Army Corps of Engineers, "HEC-2: Water Surface Profiles, Users Manual", September, 1982, and Supplements.

5. U. S. Department of The Interior, Bureau of Reclamation, "Design of Small Dams", A Water Resources Technical Publication, 1973.

6. U.S. Department of Transportation, Federal Highway Administration, "Hydraulics of Bridge Waterways", September, 1973.

Relative Positions of Existing and Proposed Cross-Sections



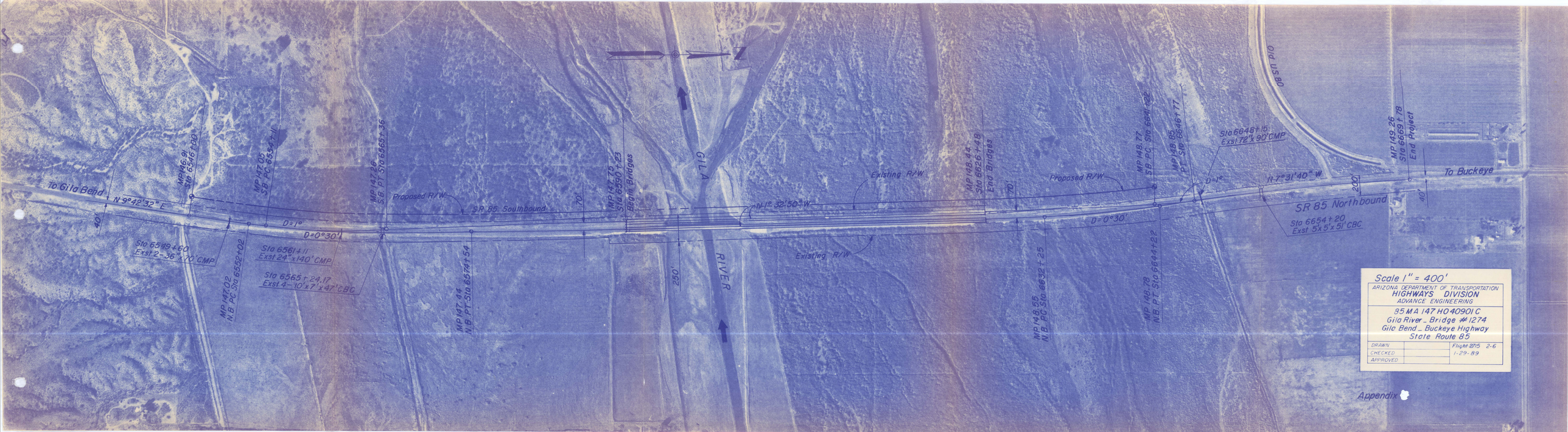
COMPARISON OF SELECTED EXISTING AND PROPOSED (ADOT) CONDITIONS

	100 YEAR CWSEL			TOPWIDTH	
SECNO	FEMA FLOODPLAIN FLOODWAY	ADOT FLOODWAY	DELTA CWSEL FLOODWAY	FEMA FLOODPLAIN FLOODWAY	ADOT FLOODWAY
190	818.01			10196	
	818.87	818.87	0	6070	6070
192	819.06			11152	
	819.86	819.86	0	6217	6217
194	820.56			11194	
	821.39	821.39	0	6475	6475
196	821.44			10242	
	822.24	822.24	0	6640	6520
198	823.22			10531	
	823.9	823.94	0.04	6939	6175
200	824.59			9666	
	825.21	825.36	0.15	7070	5750
202	825.6			10015	
	826.12	826.34	0.22	7004	4810
204	825.89			9575	
	826.39	826.56	0.17	6425	3730
204.1	-			-	
	-	826.7	-	-	3690
204.2*	827.14			8673	
	826.89	826.65	NA	6355	3381
204.3*	-				
	-	826.92	NA	-	3382
204.4	-				
	-	827.02	NA	-	3625
204.5#	827.9			6612	
	827.68	-	NA	5802	-
205.5#	829.78			8744	
	829.91	-	NA	6550	-
205.8	830.23			10935	
	830.21	-	NA	6550	-

NOTES: "*" = ADOT BRIDGE SECTION
"#" = EXISTING BRIDGE SECTION
SECTION NUMBERS ARRANGED IN INCREASING ORDER

COMPARISON OF SELECTED EXISTING AND PROPOSED (ADOT) CONDITIONS

	100 YEAR CWSEL			TOPWIDTH	
SECNO	FEMA FLOODPLAIN FLOODWAY	ADOT FLOODWAY	DELTA CWSEL FLOODWAY	FEMA FLOODPLAIN FLOODWAY	ADOT FLOODWAY
206	830.56			12061	
	830.69	827.3	-3.39	6500	3700
208	830.8			11682	
	831.01	828.56	-2.45	7250	4864
210	831.2			11370	
	831.53	830.25	-1.28	7308	5816
212	831.92			10714	
	832.45	832	-0.45	7520	6820
214	832.76			10885	
	833.41	833.23	-0.18	7810	7130
216	833.39			11196	
	834.12	834.03	-0.09	7930	7570
218	834.12			10640	
	834.9	834.87	-0.03	7690	7690
220	834.86			10626	
	835.64	835.62	-0.02	7390	7390
222	835.66			10302	
	836.44	836.42	-0.02	6900	6900
224	836.53			10214	
	837.35	837.34	-0.01	6470	6470
226	837.9			9814	
	838.78	838.77	-0.01	6220	6220
228	839.14			8815	
	839.99	839.99	0	6030	6030



Scale 1" = 400'

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
ADVANCE ENGINEERING

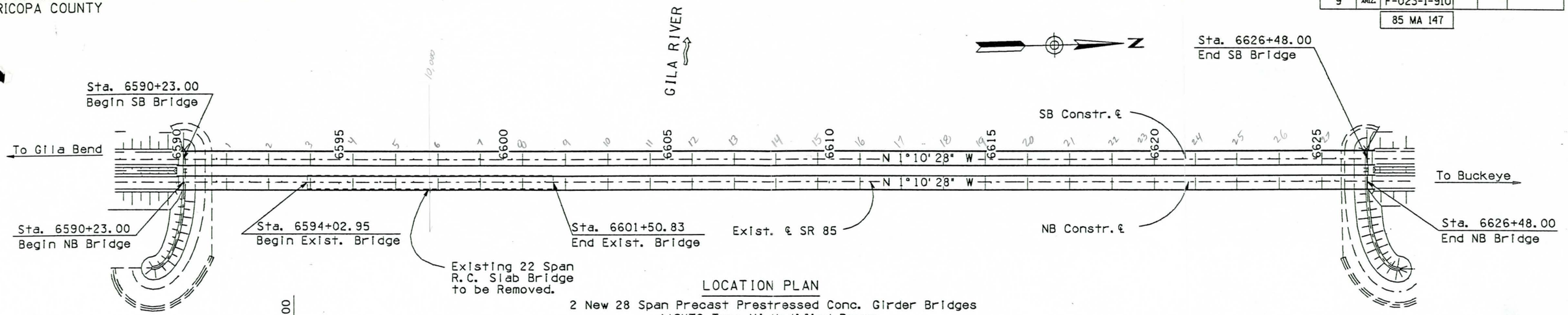
85 MA 147 H040901 C
Gila River _ Bridge #1274
Gila Bend _ Buckeye Highway
State Route 85

DRAWN		Flight 2715 2-6
CHECKED		1-29-89
APPROVED		

Appendix

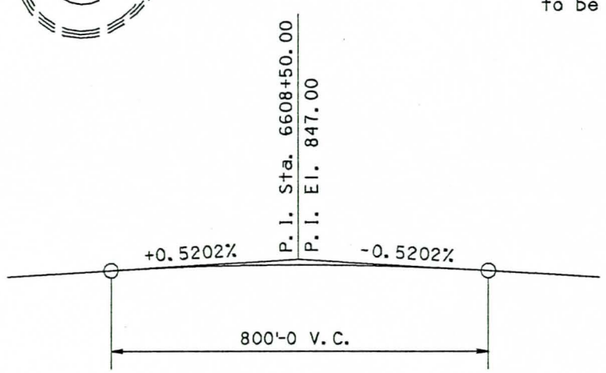
GILA BEND-BUCKEYE HWY. (SR 85)
GILA RIVER BRIDGE
MARICOPA COUNTY

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	F-023-1-910			
		85 MA 147			



LOCATION PLAN

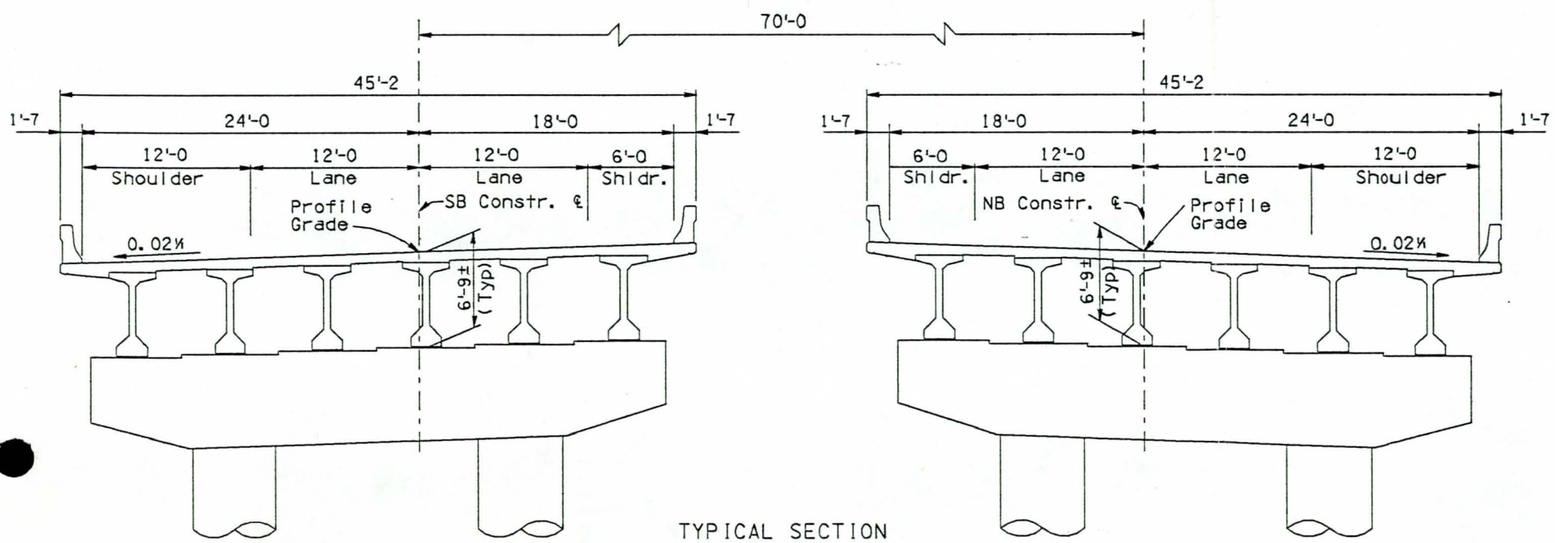
2 New 28 Span Precast Prestressed Conc. Girder Bridges
AASHTO Type VI Modified Beams
Skew = 0° 0' 0"
Scale: 1" = 150'-0



PROFILE GRADE LINE S.R. 85

SHEET LIST

TITLE	SHEET NO.
GENERAL PLAN	1 of
LOCATION PLAN 1	2 of
LOCATION PLAN 2	3 of
LOCATION PLAN 3	4 of
LOCATION PLAN 4	5 of
LOCATION PLAN 5	6 of
GENERAL NOTES & QUANTITIES	7 of



TYPICAL SECTION
Scale : 3/16" =1'

The existing bridge was constructed in 1969 under the Project No. F-023-1(504) and extended in 1982 under the Project No. SB-023-1-908.

		DATE
DESIGN	K. RUFFEN	07/90
DESIGN CK'D		
DRAWN	K. MUSSEL	07/90
DWG CK'D		
APPROVED-TEAM LEADER		
APPROVED-SUPERVISOR		

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STRUCTURES SECTION

Sta. 6590+
GILA RIVER BRIDGE
GENERAL PLAN

ROUTE	MILEPOST	STRUCTURE NO.	LOCATION
SR 85	147.75	2279 2280	GILA RIVER BRIDGE

BRIDGE ENGINEER

SHEET 1 OF

TRACS NO. H0409 01C

___ OF ___

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VIEW NAME: BR

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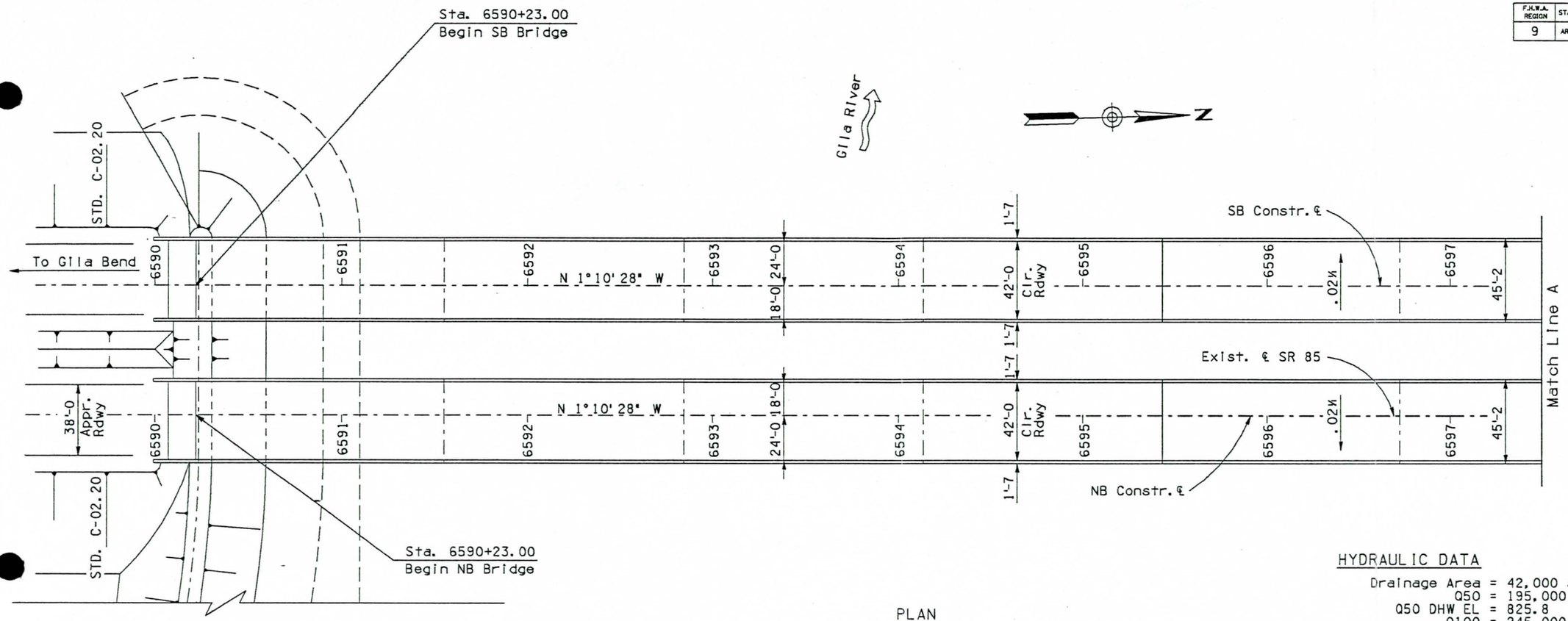
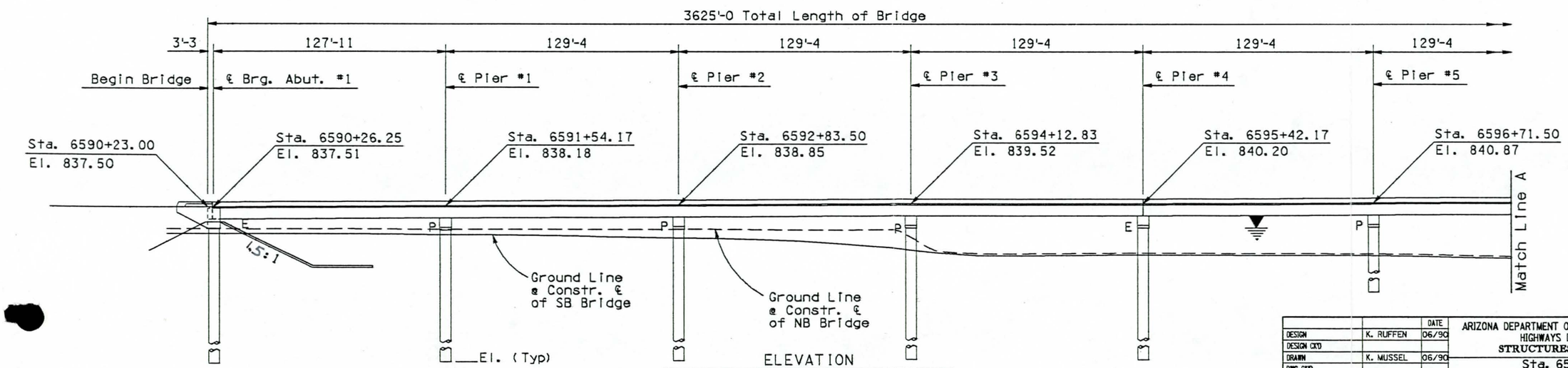
9	ARIZ.	F-023-1-910			
		85 MA 147			



PLAN
Scale: 1" = 30'-0

HYDRAULIC DATA

Drainage Area = 42,000 sq. mi.
Q50 = 195,000 cfs
Q50 DHW EL = 825.8
Q100 = 245,000 cfs
Q100 DHW EL = 827.0



ELEVATION
(Stations and Elevations taken on Constr. ℄ unless shown otherwise)
Scale: 1" = 30'-0

		DATE
DESIGN	K. RUFFEN	06/90
DESIGN CK'D		
DRAWN	K. MUSSEL	06/90
DWG CK'D		
APPROVED-TEAM LEADER		
APPROVED-SUPERVISOR		

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STRUCTURES SECTION

Sta. 6590+
GILA RIVER BRIDGE
LOCATION PLAN I

ROUTE	MILEPOST	STRUCTURE NO.	LOCATION
SR 85	147.75	2279 2280	GILA RIVER BRIDGE

BRIDGE ENGINEER

SHEET 2 OF ___ OF ___

TRACS NO. H0409 01C

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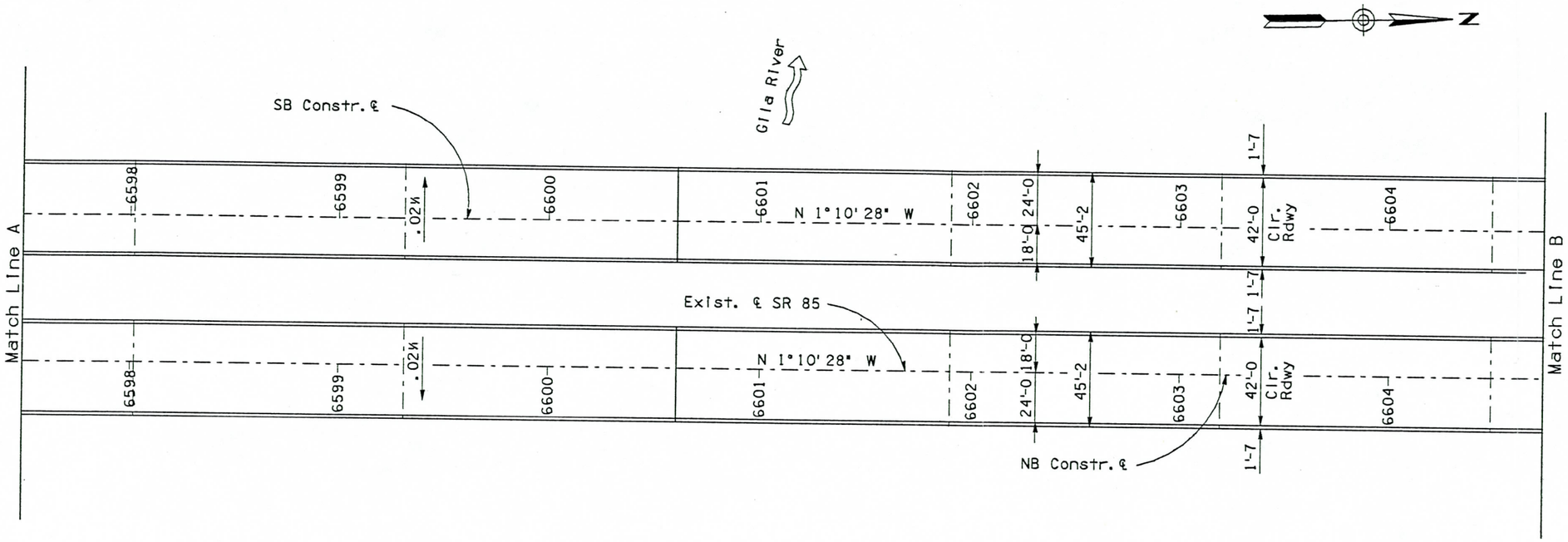
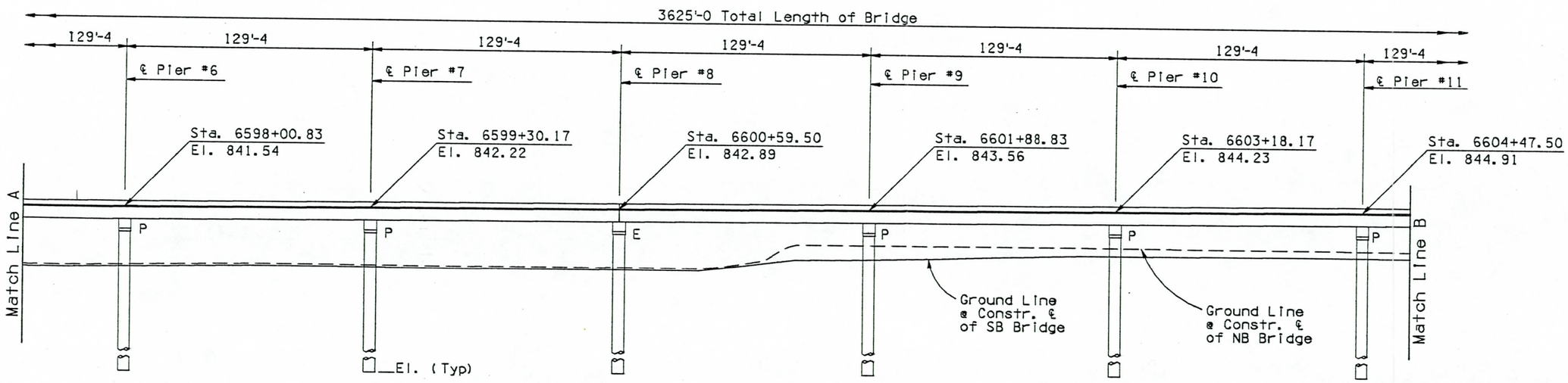
		85 MA 147			



PLAN
Scale: 1" = 30'-0



ELEVATION
(Stations and Elevation taken on Constr. ℄ unless shown otherwise)
Scale: 1" = 30'-0

		DATE
DESIGN	K. RUFFEN	06/90
DESIGN CKD		
DRAWN	K. MUSSEL	06/90
DWG CKD		
APPROVED-TEAM LEADER		
APPROVED-SUPERVISOR		

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STRUCTURES SECTION

Sta. 6590+
GILA RIVER BRIDGE
LOCATION PLAN 2

ROUTE	MILEPOST	STRUCTURE NO.	LOCATION
SR 85	147.75	2279 2280	GILA RIVER BRIDGE

BRIDGE ENGINEER

SHEET 3 OF OF

TRACS NO. H0409 01C

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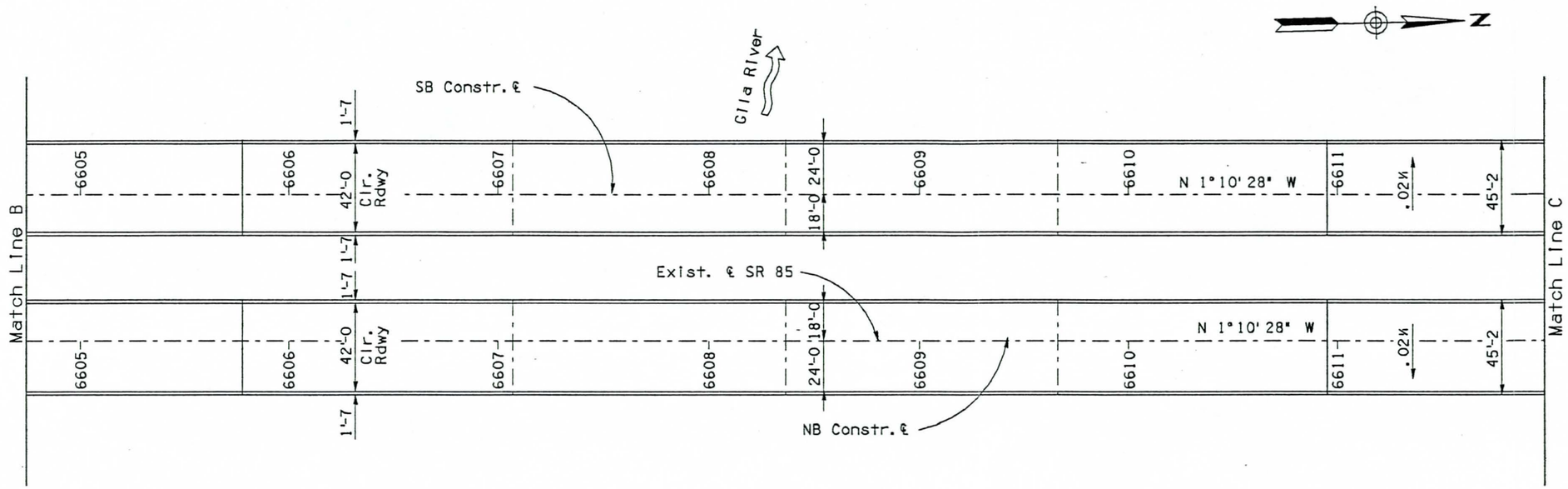
		85 MA 147			



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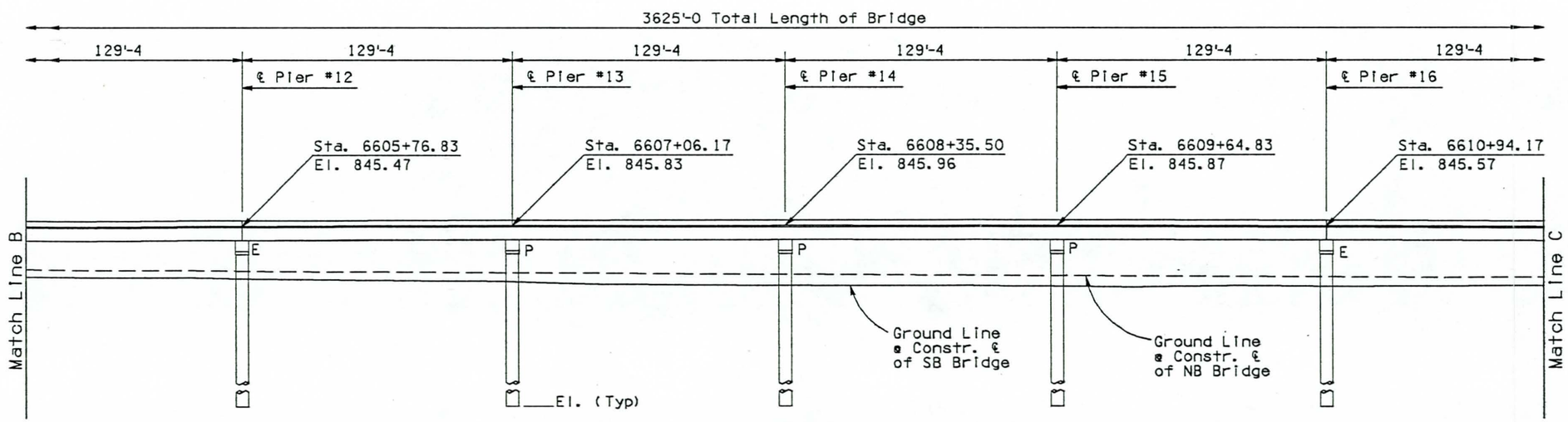

ELEVATION
(Stations and Elevations taken on Constr. ℄ unless shown otherwise)
Scale: 1" = 30'-0

		DATE
DESIGN	K. RUFFEN	06/90
DESIGN CK'D		
DRAWN	K. MUSSEL	06/90
DWG CK'D		
APPROVED-TEAM LEADER		
APPROVED-SUPERVISOR		

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STRUCTURES SECTION

Sta. 6590+
GILA RIVER BRIDGE
LOCATION PLAN 3

ROUTE	MILEPOST	STRUCTURE NO.	LOCATION
SR 85	147.75	2279 2280	GILA RIVER BRIDGE

BRIDGE ENGINEER

SHEET 4 OF ___ OF ___

TRACS NO. H0409 01C

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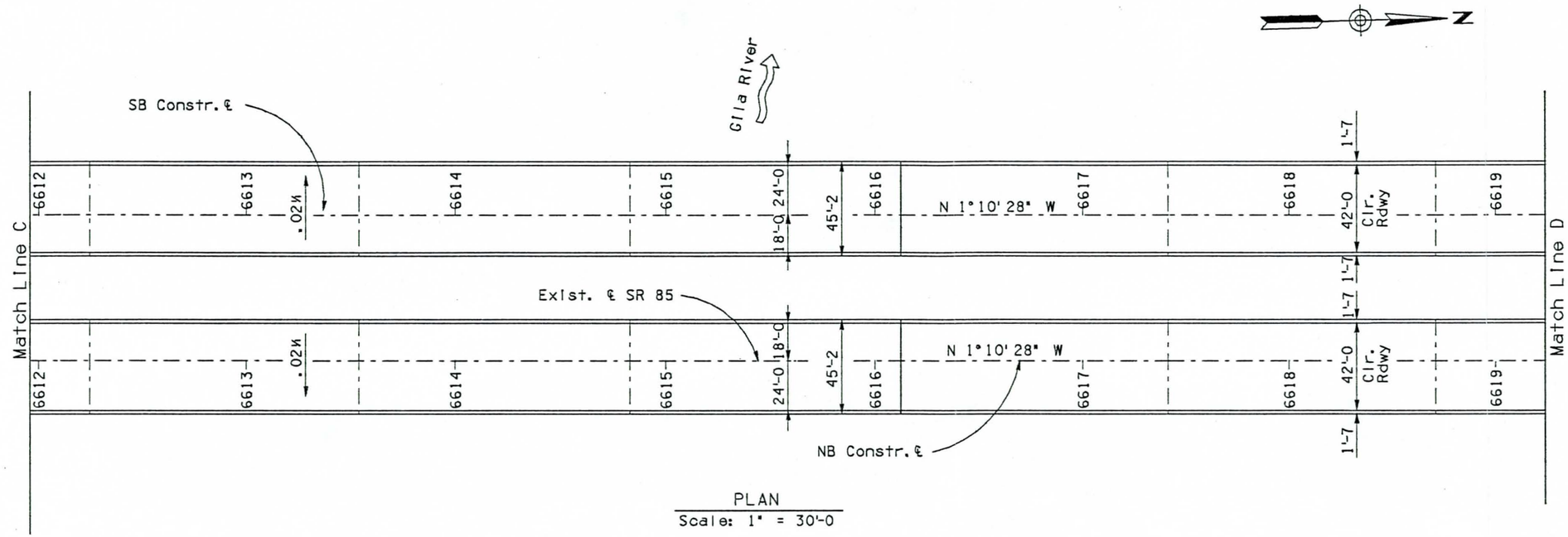
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	F-023-1-910			

85 MA 147



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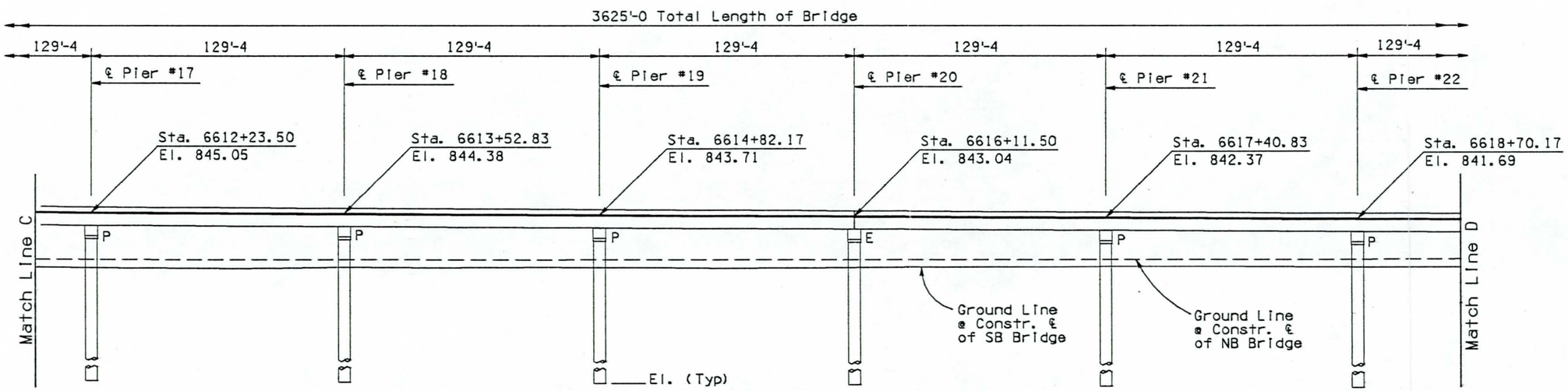

