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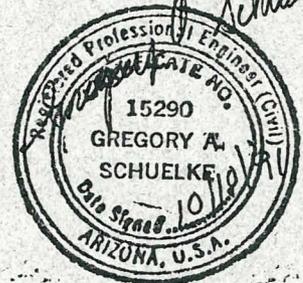
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**TECHNICAL DATA NOTEBOOK (TDN)
FOR
SUN VALLEY PARKWAY NORTH
FLOOD INSURANCE STUDY
(PORTION OF TOWN OF SURPRISE AND
UNINCORPORATED AREAS, MARICOPA COUNTY, ARIZONA)**

**OCTOBER, 1991
Revised: May 4, 1993**

**PREPARED FOR
ARIZONA DEPARTMENT OF WATER RESOURCES
ENGINEERING DIVISION
FLOOD MANAGEMENT SECTION
15 SOUTH 15TH AVENUE
PHOENIX, ARIZONA 85007
AND THE
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
3335 WEST DURANGO STREET
PHOENIX, ARIZONA 85009**

**PREPARED BY
A-N WEST, INC.
7600 NORTH 15TH STREET, SUITE 200
PHOENIX, ARIZONA 85020**



**FCD NO. 90-04
ANW NO. 7158-01**

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
NO. 90-04
A-N WEST, INC. NO. 7158-01
MAY 4, 1993

REPORT PREFACE

On January 20, 1992, the Flood Control District of Maricopa County submitted the Hydrology Report, Flood Insurance Study Report, Technical Data Notebook Report, FIRM Work Maps and supportive data to FEMA for the detailed 100-year, floodplain and floodway, Zone AE delineation of 8 washes near Sun Valley Parkway North.

On May 11, 1992, FEMA's initial review comments were received regarding this submittal. FEMA questioned the applicability of utilizing the HEC-2 model to delineate floodplains for several of these washes, because of concerns for; a) breakout of flow from the delineated limits of the floodplain; b) shifting of flow within the cross-sections from main channels to overbanks and back again along the wash reach length; and c) erosion/sediment transport which could cause further shifting of flow patterns.

A response to these FEMA review comments was transmitted by the Flood Control District on June 16, 1992 and acknowledged by FEMA in a letter of June 26, 1992.

On October 26, 1992, FEMA's second review comment letter was received regarding the supportive data and response to their May 11, 1992 comments. FEMA's concerns expressed from the May 11, 1992, comment letter remained and FEMA further stated that a detailed Zone AE was not considered appropriate. If potential breakout areas for several washes were included, an approximate 100-year Flood Hazard Zone A would be applicable.

On February 3, 1993, the Flood Control District of Maricopa County resubmitted the revised floodplain mapping for all eight washes as approximate Zone A delineations, which was acknowledged by FEMA on February 17, 1993.

On April 15, 1993, FEMA transmitted preliminary FIRM maps reflecting the eight washes as approximate Zone A.

As such, the detailed hydrologic/hydraulic analysis data and a report following this preface do not reflect the accepted FEMA FIRM mapping, but provide the preliminary detailed analysis initially submitted. This data is proposed to be used by the Flood Control District as the best available data on these washes for subsequent floodplain regulation over these washes.

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2.5 HYDRAULIC ANALYSIS MAPS	See Exhibit 3 of attached Flood Insurance Study Report
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2.8 MISC. MAPS See Figures 2-6
of attached
Hydrology Report

SECTION 3.0 HYDROLOGIC ANALYSIS See attached
Hydrology Report

3.1 METHOD DESCRIPTION Sun Valley Parkway
N.F.I.S. by A-N
West, Inc. dated
March 6, 1991.
Section 5, p.6-
13 of attached
Hydrology Report

3.2 PARAMETER ESTIMATION

3.2.1 Drainage Area Boundaries See Sec. 5.2 and
Fig. 5 of
attached
Hydrology Report

3.2.2 Physical Parameters See Sec. 5 and
Appendicies B-F
of attached
Hydrology Report

3.2.3 Statistical Parameters See Sec. 3, 4,
5.3 and 8 of
attached
Hydrology Report

3.2.4 Precipitation See Sec. 3, 4,
5.3 and 8 of
attached
Hydrology Report

3.2.5 Gage Data See Sec. 8 of
attached
Hydrology Report

3.3 CALIBRATION See Sec. 4, 7,
and 8 of
attached
Hydrology Report

3.4 SPECIAL PROBLEMS/SOLUTIONS See Sec. 6 of
attached
Hydrology Report

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3.5	FINAL RESULTS/COMPUTER RUNS	See Sec. 7, Tables 4 and 5, and Appendix G of attached Hydrologic Report
3.6	FINAL MODELING RESULTS ON DISKETTE(S)	See Appendix G of attached Hydrologic Report
SECTION 4.0	HYDRAULIC ANALYSIS	See attached Flood Insurance Study (FIS) Report (Sun Valley Parkway N. FIS) by A-N West, Inc. dated October, 10, 1991.
4.1	METHOD DESCRIPTION	See Sec. 3 of attached FIS Report
4.2	PARAMETER ESTIMATION	
4.2.1	Manning's N-Valve	See Section 3.2 and Appendix B of attached FIS Report
4.2.2	Expansion and Contraction Coefficients	Reference 10 of attached FIS Report
4.2.3	Hydraulic Jump/Drop Analysis	N/A
4.3	CROSS-SECTION DESCRIPTION	
4.3.1	Channel and Overbank	See Sec. 3.2 and Appendix B of attached FIS Report
4.3.2	Bridge or Construction	See Sec. 3.2 and Appendix B of attached FIS Report

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4.3.3	Grade Control Structures	See Sec. 3.2 and Appendix B of attached FIS Report
4.4	CALIBRATION	See Sec. 3.2 of attached FIS Report
4.5	SPECIAL PROBLEMS/SOLUTIONS	See Sec. 3.2 of attached FIS Report
4.6	FLOODWAY MODELING	See Sec. 4.2 of attached FIS Report
4.7	FINAL RESULTS/COMPUTER RUNS	See Appendix A of attached FIS Report
4.8	FINAL MODELING RUN ON DISKETTES	See Appendix A of attached FIS Report
SECTION 5.0	EROSION/SEDIMENT TRANSPORT	N/A
SECTION 6.0	REFERENCE MATERIALS	
6.1	OTHER PUBLISHED FLOOD STUDIES	See Sec. 2.3 and 6 of attached FIS Report
6.2	PREVIOUS FEMA STUDIES	See Sec. 6 of attached FIS Report
6.3	OTHER APPLICABLE STUDIES	See Sec. 6 of attached FIS Report
6.4	PUBLISHED/UNPUBLISHED HISTORICAL FLOOD INFO.	See Sec. 2.3 and 6 of attached FIS Report
6.5	REFERENCED TECHNICAL PAPERS/DOCUMENTS	See Sec. 8 of attached FIS Report

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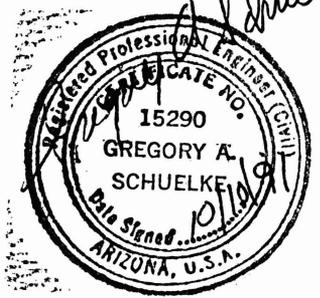
SECTION 7.0 CROSS-REFERENCING AND LABELING INFORMATION

7.1 OTHER STUDIES IMPACTED N/A

7.2 KEY TO CROSS-SECTION LABELING 141-161

SECTION 8.0 DRAFT FIS REPORT

See attached
FIS Report



SECTION 1: GENERAL INFORMATION		
1A	COMMUNITY	Portion of Town of Surprise and Unincorporated Areas
1B	COMMUNITY NUMBER	040037
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	April 15, 1993
1F	STUDY CONTRACTOR CONTACT(S) ADDRESS PHONE INTERNAL REF #	A-N West, Inc.
		7600 North 15th Street, Suite 200
		Phoenix, Arizona 85020
		(602) 861-2200
		Contact: Greg Schuelke, P.E., Project Manager
		Contract No. FCD-90-04
		Subconsultants: Cooper Aerial(Phx)&Project Engineers (Phx)
1G	TECH. REVIEWER (FEMA) PHONE	
1H	FEMA REGIONAL REVIEWER PHONE	
1I	STATE REVIEWER PHONE	Arizona Department of Water Resources
		(602) 542-1566
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County
		(602) 262-1501
1K	RIVER OR STREAM NAME	Sun Valley Parkway North; Washes No. 1-8 and Tributaries
1L	REACH DESCRIPTION (FIRM PANEL & EPA REACH #)	See attachment
1M	STUDY TYPE (Riverine, Alluvial Fan, etc)	Riverine
SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	See attachment
2B	MAPPING FOR HYDROLOGIC STUDY TYPE/SOURCE SCALE DATE	Base Mapping: U.S.G.S. 7 1/2 Minute Topographic Maps listed above, compiled in 1975 and Photo revised in 1971 and 1981, Aided by Photography by Landis Aerial Mapping of Phoenix at scale: 1"=1200' Flown Nov. and Dec. 1987 and Photography described below.
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE SCALE DATE SUBCONTRACTOR (AERIAL) DATE OF AERIAL MAPPING	Aerial Photography at Scale 1:8200 Topography Mapping at 1"=400' Scale: and 2 foot C.I. for majority of study. Mapping matches on North edge to Previous Study Mapping for Wittman ADMS with Mapping at Scale 1"=400' and 4 foot C.I. Cooper Aerial Mapping of Phoenix compiled both 2' and 4' Mapping.
		Date Flown: 9/23/90 (2' C.I. Mapping)

SECTION 3: HYDROLOGY

3A	MODEL OR METHOD USED (including vendor and version description)	Corps of Engineers HEC-1 Model Vendor: Haestad Methods, Waterbury, Conn. Version 3.1a 900 Ordinate Modification February, 1981, Revised June 14, 1985
3B	STORM DURATION	24-Hour
3C	HYETOGRAPH TYPE	SCS Type II
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	Agua Fria Tributary at Youngtown, Arizona U.S.G.S. Gage No. 9-5137 Years of Record 1961 to 1968
3F	RAINFALL AMOUNTS AND REFERENCE	Source:NOAA Atlas 2 Vol VIII-Arizona 100-Year 24-Hour Precip.= 4.21 inches for D.A.= 0.001 sgimi, 4.17 Inches for D.A.= 10 sgimi and 4.00 Inches for D.A.= 50 sgimi.
3G	UNIQUE CONDITIONS AND PROBLEMS	Splits in flow modeled with divert option of HEC-1 at culverts along Sun Valley Parkway and location upstream of Parkway.
3H	COORDINATION OF Q'S (agency, date, comments)	See attachment

SECTION 4: HYDRAULICS

4A	MODEL OR METHOD USED (including vendor and version description)	Corps of Engineers HEC-2 Model, Water Surface Profiles Vendor: Corps of Engineers, Davis, Calif. Version: 4.6.0; Febraury 1991
4B	REGIME	Subcritical Regime HEC-2 Analysis
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year Frequency
4D	METHOD OF FLOODWAY CALCULATION	Equal Conveyance Reduction (by Method 4) to establish general floodway configuration followed by Fixed Floodway Encroachments (by Method 1).
4E	UNIQUE CONDITIONS AND PROBLEMS	See attachment

ADDITIONAL STUDY INFORMATION

ITEM	DESCRIPTION/DISCUSSION
1L REACH DESCRIPTION (FIRM PANEL & EPA REACH #1)	Wash No. 1 and Tributary, Length 5.8 miles
	Extending upstream from confluence with Wash 5 West in S.W. 1/4 Section 15, T4N, R3W to Sun Valley Parkway in middle of Section 30, T4N, R3W.
	Wash No. 2 and Tributary, Length: 2.8 miles
	Extending upstream from confluence with Wash No. 1 in S.W. 1/4 Section 16, T4N, R3W to Sun Valley Parkway in middle of Section 10, T4N, R3W.
	Wash No. 3 and Tributaries, Length 2.9 miles
	Extending upstream from confluence with Wash No. 1 in S.W. 1/4 Section 15, T4N, R3W to Sun Valley Parkway in middle of Section 17, T4N, R3W.
	Wash No. 4 and Tributaries, Length 5.32 miles
	Extending upstream from confluence with Wash 5 West at East 1/4 Point of Section 23, T4N, R3W to Sun Valley Parkway in middle of Section 17, T4N, R3W.
	Wash No. 5 and Tributary, Length: 1.8 miles
	Extending from confluence with Wash No. 5 West at East 1/4 Point of Section 23, T4N, R3W to Sun Valley Parkway in middle of Section 28, T4N, R3W.
	Wash No. 6 and Tributary, Length: 1.4 miles
	Extending upstream from confluence with Trilby Wash in S.W. 1/4 Section 19, T4N, R2W to Sun Valley Parkway in middle of Section 25 T4N, R3W
	Wash No. 7, Length: 1.8 miles
	Extending upstream from confluence with Trilby Wash in N.E. 1/4 of Section 30, T4N, R2W to Sun Valley Parkway in S.W. 1/4 Section 30, T4N, R2W.
	Wash No. 8 and Tributaries, Length: 2.5 miles
	Extending upstream from confluence with McMicken Dam 100-Year Floodpool El. at East Bdy. Section 33, T4N, R2W to Sun Valley Parkway at West Edge Section 32, T4N, R2W.
3H COORDINATION OF Q'S (Agency, date, comments)	Mr. John Pederson of the Corps of Engineers, L.A. District was contacted (by telephone) on November 28, 1990 regarding previous hydrology studies in area for use in coordinating peak discharges with S.V.P.N.F.I.S. study. Mr. Pederson sent three reports by U.S. Corps of Engineers that he considered relevant to study; Gila River Basin Hydrology, Design Memorandum No. 2 Parts 1 and 2 (2 separate reports/and Hydrologic and Hydraulic Design, Tribly Wash Detention Basin and Outlet Channel, Design Memorandum No. 1.
	The S.V.P.N.F.I.S. Hydrology Report discharges are compared to the results of the Wittman ADMS Study Report which in turn are compared to the results of the U.S. Army C.O.E. Hydrology Study for the Trilby Wash Detention Basin and Outlet channel.

ADDITIONAL STUDY INFORMATION

ITEM	DESCRIPTION/DISCUSSION
3H COORDINATION OF Q'S (Agency, date, comments) CONT'D	Hydrology Report Review Comments reviewed 2/26/91 from FCDMC - A-N West sent revised Report to FCDMC on 3/7/91 addressing comments.
4E UNIQUE CONDITIONS AND PROBLEMS	Two Private Stock Ponds occurred along study washes, one on Wash No. 1 (near Sec. 1.8929, N.) and one on Wash No. 4 (near Sec. 2.1477, Q). Each stock pond had a levee diverting flow to the stock pond, which was determined by the HEC-2 analysis to be over topped by the 100-year event. Therefore both stock pond levees were considered breached and non-effective for the floodplain analysis.
	Several armored levees occur upstream and along the Sun Valley Parkway. These levees are in the road right-of-way and subject to Maricopa County Highway Department maintenance. The levees were designed to accept weir flow over the levee and were therefore considered in-place and effective for the floodplain analysis.
	Several washes contain areas of shallow flooding characterized by small braided channels. The braiding channels generally vary in capacity along the length of the floodplain. In these areas of shallow flooding, the most dominate and direct alignment to the stream outlet was chosen to establish bank stations and for future floodway delineation analysis.
2A USGS QUAD SHEET(S)	White Tank Mts., S.E. and N.E. Arizona (Both 1959, Photo Rev. 1971). McMicken Dam, Arizona (1957, Photo Rev. 1981). Waddell, Arizona (1957, Photo Rev. 1971).
4E UNIQUE CONDITIONS AND PROBLEMS	As discussed in the Report Preface, the Zone AE floodplain and floodway delineation was deleted and an approximate Zone A floodplain was proposed and accepted by FEMA. This revision was made due to concerns by FFMA that unstable and shifting flow patterns and potential erosion/sedimentation did not warrent a detailed floodplain delineation by HEC-2 model and Zone AE.

Telephone Contact Log

Date	Contact Persons	Conversation Summary
11/28/90	Greg S. called John Pederson, COE, LA. District 213-894-4759	<p>- Greg asked John about Mc Micken Dam Hydrology Study.</p> <p>- John said he would look and send copy of above study if he could find. He would also send copy of Dam Breach Study if he could find.</p> <p>- John asked of methodology used to perform Hydrology for FIS. John said he sometimes gets hyd. reports to review on FIS studies and he would be more inclined to agree on study results if he had input at beginning.</p> <p>Greg said CN method proposed with kinematic wave and S-graph was proposed. John said LAPRE-1 program must also be proposed. Greg concurred.</p> <p>John suggested that for FIS purposes where peak Q is desired for 100-year runoff, he would normally try to adjust precip. loss rate to fit stream gage data. In lieu of stream-gage data we (A-N West) could try to adjust CN numbers (as Greg proposed) to fit historic storm such as 1951 storm or COE enveloping curves.</p>

Telephone Contact Log

Date	Contact Persons	Conversation Summary
11/28/90	Greg S call to John Pederson (continued)	<p>- John to send copy of Design Memo No. 1 by COE for Phx area. If he can find as this memo developed discharge-frequency curves for available gaged streams in Phx. area. If one can find a stream gage with similar hydrologic characteristics the discharge-frequency results from this gage can be used to adjust HEC-1 model for study.</p> <p>- John ^{said} the regression equations developed by Rouske for ADOT should be used with caution and care, (i.e. "more than grain of salt, a whole saltshaker")</p> <p>- The COE also developed regression equation according to John, although these regression equations are also very sensitive and should be used with caution. The equations are very sensitive to the interpretation of the 5-year - 24 hour precip. input value.</p>

Telephone Contact Log

Date	Contact Persons	Conversation Summary
11/28/90	Greg S. call to John Pederson (continued)	<p>- Greg indicated that he had plotted a number of resulting discharge values on the enveloping curve of maximum storms from C.O.F. D.M. for Phx. area.</p> <p>Greg felt that resulting 100-year values should not plot near the enveloping curve as this was thought to be closer to SPF or PMF values.</p> <p>John said that from his experience with the enveloping curve for Southern Calif., the 100-year discharges plotted about an inch below the enveloping curve (not the Creegor curve).</p>

Telephone Contact Log

Date	Contact Persons	Conversation Summary
10/29/91	Pedro Calza, FCDMC	- A-N West had got 9" x 9"
	called Greg Schuelke, A-N West for Progress Report on Sun Valley Parkway F.I.S.	contact prints from Cooper Aerial of Phx. from aerial Photography.
		- Field Survey and Global Positioning System (GPS) survey will be complete in one week for ground control points for aerial mapping
		- In process of evaluating structures (for capacity, split-flow detention) along Sun Valley Parkway
		- Mapping not anticipated for another 4 weeks at earliest.
		- Ran Wittman ADMS HEC-1 model for later comparison to Study results

11/3/92

Re: Sun Valley Parkway N. FIS,

G.S. called John Magrulli FEMA 202 646-3932

Asked about FEMA requirements for resubmittal of approx.

A zones for Sun Valley. Will just tie maps
surface with approx. A zone limits?

11/3/92

G.S. called Pedro Colza to coordinate FCP

7158-01 Sun Valley Parkway FIS.

11/6/92 Royce of Michael Baker Engr.
called ^{6:15} back regarding resubmitted requirements
for Zone A flood plains per FEMA 10/26/92
review comments.

- No hydraulic data needs be resubmitted.
- Can just be marked up copy of previous submitted
but should include in Zone A all those areas that
could be flooded as indicated by their letter and
aerial photography

Memo To File

TDN SEC. 1.3

Progress Meeting

Project: Sun Valley Parkway N. FIS

Date: 11/28/90

Attendance: Pedro Calza - FCD MC

Sandy Shillito - FCD MC

Greg Schuelke - A-N West

- Greg passed out meeting agenda and attached data including:
 - a.) summary of data collection
 - b.) Structure summary and comparison of preliminary 100-year FIS Qs to Sun Valley Parkway design 100 Year Qs
 - c.) Comparison of Preliminary FIS Qs to Withman ADMS study
 - d.) Comparison of Prelim. FIS. Q's to COE Enveloping Curve of Phx Area Maximum Storms
- Regarding Base Map Format, Pedro requested that Date Flown Be Placed on Mapping
- Regarding Data Collection and Aerial Photography, Pedro indicated that ACME Blueprint of Phoenix has ortho-photo coverage of all areas that quadrangles cover.
- Greg went over prelim. Hyd. report Figures, noted difference in Soils types from Withman ADMS study

Memo To File
Progress Meeting (Continued)

Project. S. V. P. N. F. I. S

Date 11/28/90

- Greg gave Pedro copy of HEC-1 model on computer floppy disk (SUNVPI.DAT) and backup calcs. for divers, culvert rating curves, storage routing and channel routing.
- Greg gave Pedro copy of sheet layout, limits of new, and existing Wittman ADMS mapping, and floodplain and discussed plan for matching 4' C.I. Wittman ADMS mapping to new A-N West 2' C.I. mapping.

SUN VALLEY PARKWAY NORTH FLOOD INSURANCE STUDY

PROGRESS MEETING AGENDA

DATE: 11/28/90

1. Summary of Data Collection.
2. Topographic Mapping - Mapping Limits and Sheet Layout
- Sample Sheet Title Block Layout
3. Hydrology:
 - o Base Maps - Figure 1 - Watershed Area Map
- Figure 2 - Current Land Use Map
- Figure 3 - Hydrologic Soils Groups
- Figure 4 - Drainage Area Map
- Figure 5 - HEC-1 Schematic
 - o Preliminary Curve Numbers - D Soil - 86
(Based on Wittman ADMs) - C Soil - 81
- B Soil - 72
 - o Cover Survey Indicates - 25 to 35% Cover Density
 - o Comparison of Preliminary HEC-1 Results - To Sun Valley Parkway
- To Wittman ADMS
- To COE Enveloping Curve

SUMMARY OF DATA COLLECTION
FOR SUN VALLEY PARKWAY NORTH
FLOOD INSURANCE STUDY

CONTRACT: FCD 90-04
STUDY CONTRACTOR: A-N West, Inc.
DATA COLLECTION SUMMARY THROUGH 11/5/90

1. a) Sun Valley Parkway Grading, Drainage, and Paving Plans, Phase 1A (39 sheets), Sta. 0+00 to 370+00 by Collar, Williams & White Engineering, dated March 30, 1987.
b) Sun Valley Parkway Drainage Enhancement Plan, Phase IIB (30 sheets) by Collar, Williams & White Engineering, dated October 27, 1988.
c) Sun Valley Parkway Paving Plans, Phase 1B (15 sheets) Station 370+00 to 491+98 by Collar, Williams & White Engineering, dated March 30, 1987.
2. Drainage Report, Sun Valley Parkway Phase I, Maricopa County, Arizona, CW No. 850840-6, Prepared for The Adams Group, Prepared by Collar, Williams & White Engineering, dated March 30, 1987.
3. Wittman Area Drainage Master Study, Part A, Hydrology and Hydraulics, Prepared for the Flood Control District of Maricopa County, Prepared by The WLB Group, Inc., dated March 10, 1989.
4. Floodplain Maps, Nos. MC-2, 5, 6, 9, 13, and 14 of 100-Year Floodplain along Trilby Wash, 400-Scale, 4-foot C.I. by The WLB Group, Inc. and Cooper Aerial Survey Co. for Flood Control District of Maricopa County, date flown 12/11/86.
5. "Soil Survey of Maricopa County, Arizona Central Part," Prepared by United States Department of Agriculture, Soil Conservation Service in cooperation with University of Arizona Agricultural Experiment Station.
6. "Soil Survey of Aguila - Carefree Area, Parts of Maricopa and Pinal Counties, Arizona," Prepared by United States Department of Agriculture, Soil Conservation Service in cooperation with Bureau of Indian Affairs, Bureau of Land Management and Arizona Agricultural Experiment Station. Soil Survey compiled in 1978, Report Issued April, 1986.
7. Topographic Maps, by United States Geological Survey 7.5 Minute Series: White Tank Mountains N.E. Arizona, 1957 (Photo revised 1971), White Tank Mountains S.E. Arizona, 1957 (Photo revised 1971), McMicken Dam, Arizona, 1957 (Photo revised 1981), Waddell, Arizona 1957 (Photo revised 1971).
8. Aerial Photography by Landis Aerial Surveys, Scale: 1" = 1,200 feet, Date Flown: Nov. 20 and Dec. 11, 1987, Photo Nos. J-8, 9, and 10, and K-8 and 10.

Summary of Data Collection
Page 2

9. Topographic Mapping, 1/4 Section Mapping, Scale: 1" = 100', 1-foot C.I., Date Flown: 1987, Prepared for The Adams Group, was reviewed at the Office of the Flood Control District of Maricopa County on October 4, 1990. Several Maps with I.D. Nos. 15-12, 16-12, 17-12, 18-12, and 19-12 were Noted to Provide Topographic Coverage Adjacent to the Western Drainage Area Boundary of the Study, but did not provide useful information for the Sun Valley Parkway North FIS.

The articles of the first submittal for the Sun Valley Parkway North FIS have been reviewed. Please review the following comments:

I. HEC-1 Model

1. Could we please have a copy of the HEC-1 on floppy disc to further review the schematics of this model.
2. Route DIV091 before combining with SUB13. ✓
3. Please include the parameter *DIAGRAM for the schematic of this model in the HEC-1. ✓
4. When we receive the HEC-1 floppy and the concentration points on the delineated map further review of the routed reaches will be done.

II. Delineated Boundary Map

5. Please label all concentration points on the delineated map.
6. Please indicate flow paths for each subbasin. } on larger D.A. on Fig. 4.
7. Please indicate routed reaches.
8. The upper boundary of SUB9 should be checked and corrected.
9. The upper boundary of SUB50 with the boundary of SUB52 should be checked and corrected.
10. Please recheck the area for SUB48 it seems too large. - 0.56

III. Calculation Sheets - for rating curves, split flow, and storage basins

11. The rating curve calculations, split flow calculations, and storage calculations seem adequate although individual calculations have not been checked.
12. When assuming a percentage of split flow, please justify with an explanation.

The delineated watershed map (figure 5) was reviewed, but further analysis will be done when we receive a copy of the HEC-1 on floppy disc, and when the concentration points are placed on the delineated map - this will make it easier to follow when reviewing. The watershed area map (figure 1), current land use map (figure 2), and hydrologic soils group map (figure 3), were also reviewed and seem adequate.

Flood Control District of Maricopa County
3335 West Durango Street
Phoenix, Arizona 85009
(602) 262-1501

FAX # 269-4601

FAX COVER SHEET
LEGAL CORRESPONDENCE

TO: GREG SCHUELKE
COMPANY OR DEPT. A-NWEST FAX # 943-1989
FROM: PEDRO CALZA

NUMBER OF PAGES BEING SENT INCLUDING COVER SHEET: 2

IF THERE ARE ANY PROBLEMS, PLEASE CALL (602) 262-1501.

COMMENTS: GIVE AMIR A CALL IF YOU HAVE ANY QUESTIONS.

THE INFORMATION CONTAINED IN THIS FACSIMILE MESSAGE IS ATTORNEY/CLIENT PRIVILEGED AND CONFIDENTIAL INFORMATION INTENDED ONLY FOR THE USE OF THE INDIVIDUAL OR ENTITY NAMED ABOVE. IF THE READER OF THIS MESSAGE IS NOT THE INTENDED RECIPIENT, OR THE EMPLOYEE OR AGENT RESPONSIBLE TO DELIVER IT TO THE INTENDED RECIPIENT, YOU ARE HEREBY NOTIFIED THAT ANY DISSEMINATION, DISTRIBUTION, OR COPYING OF THIS COMMUNICATION IS STRICTLY PROHIBITED. IF YOU HAVE RECEIVED THIS COMMUNICATION IN ERROR, PLEASE IMMEDIATELY NOTIFY US BY TELEPHONE, AND RETURN THE ORIGINAL MESSAGE TO US AT THE ABOVE ADDRESS VIA THE U.S. POSTAL SERVICE. THANK YOU.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Interoffice Memorandum

Subject: Review Comments

File: Sun Valley Parkway FIS

To: PAC ~~AMH~~

From: SS

Date: 2/26/91

Via: AMH ~~AMH~~

The review of the Sun Valley Parkway North Flood Insurance Study Hydrology Report has been done. A few minor comments concerning the written report are as follows:

- ✓ 1. Need to state the version of HEC-1 on page 3 of the written report.
- ✓ 2. Need a vicinity map.
3. The figure numbers within the document are mixed matched. Please check these.
- ✓ 4. See page 7 and 14. It seems that the definition of the overland flow length element is conflicting, please define this more clearly.
- ✓ 5. Please state the duration of flooding on page 13.
6. All the appendices need titles.
7. Please sort the information in Appendix A further.
8. All maps in the Appendices need title blocks.

Magnus 3011

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

INTEROFFICE MEMORANDUM

Rev
7/17/91
TDN SEC 1.3

To: PAC
Via:

From: MRJ

Date: 7/15/1991

SUBJECT FLOOD INSURANCE STUDY OF SUN VALLEY PARKWAY BY A-N WEST INC.

OBJECTIVES TO REVIEW THE HEC-2 ANALYSIS OF SUN VALLEY PARKWAY NORTH

I have reviewed the subject Sun Valley parkway North. And here are my review comments:

General Comments:

- Floodplain Delineation is not done for map # 7,8,9, and 10
- Proper Bridge routine must be used to represent the bridge structure. (eg) Special Bridge with SB card, and Special Culvert with SC card.
- BT card is required in both Special Bridge, and Special Culvert to define the weir flow.

SHEET BY SHEET COMMENTS:

- On sheet # 2 and 3, the Floodplain need to be tied together.
- The cross-sections on the Sun Valley Packway appeared too confusing. We need to simplify sheets # 4, 5, and 6.

WASH # 1-7

Over topping observed in x-sec: 2.004, and 12.510

WASH # 2-4

Over topping in x-sec 12.013

WASH # 3-4

Why is the Floodplain bank stationing blocked with ET card in x-sec. 21.890

WASH # 4-6

- Modify the following Channel Bank stations in x-sec .273, .689, .795, .917, 1.038, 2.148, and 2.204
- Over-topping observed in x-sec: .159, 22.657, and 62.127
- Why is the Floodplain bank stationing blocked with ET card in x-sec: 2.750, 12.725, and 22.657
- The following sections exceed 1.0 Foot for difference in WSEL: .917, 1.413, 2.523, 22.523, 51.980, and -1.413

Wash 4-6
5.980 - 210 Rise

WASH # 5-0

-Need to modify the Channel Bank stationing in .153, and 11.283

-Extended WSEL in x-sec: 1.110, 1.263, and 1.361

-Why is the Floodplain bank stationing blocked with ET card in x-sec: .059, 1.110, 1.263, and 1.396

-Cross-section .775 exceed 1.0 Foot for difference in WSEL.

WASH # 6-0

-Why is the Floodplain Bank stationing blocked with ET card in x-sec: .254, 1.134, and 11.139

-Cross-section .617 exceed 1.0 Foot for difference in WSEL.

This Form Letter
Sent To Property
Owners Within Mapping
Limits According To
Attached Maricopa County
Assessors Files

August 7, 1990

To Whom It May Concern:

A-N West, Inc., a Phoenix consulting engineering firm, has been selected by the Flood Control District of Maricopa County to conduct a floodplain study of an area extending from Sun Valley Parkway north 2 miles and extending west from the Beardsley Canal approximately 10 miles.

During the course of conducting this study, it will be necessary for us to perform ground surveys to support the aerial photography used in mapping the study area.

These ground surveys consist of placing control points at various locations throughout the project area and conducting surveys to determine their location.

We anticipate that the field work will take place during the last two weeks of August and continue through September.

If you have any questions or concerns regarding this project, please feel free to direct your inquiry to Mr. Greg A. Schuelke, P.E., Project Manager or Mr. Ronald L. Vogel, R.L.S., Survey Supervisor at (602) 861-2200. If we do not receive notification from you objecting to right-of-entry, we will assume that permission is granted.

Sincerely,

A-N WEST, INC.



Ronald L. Vogel, R.L.S.
Survey Supervisor

RLV/jk



TDM 1.4.3

7600 NORTH 15TH STREET
SUITE 200
PHOENIX, ARIZONA 85020
(602) 861-2200

Letter of Transmittal

TO: Flood Control District of Maricopa County DATE: November 12, 1992
2801 West Durango Street JOB TITLE: _____
Phoenix, Arizona 85009 JOB NO.: _____

ATTN: Mr. Pedro Calza RE: Sun Valley Parkway North FIS
Mr. Greg Schuelke FCD No. 90-04

FROM: _____

WE ARE SENDING YOU ATTACHED VIA Mail
 UNDER SEPARATE COVER

THE FOLLOWING ITEMS:

- SPECIFICATIONS ORIGINALS COPY OF LETTER
- SHOP DRAWINGS PRINTS REPORT
- PLANS SAMPLES OTHER _____

QUAN.	I.D./DWG. NO.	TITLE/DESCRIPTION
1		Blue lines of Zone A floodplain revision of November 10, 1992

THESE ARE TRANSMITTED FOR REVIEW FOR YOUR USE AS REQUESTED
 OTHER _____

REMARKS: Per our meeting of November 12, we are herewith transmitting another set
of blue lines of the revised Zone A floodplains for the referenced project.

REC'D. BY: _____ DATE: _____

COPY TO: Files WITH ENCLOSURES

17

Letter of Transmittal

TO: Flood Control District of Maricopa County DATE: June 12, 1992
2801 West Durango Street JOB TITLE: _____
Phoenix, Arizona 85009 JOB NO.: ANW #7158-01
 RE: Sun Valley Parkway N, FIS FCD No. 90-04
FEMA Case No. 92-09-081P

ATTN: Mr. Pedro Calza

FROM: Greg Schuelke

WE ARE SENDING YOU ATTACHED UNDER SEPARATE COVER VIA Mail

THE FOLLOWING ITEMS:

- SPECIFICATIONS
- SHOP DRAWINGS
- PLANS
- ORIGINALS
- PRINTS
- SAMPLES
- COPY OF LETTER
- REPORT
- OTHER _____

QUAN.	I.D./DWG. NO.	TITLE/DESCRIPTION
2		Review Comment Response Letter, A-N West to FEMA
1	Attachment B	U.S.G.S. Quad Maps McMicken Dam/White Mtns, N.E.
1	Attachment A	Orthophoto Maps of Above Coverage
2	Attachment C	2000 Scale overlay of floodplain delineations
1	Attachment D	400 Scale Aerial Photo BlueLines with Floodplain delinations
2	Attachment E	Cross-Section Plots Main Wash Nos. 2, 4, 5 and 6

THESE ARE TRANSMITTED FOR REVIEW FOR YOUR USE AS REQUESTED
 OTHER _____

REMARKS: Pedro, Attached is a copy of our proposed response to FEMA review comments
on the referenced project for your review. If you approve, please send one copy of all
data on to FEMA. If you would like another copy of Attachments A, B, & D for your
records, please let me know.

