Lower El Mirage Wash Basin

CLOMR and LOMR Packets

by

Dibble Engineering

and

Flood Control District of Maricopa County

March 2015

Federal Emergency Management Agency

Washington, D.C. 20472

March 2, 2015

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 14-09-2966P

The Honorable Lana Mook
Mayor, City of El Mirage
12145 Northwest Grand Avenue
El Mirage, AZ 85335

Follows Conditional
Case No.: 13-09-1703R
Community Name: City of El Mirage, AZ
Community No.: 040041
FIRM Panel Affected: 04013C1680L

116

Dear Mayor Mook:

In a Letter of Map Revision (LOMR) dated October 15, 2014, you were notified of proposed flood hazard determinations affecting the Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for the City of El Mirage, Maricopa County, AZ. These determinations were for Lower El Mirage Wash - from approximately 3,350 downstream of North Park Place to approximately 710 feet upstream of Cactus Road. The 90-day appeal period that was initiated on October 30, 2014, when the Department of Homeland Security's Federal Emergency Management Agency (FEMA) published a notice of proposed Flood Hazard Determinations in *The Arizona Business Gazette* has elapsed.

FEMA received no valid requests for changes to the modified flood hazard information. Therefore, the modified flood hazard information for your community that became effective on February 27, 2015, remains valid and revises the FIRM and FIS report that were 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(s) and suffix code(s) 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 flood hazard information to carry out the floodplain management regulations for the NFIP. The modified flood hazard information 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 contact the Mitigation Division Director, FEMA Region IX, in Oakland, California, either by telephone at (510) 627-7100, or in writing at 1111 Broadway, Suite 1200, Oakland, California, 94607-4052.

If you have any questions regarding the LOMR, the proposed flood hazard determinations, or mapping issues in general, please call the FEMA Map Information eXchange, toll free, at (877) 336-2627 (877-FEMA MAP).

Sincerely,

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

cc: The Honorable Denny Barney
Chairman, Maricopa County Board of Commissioners

Mr. Jorge Gastelum, P.E.
Director and City Engineer
Development and Community Services
City of El Mirage

Mr. William Wiley, P.E.
Chief Engineer and General Manager
Maricopa County

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

Ms. Kelli Sertich, AICP, CFM
FMS Division Manger
Flood Control District of Maricopa County

Mr. Brian Cosson, CFM
NFIP State Manager
Arizona Department of Water Resources

Mr. Kevin Lavalle
GIS Analyst
Flood Control District of Maricopa County

Mr. Josh Papworth, P.E.
Project Engineer
Dibble and Associates Consulting Engineers

Federal Emergency Management Agency

Washington, D.C. 20472

March 2, 2015

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 14-09-2966P

The Honorable Denny Barney
Chairman, Maricopa County Board of Commissioners
301 West Jefferson, 10th Floor
Phoenix, AZ 85003

Follows Conditional
Case No.: 13-09-1703R
Community Name: Maricopa County, AZ
Community No.: 040037
FIRM Panel Affected: 04013C1680L

116

Dear Mr. Barney:

In a Letter of Map Revision (LOMR) dated October 15, 2014, you were notified of proposed flood hazard determinations affecting the Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for Maricopa County, AZ. These determinations were for Lower El Mirage Wash - from approximately 3,350 downstream of North Park Place to approximately 710 feet upstream of Cactus Road. The 90-day appeal period that was initiated on October 30, 2014, when the Department of Homeland Security's Federal Emergency Management Agency (FEMA) published a notice of proposed Flood Hazard Determinations in *The Arizona Business Gazette* has elapsed.

FEMA received no valid requests for changes to the modified flood hazard information. Therefore, the modified flood hazard information for your community that became effective on February 27, 2015, remains valid and revises the FIRM and FIS report that were 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(s) and suffix code(s) 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 flood hazard information to carry out the floodplain management regulations for the NFIP. The modified flood hazard information 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 contact the Mitigation Division Director, FEMA Region IX, in Oakland, California, either by telephone at (510) 627-7100, or in writing at 1111 Broadway, Suite 1200, Oakland, California, 94607-4052.

If you have any questions regarding the LOMR, the proposed flood hazard determinations, or mapping issues in general, please call the FEMA Map Information eXchange, toll free, at (877) 336-2627 (877-FEMA MAP).

Sincerely,

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

cc: The Honorable Lana Mook
Mayor, City of El Mirage

Mr. William Wiley, P.E.
Chief Engineer and General Manager
Maricopa County

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

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Development and Community Services
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Ms. Kelli Sertich, AICP, CFM
FMS Division Manger
Flood Control District of Maricopa County

Mr. Brian Cosson, CFM
NFIP State Manager
Arizona Department of Water Resources

Mr. Kevin Lavalle
GIS Analyst
Flood Control District of Maricopa County

Mr. Josh Papworth, P.E.
Project Engineer
Dibble and Associates Consulting Engineers

Federal Emergency Management Agency

Washington, D.C. 20472

October 15, 2014

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable Denny Barney
Chairman, Maricopa County Board of Commissioners
301 West Jefferson, 10th Floor
Phoenix, AZ 85003

IN REPLY REFER TO:

Case No.:	14-09-2966P
Follows Conditional Case No.:	13-09-1703R
Community Name:	Maricopa County, AZ
Community No.:	040037
Effective Date of This Revision:	**February 27, 2015**

Dear Mr. Barney:

The Flood Insurance Study report and Flood Insurance Rate Map for your community have been revised by this Letter of Map Revision (LOMR). Please use the enclosed annotated map panel(s) revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals issued in your community.

Additional documents are enclosed which provide information regarding this LOMR. Please see the List of Enclosures below to determine which documents are included. Other attachments specific to this request may be included as referenced in the Determination Document. If you have any questions regarding floodplain management regulations for your community or the National Flood Insurance Program (NFIP) in general, please contact the Consultation Coordination Officer for your community. If you have any technical questions regarding this LOMR, please contact the Director, Mitigation Division of the Department of Homeland Security's Federal Emergency Management Agency (FEMA) in Oakland, California, at (510) 627-7175, or the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP). Additional information about the NFIP is available on our website at http://www.fema.gov/business/nfip.

Sincerely,

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

List of Enclosures:

Letter of Map Revision Determination Document
Annotated Flood Insurance Rate Map
Annotated Flood Insurance Study Report

cc: The Honorable Lana Mook
Mayor, City of El Mirage

Mr. William Wiley, P.E.
Chief Engineer and General Manager
Maricopa County

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

Mr. Jorge Gastelum, P.E.
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Arizona Department of Water Resources

Mr. Kevin Lavalle
GIS Analyst
Flood Control District of Maricopa County

Mr. Josh Papworth, P.E.
Project Engineer
Dibble and Associates Consulting Engineers

 | Issue Date: October 15, 2014 | Effective Date: February 27, 2015 | Case No.: 14-09-2966P | LOMR-APP

Follows Conditional Case No.: 13-09-1703R

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	Maricopa County Arizona (Unincorporated Areas)	DETENTION BASIN	FLOODWAY HYDROLOGIC ANALYSIS HYDRAULIC ANALYSIS NEW TOPOGRAPHIC DATA
	COMMUNITY NO.: 040037		
IDENTIFIER	Lower El Mirage Wash Basin Project	APPROXIMATE LATITUDE & LONGITUDE: 33.588, -112.320 SOURCE: USGS QUADRANGLE DATUM: NAD 83	

ANNOTATED MAPPING ENCLOSURES	ANNOTATED STUDY ENCLOSURES
TYPE: FIRM* NO.: 04013C1680L DATE: October 16, 2013	DATE OF EFFECTIVE FLOOD INSURANCE STUDY: October 16, 2013 PROFILE(S): 728P SUMMARY OF DISCHARGES TABLE: 3

Enclosures reflect changes to flooding sources affected by this revision.
* FIRM - Flood Insurance Rate Map; ** FBFM - Flood Boundary and Floodway Map; *** FHBM - Flood Hazard Boundary Map

FLOODING SOURCE(S) & REVISED REACH(ES)

Lower El Mirage Wash - from approximately 3,350 feet downstream of North Park Place to approximately 710 feet upstream of Cactus Road

SUMMARY OF REVISIONS

Flooding Source	Effective Flooding	Revised Flooding	Increases	Decreases
Lower El Mirage Wash	Floodway	Floodway	NONE	YES
	Zone AE	Zone AE	NONE	YES
	BFEs*	BFEs	NONE	YES

* BFEs - Base Flood Elevations

DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

142877 PT202.BKR.14092966P.BG 102-D-A

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

OTHER COMMUNITIES AFFECTED BY THIS REVISION

CID Number: 040041 **Name:** City of El Mirage, Arizona

AFFECTED MAP PANELS	AFFECTED PORTIONS OF THE FLOOD INSURANCE STUDY REPORT
TYPE: FIRM* NO.: 04013C1680L DATE: October 16, 2013	DATE OF EFFECTIVE FLOOD INSURANCE STUDY: October 16, 2013 PROFILE(S): 728P-730P SUMMARY OF DISCHARGES TABLE: 3 STILLWATER ELEVATION TABLE: 4 FLOODWAY DATA TABLE: 6

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. 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 NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

We provide the floodway designation to your community as a tool to regulate floodplain development. Therefore, the floodway revision we have described in this letter, while acceptable to us, must also be acceptable to your community and adopted by appropriate community action, as specified in Paragraph 60.3(d) of the NFIP regulations.

COMMUNITY REMINDERS

We based this determination on the base (1-percent-annual-chance) flood discharges computed in the submitted hydrologic analysis. Future development of projects upstream could cause increased discharges, which could cause increased flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on discharges and could, therefore, indicate that greater flood hazards exist in this area.

Your community must regulate all proposed floodplain development and ensure that permits required by Federal and/or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

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

Mr. Jeffrey D. Lusk
Director, Mitigation Division
Federal Emergency Management Agency, Region IX
1111 Broadway, Suite 1200
Oakland, CA 94607-4052
(510) 627-7175

STATUS OF THE COMMUNITY 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(s) and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

PUBLIC NOTIFICATION OF REVISION

A notice of changes will be published in the *Federal Register*. This information also will be published in your local newspaper on or about the dates listed below and through FEMA's Flood Hazard Mapping website at https://www.floodmaps.fema.gov/fhm/Scripts/bfe_main.asp.

LOCAL NEWSPAPER Name: *Arizona Business Gazette*
Dates: October 23, 2014 and October 30, 2014

Within 90 days of the second publication in the local newspaper, a citizen may request that we reconsider this determination. Any request for reconsideration must be based on scientific or technical data. Therefore, this letter will be effective only after the 90-day appeal period has elapsed and we have resolved any appeals that we receive during this appeal period. Until this LOMR is effective, the revised flood hazard determination information presented in this LOMR may be changed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

October 15, 2014

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable Lana Mook
Mayor, City of El Mirage
12145 Northwest Grand Avenue
El Mirage, AZ 85335

IN REPLY REFER TO:

Case No.:	14-09-2966P
Follows Conditional Case No.:	13-09-1703R
Community Name:	City of El Mirage, AZ
Community No.:	040041
Effective Date of This Revision:	**February 27, 2015**

Dear Mayor Mook:

The Flood Insurance Study report and Flood Insurance Rate Map for your community have been revised by this Letter of Map Revision (LOMR). Please use the enclosed annotated map panel(s) revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals issued in your community.

Additional documents are enclosed which provide information regarding this LOMR. Please see the List of Enclosures below to determine which documents are included. Other attachments specific to this request may be included as referenced in the Determination Document. If you have any questions regarding floodplain management regulations for your community or the National Flood Insurance Program (NFIP) in general, please contact the Consultation Coordination Officer for your community. If you have any technical questions regarding this LOMR, please contact the Director, Mitigation Division of the Department of Homeland Security's Federal Emergency Management Agency (FEMA) in Oakland, California, at (510) 627-7175, or the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP). Additional information about the NFIP is available on our website at http://www.fema.gov/business/nfip.

Sincerely,

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

List of Enclosures:

Letter of Map Revision Determination Document
Annotated Flood Insurance Rate Map
Annotated Flood Insurance Study Report

cc: The Honorable Denny Barney
Chairman, Maricopa County Board of Commissioners

Mr. Jorge Gastelum, P.E.
Director and City Engineer
Development and Community Services
City of El Mirage

Mr. William Wiley, P.E.
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Mr. Kevin Lavalle
GIS Analyst
Flood Control District of Maricopa County

Mr. Josh Papworth, P.E.
Project Engineer
Dibble and Associates Consulting Engineers

Follows Conditional Case No.: 13-09-1703R

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	City of El Mirage Maricopa County Arizona	DETENTION BASIN	FLOODWAY HYDROLOGIC ANALYSIS HYDRAULIC ANALYSIS NEW TOPOGRAPHIC DATA
	COMMUNITY NO.: 040041		
IDENTIFIER	Lower El Mirage Wash Basin Project	APPROXIMATE LATITUDE & LONGITUDE: 33.588, -112.320 SOURCE: USGS QUADRANGLE DATUM: NAD 83	

ANNOTATED MAPPING ENCLOSURES	ANNOTATED STUDY ENCLOSURES
TYPE: FIRM* NO.: 04013C1680L DATE: October 16, 2013	DATE OF EFFECTIVE FLOOD INSURANCE STUDY: October 16, 2013 PROFILE(S): 728P-730P SUMMARY OF DISCHARGES TABLE: 3 STILLWATER ELEVATION TABLE: 4 FLOODWAY DATA TABLE: 6

Enclosures reflect changes to flooding sources affected by this revision.
* FIRM - Flood Insurance Rate Map; ** FBFM - Flood Boundary and Floodway Map; *** FHBM - Flood Hazard Boundary Map

FLOODING SOURCE(S) & REVISED REACH(ES)

Lower El Mirage Wash - from approximately 3,350 downstream of North Park Place to approximately 710 feet upstream of Cactus Road

SUMMARY OF REVISIONS

Flooding Source	Effective Flooding	Revised Flooding	Increases	Decreases
Lower El Mirage Wash	Floodway	Floodway	YES	YES
	Zone AE	Zone AE	YES	YES
	BFEs*	BFEs	YES	YES

* BFEs - Base Flood Elevations

DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

142877 PT202.BKR.14092966P.BG 102-I-A-C

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

OTHER COMMUNITIES AFFECTED BY THIS REVISION

CID Number: 040037 **Name:** Maricopa County, Arizona

AFFECTED MAP PANELS	AFFECTED PORTIONS OF THE FLOOD INSURANCE STUDY REPORT
TYPE: FIRM* NO.: 04013C1680L DATE: October 16, 2013	DATE OF EFFECTIVE FLOOD INSURANCE STUDY: October 16, 2013 PROFILE(S): 728P SUMMARY OF DISCHARGES TABLE: 3

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Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. 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 NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

We provide the floodway designation to your community as a tool to regulate floodplain development. Therefore, the floodway revision we have described in this letter, while acceptable to us, must also be acceptable to your community and adopted by appropriate community action, as specified in Paragraph 60.3(d) of the NFIP regulations.

COMMUNITY REMINDERS

We based this determination on the base (1-percent-annual-chance) flood discharges computed in the submitted hydrologic analysis. Future development of projects upstream could cause increased discharges, which could cause increased flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on discharges and could, therefore, indicate that greater flood hazards exist in this area.

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Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

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Mr. Jeffrey D. Lusk
Director, Mitigation Division
Federal Emergency Management Agency, Region IX
1111 Broadway, Suite 1200
Oakland, CA 94607-4052
(510) 627-7175

STATUS OF THE COMMUNITY 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(s) and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

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Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

PUBLIC NOTIFICATION OF REVISION

A notice of changes will be published in the *Federal Register*. This information also will be published in your local newspaper on or about the dates listed below and through FEMA's Flood Hazard Mapping website at https://www.floodmaps.fema.gov/fhm/Scripts/bfe_main.asp.

LOCAL NEWSPAPER Name: *Arizona Business Gazette*
Dates: October 23, 2014 and October 30, 2014

Within 90 days of the second publication in the local newspaper, a citizen may request that we reconsider this determination. Any request for reconsideration must be based on scientific or technical data. Therefore, this letter will be effective only after the 90-day appeal period has elapsed and we have resolved any appeals that we receive during this appeal period. Until this LOMR is effective, the revised flood hazard determination information presented in this LOMR may be changed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Table 3. Summary of Discharges

Flooding Source and Location	Drainage Area (Sq. Miles)	Peak Discharges (cfs) 10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual Chance
Logan Wash (continued)					
Upstream of Saguaro Boulevard	0.12	--[1]	--[1]	296	--[1]
Lower El Mirage Wash					
At the confluence with Agua Fria River	27.82	--[1]	--[1]	290	--[1]
At El Mirage Road	27.05	--[1]	--[1]	160	--[1]
At Cactus Road	26.93	--[1]	--[1]	470	--[1]
At the confluence with Lower El Mirage Wash Tributary	26.25	--[1]	--[1]	1,771	--[1]
At Dysart Road	24.19	--[1]	--[1]	845	--[1]
Lower El Mirage Wash Tributary					
Upstream of the confluence with Lower El Mirage Wash	7.88	--[1]	--[1]	1,170	--[1]
At the intersection of Greenway Road and Dysart Road	6.35	--[1]	--[1]	856	--[1]
At the intersection of Greenway Road and Litchfield Road	5.44	--[1]	--[1]	545	--[1]
Luke Wash					
At Arlington Canal Road	--[1]	--[1]	--[1]	7,633	--[1]
At Old U.S. Highway 80	--[1]	--[1]	--[1]	7,814	--[1]
Upstream limit of detailed study	--[1]	--[1]	--[1]	6,757	--[1]
Luke Wash East Main Tributary					
At confluence with Luke Wash	--[1]	--[1]	--[1]	2,749	--[1]
Luke Wash East Sub Tributary					
At confluence with Luke Wash	--[1]	--[1]	--[1]	871	--[1]
Luke Wash Minor Tributary					
At confluence with Luke Wash	--[1]	--[1]	--[1]	590	--[1]

Revised Data

--[1] Data Not Computed
--[2] Data Not Available

REVISED TO
REFLECT LOMR
EFFECTIVE: February 27, 2015

Table 4. Summary of Stillwater Elevations

FLOODING SOURCE AND LOCATION	ELEVATIONS (Feet NAVD[1]) 10-PERCENT ANNUAL CHANCE	2-PERCENT ANNUAL CHANCE	1-PERCENT ANNUAL CHANCE	0.2-PERCENT ANNUAL CHANCE
Highline Lateral				
North Watershed West of Priest Road	--[2]	--[2]	1,226.1	--[2]
NE Watershed at West Baseline Road	--[2]	--[2]	1,225.0	--[2]
Central Watershed at Guadalupe Road	--[2]	--[2]	1,225.0	--[2]
South Watershed at West Divot Drive	--[2]	--[2]	1,226.2	--[2]
Ken McDonald Golf Course				
Storm Runoff Pond	--[2]	--[2]	1,180.8	--[2]
Ponding within the vicinity of Union Pacific Railroad	--[2]	--[2]	1,215.5	--[2]
Lower El Mirage Wash Basin				
At El Mirage Road	--[2]	--[2]	1,112.0	--[2]
Sunny Cove Dam	--[2]	--[2]	2,166.4	--[2]
Sunset Dam	--[2]	--[2]	2,130.8	--[2]

Data Revised By LOMR Dated January 23, 2015

Revised Data

[1]North American Vertical Datum of 1988
[2]Data Not Available

REVISED TO
REFLECT LOMR
EFFECTIVE: February 27, 2015

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 NAVD)			
Lower El Mirage Wash								
A	3,078	41	59	2.7	1,104.4	1,104.4	1,104.4	0.0
B	4,706	47	68	2.4	1,106.8	1,106.8	1,106.8	0.0
C	6,925	282	711	1.0	1,112.0	1,112.0	1,112.0	0.0

[1] Stream Distance in Feet Above Agua Fria River

REVISED TO
REFLECT LOMR
EFFECTIVE: February 27, 2015

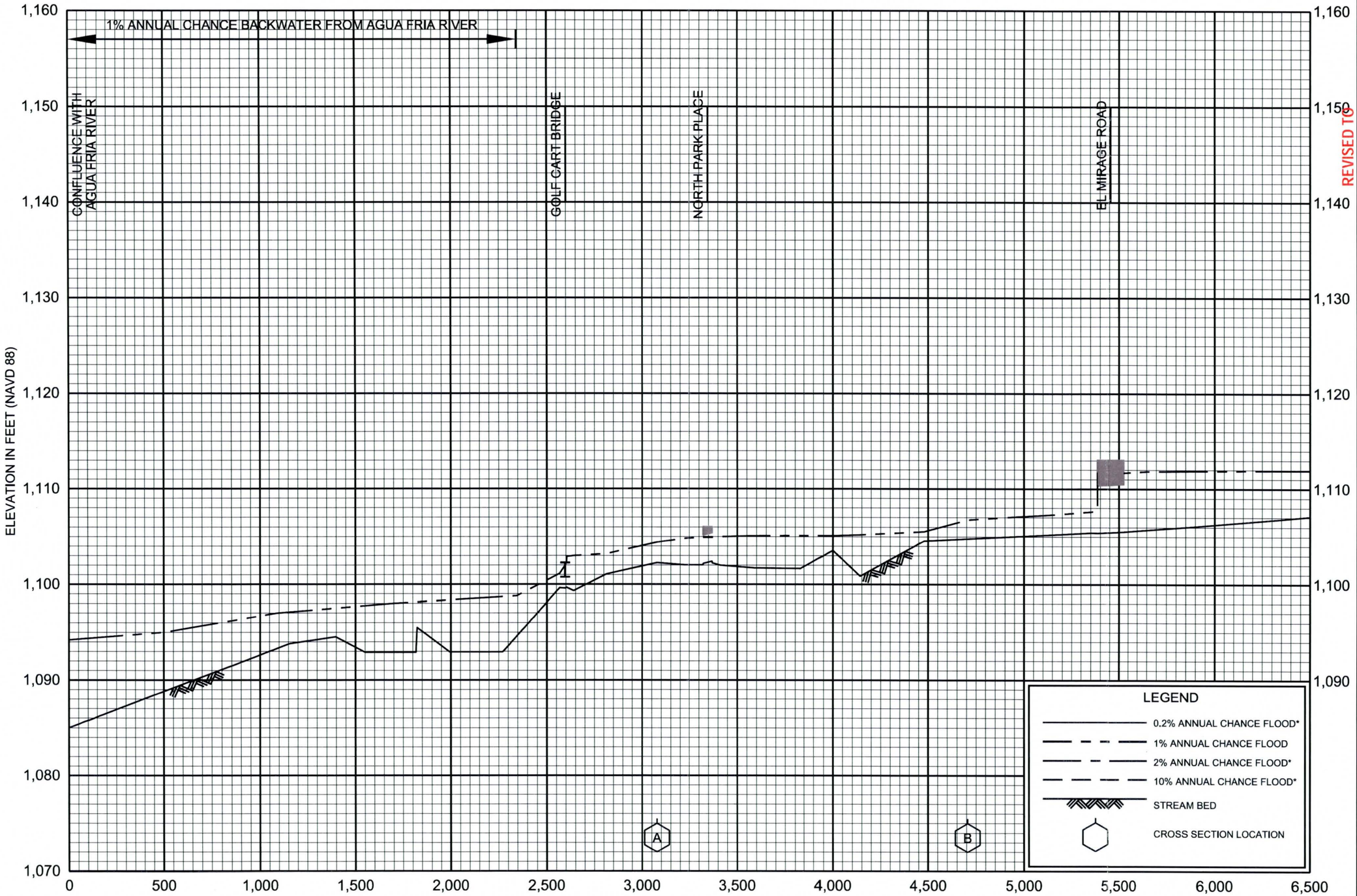
TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

FLOODWAY DATA

LOWER EL MIRAGE WASH



REVISED TO REFLECT LOMR EFFECTIVE: February 27, 2015

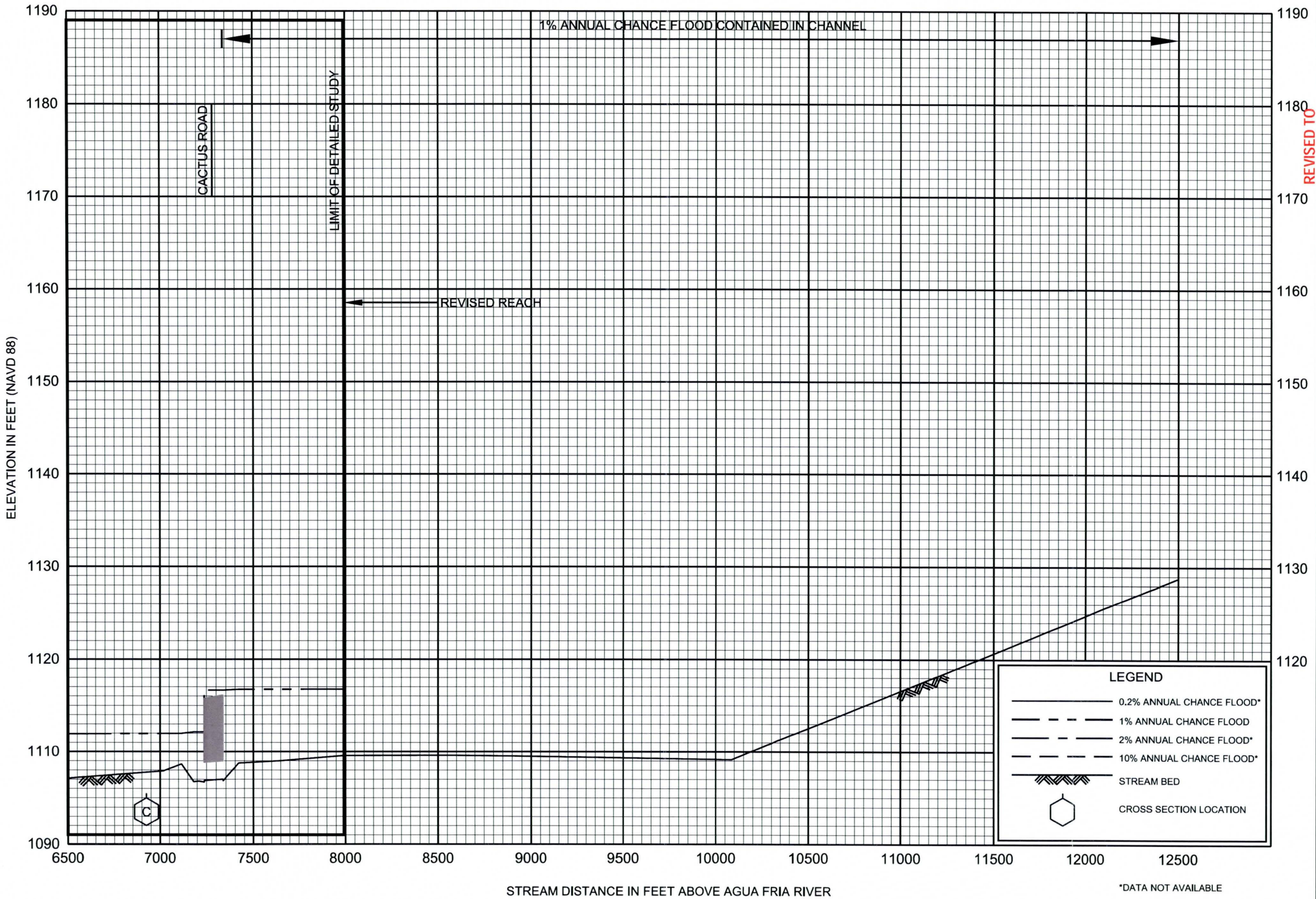
FLOOD PROFILES

LOWER EL MIRAGE WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS



REVISED TO REFLECT LOMR EFFECTIVE: February 27, 2015

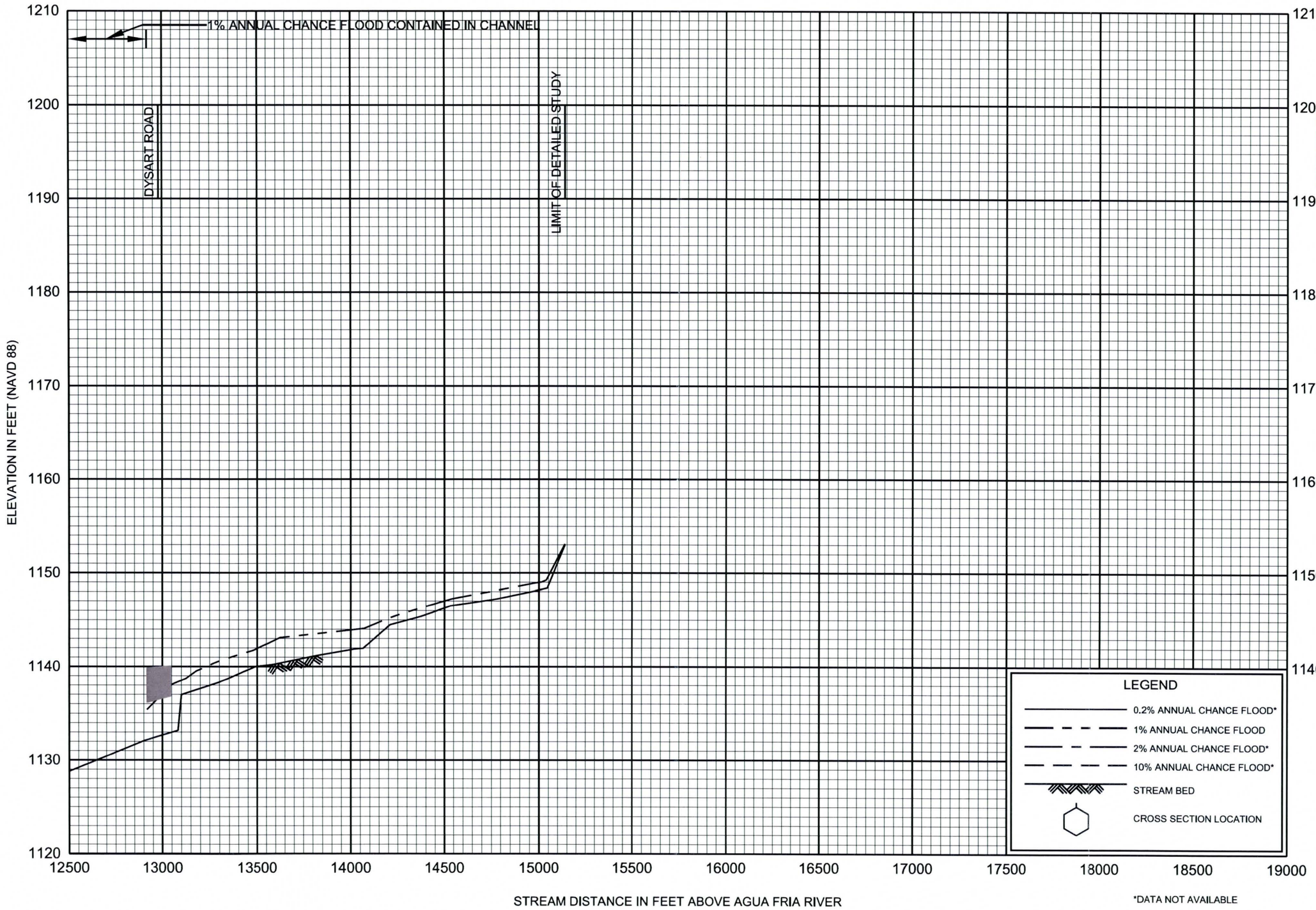
FLOOD PROFILES

LOWER EL MIRAGE WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS



REVISED TO REFLECT LOMR EFFECTIVE: February 27, 2015

FLOOD PROFILES

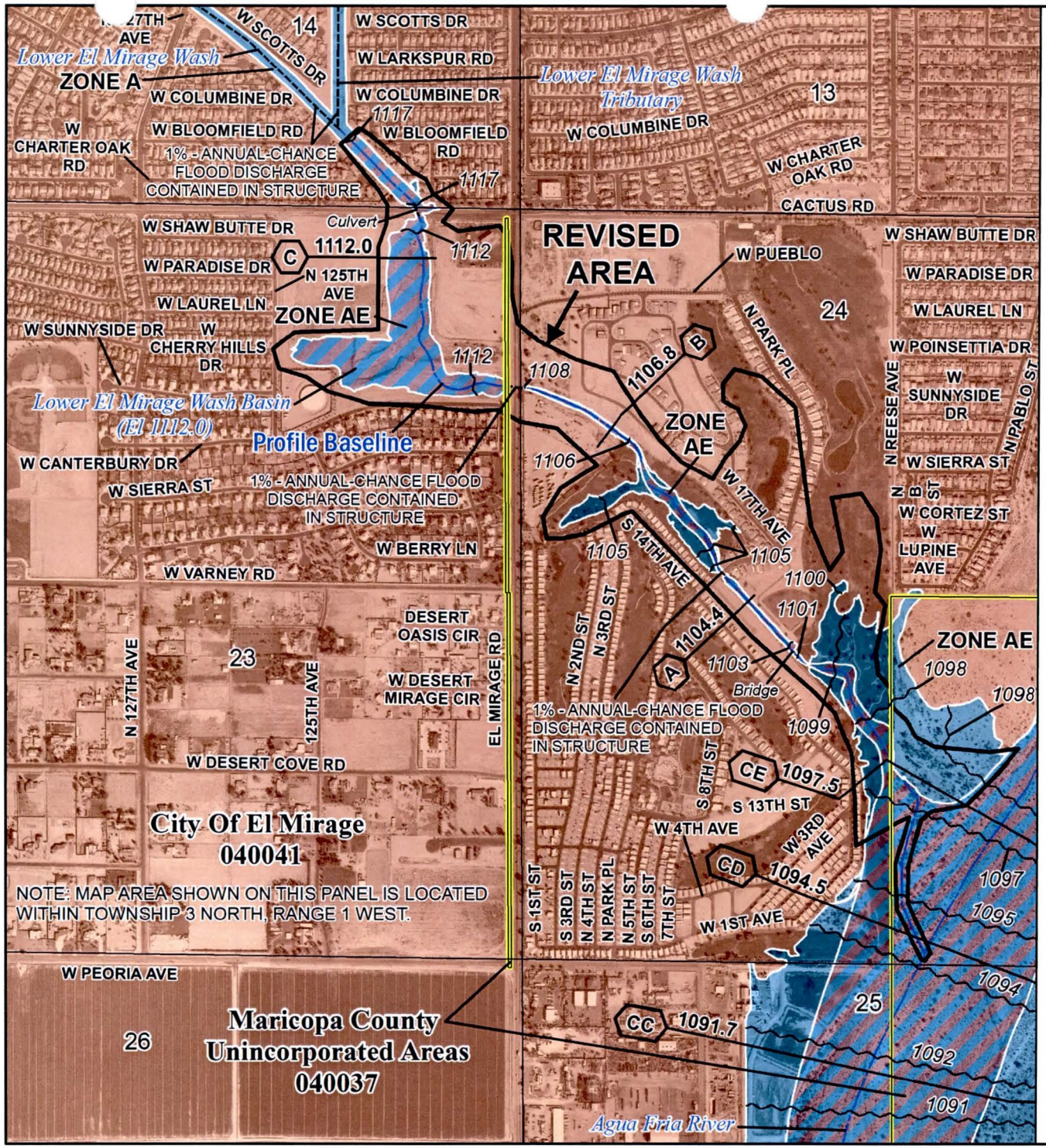
LOWER EL MIRAGE WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

730P



SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes. *Zone X*

SCALE

Map Projection:
NAD 1983 HARN StatePlane Arizona Central FIPS 0202 Feet Intl.
Western Hemisphere; Vertical Datum:NAVD88

1 inch = 1,000 feet 1:12,000

0 500 1,000 2,000 Feet

0 150 300 600 Meters

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA
And Incorporated Areas

PANEL 1680 OF 4425

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
EL MIRAGE, CITY OF	040041	1680	L
GLENDALE, CITY OF	040045	1680	L
MARICOPA COUNTY	040037	1680	L
SURPRISE, CITY OF	040053	1680	L

REVISED TO REFLECT LOMR EFFECTIVE: February 27, 2015

VERSION NUMBER
1.1.1.0

MAP NUMBER
04013C1680L

MAP REVISED
OCTOBER 16, 2013

Michael Duncan - FCDX

From: mwd@mail.maricopa.gov
Sent: Tuesday, July 08, 2014 1:39 PM
To: PMAnderson@mbakerintl.com
Cc: Michael Duncan - FCDX
Subject: Case No 14-09-2966P Lower El Mirage Wash Basin project

Baker

mwd@mail.maricopa.gov has sent you attachments using Baker eFTP

Message Text: Paul, this responds to your letter of June 11, 2014.
I have included a zip file of the GIS data with related notes in a readme file, and copies of the notification letters to the 3 affected properties.

File(s) Uploaded:

README_case no 14-09-2966P.docx
ElMirage2.zip
Notify letters.pdf

To retrieve these attachments, click on the secure link below.
https://eftp.mbakercorp.com:443?wtcQID=U0RMR05MT0dCSTpzUEp1dDZ4bA==/

Access to this information will expire on 7/15/2014 12:00:00 AM

NOTE: Some companies have policies at their sites that prohibit the above link to be accessed by just clicking on the link. If this is the case, just copy and paste the entire URL link (including the equal signs) into your browser. If you need additional assistance, contact the Michael Baker IT Support Desk at 1-866-447-6333 or e-mail us at ITServices@mbakercorp.com

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Lower El Mirage Wash Basin Project

FEMA Case No. 14-09-2966P

GIS data is projected at: NAD_1983_HARN_StatePlane_Arizona_Central_FIPS_0202_Feet_Intl

GIS data includes:

100-yr floodplain boundary (500-yr is not applicable at this location)

Floodway boundary

Baseline

Cross sections

including: ID, river mile, Q, FP Elevation, FW elevation

BFE contours

Flood Control District
of Maricopa County

Board of Directors
Denny Barney, District 1
Steve Chucri, District 2
Andrew Kunasek, District 3
Max W. Wilson, District 4
Mary Rose Wilcox, District 5

www.fcd.maricopa.gov

2801 West Durango Street
Phoenix, Arizona 85009
Phone: 602-506-1501
Fax: 602-506-4601
TT: 602-505-5897

July 8, 2014

Niels Roberts
Pueblo El Mirage Golf & RV Resort – Roberts Resorts
11201 N El Mirage Road
El Mirage, AZ 85335

NOTIFICATION: Changes to the FEMA floodplain and floodway of the Lower El Mirage Wash

PROJECT: Lower El Mirage Wash Basin

Dear Mr. Roberts:

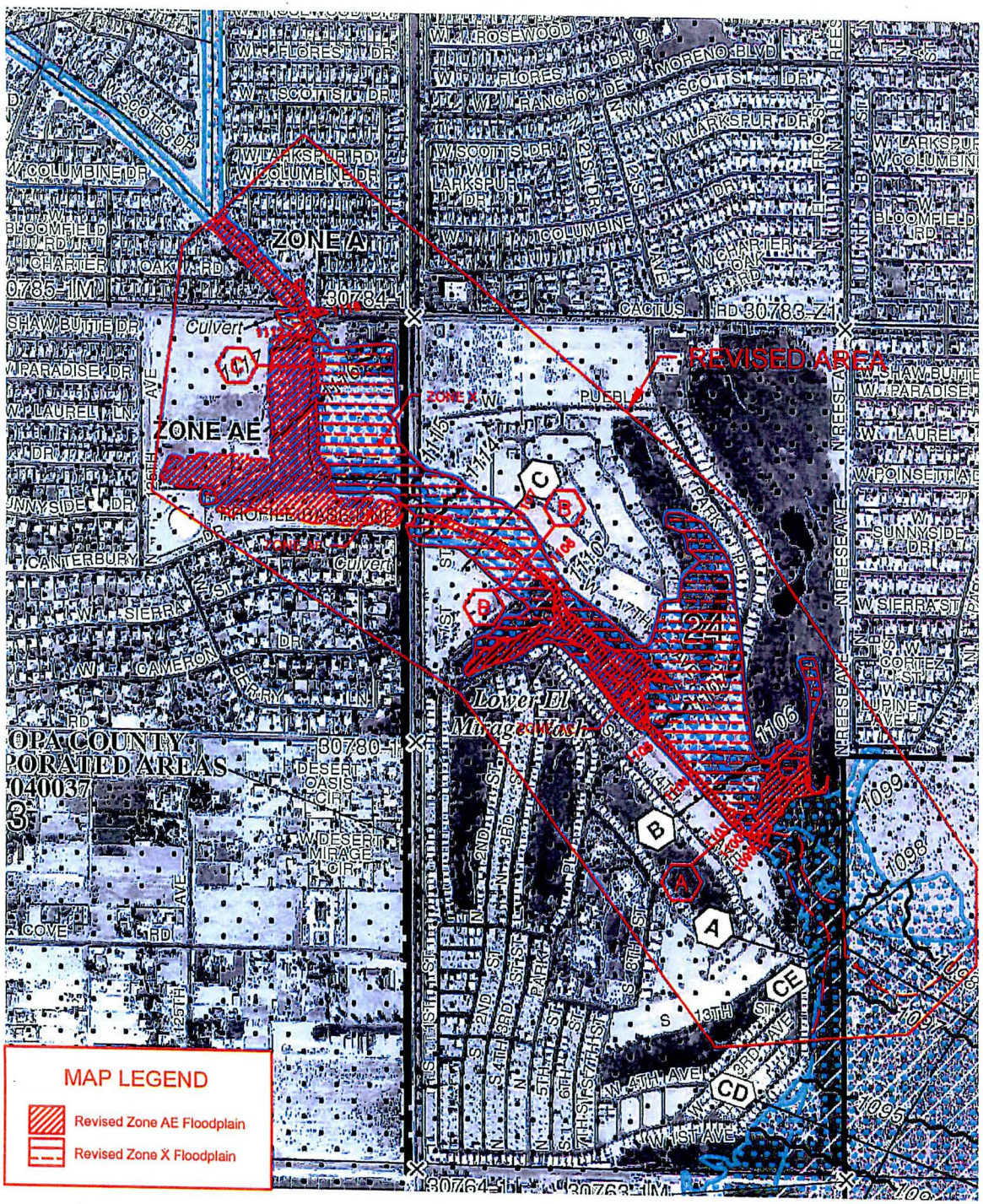
The Flood Control District of Maricopa County in partnership with the City of El Mirage has completed the Lower El Mirage Wash Basin project. This facility, located at the southwest corner of Cactus Road and El Mirage Road, functions as a detention basin that attenuates the stormwater flows of the Lower El Mirage Wash. As a result of this project the FEMA 100-year floodplain and floodway will be changed. The changes include: smaller widths, shifted locations, lower elevations overall, and some higher elevations at a few spots.

I have attached a map of the local FEMA floodplain which includes diagonal-red markings that depict the revised floodplain. The related change of the Flood Insurance Rate Map is being reviewed and processed by the Federal Emergency Management Agency (FEMA). If you have any questions regarding the changes, you may contact me at mwd@mail.maricopa.gov or 602-506-4732.

Yours truly,

Michael Duncan

Michael Duncan, P.E., CFM
Project Manager



MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1680L

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA

AND INCORPORATED AREAS

PANEL 1680 OF 4425

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY	040037	1680	L
EL MIRAGE, CITY OF	040041	1680	L
GLENDALE, CITY OF	040045	1680	L
SURPRISE, CITY OF	040053	1680	L

ANNOTATED FIRM MAP

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
04013C1680L

MAP REVISED
OCTOBER 16, 2013

Federal Emergency Management Agency

Flood Control District
of Maricopa County

Board of Directors
Denny Barney, District 1
Steve Chucri, District 2
Andrew Kunasek, District 3
Max W. Wilson, District 4
Mary Rose Wilcox, District 5

www.fcd.maricopa.gov

2801 West Durango Street
Phoenix, Arizona 85009
Phone: 602-506-1501
Fax: 602-506-4601
TT: 602-505-5897

July 8, 2014

Jorge Gastelum, Director of Development and Community Services/City Engineer
City of El Mirage
12145 NW Grand Avenue
El Mirage, AZ 85335

NOTIFICATION: Changes to the FEMA floodplain and floodway of the Lower El Mirage Wash

PROJECT: Lower El Mirage Wash Basin

Dear Mr. Gastelum:

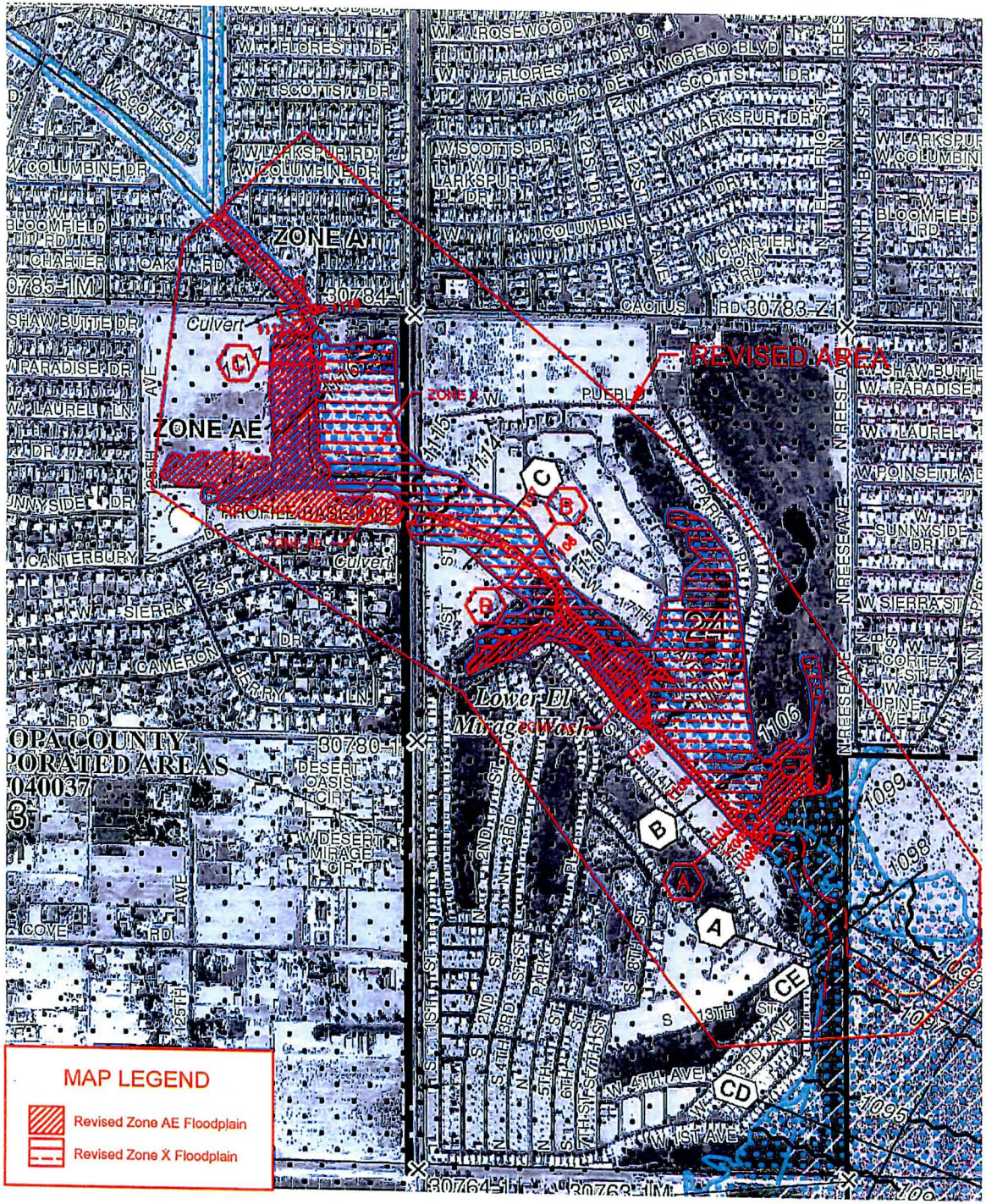
The Flood Control District of Maricopa County in partnership with the City of El Mirage has completed the Lower El Mirage Wash Basin project. This facility, located at the southwest corner of Cactus Road and El Mirage Road, functions as a detention basin that attenuates the stormwater flows of the Lower El Mirage Wash. As a result of this project the FEMA 100-year floodplain and floodway will be changed. The changes include: smaller widths, shifted locations, lower elevations overall, and some higher elevations at a few spots.

I have attached a map of the local FEMA floodplain which includes diagonal-red markings that depict the revised floodplain. The related change of the Flood Insurance Rate Map is being reviewed and processed by the Federal Emergency Management Agency (FEMA). If you have any questions regarding the changes, you may contact me at mwd@mail.maricopa.gov or 602-506-4732.

Yours truly,

Michael Duncan

Michael Duncan, P.E., CFM
Project Manager



MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1680L

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA

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04013C1680L

MAP REVISED
OCTOBER 16, 2013

Federal Emergency Management Agency

Flood Control District
of Maricopa County

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www.fcd.maricopa.gov

2801 West Durango Street
Phoenix, Arizona 85009
Phone: 602-506-1501
Fax: 602-506-4601
TT: 602-505-5897

July 8, 2014

Jim Vanders
Bureau of Land Management
Hassayampa Field Office
21605 N 7th Avenue
Phoenix, AZ 85027-2929

NOTIFICATION: Changes to the FEMA floodplain and floodway of the Lower El Mirage Wash
PROJECT: Lower El Mirage Wash Basin

Dear Mr. Vanders:

The Flood Control District of Maricopa County in partnership with the City of El Mirage has completed the Lower El Mirage Wash Basin project. This facility, located at the southwest corner of Cactus Road and El Mirage Road, functions as a detention basin that attenuates the stormwater flows of the Lower El Mirage Wash. As a result of this project the FEMA 100-year floodplain and floodway will be changed. The changes include: smaller widths, shifted locations, lower elevations overall, and some higher elevations at a few spots.

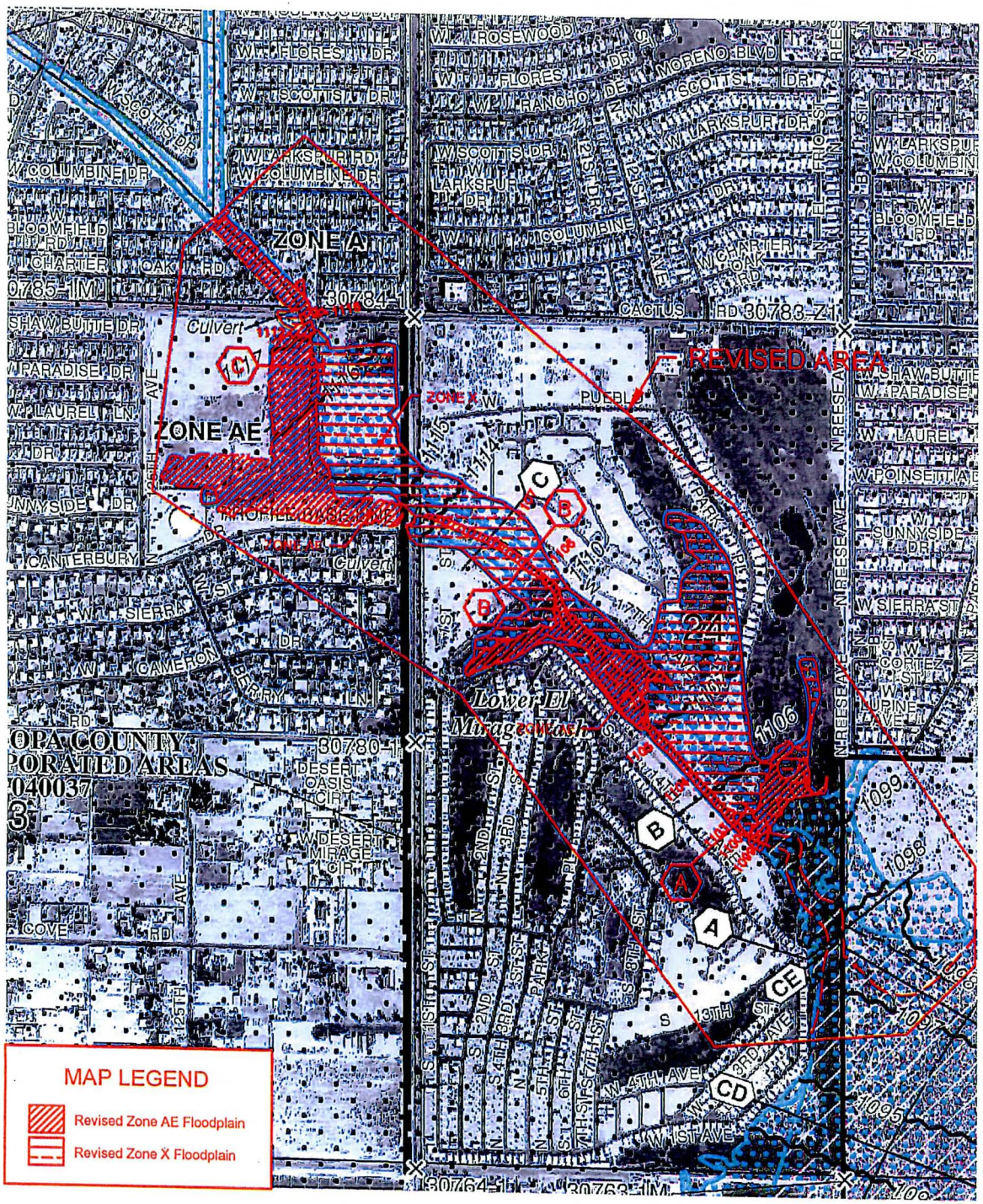
I have attached a map of the local FEMA floodplain which includes diagonal-red markings that depict the revised floodplain. I have also attached an exhibit that shows the location of the subject BLM parcel. There are very minor changes in the floodplain and floodway at the west edge of the parcel.

The related change of the Flood Insurance Rate Map is being reviewed and processed by the Federal Emergency Management Agency (FEMA). If you have any questions regarding the changes, you may contact me at mwd@mail.maricopa.gov or 602-506-4732.

Yours truly,

Michael Duncan

Michael Duncan, P.E., CFM
Project Manager



MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

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MARICOPA COUNTY, ARIZONA

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PANEL 1680 OF 4425

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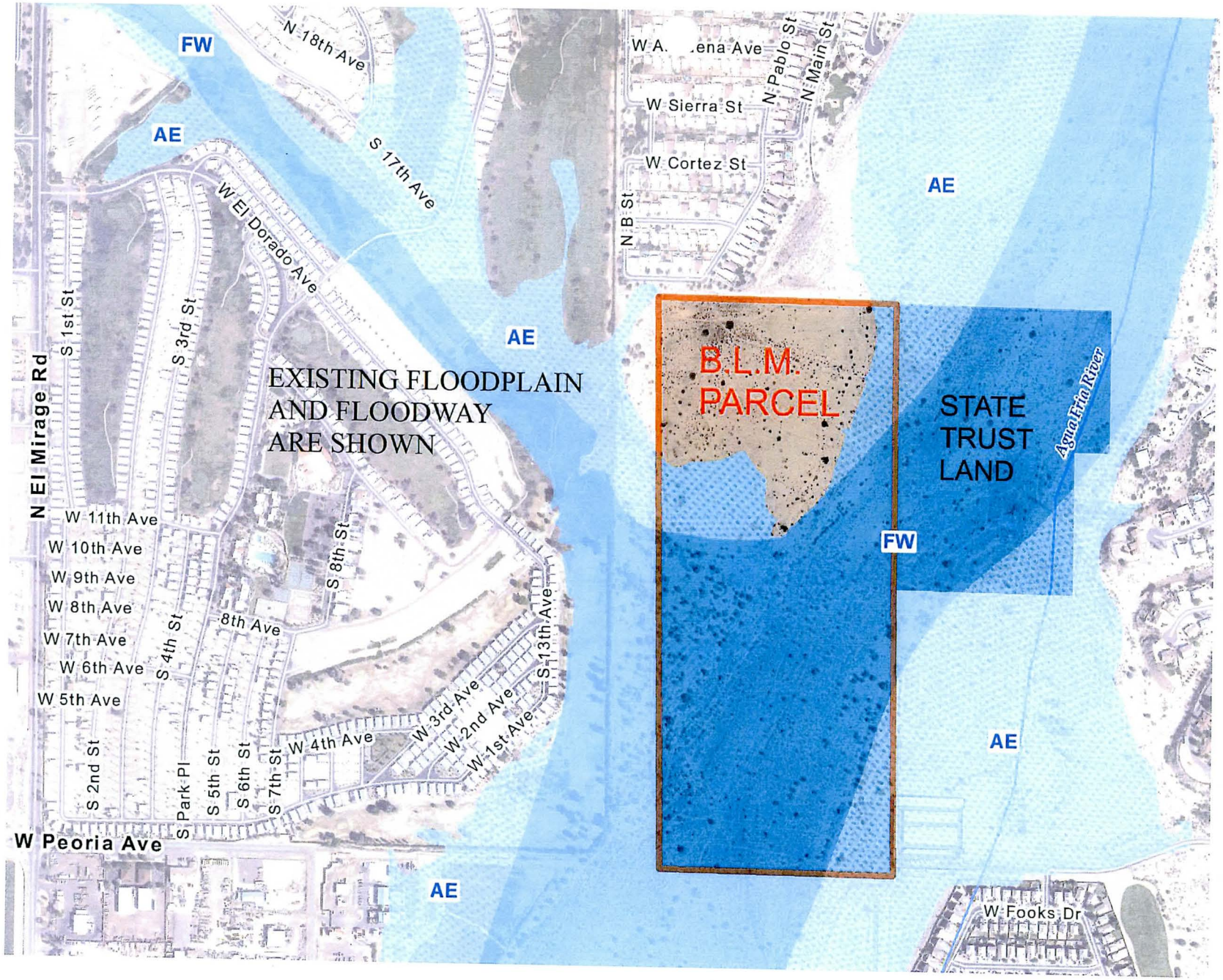
MAP REVISED
OCTOBER 16, 2013

Federal Emergency Management Agency


FW
N 18th Ave
W A. ena Ave
N Pablo St
N Main St
W Sierra St
W Cortez St
AE
S 17th Ave
W El Dorado Ave
N B St
AE
S 1st St
S 3rd St
N El Mirage Rd
EXISTING FLOODPLAIN
AND FLOODWAY
ARE SHOWN
B.L.M.
PARCEL
STATE
TRUST
LAND
Agua Fria River
FW
W 11th Ave
W 10th Ave
W 9th Ave
W 8th Ave
W 7th Ave
W 6th Ave
W 5th Ave
S 8th St
8th Ave
S 4th St
S 13th Ave
W 3rd Ave
W 2nd Ave
W 1st Ave
W 4th Ave
S 2nd St
S Park Pl
S 5th St
S 6th St
S 7th St
W Peoria Ave
AE
AE
AE
W Fooks Dr

NATIONAL FLOOD INSURANCE PROGRAM

FEMA PRODUCTION AND TECHNICAL SERVICES CONTRACTOR

June 11, 2014

Mr. Michael Duncan, P.E., CFM
Project Manager
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, AZ 85009

IN REPLY REFER TO:
Case No.: 13-09-2966P
Communities: City of El Mirage and
Maricopa County, AZ
Community Nos.: 040041 and 040037

316-AD

Dear Mr. Duncan:

This responds to your request dated May 8, 2014, that the Department of Homeland Security's Federal Emergency Management Agency (FEMA) issue a revision to the Flood Insurance Rate Map (FIRM) for Maricopa County, Arizona and Incorporated Areas. Pertinent information about the request is listed below.

Identifier:	Lower El Mirage Wash Basin Project
Flooding Source:	Lower El Mirage Wash
FIRM Panel(s) Affected:	04013C1680L

The data required to complete our review, which must be submitted within 90 days of the date of this letter, are listed on the enclosed summary.

If we do not receive the required data within 90 days, we will suspend our processing of your request. Any data submitted after 90 days will be treated as an original submittal and will be subject to all submittal/payment procedures, including the flat review and processing fee for requests of this type established by the current fee schedule. A copy of the notice summarizing the current fee schedule, which was published in the *Federal Register,* is available on the FEMA website at http://www.fema.gov/plan/prevent/fhm/frm_fees.shtm for your information.

FEMA receives a very large volume of requests and cannot maintain inactive requests for an indefinite period of time. Therefore, we are unable to grant extensions for the submission of required data/fees for revision requests. If a requester is informed by letter that additional data are required to complete our review of a request, the data/fee **must** be submitted within 90 days of the date of the letter. Any fees already paid will be forfeited for any request for which the requested data are not received within 90 days.

If you have general questions about your request, FEMA policy, or the National Flood Insurance Program, please call the FEMA Map Information eXchange (FMIX), toll free, at 1-877-FEMA MAP (1-877-336-2627). If you have specific questions concerning your request, please contact your case reviewer, Mr. Paul Anderson, P.E., CFM, by e-mail at PMAnderson@mbakerintl.com or by telephone at 720-514-1121, or the Revisions Coordinator for your request, Mr. Joseph Kuechenmeister, P.E., CFM, at JKuechenmeister@mbakerintl.com or at (720) 479-3181.

Sincerely,

Syed Qayum

Syed Qayum, CFM
LOMR Technical Manager
BakerAECOM

Enclosure

cc: Mr. William Wiley, P.E.
Chief Engineer and General Manager
Maricopa County

Mr. Jorge Gastelum, P.E.
Director of Development and Community Services
City Engineer

Mr. Josh Papworth, P.E.
Project Engineer
Dibble and Associates Consulting Engineers

bcc: Regional Administrator R9-MT
State Coordinator
PTS Case File: MBJ/JRK/PMA

NATIONAL FLOOD INSURANCE PROGRAM

FEMA PRODUCTION AND TECHNICAL SERVICES CONTRACTOR

Summary of Additional Data Required to Support a
Letter of Map Revision (LOMR)

Case No.: 13-09-2966P

Requester: Mr. Michael Duncan, P.E., CFM

Communities: City of El Mirage and Maricopa County, AZ

Community Nos.: 040041 and 040037

The issues listed below must be addressed before we can continue the review of your request.

1. Please provide GIS data for the proposed conditions topographic work maps from the Conditional Letter of Map Revision (CLOMR) entitled, "Conditional Letter of Map Revision Lower El Mirage Wash," prepared by Dibble Engineering, dated May 1, 2013. Please ensure the digital data is spatially referenced as well as includes what projection (coordinate system, example: UTM/State Plane) was used so that it may be used for accurate mapping purposes.

2. Please submit documentation of the notification to property owners who will be affected by any widening/shifting of the base (1-percent-annual-chance) floodplain and/or any base flood elevations (BFE) increases along Lower El Mirage Wash.

Please send the required data and/or fee directly to us at the address shown at the bottom of this page. For identification purposes, please include the case number referenced above on all correspondence.

Flood Control District
of Maricopa County

www.fcd.maricopa.gov

2801 West Durango Street
Phoenix, Arizona 85009
Phone: 602-506-1501
Fax: 602-506-4601
TT: 602-505-5897

Board of Directors
Denny Barney, District 1
Steve Chucri, District 2
Andrew Kunasek, District 3
Clint L. Hickman, District 4
Mary Rose Wilcox, District 5

May 8, 2014

LOMC Clearinghouse
847 South Pickett Street
Alexandria, VA 22304

SUBJECT CLOMR-to-LOMR packet

REFERENCE Case No. 13-09-1703R

CLOMR issued on July 30, 2013

Lower El Mirage Wash Basin project

The subject project has been completed. The enclosed disk contains an application packet that includes the various required documentation and the as-built plans of the project. A check for the $5,000 fee is enclosed.

You may contact me at 602-506-4732, or at mwd@mail.maricopa.gov.

Sincerely,

Michael Duncan

Michael Duncan, P.E., CFM
Project Manager

File: AWT (EM) 3.1

CASE NO 13-09-1703R

PROJECT Lower El Mirage Wash Basin

CONTACT Mike Duncan, P.E., CFM
Project Manager
Flood Control District of Maricopa County
602-506-4732

1. Application forms -- MT-2 Forms 1 and 2 are attached; Form 3 – see CLOMR
2. Processing fee -- check enclosed
3. As-built plans
   a. A PDF of the certified as-built plans is included on the disk. Sheets 24 and 25 of the as-built plans contain the tables of point elevations and the annotated as-built elevations.
   b. Of the locations where as-built elevations were captured, 17 were at the bottom of the detention basin. The differences and average are listed here:

17 Spot check points at the Bottom of the Basin

Point #	Design Elevation (feet)	As-built Elevation (feet)	Elevation DIfference (feet)
117	1109.61	1109.8	0.19
134	1107.96	1108.1	0.14
220	1107.96	1108.1	0.14
374	1108.73	1109.4	0.67
436	1109.23	1108.8	-0.43
437	1109.12	1109.1	-0.02
440	1108.91	1108.9	-0.01
474	1109.11	1109.4	0.29
649	1107.77	1107.3	-0.47
650	1108.36	1108.1	-0.26
655	1108.65	1108.3	-0.35
748	1106.99	1106.7	-0.29
751	1105.64	1105.0	-0.64
753	1106.62	1106.5	-0.12
771	1107.00	1107.4	0.40
772	1107.24	1107.4	0.16
773	1107.34	1107.8	0.46

Average of the elevation differences -0.008

The average elevation difference, -0.008 feet, is quite small; therefore, the modeling of the CLOMR submittal is accurate and applicable.

4. Annotated F.I.R.M.

   The annotated Flood Insurance Rate Map was submitted during the CLOMR processing, to Paul Anderson on July 23, 2013.

5. Notification to the affected property owners

   Copies of the letters to all affected property owners were included in Appendix H2 of the CLOMR package.

6. Letter from community - adopt/enforce -- attached

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

OVERVIEW & CONCURRENCE FORM

O.M.B No. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless it displays a valid OMB control number. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a (NFIP) Flood Insurance Rate Maps (FIRM).

A. REQUESTED RESPONSE FROM DHS-FEMA

This request is for a (check one):

☐ CLOMR: A letter from DHS-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 DHS-FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See 44 CFR Ch. 1, Parts 60, 65 & 72)

B. OVERVIEW

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

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Example: 480301 480287	City of Katy Harris County	TX TX	48473C 48201C	0005D 0220G	02/08/83 09/28/90
040041	City of El Mirage	AZ	04013C	1680L	10/16/13
040037	Maricopa County Unincorporated Areas	AZ	04013C	1680L	10/16/13

2. a. Flooding Source: Lower El Mirage Wash

   b. Types of Flooding: ☒ Riverine ☐ Coastal ☐ Shallow Flooding (e.g., Zones AO and AH) ☐ Alluvial fan ☐ Lakes ☐ Other (Attach Description)

3. Project Name/Identifier: Lower El Mirage Wash Basin

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

5. Basis for Request and Type of Revision:

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

   ☒ Physical Change ☐ Improved Methodology/Data ☒ Regulatory Floodway Revision ☒ Base Map Changes
   ☐ Coastal Analysis ☒ Hydraulic Analysis ☒ Hydrologic Analysis ☐ Corrections
   ☐ Weir-Dam Changes ☐ Levee Certification ☐ Alluvial Fan Analysis ☐ Natural Changes
   ☒ New Topographic Data ☐ Other (Attach Description)

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

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

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

☐ Dam ☐ Fill ☐ Other (Attach Description)

6. ☐ Documentation of ESA compliance is submitted (required to initiate CLOMR review). Please refer to the instructions for more information.

C. REVIEW FEE

Has the review fee for the appropriate request category been included? ☒ Yes Fee amount: $5,000

☐ No, Attach Explanation

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

D. SIGNATURE

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

Name: Michael Duncan, P.E., CFM	Company: Flood Control District ofMaricopa County	
Mailing Address: 2801 W Durango St Phoenix AZ 85009	Daytime Telephone No.: 602-506-4732	Fax No.: 602-506-8561
	E-Mail Address: mwd@mail.maricopa.gov	
Signature of Requester (required): Michael Duncan	Date: 4-30-14	

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirements for when fill is placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. For Conditional LOMR requests, the applicant has documented Endangered Species Act (ESA) compliance to FEMA prior to FEMA's review of the Conditional LOMR application. For LOMR requests, I acknowledge that compliance with Sections 9 and 10 of the ESA has been achieved independently of FEMA's process. For actions authorized, funded, or being carried out by Federal or State agencies, documentation from the agency showing its compliance with Section 7(a)(2) of the ESA will be submitted. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title: Jorge Gastelum, PE, Director of Development and Community Services/City Engineer	Community Name: City of El Mirage	
Mailing Address: 12145 NW Grand Avenue El Mirage AZ 85335	Daytime Telephone No.: 623-876-2976	Fax No.: 623-933-8418
	E-Mail Address: jgastelum@cityofelmirage.org	
Community Official's Signature (required): Jorge Gastelum	Date: 4-24-14	

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.2(b) and as described in the MT-2 Forms Instructions. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: Josh Papworth, P.E.	License No.: 37878	Expiration Date: 9/30/14
Company Name: Dibble & Associates Consulting Engineers	Telephone No.: 602-957-1155	Fax No.: 602-957-2838
Signature:	Date: 4.29.14	E-Mail Address:

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

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

☐ Dam ☐ Fill ☐ Other (Attach Description)

6. ☐ Documentation of ESA compliance is submitted (required to initiate CLOMR review). Please refer to the instructions for more information.

C. REVIEW FEE

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

☐ No, Attach Explanation

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

D. SIGNATURE

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

Name:	Company:	
Mailing Address:	Daytime Telephone No.:	Fax No.:
	E-Mail Address:	
Signature of Requester (required):	Date:	

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirements for when fill is placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. For Conditional LOMR requests, the applicant has documented Endangered Species Act (ESA) compliance to FEMA prior to FEMA's review of the Conditional LOMR application. For LOMR requests, I acknowledge that compliance with Sections 9 and 10 of the ESA has been achieved independently of FEMA's process. For actions authorized, funded, or being carried out by Federal or State agencies, documentation from the agency showing its compliance with Section 7(a)(2) of the ESA will be submitted. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title: Timothy S. Phillips, P.E., Chief Engineer & General Manager	Community Name: Maricopa County	
Mailing Address: 2801 W Durango St Phoenix AZ 85009	Daytime Telephone No.: 602-506-1501	Fax No.: 602-506-4601
	E-Mail Address:	
Community Official's Signature (required):	Date: 5/2/14	

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.2(b) and as described in the MT-2 Forms Instructions. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name:	License No.:	Expiration Date:
Company Name:	Telephone No.:	Fax No.:
Signature:	Date:	E-Mail Address:

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

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

Seal (Optional)

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 3.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a NFIP Flood Insurance Rate Maps (FIRM).

Flooding Source: Lower El Mirage

Note: Fill out one form for each flooding source studied

A. HYDROLOGY

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

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

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

Location	Drainage Area (Sq. Mi.)	Effective/FIS (cfs)	Revised (cfs)
conf. @ Agua Fria River	27.82	1,753	294
conf. @ LEMW Tributary	26.93	1,771	480

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

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model → Specify Model: LEMWB POST.dat of CLOMR
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters), and documentation to support the new analysis.

4. Review/Approval of Analysis

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

5. Impacts of Sediment Transport on Hydrology

Is the hydrology for the revised flooding source(s) affected by sediment transport? ☐ Yes ☒ No

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation..

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit*	Confluence w/Agua Fria River	See CLOMR maps	1098.7	1098.7
Upstream Limit*	730 ft. upstream of Cactus Rd.	1.514	1117.1	1116.8

*Proposed/Revised elevations must tie-into the Effective elevations within 0.5 foot at the downstream and upstream limits of revision.

2. Hydraulic Method/Model Used: HEC-RAS, version 4.1.0

3. Pre-Submittal Review of Hydraulic Models*

DHS-FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS.

4.

Models Submitted	Natural Run		Floodway Run		Datum
Duplicate Effective Model*	File Name: LEMW_DupEff	Plan Name: LEMW_DupEff	File Name: LEMW_DupEff	Plan Name: LEMW_DupEff	NGVD 1929
Corrected Effective Model*	File Name:	Plan Name:	File Name:	Plan Name:	
Existing or Pre-Project Conditions Model	File Name: LEMW_PreProj	Plan Name: LEMW_PreProj	File Name: LEMW_PreProj	Plan Name: LEMW_PreProj	NAVD 1988
Revised or Post-Project Conditions Model	File Name: LEWW_PostProj	Plan Name: LEWW_PostProj	File Name: LEWW_PostProj	Plan Name: LEWW_PostProj	NAVD 1988
Other - (attach description)	File Name:	Plan Name:	File Name:	Plan Name:	

* For details, refer to the corresponding section of the instructions.

☒ Digital Models Submitted? (Required)

C. MAPPING REQUIREMENTS

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

☒ Digital Mapping (GIS/CADD) Data Submitted (preferred)

Topographic Information: New mapping for the project - 1-foot vert. contour

Source: Cooper Aerial Mapping Company Date: April 2012

Accuracy: Hor. scale: 1"=40' Vert.: +/- 0.5 ft. accuracy

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

☒ Annotated FIRM and/or FBFM (Required)

D. COMMON REGULATORY REQUIREMENTS*

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

   a. For CLOMR requests, if either of the following is true, please submit **evidence of compliance with Section 65.12 of the NFIP regulations**:

      - The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot compared to pre-project conditions.
      - The proposed project encroaches upon a SFHA with or without BFEs established and would result in increases above 1.00 foot compared to pre-project conditions.

   b. Does this LOMR request cause increase in the BFE and/or SFHA compared with the effective BFEs and/or SFHA? ☒ Yes ☐ No

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

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

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

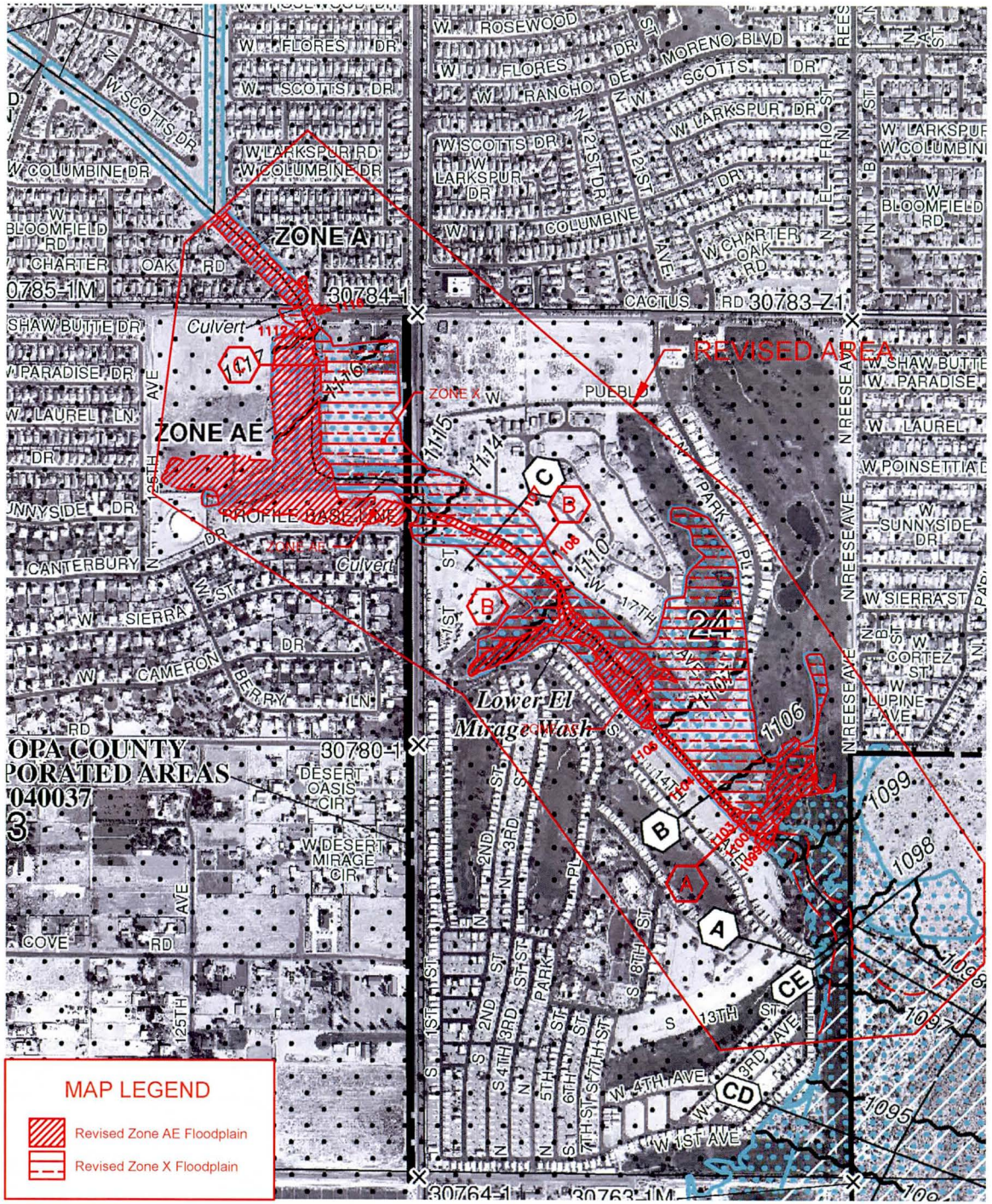
3. For LOMR requests, is the regulatory floodway being revised? ☒ Yes ☐ No

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

4. For CLOMR requests, please submit documentation to FEMA and the community to show that you have complied with Sections 9 and 10 of the Endangered Species Act (ESA).

For actions authorized, funded, or being carried out by Federal or State agencies, please submit documentation from the agency showing its compliance with Section 7(a)(2) of the ESA. Please see the MT-2 instructions for more detail.

* Not inclusive of all applicable regulatory requirements. For details, see 44 CFR parts 60 and 65.



MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

PANEL 1680L

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA

AND INCORPORATED AREAS

PANEL 1680 OF 4425

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY	040037	1680	L
EL MIRAGE, CITY OF	040041	1680	L
GLENDALE, CITY OF	040045	1680	L
SURPRISE, CITY OF	040053	1680	L

ANNOTATED FIRM MAP

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
04013C1680L

MAP REVISED
OCTOBER 16, 2013

Federal Emergency Management Agency

City of
EL MIRAGE
Arizona
GRAND HERITAGE, BRIGHT FUTURE!

Development & Community Services
12145 NW Grand Avenue, El Mirage 85335
623-972-8116; Fax 623-933-8418; TDD 623-933-3258
www.cityofelmirage.org

April 24, 2014

Subject: FEMA Case No. 13-09-1703R
Flooding source - Lower El Mirage Wash

To whom it may concern:

A flood control project has been completed on the Lower El Mirage Wash. It functions as a detention basin and is called the Lower El Mirage Wash Basin. The discharges of Lower El Mirage Wash have been attenuated by this project. As a result, both the FEMA floodplain and floodway of Lower El Mirage Wash have been modified by this project.

The City of El Mirage will adopt and enforce the modified regulatory floodway and floodplain. The related regulations, processes, and activities are part of our regulation of development and improvements within the City.

Please let me know any questions. You can reach me at (623) 876-2976 or at jgastelum@cityofelmirage.org.

Sincerely,

Jorge Gastelum, P.E.
Director of Development and Community Services / City Engineer
City of El Mirage

cc: Michael Duncan, P.E., CFM, Project Manager, Flood Control District of Maricopa County

Federal Emergency Management Agency

Washington, D.C. 20472

July 30, 2013

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 13-09-1703R
Community Name: Maricopa County, AZ
Community No.: 040037

The Honorable Andy Kunasek
Chairman, Maricopa County Board of Supervisors
301 West Jefferson Street, 10th Floor
Phoenix, AZ 85003

Dear Mr. Kunasek:

We are providing our comments with the enclosed Conditional Letter of Map Revision (CLOMR) on a proposed project within your community that, if constructed as proposed, could revise the effective Flood Insurance Study report and Flood Insurance Rate Map for your community.

If you have any questions regarding the floodplain management regulations for your community, the National Flood Insurance Program (NFIP) in general, or technical questions regarding this CLOMR, please contact the Director, Mitigation Division of the Federal Emergency Management Agency (FEMA) Regional Office in Oakland, California, at (510) 627-7175, or the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP). Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Sincerely,

Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

For: Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

List of Enclosures:
Conditional Letter of Map Revision Comment Document

cc: The Honorable Lana Mook
Mayor, City of El Mirage
City Hall

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

Mr. Timothy S. Phillips, P.E.
Chief Engineer and General Manager
Flood Control District of Maricopa County

Mr. Josh Papworth, P.E.
Project Engineer
Dibble Engineering

Federal Emergency Management Agency

Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT

COMMUNITY INFORMATION		PROPOSED PROJECT DESCRIPTION	BASIS OF CONDITIONAL REQUEST
COMMUNITY	Maricopa County Arizona (Unincorporated Areas)	DETENTION BASIN CULVERT	HYDROLOGIC ANALYSIS HYDRAULIC ANALYSIS FLOODWAY NEW TOPOGRAPHIC DATA
	COMMUNITY NO.: 040037		
IDENTIFIER	Lower El Mirage Wash Basin	APPROXIMATE LATITUDE & LONGITUDE: 35.589, -112.321 SOURCE: USGS QUADRANGLE DATUM: NAD 83	

AFFECTED MAP PANELS

TYPE: FIRM* NO.: 04013C1680L DATE: October 16, 2013

* FIRM - Flood Insurance Rate Map

FLOODING SOURCE(S) AND REACH DESCRIPTION

Lower El Mirage Wash – from approximately 4,430 feet downstream to approximately 2,400 feet upstream of North El Mirage Road

PROPOSED PROJECT DESCRIPTION

Flooding Source	Proposed Project	Location of Proposed Project
Lower El Mirage Wash	Detention Basin Modification	Just upstream of North El Mirage Road

SUMMARY OF IMPACTS TO FLOOD HAZARD DATA

Flooding Source	Effective Flooding	Proposed Flooding	Increases	Decreases
Lower El Mirage Wash	Floodway	Floodway	None	Yes
	BFEs*	BFEs	Yes	Yes
	Zone AE	Zone AE	None	Yes

* BFEs - Base (1-percent-annual-chance) Flood Elevations

COMMENT

This document provides the Federal Emergency Management Agency's (FEMA's) comment regarding a request for a CLOMR for the project described above. This document is not a final determination; it only provides our comment on the proposed project in relation to the flood hazard information shown on the effective National Flood Insurance Program (NFIP) map. We reviewed the submitted data and the data used to prepare the effective flood hazard information for your community and determined that the proposed project meets the minimum floodplain management criteria of the NFIP. Your community is responsible for approving all floodplain development and for ensuring that all permits required by Federal or State/Commonwealth law have been received. State/Commonwealth, county, and community officials, based on their knowledge of local conditions and in the interest of safety, may set higher standards for construction in the Special Flood Hazard Area (SFHA), the area subject to inundation by the base flood. If the State/Commonwealth, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304. Additional Information about the NFIP is available on the FEMA website at http://www.fema.gov/nfip.

Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

132942 PT202.BKR.13091703R.H20 104

Federal Emergency Management Agency
Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

OTHER COMMUNITIES AFFECTED BY THIS CONDITIONAL REQUEST

CID Number: 040041 **Name:** City of El Mirage, Arizona

AFFECTED MAP PANELS

TYPE: FIRM* NO.: 04013C1680L DATE: October 16, 2013

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304. Additional Information about the NFIP is available on the FEMA website at http://www.fema.gov/nfip.

Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

To determine the changes in flood hazards that will be caused by the proposed project, we compared the hydraulic modeling reflecting the proposed project (referred to as the proposed conditions model) to the hydraulic modeling used to prepare the Flood Insurance Study (FIS) (referred to as the effective model). If the effective model does not provide enough detail to evaluate the effects of the proposed project, an existing conditions model must be developed to provide this detail. This existing conditions model is then compared to the effective model and the proposed conditions model to differentiate the increases or decreases in flood hazards caused by more detailed modeling from the increases or decreases in flood hazards that will be caused by the proposed project.

The table below shows the changes in the BFEs:

BFE Comparison Table

Flooding Source: Lower El Mirage Wash		BFE Change (feet)	Location of maximum change
Existing vs. Effective	Maximum increase	0.2	Approximately 3,330 feet downstream of North El Mirage Road
	Maximum decrease	3.4	Just upstream of North El Mirage Road
Proposed vs. Existing	Maximum increase	0.3	Just upstream of North El Mirage Road
	Maximum decrease	None	N/A
Proposed vs. Effective	Maximum increase	0.2	Approximately 3,330 feet downstream of North El Mirage Road
	Maximum decrease	3.2	Just upstream of North El Mirage Road

Increases due to the proposed project that exceed those permitted under Paragraphs (c)(10) or (d)(3) of Section 60.3 of the NFIP regulations must adhere to Section 65.12 of the NFIP regulations. With this request, your community has complied with all requirements of Paragraph 65.12(a) of the NFIP regulations. Compliance with Paragraph 65.12(b) also is necessary before FEMA can issue a Letter of Map Revision when a community proposes to permit encroachments into the effective regulatory floodway that will cause BFE increases in excess of those permitted under Paragraph 60.3(d)(3). existing development that may be necessary to resolve the potential violation.

NFIP regulations Subparagraph 60.3(b)(7) requires communities to 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 ordinances; therefore, responsibility for maintenance of the altered or relocated watercourse, including any related appurtenances such as bridges, culverts, and other drainage structures, rests with your community. We may request that your community submit a description and schedule of maintenance activities necessary to ensure this requirement.

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Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

DATA REQUIRED FOR FOLLOW-UP LOMR

Upon completion of the project, your community must submit the data listed below and request that we make a final determination on revising the effective FIRM and FIS report. If the project is built as proposed and the data below are received, a revision to the FIRM and FIS report would be warranted.

• Form 1, entitled "Overview & Concurrence Form." Detailed application and certification forms must be used for requesting final revisions to the maps. Therefore, when the map revision request for the area covered by this letter is submitted, Form 1 must be included. If as-built conditions differ from the proposed plans, please submit new forms, which may be accessed at http://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/mt-2-application-forms-and-instructions, or annotated copies of the previously submitted forms showing the revised information.

• Hydraulic analyses, for as-built conditions, of the base flood and the regulatory floodway, together with a topographic work map showing the revised floodplain and floodway boundaries. Please ensure that the revised information ties in with the current effective information at the downstream and upstream ends of the revised reach.

• An annotated copy of the FIRM, at the scale of the effective FIRM, that shows the revised floodplain and floodway boundary delineations shown on the submitted work map and how they tie into the floodplain and floodway boundary delineations shown on the current effective FIRM at the downstream and upstream ends of the revised reach.

• As-built plans, certified by a registered professional engineer, of all proposed project elements.

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304. Additional Information about the NFIP is available on the FEMA website at http://www.fema.gov/nfip.

Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

• A copy of the public notice distributed by your community, stating its intent to revise the regulatory floodway, or a signed statement by your community that it has notified all affected property owners and affected adjacent jurisdictions.

• Documentation of the notification to property owners who will be affected by any widening/shifting of the base floodplain and/or any BFE increases along Lower El Mirage Wash.

• Evidence that your community has, prior to approval of the proposed encroachment, adopted floodplain management ordinances that incorporate the increased BFEs and revised floodway boundary delineations to reflect the post-project conditions, as stated in Paragraph 65.12(b).

• A letter stating that your community will adopt and enforce the modified regulatory floodway, OR, if the State/Commonwealth has jurisdiction over either the regulatory floodway or its adoption by your community, a copy of your community's letter to the appropriate State/Commonwealth agency notifying it of the modification to the regulatory floodway and a copy of the letter from that agency stating its approval of the modification.

• FEMA's fee schedule for reviewing and processing requests for conditional and final modifications to published flood information and maps may be accessed at http://www.fema.gov/forms-documents-and-software/flood-map-related-fees. The fee at the time of the map revision submittal must be received before we can begin processing the request. Payment of this fee can be made through a check or money order, made payable in U.S. funds to the National Flood Insurance Program, or by credit card (Visa or MasterCard only). Please forward the payment, along with the revision application, to the following address:

LOMC Clearinghouse
847 South Pickett Street
Alexandria, VA 22304

After receiving appropriate documentation to show that the project has been completed, FEMA will initiate a revision to the FIRM and FIS report. Because the flood hazard information (i.e., BFEs, base flood depths, SFHAs, zone designations, and/or regulatory floodways) will change as a result of the project, a 90-day appeal period will be initiated for the revision, during which community officials and interested persons may appeal the revised flood hazard information based on scientific or technical data.

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304. Additional Information about the NFIP is available on the FEMA website at http://www.fema.gov/nfip.

Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

COMMUNITY REMINDERS

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

Ms. Sally M. Ziolkowski
Director, Mitigation Division
Federal Emergency Management Agency, Region IX
1111 Broadway Street, Suite 1200
Oakland, CA 94607-4052
(510) 627-7175

A countywide study has been conducted for Maricopa County, Arizona and Incorporated Areas, and final copies of the revised FIRM and FIS report will become effective on October 16, 2013. When the revision request following this CLOMR is submitted, please ensure that the data submitted for the revision ties into the data effective at the time of the submittal.

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304. Additional Information about the NFIP is available on the FEMA website at http://www.fema.gov/nfip.

Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

July 30, 2013

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 13-09-1703R
Community Name: City of El Mirage, AZ
Community No.: 040041

The Honorable Lana Mook
Mayor, City of El Mirage
City Hall
12145 Northwest Grand Avenue
El Mirage, AZ 85335

Dear Mayor Mook:

We are providing our comments with the enclosed Conditional Letter of Map Revision (CLOMR) on a proposed project within your community that, if constructed as proposed, could revise the effective Flood Insurance Study report and Flood Insurance Rate Map for your community.

If you have any questions regarding the floodplain management regulations for your community, the National Flood Insurance Program (NFIP) in general, or technical questions regarding this CLOMR, please contact the Director, Mitigation Division of the Federal Emergency Management Agency (FEMA) Regional Office in Oakland, California, at (510) 627-7175, or the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP). Additional information about the NFIP is available on our website at http://www.fema.gov/nfip

Sincerely,

Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

For: Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

List of Enclosures:

Conditional Letter of Map Revision Comment Document

cc: The Honorable Andy Kunasek
Chairman, Maricopa County Board of Supervisors

Ms. Sue McDermott, P.E.
Deputy City Manager and City Engineer
City of El Mirage

Mr. Timothy S. Phillips, P.E.
Chief Engineer and General Manager
Flood Control District of Maricopa County

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

Mr. Josh Papworth, P.E.
Project Engineer
Dibble Engineering

Federal Emergency Management Agency

Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT

COMMUNITY INFORMATION		PROPOSED PROJECT DESCRIPTION	BASIS OF CONDITIONAL REQUEST
COMMUNITY	City of El Mirage Maricopa County Arizona	DETENTION BASIN CULVERT	HYDROLOGIC ANALYSIS HYDRAULIC ANALYSIS FLOODWAY NEW TOPOGRAPHIC DATA
	COMMUNITY NO.: 040041		
IDENTIFIER	Lower El Mirage Wash Basin	APPROXIMATE LATITUDE & LONGITUDE: 35.589, -112.321 SOURCE: USGS QUADRANGLE DATUM: NAD 83	

AFFECTED MAP PANELS

TYPE: FIRM* NO.: 04013C1680L DATE: October 16, 2013

* FIRM - Flood Insurance Rate Map

FLOODING SOURCE(S) AND REACH DESCRIPTION

Lower El Mirage Wash – from approximately 4,430 feet downstream to approximately 2,400 feet upstream of North El Mirage Road

PROPOSED PROJECT DESCRIPTION

Flooding Source	Proposed Project	Location of Proposed Project
Lower El Mirage Wash	Detention Basin Modification	From just upstream of North El Mirage Road to just downstream of Cactus Road
	Culvert Modification	At North El Mirage Road

SUMMARY OF IMPACTS TO FLOOD HAZARD DATA

Flooding Source	Effective Flooding	Proposed Flooding	Increases	Decreases
Lower El Mirage Wash	Floodway	Floodway	Yes	Yes
	BFEs*	BFEs	Yes	Yes
	Zone AE	Zone AE	Yes	Yes
	Zone A	Zone AE	None	Yes

* BFEs - Base (1-percent-annual-chance) Flood Elevations

COMMENT

This document provides the Federal Emergency Management Agency's (FEMA's) comment regarding a request for a CLOMR for the project described above. This document is not a final determination; it only provides our comment on the proposed project in relation to the flood hazard information shown on the effective National Flood Insurance Program (NFIP) map. We reviewed the submitted data and the data used to prepare the effective flood hazard information for your community and determined that the proposed project meets the minimum floodplain management criteria of the NFIP. Your community is responsible for approving all floodplain development and for ensuring that all permits required by Federal or State/Commonwealth law have been received. State/Commonwealth, county, and community officials, based on their knowledge of local conditions and in the interest of safety, may set higher standards for construction in the Special Flood Hazard Area (SFHA), the area subject to inundation by the base flood. If the State/Commonwealth, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

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Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

132942 PT202.BKR.13091703R.H20 104

Federal Emergency Management Agency
Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

OTHER COMMUNITIES AFFECTED BY THIS CONDITIONAL REQUEST

CID Number: 040037 **Name:** Maricopa County, Arizona

AFFECTED MAP PANELS

TYPE: FIRM* NO.: 04013C1680L DATE: October 16, 2013

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Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

To determine the changes in flood hazards that will be caused by the proposed project, we compared the hydraulic modeling reflecting the proposed project (referred to as the proposed conditions model) to the hydraulic modeling used to prepare the Flood Insurance Study (FIS) (referred to as the effective model). If the effective model does not provide enough detail to evaluate the effects of the proposed project, an existing conditions model must be developed to provide this detail. This existing conditions model is then compared to the effective model and the proposed conditions model to differentiate the increases or decreases in flood hazards caused by more detailed modeling from the increases or decreases in flood hazards that will be caused by the proposed project.

The table below shows the changes in the BFEs:

BFE Comparison Table

Flooding Source: Lower El Mirage Wash		BFE Change (feet)	Location of maximum change
Existing vs. Effective	Maximum increase	3.4	Approximately 2,950 feet downstream of North El Mirage Road
	Maximum decrease	3.1	Approximately 620 feet downstream of North El Mirage Road
Proposed vs. Existing	Maximum increase	0.6	Approximately 200 feet downstream of North El Mirage Road
	Maximum decrease	3.5	Approximately 240 feet downstream of North El Mirage Road
Proposed vs. Effective	Maximum increase	3.2	Approximately 2,950 feet downstream of North El Mirage Road
	Maximum decrease	5.1	Approximately 210 feet downstream of North El Mirage Road

Increases due to the proposed project that exceed those permitted under Paragraphs (c)(10) or (d)(3) of Section 60.3 of the NFIP regulations must adhere to Section 65.12 of the NFIP regulations. With this request, your community has complied with all requirements of Paragraph 65.12(a) of the NFIP regulations. Compliance with Paragraph 65.12(b) also is necessary before FEMA can issue a Letter of Map Revision when a community proposes to permit encroachments into the effective regulatory floodway that will cause BFE increases in excess of those permitted under Paragraph 60.3(d)(3). existing development that may be necessary to resolve the potential violation.

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CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

DATA REQUIRED FOR FOLLOW-UP LOMR

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• An annotated copy of the FIRM, at the scale of the effective FIRM, that shows the revised floodplain and floodway boundary delineations shown on the submitted work map and how they tie into the floodplain and floodway boundary delineations shown on the current effective FIRM at the downstream and upstream ends of the revised reach.

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Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

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• Documentation of the notification to property owners who will be affected by any widening/shifting of the base floodplain and/or any BFE increases along Lower El Mirage Wash.

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Alexandria, VA 22304

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Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

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COMMUNITY INFORMATION (CONTINUED)

COMMUNITY REMINDERS

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Ms. Sally M. Ziolkowski
Director, Mitigation Division
Federal Emergency Management Agency, Region IX
1111 Broadway Street, Suite 1200
Oakland, CA 94607-4052
(510) 627-7175

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Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

NATIONAL FLOOD INSURANCE PROGRAM

FEMA PRODUCTION AND TECHNICAL SERVICES CONTRACTOR

June 14, 2013

Mr. Michael Duncan, P.E., CFM
Project Manager
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, AZ 85009

IN REPLY REFER TO:
Case No.: 13-09-1703R
Communities: City of El Mirage and
Maricopa County, AZ
Community Nos.: 040041 and 040037

316-AD

Dear Mr. Duncan:

This responds to your submittal dated May 2, 2013, concerning a March 29, 2013, request that the Department of Homeland Security's Federal Emergency Management Agency (FEMA) issue a conditional revision to the Flood Insurance Rate Map (FIRM) for Maricopa County, Arizona and Incorporated Areas. Pertinent information about the request is listed below.

Identifier:	Lower El Mirage Wash Basin
Flooding Source:	Lower El Mirage Wash
FIRM Panel(s) Affected:	04013C1605J

The data required to complete our review, which must be submitted within 90 days of the date of this letter, are listed on the enclosed summary.

If we do not receive the required data within 90 days, we will suspend our processing of your request. Any data submitted after 90 days will be treated as an original submittal and will be subject to all submittal/payment procedures, including the flat review and processing fee for requests of this type established by the current fee schedule. A copy of the notice summarizing the current fee schedule, which was published in the *Federal Register,* is available on the FEMA website at http://www.fema.gov/plan/prevent/fhm/frm_fees.shtm for your information.

FEMA receives a very large volume of requests and cannot maintain inactive requests for an indefinite period of time. Therefore, we are unable to grant extensions for the submission of required data/fees for revision requests. If a requester is informed by letter that additional data are required to complete our review of a request, the data/fee **must** be submitted within 90 days of the date of the letter. Any fees already paid will be forfeited for any request for which the requested data are not received within 90 days.

If you have general questions about your request, FEMA policy, or the National Flood Insurance Program, please call the FEMA Map Information eXchange (FMIX), toll free, at 1-877-FEMA MAP (1-877-336-2627). If you have specific questions concerning your request, please contact your case reviewer, Mr. Paul Anderson, by e-mail at PMAnderson@mbakercorp.com or by telephone at 720-514-1121, or the Revisions Coordinator for your request, Mr. Joseph Kuechenmeister, P.E., CFM, at jkuechenmeister@mbakercorp.com or at (720) 479-3181.

Sincerely,

Syed Qayum

Syed Qayum, CFM
LOMR Technical Manager
BakerAECOM

Enclosures

cc: Ms. Sue McDermott, P.E.
Deputy City Manager and City Engineer
City of El Mirage

Mr. Timothy S. Phillips, P.E.
Chief Engineer and General Manager
Flood Control District of Maricopa County

Mr. Josh Papworth, P.E.
Project Engineer
Dibble Engineering

NATIONAL FLOOD INSURANCE PROGRAM

FEMA PRODUCTION AND TECHNICAL SERVICES CONTRACTOR

Summary of Additional Data Required to Support a
Conditional Letter of Map Revision (CLOMR)

Case No.: 13-09-1703R

Requester: Mr. Michael Duncan, P.E., CFM

Communities: City of El Mirage and Maricopa County, AZ

Community Nos.: 040041 and 040037

The issues listed below must be addressed before we can continue the review of your request.

1. Please submit a topographic drainage area map that includes the delineations of the sub-basins used in the submitted HEC-HMS hydrologic models.

2. Our detailed revealed negative surcharges at Cross Sections 1.084 through 1.014 in the submitted pre-project HEC-RAS hydraulic analysis. Please revise the floodway analysis so that all negative surcharges have been eliminated, or explain why this is not necessary.

3. An ineffective flow area is defined as the area of a cross section that will contain water that is not actively being conveyed. It is used to describe portions of a cross section in which water will pond, but the velocity in the downstream direction is close to zero. Our review of the submitted pre- and post-project conditions HEC-RAS analyses revealed that the levee option was used at several locations along the revised reach of Lower El Mirage Wash to model the ineffective flow areas. However, the use of the ineffective flow area option may be more appropriate. Please provide documentation to support using the levee option, or make the appropriate changes.

4. Our detailed review revealed water surface elevations (WSELs) higher than the end points of the cross section at the downstream section of Cactus Road at Cross Section 1.366 in the pre-project conditions HEC-RAS hydraulic analysis along Lower El Mirage Wash. Please extend the cross sections so that the end points of all cross sections are equal to or higher than the corresponding WSEL.

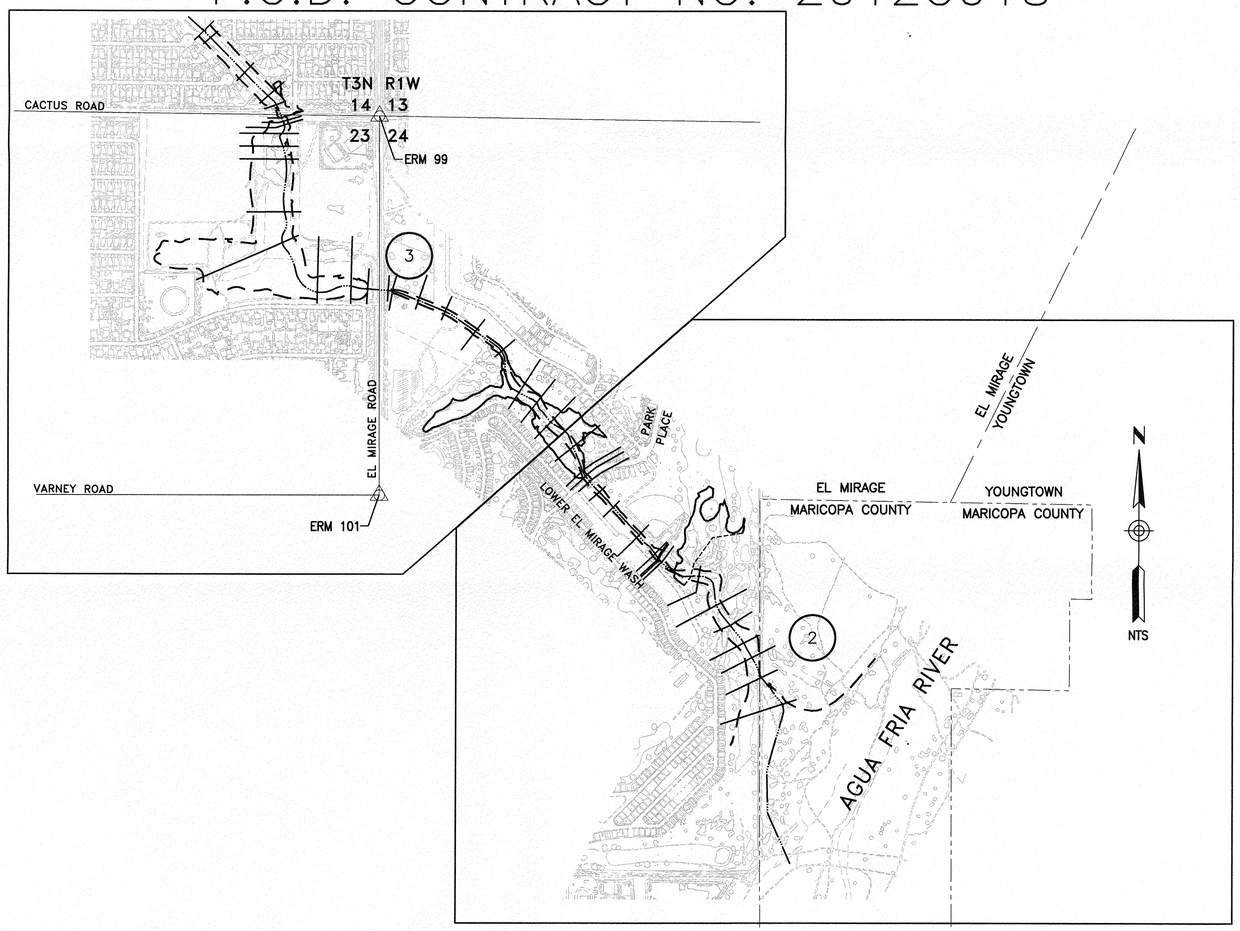
5. Our review revealed that the model parameters for the culverts at Cactus Road, El Mirage Road, North Park Place and the Golf Cart bridge differ from the as-built plans entitled "Lower El Mirage Wash Basin FDC No. 2012-C018," prepared by Flood Control District of Maricopa County – Engineering Division, dated January 24, 2013. Please revise the submitted HEC-RAS models to reflect the correct as built parameters shown on the above-mentioned plans.

6. Our detailed review revealed increases in Base Flood Elevation (BFE) as a result of the proposed project. Please provide evidence that the project meets all requirements of Section 65.12 of the NFIP regulations, including but not limited to: documentation of individual legal notice to all affected property owners, explaining the effects of the proposed action on their property; certification that no structures are located in areas that would be affected by the increases in BFE.

Please send the required data and/or fee directly to us at the address shown at the bottom of this page. For identification purposes, please include the case number referenced above on all correspondence.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

CONDITIONAL LETTER OF MAP REVISION
LOWER EL MIRAGE WASH
F.C.D. CONTRACT NO. 2012C018



NOTES

1. ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.
2. ALL HORIZONTAL COORDINATES USE ARIZONA STATE PLANE COORDINATES BASED ON THE 1983 NORTH AMERICAN DATUM.
3. MAPPING FOR THIS PROJECT IS PERFORMED BY COOPER AERIAL MAPPING COMPANY. APRIL, 2012 FLIGHT DATE.
4. FLOODPLAIN LIMITS IN THIS STUDY ARE PLOTTED AT EACH HEC-RAS CROSS SECTION ON THE BASIS OF STARTING (Sta WS Lft) AND ENDING (Sta WS Rt) STATIONS UNLESS THERE IS INEFFECTIVE FLOW AREA OR A CONFLICT WITH TOPOGRAPHIC CONTOURS, IN WHICH CASE, THE CONTOURS TAKE PRECEDENCE.
5. THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000 UNLESS NOTED OTHERWISE.

STATEMENTS OF PROFESSIONAL REGISTRANTS

THE HYDROLOGIC VALUES AND FLOODPLAIN DELINEATION WAS PREPARED UNDER MY DIRECT SUPERVISION:

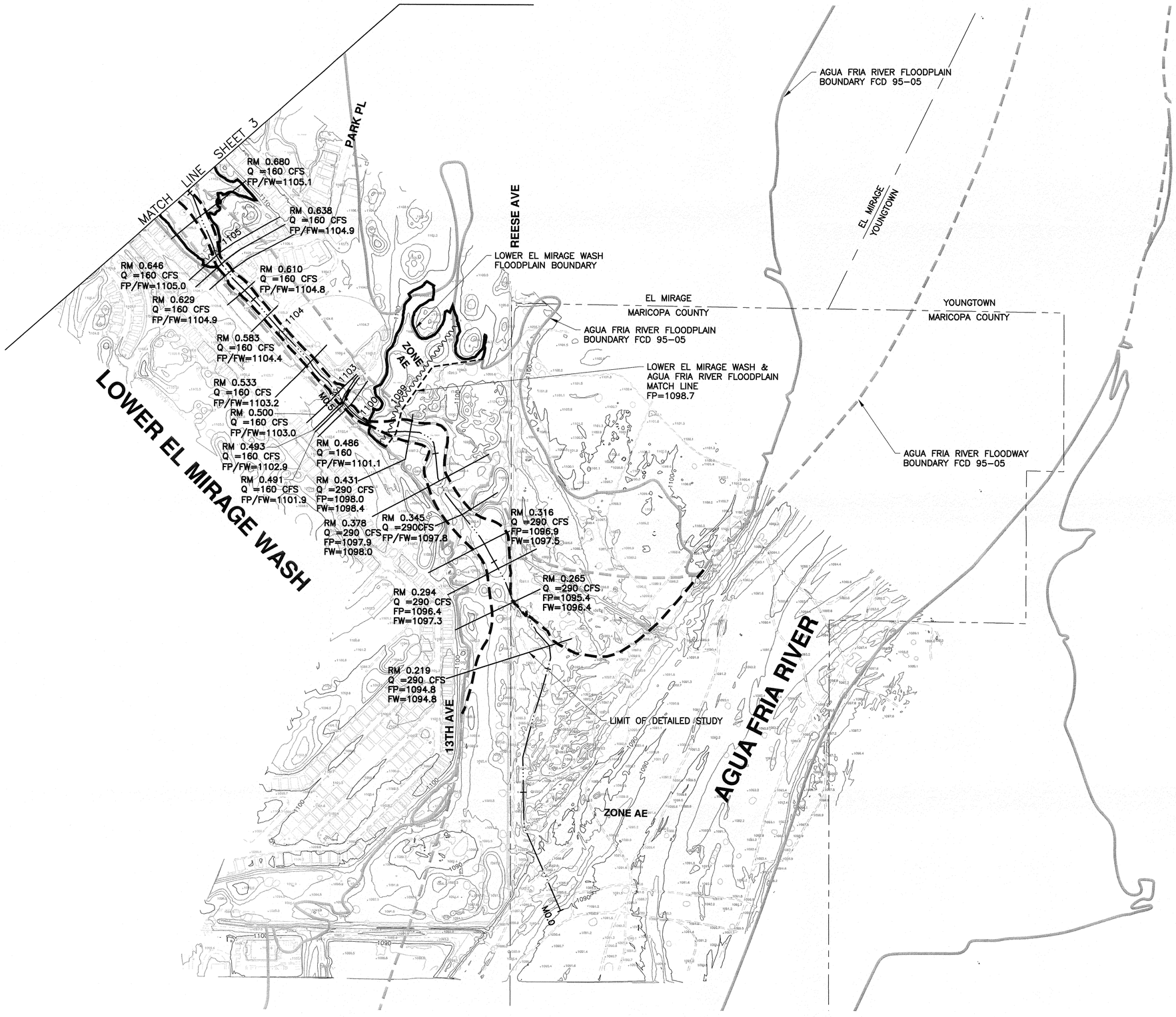
Registered Professional Engineer (Civil) Certificate No. 37878 JOSHUA E. PAPWORTH Date Signed 09/10/13 ARIZONA, U.S.A. Expires 09/30/14

PRIME CONSULTANT: Dibble Engineering			SUB CONSULTANT:
DESIGN	BY JWL	DATE 05/01/13	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JEP	05/01/13	
PLANS	GTS	05/01/13	RECOMMENDED BY: DATE
PLANS CHK.	JEP	05/01/13	APPROVED BY: DATE
SUBMITTED BY: DATE:			CHIEF ENGINEER AND GENERAL MANAGER
			SHEET 1 OF 3

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 40' HORIZONTAL SCALE AND 1' CONTOUR INTERVALS.

AERIAL MAPPING PERFORMED BY COOPER AERIAL MAPPING COMPANY. APRIL, 2012 FLIGHT DATE.

GROUND CONTROL SURVEY DATA PROVIDED BY DIBBLE ENGINEERING.



LEGEND

POST PROJECT:

100-YR FLOODPLAIN BOUNDARY

FLOODWAY BOUNDARY

CURRENT EFFECTIVE:

100-YR FLOODPLAIN BOUNDARY

FLOODWAY BOUNDARY

HYDRAULIC BASE LINE WITH RIVER MILE — M12.0 M13.0

CROSS SECTION — CROSS SECTION RIVER MILE DESIGNATION: RM 0.100; Q = CFS (100 YEAR DISCHARGE); FP= 1888.7 (FLOODPLAIN WATER SURFACE ELEVATION); FW= 1889.7 (FLOODWAY WATER SURFACE ELEVATION)

ELEVATION REFERENCE MARK — ERM XXX

BASE FLOOD ELEVATIONS — 1221

ZONE DESIGNATIONS — ZONE AE

CORPORATE LIMITS — Corporate Limits

COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY — County Boundary

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988. CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 1.85'

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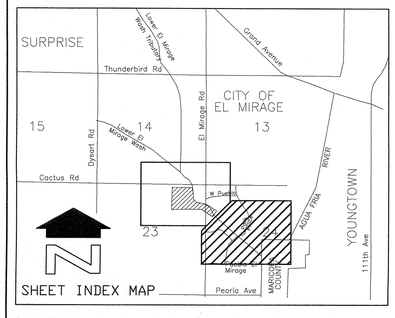
101	1109.75	BRASS CAP IN HANDHOLE AT INTERSECTION OF VARNEY ROAD AND EL MIRAGE ROAD

-200' 0' 200' 400'

SCALE: 1"= 200 FEET

CONTOUR INTERVAL = 2 FEET



SHEET INDEX MAP

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

CONDITIONAL LETTER OF MAP REVISION

LOWER EL MIRAGE WASH

FCD CONTRACT NO 2012C018

Registered Professional Engineer (Civil) CERTIFICATE NO. 37878 JOSHUA E. PAPWORTH Date Signed 05/01/13 ARIZONA U.S.A. Expires 09/30/14

Dibble Engineering

	BY	DATE
DESIGN	JWL	05/01/13
DESIGN CHK.	JEP	05/01/13
PLANS	GTS	05/01/13
PLANS CHK.	JEP	05/01/13

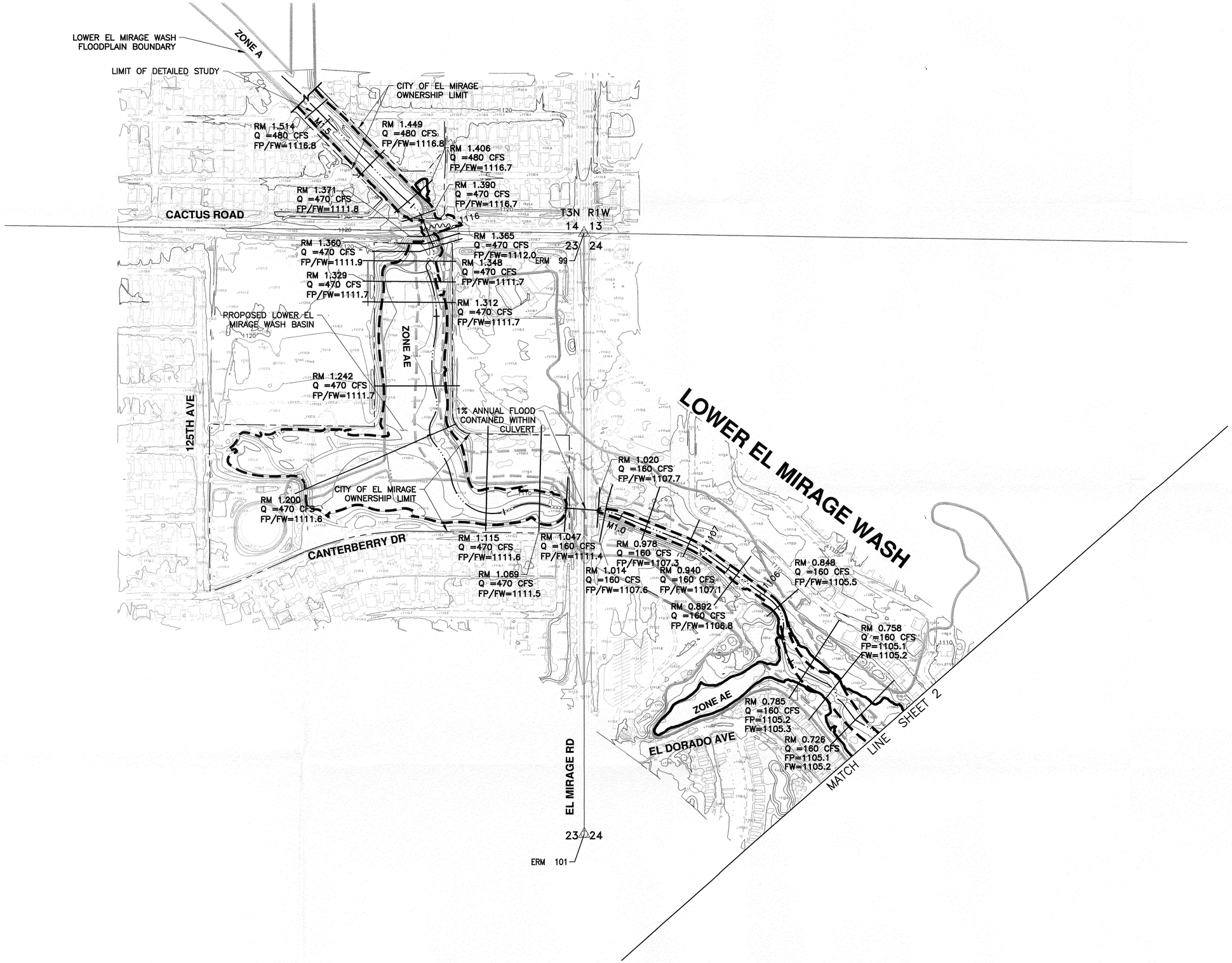
SHEET 2 OF 3

FILE:U:\2011\101122_01-Lower_El_Mirage_Wash\CAD\FCDMC Plans\1122_01-PLANS.dwg DATE:May, 01 2013 TIME: 04:15 pm

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 40' HORIZONTAL SCALE AND 1' CONTOUR INTERVALS.

AERIAL MAPPING PERFORMED BY COOPER AERIAL MAPPING COMPANY. APRIL, 2012 FLIGHT DATE.

GROUND CONTROL SURVEY DATA PROVIDED BY DIBBLE ENGINEERING.



LEGEND

POST PROJECT:

100-YR FLOODPLAIN BOUNDARY

FLOODWAY BOUNDARY

CURRENT EFFECTIVE:

100-YR FLOODPLAIN BOUNDARY

FLOODWAY BOUNDARY

HYDRAULIC BASE LINE WITH RIVER MILE — M12.0 M13.0

CROSS SECTION — CROSS SECTION RIVER MILE DESIGNATION — RM 0.100; Q = CFS (100 YEAR DISCHARGE); FP= 1888.7 (FLOODPLAIN WATER SURFACE ELEVATION); FW= 1889.7 (FLOODWAY WATER SURFACE ELEVATION)

ELEVATION REFERENCE MARK — ERM XXX

BASE FLOOD ELEVATIONS — 1221

ZONE DESIGNATIONS — ZONE AE

CORPORATE LIMITS — Corporate Limits

COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY — County Boundary

ELEVATION REFERENCE MARKS

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SCALE: 1"= 200 FEET

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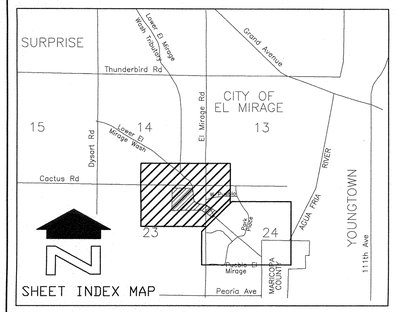

SHEET INDEX MAP

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

CONDITIONAL LETTER OF MAP REVISION

LOWER EL MIRAGE WASH

FCD CONTRACT NO 2012C018

Registered Professional Engineer (Civil) CERTIFICATE NO. 37878 JOSHUA E. PAPWORTH Date Signed 05/01/13 ARIZONA U.S.A. Expires 09/30/14

Dibble Engineering

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DESIGN	JWL	05/01/13
DESIGN CHK.	JEP	05/01/13
PLANS	GTS	05/01/13
PLANS CHK.	JEP	05/01/13

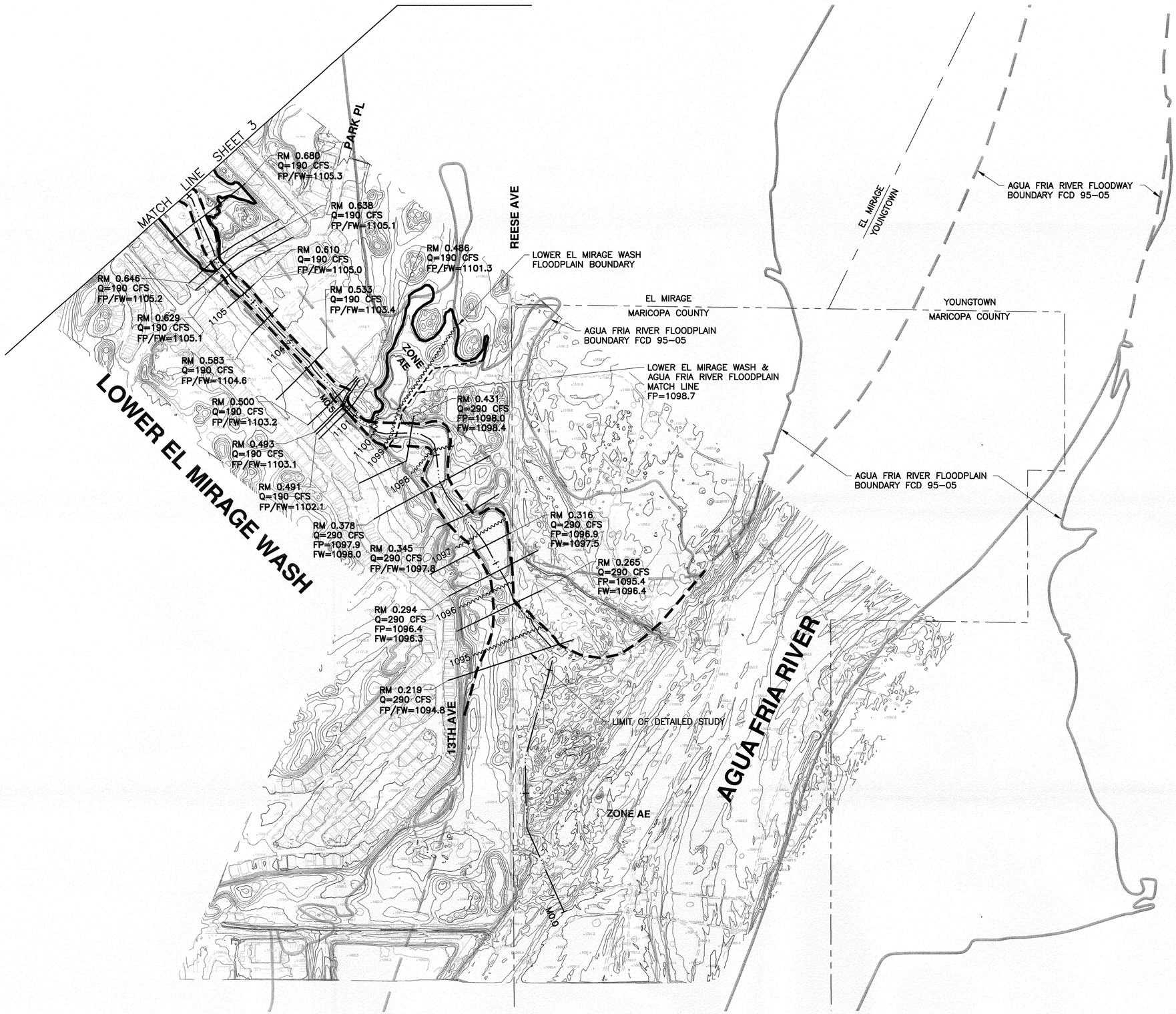
SHEET 3 OF 3

FILE:J:\2011\101122_01-Lower_El_Mirage_Wash\CAD\FCDMC Plans\1122_01-PLANS.dwg DATE:May, 01 2013 TIME: 04:15 pm

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 40' HORIZONTAL SCALE AND 1' CONTOUR INTERVALS.