ELEVATION
(Stations and Elevations taken on Constr. ℄ unless shown otherwise)
Scale: 1" = 30'-0

		DATE
DESIGN	K. RUFFEN	06/90
DESIGN CK'D		
DRAWN	K. MUSSEL	06/90
DWG CK'D		
APPROVED-TEAM LEADER		
APPROVED-SUPERVISOR		

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STRUCTURES SECTION

Sta. 6590+
GILA RIVER BRIDGE
LOCATION PLAN 4

ROUTE	MILEPOST	STRUCTURE NO.	LOCATION
SR 85	147.75	2279 2280	GILA RIVER BRIDGE

BRIDGE ENGINEER

SHEET 5 OF OF

TRACS NO. H0409 01C

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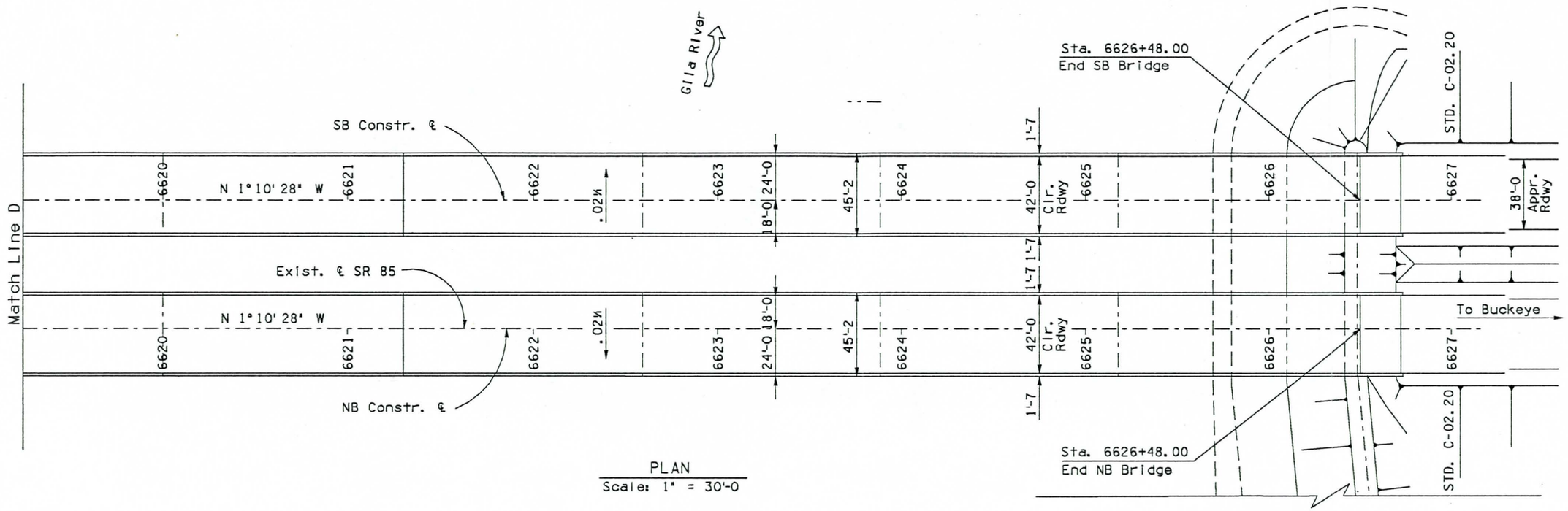
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	F-023-1-910			
		85 MA 147			



PLAN
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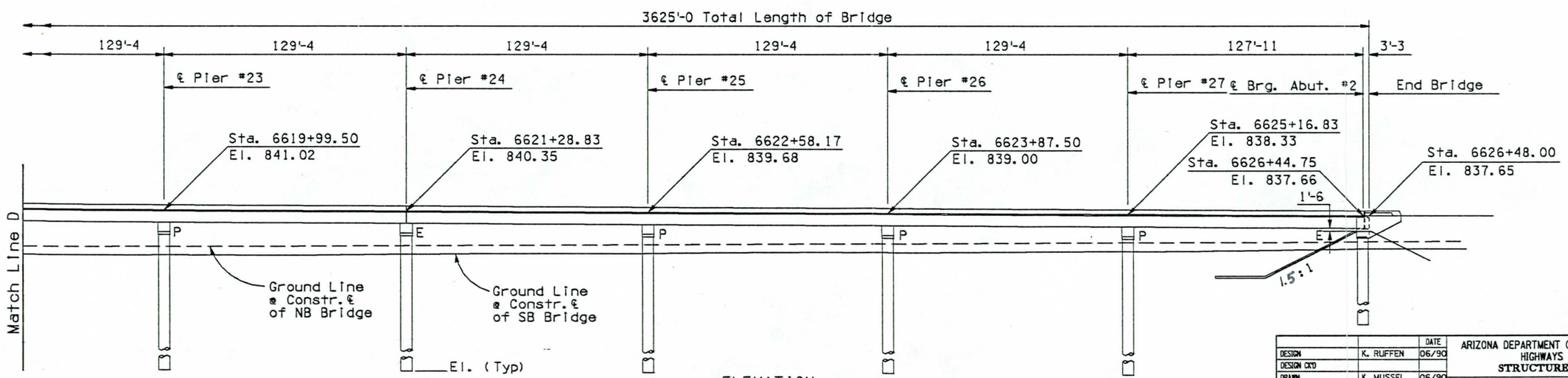

ELEVATION
(Stations and Elevations taken on Constr. ℄ unless shown otherwise)
Scale: 1" = 30'-0

		DATE
DESIGN	K. RUFFEN	06/90
DESIGN CK'D		
DRAWN	K. MUSSEL	06/90
DWG CK'D		
APPROVED-TEAM LEADER		
APPROVED-SUPERVISOR		

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STRUCTURES SECTION

Sta. 6590+
GILA RIVER BRIDGE
LOCATION PLAN 5

ROUTE	MILEPOST	STRUCTURE NO.	LOCATION
SR 85	147.75	2279 2280	GILA RIVER BRIDGE

BRIDGE ENGINEER

SHEET 6 OF ___ OF ___

TRACS NO. H0409 01C

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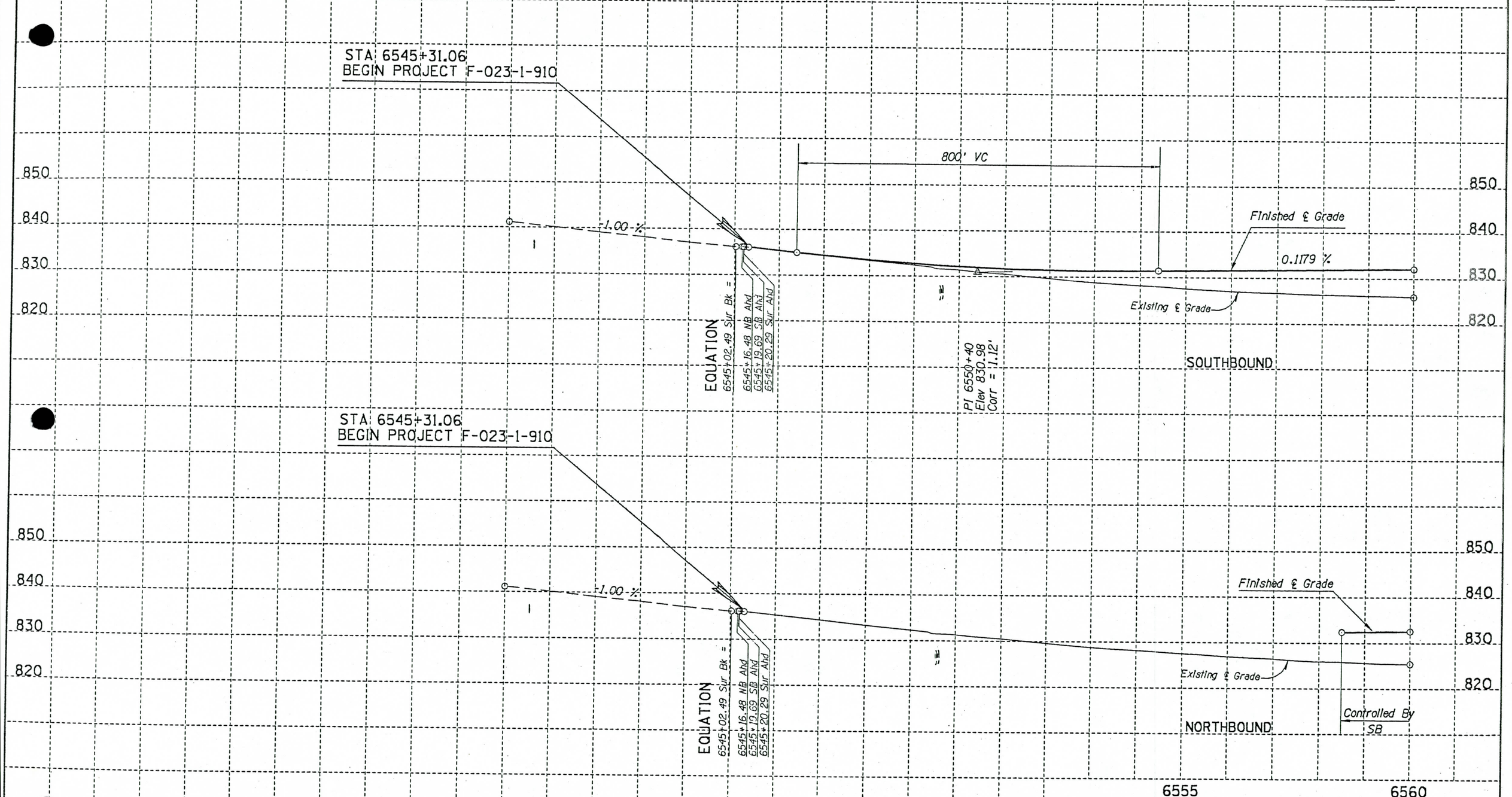
		85 MA 147			



	NAME	DATE
DESIGN	H.L. SMITH	
DRAWN	H.L. SMITH	
CHECKED		
TEAM LEADER	F. ROEHRICH	

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
HIGHWAY PLANS SERVICES

PROFILE SHEET
Sta 6545+31.06 to 6560

ROUTE SR 85 | LOCATION GILA RIVER BRIDGE #1274

SHEET OF

TRACS NO. H0409 01 C

___ OF ___

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9-OCT-1990 19:37

VIEW NAME: G1

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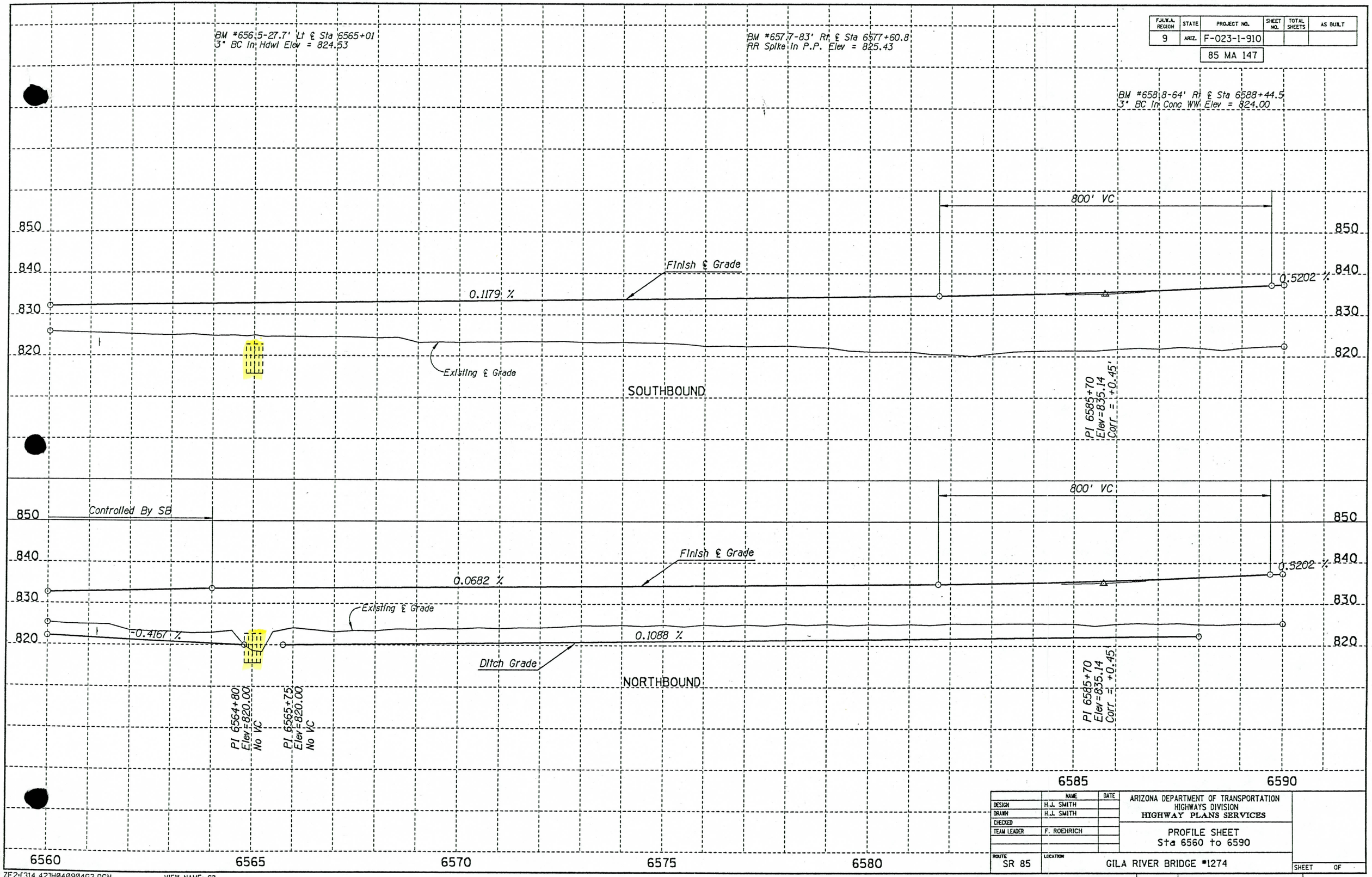
		85 MA 147			



	NAME	DATE
DESIGN	H.J. SMITH	
DRAWN	H.J. SMITH	
CHECKED		
TEAM LEADER	F. ROEHRICH	

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
HIGHWAY PLANS SERVICES

PROFILE SHEET
Sta 6560 to 6590

ROUTE: SR 85
LOCATION: GILA RIVER BRIDGE #1274

SHEET ___ OF ___

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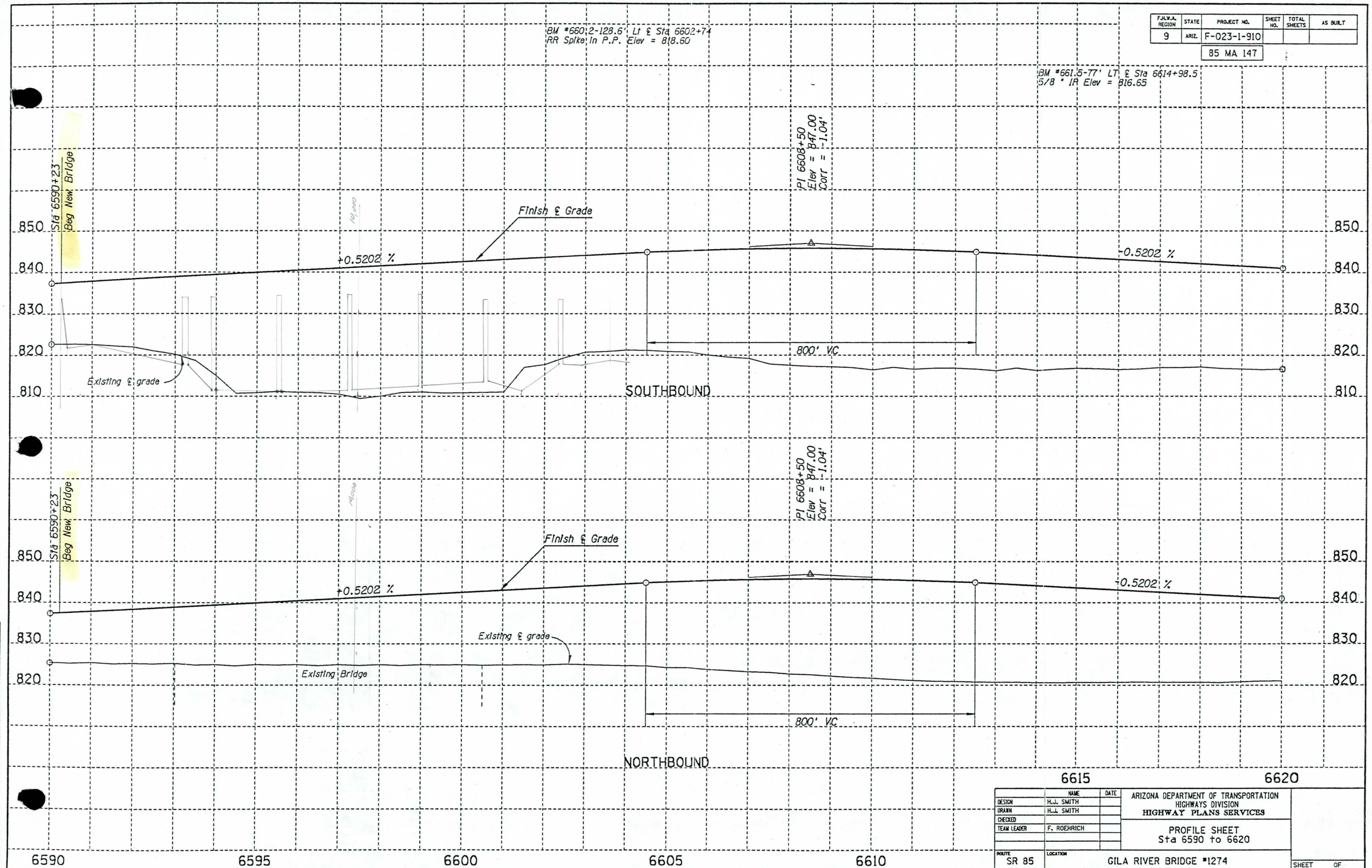
10-OCT-1990 19:30
VIEW NAME: G2

TRACS NO. H0409 01 C

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	F-023-1-910			
		85 MA 147			



	NAME	DATE
DESIGN	H.J. SMITH	
DRAWN	H.J. SMITH	
CHECKED		
TEAM LEADER	F. ROEHRICH	

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
HIGHWAY PLANS SERVICES

PROFILE SHEET
Sta 6590 to 6620

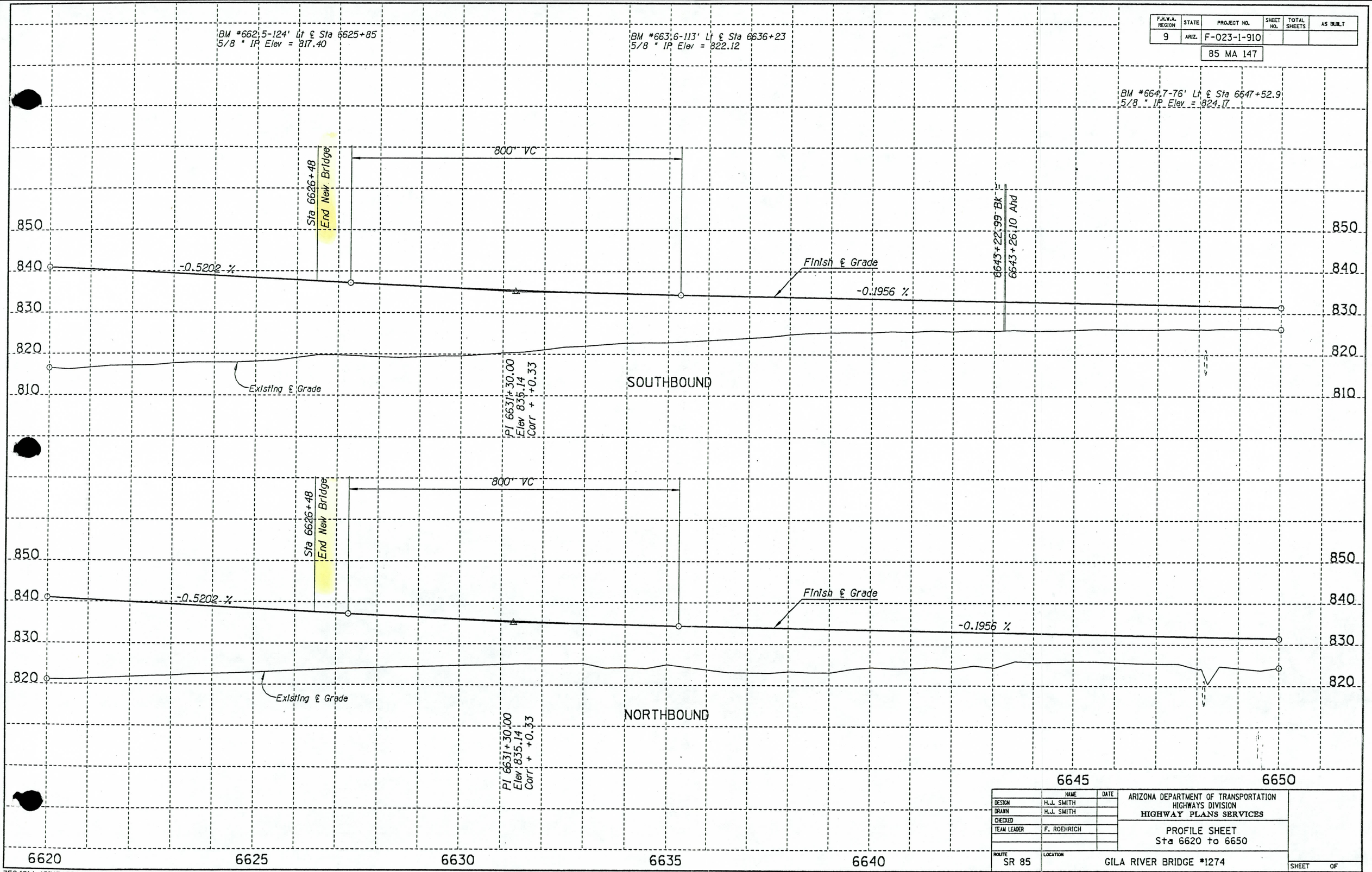
ROUTE: SR 85
LOCATION: GILA RIVER BRIDGE #1274

SHEET ___ OF ___

ZF2:[314.42]H0409G3.DGN
9-OCT-1990 19:41
VIEW NAME: G3

TRACS NO. H0409 01 C

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	F-023-1-910			
		85 MA 147			



	NAME	DATE
DESIGN	H.J. SMITH	
DRAWN	H.J. SMITH	
CHECKED		
TEAM LEADER	F. ROEHRICH	

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
HIGHWAY PLANS SERVICES

PROFILE SHEET
Sta 6620 to 6650

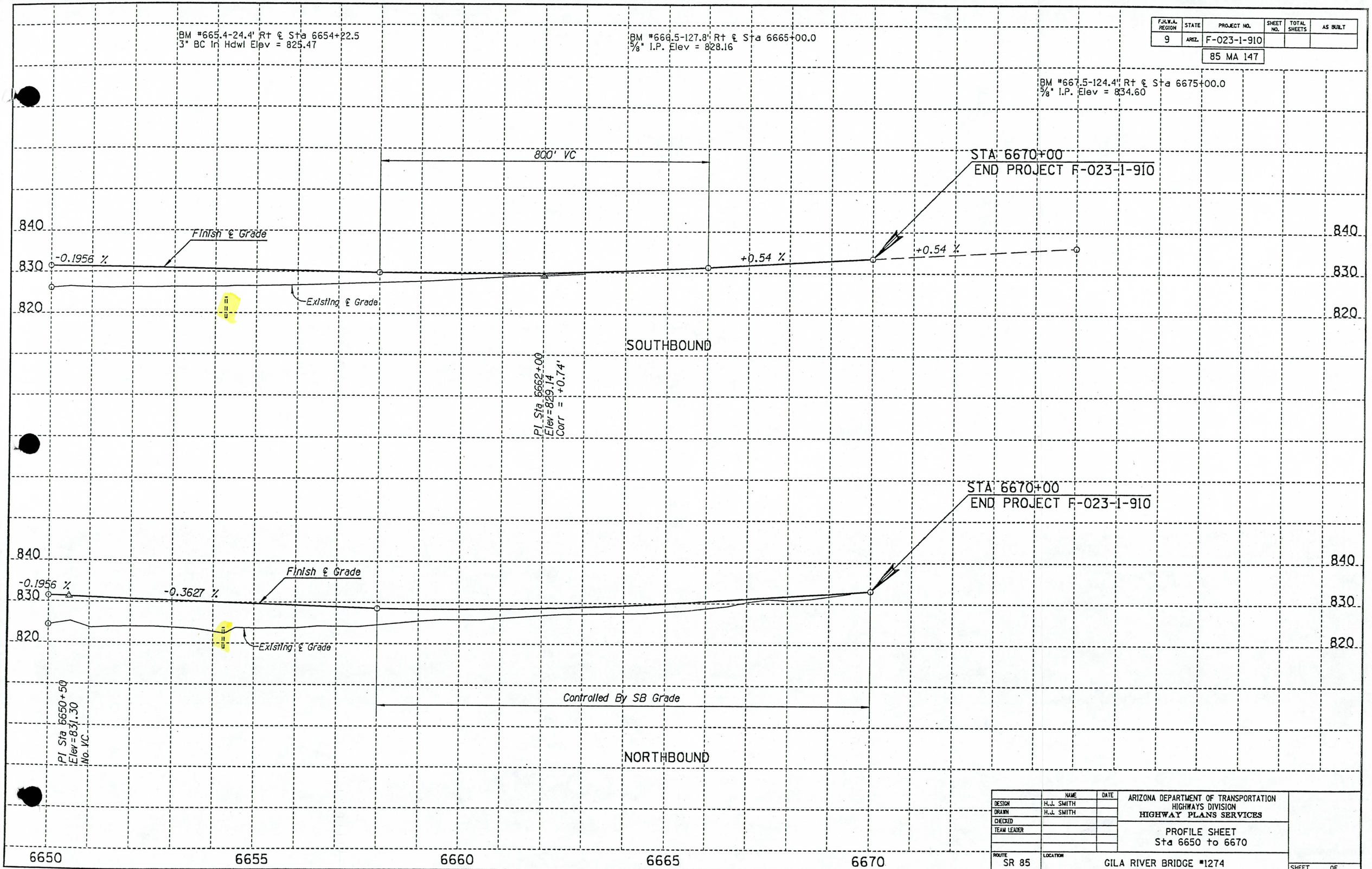
ROUTE: SR 85
LOCATION: GILA RIVER BRIDGE #1274

SHEET ___ OF ___

ZF2:[314,42]H040904G4.DGN
9-OCT-1990 19:42
VIEW NAME: G4

TRACS NO. H0409 01 C

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	F-023-1-910			
		85 MA 147			



	NAME	DATE
DESIGN	H.J. SMITH	
DRAWN	H.J. SMITH	
CHECKED		
TEAM LEADER		

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
HIGHWAY PLANS SERVICES

PROFILE SHEET
Sta 6650 to 6670

ROUTE: SR 85
LOCATION: GILA RIVER BRIDGE #1274

SHEET ___ OF ___

ZF2:[314,42]H040904G5.DGN
9-OCT-1990 19:44
VIEW NAME: G5

TRACS NO. H0409 01 C

___ OF ___

```
*  WATER SURFACE PROFILES                          *
*  VERSION OF SEPTEMBER 1988                       *
*                                                  *
*                                                  *
*  RUN DATE    11/ 8/90   TIME    7:11:59          *
****************************************************
```


```
*  U.S. ARMY CORPS OF ENGINEERS        *
*  THE HYDROLOGIC ENGINEERING CENTER   *
*  609 SECOND STREET, SUITE D          *
*  DAVIS, CALIFORNIA 95616             *
*  (916) 756-1104                      *
****************************************
```


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

END OF BANNER

THIS RUN EXECUTED 11/ 8/90 7:11:59

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**************************************************
 HEC2 RELEASE DATED SEPT 88

**************************************************

T1      DAMES & MOORE JOB NUMBER 15448-001-22
T2      FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
T3      GILA RIVER WITH 100-YEAR  FLOW    (REVISED 4/20/89)

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0        2                                                          245000    818.01

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLOC     IBW       CHNIM     ITRACE

     1                  -1

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

   -10        -10

J6  IHLEQ     ICOPY     SUBDIV    STRTDS    RMILE

                         -1


NC    0.050     0.050     0.030       0.1       0.3
NH        5     0.035    7592.2     0.060    8288.1     0.045   10623.4     0.060   13991.2     0.035
NH    19344
ET                          9.1                                                          7430     13500
X1    190.0        94    9490.0   10537.5       770      1100       910
GR    839.5    3492.2     844.7    3535.9     842.0    3649.9     836.6    3704.2     837.7    3765.2
GR    833.0    3840.3     830.3    4015.2     824.2    4232.9     824.2    4284.1     828.2    4449.6
GR    825.0    4598.5     822.7    4680.0     821.8    4832.8     818.6    4903.2     815.5    6181.5
GR    816.9    6257.8     815.8    6343.0     815.8    7538.1     810.2    7551.6     811.6    7592.2
GR    816.5    7625.2     813.1    7760.7     811.9    7983.5     816.2    8067.3     813.2    8162.9
GR    813.2    8265.6     804.1    8288.1     801.0    8415.2     801.2    8505.8     811.5    8534.1
GR    810.3    8600.8     806.2    8651.2     808.6    8755.8     804.8    8793.1     806.7    9023.9
GR    810.7    9062.5     812.0    9208.3     810.6    9310.8     812.6    9490.0     809.9    9569.3
GR    804.0    9621.8     803.0    9791.8     803.0    9843.4     810.9    9896.7     810.3   10000.0
GR    808.1   10185.0     809.6   10244.4     807.9   10368.6     807.1   10505.4     814.8   10537.5
GR    808.6   10596.2     813.1   10623.4     814.9   10858.1     810.6   10882.3     815.2   10914.4
GR    810.9   10975.4     812.6   11189.3     811.1   11373.3     803.1   11432.8     803.1   11643.2
GR    804.2   11855.9     806.4   12048.7     804.1   12160.8     804.2   12333.7     809.1   12402.5
GR    808.6   12518.3     806.2   12714.3     805.4   12844.8     805.3   12926.8     815.1   13007.5
GR    813.2   13210.6     814.4   13328.4     803.7   13385.7     810.6   13438.8     810.5   13754.3
GR    809.2   13851.4     811.3   13991.2     815.0   14023.2     814.7   14048.4     815.9   14767.7
GR    816.7   15156.7     819.0   15459.5     820.1   15958.7     821.1   16419.0     822.5   16536.5
GR    827.3   16598.3     824.5   16645.5     816.2   16668.4     826.9   16717.8     827.0   16938.3
GR    829.2   17514.8     831.0   17883.0     832.7   18017.5     842.9   19344.0
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NH       5     0.035    8228.3     0.060     9439.2     0.045    10488.7     0.060    14658.5     0.035
NH   19112
ET                         9.1                                                          7410      13660
          APPROXIMATE CROSSING OF TURNER ROAD ALIGNMENT
X1   192.0        94   10997.8   11562.8       820      1230       930
GR   829.2    4545.4     825.9    4560.1     822.5    4859.1     820.8    4873.4     825.1    4908.7
GR   821.6    4932.1     821.6    4961.5     819.4    4970.4     817.8    6098.1     819.0    6112.7
GR   819.2    6386.6     816.4    6488.0     816.4    6608.6     818.8    6694.3     815.5    6806.5
GR   816.0    6905.8     818.7    6973.0     817.2    7146.6     819.7    7338.1     817.8    7721.6
GR   818.6    7885.7     810.2    8008.0     814.2    8186.5     803.8    8228.3     803.8    8263.5
GR   806.2    8303.3     804.4    8338.8     807.9    8389.2     810.1    8700.7     807.1    8755.1
GR   810.9    8810.0     808.8    8871.8     812.5    8965.1     812.5    9045.0     810.1    9070.7
GR   810.1    9147.7     815.1    9223.9     804.0    9241.4     804.0    9278.8     808.6    9439.2
GR   806.6    9532.7     807.5    9609.9     813.3    9666.5     813.3    9737.6     810.3    9811.1
GR   813.5    9869.5     810.9   10000.0     810.9   10033.1     810.9   10105.6     809.5   10169.8
GR   809.7   10285.7     811.2   10320.5     811.5   10397.5     815.1   10442.7     816.2   10488.7
GR   823.7   10518.7     814.6   10561.0     815.4   10769.4     812.3   10919.6     816.4   10997.8
GR   804.3   11025.0     804.4   11185.2     806.1   11340.1     812.8   11562.8     812.7   11708.4
GR   811.3   11960.4     808.4   12183.0     810.4   12377.9     807.2   12487.9     815.2   12579.1
GR   806.8   12612.9     806.7   12656.5     811.5   12734.2     814.7   12985.3     807.9   13061.3
GR   809.5   13195.8     808.5   13220.1     810.2   13349.8     805.4   13367.7     805.4   13453.5
GR   813.4   13631.6     813.3   13761.7     809.1   13888.1     806.2   13964.3     817.1   14065.0
GR   815.7   14658.5     816.4   15083.3     818.3   15471.6     818.9   16050.4     819.9   16359.5
GR   826.8   16431.7     823.6   16477.7     812.5   16507.6     838.4   19112.0