REC'D. BY: _____ DATE: _____

COPY TO: FILE WITH ENCLOSURES

Letter of Transmittal

TO: Flood Control District of
Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009

DATE: November 4, 1991
JOB TITLE: _____
JOB NO.: ANW #7158-01
RE: Sun Valley Parkway N. F.I.S. FCD No. 90-04

ATTN: Mr. Pedro Calza
FROM: Greg Schuelke

WE ARE SENDING YOU ATTACHED VIA Delivery
 UNDER SEPARATE COVER

THE FOLLOWING ITEMS:

- | | | |
|---|------------------------------------|---|
| <input type="checkbox"/> SPECIFICATIONS | <input type="checkbox"/> ORIGINALS | <input type="checkbox"/> COPY OF LETTER |
| <input type="checkbox"/> SHOP DRAWINGS | <input type="checkbox"/> PRINTS | <input type="checkbox"/> REPORT |
| <input type="checkbox"/> PLANS | <input type="checkbox"/> SAMPLES | <input type="checkbox"/> OTHER _____ |

QUAN.	I.D./DWG. NO.	TITLE/DESCRIPTION
2		FEMA FIRM Mapping with proposed Sun Valley Parkway N. F.I.S. Floodplain/Floodway S uperimposed (3 sheets - 1000 scale).

THESE ARE TRANSMITTED FOR REVIEW FOR YOUR USE AS REQUESTED
 OTHER _____

REMARKS: Pedro: Per your request of 11/1/91, we have superimposed the proposed
floodplain/floodway on existing FEMA FIRM mapping.

Greg Schuelke

REC'D. BY: _____ DATE: _____

COPY TO: File WITH ENCLOSURES

October 22, 1991

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

Re: Sun Valley Parkway FIS
Contract No. FCD 90-04

Attn: Mr. Pedro Calza, Project Manager

Dear Mr. Calza:

Pursuant to our telephone conversation of October 16, 1991 we are herewith transmitting two draft final copies of the Flood Insurance Study packages for subsequent submittal to FEMA and ADWR summarized below.

- 2 Copies Technical Data Notebook
- 2 Copies Hydrology Report and Appendix G (HEC-1 Input/Output Hard Copy and HEC-1 Input on Floppy Disk)
- 2 Copies Flood Insurance Study Report and Appendix A (HEC-2 Input/Output Hard Copy and HEC-2 Input on Floppy Disk)
- 2 Copies Exhibit 3 - Flood Insurance Rate Map Bluelines (12 sheets).

The Technical Data Notebook references the Hydrology Report and Flood Insurance Study Report for pertinent information and likewise these reports and their separate appendices are referenced to the Technical Data Notebook Section Numbers.

We have made the following revisions since our September 6, 1991 submittal to the District:

1. Added Flood Hazard Zones to Maps per District Comment.
2. Added paragraph in FIS report, explaining HEC-2 output reference to extended cross-section on Wash No. 6 per District Comment.
3. Added reference in FIS report of study being part of Town of Surprise.
4. Added Paragraph to FIS report regarding use of effective area option (ET) at cross-sections near Parkway to limit effective flow at expansion and contraction of floodplain.
5. Made change in FIS report and exhibits changing vertical datum reference from NGVD 1983 to NGVD 1929.

Flood Control District of
Maricopa County

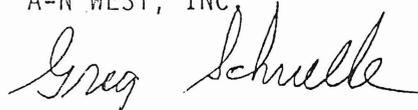
October 22, 1991
Page 2

It is our understanding the District will submit one copy each of these reports to FEMA and the ADWR for their review and approval A-N West will be on-hold awaiting approval and be available to respond to comments.

Should you have any questions, please feel free to call.

Sincerely,

A-N WEST, INC.



Greg A. Schuelke, P.E.
Vice President
Project Manager

GAS/kjb

TDW SEC 1.4.3



7600 NORTH 15TH STREET
SUITE 200
PHOENIX, ARIZONA 85020
(602) 861-2200

Letter of Transmittal

TO: Arizona Department of Water Resources
Floodplain Management Section
15 South 15th Avenue
Phoenix, Arizona 85007

DATE: July 23, 1991

JOB TITLE: _____

JOB NO.: ANW 7158001

RE: Sun Valley Parkway North FIS

ATTN: Mr. David Creighton, P.E.

FROM: Greg Schuelke

WE ARE SENDING YOU ATTACHED UNDER SEPARATE COVER VIA Delivery

THE FOLLOWING ITEMS:

- SPECIFICATIONS
- SHOP DRAWINGS
- PLANS
- ORIGINALS
- PRINTS
- SAMPLES
- COPY OF LETTER
- REPORT
- OTHER _____

QUAN.	I.D./DWG. NO.	TITLE/DESCRIPTION
1	Feb. 1973	Roughness Coefficients for Streams Channels in Arizona

THESE ARE TRANSMITTED FOR REVIEW FOR YOUR USE AS REQUESTED OTHER _____

REMARKS: Thanks for the loan of the report.

REC'D. BY: _____ DATE: _____

COPY TO: _____ 22 WITH ENCLOSURES

7600 NORTH 15TH STREET
SUITE 200
PHOENIX, ARIZONA 85020
(602) 861-2200

Letter of Transmittal

TO: U.S. Army Corps of Engineers
Room 6040
300 N. Los Angeles St.
P.O. Box 2711, Los Angeles Ca. 90053
ATTN: Mr John Pedersen, PE
FROM: Greg Schuelke

DATE: 12/10/90
JOB TITLE: _____
JOB NO.: 5482-01 7158-01
RE: Tribby Wash at Mc Mickem Dam
- 2325

WE ARE SENDING YOU ATTACHED UNDER SEPARATE COVER VIA Mail

THE FOLLOWING ITEMS:

- SPECIFICATIONS
- SHOP DRAWINGS
- PLANS
- ORIGINALS
- PRINTS
- SAMPLES
- COPY OF LETTER
- REPORT
- OTHER _____

QUAN.	I.D./DWG. NO.	TITLE/DESCRIPTION
1		Gila River Basin Hydrology Part 2, D.M. #2
1		" " " " Part 1, D.M. #2
1		Hydrology & Hydraulic Design Tribby Wash Detention Basin and Outlet Channel D.M. #1

THESE ARE TRANSMITTED FOR REVIEW FOR YOUR USE AS REQUESTED OTHER _____

REMARKS: Dear Mr Pederson, I am returning the documents
you sent over on loan. I have made a copy for use in
our current project and for future reference. Thanks

REC'D. BY: _____ DATE: _____

COPY TO: File 23 WITH ENCLOSURES



Federal Emergency Management Agency

Washington, D.C. 20472



645

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 93-09-262P

The Honorable Roy Villanueva
Mayor, Town of Surprise
12604 Santa Fe Drive
Surprise, Arizona 85374

Community: Maricopa County, Arizona
and Incorporated Areas
FIRM Panel Numbers: 04013C1115 E,
1105 E, 1120 E,
1140 E

Effective Date
of This Revision: **APR 15 1993**

102A

Dear Mayor Villanueva:

This is in response to a letter dated February 3, 1993, from Mr. Ron Nevitt, Floodplain Representative, Flood Control District of Maricopa County, regarding the effective Flood Insurance Rate Map (FIRM) for Maricopa County, Arizona and Incorporated Areas. With his letter, Mr. Nevitt submitted additional data to support his January 20, 1992, request for a Letter of Map Revision (LOMR). Mr. Nevitt requested that we change the zone designation shown on the effective FIRM from Zone X (areas of 500-year flooding or areas of 100-year flooding with average depths of less than 1 foot, or with drainage areas of less than 1 square mile) to Zone A to show the results of hydrologic and hydraulic analyses along Washes 1 through 8, downstream of Sun Valley Parkway. All of the data required to complete our review of this request were submitted with Mr. Nevitt's letters dated between January 20, 1992, and February 3, 1993, and letters dated between February 27, 1992, and November 10, 1992, from Mr. Greg A. Schuelke, P.E., A-N West, Inc.

It is our current policy to exempt fee requirements for requests that incorporate a Special Flood Hazard Area (SFHA) along a watercourse that had not previously shown any SFHA. Because this request is of this nature, the fees associated with our review and processing have been waived.

We have completed our review of the submitted data, and have revised the FIRM to show the 100-year floodplain boundary delineations and a change in the zone designation from Zone X to Zone A along Washes 1 through 8.

These modifications are shown on the enclosed annotated copies of FIRM Panels 04013C1105 E, 1115 E, 1120 E, and 1140 E. This LOMR hereby revises these panels of the effective FIRM dated September 4, 1991. The modifications will be incorporated into FIRM panels for Maricopa County, Arizona and Incorporated Areas, scheduled to become effective September 30, 1993.

These modifications have been made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and is in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR, Part 65.

As required by the legislation, a community must adopt and enforce floodplain management measures to ensure continued eligibility to participate in the National Flood Insurance Program (NFIP). Therefore, your community must enforce these regulations using, at a minimum, the base flood elevations, zone designations, and floodways in the SFHAs shown on the FIRM and Flood Boundary and Floodway Map for your community, including the previously described modifications.

This response is based on minimum floodplain management criteria established under the NFIP. With knowledge of local conditions and in the interest of safety, State and community officials may set higher standards for construction, or may limit development in floodplain areas. If the State of Arizona or Maricopa County has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP requirements.

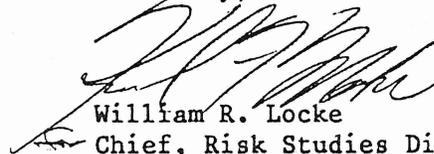
The community number and suffix code listed above will be used for all flood insurance policies and renewals issued for your community on and after the effective date listed above.

The modifications described herein are effective as of the date of this letter. However, a review of the modifications and any requests for changes should be made within 30 days. Any request for reconsideration must be based on scientific or technical data.

This LOMR will not be printed and distributed to primary map users such as local insurance agents and mortgage lenders; therefore, your community will serve as a repository for these new data. We encourage you to disseminate the information reflected by this LOMR widely throughout your community in order that interested persons, such as property owners, insurance agents, and mortgage lenders, may benefit from this information. We also encourage you to consider preparing an article for publication in your community's local newspaper that would describe the changes that have been made and the assistance your community will provide in serving as a clearinghouse for these data and interpreting NFIP maps.

If you have any questions regarding the modifications described herein, please contact the Chief, Natural and Technological Hazards Division, Federal Emergency Management Agency, in San Francisco, California, at (415) 923-7175, or Mr. John Magnotti of my staff in Washington, DC, at (202) 646-3932, or by facsimile at (202) 646-3445.

Sincerely,



William R. Locke
Chief, Risk Studies Division
Federal Insurance Administration

Enclosures

cc: Mr. Ron Nevitt
Floodplain Representative
Flood Control District of
Maricopa County
Mr. Greg A. Schuelke, P.E.
Vice President, A-N West, Inc.



Federal Emergency Management Agency

Washington, D.C. 20472

T.D.N. 1.4.5

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable Jim Bruner
Chairman, Maricopa County
Board of Supervisors
County Administration Building
301 West Jefferson, Tenth Floor
Phoenix, Arizona 85003

IN REPLY REFER TO:
Case No.: 93-09-262P

Community: Maricopa County, Arizona
and Incorporated Areas
FIRM Panel Numbers: 04013C1105 E,
1115 E, 1120 E,
and 1140 E

Effective Date
of This Revision: **APR 15 1993**

102A

Dear Mr. Bruner:

This is in response to a letter dated February 3, 1993, from Mr. Ron Nevitt, Floodplain Representative, Flood Control District of Maricopa County, regarding the effective Flood Insurance Rate Map (FIRM) for Maricopa County, Arizona and Incorporated Areas. With his letter, Mr. Nevitt submitted additional data to support his January 20, 1992, request for a Letter of Map Revision (LOMR). Mr. Nevitt requested that we change the zone designation shown on the effective FIRM from Zone X (areas of 500-year flooding or areas of 100-year flooding with average depths of less than 1 foot, or with drainage areas of less than 1 square mile) to Zone A to show the effects of new hydrologic and hydraulic analyses along Washes 1 through 8, downstream of Sun Valley Parkway. All of the data required to complete our review of this request were submitted with Mr. Nevitt's letters dated between January 20, 1992, and February 3, 1993, and letters dated between February 27, 1992, and November 10, 1992, from Mr. Greg A. Schuelke, P.E., A-N West, Inc.

It is our current policy to exempt fee requirements for requests that incorporate a Special Flood Hazard Area (SFHA) along a watercourse that had not previously shown any SFHA. Because your request is of this nature, the fees associated with our review and processing have been waived.

We have completed our review of the submitted data, and have revised the FIRM to show the 100-year floodplain boundary delineations and a change in the zone designation from Zone X to Zone A along Washes 1 through 8.

These modifications are shown on the enclosed annotated copies of FIRM Panels 04013C1105 E, 1115 E, 1120 E, and 1140 E. This LOMR hereby revises these panels of the effective FIRM dated September 4, 1991. These modifications will be incorporated into FIRM panels for Maricopa County, Arizona and Incorporated Areas, scheduled to become effective September 30, 1993.

These modifications have been made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and is in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR, Part 65.

As required by the legislation, a community must adopt and enforce floodplain management measures to ensure continued eligibility to participate in the National Flood Insurance Program (NFIP). Therefore, your community must enforce these regulations using, at a minimum, the base flood elevations, zone designations, and floodways in the SFHAs shown on the FIRM and Flood Boundary and Floodway Map for your community, including the previously described modifications.

This response is based on minimum floodplain management criteria established under the NFIP. With knowledge of local conditions and in the interest of safety, State and community officials may set higher standards for construction, or may limit development in floodplain areas. If the State of Arizona or Maricopa County has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP requirements.

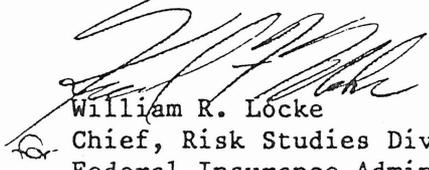
The community number and suffix code listed above will be used for all flood insurance policies and renewals issued for your community on and after the effective date listed above.

The modifications described herein are effective as of the date of this letter. However, a review of the modifications and any requests for changes should be made within 30 days. Any request for reconsideration must be based on scientific or technical data.

This LOMR will not be printed and distributed to primary map users such as local insurance agents and mortgage lenders; therefore, your community will serve as a repository for these new data. We encourage you to disseminate the information reflected by this LOMR widely throughout your community in order that interested persons, such as property owners, insurance agents, and mortgage lenders, may benefit from this information. We also encourage you to consider preparing an article for publication in your community's local newspaper that would describe the changes that have been made and the assistance your community will provide in serving as a clearinghouse for these data and interpreting NFIP maps.

If you have any questions regarding the modifications described herein, please contact the Chief, Natural and Technological Hazards Division, Federal Emergency Management Agency, in San Francisco, California, at (415) 923-7175, or Mr. John Magnotti of my staff in Washington, DC, at (202) 646-3932, or by facsimile at (202) 646-3445.

Sincerely,



William R. Locke

Chief, Risk Studies Division
Federal Insurance Administration

Enclosures

cc: Mr. Ron Nevitt
Floodplain Representative
Flood Control District of
Maricopa County

Mr. Greg A. Schuelke, P.E.
Vice President
A-N West, Inc.



TDM 1.4.5

Federal Emergency Management Agency

Washington, D.C. 20472

(202) 646-2770



CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
65-ACK

Mr. Ron Nevitt
Floodplain Representative
Flood Control District,
Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009

Date: February 7, 1992
Case Number: 92-09-0811P
Re: Sun Valley Parkway Area
Community: Maricopa County, Arizona,
and incorporated areas

Dear Mr. Nevitt:

This is to acknowledge acceptance of your request for a revision to the Flood Insurance Rate Map and/or Flood Boundary and Floodway Map for the referenced community. Our preacceptance review of the request indicates that we have the minimum data we need to begin our evaluation. If we need additional data to complete our evaluation, or if delays are encountered, we will notify you in writing within 30 days of the date of this letter.

If you write to us about your request, please include the case number (shown above) in your letter. If you have any questions about the status of your revision request, please call Michael Baker, Jr., Inc., our Technical Evaluation Contractor, at (703) 960-8800, and ask for the Revisions Coordinator for your state.

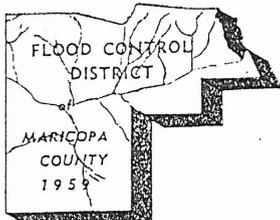
Sincerely,

William R. Locke
Chief, Risk Studies Division
Federal Insurance Administration

cc: The Honorable Roy Villanueva
Mayor, City of Surprise

The Honorable Betsey Bayless
Chairperson, Maricopa County
Board of Supervisors

Mr. Greg Scheulke, P.E.
Project Manager
A-N West, Inc.



FLOOD CONTROL DISTRICT

of

Maricopa County

2801 West Durango Street • Phoenix, Arizona 85009

Telephone (602) 506-1501

Fax (602) 506-4601

TDD (602) 506-5897

BOARD OF DIRECTORS

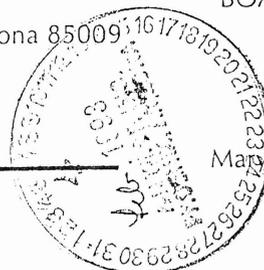
Betsy Bayless

James D. Bruner

Ed King

Tom Rawles

Mary Rose Garrido Wilcox



Neil S. Erwin, P.E., Chief Engineer and General Manager

February 3, 1993

William R. Locke
Chief, Risk Studies Division
Federal Insurance Administration
Federal Emergency Management Agency
Washington, D. C. 20472

Attn: Mr. John Magnotti:

Re: Case No. 92-09-081P
Sun Valley Parkway
Maricopa County, Arizona
FCD 90-04

Dear Mr. Locke:

Reference is made to your letter dated October 26, 1992 with review comments with the suggestion that if revisions along washes 1, 4, 5, 6, 7 and 8 are submitted, an Zone A designation, if warranted, may be shown on the FIRM.

In response we have attached additional information prepared by A-N West, Inc.

Should additional information be required, please contact either Mr. Greg A. Schuelke, P.E. of A-N West, Inc., (602) 861-2200, or Pedro Calza, Chief, Floodplain Management FCDMC at (602) 506-1501.

Sincerely,

Neil S. Erwin, P.E.
Floodplain Administrator

Ron Nevitt,
Floodplain Administration

Attachments

Copy to: Greg Schuelke, A-N West



Federal Emergency Management Agency

Washington, D.C. 20472

February 17, 1993



TDN 1.4.5

Mr. Ron Nevitt
Floodplain Representative
Maricopa County Flood Control
District
2801 West Durango Street
Phoenix, Arizona 85009

IN REPLY REFER TO:
Case No.: 93-09-262P (New)
Community: Maricopa County,
Arizona and
Incorporated Areas
Community No.: 04013C

316-ACK

Dear Mr. Nevitt:

This is in response to your request, dated February 3, 1993, for a revision to the Flood Insurance Rate Map (FIRM) for the above-referenced community. Pertinent information about the request is listed below.

Identifier:	Sun Valley Parkway
Flooding Source:	Washes 1 through 8
FIRM Panels Affected:	04013C1105 E, 04013C1115 E, 04013C1120 E, and 04013C1140 E
FBFM Panel(s) Affected:	N/A

On October 1, 1992, the Federal Emergency Management Agency (FEMA) implemented the use of detailed application and certification forms for requesting revisions or amendments to National Flood Insurance Program (NFIP) maps. These forms outline technical and NFIP-related considerations in a fashion that facilitates an efficient review.

We have completed an inventory of the information that you submitted. The items identified below are required before we can begin a detailed review of the request.

ITEM

- X 1. We have received all of the data we require to begin a detailed technical review of your request. If additional data are required, we will inform you within 30 days of the date of this letter.
- 2. We must receive the [remainder of the] initial fees, \$ _____, before we will begin our review. Payment must be in the form of a check or money order made payable to the National Flood Insurance Program. For identification purposes, the case number referenced above must be included on the check or money order.

Please forward this payment to:

Federal Emergency Management Agency
 Revisions Fee-Collection System Administrator
 P.O. Box 3173
 Merrifield, Virginia 22116

- ___ 3. Based on our initial review of your request, we have determined that the total processing costs will exceed [\$1,500/\$2,500/\$5,000]. Please provide written authorization for us to proceed with our review to a limit of \$_____.
- ___ 4. All applicable forms from the enclosed "Application/Certification Forms" package and the necessary supporting data, as described in the package instructions, must be submitted.
- ___ 5. The following forms, which were omitted from your previous submittal, must be provided:
- ___ a. Form 1, entitled "Revision Requestor and Community Official Form."
 - ___ b. Form 2, entitled "Certification by Registered Professional Engineer and/or Land Surveyor."
 - ___ c. Form 3, entitled "Hydrologic Analysis Form."
 - ___ d. Form 4, entitled "Riverine Hydraulic Analysis Form."
 - ___ e. Form 5, entitled "Riverine Mapping Form."
 - ___ f. Form 6, entitled "Channelization Form."
 - ___ g. Form 7, entitled "Bridge/Culvert Form." (one form per new/revised bridge/culvert)
- ___ 6. With this letter we are returning the original package indicating those forms that have not been completed in their entirety or on which data were requested. The item(s) that must be completed and/or statement(s) requesting data have/has been marked with an asterisk (*). Please revise and resubmit the form package.
- ___ 7. Other: _____

All required data (except the initial fees) and questions concerning your request are to be directed to our Technical Evaluation Contractor at the following address:

Michael Baker Jr., Inc.
 3601 Eisenhower Avenue
 Suite 600
 Alexandria, Virginia 22304
 (703) 960-8800

Attention: Mr. Massoud Rezakhani

When you write us about your request, please include the new case number referenced above in your letter.

If you have any questions concerning FEMA policy, or the NFIP in general, please contact Mr. Karl Mohr of our Headquarters staff in Washington, DC, at (202) 646-2770, or by facsimile at (202) 646-3445.

Sincerely,

William R. Locke

William R. Locke
Chief, Risk Studies Division
Federal Insurance Administration

Enclosures

cc: The Honorable Jim Bruner
Chairman, Maricopa County
Board of Commissioners

The Honorable Roy Villanueva
Mayor, City of Surprise

Mr. Greg A. Schuelke, P.E. ✓
Vice President
A-N West, Inc.

TDN1.4.5

A-N WEST INC.

Consulting Engineers

November 10, 1992

Mr. William R. Lock
Chief, Risk Studies Division
Federal Emergency Management Agency
FIA - RSD, Room 418
500 C Street S.W.
Washington, D.C. 20472

Re: Case No. 92-09-081 P Sun Valley Parkway,
Maricopa County, Arizona - FCDMC No. 90-04

Dear Mr. Lock:

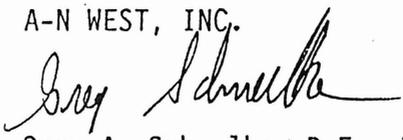
This letter is in response to review comments received from FEMA in a letter dated October 26, 1992, on the referenced project floodplain delineation study. In this letter FEMA indicated that the washes, Nos. 1-8 for this project, were not considered appropriate for detailed flood hazard Zone AE designation. FEMA further stated that these washes would be considered for a Zone A flood hazard designation if potential flood flow breakouts indicated in the letter were included within these floodplain limits.

In subsequent telephone conversations with Michael Baker, Jr. representatives, A-N West was told that detailed HEC-2 analysis for the approximate floodplain zone submittal would not be necessary and that a marked up copy of the previous submitted work maps showing the approximate Zone A limits would be adequate for a resubmittal.

We are herewith resubmitting the 200 scale mapping revised as of November 10, 1992, showing the proposed Zone A floodplains for Wash Nos. 1-8 for your further review. Should you have additional questions regarding this matter, please contact us.

Sincerely,

A-N WEST, INC.



Greg A. Schuelke, P.E., R.L.S.
Vice President
Project Manager

GAS/s1

Note: A-N west delivered this letter to FCD for forwarding by FCD to FEMA

cc: Mr. Ron Nevitt, FCDMC
Mr. Pedro Calza, FCDMC

enclosure



Federal Emergency Management Agency

Washington, D.C. 20472

OCT 26 1992



CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Stanley L. Smith Jr., P.E.
Acting Floodplain Administrator
Flood Control District of
Maricopa County
2801 West Durango Drive
Phoenix, Arizona 85009

Dear Mr. Smith:

With a letter dated June 16, 1992, Mr. Ron Nevitt of your staff, provided additional information regarding a Letter of Map Revision (LOMR) request for the Sun Valley Parkway area in the Town of Surprise and the unincorporated areas of Maricopa County. The basis of the LOMR request is detailed hydrologic and hydraulic analyses for eight washes (i.e. Washes 1 through 8) located north of the White Tank Mountains extending between Sun Valley Parkway and Tribby Wash. The additional information was submitted in reference to the following concerns we discussed in our May 11, 1992, letter:

- The potential for breakouts of flows from the main paths which were analyzed.
- Shifting of the flow within the delineated floodplain boundaries.
- Applicability of erosion/sediment transport analysis for the project site.

With a letter dated June 12, 1992, from Mr. Greg A. Schuelke, P.E., Vice President, A-N West, Inc., Consulting Engineers, comments were provided on each wash regarding potential breakouts and shifting of flow within the floodplain delineations. It was acknowledged that shifting of flow within floodplain delineations may be valid for the upper reaches of Wash 1 (i.e. Section N upstream to Sun Valley Parkway North) and for most of Washes 7 and 8. For these three washes, it was recommended to show the Special Flood Hazard Areas (SFHAs) designated as Zone A rather than Zone AE. Wash 3 was believed to be a very well-defined channel with no potential breakouts. Washes 2, 4, 5, and 6 were discussed individually, and generally it was stated that flow distribution shifts do not seem unreasonable and that any flooding which may result from breakout flows were not expected to be of significant quantity or depth, except between Cross Sections "Q" and "R" along Wash 4, for which additional approximate Zone A delineations were submitted.

In response to our concerns for possible erosion or sediment deposition in this area, orthophoto quadrangle maps dated June 1971, USGS quadrangle maps flown 1957, and aerial photo blueines flown September 23, 1990, were submitted. It was stated that comparison of the aerial photos and contour mapping shows that the wash alignments have not changed significantly within the 20 to 35 years of record provided by those maps.

We have reviewed the submitted additional data and comments regarding our concerns. Specifically, our further review of the aerial photo blue lines submitted with the June 12, 1992, letter indicated that there is a potential for breakouts of flows outside of the 100-year floodplain boundary delineations along Washes 1 and 4. Cross Sections 1.263, 1.11, 0.92, .866, .775, .640, .518, and .418 along Wash 5, Cross Sections .366 and .498 along Wash 6, Cross Sections 1.377, 1.63, 1.672, and 1.718 along Wash 7, and Cross Sections 1.601, 1.495, 1.668, 1.73, 1.808, 1.86, 2.072, and 2.112 along Wash 8, indicated areas of potential breakouts and overtopping of adjacent ridges.

In addition, based on our review, the analyzed washes do not represent stable channels and during a 100-year flood event flow could possibly leave the modeled washes and take different paths from those which were modeled. Therefore, the Flood Insurance Rate Map (FIRM) cannot be revised to show detailed Zone AE designations on any of these washes.

However, our review of floodplain delineations for Washes 2 and 3 determined that these boundaries are acceptable to show as Zone A SFHAs. If revised 100-year floodplain boundaries along Washes 1, 4, 5, 6, 7, and 8 are submitted, which include the areas subject to breakouts, then, if warranted, the FIRM would be revised to show a Zone A designation on all eight washes. Please note that the FIRM will not be revised to show the Zone A boundaries for only Washes 2 and 3.

The revised 100-year floodplain boundary delineation for Washes 1 and 4 through 8 must be submitted by January 1, 1993, so that they may be incorporated into the preliminary FIRM for Maricopa County, Arizona and Incorporated Areas, dated September 4, 1992, before final printing.

If you have any questions regarding this matter, please call Mr. John Magnotti of my staff in Washington, D.C., at (202) 646-3932.

Sincerely,



William R. Locke
Chief, Risk Studies Division
Federal Insurance Administration

cc: The Honorable Betsey Bayless
Chairperson, Maricopa County
Board of Supervisors
Mr. Ron Nevitt
Floodplain Representative
Flood Control District of
Maricopa County
Mr. Greg A. Schuelke, P.E.
Vice President
A-N West, Inc.
The Honorable Ray Villanueva
Mayor, City of Surprise



TDN 1, 4, 5

Federal Emergency Management Agency

Washington, D.C. 20472

(202) 646-2770



CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
65-ACK

Mr. Ron Nevitt
Floodplain Representative
Maricopa County Flood Control
District
2801 West Durango Street
Phoenix, Arizona 85009

Date: June 26, 1992
Case Number: 92-09-163P
Re: Sun Valley Parkway North
Community: Maricopa County, Arizona
and Incorporated Areas

Dear Mr. Nevitt:

This is to acknowledge acceptance of your request for a revision to the Flood Insurance Rate Map and/or Flood Boundary and Floodway Map for the referenced community. Our preacceptance review of the request indicates that we have the minimum data we need to begin our evaluation. If we need additional data to complete our evaluation, or if delays are encountered, we will notify you in writing within 30 days of the date of this letter.

If you write to us about your request, please include the case number (shown above) in your letter. If you have any questions about the status of your revision request, please call Michael Baker, Jr., Inc., our Technical Evaluation Contractor, at (703) 960-8800, and ask for the Revisions Coordinator for your state.

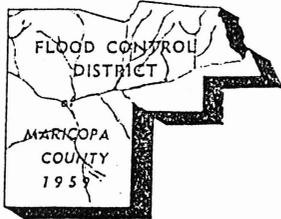
Sincerely,

William R. Locke
Chief, Risk Studies Division
Federal Insurance Administration

cc: The Honorable Roy Villanueva
Mayor, City of Surprise

The Honorable Betsey Bayless
Chairperson, Maricopa County Board
of Supervisors

✓ Mr. Greg A. Schuelka, P.E.
Vice President
A-N West, Inc.



FLOOD CONTROL DISTRICT

of

Maricopa County

2801 West Durango Street • Phoenix, Arizona 85009
Telephone (602) 506-1501
Fax (602) 506-4601
TDD (602) 506-5897

TDN 1.4.5

BOARD OF DIRECTORS

P. Ben Arredondo
Betsey Bayless
James D. Bruner
Carole Carpenter
Tom Freestone

D. E. Sagramoso, P.E., Chief Engineer and General Manager

June 16, 1992

William R. Locke
Chief, Risk Studies Division
Federal Insurance Administration
Federal Emergency Management Agency
Washington, D. C. 20472

Attn: Mr. Karl F. Mohr

Re: Case No. 92-09-081P
Sun Valley Parkway
Maricopa County, Arizona
FCD 90-04



Dear Mr. Locke:

Reference is made to your letter dated May 11, 1992 with review comments and additional data requirements requested to support our LOMR request.

In response to the comments we have attached additional information prepared by A-N West, Inc.

Should additional information be required, please contact either Mr. Greg A. Schuelke, P.E. of A-N West, Inc., (602) 861-2200, or Pedro Calza, Chief, Floodplain Management FCDMC at (602) 506-1501.

Sincerely,

Stanley L. Smith, Jr., P.E.
Acting Floodplain Administrator

Ron Nevitt,
Floodplain Administration

Attachments

Copy to: Greg Schuelke, A-N West

A-N WEST INC.

Consulting Engineers

June 12, 1992

Federal Emergency Management Agency
FIA - RSD
Room 418
500 C Street S.W.
Washington, D.C. 20472

Attn: Mr. Karl F. Mohr
Risk Studies Division

Re: Sun Valley Parkway North Area
Maricopa County, Arizona and
Incorporated Areas
FEMA Case No. 92-09-081-P
FCDMC Job No. 90-04

Dear Mr. Locke:

This letter is in response to review comments received from FEMA in a letter dated May 11, 1992, on the referenced project floodplain delineation study.

The FEMA letter review comments are briefly summarized below;

- o The floodplain mapping indicated potential breakout of flow from the main paths analyzed. Specific locations noted were Wash No. 1 between Section "AC" and "AD" and "AB" and "AC" and Wash No. 4, between Section "M" and "N".
- o The HEC-2 computer model output and floodplain mapping indicated total flow being conveyed via several adjoining washes in addition to main wash. The amount of flow being carried in these adjoining washes is not constant, and flow is being shifted from the overbanks to the main wash. Specific locations noted were Section "A" through "H" of Wash No. 4.
- o The Technical Data Notebook Submitted for the project had erosion/sediment transport analyses noted as not applicable. FEMA's review of the soil Conservation Service Soil Survey for the area indicated that the existence of erodible soils (loam and sandy loam) within the study area.

Based on these comments, the FEMA letter raised concern for the applicability of the HEC-2 model in analyzing the floodplains in this area. The letter indicated that review was suspended, pending receipt of response to these concerns.

A-N West contacted by telephone, Michael Baker Engineers (who reviewed the A-N West study for FEMA) to further clarify these comments. In discussion with Mr. Ed Mifflin and Ms. Roya Rashidmanofi of Michael Baker Engineers, it was reiterated that the concerns included, a) could breakout flows be substantial and result in significant flooding depths (i.e. over 1 foot)

beyond the delineated floodplain; b) could flows shift within the floodplain as delineated to obtain the WSEL's shown or will existing ridges or shifting sandbars cause a greater percentage of flow to remain in one portion of the channel cross-section, resulting in significantly (i.e. 0.5 feet) higher or lower WSEL's than shown.

In response to this letter, we herewith transmit the following attachments:

- Attachment 'A' - Orthophoto quadrangle maps (7-1/2 minute) 2 sheets.
McMicken Dam - Photo Date June 1971
White Tank Mountains N.E. Arizona - Photo Date Nov. 1972.
- Attachment 'B' - U.S.G.S. 7-1/2 Minute Quadrangle Maps White Mountains, N.E., Arizona and McMicken Dam, Flown 1957.
- Attachment 'C' - Transparent Overlay of Wash No. 1 - 8 floodplains/floodways by A-N West at 2000 scale (same scale as Attachment 'A' and 'B'), 1 sheet.
- Attachment 'D' - Aerial Photo Bluelines flown 9/23/90 for floodplain delineation study with floodplains by A-N West redlined on maps. 7 sheets.
- Attachment 'E' - Cross-Section Plots. - Main Washes No. 2, 4, 5, and 6.

We have reviewed our floodplain study analysis and mapping submitted in light of the concerns stated in the FEMA letter of May 11, 1992 and subsequent telephone conversations with Michael Baker staff.