AERIAL MAPPING PERFORMED BY COOPER AERIAL MAPPING COMPANY. APRIL, 2012 FLIGHT DATE.

GROUND CONTROL SURVEY DATA PROVIDED BY DIBBLE ENGINEERING.



LEGEND

PRE PROJECT:

100-YR FLOODPLAIN BOUNDARY

FLOODWAY BOUNDARY

CURRENT EFFECTIVE:

100-YR FLOODPLAIN BOUNDARY

FLOODWAY BOUNDARY

HYDRAULIC BASE LINE WITH RIVER MILE — M12.0 M13.0

CROSS SECTION — CROSS SECTION RIVER MILE DESIGNATION: RM 0.100; Q = CFS (100 YEAR DISCHARGE); FP= 1888.7 (FLOODPLAIN WATER SURFACE ELEVATION); FW= 1889.7 (FLOODWAY WATER SURFACE ELEVATION)

ELEVATION REFERENCE MARK — ERM XXX

BASE FLOOD ELEVATIONS — 1221

ZONE DESIGNATIONS — ZONE AE

CORPORATE LIMITS — Corporate Limits

COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY — County Boundary

ELEVATION REFERENCE MARKS

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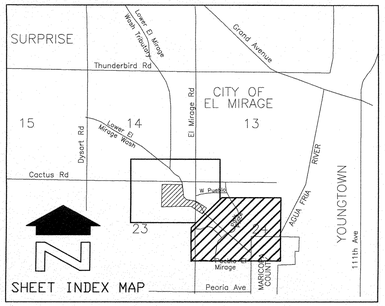

SHEET INDEX MAP

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PRE-PROJECT BASE FLOOD DELINEATION

LOWER EL MIRAGE WASH

FCD CONTRACT NO 2012C018

Registered Professional Engineer (Civil) 37878 JOSHUA E. PAPWORTH Date Signed 05/01/13 ARIZONA U.S.A. Expires 09/30/14

Dibble Engineering

	BY	DATE
DESIGN	JWL	05/01/13
DESIGN CHK.	JEP	05/01/13
PLANS	GTS	05/01/13
PLANS CHK.	JEP	05/01/13

SHEET 1 OF 2

FILE:J:\2011\101122_01-Lower_EL_Mirage_Wash\CAD\FCDMC Plans\1122_01-PLANS-PRE.dwg DATE:May, 01 2013 TIME: 04:07 pm

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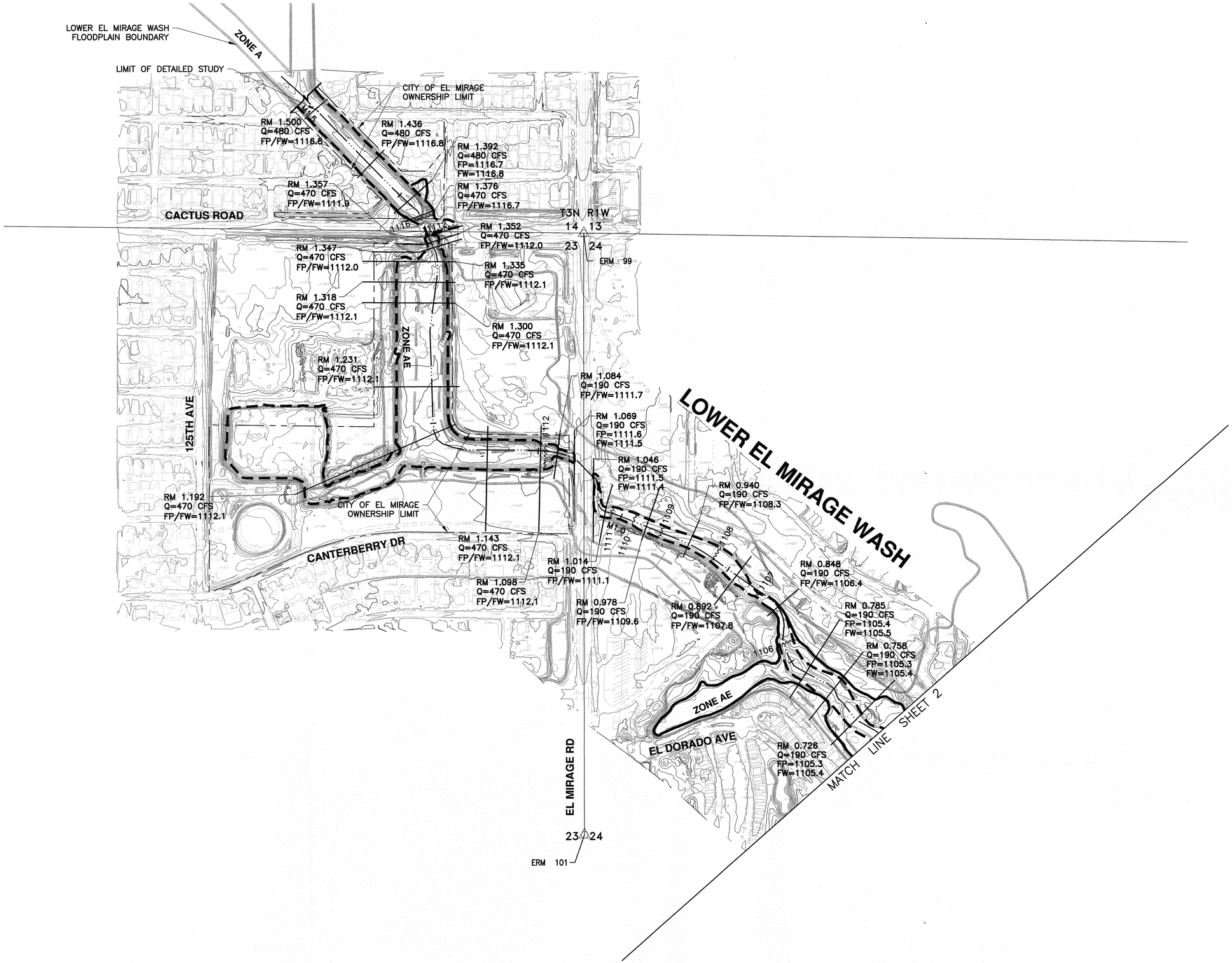

LEGEND

PRE PROJECT:
- 100-YR FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY

CURRENT EFFECTIVE:
- 100-YR FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY

HYDRAULIC BASE LINE WITH RIVER MILE — M12.0 M13.0

CROSS SECTION — CROSS SECTION/RIVER MILE DESIGNATION: RM 0.100; Q = CFS (100 YEAR DISCHARGE); FP= 1888.7 (FLOODPLAIN WATER SURFACE ELEVATION); FW= 1889.7 (FLOODWAY WATER SURFACE ELEVATION)

ELEVATION REFERENCE MARK — ERM XXX

BASE FLOOD ELEVATIONS — 1221

ZONE DESIGNATIONS — ZONE AE

CORPORATE LIMITS — Corporate Limits

COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY — County Boundary

ELEVATION REFERENCE MARKS

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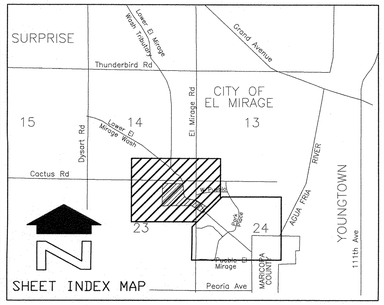

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PRE-PROJECT
BASE FLOOD DELINEATION

LOWER EL MIRAGE WASH

FCD CONTRACT NO 2012C018

Registered Professional Engineer (Civil) 37878 JOSHUA E. PAPWORTH Date Signed 05/01/13 ARIZONA U.S.A. Expires 09/30/14

Dibble Engineering

	BY	DATE
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DESIGN CHK.	JEP	05/01/13
PLANS	GTS	05/01/13
PLANS CHK.	JEP	05/01/13

SHEET 2 OF 2

FILE:J:\2011\101122_01-Lower_El_Mirage_Wash\CAD\FCDMC Plans\1122_01-PLANS-PRE.dwg DATE:May, 01 2013 TIME: 04:09 pm

RESPONSES TO COMMENTS REGARDING

ENDANGERED SPECIES ACT

emailed to FEMA reviewer on 5-16-13

FEMA CLOMR CASE NO. 13-09-1703R

PROJECT: LOWER EL MIRAGE WASH BASIN

FROM: Michael Duncan, P.E., CFM, Project Manager
Planning and Project Management Division
Flood Control District of Maricopa County
2801 W Durango St
Phoenix AZ 85009

phone 602-506-4732

These associated documents follow:

-Photos of the existing 20-acre, mostly barren, basin site,

which was roughly graded 10 years ago

-Application to the Arizona Game and Fish Department

-No Effect response from US Fish and Wildlife

-Results of survey for burrowing owls

-Copy attached of the Project 404 Permit

File No. SPL-2012-00695-DB
DEPARTMENT OF THE ARMY NATIONWIDE PERMIT VERIFICATION
Los Angeles District
Issued on February 12, 2013

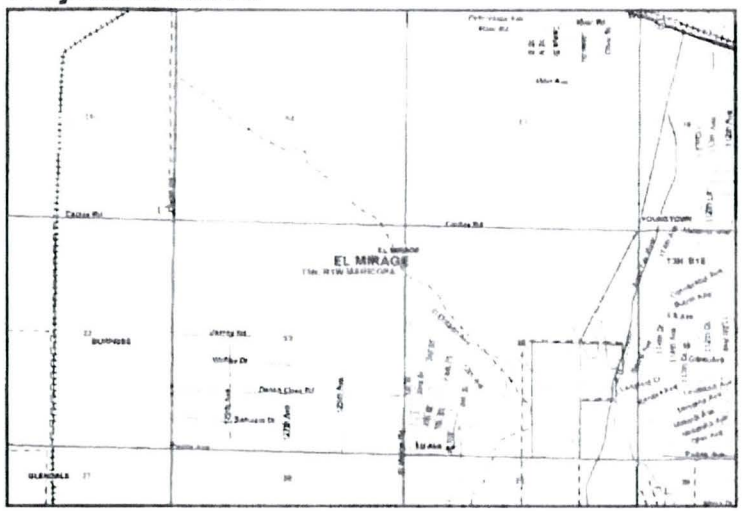
Photos of the existing roughly-graded basin site

The 6-page printout from the Arizona Game and Fish Department On-Line Environmental Review Tool follows.

This is from the Appendix H4 of the CLOMR Notebook.

Arizona's On-line Environmental Review Tool
Search ID: 20130207019585
Project Name: Lower El Mirage Wash Basin
Date: 2/7/2013 3:54:30 PM

Project Location



Project Name: Lower El Mirage Wash Basin
Submitted By: Josh Papworth
On behalf of: FCDMC
Project Search ID: 20130207019585
Date: 2/7/2013 3:54:23 PM
Project Category: Recreation Areas,Park and/or associated facilities,Creation/Construction of new facilities
Project Coordinates (UTM Zone 12-NAD 83): 376855.602, 3717732.813 meter
County: MARICOPA
USGS 7.5 Minute Quadrangle ID: 1249
Quadrangle Name: EL MIRAGE
Project locality is not anticipated to change

Location Accuracy Disclaimer

Project locations are assumed to be both precise and accurate for the purposes of environmental review. The creator/owner of the Project Review Receipt is solely responsible for the project location and thus the correctness of the Project Review Receipt content.

The Department appreciates the opportunity to provide in-depth comments and project review when additional information or environmental documentation becomes available.

Special Status Species Occurrences/Critical Habitat/Tribal Lands within 3 miles of Project Vicinity:

No special status species were documented as occurring within the project vicinity. However, further field investigations of the project area are highly recommended. Site visits may reveal previously unrecorded resources of special concern in locations where they are currently undocumented.

No proposed or designated critical habitat is within the project vicinity.

No Indian tribal lands are within the project vicinity.

 APPLICATION INITIALS: _____

Please review the entire receipt for project type recommendations and/or species or location information and retain a copy for future reference. If any of the information you provided did not accurately reflect this project, or if project plans change, another review should be conducted, as this determination may not be valid.

Arizona's On-line Environmental Review Tool:

1. This On-line Environmental Review Tool inquiry has generated recommendations regarding the potential impacts of your project on Special Status Species (SSS) and other wildlife of Arizona. SSS include all U.S. Fish and Wildlife Service federally listed, U.S. Bureau of Land Management sensitive, U.S. Forest Service sensitive, and Arizona Game and Fish Department (Department) recognized species of concern.
2. These recommendations have been made by the Department, under authority of Arizona Revised Statutes Title 5 (Amusements and Sports), 17 (Game and Fish), and 28 (Transportation). These recommendations are preliminary in scope, designed to provide early considerations for all species of wildlife, pertinent to the project type you entered.
3. This receipt, generated by the automated On-line Environmental Review Tool does not constitute an official project review by Department biologists and planners. Further coordination may be necessary as appropriate under the National Environmental Policy Act (NEPA) and/or the Endangered Species Act (ESA).

The U.S. Fish and Wildlife Service (USFWS) has regulatory authority over all federally listed species under the ESA. Contact USFWS Ecological Services Offices: http://arizonaes.fws.gov/.

Phoenix Main Office
2321 W. Royal Palm Road, Suite 103
Phoenix, AZ 85021
Phone 602-242-0210
Fax 602-242-2513

Tucson Sub-Office
201 North Bonita, Suite 141
Tucson, AZ 85745
Phone 520-670-6144
Fax 520-670-6154

Flagstaff Sub-Office
323 N. Leroux Street, Suite 101
Flagstaff, AZ 86001
Phone 928-226-0614
Fax 928-226-1099

Disclaimer:

1. This is a preliminary environmental screening tool. It is not a substitute for the potential knowledge gained by having a biologist conduct a field survey of the project area.
2. The Department's Heritage Data Management System (HDMS) data is not intended to include potential distribution of special status species. Arizona is large and diverse with plants, animals, and environmental conditions that are ever changing. Consequently, many areas may contain species that biologists do not know about or species previously noted in a particular area may no longer occur there.
3. Not all of Arizona has been surveyed for special status species, and surveys that have been conducted have varied greatly in scope and intensity. Such surveys may reveal previously undocumented population of species of special concern.
4. HDMS data contains information about species occurrences that have actually been reported to the Department.

Arizona Game and Fish Department Mission

To conserve, enhance, and restore Arizona's diverse wildlife resources and habitats through aggressive protection and

 APPLICATION INITIALS: _____

management programs, and to provide wildlife resources and safe watercraft and off-highway vehicle recreation for the enjoyment, appreciation, and use by present and future generations.

Project Category: Recreation Areas,Park and/or associated facilities,Creation/Construction of new facilities

Project Type Recommendations:

All degraded and disturbed lands should be restored to their natural state. Vegetation restoration projects (including treatments of invasive or exotic species) should have a completed site-evaluation plan (identifying environmental conditions necessary to re-establish native vegetation), a revegetation plan (species, density, method of establishment), a short and long-term monitoring plan, including adaptive management guidelines to address needs for replacement vegetation.

Based on the project type entered; coordination with State Historic Preservation Office may be required http://azstateparks.com/SHPO/index.html

Consider incorporating project components that may allow for the inclusion to promote, enhance, create, or restore wildlife habitat. Contact Project Evaluation Program for further information and opportunities - http://www.azgfd.gov/inside_azgfd/agency_directory.shtml.

Development plans should provide for open natural space for wildlife movement, while also minimizing the potential for wildlife-human interactions through design features. Please contact Project Evaluation Program for more information on living with urban wildlife.

During planning and construction, minimize potential introduction or spread of exotic invasive species. Invasive species can be plants, animals (exotic snails), and other organisms (e.g. microbes), which may cause alteration to ecological functions or compete with or prey upon native species and can cause social impacts (e.g. livestock forage reduction, increase wildfire risk). The terms noxious weed or invasive plants are often used interchangeably. Precautions should be taken to wash all equipment utilized in the project activities before and after project activities to reduce the spread of invasive species. Arizona has noxious weed regulations (Arizona Revised Statutes, Rules R3-4-244 and R3-4-245). See Arizona Department of Agriculture website for restricted plants http://www.azda.gov/PSD/quarantine5.htm. Additionally, the U.S. Department of Agriculture has information regarding pest and invasive plant control methods including: pesticide, herbicide, biological control agents, and mechanical control: http://www.usda.gov/wps/portal/usdahome. The Department regulates the importation, purchasing, and transportation of wildlife and fish (Restricted Live Wildlife), please refer to the hunting regulations for further information http://www.azgfd.gov/h_f/hunting_rules.shtml.

During the planning stages of your project, please consider the local or regional needs of wildlife in regards to movement, connectivity, and access to habitat needs. Loss of this permeability prevents wildlife from accessing resources, finding mates, reduces gene flow, prevents wildlife from re-colonizing areas where local extirpations may have occurred, and ultimately prevents wildlife from contributing to ecosystem functions, such as pollination, seed dispersal, control of prey numbers, and resistance to invasive species. In many cases, streams and washes provide natural movement corridors for wildlife and should be maintained in their natural state. Uplands also support a large diversity of species, and should be contained within important

 APPLICATION INITIALS: _____

wildlife movement corridors. In addition, maintaining biodiversity and ecosystem functions can be facilitated through improving designs of structures, fences, roadways, and culverts to promote passage for a variety of wildlife.

Minimization and mitigation of impacts to wildlife and fish species due to changes in water quality, quantity, chemistry, temperature, and alteration to flow regimes (timing, magnitude, duration, and frequency of floods) should be evaluated. Minimize impacts to springs, in-stream flow, and consider irrigation improvements to decrease water use. If dredging is a project component, consider timing of the project in order to minimize impacts to spawning fish and other aquatic species (including spawning seasons), and to reduce spread of exotic invasive species. We recommend early direct coordination with Project Evaluation Program for projects that could impact water resources, wetlands, streams, springs, and/or riparian habitats.

Minimize impacts to wildlife and wildlife habitat by staying on designated roads and trails, and by minimizing use during spring and summer breeding periods. Additional information concerning OHV use is located at:
http://www.azgfd.gov/outdoor_recreation/habitat_ohv_areas.shtml

Planning: consider impacts of lighting intensity on mammals and birds and develop measures or alternatives that can be taken to increase human safety while minimizing potential impacts to wildlife. Conduct wildlife surveys to determine species within project area, and evaluate proposed activities based on species biology and natural history to determine if artificial lighting may disrupt behavior patterns or habitat use.

Recommendations will be dependant upon goals of the fence project and the wildlife species expected to be impacted by the project. General guidelines for ensuring wildlife-friendly fences include: barbless wire on the top and bottom with the maximum fence height 42", minimum height for bottom 16". Modifications to this design may be considered for fencing anticipated to be routinely encountered by elk, bighorn sheep or pronghorn (e.g., Pronghorn fencing would require 18" minimum height on the bottom). Please refer to the Department's Fencing Guidelines located at
http://www.azgfd.gov/hgis/guidelines.aspx.

The Department recommends that wildlife surveys are conducted to determine if noise-sensitive species occur within the project area. Avoidance or minimization measures could include conducting project activities outside of breeding seasons.

Trenches should be covered or back-filled as soon as possible. Incorporate escape ramps in ditches or fencing along the perimeter to deter small mammals and herptefauna (snakes, lizards, tortoise) from entering ditches.

Recommendations Disclaimer:

1. Potential impacts to fish and wildlife resources may be minimized or avoided by the recommendations generated from information submitted for your proposed project.
2. These recommendations are proposed actions or guidelines to be considered during **preliminary project development**.
3. Additional site specific recommendations may be proposed during further NEPA/ESA analysis or through coordination with affected agencies.
4. Making this information directly available does not substitute for the Department's review of project proposals, and should not decrease our opportunity to review and evaluate additional project information and/or new project proposals.
5. The Department is interested in the conservation of all fish and wildlife resources, including those Special Status Species listed on this receipt, and those that may have not been documented within the project vicinity as well as other game and nongame wildlife.

 APPLICATION INITIALS: _____

6. **Further coordination requires the submittal of this initialed and signed Environmental Review Receipt with a cover letter and project plans or documentation that includes project narrative, acreage to be impacted, how construction or project activity(s) are to be accomplished, and project locality information (including site map).**
7. Upon receiving information by AZGFD, please allow 30 days for completion of project reviews. Mail requests to:

Project Evaluation Program, Habitat Branch
Arizona Game and Fish Department
5000 West Carefree Highway
Phoenix, Arizona 85086-5000
Phone Number: (623) 236-7600
Fax Number: (623) 236-7366

Terms of Use

By using this site, you acknowledge that you have read and understand the terms of use. Department staff may revise these terms periodically. If you continue to use our website after we post changes to these terms, it will mean that you accept such changes. If at any time you do not wish to accept the Terms, you may choose not to use the website.

1. This Environmental Review and project planning website was developed and intended for the purpose of screening projects for potential impacts on resources of special concern. By indicating your agreement to the terms of use for this website, you warrant that you will not use this website for any other purpose.
2. Unauthorized attempts to upload information or change information on this website are strictly prohibited and may be punishable under the Computer Fraud and Abuse Act of 1986 and/or the National Information Infrastructure Protection Act .
3. The Department reserves the right at any time, without notice, to enhance, modify, alter, or suspend the website and to terminate or restrict your access to the website.
4. This Environmental Review is based on the project study area that was entered. The review must be redone if the project study area, location, or the type of project changes. If additional information becomes available, this review may need to be reconsidered.
5. A signed and initialed copy of the Environmental Review Receipt indicates that the entire receipt has been read by the signer of the Environmental Review Receipt.

Security:

The Environmental Review and project planning web application operates on a complex State computer system. This system is monitored to ensure proper operation, to verify the functioning of applicable security features, and for other like purposes. Anyone using this system expressly consents to such monitoring and is advised that if such monitoring reveals possible evidence of criminal activity, system personnel may provide the evidence of such monitoring to law enforcement officials. Unauthorized attempts to upload or change information; to defeat or circumvent security measures; or to utilize this system for other than its intended purposes are prohibited.

This website maintains a record of each environmental review search result as well as all contact information. This information is maintained for internal tracking purposes. Information collected in this application will not be shared outside of the purposes of the Department.

If the Environmental Review Receipt and supporting material are not mailed to the Department or other appropriate agencies within six (6) months of the Project Review Receipt date, the receipt is considered to be null and void, and a new review must be initiated.

 APPLICATION INITIALS: _____

Arizona's On-line Environmental Review Tool
Search ID: 20130207019585
Project Name: Lower El Mirage Wash Basin
Date: 2/7/2013 3:54:30 PM

Print this Environmental Review Receipt using your Internet browser's print function and keep it for your records. Signature of this receipt indicates the signer has read and understands the information provided.

Signature: _____

Date: 2·6·13

Proposed Date of Implementation: 2013

Please provide point of contact information regarding this Environmental Review.

Application or organization responsible for project implementation

Agency/organization: FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Contact Name: MIKE DUNCAN

Address: 2801 W. DURANGO ST.

City, State, Zip: PHOENIX, AZ 85009

Phone: 602-506-1501

E-mail: _____

Person Conducting Search (if not applicant)

Agency/organization: DIBBLE ENGINEERING

Contact Name: JOSH PARWORTH

Address: 7500 N. DREAMY DRAW DR SUITE 200

City, State, Zip: PHOENIX, AZ, 85020

Phone: 602 957 1155

E-mail: _____

 APPLICATION INITIALS: _____

The email of the "no effect" response from the US Fish and Wildlife follows. This is from Appendix B of the CLOMR Notebook.

Josh Papworth

From: Martinez, Mike <mike_martinez@fws.gov>
Sent: Thursday, February 14, 2013 11:01 AM
To: Josh Papworth
Subject: Re: Lower El Mirage Wash Basin (1 of 2)

Dear Mr. Papworth:

Thank you for your email correspondence of February 7, 2013, requesting review by the U.S. Fish and Wildlife Service of application for a CLOMR for a regional basin project in the City of El Mirage, Maricopa County, Arizona (02EAAZ00-2013-TA-0087). Based on the information provided, it appears that no endangered or threatened species, or critical habitat wouldl be affected by the project; nor is the project likely to jeopardize the continued existence of proposed species or destroy or adversely modify proposed critical habitat, because no such species or habitats exist in the project area. As such, a "no effect" determination by FEMA, in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et. seq.) (ESA), for issuance of the CLOMR seems appropriate. Should the project site change or if additional information on the distribution of listed or proposed species becomes available, FEMA's determination may need to be reconsidered.

Some projects may potentially impact species that are protected under the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. sec. 703-712) and/or bald and golden eagles protected under the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668d). Prohibitions under the MBTA include the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except as specifically authorized by the FWS. If you believe migratory birds will be affected by the project, we recommend you contact our Migratory Bird Permit Office, P.O. Box 709, Albuquerque, NM 87103, (505) 248-7882 or by email FW2_birdpermits@fws.gov.

You're encouraged to coordinate review of this project with the Arizona Game and Fish Department. Additionally, since the project appears to occur in waterways and may require a permit under section 404 of the Clean Water Act, it is recommended that you coordinate with the U.S. Army Corps of Engineers. Should you require further assistance or have any questions, please contact me.

On Thu, Feb 7, 2013 at 5:53 PM, Josh Papworth <josh.papworth@dibblecorp.com> wrote:

Mr. Martinez,

I am working on behalf of the Flood Control District of Maricopa County to obtain a Conditional Letter of Map Revision from FEMA for a regional basin project in the City of El Mirage, Arizona. As part of this process we are asked to comply with Sections 9 and 10 of the Endangered Species Act. I've completed the Online Environmental Review and have attached it. The project is a stormwater storage basin/park project. An existing storage basin will be re-graded and landscaped for use as a park. I've attached pictures of the existing site, and excerpts from the construction and landscape plans (second email). Would it be possible for you to provide an opinion, based on this information, as to whether the project constitutes "no effect" to endangered species and their habitats? Your help is very much appreciated. Thank you.

Josh Papworth PE, CFM

P 623.251.7189

C 602.708.8127

Josh.Papworth@dibblecorp.com

www.dibblecorp.com

--

Mike Martinez
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
2321 W. Royal Palm Rd, Ste. 103
Phoenix, AZ 85021
(602) 242-0210

A Survey for Burrowing Owls was completed, by Wild At Heart, Inc. No owls, no signs of these owls, and no signs of any other nesting birds were found. The related documents follow.

April 18, 2013
Report

Bob Fox
31840 N 45th Street
Cave Creek, AZ 85331
480-595-5047

Michael Duncan
Project manager
602-506-4732. mwd@mail.maricopa.gov

Diana Stuart
Environmental Program Manager
Flood Control District
2801 W. Durango Street
Phoenix, AZ 85009
602-506-4766 (Office)
602-525-3151 (Cell)
dms@mail.maricopa.gov;

Re: Burrowing owl relocation – Wash Basin at Cactus and El Mirage Road, in El Mirage
PO #13699040016 990-699-6975-HAZD-0940-02-470K

3/27/13 (4 hours) no mileage cost
I completed a survey of the wash basin at Cactus and El Mirage roads. Currently this is a large, roughly-graded basin without much vegetation and enough ag land nearby to possibly be attractive to owls.
However, there were no owls present, nor were there any signs of owls or any other nesting birds.

Conclusion: There are no burrowing owls or signs of these owls on the Lower El Mirage Wash Basin, off the S/W corner of Cactus and El Mirage Road in El Mirage. Any construction may proceed as planned.

Sincerely,

Bob Fox
Owl Relocation Specialist

Wild At Heart, Inc.
31840 N. 45th Street
Cave Creek, AZ 85331
480.595.5047

Invoice Summary

5/7/13
Retention Basin Lower El Mirage Wash
PO #13699040016 990-699-6975-HAZD-0940-02-470K

Note: Burrowing Owl services are billed in two parts (for the required record keeping of the service provider).

One is for the professional wildlife services of Bob Fox and uses his S/S # 532-48-2030.

The second is for wildlife care (in this case owls) at the Wild At Heart non- profit wildlife rehabilitation facility and uses their 501(c)3 Tax ID # EIN 86- 0770883. This amount is tax deductible.

1. Wildlife Services

4 Hours @ $90.00 per hour	$ 360.00
No charge for Miles	
Wildlife Services Total:	$ 360.00

2. Wildlife Care

No owl captured

Wildlife Care Total:	$360.00

Grand Total for This Invoice:	$360.00

REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
Los Angeles District Corps of Engineers
Arizona Nevada Area Office
3636 N. Central Avenue, Suite 900
Phoenix, Arizona 85012

February 12, 2013

Office of the Chief
Regulatory Division

Mr. Robert B. Stevens
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009

DEPARTMENT OF THE ARMY NATIONWIDE PERMIT VERIFICATION
(File Number: SPL-2012-00695-DB)

Dear Mr. Stevens:

I am responding to your request (SPL-2012-00695-DB) for a Department of the Army permit. Your proposed project, Lower El Mirage Wash Basin Improvements, would result in a discharge of dredged and/or fill material into waters of the United States. Therefore, pursuant to section 404 of the Clean Water Act (33 U.S.C. 1344; 33 C.F.R. Parts 323 and 330), your proposed project requires a Department of the Army permit. The Lower El Mirage Wash Basin Improvements Project is located in Sections 23 and 24, Township 3 North, Range 1 West, El Mirage, Maricopa County, Arizona.

I have determined construction of the Lower El Mirage Wash Basin Improvements Project complies with Nationwide Permits (NWP) No. 3 (Maintenance) and No. 27 (Aquatic Habitat Restoration, Establishment and Enhancement), if conducted as described in your application.

Specifically, you are authorized to conduct the following regulated activities:

1. Conduct a flood control improvement/stream enhancement project in partnership with the City of El Mirage. Improve and enhance the existing, roughly graded, in-stream detention basin and the downstream drainage segment of the Lower El Mirage Wash prior to it entering the Pueblo El Mirage Country Club golf course and the Agua Fria River. The entire 19.7-acre project area contains approximately 5.13 acres of waters of the United States. Relocate, lengthen and enhance portions of the wash which would increase the area of waters of the United States to 6.55 acres, a net increase of 1.42 acres. Fill in a small segment of the wash (0.8 acre), which leads to the existing, outdated culvert that diagonally crosses El Mirage Road, to allow for the extension (and

lengthening) of the wash to the south. Install an improved, perpendicular culverted crossing under El Mirage Road, to better align the channel with the downstream portion of the wash prior to entering the golf course drainage. Grade/recontour a short segment of the wash, downstream of the El Mirage Road culverted road crossing, to allow for a better transition with the lower wash/golf course segment. Create approximately 12.5 acres of low flow channel and associated vegetated areas for associated drainage and non-recreational purposes.

For this NWP verification letter to be valid, you must comply with all of the terms and conditions in Enclosure 1.

Your verification is valid through March 18, 2017. All NWPs will expire on March 18, 2017. It is incumbent upon you to remain informed of changes to the NWPs. A public notice of the change(s) will be issued when any of the NWPs are modified, reissued, or revoked. Furthermore, if you commence or are under contract to commence this activity before the date on which the relevant NWP is reissued, modified, or revoked, you will have twelve (12) months from the date of the reissuance, modification, or revocation of the NWP to complete the activity under the present terms and conditions of the relevant NWP.

A preliminary jurisdictional determination (JD) has been conducted to determine the extent of U.S. Army Corps of Engineers (Corps) geographic jurisdiction, upon which this NWP verification is based. A preliminary JD is advisory in nature and is a written indication that Corps geographic jurisdiction may be present on a particular site, but is not appealable. An approved JD is an official Corps determination of the precisely identified limits of Corps geographic jurisdiction on a particular site, and is appealable. Should you wish to appeal an approved JD, you may request an administrative appeal under Corps regulations at 33 C.F.R. Part 331. Please refer to the previously mailed Notification of Appeal Process (NAP) fact sheet and Request for Appeal (RFA) form for more information.

A NWP does not grant any property rights or exclusive privileges. Additionally, it does not authorize any injury to the property, rights of others, nor does it authorize interference with any existing or proposed Federal project. Furthermore, it does not obviate the need to obtain other Federal, state, or local authorizations required by law.

Thank you for participating in our regulatory program. If you have any questions, please contact Donald Borda at 505-342-3221 or via e-mail at Donald.Borda@usace.army.mil.

Please be advised that you can now comment on your experience with Regulatory Division by accessing the Corps web-based customer survey form at: http://per2.nwp.usace.army.mil/survey.html.

"Building Strong and Taking Care of People!"

Sincerely,

Donald Borden
for

Sallie D. McGuire
Chief, Arizona Branch
Regulatory Division

Enclosures
1. Nationwide Permit Conditions
2. Certification of Compliance

LOS ANGELES DISTRICT
U.S. ARMY CORPS OF ENGINEERS

CERTIFICATE OF COMPLIANCE WITH DEPARTMENT OF THE ARMY NATIONWIDE PERMIT

Permit Number: *SPL-2012-00695-DB*

Name of Permittee: Flood Control District of Maricopa County, Lower El Mirage Wash Basin Improvements (Mr. Robert B. Stevens)

Date of Issuance: February 12, 2013

Upon completion of the activity authorized by this permit and the mitigation required by this permit, sign this certificate, and return it to the following address:

U.S. Army Corps of Engineers, Los Angeles District
Regulatory Division, Arizona Branch
ATTN: CESPL-RG-A (SPL-2012-00695-DB)
3636 N. Central Avenue, Suite 900
Phoenix, Arizona 85012-1939

Please note that your permitted activity is subject to a compliance inspection by an Army Corps of Engineers representative. If you fail to comply with this Nationwide Permit, you may be subject to permit suspension, modification, or revocation procedures as contained in 33 C.F.R. § 330.5 or enforcement procedures such as those contained in 33 C.F.R. §§ 326.4 and 326.5.

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and conditions of the said permit, and required mitigation was completed in accordance with the permit condition(s).

_____ _____
Signature of Permittee Date

NATIONAL FLOOD INSURANCE PROGRAM

FEMA PRODUCTION AND TECHNICAL SERVICES CONTRACTOR

April 12, 2013

Mr. Michael Duncan, P.E., CFM
Project Manager
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, AZ 85009

IN REPLY REFER TO:
Case No.: 13-09-1703R
Communities: City of El Mirage and Maricopa County, AZ
Community Nos.: 040041 and 040037

316-AD

Dear Mr. Duncan:

This responds to your request dated March 29, 2013, that the Department of Homeland Security's Federal Emergency Management Agency (FEMA) issue a conditional revision to the Flood Insurance Rate Map (FIRM) for Maricopa County, Arizona and Incorporated Areas. Pertinent information about the request is listed below.

Identifier:	Lower El Mirage Wash Basin
Flooding Source:	Lower El Mirage Wash
FIRM Panel(s) Affected:	04013C1605J

The data required to complete our review, which must be submitted within 90 days of the date of this letter, are listed on the enclosed summary.

If we do not receive the required data within 90 days, we will suspend our processing of your request. Any data submitted after 90 days will be treated as an original submittal and will be subject to all submittal/payment procedures, including the flat review and processing fee for requests of this type established by the current fee schedule. A copy of the notice summarizing the current fee schedule, which was published in the *Federal Register,* is available on the FEMA website at http://www.fema.gov/plan/prevent/fhm/frm_fees.shtm for your information.

FEMA receives a very large volume of requests and cannot maintain inactive requests for an indefinite period of time. Therefore, we are unable to grant extensions for the submission of required data/fees for revision requests. If a requester is informed by letter that additional data are required to complete our review of a request, the data/fee **must** be submitted within 90 days of the date of the letter. Any fees already paid will be forfeited for any request for which the requested data are not received within 90 days.

If you have general questions about your request, FEMA policy, or the National Flood Insurance Program, please call the FEMA Map Information eXchange (FMIX), toll free, at 1-877-FEMA MAP (1-877-336-2627). If you have specific questions concerning your request, please contact your case reviewer, Mr. Paul Anderson, by e-mail at PMAnderson@mbakercorp.com or by telephone at 720-514-1121, or the Revisions Coordinator for your request, Mr. Joseph Kuechenmeister, P.E., CFM, at jkuechenmeister@mbakercorp.com or at (720) 479-3181.

Sincerely,

Syed Qayum

Syed Qayum, CFM
LOMR Technical Manager
BakerAECOM

Enclosures

cc: Ms. Sue McDermott, P.E.
Deputy City Manager and City Engineer
City of El Mirage

Mr. Timothy S. Phillips, P.E.
Chief Engineer and General Manager
Flood Control District of Maricopa County

Mr. Josh Papworth, P.E.
Project Engineer
Dibble Engineering

NATIONAL FLOOD INSURANCE PROGRAM

FEMA PRODUCTION AND TECHNICAL SERVICES CONTRACTOR

Summary of Additional Data Required to Support a
Conditional Letter of Map Revision (CLOMR)

Case No.: 13-09-1703R

Requester: Mr. Michael Duncan, P.E., CFM

Communities: City of El Mirage and Maricopa County, AZ

Community Nos.: 040041 and 040037

The issues listed below must be addressed before we can continue the review of your request.

1. Please submit an existing conditions certified topographic work map that includes the following items.

   (a) Boundary delineations of the effective and existing base (1-percent-annual-chance) flood
   (b) Topographic contour information used for the boundary delineation of the existing base flood
   (c) Locations and alignment of all Cross Sections used in the hydraulic model with stationing control indicated
   (d) Stream and road alignments
   (e) Boundaries of the requestor's property
   (f) Certification by a registered professional engineer
   (g) Location and description of reference marks
   (h) Referenced vertical datum
   (i) Flow line used in the hydraulic model
   (j) Scale and north arrow

2. The submitted proposed conditions work map entitled, "Conditional Letter of Map Revision – Lower El Mirage Wash," prepared by Dibble Engineering, dated January 29, 2012, does not provide essential information required to complete our detailed review of this request. Please provide the boundary delineations of the effective base flood and regulatory floodway, which was omitted from the submitted topographic work map.

3. This CLOMR request will be processed by FEMA only after FEMA receives documentation from the requestor that demonstrates compliance with the Endangered Species Act (ESA). The requestor must demonstrate ESA compliance by submitting to FEMA either an Incidental Take Permit, Incidental Take Statement, "not likely to adversely affect" determination from the National Marine Fisheries Service or the US Fish and Wildlife Service (collectively known as "the Services"), or an official letter from the Services concurring that the project has "No Effect" on listed species or critical habitat.

   If the project is likely to cause jeopardy or adverse modification to species, then FEMA may deny the Conditional LOMC request. Please see the enclosed guidance for additional information about the ESA and compliance requirements and for responses to frequently asked questions.

Please send the required data and/or fee directly to us at the address shown at the bottom of this page. For identification purposes, please include the case number referenced above on all correspondence.

Flood Control District
of Maricopa County

Board of Directors
Denny Barney, District 1
Steve Chucri, District 2
Andrew Kunasek, District 3
Max W. Wilson, District 4
Mary Rose Wilcox, District 5

www.fcd.maricopa.gov

2801 West Durango Street
Phoenix, Arizona 85009
Phone: 602-506-1501
Fax: 602-506-4601
TT: 602-505-5897

March 29, 2013

LOMC Clearinghouse
847 South Pickett Street
Alexandria, VA 22304-4605

Subject: CLOMR Submittal
Lower El Mirage Wash Basin Project
FIRM panel affected: 04013C 1605J
Watercourse: Lower El Mirage Wash

To whom it may concern:

I hereby submit a CLOMR package submittal for the Lower El Mirage Wash Basin Project in El Mirage, Arizona. The key features of this project include grading for a detention basin and a new replacement culvert at the basin outlet. Please note the following:

A check for $4,400 has been enclosed;

The MT-2 application forms are in Appendix H.1 of the notebook; and

A disk at the back of the notebook contains the related modeling files and PDF files of the notebook, CLOMR maps, and related reports.

If you have any questions, please contact me at 602-506-4732, or mwd@mail.maricopa.gov

Sincerely,

Michael Duncan

Michael Duncan, P.E., CFM
Project Manager

Lower El Mirage Wash Basin
Conditional Letter of Map Revision

TECHNICAL DATA NOTEBOOK

FCDMC Contract No: FCD2012 C018
Dibble Project No: 101122.01

February 2013

Prepared For:

Dibble Engineering

7500 North Dreamy Draw Drive
Suite 200
Phoenix, Arizona 85020
P. 602.957.1155
F. 602.957.2838
www.dibblecorp.com

Registered Professional Engineer (Civil)
CERTIFICATE NO.
37878
JOSHUA E.
PAPWORTH
Date Signed 2/22/13
ARIZONA, U.S.A.
Expires 09/30/14

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Exhibit Map (in map pocket) Floodplain Work Map, 1 in. = 200 ft.
Electronic Files on CD-ROM (in CD Sleeve)

Section 1.0: INTRODUCTION

1.1 PURPOSE OF STUDY

The primary purpose of the Lower El Mirage Wash Basin project is to reduce the flooding hazards presented by storm water conveyed in Lower El Mirage Wash. The project will redefine the effective Zone AE flood hazard zone by updating hydrology and modifying the design of an existing detention basin, the West Cactus Basin, heretofore named the Lower El Mirage Wash Basin. A secondary objective of the project is to reduce the health and safety risks associated with the approximately 20 acre-feet of existing basin dead storage by re-profiling the existing basin and eliminating the roadway overtopping of El Mirage Road during high flows. Other purposes for the basin include providing multi-use amenities to enhance the value of the property to adjacent residential communities and currently vacant commercial parcels. This report presents the results of the floodplain delineation and requests a Conditional Letter of Map Revision (CLOMR) for the project.

1.2 AUTHORITY FOR STUDY

Dibble Engineering performed the hydrologic and hydraulic analyses for this study in association with their subcontractors, Environmental Planning Group (landscape architecture), for the City of EL Mirage and the Flood Control District of Maricopa County (FCDMC). The Project Managers for the project were Mike Duncan P.E., for FCDMC, and Kevin Roberts, P.E. for Dibble Engineering. The FCDMC performs the floodplain administration for the City of El Mirage. This study was completed in February of 2013.

1.3 LOCATION OF STUDY

Lower El Mirage Wash is located in the northwest metro Phoenix area, in Maricopa County, Arizona, as shown on **Figure 1 – Location Map**. The watershed contributing to Lower El Mirage Wash includes portions of the cities of Surprise and El Mirage. The wash conveys storm flows to the Agua Fria River. This project is focused on the downstream reach of Lower El Mirage Wash, bounded by the Agua Fria River at the downstream end and the Cactus Road crossing at the upstream end, with a total reach length of approximately 1.3 river miles. The Lower El Mirage Wash Basin (LEMWB) is located on an approximately 23.4-acre site along the Lower El Mirage Wash drainage between Cactus Road and El Mirage Road, as shown on **Figure 2 – Project Limits Map**.

1.4 SUMMARY OF METHODOLOGY

Floodplain and floodway water surface elevations and horizontal limits are determined using the HEC-RAS Version 4.1.0 computer model. Rainfall-runoff methodology (HEC-1) was utilized for the project hydrology, as explained in Section 4.

1.5 COORDINATION AND ACKNOWLEDGEMENTS

Dibble Engineering is in ongoing coordination with FCDMC and the City of El Mirage for this floodplain delineation study.

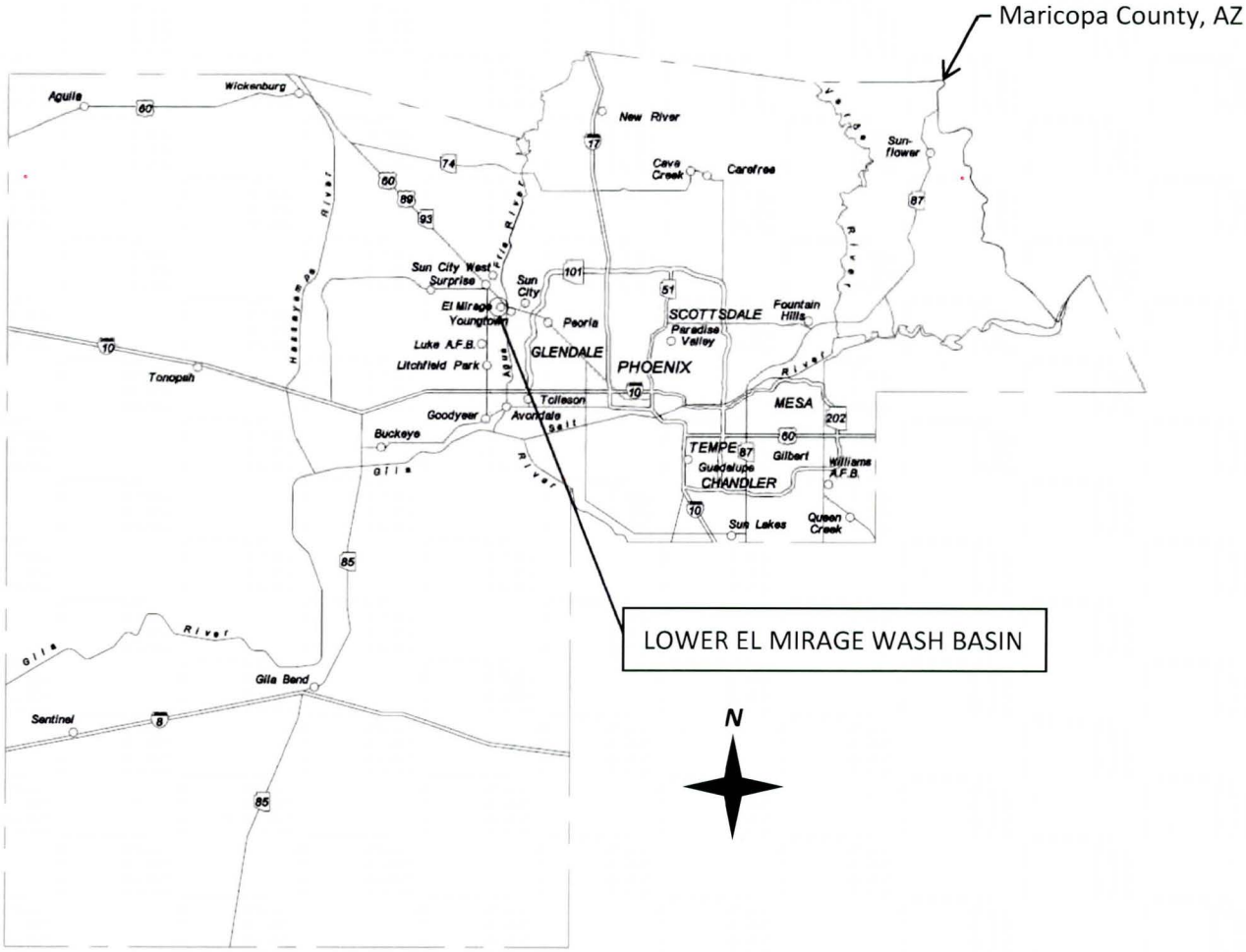

Figure 1 – Project Location Map

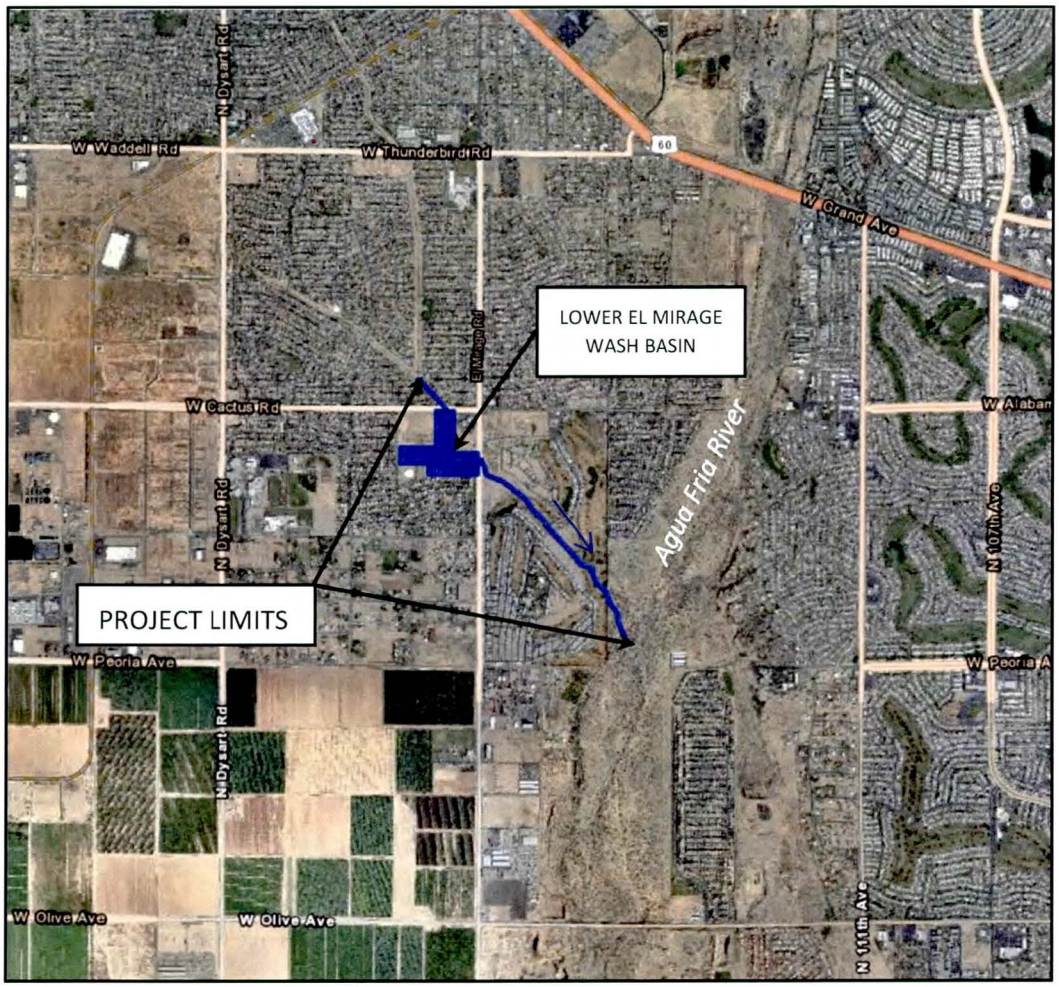

Figure 2 – Project Limits Map

1.6 STUDY RESULTS

This study indicates that the 100-year peak flow downstream of El Mirage Road will be reduced and the flood hazard boundary changed as a result of the proposed Lower El Mirage Wash Basin. Regulatory floodway limits are changed and base flood elevations are reduced within the study limits. It is requested that a CLOMR be issued based on these results and supporting documentation. Full size Work Maps showing the 100-year floodplain are provided in the map pocket at the back of this report. Basin construction plans, representing a 100% level of design completion, are bound separately and provided with this CLOMR application.

The hydraulic analyses for this study are based on the proposed construction and the study flow rates. Water surface elevations would be affected by maintenance or modifications to crossing roadways. Routine maintenance is planned along this segment. The flood elevations shown on the floodplain maps and profile drawings are considered valid only if hydraulic structures remain unobstructed, operate properly and do not fail.

Section 2.0: ADWR/FEMA forms and Local Government/ADWR Abstracts:

The FEMA Revision Request MT-2 Forms can be found in **Appendix H.1.** The FEMA abstracts are included in this section.

STUDY DOCUMENTATION ABSTRACT

INITIAL STUDY		RESTUDY		LOMR		CLOMR	X	OTHER	

Section 2.1. Study Documentation Abstract for FEMA Submittals		
2.1.1	Date Study Accepted	Pending
2.1.2	Study Contractor: Contacts Address Phone Internal Reference No. Subconsultants	Dibble Engineering Kevin Roberts, P.E. 7500 North Dreamy Draw, Suite 200 Phoenix, AZ 85020-4660 (602) 957-1155 Dibble Job No. 101122.01 Environmental Planning Group, Landscape Architects
2.1.3	FEMA Technical Review Contractor Address Phone Internal Reference Number	Pending
2.1.4	FEMA Regional Reviewer Phone	Pending
2.1.5	State Technical Reviewer Phone	Arizona Department of Water Resources (ADWR) and Arizona Division of Emergency Management (ADEM) no longer provide technical review
2.1.6	Local Technical Reviewer Phone	Mike Duncan, P.E. Flood Control District of Maricopa County (602) 506-4732

2.1.7	Reach Description	Lower El Mirage Wash Cactus Road to the Agua Fria River Approximately 1.3 miles FIRM Panels: 04013C1605J
2.1.8	USGS Quadrangle Sheets	El Mirage, Arizona, 7.5 minute, 5' C.I. Photo Date: 1957 Latest Photo Revision: 1974
2.1.9	Unique Conditions and Problems	None.
2.1.10	Coordination of Discharges (Agency, Date, Comments)	Local agency approval – See 2.1.6 above

Section 3.0: MAPPING AND SURVEY INFORMATION

3.1 FIELD SURVEY INFORMATION

Field survey was provided by three sources. Dibble Engineering provided control survey for aerial mapping in April of 2012 (NAVD88 datum). In January of 2010 the Flood Control District of Maricopa County provided field survey of existing structures as part of a planning phase of this project (NAVD88 datum). In 2004, Stanley Consultants provided field survey of the existing basin bottom (NGVD29 datum). **Appendix C** contains the project results of survey and field notes.

3.2 MAPPING

Mapping was prepared by Cooper Aerial Mapping at 1"=40' scale and with 1' contours. Aerial data was collected in April of 2012. This mapping is based on the project benchmark NGS Monument 4GA2, and uses the North American Vertical Datum of 1988 (NAVD88). Dibble Engineering performed verification that the mapping meets FEMA accuracy requirements. **Appendix C.1** contains the project results of survey for this mapping.

Section 4.0: HYDROLOGY

The basis of hydrology for the watershed contributing to this project is the *Loop 303/White Tanks ADMPU Area Hydrologic Analysis (*ADMPU-AHA), completed in 2009. The model represents existing conditions, 100-year return period, and 24-hour duration. ADMPU-AHA hydrology covers an area of approximately 238 square miles; however, the contributing area to the Lower El Mirage Wash Basin project is a relatively small component of this, approximately 27.8 square miles. As part of this CLOMR, several revisions were made to the ADMPU-AHA model in order to more accurately represent the watershed and to model the post project condition for the Lower El Mirage Wash Basin project. This hydrology with revisions has been approved by the Flood Control District of Maricopa County. A copy of the 2009 *ADMPU-AHA Final Report*, with supporting documentation, has been included in PDF format on the CD at the back of this report. The reader is referred to this report for supporting documentation of parameter estimation and details of the model development. A description of each model revision made as part of this CLOMR is provided in the next section.

4.1 METHOD DESCRIPTION

Hydrology for the Lower El Mirage Wash Basin project is developed using the *U.S. Army Corps of Engineers, HEC-1 Flood Hydrograph Package* (HEC-1) computer program. Guidance is given in the *Drainage Design Manual for Maricopa County, Arizona, Volume I, Hydrology* (DDM1) for application of the HEC-1 program within Maricopa County. Additionally, the program *Drainage Design Management System for Windows* (DDMSW) has been developed by the FCDMC to aid in the application of the methods described in DDM1. The application of these tools to the development of the ADMPU-AHA hydrology is documented in the *ADMPU-AHA Final Report*, contained in the CD at the back of this report, and will not be repeated here. Revisions that have been made to the ADMPU-AHA for this CLOMR are as follows:

4.1.1 Revision 1 – Remove Operation SRD14 (Pre and Post-Project Conditions)

This revision was made by Flood Control District of Maricopa County in October of 2009 to more accurately represent existing conditions regarding the storage at the intersection of Greenway Road and Dysart Road. The revision is based on a review of the HEC-1 model in combination with local physical conditions at this intersection.

4.1.2 Revision 2 – Remove Operation SRD25 (Pre and Post-Project Conditions)

This revision was made to more accurately represent existing conditions regarding storage at the intersection of Dysart Road, Waddell Road, and the Union Pacific Railroad. The revision is based on a review of the HEC-1 model in combination with local physical conditions at this intersection.

4.1.3 Revision 3 – Extract the Contributing Watershed (Pre and Post-Project Conditions)

The first Dibble revision was to extract the portion of Major Basin D draining to CPD54, which is the HEC-1 concentration point at the outlet of this project reach. The portion of the local watershed contained within the ADMPU-AHA (2009) Major Basin D that drains to CPD54 occupies a total area of 27.8 square miles and is illustrated on **Figure D.1** in **Appendix D.2**. Once extracted, Pre-Project and Post-Project conditions versions of the model were saved and named as follows:

Pre-Project Conditions Model: "LEMWB_PRE"
Pre-Project Conditions Model: "LEMWB_POST"

Once extracted, an automated update of the model subbasins was performed within DDMSW. The result of the subbasin update was a slight change in peak flow values, e.g. the peak flow at the confluence of Lower El Mirage Wash and Lower El Mirage Wash Tributary (CPD42) was reduced from 498 cfs to 480 cfs. This change is believed to be the result of a recent correction within DDMSW's unit hydrograph procedure, MCHUP1. The following statement is provided by FCDMC regarding the update:

> *The issue is related to time of concentration values for a multiple and 24-hour storm. This issue is partially caused by the 16-bit compiler to 32-bit compiler transition. This new update will work under both 32-bit and 64-bit computers.*

The change in peak flows resulting from this software update do not represent a significant departure from the original ADMPU-AHA hydrology results. This information is provided to the reader to explain slight differences that may be seen between the original ADMPU-AHA results provided on the attached CD, and the Lower El Mirage Wash Basin CLOMR hydrology results provided in **Appendix D.3** and **D.4**.

4.1.4 Revision 4 – Revised Operation SRD42 (Pre and Post-Project Conditions)

The third revision included incorporation of supplemental survey data for operation SRD42 (Cactus Road). The Cactus Road stage-storage-discharge modeling was updated using both 2004 Stanley Consultants survey data and 2010 FCDMC survey data. AZTEC Engineering developed a revised stage-storage-discharge curve based on this data as part of the *Lower El Mirage Wash Design Concept Report Phase 1-Analysis and Recommendations* (DCR) in June of 2010. The 2004 supplemental survey defined the channel geometry which represents the stage-storage data located upstream of Cactus Road. The 2010 supplemental survey data measured the Cactus Road culvert and roadway overtopping geometry and represents the stage-discharge data. The combined stage-storage-discharge data used for SRD42 (Cactus Road) is reproduced from the DCR and provided in **Appendix D.1**.

4.1.5 Revision 5 – Removed Operation D42D53 (Post-Project Conditions)

Revision 5 accounts for the fact that the proposed basin effectively replaces D42D53, a short channel route from Cactus Road to El Mirage Road.

4.1.6 Revision 6 – Revised Operation SRD53 (Post-Project Conditions)

Revision 6 provides the stage storage discharge curve for the proposed basin design. The data table was developed using the proposed basin grading plan and discharge data for the proposed 60 inch culvert at El Mirage Road. Culvert headwater verus discharge data was developed by performing several runs within HY-8 culvert analysis software. The combined stage-storage-discharge data used for SRD53 is provided in **Appendix D.1**.

Additional DDMSW and HEC-1 data tables can be found in **Appendix D.3** and **D.4**.

4.2 FINAL RESULTS

4.2.1 Hydrologic Analysis Results

Appendix D.3 and **Appendix D.4** provide complete hydrologic analysis results. Peak flow results used in floodplain modeling are provided in **Table 1 – Peak Flow Summary**.

Table 1– Peak Flow Summary

HEC-1 ID	Location	100-yr Peak Discharge *(cfs)*	
		Pre Project	Post Project
CPD42	Confluence of Lower El Mirage Wash and Tributary	480	480
SRD42	Just upstream of Cactus Road	473	473
SRD53	Just upstream of El Mirage Road	193	163
CPD54	Approximately 2300' upstream of LEMW confluence with the Agua Fria River	294	294

*Note: peak flows are rounded to the nearest 10 cfs for HEC-RAS modeling.

4.2.2 Verification of Results

The reader is referred to the ADMPU-AHA final report (provided with electronic data) for a discussion of verification of results. This discussion can be found in Section 4.1 of that report.

Section 5.0: HYDRAULICS

5.1 METHOD DESCRIPTION

Modeling was performed using HEC-RAS version 4.1, using steady state flow values. Peak flows from hydrology results have been applied at appropriate cross sections. The starting water surface value for the HEC-RAS computer model is normal depth. This is the result of an examination of a number of starting water surface options. Lower El Mirage Wash ends at the confluence with the Agua Fria River. However, it was concluded that it would not be appropriate to tie into the Agua Fria River water surface elevation, as the likelihood of coincident peaks is improbable. The model extends from the Agua Fria River to a point approximately 700' upstream of Cactus Road.

5.2 WORK STUDY MAPS

Appendix G contains the work study maps (reduced-size) showing the revised floodplain limits. A full size set of work study maps may be found in the map pocket.

5.3 PARAMETER ESTIMATION

5.3.1 Roughness Coefficients

Two roughness coefficient investigations have been performed as part of this floodplain delineation: pre-project conditions and post-project conditions. **Appendix E.1** contains color photographs of the existing condition and supporting roughness coefficient calculations for pre-project and post-project conditions. Post-project conditions Manning's n values are limited to the basin area and the reach of new downstream channel.

Manning's roughness coefficients, or "n"-values, are determined using procedures adopted by the USGS. The following supporting materials are used in this analysis:

- Aerial Photographs: April 2012 flight date by Cooper Aerial Survey Company, Inc. used for the topographic base mapping of study area
- Ground Photographs: Color photographs taken during field reconnaissance trips
- Field Data: Information gathered during field reconnaissance trips

The Manning's n-value is affected by many factors including bed material, cross section irregularities, depth of flow, vegetation, channel alignment, channel shape, obstructions, suspended material and bed-load. The selection procedure consists of selection of a base "n"-value and the addition of several adjustment factors to determine a total roughness coefficient for each channel sub-section (main channel and overbanks).

The base n-value accounts for roughness due to the bed material. Further refinements to the n-value are made based on *Estimated Manning's Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County, Arizona* (Thomsen, 1991). From this publication, it is found that the primary factors affecting the n-value are surface irregularities, obstructions and vegetation with consideration also given for depth and meander. Based on the primary factors, the n-value is estimated from the equation:

$$n = (n_b + n_1 + n_2 + n_3) f_m$$

Where: n_b = base Manning's value for a straight uniform channel
n_1 = value for surface irregularities
n_2 = value for obstructions
n_3 = value for vegetation
f_m = factor for meander

5.3.2 Expansion and Contraction Coefficients

Expansion and contraction coefficients for use in modeling Lower EL Mirage Wash in HEC-RAS are 0.3 and 0.5, respectively, for cross sections that model structures such as culverts and bridges. Expansion and contraction coefficients of 0.1 and 0.3, respectively, are used in locations of open channels, or areas not affected by drainage structures.

5.4 CROSS SECTION DESCRIPTION

HEC-RAS cross sections are spaced at intervals less than 400 feet, and are more tightly spaced where a more detailed modeling of the terrain is necessary. Additional cross sections are added at roadway or driveway culverts, as required for proper modeling in the RAS model. In general, cross sections are oriented perpendicular to the Lower El Mirage Wash. For areas that are not being revised, cross section data was obtained from the project mapping and supplemented at existing culverts/bridges with survey data. Cross sections at areas proposed for improvement were obtained from the proposed grading for Lower El Mirage Wash Basin, El Mirage Road, and the downstream channel.

5.5 MODELING CONSIDERATIONS

5.5.1 Hydraulic Jump and Drop Analysis

HEC-RAS results suggest that hydraulic jumps may occur at some culvert outlets and at areas within the existing golf course where grades steepen rather suddenly. Outlet protection is provided at culvert outlets, and the golf course has a grass lining. Jumps are contained within the channel section. It is acknowledged that hydraulic jumps may form; however, in HEC-RAS, both a mixed profile and subcritical profile were evaluated and the subcritical run yielded the highest water surface elevations. Accordingly, only the subcritical flow regime was used to map floodplain elevations in the channel.

5.5.2 Bridges and Culverts

There are 2 existing culverts, 1 existing bridge, and 1 new culvert modeled in the proposed condition HEC-RAS model. Culvert solution criteria are the highest upstream energy grade resulting from inlet control and outlet control. Bridges are modeling using the energy method (Standard Step) for both low flow and high flow conditions.

5.5.2.1 Cactus Road Culvert (Existing)

An existing 3 barrel 24-inch diameter reinforced concrete pipe culvert is modeled at Cactus Road. The culvert inverts were obtained from a 2010 FCDMC survey. Bridge deck data was obtained from the project mapping. This culvert will ultimately be replaced with a large capacity box culvert at the time that Cactus Road is improved. This is expected to be several years in the future.

5.5.2.2 El Mirage Road Culvert (Proposed)

A proposed 60-inch diameter reinforced concrete pipe culvert is modeled at El Mirage Road. Bridge deck data was obtained from the project mapping.

5.5.2.3 Park Place Culvert (Existing)

A 4 barrel, 10'x3' concrete box culvert exists within the resort golf course at Park Place. The culvert inverts were obtained from 2010 FCDMC survey data. Bridge deck data is obtained from the project mapping.

5.5.2.4 Golf Cart Path Bridge (Existing)

A small concrete bridge of approximate span of 10' for golf cart travel exists within the resort golf course. Bridge deck data was obtained from 2010 FCDMC survey data.

5.5.3 Levees and Dikes

No levees or dikes are present within the project limits.

5.5.4 Islands and Flow Splits

There are no hydraulically significant islands or flow splits within the project limits; no islands or flow splits are modeled.

5.5.5 Ineffective Flow Areas

Ineffective flow areas are coded into HEC-RAS cross sections at abrupt changes in conveyance section. The expansion rate is 3 longitudinal to 1 lateral; the contraction rate is 1 to 1. These values are reasonable considering the low to moderate velocities (generally less than 5 fps) of the conveyance.

5.5.6 Supercritical Flow

While the reach may be conducive to the sporadic development of supercritical flow in the immediate vicinity of culvert outlets and rolling golf course grading as discussed in Section 5.5.1, these are limited to single, non-consecutive cross sections. Therefore, no special treatment of supercritical flow was conducted. No other areas of supercritical flow were noted.

5.6 FLOODWAY MODELING

Floodway modeling was performed as part of this proposed project. Floodways were determined using equal conveyance encroachment (HEC-RAS Method 4) to start with; results were then converted to HEC-RAS Method 1 in the final analysis. The floodway encroachments were selected to produce a rise in the water surface elevation that is as near the one-foot maximum as possible while providing a reasonably consistent and realistic conveyance corridor. **Table 5,** in Section 7.2, is the **Floodway Data** table.

5.7 PROBLEMS ENCOUNTERED DURING THE STUDY

5.7.1 Special Problems & Solutions

No special problems occurred during the hydraulic modeling.

5.7.2 Modeling Warning and Error Messages

Warning messages and notes provided by HEC-RAS include:

- Critical Depth
  - During standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
  - Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
- Velocity Head
  - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
- Energy Equation
  - The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
  - The energy loss was greater than 1.0 ft (0.3 m) between the current and previous cross section. This may indicate the need for additional cross sections.
- Conveyance Ratio
  - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
- Divided Flow
  - Divided flow computed for this cross section.

These warnings have been reviewed at the locations where they occur, and are typical of overtopping roadway sections and reaches of conveyance with undulating ground slope and meandering alignment. Resulting water surfaces appear to be reasonable and consistent with field observation and standard methodology.

5.8 FINAL RESULTS

5.8.1 Hydraulic Analysis Results

Output tables for Pre-Project and Post-Project results are provided at the beginning of **Appendix E.2** and **E.4** respectively.

An exhibit showing the pre-project cross section layout is provided in **Appendix E.2**. The final water surface elevations are reported on the floodplain delineation work maps included in **Appendix G** and at the back of this report. Work study maps are on NAVD 88 vertical datum.

The floodplain within the study limits that are analyzed with detailed methods are proposed as Zone AE. Areas outside of the proposed Zone AE floodplain and within the current effective Zone AE floodplain will become Shaded Zone X.

A 'gutter' line is shown on the floodplain work maps to delimit the boundary between base flood elevations governed by Lower El Mirage Wash and those governed by the Agua Fria River. This was estimated by comparing the base flood elevations of the Agua Fria River, at the upstream limit of the confluence, with the elevations determined for Lower El Mirage Wash in this study. The approximate elevation is 1098.7. Floodway delineation limits are determined by Lower El Mirage Wash alone, within this project's limits of detailed study.

5.8.2 Verification of Results

The input parameters for each HEC-RAS model were applied in a manner consistent with standard engineering practices for floodplain delineation studies. The floodplain results appear to be reasonable for flooding sources of this nature. There is no reason to doubt the accuracy or validity of the floodplains delineated in this study.

Section 6.0: EROSION AND SEDIMENT TRANSPORT

6.1 SEDIMENT YIELD

Sediment yield calculations were performed within *Drainage Design Management System for Windows 4.6.0* software (DDMSW). The 100-year storm sediment yield and annual sediment yield are computed for the purpose of sizing a sedimentation basin at Cactus Road. The primary purpose of the sediment basin is to facilitate maintenance of the multiuse basin facility. The sediment-basin volume computation includes the summation of (1) a single 100-year storm sediment yield and (2) two times the annual sediment yield. This corresponds to a 2-year frequency sediment inspection and removal. The sediment yield consists of two parts and is defined as the sum of the wash load and the total bed material load delivered to a point of interest. The wash load is calculated with the MUSLE method, and the total bed material load is calculated with the Zeller-Fullerton equation (Zeller and Fullerton, 1983), which is based on the assumption that the reach is at an equilibrium condition. For additional information concerning the yield calculations performed within DDMSW, the reader is referred to *River Mechanics Manual for DDMSW*, 2010.

Particle gradation data for calculations was obtained by field sampling within the wash bed at a location approximately 550' upstream of Cactus Road. The exploratory boring terminated approximately 3 feet below the bed surface. The boring log and gradation test results can be found in the project geotechnical report, Addendum 1, reproduced within **Appendix F**.

6.1.1 Parameter Estimation

Other input parameters for the yield calculations are summarized below:

6.1.1.1 Peak Flow

Peak flow rates for the full range of return periods were obtained from concentration point CPD42 of the project hydrology. This corresponds to a location just upstream of Cactus Road. The hydrology used for this analysis differs from that used for floodplain delineation. The FCDMC has elected to use a hydrology model that includes future regional drainage facilities planned for the area (termed 'With Capital Improvement Projects (CIP)') for this analysis, because it is slightly higher, and thus more conservative. A discussion of the future condition peak flows is provided in the *Lower El Mirage Wash Basin Design Report*; and, because it is not relevant to the flood hazard determination, will not be provided here.

6.1.1.2 Bed Load Section Data

A representative cross section for the bed load calculation was obtained from the project mapping at a location approximately 150 upstream of Cactus Road. The slope of the channel section is the average slope for a distance of approximately 1000' upstream of Cactus Road.

6.1.1.3 Soil and Erosion Factors

Soil and erosion factors were assigned based on the unique soil identification number corresponding to NRCS soil classification. These values are the Soil Erodibility Factor (K) and the Erosion Control Factor (P). The default values within DDMSW have been selected. The specific weight of soil is calculated using the

channel bed material soil sample. The D10 of the sediment sample is taken as the D50 of the wash load; D10 is defined as the diameter of which 10% is finer by weight. This is supported by Garde and Raju (1985), wherein it is proposed that the limiting size for the wash load by be arbitrarily chosen from a mechanical analysis of the bed material, as that particle size of which 10 percent of the bed material is finer.

6.1.1.4 Land Use Factors

Land use factors were assigned based on the unique land use codes within the watershed. Land use shape files, matching land use codes to geographic limits, are those used in Loop 303/White Tanks ADMPU AHA. These factors are the Cover Management Factor and the Percent Impervious; these values are drawn from land use data automatically with DDMSW. The default values have been selected.

6.1.1.5 Topographic Factor

The topographic factor was used within the MUSCLE to estimate shallow surface erosion prior to flow concentration. This factor is calculated from the slope length distance and the slope, in percent. Slope length is defined as the distance from the point of origin of overland flow to the point where either slope gradient decreases enough such that deposition occurs, or the runoff water enters a well-defined channel that may be a part of a drainage network. The watershed for Lower El Mirage Wash Basin is nearly completely developed; most development is single family residential homes with a drainage network of streets. For this reason the slope length and is selected as a typical distance from the back of typical residential lot to the adjacent street curb: 100'. The slope is estimated as the average watershed slope: 0.43%.

6.1.2 Final Results

The resulting sediment yield is summarized below.

Table 2– Sediment Yield

Event	Wash Load (cu-ft)	Bed Load (cu-ft)	Total Yield (cu-ft)
100 Year	2,570	7,754	10,324
Annual	174	305	479
Design*	2,918	8,364	11,282

*Design = 100 Year + 2 x Annual

These values appear reasonable considering the developed nature of the contributing watershed. DDMSW output tables can be found in **Appendix F**.

The expected volume of sediment entering the study area during the 100-year event is a small percentage of the total detained volume within the proposed basin, less than 1%. Based on this result, sediment transport is not expected to have an impact on basin performance or the performance of the downstream channel. To help reduce maintenance of multiuse areas within the basin, a sediment collection area is provided just downstream of Cactus Road. The size is based on a design event consisting of the sum of the 100-Year yield and twice the annual yield. The volume provided as shown on the 100% plans submittal is 12,331 cu-ft, providing approximately 9% of additional sediment storage capacity.

6.2 EROSION PROTECTION

The hydrology used for the design of erosion protection differs from that used for floodplain delineation. The FCDMC has elected to use a hydrology model that includes future regional drainage facilities planned for the area (termed 'With Capital Improvement Projects (CIP)') for this analysis, because it is slightly higher, and thus more conservative. A discussion of the future condition peak flows is provided in the *Lower El Mirage Wash Basin Design Report*; and, because it is not relevant to the flood hazard determination, will not be provided here.

6.2.1 Storm Drain and Culvert Outlets

The procedures embedded in the District's DDMSW software package were used to size the rock used at the storm drain and culvert outlets. The "Channel Bed on Straight Reach" selection was used in sizing the rock, as this most closely represents the condition of the flows as they enter the basin. Velocities used were referenced from the existing storm drain hydraulic models, as discussed in Section V.D, and from the HEC-RAS model for the cross section immediately downstream from the Cactus Road culvert and the basin outfall culvert. Based on the uncertainties in the hydrology for the storm drain systems entering the basin, grouted riprap aprons were used at these locations. The grouted riprap apron thickness was designed according to the methods in FWHA HEC-11. The 125th Avenue storm drain outlet resulted in the largest apron thickness of 18"; this riprap section was used for all storm drain outlets to simplify construction. A summary of the riprap sizing calculations are provided in **Table 3**, and DDMSW printouts are included in **Appendix F**.

Table 3– Storm Drain and Culvert Riprap Apron Sizing Summary

Outlet Location	Q *(cfs)*	V *(fps)*	Calculated d_{50} *(in)*	Design d_{50} *(in)*	Calculated Rock Depth *(in)*	Design Rock Depth *(in)*
125th Avenue Storm Drain	157	12.5	25.6	--	17.3	18
Canterbury Drive Storm	89	7.1	8.3	--	12.4	18
El Mirage Water Campus	16	5.6	5.2	--	12.0	18
Cactus Road Culvert	104	6.4	6.7	16	12.1	--
LEMWB Outlet Culvert	191	8.7	12.4	16	13.2	--

Riprap apron extents were designed based on FHWA HEC-14 design manual. The design drawings show a typical apron depth of 36-inches.

6.2.2 Cactus Road Overtopping Flows

The procedures embedded in the District's DDMSW software package were used to size the rock used at the Cactus Road low-flow crossing. Both the "Downstream of Grade Control" and "Sloped Drop Structure" methods were analyzed (DDMSW printouts are included in **Appendix F**). The results indicate a rock size of 11.5 inches using the "Downstream of Grade Control" method, and 14.0 inches using the "Sloped Drop Structure" method. To maintain simplicity on the project, the 16-inch rock section designed for the storm drain and culvert outlets will be used at the Cactus Road low-flow crossing.

Section 7.0: DRAFT FIS REPORT DATA

7.1 SUMMARY OF DISCHARGES

Table 4 - Summary of Discharges

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQUARE MILES)	100-YEAR PEAK FLOW (CFS)
Lower El Mirage Wash @ Confluence with Lower El Mirage Wash Tributary	26.93	480
Lower El Mirage Wash @ Cactus Road	26.93	473
Lower El Mirage Wash @ El Mirage Road	27.05	163
Lower El Mirage Wash @ Confluence with Agua Fria River	27.82	294

7.2 FLOODWAY DATA

Table 5 - Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQFT)	MEAN VELOCITY (FT/S)	REGULATORY	WITHOUT FW	WITH FW	INCREASE
Lower El Mirage Wash								
A	0.486	29	28	5.7	1101.1	1101.1	1101.1	0.0
B	0.892	47	68	2.4	1106.8	1106.8	1106.8	0.0
C	1.312	279	446	1.1	1111.7	1111.7	1111.7	0.0

1. Miles Above Confluence with Agua Fria River

7.3 ANNOTATED FLOOD INSURANCE RATE MAPS

An annotated FIRM panel is contained in **Appendix H.5**.

7.4 FLOOD PROFILES

The flood profiles created using RASPLOT are included in **Appendix H.6**.

APPENDIX A

REFERENCES

APPENDIX A.1

DATA COLLECTION SUMMARY (NONE)

APPENDIX A.2

REFERENCED DOCUMENTS

Arizona Department of Water Resources, 1997, *State Standard 1-97, Requirements for Flood Study Technical Documentation*, August 2012.

Arizona Department of Water Resources, 2002, State Standard 9-02, State Standard for Floodplain Hydraulic Modeling, July 2002.

Aztec, *Lower El Mirage Wash DCR Phase 1 – Analysis and Recommendations*, June 4, 2010.

Aztec, *Lower El Mirage Wash DCR Phase 2 – Analysis and Recommendations*, August 25, 2011.

City of El Mirage, *Cactus Road: 125th Avenue to El Mirage Road - 100% Submittal,* Entellus, 2011.

City of El Mirage, *Canterbury Drive & Dietz-Crane Water Production Facilities: Phase II As-Built Drawings,* Malcolm Pirnie, Inc., 2001.

Federal Emergency Management Agency, Flood Insurance Study: Guidelines and Specifications for Study Contractors (FEMA 37), April 2003.

Federal Emergency Management Agency, *Flood Insurance Rate Map, Maricopa County, Arizona*, Map Number 04013C1605J, September 30, 2005.

Federal Highway Administration, *Hydraulic Engineering Circular No. 14, Third Edition, Hydraulic Design of Energy Dissipators for Culverts and Channels*, July 2006.

Flood Control District of Maricopa County, *Drainage Design Manual: Volume I - Hydrology*, 2011.

Flood Control District of Maricopa County, *Drainage Design Manual: Volume II - Hydraulics (DRAFT)*, 2010.

HDR, *Final Hydrology Report: Loop 303/White Tanks ADMPU Area Hydrologic Analysis*, 2009.

Premier Engineering, *El Mirage Road: Peoria Avenue to Cactus Road - Pre-90% Drawings*, 2012.

Sage Engineering Corporation, *Hancock Communities. Rancho Mirage Unit II - Phase 1: As-Built Drawings*, 2001.

Sage Engineering Corporation, *Hancock Communities. Rancho Mirage Unit II - Phase 3: As-Built Drawings*, 2001.

Stanley Consultants, Inc., *West Cactus Detention Basin and Channels Project: Candidate Assessment Report*, 2004.

Thomsen, B.W. and Hjalmarson, *Estimated Mannings Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County, Arizona. Tucson, AZ: U.S. Geological Survey*, 1991.

United States Geological Survey, *El Mirage, Arizona, 7.5-minute quadrangle*, 1:24000, 5-foot contour interval, 1957, photo revised 1974.

WLB Group, Inc., *White Tanks/Agua Fria Area Drainage Master Study*, 1991.

APPENDIX B

GENERAL DOCUMENTATION AND CORRESPONDENCE

APPENDIX B.1

SPECIAL PROBLEM REPORTS (NONE)

APPENDIX B.2

CONTACT (TELEPHONE) REPORTS (NONE)

APPENDIX B.3

MEETING MINUTES OR REPORTS

Dibble Engineering

7500 North Dreamy Draw Drive, Suite 200
Phoenix, Arizona 85020
Tel. (602) 957-1157
Fax (602) 957-2838

AGENDA

Project: Lower El Mirage Wash Basin
Date: June 26, 2012 – 10:00 AM
Re: Project Coordination Meeting
Contract: FCD 2011C004
Dibble Project: 101122.01

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1) INTRODUCTIONS

2) PROJECT SCHEDULE – Key Dates

a. 40% Submittal: Fri 7/20/12
b. City Council Presentation: Tues 8/7/12
c. Public Meeting: Thurs 8/9/12
d. 90% Submittal: Fri 9/28/12
e. CLOMR Submittal: Fri 10/12/12
f. 100% Submittal: Fri 11/9/12

3) PROJECT STATUS

a. Mapping and Data Collection Complete

b. 40% Design Underway

c. Utility Coordination
   i. Pothole Locations for Utilities (8)
      - Requested results by 7/6/12

d. Geotechnical Investigations
   i. Field work complete
   ii. Lab analysis underway
   iii. Report anticipated 7/27

e. Public Meeting Announcement (Meeting Scheduled for 8/9/12)
   i. Draft text complete (by FCDMC)
   ii. Location- El Mirage Elementary School
   iii. Time- 6:00 to 7:30
   iv. Format- Open House

4) PROJECT DESIGN DISCUSSION ITEMS

CIVIL:

a. Low flow channel design
   i. Material? (Grades)
   ii. Basin bottom grading to drain to low flow

b. Pathway
   i. Material
   ii. Low flow channel crossings - dip or culverts?

iii. Connections to existing sidewalks/trials
iv. Future crossing at Cactus Road

c. Future soccer fields
   i. Sloped in 1 direction?
   ii. Crowned in the center?

d. Future Little League fields
   i. Grading

e. Sediment Basin
   i. Evaluate the need

f. Basin top setbacks from property line
   i. 5'-10'
   ii. Water campus – integrate slope into basin?

g. Basin top elevation
   i. Elevation = 1115.0 per DCR
   ii. Elevation of existing ground at west end= 1111.0 to 1112.0 +/-
   iii. Fill needed
      - By others?

h. Any consideration for grading or utilities for future restrooms/public buildings

LANDSCAPE:

a. Current Tall Pot Tree details
b. Current LA related special provisions
c. Any other District standards or details that have been updated in the last year
d. Other?

5) OTHER

6) NEXT MEETING DATE

Dibble Engineering

7500 North Dreamy Draw Drive, Suite 200
Phoenix, Arizona 85020
Tel. (602) 957-1157
Fax (602) 957-2838

AGENDA

Project: Lower El Mirage Wash Basin
Date: June 14, 2012 – 3:00 AM
Re: Project Coordination Meeting
Contract: FCD 2011C004
Dibble Project: 101122.01

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1) INTRODUCTIONS

2) PROJECT STATUS
a. Mapping and Data Collection Complete
b. 40% Design Underway
c. Pothole Locations for Utilities

3) PROJECT SCHEDULE – Key Dates

a.	40% Submittal:	Fri 7/20/12
b.	City Council Presentation:	Tues 8/7/12
c.	Public Meeting:	Thurs 8/9/12
d.	90% Submittal:	Fri 9/28/12
e.	CLOMR Submittal:	Fri 10/12/12
f.	100% Submittal:	Fri 11/9/12

4) PROJECT DISCUSSION ITEMS
a. COEM Irrigation Respons Confirmation
   i. Irrigation Standard Specifications – as provided with project-specific modifications
   ii. Design for reclaimed water (purple pipe, etc…)
   iii. Irrigation Equipment
      - Drip: Hunter ICV valves, Bowsmith multi-port (example ml 210), sch. 40 mainlines, class 200 laterals
      - Turf: Hunter ICV valves, Hunter Rotors and Sprays (example Hunter I-20), sch. 40 mainlines, class 200 laterals
      - Backflow: Febco 825 YA
      - Controller: Tucor RKD Controller
      - Other?
   iv. Additional City Irrigation CAD Details?
   v. Coordination for Controller Power Drop

b. Planting Design – Confirm or clarify project specific design requirements
   i. Sight Visibility Restrictions: access drives on Cactus Road and 125th Ave (10'x20')
   ii. Zoning Requirements
      - Landscape Requirements (154.103)
         (a) Min tree sizes:
            (i) 15 gallon min., 8 foot high, 4 foot spread, 1-1/4" caliper at ground level
            (ii) 50% to be 24" box or larger, 10 foot high, 4 foot spread, 2-1/2" caliper at ground level
            (iii) Tall pots?
            (iv) Tree salvage opportunities
         (b) Streetscape requirments
            (i) Three streets fronted by project: 125th Ave (west boundary), Cactus Road (north boundary), and El Mirage Road (east boundary)

(ii) Per 154.103.N – Landscape along street frontage:
1. (1) tree per 30 linear foot of road,
2. (6) 5-gallon shrubs per tree
3. 60% live cover including groundcovers in ROW or front 25-foot of streetscape area
4. Contour berming in ROW required

(iii) Per 154.103.X – Streetscape standards:3
1. (1) tree per 30 linear foot of road,
2. (3) 5-gallon shrubs per 20 linear foot of road
3. Contour berming

(iv) Interior Landscape
1. Cite requirements to apply? (i.e. – commercial/industrial or other?)

(v) Site Screening
1. Interim Condition – site access control needs, if any
2. Future Parking Screening (154.102.B.6) for residential to west
   a. Exception options per code (to be approved by Planning and Zoning Commission): provide street landscaping, berms and landscape, or lower wall with landscape

(vi) Other Lanscape Related City Preferences or Needs?
1. Turf – specific variety preference?
2. Construction Timing – seeding, sod, plugs?
3. Graffiti Protection – thinning of plants along well-site wall, recommendations
4. Maintenance
   a. Review City's typical O&M practices
   b. Gabion basket acceptability
   c. Future park site O&M access needs – any potential issues to be aware of for current design?

(vii) Confirm Site Plan Changes from Pre-Design
1. Consolidate turf into central area
2. Provide sediment basin within site south of Cactus Road

(viii) City Submittals and Reviews
1. City notes – November 2010
2. Plan Submittals - # of sets, checklist, etc…

5) OTHER

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
2801 West Durango Street
Phoenix, AZ 85009

CITY OF EL MIRAGE
12145 Grand Avenue
El Mirage, AZ 85335

MEETING MINUTES August 2, 2012

PROJECT NAME: Lower El Mirage Wash Basin (SW Corner of Cactus Road and El Mirage Road)

PURPOSE: Project Aesthetics Advisory Committee (PAAC) Meeting: 10:00AM – 11:30AM

LOCATION: Primrose Conference Room, City of El Mirage - City Hall
12145 Grand Avenue, El Mirage, Arizona 85335

Attendees: See attached sign-in sheet

Welcome/Introductions

Kevin Roberts, the consultant project manager, provided an overview of the project and the current status of the work to be performed. Kevin and Michael Duncan, the FCDMC's project manager, also discussed the project history including the previous studies performed and documented in a Design Concept Report, or DCR.

Landscape Planning Overview

Harry Cooper, the FCDMC's Landscape Architect, provided an overview of the PAAC meeting process, the FCDMC's landscape architecture policy related to why aesthetics and landscape is an important consideration for flood control projects, and the landscape-related items previously identified in the DCR.

Landscape Architecture Design

John Griffin, the consultant landscape architect, led an open discussion on the landscape components of the 40% design. This discussion is outlined below by subject with pertinent outcomes.

Parking – The PAAC expressed concern that the park activities would encourage traffic to enter the neighborhood and park along both Canterbury Drive and 125th Avenue. The added parked vehicles would greatly hinder the ingress and egress of large vehicles and trailers (which are common in this neighborhood) to and from the residential lots. They were strongly against such parking and asked that the team consider options for parking that would neither encourage an increase in neighborhood traffic nor on-street parking.

Resolution: Since this is a park activity issue, the team will pass this issue on to the City for their attention. The future parking area near 125th Avenue is intended to be accessed from Cactus Road through the

future commercial site. One option that was briefly discussed was encouraging parking on the City-owned 2-acre parcel along El Mirage Road.

Landscape Materials – The team provided graphics to the PAAC demonstrating the overall plant palette included in the DCR and asked the PAAC to confirm that this was the desired plant palette for the project. In general the PAAC confirmed that native and native-adapted flowering shrubs and grasses as depicted in the graphics were preferred. However, the PAAC questioned the use of prickly pear cactus in publicly accessible areas. The PAAC also questioned why Southern Live Oak was not included when they perceive it is a common species used in El Mirage and reflects the community's character.

Resolution: The design team will add Southern Live Oak to the plant palette. The team will also be selective in the use of cacti and limit the use of spiny or thorny plant material to areas where public access is discouraged.

Structural Aesthetic Treatment – The project will include a large headwall structure for the culvert crossing of El Mirage Road. There will also be three smaller headwalls (approx. 5-foot by 9-foot) on the project. The team provided two boards that illustrated potential aesthetic treatments for these headwalls.

One option to use gabions similar to what will be used at the Cactus Road crossing was considered favorable by one member of the PAAC. The gabion wall would discourage graffiti and blend in with other City of El Mirage projects in the area. The team pointed out that this may cost more than other options and asked for a second option in the event that the gabion treatment proved cost-prohibitive. The PAAC preferred the use of a formliner with the appearance of a dry-stacked stone wall over the other options demonstrated.

The team discussed color for the formliner. With the formliner option, a single color intended to blend the wall into the surrounding setting would be selected. The team agreed it should be coordinated with the chosen rock color. One option for the smaller headwalls would be to use painted concrete and with the intent of receding visually into the landscape.

Resolution: The design team will compare costs for the gabion wall option with the formliner option. The final design will reflect the PAAC's preferences along with project budget constraints.

Decomposed Granite – The team discussed options for decomposed granite or rock mulch. The team identified the existing well site as being dressed with a ½" minus Madison Gold decomposed granite which the PAAC specifically did not want to see on the basin project. The PAAC expressed a preference for a brown colored rock as well as using a larger aggregate than ½" minus rock. The team discussed options that would not include a 3" rock mulch, but perhaps an average size around 1" instead of the ½" or 3" rock.

Resolution: The team will specify a brown rock for the project such as the 'Express Brown' or 'Table Mesa Brown' selected by the PAAC. The team will identify a final rock size based on the project needs. Subsequent discussion suggests the ADOT mulch, which is called "1-1/4" minus", would both meet erosion protection needs as well as satisfy the PAAC's desires.

APPENDIX B.4

GENERAL CORRESPONDENCE

Dibble Engineering

7500 North Dreamy Draw Drive, Suite 200
Phoenix, Arizona 85020-4669
P 602.957.1155
F 602.957.2838

Letter of Transmittal

To: FCDMC
2801 West Durango Street
Phoenix, AZ

Date: 2/26/2013
Re: Lower El Mirage Wash Basin CLOMR
Client Project No:
Dibble Project No:

Attention: Mike Duncan

Transmitted herewith are the following items:

- ☐ **Plans/Prints**
- ☐ **Exhibits**
- ☐ **Proposal**
- ☐ **Other**
- ☐ **Specifications**
- ☐ **Opinion of Cost**
- ☐ **Change Order**
- ☒ **Report**
- ☐ **Shop Drawings**
- ☐ **Electronic Media**

Copies	Date	I.D. Number	Description
3	2/22/13		Final CLOMR Submittal

These are transmitted as checked below:

- ☒ **For Review & Comment**
- ☐ **For Your Use**
- ☒ **Approval Requested**
- ☐ **Other**
- ☐ **For Your Record**
- ☐ **Returned**
- ☐ **Information Only**
- ☐ **Reference Document**
- ☐ **As Requested**
- ☐ **Return when Finished**

Remarks:

Mike, attached is the Final CLOMR submittal with your comments addressed. Let me know if you have questions or require anything further. Thank you.

Cc: 101112.01 Letter

Sincerely,
Dibble Engineering

Josh Papworth, PE

Josh Papworth

rom: Michael Duncan - FCDX <mwd@mail.maricopa.gov>
Sent: Tuesday, February 19, 2013 1:40 PM
To: Kevin Roberts
Cc: Josh Papworth; Jeremy Laipple
Subject: FW: LEM - CLOMR Report - Review comments
Attachments: LEM-CLOMR report_comments Mike D.XLSX

Hi Kevin and Josh, I have reviewed the models, and I have just this one comment to add:

In the model description boxes. there is this sentence:
Topographic mapping is based on 2012 aerial photography and supplied by the FCDMC.

I am thinking that this should be replaced with the Cooper Aerial Mapping Co. info., as was used on application form MT-2 page 2 of 3, Section C.

From: Michael Duncan - FCDX
Sent: Friday, February 15, 2013 2:20 PM
To: Kevin Roberts (kevin.roberts@dibblecorp.com)
Cc: Josh Papworth (josh.papworth@dibblecorp.com); Jeremy Laipple (jeremy.laipple@dibblecorp.com)
Subject: LEM - CLOMR Report - Review comments

Kevin and Josh, my review comments are attached.

REVIEW COMMENTS FOR: Lower El Mirage Wash Basin - CLOMR Report

REVIEWER: Mike Duncan
DATE: 2/15/2013

No.	SHEET NO.	LOCATION	DESCRIPTION
1	data disk	all RAS models	The models have not been run. Results tables and plots are blank. Please run them and save them.
2	RAS	duplicate effective model	Please add vertical datum of model to the Description box.
3	RAS	Pre-project and post-project models	Add these items to the Description boxes: vertical datum, contour interval of mapping, flight date of mapping
4	data disk	Plans	Plans file is dated 1/29/2013. Please replace with the latest version of 2/14/2013. If you need this from our contract copy, let me know.
5	Appendix H.3	inspection report	At middle of 3rd section, Debris is mis-spelled as Debree.
	I will continue my review after receipt of the run models.		

Josh Papworth

rom: Martinez, Mike <mike_martinez@fws.gov>
Sent: Thursday, February 14, 2013 11:01 AM
To: Josh Papworth
Subject: Re: Lower El Mirage Wash Basin (1 of 2)

Dear Mr. Papworth:

Thank you for your email correspondence of February 7, 2013, requesting review by the U.S. Fish and Wildlife Service of application for a CLOMR for a regional basin project in the City of El Mirage, Maricopa County, Arizona (02EAAZ00-2013-TA-0087). Based on the information provided, it appears that no endangered or threatened species, or critical habitat wouldl be affected by the project; nor is the project likely to jeopardize the continued existence of proposed species or destroy or adversely modify proposed critical habitat, because no such species or habitats exist in the project area. As such, a "no effect" determination by FEMA, in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et. seq.) (ESA), for issuance of the CLOMR seems appropriate. Should the project site change or if additional information on the distribution of listed or proposed species becomes available, FEMA's determination may need to be reconsidered.

Some projects may potentially impact species that are protected under the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. sec. 703-712) and/or bald and golden eagles protected under the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668d). Prohibitions under the MBTA include the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except as specifically authorized by the FWS. If you believe migratory birds will be affected by the project, we recommend you contact our Migratory Bird Permit Office, P.O. Box 709, Albuquerque, NM 87103, (505) 248-7882 or by emailFW2_birdpermits@fws.gov.

You're encouraged to coordinate review of this project with the Arizona Game and Fish Department. Additionally, since ıe project appears to occur in waterways and may require a permit under section 404 of the Clean Water Act, it is recommended that you coordinate with the U.S. Army Corps of Engineers. Should you require further assistance or have any questions, please contact me.

On Thu, Feb 7, 2013 at 5:53 PM, Josh Papworth <josh.papworth@dibblecorp.com> wrote:

Mr. Martinez,

I am working on behalf of the Flood Control District of Maricopa County to obtain a Conditional Letter of Map Revision from FEMA for a regional basin project in the City of El Mirage, Arizona. As part of this process we are asked to comply with Sections 9 and 10 of the Endangered Species Act. I've completed the Online Environmental Review and have attached it. The project is a stormwater storage basin/park project. An existing storage basin will be re-graded and landscaped for use as a park. I've attached pictures of the existing site, and excerpts from the construction and landscape plans (second email). Would it be possible for you to provide an opinion, based on this information, as to whether the project constitutes "no effect" to endangered species and their habitats? Your help is very much appreciated. Thank you.

Josh Papworth PE, CFM

P 623.251.7189

C 602.708.8127

Josh.Papworth@dibblecorp.com

www.dibblecorp.com

--

Mike Martinez
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
2321 W. Royal Palm Rd, Ste. 103
Phoenix, AZ 85021
(602) 242-0210

Dibble Engineering

7500 North Dreamy Draw Drive, Suite 200
Phoenix, Arizona 85020-4669
P 602.957.1155
F 602.957.2838

Letter of Transmittal

To: FCDMC
2801 West Durango Street
Phoenix, AZ

Date: 2/13/2013
Re: Lower El Mirage Wash Basin CLOMR
Client Project No:
Dibble Project No:

Attention: Mike Duncan

Transmitted herewith are the following items:

- ☐ **Plans/Prints**
- ☐ **Exhibits**
- ☐ **Proposal**
- ☐ **Other**
- ☐ **Specifications**
- ☐ **Opinion of Cost**
- ☐ **Change Order**
- ☒ **Report**
- ☐ **Shop Drawings**
- ☐ **Electronic Media**

Copies	Date	I.D. Number	Description
1	2/8/13		Draft CLOMR Submittal

These are transmitted as checked below:

- ☒ **For Review & Comment**
- ☐ **For Your Use**
- ☒ **Approval Requested**
- ☐ **Other**
- ☐ **For Your Record**
- ☐ **Returned**
- ☐ **Information Only**
- ☐ **Reference Document**
- ☐ **As Requested**
- ☐ **Return when Finished**

Remarks:

Mike, attached is the draft CLOMR submittal. Let me know if you have questions or comments. Thank you.

Cc: 101112.01 Letter

Sincerely,
Dibble Engineering

Josh Papworth, PE

APPENDIX B.5

CONTRACT DOCUMENTS (SCOPE OF WORK)

Lower El Mirage Wash Basin

Final Design

SCOPE

1.0 Background/Purpose

The project basin site is located just a short distance southwest of the intersection of Cactus Road and El Mirage Road in the City of El Mirage. The site contains an existing basin for stormwater that has only been roughly graded. The basin design configuration will include terraced levels, which will facilitate multi-use activities. The project design will include an upstream culvert at Cactus Road (to be built as part of the city's Cactus Road improvements) and a downstream culvert at El Mirage Road. A Design Concept Report (DCR-2011) for this project was completed by Aztec in August 2011. The DCR-2011 included Civil and Landscape plans to a 15% level of development. The Final Design shall finalize these concepts based of the work completed in the DCR-2011.

Work shall also include a re-delineation of the floodplain of Lower El Mirage Wash, from upstream of Cactus Road to the Agua Fria River. This Re-delineation will be included in an application package for a Conditional Letter of Map Revision (CLOMR) of the FEMA floodplain.

The overall guiding document for this final design is the latest version of the Consultant Guidelines of the Flood Control District of Maricopa County.

2.0 Schedule and Project Coordination

The design submittals for this project will occur in three stages: 40%, 90%, and 100%. Periodic coordination meetings will be held, as required, during this Final Design. Coordination for design details will be required with the City's completed Cactus Road Improvements design and MCDOT's current design project for El Mirage Road improvements. The overall design schedule is as follows:

Milestone	**Weeks from On-call Assignment Issue Date**
40% Submittal	15
PAAC meeting	16
City Council Presentation	17
Public Meeting	18
90% Submittal	25
Completion of CLOMR package and Submission to FEMA	27
100% Submittal	31

3.0 Surveying, Mapping, and Right of Way

The consultant shall obtain 1-foot vertical contour topographic mapping for the area indicated on the attached Exhibit A. The consultant shall also perform the control survey for the mapping and perform field surveying to capture features of interest. The datum-basis for the surveys shall be NAVD 1988 vertically, NAD 1983 horizontally, and shall tie into the County's Geodetic Densification and Cadastral Survey (GDACS) network of survey monuments.

4.0 Public Involvement

One public meeting will be held after the 40% stage of the design has been reached. A newsletter announcing the project and public meeting will be mailed to residents within one half mile of the project site. Civil and Landscape designs will be presented at the Public Meeting, and public comment and feedback will be obtained. Two complete copies of display board setups will be required for the Public Meeting.

5.0 Utilities

Data collection for adjacent utilities will be obtained from the City's completed Cactus Road Design plans, from the County's current El Mirage Road Design team, and from utility organizations as required.

6.0 Hydrology and Hydraulics

6.1 Hydrology

Hydrology models were developed as part of the DCR-2011 effort. As the final design is developed, and the shape and volume of the basin are refined, the stage-storage-discharge tables of the models will be updated and the models re-run.

6.2 Hydraulics

Hydraulic models were developed as part of the DCR-2011 effort, based on limited topographic data. The new 1-foot topographic mapping will be used to develop updated HEC-RAS models. As a minimum, the models to be developed will include: a corrected-effective model to be based on the new topography and the latest hydrology; and a post-project model.

6.3 Sediment Transport

A computation for sizing the volume of the sedimentation-basin area (just south of Cactus Road) shall be performed. The 100-year storm sediment yield and annual sediment yield shall be computed by using the District's DDMSW 4.6.0 software. As a minimum, the sediment-basin volume will include a single 100-year storm sediment yield plus two times the annual sediment yield. This corresponds to a 2 year frequency sediment inspection and removal.

Scour depths shall be estimated and erosion protection features shall be designed for the existing dip-crossing at Cactus Road and for the proposed culvert outlet at El Mirage Road. The scour depth computation and riprap sizing shall be based on DDMSW 4.6.0 software.

A downstream adverse impact analysis shall be performed to make sure there is no adverse impact on downstream channel in terms of scour and sediment transport load as compared with the existing condition.

Angular-rock-mulch is expected to be used to plate some of the side slopes of the basin. Alternative scour protection and erosion control techniques are encouraged to be presented for review to the design team and PAAC members for review and analysis.

7.0 Floodplain Delineation

The development of the Technical Data Notebook (TDN) for the CLOMR package will be in accordance with Section 11.0 - Floodplain Delineation Studies of the latest version of the DISTRICT's Consultant Guidelines. The related HEC-RAS modeling is specified in Section 6.2 above. Floodplain work maps will only be needed for presenting the results of the post-design model. The CLOMR package will assume that Cactus Road has the existing dip crossing. Any consultant work related to the LOMR package (as-builts, etc.) will be covered by a separate future on-call assignment.

Microstation CAD files of the new floodplain will be submitted to the DISTRICT. When the related LOMR is processed, the DISTRICT will perform the related GIS refinements and conversions for the District's GIS database.

8.0 Civil Plans

8.1 The civil plan sheets shall include, along with typical plan-set sheets: grading plans for the basin, at a scale of 1 inch = 20 feet horizontally; plan-and-profile sheets, at a scale of 1 inch = 20 feet horizontally, for near the Cactus Road culvert, the El Mirage Road culvert area, and the areas of channel re-grading downstream of El Mirage Road; geometric control sheets, and sheets for details. The plans shall be in accordance with the DISTRICT's standard template for 22-inch by 34-inch plan sheets. The Cactus Road culvert is part of the City's future Cactus Road improvement construction project, shall be depicted in these plans as a future culvert with dashed line-types. Initial grading designs and erosion control plans shall be developed by the Consultant Landscape Architect and provided to the Consultant Engineer for integration into the civil plans.

8.2 The plans will be developed in three stages: 40%, 90%, and 100%. The 40% plans will include all of the major design features and concepts. The 90% and 100% plans will be in accordance with Sections 14.6 and 14.8 of the latest version of the DISTRICT's Consultant Guidelines.

8.3 Each of the three submittal stages shall include eight (8) half-size paper copies of the plan set and eight (8) disks with electronic files in a Microstation compatible format and in PDF format.

9.0 Landscape Plans

The DCR-2011 included concepts for the designated areas of the basin to have grass-turf, shrubs, trees, hydro-seeding, multi-purpose access roads/paths/ramps, retaining walls, and aesthetic treatments to the structural elements within the project site. The shapes and variations of the basin footprints, terraces, and side-slopes shall be refined and finalized during the Final Design effort, based on the preferred alternative presented in the DCR-2011, stakeholder/public input, PAAC input, and design team review.

The content of each landscape-plans submittal shall be in accordance with the latest edition of the DISTRICT's Landscape Planning and Design manual. The level of landscape features

shall have this constraint: the construction cost of the aesthetic treatment and landscaping shall be well below $40K per acre.

For this final design effort there will only be one Project Aesthetics Advisory Committee (PAAC) meeting, which will only include the design team, representative(s) from the homeowners association just south of the project, and management representative(s) from the downstream Pueblo El Mirage resort.

The Consultant's Landscape Architect shall coordinate grading efforts and erosion control needs with the Consultant Engineer for inclusion in the 40% Submittal. Grading design shall be based on conceptual work completed in the DCR-2011 efforts. Erosion control plans shall address erosion concerns through hydroseeding, rock mulch cover, turf-lined channels, and the inclusion of both temporary and permanent erosion control techniques such as sediment wattles and semi-rigid turf reinforcement mats.

Irrigation plans, including sprinklers for grass turf and drip-style for trees and shrubs will be developed for the project. In general, the sprinkler systems will accommodate general open space activities. However, there are future plans for a closely spaced pair of Little League baseball fields at one of the grass turf areas. For this area, the sprinkler system design is expected to include some provisions to facilitate the future fully-finished baseball fields.

The manufacturers and models of irrigation controllers and other related equipment shall be coordinated with the specialist at the City of El Mirage, to ensure compatibility with the City's standard repair stock.

Each of the three submittal stages shall include eight (8) half-size paper copies of the plan set and eight (8) disks with electronic files in a Microstation compatible format and in PDF format.

10.0 Final Design Report

10.1 The Design Report shall include the background, basis, supporting computations, alternative-selection rationalization as required, etc. of the Civil Design and Landscape Design features of the project. Any provisions for, or overall concepts for, future landscape improvements shall be outlined.

10.2 The TDN for the CLOMR, as covered by item 7.0 above, will be a stand-alone document.

10.3 A Maintenance Plan shall be prepared in accordance with Section 16 of the latest version of the DISTRICT's Consultant Guidelines.

11.0 Final Deliverables

The final deliverables shall include: one signed and sealed mylar of the plan set cover sheet; two full-size and two half-size (bond) paper copies; and two copies of all related electronic files (design report, TDN, Microstation-CAD, PDF's).

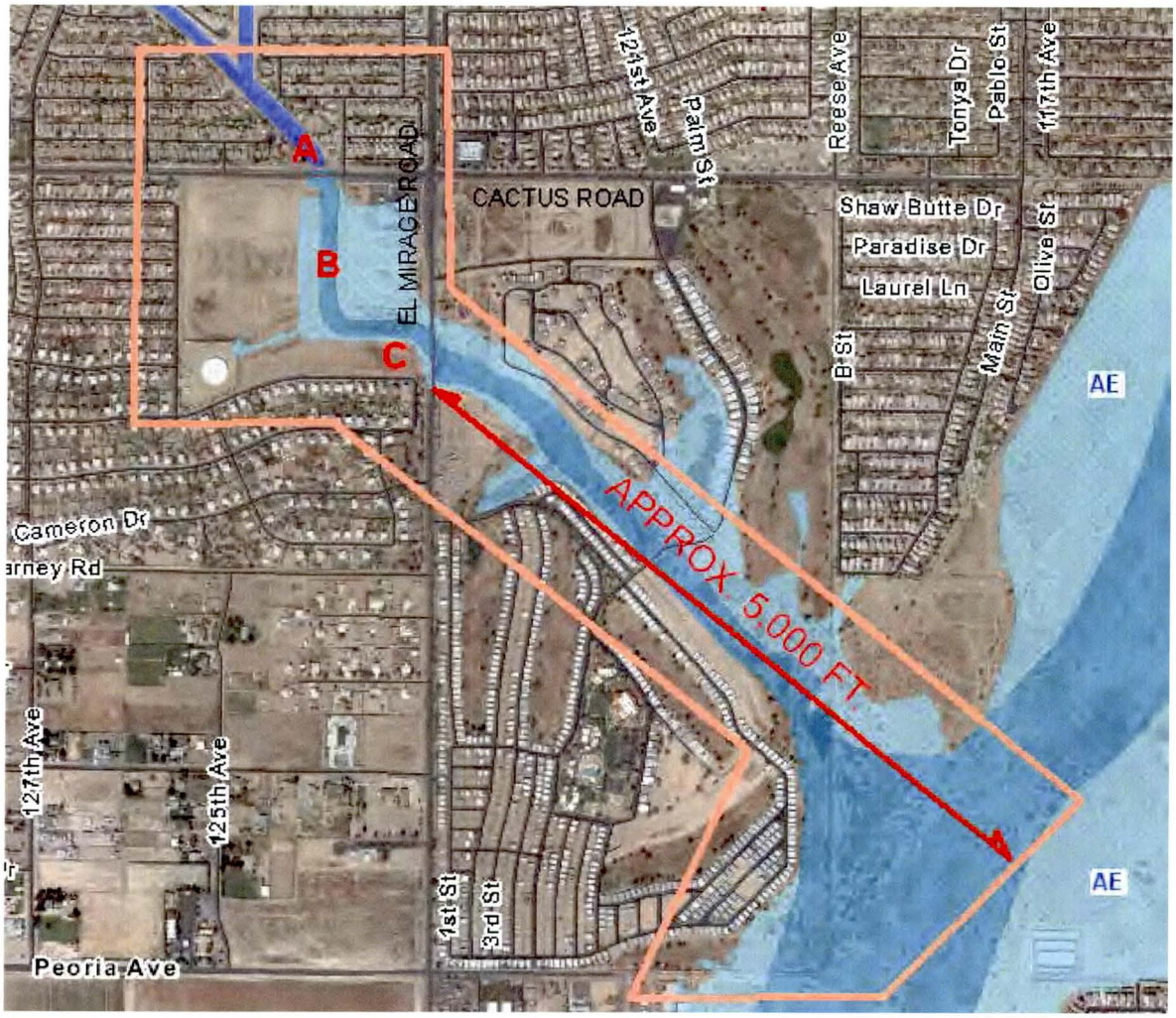
12.0 Geotechnical Soil Samples and Analysis

Soil samples are to be taken at locations A, B, and C on Exhibit A. At locations A and B the depth of sampling range will be 0 to 2 feet. One soil sample will be collected and tested from each location (A and B). At location C, the sampling range will be 0 to 12 feet. One soil sample will be collected and tested from location C. The test analyses will include density, moisture content, grain sizing, Atterberg Limits, and a full battery of tests for agronomic properties. The agronomic testing will include three soil samples (at final depth of project elements) at locations within the planned seeded areas. The soil analyses shall include all characteristics necessary to make fertility recommendations for ornamental landscape, lawn, and garden applications. The agronomic report shall include analyses showing PPM of Ca, Mg, Na, K, Fe, Zn, Cu, S, Mn, B, nitrate, nitrogen, and phosphorus at the test locations. The agronomic report shall also include levels of salinity, pH, sodium, soluble salts, organic matter percentage, exchangeable sodium percentage, electrical conductivity, and free lime, and include recommendations for soil amendments to correct deficiencies, to eliminate conditions detrimental to plant growth, and to improve the soil fertility.

Exhibit A is presented on the next sheet.

EXHIBIT A -- LOWER EL MIRAGE WASH BASIN -- PROJECT LOCATION

Topographic mapping extents are outlined



APPENDIX C

SURVEY FIELD NOTES

APPENDIX C.1

PROJECT SURVEY REPORT

Dibble Engineering

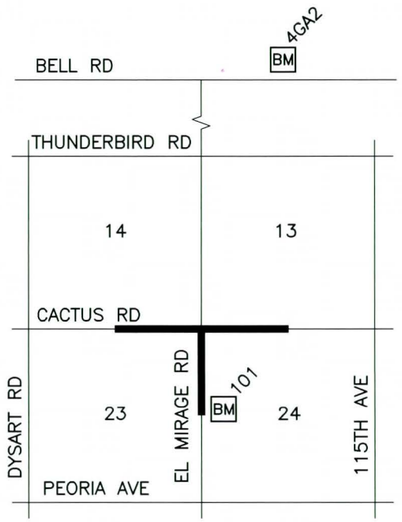
7500 North Dreamy Draw Drive
Suite 200
Phoenix, Arizona 85020
phone 602.957.1155
fax 602.957.2838
www.dibblecorp.com

Lower El Mirage Wash

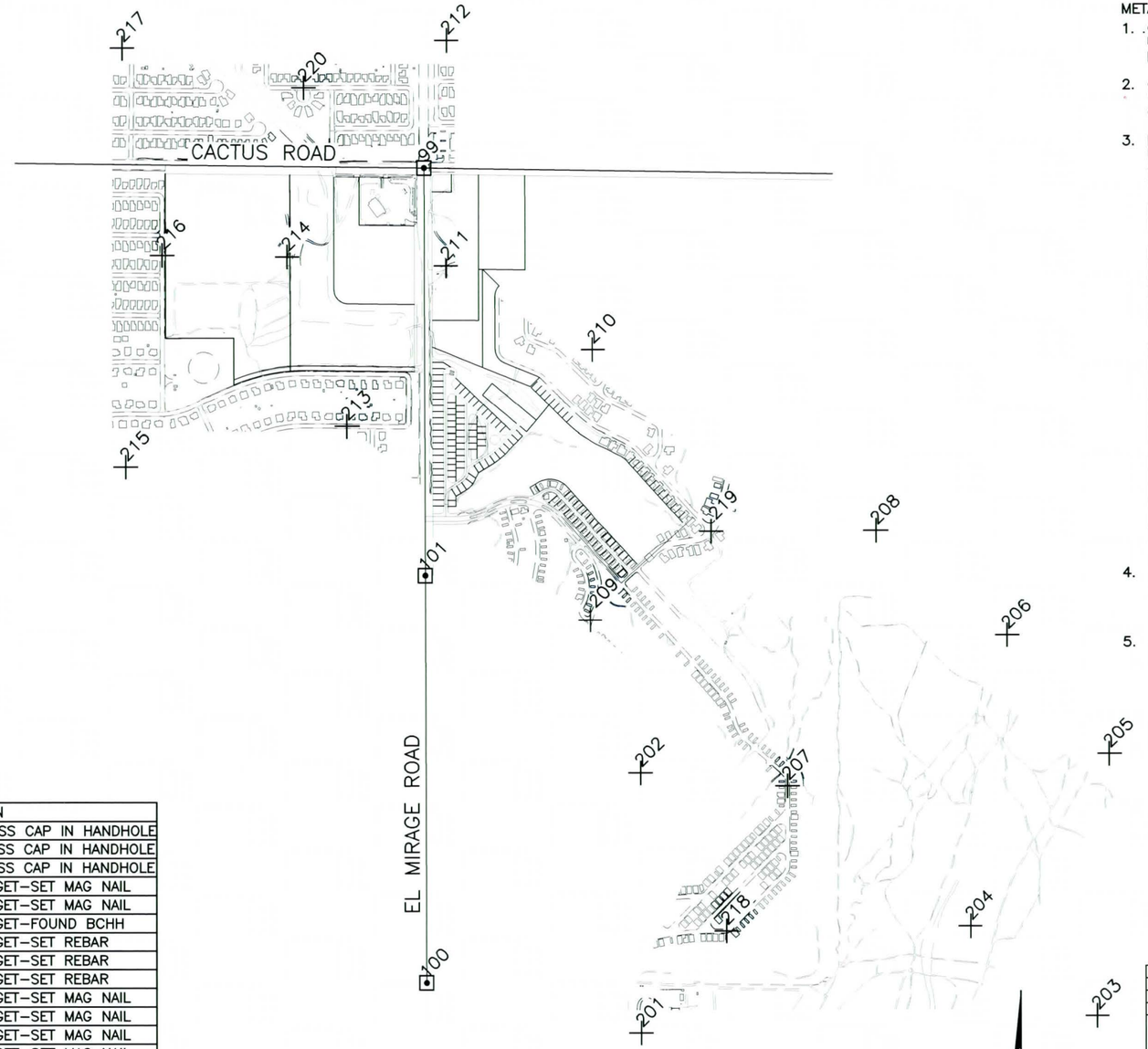
Survey Control Report
Dibble Project # 101122.01
MCFCD Project # 2011C004

Prepared by: C. Steve Duryea Jr., R.L.S.
December 19, 2012

Registered Land Surveyor
CERTIFICATE NO.
31019
C. STEVE
DURYEA, JR.
Date Signed 12/19/12
ARIZONA, U.S.A.
Expires 03/31/15



VICINITY MAP
T3N, R1W
SECTIONS 13, 14, 23, 24
NOT TO SCALE



METADATA

1. COORDINATES WERE VERIFIED IN THE FIELD USING REAL TIME KINEMATIC GPS OBSERVATIONS RELATIVE TO NGS PUBLISHED CONTROL POINTS.
2. CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL CONTROLS IN THE FIELD PRIOR TO CONSTRUCTION.
3. PROJECT META DATA
   UNITS:
   COORDINATES, DISTANCES AND ELEVATIONS ARE SHOWN IN INTERNATIONAL FEET.

   HORIZONTAL DATUM:
   NAD83 (1992 Epoch) ARIZONA CENTRAL ZONE

   HORIZONTAL ADJUSTMENT:
   COMBINED SCALE FACTOR (CSF): 0.99986808752
   SCALED TO GROUND FROM ZERO (0) NORTHING AND ZERO (0) EASTING (GROUND NORTHING + 550,000) X CSF = GRID NORTHING
   GROUND EASTING X CSF = GRID EASTING

   VERTICAL DATUM:
   NAVD88

   PRIMARY BENCHMARK:
   FOUND NGS MONUMENT
   DESIGNATION 4GA2
   ELEVATION = 1165.99'

   PROJECT BENCHMARK:
   POINT NUMBER 101
   FOUND BRASS CAP IN HANDHOLE
   CENTERLINE OF EL MIRAGE ROAD
   EAST QUARTER CORNER SECTION 23,
   TOWNSHIP 3N, RANGE 1 WEST
   ELEVATION = 1109.75'
4. THE COORDINATES PRESENTED ARE SHOWN TO THREE DECIMAL PLACES FOR CALCULATION PURPOSES AND ARE NOT REPRESENTATIVE OF THE PRECISION OF THE SURVEY MEASUREMENTS
5. THIS IS NOT A PROPERTY BOUNDARY SURVEY.