NH       6     0.035    7405.2     0.070     8411.9     0.060     9663.7     0.045    10759.0     0.060
NH   15316     0.035   17520.0
ET                         9.1                                                          7250      13750
X1   194.0        94   10759.0   11525.3      1260      1150      1200
GR   832.0    4004.2     831.0    4183.5     829.4    4338.3     827.8    4436.9     826.8    4666.0
GR   824.2    4816.5     822.6    4979.8     820.0    5106.2     823.8    5141.5     820.2    5163.7
GR   818.0    5215.0     817.9    5369.4     818.0    5606.8     817.5    5785.0     816.8    5878.1
GR   817.6    6032.5     818.3    6290.6     818.7    6551.5     817.4    6774.6     817.3    6860.5
GR   816.7    6987.5     817.4    7149.2     817.2    7296.8     817.1    7352.1     804.0    7405.2
GR   813.7    7479.0     808.6    7541.9     809.7    7598.4     810.5    7624.0     811.4    7712.4
GR   811.8    7881.5     810.6    8006.5     816.6    8037.6     810.2    8102.6     817.8    8183.5
GR   817.9    8411.9     815.8    8702.7     807.8    8751.7     805.8    8826.9     812.3    8917.2
GR   805.6    8960.6     805.5    9023.3     808.6    9096.3     805.3    9125.2     812.8    9209.5
GR   809.1    9306.0     814.3    9395.4     813.9    9555.1     811.6    9663.7     813.1    9777.1
GR   811.1    9875.7     812.3    9954.5     810.6   10000.0     811.3   10125.9     811.1   10210.3
GR   812.3   10325.7     812.9   10368.2     824.7   10426.0     814.6   10452.3     815.3   10542.5
GR   815.7   10641.8     813.6   10693.0     813.5   10693.5     815.0   10759.0     809.1   10834.8
GR   807.6   11011.0     806.8   11136.7     806.8   11250.3     808.8   11389.8     815.2   11525.3
GR   808.2   11575.8     815.8   11735.3     810.2   11917.2     809.7   12052.7     812.9   12364.5
GR   810.6   12534.0     817.1   12735.6     808.1   12861.1     809.1   12916.3     817.2   13088.2
GR   815.6   13411.6     811.5   13660.2     811.2   13773.2     814.4   13948.7     813.7   14028.7
GR   820.3   14098.3     815.7   14134.6     807.6   14161.3     819.1   14319.1     816.2   14493.5
GR   816.6   14890.8     819.0   15316.0     818.9   16052.8     827.0   17520.0
```

NH	6	0.035	7209.9	0.070	8137.1	0.060	9390.9	0.045	10451.1	0.060
NH	18805	0.035	20181.7							
ET			9.1						7200	13880
X1	196.0	94	10692.9	11651.0	400	930	880			
GR	839.9	3684.0	838.0	3898.4	836.1	4218.6	832.8	4644.7	828.6	4845.2
GR	826.5	4939.0	823.7	4992.5	824.6	5052.0	825.2	5119.5	820.7	5278.9
GR	819.1	5590.4	819.8	6039.7	820.4	6465.0	820.8	7060.4	818.8	7209.9
GR	820.5	7374.4	820.8	7451.5	808.6	7502.6	810.2	7602.2	812.3	7767.4
GR	809.3	7816.2	815.9	7903.3	812.8	7985.3	814.3	8081.7	810.7	8137.1
GR	816.1	8204.1	813.0	8219.3	816.5	8378.8	816.3	8616.0	808.5	8689.3
GR	810.5	8802.5	807.1	8811.3	807.5	8929.8	810.5	9066.3	810.7	9132.2
GR	814.2	9224.2	811.6	9335.7	810.7	9390.9	814.9	9528.7	811.9	9688.5
GR	813.9	9891.7	813.5	10000.0	812.2	10107.6	816.5	10236.7	815.6	10371.6
GR	828.4	10423.2	817.3	10451.1	817.1	10585.4	819.5	10692.9	815.7	10854.7
GR	812.5	11005.7	812.0	11302.7	807.9	11480.0	807.9	11586.6	816.6	11651.0
GR	814.6	11857.6	808.8	11896.8	813.8	11997.8	811.3	12039.7	814.0	12170.4
GR	811.3	12325.4	815.5	12481.7	815.2	12700.4	815.6	12851.5	814.0	13090.4
GR	808.6	13121.9	808.6	13160.8	816.5	13206.7	820.6	13273.9	819.9	13699.6
GR	813.5	13765.4	820.5	13836.0	812.2	13958.3	812.2	14071.3	819.4	14311.0
GR	820.2	14534.3	819.3	14711.3	819.5	14986.1	819.8	15392.3	822.2	15486.9
GR	822.6	15679.5	821.8	16016.1	826.7	16085.2	824.0	16121.8	814.0	16159.3
GR	823.2	16228.0	824.2	16675.2	827.0	17175.0	828.2	17504.3	829.8	17643.9
GR	831.4	18028.8	832.5	18331.3	842.5	18805.0	848.8	20181.7		

NH	6	0.035	5698.0	0.045	7712.0	0.060	9012.4	0.045	10433.4	0.060
NH	14255	0.035	20027.7							
ET			9.1						7050	13990
X1	198.0	94	10408.0	11619.1	950	1050	980			
GR	833.8	3888.2	831.6	3970.3	831.2	4129.6	829.9	4370.7	828.1	4446.2
GR	827.3	4605.8	826.5	4844.7	823.7	4876.1	827.2	4915.1	823.7	4922.5
GR	827.4	4965.0	822.8	5077.4	821.7	5230.0	819.8	5456.4	820.2	5698.0
GR	819.9	6046.7	821.2	6452.0	820.9	6688.1	819.5	6817.5	821.0	6863.0
GR	819.5	6890.5	821.4	7050.4	820.7	7235.2	821.0	7447.9	821.9	7712.0
GR	816.8	7755.6	811.5	7793.8	816.2	7922.7	815.2	8069.8	813.4	8213.4
GR	811.8	8269.9	817.6	8393.8	817.1	8522.5	813.7	8634.8	813.2	8672.6
GR	807.2	8698.8	807.2	8868.2	814.0	8929.3	818.6	9012.4	817.6	9209.8
GR	814.7	9326.8	813.2	9415.2	815.8	9555.5	817.5	9720.5	819.5	10000.0
GR	818.2	10099.4	818.3	10265.9	818.1	10361.3	823.9	10408.0	819.2	10433.4
GR	817.4	10530.4	815.8	10564.4	815.0	10710.9	812.7	10935.8	809.0	11283.9
GR	809.0	11438.2	814.5	11503.0	817.7	11619.1	816.0	12001.8	813.9	12274.4
GR	817.6	12354.2	810.3	12420.7	810.3	12532.0	818.0	12630.7	815.6	13240.2
GR	822.2	13312.4	815.7	13419.6	819.6	13589.9	817.5	13603.9	823.9	13815.2
GR	822.0	14186.2	820.6	14255.0	813.0	14287.9	813.0	14359.2	820.8	14502.5
GR	821.4	14828.8	825.4	15303.9	823.2	15457.6	822.1	15818.7	827.0	15883.2
GR	822.7	15942.5	813.5	15952.9	822.4	16010.4	823.4	16339.4	826.4	16852.2
GR	827.6	17234.3	829.7	17515.0	832.0	17900.2	833.8	18459.6	838.4	18602.2
GR	838.5	18763.4	839.9	18964.9	841.4	19302.5	846.7	20027.7		

NH	6	0.035	6105	0.045	9030	0.035	9540	0.045	10688	0.045
NH	14560	0.035	20370							
ET			9.1						7080	14150
X1	200	94	10688	11173	950	1050	980			
GR	828.4	5442	826.6	5494	825.6	5518	824.6	5677	823.4	5786
GR	822.6	6105	821.4	6879	819.8	6893	819.8	6905	825.1	6932
GR	823.9	7117	822.6	7448	818.1	7515	816.6	7570	819.3	7699
GR	822.1	7889	821.9	8027	819.4	8138	818.4	8149	820.8	8191
GR	819.9	8333	820.8	8397	820.8	8597	818.8	8663	818.8	8715
GR	815.4	8773	818.4	8954	808.1	8978	808.1	9030	811.8	9129
GR	812.1	9216	810.1	9249	811.8	9293	818.1	9318	821.4	9384
GR	818.3	9493	820.8	9540	819.4	9756	820.4	9841	819.9	10000
GR	821.1	10541	818.9	10688	808.3	10742	809.1	10776	810.3	10804
GR	809.0	10994	808.1	11013	808.1	11100	819.3	11173	818.4	11223
GR	819.3	11443	815.4	11636	814.3	11780	812.6	11807	813.6	11953
GR	817.8	11995	815.3	12215	817.9	12396	817.3	12601	810.0	12621
GR	810.0	12744	814.4	12771	816.9	12969	818.9	13258	821.9	13785
GR	823.6	13850	822.9	14090	821.2	14163	818.9	14202	823.9	14206
GR	825.1	14560	825.1	14703	822.1	14738	814.2	14781	814.2	14817
GR	822.7	14832	822.7	15200	825.7	15244	825.7	15401	823.2	15481
GR	823.7	15883	826.1	15912	825.9	15939	824.7	15980	818.4	15997
GR	818.4	16016	824.7	16030	823.6	16071	828.5	17311	829.5	17352
GR	836.2	18644	837.9	18704	844.4	20018	847.4	20370		

NH	6	0.035	6010	0.045	8931	0.035	9636	0.045	10673	0.045
NH	14679	0.035	20691							
ET			9.1						6940	14120
X1	202	92	9269	10000	900	840	840			
GR	837.1	5096	835.8	5122	831.3	5156	831.3	5196	834.1	5239
GR	832.8	5287	833.3	5377	826.4	5456	823.6	6010	823.8	6865
GR	822.3	6893	825.1	6926	824.6	7114	821.3	7179	822.8	7247
GR	822.8	7413	821.8	7443	824.1	7564	824.1	7646	823.8	7984
GR	819.9	8014	824.4	8048	822.9	8425	826.9	8498	824.8	8931
GR	824.8	9190	821.1	9269	814.9	9326	810.3	9335	811.1	9395
GR	813.8	9636	814.8	9686	812.1	9737	812.1	9798	818.4	9813
GR	822.4	10000	822.4	10129	811.0	10233	809.8	10442	809.5	10542
GR	812.1	10673	822.6	10704	822.6	10752	818.9	10810	820.6	11052
GR	818.8	11147	816.9	11465	817.3	11776	817.3	11986	811.6	12027
GR	811.6	12050	816.4	12093	816.1	12369	816.4	12502	809.6	12592
GR	809.5	12710	817.6	12851	821.2	13654	822.9	13675	824.1	13729
GR	823.1	14035	818.9	14064	819.7	14096	823.1	14131	826.9	14679
GR	826.2	14813	822.6	14832	822.6	14852	819.1	14902	819.1	14913
GR	815.6	14917	815.6	14933	823.1	14979	821.9	15095	824.6	15319
GR	823.9	15393	823.7	15736	823.7	15935	828.7	15991	828.4	16012
GR	824.4	16049	824.4	16068	818.6	16082	818.6	16113	824.9	16128
GR	828.5	17156	830.0	17196	836.0	18459	836.7	18541	843.5	19851
GR	844.0	19877	847.9	20691						

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NH      6     0.035     6307     0.045     8990     0.035     9589     0.045    10611     0.045
NH  14551     0.035    20770
ET                      9.1                                                      7300     14125
X1    204        94     9356    10453      260      240      250
GR  843.3      4430    843.3     4431    836.9     4514    836.6     4627    838.3      4666
GR  838.3      4741    831.6     4836    824.9     5545    824.9     6307    825.4      6630
GR  825.4      6717    821.6     6738    822.6     6752    821.1     6768    821.1      6786
GR  826.3      6810    825.9     6837    825.9     6991    826.6     7139    828.6      7256
GR  827.8      7277    823.3     7299    824.4     7309    826.6     7430    826.8      7633
GR  826.8      7686    823.9     7744    824.6     7838    827.6     7889    826.4      7991
GR  825.8      8116    825.8     8199    822.6     8240    820.4     8284    819.9      8396
GR  819.9      8440    824.3     8498    821.3     8593    820.8     8628    820.4      8990
GR  821.4      9123    821.4     9217    822.3     9356    817.8     9589    811.2      9659
GR  811.2      9987    812.1    10000    813.1    10126    813.6    10311    811.2     10370
GR  811.2     10394    817.8    10453    817.9    10496    817.6    10539    818.9     10611
GR  818.6     10727    816.8    10759    819.8    10814    823.1    10925    823.1     11048
GR  819.3     11109    820.3    11205    819.9    11291    819.1    11461    818.9     11536
GR  815.1     11681    815.3    11813    815.1    12253    816.1    12388    817.4     12572
GR  817.8     12700    820.6    13407    822.7    13445    822.1    13869    823.4     14237
GR  826.4     14551    828.0    14812    818.6    14844    824.4    14948    823.6     15013
GR  820.7     15143    823.4    15198    822.7    15470    821.6    15628    824.6     15807
GR  826.2     16294    828.5    16342    828.5    16390    826.4    16444    831.4     17330
GR  836.9     18285    837.5    18355    837.7    18426    851.2    20770

NH      6     0.035     5885     0.045     9240     0.035     9636     0.045    10384     0.045
NH  14651     0.035    20765
ET                      9.1                                                      7600     14150
X1  204.2        51     9636    10384      114      114      114
GR  840.8      4350    837.1     4807    832.4     5324    831.4     5474    828.8      5885
GR  827.1      6437    827.3     6811    827.1     7317    826.4     7879    827.1      8015
GR  826.6      8379    826.8     8758    826.4     9240    825.0     9636    812.0    9636.1
GR 811.55     10010    812.0  10383.9    825.0    10384    821.3    11597    821.1     12043
GR  821.4     12370    822.1    12641    822.8    12700    824.7    13205    825.2     13330
GR  825.7     13646    825.9    14019    825.7    14215    825.7    14651    826.4     14981
GR  826.6     15320    826.9    15629    827.2    15851    828.0    16119    828.7     16260
GR  829.7     16443    831.0    16811    832.4    17045    833.0    17322    834.5     17544
GR  835.4     17758    836.4    17855    837.0    18148    838.4    18395    840.5     18759
GR  842.7     19156    845.5    19486    847.9    19801    849.7    20245    850.7     20504
GR  852.5     20765

NC                                  .3       .5
NH      6     0.035     5474     0.045     9335     0.035     9636     0.045  10379.5     0.045
NH  12641     0.035    20765
ET                      9.11                                                     7600     14150
            DOWNSTREAM EDGE OF AZ 85 BRIDGE
X1  204.5        95     9636  10379.5         5         5         5
BT      8      4350    840.8    840.8      9636     827.6     827.6    9636.1     827.6     823.5
BT  10379     827.6    823.5  10379.5     827.6     827.6     12641     822.1     822.1     18148
BT  837.0     837.0    20765    852.5     852.5
GR  840.8      4350    831.4     5474    826.4     9335     827.6      9636     812.0    9636.1
GR  812.0      9664    823.5   9664.1    823.5    9665.0     812.0    9665.1     812.0    9699.0
GR  823.5    9699.1    823.5   9700.0    812.0    9700.1     812.0    9734.0     823.5    9734.1
GR  823.5    9735.0    812.0   9735.1    812.0    9769.0     823.5    9769.1     823.5    9770.0
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GR    812.0    9770.1    812.0    9804.0    823.5    9804.1    823.5    9805.0    812.0    9805.1
GR    812.0    9839.0    823.5    9839.1    823.5    9840.0    812.0    9840.1    812.0    9874.0
GR    823.5    9874.1    823.5    9875.0    812.0    9875.1    812.0    9909.0    823.5    9909.1
GR    823.5    9910.0    812.0    9910.1    812.0    9944.0    823.5    9944.1    823.5    9945.0
GR    812.0    9945.1    812.0    9979.0    823.5    9979.1    823.5    9980.0    812.0    9980.1
GR    812.0   10007.5    823.5   10007.6    823.5   10008.5    812.0   10008.6    812.0   10036.0
GR    823.5   10036.1    823.5   10037.0    812.0   10037.1    812.0   10071.0    823.5   10071.1
GR    823.5   10072.0    812.0   10072.1    812.0   10106.0    823.5   10106.1    823.5   10107.0
GR    812.0   10107.1    812.0   10141.0    823.5   10141.1    823.5   10142.0    812.0   10142.1
GR    812.0   10176.0    823.5   10176.1    823.5   10177.0    812.0   10177.1    812.0   10211.0
GR    823.5   10211.1    823.5   10212.0    812.0   10212.1    812.0   10246.0    823.5   10246.1
GR    823.5   10247.0    812.0   10247.1    812.0   10281.0    823.5   10281.1    823.5   10282.0
GR    812.0   10282.1    812.0   10316.0    823.5   10316.1    823.5   10317.0    812.0   10317.1
GR    812.0   10351.0    823.5   10351.1    823.5   10352.0    812.0   10352.1    812.0   10379.0
GR    827.6   10379.5    822.1     12641    837.0     18148    840.5     20245    852.5     20765

NH        6     0.035     5474     0.045     9335     0.035     9636     0.045  10379.5     0.045
NH    12641     0.035    20765
ET                         9.11                                                    7600     14150
          UPSTREAM EDGE OF AZ 85 BRIDGE
X1    205.5                                42.6      42.6      42.6
X2                                                        1.0

NC                                   0.1       0.3
NH        6     0.035     5885     0.045     9240     0.035     9636     0.045    10384     0.045
NH    14651     0.035    20765
ET                         9.1                                                     7600     14150
X1    205.8        51     9636    10384         5         5         5
GR    840.8      4350    837.1     4807    832.4      5324    831.4      5474    828.8      5885
GR    827.1      6437    827.3     6811    827.1      7317    826.4      7879    827.1      8015
GR    826.6      8379    826.8     8758    826.4      9240    825.0      9636    812.0    9636.1
GR    811.8     10010    812.0  10383.9    825.0     10384    821.3     11597    821.1     12043
GR    821.4     12370    822.1    12641    822.8     12700    824.7     13205    825.2     13330
GR    825.7     13646    825.9    14019    825.7     14215    825.7     14651    826.4     14981
GR    826.6     15320    826.9    15629    827.2     15851    828.0     16119    828.7     16260
GR    829.7     16443    831.0    16811    832.4     17045    833.0     17322    834.5     17544
GR    835.4     17758    836.4    17855    837.0     18148    838.4     18395    840.5     18759
GR    842.7     19156    845.5    19486    847.9     19801    849.7     20245    850.7     20504
GR    852.5     20765

NC                                   .1        .3
NH        6     0.035     6230     0.045     9014     0.035     9593     0.045    10667     0.045
NH    14420     0.035    20735
ET                         9.1                                                     7600     14100
X1      206        86     9563    10487      73.7      73.7      73.7
GR    836.1      4310    832.9     4555    835.8      4598    831.3      4619    831.3      4628
GR    834.9      4641    834.3     4672    831.9      4695    832.1      4729    826.9      5635
GR    826.4      6230    826.4     6469    828.9      6503    828.9      6666    822.6      6698
GR    822.6      6741    824.6     6754    824.1      6835    827.3      6856    827.8      7001
GR    828.4      7100    827.3     7232    826.9      7342    826.6      7475    828.6      7490
GR    828.4      7629    826.9     7666    826.9      7777    826.9      7834    827.3      7872
GR    826.8      8076    828.1     8171    826.4      8218    823.9      8245    823.9      8484
GR    823.8      8813    824.4     9014    828.3      9022    828.3      9081    825.1      9131
GR    824.9      9497    820.8     9563    812.3      9593    812.3      9878    814.4     10000
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GR	813.4	10281	811.8	10330	811.8	10350	818.4	10391	819.8	10487
GR	814.9	10512	815.8	10667	814.3	10892	815.6	11253	821.8	11294
GR	821.8	11372	819.1	11435	817.9	11549	817.3	11638	814.4	11707
GR	818.6	11724	816.1	11901	816.1	12198	816.1	12233	813.6	12283
GR	814.9	12567	816.6	12700	824.6	14420	825.6	15105	823.6	15142
GR	825.9	15861	825.2	16037	828.7	16767	830.5	16925	830.7	17396
GR	834.5	17972	837.7	18262	837.7	18317	837.0	18345	839.9	18871
GR	842.0	19360	845.2	19574	845.2	19622	846.4	19808	850.4	20522
GR	851.4	20735								
NH	6	0.035	6176	0.045	8826	0.035	9544	0.045	10618	0.045
NH	14608	0.035	19710							
ET			9.1						6850	14100
X1	208	94	9340	10225	900	900	900			
GR	837.6	4385	837.1	4551	834.3	4592	834.3	4616	835.8	4626
GR	834.8	4718	832.9	4734	829.8	5724	827.1	5738	827.1	6176
GR	827.4	6433	827.3	6680	823.3	6705	823.3	6733	826.6	6762
GR	825.8	6829	825.8	6945	827.1	6972	827.8	7190	827.1	7350
GR	825.8	7423	827.8	7449	823.4	7521	823.4	7616	823.8	7797
GR	823.8	7920	825.4	7950	825.4	8216	824.4	8466	824.4	8792
GR	829.8	8826	829.8	8837	824.6	8869	823.4	9340	813.1	9356
GR	811.8	9437	811.8	9544	811.8	9816	812.1	9856	819.3	9882
GR	818.6	9947	818.3	10000	817.6	10095	814.6	10150	815.1	10194
GR	821.4	10225	825.4	10572	819.6	10618	819.6	10642	825.4	10670
GR	826.1	10897	824.3	10961	825.4	10989	824.9	11425	817.3	11464
GR	818.3	11485	822.8	11528	821.8	11891	815.8	11934	815.4	12090
GR	819.4	12123	818.4	12357	818.4	12700	819.2	12779	818.1	12825
GR	824.6	12847	825.1	13206	821.4	13266	822.9	13306	824.6	13518
GR	823.7	13662	824.1	13898	822.9	13944	823.4	14190	826.6	14398
GR	827.2	14608	827.1	14811	825.7	14882	827.2	15081	824.4	15111
GR	824.7	15144	827.9	15168	823.7	15207	824.6	15354	826.1	15948
GR	828.5	16720	829.2	16753	835.5	18070	836.4	18094	836.5	18120
GR	836.4	18138	838.4	18450	844.5	19381	845.9	19710		
NH	5	0.035	6659	0.045	9360	0.045	10346	0.060	14541	0.035
NH	19805									
ET			9.1						7000	14320
X1	210	94	9307	10346	770	730	730			
GR	844.8	4510	839.4	4551	836.8	4683	839.1	4700	837.6	4777
GR	834.6	4794	832.6	5380	831.3	5731	829.1	5752	826.8	6659
GR	829.3	6678	827.8	6699	826.6	6762	825.1	6825	825.1	6892
GR	827.1	6913	824.8	7149	824.4	7276	826.3	7306	826.3	7454
GR	827.1	7655	825.8	7816	825.3	8056	827.3	8133	827.6	8669
GR	831.8	8686	831.8	8695	824.3	8735	825.1	9196	828.4	9216
GR	825.3	9289	825.3	9307	812.6	9360	812.6	9721	816.8	9747
GR	818.8	9908	815.8	9958	818.9	10000	818.9	10032	818.3	10067
GR	822.6	10346	823.9	10504	826.1	10601	826.1	10650	827.3	10774
GR	824.4	10826	824.4	10873	821.8	10911	827.4	10934	827.3	10984
GR	826.8	11268	823.8	11297	826.3	11322	820.3	11349	827.3	11381
GR	826.9	11493	820.8	11532	822.6	11594	824.8	11677	823.4	11951
GR	822.1	12049	817.6	12165	815.9	12250	815.9	12280	816.6	12389
GR	819.6	12408	819.3	12656	819.1	12780	820.9	13041	823.9	13084
GR	825.1	13550	824.6	13714	822.9	13783	825.4	13793	825.7	13900
GR	821.6	13927	821.6	13953	825.2	13966	824.4	14193	826.1	14379

GR	828.2	14435	825.4	14541	826.6	14683	829.0	14753	828.4	14992
GR	827.4	15194	825.2	15208	825.2	15219	820.6	15238	825.9	15262
GR	825.2	15293	827.2	15499	827.7	16557	848.0	19805		
NH	6	0.035	5768	0.045	9340	0.060	9759	0.045	10651	0.060
NH	14659	0.035	19947							
ET			9.1						7230	14750
X1	212	94	9340	9759	780	800	780			
GR	847.1	4637	847.1	4638	847.1	4639	846.4	4693	844.6	4725
GR	839.4	4752	839.4	4769	841.3	4778	841.3	4833	839.6	4836
GR	833.9	5754	832.1	5768	829.6	6327	832.3	6350	825.9	6390
GR	825.9	6494	832.1	6518	826.9	6611	825.8	6711	822.1	6727
GR	822.1	6761	827.1	6778	825.1	6806	826.9	6979	828.3	7183
GR	825.4	7245	825.6	7374	825.6	7517	827.4	8147	827.8	8416
GR	827.8	8516	826.9	8551	827.9	8604	827.4	8777	830.3	8794
GR	823.9	8830	827.4	8877	827.4	8939	823.4	8955	823.4	9001
GR	826.4	9028	826.4	9137	819.9	9206	819.9	9237	824.1	9265
GR	822.4	9340	813.6	9357	813.4	9493	814.8	9506	814.8	9739
GR	822.3	9759	824.9	10000	826.8	10501	825.6	10562	821.4	10592
GR	821.4	10624	825.9	10651	828.4	11065	823.6	11104	823.6	11176
GR	827.6	11196	829.1	11276	828.8	11380	825.1	11428	828.6	11492
GR	825.8	11788	823.8	12058	821.8	12392	820.4	12731	819.9	12800
GR	821.1	13326	823.4	13359	824.1	13430	821.9	13468	821.9	13507
GR	826.2	13531	823.1	13759	825.2	13813	825.2	14151	821.4	14165
GR	821.4	14202	826.1	14220	826.1	14338	829.7	14483	829.7	14659
GR	827.6	14852	826.4	14879	828.1	15097	826.1	15327	824.1	15349
GR	824.1	15374	826.7	15421	829.6	16167	853.6	19947		
NH	6	0.035	6682	0.045	9014	0.060	9709	0.045	10531	0.060
NH	14754	0.035	20053							
ET			9.1						7290	15100
X1	214	94	9142	9819	850	850	840			
GR	856.8	5052	856.8	5053	856.8	5083	840.1	5124	838.8	5191
GR	838.6	5258	836.9	5276	837.4	5588	836.1	5612	835.6	5804
GR	833.6	5821	833.6	6003	830.9	6029	830.9	6218	827.9	6257
GR	828.9	6477	823.6	6499	823.6	6532	828.6	6554	826.6	6582
GR	824.6	6682	827.1	6723	827.9	6990	828.8	7191	827.8	7377
GR	828.4	7680	828.4	8277	826.8	8335	825.6	8356	825.6	8409
GR	829.4	8424	828.3	8654	827.4	8706	828.8	8760	825.8	8810
GR	827.4	8883	826.3	8990	821.6	9014	822.4	9055	820.3	9142
GR	815.4	9173	816.3	9243	815.4	9260	815.4	9301	818.8	9329
GR	817.6	9367	814.1	9393	814.8	9709	819.4	9722	824.4	9819
GR	825.6	10000	826.8	10531	823.4	10552	823.4	10569	826.9	10592
GR	824.8	10637	828.6	10670	828.6	10882	824.3	10934	824.3	11084
GR	829.1	11110	827.6	11379	822.3	11408	822.3	11416	827.4	11481
GR	825.4	11751	821.1	11806	826.3	11831	825.8	11911	821.9	11935
GR	824.3	11967	821.8	12353	820.9	12800	820.1	13353	820.4	13525
GR	824.7	13550	826.4	13695	824.9	13857	820.9	13882	829.4	13903
GR	827.2	14250	828.6	14754	830.1	14983	828.6	15324	825.6	15354
GR	826.6	15514	828.4	15986	828.4	16250	833.2	16962	835.6	17469
GR	835.6	17610	839.1	17626	838.6	17688	853.9	20053		

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NH       5     0.045      8816     0.060      9607     0.045     10460     0.060     14660     0.035
NH   20265
ET                         9.1                                                         7350     15280
X1     216        94      8816      9739       950       800       750
GR   838.4      5535     838.4      5580     831.6      5616     831.6      5686     828.9      5722
GR   827.4      6549     829.1      6588     827.9      6707     824.3      6788     825.6      6929
GR   826.6      7122     827.9      7143     827.9      7345     828.8      7750     829.4      8100
GR   826.9      8139     828.3      8256     831.1      8277     830.3      8512     829.4      8574
GR   829.9      8816     819.8      8833     818.6      8869     815.1      8888     814.8      8964
GR   817.6      8988     818.3      9120     817.1      9145     817.3      9352     814.4      9380
GR   815.3      9491     814.3      9607     814.3      9732     822.8      9739     824.6      9877
GR   828.6      9989     828.6     10000     827.8     10155     825.4     10219     825.4     10247
GR   828.9     10292     828.9     10460     830.1     10765     824.3     10797     825.3     10841
GR   825.3     10942     824.1     11019     831.4     11030     831.4     11085     828.1     11155
GR   829.9     11204     826.8     11256     828.6     11299     828.1     11412     826.1     11488
GR   826.8     11672     825.1     11769     824.8     12044     822.6     12077     825.1     12113
GR   824.4     12334     823.3     12653     823.4     12860     822.4     13742     823.4     14089
GR   830.6     14129     830.9     14377     828.9     14526     825.9     14555     829.2     14584
GR   831.7     14660     831.7     14857     829.2     15180     826.1     15212     828.1     15242
GR   828.1     15296     824.4     15339     824.4     15339     829.6     15361     828.7     15481
GR   829.7     15742     831.9     16325     834.2     17060     835.9     17459     838.1     17526
GR   839.7     18008     843.4     18789     846.9     18807     845.6     18887     845.4     19009
GR   846.2     19051     847.2     19198     850.1     19426     858.4     20265

NH       6     0.035      6115     0.045      8378     0.060      9505     0.045     10504     0.060
NH   14606     0.035     20365
ET                         9.1                                                         7450     15140
           APPROXIMATE CROSSING OF ROOKS ROAD ALIGNMENT
           MAJOR TRANSMISSION LINE CROSSING
X1     218        89      8756      9523      1000       840       900
GR   850.9      5852     846.3      5911     830.3      6012     830.3      6028     833.6      6043
GR   833.6      6077     829.4      6115     828.6      7033     828.6      7143     826.1      7168
GR   827.6      7285     827.6      7373     826.1      7424     827.9      7494     827.8      7681
GR   826.6      7755     826.6      7803     830.3      7828     829.8      8012     828.6      8095
GR   826.3      8335     822.8      8378     820.9      8467     822.1      8482     819.8      8676
GR   825.9      8697     825.9      8756     818.4      8807     817.9      9065     823.9      9080
GR   823.3      9168     815.4      9219     816.1      9300     814.9      9316     814.9      9505
GR   824.1      9523     825.4      9563     829.3     10000     829.4     10504     830.3     10686
GR   820.6     10718     821.1     10823     824.4     10852     828.4     10926     830.9     11114
GR   830.1     11154     830.3     11219     828.3     11274     828.6     11348     831.1     11371
GR   829.1     11653     828.3     11730     826.3     11765     825.1     11896     824.6     11957
GR   825.6     12038     824.9     12241     823.8     12502     824.6     12611     823.8     12903
GR   824.9     12952     824.9     13281     825.9     14281     826.2     14606     830.6     14668
GR   833.2     14780     831.6     15019     829.4     15086     831.6     15180     825.6     15206
GR   826.6     15243     830.7     15268     830.1     15641     830.9     16148     833.1     16176
GR   834.7     16887     836.2     17298     838.2     17327     838.2     17370     838.1     17437
GR   841.2     18139     843.6     18669     846.1     18684     846.7     18788     847.9     19086
GR   850.9     19464     854.6     19835     856.1     20000     857.7     20365
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NH	6	0.035	6189	0.045	8225	0.060	9402	0.045	10501	0.060
NH	14507	0.035	20425							
ET			9.1						7580	14970
X1	220	91	7576	9156	950	800	1000			
GR	836.4	6078	836.4	6079	836.4	6080	836.4	6089	831.6	6109
GR	830.6	6189	831.4	6256	830.3	6274	830.1	7502	829.4	7576
GR	821.9	7609	823.9	7769	823.1	8042	822.9	8225	822.8	8304
GR	822.8	8369	825.1	8395	824.6	8433	822.1	8454	824.6	8486
GR	825.1	8575	823.3	8661	816.8	8713	818.1	8771	814.6	8809
GR	814.6	8964	816.8	9006	820.9	9136	827.1	9156	827.1	9235
GR	821.6	9288	821.6	9315	828.6	9329	827.3	9402	827.3	9440
GR	827.3	9503	824.6	9531	828.6	9615	828.3	9685	828.4	9826
GR	829.9	10000	829.9	10501	833.3	10521	827.6	10541	827.6	10582
GR	823.1	10608	823.1	10772	828.9	10800	828.9	10886	826.3	10906
GR	826.3	10938	831.6	10973	830.3	11034	829.6	11167	829.9	11243
GR	830.6	11475	828.9	11606	827.6	11806	826.8	11968	825.3	12141
GR	822.8	12188	826.9	12227	826.6	12318	826.4	12541	826.4	12805
GR	827.1	12960	827.2	13674	829.4	14507	832.9	14851	825.9	14891
GR	831.9	14915	831.9	15034	825.6	15057	825.7	15102	833.4	15117
GR	830.9	15135	832.7	15688	833.4	16362	835.2	16808	836.7	17073
GR	838.7	17159	839.7	17193	838.2	17216	843.7	18483	846.2	18500
GR	847.2	18909	850.6	19571	852.2	19796	854.2	19811	856.7	20089
GR	858.2	20425								

NH	6	0.035	6433	0.045	8751	0.060	9525	0.045	10533	0.060
NH	14681	0.035	20428							
ET			9.1						7900	14800
X1	222	85	7885	9091	950	960	950			
GR	838.4	6223	838.4	6224	838.4	6225	836.6	6261	836.6	6317
GR	834.1	6332	834.1	6367	836.8	6392	834.1	6433	833.3	6633
GR	828.9	6663	828.9	6766	835.9	6877	831.4	6987	830.6	7247
GR	830.1	7885	822.3	7924	822.3	8051	825.3	8061	825.3	8307
GR	826.3	8417	820.1	8442	817.6	8482	817.4	8536	820.3	8552
GR	816.8	8587	817.4	8751	820.1	8944	823.3	8979	825.1	9070
GR	829.8	9091	829.3	9159	828.1	9296	827.3	9525	826.1	9540
GR	825.4	9744	823.9	9957	824.1	10000	825.6	10113	825.8	10170
GR	829.4	10189	832.8	10533	832.8	10567	826.6	10590	826.9	10755
GR	822.3	10828	823.8	10929	830.8	10955	830.3	11161	829.1	11372
GR	830.8	11436	829.9	11599	826.9	11749	827.4	12005	827.3	12102
GR	828.3	12176	827.4	12413	827.9	12762	827.4	12880	826.8	12910
GR	825.9	13137	826.4	13536	829.9	14162	832.4	14681	827.2	14742
GR	832.7	14757	832.7	14833	825.1	14855	825.7	14866	825.7	14901
GR	830.7	14926	832.1	14961	831.7	15947	837.4	16978	840.2	17003
GR	840.2	17045	842.9	18309	846.4	18331	848.7	18862	850.1	19580
GR	852.6	19604	853.4	19645	853.9	19961	856.2	20335	858.2	20428

NH	6	0.035	6592	0.045	8195	0.060	9521	0.045	10531	0.060
NH	14607	0.035	20613							
ET			9.1						8230	14700

X1	224	86	8195	9123	960	920	950			
GR	856.8	6520	855.4	6561	841.4	6592	840.9	6620	833.8	6639
GR	834.6	6756	832.9	6793	832.9	7136	832.9	7749	833.3	8074
GR	831.6	8113	830.1	8195	820.9	8237	820.9	8250	825.3	8264
GR	824.8	8336	819.4	8383	819.4	8427	823.6	8448	823.6	8478
GR	827.4	8502	827.4	8583	822.3	8615	823.1	8766	819.4	8805
GR	820.1	8943	818.4	8953	818.8	9095	829.9	9123	830.9	9521
GR	829.9	9534	829.1	9852	829.6	10000	830.3	10194	828.3	10333
GR	831.8	10531	835.3	10542	833.6	10564	833.6	10691	823.8	10730
GR	827.4	11011	830.6	11043	833.1	11098	833.1	11131	831.8	11227
GR	830.9	11508	831.1	11568	828.8	11843	828.8	12059	828.3	12232
GR	828.3	12508	828.4	12738	828.3	12819	826.3	12854	826.3	12899
GR	828.6	12926	828.6	13020	829.2	13524	829.2	13937	829.2	14206
GR	830.4	14365	833.6	14388	833.6	14530	830.4	14607	826.7	14641
GR	827.7	14691	835.2	14729	832.6	14782	833.2	14847	831.4	14905
GR	831.9	15303	832.6	15780	835.1	16480	835.7	16830	837.4	16862
GR	837.9	16919	840.9	17727	842.1	18178	845.4	18195	848.6	18632
GR	849.1	19305	852.6	19334	852.6	19474	854.4	19537	855.6	19827
GR	860.7	20613								
NH	4	0.070	9553	0.045	10547	0.060	14248	0.035	20647	
ET			9.1						8340	14560
X1	226	84	8653	9736	1020	1120	1050			
GR	868.0	7083	868.0	7084	868.0	7085	863.5	7112	841.4	7138
GR	842.5	7146	836.2	7166	837.0	7244	835.9	7801	835.2	8312
GR	821.7	8371	821.7	8389	824.9	8402	827.9	8484	827.7	8597
GR	830.0	8653	821.2	8689	821.2	8785	826.7	8805	827.6	8888
GR	825.2	8923	827.2	8942	828.5	9003	823.2	9077	820.9	9142
GR	821.6	9235	824.7	9277	825.1	9553	819.7	9574	820.1	9718
GR	829.4	9736	833.0	9840	831.7	10000	832.4	10547	829.9	10581
GR	824.7	10603	820.9	10652	820.9	10668	824.6	10693	830.4	10876
GR	830.5	10992	834.5	11032	834.0	11089	828.9	11113	829.4	11149
GR	832.9	11179	831.4	11668	830.5	11821	828.2	11849	830.9	11863
GR	830.7	12192	830.7	12625	830.9	13070	830.1	13361	830.6	13697
GR	830.6	13844	833.6	14097	835.1	14248	827.4	14280	826.7	14324
GR	830.6	14335	831.4	14445	832.6	14551	834.6	15156	834.6	15898
GR	834.6	16596	837.2	16630	831.4	16648	831.4	16657	837.7	16672
GR	838.9	16706	836.6	16722	839.1	17273	844.1	17885	847.9	18593
GR	852.2	19257	854.9	19291	855.1	19366	854.1	19383	856.5	19849
GR	860.0	20396	861.5	20545	863.5	20562	862.9	20647		
NH	4	0.070	9752	0.045	10506	0.060	14118	0.035	20627	
ET			9.1						8610	14640
X1	228	83	9731	11463	1250	1000	1400			
GR	866.9	7745	858.7	7837	846.2	7888	855.0	7919	852.7	7946
GR	842.0	7986	843.4	8137	840.7	8362	839.0	8411	838.4	8615
GR	827.6	8649	827.4	8819	824.6	8851	828.7	8867	828.7	8943
GR	827.1	8988	827.1	9027	830.2	9074	831.2	9325	831.2	9590
GR	830.7	9731	823.2	9752	821.2	10182	820.6	10257	821.7	10267
GR	821.2	10486	823.9	10506	825.7	10966	825.1	11031	826.4	11056
GR	828.7	11272	826.2	11356	820.6	11371	820.6	11444	832.0	11463
GR	832.4	11817	832.4	11954	833.0	12473	832.7	12731	832.5	12986
GR	832.0	13065	832.4	13135	830.7	13162	833.4	13204	834.6	13344
GR	830.7	13391	833.4	13448	834.4	13636	834.2	13797	831.9	13875

GR	832.1	14002	829.4	14038	829.2	14084	826.9	14118	826.9	14146
GR	834.4	14157	834.4	14266	834.1	14399	837.1	14516	838.7	14568
GR	835.4	14736	834.7	14837	835.4	14991	834.9	15692	834.7	16393
GR	836.9	16423	832.2	16438	838.2	16461	838.9	16499	836.1	16512
GR	838.2	17055	841.9	17715	844.6	17726	847.1	18176	851.9	19067
GR	853.7	19112	854.1	19197	858.0	19955	860.5	20333	860.9	20361
GR	862.7	20373	861.9	20431	863.5	20627				

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T1      DAMES & MOORE JOB NUMBER 15448-001-022
T2      FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
T3      GILA RIVER WITH 100-YEAR ENCROACHED FLOW (REVISED 4/20/89)

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ

     -10        3                                                  245000   818.87

J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE

     15                 -1
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THIS RUN EXECUTED 11/ 8/90 7:12:38

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HEC2 RELEASE DATED SEPT 88

****

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

GILA RIVER WITH 100-YEAR

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	190.000	.00	.00	.00	801.00	245000.00	818.01	.00	818.24	8.92	4.64	65194.41	82019.48
	190.000	.00	.00	.00	801.00	245000.00	818.87	.00	819.14	8.45	4.76	59682.32	84291.68
	192.000	930.00	.00	.00	803.80	245000.00	819.06	.00	819.31	12.42	4.60	62190.91	69510.08
	192.000	930.00	.00	.00	803.80	245000.00	819.86	.00	820.16	12.31	4.78	55806.01	69825.34
	194.000	1200.00	.00	.00	804.00	245000.00	820.56	.00	820.77	11.68	4.37	68390.25	71684.66
	194.000	1200.00	.00	.00	804.00	245000.00	821.39	.00	821.66	12.24	4.68	59282.34	70030.66
	196.000	880.00	.00	.00	807.10	245000.00	821.44	.00	821.74	18.94	4.63	56523.07	56294.53
	196.000	880.00	.00	.00	807.10	245000.00	822.24	.00	822.57	16.73	4.61	53909.83	59907.26
	198.000	980.00	.00	.00	807.20	245000.00	823.22	.00	823.51	17.09	4.79	57084.36	59256.56
	198.000	980.00	.00	.00	807.20	245000.00	823.90	.00	824.24	17.23	5.02	52871.93	59021.55
	200.000	980.00	.00	.00	808.10	245000.00	824.59	.00	824.98	12.55	6.87	51440.70	69164.55
	200.000	980.00	.00	.00	808.10	245000.00	825.21	.00	825.61	11.08	6.64	50405.58	73587.62
	202.000	840.00	.00	.00	809.50	245000.00	825.60	.00	826.02	11.65	6.56	50931.84	71780.66
	202.000	840.00	.00	.00	809.50	245000.00	826.12	.00	826.56	10.90	6.53	48567.61	74218.23
	204.000	250.00	.00	.00	811.20	245000.00	825.89	.00	826.34	13.72	6.73	49660.45	66134.84
	204.000	250.00	.00	.00	811.20	245000.00	826.39	.00	826.86	12.90	6.69	47181.82	68205.08
*	204.200	114.00	.00	.00	811.55	245000.00	827.14	827.14	829.05	44.83	13.36	28642.71	36593.32
*	204.200	114.00	.00	.00	811.55	245000.00	826.89	826.89	829.14	51.87	14.21	25524.79	34017.56
*	204.500	5.00	822.10	827.60	812.00	245000.00	827.90	827.90	829.80	219.44	10.51	22805.83	16539.09
*	204.500	5.00	822.10	827.60	812.00	245000.00	827.68	827.68	829.92	248.12	11.03	20928.40	15553.90
*	205.500	42.60	822.10	827.60	812.00	245000.00	829.78	.00	830.57	59.85	6.07	37140.49	31670.09
*	205.500	42.60	822.10	827.60	812.00	245000.00	829.91	.00	830.76	51.64	5.67	35169.71	34094.21

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	205.800	5.00	.00	.00	811.80	245000.00	830.23	.00	830.62	9.38	6.87	60221.63	80010.88
*	205.800	5.00	.00	.00	811.80	245000.00	830.21	.00	830.80	12.60	7.96	47168.02	69026.87
*	206.000	73.70	.00	.00	811.80	245000.00	830.56	.00	830.67	2.47	3.41	94699.08	155886.00
*	206.000	73.70	.00	.00	811.80	245000.00	830.69	.00	830.88	3.33	3.98	73401.99	134226.70
	208.000	900.00	.00	.00	811.80	245000.00	830.80	.00	830.99	4.54	4.90	78169.66	114971.10
	208.000	900.00	.00	.00	811.80	245000.00	831.01	.00	831.30	5.97	5.67	62700.10	100252.10
	210.000	730.00	.00	.00	812.60	245000.00	831.20	.00	831.43	7.69	5.44	72478.63	88325.75
	210.000	730.00	.00	.00	812.60	245000.00	831.53	.00	831.87	9.68	6.20	60486.24	78728.98
	212.000	780.00	.00	.00	813.40	245000.00	831.92	.00	832.15	10.82	5.41	66655.94	74491.73
	212.000	780.00	.00	.00	813.40	245000.00	832.45	.00	832.74	12.45	5.92	59021.50	69423.49
	214.000	840.00	.00	.00	814.10	245000.00	832.76	.00	832.95	8.14	4.74	73626.03	85887.20
	214.000	840.00	.00	.00	814.10	245000.00	833.41	.00	833.65	9.30	5.20	65765.62	80339.92
	216.000	750.00	.00	.00	814.30	245000.00	833.39	.00	833.59	7.69	4.79	74701.66	88323.73
	216.000	750.00	.00	.00	814.30	245000.00	834.12	.00	834.37	8.51	5.17	66620.10	83968.26
	218.000	900.00	.00	.00	814.90	245000.00	834.12	.00	834.30	8.19	4.52	74372.52	85631.97
	218.000	900.00	.00	.00	814.90	245000.00	834.90	.00	835.12	8.45	4.74	68459.44	84290.51
	220.000	1000.00	.00	.00	814.60	245000.00	834.86	.00	835.07	9.02	4.65	71334.19	81591.00
	220.000	1000.00	.00	.00	814.60	245000.00	835.64	.00	835.88	8.79	4.76	66389.01	82656.33
	222.000	950.00	.00	.00	816.80	245000.00	835.66	.00	835.87	7.72	4.87	72551.84	88179.07
	222.000	950.00	.00	.00	816.80	245000.00	836.44	.00	836.69	8.11	5.17	65192.84	86033.59
	224.000	950.00	.00	.00	818.40	245000.00	836.53	.00	836.77	12.28	5.09	64855.71	69913.95
	224.000	950.00	.00	.00	818.40	245000.00	837.35	.00	837.66	13.25	5.47	57255.61	67309.69
	226.000	1050.00	.00	.00	819.70	245000.00	837.90	.00	838.17	13.23	5.10	62152.19	67354.83
	226.000	1050.00	.00	.00	819.70	245000.00	838.78	.00	839.08	12.72	5.20	57548.57	68687.34
	228.000	1400.00	.00	.00	820.60	245000.00	839.14	.00	839.43	8.44	5.24	64979.98	84343.07
	228.000	1400.00	.00	.00	820.60	245000.00	839.99	.00	840.31	8.17	5.33	61422.75	85693.34

GILA RIVER WITH 100-YEAR

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	190.000	245000.00	818.01	.00	.00	.00	10196.04	.00
	190.000	245000.00	818.87	.86	.00	.86	6070.00	.00
	192.000	245000.00	819.06	.00	1.05	.00	11152.49	930.00
	192.000	245000.00	819.86	.80	.99	.80	6216.77	930.00
	194.000	245000.00	820.56	.00	1.50	.00	11194.34	1200.00
	194.000	245000.00	821.39	.82	1.53	.82	6475.15	1200.00
	196.000	245000.00	821.44	.00	.87	.00	10242.46	880.00
	196.000	245000.00	822.24	.81	.85	.81	6639.69	880.00
	198.000	245000.00	823.22	.00	1.78	.00	10530.61	980.00
	198.000	245000.00	823.90	.68	1.66	.68	6939.54	980.00
	200.000	245000.00	824.59	.00	1.38	.00	9965.57	980.00
	200.000	245000.00	825.21	.62	1.32	.62	7070.00	980.00
	202.000	245000.00	825.60	.00	1.01	.00	10014.74	840.00
	202.000	245000.00	826.12	.51	.90	.51	7003.85	840.00
	204.000	245000.00	825.89	.00	.29	.00	9575.46	250.00
	204.000	245000.00	826.39	.49	.27	.49	6424.56	250.00
*	204.200	245000.00	827.14	.00	1.24	.00	8673.09	114.00
*	204.200	245000.00	826.89	-.25	.50	-.25	6355.34	114.00
*	204.500	245000.00	827.90	.00	.76	.00	6612.02	5.00
*	204.500	245000.00	827.68	-.23	.79	-.23	5801.60	5.00
*	205.500	245000.00	829.78	.00	1.87	.00	8743.76	42.60
*	205.500	245000.00	829.91	.13	2.23	.13	6550.00	42.60
*	205.800	245000.00	830.23	.00	.45	.00	10934.63	5.00
*	205.800	245000.00	830.21	-.02	.30	-.02	6550.00	5.00
*	206.000	245000.00	830.56	.00	.33	.00	12060.79	73.70
*	206.000	245000.00	830.69	.14	.48	.14	6500.00	73.70
	208.000	245000.00	830.80	.00	.24	.00	11682.40	900.00
	208.000	245000.00	831.01	.22	.32	.22	7250.00	900.00
	210.000	245000.00	831.20	.00	.40	.00	11369.69	730.00
	210.000	245000.00	831.53	.34	.52	.34	7308.49	730.00
	212.000	245000.00	831.92	.00	.73	.00	10713.73	780.00
	212.000	245000.00	832.45	.53	.91	.53	7520.00	780.00

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
214.000	245000.00	832.76	.00	.83	.00	10884.90	840.00
214.000	245000.00	833.41	.66	.96	.66	7810.00	840.00
216.000	245000.00	833.39	.00	.64	.00	11195.86	750.00
216.000	245000.00	834.12	.73	.71	.73	7930.00	750.00
218.000	245000.00	834.12	.00	.72	.00	10640.19	900.00
218.000	245000.00	834.90	.78	.78	.78	7690.00	900.00
220.000	245000.00	834.86	.00	.74	.00	10625.93	1000.00
220.000	245000.00	835.64	.79	.74	.79	7390.00	1000.00
222.000	245000.00	835.66	.00	.80	.00	10301.82	950.00
222.000	245000.00	836.44	.78	.80	.78	6900.00	950.00
224.000	245000.00	836.53	.00	.87	.00	10213.84	950.00
224.000	245000.00	837.35	.83	.91	.83	6470.00	950.00
226.000	245000.00	837.90	.00	1.38	.00	9813.78	1050.00
226.000	245000.00	838.78	.88	1.43	.88	6220.00	1050.00
228.000	245000.00	839.14	.00	1.23	.00	8815.13	1400.00
228.000	245000.00	839.99	.85	1.21	.85	6030.00	1400.00

SUMMARY OF ERRORS AND SPECIAL NOTES