We acknowledge that these concerns, particularly shifting flow within the floodplain delineation, may be valid for the upper reaches of Wash No. 1, Section N upstream to Sun Valley Parkway North, and for the majority of Washes No. 7 and 8. For these wash reaches, we believe that the delineated floodplain limits contain the majority of the 100-year flow. Beyond these delineations, potential breakout flow could occur but the average depth is expected to be 1 foot or less. For these three washes, we therefore recommend that an approximate Zone A flood hazard be applied rather than the Zone AE with BFE's.

For the remaining washes we wish to provide the following information to support the use of the HEC-2 model and to address the concerns raised in review comments.

Review comments concerning erodible soil and sediment transport analysis appeared to involve the concern that future storm flows will shift outside of the delineated floodplains or within the delineated floodplains due to eroding banks, sediment deposition, etc., thereby rendering the floodplain delineation limits or WSEL's significantly in error. We have transmitted Attachments A, B, and C to allow the delineated floodplains to be overlain on U.S.G.S. quadrangle mapping and orthophoto mapping of the area flown in 1957 and 1971 and 1972, respectively. These floodplain overlays show that higher vegetation growth (orthophoto mapping) of the main washes and flowlines from

U.S.G.S. mapping coincide well with the lower reach of Wash No. 1, downstream of Section "N" as well as Wash Nos. 2 - 6.

Attachment D is the aerial photo overlays of the study area flown in September, 1990 for this floodplain study with the floodplain delineations for Washes No. 1 - 8 shown in red. These redlined overlays show the higher vegetation growth of the main washes coinciding well with the lower reach of Wash No. 1 downstream of Section "N" as well as Wash No. 2 - 6.

The Sun Valley roadway and culvert structures were built in 1988 and these structures were located and sized to maintain flows to these washes. The comparison of these photos and contour mapping to the floodplain delineations provides some limited qualitative geomorphic analysis to support that these wash alignments have not changed significantly within the 20 to 35 years of record provided by this data.

Making a qualitative geomorphic analysis of profile trends was more difficult because the U.S.G.S. quadrangle mapping Attachment 'B' are not of sufficient detail in scale or contour interval to compare to the project mapping. It was observed that the U.S.G.S. mapping did not show a flowline for Wash No. 3, even at its confluence with wash No. 1. The project contour mapping and the aerial photo exhibits (Attachments A and D) show Wash No. 3 as quite well defined, particularly at its confluence with Wash No. 1. This would suggest that the Wash No. 3 channel has incised or degraded, since the U.S.G.S. mapping of 1957, 35 years ago.

We have enclosed Attachment 'E' Cross-section Plots of Wash Nos. 2 and 4 - 6 (excluding tributaries) to further address concerns of flow breaking out from the delineated floodplains and inaccurate WSEL's due to shifting flows within the floodplain delineations. Wash No. 3 and the lower reach of Wash No. 1 (below Section "N") were not considered to present problems in this area as the washes are narrow and contained. No potential breakouts existed and therefore cross-section plots were not included for these washes.

We have shown the percentage of flow in the left, and right overbank and channel for each cross-section where shifting flow may be of concern.

Wash No. 2

A general review of the floodplain mapping shows minor washes adjacent to the floodplain sloping toward the main floodplain rather than away so any breakout flow will return to, rather than leave the floodplain. An exception to this statement was noted at Section "C", where the potential breakout flow to the west would follow the 243rd Avenue Road alignment and enter Wash No. 1. Any potential breakout at this location would be small with depths less than 1 foot.

Cross-Section Plot No. 0.107 shows a lower area to the right separated by a ridge. In the cross-section plot this ridge appears narrow and readily

breachable. However, when reviewed on the 400 scale mapping this ridge is 50 feet more in width.

Wash No. 4

Potential breakout flows beyond the floodplain delineation on Wash No. 4 are not expected to be of significant quantity or depth (i.e. 1 foot deep), except between Section "Q" and "R". At this location a private levee was constructed to direct flow to a stock pond. The levee was determined to be overtopped by flows of approximately 1000 cfs (see Project FIS report, Appendix B), and the levee was therefore considered ineffective for the study. The possibility of flow being diverted from Wash No. 4 at this levee until it fails may warrant an approximate Flood Hazard Zone A downstream of this levee as shown on the attached Exhibit A.

The breakout flow noted in the review comment letter near cross-section "M" would return to the main floodplain immediately and would be less than 1 foot deep.

We reviewed the flow distributions within the floodplain on the cross-section plots in light of the review comments. The flow distribution shifts did not appear unreasonable.

Wash No. 5

The cross-sections suggested several locations where breakout could occur, namely Section 1.263, right side, 1.11, right side, 0.92, left side, 0.866, left side, 0.775, left side, 0.642, right side, 0.518, right side, 0.418 right side. However these ridges that could be overtopped to allow breakout flow are of substantial width (i.e. 20 to 100 feet with mild slopes of 4(H):1(V) or flatter) that will not breach like a levee. Any breakout flow was not expected to be of significant quantity or result in significant depth (i.e. average depth 1 foot) of flooding hazard the floodplain delineations. Furthermore, any potential breakout flow generally returns immediately to Wash No. 5.

Shifting flow distributions within the cross-sections did not appear unreasonable. The 100-year WSEL's were generally above small ridges within the floodplain which would allow flow to shift.

Wash No. 6

The ground slopes toward Wash No. 6 adjacent to the floodplain delineations. As such no significant breakout of flow from the delineated floodplain is expected.

Flow distribution changes do not seem unreasonable when cross-section plots are reviewed together with the floodplain mapping. The 100-year WSEL's appear to overtop small ridges within the floodplain to allow flow distribution shifts to occur.

Conclusion

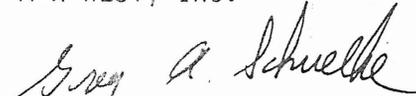
In summary, we have submitted the U.S.G.S. quadrangle mapping (1957), orthophoto mapping (1971 and 1972) and aerial photography (1989) which show the 100-year floodplain delineations from this study to coincide well with historic and current wash alignments.

In light of your concerns for floodplain breakout and flow distribution shifting within the floodplain we are recommending that the upstream reach of Wash No. 1, from Section "N" to the Sun Valley Parkway as well as all of Wash No. 7 and 8 be revised from a detailed Zone AE to an approximate Zone A. The floodplain delineations shown are still considered accurate for this zone designation for these washes. We concur that flow breakout and distribution shifting within these washes (Upper Wash No. 1 and Wash No. 7 and 8) may not allow modelling by HEC-2 program with sufficient accuracy to warrant the detailed Zone AE designation with floodway.

For the remaining washes, however we hope the attached information addresses your review comments and concerns. Should you have additional questions regarding this matter please contact us.

Sincerely,

A-N WEST, INC.



Greg A. Schuelke, P.E.
Vice President

GAS/s1

cc: Mr. Ron Nevitt, FCDMC



T.D.N. 1.4.5

Federal Emergency Management Agency

Washington, D.C. 20472

MAY 11 1992



CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Stanley L. Smith, Jr., P.E.
Acting Floodplain Administrator
Flood Control District of
Maricopa County
2801 West Durango Drive
Phoenix, Arizona 85009

Dear Mr. Smith:

This is in response to a letter dated January 20, 1992, from Mr. Ron Nevitt of your staff, regarding a Letter of Map Revision (LOMR) request for the Sun Valley Parkway area in the Town of Surprise and the unincorporated areas of Maricopa County. Mr. Nevitt requested the LOMR based on detailed hydrologic and hydraulic analyses, prepared by A-N West, Inc., for several washes located north of the White Tank Mountains extending between the Sun Valley Parkway and Trilby Wash. The data necessary for the LOMR request were submitted by Mr. Nevitt with his January 20 letter, and by Mr. Greg Schuelke, P.E., A-N West, Inc., with his letter of transmittal dated February 27, 1992.

Our review of the submitted data raised the following concerns:

- The submitted topographic maps entitled "Sun Valley Parkway North Flood Plain Delineation Study," prepared by A-N West, Inc., dated September 23, 1990, and approved September 4, 1991, indicate that breakout of flow from the main paths assumed for the analyzed washes could occur. For example, potential breakouts exist between Cross Sections "AC" and "AD," and "AB" and "AC" north of Wash #1; and between Cross Sections "M" and "N" north of Wash #4 (Exhibits A and B).
- The submitted HEC-2 hydraulic computer model and the topographic maps mentioned above indicate that the total flow at a cross section is being conveyed via several adjoining washes in addition to the main wash within the identified 100-year floodplain boundaries. An example of this situation occurs along a reach of Wash #4 between Cross Sections "A" through "H". The amount of flow that is being carried by these adjoining washes at a cross section is not constant, and flow is being shifted from the overbanks (which include the washes) to the main wash (Exhibit C).
- Page "d" of the report entitled "Technical Data Notebook for Sun Valley Parkway North Flood Insurance Study," prepared by A-N West, Inc., dated October 1991, indicates that an erosion/sediment

transport analysis does not apply for this project site. However, our review of the data presented in a report entitled "Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, Arizona," prepared by Soil Conservation Services, dated April 1986, indicates the existence of erodible soil (loam and sandy loam) within the area.

Based on our review of the submitted data, we are concerned about the use of the HEC-2 hydraulic computer model in this area. Therefore, we are not able to proceed further with this request, and a revision to the Flood Insurance Rate Map (FIRM) is not warranted at this time.

Please note that we will reconsider the request if the concerns described above are adequately addressed, and if documentation is presented to demonstrate that the HEC-2 model is applicable for this area. If you choose to pursue this request, please be advised that this revision would not be reflected on the next Preliminary FIRM for Maricopa County, Arizona and Incorporated Areas, scheduled for summer 1992.

If you have any questions concerning this matter, please call Mr. Karl F. Mohr of my staff in Washington, D.C., at (202) 646-2770.

Sincerely,



William R. Locke
Chief, Risk Studies Division
Federal Insurance Administration

Enclosures

cc: The Honorable Ray Villanueva (w/o encls)
Mayor, City of Surprise

The Honorable Betsey Bayless (w/o encls)
Chairperson, Maricopa County
Board of Supervisors

✓ Mr. Greg Scheulke, P.E. (w/encls)
Project Manager
A-N West, Inc.

Mr. Ron Nevitt (w/encls)
Floodplain Representative
Flood Control District of
Maricopa County

Mr Karl F. Mohr
FEMA
FIA - RSD
Room 418
500 C Street S.W.

Washington D.C. 20472

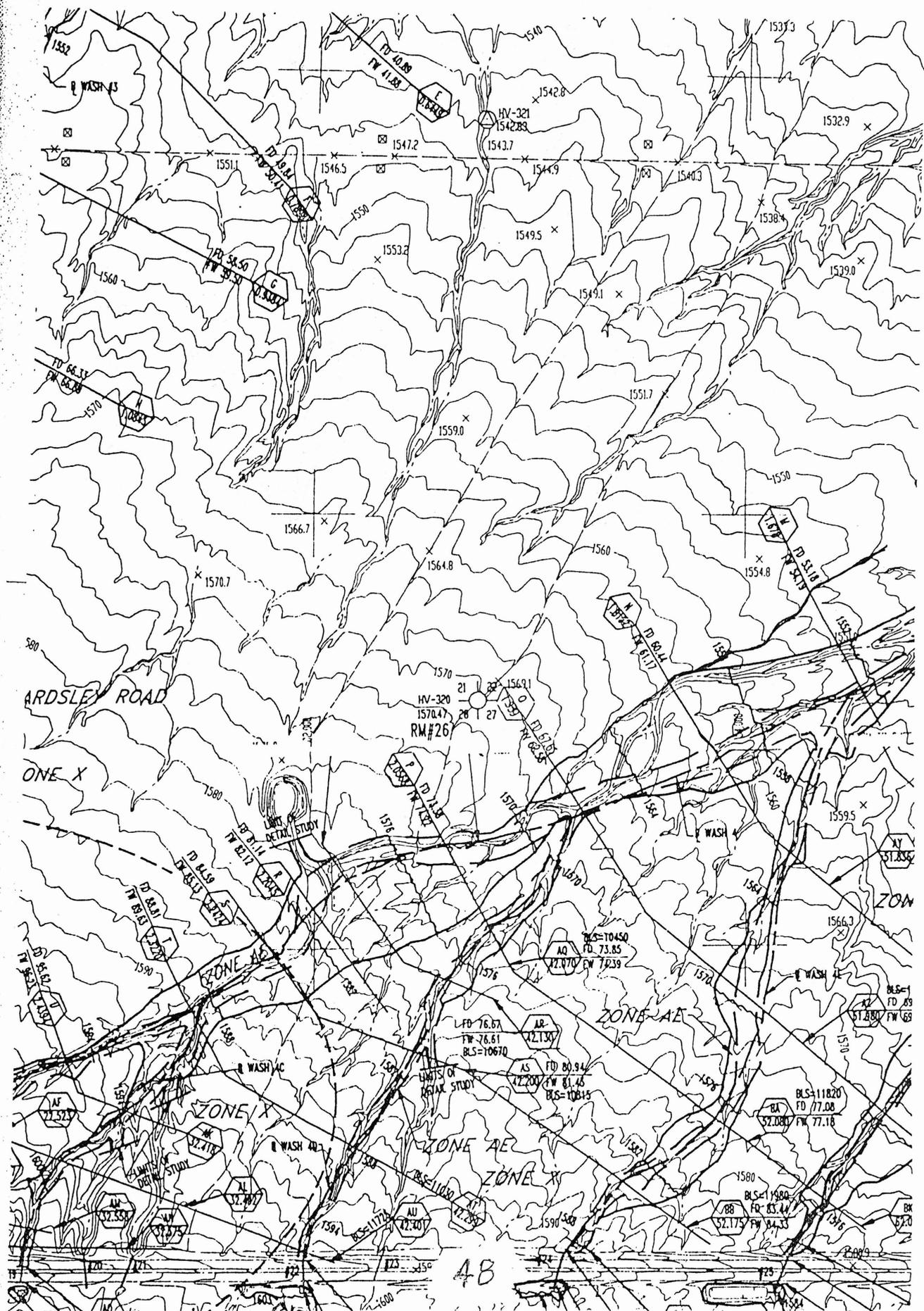


Exhibit B



Federal Emergency Management Agency

Washington, D.C. 20472

TDN 1.4.5

(202) 646-2770



CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
65-INTb

Mr. Ron Nevitt
Floodplain Representative
Flood Control District of
Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009

Date: March 12, 1992
Case Number: 92-09-081P
Re: Sun Valley Parkway Area
Community: Maricopa County, Arizona
and Incorporated Areas

Dear Mr. Nevitt:

This is in regard to your letter dated January 20, 1992, in which you requested a revision to the Flood Insurance Rate Map and/or Flood Boundary and Floodway Map for the referenced community. Our letter to you dated February 7, 1992, stated that we were reviewing the data submitted in support of your request and, within 30 days of the date of that letter, would notify you if we needed additional data or encountered delays. However, because of the complexity of the project on which your request is based, we will need additional time to complete our review. Therefore, we will inform you of our findings within 30 days of the date of this letter.

If you write to us about your request, please include the case number (shown above) in your letter. If you have any questions regarding this matter, please call Mr. Karl F. Mohr of my staff in Washington, D.C., at (202) 646-2770.

Sincerely,

William R. Locke

William R. Locke
Chief, Risk Studies Division
Federal Insurance Administration

cc: The Honorable Roy Villanueva
Mayor, City of Surprise

The Honorable Betsey Bayless
Chairperson, Maricopa County
Board of Supervisors

Mr. Greg Scheulke, P.E.
Project Manager
A. N. West, Inc.

Letter of Transmittal

TO: Michael Baker Jr. Inc.
3601 Eisenhower Avenue
Suite 600
Alexandria, Virginia 22304

DATE: February 27, 1992

JOB TITLE: _____

JOB NO.: ANW 7158-01

RE: Sun Valley Parkway FIS

ATTN: Ms. Michelle Monde

Community Maricopa County, Arizona and
Incorporated Areas
Case No. 92-09-0811 P

FROM: Greg Schuelke

WE ARE SENDING YOU ATTACHED UNDER SEPARATE COVER VIA Mail

THE FOLLOWING ITEMS:

- | | | |
|---|--|---|
| <input type="checkbox"/> SPECIFICATIONS | <input type="checkbox"/> ORIGINALS | <input type="checkbox"/> COPY OF LETTER |
| <input type="checkbox"/> SHOP DRAWINGS | <input checked="" type="checkbox"/> PRINTS | <input type="checkbox"/> REPORT |
| <input type="checkbox"/> PLANS | <input type="checkbox"/> SAMPLES | <input type="checkbox"/> OTHER _____ |

QUAN.	I.D./DWG. NO.	TITLE/DESCRIPTION
1		As-Built Plans - Sun Valley Parkway by Collar, Williams & White Engineers, Job #850840-6
(PE Seal)	Date: 3/30/87)	Phase I-A, Sheets 1-39 of 39
(PE Seal)	Date: 10/27/88)	Drainage Enhancement Plans, Sheets 2-4 and 21-30 of 30
(PE Seal)	Date: 3/30/87)	Phase I-B, Sheets 3-15 of 15

THESE ARE TRANSMITTED FOR REVIEW FOR YOUR USE AS REQUESTED OTHER _____

REMARKS: (Royal) Per your telephone request of 2/26/92 we are transmitting one full size copy of the as-built plans for Sun Valley Parkway used in the study.

REC'D. BY: _____ DATE: _____

COPY TO: File Mr. Pedro Calza, FCDMC 51 WITH ENCLOSURES

TDN SEC 1.4.7

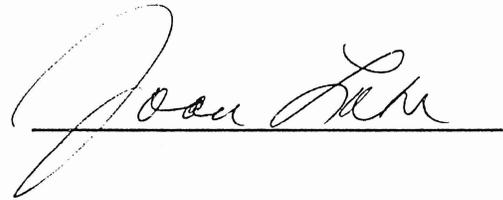
THE ARIZONA REPUBLIC  The Phoenix Gazette

STATE OF ARIZONA }
COUNTY OF MARICOPA } SS.

JOAN LOHR, being first duly sworn, upon oath deposes and says: That she is the assistant legal advertising manager of the Arizona Business Gazette, a newspaper of general circulation in the county of Maricopa, State of Arizona, published at Phoenix, Arizona, by Phoenix Newspapers Inc., which also publishes The Arizona Republic and The Phoenix Gazette, and that the copy hereto attached is a true copy of the advertisement published in the said paper on the dates as indicated.

The Arizona Republic
~~XXXXXXXXXXXXXX~~
~~The Phoenix Gazette~~

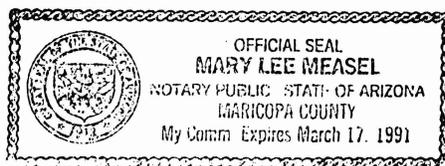
AUGUST 29, 1990



Sworn to before me this

30TH day of

AUGUST A.D. 19 90




Notary Public

INVOICE NO. 05641
ANNOUNCEMENT OF FLOOD HAZARD STUDY

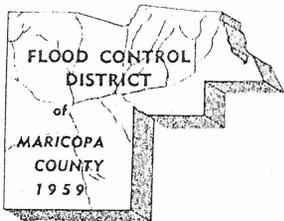
The Flood Control District of Maricopa County, under authority of the National Flood Insurance Act of 1968 (P.L. 90-448), as amended, and the Flood Disaster Protection Act of 1973 (P.L. 93-234), is funding a detailed study of flood hazard areas in western Maricopa County as follows:

Flooding areas along Sun Valley Parkway from the Beardsley Canal extending west approximately 10 miles and north to Trilby Wash.

The study is being performed for the Flood Control District by A-N West, Inc., of Phoenix, Arizona.

The purpose of this study is to examine and evaluate flood hazard areas which are developed or which are likely to be developed and to determine flood elevations for those areas. Flood elevations will be used by Maricopa County to carry out floodplain management objectives of the National Flood Insurance Program. They will also be used as the basis for determining appropriate flood insurance premium rates applicable for buildings and their contents.

This announcement is intended to notify all interested persons of the commencement of this study so that they may have an opportunity to bring any relevant facts and technical data concerning local flood hazards to the attention of the Flood Control District for consideration in the course of this study. Such information should be furnished to Mr. Pedro Calza or Mr. Joe Tram, Flood Control District of Maricopa County, 3335 West Durango Street, Phoenix, AZ 85009, telephone (602) 262-1501 for A-N West's use in performing the study.
Published: Arizona Republic, August 29, 1990.



FLOOD CONTROL DISTRICT
of
Maricopa County

TDN SEC 1.5

3335 West Durango Street • Phoenix, Arizona 85009
Telephone (602) 262-1501

BOARD OF DIRECTORS

Betsey Bayless
James D. Bruner
Carole Carpenter
Tom Freestone
Ed Pastor

D. E. Sagramoso, P.E., Chief Engineer and General Manager

AUG 15 1990

Mr. Greg A. Schuelke, P.E., L.S.
Vice President
A-N West, Inc.
7600 North 15th Street, Suite 200
Phoenix, Arizona 85020



SUBJECT: FCD 90-04, Sun Valley Parkway North
Floodplain Delineation Study

Dear Mr. Schuelke:

This letter will serve as confirmation of the August 6, 1990, verbal Notice To Proceed for the work under the above-referenced contract that was approved by the Board of Directors on August 6, 1990.

A fully executed contract is enclosed for your use. If you have any questions, please do not hesitate to contact Mr. Pedro Calza at 262-1501.

Sincerely,


Leanna Cumberland
Chief, Contracting Branch

Enclosure

CONTRACT FOR CONSULTANT SERVICES

CONTRACT FCD 90-04

Pursuant to the provisions of the Arizona Revised Statutes (A.R.S.), 48-3603, the Board of Directors has the authority to enter into contracts.

The Flood Control District of Maricopa County, Arizona, hereinafter called the "DISTRICT", is desirous of having certain professional services performed in connection with the Sun Valley Parkway North Floodplain Delineation Study, hereinafter called the "PROJECT" and as more fully described in Exhibit A, Scope of Work, and Exhibit A-1, attached; and

A-N West, Inc., hereinafter called "CONSULTANT", is desirous of performing said services;

THEREFORE, the parties hereto mutually agree as follows:

SECTION I - SERVICES OF THE CONSULTANT

The CONSULTANT, under the general supervision of the Chief Hydrologist of the DISTRICT's Hydrology Division, shall prepare studies, reports, surveys, plans, drawings, specifications and cost estimates as are necessary for the PROJECT and according to the directions and designated standards of the DISTRICT and in accordance with Exhibit A and Exhibit A-1. It is understood and agreed that the DISTRICT's authorized representative shall be the Chief Hydrologist or his duly authorized representative, hereinafter called the "AGENT" and that he/she shall be the sole contact for administering this contract.

The CONSULTANT shall meet periodically with the AGENT so as to keep the DISTRICT informed of the progress of the work in accordance with the schedule defined in Exhibit A, and Exhibit A-1.

The CONSULTANT shall promptly advise the AGENT of any factors, which may develop during the PROJECT, that would likely result in construction or design costs in excess of budgetary constraints.

SECTION II - PERIOD OF SERVICE

The CONSULTANT shall complete all work per the schedule provided in Exhibit A, Scope of Work and Exhibit A-1, Addendum to Exhibit A, within 240 calendar days after receipt of the Notice to Proceed, exclusive of DISTRICT review time. The DISTRICT is expected to require up to 60 calendar days for review time, for a total contract time period of 300 calendar days. Should extension of this contract period be necessary, and any such extension(s) continue the date of contract expiration

for a time period of more than one year from the date of contract execution, adjustment(s) of the consultant's fee(s) may, upon agreement by both the DISTRICT and the CONSULTANT, be made in accordance with the Consumer Price Index for Urban Consumers, Western Division published by the U.S. Department of Labor, Bureau of Labor Statistics, using the published edition coinciding with the initial contract expiration date. Any such fee adjustment shall only apply to the extended contract time period.

SECTION III - PAYMENTS TO THE CONSULTANT

The CONSULTANT shall be paid for work under this Contract a lump sum fee of \$_____ plus any adjustments that have been approved in writing in accordance with the Maricopa County Procurement Code.

The DISTRICT shall pay the CONSULTANT upon completion of the work as accepted by the DISTRICT, except that progress payments may be made as billed by the CONSULTANT based on approved monthly progress reports subject to the limitations set forth in Exhibit A, Scope of Work, and Exhibit A-1. Ten percent of all contract payments made on an interim basis shall be retained by the DISTRICT as insurance of proper performance of the contract or, at the option of the CONSULTANT, a substitute security may be provided by the CONSULTANT in an authorized form pursuant to procedures established by the DISTRICT. The CONSULTANT is entitled to all interest from any such substitute security.

If the CONSULTANT desires a partial payment in accordance with the provisions above, the CONSULTANT will complete and forward, a DISTRICT provided form, indicating payment distribution to MBE/WBE firms.

Any retention monies shall be paid or substitute security returned or released, as applicable, to the CONSULTANT within forty-five (45) calendar days after: (1) Completion of the work in Exhibit A through the submittal of District accepted/approved documents to FEMA, (2) receipt of a completed "Certificate of Substantial Performance" form, (3) the CONSULTANT's statement that no project disputes exist; and (4) invoicing for any retained monies has been received by the DISTRICT. Upon acceptance and approval of the project by FEMA and the completion of all final work required by the DISTRICT, the CONSULTANT shall submit a final Certificate of Performance and its invoice for any sums remaining due and payable under this Contract.

SECTION IV - THE DISTRICT'S RESPONSIBILITIES

The DISTRICT shall furnish the CONSULTANT, at no cost to the CONSULTANT, the following information or services for this PROJECT:

A. One copy of on-hand maps, records, survey ties, bench marks or other data pertinent to the PROJECT. This does not, however, relieve the CONSULTANT of the responsibility of searching records for additional information, for requesting specific information or for verification of that information provided. The DISTRICT does not warrant the accuracy or comprehensiveness of any such information.

B. All available information and data relative to policies, standards, criteria, and studies, etc. impacting the PROJECT as identified by the CONSULTANT.

C. Availability of staff for consultation with the CONSULTANT during the performance of studies and plan development in order to identify the problems, needs, and other functional aspects of the PROJECT.

D. Examination of documents submitted by the CONSULTANT and rendering of decisions pertaining thereto promptly, to avoid unreasonable delay in the progress of the work by the CONSULTANT. The DISTRICT will keep the CONSULTANT advised concerning the progress of the DISTRICT's review of work.

SECTION V - ALTERATION IN SCOPE OF WORK

Any alteration in the scope of work that will result in a substantial change in the nature of the PROJECT so as to materially increase or decrease the contract fee will require negotiation of an amendment to the contract to be executed by the DISTRICT and the CONSULTANT. No work shall commence on the change until the contract amendment has been approved by the DISTRICT and the CONSULTANT has been notified to proceed by the AGENT. It is distinctly understood and agreed that no claim for extra work done or materials furnished by the CONSULTANT will be allowed by the DISTRICT except as provided herein, nor shall the CONSULTANT do any work or furnish any materials not covered by this agreement unless such work is first authorized in writing in accordance with the Maricopa County Procurement Code. Any such work or materials furnished by the CONSULTANT without such written authorization first being given shall be at his own risk, cost, and expense, and he hereby agrees that without such written authorization he will make no claim for compensation for such work or materials furnished.

SECTION VI - RECORDS

Records of the CONSULTANT's payroll expense pertaining to this PROJECT and records of accounts between the DISTRICT and the CONSULTANT shall be kept on a generally recognized accounting basis and shall be available upon request to the DISTRICT or its authorized representative for audit during normal business hours. The records shall be subject to audit by appropriate grantor agency if the PROJECT is funded all or in part by a grant.

SECTION VII - PROJECT COMPLETION

If during the course of this contract situations arise which prevent completion within the allotted time, an extension may be granted by the AGENT.

SECTION VIII - TERMINATION

The DISTRICT may terminate this contract at any time upon reimbursement to the CONSULTANT of expenses which include reasonable charges for time and material for the percentage of work satisfactorily completed and turned over to the DISTRICT.

The DISTRICT reserves the right to postpone, terminate or abandon this PROJECT for the CONSULTANT's failure to complete the PROJECT on time, or failure to comply with the provisions of the contract. The DISTRICT also reserves the right to terminate any or all parts of this contract for its own convenience as the DISTRICT may determine at its sole discretion.

The DISTRICT hereby gives notice that pursuant to A.R.S. Section 38-511 "A" this contract may be cancelled without penalty or further obligation within three years after execution if any person significantly involved in initiation, negotiation, securing, drafting, or creating a contract on behalf of the DISTRICT is, at anytime while the contract or any extension of the contract is in effect, an employer, agent, or any other party to the contract in any capacity or a consultant to any other party of the contract with respect to the subject matter of the contract. Cancellation under this section shall be effective when written notice from the Chief Engineer and General Manager of the DISTRICT is received by all of the parties of the contract. In addition, the DISTRICT may recoup any fee for commission paid or due to any person significantly involved in initiation, negotiation, securing, drafting, or creating the contract on behalf of the DISTRICT from any other party to the contract arising as a result of the contract.

The CONSULTANT may terminate this contract in the event of nonpayment of fees as specified in Section III, PAYMENTS TO THE CONSULTANT.

SECTION IX - OWNERSHIP OF DOCUMENTS

All original documents including, but not limited to studies, reports, tracings, drawings, physical and computer models, estimates, field notes, investigations, design analyses, calculations, computer software, specifications, aerial mapping, and geotechnical reports prepared in the performance of this Contract are to be and remain the property of the DISTRICT and are to be delivered to the AGENT before final payment is made to the CONSULTANT. The DISTRICT reserves the right to reuse the documents as it sees fit. However, the DISTRICT will not reuse, alter, or modify these documents without noting such alterations, modifications, or intent of their reuse, and will hold the CONSULTANT harmless from any claims arising from the reuse,

alteration, or modification of the documents. The CONSULTANT may retain reproducible copies of all such documents delivered to the DISTRICT.

The CONSULTANT hereby releases all Subcontractors/Subconsultants employed for this project from any liability or prior notice and authorization for providing information or copies of records requested by the DISTRICT subsequent to the completion of this Contract.

SECTION X - COMPLIANCE WITH LAWS

The CONSULTANT is required to comply with all Federal, State and local laws, local ordinances and regulations. The CONSULTANT's signature on this contract certifies compliance with the provisions of the I-9 requirements of the Immigration Reform and Control Act of 1986 for all personnel that the CONSULTANT and any subconsultants employ to complete this PROJECT. It is understood that the DISTRICT shall conduct itself in accordance with the provisions of the Maricopa County Procurement Code.

SECTION XI - GENERAL CONSIDERATIONS

A. Prior to beginning the work, the CONSULTANT shall furnish the DISTRICT for approval the names of its key employees, and of its sub-consultants and their key employees to be used on this PROJECT. Any subsequent changes are subject to the written approval of the DISTRICT.

The CONSULTANT in replacing a MBE/WBE subcontractor should attempt to contract with another MBE/WBE.

B. The failure of either party to enforce any of the provisions of this Contract or to require performance of the other party of any of the provisions hereof shall not be construed to be a waiver of such provisions, nor shall it affect the validity of this Contract or any part thereof, or the right of either party to thereafter enforce each and every provision.

C. The CONSULTANT shall be responsible for the cost of any additional design, field layout, testing, construction and supervision necessary to correct those errors or omissions attributable to the CONSULTANT and for any damage incurred by the DISTRICT as a result of additional construction costs caused by such CONSULTANT errors or omissions.

D. The fact that the DISTRICT has accepted or approved the CONSULTANT's work shall in no way relieve the CONSULTANT's responsibility.

E. It is mutually understood and agreed that this Contract shall be governed by the laws of the State of Arizona, both as to interpretation and performance. Any action at law, suit in equity, or judicial proceeding for the enforcement of this Contract, or any provision thereof, shall be instituted only in the courts of the State of Arizona.

SECTION XII - SUCCESSORS AND ASSIGNS

This Contract shall not be assigned by either party without prior written approval of the other except that the CONSULTANT may use in the performance of this Contract without prior approval of the DISTRICT, personnel or services of its related entities and affiliated companies as if they were an integral part of the CONSULTANT; and it shall extend to and be binding upon the heirs, executors, administrators, successors and assigns of the parties hereto.

SECTION XIII - NO KICK-BACK CERTIFICATION

The CONSULTANT warrants that no person has been employed or retained to solicit or secure this Contract upon any agreement or understanding for a commission, percentage, brokerage, or contingent fee; and that no member of the Board of Directors/Supervisors or any employee of the DISTRICT has any interest, financially or otherwise, in the CONSULTANT firm.

For breach or violation of this warranty, the DISTRICT shall have the right to annul this Contract without liability, or at its discretion to deduct from the Contract price or consideration, the full amount of such commission, percentage, brokerage, or contingent fee.

SECTION XIV - ANTI-DISCRIMINATION PROVISION

The Flood Control District of Maricopa County will endeavor to ensure in every way possible that minority and women-owned business enterprises shall have every opportunity to participate in providing professional services, purchased goods, and contractual services to the Flood Control District of Maricopa County without being discriminated against on the grounds of race, religion, sex, age, or national origin.

The CONSULTANT agrees not to discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, or handicap and further agrees not to engage in any unlawful employment practices. The CONSULTANT further agrees to insert the foregoing provisions in all subcontracts hereunder.

SECTION XV - AMENDMENTS

This Contract may be amended by mutual written agreement of the DISTRICT and the CONSULTANT.

SECTION XVI - INDEMNIFICATION AND INSURANCE

A. The CONSULTANT shall provide and maintain the following minimum insurance requirements:

1. Professional Liability. The CONSULTANT shall show evidence of maintaining continuous insurance for the past three (3) years with a minimum coverage limit of \$1,000,000.00 each claim and/or in the aggregate.

The CONSULTANT shall provide and maintain Professional Liability Insurance with a minimum single limit of \$1,000,000.00 for each claim made and an aggregate limit of \$1,000,000.00 for all claims made through this contract's completion date or the policy's life, whichever is longer.

2. Commercial General Liability. Commercial general liability insurance with a minimum single limit of \$1,000,000.00 for each coverage/occurrence. The policy shall include coverage for bodily injury and personal injury, broad form property damage and blanket contractual coverage.

3. Automobile Liability. Automobile liability insurance, with an individual single limit for bodily injury and property damage of no less than \$1,000,000.00, each occurrence, with respects to CONSULTANT's vehicles (whether owned, hired, non-owned), assigned to or used in the performance of this contract.

4. Workers' Compensation Insurance. This insurance shall be maintained during the life of the contract.

5. Additional Insured. The policies, except professional liability and workers' compensation, required by this section shall name the DISTRICT as Additional Insured, and shall specify that insurance afforded the CONSULTANT shall be primary insurance, and that any insurance coverage carried by the DISTRICT or its employees shall be excess coverage, and not contributory coverage to that provided by the CONSULTANT. No policy issued under this contract shall lapse, be cancelled, allowed to expire, or be materially changed to affect the coverage available to the DISTRICT without thirty (30) days written notice to the DISTRICT.

