AGUA FRIA FLOODPLAIN DELINEATION FROM CACTUS ROAD TO BELL ROAD

FCD Contract No. 1999C048 – Assignment # 6

TECHNICAL DATA NOTEBOOK

Prepared for:

Flood Control District of Maricopa County

Prepared by:

WEST CONSULTANTS, INC.

WEST Consultants, Inc

Registered Professional Engineer (Civil)
CERTIFICATE NO.
36225
GARY E.
FREEMAN
Date Signed 6/19/02
ARIZONA, U.S.A.

April 2002

AGUA FRIA FLOODPLAIN DELINEATION FROM CACTUS ROAD TO BELL ROAD

FCD Contract No. 1999C048 – Assignment # 6

Prepared for:

Flood Control District of Maricopa County

2801 West Durango Street

Phoenix, AZ 85009-6399

Prepared by:

WEST CONSULTANTS, INC.

WEST Consultants, Inc

2151 East Broadway Road, Suite 116

Tempe, AZ 85282

Registered Professional Engineer (Civil)
CERTIFICATE NO.
36225
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FREEMAN
Date Signed 6/19/03
ARIZONA, U.S.A.

April 2002

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1. Introduction

The Flood Control District of Maricopa County contracted WEST Consultants, Inc. (WEST) to perform a detailed Zone-AE type analysis on a portion of the Agua Fria River located in Phoenix, Arizona. The result of this analysis is a letter of map revision (LOMR). The project involves approximately 3.6 miles of the Agua Fria between Cactus and Bell Roads, and a 1.7 mile portion of the Atchison, Topeka, & Santa Fe Railroad Channel (hereafter referred to as the AT&SF Channel) that parallels Grand Avenue to the west of the river. The project extents are shown in Figure 1.1 below. This project is officially referred to by the Flood Control District of Maricopa County (hereafter the District) as contract number 1999C048 – Assignment # 6. Mr. Michael Duncan, P.E., is the project manager for the District.

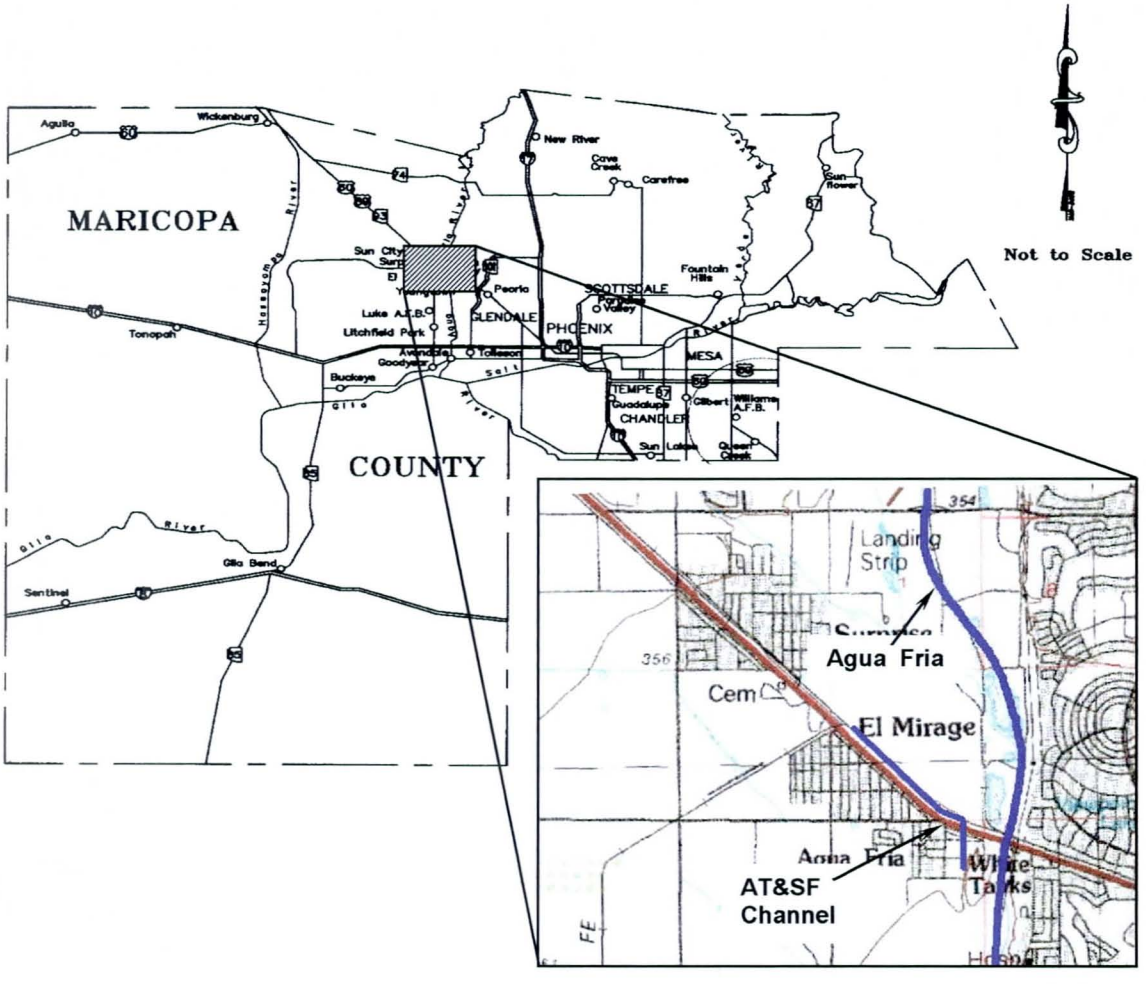

Figure 1.1 Index Map of Study Area

2. ADWR/FEMA Forms

2.1 Study Documentation Abstracts for ADWR Submittals

All information related to Sections 2.1.1 through 2.1.10 of the State Standard Attachment SSA1-97, dated November 1997, are included following page 2.

2.2 FEMA Forms

Forms required by FEMA are included following the ADWR forms.

3. Surveying and Mapping Information

3.1 Field Survey Information

A portion of the analysis was based on information obtained by field survey. In the AT&SF Channel channel, several spot elevations were determined near the driveway connecting the entrance to the Arizona Automotive Distribution Facility and Thompson Ranch Road. At this location, the AT&SF Channel passes through a three-barrel culvert. There was concern that the resolution of the topographic mapping (see Section 3.2) was not sufficient to accurately portray the channel geometry at this location. As a result, spot elevations at and around the box culvert between cross sections 9022 and 9140 were obtained by Keogh Engineering, Inc. on July 18, 2001 and incorporated into the model geometry. These spot elevations provided greater definition of the invert elevations of the culvert as well as elevations for the headwalls. Later in the analysis, it was determined that mapping along portions of the AT&SF Channel did not provide adequate definition to address landowner concerns. Therefore, on July 22, 2001 Keogh Engineering, Inc. conducted an additional survey to determine elevations along the channel thalweg and banks between cross sections 7145 and 11664.

3.2 Mapping

Digital mapping for this analysis was provided under sub-contract by Databased Terrain Mapping, Inc. (DTM). The date of the new aerial mapping is November 11, 2000. Its spatial limits extend from approximately Happy Valley Road to the north downstream to Cactus Road in the south. The majority of the mapping covers approximately 0.7 miles (3700 feet) in either direction of the Agua Fria River alignment. The AT&SF Channel that parallels Grand Avenue to the west of the river was also mapped to approximately the El Mirage Road alignment.

The topographic work map produce for this study is at a scale of 1" = 200' with a 2' vertical contour interval based on the National Geodetic Vertical Datum of 1929. Supplemental historic mapping, including the effective floodplain boundary established by the 1996 Coe & Van Loo, Inc. (CVL) study, was provided by the District in the form of paper copies. Additional construction and as-built plans for facilities along the AT&SF Channel were also provided by Thompson Ranch Development Company, Inc. at the request of the District.

FEDERAL EMERGENCY MANAGEMENT AGENCY **REVISION REQUESTER AND COMMUNITY OFFICIAL**	O.M.B No. 3067-0148 Expires April 30, 2001

1. REQUESTED RESPONSE FROM FEMA

This request is for a:

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

☒ LOMR A letter from FEMA officially revising the current NFIP map to show the changes to floodplains, floodway or flood elevations. LOMRs typically decrease flood hazards. (See 44 CFR Ch. 1 Parts 60 & 65.)

☐ Other Describe: _____

2. OVERVIEW

1. The basis for this revision request is (are): (check all that apply)

☐ Physical Change ☒ Improved Methodology/Data ☒ Floodway Revision

☐ Other Describe: _____

Note: A photograph is not required, but is very helpful during review.

2. Flooding Source: Agua River and Atchison, Topeka & Santa Fe Railroad Channel

3. Project Name/Identifier: Agua Fria River Floodplain Delineation from Cactus Road to Bell Road

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

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

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301 480287	Katy, City Harris County	TX TX	480301 48201C	0005D 0220G	02/08/83 09/28/90
040041 040053 040037	El Mirage, City Surprise, City Unicorporated Maricopa County	AZ	04013C	1165H, 1170G, 1605H, 1610H	07/19/01
040057	Youngtown, Town	AZ	04013C	1610H	07/19/01

6. The area of revision encompasses the following types of flooding and structures. Check all that apply.

Types of Flooding	Structures
☒ Riverine	☐ Channelization
☐ Coastal	☐ Levee/Floodwall
☐ Alluvial fan	☒ Bridge/Culvert
☐ Shallow Flooding (e.g. Zones AO and AH)	☐ Dam
☐ Lakes	☐ Fill
☐ Other (describe)	☐ Other (describe)

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

4. ENCROACHMENT INFORMATION

1. Does the State have jurisdiction over the floodway or its adoption by communities participating in the NFIP?
☐ Yes ☐ No

Yes, attach a copy of a letter notifying the appropriate State agency of the floodway revision and documentation of the approval of the revised floodway by the appropriate State agency.

2. Does the development in the floodway cause the 1% annual chance (base) elevation to increase at any location by more than 0.000 feet? ☐ Yes ☐ No ☐ N/A

3. Does the cumulative effect of all development that has occurred since the effective SFHA was originally identified cause the base flood elevation to increase at any location by more than one foot (or other increase limit if community or state has adopted more stringent criteria - even if a floodway has not been delineated by FEMA)? ☐ Yes ☐ No

If the answer to either items is Yes, please attach documentation that all requirements of Section 65.12 of the NFIP regulations have been met, regarding evaluation of alternatives, notice to individual legal property owners, concurrence of CEO, and certification that no insurable structures are impacted.

5. MAINTENANCE RESPONSIBILITY

The community is willing to assume responsibility for ☐ performing ☐ overseeing compliance with the maintenance and operation plans of the _____ (Name) flood control structure. If not performed promptly by an owner other than the community, the community will provide the necessary services without cost to the Federal government.

Operation and maintenance plans are attached. ☐ **Yes** ☐ **No** ☒ **N/A**

6. REVIEW FEE

The review fee for the appropriate request category has been included. ☐ Yes Fee amount: $_____

OR

This request is based on a federally sponsored flood-control project where 50 percent or more of the project's cost is federally sponsored, or the request is based on detailed hydrologic and hydraulic studies conducted by Federal, State, or local agencies to replace approximate studies conducted by FEMA and shown on the effective FIRM; thus the project is fee exempt.
☐ Yes

Please see Instructions for Fee Amounts

7. SIGNATURE

***Note:* I understand that my signature indicates that all information submitted in support of this request is correct**

Michael Duncan
Signature of Revision Requester

Michael Duncan, P.E., Project Manager
Printed Name and Title of Revision Requester

Maricopa County Flood Control District
Company Name

602-506-4732 4-1-02
Telephone No.: Date:

***Note:* Signature indicates that the community understands, from the revision requester, the impacts of the revision on flooding conditions in the community.**

Brian B. Pirooz 4/11/02
Signature of Community Official

BRIAN B. PIROOZ, PE
Printed Name and Title of Community Official ASSIT. CITY. ENG.

SURPRISE
Community Name

Telephone No.: 623 Date: 583-6025

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is in accordance with 44 CFR Ch. 1, Sect 65.2

Signature

Gary E. Freeman, Ph.D., P.E., J.D., Director, Water Resources Engineering
Printed Name and Title of Revision Requester

Registr No. 36225 Expires (Date) 06/30/2004 State AZ

Type of License/Expertise: Civil Engineer

Check which forms have been included with this request

Form Name and (Number)	Required if .....
☐ **Hydrologic** (3)	new or revised discharges
☒ **Hydraulic** (4)	new or revised water-surface elevations
☒ **Mapping** (5)	floodplain/floodway changes
☐ **Channelization** (6)	channel is modified
☐ **Bridge/Culvert** (7)	addition/revision of bridge/culvert
☐ **Levee/Floodwall** (8)	addition/revision of levee/floodwall
☐ **Coastal** (9)	new or revised coastal elevations
☐ **Coastal Structures** (10)	addition/revision of coastal structure
☐ **Dam** (11)	addition/revision of dam
☐ **Alluvial Fan** (12)	structures proposed on alluvial fan

4. ENCROACHMENT INFORMATION

1. Does the State have jurisdiction over the floodway or its adoption by communities participating in the NFIP?
☐ Yes ☐ No

Yes, attach a copy of a letter notifying the appropriate State agency of the floodway revision and documentation of the approval of the revised floodway by the appropriate State agency.

2. Does the development in the floodway cause the 1% annual chance (base) elevation to increase at any location by more than 0.000 feet? ☐ Yes ☐ No ☐ N/A

3. Does the cumulative effect of all development that has occurred since the effective SFHA was originally identified cause the base flood elevation to increase at any location by more than one foot (or other increase limit if community or state has adopted more stringent criteria - even if a floodway has not been delineated by FEMA)? ☐ Yes ☐ No

If the answer to either items is Yes, please attach documentation that all requirements of Section 65.12 of the NFIP regulations have been met, regarding evaluation of alternatives, notice to individual legal property owners, concurrence of CEO, and certification that no insurable structures are impacted.

5. MAINTENANCE RESPONSIBILITY

The community is willing to assume responsibility for ☐ performing ☐ overseeing compliance with the maintenance and operation plans of the _____
(Name)
flood control structure. If not performed promptly by an owner other than the community, the community will provide the necessary services without cost to the Federal government.

Operation and maintenance plans are attached. ☐ **Yes** ☐ **No** ☒ **N/A**

6. REVIEW FEE

The review fee for the appropriate request category has been included. ☐ Yes Fee amount: $_____

OR

This request is based on a federally sponsored flood-control project where 50 percent or more of the project's cost is federally sponsored, or the request is based on detailed hydrologic and hydraulic studies conducted by Federal, State, or local agencies to replace approximate studies conducted by FEMA and shown on the effective FIRM; thus the project is fee exempt.
☐ Yes

Please see Instructions for Fee Amounts

7. SIGNATURE

Note: **I understand that my signature indicates that all information submitted in support of this request is correct**

Michael Duncan
Signature of Revision Requester

Michael Duncan, P.E., Project Manager
Printed Name and Title of Revision Requester

Maricopa County Flood Control District
Company Name

602-506-4732 Telephone No.: 4-8-02 Date:

Note: **Signature indicates that the community understands, from the revision requester, the impacts of the revision on flooding conditions in the community.**

5/1/02
Signature of Community Official

MICHAEL ELLEGOOD, PE, Chief Engineer & General Manager
Printed Name and Title of Community Official

Flood Control District of Maricopa County
Community Name

602-506-1502 Telephone No.: 5-2-02 Date:

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is in accordance with 44 CFR Ch. 1, Sect 65.2

Signature

Gary E. Freeman, Ph.D., P.E., J.D., Director, Water Resources Engineering
Printed Name and Title of Revision Requester

Registr No. 36225 Expires (Date) 06/30/2004 State AZ

Type of License/Expertise: Civil Engineer

Check which forms have been included with this request

Form Name and (Number)	Required if .....
☐ **Hydrologic** (3)	new or revised discharges
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☐ **Alluvial Fan** (12)	structures proposed on alluvial fan

4. ENCROACHMENT INFORMATION

1. Does the State have jurisdiction over the floodway or its adoption by communities participating in the NFIP?
   ☐ Yes ☐ No

Yes, attach a copy of a letter notifying the appropriate State agency of the floodway revision and documentation of the approval of the revised floodway by the appropriate State agency.

N/A

2. Does the development in the floodway cause the 1% annual chance (base) elevation to increase at any location by more than 0.000 feet? ☐ Yes ☐ No ☐ N/A

3. Does the cumulative effect of all development that has occurred since the effective SFHA was originally identified cause the base flood elevation to increase at any location by more than one foot (or other increase limit if community or state has adopted more stringent criteria - even if a floodway has not been delineated by FEMA)? ☐ Yes ☐ No

If the answer to either items is Yes, please attach documentation that all requirements of Section 65.12 of the NFIP regulations have been met, regarding evaluation of alternatives, notice to individual legal property owners, concurrence of CEO, and certification that no insurable structures are impacted.

5. MAINTENANCE RESPONSIBILITY

N/A

The community is willing to assume responsibility for ☐ performing ☐ overseeing compliance with the maintenance and operation plans of the _____
(Name)
flood control structure. If not performed promptly by an owner other than the community, the community will provide the necessary services without cost to the Federal government.

Operation and maintenance plans are attached. ☐ **Yes** ☐ **No** ☐ **N/A**

6. REVIEW FEE

The review fee for the appropriate request category has been included. ☐ Yes Fee amount: $_____

OR

N/A

This request is based on a federally sponsored flood-control project where 50 percent or more of the project's cost is federally sponsored, or the request is based on detailed hydrologic and hydraulic studies conducted by Federal, State, or local agencies to replace approximate studies conducted by FEMA and shown on the effective FIRM; thus the project is fee exempt.
☐ Yes

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Note: **I understand that my signature indicates that all information submitted in support of this request is correct**

Michael Duncan
Signature of Revision Requester

Michael Duncan, P.E., Project Manager
Printed Name and Title of Revision Requester

Flood Control District of Maricopa County
Company Name

Telephone No.: 602-506-4732 Date: 7-1-02

Note: **Signature indicates that the community understands, from the revision requester, the impacts of the revision on flooding conditions in the community.**

Mark Fooks
Signature of Community Official

Mark Fooks Town Manager
Printed Name and Title of Community Official

Town of Youngtown
Community Name

Telephone No.: 6239335951 Date: 7/1/02

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is in accordance with 44 CFR Ch. 1, Sect 65.2

Signature

Gary E. Freeman, Ph.D., P.E., J.D., Director, Water Resources Engineering
Printed Name and Title of Revision Requester

Registr No. 36225 Expires (Date) 06/30/2004 State AZ

Type of License/Expertise: Civil Engineer

Check which forms have been included with this request

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☐ **Alluvial Fan** (12)	structures proposed on alluvial fan

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1. Does the State have jurisdiction over the floodway or its adoption by communities participating in the NFIP?
☐ Yes ☐ No

Yes, attach a copy of a letter notifying the appropriate State agency of the floodway revision and documentation of the approval of the revised floodway by the appropriate State agency.

2. Does the development in the floodway cause the 1% annual chance (base) elevation to increase at any location by more than 0.000 feet? ☐ Yes ☐ No ☐ N/A

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(Name)
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Operation and maintenance plans are attached. ☐ **Yes** ☐ **No** ☒ **N/A**

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The review fee for the appropriate request category has been included. ☐ Yes Fee amount: $_____

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☐ Yes

Please see Instructions for Fee Amounts

7. SIGNATURE

Note: **I understand that my signature indicates that all information submitted in support of this request is correct**

Michael Duncan
Signature of Revision Requester

Michael Duncan, P.E., Project Manager
Printed Name and Title of Revision Requester

Maricopa County Flood Control District
Company Name

Telephone No.: 602-506-4732 Date: 4-1-02

Note: **Signature indicates that the community understands, from the revision requester, the impacts of the revision on flooding conditions in the community.**

C E Reynolds, P.E.
Signature of Community Official

Public Works Director
Printed Name and Title of Community Official

City of El Mirage
Community Name

Telephone No.: 623-815-2491 Date: 4-1-02

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is in accordance with 44 CFR Ch. 1, Sect 65.2

Signature

Gary E. Freeman, Ph.D., P.E., J.D., Director, Water Resources Engineering
Printed Name and Title of Revision Requester

Registr No. 36225 Expires (Date) 06/30/2004 State AZ

Type of License/Expertise: Civil Engineer

Check which forms have been included with this request

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☐ **Alluvial Fan** (12)	structures proposed on alluvial fan

City of El Mirage

14405 N. Palm Street, P.O. Box 26, El Mirage, AZ 85335 (623)972-8116 Fax - (623)972-8110

July 15, 2002

Hazards Study Branch
Federal Emergency Management Agency
500 C Street SW
Washington, D.C. 50472

SUBJECT: Case No. 02-09-945P
Agua Fria Floodplain Delineation from Cactus Road to Bell Road

To Whom It May Concern:

I have reviewed the Letter of Map Revision (LOMR) package for revising the floodplain and floodway of the Agua Fria River, and of the ATSF Channel tributary. Concerning the LOMR that affects the City of El Mirage, as Floodplain Administrator for the City, I will adopt and enforce the related, modified regulatory floodway.

Sincerely,

C E Reynolds

C.E. Reynolds, P.E.
Public Works Director

Cc Mike Duncan, Maricopa Flood Control District

THE CITY OF SURPRISE, ARIZONA

ENGINEERING DEPARTMENT

12425 WEST BELL ROAD
SUITE D-100
SURPRISE, AZ 85374
OFFICE (623) 583-6025 - FAX (623) 583-0721
WEBSITE: www.surpriseaz.com

July 1, 2002

Hazards Study Branch
Federal Emergency Management Agency
500 C Street SW
Washington, D.C. 20472

SUBJECT: Case No. 02-09-945P
Agua Fria Floodplain Delineation from Cactus Road to Bell Road

To Whom It May Concern:

I have reviewed the Letter of Map Revision (LOMR) package for revising the floodplain and floodway of the Agua Fria River, and of the ATSF Channel tributary. Concerning the portion of the LOMR that affects the City of Surprise, as Floodplain Administrator for the City of Surprise, I will adopt and enforce the related, modified regulatory floodway.

Sincerely,

B. Pirooz

Brian Pirooz, P.E.
Assistant City Engineer

Town of Youngtown
12030 Clubhouse Square
Youngtown, Arizona 85363

FLOOD CONTROL DISTRICT
RECEIVED
JUL 03 '02

CH & GM	FINANCE
PID	LANDS
ADMIN	C S
REG	P & PM
✓ ENG	FILE
CONTRACTS	
ROUTING MWD	

July 2, 2002

Mike Duncan
Flood Control District of Maricopa County
2801 W. Durango Street
Phoenix, Arizona 85009-6399

RE: Case No. 02-09-945P Agua Fria Floodplain Delineation from Cactus to Bell Rd

Dear Mr Duncan:

I have reviewed the Letter of Map Revision package for revising the floodplain and floodway of the Agua Fria River, and of the ATSF Channel tributary. Concerning the portion of the LOMR that affects Youngtown, Arizona, I and my Floodplain Administrator for the Town of Youngtown will enforce the related, modified regulatory floodway.

Sincerely,
Mark Fooks

Mark Fooks
Town Manager

Cc: Jesse Mendez, Floodplain Administrator

FLOOD CONTROL DISTRICT
of
Maricopa County

2801 West Durango Street • Phoenix, Arizona 85009-6399
Telephone (602) 506-1501
Fax (602) 506-4601
TT (602) 506-5897

July 9, 2002

Hazards Study Branch
Federal Emergency Management Agency
500 C Street SW
Washington, D.C. 20472

SUBJECT: Adoption and Enforcement of Modified Regulatory Floodway Limits

LOCATION: Agua Fria River from Cactus Road to Bell Road
and
Atchison, Topeka, and Santa Fe Railroad Channel from Grand Avenue to west of the El Mirage Road alignment

To Whom It May Concern:

I have reviewed our LOMR application package for revising the floodplain and floodway limits for the Agua Fria River and for the Atchison, Topeka, and Santa Fe Railroad Channel. In the area north of Grand Avenue, portions of these floodplains are in Unincorporated Maricopa County. For these portions, as Floodplain Administrator for Unincorporated Maricopa County, I will adopt and enforce the related, modified regulatory floodway.

Sincerely,

Michael S. Ellegood, P.E.
Chief Engineer and General Manager

FLOOD CONTROL DISTRICT
of
Maricopa County

2801 West Durango Street • Phoenix, Arizona 85009-6399
Telephone (602) 506-1501
Fax (602) 506-4601
TT (602) 506-5897

May 9, 2002

TOPIC: Floodplain Restudy of
Agua Fria River from Bell Road to Cactus Road, and
Tributary channel along Grand Avenue and railroad

Dear Property Owner:

County Assessor records indicate that you may own property in the vicinity of a recent Floodplain Restudy of the Agua Fria River from Bell Road to Cactus Road. This restudy also includes a portion of a tributary to the Agua Fria River that is called the Atchison, Topeka, and Santa Fe Railway Channel.

The enclosed exhibit shows the existing floodplain (shown as dark gray), and areas where the revised floodplain differs from the existing (shown as lines and dashed lines with notes for ADJUSTED FLOODPLAIN and ADJUSTED FLOODWAY). Most of the existing floodplain in this area is type Zone AE floodplain. Zone AE floodplain requires flood insurance for federally insured loans, and has water surface elevations.

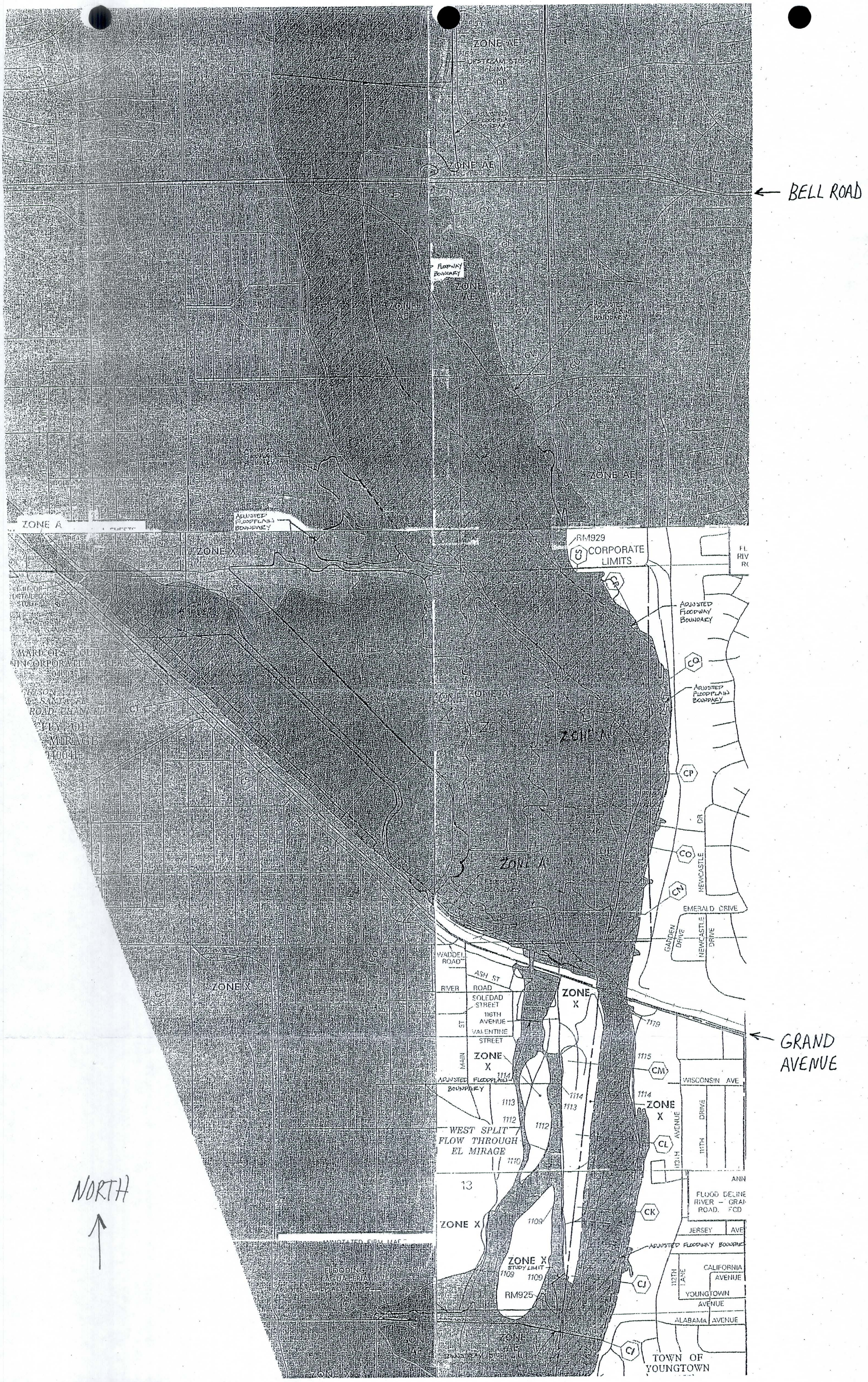
Portions of the existing floodplain will be revised to Zone A (which means flood insurance is required but no water surface elevations are specified), and revised to Zone X (which is outside the 100-year floodplain and does not require flood insurance).

This revision will be processed by the Federal Emergency Management Agency (FEMA), and will become official when FEMA issues revised Flood Insurance Rate Maps for this revision. If you have any questions about this floodplain restudy, please call me at 602-506-4732.

Sincerely,

Mike Duncan

Mike Duncan
Floodplain Study Branch


ZONE AE
UPSTREAM STUDY LIMIT
ADJUSTED FLOODPLAIN BOUNDARY
ZONE AE
BELL ROAD
FLOODWAY BOUNDARY
ZONE AE
ADJUSTED FLOODPLAIN BOUNDARY
ADJUSTED FLOODWAY BOUNDARY
MARICOPA COUNTY
ZONE AE
ZONE A
ADJUSTED FLOODPLAIN BOUNDARY
ZONE X
ZONE AE
MARICOPA COUNTY UNINCORPORATED AREAS 040037
CITY OF EL MIRAGE 040041
RM929
CORPORATE LIMITS
ADJUSTED FLOODWAY BOUNDARY
CQ
ADJUSTED FLOODPLAIN BOUNDARY
CP
DR
CO
NEWCASTLE
CN
EMERALD DRIVE
GARDEN DRIVE
NEWCASTLE DRIVE
ZONE A
ZONE X
WADDELL ROAD
ASH ST
RIVER ROAD
SOLEDAD STREET
116TH AVENUE
VALENTINE STREET
MAIN ST
ZONE X
ZONE X
1119
GRAND AVENUE
1115
CM
WISCONSIN AVE
ADJUSTED FLOODPLAIN BOUNDARY
1114
1114
1113
1113
1114
ZONE X
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WEST SPLIT FLOW THROUGH EL MIRAGE
CL
113TH AVENUE
111TH DRIVE
1110
13
FLOOD DELINE RIVER – GRAN ROAD. FCD
CK
ZONE X
1109
JERSEY AVE
ADJUSTED FLOODWAY BOUNDARY
ZONE X
STUDY LIMIT
1109
1109
CJ
112TH LANE
CALIFORNIA AVENUE
YOUNGTOWN AVENUE
RM925
ALABAMA AVENUE
ZONE AE
DOWNSTREAM STUDY LIMIT
CI
TOWN OF YOUNGTOWN
FLOODING EFFECTS FROM AGUA FRIA RIVER
ZONE X
NORTH

Burlington Northern Santa Fe
920 SE Quincy St.
Topeka KS 66612

CALMAT Land Co.
3200 N San Fernando Rd
Los Angeles CA 90065

Barbara Wusich Young Trust
4545 E Indian Bend Rd
Paradise Valley AZ 85253

Coastal American Corp.
481 Carlisle Dr.
Herndon VA 20170

Herbert Dreiseszun
PO Box 10775
Phoenix AZ 85064

Reliance West Land Co.
6224 E Berneil Ln
Paradise Valley AZ 85253

4. Hydrology

4.1 Method Description

All hydrology for this analysis was provided by the District. Flows used in the Agua Fria River were identical to those used in the existing flood insurance study performed by CVL in 1996. Hydrology of the AT&SF Channel is from the White Tanks Area Drainage Master Study (ADMS), authored by the WLB Group in 1992.

4.2 Parameter Estimation

4.2.1 Drainage Area Boundaries

Not applicable.

4.2.2 Watershed Work Maps

Not applicable.

4.2.3 Gage Data

Not applicable.

4.2.4 Statistical Parameters

Not applicable.

4.2.5 Precipitation

Not applicable.

4.2.6 Physical Parameters

Not applicable.

4.3 Problems Encountered During Study

4.3.1 Special Problems and Solutions

According to the White Tanks ADMS (see study excerpts in Appendix D), the flow in the AT&SF Channel as it crosses Greenway Road is estimated at 483 cfs. Based on field inspection it was determined that the flow moving along the northeast side of the railway would split upon crossing Greenway Road, with approximately two-thirds of the flow, or 320 cfs, remaining near the AT&SF Channel. The remaining one-third of the flow would move east along Greenway Road and enter a drainage system (Greenway Channel) that ends abruptly approximately 1000 feet east of the Greenway, Thompson Ranch Road and El Mirage Road intersection. The flow split from the AT&SF Channel will combine with flows from areas contributing to the Greenway Channel and discharge from the terminated channel into a series of agricultural fields. The fields slope to the south and flow will primarily be to the south. This flow will move south across the fields until they intersect Thompson Ranch Road. The flow is unlikely to be contained by Thompson Ranch Road and will continue south. The flow increases in the AT&SF Channel occur at locations where the water is likely to re-enter the channel as shallow (less than 1 ft in depth)

overland flow. The flow where the AT&SF Channel enters the detailed study area is thus estimated at 320 cfs. The first flow increase to 374 cfs occurs at cross section 12076 where existing irrigation ditches and berms direct water into the AT&SF Channel. This is also true of the second and third flow increases to 428 cfs at cross section 11110 and 483 cfs at cross section 9287. The increase in flow to 530 cfs occurs at the outlet from the unloading facility detention pond at cross section 7885. A final flow increase occurs at the Thompson Ranch Road crossing where water moving down Thompson Ranch Road will enter the AT&SF Channel resulting in a final flow rate of 577 cfs (from the existing model of White Tanks ADMS) in the AT&SF Channel at the Grand Avenue culverts.

4.3.2 Modeling Warning and Error Messages

Not applicable.

4.4 Calibration

Not applicable.

4.5 Final Results

4.5.1 Hydrologic Analysis Results

Not applicable.

4.5.2 Verification of Results

Not applicable.

5. Hydraulics

5.1 Method Description

Hydraulic modeling for this analysis was performed using U.S. Army Corps of Engineers' HEC-RAS computer model, specifically Version 3.0.1 dated March 2001. The analysis also made use of HEC-GeoRAS version 3.0, produced by the U.S. Army Corps of Engineers, and ArcView GIS version 3.2a, produced by Environmental Systems Research Institute, Inc. (ESRI).

The analysis for this LOMR updates a portion of the effective 1996 flood insurance study by CVL with more recent topography. See section 3.2 for description of digital topography. The spatial limits of this LOMR are from Bell Road downstream to approximately Cactus Road. The study limits also include the AT&SF Channel along the north edge of Grand Avenue from approximately El Mirage Road to a point just downstream of the culverts crossing under Grand Avenue.

Downstream boundary conditions for this analysis were determined from the current effective model by CVL and from the White Tanks ADMS. The downstream study limit on the Agua Fria was fixed by copying the geometry of cross section 15.564 from the CVL 1996 model. The water surface elevation was then fixed to reflect that of the effective model at this cross section. Agua Fria cross sections upstream of this location then reflect the digital mapping developed for

this analysis. The downstream boundary condition for the AT&SF Channel was set in similar fashion by fixing the water surface elevation at cross section 4147 to match that of the Grand Split portion of cross section 16.385 in the effective CVL 1996 model. The digital geometry developed for this analysis was used to define this bounding cross section for the AT&SF Channel.

Cross sections were again copied from the effective models and added to the upstream ends of this analysis in order to tie our results into the effective flood mapping developed by the CVL 1996 study and the White Tanks ADMS. By doing so, we ensure a smooth transition from the results of this analysis into the upstream delineations of the effective studies. Only the number of cross sections necessary for the BFEs to return to the levels of the effective model were copied and added to the upstream ends of this analysis. For the Agua Fria reach, three cross sections were necessary to transition from our results to those of the effective model. For the AT&SF Channel, two cross sections were sufficient to match water surface elevations with the White Tanks ADMS.

5.2 Work Study Maps

Four work study maps were produced by this analysis. The three 36" x 48" maps are presented at a horizontal scale of 1" = 200' and 2' vertical resolution per the District's standard. The fourth sheet is an 11"x17" plot showing the very upstream end of the AT&SF Channel. Both the 100-year floodplain and floodway boundaries are presented, the former represented with a solid bold line type and the latter with a dashed bold line type. The channel thalweg is presented with a thin (non-bold) dashed line type of longer length than the floodway. The cross sections used in the hydraulic modeling are presented in their correct geo-spatial location and are numbered with hexagonal boxes at their edge. Each cross section lists the computed water surface elevations for the floodplain and floodway above and below the line, respectively.

5.3 Parameter Estimation

5.3.1 Roughness Coefficients

For the majority of the hydraulic model, roughness coefficients were matched to those of the 1996 CVL effective model. Site visits did not reveal any sizeable discrepancies between the values used in the effective model and those observed in the field. The only alterations to these values were in portions of the over-bank, and were very small in magnitude. A complete tabular listing of Manning's *n* values used at each cross section and those used in the effective model can be reviewed in Appendix E.1.

5.3.2 Expansion and Contraction Coefficients

Expansion and contraction coefficients were set to match the effective model by CVL. Contraction values ranged from 0.1 to 0.3, while expansion values ranged from 0.3 to 0.5.

5.4 Cross Section Descriptions

There are two different reaches in this hydraulic analysis: the Agua Fria River and the AT&SF Channel along the north edge of Grand Avenue. The cross section descriptions for these two reaches are significantly different and will be described separately in sections 5.4.1 (Agua Fria) and 5.4.2 (AT&SF Channel).

5.4.1 Agua Fria Cross Section Descriptions

The cross sections defined along the Agua Fria for this analysis are located in the same positions and have the same orientation as those from the effective CVL 1996 model. The geometry of the cross sections, however, reflects the new topography developed specifically for this analysis and described in Section 3.2 of this TDN. ArcView GIS with its GeoRAS extension was utilized to create the cross sections from digital mapping.

Two cross sections were added to this analysis that were not present in the effective CVL 1996 model. Cross sections 17.5137 and 17.5758 allow for better modeling of the hydraulic effects caused by the haul road that crosses the main channel between cross sections 17.458 and 17.638. To model this haul road, cross section 17.5758 was defined along the road using ArcView and HEC-GeoRAS. This geometry was then skewed to be perpendicular to the flow of the Agua Fria and inserted into the model. In the left overbank area of this cross section, a local drainage channel enters the main branch of the Agua Fria. This portion of the geometry was artificially elevated to match the surrounding topography using the blocked flow option. Cross section 17.5137 was added to bound the haul road on the downstream side. This modeling technique was used to eliminate unrealistic excess conveyance in the overbank.

5.4.2 AT&SF Channel Cross Section Descriptions

Where possible, cross sections defining the AT&SF Channel were placed in the locations corresponding to previous studies. Cross section geometry reflects the new topography developed specifically for this analysis as described in Section 3.2 of this TDN. ArcView GIS with its GeoRAS extension was utilized to create the cross sections from digital mapping. The resolution of the aerial mapping was not sufficient to properly define many portions of this reach – especially in accurately describing the channel invert and bank elevations. This was evident from both field inspections and consulting as-built plans for the railroad facility and channel. For this reason, additional surveying was obtained as described in Section 3.1 of this report. Several cross sections along the railroad distribution facility were adjusted along the right channel bank to reflect elevations in the as-built plans. The typical cross section along the upstream portions of the AT&SF Channel is a very narrow engineered channel with fairly flat overbanks. It varies in depth from three to five feet below the surrounding terrain. The downstream portions of the reach are natural and typically have a much wider channel compared to the engineered portion upstream.

5.5 Modeling Considerations

5.5.1 Hydraulic Jump and Drop Analysis

None identified.

5.5.2 Bridges and Culverts

The Agua Fria flows under three bridges within the project limits. At the upstream end of the LOMR it passes under Bell Road between cross sections 18.978 and 18.962. The second bridge is the Atchison Topeka and Santa Fe Railroad crossing between cross sections 16.518 and 16.514. The final bridge, Grand Avenue, lies between cross sections 16.506 and 16.482.

5.5.3 Levees and Dikes

Not Applicable.

5.5.4 Islands and Split Flows

There were no islands or split flows identified in the modeling process. Immediately downstream from cross section 17.910 there is a low portion of the right bank which behaves as a lateral weir with the 100-year event. As the mapping shows, this results in limited shallow flooding in portions of the right overbank. Relative to the total flow of the 100-year event on the Agua Fria, the amount of water leaving the channel is negligible and need not be accounted for in the model hydrology.

5.5.5 Ineffective Flow Areas

Ineffective flow areas are defined throughout the analysis in order to properly model hydraulic behavior. Ineffective flow was defined at cross sections bounding the several bridges and culverts in the model to properly account for expansion and contraction of flow around these structures. There are also several historical gravel pits adjoining the main channel of the Agua Fria. These pits were modeled using a combination of blocked and ineffective flow definitions. See the cross section plots presented in Appendix E.2.

5.5.6 Supercritical Flow

None identified.

5.6 Floodway Modeling

With the floodplain completed, a floodway encroachment analysis was performed on the model. This analysis consisted of an initial run using Encroachment Method 4, the results of which were later fine tuned using HEC-RAS's Encroachment Method 1. The Method 4 analysis specifies a target surcharge and incrementally removes an equal amount of conveyance from either overbank until the target surcharge is achieved. This procedure is performed at each cross section, beginning at the downstream end of the reach and working upstream. In order to expedite the process, three identical flow profiles were executed, each with a different target surcharge close to the desired value. The most effective target was then fixed at successive cross sections and the analysis moved upstream. Once Method 4 yielded encroachment stations close enough to the desired surcharge – within 0.2 feet – Method 1 was applied to produce final encroachment values. With Method 1, the user fixes the bank stations manually, allowing for fine-tuning to achieve the desired results. Care was taken to make sure the encroachments not only complied with the one foot surcharge limit, but also that the resulting floodway was hydraulically reasonable. At several locations, the preliminary Method 1 results were further altered to maintain a smooth floodway in plan view.

5.7 Problems Encountered During the Study

5.7.1 Special Problems and Solutions

Several problems presented themselves in the course of the analysis. The most substantial was the lack of resolution in mapping along the AT&SF Channel. This was dealt with using supplemental surveying as described in section 3.1 of this report. The additional surveying provided the necessary resolution to define the floodplain where the two-foot resolution of the aerial topography was not of sufficient for detailed modeling.

A second problem was determining the proper way to hydraulically model the haul road which crosses the Agua Fria between cross sections 17.458 and 17.638. It was felt that the road would have significant effects on the hydraulic behavior of the flow in this portion of the reach and needed to be accounted for in the model. Two additional cross sections were therefore added to the model to identify the haul road. Cross section 17.5758 identifies the road profile and section 17.5137 bounds it immediately downstream. Since the road crosses the river at a nearly 45° angle relative to the direction of flow, cross section 17.5758 was skewed along the angled portion of the road to align it perpendicularly with the direction of flow. At the cross section immediately upstream of the road (17.638), 'blocked flow' was defined up to the elevation of the road to account for the partial channel blockage caused by the road profile. This approach to modeling the haul road was considered preferable over treating it simply as a weir. The difficulty of selecting a realistic weir coefficient made the simpler weir approach very problematic because standard weir coefficients are based on the assumption of a uniform geometric weir shape. The erosion associated with a flow event of 100-year magnitude would result in a rather dynamic non-uniform road profile as the high shear stresses erode away weaker portions of the crossing, a phenomenon observed in past high-flow events.

A third complication is an area of shallow flooding in between the Agua Fria River and the AT&SF channel. This shallow flooding is caused by urban runoff from a housing development west of the study area which is routed along a small channel terminating in a field northeast of Thompson Ranch Road. The resulting Zone X delineation forms a roughly triangular area: bounded by the small channel and Greenway Road on the north, by the AT&SF Channel to the southwest, and by the gravel pit (mapped Zone A) to the east.

A fourth problem was noted during initial site visits above the study limits of the AT&SF Channel. A culvert place in the channel at the El Mirage Road entrance to the unloading facility is severely undersized in comparison with channel design capacity. The flow constriction cause by the culvert will force water out of the channel onto the surrounding properties. It is recommended that this culvert be removed or replaced with a sufficiently sized crossing.

The final problem encountered in the modeling involved a small breakout of the Agua Fria River between cross sections 17.821 and 17.910. HEC-RAS modeling indicates that a small portion of the right bank between these two cross sections is too low to fully contain the 100-year flow event, resulting in a small portion of the flow escaping onto the right overbank and into the nearby gravel pit. This phenomenon was modeled within HEC-RAS

version 3.0.1 utilizing a combination of the lateral weir and storage area options. A worst-case scenario was used in determining the parameters for modeling the lateral weir. The peak flow associated with the 100-year event is 37,500 cfs, which would result in a water surface elevation approximately 1.5 feet higher than the bank at this location. From inspection of the 100-year hydrograph (provided in Appendix E.5 for reference) it is clear that this maximum flow, and thus sufficient water surface elevation for the breakout, could last no longer than five hours. At 846 cfs for five hours, a total volume of only 350 acre-feet could escape the main channel and flow into the gravel pit. The dimensions of the gravel pit are an estimated 65 acres in area and 40 to 50 feet of depth. The cumulative ponding inside the gravel pit would therefore be approximately 5.4 feet over the duration of the 100-year flow event. A more realistic scenario would have the flow in the Agua Fria high enough to break out of the main channel for only about two and a half hours, and this at a somewhat lower average flow rate than the 846 cfs maximum. For clarity, the entire bottom of the gravel pit was mapped as Zone A, as was the small portion of overbank connecting the breakout with the gravel pit. At the recommendation of the District, the areas south and east of the pit were also included in this Zone A delineation to account for the possibility of future changes in topography due to ongoing mining in the area.

5.7.2 Modeling Warning and Error Messages

There were several warning messages generated by HEC-RAS along both the Agua Fria River and the AT&SF channel. Several locations along the Agua Fria resulted in divided flow results. These results were indicative of only local high points in the cross sections and not true divided flow phenomena.

Multiple locations also indicated changes exceeding model tolerances at successive cross sections in the conveyance ratio, velocity head or energy loss. Such warnings are not a source for concern. The suggestion of additional cross sections very seldom will avoid this warning. The final location and frequency of cross sections was agreed upon by both the District and WEST.

Two cross sections along the Agua Fria reach indicated that the model was unable to converge to a numerical solution to the water surface elevation and instead defaulted to critical depth. One such location is cross section 17.5758 where the haul road crosses the channel. This road, under high flow conditions, would in effect act nearly as a weir, so the results used by the model are not inconsistent with what would likely occur. The other occurrence of this warning along the Agua Fria reach is at cross section 18.182. A review of the bed profile along this portion of the reach reveals an obvious grade break at this location, transitioning from less to more steep. Attempts to add further cross sections and better define this area of the reach did not remove the warning. That the flow would momentarily approach critical depth as it approached a break in slope is not unreasonable.

Model warnings along the AT&SF channel reach were similar to those along the Agua Fria reach. Multiple instances of changes exceeding model tolerances at successive cross sections in the conveyance ratio, velocity head or energy loss occurred. Two portions of the reach also had warnings indicating that the energy equation could not be balanced and critical depth was assumed. These occur at the upstream and downstream ends of the reach

and at each location the grade of the channel is very steep. Due to the characteristics of the channel and this steep grade, critical depth is not considered unreasonable here, either.

5.8 Calibration

Calibration of the hydraulic model was beyond the scope of this analysis.

5.9 Final Results

5.9.1 Hydraulic Analysis Results

Summaries of hydraulic model results are presented in Table 5.1 below. The table summarizes the following variables by cross section: peak discharge, floodplain water surface elevation, critical water surface elevation, average channel velocity, top width, depth of flow, Froude number, and stations for left and right edges of the water surface. Notes regarding hydraulic results: The Topwidth at several cross sections on the Agua Fria River reach will not match the work maps exactly due to the presence of occasional high ground in the middle of the cross section which was not mapped. (This applies to cross sections 18.937 through 17.910 and 15.719.) Cross section 17.5758 has a portion of its geometry skewed in order to re-align it with the flow in the channel. For this reason, its top width as measured in the mapping will not match the tabular values. As discussed in section 5.1 of this report, at both the upstream and downstream ends of both reaches the floodplain widths have been tied into existing models bounding this analysis.

Table 5.1 Summary of Hydraulic Results

Cross Section	Discharge (cfs)	Water Surface Elev. (ft)		Average Velocity (ft/s)	Topwidth (ft)	Depth of Flow (ft)	Froude Number	Station WS	
		Computed	Critical					Left	Right
Agua Fria River									
19.446	37500	1164.07	1162.19	6.5	2445	8.4	0.47	8750	11337
19.352	37500	1162.89	1161.72	7.5	2682	8.3	0.51	8606	11291
19.256	37500	1160.54	1160.28	10.3	2365	6.9	0.76	8536	11025
19.162	37500	1159.19	1157.43	6.7	2660	7.2	0.48	255	2915
19.066	37500	1157.10	1156.11	8.7	1691	7.1	0.70	204	2812
18.978	37500	1156.29	1153.04	5.3	1143	8.3	0.37	592	2635
18.970	Bell Road Bridge								
18.962	37500	1156.10	1152.92	5.4	1121	8.1	0.37	574	2634
18.937	37500	1155.93	1152.72	5.4	2194	9.9	0.37	105	2518
18.839	37500	1154.95	1152.53	6.2	2281	15.0	0.45	114	2395
18.748	37500	1153.39	1151.72	7.4	2414	9.4	0.58	2	2436
18.653	37500	1151.96	1150.61	6.9	2617	8.0	0.52	77	2731
18.558	37500	1150.14	1149.41	8.1	2635	8.1	0.62	141	2776
18.464	37500	1147.31	1147.09	9.2	2622	7.3	0.80	64	2686
18.369	37500	1144.73	1144.03	7.5	2636	6.7	0.66	54	2739
18.275	37500	1141.97	1141.76	9.5	2823	10.0	0.69	81	3119
18.182	37500	1139.03	1139.03	9.2	2689	11.0	0.84	224	3079
18.093	37500	1137.70	1133.60	5.5	3086	11.6	0.34	386	3539
18.000	37500	1137.22	1133.24	5.7	3484	11.1	0.35	526	4092
17.910	37500	1136.93	1134.01	5.0	2406	12.8	0.30	111	2598
17.821	37500	1136.66	1126.66	4.8	1530	18.5	0.22	539	2069
17.730	37500	1136.50	1125.11	4.6	1420	35.4	0.20	546	1966
17.638	37500	1136.16	1130.06	5.2	1160	28.0	0.28	422	1582
17.5758	36000	1133.95	1133.95	11.1	1135	32.0	0.96	412	1547
17.5137	36000	1130.33	1119.05	3.0	1371	26.3	0.14	55	1426
17.458	36000	1130.22	1118.59	3.4	1323	38.2	0.15	356	1679
17.370	36000	1129.94	1124.94	4.8	1182	40.7	0.26	473	1655
17.277	36000	1129.77	1119.49	3.3	891	39.8	0.17	262	1153
17.180	36000	1128.65	1123.41	7.8	545	46.5	0.42	128	673

Vertical Datum: NGVD29

Table 5.1 Summary of Hydraulic Results - Continued

Cross Section	Discharge (cfs)	Water Surface Elev. (ft)		Average Velocity	Topwidth (ft)	Depth of Flow	Froude Number	Station WS	
		Computed	Critical					Left	Right
17.085	36000	1127.18	1123.02	8.9	395	44.9	0.49	205	600
16.990	36000	1125.16	1121.69	10.4	332	39.2	0.57	183	516
16.895	36000	1124.24	1119.08	8.5	372	16.2	0.44	179	551
16.801	36000	1123.48	1117.49	7.6	467	13.5	0.40	120	587
16.707	36000	1122.55	1116.95	7.9	393	13.1	0.41	191	584
16.612	36000	1121.74	1116.14	7.6	419	13.7	0.40	201	619
16.518	36000	1120.20	1116.74	9.1	425	14.2	0.53	693	1118
16.516	Railroad Bridge								
16.514	36000	1119.38	1116.87	10.2	423	13.4	0.62	667	1090
16.506	36000	1119.31	1116.65	9.7	451	13.3	0.59	742	1193
16.494	Grand Avenue Bridge								
16.482	36000	1118.57	1115.13	9.3	434	14.5	0.55	519	954
16.471	36000	1118.24	1115.30	9.7	424	14.2	0.58	459	883
16.385	34500	1116.55	1114.65	10.1	486	12.6	0.66	304	790
16.289	34500	1115.53	1111.43	8.3	453	13.5	0.48	347	801
16.195	34500	1114.46	1110.76	8.6	563	12.5	0.49	237	983
16.099	34500	1114.24	1110.03	5.7	844	12.2	0.33	214	1059
16.004	34500	1113.65	1108.96	6.7	782	11.7	0.36	191	973
15.909	34500	1112.69	1109.35	8.3	707	12.7	0.44	209	916
15.814	34500	1110.77	1109.14	11.1	641	14.8	0.65	260	901
15.719	34500	1109.78	1106.53	8.0	641	13.8	0.49	194	869
15.658	34500	1109.22	1105.76	7.4	850	11.2	0.46	49	899
15.564	34500	1107.86	1105.27	9.1	2644	11.7	0.52	9560	12234
Atchison, Topeka, & Santa Fe Railroad Channel									
12701	577	1157.68	1157.43	1.5	472	1.2	0.59	9480	10027
12700	320	1153.06	1152.98	2.5	332	0.8	0.91	9416	10007
12691	320	1145.95	1145.95	7.1	29	2.2	0.96	951	990
12399	320	1142.37	1142.37	4.5	356	2.4	0.63	676	1032
12076	374	1138.74	1138.74	7.5	29	2.7	1.00	757	785
11664	374	1137.06	1135.47	2.4	72	3.2	0.29	845	917
11110	428	1136.18	1134.84	4.1	43	3.3	0.44	891	934
10462	428	1134.13	1133.47	5.6	33	2.8	0.65	986	1018
9792	428	1132.77	1131.27	3.7	41	3.3	0.38	1020	1064
9287	483	1131.99	1130.48	3.9	41	3.3	0.39	922	963
9140	483	1131.95	1129.01	2.6	44	4.8	0.23	1032	1076
9081	Culvert under entrance road to the Arizona Automotive Distribution Facility								
9022	483	1131.31	1130.29	4.7	41	7.3	0.52	1053	1094
8764	483	1130.53	1129.45	5.0	36	6.5	0.53	595	631
8632	483	1129.92	1129.17	5.8	35	5.9	0.66	595	631
8477	483	1129.42	1128.45	5.1	37	5.4	0.56	481	518
8260	483	1128.29	1127.73	6.3	32	2.9	0.72	453	485
7885	530	1126.01	1125.66	6.3	43	2.7	0.79	1058	1101
7502	530	1125.65	1123.27	3.0	56	4.8	0.29	951	1006
7145	530	1125.43	1122.38	2.5	69	4.8	0.25	862	930
7002	Culvert under Thompson Ranch Road								
6860	577	1123.31	1118.32	2.2	560	7.3	0.15	45	605
6521	577	1123.36	1108.51	0.2	552	17.1	0.01	111	664
6011	577	1123.35	1109.21	0.2	426	15.4	0.01	99	526
5606	577	1123.34	1119.43	0.6	823	5.6	0.05	74	897
5416	577	1123.33	1120.90	0.8	664	3.3	0.08	4	689
5281	577	1123.25	1118.76	2.1	299	6.3	0.15	648	1029
5249	Culvert under Railroad								
5224	577	1121.56	1119.22	4.1	40	4.6	0.34	988	1028
5206	577	1121.17	1119.66	5.9	101	4.2	0.51	942	1043
5135	Culvert under Grand Avenue								
5063	577	1120.87	1118.82	4.0	589	4.1	0.35	510	1099
4835	577	1120.66	1119.96	2.7	636	2.0	0.39	509	1145
4717	577	1119.91	1119.91	4.3	338	0.9	1.00	542	879
4617	577	1119.51	1119.15	2.5	365	1.2	0.45	559	924
4451	577	1118.39	1118.39	4.1	448	0.5	1.16	533	980
4147	577	1116.67	1111.69	1.0	291	6.7	0.08	700	991

Vertical Datum: NGVD29

Examination of the hydraulic results indicates a significant change in the flood elevations along the AT&SF Channel upstream of the Grand Avenue and railway culverts. In the effective hydraulic model of the Agua Fria River (CVL 1996), the flood elevations are high enough to affect this area of the AT&SF Channel. However, in the revised modeling of this study, the Agua Fria River flood elevations are lower, do not break out into this area, and the flood elevations of the AT&SF Channel flow govern this area. This study also takes into consideration the re-alignment of the AT&SF Channel around a newly-constructed railroad car unloading facility. Investigations by the District indicate that this re-alignment was done within the City of El Mirage without obtaining a floodplain use permit. For comparative purposes, the floodplain and floodway elevations of the effective models and those calculated for this analysis are presented in tabular and graphical form below. Table 5.2 displays the computed floodplain and floodway elevations for this analysis as well as those from both the CVL 1996 study (16.612 through 17.821) and the White Tanks ADMS (1.189 through 1.489). Figure 5.1 on the next page presents this data graphically. Note that in Figure 5.1 the four cross section from the White Tanks ADMS have been converted into approximate river miles along the Agua Fria. Results from this analysis are referred to as "WEST Floodplain" and "WEST Floodway".

Table 5.2 - Comparison of Effective vs. WEST Water Surface Elevations along AT&SF Channel

	Effective Models		WEST Model		Difference	
Cross Section	Floodplain (ft)	Floodway (ft)	Floodplain (ft)	Floodway (ft)	Floodplain (ft)	Floodway (ft)
1.489	1157.70	1158.50	1157.68	1158.50	-0.02	0.00
1.394	1153.60	1154.10	1153.06	1154.06	-0.54	-0.04
1.294	1149.20	1150.20	1147.73	1148.00	-1.47	-2.20
1.189	1144.60	1145.50	1140.55	1140.70	-4.05	-4.80
17.821	1139.61	1140.00	1136.62	1136.62	-2.99	-3.38
17.730	1138.24	1138.49	1135.16	1135.16	-3.08	-3.33
17.638	1133.86	1134.16	1133.45	1133.45	-0.41	-0.71
17.548	1130.61	1131.01	1132.57	1132.57	1.96	1.56
17.458	1130.14	1130.46	1131.97	1131.97	1.83	1.51
17.370	1129.84	1130.03	1130.53	1130.53	0.69	0.50
17.277	1129.54	1129.56	1128.29	1128.29	-1.25	-1.27
17.180	1128.12	1128.12	1126.58	1126.58	-1.54	-1.54
17.085	1127.04	1127.06	1125.83	1125.83	-1.21	-1.23
16.990	1125.86	1125.90	1125.59	1125.59	-0.27	-0.31
16.895	1124.99	1125.04	1124.37	1124.37	-0.62	-0.67
16.801	1124.22	1124.17	1123.36	1123.36	-0.86	-0.81
16.707	1123.10	1123.13	1123.35	1123.35	0.25	0.22
16.612	1121.94	1121.99	1123.25	1123.25	1.31	1.26

A Zone A floodplain was delineated for an area to the south and east of the gravel pit (see Sheet 2). This delineation was deemed appropriate to account for possible flooding hazards related to the uncertainties concerning future gravel pit operations and concerning flooding of the gravel pit. The flooding of the gravel pit is addressed in Section 5.7.1 of this report.