```
CAUTION SECNO=    204.200  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    204.200  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    204.200  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=    204.200  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    204.200  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    204.200  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=    204.500  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    204.500  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    204.500  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=    204.500  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    204.500  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    204.500  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=    205.500  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    205.500  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    205.800  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    205.800  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    206.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    206.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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*  WATER SURFACE PROFILES                          *
*  VERSION OF SEPTEMBER 1988                       *
*                                                  *
*                                                  *
*  RUN DATE    11/ 7/90   TIME    8:51:39          *
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*  U.S. ARMY CORPS OF ENGINEERS        *
*  THE HYDROLOGIC ENGINEERING CENTER   *
*  609 SECOND STREET, SUITE D          *
*  DAVIS, CALIFORNIA 95616             *
*  (916) 756-1104                      *
***************************************
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X     X  XXXXXXX   XXXXX             XXXXX
X     X  X        X     X           X     X
X     X  X        X                       X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                 X
X     X  X        X     X           X
X     X  XXXXXXX   XXXXX             XXXXXXX
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END OF BANNER

THIS RUN EXECUTED 11/ 7/90 8:51:40

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**************************************************
 HEC2 RELEASE DATED SEPT 88

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T1      THIS FILE CREATED BY ADOT FROM A DAMES & MOORE FILE (JOB # 15448-001-22)
T2      ADOT REVISED ENCROACHMENTS & ADDED A NEW BRIDGE BETWEEN 196 & 216
T3      GILA RIVER BRIDGE - 3625'- TYPE VI AASHTO GIRDERS

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ

      0        3                                                   195000   817.95

J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE

     1         0       -1


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

   -10       -10

J6  IHLEQ     ICOPY    SUBDIV   STRTDS   RMILE

                        -1


NC    0.050     0.050     0.030       0.1       0.3
NH        5     0.035    7592.2     0.060    8288.1     0.045   10623.4     0.060   13991.2     0.035
NH    19344

ET                          9.1                                                          7430     13500
X1    190.0        94    9490.0   10537.5       770      1100       910
GR    839.5    3492.2     844.7    3535.9     842.0    3649.9     836.6    3704.2     837.7    3765.2
GR    833.0    3840.3     830.3    4015.2     824.2    4232.9     824.2    4284.1     828.2    4449.6
GR    825.0    4598.5     822.7    4680.0     821.8    4832.8     818.6    4903.2     815.5    6181.5
GR    816.9    6257.8     815.8    6343.0     815.8    7538.1     810.2    7551.6     811.6    7592.2
GR    816.5    7625.2     813.1    7760.7     811.9    7983.5     816.2    8067.3     813.2    8162.9
GR    813.2    8265.6     804.1    8288.1     801.0    8415.2     801.2    8505.8     811.5    8534.1
GR    810.3    8600.8     806.2    8651.2     808.6    8755.8     804.8    8793.1     806.7    9023.9
GR    810.7    9062.5     812.0    9208.3     810.6    9310.8     812.6    9490.0     809.9    9569.3
GR    804.0    9621.8     803.0    9791.8     803.0    9843.4     810.9    9896.7     810.3   10000.0
GR    808.1   10185.0     809.6   10244.4     807.9   10368.6     807.1   10505.4     814.8   10537.5
GR    808.6   10596.2     813.1   10623.4     814.9   10858.1     810.6   10882.3     815.2   10914.4
GR    810.9   10975.4     812.6   11189.3     811.1   11373.3     803.1   11432.8     803.1   11643.2
GR    804.2   11855.9     806.4   12048.7     804.1   12160.8     804.2   12333.7     809.1   12402.5
GR    808.6   12518.3     806.2   12714.3     805.4   12844.8     805.3   12926.8     815.1   13007.5
GR    813.2   13210.6     814.4   13328.4     803.7   13385.7     810.6   13438.8     810.5   13754.3
GR    809.2   13851.4     811.3   13991.2     815.0   14023.2     814.7   14048.4     815.9   14767.7
GR    816.7   15156.7     819.0   15459.5     820.1   15958.7     821.1   16419.0     822.5   16536.5
GR    827.3   16598.3     824.5   16645.5     816.2   16668.4     826.9   16717.8     827.0   16938.3
GR    829.2   17514.8     831.0   17883.0     832.7   18017.5     842.9   19344.0
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NH       5     0.035    8228.3     0.060    9439.2     0.045   10488.7     0.060   14658.5     0.035
NH   19112

ET                         9.1                                                        7410     13660
            APPROXIMATE CROSSING OF TURNER ROAD ALIGNMENT
X1   192.0        94   10997.8   11562.8      820      1230       930
GR   829.2    4545.4     825.9    4560.1    822.5    4859.1     820.8    4873.4     825.1    4908.7
GR   821.6    4932.1     821.6    4961.5    819.4    4970.4     817.8    6098.1     819.0    6112.7
GR   819.2    6386.6     816.4    6488.0    816.4    6608.6     818.8    6694.3     815.5    6806.5
GR   816.0    6905.8     818.7    6973.0    817.2    7146.6     819.7    7338.1     817.8    7721.6
GR   818.6    7885.7     810.2    8008.0    814.2    8186.5     803.8    8228.3     803.8    8263.5
GR   806.2    8303.3     804.4    8338.8    807.9    8389.2     810.1    8700.7     807.1    8755.1
GR   810.9    8810.0     808.8    8871.8    812.5    8965.1     812.5    9045.0     810.1    9070.7
GR   810.1    9147.7     815.1    9223.9    804.0    9241.4     804.0    9278.8     808.6    9439.2
GR   806.6    9532.7     807.5    9609.9    813.3    9666.5     813.3    9737.6     810.3    9811.1
GR   813.5    9869.5     810.9   10000.0    810.9   10033.1     810.9   10105.6     809.5   10169.8
GR   809.7   10285.7     811.2   10320.5    811.5   10397.5     815.1   10442.7     816.2   10488.7
GR   823.7   10518.7     814.6   10561.0    815.4   10769.4     812.3   10919.6     816.4   10997.8
GR   804.3   11025.0     804.4   11185.2    806.1   11340.1     812.8   11562.8     812.7   11708.4
GR   811.3   11960.4     808.4   12183.0    810.4   12377.9     807.2   12487.9     815.2   12579.1
GR   806.8   12612.9     806.7   12656.5    811.5   12734.2     814.7   12985.3     807.9   13061.3
GR   809.5   13195.8     808.5   13220.1    810.2   13349.8     805.4   13367.7     805.4   13453.5
GR   813.4   13631.6     813.3   13761.7    809.1   13888.1     806.2   13964.3     817.1   14065.0
GR   815.7   14658.5     816.4   15083.3    818.3   15471.6     818.9   16050.4     819.9   16359.5
GR   826.8   16431.7     823.6   16477.7    812.5   16507.6     838.4   19112.0

NH       6     0.035    7405.2     0.070    8411.9     0.060    9663.7     0.045   10759.0     0.060
NH   15316     0.035   17520.0

ET                         9.1                                                        7250     13750
X1   194.0        94   10759.0   11525.3     1260      1150      1200
GR   832.0    4004.2     831.0    4183.5    829.4    4338.3     827.8    4436.9     826.8    4666.0
GR   824.2    4816.5     822.6    4979.8    820.0    5106.2     823.8    5141.5     820.2    5163.7
GR   818.0    5215.0     817.9    5369.4    818.0    5606.8     817.5    5785.0     816.8    5878.1
GR   817.6    6032.5     818.3    6290.6    818.7    6551.5     817.4    6774.6     817.3    6860.5
GR   816.7    6987.5     817.4    7149.2    817.2    7296.8     817.1    7352.1     804.0    7405.2
GR   813.7    7479.0     808.6    7541.9    809.7    7598.4     810.5    7624.0     811.4    7712.4
GR   811.8    7881.5     810.6    8006.5    816.6    8037.6     810.2    8102.6     817.8    8183.5
GR   817.9    8411.9     815.8    8702.7    807.8    8751.7     805.8    8826.9     812.3    8917.2
GR   805.6    8960.6     805.5    9023.3    808.6    9096.3     805.3    9125.2     812.8    9209.5
GR   809.1    9306.0     814.3    9395.4    813.9    9555.1     811.6    9663.7     813.1    9777.1
GR   811.1    9875.7     812.3    9954.5    810.6   10000.0     811.3   10125.9     811.1   10210.3
GR   812.3   10325.7     812.9   10368.2    824.7   10426.0     814.6   10452.3     815.3   10542.5
GR   815.7   10641.8     813.6   10693.0    813.5   10693.5     815.0   10759.0     809.1   10834.8
GR   807.6   11011.0     806.8   11136.7    806.8   11250.3     808.8   11389.8     815.2   11525.3
GR   808.2   11575.8     815.8   11735.3    810.2   11917.2     809.7   12052.7     812.9   12364.5
GR   810.6   12534.0     817.1   12735.6    808.1   12861.1     809.1   12916.3     817.2   13088.2
GR   815.6   13411.6     811.5   13660.2    811.2   13773.2     814.4   13948.7     813.7   14028.7
GR   820.3   14098.3     815.7   14134.6    807.6   14161.3     819.1   14319.1     816.2   14493.5
GR   816.6   14890.8     819.0   15316.0    818.9   16052.8     827.0   17520.0
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NH	6	0.035	7209.9	0.070	8137.1	0.060	9390.9	0.045	10451.1	0.060
NH	18805	0.035	20181.7							
ET			9.1						7320	13880
X1	196.0	94	10692.9	11651.0	400	930	880			
GR	839.9	3684.0	838.0	3898.4	836.1	4218.6	832.8	4644.7	828.6	4845.2
GR	826.5	4939.0	823.7	4992.5	824.6	5052.0	825.2	5119.5	820.7	5278.9
GR	819.1	5590.4	819.8	6039.7	820.4	6465.0	820.8	7060.4	818.8	7209.9
GR	820.5	7374.4	820.8	7451.5	808.6	7502.6	810.2	7602.2	812.3	7767.4
GR	809.3	7816.2	815.9	7903.3	812.8	7985.3	814.3	8081.7	810.7	8137.1
GR	816.1	8204.1	813.0	8219.3	816.5	8378.8	816.3	8616.0	808.5	8689.3
GR	810.5	8802.5	807.1	8811.3	807.5	8929.8	810.5	9066.3	810.7	9132.2
GR	814.2	9224.2	811.6	9335.7	810.7	9390.9	814.9	9528.7	811.9	9688.5
GR	813.9	9891.7	813.5	10000.0	812.2	10107.6	816.5	10236.7	815.6	10371.6
GR	828.4	10423.2	817.3	10451.1	817.1	10585.4	819.5	10692.9	815.7	10854.7
GR	812.5	11005.7	812.0	11302.7	807.9	11480.0	807.9	11586.6	816.6	11651.0
GR	814.6	11857.6	808.8	11896.8	813.8	11997.8	811.3	12039.7	814.0	12170.4
GR	811.3	12325.4	815.5	12481.7	815.2	12700.4	815.6	12851.5	814.0	13090.4
GR	808.6	13121.9	808.6	13160.8	816.5	13206.7	820.6	13273.9	819.9	13699.6
GR	813.5	13765.4	820.5	13836.0	812.2	13958.3	812.2	14071.3	819.4	14311.0
GR	820.2	14534.3	819.3	14711.3	819.5	14986.1	819.8	15392.3	822.2	15486.9
GR	822.6	15679.5	821.8	16016.1	826.7	16085.2	824.0	16121.8	814.0	16159.3
GR	823.2	16228.0	824.2	16675.2	827.0	17175.0	828.2	17504.3	829.8	17643.9
GR	831.4	18028.8	832.5	18331.3	842.5	18805.0	848.8	20181.7		

NC				.3	.5					
NH	6	0.035	5698.0	0.045	7712.0	0.060	9012.4	0.045	10433.4	0.060
NH	14255	0.035	20027.7							
ET			9.1						7815	13990
X1	198.0	94	10408.0	11619.1	950	1050	980			
GR	833.8	3888.2	831.6	3970.3	831.2	4129.6	829.9	4370.7	828.1	4446.2
GR	827.3	4605.8	826.5	4844.7	823.7	4876.1	827.2	4915.1	823.7	4922.5
GR	827.4	4965.0	822.8	5077.4	821.7	5230.0	819.8	5456.4	820.2	5698.0
GR	819.9	6046.7	821.2	6452.0	820.9	6688.1	819.5	6817.5	821.0	6863.0
GR	819.5	6890.5	821.4	7050.4	820.7	7235.2	821.0	7447.9	821.9	7712.0
GR	816.8	7755.6	811.5	7793.8	816.2	7922.7	815.2	8069.8	813.4	8213.4
GR	811.8	8269.9	817.6	8393.8	817.1	8522.5	813.7	8634.8	813.2	8672.6
GR	807.2	8698.8	807.2	8868.2	814.0	8929.3	818.6	9012.4	817.6	9209.8
GR	814.7	9326.8	813.2	9415.2	815.8	9555.5	817.5	9720.5	819.5	10000.0
GR	818.2	10099.4	818.3	10265.9	818.1	10361.3	823.9	10408.0	819.2	10433.4
GR	817.4	10530.4	815.8	10564.4	815.0	10710.9	812.7	10935.8	809.0	11283.9
GR	809.0	11438.2	814.5	11503.0	817.7	11619.1	816.0	12001.8	813.9	12274.4
GR	817.6	12354.2	810.3	12420.7	810.3	12532.0	818.0	12630.7	815.6	13240.2
GR	822.2	13312.4	815.7	13419.6	819.6	13589.9	817.5	13603.9	823.9	13815.2
GR	822.0	14186.2	820.6	14255.0	813.0	14287.9	813.0	14359.2	820.8	14502.5
GR	821.4	14828.8	825.4	15303.9	823.2	15457.6	822.1	15818.7	827.0	15883.2
GR	822.7	15942.5	813.5	15952.9	822.4	16010.4	823.4	16339.4	826.4	16852.2
GR	827.6	17234.3	829.7	17515.0	832.0	17900.2	833.8	18459.6	838.4	18602.2
GR	838.5	18763.4	839.9	18964.9	841.4	19302.5	846.7	20027.7		

NH	6	0.035	6105	0.045	9030	0.035	9540	0.045	10688	0.045
NH	14560	0.035	20370							
ET			9.1						8400	14150
X1	200	94	10688	11173	950	1050	980			
GR	828.4	5442	826.6	5494	825.6	5518	824.6	5677	823.4	5786
GR	822.6	6105	821.4	6879	819.8	6893	819.8	6905	825.1	6932
GR	823.9	7117	822.6	7448	818.1	7515	816.6	7570	819.3	7699
GR	822.1	7889	821.9	8027	819.4	8138	818.4	8149	820.8	8191
GR	819.9	8333	820.8	8397	820.8	8597	818.8	8663	818.8	8715
GR	815.4	8773	818.4	8954	808.1	8978	808.1	9030	811.8	9129
GR	812.1	9216	810.1	9249	811.8	9293	818.1	9318	821.4	9384
GR	818.3	9493	820.8	9540	819.4	9756	820.4	9841	819.9	10000
GR	821.1	10541	818.9	10688	808.3	10742	809.1	10776	810.3	10804
GR	809.0	10994	808.1	11013	808.1	11100	819.3	11173	818.4	11223
GR	819.3	11443	815.4	11636	814.3	11780	812.6	11807	813.6	11953
GR	817.8	11995	815.3	12215	817.9	12396	817.3	12601	810.0	12621
GR	810.0	12744	814.4	12771	816.9	12969	818.9	13258	821.9	13785
GR	823.6	13850	822.9	14090	821.2	14163	818.9	14202	823.9	14206
GR	825.1	14560	825.1	14703	822.1	14738	814.2	14781	814.2	14817
GR	822.7	14832	822.7	15200	825.7	15244	825.7	15401	823.2	15481
GR	823.7	15883	826.1	15912	825.9	15939	824.7	15980	818.4	15997
GR	818.4	16016	824.7	16030	823.6	16071	828.5	17311	829.5	17352
GR	836.2	18644	837.9	18704	844.4	20018	847.4	20370		