POINT NUMBER	NORTHING	EASTING	ELEVATION	DESCRIPTION
99	394182.031	575844.541	1118.24	FOUND BRASS CAP IN HANDHOLE
100	388906.946	575856.004	1107.85	FOUND BRASS CAP IN HANDHOLE
101	391544.251	575849.803	1109.75	FOUND BRASS CAP IN HANDHOLE
201	388583.440	577247.520	1097.87	AERIAL TARGET–SET MAG NAIL
202	390263.160	577243.720	1102.88	AERIAL TARGET–SET MAG NAIL
203	388691.880	580207.250	1096.44	AERIAL TARGET–FOUND BCHH
204	389273.230	579374.390	1092.05	AERIAL TARGET–SET REBAR
205	390385.150	580286.990	1094.48	AERIAL TARGET–SET REBAR
206	391155.570	579617.100	1101.77	AERIAL TARGET–SET REBAR
207	390178.380	578198.170	1100.40	AERIAL TARGET–SET MAG NAIL
208	391833.740	578767.600	1103.13	AERIAL TARGET–SET MAG NAIL
209	391255.120	576919.990	1103.73	AERIAL TARGET–SET MAG NAIL
210	393005.550	576940.360	1109.78	AERIAL TARGET–SET MAG NAIL
211	393548.160	575987.980	1115.82	AERIAL TARGET–SET MAG NAIL
212	395004.110	575993.810	1121.13	AERIAL TARGET–SET MAG NAIL
213	392509.330	575349.730	1112.94	AERIAL TARGET–SET MAG NAIL
214	393607.610	574966.290	1116.56	AERIAL TARGET–SET REBAR
215	392249.140	573922.800	1117.33	AERIAL TARGET–SET MAG NAIL
216	393617.480	574157.870	1116.62	AERIAL TARGET–SET MAG NAIL
217	394955.520	573903.050	1121.70	AERIAL TARGET–SET MAG NAIL
218	389243.020	577801.760	1099.60	BLIND TARGET–SET MAG NAIL
219	391829.540	577705.310	1106.38	BLIND TARGET–SET MAG NAIL
220	394699.540	575073.470	1118.08	BLIND TARGET–FOUND BCHH

LEGEND
- BRASS CAP IN HANDHOLE
- BRASS CAP FLUSH
- CONTROL POINT
- BM BENCHMARK
- AERIAL/BLIND TARGET

400 0 400 800
Scale in Feet

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION

LOWER EL MIRAGE WASH BASIN
FCD NO. 2011C004

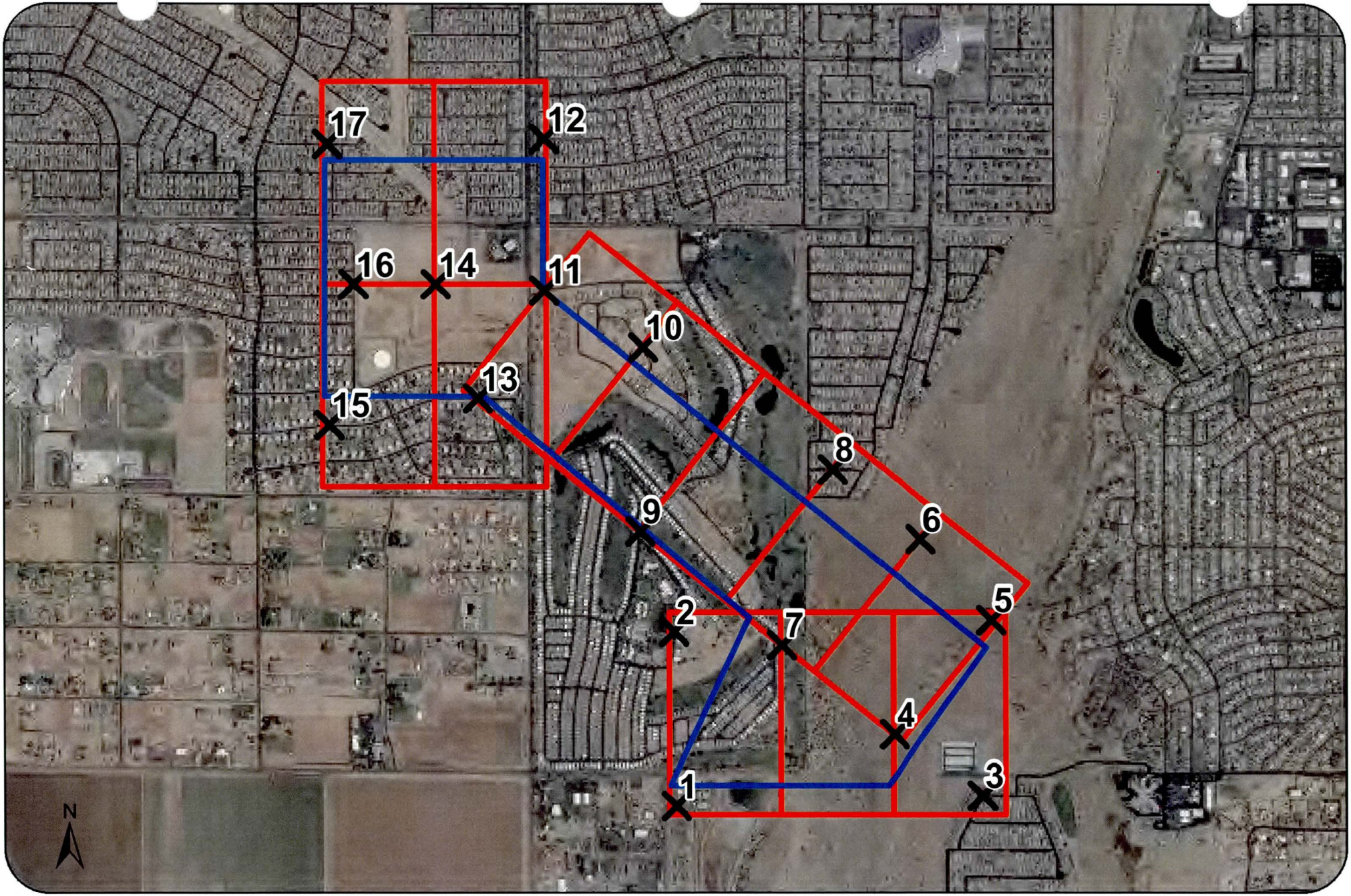
	BY	DATE
DESIGNED	N/A	11/12
DRAWN	J. GRAHAM	11/12
CHECKED	S. DURYEA	11/12

Dibble Engineering
7500 N. Dreamy Draw Drive
Suite 200
Phoenix, AZ 85020
P 602.957.1155

DRAWING NO.

AERIAL CONTROL SHEET

SHEET 1 OF 1



Legend

- Aerial Control
- Mapping Limits
- Aerial Models

LEMW

1:3600 1"=40' 1' CI
17 Panels

COOPER AERIAL

Map Date: March 28, 2012

LOWER EL MIRAGE WASH AERIAL MAPPING CHECKS				
POINT NO	DESCRIPTION	DIBBLE ELEVATION	KAM ELEVATION	DIFFERENCE
204	SET-AT-RB	1092.05	1091.95	0.10
207	SET-AT-MAG	1100.40	1100.41	-0.01
209	**SET-AT-MAG**	**1103.73**	**1103.52**	**0.21**
211	SET-AT-MAG	1115.82	1115.64	0.18
213	SET-AT-MAG	1112.94	1112.93	0.01
214	SET-AT-RB	1116.56	1116.41	0.15
216	SET-AT-MAG	1116.62	1116.63	-0.01
218	SET-BT-MAG	1099.59	1099.51	0.08
219	SET-BT-MAG	1106.38	1106.40	-0.02
220	SET-BT-BCF	1118.08	1118.26	-0.18
20000	ESW	1121.56	1121.44	0.12
20001	BOC	1121.49	1121.38	0.11
20002	GUT	1121.03	1121.03	0.00
20004	EP	1121.03	1120.99	0.04
20005	EP	1120.46	1120.40	0.06
20006	FL	1120.37	1120.39	-0.02
20007	EP	1120.53	1120.52	0.01
20008	AS	1120.81	1120.90	-0.09
20009	EP	1121.18	1121.06	0.12
20010	GUT	1121.10	1121.06	0.04
20011	BOC	1121.63	1121.47	0.16
20012	ESW	1121.71	1121.54	0.17
20013	ESW	1121.82	1121.70	0.12
20014	**ESW**	**1117.30**	**1117.00**	**0.30**
20015	**ESW**	**1117.41**	**1117.16**	**0.25**
20016	**BOC**	**1117.38**	**1117.17**	**0.21**
20017	GUT	1116.92	1116.85	0.07
20018	EP	1117.03	1116.95	0.08
20019	AS	1118.12	1117.95	0.17
20020	EP	1117.78	1117.94	-0.16
20021	EP	1118.61	1118.43	0.18
20022	EP	1118.80	1118.75	0.05
20023	NG	1115.06	1114.99	0.07
20024	EP	1115.02	1115.04	-0.02
20025	AS	1115.12	1115.14	-0.02
20026	EP	1114.72	1114.75	-0.03
20027	GUT	1114.56	1114.71	-0.15
20028	BOC	1115.07	1115.11	-0.04
20029	EC	1108.16	1108.27	-0.11
20030	EP	1108.09	1108.12	-0.03
20031	AS	1107.88	1107.89	-0.01
20032	EP	1108.12	1108.11	0.01

20033	EC	1108.15	1108.13	0.02
20034	EC	1110.26	1110.08	0.18
20035	**BOC**	**1110.17**	**1109.95**	**0.22**
20036	GUT	1109.88	1109.83	0.05
20037	EP	1109.86	1109.81	0.05
20038	CRWN	1109.87	1109.88	-0.01
20039	**EP**	**1109.84**	**1109.57**	**0.27**
20040	**GUT**	**1109.89**	**1109.68**	**0.21**
20041	**BOC**	**1110.22**	**1109.98**	**0.24**
20042	BOC	1106.68	1106.72	-0.04
20043	GUT	1106.33	1106.54	-0.21
20044	EP	1106.45	1106.45	0.00
20045	CRWN	1106.66	1106.76	-0.10
20046	EP	1106.53	1106.52	0.01
20047	GUT	1106.41	1106.54	-0.13
20048	BOC	1106.71	1106.71	0.00
20049	**EC B**	**1105.17**	**1104.96**	**0.21**
20050	**EC**	**1105.12**	**1104.86**	**0.26**
20051	**EC**	**1105.17**	**1104.87**	**0.30**
20052	**EC C**	**1105.20**	**1104.90**	**0.30**
20053	EC	1104.38	1104.43	-0.05
20054	EP	1104.38	1104.36	0.02
20055	AS	1104.08	1104.27	-0.19
20056	EP	1104.32	1104.32	0.00
20057	EC	1104.36	1104.53	-0.17
20058	EC	1099.89	1099.84	0.05
20059	EP	1099.90	1099.82	0.08
20060	AS	1099.84	1099.83	0.01
20061	EP	1099.87	1099.94	-0.07
20062	EC	1099.88	1099.95	-0.07
20063	EC	1116.91	1116.85	0.06
20064	BOC	1116.83	1116.69	0.14
20065	GUT	1116.46	1116.41	0.05
20066	EP	1116.51	1116.33	0.18
20067	**CRWN**	**1116.90**	**1116.66**	**0.24**
20068	EP	1116.66	1116.54	0.12
20069	GUT	1116.62	1116.54	0.08
20070	BOC	1117.11	1116.94	0.17
20071	**EC**	**1117.19**	**1116.95**	**0.24**
20072	EC	1116.04	1115.99	0.05
20073	BOC	1115.98	1115.88	0.10
20074	GUT	1115.50	1115.48	0.02
20075	EP	1115.59	1115.54	0.05
20076	CRWN	1115.76	1115.71	0.05

20077	EP	1115.56	1115.47	0.09
20078	GUT	1115.49	1115.82	-0.33
20079	BOC	1115.95	1115.95	0.00
20080	EC	1116.15	1116.22	-0.07

The aerial mapping meets National Map Accuracy Standards

DAILY GEOMATIC FIELD LOG

PROJECT: # N/A NAME: LEMW DATE: 04-09-12

CREW: ADAM MUELLER

EQUIPMENT: ☐ CONV. ☑ GPS ☐ LEVEL

EQUIPMENT PERFORMANCE: ☐ Excellent ☑ Good ☐ Fair ☐ Poor

FILE(S): LEMW-2012-0409R2

POINT RANGE(S): 100-101
201-220

TYPE OF SURVEY: AERIAL CONTROL

DESCRIPTION OF TASKS PERFORMED, DATUM, & EQUIPMENT PERFORMANCE:

ROD HEIGHTS CHECKED: ☐ INSTRUMENT HEIGHTS CHECKED: ☐

LOCATED ALL AERIAL CONTROL POINTS THAT WERE SET ON 4-6-12 AND LOCATED TWO CENTERLINE MONUMENTS ON EL MIRAGE ROAD

	PROVIDED CONTROL VALUES & SCOPE
ADAM MUELLER	PERFORMED FIELD QAQC (CREW SELF CHECK)
RJB	PERFORMED OFFICE QAQC of FIELD WORK

NOTES ON QAQC PERFORMED IN OFFICE:

ADJUSTMENTS MADE BY FIELD SURVEYORS OR OFFICE SURVEYORS:

ATTACHED:

☐ LEVEL CHECKS (SPREADSHEET)
☐ NOTES (COPIES)
☐ DRAWINGS & SKETCHES
☐ OTHER

11

20
~~27~~
M

208
MH:

MONDAY APRIL 9th, 2012 10/:54

LEMW

LOCATE AERIAL PANELS

MARICOPA COUNTY

EL MIRAGE, ARIZONA

JOB: LEMW-2012-0408R2

PTS: 100-101; 201-220

SUNNY, CLEAR: ± 59°

WIND: NONE

HIGH: ± 93°

ADAM MUELLER

11 LEMW

20 ~~2~~ ⊼ @ 2 HT 1.268 m

M CON'S 4.160

3_STK ✓ ΔN: .005

ΔE: .004

ΔZ: .100

100 FND-BCHII FOUND 3" CITY OF EL MIRAGE BRASS CAP IN HAND HOLE @ PEORIA + EL MIRAGE RD

208 101 FND-BCHII FOUND UNMARKED 3" BRASS CAP IN HAND HOLE @ VARNEY + EL MIRAGE ROAD

MH

3_STK_STK ✓ ΔN: .003

ΔE: .031

ΔZ: .008

04-09-12

COORD SYS: AZ CENTRAL (NAD83/92 EPOCH - GRID)

GEOID: AZGEOID03

VERTICAL DATUM: NAVD88 (NOT LEVELED) ✓

UNITS: INT FEET

CSF: 0.99986808752

GRID COORDS ✓

2 4GAZ ✓ N: 960390.600

E: 578380.889

EL: 1165.994

3 4GC1 ✓ N: 958797.244

E: 551879.892

EL: 1252.605

* PROJECT CONTROL + META DATA IS TAKEN FROM PROJECT # 101147 * ✓

REVIEWED

By randy.bilyeu at 8:17 am, Apr 10, 2012

DAILY GEOMATIC FIELD LOG

PROJECT: # 101122.01 NAME: LEMW DATE: 05-18-12

CREW: ADAM MUELLER
CHRIS ALLEN

EQUIPMENT: ☐ CONV. ☑ GPS ☐ LEVEL

EQUIPMENT PERFORMANCE: ☐ Excellent ☑ Good ☐ Fair ☐ Poor

FILE(S): LEMW-2012-0518R2

POINT RANGE(S): 20000-20080

TYPE OF SURVEY: TOPO

DESCRIPTION OF TASKS PERFORMED, DATUM, & EQUIPMENT PERFORMANCE:

ROD HEIGHTS CHECKED: ☐ INSTRUMENT HEIGHTS CHECKED: ☐

CROSS SECTIONS IN VARIOUS AREAS TO VERIFY THE AERIAL MAPPING.

ADAM MUELLER

PROVIDED CONTROL VALUES & SCOPE
PERFORMED FIELD QAQC (CREW SELF CHECK)
PERFORMED OFFICE QAQC of FIELD WORK

NOTES ON QAQC PERFORMED IN OFFICE:

6/21/12: Need to be re-exported with Northing and of - 650 [illegible]

ADJUSTMENTS MADE BY FIELD SURVEYORS OR OFFICE SURVEYORS:

ATTACHED:

☐ LEVEL CHECKS (SPREADSHEET)
☐ NOTES (COPIES)
☐ DRAWINGS & SKETCHES
☐ OTHER

FRIDAY MAY 18th, 2012

161122.01

LEMW

CROSS-SECTIONS

MARICOPA COUNTY

EL MIRAGE, ARIZONA

JOB: LEMW-2012-0518R2

PTS: 20,000-20,080

SUNNY, CLEAR: ±80°

WIND: 7MPH SW

HIGH: ±96°

ADAM MUELLER

CHRIS ALLEN

101122.01 LEMW

05-18-12

COORD SYS: AZ CENTRAL (NAD83/92 EPOCH - GRID)

GEOID: AZGEOID03

VERTICAL DATUM: NAVD88 (NOT LEVELED)

UNITS: INT FEET

CSF: 0.99986808752

TO2 HT: 1.190

CONV: 3.904

3_STK

ΔN: -.011

ΔE: -.003

ΔZ: -.269

81_STK

ΔN: -.044

ΔE: .005

ΔZ: -.207

		GRID COORDS
2	4GA2	N: 960390.000 E: 578380.889 EL: 1165.994
3	4GC1	N: 958797.244 E: 551879.892 EL: 1252.605
81	LP-RB	N: 941421.374 E: 573118.775 EL: 1118.780

* 81 ~~B~~ FROM PROJECT # 100907 *

REVIEWED
By randy.bilyeu at 3:19 pm, May 21, 2012

DAILY GEOMATIC FIELD LOG

PROJECT: # 101122.01/101147 NAME: EL MIRAGE RD/LEMW DATE: 06-08-12

CREW: ADAM MUELLER
CHRIS ALLEN

EQUIPMENT: ☐ CONV. ☑ GPS ☐ LEVEL

EQUIPMENT PERFORMANCE:
☐ Excellent
☑ Good
☐ Fair
☐ Poor

FILE(S): 1122-2012-0608R2

POINT RANGE(S): 4; 95-99

TYPE OF SURVEY: CONTROL

DESCRIPTION OF TASKS PERFORMED, DATUM, & EQUIPMENT PERFORMANCE:

ROD HEIGHTS CHECKED: ☐ INSTRUMENT HEIGHTS CHECKED: ☐

SET CONTROL FOR TOPO AREAS ON BOTH PROJECTS

ADAM MUELLER

PROVIDED CONTROL VALUES & SCOPE
PERFORMED FIELD QAQC (CREW SELF CHECK)
PERFORMED OFFICE QAQC of FIELD WORK

NOTES ON QAQC PERFORMED IN OFFICE:

ADJUSTMENTS MADE BY FIELD SURVEYORS OR OFFICE SURVEYORS:

ATTACHED:

☐ LEVEL CHECKS (SPREADSHEET)
☐ NOTES (COPIES)
☐ DRAWINGS & SKETCHES
☐ OTHER

FRIDAY JUNE 8th, 2012

101122.DP

+

101147

EL MIRAGE ROAD/LEMW

TOPOGRAPHIC SURVEY

MARICOPA COUNTY

EL MIRAGE, ARIZONA

JOB. 1122-2012-0608RR

PTS: ~~20,100~~ 95-99; 4

SUNNY, CLEAR: ±80°

WIND: NONE

HIGH: ±103°

ADAM MUELLER

CHRIS ALLEN

06-08-12

101 10 11 22.01/10 11 47 EL MIRAGE RD/LEMW

π @ 2 HT: 1.300 m
CONV: 4 265

10 3-STK ΔN: .002
ΔE: -.026
ΔZ: -.128

3 4 SET-CP-RB SET 1/2" REBAR ± 350' SOUTH OF CACTUS AND ± 1000' WEST OF EL MIRAGE ROAD

99 FND-BCF FOUND 3" CITY OF EL MIRAGE BRASS CAP FLUSH @ VOLT AIRE + 127th AVE

98 FND-BCHH FOUND 3" CITY OF EL MIRAGE BRASS CAP IN HAND HOLE @ 127th AVE AND THUNDERBIRD ROAD

COORD SYS: AZCENTRAL (NAD83 92 EPOCH/GRID)

GEOID: AZGEOID03

VERTICAL DATUM: NAVD88 (NOT LEVELED)

UNITS: INT FEET

CSF: 0.99986808752

GRID COORDS

2 4GAZ N: 960390.000
E: 578380.889
EL: 1165.994

3 4GCI N: 958797.244
E: 551879.892
EL: 1252.665

REVIEWED
By randy.bilyeu at 11:25 am, Jun 11, 2012

101122.01/101147 EL MIRAGE RD/LEMW 06-08-12

96 FND-BLF FOUND 3" CITY of EL MIRAGE
BRASS CAP FLUSH IN ℄ of 126th LN AND
BOLA RATON RD (SOUTH CAP/PL)

95 FND-BLF FOUND 3" CITY of EL MIRAGE
BRASS CAP FLUSH IN ℄ of 126th LN AND
BOLA RATON RD (NORTH CAP)

97 SET-CP-MAG SET MAG NAIL IN TOP of CURB
ON NORTH SIDE of THUNDERBIRD ± 50'
WEST of 127th AVE

S_STK_STK

ΔN: -.007
ΔE: .004
ΔZ: -.181

DAILY GEOMATIC FIELD LOG

PROJECT: # 101122.01/101127 NAME: LEMW/EL MIRAGE ROAD DATE: 06-09-12

CREW: ADAM MUELLER

EQUIPMENT: ☐ CONV. ☑ GPS ☐ LEVEL

EQUIPMENT PERFORMANCE:
- ☐ Excellent
- ☐ Good
- ☑ Fair
- ☐ Poor

FILE(S): 1122-2012-0609R2

POINT RANGE(S): 35000-35229

TYPE OF SURVEY: TOPO

DESCRIPTION OF TASKS PERFORMED, DATUM, & EQUIPMENT PERFORMANCE:

ROD HEIGHTS CHECKED: ☐ INSTRUMENT HEIGHTS CHECKED: ☐

TOPO OF SPECIFIC AREAS AS INSTRUCTED BY CLIENT

ADAM MUELLER

PROVIDED CONTROL VALUES & SCOPE
PERFORMED FIELD QAQC (CREW SELF CHECK)
PERFORMED OFFICE QAQC of FIELD WORK

NOTES ON QAQC PERFORMED IN OFFICE:

ADJUSTMENTS MADE BY FIELD SURVEYORS OR OFFICE SURVEYORS:

ATTACHED:

- ☐ LEVEL CHECKS (SPREADSHEET)
- ☐ NOTES (COPIES)
- ☐ DRAWINGS & SKETCHES
- ☐ OTHER

SATURDAY JUNE 9th, 2012

101122.01

+

101127

LEMON/EL MIRAGE ROAD

TOPOGRAPHIC SURVEY

MARICOPA COUNTY

EL MIRAGE, ARIZONA

JOB: 1122-2012-0609R2

PTS: 35,000-35229

SUNNY, CLEAR ± 79°

WIND: NONE

HEIGHT: ±105°

ADAM MUELLER

101122.01/101127 LEMW/EL MIRAGE RD

06-09-12

COORD SYS: AZCENTRAL (NAD83 92 EPOCH/GRID)

GEOID: AZGEOID03

VERTICAL DATUM: NAVD88 (NOT LEVELED)

UNITS: INT FEET

CSF: 0.99986808752

TW 4

HT: 1.234m

CONV: 4.049

2 STK

ΔN: .012

ΔE: -.006

ΔZ: .062

GRID COORDS

4 CP-RB

N: 943646.699

E: 574705.056

EL: 1117.395

55215 EL -5^25 TO INV ±42" RCP

2-STK-STK

ΔN: .039

ΔE: -.002

ΔZ: -.002

2 46A2

N: 960390.000

E: 578380.889

EL: 1165.994

APPENDIX C.2

2004 SURVEY DATA

WEST CACTUS DETENTION BASIN AND CHANNELS PROJECT

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

SURVEY REPORT

Prepared For:
Flood Control District of Maricopa County
2801 W. Durango St.
Phoenix, AZ
85009

and

City of El Mirage
P.O. Box 26
12145 N.W. Grand Ave., Suite 8
El Mirage, AZ
85335

Prepared By:
Stanley Consultants, Inc.
2929 E. Camelback Rd., Suite 130
Phoenix, AZ
85016

October 2004

FCD Contract No. 2003C020
Assignment #1

SCI #16956

Stanley Consultants INC.

WEST CACTUS DETENTION BASIN AND CHANNELS PROJECT

SURVEY REPORT

Prepared For:
Flood Control District of Maricopa County
2801 W. Durango St.
Phoenix, AZ
85009

and

City of El Mirage
P.O. Box 26
12145 N.W. Grand Ave., Suite 8
El Mirage, AZ
85335

Prepared By:
Stanley Consultants, Inc.
2929 E. Camelback Rd., Suite 130
Phoenix, AZ
85016

Registered Professional Engineer (Civil)
CERTIFICATE NO.
26837
G. SCOTT
BUCHANAN
Date Signed 11-3-04
ARIZONA, U.S.A.

October 2004

FCD Contract No. 2003C020
Assignment #1

SCI #16956

Stanley Consultants INC.

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
35694
JAMES B.
FLACK
Date Signed 11-3-04
ARIZONA, U.S.A.

West Cactus Detention Basin and Channels Project
Survey Report

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Appendicies

Appendix A Copies of Survey Field Books

Appendix B Point List for AutoCAD File BasinPoints.dwg.

Under Separate Cover

West Cactus Detention Basin and Channels Project Candidate Assessment Report

West Cactus Detention Basin and Channels Administrative Notebook

Registered Professional Engineer (Civil)
CERTIFICATE NO.
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G. SCOTT
BUCHANAN
Date Signed 11-3-04
ARIZONA, U.S.A.

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
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JAMES B.
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1.0 Introduction

The purpose of the West Cactus Basin and Channels Project is to provide drainage infrastructure within the City of El Mirage that will reduce the Lower El Mirage Wash flood potential downstream from El Mirage Road. The project could potentially provide the City of El Mirage and Maricopa County with a regional storm water detention basin that can serve as a multi-use public recreational facility. In addition, the project will locate and qualitatively assess potential erosion concerns within the Lower El Mirage Wash Channel and Lower El Mirage Wash Channel Tributary.

The project area is located within portions of Sections 10 through 15 and 22 through 24, Township 3 North, Range 1 West of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. More specifically, the project boundaries include Greenway Road to the north, Peoria Road to the south, Dysart Road to the west and the Agua Fria River to the east. The entire project area is within the City of El Mirage. Location and vicinity maps (Figures 1 and 2, respectively) are provided on the following pages.

This survey report covers the supplemental field survey data that was collected under the West Cactus Detention Basin and Channels Project (CAR) – Additional Hydrology and Hydraulics Task Scope of Work. Stanley Consultants collected the survey data and used it in the study's hydrologic and hydraulic analysis of the existing on-line detention basin located on the southwest corner of Cactus and El Mirage Roads. The survey data was also used for evaluating the storm drain systems that outfall to the existing basin.

Survey points for this study were collected using GPS, conventional leveling and total station survey equipment. Copies of survey field books are provided in Appendix A. The following survey data was collected:

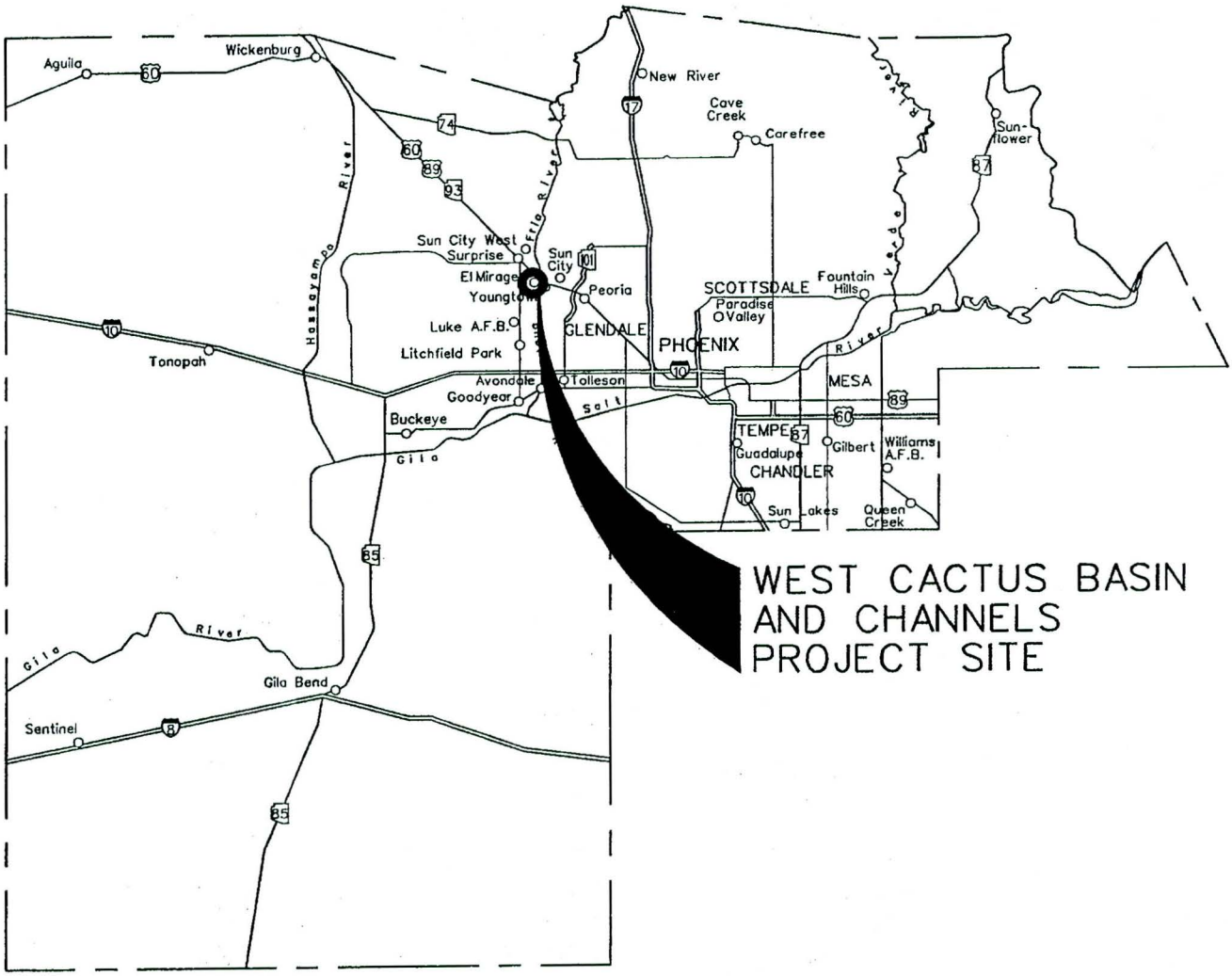
- Existing basin top and toe, basin bottom and surrounding basin grade elevations.
- Existing drainage facilities, including culverts under Cactus and El Mirage Roads and the storm drain systems located in 125th Avenue and Berry Lane/Canterbury Drive that outfall to the existing basin.
- Finish floor elevations and street grade breaks in the vicinity of sumps located in 125th Avenue and Canterbury Drive.
- Local retention within the City of El Mirage that are located in the existing basin contributing area.

2.0 Survey Control

The vertical control datum used for obtaining the supplemental field survey data is NGVD 29. This vertical control was to be consistent with the vertical datum used for the Lower El Mirage Wash and Tributary L.O.M.R.s (by A-N West for City of, El Mirage, September 2001). The L.O.M.R.s were provided to Stanley by the City of El Mirage.

Horizontal control was established by utilizing the GDACs control map for the sections listed in Section 1.0. Using a mean combined scale factor, the brass caps were located at the following roadway intersections: Greenway and Dysart Roads, Wadell and Dysart Roads, Peoria and Dysart Roads, Peoria and El Mirage Roads, Cactus and El Mirage Roads, Thunderbird Road and 115th Avenue, Peoria Road and 115th Avenue.

Location of vertical and horizontal control points are shown in the survey field book provided in Appendix A and point list provided in Appendix B.



LOCATION MAP

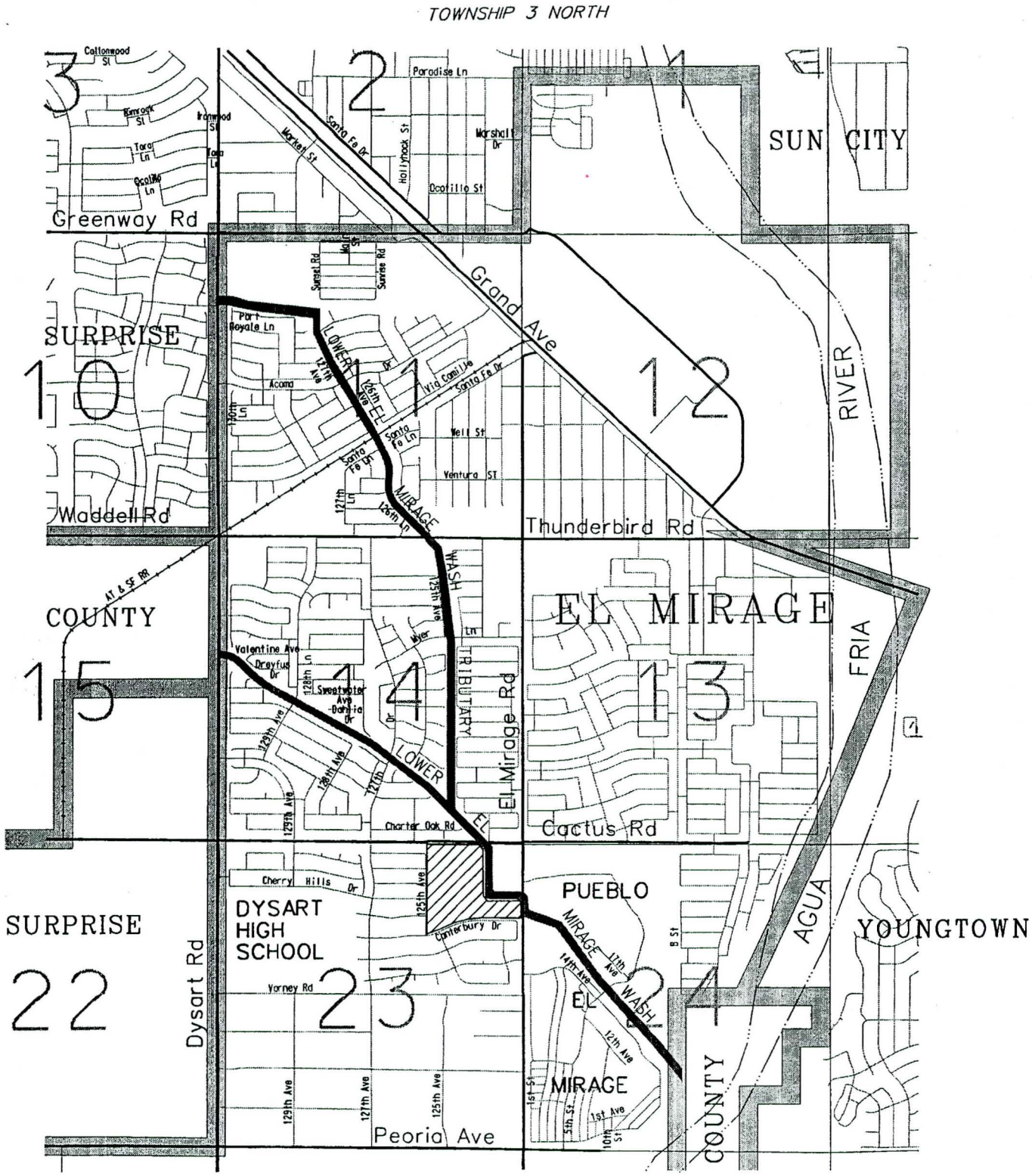
Not to Scale

N

FIGURE 1

Stanley Consultants co.

11/27/2004 q:\16956\03-Assign 1 CADD\DGN\LOCATION.dgn



WEST CACTUS BASIN AND CHANNELS

VICINITY MAP

Not to Scale

FIGURE 2

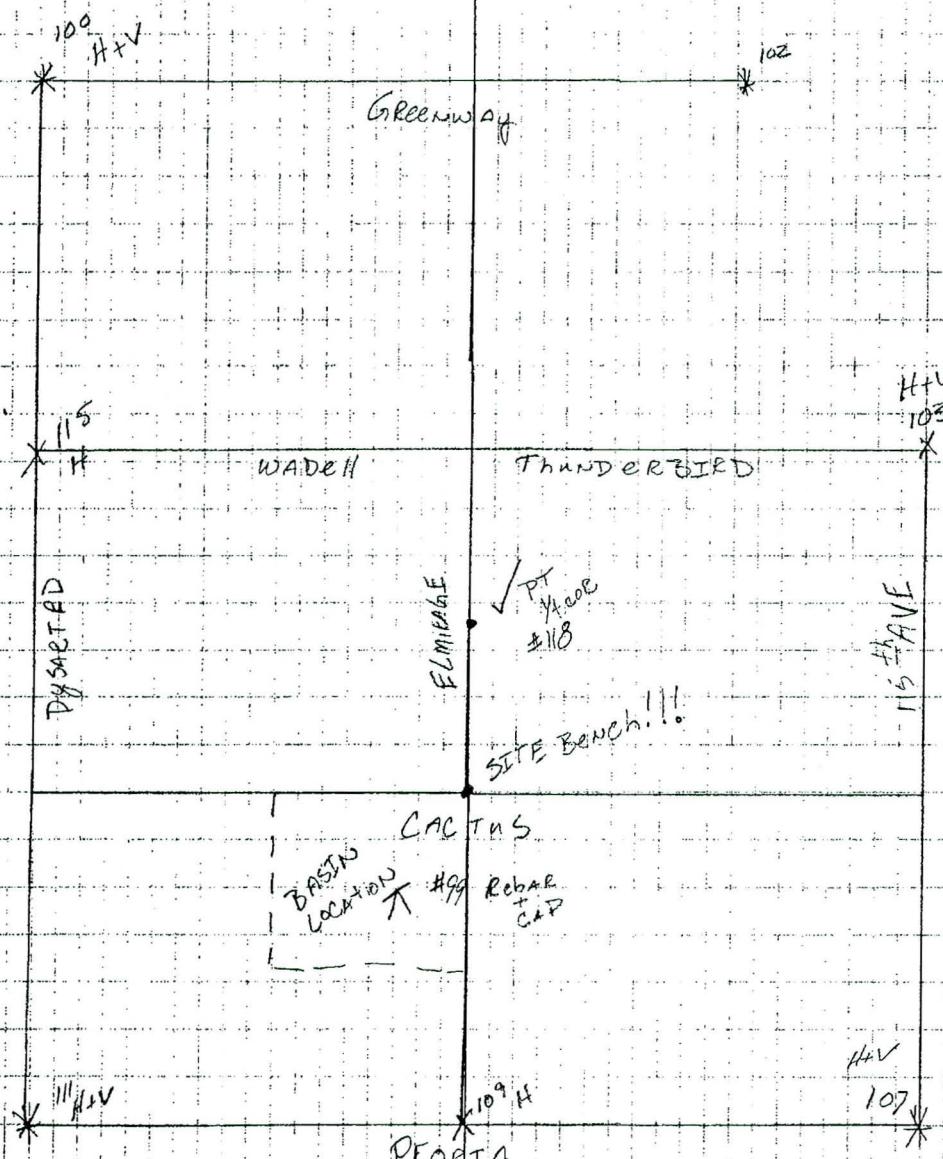
Stanley Consultants co.

APPENDIX A

Copies of Survey Field Books

PAGE NUMBER

EL MIRAGE BASINS



LOCALIZATION INFO

PTS Used

#100 H+V
#115 H
#111 H+V
#109 H
#107 H+V
#103 H

SCALE: 1.000003800
ROTATION: 0-13-34.135
DELTA N: 615316.14
E: 247447.50
ORIGIN N: 329763.82
E: 327532.91

RMS N: 0.047
E: 0.036
V: 0.00
3D: 0.06

✓ SITE BENCH BC & INTX CACTUS + ELMIRAGE
TRUE = 1116.93
FIELD = 1116.77
ERROR = -0.16

✓ #118 CALC PT 1/4 COR ALCAP & ELMIRAGE ERD
N: 0.05
E: 0.03
V: 0.01

500	G	℄ 6"x2° VERT C+G @ GB
501	℄	CENTERLINE RD (ELMIRAGE)
502	G	℄ 6"x2° VERTC+G @ GB
503	G	
504	℄	
505	G	
506	G	END CURB + Gutter
507	EP	EDGE of PAVEMENT
508	℄	
509	G	END CURB + GUTTER
510	GR	GUARDRAIL
511	GR	
512	EP	
513	℄	
514	EP	
515	EP	
516	℄	
517	EP	
518	GR	
519	GR	
520	EP	
521	℄	
522	EP	
523	℄	
524	EP	
525	GR	
526	GR	
527	EP	
528	℄	
529	EP	
530	EP	
531	CL	
532	G	Begin 6"x 2° C+G

533	G.R.	END
534	G	
535	℄	
536	EP	
537	EP	
538	℄	
539	G	
540	G	
541	℄	
542	EP	
543	EP	
544	℄	
545	G	
546	G	END C+G
547	℄	
548	EP	
549	T/CULVERT	W. TOP of CULVERT XING ELEVATION 3.0 x 30.5
550	INV	W.C. CULVERT INV
551	EP	
552	℄	
553	EP	
554	T/CULVERT	E. TOP of CULVERT
555	INV	
556	T	TOP of BANK
557	B	BOTTOM of BANK
558	B	
559	T	
560	NG	NATURAL GROUND
561	NG	
562	NG	
563	G/PC	PC 6" x 2° C+G
564	BSW	BACK of SIDEWALK 4°
565	BSW	

566	G						
567	NG						
568	NG						
569	T						
570	T						
571	B						
572	B						
573	B						
574	T						
575	T						
576	B						
577	B						
578	BB	BOTTOM BASIN					
579	B						
580	T						
581	NG						
582	NG						
583	BSW						
584	G						
585	G						
586	BSW						
587	BSW						
588	G						
589	G						
590	BSW						
591	NG						
592	NG						
593	T						
594	B						
595	B						
596	T						
597	T						
598	T						
599	T						

600	T						
601	T						
602	T						
603	T/B	TOP + BOTTOM BANK I.D.					
604	T1	TOP of BANK					
605	T1	T					
606	T1						
607	T1						
608	T1						
609	B1						
610	B1						
611	B1						
612	B1						
613	B1						
614	B1						
615	B1						
616	T1/B1						
617	T1						
618	T1						
619	B						
620	B						
621	B						
622	B						
623	B						
624	B						
625	B						
626	B						
627	T						
628	NG						
629	NG						
630	BSW						
631	G						
632	G						
633	BSW						

634	BSW
635	G
636	G
637	BSW
638	BSW
639	G
640	G
641	BSW
642	NG
643	NG
644	T
645	B
646	B
647	B
648	T
649	T
650	NG
651	NG
652	BSW
653	G
654	G
655	BSW
[illegible]	BSW
657	G
658	G
659	BSW
660	BSW
661	G
[illegible]	G
[illegible]	BSW
[illegible]	NG
[illegible]	T
[illegible]	B
[illegible]	B

668	T						
669	NG						
670	BSW						
671	G						
672	G						
673	BSW						
674	BSW						
675	G						
676	G						
677	BSW						
678	G						
679	BSW						
680	BSW						
681	G						
682	NG						
683	NG						
684	T						
685	B						
686	B						
687	T						
688	NG						
689	NG						
690	BSW						
691	G						
692	G						
693	BSW						
694	BSW						
695	G						
696	G						
697	BSW						
698	BSW						
699	G						
700	G						

701	BSW	
702	NG	
703	NG	
704	T	
705	B	
706	B	
707	T	
708	NG	
709	NG	
710	NG	
711	G	
712	BSW	
713	BSW	
714	G	
715	G	
716	BSW	
717	G/E CB	GUTTER @ E CATCH BASIN
718	G	
719	BSW	
720	BSW	
721	G	
722	NG	
723	NG	
724	NG	
725	NG	
726	NG	
727	T	
728	B	
729	B	
730	T/B	TOP + BOTTOM of BANK INTX
731	B	
732	B	
733	B	

734	B						
735	B						
736	B						
737	B						
738	B						
739	B						
740	B						
741	B						
742	B						
743	B						
744	B						
745	B						
746	T/B						
747	T						
748	T						
749	T						
760	T						
761	T						
762	T						
763	T						
764	T						
765	B						
766	B						
767	B						
768	B						
769	B						
770	B						
771	B						
772	B						
773	B						
774	T						
775	T						
776	T						
777	T						

778	T
779	B
780	T
781	T
782	T
783	T
784	T
785	T
786	T
787	T
788	T
789	T
790	T
791	T
792	T
793	T
794	T
795	T
796	T
797	T
798	T
799	T
800	T
801	T
802	T
803	T
804	T
805	T
806	T
807	T
808	T
809	T
810	T

811	T
812	T
813	T
814	T
815	T
816	T
817	B
818	B
819	B
820	B
821	B
822	B
823	B
824	B
825	B
826	B
827	B
828	B
829	B
830	B
831	B
832	B
833	B
834	B
835	B
836	B
837	B
838	B
839	B
840	B
841	B
842	B
843	B
844	B/B

SPOT ELEVATION ON BOTTOM of BASIN

845	B/B						
846	B/B						
847	B/B						
848	B/B						
849	B/B						
850	B/B						
851	B/B						
852	B/B						
853	B/B						
854	B/B						
855	B/B						
856	B/B						
857	B/B						
858	B/B						
859	B/B						
860	B/B						
861	C/B			CATCH BASIN			
862	D/W						
863	M						
864	B/B						
865	B/B						
866	B/B						
867	B/B						
868	B/B						
869	B/B						
870	B/B						
871	B/B						
872	B/B						
873	B/B						
874	B/B						
875	B/B						
876	B/B						
877	BSW			TOP OF 4" CONC SIDEWALK			
878	G						

879	PC			GUTTER SHOT 2° VERT CURB + GUTTER			
880	BSW						
81	BSW						
82	G						
83	G						
84	[illegible]						
85	BSW						
86	G			GRATE 2° [illegible]			GUTTER FL
87	G/CB						
88	BSW						
89	SDMH			STORMDRAIN MH			
890	G/CB						
91	G						
92	BSW						
93	BSW						
94	G						
95	G						
96	BSW						
97	BSW						
98	G						
99	G						
900	BSW						
01	G/CB						
02	SDMH						
03	G/CB						
04	G						
05	BSW						
06	BSW						
07	G						
08	SDMH						
09	G						
910	BSW						
11	BSW						
12	G						

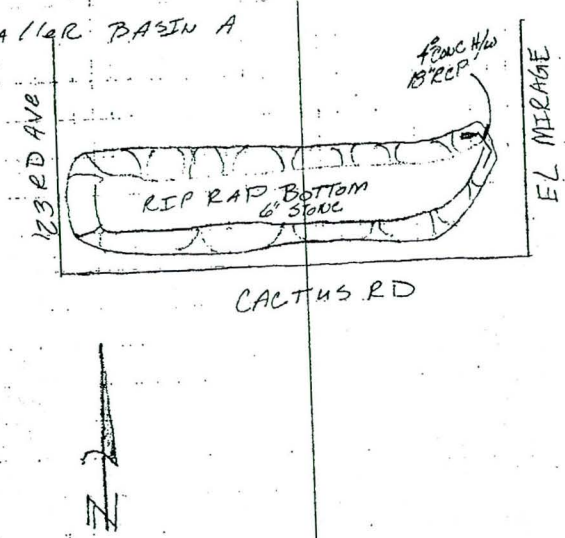
913	G						
14	BSW						
15	SDMH						
16	BSW						
17	G						
18	G						
19	BSW						
920	BSW						
21	G						
22	SDCB						
23	G						
24	BSW						
25	BSW						
26	G						
27	G						
28	BSW						
29	BSW						
930	G						
31	G						
32	BSW						
33	G/CB						
34	SDMH						
35	G/CB						
36	G						
37	G						
38	G						
39	PC						
940	PC						
41	G						
42	G						
43	G						
44	G						
45	PC						
46	PC						

947	G						
48	G						
49	G						
950	G						
51	G						
52	PC						
53	G						
54	G/CB						
55	STONE						
56	PC						
57	PC						
58	G/CB						
59	G						
960	PC						
61	NG			SLIGHT ELEVATION OF NATURAL GROUND			
62	NG						
63	NG						
64	NG						
65	NG						
66	NG						
67	NG						
68	NG						
69	NG						
970	NG						
71	NG						
72	NG						
73	NG						
74	NG						
75	NG						
76	NG						
77	B			BOTTOM of SLOPE			
78	B						
79	B						
980	B						

B
B
B
B
B
T
B
B
B
B
B
B
B
B
B
B
B
B
B
B
B
B
B
B
B
B
B
B
B
T
T
INV 30" RCP — INVERT GRADE FOR 30" CONC DRAINAGE PIPE
COR RIPRAP RIVER ROCK RIP RAP AVG STONE DIA. 12"
T

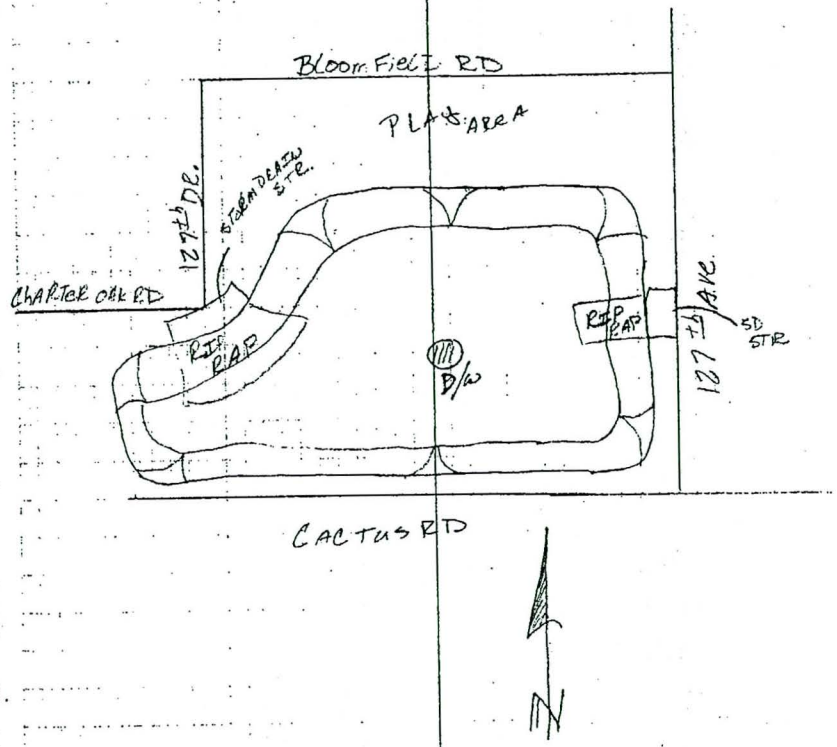
1015	COR	RIP RAP
1016	T	
1017	T	
1018	T	
1019	T	
1020	INV	30" RCP
21	T	
22	T	
23	T	
24	COR	RIP
25	INV	18" RCP
26	T	
27	T	
28	INV	CULVERT — INVERT @ 2 conc CULVERT
29	END	CULVERT — Top of WALL @ 102 of 18 [illegible] WALL
1030	"	"
31	T	
32	COR	RIP RAP
33	T	
34	TI	
35	FL	Top of 2 seperate but contributing DRAINAGE SWALE
36	TI	Flowline same swale
37	FL	
38	TI	
39	TI	
1040	T	
41	T	
42	T	
43	COR	RIPRAP
44	T	
45	T	
46	COR	RIPRAP
47	T	
48	T	

10	1049	INV 18" CCR PVC			18" CORRUGATED PLASTIC PIPE			
10	1050	T						
10	51	T						
10	52	T						
10	53	T						
10	54	T						
10	55	T						
	56	T						
	57	T						
	58	INV 18" RCP						
	59	T						
	1060	INV 30" RCP						
	61	INV 18" RCP						
	62	T						
	63	B						
	64	B						
10	65	T						
	66	B						
	67	T						
	68	B						
	69	T						
	1070	T						
	71	B						
	72	B						
	73	T						
	74	T						
	75	B						
	76	B						
	77	T						
	78	T						
	79	B						
	1080	B						
	81	T						



1082	T	
83	B	
84	B	
85	T	
86	CB/OPEN	THROAT opening @ DRAINAGE STR.
87	CB/open	
88	T	
89	T	
1090	T	
91	T	
92	T	
93	T	
94	CB/open	
95	CB/open	
96	T	
97	T	
98	B	
99	B	
1100	B	
01	B	
02	B	
03	B	
04	B	
05	B	
06	B	
07	B	
08	CB/open	
09	CB/open	
1110	T	
11	T	
12	IN 18" RCP	
13	CB/open	
14	CB/open	
15	T	

SMALLER BASIN B



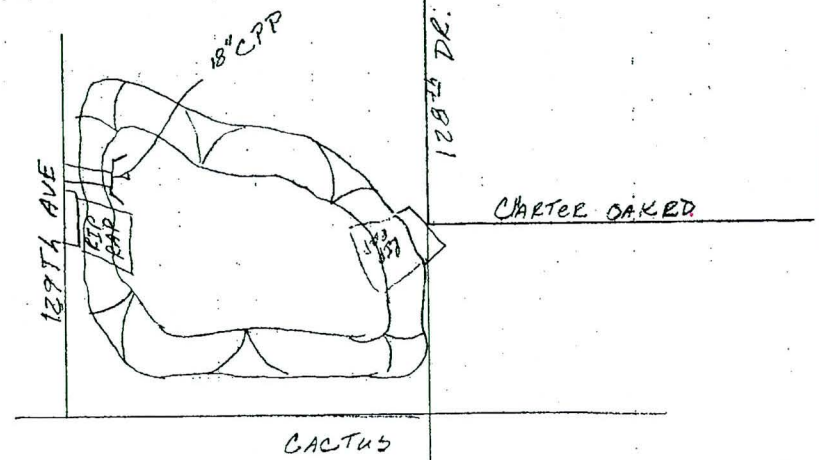
SMALLER BASIN C

1116	T						
17	T						
18	B						
19	B						
1120	B						
21	B						
22	B						
23	B						
24	#18" RCP						
25	T						
26	CB/open						
27	CB/open						
28	T						
29	T						
1130	T						
31	CB/open						
32	CB/open						
33	T						
34	B						
35	B						
36	B						
37	B						
38	B						
39	B						
1140	D/W						
41	CB/open						
42	CB/open						
43	T						
44	T						
45	CB/open						
46	CB/open						
47	T						
48	T						
49	T						

BASIN D

SKETCH ON NEXT PAGE

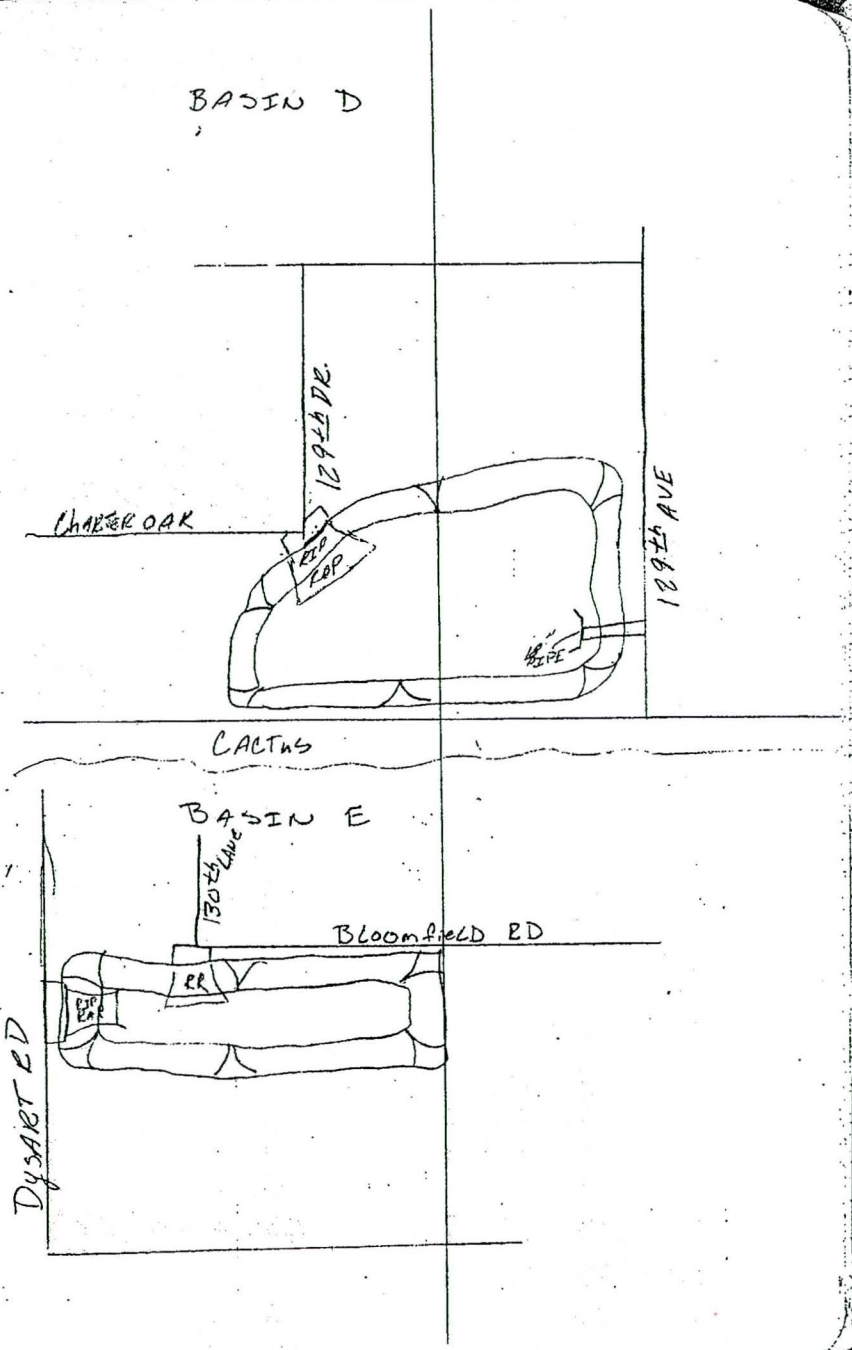
BASIN C



BASIN E

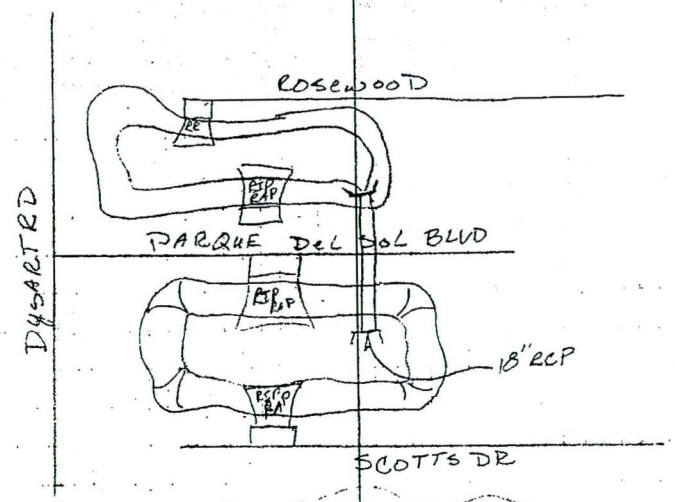
SKETCH ON NEXT PAGE

1150	T						
1151	T						
52	B		BASIN				
53	B						
54	B		E				
55	B						
56	B						
57	B						
58	B						
59	T						
1160	CB/open						
61	CB/open						
62	T						
63	CB/open						
64	CB/open						
65	T						
66	B						
67	B						
68	B						
69	B						
1170	B						
71	CB/open		BASINS				
72	CB/open			FXG			
73	T				SKETCH		
74	18" RCP					NEXT	
75	T						PAGE
76	CB/open						
77	CB/open						
78	T						
79	T						
1180	T						
81	T						
82	T						
83	B						

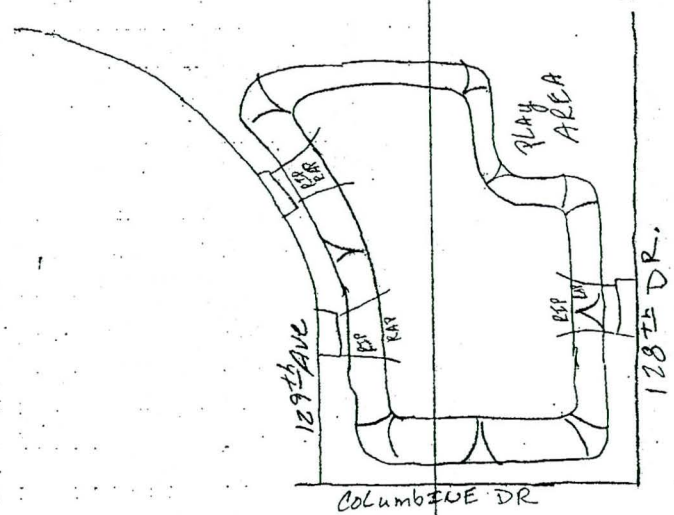


1184	B						
85	B						
86	B						
87	B						
88	B						
89	B						
1190	B						
91	B						
92	D/W						
93	INV 18" RCP						
94	T						
95	B						
96	B						
97	CB/open						
98	CB/open						
99	T						
1200	B			BASIN			
1201	B			H			
1202	T						
1203	T						
1204	B						
1205	B						
1206	CB/open						
1207	CB/open						
1208	T						
1209	B						
1210	B						
11	CB/open						
12	CB/open						
13	T						
14	B						
15	B						
16	T						

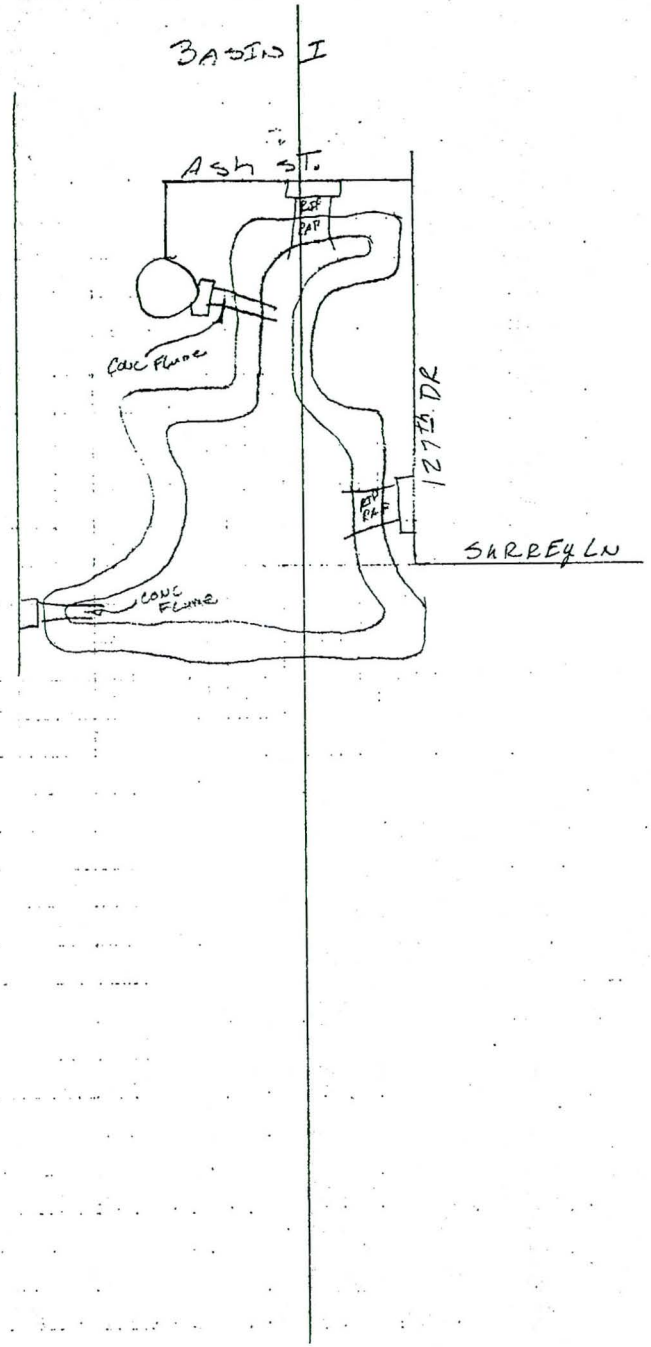
BASINS F + G



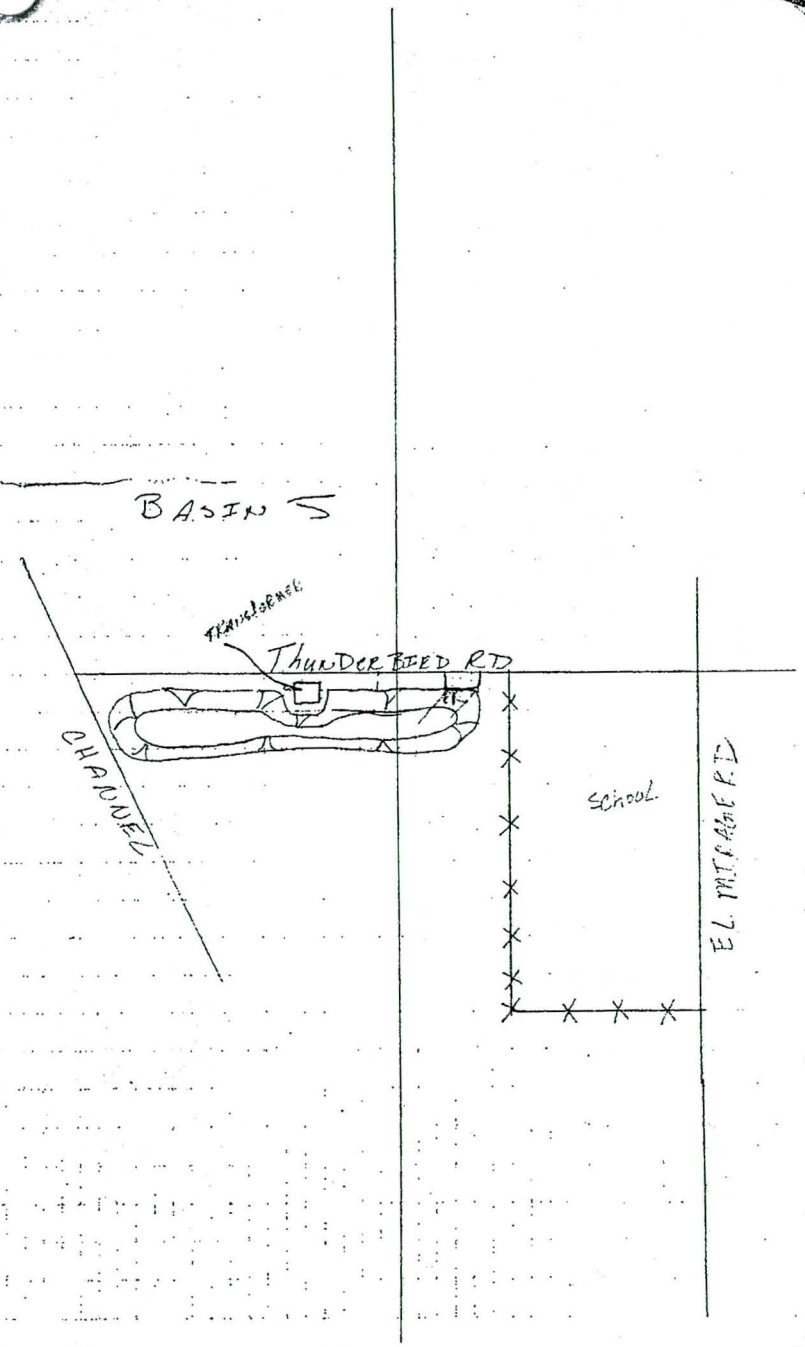
BASIN H



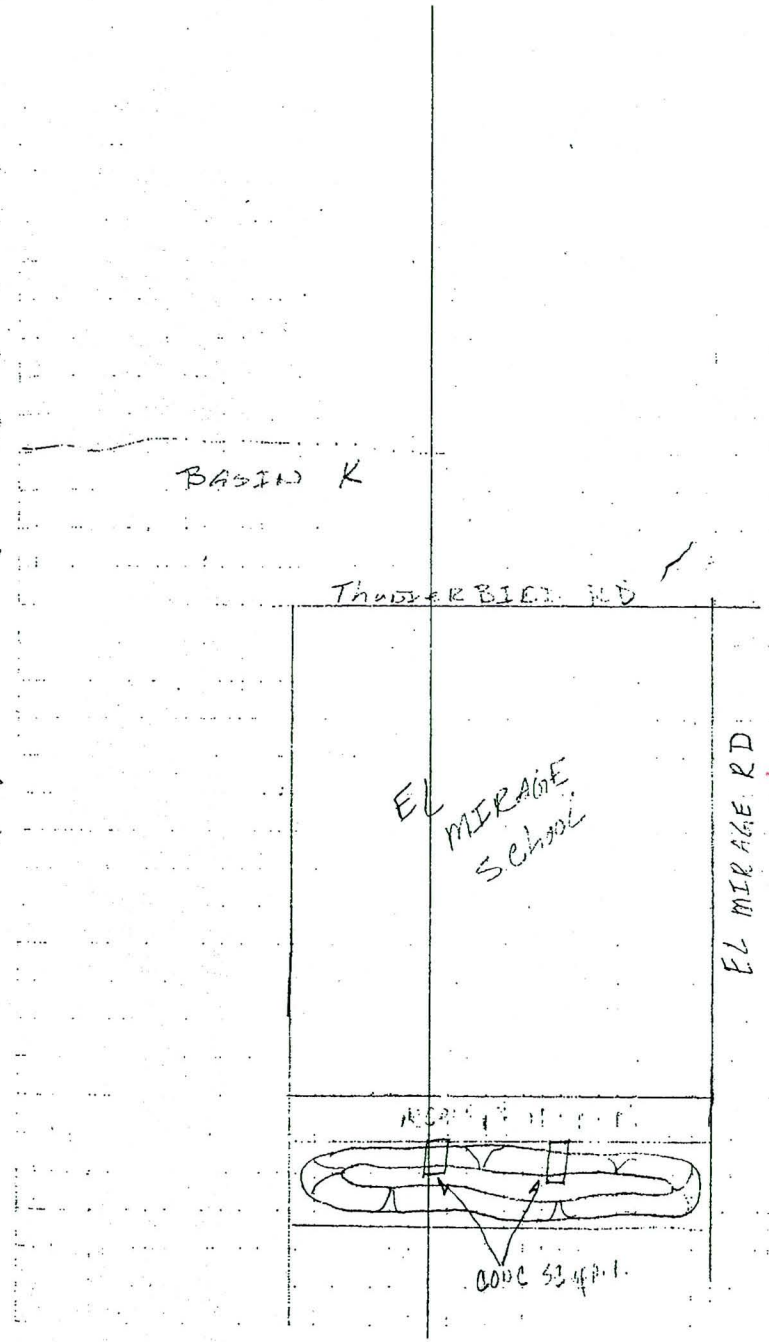
1217	T						
18	B						
19	B						
1220	T						
21	T		BASIN H				
22	B						
23	T						
24	B		BASIN I				
25	B						
26	CB open						
27	CB open						
28	T						
29	B						
1230	B						
31	T						
32	T						
33	B						
34	B						
35	T						
36	CB open						
37	CB open						
38	B						
39	B						
1240	T						
41	T						
42	B						
43	B						
44	T						
45	CB open						
46	CB open						
47	B						
48	B						
49	T						
1250	T						



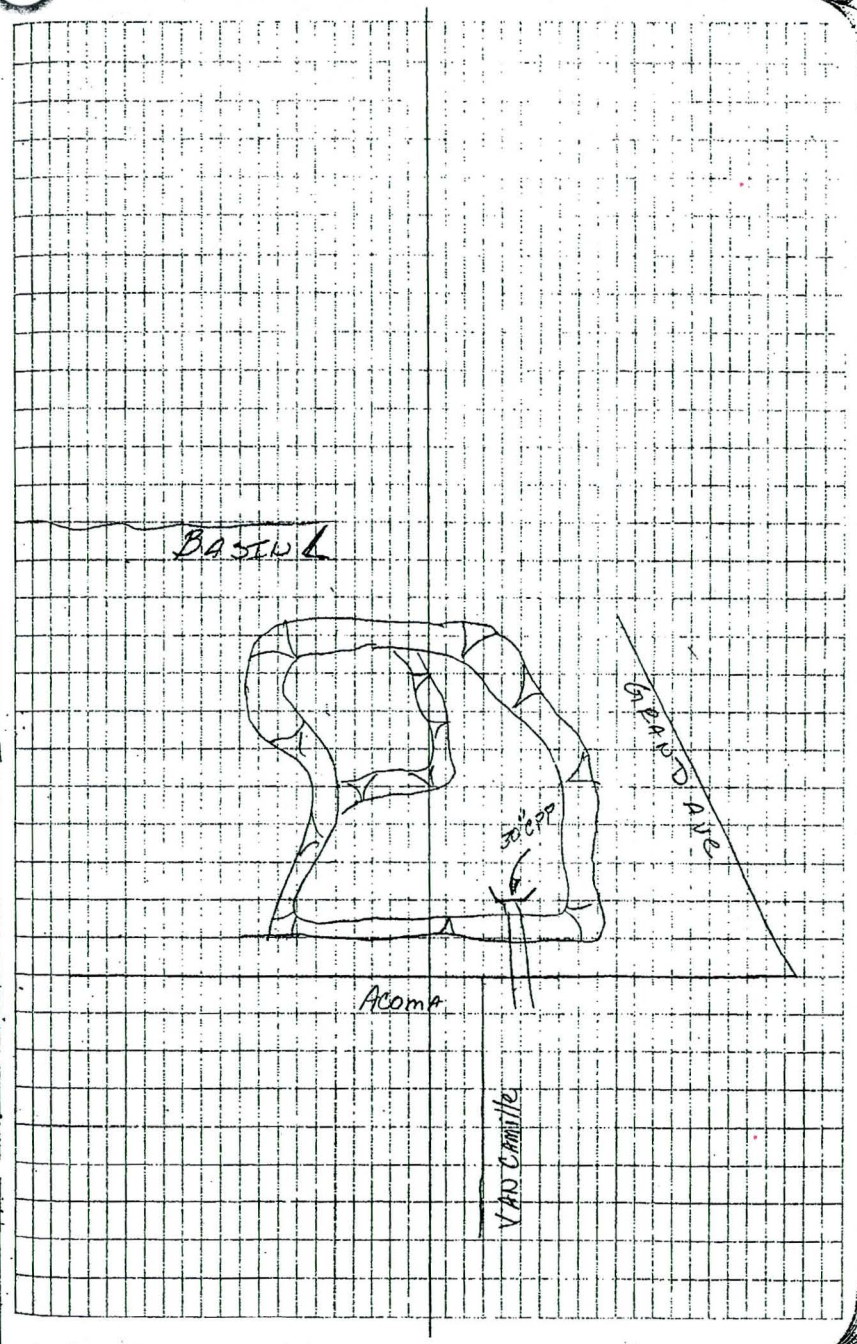
1251	B						
52	B						
53	CB open						
54	CB open						
55	T						
56	B						
57	B						
58	T						
59	T						
1260	B						
61	B						
62	T						
63	T						
64	B						
65	B						
66	T						
67	T						
68	T						
69	T						
1270	T						
71	T						
72	T						
73	B						
74	B						
75	CB/open						
76	CB/open						
77	T						
78	B						
79	B						
1280	B						
81	B						
82	T						
83	T						
84	B						



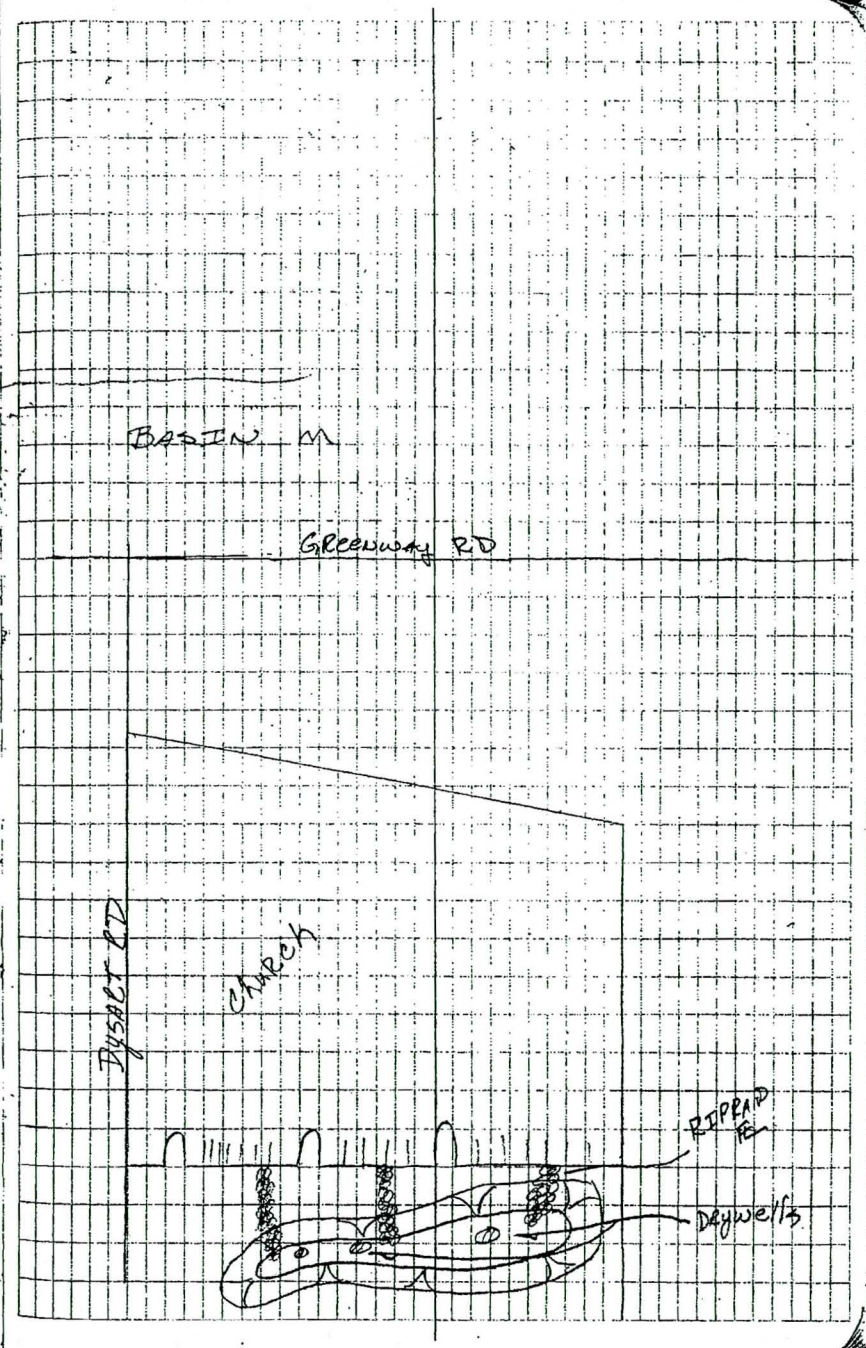
1285	B						
86	B						
87	B						
88	T						
89	T						
1290	B						
91	GAS MARKER						
92	B						
93	T						
94	B						
95	T						
96	T						
97	B						
98	B						
99	T						
1300	B						
1301	T						
02	T						
03	B						
04	P/W						
05	B						
06	T						
07	T						
08	B						
09	B						
1310	T						
11	T						
12	B						
13	B						
14	CB/open			Scupper			
15	T						
16	B						
17	B						



13[illegible]	T
1319	T
1320	T
21	B
22	B
23	CBopen
24	T
25	T
26	B
27	B
28	T
29	T
1330	B
31	T
32	T
33	T
34	B
35	B
36	T
37	T
38	B
39	B
1340	T
41	T
42	B
43	B
44	T
45	T
46	B
47	B
48	T
49	T
1350	T
51	B
52	T1



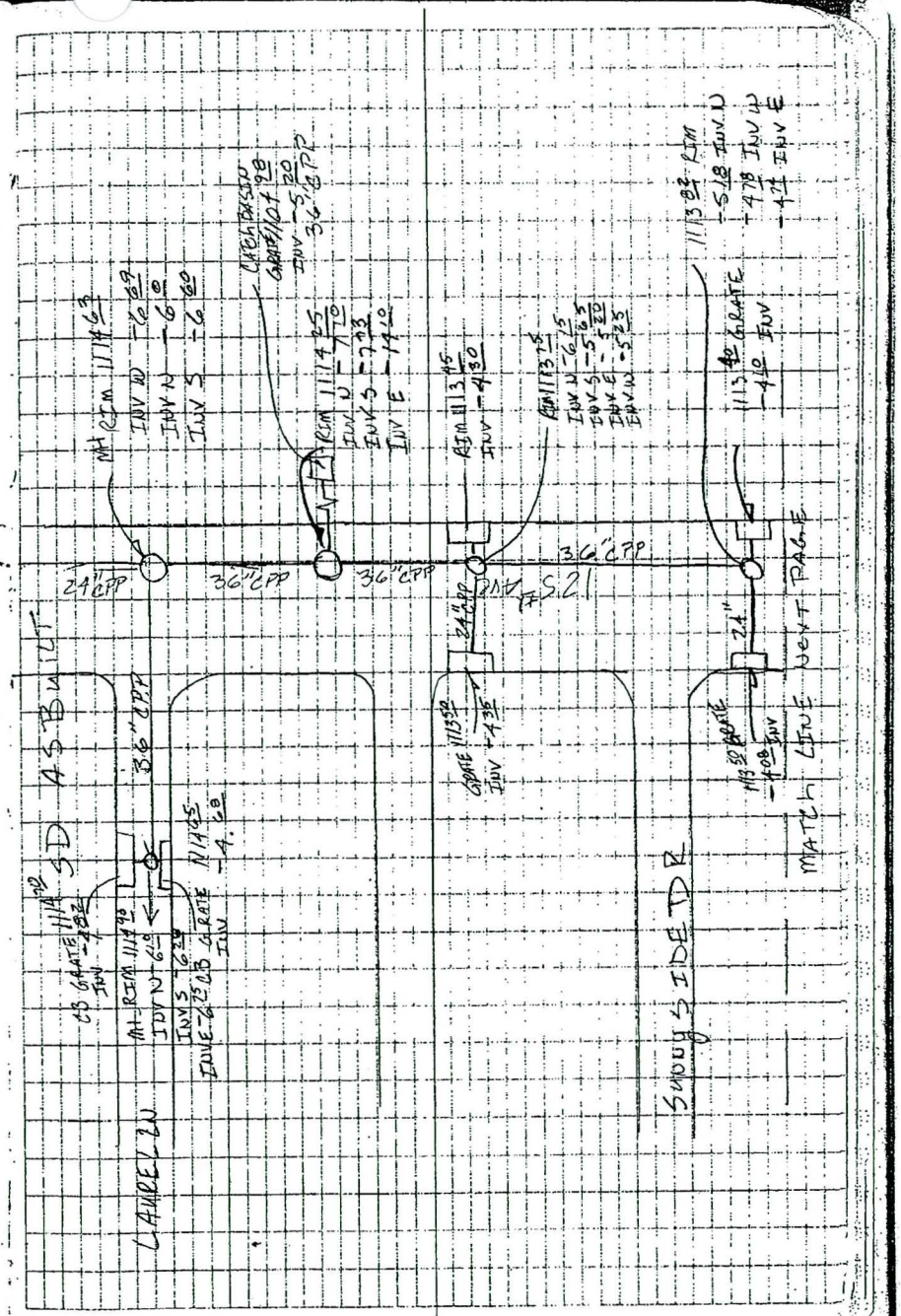
53	T1	
54	T1	
55	B1	
56	B1	
57	B	
58	T	
59	T	
1360	B	
61	30" RCP	
62	T/FL	Top of BANK @ RIPRAP FL
63	B/FL	Bottom of BANK " "
64	D/W	Drywell
65	B/FL1	
66	T/FL1	
67	T	
68	B	
69	B	
1370	T	
71	T	
72	B	
73	B	
74	T	
75	T	
76	B	
77	D/W	
78	B	
79	T	
1380	T/FL2	
81	B/FL2	
82	B/FL3	
83	T/FL3	
84	D/W	



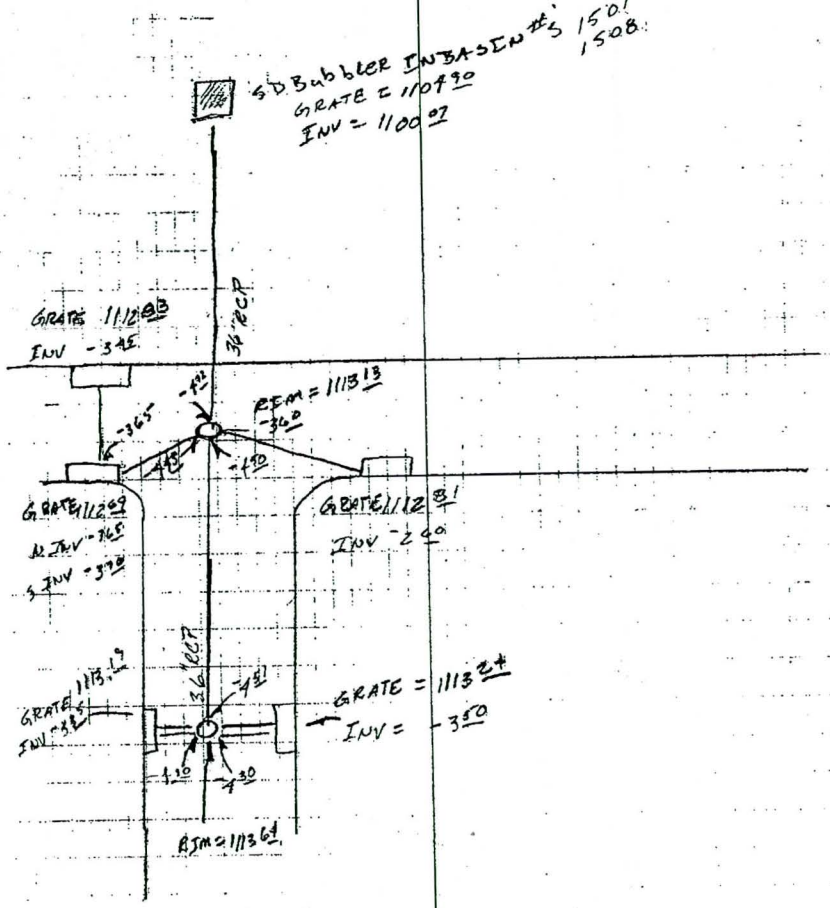
1385	~~GUTTER~~ G/CACTUS		RANDOM GUTTER SHOTSON CACTUS			
86	G/CACTUS					
87	G/CACTUS					
88	G/CACTUS					
89	G/CACTUS					
1390	G/CACTUS					
91	G/CACTUS					
92	G/CACTUS					
93	G/CACTUS					
94	G/CACTUS					
95	FL		PAVEMENT SHOT ℄ N-W INTX			
96	CL		℄ ROAD			
97	FL					
98	G/CACTUS					
99	G/CACTUS					
1400	G/CACTUS					
01	CL					
02	G/CACTUS					
03	G/CACTUS					
04	CL					
05	G/CACTUS					
06	G/CACTUS					
07	CL					
08	G/CACTUS					
09	G/CACTUS					
1410	CL					
11	G/CACTUS					
12	G/CACTUS					
13	CL					
14	G/CACTUS					
15	G/CACTUS					
16	CL					
17	G/CACTUS					
18	G/CACTUS					

1419	CL						
1420	G/CACTUS						
21	CL						
22	G/129					129th AVE	
23	G/129						
24	G/129						
25	G/129						
26	G/129						
27	G/129						
28	G/129						
29	G/129						
1430	G/129						
31	G/129						
32	G/129						
33	G/129						
34	G/129						
35	G/129						
36	G/129						
37	G/LAUREL					LAUREL RD	
38	G/LAUREL						
39	G/LAUREL						
1440	G/LAUREL						
41	G/LAUREL						
42	G/LAUREL						
43	VG					VALLEY GUTTER PL	
44	G						
45	G						
46	VG						
47	G/127						
48	GB						
49	G/127						
1450	GB						
51	G/127						
52	G/127						

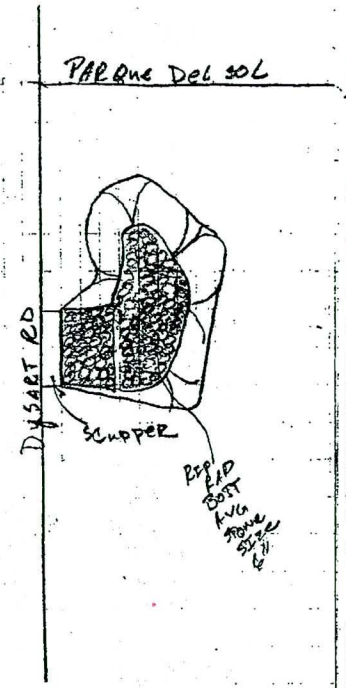
1	1453	G/127						
14	54	G/127						
	55	G/127						
	56	G/127						
	57	G/127						
	58	G/127						
	59	G/127						
	1460	G/127						
	61	GB						
	62	G						
	63	GB						
14	64	G						
	65	G/127						
	66	G/127						
	67	GB						
	68	G						
	69	GB						
	1470	GB						
	71	G						
	72	GB						
	73	GB						
1	74	G						
	75	G						
	76	G						
	77	G						
	78	G						
	79	G						
	1480	G						
	81	VG						
	82	GB SIERRA				SIERRA RD		
	83	GB SIERRA						
1	84	VG						
	85	GB						
	86	GB						



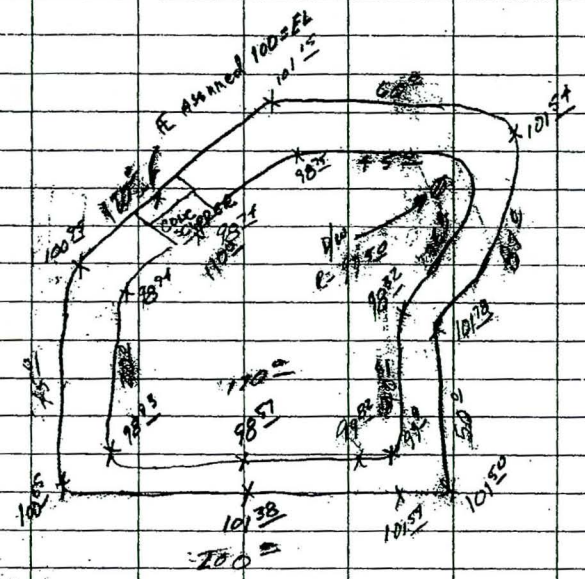
				CONC VALLEY GUTTER
88	VG			@ DYSART + LAUREL
89	GB?			Possible HIGH POINT
1490	GB?			EL DIFF. NOT visible
91	CL			@ CACTUS RD
92	PC			G/E 127TH AVE
93	P			@ 127TH AVE
94	PC			G/W 127TH AVE
95	CL			@ CACTUS RD
96	CB 1113.24			GRATE
97	SDMH 1113.64			RIM
98	CB 1113.19			GRATE
99	CB 1112.81			GRATE
1500	CB 1112.69			GRATE
1501	CB 1112.83			GRATE
02	SDMH 1113.15			RIM
03	NG	EL INFO PREVIPAGE		NATURAL GROUND NCVFTO SD Bubbler INBASIN
04	INV 24" RCP			
05	INV 24" RCP			S. END N. 2nd CULVERT
06	INV 24" RCP			@ CACTUS RD
07	Bubbler			SD Bubbler STR
08	INV			IN EX. BASIN 2.0' ± Above NG
09	NG			
1510	WALL			FACE of BRICK PROP WALL
1511	WALL			E. SIDE EL MIRAGE RD
1512	WALL			# 1512 ON WALL LINE 15.0 FROM END
1513	EP/GB			W. SIDE ELMIRAGE RD
14	EP			
15	EP			
16	EPG/B			
17	EP PC			SW COR INTX CACTUS + ELMIRAGE
18	EP PC			
19	EPPC			SE COR INT + CACTUS + EL MIRAGE



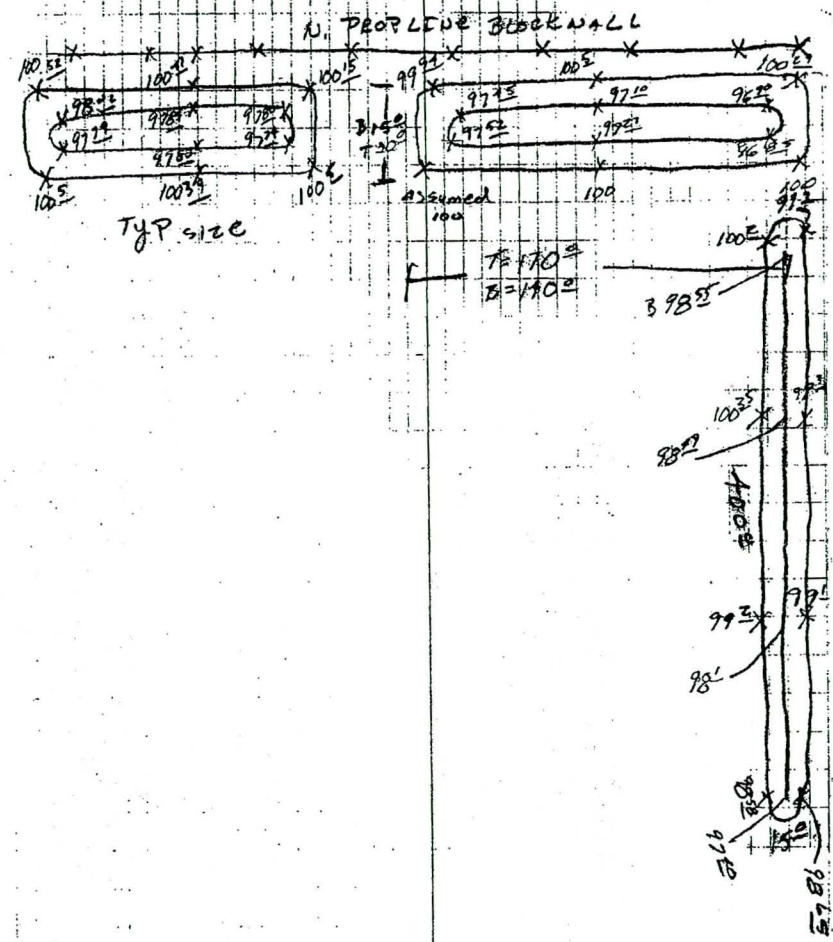
1520	EP TPC	E. SIDE EL MIRAGE
21	EP GB	
22	EP	
23	EP	
24	EP	
25		
26		
27		
28		
29		
1530		
1531		
32		
33		
34		
35		
36		
37		
38		
39		
1540		



SECOND BASIN @ SCHOOL



BASIN BEHIND SWAPMART



EL MIRAGE & CACTUS

SA
AD
J
9-1-04

BM= BC @ INT. CACTUS & EL MIRAGE
EL = 1116.93

BM						1116.93	
		6.52	23.45				
					6.24	1117.21	
		4.30	21.51				
					2.69	1118.82	
		6.41	25.23				
					5.70	1119.53	
		6.24	25.77				
TBM#1					9.45	1116.32	
		9.60	25.92				
					6.38	1119.54	
		5.63	25.17				
					6.34	1118.83	
		2.56	21.39				
					4.18	1117.21	
		6.42	23.63				
BM					6.72	1116.91	
						(-0.02)	
TBM#1						1116.32	
		5.31	21.63				
TBM#2					6.81	1114.82	
		6.76	21.58				
TBM#1					5.26	1116.32	

BC CACTUS & EL MIRAGE

BC Flush (Shaw Butte + 125th)

BC Flush (125th + Laurel)

					FF		
TBM #2						1114.82	
Laurel							
12502					7.16		
12501					6.99		
12509					7.16		
12505					7.09		
12506					7.40		
12510					7.48		
12601					7.42		
12513					8.35		
12514					7.48		
12602					7.60		
12605					7.56		
12606					7.82		
TBM #2						1114	82
TBM#3						1114	11
E.C.B.					3.55		
W.C.B.					3.58		
Cherry Hills Dr							
12502					6.46		
12501					6.12		
12505					6.26		
12506					6.56		
12509					6.50		
12510					6.66		

BC Flush 125th Ave & Laurel

BC Flush 125th Ave & Laurel

BC Flush 125th Ave & Cherry Hills Dr
E.C.B. & grate @ gutter
W.C.B. & grate @ gutter

TBM #3		1114.11
TBM #4		1114.09
E.C.B	3.58	
W.C.B.	3.64	
Sunnyside dr.		
12501	6.95	
12502	7.36	
12506	7.45	
12510	6.30	
12509	7.51	
12505	6.50	
TBM #4		1114.09
TBM #5		1114.04
12513	7.54	
12521	8.05	
12509	6.40	
12501	6.30	
S.C.B.	2.87	
N.C.B	2.96	
TBM #6		1113.33
S.C.B.	2.97	
~~N.C.B.~~		
12437	6.34	
12514	6.54	
12518	7.85	
12517	7.22	
12505	5.39	

BC Flush (125th & Cherryhills)

BC Flush (125th & Sunnyside)

BC Flush (125th & Sunnyside)

BC Flush (125th & Canterbury)

S.C.B. & grate W. Berry @ Canterbury

N.C.B. & grate W. Berry " "

BC Flush (Berry & Canterbury)

S.C.B. & grate E. Berry @ Canterbury

TBM #6						1113.33
E.C.B					3.35	
W.C.B					3.33	
12.433					6.22	

B.F. Flush (Berry & Canterbury)

E C B on Berry S. of Canterbury
W C.B " " " " "

APPENDIX B

Point List for AutoCAD File BasinPoints.dwg

Drawing Name: basin points
Project Name: SURVEY
Project Path: q:\16956\02-assgn 1 - west cactus\05-study phase\05-dwgs\SURVEY\
Username: 6445

Number	Northing	Easting	Elevation	Raw Desc	Full Desc
1	942755.2766	575814.7447	1112.01	g	g
2	942754.9329	575847.9425	1112.63	cl	cl
3	942755.4867	575878.4984	1112.25	g	g
4	942805.0639	575878.4087	1112.26	g	g
5	942806.5868	575847.7250	1112.61	cl	cl
6	942805.8954	575814.6831	1112.21	g	g
7	942848.6900	575814.6374	1112.21	g	g
8	942857.9878	575831.2375	1112.31	ep	ep
9	942854.0811	575847.1315	1112.36	cl	cl
10	942855.0444	575878.2824	1111.98	g	g
11	942854.2752	575885.0529	1112.13	gr	gr
12	942907.9754	575883.8596	1111.18	gr	gr
13	942907.9434	575878.3346	1111.26	g	g
14	942910.8664	575846.9459	1111.70	cl	cl
15	942910.7638	575832.8721	1111.89	ep	ep
16	942960.0789	575833.2337	1111.53	ep	ep
17	942961.7200	575846.6920	1111.40	cl	cl
18	942961.0272	575878.3275	1110.73	g	g
19	942962.3254	575883.9019	1110.64	gr	gr
20	943012.0454	575883.8104	1110.57	gr	gr
21	943013.5825	575846.1493	1111.19	cl	cl
22	943012.2183	575831.6194	1111.39	ep	ep
23	943057.7552	575831.5407	1111.45	ep	ep
24	943058.3835	575846.3854	1111.23	cl	cl
25	943057.7765	575877.7220	1110.82	g	g
26	943058.6257	575883.5886	1110.81	gr	gr
27	943108.5061	575883.3887	1111.55	gr	gr
28	943108.6425	575877.7662	1111.47	g	g
29	943110.1749	575846.0642	1111.55	cl	cl
30	943110.3532	575831.8805	1111.64	ep	ep
31	943141.1555	575832.6205	1111.97	ep	ep
32	943140.3275	575846.1073	1111.86	cl	cl
33	943141.0601	575877.6834	1111.82	g	g
34	943142.7537	575883.4747	1112.20	gr	gr
35	943197.1145	575877.7417	1112.21	g	g
36	943198.7042	575846.0555	1112.48	cl	cl
37	943197.9753	575832.2021	1112.46	ep	ep
38	943252.3810	575831.2662	1113.09	ep	ep
39	943254.2105	575846.0876	1112.97	cl	cl
40	943253.1314	575877.4857	1112.53	g	g
41	943313.5751	575877.2870	1112.83	g	g
42	943315.8397	575846.0657	1113.31	cl	cl
43	943316.4355	575831.0473	1113.25	ep	ep
44	943374.7745	575831.5135	1113.62	ep	ep
45	943375.5093	575845.7064	1113.72	cl	cl
46	943376.8508	575877.2433	1113.09	g	g
47	943404.5937	575877.1433	1113.24	g	g
48	943405.7647	575845.2496	1114.05	cl	cl
49	943406.4478	575831.5804	1113.95	ep	ep
50	943192.4925	575804.4079	1111.72	t/culvert	t/culvert
51	943192.0854	575804.0641	1107.47	inv	inv
52	943166.4077	575831.2636	1112.22	ep	ep
53	943139.5195	575846.2096	1111.88	cl	cl
54	943117.1132	575877.5776	1111.62	ep	ep
55	943111.1803	575886.4374	1111.66	t/culvert	t/culvert
56	943111.6018	575886.8931	1107.35	inv	inv
57	943237.2123	575793.6568	1112.87	t/culvert	t/culvert
58	943212.1207	575794.1447	1106.71	bc	bc
59	943189.3725	575793.7721	1106.91	b	b

Number	Northing	Easting	Elevation	Raw Desc	Full Desc
60	943170.8670	575797.9940	1112.34	t/culvert	t/culvert
61	943070.2196	575784.7042	1114.31	ng	ng
62	942966.1773	575785.9528	1114.31	ng	ng
63	942856.5457	575784.8268	1113.48	ng	ng
64	942857.8781	575709.5330	1113.07	g/pc	g/pc
65	942862.4275	575709.2185	1113.65	bsw	bsw
66	942863.0169	575658.0185	1113.80	bsw	bsw
67	942858.5242	575657.9497	1113.19	g	g
68	942964.6978	575670.1815	1113.32	ng	ng
69	943038.6745	575676.6019	1113.44	ng	ng
70	943147.1977	575731.5356	1113.00	t	t
71	943189.9437	575719.7472	1112.49	t	t
72	943178.8118	575684.2718	1106.51	b	b
73	943216.1462	575675.4462	1106.61	b	b
74	943238.4764	575682.4779	1106.67	b	b
75	943262.8501	575685.2320	1111.04	t	t
76	943284.6772	575624.5043	1113.30	t	t
77	943285.9068	575526.9205	1113.33	t	t
78	943247.5157	575520.5297	1103.51	b	b
79	943210.6400	575518.0060	1103.62	b/b	b/b
80	943182.1659	575513.3887	1104.55	b	b
81	943135.2766	575510.0845	1113.60	t	t
82	943031.5961	575507.0940	1113.18	ng	ng
83	942927.4584	575506.3555	1113.12	ng	ng
84	942864.9020	575505.0878	1114.23	bsw	bsw
85	942860.3611	575505.1971	1113.70	g	g
86	942859.7466	575566.3535	1113.50	g	g
87	942864.1699	575566.3025	1114.02	bsw	bsw
88	942866.3383	575394.9666	1114.54	bsw	bsw
89	942861.8613	575394.6625	1114.04	g	g
90	942861.1234	575456.1679	1113.84	g	g
91	942865.6822	575455.9737	1114.24	bsw	bsw
92	942966.4510	575398.5797	1113.48	ng	ng
93	943062.2810	575401.6389	1113.28	ng	ng
94	943135.4801	575402.7145	1113.61	t	t
95	943171.4300	575404.9726	1104.17	b	b
96	943254.7576	575411.6325	1103.67	b	b
97	943288.4747	575412.4785	1114.03	t	t
98	943295.5238	575320.8533	1114.34	t	t
99	943325.2754	575281.4101	1114.50	t	t
117	943375.7564	575263.4450	1114.55	t	t
118	943507.7068	575259.6590	1114.04	t	t
119	943637.9501	575262.6889	1114.47	t	t
120	943719.8951	575262.6720	1114.37	t	t
121	943798.9691	575272.6651	1114.83	t/b	t/b
122	943805.3902	575260.8850	1115.08	t/1	t/1
123	943936.0026	575258.2914	1115.07	t/1	t/1
124	944060.9608	575256.6726	1115.25	t/1	t/1
125	944136.8535	575269.7208	1115.85	t/1	t/1
126	944167.2935	575227.0654	1112.94	t/1	t/1
127	944144.9731	575197.1831	1106.48	b/1	b/1
128	944113.5503	575206.9249	1105.72	b/1	b/1
129	944045.9348	575221.1076	1104.52	b/1	b/1
130	943941.3063	575223.9244	1104.69	b/1	b/1
131	943816.4801	575223.4479	1104.17	b/1	b/1
132	943777.9464	575227.2497	1104.68	b/1	b/1
133	943740.2275	575226.9011	1104.96	b/1	b/1
134	943693.9887	575201.9886	1104.01	t1/b1	t1/b1
135	943735.8197	575235.4923	1109.55	t/1	t/1
136	943776.8430	575258.7477	1114.33	t/1	t/1
137	943756.3214	575270.2501	1112.32	b	b
138	943686.6119	575230.9851	1105.54	b	b
139	943640.3291	575228.9103	1104.97	b	b

Number	Northing	Easting	Elevation	Raw Desc	Full Desc
140	943509.8591	575227.6423	1104.16	b	b
141	943371.6504	575231.9999	1104.55	b	b
142	943303.8984	575253.6845	1104.07	b	b
143	943260.8067	575331.1179	1103.98	b	b
144	943183.2874	575233.7918	1105.08	b	b
145	943140.1006	575230.9107	1114.27	t	t
146	943033.8291	575226.3162	1114.15	ng	ng
147	942943.7448	575227.5566	1114.26	ng	ng
148	942868.2234	575228.8317	1115.12	bsw	bsw
149	942863.9840	575228.9912	1114.59	g	g
150	942863.2943	575279.5322	1114.44	g	g
151	942867.7664	575279.9433	1114.92	bsw	bsw
152	942866.9883	575347.1490	1114.77	bsw	bsw
153	942862.4276	575347.1414	1114.19	g	g
154	942863.9652	575228.8372	1114.55	g	g
155	942868.2524	575229.0974	1115.07	bsw	bsw
156	942869.0272	575176.5841	1115.24	bsw	bsw
157	942864.5605	575176.2854	1114.71	g	g
158	942865.2697	575125.0537	1114.88	g	g
159	942869.6993	575125.0921	1115.43	bsw	bsw
160	942971.1587	575127.8056	1114.90	ng	ng
161	943055.8638	575124.3962	1114.94	ng	ng
162	943139.5078	575119.7783	1115.11	t	t
163	943205.7499	575118.3318	1103.93	b	b
164	943175.4577	575037.1178	1105.07	b	b
165	943107.1292	574999.0900	1104.82	b	b
166	943086.8158	575020.0039	1115.45	t	t
167	943135.7427	575065.3657	1115.37	t	t
168	942981.6675	575016.7149	1115.60	ng	ng
169	942909.1891	575017.6395	1115.45	ng	ng
170	942868.5485	575018.3880	1115.61	bsw	bsw
171	942864.4818	575018.8033	1115.03	g	g
172	942865.4395	575068.5802	1115.09	g	g
173	942870.1485	575068.6708	1115.60	bsw	bsw
174	942870.0690	575103.6088	1115.52	bsw	bsw
175	942865.5565	575103.8128	1114.99	g	g
176	942860.7638	574971.1366	1114.91	g	g
177	942864.5998	574971.0320	1115.43	bsw	bsw
178	942859.4143	574922.2563	1115.31	bsw	bsw
179	942855.3535	574923.0646	1114.74	g	g
180	942847.8452	574874.2312	1114.57	g	g
181	942852.3039	574873.5876	1115.08	bsw	bsw
182	942927.8035	574868.8281	1116.05	ng	ng
183	943022.6333	574862.7641	1115.67	t	t
184	943045.0806	574854.4450	1104.83	b	b
185	943022.6833	574731.8119	1106.39	b	b
186	942980.6381	574737.0465	1115.76	t	t
187	942902.7870	574747.4074	1116.02	ng	ng
188	942826.9572	574762.1066	1114.81	bsw	bsw
189	942822.9790	574763.4486	1114.22	g	g
190	942835.2694	574812.5962	1114.38	g	g
191	942839.5122	574811.5659	1114.96	bsw	bsw
192	942848.0903	574850.9402	1115.03	bsw	bsw
193	942843.7698	574852.2829	1114.46	g	g
194	942808.6431	574715.6354	1114.10	g	g
195	942812.9863	574714.5829	1114.67	bsw	bsw
196	942793.2352	574670.4871	1113.98	g	g
197	942797.4376	574669.1995	1114.54	bsw	bsw
198	942779.9428	574623.6092	1114.37	bsw	bsw
199	942775.8181	574625.4312	1113.87	g	g
200	942856.5688	574617.8818	1115.94	ng	ng
201	942927.3735	574616.0565	1115.95	ng	ng
202	942968.7552	574612.0009	1115.60	t	t

Number	Northing	Easting	Elevation	Raw Desc	Full Desc
203	943009.8868	574608.9974	1107.22	b	b
204	943026.4013	574469.8587	1105.51	b	b
205	942971.3825	574461.5925	1116.57	t	t
206	942898.0959	574464.0084	1116.83	ng	ng
207	942821.7890	574476.1285	1116.58	ng	ng
208	942731.2568	574513.3011	1113.90	bsw	bsw
209	942727.3242	574515.0476	1113.41	g	g
210	942746.9776	574559.4862	1113.60	g	g
211	942751.1120	574557.4423	1114.09	bsw	bsw
212	942772.1428	574605.0238	1114.23	bsw	bsw
213	942768.2676	574606.9827	1113.75	g	g
214	942726.6888	574513.8999	1113.39	g	g
215	942731.0977	574512.2608	1113.91	bsw	bsw
216	942709.0029	574462.2249	1113.74	bsw	bsw
217	942704.9107	574463.9313	1113.22	g	g
218	942683.7597	574416.5866	1113.08	g	g
219	942687.9265	574414.9584	1113.60	bsw	bsw
220	942772.2336	574405.5774	1116.61	ng	ng
221	942878.3229	574416.0543	1116.80	ng	ng
222	942982.3919	574428.8376	1116.73	t	t
223	943033.3425	574458.6443	1106.01	b	b
224	943124.4443	574365.4192	1106.17	b	b
225	943081.2302	574333.1760	1116.32	t	t
226	942973.8602	574334.4541	1116.86	ng	ng
227	942871.2431	574337.6263	1116.89	ng	ng
228	942769.0236	574361.6755	1116.64	ng	ng
229	942673.5347	574393.6028	1113.03	g	g
230	942678.0861	574392.3603	1113.54	bsw	bsw
231	942698.6667	574439.4723	1113.68	bsw	bsw
232	942694.6212	574440.9177	1113.15	g	g
233	942713.6802	574484.3956	1113.29	g	g
234	942717.6599	574482.1393	1113.85	bsw	bsw
235	942652.6401	574348.2962	1112.74	bsw	bsw
236	942633.3890	574302.1626	1113.18	g	g
237	942637.6908	574300.6804	1113.68	bsw	bsw
238	942619.7543	574245.0679	1114.09	bsw	bsw
239	942615.3116	574246.5901	1113.55	g	g
240	942717.9001	574245.4500	1116.57	ng	ng
241	942815.8509	574247.6755	1117.01	ng	ng
242	942917.4365	574245.2342	1117.24	ng	ng
243	943017.4712	574251.0951	1117.33	ng	ng
244	943101.4458	574253.4077	1117.46	ng	ng
245	943161.2665	574266.2633	1117.68	t	t
246	943196.6249	574295.6725	1105.32	b	b
247	943185.9776	574247.2700	1117.43	t	t
248	942815.1056	574592.9870	1116.08	t/b	t/b
249	942783.8612	574603.0896	1114.38	b	b
250	942737.6086	574505.6025	1113.81	b	b
251	942693.1937	574409.0242	1113.80	b	b
252	942656.6604	574327.8667	1113.56	b	b
253	942626.5884	574231.5045	1114.25	b	b
254	942657.1096	574185.9561	1114.71	b	b
255	942736.9744	574182.5419	1114.95	b	b
256	942898.9246	574182.2690	1114.28	b	b
257	943066.8046	574181.5349	1114.67	b	b
258	943257.9530	574180.2369	1114.81	b	b
259	943391.2694	574184.5697	1114.67	b	b
260	943546.1656	574185.2434	1115.26	b	b
261	943691.4994	574184.2077	1115.55	b	b
262	943840.6023	574180.8622	1115.95	b	b
263	943992.2677	574180.6694	1116.23	b	b
264	944092.8991	574187.5987	1118.07	t/b	t/b
265	944040.9553	574209.1806	1119.29	t	t

Number	Northing	Easting	Elevation	Raw Desc	Full Desc
266	943897.7957	574205.5488	1119.04	t	t
267	943767.8506	574205.9485	1119.87	t	t
268	943671.4611	574204.9026	1118.92	t	t
269	943570.2653	574205.2358	1118.43	t	t
270	943456.8939	574204.8458	1118.35	t	t
271	943360.1951	574203.6443	1117.67	t	t
272	943249.4558	574201.6606	1117.43	t	t
273	943138.8282	574201.4914	1116.94	t	t
274	943013.1900	574200.9235	1116.85	t	t
275	942907.5667	574199.3899	1116.76	t	t
276	942796.6100	574198.6046	1116.55	t	t
277	942711.9967	574200.4497	1116.42	t	t
278	942649.8146	574213.4937	1115.63	t	t
279	942660.6065	574285.3426	1116.33	t	t
280	942704.8514	574402.2238	1116.22	t	t
281	942760.4973	574511.8276	1117.25	t	t
282	942796.5275	574584.9626	1116.80	t	t
283	943693.9321	574779.6341	1106.68	b	b
284	943705.2288	574672.5661	1106.48	b	b
285	943728.2651	574595.9943	1107.05	b	b
286	943707.3857	574513.1359	1107.48	b	b
287	943712.0964	574394.5164	1108.55	b	b
288	943706.6240	574348.9658	1109.57	b	b
289	943582.9807	574331.4113	1108.72	b	b
290	943457.5127	574314.6186	1106.48	b	b
291	943327.2116	574307.0099	1104.92	b	b
292	943330.0639	574251.7542	1117.90	t	t
293	943458.5964	574257.9783	1118.57	t	t
294	943590.7194	574269.2124	1119.25	t	t
295	943677.4177	574273.0754	1118.62	t	t
296	943758.5095	574288.6921	1119.24	t	t
297	943757.4420	574317.1083	1116.21	b	b
298	943756.6288	574328.6856	1122.09	t	t
299	943725.4812	574355.7749	1119.96	t	t
300	943728.1857	574394.0185	1119.31	t	t
301	943730.3331	574508.2165	1117.74	t	t
302	943753.9492	574598.0420	1116.21	t	t
303	943726.5080	574623.5831	1114.76	t	t
304	943727.4407	574672.4392	1115.41	t	t
305	943712.9482	574779.5992	1115.28	t	t
306	943710.7374	574900.9687	1119.81	t	t
307	943752.1734	574918.7908	1115.72	t	t
308	943742.9158	574972.7800	1115.86	t	t
309	943646.5602	574961.9319	1115.87	t	t
310	943653.2941	574929.0658	1114.27	t	t
311	943580.6968	574960.9734	1114.47	t	t
312	943582.0612	574919.8956	1112.88	t	t
313	943527.3551	574911.7715	1113.25	t	t
314	943489.9917	574813.1972	1111.59	t	t
315	943478.8652	574743.7088	1111.89	t	t
316	943383.6873	574708.2874	1111.86	t	t
317	943312.8670	574727.0300	1114.24	t	t
318	943190.2002	574722.2164	1116.04	t	t
319	943087.6781	574719.8534	1116.91	t	t
320	943124.3672	574810.2496	1116.23	t	t
321	943165.4575	574916.6514	1116.22	t	t
322	943214.5882	574978.7368	1119.83	t	t
323	943220.8872	575022.2813	1116.83	t	t
324	943338.1404	575007.3729	1116.10	t	t
325	943433.2752	575005.3808	1116.24	t	t
326	943557.3171	575002.3963	1115.68	t	t
327	943668.8147	575001.1570	1116.46	t	t
328	943762.8649	575003.9118	1115.71	t	t

Number	Northing	Easting	Elevation	Raw Desc	Full Desc
329	943879.2639	575003.6383	1116.48	t	t
330	943995.8057	575003.1413	1116.36	t	t
331	944064.5500	575016.2126	1115.50	t	t
332	944085.8092	575056.5372	1112.49	t	t
333	944087.0007	575190.8170	1108.83	t	t
334	944165.8425	575150.4610	1110.97	t	t
335	944164.5424	575160.0080	1104.94	b	b
336	944085.8517	575196.3541	1105.48	b	b
337	944061.8413	575058.9523	1107.61	b	b
338	944047.1609	575047.2589	1107.36	b	b
339	943996.2199	575038.6939	1105.74	b	b
340	943882.9575	575040.7016	1105.18	b	b
341	943767.4736	575041.6608	1106.09	b	b
342	943657.9540	575052.9075	1105.02	b	b
343	943588.6201	575048.2209	1103.91	b	b
344	943437.2294	575038.8726	1104.92	b	b
345	943344.3453	575045.6805	1104.51	b	b
346	943218.7024	575058.1452	1105.22	b	b
347	943193.5086	575022.5500	1106.69	b	b
348	943176.5070	574997.5956	1106.44	b	b
349	943145.4281	574930.6218	1105.42	b	b
350	943102.5327	574821.5472	1104.27	b	b
351	943059.2488	574707.5412	1105.42	b	b
352	943192.8447	574700.8730	1105.64	b	b
353	943309.9592	574710.1062	1105.49	b	b
354	943377.9316	574692.6622	1105.07	b	b
355	943495.1194	574713.1927	1105.70	b	b
356	943510.7214	574807.7981	1105.33	b	b
357	943542.8292	574894.3995	1106.75	b	b
358	943583.1402	574905.6056	1105.95	b	b
359	943657.1427	574917.8172	1107.52	b	b
360	943677.7427	574893.6375	1107.19	b	b
361	943214.6529	575525.4904	1103.50	b/b	b/b
362	943225.7066	575395.3502	1102.98	b/b	b/b
363	943238.5306	575278.9316	1103.85	b/b	b/b
364	943243.3005	575187.3031	1103.85	b/b	b/b
365	943246.5743	575113.2524	1103.27	b/b	b/b
366	943341.4532	575103.4907	1103.49	b/b	b/b
367	943469.5435	575104.3147	1103.06	b/b	b/b
368	943623.2006	575097.5077	1104.01	b/b	b/b
369	943774.6367	575097.7527	1105.06	b/b	b/b
370	943939.9038	575101.3927	1103.95	b/b	b/b
371	943926.1213	575180.0549	1104.39	b/b	b/b
372	943754.8599	575170.2278	1104.06	b/b	b/b
373	943579.4159	575188.8618	1103.01	b/b	b/b
374	943485.1710	575175.4451	1103.84	b/b	b/b
375	943368.7045	575174.8087	1104.32	b/b	b/b
376	943153.2580	574998.2501	1105.21	b/b	b/b
377	943083.8344	574862.2093	1104.29	b/b	b/b
378	943046.2461	574743.3517	1105.23	b/b	b/b
379	943032.5527	574619.0706	1104.91	c/b	c/b
380	943045.6775	574618.5962	1104.60	d/w	d/w
381	943055.2313	574618.2404	1104.76	m/h	m/h
382	943212.2520	574634.6356	1106.13	b/b	b/b
383	943361.9544	574647.0421	1105.87	b/b	b/b
384	943489.4258	574660.8449	1105.28	b/b	b/b
385	943549.4533	574671.7077	1104.55	b/b	b/b
386	943574.7228	574765.2343	1105.16	b/b	b/b
387	943613.4572	574801.1017	1105.52	b/b	b/b
388	943634.6114	574658.4292	1105.26	b/b	b/b
389	943642.5967	574534.2618	1105.64	b/b	b/b
390	943635.7440	574427.1817	1106.39	b/b	b/b
391	943485.1210	574420.3381	1103.67	b/b	b/b