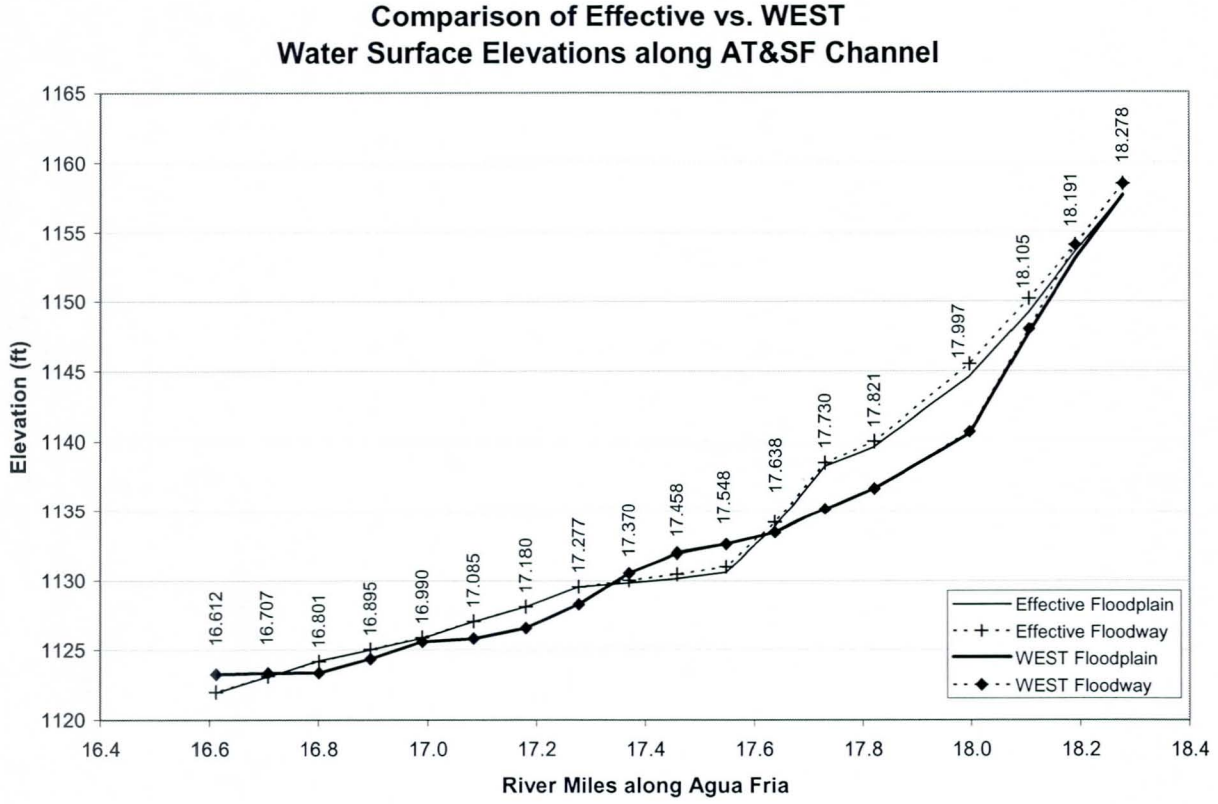


Figure 5.1 Water Surface Comparison along AT&SF Channel

As discussed in section 4.3.1, a portion of the flow entering at the upstream end of the AT&SF Channel temporarily leaves the hydraulic model at Greenway Road. In order to account for this flow in the mapping, the area between the AT&SF Channel and the gravel pit was delineated Shaded Zone X (see Sheet 2). A simple application of Manning's equation, assuming a roughness of 0.06 for agricultural fields and an approximate ¼ mile flow width, results in flow depths of approximately 0.35 feet across the area mapped as Shaded Zone X.

5.9.2 Verification of Results

The results generated by this hydraulic model are reasonable and within expected parameters.

6. Erosion and Sediment Transport

Not applicable.

7. Draft FIS Report Data

7.1 Summary of Discharges

Table 7.1 below summarizes the discharges of the revised model.

Table 7.1 - Summary of Revised Discharges

Cross Section	Description	Discharge (cfs)
Agua Fria River		
19.446	Upstream end of detailed study	37,500
17.5758	Haul Road Crossing	36,000
16.385	Grand Avenue Bridge	34,500
Atchison, Topeka, & Santa Fe Railroad Channel		
12701	Upstream end of detailed study	577
12700	Greenway Road	320
12076	Immediately u/s of adjoining field	374
1110	Break in adjoining fields	428
9287	Break in adjoining fields	483
7885	Immediately d/s of adjoining retention basin	530
6860	Culvert under Thompson Ranch Road	577

7.2 Floodway Data

Floodway Data are listed in Table 7.2 on pages 15 and 16. No floodway was defined in this analysis for cross sections 5224 through 4147 on the AT&SF Channel. The tabulated value for topwidth at cross section 18.978 does not agree with the mapping of the floodway on Sheet 3. This is due to the inability to set encroachment values at a cross section immediately upstream of a bridge. Effects of this are negligible in the backwater calculations for the floodway but the difference is evident if topwidths are compared between the mapping and tabulated value.

7.3 Annotated Flood Insurance Rate Maps

Copies of annotated Flood Insurance Rate Maps are included in the Exhibit Maps section following the Appendices.

7.4 Flood Profiles

A draft Flood Profile is included in the Exhibit Maps section following the Appendices.

Table 7.2 - Floodway Data

Flooding Source	Floodway			Base Flood Water Surface Elevation[1]		
Cross Section	Width (ft)	Section Area (sq ft)	Mean Velocity (ft/s)	Floodway (ft)	Floodplain (ft)	Increase (ft)
Agua Fria River						
19.446	2155	7890.4	6.4	1164.53	1164.07	0.46
19.352	2047	7276.1	7.9	1163.42	1162.89	0.53
19.256	1713	4625.3	11.4	1160.55	1160.54	0.01
19.162	1639	7463.0	6.7	1159.19	1159.19	0.00
19.066	1365	5589.1	8.5	1157.20	1157.10	0.10
18.978	1144	7659.4	5.2	1156.46	1156.29	0.17
18.970	Bell Road Bridge					
18.962	1076	7178.6	5.2	1156.29	1156.10	0.19
18.937	1079	7207.4	5.2	1156.13	1155.93	0.20
18.839	964	5983.8	6.3	1155.16	1154.95	0.21
18.748	867	5130.4	7.3	1153.77	1153.39	0.38
18.653	992	5532.8	7.0	1152.51	1151.96	0.55
18.558	967	4796.8	8.4	1150.69	1150.14	0.00
18.464	1011	4355.6	9.2	1148.19	1147.31	0.88
18.369	1139	4176.1	9.5	1144.92	1144.73	0.19
18.275	1326	5565.2	8.8	1142.77	1141.97	0.00
18.182	1238	3915.9	10.5	1139.35	1139.03	0.32
18.093	1154	7398.8	5.6	1138.38	1137.70	0.68
18.000	1070	6928.7	6.1	1137.82	1137.22	0.60
17.910	957	6176.5	7.1	1137.11	1136.93	0.18
17.821	1020	8995.5	5.0	1137.01	1136.66	0.35
17.730	1051	9491.0	4.7	1136.85	1136.50	0.35
17.638	1008	8146.7	5.1	1136.54	1136.16	0.38
17.5758	973	3557.9	11.6	1134.15	1133.95	0.20
17.5137	1045	11920.0	3.1	1130.33	1130.33	0.00
17.458	1105	11233.4	3.5	1130.22	1130.22	0.00
17.370	1135	9135.9	4.9	1129.92	1129.94	0.00
17.277	891	10837.2	3.3	1129.77	1129.77	0.00
17.180	545	4862.6	7.8	1128.65	1128.65	0.00
17.085	395	4031.7	8.9	1127.18	1127.18	0.00
16.990	332	3465.8	10.4	1125.17	1125.16	0.01
16.895	372	4256.3	8.5	1124.25	1124.24	0.01
16.801	421	4730.5	7.6	1123.48	1123.48	0.00
16.707	393	4589.5	7.8	1122.57	1122.55	0.02
16.612	419	4723.5	7.6	1121.76	1121.74	0.02
16.518	426	3972.3	9.1	1120.24	1120.20	0.04
16.516	Railroad Bridge					
16.514	423	3568.5	10.1	1119.44	1119.38	0.06
16.506	452	3753.8	9.6	1119.38	1119.31	0.07
16.494	Grand Avenue Bridge					
16.482	437	3933.8	9.2	1118.67	1118.57	0.10
16.471	425	3766.0	9.6	1118.36	1118.24	0.12
16.385	470	3598.8	9.6	1116.97	1116.55	0.42
16.289	459	4482.0	7.7	1116.19	1115.53	0.66
16.195	546	4753.5	7.7	1115.45	1114.46	0.99
16.099	690	6267.3	5.9	1115.15	1114.24	0.91
16.004	619	5738.3	6.9	1114.56	1113.65	0.91
15.909	618	4756.1	9.2	1113.42	1112.69	0.73
15.814	593	3841.8	11.0	1111.77	1110.77	1.00
15.719	582	4035.2	9.6	1110.41	1109.78	0.63
15.658	606	4574.1	8.6	1109.65	1109.22	0.43
15.564	661	5169.3	8.4	1108.67	1107.86	0.81

[1] Vertical Datum: NGVD29

Table 7.2 - Floodway Data - Continued

Flooding Source	Floodway			Base Flood Water Surface Elevation[1]		
Cross Section	Width (ft)	Section Area (sq ft)	Mean Velocity (ft/s)	Floodway (ft)	Floodplain (ft)	Increase (ft)
Atchison, Topeka, & Santa Fe Railroad Channel						
12701	210	176.0	3.7	1158.50	1157.68	0.82
12700	118	74.8	4.9	1154.06	1153.06	1.00
12691	29	45.7	7.0	1145.98	1145.95	0.03
12399	23	42.1	7.6	1142.61	1142.37	0.24
12076	24	42.7	7.6	1138.74	1138.74	0.00
11664	72	155.2	2.4	1137.06	1137.06	0.00
11110	43	105.5	4.1	1136.18	1136.18	0.00
10462	33	76.0	5.6	1134.13	1134.13	0.00
9792	41	116.8	3.7	1132.77	1132.77	0.00
9287	41	123.4	3.9	1131.99	1131.99	0.00
9140	44	182.8	2.6	1131.95	1131.95	0.00
9081	Culvert under entrance road to the Arizona Automotive Distribution Facility					
9022	41	103.5	4.7	1131.31	1131.31	0.00
8764	36	96.9	5.0	1130.53	1130.53	0.00
8632	35	83.7	5.8	1129.92	1129.92	0.00
8477	37	95.0	5.1	1129.42	1129.42	0.00
8260	32	76.2	6.3	1128.29	1128.29	0.00
7885	43	84.5	6.3	1126.01	1126.01	0.00
7502	56	178.1	3.0	1125.65	1125.65	0.00
7145	69	213.4	2.5	1125.43	1125.43	0.00
7002	Culvert under Thompson Ranch Road					
6860	133	731.4	2.2	1123.31	1123.31	0.00
6521	131	1808.6	0.3	1123.36	1123.36	0.00
6011	125	1767.9	0.3	1123.35	1123.35	0.00
5606	197	866.6	0.7	1123.34	1123.34	0.00
5416	205	581.6	1.0	1123.33	1123.33	0.00
5281	113	441.2	2.1	1123.25	1123.25	0.00
5249	Culvert under Railroad					
5224	n/a	n/a	n/a	n/a	1121.56	n/a
5206	n/a	n/a	n/a	n/a	1121.17	n/a
5135	Culvert under Grand Avenue					
5063	n/a	n/a	n/a	n/a	1120.87	n/a
4835	n/a	n/a	n/a	n/a	1120.66	n/a
4717	n/a	n/a	n/a	n/a	1119.91	n/a
4617	n/a	n/a	n/a	n/a	1119.51	n/a
4451	n/a	n/a	n/a	n/a	1118.39	n/a
4147	n/a	n/a	n/a	n/a	1116.67	n/a

[1] Vertical Datum: NGVD29

A.1 Data Collection Summary

Not Applicable / Not Included

A.2 Referenced Documents

References

1. U.S. Army Corps of Engineers, "HEC-RAS User's Manual," Version 2.2, September 1998.

2. U.S. Army Corps of Engineers, "HEC-RAS Hydraulic Reference Manual," Version 2.2, September 1998.

3. WLB Group, "White Tanks Area Drainage Master Study," 1992.

4. Arizona Department of Water Resources, Flood Mitigation Section, "Requirements for Flood Study Technical Documentation," State Standard SS1-97, November 1997.

5. Chih Ted Yang, "Sediment Transport – Theory and Practice," The McGraw-Hill Companies, Inc., 1996.

6. Federal Emergency Management Association, "FEMA-37 – Guidelines & Specifications for Study Contractors," January 1995.

7. U.S. Army Corps of Engineers, Los Angeles District, "Hydrologic Evaluation of Impacts of New Waddell Dam on Downstream Peak Discharges in the Agua Fria River," Agua Fria River Study New Waddell Dam to Gila River Confluence, Arizona, July 1995.

8. Department of Civil Engineering, Arizona State University, "Agua Fria River Sediment Transport Study," Carriaga, C., Mays, L., Ruff, P., February 1994.

9. Coe & Van Loo Consultants, Inc., "Agua Fria River Floodplain Delineation Re-Study," Revised Floodplain Mapping, Sheets 1 through 45, September 1996.

B.1 Special Problem Reports

Not Applicable / Not Included

B.2 Contact (telephone) Reports

Not Applicable / Not Included

B.3 Meeting Minutes or Reports

Not Applicable / Not Included

B.4 General Correspondence

Agua Fria Floodplain Delineation from Cactus Road to Bell Road
FCD 1999-C048 - Assignment #6

Distribution of Final Products

Reports (sealed)	Where	Call Number	Date
1.	FEMA	sent versions on 5-2-02 & 12-16-02	
2.	FCD Library	A260.014.015	01-28-04
3.	City of El Mirage		sent on 01-26-04
4.	City of Surprise		" "
5.	Town of Youngtown		" "

Mylars (sealed)	Where	Drawer (s)	Date
1.	FCD Floodplain Files	303	sealed 06-19-03
2.	Paper copy	4	" "

GIS Data	Where	Approval Date
1.	FCD GIS Branch	08-25-03 by KAL

DISKS	Where	Path Name or Location	Date
1.	Added to Model Library S:\ENG\Model_Library\Floodplain-ADMS-ADMP\Number\1999C048\ AguaFriaRiver_Assignment6\HEC-RAS\AF_LOMR_Final_WEST.rep Model files dated 6-23-03 and 9-22-03		
2.	Location of Disks	TDN in Engineering Library	

Aerial Photos (9"x9")	Where	Location	Date
1.			

Other Stuff	What	Where	Call Number/Location	Date
1.	Floodplain Management Maps reprinted		(mwd requested on 03-05-04)	
2.	LOMR letter	location	Appendix B4 of TDN	
		approval date	MAY 13 2003	
		effective date	AUG 28 2003	
		case number	02-09-945P	

Federal Emergency Management Agency

Washington, D.C. 20472

OCT 10 2003

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 02-09-945P

The Honorable R. Fulton Brock
Chairman, Maricopa County
Board of Supervisors
301 West Jefferson, 10th Floor
Phoenix, AZ 85003

Community: Maricopa County, AZ
Community No.: 040037
Map Panels Affected: 04013C1165 H, 1170 G, 1605 H and 1610 H

116

Dear Mr. Brock:

In a Letter of Map Revision (LOMR) dated May 13, 2003, you were notified of proposed modified flood elevation determinations affecting the Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for Maricopa County, Arizona and Incorporated Areas. These determinations were for Agua River and the Atchison, Topeka and Santa Fe Railroad Channel. The 90-day appeal period that was initiated on May 29, 2003, when the Federal Emergency Management Agency (FEMA) published a notice of proposed Base Flood Elevations (BFEs) in *Arizona Republic*, has elapsed.

FEMA received no valid requests for changes to the modified BFEs. Therefore, the modified BFEs for your community became effective on August 28, 2003, remain valid and revise the FIRM that was in effect prior to that date.

The modifications are pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and are in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. The community numbers and suffix codes are unaffected by this revision. The community number and appropriate suffix code as shown above will be used by the National Flood Insurance Program (NFIP) for all flood insurance policies and renewals issued for your community.

FEMA has developed criteria for floodplain management as required under the above-mentioned Acts of 1968 and 1973. To continue participation in the NFIP, your community must use the modified BFEs to carry out the floodplain management regulations for the NFIP. The modified BFEs will also be used to calculate the appropriate flood insurance premium rates for all new buildings and their contents and for the second layer of insurance on existing buildings and their contents.

If you have any questions regarding the necessary floodplain management measures for your community or the NFIP in general, please call the Director, Federal Insurance and Mitigation Division of FEMA in Oakland, California at (510) 627-7184. If you have any questions regarding the LOMR, the proposed modified BFEs, or mapping issues in general, please call the FEMA Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,

Doug Bellomo, P.E., Acting Chief
Hazard Study Branch
Emergency Preparedness and Response Directorate

cc: The Honorable Robert Robles
Mayor, City of El Mirage

The Honorable Joan H. Shafer
Mayor, City of Surprise

The Honorable Bryan Hackbarth
Mayor, Town of Youngtown

Mr. Michael Duncan, P.E.
Project Manager
Flood Delineation Branch
Flood Control District of Maricopa County

Ms. Shanna Yager
Branch Manager
Flood Control District of Maricopa County

Ms. Terri Miller
Executive Consultant
Mitigation Section
Arizona Division of Emergency Management

Federal Emergency Management Agency

Washington, D.C. 20472

OCT 10 2003

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 02-09-945P

The Honorable Joan H. Shafer
Mayor, City of Surprise
12425 West Bell Road, Suite D-100
Surprise, AZ 85374

Community: City of Surprise, AZ
Community No.: 040053
Map Panels Affected: 04013C1165 H and 1170 G

116

Dear Mayor Shafer:

In a Letter of Map Revision (LOMR) dated May 13, 2003, you were notified of proposed modified flood elevation determinations affecting the Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for Maricopa County, Arizona and Incorporated Areas (the effective FIRM and FIS report for your community). These determinations were for Agua Fria River from approximately 3,700 feet downstream to approximately 300 feet downstream of Bell Road. The 90-day appeal period that was initiated on May 29, 2003, when the Federal Emergency Management Agency (FEMA) published a notice of proposed Base Flood Elevations (BFEs) in *Arizona Republic* has elapsed.

FEMA received no valid requests for changes to the modified BFEs. Therefore, the modified BFEs for your community became effective on August 28, 2003, remain valid and revise the FIRM and FIS that was in effect prior to that date.

The modifications are pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and are in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. The community numbers and suffix codes are unaffected by this revision. The community number and appropriate suffix code as shown above will be used by the National Flood Insurance Program (NFIP) for all flood insurance policies and renewals issued for your community.

FEMA has developed criteria for floodplain management as required under the above-mentioned Acts of 1968 and 1973. To continue participation in the NFIP, your community must use the modified BFEs to carry out the floodplain management regulations for the NFIP. The modified BFEs will also be used to calculate the appropriate flood insurance premium rates for all new buildings and their contents and for the second layer of insurance on existing buildings and their contents.

If you have any questions regarding the necessary floodplain management measures for your community or the NFIP in general, please call the Director, Federal Insurance and Mitigation Division of FEMA in Oakland, California at (510) 627-7184. If you have any questions regarding the LOMR, the proposed modified BFEs, or mapping issues in general, please call the FEMA Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,

Doug Bellomo, P.E., Acting Chief
Hazard Study Branch
Emergency Preparedness and Response Directorate

cc: The Honorable Robert Robles
Mayor, City of El Mirage

The Honorable Bryan Hackbarth
Mayor, Town of Youngtown

The Honorable R. Fulton Brock
Chairman, Maricopa County

Mr. Michael Duncan, P.E.
Project Manager
Flood Delineation Branch
Flood Control District of Maricopa County

Mr. Brian Pirooz, P.E.
Assistant City Engineer
City of Surprise

Ms. Shanna Yager
Branch Manager
Flood Control District of Maricopa County

Ms. Terri Miller
Executive Consultant
Mitigation Section
Arizona Division of Emergency Management

Federal Emergency Management Agency
Washington, D.C. 20472

OCT 10 2003

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 03-09-1014X

The Honorable Bryan Hackbarth
Mayor, Town of Youngtown
12030 Clubhouse Square
Youngtown, AZ 85363

Community: Town of Youngtown, AZ
Community No.: 040057
Map Panel Affected: 04013C1610 H

116

Dear Mayor Hackbarth:

In a Letter of Map Revision (LOMR) dated May 20, 2003, you were notified of proposed modified flood elevation determinations affecting the Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for Maricopa County, Arizona and Incorporated Areas (the effective FIRM and FIS report for your community). These determinations were for Auga Fria River from approximately 4,900 feet downstream to just downstream of Grand Avenue. The 90-day appeal period that was initiated on May 29, 2003, when the Federal Emergency Management Agency (FEMA) published a notice of proposed Base Flood Elevations (BFEs) in *Arizona Republic*, has elapsed.

FEMA received no valid requests for changes to the modified BFEs. Therefore, the modified BFEs for your community became effective on August 28, 2003, remain valid and revise the FIRM and FIS that was in effect prior to that date.

The modifications are pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and are in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. The community number and suffix code are unaffected by this revision. The community number and appropriate suffix code as shown above will be used by the National Flood Insurance Program (NFIP) for all flood insurance policies and renewals issued for your community.

FEMA has developed criteria for floodplain management as required under the above-mentioned Acts of 1968 and 1973. To continue participation in the NFIP, your community must use the modified BFEs to carry out the floodplain management regulations for the NFIP. The modified BFEs will also be used to calculate the appropriate flood insurance premium rates for all new buildings and their contents and for the second layer of insurance on existing buildings and their contents.

If you have any questions regarding the necessary floodplain management measures for your community or the NFIP in general, please call the Director, Federal Insurance and Mitigation Division of FEMA in Oakland, California at (510) 627-7184. If you have any questions regarding the LOMR, the proposed modified BFEs, or mapping issues in general, please call the FEMA Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,

Doug Bellomo, P.E., Acting Chief
Hazard Study Branch
Emergency Preparedness and Response Directorate

cc: The Honorable Robert Robles
Mayor, City of El Mirage

The Honorable Joan H. Shafer
Mayor, City of Surprise

The Honorable R. Fulton Brock
Chairman, Maricopa County
Board of Supervisors

Mr. Michael Duncan, P.E.
Project Manager
Flood Delineation Branch
Flood Control District of Maricopa County

Mr. Jesse Mendez
Floodplain Administrator
Town of Youngtown

Ms. Shanna Yager
Branch Manager
Flood Control District of Maricopa County

Ms. Terri Miller
Executive Consultant
Mitigation Section
Arizona Division of Emergency Management

Federal Emergency Management Agency

Washington, D.C. 20472

OCT 10 2003

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 02-09-945P

The Honorable Robert Robles
Mayor, City of El Mirage
P.O. Box 26
El Mirage, AZ 85335

Community: City of El Mirage, AZ
Community No.: 040041
Map Panels Affected: 04013C1165 H, 1170 G, 1605 H and 1610 H

116

Dear Mayor Robles:

In a Letter of Map Revision (LOMR) dated May 13, 2003, you were notified of proposed modified flood elevation determinations affecting the Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for Maricopa County, Arizona and Incorporated Areas (the effective FIRM and FIS report for your community). These determinations were for Agua Fria River from approximately 800 feet upstream of Grand Avenue to approximately 2,800 feet downstream of Bell Road, along West Split Flow through El Mirage from approximately 800 feet downstream to just downstream of Grand Avenue; and along the Atchison Topeka and Santa Fe Railroad Channel from approximately 300 feet upstream of Grand Avenue to approximately 1,000 feet downstream of Greenway Road. The 90-day appeal period that was initiated on May 29, 2003, when the Federal Emergency Management Agency (FEMA) published a notice of proposed Base Flood Elevations (BFEs) in the *Arizona Republic*, has elapsed.

FEMA received no valid requests for changes to the modified BFEs. Therefore, the modified BFEs for your community became effective on August 28, 2003, and revise the FIRM and FIS that was in effect prior to that date.

The modifications are pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and are in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. The community numbers and suffix codes are unaffected by this revision. The community number and appropriate suffix code as shown above will be used by the National Flood Insurance Program (NFIP) for all flood insurance policies and renewals issued for your community.

FEMA has developed criteria for floodplain management as required under the above-mentioned Acts of 1968 and 1973. To continue participation in the NFIP, your community must use the modified BFEs to carry out the floodplain management regulations for the NFIP. The modified BFEs will also be used to calculate the appropriate flood insurance premium rates for all new buildings and their contents and for the second layer of insurance on existing buildings and their contents.

If you have any questions regarding the necessary floodplain management measures for your community or the NFIP in general, please call the Director, Federal Insurance and Mitigation Division of FEMA in Oakland, California at (510) 627-7184. If you have any questions regarding the LOMR, the proposed modified BFEs, or mapping issues in general, please call the FEMA Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,

Doug Bellomo, P.E., Acting Chief
Hazard Study Branch
Emergency Preparedness and Response Directorate

cc: The Honorable Joan H. Shafer
Mayor, City of Surprise

The Honorable Bryan Hackbarth
Mayor, Town of Youngtown

The Honorable R. Fulton Brock
Chairman, Maricopa County
Board of Supervisors

Mr. Michael Duncan, P.E.
Project Manager
Flood Delineation Branch
Flood Control District of Maricopa County

Mr. C. E. Reynolds, P.E.
Public Works Director
City of El Mirage

Ms. Shanna Yager
Branch Manager
Flood Control District of Maricopa County

Ms. Terri Miller
Executive Consultant
Mitigation Section
Arizona Division of Emergency Management

Federal Emergency Management Agency

Washington, D.C. 20472

MAY 20 2003

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 03-09-1014X

The Honorable Daphne Green
Mayor, Town of Youngtown
12030 Clubhouse Square
Youngtown, AZ 85363

Community: Town of Youngtown, AZ
Community No.: 040057
Panel Affected: 04013C1610 H
Effective Date of This Revision: **AUG 28 2003**

102-I-A-C

Dear Mayor Green:

This responds to a request that the Federal Emergency Management Agency (FEMA) revise the effective Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for Maricopa County, Arizona and Incorporated Areas (the effective FIRM and FIS report for your community), in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated April 8, 2002, Mr. Michael Duncan, P.E., Project Manager, Flood Delineation Branch, Flood Control District of Maricopa County, requested that FEMA revise the FIRM and FIS report to show the effects of a revised hydraulic analysis and updated topographic information along the profile baseline of the Agua Fria River from approximately 4,900 feet downstream of Grand Avenue to approximately 2,500 feet upstream of Bell Road; along West Split Flow Through El Mirage from approximately 800 feet downstream to just downstream of Grand Avenue; and along the Atchison, Topeka and Santa Fe (AT&SF) Railroad Channel from just upstream of Grand Avenue to approximately 1,200 feet downstream of Greenway Road. In the April 8 request, Mr. Duncan also asked that FEMA revise the FIRM and FIS report to show the effects of construction of three 8-foot by 4-foot reinforced-concrete box culverts at Thompson Ranch Road; construction of three 10-foot by 3-foot concrete box culverts at an unnamed road; and channel realignment along the AT&SF Railroad Channel from approximately 7,700 feet downstream to approximately 1,100 feet downstream of Greenway Road. This Letter of Map Revision (LOMR) is being issued to correct a LOMR (Case No. 02-09-945P) dated May 13, 2003, which is to become effective on August 28, 2003. The May 13 LOMR for your community inadvertently referenced an incorrect case number (Case No. 02-09-857P). The May 13 LOMR determination and the attachments – annotated FIRM Panel 04013C1610 H, Profile Panel 18P, and affected portions of the Floodway Data Table – remain valid. The determinations made in separate LOMRs with Case No. 02-09-945P for the Cities of El Mirage and Surprise and the unincorporated areas of Maricopa County, all also issued on May 13, 2003, and to become effective on August 28, 2003, remain valid.

All data required to complete our review of this request were submitted with letters from Mr. C. E. Reynolds, P.E., Public Works Director, City of El Mirage, and Mr. Duncan. Because this LOMR is based

on flood hazard information meant to improve upon that shown on the flood map or within the flood study, and does not partially or wholly incorporate manmade modifications within the Special Flood Hazard Area (SFHA), fees were not assessed for the review. The SFHA is the area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood).

We have completed our review of the submitted data and the flood data shown on the effective FIRM and in the effective FIS report. We have revised the FIRM and FIS report to modify the elevations and floodway boundary delineations of the base flood along the profile baseline of the Agua Fria River from approximately 4,900 feet downstream to just downstream of Grand Avenue. As a result of the modifications, the Base Flood Elevations (BFEs) for the Agua Fria River and the width of the regulatory floodway increased in some areas and decreased in other areas. The modifications are shown on the enclosed annotated copies of FIRM Panel 04013C1610 H, Profile Panel 18P, and affected portions of the Floodway Data Table. This LOMR hereby revises the above-referenced panel of the effective FIRM and the affected portions of the FIS report, both dated July 19, 2001.

The modifications are effective as of the date shown above. The map panel listed above and as modified by this letter will be used for all flood insurance policies and renewals issued for your community.

The following table is a partial listing of existing and modified BFEs:

Location	Existing BFE (feet)*	Modified BFE (feet)*
Approximately 2,400 feet downstream of Grand Avenue	1,113	1,114
Approximately 200 feet downstream of Grand Avenue	1,119	1,118

*Referenced to the National Geodetic Vertical Datum, rounded to the nearest whole foot

As stated in the May 13 LOMR, public notification of the proposed modified BFEs will be given in the *Arizona Republic* on or about May 22 and May 29, 2003. A copy of this notification is enclosed. In addition, a notice of changes will be published in the *Federal Register*. Within 90 days of the second publication in the *Arizona Republic*, any interested party may request that FEMA reconsider the determination made by this LOMR. Any request for reconsideration must be based on scientific or technical data. All interested parties are on notice that, until the 90-day period elapses, the determination to modify the BFEs made by this LOMR may itself be modified.

Because this LOMR will not be printed and distributed to primary users, such as local insurance agents and mortgage lenders, your community will serve as a repository for these new data. We encourage you to disseminate the information reflected by this LOMR throughout the community, so that interested persons, such as property owners, local insurance agents, and mortgage lenders, may benefit from the information. We also encourage you to prepare a related article for publication in your community's local newspaper. This article should describe the assistance that officials of your community will give to interested persons by providing these data and interpreting the NFIP maps.

We will not physically revise and republish the FIRM and FIS report for your community to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panel and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

The floodway is provided to your community as a tool to regulate floodplain development. Therefore, the floodway modifications described in this LOMR, while acceptable to FEMA, must also be acceptable to your community and adopted by appropriate community action, as specified in Paragraph 60.3(d) of the NFIP regulations.

This LOMR is based on minimum floodplain management criteria established under the NFIP. Your community is responsible for approving all floodplain development and for ensuring all necessary permits required by Federal or State law have been received. State, county, and community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction in the SFHA. If the State, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

The basis of this LOMR is, in whole or in part, a channel-modification project. NFIP regulations, as cited in Paragraph 60.3(b)(7), require that communities ensure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management regulations. Consequently, the ultimate responsibility for maintenance of the modified channel rests with your community.

This determination has been made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 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, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed minimum NFIP criteria. These criteria are the minimum and do not supersede any State or local requirements of a more stringent nature. This includes adoption of the effective FIRM to which the regulations apply and the modifications described in this LOMR. Our records show that your community has met this requirement.

A Consultation Coordination Officer (CCO) has been designated to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Mr. Jack Eldridge
Chief, National Flood Insurance Program Branch
Federal Emergency Management Agency, Region IX
1111 Broadway Street, Suite 1200
Oakland, CA 94607-4052
(510) 627-7184

If you have any questions regarding floodplain management regulations for your community or the NFIP in general, please call the CCO for your community at the telephone number cited above. If you have any questions regarding this LOMR, please call our Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,

Max H. Yuan, P.E., Project Engineer
Hazard Study Branch
Federal Insurance and
Mitigation Administration

For: Mary Jean Pajak, P.E., Acting Chief
Hazard Study Branch
Federal Insurance and
Mitigation Administration

Enclosures

cc: The Honorable Robert Robles
Mayor, City of El Mirage

The Honorable Joan H. Shafer
Mayor, City of Surprise

The Honorable R. Fulton Brock
Chairman, Maricopa County
Board of Supervisors

Mr. Michael Duncan, P.E.
Project Manager
Flood Delineation Branch
Flood Control District of Maricopa County

Mr. Jesse Mendez
Floodplain Administrator
Town of Youngtown

Ms. Shanna Yager
Branch Manager
Flood Control District of Maricopa County

Ms. Terri Miller
Executive Consultant
Mitigation Section
Arizona Division of Emergency Management

CHANGES ARE MADE IN DETERMINATIONS OF BASE FLOOD ELEVATIONS FOR THE CITIES OF EL MIRAGE AND SURPRISE, THE TOWN OF YOUNGTOWN, AND THE UNINCORPORATED AREAS OF MARICOPA COUNTY, ARIZONA, UNDER THE NATIONAL FLOOD INSURANCE PROGRAM

On July 19, 2001, the Federal Emergency Management Agency identified Special Flood Hazard Areas (SFHAs) in the Cities of El Mirage and Surprise, the Town of Youngtown, and the unincorporated areas of Maricopa County, Arizona, through issuance of a Flood Insurance Rate Map (FIRM). The Federal Insurance and Mitigation Administration has determined that modification of the elevations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) for certain locations in these communities are appropriate. The modified Base Flood Elevations (BFEs) revise the FIRM for the communities.

The changes are being made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and are in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65.

A revised hydraulic analysis was performed to incorporate updated topographic information along the Agua Fria River, the Atchison, Topeka and Santa Fe Railroad Channel, and West Split Flow Through El Mirage; three 8-foot by 4-foot reinforced-concrete box culverts at Thompson Ranch Road; three 10-foot by 3-foot concrete box culverts at an unnamed road; and channel realignment along the Atchison, Topeka and Santa Fe Railroad Channel. This has resulted in revised delineations of the regulatory floodways, increases and decreases in SFHA width, and increased and decreased BFEs for the Agua Fria River and Atchison, Topeka and Santa Fe Railroad Channel and an increase in SFHA width and increased BFEs for West Split Flow Through El Mirage. The table below indicates existing and modified BFEs for selected locations along the affected lengths of the flooding source(s) cited above.

Location	Existing BFE (feet)*	Modified BFE (feet)*
Agua Fria River (baseline):		
[3]Approximately 2,400 feet downstream of Grand Avenue	1,113	1,114
[3]Approximately 300 feet downstream of Grand Avenue	1,119	1,118
[1]Approximately 1,100 feet upstream of Grand Avenue	1,123	1,122
[1]Approximately 6,100 feet upstream of Grand Avenue	1,134	1,136
[4]Approximately 1,100 feet upstream of 115th Street	1,138	1,137
[2]Approximately 3,500 feet downstream of Bell Road	1,144	1,143
[2]Approximately 1,300 feet downstream of Bell Road	1,152	1,153
[4]Approximately 300 feet upstream of Bell Road	1,156	1,157
Atchison, Topeka and Santa Fe Railroad Channel:		
[4]Just upstream of Atchison, Topeka & Santa Fe Railway	1,121	1,123
[1]Approximately 7,600 feet downstream of Greenway Road	1,124	1,123
[1]Approximately 2,100 feet downstream of Greenway Road	1,145	1,146
[4]Approximately 1,900 feet downstream of Greenway Road	1,149	None

West Split Flow Through El Mirage:		
[1]Approximately 400 feet downstream of Grand Avenue	1,119	1,120

[1]City of El Mirage
[2]City of Surprise
[3]Town of Youngtown
[4]Unincorporated areas of Maricopa County

*National Geodetic Vertical Datum, rounded to nearest whole foot

Under the above-mentioned Acts of 1968 and 1973, the Federal Insurance and Mitigation Administration must develop criteria for floodplain management. To participate in the National Flood Insurance Program (NFIP), the community must use the modified BFEs to administer the floodplain management measures of the NFIP. These modified BFEs will also be used to calculate the appropriate flood insurance premium rates for new buildings and their contents and for the second layer of insurance on existing buildings and contents.

Upon the second publication of notice of these changes in this newspaper, any person has 90 days in which he or she can request, through the Chief Executive Officer of the community, that the Federal Insurance and Mitigation Administration reconsider the determination. Any request for reconsideration must be based on knowledge of changed conditions or new scientific or technical data. All interested parties are on notice that until the 90-day period elapses, the Federal Insurance and Mitigation Administration's determination to modify the BFEs may itself be changed.

Any person having knowledge or wishing to comment on these changes should immediately notify:

The Honorable Robert Robles
Mayor, City of El Mirage
P.O. Box 26
El Mirage, AZ 85335

OR

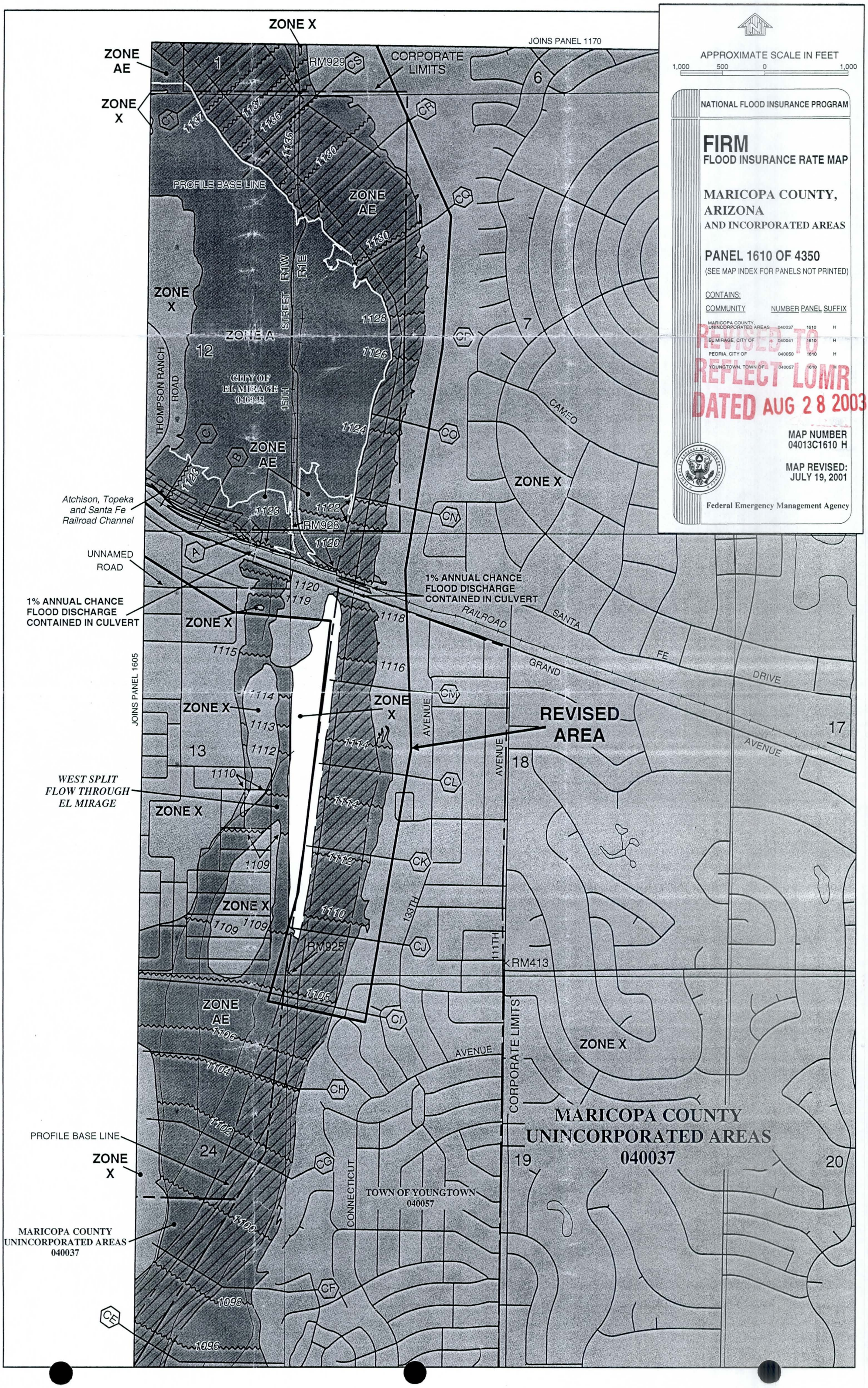
The Honorable Joan H. Shafer
Mayor, City of Surprise
12425 West Bell Road, Suite D-100
Surprise, AZ 85374

OR

The Honorable Daphne Green
Mayor, Town of Youngtown
12030 Clubhouse Square
Youngtown, AZ 85363

OR

The Honorable R. Fulton Brock
Chairman, Maricopa County
Board of Supervisors
301 West Jefferson, 10th Floor
Phoenix, AZ 85003


ZONE X
ZONE AE
ZONE X
JOINS PANEL 1170
RM929
CS
CORPORATE LIMITS
1
6
CR
CQ
1137
1136
1135
1130
PROFILE BASE LINE
ZONE AE
1130
ZONE X
R1W
R1E
STREET
1128
ZONE A
12
7
CP
1126
CITY OF EL MIRAGE 040041
15TH
THOMPSON RANCH ROAD
CAMEO
1124
CO
ZONE AE
Atchison, Topeka and Santa Fe Railroad Channel
1123
1122
RM928
CN
1120
UNNAMED ROAD
1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN CULVERT
1120
1119
1118
ZONE X
RAILROAD
SANTA FE
GRAND
DRIVE
1115
1116
JOINS PANEL 1605
1114
ZONE X
ZONE X
CM
AVENUE
REVISED AREA
17
1113
13
1112
1114
18
AVENUE
1110
CL
WEST SPLIT FLOW THROUGH EL MIRAGE
ZONE X
1114
1109
1112
CK
ZONE X
1110
1109
1109
133TH
RM925
CJ
111TH
RM413
1108
ZONE AE
CI
1106
AVENUE
ZONE X
1104
CH
CORPORATE LIMITS
MARICOPA COUNTY UNINCORPORATED AREAS 040037
1102
PROFILE BASE LINE
24
CG
19
20
ZONE X
CONNECTICUT
TOWN OF YOUNGTOWN 040057
1100
MARICOPA COUNTY UNINCORPORATED AREAS 040037
CF
1098
CE
1096
APPROXIMATE SCALE IN FEET
1,000 500 0 1,000
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
MARICOPA COUNTY, ARIZONA
AND INCORPORATED AREAS
PANEL 1610 OF 4350
(SEE MAP INDEX FOR PANELS NOT PRINTED)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
MARICOPA COUNTY, UNINCORPORATED AREAS 040037 1610 H
EL MIRAGE, CITY OF 040041 1610 H
PEORIA, CITY OF 040050 1610 H
YOUNGTOWN, TOWN OF 040057 1610 H
REVISED TO REFLECT LOMR DATED AUG 2 8 2003
MAP NUMBER
04013C1610 H
MAP REVISED:
JULY 19, 2001
Federal Emergency Management Agency

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Agua Fria River (Cont'd)								
CA	14.316	1,030	4,856	7.1	1,085.8	1,085.8	1,085.8	0.0
CB	14.412	1,170	5,947	5.8	1,087.5	1,087.5	1,087.6	0.1
CC	14.602	1,350	5,474	6.3	1,089.9	1,089.9	1,090.2	0.3
CD	14.792	1,364	6,635	5.2	1,092.7	1,092.7	1,093.2	0.5
CE	14.975	1,730	5,339	6.5	1,095.7	1,095.7	1,095.8	0.1
CF	15.172	830	5,541	6.2	1,098.6	1,098.6	1,098.8	0.2
CG	15.455	795	4,451	7.8	1,101.3	1,101.3	1,102.1	0.8
CH	15.641	558	3,364	10.3	1,104.3	1,104.3	1,105.0	0.7
CI	15.831	661	5,170	6.7	1,107.9	1,107.9	1,108.7	0.8
CJ	15.992	582	4,035	8.6	1,109.8	1,109.8	1,110.4	0.6
CK	16.182	618	4,756	7.3	1,112.7	1,112.7	1,113.4	0.7
CL	16.371	690	6,267	5.5	1,114.2	1,114.2	1,115.2	1.0
CM	16.562	453	4,477	7.7	1,115.5	1,115.5	1,116.2	0.7
CN	16.980	393	4,588	7.8	1,122.6	1,122.6	1,122.6	0.0
CO	17.169	372	4,255	8.5	1,124.2	1,124.2	1,124.2	0.0
CP	17.359	395	4,031	8.9	1,127.2	1,127.2	1,127.2	0.0
CQ	17.552	891	10,837	3.3	1,129.8	1,129.8	1,129.8	0.0
CR	17.733	1,105	11,233	3.2	1,130.2	1,130.2	1,130.2	0.0
CS	17.913	1,008	8,478	4.4	1,136.3	1,136.3	1,136.6	0.3
CT	18.095	1,021	9,285	4.0	1,136.8	1,136.8	1,137.1	0.3
CU	18.367	1,156	7,563	5.5	1,137.8	1,137.8	1,138.4	0.6
CV	18.550	1,326	5,564	6.7	1,142.0	1,142.0	1,142.8	0.8
CW	18.739	1,011	4,355	8.6	1,147.3	1,147.3	1,148.2	0.9
CX	18.929	992	5,533	6.8	1,152.0	1,152.0	1,152.5	0.5
CY	19.114	964	5,984	6.3	1,155.0	1,155.0	1,155.2	0.2
CZ	19.212	1,077	7,207	5.2	1,155.9	1,155.9	1,156.1	0.2
			REVISED DATA					

[1]Miles Above Confluence With Gila River

TABLE 5

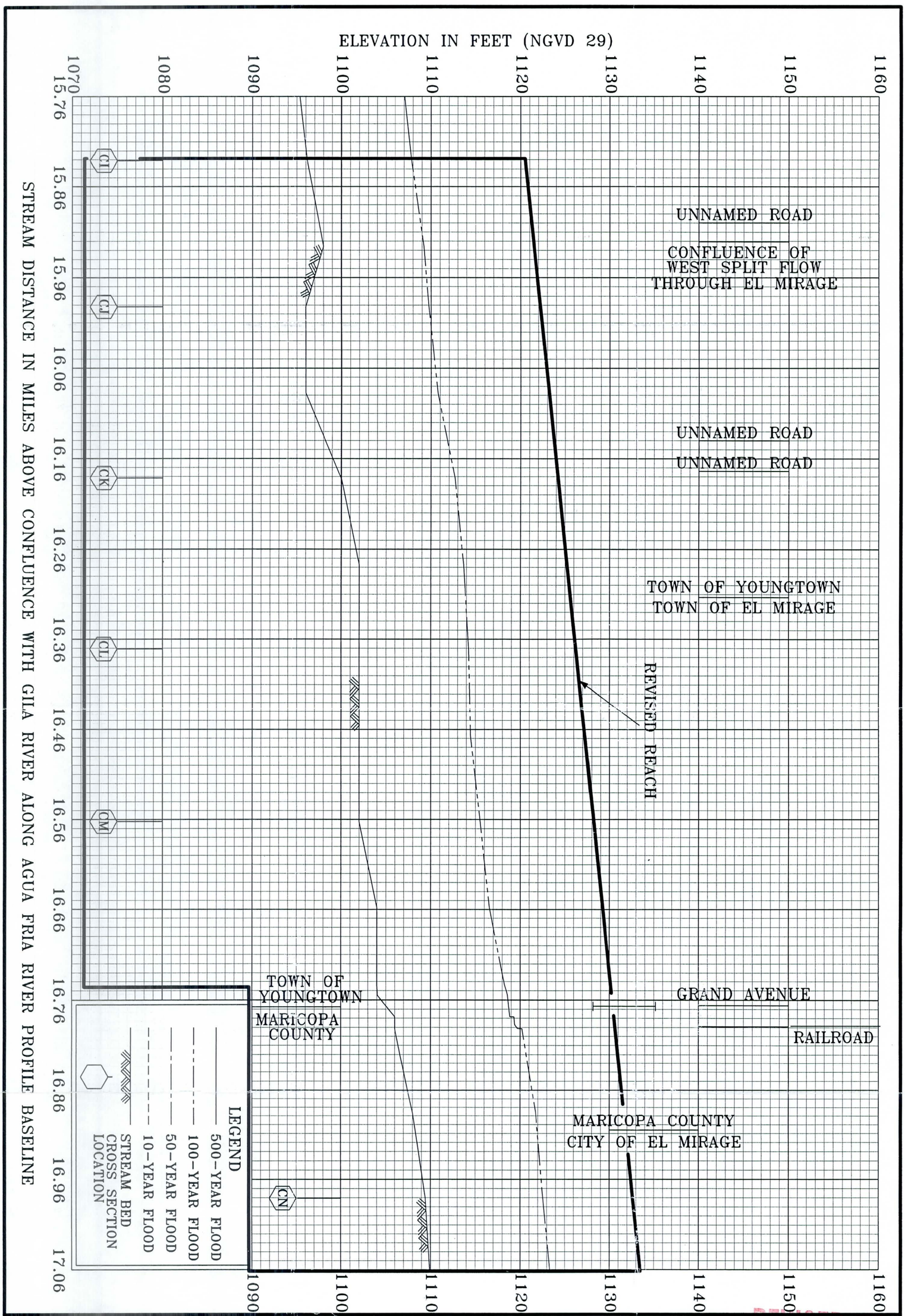
FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

FLOODWAY DATA

AGUA FRIA RIVER

REVISED TO REFLECT LOMR DATED AUG 28 2003



18P

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

FLOOD PROFILES

AGUA FRIA RIVER

REVISED TO REFLECT LOWER DATED AUG 28 2003

Michael Duncan - FCDX

From: Dawn Hawkins [DHAWKINS@mbakercorp.com]
Sent: Thursday, May 15, 2003 12:27 PM
To: mwd@mail.maricopa.gov
Subject: Re: LOMR for Agua Fria River (Cactus Rd to Bell Rd)

5-13-03

Mike,

Also, for the Town of Youngtown, Arizona the case number was incorrectly shown on the letter and we will have to change this number. None of the data will be affected. We will send another letter for Town of Youngtown.

Thanks.
>>> Michael Duncan - FCDX <mwd@mail.maricopa.gov> 05/15/03 12:37PM >>>
Has this LOMR left in the mail yet?

Federal Emergency Management Agency

Washington, D.C. 20472

MAY 13 2003

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 02-09-945P

The Honorable Robert Robles
Mayor, City of El Mirage
P.O. Box 26
El Mirage, AZ 85335

Community: City of El Mirage, AZ
Community No.: 040041
Panels Affected: 04013C1165 H, 1170 G, 1605 H, and 1610 H
Effective Date of This Revision: **AUG 28 2003**

102-I-A-C

Dear Mayor Robles:

This responds to a request that the Federal Emergency Management Agency (FEMA) revise the effective Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for Maricopa County, Arizona and Incorporated Areas (the effective FIRM and FIS report for your community), in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated April 8, 2002, Mr. Michael Duncan, P.E., Project Manager, Flood Delineation Branch, Flood Control District of Maricopa County, requested that FEMA revise the FIRM and FIS report to show the effects of a revised hydraulic analysis and updated topographic information along the profile baseline of the Agua Fria River from approximately 4,900 feet downstream of Grand Avenue to approximately 2,500 feet upstream of Bell Road; along West Split Flow Through El Mirage from approximately 800 feet downstream to just downstream of Grand Avenue; and along the Atchison, Topeka and Santa Fe (AT&SF) Railroad Channel from just upstream of Grand Avenue to approximately 1,200 feet downstream of Greenway Road. In the April 8 request, Mr. Duncan also asked that FEMA revise the FIRM and FIS report to show the effects of construction of three 8-foot by 4-foot reinforced-concrete box culverts at Thompson Ranch Road; construction of three 10-foot by 3-foot concrete box culverts at an unnamed road; and channel realignment along the AT&SF Railroad Channel from approximately 7,700 feet downstream to approximately 1,100 feet downstream of Greenway Road.

All data required to complete our review of this request were submitted with letters from Mr. C. E. Reynolds, P.E., Public Works Director, City of El Mirage, and Mr. Duncan. Because this Letter of Map Revision (LOMR) is based on flood hazard information meant to improve upon that shown on the flood map or within the flood study, and does not partially or wholly incorporate manmade modifications within the Special Flood Hazard Area (SFHA), fees were not assessed for the review. The SFHA is the area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood).

We have completed our review of the submitted data and the flood data shown on the effective FIRM and in the effective FIS report. We have revised the FIRM and FIS report to modify the elevations and floodplain and floodway boundary delineations of the base flood along the profile baseline of the Agua Fria River from approximately 800 feet upstream of Grand Avenue to approximately 2,800 feet downstream of Bell Road; along West Split Flow Through El Mirage from approximately 800 feet downstream to just downstream of Grand Avenue; and along the AT&SF Railroad Channel from approximately 300 feet upstream of Grand Avenue to approximately 1,000 feet downstream of Greenway

Road. As a result of the modifications, the Base Flood Elevations (BFEs) for the Agua Fria River and the widths of the SFHA and the regulatory floodway increased in some areas and decreased in other areas. For the AT&SF Railroad Channel, the BFEs and the widths of the SFHA and the regulatory floodway increased in some areas and decreased in other areas. For West Split Flow Through El Mirage, the BFEs and the width of the SFHA increased. The modifications are shown on the enclosed annotated copies of FIRM Panels 04013C1165 H, 04013C1170 G, 04013C1605 H, and 04013C1610 H; Profile Panels 18P through 20P, 364P, 608P, and 609P; and affected portions of the Floodway Data Table. This LOMR hereby revises the above-referenced panels of the effective FIRM and the affected portions of the FIS report, both dated July 19, 2001.

Because this revision request also affects the City of Surprise, the Town of Youngtown, and the unincorporated areas of Maricopa County, separate LOMRs for those communities were issued on the same date as this LOMR.

The modifications are effective as of the date shown above. The map panels as listed above and as modified by this letter will be used for all flood insurance policies and renewals issued for your community.

The following table is a partial listing of existing and modified BFEs:

Location	Existing BFE (feet)*	Modified BFE (feet)*
Agua Fria River:		
Approximately 1,100 feet upstream of Grand Avenue	1,123	1,122
Approximately 6,100 feet upstream of Grand Avenue	1,134	1,136
AT&SF Railroad Channel:		
Approximately 7,600 feet downstream of Greenway Road	1,124	1,123
Approximately 2,100 feet downstream of Greenway Road	1,145	1,146
West Split Flow Through El Mirage:		
Approximately 400 feet downstream of Grand Avenue	1,119	1,120

*Referenced to the National Geodetic Vertical Datum, rounded to the nearest whole foot

Public notification of the proposed modified BFEs will be given in the *Arizona Republic* on or about May 22 and May 29, 2003. A copy of this notification is enclosed. In addition, a notice of changes will be published in the *Federal Register*. Within 90 days of the second publication in the *Arizona Republic*, any interested party may request that FEMA reconsider the determination made by this LOMR. Any request for reconsideration must be based on scientific or technical data. All interested parties are on notice that, until the 90-day period elapses, the determination to modify the BFEs made by this LOMR may itself be modified.

Because this LOMR will not be printed and distributed to primary users, such as local insurance agents and mortgage lenders, your community will serve as a repository for these new data. We encourage you to disseminate the information reflected by this LOMR throughout the community, so that interested persons, such as property owners, local insurance agents, and mortgage lenders, may benefit from the information.

We also encourage you to prepare a related article for publication in your community's local newspaper. This article should describe the assistance that officials of your community will give to interested persons by providing these data and interpreting the NFIP maps.

We will not physically revise and republish the FIRM and FIS report for your community to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panels and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

The floodway is provided to your community as a tool to regulate floodplain development. Therefore, the floodway modifications described in this LOMR, while acceptable to FEMA, must also be acceptable to your community and adopted by appropriate community action, as specified in Paragraph 60.3(d) of the NFIP regulations.

This LOMR is based on minimum floodplain management criteria established under the NFIP. Your community is responsible for approving all floodplain development and for ensuring all necessary permits required by Federal or State law have been received. State, county, and community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction in the SFHA. If the State, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

The basis of this LOMR is, in whole or in part, a channel-modification/culvert project. NFIP regulations, as cited in Paragraph 60.3(b)(7), require that communities ensure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management regulations. Consequently, the ultimate responsibility for maintenance of the modified channel and culverts rests with your community.

This determination has been made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 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, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed minimum NFIP criteria. These criteria are the minimum and do not supersede any State or local requirements of a more stringent nature. This includes adoption of the effective FIRM to which the regulations apply and the modifications described in this LOMR. Our records show that your community has met this requirement.

A Consultation Coordination Officer (CCO) has been designated to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Mr. Jack Eldridge
Chief, National Flood Insurance Program Branch
Federal Emergency Management Agency, Region IX
1111 Broadway Street, Suite 1200
Oakland, CA 94607-4052
(510) 627-7184

If you have any questions regarding floodplain management regulations for your community or the NFIP in general, please call the CCO for your community at the telephone number cited above. If you have any questions regarding this LOMR, please call our Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,

Max H. Yuan, P.E., Project Engineer
Hazard Study Branch
Federal Insurance and
Mitigation Administration

For: Mary Jean Pajak, P.E., Acting Chief
Hazard Study Branch
Federal Insurance and
Mitigation Administration

Enclosures

cc: The Honorable Joan H. Shafer
Mayor, City of Surprise

The Honorable Daphne Green
Mayor, Town of Youngtown

The Honorable R. Fulton Brock
Chairman, Maricopa County
Board of Supervisors

Mr. Michael Duncan, P.E.
Project Manager
Flood Delineation Branch
Flood Control District of Maricopa County

Mr. C. E. Reynolds, P.E.
Public Works Director
City of El Mirage

Ms. Shanna Yager
Branch Manager
Flood Control District of Maricopa County

Ms. Terri Miller
Executive Consultant
Mitigation Section
Arizona Division of Emergency Management

CHANGES ARE MADE IN DETERMINATIONS OF BASE FLOOD ELEVATIONS FOR THE CITIES OF EL MIRAGE AND SURPRISE, THE TOWN OF YOUNGTOWN, AND THE UNINCORPORATED AREAS OF MARICOPA COUNTY, ARIZONA, UNDER THE NATIONAL FLOOD INSURANCE PROGRAM

On July 19, 2001, the Federal Emergency Management Agency identified Special Flood Hazard Areas (SFHAs) in the Cities of El Mirage and Surprise, the Town of Youngtown, and the unincorporated areas of Maricopa County, Arizona, through issuance of a Flood Insurance Rate Map (FIRM). The Federal Insurance and Mitigation Administration has determined that modification of the elevations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) for certain locations in these communities are appropriate. The modified Base Flood Elevations (BFEs) revise the FIRM for the communities.

The changes are being made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and are in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65.

A revised hydraulic analysis was performed to incorporate updated topographic information along the Agua Fria River, the Atchison, Topeka and Santa Fe Railroad Channel, and West Split Flow Through El Mirage; three 8-foot by 4-foot reinforced-concrete box culverts at Thompson Ranch Road; three 10-foot by 3-foot concrete box culverts at an unnamed road; and channel realignment along the Atchison, Topeka and Santa Fe Railroad Channel. This has resulted in revised delineations of the regulatory floodways, increases and decreases in SFHA width, and increased and decreased BFEs for the Agua Fria River and Atchison, Topeka and Santa Fe Railroad Channel and an increase in SFHA width and increased BFEs for West Split Flow Through El Mirage. The table below indicates existing and modified BFEs for selected locations along the affected lengths of the flooding source(s) cited above.

Location	Existing BFE (feet)*	Modified BFE (feet)*
Agua Fria River (baseline):		
[3]Approximately 2,400 feet downstream of Grand Avenue	1,113	1,114
[3]Approximately 300 feet downstream of Grand Avenue	1,119	1,118
[1]Approximately 1,100 feet upstream of Grand Avenue	1,123	1,122
[1]Approximately 6,100 feet upstream of Grand Avenue	1,134	1,136
[4]Approximately 1,100 feet upstream of 115th Street	1,138	1,137
[2]Approximately 3,500 feet downstream of Bell Road	1,144	1,143
[2]Approximately 1,300 feet downstream of Bell Road	1,152	1,153
[4]Approximately 300 feet upstream of Bell Road	1,156	1,157
Atchison, Topeka and Santa Fe Railroad Channel:		
[4]Just upstream of Atchison, Topeka & Santa Fe Railway	1,121	1,123
[1]Approximately 7,600 feet downstream of Greenway Road	1,124	1,123
[1]Approximately 2,100 feet downstream of Greenway Road	1,145	1,146
[4]Approximately 1,900 feet downstream of Greenway Road	1,149	None

West Split Flow Through El Mirage:		
[1]Approximately 400 feet downstream of Grand Avenue	1,119	1,120

[1]City of El Mirage
[2]City of Surprise
[3]Town of Youngtown
[4]Unincorporated areas of Maricopa County

*National Geodetic Vertical Datum, rounded to nearest whole foot

Under the above-mentioned Acts of 1968 and 1973, the Federal Insurance and Mitigation Administration must develop criteria for floodplain management. To participate in the National Flood Insurance Program (NFIP), the community must use the modified BFEs to administer the floodplain management measures of the NFIP. These modified BFEs will also be used to calculate the appropriate flood insurance premium rates for new buildings and their contents and for the second layer of insurance on existing buildings and contents.

Upon the second publication of notice of these changes in this newspaper, any person has 90 days in which he or she can request, through the Chief Executive Officer of the community, that the Federal Insurance and Mitigation Administration reconsider the determination. Any request for reconsideration must be based on knowledge of changed conditions or new scientific or technical data. All interested parties are on notice that until the 90-day period elapses, the Federal Insurance and Mitigation Administration's determination to modify the BFEs may itself be changed.