NH	6	0.035	6010	0.045	8931	0.035	9636	0.045	10673	0.045
NH	14679	0.035	20691							
ET			9.1						8740	13550
X1	202	92	9269	10000	900	840	840			
GR	837.1	5096	835.8	5122	831.3	5156	831.3	5196	834.1	5239
GR	832.8	5287	833.3	5377	826.4	5456	823.6	6010	823.8	6865
GR	822.3	6893	825.1	6926	824.6	7114	821.3	7179	822.8	7247
GR	822.8	7413	821.8	7443	824.1	7564	824.1	7646	823.8	7984
GR	819.9	8014	824.4	8048	822.9	8425	826.9	8498	824.8	8931
GR	824.8	9190	821.1	9269	814.9	9326	810.3	9335	811.1	9395
GR	813.8	9636	814.8	9686	812.1	9737	812.1	9798	818.4	9813
GR	822.4	10000	822.4	10129	811.0	10233	809.8	10442	809.5	10542
GR	812.1	10673	822.6	10704	822.6	10752	818.9	10810	820.6	11052
GR	818.8	11147	816.9	11465	817.3	11776	817.3	11986	811.6	12027
GR	811.6	12050	816.4	12093	816.1	12369	816.4	12502	809.6	12592
GR	809.5	12710	817.6	12851	821.2	13654	822.9	13675	824.1	13729
GR	823.1	14035	818.9	14064	819.7	14096	823.1	14131	826.9	14679
GR	826.2	14813	822.6	14832	822.6	14852	819.1	14902	819.1	14913
GR	815.6	14917	815.6	14933	823.1	14979	821.9	15095	824.6	15319
GR	823.9	15393	823.7	15736	823.7	15935	828.7	15991	828.4	16012
GR	824.4	16049	824.4	16068	818.6	16082	818.6	16113	824.9	16128
GR	828.5	17156	830.0	17196	836.0	18459	836.7	18541	843.5	19851
GR	844.0	19877	847.9	20691						

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NH      6      .035      6307      .045      8990      .035      9589      .045     10611      .045
NH  14551      .035     20770

ET                       9.1                                                         9240     12970
          DOWNSTREAM     OF AZ 85 BRIDGE
X1    204        94      9356     10453       260       240       250                800
GR   43.3      4430      43.3      4431      36.9      4514      36.6      4627      38.3      4666
GR   38.3      4741      31.6      4836      24.9      5545      24.9      6307      25.4      6630
GR   25.4      6717      21.6      6738      22.6      6752      21.1      6768      21.1      6786
GR   26.3      6810      25.9      6837      25.9      6991      26.6      7139      28.6      7256
GR   27.8      7277      23.3      7299      24.4      7309      26.6      7430      26.8      7633
GR   26.8      7686      23.9      7744      24.6      7838      27.6      7889      26.4      7991
GR   25.8      8116      25.8      8199      22.6      8240      20.4      8284      19.9      8396
GR   19.9      8440      24.3      8498      21.3      8593      20.8      8628      20.4      8990
GR   21.4      9123      21.4      9217      22.3      9356      17.8      9589      11.2      9659
GR   11.2      9987      12.1     10000      13.1     10126      13.6     10311      11.2     10370
GR   11.2     10394      17.8     10453      17.9     10496      17.6     10539      18.9     10611
GR   18.6     10727      16.8     10759      19.8     10814      23.1     10925      23.1     11048
GR   19.3     11109      20.3     11205      19.9     11291      19.1     11461      18.9     11590
GR   15.1     11681      15.3     11813      15.1     12253      16.1     12388      17.4     12572
GR   18.0     12700      20.6     13407      22.7     13445      22.1     13869      23.4     14237
GR   26.4     14551      28.0     14812      18.6     14844      24.4     14948      23.6     15013
GR   20.7     15143      23.4     15198      22.7     15470      21.6     15628      24.6     15807
GR   26.2     16294      28.5     16342      28.5     16390      26.4     16444      31.4     17330
GR   36.9     18285      37.5     18355      37.7     18426      51.2     20770

ET                       9.1                                                         9260     12950
X1   204.1         0         0         0        67        67        67         0         0         0

NH      2      .035      9609      .045     12780

X1   204.2        96      9356     10485         1         1         1         0       800         0
X2       0         0         0    833.75     840.5
GR   33.75      9280      21.8      9298      22.3      9356      17.8      9578     33.75    9578.1
GR   33.75    9588.9      17.8      9589      11.2      9648     33.75    9648.1     33.75    9658.9
GR   11.2      9659      11.2      9803     33.75    9803.1     33.75    9813.9      11.2      9814
GR   11.2      9973     33.75    9973.1     33.75    9983.9      11.2      9984      12.4     10143
GR   33.75   10143.1     33.75   10153.9      12.4     10154      13.6     10300     33.75   10300.1
GR   33.75   10310.9      13.6     10311      11.2     10394      17.9     10485     33.75   10485.1
GR   33.75   10495.9      17.9     10496      17.6     10539      18.9     10611      18.2     10653
GR   33.75   10653.1     33.75   10663.9      18.2     10664      16.8     10759      19.8     10803
GR   33.75   10803.1     33.75   10813.9      19.8     10814      23.1     11037     33.75   11037.1
GR   33.75   11047.9      23.1     11048      20.8     11163     33.75   11163.1     33.75   11173.9
GR   20.8     11174      20.3     11205      19.7     11333     33.75   11333.1     33.75   11343.9
GR   19.7     11344      19.1     11461      18.2     11503     33.75   11503.1     33.75   11513.9
GR   18.2     11514      15.1     11673     33.75   11673.1     33.75   11683.9      15.1     11684
GR   15.1     11843     33.75   11843.1     33.75   11853.9      15.1     11854      15.1     12013
GR   33.75   12013.1     33.75   12023.9      15.1     12024      15.1     12183     33.75   12183.1
GR   33.75   12193.9      15.1     12194      15.1     12253      15.7     12353     33.75   12353.1
GR   33.75   12363.9      15.7     12364      16.6     12523     33.75   12523.1     33.75   12533.9
GR   16.6     12534      17.6     12693     33.75   12693.1     33.75   12703.9      17.6     12704
GR   18.5     12863     33.75   12863.1     33.75   12873.9      18.5     12874      18.7     12895
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GR    33.75     12905

X1    204.3         0         0         0        94        94        94         0         0         0
X2                                   833.75    840.5

NH        2      .035      9609      .045     12780

ET                          9.1                                                          9250     12875
X1    204.4        94      9356     10496         1         1         1                  800
GR     43.3      4430      43.3      4431      36.9      4514      36.6      4627      38.3      4666
GR     38.3      4741      31.6      4836      24.9      5545      24.9      6307      25.4      6630
GR     25.4      6717      21.6      6738      22.6      6752      21.1      6768      21.1      6786
GR     26.3      6810      25.9      6837      25.9      6991      26.6      7139      28.6      7256
GR     27.8      7277      23.3      7299      24.4      7309      26.6      7430      26.8      7633
GR     26.8      7686      23.9      7744      24.6      7838      27.6      7889      26.4      7991
GR     25.8      8116      25.8      8199      22.6      8240      20.4      8284      19.9      8396
GR     19.9      8440      24.3      8498      21.3      8593      20.8      8628      20.4      8990
GR     21.4      9123      21.4      9217      22.3      9356      17.8      9589      11.2      9659
GR     11.2      9987      12.1     10000      13.1     10126      13.6     10311      11.2     10370
GR     11.2     10394      17.8     10453      17.9     10496      17.6     10539      18.9     10611
GR     18.6     10727      16.8     10759      19.8     10814      23.1     10925      23.1     11048
GR     19.3     11109      20.3     11205      19.9     11291      19.1     11461      18.9     11590
GR     15.1     11681      15.3     11813      15.1     12253      16.1     12388      17.4     12572
GR     18.0     12700      20.6     13407      22.7     13445      22.1     13869      23.4     14237
GR     26.4     14551      28.0     14812      18.6     14844      24.4     14948      23.6     15013
GR     20.7     15143      23.4     15198      22.7     15470      21.6     15628      24.6     15807
GR     26.2     16294      28.5     16342      28.5     16390      26.4     16444      31.4     17330
GR     36.9     18285      37.5     18355      37.7     18426      51.2     20770

NH        6     0.035      6230     0.045      9014     0.035      9593     0.045     10667     0.045
NH    14420     0.035     20735

ET                          9.1                                                          9200     12900
            UPSTREAM      OF AZ 85 BRIDGE
X1      206        86      9563     10487        78        78        78         0         0         0
GR    836.1      4310     832.9      4555     835.8      4598     831.3      4619     831.3      4628
GR    834.9      4641     834.3      4672     831.9      4695     832.1      4729     826.9      5635
GR    826.4      6230     826.4      6469     828.9      6503     828.9      6666     822.6      6698
GR    822.6      6741     824.6      6754     824.1      6835     827.3      6856     827.8      7001
GR    828.4      7100     827.3      7232     826.9      7342     826.6      7475     828.6      7490
GR    828.4      7629     826.9      7666     826.9      7777     826.9      7834     827.3      7872
GR    826.8      8076     828.1      8171     826.4      8218     823.9      8245     823.9      8484
GR    823.8      8813     824.4      9014     828.3      9022     828.3      9081     825.1      9131
GR    824.9      9497     820.8      9563     812.3      9593     812.3      9878     814.4     10000
GR    813.4     10281     811.8     10330     811.8     10350     818.4     10391     819.8     10487
GR    814.9     10512     815.8     10667     814.3     10892     815.6     11253     821.8     11294
GR    821.8     11372     819.1     11435     817.9     11549     817.3     11638     814.4     11707
GR    818.6     11724     816.1     11901     816.1     12198     816.1     12233     813.6     12283
GR    814.9     12567     816.6     12700     824.6     14420     825.6     15105     823.6     15142
GR    825.9     15861     825.2     16037     828.7     16767     830.5     16925     830.7     17396
GR    834.5     17972     837.7     18262     837.7     18317     837.0     18345     839.9     18871
GR    842.0     19360     845.2     19574     845.2     19622     846.4     19808     850.4     20522
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GR	851.4	20735								

NH	6	0.035	6176	0.045	8826	0.035	9544	0.045	10618	0.045
NH	14608	0.035	19710							
ET			9.1						8450	13340
X1	208	94	9340	10225	900	900	900			
GR	837.6	4385	837.1	4551	834.3	4592	834.3	4616	835.8	4626
GR	834.8	4718	832.9	4734	829.8	5724	827.1	5738	827.1	6176
GR	827.4	6433	827.3	6680	823.3	6705	823.3	6733	826.6	6762
GR	825.8	6829	825.8	6945	827.1	6972	827.8	7190	827.1	7350
GR	825.8	7423	827.8	7449	823.4	7521	823.4	7616	823.8	7797
GR	823.8	7920	825.4	7950	825.4	8216	824.4	8466	824.4	8792
GR	829.8	8826	829.8	8837	824.6	8869	823.4	9340	813.1	9356
GR	811.8	9437	811.8	9544	811.8	9816	812.1	9856	819.3	9882
GR	818.6	9947	818.3	10000	817.6	10095	814.6	10150	815.1	10194
GR	821.4	10225	825.4	10572	819.6	10618	819.6	10642	825.4	10670
GR	826.1	10897	824.3	10961	825.4	10989	824.9	11425	817.3	11464
GR	818.3	11485	822.8	11528	821.8	11891	815.8	11934	815.4	12090
GR	819.4	12123	818.4	12357	818.4	12700	819.2	12779	818.1	12825
GR	824.6	12847	825.1	13206	821.4	13266	822.9	13306	824.6	13518
GR	823.7	13662	824.1	13898	822.9	13944	823.4	14190	826.6	14398
GR	827.2	14608	827.1	14811	825.7	14882	827.2	15081	824.4	15111
GR	824.7	15144	827.9	15168	823.7	15207	824.6	15354	826.1	15948
GR	828.5	16720	829.2	16753	835.5	18070	836.4	18094	836.5	18120
GR	836.4	18138	838.4	18450	844.5	19381	845.9	19710		

NH	5	0.035	6659	0.045	9360	0.045	10346	0.060	14541	0.035
NH	19805									
ET			9.1						7840	13680
X1	210	94	9307	10346	770	730	730			
GR	844.8	4510	839.4	4551	836.8	4683	839.1	4700	837.6	4777
GR	834.6	4794	832.6	5380	831.3	5731	829.1	5752	826.8	6659
GR	829.3	6678	827.8	6699	826.6	6762	825.1	6825	825.1	6892
GR	827.1	6913	824.8	7149	824.4	7276	826.3	7306	826.3	7454
GR	827.1	7655	825.8	7816	825.3	8056	827.3	8133	827.6	8669
GR	831.8	8686	831.8	8695	824.3	8735	825.1	9196	828.4	9216
GR	825.3	9289	825.3	9307	812.6	9360	812.6	9721	816.8	9747
GR	818.8	9908	815.8	9958	818.9	10000	818.9	10032	818.3	10067
GR	822.6	10346	823.9	10504	826.1	10601	826.1	10650	827.3	10774
GR	824.4	10826	824.4	10873	821.8	10911	827.4	10934	827.3	10984
GR	826.8	11268	823.8	11297	826.3	11322	820.3	11349	827.3	11381
GR	826.9	11493	820.8	11532	822.6	11594	824.8	11677	823.4	11951
GR	822.1	12049	817.6	12165	815.9	12250	815.9	12280	816.6	12389
GR	819.6	12408	819.3	12656	819.1	12780	820.9	13041	823.9	13084
GR	825.1	13550	824.6	13714	822.9	13783	825.4	13793	825.7	13900
GR	821.6	13927	821.6	13953	825.2	13966	824.4	14193	826.1	14379
GR	828.2	14435	825.4	14541	826.6	14683	829.0	14753	828.4	14992
GR	827.4	15194	825.2	15208	825.2	15219	820.6	15238	825.9	15262
GR	825.2	15293	827.2	15499	827.7	16557	848.0	19805		

NH	6	0.035	5768	0.045	9340	0.060	9759	0.045	10651	0.060
NH	14659	0.035	19947							
ET			9.1						7230	14050
X1	212	94	9340	9759	780	800	780			
GR	847.1	4637	847.1	4638	847.1	4639	846.4	4693	844.6	4725
GR	839.4	4752	839.4	4769	841.3	4778	841.3	4833	839.6	4836
GR	833.9	5754	832.1	5768	829.6	6327	832.3	6350	825.9	6390
GR	825.9	6494	832.1	6518	826.9	6611	825.8	6711	822.1	6727
GR	822.1	6761	827.1	6778	825.1	6806	826.9	6979	828.3	7183
GR	825.4	7245	825.6	7374	825.6	7517	827.4	8147	827.8	8416
GR	827.8	8516	826.9	8551	827.9	8604	827.4	8777	830.3	8794
GR	823.9	8830	827.4	8877	827.4	8939	823.4	8955	823.4	9001
GR	826.4	9028	826.4	9137	819.9	9206	819.9	9237	824.1	9265
GR	822.4	9340	813.6	9357	813.4	9493	814.8	9506	814.8	9739
GR	822.3	9759	824.9	10000	826.8	10501	825.6	10562	821.4	10592
GR	821.4	10624	825.9	10651	828.4	11065	823.6	11104	823.6	11176
GR	827.6	11196	829.1	11276	828.8	11380	825.1	11428	828.6	11492
GR	825.8	11788	823.8	12058	821.8	12392	820.4	12731	819.9	12800
GR	821.1	13326	823.4	13359	824.1	13430	821.9	13468	821.9	13507
GR	826.2	13531	823.1	13759	825.2	13813	825.2	14151	821.4	14165
GR	821.4	14202	826.1	14220	826.1	14338	829.7	14483	829.7	14659
GR	827.6	14852	826.4	14879	828.1	15097	826.1	15327	824.1	15349
GR	824.1	15374	826.7	15421	829.6	16167	853.6	19947		

NH	6	0.035	6682	0.045	9014	0.060	9709	0.045	10531	0.060
NH	14754	0.035	20053							
ET			9.1						7290	14420
X1	214	94	9142	9819	850	850	840			
GR	856.8	5052	856.8	5053	856.8	5083	840.1	5124	838.8	5191
GR	838.6	5258	836.9	5276	837.4	5588	836.1	5612	835.6	5804
GR	833.6	5821	833.6	6003	830.9	6029	830.9	6218	827.9	6257
GR	828.9	6477	823.6	6499	823.6	6532	828.6	6554	826.6	6582
GR	824.6	6682	827.1	6723	827.9	6990	828.8	7191	827.8	7377
GR	828.4	7680	828.4	8277	826.8	8335	825.6	8356	825.6	8409
GR	829.4	8424	828.3	8654	827.4	8706	828.8	8760	825.8	8810
GR	827.4	8883	826.3	8990	821.6	9014	822.4	9055	820.3	9142
GR	815.4	9173	816.3	9243	815.4	9260	815.4	9301	818.8	9329
GR	817.6	9367	814.1	9393	814.8	9709	819.4	9722	824.4	9819
GR	825.6	10000	826.8	10531	823.4	10552	823.4	10569	826.9	10592
GR	824.8	10637	828.6	10670	828.6	10882	824.3	10934	824.3	11084
GR	829.1	11110	827.6	11379	822.3	11408	822.3	11416	827.4	11481
GR	825.4	11751	821.1	11806	826.3	11831	825.8	11911	821.9	11935
GR	824.3	11967	821.8	12353	820.9	12800	820.1	13353	820.4	13525
GR	824.7	13550	826.4	13695	824.9	13857	820.9	13882	829.4	13903
GR	827.2	14250	828.6	14754	830.1	14983	828.6	15324	825.6	15354
GR	826.6	15514	828.4	15986	828.4	16250	833.2	16962	835.6	17469
GR	835.6	17610	839.1	17626	838.6	17688	853.9	20053		

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NH       5     0.045      8816     0.060      9607     0.045     10460     0.060     14660     0.035
NH   20265
ET                         9.1                                                         7350     14920
X1     216        94      8816      9739       950       800       750
GR   838.4      5535     838.4      5580     831.6      5616     831.6      5686     828.9      5722
GR   827.4      6549     829.1      6588     827.9      6707     824.3      6788     825.6      6929
GR   826.6      7122     827.9      7143     827.9      7345     828.8      7750     829.4      8100
GR   826.9      8139     828.3      8256     831.1      8277     830.3      8512     829.4      8574
GR   829.9      8816     819.8      8833     818.6      8869     815.1      8888     814.8      8964
GR   817.6      8988     818.3      9120     817.1      9145     817.3      9352     814.4      9380
GR   815.3      9491     814.3      9607     814.3      9732     822.8      9739     824.6      9877
GR   828.6      9989     828.6     10000     827.8     10155     825.4     10219     825.4     10247
GR   828.9     10292     828.9     10460     830.1     10765     824.3     10797     825.3     10841
GR   825.3     10942     824.1     11019     831.4     11030     831.4     11085     828.1     11155
GR   829.9     11204     826.8     11256     828.6     11299     828.1     11412     826.1     11488
GR   826.8     11672     825.1     11769     824.8     12044     822.6     12077     825.1     12113
GR   824.4     12334     823.3     12653     823.4     12860     822.4     13742     823.4     14089
GR   830.6     14129     830.9     14377     828.9     14526     825.9     14555     829.2     14584
GR   831.7     14660     831.7     14857     829.2     15180     826.1     15212     828.1     15242
GR   828.1     15296     824.4     15339     824.4     15339     829.6     15361     828.7     15481
GR   829.7     15742     831.9     16325     834.2     17060     835.9     17459     838.1     17526
GR   839.7     18008     843.4     18789     846.9     18807     845.6     18887     845.4     19009
GR   846.2     19051     847.2     19198     850.1     19426     858.4     20265

NC                                     .1        .3
NH       6     0.035      6115     0.045      8378     0.060      9505     0.045     10504     0.060
NH   14606     0.035     20365
ET                         9.1                                                         7450     15140
             APPROXIMATE CROSSING OF ROOKS ROAD ALIGNMENT
             MAJOR TRANSMISSION LINE CROSSING
X1     218        89      8756      9523      1000       840       900
GR   850.9      5852     846.3      5911     830.3      6012     830.3      6028     833.6      6043
GR   833.6      6077     829.4      6115     828.6      7033     828.6      7143     826.1      7168
GR   827.6      7285     827.6      7373     826.1      7424     827.9      7494     827.8      7681
GR   826.6      7755     826.6      7803     830.3      7828     829.8      8012     828.6      8095
GR   826.3      8335     822.8      8378     820.9      8467     822.1      8482     819.8      8676
GR   825.9      8697     825.9      8756     818.4      8807     817.9      9065     823.9      9080
GR   823.3      9168     815.4      9219     816.1      9300     814.9      9316     814.9      9505
GR   824.1      9523     825.4      9563     829.3     10000     829.4     10504     830.3     10686
GR   820.6     10718     821.1     10823     824.4     10852     828.4     10926     830.9     11114
GR   830.1     11154     830.3     11219     828.3     11274     828.6     11348     831.1     11371
GR   829.1     11653     828.3     11730     826.3     11765     825.1     11896     824.6     11957
GR   825.6     12038     824.9     12241     823.8     12502     824.6     12611     823.8     12903
GR   824.9     12952     824.9     13281     825.9     14281     826.2     14606     830.6     14668
GR   833.2     14780     831.6     15019     829.4     15086     831.6     15180     825.6     15206
GR   826.6     15243     830.7     15268     830.1     15641     830.9     16148     833.1     16176
GR   834.7     16887     836.2     17298     838.2     17327     838.2     17370     838.1     17437
GR   841.2     18139     843.6     18669     846.1     18684     846.7     18788     847.9     19086
GR   850.9     19464     854.6     19835     856.1     20000     857.7     20365
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NH	6	0.035	6189	0.045	8225	0.060	9402	0.045	10501	0.060
NH	14507	0.035	20425							
ET			9.1						7580	14970
X1	220	91	7576	9156	950	800	1000			
GR	836.4	6078	836.4	6079	836.4	6080	836.4	6089	831.6	6109
GR	830.6	6189	831.4	6256	830.3	6274	830.1	7502	829.4	7576
GR	821.9	7609	823.9	7769	823.1	8042	822.9	8225	822.8	8304
GR	822.8	8369	825.1	8395	824.6	8433	822.1	8454	824.6	8486
GR	825.1	8575	823.3	8661	816.8	8713	818.1	8771	814.6	8809
GR	814.6	8964	816.8	9006	820.9	9136	827.1	9156	827.1	9235
GR	821.6	9288	821.6	9315	828.6	9329	827.3	9402	827.3	9440
GR	827.3	9503	824.6	9531	828.6	9615	828.3	9685	828.4	9826
GR	829.9	10000	829.9	10501	833.3	10521	827.6	10541	827.6	10582
GR	823.1	10608	823.1	10772	828.9	10800	828.9	10886	826.3	10906
GR	826.3	10938	831.6	10973	830.3	11034	829.6	11167	829.9	11243
GR	830.6	11475	828.9	11606	827.6	11806	826.8	11968	825.3	12141
GR	822.8	12188	826.9	12227	826.6	12318	826.4	12541	826.4	12805
GR	827.1	12960	827.2	13674	829.4	14507	832.9	14851	825.9	14891
GR	831.9	14915	831.9	15034	825.6	15057	825.7	15102	833.4	15117
GR	830.9	15135	832.7	15688	833.4	16362	835.2	16808	836.7	17073
GR	838.7	17159	839.7	17193	838.2	17216	843.7	18483	846.2	18500
GR	847.2	18909	850.6	19571	852.2	19796	854.2	19811	856.7	20089
GR	858.2	20425								

NH	6	0.035	6433	0.045	8751	0.060	9525	0.045	10533	0.060
NH	14681	0.035	20428							
ET			9.1						7900	14800
X1	222	85	7885	9091	950	960	950			
GR	838.4	6223	838.4	6224	838.4	6225	836.6	6261	836.6	6317
GR	834.1	6332	834.1	6367	836.8	6392	834.1	6433	833.3	6633
GR	828.9	6663	828.9	6766	835.9	6877	831.4	6987	830.6	7247
GR	830.1	7885	822.3	7924	822.3	8051	825.3	8061	825.3	8307
GR	826.3	8417	820.1	8442	817.6	8482	817.4	8536	820.3	8552
GR	816.8	8587	817.4	8751	820.1	8944	823.3	8979	825.1	9070
GR	829.8	9091	829.3	9159	828.1	9296	827.3	9525	826.1	9540
GR	825.4	9744	823.9	9957	824.1	10000	825.6	10113	825.8	10170
GR	829.4	10189	832.8	10533	832.8	10567	826.6	10590	826.9	10755
GR	822.3	10828	823.8	10929	830.8	10955	830.3	11161	829.1	11372
GR	830.8	11436	829.9	11599	826.9	11749	827.4	12005	827.3	12102
GR	828.3	12176	827.4	12413	827.9	12762	827.4	12880	826.8	12910
GR	825.9	13137	826.4	13536	829.9	14162	832.4	14681	827.2	14742
GR	832.7	14757	832.7	14833	825.1	14855	825.7	14866	825.7	14901
GR	830.7	14926	832.1	14961	831.7	15947	837.4	16978	840.2	17003
GR	840.2	17045	842.9	18309	846.4	18331	848.7	18862	850.1	19580
GR	852.6	19604	853.4	19645	853.9	19961	856.2	20335	858.2	20428

NH	6	0.035	6592	0.045	8195	0.060	9521	0.045	10531	0.060
NH	14607	0.035	20613							
ET			9.1						8230	14700

X1	224	86	8195	9123	960	920	950			
GR	856.8	6520	855.4	6561	841.4	6592	840.9	6620	833.8	6639
GR	834.6	6756	832.9	6793	832.9	7136	832.9	7749	833.3	8074
GR	831.6	8113	830.1	8195	820.9	8237	820.9	8250	825.3	8264
GR	824.8	8336	819.4	8383	819.4	8427	823.6	8448	823.6	8478
GR	827.4	8502	827.4	8583	822.3	8615	823.1	8766	819.4	8805
GR	820.1	8943	818.4	8953	818.8	9095	829.9	9123	830.9	9521
GR	829.9	9534	829.1	9852	829.6	10000	830.3	10194	828.3	10333
GR	831.8	10531	835.3	10542	833.6	10564	833.6	10691	823.8	10730
GR	827.4	11011	830.6	11043	833.1	11098	833.1	11131	831.8	11227
GR	830.9	11508	831.1	11568	828.8	11843	828.8	12059	828.3	12232
GR	828.3	12508	828.4	12738	828.3	12819	826.3	12854	826.3	12899
GR	828.6	12926	828.6	13020	829.2	13524	829.2	13937	829.2	14206
GR	830.4	14365	833.6	14388	833.6	14530	830.4	14607	826.7	14641
GR	827.7	14691	835.2	14729	832.6	14782	833.2	14847	831.4	14905
GR	831.9	15303	832.6	15780	835.1	16480	835.7	16830	837.4	16862
GR	837.9	16919	840.9	17727	842.1	18178	845.4	18195	848.6	18632
GR	849.1	19305	852.6	19334	852.6	19474	854.4	19537	855.6	19827
GR	860.7	20613								
NH	4	0.070	9553	0.045	10547	0.060	14248	0.035	20647	
ET			9.1						8340	14560
X1	226	84	8653	9736	1020	1120	1050			
GR	868.0	7083	868.0	7084	868.0	7085	863.5	7112	841.4	7138
GR	842.5	7146	836.2	7166	837.0	7244	835.9	7801	835.2	8312
GR	821.7	8371	821.7	8389	824.9	8402	827.9	8484	827.7	8597
GR	830.0	8653	821.2	8689	821.2	8785	826.7	8805	827.6	8888
GR	825.2	8923	827.2	8942	828.5	9003	823.2	9077	820.9	9142
GR	821.6	9235	824.7	9277	825.1	9553	819.7	9574	820.1	9718
GR	829.4	9736	833.0	9840	831.7	10000	832.4	10547	829.9	10581
GR	824.7	10603	820.9	10652	820.9	10668	824.6	10693	830.4	10876
GR	830.5	10992	834.5	11032	834.0	11089	828.9	11113	829.4	11149
GR	832.9	11179	831.4	11668	830.5	11821	828.2	11849	830.9	11863
GR	830.7	12192	830.7	12625	830.9	13070	830.1	13361	830.6	13697
GR	830.6	13844	833.6	14097	835.1	14248	827.4	14280	826.7	14324
GR	830.6	14335	831.4	14445	832.6	14551	834.6	15156	834.6	15898
GR	834.6	16596	837.2	16630	831.4	16648	831.4	16657	837.7	16672
GR	838.9	16706	836.6	16722	839.1	17273	844.1	17885	847.9	18593
GR	852.2	19257	854.9	19291	855.1	19366	854.1	19383	856.5	19849
GR	860.0	20396	861.5	20545	863.5	20562	862.9	20647		
NH	4	0.070	9752	0.045	10506	0.060	14118	0.035	20627	
ET			9.1						8610	14640
X1	228	83	9731	11463	1250	1000	1400			
GR	866.9	7745	858.7	7837	846.2	7888	855.0	7919	852.7	7946
GR	842.0	7986	843.4	8137	840.7	8362	839.0	8411	838.4	8615
GR	827.6	8649	827.4	8819	824.6	8851	828.7	8867	828.7	8943
GR	827.1	8988	827.1	9027	830.2	9074	831.2	9325	831.2	9590
GR	830.7	9731	823.2	9752	821.2	10182	820.6	10257	821.7	10267
GR	821.2	10486	823.9	10506	825.7	10966	825.1	11031	826.4	11056
GR	828.7	11272	826.2	11356	820.6	11371	820.6	11444	832.0	11463
GR	832.4	11817	832.4	11954	833.0	12473	832.7	12731	832.5	12986
GR	832.0	13065	832.4	13135	830.7	13162	833.4	13204	834.6	13344
GR	830.7	13391	833.4	13448	834.4	13636	834.2	13797	831.9	13875

GR	832.1	14002	829.4	14038	829.2	14084	826.9	14118	826.9	14146
GR	834.4	14157	834.4	14266	834.1	14399	837.1	14516	838.7	14568
GR	835.4	14736	834.7	14837	835.4	14991	834.9	15692	834.7	16393
GR	836.9	16423	832.2	16438	838.2	16461	838.9	16499	836.1	16512
GR	838.2	17055	841.9	17715	844.6	17726	847.1	18176	851.9	19067
GR	853.7	19112	854.1	19197	858.0	19955	860.5	20333	860.9	20361
GR	862.7	20373	861.9	20431	863.5	20627				

T1
T2
T3 GILA RIVER BRIDGE -3625'