Number	Northing	Easting	Elevation	Raw Desc	Full Desc
392	943343.9485	574453.7778	1104.61	b/b	b/b
393	943207.1030	574502.5214	1106.63	b/b	b/b
394	943117.3361	574522.6336	1106.50	b/b	b/b
395	942612.9645	574183.9058	1114.77	bsw	bsw
396	942609.8541	574180.5635	1114.33	g	g
397	942624.8846	574173.3926	1114.44	pc	pc
398	942625.3487	574177.8844	1115.01	bsw	bsw
399	942682.9155	574177.3385	1115.13	bsw	bsw
400	942683.1558	574172.8785	1114.60	g	g
401	942756.1632	574172.7255	1114.84	g	g
402	942756.3387	574177.1954	1115.35	bsw	bsw
403	942810.5709	574177.1401	1114.78	bsw	bsw
404	942810.8948	574172.6350	1114.23	g	g
405	942878.9892	574172.4559	1113.46	g/cb	g/cb
406	942879.2053	574176.9741	1114.20	bsw	bsw
407	942881.4653	574164.0565	1113.79	sd/mh	sd/mh
408	942881.7992	574144.0161	1113.48	g/cb	g/cb
409	942941.9313	574172.3006	1113.73	g	g
410	942941.0086	574176.6835	1114.23	bsw	bsw
411	942990.7193	574176.7007	1114.47	bsw	bsw
412	942990.7475	574172.1463	1113.88	g	g
413	943045.7151	574172.0129	1114.07	g	g
414	943045.8883	574176.6047	1114.63	bsw	bsw
415	943092.0752	574176.4396	1114.77	bsw	bsw
416	943091.8550	574171.9481	1114.23	g	g
417	943142.3605	574171.8709	1113.79	g	g
418	943142.8091	574176.3617	1114.29	bsw	bsw
419	943172.5937	574171.7080	1113.41	g/cb	g/cb
420	943173.3985	574163.4618	1113.71	sd/mh	sd/mh
421	943172.8684	574144.0910	1113.51	g/cb	g/cb
422	943239.5688	574171.7085	1113.73	g	g
423	943238.9524	574176.1101	1114.26	bsw	bsw
424	943288.5099	574176.0844	1114.39	bsw	bsw
425	943288.4435	574171.5308	1113.86	g	g
426	943357.1112	574164.4776	1114.27	sd/mh	sd/mh
427	943357.0816	574171.4517	1114.11	g	g
428	943357.3687	574176.0056	1114.65	bsw	bsw
429	943425.2962	574175.7796	1114.83	bsw	bsw
430	943425.2045	574171.3166	1114.29	g	g
431	943478.6001	574171.2303	1114.46	g	g
432	943478.9246	574175.7517	1114.95	bsw	bsw
433	943478.9968	574162.7880	1114.60	sd/mh	sd/mh
434	943548.9010	574175.7392	1115.13	bsw	bsw
435	943548.8288	574171.0905	1114.65	g	g
436	943617.8208	574170.9082	1114.85	g	g
437	943618.0361	574175.4303	1115.37	bsw	bsw
438	943692.1681	574175.3728	1115.59	bsw	bsw
439	943692.4224	574170.8701	1115.12	g	g
440	943692.7944	574163.1445	1115.28	sd/cb	sd/cb
441	943759.6865	574170.7466	1115.28	g	g
442	943759.6217	574175.2331	1115.81	bsw	bsw
443	943854.8562	574174.9952	1116.11	bsw	bsw
444	943854.8699	574170.5571	1115.61	g	g
445	943929.0932	574170.3825	1115.84	g	g
446	943929.2803	574174.9024	1116.36	bsw	bsw
447	943969.4368	574174.7914	1116.47	bsw	bsw
448	943969.5029	574170.2289	1115.93	g	g
449	943500.7370	574121.6135	1114.54	g	g
450	943505.2986	574121.6436	1115.09	bsw	bsw
451	943501.6357	574043.4466	1114.64	g/cb	g/cb
452	943481.1423	574044.6472	1114.89	sd/mh	sd/mh
453	943473.2991	574043.8335	1114.59	g/cd	g/cd
454	943503.6208	573861.5438	1115.38	g	g

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455	943474.9628	573868.5210	1115.40	g	g
456	943474.0528	573972.8222	1115.02	g	g
457	943472.0736	574122.2215	1114.57	pc	pc
458	943240.0661	574122.3825	1113.77	pc	pc
459	943242.2837	574000.2072	1114.22	g	g
460	943243.8561	573855.7984	1114.59	g	g
461	943215.3202	573849.7816	1114.66	g	g
462	943213.5572	573990.4467	1114.23	g	g
463	943212.1311	574118.9552	1113.77	pc	pc
464	942940.8426	574123.0306	1113.76	pc	pc
465	942942.3892	573987.4620	1114.20	g	g
466	942940.0163	573848.5130	1114.63	g	g
467	942910.4913	573836.8144	1114.65	g	g
468	942914.0259	573959.4151	1114.25	g	g
469	942912.2878	574123.2886	1113.75	g	g
470	942618.8622	574390.1389	1113.05	pc	pc
471	942568.3585	574412.3189	1113.24	g	g
472	942495.1150	574444.9846	1113.21	g/cb	g/cb
473	942498.6288	574452.2253	1113.64	sd/mh	sd/mh
474	942371.3950	574499.9916	1113.86	pc	pc
475	942382.5245	574526.3971	1113.87	pc	pc
476	942505.5321	574471.5309	1113.21	g/cb	g/cb
477	942585.4861	574436.0784	1113.21	g	g
478	942629.6187	574416.5526	1113.06	pc	pc
479	943815.9230	574268.0077	1120.93	ng	ng
480	943941.6898	574270.9931	1120.36	ng	ng
481	944079.5785	574278.1949	1120.54	ng	ng
482	944087.4880	574407.5500	1120.01	ng	ng
483	944008.3414	574423.5323	1119.65	ng	ng
484	943879.9349	574432.7807	1119.00	ng	ng
485	943847.9201	574551.6368	1119.00	ng	ng
486	943958.8870	574580.7815	1119.42	ng	ng
487	944060.5950	574591.1990	1119.76	ng	ng
488	944059.3017	574704.1526	1118.55	ng	ng
489	943978.2766	574711.6326	1118.67	ng	ng
490	943866.8770	574708.3213	1118.58	ng	ng
491	943805.8717	574824.7462	1117.22	ng	ng
492	943914.7341	574866.2212	1118.22	ng	ng
493	944007.3683	574888.0147	1118.27	ng	ng
494	944080.0473	574920.9661	1118.30	ng	ng
495	944118.8875	574871.2980	1118.37	b	b
496	944123.4353	574774.9715	1118.91	b	b
497	944124.8145	574694.5604	1118.93	b	b
498	944135.8982	574601.5755	1120.54	b	b
499	944140.6524	574474.0441	1121.15	b	b
1487	944147.8379	574270.5264	1122.02	b	b
1488	944849.1515	574568.4065	1109.86	b	b
1489	944939.5315	574469.6307	1110.41	b	b
1490	945027.4606	574383.5838	1110.59	b	b
1491	944989.4311	574346.4320	1110.82	b	b
1492	944915.5269	574418.0393	1110.64	b	b
1493	944852.2879	574487.8939	1109.97	b	b
1494	944787.9326	574559.2589	1109.27	b	b
1495	944708.7882	574637.5916	1109.28	b	b
1496	944625.2135	574718.8909	1109.17	b	b
1497	944537.2366	574808.3691	1109.07	b	b
1498	944432.5490	574911.7069	1108.41	b	b
1499	944338.0762	575004.6886	1107.93	b	b
1500	944275.5540	575070.5824	1107.25	b	b
1501	944341.5219	575094.2977	1107.44	b	b
1502	944424.1253	575016.2276	1108.19	b	b
1503	944506.8805	574932.9250	1108.35	b	b
1504	944583.4021	574856.6590	1109.22	b	b

Number	Northing	Easting	Elevation	Raw Desc	Full Desc
1505	944638.5522	574799.2959	1109.10	b	b
1506	944720.8386	574715.4657	1109.16	b	b
1507	944807.1589	574632.8597	1109.57	b	b
1508	944938.6212	574622.5608	1110.12	b	b
1509	945065.1315	574623.1881	1111.84	b	b
1510	945189.9678	574625.7837	1111.87	b	b
1511	945188.1724	574572.3445	1112.38	b	b
1512	945092.1752	574572.8430	1112.08	b	b
1513	945019.6732	574575.2541	1112.09	b	b
1514	944937.9125	574574.2942	1110.16	b	b
1515	945189.4269	574652.3436	1117.60	t	t
1516	945091.5022	574644.5766	1117.02	t	t
1517	945091.1702	574632.9575	1112.48	inv/rcp30i	inv/rcp30in
1518	945006.6941	574643.7674	1116.22	cor/riprap	cor/riprap
1519	945006.5443	574655.0515	1117.40	t	t
1520	944959.4750	574642.4442	1114.04	cor/riprap	cor/riprap
1521	944900.5217	574659.3649	1117.99	t	t
1522	944819.9459	574662.7416	1116.94	t	t
1523	944739.6057	574741.1072	1116.60	t	t
1524	944672.5452	574806.3518	1115.84	t	t
1525	944655.2124	574788.1695	1108.35	inv30inrcp	inv30inrcp
1526	944589.8578	574895.0018	1117.55	t	t
1527	944464.3391	575019.1749	1117.38	t	t
1528	944377.9693	575099.8874	1115.82	t	t
1529	944305.3673	575155.7438	1112.88	cor/riprap	cor/riprap
1530	944311.7752	575129.8998	1106.94	inv/18inrc	inv/18inrcp
1531	944265.7236	575195.1081	1116.24	t	t
1532	944244.7592	575143.9469	1114.12	t	t
1533	944261.2021	575133.8662	1105.34	inv/culvert	inv/culvert
1534	944269.4097	575156.2524	1109.26	end/hw	end/hw
1535	944246.8011	575101.3339	1109.31	end/hw	end/hw
1536	944244.4303	575073.7436	1114.99	t	t
1537	944262.5883	575070.9859	1109.97	cor/riprap	cor/riprap
1538	944324.8896	574973.1348	1116.72	t	t
1539	944233.2631	574912.7235	1119.66	t/1	t/1
1540	944249.9693	574905.3613	1117.57	fl	fl
1541	944266.9171	574898.7698	1121.41	t/1	t/1
1542	944292.0146	574940.6225	1117.02	fl	fl
1543	944327.6599	574959.5547	1118.59	t/1	t/1
1544	944311.1668	574977.4450	1118.25	t/1	t/1
1545	944426.9747	574873.4267	1116.88	t	t
1546	944526.9082	574775.0975	1118.03	t	t
1547	944587.7370	574711.5237	1118.51	t	t
1548	944629.4298	574689.6666	1114.31	cor/riprap	cor/riprap
1549	944749.3960	574558.9388	1116.23	t	t
1550	944829.8642	574475.9746	1117.42	t	t
1551	944838.6304	574483.2078	1113.55	cor/riprap	cor/riprap
1552	944924.0523	574373.3895	1118.41	t	t
1553	945006.7386	574293.2021	1117.78	t	t
1554	945023.9370	574278.8814	1118.03	t	t
1555	945034.8595	574290.7536	1111.80	inv/cor/pv	inv/cor/pvc/
1556	945093.1799	574351.2581	1118.24	t	t
1557	945006.5730	574441.1156	1118.24	t	t
1558	944909.7160	574537.4057	1116.24	t	t
1559	944959.4626	574555.8557	1113.90	cor/riprap	cor/riprap
1560	945005.9269	574556.3490	1115.67	cor/riprap	cor/riprap
1561	945009.8741	574542.3901	1118.81	t	t
1562	945114.6403	574545.0185	1118.42	t	t
1563	945113.5762	574562.6654	1111.84	inv/18inrc	inv/18inrcp
1564	945194.8844	574546.6465	1118.46	t	t
1565	944497.0241	574846.8548	1108.25	inv30inrcp	inv30inrcp
1566	944272.3463	575762.6689	1114.34	inv18in/rc	inv18in/rcp
1567	944287.3541	575766.3614	1120.47	t	t

Number	Northing	Easting	Elevation	Raw Desc	Full Desc
1568	944274.0546	575760.4411	1114.64	b	b
1569	944270.5671	575761.1026	1114.70	b	b
1570	944261.6525	575767.7916	1117.66	t	t
1571	944268.0229	575745.4840	1114.66	b	b
1572	944286.4751	575746.5633	1120.32	t	t
1573	944254.5172	575719.2405	1114.84	b	b
1574	944245.5560	575718.9311	1116.66	t	t
1575	944247.2257	575623.0716	1117.04	t	t
1576	944256.3834	575623.2232	1114.95	b	b
1577	944269.4146	575623.5015	1114.80	b	b
1578	944288.0712	575622.0985	1119.80	t	t
1579	944289.2592	575521.8618	1119.75	t	t
1580	944272.0735	575521.7979	1115.35	b	b
1581	944258.6939	575521.6804	1114.99	b	b
1582	944249.0035	575522.2430	1117.22	t	t
1583	944251.9398	575439.2796	1117.01	t	t
1584	944258.1079	575440.0231	1115.04	b	b
1585	944271.7368	575440.4870	1115.16	b	b
1586	944288.5298	575445.9662	1119.50	t	t
1587	944285.3685	575323.3314	1118.82	t	t
1588	944273.4984	575332.0345	1116.37	b	b
1589	944261.8321	575333.8038	1116.07	b	b
1590	944255.4356	575324.3848	1117.38	t	t
1591	944401.6876	573072.4745	1122.35	cb/open	cb/open
1592	944403.9974	573066.6714	1122.66	cb/open	cb/open
1593	944370.1985	573019.0532	1123.51	t	t
1594	944283.8183	573011.8283	1124.59	t	t
1595	944276.0683	573089.8374	1123.72	t	t
1596	944285.9978	573162.4071	1122.63	t	t
1597	944345.5454	573177.9555	1122.30	t	t
1598	944411.3364	573181.9595	1122.45	t	t
1599	944424.0771	573187.3093	1121.65	cb/open	cb/open
1600	944423.9987	573193.2257	1121.95	cb/open	cb/open
1601	944452.1029	573164.2898	1122.27	t	t
1602	944450.8953	573089.5748	1123.10	t	t
1603	944424.8364	573103.3768	1120.18	b	b
1604	944381.4833	573088.3968	1120.02	b	b
1605	944357.2483	573031.7920	1120.56	b	b
1606	944292.0048	573026.5847	1121.44	b	b
1607	944288.4091	573093.1025	1120.32	b	b
1608	944302.0664	573152.9021	1119.71	b	b
1609	944341.2207	573163.0494	1119.41	b	b
1610	944400.8020	573158.5038	1119.67	b	b
1611	944423.4144	573161.1308	1120.07	b	b
1612	944433.5072	573141.9213	1119.76	b	b
1613	944416.5277	572058.2041	1126.30	cb/open	cb/open
1614	944411.4927	572055.1689	1126.12	cb/open	cb/open
1615	944408.5781	572016.1578	1127.39	t	t
1616	944382.3539	571948.8990	1126.61	t	t
1617	944362.9316	571938.7530	1123.71	inv18in/rcp	inv18in/rcp
1618	944327.2019	571929.6909	1125.79	cb/open	cb/open
1619	944328.0508	571924.1401	1126.11	cb/open	cb/open
1620	944289.6014	571958.7394	1126.55	t	t
1621	944295.6792	572045.2745	1126.92	t	t
1622	944376.9155	572054.5938	1127.32	t	t
1623	944384.9507	572031.1756	1123.64	b	b
1624	944380.3684	571999.8421	1123.74	b	b
1625	944373.6252	571961.9339	1124.11	b	b
1626	944364.2675	571952.6743	1123.43	b	b
1627	944304.3272	571974.8894	1123.56	b	b
1628	944309.4344	572033.0623	1123.57	b	b
1629	944363.6363	571859.5386	1123.42	inv18in/rcp	inv18in/rcp
1630	944363.3868	571864.9620	1126.68	t	t

Number	Northing	Easting	Elevation	Raw Desc	Full Desc
1631	944319.3243	571873.1646	1126.02	cb/open	cb/open
1632	944319.4482	571867.3755	1125.77	cb/open	cb/open
1633	944300.1624	571845.8143	1126.74	t	t
1634	944298.4775	571735.8458	1128.14	t	t
1635	944370.6258	571725.2774	1127.83	t	t
1636	944416.2437	571739.3232	1126.65	cb/open	cb/open
1637	944412.4964	571743.5629	1126.32	cb/open	cb/open
1638	944397.3973	571855.2764	1127.68	t	t
1639	944386.8912	571840.1583	1124.73	b	b
1640	944362.8942	571847.9208	1123.75	b	b
1641	944320.0585	571827.6252	1123.69	b	b
1642	944312.4755	571754.2755	1124.23	b	b
1643	944355.8606	571751.4700	1124.07	b	b
1644	944389.0893	571765.2013	1123.23	b	b
1645	944340.4944	571797.5372	1123.86	d/w	d/w
1646	944678.1969	570810.8781	1127.69	cb/open	cb/open
1647	944672.2798	570811.7665	1127.41	cb/open	cb/open
1648	944679.9581	570722.9752	1128.89	t	t
1649	944667.3244	570677.0105	1128.37	t	t
1650	944635.9031	570636.7201	1127.50	cb/open	cb/open
1651	944635.8887	570643.3324	1126.99	cb/open	cb/open
1652	944608.1371	570695.2578	1128.57	t	t
1653	944605.4445	570810.6749	1129.23	t	t
1654	944613.3537	570930.7044	1129.50	t	t
1655	944673.0668	570917.4551	1128.99	t	t
1656	944673.6561	570854.8432	1128.15	t	t
1657	944638.4951	570811.6425	1124.45	b	b
1658	944657.3076	570763.9504	1125.25	b	b
1659	944637.9475	570671.0242	1124.78	b	b
1660	944624.6937	570701.4120	1125.38	b	b
1661	944624.3070	570811.3039	1124.93	b	b
1662	944632.1743	570911.3533	1125.75	b	b
1663	944657.2056	570909.2398	1125.72	b	b
1664	945576.3284	570854.3061	1131.49	t	t
1665	945573.5768	570822.1505	1130.35	cb/open	cb/open
1666	945567.8254	570821.8528	1130.61	cb/open	cb/open
1667	945604.6510	570765.6166	1131.65	t	t
1668	945634.4959	570804.8992	1130.59	cb/open	cb/open
1669	945629.1114	570804.6420	1130.34	cb/open	cb/open
1670	945612.5029	570863.3647	1131.85	t	t
1671	945603.2839	570856.3134	1129.74	b	b
1672	945589.0678	570854.1190	1129.72	b	b
1673	945583.7610	570822.0617	1128.73	b	b
1674	945597.7420	570795.8599	1128.22	b	b
1675	945601.5470	570804.8762	1128.02	b	b
1676	945684.9096	570805.3928	1130.65	cb/open	cb/open
1677	945690.4299	570805.3709	1130.37	cb/open	cb/open
1678	945699.1305	570836.3965	1131.39	t	t
1679	945701.0124	570832.3898	1128.36	inv18in/rcp	inv18in/rcp
1680	945726.1787	570849.9239	1132.95	t	t
1681	945751.7712	570821.8540	1131.28	cb/open	cb/open
1682	945745.9710	570822.2075	1131.13	cb/open	cb/open
1683	945757.4616	570787.3107	1131.97	t	t
1684	945758.6729	570715.4206	1132.14	t	t
1685	945746.5272	570679.7364	1132.19	t	t
1686	945706.1082	570689.5633	1131.64	t	t
1687	945697.2610	570756.5953	1131.23	t	t
1688	945715.6014	570755.6225	1128.00	b	b
1689	945705.9040	570805.3656	1128.64	b	b
1690	945706.0711	570831.4862	1127.82	b	b
1691	945719.9698	570830.8557	1128.37	b	b
1692	945731.1123	570823.2561	1128.73	b	b
1693	945743.8498	570784.0192	1128.65	b	b

Number	Northing	Easting	Elevation	Raw Desc	Full Desc
1694	945744.4397	570726.7750	1128.38	b	b
1695	945734.1578	570695.7117	1128.41	b	b
1696	945719.4826	570698.5279	1128.33	b	b
1697	945602.1134	570818.3377	1128.47	d/w	d/w
1698	945619.3183	570831.2493	1128.34	inv18in/rcp	inv18in/rcp
1699	945148.9342	572139.4454	1127.22	t	t
1700	945155.5283	572110.5056	1123.05	b	b
1701	945129.7635	572098.6797	1122.69	b	b
1702	945112.4009	572128.2602	1126.84	cb/open	cb/open
1703	945110.3115	572133.7171	1127.23	cb/open	cb/open
1704	945055.2227	572098.7677	1128.06	t	t
1705	945064.1618	572067.9238	1122.50	b	b
1706	945000.1651	572040.1676	1122.64	b	b
1707	944974.2514	572046.4100	1127.19	t	t
1708	944990.7646	571938.9902	1125.96	t	t
1709	945006.7522	571952.5001	1122.75	b	b
1710	945114.9982	571919.2347	1122.63	b	b
1711	945109.5655	571900.4186	1125.26	cb/open	cb/open
1712	945107.7917	571895.0103	1125.57	cb/open	cb/open
1713	945198.9040	571876.8050	1127.39	t	t
1714	945207.9048	571901.6277	1122.90	b	b
1715	945287.7925	571858.4813	1122.86	b	b
1716	945274.2868	571832.3138	1127.08	cb/open	cb/open
1717	945271.7481	571827.2697	1127.36	cb/open	cb/open
1718	945396.4350	571761.2272	1128.54	t	t
1719	945394.7611	571794.7010	1122.82	b	b
1720	945396.5338	571804.0991	1122.75	b	b
1721	945423.1577	571813.5128	1129.95	t	t
1722	945373.3027	571912.0013	1130.01	t	t
1723	945345.2674	571902.4644	1122.98	b	b
1724	945246.1981	572079.3723	1122.41	b	b
1725	945252.6285	572102.1340	1127.57	t	t
1726	945194.7768	572080.8715	1125.82	t	t
1727	945192.1240	572065.8444	1122.53	b	b
1728	948299.9607	573023.3127	1135.89	t	t
1729	948289.6044	573009.9261	1133.16	b	b
1730	948249.0570	573001.9697	1133.24	b	b
1731	948245.0657	573019.7999	1134.78	cb/open	cb/open
1732	948246.5517	573025.4126	1134.96	cb/open	cb/open
1733	948199.5749	572975.7138	1135.04	t	t
1734	948212.0663	572975.7981	1132.83	b	b
1735	948224.0402	572874.8897	1132.07	b	b
1736	948198.9679	572874.1794	1135.58	t	t
1737	948201.4147	572721.8807	1136.28	t	t
1738	948214.2329	572723.2948	1132.75	b	b
1739	948216.1821	572583.0320	1130.74	b	b
1740	948205.4426	572568.0317	1136.77	t	t
1741	948242.2065	572541.3506	1135.18	cb/open	cb/open
1742	948240.5278	572546.7881	1135.01	cb/open	cb/open
1743	948226.5387	572578.0317	1131.44	b	b
1744	948227.0161	572605.1534	1130.52	b	b
1745	948252.4696	572606.4468	1136.22	t	t
1746	948254.1260	572667.4471	1135.70	t	t
1747	948247.0190	572680.9952	1132.40	b	b
1748	948317.2518	572692.7073	1132.74	b	b
1749	948339.4075	572684.5643	1136.25	t	t
1750	948351.0789	572795.3399	1135.07	cb/open	cb/open
1751	948345.1705	572794.9877	1134.87	cb/open	cb/open
1752	948321.2531	572793.7933	1132.39	b	b
1753	948363.2535	572865.4451	1132.13	b	b
1754	948372.9576	572846.0346	1135.61	t	t
1755	948454.4194	572843.7818	1136.02	t	t
1756	948443.3704	572864.8323	1132.65	b	b

Number	Northing	Easting	Elevation	Raw Desc	Full Desc
1757	948459.0930	572903.7216	1132.78	b	b
1758	948484.0335	572907.3602	1135.08	cb/open	cb/open
1759	948489.7452	572907.0198	1135.29	cb/open	cb/open
1760	948464.1984	573007.4998	1136.58	t	t
1761	948445.3795	572994.5808	1132.34	b	b
1762	948403.9518	573006.1922	1132.37	b	b
1763	948388.4854	573022.6668	1136.28	t	t
1764	948378.8165	572941.7463	1135.99	t	t
1765	948390.8816	572926.4770	1132.21	b	b
1766	948294.6910	572928.0504	1132.09	b	b
1767	948306.7952	572939.8424	1135.73	t	t
1768	949417.7718	574465.7116	1137.73	t	t
1769	949418.1611	574477.1357	1136.51	b	b
1770	949408.8180	574485.3860	1136.29	b	b
1771	949400.5549	574486.1907	1138.00	t	t
1772	949398.9092	574571.6829	1137.95	t	t
1773	949398.5391	574687.9448	1137.95	t	t
1774	949398.4503	574786.8753	1137.88	t	t
1775	949398.4875	574845.9978	1137.60	t	t
1776	949399.7854	574949.4896	1137.39	t	t
1777	949405.2242	575098.7699	1137.64	t	t
1778	949409.0304	575095.2675	1136.01	b	b
1779	949420.9880	575085.4976	1135.71	b	b
1780	949436.5416	575085.1781	1136.41	cb/open	cb/open
1781	949443.4728	575085.2662	1136.68	cb/open	cb/open
1782	949417.5425	574982.3501	1136.97	t	t
1783	949412.6045	574982.2730	1135.95	b	b
1784	949407.6111	574981.8762	1136.04	b	b
1785	949408.5944	574876.3590	1135.41	b	b
1786	949424.7757	574874.6016	1135.45	b	b
1787	949436.4301	574874.7669	1137.31	t	t
1788	949437.9569	574786.2596	1137.53	t	t
1789	949426.3510	574785.2784	1135.53	b	b
1790	949409.4099	574784.6067	1135.29	b	b
1791	949410.1400	574669.2377	1135.53	b	b
1792	949427.4045	574668.8228	1135.50	b	b
1793	949437.0944	574669.0671	1137.74	t	t
1794	949438.7834	574576.7919	1137.74	t	t
1795	949428.5684	574574.6522	1135.71	b	b
1796	949419.4156	574577.7980	1135.13	gas/marker	gas/marker
1797	949411.0583	574576.6519	1135.34	b	b
1798	949399.3594	574576.7985	1137.83	t	t
1799	949423.9058	574488.6724	1136.03	b	b
1800	949437.4285	574483.2913	1137.86	t	t
1801	948192.2174	575777.1267	1132.18	t	t
1802	948192.0130	575755.3205	1129.80	b	b
1803	948188.6745	575751.2100	1129.86	b	b
1804	948181.1742	575750.1231	1132.50	t	t
1805	948193.7179	575755.2030	1129.90	b	b
1806	948201.1673	575754.0222	1131.95	t	t
1807	948202.5485	575736.8900	1131.81	t	t
1808	948195.4287	575736.9309	1129.65	b	b
1809	948191.9739	575736.7622	1129.74	d/w	d/w
1810	948188.9493	575736.4011	1129.60	b	b
1811	948181.2262	575735.8219	1132.13	t	t
1812	948202.8317	575644.4690	1132.03	t	t
1813	948195.5350	575644.5192	1130.02	b	b
1814	948190.9266	575644.3919	1129.82	b	b
1815	948182.2279	575643.6145	1132.45	t	t
1816	948185.1674	575509.4479	1131.79	t	t
1817	948189.9009	575509.6344	1130.26	b	b
1818	948196.8122	575509.6819	1130.01	b	b
1819	948205.1848	575509.8665	1131.79	cb/open	cb/open

Number	Northing	Easting	Elevation	Raw Desc	Full Desc
1820	948204.0056	575419.5234	1132.91	t	t
1821	948197.0207	575418.9867	1130.56	b	b
1822	948193.0792	575418.3420	1130.37	b	b
1823	948186.6317	575418.0078	1132.29	t	t
1824	948186.1241	575340.2187	1132.06	t	t
1825	948192.9039	575340.1082	1130.03	b	b
1826	948197.3330	575340.0701	1130.18	b	b
1827	948205.4152	575340.3807	1131.80	cb/open	cb/open
1828	948214.5248	575200.9381	1132.23	t	t
1829	948220.7594	575179.2194	1131.97	t	t
1830	948210.7267	575187.3108	1129.82	b	b
1831	948209.6332	575195.6477	1129.71	b	b
1832	948204.7292	575188.5567	1129.55	b	b
1833	948200.3564	575180.1001	1131.87	t	t
1834	948191.1486	575199.7483	1132.56	t	t
1835	948197.8593	575201.5057	1130.50	b	b
1836	948208.4984	575209.4907	1132.23	t	t
1837	953178.7522	574843.5127	1149.86	t	t
1838	953211.9496	574897.0154	1151.78	t	t
1839	953215.4045	574871.1928	1146.61	b	b
1840	953296.7268	574829.7940	1146.23	b	b
1841	953309.5494	574856.9151	1152.90	t	t
1842	953413.0675	574761.1925	1152.22	t	t
1843	953394.4925	574751.6549	1146.30	b	b
1844	953400.1450	574637.3777	1147.60	b	b
1845	953428.5650	574635.2036	1153.18	t	t
1846	953407.3230	574463.2630	1152.82	t	t
1847	953386.2315	574489.8365	1147.33	b	b
1848	953295.5825	574501.9261	1150.68	b	b
1849	953292.1212	574491.3421	1153.57	t	t
1850	953218.0485	574536.9407	1153.56	t	t
1851	953218.5814	574550.0316	1152.03	b	b
1852	953217.8930	574559.6719	1151.69	b	b
1853	953217.3191	574566.9969	1152.78	t	t
1854	953197.6177	574559.3282	1152.65	t	t
1855	953268.6214	574614.6217	1152.85	t	t
1856	953301.8322	574611.6187	1147.40	b	b
1857	953300.9151	574589.8042	1149.83	t1/b1	t1/b1
1858	953358.9581	574557.0819	1149.74	t1/b1	t1/b1
1859	953339.4251	574493.6599	1149.29	t/1	t/1
1860	953354.6204	574498.6995	1147.28	b/1	b/1
1861	953377.7706	574556.5909	1147.63	b/1	b/1
1862	953242.1433	574692.4226	1146.36	b	b
1863	953230.1643	574670.0148	1152.62	t	t
1864	953110.2694	574746.3393	1152.27	t	t
1865	953133.6563	574754.7276	1146.72	b	b
1866	953181.2524	574843.1623	1145.82	inv30inrcp	inv30inrcp
1867	953683.7263	571083.4793	1157.45	t/fl	t/fl
1868	953651.0188	571081.7347	1155.61	b/fl	b/fl
1869	953642.7880	571134.2167	1155.74	d/w	d/w
1870	953671.7002	571124.2823	1156.21	b/fl1	b/fl1
1871	953683.5563	571123.9429	1158.05	t/fl1	t/fl1
1872	953681.8809	571208.0654	1157.92	t	t
1873	953669.2154	571209.9162	1155.98	b	b
1874	953640.0690	571241.6251	1156.38	b	b
1875	953631.0483	571252.6685	1158.14	t	t
1876	953491.0159	571244.4389	1157.34	t	t
1877	953499.5934	571235.5305	1155.81	b	b
1878	953549.3504	571088.7221	1156.05	b	b
1879	953541.5513	571085.3295	1157.58	t	t
1880	953627.1334	570925.9836	1157.65	t	t
1881	953635.6321	570931.8708	1156.00	b	b
1882	953642.1796	570934.7963	1155.90	d/w	d/w

Number	Northing	Easting	Elevation	Raw Desc	Full Desc
1883	953654.0755	570912.8426	1155.89	b	b
1884	953655.7502	570886.4285	1156.98	t	t
1885	953683.1739	570915.8633	1158.92	t/fl2	t/fl2
1886	953670.8157	570916.5313	1156.91	b/fl2	b/fl2
1887	953671.1405	571015.8528	1156.48	b/fl3	b/fl3
1888	953683.2925	571014.9801	1158.63	t/fl3	t/fl3
1889	953642.3894	571034.4515	1155.78	d/w	d/w
1890	944204.9155	571181.6074	1128.44	g/cactus	g/cactus
1891	944268.7992	571183.0723	1128.45	g/cactus	g/cactus
1892	944267.0741	571340.0207	1128.02	g/cactus	g/cactus
1893	944203.2146	571337.9377	1128.01	g/cactus	g/cactus
1894	944201.0818	571506.0251	1127.45	g/cactus	g/cactus
1895	944265.0510	571510.7958	1127.59	g/cactus	g/cactus
1896	944263.1070	571668.4277	1127.12	g/cactus	g/cactus
1897	944199.2647	571666.0655	1127.07	g/cactus	g/cactus
1898	944196.8553	571851.7389	1126.53	g/cactus	g/cactus
1899	944260.7764	571846.5622	1126.53	g/cactus	g/cactus
1900	944260.0312	571898.9143	1126.23	fl	fl
1901	944228.4227	571897.2325	1125.75	cl	cl
1902	944196.3634	571897.1162	1126.44	fl	fl
1903	944195.7054	571942.5400	1126.20	g/cactus	g/cactus
1904	944259.8131	571948.5132	1126.22	g/cactus	g/cactus
1905	944257.7567	572104.6444	1125.83	g/cactus	g/cactus
1906	944225.7941	572104.6796	1125.07	c/l	c/l
1907	944193.8284	572104.7075	1125.67	g/cactus	g/cactus
1908	944191.8613	572262.4175	1125.24	g/cactus	g/cactus
1909	944223.8504	572264.4619	1124.58	cl	cl
1910	944255.7420	572266.2082	1125.33	g/cactus	g/cactus
1911	944253.7996	572427.7452	1124.83	g/cactus	g/cactus
1912	944222.4662	572427.3692	1124.10	cl	cl
1913	944189.9870	572427.9306	1124.67	g/cactus	g/cactus
1914	944188.0312	572581.5954	1124.29	g/cactus	g/cactus
1915	944220.0282	572583.9504	1123.66	cl	cl
1916	944251.7794	572585.8851	1124.38	g/cactus	g/cactus
1917	944250.0007	572736.8207	1123.87	g/cactus	g/cactus
1918	944218.4092	572738.3481	1123.17	cl	cl
1919	944186.1692	572738.0964	1123.83	g/cactus	g/cactus
1920	944184.2404	572896.7101	1123.35	g/cactus	g/cactus
1921	944216.4200	572900.6945	1122.63	cl	cl
1922	944247.9620	572902.9210	1123.36	g/cactus	g/cactus
1923	944245.0397	573161.5007	1122.51	g/cactus	g/cactus
1924	944213.4395	573162.3516	1121.88	cl	cl
1925	944181.0303	573161.9349	1122.52	g/cactus	g/cactus
1926	944212.4007	573213.6970	1121.77	cl	cl
1927	944168.9781	571911.3867	1126.41	g/129	g/129
1928	944164.1447	571882.7888	1126.41	g/129	g/129
1929	944041.7710	571881.3400	1124.08	g/129	g/129
1930	943901.2836	571879.8668	1123.03	g/129	g/129
1931	943767.3162	571877.6781	1122.36	g/129	g/129
1932	943697.5320	571876.7391	1121.95	g/129	g/129
1933	943586.9929	571875.1903	1121.44	g/129	g/129
1934	943478.4940	571873.7820	1120.90	g/129	g/129
1935	943477.9807	571902.5487	1120.87	g/129	g/129
1936	943589.5771	571903.8298	1121.45	g/129	g/129
1937	943696.1241	571905.2676	1122.03	g/129	g/129
1938	943766.4720	571906.0626	1122.49	g/129	g/129
1939	943875.5839	571906.5070	1123.02	g/129	g/129
1940	943982.4242	571908.3058	1123.62	g/129	g/129
1941	944054.3846	571909.6469	1124.31	g/129	g/129
1942	943643.4070	570755.2424	1124.35	g/laurel	g/laurel
1943	943642.7589	570705.5405	1124.48	g/laurel	g/laurel
1944	943643.4797	570654.2511	1124.62	g/laurel	g/laurel
1945	943596.1518	570650.8187	1124.58	g/laurel	g/laurel

Number	Northing	Easting	Elevation	Raw Desc	Full Desc
1946	943595.9830	570707.9269	1124.52	g/laurel	g/laurel
1947	943595.9381	570753.7784	1124.40	g/laurel	g/laurel
1948	943595.3683	570773.5988	1124.31	v/g	v/g
1949	943577.1741	570802.5543	1124.32	g	g
1950	943657.8231	570802.0066	1124.63	g	g
1951	943639.9489	570773.8967	1124.35	v/g	v/g
1952	943529.4147	573286.0509	1117.10	g/127	g/127
1953	943630.3980	573271.6389	1118.29	gb	gb
1954	943718.4051	573256.2784	1118.02	g/127	g/127
1955	943787.8773	573244.4479	1117.93	gb	gb
1956	943874.3561	573231.2841	1119.00	g/127	g/127
1957	943982.5292	573229.7266	1120.21	g/127	g/127
1958	944051.2041	573230.4909	1120.80	g/127	g/127
1959	944104.2596	573231.2659	1121.32	g/127	g/127
1960	944149.3948	573231.8009	1121.72	g/127	g/127
1961	944150.4695	573192.3246	1121.72	g/127	g/127
1962	944092.7381	573191.5781	1121.22	g/127	g/127
1963	944050.2389	573191.0017	1120.83	g/127	g/127
1964	943982.2020	573189.8743	1120.14	g/127	g/127
1965	943885.3370	573191.1231	1119.20	g/127	g/127
1966	943778.4708	573205.8567	1118.22	gb	gb
1967	943704.4424	573218.3946	1118.25	g	g
1968	943623.8199	573232.4102	1118.36	gb	gb
1969	943520.4851	573247.1898	1117.34	g	g
1970	942524.6712	573168.7739	1118.07	g/127	g/127
1971	942448.6413	573169.5614	1118.19	g/127	g/127
1972	942375.3651	573169.2132	1118.35	gb	gb
1973	942287.7105	573169.4583	1118.12	g	g
1974	942214.7658	573169.7040	1117.85	gb	gb
1975	942141.6786	573169.6925	1117.86	gb	gb
1976	942071.9881	573169.7903	1118.04	g	g
1977	942005.1701	573170.0090	1118.20	gb	gb
1978	941999.0230	573209.2637	1118.24	gb	gb
1979	942075.6290	573209.3276	1118.12	g	g
1980	942145.3911	573209.2206	1117.94	g	g
1981	942212.5354	573209.1093	1117.90	g	g
1982	942302.2763	573208.7548	1118.27	g	g
1983	942385.9748	573208.2479	1118.42	g	g
1984	942456.0773	573208.6751	1118.28	g	g
1985	942519.7540	573208.5673	1118.09	g	g
1986	942338.4185	574546.4649	1113.81	v/g	v/g
1987	942364.7992	574605.4686	1114.16	gb/sierra	gb/sierra
1988	942391.9306	574602.0865	1114.11	gb/sierra	gb/sierra
1989	942364.5040	574535.2355	1113.86	v/g	v/g
1990	942837.3925	575032.1927	1115.00	gb	gb
1991	942864.1096	575045.3645	1115.15	gb	gb
1992	942385.9748	573208.2479	1118.42	g	g
1993	942456.0773	573208.6751	1118.28	g	g
1994	942519.7540	573208.5673	1118.09	g	g
1995	942338.4185	574546.4649	1113.81	v/g	v/g
1996	942364.7992	574605.4686	1114.16	gb/sierra	gb/sierra
1997	942391.9306	574602.0865	1114.11	gb/sierra	gb/sierra
1998	942364.5040	574535.2355	1113.86	v/g	v/g
1999	942837.3925	575032.1927	1115.00	gb	gb
2000	942864.1096	575045.3645	1115.15	gb	gb
2001	943642.2670	570624.2266	1124.72	v/g	v/g
2002	943596.7422	570620.5584	1124.45	v/g	v/g
2003	943596.0716	570699.0816	1124.45	gb?	gb?
2004	943642.6850	570709.0108	1124.53	gb?	gb?
2005	944211.7702	573262.1159	1121.62	cl/vg	cl/vg
2006	944179.6785	573270.5834	1122.24	pc	pc
2007	944178.0546	573212.3296	1122.47	pav	pav
2008	944181.3284	573152.5265	1122.58	pc	pc

Number	Northing	Easting	Elevation	Raw Desc	Full Desc
2009	944213.2161	573153.5674	1121.89	cl/vg	cl/vg
2010	942506.3483	574471.0777	1113.24	cb/open	cb/open
2011	942498.1906	574452.2402	1113.63	sd/mh	sd/mh
2012	942494.6470	574445.1133	1113.19	cb/open	cb/open
2013	942658.3846	574430.4009	1112.81	cb/open	cb/open
2014	942627.4584	574360.0079	1112.69	cb/open	cb/open
2015	942653.2065	574347.8573	1112.83	cb/open	cb/open
2016	942645.8202	574386.3369	1113.13	sd/mh	sd/mh
2017	943357.4082	574313.7186	1103.70	ng	ng
2018	944169.9470	575166.9288	1105.49	inv	inv
2019	944168.4808	575164.3472	1105.49	inv	inv
2020	944167.4588	575161.3110	1105.47	inv	inv
2021	943030.9220	574619.2912	1104.90	bubler	bubler
2022	943032.0982	574617.8652	1100.08	inv	inv
2023	943031.1553	574620.6362	1103.65	ng	ng
2024	942832.1661	575901.4499	1113.25	wall	wall
2025	942922.3626	575900.9816	1111.73	wall/cor	wall/cor
2026	942922.9861	575952.1851	1111.07	wall	wall
2027	943494.6347	575827.5766	1114.42	ep/gb	ep/gb
2028	943632.1352	575829.7792	1115.37	ep	ep
2029	943771.5263	575830.3031	1116.20	ep	ep
2030	943904.2208	575829.7134	1116.75	ep/gb	ep/gb
2031	944122.5990	575831.8968	1117.04	pc	pc
2032	944167.5286	575787.2384	1117.87	pc	pc
2033	944152.9409	575907.4303	1116.81	pc	pc
2034	944110.6883	575881.2509	1116.54	pc	pc
2035	943908.0999	575874.7705	1116.42	ep/gb	ep/gb
2036	943776.5592	575873.2469	1115.64	ep	ep
2037	943631.3434	575872.7619	1114.86	ep	ep
2038	943497.3205	575873.1104	1114.19	ep/gb	ep/gb
2039	945352.0934	570638.1484	1129.62	cb/open	cb/open
2040	945352.4040	570644.8209	1129.29	cb/open	cb/open
2041	945351.7036	570663.3188	1127.14	b	b
2042	945334.6631	570678.0676	1127.53	b	b
2043	945325.1232	570678.6822	1130.51	t	t
2044	945363.3628	570728.6433	1131.83	t	t
2045	945403.4592	570681.1629	1127.80	b	b
2046	945426.9812	570671.8553	1131.03	t	t

APPENDIX C.3

2010 SURVEY DATA

El Mirage Topographic Spreadsheet
2-Feb-10

Meta Data:
Vertical Datum: NAVD 88
Coordinate System: US State Plane 1983
Zone: Arizona Central 0202
Datum: NAD 1983 (NSRS 2007)
Geoid Model: Geoid03AZ

Thunderbird Rd / Wadell Rd

Point #	Northing	Easting	Elevation	Description
199	949452.81	570407.37	1150.86	panel
200	949482.29	570431.17	1149.95	eow
201	949458.91	570400.87	1150.9	eow
202	949459.15	570352.69	1150.78	eow
203	949459.94	570302.51	1150.48	eow
204	949461.01	570252.17	1150.73	eow
205	949462.44	570201.92	1150.41	eow
206	949466.16	570151.99	1150.45	eow
207	949468.21	570101.62	1150.44	eow
208	949467.52	570053.48	1150.39	eow
209	949466.39	570005.32	1150.74	eow
210	949468.76	569955.54	1150.83	eow
211	949470.85	569903.98	1150.78	eow
212	949469.16	569853.41	1151.23	eow
213	949465.17	569803.93	1151.04	eow
214	949467.05	569755.63	1151.51	eow
215	949470.2	569702.8	1150.9	eow
216	949468.98	569652.32	1151.06	eow
217	949462.77	569600.12	1150.65	eow
218	949466.06	569464.57	1151.1	eow
219	949464.79	569414.28	1151.29	eow
220	949464.73	569335.13	1151.37	eow
221	949461.36	569285.96	1151.44	eow
222	949458.28	569248.89	1151.73	eow
223	949459.1	569161.93	1151.78	eow
224	949466.01	569111.84	1151.86	eow
225	949470.72	569062.24	1152.02	eow
226	949471.42	569013.7	1152.29	eow
227	949467.77	568954.47	1152.24	eow
228	949472.67	568872.5	1152.53	eow
229	949473.07	568821.91	1152.73	eow
230	949470.7	568761.89	1153.02	eow
231	949472.07	568712.81	1153.16	eow
232	949477.83	568653.96	1153.54	eow
233	949474.92	568604.34	1153.93	eow
234	949472.88	568552.79	1153.75	eow
235	949475.95	568503.62	1154.06	eow
236	949480.64	568453.37	1154.42	eow
237	949476.38	568402.92	1154.16	eow
238	949474.37	568348.35	1153.99	eow
239	949475.46	568298.55	1154.28	eow
240	949479.41	568253.14	1154.53	eow
241	949482.78	568202.81	1154.62	eow
242	949479.58	568152.28	1154.58	eow
243	949481.4	568101.73	1154.97	eow
244	949482.75	568063.91	1155.09	eow
245	949484.02	568013.47	1155.06	eow
246	949483.56	567963.35	1155.23	eow
247	949482.33	567914.33	1155.31	eow
248	949477.52	567867.88	1155.64	eow
249	949482.22	567818.54	1155.26	eow
250	949487.3	567769.95	1154.85	eow
251	949488.02	567718.72	1154.89	eow
252	949488.73	567666.81	1155.04	eow
253	949489.37	567616.05	1155.27	eow
254	949489.98	567563.57	1155.33	eow

Legend

AP	Angle Point
BB	Bottom of Basin
CALC	Calculated
CL	Centerline
CONC	Concrete
COR	Corner
CT	Cart
EOW	Edge of Walk
FL	Flowline
GB	Grade Break
HD	Head
HND	Hand
HW	High Water
INV	Invert
NG	Natural Ground
NTH	North
PTH	Path
RCP	Reinforced Concrete Pipe
RL	Rail
TB	Top of Bank
TRSH	Trash
WL	Wall
WLK	Walk

255	949490.77	567511.81	1155.48	eow
256	949491.15	567461.18	1155.57	eow
257	949491.94	567410.69	1155.71	eow
258	949492.49	567359.89	1155.9	eow
259	949493.34	567308.27	1156.15	eow
260	949494.04	567257.86	1156.41	eow
261	949494.59	567206.64	1156.35	eow
262	949495.18	567154.16	1156.61	eow
263	949495.72	567102.77	1156.57	eow
264	949496.49	567052.63	1156.65	eow
265	949497.14	567002.05	1156.58	eow
266	949498.06	566950.64	1156.45	eow
267	949498.55	566900.84	1156.32	eow
268	949503.72	566849.55	1156.03	eow
269	949509.9	566798.33	1155.88	eow

Cactus Rd

Point #	Northing	Easting	Elevation	Description
100	944147	574937.14	1119.37	ng
101	944123.2	574928.83	1119.09	ng
102	944106.75	574838.09	1121.58	cl pth conc
103	944108.13	574866.54	1120.63	cl pth
104	944105.4	574923.5	1119.34	cl pth
105	944106.45	574951.21	1118.37	cl pth
106	944106.7	574989.38	1117.42	cl pth hw
107	944107.22	575007.41	1117.08	cl pth hw
108	944113.29	574996.92	1117.2	end hnd rl
109	944110.31	575004.22	1116.86	ap hnd rl
110	944110.13	575028.31	1116.87	hnd rl
111	944113.02	575060.04	1116.42	ap hnd rl
112	944116.74	575067.22	1116.05	end hnd rl
113	944109.68	575057.28	1116.75	cl pth
114	944109.16	575090.54	1115.92	cl pth
115	944108.49	575124.97	1115.85	cl pth
116	944108.1	575148.5	1115.85	cl pth
117	944115.71	575150.28	1116.19	hw mark
118	944117.48	575132.75	1116.38	hw mark
119	944143.93	575118.25	1117.45	hw mark
120	944149.91	575127.79	1118.34	tb
121	944142.2	575118.28	1117.42	hw
122	944135.84	575107.2	1116.21	ng
123	944127.62	575096.2	1115.7	ng
124	944120.79	575082.09	1115.72	ng
125	944146.3	575081.26	1110.72	hd wl east
126	944123.59	575025.92	1110.85	hd wl west
127	944134.13	575050.63	1107.08	fl in 24 inch rcp
128	944135.44	575053.04	1107.03	fl in 24 inch rcp
129	943959.88	574997.89	1113.19	trsh line basin nth
130	943923.95	574952.96	1111.71	hw basin nth
378	944044.67	575086.3	1106.81	fl out 24 inch rcp
379	944045.55	575088.93	1106.85	fl out 24 inch rcp
380	944046.7	575091.63	1106.88	fl out 24 inch rcp
381	944136.39	575055.99	1109.01	top in 24 inch rcp - blocked with debri
2613	944105.75	574935.37	1118.83	cl pth

El Mirage Rd

Point #	Northing	Easting	Elevation	Description
196	942721.2	575808.86	1114.25	con wlk
197	942731.95	575808.61	1113.82	gb rail
198	942754.21	575808.72	1112.78	gb rail
270	943142.64	575635.82	1113.17	debri limits
271	943142.62	575635.95	1113.16	debri limits
272	943147.17	575611.04	1113.07	debri limits
273	943146.5	575586.83	1113.23	debri limits
274	943151.42	575563.27	1113.19	debri limits
275	943180.84	575735.24	1115.24	ng
276	943129.43	575735.85	1114.76	ng
277	943079.29	575736.76	1113.9	ng

278	943028.16	575736.75	1113.91	ng
279	943017.54	575714.39	1115.11	top of canal
280	942993.98	575720.22	1115.14	top of canal
281	942970	575724.01	1115.13	top of canal
282	942945.94	575726.19	1115.15	top of canal
283	942895.76	575728.55	1115.21	top of canal
284	942846.08	575729.6	1115.23	top of canal
285	942794.87	575730.71	1115.21	top of canal
286	942793.69	575736.98	1114.51	ng
287	942744.38	575736.33	1113.9	ng
288	942726	575733.97	1114.39	begin eow
289	942702.74	575733.86	1114.19	eow
290	942804.23	575808.69	1112.67	rail
291	942853.61	575808.69	1112.19	rail
292	942903.94	575808.51	1112.13	rail
293	942954.86	575808.32	1112.63	rail
294	943003.88	575808.29	1113.41	rail
295	943019.48	575808.2	1113.73	rail @ end of walk
296	943071.73	575810.34	1114.49	ng
297	943122.93	575810.82	1114.77	ng
298	943173.67	575810.8	1115.02	ng
299	943003.87	575815.24	1110.77	hd wl
300	943003.82	575811.22	1113.42	hd wl ap
301	942973.57	575811.51	1112.99	hd wl ap
302	942964.74	575815.56	1110.81	hd wl
303	942981.42	575811.94	1108.99	inv
304	942987.61	575811.65	1108.99	edge of divider
305	942988.74	575811.65	1108.93	edge of divider
306	942995.09	575811.78	1108.96	inv
307	942799.6	575869.41	1113.18	wall
308	942799.36	575844.08	1114.24	wall
309	942717.84	575826.3	1114.64	wall
310	942691.77	575826.33	1114.82	wall
311	943054.22	575725.86	1110.9	hd wl
312	943054.37	575729.31	1113.31	hd wl ap
313	943085.52	575729.13	1113.37	hd wl ap
314	943093.42	575725.41	1110.92	hd wl
315	943077.92	575728.84	1109.02	inv
316	943071.31	575728.85	1109.03	edqe of divider
317	943069.68	575728.85	1109.08	edqe of divider
318	943062.45	575728.82	1109.13	inv
319	942799.2	575826.22		calc.wall cor

Park Place

Point #	Northing	Easting	Elevation	Description
131	941547.57	577190.92	1104	hw conc box west
132	941567.55	577218.7	1104.05	hw conc box east
133	941566.82	577226.9	1105.72	hw dirt tb
134	941561.02	577220.9	1102.15	dirt toe
135	941559.81	577219.22	1102.4	inside wall
136	941538.73	577191.72	1105.17	tb dirt west
137	941631.74	577323.19	1105.72	fl curb
138	941652.23	577423.84	1106.08	fl curb
139	941677.95	577565.95	1106.44	fl curb
140	941774.26	577651.73	1106.01	fl curb
141	941852.29	577673.63	1105.42	fl curb
142	941881.64	577667.58	1106.21	conc pad
143	941991.36	577703.09	1105.01	fl curb
144	942106.7	577734.68	1104.56	fl curb
145	942173.84	577753.27	1104.26	fl curb at inlet
146	942173.87	577751.92	1104.48	top curb
147	942162.44	577741.14	1105.74	conc pad
148	942204.44	577638.99	1101.67	top pvc
149	941323.24	577442.97	1103.89	hw
150	941072.33	577676.34	1102.95	hw
151	941034.85	577743.2	1102.57	hw
152	941036.67	577744.58	1102.71	end log wall
153	941025.18	577739.68	1102.34	edge ct path
154	941014.66	577732.31	1101.93	edge ct path
155	941005.11	577727.94	1101.85	edge ct path

156	940998.22	577725.31	1102.2	gb edge ct path
157	940993.93	577722.81	1102.58	gb edge ct path
158	940983.72	577718.86	1102.93	gb edge ct path
159	940969.07	577712.53	1103.3	edge ct path
160	940960.87	577709.54	1103.75	gb edge ct path
161	940961.11	577719.01	1102.7	tb
162	940971.44	577723.32	1100.24	gb
163	940972.49	577724.07	1099.11	fl
164	940979.9	577726.9	1099.14	fl
165	940981.5	577727.16	1100.19	gb
166	940990.03	577730.5	1100.55	gb bb
167	940996.07	577732.2	1101.7	tb
168	940975.06	577760.19	1102.67	tb
169	940965.31	577751.65	1100.46	gb bb
170	940961.66	577748.87	1100.23	tb
171	940961	577748.26	1099.09	fl
172	940952.68	577739.24	1098.74	fl
173	940951.58	577738.13	1100.22	gb tb
174	940948	577735.19	1101.1	gb
175	940943.93	577731.37	1102.32	edge ct path
176	940939.22	577725.73	1103.41	edge ct path
177	940969.02	577709.75	1102.95	gb
178	940979.11	577713.06	1101.2	gb
179	940979.08	577713.09	1101.23	gb
180	940982.18	577714.58	1100.24	gb
181	940984.09	577715.88	1098.76	fl
182	940988.15	577717.95	1099.02	fl
183	940988.95	577719.11	1100.24	tb
184	940994.28	577721.15	1101.13	gb
185	941001.64	577724.27	1101.75	tb
186	941047.9	577731.92	1103.5	tb
187	941042.28	577724.96	1102.62	hw
188	941025.98	577708.45	1101.43	gb
189	941018.92	577702.51	1100.19	gb
190	941018.16	577701.15	1098.98	fl
191	941008.11	577692.52	1098.83	fl
192	941006.93	577691.65	1100.09	gb
193	941004.71	577689.42	1101.91	gb
194	940992.02	577676.88	1104.12	tb
195	941042.38	577649.51	1102.95	hw
320	941564.39	577163.36	1103.89	ng
321	941578.4	577179.43	1103.17	tb
322	941579.84	577181.06	1102	edge of water
323	941581.1	577182.25	1101.3	approx toe
324	941596.88	577194.99	1101.5	approx toe
325	941597.31	577195.28	1102.13	edge of water
326	941601.04	577200.66	1105.36	tb
327	941616.58	577221.43	1106.95	ng
328	941593.66	577237.26	1106.99	ng
329	941574.62	577216.01	1106.07	tb
330	941569.91	577209.77	1101.96	toe
331	941557.21	577196.3	1101.8	toe
332	941553.24	577191.02	1103.87	tb
333	941536.77	577172.23	1105	ng
334	941538.3	577191.88	1105.59	hd wl
335	941538.06	577195.56	1106.85	hd wl ap
336	941566.47	577226.89	1106.87	hd wl ap
337	941568.38	577226.79	1106.37	hd wl
338	941542.01	577199.52	1102.38	inv
339	941548.38	577206.31	1102.31	inv
340	941555.88	577214.72	1102.41	inv
341	941561.67	577220.73	1102.41	inv @ edge of debri
342	941559.94	577219.22	1102.38	edge of divider
343	941559.38	577218.6	1102.41	edge of divider
344	941552.67	577211.25	1102.39	edge of divider
345	941552.12	577210.6	1102.44	edge of divider
346	941545.37	577203.23	1102.31	edge of divider
347	941544.8	577202.59	1102.39	edge of divider
348	941464.24	577226.5	1106.21	ng
349	941478.47	577240.32	1104.9	tb
350	941483.53	577244.68	1102.27	edge of water
351	941484.32	577245.44	1101.55	approx toe

352	941502.7	577265.3	1101.6	approx toe
353	941503.36	577265.87	1102.22	edge of water
354	941507.79	577269.25	1105.12	tb
355	941522.04	577280.62	1106.42	ng
356	941479.67	577348.82	1106.57	ng
357	941472.39	577338.09	1106.3	tb
358	941448.95	577309.75	1102.47	edge of water
359	941448.14	577309.21	1101.54	approx toe
360	941438.44	577303.59	1101.48	approx toe
361	941437.69	577303.03	1102.42	edge of water
362	941415.16	577275.86	1107.06	tb
363	941401.2	577256.56	1106.67	ng
364	941532.24	577259.27	1105.56	hd wl
365	941533.21	577257.23	1106.62	hd wl ap
366	941504.35	577225.38	1106.56	hd wl ap
367	941500.32	577226.9	1104.45	hd wl
368	941507.94	577229.59	1102.91	inv @ top of dirt
369	941529.68	577253.84	1103.88	inv @ top of dirt
370	941522.2	577245.6	1102.18	inv
371	941514.98	577237.43	1102.18	inv
372	941510.99	577233.07	1102.26	edge of divider
373	941511.54	577233.72	1102.29	edge of divider
374	941518.12	577241.22	1102.23	edge of divider
375	941518.7	577241.88	1102.19	edge of divider
376	941525.17	577249.14	1102.19	edge of divider
377	941525.92	577249.88	1102.34	edge of divider

Basin Topo - Southwest Corner El Mirage Rd & Cactus Rd

Point #	Northing	Easting	Elevation	Description
1000	943928.241	575149.413	1106.886	toe
1001	943969.507	575134.171	1107.372	toe
1002	943987.604	575123.911	1107.838	toe
1003	944002.422	575126.07	1108.993	toe
1004	944015.652	575132.962	1109.83	toe
1005	944031.428	575141.813	1110.297	toe
1006	944039.492	575137.825	1110.174	toe
1007	944027.504	575135.439	1109.856	toe
1008	944025.375	575125.61	1109.927	toe
1009	944040.028	575119.596	1108.333	toe
1010	944043.398	575101.532	1107.132	toe
1011	944045.64	575082.775	1108.384	toe
1012	944036.834	575079.814	1108.751	toe
1013	944013.609	575091.533	1108.401	toe
1014	943961.588	575109.83	1108.895	toe
1015	943936.319	575082.938	1109.343	toe
1016	943934.385	575076.903	1108.25	toe
1017	943936.897	575057.337	1108.857	toe
1018	943936.17	575047.321	1108.013	toe
1019	943919.39	575029.709	1107.263	toe
1020	943917.418	575011.393	1107.199	toe
1021	943917.242	575007.425	1108.432	toe
1022	943927.531	574963.386	1109.361	toe
1023	943886.209	574965.308	1107.241	toe
1024	943789.255	574963.359	1107.069	toe
1025	943700.947	574964.96	1106.858	toe
1026	943634.255	574964.064	1108.167	toe
1027	943626.139	574979.133	1107.22	toe
1028	943609.77	574970.085	1107.749	toe
1029	943593.991	574964.296	1108.797	toe
1030	943586.616	574989.851	1106.975	toe
1031	943514.91	574964.652	1107.457	toe
1032	943425.788	574967.141	1106.748	toe
1033	943344.984	574966.316	1107.227	toe
1034	943259.086	574968.304	1106.334	toe
1035	943173.451	574963.818	1107.214	toe
1036	943124.919	574984.266	1106.555	toe
1037	943096.542	574982.957	1106.561	toe
1038	943079.139	574952.593	1108.478	toe
1039	943078.734	574944.558	1109.85	toe
1040	943098.773	574937.156	1112.591	ramp

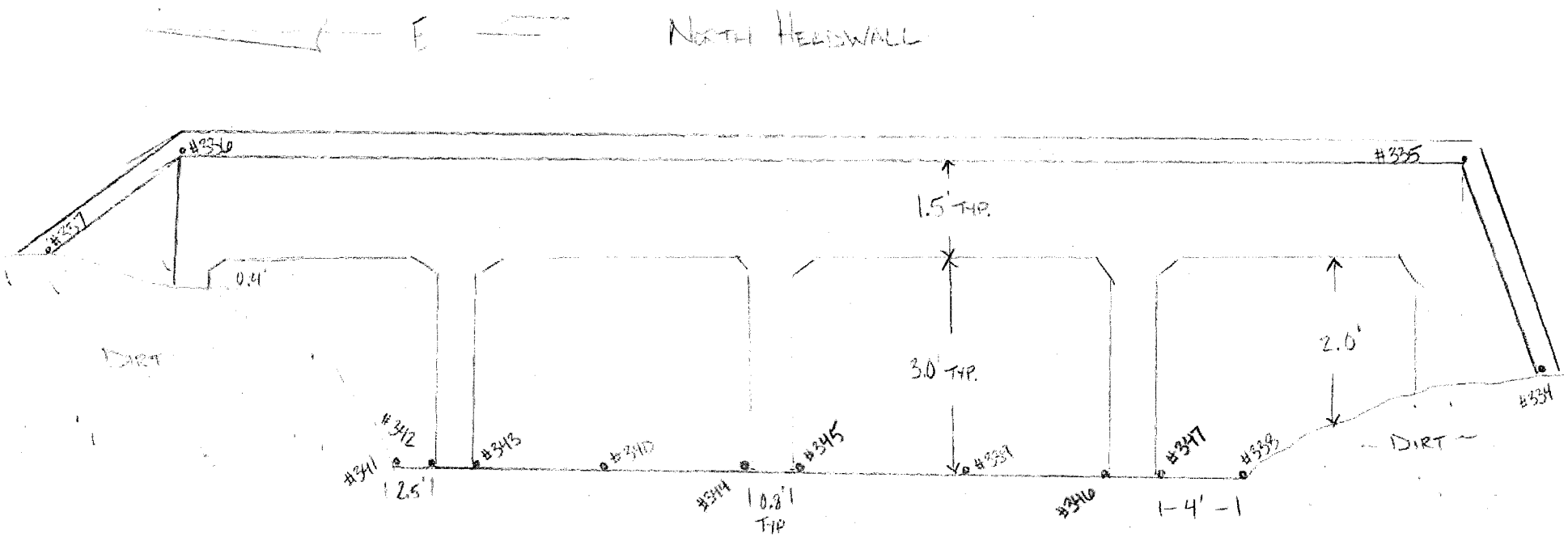
1041	943096.786	574925.479	1112.652	ramp
1042	943075.911	574922.995	1110.176	toe
1043	943054.36	574909.578	1108.891	toe
1044	943039.25	574889.878	1108.173	toe
1045	943010.821	574828.35	1105.812	toe
1046	942989.786	574763.777	1105.895	toe
1047	942955.163	574677.945	1107.13	toe
1048	942940.943	574673.862	1106.752	toe
1049	942955.968	574673.026	1108.711	toe
1050	942955.847	574667.262	1109.065	toe
1051	942941.507	574663.048	1107.137	toe
1052	942936.091	574638.007	1106.949	toe
1053	942950.926	574626.218	1107.303	toe
1054	943006.765	574616.917	1107.244	toe
1055	943048.845	574618.217	1107.077	toe
1056	943072.5	574629.844	1107.654	toe
1057	943165.689	574639.501	1107.251	toe
1058	943261.877	574622.655	1107.458	toe
1059	943256.787	574609.501	1106.887	toe
1060	943266.688	574623.054	1108.357	toe
1061	943274.814	574622.107	1108.748	toe
1062	943269.915	574611.271	1106.709	toe
1063	943279.452	574617.744	1107.034	toe
1064	943291.901	574619.006	1108.36	toe
1065	943295.296	574614.426	1108.485	toe
1066	943289.764	574600.843	1107.092	toe
1067	943294.127	574520.808	1107.749	toe
1068	943292.799	574427.532	1106.82	toe
1069	943291.148	574352.294	1106.334	toe
1070	943287.59	574283.96	1106.939	toe
1071	943285.756	574234.799	1108.326	toe
1072	943252.148	574228.113	1107.46	toe
1073	943178.818	574231.311	1106.591	toe
1074	943076.649	574219.66	1107.255	toe
1075	943066.886	574235.744	1106.373	toe
1076	943035.603	574271.019	1106.54	toe
1077	943003.121	574293.907	1108.296	toe
1078	943001.916	574392.078	1108.32	toe
1079	942998.941	574470.545	1108.57	toe
1080	943000.538	574509.246	1108.45	toe
1081	942981.173	574558.039	1107.556	toe
1082	942950.869	574575.923	1107.047	toe
1083	942932.168	574556.964	1108.836	toe
1084	942897.269	574561.754	1109.877	toe
1085	942875.637	574570.613	1111.009	toe
1086	942883.009	574599.997	1110.034	toe
1087	942914.83	574613.417	1108.128	toe
1088	942890.728	574622.331	1110.264	toe
1089	942894.588	574640.091	1110.016	toe
1090	942919.124	574637.441	1107.641	toe
1091	942896.227	574650.82	1108.12	toe
1092	942908.325	574671.549	1106.882	toe
1093	942910.435	574744.092	1106.041	toe
1094	942920.81	574774.432	1106.142	toe
1095	942965.325	574882.275	1105.641	toe
1096	942984.705	574923.062	1106.075	toe
1097	943029.044	574944.067	1106.299	toe
1098	943055.94	574965.416	1106.151	toe
1099	943062.798	574999.053	1106.607	toe
1100	943057.781	575032.255	1106.982	toe
1101	943049.696	575046.307	1109.195	toe
1102	943061.304	575061.896	1108.927	toe
1103	943057.827	575076.236	1108.396	toe
1104	943029.865	575067.475	1110.734	toe
1105	943026.962	575072.485	1111.15	toe
1106	943060.681	575096.604	1107.847	toe
1107	943053.692	575195.218	1106.057	toe
1108	943047.629	575294.404	1106.305	toe
1109	943045.305	575382.419	1105.68	toe
1110	943037.259	575461.33	1107.877	toe
1111	943045.619	575558.178	1107.246	toe
1112	943043.22	575600.452	1108.657	toe

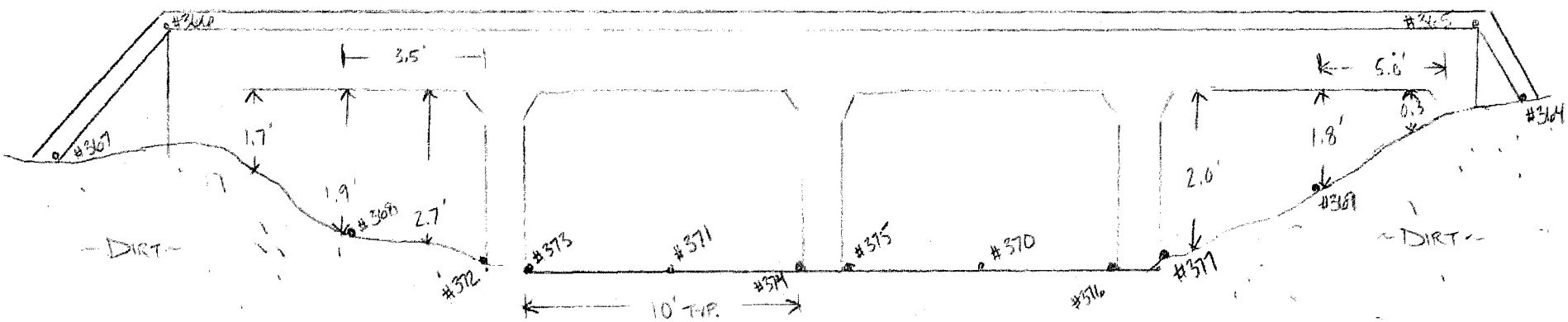
1113	943057.223	575613.472	1108.429	toe
1114	943061.595	575631.715	1111.275	toe
1115	943073.314	575633.375	1112.198	toe
1116	943080.605	575636.23	1111.59	toe
1117	943092.398	575603.369	1108.212	toe
1118	943091.857	575638.008	1108.812	toe
1119	943088.275	575657.017	1108.903	toe
1120	943069.193	575703.477	1109.739	toe
1121	943057.986	575728.614	1108.762	toe
1122	943085.657	575728.615	1109.092	toe
1123	943091.886	575705.068	1108.703	toe
1124	943102.297	575662.082	1108.472	toe
1125	943110.902	575644.768	1109.202	toe
1126	943120.471	575592.07	1108.457	toe
1127	943123.314	575555.787	1107.309	toe
1128	943131.309	575553.609	1107.85	toe
1129	943132.992	575488.898	1105.576	toe
1130	943136.405	575400.138	1105.644	toe
1131	943136.785	575320.647	1105.599	toe
1132	943140.783	575244.308	1105.971	toe
1133	943158.367	575203.585	1105.921	toe
1134	943189.925	575173.803	1105.698	toe
1135	943232.333	575158.407	1105.895	toe
1136	943278.281	575153.477	1105.622	toe
1137	943369.921	575151.041	1105.514	toe
1138	943458.248	575151.546	1105.929	toe
1139	943563.825	575156.204	1106.927	toe
1140	943557.807	575141.017	1106.26	toe
1141	943600.532	575174.58	1110.998	toe
1142	943614.091	575161.149	1111.118	toe
1143	943572.383	575127.65	1105.798	toe
1144	943629.022	575153.382	1106.258	toe
1145	943716.652	575150.741	1106.105	toe
1146	943805.401	575150.541	1106.652	toe
1147	943868.905	575153.942	1106.955	toe
2000	943928.204	575182.41	1118.439	TB
2001	943973.884	575182.418	1118.352	TB
2002	943993.471	575180.798	1117.092	TB
2003	944018.757	575161.188	1115.115	TB
2004	944047.254	575158.88	1113.975	TB
2005	944059.51	575137.69	1114.577	TB
2006	944060.243	575099.929	1114.985	TB
2007	944060.734	575068.546	1115.922	TB
2008	944038.967	575067.718	1116.106	TB
2009	944021.366	575068.687	1116.437	TB
2010	944013.59	575065.674	1119.23	TB
2011	944016.838	575019.841	1121.662	TB
2012	944008.831	574973.314	1120.674	TB
2013	943976	574934.665	1117.765	TB
2014	943921.909	574924.318	1118.039	TB
2015	943816.516	574927.294	1117.869	TB
2016	943705.925	574924.116	1118.437	TB
2017	943653.025	574921.144	1118.274	TB
2018	943600.305	574925.671	1117.307	TB
2019	943538.858	574924.757	1117.418	TB
2020	943476.405	574906.981	1116.588	TOP OF RAMP
2021	943452.083	574920.397	1116.649	TOP OF RAMP
2022	943510.012	574948.758	1114.35	TOP OF RAMP
2023	943511.092	574945.421	1112.853	TOE OF RAMP
2024	943521.283	574933.585	1112.834	TOE OF RAMP
2025	943353.17	574929.275	1117.587	TB
2026	943252.65	574931.634	1117.567	TB
2027	943151.653	574930.805	1117.675	TB
2028	943097.976	574947.663	1117.793	TB
2029	943127.214	574926.531	1116.777	TB
2030	943114.453	574902.443	1121.044	TB
2031	943091.904	574903.019	1121.246	TB
2032	943072.343	574887.72	1119.917	TB
2033	943050.733	574839.993	1117.537	TB
2034	943038.256	574763.629	1121.082	TB
2035	942993.359	574707.336	1119.134	TB
2036	942976.412	574662.399	1118.372	TB

2037	942966.957	574644.849	1118.551 TB
2038	943011.219	574636.369	1118.717 TB
2039	943060.341	574647.338	1117.868 TB
2040	943164.76	574659.128	1117.032 TB
2041	943246.185	574658.182	1117.508 TB
2042	943278.524	574647.805	1114.228 TB
2043	943298.324	574641.522	1111.325 TB
2044	943299.343	574600.641	1111.941 TB
2045	943303.672	574515.77	1112.597 TB
2046	943302.807	574418.7	1111.715 TB
2047	943301.55	574326.178	1112.311 TB
2048	943298.728	574248.57	1114.286 TB
2049	943291.446	574185.357	1118.23 TB
2050	943192.892	574182.441	1118.795 TB
2051	943092.817	574180.842	1118.494 TB
2052	943038.072	574189.409	1119.542 TB
2053	942992.569	574225.07	1118.332 TB
2054	942966.078	574235.923	1118.568 TB
2055	942961.097	574282.944	1118.17 TB
2056	942961.247	574341.657	1118.656 TB
2057	942962.148	574424.152	1118.582 TB
2058	942959.296	574501.038	1118.751 TB
2059	942951.01	574519.981	1117.633 TB
2060	942881.327	574521.45	1118.172 TB
2061	942838.696	574543.47	1117.682 TB
2062	942848.732	574618.557	1117.421 TB
2063	942862.041	574689.744	1117.887 TB
2064	942892.063	574777.86	1117.973 TB
2065	942924.668	574861.312	1117.806 TB
2066	942953.713	574929.363	1117.693 TB
2067	942994.536	574976.8	1117.48 TB
2068	943018.28	574997.324	1116.616 TB
2069	943016.901	575052.357	1115.227 TB
2070	943016.47	575074.249	1115.229 TB
2071	943015.968	575176.704	1115.937 TB
2072	943012.272	575272.131	1115.847 TB
2073	943011.74	575378.127	1115.601 TB
2074	943009.371	575473.279	1115.441 TB
2075	943009.451	575561.5	1115.299 TB
2076	943010.165	575614.717	1115.641 TB
2077	943043.826	575654.212	1115.355 TB
2078	943061.621	575669.999	1115.029 TB
2079	943053.817	575703.711	1114.994 TB
2080	943049.604	575728.562	1113.577 TB
2081	943067.177	575734.275	1113.888 TB
2082	943091.141	575729.042	1114.136 TB
2083	943114.976	575718.956	1114.232 TB
2084	943118.958	575677.657	1113.593 TB
2085	943158.252	575586.963	1114.696 TB
2086	943161.748	575510.437	1115.373 TB
2087	943168.683	575423.227	1115.262 TB
2088	943166.47	575347.164	1115.67 TB
2089	943166.486	575296.571	1115.618 TB
2090	943174.87	575245.835	1115.837 TB
2091	943204.671	575204.709	1115.993 TB
2092	943254.658	575187.229	1115.769 TB
2093	943349.425	575184.76	1115.612 TB
2094	943444.262	575185.102	1115.687 TB
2095	943549.673	575186.346	1115.976 TB
2096	943591.174	575189.117	1116.135 TB
2097	943653.262	575198.695	1115.603 TB
2098	943666.382	575184.928	1116.35 TB
2099	943715.54	575185.412	1116.566 TB
2100	943766.56	575193.891	1119.513 TB
2101	943819.472	575190.018	1119.05 TB
2102	943865.737	575186.979	1119.132 TB

DATE: 2/2/10

PARK PLACE

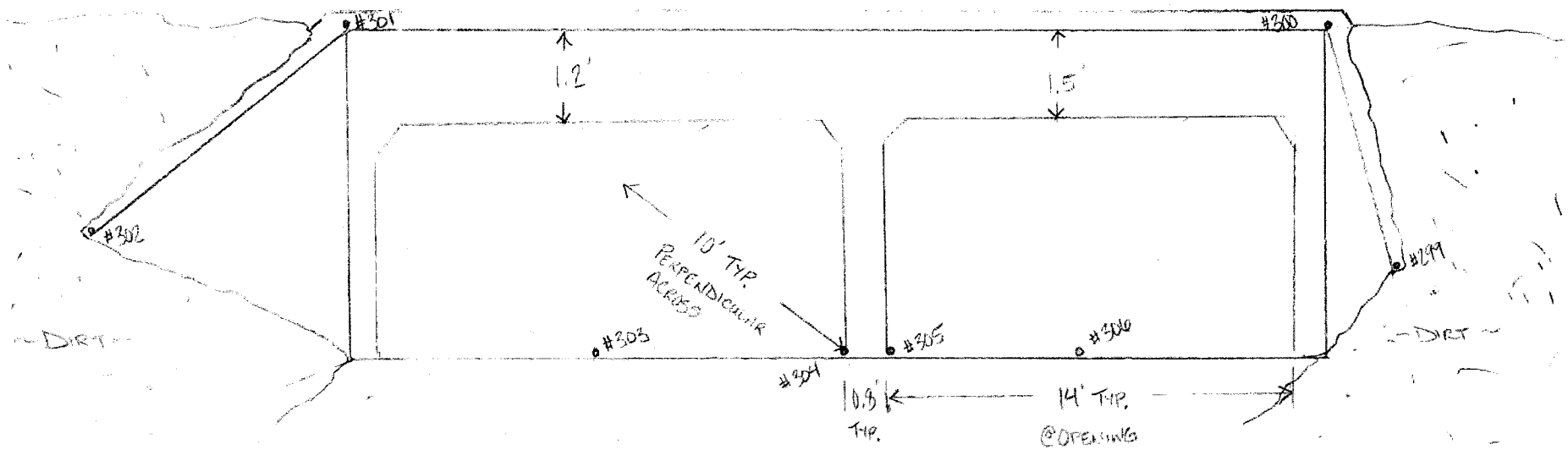




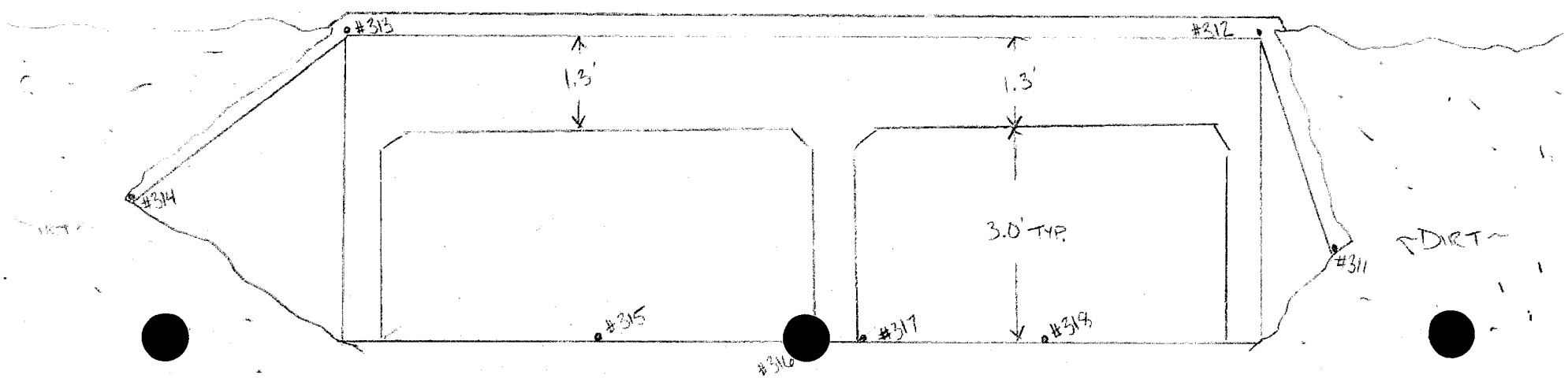
DATE 2/1/10

EL MIRAGE RD

EAST HEADWALL



WEST HEADWALL



APPENDIX D

HYROLOGIC ANALYSIS SUPPORTING DOCUMENTATION

APPENDIX D.1

STORAGE ROUTING DATA

Stage Storage Discharge Data for Proposed Basin - El Mirage Rd to Cactus Rd

100% Design Grading/60-inch Outlet Pipe

PROPOSED BASIN

PT No.	WSE	V (CY)	V (ac-ft)	Q (cfs)*
1	1105.606	-	-	0.0
2	1106.720	193.32	0.12	7.7
3	1107.720	1451.94	0.90	25.5
4	1108.720	6751.96	4.19	51.6
5	1109.720	19057.82	11.81	84.0
6	1110.220	27405.56	16.99	101.6
7	1110.720	36719.29	22.76	119.6
8	1111.220	46806.03	29.01	137.4
9	1111.720	57599.87	35.70	154.7
10	1111.920	62036.02	38.45	161.3
11	1112.120	66527.91	41.24	167.7
12	1112.320	71076.68	44.06	173.7
13	1112.520	75681.99	46.91	179.3
14	1112.720	80344.52	49.80	184.2
15	1112.820	82698.86	51.26	187.1
16	1112.920	85066.56	52.73	189.2
17	1113.020	87446.79	54.20	192.3
18	1113.120	89839.60	55.69	194.4
19	1113.220	92244.93	57.18	197.4
20	1113.320	94662.72	58.68	199.6

*Discharge Data Obtained from HY8 Runs Using Proposed Culvert Design Information

EXISTING CONDITIONS - WEST CACTUS BASIN

Client: Flood Control District of Maricopa County
Project: FCD2008C014, WA#1 - Lower El Mirage Wash DCR, Phase 1
Description: **Existing condition stage-storage-discharge data**
AZTEC Project No.: AZE0913-02
Date: 5/19/10 By: dtp

Stage - Discharge Data for West Cactus Basin

Stage (feet)	Water Surface Elevation	Discharge, in cfs			Storage Volume ac-ft
		Total	Culvert	Weir	
0	1103	0	0	0	0
1	1104	0	0	0	0.66
2	1105	0	0	0	4.1
4.2	1107.2	0	0	0	20
5	1108	25	25	0	27.6
7	1110	225	225	0	47.2
8	1111	375	375	0	57.8
8.7	1111.7	430	430	0	67
9	1112	474	470	4	69.2
9.3	1112.3	526	500	26	74
9.7	1112.7	633	535	98	78
10	1113	737	550	187	81.7
10.2	1113.2	835	565	270	85
10.4	1113.4	955	575	380	87
10.6	1113.6	1117	580	537	90
10.8	1113.8	1362	605	757	93

Elevation datum = NGVD29

Stage - Storage - Discharge Data for West Cactus Basin
CODE into HEC-1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SV	0	0.66	4.1	20	27.6	47.2	57.8	67	69.2	74
SV	78	81.7	85	87	90					
SQ	0	0	0	0	25	225	375	430	474	526
SQ	633	737	835	955	1117					
SE	1103	1104	1105	1107.2	1108	1110	1111	1111.7	1112	1112.3
SE	1112.7	1113	1113.2	1113.4	1113.6					

This data is a result of the following:

Storage data from: existing surface created from 2010 FCDMC survey data, supplemented with basin bottom spot elevation from the 2004 Stanley survey data.

Discharge data from: 2-10'x3' rcb combined with weir overflow data for controlling section as determined from 2010 survey data. Overflow weir data generated using COE uneven weir program.

EXISTING CONDITIONS - UPSTREAM OF CACTUS ROAD

Client: Flood Control District of Maricopa County
Project: FCD2008C014, WA#1 - Lower El Mirage Wash DCR, Phase 1
Description: **Existing condition stage-storage-discharge data**
AZTEC Project No.: AZE0913-02
Date: 5/19/10 By: dtp

Stage - Discharge Data for Cactus Road

Stage (feet)	Water Surface Elevation	Discharge, in cfs		
		Total	Culvert	Weir
0	1105.16	0	0	0
1.84	1107	9	9	0
4.84	1110	41	41	0
8.84	1114	81	81	0
9.02	1114.18	82	82	0
9.24	1114.4	118	85	33
9.44	1114.6	147.5	86.5	61
9.64	1114.8	184	88	96
9.84	1115	230	90	140
10.04	1115.2	294	92	202
10.34	1115.5	422	95	327
10.84	1116	717	98	619
11.34	1116.5	1123	105	1018

Storage Volume ac-ft
0
0.03
1.63
11.41
12
12.6
13.3
14
14.62
15.3
16.4
18.09
20.2

Elevation datum = NGVD29

Stage - Storage - Discharge Data for Cactus Road
CODE into HEC-1

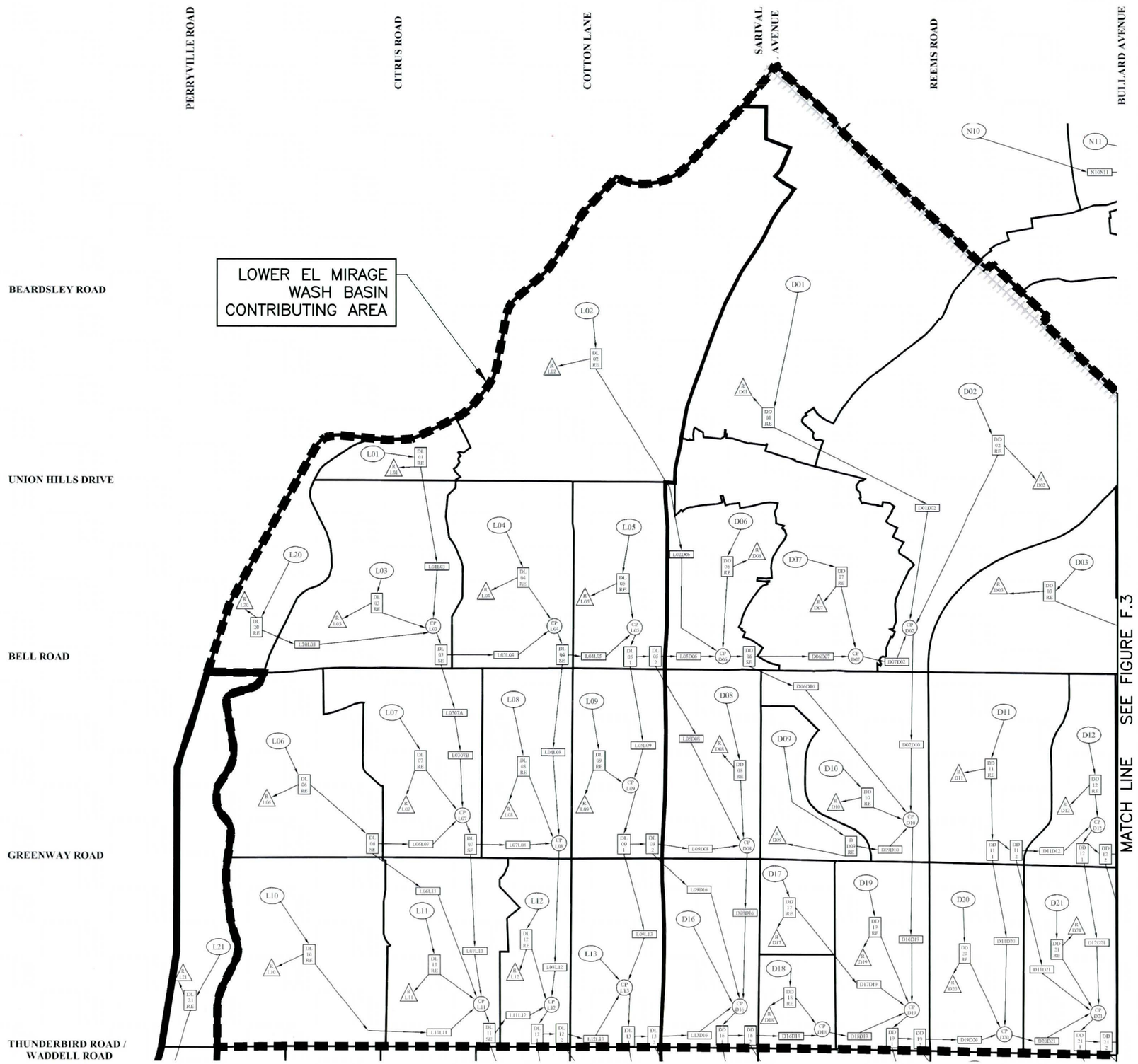
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SV	0	0.03	1.63	11.41	12	12.6	13.3	14	14.62	15.3
SV	16.4	18.09	20.2							
SQ	0	9	41	81	82	118	147.5	184	230	294
SQ	422	717	1123							
SE	1105.2	1107	1110	1114	1114.2	1114.4	1114.6	1114.8	1115	1115.2
SE	1115.5	1116	1116.5							

This data is a result of the following:
Storage data from: existing surface created from 2010 FCDMC survey data, supplemented with 2004 Stanley survey data north of Cactus Road.

Discharge data from: 3-24" rcp combined with weir overflow data for controlling section as determined from 2010 survey data. Overflow weir data generated using COE uneven weir program.

APPENDIX D.2

CONTRIBUTING WATERSHED HEC-1 SCHEMATIC



LEGEND

- HEC-1 REGION BOUNDARY
- MAJOR BASIN 02 BOUNDARY
- HYDROLOGIC SUBBASIN BOUNDARY
- W## — HYDROLOGIC SUBBASIN LABEL
- CP W## — CONCENTRATION POINT LABEL
- W##W## — ROUTE LABEL
- DW ## SW — DIVERSION LABEL
- R W## — RETENTION LABEL
- SR W## — STORAGE ROUTE LABEL
- RAILROAD

REFERENCE:
FIGURE 7 – EXISTING CONDITIONS HYDROLOGY
HEC-1 SCHEMATIC
FINAL HYDROLOGY REPORT, LOOP 303/WHITE TANKS ADMPU
AREA HYDROLOGIC ANALYSIS, SEPTEMBER 2008
HDR, INC.

3000' 0' 3000' 6000'
SCALE: 1"= 3000 FEET

Flood Control District of Maricopa County

Dibble Engineering

TITLE

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
LOWER EL MIRAGE WASH BASIN
Int. of Cactus Road & El Mirage Road | El Mirage, Arizona

SUBMITTAL

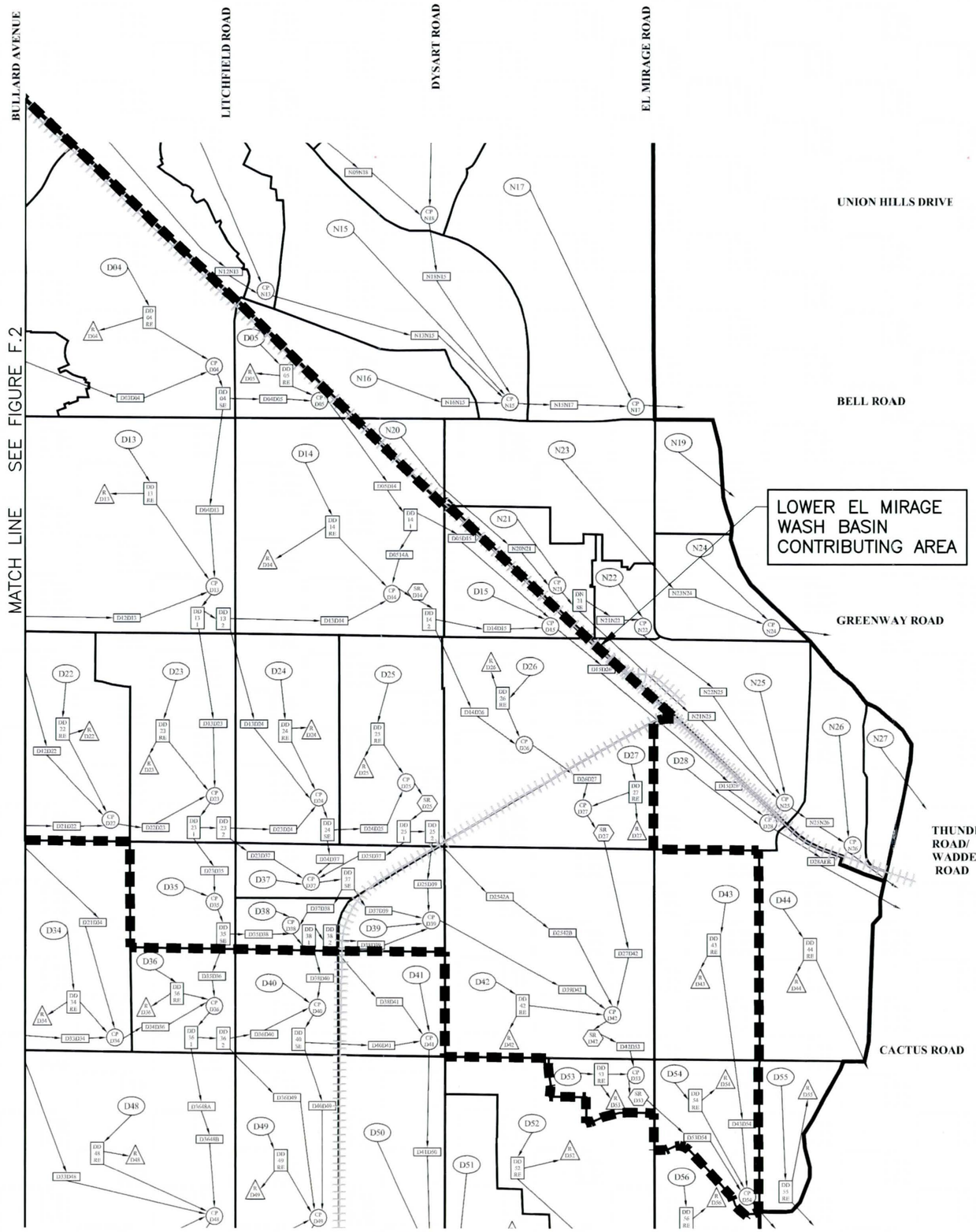
issued for: rev date

KEY MAP

PROJECT NUMBER
101120.01

Fig D.1
Contributing Watershed HEC-1 Schematic

FILE:J:\2011\101122_01-/ Mirage_Wash\CAD\Exhibits\Hydrology Exhibit.dwg DATE:Oct 18, 2012 TIME:7:56 PM (by:geoff.stone)



LEGEND

- HEC-1 REGION BOUNDARY
- MAJOR BASIN 02 BOUNDARY
- HYDROLOGIC SUBBASIN BOUNDARY
- W## — HYDROLOGIC SUBBASIN LABEL
- CP W## — CONCENTRATION POINT LABEL
- W##W## — ROUTE LABEL
- DW ## SW — DIVERSION LABEL
- R W## — RETENTION LABEL
- SR W## — STORAGE ROUTE LABEL
- RAILROAD

REFERENCE:
FIGURE 7 – EXISTING CONDITIONS HYDROLOGY
HEC-1 SCHEMATIC
FINAL HYDROLOGY REPORT, LOOP 303/WHITE TANKS ADMPU
AREA HYDROLOGIC ANALYSIS, SEPTEMBER 2008
HDR, INC.

3000' 0' 3000' 6000'
SCALE: 1"= 3000 FEET

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Fig D.
Contributing Watershed HEC-1 Schematic

FILE:J:\2011\101122_01-Lower_El_Mirage_Wash\CAD\Exhibits\Hydrology Exhibit.dwg DATE:Oct 18, 2012 TIME:7:56 PM (by:geoff.stone)