Any person having knowledge or wishing to comment on these changes should immediately notify:

The Honorable Robert Robles
Mayor, City of El Mirage
P.O. Box 26
El Mirage, AZ 85335

OR

The Honorable Joan H. Shafer
Mayor, City of Surprise
12425 West Bell Road, Suite D-100
Surprise, AZ 85374

OR

The Honorable Daphne Green
Mayor, Town of Youngtown
12030 Clubhouse Square
Youngtown, AZ 85363

OR

The Honorable R. Fulton Brock
Chairman, Maricopa County
Board of Supervisors
301 West Jefferson, 10th Floor
Phoenix, AZ 85003

Federal Emergency Management Agency

Washington, D.C. 20472

MAY 13 2003

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 02-09-945P

The Honorable R. Fulton Brock
Chairman, Maricopa County
Board of Supervisors
301 West Jefferson, 10th Floor
Phoenix, AZ 85003

Community: Maricopa County, AZ
Community No.: 040037
Panels Affected: 04013C1165 H, 1170 G,
1605 H, and 1610 H
Effective Date of This Revision: **AUG 28 2003**

102-I-A-C

Dear Mr. Brock:

This responds to a request that the Federal Emergency Management Agency (FEMA) revise the effective Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for Maricopa County, Arizona and Incorporated Areas, in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated April 8, 2002, Mr. Michael Duncan, P.E., Project Manager, Flood Delineation Branch, Flood Control District of Maricopa County, requested that FEMA revise the FIRM and FIS report to show the effects of a revised hydraulic analysis and updated topographic information along the profile baseline of the Agua Fria River from approximately 4,900 feet downstream of Grand Avenue to approximately 2,500 feet upstream of Bell Road; along West Split Flow Through El Mirage from approximately 800 feet downstream to just downstream of Grand Avenue; and along the Atchison, Topeka and Santa Fe (AT&SF) Railroad Channel from just upstream of Grand Avenue to approximately 1,200 feet downstream of Greenway Road. In the April 8 request, Mr. Duncan also asked that FEMA revise the FIRM and FIS report to show the effects of construction of three 8-foot by 4-foot reinforced-concrete box culverts at Thompson Ranch Road; construction of three 10-foot by 3-foot concrete box culverts at an unnamed road; and channel realignment along the AT&SF Railroad Channel from approximately 7,700 feet downstream to approximately 1,100 feet downstream of Greenway Road.

All data required to complete our review of this request were submitted with letters from Mr. C. E. Reynolds, P.E., Public Works Director, City of El Mirage, and Mr. Duncan. Because this Letter of Map Revision (LOMR) is based on flood hazard information meant to improve upon that shown on the flood map or within the flood study, and does not partially or wholly incorporate manmade modifications within the Special Flood Hazard Area (SFHA), fees were not assessed for the review. The SFHA is the area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood).

We have completed our review of the submitted data and the flood data shown on the effective FIRM and in the effective FIS report. We have revised the FIRM and FIS report to modify the elevations and floodplain and floodway boundary delineations of the base flood along the Agua Fria River and the

AT&SF Railroad Channel. As a result of the modifications, the Base Flood Elevations (BFEs) for the Agua Fria River and the widths of the SFHA and the regulatory floodway increased in some areas and decreased in other areas. For the AT&SF Railroad Channel, the BFEs increased in some areas and decreased in other areas, and the widths of the SFHA and the regulatory floodway decreased. The modifications are shown on the enclosed annotated copies of FIRM Panels 04013C1165 H, 04013C1170 G, 04013C1605 H, and 04013C1610 H; Profile Panels 18P through 20P, 608P, and 609P; and affected portions of the Floodway Data Table. This LOMR hereby revises the above-referenced panels of the effective FIRM and the affected portions of the FIS report, both dated July 19, 2001.

Because this revision request also affects the Cities of El Mirage and Surprise and the Town of Youngtown, separate LOMRs for those communities were issued on the same date as this LOMR.

The modifications are effective as of the date shown above. The map panels as listed above and as modified by this letter will be used for all flood insurance policies and renewals issued for your community.

The following table is a partial listing of existing and modified BFEs:

Location	Existing BFE (feet)*	Modified BFE (feet)*
Agua Fria River (baseline):		
Approximately 1,100 feet upstream of 115th Street	1,138	1,137
Approximately 300 feet upstream of Bell Road	1,156	1,157
AT&SF Railroad Channel:		
Just upstream of AT&SF	1,121	1,123
Approximately 1,900 feet downstream of Greenway Road	1,149	None

*Referenced to the National Geodetic Vertical Datum, rounded to the nearest whole foot

Public notification of the proposed modified BFEs will be given in the *Arizona Republic* on or about May 22 and May 29, 2003. A copy of this notification is enclosed. In addition, a notice of changes will be published in the *Federal Register*. Within 90 days of the second publication in the *Arizona Republic*, any interested party may request that FEMA reconsider the determination made by this LOMR. Any request for reconsideration must be based on scientific or technical data. All interested parties are on notice that, until the 90-day period elapses, the determination to modify the BFEs made by this LOMR may itself be modified.

Because this LOMR will not be printed and distributed to primary users, such as local insurance agents and mortgage lenders, your community will serve as a repository for these new data. We encourage you to disseminate the information reflected by this LOMR throughout the community, so that interested persons, such as property owners, local insurance agents, and mortgage lenders, may benefit from the information. We also encourage you to prepare a related article for publication in your community's local newspaper. This article should describe the assistance that officials of your community will give to interested persons by providing these data and interpreting the NFIP maps.

We will not physically revise and republish the FIRM and FIS report for your community to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panels and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

The floodway is provided to your community as a tool to regulate floodplain development. Therefore, the floodway modifications described in this LOMR, while acceptable to FEMA, must also be acceptable to your community and adopted by appropriate community action, as specified in Paragraph 60.3(d) of the NFIP regulations.

This LOMR is based on minimum floodplain management criteria established under the NFIP. Your community is responsible for approving all floodplain development and for ensuring all necessary permits required by Federal or State law have been received. State, county, and community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction in the SFHA. If the State, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

The basis of this LOMR is, in whole or in part, a channel-modification/culvert project. NFIP regulations, as cited in Paragraph 60.3(b)(7), require that communities ensure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management regulations. Consequently, the ultimate responsibility for maintenance of the modified channel and culverts rests with your community.

This determination has been made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 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, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed minimum NFIP criteria. These criteria are the minimum and do not supersede any State or local requirements of a more stringent nature. This includes adoption of the effective FIRM to which the regulations apply and the modifications described in this LOMR. Our records show that your community has met this requirement.

A Consultation Coordination Officer (CCO) has been designated to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Mr. Jack Eldridge
Chief, National Flood Insurance Program Branch
Federal Emergency Management Agency, Region IX
1111 Broadway Street, Suite 1200
Oakland, CA 94607-4052
(510) 627-7184

If you have any questions regarding floodplain management regulations for your community or the NFIP in general, please call the CCO for your community at the telephone number cited above. If you have any questions regarding this LOMR, please call our Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,

Max H. Yuan, P.E., Project Engineer
Hazard Study Branch
Federal Insurance and
Mitigation Administration

For: Mary Jean Pajak, P.E., Acting Chief
Hazard Study Branch
Federal Insurance and
Mitigation Administration

Enclosures

cc: The Honorable Robert Robles
Mayor, City of El Mirage

The Honorable Joan H. Shafer
Mayor, City of Surprise

The Honorable Daphne Green
Mayor, Town of Youngtown

Mr. Michael Duncan, P.E.
Project Manager
Flood Delineation Branch
Flood Control District of Maricopa County

Ms. Shanna Yager
Branch Manager
Flood Control District of Maricopa County

Ms. Terri Miller
Executive Consultant
Mitigation Section
Arizona Division of Emergency Management

CHANGES ARE MADE IN DETERMINATIONS OF BASE FLOOD ELEVATIONS FOR THE CITIES OF EL MIRAGE AND SURPRISE, THE TOWN OF YOUNGTOWN, AND THE UNINCORPORATED AREAS OF MARICOPA COUNTY, ARIZONA, UNDER THE NATIONAL FLOOD INSURANCE PROGRAM

On July 19, 2001, the Federal Emergency Management Agency identified Special Flood Hazard Areas (SFHAs) in the Cities of El Mirage and Surprise, the Town of Youngtown, and the unincorporated areas of Maricopa County, Arizona, through issuance of a Flood Insurance Rate Map (FIRM). The Federal Insurance and Mitigation Administration has determined that modification of the elevations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) for certain locations in these communities are appropriate. The modified Base Flood Elevations (BFEs) revise the FIRM for the communities.

The changes are being made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and are in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65.

A revised hydraulic analysis was performed to incorporate updated topographic information along the Agua Fria River, the Atchison, Topeka and Santa Fe Railroad Channel, and West Split Flow Through El Mirage; three 8-foot by 4-foot reinforced-concrete box culverts at Thompson Ranch Road; three 10-foot by 3-foot concrete box culverts at an unnamed road; and channel realignment along the Atchison, Topeka and Santa Fe Railroad Channel. This has resulted in revised delineations of the regulatory floodways, increases and decreases in SFHA width, and increased and decreased BFEs for the Agua Fria River and Atchison, Topeka and Santa Fe Railroad Channel and an increase in SFHA width and increased BFEs for West Split Flow Through El Mirage. The table below indicates existing and modified BFEs for selected locations along the affected lengths of the flooding source(s) cited above.

Location	Existing BFE (feet)*	Modified BFE (feet)*
Agua Fria River (baseline):		
[3]Approximately 2,400 feet downstream of Grand Avenue	1,113	1,114
[3]Approximately 300 feet downstream of Grand Avenue	1,119	1,118
[1]Approximately 1,100 feet upstream of Grand Avenue	1,123	1,122
[1]Approximately 6,100 feet upstream of Grand Avenue	1,134	1,136
[4]Approximately 1,100 feet upstream of 115th Street	1,138	1,137
[2]Approximately 3,500 feet downstream of Bell Road	1,144	1,143
[2]Approximately 1,300 feet downstream of Bell Road	1,152	1,153
[4]Approximately 300 feet upstream of Bell Road	1,156	1,157
Atchison, Topeka and Santa Fe Railroad Channel:		
[4]Just upstream of Atchison, Topeka & Santa Fe Railway	1,121	1,123
[1]Approximately 7,600 feet downstream of Greenway Road	1,124	1,123
[1]Approximately 2,100 feet downstream of Greenway Road	1,145	1,146
[4]Approximately 1,900 feet downstream of Greenway Road	1,149	None

West Split Flow Through El Mirage:		
[1]Approximately 400 feet downstream of Grand Avenue	1,119	1,120

[1]City of El Mirage
[2]City of Surprise
[3]Town of Youngtown
[4]Unincorporated areas of Maricopa County

*National Geodetic Vertical Datum, rounded to nearest whole foot

Under the above-mentioned Acts of 1968 and 1973, the Federal Insurance and Mitigation Administration must develop criteria for floodplain management. To participate in the National Flood Insurance Program (NFIP), the community must use the modified BFEs to administer the floodplain management measures of the NFIP. These modified BFEs will also be used to calculate the appropriate flood insurance premium rates for new buildings and their contents and for the second layer of insurance on existing buildings and contents.

Upon the second publication of notice of these changes in this newspaper, any person has 90 days in which he or she can request, through the Chief Executive Officer of the community, that the Federal Insurance and Mitigation Administration reconsider the determination. Any request for reconsideration must be based on knowledge of changed conditions or new scientific or technical data. All interested parties are on notice that until the 90-day period elapses, the Federal Insurance and Mitigation Administration's determination to modify the BFEs may itself be changed.

Any person having knowledge or wishing to comment on these changes should immediately notify:

The Honorable Robert Robles
Mayor, City of El Mirage
P.O. Box 26
El Mirage, AZ 85335

OR

The Honorable Joan H. Shafer
Mayor, City of Surprise
12425 West Bell Road, Suite D-100
Surprise, AZ 85374

OR

The Honorable Daphne Green
Mayor, Town of Youngtown
12030 Clubhouse Square
Youngtown, AZ 85363

OR

The Honorable R. Fulton Brock
Chairman, Maricopa County
Board of Supervisors
301 West Jefferson, 10th Floor
Phoenix, AZ 85003

Federal Emergency Management Agency

Washington, D.C. 20472

MAY 13 2003

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 02-09-945P

The Honorable Joan H. Shafer
Mayor, City of Surprise
12425 West Bell Road, Suite D-100
Surprise, AZ 85374

Community: City of Surprise, AZ
Community No.: 040053
Panels Affected: 04013C1165 H and 1170 G
Effective Date of This Revision: **AUG 28 2003**

102-I-A-C

Dear Mayor Shafer:

This responds to a request that the Federal Emergency Management Agency (FEMA) revise the effective Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for Maricopa County, Arizona and Incorporated Areas (the effective FIRM and FIS report for your community), in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated April 8, 2002, Mr. Michael Duncan, P.E., Project Manager, Flood Delineation Branch, Flood Control District of Maricopa County, requested that FEMA revise the FIRM and FIS report to show the effects of a revised hydraulic analysis and updated topographic information along the profile baseline of the Agua Fria River from approximately 4,900 feet downstream of Grand Avenue to approximately 2,500 feet upstream of Bell Road; along West Split Flow Through El Mirage from approximately 800 feet downstream to just downstream of Grand Avenue; and along the Atchison, Topeka and Santa Fe (AT&SF) Railroad Channel from just upstream of Grand Avenue to approximately 1,200 feet downstream of Greenway Road. In the April 8 request, Mr. Duncan also asked that FEMA revise the FIRM and FIS report to show the effects of construction of three 8-foot by 4-foot reinforced-concrete box culverts at Thompson Ranch Road; construction of three 10-foot by 3-foot concrete box culverts at an unnamed road; and channel realignment along the AT&SF Railroad Channel from approximately 7,700 feet downstream to approximately 1,100 feet downstream of Greenway Road.

All data required to complete our review of this request were submitted with letters from Mr. C. E. Reynolds, P.E., Public Works Director, City of El Mirage, and Mr. Duncan. Because this Letter of Map Revision (LOMR) is based on flood hazard information meant to improve upon that shown on the flood map or within the flood study, and does not partially or wholly incorporate manmade modifications within the Special Flood Hazard Area (SFHA), fees were not assessed for the review. The SFHA is the area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood).

We have completed our review of the submitted data and the flood data shown on the effective FIRM and in the effective FIS report. We have revised the FIRM and FIS report to modify the elevations and floodplain and floodway boundary delineations of the base flood along the profile baseline of the Agua Fria River from approximately 3,700 feet downstream to approximately 300 feet downstream of Bell Road. As a result of the modifications, the Base Flood Elevations (BFEs) for the Agua Fria River and the width of the SFHA increased in some areas and decreased in other areas, and the width of the regulatory floodway decreased. The modifications are shown on the enclosed annotated copies of FIRM Panels 04013C1165 H and 04013C1170 G, Profile Panel 20P, and affected portions of the Floodway Data Table. This LOMR hereby revises the above-referenced panels of the effective FIRM and the affected portions of the FIS report, both dated July 19, 2001.

Because this revision request also affects the City of El Mirage, the Town of Youngtown, and the unincorporated areas of Maricopa County, separate LOMRs for those communities were issued on the same date as this LOMR.

The modifications are effective as of the date shown above. The map panels as listed above and as modified by this letter will be used for all flood insurance policies and renewals issued for your community.

The following table is a partial listing of existing and modified BFEs:

Location	Existing BFE (feet)*	Modified BFE (feet)*
Approximately 3,500 feet downstream of Bell Road	1,144	1,143
Approximately 1,300 feet downstream of Bell Road	1,152	1,153

*Referenced to the National Geodetic Vertical Datum, rounded to the nearest whole foot

Public notification of the proposed modified BFEs will be given in the *Arizona Republic* on or about May 22 and May 29, 2003. A copy of this notification is enclosed. In addition, a notice of changes will be published in the *Federal Register*. Within 90 days of the second publication in the *Arizona Republic*, any interested party may request that FEMA reconsider the determination made by this LOMR. Any request for reconsideration must be based on scientific or technical data. All interested parties are on notice that, until the 90-day period elapses, the determination to modify the BFEs made by this LOMR may itself be modified.

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This LOMR is based on minimum floodplain management criteria established under the NFIP. Your community is responsible for approving all floodplain development and for ensuring all necessary permits required by Federal or State law have been received. State, county, and community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction in the SFHA. If the State, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

The basis of this LOMR is, in whole or in part, a channel-modification project. NFIP regulations, as cited in Paragraph 60.3(b)(7), require that communities ensure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management regulations. Consequently, the ultimate responsibility for maintenance of the modified channel rests with your community.

This determination has been made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 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, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed minimum NFIP criteria. These criteria are the minimum and do not supersede any State or local requirements of a more stringent nature. This includes adoption of the effective FIRM to which the regulations apply and the modifications described in this LOMR. Our records show that your community has met this requirement.

A Consultation Coordination Officer (CCO) has been designated to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Mr. Jack Eldridge
Chief, National Flood Insurance Program Branch
Federal Emergency Management Agency, Region IX
1111 Broadway Street, Suite 1200
Oakland, CA 94607-4052
(510) 627-7184

If you have any questions regarding floodplain management regulations for your community or the NFIP in general, please call the CCO for your community at the telephone number cited above. If you have any questions regarding this LOMR, please call our Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,

Max H. Yuan, P.E., Project Engineer
Hazard Study Branch
Federal Insurance and
Mitigation Administration

For: Mary Jean Pajak, P.E., Acting Chief
Hazard Study Branch
Federal Insurance and
Mitigation Administration

Enclosures

cc: The Honorable Robert Robles
Mayor, City of El Mirage

The Honorable Daphne Green
Mayor, Town of Youngtown

The Honorable R. Fulton Brock
Chairman, Maricopa County
Board of Supervisors

Mr. Michael Duncan, P.E.
Project Manager
Flood Delineation Branch
Flood Control District of Maricopa County

Mr. Brian Pirooz, P.E.
Assistant City Engineer
City of Surprise

Ms. Shanna Yager
Branch Manager
Flood Control District of Maricopa County

Ms. Terri Miller
Executive Consultant
Mitigation Section
Arizona Division of Emergency Management

CHANGES ARE MADE IN DETERMINATIONS OF BASE FLOOD ELEVATIONS FOR THE CITIES OF EL MIRAGE AND SURPRISE, THE TOWN OF YOUNGTOWN, AND THE UNINCORPORATED AREAS OF MARICOPA COUNTY, ARIZONA, UNDER THE NATIONAL FLOOD INSURANCE PROGRAM

On July 19, 2001, the Federal Emergency Management Agency identified Special Flood Hazard Areas (SFHAs) in the Cities of El Mirage and Surprise, the Town of Youngtown, and the unincorporated areas of Maricopa County, Arizona, through issuance of a Flood Insurance Rate Map (FIRM). The Federal Insurance and Mitigation Administration has determined that modification of the elevations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) for certain locations in these communities are appropriate. The modified Base Flood Elevations (BFEs) revise the FIRM for the communities.

The changes are being made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and are in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65.

A revised hydraulic analysis was performed to incorporate updated topographic information along the Agua Fria River, the Atchison, Topeka and Santa Fe Railroad Channel, and West Split Flow Through El Mirage; three 8-foot by 4-foot reinforced-concrete box culverts at Thompson Ranch Road; three 10-foot by 3-foot concrete box culverts at an unnamed road; and channel realignment along the Atchison, Topeka and Santa Fe Railroad Channel. This has resulted in revised delineations of the regulatory floodways, increases and decreases in SFHA width, and increased and decreased BFEs for the Agua Fria River and Atchison, Topeka and Santa Fe Railroad Channel and an increase in SFHA width and increased BFEs for West Split Flow Through El Mirage. The table below indicates existing and modified BFEs for selected locations along the affected lengths of the flooding source(s) cited above.

Location	Existing BFE (feet)*	Modified BFE (feet)*
Agua Fria River (baseline):		
[3]Approximately 2,400 feet downstream of Grand Avenue	1,113	1,114
[3]Approximately 300 feet downstream of Grand Avenue	1,119	1,118
[1]Approximately 1,100 feet upstream of Grand Avenue	1,123	1,122
[1]Approximately 6,100 feet upstream of Grand Avenue	1,134	1,136
[4]Approximately 1,100 feet upstream of 115th Street	1,138	1,137
[2]Approximately 3,500 feet downstream of Bell Road	1,144	1,143
[2]Approximately 1,300 feet downstream of Bell Road	1,152	1,153
[4]Approximately 300 feet upstream of Bell Road	1,156	1,157
Atchison, Topeka and Santa Fe Railroad Channel:		
[4]Just upstream of Atchison, Topeka & Santa Fe Railway	1,121	1,123
[1]Approximately 7,600 feet downstream of Greenway Road	1,124	1,123
[1]Approximately 2,100 feet downstream of Greenway Road	1,145	1,146
[4]Approximately 1,900 feet downstream of Greenway Road	1,149	None

West Split Flow Through El Mirage:		
[1]Approximately 400 feet downstream of Grand Avenue	1,119	1,120

[1]City of El Mirage
[2]City of Surprise
[3]Town of Youngtown
[4]Unincorporated areas of Maricopa County

*National Geodetic Vertical Datum, rounded to nearest whole foot

Under the above-mentioned Acts of 1968 and 1973, the Federal Insurance and Mitigation Administration must develop criteria for floodplain management. To participate in the National Flood Insurance Program (NFIP), the community must use the modified BFEs to administer the floodplain management measures of the NFIP. These modified BFEs will also be used to calculate the appropriate flood insurance premium rates for new buildings and their contents and for the second layer of insurance on existing buildings and contents.

Upon the second publication of notice of these changes in this newspaper, any person has 90 days in which he or she can request, through the Chief Executive Officer of the community, that the Federal Insurance and Mitigation Administration reconsider the determination. Any request for reconsideration must be based on knowledge of changed conditions or new scientific or technical data. All interested parties are on notice that until the 90-day period elapses, the Federal Insurance and Mitigation Administration's determination to modify the BFEs may itself be changed.

Any person having knowledge or wishing to comment on these changes should immediately notify:

The Honorable Robert Robles
Mayor, City of El Mirage
P.O. Box 26
El Mirage, AZ 85335

OR

The Honorable Joan H. Shafer
Mayor, City of Surprise
12425 West Bell Road, Suite D-100
Surprise, AZ 85374

OR

The Honorable Daphne Green
Mayor, Town of Youngtown
12030 Clubhouse Square
Youngtown, AZ 85363

OR

The Honorable R. Fulton Brock
Chairman, Maricopa County
Board of Supervisors
301 West Jefferson, 10th Floor
Phoenix, AZ 85003

Federal Emergency Management Agency

Washington, D.C. 20472

MAY 20 2003

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 03-09-1014X

The Honorable Daphne Green
Mayor, Town of Youngtown
12030 Clubhouse Square
Youngtown, AZ 85363

Community: Town of Youngtown, AZ
Community No.: 040057
Panel Affected: 04013C1610 H
Effective Date of This Revision: AUG 28 2003

102-I-A-C

Dear Mayor Green:

This responds to a request that the Federal Emergency Management Agency (FEMA) revise the effective Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for Maricopa County, Arizona and Incorporated Areas (the effective FIRM and FIS report for your community), in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated April 8, 2002, Mr. Michael Duncan, P.E., Project Manager, Flood Delineation Branch, Flood Control District of Maricopa County, requested that FEMA revise the FIRM and FIS report to show the effects of a revised hydraulic analysis and updated topographic information along the profile baseline of the Agua Fria River from approximately 4,900 feet downstream of Grand Avenue to approximately 2,500 feet upstream of Bell Road; along West Split Flow Through El Mirage from approximately 800 feet downstream to just downstream of Grand Avenue; and along the Atchison, Topeka and Santa Fe (AT&SF) Railroad Channel from just upstream of Grand Avenue to approximately 1,200 feet downstream of Greenway Road. In the April 8 request, Mr. Duncan also asked that FEMA revise the FIRM and FIS report to show the effects of construction of three 8-foot by 4-foot reinforced-concrete box culverts at Thompson Ranch Road; construction of three 10-foot by 3-foot concrete box culverts at an unnamed road; and channel realignment along the AT&SF Railroad Channel from approximately 7,700 feet downstream to approximately 1,100 feet downstream of Greenway Road. This Letter of Map Revision (LOMR) is being issued to correct a LOMR (Case No. 02-09-945P) dated May 13, 2003, which is to become effective on August 28, 2003. The May 13 LOMR for your community inadvertently referenced an incorrect case number (Case No. 02-09-857P). The May 13 LOMR determination and the attachments – annotated FIRM Panel 04013C1610 H, Profile Panel 18P, and affected portions of the Floodway Data Table – remain valid. The determinations made in separate LOMRs with Case No. 02-09-945P for the Cities of El Mirage and Surprise and the unincorporated areas of Maricopa County, all also issued on May 13, 2003, and to become effective on August 28, 2003, remain valid.

All data required to complete our review of this request were submitted with letters from Mr. C. E. Reynolds, P.E., Public Works Director, City of El Mirage, and Mr. Duncan. Because this LOMR is based

on flood hazard information meant to improve upon that shown on the flood map or within the flood study, and does not partially or wholly incorporate manmade modifications within the Special Flood Hazard Area (SFHA), fees were not assessed for the review. The SFHA is the area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood).

We have completed our review of the submitted data and the flood data shown on the effective FIRM and in the effective FIS report. We have revised the FIRM and FIS report to modify the elevations and floodway boundary delineations of the base flood along the profile baseline of the Agua Fria River from approximately 4,900 feet downstream to just downstream of Grand Avenue. As a result of the modifications, the Base Flood Elevations (BFEs) for the Agua Fria River and the width of the regulatory floodway increased in some areas and decreased in other areas. The modifications are shown on the enclosed annotated copies of FIRM Panel 04013C1610 H, Profile Panel 18P, and affected portions of the Floodway Data Table. This LOMR hereby revises the above-referenced panel of the effective FIRM and the affected portions of the FIS report, both dated July 19, 2001.

The modifications are effective as of the date shown above. The map panel listed above and as modified by this letter will be used for all flood insurance policies and renewals issued for your community.

The following table is a partial listing of existing and modified BFEs:

Location	Existing BFE (feet)*	Modified BFE (feet)*
Approximately 2,400 feet downstream of Grand Avenue	1,113	1,114
Approximately 200 feet downstream of Grand Avenue	1,119	1,118

*Referenced to the National Geodetic Vertical Datum, rounded to the nearest whole foot

As stated in the May 13 LOMR, public notification of the proposed modified BFEs will be given in the *Arizona Republic* on or about May 22 and May 29, 2003. A copy of this notification is enclosed. In addition, a notice of changes will be published in the *Federal Register*. Within 90 days of the second publication in the *Arizona Republic*, any interested party may request that FEMA reconsider the determination made by this LOMR. Any request for reconsideration must be based on scientific or technical data. All interested parties are on notice that, until the 90-day period elapses, the determination to modify the BFEs made by this LOMR may itself be modified.

Because this LOMR will not be printed and distributed to primary users, such as local insurance agents and mortgage lenders, your community will serve as a repository for these new data. We encourage you to disseminate the information reflected by this LOMR throughout the community, so that interested persons, such as property owners, local insurance agents, and mortgage lenders, may benefit from the information. We also encourage you to prepare a related article for publication in your community's local newspaper. This article should describe the assistance that officials of your community will give to interested persons by providing these data and interpreting the NFIP maps.

We will not physically revise and republish the FIRM and FIS report for your community to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panel and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

The floodway is provided to your community as a tool to regulate floodplain development. Therefore, the floodway modifications described in this LOMR, while acceptable to FEMA, must also be acceptable to your community and adopted by appropriate community action, as specified in Paragraph 60.3(d) of the NFIP regulations.

This LOMR is based on minimum floodplain management criteria established under the NFIP. Your community is responsible for approving all floodplain development and for ensuring all necessary permits required by Federal or State law have been received. State, county, and community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction in the SFHA. If the State, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

The basis of this LOMR is, in whole or in part, a channel-modification project. NFIP regulations, as cited in Paragraph 60.3(b)(7), require that communities ensure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management regulations. Consequently, the ultimate responsibility for maintenance of the modified channel rests with your community.

This determination has been made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 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, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed minimum NFIP criteria. These criteria are the minimum and do not supersede any State or local requirements of a more stringent nature. This includes adoption of the effective FIRM to which the regulations apply and the modifications described in this LOMR. Our records show that your community has met this requirement.

A Consultation Coordination Officer (CCO) has been designated to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Mr. Jack Eldridge
Chief, National Flood Insurance Program Branch
Federal Emergency Management Agency, Region IX
1111 Broadway Street, Suite 1200
Oakland, CA 94607-4052
(510) 627-7184

If you have any questions regarding floodplain management regulations for your community or the NFIP in general, please call the CCO for your community at the telephone number cited above. If you have any questions regarding this LOMR, please call our Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,

Max H. Yuan, P.E., Project Engineer
Hazard Study Branch
Federal Insurance and
Mitigation Administration

For: Mary Jean Pajak, P.E., Acting Chief
Hazard Study Branch
Federal Insurance and
Mitigation Administration

Enclosures

cc: The Honorable Robert Robles
Mayor, City of El Mirage

The Honorable Joan H. Shafer
Mayor, City of Surprise

The Honorable R. Fulton Brock
Chairman, Maricopa County
Board of Supervisors

Mr. Michael Duncan, P.E.
Project Manager
Flood Delineation Branch
Flood Control District of Maricopa County

Mr. Jesse Mendez
Floodplain Administrator
Town of Youngtown

Ms. Shanna Yager
Branch Manager
Flood Control District of Maricopa County

Ms. Terri Miller
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Mitigation Section
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[1]City of El Mirage
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[4]Unincorporated areas of Maricopa County

*National Geodetic Vertical Datum, rounded to nearest whole foot

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The Honorable Robert Robles
Mayor, City of El Mirage
P.O. Box 26
El Mirage, AZ 85335

OR

The Honorable Joan H. Shafer
Mayor, City of Surprise
12425 West Bell Road, Suite D-100
Surprise, AZ 85374

OR

The Honorable Daphne Green
Mayor, Town of Youngtown
12030 Clubhouse Square
Youngtown, AZ 85363

OR

The Honorable R. Fulton Brock
Chairman, Maricopa County
Board of Supervisors
301 West Jefferson, 10th Floor
Phoenix, AZ 85003

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Agua Fria River (Cont'd)								
CA	14.316	1,030	4,856	7.1	1,085.8	1,085.8	1,085.8	0.0
CB	14.412	1,170	5,947	5.8	1,087.5	1,087.5	1,087.6	0.1
CC	14.602	1,350	5,474	6.3	1,089.9	1,089.9	1,090.2	0.3
CD	14.792	1,364	6,635	5.2	1,092.7	1,092.7	1,093.2	0.5
CE	14.975	1,730	5,339	6.5	1,095.7	1,095.7	1,095.8	0.1
CF	15.172	830	5,541	6.2	1,098.6	1,098.6	1,098.8	0.2
CG	15.455	795	4,451	7.8	1,101.3	1,101.3	1,102.1	0.8
CH	15.641	558	3,364	10.3	1,104.3	1,104.3	1,105.0	0.7
CI	15.831	661	5,170	6.7	1,107.9	1,107.9	1,108.7	0.8
CJ	15.992	582	4,035	8.6	1,109.8	1,109.8	1,110.4	0.6
CK	16.182	618	4,756	7.3	1,112.7	1,112.7	1,113.4	0.7
CL	16.371	690	6,267	5.5	1,114.2	1,114.2	1,115.2	1.0
CM	16.562	453	4,477	7.7	1,115.5	1,115.5	1,116.2	0.7
CN	16.980	393	4,588	7.8	1,122.6	1,122.6	1,122.6	0.0
CO	17.169	372	4,255	8.5	1,124.2	1,124.2	1,124.2	0.0
CP	17.359	395	4,031	8.9	1,127.2	1,127.2	1,127.2	0.0
CQ	17.552	891	10,837	3.3	1,129.8	1,129.8	1,129.8	0.0
CR	17.733	1,105	11,233	3.2	1,130.2	1,130.2	1,130.2	0.0
CS	17.913	1,008	8,478	4.4	1,136.3	1,136.3	1,136.6	0.3
CT	18.095	1,021	9,285	4.0	1,136.8	1,136.8	1,137.1	0.3
CU	18.367	1,156	7,563	5.5	1,137.8	1,137.8	1,138.4	0.6
CV	18.550	1,326	5,564	6.7	1,142.0	1,142.0	1,142.8	0.8
CW	18.739	1,011	4,355	8.6	1,147.3	1,147.3	1,148.2	0.9
CX	18.929	992	5,533	6.8	1,152.0	1,152.0	1,152.5	0.5
CY	19.114	964	5,984	6.3	1,155.0	1,155.0	1,155.2	0.2
CZ	19.212	1,077	7,207	5.2	1,155.9	1,155.9	1,156.1	0.2
			REVISED DATA					

[1]Miles Above Confluence With Gila River

REVISED TO REFLECT LOMR DATED AUG 28 200

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ AND INCORPORATED AREAS

FLOODWAY DATA

AGUA FRIA RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Agua Fria River (Cont'd)				REVISED DATA				
DA	19.341	1,311	5,585	7.0	1,157.1	1,157.1	1,157.2	0.1
DB	19.531	1,645	4,444	8.4	1,160.5	1,160.5	1,160.5	0.0
DC	19.721	2,155	7,965	4.7	1,164.1	1,164.1	1,164.5	0.4
DD	19.906	2,238	6,965	5.4	1,166.6	1,166.6	1,166.8	0.2
DE	20.097	2,207	7,057	5.3	1,169.7	1,169.7	1,170.1	0.4
DF	20.286	1,818	6,409	5.9	1,172.4	1,172.4	1,172.8	0.4
DG	20.478	1,314	5,569	6.7	1,175.4	1,175.4	1,175.8	0.4
DH	20.658	1,120	5,215	7.2	1,178.0	1,178.0	1,178.4	0.4
DI	20.85	669	4,141	9.1	1,181.4	1,181.4	1,182.1	0.7
DJ	21.039	779	5,748	6.5	1,184.4	1,184.4	1,185.3	0.9
DK	21.331	1,100	4,473	7.8	1,187.2	1,187.2	1,188.1	0.9
DL	21.516	1,029	5,900	5.9	1,190.2	1,190.2	1,190.6	0.4
DM	21.701	923	4,911	7.1	1,191.3	1,191.3	1,191.7	0.4
DN	21.794	937	7,288	4.8	1,193.5	1,193.5	1,193.6	0.1
DO	22.069	951	4,724	7.4	1,196.0	1,196.0	1,196.3	0.3
DP	22.257	1,397	6,377	5.5	1,200.6	1,200.6	1,200.7	0.1
DQ	22.448	1,678	5,335	6.6	1,202.1	1,202.1	1,203.0	0.9
DR	22.639	2,094	7,393	4.5	1,206.6	1,206.6	1,206.6	0.0
DS	22.828	2,919	4,634	7.1	1,208.9	1,208.9	1,208.9	0.0
DT	23.015	3,179	6,992	4.7	1,212.8	1,212.8	1,212.8	0.0
DU	23.205	3,155	7,845	4.2	1,215.6	1,215.6	1,215.6	0.0
DV	23.299	3,010	6,330	5.2	1,217.0	1,217.0	1,217.0	0.0
DW	23.489	2,201	6,643	5.0	1,221.0	1,221.0	1,221.0	0.0
DX	23.679	1,420	4,826	6.8	1,225.2	1,225.2	1,225.4	0.2
DY	23.868	1,088	5,467	6.0	1,228.5	1,228.5	1,229.2	0.7
DZ	24.06	1,005	4,787	6.5	1,232.6	1,232.6	1,233.4	0.8

[1]Miles Above Confluence With Gila River

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

FLOODWAY DATA

AGUA FRIA RIVER

REVISED TO REFLECT LOM
DATE: AUG 2 8 20

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Atchison, Topeka and Santa Fe Railroad Channel			REVISED DATA					
A	0.150[1]	43	441	2.1	1,123.3	1,123.3	1,123.3	0.0
B	0.890[1]	125	1,768	0.3	1,123.3	1,123.3	1,123.3	0.0
C	1.410[1]	131	1,808	0.3	1,123.4	1,123.4	1,123.4	0.0
D	2.035[1]	69	213	2.5	1,125.4	1,125.4	1,125.4	0.0
E	2.768[1]	43	84	6.3	1,126.0	1,126.0	1,126.0	0.0
F	3.365[1]	37	95	5.1	1,129.4	1,129.4	1,129.4	0.0
G	3.905[1]	41	104	4.7	1,131.3	1,131.3	1,131.3	0.0
H	4.028[1]	44	183	2.6	1,131.9	1,131.9	1,131.9	0.0
I	4.672[1]	41	113	3.8	1,132.7	1,132.7	1,132.7	0.0
J	5.345[1]	33	76	5.6	1,134.1	1,134.1	1,134.1	0.0
K	5.995[1]	41	105	4.1	1,136.2	1,136.2	1,136.2	0.0
L	6.550[1]	72	155	2.4	1,137.1	1,137.1	1,137.1	0.0
M	7.280[1]	24	43	7.5	1,142.4	1,142.4	1,142.6	0.2
N	8.460[1]	136	100	3.2	1,153.2	1,153.2	1,154.2	1.0
O	8.905[1]	210	153	3.8	1,157.6	1,157.6	1,158.4	0.8
Casandro Wash			18				2,073.3	0.0
A	0.327[2]	29	39	4.80	2,073.3	2,073.3	2,087.6	0.0
B	0.507[2]	26	41	7.10	2,087.6	2,087.6	2,106.0	0.0
C	0.751[2]	41	19	4.60	2,106.0	2,106.0	2,126.1	0.0
D	0.962[2]	178	183	1.60	2,126.1	2,126.1	2,181.6	0.0
E	1.455[2]	124	254	6.90	2,181.6	2,181.6	2,215.5	0.0
F	1.900[2]	196	271	3.50	2,215.5	2,215.5	2,253.0	0.0
G	2.460[2]	164	378	2.95	2,253.0	2,253.0	2,258.8	0.0
H	2.560[2]	169		2.21	2,258.8	2,258.8		
South Branch Casandro Wash			122				2,245.5	0.0
A	0.375[2]	157	128	4.50	2,245.5	2,245.5	2,257.4	0.0
B	0.565[2]	105	104	3.91	2,257.4	2,257.4	2,272	0.0
C	0.730[2]	98		4.81	2,272.1	2,272.1		

[1]Thousands of Feet Above Grand Avenue [2]Miles Above Mouth

REVISED TO REFLECT LOMR DATED AUG 2 8 200

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ AND INCORPORATED AREAS

FLOODWAY DATA

ATCHISON, TOPEKA & SANTA FE RAILROAD CHANNEL-CASANDRO WASH-SOUTH BRANCH CASANDRO WASH

FLOOD PROFILES

AGUA FRIA RIVER

REVISED TO REFLECT LOMR DATED AUG 28 2003

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

18P

REVISED TO REFLECT LOMR DATED AUG 28 2003

FLOOD PROFILES

AGUA FRIA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

REVISED TO REFLECT LOMR DATED AUG 28 2003

FLOOD PROFILES

AGUA FRIA RIVER

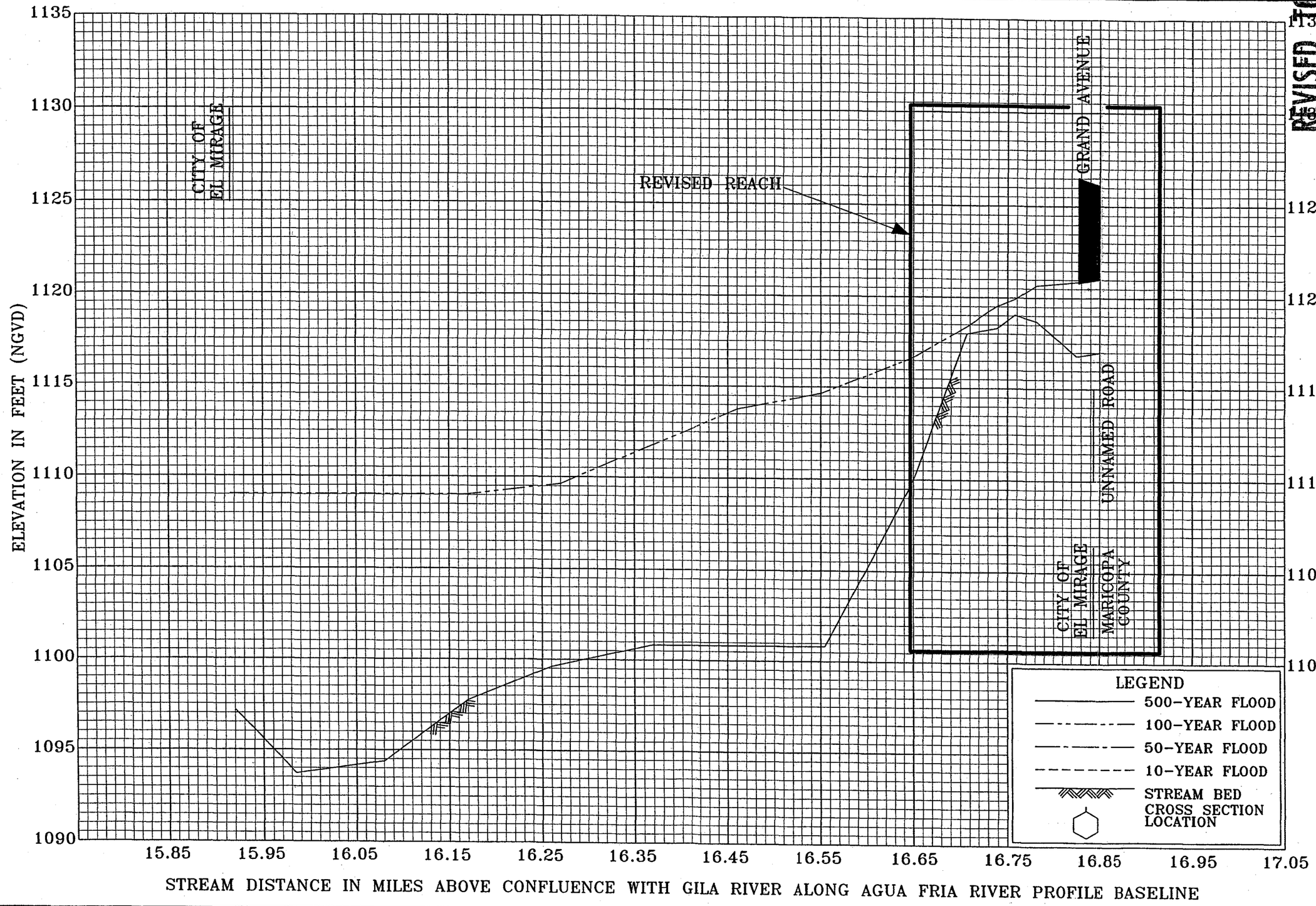
FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

20P

REVISED TO REFLECT LOMR DATED AUG 23 2007



FLOOD PROFILES

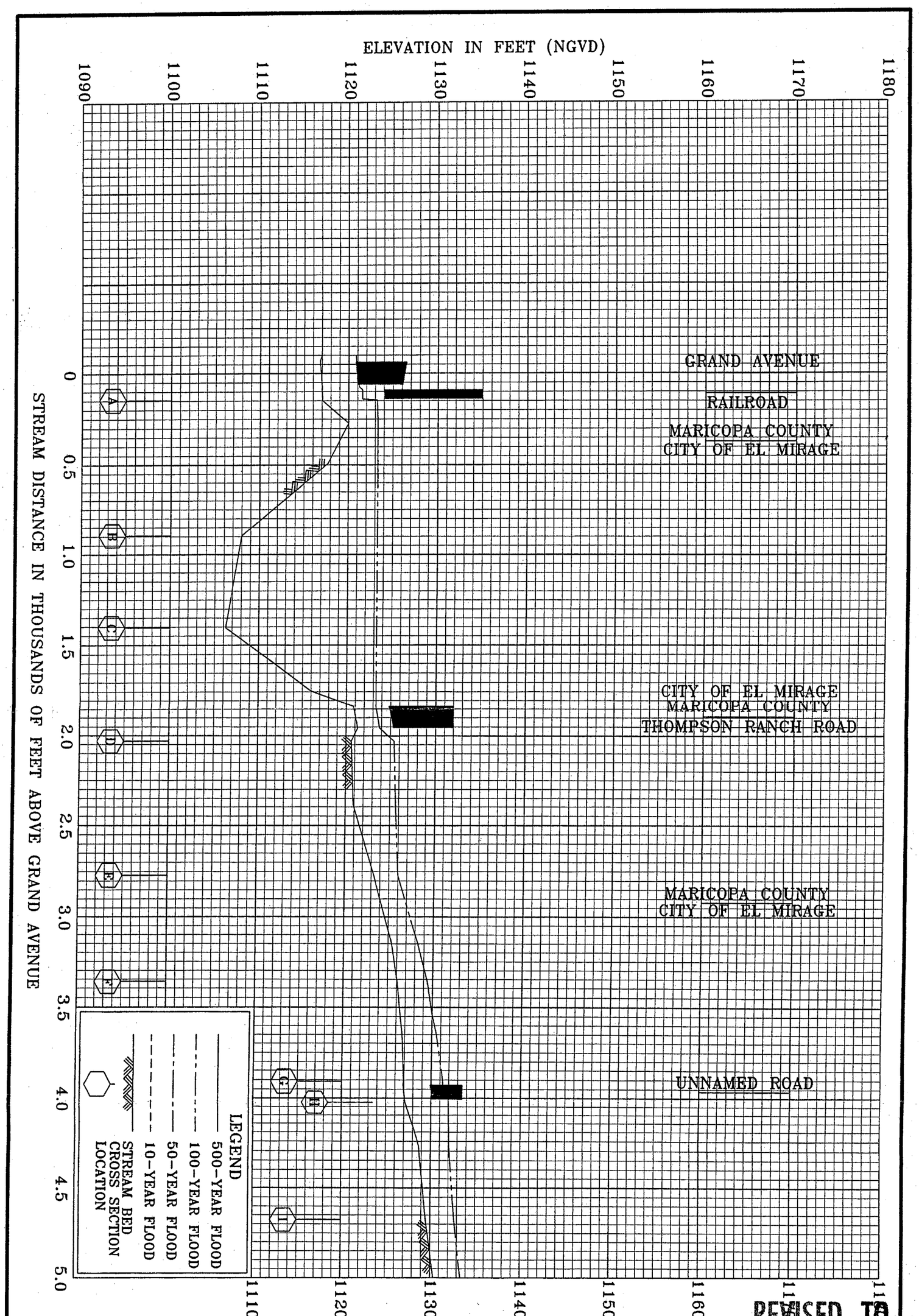
WEST SPLIT FLOW THROUGH EL MIRAGE

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

364P



608P

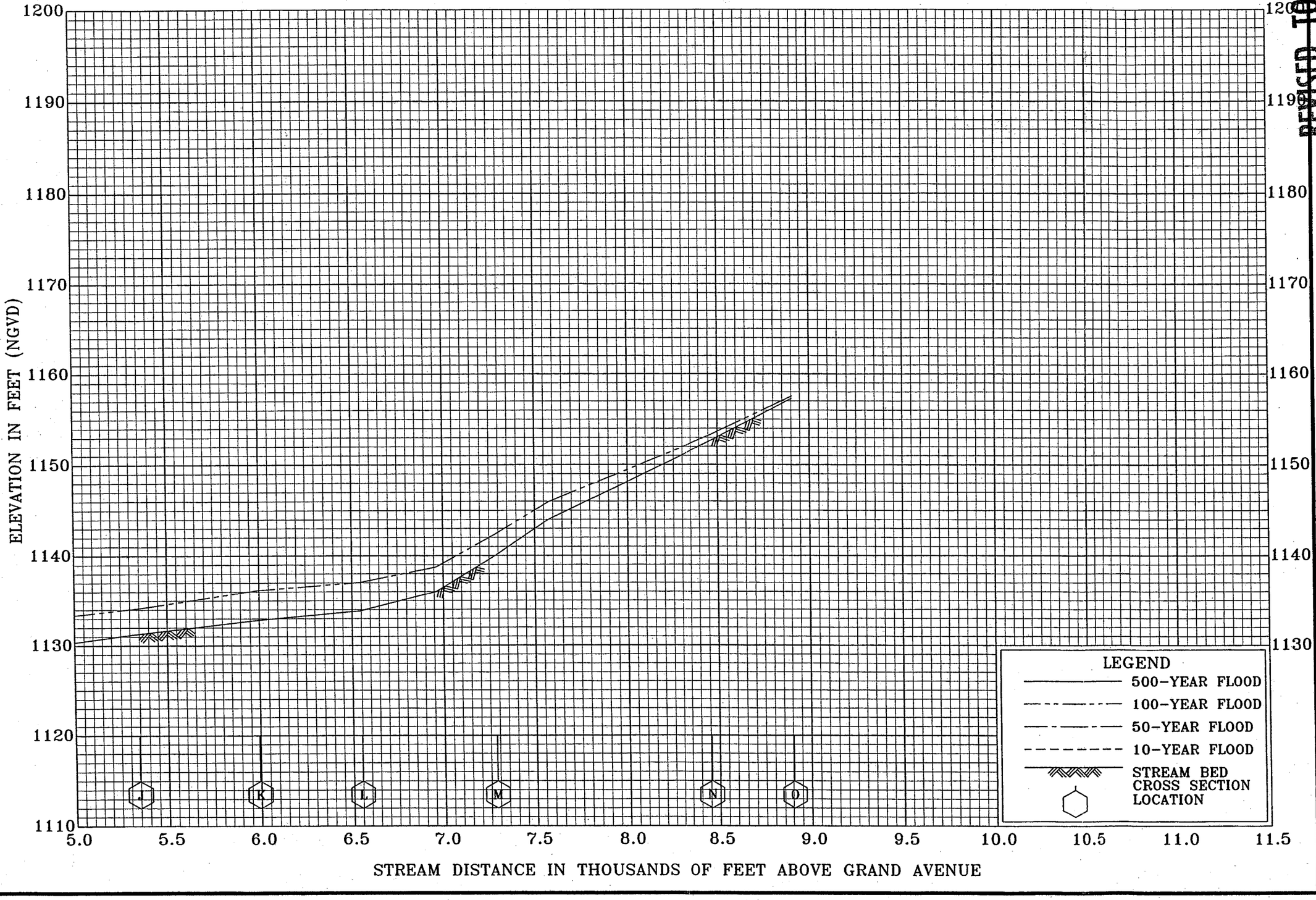
FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

FLOOD PROFILES

ATCHISON, TOPEKA AND SANTA FE RAILROAD CHANNEL

REVISED TO REFLECT LOMR DATED AUG 28 2003



REVISED TO REFLECT LOMR DATED AUG 28 2003

FLOOD PROFILES

ATCHISON, TOPEKA AND SANTA FE RAILROAD CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

609P

APPROXIMATE SCALE IN FEET

1,000 500 0 1,000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA
AND INCORPORATED AREAS

PANEL 1605 OF 4350

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

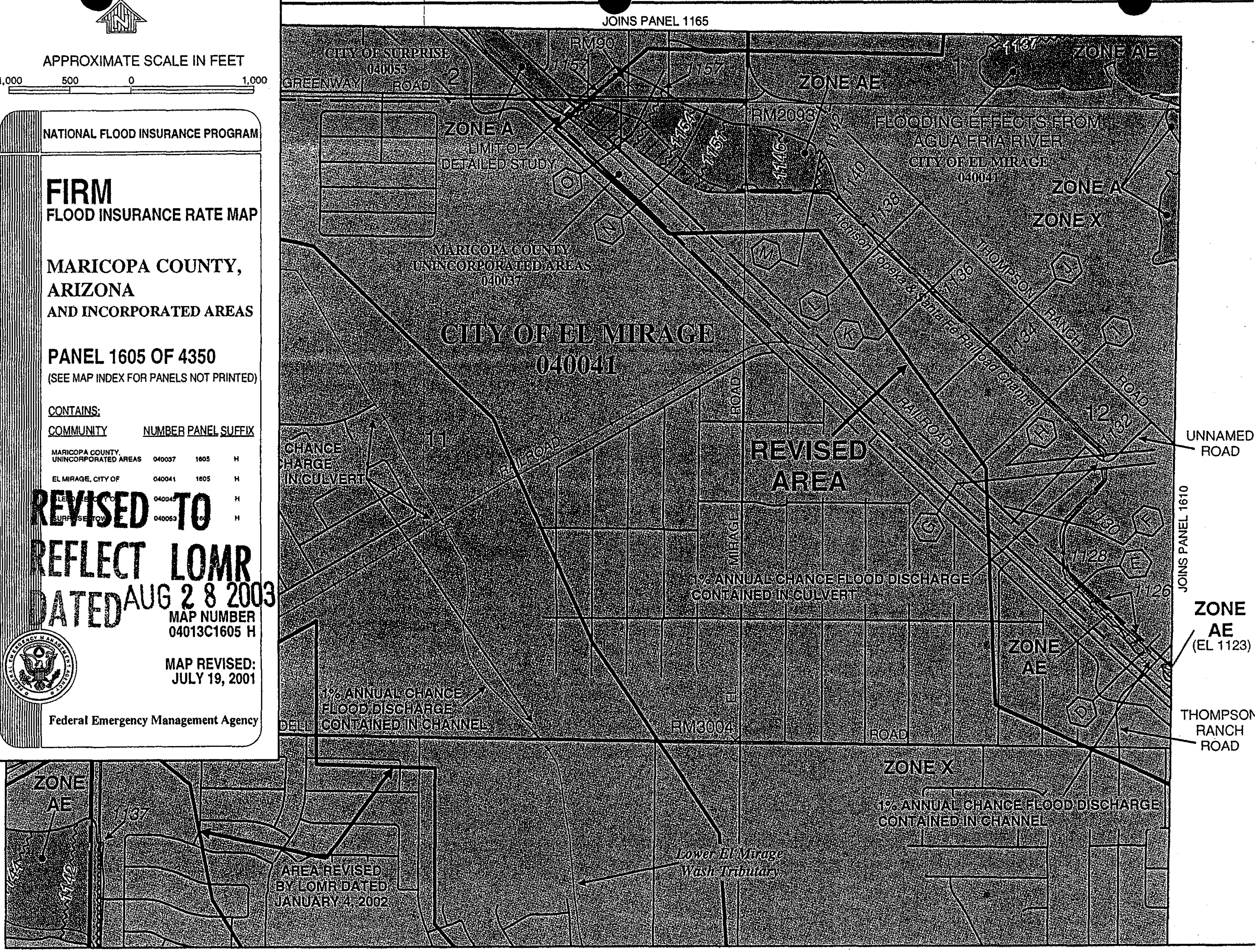
COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY, UNINCORPORATED AREAS	040037	1605	H
EL MIRAGE, CITY OF	040041	1605	H
[illegible]	040045	[illegible]	H
[illegible]	040053	[illegible]	H

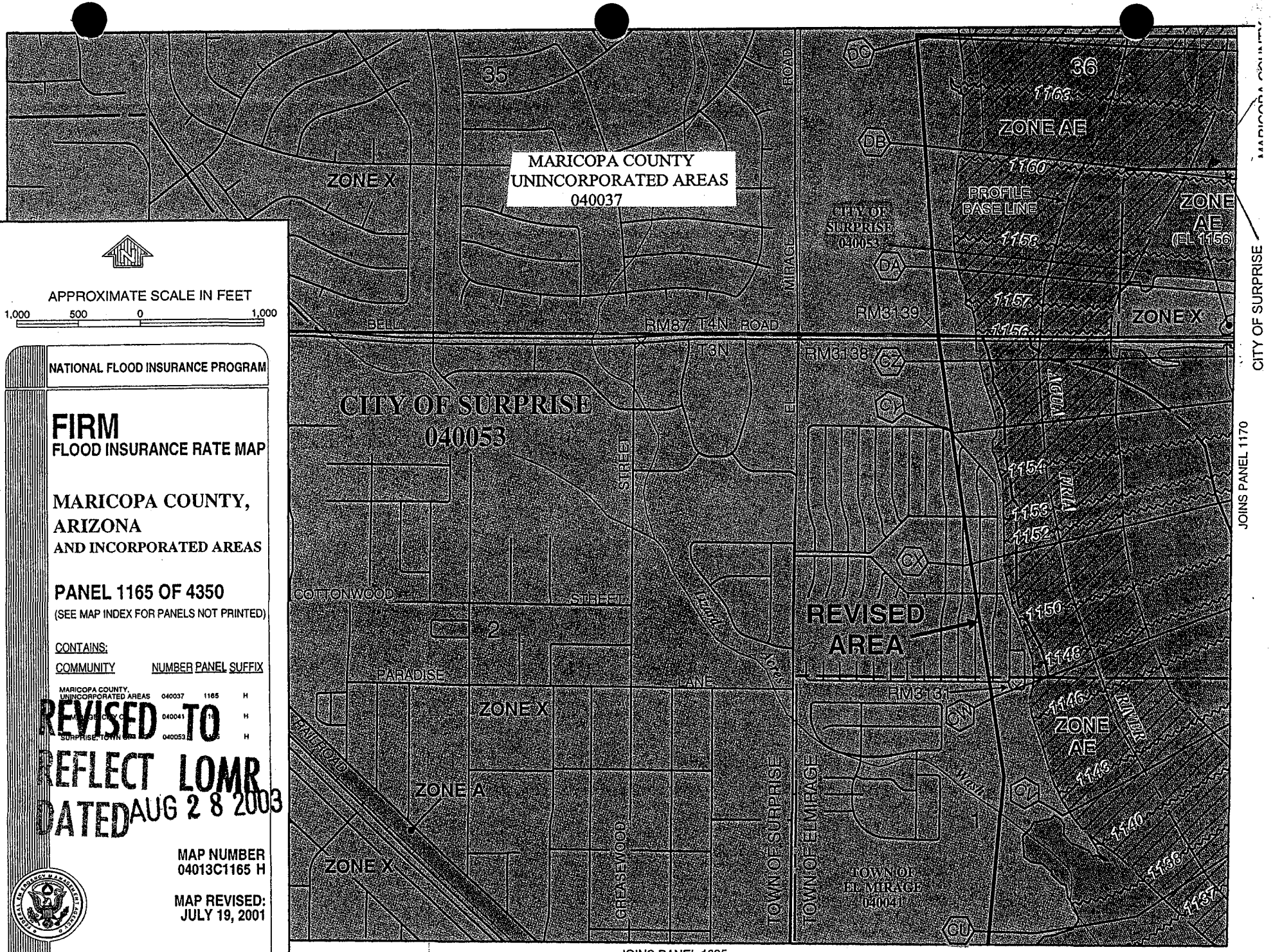
REVISED TO REFLECT LOMR DATED AUG 2 8 2003

MAP NUMBER
04013C1605 H

MAP REVISED:
JULY 19, 2001

Federal Emergency Management Agency





APPROXIMATE SCALE IN FEET

1,000 500 0 1,000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA
AND INCORPORATED AREAS

PANEL 1165 OF 4350
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

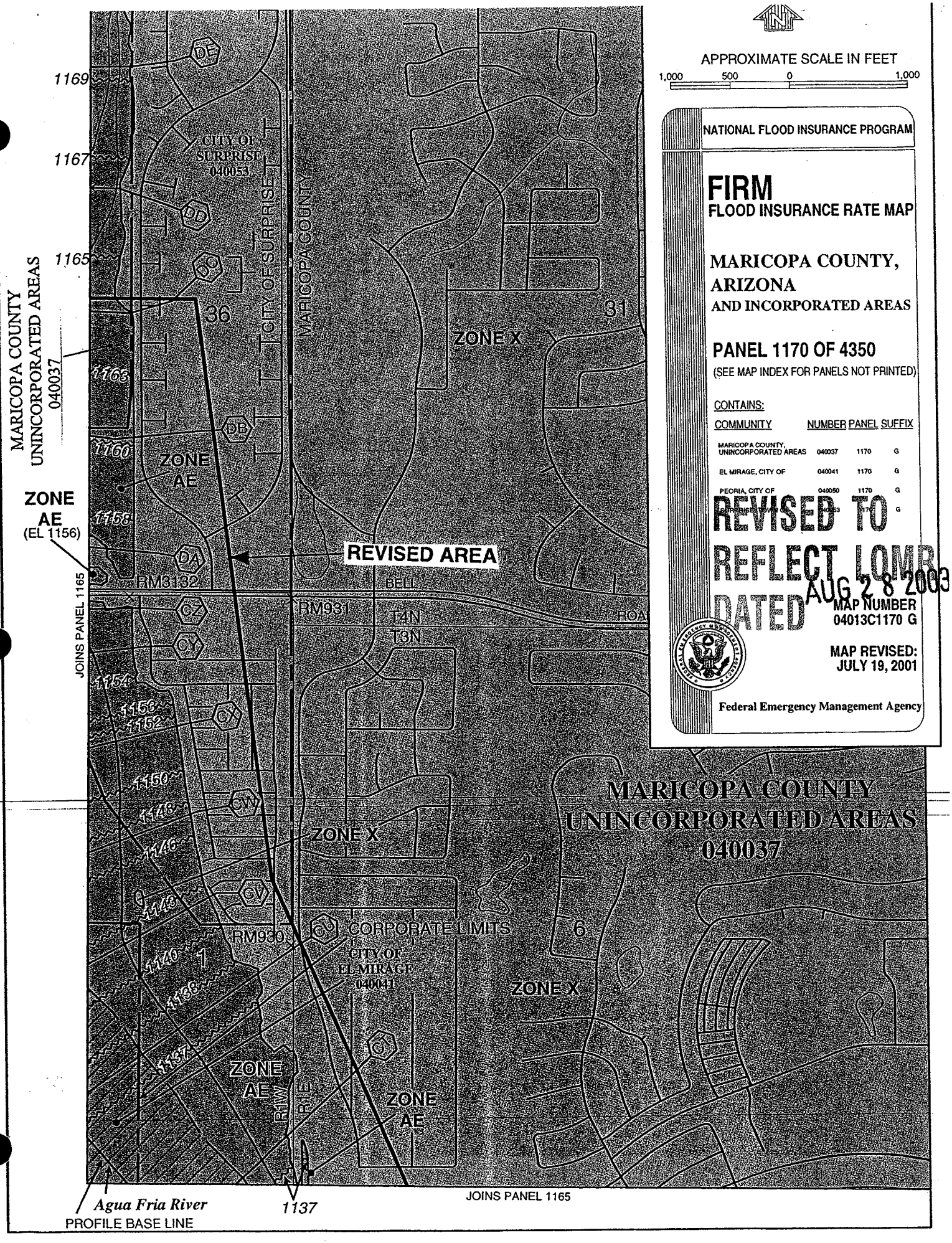
COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY, UNINCORPORATED AREAS	040037	1165	H
[illegible]	040041		H
SURPRISE, TOWN OF	040053		H

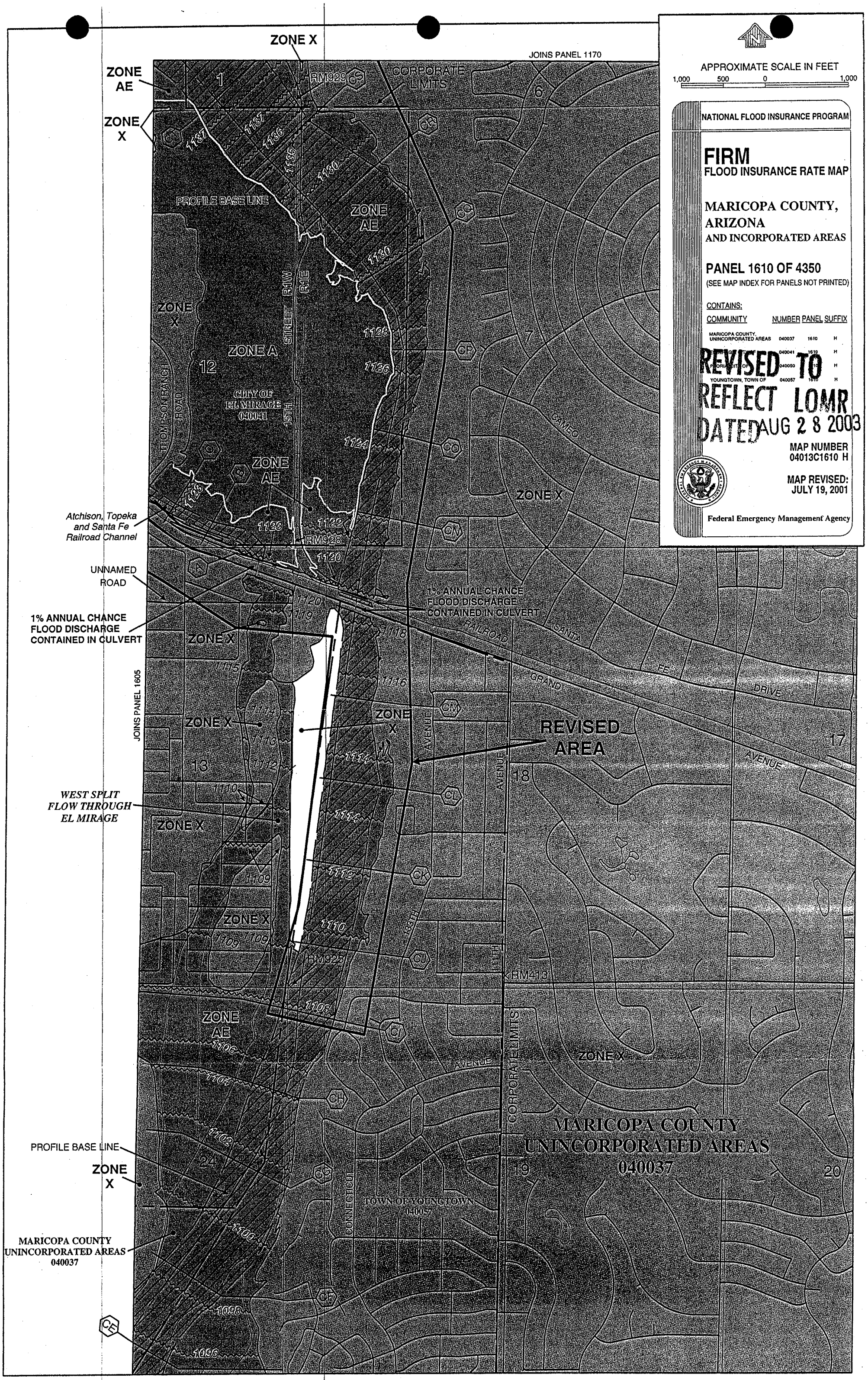
REVISED TO REFLECT LOMR DATED AUG 2 8 2003

MAP NUMBER
04013C1165 H

MAP REVISED:
JULY 19, 2001

Federal Emergency Management Agency


APPROXIMATE SCALE IN FEET
1,000 500 0 1,000
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
MARICOPA COUNTY, ARIZONA
AND INCORPORATED AREAS
PANEL 1170 OF 4350
(SEE MAP INDEX FOR PANELS NOT PRINTED)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
MARICOPA COUNTY, UNINCORPORATED AREAS 040037 1170 G
EL MIRAGE, CITY OF 040041 1170 G
PEORIA, CITY OF 040050 1170 G
REVISED TO REFLECT LOMR DATED AUG 28 2003
MAP NUMBER
04013C1170 G
MAP REVISED:
JULY 19, 2001
Federal Emergency Management Agency
MARICOPA COUNTY
UNINCORPORATED AREAS
040037
CITY OF SURPRISE
040053
MARICOPA COUNTY
CITY OF SURPRISE
MARICOPA COUNTY
UNINCORPORATED AREAS
040037
ZONE X
ZONE AE
ZONE AE (EL 1156)
REVISED AREA
RM3132
RM931
RM930
BELL
T4N
T3N
ROA
CORPORATE LIMITS
CITY OF EL MIRAGE
040041
ZONE AE
R1W
R1E
Agua Fria River
PROFILE BASE LINE
1137
JOINS PANEL 1165
JOINS PANEL 1165
1169
1167
1165
1163
1160
1158
1154
1156
1152
1150
1148
1146
1144
1140
1138
1136
36
31
6
1



APPROXIMATE SCALE IN FEET

1,000 500 0 1,000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA
AND INCORPORATED AREAS

PANEL 1610 OF 4350
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY, UNINCORPORATED AREAS	040037	1610	H
[illegible]	040041	1610	H
PEORIA, CITY OF	040050	[illegible]	H
YOUNGTOWN, TOWN OF	040057	1610	H

REVISED TO REFLECT LOMR DATED AUG 2 8 2003

MAP NUMBER
04013C1610 H

MAP REVISED:
JULY 19, 2001

Federal Emergency Management Agency

WEST
CONSULTANTS, INC.