6. DISTRICT approved documentation outlining the coverages specified in this section shall be filed with the DISTRICT prior to issuance of the Notice to Proceed.

B. The CONSULTANT agrees to indemnify and save harmless the DISTRICT, any of its departments, agencies, officers, or employees from all suits, including attorney's fees and costs of litigation, actions, loss, damage, expense, cost or claims, of any character or any nature arising out of the CONSULTANT's wanton, willful or negligent acts, errors or omissions in the performance of work under this Contract, and any wanton, willful or negligent acts, errors or omissions by any subconsultant or other agent used by the CONSULTANT in the performance of work under this Contract.

IN WITNESS WHEREOF, the parties herein have executed this Contract.

A-N WEST, INC.

Gregory A Schuelke
Principal

Gregory A Schuelke
Printed Name

Vice President
Title

Date: July 2, 1990

86-0545733
Tax Identification Number

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY:

D. E. Sagramoso
D. E. Sagramoso, P.E.
Chief Engineer and General Manager

ACCEPTED AND APPROVED:

Jim Brewer
Chairman, Board of Directors

Scope of Work
Flood Control District of Maricopa County
Topographic Mapping and Flood Insurance Study

General

The project consists of topographic mapping and floodplain and floodway delineations of Sunvalley Parkway and various unnamed washes in the Wittman Area Drainage Master Study region. The Consultant will modify the hydrology to reflect the Sunvalley Parkway and do a backwater analysis using the HEC-2 computer model to determine floodplain and floodway delineations for the 100 year peak flood for the areas to be defined in the field. All work must be reviewed and accepted by the Federal Emergency Management Agency (FEMA) prior to the finalization of this contract. As a part of this requirement, the Consultant shall be responsible for Public Notification regarding this project. All work under this Scope will be completed within 240 calendar days from the date of the Notice to Proceed, including 60 days for Flood Control District reviews.

Task 1 Data Collection

- 1.1 The Consultant will collect and review pertinent data from the District and other outside sources. Data to be collected will include previous flood hazard reports and hydrology for the study area; existing topographic mapping; historical flooding information; as-built plans for existing structures; FEMA Flood Hazard Boundary Maps and any Letters of Map Amendment and/or Revisions and other pertinent information.
- 1.2 Written summary of data collection will be submitted to the District for information purposes.
- 1.3 The Consultant will submit a project schedule showing coordination meetings and completion dates for each of the tasks in the contract.

Task 2 Topographic Mapping

- 2.1 The Consultant will notify all property owners and obtain any necessary Rights of Entry for the study area. The District will assist Consultant as may be necessary to complete this task.
- 2.2 An aerial survey subconsultant shall be retained by the firm as part of this contract. The Consultant shall coordinate all the aerial surveying work with the aerial surveying Consultant to ensure that the specifications of the aerial surveying work is met. Quality control on surveys will be per FEMA 37, Flood Insurance Study Guidelines and Specifications for Study Consultants.
 - 2.2.1 Prepare topographic mapping to a 2-foot contour interval, 1"=400 scale, with spot elevations and/or 1-foot contours on all section line and mid-section line roads.

2.2.2 Ground Control:

- a. The Consultant shall provide all survey control.
- b. The Consultant shall systematically set panel points and establish horizontal and vertical control throughout the areas to be mapped for use in compilation by the aerial survey Consultant. Where readily available, surveys will tie into the State Plane Coordinate System. Field control shall be sufficient to readily allow for compilation of maps by the aerial survey Consultant at the desired map scale and contour interval and will be based on the National Geodetic Vertical Data (NGVD).
- c. The horizontal and vertical control points shall be located and marked by the Consultant. The controls for the area mapping shall be in sufficient numbers and shall be in locations which will be compatible with the accuracy of the mapping requirements. The controls shall be of at least third order accuracy. Section corners, quarter corners, and mid-section points shall be used for control points wherever possible.

2.2.3 Digital contour and planimetric data developed for this project shall be delivered in AutoCAD DXF or Intergraph ISIF ASCII format, as specified in Autodesk, Inc., publication TD106-009 (May 7, 1986) or Intergraph publication DIX4110 (May 12, 1985). Layer names and graphics attributes shall be fully documented by the Consultant. The delivered DXF or ISIF files shall be compatible with the requirements, and subject to the limitations, of the ESRI DXFARC or the ESRI SIF2ARC software translator as detailed in the January 1989 release of the "ARC/INFO Users Guide". All file deliveries shall be in ASCII format on industry-standard 1/2" magnetic tape, 2400-foot reels, written in a generic unlabelled COPY format, with specified record-lengths and blocksizes.

2.2.4 The Consultant shall provide permanent non-erasable topographic mylar sheets 24" X 36" with a scale of 1-inch equal to 400 feet, with a contour interval of 2 feet for all mapping with the exception of section line roads which will have a contour interval of 1 foot. A cover sheet will be provided with the project title, date of topographic mapping, and a location map showing geographic range covered by each specific mapping sheet. Each manuscript shall include a minimum of a north arrow, scale, section corners and quarter corners, current and proposed streets and Highway names, State Plane Coordinate System, major drainage features, corporate boundaries, cross section lines, channel station center line, index map, description and elevation of control points and ERMs, and reference marks used in ground control. The mapping will have an accuracy such that ninety percent (90%) of all contours shall be within one-half contour of the true elevations and the remaining ten percent (10%) of the contours shall not be in error by more than one contour interval.

2.2.5 The Consultant shall provide permanent non-erasable topographic mylars as described above in Section 2.2.4 with delineated floodplains included.

- 2.2.6 Sketch maps no larger than 11" x 17" for the study area must be included in the narrative report along with the flood profile maps.
- 2.2.7 Hydrologic Work Maps should be at a scale of 1 inch = 1200 feet and shall include: reproducible transparent overlay maps of existing drainage patterns, subwatersheds; major flow paths; and general topographic maps.

Task 3 Hydrology

- 3.1 The hydrologic study of the watershed will be delivered to the District under separate cover from the hydraulic analysis. The Consultant shall use the U.S. Army Corps of Engineers computer program HEC-1 to modify the hydrologic model developed for the Wittman Area Drainage Master Study to reflect the Sunvalley Parkway and related hydraulic structures.
- 3.2 Final report should include the following sections:
 - a. Scope of the study
 - b. Description of the watershed.
 - c. Previous studies and reports.
 - d. Methodology.
 - e. Assumptions.
 - f. Results.
 - g. Comparison of the results with other studies and/or stream gages.
 - h. Conclusion
 - i. List of references and agencies contacted.
- 3.2.1 Tables and Figures for the main Text:
 - a. Watershed area (11x17) foldout map.
 - b. Table showing the flow peaks and volumes at critical concentration points for different rainfall total and distributions.
 - c. Table showing the critical peaks and volumes for major concentration points as compared to previous studies (where available).
 - d. Spread sheet showing all the sub-basins and their major parameters (slope, area, friction, total rainfall, Time of concentration or Lag, major structures, etc.)
- 3.2.2 Tables and Figures for the appendices:
 - a. Topographic base map showing the sub-watersheds, routing reaches, Tc calculation paths, major man made structures, and references (i.e. street names, Township Range Section, etc.) at scale of 1:2000.
 - b. Soils map at the same scale as the base map.
 - c. Land use map at the same scale as above.
 - d. Schematic map for the HEC-1 showing the sub-basins (area, Tc), the flow paths, the routing reaches (length, slope, friction, width, associated velocities, associated transmission losses, etc.), order of combining the hydrographs, channel, pipe or culvert dimensions (where appropriate).
 - e. Pertinent data on all the structures in the watershed (such as spillway elevation, rating curves, etc.)

- 4.2 Ground Control for Floodplain Delineations:
- a. All topographic mapping and survey work shall meet or exceed Federal Emergency Management Agency (FEMA) minimum criteria as defined in FEMA Document 37, Flood Insurance Study Guidelines and Specifications for Study Consultants, Appendix 4, September 1985. This would include, but is not limited to: the establishment of "permanent" elevation reference marks (ERM's); field control; and verification of profiles by the ground survey profile procedure.
 - b. Horizontal and Vertical Control: Systematically set panel points and establish horizontal and vertical control throughout the area to be mapped for use in compilation by the aerial survey Consultant. Where readily available, surveys will tie into State Plane Coordinate System. Field control shall be sufficient, at least one "permanent" point per mile, such point(s) being used as Elevation Reference Marks (ERMs). Surveys will be based on National Geodetic Vertical Datum (NGVD), per FEMA guidelines. "Permanent" survey points shall consist of existing monumentation, such as brass caps or similar survey monuments. Where additional monumentation is needed, survey markers conforming to Maricopa Association of Governments (MAG) Uniform Standard Detail for Public Works Construction, detail 120-1, Type C, shall be placed 2" +/- above grade. Elevation Reference Marks will be labelled on available maps and described in a manner which allow them to be readily located in the field.
 - c. "As-Built" plans or surveys of all bridges and hydraulic structures are to be obtained by the Study Consultant.
 - d. The Consultant shall verify profiles for mapped floodplains. The ground survey profile procedure as described in FEMA Document 37 or other methods approved by FEMA.

4.3 The Consultant will conduct field reconnaissance of the full study reach. This will include observation of channel and floodplain conditions for estimation of Manning's "n" values; photographic documentation of floodplain characteristics; determination of channel bank stations; observation of possible overflow areas; inspection of levees or other flood control structures; and measurement of bridge dimensions.

- 4.3.1 A written summary of the field inspection, including photographs to document "n" value estimation will be submitted to the District for review and approval.

Task 5 Floodplain and Floodway Delineation

- 5.1 Floodplain and Floodway delineations must be obtained using the U.S. Army Corps of Engineers HEC-2 Water Surface Profiles computer model, 1989 version, and using methodology acceptable to FEMA. This model will simulate the effects of floodplain geomorphology, flow changes, bridges and culverts, hydraulic roughness factors, effective flow limitations, split-flows, and other considerations. The Consultant will prepare the study using the guidelines established in "The Flood Insurance Study Guidelines and Specification for Study Consultants", dated September 1985 and "Appeals, Revisions, and Amendments to Flood Insurance Maps", September 1985.

- 5.2 Bridges and Culverts must be modeled in compliance with HEC-2 modeling requirements for the selected routine. Where multiple bridges occur, each bridge will be modeled separately.
- 5.3 All cross sections will be plotted using a pen plotter. The cross section plots will show water surface profiles, ineffective flow areas, "n" values, encroachments, channel stationing and other pertinent information. These plots are to be available at all reviews.
- 5.4 For floodplains identified as ponding areas, it is preferable to analyze the area by using the HEC-2 model, which will provide the District with water-surface-elevations. If appropriate, the Consultant shall identify in the ponded floodplains a floodway. The purpose of this floodway is to allow the pond to seek a constant stage throughout the areal extent of the ponds, versus the creation of two independent ponds.
- 5.5 Flood zones must be determined according to FEMA criteria .
- 5.6 The Consultant will prepare working maps and models of the 100-year floodplain and floodway during the course of the hydraulic modeling analysis for review by the Flood Control District at progress meetings. Floodways are to be determined using equal conveyance encroachment methods to start with, but only encroachment method 1 will be used in the final analysis.
- 5.7 The delineation work shall meet requirements for floodplain delineations as prescribed by FEMA and the Arizona Department of Water Resources.
- 5.8 The final report for the floodplain/floodway delineation study will include, but is not limited to the following:
- I. Introduction
 - a. Purpose of study
 - b. Authority for study
 - c. Coordination and acknowledgments
 - II. Area Studied
 - a. Scope of study
 - b. Community description
 - c. Principal flood problems
 - d. Flood protection measures
 - III. Engineering methods
 - a. Hydrologic analyses
 - b. Hydraulic analyses
 - IV. Floodplain Management applications
 - a. Flood boundaries
 - b. Floodways
 - V. Insurance applications
 - VI. Other studies
 - VII. Location of data
 - VIII. Bibliography

Task 6 Coordination

- 6.1 The Consultant shall participate in regular coordination meetings (at least every three weeks) with the District's Project Manager and in Milestone coordination meetings in the development of the hydrologic and hydraulic analyses
- 6.2 Prior to finalizing of the hydraulic analysis, The Consultant will submit maps, report, and HEC-1 model to ADWR and any other governmental agency reviewers through the District. The Consultant will respond to questions by the reviewers and make modifications to the hydrologic maps, model, and report if necessary.
- 6.3 The Consultant will submit maps, report, HEC-2 model to ADWR, FEMA for review by the Technical Evaluation Consultant (TEC), and any other governmental agency reviewers through the District. The Consultant will respond to questions by the reviewers and make modifications to maps, models and report if required.

Task 7 Final Products

7.1. Mapping:

- a. One complete set of 9" X 9" contact prints of the aerial stereo photographs sequentially numbered and catalogued.
- b. One complete set of contour maps, blue-line, draft copy for Flood Control District reference during the project, delivered immediately following the topographic mapping.
- c. One complete set of contour maps at 1"= 400' scale with the floodplain delineations in reproducible form (mylar) and six blue-line copies as outlined in Task 2.
- d. One set of transparent overlays of photo-mylars
- e. One complete set of mylars for the foldout maps (no larger than 11" x 17") used in the report.

7.2 One-half inch magnetic tape formatted at 1600 bpi containing the topographic data and the digitized floodplain/floodway boundaries in either the AutoCAD DXF ASCII format or the Intergraph ISIF ASCII format.

7.3 Six hardcopies of the HEC-2 and HEC-1 printouts and a copy of the HEC-2 and HEC-1 model input/output on 5-1/4", 1.2 Mb diskettes compatible with an IBM-AT personal computer.

7.4 Tabular list of control points (ERM's) used with descriptions, elevations, and coordinates.

7.5 Reports:

- a. The Consultant will produce a final report incorporating the comments of the District, FEMA and other reviewers. Six copies of the Hydrology and Hydraulics reports as outlined in Tasks 3 & 5 respectively, will be delivered.

7.6 Documentation for this study will be as outlined in Instructions for Organizing and Submitting Technical Documentation for Flood Studies as required by ADWR.

ADDENDUM TO EXHIBIT A
EXHIBIT 'A' -1

SCOPE OF WORK
SUN VALLEY PARKWAY NORTH FLOODPLAIN
DELINEATION STUDY (FCD 90-04)
REVISED 6/25/90

The Consultant shall make the necessary surveys and studies and shall prepare a Flood Insurance Study (FIS) report for the Sun Valley Parkway north area. The floodplain mapping limits are shown on the study area map. The purpose of the study is to develop 100-year discharges and delineate floodplains along the upstream side of the Sun Valley Parkway and the washes highlighted on the study area map downstream of the Parkway. The approximate length of these floodplain delineations is 22 miles. The purpose of the study is also to develop floodways for the highlighted washes downstream of the Parkway.

All work must be reviewed and accepted by the Federal Emergency Management Agency (FEMA) prior to the finalization of the project.

All work under this scope will be completed within 240 calendar days from the date of the Notice to Proceed, including 60 days for Flood Control District reviews.

The work shall include the following tasks:

1. Data Collection

Collect, assemble, and review pertinent maps, drainage and flood hazard reports, hydrology, topographic mapping, and as-built plans for the study area. Included in this data will be the Wittman Area Drainage Master Study, the Sun Valley Parkway Drainage Design Report, and roadway as-built plans.

2. Topographic Mapping

Develop new topographic mapping for the study within the limits shown on the study area map for a total of approximately 10,240 acres. Develop 400-scale, 2-foot contour interval (C.I.) mapping from 200 feet south of the Sun Valley Parkway to the north mapping limits. Develop 400-scale, 4-foot C.I. mapping from 200 feet south of the Sun Valley Parkway to the south mapping limits.

The existing 400-scale, 4-foot contour mapping from the Wittman Area Drainage Master Study will be utilized for the portion of the study to the north of the new mapping limits.

3. Hydrology

The hydrologic study of the watershed will be delivered to the District under separate cover from the hydraulic analysis. The Consultant shall use the U.S. Army Corps of Engineers' computer program HEC-1 to modify the hydrologic model developed for the Wittman Area Drainage Master Study to compute peak discharges along the Sun Valley Parkway and downstream washes. The hydrologic analysis will be limited to the 100-year, 24-hour storm event. The hydrologic analysis will utilize the general hydrology methodology, including soils and curve number data established by the Wittman Area Drainage Master Study.

The topographic mapping base for the model will be the U.S.G.S. 7-1/2 minute quadrangle maps aided by the detailed mapping proposed in Task 2.

The results of this analysis will be compared to those of the Sun Valley Parkway Drainage Design Report and other studies and/or stream gages.

4. Field Surveys

Field survey will be performed on National Geodetic Vertical Datum to establish horizontally and vertically controlled panel points at intervals compatible with the accuracy of the mapping requirements. Section corners, quarter corners, and midsection points will be used for control points wherever possible.

Elevation Reference Marks (ERM's) shall be field surveyed and controlled relative to the mapping utilizing existing monumentation (such as brass caps) or establishing new monumentation to obtain approximately one ERM per half mile along floodplain delineations.

Ground survey profiles will be conducted to verify profiles for mapped floodplains per FEMA Document 37 procedures.

Field reconnaissance of the full study reach will be conducted. This will include observation of channel and floodplain conditions for estimation of Manning's 'n' values, photographic documentation of floodplain

characteristics, determination of channel bank stations, observation of possible overbank. A written summary of the field reconnaissance will be submitted to the District for review and approval.

5. Floodplain and Floodway Delineation

Floodplain and floodway delineations will be performed using the U.S. Army Corps of Engineers' HEC-2 computer model and using methodologies acceptable to FEMA. Floodplain delineations will be determined along the upstream side of the Sun Valley Parkway from the west end of the study area to the McMicken Dam flood pool. Floodplains and floodways will be computed for the washes shown on the study area map downstream of the Sun Valley Parkway. The total length of proposed floodplain delineations is approximately 22 miles.

The Consultant will prepare the study using the guidelines established in the "Flood Insurance Study Guidelines and Specifications for Study Consultants," dated September, 1985 and "Appeals, Revisions, and Amendments to Flood Insurance Maps," September, 1985.

The cross-section data will be taken from the new 400-scale, 2-foot C.I. mapping proposed in Task 2 or the existing 400-scale, 4-foot C.I. mapping from the Wittman Area Drainage Master Study. These delineations will be prepared to FEMA standards defined in the "Guidelines and Specifications for Study Contractors," dated September, 1985.

Cross-section plots will be prepared using ink plotter and will show water surface profile, ineffective flow areas, 'n' values, encroachments, channel stationing, and other pertinent information. These plots will be available at all reviews.

6. Coordination

The consultant shall participate in regular coordination meetings or telephone progress reports (at least every three weeks) with the District's Project Manager and in milestone coordination meetings in the development of the hydrologic and hydraulic analyses, as outlined on the attached schedule.

Prior to finalizing of the hydraulic analysis, the Consultant will submit maps, report, and HEC-1 model to ADWR and any other governmental agency reviewers through the District. The Consultant will respond to questions by

the reviewers and make modifications to the hydrologic maps, model, and report, if necessary.

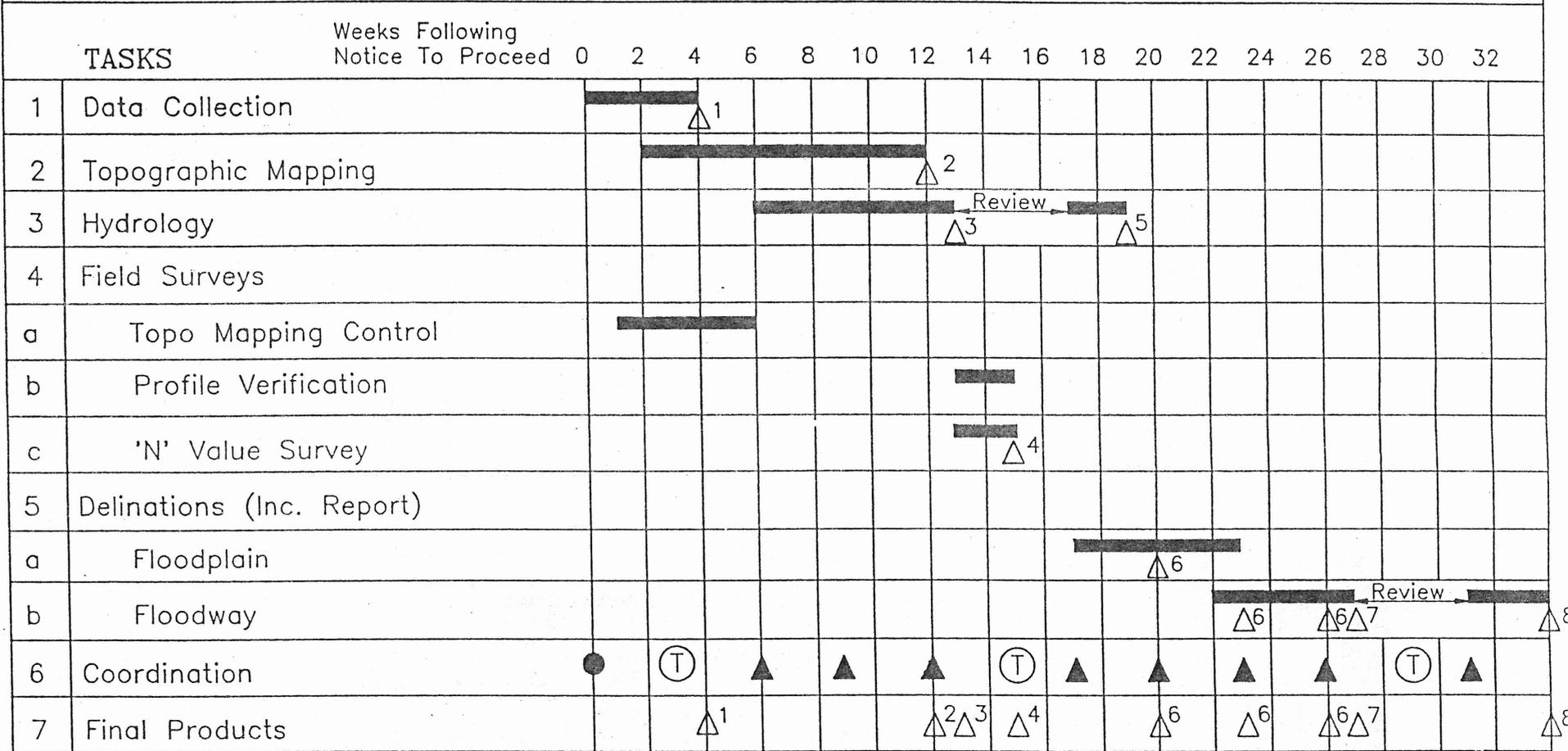
The Consultant will submit maps, report, HEC-2 model to ADWR, FEMA for review by the Technical Evaluation Consultant (TEC), and any other governmental agency reviewers through the District. The Consultant will respond to questions by the reviewers and make modifications to maps, models, and report, if required.

7. Final Products

- A. Hydrology Report summarizing the methodology and results (six copies), including the following figures and exhibits:
- 1) Watershed area map (11" X 17")
 - 2) Topographic base map (2,000-scale)
 - 3) Soils map (2,000-scale)
 - 4) Land use map (2,000-scale)
 - 5) HEC-1 schematic map (2,000-scale).
- B. Floodplain and floodway report in FEMA format for Flood Insurance Studies (six copies), including profiles.
- C. Mapping:
- 1) One complete set of 9" X 9" contact prints of the aerial stereo photographs sequentially numbered and catalogued for the new mapping proposed in Task 2.
 - 2) One complete set of contour maps, blue-line, draft copy for the Flood Control District's reference during the project, delivered immediately following the topographic mapping.
 - 3) One complete set of contour maps at 1" = 400' scale, with the floodplain delineations in reproducible form (mylar) and six blue-line copies, as outlined in Task 2.
 - 4) One set of transparent overlays of photo-mylars at 410 scale to the District (optional).
 - 5) One complete set of mylars for the foldout maps (no larger than 11" X 17") used in the report.
- D. One-half inch magnetic tape formatted at 1,600 bpi containing the topographic data and the digitized floodplain/floodway boundaries in either the AutoCAD DXF ASCII format or the Intergraph ISIF ASCII format.

- E. Six hard copies of the HEC-2 and HEC-1 printouts and a copy of the HEC-2 and HEC-1 model input/output on 5-1/4 inch, 1.2 Mb diskettes compatible with an IBM-AT personal computer.
- F. Tabular list of control points (ERM's) used with descriptions, elevations, and coordinates.
- G. Documentation for this study will be as outlined in Instructions for Organizing and Submitting Technical Documentation for Flood Studies as required by ADWR.

ESTIMATED PROJECT SCHEDULE
SUN VALLEY PARKWAY NORTH
FLOOD DELINEATION STUDY
CONTRACT NO. FCD 90-04



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FINAL PRODUCTS

- ▲ Meetings
- △ Submitted
- Field Trip
- ⊙ Telephone Progress Report

SUBMITTED SUMMARY

1. Summary of Data Collection
2. Base Topography Mapping Draft Bluelines
3. Draft Hydrology Report to FCD and ADWR
4. Written Summary of 'N' Value Estimation
5. Final Hydrology Report to FCD and ADWR
6. Working Maps of Floodplain/Floodway
7. Final Draft Hydraulic Report to FCD, ADWR & FEMA
8. Final Hydraulic Report to FCD, ADWR & FEMA

SECTION 2: MAPPING AND SURVEY INFORMATION

2.1 Description of Mapping, Map Control and other Study Survey Information.

The Sun Valley Parkway North Flood Insurance Study involved the study of floodplains along the upstream side of the Sun Valley Parkway and washes between the Parkway and Wash 5 West, Trilby Wash and McMicken Dam.

Floodplains had been previously studied and mapping developed along Wash 5 West, Trilby Wash and McMicken Dam as part of a previous study for the Flood Control District by the WLB Group of Phoenix. This study was titled the Wittman Area Drainage Master Study (ADMS). The mapping produced for this study was flown on December 11, 1986 by Cooper Aerial Survey of Phoenix. The mapping produced was at scale: 1" = 400' and 4 foot C.I.

Since the Sun Valley Parkway North F.I.S. involved studying tributary washes to these previously studied washes, the new mapping area developed for A-N West has chosen to proceed upslope (south and west) from this existing mapping.

The new mapping developed for A-N West was compiled at scale 1" = 400' and 2 foot C.I. from the match with the Wittman ADMS mapping to a line parallel and upslope (south and west) of the Sun Valley Parkway. New mapping of scale 1" = 400' and 4-foot C.I. was also developed for A-N West for 1 mile upslope (south and west) of the Parkway to provide mapping for delineating drainage areas in the hydrologic analysis.

Cooper Aerial Survey of Phoenix was subcontracted by A-N West to compile the new mapping for the Sun Valley Parkway North F.I.S.

Two mapping photo panel points common the both the Sun Valley Parkway North F.I.S. and existing Wittman ADMS mapping were utilized by Cooper Aerial Survey to match the existing Wittman ADMS mapping to the new Sun Valley Parkway FIS mapping. Cooper Aerial digitized or traced a portion of the Wittman ADMS mapping along Wash 5 West, Trilby Wash and McMicken Dam onto the new Sun Valley Parkway mapping to provide mapping for the new study washes at the confluence with the Wittman ADMS study washes (Wash 5 West, Trilby Wash and McMicken Dam). These common panel points are No. 9213 and 9326 and are shown on the following Figure 2, Photo Control Layout and Sheet Locations and Table 1, Summary of Photo Control Survey Results.

The following Figure 1 shows the location of existing and new mapping for the study. Flight lines for the new mapping are also shown.

A-N West subcontracted Hunsacker and Associates from San Bernardino, California to provide Global Positioning System (GPS) equipment and personnel to establish horizontal and vertical control for the aerial mapping panel locations.

A-N West subcontracted Project Engineering of Phoenix to assist in performing field surveys to locate available section corners, 1/4 corners, and install photo control panels. Project Engineering also performed field survey to establish vertical control for enough monuments to provide basic vertical control to the GPS consultant and additional vertical control to serve as a second check of the GPS results. Project Engineering's field notes are included in Section 2.3.

The GPS subconsultant required a minimum of eight vertical points over the project area as given elevations for the GPS survey of the remaining panel points. A-N West provided twelve vertical control points to the GPS subconsultant. These points are noted on following Table 1, Summary of Photo Control Survey Result which follows in Section 2.3. Tables 2 and 3 which include the GPS monument coordinates and elevations, respectively as received from Hunsacker are also included in Section 2.3.

The following Figure 2 shows the monuments and photo control point locations that horizontal and vertical control was established by the GPS subconsultant, Hunsacker and Associates. Figure 2 also shows the sheet number and location for new mapping compiled for the study area by Cooper Aerial of Phoenix.

The vertical control survey performed by Project Engineering of Phoenix involved several level circuits tied to known United States Geological Survey (USGS) benchmarks. Three U.S.G.S. bench marks were utilized in the field survey, described as follows:

- U.S.G.S. Benchmark 49 L.C. - Elev. = 1411.783 - Sec. 29 T4N, R2W
- U.S.G.S. Benchmark 50 L.C. - Elev. = 1459.887 - N.W. Corner, Sec. 19, T4N, R2W
- U.S.G.S. Benchmark 51 L.C. - Elev. = 1521.960 - Sec. 15 T4N, R3W

These U.S.G.S. benchmark elevations are on National Geodetic Vertical Datum N.G.V.D. 1929 per Arizona D.O.T. Geodesy Department (Mr. Pat Church). These benchmarks are shown on Figure 2.

The horizontal control for the photo control panel points was established by reference to the U.S.G.S. Triangulation Station titled "FRIA". This point is shown on Figure 2 and was given the number 9000 for the GPS survey. The Tri. Station "FRIA" has the following 1983 North American Datum (NAD) Latitude (33: 38' 42.11722"N) and Longitude (112: 29' 46.87056"W) and coordinates in feet (962715.873 N and 523586.280 E).

Check profiles were surveyed by A-N West and plotted on the mapping compiled by Cooper Aerial of Phoenix per FEMA Document No. 37 to check mapping accuracy. These profile plots and field notes are included in Section 2.3. The check profiles were within the tolerance required by FEMA No. 37.

2.2 Index of Maps

The following two exhibits show an index of mapping for the project:

Figure 1 - "Aerial Photography Photo and Mapping Index", shows existing and new mapping limits, scale and contour interval utilized in the project as well as flight lines and photo numbers for new aerial photography.

Figure 2 - "Photo Control Layout and Sheet Locations", shows the photo control points established for the new mapping and the new mapping sheet layout.

2.3 Survey Field Notes

As discussed in Section 2.1 the vertical datum is N.G.V.D. 1929 and is based on three U.S.G.S. benchmarks located in the study area. The horizontal datum was established for the U.S.G.S. triangulation station "FRIA" and mapping control points and coordinates are based on the 1983 state plane coordinates.

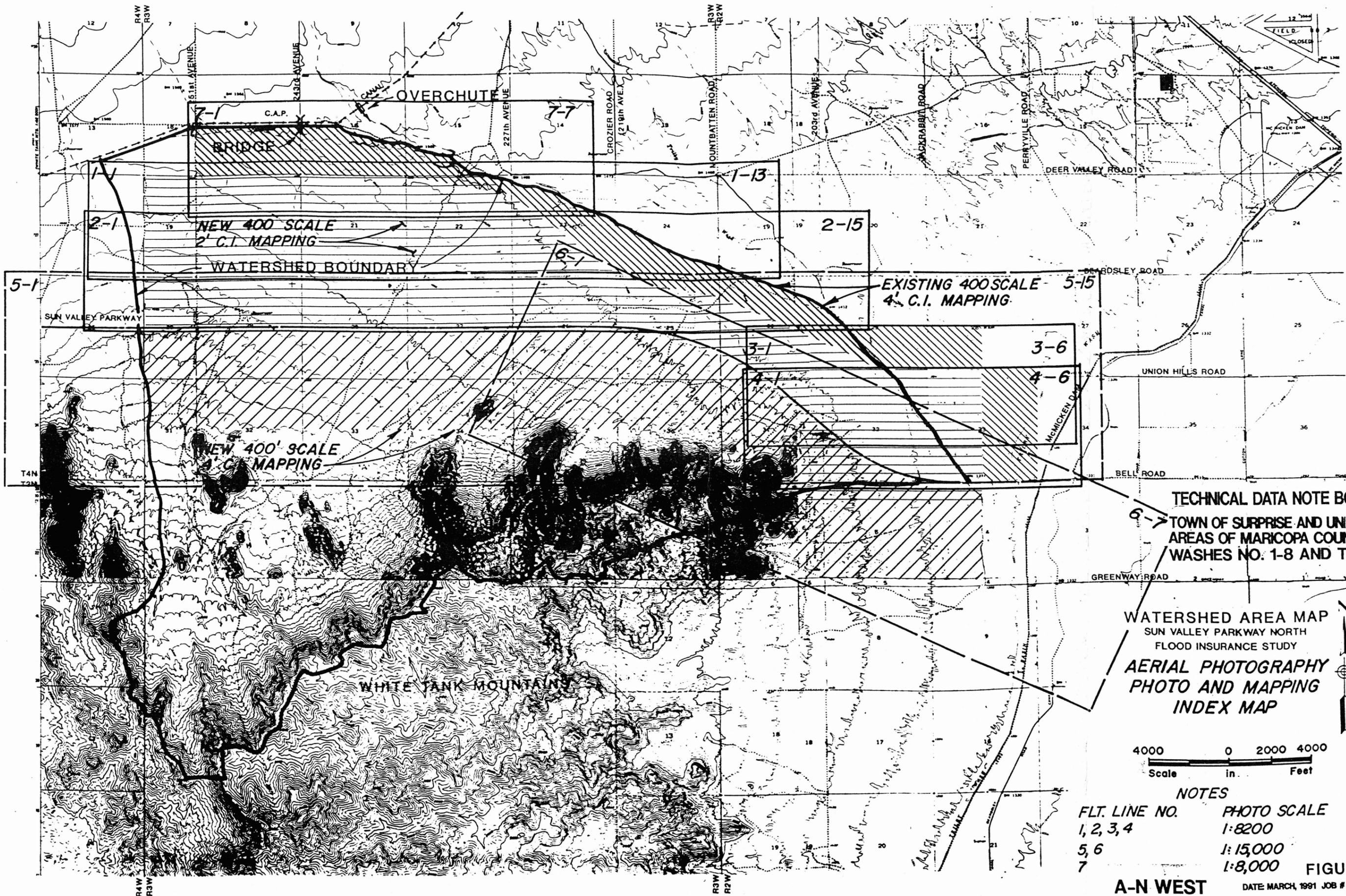
The following registered land surveyors were responsible for establishing horizontal and vertical control for the new mapping on this project.