APPENDIX D.3

PRE-PROJECT CONDITIONS MODELING DATA AND RESULTS

```
1****************************************                                    ****************************************
*                                      *                                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                    *    U.S. ARMY CORPS OF ENGINEERS      *
*              JUN  1998               *                                    *    HYDROLOGIC ENGINEERING CENTER     *
*           VERSION 4.1                *                                    *          609 SECOND STREET           *
*                                      *                                    *       DAVIS, CALIFORNIA 95616        *
*  RUN DATE   08FEB13  TIME  14:56:10  *                                    *           (916) 756-1104             *
*                                      *                                    *                                      *
****************************************                                    ****************************************


                                    X     X  XXXXXXX   XXXXX          X
                                    X     X  X        X     X        XX
                                    X     X  X        X              X
                                    XXXXXXX  XXXX     X        XXXXX  X
                                    X     X  X        X              X
                                    X     X  X        X     X        X
                                    X     X  XXXXXXX   XXXXX        XXX


THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                          HEC-1 INPUT                                                    PAGE  1

      LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

        1           ID        Flood Control District of Maricopa County
        2           ID        LEMWB_PRE - Lower El Mirage Wash Basin Floodplain Delineation
        3           ID        Conditional Letter of Map Revision Pre-Project Hydrology
        4           ID        100 YEAR
        5           ID        24 Hour Storm
        6           ID        Unit Hydrograph: S-Graph
        7           ID        02/08/2013
        8           ID
        9           ID    MODEL ORIGIN: LOOP 303/WHITE TANKS ADMPU
       10           ID    FCDMC CONTRACT 2007C031
       11           ID    BY HDR ENGINEERING (#79902)
       12           ID    EXISTING CONDITIONS -AUGUST 2009
       13           ID    MAJOR BASIN 01
       14           ID          HDR FILE NAME: EX-MB1.DAT
       15           ID      ************************************************************************
       16           ID
       17           ID      FOLLOWING ARE THE CHANGES BY FCDMC:
       18           ID      1. Removed SRD14. - by JWH 10-16-09
       19           ID      FILE NAME: WT1EC01.DAT
       20           ID
       21           ID      For details concerning changes to this HEC-1 model, please contact
       22           ID      FCDMC, H&H Branch.
       23           ID
       24           ID      ************************************************************************
       25           ID
       26           ID      DIBBLE revisions for FCD2011C004, Work Assignment No. 1 are listed below:
       27           ID      1. Extracted portion of Major Basin D draining to CPD54 (Lower El Mirage)
       28           ID      2. Removed operation SRD25
       29           ID      3. Replaced SRD42 operation with stage-storage-discharge data using FCD
       30           ID         survey data
       31           ID      4. Rvised SRD53 operation stage-storage-discharge using 2010 FCD survey da
       32           ID
       33           ID         Filename: LEMWB_PRE.DAT         Date: 10/29/2012
       34           ID
       35           IT       5       0       0    2000
       36           IN      15
       37           IO       3
                    *DIAGRAM
                    *
       38           JD   3.480  0.0001
       39           PC   0.000   0.002   0.005   0.008   0.011   0.014   0.017   0.020   0.023   0.026
       40           PC   0.029   0.032   0.035   0.038   0.041   0.044   0.048   0.052   0.056   0.060
       41           PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
       42           PC   0.110   0.115   0.120   0.126   0.133   0.140   0.147   0.155   0.163   0.172
       43           PC   0.181   0.191   0.203   0.218   0.236   0.257   0.283   0.387   0.663   0.707
       44           PC   0.735   0.758   0.776   0.791   0.804   0.815   0.825   0.834   0.842   0.849
       45           PC   0.856   0.863   0.869   0.875   0.881   0.887   0.893   0.898   0.903   0.908
       46           PC   0.913   0.918   0.922   0.926   0.930   0.934   0.938   0.942   0.946   0.950
       47           PC   0.953   0.956   0.959   0.962   0.965   0.968   0.971   0.974   0.977   0.980
       48           PC   0.983   0.986   0.989   0.992   0.995   0.998   1.000
       49           JD   3.306    10.0
       50           JD   3.132    30.0
                    *
1                                          HEC-1 INPUT                                                    PAGE  2

      LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


       51           KK     D03   BASIN
       52           KM        BASIN BOUNDARY FROM KINGSWOOD PARKE
       53           BA   0.723
       54           LG    0.23    0.25    4.80    0.38      35
       55           UI       0     123     481     721    1150    1206     816     545     244     150
       56           UI      70      35      35       0       0       0       0       0       0       0
       57           UI       0       0       0       0       0       0       0       0       0       0
       58           UI       0       0       0       0       0       0       0       0       0       0
       59           UI       0       0       0       0       0       0       0       0       0       0
                    *

       60           KK  DD03RE  DIVERT
       61           KM        Master Drainage Report Update for Kingswood Parke Phase One
       62           KM        (excess retention provided for future development was
       63           KM        subtracted from total retenttion provided)
       64           DT    RD03    51.7     0.0
       65           DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
       66           DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
                    *

       67           KK  D03D04   ROUTE
```

```
 68          KM        Cross-section: Cross-section determined from aerial
 69          KM        Manning's N Value: street and earth with sparse trees and shrubs
 70          RS        4    FLOW
 71          RC   0.032   0.013   0.032    4458  0.0038    0.00
 72          RX  100.00  108.00  119.00  119.10  155.00  155.10  160.00  165.00
 73          RY  1000.3 1000.00  999.50  999.00  999.70 1000.20 1000.30 1000.40
             *

 74          KK     D04   BASIN
 75          KM        BASIN BOUNDARY FROM GRAND VILLAGE NORTH/SOUTH, BELLAZANO CONDOS,
 76          KM        HOPI VILLAGE, PIMA VILLAGE, SUN VILLAGE, ZUNI VILLAGE, PUEBLO VILLAGE,
 77          KM        GRAND AVE PROFF PLAZA AND GRAND AVE CHANNEL
 78          BA   0.891
 79          LG    0.22    0.27    5.70    0.26      36
 80          UI       0     123     429     682     934    1451    1138     831     585     291
 81          UI     187     115      38      38      38       0       0       0       0       0
 82          UI       0       0       0       0       0       0       0       0       0       0
 83          UI       0       0       0       0       0       0       0       0       0       0
 84          UI       0       0       0       0       0       0       0       0       0       0
             *

 85          KK  DD04RE  DIVERT
 86          KM        Master Drainage Report Update for Kingswood Parke Phase One (Sun Village
 87          KM        Final Drainage Report for Grand Village Center Phase 6, Drainage Report
 88          KM        Grand Point Plaza, Final Drainage Report -Revised  For Grand Pointe
 89          KM        Plaza Montessori of Surprise SP06-41
 90          DT    RD04    46.9     0.0
 91          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
 92          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 93          KK   CPD04 COMBINE
 94          HC       2   1.614
             *

 95          KK  DD04SE  DIVERT
 96          KM        Split flow Bell Rd at Litchfield Rd intersection
 97          DT   DD04S     0.0     0.0
 98          DI     0.0    86.1   158.5   512.0   904.0  1940.0     0.0     0.0     0.0     0.0
 99          DQ     0.0     0.0    42.4   259.0   534.0  1278.0     0.0     0.0     0.0     0.0
             *

100          KK  D04D05   ROUTE
101          KM        Cross-section: Cross-section determined from aerial
102          KM        Manning's N Value: street and earth with sparse trees and shrubs
103          RS        3    FLOW
104          RC   0.032   0.013   0.013    2993  0.0027    0.00
105          RX  100.00  119.00  135.00  135.10  180.00  180.10  181.00  182.00
106          RY  1000.0  999.80  999.50  999.00  999.80 1000.30 1000.40 1000.50
             *

107          KK     D05   BASIN
108          KM        BASIN BOUNDARY FROM WAL MART STORE
109          KM        SURPRISE TOWN CENTER AND GRAND AVE CHANNEL
110          BA   0.163
111          LG    0.11    0.26    4.90    0.39      73
112          UI       0     127     387     470     197      58      15       0       0       0
113          UI       0       0       0       0       0       0       0       0       0       0
114          UI       0       0       0       0       0       0       0       0       0       0
115          UI       0       0       0       0       0       0       0       0       0       0
116          UI       0       0       0       0       0       0       0       0       0       0
             *

117          KK  DD05RE  DIVERT
118          KM        West Point Towne Center Final Master Infrastructure Drainage Report
119          DT    RD05     8.2     0.0
120          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
121          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

122          KK   CPD05 COMBINE
123          HC       2   1.777
             *

124          KK  D05D14   ROUTE
125          KM        Cross-section: Cross-section determined from aerial, assumed
126          KM        3' depth / Manning's N Value: earth with grass and forbs
127          RS        2    FLOW
128          RC   0.032   0.032   0.032    3385  0.0053    0.00
129          RX  100.00  101.00  102.00  122.00  142.00  162.00  163.00  164.00
130          RY  1000.0  999.90  999.80  996.80  996.70  999.80  999.90 1000.00
             *
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

131          KK   DD141  DIVERT
132          KM        culvert crossing under Dysart Road - once the capacity is reached
133          KM        under the road, the flow will split with some continuing under
134          KM        the road and some will go south along the roadway
135          DT  DD141S     0.0     0.0
136          DI     0.0   122.0   500.0  1000.0     0.0     0.0     0.0     0.0     0.0     0.0
137          DQ     0.0     0.0   378.0   878.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

138          KK  D05D15   ROUTE
139          KM        Cross-section: Cross-section determined from aerial, assumed
140          KM        3' depth  / Manning's N Value: concrete
141          RS        8    FLOW
142          RC   0.016   0.016   0.016    4588  0.0044    0.00
143          RX  100.00  101.00  102.00  127.00  131.00  140.00  141.00  142.00
144          RY  1000.0  999.90  999.80  996.80  996.70  999.80  999.90 1000.00
             *

145          KK     D11   BASIN
146          KM        BASIN BOUNDARY FROM ORCHIDS DEVELOPMENT
147          KM        AND  GREENWAY ROAD DRAINAGE REPORT BY CMX (2008)
148          BA   0.662
149          LG    0.25    0.25    5.60    0.27      37
150          UI       0      78     212     386     499     683     948     708     543     408
151          UI     261     135     102      67      24      24      24      24       0       0
152          UI       0       0       0       0       0       0       0       0       0       0
```

```
153          UI       0       0       0       0       0       0       0       0       0       0
154          UI       0       0       0       0       0       0       0       0       0       0
             *

155          KK  DD11RE  DIVERT
156          KM        Final Drainage Report for Parkway Bank, Drainage Report for Deer Valley
157          KM        Credit Union Final Drainage Report for Jiffy Lube at Bell and Reems
158          KM        for The Orchard Estates Apartments, Drainage Report
159          KM        for Mountainside Fitness Center Lot 7 a
160          DT    RD11    32.4     0.0
161          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
162          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

163          KK   DD111  DIVERT
164          KM        Greenway at Parkview intersection split flow
165          DT  DD111S     0.0     0.0
166          DI     0.0    33.8   453.4  1486.3  2998.5     0.0     0.0     0.0     0.0     0.0
167          DQ     0.0    25.6   376.5  1210.3  2419.3     0.0     0.0     0.0     0.0     0.0
             *

168          KK   DD112  DIVERT
169          KM        Greenway at Parkview intersection split flow
170          DT  DD112S     0.0     0.0
171          DI     0.0     8.2    77.0   276.0   579.1     0.0     0.0     0.0     0.0     0.0
172          DQ     0.0     5.4    35.1    78.9   133.0     0.0     0.0     0.0     0.0     0.0
             *
1                                    HEC-1 INPUT                                          PAGE  5

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

173          KK  D11D12   ROUTE
174          KM        Cross-section: Cross-section determined from aerial
175          KM        Manning's N Value: clean earth; straight
176          RS       2    FLOW
177          RC   0.022   0.022   0.022    2668  0.0037    0.00
178          RX  100.00  124.00  154.00  155.00  156.00  157.00  158.00  159.00
179          RY  1208.0 1203.00 1208.00 1208.10 1208.20 1208.30 1208.40 1208.50
             *

180          KK     D12   BASIN
181          KM        BASIN BOUNDARY FROM ORCHIDS PARK
182          KM        AND  GREENWAY ROAD DRAINAGE REPORT BY CMX (2008)
183          BA   0.347
184          LG    0.24    0.25    5.80    0.28      33
185          UI       0      26      26      55     112     153     167     211     223     223
186          UI     210     185     198     139     145     103      85      78      61      46
187          UI      39      33      26      24      19      15      15      15       4       3
188          UI       3       3       3       3       3       3       3       3       3       3
189          UI       3       3       3       3       0       0       0       0       0       0
             *

190          KK  DD12RE  DIVERT
191          KM        Final Drainage Report for Residence Inn by Marriot
192          KM        Final Drainage Report for The Orchards Parcel 5
193          KM        (Includes Parcels 9,11,12 and 1/2 of 8), Final Drainage Report for
194          KM        Stadium Village (South) Residences
195          KM        Final Drainage Report for Stadium Village Residences
196          DT    RD12    15.3     0.0
197          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
198          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

199          KK   CPD12 COMBINE
200          HC       2   1.009
             *

201          KK   DD121  DIVERT
202          KM        Greenway at Bullard intersection split flow
203          DT  DD121S     0.0     0.0
204          DI     0.0    68.7   371.0  1186.5  2407.4     0.0     0.0     0.0     0.0     0.0
205          DQ     0.0    19.7   166.4   705.0  1553.4     0.0     0.0     0.0     0.0     0.0
             *

206          KK   DD122  DIVERT
207          KM        Greenway at Bullard intersection split flow
208          DT  DD122S     0.0     0.0
209          DI     0.0    48.9   204.6   481.5   854.0     0.0     0.0     0.0     0.0     0.0
210          DQ     0.0    24.3    82.0   159.0   251.4     0.0     0.0     0.0     0.0     0.0
             *
1                                    HEC-1 INPUT                                          PAGE  6

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

211          KK  D12D13   ROUTE
212          KM        Cross-section: determined from aerial and contours
213          KM        Manning's N Value: earth with sparse trees and shrubs for left
214          KM        overbank and main channel, right overbank is pavement
215          RS      10    FLOW
216          RC   0.032   0.032   0.013    5345  0.0031    0.00
217          RX  100.00  100.10  100.20  155.00  198.00  205.00  215.00  220.00
218          RY  1000.2 1000.10 1000.00  998.00  998.40  998.50  998.60  998.70
             *

219          KK     D13   BASIN
220          KM        BASIN BOUNDARY FROM GREENWAY ROAD DRAINAGE REPORT BY CMX (2008)
221          BA   1.030
222          LG    0.29    0.33    4.90    0.31      17
223          UI       0     187     635    1136    1450    1305    1090     762     495     293
224          UI     195     139      98      46      22      22      22      22      22      22
225          UI       0       0       0       0       0       0       0       0       0       0
226          UI       0       0       0       0       0       0       0       0       0       0
227          UI       0       0       0       0       0       0       0       0       0       0
             *

228          KK  DD13RE  DIVERT
229          KM        Final Drainage Report for Surprise Festival, Final Drainage Report
230          KM        for The City at Surprise Office Building, Final Drainage Report for
231          KM        Surprise Tennis Center, Final Drainage Report for City of Surprise
232          KM        Central Utility Plant, Final Drainage Report for Hear
233          DT    RD13    17.1     0.0
234          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
235          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *
```

```
236          KK  DD04SERETRIEVE
237          DR   DD04S
             *

238          KK  D04D13   ROUTE
239          KM        Cross-section: Cross-section determined from aerial
240          KM        Manning's N Value: Natural desert wash, sheet flow
241          RS      13    FLOW
242          RC   0.040   0.040   0.040    5483  0.0031    0.00
243          RX  100.00  101.00  102.00  150.00  155.00  700.00  710.00  720.00
244          RY  1000.0  999.90  999.80  997.80  997.90  999.80  999.90 1000.00
             *

245          KK   CPD13 COMBINE
246          HC       3   3.653
             *

247          KK   DD131  DIVERT
248          KM        Greenway at Litchfield intersection split flow
249          DT  DD131S     0.0     0.0
250          DI     0.0   519.2   917.3  1650.7  2842.4     0.0     0.0     0.0     0.0     0.0
251          DQ     0.0    18.8   121.1   423.4   996.3     0.0     0.0     0.0     0.0     0.0
             *
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

252          KK   DD132  DIVERT
253          KM        Greenway at Litchfield intersection split flow
254          DT  DD132S     0.0     0.0
255          DI     0.0   500.4   796.2  1227.2  1846.1     0.0     0.0     0.0     0.0     0.0
256          DQ     0.0   112.4   318.0   584.2   899.4     0.0     0.0     0.0     0.0     0.0
             *

257          KK  D13D14   ROUTE
258          KM        Cross-section: Cross-section determined from FCDMC 69
259          KM        Manning's N Value: earth with grass and forbs
260          RS       5    FLOW
261          RC   0.025   0.025   0.025    5304  0.0015    0.00
262          RX  100.00  120.00  122.40  140.40  158.40  176.40  176.80  196.80
263          RY  1175.5 1175.40 1175.00 1172.00 1171.90 1175.00 1175.40 1175.50
             *

264          KK     D14   BASIN
265          KM        BASIN BOUNDARY FROM WEST POINT DEVELOPMENT AND GRANDE AVE CHANNEL
266          BA   0.942
267          LG    0.23    0.26    5.10    0.33      37
268          UI       0     115     326     583     757    1079    1353     984     745     547
269          UI     300     193     123      66      35      35       0       0       0       0
270          UI       0       0       0       0       0       0       0       0       0       0
271          UI       0       0       0       0       0       0       0       0       0       0
272          UI       0       0       0       0       0       0       0       0       0       0
             *

273          KK  DD14RE  DIVERT
274          KM        West Point Towne Center Final Master Infrastructure Drainage Report
275          DT    RD14    63.4     0.0
276          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
277          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

278          KK   DD141RETRIEVE
279          DR  DD141S
             *

280          KK  D0514A   ROUTE
281          KM        Cross-section: Cross-section determined from aerial
282          KM        Manning's N Value: street and ROW
283          KM        Route is from DD141 diversion to CPD14
284          RS       3    FLOW
285          RC   0.032   0.013   0.032    3147  0.0051    0.00
286          RX  100.00  120.00  140.00  140.10  200.00  200.10  220.00  240.00
287          RY  1000.0  999.50 1000.00  999.50  999.50 1000.00  999.50 1000.00
             *

288          KK   CPD14 COMBINE
289          HC       3   4.758
             *
             *
             *    Removed SRD 14 from schematic to show no storage routing per
             *    site visit by AMM  -  FCDMC/JWH 10-19-09
             *
             * KK SRD14STORAGE
             * KM      Storage in basin at Greenway and Dysart
             * KM      Volume estimated from topo
             * KO
             * RS     1    STOR
             * SV          0.30    4.10   17.00   40.40   95.20
             * SQ         23.60   83.80  162.00  645.50 2369.50
             * SE1164.0 1165.00 1166.00 1167.00 1168.00 1169.00
             * ST
             *
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

290          KK   DD142  DIVERT
291          KM        Greenway at Dysart intersection split flow
292          DT  DD142S     0.0     0.0
293          DI     0.0   295.5   693.0  1325.3  2531.5     0.0     0.0     0.0     0.0     0.0
294          DQ     0.0   269.3   457.1   770.3  1405.9     0.0     0.0     0.0     0.0     0.0
             *

295          KK  D14D15   ROUTE
296          KM        Cross section: Cross-section determined from  aerial, 1/2 street section
297          KM        Manning's N Value: street, clean earth
298          RS       1    FLOW
299          RC   0.022   0.013   0.013    3351  0.0029    0.00
300          RX  100.00  100.10  110.00  110.10  120.00  125.00  133.90  134.00
301          RY  1003.0  999.80  999.70  999.20  999.40  999.50  999.70 1000.50
             *

302          KK     D15   BASIN
303          KM        BASIN BOUNDARY FROM SUCCESS SCHOOL
304          BA   0.220
```

```
305          LG    0.19    0.15    7.00    0.16      52
306          UI       0     101     306     560     408     206      75      26      16       0
307          UI       0       0       0       0       0       0       0       0       0       0
308          UI       0       0       0       0       0       0       0       0       0       0
309          UI       0       0       0       0       0       0       0       0       0       0
310          UI       0       0       0       0       0       0       0       0       0       0
             *

311          KK   CPD15 COMBINE
312          HC       3   4.978
             *

313          KK     L01   BASIN
314          KM         BASIN BOUNDARY FROM SUN CITY GRAND AND BEARSLEY CSR
315          BA   0.162
316          LG    0.26    0.26    5.20    0.30      33
317          UI       0      66     203     375     316     179      67      27      11       0
318          UI       0       0       0       0       0       0       0       0       0       0
319          UI       0       0       0       0       0       0       0       0       0       0
320          UI       0       0       0       0       0       0       0       0       0       0
321          UI       0       0       0       0       0       0       0       0       0       0
             *

322          KK  DL01RE  DIVERT
323          KM         Master Drainage Report for Del Webb's Grand Avenue Property
324          DT    RL01     9.9     0.0
325          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
326          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

327          KK  L01L03   ROUTE
328          KM         Cross-section: From Arizona Traditions Report
329          KM         Manning's N Value: Channel along Arizona Traditons
330          KM         Manning's for earth with grass and forbs
331          RS       5    FLOW
332          RC   0.025   0.025   0.025    5547  0.0032    0.00
333          RX  100.00  114.00  116.00  118.00  120.00  122.00  124.00  138.00
334          RY  1000.0  995.40  995.30  995.20  995.10  995.20  995.30 1000.00
             *

335          KK     L03   BASIN
336          KM         BASIN BOUNDARY FROM ARIZONA TRADITIONS NORTH AND SOUTH
337          BA   0.786
338          LG    0.20    0.25    5.80    0.25      27
339          UI       0     103     330     546     727    1135    1063     775     567     362
340          UI     177     126      70      31      31      31       0       0       0       0
341          UI       0       0       0       0       0       0       0       0       0       0
342          UI       0       0       0       0       0       0       0       0       0       0
343          UI       0       0       0       0       0       0       0       0       0       0
             *

344          KK  DL03RE  DIVERT
345          KM         Master Drainage Study for Arizona Traditions
346          DT    RL03    68.1     0.0
347          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
348          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

349          KK     L20   BASIN
350          KM         BASIN BOUNDARY FROM FRS#3 ON THE WEST
351          KM         BEARDSLEY CSR ON THE EAST AND BELL POINT I
352          BA   0.347
353          LG    0.27    0.28    5.60    0.24      20
354          UI       0      42     117     211     273     386     496     365     278     207
355          UI     118      71      48      28      13      13      13       0       0       0
356          UI       0       0       0       0       0       0       0       0       0       0
357          UI       0       0       0       0       0       0       0       0       0       0
358          UI       0       0       0       0       0       0       0       0       0       0
             *

359          KK  DL20RE  DIVERT
360          KM         Bell Pointe I and II, Arizona Traditions Parcel XIV
361          DT    RL20    21.3     0.0
362          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
363          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

364          KK  L20L03   ROUTE
365          KM         Cross-section: Estimated 3' deep and 4:1 side slopes
366          KM         width based on aerial
367          KM         Manning's N Value: earth w/ sparse trees and shrubs
368          RS       6    FLOW
369          RC   0.032   0.032   0.032    5440  0.0055    0.00
370          RX  100.00  106.00  112.00  124.00  136.00  148.00  168.00  188.00
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

371          RY  1310.5 1310.30 1310.00 1307.00 1307.10 1310.00 1310.25 1310.50
             *

372          KK   CPL03 COMBINE
373          HC       3   1.295
             *

374          KK  DL03SE  DIVERT
375          KM         Diversion at Bell Rd near Citrus
376          KM         Culverts under Bell Rd to south
377          DT   DL03S     0.0     0.0
378          DI     0.0    37.0   237.0   537.0  1037.0     0.0     0.0     0.0     0.0     0.0
379          DQ     0.0    37.0    37.0   337.0   837.0     0.0     0.0     0.0     0.0     0.0
             *

380          KK  L03L04   ROUTE
381          KM         Cross-section:Cross section estimated from aerial for 1/2 street section
382          KM         Manning's N Value: street, earth with sparse trees and shrubs
383          RS       8    FLOW
384          RC   0.032   0.013   0.013    3413  0.0046    0.00
385          RX  100.00  103.00  123.00  123.10  162.00  162.10  165.00  169.00
386          RY  1000.2 1000.10  999.50  999.00  999.80 1000.30 1000.40 1000.50
             *

387          KK     L04   BASIN
```

```
388          KM        BASIN BOUNDARY FROM HAPPY TRAILS DEVLP
389          BA   0.631
390          LG    0.18    0.25    5.00    0.38      22
391          UI       0      74     199     364     469     637     900     679     522     393
392          UI     261     128     100      68      23      23      23      23       0       0
393          UI       0       0       0       0       0       0       0       0       0       0
394          UI       0       0       0       0       0       0       0       0       0       0
395          UI       0       0       0       0       0       0       0       0       0       0
             *

396          KK  DL04RE  DIVERT
397          KM        Retention volume estimated based on aerial, Happy Trails
398          DT    RL04    44.0     0.0
399          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
400          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

401          KK   CPL04 COMBINE
402          HC       2   1.926
             *

403          KK  DL04SE  DIVERT
404          KM        Intersection diversion Bell Rd at Cotton Ln
405          DT   DL04S     0.0     0.0
406          DI     0.0     0.0    56.3   171.0  1026.0  1998.0  4546.0     0.0     0.0     0.0
407          DQ     0.0     0.0     0.0    36.0   526.0  1058.0  2453.0     0.0     0.0     0.0
             *
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

408          KK  L04L05   ROUTE
409          KM        Cross-section: Cross-section determined from aerial
410          KM        Manning's N Value: retention basins, earth w/ grass
411          RS       1    FLOW
412          RC   0.025   0.025   0.025    2571  0.0024    0.00
413          RX  100.00  109.00  109.10  121.50  209.50  209.60  211.00  215.00
414          RY  1283.3 1282.80 1282.30 1282.50 1282.60 1283.00 1283.10 1283.30
             *

415          KK     L05   BASIN
416          KM        BASIN BOUNDARY FROM COMM DEVLP AND BELL WEST RANCH
417          BA   0.486
418          LG    0.23    0.25    5.70    0.25      43
419          UI       0      69     249     389     542     817     609     439     298     141
420          UI      93      52      21      21      21       0       0       0       0       0
421          UI       0       0       0       0       0       0       0       0       0       0
422          UI       0       0       0       0       0       0       0       0       0       0
423          UI       0       0       0       0       0       0       0       0       0       0
             *

424          KK  DL05RE  DIVERT
425          KM        Final Drainage Report for Cotton Lane Professional Park, Drainage Report
426          KM        Bell West Ranch Shops, Final Drainage Report - Bell West Ranch Parcel 4
427          KM        Master Drainage Report - Bell West Ranch
428          DT    RL05    33.2     0.0
429          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
430          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

431          KK   CPL05 COMBINE
432          HC       2   2.412
             *

433          KK   DL051  DIVERT
434          KM        Diversion at L303 and Bell
435          DT  DL051S     0.0     0.0
436          DI     0.0   302.2  1308.0  3126.8  6532.9     0.0     0.0     0.0     0.0     0.0
437          DQ     0.0     1.9   103.3   562.9  1938.1     0.0     0.0     0.0     0.0     0.0
             *

438          KK   DL052  DIVERT
439          KM        Diversion at L303 and Bell
440          DT  DL052S     0.0     0.0
441          DI     0.0   300.3  1204.7  2563.8  4594.8     0.0     0.0     0.0     0.0     0.0
442          DQ     0.0     7.6    25.6    49.7    78.6     0.0     0.0     0.0     0.0     0.0
             *

443          KK  L05D06   ROUTE
444          KM        Cross-section: Estimated 3' deep and 4:1 side slopes, width based
445          KM        on aerial / Manning's N Value: half street and ROW
446          RS       1    FLOW
447          RC   0.032   0.013   0.032    3272  0.0062    0.00
448          RX  100.00  101.00  102.00  114.00  153.00  165.00  166.00  167.00
449          RY  1000.2 1000.10 1000.00  997.00  996.90 1000.00 1000.10 1000.20
             *
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

450          KK     L02   BASIN
451          KM        BASIN BOUNDARY FROM SUN CITY GRAND AND BEARSLEY CSR
452          BA   1.884
453          LG    0.22    0.26    5.20    0.32      31
454          UI       0     163     239     617     823     984    1201    1620    2018    1592
455          UI    1312    1066     865     669     385     279     230     163     100      50
456          UI      50      50      50      50       0       0       0       0       0       0
457          UI       0       0       0       0       0       0       0       0       0       0
458          UI       0       0       0       0       0       0       0       0       0       0
             *

459          KK  DL02RE  DIVERT
460          KM        Master Drainage Report for Del Webb's Grand Avenue Property
461          DT    RL02   117.2     0.0
462          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
463          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

464          KK  L02D06   ROUTE
465          KM        Cross-section: Estimated 3' deep and 4:1 side slopes, width based
466          KM        on aerial / Manning's N Value: earth w/ sparse trees and shrubs
467          KM        exist conditions: outfall to south into L303 ROW
468          RS       6    FLOW
469          RC   0.032   0.032   0.013    8306  0.0043    0.00
470          RX  100.00  101.00  102.00  114.00  153.00  165.00  166.00  167.00
```

```
471          RY  1000.4  999.90  999.80  997.00  997.10  999.80  999.90 1000.35
             *

472          KK     D06   BASIN
473          KM        BASIN BOUNDARY FROM SUN CITY GRAND
474          BA   0.463
475          LG    0.22    0.19    6.60    0.18      32
476          UI       0      61     202     331     443     696     615     450     326     193
477          UI     105      69      34      19      19       19       0       0       0       0
478          UI       0       0       0       0       0       0       0       0       0       0
479          UI       0       0       0       0       0       0       0       0       0       0
480          UI       0       0       0       0       0       0       0       0       0       0
             *

481          KK  DD06RE  DIVERT
482          KM        Master Drainage Report for Del Webb's Grand Avenue Property
483          DT    RD06    32.0     0.0
484          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
485          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

486          KK   CPD06 COMBINE
487          HC       3   4.759
             *
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

488          KK  DD06SE  DIVERT
489          KM        Divert based on capacity at Bell Road. Bell Rd section from
490          KM        Final Drainage Report for Westfield Commons Jan 2008
491          DT   DD06S     0.0     0.0
492          DI     0.0   100.0   200.0   300.0   370.0   400.0   800.0  1000.0 10000.0     0.0
493          DQ     0.0     0.0     0.0     0.0     0.0    30.0   430.0   630.0  9630.0     0.0
             *

494          KK  D06D07   ROUTE
495          KM        Cross-section: Cross-section determined from aerial
496          KM        Manning's N Value: street and ROW, left overbank is
497          KM        earth with sparse trees and shrubs
498          RS      12    FLOW
499          RC   0.013   0.013   0.013    2785  0.0052    0.00
500          RX  100.00  100.10  118.70  118.80  165.00  211.10  211.20  230.00
501          RY  1266.0 1264.00 1263.74 1263.24 1264.00 1263.50 1264.00 1264.38
             *

502          KK     D07   BASIN
503          KM        BASIN BOUNDARY FROM SUN CITY GRAND
504          BA   0.886
505          LG    0.21    0.23    6.20    0.22      27
506          UI       0      85     163     359     467     575     744    1058     862     689
507          UI     548     433     301     162     141      86      62      26      26      26
508          UI      26       0       0       0       0       0       0       0       0       0
509          UI       0       0       0       0       0       0       0       0       0       0
510          UI       0       0       0       0       0       0       0       0       0       0
             *

511          KK  DD07RE  DIVERT
512          KM        Master Drainage Report for Del Webb's Grand Avenue Property
513          DT    RD07    61.2     0.0
514          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
515          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

516          KK   CPD07 COMBINE
517          HC       2   5.645
             *

518          KK  D07D02   ROUTE
519          KM        Cross-section: Estimated 3' deep, side slopes and width based
520          KM        on aerial / Manning's N Value: earth w/ sparse trees and brush
521          RS       1    FLOW
522          RC   0.032   0.032   0.032    1520  0.0013    0.00
523          RX  100.00  100.10  100.20  133.00  156.00  174.80  174.90  175.00
524          RY  1001.0  999.90  999.80  997.00  997.10  999.80  999.90 1001.00
             *
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

525          KK     D01   BASIN
526          KM        BASIN BOUNDARY FROM SUN CITY GRAND
527          BA   1.564
528          LG    0.21    0.26    5.10    0.34      24
529          UI       0     131     176     483     649     775     937    1194    1647    1366
530          UI    1110     920     751     604     410     232     215     142     129      40
531          UI      40      40      40      40      40       0       0       0       0       0
532          UI       0       0       0       0       0       0       0       0       0       0
533          UI       0       0       0       0       0       0       0       0       0       0
             *

534          KK  DD01RE  DIVERT
535          KM        Master Drainage Report for Del Webb's Grand Avenue Property
536          DT    RD01    97.0     0.0
537          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
538          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

539          KK  D01D02   ROUTE
540          KM        Cross-section: Golf course, assumed 0.5% side slopes, V-ditch
541          KM        Manning's N Value: golf course
542          RS      18    FLOW
543          RC   0.025   0.025   0.025    9289  0.0038    0.00
544          RX  100.00  200.00  400.00  500.00  550.00  600.00  800.00  900.00
545          RY  1000.0  999.50  998.50  998.00  998.25  998.50  999.50 1000.00
             *

546          KK     D02   BASIN
547          KM        BASIN BOUNDARY FROM SUN CITY GRAND
548          BA   1.844
549          LG    0.21    0.26    5.40    0.29      28
550          UI       0     170     295     683     902    1091    1371    1988    1900    1476
551          UI    1205     961     751     442     293     240     170      90      52      52
552          UI      52      52       0       0       0       0       0       0       0       0
553          UI       0       0       0       0       0       0       0       0       0       0
```

```
554          UI       0       0       0       0       0       0       0       0       0       0
             *

555          KK  DD02RE  DIVERT
556          KM        Master Drainage Report for Del Webb's Grand Avenue Property
557          DT    RD02   125.6     0.0
558          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
559          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

560          KK   CPD02 COMBINE
561          HC       3   9.053
             *
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

562          KK  D02D10   ROUTE
563          KM        Cross-section determined from site visit by John Holmes at FCDMC
564          RS       8    FLOW
565          RC   0.032   0.032   0.032    5395  0.0037    0.00
566          RX  100.00  102.50  105.00  110.00  120.00  125.00  127.50  130.00
567          RY  1242.0 1241.00 1240.00 1238.00 1237.90 1240.00 1241.00 1242.00
             *

568          KK     D09   BASIN
569          KM        BASIN BOUNDARY FROM MOUNTAIN VISTA RANCH
570          BA   0.265
571          LG    0.25    0.25    5.70    0.24      35
572          UI       0      39     152     231     338     457     320     225     135      67
573          UI      42      16      12      12       0       0       0       0       0       0
574          UI       0       0       0       0       0       0       0       0       0       0
575          UI       0       0       0       0       0       0       0       0       0       0
576          UI       0       0       0       0       0       0       0       0       0       0
             *

577          KK  DD09RE  DIVERT
578          KM        Drainage Report for Montain Vista Ranch
579          DT    RD09    15.8     0.0
580          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
581          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

582          KK  D09D10   ROUTE
583          KM        Cross-section: Estimated V-ditch w/ 4:1 side slopes
584          KM        Manning's N Value: earth with grass, sparse trees and shrubs
585          RS       1    FLOW
586          RC   0.025   0.025   0.032    1657  0.0043    0.00
587          RX  100.00  105.00  110.00  130.00  150.00  160.00  165.00  167.00
588          RY  1000.0  999.90  999.80  996.80  996.70  998.70  999.80 1000.00
             *

589          KK  DD06SERETRIEVE
590          DR   DD06S
             *

591          KK  D06D10   ROUTE
592          KM        Cross-section: From Final Drainage Report for Westfield Commons
593          RS      13    FLOW
594          RC   0.030   0.030   0.030    8002  0.0044    0.00
595          RX  100.00  109.00  113.00  118.00  125.00  131.00  137.00  142.00
596          RY  1240.0 1239.82 1238.04 1236.26 1236.16 1238.04 1239.60 1240.82
             *

597          KK     D10   BASIN
598          KM        BASIN BOUNDARY FROM MOUNTAIN VISTA RANCH
599          KM        COMMERCIAL DEVLP AND AG LANG
600          BA   0.628
601          LG    0.24    0.26    5.80    0.23      34
602          UI       0      80     248     420     555     842     875     632     466     317
603          UI     155     111      69      25      25      25       0       0       0       0
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

604          UI       0       0       0       0       0       0       0       0       0       0
605          UI       0       0       0       0       0       0       0       0       0       0
606          UI       0       0       0       0       0       0       0       0       0       0
             *

607          KK  DD10RE  DIVERT
608          KM        Mountain Vista Ranch Drainage Proposal for Reems Road
609          KM        Drainage Report for Montain Vista Ranch, Final Drainage Report Westfiel
610          KM        Commons Final Drainage Report for Greenway & Reems, Final Drainage
611          KM        Report for the Interim Condition for Westfield Commons Subd
612          DT    RD10    37.8     0.0
613          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
614          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

615          KK   CPD10 COMBINE
616          HC       4   9.946
             *

617          KK  D10D19   ROUTE
618          KM        Cross-section determined from Drainage Report
619          KM        for Channelization of Reems Road Floodplain along Tash Project.
620          RS       3    FLOW
621          RC   0.022   0.022   0.022    5364  0.0027    0.00
622          RX  100.00  107.60  115.20  122.80  130.80  138.40  146.00  153.60
623          RY  1220.0 1218.00 1216.00 1214.00 1213.90 1216.00 1218.00 1220.00
             *

624          KK     L09   BASIN
625          KM        BASIN BOUNDARY FROM SURPRISE FARMS
626          BA   0.489
627          LG    0.27    0.27    5.70    0.24      31
628          UI       0      60     171     304     396     565     703     510     385     282
629          UI     152     100      62      32      18      18      18       0       0       0
630          UI       0       0       0       0       0       0       0       0       0       0
631          UI       0       0       0       0       0       0       0       0       0       0
632          UI       0       0       0       0       0       0       0       0       0       0
             *

633          KK  DL09RE  DIVERT
634          KM        Final Drainage Report for Parcels 2-7 of Surprise Farms, Parcel 8
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635          KM        (Basins A, B, C). Final Drainage Report for Safeway Store #1997,
636          KM        Retention Calculations for New Dysart Elementary School No. 9
637          KM        at Site J (excess of 3.30 ac-ft).
638          DT    RL09    40.3     0.0
639          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
640          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

641          KK   DL051RETRIEVE
642          DR  DL051S
             *
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

643          KK  L05L09   ROUTE
644          KM        Cross-section: Cross-section determined from aerial
645          KM        Manning's N Value: earth w/ sparse trees and brush
646          RS      15    FLOW
647          RC   0.032   0.032   0.032    5376  0.0045    0.00
648          RX  100.00  240.00  280.00  400.00  440.00  480.00  500.00  550.00
649          RY  1258.0 1254.00 1253.00 1253.00 1253.00 1254.00 1255.00 1257.00
             *

650          KK   CPL09 COMBINE
651          HC       2   2.901
             *

652          KK   DL091  DIVERT
653          KM        L303 at Greenway intersection split flow
654          DT  DL091S     0.0     0.0
655          DI     0.0   139.8   574.5  1711.2  3567.8     0.0     0.0     0.0     0.0     0.0
656          DQ     0.0    14.8   433.6  1380.6  2769.3     0.0     0.0     0.0     0.0     0.0
             *

657          KK   DL092  DIVERT
658          KM        L303 at Greenway intersection split flow
659          DT  DL092S     0.0     0.0
660          DI     0.0   125.0   140.9   330.6   798.6     0.0     0.0     0.0     0.0     0.0
661          DQ     0.0     0.0    15.9   177.9   429.6     0.0     0.0     0.0     0.0     0.0
             *

662          KK  L09D08   ROUTE
663          KM        Cross-section: Estimated 3' deep and 4:1 side slopes, width based
664          KM        on aerial / Manning's N Value: retention basins, earth w/ grass
665          RS       1    FLOW
666          RC   0.025   0.025   0.025    2922  0.0014    0.00
667          RX  100.00  101.00  102.00  114.00  133.00  145.00  146.00  147.00
668          RY  1000.2 1000.10 1000.00  997.00  997.00 1000.00 1000.10 1000.20
             *

669          KK     D08   BASIN
670          KM        BASIN BOUNDARY FROM LOOP 303 AND NORTHWEST RANCH
671          BA   0.514
672          LG    0.28    0.26    5.40    0.29      30
673          UI       0      44      62     164     219     262     318     419     545     442
674          UI     361     297     241     192     118      76      69      44      35      13
675          UI      13      13      13      13       0       0       0       0       0       0
676          UI       0       0       0       0       0       0       0       0       0       0
677          UI       0       0       0       0       0       0       0       0       0       0
             *

678          KK  DD08RE  DIVERT
679          KM        Final Drainage Report for Surprise Farms Parcel 12 (Parcel 12 Basin A
680          KM        only, Basin B/C same as Tract O), Final Drainage Report for
681          KM        Parcel 13 of Surprise Farms (Tract O, P), Final Drainage Report
682          KM        for Surprise Farms Parcel 9 (Tract K and 9), Final Drainage Report
683          DT    RD08    26.0     0.0
684          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

685          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

686          KK   DL052RETRIEVE
687          DR  DL052S
             *

688          KK  L05D08   ROUTE
689          KM        Cross-section: Estimated V ditch 2' deep , width based on aerial
690          KM        Manning's N Value:  earth w/ grass
691          RS      19    FLOW
692          RC   0.022   0.022   0.022    7790  0.0039    0.00
693          RX  100.00  120.00  130.00  150.00  151.00  170.00  180.00  200.00
694          RY  1000.0  999.20  998.80  998.00  997.90  998.80  999.20 1000.00
             *

695          KK   CPD08 COMBINE
696          KM        Sarival at Greenway
697          HC       3   3.415
             *

698          KK  D08D16   ROUTE
699          KM        Cross-section: Ag field, assumed 0.5% side slopes
700          KM        V-ditch / Manning's N Value: Ag field
701          RS      11    FLOW
702          RC   0.038   0.038   0.038    5348  0.0053    0.00
703          RX  100.00  200.00  400.00  500.00  550.00  600.00  800.00  900.00
704          RY  1000.0  999.50  998.50  998.00  998.25  998.50  999.50 1000.00
             *

705          KK     L06   BASIN
706          KM        BASIN BOUNDARY FROM SURPRISE FARMS AND SF SCHOOL DISTRICT
707          BA   0.696
708          LG    0.28    0.29    5.30    0.28      23
709          UI       0     103     394     600     874    1202     843     594     364     175
710          UI     113      45      32      32       0       0       0       0       0       0
711          UI       0       0       0       0       0       0       0       0       0       0
712          UI       0       0       0       0       0       0       0       0       0       0
713          UI       0       0       0       0       0       0       0       0       0       0
             *

714          KK  DL06RE  DIVERT
715          KM        Final Drainage Report for Surprise Farms Phase 5 (Tracts A1, B, C1, G,
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716          KM        KN, M1, N1, O, P, Q S1N, S1S, Z), Drainage Report for Surprise Farms
717          KM        Phase 4 Parcel 1 (TR-1D, 1F, 3A1,  & 3A2 (3As in Parcel 4B)),
718          KM        Drainage Report for City of Surprise Surprise Farms Park (Basins 1,2,5)
719          KM        Drainage Report for Surprise Farms Phase 4B Infrastructure (Retention
720          KM        in Surrounding Basins except for missing reports: TR-2B1, 2B2, 3N,
721          KM        3H, 3K, 4J), Drainage Report for Surprise Farms Phase 4 Parcel 5
722          KM        (TR-5A1, 5A2, 5B West, 5B East, 5D), Drainage Report for
723          KM        Surprise Farms Phase 4 Parcel 6 (TR 6J), Drainage Report for
724          KM        Surprise Farms Phase III Parcel 1 (Retention Basin 1,2,3,4)
725          KM        Drainage Report for Surprise Farms Phase III Parcel 2
726          KM        (Basins 1,2,3,4,5), Drainage Report for Surprise Farms Phase III Parcel
727          KM        for Surprise Farms Phase III Parcel  4 (Basin 1,3,6), Drainage Report
1                                    HEC-1 INPUT                                          PAGE 19

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

728          KM        for Surprise Farms Phase III Parcel 5 (Basin 1), Drainage
729          KM        Report for Surprise Farms Phase III Parcel 3
730          KM        (Basin 1, 2, 3, 4), Drainage Report for New
731          KM        Dysart Preschool (One basin on N Corner), Drainage Report for
732          KM        Dysart Elementary School No 15 and Preschool
733          DT    RL06    59.3     0.0
734          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
735          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

736          KK  DL06SE  DIVERT
737          KM        179th at Greeway split flow
738          DT   DL06S     0.0     0.0
739          DI     0.0   125.4   973.2  2548.4  5028.3     0.0     0.0     0.0     0.0     0.0
740          DQ     0.0   125.4   973.2  2275.2  4106.2     0.0     0.0     0.0     0.0     0.0
             *

741          KK  L06L07   ROUTE
742          KM        Cross-section: Cross-section determined from A-team survey
743          KM        Manning's N Value: street and earth channel with sparse trees and shrubs
744          RS       1    FLOW
745          RC   0.032   0.013   0.013    2771  0.0031    0.00
746          RX  100.00  100.10  100.20  122.00  126.00  133.00  146.00  159.00
747          RY  1286.2 1286.10 1286.00 1282.00 1282.00 1283.00 1283.00 1283.80
             *

748          KK     L07   BASIN
749          KM        BASIN BOUNDARY FROM SURPRISE FARMS
750          BA   0.632
751          LG    0.28    0.29    5.30    0.28      26
752          UI       0      88     314     494     682    1047     799     581     403     192
753          UI     126      75      27      27      27       0       0       0       0       0
754          UI       0       0       0       0       0       0       0       0       0       0
755          UI       0       0       0       0       0       0       0       0       0       0
756          UI       0       0       0       0       0       0       0       0       0       0
             *

757          KK  DL07RE  DIVERT
758          KM        Drainage Report for Surprise Farms Phase II Infrastructure, Drainage
759          KM        Report for Surprise Farms Community Park (Community Parks Basin A, B)
760          KM        Pavement Drainage Report for Surprise Farms School Site
761          KM        (High School Basin A, B1, C1, D, E, F1), Drainage Report for
762          KM        Surprise Farms Phase 2 Parcel 6, Drainage Report for Surprise
763          KM        Farms Phase III Parcel 6 (Basins 1,2,3,4,5), Drainage Report for
764          KM        Surprise Farms Phase 2 Parcel 1, Drainage Report for Surprise Farms
765          KM        Phase 2 Parcel 5, Drainage Report for Surprise Farms Phase 2 Parcel 2,
766          KM        Drainage Report for Surprise Farms Phase 2 Parcel 4,
767          KM        Drainage Report for Surprise Farms
768          KM        Phase 2 Parcel 3, Drainage Report for City of Surprise Surprise Farms
769          KM        Drainage Report for Surprise Farms Phase 2 Parcel 1
770          DT    RL07    46.3     0.0
771          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
772          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *
1                                    HEC-1 INPUT                                          PAGE 20

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

773          KK  DL03SERETRIEVE
774          DR   DL03S
             *

775          KK  L0307A   ROUTE
776          KM        Cross-section: Channel is 16' wide and 2' deep with 4: side slopes per
777          KM        Surprise Farms Phase II Infrastructure Report (Report 287)
778          KM        Manning's N Value: riprap and pavement
779          RS       3    FLOW
780          RC   0.013   0.032   0.032    3088  0.0052    0.00
781          RX  100.00  119.00  119.50  155.00  163.00  171.00  172.00  173.00
782          RY  1000.0  999.60 1000.10  999.50  997.50  999.50  999.70 1000.00
             *

783          KK  L0307B   ROUTE
784          KM        Cross-section: Cross section determined from aerial, 1/2 street section
785          KM        Manning's N Value: pavement, earth with sparse trees and shrubs
786          RS      12    FLOW
787          RC   0.013   0.013   0.032    2848  0.0018    0.00
788          RX  100.00  100.10  105.00  115.00  115.10  115.50  132.00  134.00
789          RY  1001.0 1000.00  999.90  999.60 1000.10 1000.20 1000.30 1000.40
             *

790          KK   CPL07 COMBINE
791          HC       3   2.623
             *

792          KK  DL07SE  DIVERT
793          KM        Paradise at Greenway split flow
794          DT   DL07S     0.0     0.0
795          DI     0.0   233.4   660.0  1459.1  2912.5     0.0     0.0     0.0     0.0     0.0
796          DQ     0.0    47.7   135.0   309.0   902.5     0.0     0.0     0.0     0.0     0.0
             *

797          KK  L07L08   ROUTE
798          KM        Cross-section: Cross-section determined from A-team survey
799          KM        Manning's N Value: clean earth; straight
800          RS       1    FLOW
801          RC   0.022   0.022   0.022    2557  0.0041    0.00
802          RX  100.00  100.90  101.00  115.00  127.00  150.00  151.00  152.00
803          RY  1279.6 1279.50 1277.50 1275.50 1278.50 1279.50 1279.60 1279.70
             *
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 804          KK     L08   BASIN
 805          KM        BASIN BOUNDARY FROM SURPRISE FARMS
 806          BA   0.485
 807          LG    0.27    0.17    7.30    0.13      31
 808          UI       0      55     144     267     344     458     673     533     411     312
 809          UI     220     113      85      55      24      17      17      17       0       0
 810          UI       0       0       0       0       0       0       0       0       0       0
 811          UI       0       0       0       0       0       0       0       0       0       0
 812          UI       0       0       0       0       0       0       0       0       0       0
              *
                                          HEC-1 INPUT                                                PAGE 21

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 813          KK  DL08RE  DIVERT
 814          KM        Final Drainage Report for Surprise Farms Parcel 12 (Parcel 12 Basin A
 815          KM        only, Basin B/C same as Tract O), Final Drainage Report for Parcel 13 of
 816          KM        Surprise Farms (Tract O, P), Final Drainage Report for Surprise Farms
 817          KM        Parcel 9 (Tract K and 9), Final Drainage Report for Parcel 10 & 11 of
 818          KM        Surprise Farms (Tract L, M, N), Drainage Report for Parcel 15 (Basins
 819          KM        A & B only, Basin C in School Site), Drainage Report for New Dysart
 820          KM        Elementary School No 18, Remaining retention volume estimated based
 821          KM        on aerial
 822          DT    RL08    39.4     0.0
 823          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
 824          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

 825          KK  DL04SERETRIEVE
 826          DR   DL04S
              *

 827          KK  L04L08   ROUTE
 828          KM        Cross-section: Cross-section determined from aerial
 829          KM        Manning's N Value: street and earth with sparse trees and shrubs
 830          RS       1    FLOW
 831          RC   0.013   0.013   0.032    5352  0.0042    0.00
 832          RX  100.00  100.10  100.20  115.20  115.30  115.40  145.00  153.00
 833          RY  1000.0  999.90  999.80  999.50 1000.00 1000.10 1000.20 1000.30
              *

 834          KK   CPL08 COMBINE
 835          HC       3   3.739
              *

 836          KK  L08L12   ROUTE
 837          KM        Cross-section: Cross-section determined from aerial
 838          KM        Manning's N Value: street, earth with grass and forbs
 839          RS      14    FLOW
 840          RC   0.013   0.025   0.025    5397  0.0031    0.00
 841          RX  100.00  107.00  112.00  116.00  122.00  126.00  165.00  280.00
 842          RY  1248.5 1248.50 1248.00 1247.50 1247.51 1248.00 1248.20 1248.50
              *

 843          KK     L10   BASIN
 844          KM        BASIN BOUNDARY FROM SIERRA MONTANA
 845          KM        WADDELL HACIENDAS AND BEARDSLEY CSR
 846          BA   0.844
 847          LG    0.27    0.25    4.55    0.39      18
 848          UI       0      95     239     450     581     762    1140     942     727     555
 849          UI     407     211     158      97      56      29      29      29       0       0
 850          UI       0       0       0       0       0       0       0       0       0       0
 851          UI       0       0       0       0       0       0       0       0       0       0
 852          UI       0       0       0       0       0       0       0       0       0       0
              *
1                                         HEC-1 INPUT                                                PAGE 22

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 853          KK  DL10RE  DIVERT
 854          KM        Final Drainage Report for Sierra Montana Parcel 4 (Basins 1, 2),
 855          KM        Drainage Report for Sierra Montana Parcel 1 (Basins 1,2,3,3A,3B),
 856          KM        Drainage Report for Sierra Montana Parcel 3 (Basins 3,3A,3B,3C),
 857          KM        Drainage Report for Sierra Montana Infastructure Phase II (P2 Retention)
 858          KM        Sierra Montana Final Drainage Report Parcel 5 (Basins 1,2,3,4,7,8)
 859          KM        Sierra Montana Final Drainage Report Parcel 6 (Basins 1,2,3,4,6)
 860          DT    RL10    34.2     0.0
 861          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
 862          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

 863          KK  L10L11   ROUTE
 864          KM        Cross-section: Estimated 3' deep and 4:1 side slopes, width based
 865          KM        on aerial / Manning's N Value: earth with sparse trees and shrubs
 866          RS       3    FLOW
 867          RC   0.032   0.032   0.032    3249  0.0031    0.00
 868          RX  100.00  100.10  100.20  112.00  154.00  166.00  183.00  185.00
 869          RY  1000.2 1000.10 1000.00  997.00  997.00 1000.00 1000.30 1000.40
              *

 870          KK  DL06SERETRIEVE
 871          DR   DL06S
              *

 872          KK  L06L11   ROUTE
 873          KM        Cross-section: Estimated 3' deep and 4:1 side slopes, width based
 874          KM        on aerial / Manning's N Value: earth w/ sparse trees and shrubs
 875          RS       1    FLOW
 876          RC   0.032   0.032   0.032    8226  0.0043    0.00
 877          RX  100.00  106.00  112.00  124.00  154.00  166.00  172.00  178.00
 878          RY  1290.5 1290.30 1290.00 1287.00 1287.10 1290.00 1290.25 1290.50
              *

 879          KK     L11   BASIN
 880          KM        BASIN BOUNDARY FROM SIERRA MONTANA
 881          KM        WADDELL CHANNEL DESIGNED FOR 512 CFS PER DEVELOPMENT RPT
 882          BA   0.622
 883          LG    0.25    0.25    4.90    0.35      34
 884          UI       0      81     261     432     575     898     841     613     448     287
 885          UI     140      99      55      25      25      25       0       0       0       0
 886          UI       0       0       0       0       0       0       0       0       0       0
 887          UI       0       0       0       0       0       0       0       0       0       0
 888          UI       0       0       0       0       0       0       0       0       0       0
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 889          KK  DL11RE  DIVERT
 890          KM        Sierra Montana Parcel 8 (Basins 8, 8A, 8B), Parcel 9 (Basins 9, 9A, 8C),
 891          KM        Parcel 7 (Basins 1-4), Parcel 12 (included in Parcel 14 report), P
 892          KM        arcel 14 (Basins 1,2,3a,3b,4a,4b,5,6,7,8,OS2,OS4,OS5 (Includes
 893          KM        Retention for P14 &12)), Parcel 20 (Basins R20C, R20, R20A),
 894          KM        Phase 1S and 1N estimated from aerial, Infrastructure Phase I
 895          KM        (Retention from Parcel 21)
 896          DT    RL11     47.6      0.0
1                                        HEC-1 INPUT                                                PAGE 23

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 897          DI     0.0    500.0  5000.0 50000.0      0.0      0.0      0.0      0.0      0.0      0.0
 898          DQ     0.0    500.0  5000.0 50000.0      0.0      0.0      0.0      0.0      0.0      0.0
              *

 899          KK  DL07SERETRIEVE
 900          DR   DL07S
              *

 901          KK  L07L11   ROUTE
 902          KM        Cross-section: 3' deep, 6:1 side slope and 6' bottom width per
 903          KM        Drainage Report for Sierra Montana Infrastructure Phase I (Report 909)
 904          KM        Manning's N Value: earth with sparse trees and shrubs
 905          RS      16    FLOW
 906          RC   0.032   0.032   0.032    8463  0.0026    0.00
 907          RX  100.00  101.00  102.00  120.00  126.00  144.00  145.00  146.00
 908          RY  1000.0  999.90  999.80  996.80  996.70  999.80  999.90 1000.00
              *

 909          KK   CPL11 COMBINE
 910          HC       4   4.089
              *

 911          KK  DL11SE  DIVERT
 912          KM        Waddell at 173rd alignment split flow
 913          DT   DL11S      0.0      0.0
 914          DI     0.0    309.0  1207.7  2631.3  4439.4      0.0      0.0      0.0      0.0      0.0
 915          DQ     0.0      0.0    22.5   147.6   353.8      0.0      0.0      0.0      0.0      0.0
              *

 916          KK  L11L12   ROUTE
 917          KM        Cross-section: Cross-section determined from aerial
 918          KM        Manning's N Value: earth with grass and forbs
 919          RS       2    FLOW
 920          RC   0.025   0.025   0.025    2002  0.0032    0.00
 921          RX  100.00  110.00  180.00  190.00  200.00  220.00  240.00  240.10
 922          RY  1249.5 1249.00 1248.50 1247.00 1248.50 1248.70 1248.80 1249.50
              *

 923          KK     L12   BASIN
 924          KM        BASIN BOUNDARY FROM SIERRA MONTANA, AG LAND AND 1990 TOPO
 925          BA   0.358
 926          LG    0.39    0.25    6.20    0.22      10
 927          UI       0      30      41     111     149     178     216     276     378     312
 928          UI     254     210     171     137      92      53      49      32      29       9
 929          UI       9       9       9       9       0       0       0       0       0       0
 930          UI       0       0       0       0       0       0       0       0       0       0
 931          UI       0       0       0       0       0       0       0       0       0       0
              *

 932          KK  DL12RE  DIVERT
 933          KM        Sierra Montana Parcel 16 (Basins 10A, 16B), Parcel 15 (Basins 15A,
 934          KM        15B, 15C), Parcel 18 (Basins 18A-D), Sierra Montana Crossings
 935          DT    RL12      9.0      0.0
 936          DI     0.0    500.0  5000.0 50000.0      0.0      0.0      0.0      0.0      0.0      0.0
 937          DQ     0.0    500.0  5000.0 50000.0      0.0      0.0      0.0      0.0      0.0      0.0
              *
1                                        HEC-1 INPUT                                                PAGE 24

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 938          KK   CPL12 COMBINE
 939          HC       3   5.563
              *

 940          KK   DL121  DIVERT
 941          KM        Waddell at Cotton split flow
 942          DT  DL121S      0.0      0.0
 943          DI     0.0   3141.9  7409.3 13063.4 20317.2      0.0      0.0      0.0      0.0      0.0
 944          DQ     0.0    550.7  2126.5  4314.6  7195.9      0.0      0.0      0.0      0.0      0.0
              *

 945          KK   DL122  DIVERT
 946          KM        Waddell at Cotton split flow
 947          DT  DL122S      0.0      0.0
 948          DI     0.0   2591.2  5282.9  8748.8 13121.3      0.0      0.0      0.0      0.0      0.0
 949          DQ     0.0     31.8    90.0   165.3   254.6      0.0      0.0      0.0      0.0      0.0
              *

 950          KK  L12L13   ROUTE
 951          KM        Cross-section: Ag field, assumed 0.5% side slopes, V-ditch
 952          KM        Manning's N Value: Ag field
 953          RS       3    FLOW
 954          RC   0.038   0.038   0.038    2537  0.0051    0.00
 955          RX  100.00  200.00  400.00  500.00  550.00  600.00  800.00  900.00
 956          RY  1000.0  999.50  998.50  998.00  998.25  998.50  999.50 1000.00
              *

 957          KK     L13   BASIN
 958          KM        BASIN BOUNDARY FROM AERIAL PHOTOGRAPHY OF AG LAND
 959          KM        EASTERN BOUNDARY LOOP 303
 960          BA   0.483
 961          LG    0.49    0.25    4.90    0.44       3
 962          UI       0      29      29      42      69     125     171     159     224     224
 963          UI     244     244     244     214     203     224     162     159     147     111
 964          UI      97      83      91      55      50      46      36      36      27      26
 965          UI      25      16      16      16      16       9       4       4       4       4
 966          UI       4       4       4       4       4       4       4       4       4       4
 967          UI       4       4       4       4       4       4       0       0       0       0
              *

 968          KK   DL091RETRIEVE
 969          DR  DL091S
              *
```

```
KK  L09L13   ROUTE
KM        Cross-section: Ag field, assumed 0.5% side slopes, V-ditch
KM        Manning's N Value: Ag field
RS      61    FLOW
RC   0.038   0.038   0.038    5317  0.0039    0.00
RX  100.00  200.00  400.00  500.00  550.00  600.00  800.00  900.00
RY  1000.0  999.50  998.50  998.00  998.25  998.50  999.50 1000.00
*
```



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LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

KK   CPL13 COMBINE
HC       3   7.021
*

KK   DL131  DIVERT
KM        L303 at Waddell split flow
KM        Orig calc's by KHA, 2008. Modified for SE component
DT  DL131S      0.0     0.0
DI     0.0   100.5   491.9  1284.7  2545.0     0.0     0.0     0.0     0.0     0.0
DQ     0.0    99.9   470.6  1082.3  1928.4     0.0     0.0     0.0     0.0     0.0
*

KK   DL132  DIVERT
KM        L303 at Waddell split flow
KM        Orig calc's by KHA, 2008. Modified for SE component
DT  DL132S      0.0     0.0
DI     0.0     0.6    21.3   202.4   616.6     0.0     0.0     0.0     0.0     0.0
DQ     0.0     0.6    14.2    36.5    64.9     0.0     0.0     0.0     0.0     0.0
*

KK  L13D16   ROUTE
KM        Cross-section: Ag field, assumed 0.5% side slopes, V-ditch
KM        Manning's N Value: Ag field
RS      17    FLOW
RC   0.038   0.038   0.038    2781  0.0033    0.00
RX  100.00  200.00  400.00  500.00  550.00  600.00  800.00  900.00
RY  1000.0  999.50  998.50  998.00  998.25  998.50  999.50 1000.00
*

KK     D16   BASIN
KM        BASIN BOUNDARY FROM AG LAND AND 1990 TOPO
BA   0.517
LG    0.48    0.25    4.90    0.44       5
UI       0      32      32      50      81     146     188     187     239     267
UI     269     269     265     224     238     217     168     185     128     117
UI      94      96      74      58      52      41      40      31      29      28
UI      18      18      18      18       9       4       4       4       4       4
UI       4       4       4       4       4       4       4       4       4       4
UI       4       4       4       4       0       0       0       0       0       0
*

KK   DL092RETRIEVE
DR  DL092S
*

KK  L09D16   ROUTE
KM        Cross-section: Ag field, assumed 0.5% side slopes, V-ditch
KM        Manning's N Value: Ag. Field
RS       1    FLOW
RC   0.038   0.038   0.038    5960  0.0060    0.00
RX  100.00  200.00  400.00  500.00  550.00  600.00  800.00  900.00
RY  1000.0  999.50  998.50  998.00  998.25  998.50  999.50 1000.00
*
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1


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LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

KK   CPD16 COMBINE
HC       4   8.052
*

KK   DD161  DIVERT
KM        Waddell at Sarival split flow
DT  DD161S      0.0     0.0
DI     0.0    52.0   492.4  1578.2  3317.0     0.0     0.0     0.0     0.0     0.0
DQ     0.0    38.3   403.6  1166.1  2341.9     0.0     0.0     0.0     0.0     0.0
*

KK   DD162  DIVERT
KM        Waddell at Sarival split flow
DT  DD162S      0.0     0.0
DI     0.0    13.7    88.8   412.0   975.1     0.0     0.0     0.0     0.0     0.0
DQ     0.0     7.4    32.2    66.7   108.7     0.0     0.0     0.0     0.0     0.0
*

KK  D16D18   ROUTE
KM        Cross-section: Cross-section determined from aerial
KM        Manning's N Value: street and ROW
RS       3    FLOW
RC   0.032   0.013   0.013    2183  0.0035    0.00
RX  100.00  101.00  102.00  148.00  148.10  176.00  177.00  178.00
RY  1000.0  999.90  999.80  999.70  999.20  999.80  999.90 1000.00
*

KK     D18   BASIN
KM        BASIN BOUNDARY FROM LEGACY PARK
BA   0.199
LG    0.25    0.25    4.60    0.40      30
UI       0      85     259     479     381     209      75      30      14       0
UI       0       0       0       0       0       0       0       0       0       0
UI       0       0       0       0       0       0       0       0       0       0
UI       0       0       0       0       0       0       0       0       0       0
UI       0       0       0       0       0       0       0       0       0       0
*

KK  DD18RE  DIVERT
KM        Master Drainage Report for Legacy Parc (has excess retention)
DT    RD18    17.2     0.0
DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
*
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1050          KK   CPD18 COMBINE
1051          HC       2   8.251
              *
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1052          KK  D18D19   ROUTE
1053          KM        Cross-section: Cross-section determined from aerial
1054          KM        Manning's N Value: street and ROW
1055          RS       2    FLOW
1056          RC   0.032   0.013   0.013    2766  0.0024    0.00
1057          RX  100.00  101.00  132.50  133.00  133.10  151.00  152.00  153.00
1058          RY  1000.1 1000.00  999.50  999.40  998.90  999.30  999.40  999.50
              *

1059          KK     D17   BASIN
1060          KM        BASIN BOUNDARY FROM LEGACY PARK
1061          BA   0.197
1062          LG    0.25    0.25    3.95    0.58      30
1063          UI       0      88     267     491     370     194      69      26      14       0
1064          UI       0       0       0       0       0       0       0       0       0       0
1065          UI       0       0       0       0       0       0       0       0       0       0
1066          UI       0       0       0       0       0       0       0       0       0       0
1067          UI       0       0       0       0       0       0       0       0       0       0
              *

1068          KK  DD17RE  DIVERT
1069          KM        Master Drainage Report for Kenly Farms Subdivision, Master Drainage
1070          KM        Report for Legacy Parc (has excess retention)
1071          DT    RD17    16.5     0.0
1072          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1073          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

1074          KK  D17D19   ROUTE
1075          KM        Cross-section: Cross-section from Drainage Report for Channelization of
1076          KM        Reems Road (Report 691) / Manning's N Value: channel w/ grass
1077          KM        bottom and riprap sides
1078          RS      18    FLOW
1079          RC   0.032   0.025   0.032    5422  0.0042    0.00
1080          RX  100.00  101.00  102.00  125.00  133.00  156.00  157.00  159.00
1081          RY  1000.0  999.90  999.80  993.80  993.70  999.80  999.90 1000.00
              *

1082          KK     D19   BASIN
1083          KM        BASIN BOUNDARY FROM TASH, WADDEL SQUARE, LME,  AND SCHOOL
1084          BA   0.506
1085          LG    0.27    0.26    4.65    0.39      26
1086          UI       0      70     172     385     537     585     522     464     353     233
1087          UI     180     113      81      64      40      40       9       9       9       9
1088          UI       9       9       9       9       9       0       0       0       0       0
1089          UI       0       0       0       0       0       0       0       0       0       0
1090          UI       0       0       0       0       0       0       0       0       0       0
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1091          KK  DD19RE  DIVERT
1092          KM        Drainage Report for Greenway Parc at Surprise One, Final Drainage
1093          KM        Report for Retail Center for Venture Development  SP06-411, Stormwater
1094          KM        Management Report for Jack in the Box, Final Drainage Report for
1095          KM        Greenway Parc at Surprise Three, Drainage Report for Greenway Parc at
1096          KM        Surprise Two, Drainage Report for Walgreens at Waddell & Reems Case
1097          KM        # SPA04-297, Drainage Report for Waddell Square, Final Drainage Report
1098          KM        for Waddell Square Phase 2-Wells Fargo, Final Drainage Report for
1099          KM        Waddell Square NWC Reems and Waddell, Final Drainage Rpt for Tash
1100          DT    RD19    33.7     0.0
1101          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1102          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

1103          KK   CPD19 COMBINE
1104          HC       4  16.488
              *

1105          KK   DD191  DIVERT
1106          KM        Waddell at Reems split flow
1107          DT  DD191S     0.0     0.0
1108          DI     0.0   107.6   404.8  1261.9  2553.0     0.0     0.0     0.0     0.0     0.0
1109          DQ     0.0    58.0   241.1   802.7  1649.6     0.0     0.0     0.0     0.0     0.0
              *

1110          KK   DD192  DIVERT
1111          KM        Waddell at Reems split flow
1112          DT  DD192S     0.0     0.0
1113          DI     0.0    49.6   163.7   459.2   903.4     0.0     0.0     0.0     0.0     0.0
1114          DQ     0.0    27.9    69.2   121.4   182.6     0.0     0.0     0.0     0.0     0.0
              *

1115          KK  D19D20   ROUTE
1116          KM        Cross-section: Cross-section determined from aerial
1117          KM        Manning's N Value: street and earth with sparse trees and shrubs
1118          RS       4    FLOW
1119          RC   0.032   0.013   0.013    2674  0.0050    0.00
1120          RX  100.00  101.00  125.00  150.00  150.10  175.00  189.90  190.00
1121          RY  1003.0  999.90  998.90  999.90  999.40  999.60  999.80 1000.25
              *

1122          KK     D20   BASIN
1123          KM        BASIN BOUNDARY FROM COUNTRYSIDE UNITS 1-4 AND COTTON GIN
1124          BA   0.498
1125          LG    0.26    0.26    4.65    0.39      30
1126          UI       0      68     230     371     502     789     646     473     338     179
1127          UI     111      68      25      21      21       0       0       0       0       0
1128          UI       0       0       0       0       0       0       0       0       0       0
1129          UI       0       0       0       0       0       0       0       0       0       0
1130          UI       0       0       0       0       0       0       0       0       0       0
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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1131          KK  DD20RE  DIVERT
1132          KM        Final Drainage Report Greenway Marketplace Wal-mart Neighborhood
1133          KM        Market #4218-00, Drainage Report for Countryside Elementary School,
1134          KM        Ashton Ranch Water Supply Facility Expansion, Countryside -
1135          KM        Preliminary Drainage  Report, Final Drainage Report for Cotton Gin
1136          DT    RD20     38.1     0.0
1137          DI     0.0    500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1138          DQ     0.0    500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

1139          KK   DD111RETRIEVE
1140          DR  DD111S
              *

1141          KK  D11D20   ROUTE
1142          KM        Cross-section: Cross-section determined from aerial
1143          KM        Manning's N Value: retention basins, earth w/ grass
1144          RS       5    FLOW
1145          RC   0.025   0.025   0.025    6256  0.0032    0.00
1146          RX  100.00  101.00  102.00  114.00  190.00  202.00  203.00  204.00
1147          RY  1000.2 1000.10 1000.00  997.00  996.90 1000.00 1000.10 1000.20
              *

1148          KK   CPD20 COMBINE
1149          HC       3  17.648
              *

1150          KK  D20D21   ROUTE
1151          KM        Cross-section:  / Manning's N Value: street and earth with sparse
1152          KM        trees and shrubs
1153          RS       5    FLOW
1154          RC   0.032   0.032   0.013    5323  0.0023    0.00
1155          RX  100.00  100.50  112.00  150.00  162.00  198.00  198.00  220.00
1156          RY  1000.1 1000.00  997.00  997.00 1000.00  999.46  998.90  999.40
              *

1157          KK     D21   BASIN
1158          KM        BASIN BOUNDARY FROM ASHTON RANCH MULTI UNITS
1159          BA   0.496
1160          LG    0.25    0.25    4.65    0.40      32
1161          UI       0      63     196     332     438     665     691     499     368     251
1162          UI     122      87      55      19      19      19       0       0       0       0
1163          UI       0       0       0       0       0       0       0       0       0       0
1164          UI       0       0       0       0       0       0       0       0       0       0
1165          UI       0       0       0       0       0       0       0       0       0       0
              *

1166          KK  DD21RE  DIVERT
1167          KM        Final Drainage Report for Ashton Ranch Unit 3, Final Drainage Report for
1168          KM        Ashton Ranch Unit 1, Final Drainage Report for Ashton Ranch Unit 2,
1169          KM        Final Drainage Report for Ashton Ranch Unit 4
1170          DT    RD21     39.9     0.0
1171          DI     0.0    500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1172          DQ     0.0    500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1173          KK   DD112RETRIEVE
1174          DR  DD112S
              *

1175          KK  D11D21   ROUTE
1176          KM        Cross-section:determined from aerial, street section through subdivision
1177          KM        Manning's N Value: street, earth with sparse trees and shrubs
1178          RS      10    FLOW
1179          RC   0.032   0.013   0.032    8031  0.0035    0.00
1180          RX  100.00  106.00  115.00  115.10  167.00  167.10  174.00  179.00
1181          RY  1000.0  999.80  999.50  999.00  998.90  999.50  999.80 1000.00
              *

1182          KK   DD121RETRIEVE
1183          DR  DD121S
              *

1184          KK  D12D21   ROUTE
1185          KM        Cross-section: Cross-section determined from aerial
1186          KM        Manning's N Value: street and earth with sparse trees and shrubs
1187          RS       2    FLOW
1188          RC   0.013   0.013   0.032    2810  0.0078    0.00
1189          RX  100.00  105.00  110.00  115.00  140.00  140.10  176.00  177.00
1190          RY  1000.0  999.90  999.80  999.70  999.20  999.70  999.80 1000.00
              *

1191          KK   CPD21 COMBINE
1192          HC       4  18.491
              *

1193          KK   DD211  DIVERT
1194          KM        Waddell at Bullard split flow
1195          DT  DD211S     0.0     0.0
1196          DI     0.0   184.9   770.2  1884.9  3510.6     0.0     0.0     0.0     0.0     0.0
1197          DQ     0.0   139.4   462.9  1049.1  1871.4     0.0     0.0     0.0     0.0     0.0
              *

1198          KK   DD212  DIVERT
1199          KM        Waddell at Bullard split flow
1200          DT  DD212S     0.0     0.0
1201          DI     0.0    45.5   307.3   835.8  1639.2     0.0     0.0     0.0     0.0     0.0
1202          DQ     0.0    36.2   111.1   209.5   326.8     0.0     0.0     0.0     0.0     0.0
              *

1203          KK  D21D22   ROUTE
1204          KM        Cross-section: Cross-section determined from aerial
1205          KM        Manning's N Value: earth with grass and forbs (main channel)
1206          KM        earth with sparse trees and shrubs (overbanks)
1207          RS       4    FLOW
1208          RC   0.032   0.025   0.032    2720  0.0029    0.00
1209          RX  100.00  103.00  105.00  116.00  151.00  160.00  165.00  170.00
1210          RY  1000.2 1000.10 1000.00  997.00  997.10 1000.00 1000.10 1000.20
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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1211          KK     D22   BASIN
1212          KM        BASIN BOUNDARY FROM ROYAL RANCH UNIT I AND II
1213          BA   0.454
1214          LG    0.24    0.25    4.70    0.38      32
1215          UI       0      64     230     360     501     760     570     413     282     134
1216          UI      88      50      20      20      20       0       0       0       0       0
1217          UI       0       0       0       0       0       0       0       0       0       0
1218          UI       0       0       0       0       0       0       0       0       0       0
1219          UI       0       0       0       0       0       0       0       0       0       0
              *

1220          KK  DD22RE  DIVERT
1221          KM        Drainage Report for Royal Ranch Unit 2 (Basins P1&N in D23), Final
1222          KM        Drainage Report for Royal Ranch Unit 2, Parcel 5, Final Drainage
1223          KM        Report for Royal Ranch Unit 2 Parcel 8, portion estimated by aerial for
1224          KM        Del Webb
1225          DT    RD22    37.5     0.0
1226          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1227          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

1228          KK   DD122RETRIEVE
1229          DR  DD122S
              *

1230          KK  D12D22   ROUTE
1231          KM        Cross-section: Cross section determined from aerial
1232          KM        Manning's N Value: street and earth with sparse trees and shrubs
1233          RS       7    FLOW
1234          RC   0.032   0.013   0.013    7744  0.0040    0.00
1235          RX  100.00  105.00  145.00  145.10  160.00  174.00  178.00  180.00
1236          RY  1000.0  999.90  999.50  999.00  999.20  999.50  999.60  999.65
              *

1237          KK   CPD22 COMBINE
1238          HC       3  18.945
              *

1239          KK  D22D23   ROUTE
1240          KM        Cross-section: Cross-section determined from aerial
1241          KM        Manning's N Value: earth with sparse trees and shrubs/ riprap
1242          RS       2    FLOW
1243          RC   0.032   0.032   0.032    2705  0.0037    0.00
1244          RX  100.00  104.00  106.00  110.00  118.00  122.00  126.00  138.00
1245          RY  1161.0 1160.00 1159.00 1158.00 1158.10 1159.00 1160.00 1161.00
              *

1246          KK     D23   BASIN
1247          KM        BASIN BOUNDARY FROM SIERRA VERDE
1248          BA   0.541
1249          LG    0.27    0.27    5.00    0.33      26
1250          UI       0      59     139     271     348     447     672     631     480     373
1251          UI     285     172     101      77      55      18      18      18      18       0
1252          UI       0       0       0       0       0       0       0       0       0       0
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1253          UI       0       0       0       0       0       0       0       0       0       0
1254          UI       0       0       0       0       0       0       0       0       0       0
              *

1255          KK  DD23RE  DIVERT
1256          KM        Final Drainage Report for Sierra Verde Parcel 5, Infrastructure Drainage
1257          KM        Report for Sierra Verde (temporary basins removed), Final Drainage
1258          KM        Report for Sierra Verde Parcel 4Final Drainage Report for Harmony
1259          KM        Apartments, Drainage Report for Royal Ranch Unit 2 Final Drainage
1260          KM        Report for Sierra Verde Parcel 9, Final Drainage Report for Sierra Verde
1261          KM        Parcel 3, Final Drainage Report for Sierra Verde Parcel 2, Final Drainag
1262          KM        Report for Sierra Verde Parcel 1, Drainage Report for Fry's at Waddell
1263          KM        and Litchfield Roads
1264          DT    RD23    36.3     0.0
1265          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1266          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

1267          KK   DD131RETRIEVE
1268          DR  DD131S
              *

1269          KK  D13D23   ROUTE
1270          KM        Cross-section: Cross-section determined from aerial 1/2 street section
1271          KM        Manning's N Value: street, earth with sparse trees and shrubs
1272          RS       3    FLOW
1273          RC   0.032   0.013   0.032    5460  0.0044    0.00
1274          RX  100.00  100.00  109.00  109.00  148.00  148.00  197.00  198.00
1275          RY  1180.0 1176.28 1176.28 1175.78 1175.00 1175.50 1177.00 1177.10
              *

1276          KK   CPD23 COMBINE
1277          HC       3   22.13
              *

1278          KK   DD231  DIVERT
1279          KM        Waddell at Litchfield split flow
1280          DT  DD231S     0.0     0.0
1281          DI     0.0   518.8   867.4  1680.6  2985.0     0.0     0.0     0.0     0.0     0.0
1282          DQ     0.0    51.3   223.3   727.6  1503.5     0.0     0.0     0.0     0.0     0.0
              *

1283          KK   DD232  DIVERT
1284          KM        Waddell at Litchfield split flow
1285          DT  DD232S     0.0     0.0
1286          DI     0.0   467.5   644.1   953.0  1481.6     0.0     0.0     0.0     0.0     0.0
1287          DQ     0.0    55.8   138.4   242.9   365.2     0.0     0.0     0.0     0.0     0.0
              *

1288          KK  D23D24   ROUTE
1289          KM        Manning's N Value: Litchfield Manor, CS 400 HDR 896
1290          RS       2    FLOW
1291          RC   0.025   0.025   0.025    2496  0.0020    0.00
1292          RX  100.00  100.10  104.10  108.10  112.10  123.70  143.60  151.60
1293          RY  1157.0 1155.00 1154.00 1153.00 1153.10 1155.00 1156.00 1157.00
              *
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1294          KK     D24   BASIN
1295          KM        BASIN BOUNDARY FROM LITCHFIELD MANOR
1296          BA   0.492
1297          LG    0.27    0.25    5.10    0.32      28
1298          UI       0      56     144     269     347     461     679     542     419     317
1299          UI     226     116      88      56      26      17      17      17       0       0
1300          UI       0       0       0       0       0       0       0       0       0       0
1301          UI       0       0       0       0       0       0       0       0       0       0
1302          UI       0       0       0       0       0       0       0       0       0       0
              *

1303          KK  DD24RE  DIVERT
1304          KM        Final Drainage Report for Litchfield Manor (excess retention per report)
1305          DT    RD24    40.9     0.0
1306          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1307          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

1308          KK   DD132RETRIEVE
1309          DR  DD132S
              *

1310          KK  D13D24   ROUTE
1311          KM        Cross-section: Cross-section determined from aerial 1/2 street section
1312          KM        Manning's N Value: street, earth with sparse trees and shrubs
1313          RS       3    FLOW
1314          RC   0.032   0.013   0.013    5460  0.0044    0.00
1315          RX  100.00  100.10  145.00  145.10  175.00  175.10  184.90  185.00
1316          RY  1178.0 1176.50 1175.50 1175.00 1175.78 1176.28 1176.28 1180.00
              *

1317          KK   CPD24 COMBINE
1318          HC       3  22.622
              *

1319          KK  DD24SE  DIVERT
1320          KM        Waddell near Dysart split flow (subdivision boundary)
1321          DT   DD24S     0.0     0.0
1322          DI     0.0    55.3   366.8  1137.9  2658.6     0.0     0.0     0.0     0.0     0.0
1323          DQ     0.0     0.0    81.5   397.9  1115.4     0.0     0.0     0.0     0.0     0.0
              *

1324          KK  D24D25   ROUTE
1325          KM        Cross-section: Cross-section determined from aerial
1326          KM        Manning's N Value: Grass, earth with sparse trees and shrubs
1327          RS       3    FLOW
1328          RC   0.032   0.025   0.032    2701  0.0017    0.00
1329          RX  100.00  105.00  120.00  130.00  150.00  165.00  200.00  210.00
1330          RY  1000.0  999.50  997.20  996.00  995.90  997.20  999.50 1000.00
              *
1                                    HEC-1 INPUT                                          PAGE 34

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1331          KK     D25   BASIN
1332          KM        BASIN BOUNDARY FROM ROSEVIEW MULTI PHASE
1333          BA   0.497
1334          LG    0.25    0.25    4.80    0.36      30
1335          UI       0      64     198     335     442     675     689     499     367     248
1336          UI     120      86      53      20      20      20       0       0       0       0
1337          UI       0       0       0       0       0       0       0       0       0       0
1338          UI       0       0       0       0       0       0       0       0       0       0
1339          UI       0       0       0       0       0       0       0       0       0       0
              *

1340          KK  DD25RE  DIVERT
1341          KM        Drainage Report for Roseview - Parcels 1-6, Master Drainage
1342          KM        Report for Roseview, Retention for Parcels 7 and 8 were estimated
1343          KM        based on aerial, Parcel 5a has no retention
1344          DT    RD25    37.1     0.0
1345          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1346          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

1347          KK   CPD25 COMBINE
1348          HC       2  23.119
              *

1349          KK   DD251  DIVERT
1350          KM        Waddell/Dysart/RR split flow
1351          DT  DD251S     0.0     0.0
1352          DI     0.0    69.9  1206.6  4171.1  8464.1     0.0     0.0     0.0     0.0     0.0
1353          DQ     0.0    69.9  1097.4  3288.4  6292.9     0.0     0.0     0.0     0.0     0.0
              *

1354          KK   DD252  DIVERT
1355          KM        Waddell/Dysart/RR split flow
1356          DT  DD252S     0.0     0.0
1357          DI     0.0     0.0   109.3   882.7  2171.2     0.0     0.0     0.0     0.0     0.0
1358          DQ     0.0     0.0   109.3   363.0   701.2     0.0     0.0     0.0     0.0     0.0
              *

1359          KK  D2542A   ROUTE
1360          KM        Cross-section: Cross-section estimated from aerial, estimated 3' deep
1361          KM        Manning's N Value: earth with sparse trees and shrubs
1362          KM        Route is from D25 to D42 (broken into 2 routes, 1st route)
1363          RS       1    FLOW
1364          RC   0.032   0.032   0.032    2090  0.0057    0.00
1365          RX  100.00  101.00  102.00  122.00  128.00  145.00  146.00  147.00
1366          RY  1000.0  999.90  999.80  997.00  997.10  999.80  999.90 1000.00
              *

1367          KK  D2542B   ROUTE
1368          KM        Cross-section: Cross-section from Lower El Mirage Channelization
1369          KM        (Report FCDMC 18-198B) / Manning's N Value: clean earth; straight
1370          KM        Route is from D25 to D42 (broken into 2 routes, 2nd route)
1371          RS       1    FLOW
1372          RC   0.022   0.022   0.022    4791  0.0042    0.00
1                                    HEC-1 INPUT                                          PAGE 35

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1373          RX  100.00  103.00  105.50  137.50  187.50  219.50  222.00  225.00
```

```
1374          RY  1000.0  999.50  998.50  990.50  990.40  998.50  999.50 1000.00
              *

1375          KK     D37   BASIN
1376          KM         BASIN BOUNDARY FROM  AG LAND, 1990 TOPO AND BNSF RR ALIGNMENT
1377          BA   0.197
1378          LG    0.50    0.25    5.60    0.33       0
1379          UI       0      18      24      50     101     108     143     150     150     128
1380          UI     135      94      92      66      52      47      31      25      21      16
1381          UI      15      10      10       8       2       2       2       2       2       2
1382          UI       2       2       2       2       2       2       2       0       0       0
1383          UI       0       0       0       0       0       0       0       0       0       0
              *

1384          KK   DD232RETRIEVE
1385          DR  DD232S
              *

1386          KK  D23D37   ROUTE
1387          KM        Cross-section: Ag field, assumed 0.5%
1388          KM        side slopes, V-ditch Manning's N Value: avg value for cultivated
1389          KM        areas from Estimated Manning's Roughness
1390          KM        Coefficient for Stream Channels and Flood Plains in MC
1391          RS      36    FLOW
1392          RC   0.038   0.038   0.038    3332  0.0024    0.00
1393          RX  100.00  200.00  400.00  500.00  550.00  600.00  800.00  900.00
1394          RY  1000.0  999.50  998.50  998.00  998.25  998.50  999.50 1000.00
              *

1395          KK   DD251RETRIEVE
1396          DR  DD251S
              *

1397          KK  D25D37   ROUTE
1398          KM        Cross-section: Estimated 2' deep and 4:1 side slopes, width based on
1399          KM        aerial & topo / Manning's N Value: earth w/ sparse trees and brush
1400          RS       7    FLOW
1401          RC   0.032   0.032   0.032    2711  0.0007    0.00
1402          RX  100.00  115.00  130.00  138.00  144.00  152.00  165.00  185.00
1403          RY  1000.0  999.50  999.00  996.00  996.10  999.00  999.50 1000.00
              *

1404          KK  DD24SERETRIEVE
1405          DR   DD24S
              *

1406          KK  D24D37   ROUTE
1407          KM        Cross-section: Ag field, assumed 0.5% side
1408          KM        slopes, V-ditch  Manning's N Value: Ag field
1409          RS       5    FLOW
1410          RC   0.038   0.038   0.038    1422  0.0028    0.00
1411          RX  100.00  200.00  400.00  500.00  550.00  600.00  800.00  900.00
1412          RY  1000.0  999.50  998.50  998.00  998.25  998.50  999.50 1000.00
              *
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1413          KK   CPD37 COMBINE
1414          HC       4  23.316
              *

1415          KK  DD37SE  DIVERT
1416          KM        split flow across low point in RR tracks
1417          DT   DD37S     0.0     0.0
1418          DI     0.0  1457.6  3118.3  5527.2  9114.3     0.0     0.0     0.0     0.0     0.0
1419          DQ     0.0     0.0     4.6   291.9  1203.2     0.0     0.0     0.0     0.0     0.0
              *

1420          KK  D37D39   ROUTE
1421          KM        Cross-section: Ag field, assumed 0.5%
1422          KM        side slopes, V-ditch / Manning's N Value: Ag field
1423          RS       1    FLOW
1424          RC   0.038   0.038   0.038    2643  0.0030    0.00
1425          RX  100.00  200.00  400.00  500.00  550.00  600.00  800.00  900.00
1426          RY  1000.0  999.50  998.50  998.00  998.25  998.50  999.50 1000.00
              *

1427          KK     D35   BASIN
1428          KM        BASIN BOUNDARY FROM MARYVALE PARK PARCELS, AG LAND AND 1990 TOPO
1429          BA   0.254
1430          LG    0.50    0.25    4.55    0.53       0
1431          UI       0      22      26      55     109     125     162     181     181     172
1432          UI     152     151     117     102      77      62      57      38      32      27
1433          UI      20      20      13      12      12       6       3       3       3       3
1434          UI       3       3       3       3       3       3       3       3       3       0
1435          UI       0       0       0       0       0       0       0       0       0       0
              *

1436          KK   DD231RETRIEVE
1437          DR  DD231S
              *

1438          KK  D23D35   ROUTE
1439          KM        Cross-section: Ag field, assumed 0.5%
1440          KM        side slopes, V-ditch / Manning's N Value: Ag field
1441          RS      14    FLOW
1442          RC   0.038   0.038   0.038    2692  0.0037    0.00
1443          RX  100.00  200.00  400.00  500.00  550.00  600.00  800.00  900.00
1444          RY  1000.0  999.50  998.50  998.00  998.25  998.50  999.50 1000.00
              *

1445          KK   CPD35 COMBINE
1446          HC       2  22.384
              *

1447          KK  DD35SE  DIVERT
1448          KM        Litchfield at 1/2 mi S. of Waddell split flow
1449          DT   DD35S     0.0     0.0
1450          DI     0.0   112.5   584.6  1947.2  4136.3     0.0     0.0     0.0     0.0     0.0
1451          DQ     0.0    18.8    97.4   368.7   900.0     0.0     0.0     0.0     0.0     0.0
              *
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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1452          KK  D35D38   ROUTE
1453          KM        Cross-section: Cross-section from Surprise Pointe Master
1454          KM        Drainage Report / Manning's N Value: riprap
1455          RS       3    FLOW
1456          RC   0.032   0.032   0.032    2588  0.0023    0.00
1457          RX  100.00  105.00  110.00  125.50  131.50  151.00  155.00  160.00
1458          RY  1000.0  999.90  999.80  996.10  996.00  999.80  999.90 1000.00
              *

1459          KK     D38   BASIN
1460          KM        BASIN BOUNDARY FROM  AG LAND, 1990 TOPO AND BNSF RR ALIGNMENT
1461          BA   0.124
1462          LG    0.50    0.25    4.45    0.57       0
1463          UI       0      11      15      32      64      69      91      95      95      80
1464          UI      84      60      56      41      33      28      19      16      13      10
1465          UI       9       6       6       4       1       1       1       1       1       1
1466          UI       1       1       1       1       1       1       1       0       0       0
1467          UI       0       0       0       0       0       0       0       0       0       0
              *

1468          KK  DD37SERETRIEVE
1469          DR   DD37S
              *

1470          KK  D37D38   ROUTE
1471          KM        Cross-section: Cross-section estimated from aerial and topo-railroad
1472          KM        Manning's N Value: earth w/ sparse trees and brush
1473          RS       1    FLOW
1474          RC   0.032   0.032   0.032    1505  0.0040    0.00
1475          RX  100.00  120.00  127.00  134.00  155.00  170.00  190.00  290.00
1476          RY  1148.1 1148.00 1147.00 1146.00 1146.10 1147.00 1148.00 1148.10
              *

1477          KK   CPD38 COMBINE
1478          HC       3  23.694
              *

1479          KK   DD381  DIVERT
1480          KM        RR tracks btwn Cactus and Waddell split flow
1481          DT  DD381S     0.0     0.0
1482          DI     0.0   178.5  1607.5  4129.9  7990.7     0.0     0.0     0.0     0.0     0.0
1483          DQ     0.0   156.9  1414.9  3582.1  6821.6     0.0     0.0     0.0     0.0     0.0
              *

1484          KK   DD382  DIVERT
1485          KM        RR tracks btwn Cactus and Waddell split flow
1486          DT  DD382S     0.0     0.0
1487          DI     0.0    21.7   192.6   547.8  1169.1     0.0     0.0     0.0     0.0     0.0
1488          DQ     0.0    15.2    51.2    99.4   157.1     0.0     0.0     0.0     0.0     0.0
              *
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1489          KK  D38D39   ROUTE
1490          KM        Cross-section: Ag field, assumed 0.5% side slopes, V-ditch
1491          KM        Manning's N Value: Earth with grass and forbs
1492          RS      20    FLOW
1493          RC   0.025   0.025   0.025    2996  0.0013    0.00
1494          RX  100.00  200.00  400.00  500.00  550.00  600.00  800.00  900.00
1495          RY  1000.0  999.50  998.50  998.00  998.25  998.50  999.50 1000.00
              *

1496          KK     D39   BASIN
1497          KM        BASIN BOUNDARY FROM  AG LAND, 1990 TOPO AND BNSF RR ALIGNMENT
1498          BA   0.182
1499          LG    0.50    0.25    5.60    0.33       0
1500          UI       0      17      25      56      98     120     137     146     139     125
1501          UI     113      98      69      54      50      31      26      21      16      14
1502          UI      10      10       7       2       2       2       2       2       2       2
1503          UI       2       2       2       2       2       0       0       0       0       0
1504          UI       0       0       0       0       0       0       0       0       0       0
              *

1505          KK   DD252RETRIEVE
1506          DR  DD252S
              *

1507          KK  D25D39   ROUTE
1508          KM        Cross-section: Cross-section from Surprise Pointe Master
1509          KM        Drainage Report / Manning's N Value: clean earth
1510          RS       1    FLOW
1511          RC   0.022   0.022   0.022    2101  0.0029    0.00
1512          RX  100.00  101.00  102.00  120.00  120.50  132.20  133.00  134.00
1513          RY  1000.0  999.90  999.80  996.80  996.90  999.80  999.90 1000.00
              *

1514          KK   CPD39 COMBINE
1515          HC       4  23.876
              *

1516          KK  D39D42   ROUTE
1517          KM        Cross-section: Cross-section from Lower El Mirage Channelization
1518          KM        (Report FCDMC 18-198B) / Manning's N Value: clean earth; straight
1519          RS       5    FLOW
1520          RC   0.022   0.022   0.022    5691  0.0035    0.00
1521          RX  100.00  103.00  105.50  137.50  187.50  219.50  222.00  225.00
1522          RY  1000.0  999.50  998.50  990.50  990.40  998.50  999.50 1000.00
              *

1523          KK     D26   BASIN
1524          KM        BASIN BOUNDARY FROM RACHO EL MIRAGE, SCHOOL
1525          KM        MOBILE HOME PARK, SUNWEST CEMETARY AND GRAND AVE CHANNEL
1526          BA   0.642
1527          LG    0.24    0.25    5.80    0.24      34
1528          UI       0     165     560     873    1364     927     587     245     140      44
1529          UI      37       0       0       0       0       0       0       0       0       0
1530          UI       0       0       0       0       0       0       0       0       0       0
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1531          UI       0       0       0       0       0       0       0       0       0       0
1532          UI       0       0       0       0       0       0       0       0       0       0
              *
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1533          KK  DD26RE  DIVERT
1534          KM        Retention volume estimated based on aerial
1535          DT    RD26     52.4     0.0
1536          DI     0.0    500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1537          DQ     0.0    500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

1538          KK   DD142RETRIEVE
1539          DR  DD142S
              *

1540          KK  D14D26   ROUTE
1541          KM        Cross-section: Cross-section from Lower El Mirage Channelization
1542          KM        (Report FCDMC 18-198B) / Manning's N Value: clean earth; straight
1543          RS       2    FLOW
1544          RC   0.022   0.022   0.022    5050  0.0048    0.00
1545          RX  100.00  102.50  105.50  137.50  187.50  219.50  222.00  225.00
1546          RY  1000.0  999.50  999.00  991.00  991.10  999.00  999.80 1000.00
              *

1547          KK   CPD26 COMBINE
1548          HC       2     5.4
              *

1549          KK  D26D27   ROUTE
1550          KM        Cross-section: Cross-section determined from FCDMC 18
1551          KM        Manning's N Value: Clean earth
1552          RS       2    FLOW
1553          RC   0.022   0.022   0.022    2050  0.0039    0.00
1554          RX  100.00  102.50  105.50  137.50  187.50  219.50  222.00  225.00
1555          RY  1000.0  999.50  999.00  991.00  991.00  999.00  999.50 1000.00
              *

1556          KK     D27   BASIN
1557          KM        BASIN BOUNDARY FROM RANCHO EL MIRAGE
1558          KM        WEST EL MIRAGE AND BNSF RR ALIGNMENT
1559          BA   0.316
1560          LG    0.20    0.24    4.90    0.36      42
1561          UI       0     103     332     568     679     409     199      89      33      20
1562          UI       0       0       0       0       0       0       0       0       0       0
1563          UI       0       0       0       0       0       0       0       0       0       0
1564          UI       0       0       0       0       0       0       0       0       0       0
1565          UI       0       0       0       0       0       0       0       0       0       0
              *

1566          KK  DD27RE  DIVERT
1567          KM        Retention volume estimated based on aerial
1568          DT    RD27      8.2     0.0
1569          DI     0.0    500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1570          DQ     0.0    500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1571          KK   CPD27 COMBINE
1572          HC       2   5.716
              *

1573          KK   SRD27 STORAGE
1574          KM        Storage at culvert under TB Road
1575          KO
1576          RS       1    STOR
1577          SV                                                  22.80   51.41
1578          SQ           52.00  202.00  415.00  658.00  906.00 1127.00 2999.00
1579          SE  1140.0 1142.00 1144.00 1146.00 1148.00 1150.00 1152.00 1154.00
1580          ST
              *

1581          KK  D27D42   ROUTE
1582          KM        Cross-section: Cross-section from Lower El Mirage Channelization
1583          KM        (Report FCDMC 18-198B) / Manning's N Value: clean earth; straight
1584          RS       3    FLOW
1585          RC   0.022   0.022   0.022    5598  0.0032    0.00
1586          RX  100.00  102.50  105.50  137.50  187.50  219.50  222.00  225.00
1587          RY  1000.0  999.50  999.00  991.00  991.10  999.00  999.50 1000.00
              *

1588          KK     D42   BASIN
1589          KM        BASIN BOUNDARY FROM PARQUE VERDE MULTI PHASE
1590          KM        DYSART SCHOOL DISTRICT, AND BUENA VISTA
1591          BA   0.994
1592          LG    0.24    0.24    5.20    0.30      32
1593          UI       0     150     592     894    1340    1711    1182     824     458     248
1594          UI     147      46      46      46       0       0       0       0       0       0
1595          UI       0       0       0       0       0       0       0       0       0       0
1596          UI       0       0       0       0       0       0       0       0       0       0
1597          UI       0       0       0       0       0       0       0       0       0       0
              *

1598          KK  DD42RE  DIVERT
1599          KM        Retention volume estimated based on aerial, Cactus and Dysart
1600          KM        Subdivision and Parque Verde - No Reports available
1601          DT    RD42     71.8     0.0
1602          DI     0.0    500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1603          DQ     0.0    500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

1604          KK   CPD42 COMBINE
1605          HC       4  26.933
              *

1606          KK   SRD42 STORAGE
1607          KM        Storage behind Cactus Road - 2009 ADMPU data revised by DIBBLE
1608          KM    Storage and roadway data based on 2010 survey by FCDMC (NGVD29)
1609          KM    Discharge data based on 3-24" pipes + overflow through control section
1610          KO       1       2
1611          RS       1    STOR
1612          SV           0.03    1.63   11.41   12.00   12.60   13.30   14.00   14.62   15.30
```



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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1613          SV   16.40   18.09   20.20
1614          SQ            9.00   41.00   81.00   82.00  118.00  147.50  184.00  230.00  294.00
```

```
1615          SQ  422.00  717.00 1123.00
1616          SE  1105.2 1107.00 1110.00 1114.00 1114.20 1114.40 1114.60 1114.80 1115.00 1115.20
1617          SE  1115.5 1116.00 1116.50
              *

1618          KK  D42D53   ROUTE
1619          KM        Cross-section: Cross-section estimated from aerial and topo data
1620          KM        from West Cactus Basin CAR (with average width of 2 channel segments)
1621          KM        Manning's N Value: clean earth; straight
1622          RS       1    FLOW
1623          RC   0.022   0.022   0.022    1558  0.0026    0.00
1624          RX  100.00  103.00  105.00  145.00  271.00  311.00  313.00  315.00
1625          RY  1000.0  999.90  999.80  995.80  995.90  999.80  999.90 1000.00
              *

1626          KK     D53   BASIN
1627          KM        BASIN BOUNDARY FROM EL MIRAGE MARKET PLACE, RANCHO MIRAGE UNIT 3
1628          BA   0.118
1629          LG    0.31    0.32    4.60    0.36      11
1630          UI       0      56     169     306     216     105      39      12       9       0
1631          UI       0       0       0       0       0       0       0       0       0       0
1632          UI       0       0       0       0       0       0       0       0       0       0
1633          UI       0       0       0       0       0       0       0       0       0       0
1634          UI       0       0       0       0       0       0       0       0       0       0
              *

1635          KK  DD53RE  DIVERT
1636          KM        Retention volume estimated based on aerial
1637          DT    RD53    12.1     0.0
1638          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1639          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

1640          KK   CPD53 COMBINE
1641          HC       2  27.051
              *

1642          KK   SRD53 STORAGE
1643          KM        West Cactus Basin - 2009 ADMPU data revised by AZTEC
1644          KM    Storage and roadway data based on 2010 survey by FCDMC (NGVD29)
1645          KM    Discharge data based on 2-10'x3' RCBC + overflow through control section
1646          KM        Calculations based on field visit and existing topo
1647          RS       1    STOR
1648          SV            0.66    4.10   20.00   27.60   47.20   57.80   67.00   69.20   74.00
1649          SV   78.00   81.70   85.00   87.00   90.00
1650          SQ                                   25.00  225.00  375.00  430.00  474.00  526.00
1651          SQ  633.00  737.00  835.00  955.00 1117.00
1652          SE  1103.0 1104.00 1105.00 1107.20 1108.00 1110.00 1111.00 1111.70 1112.00 1112.30
1653          SE  1112.7 1113.00 1113.20 1113.40 1113.60
              *
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1654          KK  D53D54   ROUTE
1655          KM        Cross-section: Golf course, Cross-section determined from
1656          KM        aerial-golf course / Manning's N Value: earth w/ grass
1657          RS       4    FLOW
1658          RC   0.025   0.025   0.025    3999  0.0045    0.00
1659          RX  100.00  174.00  228.00  298.00  357.50  413.00  468.00  486.00
1660          RY  1106.0 1104.00 1103.00 1102.00 1101.90 1103.00 1104.00 1104.10
              *

1661          KK     D43   BASIN
1662          KM        BASIN BOUNDARY FROM MONTA BLANCA ESTATES, SUNNYVALE AND SUNDIAL
1663          BA   0.500
1664          LG    0.25    0.25    4.70    0.37      33
1665          UI       0      75     298     450     674     861     594     414     230     125
1666          UI      74      23      23      23       0       0       0       0       0       0
1667          UI       0       0       0       0       0       0       0       0       0       0
1668          UI       0       0       0       0       0       0       0       0       0       0
1669          UI       0       0       0       0       0       0       0       0       0       0
              *

1670          KK  DD43RE  DIVERT
1671          KM        Retention volume estimated based on aerial
1672          DT    RD43    35.5     0.0
1673          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1674          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

1675          KK  D43D54   ROUTE
1676          KM        Cross-section: Golf course, assumed 0.5%
1677          KM        side slopes, V-ditch / Manning's N Value: grass - golf course
1678          RS      14    FLOW
1679          RC   0.025   0.025   0.025    3872  0.0023    0.00
1680          RX  100.00  200.00  400.00  500.00  550.00  600.00  800.00  900.00
1681          RY  1000.0  999.50  998.50  998.00  998.25  998.50  999.50 1000.00
              *

1682          KK     D54   BASIN
1683          KM        BASIN BOUNDARY FROM FAIRWAYS GOLF COURSE DIVISION
1684          KM        AND PUEBLO EL MIRAGE RV RESORT
1685          BA   0.271
1686          LG    0.20    0.27    4.45    0.50      14
1687          UI       0      65     225     347     561     401     260     119      64      26
1688          UI      15      15       0       0       0       0       0       0       0       0
1689          UI       0       0       0       0       0       0       0       0       0       0
1690          UI       0       0       0       0       0       0       0       0       0       0
1691          UI       0       0       0       0       0       0       0       0       0       0
              *

1692          KK  DD54RE  DIVERT
1693          KM        NO REPORTS - ESTIMATED FIRST FLUSH RETENTION FROM AERIAL
1694          KM        DUE TO LOCATION OF DEVELOPMENT TO THE RIVER
1695          DT    RD54     3.0     0.0
1696          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1697          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1698          KK   CPD54 COMBINE
1699          HC       3  27.822
```

```
                    *
     1700           ZZ
1
            SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.     (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   51        D03
              .
              .
   64         .------->    RD03
   60     DD03RE
              V
              V
   67     D03D04
              .
              .
   74         .         D04
              .           .
              .           .
   90         .           .------->    RD04
   85         .      DD04RE
              .           .
              .           .
   93      CPD04............
              .
              .
   97         .------->   DD04S
   95     DD04SE
              V
              V
  100     D04D05
              .
              .
  107         .         D05
              .           .
              .           .
  119         .           .------->    RD05
  117         .      DD05RE
              .           .
              .           .
  122      CPD05............
              V
              V
  124     D05D14
              .
              .
  135         .------->  DD141S
  131      DD141
              V
              V
  138     D05D15
              .
              .
  145         .         D11
              .           .
              .           .
  160         .           .------->    RD11
  155         .      DD11RE
              .           .
              .           .
  165         .           .------->  DD111S
  163         .       DD111
              .           .
              .           .
  170         .           .------->  DD112S
  168         .       DD112
              .           V
              .           V
  173         .      D11D12
              .           .
              .           .
  180         .           .         D12
              .           .           .
              .           .           .
  196         .           .           .------->    RD12
  190         .           .      DD12RE
              .           .           .
              .           .           .
  199         .       CPD12............
              .           .
              .           .
  203         .           .------->  DD121S
  201         .       DD121
              .           .
              .           .
  208         .           .------->  DD122S
  206         .       DD122
              .           V
              .           V
  211         .      D12D13
              .           .
              .           .
  219         .           .         D13
              .           .           .
              .           .           .
  233         .           .           .------->    RD13
  228         .           .      DD13RE
              .           .           .
              .           .           .
  237         .           .           .           .<-------   DD04S
  236         .           .           .      DD04SE
              .           .           .           V
              .           .           .           V
  238         .           .           .      D04D13
              .           .           .           .
              .           .           .           .
  245         .       CPD13........................
              .           .
              .           .
  249         .           .------->  DD131S
  247         .       DD131
              .           .
              .           .
  254         .           .------->  DD132S
```

```
252          .       DD132
             .           V
             .           V
257          .      D13D14
             .           .
             .           .
264          .           .         D14
             .           .           .
             .           .           .
275          .           .           .-------->    RD14
273          .           .      DD14RE
             .           .           .
             .           .           .
279          .           .           .           .<-------  DD141S
278          .           .           .       DD141
             .           .           .           V
             .           .           .           V
280          .           .           .      D0514A
             .           .           .           .
             .           .           .           .
288          .       CPD14.......................
             .           .
             .           .
292          .           .-------->  DD142S
290          .       DD142
             .           V
             .           V
295          .      D14D15
             .           .
             .           .
302          .           .         D15
             .           .           .
             .           .           .
311       CPD15.......................
             .
             .
313          .         L01
             .           .
             .           .
324          .           .-------->    RL01
322          .      DL01RE
             .           V
             .           V
327          .      L01L03
             .           .
             .           .
335          .           .         L03
             .           .           .
             .           .           .
346          .           .           .-------->    RL03
344          .           .      DL03RE
             .           .           .
             .           .           .
349          .           .           .         L20
             .           .           .           .
             .           .           .           .
361          .           .           .           .-------->    RL20
359          .           .           .      DL20RE
             .           .           .           V
             .           .           .           V
364          .           .           .      L20L03
             .           .           .           .
             .           .           .           .
372          .       CPL03.......................
             .           .
             .           .
377          .           .-------->   DL03S
374          .      DL03SE
             .           V
             .           V
380          .      L03L04
             .           .
             .           .
387          .           .         L04
             .           .           .
             .           .           .
398          .           .           .-------->    RL04
396          .           .      DL04RE
             .           .           .
             .           .           .
401          .       CPL04............
             .           .
             .           .
405          .           .-------->   DL04S
403          .      DL04SE
             .           V
             .           V
408          .      L04L05
             .           .
             .           .
415          .           .         L05
             .           .           .
             .           .           .
428          .           .           .-------->    RL05
424          .           .      DL05RE
             .           .           .
             .           .           .
431          .       CPL05............
             .           .
             .           .
435          .           .-------->  DL051S
433          .       DL051
             .           .
             .           .
440          .           .-------->  DL052S
138          .       DL052
             .           V
             .           V
443          .      L05D06
             .           .
             .           .
450          .           .         L02
             .           .           .
             .           .           .
461          .           .           .-------->    RL02
459          .           .      DL02RE
             .           .           V
```

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                 .          .          V
464              .          .     L02D06
                 .          .          .
                 .          .          .
472              .          .          .        D06
                 .          .          .          .
                 .          .          .          .
483              .          .          .          .-------->    RD06
481              .          .          .     DD06RE
                 .          .          .          .
                 .          .          .          .
486              .      CPD06.......................
                 .          .
                 .          .
491              .          .-------->   DD06S
488              .     DD06SE
                 .          V
                 .          V
494              .     D06D07
                 .          .
                 .          .
502              .          .        D07
                 .          .          .
                 .          .          .
513              .          .          .-------->    RD07
511              .          .     DD07RE
                 .          .          .
                 .          .          .
516              .      CPD07............
                 .          V
                 .          V
518              .     D07D02
                 .          .
                 .          .
525              .          .        D01
                 .          .          .
                 .          .          .
536              .          .          .-------->    RD01
534              .          .     DD01RE
                 .          .          V
                 .          .          V
539              .          .     D01D02
                 .          .          .
                 .          .          .
546              .          .          .        D02
                 .          .          .          .
                 .          .          .          .
557              .          .          .          .-------->    RD02
555              .          .          .     DD02RE
                 .          .          .          .
                 .          .          .          .
560              .      CPD02.......................
                 .          V
                 .          V
562              .     D02D10
                 .          .
                 .          .
568              .          .        D09
                 .          .          .
                 .          .          .
579              .          .          .-------->    RD09
577              .          .     DD09RE
                 .          .          V
                 .          .          V
582              .          .     D09D10
                 .          .          .
                 .          .          .
590              .          .          .          .<-------   DD06S
589              .          .          .     DD06SE
                 .          .          .          V
                 .          .          .          V
591              .          .          .     D06D10
                 .          .          .          .
                 .          .          .          .
597              .          .          .          .        D10
                 .          .          .          .          .
                 .          .          .          .          .
612              .          .          .          .          .-------->    RD10
607              .          .          .          .     DD10RE
                 .          .          .          .          .
                 .          .          .          .          .
615              .      CPD10.................................
                 .          V
                 .          V
617              .     D10D19
                 .          .
                 .          .
624              .          .        L09
                 .          .          .
                 .          .          .
638              .          .          .-------->    RL09
633              .          .     DL09RE
                 .          .          .
                 .          .          .
642              .          .          .          .<-------  DL051S
641              .          .          .       DL051
                 .          .          .          V
                 .          .          .          V
643              .          .          .     L05L09
                 .          .          .          .
                 .          .          .          .
650              .          .      CPL09............
                 .          .          .
                 .          .          .
654              .          .          .-------->  DL091S
652              .          .      DL091
                 .          .          .
                 .          .          .
659              .          .          .-------->  DL092S
657              .          .      DL092
                 .          .          V
                 .          .          V
662              .          .     L09D08
                 .          .          .
                 .          .          .
669              .          .          .        D08
                 .          .          .          .
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683                                  .------->    RD08
678                            DD08RE
687                                                .<-------  DL052S
686                                       DL052
                                             V
                                             V
688                                      L05D08
695                         CPD08.......................
                                V
                                V
698                          D08D16
705                                L06
733                                  .------->    RL06
714                            DL06RE
738                                  .------->   DL06S
736                            DL06SE
                                     V
                                     V
741                            L06L07
748                                        L07
770                                            .------->    RL07
757                                      DL07RE
774                                                   .<-------   DL03S
773                                            .     DL03SE
                                                         V
                                                         V
775                                            .     L0307A
                                                         V
                                                         V
783                                            .     L0307B
790                             CPL07.......................
794                                  .------->   DL07S
792                            DL07SE
                                     V
                                     V
797                            L07L08
804                                        L08
822                                            .------->    RL08
813                                      DL08RE
826                                                   .<-------   DL04S
825                                            .     DL04SE
                                                         V
                                                         V
827                                            .     L04L08
834                             CPL08.......................
                                     V
                                     V
836                            L08L12
843                                        L10
860                                            .------->    RL10
853                                      DL10RE
                                             V
                                             V
863                                      L10L11
871                                                   .<-------   DL06S
870                                            .     DL06SE
                                                         V
                                                         V
872                                            .     L06L11
879                                                           L11
896                                                           .------->    RL11
889                                                       DL11RE
900                                                                   .<-------   DL07S
899                                                               DL07SE
                                                                     V
                                                                     V
 01                                                               L07L11
909                                      CPL11.....................................
913                                          .------->   DL11S
911                                      DL11SE
                                             V
                                             V
```

```
916                                   L11L12
                                          .
923                                       .        L12
                                          .         .
935                                       .         .-------->   RL12
932                                       .     DL12RE
                                          .         .
938                                   CPL12.....................
                                          .
                                          .
942                                       .-------> DL121S
940                                   DL121
                                          .
                                          .
947                                       .-------> DL122S
945                                   DL122
                                          V
                                          V
950                                  L12L13
                                          .
                                          .
957                                       .        L13
                                          .         .
969                                       .         .<-------  DL091S
968                                       .      DL091
                                          .         V
                                          .         V
970                                       .     L09L13
                                          .         .
977                                   CPL13.....................
                                          .
                                          .
982                                       .-------> DL131S
979                                   DL131
                                          .
                                          .
988                                       .-------> DL132S
985                                   DL132
                                          V
                                          V
991                                  L13D16
                                          .
                                          .
998                                       .        D16
                                          .         .
1009                                      .         .<-------  DL092S
1008                                      .      DL092
                                          .         V
                                          .         V
1010                                      .     L09D16
                                          .         .
1017                              CPD16.................................
                                          .
                                          .
1021                                      .-------> DD161S
1019                              DD161
                                          .
                                          .
1026                                      .-------> DD162S
1024                              DD162
                                          V
                                          V
1029                             D16D18
                                          .
                                          .
1036                                      .        D18
                                          .
                                          .
1047                                      .------->   RD18
1045                                     DD18RE
                                          .
                                          .
1050                              CPD18............
                                          V
                                          V
1052                             D18D19
                                          .
                                          .
1059                                      .        D17
                                          .
                                          .
1071                                      .------->   RD17
1068                                     DD17RE
                                          V
                                          V
1074                                     D17D19
                                          .
                                          .
1082                                      .        D19
                                          .         .
1100                                      .         .------->   RD19
1091                                      .     DD19RE
                                          .         .
1103                      CPD19.................................
                                  .
                                  .
1107                              .-------> DD191S
1105                      DD191
                                  .
                                  .
1112                              .-------> DD192S
1110                      DD192
                                  V
                                  V
1115                     D19D20
                                  .
                                  .
1122                              .        D20
```

```
                .          .          .
                .          .          .
1136            .          .          .-------->    RD20
1131            .          .     DD20RE
                .          .          .
                .          .          .
1140            .          .          .          .<-------  DD111S
1139            .          .          .      DD111
                .          .          .          V
                .          .          .          V
 141            .          .          .     D11D20
                .          .          .          .
                .          .          .          .
1148            .      CPD20.......................
                .          V
                .          V
1150            .     D20D21
                .          .
                .          .
1157            .          .        D21
                .          .          .
                .          .          .
1170            .          .          .-------->    RD21
1166            .          .     DD21RE
                .          .          .
                .          .          .
1174            .          .          .          .<-------  DD112S
1173            .          .          .      DD112
                .          .          .          V
                .          .          .          V
1175            .          .          .     D11D21
                .          .          .          .
                .          .          .          .
1183            .          .          .          .          .<-------  DD121S
1182            .          .          .          .      DD121
                .          .          .          .          V
                .          .          .          .          V
1184            .          .          .          .     D12D21
                .          .          .          .          .
                .          .          .          .          .
1191            .      CPD21...................................
                .          .
                .          .
1195            .          .-------->  DD211S
1193            .      DD211
                .          .
                .          .
1200            .          .-------->  DD212S
1198            .      DD212
                .          V
                .          V
1203            .     D21D22
                .          .
                .          .
1211            .          .        D22
                .          .          .
                .          .          .
225             .          .          .-------->    RD22
220             .          .     DD22RE
                .          .          .
                .          .          .
1229            .          .          .          .<-------  DD122S
1228            .          .          .      DD122
                .          .          .          V
                .          .          .          V
1230            .          .          .     D12D22
                .          .          .          .
                .          .          .          .
1237            .      CPD22.......................
                .          V
                .          V
1239            .     D22D23
                .          .
                .          .
1246            .          .        D23
                .          .          .
                .          .          .
1264            .          .          .-------->    RD23
1255            .          .     DD23RE
                .          .          .
                .          .          .
1268            .          .          .          .<-------  DD131S
1267            .          .          .      DD131
                .          .          .          V
                .          .          .          V
1269            .          .          .     D13D23
                .          .          .          .
                .          .          .          .
1276            .      CPD23.......................
                .          .
                .          .
1280            .          .-------->  DD231S
1278            .      DD231
                .          .
                .          .
1285            .          .-------->  DD232S
1283            .      DD232
                .          V
                .          V
1288            .     D23D24
                .          .
                .          .
1294            .          .        D24
                .          .          .
                .          .          .
305             .          .          .-------->    RD24
03              .          .     DD24RE
                .          .          .
                .          .          .
1309            .          .          .          .<-------  DD132S
1308            .          .          .      DD132
                .          .          .          V
                .          .          .          V
1310            .          .          .     D13D24
                .          .          .          .
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1317            .      CPD24.......................
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1321            .          .-------->   DD24S
1319            .     DD24SE
                .          V
                .          V
1324            .     D24D25
                .          .
                .          .
1331            .          .        D25
                .          .          .
                .          .          .
1344            .          .          .-------->    RD25
1340            .          .     DD25RE
                .          .          .
                .          .          .
1347            .     CPD25............
                .          .
                .          .
1351            .          .-------->  DD251S
1349            .     DD251
                .          .
                .          .
1356            .          .-------->  DD252S
1354            .     DD252
                .          V
                .          V
1359            .     D2542A
                .          V
                .          V
1367            .     D2542B
                .          .
                .          .
1375            .          .        D37
                .          .          .
                .          .          .
1385            .          .          .          .<-------  DD232S
1384            .          .          .      DD232
                .          .          .          V
                .          .          .          V
1386            .          .          .     D23D37
                .          .          .          .
                .          .          .          .
1396            .          .          .          .          .<-------  DD251S
1395            .          .          .          .      DD251
                .          .          .          .          V
                .          .          .          .          V
1397            .          .          .          .     D25D37
                .          .          .          .          .
                .          .          .          .          .
1405            .          .          .          .          .          .<-------   DD24S
1404            .          .          .          .          .     DD24SE
                .          .          .          .          .          V
                .          .          .          .          .          V
1406            .          .          .          .          .     D24D37
                .          .          .          .          .          .
                .          .          .          .          .          .
1413            .          .      CPD37...................................
                .          .          .
                .          .          .
1417            .          .          .-------->   DD37S
1415            .          .     DD37SE
                .          .          V
                .          .          V
1420            .          .     D37D39
                .          .          .
                .          .          .
1427            .          .          .        D35
                .          .          .          .
                .          .          .          .
1437            .          .          .          .          .<-------  DD231S
1436            .          .          .          .      DD231
                .          .          .          .          V
                .          .          .          .          V
1438            .          .          .          .     D23D35
                .          .          .          .          .
                .          .          .          .          .
1445            .          .          .      CPD35............
                .          .          .          .
                .          .          .          .
1449            .          .          .          .-------->   DD35S
1447            .          .          .     DD35SE
                .          .          .          V
                .          .          .          V
1452            .          .          .     D35D38
                .          .          .          .
                .          .          .          .
1459            .          .          .          .        D38
                .          .          .          .          .
                .          .          .          .          .
1469            .          .          .          .          .          .<-------   DD37S
1468            .          .          .          .          .     DD37SE
                .          .          .          .          .          V
                .          .          .          .          .          V
1470            .          .          .          .          .     D37D38
                .          .          .          .          .          .
                .          .          .          .          .          .
1477            .          .          .      CPD38........................
                .          .          .          .
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1481            .          .          .          .-------->  DD381S
1479            .          .          .      DD381
                .          .          .          .
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1486            .          .          .          .-------->  DD382S
1484            .          .          .      DD382
                .          .          .          V
                .          .          .          V
1489            .          .          .     D38D39
                .          .          .          .
                .          .          .          .
1496            .          .          .          .        D39
                .          .          .          .          .
                .          .          .          .          .
1506            .          .          .          .          .          .<-------  DD252S
1505            .          .          .          .          .      DD252
                .          .          .          .          .          V
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                 .          .          .          .          .          V
 1507            .          .          .          .          .      D25D39
                 .          .          .          .          .          .
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 1514            .          .       CPD39.................................
                 .          .          V
                 .          .          V
 1516            .          .      D39D42
                 .          .          .
                 .          .          .
  523            .          .          .        D26
                 .          .          .          .
                 .          .          .          .
 1535            .          .          .          .-------->    RD26
 1533            .          .          .     DD26RE
                 .          .          .          .
                 .          .          .          .
 1539            .          .          .          .          .<-------  DD142S
 1538            .          .          .          .      DD142
                 .          .          .          .          V
                 .          .          .          .          V
 1540            .          .          .          .     D14D26
                 .          .          .          .          .
                 .          .          .          .          .
 1547            .          .          .      CPD26............
                 .          .          .          V
                 .          .          .          V
 1549            .          .          .     D26D27
                 .          .          .          .
                 .          .          .          .
 1556            .          .          .          .        D27
                 .          .          .          .          .
                 .          .          .          .          .
 1568            .          .          .          .          .-------->    RD27
 1566            .          .          .          .      DD27RE
                 .          .          .          .          .
                 .          .          .          .          .
 1571            .          .          .      CPD27............
                 .          .          .          V
                 .          .          .          V
 1573            .          .          .      SRD27
                 .          .          .          V
                 .          .          .          V
 1581            .          .          .     D27D42
                 .          .          .          .
                 .          .          .          .
 1588            .          .          .          .        D42
                 .          .          .          .          .
                 .          .          .          .          .
 1601            .          .          .          .          .-------->    RD42
 1598            .          .          .          .      DD42RE
                 .          .          .          .          .
                 .          .          .          .          .
 1604            .      CPD42.................................
                 .          V
                 .          V
 1606            .      SRD42
                 .          V
                 .          V
  618            .     D42D53
                 .          .
                 .          .
 1626            .          .        D53
                 .          .          .
                 .          .          .
 1637            .          .          .-------->    RD53
 1635            .          .     DD53RE
                 .          .          .
                 .          .          .
 1640            .      CPD53............
                 .          V
                 .          V
 1642            .      SRD53
                 .          V
                 .          V
 1654            .     D53D54
                 .          .
                 .          .
 1661            .          .        D43
                 .          .          .
                 .          .          .
 1672            .          .          .-------->    RD43
 1670            .          .     DD43RE
                 .          .          V
                 .          .          V
 1675            .          .     D43D54
                 .          .          .
                 .          .          .
 1682            .          .          .        D54
                 .          .          .          .
                 .          .          .          .
 1695            .          .          .          .-------->    RD54
 1692            .          .          .     DD54RE
                 .          .          .          .
                 .          .          .          .
 1698            .      CPD54........................
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(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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1*****************************************                    *****************************************
 *                                       *                    *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                    *    U.S. ARMY CORPS OF ENGINEERS       *
 *              JUN   1998               *                    *    HYDROLOGIC ENGINEERING CENTER      *
 *            VERSION 4.1                *                    *          609 SECOND STREET            *
 *                                       *                    *       DAVIS, CALIFORNIA 95616         *
 *  RUN DATE   08FEB13  TIME  14:56:10   *                    *           (916) 756-1104              *
 *                                       *                    *                                       *
    *****************************************                  *****************************************
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Flood Control District of Maricopa County
LEMWB_PRE - Lower El Mirage Wash Basin Floodplain Delineation
Conditional Letter of Map Revision Pre-Project Hydrology
100 YEAR
24 Hour Storm

INTERPOLATED HYDROGRAPH AT CPD54

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	166.58-HR
294.	12.25	(CFS)	146.	66.	22.	10.
		(INCHES)	0.049	0.089	0.090	0.090
		(AC-FT)	73.	131.	133.	133.

CUMULATIVE AREA = 27.82 SQ MI

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	D03	931.	12.25	106.	33.	11.	0.72		
DIVERSION TO	RD03	931.	12.25	96.	26.	9.	0.72		
HYDROGRAPH AT	DD03RE	100.	12.83	21.	7.	2.	0.72		
ROUTED TO	D03D04	61.	13.17	21.	7.	2.	0.72		
HYDROGRAPH AT	D04	1115.	12.33	138.	43.	14.	0.89		
DIVERSION TO	RD04	1082.	12.33	85.	24.	8.	0.89		
HYDROGRAPH AT	DD04RE	831.	12.42	67.	19.	6.	0.89		
2 COMBINED AT	CPD04	813.	12.42	86.	26.	9.	1.61		
DIVERSION TO	DD04S	471.	12.42	25.	6.	2.	1.61		
HYDROGRAPH AT	DD04SE	342.	12.42	62.	20.	7.	1.61		
ROUTED TO	D04D05	288.	12.67	61.	20.	7.	1.61		
HYDROGRAPH AT	D05	319.	12.17	34.	12.	4.	0.16		
DIVERSION TO	RD05	134.	11.92	13.	4.	1.	0.16		
HYDROGRAPH AT	DD05RE	319.	12.17	27.	8.	3.	0.16		
2 COMBINED AT	CPD05	317.	12.67	85.	27.	9.	1.78		
ROUTED TO	D05D14	255.	12.83	83.	27.	9.	1.78		
DIVERSION TO	DD141S	133.	12.83	14.	3.	1.	1.78		
HYDROGRAPH AT	DD141	122.	12.25	70.	24.	8.	1.78		
ROUTED TO	D05D15	129.	12.50	69.	24.	8.	1.78		
HYDROGRAPH AT	D11	758.	12.42	104.	32.	11.	0.66		
DIVERSION TO	RD11	728.	12.33	58.	16.	5.	0.66		
HYDROGRAPH AT	DD11RE	698.	12.50	57.	16.	5.	0.66		
DIVERSION TO	DD111S	574.	12.50	46.	13.	4.	0.66		
HYDROGRAPH AT	DD111	124.	12.50	11.	3.	1.	0.66		
DIVERSION TO	DD112S	45.	12.50	6.	2.	1.	0.66		
HYDROGRAPH AT	DD112	79.	12.50	5.	1.	0.	0.66		
ROUTED TO	D11D12	46.	12.67	5.	1.	0.	0.66		
HYDROGRAPH AT	D12	236.	12.58	52.	16.	5.	0.35		
DIVERSION TO	RD12	236.	12.58	28.	8.	3.	0.35		
HYDROGRAPH AT	DD12RE	209.	12.83	30.	8.	3.	0.35		
2 COMBINED AT	CPD12	244.	12.83	34.	10.	3.	1.01		
DIVERSION TO	DD121S	105.	12.83	12.	3.	1.	1.01		

+	HYDROGRAPH AT	DD121	139.	12.83	22.	6.	2.	1.01
+	DIVERSION TO	DD122S	58.	12.83	10.	3.	1.	1.01
+	HYDROGRAPH AT	DD122	81.	12.83	12.	3.	1.	1.01
	ROUTED TO	D12D13	47.	13.67	11.	3.	1.	1.01
+	HYDROGRAPH AT	D13	1106.	12.25	120.	35.	12.	1.03
+	DIVERSION TO	RD13	495.	12.08	30.	9.	3.	1.03
+	HYDROGRAPH AT	DD13RE	1106.	12.25	99.	26.	9.	1.03
+	HYDROGRAPH AT	DD04SE	471.	12.42	25.	6.	2.	1.61
+	ROUTED TO	D04D13	156.	13.50	24.	6.	2.	1.61
+	3 COMBINED AT	CPD13	1106.	12.25	134.	36.	12.	3.65
+	DIVERSION TO	DD131S	195.	12.25	12.	3.	1.	3.65
+	HYDROGRAPH AT	DD131	902.	12.25	120.	32.	11.	3.65
+	DIVERSION TO	DD132S	383.	12.25	36.	10.	3.	3.65
+	HYDROGRAPH AT	DD132	518.	12.25	84.	22.	7.	3.65
+	ROUTED TO	D13D14	440.	12.67	82.	22.	7.	3.65
+	HYDROGRAPH AT	D14	1065.	12.42	144.	45.	15.	0.94
+	DIVERSION TO	RD14	1065.	12.42	117.	32.	11.	0.94
+	HYDROGRAPH AT	DD14RE	384.	12.75	42.	13.	4.	0.94
+	HYDROGRAPH AT	DD141	133.	12.83	14.	3.	1.	1.78
	ROUTED TO	D0514A	107.	13.08	14.	3.	1.	1.78
+	3 COMBINED AT	CPD14	822.	12.75	135.	38.	13.	4.76
+	DIVERSION TO	DD142S	521.	12.75	111.	32.	11.	4.76
+	HYDROGRAPH AT	DD142	301.	12.75	25.	7.	2.	4.76
+	ROUTED TO	D14D15	218.	12.83	24.	7.	2.	4.76
+	HYDROGRAPH AT	D15	412.	12.17	43.	14.	5.	0.22
+	3 COMBINED AT	CPD15	406.	12.17	129.	43.	15.	4.98
+	HYDROGRAPH AT	L01	262.	12.17	24.	7.	2.	0.16
+	DIVERSION TO	RL01	262.	12.17	18.	5.	2.	0.16
+	HYDROGRAPH AT	DL01RE	120.	12.33	8.	2.	1.	0.16
+	ROUTED TO	L01L03	48.	12.75	8.	2.	1.	0.16
+	HYDROGRAPH AT	L03	935.	12.33	113.	34.	11.	0.79
+	DIVERSION TO	RL03	935.	12.33	113.	33.	11.	0.79
+	HYDROGRAPH AT	DL03RE	2.	19.83	1.	0.	0.	0.79
+	HYDROGRAPH AT	L20	381.	12.42	46.	13.	4.	0.35
+	DIVERSION TO	RL20	381.	12.42	41.	11.	4.	0.35
	HYDROGRAPH AT	DL20RE	59.	12.92	8.	2.	1.	0.35
+	ROUTED TO	L20L03	29.	13.42	8.	2.	1.	0.35
+	3 COMBINED AT	CPL03	44.	12.75	14.	5.	2.	1.29
+	DIVERSION TO	DL03S	37.	12.75	14.	5.	2.	1.29

+	HYDROGRAPH AT	DL03SE	8.	13.17	1.	0.	0.	1.29
+	ROUTED TO	L03L04	8.	13.42	1.	0.	0.	1.29
+	HYDROGRAPH AT	L04	646.	12.42	80.	24.	8.	0.63
+	DIVERSION TO	RL04	646.	12.42	79.	22.	7.	0.63
+	HYDROGRAPH AT	DL04RE	5.	18.42	4.	1.	0.	0.63
+	2 COMBINED AT	CPL04	6.	13.42	4.	1.	0.	1.93
+	DIVERSION TO	DL04S	0.	0.00	0.	0.	0.	1.93
+	HYDROGRAPH AT	DL04SE	6.	13.42	4.	1.	0.	1.93
+	ROUTED TO	L04L05	4.	20.42	4.	1.	0.	1.93
+	HYDROGRAPH AT	L05	641.	12.33	82.	26.	9.	0.49
+	DIVERSION TO	RL05	641.	12.33	61.	17.	6.	0.49
+	HYDROGRAPH AT	DL05RE	313.	12.58	31.	9.	3.	0.49
+	2 COMBINED AT	CPL05	310.	12.58	31.	10.	3.	2.41
+	DIVERSION TO	DL051S	3.	12.50	0.	0.	0.	2.41
+	HYDROGRAPH AT	DL051	307.	12.58	31.	10.	3.	2.41
+	DIVERSION TO	DL052S	8.	12.58	1.	0.	0.	2.41
+	HYDROGRAPH AT	DL052	299.	12.58	30.	10.	3.	2.41
+	ROUTED TO	L05D06	215.	12.67	29.	10.	3.	2.41
+	HYDROGRAPH AT	L02	1670.	12.58	270.	83.	28.	1.88
+	DIVERSION TO	RL02	1670.	12.58	219.	59.	20.	1.88
+	HYDROGRAPH AT	DL02RE	684.	13.00	78.	24.	8.	1.88
+	ROUTED TO	L02D06	351.	13.50	73.	24.	8.	1.88
+	HYDROGRAPH AT	D06	603.	12.33	75.	23.	8.	0.46
+	DIVERSION TO	RD06	603.	12.33	60.	16.	5.	0.46
+	HYDROGRAPH AT	DD06RE	245.	12.67	22.	6.	2.	0.46
+	3 COMBINED AT	CPD06	453.	12.67	118.	39.	13.	4.76
+	DIVERSION TO	DD06S	83.	12.67	3.	1.	0.	4.76
+	HYDROGRAPH AT	DD06SE	370.	12.67	116.	38.	13.	4.76
+	ROUTED TO	D06D07	418.	12.83	115.	38.	13.	4.76
+	HYDROGRAPH AT	D07	896.	12.50	130.	39.	13.	0.89
+	DIVERSION TO	RD07	896.	12.50	116.	31.	10.	0.89
+	HYDROGRAPH AT	DD07RE	177.	13.08	25.	8.	3.	0.89
+	2 COMBINED AT	CPD07	438.	13.58	138.	46.	15.	5.64
+	ROUTED TO	D07D02	389.	13.75	136.	46.	15.	5.64
+	HYDROGRAPH AT	D01	1299.	12.58	205.	61.	20.	1.56
+	DIVERSION TO	RD01	1299.	12.58	184.	49.	16.	1.56
+	HYDROGRAPH AT	DD01RE	246.	13.25	38.	12.	4.	1.56
+	ROUTED TO	D01D02	93.	14.75	34.	12.	4.	1.56
+	HYDROGRAPH AT	D02	1701.	12.50	259.	78.	26.	1.84

+	DIVERSION TO	RD02	1701.	12.50	237.	63.	21.	1.84
+	HYDROGRAPH AT	DD02RE	251.	13.25	45.	15.	5.	1.84
+	3 COMBINED AT	CPD02	514.	13.25	205.	71.	24.	9.05
	ROUTED TO	D02D10	473.	13.92	203.	71.	24.	9.05
+	HYDROGRAPH AT	D09	352.	12.33	42.	13.	4.	0.26
+	DIVERSION TO	RD09	352.	12.33	29.	8.	3.	0.26
+	HYDROGRAPH AT	DD09RE	220.	12.50	17.	5.	2.	0.26
+	ROUTED TO	D09D10	159.	12.58	16.	5.	2.	0.26
+	HYDROGRAPH AT	DD06SE	83.	12.67	3.	1.	0.	4.76
+	ROUTED TO	D06D10	16.	13.75	3.	1.	0.	4.76
+	HYDROGRAPH AT	D10	756.	12.33	97.	30.	10.	0.63
+	DIVERSION TO	RD10	756.	12.33	70.	19.	6.	0.63
+	HYDROGRAPH AT	DD10RE	468.	12.58	37.	11.	4.	0.63
+	4 COMBINED AT	CPD10	606.	12.58	245.	86.	29.	9.95
+	ROUTED TO	D10D19	494.	14.08	242.	86.	29.	9.95
+	HYDROGRAPH AT	L09	562.	12.42	73.	22.	7.	0.49
+	DIVERSION TO	RL09	562.	12.42	72.	20.	7.	0.49
+	HYDROGRAPH AT	DL09RE	7.	17.25	5.	2.	1.	0.49
+	HYDROGRAPH AT	DL051	3.	12.50	0.	0.	0.	2.41
	ROUTED TO	L05L09	1.	13.75	0.	0.	0.	2.41
+	2 COMBINED AT	CPL09	7.	17.25	5.	2.	1.	2.90
+	DIVERSION TO	DL091S	1.	17.25	1.	0.	0.	2.90
+	HYDROGRAPH AT	DL091	6.	17.25	4.	1.	0.	2.90
+	DIVERSION TO	DL092S	0.	0.00	0.	0.	0.	2.90
+	HYDROGRAPH AT	DL092	6.	17.25	4.	1.	0.	2.90
+	ROUTED TO	L09D08	5.	18.92	4.	1.	0.	2.90
+	HYDROGRAPH AT	D08	456.	12.58	74.	22.	7.	0.51
+	DIVERSION TO	RD08	456.	12.58	48.	13.	4.	0.51
+	HYDROGRAPH AT	DD08RE	345.	12.75	33.	9.	3.	0.51
+	HYDROGRAPH AT	DL052	8.	12.58	1.	0.	0.	2.41
+	ROUTED TO	L05D08	2.	14.17	1.	0.	0.	2.41
+	3 COMBINED AT	CPD08	345.	12.75	36.	11.	4.	3.41
+	ROUTED TO	D08D16	158.	13.67	32.	11.	4.	3.41
+	HYDROGRAPH AT	L06	848.	12.33	91.	27.	9.	0.70
+	DIVERSION TO	RL06	848.	12.33	91.	27.	9.	0.70
	HYDROGRAPH AT	DL06RE	0.	0.00	0.	0.	0.	0.70
+	DIVERSION TO	DL06S	0.	0.00	0.	0.	0.	0.70
+	HYDROGRAPH AT	DL06SE	0.	0.00	0.	0.	0.	0.70
+	ROUTED TO	L06L07	0.	0.00	0.	0.	0.	0.70

+	HYDROGRAPH AT	L07	756.	12.33	86.	26.	9.	0.63
+	DIVERSION TO	RL07	756.	12.33	85.	23.	8.	0.63
+	HYDROGRAPH AT	DL07RE	9.	15.75	6.	2.	1.	0.63
+	HYDROGRAPH AT	DL03SE	37.	12.75	14.	5.	2.	1.29
+	ROUTED TO	L0307A	34.	13.67	13.	5.	2.	1.29
+	ROUTED TO	L0307B	33.	14.00	13.	5.	2.	1.29
+	3 COMBINED AT	CPL07	35.	14.00	18.	7.	2.	2.62
+	DIVERSION TO	DL07S	7.	14.00	4.	1.	0.	2.62
+	HYDROGRAPH AT	DL07SE	28.	14.00	14.	5.	2.	2.62
+	ROUTED TO	L07L08	27.	14.08	14.	5.	2.	2.62
+	HYDROGRAPH AT	L08	599.	12.42	81.	24.	8.	0.49
+	DIVERSION TO	RL08	599.	12.42	75.	20.	7.	0.49
+	HYDROGRAPH AT	DL08RE	63.	13.08	13.	4.	1.	0.49
+	HYDROGRAPH AT	DL04SE	0.	0.00	0.	0.	0.	1.93
+	ROUTED TO	L04L08	0.	0.00	0.	0.	0.	1.93
+	3 COMBINED AT	CPL08	62.	13.17	26.	9.	3.	3.74
+	ROUTED TO	L08L12	47.	14.33	26.	9.	3.	3.74
+	HYDROGRAPH AT	L10	816.	12.42	100.	29.	10.	0.84
+	DIVERSION TO	RL10	816.	12.42	65.	17.	6.	0.84
+	HYDROGRAPH AT	DL10RE	627.	12.58	42.	12.	4.	0.84
+	ROUTED TO	L10L11	406.	12.83	41.	12.	4.	0.84
+	HYDROGRAPH AT	DL06SE	0.	0.00	0.	0.	0.	0.70
+	ROUTED TO	L06L11	0.	0.00	0.	0.	0.	0.70
+	HYDROGRAPH AT	L11	722.	12.33	92.	28.	9.	0.62
+	DIVERSION TO	RL11	722.	12.33	88.	24.	8.	0.62
+	HYDROGRAPH AT	DL11RE	25.	13.83	12.	4.	1.	0.62
+	HYDROGRAPH AT	DL07SE	7.	14.00	4.	1.	0.	2.62
+	ROUTED TO	L07L11	6.	15.33	3.	1.	0.	2.62
+	4 COMBINED AT	CPL11	402.	12.83	55.	17.	6.	4.09
+	DIVERSION TO	DL11S	2.	12.83	0.	0.	0.	4.09
+	HYDROGRAPH AT	DL11SE	394.	12.83	53.	17.	6.	4.09
+	ROUTED TO	L11L12	315.	13.00	53.	17.	6.	4.09
+	HYDROGRAPH AT	L12	296.	12.58	41.	11.	4.	0.36
+	DIVERSION TO	RL12	237.	12.42	17.	5.	2.	0.36
+	HYDROGRAPH AT	DL12RE	296.	12.58	26.	7.	2.	0.36
+	3 COMBINED AT	CPL12	432.	13.00	99.	33.	11.	5.56
+	DIVERSION TO	DL121S	76.	13.00	17.	6.	2.	5.56
+	HYDROGRAPH AT	DL121	356.	13.00	81.	27.	9.	5.56
+	DIVERSION TO	DL122S	4.	13.00	1.	0.	0.	5.56

+	HYDROGRAPH AT	DL122	352.	13.00	80.	27.	9.	5.56
+	ROUTED TO	L12L13	285.	13.25	78.	27.	9.	5.56
+	HYDROGRAPH AT	L13	174.	12.83	39.	10.	3.	0.48
	HYDROGRAPH AT	DL091	1.	17.25	1.	0.	0.	2.90
+	ROUTED TO	L09L13	1.	22.42	0.	0.	0.	2.90
+	3 COMBINED AT	CPL13	410.	13.25	111.	36.	12.	7.02
+	DIVERSION TO	DL131S	393.	13.25	109.	36.	12.	7.02
+	HYDROGRAPH AT	DL131	17.	13.17	3.	1.	0.	7.02
+	DIVERSION TO	DL132S	11.	13.25	2.	1.	0.	7.02
+	HYDROGRAPH AT	DL132	6.	13.17	1.	0.	0.	7.02
+	ROUTED TO	L13D16	4.	14.58	1.	0.	0.	7.02
+	HYDROGRAPH AT	D16	197.	12.75	43.	12.	4.	0.52
+	HYDROGRAPH AT	DL092	0.	0.00	0.	0.	0.	2.90
+	ROUTED TO	L09D16	0.	0.00	0.	0.	0.	2.90
+	4 COMBINED AT	CPD16	226.	13.58	71.	22.	7.	8.05
+	DIVERSION TO	DD161S	182.	13.58	56.	17.	6.	8.05
+	HYDROGRAPH AT	DD161	43.	13.58	15.	5.	2.	8.05
+	DIVERSION TO	DD162S	17.	13.58	7.	2.	1.	8.05
+	HYDROGRAPH AT	DD162	26.	13.58	8.	3.	1.	8.05
	ROUTED TO	D16D18	24.	13.83	8.	3.	1.	8.05
+	HYDROGRAPH AT	D18	312.	12.17	28.	8.	3.	0.20
+	DIVERSION TO	RD18	312.	12.17	28.	8.	3.	0.20
+	HYDROGRAPH AT	DD18RE	1.	22.00	0.	0.	0.	0.20
+	2 COMBINED AT	CPD18	24.	13.83	8.	3.	1.	8.25
+	ROUTED TO	D18D19	23.	14.00	8.	3.	1.	8.25
+	HYDROGRAPH AT	D17	293.	12.17	25.	8.	3.	0.20
+	DIVERSION TO	RD17	293.	12.17	25.	8.	3.	0.20
+	HYDROGRAPH AT	DD17RE	0.	0.00	0.	0.	0.	0.20
+	ROUTED TO	D17D19	0.	0.00	0.	0.	0.	0.20
+	HYDROGRAPH AT	D19	492.	12.33	66.	20.	7.	0.51
+	DIVERSION TO	RD19	492.	12.33	63.	17.	6.	0.51
+	HYDROGRAPH AT	DD19RE	26.	13.67	9.	3.	1.	0.51
+	4 COMBINED AT	CPD19	475.	14.00	244.	87.	29.	16.49
+	DIVERSION TO	DD191S	216.	14.00	124.	45.	15.	16.49
+	HYDROGRAPH AT	DD191	144.	14.00	91.	34.	11.	16.49
	DIVERSION TO	DD192S	60.	14.50	42.	17.	6.	16.49
+	HYDROGRAPH AT	DD192	86.	14.00	48.	17.	6.	16.49
+	ROUTED TO	D19D20	86.	14.17	48.	17.	6.	16.49
+	HYDROGRAPH AT	D20	573.	12.33	69.	21.	7.	0.50

+	DIVERSION TO	RD20	573.	12.33	68.	19.	6.	0.50
+	HYDROGRAPH AT	DD20RE	7.	16.92	5.	2.	1.	0.50
+	HYDROGRAPH AT	DD111	574.	12.50	46.	13.	4.	0.66
+	ROUTED TO	D11D20	303.	12.92	43.	13.	4.	0.66
+	3 COMBINED AT	CPD20	300.	13.00	85.	29.	10.	17.65
+	ROUTED TO	D20D21	223.	13.42	82.	29.	10.	17.65
+	HYDROGRAPH AT	D21	548.	12.33	70.	22.	7.	0.50
+	DIVERSION TO	RD21	548.	12.33	70.	20.	7.	0.50
+	HYDROGRAPH AT	DD21RE	6.	18.42	5.	2.	1.	0.50
+	HYDROGRAPH AT	DD112	45.	12.50	6.	2.	1.	0.66
+	ROUTED TO	D11D21	20.	13.33	5.	2.	1.	0.66
+	HYDROGRAPH AT	DD121	105.	12.83	12.	3.	1.	1.01
+	ROUTED TO	D12D21	82.	13.00	12.	3.	1.	1.01
+	4 COMBINED AT	CPD21	280.	13.42	95.	34.	11.	18.49
+	DIVERSION TO	DD211S	192.	13.42	70.	25.	8.	18.49
+	HYDROGRAPH AT	DD211	88.	13.42	25.	9.	3.	18.49
+	DIVERSION TO	DD212S	48.	13.42	18.	7.	2.	18.49
+	HYDROGRAPH AT	DD212	40.	13.42	6.	2.	1.	18.49
+	ROUTED TO	D21D22	27.	13.75	6.	2.	1.	18.49
+	HYDROGRAPH AT	D22	547.	12.33	65.	20.	7.	0.45
+	DIVERSION TO	RD22	547.	12.33	65.	19.	6.	0.45
+	HYDROGRAPH AT	DD22RE	5.	19.58	3.	1.	0.	0.45
+	HYDROGRAPH AT	DD122	58.	12.83	10.	3.	1.	1.01
+	ROUTED TO	D12D22	43.	13.42	10.	3.	1.	1.01
+	3 COMBINED AT	CPD22	60.	13.67	15.	5.	2.	18.94
+	ROUTED TO	D22D23	55.	13.83	15.	5.	2.	18.94
+	HYDROGRAPH AT	D23	539.	12.42	73.	22.	7.	0.54
+	DIVERSION TO	RD23	539.	12.42	68.	18.	6.	0.54
+	HYDROGRAPH AT	DD23RE	34.	13.42	10.	4.	1.	0.54
+	HYDROGRAPH AT	DD131	195.	12.25	12.	3.	1.	3.65
+	ROUTED TO	D13D23	121.	12.50	12.	3.	1.	3.65
+	3 COMBINED AT	CPD23	94.	12.58	27.	9.	3.	22.13
+	DIVERSION TO	DD231S	9.	12.58	3.	1.	0.	22.13
+	HYDROGRAPH AT	DD231	85.	12.58	24.	8.	3.	22.13
+	DIVERSION TO	DD232S	10.	12.58	3.	1.	0.	22.13
+	HYDROGRAPH AT	DD232	75.	12.58	22.	7.	2.	22.13
+	ROUTED TO	D23D24	57.	12.75	21.	7.	2.	22.13
+	HYDROGRAPH AT	D24	521.	12.42	68.	21.	7.	0.49
+	DIVERSION TO	RD24	521.	12.42	68.	20.	7.	0.49

+	HYDROGRAPH AT	DD24RE	2.	18.17	1.	0.	0.	0.49
+	HYDROGRAPH AT	DD132	383.	12.25	36.	10.	3.	3.65
+	ROUTED TO	D13D24	287.	12.50	36.	10.	3.	3.65
	3 COMBINED AT	CPD24	284.	12.58	52.	16.	5.	22.62
+	DIVERSION TO	DD24S	60.	12.58	5.	1.	0.	22.62
+	HYDROGRAPH AT	DD24SE	224.	12.58	47.	14.	5.	22.62
+	ROUTED TO	D24D25	198.	12.75	46.	14.	5.	22.62
+	HYDROGRAPH AT	D25	557.	12.33	70.	21.	7.	0.50
+	DIVERSION TO	RD25	557.	12.33	68.	19.	6.	0.50
+	HYDROGRAPH AT	DD25RE	12.	14.67	7.	3.	1.	0.50
+	2 COMBINED AT	CPD25	198.	12.75	47.	16.	5.	23.12
+	DIVERSION TO	DD251S	185.	12.75	46.	15.	5.	23.12
+	HYDROGRAPH AT	DD251	12.	12.75	1.	0.	0.	23.12
+	DIVERSION TO	DD252S	12.	12.75	1.	0.	0.	23.12
+	HYDROGRAPH AT	DD252	0.	0.00	0.	0.	0.	23.12
+	ROUTED TO	D2542A	0.	0.00	0.	0.	0.	23.12
+	ROUTED TO	D2542B	0.	0.00	0.	0.	0.	23.12
+	HYDROGRAPH AT	D37	113.	12.50	16.	4.	1.	0.20
+	HYDROGRAPH AT	DD232	10.	12.58	3.	1.	0.	22.13
	ROUTED TO	D23D37	5.	15.58	3.	1.	0.	22.13
+	HYDROGRAPH AT	DD251	185.	12.75	46.	15.	5.	23.12
+	ROUTED TO	D25D37	156.	13.25	45.	15.	5.	23.12
+	HYDROGRAPH AT	DD24SE	60.	12.58	5.	1.	0.	22.62
+	ROUTED TO	D24D37	43.	13.00	5.	1.	0.	22.62
+	4 COMBINED AT	CPD37	214.	13.08	65.	21.	7.	23.32
+	DIVERSION TO	DD37S	0.	0.00	0.	0.	0.	23.32
+	HYDROGRAPH AT	DD37SE	214.	13.08	65.	21.	7.	23.32
+	ROUTED TO	D37D39	160.	13.42	62.	21.	7.	23.32
+	HYDROGRAPH AT	D35	114.	12.58	18.	4.	1.	0.25
+	HYDROGRAPH AT	DD231	9.	12.58	3.	1.	0.	22.13
+	ROUTED TO	D23D35	4.	15.00	3.	1.	0.	22.13
+	2 COMBINED AT	CPD35	114.	12.58	21.	6.	2.	22.38
+	DIVERSION TO	DD35S	17.	12.58	3.	1.	0.	22.38
+	HYDROGRAPH AT	DD35SE	85.	12.58	15.	4.	1.	22.38
+	ROUTED TO	D35D38	79.	12.83	15.	4.	1.	22.38
	HYDROGRAPH AT	D38	58.	12.50	8.	2.	1.	0.12
+	HYDROGRAPH AT	DD37SE	0.	0.00	0.	0.	0.	23.32
+	ROUTED TO	D37D38	0.	0.00	0.	0.	0.	23.32
+	3 COMBINED AT	CPD38	120.	12.67	22.	6.	2.	23.69

+	DIVERSION TO	DD381S	105.	12.67	19.	5.	2.	23.69
+	HYDROGRAPH AT	DD381	14.	12.67	3.	1.	0.	23.69
+	DIVERSION TO	DD382S	10.	12.67	2.	0.	0.	23.69
+	HYDROGRAPH AT	DD382	4.	12.67	1.	0.	0.	23.69
+	ROUTED TO	D38D39	3.	14.33	1.	0.	0.	23.69
+	HYDROGRAPH AT	D39	108.	12.50	15.	4.	1..	0.18
+	HYDROGRAPH AT	DD252	12.	12.75	1.	0.	0.	23.12
+	ROUTED TO	D25D39	8.	13.00	1.	0.	0.	23.12
+	4 COMBINED AT	CPD39	173.	13.42	76.	25.	8.	23.88
+	ROUTED TO	D39D42	168.	13.67	75.	25.	8.	23.88
+	HYDROGRAPH AT	D26	960.	12.25	99.	30.	10.	0.64
+	DIVERSION TO	RD26	960.	12.25	96.	26.	9.	0.64
+	HYDROGRAPH AT	DD26RE	18.	14.33	10.	4.	1.	0.64
+	HYDROGRAPH AT	DD142	521.	12.75	111.	32.	11.	4.76
+	ROUTED TO	D14D26	422.	12.92	109.	32.	11.	4.76
+	2 COMBINED AT	CPD26	424.	12.92	117.	35.	12.	5.40
+	ROUTED TO	D26D27	414.	13.00	117.	35.	12.	5.40
+	HYDROGRAPH AT	D27	485.	12.17	51.	16.	5.	0.32
+	DIVERSION TO	RD27	122.	11.92	13.	4.	1.	0.32
+	HYDROGRAPH AT	DD27RE	485.	12.17	44.	12.	4.	0.32
+	2 COMBINED AT	CPD27	477.	12.17	156.	47.	16.	5.72
+	ROUTED TO	SRD27	477.	12.17	156.	47.	16.	5.72
+	ROUTED TO	D27D42	402.	13.33	152.	47.	16.	5.72
+	HYDROGRAPH AT	D42	1278.	12.33	147.	45.	15.	0.99
+	DIVERSION TO	RD42	1278.	12.33	135.	36.	12.	0.99
+	HYDROGRAPH AT	DD42RE	112.	12.92	26.	9.	3.	0.99
+	4 COMBINED AT	CPD42	480.	13.42	212.	69.	23.	26.93
+	ROUTED TO	SRD42	473.	13.58	191.	69.	23.	26.93
+	ROUTED TO	D42D53	463.	13.67	191.	69.	23.	26.93
+	HYDROGRAPH AT	D53	176.	12.17	12.	3.	1.	0.12
+	DIVERSION TO	RD53	176.	12.17	12.	3.	1.	0.12
+	HYDROGRAPH AT	DD53RE	0.	0.00	0.	0.	0.	0.12
+	2 COMBINED AT	CPD53	463.	13.67	191.	69.	23.	27.05
+	ROUTED TO	SRD53	193.	15.50	140.	59.	20.	27.05
+	ROUTED TO	D53D54	192.	15.83	139.	59.	20.	27.05
+	HYDROGRAPH AT	D43	628.	12.33	73.	22.	7.	0.50
+	DIVERSION TO	RD43	628.	12.33	66.	18.	6.	0.50
+	HYDROGRAPH AT	DD43RE	56.	12.92	14.	5.	2.	0.50
+	ROUTED TO	D43D54	29.	14.08	13.	5.	2.	0.50

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          HYDROGRAPH AT
+                          D54       327.   12.25          28.          8.          3.       0.27

          DIVERSION TO
+                         RD54        81.   12.00           5.          2.          1.       0.27

          HYDROGRAPH AT
+                       DD54RE       327.   12.25          25.          6.          2.       0.27

          3 COMBINED AT
                         CPD54       294.   12.25         146.         66.         22.      27.82
+                       SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION    SRD27
                      (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

     PLAN  1 ..............                  INITIAL VALUE    SPILLWAY CREST     TOP OF DAM
                             ELEVATION          1142.00              0.00             0.00
                             STORAGE                 0.                 0.               0.
                             OUTFLOW                52.                 0.               0.