California
11848 Bernardo Plaza Court,
Suite 140-B
San Diego, CA 92128-2418

858.487.9378
858.487.9448 Fax

Washington
12509 Bel-Red Road
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Bellevue, WA 98005-2535

425.646.8806
425.646.0570 Fax

Arizona
2151 East Broadway Road
Suite 116
Tempe, AZ 85282-1705

480.345.2155
480.345.2156 Fax

www.westconsultants.com

November 8, 2000

Michael Duncan
Maricopa Co. Flood Control District
2801 W. Durango St.
Phoenix, AZ 85009

RE: FCD Contract No. 1999C048 - Assignment No. 6
Agua Fria Floodplain Delineation and Sediment Transport Study

Dear Mike:

Enclosed are two CD-ROM's containing the final mapping and orthophotos for the Agua Fria River from Cactus to Happy Valley Rd. The data is in Arc-Info format as provided by DTM. Please pass the data to Eric Feldman for his approval.

Please contact me at (480) 345-2155 should you have any questions or need additional information.

Sincerely,

Gary E. Freeman, Ph.D., P.E.
Director, Water Resources Engineering

Enclosure

Hydraulics
Hydrology
Sedimentation
Water Quality
Erosion Control
Environmental Services

ENTIRE

DTM-DATABASED TERRAIN MAPPING, INC.
1075 E. Ft. Lowell Road, Suite A-1
Tucson, Arizona 85719-2159
(520) 292-2020
FAX (520) 888-4393

DATABASED TERRAIN MAPPING, INC.

TRANSMITTAL

TO: WEST CONSULTANTS

Attn: DENNIS RICHARDS

DATE: 12.13.2000
DTM Job# 20155
Client Job# FED 1999C048

Shipped VIA:
Shipping Date:
___Pages, including this page

The following items/documents are attached:

COPIES	DATE	DESCRIPTION
2		SETS of 1:7200 STEREO AERIAL PHOTOGRAPHY CONTACT PRINTS
		1 SET HAS BEEN ANNOTATED WITH THE SURVEY CONTROL POINT LOCATIONS AND NUMBERS.

REMARKS: WE ARE PROCEEDING WITH MAP DATA COLLECTION BEGINNING WITH THE AREA SOUTH OF GRAND AVE. ACAD FILES WILL BE FORWARDED AS THE EDITING IS COMPLETED.

COPY TO: FILE

SIGNED: LEE HARBERS

DTM-DATABASED TERRAIN MAPPING, INC.
1075 E. Ft. Lowell Road, Suite A-1
Tucson, Arizona 85719-2159
(520) 292-2020
FAX (520) 888-4393

DATABASED TERRAIN MAPPING, INC.

TRANSMITTAL

TO: WEST CONSULTANTS
2151 EAST BROADWAY ROAD
SUITE 116
TEMPE, AZ 85282-1705
Attn: DENNIS RICHARDS

DATE: 01.09.2001
DTM Job# 20155
Client Job# FCD # 1999C048

Shipped VIA: DELIVERED
Shipping Date:
___Pages, including this page

The following items/documents are attached:

COPIES	DATE	DESCRIPTION
1		SET OF 2 3.5" DISKETTES CONTAINING DATA IN ACAD FORMAT FOR FCD CONTRACT 1999C048 (AGUA FRIA). THE PRIMARY FILE NAMED "AGUAFRIA.ZIP" CONTAINS: PRELIM-T.DWG (TOPOGRAPHIC DATA) AND PRELIM-D.DWG (DIGITAL TERRAIN MODEL DATA
1		3.5" DISKETTE WITH EXCEL FILES FOR PHOTOGRAMMETRIC CONTROL POINTS (CTRL.XLS) AND ERM POINTS (FPCTLFCD.XLS)

REMARKS: ADDITIONAL TOPOGRAPHIC COVERAGE WILL BE FORWARDED BY 1.15.01 AS "PRELIMINARY" FILES TO AFFORD YOU WORKING DATASETS.

ALL PRELIMINARY FILES ARE ACCURATE BUT NOT NECESSARILY ASSEMBLED OR FORMATTED TO FCD SPEC'S.

COPY TO: FILE

SIGNED: LEE HARBERS

DTM-DATABASED TERRAIN MAPPING, INC.
1075 E. Ft. Lowell Road, Suite A-1
Tucson, Arizona 85719-2159
(520) 292-2020
FAX (520) 888-4393

TRANSMITTAL

TO: West Consultants

DATE: 01/26/01
DTM Job# 201FDS
Client Job# AQUA FRIA

Attn: Dennis Richards

Shipped VIA:
Shipping Date:
___Pages, including this page

The following items/documents are attached:

COPIES	DATE	DESCRIPTION
1		CD-ROM WITH TOPO. DWG & DTM IN ELECTRONIC FORMAT
		CDROM LABELED "01012-1403"
		"PRELIMINARY 2" DELIVERY"

REMARKS: FOR YOUR USE

COPY TO: File

SIGNED: Monka

DTM-DATABASED TERRAIN MAPPING, INC.
1075 E. Ft. Lowell Road, Suite A-1
Tucson, Arizona 85719-2159
(520) 292-2020
FAX (520) 888-4393

DATABASED TERRAIN MAPPING, INC.

TRANSMITTAL

TO: West Consultants

DATE: 2-13-01

DTM Job# 201515

Client Job# AQUA FRIA

Attn: Dennis Richards

Shipped VIA:

Shipping Date:

___Pages, including this page

The following items/documents are attached:

COPIES	DATE	DESCRIPTION
1		CD ROM WITH DIGITAL FILES OF "PREVIMINARY" 3A & 3B TOPO.DWG & DTM.DWG
		CD LABELED "010213_0808"

REMARKS: For Your Use

COPY TO: File

SIGNED: Monika

Subject: RE: Agua Fria
From: Michael Duncan - FCDX <mwd@mail.maricopa.gov>
Date: Wed, 7 Mar 2001 17:10:00 -0700
To: "James E. Heyen" <jheyen@westconsultants.com>
X-Mozilla-Status: 0011
X-Mozilla-Status2: 00000000
Received: from 156.42.103.142 (156.42.103.142) by mail07a.vwh1.net (RS ver 1.0.58s) with SMTP id 016875496 for <jheyen@westconsultants.com>; Wed, 7 Mar 2001 19:10:04 -0500 (EST)
Received: by mail.maricopa.gov with Internet Mail Service (5.5.2650.21) id <G3YRGDQA>; Wed, 7 Mar 2001 17:10:00 -0700
Message-ID: <C107355A9A0AD111B57E00A0C93691C20157EADF@MARICOPA_XCNG30>
MIME-Version: 1.0
X-Mailer: Internet Mail Service (5.5.2650.21)
Content-Type: text/plain; charset=us-ascii; format=flowed
X-Loop-Detect: 1
X-UIDL: 1e5ff9c43a10ed71b35a0c0e92c04d74
Content-transfer-encoding: 7bit

That is from our study no. FCD 95-05. The CD that I gave you on 10-30-00 has topographic mapping from this study.
We do not have exact CADD files, but we do have the information in our GIS database. Would you need the cross-sections? And what else?

-----Original Message-----
From: James E. Heyen [mailto:jheyen@westconsultants.com]
Sent: Wednesday, March 07, 2001 4:13 PM
To: Michael Duncan - FCDX
Subject: Agua Fria

Mike,

Another question for you on Agua Fria. I was able to find the Coe & Van Loo 1995 study from which the RAS model is being produced. I'm wondering if there would be an electronic copy of the work maps available from that study? The hard copy of the work maps are in pretty good condition and I can get cross section locations from it, although it would still be easier if there was an electronic copy available.

Thanks,
James

--
James E. Heyen, E.I.T.
Hydraulic Engineer
WEST Consultants, Inc.
2151 E. Broadway Road - Suite 116
Tempe, AZ 85282-1705
(480) 345-2155 Phone
(480) 345-2156 Fax
Visit our web site at http://www.westconsultants.com

"For every difficult, intricate, complex, perplexing problem there is a simple, elegant, obvious, clear, direct, wrong answer."

Subject: FW: agua fria ras conversion
From: Michael Duncan - FCDX <mwd@mail.maricopa.gov>
Date: Fri, 9 Mar 2001 10:33:23 -0700
To: "James Heyen (E-mail)" <jheyen@westconsultants.com>
X-Mozilla-Status: 0001
X-Mozilla-Status2: 00000000
Received: from 156.42.103.142 (156.42.103.142) by mail07b.vwh1.net (RS ver 1.0.58s) with SMTP id 0791818 for <jheyen@westconsultants.com>; Fri, 9 Mar 2001 12:33:37 -0500 (EST)
Received: by mail.maricopa.gov with Internet Mail Service (5.5.2650.21) id <GS7LYQS8>; Fri, 9 Mar 2001 10:33:33 -0700
Message-ID: <C107355A9A0AD111B57E00A0C93691C20157EAE7@MARICOPA_XCNG30>
MIME-Version: 1.0
X-Mailer: Internet Mail Service (5.5.2650.21)
X-Loop-Detect: 1
Status: U
X-UIDL: 9a949223a1f23bbc9a314817b421a92e:a6
Content-transfer-encoding: 7bit

James, here is the latest version of the HEC-2 to HEC-RAS conversion (still in process) for the Coe and Van Loo flood insurance study for the Agua Fria River.

-----Original Message-----
From: Dave Degerness - FCDX
Sent: Friday, March 09, 2001 10:30 AM
To: Michael Duncan - FCDX
Subject: agua fria ras conversion

<<Agua Fria 03-06-01.zip>>

Attachment Converted: "c:\docume~1\jamesh\applic~1\qualcomm\eudora\attach\Agua Fria 03-06-01.zip"

Subject: FW: DXF files for the Agua Fria River
From: Michael Duncan - FCDX <mwd@mail.maricopa.gov>
Date: Fri, 9 Mar 2001 14:57:30 -0700
To: "James Heyen (E-mail)" <jheyen@westconsultants.com>
X-Mozilla-Status: 0001
X-Mozilla-Status2: 00000000
Received: from 156.42.103.142 (156.42.103.142) by mail07b.ywh1.net (RS ver 1.0.58s) with SMTP id 0898654 for <jheyen@westconsultants.com>; Fri, 9 Mar 2001 16:57:31 -0500 (EST)
Received: by mail.maricopa.gov with Internet Mail Service (5.5.2650.21) id <GS7LYWD0>; Fri, 9 Mar 2001 14:57:31 -0700
Message-ID: <C107355A9A0AD111B57E00A0C9369FC20157EAE9@MARICOPA_XCNG30>
MIME-Version: 1.0
X-Mailer: Internet Mail Service (5.5.2650.21)
X-Loop-Detect: 1
Status: U
X-UIDL: a958a72e298a06da06545a74b0ec9153 a7
Content-transfer-encoding: 7bit

here are the three related files

<<fpxfcd95_05.dxf>> <<fpbln95_05.dxf>> <<fpxfcd89_50.dxf>>

-----Original Message-----
From: Steve Bruffy - FCDX
Sent: Friday, March 09, 2001 1:03 PM
To: Michael Duncan - FCDX
Subject: DXF files for the Agua Fria River

Michael,

I put your DXF files for the Agua Fria River on the share drive under MikeD. I got the cross-sections and baseline for FCD 95-05 "Agua Fria Floodplain Restudy" and I also got the cross-sections for the area of Grand and Greenway from FCD 89-50 "White Tanks - Agua Fria ADMP". There was no baseline data for that area. Let me know if there's anything else.

Attachment Converted:
"c:\docume~1\jamesh\applic~1\qualcomm\eudora\attach\fpxfcd95_05.dxf"

Attachment Converted:
"c:\docume~1\jamesh\applic~1\qualcomm\eudora\attach\fpbln95_05.dxf"

Attachment Converted:
"c:\docume~1\jamesh\applic~1\qualcomm\eudora\attach\fpxfcd89_50.dxf"

DTM-DATABASED TERRAIN MAPPING, INC.
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Tucson, Arizona 85719-2159
(520) 292-2020
FAX (520) 888-4393

DATABASED TERRAIN MAPPING, INC.

TRANSMITTAL

TO: West Consultants

DATE: 3-16-01

DTM Job# 2015F5

Client Job#

Attn: Gary Freeman

Shipped VIA:

Shipping Date:

___Pages, including this page

The following items/documents are attached:

COPIES	DATE	DESCRIPTION
2		SETS OF BLUELINES OF TOPO
1		SET OF TOPO VELLUM PLOTS
1		SURVEY REPORT
1		CD ROM LABELED "010308_0656"
		DIGITAL FILES OF TOPO, DTM IN
		AUTOCAD FORMAT
2		CD ROM WITH DIGITAL FILES OF TIF & TFW
		T03NR01ES061081 THRU T04NR01WS361081
		CD LABELED "010316_1114 & 010316_1114"

REMARKS: FOR YOUR USE

COPY TO: FILE

SIGNED: Monika

Subject: 500 cfs is OK for the trib along railroad
From: Michael Duncan - FCDX <mwd@mail.maricopa.gov>
Date: Tue, 17 Apr 2001 17:55:31 -0700
To: "'jheyen@westconsultants.com'" <jheyen@westconsultants.com>
CC: "Gary Freeman (E-mail)" <gfreeman@westconsultants.com>
X-Mozilla-Status: 0001
X-Mozilla-Status2: 00000000
Received: from mail.maricopa.gov (156.42.103.174) by mail07a.vwh1.net (RS ver 1.0.58s) with SMTP id 02063027; Tue, 17 Apr 2001 20:55:35 -0400 (EDT)
Received: by mail.maricopa.gov with Internet Mail Service (5.5.2653.19) id <J1NL7DLH>; Tue, 17 Apr 2001 17:55:34 -0700
Message-ID: <C107355A9A0AD111B57E00A0C93691C2015ZEB3A@MARICOPA_XCNG30>
MIME-Version: 1.0
X-Mailer: Internet Mail Service (5.5.2653.19)
Content-Type: text/plain; charset=us-ascii; format=flowed
X-Loop-Detect: 1
X-UIDL: acaa24158276bc8296b861eac26da1c11a
Content-transfer-encoding: 7bit

The White Tanks Area Drainage Master Study by WLB has 483 cfs at the top end of this trib. floodplain. The 435 cfs, that I mentioned earlier today, is from the Flood Insurance Study, and is at the point where the trib. flows into the Agua Fria. The existing model by CVL uses 500 cfs.

It is OK to use 500 cfs.

DTM-DATABASED TERRAIN MAPPING, INC.
1075 E. Ft. Lowell Road, Suite A-1
Tucson, Arizona 85719-2159
(520) 292-2020
FAX (520) 888-4393

DATABASED TERRAIN MAPPING, INC.

TRANSMITTAL

TO: West Consultants

DATE: 4-19-01
DTM Job# 20155
Client Job# FCD1999C048

Attn: Dennis Richards

Shipped VIA:
Shipping Date:
___Pages, including this page

The following items/documents are attached:

COPIES	DATE	DESCRIPTION
2		CD ROMS WITH GIS DATA TO BE SUBMITTED TO ERIC FELDMAN AT FCDMC FOR APPROVAL

REMARKS: Arc Info Format

COPY TO: File

SIGNED: Monika

Subject: Hydrology flows for tributary to Agua Fria
From: Michael Duncan - FCDX <mwd@mail.maricopa.gov>
Date: Thu, 10 May 2001 12:37:19 -0700
To: "'gfreeman@westconsultants.com'" <gfreeman@westconsultants.com>
CC: "James Heyen (E-mail)" <jheyen@westconsultants.com>
X-Mozilla-Status: 0001
X-Mozilla-Status2: 00000000
Received: from 156.42.103.174 (156.42.103.174) by mail07b.vwh1.net (RS ver 1.0.60s) with SMTP id 03571160; Thu, 10 May 2001 15:37:22 -0400 (EDT)
Received: by maricopa_xcng2.maricopa.gov with Internet Mail Service (5.5.2653.19) id <K25MP40X>; Thu, 10 May 2001 12:37:21 -0700
Message-ID: <C107355A9A0AD111B57E00A0C93691C20157EB5D@MARICOPA_XCNG30>
MIME-Version: 1.0
X-Mailer: Internet Mail Service (5.5.2653.19)
Content-Type: text/plain; charset=us-ascii; format=flowed
X-Loop-Detect: 1
X-UIDL: 704a108ead8c3a982a238e889a1d755b 2a
Content-transfer-encoding: 7bit

I have decided to use the existing flowrates of the existing floodplain study.

The study calls it "Atchison ,Topeka, and Santa Fe RR Channel", or Wash 12 (ref: White Tanks Area Drainage Master Study).

The dividing line is at 0.4-miles-upstream (I think this is approximately at Thompson Ranch Road) of the culvert under the railroad.

Upstream of this point, the Q is 483 cfs

Downstream of this point, all the way to the Agua Fria, the Q is 577 cfs

FLOOD CONTROL DISTRICT
OF
MARICOPA COUNTY

2801 West Durango Street
Phoenix, Arizona 85009
Telephone (602)506-1501
Fax (602)506-7346
TDD (602)506-5897

FLOODPLAIN ~~MANAGEMENT~~ DELINEATION BRANCH

To: JAMES HEYEN

Company or Department: WEST CONSULTANTS

Fax Number: 480-345-2156

From: MIKE DUNCAN Date: 10-15-01

Number of pages being sent including cover sheet: 3

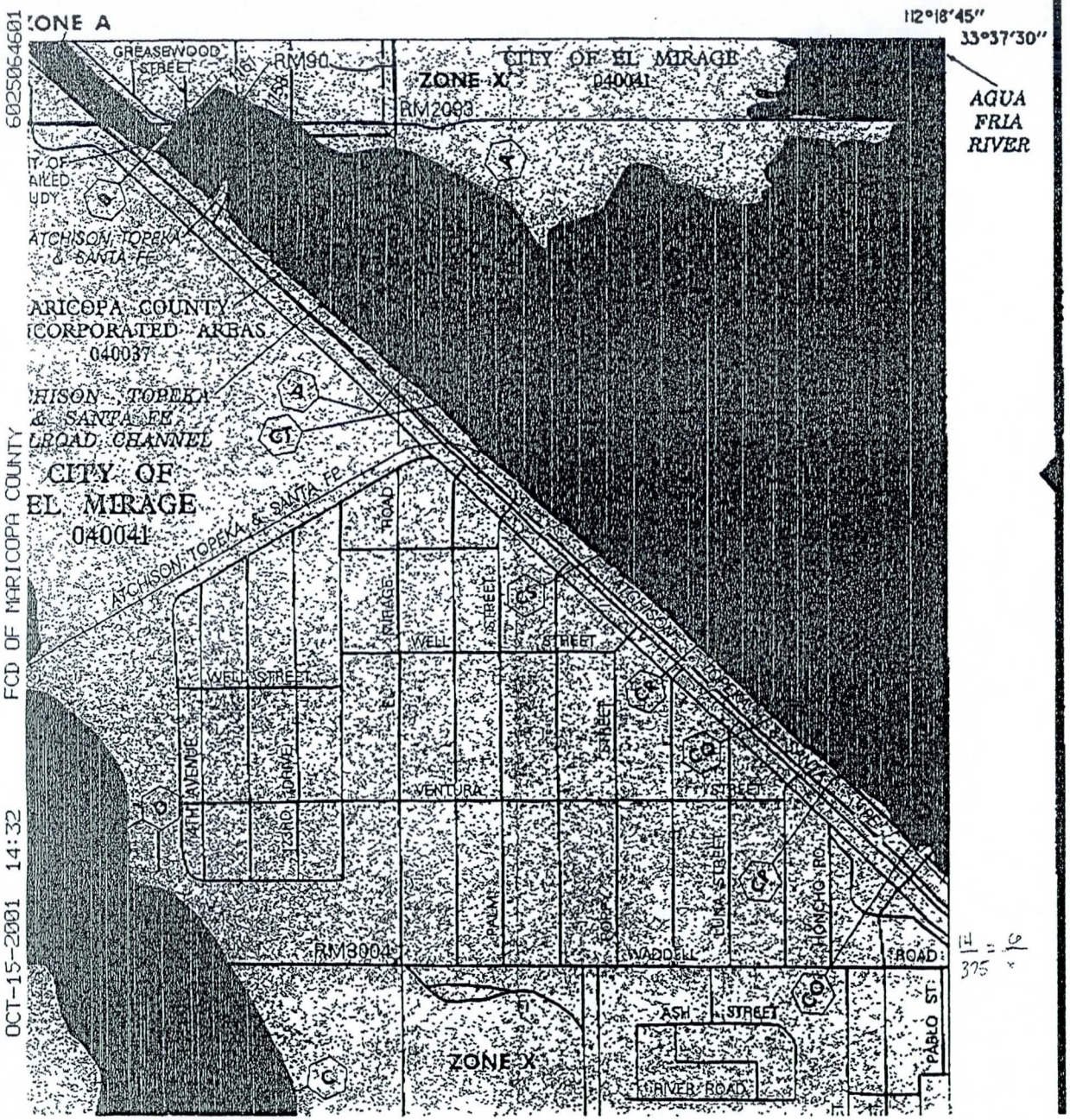
If there are any problems or questions, please call (602)506-1501

Comments:

HERE ARE TWO PORTIONS OF F.I.R.M. PANEL # 1605

SHOWING THE EXISTING FLOODPLAIN & FLOODWAY OF THE TRIBUTARY.

THE UPSTREAM END OF THE NEW FLOODPLAIN WILL NEED TO TIE INTO THE EXISTING FLOODPLAIN.



LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

- **ZONE A** — No base flood elevations determined.
- **ZONE AE** — Base flood elevations determined.
- **ZONE AH** — Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
- **ZONE AO** — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE A99** — To be protected from 100-year flood by Federal flood protection system under construction ; no base flood elevations determined.
- **ZONE V** — Coastal flood with velocity hazard (wave action); no base flood elevations determined.
- **ZONE VE** — Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

- **ZONE X** — Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

- **ZONE X** — Areas determined to be outside 500-year floodplain.
- **ZONE D** — Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS

Identified 1983 | Identified 1990 | Otherwise Protected Areas

Coastal barrier areas are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain Boundary
- Floodway Boundary
- Zone D Boundary
- Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.
- 513 — Base Flood Elevation Line; Elevation in Feet. See Map Index for Elevation Datum.

To determine if flood insurance is available, contact an insurance agent or call the National Flood Insurance Program at (800) 638-6620.

APPROXIMATE SCALE IN FEET

1000 0 1000

MAP ROOM 1605 H

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 1605 OF 4350

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EL MIRAGE, CITY OF	040041	1605	H
GLENDALE, CITY OF	040045	1605	H
MARICOPA COUNTY, UNINCORPORATED AREAS	040037	1605	H
SURPRISE, CITY OF	040053	1605	H
YOUNGTOWN, TOWN OF	040057	1605	H

MAP NUMBER
04013C1605 H

MAP REVISED:
JULY 19, 2001

Federal Emergency Management Agency

TOTAL P.03

Subject: RE: Agua Fria Question
From: Michael Duncan - FCDX <mwd@mail.maricopa.gov>
Date: Mon, 3 Dec 2001 13:19:03 -0700
To: "James Heyen" <jheyen@westconsultants.com>
X-UIDL: 160
X-Mozilla-Status: 0011
X-Mozilla-Status2: 00000000
Return-Path: <mwd@mail.maricopa.gov>
Received: from maricopa_xcng2.maricopa.gov (mail.maricopa.gov [156.42.103.174] (may be forged)) by monty.bcentralhost.com id PAA03373 for <jheyen@westconsultants.com>; Mon, 3 Dec 2001 15:19:30 -0500 (EST) [ConcentricHost SMTP MX 1.27]
Errors-To: <mwd@mail.maricopa.gov>
Received: by maricopa_xcng2.maricopa.gov with Internet Mail Service (5.5.2653.19) id <YFYQP049>; Mon, 3 Dec 2001 13:19:10 -0700
Message-ID: <C107355A9A0AD111B57E00A0C93691C20157ECB8@MARICOPA_XCNG30>
MIME-Version: 1.0
X-Mailer: Internet Mail Service (5.5.2653.19)
Content-Type: text/plain; charset="iso-8859-1"
X-UIDL: 160

There are three communities involved:
Surprise = 040053 El Mirage = 040041 Unincorporated Maricopa County = 040037

Put me as local tech. reviewer: Michael Duncan, P.E. (602) 506-4732

I need just one copy of your first submittal of the TDN.

At Task 11 of the scope, the "two" in the first sentence should be deleted. When the TDN is ready to send to FEMA, I will need 4 copies, as it says at 4 of the items under Task 11. [It is 4 copies because I will give copies to Surprise and El Mirage, send one to FEMA, and have one for me.]

-----Original Message-----
From: James Heyen [mailto:jheyen@westconsultants.com]
Sent: Monday, December 03, 2001 12:03 PM
To: Michael Duncan - FCDX
Subject: Agua Fria Question

Mike,

The TDN is all but finished, but I have a couple of small pieces of information I wonder if you could provide me with. In the ADWR/FEMA forms, I need the community name and number. Also, I assume you are to be the "Local Technical Reviewer"?

I believe once I have these pieces of information, the TDN will be complete minus the final assembly. Would you like one copy delivered to you for review? I imagine I could have it in your hands by the middle of the week. Upon your approval, the deliverables of Task 11 in the final SOW could then be delivered.

Feel free to either reply to this email or phone me - I'm in the office all day today.

Thanks,
James

--

James E. Heyen, E.I.T.
Hydraulic Engineer
WEST Consultants, Inc.
2151 E. Broadway Road - Suite 116
Tempe, AZ 85282-1705
(480) 345-2155 Phone
(480) 345-2156 Fax
Visit our web site at http://www.westconsultants.com

"As water reflects a face,
so a man's heart reflects the man."
- King Solomon

Subject: RE: Agua Fria LOMR "packet"
From: Michael Duncan - FCDX <mwd@mail.maricopa.gov>
Date: Mon, 17 Dec 2001 09:54:52 -0700
To: "James Heyen" <jheyen@westconsultants.com>
X-UIDL: 219
X-Mozilla-Status: 0013
X-Mozilla-Status2: 00000000
Return-Path: <mwd@mail.maricopa.gov>
Received: from maricopa_xcng2.maricopa.gov (mail.maricopa.gov [156.42.103.174] (may be forged)) by monty.bcentralhost.com id LAA06025 for <jheyen@westconsultants.com>; Mon, 17 Dec 2001 11:55:07 -0500 (EST) [ConcentricHost SMTP MX 1.27]
Errors-To: <mwd@mail.maricopa.gov>
Received: by maricopa_xcng2.maricopa.gov with Internet Mail Service (5.5.2653.19) id <Y2QGZS82>; Mon, 17 Dec 2001 09:55:07 -0700
Message-ID: <C107355A9A0AD111B57E00A0C9369FC20157ECD2@MARICOPA_XCNG30>
MIME-Version: 1.0
X-Mailer: Internet Mail Service (5.5.2653.19)
Content-Type: text/plain; charset="iso-8859-1"
X-UIDL: 219

James, I can scan our copies of the affected FIRMs and give you tif files of them. Would that be any help to you?

-----Original Message-----
From: James Heyen [mailto:jheyen@westconsultants.com]
Sent: Monday, December 17, 2001 9:52 AM
To: Michael Duncan - FCDX
Subject: Re: Agua Fria LOMR "packet"

Mike,

Thanks for checking. I can give you a packet this week, probably either tomorrow or wednesday at the latest. It will include all of the items required with the exception of annotated flood insurance rate maps. I've been unable to locate our Maricopa County FIRM key map from FEMA indicating which maps we need, so I haven't ordered them yet. I should be able to do this on-line, but their web site has been less than accommodating. If you happen to have a list of the impacted FIRMs handy, that could cut down on the turn-around time for this last item. Once I have the FIRMs in hand, it will not take long to annotate them - perhaps a day. At present, I believe I only have some plotting and assembly work remaining before I can deliver the packet to you this week.

Appreciate your patience,
James

Michael Duncan - FCDX wrote:

> When do you think that I might receive the Agua Fria LOMR packet?
>
> .

--
James E. Heyen, E.I.T.
Hydraulic Engineer
WEST Consultants, Inc.

2151 E. Broadway Road - Suite 116
Tempe, AZ 85282-1705
(480) 345-2155 Phone
(480) 345-2156 Fax
Visit our web site at http://www.westconsultants.com

"As water reflects a face,
so a man's heart reflects the man."
- King Solomon

B.5 Contract Documents

FLOOD CONTROL DISTRICT of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009
(602) 506-1501
Fax (602) 506-4601

254A04

LETTER OF TRANSMITTAL

TO: Dennis Richards, Vice President
WEST Consultants, Inc.
2151 E. Broadway Road, Suite 116
Tempe, AZ 85282-1705

November 7, 2001

SUBJECT: Contract No. 1999C048
Assignment No. 6
Agua Fria Floodplain Delineation and Sediment Transport Study

WE ARE SENDING YOU THE FOLLOWING ITEMS:
( ) Enclosed ( ) Under separate cover

	Shop Drawings	Prints	Legal Description	Samples
	Specification	Change Order	Copy of Letter	Plans
X	Notice to Proceed			
X	Certificate of Performance			
X	Scope of Work			

THESE ARE TRANSMITTED:

	For Approval	Approved as submitted
X	For your use	Approved as noted
	As requested	Returned for corrections
	Resubmit ( ) copies for approval	For review and comments
	Submit ( ) copies for distribution	Return ( ) corrected prints
	FOR ESTIMATE DUE:	Borrowed prints being returned

Remarks: Please specify assignment number on all correspondence.

SIGNED: Michael Duncan

Michael Duncan
Project Manager

FLOOD CONTROL DISTRICT of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009
(602) 506-1501
Fax (602) 506-4601

NOTICE TO PROCEED

TO: Dennis Richards, Vice President
WEST Consultants, Inc.
2151 E. Broadway Road, Suite 116
Tempe, AZ 85282-1705

November 7, 2001

SUBJECT:

PCN	00109.02.00
FCD Contract No.	1999C048
Assignment No.	6

Agua Fria Floodplain Delineation and Sediment Transport Study

Your not-to-exceed cost estimate of $153,502.00 for Assignment No. 6 has been received and accepted for this project with a completion date of 7/5/02. You are hereby authorized to proceed with the work for the referenced project as originally described in the Scope of Work. Please specify the contract title, contract number, assignment number, and the dates of the completed service on all related correspondence, including the invoice. Send the invoices and certificates of performance to the attention of Finance Department, Flood Control District of Maricopa County. The certificate of performance must be dated on or after the final invoice date and must accompany the final invoices.

The original completion date of 10/5/01 for this assignment is extended to 7/5/02, and the original cost of $ 149,924.00 is increased to $ 153,502.00, to include additional work within the original scope. The scope is as follows: Delineate approx. 2 miles of Agua Fria floodplain from Bell Rd. to downstream of Grand Av. Delineate floodplain of tributary that is at Grand Av. and northwest of El Mirage Rd. Perform aerial mapping for 2-ft-contour topo. for 6000 ft. wide by 8.25 miles along the Agua Fria River. Construct three HEC-6T sediment transport models, for 1964-65 topo., 1982-83 topo., and new 2000 topo., for 10 river-miles of the Agua Fria River from Cactus Rd. to Jomax Rd. Review and evaluate sediment transport model for 1995 topo. by others.

If at any time during the project assignment a material change in the scope of services to be provided occurs, causing an increase in the original cost estimate shown here, you must provide the District with a written explanation of the additional work along with an estimate of additional costs. No additional work shall commence prior to written authorization by the District. No claims for additional work shall be accepted that have not received prior District approval.

SIGNED: Michael Duncan

Michael Duncan
Project Manager

11/8/01

Michael S. Ellegood, P.E.
Chief Engineer and General Manager

Copy to: LRH (Finance)

COORD: BCHR BAR TMM

INFO: DAW JJT

FILE: 1999C048

Certificate of Performance of Engineering Open Order Contract and Payment of All Claims

I, _____, hereby certify to the Flood Control District of Maricopa County (FCDMC) that all lawful claims for labor, rental of equipment, material used, and any other claims by company, or its subcontractors in connection with the specific assignment described below and as authorized by the terms of the FCDMC Contract 1999C048 have been paid.

Company understands that with receipt of payment for previously invoiced amounts plus any retained funds, that this is a settlement of all claims of every nature and kind against the FCDMC arising out of the performance of the FCDMC's specific assignment through FCDMC Contract 1999C048 for Assignment No. 6 relating to the material, equipment, and work covered in and required by the contract.

The undersigned hereby certifies that to his/her knowledge, no contractual disputes exist in regard to this contract and that he/she has no knowledge of any pending or potential claims in regard to this contract.

Upon submission of this document and a separate invoice for any retained funds to the FCDMC, invoice processing will be completed within forty-five (45) calendar days.

Signed the _____ day of _____, 200__.

_____

Signature

Title: _____

SCOPE OF WORK
September 19, 2000

AGUA FRIA FLOODPLAIN DELINEATION AND SEDIMENT TRANSPORT STUDY FROM CACTUS ROAD TO JOMAX ROAD

FCD Contract No. 1999C048
Assignment #6

GENERAL

This Scope of Work outlines the tasks required to perform a sediment transport analysis of the Agua Fria River from Cactus Road to Jomax Road, a distance of approximately ten miles; and a letter of map revision (LOMR) from downstream of Grand Avenue to approximately Bell Road, a distance of approximately two miles. As part of the study, new topographic mapping will be obtained from Cactus Road to Happy Valley Road.

The purpose of the sediment transport analyses will be to construct a numerical model that may be used for predictive analysis and also function as a management tool. The sediment transport model would serve to evaluate potential effects on channel stability of sand and gravel mining operations and conceptual protection measures (i.e., proposed berms, setback buffers, etc.) in the vicinity of sand and gravel mining operations. The model may provide a basis for developing permitting guidelines and requirements. The topographic data in the initial baseline sediment transport model will be based on an initial baseline period (1964-65 topography), with results compared to an interim period (1982-83 topography) and current conditions (2000 topography). The management tool or predictive sediment transport model will based on current conditions (2000 topography). Information and modeling contained in the report titled "Agua Fria Sediment Transport Study", by Arizona State University,1994 (based on 1987 topography) will be used to the extent possible. Current conditions will be based on the new topographic information obtained as part of this study. In addition, the sediment transport analysis currently being performed (based on 1995 topography) for the Agua Fria Watercourse Master Plan will be reviewed and evaluated for possible inclusion of supplemental data and confirmation of results.

The letter of map revision will be performed for a reach of the Agua Fria River from downstream of Grand Avenue to approximately Bell Road. In addition, it will also encompass the tributary flow that is north of Grande Avenue from northwest of El Mirage Road to the Floodway District of the revised The HEC-RAS model prepared for the Agua Fria Watercourse Master Plan (which is based on the current FIS) will be provided by the District. Cross section location and orientation of this model will be reviewed and modified, if necessary. In addition, relevant information for a letter of map revision being prepared by others for a tributary west located north of Grand Avenue and west of the Agua Fria River will be incorporated within this study.

Phase II (Floodplain Delineation) will be the priority and will be ready for submittal to FEMA by December 31, 2000. All work (Phase I and Phase II) is to be completed by June 30, 2001.

TASKS

Phase I. (Tasks 1 – 9)

Task 1. Coordination. Participate in regular coordination meetings with the District's Project Manager and in milestone coordination meetings in the development of the floodplain delineation and the sediment transport analyses. Prepare minutes of any meetings. Submit monthly progress reports that provide a description of the work accomplished during the reporting month, a brief description of the work to be accomplished the following month, and a description of any problems encountered.

Right-of-entry is to be obtained by the District for obtaining sediment samples. Otherwise data from the Agua Fria Water Course Master Plan will be utilized for this study.

Task 2. Data Collection. Collect and review the available hydrologic, hydraulic, sediment size, and topographic information for the reach of the Agua Fria River from approximately Cactus Road to upstream of Jomax Road. This will include, but not be limited to, the following:

- Peak discharge-frequency relationships for the project reach
- Hydrographs for various flood frequencies within the project reach
- Historical flow data, including recorded mean daily flows, peak flows, instantaneous flood hydrogaphs
- Historical flow release data from New Waddell Dam upstream of the project area
- Sediment size distributions
- Profile and cross-sectional data (current and historic)
- Historical aerial photography
- Previous and/or current floodplain studies, sediment transport studies, mining plans, etc.
- Plans for utility and bridge crossings (both existing and planned) of the Agua Fria River upstream, downstream, and through the project reach
- Contact Central Arizona Project (CAP) regarding available sediment data.
- Identification of sediment supply at various time periods.
- Mining operation data, including timing of removals and quantity of material removed, both within the project limits and in the regional area for comparison purposes

Task 3. Field Reconnaissance/Site Visits. Conduct field investigation, as required, to verify collected information, supplement available data, and become familiar with the physical environment of the study reach. Document the variation in general geologic, vegetative, sediment size and channel capacity characteristics along the study reach. Document all structural features (bridges, culvert outlets, utility crossings, bank

protection, etc.) and other flood control activities occurring along the project reach, and identify conditions at locations affected by activities of man. Locations for obtaining sediment samples will be identified during the initial field investigation.

Task 4. Topographic Mapping and Control Survey. To be performed by Databased Terrain Mapping, Inc. (DTM). See Attached Scope of Work.

Task 5. Qualitative Geomorphic Analysis. Examine the fluvial history of the Agua Fria River study area. Analyze available aerial photographs. Review and quantify changes to profile gradient, historical channel pattern, flow regime, and bank stability. Divide the study reach into subreaches based on common characteristics, and estimate the long and short-term channel stability trends expected along each subreach. Qualitatively evaluate lateral migration trends. Principals of fluvial geomorphology and engineering geomorphics will be utilized to establish past, present and future trends of the Agua Fria River system within the study reach.

Task 6. Hydrology. Hydrology for the study reach will be based on available water discharge values and runoff hydrograph information for the Agua Fria River and contributing tributaries. A long-term hydrologic database will be prepared for input into the sediment transport numerical model. This flow series will be developed primarily from available water data information obtained from the U.S. Geological Survey, U.S. Army Corps of Engineers, and the Flood Control District of Maricopa County. In addition, frequency flow data, representative of floods with the 2-, 5-, 10-, 25-, 50-, and 100-year frequency along the river system will be assembled. Study will consider that releases from the New Waddell Dam will be clear water releases. It is anticipated that discharge-frequency information will be available from the U.S. Army Corps of Engineers' report: "Agua Fria River Study, New Waddell Dam to Gila River Confluence, Arizona, Hydrologic Evaluation of Impacts of New Waddell Dam on Downstream Peak Discharges in the Agua Fria River," July 1995.

Task 7. Hydraulics. Hydraulic (HEC-2 or HEC-RAS) models will be provided by the District for baseline and intermediate conditions. However, a new model will need to be developed for the 2000 current conditions. Hydraulic models will be calibrated to the extent possible based on available flow data and water surface elevation data. Channel roughness coefficients, "n" values, will be verified to insure that they are representative of those within the provided models and that the model is compositing them correctly based upon channel back stationing.

Task 8. Sediment Transport Analysis. Sediment transport analyses will be performed using the HEC-6T computer program. This model simulates bed elevation changes resulting from the effect of sequential water flow and sediment flow input data. Man-induced changes in the river environment, however, such as sand and gravel mining, are non-hydraulically driven events, often occurring in an arbitrary, non-sequential manner. If sufficient data is not available to adequately describe the sequence of events in the historical period, engineering judgment will be used to develop a model presenting a reasonable representation of historical changes.

A typical model development sequence would include a calibration phase with a sediment transport model based on initial period topography information, and running a simulation with historical flow data up to the interim time period. Model parameters are adjusted (inflowing sediment load, bed sediment gradation, roughness coefficients, sediment transport equation, etc.) until the geometric results at the end of the simulation are in close agreement with the interim period topographic information. After these adjustments, the model simulations continue in a confirmation phase up the next time period with topographic information available to verify the selection of input parameters.

In summary, this task will include the development of three new sediment transport models, and comparisons with the modeling of: Agua Fria Sediment Transport Study by A.S.U. (1987 topography), and the Agua Fria Watercourse Master Plan (1995 topography).

8.1 Initial Baseline Model (based on 1964-65 topography)

8.1.1 Develop model.
8.1.2 Calibrate and verify model.
8.1.3 Perform model runs to investigate trends and model weaknesses.
8.1.4 Compare results to appropriate topography and modeling.

8.2 Intermediate Baseline Model (based on 1982-83 topography)

8.2.1 Develop model.
8.2.2 Calibrate and verify model.
8.2.3 Perform model runs to investigate trends and model weaknesses.
8.2.4 Compare results to appropriate topography and modeling.

8.3 Current Baseline Model (based on 2000 topography obtained under this scope)

8.3.1 Develop model.
8.3.2 Calibrate and verify model to the extent possible.
8.3.3 When the Current Baseline Model is completed, it should be suitable to be used as a predictive tool to evaluate: potential effects of sand and gravel mining, proposed protection measures, potential headcuts, and channel stability impacts along the Agua Fria River and the overall system response.

All of the model analyses will address changes in watershed (i.e., urbanization) and the construction of New Waddell Dam. The inflowing sediment load will be adjusted in the time series as necessary to model changes in sediment supply to the system. The impact of back-to-back (i.e., 10-year or 25-year followed by 100-year) storms and long term releases from New Waddell Dam will be considered in the models.

9. **Sediment Transport Documentation.** A report will be prepared presenting study methods, results, and conclusions. Documentation will include channel profile plots at 5-year intervals (i.e., 1965, 1970, 1975, etc) through the study period and comparison of model results versus actual data. The report will include recommendations of proposed mitigation measures. Deliverables of Phase I include the report and plan and profile sheets (1" = 400') illustrating changes to the channel bed and banks. Deliverables will be provided in both electronic and hard copy.

Phase II. (Tasks 10-12)

Task 10. Floodplain Delineation. A request for a LOMR will be prepared and submitted for the reach of the Agua Fria River from just downstream of Grand Avenue to approximately Bell Road to include the channel that parallels Grand Avenue. The HEC-RAS model prepared for the Agua Fria Watercourse Master Plan (which is based on the current FIS) will be provided by the District. This model will be revised with cross section locations and orientation modified, where necessary, to more accurately reflect site conditions. The LOMR will include the tributary upstream of Grand Avenue which extends approximately 1,000 feet northwest of El Mirage Road. In addition, available data and results of a LOMR being prepared by others for this tributary will be incorporated within this study. The revised model and draft floodplain work map of the study area will be submitted to the District for review.

Task 11. LOMR Documentation. The following documentation will be prepared and two copies submitted to the District:

- Four complete copies of Technical Data Notebook (TDN), prepared according to ADWR State Standard SSA1-97 and the District's Consultant Guideline (October 1, 1998)
- HIS data.
- Four copies of completed FEMA forms and annotated FIRM's with the proposed delineation.
- Four paper copies and electronic copies of floodplain work study map.
- Four electronic copies of revised hydraulic model on CD or diskette.

Task 12. LOMR Deliverables. After issuance of LOMR by FEMA, the following deliverables shall be submitted:

- Three complete copies of TDN, prepared according to ADWR State Standard SSA 1-97. This submittal of the TDN shall include any correspondence and/or meetings with the reviewing agencies, and shall reflect any revisions required by those reviewing agencies.
- Three paper copies of the floodplain work-study map with a scale of 1 inch = 200 feet.
- Three electronic copies of the hydraulic model on CD or diskette.
- Three electronic copies of the floodplain CADD information of the floodplain work-study map on CD or diskette.

C.1 Survey Field Notes for Aerial Mapping Control

Not Applicable / Not Included

C.2 Survey Field Notes for Hydrologic Modeling

Not Applicable / Not Included

C.3 Survey Field Notes for Hydraulic Modeling

THOMPSON RANCH DEVELOPMENT

COMPANY, INC.

FAX TRANSMITTAL SHEET

PLEASE DELIVER TO: JAMES

COMPANY: WEST CONSULTANTS

FROM: MARK SCHWARTZ

DATE: 10/03/01

NUMBER OF PAGE IN THIS TRANSMITTAL 1

MESSAGE:

Please let me know if you have any questions and when the revised map is ready. Thank you.

FAX NUMBER: (602) 957-3159

P.O. BOX 10775 • PHOENIX, ARIZONA 85064
5045 NORTH 12TH STREET #110 • PHOENIX, ARIZONA 85014
PHONE (602) 954-0321 • FAX (602) 957-3159

10/03/01

RECONSTRUCTED LEFT BANK OF DRAINAGE CHANNEL

STAKE NUMBER/ CROSS SECTION	FLOW LINE @ CENTER LINE OF CHANNEL (1)	TOP OF LEFT BANK IN INCHES ABOVE FLOW LINE
1	1127.22	55"
2	1127.22	54"
3/8764	1127.11	54"
4	1127.26	56"
5/8632	1126.80	55.5"
6	1126.56	55.5"
7	1126.59	54"
8/8477	1126.56	54"
9	1126.37	57"
10	1125.95	55"
11/8260	1125.82	53"
12	1125.95	52"
13/7885 manhole	1123.24	53"

NOTES:

(1) All flow line elevations are per the surveyor's stakes.

No smoothing

THOMPSON RANCH DEVELOPMENT

COMPANY, INC.

FAX TRANSMITTAL COVER SHEET

TO: GARY FREEMAN

WEST CONSULTING

FROM: MARK SCHWARTZ

DATE: 7/23/01

Cover Sheet plus 2 pages attached.

Memo:

Elevations of culvert inlet, outlet and headwall through the drainage channel are attached. I have also attached a diagram of the floor of the culvert.

Please call me at 602-246-2288 when you have had a chance to look at this information. Thank you.

Fax Number: (602) 957-3159

P.O. BOX 10775 • PHOENIX, ARIZONA 85064
5045 NORTH 12TH STREET #110 • PHOENIX, ARIZONA 85014
PHONE (602) 954-0321 • FAX (602) 957-3159

PREPARED FOR

Thomson Ranch

BY DEK

DATE 7/18/01

JOB NO. 19019

Exist. Box Culvert Elevations

Invert Inlet 29.04 } Box Culvert

Invert Outlet 29.04 }

Top Curb Median Nose Northwest 34.83 (32.99) Plan

Top Curb Median Nose South East 34.96 (32.99)

Keogh Engineering, Inc.
1616 N. LITCHFIELD RD. #120 · GOODYEAR, AZ 85338
(623) 535-7260 FAX (623) 535-7262

CHECKED BY DEK

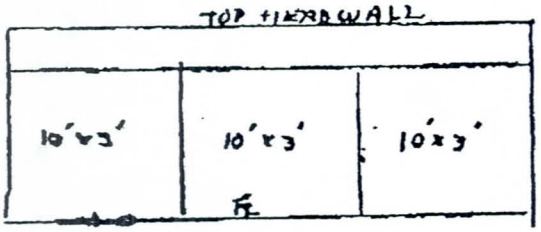
DATE 7/19/01

SHEET NO 1

OF 1

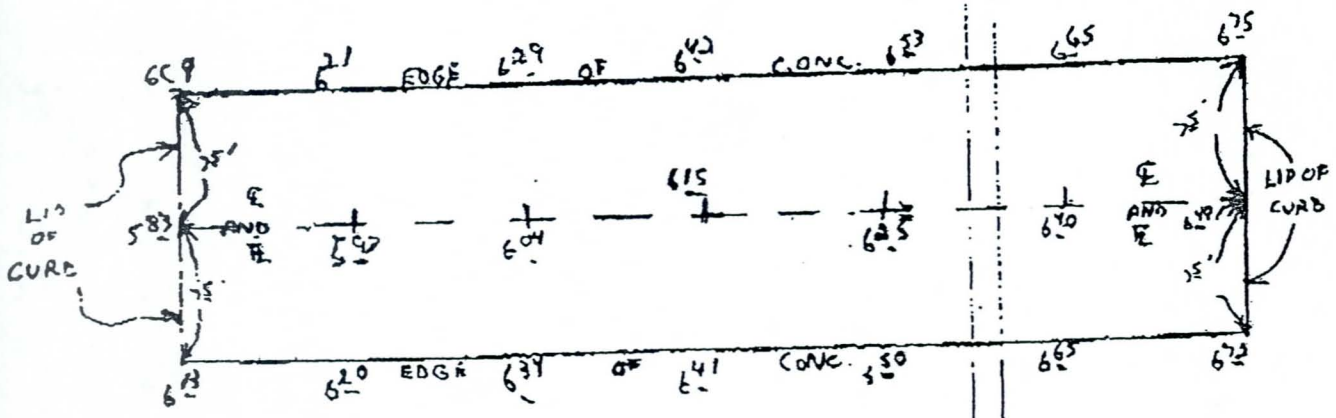
NEED TO RAISE CULVERTS 0.3 FT FROM PLANS

SOUTHEAST END
33.34 TOP HEADWALL
NORTHWEST END
33.54 TOP HEADWALL



FL SOUTH EAST END 28.84 vs. 27.23 1.61'

FL NORTHWEST END 29.04 vs. 27.47 1.57' too high



SWARTZ

CURB - 34.83 - 32.99 = 1.84
34.96 - 32.99 = 1.97
> 1.90

INLET 29.04 - 27.47 = 1.57
OUTLET 28.84 - 27.23 = 1.61
> 1.59

NET - RAISE CULVERT BY 0.30 FROM PLANS

	FCD		WLB 9/92
SE Sect 12 BM 5 -	1120.71 + 0.39 =		1121.10
			WLB 9/92
	1149.57 - 0.44		1149.13

EL MIRAGE DATUM = FCD DATUM + 2.06'

WEST CONSULTANTS, INC.

California
11848 Bernardo Plaza Ct.
Suite 140-B
San Diego, CA 92128

858-487-9378
858-487-9448 Fax

Washington
12509 Bel Red Road
Suite 100
Bellevue, WA 98005

425-646-8806
425-646-0570 Fax

Arizona
2151 East Broadway Road
Suite 116
Tempe, AZ 85282

480-345-2155
480-345-2156 Fax

www.westconsultants.com

Hydraulics
Hydrology
Sedimentation
Water Quality
Erosion Control
Environmental Services

August 14, 2001

ATTN: Dennis

Dennis:

I have marked the points we would like to tie into on the as built plans. It would be wonderful to tie into a benchmark in the area. The closest one we see is east of Thompson Ranch Road just north of Grand. It appears to be near the old railroad fill. The elevation of this benchmark is 1121.1 according to the plans provided by Mark Schwartz. The benchmark is located at the southeast corner of Section 12, T3N, R1W and is an X chiseled into a concrete pipe.

James Heyen from our will be on site Tuesday if he knows what time your survey team will be out. Please call and let him know what time to be out at the site. He can assist you in locating the various points and coordinate to be sure we don't miss anything.

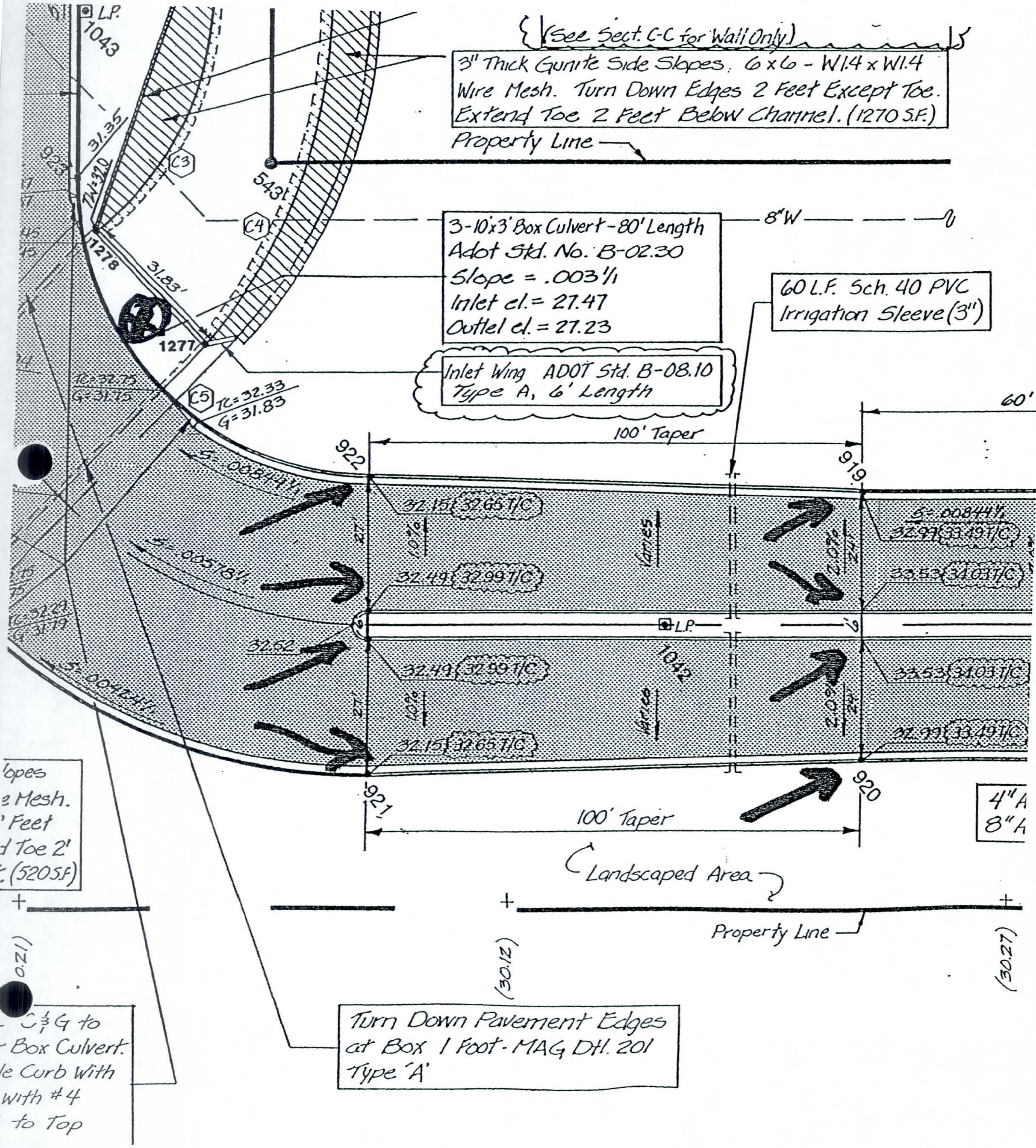
There are two additional points we want to tie in to your survey. These are the inlet and outlet invert elevations of the culvert under the access road to the automotive facility. With these points and a tie in to the old survey (and hopefully a benchmark) we can tie your survey to our survey and complete our flood mapping project.