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	-10	3						245000	818.87	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	2	0	-1							

```
T1
T2
T3      GILA RIVER BRIDGE  -3625'

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ

     -10       3        0        0        0        0        0     350000   820.99

J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE

     15        0       -1
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THIS RUN EXECUTED 11/ 7/90 8:52:17

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HEC2 RELEASE DATED SEPT 88

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

GILA RIVER BRIDGE - 3625

SUMMARY PRINTOUT TABLE 150

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
190.000	.00	.00	.00	801.00	195000.00	817.95	.00	818.16	7.18	4.15	54098.02	72752.95
190.000	.00	.00	.00	801.00	245000.00	818.87	.00	819.14	8.45	4.76	59682.32	84291.68
190.000	.00	.00	.00	801.00	350000.00	820.99	.00	821.37	9.46	5.66	72550.67	113805.20
192.000	930.00	.00	.00	803.80	195000.00	818.82	.00	819.06	11.34	4.34	49356.15	57915.06
192.000	930.00	.00	.00	803.80	245000.00	819.86	.00	820.16	12.31	4.78	55806.01	69825.34
192.000	930.00	.00	.00	803.80	350000.00	822.06	.00	822.46	12.60	5.37	69500.11	98607.38
194.000	1200.00	.00	.00	804.00	195000.00	820.24	.00	820.47	11.76	4.30	51875.06	56871.57
194.000	1200.00	.00	.00	804.00	245000.00	821.39	.00	821.66	12.24	4.68	59282.34	70030.66
194.000	1200.00	.00	.00	804.00	350000.00	823.63	.00	823.98	12.44	5.26	73820.88	99232.32
196.000	880.00	.00	.00	807.10	195000.00	821.08	.00	821.36	16.82	4.25	46021.72	47545.27
196.000	880.00	.00	.00	807.10	245000.00	822.24	.00	822.57	16.82	4.62	53556.54	59740.40
196.000	880.00	.00	.00	807.10	350000.00	824.48	.00	824.89	16.22	5.21	68151.89	86905.50
198.000	980.00	.00	.00	807.20	195000.00	822.78	.00	823.10	18.35	4.82	43474.41	45526.23
198.000	980.00	.00	.00	807.20	245000.00	823.94	.00	824.32	18.26	5.18	50481.81	57329.51
198.000	980.00	.00	.00	807.20	350000.00	826.12	.00	826.59	17.77	5.77	63919.90	83016.41
200.000	980.00	.00	.00	808.10	195000.00	824.19	.00	824.61	12.03	6.60	39018.24	56220.65
200.000	980.00	.00	.00	808.10	245000.00	825.36	.00	825.83	12.19	7.01	45720.37	70169.92
200.000	980.00	.00	.00	808.10	350000.00	827.52	.00	828.10	12.25	7.68	58125.13	99991.95
202.000	840.00	.00	.00	809.50	195000.00	825.15	.00	825.58	10.74	6.14	37979.53	59497.10
202.000	840.00	.00	.00	809.50	245000.00	826.34	.00	826.85	11.39	6.76	43678.80	72592.41
202.000	840.00	.00	.00	809.50	350000.00	828.51	.00	829.19	12.27	7.80	54126.69	99911.48
204.000	250.00	.00	.00	811.20	195000.00	825.38	.00	826.01	17.29	7.34	31489.58	46898.73
204.000	250.00	.00	.00	811.20	245000.00	826.56	.00	827.33	18.18	8.01	35909.62	57462.75
204.000	250.00	.00	.00	811.20	350000.00	828.71	.00	829.74	19.61	9.20	43935.59	79038.79

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
204.100	67.00	.00	.00	811.20	195000.00	825.51	.00	826.13	16.66	7.26	31765.45	47776.81
204.100	67.00	.00	.00	811.20	245000.00	826.70	.00	827.45	17.60	7.93	36157.69	58403.08
204.100	67.00	.00	.00	811.20	350000.00	828.85	.00	829.87	19.12	9.14	44123.48	80039.46
204.200	1.00	840.50	833.75	811.20	195000.00	825.47	.00	826.16	21.29	7.49	29967.92	42260.54
204.200	1.00	840.50	833.75	811.20	245000.00	826.65	.00	827.49	23.12	8.23	33950.80	50956.65
204.200	1.00	840.50	833.75	811.20	350000.00	828.79	.00	829.94	26.26	9.56	41172.97	68294.36
204.300	94.00	840.50	833.75	811.20	195000.00	825.72	.00	826.37	19.66	7.28	30781.16	43982.57
204.300	94.00	840.50	833.75	811.20	245000.00	826.92	.00	827.72	21.36	8.01	34851.64	53012.38
204.300	94.00	840.50	833.75	811.20	350000.00	829.10	.00	830.20	24.30	9.31	42235.41	71002.50
204.400	1.00	.00	.00	811.20	195000.00	825.79	.00	826.39	15.51	7.03	32322.83	49519.60
204.400	1.00	.00	.00	811.20	245000.00	827.02	.00	827.74	16.35	7.69	36786.15	60593.34
204.400	1.00	.00	.00	811.20	350000.00	829.26	.00	830.24	17.70	8.87	44904.79	83201.59
206.000	78.00	.00	.00	811.80	195000.00	826.05	.00	826.53	11.88	6.05	35486.37	56578.46
206.000	78.00	.00	.00	811.80	245000.00	827.30	.00	827.89	12.80	6.71	40119.28	68485.91
206.000	78.00	.00	.00	811.80	350000.00	829.58	.00	830.41	14.21	7.85	48575.71	92862.94
208.000	900.00	.00	.00	811.80	195000.00	827.25	.00	828.08	20.40	8.87	29958.70	43171.96
208.000	900.00	.00	.00	811.80	245000.00	828.56	.00	829.43	19.29	9.18	36345.93	55783.66
208.000	900.00	.00	.00	811.80	350000.00	830.94	.00	831.90	17.79	9.75	47955.92	82988.34
210.000	730.00	.00	.00	812.60	195000.00	829.01	.00	829.61	19.65	7.80	36737.15	43995.44
210.000	730.00	.00	.00	812.60	245000.00	830.25	.00	830.90	19.16	8.21	43967.52	55970.45
210.000	730.00	.00	.00	812.60	350000.00	832.55	.00	833.29	18.19	8.88	57367.59	82065.29
212.000	780.00	.00	.00	813.40	195000.00	830.79	.00	831.14	17.17	6.51	44131.78	47064.63
212.000	780.00	.00	.00	813.40	245000.00	832.00	.00	832.37	16.22	6.64	52375.80	60837.51
212.000	780.00	.00	.00	813.40	350000.00	834.24	.00	834.68	14.92	6.91	67629.64	90624.80
214.000	840.00	.00	.00	814.10	195000.00	832.05	.00	832.29	10.46	5.22	52914.52	60281.00
214.000	840.00	.00	.00	814.10	245000.00	833.23	.00	833.50	10.63	5.52	61350.93	75150.34
214.000	840.00	.00	.00	814.10	350000.00	835.43	.00	835.77	10.72	6.02	77031.36	106897.50
216.000	750.00	.00	.00	814.30	195000.00	832.82	.00	833.06	9.00	5.06	55141.68	65000.99
216.000	750.00	.00	.00	814.30	245000.00	834.03	.00	834.30	9.20	5.36	64300.62	80780.13
216.000	750.00	.00	.00	814.30	350000.00	836.26	.00	836.58	9.34	5.84	81181.10	114530.80
218.000	900.00	.00	.00	814.90	195000.00	833.64	.00	833.84	8.50	4.51	58807.98	66886.55
218.000	900.00	.00	.00	814.90	245000.00	834.87	.00	835.08	8.55	4.76	68192.84	83783.27
218.000	900.00	.00	.00	814.90	350000.00	837.10	.00	837.38	8.59	5.19	85388.80	119407.10
220.000	1000.00	.00	.00	814.60	195000.00	834.40	.00	834.61	8.81	4.48	57191.20	65690.23
220.000	1000.00	.00	.00	814.60	245000.00	835.62	.00	835.86	8.87	4.78	66194.16	82278.35
220.000	1000.00	.00	.00	814.60	350000.00	837.85	.00	838.15	8.95	5.30	82686.80	116970.60
222.000	950.00	.00	.00	816.80	195000.00	835.19	.00	835.41	7.89	4.81	56566.15	69414.06
222.000	950.00	.00	.00	816.80	245000.00	836.42	.00	836.67	8.16	5.18	65056.80	85759.13
222.000	950.00	.00	.00	816.80	350000.00	838.67	.00	839.00	8.56	5.83	80629.83	119639.70

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
224.000	950.00	.00	.00	818.40	195000.00	836.10	.00	836.37	13.48	5.21	49125.47	53117.17
224.000	950.00	.00	.00	818.40	245000.00	837.34	.00	837.65	13.32	5.48	57164.00	67141.41
224.000	950.00	.00	.00	818.40	350000.00	839.60	.00	839.99	13.19	5.97	71820.22	96365.34
226.000	1050.00	.00	.00	819.70	195000.00	837.53	.00	837.79	12.64	4.91	49793.30	54850.13
226.000	1050.00	.00	.00	819.70	245000.00	838.77	.00	839.07	12.76	5.20	57497.70	68592.00
226.000	1050.00	.00	.00	819.70	350000.00	841.04	.00	841.42	12.95	5.73	71609.23	97249.77
228.000	1400.00	.00	.00	820.60	195000.00	838.71	.00	838.98	7.62	4.89	53681.72	70649.22
228.000	1400.00	.00	.00	820.60	245000.00	839.99	.00	840.30	8.19	5.34	61390.72	85628.11
228.000	1400.00	.00	.00	820.60	350000.00	842.31	.00	842.72	9.04	6.10	75390.67	116396.40

GILA RIVER BRIDGE - 3625

SUMMARY PRINTOUT TABLE 150

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
190.000	195000.00	817.95	.00	.00	.00	6070.00	.00
190.000	245000.00	818.87	.92	.00	.92	6070.00	.00
190.000	350000.00	820.99	2.12	.00	3.04	6070.00	.00
192.000	195000.00	818.82	.00	.87	.00	6101.06	930.00
192.000	245000.00	819.86	1.04	.99	1.04	6216.77	930.00
192.000	350000.00	822.06	2.20	1.07	3.24	6235.79	930.00
194.000	195000.00	820.24	.00	1.43	.00	6466.56	1200.00
194.000	245000.00	821.39	1.14	1.53	1.14	6475.15	1200.00
194.000	350000.00	823.63	2.24	1.57	3.39	6491.97	1200.00
196.000	195000.00	821.08	.00	.83	.00	6512.12	880.00
196.000	245000.00	822.24	1.16	.85	1.16	6519.69	880.00
196.000	350000.00	824.48	2.24	.85	3.40	6534.33	880.00
198.000	195000.00	822.78	.00	1.71	.00	5948.21	980.00
198.000	245000.00	823.94	1.16	1.70	1.16	6175.00	980.00
198.000	350000.00	826.12	2.18	1.64	3.33	6175.00	980.00
200.000	195000.00	824.19	.00	1.41	.00	5750.00	980.00
200.000	245000.00	825.36	1.17	1.42	1.17	5750.00	980.00
200.000	350000.00	827.52	2.16	1.40	3.32	5750.00	980.00
202.000	195000.00	825.15	.00	.96	.00	4691.02	840.00
202.000	245000.00	826.34	1.19	.98	1.19	4810.00	840.00
202.000	350000.00	828.51	2.17	1.00	3.36	4810.00	840.00
204.000	195000.00	825.38	.00	.22	.00	3730.00	250.00
204.000	245000.00	826.56	1.18	.22	1.18	3730.00	250.00
204.000	350000.00	828.71	2.15	.20	3.34	3730.00	250.00
204.100	195000.00	825.51	.00	.13	.00	3690.00	67.00
204.100	245000.00	826.70	1.19	.14	1.19	3690.00	67.00
204.100	350000.00	828.85	2.16	.14	3.35	3690.00	67.00
204.200	195000.00	825.47	.00	-.03	.00	3378.16	1.00
204.200	245000.00	826.65	1.18	-.04	1.18	3381.00	1.00
204.200	350000.00	828.79	2.13	-.07	3.31	3386.17	1.00
204.300	195000.00	825.72	.00	.24	.00	3378.74	94.00
204.300	245000.00	826.92	1.20	.27	1.20	3381.65	94.00
204.300	350000.00	829.10	2.18	.31	3.39	3386.93	94.00
204.400	195000.00	825.79	.00	.07	.00	3625.00	1.00
204.400	245000.00	827.02	1.23	.10	1.23	3625.00	1.00
204.400	350000.00	829.26	2.24	.16	3.47	3625.00	1.00

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
206.000	195000.00	826.05	.00	.26	.00	3700.00	78.00
206.000	245000.00	827.30	1.25	.28	1.25	3700.00	78.00
206.000	350000.00	829.58	2.29	.33	3.54	3700.00	78.00
208.000	195000.00	827.25	.00	1.20	.00	4847.21	900.00
208.000	245000.00	828.56	1.32	1.26	1.32	4863.58	900.00
208.000	350000.00	830.94	2.38	1.36	3.69	4890.00	900.00
210.000	195000.00	829.01	.00	1.76	.00	5804.84	730.00
210.000	245000.00	830.25	1.25	1.69	1.25	5816.51	730.00
210.000	350000.00	832.55	2.30	1.61	3.55	5840.00	730.00
212.000	195000.00	830.79	.00	1.79	.00	6820.00	780.00
212.000	245000.00	832.00	1.21	1.75	1.21	6820.00	780.00
212.000	350000.00	834.24	2.24	1.69	3.45	6820.00	780.00
214.000	195000.00	832.05	.00	1.25	.00	7130.00	840.00
214.000	245000.00	833.23	1.18	1.23	1.18	7130.00	840.00
214.000	350000.00	835.43	2.20	1.19	3.38	7130.00	840.00
216.000	195000.00	832.82	.00	.78	.00	7570.00	750.00
216.000	245000.00	834.03	1.21	.80	1.21	7570.00	750.00
216.000	350000.00	836.26	2.23	.83	3.44	7570.00	750.00
218.000	195000.00	833.64	.00	.82	.00	7690.00	900.00
218.000	245000.00	834.87	1.22	.83	1.22	7690.00	900.00
218.000	350000.00	837.10	2.24	.84	3.46	7690.00	900.00
220.000	195000.00	834.40	.00	.75	.00	7390.00	1000.00
220.000	245000.00	835.62	1.22	.75	1.22	7390.00	1000.00
220.000	350000.00	837.85	2.23	.75	3.45	7390.00	1000.00
222.000	195000.00	835.19	.00	.79	.00	6900.00	950.00
222.000	245000.00	836.42	1.23	.80	1.23	6900.00	950.00
222.000	350000.00	838.67	2.25	.82	3.48	6900.00	950.00
224.000	195000.00	836.10	.00	.91	.00	6470.00	950.00
224.000	245000.00	837.34	1.24	.92	1.24	6470.00	950.00
224.000	350000.00	839.60	2.27	.94	3.51	6470.00	950.00
226.000	195000.00	837.53	.00	1.44	.00	6220.00	1050.00
226.000	245000.00	838.77	1.24	1.44	1.24	6220.00	1050.00
226.000	350000.00	841.04	2.27	1.44	3.51	6220.00	1050.00
228.000	195000.00	838.71	.00	1.18	.00	6030.00	1400.00
228.000	245000.00	839.99	1.28	1.21	1.28	6030.00	1400.00
228.000	350000.00	842.31	2.32	1.27	3.60	6030.00	1400.00

SUMMARY OF ERRORS AND SPECIAL NOTES

SEE SHEET 18
OLD U.S. 80
LEGEND
100-YEAR FLOODPLAIN BOUNDARY
FLOODWAY BOUNDARY
8 RIVER DISTANCE IN THOUSANDS OF FEET UPSTREAM FROM GILLESPIE DAM
274 CROSS SECTION LOCATION AND NUMBER
850.4 100-YEAR WATER SURFACE ELEVATION IN FEET
851.1 FLOODWAY ELEVATION IN FEET
SCALE: 1" = 400'
CONTOUR INTERVAL: 4 FEET
SEE INDEX SHEET FOR MAP INDEX AND REFERENCES
DELINEATION REVIEW
PRINTOUT REVIEW
BY
DATE
FCD CONTRACT NO. 86-28
FLOOD CONTROL DISTI
OF MARICOPA COUN
FLOODPLAIN DELINEATIO
GILA RIVER
GILLESPIE DAM TO BULLARD
BY DAMES & MOORE
RECOMMENDED BY:
APPROVED BY:
CHIEF ENGINEER AND GENERAL MANAGER
ADOT study
Dames & Moore study for MCFCD
7-24-78

UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF RECLAMATION

DESIGN OF SMALL DAMS

A Water Resources Technical Publication

First Edition, 1960
Second Edition, 1973
Revised Reprint, 1977
Third Edition, 1987

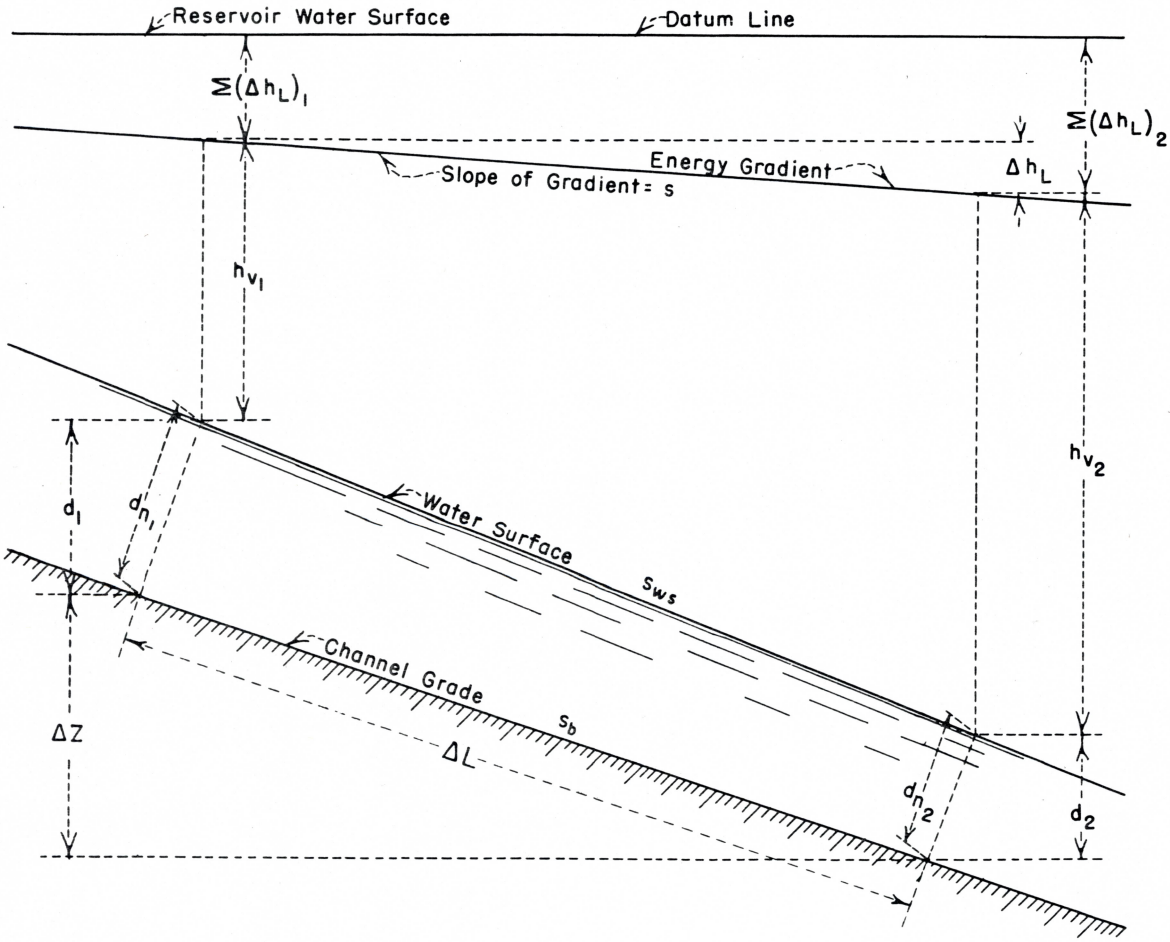

Figure 9-35.—Flow in open channels. 288-D-2421.

can ordinarily be neglected. The friction loss can then be expressed as:

$$\Delta h_L = s\Delta L \tag{18}$$

where s is the average friction slope expressed by either the Chezy or the Manning formula. For the reach ΔL, the head loss can be expressed as:

$$\Delta h_L = \left(\frac{s_1 + s_2}{2}\right) \Delta L$$

From the Manning formula (eq. (30), app. B), $s = (vn/1.486r^{2/3})^2$.

The roughness coefficient, n, will depend on the nature of the channel surface. For conservative design the frictional loss should be maximized when evaluating depths of flow and minimized when evaluating the energy content of the flow. For determining depths of flow in a concrete-lined channel, an n of about 0.014 should be assumed. For determining specific energies of flow needed to design the dissipating device, an n of about 0.008 should be assumed.

Where only rough approximations of depths and velocities of flow in a discharge channel are desired, the total head loss $\Sigma\Delta h_L$ to any point along the channel might be expressed in terms of the velocity head. Thus, at any section the relationship can be stated: reservoir water surface elevation minus floor grade elevation $= d + h_v + Kh_v$. For spillways with small drops, K can be assumed as approximately 0.2 for determining depths of flow and 0.1 or less for evaluating the energy of flow. Rough approximations of losses can also be obtained from figure B-5.

9.19. *Open Channels.*—(a) *Profile.*—The profile of an open channel is usually selected to conform to topographic and geologic site conditions. It is generally defined as straight reaches connected

by vertical curves. Sharp convex and concave vertical curves would develop unsatisfactory flows in the channel and should be avoided. Convex curves should be flat enough to maintain positive pressures and thus preclude the tendency for the flow to separate from the floor. Concave curves should have a sufficiently long radius of curvature to minimize the dynamic forces on the floor brought about by the centrifugal force from a change in the direction of flow.

To avoid the tendency for the water to spring away from the floor and, thereby, reduce the surface contact pressure, the floor shape for convex curvature should be made slightly flatter than the trajectory of a free-discharging jet issuing under a head equal to the specific energy of flow as it enters the curve. The curvature should approximate a shape defined by the equation:

$$-y = x \tan \theta + \frac{x^2}{K[4(d + h_v) \cos^2 \theta]} \qquad (19)$$

where θ is the slope angle of the floor upstream from the curve. Except for the factor K, the equation is that of a free-discharging trajectory issuing from an inclined orifice. To ensure positive pressure along the entire contact surface of the curve, K should be equal to or greater than 1.5.

For the concave curvature, the pressure exerted upon the floor surface by the centrifugal force of the flow varies directly with the energy of the flow and inversely with the radius of curvature. An approximate relationship of these criteria can be expressed in the equations:

$$R = \frac{2qv}{p} \text{ and } R = \frac{2dv^2}{p} \qquad (20)$$

where:

R = the minimum radius of curvature, in feet,
q = the discharge, in cubic feet per second per foot of width,
v = the velocity, in feet per second,
d = the depth of flow, in feet, and
p = the normal dynamic pressure exerted on the floor, in pounds per square foot.

An assumed value of p = 1,000 will normally produce an acceptable radius; however, in no case should the radius be less than $10d$. For the reverse curve at the lower end of the ogee crest, radii of not less than $5d$ have been found acceptable.

(b) *Convergence and Divergence.*—The best hydraulic performance in a discharge channel is obtained when the confining sidewalls are parallel and the distribution of flow across the channel is maintained uniform. However, economy may dictate a channel section narrower or wider than either the crest or the terminal structure, thereby requiring converging or diverging transitions to fit the various components together. Sidewall convergence must be made gradual to avoid cross waves, wave runup on the walls, and uneven distribution of flow across the channel. Similarly, the rate of divergence of the sidewalls must be limited or else the flow will not spread to occupy the entire width of the channel uniformly. This will result in undesirable flow conditions at the terminal structure.

The inertial and gravitational forces of streamlined kinetic flow in a channel can be expressed by the Froude number parameter, $v/(gd)^{1/2}$. Variations from streamlined flow caused by outside interferences that cause an expansion or a contraction of the flow can also be related to this parameter. Experiments have shown that an angular variation of the flow boundaries not exceeding that produced by the equation,

$$\tan \alpha = \frac{1}{3F} \qquad (21)$$

will provide an acceptable transition for either a contracting or an expanding channel. In this equation, $F = v/(gd)^{1/2}$, and α is the angular variation of the sidewall with respect to the channel centerline; v and d are the velocity and depth at the start of the transition. Figure 9-36 is a nomograph from which the tangent of the flare angle or the flare angle in degrees may be obtained for known values of depth and velocity of flow.

(c) *Channel Freeboard.*—In a channel conducting flow at the supercritical stage, the surface roughness, wave action, air bulking, splash, and spray are related to the velocity and energy content of the flow. Expressed in terms of v and d, the energy per foot of width $qh_v = v^3d/2g$. Therefore the relationship of velocity and depth to the flow energy also can be expressed in terms of v and $d^{1/3}$. An empirical expression based on this relationship that gives a reasonable indication of desirable freeboard values is:

$$\text{Freeboard (in feet)} = 2.0 + 0.025v\sqrt[3]{d} \qquad (22)$$

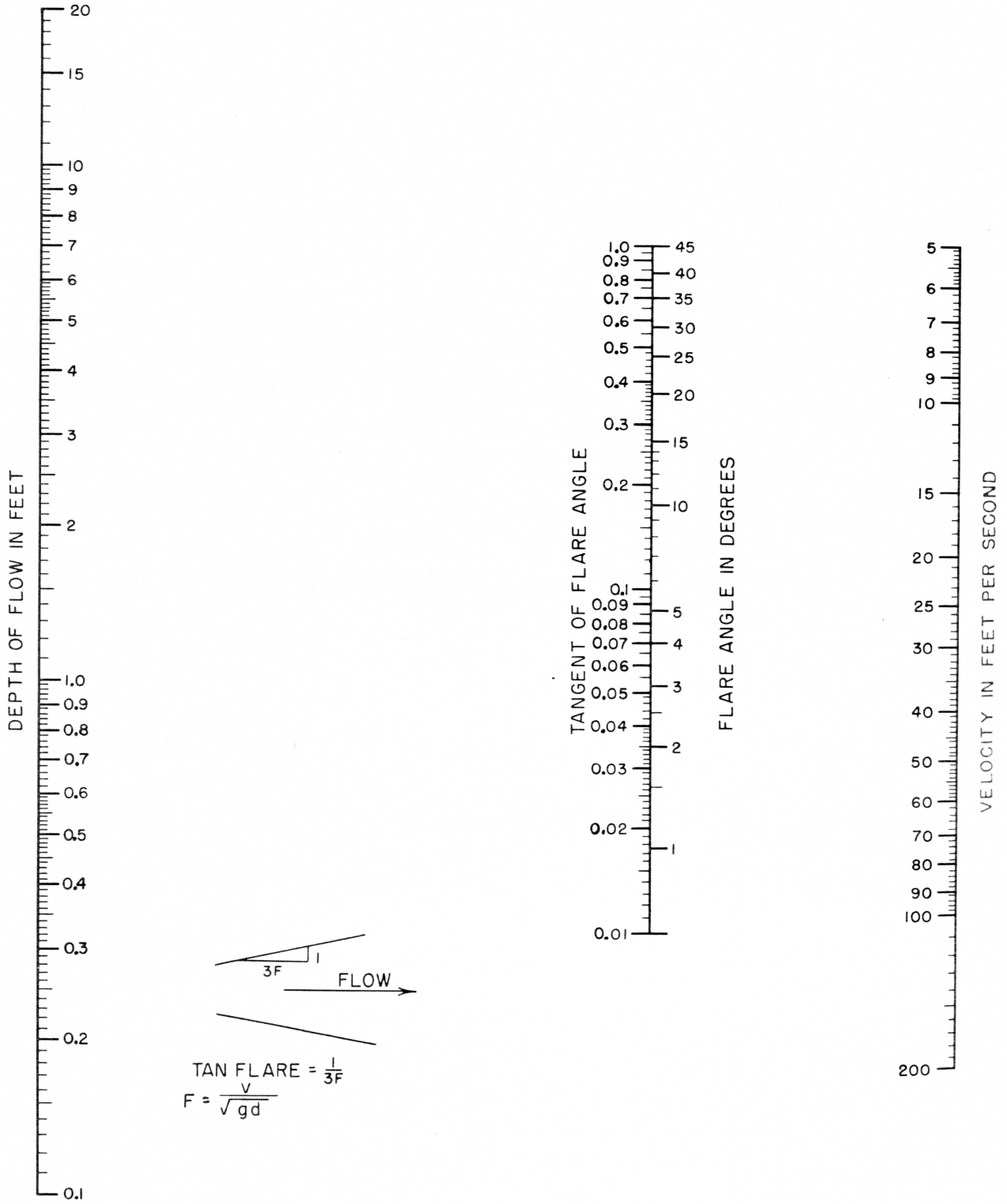

Figure 9-36.—Flare angle for divergent or convergent channels. 288–D–2422.

Gila River bridges
expansion & contraction

Refer to "Design of Small Dams", para. 204(b)

- Upstream transition
  start of upstream transition at SECNO 218
- Downstream transition
  start of downstream transition at SECNO 204.1

SECNO	VCH	AREA	TOPWID
204.1	7.89	36222	3625
218	4.75	68238	7690

<u>Downstream transition</u>

@ SECNO 204.1

$$D = \frac{A}{T} = \frac{36222}{3625} = 10.0'$$

$$F = \frac{V}{\sqrt{gD}} = \frac{7.89}{\sqrt{32.2 * 10'}} = 0.44$$

$$\tan \alpha = \frac{1}{3F} = \frac{1}{3(0.44)} = 0.76$$

or 1.3:1

∴ 1.5:1 o.k. for downstream transition

Gila River bridge
expansion & contraction

Upstream transition

@ SECNO 218

$$D = \frac{A}{T} = \frac{68238}{7690} = 8.87$$

$$F = \frac{V}{\sqrt{gD}} = \frac{4.75}{\sqrt{32.2(8.87)}} = 0.28$$

$$\tan \alpha = \frac{1}{3F} = \frac{1}{3(0.28)} = 1.19$$

or 0.84 : 1

∴ 1.5 : 1 o.k. for upstream transition

DISCUSSION

As a result of a meeting held on December 17, 1990 with Joe Tram and Tim Murphy of FCDMC and Darell Krull of the Arizona Department of Water Resources, an additional HEC-2 model (FCD21.DAT) was developed using a 2:1 expansion rate downstream of the proposed structures. This analysis was requested by FCDMC. This 2:1 model shows compliance with FEMA requirements in that the base flood water surface elevations are not raised more than 1 foot.

The increase in calculated water surface elevations downstream of the proposed structures is a result of the HEC-2 computer program calculating water surface elevations using the Standard Step Method computational procedure. The program is intended for calculating water surface profiles for steady gradually varied flow. However, flow through a constriction (bridge) is not gradually varied flow; rather it is rapidly varied flow.

Because HEC-2 utilizes the Standard Step Method, the calculated water surface elevations are higher than the normal water surface (water surface which would be calculated if no constriction was modeled). This occurs as a result of the reduction in effective flow area due to the expansion rate modeled.

COMPARISON OF SELECTED EXISTING AND PROPOSED (ADOT) CONDITIONS

	100 YEAR CWSEL			TOPWIDTH	
SECNO	FEMA FLOODPLAIN FLOODWAY	ADOT FLOODWAY	DELTA CWSEL FLOODPLAIN	FEMA FLOODPLAIN FLOODWAY	ADOT FLOODWAY
190	818.0			10196	
	818.9	818.9	0.9	6070	6070
192	819.1			11152	
	819.9	819.9	0.8	6217	6217
194	820.6			11194	
	821.4	821.4	0.9	6475	6165
196	821.4			10242	
	822.2	822.4	0.9	6640	5901
198	823.2			10531	
	823.9	824.2	1.0	6939	5650
200	824.6			9666	
	825.2	825.6	1.0	7070	5535
202	825.6			10015	
	826.1	826.6	1.0	7004	4550
204	825.9			9575	
	826.4	826.8	0.9	6425	3690
204.1	-			-	
	-	826.9		-	3625
204.2*	827.1			8673	
	826.9	826.9	-0.3	6355	3381
204.3*	-				
	-	827.1		-	3382
204.4	-				
	-	827.2		-	3625
204.5#	827.9			6612	
	827.7	-		5802	-
205.5#	829.8			8744	
	829.9	-		6550	-
205.8	830.2			10935	
	830.2	-		6550	-

BRIDGE

NOTES: "*" = ADOT BRIDGE SECTION
"#" = EXISTING BRIDGE SECTION
SECTION NUMBERS ARRANGED IN INCREASING ORDER

COMPARISON OF SELECTED EXISTING AND PROPOSED (ADOT) CONDITIONS

	100 YEAR CWSEL			TOPWIDTH	
SECNO	FEMA FLOODPLAIN FLOODWAY	ADOT FLOODWAY	DELTA w/ FEMA FLOODWAY	FEMA FLOODPLAIN FLOODWAY	ADOT FLOODWAY
206	830.6 830.7	827.5	-3.1	12061 6500	3700
208	830.8 831.0	828.7	-2.1	11682 7250	4865
210	831.2 831.5	830.3	-0.9	11370 7308	5817
212	831.9 832.5	832.0	0.1	10714 7520	6820
214	832.8 833.4	833.2	0.5	10885 7810	7130
216	833.4 834.1	834.0	0.6	11196 7930	7570
218	834.1 834.9	834.9	0.8	10640 7690	7690
220	834.9 835.6	835.6	0.8	10626 7390	7390
222	835.7 836.4	836.4	0.8	10302 6900	6900
224	836.5 837.4	837.3	0.8	10214 6470	6470
226	837.9 838.8	838.8	0.9	9814 6220	6220
228	839.1 840.0	840.0	0.9	8815 6030	6030

DISCUSSION (continued)

According to "Backwater Effects of Piers and Abutments" (reference 2); which is the comprehensive report from which "Hydraulics of Bridge Waterways" (reference 6) was developed, the depth of flow caused by a constriction at Section III (see figure 1-1, following) is at a minimum (below the normal water surface). Between Section III and Section IV the flow is expanding and the water surface is rising until normal depth is reached at Section IV (the section where the flow has fully expanded).

F 8.25
Drainage Design Library
Hydraulics
(41)

BACKWATER EFFECTS OF PIERS AND ABUTMENTS

by

H. K. Liu, J. N. Bradley, E. J. Plate

Prepared by the
Civil Engineering Section
Colorado State University
Fort Collins, Colorado

in cooperation with
The U. S. Department of Commerce
Bureau of Public Roads

October 1957

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BRIDGE DIVISION

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III. THEORETICAL ANALYSIS

An open channel will flow at a normal depth if the discharge is constant, and the channel, within a sufficiently long reach, has a uniform cross-section, a uniform surface roughness, and a uniform grade. If a constriction is installed into such a channel, the flow pattern will become that as shown in Fig. 1-1. Along the centerline profile, the flow can be divided into several reaches. at section O, the flow depth is essentially unaffected by the contraction. From section O to section I, the flow depth increases to a maximum. Downstream from section I the flow depth begins to decrease through section II where the minimum bridge opening begins, until it reaches a minimum flow area at section III. From section III, the flow depth begins to increase until it reaches the normal depth at section IV.

As shown in Fig. 1-1b, the approaching flow separating from the sidewalls of the channel begins to converge toward the contracted opening. A separation zone designated as zone Ia is formed by the boundary and the converging stream. At the upstream edge of the model the converging streamline separates again -- this time from the walls of the bridge opening. A strong eddy is formed owing to separation. This eddy zone, designated as zone IIIa extends to the sidewall downstream from the model. The streamlines that separate from the abutment form a jet. The jet continues to converge until it reaches section III, where the width and the depth of the jet assume a minimum, [the vena-contracta]. Downstream from section III the jet begins to diverge until it reaches the side boundaries approximately at section IV. In this reach between sections III and IV

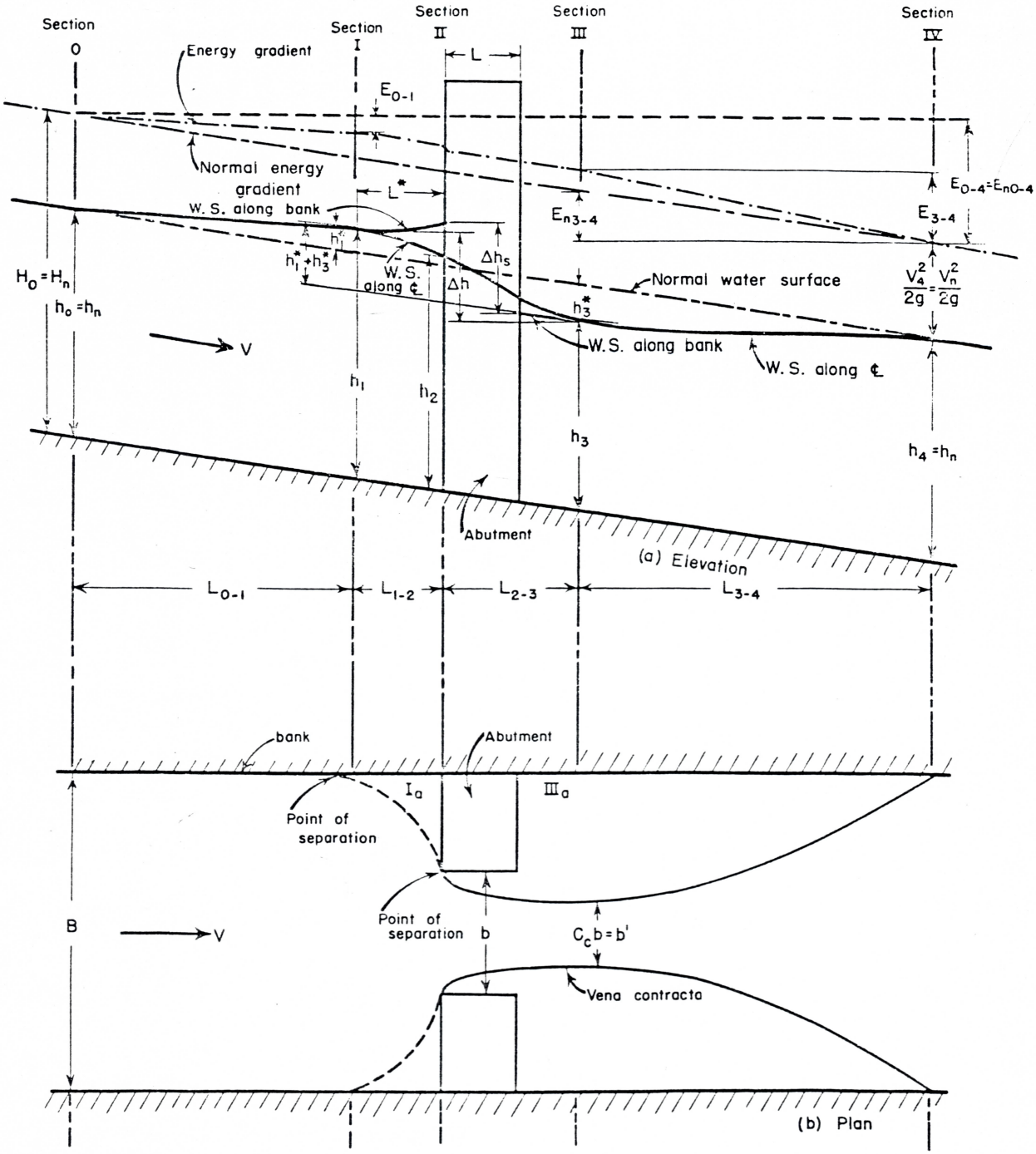

Fig. No. 1-1 Definition sketch of simple normal crossing with vertical-wall abutment

the jet boundaries cannot be traced distinctly owing to the lateral mixing of the jet with the surrounding water.

Along the boundary, the flow depth begins to increase from section 0 until it reaches a maximum at the stagnation point which exists at the intersection of the upstream face of the abutment and the channel wall. Along the upstream face of the abutment, the flow depth decreases gradually from the stagnation depth to a point near the edge of the abutment -- beyond which the depth decreases rapidly. The minimum flow depth is usually at the center of the eddy which is in the separation zone IIIa. The eddy is small compared to the size of zone IIIa. It can be stated that within the separation zone IIIa, the depth is essentially the same as that at section III. From section III, the flow depth along the boundary increases until it reaches the normal depth at section IV.

From this brief discussion, it is clear that an analysis of the problem of open channel flow through a local contraction is very complex. An engineer who must estimate the height of the maximum backwater, which is the maximum elevation above the normal water surface, not only needs to know how to apply an empirical formula for backwater, but he also needs to understand the fundamental nature of the problem in order to apply the formula intelligently. It is the purpose of this research to provide such information by means of model study.

Theoretical considerations, based on the continuity equation, the momentum equation, and the energy equation, are employed in order to derive an equation for the maximum backwater. Dimensional analysis is used in order to evaluate the parameters whose influence on the maximum backwater is most important. The theory of free streamlines is used to determine the location of the maximum backwater.

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*  WATER SURFACE PROFILES                          *
*  VERSION OF SEPTEMBER 1988                       *
*                                                  *
*                                                  *
*  RUN DATE    12/26/90   TIME    9:40:34          *
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*  U.S. ARMY CORPS OF ENGINEERS        *
*  THE HYDROLOGIC ENGINEERING CENTER   *
*  609 SECOND STREET, SUITE D          *
*  DAVIS, CALIFORNIA 95616             *
*  (916) 756-1104                      *
***************************************
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X     X  XXXXXXX   XXXXX             XXXXX
X     X  X        X     X           X     X
X     X  X        X                       X
XXXXXXX  XXXX     X         XXXXX    XXXXX
X     X  X        X                 X
X     X  X        X     X           X
X     X  XXXXXXX   XXXXX            XXXXXXX
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END OF BANNER

THIS RUN EXECUTED 12/26/90 9:40:34

****
HEC-2 RELEASE DATED SEPT 88

****

T1 THIS FILE CREATED BY ADOT FROM A DAMES & MOORE FILE (JOB # 15448-001-22)
T2 ADOT REVISED ENCROACHMENTS & ADDED A NEW BRIDGE BETWEEN 194 & 216
T3 GILA RIVER BRIDGE - 3625'- TYPE VI AASHTO GIRDERS

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	3						195000	817.95	
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1	0	-1							
J5	LPRNT	NUMSEC				********REQUESTED SECTION NUMBERS********				
	-10	-10								
J6	IHLEQ	ICOPY	SUBDIV	STRTDS	RMILE					
	[illegible]		-1							

NC	0.050	0.050	0.030	0.1	0.3					
NH	5	0.035	7592.2	0.060	8288.1	0.045	10623.4	0.060	13991.2	0.035
NH	19344									
ET			9.1						7430	13500
X1	190.0	94	9490.0	10537.5	770	1100	910			
GR	839.5	3492.2	844.7	3535.9	842.0	3649.9	836.6	3704.2	837.7	3765.2
GR	833.0	3840.3	830.3	4015.2	824.2	4232.9	824.2	4284.1	828.2	4449.6
GR	825.0	4598.5	822.7	4680.0	821.8	4832.8	818.6	4903.2	815.5	6181.5
GR	816.9	6257.8	815.8	6343.0	815.8	7538.1	810.2	7551.6	811.6	7592.2
GR	816.5	7625.2	813.1	7760.7	811.9	7983.5	816.2	8067.3	813.2	8162.9
GR	813.2	8265.6	804.1	8288.1	801.0	8415.2	801.2	8505.8	811.5	8534.1
GR	810.3	8600.8	806.2	8651.2	808.6	8755.8	804.8	8793.1	806.7	9023.9
GR	810.7	9062.5	812.0	9208.3	810.6	9310.8	812.6	9490.0	809.9	9569.3
GR	804.0	9621.8	803.0	9791.8	803.0	9843.4	810.9	9896.7	810.3	10000.0
GR	808.1	10185.0	809.6	10244.4	807.9	10368.6	807.1	10505.4	814.8	10537.5
GR	808.6	10596.2	813.1	10623.4	814.9	10858.1	810.6	10882.3	815.2	10914.4
GR	810.9	10975.4	812.6	11189.3	811.1	11373.3	803.1	11432.8	803.1	11643.2
GR	804.2	11855.9	806.4	12048.7	804.1	12160.8	804.2	12333.7	809.1	12402.5
GR	808.6	12518.3	806.2	12714.3	805.4	12844.8	805.3	12926.8	815.1	13007.5
GR	813.2	13210.6	814.4	13328.4	803.7	13385.7	810.6	13438.8	810.5	13754.3
GR	[illegible]09.2	13851.4	811.3	13991.2	815.0	14023.2	814.7	14048.4	815.9	14767.7
GR	816.7	15156.7	819.0	15459.5	820.1	15958.7	821.1	16419.0	822.5	16536.5
GR	827.3	16598.3	824.5	16645.5	816.2	16668.4	826.9	16717.8	827.0	16938.3
GR	829.2	17514.8	831.0	17883.0	832.7	18017.5	842.9	19344.0		

NH	5	0.035	8228.3	0.060	9439.2	0.045	10488.7	0.060	14658.5	0.035
NH	9112									
ET			9.1						7410	13660
	APPROXIMATE CROSSING OF TURNER ROAD ALIGNMENT									
X1	192.0	94	10997.8	11562.8	820	1230	930			
GR	829.2	4545.4	825.9	4560.1	822.5	4859.1	820.8	4873.4	825.1	4908.7
GR	821.6	4932.1	821.6	4961.5	819.4	4970.4	817.8	6098.1	819.0	6112.7
GR	819.2	6386.6	816.4	6488.0	816.4	6608.6	818.8	6694.3	815.5	6806.5
GR	816.0	6905.8	818.7	6973.0	817.2	7146.6	819.7	7338.1	817.8	7721.6
GR	818.6	7885.7	810.2	8008.0	814.2	8186.5	803.8	8228.3	803.8	8263.5
GR	806.2	8303.3	804.4	8338.8	807.9	8389.2	810.1	8700.7	807.1	8755.1
GR	810.9	8810.0	808.8	8871.8	812.5	8965.1	812.5	9045.0	810.1	9070.7
GR	810.1	9147.7	815.1	9223.9	804.0	9241.4	804.0	9278.8	808.6	9439.2
GR	806.6	9532.7	807.5	9609.9	813.3	9666.5	813.3	9737.6	810.3	9811.1
GR	813.5	9869.5	810.9	10000.0	810.9	10033.1	810.9	10105.6	809.5	10169.8
GR	809.7	10285.7	811.2	10320.5	811.5	10397.5	815.1	10442.7	816.2	10488.7
GR	823.7	10518.7	814.6	10561.0	815.4	10769.4	812.3	10919.6	816.4	10997.8
GR	804.3	11025.0	804.4	11185.2	806.1	11340.1	812.8	11562.8	812.7	11708.4
GR	811.3	11960.4	808.4	12183.0	810.4	12377.9	807.2	12487.9	815.2	12579.1
GR	806.8	12612.9	806.7	12656.5	811.5	12734.2	814.7	12985.3	807.9	13061.3
GR	809.5	13195.8	808.5	13220.1	810.2	13349.8	805.4	13367.7	805.4	13453.5
GR	813.4	13631.6	813.3	13761.7	809.1	13888.1	806.2	13964.3	817.1	14065.0
GR	815.7	14658.5	816.4	15083.3	818.3	15471.6	818.9	16050.4	819.9	16359.5
GR	826.8	16431.7	823.6	16477.7	812.5	16507.6	838.4	19112.0		

NH	6	0.035	7405.2	0.070	8411.9	0.060	9663.7	0.045	10759.0	0.060
NH	15316	0.035	17520.0							