                  RATIO     MAXIMUM      MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF     TIME OF
                    OF     RESERVOIR      DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
                   PMF      W.S.ELEV    OVER DAM     AC-FT       CFS       HOURS        HOURS       HOURS

                  1.00      1147.30     1147.30         0.       573.    166.58        13.00        0.00

     PLAN  2 ..............                  INITIAL VALUE    SPILLWAY CREST     TOP OF DAM
                             ELEVATION          1142.00              0.00             0.00
                             STORAGE                 0.                 0.               0.
                             OUTFLOW                52.                 0.               0.

                  RATIO     MAXIMUM      MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF     TIME OF
                    OF     RESERVOIR      DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
                   PMF      W.S.ELEV    OVER DAM     AC-FT       CFS       HOURS        HOURS       HOURS

                  1.00      1146.50     1146.50         0.       476.    166.58        12.25        0.00

     PLAN  3 ..............                  INITIAL VALUE    SPILLWAY CREST     TOP OF DAM
                             ELEVATION          1142.00              0.00             0.00
                             STORAGE                 0.                 0.               0.
                             OUTFLOW                52.                 0.               0.

                  RATIO     MAXIMUM      MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF     TIME OF
                    OF     RESERVOIR      DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW   FAILURE
                   PMF      W.S.ELEV    OVER DAM     AC-FT       CFS       HOURS        HOURS       HOURS

                  1.00      1146.25     1146.25         0.       445.    166.58        12.25        0.00

*** NORMAL END OF HEC-1 ***
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APPENDIX D.4

POST-PROJECT CONDITIONS MODELING DATA AND RESULTS

Project

Reference	LEMWB_POST
Title	100% Lower El Mirage Wash Basin Floodplain Delineation Dated 1/29/13
Location	Maricopa County
Agency	Flood Control District of Maricopa County

Project Defaults

Model	HEC1
Soils Agency	FCDMC
Land Use Agency	FCDMC
Rainfall	NOAA14
Roads Agency	MCDOT

HEC-1 Defaults

Unit Hydrograph	S-Graph
Loss Method	Green-Ampt
Duration	24 Hour
Tabulation Interval	5
No. Ordinates	2000
Output	3

Comments

Post Project conditions model for Lower El Mirage Wash Basin floodplain delineation and FEMA CLOMR submittal. Model origin is Loop 303 / White Tanks ADMPU AHA - Existing Condtitons, Major Basin 01

ID	Method	Duration	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
DEFAULT	NOAA14	5 MIN	0.248	0.337	0.405	0.497	0.568	0.641
	NOAA14	5 MIN	0.248	0.337	0.405	0.497	0.568	0.641
	NOAA14	10 MIN	0.377	0.513	0.617	0.757	0.865	0.975
	NOAA14	10 MIN	0.377	0.513	0.617	0.757	0.865	0.975
	NOAA14	15 MIN	0.468	0.636	0.765	0.938	1.072	1.209
	NOAA14	15 MIN	0.468	0.636	0.765	0.938	1.072	1.209
	NOAA14	30 MIN	0.630	0.857	1.030	1.264	1.443	1.628
	NOAA14	30 MIN	0.630	0.857	1.030	1.264	1.443	1.628
	NOAA14	1 HOUR	0.779	1.060	1.275	1.564	1.786	2.015
	NOAA14	1 HOUR	0.779	1.060	1.275	1.564	1.786	2.015
	NOAA14	2 HOUR	0.876	1.175	1.404	1.717	1.957	2.208
	NOAA14	2 HOUR	0.876	1.175	1.404	1.717	1.957	2.208
	NOAA14	3 HOUR	0.914	1.208	1.441	1.763	2.022	2.295
	NOAA14	3 HOUR	0.914	1.208	1.441	1.763	2.022	2.295
	NOAA14	6 HOUR	1.050	1.354	1.596	1.929	2.190	2.464
	NOAA14	6 HOUR	1.050	1.354	1.596	1.929	2.190	2.464
	NOAA14	12 HOUR	1.163	1.480	1.730	2.067	2.325	2.593
	NOAA14	12 HOUR	1.163	1.480	1.730	2.067	2.325	2.593
	NOAA14	24 HOUR	1.471	1.903	2.244	2.717	3.089	3.480
	NOAA14	24 HOUR	1.471	1.903	2.244	2.717	3.089	3.480

ID	Type	Area (sq mi)	Discharge cfs 2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Major Basin 01								
D03	Hydrograph	0.720						931
RD03	Diversion	0.720						931
DD03RE	Hydrograph	0.720						100
D03D04	Routed	0.720						61
D04	Hydrograph	0.890						1,115
RD04	Diversion	0.890						1,082
DD04RE	Hydrograph	0.890						831
CPD04	Combined	1.610						813
DD04S	Diversion	1.610						471
DD04SE	Hydrograph	1.610						342
D04D05	Routed	1.610						288
D05	Hydrograph	0.160						319
RD05	Diversion	0.160						134
DD05RE	Hydrograph	0.160						319
CPD05	Combined	1.780						317
D05D14	Routed	1.780						255
DD141S	Diversion	1.780						133
DD141	Hydrograph	1.780						122
D05D15	Routed	1.780						129
D11	Hydrograph	0.660						758
RD11	Diversion	0.660						728
DD11RE	Hydrograph	0.660						698
DD111S	Diversion	0.660						574
DD111	Hydrograph	0.660						124
DD112S	Diversion	0.660						45
DD112	Hydrograph	0.660						79
D11D12	Routed	0.660						46
D12	Hydrograph	0.350						236
RD12	Diversion	0.350						236
DD12RE	Hydrograph	0.350						209
CPD12	Combined	1.010						244
DD121S	Diversion	1.010						105
DD121	Hydrograph	1.010						139
DD122S	Diversion	1.010						58
DD122	Hydrograph	1.010						81
D12D13	Routed	1.010						47
D13	Hydrograph	1.030						1,106
RD13	Diversion	1.030						495
DD13RE	Hydrograph	1.030						1,106
DD04SE	Hydrograph	1.610						471
D04D13	Routed	1.610						156
CPD13	Combined	3.650						1,106
DD131S	Diversion	3.650						195
DD131	Hydrograph	3.650						902
DD132S	Diversion	3.650						383
DD132	Hydrograph	3.650						518
D13D14	Routed	3.650						440
D14	Hydrograph	0.940						1,065
RD14	Diversion	0.940						1,065
DD14RE	Hydrograph	0.940						384
DD141	Hydrograph	1.780						133
D0514A	Routed	1.780						107
CPD14	Combined	4.760						822
DD142S	Diversion	4.760						521

ID	Type	Area (sq mi)	Discharge cfs 2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
DD142	Hydrograph	4.760						301
D14D15	Routed	4.760						218
D15	Hydrograph	0.220						412
CPD15	Combined	4.980						406
L01	Hydrograph	0.160						262
RL01	Diversion	0.160						262
DL01RE	Hydrograph	0.160						120
L01L03	Routed	0.160						48
L03	Hydrograph	0.790						935
RL03	Diversion	0.790						935
DL03RE	Hydrograph	0.790						2
L20	Hydrograph	0.350						381
RL20	Diversion	0.350						381
DL20RE	Hydrograph	0.350						59
L20L03	Routed	0.350						29
CPL03	Combined	1.290						44
DL03S	Diversion	1.290						37
DL03SE	Hydrograph	1.290						8
L03L04	Routed	1.290						8
L04	Hydrograph	0.630						646
RL04	Diversion	0.630						646
DL04RE	Hydrograph	0.630						5
CPL04	Combined	1.930						6
DL04S	Diversion	1.930						
DL04SE	Hydrograph	1.930						6
L04L05	Routed	1.930						4
L05	Hydrograph	0.490						641
RL05	Diversion	0.490						641
DL05RE	Hydrograph	0.490						313
CPL05	Combined	2.410						310
DL051S	Diversion	2.410						3
DL051	Hydrograph	2.410						307
DL052S	Diversion	2.410						8
DL052	Hydrograph	2.410						299
L05D06	Routed	2.410						215
L02	Hydrograph	1.880						1,670
RL02	Diversion	1.880						1,670
DL02RE	Hydrograph	1.880						684
L02D06	Routed	1.880						351
D06	Hydrograph	0.460						603
RD06	Diversion	0.460						603
DD06RE	Hydrograph	0.460						245
CPD06	Combined	4.760						453
DD06S	Diversion	4.760						83
DD06SE	Hydrograph	4.760						370
D06D07	Routed	4.760						418
D07	Hydrograph	0.890						896
RD07	Diversion	0.890						896
DD07RE	Hydrograph	0.890						177
CPD07	Combined	5.640						438
D07D02	Routed	5.640						389
D01	Hydrograph	1.560						1,299
RD01	Diversion	1.560						1,299
DD01RE	Hydrograph	1.560						246
D01D02	Routed	1.560						93
D02	Hydrograph	1.840						1,701

ID	Type	Area (sq mi)	Discharge cfs 2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
RD02	Diversion	1.840						1,701
DD02RE	Hydrograph	1.840						251
CPD02	Combined	9.050						514
D02D10	Routed	9.050						473
D09	Hydrograph	0.260						352
RD09	Diversion	0.260						352
DD09RE	Hydrograph	0.260						220
D09D10	Routed	0.260						159
DD06SE	Hydrograph	4.760						83
D06D10	Routed	4.760						16
D10	Hydrograph	0.630						756
RD10	Diversion	0.630						756
DD10RE	Hydrograph	0.630						468
CPD10	Combined	9.950						606
D10D19	Routed	9.950						494
L09	Hydrograph	0.490						562
RL09	Diversion	0.490						562
DL09RE	Hydrograph	0.490						7
DL051	Hydrograph	2.410						3
L05L09	Routed	2.410						1
CPL09	Combined	2.900						7
DL091S	Diversion	2.900						1
DL091	Hydrograph	2.900						6
DL092S	Diversion	2.900						
DL092	Hydrograph	2.900						6
L09D08	Routed	2.900						5
D08	Hydrograph	0.510						456
RD08	Diversion	0.510						456
DD08RE	Hydrograph	0.510						345
DL052	Hydrograph	2.410						8
L05D08	Routed	2.410						2
CPD08	Combined	3.410						345
D08D16	Routed	3.410						158
L06	Hydrograph	0.700						848
RL06	Diversion	0.700						848
DL06RE	Hydrograph	0.700						
DL06S	Diversion	0.700						
DL06SE	Hydrograph	0.700						
L06L07	Routed	0.700						
L07	Hydrograph	0.630						756
RL07	Diversion	0.630						756
DL07RE	Hydrograph	0.630						9
DL03SE	Hydrograph	1.290						37
L0307A	Routed	1.290						34
L0307B	Routed	1.290						33
CPL07	Combined	2.620						35
DL07S	Diversion	2.620						7
DL07SE	Hydrograph	2.620						28
L07L08	Routed	2.620						27
L08	Hydrograph	0.490						599
RL08	Diversion	0.490						599
DL08RE	Hydrograph	0.490						63
DL04SE	Hydrograph	1.930						
L04L08	Routed	1.930						
CPL08	Combined	3.740						62
L08L12	Routed	3.740						47

ID	Type	Area (sq mi)	Discharge cfs 2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
L10	Hydrograph	0.840						816
RL10	Diversion	0.840						816
DL10RE	Hydrograph	0.840						627
L10L11	Routed	0.840						406
DL06SE	Hydrograph	0.700						
L06L11	Routed	0.700						
L11	Hydrograph	0.620						722
RL11	Diversion	0.620						722
DL11RE	Hydrograph	0.620						25
DL07SE	Hydrograph	2.620						7
L07L11	Routed	2.620						6
CPL11	Combined	4.090						402
DL11S	Diversion	4.090						2
DL11SE	Hydrograph	4.090						394
L11L12	Routed	4.090						315
L12	Hydrograph	0.360						296
RL12	Diversion	0.360						237
DL12RE	Hydrograph	0.360						296
CPL12	Combined	5.560						432
DL121S	Diversion	5.560						76
DL121	Hydrograph	5.560						356
DL122S	Diversion	5.560						4
DL122	Hydrograph	5.560						352
L12L13	Routed	5.560						285
L13	Hydrograph	0.480						174
DL091	Hydrograph	2.900						1
L09L13	Routed	2.900						1
CPL13	Combined	7.020						410
DL131S	Diversion	7.020						393
DL131	Hydrograph	7.020						17
DL132S	Diversion	7.020						11
DL132	Hydrograph	7.020						6
L13D16	Routed	7.020						4
D16	Hydrograph	0.520						197
DL092	Hydrograph	2.900						
L09D16	Routed	2.900						
CPD16	Combined	8.050						226
DD161S	Diversion	8.050						182
DD161	Hydrograph	8.050						43
DD162S	Diversion	8.050						17
DD162	Hydrograph	8.050						26
D16D18	Routed	8.050						24
D18	Hydrograph	0.200						312
RD18	Diversion	0.200						312
DD18RE	Hydrograph	0.200						1
CPD18	Combined	8.250						24
D18D19	Routed	8.250						23
D17	Hydrograph	0.200						293
RD17	Diversion	0.200						293
DD17RE	Hydrograph	0.200						
D17D19	Routed	0.200						
D19	Hydrograph	0.510						492
RD19	Diversion	0.510						492
DD19RE	Hydrograph	0.510						26
CPD19	Combined	16.490						475
DD191S	Diversion	16.490						216

ID	Type	Area (sq mi)	Discharge cfs 2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
DD191	Hydrograph	16.490						144
DD192S	Diversion	16.490						60
DD192	Hydrograph	16.490						86
D19D20	Routed	16.490						86
D20	Hydrograph	0.500						573
RD20	Diversion	0.500						573
DD20RE	Hydrograph	0.500						7
DD111	Hydrograph	0.660						574
D11D20	Routed	0.660						303
CPD20	Combined	17.650						300
D20D21	Routed	17.650						223
D21	Hydrograph	0.500						548
RD21	Diversion	0.500						548
DD21RE	Hydrograph	0.500						6
DD112	Hydrograph	0.660						45
D11D21	Routed	0.660						20
DD121	Hydrograph	1.010						105
D12D21	Routed	1.010						82
CPD21	Combined	18.490						280
DD211S	Diversion	18.490						192
DD211	Hydrograph	18.490						88
DD212S	Diversion	18.490						48
DD212	Hydrograph	18.490						40
D21D22	Routed	18.490						27
D22	Hydrograph	0.450						547
RD22	Diversion	0.450						547
DD22RE	Hydrograph	0.450						5
DD122	Hydrograph	1.010						58
D12D22	Routed	1.010						43
CPD22	Combined	18.940						60
D22D23	Routed	18.940						55
D23	Hydrograph	0.540						539
RD23	Diversion	0.540						539
DD23RE	Hydrograph	0.540						34
DD131	Hydrograph	3.650						195
D13D23	Routed	3.650						121
CPD23	Combined	22.130						94
DD231S	Diversion	22.130						9
DD231	Hydrograph	22.130						85
DD232S	Diversion	22.130						10
DD232	Hydrograph	22.130						75
D23D24	Routed	22.130						57
D24	Hydrograph	0.490						521
RD24	Diversion	0.490						521
DD24RE	Hydrograph	0.490						2
DD132	Hydrograph	3.650						383
D13D24	Routed	3.650						287
CPD24	Combined	22.620						284
DD24S	Diversion	22.620						60
DD24SE	Hydrograph	22.620						224
D24D25	Routed	22.620						198
D25	Hydrograph	0.500						557
RD25	Diversion	0.500						557
DD25RE	Hydrograph	0.500						12
CPD25	Combined	23.120						198
DD251S	Diversion	23.120						185

ID	Type	Area (sq mi)	Discharge cfs 2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
DD251	Hydrograph	23.120						12
DD252S	Diversion	23.120						12
DD252	Hydrograph	23.120						
D2542A	Routed	23.120						
D2542B	Routed	23.120						
D37	Hydrograph	0.200						113
DD232	Hydrograph	22.130						10
D23D37	Routed	22.130						5
DD251	Hydrograph	23.120						185
D25D37	Routed	23.120						156
DD24SE	Hydrograph	22.620						60
D24D37	Routed	22.620						43
CPD37	Combined	23.320						214
DD37S	Diversion	23.320						
DD37SE	Hydrograph	23.320						214
D37D39	Routed	23.320						160
D35	Hydrograph	0.250						114
DD231	Hydrograph	22.130						9
D23D35	Routed	22.130						4
CPD35	Combined	22.380						114
DD35S	Diversion	22.380						17
DD35SE	Hydrograph	22.380						85
D35D38	Routed	22.380						79
D38	Hydrograph	0.120						58
DD37SE	Hydrograph	23.320						
D37D38	Routed	23.320						
CPD38	Combined	23.690						120
DD381S	Diversion	23.690						105
DD381	Hydrograph	23.690						14
DD382S	Diversion	23.690						10
DD382	Hydrograph	23.690						4
D38D39	Routed	23.690						3
D39	Hydrograph	0.180						108
DD252	Hydrograph	23.120						12
D25D39	Routed	23.120						8
CPD39	Combined	23.880						173
D39D42	Routed	23.880						168
D26	Hydrograph	0.640						960
RD26	Diversion	0.640						960
DD26RE	Hydrograph	0.640						18
DD142	Hydrograph	4.760						521
D14D26	Routed	4.760						422
CPD26	Combined	5.400						424
D26D27	Routed	5.400						414
D27	Hydrograph	0.320						485
RD27	Diversion	0.320						122
DD27RE	Hydrograph	0.320						485
CPD27	Combined	5.720						477
SRD27	Routed	5.720						477
D27D42	Routed	5.720						402
D42	Hydrograph	0.990						1,278
RD42	Diversion	0.990						1,278
DD42RE	Hydrograph	0.990						112
CPD42	Combined	26.930						480
SRD42	Routed	26.930						473
D53	Hydrograph	0.120						176

ID	Type	Area (sq mi)	Discharge cfs 2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
RD53	Diversion	0.120						176
DD53RE	Hydrograph	0.120						
CPD53	Combined	27.050						473
SRD53	Routed	27.050						163
D53D54	Routed	27.050						163
D43	Hydrograph	0.500						628
RD43	Diversion	0.500						628
DD43RE	Hydrograph	0.500						56
D43D54	Routed	0.500						29
D54	Hydrograph	0.270						327
RD54	Diversion	0.270						81
DD54RE	Hydrograph	0.270						327
CPD54	Combined	27.820						294

Flood Control District of Maricopa County
Drainage Design Management System
SUB BASINS
Project Reference: LEMWB_POST

Area ID	Sub Basin Parameters								Rainfall Losses				
	Area (sq mi)	Length (mi)	Slope (ft/mi)	S-Graph	Lca (mi)	Lag (min)	Velocity (f/s)	Kn	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)
Major Basin ID: 01													
D01	1.564	3.01	16.6	VALLEY	1.22	40.20	6.60	0.029	0.21	0.26	5.10	0.34	24
D02	1.844	3.08	14.9	VALLEY	0.88	36.50	7.42	0.029	0.21	0.26	5.40	0.29	28
D03	0.723	1.11	25.2	VALLEY	0.69	21.10	4.62	0.030	0.23	0.25	4.80	0.38	35
D04	0.891	1.62	24.7	VALLEY	0.90	24.40	5.84	0.027	0.22	0.27	5.70	0.26	36
D05	0.163	0.76	26.2	VALLEY	0.40	10.90	6.19	0.022	0.11	0.26	4.90	0.39	73
D06	0.463	1.14	20.0	VALLEY	1.06	25.40	3.95	0.029	0.22	0.19	6.60	0.18	32
D07	0.886	2.46	19.6	VALLEY	1.03	34.90	6.19	0.030	0.21	0.23	6.20	0.22	27
D08	0.514	1.48	20.7	VALLEY	0.95	39.60	3.28	0.043	0.28	0.26	5.40	0.29	30
D09	0.265	1.31	20.8	VALLEY	0.64	22.70	5.07	0.030	0.25	0.25	5.70	0.24	35
D10	0.628	1.65	21.4	VALLEY	0.84	26.40	5.49	0.029	0.24	0.26	5.80	0.23	34
D11	0.662	1.90	18.5	VALLEY	0.70	28.60	5.85	0.031	0.25	0.25	5.60	0.27	37
D12	0.347	1.45	19.1	AGRICULTURE	0.86	48.30	2.64	0.054	0.24	0.25	5.80	0.28	33
D13	1.030	1.82	19.8	AGRICULTURE	0.50	22.00	7.26	0.028	0.29	0.33	4.90	0.31	17
D14	0.942	1.82	21.9	VALLEY	0.96	27.70	5.77	0.028	0.23	0.26	5.10	0.33	37
D15	0.220	0.87	25.9	VALLEY	0.44	14.00	5.46	0.026	0.19	0.15	7.00	0.16	52
D16	0.517	1.13	31.9	AGRICULTURE	0.56	59.50	1.67	0.095	0.48	0.25	4.90	0.44	5
D17	0.197	0.76	26.2	VALLEY	0.36	14.20	4.73	0.030	0.25	0.25	3.95	0.58	30
D18	0.199	0.83	24.0	VALLEY	0.33	14.50	5.07	0.030	0.25	0.25	4.60	0.40	30
D19	0.506	1.50	22.9	AGRICULTURE	0.77	26.80	4.92	0.032	0.27	0.26	4.65	0.39	26
D20	0.498	1.58	21.1	VALLEY	0.68	24.80	5.58	0.030	0.26	0.26	4.65	0.39	30
D21	0.496	1.52	19.8	VALLEY	0.80	26.40	5.07	0.030	0.25	0.25	4.65	0.40	32
D22	0.454	1.47	22.6	VALLEY	0.75	23.90	5.39	0.029	0.24	0.25	4.70	0.38	32
D23	0.541	1.70	21.7	VALLEY	0.77	31.10	4.81	0.035	0.27	0.27	5.00	0.33	26
D24	0.492	1.48	20.2	VALLEY	0.75	29.60	4.39	0.035	0.27	0.25	5.10	0.32	28
D25	0.497	1.55	17.6	VALLEY	0.73	26.30	5.20	0.030	0.25	0.25	4.80	0.36	30
D26	0.642	0.96	16.7	VALLEY	0.31	18.10	4.66	0.034	0.24	0.25	5.80	0.24	34
D27	0.316	0.91	5.0	VALLEY	0.25	16.30	4.92	0.027	0.20	0.24	4.90	0.36	42
D35	0.254	0.84	19.7	AGRICULTURE	0.23	43.40	1.71	0.099	0.50	0.25	4.55	0.53	
D37	0.197	0.63	14.4	AGRICULTURE	0.22	40.60	1.37	0.099	0.50	0.25	5.60	0.33	
D38	0.124	0.55	18.1	AGRICULTURE	0.27	40.30	1.20	0.100	0.50	0.25	4.45	0.57	
D39	0.182	0.50	18.6	AGRICULTURE	0.27	38.60	1.14	0.100	0.50	0.25	5.60	0.33	
D42	0.994	1.46	22.4	VALLEY	0.57	22.30	5.76	0.030	0.24	0.24	5.20	0.30	32
D43	0.500	1.33	20.0	VALLEY	0.59	22.30	5.26	0.030	0.25	0.25	4.70	0.37	33
D53	0.118	0.66	19.5	VALLEY	0.33	13.80	4.22	0.030	0.31	0.32	4.60	0.36	11
D54	0.271	1.07	18.7	VALLEY	0.44	18.60	5.06	0.030	0.20	0.27	4.45	0.50	14

* Non default value

Flood Control District of Maricopa County
Drainage Design Management System
SUB BASINS
Project Reference: LEMWB_POST

Area ID	Sub Basin Parameters								Rainfall Losses				
	Area (sq mi)	Length (mi)	Slope (ft/mi)	S-Graph	Lca (mi)	Lag (min)	Velocity (f/s)	Kn	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)
Major Basin ID: 01													
L01	0.162	0.73	12.7	VALLEY	0.29	14.80	4.35	0.030	0.26	0.26	5.20	0.30	33
L02	1.884	2.61	14.9	VALLEY	1.13	39.00	5.88	0.030	0.22	0.26	5.20	0.32	31
L03	0.786	1.54	19.5	VALLEY	0.74	25.80	5.24	0.030	0.20	0.25	5.80	0.25	27
L04	0.631	1.64	22.3	VALLEY	0.99	28.80	5.02	0.030	0.18	0.25	5.00	0.38	22
L05	0.486	1.31	19.3	VALLEY	0.76	23.80	4.86	0.029	0.23	0.25	5.70	0.25	43
L06	0.696	1.36	27.9	VALLEY	0.72	22.80	5.26	0.030	0.28	0.29	5.30	0.28	23
L07	0.632	1.72	20.9	VALLEY	0.57	24.10	6.30	0.030	0.28	0.29	5.30	0.28	26
L08	0.485	1.46	24.1	VALLEY	0.96	29.50	4.36	0.033	0.27	0.17	7.30	0.13	31
L09	0.489	1.45	20.7	VALLEY	0.75	27.60	4.62	0.033	0.27	0.27	5.70	0.24	31
L10	0.844	1.87	23.0	VALLEY	0.83	30.00	5.49	0.032	0.27	0.25	4.55	0.39	18
L11	0.622	1.56	22.8	VALLEY	0.79	25.80	5.31	0.030	0.25	0.25	4.90	0.35	34
L12	0.358	1.20	25.5	VALLEY	0.49	40.10	2.64	0.063	0.39	0.25	6.20	*0.22	10
L13	0.483	1.10	27.8	AGRICULTURE	0.55	61.40	1.58	0.097	0.49	0.25	4.90	0.44	3
L20	0.347	1.54	5.1	VALLEY	0.47	28.00	4.83	0.030	0.27	0.28	5.60	0.24	20

* Non default value

Flood Control District of Maricopa County
Drainage Design Management System
HEC-1 STORAGE FACILITIES
Project Reference: LEMWB_POST

Storage Basin ID: SRD27

			1	2	3	4	5	6	7	8	9	10
Elevation Top of Dam:	0.00	**Volume (ac-ft)**							22.80	51.41		
Length of Dam:	0.00	**Discharge (cfs)**		52	202	415	658	906	1,127	2,999		
Discharge Coefficient:	0.00	**Elevation (ft)**	1,140.0	1,142.0	1,144.0	1,146.0	1,148.0	1,150.0	1,152.0	1,154.0	-	-
Weir Coefficient:	0.00											

	11	12	13	14.	15	16	17	18	19	20
Volume (ac-ft)	-	-	-	-	-	-	-	-	-	-
Discharge (cfs)	-	-	-	-	-	-	-	-	-	-
Elevation (ft)	-	-	-	-	-	-	-	-	-	-

	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Peak Volume (ac-ft)						
Peak Stage (ft)						1,146.51

Storage Basin ID: SRD42

			1	2	3	4	5	6	7	8	9	10
Elevation Top of Dam:	0.00	**Volume (ac-ft)**		0.03	1.63	11.41	12.00	12.60	13.30	14.00	14.62	15.30
Length of Dam:	0.00	**Discharge (cfs)**		9	41	81	82	118	148	184	230	294
Discharge Coefficient:	0.00	**Elevation (ft)**	1,105.2	1,107.0	1,110.0	1,114.0	1,114.2	1,114.4	1,114.6	1,114.8	1,115.0	1,115.2
Weir Coefficient:	0.00											

	11	12	13	14.	15	16	17	18	19	20
Volume (ac-ft)	16.40	18.09	20.20	-	-	-	-	-	-	-
Discharge (cfs)	422	717	1,123	-	-	-	-	-	-	-
Elevation (ft)	1,115.5	1,116.0	1,116.5	-	-	-	-	-	-	-

	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Peak Volume (ac-ft)						16.69
Peak Stage (ft)						1,115.59

Storage Basin ID: SRD53

			1	2	3	4	5	6	7	8	9	10
Elevation Top of Dam:	0.00	**Volume (ac-ft)**		0.12	0.90	4.19	11.81	16.99	22.76	29.01	35.70	38.45
Length of Dam:	0.00	**Discharge (cfs)**		8	26	52	84	102	120	137	155	161
Discharge Coefficient:	0.00	**Elevation (ft)**	1,105.6	1,106.7	1,107.7	1,108.7	1,109.7	1,110.2	1,110.7	1,111.2	1,111.7	1,111.9
Weir Coefficient:	0.00											

	11	12	13	14.	15	16	17	18	19	20
Volume (ac-ft)	41.24	44.06	46.91	49.80	51.26	52.73	54.20	55.69	57.18	58.68
Discharge (cfs)	168	174	179	184	187	189	192	194	197	200
Elevation (ft)	1,112.1	1,112.3	1,112.5	1,112.7	1,112.8	1,112.9	1,113.0	1,113.1	1,113.2	1,113.3

	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Peak Volume (ac-ft)						39.19
Peak Stage (ft)						1,111.95

```
1****************************************                                    ****************************************
*                                      *                                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                    *   U.S. ARMY CORPS OF ENGINEERS       *
*              JUN  1998               *                                    *   HYDROLOGIC ENGINEERING CENTER      *
*            VERSION 4.1               *                                    *          609 SECOND STREET           *
*                                      *                                    *       DAVIS, CALIFORNIA 95616        *
*  RUN DATE   08FEB13  TIME  14:44:30  *                                    *          (916) 756-1104              *
*                                      *                                    *                                      *
****************************************                                    ****************************************

                                        X     X  XXXXXXX   XXXXX           X
                                        X     X  X        X     X         XX
                                        X     X  X        X               X
                                        XXXXXXX  XXXX     X        XXXXX  X
                                        X     X  X        X               X
                                        X     X  X        X     X         X
                                        X     X  XXXXXXX   XXXXX         XXX

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                                HEC-1 INPUT                                                    PAGE  1

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

    1           ID        Flood Control District of Maricopa County
    2           ID        LEMWB_POST - Lower El Mirage Wash Basin Floodplain Delineation
    3           ID        Conditional Letter of Map Revision Post-Project Hydrology
    4           ID        100 YEAR
    5           ID        24 Hour Storm
    6           ID        Unit Hydrograph: S-Graph
    7           ID        1/29/2013
    8           ID
    9           ID    MODEL ORIGIN: LOOP 303/WHITE TANKS ADMPU
   10           ID    FCDMC CONTRACT 2007C031
   11           ID    BY HDR ENGINEERING (#79902)
   12           ID    EXISTING CONDITIONS -AUGUST 2009
   13           ID    MAJOR BASIN 01
   14           ID            HDR FILE NAME: EX-MB1.DAT
   15           ID      ***********************************************************************
   16           ID
   17           ID      FOLLOWING ARE THE CHANGES BY FCDMC:
   18           ID      1. Removed SRD14. - by JWH 10-16-09
   19           ID      FILE NAME: WT1EC01.DAT
   20           ID
   21           ID      For details concerning changes to this HEC-1 model, please contact
   22           ID      FCDMC, H&H Branch.
   23           ID
   24           ID      ***********************************************************************
   25           ID
   26           ID      DIBBLE revisions for FCD2011C004, Work Assignment No. 1 are listed below:
   27           ID      1. Extracted portion of Major Basin D draining to CPD54 (Lower El Mirage)
   28           ID      2. Removed SRD25 operation
   29           ID      3. Replaced SRD42 operation with stage-storage-discharge data using FCD
   30           ID         survey data
   31           ID      4. Removed operation D42D53 (new basin occupies what was a channel route)
   32           ID      5. Revised D53D54 (golf coarse route) operation to without CIP condition
   33           ID      6. Revised operation SRD53 (model new west cactus basin)
   34           ID          Note: SRD53 (west cactus basin) contains the current 100% design
   35           ID            - Basin grading, dateD 1/11/2013
   36           ID            - Outlet is a single new 60" pipe
   37           ID                - Volume does not include ponded volume u/s of Cactus Rd (SRD42)
   38           ID
   39           ID      Filename: LEMWB_POST.DAT          DatE: 1/29/2013
   40           ID
   41           IT       5       0       0    2000
   42           IN      15
   43           IO       3
                *DIAGRAM
                *
   44           JD   3.480  0.0001
   45           PC   0.000   0.002   0.005   0.008   0.011   0.014   0.017   0.020   0.023   0.026
   46           PC   0.029   0.032   0.035   0.038   0.041   0.044   0.048   0.052   0.056   0.060
   47           PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
   48           PC   0.110   0.115   0.120   0.126   0.133   0.140   0.147   0.155   0.163   0.172
   49           PC   0.181   0.191   0.203   0.218   0.236   0.257   0.283   0.387   0.663   0.707
   50           PC   0.735   0.758   0.776   0.791   0.804   0.815   0.825   0.834   0.842   0.849
   51           PC   0.856   0.863   0.869   0.875   0.881   0.887   0.893   0.898   0.903   0.908
   52           PC   0.913   0.918   0.922   0.926   0.930   0.934   0.938   0.942   0.946   0.950
   53           PC   0.953   0.956   0.959   0.962   0.965   0.968   0.971   0.974   0.977   0.980
1                                                HEC-1 INPUT                                                    PAGE  2

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   54           PC   0.983   0.986   0.989   0.992   0.995   0.998   1.000
   55           JD   3.306    10.0
   56           JD   3.132    30.0
                *

   57           KK     D03   BASIN
   58           KM        BASIN BOUNDARY FROM KINGSWOOD PARKE
   59           BA   0.723
   60           LG    0.23    0.25    4.80    0.38      35
   61           UI       0     123     481     721    1150    1206     816     545     244     150
   62           UI      70      35      35       0       0       0       0       0       0       0
   63           UI       0       0       0       0       0       0       0       0       0       0
   64           UI       0       0       0       0       0       0       0       0       0       0
   65           UI       0       0       0       0       0       0       0       0       0       0
                *

   66           KK  DD03RE  DIVERT
   67           KM        Master Drainage Report Update for Kingswood Parke Phase One
   68           KM        (excess retention provided for future development was
   69           KM        subtracted from total retenttion provided)
```

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 70          DT    RD03    51.7     0.0
 71          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
 72          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

 73          KK  D03D04   ROUTE
 74          KM        Cross-section: Cross-section determined from aerial
 75          KM        Manning's N Value: street and earth with sparse trees and shrubs
 76          RS       4    FLOW
 77          RC   0.032   0.013   0.032    4458  0.0038    0.00
 78          RX  100.00  108.00  119.00  119.10  155.00  155.10  160.00  165.00
 79          RY  1000.3 1000.00  999.50  999.00  999.70 1000.20 1000.30 1000.40
             *

 80          KK     D04   BASIN
 81          KM        BASIN BOUNDARY FROM GRAND VILLAGE NORTH/SOUTH, BELLAZANO CONDOS,
 82          KM        HOPI VILLAGE, PIMA VILLAGE, SUN VILLAGE, ZUNI VILLAGE, PUEBLO VILLAGE,
 83          KM        GRAND AVE PROFF PLAZA AND GRAND AVE CHANNEL
 84          BA   0.891
 85          LG    0.22    0.27    5.70    0.26      36
 86          UI       0     123     429     682     934    1451    1138     831     585     291
 87          UI     187     115      38      38      38       0       0       0       0       0
 88          UI       0       0       0       0       0       0       0       0       0       0
 89          UI       0       0       0       0       0       0       0       0       0       0
 90          UI       0       0       0       0       0       0       0       0       0       0
             *

 91          KK  DD04RE  DIVERT
 92          KM        Master Drainage Report Update for Kingswood Parke Phase One (Sun Village
 93          KM        Final Drainage Report for Grand Village Center Phase 6, Drainage Report
 94          KM        Grand Point Plaza, Final Drainage Report -Revised  For Grand Pointe
 95          KM        Plaza Montessori of Surprise SP06-41
 96          DT    RD04    46.9     0.0
 97          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
 98          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *
1                                          HEC-1 INPUT                                          PAGE  3

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 99          KK   CPD04 COMBINE
100          HC       2   1.614
             *

101          KK  DD04SE  DIVERT
102          KM        Split flow Bell Rd at Litchfield Rd intersection
103          DT   DD04S     0.0     0.0
104          DI     0.0    86.1   158.5   512.0   904.0  1940.0     0.0     0.0     0.0     0.0
105          DQ     0.0     0.0    42.4   259.0   534.0  1278.0     0.0     0.0     0.0     0.0
             *

106          KK  D04D05   ROUTE
107          KM        Cross-section: Cross-section determined from aerial
108          KM        Manning's N Value: street and earth with sparse trees and shrubs
109          RS       3    FLOW
110          RC   0.032   0.013   0.013    2993  0.0027    0.00
111          RX  100.00  119.00  135.00  135.10  180.00  180.10  181.00  182.00
112          RY  1000.0  999.80  999.50  999.00  999.80 1000.30 1000.40 1000.50
             *

113          KK     D05   BASIN
114          KM        BASIN BOUNDARY FROM WAL MART STORE
115          KM        SURPRISE TOWN CENTER AND GRAND AVE CHANNEL
116          BA   0.163
117          LG    0.11    0.26    4.90    0.39      73
118          UI       0     127     387     470     197      58      15       0       0       0
119          UI       0       0       0       0       0       0       0       0       0       0
120          UI       0       0       0       0       0       0       0       0       0       0
121          UI       0       0       0       0       0       0       0       0       0       0
122          UI       0       0       0       0       0       0       0       0       0       0
             *

123          KK  DD05RE  DIVERT
124          KM        West Point Towne Center Final Master Infrastructure Drainage Report
125          DT    RD05     8.2     0.0
126          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
127          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

128          KK   CPD05 COMBINE
129          HC       2   1.777
             *

130          KK  D05D14   ROUTE
131          KM        Cross-section: Cross-section determined from aerial, assumed
132          KM        3' depth / Manning's N Value: earth with grass and forbs
133          RS       2    FLOW
134          RC   0.032   0.032   0.032    3385  0.0053    0.00
135          RX  100.00  101.00  102.00  122.00  142.00  162.00  163.00  164.00
136          RY  1000.0  999.90  999.80  996.80  996.70  999.80  999.90 1000.00
             *
1                                          HEC-1 INPUT                                          PAGE  4

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

137          KK   DD141  DIVERT
138          KM        culvert crossing under Dysart Road - once the capacity is reached
139          KM        under the road, the flow will split with some continuing under
140          KM        the road and some will go south along the roadway
141          DT  DD141S     0.0     0.0
142          DI     0.0   122.0   500.0  1000.0     0.0     0.0     0.0     0.0     0.0     0.0
143          DQ     0.0     0.0   378.0   878.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

144          KK  D05D15   ROUTE
145          KM        Cross-section: Cross-section determined from aerial, assumed
146          KM        3' depth  / Manning's N Value: concrete
147          RS       8    FLOW
148          RC   0.016   0.016   0.016    4588  0.0044    0.00
149          RX  100.00  101.00  102.00  127.00  131.00  140.00  141.00  142.00
150          RY  1000.0  999.90  999.80  996.80  996.70  999.80  999.90 1000.00
             *

151          KK     D11   BASIN
152          KM        BASIN BOUNDARY FROM ORCHIDS DEVELOPMENT
```

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153          KM        AND  GREENWAY ROAD DRAINAGE REPORT BY CMX (2008)
154          BA   0.662
155          LG    0.25    0.25    5.60    0.27      37
156          UI       0      78     212     386     499     683     948     708     543     408
157          UI     261     135     102      67      24      24      24      24       0       0
158          UI       0       0       0       0       0       0       0       0       0       0
159          UI       0       0       0       0       0       0       0       0       0       0
160          UI       0       0       0       0       0       0       0       0       0       0
             *

161          KK  DD11RE  DIVERT
162          KM        Final Drainage Report for Parkway Bank, Drainage Report for Deer Valley
163          KM        Credit Union Final Drainage Report for Jiffy Lube at Bell and Reems
164          KM        for The Orchard Estates Apartments, Drainage Report
165          KM        for Mountainside Fitness Center Lot 7 a
166          DT    RD11    32.4     0.0
167          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
168          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

169          KK   DD111  DIVERT
170          KM        Greenway at Parkview intersection split flow
171          DT  DD111S     0.0     0.0
172          DI     0.0    33.8   453.4  1486.3  2998.5     0.0     0.0     0.0     0.0     0.0
173          DQ     0.0    25.6   376.5  1210.3  2419.3     0.0     0.0     0.0     0.0     0.0
             *

174          KK   DD112  DIVERT
175          KM        Greenway at Parkview intersection split flow
176          DT  DD112S     0.0     0.0
177          DI     0.0     8.2    77.0   276.0   579.1     0.0     0.0     0.0     0.0     0.0
178          DQ     0.0     5.4    35.1    78.9   133.0     0.0     0.0     0.0     0.0     0.0
             *
1                                          HEC-1 INPUT                                          PAGE  5

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

179          KK  D11D12   ROUTE
180          KM        Cross-section: Cross-section determined from aerial
181          KM        Manning's N Value: clean earth; straight
182          RS       2    FLOW
183          RC   0.022   0.022   0.022    2668  0.0037    0.00
184          RX  100.00  124.00  154.00  155.00  156.00  157.00  158.00  159.00
185          RY  1208.0 1203.00 1208.00 1208.10 1208.20 1208.30 1208.40 1208.50
             *

186          KK     D12   BASIN
187          KM        BASIN BOUNDARY FROM ORCHIDS PARK
188          KM        AND  GREENWAY ROAD DRAINAGE REPORT BY CMX (2008)
189          BA   0.347
190          LG    0.24    0.25    5.80    0.28      33
191          UI       0      26      26      55     112     153     167     211     223     223
192          UI     210     185     198     139     145     103      85      78      61      46
193          UI      39      33      26      24      19      15      15      15       4       3
194          UI       3       3       3       3       3       3       3       3       3       3
195          UI       3       3       3       3       0       0       0       0       0       0
             *

196          KK  DD12RE  DIVERT
197          KM        Final Drainage Report for Residence Inn by Marriot
198          KM        Final Drainage Report for The Orchards Parcel 5
199          KM        (Includes Parcels 9,11,12 and 1/2 of 8), Final Drainage Report for
200          KM        Stadium Village (South) Residences
201          KM        Final Drainage Report for Stadium Village Residences
202          DT    RD12    15.3     0.0
203          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
204          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

205          KK   CPD12 COMBINE
206          HC       2   1.009
             *

207          KK   DD121  DIVERT
208          KM        Greenway at Bullard intersection split flow
209          DT  DD121S     0.0     0.0
210          DI     0.0    68.7   371.0  1186.5  2407.4     0.0     0.0     0.0     0.0     0.0
211          DQ     0.0    19.7   166.4   705.0  1553.4     0.0     0.0     0.0     0.0     0.0
             *

212          KK   DD122  DIVERT
213          KM        Greenway at Bullard intersection split flow
214          DT  DD122S     0.0     0.0
215          DI     0.0    48.9   204.6   481.5   854.0     0.0     0.0     0.0     0.0     0.0
216          DQ     0.0    24.3    82.0   159.0   251.4     0.0     0.0     0.0     0.0     0.0
             *
1                                          HEC-1 INPUT                                          PAGE  6

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

217          KK  D12D13   ROUTE
218          KM        Cross-section: determined from aerial and contours
219          KM        Manning's N Value: earth with sparse trees and shrubs for left
220          KM        overbank and main channel, right overbank is pavement
221          RS      10    FLOW
222          RC   0.032   0.032   0.013    5345  0.0031    0.00
223          RX  100.00  100.10  100.20  155.00  198.00  205.00  215.00  220.00
224          RY  1000.2 1000.10 1000.00  998.00  998.40  998.50  998.60  998.70
             *

225          KK     D13   BASIN
226          KM        BASIN BOUNDARY FROM GREENWAY ROAD DRAINAGE REPORT BY CMX (2008)
227          BA   1.030
228          LG    0.29    0.33    4.90    0.31      17
229          UI       0     187     635    1136    1450    1305    1090     762     495     293
230          UI     195     139      98      46      22      22      22      22      22      22
231          UI       0       0       0       0       0       0       0       0       0       0
232          UI       0       0       0       0       0       0       0       0       0       0
233          UI       0       0       0       0       0       0       0       0       0       0
             *

234          KK  DD13RE  DIVERT
235          KM        Final Drainage Report for Surprise Festival, Final Drainage Report
236          KM        for The City at Surprise Office Building, Final Drainage Report for
237          KM        Surprise Tennis Center, Final Drainage Report for City of Surprise
```

```
KM        Central Utility Plant, Final Drainage Report for Hear
DT    RD13     17.1      0.0
DI     0.0    500.0  5000.0 50000.0     0.0      0.0      0.0      0.0      0.0      0.0
DQ     0.0    500.0  5000.0 50000.0     0.0      0.0      0.0      0.0      0.0      0.0
*

KK  DD04SERETRIEVE
DR   DD04S
*

KK  D04D13   ROUTE
KM        Cross-section: Cross-section determined from aerial
KM        Manning's N Value: Natural desert wash, sheet flow
RS      13    FLOW
RC   0.040   0.040   0.040    5483  0.0031    0.00
RX  100.00  101.00  102.00  150.00  155.00  700.00  710.00  720.00
RY  1000.0  999.90  999.80  997.80  997.90  999.80  999.90 1000.00
*

KK   CPD13 COMBINE
HC       3   3.653
*

KK   DD131  DIVERT
KM        Greenway at Litchfield intersection split flow
DT  DD131S     0.0     0.0
DI     0.0   519.2   917.3  1650.7  2842.4     0.0      0.0      0.0      0.0      0.0
DQ     0.0    18.8   121.1   423.4   996.3     0.0      0.0      0.0      0.0      0.0
*
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

KK   DD132  DIVERT
KM        Greenway at Litchfield intersection split flow
DT  DD132S     0.0     0.0
DI     0.0   500.4   796.2  1227.2  1846.1     0.0      0.0      0.0      0.0      0.0
DQ     0.0   112.4   318.0   584.2   899.4     0.0      0.0      0.0      0.0      0.0
*

KK  D13D14   ROUTE
KM        Cross-section: Cross-section determined from FCDMC 69
KM        Manning's N Value: earth with grass and forbs
RS       5    FLOW
RC   0.025   0.025   0.025    5304  0.0015    0.00
RX  100.00  120.00  122.40  140.40  158.40  176.40  176.80  196.80
RY  1175.5 1175.40 1175.00 1172.00 1171.90 1175.00 1175.40 1175.50
*

KK     D14   BASIN
KM        BASIN BOUNDARY FROM WEST POINT DEVELOPMENT AND GRANDE AVE CHANNEL
BA   0.942
LG    0.23    0.26    5.10    0.33      37
UI       0     115     326     583     757    1079    1353     984     745     547
UI     300     193     123      66      35      35      35       0       0       0
UI       0       0       0       0       0       0       0       0       0       0
UI       0       0       0       0       0       0       0       0       0       0
UI       0       0       0       0       0       0       0       0       0       0
*

KK  DD14RE  DIVERT
KM        West Point Towne Center Final Master Infrastructure Drainage Report
DT    RD14    63.4     0.0
DI     0.0   500.0  5000.0 50000.0     0.0      0.0      0.0      0.0      0.0      0.0
DQ     0.0   500.0  5000.0 50000.0     0.0      0.0      0.0      0.0      0.0      0.0
*

KK   DD141RETRIEVE
DR  DD141S
*

KK  D0514A   ROUTE
KM        Cross-section: Cross-section determined from aerial
KM        Manning's N Value: street and ROW
KM        Route is from DD141 diversion to CPD14
RS       3    FLOW
RC   0.032   0.013   0.032    3147  0.0051    0.00
RX  100.00  120.00  140.00  140.10  200.00  200.10  220.00  240.00
RY  1000.0  999.50 1000.00  999.50  999.50 1000.00  999.50 1000.00
*

KK   CPD14 COMBINE
HC       3   4.758
*
*
*    Removed SRD 14 from schematic to show no storage routing per
*    site visit by AMM  -  FCDMC/JWH 10-19-09
*
* KK SRD14STORAGE
* KM      Storage in basin at Greenway and Dysart
* KM      Volume estimated from topo
* KO
* RS     1    STOR
* SV          0.30    4.10   17.00   40.40   95.20
* SQ         23.60   83.80  162.00  645.50 2369.50
* SE1164.0 1165.00 1166.00 1167.00 1168.00 1169.00
* ST
*
```



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LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

KK   DD142  DIVERT
KM        Greenway at Dysart intersection split flow
DT  DD142S     0.0     0.0
DI     0.0   295.5   693.0  1325.3  2531.5     0.0      0.0      0.0      0.0      0.0
DQ     0.0   269.3   457.1   770.3  1405.9     0.0      0.0      0.0      0.0      0.0
*

KK  D14D15   ROUTE
KM        Cross section: Cross-section determined from  aerial, 1/2 street section
KM        Manning's N Value: street, clean earth
RS       1    FLOW
RC   0.022   0.013   0.013    3351  0.0029    0.00
RX  100.00  100.10  110.00  110.10  120.00  125.00  133.90  134.00
```

```
307          RY  1003.0  999.80  999.70  999.20  999.40  999.50  999.70 1000.50
             *

308          KK     D15   BASIN
309          KM        BASIN BOUNDARY FROM SUCCESS SCHOOL
310          BA   0.220
311          LG    0.19    0.15    7.00    0.16      52
312          UI       0     101     306     560     408     206      75      26      16       0
313          UI       0       0       0       0       0       0       0       0       0       0
314          UI       0       0       0       0       0       0       0       0       0       0
315          UI       0       0       0       0       0       0       0       0       0       0
316          UI       0       0       0       0       0       0       0       0       0       0
             *

317          KK   CPD15 COMBINE
318          HC       3   4.978
             *

319          KK     L01   BASIN
320          KM        BASIN BOUNDARY FROM SUN CITY GRAND AND BEARSLEY CSR
321          BA   0.162
322          LG    0.26    0.26    5.20    0.30      33
323          UI       0      66     203     375     316     179      67      27      11       0
324          UI       0       0       0       0       0       0       0       0       0       0
325          UI       0       0       0       0       0       0       0       0       0       0
326          UI       0       0       0       0       0       0       0       0       0       0
327          UI       0       0       0       0       0       0       0       0       0       0
             *

328          KK  DL01RE  DIVERT
329          KM        Master Drainage Report for Del Webb's Grand Avenue Property
330          DT    RL01     9.9     0.0
331          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
332          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

333          KK  L01L03   ROUTE
334          KM        Cross-section: From Arizona Traditions Report
335          KM        Manning's N Value: Channel along Arizona Traditons
336          KM        Manning's for earth with grass and forbs
337          RS       5    FLOW
338          RC   0.025   0.025   0.025    5547  0.0032    0.00
339          RX  100.00  114.00  116.00  118.00  120.00  122.00  124.00  138.00
340          RY  1000.0  995.40  995.30  995.20  995.10  995.20  995.30 1000.00
             *

341          KK     L03   BASIN
342          KM        BASIN BOUNDARY FROM ARIZONA TRADITIONS NORTH AND SOUTH
343          BA   0.786
344          LG    0.20    0.25    5.80    0.25      27
345          UI       0     103     330     546     727    1135    1063     775     567     362
346          UI     177     126      70      31      31      31       0       0       0       0
347          UI       0       0       0       0       0       0       0       0       0       0
348          UI       0       0       0       0       0       0       0       0       0       0
349          UI       0       0       0       0       0       0       0       0       0       0
             *

350          KK  DL03RE  DIVERT
351          KM        Master Drainage Study for Arizona Traditions
352          DT    RL03    68.1     0.0
353          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
354          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

355          KK     L20   BASIN
356          KM        BASIN BOUNDARY FROM FRS#3 ON THE WEST
357          KM        BEARDSLEY CSR ON THE EAST AND BELL POINT I
358          BA   0.347
359          LG    0.27    0.28    5.60    0.24      20
360          UI       0      42     117     211     273     386     496     365     278     207
361          UI     118      71      48      28      13      13      13       0       0       0
362          UI       0       0       0       0       0       0       0       0       0       0
363          UI       0       0       0       0       0       0       0       0       0       0
364          UI       0       0       0       0       0       0       0       0       0       0
             *

365          KK  DL20RE  DIVERT
366          KM        Bell Pointe I and II, Arizona Traditions Parcel XIV
367          DT    RL20    21.3     0.0
368          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
369          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

370          KK  L20L03   ROUTE
371          KM        Cross-section: Estimated 3' deep and 4:1 side slopes
372          KM        width based on aerial
373          KM        Manning's N Value: earth w/ sparse trees and shrubs
374          RS       6    FLOW
375          RC   0.032   0.032   0.032    5440  0.0055    0.00
376          RX  100.00  106.00  112.00  124.00  136.00  148.00  168.00  188.00
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

377          RY  1310.5 1310.30 1310.00 1307.00 1307.10 1310.00 1310.25 1310.50
             *

378          KK   CPL03 COMBINE
379          HC       3   1.295
             *

380          KK  DL03SE  DIVERT
381          KM        Diversion at Bell Rd near Citrus
382          KM        Culverts under Bell Rd to south
383          DT    DL03S     0.0     0.0
384          DI     0.0    37.0   237.0   537.0  1037.0     0.0     0.0     0.0     0.0     0.0
385          DQ     0.0    37.0    37.0   337.0   837.0     0.0     0.0     0.0     0.0     0.0
             *

386          KK  L03L04   ROUTE
387          KM        Cross-section:Cross section estimated from aerial for 1/2 street section
388          KM        Manning's N Value: street, earth with sparse trees and shrubs
389          RS       8    FLOW
```

```
390          RC   0.032   0.013   0.013    3413  0.0046    0.00
391          RX  100.00  103.00  123.00  123.10  162.00  162.10  165.00  169.00
392          RY  1000.2 1000.10  999.50  999.00  999.80 1000.30 1000.40 1000.50
             *

393          KK     L04   BASIN
394          KM        BASIN BOUNDARY FROM HAPPY TRAILS DEVLP
395          BA   0.631
396          LG    0.18    0.25    5.00    0.38      22
397          UI       0      74     199     364     469     637     900     679     522     393
398          UI     261     128     100      68      23      23      23      23       0       0
399          UI       0       0       0       0       0       0       0       0       0       0
400          UI       0       0       0       0       0       0       0       0       0       0
401          UI       0       0       0       0       0       0       0       0       0       0
             *

402          KK  DL04RE  DIVERT
403          KM        Retention volume estimated based on aerial, Happy Trails
404          DT    RL04    44.0     0.0
405          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
406          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

407          KK   CPL04 COMBINE
408          HC       2   1.926
             *

409          KK  DL04SE  DIVERT
410          KM        Intersection diversion Bell Rd at Cotton Ln
411          DT   DL04S     0.0     0.0
412          DI     0.0     0.0    56.3   171.0  1026.0  1998.0  4546.0     0.0     0.0     0.0
413          DQ     0.0     0.0     0.0    36.0   526.0  1058.0  2453.0     0.0     0.0     0.0
             *
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

414          KK  L04L05   ROUTE
415          KM        Cross-section: Cross-section determined from aerial
416          KM        Manning's N Value: retention basins, earth w/ grass
417          RS       1    FLOW
418          RC   0.025   0.025   0.025    2571  0.0024    0.00
419          RX  100.00  109.00  109.10  121.50  209.50  209.60  211.00  215.00
420          RY  1283.3 1282.80 1282.30 1282.50 1282.60 1283.00 1283.10 1283.30
             *

421          KK     L05   BASIN
422          KM        BASIN BOUNDARY FROM COMM DEVLP AND BELL WEST RANCH
423          BA   0.486
424          LG    0.23    0.25    5.70    0.25      43
425          UI       0      69     249     389     542     817     609     439     298     141
426          UI      93      52      21      21      21       0       0       0       0       0
427          UI       0       0       0       0       0       0       0       0       0       0
428          UI       0       0       0       0       0       0       0       0       0       0
429          UI       0       0       0       0       0       0       0       0       0       0
             *

430          KK  DL05RE  DIVERT
431          KM        Final Drainage Report for Cotton Lane Professional Park, Drainage Report
432          KM        Bell West Ranch Shops, Final Drainage Report - Bell West Ranch Parcel 4
433          KM        Master Drainage Report - Bell West Ranch
434          DT    RL05    33.2     0.0
435          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
436          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

437          KK   CPL05 COMBINE
438          HC       2   2.412
             *

439          KK   DL051  DIVERT
440          KM        Diversion at L303 and Bell
441          DT  DL051S     0.0     0.0
442          DI     0.0   302.2  1308.0  3126.8  6532.9     0.0     0.0     0.0     0.0     0.0
443          DQ     0.0     1.9   103.3   562.9  1938.1     0.0     0.0     0.0     0.0     0.0
             *

444          KK   DL052  DIVERT
445          KM        Diversion at L303 and Bell
446          DT  DL052S     0.0     0.0
447          DI     0.0   300.3  1204.7  2563.8  4594.8     0.0     0.0     0.0     0.0     0.0
448          DQ     0.0     7.6    25.6    49.7    78.6     0.0     0.0     0.0     0.0     0.0
             *

449          KK  L05D06   ROUTE
450          KM        Cross-section: Estimated 3' deep and 4:1 side slopes, width based
451          KM        on aerial / Manning's N Value: half street and ROW
452          RS       1    FLOW
453          RC   0.032   0.013   0.032    3272  0.0062    0.00
454          RX  100.00  101.00  102.00  114.00  153.00  165.00  166.00  167.00
455          RY  1000.2 1000.10 1000.00  997.00  996.90 1000.00 1000.10 1000.20
             *
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

456          KK     L02   BASIN
457          KM        BASIN BOUNDARY FROM SUN CITY GRAND AND BEARSLEY CSR
458          BA   1.884
459          LG    0.22    0.26    5.20    0.32      31
460          UI       0     163     239     617     823     984    1201    1620    2018    1592
461          UI    1312    1066     865     669     385     279     230     163     100      50
462          UI      50      50      50      50       0       0       0       0       0       0
463          UI       0       0       0       0       0       0       0       0       0       0
464          UI       0       0       0       0       0       0       0       0       0       0
             *

465          KK  DL02RE  DIVERT
466          KM        Master Drainage Report for Del Webb's Grand Avenue Property
467          DT    RL02   117.2     0.0
468          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
469          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

470          KK  L02D06   ROUTE
```

```
KM        Cross-section: Estimated 3' deep and 4:1 side slopes, width based
KM        on aerial / Manning's N Value: earth w/ sparse trees and shrubs
KM        exist conditions: outfall to south into L303 ROW
RS       6    FLOW
RC   0.032   0.032   0.013    8306  0.0043    0.00
RX  100.00  101.00  102.00  114.00  153.00  165.00  166.00  167.00
RY  1000.4  999.90  999.80  997.00  997.10  999.80  999.90 1000.35
*

KK     D06   BASIN
KM        BASIN BOUNDARY FROM SUN CITY GRAND
BA   0.463
LG    0.22    0.19    6.60    0.18      32
UI       0      61     202     331     443     696     615     450     326     193
UI     105      69      34      19      19      19       0       0       0       0
UI       0       0       0       0       0       0       0       0       0       0
UI       0       0       0       0       0       0       0       0       0       0
UI       0       0       0       0       0       0       0       0       0       0
*

KK  DD06RE  DIVERT
KM        Master Drainage Report for Del Webb's Grand Avenue Property
DT    RD06    32.0     0.0
DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
*

KK   CPD06 COMBINE
HC       3   4.759
*
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

KK  DD06SE  DIVERT
KM        Divert based on capacity at Bell Road. Bell Rd section from
KM        Final Drainage Report for Westfield Commons Jan 2008
DT   DD06S     0.0     0.0
DI     0.0   100.0   200.0   300.0   370.0   400.0   800.0  1000.0 10000.0     0.0
DQ     0.0     0.0     0.0     0.0     0.0    30.0   430.0   630.0  9630.0     0.0
*

KK  D06D07   ROUTE
KM        Cross-section: Cross-section determined from aerial
KM        Manning's N Value: street and ROW, left overbank is
KM        earth with sparse trees and shrubs
RS      12    FLOW
RC   0.013   0.013   0.013    2785  0.0052    0.00
RX  100.00  100.10  118.70  118.80  165.00  211.10  211.20  230.00
RY  1266.0 1264.00 1263.74 1263.24 1264.00 1263.50 1264.00 1264.38
*

KK     D07   BASIN
KM        BASIN BOUNDARY FROM SUN CITY GRAND
BA   0.886
LG    0.21    0.23    6.20    0.22      27
UI       0      85     163     359     467     575     744    1058     862     689
UI     548     433     301     162     141      86      62      26      26      26
UI      26       0       0       0       0       0       0       0       0       0
UI       0       0       0       0       0       0       0       0       0       0
UI       0       0       0       0       0       0       0       0       0       0
*

KK  DD07RE  DIVERT
KM        Master Drainage Report for Del Webb's Grand Avenue Property
DT    RD07    61.2     0.0
DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
*

KK   CPD07 COMBINE
HC       2   5.645
*

KK  D07D02   ROUTE
KM        Cross-section: Estimated 3' deep, side slopes and width based
KM        on aerial / Manning's N Value: earth w/ sparse trees and brush
RS       1    FLOW
RC   0.032   0.032   0.032    1520  0.0013    0.00
RX  100.00  100.10  100.20  133.00  156.00  174.80  174.90  175.00
RY  1001.0  999.90  999.80  997.00  997.10  999.80  999.90 1001.00
*
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

KK     D01   BASIN
KM        BASIN BOUNDARY FROM SUN CITY GRAND
BA   1.564
LG    0.21    0.26    5.10    0.34      24
UI       0     131     176     483     649     775     937    1194    1647    1366
UI    1110     920     751     604     410     232     215     142     129      40
UI      40      40      40      40      40       0       0       0       0       0
UI       0       0       0       0       0       0       0       0       0       0
UI       0       0       0       0       0       0       0       0       0       0
*

KK  DD01RE  DIVERT
KM        Master Drainage Report for Del Webb's Grand Avenue Property
DT    RD01    97.0     0.0
DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
*

KK  D01D02   ROUTE
KM        Cross-section: Golf course, assumed 0.5% side slopes, V-ditch
KM        Manning's N Value: golf course
RS      18    FLOW
RC   0.025   0.025   0.025    9289  0.0038    0.00
RX  100.00  200.00  400.00  500.00  550.00  600.00  800.00  900.00
RY  1000.0  999.50  998.50  998.00  998.25  998.50  999.50 1000.00
*

KK     D02   BASIN
KM        BASIN BOUNDARY FROM SUN CITY GRAND
```

```
554          BA   1.844
555          LG    0.21    0.26    5.40    0.29      28
556          UI       0     170     295     683     902    1091    1371    1988    1900    1476
557          UI    1205     961     751     442     293     240     170      90      52      52
558          UI      52      52       0       0       0       0       0       0       0       0
559          UI       0       0       0       0       0       0       0       0       0       0
560          UI       0       0       0       0       0       0       0       0       0       0
             *

561          KK  DD02RE  DIVERT
562          KM        Master Drainage Report for Del Webb's Grand Avenue Property
563          DT    RD02   125.6     0.0
564          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
565          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

566          KK   CPD02 COMBINE
567          HC       3   9.053
             *
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

568          KK  D02D10   ROUTE
569          KM        Cross-section determined from site visit by John Holmes at FCDMC
570          RS       8    FLOW
571          RC   0.032   0.032   0.032    5395  0.0037    0.00
572          RX  100.00  102.50  105.00  110.00  120.00  125.00  127.50  130.00
573          RY  1242.0 1241.00 1240.00 1238.00 1237.90 1240.00 1241.00 1242.00
             *

574          KK     D09   BASIN
575          KM        BASIN BOUNDARY FROM MOUNTAIN VISTA RANCH
576          BA   0.265
577          LG    0.25    0.25    5.70    0.24      35
578          UI       0      39     152     231     338     457     320     225     135      67
579          UI      42      16      12      12       0       0       0       0       0       0
580          UI       0       0       0       0       0       0       0       0       0       0
581          UI       0       0       0       0       0       0       0       0       0       0
582          UI       0       0       0       0       0       0       0       0       0       0
             *

583          KK  DD09RE  DIVERT
584          KM        Drainage Report for Montain Vista Ranch
585          DT    RD09    15.8     0.0
586          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
587          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

588          KK  D09D10   ROUTE
589          KM        Cross-section: Estimated V-ditch w/ 4:1 side slopes
590          KM        Manning's N Value: earth with grass, sparse trees and shrubs
591          RS       1    FLOW
592          RC   0.025   0.025   0.032    1657  0.0043    0.00
593          RX  100.00  105.00  110.00  130.00  150.00  160.00  165.00  167.00
594          RY  1000.0  999.90  999.80  996.80  996.70  998.70  999.80 1000.00
             *

595          KK  DD06SERETRIEVE
596          DR   DD06S
             *

597          KK  D06D10   ROUTE
598          KM        Cross-section: From Final Drainage Report for Westfield Commons
599          RS      13    FLOW
600          RC   0.030   0.030   0.030    8002  0.0044    0.00
601          RX  100.00  109.00  113.00  118.00  125.00  131.00  137.00  142.00
602          RY  1240.0 1239.82 1238.04 1236.26 1236.16 1238.04 1239.60 1240.82
             *

603          KK     D10   BASIN
604          KM        BASIN BOUNDARY FROM MOUNTAIN VISTA RANCH
605          KM        COMMERCIAL DEVLP AND AG LANG
606          BA   0.628
607          LG    0.24    0.26    5.80    0.23      34
608          UI       0      80     248     420     555     842     875     632     466     317
609          UI     155     111      69      25      25       0       0       0       0
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

610          UI       0       0       0       0       0       0       0       0       0       0
611          UI       0       0       0       0       0       0       0       0       0       0
612          UI       0       0       0       0       0       0       0       0       0       0
             *

613          KK  DD10RE  DIVERT
614          KM        Mountain Vista Ranch Drainage Proposal for Reems Road
615          KM        Drainage Report for Montain Vista Ranch, Final Drainage Report Westfiel
616          KM        Commons Final Drainage Report for Greenway & Reems, Final Drainage
617          KM        Report for the Interim Condition for Westfield Commons Subd
618          DT    RD10    37.8     0.0
619          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
620          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

621          KK   CPD10 COMBINE
622          HC       4   9.946
             *

623          KK  D10D19   ROUTE
624          KM        Cross-section determined from Drainage Report
625          KM        for Channelization of Reems Road Floodplain along Tash Project.
626          RS       3    FLOW
627          RC   0.022   0.022   0.022    5364  0.0027    0.00
628          RX  100.00  107.60  115.20  122.80  130.80  138.40  146.00  153.60
629          RY  1220.0 1218.00 1216.00 1214.00 1213.90 1216.00 1218.00 1220.00
             *

630          KK     L09   BASIN
631          KM        BASIN BOUNDARY FROM SURPRISE FARMS
632          BA   0.489
633          LG    0.27    0.27    5.70    0.24      31
634          UI       0      60     171     304     396     565     703     510     385     282
635          UI     152     100      62      32      18      18      18       0       0       0
636          UI       0       0       0       0       0       0       0       0       0       0
```

```
637          UI       0       0       0       0       0       0       0       0       0       0
638          UI       0       0       0       0       0       0       0       0       0       0
             *

639          KK  DL09RE  DIVERT
640          KM        Final Drainage Report for Parcels 2-7 of Surprise Farms, Parcel 8
641          KM        (Basins A, B, C). Final Drainage Report for Safeway Store #1997,
642          KM        Retention Calculations for New Dysart Elementary School No. 9
643          KM        at Site J (excess of 3.30 ac-ft).
644          DT    RL09    40.3     0.0
645          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
646          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

647          KK   DL051RETRIEVE
648          DR  DL051S
             *
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

649          KK  L05L09   ROUTE
650          KM        Cross-section: Cross-section determined from aerial
651          KM        Manning's N Value: earth w/ sparse trees and brush
652          RS      15    FLOW
653          RC   0.032   0.032   0.032    5376  0.0045    0.00
654          RX  100.00  240.00  280.00  400.00  440.00  480.00  500.00  550.00
655          RY  1258.0 1254.00 1253.00 1253.00 1253.00 1254.00 1255.00 1257.00
             *

656          KK   CPL09 COMBINE
657          HC       2   2.901
             *

658          KK   DL091  DIVERT
659          KM        L303 at Greenway intersection split flow
660          DT  DL091S     0.0     0.0
661          DI     0.0   139.8   574.5  1711.2  3567.8     0.0     0.0     0.0     0.0     0.0
662          DQ     0.0    14.8   433.6  1380.6  2769.3     0.0     0.0     0.0     0.0     0.0
             *

663          KK   DL092  DIVERT
664          KM        L303 at Greenway intersection split flow
665          DT  DL092S     0.0     0.0
666          DI     0.0   125.0   140.9   330.6   798.6     0.0     0.0     0.0     0.0     0.0
667          DQ     0.0     0.0    15.9   177.9   429.6     0.0     0.0     0.0     0.0     0.0
             *

668          KK  L09D08   ROUTE
669          KM        Cross-section: Estimated 3' deep and 4:1 side slopes, width based
670          KM        on aerial / Manning's N Value: retention basins, earth w/ grass
671          RS       1    FLOW
672          RC   0.025   0.025   0.025    2922  0.0014    0.00
673          RX  100.00  101.00  102.00  114.00  133.00  145.00  146.00  147.00
674          RY  1000.2 1000.10 1000.00  997.00  997.00 1000.00 1000.10 1000.20
             *

675          KK     D08   BASIN
676          KM        BASIN BOUNDARY FROM LOOP 303 AND NORTHWEST RANCH
677          BA   0.514
678          LG    0.28    0.26    5.40    0.29      30
679          UI       0      44      62     164     219     262     318     419     545     442
680          UI     361     297     241     192     118      76      69      44      35      13
681          UI      13      13      13      13       0       0       0       0       0       0
682          UI       0       0       0       0       0       0       0       0       0       0
683          UI       0       0       0       0       0       0       0       0       0       0
             *

684          KK  DD08RE  DIVERT
685          KM        Final Drainage Report for Surprise Farms Parcel 12 (Parcel 12 Basin A
686          KM        only, Basin B/C same as Tract O), Final Drainage Report for
687          KM        Parcel 13 of Surprise Farms (Tract O, P), Final Drainage Report
688          KM        for Surprise Farms Parcel 9 (Tract K and 9), Final Drainage Report
689          DT    RD08    26.0     0.0
690          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

691          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

692          KK   DL052RETRIEVE
693          DR  DL052S
             *

694          KK  L05D08   ROUTE
695          KM        Cross-section: Estimated V ditch 2' deep , width based on aerial
696          KM        Manning's N Value:  earth w/ grass
697          RS      19    FLOW
698          RC   0.022   0.022   0.022    7790  0.0039    0.00
699          RX  100.00  120.00  130.00  150.00  151.00  170.00  180.00  200.00
700          RY  1000.0  999.20  998.80  998.00  997.90  998.80  999.20 1000.00
             *

701          KK   CPD08 COMBINE
702          KM        Sarival at Greenway
703          HC       3   3.415
             *

704          KK  D08D16   ROUTE
705          KM        Cross-section: Ag field, assumed 0.5% side slopes
706          KM        V-ditch / Manning's N Value: Ag field
707          RS      11    FLOW
708          RC   0.038   0.038   0.038    5348  0.0053    0.00
709          RX  100.00  200.00  400.00  500.00  550.00  600.00  800.00  900.00
710          RY  1000.0  999.50  998.50  998.00  998.25  998.50  999.50 1000.00
             *

711          KK     L06   BASIN
712          KM        BASIN BOUNDARY FROM SURPRISE FARMS AND SF SCHOOL DISTRICT
713          BA   0.696
714          LG    0.28    0.29    5.30    0.28      23
715          UI       0     103     394     600     874    1202     843     594     364     175
716          UI     113      45      32      32       0       0       0       0       0       0
717          UI       0       0       0       0       0       0       0       0       0       0
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 718          UI       0       0       0       0       0       0       0       0       0       0
 719          UI       0       0       0       0       0       0       0       0       0       0
              *

 720          KK  DL06RE  DIVERT
 721          KM        Final Drainage Report for Surprise Farms Phase 5 (Tracts A1, B, C1, G,
 722          KM        KN, M1, N1, O, P, Q S1N, S1S, Z), Drainage Report for Surprise Farms
 723          KM        Phase 4 Parcel 1 (TR-1D, 1F, 3A1,  & 3A2 (3As in Parcel 4B)),
 724          KM        Drainage Report for City of Surprise Surprise Farms Park (Basins 1,2,5)
 725          KM        Drainage Report for Surprise Farms Phase 4B Infrastructure (Retention
 726          KM        in Surrounding Basins except for missing reports: TR-2B1, 2B2, 3N,
 727          KM        3H, 3K, 4J), Drainage Report for Surprise Farms Phase 4 Parcel 5
 728          KM        (TR-5A1, 5A2, 5B West, 5B East, 5D), Drainage Report for
 729          KM        Surprise Farms Phase 4 Parcel 6 (TR 6J), Drainage Report for
 730          KM        Surprise Farms Phase III Parcel 1 (Retention Basin 1,2,3,4)
 731          KM        Drainage Report for Surprise Farms Phase III Parcel 2
 732          KM        (Basins 1,2,3,4,5), Drainage Report for Surprise Farms Phase III Parcel
 733          KM        for Surprise Farms Phase III Parcel  4 (Basin 1,3,6), Drainage Report
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 734          KM        for Surprise Farms Phase III Parcel 5 (Basin 1), Drainage
 735          KM        Report for Surprise Farms Phase III Parcel 3
 736          KM        (Basin 1, 2, 3, 4), Drainage Report for New
 737          KM        Dysart Preschool (One basin on N Corner), Drainage Report for
 738          KM        Dysart Elementary School No 15 and Preschool
 739          DT    RL06    59.3     0.0
 740          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
 741          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

 742          KK  DL06SE  DIVERT
 743          KM        179th at Greeway split flow
 744          DT   DL06S     0.0     0.0
 745          DI     0.0   125.4   973.2  2548.4  5028.3     0.0     0.0     0.0     0.0     0.0
 746          DQ     0.0   125.4   973.2  2275.2  4106.2     0.0     0.0     0.0     0.0     0.0
              *

 747          KK  L06L07   ROUTE
 748          KM        Cross-section: Cross-section determined from A-team survey
 749          KM        Manning's N Value: street and earth channel with sparse trees and shrubs
 750          RS       1    FLOW
 751          RC   0.032   0.013   0.013    2771  0.0031    0.00
 752          RX  100.00  100.10  100.20  122.00  126.00  133.00  146.00  159.00
 753          RY  1286.2 1286.10 1286.00 1282.00 1282.00 1283.00 1283.00 1283.80
              *

 754          KK     L07   BASIN
 755          KM        BASIN BOUNDARY FROM SURPRISE FARMS
 756          BA   0.632
 757          LG    0.28    0.29    5.30    0.28      26
 758          UI       0      88     314     494     682    1047     799     581     403     192
 759          UI     126      75      27      27      27       0       0       0       0       0
 760          UI       0       0       0       0       0       0       0       0       0       0
 761          UI       0       0       0       0       0       0       0       0       0       0
 762          UI       0       0       0       0       0       0       0       0       0       0
              *

 763          KK  DL07RE  DIVERT
 764          KM        Drainage Report for Surprise Farms Phase II Infrastructure, Drainage
 765          KM        Report for Surprise Farms Community Park (Community Parks Basin A, B)
 766          KM        Pavement Drainage Report for Surprise Farms School Site
 767          KM        (High School Basin A, B1, C1, D, E, F1), Drainage Report for
 768          KM        Surprise Farms Phase 2 Parcel 6, Drainage Report for Surprise
 769          KM        Farms Phase III Parcel 6 (Basins 1,2,3,4,5), Drainage Report for
 770          KM        Surprise Farms Phase 2 Parcel 1, Drainage Report for Surprise Farms
 771          KM        Phase 2 Parcel 5, Drainage Report for Surprise Farms Phase 2 Parcel 2,
 772          KM        Drainage Report for Surprise Farms Phase 2 Parcel 4,
 773          KM        Drainage Report for Surprise Farms
 774          KM        Phase 2 Parcel 3, Drainage Report for City of Surprise Surprise Farms
 775          KM        Drainage Report for Surprise Farms Phase 2 Parcel 1
 776          DT    RL07    46.3     0.0
 777          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
 778          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 779          KK  DL03SERETRIEVE
 780          DR   DL03S
              *

 781          KK  L0307A   ROUTE
 782          KM        Cross-section: Channel is 16' wide and 2' deep with 4: side slopes per
 783          KM        Surprise Farms Phase II Infrastructure Report (Report 287)
 784          KM        Manning's N Value: riprap and pavement
 785          RS       3    FLOW
 786          RC   0.013   0.032   0.032    3088  0.0052    0.00
 787          RX  100.00  119.00  119.50  155.00  163.00  171.00  172.00  173.00
 788          RY  1000.0  999.60 1000.10  999.50  997.50  999.50  999.70 1000.00
              *

 789          KK  L0307B   ROUTE
 790          KM        Cross-section: Cross section determined from aerial, 1/2 street section
 791          KM        Manning's N Value: pavement, earth with sparse trees and shrubs
 792          RS      12    FLOW
 793          RC   0.013   0.013   0.032    2848  0.0018    0.00
 794          RX  100.00  100.10  105.00  115.00  115.10  115.50  132.00  134.00
 795          RY  1001.0 1000.00  999.90  999.60 1000.10 1000.20 1000.30 1000.40
              *

 796          KK   CPL07 COMBINE
 797          HC       3   2.623
              *

 798          KK  DL07SE  DIVERT
 799          KM        Paradise at Greenway split flow
 800          DT   DL07S     0.0     0.0
 801          DI     0.0   233.4   660.0  1459.1  2912.5     0.0     0.0     0.0     0.0     0.0
 802          DQ     0.0    47.7   135.0   309.0   902.5     0.0     0.0     0.0     0.0     0.0
              *

 803          KK  L07L08   ROUTE
 804          KM        Cross-section: Cross-section determined from A-team survey
```

```
KM        Manning's N Value: clean earth; straight
RS       1    FLOW
RC   0.022   0.022   0.022    2557  0.0041    0.00
RX  100.00  100.90  101.00  115.00  127.00  150.00  151.00  152.00
RY  1279.6 1279.50 1277.50 1275.50 1278.50 1279.50 1279.60 1279.70
*

KK     L08   BASIN
KM        BASIN BOUNDARY FROM SURPRISE FARMS
BA   0.485
LG    0.27    0.17    7.30    0.13      31
UI       0      55     144     267     344     458     673     533     411     312
UI     220     113      85      55      24      17      17      17       0       0
UI       0       0       0       0       0       0       0       0       0       0
UI       0       0       0       0       0       0       0       0       0       0
UI       0       0       0       0       0       0       0       0       0       0
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

KK  DL08RE  DIVERT
KM        Final Drainage Report for Surprise Farms Parcel 12 (Parcel 12 Basin A
KM        only, Basin B/C same as Tract O), Final Drainage Report for Parcel 13 of
KM        Surprise Farms (Tract O, P), Final Drainage Report for Surprise Farms
KM        Parcel 9 (Tract K and 9), Final Drainage Report for Parcel 10 & 11 of
KM        Surprise Farms (Tract L, M, N), Drainage Report for Parcel 15 (Basins
KM        A & B only, Basin C in School Site), Drainage Report for New Dysart
KM        Elementary School No 18, Remaining retention volume estimated based
KM        on aerial
DT    RL08    39.4     0.0
DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
*

KK  DL04SERETRIEVE
DR   DL04S
*

KK  L04L08   ROUTE
KM        Cross-section: Cross-section determined from aerial
KM        Manning's N Value: street and earth with sparse trees and shrubs
RS       1    FLOW
RC   0.013   0.013   0.032    5352  0.0042    0.00
RX  100.00  100.10  100.20  115.20  115.30  115.40  145.00  153.00
RY  1000.0  999.90  999.80  999.50 1000.00 1000.10 1000.20 1000.30
*

KK   CPL08 COMBINE
HC       3   3.739
*

KK  L08L12   ROUTE
KM        Cross-section: Cross-section determined from aerial
KM        Manning's N Value: street, earth with grass and forbs
RS      14    FLOW
RC   0.013   0.025   0.025    5397  0.0031    0.00
RX  100.00  107.00  112.00  116.00  122.00  126.00  165.00  280.00
RY  1248.5 1248.50 1248.00 1247.50 1247.51 1248.00 1248.20 1248.50
*

KK     L10   BASIN
KM        BASIN BOUNDARY FROM SIERRA MONTANA
KM        WADDELL HACIENDAS AND BEARDSLEY CSR
BA   0.844
LG    0.27    0.25    4.55    0.39      18
UI       0      95     239     450     581     762    1140     942     727     555
UI     407     211     158      97      56      29      29      29       0       0
UI       0       0       0       0       0       0       0       0       0       0
UI       0       0       0       0       0       0       0       0       0       0
UI       0       0       0       0       0       0       0       0       0       0
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

KK  DL10RE  DIVERT
KM        Final Drainage Report for Sierra Montana Parcel 4 (Basins 1, 2),
KM        Drainage Report for Sierra Montana Parcel 1 (Basins 1,2,3,3A,3B),
KM        Drainage Report for Sierra Montana Parcel 3 (Basins 3,3A,3B,3C),
KM        Drainage Report for Sierra Montana Infastructure Phase II (P2 Retention)
KM        Sierra Montana Final Drainage Report Parcel 5 (Basins 1,2,3,4,7,8)
KM        Sierra Montana Final Drainage Report Parcel 6 (Basins 1,2,3,4,6)
DT    RL10    34.2     0.0
DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
*

KK  L10L11   ROUTE
KM        Cross-section: Estimated 3' deep and 4:1 side slopes, width based
KM        on aerial / Manning's N Value: earth with sparse trees and shrubs
RS       3    FLOW
RC   0.032   0.032   0.032    3249  0.0031    0.00
RX  100.00  100.10  100.20  112.00  154.00  166.00  183.00  185.00
RY  1000.2 1000.10 1000.00  997.00  997.00 1000.00 1000.30 1000.40
*

KK  DL06SERETRIEVE
DR   DL06S
*

KK  L06L11   ROUTE
KM        Cross-section: Estimated 3' deep and 4:1 side slopes, width based
KM        on aerial / Manning's N Value: earth w/ sparse trees and shrubs
RS       1    FLOW
RC   0.032   0.032   0.032    8226  0.0043    0.00
RX  100.00  106.00  112.00  124.00  154.00  166.00  172.00  178.00
RY  1290.5 1290.30 1290.00 1287.00 1287.10 1290.00 1290.25 1290.50
*

KK     L11   BASIN
KM        BASIN BOUNDARY FROM SIERRA MONTANA
KM        WADDELL CHANNEL DESIGNED FOR 512 CFS PER DEVELOPMENT RPT
BA   0.622
LG    0.25    0.25    4.90    0.35      34
```

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890          UI       0      81     261     432     575     898     841     613     448     287
891          UI     140      99      55      25      25      25       0       0       0       0
892          UI       0       0       0       0       0       0       0       0       0       0
893          UI       0       0       0       0       0       0       0       0       0       0
894          UI       0       0       0       0       0       0       0       0       0       0
             *

895          KK  DL11RE  DIVERT
896          KM        Sierra Montana Parcel 8 (Basins 8, 8A, 8B), Parcel 9 (Basins 9, 9A, 8C),
897          KM        Parcel 7 (Basins 1-4), Parcel 12 (included in Parcel 14 report), P
898          KM        arcel 14 (Basins 1,2,3a,3b,4a,4b,5,6,7,8,OS2,OS4,OS5 (Includes
899          KM        Retention for P14 &12)), Parcel 20 (Basins R20C, R20, R20A),
900          KM        Phase 1S and 1N estimated from aerial, Infrastructure Phase I
901          KM        (Retention from Parcel 21)
902          DT    RL11     47.6     0.0
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

903          DI     0.0    500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
904          DQ     0.0    500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *

905          KK  DL07SERETRIEVE
906          DR   DL07S
             *

907          KK  L07L11   ROUTE
908          KM        Cross-section: 3' deep, 6:1 side slope and 6' bottom width per
909          KM        Drainage Report for Sierra Montana Infrastructure Phase I (Report 909)
910          KM        Manning's N Value: earth with sparse trees and shrubs
911          RS      16    FLOW
912          RC   0.032   0.032   0.032    8463  0.0026    0.00
913          RX  100.00  101.00  102.00  120.00  126.00  144.00  145.00  146.00
914          RY  1000.0  999.90  999.80  996.80  996.70  999.80  999.90 1000.00
             *

915          KK   CPL11 COMBINE
916          HC       4   4.089
             *

917          KK  DL11SE  DIVERT
918          KM        Waddell at 173rd alignment split flow
919          DT   DL11S     0.0     0.0
920          DI     0.0   309.0  1207.7  2631.3  4439.4     0.0     0.0     0.0     0.0     0.0
921          DQ     0.0     0.0    22.5   147.6   353.8     0.0     0.0     0.0     0.0     0.0
             *

922          KK  L11L12   ROUTE
923          KM        Cross-section: Cross-section determined from aerial
924          KM        Manning's N Value: earth with grass and forbs
925          RS       2    FLOW
926          RC   0.025   0.025   0.025    2002  0.0032    0.00
927          RX  100.00  110.00  180.00  190.00  200.00  220.00  240.00  240.10
928          RY  1249.5 1249.00 1248.50 1247.00 1248.50 1248.70 1248.80 1249.50
             *

929          KK     L12   BASIN
930          KM        BASIN BOUNDARY FROM SIERRA MONTANA, AG LAND AND 1990 TOPO
931          BA   0.358
932          LG    0.39    0.25    6.20    0.22      10
933          UI       0      30      41     111     149     178     216     276     378     312
934          UI     254     210     171     137      92      53      49      32      29       9
935          UI       9       9       9       9       0       0       0       0       0       0
936          UI       0       0       0       0       0       0       0       0       0       0
937          UI       0       0       0       0       0       0       0       0       0       0
             *

938          KK  DL12RE  DIVERT
939          KM        Sierra Montana Parcel 16 (Basins 10A, 16B), Parcel 15 (Basins 15A,
940          KM        15B, 15C), Parcel 18 (Basins 18A-D), Sierra Montana Crossings
941          DT    RL12     9.0     0.0
942          DI     0.0    500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
943          DQ     0.0    500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
             *
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

944          KK   CPL12 COMBINE
945          HC       3   5.563
             *

946          KK   DL121  DIVERT
947          KM        Waddell at Cotton split flow
948          DT  DL121S     0.0     0.0
949          DI     0.0  3141.9  7409.3 13063.4 20317.2     0.0     0.0     0.0     0.0     0.0
950          DQ     0.0   550.7  2126.5  4314.6  7195.9     0.0     0.0     0.0     0.0     0.0
             *

951          KK   DL122  DIVERT
952          KM        Waddell at Cotton split flow
953          DT  DL122S     0.0     0.0
954          DI     0.0  2591.2  5282.9  8748.8 13121.3     0.0     0.0     0.0     0.0     0.0
955          DQ     0.0    31.8    90.0   165.3   254.6     0.0     0.0     0.0     0.0     0.0
             *

956          KK  L12L13   ROUTE
957          KM        Cross-section: Ag field, assumed 0.5% side slopes, V-ditch
958          KM        Manning's N Value: Ag field
959          RS       3    FLOW
960          RC   0.038   0.038   0.038    2537  0.0051    0.00
961          RX  100.00  200.00  400.00  500.00  550.00  600.00  800.00  900.00
962          RY  1000.0  999.50  998.50  998.00  998.25  998.50  999.50 1000.00
             *

963          KK     L13   BASIN
964          KM        BASIN BOUNDARY FROM AERIAL PHOTOGRAPHY OF AG LAND
965          KM        EASTERN BOUNDARY LOOP 303
966          BA   0.483
967          LG    0.49    0.25    4.90    0.44       3
968          UI       0      29      29      42      69     125     171     159     224     224
969          UI     244     244     244     214     203     224     162     159     147     111
970          UI      97      83      91      55      50      46      36      36      27      26
971          UI      25      16      16      16      16       9       4       4       4       4
972          UI       4       4       4       4       4       4       4       4       4       4
```

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 973          UI       4       4       4       4       4       4       0       0       0       0
              *

 974          KK   DL091RETRIEVE
 975          DR  DL091S
              *

 976          KK  L09L13   ROUTE
 977          KM        Cross-section: Ag field, assumed 0.5% side slopes, V-ditch
 978          KM        Manning's N Value: Ag field
 979          RS      61    FLOW
 980          RC   0.038   0.038   0.038    5317  0.0039    0.00
 981          RX  100.00  200.00  400.00  500.00  550.00  600.00  800.00  900.00
 982          RY  1000.0  999.50  998.50  998.00  998.25  998.50  999.50 1000.00
              *
1                                          HEC-1 INPUT                                          PAGE 25

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 983          KK   CPL13 COMBINE
 984          HC       3   7.021
              *

 985          KK   DL131  DIVERT
 986          KM        L303 at Waddell split flow
 987          KM        Orig calc's by KHA, 2008. Modified for SE component
 988          DT  DL131S     0.0     0.0
 989          DI     0.0   100.5   491.9  1284.7  2545.0     0.0     0.0     0.0     0.0     0.0
 990          DQ     0.0    99.9   470.6  1082.3  1928.4     0.0     0.0     0.0     0.0     0.0
              *

 991          KK   DL132  DIVERT
 992          KM        L303 at Waddell split flow
 993          KM        Orig calc's by KHA, 2008. Modified for SE component
 994          DT  DL132S     0.0     0.0
 995          DI     0.0     0.6    21.3   202.4   616.6     0.0     0.0     0.0     0.0     0.0
 996          DQ     0.0     0.6    14.2    36.5    64.9     0.0     0.0     0.0     0.0     0.0
              *

 997          KK  L13D16   ROUTE
 998          KM        Cross-section: Ag field, assumed 0.5% side slopes, V-ditch
 999          KM        Manning's N Value: Ag field
1000          RS      17    FLOW
1001          RC   0.038   0.038   0.038    2781  0.0033    0.00
1002          RX  100.00  200.00  400.00  500.00  550.00  600.00  800.00  900.00
1003          RY  1000.0  999.50  998.50  998.00  998.25  998.50  999.50 1000.00
              *

1004          KK     D16   BASIN
1005          KM        BASIN BOUNDARY FROM AG LAND AND 1990 TOPO
1006          BA   0.517
1007          LG    0.48    0.25    4.90    0.44       5
1008          UI       0      32      32      50      81     146     188     187     239     267
1009          UI     269     269     265     224     238     217     168     185     128     117
1010          UI      94      96      74      58      52      41      40      31      29      28
1011          UI      18      18      18      18       9       4       4       4       4       4
1012          UI       4       4       4       4       4       4       4       4       4       4
1013          UI       4       4       4       4       0       0       0       0       0       0
              *

1014          KK   DL092RETRIEVE
1015          DR  DL092S
              *

1016          KK  L09D16   ROUTE
1017          KM        Cross-section: Ag field, assumed 0.5% side slopes, V-ditch
1018          KM        Manning's N Value: Ag. Field
1019          RS       1    FLOW
1020          RC   0.038   0.038   0.038    5960  0.0060    0.00
1021          RX  100.00  200.00  400.00  500.00  550.00  600.00  800.00  900.00
1022          RY  1000.0  999.50  998.50  998.00  998.25  998.50  999.50 1000.00
              *
1                                          HEC-1 INPUT                                          PAGE 26

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1023          KK   CPD16 COMBINE
1024          HC       4   8.052
              *

1025          KK   DD161  DIVERT
1026          KM        Waddell at Sarival split flow
1027          DT  DD161S     0.0     0.0
1028          DI     0.0    52.0   492.4  1578.2  3317.0     0.0     0.0     0.0     0.0     0.0
1029          DQ     0.0    38.3   403.6  1166.1  2341.9     0.0     0.0     0.0     0.0     0.0
              *

1030          KK   DD162  DIVERT
1031          KM        Waddell at Sarival split flow
1032          DT  DD162S     0.0     0.0
1033          DI     0.0    13.7    88.8   412.0   975.1     0.0     0.0     0.0     0.0     0.0
1034          DQ     0.0     7.4    32.2    66.7   108.7     0.0     0.0     0.0     0.0     0.0
              *

1035          KK  D16D18   ROUTE
1036          KM        Cross-section: Cross-section determined from aerial
1037          KM        Manning's N Value: street and ROW
1038          RS       3    FLOW
1039          RC   0.032   0.013   0.013    2183  0.0035    0.00
1040          RX  100.00  101.00  102.00  148.00  148.10  176.00  177.00  178.00
1041          RY  1000.0  999.90  999.80  999.70  999.20  999.80  999.90 1000.00
              *

1042          KK     D18   BASIN
1043          KM        BASIN BOUNDARY FROM LEGACY PARK
1044          BA   0.199
1045          LG    0.25    0.25    4.60    0.40      30
1046          UI       0      85     259     479     381     209      75      30      14       0
1047          UI       0       0       0       0       0       0       0       0       0       0
1048          UI       0       0       0       0       0       0       0       0       0       0
1049          UI       0       0       0       0       0       0       0       0       0       0
1050          UI       0       0       0       0       0       0       0       0       0       0
              *

1051          KK  DD18RE  DIVERT
```

```
1052          KM        Master Drainage Report for Legacy Parc (has excess retention)
1053          DT    RD18    17.2     0.0
1054          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1055          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

1056          KK   CPD18 COMBINE
1057          HC       2   8.251
              *
1                                        HEC-1 INPUT                                          PAGE 27

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1058          KK  D18D19   ROUTE
1059          KM        Cross-section: Cross-section determined from aerial
1060          KM        Manning's N Value: street and ROW
1061          RS       2    FLOW
1062          RC   0.032   0.013   0.013    2766  0.0024    0.00
1063          RX  100.00  101.00  132.50  133.00  133.10  151.00  152.00  153.00
1064          RY  1000.1 1000.00  999.50  999.40  998.90  999.30  999.40  999.50
              *

1065          KK     D17   BASIN
1066          KM        BASIN BOUNDARY FROM LEGACY PARK
1067          BA   0.197
1068          LG    0.25    0.25    3.95    0.58      30
1069          UI       0      88     267     491     370     194      69      26      14       0
1070          UI       0       0       0       0       0       0       0       0       0       0
1071          UI       0       0       0       0       0       0       0       0       0       0
1072          UI       0       0       0       0       0       0       0       0       0       0
1073          UI       0       0       0       0       0       0       0       0       0       0
              *

1074          KK  DD17RE  DIVERT
1075          KM        Master Drainage Report for Kenly Farms Subdivision, Master Drainage
1076          KM        Report for Legacy Parc (has excess retention)
1077          DT    RD17    16.5     0.0
1078          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1079          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

1080          KK  D17D19   ROUTE
1081          KM        Cross-section: Cross-section from Drainage Report for Channelization of
1082          KM        Reems Road (Report 691) / Manning's N Value: channel w/ grass
1083          KM        bottom and riprap sides
1084          RS      18    FLOW
1085          RC   0.032   0.025   0.032    5422  0.0042    0.00
1086          RX  100.00  101.00  102.00  125.00  133.00  156.00  157.00  159.00
1087          RY  1000.0  999.90  999.80  993.80  993.70  999.80  999.90 1000.00
              *

1088          KK     D19   BASIN
1089          KM        BASIN BOUNDARY FROM TASH, WADDEL SQUARE, LME,  AND SCHOOL
1090          BA   0.506
1091          LG    0.27    0.26    4.65    0.39      26
1092          UI       0      70     172     385     537     585     522     464     353     233
1093          UI     180     113      81      64      40      40       9       9       9       9
1094          UI       9       9       9       9       9       0       0       0       0       0
1095          UI       0       0       0       0       0       0       0       0       0       0
1096          UI       0       0       0       0       0       0       0       0       0       0
              *
1                                        HEC-1 INPUT                                          PAGE 28

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1097          KK  DD19RE  DIVERT
1098          KM        Drainage Report for Greenway Parc at Surprise One, Final Drainage
1099          KM        Report for Retail Center for Venture Development  SP06-411, Stormwater
1100          KM        Management Report for Jack in the Box, Final Drainage Report for
1101          KM        Greenway Parc at Surprise Three, Drainage Report for Greenway Parc at
1102          KM        Surprise Two, Drainage Report for Walgreens at Waddell & Reems Case
1103          KM        # SPA04-297, Drainage Report for Waddell Square, Final Drainage Report
1104          KM        for Waddell Square Phase 2-Wells Fargo, Final Drainage Report for
1105          KM        Waddell Square NWC Reems and Waddell, Final Drainage Rpt for Tash
1106          DT    RD19    33.7     0.0
1107          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1108          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

1109          KK   CPD19 COMBINE
1110          HC       4  16.488
              *

1111          KK   DD191  DIVERT
1112          KM        Waddell at Reems split flow
1113          DT  DD191S     0.0     0.0
1114          DI     0.0   107.6   404.8  1261.9  2553.0     0.0     0.0     0.0     0.0     0.0
1115          DQ     0.0    58.0   241.1   802.7  1649.6     0.0     0.0     0.0     0.0     0.0
              *

1116          KK   DD192  DIVERT
1117          KM        Waddell at Reems split flow
1118          DT  DD192S     0.0     0.0
1119          DI     0.0    49.6   163.7   459.2   903.4     0.0     0.0     0.0     0.0     0.0
1120          DQ     0.0    27.9    69.2   121.4   182.6     0.0     0.0     0.0     0.0     0.0
              *

1121          KK  D19D20   ROUTE
1122          KM        Cross-section: Cross-section determined from aerial
1123          KM        Manning's N Value: street and earth with sparse trees and shrubs
1124          RS       4    FLOW
1125          RC   0.032   0.013   0.013    2674  0.0050    0.00
1126          RX  100.00  101.00  125.00  150.00  150.10  175.00  189.90  190.00
1127          RY  1003.0  999.90  998.90  999.90  999.40  999.60  999.80 1000.25
              *

1128          KK     D20   BASIN
1129          KM        BASIN BOUNDARY FROM COUNTRYSIDE UNITS 1-4 AND COTTON GIN
1130          BA   0.498
1131          LG    0.26    0.26    4.65    0.39      30
1132          UI       0      68     230     371     502     789     646     473     338     179
1133          UI     111      68      25      21      21       0       0       0       0       0
1134          UI       0       0       0       0       0       0       0       0       0       0
1135          UI       0       0       0       0       0       0       0       0       0       0
1136          UI       0       0       0       0       0       0       0       0       0       0
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LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1137            KK  DD20RE  DIVERT
1138            KM        Final Drainage Report Greenway Marketplace Wal-mart Neighborhood
1139            KM        Market #4218-00, Drainage Report for Countryside Elementary School,
1140            KM        Ashton Ranch Water Supply Facility Expansion, Countryside -
1141            KM        Preliminary Drainage  Report, Final Drainage Report for Cotton Gin
1142            DT    RD20     38.1     0.0
1143            DI     0.0    500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1144            DQ     0.0    500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
                *

1145            KK   DD111RETRIEVE
1146            DR  DD111S
                *

1147            KK  D11D20   ROUTE
1148            KM        Cross-section: Cross-section determined from aerial
1149            KM        Manning's N Value: retention basins, earth w/ grass
1150            RS       5    FLOW
1151            RC   0.025   0.025   0.025    6256  0.0032    0.00
1152            RX  100.00  101.00  102.00  114.00  190.00  202.00  203.00  204.00
1153            RY  1000.2 1000.10 1000.00  997.00  996.90 1000.00 1000.10 1000.20
                *

1154            KK   CPD20 COMBINE
1155            HC       3  17.648
                *

1156            KK  D20D21   ROUTE
1157            KM        Cross-section:  / Manning's N Value: street and earth with sparse
1158            KM        trees and shrubs
1159            RS       5    FLOW
1160            RC   0.032   0.032   0.013    5323  0.0023    0.00
1161            RX  100.00  100.50  112.00  150.00  162.00  198.00  198.00  220.00
1162            RY  1000.1 1000.00  997.00  997.00 1000.00  999.46  998.90  999.40
                *

1163            KK     D21   BASIN
1164            KM        BASIN BOUNDARY FROM ASHTON RANCH MULTI UNITS
1165            BA   0.496
1166            LG    0.25    0.25    4.65    0.40      32
1167            UI       0      63     196     332     438     665     691     499     368     251
1168            UI     122      87      55      19      19      19       0       0       0       0
1169            UI       0       0       0       0       0       0       0       0       0       0
1170            UI       0       0       0       0       0       0       0       0       0       0
1171            UI       0       0       0       0       0       0       0       0       0       0
                *

1172            KK  DD21RE  DIVERT
1173            KM        Final Drainage Report for Ashton Ranch Unit 3, Final Drainage Report for
1174            KM        Ashton Ranch Unit 1, Final Drainage Report for Ashton Ranch Unit 2,
1175            KM        Final Drainage Report for Ashton Ranch Unit 4
1176            DT    RD21     39.9     0.0
1177            DI     0.0    500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1178            DQ     0.0    500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
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LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1179            KK   DD112RETRIEVE
1180            DR  DD112S
                *

1181            KK  D11D21   ROUTE
1182            KM        Cross-section:determined from aerial, street section through subdivision
1183            KM        Manning's N Value: street, earth with sparse trees and shrubs
1184            RS      10    FLOW
1185            RC   0.032   0.013   0.032    8031  0.0035    0.00
1186            RX  100.00  106.00  115.00  115.10  167.00  167.10  174.00  179.00
1187            RY  1000.0  999.80  999.50  999.00  998.90  999.50  999.80 1000.00
                *

1188            KK   DD121RETRIEVE
1189            DR  DD121S
                *

1190            KK  D12D21   ROUTE
1191            KM        Cross-section: Cross-section determined from aerial
1192            KM        Manning's N Value: street and earth with sparse trees and shrubs
1193            RS       2    FLOW
1194            RC   0.013   0.013   0.032    2810  0.0078    0.00
1195            RX  100.00  105.00  110.00  115.00  140.00  140.10  176.00  177.00
1196            RY  1000.0  999.90  999.80  999.70  999.20  999.70  999.80 1000.00
                *

1197            KK   CPD21 COMBINE
1198            HC       4  18.491
                *

1199            KK   DD211  DIVERT
1200            KM        Waddell at Bullard split flow
1201            DT  DD211S      0.0     0.0
1202            DI     0.0    184.9   770.2  1884.9  3510.6     0.0     0.0     0.0     0.0     0.0
1203            DQ     0.0    139.4   462.9  1049.1  1871.4     0.0     0.0     0.0     0.0     0.0
                *

1204            KK   DD212  DIVERT
1205            KM        Waddell at Bullard split flow
1206            DT  DD212S      0.0     0.0
1207            DI     0.0     45.5   307.3   835.8  1639.2     0.0     0.0     0.0     0.0     0.0
1208            DQ     0.0     36.2   111.1   209.5   326.8     0.0     0.0     0.0     0.0     0.0
                *

1209            KK  D21D22   ROUTE
1210            KM        Cross-section: Cross-section determined from aerial
1211            KM        Manning's N Value: earth with grass and forbs (main channel)
1212            KM        earth with sparse trees and shrubs (overbanks)
1213            RS       4    FLOW
1214            RC   0.032   0.025   0.032    2720  0.0029    0.00
1215            RX  100.00  103.00  105.00  116.00  151.00  160.00  165.00  170.00
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1216          RY  1000.2 1000.10 1000.00  997.00  997.10 1000.00 1000.10 1000.20
              *
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1217          KK     D22   BASIN
1218          KM        BASIN BOUNDARY FROM ROYAL RANCH UNIT I AND II
1219          BA   0.454
1220          LG    0.24    0.25    4.70    0.38      32
1221          UI       0      64     230     360     501     760     570     413     282     134
1222          UI      88      50      20      20      20       0       0       0       0       0
1223          UI       0       0       0       0       0       0       0       0       0       0
1224          UI       0       0       0       0       0       0       0       0       0       0
1225          UI       0       0       0       0       0       0       0       0       0       0
              *

1226          KK  DD22RE  DIVERT
1227          KM        Drainage Report for Royal Ranch Unit 2 (Basins P1&N in D23), Final
1228          KM        Drainage Report for Royal Ranch Unit 2, Parcel 5, Final Drainage
1229          KM        Report for Royal Ranch Unit 2 Parcel 8, portion estimated by aerial for
1230          KM        Del Webb
1231          DT    RD22    37.5     0.0
1232          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1233          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

1234          KK   DD122RETRIEVE
1235          DR  DD122S
              *

1236          KK  D12D22   ROUTE
1237          KM        Cross-section: Cross section determined from aerial
1238          KM        Manning's N Value: street and earth with sparse trees and shrubs
1239          RS       7    FLOW
1240          RC   0.032   0.013   0.013    7744  0.0040    0.00
1241          RX  100.00  105.00  145.00  145.10  160.00  174.00  178.00  180.00
1242          RY  1000.0  999.90  999.50  999.00  999.20  999.50  999.60  999.65
              *

1243          KK   CPD22 COMBINE
1244          HC       3  18.945
              *

1245          KK  D22D23   ROUTE
1246          KM        Cross-section: Cross-section determined from aerial
1247          KM        Manning's N Value: earth with sparse trees and shrubs/ riprap
1248          RS       2    FLOW
1249          RC   0.032   0.032   0.032    2705  0.0037    0.00
1250          RX  100.00  104.00  106.00  110.00  118.00  122.00  126.00  138.00
1251          RY  1161.0 1160.00 1159.00 1158.00 1158.10 1159.00 1160.00 1161.00
              *

1252          KK     D23   BASIN
1253          KM        BASIN BOUNDARY FROM SIERRA VERDE
1254          BA   0.541
1255          LG    0.27    0.27    5.00    0.33      26
1256          UI       0      59     139     271     348     447     672     631     480     373
1257          UI     285     172     101      77      55      18      18      18      18       0
1258          UI       0       0       0       0       0       0       0       0       0       0
1                                          HEC-1 INPUT                                                    PAGE 32

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1259          UI       0       0       0       0       0       0       0       0       0       0
1260          UI       0       0       0       0       0       0       0       0       0       0
              *

1261          KK  DD23RE  DIVERT
1262          KM        Final Drainage Report for Sierra Verde Parcel 5, Infrastructure Drainage
1263          KM        Report for Sierra Verde (temporary basins removed), Final Drainage
1264          KM        Report for Sierra Verde Parcel 4Final Drainage Report for Harmony
1265          KM        Apartments, Drainage Report for Royal Ranch Unit 2 Final Drainage
1266          KM        Report for Sierra Verde Parcel 9, Final Drainage Report for Sierra Verde
1267          KM        Parcel 3, Final Drainage Report for Sierra Verde Parcel 2, Final Drainag
1268          KM        Report for Sierra Verde Parcel 1, Drainage Report for Fry's at Waddell
1269          KM        and Litchfield Roads
1270          DT    RD23    36.3     0.0
1271          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1272          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

1273          KK   DD131RETRIEVE
1274          DR  DD131S
              *

1275          KK  D13D23   ROUTE
1276          KM        Cross-section: Cross-section determined from aerial 1/2 street section
1277          KM        Manning's N Value: street, earth with sparse trees and shrubs
1278          RS       3    FLOW
1279          RC   0.032   0.013   0.032    5460  0.0044    0.00
1280          RX  100.00  100.00  109.00  109.00  148.00  148.00  197.00  198.00
1281          RY  1180.0 1176.28 1176.28 1175.78 1175.00 1175.50 1177.00 1177.10
              *

1282          KK   CPD23 COMBINE
1283          HC       3   22.13
              *

1284          KK   DD231  DIVERT
1285          KM        Waddell at Litchfield split flow
1286          DT  DD231S     0.0     0.0
1287          DI     0.0   518.8   867.4  1680.6  2985.0     0.0     0.0     0.0     0.0     0.0
1288          DQ     0.0    51.3   223.3   727.6  1503.5     0.0     0.0     0.0     0.0     0.0
              *

1289          KK   DD232  DIVERT
1290          KM        Waddell at Litchfield split flow
1291          DT  DD232S     0.0     0.0
1292          DI     0.0   467.5   644.1   953.0  1481.6     0.0     0.0     0.0     0.0     0.0
1293          DQ     0.0    55.8   138.4   242.9   365.2     0.0     0.0     0.0     0.0     0.0
              *