We need to get channel invert elevations and elevations along the left descending bank (left bank looking downstream) from the culvert down the channel around the corner where the channel parallels the railroad tracks.

If you have any questions fell free to call me at 480-345-2155.

Sincerely;

Gary E. Freeman


(See Sect. C-C for Wall Only)
3" Thick Gunite Side Slopes. 6x6 - W1.4 x W1.4 Wire Mesh. Turn Down Edges 2 Feet Except Toe. Extend Toe 2 Feet Below Channel. (1270 S.F.)
Property Line
L.P. 1043
543
C3
C4
C5
8"W
3-10'x3' Box Culvert-80' Length
Adot Std. No. B-02.30
Slope = .003'/1
Inlet el. = 27.47
Outlet el. = 27.23
60 L.F. Sch. 40 PVC Irrigation Sleeve (3")
Inlet Wing ADOT Std. B-08.10 Type A, 6' Length
1278
1277
31.35
31.83'
TW=32.0
TC=32.75
G=31.75
TC=32.33
G=31.83
TC=32.29
G=31.79
60'
100' Taper
922
919
921
920
S=.00844'/1
S=.00578'/1
S=.00424'/1
32.15 {32.65 T/C}
32.49 {32.99 T/C}
32.62
32.49 {32.99 T/C}
32.15 {32.65 T/C}
32.99 {33.49 T/C}
33.53 {34.03 T/C}
33.53 {34.03 T/C}
32.99 {33.49 T/C}
1.0%
2.0%
27'
24'
Varies
L.P.
1042
100' Taper
Landscaped Area
Property Line
(30.12)
(30.27)
(30.21)
4" A
8" A
Slopes
Mesh.
Feet
Toe 2'
(5205 S.F.)
C & G to
Box Culvert.
Curb With
with #4
to Top
Turn Down Pavement Edges at Box 1 Foot - MAG Dtl. 201 Type "A"

Job No. _____

Keogh Engineering, Inc.
Consulting Engineers
Land Surveyors

1616 N. Litchfield Rd., Suite 120
Goodyear, AZ 85338
(623)535-7260
Fax (623) 535-7262

FAX TRANSMITTAL

DATE: 8/22/01

TO: James E. Heyen
West Consultants, Inc.

FAX NO. (480) 345-2156

FROM KEOGH ENGINEERING, INC.
1616 N. Litchfield Rd., Suite 120
Goodyear, AZ 85338

Keogh Engineering, Inc.	623-535-7260
Keogh Engineering, Inc. Fax Number	623-535-7262

NO. OF PAGES TRANSMITTED INCLUDING COVER SHEET 5

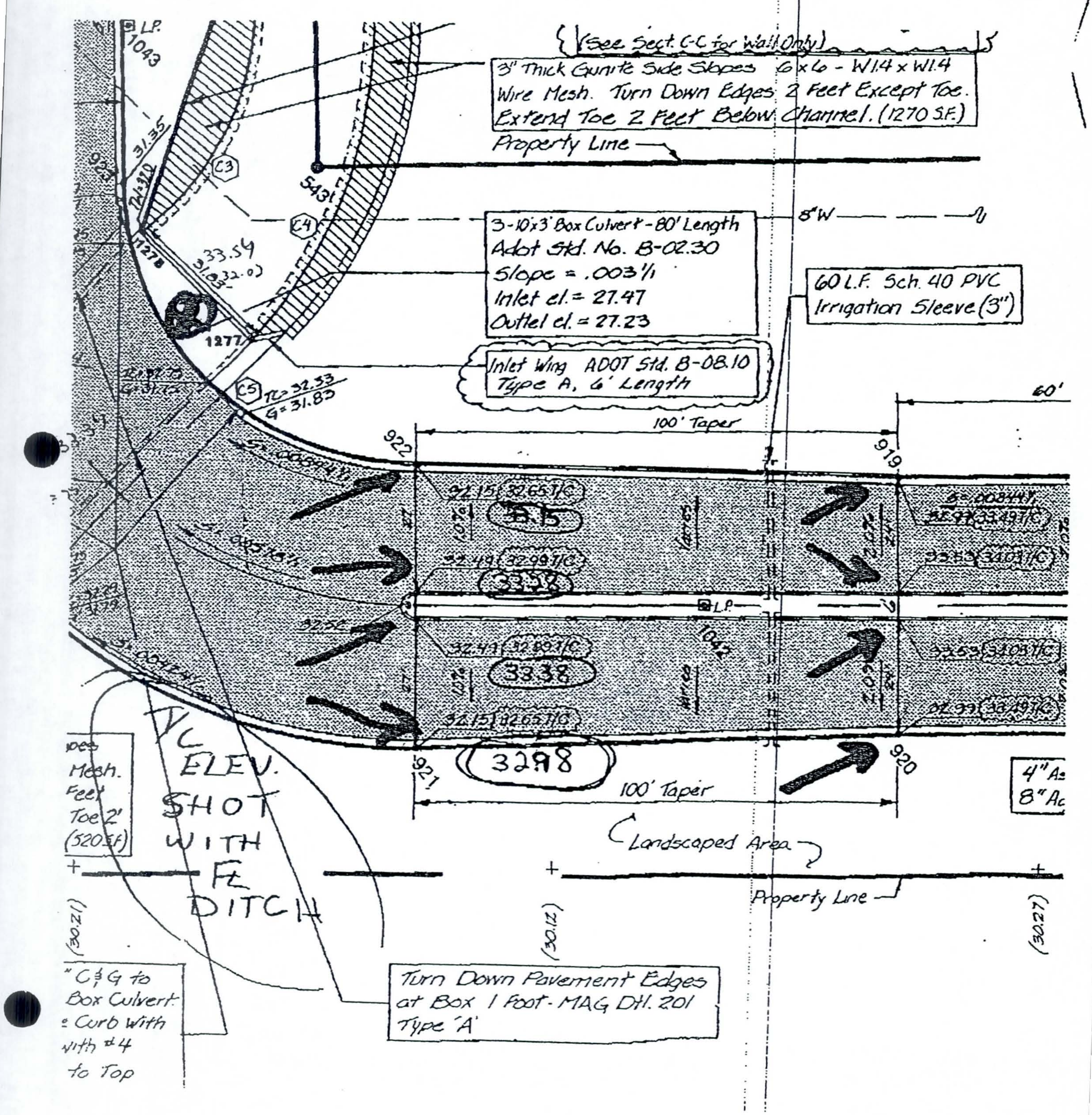
MESSAGE: _____

IF YOU HAVE ANY QUESTIONS REGARDING TRANSMISSION OF FAX, PLEASE CONTACT

Gene Johnson AT ABOVE PHONE NUMBER

IF YOU HAVE ANY QUESTIONS REGARDING CONTENT OF FAX, PLEASE CONTACT

_____ AT ABOVE PHONE NUMBER


(See Sect. C-C for Wall Only)
3" Thick Gunite Side Slopes 6x6 - W1.4 x W1.4 Wire Mesh. Turn Down Edges 2 Feet Except Toe. Extend Toe 2 Feet Below Channel. (1270 S.F.)
Property Line
3-10'x3' Box Culvert - 80' Length
Adot Std. No. B-02.30
Slope = .003'/1
Inlet el. = 27.47
Outlet el. = 27.23
8"W
60 L.F. Sch. 40 PVC Irrigation Sleeve (3")
Inlet Wing ADOT Std. B-08.10 Type A, 6' Length
TC=32.53
G=31.83
100' Taper
60'
922
919
921
920
33.15
33.38
3298
TC ELEV. SHOT WITH FL DITCH
100' Taper
Landscaped Area
Property Line
(30.21)
(30.12)
(30.27)
Turn Down Pavement Edges at Box 1 Foot - MAG Dtl. 201 Type 'A'
"C & G to Box Culvert
Curb With
with #4
to Top
4" A
8" A

Keogh Engineering, Inc.
1616 N. Litchfield Rd. #120
Goodyear, Arizona 85338 • (623) 535-7260 FAX (623) 535-7262

ERMS chiseled "X"
SEC 12 T3N R1W 1121.10

PAGE 1 OF 3
DATE 8-22-01
J.N. 19019
CREW G.J
J.U
B.C.

JOB NAME: THOMPSON RANCH ROAD

BENCH MARK: CHISLED "X" ON CONC PIPE, SOUTH EAST CORNER SEC. 12 T3N R1W ELEV. = 1121.1

REMARKS: SHOTS BETWEEN STATION ARE EVEN SPLITS

STATION/HORZ. ANGLE	DISTANCE/OFFSET	VERT. DIFF.	ELEVATION	DESCRIPTION
DOWN STREAM SIDE OF THOMPSON RANCH ROAD				
		TOP OF HEADWALL	1126.55	
		FL CONC BOX	1121.19	
UP STREAM SIDE OF THOMPSON RANCH ROAD				
		TOP OF HEADWALL	1127.04	
		FL CONC BOX	1121.71	
STA. " 7145		EX. FL	1121.00	
		EX. FL	1120.94	
		EX. FL	1120.78	
		EX. FL	1121.35	
STA " 7502		EX. FL	1121.29	
		EX. FL	1121.94	
		EX. FL	1121.94	
		EX. FL	1122.75	
STA " 7855		EX. FL	1123.70	
		EX. FL	1123.24	
		EX. FL	1124.93	
		EX. FL	1125.55	
		EX. FL	1125.95	
		EX. FL	1125.80	
STA " 8260		EX. FL	1125.78	

Keogh Engineering, Inc.
1616 N. Litchfield Rd. #120
Goodyear Arizona 85338 • (623) 535-7260 FAX (623) 535-7262

JOB NAME: THOMPSON RANCH ROAD

DATE 8-22-01

BENCH MARK: SEE PAGE 1 OF 3

J.N. 19019

REMARKS: SEE PAGE 1 OF 3

CREW G.J.
J.H.
B.S.

STATION/HORZ. ANGLE	DISTANCE/OFFSET	VERT. DIFF.	ELEVATION	DESCRIPTION
		EX. FL	1125.95	
		EX. FL	1126.37	
STA " 8477		EX. FL	1126.46	
		EX. FL	1126.56	
		EX. FL	1126.66	
STA " 8632		EX. FL	1126.80	
		EX FL	1127.21	
STA " 8764		EX FL	1127.11	
		EX FL	1127.22	
		EX FL	1127.22	
		EX FL	1127.59	
STA " 9022		EX FL	1127.64	
DOWNSTREAM SIDE OF AUTOMOTIVE			FACILITY	INTERFACE
		TOP OF HEADWALL	1131.77	
		FL CONC BOX	1127.35	
WP STREAM SIDE OF AUTOMOTIVE			FACILITY	INTER
		TOP OF HEADWALL	1132.02	
		FL CONC BOX	1127.53	
STA " 9140		EX FL	1128.54	
STA " 9287		EX FL	1128.06	TOP OF BANK 1131.75
STA " 9792		EX FL	1129.89	TOP OF BANK 1133.26

Keogh Engineering, Inc.
1616 N. Litchfield Rd. #120
Goodyear, Arizona 85338 - (623) 535-7260 FAX (623) 535-7262

JOB NAME: THOMPSON RANCH ROAD

DATE

BENCH MARK: SEE PAGE 1 OF 3

J.N.

CREW

REMARKS: SEE PAGE 1 OF 3

STATION/HORZ. ANGLE	DISTANCE/OFFSET	VERT. DIFF.	ELEVATION	DESCRIPTION
STA » 10462		EX FL	1131.70	TOP OF BANK 1135.27
STA » 11110		EX FL	1133.23	TOP OF BANK 1136.17
STA » 11664		EX FL	1134.27	TOP OF BANK 1137.41

FCDMC Study Elevation Reference Marks (ERM)

The information here on was gathered during studies contracted by the Flood Control District of Maricopa County (FCDMC) and is deemed reliable but is not guaranteed and should always be verified by the user. It is entirely the responsibility of any other user to determine its suitability and errors or omissions before using it for themselves and/or for another purpose. **'Unofficial Document'.**

ID:	ERM18
NAD83 Northing (Int Feet):	949292.81
NAD83 Easting (Int Feet):	581030.3
Elevation 1929 (Int feet):	1120.71
Horizontal Order:	GPS Order B (FGCC 1988), relative accuracy of 1 part in 1,000,000
Vertical Order:	Second-Order, Class II, (FGCC 1984), relative accuracy of 1.3mm x square root of distance in kilometers between points
Date Entered:	2000-01-10
Description:	Stone with chisled "+" (section Corner) north of Grand Ave. along wood power pole line on west side of paved road to batch plant at southwest corner of Sec 7, T3N,R1E.

Flood Control District of Maricopa County

Close

DATASHEETS

OUK ENVI (2)

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
DATABASE = Sybase ,PROGRAM = datasheet, VERSION = 6.54
1        National Geodetic Survey,   Retrieval Date = OCTOBER 12, 2001
 AJ3856 ***********************************************************************
 AJ3856  DESIGNATION -  4GA2
 AJ3856  PID         -  AJ3856
 AJ3856  STATE/COUNTY-  AZ/MARICOPA
 AJ3856  USGS QUAD   -  CALDERWOOD BUTTE (1981)
 AJ3856
 AJ3856                        *CURRENT SURVEY CONTROL
 AJ3856
 AJ3856* NAD 83(1992)-  33 38 21.67284(N)    112 18 58.59311(W)      ADJUS
 AJ3856* NAVD 88     -       355.40   (meters)    1166.0     (feet)  GPS OI
 AJ3856
 AJ3856  X           -  -2,018,507.750 (meters)                      COMP
 AJ3856  Y           -  -4,917,650.950 (meters)                      COMP
 AJ3856  Z           -   3,513,392.975 (meters)                      COMP
 AJ3856  LAPLACE CORR-           2.38  (seconds)                     DEFLE
 AJ3856  ELLIP HEIGHT-         325.37  (meters)                      GPS OI
 AJ3856  GEOID HEIGHT-         -29.99  (meters)                      GEOID
 AJ3856
 AJ3856  HORZ ORDER  -  B
 AJ3856  ELLP ORDER  -  THIRD      CLASS II
 AJ3856
 AJ3856.The horizontal coordinates were established by GPS observations
 AJ3856.and adjusted by the National Geodetic Survey in April 2001.
 AJ3856
 AJ3856.The orthometric height was determined by GPS observations and a
 AJ3856.high-resolution geoid model using precise GPS observation and
 AJ3856.processing techniques.
 AJ3856
 AJ3856.The X, Y, and Z were computed from the position and the ellipsoid
 AJ3856
 AJ3856.The Laplace correction was computed from DEFLEC99 derived deflect
 AJ3856
 AJ3856.The ellipsoidal height was determined by GPS observations
 AJ3856.and is referenced to NAD 83.
 AJ3856
 AJ3856.The geoid height was determined by GEOID99.
 AJ3856
```

```
AJ3856;                      North         East      Units   Scale      Con
AJ3856;SPC AZ C      -   292,726.872   176,290.495   MT  0.99991694 -0 13
AJ3856;UTM  12       - 3,722,946.231   377,929.307   MT  0.99978371 -0 43
AJ3856
AJ3856                          SUPERSEDED SURVEY CONTROL
AJ3856
AJ3856.No superseded survey control is available for this station.
AJ3856
AJ3856_MARKER: I = METAL ROD
AJ3856_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)
AJ3856_STAMPING: 4GA2 1999
AJ3856_MARK LOGO: MCDOT
AJ3856_PROJECTION: FLUSH
AJ3856_MAGNETIC: B = BAR MAGNET IMBEDDED IN MONUMENT
AJ3856_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
AJ3856+STABILITY: POSITION/ELEVATION WELL
AJ3856_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AJ3856+SATELLITE: SATELLITE OBSERVATIONS - 1999
AJ3856_ROD/PIPE-DEPTH:  4.0 meters
AJ3856_SLEEVE-DEPTH  :  0.8 meters
AJ3856
AJ3856  HISTORY      - Date     Condition        Report By
AJ3856  HISTORY      - 1999     MONUMENTED       MCDOT
AJ3856
AJ3856                           STATION DESCRIPTION
AJ3856
AJ3856'DESCRIBED BY MARICOPA CO DOT 1999 (JJR)
AJ3856'THE STATION IS LOCATED ABOUT 0.5 MILES (0.8 KM) NORTH OF THE TOWN
AJ3856'EL MIRAGE, TOWNSHIP 4 NORTH, RANGE 1 WEST, SECTION 36
AJ3856'OWNERSHIP - STATE LAND
AJ3856'TO REACH THE STATION FROM THE JUNCTION OF U.S.  60 (GRAND AVENUE)
AJ3856'BELL ROAD, DRIVE EAST ON BELL ROAD 2.0 MI (3.2 KM) TO THE EAST BAI
AJ3856'THE AGUA FRIA RIVER AND THE STATION ON THE LEFT 235 FT (71.6 M) NO
AJ3856'OF THE CENTERLINE OF BELL ROAD (NOTE-TO ACCESS MONUMENT DRIVE OVEI
AJ3856'CURB ON THE NORTH SIDE OF BELL ROAD JUST EAST OF THE MONUMENT AND
AJ3856'DRIVE TO STATION) MONUMENT DESCRIPTION - THE STATION IS MARKED BY
AJ3856'ALUMINUM CAP COMPRESSED ON A 13.0 FOOT (4.0 M) STAINLESS STEEL ROI
AJ3856'DRIVEN TO REFUSAL, ENCASED IN A 1 INCH GREASED PVC SLEEVE ENCLOSEI
AJ3856'A 5 INCH PVC PIPE WITH A COUNTY LOGO ACCESS COVER STAMPED 4GA2 19!
AJ3856'SURROUNDED WITH A CONCRETE COLLAR FLUSH WITH THE GROUND, WITNESSEI
AJ3856'A WHITE CARSONITE MARKER
AJ3856'STATION TIES -
AJ3856'235 FT (71.6 M) NORTH OF THE CENTERLINE OF BELL ROAD AND THE SOUTI
AJ3856'QUARTER CORNER OF SECTION 36
AJ3856'17 FT (5.2 M) EAST OF THE TOP OF THE EAST BANK OF THE AGUA FRIA R
AJ3856'FOR A TO REACH MAP, STATION IMAGES AND ADDITIONAL INFORMATION, YOI
```

AJ3856'VISIT-WWW.MCDOT.MARICOPA.GOV SEARCH KEYWORD GDACS

*** retrieval complete.
Elapsed Time = 00:00:03

D.1 Precipitation Data

Not Applicable / Not Included

D.2 Physical Parameter Calculations

Not Applicable / Not Included

D.3 Hydrograph Routing Data

Not Applicable / Not Included

D.4 Reservoir Routing Data

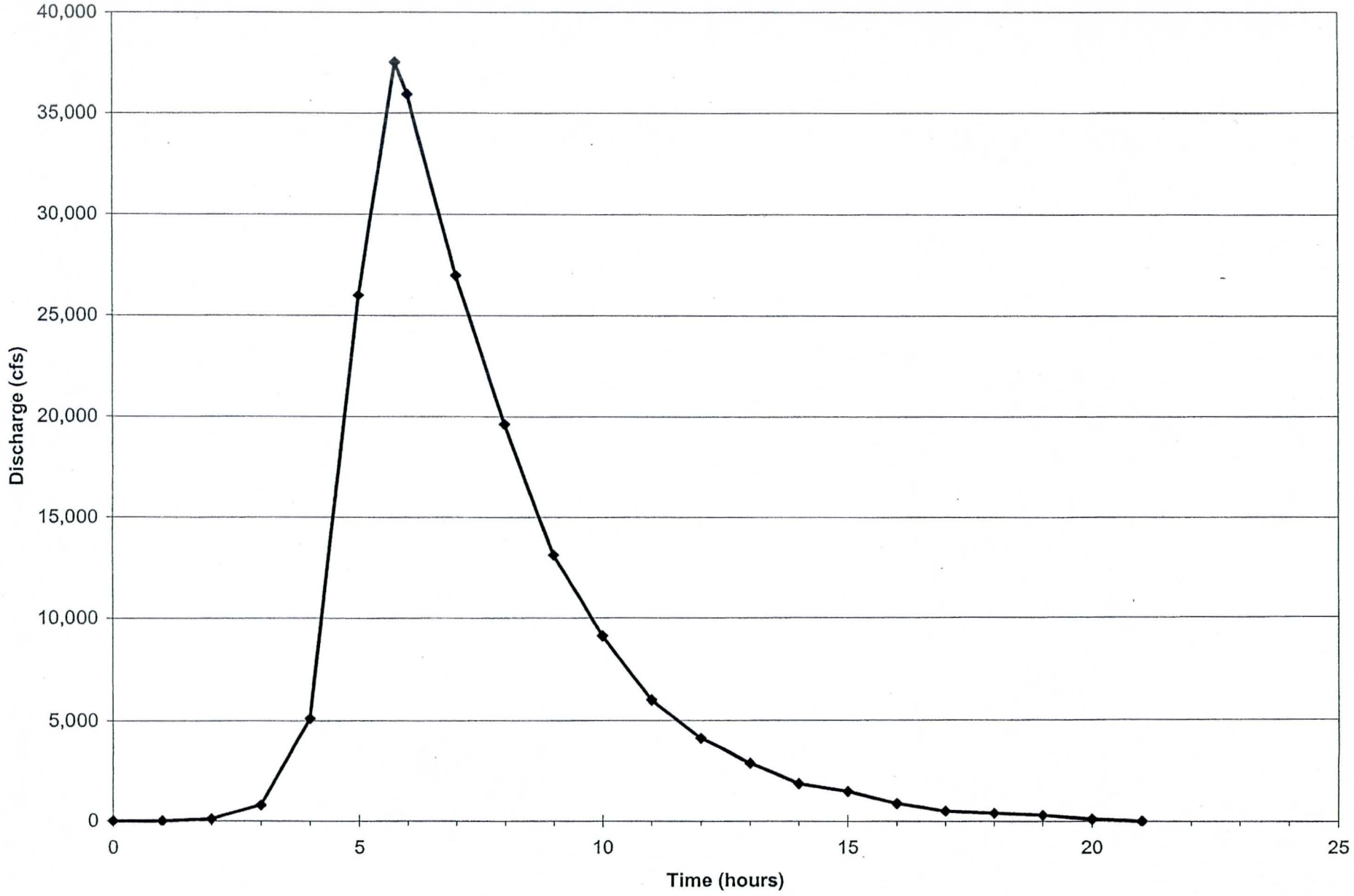
Not Applicable / Not Included

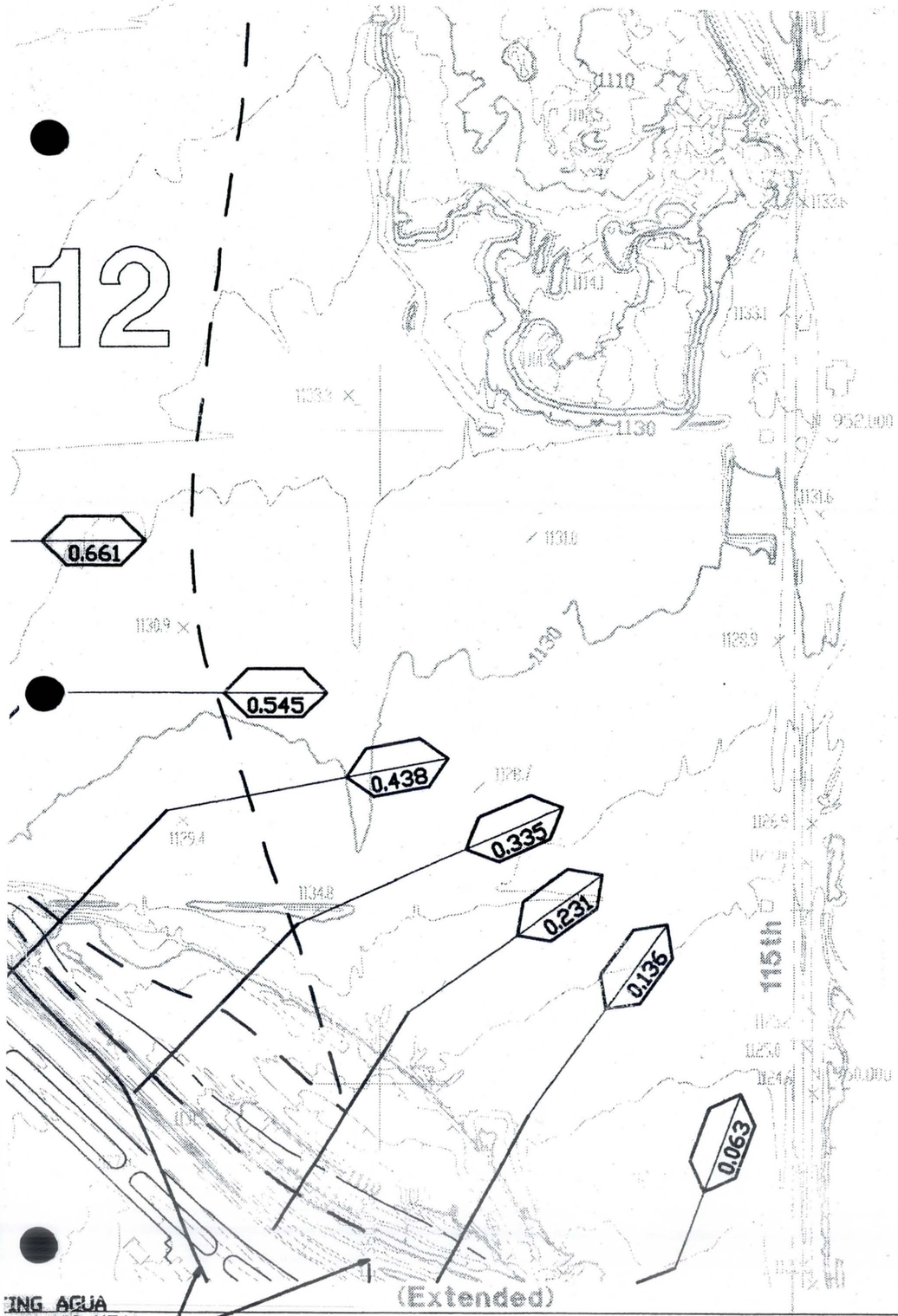
D.5 Flow Splits and Diversion Data

Not Applicable / Not Included

D.6 Hydrologic Calculations

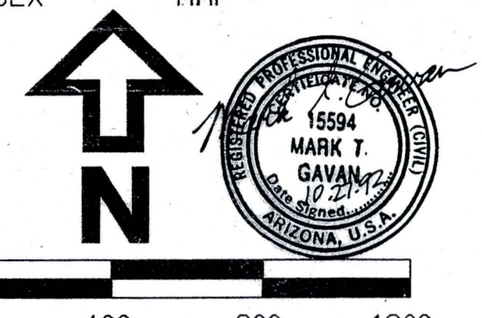
100-Year Hydrograph - Agua Fria River at Bell Road





					Baseline Road
62	63	64			Elliot Road

INDEX MAP



BASE MAP: WHITE TANKS/AGUA FRIA A.D.M.S. TOPOGRAPHIC MAPS
CONTOUR INTERVAL = 2'

LEGEND

1.452	CROSS SECTION NUMBER
FP=1158.9	FLOODPLAIN WATER SURFACE ELEVATION = 1158.9
FW=1159.8	FLOODWAY WATER SURFACE ELEVATION = 1159.8
Q100=764cfs	100-YEAR PEAK DISCHARGE = 764 CUBIC FEET PER SEC.
1157	BASE FLOOD ELEVATION
	STREAM CENTERLINE
	FLOODWAY BOUNDARY
	FLOODPLAIN BOUNDARY
RM NO. 100	ELEVATION REFERENCE MARK
ZONE AE	FLOOD INSURANCE RATE ZONE

SHEET TITLE:
FLOODPLAIN MAP

STUDY CONSULTANT:
The WLB Group INC.

MAPPING COMPANY:
Cooper Aerial of Phoenix, Inc.

SHEET 11 OF --

DATE FLOWN 12/22/83

ING AGUA
ER 100-YEAR
L IN AND
DWAY

T 3 N , R 1 W
FIRM PANEL NO 1165 , 1170 , 1610 , 1615

LIMIT OF DETAILED STUDY

FP=1160.8
FW=1161.4
1.598
Q100=483cfs

FP=1157.7
FW=1158.5
1.489
Q100=483cfs

RM No. 45
ELEV.=1149.13

FP=1153.6
FW=1154.1
1.394
Q100=483cfs

FP=1149.2
FP=1150.2
1.294
Q100=483cfs

FP=1144.6
FW=1145.6
1.189
Q100=483cfs

1.085

0.992

0.892

0.771

0.661

EXISTING 100-YEAR
AGUA FRIA RIVER
FLOODPLAIN AND FLOODWAY
EAST OF THESE LINES

ZONE AE

LIMITS

EL MIRAGE

CITY

SURPRISE

Avenue

Road

Railroad

A.T. & S.F. RAILROAD CHANNEL

TRIBUTARY

1157

1141

12

WASH 12 OF WHITE TANKS AREA DRAINAGE MASTER PLAN

```
C
C     22
C  0.000
C  0.000   BOTH FLOODPLAIN AND FLOODWAY MATCH INTO EXISTING 100-YEAR DELINEA-
C  0.000   TIONS ON THE AGUA FRIA RIVER COMPUTED BY JERRY R. JONES AND ASSOC.
C  0.000   2-6-89 AT APPROXIMATELY CROSS SECTIONS 1.085 AND 0.231 RESPECTIVELY.
C  0.000
C  0.000   Q @ X1=0.000 TO X1=0.335 EQUALS Q @ CP158A
C  0.000   Q = 577 CFS
C  0.000
C  0.000   ATCHINSON, TOPEKA AND SANTA FE RAILROAD BRIDGE
C  0.000
C  0.438
C  0.438   Q @ X1=0.438 TO X1=1.598 EQUALS Q AT CP158B
C  0.438   Q = 483 CFS
C  0.438
C  1.489
C  1.489   FACTORY STREET
C  1.489
C  1.598
C  1.598   CITY OF EL MIRAGE CORPORATE LIMITS,SOUTH OF GREENWAY ROAD.
C  1.598   TOWN OF SURPRISE CORPORATE LIMITS,NORTH OF GREENWAY ROAD.
C  1.598   LIMIT OF DETAILED STUDY
C  1.598
T1       WHITE TANKS / AGUA FRIA AREA DRAINAGE MASTER STUDY
T2       100 - YEAR STORM EVENT     FLOODPLAIN RUN       FILE: 12.H2I
T3       ATCHISON,TOPEKA AND SANTA FE RAILROAD CHANNEL - AGUA FRIA RIVER
T4       NORTHWEST TO GREENWAY ROAD. (WASH  12)
J1     0       2       0       0   .0008       0       0       0 1118.45       0
J2     1       0       0       0       0       0       0       0       0       0
J3    38      43       1      53      21      22      54      51       4       8
J3    42       5      26       0     110       0     200
NC  .045     .03    .035      .3      .5
QT     2     577     577
ET                   9.1                                          9931.6310078.38
X1  0.00      11    9935   10075       0       0       0
GR  1128    9850    1126    9900    1120    9920    1118    9935    1116    9950
GR  1115   10000    1116   10010    1118   10075    1120   10090    1122   10110
GR  1128   10430
NC   .05     .03    .035      .1      .3
ET                   9.1                                          9914.5810092.48
X1  .063      13    9940   10030     320     300     330
GR1121.7    9680    1120    9855    1118    9940    1116    9950    1112   10000
GR  1116   10020    1118   10030    1117   10060    1118   10085    1120   10110
GR  1122   10120    1128   10135  1129.1   10155
ET                   9.1                                          9751.8110066.59
X1  .136      18    9755   10065     400     330     390
GR  1124    9635    1122    9680    1120    9745    1118    9755    1116    9780
GR  1110    9940    1106   10000    1116   10060    1118   10065    1120   10070
GR  1124   10080    1122   10115    1120   10125    1119   10140    1120   10150
GR  1122   10175    1128   10185  1129.4   10210
ET                   9.1                                          980010101.60
X1  .231      22    9650   10100     500     520     500
GR  1126    9550    1124    9590    1120    9610    1118    9650    1116    9730
GR  1114    9820    1114    9900    1116    9940  1116.6    9950    1116    9960
GR  1110    9990    1105   10000    1116   10095    1118   10100    1120   10105
GR  1122   10115    1125   10130    1124   10150    1122   10165  1121.6   10180
GR  1122   10190  1129.6   10220
ET                   9.1                                          980010069.81
X1  .335      16    9950   10065     520     580     550
GR  1130    9410    1128    9525    1126    9645    1120    9665    1118    9695
GR1116.5    9920    1117    9950    1116    9980  1115.4   10000    1116   10055
GR  1118   10065    1120   10080  1122.5   10120    1124   10145    1130   10150
GR1131.4   10160
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ET                   9.1                                          9841.5410052.08
X1  .438      17    9930   10055     530     530     540
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577 cfs

483 cfs

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GR  1122    9930    1120    9980  1118.8   10000  1120.2   10020    1120   10050
GR  1122   10055    1126   10085  1124.1   10110    1126   10130    1130   10140
GR  1132   10155  1132.9   10165
NC   .07     .03    .045      .1      .3
ET                  9.1                                          985010025.68
X1  .545       9    9975   10020     550     550     570
GR1131.4    9385    1130    9740    1128    9975    1127   10000    1128   10020
GR  1130   10030    1132   10040    1134   10050  1134.9   10055
ET                  9.1                                            9850   10030
X1  .661      11    9960   10030     610     610     610
GR  1134    9320    1132    9720  1130.7    9875  1131.7    9960    1130    9980
GR1128.8   10000    1130   10010    1132   10030    1134   10040    1136   10050
GR1136.6   10055
ET                  9.1                                            9850   10030
X1  .771      10    9960   10030     580     580     580
GR1135.4    9430    1134    9730  1132.6    9910  1133.8    9960    1132    9980
GR1131.5   10000    1132   10010    1134   10030    1136   10045  1137.9   10055
ET                  9.1                                          980010052.91
X1  .892       9    9980   10050     640     640     640
GR1137.2    9550  1136.1    9825  1136.7    9840    1136    9860  1135.2    9930
GR1135.4    9980  1134.4   10000    1136   10050  1140.1   10070
ET                  9.1                                          970010019.66
X1  .992      13    9955   10020     530     530     530
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GR1137.8    9955    1136    9985  1135.4   10000    1136   10015    1138   10020
GR  1140   10025    1142   10035  1142.6   10045
ET                  9.1                                          960010023.14
X1 1.085    13      9975    10030   490     490     490
GR1139.8    8980  1139.4    9190  1139.8    9400  1139.2    9640  1138.6    9830
GR1140.5    9880    1140    9910  1140.4    9940    1140    9975  1138.4   10000
GR  1140   10030    1144   10055  1145.4   10070
ET                  9.1                                          932510005.59
X1 1.189    11      9925    10030   550     550     550
GR  1145    8650    1144    8760  1143.8    8950    1144    9250  1145.9    9600
GR1145.1    9830  1145.8    9925  1144.3   10000    1146   10030    1148   10040
GR1149.4   10050
ET                  9.1                                          960010009.59
X1 1.294    10      9940    10020   550     550     550
GR1149.6    8780  1148.3    9070    1149    9280  1148.6    9500  1149.7    9770
GR1149.6    9940  1148.4   10000    1150   10020    1152   10030  1153.7   10040
ET                  9.1                                          970010014.42
X1 1.394    11      9940    10020   530     530     530
GR1154.5    9125    1154    9140  1152.3    9640  1153.1    9730  1153.6    9850
GR1153.3    9890  1154.4    9940  1152.6   10000    1154   10020    1156   10030
GR1158.1   10045
ET                  9.1                                          980010026.80
X1 1.489     8      9930    10050   450     500     500
GR1158.2    9370    1158    9415  1156.5    9725    1158    9930  1157.3   10000
GR  1158   10050    1160   10135    1161   10210
NC   .08     .03    .045      .1      .3
ET                  9.1                                          990010023.90
X1 1.598    12      9975    10020   510     580     580
GR1160.8    9460    1160    9590  1159.8    9630    1160    9715  1159.9    9810
GR  1160    9875  1160.2    9940    1160    9975  1158.3   10000    1160   10020
GR  1162   10030    1164   10045
EJ
T1      WHITE TANKS / AGUA FRIA AREA DRAINAGE MASTER STUDY
T2      100 - YEAR STORM EVENT     FLOODWAY RUN       FILE: 12.H2I
T3      ATCHISON,TOPEKA AND SANTA FE RAILROAD CHANNEL - AGUA FRIA RIVER
T4      NORTHWEST TO GREENWAY ROAD. (WASH  12)
J1     0       3       0       0       0       0       0 1118.45       0
J2    15       0      -1       0       0       0       0       0       0       0