Survey Supervisor, Ronald L. Vogel, R.L.S., A-N West, Inc. Phoenix, AZ.
Global Position Systems (GPS) Project Manager, Bob Morrison, R.L.S., Hunsacker and Associates.
Field Survey Project Manager, Larry Maldonado, R.L.S., Project Engineering, Phoenix, AZ.

The field survey by Project Engineering to establish control points was performed from September 17, 1990 to October 11, 1990.

Check profiles were performed by A-N West on November 12, 1990.

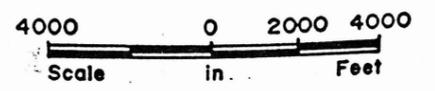
The G.P.S. survey was performed in mid-October and completed on November 5, 1990.



TECHNICAL DATA NOTE BOOK SEC. 2.2

TOWN OF SURPRISE AND UNINCORPORATED
AREAS OF MARICOPA COUNTY, ARIZONA
WASHES NO. 1-8 AND TRIBUTARIES

WATERSHED AREA MAP
SUN VALLEY PARKWAY NORTH
FLOOD INSURANCE STUDY
AERIAL PHOTOGRAPHY
PHOTO AND MAPPING
INDEX MAP



NOTES

FLT. LINE NO.	PHOTO SCALE
1, 2, 3, 4	1:8,200
5, 6	1:15,000
7	1:8,000

A-N WEST
p. 77

FIGURE I
DATE MARCH, 1991 JOB # 7158-01

**TABLE 1
SUMMARY OF PHOTO CONTROL SURVEY RESULTS**

Control Point I.D.	1983 State Plane Coordinates in International Feet from GPS		Panel Elev. from Mapping	Mapping		From GPS by Hunsacker & Assoc.		From Project Engineering's Field Survey		Remarks
				Elev. Ref. Mark No.	Bench Mark Elev.	Monument Elevation	Ground Elevation	Monument Elevation Field Survey	Ground Elevation Field Survey	
	Northing	Easting								
9000	962715.873	523586.280								Triangulation Station 'FRIA'
9101	962910.788	523996.700	1461.03	35	1461.03	1461.03	1461.03			
9102	976493.177	505677.112	1500.21			1500.21	1500.21			
9103	969295.692	516815.500	1464.83	29	1464.83	1464.83	1464.83			
9104	965753.115	527235.554	1399.99	33	1400.01	1400.01	1399.99			
9105	972331.613	513242.203	1474.99	17	1474.99	1474.99	1474.99			
9106	979144.718	505395.038	1519.11			1519.11	1519.11			
9107	979068.144	502812.596	1521.94			1521.99	1521.94			
9109	963194.443	528989.333	1388.31	32	1388.31	1388.31	1388.31			
9110	963673.362	526807.708	1411.95	34	1411.95	1411.95	1411.95			
9111	968311.647	520226.557	1445.34	27	1445.34	1445.34	1445.34			
9113	961175.162	525935.168	1440.74			1440.67	1440.67	1440.745	1440.745	
9114	967022.201	523719.786	1427.26			1427.26	1427.26			
9116	976400.473	508084.107	1491.77			1491.77	1491.77	1491.773	1491.773	Given Elev. for GPS
9117	976384.981	513366.875	1472.94	18	1473.808	1472.94	1472.94	1473.808		
9118	979085.945	497574.669	1543.22	1	1543.22	1543.22	1543.22			
9119	957776.726	531372.790	1362.30			1362.30	1362.30	1362.30	1362.30	Given Elev. for GPS
9120	971181.383	518573.678	1438.66	16	1438.66	1438.66	1438.66	1438.66	1438.66	Given Elev. for GPS
9121	971125.094	513252.554	1483.51			1483.51	1483.51			
9122	960360.586	531499.234	1365.64	37	1365.67	1365.57	1365.57	1365.638	1365.638	
9123	973755.707	510684.247	1487.03	9	1487.03	1487.03	1487.03			
9124	979135.406	495050.496	1547.39	8	1547.39	1547.39	1547.39			
9125	979264.946	500466.070	1538.66	15	1538.76	1538.76	1538.66			
9203	962926.207	531484.511	1363.59	31	1363.59	1363.56	1363.21	1363.594	1363.594	
9204	965655.454	531644.274	1366.90	30	1367.00	1367.00	1366.90	1367.001	1366.90	Given Elev. for GPS
9205	960415.118	528947.191	1391.48			1391.88	1391.48			
9213	965758.167	523695.909	1439.11			1440.11	1439.11			Common Pt. (Witman ADMS) BC=1440.03 RM#27, Pt. No. 325
9216	965781.782	520880.155	1471.23			1470.86	1471.36	1470.878	1471.23	
9219	967220.081	518541.730	1468.67	28	1468.31	1468.31	1468.81	1468.308	1468.67	Given Elev. for GPS
9223	971101.249	515942.183	1462.68			1463.13	1462.68			
9225	968474.965	513275.621	1501.47			1500.87	1501.47	1500.851		
9229	968477.785	510641.548	1526.44	24	1525.77	1525.69	1526.49	1525.772	1526.44	
9230	971106.211	510673.424	1501.43	23	1502.58	1502.58	1501.43			
9232	976365.384	510714.272	1489.28			1489.34	1489.34	1489.282	1489.282	
9238	968494.205	505372.068	1572.27	25	1571.33	1571.33	1572.33	1571.415	1572.27	
9242	968519.539	500094.686	1617.38	20	1616.87	1616.87	1617.57	1616.872	1617.38	Given Elev. for GPS
9243	968547.059	494816.889	1647.68	21	1647.32	1646.90	1647.50	1647.323	1647.68	
9244	968571.336	489515.449	1674.22	22	1674.12	1674.12	1674.22	1674.118	1674.32	Given Elev. for GPS
9301	971199.995	492193.323	1633.82	5	1634.88	1634.88	1633.82			
9302	973848.714	492214.847	1600.04	6	1600.04	1600.04	1600.04			
9303	976408.301	492216.416	1579.81	7	1579.81	1579.81	1579.81	1579.842	1579.842	
9304	979023.367	492205.716	1559.70			1559.8	1559.70			
9305	971213.618	489533.240	1636.39			1637.03	1636.39	1636.985	1636.33	
9306	972533.142	489532.186	1618.89			1618.89	1618.89	1618.871	1618.871	
9307	973859.565	489559.039	1604.44			1604.44	1604.44	1606.653	1604.44	
9308	976493.470	489571.925	1581.73			1582.15	1581.73	1582.152	1581.66	Given Elev. for GPS
9309	971173.912	497477.453	1601.72	4	1602.77	1602.95	1601.89	1602.770	1601.72	
9310	973847.101	497538.573	1574.29	3	1574.29	1574.29	1574.29	1574.61	1574.615	
9311	976454.501	497527.043	1550.80	2	1552.49	1550.80	1550.80	1552.489	1551.13	
9312	971187.929	495060.991	1616.78			1616.78	1616.78			
9313	972459.009	495109.560	1600.85			1600.85	1600.85			
9314	974564.088	495133.285	1579.83			1579.83	1579.83	1580.099	1580.099	
9315	976465.616	494881.573	1563.28			1564.17	1563.28			
9316	971160.498	500120.082	1586.50	19	1587.42	1587.42	1586.50			
9317	972319.376	500145.254	1572.62	12	1572.62	1572.62	1572.62			
9318	974419.730	500025.394	1557.19	13	1557.33	1557.19	1557.19	1557.329	1557.329	
9319	976442.633	500162.837	1542.79			1544.01	1542.69			
9320	971147.256	502758.099	1570.47	26	1571.61	1571.61	1570.47			
9321	973788.679	502778.721	1542.83			1543.48	1542.83			
9322	976428.329	502796.833	1517.95	14	1519.13	1518.73	1517.59	1519.129	1517.95	
9323	971135.884	505396.755	1543.38	11	1544.73	1544.73	1543.38			
9324	973841.065	505533.308	1524.18			1524.21	1523.71	1524.185	1524.185	
9325	972408.511	508075.893	1514.79			1514.56	1514.51	1514.79	1514.79	
9326	973760.108	508051.747	1508.25	10	1509.42	1509.42	1508.18	1509.421	1508.25	Common Pt. (Witman ADMS) BC=1409.51 RM#43, Pt. No. 316
9327	969311.556	523972.087	1411.22	36	1411.78	1411.77	1411.22	1411.783		
9401	957669.726	526406.357	1436.81			1436.81	1436.81			
9402	960287.556	523626.559	1487.89			1488.05	1487.89			
9403	963050.088	520933.097	1524.64			1524.85	1524.85			
9404	965800.706	518529.857	1474.67			1475.72	1474.67			
9405	961652.439	518450.786	1620.57			1620.41	1620.41	1620.41	1620.57	Given Elev. for GPS
9406	965812.113	515901.265	513.78			1515.34	1513.78			
9407	965823.199	513273.557	1549.10			1550.22	1549.10			
9408	962939.881	513196.842	1660.17			1660.21	1660.17			
9409	965828.463	510627.852	1557.97			1559.84	1557.97			
9410	963283.388	508164.264	1639.19			1639.19	1639.19	1639.19	1639.19	Given Elev. for GPS
9411	965855.633	505323.172	1598.68			1598.68	1598.68			
9412	963222.865	502697.724	1662.54			1664.48	1662.54			
9413	965880.490	500074.563	1649.77			1651.71	1649.77			
9414	965893.095	497436.267	1667.54			1669.69	1667.54			
9415	963251.903	497416.659	1716.89			1717.69	1716.89	1717.69	1716.84	Given Elev. for GPS
9416	965894.607	494779.806	1678.66			1678.81	1678.66			
9417	965892.367	492204.034	1710.78			1710.91	1710.78			
9418	963289.365	489476.837	1769.88			1770.88	1769.88	1770.88	1769.88	Given Elev. for GPS

P. 78
R-IVESTING
Consulting Engineers

RECEIVED: NOVEMBER 5, 1990

Datum: NAD83
Zone: 0202 Arizona Central
State Plane in: International Feet

Coordinate Source [GEO LAB]: c:\geolab\anwest_a.lst

Latitude	Longitude	Northing	Easting	Convergence	Scale factor	Name
33:38'42.11722" N	112:29'46.87056" W	962715.873	523586.280	-0:19'16.250"	0.999935633	9000 - FRIA
33:40'30.36161" N	112:35'58.82500" W	973848.714	492214.847	-0:22'43.421"	0.999949433	9302
33:41'21.55446" N	112:35'59.33795" W	979023.367	492205.716	-0:22'44.213"	0.999949437	9304
33:40'30.29418" N	112:36'30.25137" W	973859.565	489559.039	-0:23'00.848"	0.999950705	9307
33:40'55.68402" N	112:35'59.00667" W	976408.301	492216.416	-0:22'43.773"	0.999949432	9303
33:40'56.35253" N	112:36'30.30757" W	976493.470	489571.925	-0:23'01.141"	0.999950698	9308
33:40'04.15607" N	112:35'58.87254" W	971199.995	492193.323	-0:22'43.187"	0.999949443	9301
33:40'04.11581" N	112:36'30.34706" W	971213.618	489533.240	-0:23'00.638"	0.999950717	9305
33:39'37.97419" N	112:36'30.34831" W	968571.336	489515.449	-0:23'00.376"	0.999950726	9244
33:40'17.16994" N	112:36'30.46404" W	972533.142	489532.186	-0:23'00.834"	0.999950718	9306
33:39'12.35207" N	112:30'46.89274" W	965800.706	518529.857	-0:19'49.769"	0.999937705	9404
33:40'16.65805" N	112:31'49.90439" W	972331.613	513242.203	-0:20'25.264"	0.999939934	9105
33:40'56.48403" N	112:34'56.16554" W	976454.501	497527.043	-0:22'08.927"	0.999946937	9311
33:38'31.30734" N	112:30'47.54504" W	961652.439	518450.786	-0:19'49.775"	0.999937738	9405
33:38'18.09519" N	112:29'46.23315" W	960287.556	523626.559	-0:19'15.694"	0.999935617	9402
33:39'38.37721" N	112:32'20.40177" W	968477.785	510641.548	-0:20'41.828"	0.999941054	9229
33:40'56.76640" N	112:31'48.71401" W	976384.981	513366.875	-0:20'24.962"	0.999939881	9117
33:38'45.27548" N	112:30'18.27722" W	963050.088	520933.097	-0:19'33.679"	0.999936713	9403
33:39'12.36613" N	112:29'03.90094" W	965753.115	527235.554	-0:18'52.690"	0.999934174	9104
33:38'47.14697" N	112:28'42.98912" W	963194.443	528989.333	-0:18'40.895"	0.999933484	9109
33:39'11.63639" N	112:28'11.73927" W	965655.454	531644.274	-0:18'23.776"	0.999932452	9204
33:38'44.62637" N	112:28'13.45636" W	962926.207	531484.511	-0:18'24.510"	0.999932514	9203
33:38'19.64770" N	112:28'43.30894" W	960415.118	528947.191	-0:18'40.848"	0.999933500	9205
33:39'38.50244" N	112:31'49.23799" W	968474.695	513275.621	-0:20'24.555"	0.999939920	9225
33:40'04.72223" N	112:31'49.69712" W	971125.094	513252.554	-0:20'25.043"	0.999939930	9121
33:38'19.24437" N	112:28'13.11973" W	960360.586	531499.234	-0:18'24.120"	0.999932508	9122
33:37'53.67443" N	112:28'14.45163" W	957776.726	531372.790	-0:18'24.652"	0.999932557	9119
33:39'38.22142" N	112:33'22.74568" W	968494.205	505372.068	-0:21'16.385"	0.999943371	9238
33:39'26.39509" N	112:30'46.84914" W	967220.081	518541.730	-0:19'49.867"	0.999937700	9219
33:39'12.29810" N	112:30'19.08743" W	965781.782	520880.155	-0:19'34.359"	0.999936735	9216
33:38'44.06832" N	112:29'42.02865" W	962910.788	523996.700	-0:19'13.583"	0.999935467	9101
33:38'27.00376" N	112:29'18.98502" W	961175.162	525935.168	-0:19'00.673"	0.999934691	9113
33:39'38.08060" N	112:35'27.62629" W	968547.059	494816.889	-0:22'25.608"	0.999948203	9243
33:39'38.14459" N	112:34'25.18354" W	968519.539	500094.686	-0:21'50.995"	0.999945755	9242
33:40'56.55663" N	112:33'53.80182" W	976428.329	502796.833	-0:21'34.338"	0.999944526	9322
33:41'24.47420" N	112:34'21.59686" W	979264.946	500466.070	-0:21'50.020"	0.999945585	9125
33:41'23.59064" N	112:33'23.25414" W	979144.718	505395.038	-0:21'17.646"	0.999943360	9106
33:41'22.67378" N	112:33'53.81134" W	979068.144	502812.596	-0:21'34.589"	0.999944519	9107
33:40'15.74030" N	112:34'24.87101" W	972319.376	500145.254	-0:21'51.181"	0.999945732	9317
33:40'30.44094" N	112:33'53.82015" W	973788.679	502778.721	-0:21'34.102"	0.999944534	9321
33:40'36.51195" N	112:34'26.44732" W	974419.730	500025.394	-0:21'52.253"	0.999945786	9318
33:40'57.37569" N	112:33'19.72176" W	976493.177	505677.112	-0:21'15.443"	0.999943235	9102
33:40'31.12899" N	112:33'21.22934" W	973841.065	505533.308	-0:21'16.036"	0.999943299	9324
33:40'04.38283" N	112:32'20.21187" W	971106.211	510673.424	-0:20'41.958"	0.999941040	9230
33:40'56.41557" N	112:32'20.10329" W	976365.384	510714.272	-0:20'42.368"	0.999941022	9232
33:40'56.60489" N	112:32'51.23090" W	976400.473	508084.107	-0:20'59.634"	0.999942170	9116
33:40'30.59561" N	112:32'20.27260" W	973755.707	510684.247	-0:20'42.229"	0.999941035	9123
33:40'05.58733" N	112:30'46.74155" W	971181.383	518573.678	-0:19'50.146"	0.999937687	9120
33:40'04.64323" N	112:31'17.87188" W	971101.249	515942.183	-0:20'07.390"	0.999938788	9223
33:39'46.83077" N	112:31'07.41437" W	969295.692	516815.500	-0:20'01.444"	0.999938421	9103
33:39'47.39207" N	112:29'42.74349" W	969311.556	523972.087	-0:19'14.511"	0.999935477	9327
33:39'12.22183" N	112:29'45.77542" W	965758.167	523695.909	-0:19'15.896"	0.999935589	9213

33:39'24.72870" N	112:29'45.57676" W	967022.201	523719.786	-0:19'15.891"	0.999935579	9114
33:39'37.29002" N	112:30'26.99055" W	968311.647	520226.557	-0:19'38.953"	0.999937003	9111
33:38'51.76706" N	112:29'08.82696" W	963673.362	526807.708	-0:18'55.250"	0.999934344	9110
33:40'56.53353" N	112:34'24.97316" W	976442.633	500162.837	-0:21'51.627"	0.999945723	9319
33:40'04.27372" N	112:34'25.08168" W	971160.498	500120.082	-0:21'51.188"	0.999945743	9316
33:40'04.30752" N	112:33'53.86808" W	971147.256	502758.099	-0:21'33.883"	0.999944544	9320
33:40'30.48121" N	112:32'51.42303" W	973760.108	508051.747	-0:20'59.501"	0.999942185	9326
33:40'17.11100" N	112:32'51.03967" W	972408.511	508075.893	-0:20'59.166"	0.999942174	9325
33:40'04.35768" N	112:33'22.64702" W	971135.884	505396.755	-0:21'16.573"	0.999943360	9323
33:40'16.80103" N	112:35'24.46534" W	972459.009	495109.560	-0:22'24.235"	0.999948065	9313
33:40'04.22291" N	112:35'24.94199" W	971187.929	495060.991	-0:22'24.376"	0.999948088	9312
33:40'30.68934" N	112:34'55.83035" W	973847.101	497538.573	-0:22'08.491"	0.999946932	9310
33:40'37.62842" N	112:35'24.34695" W	974564.088	495133.285	-0:22'24.373"	0.999948054	9314
33:40'56.42426" N	112:35'27.47232" W	976465.616	494881.573	-0:22'26.290"	0.999948172	9315
33:38'45.86129" N	112:34'56.46554" W	963251.903	497416.659	-0:22'07.830"	0.999946989	9415
33:39'11.99240" N	112:34'56.43474" W	965893.095	497436.267	-0:22'08.066"	0.999946980	9414
33:39'12.03466" N	112:34'25.22317" W	965880.490	500074.563	-0:21'50.768"	0.999945764	9413
33:39'11.64760" N	112:35'58.33094" W	965892.367	492204.034	-0:22'42.366"	0.999949438	9417
33:38'45.71633" N	112:36'30.38699" W	963289.365	489476.837	-0:22'59.872"	0.999950745	9418
33:39'11.83703" N	112:35'27.86029" W	965894.607	494779.806	-0:22'25.481"	0.999948220	9416
33:41'22.84775" N	112:35'25.67941" W	979135.406	495050.496	-0:22'25.554"	0.999948093	9124
33:41'22.52032" N	112:34'55.80257" W	979085.945	497574.669	-0:22'08.977"	0.999946915	9118
33:39'12.16592" N	112:32'20.37512" W	965828.463	510627.852	-0:20'41.576"	0.999941060	9409
33:38'43.74024" N	112:31'49.78124" W	962939.881	513196.842	-0:20'24.367"	0.999939954	9408
33:39'12.31383" N	112:31'17.98974" W	965812.113	515901.265	-0:20'07.003"	0.999938805	9406
33:39'12.27030" N	112:31'49.07620" W	965823.199	513273.557	-0:20'24.231"	0.999939921	9407
33:39'12.11439" N	112:33'23.13097" W	965855.633	505323.172	-0:21'16.356"	0.999943393	9411
33:38'46.83913" N	112:32'49.33561" W	963283.388	508164.264	-0:20'57.395"	0.999942135	9410
33:38'45.90597" N	112:33'53.99441" W	963222.865	502697.724	-0:21'33.214"	0.999944571	9412
33:40'04.23913" N	112:34'56.34981" W	971173.912	497477.453	-0:22'08.524"	0.999946961	9309
33:37'52.34881" N	112:29'13.18302" W	957669.726	526406.357	-0:18'57.171"	0.999934503	9401

TABLE 2

TECHNICAL DATA NOTEBOOK
SECTION 2.3
SUN VALLEY PARKWAY N. FIS
TOWN OF SURPRISE AND
UNINCORP. AREAS OF
MARICOPA CO. ARIZONA
WASHES NO. 1-8 AND TRIBS.
A-N WEST, INC NO. 7758-01
GPS RESULTS FROM
HUNSACKER AND ASSOC.
COORDINATES FOR MAPPING
ON 1983 STATE PLANE BASE

P. 79

HUNSAKER & ASSOC.
 GPS SURVEY RESULTS
 GROUND ELEVATION
 CLIENT: AN WEST
 10 OCT., 1990

STATION	MON. EL.	UP\DOWN	GROUND
9326	1509.42	1.24	1508.18
<u>9116</u>	1491.77	0.00	1491.77
<u>9232</u>	1489.34	0.00	1489.34
9123	1487.03	0.00	1487.03
9230	1502.58	1.15	1501.43
9229	1525.69	-0.80	1526.49
9409	1559.84	1.87	1557.97
9408	1660.21	0.04	1660.17
9407	1550.22	1.12	1549.1
9225	1500.87	-0.60	1501.47
9121	1483.51	0.00	1483.51
9105	1474.99	0.00	1474.99
9117	1472.94	0.00	1472.94
9223	1463.13	0.45	1462.68
9103	1464.83	0.00	1464.83
9406	1515.34	1.56	1513.78
<u>9405</u>	1620.41	0.00	1620.41
9404	1475.72	1.05	1474.67
9219	1468.31	-0.50	1468.81
<u>9120</u>	1438.66	0.00	1438.66
9111	1445.34	0.00	1445.34
9216	1470.86	-0.50	1471.36
9403	1524.85	0.21	1524.64
9402	1488.05	0.16	1487.89
9101	1461.03	0.00	1461.03
9213	1440.11	1.00	1439.11
9114	1427.26	0.00	1427.26
9327	1411.77	0.55	1411.22
9104	1400.01	0.02	1399.99
9110	1411.95	0.00	1411.95
9113	1440.67	0.00	1440.67
9401	1436.81	0.00	1436.81
<u>9119</u>	1362.3	0.00	1362.3
9205	1391.88	0.40	1391.48
9109	1388.31	0.00	1388.31
<u>9204</u>	1367	0.10	1366.9
9203	1363.56	0.35	1363.21
9122	1363.57	0.00	1363.57

Explanation
9116 Underlined Points Indicate
 Points Where Monument Elevs.
 were given to GPS
 Consultant (Hunsacker)
 By A-N West

Table 3
 Technical Data Notebook
 Section 2.3

Sun Valley Parkway N. F.I.S.
 Town of Surprise and Portions
 of Unincorp. Maricopa Co, AZ.
 Washes No. 1-8 and Tributaries
 A-N West, Inc No. 7158-01

GPS Results From Hunsacker
 and Assoc.

Monument and Panel Elevations
 on N.G.V.D 1929 For Mapping.

HUNSAKER & ASSOC.
 GPS SURVEY RESULTS
 GROUND ELEVATION
 CLIENT: AN WEST
 10 OCT., 1990

STATION	MON. EL.	UP\DOWN	GROUND
<u>9308</u>	1582.15	0.42	1581.73
9307	1604.44	0.00	1604.44
9306	1618.89	0.00	1618.89
9305	1637.03	0.64	1636.39
<u>9244</u>	1674.12	-0.10	1674.22
<u>9418</u>	1770.88	1.00	1769.88
<u>9417</u>	1710.91	0.13	1710.78
9301	1634.88	1.06	1633.82
9302	1600.04	0.00	1600.04
9303	1579.81	0.00	1579.81
9304	1559.8	0.10	1559.7
9124	1547.39	0.00	1547.39
9315	1564.17	0.89	1563.28
9314	1579.83	0.00	1579.83
9313	1600.85	0.00	1600.85
9312	1616.78	0.00	1616.78
9243	1646.9	-0.60	1647.5
9416	1678.81	0.15	1678.66
<u>9415</u>	1717.69	0.80	1716.89
<u>9414</u>	1669.69	2.15	1667.54
9309	1602.95	1.06	1601.89
9310	1574.29	0.00	1574.29
9311	1550.8	0.00	1550.8
9118	1543.22	0.00	1543.22
9125	1538.76	0.10	1538.66
9319	1544.01	1.32	1542.69
9318	1557.19	0.00	1557.19
9317	1572.62	0.00	1572.62
9316	1587.42	0.92	1586.5
<u>9242</u>	1616.87	-0.70	1617.57
9413	1651.71	1.94	1649.77
9412	1664.48	1.94	1662.54
9320	1571.61	1.14	1570.47
9321	1543.48	0.65	1542.83
9322	1518.73	1.14	1517.59
9107	1521.99	0.05	1521.94
9106	1519.11	0.00	1519.11
9102	1500.21	0.00	1500.21
9324	1524.21	0.50	1523.71
9323	1544.73	1.35	1543.38
9238	1571.33	-1.00	1572.33
9411	1598.68	0.00	1598.68
<u>9410</u>	1639.19	0.00	1639.19
<u>9325</u>	1514.56	0.05	1514.51

1/2 REBAR EAST OF GLO MONU

Table 3

sht. 2 of 2



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Field Survey Notes By
Project Engineering, Phx. Az.
Dates: Sept 17 to Oct. 11, 1990

TECHNICAL DATA NOTEBOOK
SECTION 2.3

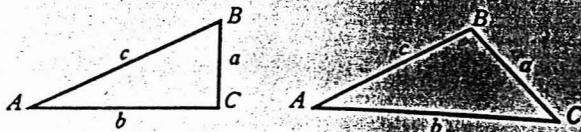
Sun Valley Parkway N. FIS
Town of Surprise and Portions
of Unincorp. Maricopa Co.
Washes No 1-8 and Tributaries
A-N West Inc No. 7158-01

Sun Valley Parkway
 **LIETZ**
SINCE 1882

ECONOMY FIELD BOOK

No. 8152-05

FORMULAE FOR SOLVING RIGHT TRIANGLES



$$\sin A = \frac{a}{c} = \cos B \quad \cot A = \frac{b}{a} = \tan B$$

$$\cos A = \frac{b}{c} = \sin B \quad \sec A = \frac{c}{b} = \operatorname{cosec} B$$

$$\tan A = \frac{a}{b} = \cot B \quad \operatorname{cosec} A = \frac{c}{a} = \sec B$$

Given	Required	Solution
A, c	B, a, b	$B = 90^\circ - A, a = c \sin A, b = c \cos A$
A, b	B, a, c	$B = 90^\circ - A, a = b \tan A, c = \frac{b}{\cos A}$
A, a	B, b, c	$B = 90^\circ - A, b = a \cot A, c = \frac{a}{\sin A}$
a, c	A, B, b	$\sin A = \frac{a}{c}, \cos B = \frac{a}{c}, b = \sqrt{c^2 - a^2} \quad (c > a)$
a, b	A, B, c	$\tan A = \frac{a}{b}, \cot B = \frac{a}{b}, c = \sqrt{a^2 + b^2}$

FORMULAE FOR SOLVING OBLIQUE TRIANGLES

Given	Required	Solution
A, a, b	B, c	$\sin B = \frac{b \sin A}{a}, c = \frac{a \sin C}{\sin A}$
A, B, a	b, c	$b = \frac{a \sin B}{\sin A}, c = \frac{a \sin C}{\sin A}$
a, b, c	A, B, C	$A + B = 180^\circ - C, c = \frac{a \sin C}{\sin A}$
a, b, c	Area	side $\frac{a^2 + b^2 - c^2}{2}, \text{area} = \sqrt{(s-a)(s-b)(s-c)}$
A, b, c	Area	$\text{area} = \frac{bc \sin A}{2}$
A, B, C, a	Area	$\text{area} = \frac{a^2 \sin B \sin C}{2 \sin A}$

MADE IN U.S.A.

Sur Valley Pkwy
Levels

by

Project Eng. Const.

Surveyed by

Karl Mortensen

Dates

Sept 17 to Oct 11 '90

Index

Item

page

Bench Loop Master Plan

2

Loop 1

3-12

Loop 2

32, 18-20, 33-34

Loop 3

13-17

Loop 4

21-25

Elev's on USGS

Datum from Control:

"49 LC" = 1411.783

"50 LC" = 1459.887

"51 LC" = 1521.960

All Elev's in this

Points S. of Pkwy 26-30

Book have been Adjusted

Trig Level checks 31, 35

Bench Loops Run using a
Pentax AL-M2 Precision

Level with a Parallel plate
micrometer (rated accuracy:

± 0.4 mm for 1 km B&B Run)

Loop 1

Sta	Turn No.	(+)	(-)	Elev.
USGS 49 ^{POB} LC				1411.783
π		5910 6.231		
T.P.#1	1		3.100 2.435	
π		7661 7.143		
T.P.#2	2		2.400 1.880	
π		1139 6.899		
T.P.#3	3		2.936 2.105	
π		6450 6.171		
T.P.#4	4		3.324 3.044	
π		7726 7.253		
T.P.#5	5		2.897 2.426	
π		7501 7.701		
T.P.#6	6		3.805 4.002	
π		8301 6.904		
T.P.#7	7		3.568 2.177	
π		8705 7.947		
T.P.#8	8		2.566 1.816	
π		10339 8.545		
T.P.#9	9		2.379 0.602	
π		12262 12.152		
T.P.#10	10		1.937 1.827	
π		9131 7.646		
PK in North Curb #11	11		4.534 3.046	
MP129.75				

USGS Datum

~~1411.783~~
~~1411.781~~
~~1411.781~~

~~1411.783~~
~~1411.781~~
~~1411.781~~

~~1411.783~~
~~1411.781~~
~~1411.781~~

85

98

Sta	Turn No	(+)	(-)	Elev.	Loop 1
MP 129.75					
PT# 11					
π		3.819			
		3.768			
PT# 12	12		5.321		
		4.523		5.201	
π		3.955			
MCHD B.C. (N.E. Corner)	ERM 13		5.987	1468.108	MCHD B.C. North H.W. Elevation stamped 1469.55
π		4.700			MP 129.7 (N.E. Corner)
T.P.# 13	14			5.149	
π		3.775			
T.P.# 14	15			5.085	
π		3.854			
MCHD B.C. (N.E. Corner)	ERM 16			6.710	1463.489
π		5.677			MCHD B.C. North H.W. Elevation stamped 1464.92
T.P.# 15	17			5.295	MP 129.50 (N.E. Corner)
π		4.246			
T.P.# 16	18			3.633	
π		6.529			
MCHD B.C. in H.H.	ERM 19			2.702	1468.308
π		5.956			MCHD B.C. in H.H. Med & Turn out. Panel = 1468.67
T.P.# 17	20			2.829	H = 0.36' (MP 129.75) on W. Line See B0
π		6.390			
T.P.# 18	21			2.922	
π		5.905			
MCHD B.C. (N.W. Corner)	ERM 22			5.069	1475.736
					MCHD B.C. in North H.W. Elevation stamped 1477.17
					MP 128.95 (N.W. Corner)

$\begin{array}{r} +28.781 \\ -28.574 \\ \hline *0.207 \\ \text{6 turns} \end{array}$

Sta Turn No. (+) (-) Elev.