1294          KK  D23D24   ROUTE
1295          KM        Manning's N Value: Litchfield Manor, CS 400 HDR 896
1296          RS       2    FLOW
```

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1297          RC   0.025   0.025   0.025    2496  0.0020    0.00
1298          RX  100.00  100.10  104.10  108.10  112.10  123.70  143.60  151.60
1299          RY  1157.0 1155.00 1154.00 1153.00 1153.10 1155.00 1156.00 1157.00
              *
1                                        HEC-1 INPUT                                                    PAGE 33

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1300          KK     D24   BASIN
1301          KM        BASIN BOUNDARY FROM LITCHFIELD MANOR
1302          BA   0.492
1303          LG    0.27    0.25    5.10    0.32      28
1304          UI       0      56     144     269     347     461     679     542     419     317
1305          UI     226     116      88      56      26      17      17      17       0       0
1306          UI       0       0       0       0       0       0       0       0       0       0
1307          UI       0       0       0       0       0       0       0       0       0       0
1308          UI       0       0       0       0       0       0       0       0       0       0
              *

1309          KK  DD24RE  DIVERT
1310          KM        Final Drainage Report for Litchfield Manor (excess retention per report)
1311          DT    RD24    40.9     0.0
1312          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1313          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

1314          KK   DD132RETRIEVE
1315          DR  DD132S
              *

1316          KK  D13D24   ROUTE
1317          KM        Cross-section: Cross-section determined from aerial 1/2 street section
1318          KM        Manning's N Value: street, earth with sparse trees and shrubs
1319          RS       3    FLOW
1320          RC   0.032   0.013   0.013    5460  0.0044    0.00
1321          RX  100.00  100.10  145.00  145.10  175.00  175.10  184.90  185.00
1322          RY  1178.0 1176.50 1175.50 1175.00 1175.78 1176.28 1176.28 1180.00
              *

1323          KK   CPD24 COMBINE
1324          HC       3  22.622
              *

1325          KK  DD24SE  DIVERT
1326          KM        Waddell near Dysart split flow (subdivision boundary)
1327          DT   DD24S     0.0     0.0
1328          DI     0.0    55.3   366.8  1137.9  2658.6     0.0     0.0     0.0     0.0     0.0
1329          DQ     0.0     0.0    81.5   397.9  1115.4     0.0     0.0     0.0     0.0     0.0
              *

1330          KK  D24D25   ROUTE
1331          KM        Cross-section: Cross-section determined from aerial
1332          KM        Manning's N Value: Grass, earth with sparse trees and shrubs
1333          RS       3    FLOW
1334          RC   0.032   0.025   0.032    2701  0.0017    0.00
1335          RX  100.00  105.00  120.00  130.00  150.00  165.00  200.00  210.00
1336          RY  1000.0  999.50  997.20  996.00  995.90  997.20  999.50 1000.00
              *
                                         HEC-1 INPUT                                                    PAGE 34

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1337          KK     D25   BASIN
1338          KM        BASIN BOUNDARY FROM ROSEVIEW MULTI PHASE
1339          BA   0.497
1340          LG    0.25    0.25    4.80    0.36      30
1341          UI       0      64     198     335     442     675     689     499     367     248
1342          UI     120      86      53      20      20      20       0       0       0       0
1343          UI       0       0       0       0       0       0       0       0       0       0
1344          UI       0       0       0       0       0       0       0       0       0       0
1345          UI       0       0       0       0       0       0       0       0       0       0
              *

1346          KK  DD25RE  DIVERT
1347          KM        Drainage Report for Roseview - Parcels 1-6, Master Drainage
1348          KM        Report for Roseview, Retention for Parcels 7 and 8 were estimated
1349          KM        based on aerial, Parcel 5a has no retention
1350          DT    RD25    37.1     0.0
1351          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1352          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

1353          KK   CPD25 COMBINE
1354          HC       2  23.119
              *

1355          KK   DD251  DIVERT
1356          KM        Waddell/Dysart/RR split flow
1357          DT  DD251S     0.0     0.0
1358          DI     0.0    69.9  1206.6  4171.1  8464.1     0.0     0.0     0.0     0.0     0.0
1359          DQ     0.0    69.9  1097.4  3288.4  6292.9     0.0     0.0     0.0     0.0     0.0
              *

1360          KK   DD252  DIVERT
1361          KM        Waddell/Dysart/RR split flow
1362          DT  DD252S     0.0     0.0
1363          DI     0.0     0.0   109.3   882.7  2171.2     0.0     0.0     0.0     0.0     0.0
1364          DQ     0.0     0.0   109.3   363.0   701.2     0.0     0.0     0.0     0.0     0.0
              *

1365          KK  D2542A   ROUTE
1366          KM        Cross-section: Cross-section estimated from aerial, estimated 3' deep
1367          KM        Manning's N Value: earth with sparse trees and shrubs
1368          KM        Route is from D25 to D42 (broken into 2 routes, 1st route)
1369          RS       1    FLOW
1370          RC   0.032   0.032   0.032    2090  0.0057    0.00
1371          RX  100.00  101.00  102.00  122.00  128.00  145.00  146.00  147.00
1372          RY  1000.0  999.90  999.80  997.00  997.10  999.80  999.90 1000.00
              *

1373          KK  D2542B   ROUTE
1374          KM        Cross-section: Cross-section from Lower El Mirage Channelization
1375          KM        (Report FCDMC 18-198B) / Manning's N Value: clean earth; straight
1376          KM        Route is from D25 to D42 (broken into 2 routes, 2nd route)
1377          RS       1    FLOW
```

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1378          RC   0.022   0.022   0.022    4791  0.0042    0.00
1                                   HEC-1 INPUT                                                    PAGE 35

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1379          RX  100.00  103.00  105.50  137.50  187.50  219.50  222.00  225.00
1380          RY  1000.0  999.50  998.50  990.50  990.40  998.50  999.50 1000.00
              *

1381          KK     D37   BASIN
1382          KM         BASIN BOUNDARY FROM  AG LAND, 1990 TOPO AND BNSF RR ALIGNMENT
1383          BA   0.197
1384          LG    0.50    0.25    5.60    0.33       0
1385          UI       0      18      24      50     101     108     143     150     150     128
1386          UI     135      94      92      66      52      47      31      25      21      16
1387          UI      15      10      10       8       2       2       2       2       2       2
1388          UI       2       2       2       2       2       2       2       0      •0       0
1389          UI       0       0       0       0       0       0       0       0       0       0
              *

1390          KK   DD232RETRIEVE
1391          DR  DD232S
              *

1392          KK  D23D37   ROUTE
1393          KM        Cross-section: Ag field, assumed 0.5%
1394          KM        side slopes, V-ditch Manning's N Value: avg value for cultivated
1395          KM        areas from Estimated Manning's Roughness
1396          KM        Coefficient for Stream Channels and Flood Plains in MC
1397          RS      36    FLOW
1398          RC   0.038   0.038   0.038    3332  0.0024    0.00
1399          RX  100.00  200.00  400.00  500.00  550.00  600.00  800.00  900.00
1400          RY  1000.0  999.50  998.50  998.00  998.25  998.50  999.50 1000.00
              *

1401          KK   DD251RETRIEVE
1402          DR  DD251S
              *

1403          KK  D25D37   ROUTE
1404          KM        Cross-section: Estimated 2' deep and 4:1 side slopes, width based on
1405          KM        aerial & topo / Manning's N Value: earth w/ sparse trees and brush
1406          RS       7    FLOW
1407          RC   0.032   0.032   0.032    2711  0.0007    0.00
1408          RX  100.00  115.00  130.00  138.00  144.00  152.00  165.00  185.00
1409          RY  1000.0  999.50  999.00  996.00  996.10  999.00  999.50 1000.00
              *

1410          KK  DD24SERETRIEVE
1411          DR   DD24S
              *

1412          KK  D24D37   ROUTE
1413          KM        Cross-section: Ag field, assumed 0.5% side
1414          KM        slopes, V-ditch  Manning's N Value: Ag field
1415          RS       5    FLOW
1416          RC   0.038   0.038   0.038    1422  0.0028    0.00
1417          RX  100.00  200.00  400.00  500.00  550.00  600.00  800.00  900.00
1418          RY  1000.0  999.50  998.50  998.00  998.25  998.50  999.50 1000.00
              *
1                                   HEC-1 INPUT                                                    PAGE 36

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1419          KK   CPD37 COMBINE
1420          HC       4  23.316
              *

1421          KK  DD37SE  DIVERT
1422          KM        split flow across low point in RR tracks
1423          DT   DD37S     0.0     0.0
1424          DI     0.0  1457.6  3118.3  5527.2  9114.3     0.0     0.0     0.0     0.0     0.0
1425          DQ     0.0     0.0     4.6   291.9  1203.2     0.0     0.0     0.0     0.0     0.0
              *

1426          KK  D37D39   ROUTE
1427          KM        Cross-section: Ag field, assumed 0.5%
1428          KM        side slopes, V-ditch / Manning's N Value: Ag field
1429          RS       1    FLOW
1430          RC   0.038   0.038   0.038    2643  0.0030    0.00
1431          RX  100.00  200.00  400.00  500.00  550.00  600.00  800.00  900.00
1432          RY  1000.0  999.50  998.50  998.00  998.25  998.50  999.50 1000.00
              *

1433          KK     D35   BASIN
1434          KM        BASIN BOUNDARY FROM MARYVALE PARK PARCELS, AG LAND AND 1990 TOPO
1435          BA   0.254
1436          LG    0.50    0.25    4.55    0.53       0
1437          UI       0      22      26      55     109     125     162     181     181     172
1438          UI     152     151     117     102      77      62      57      38      32      27
1439          UI      20      20      13      12      12       6       3       3       3       3
1440          UI       3       3       3       3       3       3       3       3       3       0
1441          UI       0       0       0       0       0       0       0       0       0       0
              *

1442          KK   DD231RETRIEVE
1443          DR  DD231S
              *

1444          KK  D23D35   ROUTE
1445          KM        Cross-section: Ag field, assumed 0.5%
1446          KM        side slopes, V-ditch / Manning's N Value: Ag field
1447          RS      14    FLOW
1448          RC   0.038   0.038   0.038    2692  0.0037    0.00
1449          RX  100.00  200.00  400.00  500.00  550.00  600.00  800.00  900.00
1450          RY  1000.0  999.50  998.50  998.00  998.25  998.50  999.50 1000.00
              *

1451          KK   CPD35 COMBINE
1452          HC       2  22.384
              *

1453          KK  DD35SE  DIVERT
1454          KM        Litchfield at 1/2 mi S. of Waddell split flow
1455          DT   DD35S     0.0     0.0
1456          DI     0.0   112.5   584.6  1947.2  4136.3     0.0     0.0     0.0     0.0     0.0
```

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1457          DQ     0.0    18.8    97.4   368.7   900.0     0.0     0.0     0.0     0.0     0.0
              *
1                                        HEC-1 INPUT                                                PAGE 37

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1458          KK  D35D38   ROUTE
1459          KM        Cross-section: Cross-section from Surprise Pointe Master
1460          KM        Drainage Report / Manning's N Value: riprap
1461          RS       3    FLOW
1462          RC   0.032   0.032   0.032    2588  0.0023    0.00
1463          RX  100.00  105.00  110.00  125.50  131.50  151.00  155.00  160.00
1464          RY  1000.0  999.90  999.80  996.10  996.00  999.80  999.90 1000.00
              *

1465          KK     D38 • BASIN
1466          KM        BASIN BOUNDARY FROM  AG LAND, 1990 TOPO AND BNSF RR ALIGNMENT
1467          BA   0.124
1468          LG    0.50    0.25    4.45    0.57       0
1469          UI       0      11      15      32      64      69      91      95      95      80
1470          UI      84      60      56      41      33      28      19      16      13      10
1471          UI       9       6       6       4       1       1       1       1       1       1
1472          UI       1       1       1       1       1       1       1       0       0       0
1473          UI       0       0       0       0       0       0       0       0       0       0
              *

1474          KK  DD37SERETRIEVE
1475          DR   DD37S
              *

1476          KK  D37D38   ROUTE
1477          KM        Cross-section: Cross-section estimated from aerial and topo-railroad
1478          KM        Manning's N Value: earth w/ sparse trees and brush
1479          RS       1    FLOW
1480          RC   0.032   0.032   0.032    1505  0.0040    0.00
1481          RX  100.00  120.00  127.00  134.00  155.00  170.00  190.00  290.00
1482          RY  1148.1 1148.00 1147.00 1146.00 1146.10 1147.00 1148.00 1148.10
              *

1483          KK   CPD38 COMBINE
1484          HC       3  23.694
              *

1485          KK   DD381  DIVERT
1486          KM        RR tracks btwn Cactus and Waddell split flow
1487          DT  DD381S     0.0     0.0
1488          DI     0.0   178.5  1607.5  4129.9  7990.7     0.0     0.0     0.0     0.0     0.0
1489          DQ     0.0   156.9  1414.9  3582.1  6821.6     0.0     0.0     0.0     0.0     0.0
              *

1490          KK   DD382  DIVERT
1491          KM        RR tracks btwn Cactus and Waddell split flow
1492          DT  DD382S     0.0     0.0
1493          DI     0.0    21.7   192.6   547.8  1169.1     0.0     0.0     0.0     0.0     0.0
1494          DQ     0.0    15.2    51.2    99.4   157.1     0.0     0.0     0.0     0.0     0.0
              *
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1495          KK  D38D39   ROUTE
1496          KM        Cross-section: Ag field, assumed 0.5% side slopes, V-ditch
1497          KM        Manning's N Value: Earth with grass and forbs
1498          RS      20    FLOW
1499          RC   0.025   0.025   0.025    2996  0.0013    0.00
1500          RX  100.00  200.00  400.00  500.00  550.00  600.00  800.00  900.00
1501          RY  1000.0  999.50  998.50  998.00  998.25  998.50  999.50 1000.00
              *

1502          KK     D39   BASIN
1503          KM        BASIN BOUNDARY FROM  AG LAND, 1990 TOPO AND BNSF RR ALIGNMENT
1504          BA   0.182
1505          LG    0.50    0.25    5.60    0.33       0
1506          UI       0      17      25      56      98     120     137     146     139     125
1507          UI     113      98      69      54      50      31      26      21      16      14
1508          UI      10      10       7       2       2       2       2       2       2       2
1509          UI       2       2       2       2       2       0       0       0       0       0
1510          UI       0       0       0       0       0       0       0       0       0       0
              *

1511          KK   DD252RETRIEVE
1512          DR  DD252S
              *

1513          KK  D25D39   ROUTE
1514          KM        Cross-section: Cross-section from Surprise Pointe Master
1515          KM        Drainage Report / Manning's N Value: clean earth
1516          RS       1    FLOW
1517          RC   0.022   0.022   0.022    2101  0.0029    0.00
1518          RX  100.00  101.00  102.00  120.00  120.50  132.20  133.00  134.00
1519          RY  1000.0  999.90  999.80  996.80  996.90  999.80  999.90 1000.00
              *

1520          KK   CPD39 COMBINE
1521          HC       4  23.876
              *

1522          KK  D39D42   ROUTE
1523          KM        Cross-section: Cross-section from Lower El Mirage Channelization
1524          KM        (Report FCDMC 18-198B) / Manning's N Value: clean earth; straight
1525          RS       5    FLOW
1526          RC   0.022   0.022   0.022    5691  0.0035    0.00
1527          RX  100.00  103.00  105.50  137.50  187.50  219.50  222.00  225.00
1528          RY  1000.0  999.50  998.50  990.50  990.40  998.50  999.50 1000.00
              *

1529          KK     D26   BASIN
1530          KM        BASIN BOUNDARY FROM RACHO EL MIRAGE, SCHOOL
1531          KM        MOBILE HOME PARK, SUNWEST CEMETARY AND GRAND AVE CHANNEL
1532          BA   0.642
1533          LG    0.24    0.25    5.80    0.24      34
1534          UI       0     165     560     873    1364     927     587     245     140      44
1535          UI      37       0       0       0       0       0       0       0       0       0
1536          UI       0       0       0       0       0       0       0       0       0       0
1                                        HEC-1 INPUT                                                PAGE 39
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1537          UI       0       0       0       0       0       0       0       0       0       0
1538          UI       0       0       0       0       0       0       0       0       0       0
              *

1539          KK  DD26RE  DIVERT
1540          KM        Retention volume estimated based on aerial
1541          DT    RD26    52.4     0.0
1542          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1543          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

1544          KK   DD142RETRIEVE
1545          DR  DD142S
              *

1546          KK  D14D26   ROUTE
1547          KM        Cross-section: Cross-section from Lower El Mirage Channelization
1548          KM        (Report FCDMC 18-198B) / Manning's N Value: clean earth; straight
1549          RS       2    FLOW
1550          RC   0.022   0.022   0.022    5050  0.0048    0.00
1551          RX  100.00  102.50  105.50  137.50  187.50  219.50  222.00  225.00
1552          RY  1000.0  999.50  999.00  991.00  991.10  999.00  999.80 1000.00
              *

1553          KK   CPD26 COMBINE
1554          HC       2     5.4
              *

1555          KK  D26D27   ROUTE
1556          KM        Cross-section: Cross-section determined from FCDMC 18
1557          KM        Manning's N Value: Clean earth
1558          RS       2    FLOW
1559          RC   0.022   0.022   0.022    2050  0.0039    0.00
1560          RX  100.00  102.50  105.50  137.50  187.50  219.50  222.00  225.00
1561          RY  1000.0  999.50  999.00  991.00  991.00  999.00  999.50 1000.00
              *

1562          KK     D27   BASIN
1563          KM        BASIN BOUNDARY FROM RANCHO EL MIRAGE
1564          KM        WEST EL MIRAGE AND BNSF RR ALIGNMENT
1565          BA   0.316
1566          LG    0.20    0.24    4.90    0.36      42
1567          UI       0     103     332     568     679     409     199      89      33      20
1568          UI       0       0       0       0       0       0       0       0       0       0
1569          UI       0       0       0       0       0       0       0       0       0       0
1570          UI       0       0       0       0       0       0       0       0       0       0
1571          UI       0       0       0       0       0       0       0       0       0       0
              *

1572          KK  DD27RE  DIVERT
1573          KM        Retention volume estimated based on aerial
1574          DT    RD27     8.2     0.0
1575          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1576          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1577          KK   CPD27 COMBINE
1578          HC       2   5.716
              *

1579          KK   SRD27 STORAGE
1580          KM        Storage at culvert under TB Road
1581          KO
1582          RS       1    STOR
1583          SV                                                  22.80   51.41
1584          SQ           52.00  202.00  415.00  658.00  906.00 1127.00 2999.00
1585          SE  1140.0 1142.00 1144.00 1146.00 1148.00 1150.00 1152.00 1154.00
1586          ST
              *

1587          KK  D27D42   ROUTE
1588          KM        Cross-section: Cross-section from Lower El Mirage Channelization
1589          KM        (Report FCDMC 18-198B) / Manning's N Value: clean earth; straight
1590          RS       3    FLOW
1591          RC   0.022   0.022   0.022    5598  0.0032    0.00
1592          RX  100.00  102.50  105.50  137.50  187.50  219.50  222.00  225.00
1593          RY  1000.0  999.50  999.00  991.00  991.10  999.00  999.50 1000.00
              *

1594          KK     D42   BASIN
1595          KM        BASIN BOUNDARY FROM PARQUE VERDE MULTI PHASE
1596          KM        DYSART SCHOOL DISTRICT, AND BUENA VISTA
1597          BA   0.994
1598          LG    0.24    0.24    5.20    0.30      32
1599          UI       0     150     592     894    1340    1711    1182     824     458     248
1600          UI     147      46      46      46       0       0       0       0       0       0
1601          UI       0       0       0       0       0       0       0       0       0       0
1602          UI       0       0       0       0       0       0       0       0       0       0
1603          UI       0       0       0       0       0       0       0       0       0       0
              *

1604          KK  DD42RE  DIVERT
1605          KM        Retention volume estimated based on aerial, Cactus and Dysart
1606          KM        Subdivision and Parque Verde - No Reports available
1607          DT    RD42    71.8     0.0
1608          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1609          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

1610          KK   CPD42 COMBINE
1611          HC       4  26.933
              *

1612          KK   SRD42 STORAGE
1613          KM        Storage behind Cactus Road - 2009 ADMPU data revised by DIBBLE
1614          KM    Storage and roadway data based on 2010 survey by FCDMC (NGVD29)
1615          KM    Discharge data based on 3-24" pipes + overflow through control section
1616          KO       1       2
1617          RS       1    STOR
1618          SV           0.03    1.63   11.41   12.00   12.60   13.30   14.00   14.62   15.30
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1619          SV   16.40   18.09   20.20
1620          SQ            9.00   41.00   81.00   82.00  118.00  147.50  184.00  230.00  294.00
1621          SQ  422.00  717.00 1123.00
1622          SE  1105.2 1107.00 1110.00 1114.00 1114.20 1114.40 1114.60 1114.80 1115.00 1115.20
1623          SE  1115.5 1116.00 1116.50
              *

1624          KK     D53   BASIN
1625          KM        BASIN BOUNDARY FROM EL MIRAGE MARKET PLACE, RANCHO MIRAGE UNIT 3
1626          BA   0.118
1627          LG    0.31    0.32    4.60    0.36      11
1628          UI       0      56     169     306     216     105      39      12       9       0
1629          UI       0       0       0       0       0       0       0       0       0       0
1630          UI       0       0       0       0       0       0       0       0       0       0
1631          UI       0       0       0       0       0       0       0       0       0       0
1632          UI       0       0       0       0       0       0       0       0       0       0
              *

1633          KK  DD53RE  DIVERT
1634          KM        Retention volume estimated based on aerial
1635          DT    RD53    12.1     0.0
1636          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1637          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

1638          KK   CPD53 COMBINE
1639          HC       2  27.051
              *

1640          KK   SRD53 STORAGE
1641          KM        West Cactus Basin - 2013 Design data revised by DIBBLE
1642          KM        100% grading plaN
1643          KM    Volume does not include ponded channel storage u/s of Cactus Rd
1644          KO       1       3
1645          RS       1    STOR
1646          SV            0.12    0.90    4.19   11.81   16.99   22.76   29.01   35.70   38.45
1647          SV   41.24   44.06   46.91   49.80   51.26   52.73   54.20   55.69   57.18   58.68
1648          SQ            7.70   25.50   51.60   84.00  101.60  119.60  137.40  154.70  161.30
1649          SQ  167.70  173.70  179.30  184.20  187.10  189.20  192.30  194.40  197.40  199.60
1650          SE  1105.6 1106.70 1107.70 1108.70 1109.70 1110.20 1110.70 1111.20 1111.70 1111.90
1651          SE  1112.1 1112.30 1112.50 1112.70 1112.80 1112.90 1113.00 1113.10 1113.20 1113.30
              *

1652          KK  D53D54   ROUTE
1653          KM        Cross-section: Golf course, Cross-section determined from
1654          KM        aerial-golf course / Manning's N Value: earth w/ grass
1655          RS       4    FLOW
1656          RC   0.025   0.025   0.025    3999  0.0045    0.00
1657          RX  100.00  174.00  228.00  298.00  357.50  413.00  468.00  486.00
1658          RY  1106.0 1104.00 1103.00 1102.00 1101.90 1103.00 1104.00 1104.10
              *
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1659          KK     D43   BASIN
1660          KM        BASIN BOUNDARY FROM MONTA BLANCA ESTATES, SUNNYVALE AND SUNDIAL
1661          BA   0.500
1662          LG    0.25    0.25    4.70    0.37      33
1663          UI       0      75     298     450     674     861     594     414     230     125
1664          UI      74      23      23      23       0       0       0       0       0       0
1665          UI       0       0       0       0       0       0       0       0       0       0
1666          UI       0       0       0       0       0       0       0       0       0       0
1667          UI       0       0       0       0       0       0       0       0       0       0
              *

1668          KK  DD43RE  DIVERT
1669          KM        Retention volume estimated based on aerial
1670          DT    RD43    35.5     0.0
1671          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1672          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

1673          KK  D43D54   ROUTE
1674          KM        Cross-section: Golf course, assumed 0.5%
1675          KM        side slopes, V-ditch / Manning's N Value: grass - golf course
1676          RS      14    FLOW
1677          RC   0.025   0.025   0.025    3872  0.0023    0.00
1678          RX  100.00  200.00  400.00  500.00  550.00  600.00  800.00  900.00
1679          RY  1000.0  999.50  998.50  998.00  998.25  998.50  999.50 1000.00
              *

1680          KK     D54   BASIN
1681          KM        BASIN BOUNDARY FROM FAIRWAYS GOLF COURSE DIVISION
1682          KM        AND PUEBLO EL MIRAGE RV RESORT
1683          BA   0.271
1684          LG    0.20    0.27    4.45    0.50      14
1685          UI       0      65     225     347     561     401     260     119      64      26
1686          UI      15      15       0       0       0       0       0       0       0       0
1687          UI       0       0       0       0       0       0       0       0       0       0
1688          UI       0       0       0       0       0       0       0       0       0       0
1689          UI       0       0       0       0       0       0       0       0       0       0
              *

1690          KK  DD54RE  DIVERT
1691          KM        NO REPORTS - ESTIMATED FIRST FLUSH RETENTION FROM AERIAL
1692          KM        DUE TO LOCATION OF DEVELOPMENT TO THE RIVER
1693          DT    RD54     3.0     0.0
1694          DI     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
1695          DQ     0.0   500.0  5000.0 50000.0     0.0     0.0     0.0     0.0     0.0     0.0
              *

1696          KK   CPD54 COMBINE
1697          HC       3  27.822
              *
1698          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT
LINE (V) ROUTING (---->) DIVERSION OR PUMP FLOW

NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW

```
 57        D03
             .
             .
 70          .------->    RD03
 66      DD03RE
             V
             V
 73      D03D04
             .
             .
 80          .         D04
             .           .
             .           .
 96          .           .------->    RD04
 91          .      DD04RE
             .           .
             .           .
 99       CPD04............
             .
             .
103          .------->   DD04S
101      DD04SE
             V
             V
106      D04D05
             .
             .
113          .         D05
             .           .
             .           .
125          .           .------->    RD05
123          .      DD05RE
             .           .
             .           .
128       CPD05............
             V
             V
130      D05D14
             .
             .
141          .------->  DD141S
137       DD141
             V
             V
144      D05D15
             .
             .
151          .         D11
             .           .
             .           .
166          .           .------->    RD11
161          .      DD11RE
             .           .
             .           .
171          .           .------->  DD111S
169          .       DD111
             .           .
             .           .
176          .           .------->  DD112S
174          .       DD112
             .           V
             .           V
179          .      D11D12
             .           .
             .           .
186          .           .         D12
             .           .           .
             .           .           .
202          .           .           .------->    RD12
196          .           .      DD12RE
             .           .           .
             .           .           .
205          .       CPD12............
             .           .
             .           .
209          .           .------->  DD121S
207          .       DD121
             .           .
             .           .
214          .           .------->  DD122S
212          .       DD122
             .           V
             .           V
217          .      D12D13
             .           .
             .           .
225          .           .         D13
             .           .           .
             .           .           .
239          .           .           .------->    RD13
234          .           .      DD13RE
             .           .           .
             .           .           .
243          .           .           .           .<-------   DD04S
242          .           .           .      DD04SE
             .           .           .           V
             .           .           .           V
244          .           .           .      D04D13
             .           .           .           .
             .           .           .           .
251          .       CPD13........................
             .           .
             .           .
255          .           .------->  DD131S
253          .       DD131
             .           .
             .           .
260          .           .------->  DD132S
258          .       DD132
             .           V
             .           V
263          .      D13D14
             .           .
             .           .
270          .           .         D14
             .           .           .
```

```
          .          .          .
281       .          .          .-------->    RD14
279       .          .      DD14RE
          .          .          .
          .          .          .
285       .          .          .           .<-------  DD141S
284       .          .          .       DD141
          .          .          .           V
          .          .          .           V
286       .          .          .      D0514A
          .          .          .           .
          .          .          .           .
294       .      CPD14.......................
          .          .
          .          .
298       .          .-------->  DD142S
296       .      DD142
          .          V
          .          V
301       .     D14D15
          .          .
          .          .
308       .          .         D15
          .          .          .
          .          .          .
317    CPD15.......................
          .
          .
319       .        L01
          .          .
          .          .
330       .          .-------->    RL01
328       .     DL01RE
          .          V
          .          V
333       .     L01L03
          .          .
          .          .
341       .          .         L03
          .          .          .
          .          .          .
352       .          .          .-------->    RL03
350       .          .      DL03RE
          .          .          .
          .          .          .
355       .          .          .         L20
          .          .          .           .
          .          .          .           .
367       .          .          .           .-------->    RL20
365       .          .          .      DL20RE
          .          .          .           V
          .          .          .           V
370       .          .          .      L20L03
          .          .          .           .
          .          .          .           .
378       .      CPL03.......................
          .          .
          .          .
383       .          .-------->   DL03S
380       .     DL03SE
          .          V
          .          V
386       .     L03L04
          .          .
          .          .
393       .          .         L04
          .          .          .
          .          .          .
404       .          .          .-------->    RL04
402       .          .      DL04RE
          .          .          .
          .          .          .
407       .      CPL04............
          .          .
          .          .
411       .          .-------->   DL04S
409       .     DL04SE
          .          V
          .          V
414       .     L04L05
          .          .
          .          .
421       .          .         L05
          .          .          .
          .          .          .
434       .          .          .-------->    RL05
430       .          .      DL05RE
          .          .          .
          .          .          .
437       .      CPL05............
          .          .
          .          .
441       .          .-------->  DL051S
439       .      DL051
          .          .
          .          .
446       .          .-------->  DL052S
444       .      DL052
          .          V
          .          V
449       .     L05D06
          .          .
          .          .
456       .          .         L02
          .          .          .
          .          .          .
 67       .          .          .-------->    RL02
465       .          .      DL02RE
          .          .          V
          .          .          V
470       .          .      L02D06
          .          .          .
          .          .          .
478       .          .          .         D06
          .          .          .           .
          .          .          .           .
489       .          .          .           .-------->    RD06
```

```
487          .           .           .      DD06RE
             .           .           .           .
             .           .           .           .
492          .       CPD06.......................
             .           .
             .           .
497          .           .------->   DD06S
494          .      DD06SE
             .          V
             .          V
500          .      D06D07
             .           .
             .           .
508          .           .         D07
             .           .           .
             .           .           .
519          .           .           .------->    RD07
517          .           .      DD07RE
             .           .           .
             .           .           .
522          .       CPD07............
             .          V
             .          V
524          .      D07D02
             .           .
             .           .
531          .           .         D01
             .           .           .
             .           .           .
542          .           .           .------->    RD01
540          .           .      DD01RE
             .           .          V
             .           .          V
545          .           .      D01D02
             .           .           .
             .           .           .
552          .           .           .         D02
             .           .           .           .
             .           .           .           .
563          .           .           .           .------->    RD02
561          .           .           .      DD02RE
             .           .           .           .
             .           .           .           .
566          .       CPD02.......................
             .          V
             .          V
568          .      D02D10
             .           .
             .           .
574          .           .         D09
             .           .           .
             .           .           .
585          .           .           .------->    RD09
583          .           .      DD09RE
             .           .          V
             .           .          V
588          .           .      D09D10
             .           .           .
             .           .           .
596          .           .           .           .<-------   DD06S
595          .           .           .      DD06SE
             .           .           .           V
             .           .           .           V
597          .           .           .      D06D10
             .           .           .           .
             .           .           .           .
603          .           .           .           .         D10
             .           .           .           .           .
             .           .           .           .           .
618          .           .           .           .           .------->    RD10
613          .           .           .           .      DD10RE
             .           .           .           .           .
             .           .           .           .           .
621          .       CPD10.....................................
             .          V
             .          V
623          .      D10D19
             .           .
             .           .
630          .           .         L09
             .           .           .
             .           .           .
644          .           .           .------->    RL09
639          .           .      DL09RE
             .           .           .
             .           .           .
648          .           .           .           .<-------  DL051S
647          .           .           .       DL051
             .           .           .           V
             .           .           .           V
649          .           .           .      L05L09
             .           .           .           .
             .           .           .           .
656          .           .       CPL09............
             .           .           .
             .           .           .
660          .           .           .------->  DL091S
658          .           .       DL091
             .           .           .
             .           .           .
665          .           .           .------->  DL092S
663          .           .       DL092
             .           .          V
             .           .          V
668          .           .      L09D08
             .           .           .
             .           .           .
675          .           .           .         D08
             .           .           .           .
             .           .           .           .
689          .           .           .           .------->    RD08
684          .           .           .      DD08RE
             .           .           .           .
             .           .           .           .
693          .           .           .           .           .<-------  DL052S
692          .           .           .           .       DL052
             .           .           .           .          V
```

```
                                                V
694                                         L05D08
                                                .
                                                .
701                                 CPD08.......................
                                        V
                                        V
704                                 D08D16
                                        .
                                        .
711                                     .       L06
                                        .       .
                                        .       .
739                                     .       .------->   RL06
720                                     .   DL06RE
                                        .       .
                                        .       .
744                                     .       .------->   DL06S
742                                     .   DL06SE
                                        .       V
                                        .       V
747                                     .   L06L07
                                        .       .
                                        .       .
754                                     .       .       L07
                                        .       .       .
                                        .       .       .
776                                     .       .       .------->   RL07
763                                     .       .   DL07RE
                                        .       .       .
                                        .       .       .
780                                     .       .       .           .<-------   DL03S
779                                     .       .       .       DL03SE
                                        .       .       .           V
                                        .       .       .           V
781                                     .       .       .       L0307A
                                        .       .       .           V
                                        .       .       .           V
789                                     .       .       .       L0307B
                                        .       .       .           .
                                        .       .       .           .
796                                     .   CPL07.......................
                                        .       .
                                        .       .
800                                     .       .------->   DL07S
798                                     .   DL07SE
                                        .       V
                                        .       V
803                                     .   L07L08
                                        .       .
                                        .       .
810                                     .       .       L08
                                        .       .       .
                                        .       .       .
828                                     .       .       .------->   RL08
819                                     .       .   DL08RE
                                        .       .       .
                                        .       .       .
832                                     .       .       .           .<-------   DL04S
831                                     .       .       .       DL04SE
                                        .       .       .           V
                                        .       .       .           V
833                                     .       .       .       L04L08
                                        .       .       .           .
                                        .       .       .           .
840                                     .   CPL08.......................
                                        .       V
                                        .       V
842                                     .   L08L12
                                        .       .
                                        .       .
849                                     .       .       L10
                                        .       .       .
                                        .       .       .
866                                     .       .       .------->   RL10
859                                     .       .   DL10RE
                                        .       .       V
                                        .       .       V
869                                     .       .   L10L11
                                        .       .       .
                                        .       .       .
877                                     .       .       .           .<-------   DL06S
876                                     .       .       .       DL06SE
                                        .       .       .           V
                                        .       .       .           V
878                                     .       .       .       L06L11
                                        .       .       .           .
                                        .       .       .           .
885                                     .       .       .           .       L11
                                        .       .       .           .       .
                                        .       .       .           .       .
902                                     .       .       .           .       .------->   RL11
895                                     .       .       .           .   DL11RE
                                        .       .       .           .       .
                                        .       .       .           .       .
906                                     .       .       .           .       .           .<-------   DL07S
905                                     .       .       .           .       .       DL07SE
                                        .       .       .           .       .           V
                                        .       .       .           .       .           V
907                                     .       .       .           .       .       L07L11
                                        .       .       .           .       .           .
                                        .       .       .           .       .           .
915                                     .       .   CPL11.......................................
                                        .       .       .
                                        .       .       .
919                                     .       .       .------->   DL11S
917                                     .       .   DL11SE
                                        .       .       V
                                        .       .       V
922                                     .       .   L11L12
                                        .       .       .
                                        .       .       .
929                                     .       .       .       L12
                                        .       .       .       .
                                        .       .       .       .
941                                     .       .       .       .------->   RL12
938                                     .       .       .   DL12RE
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944                 CPL12.......................
948                          .-------> DL121S
946                 DL121
953                          .-------> DL122S
951                 DL122
                        V
                        V
956               L12L13
963                                L13
975                                                .<-------  DL091S
974                                          DL091
                                                 V
                                                 V
976                                        L09L13
983                 CPL13.......................
988                          .-------> DL131S
985                 DL131
994                          .-------> DL132S
991                 DL132
                        V
                        V
997               L13D16
1004                               D16
1015                                               .<-------  DL092S
1014                                         DL092
                                                 V
                                                 V
1016                                       L09D16
1023          CPD16...................................
1027                     .-------> DD161S
1025          DD161
1032                     .-------> DD162S
1030          DD162
                  V
                  V
1035        D16D18
1042                         D18
1053                         .------->   RD18
1051              DD18RE
1056          CPD18............
                  V
                  V
1058        D18D19
1065                         D17
1077                         .------->   RD17
1074              DD17RE
                        V
                        V
1080              D17D19
1088                               D19
1106                                           .------->   RD19
1097                                     DD19RE
1109      CPD19...................................
1113                .-------> DD191S
1111      DD191
1118                .-------> DD192S
1116      DD192
              V
              V
1121     D19D20
1128              D20
1142                     .------->   RD20
1137        DD20RE
1146                         .<-------  DD111S
1145              DD111
```

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                .          .          V
                .          .          V
1147            .          .      D11D20
                .          .          .
                .          .          .
1154            .      CPD20.......................
                .          V
                .          V
1156            .      D20D21
                .          .
                .          .
1163            .          .        D21
                .          .          .
                .          .          .
1176            .          .          .------->    RD21
1172            .          .      DD21RE
                .          .          .
                .          .          .
1180            .          .          .<-------  DD112S
1179            .          .       DD112
                .          .          V
                .          .          V
1181            .          .      D11D21
                .          .          .
                .          .          .
1189            .          .          .          .<-------  DD121S
1188            .          .          .       DD121
                .          .          .          V
                .          .          .          V
1190            .          .          .      D12D21
                .          .          .          .
                .          .          .          .
1197            .      CPD21...................................
                .          .
                .          .
1201            .          .------->  DD211S
1199            .      DD211
                .          .
                .          .
1206            .          .------->  DD212S
1204            .      DD212
                .          V
                .          V
1209            .      D21D22
                .          .
                .          .
1217            .          .        D22
                .          .          .
                .          .          .
1231            .          .          .------->    RD22
1226            .          .      DD22RE
                .          .          .
                .          .          .
1235            .          .          .<-------  DD122S
1234            .          .       DD122
                .          .          V
                .          .          V
1236            .          .      D12D22
                .          .          .
                .          .          .
1243            .      CPD22.......................
                .          V
                .          V
1245            .      D22D23
                .          .
                .          .
1252            .          .        D23
                .          .          .
                .          .          .
1270            .          .          .------->    RD23
1261            .          .      DD23RE
                .          .          .
                .          .          .
1274            .          .          .<-------  DD131S
1273            .          .       DD131
                .          .          V
                .          .          V
1275            .          .      D13D23
                .          .          .
                .          .          .
1282            .      CPD23.......................
                .          .
                .          .
1286            .          .------->  DD231S
1284            .      DD231
                .          .
                .          .
1291            .          .------->  DD232S
1289            .      DD232
                .          V
                .          V
1294            .      D23D24
                .          .
                .          .
1300            .          .        D24
                .          .          .
                .          .          .
1311            .          .          .------->    RD24
1309            .          .      DD24RE
                .          .          .
                .          .          .
1315            .          .          .<-------  DD132S
1314            .          .       DD132
                .          .          V
                .          .          V
1316            .          .      D13D24
                .          .          .
                .          .          .
1323            .      CPD24.......................
                .          .
                .          .
1327            .          .------->   DD24S
1325            .      DD24SE
                .          V
                .          V
1330            .      D24D25
                .          .
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1337          .          .         D25
              .          .           .
              .          .           .
1350          .          .           .-------->    RD25
1346          .          .      DD25RE
              .          .           .
              .          .           .
1353          .      CPD25............
              .          .
              .          .
1357          .          .-------->  DD251S
1355          .      DD251
              .          .
              .          .
1362          .          .-------->  DD252S
1360          .      DD252
              .          V
              .          V
1365          .     D2542A
              .          V
              .          V
1373          .     D2542B
              .          .
              .          .
1381          .          .         D37
              .          .           .
              .          .           .
1391          .          .           .<-------  DD232S
1390          .          .      DD232
              .          .           V
              .          .           V
1392          .          .     D23D37
              .          .           .
              .          .           .
1402          .          .           .           .<-------  DD251S
1401          .          .           .       DD251
              .          .           .           V
              .          .           .           V
1403          .          .           .     D25D37
              .          .           .           .
              .          .           .           .
1411          .          .           .           .           .<-------   DD24S
1410          .          .           .           .      DD24SE
              .          .           .           .           V
              .          .           .           .           V
1412          .          .           .           .      D24D37
              .          .           .           .           .
              .          .           .           .           .
1419          .          .      CPD37...................................
              .          .           .
              .          .           .
1423          .          .           .-------->   DD37S
1421          .          .      DD37SE
              .          .           V
              .          .           V
1426          .          .      D37D39
              .          .           .
              .          .           .
1433          .          .           .        D35
              .          .           .          .
              .          .           .          .
1443          .          .           .          .           .<-------  DD231S
1442          .          .           .       DD231
              .          .           .          V
              .          .           .          V
1444          .          .           .      D23D35
              .          .           .          .
              .          .           .          .
1451          .          .           .      CPD35............
              .          .           .          .
              .          .           .          .
1455          .          .           .          .-------->   DD35S
1453          .          .           .      DD35SE
              .          .           .          V
              .          .           .          V
1458          .          .           .      D35D38
              .          .           .          .
              .          .           .          .
1465          .          .           .          .         D38
              .          .           .          .           .
              .          .           .          .           .
1475          .          .           .          .           .           .<-------   DD37S
1474          .          .           .          .           .      DD37SE
              .          .           .          .           .           V
              .          .           .          .           .           V
1476          .          .           .          .           .      D37D38
              .          .           .          .           .           .
              .          .           .          .           .           .
1483          .          .           .      CPD38........................
              .          .           .          .
              .          .           .          .
1487          .          .           .          .-------->  DD381S
1485          .          .           .      DD381
              .          .           .          .
              .          .           .          .
1492          .          .           .          .-------->  DD382S
1490          .          .           .      DD382
              .          .           .          V
              .          .           .          V
1495          .          .           .     D38D39
              .          .           .          .
              .          .           .          .
1502          .          .           .          .         D39
              .          .           .          .           .
              .          .           .          .           .
1512          .          .           .          .           .           .<-------  DD252S
1511          .          .           .          .           .       DD252
              .          .           .          .           .           V
              .          .           .          .           .           V
1513          .          .           .          .           .      D25D39
              .          .           .          .           .           .
              .          .           .          .           .           .
1520          .          .      CPD39...................................
              .          .           V
              .          .           V
1522          .          .      D39D42
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                .          .          .
                .          .          .
 1529           .          .          .        D26
                .          .          .          .
                .          .          .          .
 1541           .          .          .          .-------->    RD26
 1539           .          .          .     DD26RE
                .          .          .          .
                .          .          .          .
  545           .          .          .          .           .<-------  DD142S
  544           .          .          .          .       DD142
                .          .          .          .          V
                .          .          .          .          V
 1546           .          .          .          .     D14D26
                .          .          .          .          .
                .          .          .          .          .
 1553           .          .          .      CPD26...........
                .          .          .          V
                .          .          .          V
 1555           .          .          .     D26D27
                .          .          .          .
                .          .          .          .
 1562           .          .          .          .        D27
                .          .          .          .          .
                .          .          .          .          .
 1574           .          .          .          .          .-------->    RD27
 1572           .          .          .          .     DD27RE
                .          .          .          .          .
                .          .          .          .          .
 1577           .          .          .      CPD27...........
                .          .          .          V
                .          .          .          V
 1579           .          .          .      SRD27
                .          .          .          V
                .          .          .          V
 1587           .          .          .     D27D42
                .          .          .          .
                .          .          .          .
 1594           .          .          .          .        D42
                .          .          .          .          .
                .          .          .          .          .
 1607           .          .          .          .          .-------->    RD42
 1604           .          .          .          .     DD42RE
                .          .          .          .          .
                .          .          .          .          .
 1610           .      CPD42.................................
                .          V
                .          V
 1612           .      SRD42
                .          .
                .          .
 1624           .          .        D53
                .          .          .
                .          .          .
 1635           .          .          .-------->    RD53
 1633           .          .     DD53RE
                .          .          .
                .          .          .
  638           .      CPD53...........
                .          V
                .          V
 1640           .      SRD53
                .          V
                .          V
 1652           .     D53D54
                .          .
                .          .
 1659           .          .        D43
                .          .          .
                .          .          .
 1670           .          .          .-------->    RD43
 1668           .          .     DD43RE
                .          .          V
                .          .          V
 1673           .          .     D43D54
                .          .          .
                .          .          .
 1680           .          .          .        D54
                .          .          .          .
                .          .          .          .
 1693           .          .          .          .-------->    RD54
 1690           .          .          .     DD54RE
                .          .          .          .
                .          .          .          .
 1696           .      CPD54......................
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1****************************************                                    ****************************************
*                                        *                                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *                                    *    U.S. ARMY CORPS OF ENGINEERS      *
*              JUN   1998                *                                    *    HYDROLOGIC ENGINEERING CENTER     *
*           VERSION 4.1                  *                                    *          609 SECOND STREET           *
*                                        *                                    *       DAVIS, CALIFORNIA 95616        *
*  RUN DATE   08FEB13  TIME  14:44:30    *                                    *           (916) 756-1104             *
*                                        *                                    *                                      *
****************************************                                    ****************************************
```

Flood Control District of Maricopa County
LEMWB_POST - Lower El Mirage Wash Basin Floodplain Delineation
Conditional Letter of Map Revision Post-Project Hydrology
100 YEAR
24 Hour Storm
Unit Hydrograph: S-Graph
1/29/2013

MODEL ORIGIN: LOOP 303/WHITE TANKS ADMPU
FCDMC CONTRACT 2007C031
BY HDR ENGINEERING (#79902)
EXISTING CONDITIONS -AUGUST 2009
MAJOR BASIN 01
HDR FILE NAME: EX-MB1.DAT
****

```
                                (CFS)
+     345.     12.25                    227.        120.         40.          17.
                            (INCHES)    0.076       0.161       0.161        0.161
                             (AC-FT)    113.        239.        239.         239.

                            CUMULATIVE AREA =   27.82 SQ MI

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

                          HYDROGRAPH AT STATION    CPD54
                         TRANSPOSITION AREA     10.0 SQ MI

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR       72-HR    166.58-HR
+   (CFS)        (HR)
                                (CFS)
+     319.     12.25                    191.         96.         32.          14.
                            (INCHES)    0.064       0.128       0.129        0.129
                             (AC-FT)     94.        190.        191.         191.

                            CUMULATIVE AREA =   27.82 SQ MI

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

                          HYDROGRAPH AT STATION    CPD54
                         TRANSPOSITION AREA     30.0 SQ MI

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR       72-HR    166.58-HR
+   (CFS)        (HR)
                                (CFS)
+     292.     12.25                    152.         76.         25.          11.
                            (INCHES)    0.051       0.101       0.102        0.102
                             (AC-FT)     76.        150.        151.         151.

                            CUMULATIVE AREA =   27.82 SQ MI

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


                          INTERPOLATED HYDROGRAPH AT    CPD54

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR       72-HR    166.58-HR
+   (CFS)        (HR)
                                (CFS)
+     294.     12.25                    155.         77.         26.          11.
                            (INCHES)    0.052       0.103       0.103        0.103
                             (AC-FT)     77.        153.        153.         153.

                            CUMULATIVE AREA =   27.82 SQ MI

1
                                    RUNOFF SUMMARY
                              FLOW IN CUBIC FEET PER SECOND
                          TIME IN HOURS,  AREA IN SQUARE MILES

                                     PEAK   TIME OF    AVERAGE FLOW FOR MAXIMUM PERIOD    BASIN    MAXIMUM    TIME OF
          OPERATION        STATION   FLOW    PEAK                                       AREA     STAGE     MAX STAGE
+                                                        6-HOUR     24-HOUR     72-HOUR
          HYDROGRAPH AT
+                            D03     931.   12.25         106.        33.         11.      0.72
          DIVERSION TO
+                           RD03     931.   12.25          96.        26.          9.      0.72
          HYDROGRAPH AT
+                          DD03RE    100.   12.83          21.         7.          2.      0.72
          ROUTED TO
+                          D03D04     61.   13.17          21.         7.          2.      0.72
          HYDROGRAPH AT
+                            D04    1115.   12.33         138.        43.         14.      0.89
          DIVERSION TO
+                           RD04    1082.   12.33          85.        24.          8.      0.89
          HYDROGRAPH AT
+                          DD04RE    831.   12.42          67.        19.          6.      0.89
          2 COMBINED AT
+                           CPD04    813.   12.42          86.        26.          9.      1.61
          DIVERSION TO
+                           DD04S    471.   12.42          25.         6.          2.      1.61
          HYDROGRAPH AT
+                          DD04SE    342.   12.42          62.        20.          7.      1.61
          ROUTED TO
+                          D04D05    288.   12.67          61.        20.          7.      1.61
          HYDROGRAPH AT
+                            D05     319.   12.17          34.        12.          4.      0.16
          DIVERSION TO
+                           RD05     134.   11.92          13.         4.          1.      0.16
          HYDROGRAPH AT
+                          DD05RE    319.   12.17          27.         8.          3.      0.16
          2 COMBINED AT
+                           CPD05    317.   12.67          85.        27.          9.      1.78
          ROUTED TO
+                          D05D14    255.   12.83          83.        27.          9.      1.78
          DIVERSION TO
+                          DD141S    133.   12.83          14.         3.          1.      1.78
          HYDROGRAPH AT
+                           DD141    122.   12.25          70.        24.          8.      1.78
```

+	ROUTED TO	D05D15	129.	12.50	69.	24.	8.	1.78
+	HYDROGRAPH AT	D11	758.	12.42	104.	32.	11.	0.66
+	DIVERSION TO	RD11	728.	12.33	58.	16.	5.	0.66
	HYDROGRAPH AT	DD11RE	698.	12.50	57.	16.	5.	0.66
+	DIVERSION TO	DD111S	574.	12.50	46.	13.	4.	0.66
+	HYDROGRAPH AT	DD111	124.	12.50	11.	3.	1.	0.66
+	DIVERSION TO	DD112S	45.	12.50	6.	2.	1.	0.66
+	HYDROGRAPH AT	DD112	79.	12.50	5.	1.	0.	0.66
+	ROUTED TO	D11D12	46.	12.67	5.	1.	0.	0.66
+	HYDROGRAPH AT	D12	236.	12.58	52.	16.	5.	0.35
+	DIVERSION TO	RD12	236.	12.58	28.	8.	3.	0.35
+	HYDROGRAPH AT	DD12RE	209.	12.83	30.	8.	3.	0.35
+	2 COMBINED AT	CPD12	244.	12.83	34.	10.	3.	1.01
+	DIVERSION TO	DD121S	105.	12.83	12.	3.	1.	1.01
+	HYDROGRAPH AT	DD121	139.	12.83	22.	6.	2.	1.01
+	DIVERSION TO	DD122S	58.	12.83	10.	3.	1.	1.01
+	HYDROGRAPH AT	DD122	81.	12.83	12.	3.	1.	1.01
+	ROUTED TO	D12D13	47.	13.67	11.	3.	1.	1.01
+	HYDROGRAPH AT	D13	1106.	12.25	120.	35.	12.	1.03
	DIVERSION TO	RD13	495.	12.08	30.	9.	3.	1.03
+	HYDROGRAPH AT	DD13RE	1106.	12.25	99.	26.	9.	1.03
+	HYDROGRAPH AT	DD04SE	471.	12.42	25.	6.	2.	1.61
+	ROUTED TO	D04D13	156.	13.50	24.	6.	2.	1.61
+	3 COMBINED AT	CPD13	1106.	12.25	134.	36.	12.	3.65
+	DIVERSION TO	DD131S	195.	12.25	12.	3.	1.	3.65
+	HYDROGRAPH AT	DD131	902.	12.25	120.	32.	11.	3.65
+	DIVERSION TO	DD132S	383.	12.25	36.	10.	3.	3.65
+	HYDROGRAPH AT	DD132	518.	12.25	84.	22.	7.	3.65
+	ROUTED TO	D13D14	440.	12.67	82.	22.	7.	3.65
+	HYDROGRAPH AT	D14	1065.	12.42	144.	45.	15.	0.94
+	DIVERSION TO	RD14	1065.	12.42	117.	32.	11.	0.94
+	HYDROGRAPH AT	DD14RE	384.	12.75	42.	13.	4.	0.94
+	HYDROGRAPH AT	DD141	133.	12.83	14.	3.	1.	1.78
+	ROUTED TO	D0514A	107.	13.08	14.	3.	1.	1.78
+	3 COMBINED AT	CPD14	822.	12.75	135.	38.	13.	4.76
	DIVERSION TO	DD142S	521.	12.75	111.	32.	11.	4.76
+	HYDROGRAPH AT	DD142	301.	12.75	25.	7.	2.	4.76
+	ROUTED TO	D14D15	218.	12.83	24.	7.	2.	4.76
+	HYDROGRAPH AT	D15	412.	12.17	43.	14.	5.	0.22

+	3 COMBINED AT	CPD15	406.	12.17	129.	43.	15.	4.98
+	HYDROGRAPH AT	L01	262.	12.17	24.	7.	2.	0.16
+	DIVERSION TO	RL01	262.	12.17	18.	5.	2.	0.16
+	HYDROGRAPH AT	DL01RE	120.	12.33	8.	2.	1.	0.16
+	ROUTED TO	L01L03	48.	12.75	8.	2.	1.	0.16
+	HYDROGRAPH AT	L03	935.	12.33	113.	34.	11.	0.79
+	DIVERSION TO	RL03	935.	12.33	113.	33.	11.	0.79
+	HYDROGRAPH AT	DL03RE	2.	19.83	1.	0.	0.	0.79
+	HYDROGRAPH AT	L20	381.	12.42	46.	13.	4.	0.35
+	DIVERSION TO	RL20	381.	12.42	41.	11.	4.	0.35
+	HYDROGRAPH AT	DL20RE	59.	12.92	8.	2.	1.	0.35
+	ROUTED TO	L20L03	29.	13.42	8.	2.	1.	0.35
+	3 COMBINED AT	CPL03	44.	12.75	14.	5.	2.	1.29
+	DIVERSION TO	DL03S	37.	12.75	14.	5.	2.	1.29
+	HYDROGRAPH AT	DL03SE	8.	13.17	1.	0.	0.	1.29
+	ROUTED TO	L03L04	8.	13.42	1.	0.	0.	1.29
+	HYDROGRAPH AT	L04	646.	12.42	80.	24.	8.	0.63
+	DIVERSION TO	RL04	646.	12.42	79.	22.	7.	0.63
+	HYDROGRAPH AT	DL04RE	5.	18.42	4.	1.	0.	0.63
+	2 COMBINED AT	CPL04	6.	13.42	4.	1.	0.	1.93
+	DIVERSION TO	DL04S	0.	0.00	0.	0.	0.	1.93
+	HYDROGRAPH AT	DL04SE	6.	13.42	4.	1.	0.	1.93
+	ROUTED TO	L04L05	4.	20.42	4.	1.	0.	1.93
+	HYDROGRAPH AT	L05	641.	12.33	82.	26.	9.	0.49
+	DIVERSION TO	RL05	641.	12.33	61.	17.	6.	0.49
+	HYDROGRAPH AT	DL05RE	313.	12.58	31.	9.	3.	0.49
+	2 COMBINED AT	CPL05	310.	12.58	31.	10.	3.	2.41
+	DIVERSION TO	DL051S	3.	12.50	0.	0.	0.	2.41
+	HYDROGRAPH AT	DL051	307.	12.58	31.	10.	3.	2.41
+	DIVERSION TO	DL052S	8.	12.58	1.	0.	0.	2.41
+	HYDROGRAPH AT	DL052	299.	12.58	30.	10.	3.	2.41
+	ROUTED TO	L05D06	215.	12.67	29.	10.	3.	2.41
+	HYDROGRAPH AT	L02	1670.	12.58	270.	83.	28.	1.88
+	DIVERSION TO	RL02	1670.	12.58	219.	59.	20.	1.88
+	HYDROGRAPH AT	DL02RE	684.	13.00	78.	24.	8.	1.88
+	ROUTED TO	L02D06	351.	13.50	73.	24.	8.	1.88
+	HYDROGRAPH AT	D06	603.	12.33	75.	23.	8.	0.46
+	DIVERSION TO	RD06	603.	12.33	60.	16.	5.	0.46
+	HYDROGRAPH AT	DD06RE	245.	12.67	22.	6.	2.	0.46

+	3 COMBINED AT	CPD06	453.	12.67	118.	39.	13.	4.76
+	DIVERSION TO	DD06S	83.	12.67	3.	1.	0.	4.76
+	HYDROGRAPH AT	DD06SE	370.	12.67	116.	38.	13.	4.76
	ROUTED TO	D06D07	418.	12.83	115.	38.	13.	4.76
+	HYDROGRAPH AT	D07	896.	12.50	130.	39.	13.	0.89
+	DIVERSION TO	RD07	896.	12.50	116.	31.	10.	0.89
+	HYDROGRAPH AT	DD07RE	177.	13.08	25.	8.	3.	0.89
+	2 COMBINED AT	CPD07	438.	13.58	138.	46.	15.	5.64
+	ROUTED TO	D07D02	389.	13.75	136.	46.	15.	5.64
+	HYDROGRAPH AT	D01	1299.	12.58	205.	61.	20.	1.56
+	DIVERSION TO	RD01	1299.	12.58	184.	49.	16.	1.56
+	HYDROGRAPH AT	DD01RE	246.	13.25	38.	12.	4.	1.56
+	ROUTED TO	D01D02	93.	14.75	34.	12.	4.	1.56
+	HYDROGRAPH AT	D02	1701.	12.50	259.	78.	26.	1.84
+	DIVERSION TO	RD02	1701.	12.50	237.	63.	21.	1.84
+	HYDROGRAPH AT	DD02RE	251.	13.25	45.	15.	5.	1.84
+	3 COMBINED AT	CPD02	514.	13.25	205.	71.	24.	9.05
+	ROUTED TO	D02D10	473.	13.92	203.	71.	24.	9.05
+	HYDROGRAPH AT	D09	352.	12.33	42.	13.	4.	0.26
	DIVERSION TO	RD09	352.	12.33	29.	8.	3.	0.26
+	HYDROGRAPH AT	DD09RE	220.	12.50	17.	5.	2.	0.26
+	ROUTED TO	D09D10	159.	12.58	16.	5.	2.	0.26
+	HYDROGRAPH AT	DD06SE	83.	12.67	3.	1.	0.	4.76
+	ROUTED TO	D06D10	16.	13.75	3.	1.	0.	4.76
+	HYDROGRAPH AT	D10	756.	12.33	97.	30.	10.	0.63
+	DIVERSION TO	RD10	756.	12.33	70.	19.	6.	0.63
+	HYDROGRAPH AT	DD10RE	468.	12.58	37.	11.	4.	0.63
+	4 COMBINED AT	CPD10	606.	12.58	245.	86.	29.	9.95
+	ROUTED TO	D10D19	494.	14.08	242.	86.	29.	9.95
+	HYDROGRAPH AT	L09	562.	12.42	73.	22.	7.	0.49
+	DIVERSION TO	RL09	562.	12.42	72.	20.	7.	0.49
+	HYDROGRAPH AT	DL09RE	7.	17.25	5.	2.	1.	0.49
+	HYDROGRAPH AT	DL051	3.	12.50	0.	0.	0.	2.41
+	ROUTED TO	L05L09	1.	13.75	0.	0.	0.	2.41
+	2 COMBINED AT	CPL09	7.	17.25	5.	2.	1.	2.90
	DIVERSION TO	DL091S	1.	17.25	1.	0.	0.	2.90
+	HYDROGRAPH AT	DL091	6.	17.25	4.	1.	0.	2.90
+	DIVERSION TO	DL092S	0.	0.00	0.	0.	0.	2.90
+	HYDROGRAPH AT	DL092	6.	17.25	4.	1.	0.	2.90

+	ROUTED TO	L09D08	5.	18.92	4.	1.	0.	2.90
+	HYDROGRAPH AT	D08	456.	12.58	74.	22.	7.	0.51
+	DIVERSION TO	RD08	456.	12.58	48.	13.	4.	0.51
+	HYDROGRAPH AT	DD08RE	345.	12.75	33.	9.	3.	0.51
+	HYDROGRAPH AT	DL052	8.	12.58	1.	0.	0.	2.41
+	ROUTED TO	L05D08	2.	14.17	1.	0.	0.	2.41
+	3 COMBINED AT	CPD08	345.	12.75	36.	11.	4.	3.41
+	ROUTED TO	D08D16	158.	13.67	32.	11.	4.	3.41
+	HYDROGRAPH AT	L06	848.	12.33	91.	27.	9.	0.70
+	DIVERSION TO	RL06	848.	12.33	91.	27.	9.	0.70
+	HYDROGRAPH AT	DL06RE	0.	0.00	0.	0.	0.	0.70
+	DIVERSION TO	DL06S	0.	0.00	0.	0.	0.	0.70
+	HYDROGRAPH AT	DL06SE	0.	0.00	0.	0.	0.	0.70
+	ROUTED TO	L06L07	0.	0.00	0.	0.	0.	0.70
+	HYDROGRAPH AT	L07	756.	12.33	86.	26.	9.	0.63
+	DIVERSION TO	RL07	756.	12.33	85.	23.	8.	0.63
+	HYDROGRAPH AT	DL07RE	9.	15.75	6.	2.	1.	0.63
+	HYDROGRAPH AT	DL03SE	37.	12.75	14.	5.	2.	1.29
+	ROUTED TO	L0307A	34.	13.67	13.	5.	2.	1.29
+	ROUTED TO	L0307B	33.	14.00	13.	5.	2.	1.29
+	3 COMBINED AT	CPL07	35.	14.00	18.	7.	2.	2.62
+	DIVERSION TO	DL07S	7.	14.00	4.	1.	0.	2.62
+	HYDROGRAPH AT	DL07SE	28.	14.00	14.	5.	2.	2.62
+	ROUTED TO	L07L08	27.	14.08	14.	5.	2.	2.62
+	HYDROGRAPH AT	L08	599.	12.42	81.	24.	8.	0.49
+	DIVERSION TO	RL08	599.	12.42	75.	20.	7.	0.49
+	HYDROGRAPH AT	DL08RE	63.	13.08	13.	4.	1.	0.49
+	HYDROGRAPH AT	DL04SE	0.	0.00	0.	0.	0.	1.93
+	ROUTED TO	L04L08	0.	0.00	0.	0.	0.	1.93
+	3 COMBINED AT	CPL08	62.	13.17	26.	9.	3.	3.74
+	ROUTED TO	L08L12	47.	14.33	26.	9.	3.	3.74
+	HYDROGRAPH AT	L10	816.	12.42	100.	29.	10.	0.84
+	DIVERSION TO	RL10	816.	12.42	65.	17.	6.	0.84
+	HYDROGRAPH AT	DL10RE	627.	12.58	42.	12.	4.	0.84
+	ROUTED TO	L10L11	406.	12.83	41.	12.	4.	0.84
+	HYDROGRAPH AT	DL06SE	0.	0.00	0.	0.	0.	0.70
+	ROUTED TO	L06L11	0.	0.00	0.	0.	0.	0.70
+	HYDROGRAPH AT	L11	722.	12.33	92.	28.	9.	0.62
+	DIVERSION TO	RL11	722.	12.33	88.	24.	8.	0.62

+	HYDROGRAPH AT	DL11RE	25.	13.83	12.	4.	1.	0.62
+	HYDROGRAPH AT	DL07SE	7.	14.00	4.	1.	0.	2.62
+	ROUTED TO	L07L11	6.	15.33	3.	1.	0.	2.62
	4 COMBINED AT	CPL11	402.	12.83	55.	17.	6.	4.09
+	DIVERSION TO	DL11S	2.	12.83	0.	0.	0.	4.09
+	HYDROGRAPH AT	DL11SE	394.	12.83	53.	17.	6.	4.09
+	ROUTED TO	L11L12	315.	13.00	53.	17.	6.	4.09
+	HYDROGRAPH AT	L12	296.	12.58	41.	11.	4.	0.36
+	DIVERSION TO	RL12	237.	12.42	17.	5.	2.	0.36
+	HYDROGRAPH AT	DL12RE	296.	12.58	26.	7.	2.	0.36
+	3 COMBINED AT	CPL12	432.	13.00	99.	33.	11.	5.56
+	DIVERSION TO	DL121S	76.	13.00	17.	6.	2.	5.56
+	HYDROGRAPH AT	DL121	356.	13.00	81.	27.	9.	5.56
+	DIVERSION TO	DL122S	4.	13.00	1.	0.	0.	5.56
+	HYDROGRAPH AT	DL122	352.	13.00	80.	27.	9.	5.56
+	ROUTED TO	L12L13	285.	13.25	78.	27.	9.	5.56
+	HYDROGRAPH AT	L13	174.	12.83	39.	10.	3.	0.48
+	HYDROGRAPH AT	DL091	1.	17.25	1.	0.	0.	2.90
+	ROUTED TO	L09L13	1.	22.42	0.	0.	0.	2.90
	3 COMBINED AT	CPL13	410.	13.25	111.	36.	12.	7.02
+	DIVERSION TO	DL131S	393.	13.25	109.	36.	12.	7.02
+	HYDROGRAPH AT	DL131	17.	13.17	3.	1.	0.	7.02
+	DIVERSION TO	DL132S	11.	13.25	2.	1.	0.	7.02
+	HYDROGRAPH AT	DL132	6.	13.17	1.	0.	0.	7.02
+	ROUTED TO	L13D16	4.	14.58	1.	0.	0.	7.02
+	HYDROGRAPH AT	D16	197.	12.75	43.	12.	4.	0.52
+	HYDROGRAPH AT	DL092	0.	0.00	0.	0.	0.	2.90
+	ROUTED TO	L09D16	0.	0.00	0.	0.	0.	2.90
+	4 COMBINED AT	CPD16	226.	13.58	71.	22.	7.	8.05
+	DIVERSION TO	DD161S	182.	13.58	56.	17.	6.	8.05
+	HYDROGRAPH AT	DD161	43.	13.58	15.	5.	2.	8.05
+	DIVERSION TO	DD162S	17.	13.58	7.	2.	1.	8.05
+	HYDROGRAPH AT	DD162	26.	13.58	8.	3.	1.	8.05
+	ROUTED TO	D16D18	24.	13.83	8.	3.	1.	8.05
+	HYDROGRAPH AT	D18	312.	12.17	28.	8.	3.	0.20
	DIVERSION TO	RD18	312.	12.17	28.	8.	3.	0.20
+	HYDROGRAPH AT	DD18RE	1.	22.00	0.	0.	0.	0.20
+	2 COMBINED AT	CPD18	24.	13.83	8.	3.	1.	8.25
+	ROUTED TO	D18D19	23.	14.00	8.	3.	1.	8.25

+	HYDROGRAPH AT	D17	293.	12.17	25.	8.	3.	0.20
+	DIVERSION TO	RD17	293.	12.17	25.	8.	3.	0.20
+	HYDROGRAPH AT	DD17RE	0.	0.00	0.	0.	0.	0.20
+	ROUTED TO	D17D19	0.	0.00	0.	0.	0.	0.20
+	HYDROGRAPH AT	D19	492.	12.33	66.	20.	7.	0.51
+	DIVERSION TO	RD19	492.	12.33	63.	17.	6.	0.51
+	HYDROGRAPH AT	DD19RE	26.	13.67	9.	3.	1.	0.51
+	4 COMBINED AT	CPD19	475.	14.00	244.	87.	29.	16.49
+	DIVERSION TO	DD191S	216.	14.00	124.	45.	15.	16.49
+	HYDROGRAPH AT	DD191	144.	14.00	91.	34.	11.	16.49
+	DIVERSION TO	DD192S	60.	14.50	42.	17.	6.	16.49
+	HYDROGRAPH AT	DD192	86.	14.00	48.	17.	6.	16.49
+	ROUTED TO	D19D20	86.	14.17	48.	17.	6.	16.49
+	HYDROGRAPH AT	D20	573.	12.33	69.	21.	7.	0.50
+	DIVERSION TO	RD20	573.	12.33	68.	19.	6.	0.50
+	HYDROGRAPH AT	DD20RE	7.	16.92	5.	2.	1.	0.50
+	HYDROGRAPH AT	DD111	574.	12.50	46.	13.	4.	0.66
+	ROUTED TO	D11D20	303.	12.92	43.	13.	4.	0.66
+	3 COMBINED AT	CPD20	300.	13.00	85.	29.	10.	17.65
+	ROUTED TO	D20D21	223.	13.42	82.	29.	10.	17.65
+	HYDROGRAPH AT	D21	548.	12.33	70.	22.	7.	0.50
+	DIVERSION TO	RD21	548.	12.33	70.	20.	7.	0.50
+	HYDROGRAPH AT	DD21RE	6.	18.42	5.	2.	1.	0.50
+	HYDROGRAPH AT	DD112	45.	12.50	6.	2.	1.	0.66
+	ROUTED TO	D11D21	20.	13.33	5.	2.	1.	0.66
+	HYDROGRAPH AT	DD121	105.	12.83	12.	3.	1.	1.01
+	ROUTED TO	D12D21	82.	13.00	12.	3.	1.	1.01
+	4 COMBINED AT	CPD21	280.	13.42	95.	34.	11.	18.49
+	DIVERSION TO	DD211S	192.	13.42	70.	25.	8.	18.49
+	HYDROGRAPH AT	DD211	88.	13.42	25.	9.	3.	18.49
+	DIVERSION TO	DD212S	48.	13.42	18.	7.	2.	18.49
+	HYDROGRAPH AT	DD212	40.	13.42	6.	2.	1.	18.49
+	ROUTED TO	D21D22	27.	13.75	6.	2.	1.	18.49
+	HYDROGRAPH AT	D22	547.	12.33	65.	20.	7.	0.45
+	DIVERSION TO	RD22	547.	12.33	65.	19.	6.	0.45
+	HYDROGRAPH AT	DD22RE	5.	19.58	3.	1.	0.	0.45
+	HYDROGRAPH AT	DD122	58.	12.83	10.	3.	1.	1.01
+	ROUTED TO	D12D22	43.	13.42	10.	3.	1.	1.01
+	3 COMBINED AT	CPD22	60.	13.67	15.	5.	2.	18.94

+	ROUTED TO	D22D23	55.	13.83	15.	5.	2.	18.94
+	HYDROGRAPH AT	D23	539.	12.42	73.	22.	7.	0.54
+	DIVERSION TO	RD23	539.	12.42	68.	18.	6.	0.54
	HYDROGRAPH AT	DD23RE	34.	13.42	10.	4.	1.	0.54
+	HYDROGRAPH AT	DD131	195.	12.25	12.	3.	1.	3.65
+	ROUTED TO	D13D23	121.	12.50	12.	3.	1.	3.65
+	3 COMBINED AT	CPD23	94.	12.58	27.	9.	3.	22.13
+	DIVERSION TO	DD231S	9.	12.58	3.	1.	0.	22.13
+	HYDROGRAPH AT	DD231	85.	12.58	24.	8.	3.	22.13
+	DIVERSION TO	DD232S	10.	12.58	3.	1.	0.	22.13
+	HYDROGRAPH AT	DD232	75.	12.58	22.	7.	2.	22.13
+	ROUTED TO	D23D24	57.	12.75	21.	7.	2.	22.13
+	HYDROGRAPH AT	D24	521.	12.42	68.	21.	7.	0.49
+	DIVERSION TO	RD24	521.	12.42	68.	20.	7.	0.49
+	HYDROGRAPH AT	DD24RE	2.	18.17	1.	0.	0.	0.49
+	HYDROGRAPH AT	DD132	383.	12.25	36.	10.	3.	3.65
+	ROUTED TO	D13D24	287.	12.50	36.	10.	3.	3.65
+	3 COMBINED AT	CPD24	284.	12.58	52.	16.	5.	22.62
+	DIVERSION TO	DD24S	60.	12.58	5.	1.	0.	22.62
	HYDROGRAPH AT	DD24SE	224.	12.58	47.	14.	5.	22.62
+	ROUTED TO	D24D25	198.	12.75	46.	14.	5.	22.62
+	HYDROGRAPH AT	D25	557.	12.33	70.	21.	7.	0.50
+	DIVERSION TO	RD25	557.	12.33	68.	19.	6.	0.50
+	HYDROGRAPH AT	DD25RE	12.	14.67	7.	3.	1.	0.50
+	2 COMBINED AT	CPD25	198.	12.75	47.	16.	5.	23.12
+	DIVERSION TO	DD251S	185.	12.75	46.	15.	5.	23.12
+	HYDROGRAPH AT	DD251	12.	12.75	1.	0.	0.	23.12
+	DIVERSION TO	DD252S	12.	12.75	1.	0.	0.	23.12
+	HYDROGRAPH AT	DD252	0.	0.00	0.	0.	0.	23.12
+	ROUTED TO	D2542A	0.	0.00	0.	0.	0.	23.12
+	ROUTED TO	D2542B	0.	0.00	0.	0.	0.	23.12
+	HYDROGRAPH AT	D37	113.	12.50	16.	4.	1.	0.20
+	HYDROGRAPH AT	DD232	10.	12.58	3.	1.	0.	22.13
+	ROUTED TO	D23D37	5.	15.58	3.	1.	0.	22.13
+	HYDROGRAPH AT	DD251	185.	12.75	46.	15.	5.	23.12
	ROUTED TO	D25D37	156.	13.25	45.	15.	5.	23.12
+	HYDROGRAPH AT	DD24SE	60.	12.58	5.	1.	0.	22.62
+	ROUTED TO	D24D37	43.	13.00	5.	1.	0.	22.62
+	4 COMBINED AT	CPD37	214.	13.08	65.	21.	7.	23.32

+	DIVERSION TO	DD37S	0.	0.00	0.	0.	0.	23.32
+	HYDROGRAPH AT	DD37SE	214.	13.08	65.	21.	7.	23.32
+	ROUTED TO	D37D39	160.	13.42	62.	21.	7.	23.32
+	HYDROGRAPH AT	D35	114.	12.58	18.	4.	1.	0.25
+	HYDROGRAPH AT	DD231	9.	12.58	3.	1.	0.	22.13
+	ROUTED TO	D23D35	4.	15.00	3.	1.	0.	22.13
+	2 COMBINED AT	CPD35	114.	12.58	21.	6.	2.	22.38
+	DIVERSION TO	DD35S	17.	12.58	3.	1.	0.	22.38
+	HYDROGRAPH AT	DD35SE	85.	12.58	15.	4.	1.	22.38
+	ROUTED TO	D35D38	79.	12.83	15.	4.	1.	22.38
+	HYDROGRAPH AT	D38	58.	12.50	8.	2.	1.	0.12
+	HYDROGRAPH AT	DD37SE	0.	0.00	0.	0.	0.	23.32
+	ROUTED TO	D37D38	0.	0.00	0.	0.	0.	23.32
+	3 COMBINED AT	CPD38	120.	12.67	22.	6.	2.	23.69
+	DIVERSION TO	DD381S	105.	12.67	19.	5.	2.	23.69
+	HYDROGRAPH AT	DD381	14.	12.67	3.	1.	0.	23.69
+	DIVERSION TO	DD382S	10.	12.67	2.	0.	0.	23.69
+	HYDROGRAPH AT	DD382	4.	12.67	1.	0.	0.	23.69
+	ROUTED TO	D38D39	3.	14.33	1.	0.	0.	23.69
+	HYDROGRAPH AT	D39	108.	12.50	15.	4.	1.	0.18
+	HYDROGRAPH AT	DD252	12.	12.75	1.	0.	0.	23.12
+	ROUTED TO	D25D39	8.	13.00	1.	0.	0.	23.12
+	4 COMBINED AT	CPD39	173.	13.42	76.	25.	8.	23.88
+	ROUTED TO	D39D42	168.	13.67	75.	25.	8.	23.88
+	HYDROGRAPH AT	D26	960.	12.25	99.	30.	10.	0.64
+	DIVERSION TO	RD26	960.	12.25	96.	26.	9.	0.64
+	HYDROGRAPH AT	DD26RE	18.	14.33	10.	4.	1.	0.64
+	HYDROGRAPH AT	DD142	521.	12.75	111.	32.	11.	4.76
+	ROUTED TO	D14D26	422.	12.92	109.	32.	11.	4.76
+	2 COMBINED AT	CPD26	424.	12.92	117.	35.	12.	5.40
+	ROUTED TO	D26D27	414.	13.00	117.	35.	12.	5.40
+	HYDROGRAPH AT	D27	485.	12.17	51.	16.	5.	0.32
+	DIVERSION TO	RD27	122.	11.92	13.	4.	1.	0.32
+	HYDROGRAPH AT	DD27RE	485.	12.17	44.	12.	4.	0.32
+	2 COMBINED AT	CPD27	477.	12.17	156.	47.	16.	5.72
+	ROUTED TO	SRD27	477.	12.17	156.	47.	16.	5.72
+	ROUTED TO	D27D42	402.	13.33	152.	47.	16.	5.72
+	HYDROGRAPH AT	D42	1278.	12.33	147.	45.	15.	0.99
+	DIVERSION TO	RD42	1278.	12.33	135.	36.	12.	0.99

	HYDROGRAPH AT							
+		DD42RE	112.	12.92	26.	9.	3.	0.99
	4 COMBINED AT							
+		CPD42	480.	13.42	212.	69.	23.	26.93
	ROUTED TO							
+		SRD42	473.	13.58	191.	69.	23.	26.93
	HYDROGRAPH AT							
		D53	176.	12.17	12.	3.	1.	0.12
	DIVERSION TO							
+		RD53	176.	12.17	12.	3.	1.	0.12
	HYDROGRAPH AT							
+		DD53RE	0.	0.00	0.	0.	0.	0.12
	2 COMBINED AT							
+		CPD53	473.	13.58	191.	69.	23.	27.05
	ROUTED TO							
+		SRD53	163.	15.83	148.	69.	23.	27.05
	ROUTED TO							
+		D53D54	163.	16.17	147.	69.	23.	27.05
	HYDROGRAPH AT							
+		D43	628.	12.33	73.	22.	7.	0.50
	DIVERSION TO							
+		RD43	628.	12.33	66.	18.	6.	0.50
	HYDROGRAPH AT							
+		DD43RE	56.	12.92	14.	5.	2.	0.50
	ROUTED TO							
+		D43D54	29.	14.08	13.	5.	2.	0.50
	HYDROGRAPH AT							
+		D54	327.	12.25	28.	8.	3.	0.27
	DIVERSION TO							
+		RD54	81.	12.00	5.	2.	1.	0.27
	HYDROGRAPH AT							
+		DD54RE	327.	12.25	25.	6.	2.	0.27
	3 COMBINED AT							
+		CPD54	294.	12.25	155.	77.	26.	27.82

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION SRD27
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1142.00	0.00	0.00
STORAGE	0.	0.	0.
OUTFLOW	52.	0.	0.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1147.30	1147.30	0.	573.	166.58	13.00	0.00

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1142.00	0.00	0.00
STORAGE	0.	0.	0.
OUTFLOW	52.	0.	0.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1146.50	1146.50	0.	476.	166.58	12.25	0.00

PLAN 3 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1142.00	0.00	0.00
STORAGE	0.	0.	0.
OUTFLOW	52.	0.	0.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1146.25	1146.25	0.	445.	166.58	12.25	0.00

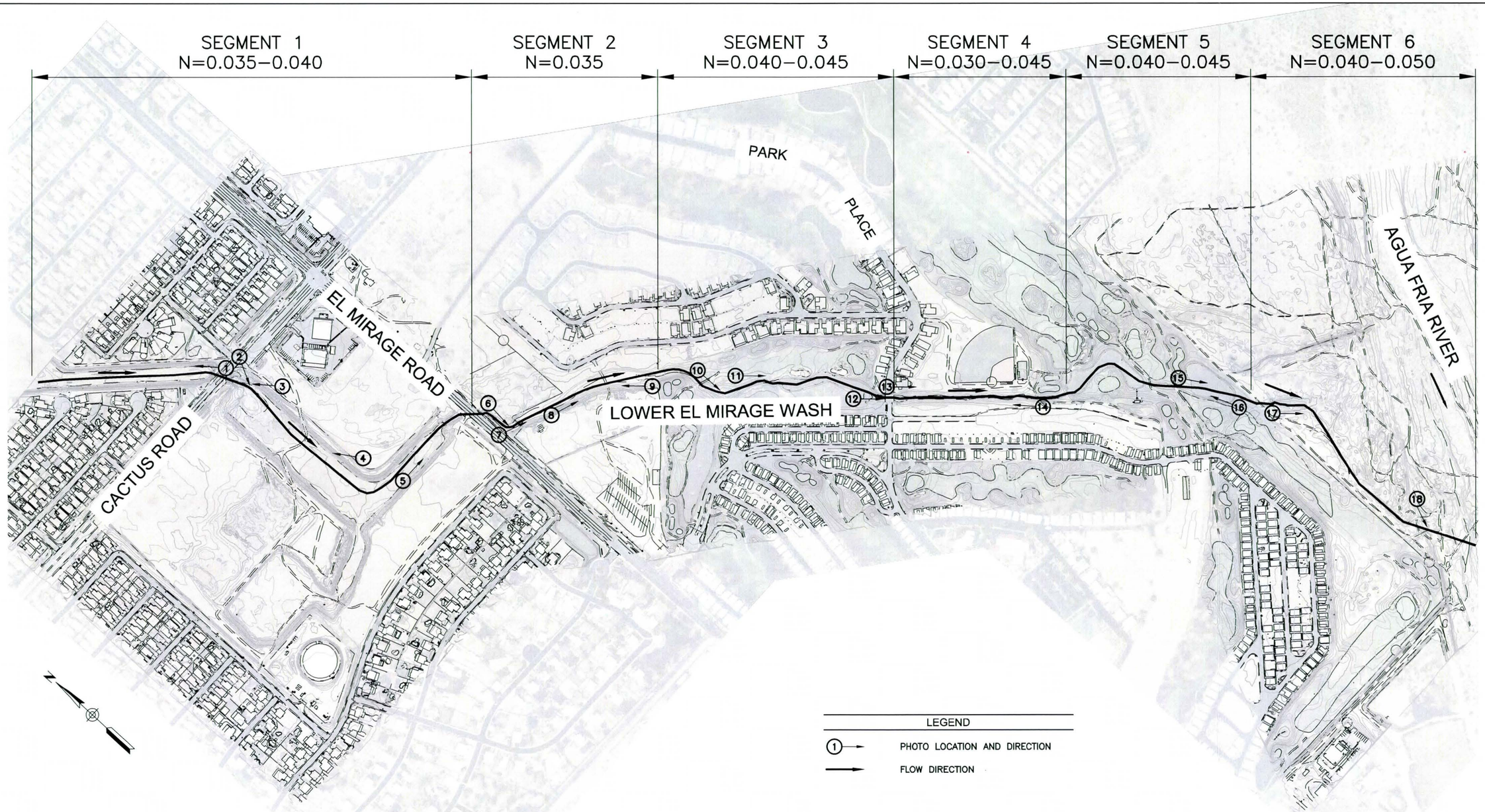
*** NORMAL END OF HEC-1 ***

APPENDIX E

HYDRAULIC ANALYSIS SUPPORTING DOCUMENTATION

APPENDIX E.1

ROUGHNESS COEFFICIENT ESTIMATION



LEGEND

PHOTO LOCATION AND DIRECTION

FLOW DIRECTION

NOTE:
LANDSCAPE VALUES ARE APPLIED ON A CROSS SECTION BY CROSS SECTION BASIS. AN N VALUE OF 0.016 IS APPLIED AT PAVED ROADWAY CROSSINGS.

0' 250' 500' 1000'

SCALE: 1"=500'

Flood Control District of Maricopa County

Dibble Engineering

TITLE

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
LOWER EL MIRAGE WASH BASIN

Int. of Cactus Road & El Mirage Road | El Mirage, Arizona

SUBMITTAL

issued for: rev date

KEY MAP

PROJECT NUMBER
101120.01

Fig F.1

Existing
Conditions
Manning's N

FILE:J:\2011\101122_01-_Mirage_Wash\CAD\Exhibits\Mannings Exhibit.dwg DATE:Oct 18, 2012 TIME:7:56 PM (by:geoff.stone)

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Lower El Mirage Wash
Stream: El Mirage Wash
Location: Segment 1
Notes: Existing Wash Between Cactus Culvert and El Mirage Culvert

Channel Conditions		Manning's n Adjustment		Left Overbank	Left Bank (Earth)	Left Bank (Rip-Rap)	Channel	Right Bank (Earth)	Right Bank (Rip-Rap)	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032							
	Coarse Sand		.026 - .035	0.030	0.026		0.026	0.026		0.030
	Gravel		.028 - .035							
	Cobble		.030 - .050							
	Boulder		.040 - .070							
Degree of Irregularity	Smooth	n_1	0							
	Minor		.001 - .005	0.001	0.003		0.001	0.003		0.001
	Moderate		.006 - .010							
	Severe		.011 - .020							
Effects of Obstruction	Negligible	n_2	.000 - .004	0.001	0.001		0.001	0.001		0.001
	Minor		.005 - .015							
	Appreciable		.020 - .030							
	Severe		.040 - .060							
Vegetation	Small	n_3	.002 - .010	0.002			0.006			0.002
	Medium		.010 - .025		0.010			0.010		
	Large		.025 - .050							
	Very Large		.050 - .100							
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000		0.000	0.000		0.000
	Occ. Alt.		.001 - .005							
	Freq. Alt.		.010 - .015							
Subtotal				0.034	0.040		0.034	0.040		0.034
Degree of Meandering	Minor	m	1	1	1		1	1		1
	Appreciable		1.15							
	Severe		1.3							
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.034	0.040	0.000	0.034	0.040	0.000	0.034
Manning's n Value Used				**0.035**	**0.040**	**0.000**	**0.035**	**0.040**	**0.000**	**0.035**

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Lower El Mirage Wash
Stream: El Mirage Wash
Location: Segment 2
Notes: Existing Wash Between El Mirage Culvert and Golf Course

Channel Conditions		Manning's n Adjustment		Left Overbank	Left Bank (Earth)	Left Bank (Rip-Rap)	Channel	Right Bank (Earth)	Right Bank (Rip-Rap)	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032							
	Coarse Sand		.026 - .035	0.030			0.026			0.030
	Gravel		.028 - .035							
	Cobble		.030 - .050							
	Boulder		.040 - .070							
Degree of Irregularity	Smooth	n_1	0							
	Minor		.001 - .005	0.001			0.001			0.001
	Moderate		.006 - .010							
	Severe		.011 - .020							
Effects of Obstruction	Negligible	n_2	.000 - .004	0.001			0.001			0.001
	Minor		.005 - .015							
	Appreciable		.020 - .030							
	Severe		.040 - .060							
Vegetation	Small	n_3	.002 - .010	0.002			0.006			0.002
	Medium		.010 - .025							
	Large		.025 - .050							
	Very Large		.050 - .100							
Variations in Channel Cross Section	Gradual	n_4	0	0.000			0.000			0.000
	Occ. Alt.		.001 - .005							
	Freq. Alt.		.010 - .015							
Subtotal				0.034			0.034			0.034
Degree of Meandering	Minor	m	1	1			1			1
	Appreciable		1.15							
	Severe		1.3							
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.034	0.000	0.000	0.034	0.000	0.000	0.034
Manning's n Value Used				**0.035**	**0.000**	**0.000**	**0.035**	**0.000**	**0.000**	**0.035**

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Lower El Mirage Wash
Stream: El Mirage Wash
Location: Segment 3
Notes: Existing Wash along western portion of Golf Course

Channel Conditions		Manning's n Adjustment		Left Overbank	Left Bank (Earth)	Left Bank (Rip-Rap)	Channel	Right Bank (Earth)	Right Bank (Rip-Rap)	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.025			0.025			0.025
	Coarse Sand		.026 - .035							
	Gravel		.028 - .035							
	Cobble		.030 - .050							
	Boulder		.040 - .070							
Degree of Irregularity	Smooth	n_1	0	0.000			0.000			0.000
	Minor		.001 - .005							
	Moderate		.006 - .010							
	Severe		.011 - .020							
Effects of Obstruction	Negligible	n_2	.000 - .004	0.000						0.000
	Minor		.005 - .015				0.005			
	Appreciable		.020 - .030							
	Severe		.040 - .060							
Vegetation	Small	n_3	.002 - .010	0.010			0.010			0.010
	Medium		.010 - .025							
	Large		.025 - .050							
	Very Large		.050 - .100							
Variations in Channel Cross Section	Gradual	n_4	0	0.000			0.000			0.000
	Occ. Alt.		.001 - .005							
	Freq. Alt.		.010 - .015							
Subtotal				0.035			0.040			0.035
Degree of Meandering	Minor	m	1							
	Appreciable		1.15	1.15			1.15			1.15
	Severe		1.3							
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.040	0.000	0.000	0.046	0.000	0.000	0.040
Manning's n Value Used				**0.040**	**0.000**	**0.000**	**0.045**	**0.000**	**0.000**	**0.040**

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Lower El Mirage Wash
Stream: El Mirage Wash
Location: Segement 4
Notes: Existing Wash along riparion improvement area

Channel Conditions		Manning's n Adjustment		Left Overbank	Left Bank (Earth)	Left Bank (Rip-Rap)	Channel	Right Bank (Earth)	Right Bank (Rip-Rap)	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.025			0.025			0.025
	Coarse Sand		.026 - .035							
	Gravel		.028 - .035							
	Cobble		.030 - .050							
	Boulder		.040 - .070							
Degree of Irregularity	Smooth	n_1	0							
	Minor		.001 - .005	0.001			0.001			0.001
	Moderate		.006 - .010							
	Severe		.011 - .020							
Effects of Obstruction	Negligible	n_2	.000 - .004	0.001						0.001
	Minor		.005 - .015				0.010			
	Appreciable		.020 - .030							
	Severe		.040 - .060							
Vegetation	Small	n_3	.002 - .010	0.005			0.010			0.005
	Medium		.010 - .025							
	Large		.025 - .050							
	Very Large		.050 - .100							
Variations in Channel Cross Section	Gradual	n_4	0	0.000			0.000			0.000
	Occ. Alt.		.001 - .005							
	Freq. Alt.		.010 - .015							
Subtotal				0.032			0.046			0.032
Degree of Meandering	Minor	m	1	1			1			1
	Appreciable		1.15							
	Severe		1.3							
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.032	0.000	0.000	0.046	0.000	0.000	0.032
Manning's n Value Used				**0.030**	**0.000**	**0.000**	**0.045**	**0.000**	**0.000**	**0.030**

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Lower El Mirage Wash
Stream: El Mirage Wash
Location: Segment 5
Notes: Existing Wash along eastern portion of Golf Course

Channel Conditions		Manning's n Adjustment		Left Overbank	Left Bank (Earth)	Left Bank (Rip-Rap)	Channel	Right Bank (Earth)	Right Bank (Rip-Rap)	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.025			0.025			0.025
	Coarse Sand		.026 - .035							
	Gravel		.028 - .035							
	Cobble		.030 - .050							
	Boulder		.040 - .070							
Degree of Irregularity	Smooth	n_1	0	0.000			0.000			0.000
	Minor		.001 - .005							
	Moderate		.006 - .010							
	Severe		.011 - .020							
Effects of Obstruction	Negligible	n_2	.000 - .004	0.000						0.000
	Minor		.005 - .015				0.005			
	Appreciable		.020 - .030							
	Severe		.040 - .060							
Vegetation	Small	n_3	.002 - .010	0.010			0.010			0.010
	Medium		.010 - .025							
	Large		.025 - .050							
	Very Large		.050 - .100							
Variations in Channel Cross Section	Gradual	n_4	0	0.000			0.000			0.000
	Occ. Alt.		.001 - .005							
	Freq. Alt.		.010 - .015							
Subtotal				0.035			0.040			0.035
Degree of Meandering	Minor	m	1							
	Appreciable		1.15	1.15			1.15			1.15
	Severe		1.3							
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.040	0.000	0.000	0.046	0.000	0.000	0.040
Manning's n Value Used				**0.040**	**0.000**	**0.000**	**0.045**	**0.000**	**0.000**	**0.040**

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Lower El Mirage Wash
Stream: El Mirage Wash
Location: Segment 6
Notes: Existing Wash between Golf Course and Agua Fria Thalwag

Channel Conditions		Manning's n Adjustment		Left Overbank	Left Bank (DG)	Left Bank (Rip-Rap)	Channel	Right Bank (DG)	Right Bank (Rip-Rap)	Right Overbank (Golf Course)
Channel Material	Firm Soil	n_b	.025 - .032							0.025
	Coarse Sand		.026 - .035	0.030			0.026			
	Gravel		.028 - .035							
	Cobble		.030 - .050							
	Boulder		.040 - .070							
Degree of Irregularity	Smooth	n_1	0							
	Minor		.001 - .005							0.001
	Moderate		.006 - .010	0.008			0.008			
	Severe		.011 - .020							
Effects of Obstruction	Negligible	n_2	.000 - .004	0.001			0.001			0.001
	Minor		.005 - .015							
	Appreciable		.020 - .030							
	Severe		.040 - .060							
Vegetation	Small	n_3	.002 - .010							0.010
	Medium		.010 - .025	0.010			0.010			
	Large		.025 - .050							
	Very Large		.050 - .100							
Variations in Channel Cross Section	Gradual	n_4	0	0.000			0.000			
	Occ. Alt.		.001 - .005							0.003
	Freq. Alt.		.010 - .015							
Subtotal				0.049			0.045			0.040
Degree of Meandering	Minor	m	1	1			1			1
	Appreciable		1.15							
	Severe		1.3							
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.049			0.045			0.040
Manning's n Value Used				**0.050**	**0.000**	**0.000**	**0.045**	**0.000**	**0.000**	**0.040**

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Lower El Mirage Wash
Stream: El Mirage Wash
Location: North-South Segment of Proposed Basin
Notes: Surface Treatment as Proposed by Landscape Architect

Channel Conditions		Manning's n Adjustment		Left Overbank	Left Bank (Earth)	Left Bank (Rip-Rap)	Channel	Right Bank (Earth)	Right Bank (Rip-Rap)	Right Overbank (Golf Course)
Channel Material	Firm Soil	n_b	.025 - .032		0.025		0.025	0.025		
	Coarse Sand		.026 - .035	0.030						0.030
	Gravel		.028 - .035							
	Cobble		.030 - .050							
	Boulder		.040 - .070							
Degree of Irregularity	Smooth	n_1	0							
	Minor		.001 - .005	0.001	0.001		0.001	0.001		0.001
	Moderate		.006 - .010							
	Severe		.011 - .020							
Effects of Obstruction	Negligible	n_2	.000 - .004	0.001			0.000			0.001
	Minor		.005 - .015		0.010			0.010		
	Appreciable		.020 - .030							
	Severe		.040 - .060							
Vegetation	Small	n_3	.002 - .010	0.002						0.002
	Medium		.010 - .025		0.010		0.020	0.010		
	Large		.025 - .050							
	Very Large		.050 - .100							
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000		0.000	0.000		0.000
	Occ. Alt.		.001 - .005							
	Freq. Alt.		.010 - .015							
Subtotal				0.034	0.046		0.046	0.046		0.034
Degree of Meandering	Minor	m	1	1	1		1	1		1
	Appreciable		1.15							
	Severe		1.3							
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.034	0.046	0.000	0.046	0.046	0.000	0.034
Manning's n Value Used				**0.035**	**0.045**	**0.000**	**0.045**	**0.045**	**0.000**	**0.035**

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Lower El Mirage Wash
Stream: El Mirage Wash
Location: East-West Segment of Proposed Basin
Notes: Surface Treatment as Proposed by Landscape Architect

Channel Conditions		Manning's n Adjustment		Left Overbank	Left Bank (Earth)	Left Bank (Rip-Rap)	Channel	Right Bank (Earth)	Right Bank (Rip-Rap)	Right Overbank (Golf Course)
Channel Material	Firm Soil	n_b	.025 - .032		0.025		0.025	0.025		
	Coarse Sand		.026 - .035	0.030						0.030
	Gravel		.028 - .035							
	Cobble		.030 - .050							
	Boulder		.040 - .070							
Degree of Irregularity	Smooth	n_1	0							
	Minor		.001 - .005	0.001	0.001		0.001	0.001		0.001
	Moderate		.006 - .010							
	Severe		.011 - .020							
Effects of Obstruction	Negligible	n_2	.000 - .004	0.001						0.001
	Minor		.005 - .015		0.010		0.010	0.010		
	Appreciable		.020 - .030							
	Severe		.040 - .060							
Vegetation	Small	n_3	.002 - .010	0.002						0.002
	Medium		.010 - .025		0.010		0.020	0.010		
	Large		.025 - .050							
	Very Large		.050 - .100							
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000		0.000	0.000		0.000
	Occ. Alt.		.001 - .005							
	Freq. Alt.		.010 - .015							
Subtotal				0.034	0.046		0.056	0.046		0.034
Degree of Meandering	Minor	m	1	1	1		1	1		1
	Appreciable		1.15							
	Severe		1.3							
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.034	0.046	0.000	0.056	0.046	0.000	0.034
Manning's n Value Used				**0.035**	**0.045**	**0.000**	**0.055**	**0.045**	**0.000**	**0.035**

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Lower El Mirage Wash
Stream: El Mirage Wash
Location: Proposed Unlined Channel Downstream of El Mirage Road
Notes:

Channel Conditions		Manning's n Adjustment		Left Overbank	Left Bank (Earth)	Left Bank (Rip-Rap)	Channel	Right Bank (Earth)	Right Bank (Rip-Rap)	Right Overbank (Golf Course)
Channel Material	Firm Soil	n_b	.025 - .032		0.025		0.025	0.025		
	Coarse Sand		.026 - .035	0.030						0.030
	Gravel		.028 - .035							
	Cobble		.030 - .050							
	Boulder		.040 - .070							
Degree of Irregularity	Smooth	n_1	0		0.000		0.000	0.000		
	Minor		.001 - .005	0.001						0.001
	Moderate		.006 - .010							
	Severe		.011 - .020							
Effects of Obstruction	Negligible	n_2	.000 - .004	0.001	0.001		0.001	0.001		0.001
	Minor		.005 - .015							
	Appreciable		.020 - .030							
	Severe		.040 - .060							
Vegetation	Small	n_3	.002 - .010	0.002	0.005		0.005	0.005		0.002
	Medium		.010 - .025							
	Large		.025 - .050							
	Very Large		.050 - .100							
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000		0.000	0.000		0.000
	Occ. Alt.		.001 - .005							
	Freq. Alt.		.010 - .015							
Subtotal				0.034	0.031		0.031	0.031		0.034
Degree of Meandering	Minor	m	1	1	1		1	1		1
	Appreciable		1.15							
	Severe		1.3							
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.034	0.031	0.000	0.031	0.031	0.000	0.034
Manning's n Value Used				**0.035**	**0.030**	**0.000**	**0.030**	**0.030**	**0.000**	**0.035**

Segment 1 - Photo #1

Segment 1 - Photo #2

Segment 1 - Photo #3

Segment 1 - Photo #4

Segment 1 - Photo #6

Segment 2 - Photo #7

Segment 2 - Photo #8

Segment 2 - Photo #9

Segment 2 - Photo #10

Segment 3 - Photo #11

Segment 3 - Photo #12

Segment 3 - Photo #13

Segment 4 - Photo #14

Segment 4 - Photo #15

Segment 5 - Photo #16

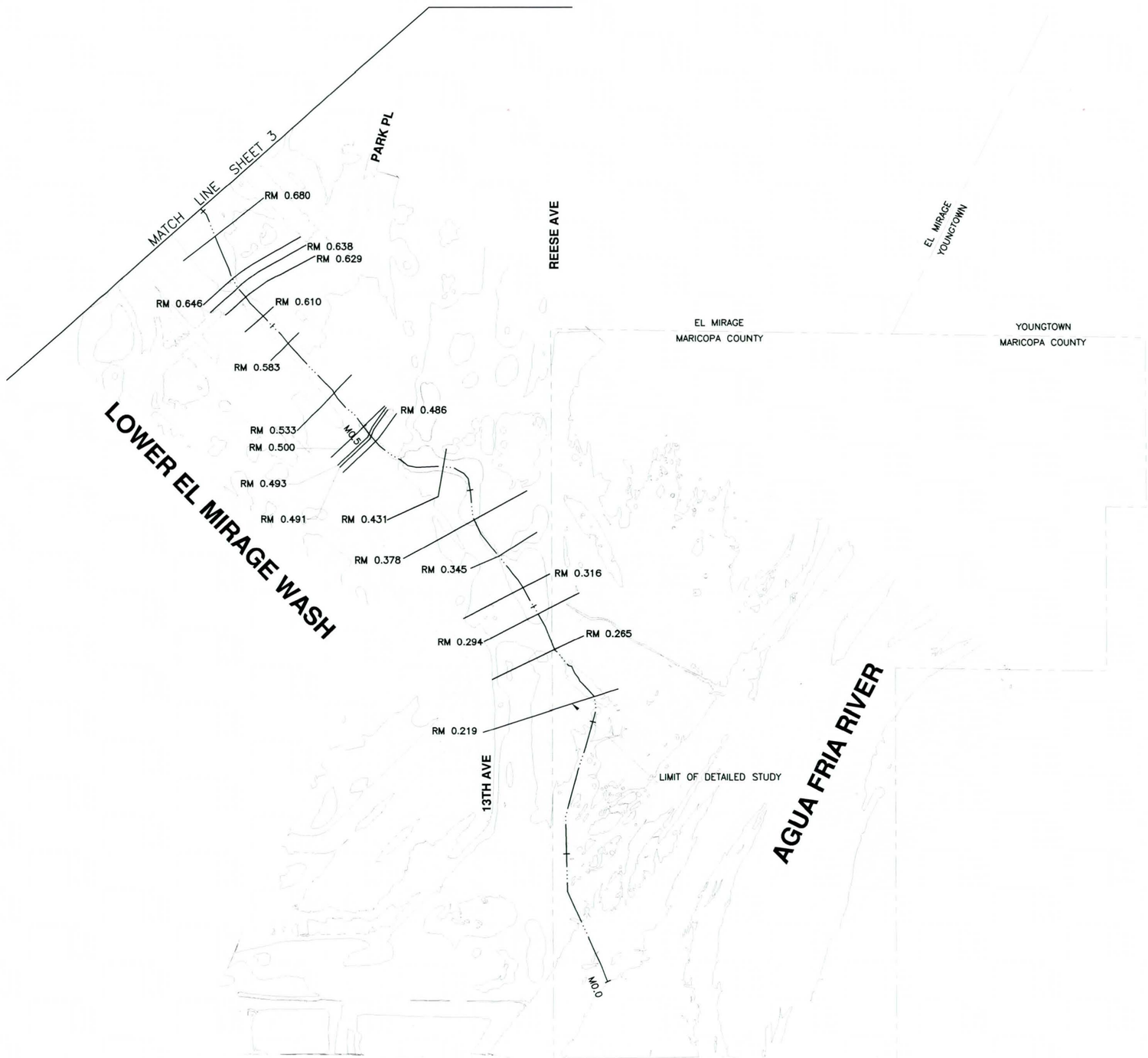
Segment 5 - Photo #17

Segment 6 - Photo #18

Segment 6 - Photo #19

APPENDIX E.2

PRE-PROJECT CONDITIONS HEC-RAS OUTPUT



LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M 0.0 M 0.50
CROSS SECTION	RM 0.100 Q = CFS FP= 1888.7 FW= 1889.7
ELEVATION REFERENCE MARK	ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.
CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 1.87'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
99	1118.24	BRASS CAP IN HANDHOLE AT INTERSECTION OF CACTUS ROAD AND EL MIRAGE ROAD
101	1109.75	BRASS CAP IN HANDHOLE AT INTERSECTION OF VARNEY ROAD AND EL MIRAGE ROAD

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

NO.	REVISION	BY	DATE

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PRE-PROJECT CROSS SECTION LAYOUT

LOWER EL MIRAGE WASH

FCD CONTRACT NO 2012C018

Dibble Engineering

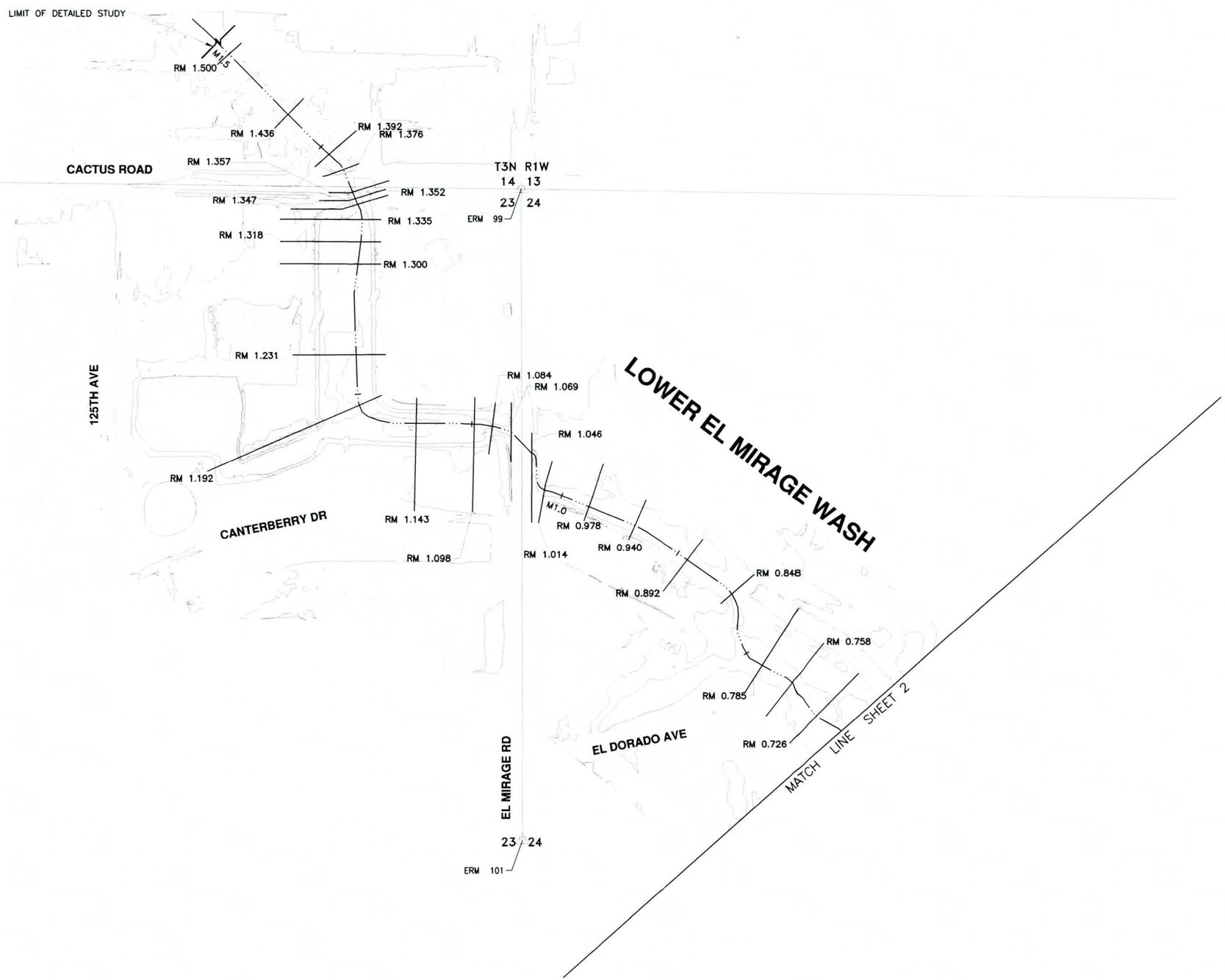
	BY	DATE
DESIGN	CWL	
DESIGN CHK	JEF	
PLAN	CWL	
PLAN CHK	JEF	

SHEET 1 OF 2

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 40' HORIZONTAL SCALE AND 1' CONTOUR INTERVALS.

AERIAL MAPPING PERFORMED BY COOPER AERIAL MAPPING COMPANY. APRIL, 2012 FLIGHT DATE.

GROUND CONTROL SURVEY DATA PROVIDED BY DIBBLE ENGINEERING.