ET			9.1						7500	13690
X1	194.0	94	10759.0	11525.3	1260	1150	1200			
GR	832.0	4004.2	831.0	4183.5	829.4	4338.3	827.8	4436.9	826.8	4666.0
GR	824.2	4816.5	822.6	4979.8	820.0	5106.2	823.8	5141.5	820.2	5163.7
GR	818.0	5215.0	817.9	5369.4	818.0	5606.8	817.5	5785.0	816.8	5878.1
GR	817.6	6032.5	818.3	6290.6	818.7	6551.5	817.4	6774.6	817.3	6860.5
GR	816.7	6987.5	817.4	7149.2	817.2	7296.8	817.1	7352.1	804.0	7405.2
GR	813.7	7479.0	808.6	7541.9	809.7	7598.4	810.5	7624.0	811.4	7712.4
GR	811.8	7881.5	810.6	8006.5	816.6	8037.6	810.2	8102.6	817.8	8183.5
GR	817.9	8411.9	815.8	8702.7	807.8	8751.7	805.8	8826.9	812.3	8917.2
GR	805.6	8960.6	805.5	9023.3	808.6	9096.3	805.3	9125.2	812.8	9209.5
GR	809.1	9306.0	814.3	9395.4	813.9	9555.1	811.6	9663.7	813.1	9777.1
GR	811.1	9875.7	812.3	9954.5	810.6	10000.0	811.3	10125.9	811.1	10210.3
GR	812.3	10325.7	812.9	10368.2	824.7	10426.0	814.6	10452.3	815.3	10542.5
GR	815.7	10641.8	813.6	10693.0	813.5	10693.5	815.0	10759.0	809.1	10834.8
GR	807.6	11011.0	806.8	11136.7	806.8	11250.3	808.8	11389.8	815.2	11525.3
GR	808.2	11575.8	815.8	11735.3	810.2	11917.2	809.7	12052.7	812.9	12364.5
GR	810.6	12534.0	817.1	12735.6	808.1	12861.1	809.1	12916.3	817.2	13088.2
GR	815.6	13411.6	811.5	13660.2	811.2	13773.2	814.4	13948.7	813.7	14028.7
GR	820.3	14098.3	815.7	14134.6	807.6	14161.3	819.1	14319.1	816.2	14493.5
GR	816.6	14890.8	819.0	15316.0	818.9	16052.8	827.0	17520.0		

NH	6	0.035	7209.9	0.070	8137.1	0.060	9390.9	0.045	10451.1	0.060
NH	18805	0.035	20181.7							
ET			9.1						7860	13800
X1	196.0	94	10692.9	11651.0	400	930	880			
GR	839.9	3684.0	838.0	3898.4	836.1	4218.6	832.8	4644.7	828.6	4845.2
GR	826.5	4939.0	823.7	4992.5	824.6	5052.0	825.2	5119.5	820.7	5278.9
GR	819.1	5590.4	819.8	6039.7	820.4	6465.0	820.8	7060.4	818.8	7209.9
GR	820.5	7374.4	820.8	7451.5	808.6	7502.6	810.2	7602.2	812.3	7767.4
GR	809.3	7816.2	815.9	7903.3	812.8	7985.3	814.3	8081.7	810.7	8137.1
GR	816.1	8204.1	813.0	8219.3	816.5	8378.8	816.3	8616.0	808.5	8689.3
GR	810.5	8802.5	807.1	8811.3	807.5	8929.8	810.5	9066.3	810.7	9132.2
GR	814.2	9224.2	811.6	9335.7	810.7	9390.9	814.9	9528.7	811.9	9688.5
GR	813.9	9891.7	813.5	10000.0	812.2	10107.6	816.5	10236.7	815.6	10371.6
GR	828.4	10423.2	817.3	10451.1	817.1	10585.4	819.5	10692.9	815.7	10854.7
GR	812.5	11005.7	812.0	11302.7	807.9	11480.0	807.9	11586.6	816.6	11651.0
GR	814.6	11857.6	808.8	11896.8	813.8	11997.8	811.3	12039.7	814.0	12170.4
GR	811.3	12325.4	815.5	12481.7	815.2	12700.4	815.6	12851.5	814.0	13090.4
GR	808.6	13121.9	808.6	13160.8	816.5	13206.7	820.6	13273.9	819.9	13699.6
GR	813.5	13765.4	820.5	13836.0	812.2	13958.3	812.2	14071.3	819.4	14311.0
GR	820.2	14534.3	819.3	14711.3	819.5	14986.1	819.8	15392.3	822.2	15486.9
GR	822.6	15679.5	821.8	16016.1	826.7	16085.2	824.0	16121.8	814.0	16159.3
GR	823.2	16228.0	824.2	16675.2	827.0	17175.0	828.2	17504.3	829.8	17643.9
GR	831.4	18028.8	832.5	18331.3	842.5	18805.0	848.8	20181.7		

NC				.3	.5					
NH	6	0.035	5698.0	0.045	7712.0	0.060	9012.4	0.045	10433.4	0.060
NH	4255	0.035	20027.7							
ET			9.1						8220	13870
X1	198.0	94	10408.0	11619.1	950	1050	980			
GR	833.8	3888.2	831.6	3970.3	831.2	4129.6	829.9	4370.7	828.1	4446.2
GR	827.3	4605.8	826.5	4844.7	823.7	4876.1	827.2	4915.1	823.7	4922.5
GR	827.4	4965.0	822.8	5077.4	821.7	5230.0	819.8	5456.4	820.2	5698.0
GR	819.9	6046.7	821.2	6452.0	820.9	6688.1	819.5	6817.5	821.0	6863.0
GR	819.5	6890.5	821.4	7050.4	820.7	7235.2	821.0	7447.9	821.9	7712.0
GR	816.8	7755.6	811.5	7793.8	816.2	7922.7	815.2	8069.8	813.4	8213.4
GR	811.8	8269.9	817.6	8393.8	817.1	8522.5	813.7	8634.8	813.2	8672.6
GR	807.2	8698.8	807.2	8868.2	814.0	8929.3	818.6	9012.4	817.6	9209.8
GR	814.7	9326.8	813.2	9415.2	815.8	9555.5	817.5	9720.5	819.5	10000.0
GR	818.2	10099.4	818.3	10265.9	818.1	10361.3	823.9	10408.0	819.2	10433.4
GR	817.4	10530.4	815.8	10564.4	815.0	10710.9	812.7	10935.8	809.0	11283.9
GR	809.0	11438.2	814.5	11503.0	817.7	11619.1	816.0	12001.8	813.9	12274.4
GR	817.6	12354.2	810.3	12420.7	810.3	12532.0	818.0	12630.7	815.6	13240.2
GR	822.2	13312.4	815.7	13419.6	819.6	13589.9	817.5	13603.9	823.9	13815.2
GR	822.0	14186.2	820.6	14255.0	813.0	14287.9	813.0	14359.2	820.8	14502.5
GR	821.4	14828.8	825.4	15303.9	823.2	15457.6	822.1	15818.7	827.0	15883.2
GR	822.7	15942.5	813.5	15952.9	822.4	16010.4	823.4	16339.4	826.4	16852.2
GR	827.6	17234.3	829.7	17515.0	832.0	17900.2	833.8	18459.6	838.4	18602.2
GR	838.5	18763.4	839.9	18964.9	841.4	19302.5	846.7	20027.7		

NH	6	0.035	6105	0.045	9030	0.035	9540	0.045	10688	0.045
NH	14560	0.035	20370							
ET			9.1						8565	14100
X1	200	94	10688	11173	950	1050	980			
GR	828.4	5442	826.6	5494	825.6	5518	824.6	5677	823.4	5786
GR	822.6	6105	821.4	6879	819.8	6893	819.8	6905	825.1	6932
GR	823.9	7117	822.6	7448	818.1	7515	816.6	7570	819.3	7699
GR	822.1	7889	821.9	8027	819.4	8138	818.4	8149	820.8	8191
GR	819.9	8333	820.8	8397	820.8	8597	818.8	8663	818.8	8715
GR	815.4	8773	818.4	8954	808.1	8978	808.1	9030	811.8	9129
GR	812.1	9216	810.1	9249	811.8	9293	818.1	9318	821.4	9384
GR	818.3	9493	820.8	9540	819.4	9756	820.4	9841	819.9	10000
GR	821.1	10541	818.9	10688	808.3	10742	809.1	10776	810.3	10804
GR	809.0	10994	808.1	11013	808.1	11100	819.3	11173	818.4	11223
GR	819.3	11443	815.4	11636	814.3	11780	812.6	11807	813.6	11953
GR	817.8	11995	815.3	12215	817.9	12396	817.3	12601	810.0	12621
GR	810.0	12744	814.4	12771	816.9	12969	818.9	13258	821.9	13785
GR	823.6	13850	822.9	14090	821.2	14163	818.9	14202	823.9	14206
GR	825.1	14560	825.1	14703	822.1	14738	814.2	14781	814.2	14817
GR	822.7	14832	822.7	15200	825.7	15244	825.7	15401	823.2	15481
GR	823.7	15883	826.1	15912	825.9	15939	824.7	15980	818.4	15997
GR	818.4	16016	824.7	16030	823.6	16071	828.5	17311	829.5	17352
GR	836.2	18644	837.9	18704	844.4	20018	847.4	20370		

NH	6	0.035	6010	0.045	8931	0.035	9636	0.045	10673	0.045
NH	14679	0.035	20691							
ET			9.1						8860	13410
X1	202	92	9269	10000	900	840	840			
GR	837.1	5096	835.8	5122	831.3	5156	831.3	5196	834.1	5239
GR	832.8	5287	833.3	5377	826.4	5456	823.6	6010	823.8	6865
GR	822.3	6893	825.1	6926	824.6	7114	821.3	7179	822.8	7247
GR	822.8	7413	821.8	7443	824.1	7564	824.1	7646	823.8	7984
GR	819.9	8014	824.4	8048	822.9	8425	826.9	8498	824.8	8931
GR	824.8	9190	821.1	9269	814.9	9326	810.3	9335	811.1	9395
GR	813.8	9636	814.8	9686	812.1	9737	812.1	9798	818.4	9813
GR	822.4	10000	822.4	10129	811.0	10233	809.8	10442	809.5	10542
GR	812.1	10673	822.6	10704	822.6	10752	818.9	10810	820.6	11052
GR	818.8	11147	816.9	11465	817.3	11776	817.3	11986	811.6	12027
GR	811.6	12050	816.4	12093	816.1	12369	816.4	12502	809.6	12592
GR	809.5	12710	817.6	12851	821.2	13654	822.9	13675	824.1	13729
GR	823.1	14035	818.9	14064	819.7	14096	823.1	14131	826.9	14679
GR	826.2	14813	822.6	14832	822.6	14852	819.1	14902	819.1	14913
GR	815.6	14917	815.6	14933	823.1	14979	821.9	15095	824.6	15319
GR	823.9	15393	823.7	15736	823.7	15935	828.7	15991	828.4	16012
GR	824.4	16049	824.4	16068	818.6	16082	818.6	16113	824.9	16128
GR	828.5	17156	830.0	17196	836.0	18459	836.7	18541	843.5	19851
GR	844.0	19877	847.9	20691						

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NH      6      .035     6307      .045     8990      .035     9589      .045    10611      .045
NH  14551      .035    20770

ET                      9.1                                                      9250     12940
          DOWNSTREAM  OF AZ 85 BRIDGE
X1    204        94     9356     10453      260      240      250                800
GR   43.3      4430     43.3      4431     36.9     4514     36.6      4627     38.3      4666
GR   38.3      4741     31.6      4836     24.9     5545     24.9      6307     25.4      6630
GR   25.4      6717     21.6      6738     22.6     6752     21.1      6768     21.1      6786
GR   26.3      6810     25.9      6837     25.9     6991     26.6      7139     28.6      7256
GR   27.8      7277     23.3      7299     24.4     7309     26.6      7430     26.8      7633
GR   26.8      7686     23.9      7744     24.6     7838     27.6      7889     26.4      7991
GR   25.8      8116     25.8      8199     22.6     8240     20.4      8284     19.9      8396
GR   19.9      8440     24.3      8498     21.3     8593     20.8      8628     20.4      8990
GR   21.4      9123     21.4      9217     22.3     9356     17.8      9589     11.2      9659
GR   11.2      9987     12.1     10000     13.1    10126     13.6     10311     11.2     10370
GR   11.2     10394     17.8     10453     17.9    10496     17.6     10539     18.9     10611
GR   18.6     10727     16.8     10759     19.8    10814     23.1     10925     23.1     11048
GR   19.3     11109     20.3     11205     19.9    11291     19.1     11461     18.9     11590
GR   15.1     11681     15.3     11813     15.1    12253     16.1     12388     17.4     12572
GR   18.0     12700     20.6     13407     22.7    13445     22.1     13869     23.4     14237
GR   26.4     14551     28.0     14812     18.6    14844     24.4     14948     23.6     15013
GR   20.7     15143     23.4     15198     22.7    15470     21.6     15628     24.6     15807
GR   26.2     16294     28.5     16342     28.5    16390     26.4     16444     31.4     17330
GR   36.9     18285     37.5     18355     37.7    18426     51.2     20770

ET                      9.1                                                      9250     12875
X1   204.1         0        0         0       67       67       67         0        0         0

NH      2      .035     9609      .045    12780

X1   204.2        96     9356     10485        1        1        1         0      800         0
X2       0         0        0    833.75    840.5
GR   33.75      9280     21.8      9298     22.3     9356     17.8      9578    33.75    9578.1
GR   33.75    9588.9     17.8      9589     11.2     9648    33.75    9648.1    33.75    9658.9
GR   11.2      9659     11.2      9803    33.75   9803.1    33.75    9813.9     11.2      9814
GR   11.2      9973    33.75    9973.1    33.75   9983.9     11.2      9984     12.4     10143
GR   33.75   10143.1    33.75   10153.9     12.4    10154     13.6     10300    33.75   10300.1
GR   33.75   10310.9     13.6     10311     11.2    10394     17.9     10485    33.75   10485.1
GR   33.75   10495.9     17.9     10496     17.6    10539     18.9     10611     18.2     10653
GR   33.75   10653.1    33.75   10663.9     18.2    10664     16.8     10759     19.8     10803
GR   33.75   10803.1    33.75   10813.9     19.8    10814     23.1     11037    33.75   11037.1
GR   33.75   11047.9     23.1     11048     20.8    11163    33.75   11163.1    33.75   11173.9
GR   20.8     11174     20.3     11205     19.7    11333    33.75   11333.1    33.75   11343.9
GR   19.7     11344     19.1     11461     18.2    11503    33.75   11503.1    33.75   11513.9
GR   18.2     11514     15.1     11673    33.75   11673.1    33.75   11683.9     15.1     11684
GR   15.1     11843    33.75   11843.1    33.75   11853.9     15.1     11854     15.1     12013
GR   33.75   12013.1    33.75   12023.9     15.1    12024     15.1     12183    33.75   12183.1
GR   33.75   12193.9     15.1     12194     15.1    12253     15.7     12353    33.75   12353.1
GR   33.75   12363.9     15.7     12364     16.6    12523    33.75   12523.1    33.75   12533.9
GR   16.6     12534     17.6     12693    33.75   12693.1    33.75   12703.9     17.6     12704
GR   18.5     12863    33.75   12863.1    33.75   12873.9     18.5     12874     18.7     12895
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GR    33.75     12905


X1    204.3         0         0         0        94        94        94         0         0         0
X2                                   833.75    840.5

NH        2      .035      9609      .045     12780

ET                          9.1                                                   9250     12875
X1    204.4        94      9356     10496         1         1         1               800
GR     43.3      4430      43.3      4431      36.9      4514      36.6      4627      38.3      4666
GR     38.3      4741      31.6      4836      24.9      5545      24.9      6307      25.4      6630
GR     25.4      6717      21.6      6738      22.6      6752      21.1      6768      21.1      6786
GR     26.3      6810      25.9      6837      25.9      6991      26.6      7139      28.6      7256
GR     27.8      7277      23.3      7299      24.4      7309      26.6      7430      26.8      7633
GR     26.8      7686      23.9      7744      24.6      7838      27.6      7889      26.4      7991
GR     25.8      8116      25.8      8199      22.6      8240      20.4      8284      19.9      8396
GR     19.9      8440      24.3      8498      21.3      8593      20.8      8628      20.4      8990
GR     21.4      9123      21.4      9217      22.3      9356      17.8      9589      11.2      9659
GR     11.2      9987      12.1     10000      13.1     10126      13.6     10311      11.2     10370
GR     11.2     10394      17.8     10453      17.9     10496      17.6     10539      18.9     10611
GR     18.6     10727      16.8     10759      19.8     10814      23.1     10925      23.1     11048
GR     19.3     11109      20.3     11205      19.9     11291      19.1     11461      18.9     11590
GR     15.1     11681      15.3     11813      15.1     12253      16.1     12388      17.4     12572
GR     18.0     12700      20.6     13407      22.7     13445      22.1     13869      23.4     14237
GR     26.4     14551      28.0     14812      18.6     14844      24.4     14948      23.6     15013
GR     20.7     15143      23.4     15198      22.7     15470      21.6     15628      24.6     15807
GR     26.2     16294      28.5     16342      28.5     16390      26.4     16444      31.4     17330
GR     36.9     18285      37.5     18355      37.7     18426      51.2     20770

NH        6     0.035      6230     0.045      9014     0.035      9593     0.045     10667     0.045
NH    14420     0.035     20735

ET                          9.1                                                   9200     12900
            UPSTREAM     OF AZ 85 BRIDGE
X1      206        86      9563     10487        78        78        78         0         0         0
GR    836.1      4310     832.9      4555     835.8      4598     831.3      4619     831.3      4628
GR    834.9      4641     834.3      4672     831.9      4695     832.1      4729     826.9      5635
GR    826.4      6230     826.4      6469     828.9      6503     828.9      6666     822.6      6698
GR    822.6      6741     824.6      6754     824.1      6835     827.3      6856     827.8      7001
GR    828.4      7100     827.3      7232     826.9      7342     826.6      7475     828.6      7490
GR    828.4      7629     826.9      7666     826.9      7777     826.9      7834     827.3      7872
GR    826.8      8076     828.1      8171     826.4      8218     823.9      8245     823.9      8484
GR    823.8      8813     824.4      9014     828.3      9022     828.3      9081     825.1      9131
GR    824.9      9497     820.8      9563     812.3      9593     812.3      9878     814.4     10000
GR    813.4     10281     811.8     10330     811.8     10350     818.4     10391     819.8     10487
GR    814.9     10512     815.8     10667     814.3     10892     815.6     11253     821.8     11294
GR    821.8     11372     819.1     11435     817.9     11549     817.3     11638     814.4     11707
GR    818.6     11724     816.1     11901     816.1     12198     816.1     12233     813.6     12283
GR    814.9     12567     816.6     12700     824.6     14420     825.6     15105     823.6     15142
GR    825.9     15861     825.2     16037     828.7     16767     830.5     16925     830.7     17396
GR    834.5     17972     837.7     18262     837.7     18317     837.0     18345     839.9     18871
GR    842.0     19360     845.2     19574     845.2     19622     846.4     19808     850.4     20522
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GR	851.4	20735								
NH	6	0.035	6176	0.045	8826	0.035	9544	0.045	10618	0.045
NH	24608	0.035	19710							
ET			9.1						8450	13340
X1	208	94	9340	10225	900	900	900			
GR	837.6	4385	837.1	4551	834.3	4592	834.3	4616	835.8	4626
GR	834.8	4718	832.9	4734	829.8	5724	827.1	5738	827.1	6176
GR	827.4	6433	827.3	6680	823.3	6705	823.3	6733	826.6	6762
GR	825.8	6829	825.8	6945	827.1	6972	827.8	7190	827.1	7350
GR	825.8	7423	827.8	7449	823.4	7521	823.4	7616	823.8	7797
GR	823.8	7920	825.4	7950	825.4	8216	824.4	8466	824.4	8792
GR	829.8	8826	829.8	8837	824.6	8869	823.4	9340	813.1	9356
GR	811.8	9437	811.8	9544	811.8	9816	812.1	9856	819.3	9882
GR	818.6	9947	818.3	10000	817.6	10095	814.6	10150	815.1	10194
GR	821.4	10225	825.4	10572	819.6	10618	819.6	10642	825.4	10670
GR	826.1	10897	824.3	10961	825.4	10989	824.9	11425	817.3	11464
GR	818.3	11485	822.8	11528	821.8	11891	815.8	11934	815.4	12090
GR	819.4	12123	818.4	12357	818.4	12700	819.2	12779	818.1	12825
GR	824.6	12847	825.1	13206	821.4	13266	822.9	13306	824.6	13518
GR	823.7	13662	824.1	13898	822.9	13944	823.4	14190	826.6	14398
GR	827.2	14608	827.1	14811	825.7	14882	827.2	15081	824.4	15111
GR	824.7	15144	827.9	15168	823.7	15207	824.6	15354	826.1	15948
GR	828.5	16720	829.2	16753	835.5	18070	836.4	18094	836.5	18120
GR	836.4	18138	838.4	18450	844.5	19381	845.9	19710		
NH	5	0.035	6659	0.045	9360	0.045	10346	0.060	14541	0.035
NH	19805									
ET			9.1						7840	13680
X1	210	94	9307	10346	770	730	730			
GR	844.8	4510	839.4	4551	836.8	4683	839.1	4700	837.6	4777
GR	834.6	4794	832.6	5380	831.3	5731	829.1	5752	826.8	6659
GR	829.3	6678	827.8	6699	826.6	6762	825.1	6825	825.1	6892
GR	827.1	6913	824.8	7149	824.4	7276	826.3	7306	826.3	7454
GR	827.1	7655	825.8	7816	825.3	8056	827.3	8133	827.6	8669
GR	831.8	8686	831.8	8695	824.3	8735	825.1	9196	828.4	9216
GR	825.3	9289	825.3	9307	812.6	9360	812.6	9721	816.8	9747
GR	818.8	9908	815.8	9958	818.9	10000	818.9	10032	818.3	10067
GR	822.6	10346	823.9	10504	826.1	10601	826.1	10650	827.3	10774
GR	824.4	10826	824.4	10873	821.8	10911	827.4	10934	827.3	10984
GR	826.8	11268	823.8	11297	826.3	11322	820.3	11349	827.3	11381
GR	826.9	11493	820.8	11532	822.6	11594	824.8	11677	823.4	11951
GR	822.1	12049	817.6	12165	815.9	12250	815.9	12280	816.6	12389
GR	819.6	12408	819.3	12656	819.1	12780	820.9	13041	823.9	13084
GR	825.1	13550	824.6	13714	822.9	13783	825.4	13793	825.7	13900
GR	821.6	13927	821.6	13953	825.2	13966	824.4	14193	826.1	14379
GR	828.2	14435	825.4	14541	826.6	14683	829.0	14753	828.4	14992
GR	827.4	15194	825.2	15208	825.2	15219	820.6	15238	825.9	15262
GR	825.2	15293	827.2	15499	827.7	16557	848.0	19805		

NH	6	0.035	5768	0.045	9340	0.060	9759	0.045	10651	0.060
NH	14659	0.035	19947							
ET			9.1						7230	14050
X1	212	94	9340	9759	780	800	780			
GR	847.1	4637	847.1	4638	847.1	4639	846.4	4693	844.6	4725
GR	839.4	4752	839.4	4769	841.3	4778	841.3	4833	839.6	4836
GR	833.9	5754	832.1	5768	829.6	6327	832.3	6350	825.9	6390
GR	825.9	6494	832.1	6518	826.9	6611	825.8	6711	822.1	6727
GR	822.1	6761	827.1	6778	825.1	6806	826.9	6979	828.3	7183
GR	825.4	7245	825.6	7374	825.6	7517	827.4	8147	827.8	8416
GR	827.8	8516	826.9	8551	827.9	8604	827.4	8777	830.3	8794
GR	823.9	8830	827.4	8877	827.4	8939	823.4	8955	823.4	9001
GR	826.4	9028	826.4	9137	819.9	9206	819.9	9237	824.1	9265
GR	822.4	9340	813.6	9357	813.4	9493	814.8	9506	814.8	9739
GR	822.3	9759	824.9	10000	826.8	10501	825.6	10562	821.4	10592
GR	821.4	10624	825.9	10651	828.4	11065	823.6	11104	823.6	11176
GR	827.6	11196	829.1	11276	828.8	11380	825.1	11428	828.6	11492
GR	825.8	11788	823.8	12058	821.8	12392	820.4	12731	819.9	12800
GR	821.1	13326	823.4	13359	824.1	13430	821.9	13468	821.9	13507
GR	826.2	13531	823.1	13759	825.2	13813	825.2	14151	821.4	14165
GR	821.4	14202	826.1	14220	826.1	14338	829.7	14483	829.7	14659
GR	827.6	14852	826.4	14879	828.1	15097	826.1	15327	824.1	15349
GR	824.1	15374	826.7	15421	829.6	16167	853.6	19947		

NH	6	0.035	6682	0.045	9014	0.060	9709	0.045	10531	0.060
NH	14754	0.035	20053							
ET			9.1						7290	14420
X1	214	94	9142	9819	850	850	840			
GR	856.8	5052	856.8	5053	856.8	5083	840.1	5124	838.8	5191
GR	838.6	5258	836.9	5276	837.4	5588	836.1	5612	835.6	5804
GR	833.6	5821	833.6	6003	830.9	6029	830.9	6218	827.9	6257
GR	828.9	6477	823.6	6499	823.6	6532	828.6	6554	826.6	6582
GR	824.6	6682	827.1	6723	827.9	6990	828.8	7191	827.8	7377
GR	828.4	7680	828.4	8277	826.8	8335	825.6	8356	825.6	8409
GR	829.4	8424	828.3	8654	827.4	8706	828.8	8760	825.8	8810
GR	827.4	8883	826.3	8990	821.6	9014	822.4	9055	820.3	9142
GR	815.4	9173	816.3	9243	815.4	9260	815.4	9301	818.8	9329
GR	817.6	9367	814.1	9393	814.8	9709	819.4	9722	824.4	9819
GR	825.6	10000	826.8	10531	823.4	10552	823.4	10569	826.9	10592
GR	824.8	10637	828.6	10670	828.6	10882	824.3	10934	824.3	11084
GR	829.1	11110	827.6	11379	822.3	11408	822.3	11416	827.4	11481
GR	825.4	11751	821.1	11806	826.3	11831	825.8	11911	821.9	11935
GR	824.3	11967	821.8	12353	820.9	12800	820.1	13353	820.4	13525
GR	824.7	13550	826.4	13695	824.9	13857	820.9	13882	829.4	13903
GR	827.2	14250	828.6	14754	830.1	14983	828.6	15324	825.6	15354
GR	826.6	15514	828.4	15986	828.4	16250	833.2	16962	835.6	17469
GR	835.6	17610	839.1	17626	838.6	17688	853.9	20053		

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NH      5     0.045     8816     0.060     9607     0.045    10460     0.060    14660     0.035
NH  20265
ET                      9.1                                                      7350     14920
X1    216        94     8816      9739      950       800      750
GR  838.4      5535    838.4      5580    831.6      5616    831.6      5686    828.9      5722
GR  827.4      6549    829.1      6588    827.9      6707    824.3      6788    825.6      6929
GR  826.6      7122    827.9      7143    827.9      7345    828.8      7750    829.4      8100
GR  826.9      8139    828.3      8256    831.1      8277    830.3      8512    829.4      8574
GR  829.9      8816    819.8      8833    818.6      8869    815.1      8888    814.8      8964
GR  817.6      8988    818.3      9120    817.1      9145    817.3      9352    814.4      9380
GR  815.3      9491    814.3      9607    814.3      9732    822.8      9739    824.6      9877
GR  828.6      9989    828.6     10000    827.8     10155    825.4     10219    825.4     10247
GR  828.9     10292    828.9     10460    830.1     10765    824.3     10797    825.3     10841
GR  825.3     10942    824.1     11019    831.4     11030    831.4     11085    828.1     11155
GR  829.9     11204    826.8     11256    828.6     11299    828.1     11412    826.1     11488
GR  826.8     11672    825.1     11769    824.8     12044    822.6     12077    825.1     12113
GR  824.4     12334    823.3     12653    823.4     12860    822.4     13742    823.4     14089
GR  830.6     14129    830.9     14377    828.9     14526    825.9     14555    829.2     14584
GR  831.7     14660    831.7     14857    829.2     15180    826.1     15212    828.1     15242
GR  828.1     15296    824.4     15339    824.4     15339    829.6     15361    828.7     15481
GR  829.7     15742    831.9     16325    834.2     17060    835.9     17459    838.1     17526
GR  839.7     18008    843.4     18789    846.9     18807    845.6     18887    845.4     19009
GR  846.2     19051    847.2     19198    850.1     19426    858.4     20265

NC                                  .1       .3
NH      6     0.035     6115     0.045     8378     0.060     9505     0.045    10504     0.060
NH  14606     0.035    20365
ET                      9.1                                                      7450     15140
        APPROXIMATE CROSSING OF ROOKS ROAD ALIGNMENT
        MAJOR TRANSMISSION LINE CROSSING
X1    218        89     8756      9523     1000       840      900
GR  850.9      5852    846.3      5911    830.3      6012    830.3      6028    833.6      6043
GR  833.6      6077    829.4      6115    828.6      7033    828.6      7143    826.1      7168
GR  827.6      7285    827.6      7373    826.1      7424    827.9      7494    827.8      7681
GR  826.6      7755    826.6      7803    830.3      7828    829.8      8012    828.6      8095
GR  826.3      8335    822.8      8378    820.9      8467    822.1      8482    819.8      8676
GR  825.9      8697    825.9      8756    818.4      8807    817.9      9065    823.9      9080
GR  823.3      9168    815.4      9219    816.1      9300    814.9      9316    814.9      9505
GR  824.1      9523    825.4      9563    829.3     10000    829.4     10504    830.3     10686
GR  820.6     10718    821.1     10823    824.4     10852    828.4     10926    830.9     11114
GR  830.1     11154    830.3     11219    828.3     11274    828.6     11348    831.1     11371
GR  829.1     11653    828.3     11730    826.3     11765    825.1     11896    824.6     11957
GR  825.6     12038    824.9     12241    823.8     12502    824.6     12611    823.8     12903
GR  824.9     12952    824.9     13281    825.9     14281    826.2     14606    830.6     14668
GR  833.2     14780    831.6     15019    829.4     15086    831.6     15180    825.6     15206
GR  826.6     15243    830.7     15268    830.1     15641    830.9     16148    833.1     16176
GR  834.7     16887    836.2     17298    838.2     17327    838.2     17370    838.1     17437
GR  841.2     18139    843.6     18669    846.1     18684    846.7     18788    847.9     19086
GR  850.9     19464    854.6     19835    856.1     20000    857.7     20365
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NH	6	0.035	6189	0.045	8225	0.060	9402	0.045	10501	0.060
NH	14507	0.035	20425							
ET			9.1						7580	14970
X1	220	91	7576	9156	950	800	1000			
GR	836.4	6078	836.4	6079	836.4	6080	836.4	6089	831.6	6109
GR	830.6	6189	831.4	6256	830.3	6274	830.1	7502	829.4	7576
GR	821.9	7609	823.9	7769	823.1	8042	822.9	8225	822.8	8304
GR	822.8	8369	825.1	8395	824.6	8433	822.1	8454	824.6	8486
GR	825.1	8575	823.3	8661	816.8	8713	818.1	8771	814.6	8809
GR	814.6	8964	816.8	9006	820.9	9136	827.1	9156	827.1	9235
GR	821.6	9288	821.6	9315	828.6	9329	827.3	9402	827.3	9440
GR	827.3	9503	824.6	9531	828.6	9615	828.3	9685	828.4	9826
GR	829.9	10000	829.9	10501	833.3	10521	827.6	10541	827.6	10582
GR	823.1	10608	823.1	10772	828.9	10800	828.9	10886	826.3	10906
GR	826.3	10938	831.6	10973	830.3	11034	829.6	11167	829.9	11243
GR	830.6	11475	828.9	11606	827.6	11806	826.8	11968	825.3	12141
GR	822.8	12188	826.9	12227	826.6	12318	826.4	12541	826.4	12805
GR	827.1	12960	827.2	13674	829.4	14507	832.9	14851	825.9	14891
GR	831.9	14915	831.9	15034	825.6	15057	825.7	15102	833.4	15117
GR	830.9	15135	832.7	15688	833.4	16362	835.2	16808	836.7	17073
GR	838.7	17159	839.7	17193	838.2	17216	843.7	18483	846.2	18500
GR	847.2	18909	850.6	19571	852.2	19796	854.2	19811	856.7	20089
GR	858.2	20425								

NH	6	0.035	6433	0.045	8751	0.060	9525	0.045	10533	0.060
NH	14681	0.035	20428							
ET			9.1						7900	14800
X1	222	85	7885	9091	950	960	950			
GR	838.4	6223	838.4	6224	838.4	6225	836.6	6261	836.6	6317
GR	834.1	6332	834.1	6367	836.8	6392	834.1	6433	833.3	6633
GR	828.9	6663	828.9	6766	835.9	6877	831.4	6987	830.6	7247
GR	830.1	7885	822.3	7924	822.3	8051	825.3	8061	825.3	8307
GR	826.3	8417	820.1	8442	817.6	8482	817.4	8536	820.3	8552
GR	816.8	8587	817.4	8751	820.1	8944	823.3	8979	825.1	9070
GR	829.8	9091	829.3	9159	828.1	9296	827.3	9525	826.1	9540
GR	825.4	9744	823.9	9957	824.1	10000	825.6	10113	825.8	10170
GR	829.4	10189	832.8	10533	832.8	10567	826.6	10590	826.9	10755
GR	822.3	10828	823.8	10929	830.8	10955	830.3	11161	829.1	11372
GR	830.8	11436	829.9	11599	826.9	11749	827.4	12005	827.3	12102
GR	828.3	12176	827.4	12413	827.9	12762	827.4	12880	826.8	12910
GR	825.9	13137	826.4	13536	829.9	14162	832.4	14681	827.2	14742
GR	832.7	14757	832.7	14833	825.1	14855	825.7	14866	825.7	14901
GR	830.7	14926	832.1	14961	831.7	15947	837.4	16978	840.2	17003
GR	840.2	17045	842.9	18309	846.4	18331	848.7	18862	850.1	19580
GR	852.6	19604	853.4	19645	853.9	19961	856.2	20335	858.2	20428

NH	6	0.035	6592	0.045	8195	0.060	9521	0.045	10531	0.060
NH	14607	0.035	20613							
ET			9.1						8230	14700

X1	224	86	8195	9123	960	920	950			
GR	856.8	6520	855.4	6561	841.4	6592	840.9	6620	833.8	6639
GR	834.6	6756	832.9	6793	832.9	7136	832.9	7749	833.3	8074
GR	821.6	8113	830.1	8195	820.9	8237	820.9	8250	825.3	8264
GR	824.8	8336	819.4	8383	819.4	8427	823.6	8448	823.6	8478
GR	827.4	8502	827.4	8583	822.3	8615	823.1	8766	819.4	8805
GR	820.1	8943	818.4	8953	818.8	9095	829.9	9123	830.9	9521
GR	829.9	9534	829.1	9852	829.6	10000	830.3	10194	828.3	10333
GR	831.8	10531	835.3	10542	833.6	10564	833.6	10691	823.8	10730
GR	827.4	11011	830.6	11043	833.1	11098	833.1	11131	831.8	11227
GR	830.9	11508	831.1	11568	828.8	11843	828.8	12059	828.3	12232
GR	828.3	12508	828.4	12738	828.3	12819	826.3	12854	826.3	12899
GR	828.6	12926	828.6	13020	829.2	13524	829.2	13937	829.2	14206
GR	830.4	14365	833.6	14388	833.6	14539	830.4	14607	826.7	14641
GR	827.7	14691	835.2	14729	832.6	14782	833.2	14847	831.4	14905
GR	831.9	15303	832.6	15780	835.1	16480	835.7	16830	837.4	16862
GR	837.9	16919	840.9	17727	842.1	18178	845.4	18195	848.6	18632
GR	849.1	19305	852.6	19334	852.6	19474	854.4	19537	855.6	19827
GR	860.7	20613								
NH	4	0.070	9553	0.045	10547	0.060	14248	0.035	20647	
ET			9.1						8340	14560
X1	226	84	8653	9736	1020	1120	1050			
GR	868.0	7083	868.0	7084	868.0	7085	863.5	7112	841.4	7138
GR	842.5	7146	836.2	7166	837.0	7244	835.9	7801	835.2	8312
GR	821.7	8371	821.7	8389	824.9	8402	827.9	8484	827.7	8597
GR	830.0	8653	821.2	8689	821.2	8785	826.7	8805	827.6	8888
GR	825.2	8923	827.2	8942	828.5	9003	823.2	9077	820.9	9142
GR	821.6	9235	824.7	9277	825.1	9553	819.7	9574	820.1	9718
GR	829.4	9736	833.0	9840	831.7	10000	832.4	10547	829.9	10581
GR	824.7	10603	820.9	10652	820.9	10668	824.6	10693	830.4	10876
GR	830.5	10992	834.5	11032	834.0	11089	828.9	11113	829.4	11149
GR	832.9	11179	831.4	11668	830.5	11821	828.2	11849	830.9	11863
GR	830.7	12192	830.7	12625	830.9	13070	830.1	13361	830.6	13697
GR	830.6	13844	833.6	14097	835.1	14248	827.4	14280	826.7	14324
GR	830.6	14335	831.4	14445	832.6	14551	834.6	15156	834.6	15898
GR	834.6	16596	837.2	16630	831.4	16648	831.4	16657	837.7	16672
GR	838.9	16706	836.6	16722	839.1	17273	844.1	17885	847.9	18593
GR	852.2	19257	854.9	19291	855.1	19366	854.1	19383	856.5	19849
GR	860.0	20396	861.5	20545	863.5	20562	862.9	20647		
NH	4	0.070	9752	0.045	10506	0.060	14118	0.035	20627	
ET			9.1						8610	14640
X1	228	83	9731	11463	1250	1000	1400			
GR	866.9	7745	858.7	7837	846.2	7888	855.0	7919	852.7	7946
GR	842.0	7986	843.4	8137	840.7	8362	839.0	8411	838.4	8615
GR	827.6	8649	827.4	8819	824.6	8851	828.7	8867	828.7	8943
GR	827.1	8988	827.1	9027	830.2	9074	831.2	9325	831.2	9590
GR	830.7	9731	823.2	9752	821.2	10182	820.6	10257	821.7	10267
GR	821.2	10486	823.9	10506	825.7	10966	825.1	11031	826.4	11056
GR	828.7	11272	826.2	11356	820.6	11371	820.6	11444	832.0	11463
GR	832.4	11817	832.4	11954	833.0	12473	832.7	12731	832.5	12986
GR	832.0	13065	832.4	13135	830.7	13162	833.4	13204	834.6	13344
GR	830.7	13391	833.4	13448	834.4	13636	834.2	13797	831.9	13875

GR	832.1	14002	829.4	14038	829.2	14084	826.9	14118	826.9	14146
GR	834.4	14157	834.4	14266	834.1	14399	837.1	14516	838.7	14568
GR	835.4	14736	834.7	14837	835.4	14991	834.9	15692	834.7	16393
GR	836.9	16423	832.2	16438	838.2	16461	838.9	16499	836.1	16512
GR	838.2	17055	841.9	17715	844.6	17726	847.1	18176	851.9	19067
GR	853.7	19112	854.1	19197	858.0	19955	860.5	20333	860.9	20361
GR	862.7	20373	861.9	20431	863.5	20627				