MCHD B.C. (N.W. Corner) 1475.736

7.820
7.256

T.P.# 19 23 3.521
3.460

5.261
5.573

T.P.# 20 24 4.007
3.630

5.724
5.514

T.P.# 21 25 3.767
3.561

5.717
5.627

T.P.# 22 26 3.956
3.863

5.234
5.009

MCHD B.C. (N.E. Corner) 1484.410

6.008
7.065

T.P.# 23 28 3.765

6.311

MCHD B.C. (N.W. Corner) 1489.934

ERM 27
7.616

T.P.# 24 30 2.729

6.355

T.P.# 25 31 3.947

5.108

T.P.# 26 32 4.019

5.001

MCHD B.C. (Flush) 1499.759

ERM 33
3.555

Loop 1

5

MCHD B.C. in North H.W. ^{Stamped} Elev 1477.17
MP 128.95 (N.W. Corner)

MCHD B.C. in North H.W. ^{Stamped} Elev 1485.76
MP 128.60 (N.E. Corner)

MCHD B.C. in North H.W. ^{Stamped} Elev 1491.30
MP 128.50 (N.W. Corner)

MCHD B.C. (Flush) Med & Turn out
MP 128.25

87

Sta	Turn No.	(+)	(-)	Elev	Loop 1
MCHD B.C. (Flush)				1499.759	MCHD B.C. (Flush) Med & Turnout MP 128.25
MCHD B.C. in HH	ERM 34	4.665	3.571	1500.851	MCHD B.C. in HH Med & Approx 1/4 Cor. MP 128.2
MCHD B.C. (Flush)	ERM 35	5.079	2.916	1503.013	MCHD B.C. (Flush) Med & P.T.
T.P. #27	36	5.864	3.086		200' ± E of MP 128 (AK N EP)
		7.317			
TP 28	37		2.987		AK N EP
		7.366			
TP 29	38		3.067		AK N EP
		7.159			
TP 30	39		2.805		PK N EP
		7.016			
TP 31	40		3.401		PK N EP
		6.639			
ERM	41		3.249	1525.772	MCHD BC ^{HP} Med & Pkwy Center Sec 26 (Panel) Down 0.67 below Rim of 1525.44
		6.357			
ERM	42		5.088	1527.040	BC NW Cor Box Culvert Top Head wall stamped: 1528.37
		7.901			
TP 32	43		3.772		AK N EP
		6.696			
TP 33	44		3.506		PK N EP
		6.152			

+46.440
-21.511
+24.929
7.400

88

Sta	Turn No	BST	FS -	Elev		Loop 1
ERM	45		7702	1532.805		BC Top of rd. New Cor Box Culvert stamped: 1534.14
		9.575				Standard
TP 34	46		1014		+51.141 -21.305	PK N EP
		7.721			+23.936	
TP 35	47		2464		7 turns	PK N EP
		6.739				
ERM	48		3659	1549.699	↓	BC in HH Med & Parkway Island Brook Down 0.56 from Pave to Panel
		6.371				
TP 36	49		3861			PK N EP
		6.379				
TP 37	50		3688		+45.344 -23.619	PK N EP
		6.490			+21.725	
TP 38	51		3827			PK N EP
		5.180 4.438				
TP 39	52		2073 3323		+44.602 -24.869	PK N EP
		7.364			+19.733	
TP 40	53		2910		7 turns	PK N EP
		7.451				
TP 41	54		3216			PK N EP
		6.109				
ERM	55		4044	1571.415	↓	MCHD BC in HH & Med Parkway Center Sec 27 Down 0.86 Below Rim + Panel of 1572.27
		7.512				
TP 42	56		2980			PK N EP
		7.374				
TP 43	57		2887			PK N EP
		7.276				

Sta	Turn No	BS+	FS-	Elev		LOOP 1
ERM	58		4869	1582.837		BC Top Headwall NW Cor Box Culvert Stamped: 1584.07
		8.493				
TP 44	59		3069			PK N EP
		7.068				
TP 45	60		3004		$\begin{matrix} +50.607 \\ -23.761 \\ \hline +26.846 \\ \text{1 turn} \end{matrix}$	PK N EP
		6.574				
TP 46	61		2957			PK N EP
		6.310				
ERM	62		4001	1598.247	*	BC in HH Med & Artery Island Break 1/4 Cor Sec 28 + 29 Down 0.30 below Rim + Panel
		6.037				
TP 47	63		3946			PK N EP 60' E of MP 126
		6.282				
TP 48	64		3601			PK N EP
		6.315				
TP 49	65		3690			PK N EP
		6.328			$\begin{matrix} +47.516 \\ -28.882 \\ \hline +18.634 \\ \text{1 turn} \end{matrix}$	
ERM	66		4704	1607.263		BC Top Headwall NW Cor Box Culvert Stamped: 1608.40
		7.302				
TP 50	67		4131			PK N EP
		6.026				
ERM	68		5676	1610.782		BC Top Headwall NW Cor Box Culvert Stamped 1611.88
		9.226				
ERM	69		3134	1616.872	*	BC in HH & Med Artery Center Sec 28 Down 0.51 Below Rim (Panel 1617.38) + Panel
		5.601				
ERM	70		5700	1616.772		BC Top Headwall NW Cor Box Culvert stamped: 1617.88
		6.999				

Sta	Turn No	BST	FS -	Elev		Loop 1
ERM	71		5496	1618.274		BC Top of Hill NW Cor Ford Culvert Stamped 1619.38
		6505				
TP 51	72		4373			PK N EP
		6267				
TP 52	73		3384			PK N EP
		6456				
ERM	74		2927	1626.814		BC Flush & Parkway Island Break 800' E of 1/4 Cor
		5823				
TP	75		3551			PK N EP
		6315				
ERM	76		3110	1632.289	*	BC in HH & Parkway Island 1/4 Cor Sec 29+28 (see p. 13) 0.50 Parkway
		2311				
TP	77		10374			Hub E Side Trail 300' ± N. of 1/4 Cor above
		3602				
TP	78		6863			Hub E Side Trail
		3360				
TP	79		5205			Hub E Side Trail
		2313				
TP	80		7404			Hub E Side Trail
		3193				
TP	81		6400			Hub E Side Trail
		3139				
TP	82		7391			Hub E Side Trail
		3542				
ERM	83		5333	1602.770	*	GLO BC marked: 520/521 521/522 1.05' above Panel of 1601.72
		1.060				

$\begin{array}{r} + 43.966 \\ - 28.541 \\ \hline + 15.425 \\ \times 1 \text{ turn} \end{array}$

$\begin{array}{r} + 19.460 \\ - 48.970 \\ \hline - 29.510 \end{array}$

16

Sta	Turn No	OS+	FS-	Elev		Loop 1
TP	84		5626			Hub E side trail
		3084				
TP	85		6570			Hub E side trail
		3537 4537				
TP	86		6432			Hub E side trail
		2133				
TP	87		6361			Hub E side trail
		3427				
TP	88		8115			Hub E side trail
		3142				
TP	89		7902			Hub E side trail
		3148				
TP	90		6680	1574.606		Hub Flush with Panel at 1/4 Cor (Loose GLOB marked ^{1/4} 520521)
		5338				
TBM	91		5328	1574.615	+	Rebar Flush & Panel 50'± NE of 1/4 Cor above
		2786				
TP	92		7265			Hub E side fence
		3616				
TP	93		6514			Hub E side trail
		2182				
TP	94		7288			Hub E side fence
		3221				
TP	95		6021			Hub E side fence
		2987				
TP	96		5837			Hub E side trail
		3493				

~~$$\begin{array}{r} 25.807 \\ - 53.014 \\ \hline 27.145 \end{array}$$~~
 8 turns

$$\begin{array}{r} + 24.869 \\ - 52.014 \\ \hline 28.145 \end{array}$$

$$\begin{array}{r} + 23.246 \\ - 45.359 \\ \hline 22.113 \end{array}$$

 7 turns

eb

Loop 1

Sta	Turn No	BS+	FS-	Elev		
TP	97		7236			Hub E Side Fence
		4956				
ERM	98		5198	1552.489	*	G.I.D. BC marked: $\frac{519}{220} \frac{516}{521}$ 1.36' above Panel 3' East Panel = 1551.13
		5061				
TP	99		503.8			Hub 400'± SE of sec Cor Above
		4754				
TP	100		3603			Hub
		8417				
TP	101		3227			Hub
		3436				
TP	102		5670		* 45.214 - 40.364 + H.850 8 turns	Hub
		6284				
TP	103		4581			Hub
		7251				
TP	104		3558			Hub
		5546				
TP	105		7490			Hub
		4485				
TRM	106		7197	1557329	*	1/2" Rebar Flush w. Panel 600'± N of Center sec 21
		3402				
TP	107		8728			Hub 300'± NE of Panel above
		5137				
TP	108		9449			Hub
		4661				
TP	109		8658			Hub
		2967				

93

Sta	Turn No	BS+	FS-	Elev		Loop 1
TP	110		7959			Hub
		6117				
TP	111		6928			Hub
		3566				
TP	112		8136		+32.170 -70.380 -38.190 8 turns	Hub
		3001				
TP	113		7461			Hub
		3339				
ERM	114		13061	1519.129		660 BC marked 516/525 POB of Loop 2 p. 32
		6568 7129				1.18 above Panel of 1517.95
TP	115		6819 7404		+27.787 -24.981 +2.806	Hub
		5758 5978				
TP	116		10026 10746		+27.514 -24.678 +2.836	Hub
		2548 1576				
TP	117		7911 6936		4 turns	Hub
		12933 12831				
End	118		0.191 0.092	1521.960		BR BC on Conc Post stamped: 1522 S/LC 1955 NGS Datum = 1521.960

94

Sta	BS+	FS-		Elev	
POB				1632.289	Turn No. 75 P. 9 BC in HH 1/4 Cor Sec 29 & 28
	6203		↑		
ERM 1		4248		1634.242	BC Top Head wall NW Cor Box Culvert (Not Stamped)
	8142				
TP 2		3153			PK N EP
	6169				
ERM 3		6050	+46.062 -31.017 +150.45	1639.347	BC Top Head wall NW Cor Box Culvert Stamped: 1640.45
	7993				
ERM 4		5620	7 turns	1640.819	BC Top Head wall NW Cor Box Culvert Stamped: 1641.94
	6898				
TP 5		4253			PK N EP
	5860				
TP 6		4170			PK N EP
	5697 5855				
ERM TP 7		3523 3843		1647.323	PK N EP BC in HH & Med. Parkway Center Sec 29 Down 0.35 from Rim & Panel of 1647.68
	6962 7398		↓		
TP 8		2316 2588			PK N EP
	6410				
ERM 9		4251		1654.125	BC Top Head wall NW Cor Box Culvert stamped: 1655.28
	8142				
TP 10		2686			PK N EP
	7432		+50.010 -25.624 +24.386		
ERM 11		5036		1661.974	BC Top Head wall NW Cor Box Culvert Stamped: 1663.11
	8818		7 turns		
TP 12		3569			PK N EP
	6261				

56

96

Sta	BS+	FS-		Elev		
TP 13		3652				Loop 3
	5.885					PK N EP
ERM 14		4,114	↕	1671.598		BC in HH (0.65' below R in) @ Med Outkey 1/4 Cor Sec 30/29
	5.544					
ERM 15		3938				BC Flush @ Med Break Prkey
	3.945					
TP 16		5329				PK N EP 100'± E of MP 124
	5.640					
TP 17		4456				PK N EP
	5.583					
TP 18		4,354				PK N EP
	5.613					
TP 19		4514				PK N EP
	4.855					
ERM 20		6,525		1673.753		BC Top Headwall NW Cor Box Culvert Stamped: 1674.88
	5.239					
ERM 21		4872	↕	1674.118		6x0 BC in HH @ med Prkey W 1/4 Cor Sec 30 0.20 Below Rim Panel of 1674.32
	0.727					
TP 22		7,547				Hub 350'± N of 1/4 Cor Culvert
	5.072					
TP 23		10,211				Hub
	3.930					
TP 24		7,627				Hub
	2.122					
TP 25		9,667				Hub
	2.035					

+36.419
-33.988

+2.431

7 turns

+20.094
-57.216

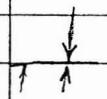
-37.122

7 turns

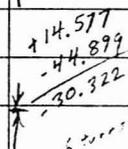
Loop 3

67

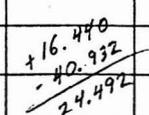
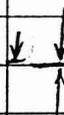
Sta	BS+	FS-	Flor	
TP 26	2464	7503		Hub
TP 27	3744	7991		Hub
ERM 28	0909	6670	1636.985	GLO BC marked $\frac{524}{525} \frac{519}{520}$ 0.65 above Panel of 1636.33
TP 29	2278	7100		Hub E side Fence
TP 30	2389	7834		Hub E side Fence
TBM 31	3808	8751	1618.871	$\frac{1}{2}$ " Rebar Flush with Panel 10' W. of Fence Cor
TP 32	2588	7447		Hub E side Fence
TP 33	2605	7327		Hub E side Fence
ERM 34	1641	6440	1606.653	GLO BC marked: $\frac{1}{4}$ $\frac{524}{520}$ 1.85 above BC panel of 1604.80 and 2.21 above Panel 10' NE of 1604.74
TP 35	2121	7344		Hub E side Fence
TP 36	2695	7399		Hub E side Fence
TP 37	3334	6862		Hub E side Wash
TP 38	2975	7073		Hub E side Wash by Trail



-8.189



-2.213



6 turn

Sta	BS +	FS -		Elev	Loop 3
TP 39		6,681			Hub by trail
	3,674				
ERM 40		5,573	↓	1582.152	GLO BC marked: $\frac{513}{524} \frac{18}{519}$ 0.49 above corner of 1581.66
	5,005		↑		
TP 41		5,169			Hub 400' ± E of Sec Cor above
	4,727				
TP 42		4,937			Hub
	4,840				
TP 43		4,977			Hub
	6,274				
TP 44		5,109			Hub
	4,194				
TP 45		5,058			Hub
	4,942				
TBM 46		7,032	↓	1579.842	1/2" Rebar flush w. Panel approx NW Cor Sec 20
	4,551		↑		
TP 47		6,199			Hub S side trail towards E. 1/4 Cor. Sec 20
	3,344				
TP 48		4,984			Hub N side trail
	4,789				
TP 49		5,244			Hub by trail
	5,666				
TP 50		4,654			Hub by trail
	5,611				
TP 51		5,078			Hub by trail
	5,427				

+29.982
-32.282
-2.300
6 turns

+40.621
-40.352
+0.269

+40.421
-38.352
+2.069
8 turns

86

Sta	BS+	FS-		Elev	
TP 52		5440			Loop 3 Hub by trail
	5.060				
TP 53		4484			Hub by trail
	6.173				
TBM 54		4269	↓	1580.099	1/2" Rebar flush w. Panel 600'± N. of Center Sec 20
	4.576		↑		
TP 55		5693			Hub by trail
	5.072				
TP 56		5713			Hub by trail
	4.619				
TP 57		4761			Hub by trail
	4.832				
					+28.879 -34.353 ----- -5.474 6 turns
TP 58		5498			Hub by trail
	6.341				
TP 59		5715			Hub by Power Line trail
	3.439				
End 60		6973	↓	1574.615	Turn No 91 p 10 (1/2" Rebar in Panel 50'± NE of E 1/4 Cor Sec 20) End Loop 3

606

Sta	BS +	FS -	Elev.	Loop 2 (Btm Page)
POB			1549.699	Turn No. 4B p 7 BC in 1/4 W 1/4 Cor sec 26
	0947			
TP 1		9597		Hub 400' ± N of 1/4 Cor above
	2933			
TP 2		6523		Hub
	3034			
TP 3		7821		Hub
	5090			
TP 4		6933		Hub
	3665			
TP 5		6282		Hub 200' ± S of BLM BC (Disturbed) marked $\frac{522}{527} \frac{523}{528}$
	3432			
TP 6		8186		Hub 250' ± N of BLM BC above
	2619			
TP 7		7519		Hub
	3764			
TP 8		7193		Hub
	4890			
TRM 9		6385	1514.79	1/2" Rebar Flush w. Panel approx 1/16 Cor
	6077			
TP 10		6428		Hub
	4821			
TP 11		7286		Hub
	4928			
ERM 12	230 3259	5295	1509.421	6" BC marked: $\frac{522}{523} \frac{524}{525}$ 1.17 above Panel of 15.08.25

See page 35
-40.13

~~46.206~~
~~85.378~~
~~52.178~~
12 turns

100

Sta	BS+	FS-	Elev	Loop 2
TP 13	2.97 3633	6.89 7854		Hub
TP 14	2.64 3431	6.55 7212	119.145 -56.86 11.035	Hub
TP 15	2.91 3303	7.62 8416	+23.733 -41.390 -17.657	Hub
TP 16	3.165 2918	5.97 6365	6 turns	Hub
TP 17	5.20 7189	8.21 7953		Hub N Bank west 100' E of Sec Line
TBM 18	3382 3425	1.62 3590	↓ 1491.773 ↑	Alum Cap Flush w Panel near NW Cor Sec 23
TP 19	4.637 4760	6.504 6549	+27.817 -32.328 -2.509	Hub by trail 400' E of Panel above
TP 20	6.295 6437	5.001 5113	Av. 2.508	Hub by trail
TP 21	5.280 6034	3214 3343	+30.956 -33.443 -2.491	Top Rebar in small Rock pile (1/6 Cor)
TP 22	4.383 4420	7.902 8663	6 turns	Nail by trail
TP 23	5840 5880	2.760 2799		Hub by trail
TBM 24	3659 3388	6.945 6980	↓ 1489282	Rebar Flush w Panel Next N 1/4 Cor Sec 23
TP 25	4247 4041	6.029 5768		Hub by Trail

Sta	BS +	FS -		Elev	
TP 26		6170			Loop 2
	2443	5989	+20.978		Hub by trail
	2338		-16.472		
			-15.474		
TP 27		8150			Hub by trail
	2745	8041	Avg -15.482		
	2376		+20.317		
TP 28		6827	-33.191		Hub by trail
	2013	6451	-15.474		
	2096		6 turns		
TP 29		5521			Hub by trail
	5905	5607			
	6078				
End 30		3781	↓	1473.808	BR BC stamped: "H4 ¹⁴⁷⁸ 1471" near NE Cor Sec 23
	6829	3935			
					for Loop 2 turn to page 33

Sta	BST	FS-	Elev		Loop 4
POB			1468.108		Turn No 13 p. 4 BC in Head wall stamped 1469.55
	6689				
ERM 1		3919	1470.878		BC in HI Med & Prkwy Approx S Line Sec 30 Down 0.35 from Rim & Panel of 1471.23
	5.069				
TP 2		4237			PK N EP (200' + E of Turn No 11, p 4)
	5638				
TP 3		4307			PK N EP
	5881				
ERM 4		3188	1475.735		BC in Conc (Flush) Med & PC of Prkwy
	4820				
TP 5		4178			PK N EP 200' + E of MP 130
	5789				
ERM 6		7979	1474.187		BC top Head wall N/W Cor Box Culvert Stamped: 1475.63
	8187 9581				
TP 7		5729			PK N EP
	5772 4044	4305			
ERM 8		8154	1474.263		BC Top Head wall SE Cor Box Culvert Stamped: 1475.92
	4175				
TP 9		6755			PK N EP
	3057				
ERM 10		6615	1468.125		BC Flush in pipe & Prkwy Med Break Approx E. Line Sec 31
	2171				
TP 11		7712			PK N EP Adjacent to "Frida" Ter Sta on Hill
	2204				
TP 12		8658			PK N EP
	1.924				

$\begin{matrix} \times 55.077 \\ 55.061 \\ \hline \times 0.016 \\ \hline 54.748 \\ - 9.912 \\ \hline 44.836 \\ \hline 10 \text{ turns} \end{matrix}$

$\begin{matrix} \times 18.695 \\ - 32.591 \\ \hline - 13.896 \\ \hline 5 \text{ turns} \end{matrix}$

103

Sta	BS+	FS-	Elev	
ERM 13		9978	1448.077	Loop 4
	8460			BC top Head Wall N.W. Cor Box Culvert (not stamped)
TP 14		5787		PK N. EP
	3936			
ERM 15		5456	1449.230	BC in Conc (Flush) Med of Parkway PC
	2289			
TP 16		6509		PK N. EP
	2593			
TBM 17		6858	1440.745	Alum Cap. in Med of Parkway Flush w Panel at MP 131
	0587			
TP 18		9205		PK N. EP
	0921			
TP 19		8869		PK N. EP
	1247			
TP 20		8996		PK N. EP
	1074			
TP 21		8933		PK N. EP
	1699			
TP 22		7841		PK N. EP
	2277			
TP 23		7586		PK N. EP
	2335			
ERM 24		6695	1392.761	BC Flush Med of Parkway PC approx N. Line Sec 4
	2012			
TP 25		7802		PK N. EP
	2479			

$\begin{array}{r} +15.022 \\ -11.492 \\ \hline 56.470 \\ 9 \text{ turns} \end{array}$

Sta	BS+	FS-	Elev	Loop 4
TP 26		7833		PK N EP
	2452			
TP 27		7068		PK N EP
	3064			
TP 28		7173		PK N EP
	2954			
TP 29		7024		PK N EP
	3533			
TP 30		6595		PK N EP
	4104			
ERM 31		6090	1363.725	E BC (of 2) Med E Pkwy "turn outs." Matching Fence
	5676			Lines to the N of S Approx Mid Sec Line
TBM 32		3813	1365.638	Alum Cap Flush w Panel near N 1/4 Cor Sec 4
	3791			
TP 33		6973		Hub by trail 400' E N of Panel above
	5154			
TP 34		5522		Hub by trail
	5841			
TP 35		5388		Hub by trail
	5085			
TP 36		5194		Hub by trail
	5177			
TBM 37		4016	1363.594	Alum Cap Flush w Panel Approx Center Sec 33
	4542			
TP 38		5207		Hub by trail
	6501			

105

$$\begin{array}{r} \times 20.598 \\ - 42.585 \\ \hline - 28.987 \\ \text{7 turns} \end{array}$$

$$\begin{array}{r} \times 30.724 \\ - 30.906 \\ \hline - 0.182 \\ \text{6 turns} \end{array}$$

Sta	Bst	Fs		Elev	
TP 39		5664			Loop 4
	4607				Hub by trail
TP 40		5333	$\begin{array}{r} +27.222 \\ -25.892 \\ \hline \times 3.4335 \end{array}$		Hub by trail
	5022				
TP 41		3483	SWMS		Hub by trail
	6560				
TRM 42		4139	\downarrow	1367.001	$\frac{1}{2}$ " Pipe O.D. above Panel ^{1366.90} N $\frac{1}{4}$ Cor Sec 33
	6823				
TP 43		4012			Hub 400' + WNW of Panel above
	6517				
TP 44		4089			Hub
	6205				
TP 45		4288			Hub
	6157				
TP 46		4209			Hub
	6063				
TP 47		3775			Hub
	6245		$\begin{array}{r} +108.056 \\ -63.276 \\ \hline \times 44.780 \\ \hline 16 \text{ turns} \end{array}$		Hub
TP 48		4155			Hub
	6509				
TP 49		3945			Hub by trail
	7013				
TP 50		3460			Hub 50' S of trail
	7447				
TP 51		3347			Hub by trail
	7375				

Sta	Pointing	ZnA	HD	HT	Elev	
POE	BS	D	90-59-55 90-57-55	1117.25	5.68	1674.118
		R	269-00-20 269-00-20	1112.25	5.68	0
		Aug	90-59-48			
TP1	FS	D	89-07-30 89-07-25	1740.40	0	
		R	270-52-35 270-52-40	1740.40		
		Aug	89-07-25			
TP1	BS	D	91-09-15 91-09-20	1915.44	0	
		R	268-50-35 268-50-30	1915.44		
		Aug	91-09-23			
End 2	FS	D	88-46-46 88-46-40	546.16	5.16	1770.88
		R	271-13-15 271-13-10	546.16	5.16	
		Aug	88-46-44			+95.766

S. of Arkwy

SLO BC in NH (ERM 21 p 14)
(W 1/4 Per Sec 30)

Target on Tripod

" " "

GLO BC marked: 536 + ^{1/4} 537 100' above Panel of 1769.88

109

Sta	Pointing	Zrx	HD	HT	Elev	S. of Hwy	
POB	BS	D	90-25-30 90-25-25	1456.13	10.32	1632.287	610 BC stamped (V. 4 for Sec 23) Turn No. 76 p 9
		R	269-35-00 269-34-55	1456.13	10.32	0	
		Avg	90-25-15				
TP 1	FS	D	88-54-45 ⁴⁵ 88-54-25	1439.55	0		Target on Tripod
		R	271-05-25	1439.55			
		Avg	88-54-40				
TP 1	BS	D	90-54-50 ⁻⁵⁰ 90-54-44	1566.26	0		" " "
		R	269-05-25 ⁻²⁰	1566.26			
		Avg	90-54-44				
End 2	FS	D	88-36-15 88-36-10	864.90	8.98	1717.69	610 BC stamped 532/533 0.85 above Point of 1716.84
		R	271-24-00 271-23-50	864.90	8.98		
		Avg	88-36-09			785.400	

all

Sta	Pointing	Zn A	HD	H7	Elev	
POB	BS	D	90-22-45 ⁻⁴⁵	1631.03	10.64	1549.699
		R	269-37-15 ⁻¹⁰	1631.03	10.64	0
		Avg	90-22-45			
TP 1	FS	D	88-57-30 ⁻³⁰	1478.71	0	
		R	271-07-25 ²⁵	1478.71		
		Avg	88-57-23			
TP 1	BS	D	90-24-30 ⁻³⁵	1492.44	0	
		R	269-35-20 ⁻²⁵	1492.45		
		Avg	90-24-35			
End 2	FS	D	88-03-30 ⁻²⁵	1022.20	4.11	1639.19
		R	271-56-30 ⁻²⁵	1022.21	4.11	
		Avg	88-03-30			+89.490

S. of Pkwy	
Turn No 48 pt (BC in HH)	1/4 Cor Sec 27 & 26
Target on Tripod	
" " "	
Alum Cap Flush in Panel	near W 1/4 Cor Sec 35

111

Sta.	Pointing	Zn A	HD	HT	Elev	
POB	BS	D	92-14-20 ²⁵	1476.44	5.36	1468.125
		R	267-45-35 ⁻⁴⁰	1476.44	5.36	
		Aug	92-14-23			
TP1	FS	D	89-21-50 ⁻⁵⁵	1769.08	0	
		R	270-38-10 ⁻¹⁰	1769.09		
		Aug	89-21-51			
TP1	BS	D	92-44-05 ⁻⁰⁰	1394.00	0	
		R	267-16-00 ⁻⁰⁰	1394.00		
		Aug	92-44-01			
End 2	D	D	88-56-45 ⁻⁵⁰	704.32	9.96	1620.41
		R	271-03-15 ⁻²⁰	704.32	9.96	
		Aug	88-56-45			+ 152.286

S. of Arkwy

BC @ Med Brook by "Frida" tri Sta Hill ERM 10 p 21

Target on tripod

Alum Cap 0.16' Below Ground (+ Pave) of 1620.57)

Approx 1200' + N of SW Cor Sec 31

Sta.	Pointing	Zn L	HT	HT	Elev	
POB	BS	D	89-20-05 ⁻¹⁰	1455.30	9.96	1468.308
		R	270-39-45 ⁻⁴⁵	1455.30	9.95	0
		Aug	89-20-11			
TBM 1	FS	D	90-17-40 ⁻⁴⁰	2505.8	9.90	1438.66
		R	269-42-15 ⁻¹⁰	2505.8	9.90	
		Aug	90-17-44			-29.648
TBM 1	BS	D	90-08-40 ⁻⁴⁰ 90-08-40	5152.49	14.22	
		R	269-51-15 ⁻¹⁵ 269-51-15	5152.49	14.22	0
		Aug	90-08-42.5			
End 2	FS	D	95-19-45	59.30	0	1459.887
		R	264-40-15	59.30	0	
		Aug	95-19-45			+21.194

Trio Level Checks

BC in HT & Primary (E Line Sec 25)

(Form 19, 19 p 4)

Alum Cap Flush w. Panel Approx NE Cor Sec 25

" " " " "

BR BC "50 LC" near NE Cor Sec 24

(ERM 7 p 33)

Sta	BS +	FS -	Elev
POB			1519.129
	6.302		
TP 1		5.982	
	8.019		
TP 2		3.083	
	7.692		
TP 3		6.669	
	8.452		
TP 4		5.618	
	4.989		
TP 5		8.191	
	6.947		
TP 6		6.399	
	6.543		
TBM 7		6.956	1524.185
	6.66		
TP 8		6.44	
	4.525		
TP 9		6.18	
	3.78		
TP 10		5.095	
	3.415		
TP 11		6.42	
	3.685		
TP 12		7.03	
	3.64		
TP 13		6.17	
	1.775		
END 14		4.92	1509.421

$$\begin{array}{r} +48.943 \\ -43.878 \\ \hline +5.065 \end{array}$$

7 turns

$$\begin{array}{r} +27.480 \\ -42.255 \\ \hline -14.775 \end{array}$$

7 turns

11

Loop 2

Turn No. 114 p. 12 (GLO BC NW Cor Sec 22)

Hub 405 - to words center Sec 22

Hub

Hub

Hub

Hub

Hub

Rebar Near Center Sec 22 Flush w. Panel

GLO BC 1/4 Cor Sec 22, 23 (ERM 12 p. 18)

For Loop 2 - turn to page 18 ERM 12

Sta	BS+	FS-		Elev	
POB	4.33 4791		↑	1473.938	Loop 2
TP 1	5.06 5.041	6.85 6.767			Hub by Rd heading East
TP 2	5.04 5.598	7.66 7.641	$\frac{+28.88}{-42.75}{-13.90}$		Hub by Rd
TP 3	1.98 2.564	7.52 8.095	$\frac{+30.791}{-44.751}{-13.960}$		Hub 25' S of Rd
TP 4	4.82 4.862	6.46 7.060	$\frac{+9}{-73.830}$		Hub by Rd w side wash
TP 5	5.64 6.315	3.88 3.916	6 $\frac{3}{4}$ ins		Hub by Rd E side wash
TP 6	7.96 2.120	6.41 7.111			Hub by Rd
ERM 7	1.539	4.00 4.161	↓ ↑	1459.887	BR BC stamped "50 LC 1460" (End Loop 2) USGS Datum = 1459.887
TP 8	1.879	6.561			Hub by Rd heading SE
TP 9	2.854	6.800			Hub by Rd
TP 10	2.414	6.397			Hub by Rd
TP 11	2.525	5.532			Hub by Rd
TP 12	2.711	5.524			Hub by Rd

Sta	BS+	FS-	Elev
TP 13		7232	
	3373		
TP 14		7050	
	1920		
TP 15		6126	
	1830		
TP 16		10,955	
	4790		
TP 17		5,350	
	5376		19 turns
TP 18		3522	
	6542		
TP 19		5,759	
	1507		
TP 20		6913	
	3329		
End 21		6981	↓ 1411.783

Loop 2

Hub by Rd

Hub by Rd

Hub by Rd

Hub by Rd N. Side Tridley wash

Hub by Rd S. Side Tridley wash

Hub by Rd Fork

Hub by Rd

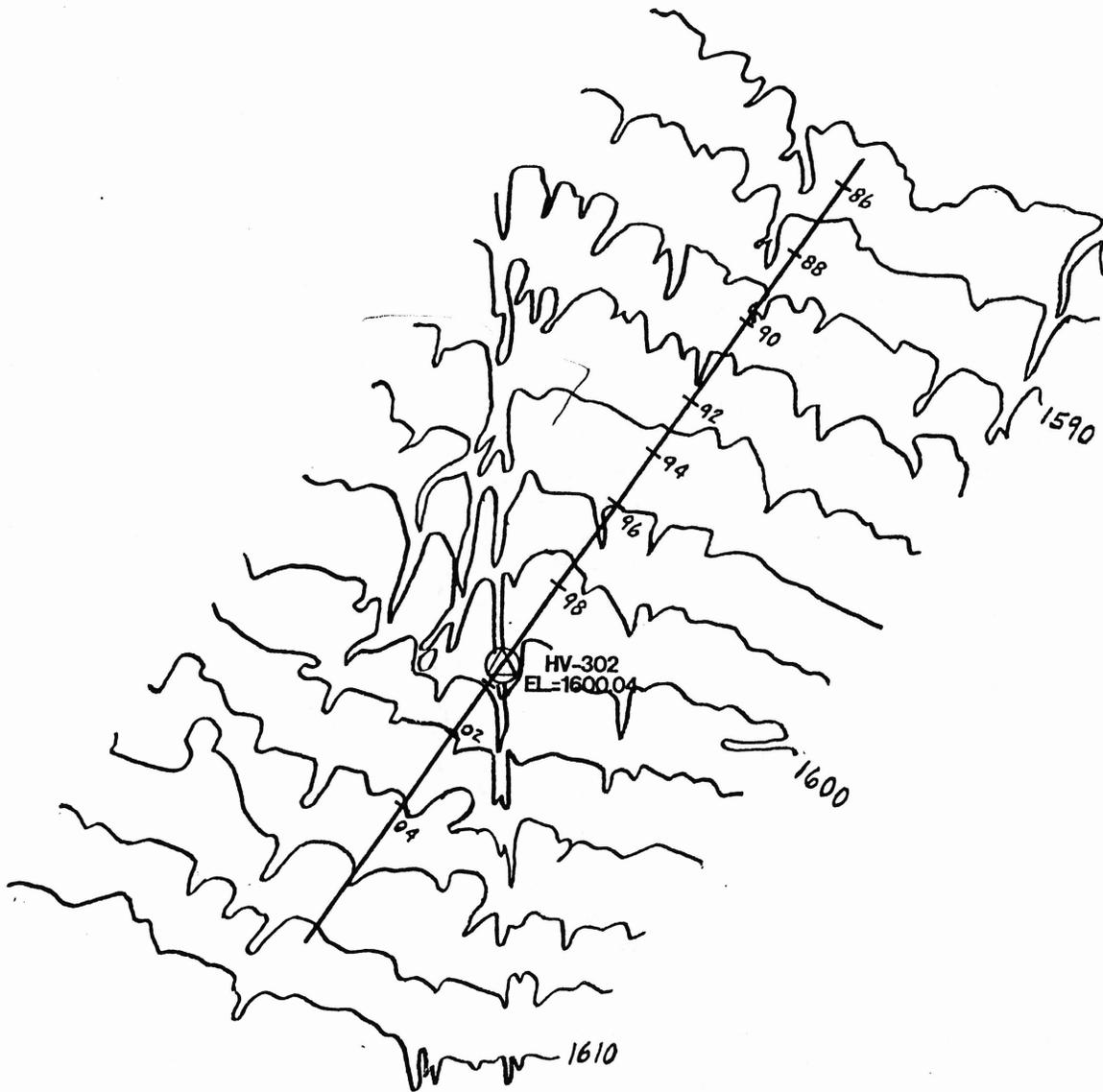
Hub 25' N. of Rd

End SB p 25 BR BC " 49 CC" (+ POB page 3)

USGS Datum = 1411.783

Sta	Zn ⁺	HD	HT	Elev	Trig	Trig Level Checks
BS	D 89-28-30 ⁻³⁵	2607.96	9.88	1549.699	0	E Pitway at W. Line Sec 26 (POB p. 18)
	R 270-31-30 ⁻³⁵					
FS	D 90-22-40 ⁻³⁵	2682.41	8.53	1509.421	-40.13	BC W 1/4 Cor Sec 23 (ERM 12 p. 18)
	R 269-37-35 ⁻³⁵					
FS	D 90-27-45 ⁻⁴⁵	1342.35	9.83	1514.79	-34.80	Rebar (pane 1) 1/4 mi S of W 1/4 Cor Sec 23
	R 269-32-15 ⁻¹⁵					Refer to Page 18
					-5.33	
BS	D 89-20-30 ⁻³⁰	1003.73	8.16		0	BC SW Cor Sec 21
	R 270-37-30 ⁻³⁰					
FS	D 90-31-15 ⁻¹⁵	1670.83	9.51		-28.10	Rebar (pane 1) near W 1/4 Cor Sec 21
	R 269-28-30					
BS	D 89-56-50 ⁻⁵⁰	2210.15	9.91		0	NE Cor Sec 19
	R 270-03-05 ⁻¹⁰					
FS	D 89-55-35 ⁻³⁰	1323.89	9.32		+0.27	Rebar near Center Sec 20
	R 270-04-40 ⁻⁴⁵					