ER
```
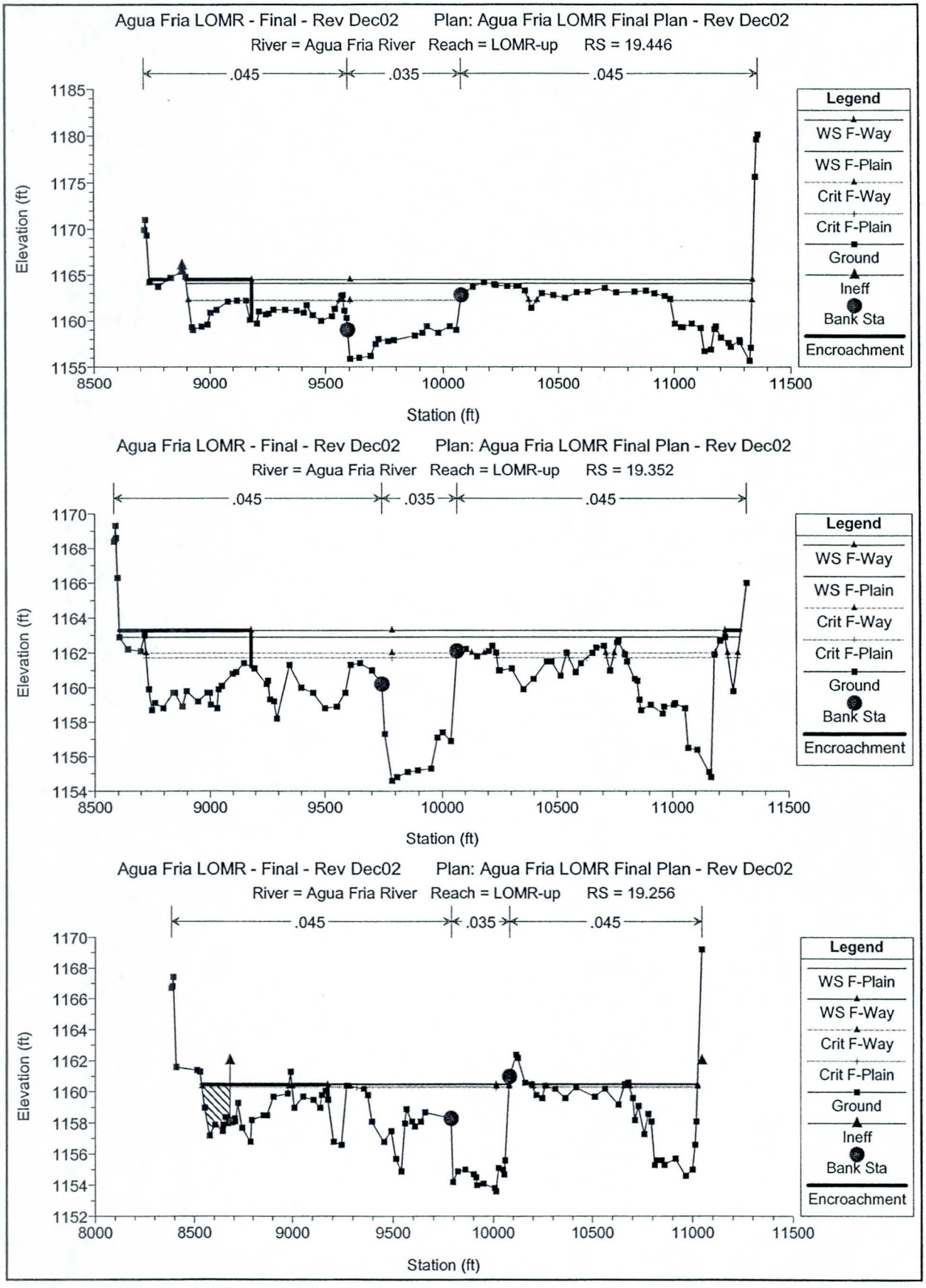

E.1 Roughness Coefficient Estimation

Not Applicable / Not Included

E.2 Cross Section Plots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.035
.045
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Way
Crit F-Plain
Ground
Ineff
Bank Sta
Encroachment
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River = Agua Fria River Reach = LOMR-up RS = 19.352
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.035
.045
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Way
Crit F-Plain
Ground
Bank Sta
Encroachment
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River = Agua Fria River Reach = LOMR-up RS = 19.256
.045
.035
.045
Elevation (ft)
Station (ft)
Legend
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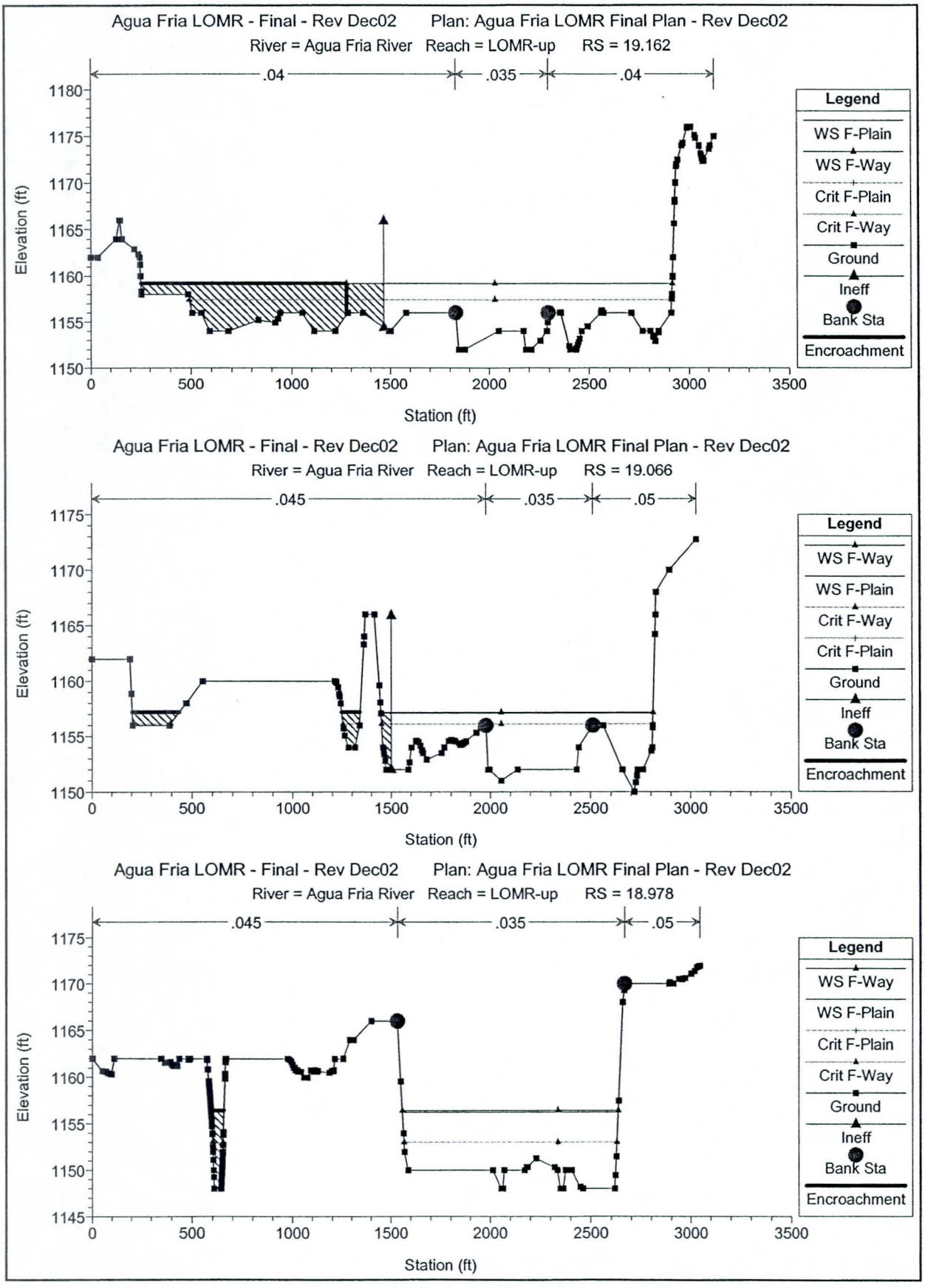
WS F-Way
Crit F-Way
Crit F-Plain
Ground
Ineff
Bank Sta
Encroachment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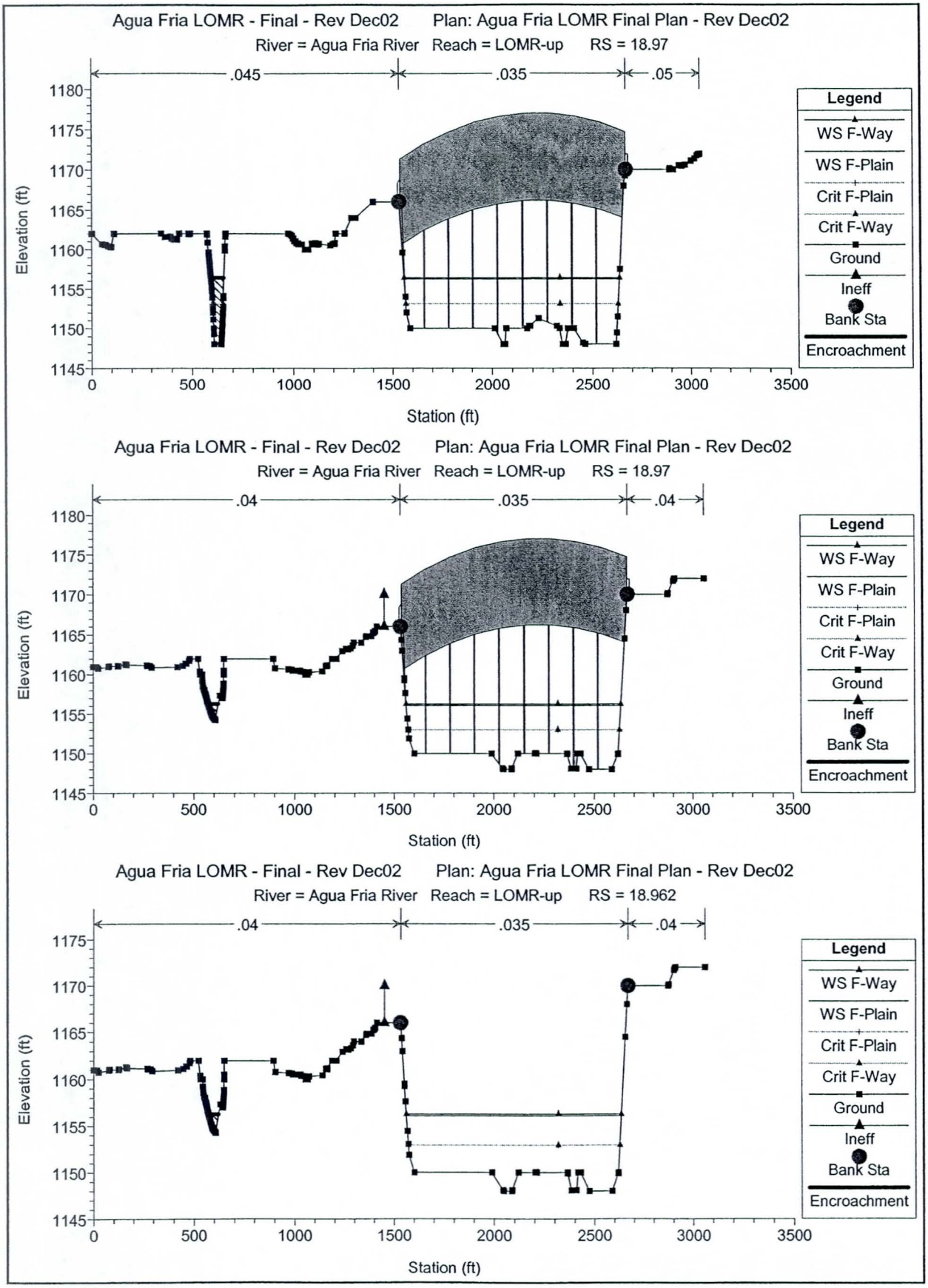
.035
.04
Elevation (ft)
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Ineff
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 19.066
.045
.035
.05
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Way
Crit F-Plain
Ground
Ineff
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 18.978
.045
.035
.05
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Ineff
Bank Sta
Encroachment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.035
.05
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Ineff
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 18.97
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Ineff
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 18.962
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
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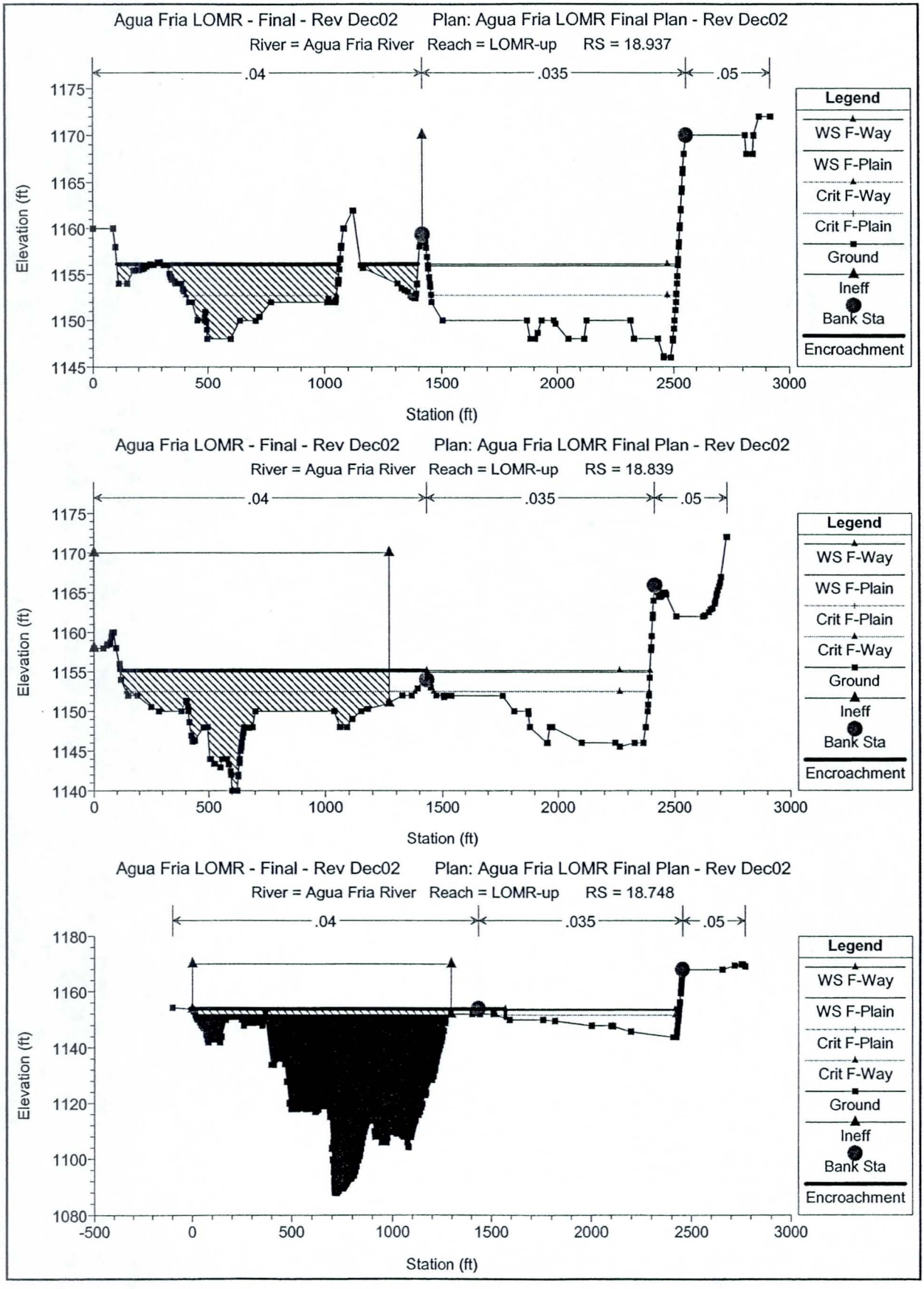
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Ineff
Bank Sta
Encroachment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.035
.05
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Way
Crit F-Plain
Ground
Ineff
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 18.839
.04
.035
.05
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Ineff
Bank Sta
Encroachment
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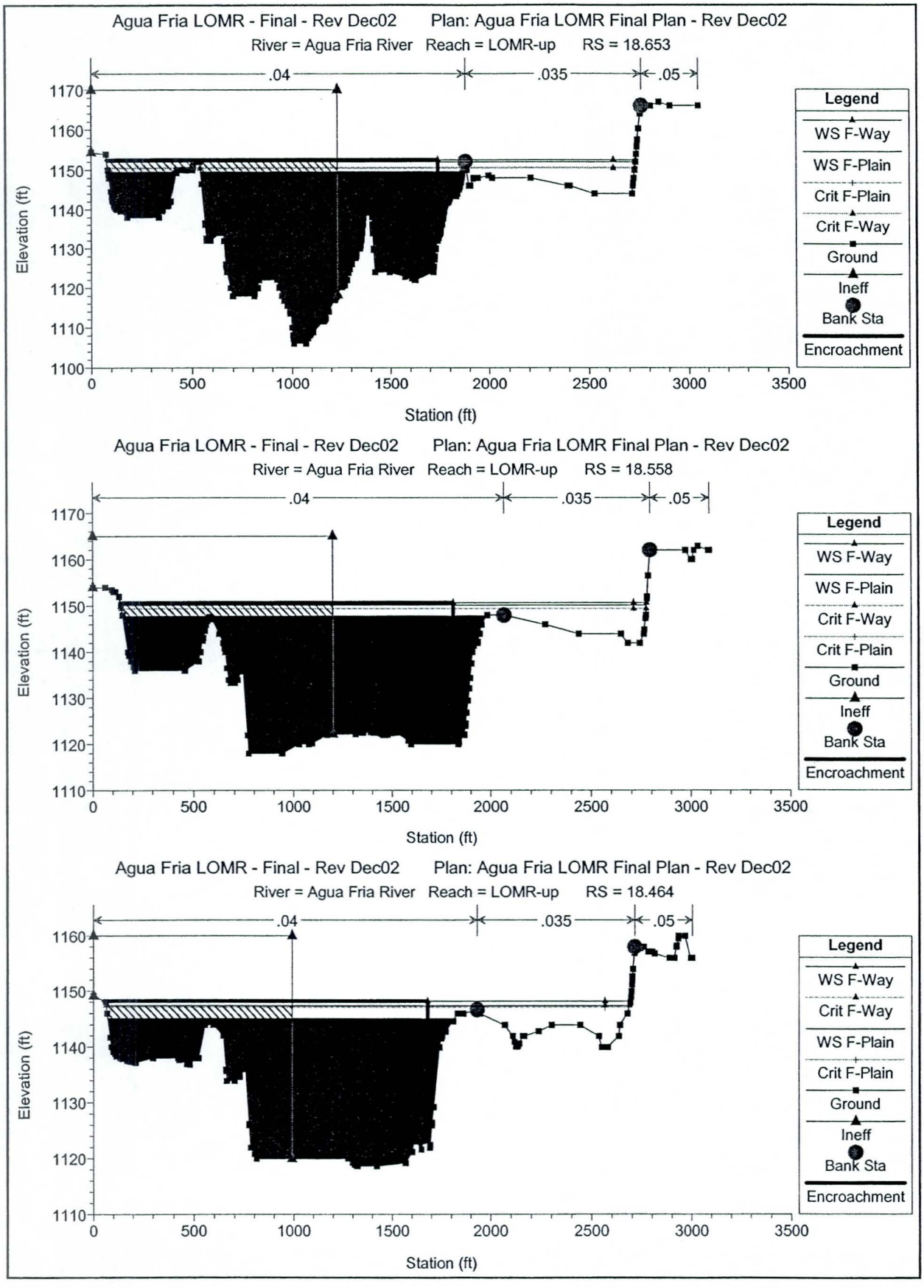
River = Agua Fria River Reach = LOMR-up RS = 18.748
.04
.035
.05
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Ineff
Bank Sta
Encroachment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River = Agua Fria River Reach = LOMR-up RS = 18.653
.04
.035
.05
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Ineff
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 18.558
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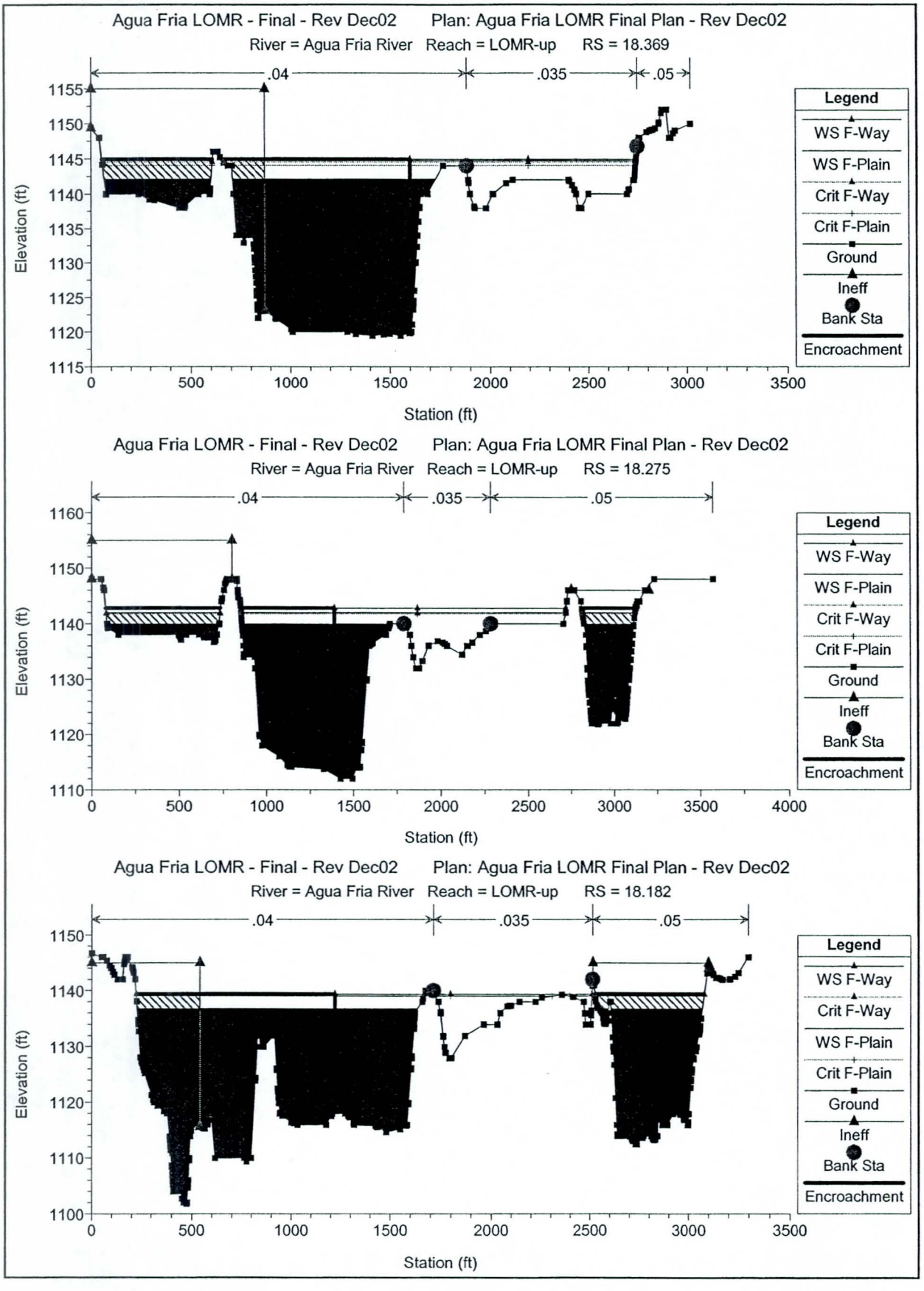
River = Agua Fria River Reach = LOMR-up RS = 18.464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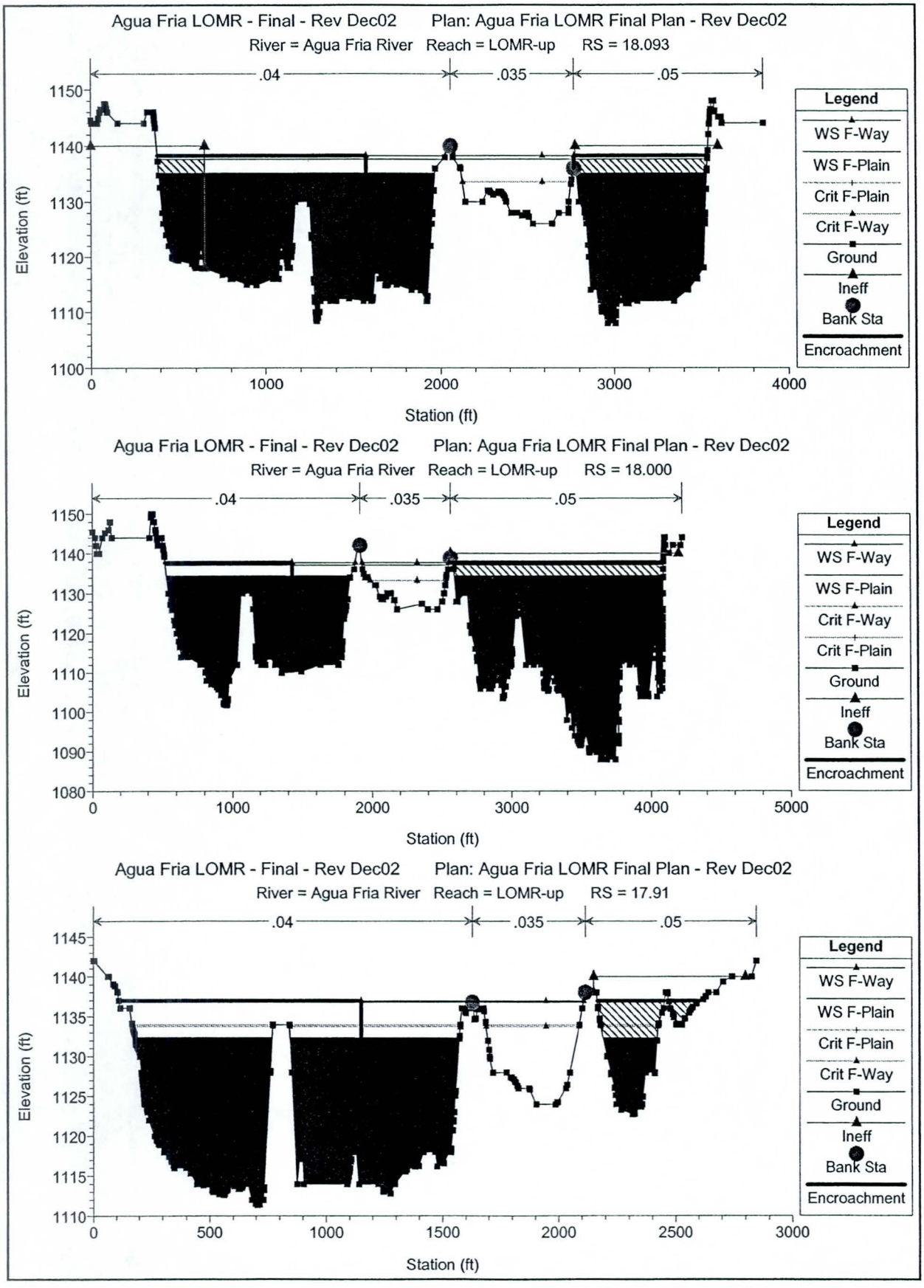
River = Agua Fria River Reach = LOMR-up RS = 18.369
.04
.035
.05
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Way
Crit F-Plain
Ground
Ineff
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 18.275
.04
.035
.05
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Way
Crit F-Plain
Ground
Ineff
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 18.182
.04
.035
.05
Elevation (ft)
Station (ft)
Legend
WS F-Way
Crit F-Way
WS F-Plain
Crit F-Plain
Ground
Ineff
Bank Sta
Encroachment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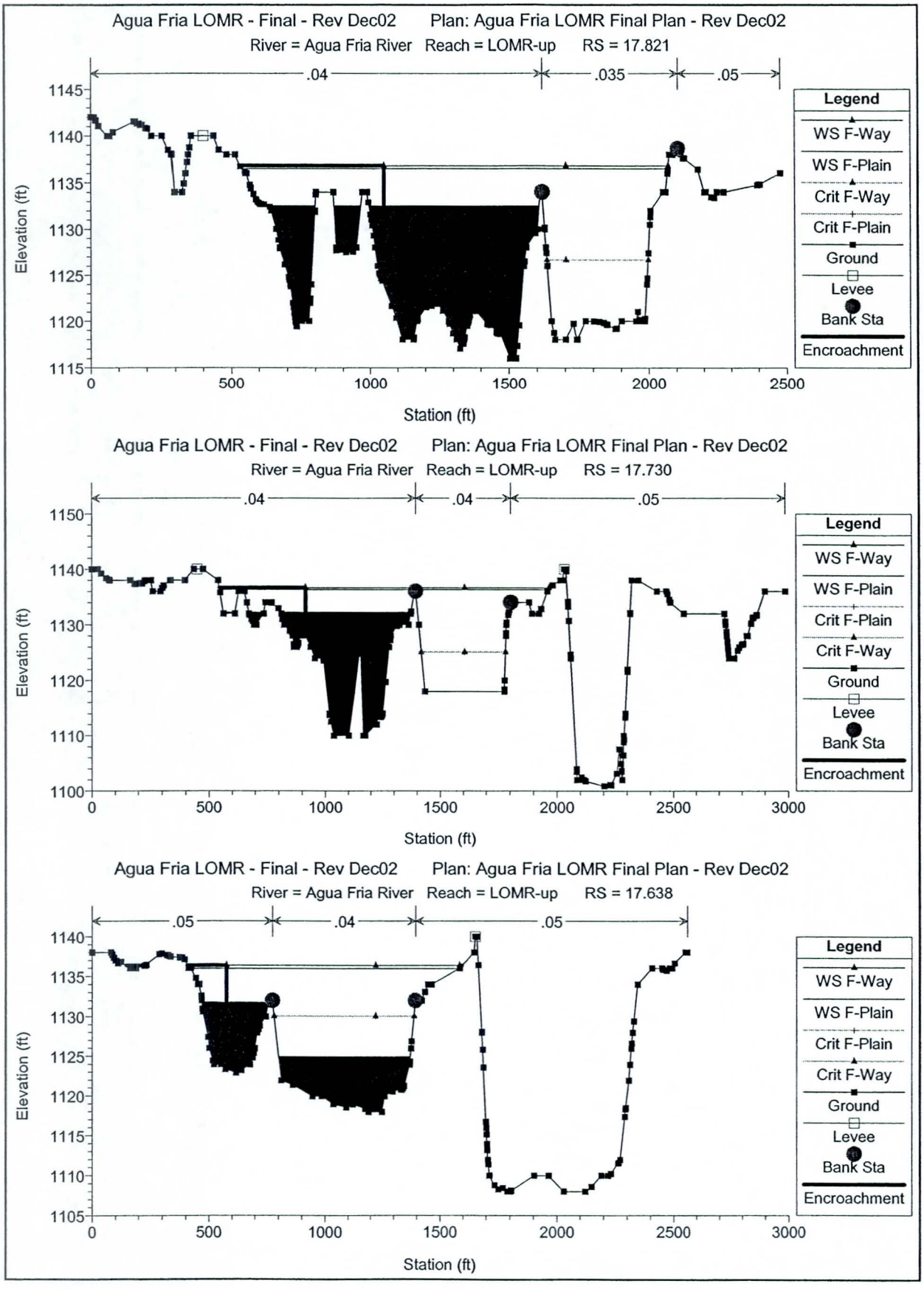
River = Agua Fria River Reach = LOMR-up RS = 18.093
.04
.035
.05
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Ineff
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 18.000
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 17.91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River = Agua Fria River Reach = LOMR-up RS = 17.821
.04
.035
.05
Elevation (ft)
1145
1140
1135
1130
1125
1120
1115
0
500
1000
1500
2000
2500
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Way
Crit F-Plain
Ground
Levee
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 17.730
.04
.04
.05
Elevation (ft)
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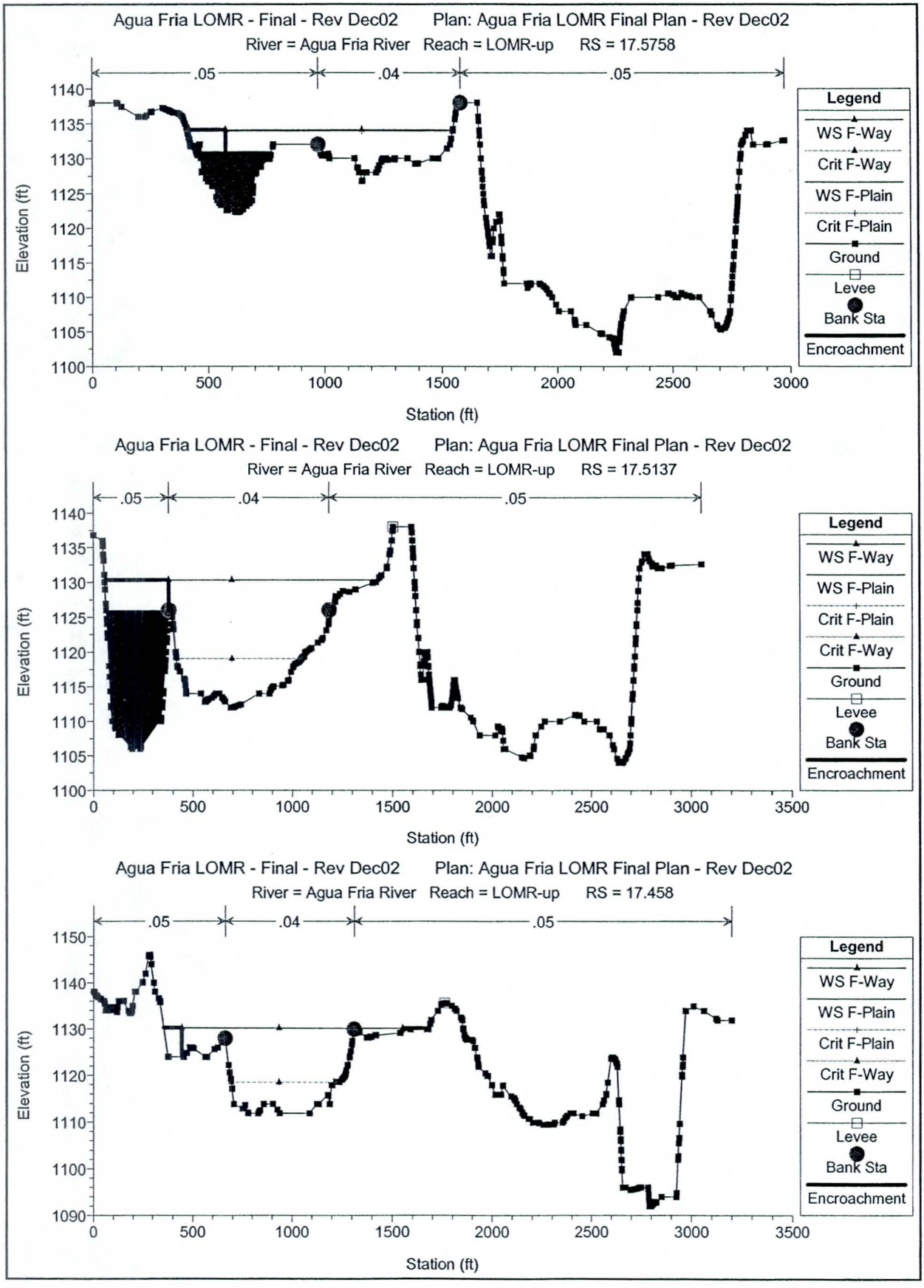
1140
1130
1120
1110
1100
0
500
1000
1500
2000
2500
3000
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 17.638
.05
.04
.05
Elevation (ft)
1140
1135
1130
1125
1120
1115
1110
1105
0
500
1000
1500
2000
2500
3000
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Encroachment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.05
.04
.05
Elevation (ft)
1140
1135
1130
1125
1120
1115
1110
1105
1100
0
500
1000
1500
2000
2500
3000
Station (ft)
Legend
WS F-Way
Crit F-Way
WS F-Plain
Crit F-Plain
Ground
Levee
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 17.5137
.05
.04
.05
Elevation (ft)
1140
1135
1130
1125
1120
1115
1110
1105
1100
0
500
1000
1500
2000
2500
3000
3500
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 17.458
.05
.04
.05
Elevation (ft)
1150
1140
1130
1120
1110
1100
1090
0
500
1000
1500
2000
2500
3000
3500
Station (ft)
Legend
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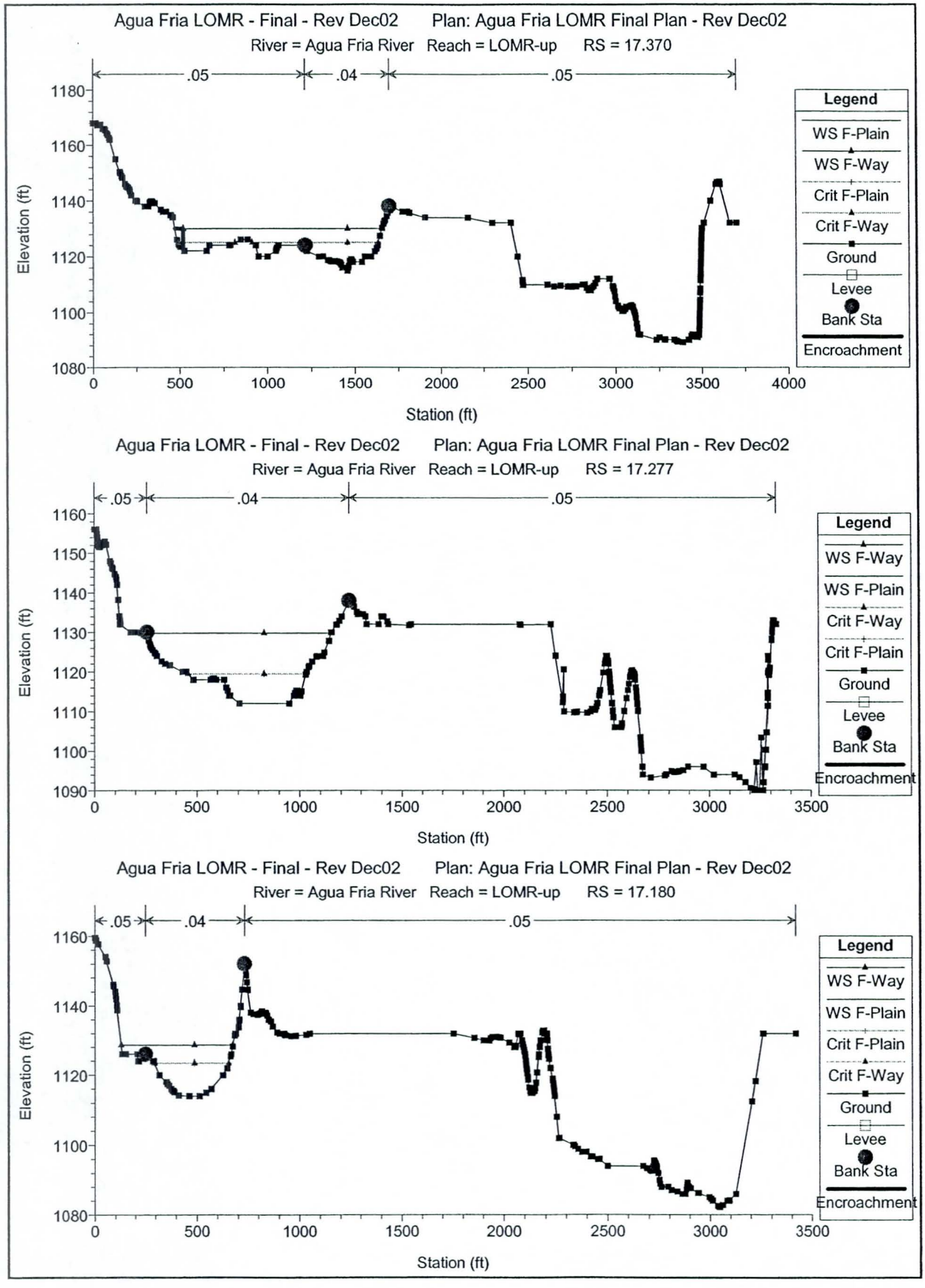
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Encroachment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.05
.04
.05
Elevation (ft)
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 17.277
.05
.04
.05
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Way
Crit F-Plain
Ground
Levee
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 17.180
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.04
.05
Elevation (ft)
Station (ft)
Legend
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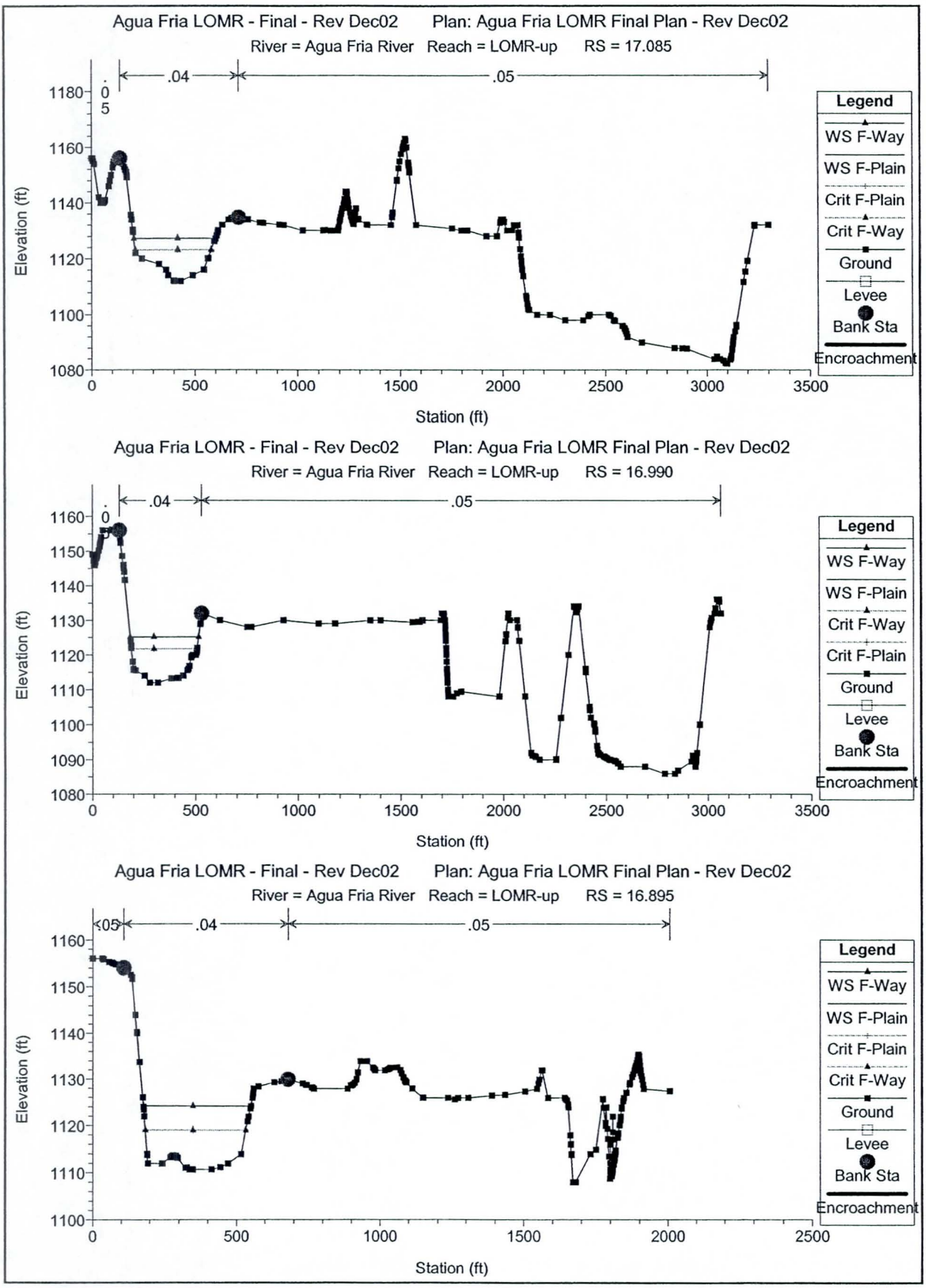
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Encroachment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.04
.05
Elevation (ft)
Station (ft)
Legend
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WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 16.990
.04
.05
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Way
Crit F-Plain
Ground
Levee
Bank Sta
Encroachment
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River = Agua Fria River Reach = LOMR-up RS = 16.895
.05
.04
.05
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Station (ft)
Legend
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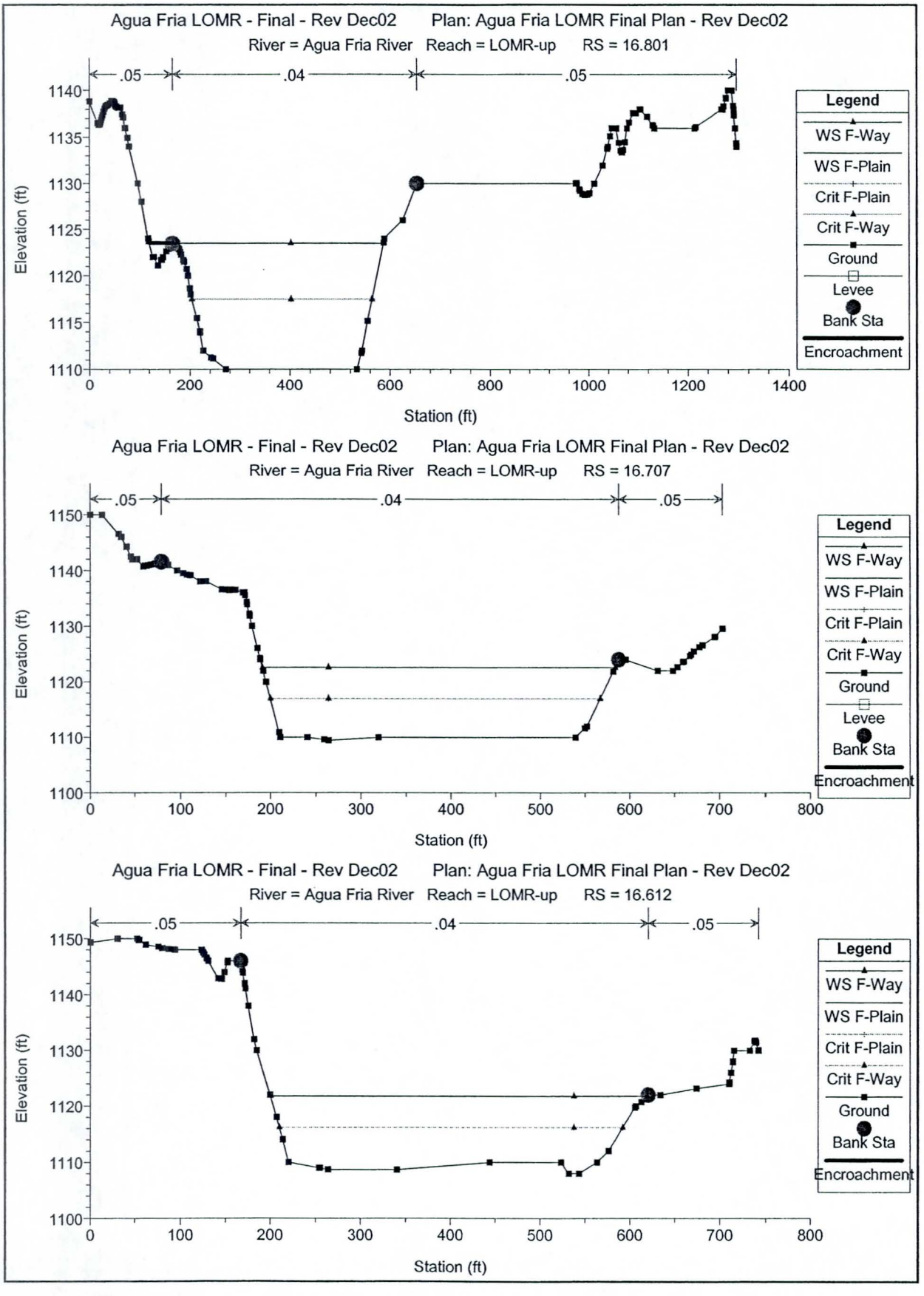
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Encroachment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.04
.05
Elevation (ft)
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1135
1130
1125
1120
1115
1110
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200
400
600
800
1000
1200
1400
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 16.707
.05
.04
.05
Elevation (ft)
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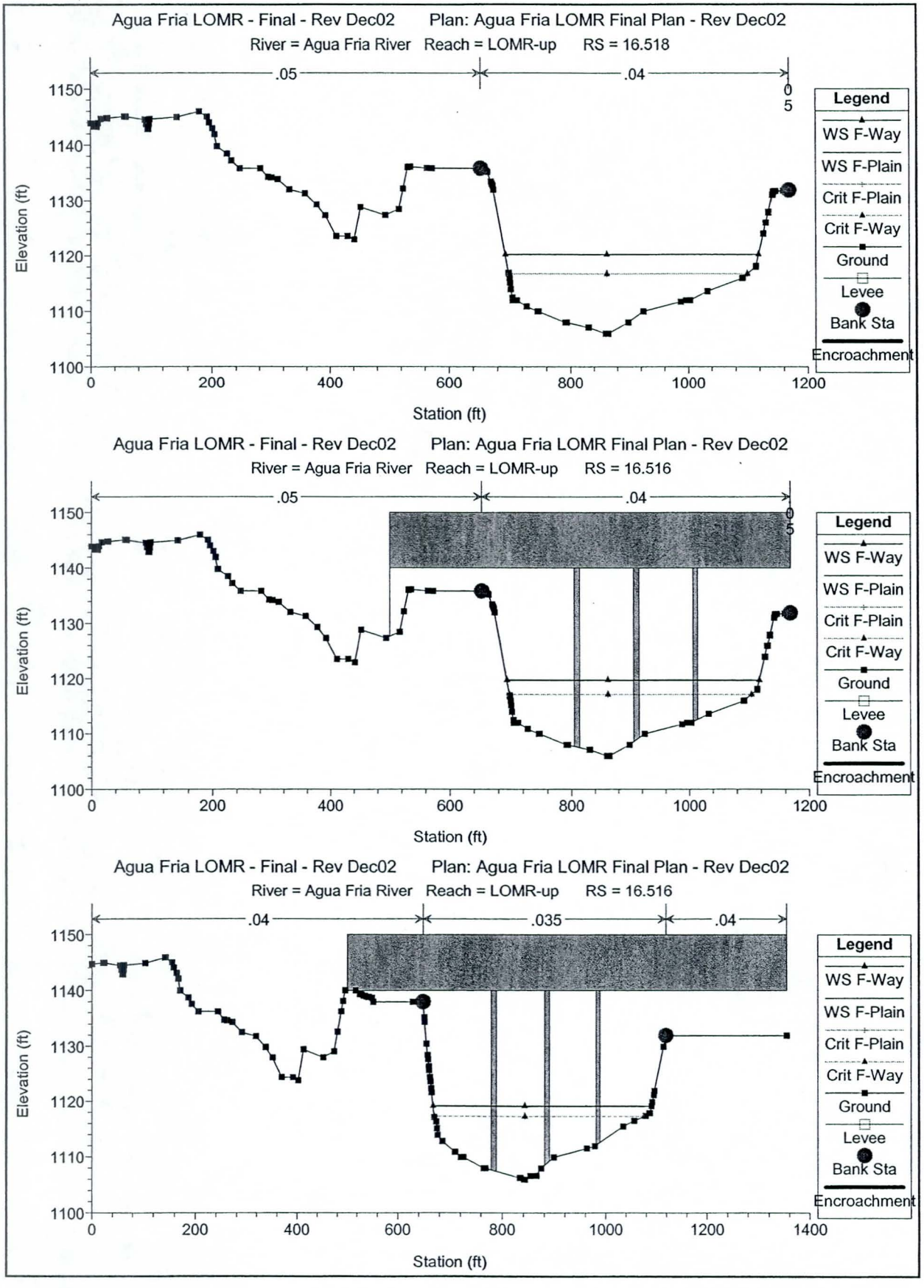
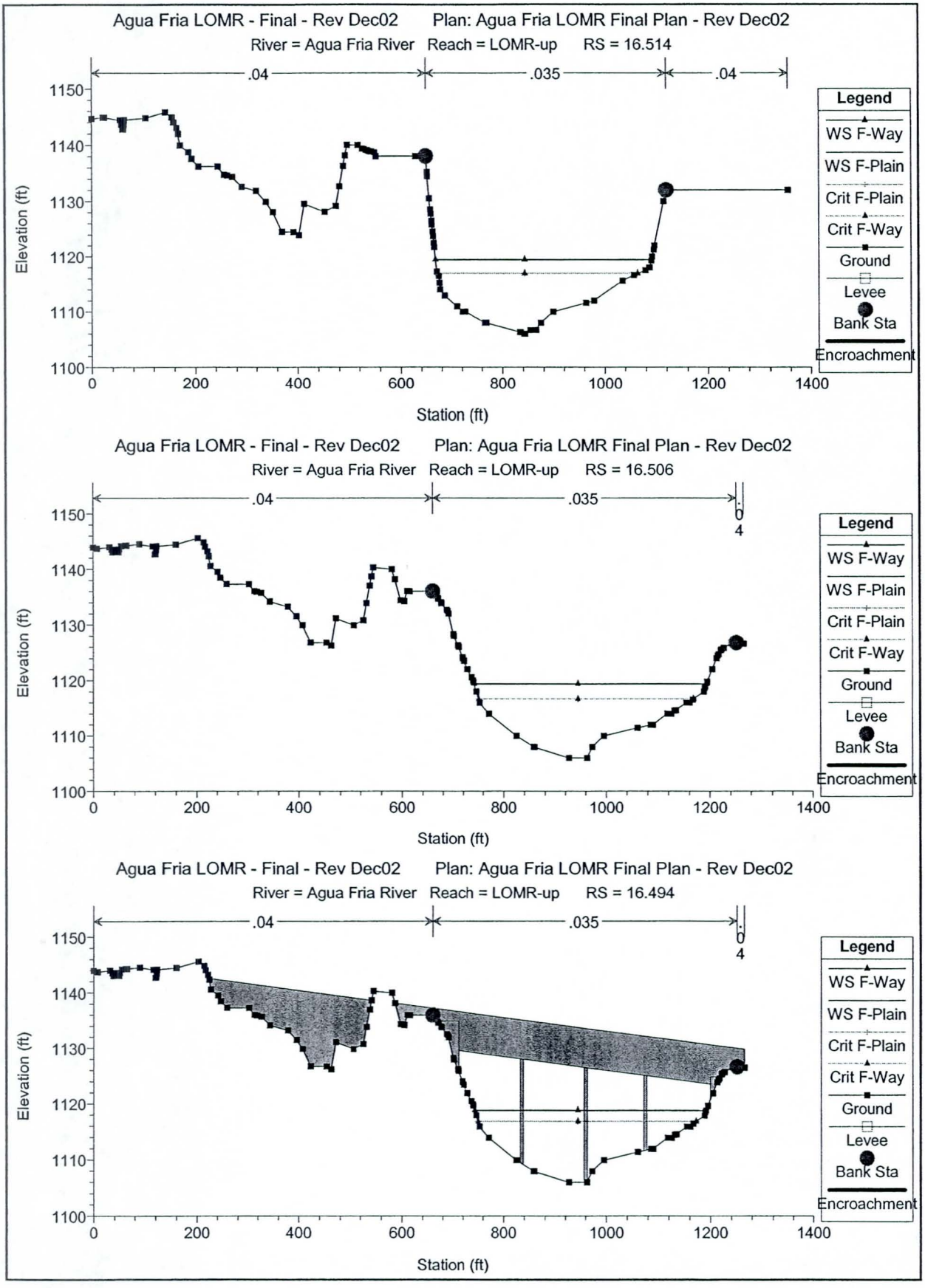
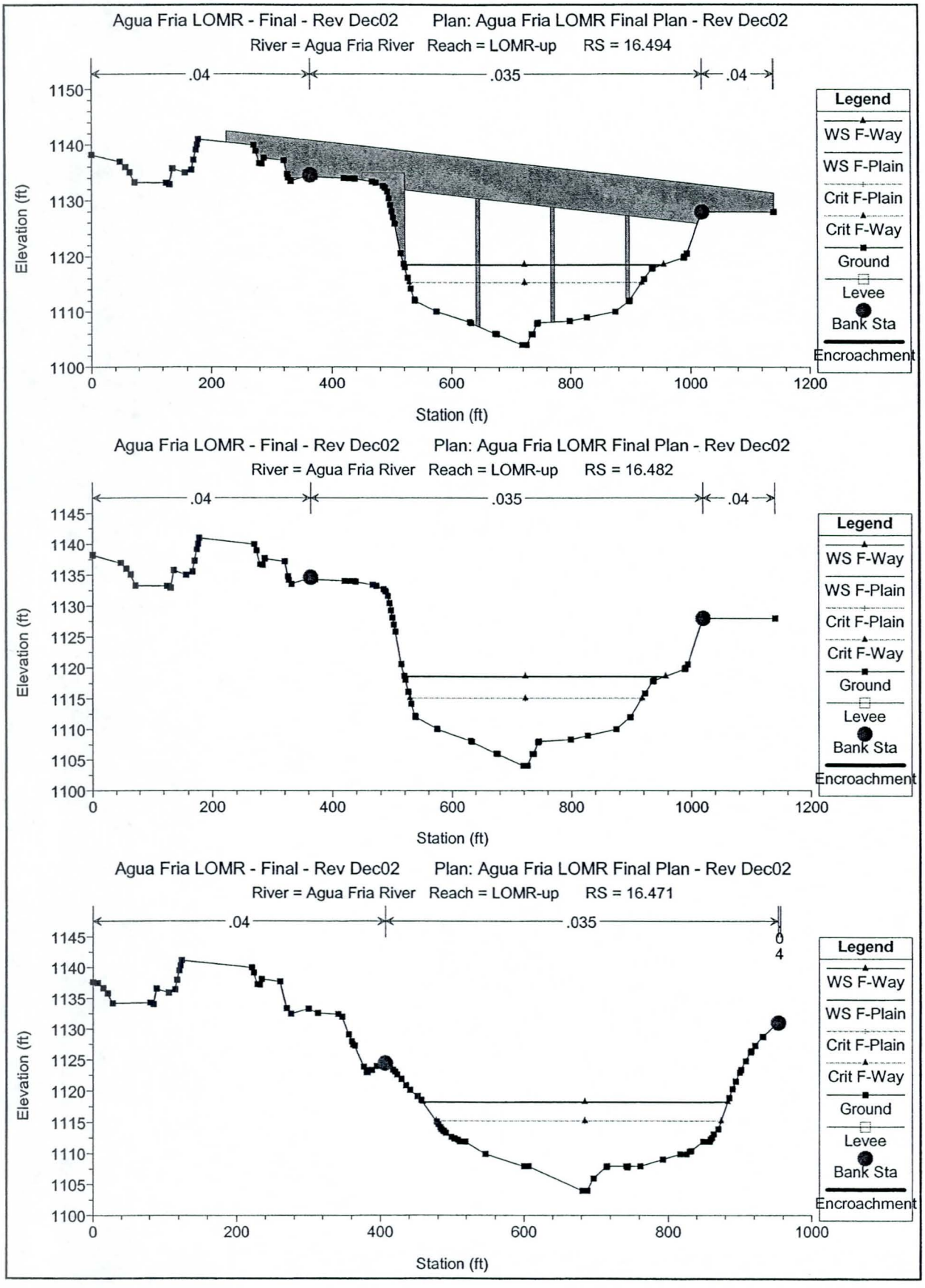
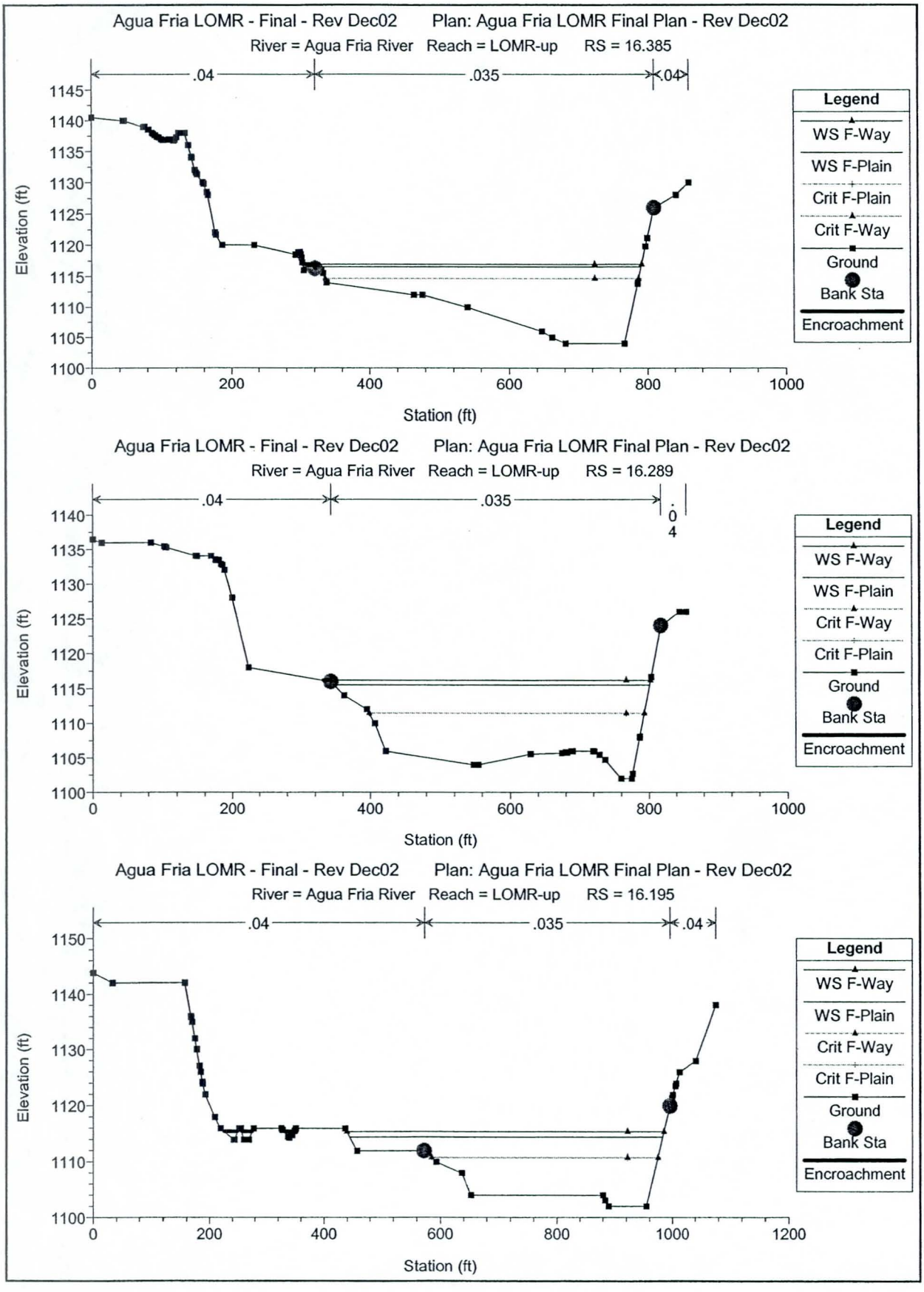
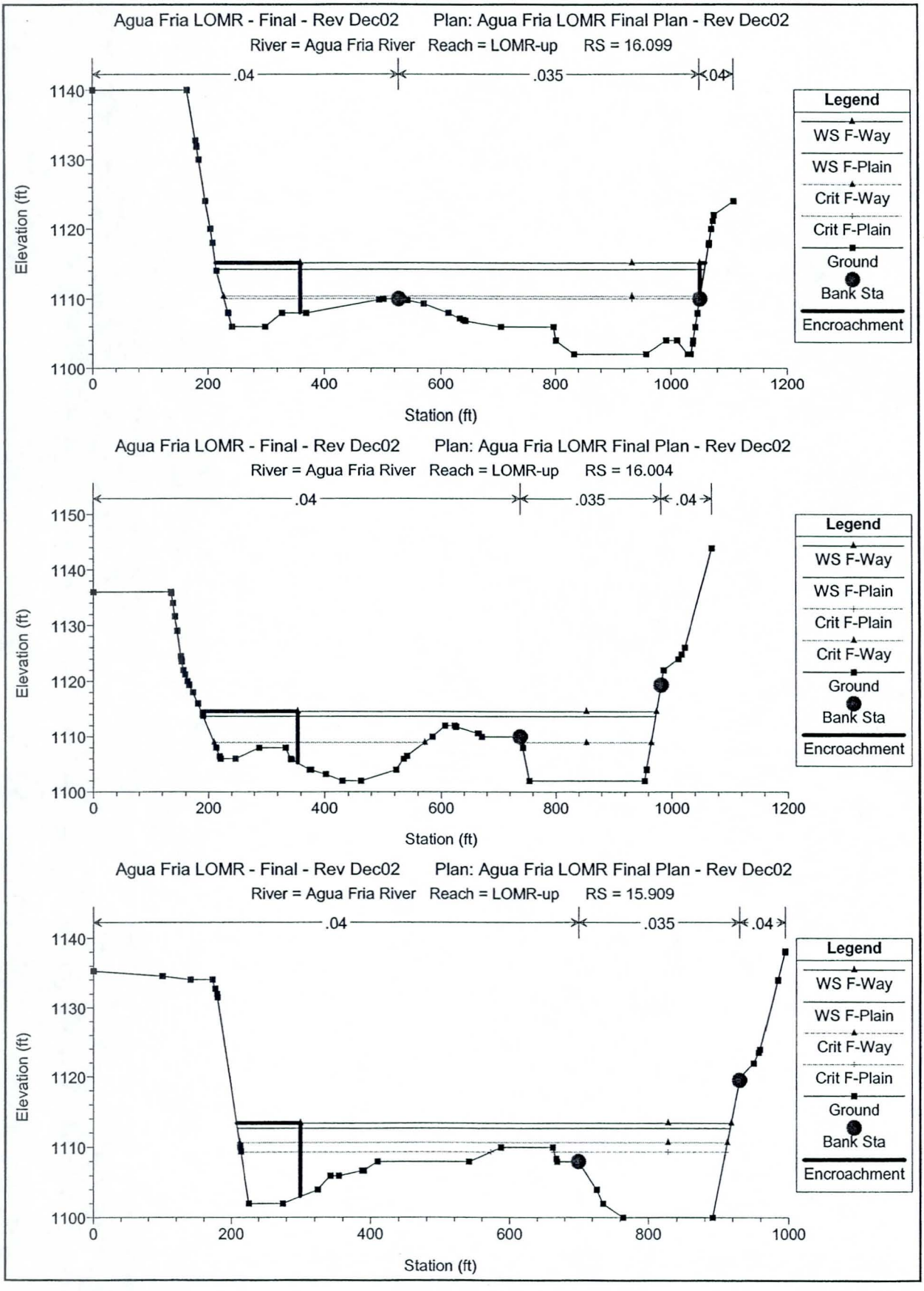
1140
1130
1120
1110
1100
0
100
200
300
400
500
600
700
800
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 16.612
.05
.04
.05
Elevation (ft)
1150
1140
1130
1120
1110
1100
0
100
200
300
400
500
600
700
800
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Bank Sta
Encroachment

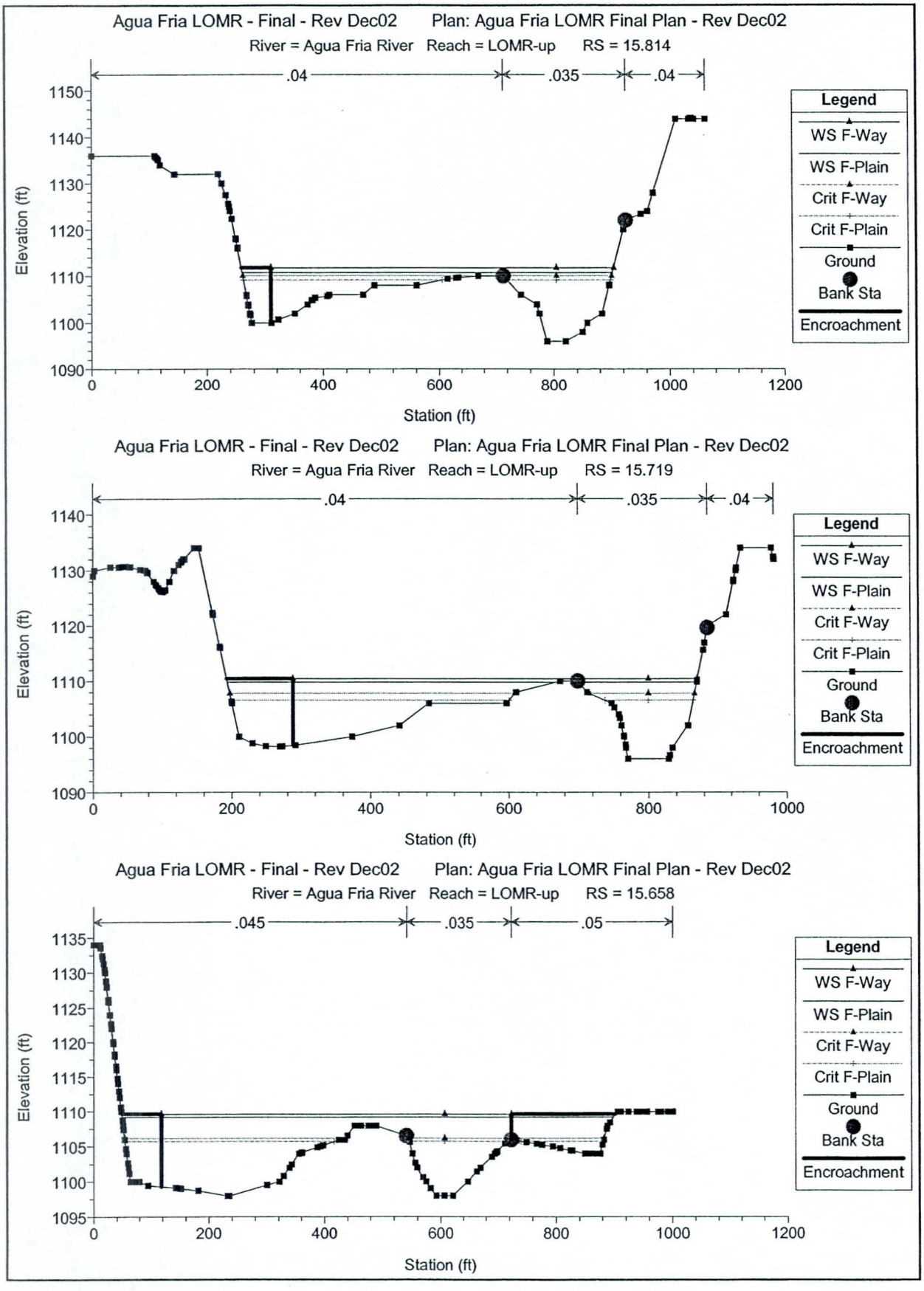

Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 16.518
.05
.04
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 16.516
.05
.04
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 16.516
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Encroachment

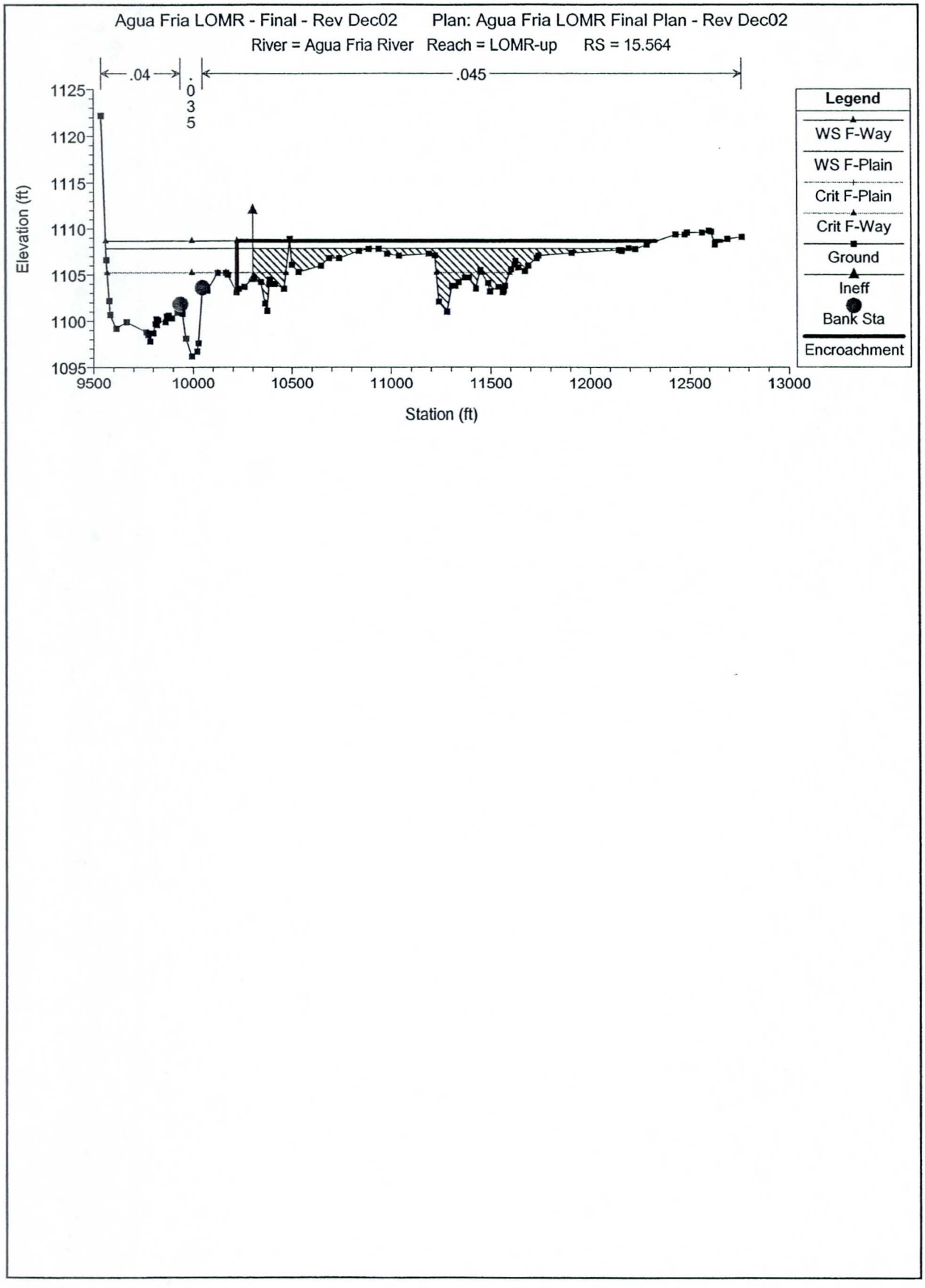

Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 16.514
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 16.506
.04
.035
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 16.494
.04
.035
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Encroachment

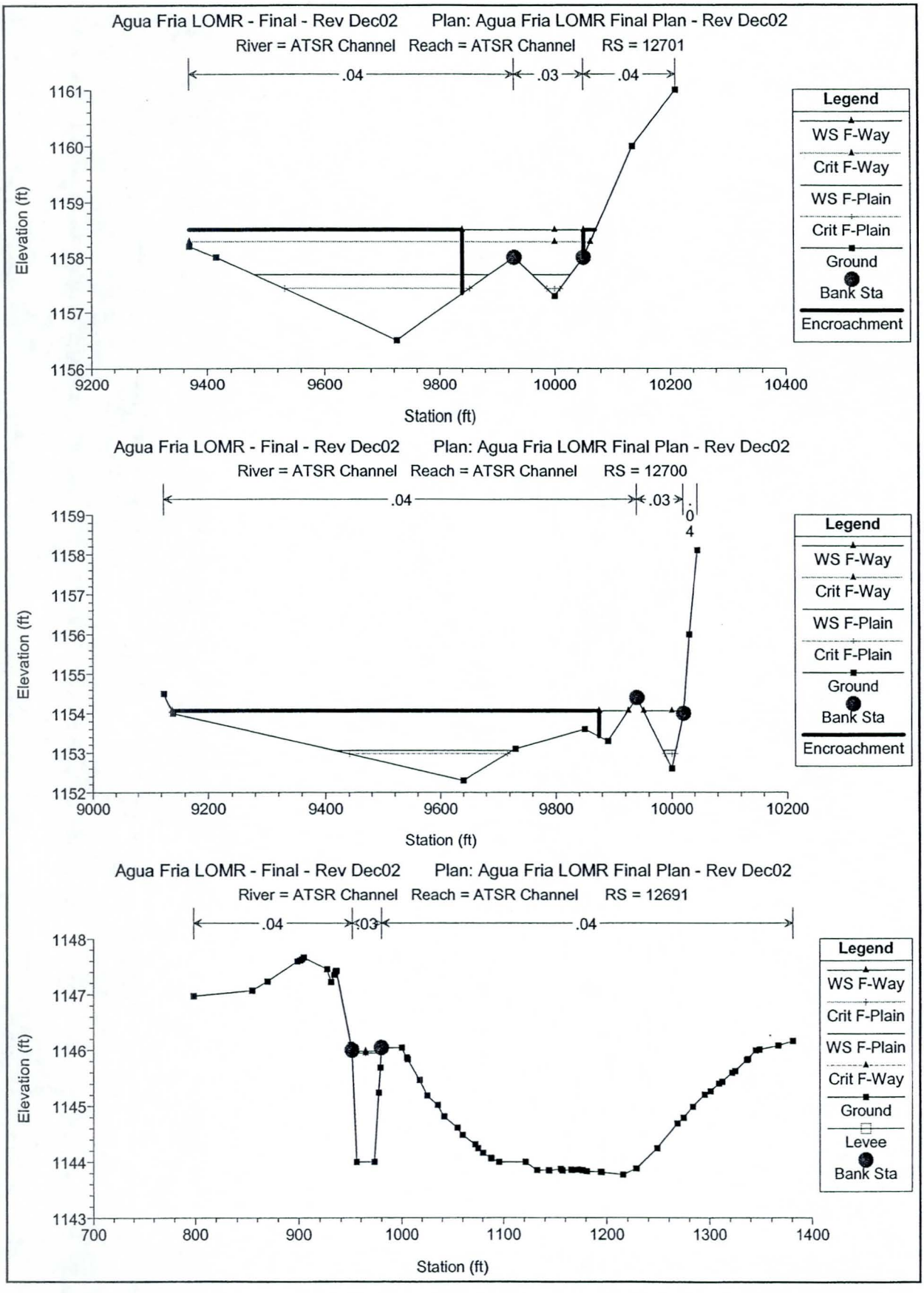

Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 16.494
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 16.482
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 16.471
.04
.035
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Encroachment

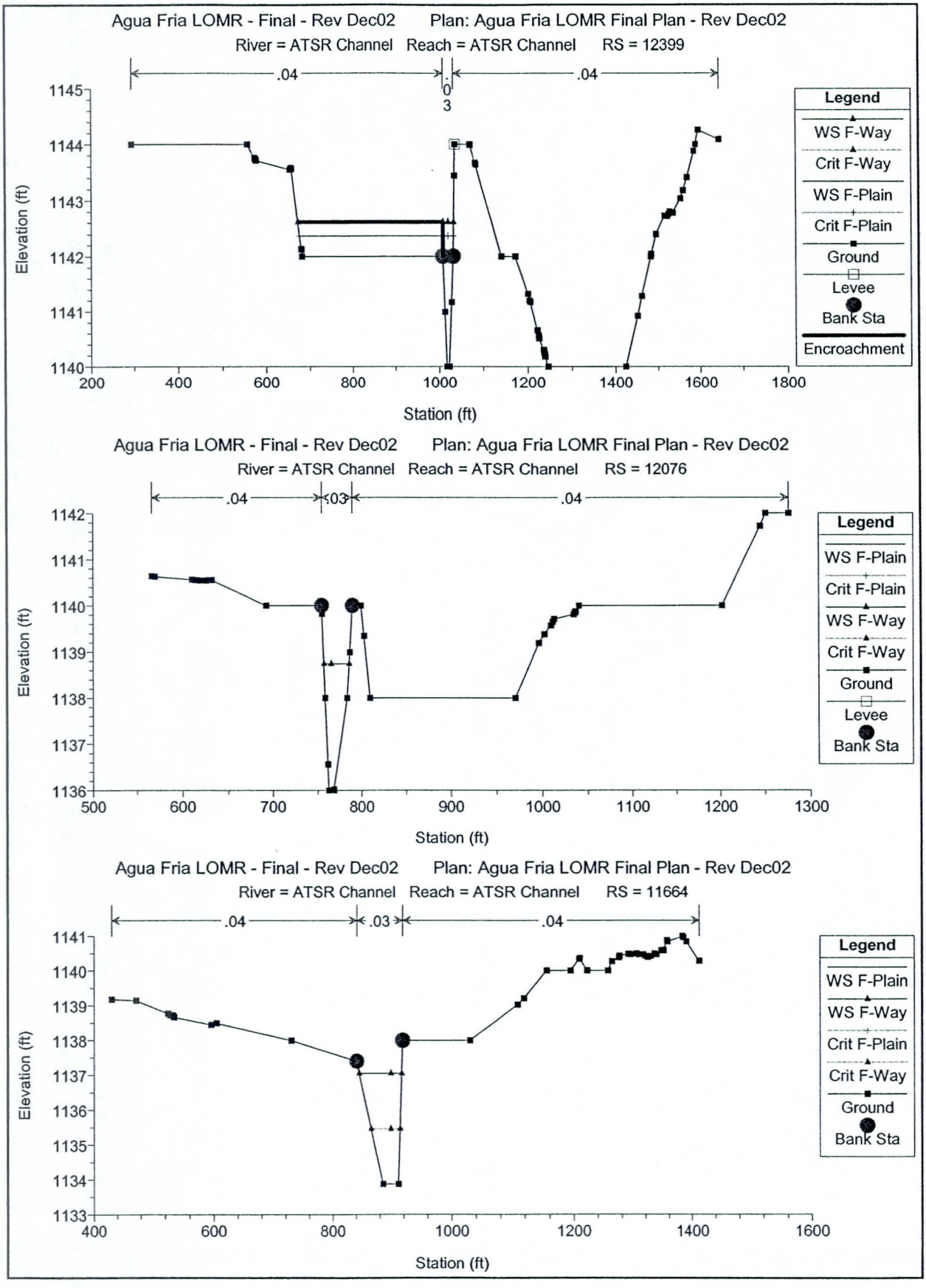

Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 16.385
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 16.289
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Way
Crit F-Plain
Ground
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 16.195
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Way
Crit F-Plain
Ground
Bank Sta
Encroachment

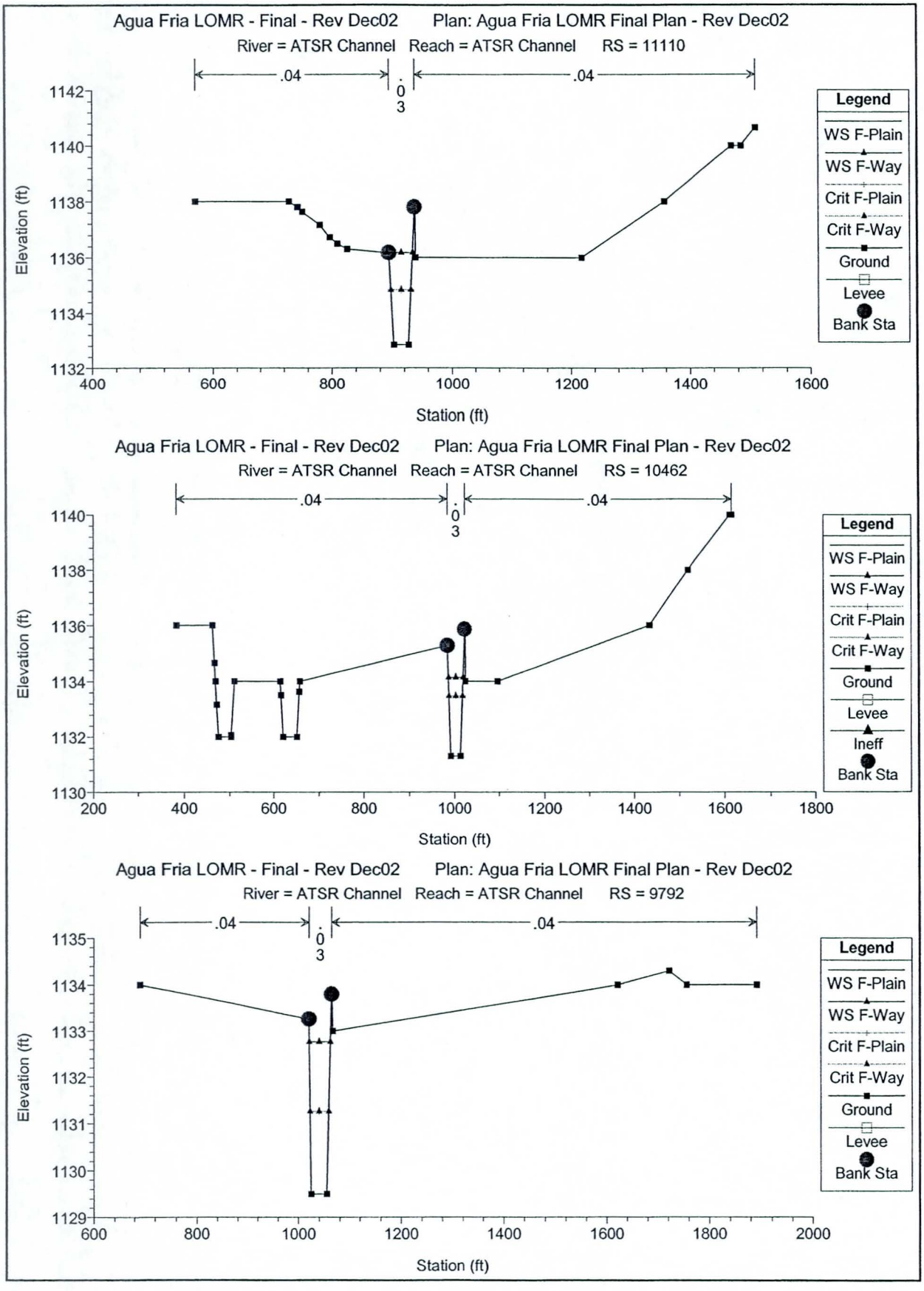

Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 16.099
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Way
Crit F-Plain
Ground
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 16.004
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 15.909
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Way
Crit F-Plain
Ground
Bank Sta
Encroachment

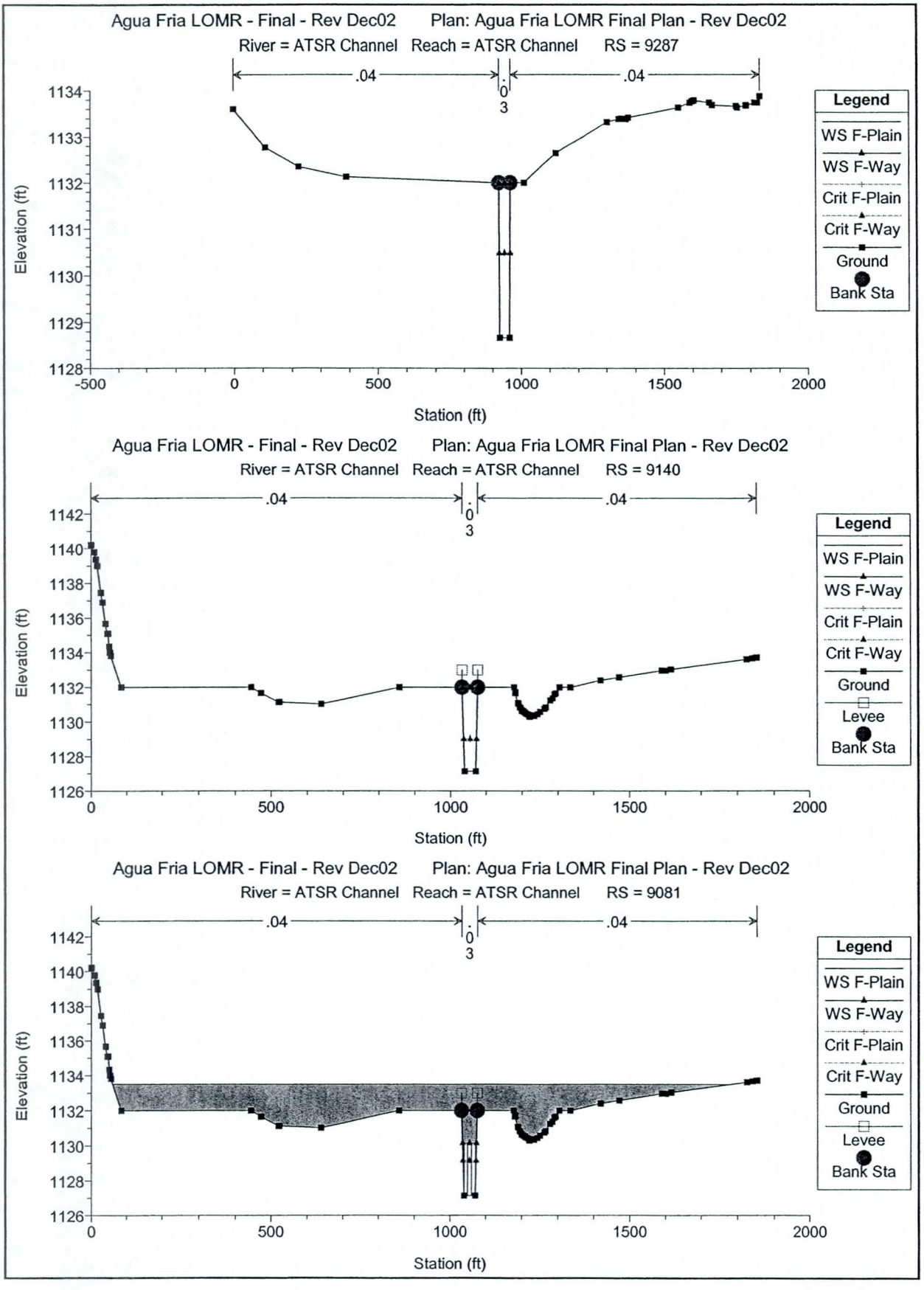

Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 15.814
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Way
Crit F-Plain
Ground
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 15.719
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Way
Crit F-Plain
Ground
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 15.658
.045
.035
.05
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Way
Crit F-Plain
Ground
Bank Sta
Encroachment

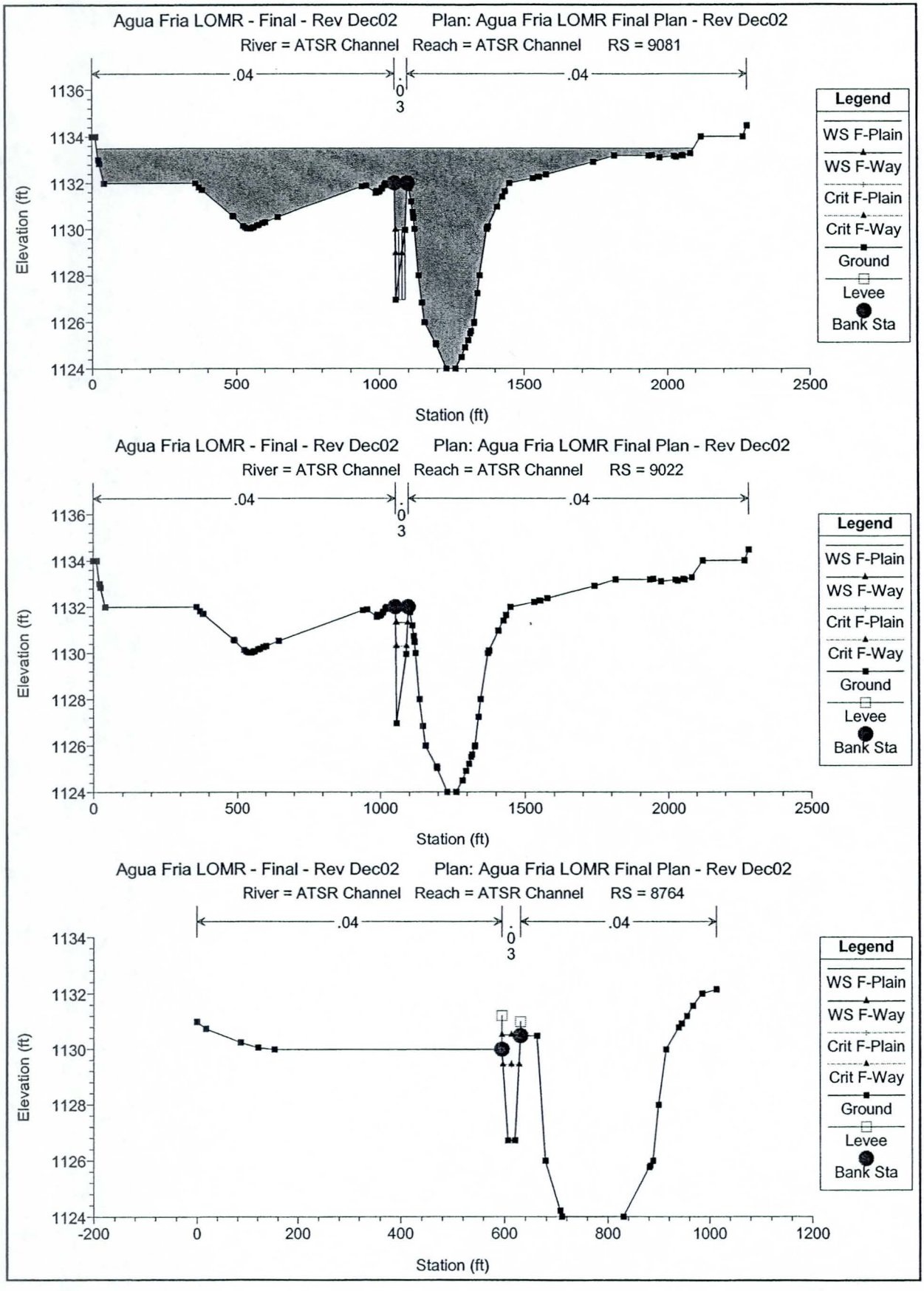

Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = Agua Fria River Reach = LOMR-up RS = 15.564
.04
.035
.045
Elevation (ft)
1125
1120
1115
1110
1105
1100
1095
9500
10000
10500
11000
11500
12000
12500
13000
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Ineff
Bank Sta
Encroachment

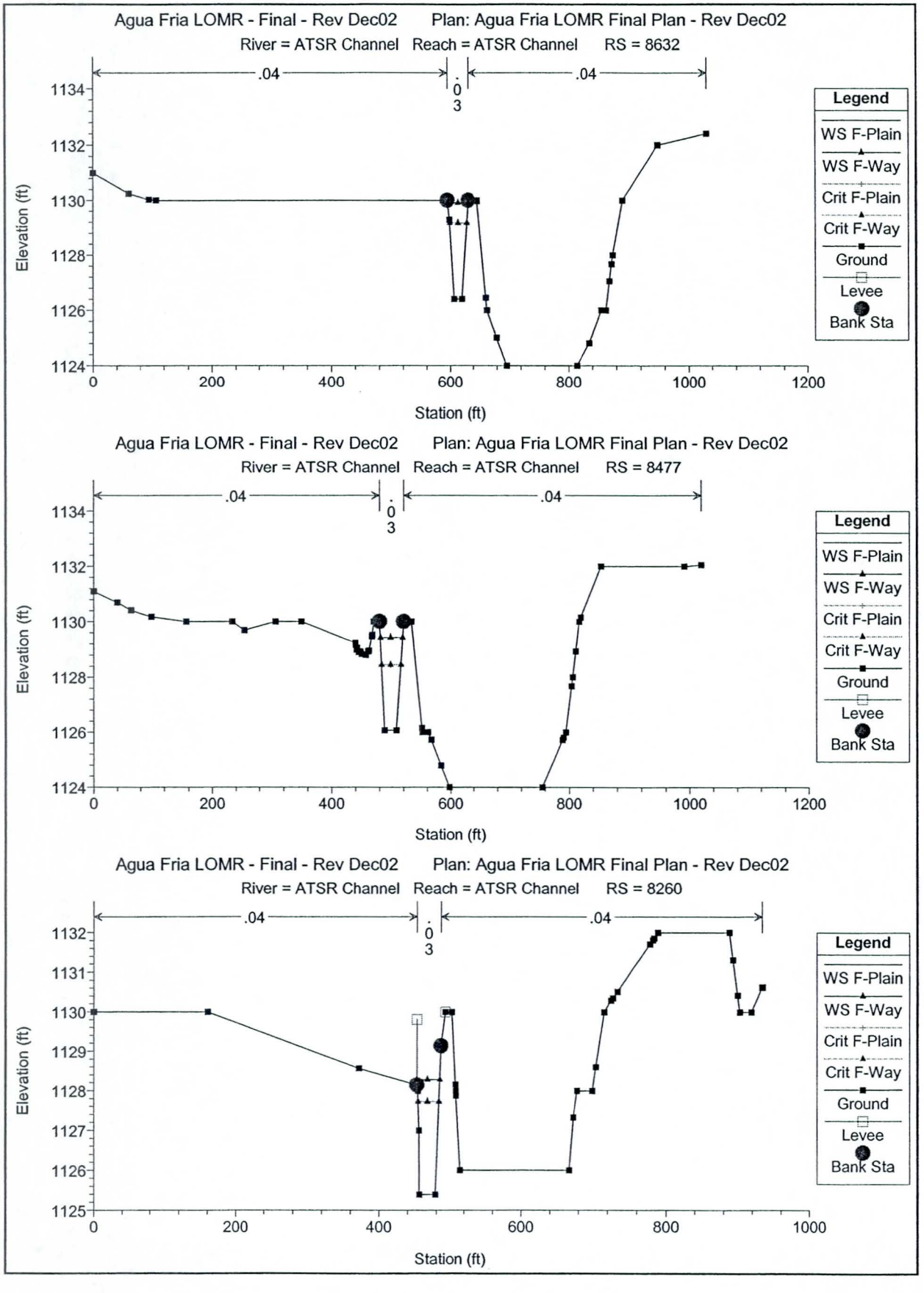

Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 12701
.04
.03
.04
Elevation (ft)
1161
1160
1159
1158
1157
1156
9200
9400
9600
9800
10000
10200
10400
Station (ft)
Legend
WS F-Way
Crit F-Way
WS F-Plain
Crit F-Plain
Ground
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 12700
.04
.03
.04
Elevation (ft)
1159
1158
1157
1156
1155
1154
1153
1152
9000
9200
9400
9600
9800
10000
10200
Station (ft)
Legend
WS F-Way
Crit F-Way
WS F-Plain
Crit F-Plain
Ground
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 12691
.04
.03
.04
Elevation (ft)
1148
1147
1146
1145
1144
1143
700
800
900
1000
1100
1200