```
T1
T2
T3     GILA RIVER BRIDGE  -3625'

J1  ICHECK   INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ

    -10        3                                                   245000   818.87

J2  NPROF    IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE

     2         0       -1
```

```
T1
T2
T3      GILA RIVER BRIDGE  -3625'

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

     -10       3         0         0         0         0         0     350000    820.99

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     15        0        -1
```

THIS RUN EXECUTED 12/26/90 9:41:12

****
HEC-2 RELEASE DATED SEPT 88

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

GILA RIVER BRIDGE - 3625

SUMMARY PRINTOUT TABLE 150

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	E6	10*KS	VCH	AREA	.01K
190.000	.00	.00	.00	801.00	195000.00	817.95	.00	818.16	7.18	4.15	54098.02	72752.95
190.000	.00	.00	.00	801.00	245000.00	818.87	.00	819.14	8.45	4.76	59682.32	84291.68
190.000	.00	.00	.00	801.00	350000.00	820.99	.00	821.37	9.46	5.66	72550.67	113805.20
192.000	930.00	.00	.00	803.80	195000.00	818.82	.00	819.06	11.34	4.34	49356.15	57915.06
192.000	930.00	.00	.00	803.80	245000.00	819.86	.00	820.16	12.31	4.78	55806.01	69825.34
192.000	930.00	.00	.00	803.80	350000.00	822.06	.00	822.46	12.60	5.37	69500.11	98607.38
194.000	1200.00	.00	.00	805.30	195000.00	820.28	.00	820.53	12.85	4.51	49757.62	54402.90
194.000	1200.00	.00	.00	805.30	245000.00	821.43	.00	821.72	13.42	4.91	56810.75	66885.70
194.000	1200.00	.00	.00	805.30	350000.00	823.67	.00	824.06	13.71	5.53	70639.72	94512.03
196.000	880.00	.00	.00	807.10	195000.00	821.21	.00	821.55	19.10	4.57	42464.20	44616.00
196.000	880.00	.00	.00	807.10	245000.00	822.38	.00	822.77	19.09	4.97	49328.05	56073.97
196.000	880.00	.00	.00	807.10	350000.00	824.61	.00	825.11	18.53	5.61	62519.13	81298.19
198.000	980.00	.00	.00	807.20	195000.00	823.07	.00	823.42	18.82	4.98	41853.61	44948.17
198.000	980.00	.00	.00	807.20	245000.00	824.24	.00	824.65	18.90	5.36	48407.08	56350.02
198.000	980.00	.00	.00	807.20	350000.00	826.43	.00	826.96	18.73	6.02	60776.46	80867.80
200.000	980.00	.00	.00	808.10	195000.00	824.46	.00	824.86	11.04	6.40	39805.89	58681.65
200.000	980.00	.00	.00	808.10	245000.00	825.65	.00	826.11	11.27	6.83	46395.93	72964.34
200.000	980.00	.00	.00	808.10	350000.00	827.85	.00	828.42	11.48	7.53	58575.69	103294.40
202.000	840.00	.00	.00	809.50	195000.00	825.35	.00	825.77	10.23	6.06	38233.59	60969.23
202.000	840.00	.00	.00	809.50	245000.00	826.57	.00	827.07	10.89	6.69	43761.68	74233.64
202.000	840.00	.00	.00	809.50	350000.00	828.79	.00	829.47	11.83	7.76	53866.71	101760.00
204.000	250.00	.00	.00	811.20	195000.00	825.56	.00	826.18	16.35	7.21	31946.55	48222.23
204.000	250.00	.00	.00	811.20	245000.00	826.78	.00	827.52	17.17	7.87	36432.03	59129.16
204.000	250.00	.00	.00	811.20	350000.00	828.98	.00	829.98	18.49	9.04	44576.20	81397.46

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
204.100	67.00	.00	.00	811.20	195000.00	825.67	.00	826.29	16.15	7.20	31860.19	48527.17
204.100	67.00	.00	.00	811.20	245000.00	826.89	.00	827.64	17.02	7.87	36283.69	59391.40
204.100	67.00	.00	.00	811.20	350000.00	829.10	.00	830.11	18.43	9.07	44308.95	81527.66
204.200	1.00	840.50	833.75	811.20	195000.00	825.65	.00	826.31	20.09	7.34	30559.47	43510.28
204.200	1.00	840.50	833.75	811.20	245000.00	826.86	.00	827.67	21.73	8.05	34653.72	52558.03
204.200	1.00	840.50	833.75	811.20	350000.00	829.06	.00	830.16	24.57	9.34	42080.95	70606.55
204.300	94.00	840.50	833.75	811.20	195000.00	825.87	.00	826.50	18.66	7.15	31318.57	45135.84
204.300	94.00	840.50	833.75	811.20	245000.00	827.11	.00	827.88	20.22	7.85	35490.31	54488.96
204.300	94.00	840.50	833.75	811.20	350000.00	829.35	.00	830.40	22.90	9.12	43060.71	73132.72
204.400	1.00	.00	.00	811.20	195000.00	825.94	.00	826.52	14.69	6.90	32892.11	50876.05
204.400	1.00	.00	.00	811.20	245000.00	827.20	.00	827.90	15.44	7.54	37457.21	62343.67
204.400	1.00	.00	.00	811.20	350000.00	829.49	.00	830.44	16.65	8.69	45762.80	85768.59
206.000	78.00	.00	.00	811.80	195000.00	826.19	.00	826.66	11.35	5.96	36011.43	57873.25
206.000	78.00	.00	.00	811.80	245000.00	827.47	.00	828.04	12.19	6.60	40743.02	70170.01
206.000	78.00	.00	.00	811.80	350000.00	829.80	.00	830.60	13.48	7.71	49376.73	95339.73
208.000	900.00	.00	.00	811.80	195000.00	827.34	.00	828.14	19.65	8.74	30401.94	43988.46
208.000	900.00	.00	.00	811.80	245000.00	828.67	.00	829.51	18.52	9.04	36888.35	56935.41
208.000	900.00	.00	.00	811.80	350000.00	831.09	.00	832.02	17.00	9.59	48691.03	84886.48
210.000	730.00	.00	.00	812.60	195000.00	829.04	.00	829.64	19.40	7.77	36912.54	44266.95
210.000	730.00	.00	.00	812.60	245000.00	830.30	.00	830.94	18.84	8.16	44238.76	56449.80
210.000	730.00	.00	.00	812.60	350000.00	832.63	.00	833.36	17.75	8.80	57842.38	83077.31
212.000	780.00	.00	.00	813.40	195000.00	830.81	.00	831.15	17.08	6.50	44212.12	47190.46
212.000	780.00	.00	.00	813.40	245000.00	832.02	.00	832.39	16.08	6.62	52518.99	61091.71
212.000	780.00	.00	.00	813.40	350000.00	834.28	.00	834.72	14.70	6.87	67934.76	91274.52
214.000	840.00	.00	.00	814.10	195000.00	832.05	.00	832.29	10.44	5.21	52959.78	60356.39
214.000	840.00	.00	.00	814.10	245000.00	833.24	.00	833.52	10.58	5.51	61440.58	75316.95
214.000	840.00	.00	.00	814.10	350000.00	835.46	.00	835.80	10.63	6.00	77245.90	107367.10
216.000	750.00	.00	.00	814.30	195000.00	832.83	.00	833.07	8.98	5.06	55177.25	65058.57
216.000	750.00	.00	.00	814.30	245000.00	834.04	.00	834.31	9.17	5.35	64370.84	80908.30
216.000	750.00	.00	.00	814.30	350000.00	836.28	.00	836.61	9.28	5.83	81358.05	114914.70
218.000	900.00	.00	.00	814.90	195000.00	833.65	.00	833.84	8.49	4.51	58832.39	66928.02
218.000	900.00	.00	.00	814.90	245000.00	834.87	.00	835.09	8.53	4.75	68245.88	83884.07
218.000	900.00	.00	.00	814.90	350000.00	837.12	.00	837.39	8.55	5.17	85528.20	119719.30
220.000	1000.00	.00	.00	814.60	195000.00	834.40	.00	834.61	8.80	4.48	57208.80	65720.94
220.000	1000.00	.00	.00	814.60	245000.00	835.62	.00	835.86	8.85	4.77	66233.41	82354.42
220.000	1000.00	.00	.00	814.60	350000.00	837.86	.00	838.16	8.92	5.29	82793.69	117212.70
222.000	950.00	.00	.00	816.80	195000.00	835.19	.00	835.41	7.89	4.81	56577.94	69435.66
222.000	950.00	.00	.00	816.80	245000.00	836.42	.00	836.68	8.15	5.18	65083.34	85812.63
222.000	950.00	.00	.00	816.80	350000.00	838.68	.00	839.01	8.53	5.83	80704.78	119814.50

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
224.000	950.00	.00	.00	818.40	195000.00	836.10	.00	836.37	13.47	5.21	49132.98	53129.56
[illegible]1.000	950.00	.00	.00	818.40	245000.00	837.34	.00	837.65	13.30	5.48	57182.18	67174.77
[illegible]4.000	950.00	.00	.00	818.40	350000.00	839.61	.00	840.00	13.16	5.96	71875.12	96483.25
226.000	1050.00	.00	.00	819.70	195000.00	837.53	.00	837.79	12.64	4.90	49797.10	54856.55
226.000	1050.00	.00	.00	819.70	245000.00	838.77	.00	839.07	12.75	5.20	57507.19	68609.78
226.000	1050.00	.00	.00	819.70	350000.00	841.04	.00	841.43	12.93	5.72	71644.16	97326.04
228.000	1400.00	.00	.00	820.60	195000.00	838.71	.00	838.98	7.62	4.89	53684.66	70654.66
228.000	1400.00	.00	.00	820.60	245000.00	839.99	.00	840.31	8.18	5.34	61396.98	85640.85
228.000	1400.00	.00	.00	820.60	350000.00	842.31	.00	842.72	9.03	6.10	75413.86	116451.00

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SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
190.000	195000.00	817.95	.00	.00	.00	6070.00	.00
190.000	245000.00	818.87	.92	.00	.92	6070.00	.00
190.000	350000.00	820.99	2.12	.00	3.04	6070.00	.00
192.000	195000.00	818.82	.00	.87	.00	6101.06	930.00
192.000	245000.00	819.86	1.04	.99	1.04	6216.77	930.00
192.000	350000.00	822.06	2.20	1.07	3.24	6235.79	930.00
194.000	195000.00	820.28	.00	1.47	.00	6156.85	1200.00
194.000	245000.00	821.43	1.15	1.57	1.15	6165.44	1200.00
194.000	350000.00	823.67	2.24	1.61	3.39	6182.25	1200.00
196.000	195000.00	821.21	.00	.93	.00	5892.97	880.00
196.000	245000.00	822.38	1.17	.95	1.17	5900.58	880.00
196.000	350000.00	824.61	2.23	.94	3.40	5915.20	880.00
198.000	195000.00	823.07	.00	1.86	.00	5556.79	980.00
198.000	245000.00	824.24	1.17	1.86	1.17	5650.00	980.00
198.000	350000.00	826.43	2.19	1.82	3.36	5650.00	980.00
200.000	195000.00	824.46	.00	1.38	.00	5535.00	980.00
200.000	245000.00	825.65	1.19	1.40	1.19	5535.00	980.00
[illegible].000	350000.00	827.85	2.20	1.41	3.39	5535.00	980.00
202.000	195000.00	825.35	.00	.89	.00	4550.00	840.00
202.000	245000.00	826.57	1.22	.92	1.22	4550.00	840.00
202.000	350000.00	828.79	2.22	.94	3.44	4550.00	840.00
204.000	195000.00	825.56	.00	.21	.00	3690.00	250.00
204.000	245000.00	826.78	1.22	.21	1.22	3690.00	250.00
204.000	350000.00	828.98	2.21	.20	3.42	3690.00	250.00
204.100	195000.00	825.67	.00	.11	.00	3625.00	67.00
204.100	245000.00	826.89	1.22	.11	1.22	3625.00	67.00
204.100	350000.00	829.10	2.21	.12	3.43	3625.00	67.00
204.200	195000.00	825.65	.00	-.02	.00	3378.58	1.00
204.200	245000.00	826.86	1.21	-.03	1.21	3381.51	1.00
204.200	350000.00	829.06	2.19	-.05	3.41	3386.82	1.00
204.300	195000.00	825.87	.00	.22	.00	3379.12	94.00
204.300	245000.00	827.11	1.23	.25	1.23	3382.11	94.00
204.300	350000.00	829.35	2.24	.29	3.47	3387.52	94.00
204.400	195000.00	825.94	.00	.07	.00	3625.00	1.00
204.400	245000.00	827.20	1.26	.10	1.26	3625.00	1.00
204.400	350000.00	829.49	2.29	.15	3.55	3625.00	1.00

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
206.000	195000.00	826.19	.00	.24	.00	3700.00	78.00
[illegible].000	245000.00	827.47	1.28	.26	1.28	3700.00	78.00
[illegible].000	350000.00	829.80	2.33	.31	3.61	3700.00	78.00
208.000	195000.00	827.34	.00	1.15	.00	4848.35	900.00
208.000	245000.00	828.67	1.34	1.21	1.34	4864.97	900.00
208.000	350000.00	831.09	2.42	1.29	3.75	4890.00	900.00
210.000	195000.00	829.04	.00	1.70	.00	5805.13	730.00
210.000	245000.00	830.30	1.26	1.63	1.26	5816.95	730.00
210.000	350000.00	832.63	2.34	1.54	3.60	5840.00	730.00
212.000	195000.00	830.81	.00	1.77	.00	6820.00	780.00
212.000	245000.00	832.02	1.22	1.73	1.22	6820.00	780.00
212.000	350000.00	834.28	2.26	1.65	3.48	6820.00	780.00
214.000	195000.00	832.05	.00	1.25	.00	7130.00	840.00
214.000	245000.00	833.24	1.19	1.22	1.19	7130.00	840.00
214.000	350000.00	835.46	2.22	1.17	3.41	7130.00	840.00
216.000	195000.00	832.83	.00	.77	.00	7570.00	750.00
216.000	245000.00	834.04	1.21	.80	1.21	7570.00	750.00
216.000	350000.00	836.28	2.24	.83	3.46	7570.00	750.00
218.000	195000.00	833.65	.00	.82	.00	7690.00	900.00
218.000	245000.00	834.87	1.22	.83	1.22	7690.00	900.00
218.000	350000.00	837.12	2.25	.83	3.47	7690.00	900.00
220.000	195000.00	834.40	.00	.75	.00	7390.00	1000.00
220.000	245000.00	835.62	1.22	.75	1.22	7390.00	1000.00
220.000	350000.00	837.86	2.24	.74	3.46	7390.00	1000.00
222.000	195000.00	835.19	.00	.79	.00	6900.00	950.00
222.000	245000.00	836.42	1.23	.80	1.23	6900.00	950.00
222.000	350000.00	838.68	2.26	.82	3.49	6900.00	950.00
224.000	195000.00	836.10	.00	.91	.00	6470.00	950.00
224.000	245000.00	837.34	1.24	.92	1.24	6470.00	950.00
224.000	350000.00	839.61	2.27	.93	3.52	6470.00	950.00
226.000	195000.00	837.53	.00	1.44	.00	6220.00	1050.00
226.000	245000.00	838.77	1.24	1.43	1.24	6220.00	1050.00
226.000	350000.00	841.04	2.27	1.43	3.51	6220.00	1050.00
228.000	195000.00	838.71	.00	1.18	.00	6030.00	1400.00
228.000	245000.00	839.99	1.28	1.21	1.28	6030.00	1400.00
228.000	350000.00	842.31	2.32	1.26	3.60	6030.00	1400.00

SUMMARY OF ERRORS AND SPECIAL NOTES