L11



Technical Data Notebook
Section 2.3

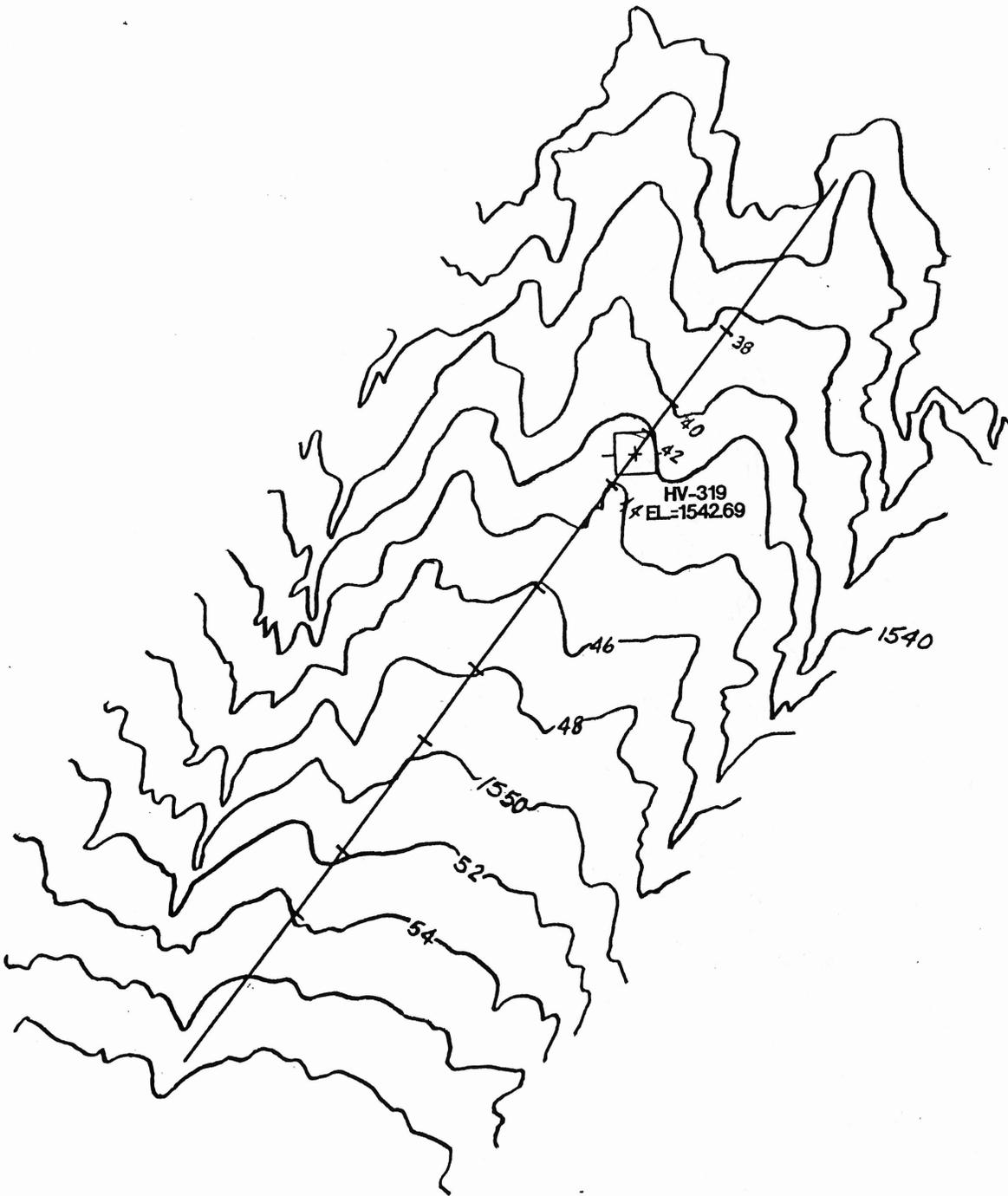
Sun Valley Parkway N.F.I.S.
Town of Surprise and Portions
of Unincorp. Maricopa Co. AZ
Washes Nos 1-8 and Tributaries
A-N West Inc No 7158-01

Check Profile Plots
By A-N West

CHECK PROFILE

**CONTROL POINT # HV-302
EL.-1600.04**

SHEET # 1

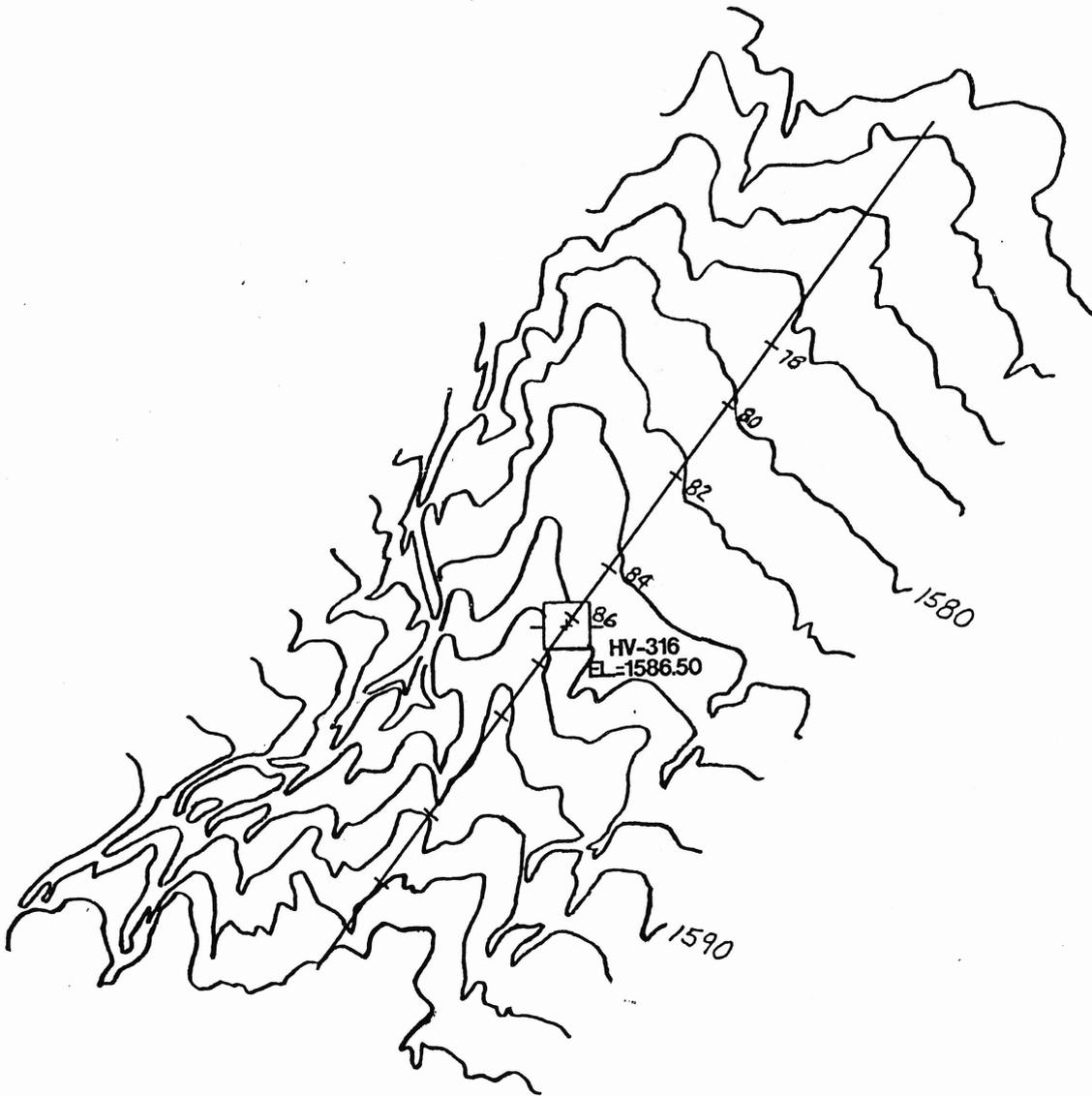


CHECK PROFILE

CONTROL POINT # HV-319
EL.=1542.69

SHEET # 1 & 2

119

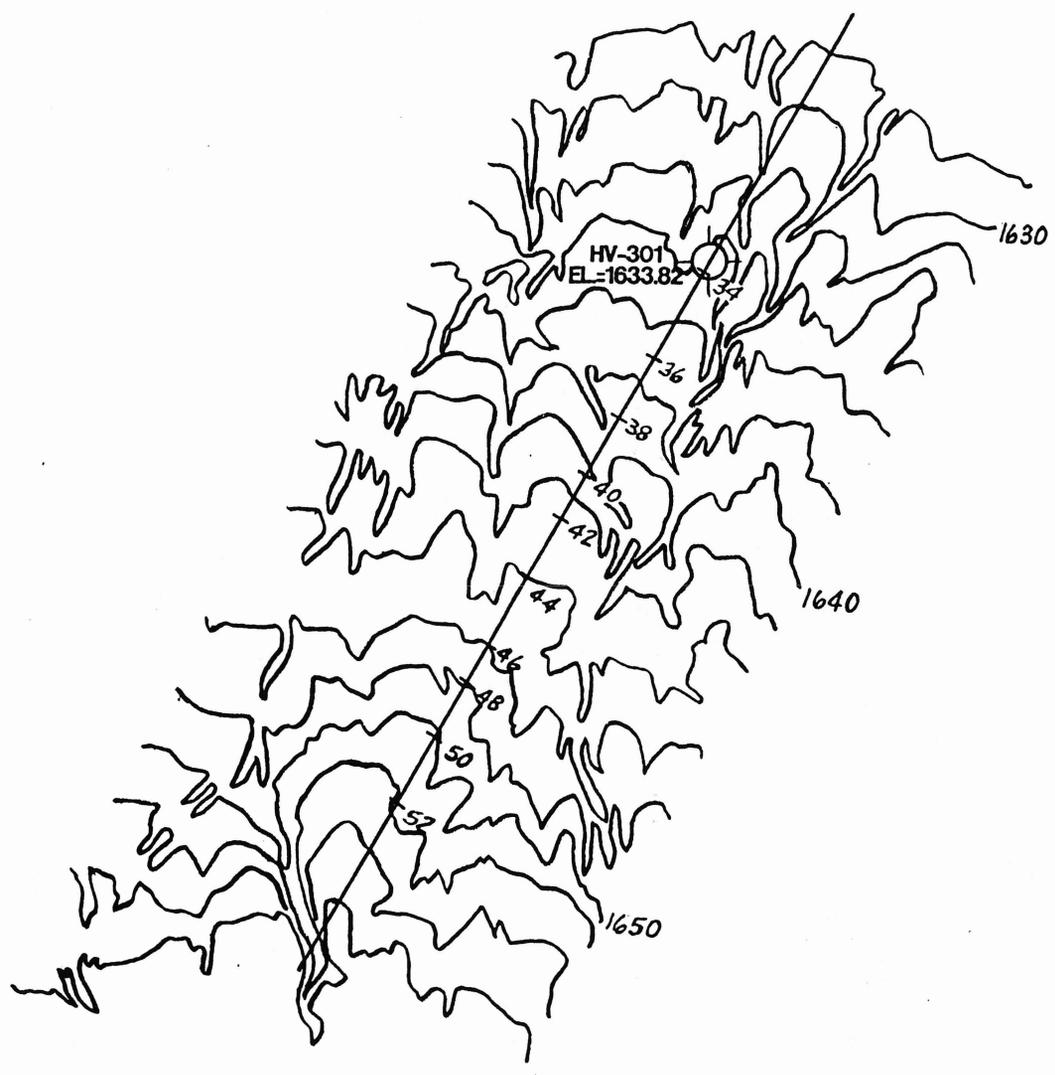


CHECK PROFILE

CONTROL POINT # HV-316
EL.=1586.50

SHEET # 1 & 4

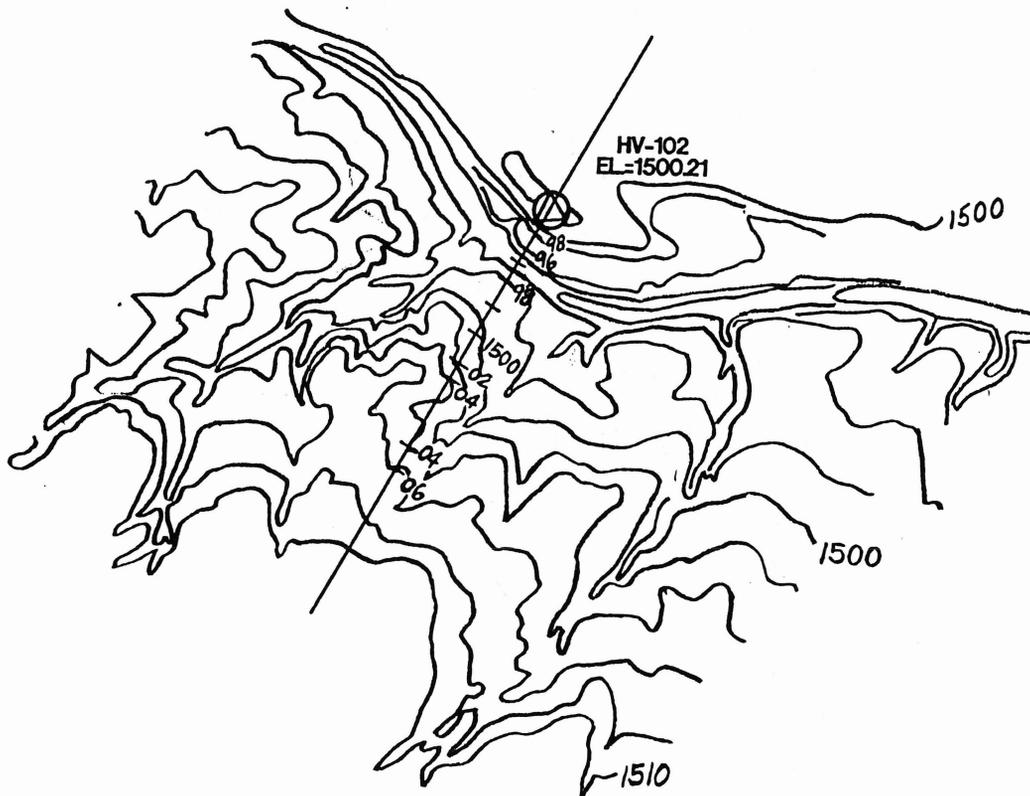
120



CHECK PROFILE

CONTROL POINT # HV-301
EL.=1633.82

SHEET # 1 & 4

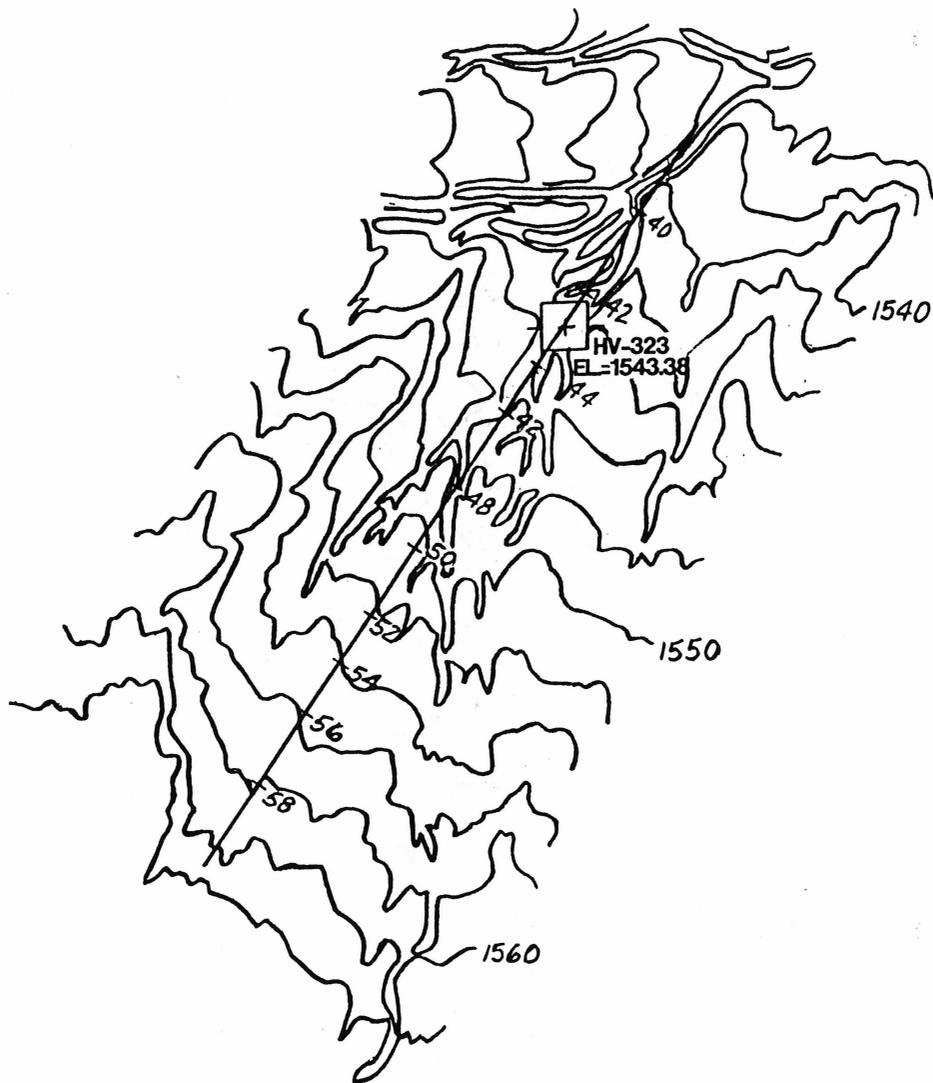


CHECK PROFILE

CONTROL POINT # HV-102
EL.=1500.21

SHEET # 2

122

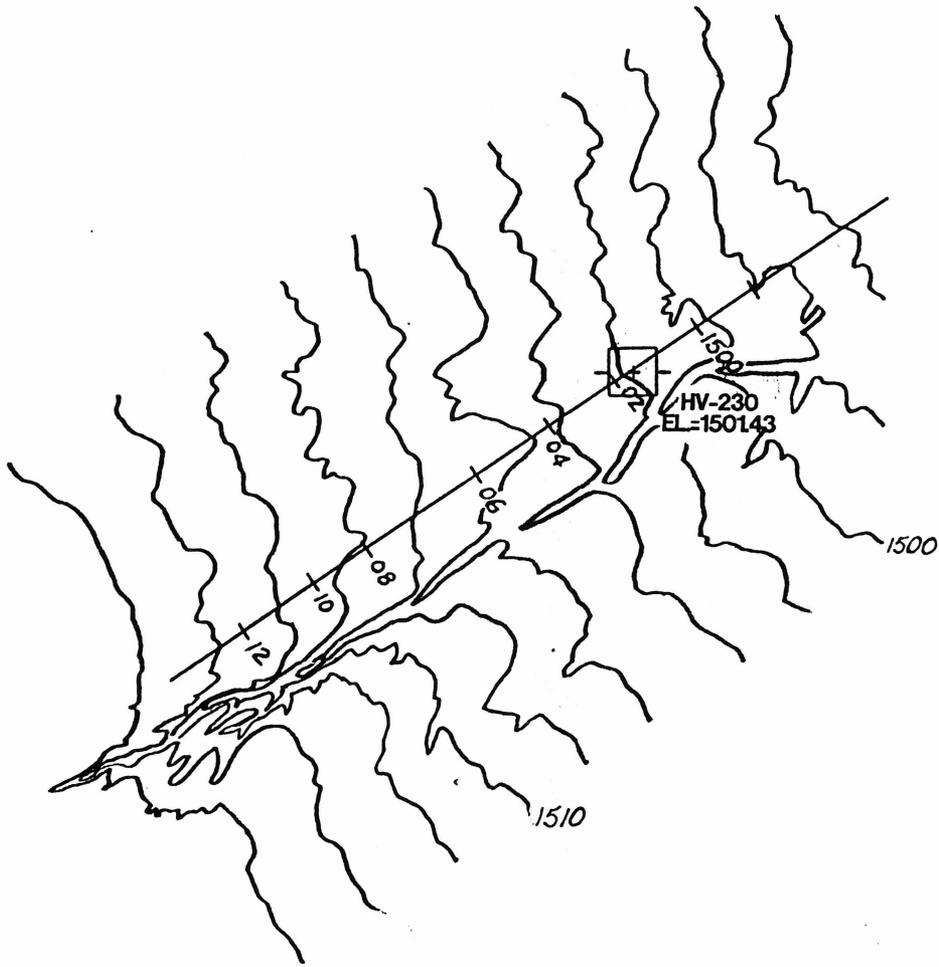


CHECK PROFILE

CONTROL POINT # HV-323
EL.=1543.38

SHEET # 2 & 5

723

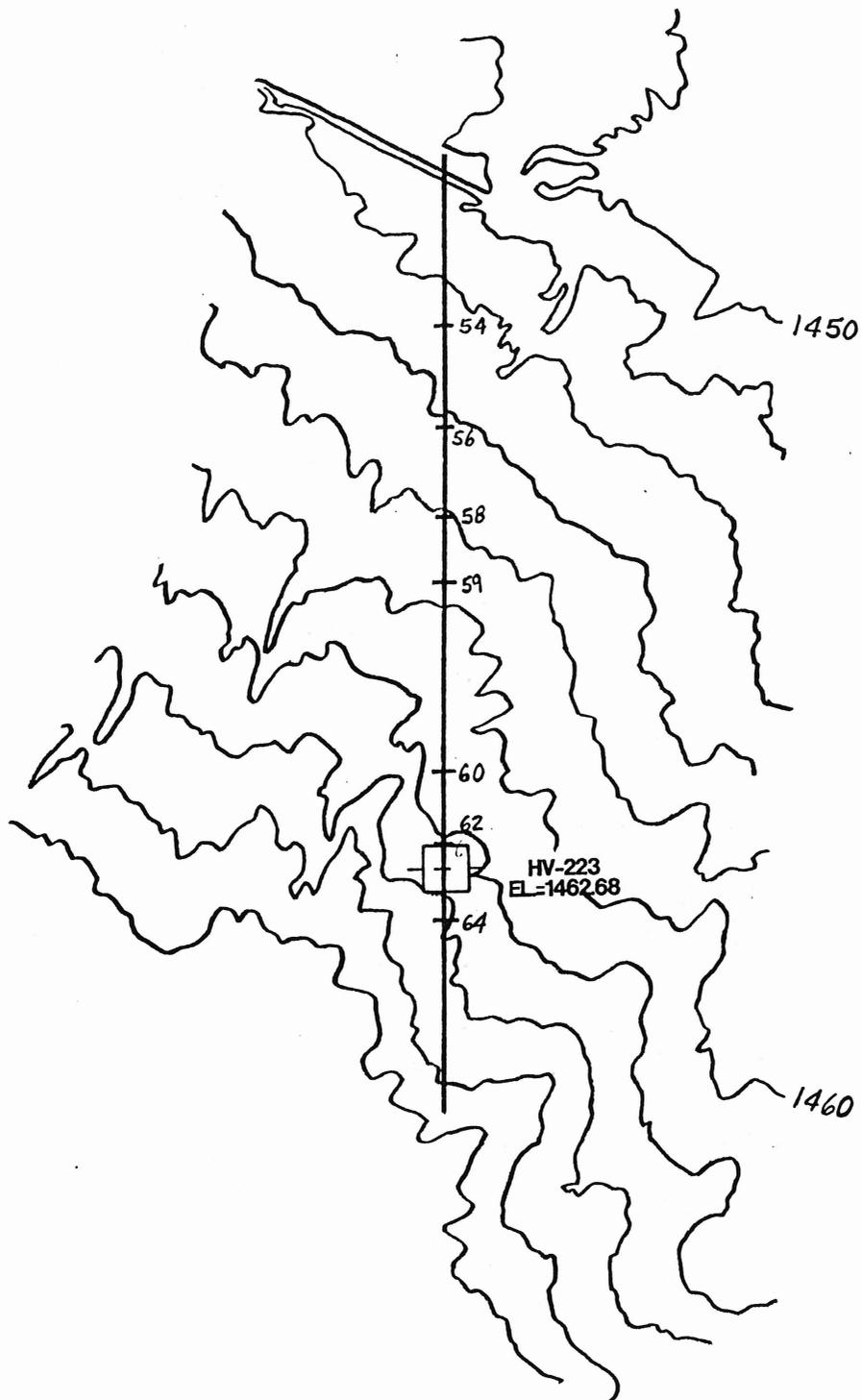


CHECK PROFILE

CONTROL POINT # HV-230
EL.=1501.43

SHEET # 2 & 5

124

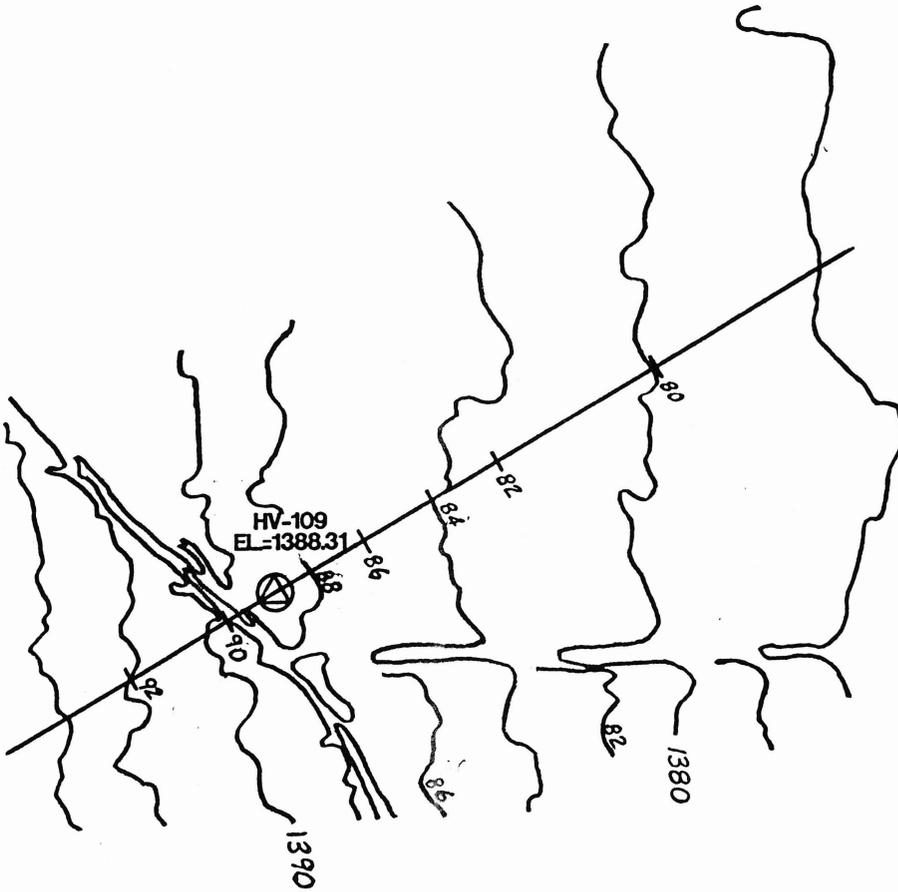


CHECK PROFILE

CONTROL POINT # HV-223
EL.=1462.68

SHEET # 3 & 6

125

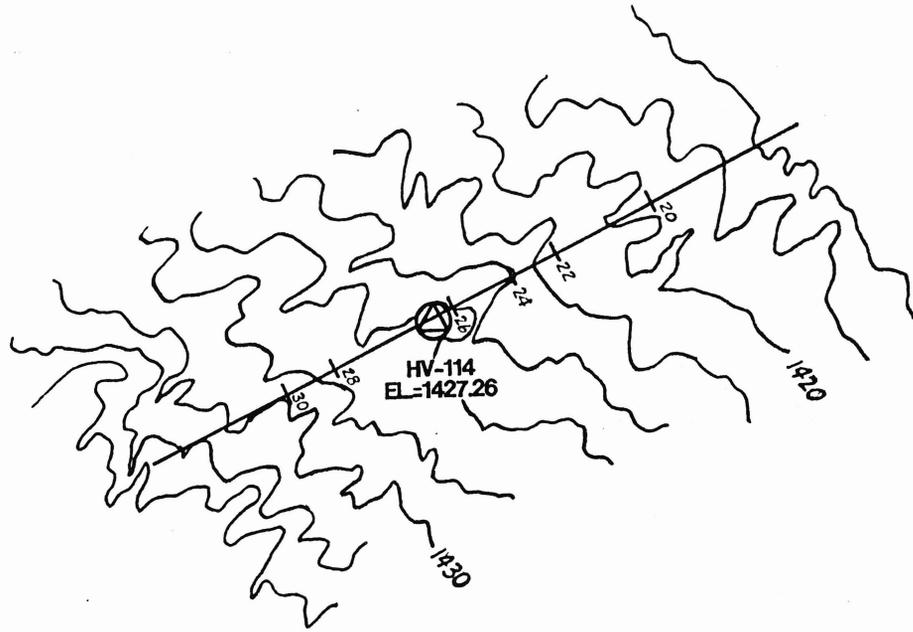


CHECK PROFILE

CONTROL POINT # HV-109
EL.=1388.31

SHEET # 7

126



CHECK PROFILE

CONTROL POINT # HV-114
EL.=1427.26

128

Check Profiles
Survey Notes
By A-N West

11/12/90

R.V.

K.d.

Technical Data Notebook
Section 2.3
Sun Valley Parkway N. FIS.
Town of Surprise and
Portions of Union Corp.
Maricopa Co, AZ
Washes No. 1-8 and Tribs
A-N West Inc No 7158-01

T@ # 9109 0°-00' to # 9000

584-56-18 W

△ Lt. 15°-35' for Profile Line S.W.

± 25 69-21-18 W

EI. of 9109 = 1388.31

+4.92

$\frac{1343.23}{\Delta}$

△ From 9000 Dist. EI.

△ Lt. 15°-35' 132' 1390

△ Lt. 15°-35' 366' 1392

△ Lt. 195°-35' 76' 1388

△ Lt. " " 217' 1386

△ Lt. " " 385' 1384

△ Lt. " " 550' 1382

△ Lt. 195°-35' 926' 1380

129

PI @ # 9114 0°-00' to # 9000 OK

S 1-46-32 W

Δ Rt. 60°-05' for Profile line S.W.

S 61-51-32 W

EI. of # 9114 = 1427.26

+ 4.78

1432.04
π

Δ from 9000 Dist. El.

Δ Rt. 60°-05' 236' 1428

¹⁰ Δ Rt. 60°-05' 338' 1430

Δ Rt. 240°-05' 63' 1426

Δ Rt. 240°-05' 186' 1424

Δ Rt. 240°-05' 300' 1422

Δ Rt. 240°-05' 524' 1420

TC #9223 0°-00' to #9000 OK

S 42-21-08 E

X Rt. 43°-50' for Profile line South

S 1-28-52 W

El. of 9223 = 1463.13

+ 4.40

1467.53
A

X from #9000 Dist. El. G/R

X Rt. 43°-50' 112' 1464 3.53

- 1466 1.53

X Rt. 223°-50' 44' 1462 5.53

¹³X Rt. 223°-50' 206' 1460 7.53

X Rt. 223°-50' 628' 1459 8.53

X Rt. 233°-50' 767' 1458 139 9.53

X Rt. 233°-50' 962' 1456 334 11.53

X Rt. 233°-50' 1188' 1454 560 13.53

TC # 9117 0°-00' to 9000

536-46-58E

Δ Rt. 349°-41'-54" to Profile line S.E.

EI. of " 9117 = 1472.94

+ 4.46

1477.40

π

Δ from 9000 Dist. EI.

Δ Rt. 349°-41'-54" 640' 1472

" 974 1470

" 1192 1468

" 1436 1466

" 1700' 1464

" 1969' 1462

" 2633' 1460

132

TC #9230 0°-00' to #9000 OK

S56-59-08E

X Rt. 108-36-06 to Profile line SW

S51-36-58W

El. of #9230 = 1502.58

3.83

1506.41

↑

X From 9000 Dist El. G/R

X Rt. 288°-36'-06" 154' 1500 6.41

X Rt. 288°-36'-06" 300' 1498 8.41

X Rt. 108°-36'-06" 57' 1502 4.41

533 T.P. 8.96 1511.85 - 3.52 1502.89

" 230' 1504 7.85

" 398' 1506 5.85

T.P. 7.01 1514.83 - 4.03 1507.82

679' 1508 6.83

810' 1510 4.83

T.P. 5.55 1516.77 - 3.61 1511.22

985' 1512 4.17

T@ # 9102 0°-00' to # 9116 OK

S 87-47-39 E

X Rt 119°-00'-00" to Profile line SW

S 31-12-21 W

El. of 9102 = 1500.21

+9.58

1509.79

^

X from 9116 Dist El.

G/R

X Rt. 119°-00'-00" 50' 1498 11.79

X Rt. 119°-00'-00" 101' 1496 13.79

X Rt. 119°-00'-00" 108' 1496 15.79

" " 112' 1492 17.79

" " 141' 1492 17.79

" " 144' 1494 15.79

" " 149' 1496 13.79

" " 175 1498 11.79

" " 318' 1500 9.79

" " 372' 1502 7.79

" " 410 1504 5.79

" " 575 1504 5.79

" " 634 1506 3.79

134

T@ #9319 0°-00' to #9000 OK

S 59-37-43 E

X RT 97°-55' to Profile line SW

S 38-17-17 W

El. of 9319 = 1544.01
+ 5.50
1549.51
/

X from #9000 Dist. El. G/R

X RT. 277°-55' 50' 1542 7.51

X RT. 277°-55' 129' 1540 9.51

135
X RT. 277°-55' 375' 1538 11.51

X RT. 97°-55' 100' 1544 5.51

" " 402' 1546 3.51

T.P. 8.70 1554.68 3.53 1545.98

X RT. 97°-55' 650' 1548 6.68

" " 867' 1550 4.68

T.P. 9.65 1560.16 4.17 1550.51

X RT. 97°-55' 1205' 1552 8.16

" " 1390' 1554 6.16

TC # 9316 0°-00' to # 9000 OK

S 70-12-29 E

X RT. 107°-00'-00" for Profile line SW

S 36-47-31 W

El. of 9316 = 1587.42
+ 1.70

1589.12
^

X from # 9000 Dist. El. G/R.

X RT 287-00.00 15' 1586 3.12

1586 " " 145' 1584 5.12

" " 400' 1582 7.12

" " 595 1580 9.12

T.P. 4.75 1584.60 - 9.27 1579.85

747 1578 6.60

B.M. + 8.37

X RT 107°-00'-00" 1595.79

" " 100 1588 7.79

" " 238 1590 5.79

" " 513 1592 3.79

T.P. 9.75 1601.76 - 3.78 1592.01

680 1594 7.76

844 1596 5.76

TC #9323 0°-00' to #9000 05

565-09-37E

X Rt. 100°-00'-00" to Profile line SW

S. 34-50-23 W

El. of #9323 = 1544.73

+ 5.08

1549.81
^

X Rt from 9000 Dist El. G/R

X Rt. 280-00-00 85' 1542 7.81

137 " " 285' 1540 9.81

X Rt. 100°-00'-00" 108' 1544 5.81

" " 227' 1546 3.81

T.P. 9.82 1556.67 - 3.02 1546.79

X Rt. 100°-00'-00" 414' 1548 8.67

" " 570' 1550 6.67

" " 735' 1552 4.67

T.P. 8.90 1562.80 - 2.77 1553.90

X Rt 100°-00'-00" 857' 1554 8.8

" " 959' 1556 6.8

" " 1154' 1558 4.8

TC # 9301 0°-00' to # 9302 O/K

N 00-27.57E

Z Rt. 210°-00' to Profile line SW

S 30-27.57W

El. of 9301 = 1634.88

+ 7.83

$\frac{1642.71}{1}$

Z from 9302 Dist. El. G/R

Z Rt. 210°-00' 37' 1634 8.71

" " 236' 1636 6.71

" " 375 1638 4.71

T.P. 1649.72 11.01 -4.00 1638.71

534' 1640 9.72

632' 1642 7.72

767' 1644 5.72

940' 1646 3.72

1019 1648 1.72

T.P. 1656.08 8.16 -1.80 1647.92

1166' 1650 6.08

1309' 1652 4.08

TC # 9302 0°-00' to ⁹³¹⁴~~9301~~ OK

N 76-13-37 E

X Rt. 140°-00'-00" to Profile line SWL

S 36-13-37 W

El. of 9302 = 1600.04

↓ 6.37

$\frac{1606.41}{\downarrow}$

X from # 9314 Dist. El. G/e.