1300
1400
Station (ft)
Legend
WS F-Way
Crit F-Plain
WS F-Plain
Crit F-Way
Ground
Levee
Bank Sta

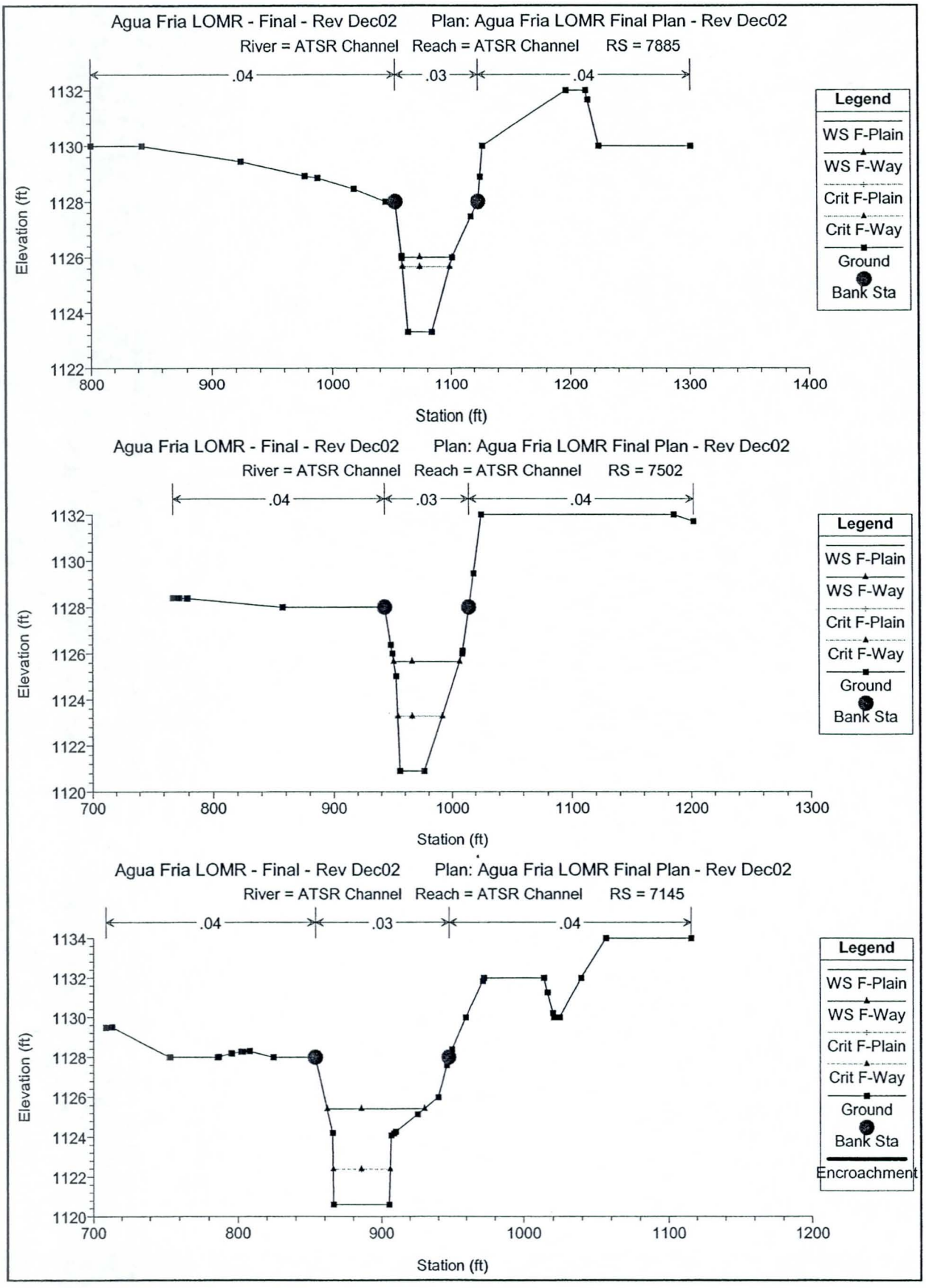

Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 12399
.04
.0
3
.04
Legend
WS F-Way
Crit F-Way
WS F-Plain
Crit F-Plain
Ground
Levee
Bank Sta
Encroachment
Elevation (ft)
Station (ft)
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 12076
.04
.03
.04
Legend
WS F-Plain
Crit F-Plain
WS F-Way
Crit F-Way
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 11664
.04
.03
.04
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Bank Sta
Elevation (ft)
Station (ft)

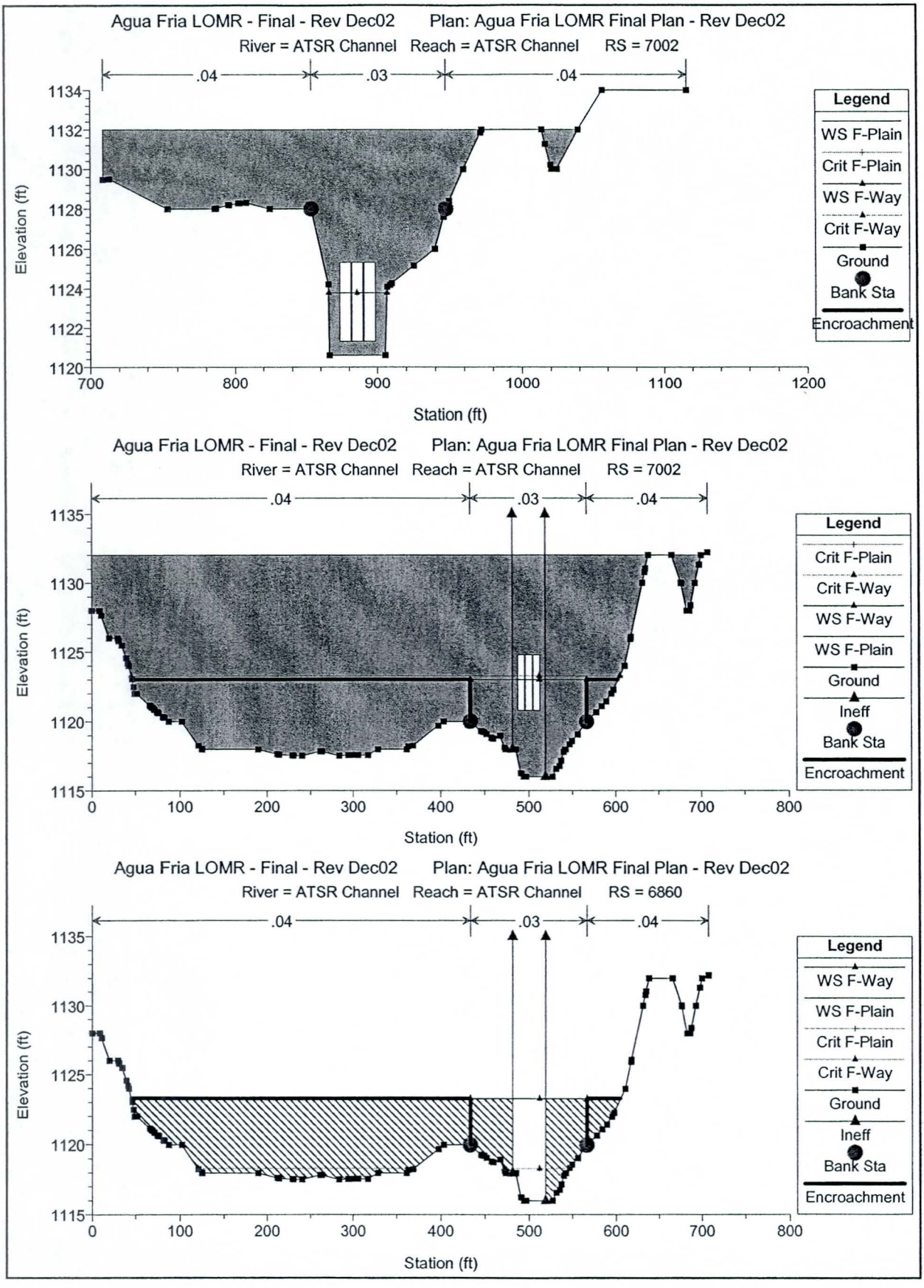

Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 11110
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 10462
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Levee
Ineff
Bank Sta
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 9792
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta

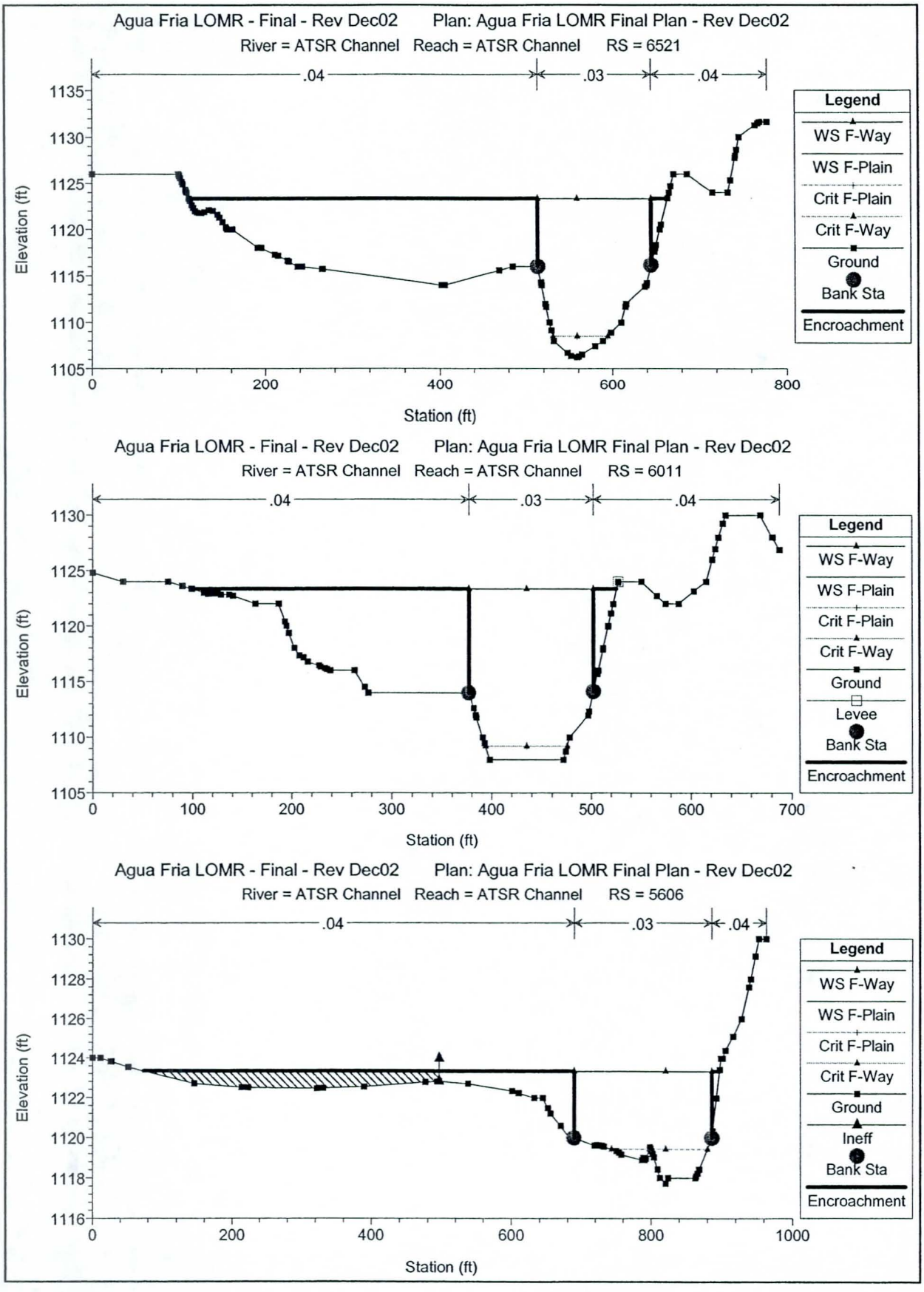

Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 9287
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Bank Sta
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 9140
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 9081
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta

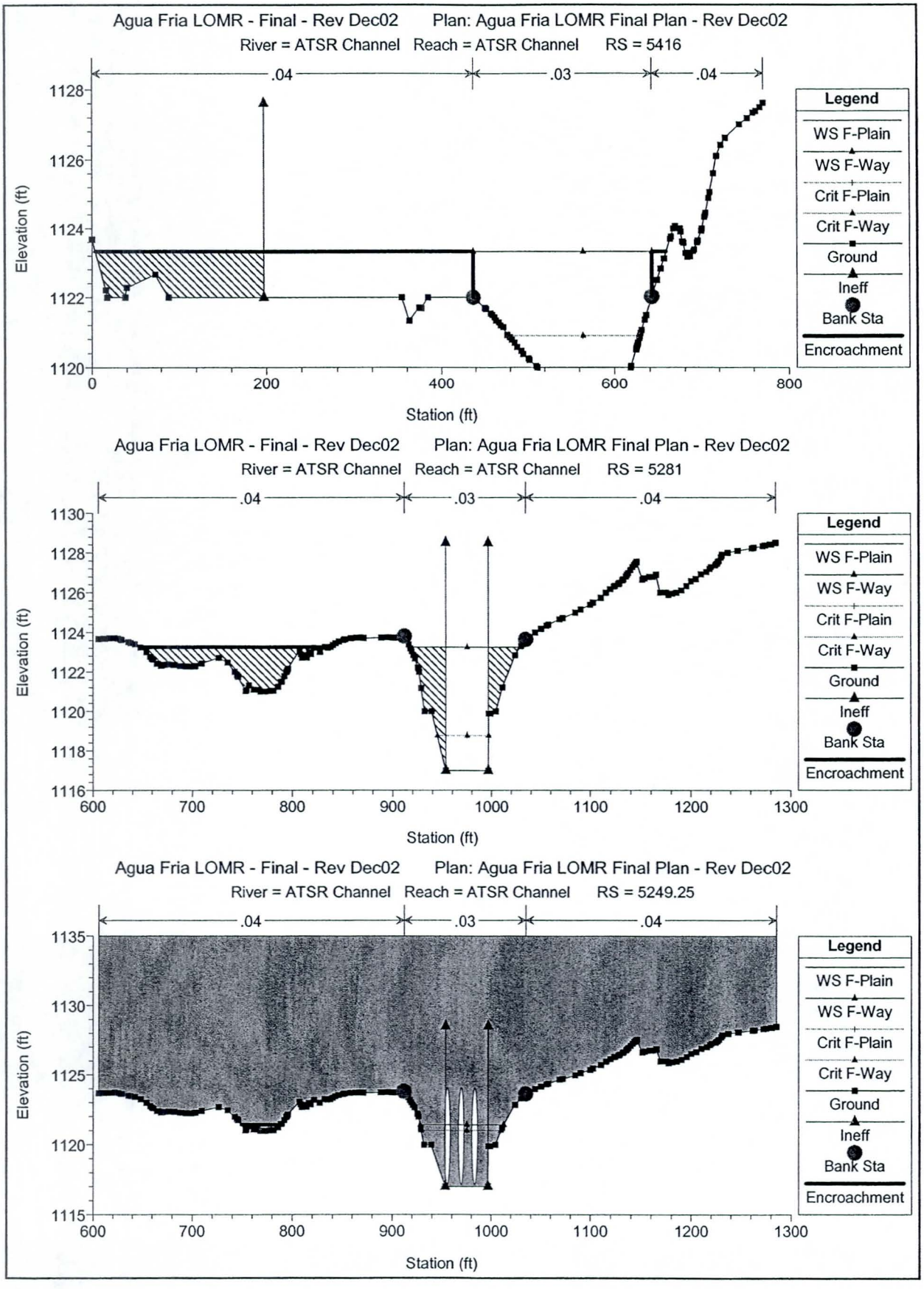

Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 9081
.04
.03
.04
Elevation (ft)
1136
1134
1132
1130
1128
1126
1124
0
500
1000
1500
2000
2500
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 9022
.04
.03
.04
Elevation (ft)
1136
1134
1132
1130
1128
1126
1124
0
500
1000
1500
2000
2500
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 8764
.04
.03
.04
Elevation (ft)
1134
1132
1130
1128
1126
1124
-200
0
200
400
600
800
1000
1200
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta

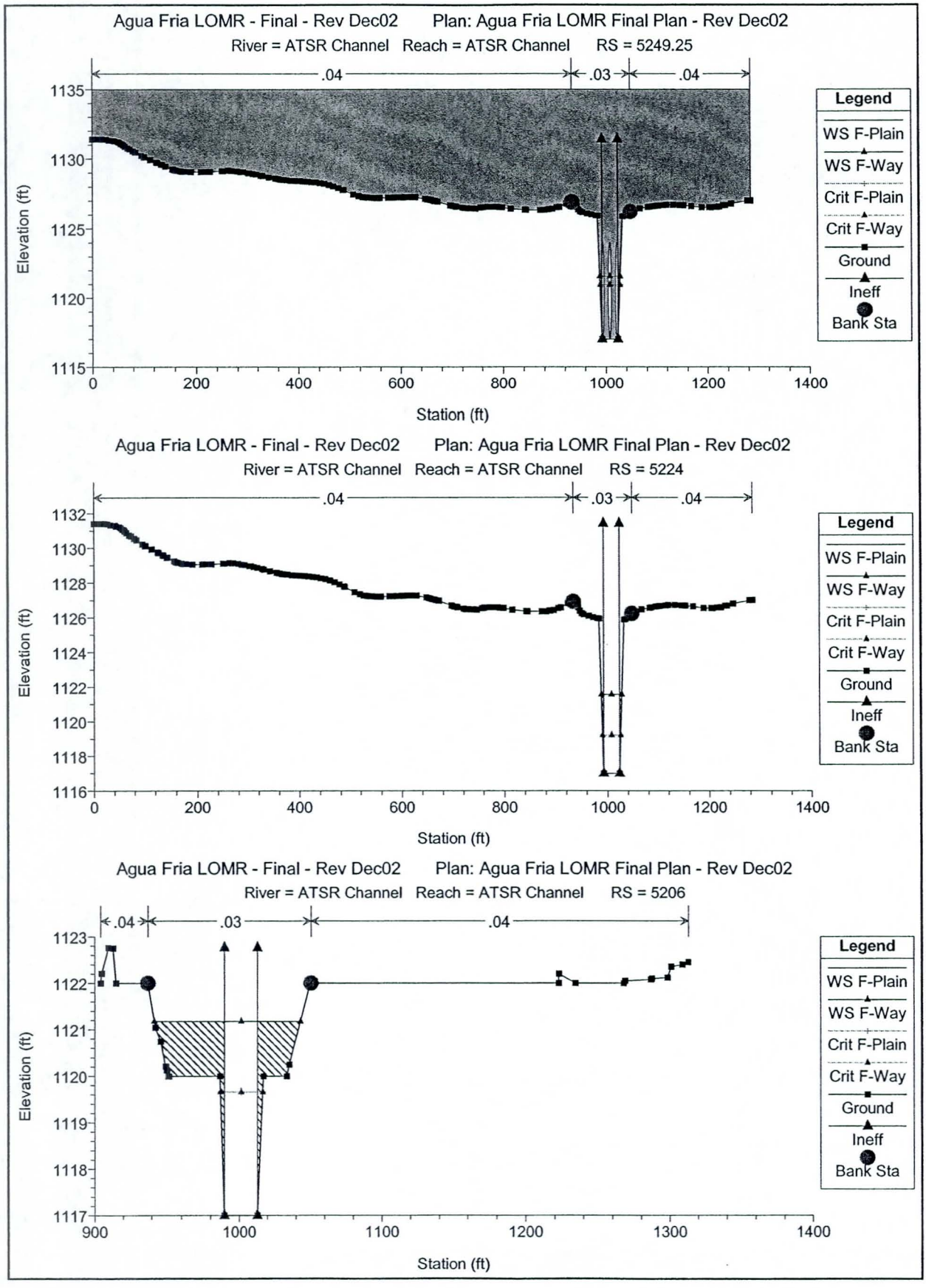

Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 8632
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 8477
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 8260
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta

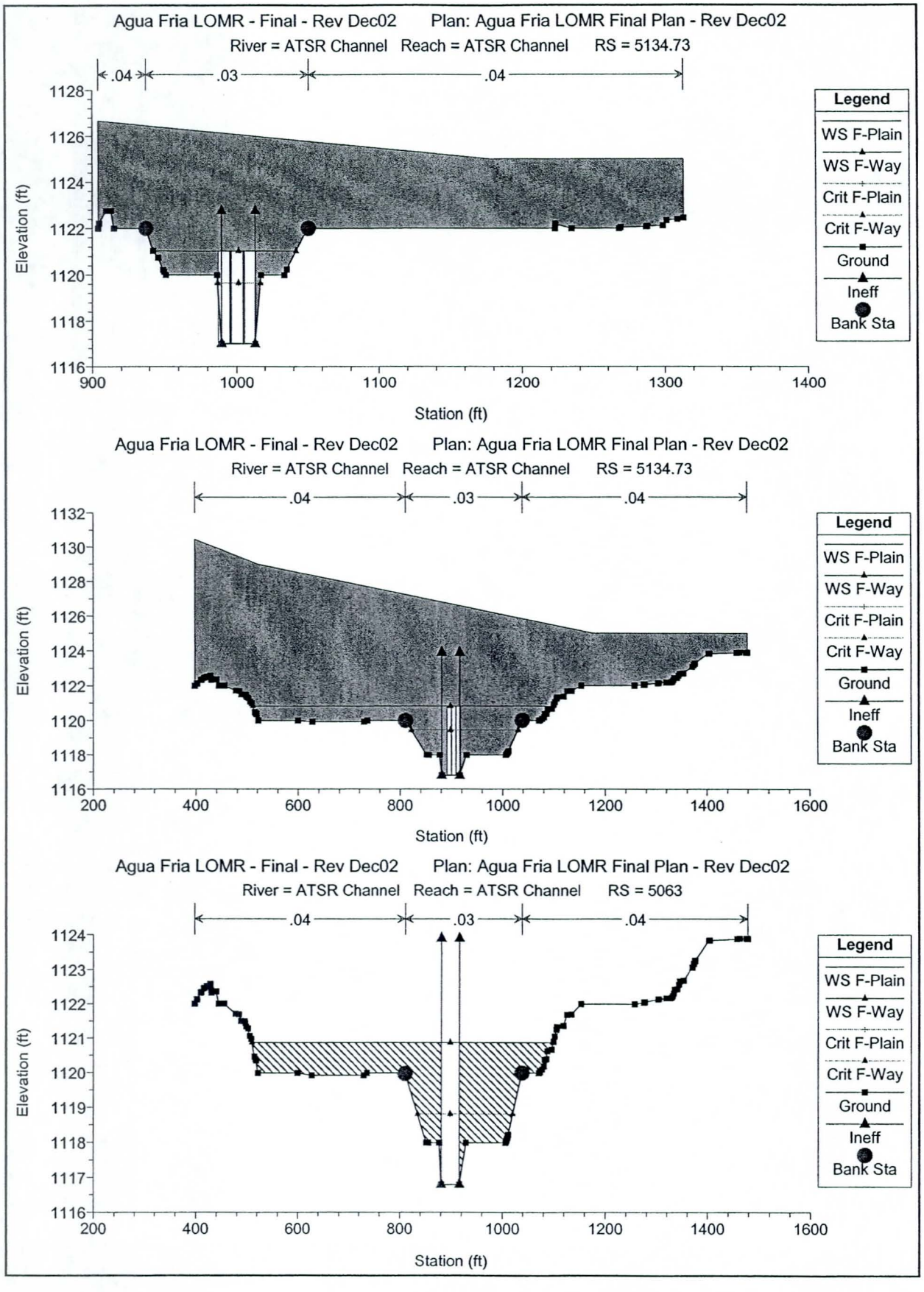

Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 7885
.04
.03
.04
Elevation (ft)
1132
1130
1128
1126
1124
1122
800
900
1000
1100
1200
1300
1400
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Bank Sta
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 7502
.04
.03
.04
Elevation (ft)
1132
1130
1128
1126
1124
1122
1120
700
800
900
1000
1100
1200
1300
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Bank Sta
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 7145
.04
.03
.04
Elevation (ft)
1134
1132
1130
1128
1126
1124
1122
1120
700
800
900
1000
1100
1200
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Bank Sta
Encroachment

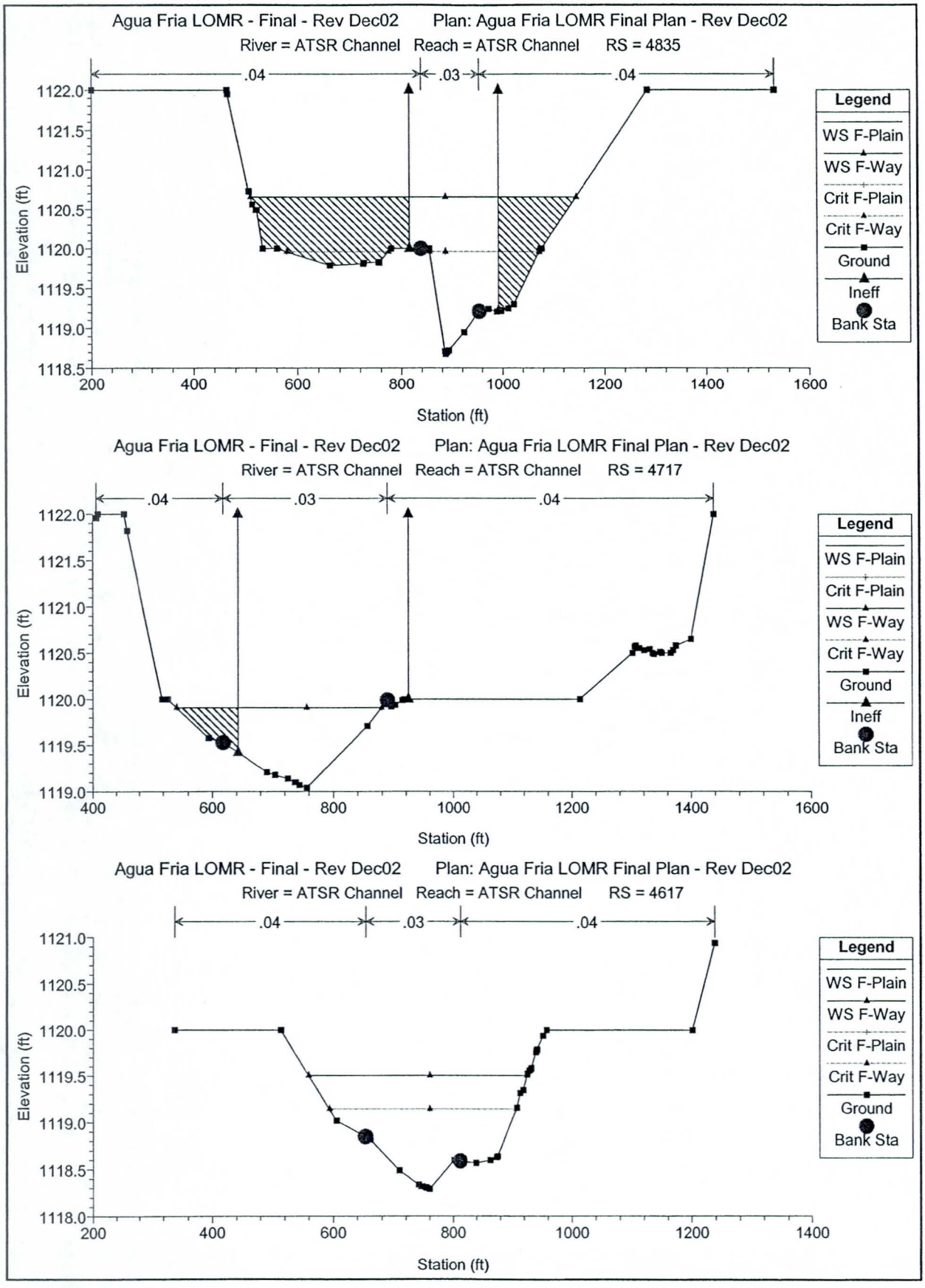

Agua Fria LOMR - Final - Rev Dec02
Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel
Reach = ATSR Channel
RS = 7002
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
WS F-Plain
Crit F-Plain
WS F-Way
Crit F-Way
Ground
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02
Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel
Reach = ATSR Channel
RS = 7002
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
Crit F-Plain
Crit F-Way
WS F-Way
WS F-Plain
Ground
Ineff
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02
Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel
Reach = ATSR Channel
RS = 6860
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Ineff
Bank Sta
Encroachment

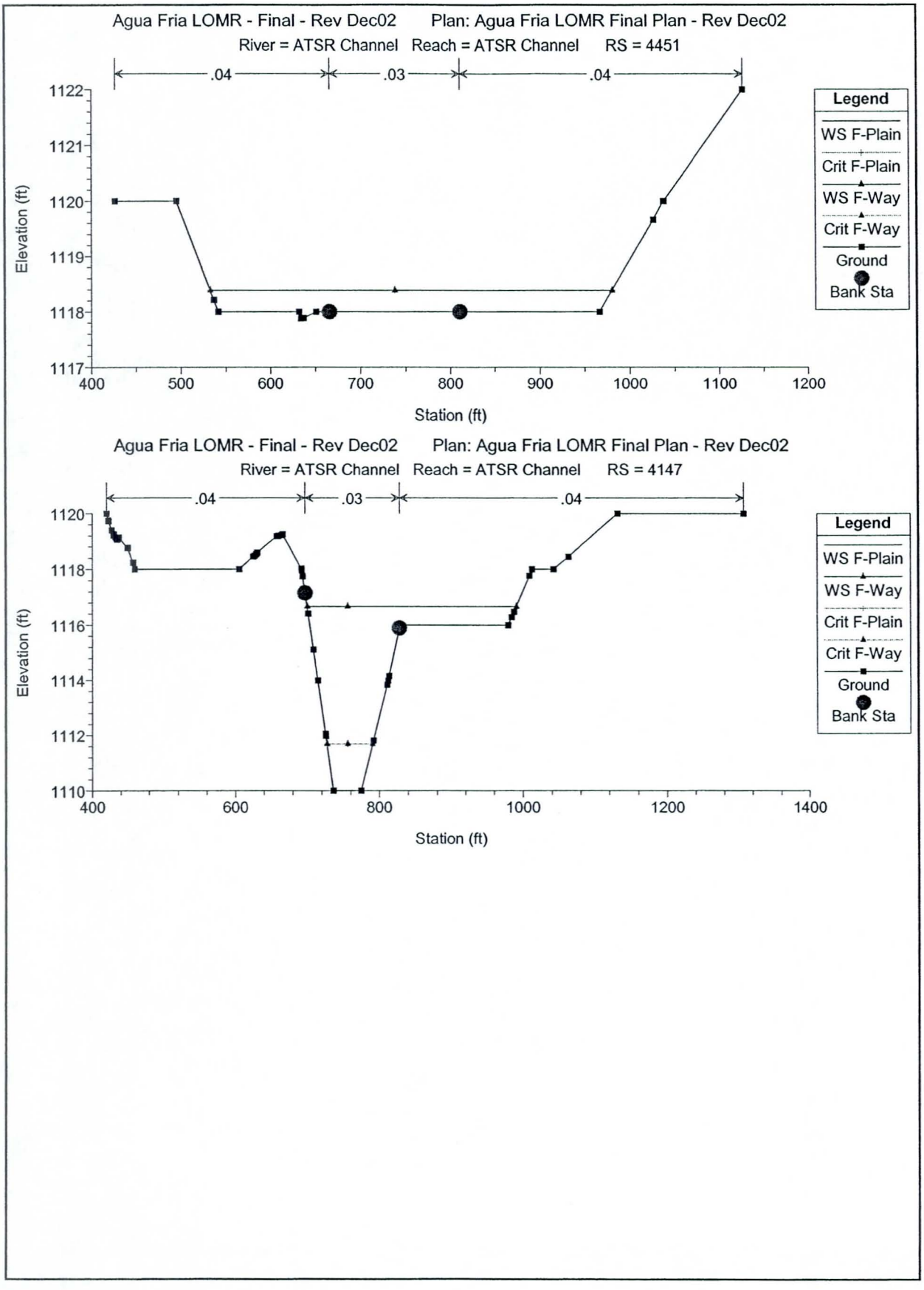

Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 6521
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 6011
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Levee
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 5606
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
WS F-Way
WS F-Plain
Crit F-Plain
Crit F-Way
Ground
Ineff
Bank Sta
Encroachment


Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 5416
.04
.03
.04
Elevation (ft)
1128
1126
1124
1122
1120
0
200
400
600
800
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Ineff
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 5281
.04
.03
.04
Elevation (ft)
1130
1128
1126
1124
1122
1120
1118
1116
600
700
800
900
1000
1100
1200
1300
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Ineff
Bank Sta
Encroachment
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 5249.25
.04
.03
.04
Elevation (ft)
1135
1130
1125
1120
1115
600
700
800
900
1000
1100
1200
1300
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Ineff
Bank Sta
Encroachment


Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 5249.25
.04
.03
.04
Elevation (ft)
1135
1130
1125
1120
1115
0
200
400
600
800
1000
1200
1400
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Ineff
Bank Sta
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 5224
.04
.03
.04
Elevation (ft)
1132
1130
1128
1126
1124
1122
1120
1118
1116
0
200
400
600
800
1000
1200
1400
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Ineff
Bank Sta
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 5206
.04
.03
.04
Elevation (ft)
1123
1122
1121
1120
1119
1118
1117
900
1000
1100
1200
1300
1400
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Ineff
Bank Sta


Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 5134.73
.04
.03
.04
Elevation (ft)
1128
1126
1124
1122
1120
1118
1116
900
1000
1100
1200
1300
1400
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Ineff
Bank Sta
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 5134.73
.04
.03
.04
Elevation (ft)
1132
1130
1128
1126
1124
1122
1120
1118
1116
200
400
600
800
1000
1200
1400
1600
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Ineff
Bank Sta
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 5063
.04
.03
.04
Elevation (ft)
1124
1123
1122
1121
1120
1119
1118
1117
1116
200
400
600
800
1000
1200
1400
1600
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Ineff
Bank Sta


Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 4835
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Ineff
Bank Sta
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 4717
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
WS F-Plain
Crit F-Plain
WS F-Way
Crit F-Way
Ground
Ineff
Bank Sta
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 4617
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Bank Sta


Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 4451
.04
.03
.04
Elevation (ft)
1122
1121
1120
1119
1118
1117
400
500
600
700
800
900
1000
1100
1200
Station (ft)
Legend
WS F-Plain
Crit F-Plain
WS F-Way
Crit F-Way
Ground
Bank Sta
Agua Fria LOMR - Final - Rev Dec02 Plan: Agua Fria LOMR Final Plan - Rev Dec02
River = ATSR Channel Reach = ATSR Channel RS = 4147
.04
.03
.04
Elevation (ft)
1120
1118
1116
1114
1112
1110
400
600
800
1000
1200
1400
Station (ft)
Legend
WS F-Plain
WS F-Way
Crit F-Plain
Crit F-Way
Ground
Bank Sta

E.3 Expansion and Contraction Coefficients

Not Applicable / Not Included

E.4 Analysis of Structures

Not Applicable / Not Included

E.5 Hydraulic Calculations

HEC-RAS Plan: LOMR Final River: Agua Fria River Reach: LOMR-up Profile: F-Plain

Reach	River Sta	Q US	Q Leaving Total	Q DS	Q Weir	Total Gate Flow	Wr Top Wdth	Weir Max Depth	Weir Avg Depth	Min El Weir Flow	E.G. US.	W.S. US.	E.G. DS	W.S. DS
		(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
LOMR-up	17.866	37500.00	846.29	37500.00	846.29		95.97	2.69	1.92	1134.00	1137.00	1136.72	1136.89	1136.61

F Erosion and Sediment Transport Analysis Supporting Documentation

Not Applicable / Not Included

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PRELIMINARY

FLOOD DELINEATION STUDY OF AGUA FRIA RIVER – CACTUS RD. TO APPROX. BELL ROAD

F.C.D. CONTRACT NO. 1999C048
ASSIGNMENT NO. 6 – PHASE II

LEGEND

- 100-YR FLOODPLAIN BOUNDARY
- 100-YR FLOODWAY BOUNDARY
- HYDRAULIC BASELINE
- CROSS SECTION — FP = 100 YR WSE / FW = FLOODWAY — (2)
- BASE FLOOD ELEVATIONS — 1224
- ZONE DESIGNATIONS — ZONE AE
- SPOT ELEVATIONS — 72.6 ×
- ELEVATION REFERENCE MARKS — ERM 1
- DRAWING NOTES — (1)

ELEVATION REFERENCE MARKS

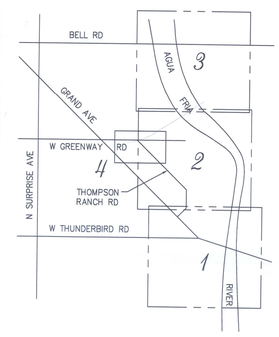
ERM 1 [ELEVATION = 1120.71]
STONE WITH CHISLED "+" (SEC CORNER) NORTH OF GRAND AVE. ALONG WOOD POWER POLE LINE ON WEST SIDE OF PAVED ROAD.

NOTES THIS SHEET

(1) CROSS SECTION GEOMETRY AND WATER SURFACE ELEVATIONS COPIED FROM EFFECTIVE MODEL.

REVISIONS

INDEX MAP



Registered Professional Engineer Certificate No. 36225 GARY E. FREEMAN Date Signed 6/19/02 Arizona, U.S.A.

200' 0' 200' 400'
SCALE: 1" = 200'
VERTICAL CONTOUR INTERVAL = 2 FEET

ALL ELEVATIONS BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

	BY	DATE
DESIGN	---	---
DESIGN CHECK	---	---
PLANS	JEH	12/01
PLANS CHECK	GEF	12/01

SUBMITTED BY: _____ DATE

WEST Consultants, Inc.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: _____ DATE

APPROVED BY: _____ DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 1 OF 4

MATCHLINE – SHEETS 2 & 3

LIMIT OF STUDY

ZONE AE

SHADED ZONE X

ZONE A

AGUA FRIA RIVER

THOMPSON RANCH ROAD

GRAND AVENUE

Q = 37,500 CFS FP = 1136.66 FW = 1137.01 17.821

Q = 37,500 CFS FP = 1136.5 FW = 1136.85 17.730

Q = 37,500 CFS FP = 1136.16 FW = 1136.54 17.638

Q = 36,000 CFS FP = 1133.95 FW = 1134.15 17.5758

Q = 36,000 CFS FP = 1130.33 FW = 1130.33 17.5137

FP = 1130.22 FW = 1130.22 17.458

Q = 36,000 CFS

FP = 1129.82 FW = 1129.82 17.319

FP = 1129.77 FW = 1129.77 17.277

Q = 36,000 CFS

FP = 1128.65 FW = 1128.65 17.180

Q = 36,000 CFS

FP = 1127.19 FW = 1127.19 17.085

Q = 36,000 CFS

FP = 1126.16 FW = 1126.17 16.990

Q = 36,000 CFS

FP = 1124.24 FW = 1124.25 16.895

Q = 36,000 CFS

FP = 1123.48 FW = 1123.48 16.801

12691 FP = 1145.95 FW = 1145.98 Q = 320 CFS

12399 FP = 1142.37 FW = 1142.60 Q = 374 CFS

11664 FP = 1137.06 FW = 1137.06

11110 FP = 1136.18 FW = 1136.18 Q = 428 CFS

10462 FP = 1134.13 FW = 1134.13 Q = 428 CFS

9792 FP = 1132.77 FW = 1132.77 Q = 428 CFS

9022 FP = 1131.31 FW = 1131.31 Q = 483 CFS

8477 FP = 1129.42 FW = 1129.42 Q = 483 CFS

8260 FP = 1128.29 FW = 1128.29 Q = 483 CFS

7885 FP = 1126.01 FW = 1126.01 Q = 530 CFS

7502 FP = 1125.65 FW = 1125.65 Q = 530 CFS

7145 FP = 1125.43 FW = 1125.43 Q = 530 CFS

12076 FP = 1138.74 FW = 1138.74 Q = 374 CFS

9287 FP = 1131.99 FW = 1131.99 Q = 483 CFS

9140 FP = 1131.95 FW = 1131.95 Q = 483 CFS

8764 FP = 1130.53 FW = 1130.53 Q = 483 CFS

8632 FP = 1129.92 FW = 1129.92 Q = 483 CFS

MATCHLINE – SHEETS 1 & 2

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PRELIMINARY