X Rt. 140°-00' 42' 1600 6.41

" " 190' 1602 4.41

" " 392' 1604 2.41

" 320°-00' 221' 1598 8.41

T.P. 1600.85 2.79 - 8.35 1598.06

X Rt. 320°-00' 440' 1596 4.85

" " 560' 1594 6.85

" " 700' 1592 8.85

3.73 1595.86 - 8.78 1592.07

X Rt. 320°-00" 910' 1590 $\frac{5.80}{159.0}$

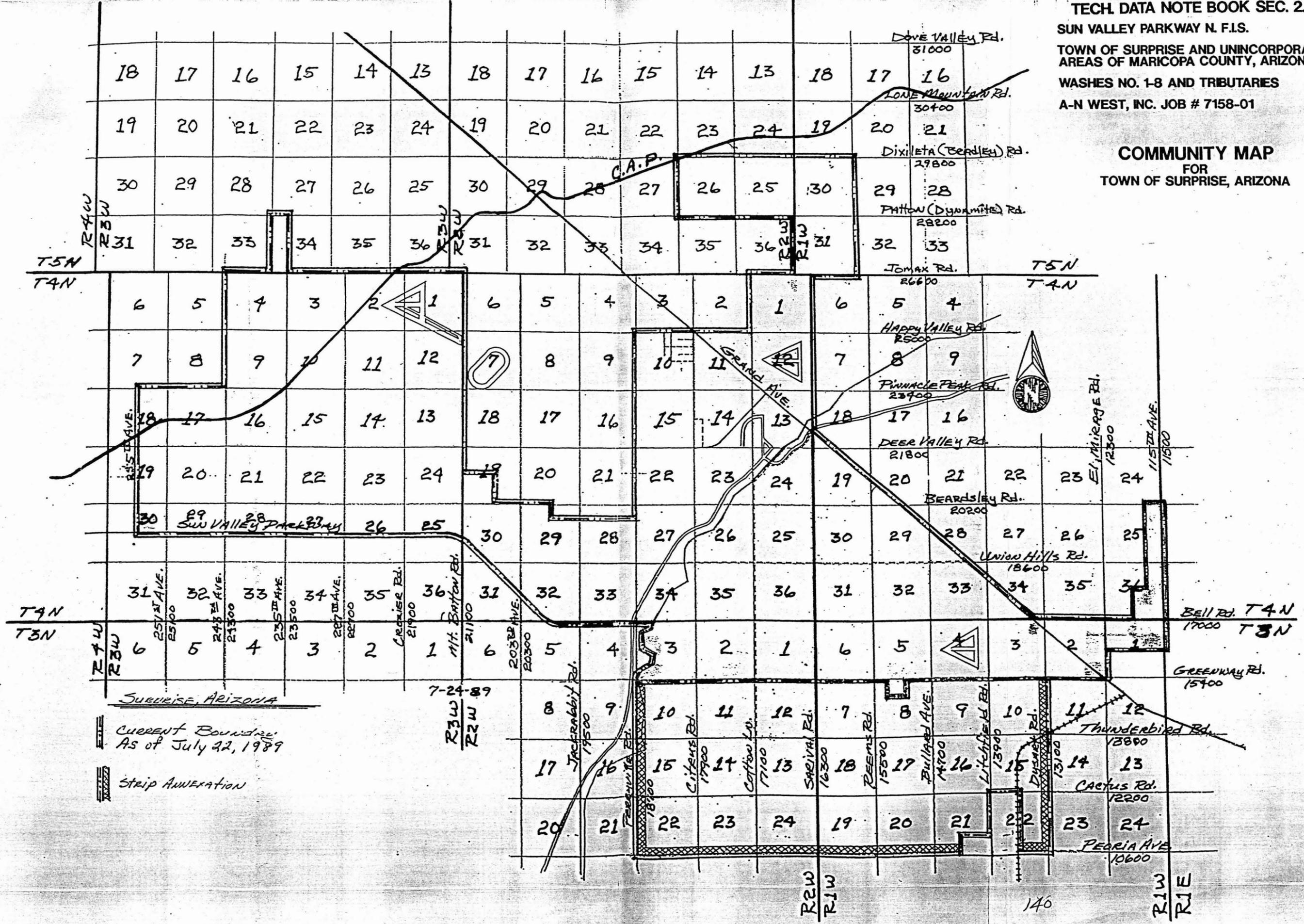
" " 1010' 1588 7.8

" " 1275' 1586 9.8

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TECH. DATA NOTE BOOK SEC. 27
 SUN VALLEY PARKWAY N. F.I.S.
 TOWN OF SURPRISE AND UNINCORPORATED
 AREAS OF MARICOPA COUNTY, ARIZONA
 WASHES NO. 1-8 AND TRIBUTARIES
 A-N WEST, INC. JOB # 7158-01

COMMUNITY MAP
 FOR
 TOWN OF SURPRISE, ARIZONA



SURPRISE, ARIZONA
 CURRENT BOUNDARY
 As of July 22, 1989
 Strip Annexation

7-24-89
 R3W
 R2W

KEY TO CROSS-SECTION (XS) LABELING

Prepared by:

SC: A-N West, Inc. Phx. Az Community Name Sun Valley Parkway North FIS.
 TEC: _____ State Town of Surprise and Unincorp. Areas of Maricopa Co, Arizona

Date prepared:

SC: Sept. 1991
 TEC: _____

Stream Name

Run Date WASH No. 1 AND TRIBUTARY

Field Survey Section No.	XS Letter Draft FIS	Computer Stationing	EPA Reach File No. (If Available)	XS Letter Final FIS
<u>.080</u>	<u>A</u>	<u>.080</u>	<u>_____</u>	<u>_____</u>
<u>.216</u>	<u>B</u>	<u>.216</u>	<u>_____</u>	<u>_____</u>
<u>.359</u>	<u>C</u>	<u>.359</u>	<u>_____</u>	<u>_____</u>
<u>.503</u>	<u>D</u>	<u>.503</u>	<u>_____</u>	<u>_____</u>
<u>.636</u>	<u>E</u>	<u>.636</u>	<u>_____</u>	<u>_____</u>
<u>.778</u>	<u>F</u>	<u>.778</u>	<u>_____</u>	<u>_____</u>
<u>.964</u>	<u>G</u>	<u>.964</u>	<u>_____</u>	<u>_____</u>
<u>1.112</u>	<u>H</u>	<u>1.112</u>	<u>_____</u>	<u>_____</u>
<u>1.220</u>	<u>I</u>	<u>1.220</u>	<u>_____</u>	<u>_____</u>
<u>1.377</u>	<u>J</u>	<u>1.377</u>	<u>_____</u>	<u>_____</u>
<u>1.490</u>	<u>K</u>	<u>1.490</u>	<u>_____</u>	<u>_____</u>
<u>1.636</u>	<u>L</u>	<u>1.636</u>	<u>_____</u>	<u>_____</u>
<u>1.778</u>	<u>M</u>	<u>1.778</u>	<u>_____</u>	<u>_____</u>
<u>1.893</u>	<u>N</u>	<u>1.893</u>	<u>_____</u>	<u>_____</u>
<u>2.004</u>	<u>O</u>	<u>2.004</u>	<u>_____</u>	<u>_____</u>
<u>2.126</u>	<u>P</u>	<u>2.126</u>	<u>_____</u>	<u>_____</u>
<u>2.244</u>	<u>Q</u>	<u>2.244</u>	<u>_____</u>	<u>_____</u>

KEY TO CROSS-SECTION (XS) LABELING

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 SC: A-N West, Inc. Phx. Az Community Name Town of Surprise and Unincorp.
 TEC: _____ State Areas of Maricopa Co, Arizona

Date prepared: _____
 SC: Sept, 1991 Stream Name _____
 TEC: _____ Run Date WASH NO. 1 AND TRIBUTARY (CONT.)

Field Survey Section No.	XS Letter Draft FIS	Computer Stationing	EPA Reach File No. (If Available)	XS Letter Final FIS
<u>2.379</u>	<u>R</u>	<u>2.379</u>	_____	_____
<u>2.501</u>	<u>S</u>	<u>2.501</u>	_____	_____
<u>2.630</u>	<u>T</u>	<u>2.630</u>	_____	_____
<u>2.758</u>	<u>U</u>	<u>2.758</u>	_____	_____
<u>2.892</u>	<u>V</u>	<u>2.892</u>	_____	_____
<u>3.017</u>	<u>W</u>	<u>3.017</u>	_____	_____
<u>3.151</u>	<u>X</u>	<u>3.151</u>	_____	_____
<u>3.281</u>	<u>Y</u>	<u>3.281</u>	_____	_____
<u>3.408</u>	<u>Z</u>	<u>3.408</u>	_____	_____
<u>3.547</u>	<u>AA</u>	<u>3.547</u>	_____	_____
<u>3.631</u>	<u>AB</u>	<u>3.631</u>	_____	_____
<u>3.761</u>	<u>AC</u>	<u>3.761</u>	_____	_____
<u>3.887</u>	<u>AD</u>	<u>3.887</u>	_____	_____
<u>4.055</u>	<u>AE</u>	<u>4.055</u>	_____	_____
<u>4.066</u>	<u>AF</u>	<u>4.066</u>	_____	_____
<u>4.094</u>	<u>AG</u>	<u>4.094</u>	_____	_____
<u>4.101</u>	<u>AH</u>	<u>4.101</u>	_____	_____

KEY TO CROSS-SECTION (XS) LABELING

Prepared by:

SC: A-N West, Inc. Phx. Az Community Name Sun Valley Parkway North FIS.
 TEC: Town of Surprise and Unincorp. State Areas of Maricopa Co, Arizona

Date prepared:

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 TEC: _____

Stream Name

Run Date WASH NO. 1 AND TRIBUTARY^A (CONT.)

Field Survey Section No.	XS Letter Draft FIS	Computer Stationing	EPA Reach File No. (If Available)	XS Letter Final FIS
	<u>TRIBUTARY</u>			
<u>12.510</u>	<u>AI</u>	<u>12.510</u>		
<u>12.639</u>	<u>AJ</u>	<u>12.639</u>		
<u>12.761</u>	<u>AK</u>	<u>12.761</u>		
<u>12.904</u>	<u>AL</u>	<u>12.904</u>		
<u>13.023</u>	<u>AM</u>	<u>13.023</u>		
<u>13.170</u>	<u>AN</u>	<u>13.170</u>		
<u>13.277</u>	<u>AO</u>	<u>13.277</u>		
<u>13.408</u>	<u>AP</u>	<u>13.408</u>		
<u>13.536</u>	<u>AQ</u>	<u>13.536</u>		
<u>13.616</u>	<u>AR</u>	<u>13.616</u>		
<u>13.743</u>	<u>AS</u>	<u>13.743</u>		
<u>13.875</u>	<u>AT</u>	<u>13.875</u>		
<u>14.000</u>	<u>AU</u>	<u>14.000</u>		
<u>14.009</u>	<u>AV</u>	<u>14.009</u>		
<u>14.034</u>	<u>AW</u>	<u>14.034</u>		
<u>14.042</u>	<u>AX</u>	<u>14.042</u>		

KEY TO CROSS-SECTION (XS) LABELING

Prepared by: Sun Valley Parkway North FIS.
 SC: A-N West, Inc. Phx. Az Community Name Town of Surprise and Unincorp.
 TEC: _____ State Areas of Maricopa Co, Arizona

Date prepared: _____
 SC: Sept. 1991 Stream Name _____
 TEC: _____ Run Date WASH NO. 2 AND TRIBUTARY

Field Survey Section No.	XS Letter Draft FIS	Computer Stationing	EPA Reach File No. (If Available)	XS Letter Final FIS
<u>.107</u>	<u>A</u>	<u>.107</u>	_____	_____
<u>.220</u>	<u>B</u>	<u>.220</u>	_____	_____
<u>.352</u>	<u>C</u>	<u>.352</u>	_____	_____
<u>.481</u>	<u>D</u>	<u>.481</u>	_____	_____
<u>.611</u>	<u>E</u>	<u>.611</u>	_____	_____
<u>.738</u>	<u>F</u>	<u>.738</u>	_____	_____
<u>.873</u>	<u>G</u>	<u>.873</u>	_____	_____
<u>1.013</u>	<u>H</u>	<u>1.013</u>	_____	_____
<u>1.151</u>	<u>I</u>	<u>1.151</u>	_____	_____
<u>1.288</u>	<u>J</u>	<u>1.288</u>	_____	_____
<u>1.425</u>	<u>K</u>	<u>1.425</u>	_____	_____
<u>1.555</u>	<u>L</u>	<u>1.555</u>	_____	_____
<u>1.719</u>	<u>M</u>	<u>1.719</u>	_____	_____
<u>1.831</u>	<u>N</u>	<u>1.831</u>	_____	_____
<u>1.993</u>	<u>O</u>	<u>1.993</u>	_____	_____
<u>2.123</u>	<u>P</u>	<u>2.123</u>	_____	_____
<u>2.254</u>	<u>Q</u>	<u>2.254</u>	_____	_____

KEY TO CROSS-SECTION (XS) LABELING

Prepared by:

SC: A-N West, Inc. Phx. Az Community Name Town of Surprise and Unincorp.

TEC: _____ State Areas of Maricopa Co, Arizona

Sun Valley Parkway North FIS.

Date prepared:

SC: Sept. 1991

TEC: _____

Stream Name

Run Date WASH NO. 2 AND TRIBUTARY (CONT.)

Field Survey Section No.	XS Letter Draft FIS	Computer Stationing	EPA Reach File No. (If Available)	XS Letter Final FIS
<u>2.281</u>	<u>R</u>	<u>2.281</u>	_____	_____
<u>2.287</u>	<u>S</u>	<u>2.287</u>	_____	_____
<u>2.313</u>	<u>T</u>	<u>2.313</u>	_____	_____
<u>2.321</u>	<u>U</u>	<u>2.321</u>	_____	_____
_____	<u>TRIBUTARY</u>	_____	_____	_____
<u>11.711</u>	<u>V</u>	<u>11.711</u>	_____	_____
<u>11.855</u>	<u>W</u>	<u>11.855</u>	_____	_____
<u>11.967</u>	<u>X</u>	<u>11.967</u>	_____	_____
<u>11.975</u>	<u>Y</u>	<u>11.975</u>	_____	_____
<u>12.002</u>	<u>Z</u>	<u>12.002</u>	_____	_____
<u>12.013</u>	<u>A A</u>	<u>12.013</u>	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

KEY TO CROSS-SECTION (XS) LABELING

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 SC: A-N West, Inc. Phx. Az Community Name Town of Surprise and Unincorp.
 TEC: _____ State Areas of Maricopa Co, Arizona

Date prepared: _____
 SC: Sept. 1991 Stream Name _____
 TEC: _____ Run Date WASH NO. 3 AND TRIBUTARY (CONT.)

Field Survey Section No.	XS Letter Draft FIS	Computer Stationing	EPA Reach File No. (If Available)	XS Letter Final FIS
<u>2.142</u>	<u>R</u>	<u>2.142</u>	_____	_____
<u>2.171</u>	<u>S</u>	<u>2.171</u>	_____	_____
<u>2.186</u>	<u>T</u>	<u>2.186</u>	_____	_____
<u>TRIBUTARY A</u>				
<u>11.884</u>	<u>U</u>	<u>11.884</u>	_____	_____
<u>12.000</u>	<u>V</u>	<u>12.000</u>	_____	_____
<u>12.063</u>	<u>W</u>	<u>12.063</u>	_____	_____
<u>12.089</u>	<u>X</u>	<u>12.089</u>	_____	_____
<u>12.115</u>	<u>Y</u>	<u>12.115</u>	_____	_____
<u>12.128</u>	<u>Z</u>	<u>12.128</u>	_____	_____
<u>TRIBUTARY B</u>				
<u>21.890</u>	<u>AA</u>	<u>21.890</u>	_____	_____
<u>22.016</u>	<u>AB</u>	<u>22.016</u>	_____	_____
<u>22.037</u>	<u>AC</u>	<u>22.037</u>	_____	_____
<u>22.067</u>	<u>AD</u>	<u>22.067</u>	_____	_____
<u>22.076</u>	<u>AE</u>	<u>22.076</u>	_____	_____

KEY TO CROSS-SECTION (XS) LABELING

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SC: A-N West, Inc. Phx. Az Community Name Sun Valley Parkway North F.I.S.
 TEC: Town of Surprise and Unincorp. State Areas of Maricopa Co, Arizona

Date prepared:

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Stream Name

Run Date WASH No. 3 AND TRIBUTARY

Field Survey Section No.	XS Letter Draft FIS	Computer Stationing	EPA Reach File No. (If Available)	XS Letter Final FIS
<u>.086</u>	<u>A</u>	<u>.086</u>	_____	_____
<u>.209</u>	<u>B</u>	<u>.209</u>	_____	_____
<u>.355</u>	<u>C</u>	<u>.355</u>	_____	_____
<u>.499</u>	<u>D</u>	<u>.499</u>	_____	_____
<u>.645</u>	<u>E</u>	<u>.645</u>	_____	_____
<u>.790</u>	<u>F</u>	<u>.790</u>	_____	_____
<u>.938</u>	<u>G</u>	<u>.938</u>	_____	_____
<u>1.084</u>	<u>H</u>	<u>1.084</u>	_____	_____
<u>1.221</u>	<u>I</u>	<u>1.221</u>	_____	_____
<u>1.347</u>	<u>J</u>	<u>1.347</u>	_____	_____
<u>1.484</u>	<u>K</u>	<u>1.484</u>	_____	_____
<u>1.622</u>	<u>L</u>	<u>1.622</u>	_____	_____
<u>1.768</u>	<u>M</u>	<u>1.768</u>	_____	_____
<u>1.888</u>	<u>N</u>	<u>1.888</u>	_____	_____
<u>2.007</u>	<u>O</u>	<u>2.007</u>	_____	_____
<u>2.076</u>	<u>P</u>	<u>2.076</u>	_____	_____
<u>2.128</u>	<u>Q</u>	<u>2.128</u>	_____	_____

KEY TO CROSS-SECTION (XS) LABELING

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 TEC: _____ State Areas of Maricopa Co, Arizona

Date prepared: _____
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 TEC: _____ Run Date WASH NO. 4 AND TRIBUTARIES

Field Survey Section No.	XS Letter Draft FIS	Computer Stationing	EPA Reach File No. (If Available)	XS Letter Final FIS
<u>.159</u>	<u>A</u>	<u>.159</u>	_____	_____
<u>.273</u>	<u>B</u>	<u>.273</u>	_____	_____
<u>.417</u>	<u>C</u>	<u>.417</u>	_____	_____
<u>.564</u>	<u>D</u>	<u>.564</u>	_____	_____
<u>.689</u>	<u>E</u>	<u>.689</u>	_____	_____
<u>.795</u>	<u>F</u>	<u>.795</u>	_____	_____
<u>.917</u>	<u>G</u>	<u>.917</u>	_____	_____
<u>1.038</u>	<u>H</u>	<u>1.038</u>	_____	_____
<u>1.167</u>	<u>I</u>	<u>1.167</u>	_____	_____
<u>1.292</u>	<u>J</u>	<u>1.292</u>	_____	_____
<u>1.413</u>	<u>K</u>	<u>1.413</u>	_____	_____
<u>1.553</u>	<u>L</u>	<u>1.553</u>	_____	_____
<u>1.678</u>	<u>M</u>	<u>1.678</u>	_____	_____
<u>1.818</u>	<u>N</u>	<u>1.818</u>	_____	_____
<u>1.939</u>	<u>O</u>	<u>1.939</u>	_____	_____
<u>2.057</u>	<u>P</u>	<u>2.057</u>	_____	_____
<u>2.148</u>	<u>Q</u>	<u>2.148</u>	_____	_____

KEY TO CROSS-SECTION (XS) LABELING

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 TEC: _____ State Areas of Maricopa Co, Arizona

Date prepared: _____
 SC: Sept. 1991 Stream Name _____
 TEC: _____ Run Date WASH No. 4 AND TRIBUTARIES (CONT.)

Field Survey Section No.	XS Letter Draft FIS	Computer Stationing	EPA Reach File No. (If Available)	XS Letter Final FIS
<u>2.204</u>	<u>R</u>	<u>2.204</u>	_____	_____
<u>2.242</u>	<u>S</u>	<u>2.242</u>	_____	_____
<u>2.322</u>	<u>T</u>	<u>2.322</u>	_____	_____
<u>2.439</u>	<u>U</u>	<u>2.439</u>	_____	_____
<u>2.523</u>	<u>V</u>	<u>2.523</u>	_____	_____
<u>2.621</u>	<u>W</u>	<u>2.621</u>	_____	_____
<u>2.750</u>	<u>X</u>	<u>2.750</u>	_____	_____
<u>2.759</u>	<u>Y</u>	<u>2.759</u>	_____	_____
<u>2.784</u>	<u>Z</u>	<u>2.784</u>	_____	_____
<u>2.798</u>	<u>AA</u>	<u>2.798</u>	_____	_____
_____	<u>TRIBUTARY A</u>	_____	_____	_____
<u>12.725</u>	<u>AB</u>	<u>12.725</u>	_____	_____
<u>12.734</u>	<u>AC</u>	<u>12.734</u>	_____	_____
<u>12.760</u>	<u>AD</u>	<u>12.760</u>	_____	_____
<u>12.775</u>	<u>AE</u>	<u>12.775</u>	_____	_____
_____	<u>TRIBUTARY B</u>	_____	_____	_____
<u>22.523</u>	<u>AF</u>	<u>22.523</u>	_____	_____

KEY TO CROSS-SECTION (XS) LABELING

Prepared by:

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 TEC: _____

Sun Valley Parkway North FIS.

Community Name Town of Surprise and Unincorp.
 State Areas of Maricopa Co, Arizona

Date prepared:

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 TEC: _____

Stream Name
 Run Date

WASH NO. 4 AND TRIBUTARIES (CONT.)

Field Survey Section No.	XS Letter Draft FIS	Computer Stationing	EPA Reach File No. (If Available)	XS Letter Final FIS
<u>22.617</u>	<u>AG</u>	<u>22.617</u>	_____	_____
<u>22.657</u>	<u>AH</u>	<u>22.657</u>	_____	_____
<u>22.669</u>	<u>AI</u>	<u>22.669</u>	_____	_____
<u>22.697</u>	<u>AJ</u>	<u>22.697</u>	_____	_____
<u>TRIBUTARY C</u>				
<u>32.418</u>	<u>AK</u>	<u>32.418</u>	_____	_____
<u>32.492</u>	<u>AL</u>	<u>32.492</u>	_____	_____
<u>32.558</u>	<u>AM</u>	<u>32.558</u>	_____	_____
<u>32.575</u>	<u>AN</u>	<u>32.575</u>	_____	_____
<u>32.584</u>	<u>AO</u>	<u>32.584</u>	_____	_____
<u>32.610</u>	<u>AP</u>	<u>32.610</u>	_____	_____
<u>TRIBUTARY D</u>				
<u>42.070</u>	<u>AQ</u>	<u>42.070</u>	_____	_____
<u>42.130</u>	<u>AR</u>	<u>42.130</u>	_____	_____
<u>42.200</u>	<u>AS</u>	<u>42.200</u>	_____	_____
<u>42.299</u>	<u>AT</u>	<u>42.299</u>	_____	_____
<u>42.401</u>	<u>AU</u>	<u>42.401</u>	_____	_____

KEY TO CROSS-SECTION (XS) LABELING

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 TEC: _____ State Areas of Maricopa Co, Arizona

Sun Valley Parkway North FIS.

Date prepared:

SC: Sept. 1991
 TEC: _____

Stream Name

Run Date WASH NO. 5 AND TRIBUTARY

Field Survey Section No.	XS Letter Draft FIS	Computer Stationing	EPA Reach File No. (If Available)	XS Letter Final FIS
<u>.059</u>	<u>A</u>	<u>.059</u>	_____	_____
<u>.153</u>	<u>B</u>	<u>.153</u>	_____	_____
<u>.265</u>	<u>C</u>	<u>.265</u>	_____	_____
<u>.418</u>	<u>D</u>	<u>.418</u>	_____	_____
<u>.518</u>	<u>E</u>	<u>.518</u>	_____	_____
<u>.642</u>	<u>F</u>	<u>.642</u>	_____	_____
<u>.775</u>	<u>G</u>	<u>.775</u>	_____	_____
<u>.866</u>	<u>H</u>	<u>.866</u>	_____	_____
<u>.920</u>	<u>I</u>	<u>.920</u>	_____	_____
<u>.998</u>	<u>J</u>	<u>.998</u>	_____	_____
<u>1.110</u>	<u>K</u>	<u>1.110</u>	_____	_____
<u>1.204</u>	<u>L</u>	<u>1.204</u>	_____	_____
<u>1.263</u>	<u>M</u>	<u>1.263</u>	_____	_____
<u>1.331</u>	<u>N</u>	<u>1.331</u>	_____	_____
<u>1.361</u>	<u>O</u>	<u>1.361</u>	_____	_____
<u>1.387</u>	<u>P</u>	<u>1.387</u>	_____	_____
<u>1.396</u>	<u>Q</u>	<u>1.396</u>	_____	_____

KEY TO CROSS-SECTION (XS) LABELING

Prepared by: Sun Valley Parkway North FIS.
 SC: A-N West, Inc. Phx. Az Community Name Town of Surprise and Unincorp.
 TEC: _____ State Areas of Maricopa Co, Arizona

Date prepared: _____
 SC: Sept 1991 Stream Name _____
 TEC: _____ Run Date WASH NO. 5 AND TRIBUTARY (CONT.)

Field Survey Section No.	XS Letter Draft FIS	Computer Stationing	EPA Reach File No. (If Available)	XS Letter Final FIS
	<u>TRIBUTARY A</u>			
<u>11.007</u>	<u>R</u>	<u>11.007</u>		
<u>11.117</u>	<u>S</u>	<u>11.117</u>		
<u>11.210</u>	<u>T</u>	<u>11.210</u>		
<u>11.244</u>	<u>U</u>	<u>11.244</u>		
<u>11.274</u>	<u>V</u>	<u>11.274</u>		
<u>11.283</u>	<u>W</u>	<u>11.283</u>		
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

KEY TO CROSS-SECTION (XS) LABELING

Prepared by: San Valley Parkway North F.I.S.
 SC: A-N West, Inc. Phx. Az Community Name Town of Surprise and Unincorp.
 TEC: _____ State Areas of Maricopa Co, Arizona

Date prepared: _____ Stream Name _____
 SC: Sept. 1991 Run Date WASH No. 6 AND TRIBUTARY
 TEC: _____

Field Survey Section No.	XS Letter Draft FIS	Computer Stationing	EPA Reach File No. (If Available)	XS Letter Final FIS
<u>.254</u>	<u>A</u>	<u>.254</u>	_____	_____
<u>.366</u>	<u>B</u>	<u>.366</u>	_____	_____
<u>.498</u>	<u>C</u>	<u>.498</u>	_____	_____
<u>.617</u>	<u>D</u>	<u>.617</u>	_____	_____
<u>.737</u>	<u>E</u>	<u>.737</u>	_____	_____
<u>.849</u>	<u>F</u>	<u>.849</u>	_____	_____
<u>.950</u>	<u>G</u>	<u>.950</u>	_____	_____
<u>1.042</u>	<u>H</u>	<u>1.042</u>	_____	_____
<u>1.097</u>	<u>I</u>	<u>1.097</u>	_____	_____
<u>1.134</u>	<u>J</u>	<u>1.134</u>	_____	_____
<u>1.178</u>	<u>K</u>	<u>1.178</u>	_____	_____
<u>1.225</u>	<u>L</u>	<u>1.225</u>	_____	_____
<u>1.237</u>	<u>M</u>	<u>1.237</u>	_____	_____
<u>1.269</u>	<u>N</u>	<u>1.269</u>	_____	_____
<u>1.282</u>	<u>O</u>	<u>1.282</u>	_____	_____
_____	<u>TRIBUTARY A</u>	_____	_____	_____
<u>11.139</u>	<u>P</u>	<u>11.139</u>	_____	_____

KEY TO CROSS-SECTION (XS) LABELING

Prepared by:

SC: A-N West, Inc. Phx. Az
 TEC: _____

Sun Valley Parkway North FIS.

Community Name Town of Surprise and Unincorp.
 State Areas of Maricopa Co, Arizona

Date prepared:

SC: Sept. 1991
 TEC: _____

Stream Name
 Run Date

WASH No. 7

Field Survey Section No.	XS Letter Draft FIS	Computer Stationing	EPA Reach File No. (If Available)	XS Letter Final FIS
<u>.254</u>	<u>A</u>	<u>.254</u>	_____	_____
<u>.398</u>	<u>B</u>	<u>.398</u>	_____	_____
<u>.495</u>	<u>C</u>	<u>.495</u>	_____	_____
<u>.650</u>	<u>D</u>	<u>.650</u>	_____	_____
<u>.779</u>	<u>E</u>	<u>.779</u>	_____	_____
<u>.851</u>	<u>F</u>	<u>.851</u>	_____	_____
<u>1.005</u>	<u>G</u>	<u>1.005</u>	_____	_____
<u>1.144</u>	<u>H</u>	<u>1.144</u>	_____	_____
<u>1.206</u>	<u>I</u>	<u>1.206</u>	_____	_____
<u>1.282</u>	<u>J</u>	<u>1.282</u>	_____	_____
<u>1.377</u>	<u>K</u>	<u>1.377</u>	_____	_____
<u>1.445</u>	<u>L</u>	<u>1.445</u>	_____	_____
<u>1.509</u>	<u>M</u>	<u>1.509</u>	_____	_____
<u>1.555</u>	<u>N</u>	<u>1.555</u>	_____	_____
<u>1.591</u>	<u>O</u>	<u>1.591</u>	_____	_____
<u>1.630</u>	<u>P</u>	<u>1.630</u>	_____	_____
<u>1.672</u>	<u>Q</u>	<u>1.672</u>	_____	_____

KEY TO CROSS-SECTION (XS) LABELING

Prepared by:

SC: A-N West, Inc. Phx. Az Community Name Sun Valley Parkway North F.I.S.
 TEC: _____ State Town of Surprise and Unincorp. Areas of Maricopa Co, Arizona

Date prepared:

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Stream Name

Run Date WASH NO. 8 AND TRIBUTARIES

Field Survey Section No.	XS Letter Draft FIS	Computer Stationing	EPA Reach File No. (If Available)	XS Letter Final FIS
<u>.114</u>	<u>A</u>	<u>.114</u>	_____	_____
<u>.265</u>	<u>B</u>	<u>.265</u>	_____	_____
<u>.362</u>	<u>C</u>	<u>.362</u>	_____	_____
<u>.474</u>	<u>D</u>	<u>.474</u>	_____	_____
<u>.623</u>	<u>E</u>	<u>.623</u>	_____	_____
<u>.773</u>	<u>F</u>	<u>.773</u>	_____	_____
<u>.893</u>	<u>G</u>	<u>.893</u>	_____	_____
<u>1.016</u>	<u>H</u>	<u>1.016</u>	_____	_____
<u>1.094</u>	<u>I</u>	<u>1.094</u>	_____	_____
<u>1.177</u>	<u>J</u>	<u>1.177</u>	_____	_____
<u>1.285</u>	<u>K</u>	<u>1.285</u>	_____	_____
<u>1.375</u>	<u>L</u>	<u>1.375</u>	_____	_____
<u>1.495</u>	<u>M</u>	<u>1.495</u>	_____	_____
<u>1.601</u>	<u>N</u>	<u>1.601</u>	_____	_____
<u>1.668</u>	<u>O</u>	<u>1.668</u>	_____	_____
<u>1.730</u>	<u>P</u>	<u>1.730</u>	_____	_____
<u>1.808</u>	<u>Q</u>	<u>1.808</u>	_____	_____

KEY TO CROSS-SECTION (XS) LABELING

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 SC: A-N West, Inc. Phx. Az Community Name Town of Surprise and Unincorp.
 TEC: _____ State Areas of Maricopa Co, Arizona

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 SC: Sept. 1991 Stream Name _____
 TEC: _____ Run Date WASH NO. 8 AND TRIBUTARIES (CONT.)

Field Survey Section No.	XS Letter Draft FIS	Computer Stationing	EPA Reach File No. (If Available)	XS Letter Final FIS
<u>1.860</u>	<u>R</u>	<u>1.860</u>	_____	_____
<u>1.917</u>	<u>S</u>	<u>1.917</u>	_____	_____
<u>1.975</u>	<u>T</u>	<u>1.975</u>	_____	_____
<u>2.027</u>	<u>U</u>	<u>2.027</u>	_____	_____
<u>2.072</u>	<u>V</u>	<u>2.072</u>	_____	_____
<u>2.112</u>	<u>W</u>	<u>2.112</u>	_____	_____
<u>2.157</u>	<u>X</u>	<u>2.157</u>	_____	_____
<u>2.172</u>	<u>Y</u>	<u>2.172</u>	_____	_____
<u>2.204</u>	<u>Z</u>	<u>2.204</u>	_____	_____
<u>2.216</u>	<u>AA</u>	<u>2.216</u>	_____	_____
<u>TRIBUTARY A</u>				
<u>12.152</u>	<u>AB</u>	<u>12.152</u>	_____	_____
<u>12.181</u>	<u>AC</u>	<u>12.181</u>	_____	_____
<u>12.189</u>	<u>AD</u>	<u>12.189</u>	_____	_____
<u>12.197</u>	<u>AE</u>	<u>12.197</u>	_____	_____
<u>12.209</u>	<u>AF</u>	<u>12.209</u>	_____	_____
<u>TRIBUTARY B</u>				

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Stream Name

Run Date WASH NO. 8 AND TRIBUTARIES (CONT.)

Field Survey Section No.	XS Letter Draft FIS	Computer Stationing	EPA Reach File No. (If Available)	XS Letter Final FIS
<u>22.080</u>	<u>AG</u>	<u>22.080</u>	_____	_____
<u>22.097</u>	<u>AH</u>	<u>22.097</u>	_____	_____
<u>22.129</u>	<u>AI</u>	<u>22.129</u>	_____	_____
<u>22.140</u>	<u>AJ</u>	<u>22.140</u>	_____	_____
<u>22.182</u>	<u>AK</u>	<u>22.182</u>	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
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