FLOOD DELINEATION STUDY OF AGUA FRIA RIVER – CACTUS RD. TO APPROX. BELL ROAD

F.C.D. CONTRACT NO. 1999C048
ASSIGNMENT NO. 6 – PHASE II

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- 100-YR FLOODPLAIN BOUNDARY
- 100-YR FLOODWAY BOUNDARY
- HYDRAULIC BASELINE
- CROSS SECTION (FP = 100 YR WSE / FW = FLOODWAY) 2
- BASE FLOOD ELEVATIONS 1224
- ZONE DESIGNATIONS ZONE AE
- SPOT ELEVATIONS 72.6
- ELEVATION REFERENCE MARKS ERM 1
- DRAWING NOTES 1

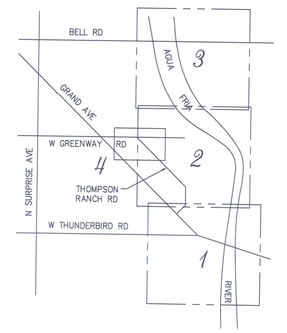
ELEVATION REFERENCE MARKS

NONE THIS SHEET

NOTES THIS SHEET

REVISIONS

INDEX MAP



200' 0' 200' 400'
SCALE: 1" = 200'
VERTICAL CONTOUR INTERVAL = 2 FEET

ALL ELEVATIONS BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

WEST Consultants, Inc.

	BY	DATE
DESIGN	---	---
DESIGN CHECK	---	---
PLANS	JEH	12/01
PLANS CHECK	GEF	12/01

SUBMITTED BY: DATE

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE
APPROVED BY: DATE
CHIEF ENGINEER AND GENERAL MANAGER

SHEET 2 OF 4

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PRELIMINARY

FLOOD DELINEATION STUDY OF AGUA FRIA RIVER – CACTUS RD. TO APPROX. BELL ROAD

F.C.D. CONTRACT NO. 1999C048
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- CROSS SECTION — FP = 100 YR WSE / FW = FLOODWAY (2)
- BASE FLOOD ELEVATIONS — 1224
- ZONE DESIGNATIONS — ZONE AE
- SPOT ELEVATIONS — 72.6
- ELEVATION REFERENCE MARKS — ERM 1
- DRAWING NOTES — (1)

ELEVATION REFERENCE MARKS

ERM 2 [ELEVATION = 1164.34]
ALUMINUM CAP STAMPED "4GA2 1999" COMPRESSED ON A 13.0 FOOT STEEL ROD BURRIED IN GROUND ENCASED BY PVC AND CONCRETE COLLAR.

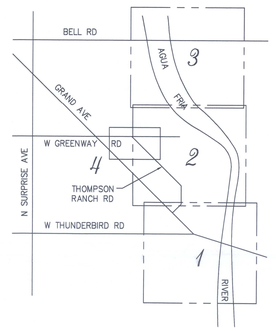
NOTES THIS SHEET

(1) CROSS SECTION GEOMETRY COPIED FROM EFFECTIVE MODEL.

(2) FLOODWAY ADJUSTED TO TRANSITION INTO EFFECTIVE MODEL AT X-SEC 19.448.

REVISIONS

INDEX MAP



Registered Professional Engineer (State) CERTIFICATE NO. 38225 GARY E. FREEMAN 6/30/03 Date Signed ARIZONA, U.S.A.

200' 0' 200' 400'
SCALE: 1" = 200'
VERTICAL CONTOUR INTERVAL = 2 FEET

ALL ELEVATIONS BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

WEST Consultants, Inc.	BY	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN	---	---	RECOMMENDED BY: DATE
DESIGN CHECK	---	---	APPROVED BY: DATE
PLANS	JEH	12/01	CHIEF ENGINEER AND GENERAL MANAGER
PLANS CHECK	GEF	12/01	SHEET 3 OF 4
SUBMITTED BY: DATE			

ZONE AE
LIMIT OF STUDY
ERM 2
1164.34
BELL ROAD
AGUA FRIA RIVER
FP = 1164.97 / FW = 1164.23 — 19.446
Q = 37,500 CFS FP = 1162.88 / FW = 1163.42 — 19.352
Q = 37,500 CFS FP = 1160.54 / FW = 1160.54 — 19.256
Q = 37,500 CFS FP = 1159.19 / FW = 1159.19 — 19.162
Q = 37,500 CFS FP = 1157.10 / FW = 1157.20 — 19.066
Q = 37,500 CFS FP = 1156.29 / FW = 1156.46 — 18.978
Q = 37,500 CFS FP = 1156.10 / FW = 1156.29 — 18.962
Q = 37,500 CFS FP = 1155.93 / FW = 1156.13 — 18.937
Q = 37,500 CFS FP = 1154.95 / FW = 1155.16 — 18.839
Q = 37,500 CFS FP = 1153.39 / FW = 1153.77 — 18.748
Q = 37,500 CFS FP = 1151.96 / FW = 1152.51 — 18.653
Q = 37,500 CFS FP = 1150.14 / FW = 1150.69 — 18.558
Q = 37,500 CFS FP = 1147.31 / FW = 1148.19 — 18.464
Q = 37,500 CFS FP = 1144.73 / FW = 1144.92 — 18.369
Q = 37,500 CFS FP = 1141.97 / FW = 1142.77 — 18.275
Q = 37,500 CFS FP = 1139.03 / FW = 1139.34 — 18.182
Q = 37,500 CFS FP = 1137.72 / FW = 1138.38 — 18.093
Q = 37,500 CFS FP = 1137.22 / FW = 1137.82 — 18.000
Q = 37,500 CFS FP = 1136.93 / FW = 1137.11 — 17.910
MATCHLINE – SHEETS 2 & 3
MATCHLINE – SHEETS 2 & 3

SHADED ZONE X

LIMIT OF STUDY

ZONE AE

MATCHLINE – SHEETS 2 & 4

12701 FP = 1157.68 FW = 1158.50

12700 FP = 1153.06 FW = 1154.06

12691 FP = 1145.95 FW = 1145.98

12399 FP = 1142.37 FW = 1142.60

11664 FP = 1137.06 FW = 1137.06

Q = 320 CFS

Q = 320 CFS

Q = 374 CFS

Q = 374 CFS

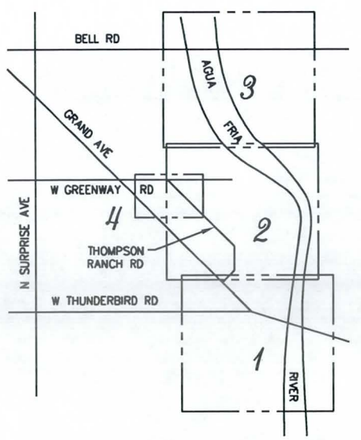
1150

1140

1140

1140

INDEX MAP



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PRELIMINARY

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F.C.D. CONTRACT NO. 1999C048
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- 100-YR FLOODWAY BOUNDARY
- HYDRAULIC BASELINE
- CROSS SECTION (FP = 100 YR WSE, FW = FLOODWAY, 2)
- BASE FLOOD ELEVATIONS (1224)
- ZONE DESIGNATIONS (ZONE AE)
- SPOT ELEVATIONS (72.6)
- ELEVATION REFERENCE MARKS (ERM 1)
- DRAWING NOTES (1)

NOTES THIS SHEET

Registered Professional Engineer (Civil)
CERTIFICATE NO.
36225
GARY E.
FREEMAN
Date Signed 6/19/03
ARIZONA, U.S.A.

N

100' 0' 100' 200'
SCALE: 1" = 200'
VERTICAL CONTOUR INTERVAL = 2 FEET

ALL ELEVATIONS BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

WEST Consultants, Inc.

	BY	DATE
DESIGN	---	---
DESIGN CHECK	---	---
PLANS	JEH	12/01
PLANS CHECK	GEF	12/01

SUBMITTED BY: DATE

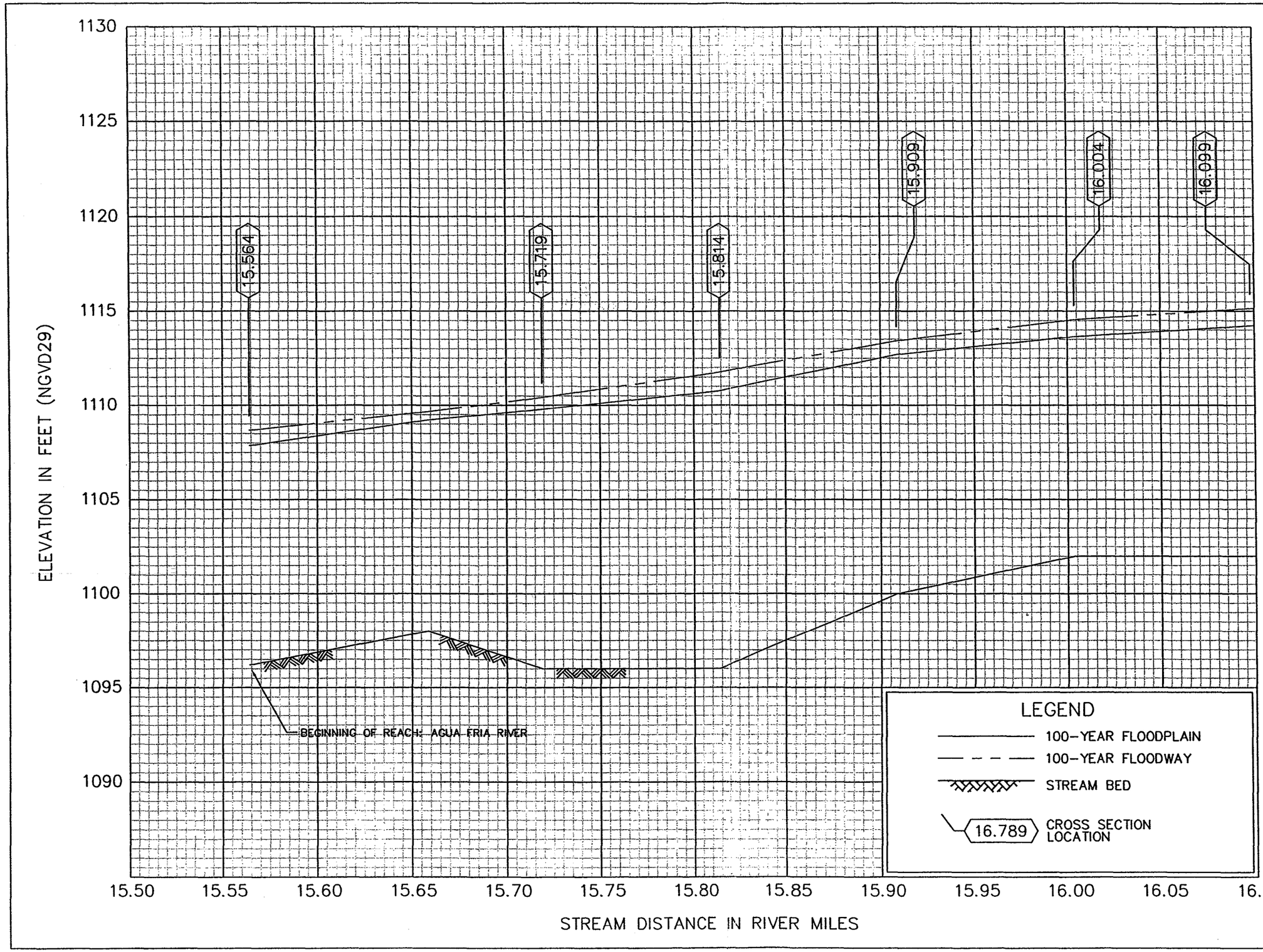
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 4 OF 4

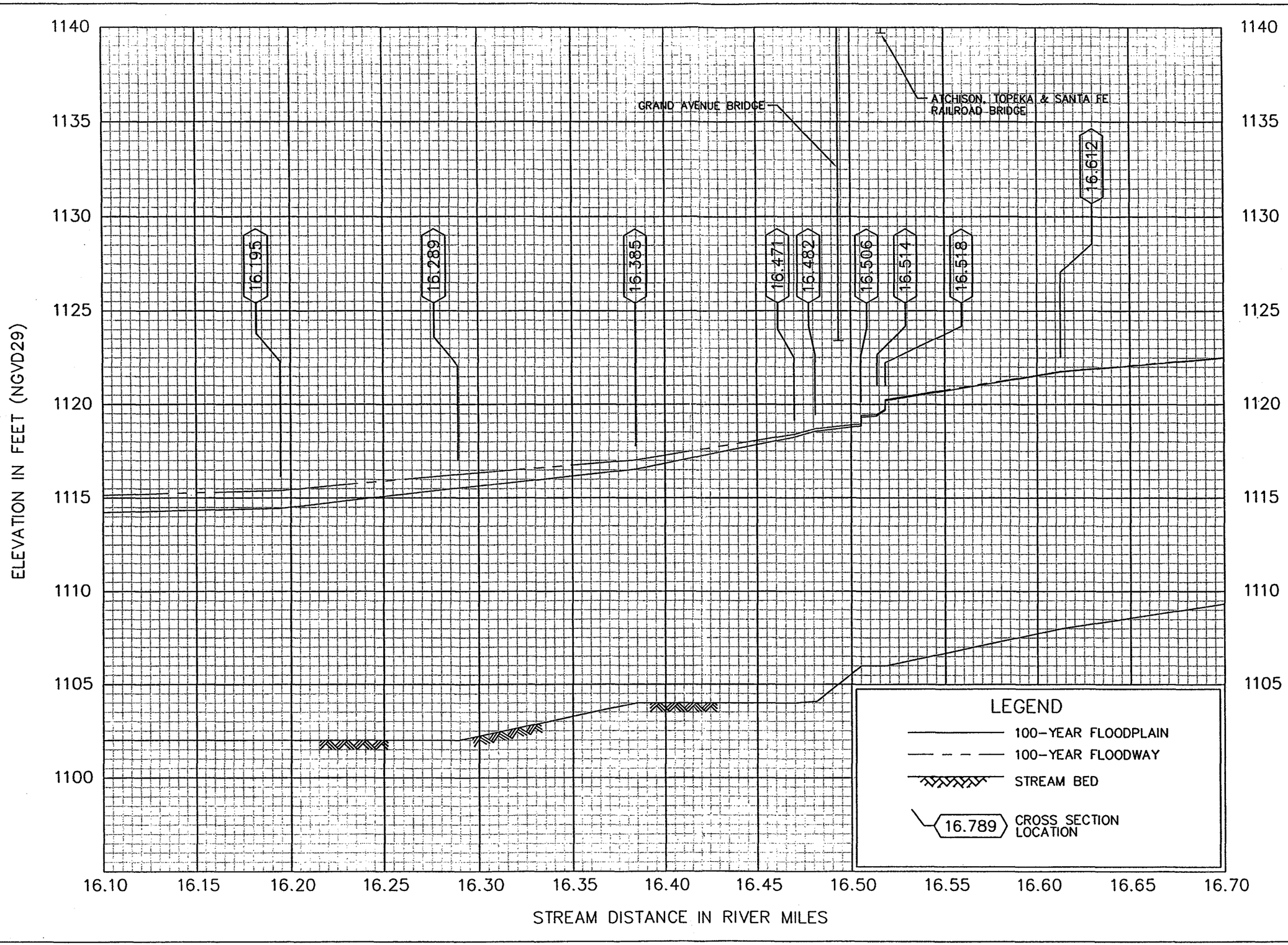


FLOOD PROFILES

AGUA FRIA RIVER AND ATCHISON, TOPEKA, & SANTA FE RAILROAD CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY
EL MIRAGE, SURPRISE, AND UNINCORPORATED AREAS
MARICOPA COUNTY, AZ

01P

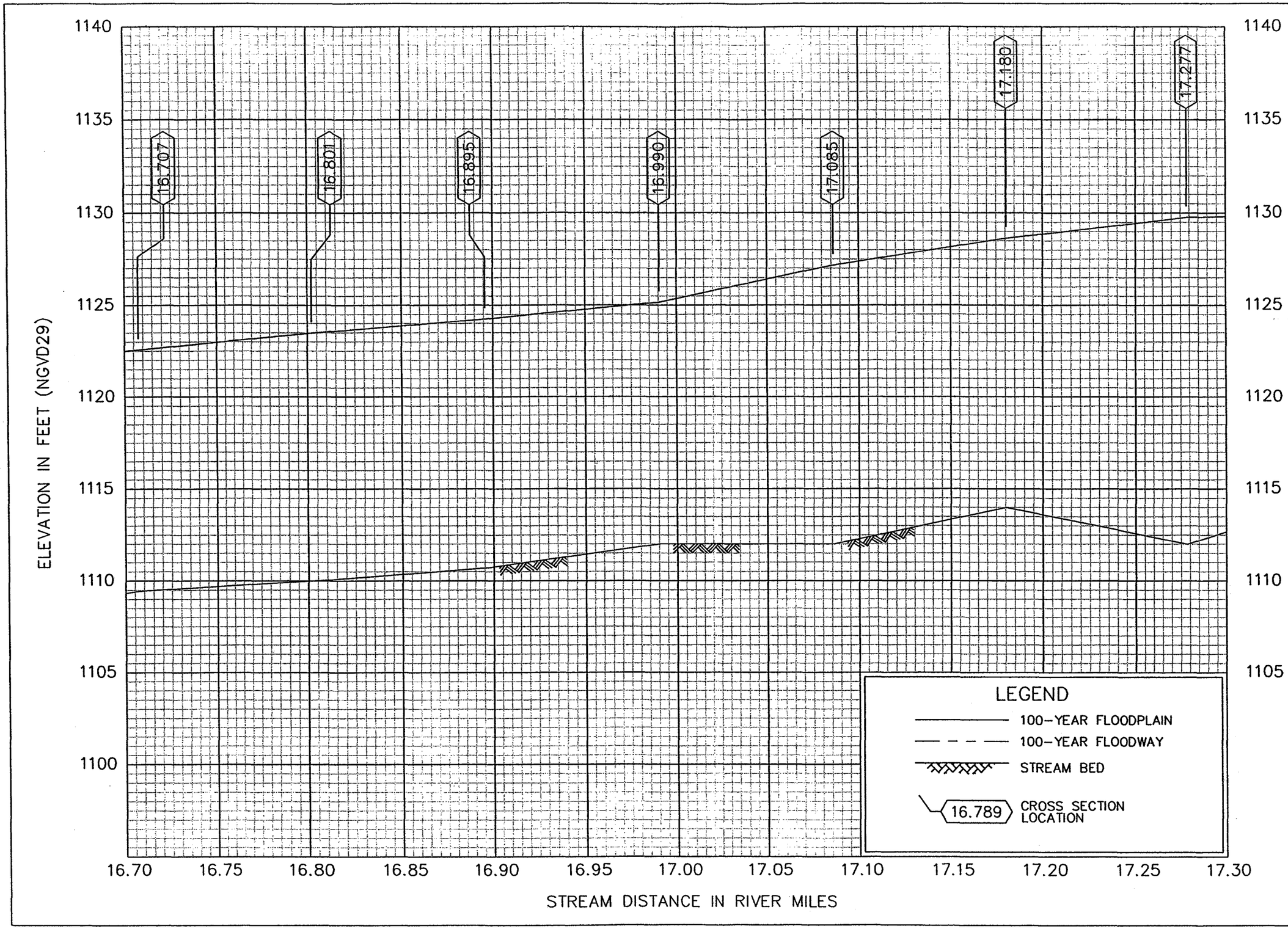


FLOOD PROFILES

AGUA FRIA RIVER AND ATCHISON, TOPEKA, & SANTA FE RAILROAD CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY
EL MIRAGE, SURPRISE, AND UNINCORPORATED AREAS
MARICOPA COUNTY, AZ

02P

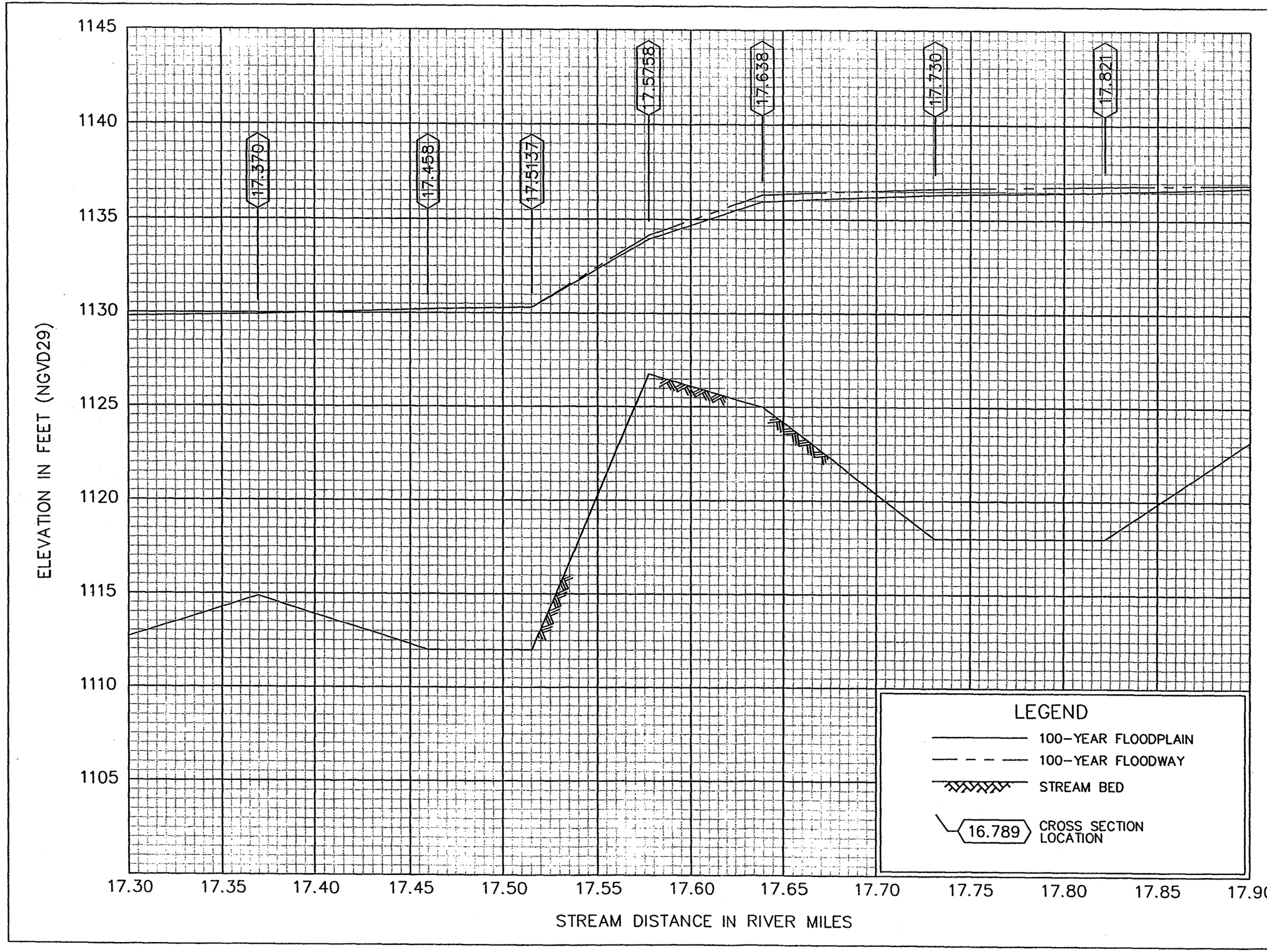


FLOOD PROFILES

AGUA FRIA RIVER AND ATCHISON, TOPEKA, & SANTA FE RAILROAD CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY
EL MIRAGE, SURPRISE, AND UNINCORPORATED AREAS
MARICOPA COUNTY, AZ

03P

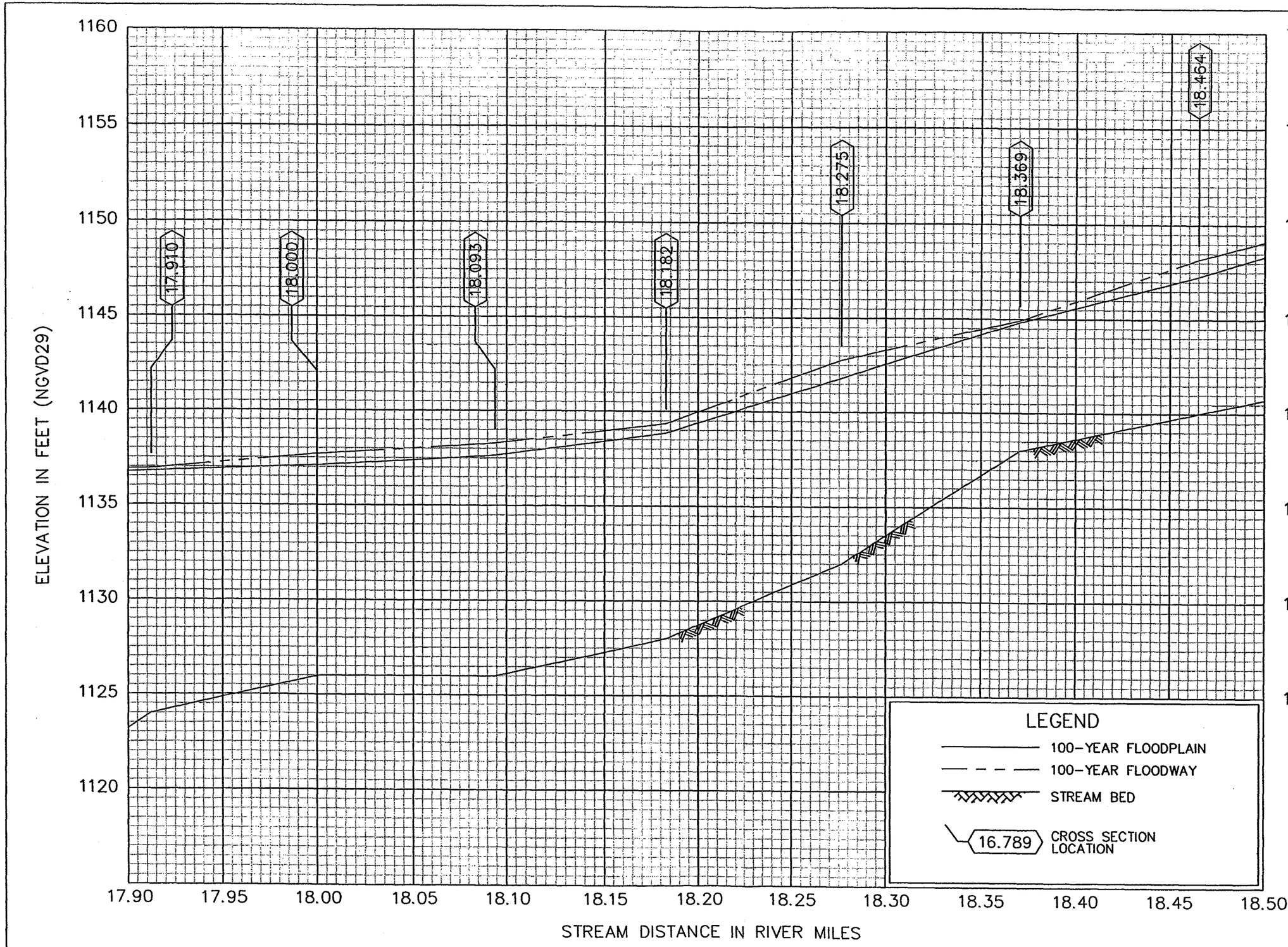


FLOOD PROFILES

AGUA FRIA RIVER AND ATCHISON, TOPEKA, & SANTA FE RAILROAD CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY
EL MIRAGE, SURPRISE, AND UNINCORPORATED AREAS
MARICOPA COUNTY, AZ

04P

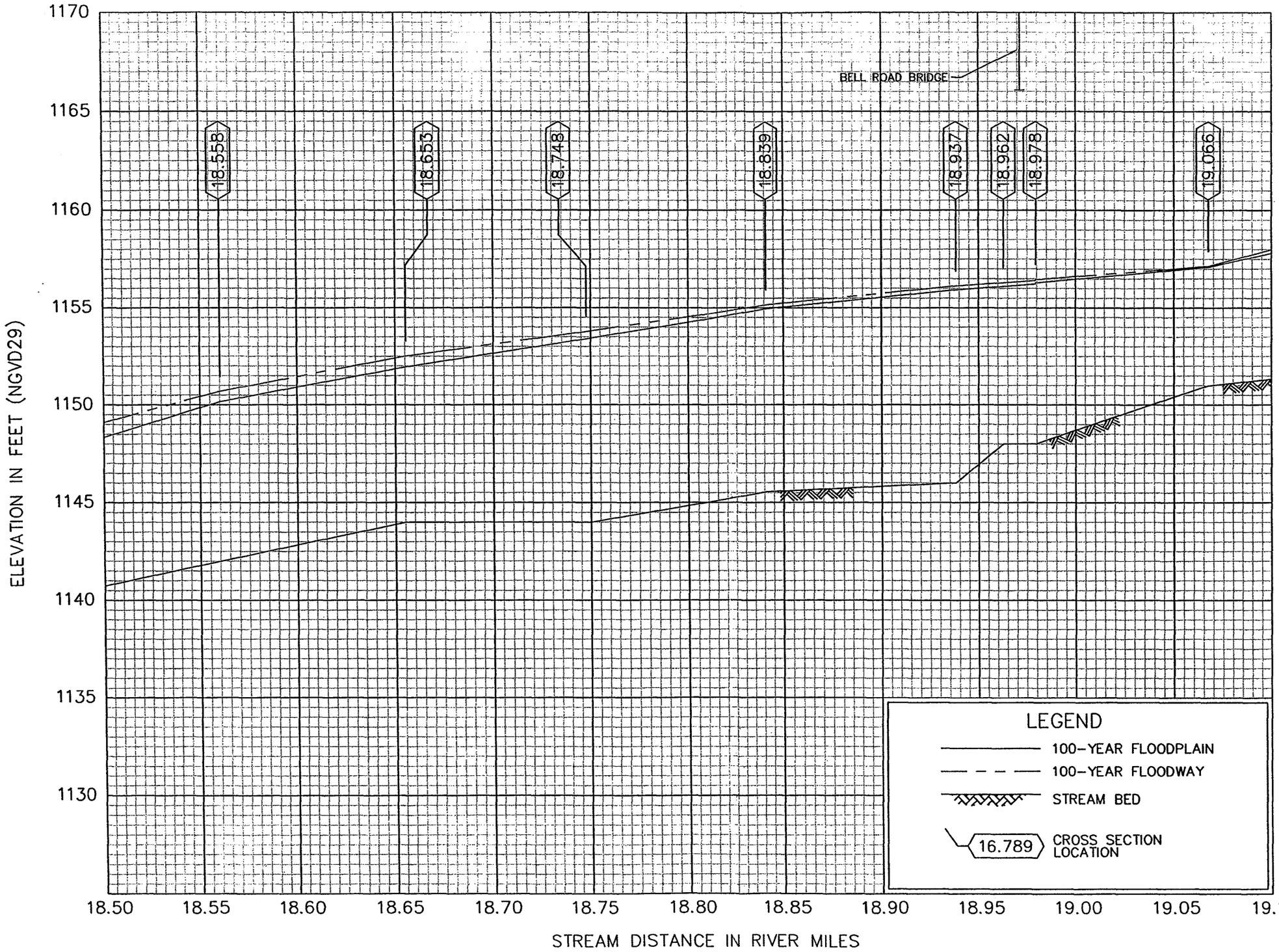


FLOOD PROFILES

AGUA FRIA RIVER AND ATCHISON, TOPEKA, & SANTA FE RAILROAD CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY
EL MIRAGE, SURPRISE, AND UNINCORPORATED AREAS
MARICOPA COUNTY, AZ

05P

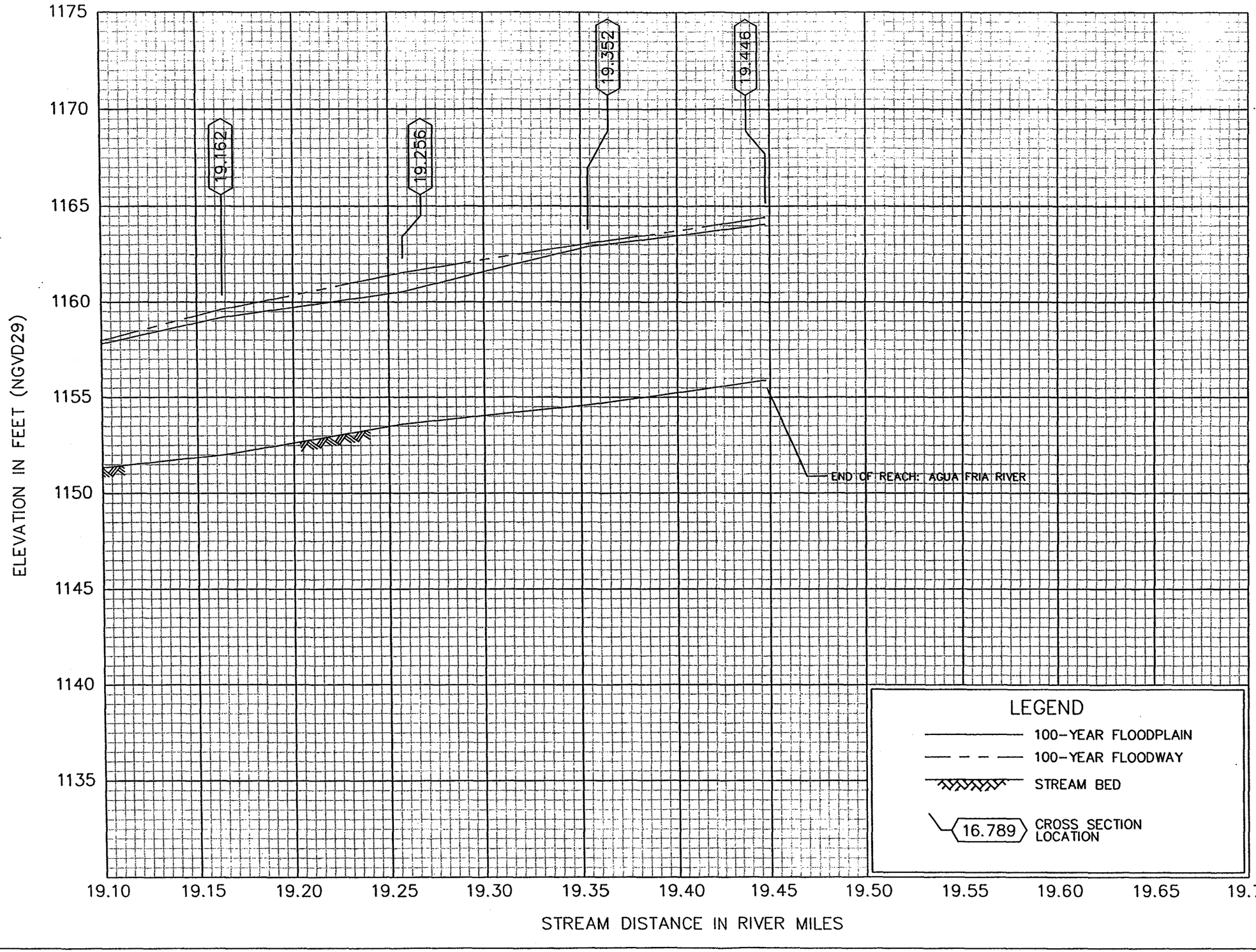


FLOOD PROFILES

AGUA FRIA RIVER AND ATCHISON, TOPEKA, & SANTA FE RAILROAD CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY
EL MIRAGE, SURPRISE, AND UNINCORPORATED AREAS
MARICOPA COUNTY, AZ

06P

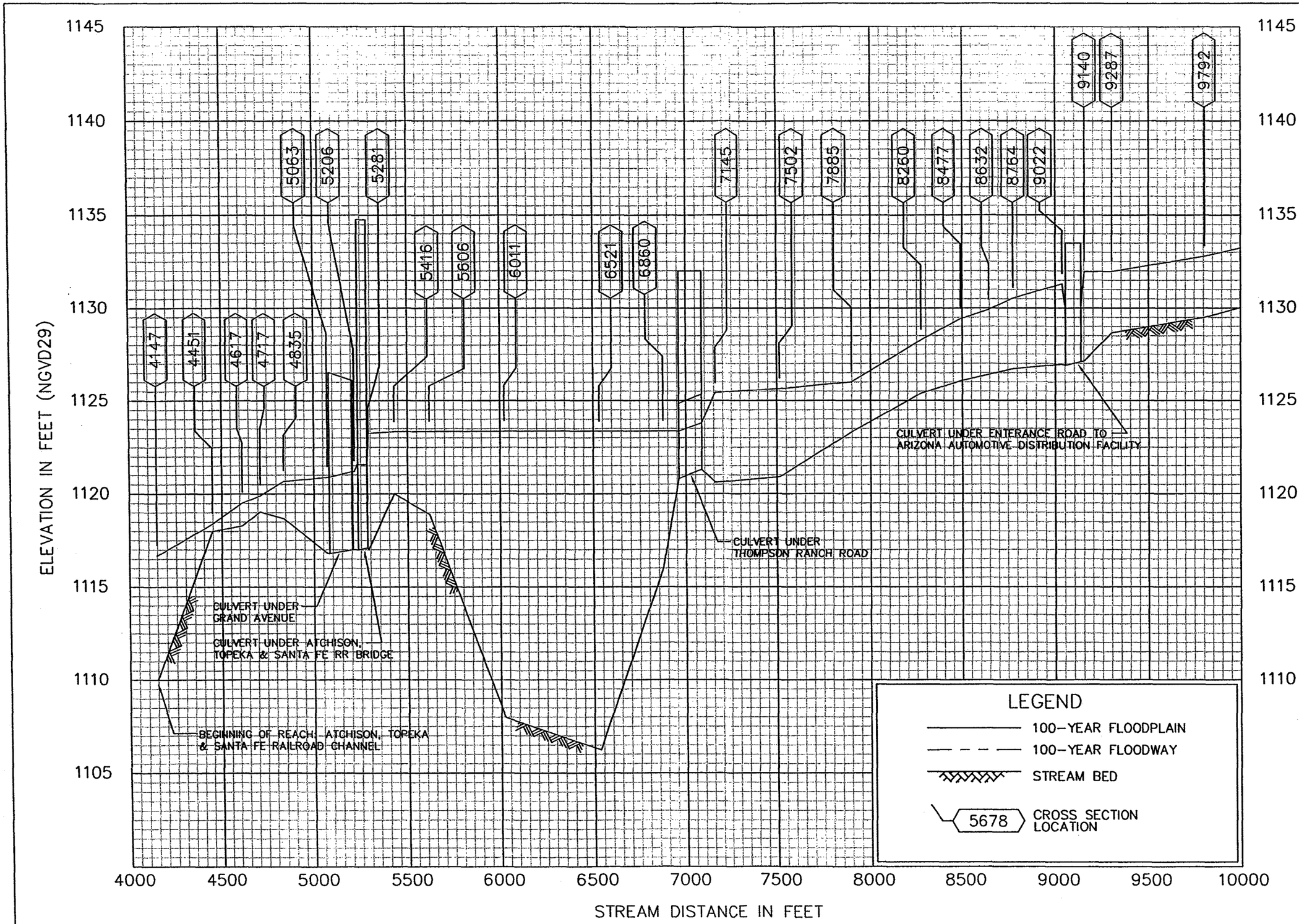


FLOOD PROFILES

AGUA FRIA RIVER AND ATCHISON, TOPEKA, & SANTA FE RAILROAD CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY
EL MIRAGE, SURPRISE, AND UNINCORPORATED AREAS
MARICOPA COUNTY, AZ

07P

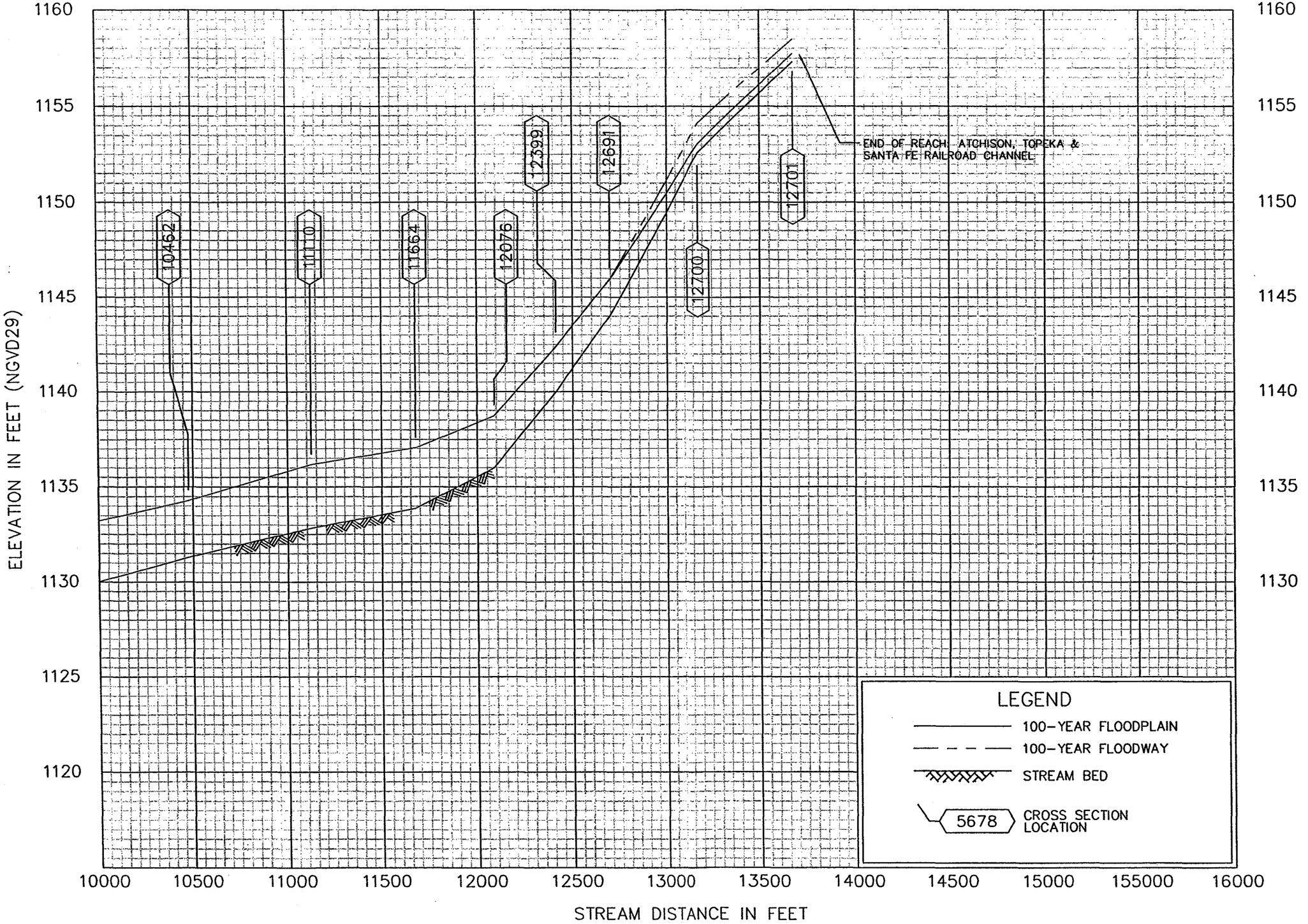


FLOOD PROFILES

AGUA FRIA RIVER AND ATCHISON, TOPEKA, & SANTA FE RAILROAD CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY
EL MIRAGE, SURPRISE, AND UNINCORPORATED AREAS
MARICOPA COUNTY, AZ

08P



FLOOD PROFILES

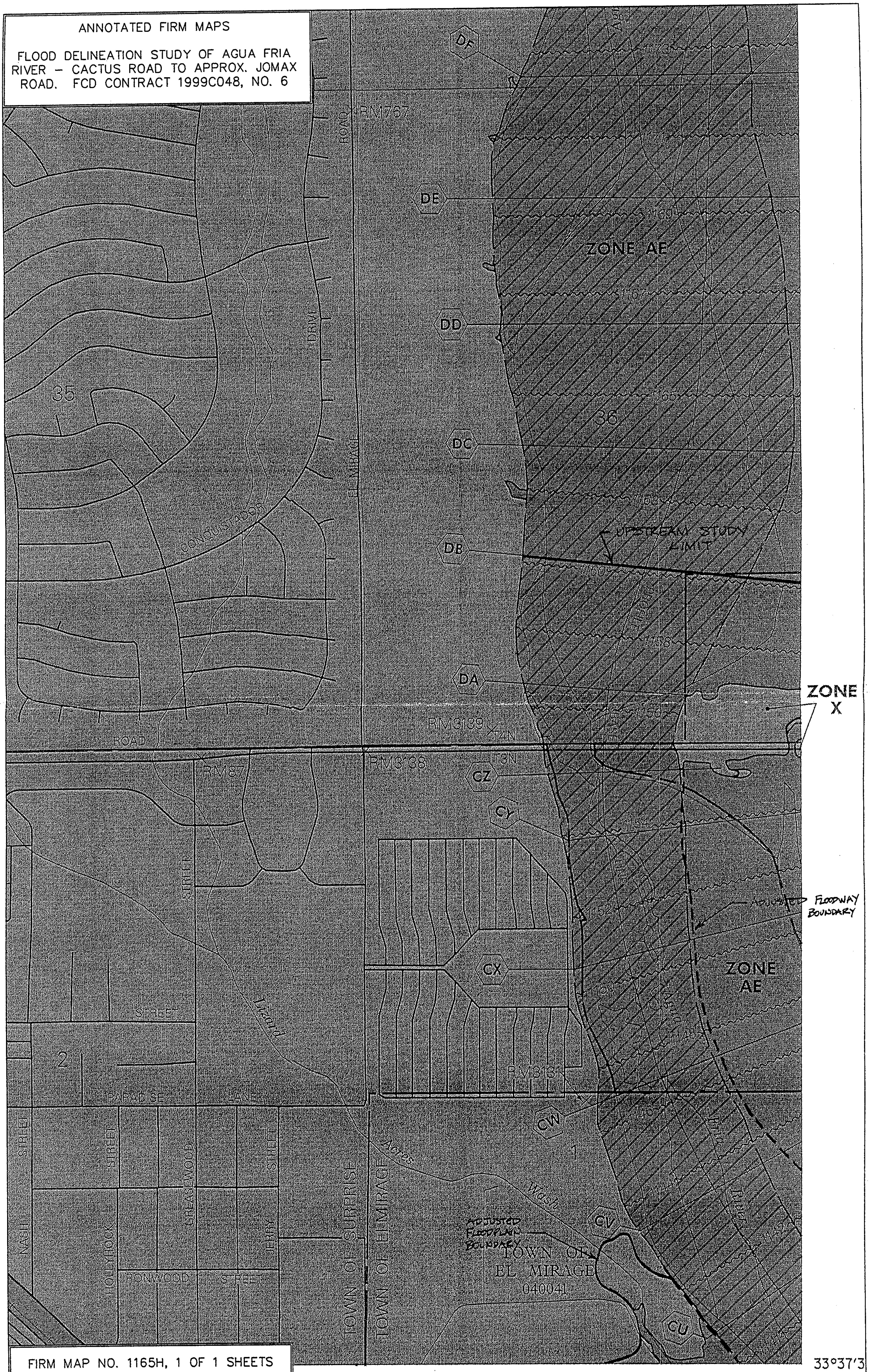
AGUA FRIA RIVER AND ATCHISON, TOPEKA, & SANTA FE RAILROAD CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY
EL MIRAGE, SURPRISE, AND UNINCORPORATED AREAS
MARICOPA COUNTY, AZ

09P

ANNOTATED FIRM MAPS

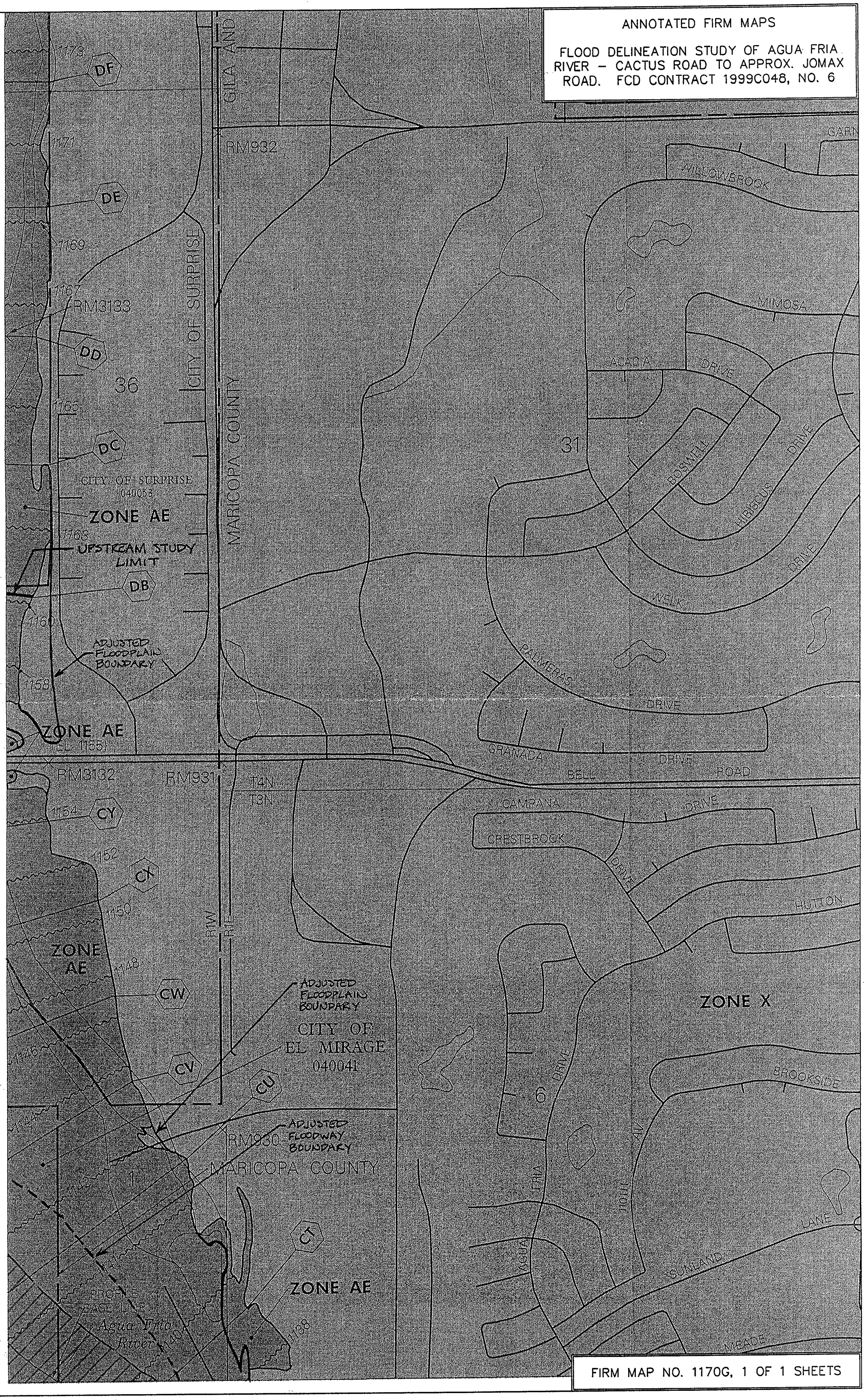
FLOOD DELINEATION STUDY OF AGUA FRIA RIVER – CACTUS ROAD TO APPROX. JOMAX ROAD. FCD CONTRACT 1999C048, NO. 6



FIRM MAP NO. 1165H, 1 OF 1 SHEETS

ANNOTATED FIRM MAPS

FLOOD DELINEATION STUDY OF AGUA FRIA RIVER – CACTUS ROAD TO APPROX. JOMAX ROAD. FCD CONTRACT 1999C048, NO. 6



FIRM MAP NO. 1170G, 1 OF 1 SHEETS

ANNOTATED FIRM MAPS

FLOOD DELINEATION STUDY OF AGUA FRIA RIVER – GRAND AVENUE TO APPROX. BELL ROAD. FCD CONTRACT 1999C048, NO. 6

RM929

CORPORATE LIMITS

ZONE A

ADJUSTED FLOODWAY BOUNDARY

ADJUSTED FLOODPLAIN BOUNDARY

ZONE AE

SHADED ZONE X

ADJUSTED FLOODPLAIN BOUNDARY

ADJUSTED FLOODPLAIN FLOODWAY BOUNDARY

ZONE A

CITY OF EL MIRAGE 040041

ADJUSTED FLOODWAY BOUNDARY

RM928

ZONE X

ADJUSTED FLOODWAY BOUNDARY

ADJUSTED FLOODPLAIN BOUNDARY

ZONE X

ZONE X

ADJUSTED FLOODWAY BOUNDARY

ZONE X

ADJUSTED FLOODWAY BOUNDARY

ADJUSTED FLOODPLAIN BOUNDARY

ZONE X

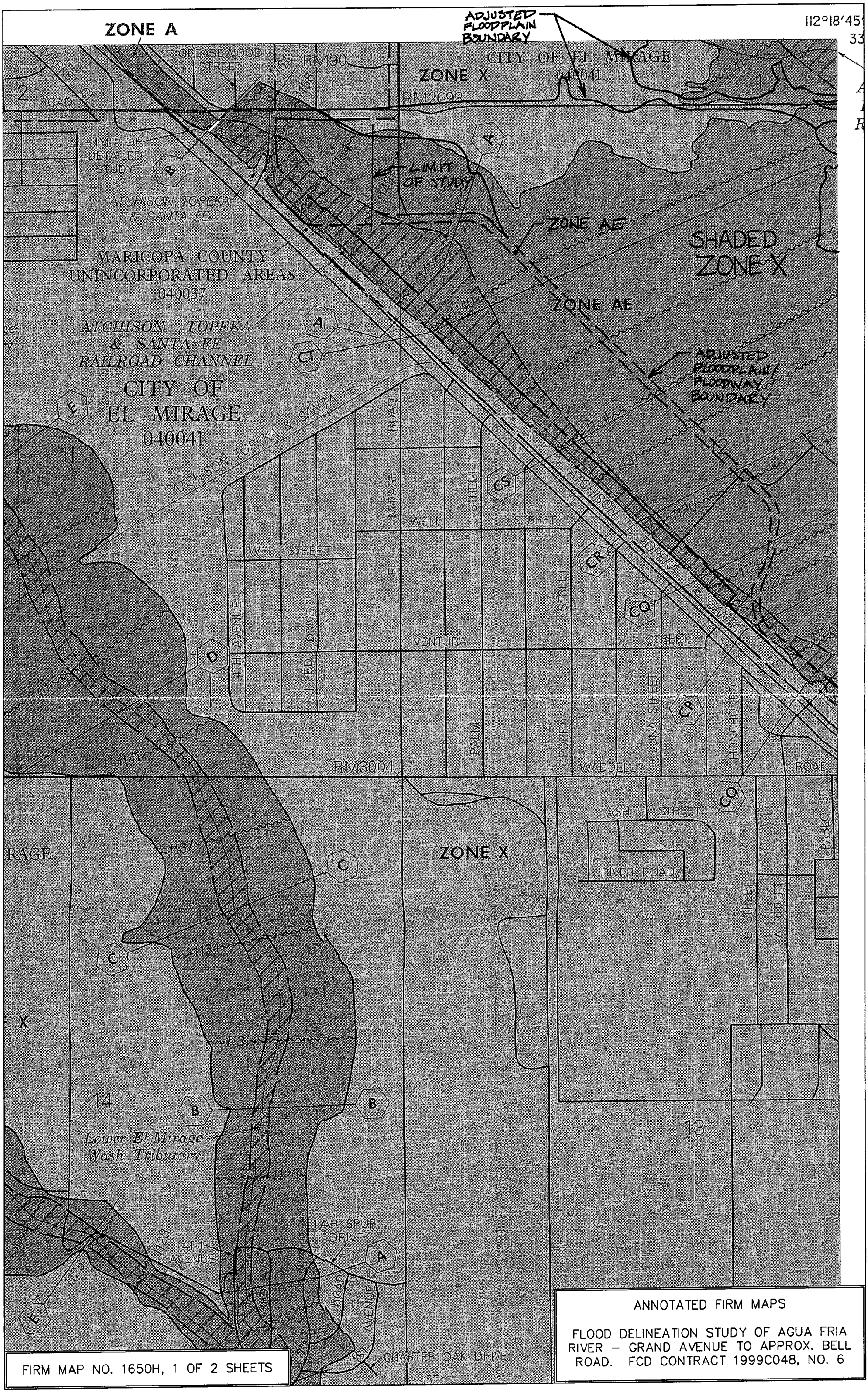
RM925

WEST SPLIT FLOW THROUGH EL MIRAGE

This area protected from the one percent annual chance (100-year) flood by levees, dikes or other structures subject to possible failure or overtopping during larger floods.

CORPORATE LIMITS

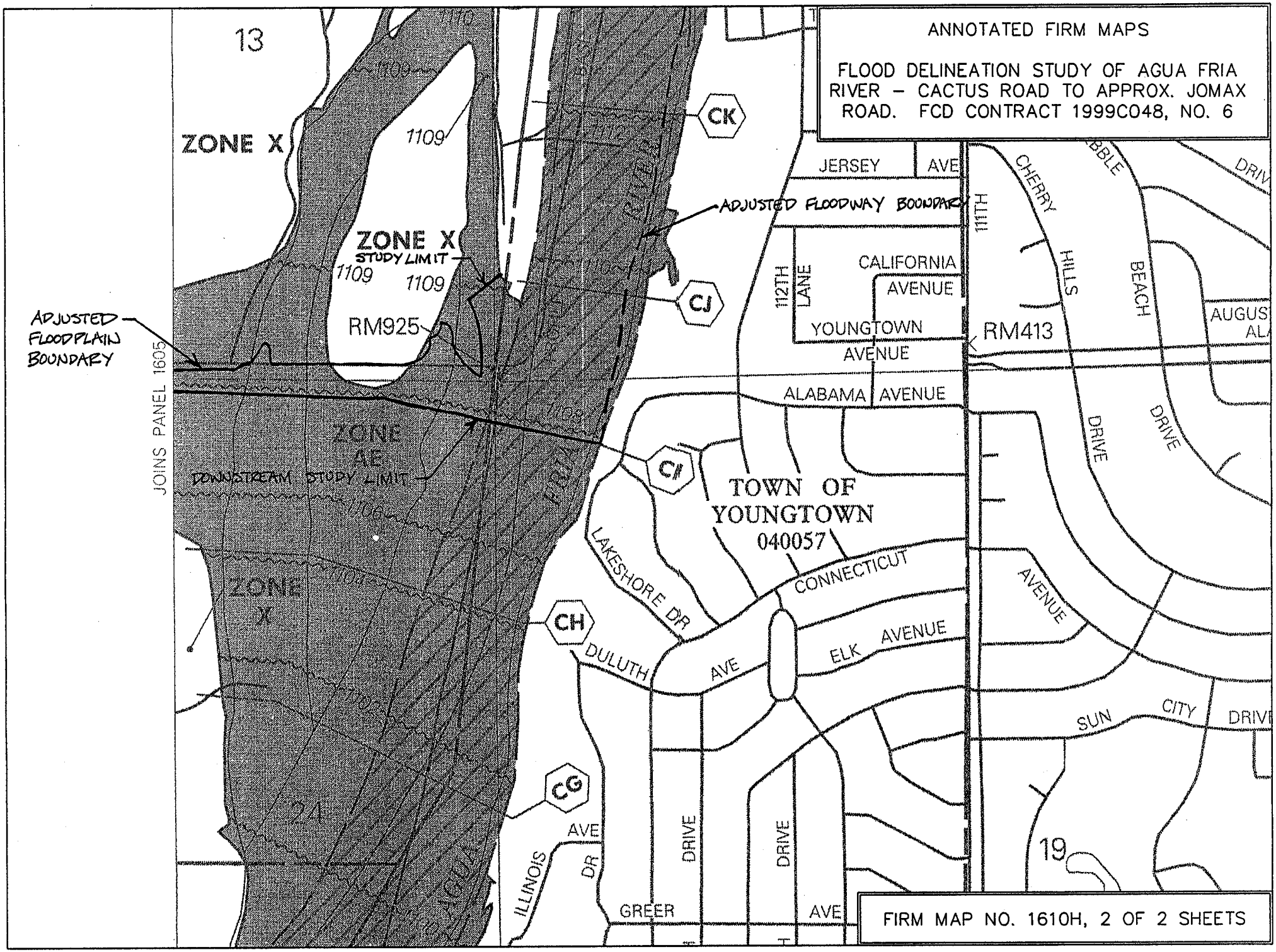
FIRM MAP NO. 1610H, 1 OF 2 SHEETS

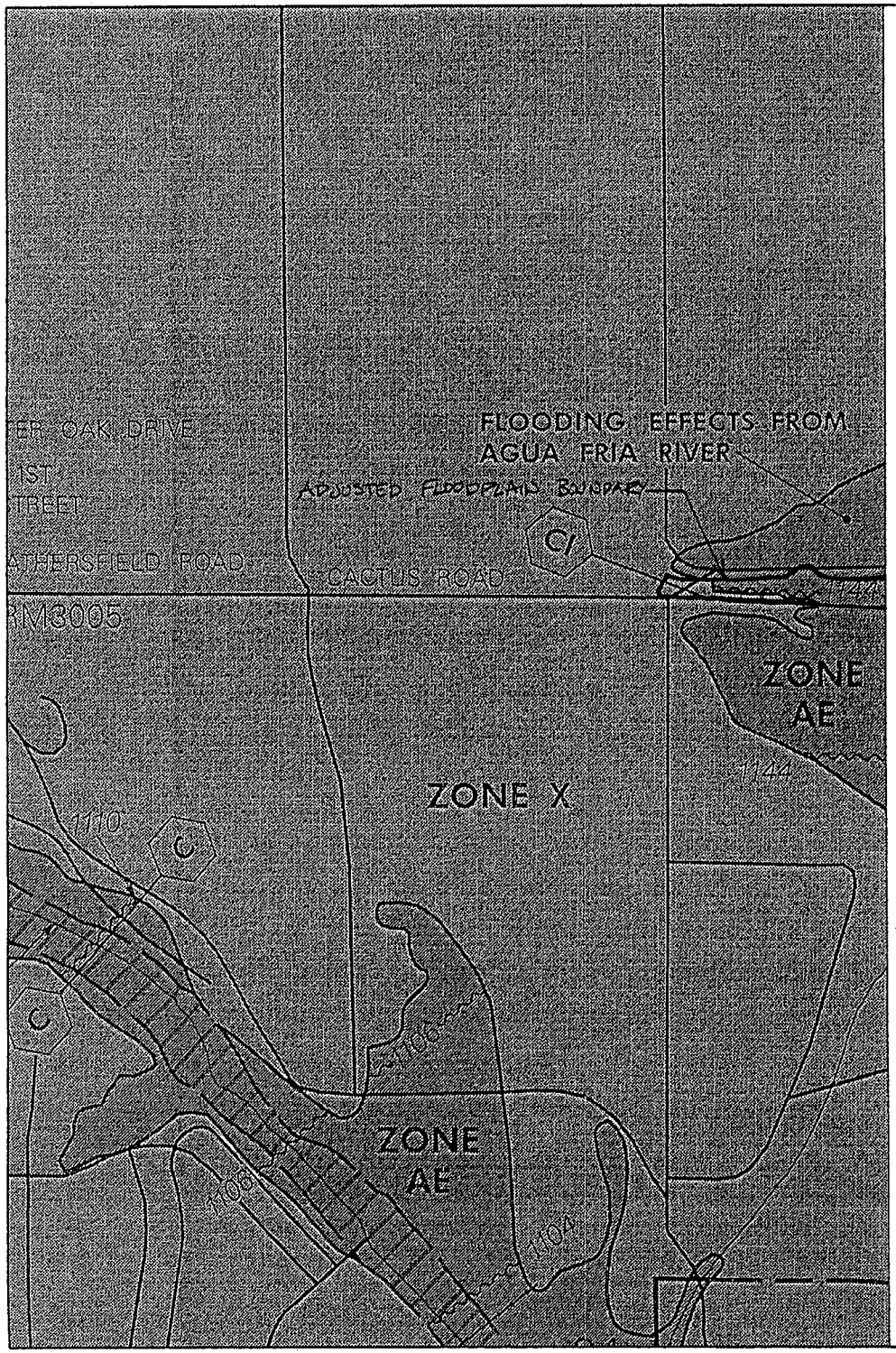


FIRM MAP NO. 1650H, 1 OF 2 SHEETS

ANNOTATED FIRM MAPS

FLOOD DELINEATION STUDY OF AGUA FRIA RIVER – GRAND AVENUE TO APPROX. BELL ROAD. FCD CONTRACT 1999C048, NO. 6


ANNOTATED FIRM MAPS
FLOOD DELINEATION STUDY OF AGUA FRIA RIVER – CACTUS ROAD TO APPROX. JOMAX ROAD. FCD CONTRACT 1999C048, NO. 6
13
ZONE X
1109
ZONE X
STUDY LIMIT
1109
1109
RM925
ADJUSTED FLOODPLAIN BOUNDARY
JOINS PANEL 1605
ZONE AE
DOWNSTREAM STUDY LIMIT
ZONE X
24
CK
CJ
CI
CH
CG
ADJUSTED FLOODWAY BOUNDARY
JERSEY AVE
CALIFORNIA AVENUE
YOUNGTOWN AVENUE
112TH LANE
111TH
CHERRY HILLS
BEACH
RM413
ALABAMA AVENUE
DRIVE
DRIVE
TOWN OF YOUNGTOWN
040057
LAKESHORE DR
CONNECTICUT AVENUE
DULUTH AVE
ELK AVENUE
SUN CITY
ILLINOIS DR
AVE
DRIVE
DRIVE
GREER AVE
19
FIRM MAP NO. 1610H, 2 OF 2 SHEETS



constr

Areas
A30, A

Certai
flood

ANNOTATED FIRM MAPS

FLOOD DELINEATION STUDY OF AGUA FRIA RIVER – CACTUS ROAD TO APPROX. JOMAX ROAD. FCD CONTRACT 1999C048, NO. 6

Boundaries of the floodways were computed at cross s interpolated between cross sections. The floodways were hydraulic considerations with regard to requirements of Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to to Floodway Data Table where floodway width is shown at ½

Corporate limits shown are current as of the date of this ma should contact appropriate community officials to determine limits have changed subsequent to the issuance of

This map may incorporate approximate boundaries of Co Resource System Units and /or Otherwise Protected Areas under the Coastal Barrier Improvement Act of 1990 (PL

For community map revision history prior to countywide m Section 6.0 of the Flood Insurance Study Report.

For adjoining map panels and base map source see separ Map Index.

MAP REPOSITORY

Refer to Repository Listing on Map Inde

EFFECTIVE DATE OF
COUNTYWIDE FLOOD INSURANCE RATE M

APRIL 15, 1988

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PA

SEPTEMBER 4, 1991, DECEMBER 3, 1993, SEPTEMBER 3

Map revised July 19, 2001 to update corporate limits, to flood elevations, to add base flood elevations, to add Special Areas, to change Special Flood Hazard Areas, to change zon to update map format, to add roads and road na incorporate previously issued Letters of Map Revision

FIRM MAP NO. 1605H, 2 OF 2 SHEETS