LEGEND

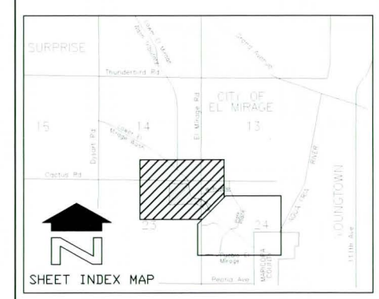
100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M1.0 M1.5
CROSS SECTION	RM 0.100 Q = CFS FP= 1888.7 FW= 1889.7
ELEVATION REFERENCE MARK	ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988. CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 1.87'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
99	1118.24	BRASS CAP IN HANDHOLE AT INTERSECTION OF CACTUS ROAD AND EL MIRAGE ROAD
101	1109.75	BRASS CAP IN HANDHOLE AT INTERSECTION OF VARNEY ROAD AND EL MIRAGE ROAD

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



SHEET INDEX MAP

NO	REVISION	BY	DATE

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PRE-PROJECT CROSS SECTION LAYOUT

LOWER EL MIRAGE WASH

FCD CONTRACT NO 2012C018

Dibble Engineering

	BY	DATE
DESIGN	JWL	01/29/13
DESIGN CHK	GFP	01/29/13
PLANS	DTS	01/29/13
PLANS CHK	DEP	01/29/13

SHEET 2 OF 2

```
                    HEC-RAS Version 4.1.0 Jan 2010
                     U.S. Army Corps of Engineers
                    Hydrologic Engineering Center
                          609 Second Street
                          Davis, California

          X     X  XXXXXX    XXXX        XXXX       XX      XXXX
          X     X  X        X    X       X   X     X  X    X
          X     X  X        X            X   X    X    X   X
          XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
          X     X  X        X            X  X     X    X        X
          X     X  X        X    X       X   X    X    X        X
          X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Lower El Mirage Wash Basin-Pre Project
Project File : LEMWB_PreProj.prj
Run Date and Time: 2/22/2013 10:27:35 AM

Project in English units

Project Description:
Lower El Mirage Wash Basin, Project FCDMC 2012C018. Existing/Pre project conditions model. Completed in November 2012.

RAS model is prepared by
Dibble Engineering in support of a Conditional Letter of Map Revision for the Lower El Mirage Wash Basin and downstream wash.

Reach Description:
From a
point approx. 1160' upstream of the confluence with the Agua Fria River (River Mile 0.219) to a point approximately 500 feet north and 1,200 feet west of the intersection of Cactus Road and El Mirage Road (River Mile 1.514), a distance of 1.295 river miles.

The Cross-section data were generated by Civil3d. The mapped hydraulic base line represents the 10,000-station point of the HEC-RAS model.

Topographic mapping is based on 2012 aerial photography and supplied by Cooper Aerial Mapping Co. at 1"=40' scale and with 1' contour interval. Aerial data was collected in April of 2012. This mapping is based on the project benchmark NGS Monument 4GA2, and uses the North American Vertical Datum of 1988 (NAVD88). Field reconnaissance performed on September 18, 2012.

scharge data is from the Lower El Mirage Wash Basin HEC-1 model. The sis of hydrology for the watershed contributing to this project is the Loop 303/White Tanks ADMPU Area Hydrologic Analysis, Existing Conditions, without CIP, completed in 2009. The model represents a 100-year return period and a 24-hour duration. Several revisions were made to the ADMPU model in order to correct inaccuracies and to model the existing condition for the Lower El Mirage Wash Basin project. See the project Technical Data Notebook for additional information.

Hydrologic concentration points are noted in cross-section descriptions using the corresponding HEC-1 ID's. The flow rates have been rounded to the nearest 10 cubic feet per second (cfs). Flow rates obtained from HEC-1 are applied at the downstream end of the relevant sub-basin.

River Mile (RM) stationing is based upon the estimated tie in point with downstream receiving waters. This point represents RM 0.000. The assumed starting WS Elevation is based upon normal depth in the study wash.

Horizontal and Vertical Coordinate Basis for this project is as follows:

Horizontal--Arizona State Plane, Central Region, NAD 1983
Vertical--NAVD
1988

PLAN DATA

Plan Title: Lower El Mirage Wash Basin-Pre Project
Plan File : j:\2011\101122_01-Lower_El_Mirage_Wash\Design Notebook\Calculations and Analysis\Drainage\HEC-RAS\Existing Conditions Model\LEMWB_PreProj.p01

Geometry Title: Lower El Mirage Wash Basin-Pre Project
Geometry File : j:\2011\101122_01-Lower_El_Mirage_Wash\Design Notebook\Calculations and Analysis\Drainage\HEC-RAS\Existing Conditions Model\LEMWB_PreProj.g01

Flow Title : Lower El Mirage Wash Basin-Pre Project
Flow File : j:\2011\101122_01-Lower_El_Mirage_Wash\Design Notebook\Calculations and Analysis\Drainage\HEC-RAS\Existing Conditions Model\LEMWB_PreProj.f01

Plan Summary Information:

Number of:	Cross Sections =	43	Multiple Openings =	0
	Culverts =	3	Inline Structures =	1
	Bridges =	1	Lateral Structures =	0

Computational Information

Water surface calculation tolerance	=	0.01
Critical depth calculation tolerance	=	0.01
Maximum number of iterations	=	20
Maximum difference tolerance	=	0.3
Flow tolerance factor	=	0.001

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

Encroachment Data
Equal Conveyance = True
Left Offset = 0
Right Offset = 0

River = Lr El Mirage Wsh Reach = Lr El Mirage Wsh

RS	Profile	Method	Value1	Value2
1.500	PF 2	1	9933.0410062.86	
1.436	PF 2	1	9920.3310069.35	
1.392	PF 2	1	9938.6810075.97	
1.376	PF 2	1	9873.1310099.48	
1.357	PF 2	1	9870.6710097.02	
1.352	PF 2	1	9870.6710146.76	
1.347	PF 2	1	9870.67 10270.6	
1.335	PF 2	1	9945.510246.01	
1.318	PF 2	1	9934.2110213.95	
1.300	PF 2	1	9914.9410191.51	
1.231	PF 2	1	9899.1510172.38	
1.192	PF 2	1	9901.3210670.77	
1.143	PF 2	1	9896.4210357.04	
1.098	PF 2	1	9890.910356.61	
1.084	PF 2	1	9946.2110028.62	
1.069	PF 2	1	998110028.17	
1.046	PF 2	1	9981.6810016.06	
1.014	PF 2	1	9977.1110029.81	
0.978	PF 2	1	9951.1310029.46	
0.940	PF 2	1	9949.5210027.72	
0.892	PF 2	1	9947.5810052.62	
0.848	PF 2	1	9967.7110037.17	
0.785	PF 2	1	9963.1610037.65	
0.758	PF 2	1	9947.1210059.47	
0.726	PF 2	1	9964.1210039.29	
0.680	PF 2	1	9970.1310027.22	
0.646	PF 2	1	9982.9 10015.3	
0.638	PF 2	1	9978.9910022.38	
0.629	PF 2	1	9979.810021.09	
0.610	PF 2	1	9954.07 10041.7	
0.583	PF 2	1	9967.1810032.58	
0.533	PF 2	1	9958.1710036.28	
0.500	PF 2	1	9935.0510038.01	
0.493	PF 2	1	9929.7810029.99	
0.491	PF 2	1	9922.8610023.07	
0.486	PF 2	1	9958.9310024.94	
0.431	PF 2	1	9950.2810047.02	
0.378	PF 2	1	9961.1210051.86	
0.345	PF 2	1		
0.316	PF 2	1	9895.8810052.68	
0.294	PF 2	1	9944.2610050.53	
0.265	PF 2	1	9993.2110097.49	
0.219	PF 2	1	9945.3110327.11	

FLOW DATA

Flow Title: Lower El Mirage Wash Basin-Pre Project
Flow File : j:\2011\101122_01-Lower_El_Mirage_Wash\Design Notebook\Calculations and Analysis\Drainage\HEC-RAS\Existing Conditions Model\LEMWB_PreProj.f01

Flow Data (cfs)

River	Reach	RS	PF 1	PF 2
Lr El Mirage Wsh	Lr El Mirage Wsh	1.500	480	480
Lr El Mirage Wsh	Lr El Mirage Wsh	1.376	470	470
Lr El Mirage Wsh	Lr El Mirage Wsh	1.084	190	190
Lr El Mirage Wsh	Lr El Mirage Wsh	0.431	290	290

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Lr El Mirage Wsh	Lr El Mirage Wsh	PF 1	Normal S = 0.0055	Normal S = 0.003

Changes in WS and EG

River	Reach	RS	Profile	Type	Value
Lr El Mirage Wsh	Lr El Mirage Wsh	1.046	PF 1	K Loss	.85
Lr El Mirage Wsh	Lr El Mirage Wsh	1.014	PF 1	K Loss	.85

GEOMETRY DATA

Geometry Title: Lower El Mirage Wash Basin-Pre Project
Geometry File : j:\2011\101122_01-Lower_El_Mirage_Wash\Design Notebook\Calculations and Analysis\Drainage\HEC-RAS\Existing Conditions Model\LEMWB_PreProj.g01

CROSS SECTION

RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh RS: 1.500

INPUT
Description: BEGIN DETAILED STUDY

Q=480 cfs (CPD42, 24 hr)
Station Elevation Data num= 33

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9933.04  1118.4 9936.86 1118.17 9942.15 1117.29 9946.54 1116.48 9954.49 1114.05
 9956.17 1113.55 9958.79  1112.9 9966.38 1111.03 9971.18 1110.91  9978.3 1110.69
 9986.85 1110.65 9987.48 1110.65 9988.85  1110.6 9994.92 1110.32  9997.4 1110.14
  9999.4 1109.98   10000 1110.0310002.46 1110.2310002.69 1110.2410003.46 1110.26
10011.64 1110.2410017.91 1110.3410027.55 1110.5710031.41 1110.6810039.55 1112.53
10043.98 1114.1810045.37 1114.6910045.93 1114.9110052.01 1117.1110056.96 1118.67
10058.14 1119.0310059.33  1119.110062.86  1119.4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9933.04     .04 9966.38    .03510031.41     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9933.0410062.86          336.537  341.38 346.306             .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.436

INPUT
Description:
Station Elevation Data    num=      59
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9910.09 1119.77 9910.42 1119.75  9911.2 1119.78 9914.19  1119.9 9919.95 1119.93
 9920.24 1119.39 9920.33  1119.2  9921.6 1119.24 9923.64 1119.25 9925.47 1119.11
  9933.5 1118.45    9938 1117.51 9938.51 1117.34 9943.81 1115.67 9952.52  1113.1
 9953.31 1112.87 9955.67 1112.05 9957.95 1111.25 9958.23 1111.15 9963.66 1110.26
 9969.19 1109.82 9970.66 1109.76 9975.29 1109.76 9982.87 1109.81 9990.89 1109.79
 9991.19 1109.79  9991.3 1109.78 9997.93 1109.22   10000 1109.1710004.91 1109.01
10007.12 1109.2710008.15 1109.2510008.62 1109.2310011.03 1109.1710011.72 1109.17
10014.07 1109.2310014.23 1109.2410018.13 1109.55 10019.5  1109.710024.39 1109.67
10025.24 1109.6410031.23 1110.42 10031.9  1110.510032.14 1110.5410032.94  1110.7
10042.64 1112.5310047.16 1113.8110050.59  1114.910052.46 1115.58 10054.8    1116
10057.07 1117.3610059.07 1117.98 10060.8 1118.3310068.32 1119.5810069.35 1119.71
10072.27 1119.7110075.35 1119.6510076.25 1119.6610076.92 1119.66

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9910.09    .035 9920.33     .04 9970.66    .03510025.24     .0410069.35    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9920.3310069.35          235.985  230.52 225.121             .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.392

INPUT
Description:
Station Elevation Data    num=      81
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9854.42 1118.44 9854.96 1118.42    9856 1118.38  9858.5 1118.19 9858.79 1118.17
 9858.88 1118.16 9860.42  1118.1 9861.25 1118.02  9862.3 1117.95 9864.84 1117.64
 9865.25  1117.6  9868.3 1117.48 9868.92 1117.45 9869.61 1117.42 9874.96 1117.25
 9883.84 1116.79 9885.62 1116.74 9888.53 1116.68 9890.74 1116.58 9891.12 1116.55
 9901.51 1116.26 9911.07 1115.97 9912.75 1115.91 9913.75 1115.91 9914.11  1115.9
 9914.34 1115.89 9915.01  1115.9 9915.37 1115.91 9922.38 1115.99 9923.36    1116
 9925.26  1116.6 9925.72 1116.67 9927.26 1116.87 9929.08 1117.17 9935.79 1117.12
 9938.68 1117.18 9939.62 1116.94 9942.21 1116.31 9943.03 1116.02 9945.04 1115.28
 9946.72 1114.67 9953.25 1112.38 9956.43 1111.51 9960.84 1110.27 9965.32 1109.29
  9965.5 1109.26 9966.21 1109.23 9975.25 1108.91 9977.62 1108.87 9979.53 1108.85
 9981.29 1109.03 9981.37 1109.03  9981.5 1109.04 9990.21 1109.21 9997.83 1109.12
   10000 1109.1510001.49 1109.1810002.36 1109.0310004.36 1108.7610007.42  1108.9
10008.91 1109.1210010.34 1109.1810012.63 1109.4310016.83 1109.4410020.18 1109.42
10023.86 1109.3210032.29 1109.0510037.33 1109.3210037.91 1109.36 10038.2 1109.45
10040.17 1109.9910044.18 1111.1210046.29 1112.04 10050.7 1114.1110056.82 1115.75
10062.34 1117.3110065.26 1117.9110068.61 1118.6610071.92 1119.0610074.16 1119.38
10075.97 1119.51

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9854.42    .035 9938.68     .04 9965.32    .03510037.91     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9938.6810075.97          106.417    84.6  67.435             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9854.42 9935.79    1118       T

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.376

INPUT
Description: Upstream of Cactus Road

Q=470 cfs (SRD42, 24 hr)
Station Elevation Data    num=      77
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9932.45 1117.66  9932.8 1117.62 9932.85 1117.62 9938.25 1116.76 9942.89  1115.7
 9943.91 1115.43 9947.01 1114.48 9950.63 1113.32 9952.77 1112.62 9956.25 1111.59
 9956.57  1111.5 9957.11 1111.38 9957.37 1111.33 9959.18 1111.09 9961.23  1110.6
 9962.13 1110.35 9962.45  1110.3  9962.9 1110.24 9963.97 1110.17 9967.56 1109.71
 9968.33  1109.3  9969.5 1110.37  9969.6 1110.14 9970.75 1109.55 9973.73 1108.52
 9976.16 1107.81  9976.8 1107.49  9977.6 1107.29 9985.56 1107.31 9986.74 1107.29
 9994.08 1106.87 9995.02 1106.86 9999.99 1106.89 10006.4 1106.9210011.17 1107.03
10013.05  1107.110018.84 1107.1710022.08 1107.3810023.06 1107.4310023.57 1107.53
10023.99 1107.5510024.23 1107.5510024.66 1107.56 10028.9 1108.8610033.62 1110.41
10034.11 1111.0610035.89  1111.4 10036.2 1111.3910036.83 1111.6210037.75 1111.91
```

```
10039.38 1112.5110043.11  1114.110043.88 1114.4710044.21 1114.5810044.61 1114.63
10045.01 1114.6310045.21 1114.5910045.95 1114.8510046.46 1114.9810048.51 1115.63
10050.68 1116.2510051.95  1116.710053.85 1116.7910062.27 1117.05 10063.3 1117.05
10065.04 1117.0810066.63 1117.0810067.45 1117.1310067.84 1117.1510070.14 1117.14
10071.13 1117.1710077.98 1117.6710079.12 1117.7510079.71 1117.7710079.83 1117.77
10080.73 1117.8310087.85 1117.95

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9932.45     .04  9977.6    .03510024.66     .0410051.95    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9932.4510051.95          113.312   98.02 103.066             .3       .5
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
 9932.45 9995.71 1114.22       T
10003.5310087.85  1116.1       T

CULVERT


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.366

INPUT
Description:
Distance from Upstream XS =    29.5
Deck/Roadway Width        =      46
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
9947.821 1114.22        9974.281  1114.9        10032.53 1117.36
10049.61 1117.31        10080.73 1117.83

Upstream Bridge Cross Section Data
Station Elevation Data    num=      77
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9932.45 1117.66  9932.8 1117.62 9932.85 1117.62 9938.25 1116.76 9942.89  1115.7
 9943.91 1115.43 9947.01 1114.48 9950.63 1113.32 9952.77 1112.62 9956.25 1111.59
 9956.57  1111.5 9957.11 1111.38 9957.37 1111.33 9959.18 1111.09 9961.23  1110.6
 9962.13 1110.35 9962.45  1110.3  9962.9 1110.24 9963.97 1110.17 9967.56 1109.71
 9968.33  1109.3  9969.5 1110.37  9969.6 1110.14 9970.75 1109.55 9973.73 1108.52
 9976.16 1107.81  9976.8 1107.49  9977.6 1107.29 9985.56 1107.31 9986.74 1107.29
 9994.08 1106.87 9995.02 1106.86 9999.99 1106.89 10006.4 1106.9210011.17 1107.03
10013.05  1107.110018.84 1107.1710022.08 1107.3810023.06 1107.4310023.57 1107.53
10023.99 1107.5510024.23 1107.5510024.66 1107.56 10028.9 1108.8610033.62 1110.41
10034.11 1111.0610035.89  1111.4 10036.2 1111.3910036.83 1111.6210037.75 1111.91
10039.38 1112.5110043.11  1114.110043.88 1114.4710044.21 1114.5810044.61 1114.63
10045.01 1114.6310045.21 1114.5910045.95 1114.8510046.46 1114.9810048.51 1115.63
10050.68 1116.2510051.95  1116.710053.85 1116.7910062.27 1117.05 10063.3 1117.05
10065.04 1117.0810066.63 1117.0810067.45 1117.1310067.84 1117.1510070.14 1117.14
10071.13 1117.1710077.98 1117.6710079.12 1117.7510079.71 1117.7710079.83 1117.77
10080.73 1117.8310087.85 1117.95

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9932.45     .04  9977.6    .03510024.66     .0410051.95    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9932.4510051.95             .3       .5
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
 9932.45 9995.71 1114.22       T
10003.5310087.85  1116.1       T

Downstream  Deck/Roadway Coordinates
    num=       7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
9903.887    1115    11069930.797 1114.89    11069958.837 1114.39    1106
9998.517  1115.6    110610046.62 1117.36    110610066.39 1117.31    1106
10097.02 1117.69    1106

Downstream Bridge Cross Section Data
Station Elevation Data    num=     100
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9870.67 1115.74 9871.29 1115.72 9881.38 1115.46 9892.09 1115.16 9895.96 1115.07
 9899.12 1115.02 9910.43  1114.9 9932.99 1114.47 9938.39  1114.3  9938.5 1114.28
  9940.2 1114.24 9944.87 1114.26 9945.77 1114.26 9947.03 1114.19 9951.75 1113.95
 9953.05 1113.95 9956.87 1113.96 9957.25 1113.95 9957.48 1113.96 9958.15 1113.97
 9958.59  1114.3 9958.66 1114.35 9958.95 1114.32 9959.12 1114.31  9959.2 1114.31
 9960.03 1114.26 9960.42 1114.22 9960.47 1114.22 9960.54 1114.21  9960.6  1114.2
 9961.75 1114.11 9961.97 1114.09 9962.22 1113.99 9963.74 1113.65  9963.9 1113.62
 9964.08 1113.62 9965.96 1113.52 9967.06 1113.57 9969.01 1113.65 9971.16 1113.53
 9972.12 1113.47 9977.82 1112.43 9978.19 1112.37 9978.37 1112.33 9982.26 1111.58
 9984.65 1111.03 9987.31 1110.65 9988.48 1110.52 9990.33 1110.01 9991.94 1109.32
 9992.02 1109.28 9992.25 1109.16 9995.01 1107.98 9995.77 1107.45 9995.95 1107.42
 9997.57 1106.66 9999.95 1106.72   10000 1106.7210001.06 1106.7110003.57 1106.71
10004.56 1109.1310005.55  1109.210006.07 1109.32 10007.1 1109.5610008.43 1109.88
10009.47  1110.110009.67 1110.1710009.85 1110.2610011.36    111110012.06 1111.45
10013.25 1112.1410015.66 1113.1310016.04 1113.3710018.54 1114.7110019.78  1115.1
 10020.4 1115.4610020.82  1115.6 10022.3 1115.6310023.94 1115.5810024.68 1115.63
10029.22 1115.8310031.74 1115.98 10033.1    111610036.07 1116.1310039.95 1116.35
10041.86 1116.5310042.95 1116.5610043.82 1116.6210051.86 1116.9210056.43 1117.05
10059.99 1117.1810061.99 1117.2310073.86 1117.0710076.38 1117.0110078.09 1116.95
10084.11 1116.8410085.66 1116.7810089.04 1116.6210095.43 1116.6210097.02 1116.71

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9870.67    .035 9958.66     .04 9997.57    .03510003.57     .0410020.82    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9958.6610020.82             .3       .5
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
   1000610097.02    1117       T
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 9844.78    9938    1117       T

Upstream Embankment side slope              =       5 horiz. to 1.0 vertical
Downstream Embankment side slope            =       3 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular      2
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 2 - Groove end entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 1.2    96.8     .013     .013        0                  .2                 1
Number of Barrels =  3
Upstream   Elevation =  1107.03
Centerline Stations
    Sta.    Sta.    Sta.
9996.7149999.80910002.53
Downstream Elevation =  1106.88
Centerline Stations
    Sta.    Sta.    Sta.
9997.081   1000010002.77

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.357

INPUT
Description: Downstream of Cactus Road
Station Elevation Data    num=     100
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9870.67 1115.74 9871.29 1115.72 9881.38 1115.46 9892.09 1115.16 9895.96 1115.07
 9899.12 1115.02 9910.43  1114.9 9932.99 1114.47 9938.39  1114.3  9938.5 1114.28
  9940.2 1114.24 9944.87 1114.26 9945.77 1114.26 9947.03 1114.19 9951.75 1113.95
 9953.05 1113.95 9956.87 1113.96 9957.25 1113.95 9957.48 1113.96 9958.15 1113.97
 9958.59  1114.3 9958.66 1114.35 9958.95 1114.32 9959.12 1114.31  9959.2 1114.31
 9960.03 1114.26 9960.42 1114.22 9960.47 1114.22 9960.54 1114.21  9960.6  1114.2
 9961.75 1114.11 9961.97 1114.09 9962.22 1113.99 9963.74 1113.65  9963.9 1113.62
 9964.08 1113.62 9965.96 1113.52 9967.06 1113.57 9969.01 1113.65 9971.16 1113.53
 9972.12 1113.47 9977.82 1112.43 9978.19 1112.37 9978.37 1112.33 9982.26 1111.58
 9984.65 1111.03 9987.31 1110.65 9988.48 1110.52 9990.33 1110.01 9991.94 1109.32
 9992.02 1109.28 9992.25 1109.16 9995.01 1107.98 9995.77 1107.45 9995.95 1107.42
 9997.57 1106.66 9999.95 1106.72   10000 1106.7210001.06 1106.7110003.57 1106.71
10004.56 1109.1310005.55  1109.210006.07 1109.32 10007.1 1109.5610008.43 1109.88
10009.47  1110.110009.67 1110.1710009.85 1110.2610011.36    111110012.06 1111.45
10013.25 1112.1410015.66 1113.1310016.04 1113.3710018.54 1114.7110019.78  1115.1
 10020.4 1115.4610020.82  1115.6 10022.3 1115.6310023.94 1115.5810024.68 1115.63
10029.22 1115.8310031.74 1115.98 10033.1    111610036.07 1116.1310039.95 1116.35
10041.86 1116.5310042.95 1116.5610043.82 1116.6210051.86 1116.9210056.43 1117.05
10059.99 1117.1810061.99 1117.2310073.86 1117.0710076.38 1117.0110078.09 1116.95
10084.11 1116.8410085.66 1116.7810089.04 1116.6210095.43 1116.6210097.02 1116.71

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9870.67    .035 9958.66     .04 9997.57    .03510003.57     .0410020.82    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9958.6610020.82          31.672   29.35  40.501             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
   1000610097.02    1117       T
 9844.78    9938    1117       T

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.352

INPUT
Description:
Station Elevation Data    num=     124
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9870.67 1116.24 9886.31 1115.56 9887.52 1115.49  9890.2 1115.28 9892.63 1115.34
 9900.02 1115.13    9901 1115.07  9903.2 1115.08 9904.74  1115.1 9920.09 1115.24
 9921.08 1115.28 9923.67 1115.26 9928.57 1115.24 9930.08 1115.16 9931.16 1115.42
 9932.43 1115.72 9934.61 1116.38  9934.9 1116.48 9935.33  1116.2 9937.47 1114.95
 9937.76 1114.69 9939.08 1114.23 9939.66 1114.18 9940.73 1113.95 9943.46 1113.89
 9947.53 1113.92  9949.7 1113.72 9951.17 1113.69 9951.89 1113.62 9953.03 1113.63
 9953.67 1113.58 9954.79 1113.54  9956.3 1113.41 9956.98 1113.32 9957.68 1113.15
 9959.35  1112.8 9960.52 1112.61 9962.02  1112.5 9962.15 1112.44 9962.26 1112.43
 9964.64 1111.98 9967.95  1111.5 9970.43 1110.72  9971.5 1110.29  9972.6 1110.15
 9989.56 1108.51 9991.86 1108.26 9991.94 1108.25 9992.84 1107.77 9993.08 1107.64
 9994.08  1107.1 9998.08 1107.1210004.15 1106.9910005.41 1108.1310005.56 1108.29
10006.88 1108.4310008.68 1108.6110010.42 1108.7810011.41 1109.0810015.07 1110.07
10017.05 1111.0210018.85  1112.110019.28 1112.4110019.84 1112.85   10021  1113.6
10022.29 1114.33 10023.8 1115.2110024.13  1115.410024.26 1115.4110026.58 1115.85
10027.88 1115.9510029.84 1115.9910030.45 1116.04 10031.4 1116.2510031.83 1116.31
10034.37 1116.7510036.01 1116.68 10036.6 1116.7410038.34 1116.9510038.94 1117.05
10041.38 1117.5910044.06  1118.110045.32 1118.4310045.98 1118.5410049.74    1119
10051.98 1119.2610054.51 1119.46 10058.8 1119.8210061.36 1119.9810065.95 1120.21
10069.69 1120.2210074.17 1120.3710079.07 1120.3810082.01 1120.3810084.61 1120.36
10085.38 1120.3610086.22 1120.3910087.78 1120.5710087.86 1120.5910088.02 1120.58
10095.13 1120.4210097.67 1120.3710106.15 1120.5110107.91 1120.5710112.22 1120.53
10112.45 1120.5310113.48  1120.510113.71 1120.4910115.13 1120.5510115.66 1120.58
 10119.5 1120.6610120.32 1120.6910121.36 1120.7310121.57 1120.73 10121.8 1120.72
10122.24 1120.7310125.83  1120.710128.61 1120.7310128.95 1120.73 10129.4 1120.68
10130.96 1120.7210142.43 1121.0710145.24 1120.9910146.76 1120.98
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Manning's n Values          num=        5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9870.67    .035  9934.9     .04 9994.08    .03510004.15     .0410065.95    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9934.910065.95          27.999   25.96   25.99             .1       .3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
 9870.67 9986.97    1116        F
   1001410146.76    1116        F

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.347

INPUT
Description:
Station Elevation Data     num=      174
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9870.67 1116.48 9875.23 1116.29 9894.62 1115.74 9898.04 1115.67  9898.4 1115.68
 9899.28 1115.59 9899.74 1115.55  9902.7 1115.28 9908.35  1115.3 9920.03 1115.39
 9926.74 1115.68 9928.69 1116.58 9928.86 1116.63 9928.92 1116.67 9929.38 1116.86
 9930.64 1117.35 9931.02 1117.13 9932.23 1116.49 9933.52 1115.73 9933.86 1115.57
  9935.9 1115.45 9939.96 1115.28 9942.14 1115.21 9945.24 1115.18 9948.62 1114.88
 9948.84 1114.86 9950.35 1114.76 9952.11 1114.65 9961.24 1113.57 9963.16  1113.4
 9965.19 1113.21 9971.62 1112.47 9971.76 1112.44 9974.43 1111.81 9975.19 1111.42
  9977.6 1110.19 9977.79 1110.06 9978.03 1109.93 9980.06 1109.61  9980.2 1109.58
 9981.62 1109.37 9981.88 1109.37 9983.08 1109.18 9983.62 1109.17 9984.45 1109.08
 9989.45 1108.68  9989.5 1108.68 9991.36  1107.510000.01 1107.3410004.93 1107.24
10006.23 1107.7210007.15 1108.05 10008.5 1108.2210010.98 1108.6310013.39 1109.01
10014.13  1109.210014.82 1109.2610018.22 1109.54 10018.3 1109.5510022.06 1111.24
 10025.7 1111.8310026.38 1112.0910026.96 1112.3410028.28 1113.0310029.72 1112.96
10030.55 1112.9910032.33 1113.5310032.43 1113.55 10034.2 1113.2110034.51 1113.14
10035.49 1113.1210035.75 1113.1310040.87 1112.8710042.34 1112.7110044.45 1112.64
10046.67 1112.6110049.23 1112.6510052.22 1112.8710054.44 1112.8710057.73  1112.9
10062.31 1113.0410065.28 1113.17 10074.3 1113.7910076.46 1113.8910079.83 1114.17
10083.21 1114.27 10087.7 1114.5610089.94 1114.6210091.19 1114.6310098.29 1114.54
10107.78 1114.6710112.15 1114.5410113.21 1114.5510113.55  1114.510115.47  1114.6
10117.22 1114.6810118.57  1114.710123.52 1114.9110127.22 1114.8810128.93 1114.86
10130.51 1114.9410130.82 1114.9510131.51 1114.9310133.69 1115.1710135.29 1115.31
10135.74 1115.3310138.34 1115.3910140.49  1115.410141.02  1115.510141.12 1115.56
10142.87 1115.6110145.03 1115.7810145.72 1115.8310145.93 1115.8410148.97 1115.81
10150.38 1115.7710151.21 1115.89   10152  1115.910156.57 1116.1210156.97 1116.14
 10158.5 1116.3210158.71 1116.28 10159.4 1116.2110161.23 1116.1110163.65 1116.44
10164.29 1116.4510165.56 1116.6110167.73 1117.07 10168.4 1117.2210169.63 1117.38
10171.04 1117.4810171.65  1117.510175.62 1117.6910180.53 1117.8110182.35 1117.99
10183.38 1118.0610189.87 1118.1910192.74 1118.2210201.91 1118.7610203.24 1118.79
 10204.2 1118.9910205.39 1119.2710206.34 1119.2510206.44 1119.2410206.62  1119.2
10207.64 1118.9310207.91 1118.9410210.39 1119.0210211.52 1119.1710211.59 1119.17
10215.25 1119.2710216.29 1119.2610216.83 1119.2610217.52  1119.310220.16 1119.32
10225.06 1119.3810226.64 1119.3910229.81 1119.3910230.55 1119.4210230.71 1119.43
10231.48 1119.4510231.81 1119.4610236.38 1119.6210238.31 1119.6110239.71 1119.63
10248.05 1119.4610249.28 1119.4510250.38 1119.4510250.91 1119.4110260.42 1119.31
10261.68 1119.3110264.17 1119.1310269.72 1118.89 10270.6 1118.86

Manning's n Values          num=        5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9870.67    .035 9930.64     .04 9991.36    .03510004.93     .0410032.33    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9930.6410032.33         76.184   64.05  56.148             .1       .3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
 9870.67 9978.47    1116        F
10022.82 10270.6    1116        F

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.335

INPUT
Description:
Station Elevation Data     num=      235
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9922.92  1117.7 9929.18 1117.76 9932.23 1117.66 9935.53 1117.58 9937.35 1117.28
 9938.61 1117.06 9939.07  1117.2 9941.32 1117.85 9942.57 1118.02 9943.59 1118.12
  9945.3 1118.59  9945.5 1118.65 9947.18 1117.97 9950.79 1116.47 9951.91 1115.68
 9952.68 1115.31 9955.15 1114.87 9957.41 1114.46  9958.6 1113.89 9960.01 1113.22
 9962.71 1112.24 9963.42 1112.15 9966.69 1111.35 9967.74 1111.12 9968.03 1111.05
 9970.34 1110.41 9971.13 1110.21  9971.9 1109.99 9972.78 1109.71 9974.52 1109.33
 9976.78 1108.69 9978.13  1108.4  9980.9  1107.8 9981.88 1107.49 9983.32 1107.11
 9991.41 1107.2410002.41 1107.3410003.48 1107.3310004.58 1107.3310006.98 1107.63
10008.69 1107.9210009.95 1108.1510010.44 1108.2210010.83 1108.3210011.62 1108.51
10011.82  1108.5 10012.4  1108.510012.68 1108.5110013.38 1108.5210015.51 1108.52
10017.42  1108.310018.26 1108.2110019.38 1108.2710020.94 1108.3710021.48 1108.38
10021.62 1108.3910022.65 1108.4410025.12 1108.5410026.49 1108.61 10028.7 1108.67
10030.88 1108.7810033.43 1108.9610035.96 1109.1610039.32 1109.2810039.87 1109.31
10040.09 1109.3210040.86 1109.2510043.68 1109.0310045.66 1108.8310046.87 1108.71
10047.87 1108.5810049.99 1108.3810050.11 1108.3810050.18 1108.3910050.74 1108.32
 10051.3 1108.3310051.65  1108.310051.93  1108.310052.25 1108.3110052.46 1108.31
10054.39 1108.3910054.71 1108.3910055.14 1108.3610055.55 1108.3310057.21 1108.19
10058.26 1108.1810058.88 1108.05 10059.9 1108.1510061.99 1108.3910062.81  1108.6
 10063.4 1108.6510065.67 1108.7910066.74 1108.8610067.06 1108.8610068.73 1108.84
10068.85 1108.83 10069.6 1108.8310071.33 1108.6710072.37 1108.5910073.92 1108.38
10078.57 1107.7610079.34 1107.7910081.42 1107.8910082.34 1108.1610083.37 1108.29
10083.96 1108.5210084.59 1108.7410086.25 1109.45 10087.8 1109.9910088.17 1110.08
10088.47 1110.1810090.28 1110.5610090.79 1110.6910092.07  1110.810093.55 1110.69
10093.71 1110.6610094.29 1110.6810095.38 1110.6110096.45 1110.66 10098.3 1110.77
10098.39 1110.7710100.24 1110.5110103.27 1110.2810103.52  1110.310103.63  1110.3
10105.58 1110.2910106.33 1110.1310107.96  1110.110108.24  1110.110108.56 1110.14
10109.94 1110.3210112.18 1110.29 10112.9 1110.2910115.41 1110.13 10117.6 1110.15
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 10118.9 1110.2410121.05 1110.2210123.17 1110.2110125.08 1110.3110125.61 1110.29
 10125.8  1110.310130.45 1110.12 10133.2 1110.0610134.46 1110.0210137.91 1109.93
10138.29 1109.9110139.97 1109.7310140.77 1109.7510143.48 1109.7410144.89 1109.72
10147.31 1109.7110147.98 1109.7510150.33 1109.9110151.61 1109.9410152.35 1109.96
10154.56 1109.9610154.65 1109.9710155.33    111010157.53 1110.05 10160.5 1110.06
10161.43 1110.0410161.65 1110.0410163.52 1109.9110164.48 1110.0110164.86 1110.01
10164.96 1110.0210166.07 1109.92 10167.2 1110.1810167.92 1110.3210168.87  1110.5
10170.83 1110.91   10171 1110.9610171.09 1110.9710171.52 1111.07 10173.3 1111.57
10174.96 1111.9810178.67 1113.0910181.04 1113.4710181.57 1113.5810183.78 1113.88
10185.99 1114.0810188.38 1114.4310191.23 1115.6110192.49 1116.2510193.55 1116.86
10194.18 1117.2510194.83 1117.3310195.37  1117.410195.76  1117.410195.86 1117.65
10196.37 1117.5810197.14 1117.3610197.71 1117.0310197.78 1117.0110200.01 1117.59
10201.59 1117.6210202.65 1117.6210208.04 1117.6310211.03  1117.810212.19 1117.92
10212.97 1117.9710215.49 1118.1110217.94 1118.3710218.77 1118.4410220.78 1118.55
10223.04  1118.710225.38 1118.86 10226.8 1118.9810234.73 1119.5910236.59 1119.71
10246.01 1120.0410247.35 1120.0710263.78 1120.11 10270.5 1119.9110287.45 1119.61
10287.79  1119.610289.01 1119.54 10297.6 1119.1410299.38 1119.1110300.24  1119.1
10303.35    111910303.87 1118.9910305.98  1118.910308.69 1118.8510309.58 1118.84
10312.88 1118.7910315.41 1118.8210316.09 1118.8110319.01 1118.8110322.85 1118.87
10323.05 1118.8710323.81  1118.910326.03 1118.88 10327.2 1118.9210328.35 1118.97

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9922.92    .035  9945.5     .04 9983.32    .03510166.07     .0410246.01    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9945.510246.01           90.186   90.26  93.888              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10055.9610328.35    1118       F

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.318

INPUT
Description:
Station Elevation Data    num=     175
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9917.47 1118.12 9917.99 1118.13 9919.56 1118.17    9920 1118.14 9921.19 1117.99
  9922.2 1117.92 9923.65 1117.84 9924.41 1117.77 9925.07 1117.58 9926.17 1117.72
 9926.28 1117.71 9926.41 1117.75 9928.23 1118.09 9929.68 1118.54 9929.99 1118.66
  9930.7  1118.9 9931.81 1119.33    9933 1119.65 9934.21  1119.9 9936.06 1118.97
 9936.79 1118.65 9943.79 1114.74 9944.61 1114.28 9945.78 1113.97 9952.01 1112.22
 9953.29 1111.76 9961.28 1109.23 9963.13 1108.71 9965.06 1108.14 9968.12 1106.98
 9971.14 1106.56  9971.4 1106.49  9971.6 1106.47 9972.71  1106.5 9981.79  1106.7
 9982.25 1106.68 9982.85 1106.58 9984.29  1106.8    9985  1106.9  9986.1  1106.8
 9986.25 1106.79 9986.57 1106.79 9987.13 1106.74 9989.13 1106.91  9989.7 1106.98
 9989.84 1106.99 9991.46 1107.03 9991.78 1107.04 9993.62 1107.03 9995.35  1107.1
    9997 1107.04 9997.29 1107.03 9997.51 1107.03   10000 1107.0410000.38 1107.04
10003.58  1106.910004.53 1106.8510007.64 1106.6410009.08 1106.5510013.46 1106.86
10014.99 1106.9110016.19 1106.9410016.76 1107.0410018.78 1107.25   10027 1107.67
10029.26 1107.7510030.15 1107.7710030.82 1107.8110031.01 1107.8110031.23  1107.8
10031.86 1107.8710038.13 1108.1610042.13 1108.2510047.22  1108.210059.92 1107.85
10065.96 1107.6510067.19  1107.610072.59  1107.310074.82 1107.1810076.15 1107.12
 10076.6 1107.0910084.16 1106.9910089.47 1106.83   10092 1106.7210099.18  1106.1
10102.97 1105.6710103.25 1105.6710103.32 1105.6910104.11 1105.7910105.08 1105.97
10105.51 1106.0810106.06 1106.2510106.23 1106.3210106.73 1106.4310106.99 1106.48
10107.21 1106.4810107.46  1106.510107.73 1106.4910108.07 1106.4910108.69 1106.37
10108.93 1106.3610109.34 1106.2410109.62 1106.1610110.11  1105.910111.43 1105.91
10112.58 1105.9110121.99 1105.8110131.61 1105.9510132.13 1105.9510135.76 1105.99
 10143.3 1106.3310147.82 1106.66 10149.7 1106.8510151.19 1106.8810153.91 1106.94
10154.86 1107.0710156.64 1107.3110160.89 1107.7610161.23 1107.8210161.46 1107.86
10163.76 1108.6210164.49 1108.7810168.02 1109.6610168.48 1109.8410174.27 1111.88
10174.69 1112.0510175.29 1112.2310178.37 1113.0110181.02 1114.11 10181.1 1114.15
10181.54 1114.2610184.47 1114.4610185.35 1114.8310187.12 1114.3610187.38  1114.4
 10188.9 1114.7410188.95 1114.7610189.94 1115.8810190.26 1116.4410192.06 1116.85
10192.65  1117.110193.54 1117.3910194.15 1117.6110194.53 1117.6710196.13 1117.97
10197.34 1117.9910198.54 1118.0210200.23  1118.110202.79 1118.2110204.58 1118.35
10206.16 1118.5410206.64 1118.6210210.37 1119.1610212.26 1119.5310213.95 1119.91
10218.17 1120.0410220.22 1120.0810220.81 1120.13 10222.4 1120.1310236.69 1120.19
10241.62 1120.0710245.59 1120.0710254.56 1119.9710255.91 1119.8110263.78 1119.76
10267.31 1119.6710267.95 1119.6610286.37 1119.5910287.67 1119.5810288.57 1119.58
10306.21 1119.5610307.28 1119.5610308.74 1119.5710322.12 1119.64 10322.9 1119.65

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9917.47    .035 9934.21     .04  9971.4    .035 10143.3     .0410213.95    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9934.2110213.95           90.049   90.69  93.823              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10077.13 10322.9    1118       F

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.300

INPUT
Description:
Station Elevation Data    num=     165
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9906.34 1117.45 9906.57 1117.45 9907.68 1117.51 9908.72 1117.58 9909.17 1117.72
 9910.07 1118.06 9911.66 1118.99 9912.39 1119.39 9913.97 1119.44 9914.53 1119.45
 9914.94 1119.52 9915.25 1119.45 9917.15 1119.01 9919.44 1117.55 9919.55  1117.5
 9920.15 1117.29 9921.23 1116.91 9921.46  1116.9 9922.37 1116.84 9923.24 1116.41
 9923.38 1116.36 9923.68 1116.34 9924.71  1116.3    9928 1116.13 9930.28  1115.1
 9932.61 1114.01 9933.43 1113.72 9934.61 1113.18 9935.34 1112.86 9936.24 1112.55
 9940.87 1111.46 9941.36 1111.34 9942.22 1111.18 9943.12  1110.9 9946.08 1110.02
 9947.07 1109.65 9949.86 1108.83 9954.44 1107.74 9956.35 1107.27 9956.78 1107.15
 9960.79 1106.56 9960.84 1106.55  9960.9 1106.55 9961.18 1106.53 9970.05 1106.38
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  9970.6 1106.43 9972.93 1106.59 9974.51 1106.58 9982.13 1106.72  9989.8 1106.56
 9998.95 1106.5510000.85 1106.46 10004.4 1106.4110006.27 1106.2410012.05 1106.34
 10013.9 1106.4810019.53 1106.3610021.76  1106.310025.14 1106.1310025.54 1106.12
10025.84 1106.0910026.33 1106.0610032.91 1106.02 10034.5 1106.04 10039.3 1106.02
10040.62 1106.0110043.76 1105.9610045.53 1105.9810049.06 1106.1410052.48 1106.14
10053.52 1106.3410059.49 1106.2510061.56 1106.2310062.75 1106.1610067.51 1106.05
10068.89 1106.0310074.54 1105.9210078.09 1105.7810079.16  1105.810083.72 1105.68
10085.02 1105.51 10087.2 1105.2210088.77 1105.2110094.43 1105.2810107.21 1105.34
10112.93 1105.6710116.93 1105.8310121.23 1105.9210122.32 1105.9410122.65 1105.95
10122.88 1105.9610123.28 1105.9710137.94 1106.5110142.91  1106.710146.06 1106.89
10146.92 1106.9510147.26 1106.9610147.48 1107.0510148.72 1107.3210150.63 1107.62
10152.32 1108.0810156.75 1109.52 10157.4 1109.78 10158.4 1110.2710159.78 1110.71
10161.98 1111.3410163.46 1111.7110165.18 1112.1310165.91 1112.4910167.07 1113.03
10167.96 1113.4410168.49 1113.6210169.76 1113.9310170.28 1113.9910172.88 1115.28
10173.24 1115.3910175.08 1115.8110175.21 1115.8210175.26 1115.8410175.36 1115.85
10177.57 1116.2610178.96 1116.2110179.58 1117.1510180.05 1117.4610180.69 1117.85
10181.17 1117.9110182.31 1118.0410182.74 1118.0610182.93 1118.0710184.37 1118.14
10184.58 1118.1310184.72 1118.1710185.44 1118.2910186.46 1118.4410187.66 1118.59
 10189.5 1119.1410190.15 1119.3110190.39 1119.3510191.51 1119.6410192.67 1119.48
10193.54 1119.3210194.26 1119.2410194.46 1119.2110194.69 1119.2210195.71 1119.08
10200.42 1119.1410202.97 1119.1610205.86 1119.2410209.55  1119.410210.91  1119.4
10213.14 1119.3510214.61 1119.3110226.41 1119.5110230.71 1119.6710233.17 1119.64
10237.51 1119.4210237.64  1119.410246.04 1119.43 10253.6 1119.3910257.19 1119.41
10274.95 1119.3410276.08 1119.3310293.38  1119.110311.16 1119.0310311.77 1119.03

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9906.34    .035 9914.94     .04 9960.79    .03510146.06     .0410191.51    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9914.9410191.51          366.044  367.42 376.759             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10092.6110311.77    1118        F

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.231

INPUT
Description:
Station Elevation Data    num=      80
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9880.12 1116.49  9884.3 1116.49 9886.73  1116.5 9888.85 1116.75 9890.23 1116.15
 9891.38 1115.87 9893.64 1116.17 9894.13 1116.22 9895.46  1116.6 9899.15  1117.7
 9899.89 1117.47 9905.39 1115.97 9915.33 1115.54  9919.2  1115.4 9923.69 1113.83
  9925.1 1113.34 9926.32 1112.86 9931.21 1111.08 9936.31 1109.25 9941.01 1107.73
 9946.58 1106.39 9947.49  1106.2 9947.78 1106.15 9951.96 1105.48  9957.8 1105.42
 9959.77 1105.36 9961.29 1105.33 9970.57 1105.02 9972.56 1105.03 9976.87 1105.07
 9990.17 1105.2210005.53 1105.1310006.32 1105.13 10007.5 1105.1110018.25 1104.96
10025.95 1104.9410029.36 1104.91 10040.2 1104.7410056.38 1104.5410061.28 1104.54
10091.81 1104.4110096.61  1104.4 10116.2 1104.8610116.68 1104.8610129.46 1105.16
10133.67 1105.8610135.01 1106.0610137.19 1106.7910141.35 1108.0710144.95 1109.27
10147.56 1110.0510149.34 1110.6310154.09 1112.1910159.92 1114.1410163.34 1115.22
10167.31 1116.2410172.38 1117.4810176.92 1117.4910178.88  1117.510180.37 1117.46
10183.91 1117.5210186.29 1117.4910187.46 1117.4310206.84 1117.4410208.27 1117.43
10208.37 1117.4310208.48 1117.4210208.79  1117.410218.72 1116.6710223.56 1115.69
10225.11 1115.4110227.79 1115.3310233.93 1114.9110235.59 1114.5710239.75  1114.2
10240.49 1114.1110242.18 1113.87 10250.5 1113.4210253.92 1113.2810253.96 1113.28

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9880.12    .035 9899.15     .04 9951.96    .03510129.46     .0410172.38    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9899.1510172.38          176.447  206.05 275.579             .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.192

INPUT
Description:
Station Elevation Data    num=     311
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9901.32 1116.02 9902.24 1115.99 9907.68 1115.86 9911.79 1115.52 9914.04 1115.28
 9917.11 1113.99 9921.22 1112.67 9925.24  1111.4 9928.78 1110.22 9930.27 1109.77
 9934.97 1108.47 9936.97 1107.82 9937.38 1107.66 9937.81 1107.54  9941.4  1106.6
 9942.95 1106.08 9944.99 1105.56 9950.29 1105.43 9953.49 1105.41 9960.58  1105.4
 9963.47  1105.4 9978.49  1105.1 9980.71 1105.05 9987.85 1104.98 9998.85 1104.85
10000.01 1104.8310003.19 1104.7710007.35 1104.7510011.03 1104.7510011.37 1104.76
10016.02 1104.7510016.17 1104.7410024.45 1104.7210036.87 1104.7710041.79 1104.76
10057.53 1104.8710058.42 1104.8610067.66 1104.6910074.49 1104.6610088.93 1104.63
10096.28 1104.7710100.57 1104.8310102.15 1104.8310109.74  1105.110118.26 1105.33
   10122 1105.4110124.15 1105.4710129.44 1105.6310131.54 1105.6910142.58 1106.28
10143.52 1106.3810147.21 1107.3110148.45 1107.6610151.42 1107.8810151.85 1107.91
10152.27 1108.0210155.22 1108.7610157.46  1109.410159.58 1109.8710160.62 1110.22
10161.75 1110.4710165.71 1111.7710166.55 1111.9510172.32 1113.3510173.58 1113.76
10174.22 1113.9410176.33 1114.4110179.68 1115.25 10181.9  1115.810183.54 1116.08
10186.58 1116.7810189.41 1115.8810192.01  1114.610195.82 1113.3110196.07 1113.23
10196.74 1113.1910206.03 1112.5810212.32 1114.1410212.87 1114.2710213.14 1114.45
 10215.4 1115.6810217.31 1116.2310218.83 1116.7910219.45 1116.9510220.37 1117.05
10224.01  1117.510225.33 1117.77 10227.6 1118.73 10228.6 1119.07 10230.5 1119.78
10232.85 1120.53 10234.6 1120.2710239.44 1119.8410243.67 1121.21 10244.1 1121.36
 10244.3 1121.4110244.74 1121.2810246.68 1120.8210248.43 1120.8110252.03 1120.86
10254.55 1121.3710254.67 1121.3910254.82 1121.3610258.32 1121.0410259.62 1121.08
10262.89 1120.8210264.55 1120.6710267.02 1120.5610269.04 1120.3810272.66 1119.98
10273.08 1119.9310273.38 1119.9410273.58  1119.910275.38 1119.7510277.21 1119.82
10278.15 1119.6710283.57 1118.87 10284.5 1118.7510285.56 1118.6910286.48 1118.83
10287.99 1119.0810288.71 1118.9910290.08 1119.0310292.91 1119.1310294.95 1119.13
10295.03 1119.1210297.37 1118.9410303.62 1118.3710304.02 1118.3610304.32 1118.31
10309.39 1118.2810310.55 1118.2710310.71 1118.3210315.62  1119.410316.27 1119.25
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10318.52 1119.1310319.27 1119.17 10320.8 1118.9510322.24 1118.9610323.49 1118.64
10324.73 1118.47 10329.8 1118.0310329.97 1118.0210331.99 1118.4910332.95 1118.39
10334.24  1118.210336.02 1118.3310338.08 1118.1710344.35 1117.8710346.97 1118.46
 10348.7 1118.9310349.32 1119.3710351.02 1120.2910351.79 1120.5910353.08  1120.8
10354.51 1120.4610355.89 1119.9610358.04  1119.810358.33 1119.7910359.22 1119.57
10362.42 1118.8110365.73 1118.8910367.23 1118.8510368.32 1119.2110370.19 1119.86
10372.03  1119.810373.61 1119.9410374.61 1120.1810378.83 1119.0910378.96 1119.05
10381.17 1119.1510381.66 1119.16   10384 1118.7810386.32 1118.4510387.52 1118.91
 10392.1 1120.8510394.54  1120.3 10396.6 1120.2610398.48 1119.8210400.43 1119.48
10403.05 1119.4610404.35 1119.4410409.52 1119.4910412.11 1119.4910416.09  1119.5
10418.86 1119.5510421.19 1119.4910422.12 1119.6710423.72 1119.7710426.28 1119.52
10428.53 1119.5110429.95 1119.4610432.19 1119.29 10434.1 1119.3310435.14 1119.35
10436.61 1119.6510439.18  1119.7 10440.2  1119.710443.15 1119.9610444.45 1120.03
 10446.2 1119.9510447.54 1119.9110448.38  1119.910449.92  1119.910450.77 1119.91
10452.22 1119.9410453.68    112010456.03 1119.6510456.19 1119.6110456.34 1119.61
10460.28 1119.9710461.75 1119.9810463.96 1119.7610465.51 1119.4910467.87 1119.55
10468.88 1119.5810470.29 1119.4810471.62 1119.4410473.27 1119.21 10475.7 1118.63
10477.03 1118.4710477.87 1118.2910481.02 1118.0410483.03 1117.9110486.08 1117.73
10487.29 1117.6810488.84 1117.8110489.95 1118.0310491.72 1118.2510493.17  1118.4
10495.48 1118.86 10497.4 1118.9810497.84 1118.9610498.58 1118.99 10499.4 1119.15
10501.45  1118.910501.54 1118.8810503.06 1118.5610503.16 1118.54 10503.6 1118.54
10506.14 1118.4910508.93 1118.6710509.03 1118.6710509.19 1118.6610512.16 1118.47
10513.09 1118.4310514.31 1118.2910515.97 1118.0210516.46 1117.9210516.93 1117.97
10517.24 1117.9510518.62 1117.3910520.54 1116.7510520.95  1116.710523.28  1116.3
10523.46 1116.16 10525.6 1114.2410527.49 1112.8310527.88 1112.58 10528.2 1112.41
 10530.5 1111.1810530.99 1110.9510533.61 1109.5610535.91 1108.2510536.29 1108.08
10537.45 1107.66 10538.4 1107.3110538.62 1107.2910541.02 1106.9810543.78  1106.9
10546.07 1106.8310549.18  1106.910549.47  1106.910550.56 1106.9110556.89 1106.94
10557.24 1106.9510559.49 1106.9410564.22 1106.8910565.21 1106.8910570.53 1106.83
10576.89 1107.0810577.93 1107.0910580.23  1107.110582.68 1107.1610587.27 1107.24
10588.41 1106.9710590.84 1107.1910598.43 1107.89 10604.2  1108.510604.57 1108.53
10607.33 1108.7610607.84 1108.8210608.52 1108.9610613.92 1109.9210616.04 1110.25
10622.44 1111.3910625.59 1112.2210625.98 1112.3410626.29 1112.4310630.62 1113.58
10632.67 1114.1710636.01 1115.1910637.73 1115.6510641.82 1116.8110646.61 1117.61
10648.12 1117.9810650.07 1118.1710656.79 1118.9210660.21 1119.2810663.39 1119.35
10670.77 1119.48

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9901.32     .04 9944.99    .03510142.58     .0410186.58    .03510508.93     .04
10543.78    .03510590.84     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9901.3210186.58          183.719  259.78 404.145             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10186.5810670.77    1118       F

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.143

INPUT
Description:
Station Elevation Data    num=     102
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9896.42 1115.65  9903.5 1115.68 9907.75 1115.66 9913.94 1115.56 9915.33 1115.51
 9920.53 1115.51 9921.98  1114.8 9922.32 1114.58 9922.62 1114.67 9923.68 1114.95
 9927.18 1115.91 9931.29 1117.01 9933.26 1116.39 9935.97 1115.53 9937.56 1115.65
 9938.03 1115.69 9939.07 1115.52 9941.17 1115.31  9941.5 1115.21 9941.73  1115.2
 9942.41 1115.14 9943.83 1114.89 9944.19 1114.82 9945.47 1114.73 9946.71 1114.48
 9948.23 1114.05 9948.82  1113.7 9949.68 1113.25 9950.36 1113.09  9951.6 1112.57
 9951.89 1112.47 9955.78 1111.23 9956.05 1111.18 9956.17 1111.12 9956.62 1110.99
 9962.55 1108.93 9964.16  1108.4 9965.98 1107.86  9967.1  1107.5 9968.57 1107.17
 9971.92  1106.4 9972.91 1106.22  9977.2 1105.62 9981.38 1105.28 9986.48 1104.88
 9994.16 1104.69 9997.14 1104.63   10000 1104.6310000.15 1104.6410007.99 1104.72
10009.41 1104.7710011.16 1104.7810013.05 1104.7710026.78  1104.510032.97 1104.45
10036.77 1104.4810048.48 1104.6510052.73 1104.92 10054.3 1105.0310058.51 1105.38
10061.16 1105.5910062.46 1105.7310063.02 1105.8510064.63 1106.1410067.82 1106.75
10068.78 1106.9710069.59 1107.1710071.71 1107.7110073.03    110810076.68 1108.98
10083.34  1110.910085.43 1111.74 10088.7 1112.7710089.44 1112.9510089.87 1113.07
10090.18 1113.2210090.72 1113.3810094.34 1114.57 10096.5 1115.3210096.94 1115.49
10097.74 1115.3910099.61 1115.1510109.64 1115.09 10111.8 1115.0810112.93 1115.07
10151.01 1114.9310169.09 1114.7910192.31 1114.7810196.99 1114.7910253.64 1114.98
10258.38 1114.9810300.42 1114.9410310.72  1114.9 10321.6    111510322.28 1115.01
10323.23 1115.0310330.32 1115.0810335.71 1115.19 10349.1 1115.43 10356.9  1115.4
10357.03  1115.410357.04  1115.4

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9896.42    .035 9931.29     .04 9986.48    .03510048.48     .0410096.94    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9931.2910096.94          237.359  233.72 238.998             .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.098

INPUT
Description:
Station Elevation Data    num=     104
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  9890.9 1116.16 9896.42 1116.31 9904.86 1116.24 9910.37 1116.18 9913.11 1116.14
 9920.62 1115.94 9927.03 1115.73 9929.84  1115.6 9931.03 1115.59 9932.28 1115.55
 9934.65 1115.11 9935.04 1115.03 9935.37 1115.13 9936.67 1115.54 9938.29 1115.98
 9939.97 1116.47  9941.6 1116.06 9943.49 1115.64 9944.69 1115.34 9947.21 1114.85
 9949.03 1114.47 9950.05 1114.26 9950.81 1114.15 9954.68 1113.43 9959.25 1112.89
 9959.92 1112.87 9966.58 1112.28  9968.1 1112.17 9973.05 1111.66  9973.2 1111.64
  9973.9 1111.43 9979.21 1109.83 9980.28 1109.55 9982.46 1108.86 9984.46 1108.59
 9985.62 1108.45 9986.98 1108.28 9987.89 1108.23 9990.77 1107.94 9990.96 1107.93
 9991.01 1107.92 9993.72 1107.31 9994.62 1107.73 9995.05 1107.92 9997.92 1108.02
```

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 9999.89 1108.05 9999.99 1108.0510002.19 1108.0110005.19 1107.9110010.11 1107.72
10011.44 1107.6910016.08 1107.4310017.61 1107.3710022.28 1107.0510026.96  1106.8
10028.54 1106.7410029.91 1106.7410038.57 1106.7910044.02 1106.8410046.25  1106.9
   10049 1107.0310056.79 1107.4110061.77 1107.8110063.77 1108.1310067.57 1108.64
10072.83 1109.7210073.12 1109.7910073.53 1109.8910077.06 1110.7310082.67 1111.87
10084.01 1112.1610084.75 1112.3110088.61 1113.4410089.61  1113.7100090.01 1113.83
10090.77 1114.2410091.52 1114.6210092.22 1114.8210093.61 1114.8210094.74  1115.1
10095.45 1115.16 10096.6 1115.2310096.94 1115.2610097.81 1115.4810099.47 1115.73
 10100.2 1115.8510102.01 1115.3910102.77 1115.2210111.25 1115.1210116.02 1115.04
10118.89 1115.0210192.82 1114.9410250.21 1114.6410253.26 1114.6310283.04 1114.78
10325.95 1114.57   10329 1114.5610329.35 1114.5610337.98 1114.5110343.13 1114.55
10346.53 1114.5310351.55 1114.7110355.39 1114.7810356.61 1114.83

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
  9890.9    .035 9939.97     .04 9987.89    .03510061.77     .04 10100.2    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9939.97 10100.2           80.464    74.2  85.789             .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
10066.8110356.61    1115       F

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.084

INPUT
Description: Q=190 cfs (SRD53, 24 hr)
Station Elevation Data    num=      91
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9903.28 1115.18 9906.51 1115.18 9915.17 1115.22 9918.82    1115 9924.54 1114.64
 9925.56 1114.46 9928.23 1113.82 9931.42 1114.65 9931.56 1114.69 9931.67 1114.72
 9932.97 1114.96 9936.45 1115.61 9936.89 1115.49 9940.98 1114.19 9941.37 1114.05
 9942.17 1113.82 9943.41 1113.51 9944.42 1113.75 9945.01 1113.91 9945.69 1113.95
 9946.21 1114.16 9950.72 1113.48 9951.26 1113.42 9953.21 1113.37 9955.93 1113.36
 9960.07 1113.36 9960.83 1113.37 9962.04 1113.29 9962.61 1113.25 9965.53 1113.19
 9966.23 1113.14 9968.74 1113.05 9969.79 1112.93  9971.9 1112.68 9976.08 1112.26
 9978.19 1111.97 9980.35 1111.59 9986.19 1111.11 9986.35 1111.11 9986.44  1111.1
  9986.8 1111.07 9993.11 1110.98 9994.53 1111.06 9997.87 1110.36 9999.33 1110.18
   10000 1110.1310000.82 1110.0610001.61 1109.9710004.41 1109.7810004.99 1109.76
10005.19 1109.5510006.21 1109.3610006.31 1109.3310008.34 1108.8110008.78 1108.93
10010.36 1109.5210011.81 1110.3710013.42 1111.0310014.66 1111.4310016.93    1112
10019.37  1112.510022.82 1113.2610026.61 1113.7310028.62 1114.03   10032 1113.98
10035.49    111410036.72 1113.9810037.31 1114.0210039.44 1113.9210039.95 1113.86
10040.12 1113.8510043.32 1113.7910044.48 1113.8510047.46  1113.910050.85 1113.93
10052.54 1113.8910056.73 1113.9310058.73 1114.3810060.52 1114.7110062.11 1114.99
10068.18 1114.6210069.23 1114.6310075.21  1114.710078.27  1114.710081.87 1114.72
10086.53 1114.7310094.08 1114.8510095.89  1114.910101.45 1114.8110111.19 1114.82
10114.87 1114.84

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9903.28    .035 9946.21     .0410028.62    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9946.2110028.62           82.791   77.89  81.561             .3       .5

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.069

INPUT
Description: Upstream of El Mirage Road
Station Elevation Data    num=      76
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9881.34 1115.42 9883.69  1115.4 9885.09 1115.38 9889.37 1115.43 9890.66 1115.45
 9891.18 1115.45 9901.16 1115.32 9909.84 1115.13 9920.59 1115.04 9932.05 1115.01
 9942.29 1114.93  9946.2 1114.92 9954.91 1114.93 9964.91 1114.89 9965.18 1114.89
 9965.25 1114.91 9965.38 1114.93 9967.58 1115.13 9968.59  1115.1  9969.4 1115.01
 9972.61 1114.89 9973.08 1114.79 9973.74 1114.39 9975.73 1114.21 9978.02 1114.19
    9981 1113.98 9981.95 1113.95 9982.87  1113.9 9984.62 1113.67 9987.62 1112.86
 9988.52 1109.34  9988.6 1109.23 9989.15 1109.12 9989.46 1109.09 9989.66 1109.08
 9990.98 1109.05 9993.98 1108.9710016.73 1109.6310019.34 1109.8610019.76  1109.9
10019.85 1109.9210020.11 1109.9910020.14 1110.0410020.54 1112.6410021.41 1112.83
 10022.7 1112.8310023.36 1113.0210025.04 1113.6910025.78 1113.6910028.17  1113.9
10030.44 1113.9410031.49 1113.95 10031.9 1113.9710034.26 1113.8210034.46 1113.81
10036.71 1113.8110044.74 1113.8310045.15 1113.8210045.42 1113.8210045.82 1113.87
10050.69 1114.1810051.78 1114.1710052.51 1113.9510054.06  1113.6 10057.3 1113.59
10059.48 1113.6310064.02 1113.4610076.66 1113.2410080.34 1113.2610092.14 1113.46
10095.12 1113.7610098.35 1113.9510106.66 1114.5610118.61 1115.0710122.15 1115.11
10123.36 1115.12

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9881.34    .035    9981     .04 9989.15    .03510019.34     .0410028.17    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          998110028.17          117.663  121.52 118.169             .3       .5

CULVERT


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.060

INPUT
Description:
Distance from Upstream XS =      29
Deck/Roadway Width        =      44
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
```

```
    num=        2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
9974.498 1114.32    110810028.33  1113.9    1108

Upstream Bridge Cross Section Data
Station Elevation Data    num=      76
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9881.34 1115.42 9883.69  1115.4 9885.09 1115.38 9889.37 1115.43 9890.66 1115.45
 9891.18 1115.45 9901.16 1115.32 9909.84 1115.13 9920.59 1115.04 9932.05 1115.01
 9942.29 1114.93  9946.2 1114.92 9954.91 1114.93 9964.91 1114.89 9965.18 1114.89
 9965.25 1114.91 9965.38 1114.93 9967.58 1115.13 9968.59  1115.1  9969.4 1115.01
 9972.61 1114.89 9973.08 1114.79 9973.74 1114.39 9975.73 1114.21 9978.02 1114.19
    9981 1113.98 9981.95 1113.95 9982.87  1113.9 9984.62 1113.67 9987.62 1112.86
 9988.52 1109.34  9988.6 1109.23 9989.15 1109.12 9989.46 1109.09 9989.66 1109.08
 9990.98 1109.05 9993.98 1108.9710016.73 1109.6310019.34 1109.8610019.76  1109.9
10019.85 1109.9210020.11 1109.9910020.14 1110.0410020.54 1112.6410021.41 1112.83
 10022.7 1112.8310023.36 1113.0210025.04 1113.6910025.78 1113.6910028.17  1113.9
10030.44 1113.9410031.49 1113.95 10031.9 1113.9710034.26 1113.8210034.46 1113.81
10036.71 1113.8110044.74 1113.8310045.15 1113.8210045.42 1113.8210045.82 1113.87
10050.69 1114.1810051.78 1114.1710052.51 1113.9510054.06  1113.6 10057.3 1113.59
10059.48 1113.6310064.02 1113.4610076.66 1113.2410080.34 1113.2610092.14 1113.46
10095.12 1113.7610098.35 1113.9510106.66 1114.5610118.61 1115.0710122.15 1115.11
10123.36 1115.12

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9881.34    .035    9981     .04 9989.15    .03510019.34     .0410028.17    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
          998110028.17             .3       .5

Downstream  Deck/Roadway Coordinates
    num=        5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
9980.659 1113.45    1108 10063.1    1113    110810118.06 1112.98    1108
 10176.5 1113.27    110810259.96 1113.93    1108

Downstream Bridge Cross Section Data
Station Elevation Data    num=      89
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9916.72 1114.42 9922.73  1114.4 9945.84 1114.19 9951.57 1114.16 9952.91 1114.15
 9954.59 1114.17 9967.43 1113.95  9967.7 1113.95 9968.14 1113.98 9971.88 1113.84
 9980.08 1113.59 9981.19 1113.33 9981.38  1113.2 9981.681112.854 9981.96 1112.53
 9983.22 1111.43  9985.6 1109.97 9988.44 1108.94 9989.81 1108.72 9990.45 1108.66
 9991.79 1108.59 9999.27 1108.25 9999.68 1108.24   10000 1108.2410000.66 1108.22
10003.03 1108.2510011.62 1108.4510013.02  1108.510014.15 1108.6210015.56    1109
10015.67 1108.9810015.731109.48410016.06 1112.2610018.89 1112.1410021.08 1112.32
10021.81 1112.2310025.52 1112.3610038.87 1112.1910045.51 1112.1210051.19 1112.03
10053.75 1112.0310055.26 1111.9910057.21    1112 10058.9 1112.06 10062.6 1112.04
10065.87 1112.0310070.58 1111.95 10094.4 1111.7910096.37 1111.4510098.92 1111.61
 10103.2 1111.7410111.39 1111.7910113.75 1111.94 10116.1 1111.7810116.71  1111.6
10119.72 1110.9710119.94 1110.9610121.19 1111.3310122.32 1111.7110122.62 1111.92
10123.19    111210124.93 1111.7210130.71 1111.7210133.97 1111.6410140.25 1112.09
10148.86  1112.210155.55 1112.2510158.43 1112.3410160.87 1112.4510170.72  1112.4
10193.34 1112.6910195.47  1112.7 10198.6 1112.7510206.85 1112.7910207.35 1112.83
10214.59 1113.0510229.53 1113.3310239.53 1113.43 10243.6  1113.510257.13  1113.8
10263.04 1114.0510264.49 1114.1210264.81 1114.1410265.22 1114.1610271.61 1114.26
10274.53 1114.2910278.53  1114.410280.24 1114.4510281.45 1114.45

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9916.72    .035 9981.68    .03510016.06    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
        9981.6810016.06            .3       .5
Right Levee     Station=10025.52      Elevation= 1112.36

Upstream Embankment side slope              =      40 horiz. to 1.0 vertical
Downstream Embankment side slope            =     100 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1          Box       3      14
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                .25     116     .014     .014        0                  .2                  1
Number of Barrels =  2
Upstream   Elevation =  1109.13
Centerline Stations
    Sta.    Sta.
9996.28310012.57
Downstream Elevation =  1108.99
Centerline Stations
    Sta.    Sta.
9992.98910008.45

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.046

INPUT
Description: Downstream of El Mirage Road
Station Elevation Data    num=      89
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9916.72 1114.42 9922.73  1114.4 9945.84 1114.19 9951.57 1114.16 9952.91 1114.15
 9954.59 1114.17 9967.43 1113.95  9967.7 1113.95 9968.14 1113.98 9971.88 1113.84
```

```
 9980.08 1113.59 9981.19 1113.33 9981.38  1113.2 9981.681112.854 9981.96 1112.53
 9983.22 1111.43  9985.6 1109.97 9988.44 1108.94 9989.81 1108.72 9990.45 1108.66
 9991.79 1108.59 9999.27 1108.25 9999.68 1108.24   10000 1108.2410000.66 1108.22
10003.03 1108.2510011.62 1108.4510013.02  1108.510014.15 1108.6210015.56    1109
10015.67 1108.9810015.731109.48410016.06 1112.2610018.89 1112.1410021.08 1112.32
10021.81 1112.2310025.52 1112.3610038.87 1112.1910045.51 1112.1210051.19 1112.03
10053.75 1112.0310055.26 1111.9910057.21    1112 10058.9 1112.06 10062.6 1112.04
10065.87 1112.0310070.58 1111.95 10094.4 1111.7910096.37 1111.4510098.92 1111.61
 10103.2 1111.7410111.39 1111.7910113.75 1111.94 10116.1 1111.7810116.71  1111.6
10119.72 1110.9710119.94 1110.9610121.19 1111.3310122.32 1111.7110122.62 1111.92
10123.19    111210124.93 1111.7210130.71 1111.7210133.97 1111.6410140.25 1112.09
10148.86  1112.210155.55 1112.2510158.43 1112.3410160.87 1112.4510170.72  1112.4
10193.34 1112.6910195.47  1112.7 10198.6 1112.7510206.85 1112.7910207.35 1112.83
10214.59 1113.0510229.53 1113.3310239.53 1113.43 10243.6  1113.510257.13  1113.8
10263.04 1114.0510264.49 1114.1210264.81 1114.1410265.22 1114.1610271.61 1114.26
10274.53 1114.2910278.53  1114.410280.24 1114.4510281.45 1114.45

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9916.72    .035 9981.68    .03510016.06    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9981.6810016.06          173.838  171.01 183.572             .3       .5
Right Levee     Station=10025.52      Elevation= 1112.36

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.014

INPUT
Description:
Station Elevation Data    num=      67
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9878.84 1114.54 9879.67  1114.6 9880.97 1114.64 9884.27 1114.64 9884.86  1113.4
 9887.29 1113.38 9893.75 1113.34 9895.62 1113.48 9896.76 1113.55 9898.29 1113.67
 9903.04 1113.88 9913.79 1113.89 9926.32 1113.81 9930.92 1113.94 9933.86 1114.01
 9938.44 1114.08 9944.96 1114.07 9946.29 1114.06 9950.57 1113.91 9953.04  1113.8
 9955.79 1113.42 9957.45 1113.22 9959.38 1112.95 9961.36 1112.75 9963.71 1112.56
 9964.06 1112.53 9967.28 1112.37  9969.2 1112.36 9970.83 1112.33 9973.33 1112.27
 9974.89 1112.22  9977.1 1112.22 9977.111112.215 9978.88 1111.38 9980.06 1110.79
 9983.19 1109.76  9983.3 1109.73 9983.52 1109.73 9993.18 1109.53 9999.99 1109.48
   10001 1109.4810005.28 1109.4710012.94 1109.57 10014.8 1109.6210018.81 1109.67
10019.72 1109.8110022.19 1110.0810026.09 1111.4310027.58 1111.9510029.81 1112.48
10031.38 1112.9210031.85 1112.99 10033.9  1113.310034.36 1113.3410038.07 1113.86
10040.36 1113.93   10042 1114.1310047.89 1114.2910048.14  1114.310052.52 1114.26
10055.33 1114.2610063.07 1114.2410078.29 1114.1710099.67 1114.1710113.84 1114.04
10122.81 1114.1910134.52  1114.3

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9878.84    .035 9977.11    .03510029.81    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9977.1110029.81          200.888  192.21 190.989             .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.978

INPUT
Description:
Station Elevation Data    num=      81
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9817.05 1112.04 9817.46 1112.03  9818.4 1111.99 9820.29 1111.94 9822.92 1111.82
 9824.38 1111.77 9826.54 1111.73  9828.5 1111.73 9832.04  1111.7 9834.62 1111.64
 9838.79 1111.51 9839.08  1111.5 9840.15  1111.5 9847.01 1111.17 9849.17 1111.08
 9854.72 1111.04 9856.59 1110.93  9862.5 1110.62 9865.19 1110.49 9866.96 1110.41
 9875.83 1109.99 9878.65 1109.84 9879.81 1109.82 9882.92 1109.78 9885.05  1109.9
 9889.44 1110.01 9889.68 1110.02 9906.19 1110.12 9913.86 1110.49 9914.64 1110.51
 9916.12 1110.52 9922.17 1110.52  9925.3 1110.51 9933.11 1110.44 9934.89 1110.41
 9939.13 1110.42 9951.13 1110.34 9953.72 1110.22 9960.52 1109.94 9966.96 1109.54
 9967.88 1109.49 9971.48 1109.41 9977.14  1109.3 9979.59 1109.22 9982.22 1108.98
 9983.07 1108.89 9987.56 1108.68 9987.69 1108.67 9988.38 1108.68 9992.75  1108.7
 9993.14 1108.72 9995.22 1108.6810005.56 1108.3710008.33 1108.3110009.57 1108.34
10013.79 1108.5510021.86 1109.2810023.55 1109.4310025.93 1109.7210026.83 1109.89
10029.461110.34810031.67 1110.7510034.58 1112.0410035.73 1112.4710038.76 1113.71
10039.07 1113.8910039.25 1113.9210040.18 1114.2710041.35 1113.8910042.85 1113.55
10043.65 1113.2410044.96 1112.8610048.39 1112.51 10048.5  1112.510054.15 1112.35
10054.85 1112.3510056.79 1112.3410058.17 1112.3810060.85  1112.510061.75 1112.56
10062.59 1112.56

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9817.05    .035 9951.13    .03510029.46    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9951.1310029.46          207.457  201.61 199.811             .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.940

INPUT
Description:
Station Elevation Data    num=      60
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9886.23 1112.17 9886.49 1112.13 9888.74 1111.88 9889.25 1111.81 9891.97 1111.54
 9895.95 1111.13 9897.66 1111.01 9905.91 1110.46 9912.14 1110.26 9915.97  1110.1
 9920.23 1110.02  9927.8 1109.79 9932.01  1109.8 9937.42 1109.77 9942.27 1109.94
 9943.16 1109.96 9943.79 1109.96 9946.01 1109.97 9949.52 1109.98 9951.49 1109.68
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 9956.31 1108.93  9962.8 1107.87 9962.98 1107.84 9963.18 1107.83 9973.48 1107.18
 9977.38 1107.08 9982.27 1106.87 9988.55 1106.73 9994.28 1106.67 9995.81 1106.66
  9999.5 1106.6810003.21 1106.7510006.28 1106.8310008.11 1106.9410011.38 1107.17
10013.66 1107.58 10017.9 1108.3210020.04 1108.6210025.09 1109.4210027.72 1109.94
10030.19 1110.34 10035.2 1111.0110036.56 1111.2210037.61 1111.5110038.39 1111.79
10040.12 1112.54 10040.9 1112.8210045.11 1113.3410045.29 1113.3610045.37 1113.28
10048.19 1110.9510050.08 1109.8210051.06 1109.3610052.01 1109.3610054.46 1109.42
10058.39 1109.7910058.55 1109.810058.71 1109.8210061.39 1110.0510062.53 1110.11

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9886.23    .035 9949.52    .03510027.72    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9949.5210027.72          268.111  252.94  250.15             .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.892

INPUT
Description:
Station Elevation Data    num=      79
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9895.34 1110.18 9904.04  1110.2 9906.99  1110.2  9923.9 1110.23 9924.22 1110.23
 9925.32 1110.26 9934.34 1110.46 9936.86 1110.51 9942.78 1110.35 9947.58 1110.28
 9953.97 1109.31 9957.19 1108.81 9962.68 1107.48 9963.19 1107.36 9966.68 1106.99
 9968.54 1106.66 9973.32 1106.49 9978.96 1106.34 9980.18 1106.32 9987.39 1106.34
 9994.48 1106.19 9999.81  1106.1   10000  1106.110003.03 1106.07 10008.1 1106.03
10008.88 1106.0210010.04 1106.0310016.48 1106.1610020.67 1106.23 10021.7 1106.32
10029.27 1106.9610033.27 1107.6410036.62 1108.1710041.16  1108.810046.94 1109.54
10052.62 1110.3310055.58 1110.71 10059.4 1112.35 10059.5  1112.410060.05 1112.65
10063.31 1113.9910064.46 1113.5710065.84 1113.0410067.11 1112.5210068.64 1111.89
 10071.2 1112.6810071.27  1112.710071.35  1112.710074.82 1112.8210074.89  1112.8
10078.11 1111.5610078.88 1111.13 10079.9 1110.6210083.78 1110.4910089.62 1110.34
10091.41 1110.2510097.96 1110.1410101.38 1110.1410106.07  1110.110106.49 1110.33
10107.79 1110.9510108.38 1111.0810110.26 1111.4410113.07 1110.8510114.66 1110.51
10116.43 1110.2510117.26 1110.2710117.47 1110.2710117.72 1110.2810119.91 1110.26
10132.07 1110.2310136.48 1110.2710139.75 1110.4710141.98 1110.5610158.57 1110.84
10159.18 1110.8310159.62 1110.8310159.89 1110.8410162.18 1110.83

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9895.34    .035 9947.58    .03510052.62    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9947.5810052.62          240.253   228.8 223.465             .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.848

INPUT
Description:
Station Elevation Data    num=      47
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9879.95 1109.93 9882.07 1109.74 9884.77 1109.43 9889.12 1109.17 9890.07 1109.09
 9891.21 1109.05 9895.38 1108.99 9896.26 1108.97 9902.19 1108.87 9904.07 1108.87
 9906.67 1108.93 9913.21 1108.88 9934.21 1108.97  9935.2 1108.97 9949.28 1109.27
 9957.42 1109.62 9959.16 1109.68 9960.84 1109.65 9966.26  1109.6 9967.71 1109.58
 9968.54 1109.46 9975.61 1108.32 9979.45 1107.84 9989.19 1106.78  9991.8 1106.51
 9995.34 1106.1210002.78 1105.2410004.29 1105.1710010.49 1105.0410012.42 1105.04
10014.36 1105.0310019.93 1105.1110023.59 1105.2410026.26 1105.93 10026.4 1105.95
10026.61 1106.0410030.08  1107.310034.17 1108.6810035.45 1109.1310037.17 1109.86
 10040.9 1111.3810046.12  1112.510048.24 1113.0310049.75 1113.25 10050.4 1113.35
10052.96 1113.51   10060 1113.91

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9879.95     .04 9967.71    .04510037.17     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9967.7110037.17          280.95  335.49  369.21             .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.785

INPUT
Description:
Station Elevation Data    num=      93
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9728.17 1110.15  9730.3 1110.31 9731.54  1110.4 9734.28 1110.63  9736.7 1110.68
 9742.18 1110.77 9755.28 1110.89 9758.31 1110.91 9766.65 1110.92 9783.91 1110.91
 9788.65  1110.9 9793.82 1111.11 9796.97 1111.16 9800.86 1110.92 9802.47 1110.83
 9803.27 1110.65 9807.75 1109.57 9810.78 1109.16 9811.81    1109 9812.85 1108.97
  9816.7 1108.76 9818.41 1108.66 9820.71 1108.56 9827.14 1109.58 9828.77 1109.86
 9829.79 1110.08 9832.83 1110.69 9836.42 1111.13 9838.38 1111.33 9841.08 1111.31
 9842.38 1111.32 9843.82 1111.16 9847.18 1110.65 9849.54 1110.35 9853.25  1109.7
 9857.42 1109.24 9857.52 1109.23 9857.59 1109.22 9865.32 1107.93 9868.04  1107.7
 9872.25 1107.31 9873.96 1107.19 9891.08 1106.83 9892.59  1106.8 9900.54 1106.53
 9910.49 1106.14 9913.44 1105.99 9921.89 1105.41 9928.14 1105.02 9933.91 1104.75
 9939.55 1104.53  9944.5 1104.35 9947.92 1104.27 9960.12 1104.02 9963.16 1103.95
 9964.54 1103.92 9970.91 1103.51 9975.99 1103.22 9978.04 1102.94  9981.3 1102.46
 9986.06 1101.97 9986.42 1101.92 9986.85 1101.88 9992.81 1101.45 9996.72 1101.12
 9999.06 1100.99   10000 1100.9810005.19 1100.8910007.76 1100.8710008.62 1100.88
10010.52 1100.9610018.49 1101.3910023.22 1102.1510025.73 1102.5610037.65 1104.14
10038.11  1104.210039.09 1104.2610048.61 1104.76 10052.5 1104.9710057.78 1105.31
10064.65 1105.6810067.59 1105.8210073.43 1106.01 10082.4 1106.3610093.55 1106.19
10099.66 1106.2410105.03 1106.2710105.85  1106.310108.23 1106.4610120.85 1107.16
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10124.27 1107.4910129.94 1107.9910131.44 1108.33

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9728.17     .04 9963.16    .04510037.65     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9963.1610037.65          148.273  142.54 137.798             .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.758

INPUT
Description:
Station Elevation Data    num=      79
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9796.01 1111.01 9799.65  1110.8  9802.5 1110.39  9803.5 1110.32 9804.27 1110.21
  9807.4    1110 9813.34 1109.49 9815.04 1109.33 9816.23 1109.47 9820.57 1109.79
 9820.89 1109.82 9827.35 1110.23 9828.47 1110.25 9834.83  1110.3 9835.59 1110.27
 9841.64 1110.14 9845.47 1110.05 9852.19 1109.41 9856.51 1108.99 9864.78 1107.75
 9864.86 1107.74 9865.31 1107.72 9883.28 1106.87 9884.86 1106.78 9895.48 1106.29
 9902.07 1106.11 9905.07 1105.98 9910.96 1105.87 9920.54 1105.65 9925.79 1105.56
 9938.52 1105.31 9947.11 1105.29 9947.12 1105.29  9952.9  1105.1 9963.94 1104.65
 9966.71 1104.53 9968.43 1104.48 9975.76 1104.29  9983.9  1104.1 9985.56 1104.05
 9985.68 1104.05 9992.86 1103.87  9996.4 1103.81 9997.03 1103.79 9997.29 1103.78
 9999.47 1103.78 9999.54 1103.77   10000 1103.7610002.13 1103.7210002.37 1103.72
10004.53  1103.710007.59 1103.7410007.99 1103.7410011.45 1103.5510013.44  1103.6
   10015 1103.67 10019.7 1103.8710022.96 1103.9810028.74 1104.1210032.54 1104.16
10039.28  1104.510040.62 1104.5610046.07 1104.6810059.47 1105.3610060.79 1105.45
10062.29 1105.4710081.46 1105.6510105.58 1105.7410119.05 1105.8610129.96 1106.22
10132.55 1106.2810143.35 1106.6610146.63 1106.7910149.16 1106.9110160.79 1107.52
10166.16 1107.8210169.72 1108.0410171.42 1108.1910173.27 1108.23

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9796.01     .04 9947.12    .04510059.47     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9947.1210059.47          180.652  169.35 171.347             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
   1005910173.27    1108        F

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.726

INPUT
Description:
Station Elevation Data    num=      96
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9756.86 1109.91  9760.2 1109.37 9762.41 1109.09  9763.5 1108.81 9764.76 1108.68
 9767.38 1108.34 9772.01 1107.53 9774.61 1107.09 9776.47 1106.93 9779.78 1106.61
 9784.07 1106.53 9791.74 1106.35 9794.93 1106.27 9800.07 1106.22 9801.85  1106.2
 9803.06  1106.2 9810.35 1106.11 9811.15 1106.11 9813.89 1106.05 9818.19 1105.93
 9822.34 1105.87  9825.9 1105.86 9830.16 1105.82 9833.16 1105.76 9847.11 1105.63
 9848.85 1105.62 9850.14 1105.63 9864.71 1105.47 9878.64 1105.29 9890.64 1105.19
 9898.97 1105.07 9899.13 1105.07 9899.52 1105.08 9909.55 1105.14 9911.88 1105.37
 9914.65 1105.62 9916.34 1105.78 9917.46 1105.73 9918.63 1105.74 9923.03 1105.59
 9923.28 1105.59 9923.93 1105.56 9928.49 1105.33 9929.18  1105.1 9930.42 1104.64
 9935.73 1103.54 9935.81 1103.52 9935.87 1103.52 9942.77 1103.33 9947.35 1103.24
  9952.5 1103.16 9955.06 1103.66 9956.64 1103.96 9957.66 1103.99 9958.55 1104.06
 9960.73 1104.08 9961.77 1104.06 9964.121103.662  9969.8 1102.84 9972.83  1101.9
 9973.58 1101.66 9991.33 1101.71   10000 1101.7710028.78 1101.8710029.94 1102.22
10030.98  1102.610033.41  1103.110034.23 1103.2510037.17 1103.5110039.29 1103.65
10042.66 1103.7110057.71 1103.8910059.55  1103.910061.07 1103.92 10066.3 1104.01
10069.06 1104.0510076.43 1104.0210078.17 1104.0210078.73 1104.0310086.76 1104.21
10094.61 1104.57   10101 1104.7310101.73 1104.7610103.11  1104.810107.97 1104.99
10108.74 1105.0610117.22 1105.9110123.64 1106.43   10125 1106.5210127.08 1106.62
10140.74 1107.0710146.39 1107.3410150.23 1107.4510151.15 1107.4510153.62 1107.39
 10154.2  1107.4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9756.86     .04 9964.12    .04510039.29     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9964.1210039.29          317.172   241.5 220.931             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 9756.86 9916.34  1107.5        T
   10095 10154.2  1107.5        T

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.680

INPUT
Description:
Station Elevation Data    num=      91
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9760.21 1109.83 9764.08 1108.95 9768.65 1107.78 9771.71 1107.07  9775.8 1106.02
  9776.7  1105.8 9777.28 1105.71 9781.43 1104.95  9782.1  1104.9 9790.48 1104.48
 9796.45  1104.3  9799.3 1104.25  9801.7 1104.19 9806.95 1104.01 9809.09 1103.96
 9811.93  1103.9 9814.99  1103.9  9818.4 1104.07 9827.93 1104.45 9829.66  1104.6
 9831.74 1104.74 9838.43 1105.18 9845.05 1105.51 9846.48 1105.55  9852.2  1105.7
 9854.04 1105.76 9857.65 1105.76 9859.89 1105.78 9863.37  1105.8 9865.96 1105.82
 9868.25  1105.8 9870.69 1105.75 9874.54 1105.69 9876.76 1105.63 9880.26 1105.56
 9884.07 1105.63 9886.41  1105.7  9887.4 1105.85 9890.31  1105.7 9892.09 1105.48
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 9898.75 1104.95 9899.85 1104.85 9902.38 1104.85 9903.99 1104.92 9910.89 1105.36
 9913.46    1105 9916.33 1104.57 9918.37 1104.21 9920.57 1103.83 9920.77 1103.81
 9927.02 1103.48 9928.01 1103.46  9928.7 1103.44 9939.75 1103.59  9955.1 1103.72
 9957.07 1103.86 9958.49    1104 9961.41 1103.98 9966.25 1103.79 9967.57 1103.52
 9970.131102.942  9971.3 1102.44 9972.78 1101.72 9983.16 1101.72 9991.94 1101.78
   10000 1101.8410013.87 1101.9210017.76 1101.9510020.89 1102.5810021.16 1102.62
 10021.6 1102.6410027.221103.04910031.94 1103.1110044.06 1103.4910046.41 1103.58
10053.81 1103.5910065.71 1103.6410080.46 1103.5110085.66 1103.64 10094.5 1103.53
10096.57 1103.5210099.97 1103.56 10103.6 1103.6210105.72  1103.7 10119.6 1104.09
10127.18 1105.0210132.96 1105.7110137.62 1105.7810146.39 1105.9810153.47 1106.98
10154.88 1107.17

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9760.21     .04 9970.13    .04510027.22     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9970.1310027.22           197.47  178.52 179.435              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9760.21    9945 1105.75       T

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.646

INPUT
Description:
Station Elevation Data    num=     129
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9688.51 1109.81 9688.72 1109.79 9689.62 1109.67 9690.43 1109.51  9695.3 1108.62
 9700.73    1108 9702.61 1107.93 9703.53 1107.85 9704.07 1107.82 9708.41  1107.5
  9712.9 1107.13 9714.37 1107.13 9716.47 1107.43 9720.86 1107.54  9723.8 1107.71
 9728.53 1107.77 9736.36 1107.73  9738.3 1107.69 9755.32 1107.65 9755.46 1107.65
 9774.04  1107.6 9774.17  1107.6 9781.51 1107.57 9783.18 1107.56 9789.97 1107.46
 9793.89 1107.51 9797.79 1107.52 9801.98 1107.56 9806.42 1107.52 9810.64 1107.55
 9817.07 1107.48 9825.63 1107.47 9835.38 1107.38 9839.99 1107.39  9843.1 1107.32
 9843.41 1107.32 9844.89 1107.39 9851.07 1107.32 9852.06  1107.3 9859.39 1107.31
 9868.21 1107.36 9870.33 1107.38 9870.59 1107.38 9870.94 1107.37 9881.75 1107.35
 9893.36 1107.25 9895.93 1107.28 9896.82 1107.22 9903.42 1107.22  9906.6 1107.28
 9908.82 1107.25 9909.33 1107.25 9917.05 1107.48 9927.12 1107.27 9927.83 1107.27
  9929.7 1107.26  9934.9 1106.91 9936.64 1106.81 9936.97 1106.82 9937.88 1106.83
 9945.48 1106.99 9950.55 1106.97 9954.86 1106.97 9963.88 1106.87 9964.54 1106.86
 9966.42 1106.77 9967.63 1106.66 9969.82 1106.47 9972.33 1106.26 9976.05 1106.06
 9977.31 1105.97 9978.01 1105.87 9981.92 1105.37  9982.9 1104.84 9984.29 1104.34
 9986.15 1103.84 9987.82 1103.13 9990.62 1102.39    9992    1102 9995.86  1102.1
 9996.62  1102.1 9999.99 1102.1310003.95 1102.1510009.25 1102.1910010.44 1102.19
10011.42 1102.5610011.99 1102.75 10013.1 1103.4310013.92 1104.03 10015.3 1104.79
10018.68 1104.9210020.69  1104.710022.63 1104.0310023.54 1103.6810024.07 1103.69
10025.52 1103.74 10026.2 1103.8210026.47 1103.6510026.53 1103.65 10027.9 1103.62
10028.04 1103.7310031.55 1104.0710031.94 1104.1110032.14 1104.1310032.21 1104.14
10032.39 1104.14 10032.7 1104.1510053.63 1104.6910057.34 1104.8810062.01 1104.99
10065.44 1105.0610074.86 1105.3110076.06 1105.3510089.08 1106.0310093.11 1106.13
10093.82 1106.16 10093.9 1106.1610094.51 1106.1810104.93 1106.46 10107.1  1106.5
10119.18 1106.3310121.49 1106.2610131.63 1106.08 10137.9 1106.0710140.73 1106.05
10142.31  1105.910146.58  1105.610151.31 1105.2410151.77 1105.23

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9688.51     .04  9982.9    .045 10015.3     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9982.9 10015.3          41.697   41.03  44.619              .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10018.6810151.77    1107       T
Right Levee     Station= 10107.1      Elevation=  1106.5

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.638

INPUT
Description: Upstream of Park Place
Station Elevation Data    num=     142
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9685.18 1109.06 9686.62 1108.78 9687.44 1108.59 9688.18 1108.46 9689.36 1108.25
 9690.18 1108.14 9691.53  1108.1 9697.06 1108.02 9698.97 1107.84 9707.38 1107.89
 9708.13 1107.93 9709.35 1107.94 9713.37 1107.95 9732.61 1107.74 9740.36 1107.52
 9740.84  1107.5 9741.53 1107.49 9749.23 1107.43 9752.52 1107.13 9755.53 1107.16
 9755.96 1107.15 9768.31 1107.23  9768.9 1107.23 9783.51 1107.25    9784 1107.25
 9794.62 1107.27 9794.88 1107.28 9794.96 1107.29 9804.78 1107.29 9812.66 1107.48
 9814.64 1107.47 9815.26 1107.48 9815.71 1107.45 9816.23 1107.42 9832.25 1107.03
  9834.3 1107.02 9836.93 1106.85 9838.39 1106.76 9839.46 1106.54 9839.78 1106.47
 9839.98 1106.48 9841.54 1106.62 9848.23 1106.56 9849.95 1106.51 9850.62  1106.4
  9851.4 1106.28 9852.03 1106.31 9852.65 1106.29  9853.5 1106.31 9857.81 1106.24
 9863.41 1106.06 9869.33 1105.97 9871.26 1105.95 9871.69 1105.94 9878.74 1105.85
 9880.88 1105.83 9890.01 1105.83 9891.89 1105.84 9900.15 1105.86 9900.58 1105.86
  9906.7 1105.76 9908.13 1105.75 9914.85 1105.64 9919.68  1105.7 9921.58 1105.67
 9926.99 1105.57 9927.18 1105.57 9928.14 1105.58 9936.89 1105.63 9944.27 1105.73
 9954.42 1105.91 9956.13 1105.95 9960.75 1106.07  9963.6 1106.17 9967.61 1106.21
 9972.06 1106.29 9973.59 1106.34 9978.21 1106.18 9978.99 1106.16 9980.47 1105.95
 9981.57 1105.41 9983.13 1104.57 9983.92 1104.19 9984.05 1104.12    9985 1103.67
 9985.74 1103.15 9986.52 1102.93 9988.13 1102.24   10000 1102.34 10001.7 1102.35
10005.76 1102.3810007.71 1102.3810007.79 1102.4310008.02 1102.4810008.32 1102.54
10009.01 1102.7210009.39 1102.8210009.74 1102.8910011.42 1103.0610014.29  1103.3
10018.06 1103.6810018.68 1103.7210019.88 1103.8710022.16 1104.3710022.23 1104.94
10022.37 1106.0910022.38 1106.1210024.72 1105.6510026.24 1105.6710029.59  1105.7
 10038.1 1105.4810041.07 1105.5510047.51 1105.5310053.31 1105.7710058.48 1105.79
10062.69 1105.78 10064.5  1105.8 10072.3  1105.810074.24 1105.7710085.18 1105.82
10085.26 1105.8310086.13 1105.8310097.47 1105.9210100.73 1105.86 10105.6 1105.81
10105.98 1105.8110108.34 1105.7710111.71 1105.7710115.39 1105.6710121.16 1105.63
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10123.26 1105.5510127.37 1105.5910131.13 1105.5910131.64 1105.5810131.73 1105.58
10131.86 1105.5710132.12 1105.5610136.86 1105.3310138.62 1105.2410140.71 1105.11
10141.64 1105.0810143.05 1105.04

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9685.18     .04 9978.99    .04510022.38     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9978.9910022.38           48.194   47.73  47.333             .3       .5
Right Levee     Station=10097.47      Elevation= 1105.92

CULVERT


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.634

INPUT
Description:
Distance from Upstream XS =       1
Deck/Roadway Width        =      46
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
9979.223 1106.13    110210022.35    1106    110210025.32 1106.01    1102
10053.45 1105.77    1102

Upstream Bridge Cross Section Data
Station Elevation Data    num=     142
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9685.18 1109.06 9686.62 1108.78 9687.44 1108.59 9688.18 1108.46 9689.36 1108.25
 9690.18 1108.14 9691.53  1108.1 9697.06 1108.02 9698.97 1107.84 9707.38 1107.89
 9708.13 1107.93 9709.35 1107.94 9713.37 1107.95 9732.61 1107.74 9740.36 1107.52
 9740.84  1107.5 9741.53 1107.49 9749.23 1107.43 9752.52 1107.13 9755.53 1107.16
 9755.96 1107.15 9768.31 1107.23  9768.9 1107.23 9783.51 1107.25    9784 1107.25
 9794.62 1107.27 9794.88 1107.28 9794.96 1107.29 9804.78 1107.29 9812.66 1107.48
 9814.64 1107.47 9815.26 1107.48 9815.71 1107.45 9816.23 1107.42 9832.25 1107.03
  9834.3 1107.02 9836.93 1106.85 9838.39 1106.76 9839.46 1106.54 9839.78 1106.47
 9839.98 1106.48 9841.54 1106.62 9848.23 1106.56 9849.95 1106.51 9850.62  1106.4
  9851.4 1106.28 9852.03 1106.31 9852.65 1106.29  9853.5 1106.31 9857.81 1106.24
 9863.41 1106.06 9869.33 1105.97 9871.26 1105.95 9871.69 1105.94 9878.74 1105.85
 9880.88 1105.83 9890.01 1105.83 9891.89 1105.84 9900.15 1105.86 9900.58 1105.86
  9906.7 1105.76 9908.13 1105.75 9914.85 1105.64 9919.68  1105.7 9921.58 1105.67
 9926.99 1105.57 9927.18 1105.57 9928.14 1105.58 9936.89 1105.63 9944.27 1105.73
 9954.42 1105.91 9956.13 1105.95 9960.75 1106.07  9963.6 1106.17 9967.61 1106.21
 9972.06 1106.29 9973.59 1106.34 9978.21 1106.18 9978.99 1106.16 9980.47 1105.95
 9981.57 1105.41 9983.13 1104.57 9983.92 1104.19 9984.05 1104.12    9985 1103.67
 9985.74 1103.15 9986.52 1102.93 9988.13 1102.24   10000 1102.34 10001.7 1102.35
10005.76 1102.3810007.71 1102.3810007.79 1102.4310008.02 1102.4810008.32 1102.54
10009.01 1102.7210009.39 1102.8210009.74 1102.8910011.42 1103.0610014.29  1103.3
10018.06 1103.6810018.68 1103.7210019.88 1103.8710022.16 1104.3710022.23 1104.94
10022.37 1106.0910022.38 1106.1210024.72 1105.6510026.24 1105.6710029.59  1105.7
 10038.1 1105.4810041.07 1105.5510047.51 1105.5310053.31 1105.7710058.48 1105.79
10062.69 1105.78 10064.5  1105.8 10072.3  1105.810074.24 1105.7710085.18 1105.82
10085.26 1105.8310086.13 1105.8310097.47 1105.9210100.73 1105.86 10105.6 1105.81
10105.98 1105.8110108.34 1105.7710111.71 1105.7710115.39 1105.6710121.16 1105.63
10123.26 1105.5510127.37 1105.5910131.13 1105.5910131.64 1105.5810131.73 1105.58
10131.86 1105.5710132.12 1105.5610136.86 1105.3310138.62 1105.2410140.71 1105.11
10141.64 1105.0810143.05 1105.04

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9685.18     .04 9978.99    .04510022.38     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9978.9910022.38              .3       .5
Right Levee     Station=10097.47      Elevation= 1105.92

Downstream  Deck/Roadway Coordinates
    num=       3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
9973.683 1106.12    11029979.883 1106.14    110210025.16    1106    1102

Downstream Bridge Cross Section Data
Station Elevation Data    num=     104
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9684.47 1108.61 9685.11 1108.59  9687.8 1108.75 9688.08 1108.67 9689.34 1108.05
  9690.7 1107.57 9692.01 1107.31 9692.83  1107.2  9693.7 1107.16  9694.6 1107.05
 9695.89 1107.04 9701.18 1106.76 9702.16 1106.74 9702.45 1106.72 9708.24  1106.6
 9710.45 1106.58 9716.75 1106.51  9717.2 1106.49 9721.76 1106.12 9737.28 1106.17
 9751.18 1106.26 9775.91 1106.55 9783.07 1106.51 9791.91 1106.36 9813.09 1105.96
  9830.6 1105.76 9834.75 1106.04 9835.86  1106.1 9842.04  1106.1 9846.68 1106.17
 9850.75 1106.18 9856.35 1106.36 9859.12 1106.48 9861.66 1106.41 9864.25 1106.42
 9882.56 1106.33 9885.04 1106.37 9885.58 1106.39 9885.91 1106.34 9886.43 1106.17
 9887.97 1106.34 9888.13 1106.35 9890.61 1106.48 9894.64 1106.58 9895.15 1106.59
 9895.53 1106.59 9899.73 1106.31 9902.91 1106.13 9908.57 1106.11 9919.86 1106.13
  9932.1 1106.64 9933.78 1106.68  9937.1 1106.63 9943.18 1106.49 9952.32 1106.41
 9954.27 1106.37 9957.96 1106.25 9961.61  1106.1 9962.19  1106.1 9964.07 1106.11
 9969.14 1106.05 9969.45    1106 9972.41 1106.13 9973.24 1106.14 9977.74  1105.9
 9979.49 1105.83  9979.8  1105.8 9980.35 1105.51 9982.84 1104.46 9983.16 1104.34
 9987.45 1102.63 9988.74 1102.04 9997.16 1102.15   10000  1102.210012.36  1102.4
10012.45  1102.410015.91 1103.0610019.51 1103.6410020.95 1104.1110021.09 1105.93
10021.09 1106.0110022.22 1105.9110022.77 1105.8710023.86 1105.9410026.57 1106.07
10038.15 1106.16 10043.9 1106.0510062.28 1106.0610068.42 1106.0510071.58 1106.05
10073.01 1105.98 10074.1 1105.9310078.87 1105.74 10084.7 1105.6110089.33 1105.41
10090.17 1105.3610091.89 1105.3310092.16 1105.3210092.24 1105.33 10097.2  1105.2
10099.77  1105.110101.67 1105.0410104.47 1105.0110105.61 1105.02

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9684.47     .03  9979.8    .04510021.09     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
        9979.810021.09              .3       .5
```

```
Right Levee     Station=10038.15      Elevation= 1106.16

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1          Box        3      10
FHWA Chart # 10- 90 degree headwall; Chamfered or beveled inlet
FHWA Scale # 1 - Inlet edges chamfered 3/4 inch
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                  1      46     .014     .014        0                .2                 1
Number of Barrels =  4
Upstream   Elevation =  1102.41
Centerline Stations
    Sta.    Sta.    Sta.    Sta.
9983.9589994.79810005.6310016.34
Downstream Elevation =  1102.18
Centerline Stations
    Sta.    Sta.    Sta.    Sta.
9983.1619994.10710004.8310015.76

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.629

INPUT
Description: Downstream of Park Place
Station Elevation Data    num=     104
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9684.47 1108.61 9685.11 1108.59  9687.8 1108.75 9688.08 1108.67 9689.34 1108.05
  9690.7 1107.57 9692.01 1107.31 9692.83  1107.2  9693.7 1107.16  9694.6 1107.05
 9695.89 1107.04 9701.18 1106.76 9702.16 1106.74 9702.45 1106.72 9708.24  1106.6
 9710.45 1106.58 9716.75 1106.51  9717.2 1106.49 9721.76 1106.12 9737.28 1106.17
 9751.18 1106.26 9775.91 1106.55 9783.07 1106.51 9791.91 1106.36 9813.09 1105.96
  9830.6 1105.76 9834.75 1106.04 9835.86  1106.1 9842.04  1106.1 9846.68 1106.17
 9850.75 1106.18 9856.35 1106.36 9859.12 1106.48 9861.66 1106.41 9864.25 1106.42
 9882.56 1106.33 9885.04 1106.37 9885.58 1106.39 9885.91 1106.34 9886.43 1106.17
 9887.97 1106.34 9888.13 1106.35 9890.61 1106.48 9894.64 1106.58 9895.15 1106.59
 9895.53 1106.59 9899.73 1106.31 9902.91 1106.13 9908.57 1106.11 9919.86 1106.13
  9932.1 1106.64 9933.78 1106.68  9937.1 1106.63 9943.18 1106.49 9952.32 1106.41
 9954.27 1106.37 9957.96 1106.25 9961.61  1106.1 9962.19  1106.1 9964.07 1106.11
 9969.14 1106.05 9969.45    1106 9972.41 1106.13 9973.24 1106.14 9977.74  1105.9
 9979.49 1105.83  9979.8  1105.8 9980.35 1105.51 9982.84 1104.46 9983.16 1104.34
 9987.45 1102.63 9988.74 1102.04 9997.16 1102.15   10000  1102.210012.36  1102.4
10012.45  1102.410015.91 1103.0610019.51 1103.6410020.95 1104.1110021.09 1105.93
10021.09 1106.0110022.22 1105.9110022.77 1105.8710023.86 1105.9410026.57 1106.07
10038.15 1106.16 10043.9 1106.0510062.28 1106.0610068.42 1106.0510071.58 1106.05
10073.01 1105.98 10074.1 1105.9310078.87 1105.74 10084.7 1105.6110089.33 1105.41
10090.17 1105.3610091.89 1105.3310092.16 1105.3210092.24 1105.33 10097.2  1105.2
10099.77  1105.110101.67 1105.0410104.47 1105.0110105.61 1105.02

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9684.47     .03  9979.8    .04510021.09     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9979.810021.09          101.394  100.66 100.204            .3       .5
Right Levee     Station=10038.15      Elevation= 1106.16

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.610

INPUT
Description:
Station Elevation Data    num=      45
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9945.38 1106.54 9946.99 1106.54 9949.69  1106.5 9953.63 1106.52 9953.79 1106.52
 9954.07  1106.5 9956.41 1106.31  9962.8 1105.81 9964.33  1105.6 9973.98 1104.34
 9981.36 1103.58 9982.08 1103.49 9982.63 1103.45 9988.24 1102.92  9992.3 1102.49
 9993.27 1102.45 9993.62 1102.34 9994.06 1102.17 10000.9 1102.0910007.31 1102.04
10007.52 1102.1410007.74 1102.2610008.11 1102.39 10010.3 1102.7110014.84 1103.32
10015.88 1103.4410016.66 1103.5610026.77 1105.1610034.11  1106.1 10041.7    1107
10042.08 1107.0310045.37  1107.110048.32 1106.9410049.86 1106.9710062.58 1106.72
10064.23 1106.6610071.92 1106.6610075.44 1106.6510077.83 1106.5410085.26 1106.18
 10086.1 1106.1210091.39 1105.57 10092.3 1105.5910093.33 1105.6610093.47 1105.66

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9945.38     .03 9954.07    .045 10041.7     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9954.07 10041.7          142.218   143.1 144.798            .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.583

INPUT
Description:
Station Elevation Data    num=      44
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
 9940.82    1106 9944.43 1106.03 9951.29 1106.03 9956.01 1106.05 9956.83 1106.05
 9956.98 1106.06  9957.4 1106.04  9957.9 1106.04 9963.72 1105.94 9965.71 1105.82
 9967.18 1105.78 9969.82  1105.5 9975.93 1104.74 9977.34 1104.58 9984.65 1103.49
 9987.23 1103.16 9988.35 1102.88 9989.76 1102.61 9991.14 1102.33 9999.17 1102.28
   10000 1102.2810007.36 1102.2610007.55  1102.310008.33 1102.59 10011.6 1103.04
10013.94 1103.3710020.05 1104.4310022.55 1104.7910032.58  1106.110036.57 1106.61
10041.18 1107.1210042.37 1107.2710043.37 1107.25 10048.2 1106.9710052.62 1106.91
10059.13 1106.9110067.49 1106.93 10073.8 1106.9210083.72 1106.4710086.06 1106.37
 10087.6 1106.2110092.67 1105.6410094.05 1105.5710094.59 1105.56

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9940.82     .03 9967.18    .04510032.58     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9967.1810032.58          263.346  263.98 264.462             .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.533

INPUT
Description:
Station Elevation Data    num=      63
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9902.68 1104.65 9909.04 1104.61 9923.46 1104.65 9934.86 1104.55  9941.1 1104.45
 9955.85 1104.64 9958.17 1104.68 9959.83 1104.58 9973.74 1103.79 9974.51 1103.69
 9982.62  1102.6 9989.97 1101.84 9990.43 1101.79 9990.88 1101.68 9992.03 1101.42
 9993.06 1101.16   10000 1101.1210000.69 1101.1110006.24 1101.0810006.59 1101.19
10007.65 1101.3810010.08 1101.7210013.41 1102.0710015.61 1102.2610020.11 1102.78
10026.03 1103.7210026.39 1103.79   10030 1104.1810036.28 1104.89 10041.5 1105.27
10042.11 1105.32 10042.2 1105.3210047.44 1105.4810048.43 1105.5210055.29 1105.77
10057.04 1105.7210060.32 1105.5810064.76 1105.6510065.98 1105.6610068.63 1105.76
10069.22 1105.7710075.07  1105.610077.26 1105.54 10081.3 1105.5610091.13 1105.07
10091.31 1105.0710091.38 1105.0610095.73 1104.7110097.15 1104.7810113.34 1104.59
10116.62 1104.5710124.25 1104.5610126.64 1104.5510129.01 1104.4910136.68 1104.65
10137.79 1104.6810155.83 1104.8610157.75 1104.8910159.69 1104.89 10170.1 1105.06
10182.88 1105.1110197.85 1105.2610205.16 1105.25

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9902.68     .03 9958.17    .04510036.28     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9958.1710036.28          176.53  173.45 173.415             .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.500

INPUT
Description:
Station Elevation Data    num=      91
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9886.43 1103.92 9894.88 1103.91 9895.03 1103.91 9896.83 1103.95  9897.1 1103.95
 9902.88 1104.06 9905.04 1104.05 9911.01 1104.05 9917.51 1103.99 9918.97 1103.99
 9919.29 1103.98 9922.12 1103.99 9926.14 1103.96 9926.51 1103.96 9930.56 1103.98
 9931.86 1103.97 9935.05 1103.96 9939.63 1103.84  9941.3 1103.79 9944.88 1103.58
 9950.05 1103.37 9951.58 1103.29 9957.63 1102.86 9957.76 1102.86 9960.12 1102.54
 9960.92 1102.44 9961.25 1102.42 9971.66 1101.85 9971.89 1101.84 9983.26 1100.97
 9986.28 1100.76 9986.34 1100.75 9986.42 1100.74 9990.12 1100.44 9991.61 1100.38
  9992.5 1100.28 9994.48 1099.43 9994.68 1099.34 9995.14 1099.35   10000 1099.48
10004.62  1099.610009.24  1099.810010.09    110010010.42 1100.0510010.64 1100.33
10010.98 1100.7710011.44 1101.6110012.36 1101.8110012.99  1101.910016.62 1102.45
10023.03 1103.2510025.26 1103.3610030.36  1103.710030.83 1103.7310038.011104.079
10038.86 1104.1210039.73 1104.1410046.97 1104.0910048.56 1104.13   10050 1104.07
10053.46 1104.0110056.15 1103.9910057.01 1103.9810059.49 1103.8510069.47 1103.87
 10071.3 1103.8410082.96 1103.7510086.56 1103.6510090.41  1103.210093.06    1103
   10103 1103.0710105.49 1103.0510112.32 1103.1210117.35 1103.1410119.84 1102.96
10120.35 1102.9110120.64 1102.9710123.35  1103.310125.53 1103.4310128.71 1103.65
10131.28 1103.7310134.23 1103.73 10142.7 1103.9110167.04 1104.2110167.96 1104.23
10168.97 1104.2410169.51 1104.21 10173.2 1104.1710175.33 1104.5610175.63 1104.61
10175.68 1104.61

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9886.43     .03 9935.05    .04510038.01     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9935.0510038.01           26.431   35.85   38.41             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9886.43    9940    1104       T
Right Levee     Station=10039.73      Elevation= 1104.14

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.493

INPUT
Description:
Station Elevation Data    num=      95
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9876.55 1103.81 9882.75 1103.85 9883.96  1103.9 9884.67 1103.96  9889.5 1104.28
 9894.25 1104.63 9894.29 1104.23 9896.21 1104.31 9912.81 1103.75 9917.93  1103.7
 9922.88 1103.64 9925.36 1103.63  9927.6 1103.63  9929.6 1103.58 9930.26 1103.54
 9932.01 1103.52 9932.25 1103.52 9933.18 1103.51 9934.71 1103.44 9935.42  1103.4
 9944.21 1102.58 9947.26 1102.39 9947.79 1102.39 9949.11 1102.38 9951.35 1102.33
 9955.75 1102.24 9958.06 1102.12 9960.98 1102.03    9964 1101.96 9964.76 1101.93
 9964.97 1101.92 9969.17  1101.9 9971.62 1101.88 9972.54 1101.88 9974.68 1101.75
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 9978.22 1101.93 9979.68 1101.84 9983.96 1101.53 9984.34 1101.53  9984.5  1101.5
 9986.26  1101.5 9990.29 1101.76 9990.64 1101.74 9991.01 1101.68 9991.71 1101.49
 9995.92 1100.04  9996.5  1099.8  9996.8 1099.67 9998.25 1099.72   10000 1099.79
10005.21 1099.9810005.67 1100.1410007.17 1100.6410008.71 1101.9410009.25 1102.23
10010.09 1102.3410012.11 1102.49 10015.3 1102.6310017.34 1102.9110020.44 1103.19
10023.72 1103.5210025.05 1103.6510027.46 1103.7310032.57 1103.8710034.96 1103.85
10044.29 1103.8310048.02  1103.710048.79 1103.6910049.22 1103.6810052.57 1103.76
10053.68 1103.7710063.44 1103.8310065.79 1103.8410069.88  1103.810083.79 1103.69
10085.47 1103.5310091.38 1102.92 10094.1 1102.9610096.18 1102.9310100.34 1102.97
10106.42 1102.9110109.65 1102.8910113.58 1102.9210116.57 1103.09 10120.6  1103.3
10123.59 1103.41   10128 1103.5610132.21 1103.7710137.12 1103.8810146.54 1103.83
10155.61 1103.8510165.42 1103.9310168.39 1104.0110170.36 1104.0810172.07 1104.34

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9876.55     .03 9934.71    .04510025.05     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9934.7110025.05           19.026   10.88   9.936             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9876.55    9952    1104       T
Right Levee     Station=10032.57      Elevation= 1103.87

BRIDGE


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.492

INPUT
Description:
Distance from Upstream XS =       1
Deck/Roadway Width        =     7.5
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
9978.765 1101.89 1100.399990.325 1102.58 1101.0810001.25 1102.93 1101.43
10016.51  1103.3  1101.810025.05 1103.65 1102.15

Upstream Bridge Cross Section Data
Station Elevation Data    num=      95
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9876.55 1103.81 9882.75 1103.85 9883.96  1103.9 9884.67 1103.96  9889.5 1104.28
 9894.25 1104.63 9894.29 1104.23 9896.21 1104.31 9912.81 1103.75 9917.93  1103.7
 9922.88 1103.64 9925.36 1103.63  9927.6 1103.63  9929.6 1103.58 9930.26 1103.54
 9932.01 1103.52 9932.25 1103.52 9933.18 1103.51 9934.71 1103.44 9935.42  1103.4
 9944.21 1102.58 9947.26 1102.39 9947.79 1102.39 9949.11 1102.38 9951.35 1102.33
 9955.75 1102.24 9958.06 1102.12 9960.98 1102.03    9964 1101.96 9964.76 1101.93
 9964.97 1101.92 9969.17  1101.9 9971.62 1101.88 9972.54 1101.88 9974.68 1101.75
 9978.22 1101.93 9979.68 1101.84 9983.96 1101.53 9984.34 1101.53  9984.5  1101.5
 9986.26  1101.5 9990.29 1101.76 9990.64 1101.74 9991.01 1101.68 9991.71 1101.49
 9995.92 1100.04  9996.5  1099.8  9996.8 1099.67 9998.25 1099.72   10000 1099.79
10005.21 1099.9810005.67 1100.1410007.17 1100.6410008.71 1101.9410009.25 1102.23
10010.09 1102.3410012.11 1102.49 10015.3 1102.6310017.34 1102.9110020.44 1103.19
10023.72 1103.5210025.05 1103.6510027.46 1103.7310032.57 1103.8710034.96 1103.85
10044.29 1103.8310048.02  1103.710048.79 1103.6910049.22 1103.6810052.57 1103.76
10053.68 1103.7710063.44 1103.8310065.79 1103.8410069.88  1103.810083.79 1103.69
10085.47 1103.5310091.38 1102.92 10094.1 1102.9610096.18 1102.9310100.34 1102.97
10106.42 1102.9110109.65 1102.8910113.58 1102.9210116.57 1103.09 10120.6  1103.3
10123.59 1103.41   10128 1103.5610132.21 1103.7710137.12 1103.8810146.54 1103.83
10155.61 1103.8510165.42 1103.9310168.39 1104.0110170.36 1104.0810172.07 1104.34

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9876.55     .03 9934.71    .04510025.05     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9934.7110025.05             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9876.55    9952    1104       T
Right Levee     Station=10032.57      Elevation= 1103.87

Downstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
9975.005 1101.97 1100.479985.255 1102.58 1101.089996.195 1102.93 1101.43
10015.75  1103.3  1101.810024.67 1103.65 1102.14

Downstream Bridge Cross Section Data
Station Elevation Data    num=     103
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9876.55  1104.6 9877.51 1104.67 9877.55 1104.91 9877.65 1105.33 9881.83 1105.32
 9885.88  1105.3  9889.5 1105.22 9895.71  1105.1 9895.77 1104.62  9895.8 1104.23
  9903.1 1103.97 9922.85 1103.49 9922.861103.489  9923.3 1103.44 9923.61 1103.42
 9924.12 1103.38  9928.9 1102.95 9932.52 1102.81 9933.23 1102.76 9935.69 1102.65
 9937.62 1102.58 9938.92 1102.53 9941.72 1102.39 9944.96 1102.37 9945.48 1102.36
 9946.86 1102.37 9948.47 1102.39  9949.8 1102.39 9952.17 1102.35 9953.79 1102.27
 9957.25 1102.13 9960.15 1102.04 9963.98 1101.95 9965.73 1101.94 9971.61 1101.92
 9972.68 1101.92 9977.01 1102.01 9978.68 1101.92 9979.86 1101.87 9980.98 1101.71
 9984.89 1101.19 9985.88 1101.05 9986.29 1101.01 9988.14 1100.77 9990.17 1100.96
  9994.8 1099.91 9995.61  1099.6 9999.92 1099.77   10000 1099.7710001.86 1099.92
 10003.3 1099.9510005.21 1099.9610007.72 1100.7810008.17 1100.9310008.61 1101.06
10010.09 1101.3310011.71 1101.77 10012.1 1101.7710013.23  1102.110013.43 1102.48
10013.55    110310013.69 1103.0510016.47 1103.0810017.69  1103.110018.67  1103.2
10019.97 1103.2810022.09 1103.4410023.07  1103.510024.67 1103.6410024.72 1103.65
10025.64 1103.6510029.55 1103.75 10031.5 1103.77 10038.8 1103.7810040.97 1103.76
 10043.9 1103.7510045.54  1103.710048.32 1103.6110049.86 1103.6810052.12 1103.74
10065.32 1103.8110083.12 1103.6510091.42 1102.8710100.65 1102.7310105.97 1102.78
10111.22  1102.810112.17 1102.81   10114 1102.8910114.96 1102.9210115.96 1102.97
 10117.6 1103.0910122.23 1103.3510124.81 1103.47 10126.1 1103.5610129.65 1103.73
10133.42 1103.8610145.85  1103.810146.06  1103.810164.31 1103.9410164.88 1103.94
10165.26 1103.9610170.62 1104.0910172.06 1104.39
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9876.55     .04 9922.86    .04510023.07     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9922.8610023.07          .3        .5
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
 9876.55    9978    1104       T

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.491

INPUT
Description:
Station Elevation Data    num=     103
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9876.55  1104.6 9877.51 1104.67 9877.55 1104.91 9877.65 1105.33 9881.83 1105.32
 9885.88  1105.3  9889.5 1105.22 9895.71  1105.1 9895.77 1104.62  9895.8 1104.23
  9903.1 1103.97 9922.85 1103.49 9922.861103.489  9923.3 1103.44 9923.61 1103.42
 9924.12 1103.38  9928.9 1102.95 9932.52 1102.81 9933.23 1102.76 9935.69 1102.65
 9937.62 1102.58 9938.92 1102.53 9941.72 1102.39 9944.96 1102.37 9945.48 1102.36
 9946.86 1102.37 9948.47 1102.39  9949.8 1102.39 9952.17 1102.35 9953.79 1102.27
 9957.25 1102.13 9960.15 1102.04 9963.98 1101.95 9965.73 1101.94 9971.61 1101.92
 9972.68 1101.92 9977.01 1102.01 9978.68 1101.92 9979.86 1101.87 9980.98 1101.71
 9984.89 1101.19 9985.88 1101.05 9986.29 1101.01 9988.14 1100.77 9990.17 1100.96
  9994.8 1099.91 9995.61  1099.6 9999.92 1099.77   10000 1099.7710001.86 1099.92
 10003.3 1099.9510005.21 1099.9610007.72 1100.7810008.17 1100.9310008.61 1101.06
10010.09 1101.3310011.71 1101.77 10012.1 1101.7710013.23  1102.110013.43 1102.48
10013.55    110310013.69 1103.0510016.47 1103.0810017.69  1103.110018.67  1103.2
10019.97 1103.2810022.09 1103.4410023.07  1103.510024.67 1103.6410024.72 1103.65
10025.64 1103.6510029.55 1103.75 10031.5 1103.77 10038.8 1103.7810040.97 1103.76
 10043.9 1103.7510045.54  1103.710048.32 1103.6110049.86 1103.6810052.12 1103.74
10065.32 1103.8110083.12 1103.6510091.42 1102.8710100.65 1102.7310105.97 1102.78
10111.22  1102.810112.17 1102.81   10114 1102.8910114.96 1102.9210115.96 1102.97
 10117.6 1103.0910122.23 1103.3510124.81 1103.47 10126.1 1103.5610129.65 1103.73
10133.42 1103.8610145.85  1103.810146.06  1103.810164.31 1103.9410164.88 1103.94
10165.26 1103.9610170.62 1104.0910172.06 1104.39

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9876.55     .04 9922.86    .04510023.07     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9922.8610023.07          43.874   26.68  27.762            .3        .5
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
 9876.55    9978    1104       T

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.486

INPUT
Description:
Station Elevation Data    num=      94
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9863.86 1103.45 9867.68 1103.48 9869.56 1103.43 9874.17 1103.46  9874.5 1103.46
 9877.21 1103.32 9886.83 1102.85 9891.25 1102.65 9893.68 1102.48 9896.61 1102.31
 9901.18 1102.01 9901.46 1101.99 9906.86 1101.85 9910.48 1101.73 9910.69 1101.72
 9910.86 1101.71 9914.21 1101.79 9915.29 1101.79 9925.81 1101.71 9926.98 1101.71
  9927.4 1101.69 9931.23 1101.83 9937.07 1102.07 9938.33 1102.23 9940.34 1102.74
 9941.82 1103.02  9943.4  1103.1 9948.05 1103.21 9958.93 1103.17 9965.28 1102.79
  9967.2 1102.73 9969.51 1102.73 9970.37  1102.7 9971.59 1102.65 9972.48 1102.61
 9973.58 1102.55 9975.59 1102.43 9977.75 1102.31 9983.48 1101.09 9985.11 1100.77
 9985.64 1100.73 9988.55 1100.49 9989.49 1100.41 9991.56 1100.14  9992.6 1100.06
 9992.84 1099.94 9993.48 1099.64 9994.58 1099.6610006.92 1099.8510008.33 1100.26
 10009.2 1100.5310011.13    110110011.79 1101.1110014.55 1101.7210015.58 1101.95
10015.87 1102.0210017.93 1102.4610024.941103.18810025.33 1103.2310026.06 1103.31
10027.61 1103.5810029.61 1103.52 10033.9 1103.5710034.87  1103.610042.08 1103.88
10042.75 1103.8610047.08 1103.6210047.72 1103.4910049.23 1103.5710051.45 1103.68
10062.16 1103.7410066.36  1103.7 10082.3 1103.4110089.04 1102.8710091.89 1102.83
10102.17 1102.6210109.53 1102.7210116.51 1102.72 10119.2 1103.0110121.78 1103.28
10123.02 1103.4410131.73 1103.7310132.71 1103.7710133.85 1103.7610145.42 1103.78
10148.48  1103.810163.15 1103.9410165.58 1104.0210169.71 1104.0910170.96 1104.27
10171.23 1104.2810171.34 1104.2910171.53  1104.310174.93 1104.29
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9863.86     .04 9958.93    .04510024.94     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9958.9310024.94          288.832  294.72 302.293             .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.431

INPUT
Description: Q=290 cfs (CPD54, 24 hr)
Station Elevation Data    num=     117
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  9927.3 1102.25 9927.36 1102.25 9927.91 1102.22 9929.75 1102.08 9931.22 1101.95
 9936.36 1101.32 9937.67 1101.01 9941.51 1100.41  9946.6 1099.44 9950.281098.732
 9952.25 1098.51 9960.08 1097.72 9964.77 1097.02  9965.1 1096.96 9965.33 1096.92
 9965.56 1096.84 9965.88 1096.74 9967.79 1096.08 9969.24 1094.63 9970.08 1093.76
 9970.58 1093.57 9970.84 1093.51 9971.36 1093.44 9973.47 1092.9410013.84 1092.94
10015.97 1093.4710016.52 1093.5910017.03 1094.1610018.63 1096.1610018.97 1096.19
10029.18 1097.5210029.77 1097.5410034.65 1097.9510038.07 1098.1710040.39 1098.26
10043.02 1098.4110047.02 1098.5610047.55 1098.58   10048 1098.5810050.43 1098.34
10055.85 1097.77 10057.4 1097.6410062.05 1097.3310063.67 1097.3110069.84 1097.26
10073.32 1097.1810087.16 1097.2610089.76  1097.310093.64 1097.3510105.77 1097.62
10111.24 1097.67 10112.4 1097.6410116.47  1097.710116.63 1097.7110121.72 1098.16
10123.86 1098.3310125.61 1098.4910126.85 1098.5610130.17 1098.9110133.67 1099.45
10134.99 1099.8610138.83 1101.0610143.25 1101.7210143.82 1101.7910145.11 1101.93
10147.55 1102.0710150.37 1102.1110150.76 1102.1210151.27 1102.1110155.41 1101.92
10157.78 1101.8310160.55 1101.5910163.98 1101.2310166.15 1101.0810171.39 1101.16
10175.09 1101.2610178.89 1101.3310179.59 1101.3310180.51 1101.3910181.82 1101.45
 10187.7 1101.7710191.13 1101.95 10193.9 1102.0810198.49 1102.2110200.51 1102.26
10202.97  1102.310211.57 1102.3610219.69 1102.3310221.79 1102.3310225.28 1102.32
10228.66 1102.2410231.16 1102.2310232.33 1102.2610245.32 1102.1410247.81 1102.11
10254.54 1101.5110256.53 1101.4910258.64 1101.4610262.96 1101.2210265.89 1101.41
10267.76 1101.59 10269.2  1101.710274.52 1101.72 10276.9 1101.5510278.13 1101.56
10279.42 1101.4710282.28 1101.7910285.59 1102.14 10289.9 1102.2210293.57 1102.26
10305.63 1102.5410313.81 1102.7110315.27 1102.7110324.73 1102.6510328.72 1102.67
10334.73 1102.7210334.77 1102.72

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  9927.3     .04 9950.28    .04510047.02     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9950.2810047.02          361.758     277 194.234             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    994810047.02    1096        T
10047.0210334.77    1100        T

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.378

INPUT
Description:
Station Elevation Data    num=     156
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9763.97 1099.29 9764.44 1099.31    9769 1099.37 9769.78 1099.36 9773.98 1099.17
 9775.36 1099.09 9778.63 1099.13 9780.18 1099.13 9780.97 1099.14 9782.71 1099.05
 9784.93 1098.95 9785.04 1098.91 9785.25 1098.85 9786.32 1098.57 9787.16  1098.4
 9788.28  1098.1  9788.4 1098.08 9789.51 1097.97 9789.99 1097.95 9790.76  1097.9
 9792.25 1097.97 9792.73 1098.04 9794.77 1098.44 9794.95 1098.42 9795.86 1098.33
 9797.85 1098.16 9798.32 1098.11 9799.16  1098.2 9801.67 1098.52 9805.81 1098.78
 9806.51 1098.83 9807.53 1098.81 9810.15 1098.71 9814.18 1098.62 9822.42 1098.35
  9824.6 1098.26 9828.64 1098.18 9831.16 1098.07 9832.29 1098.05 9837.63 1097.86
  9839.7 1097.76 9841.23 1097.67 9843.91 1097.44 9844.78 1097.37 9846.92 1097.14
 9849.17 1097.14 9855.01 1097.03 9857.98 1096.99 9864.12 1096.85 9864.61 1096.84
 9864.75 1096.84 9869.29 1096.69 9869.97 1096.64 9874.62 1096.43 9883.01 1095.95
 9883.68 1095.91 9884.32 1095.88    9899 1095.67 9899.37 1095.66 9899.72 1095.66
  9909.6 1095.52 9916.63 1095.44 9922.56  1095.3 9927.71 1095.27 9928.74 1095.33
 9931.02 1095.45 9932.64 1095.51 9937.56 1095.63 9937.71 1095.64 9937.92 1095.64
 9940.13 1095.74  9940.9 1095.78 9946.27 1095.76 9948.87 1095.82 9950.73 1095.96
 9953.73 1096.14 9955.46 1096.14 9961.12 1096.33 9962.39 1096.24 9965.45 1096.14
 9968.82 1095.83 9971.13 1095.66 9976.89  1095.1 9978.33 1095.01 9978.99 1094.96
 9980.45 1094.37 9982.85 1093.57 9984.58 1092.9410024.95 1092.94 10028.1 1093.93
10028.33 1094.01 10028.5 1094.0510028.57 1094.07 10032.4 1095.2310036.15 1095.54
10036.94 1095.6110037.63 1095.6110042.69  1095.810047.38 1096.0210051.86 1096.26
10060.51  1097.110060.63 1097.1210062.14 1097.3510069.24 1098.4410069.56 1098.48
10070.06 1098.5410080.15 1099.5310091.28 1100.09 10093.6 1100.2410095.83 1100.25
10109.34 1100.4210121.09 1099.76 10123.2 1099.5410128.32 1098.8910131.33 1098.36
10135.43 1097.4710140.24 1097.1410142.51 1097.0310146.17 1096.8610146.95 1096.87
10149.67 1097.0810150.05  1097.110152.05 1097.3710157.31 1098.2310158.27 1098.46
10162.98 1099.4510163.84 1099.64 10166.1  1100.310167.63 1100.5610169.32 1100.74
10170.86 1100.98 10172.7 1101.2310174.99 1101.5110183.26 1101.65 10190.8 1101.57
10197.96 1101.57 10202.5 1101.6810204.26 1101.6910205.22 1101.6610208.84  1101.6
10223.21 1101.6110227.48 1101.6210229.97 1101.3810236.53 1100.8810249.58 1100.95
10250.72 1100.9610251.97    110110264.73 1101.3810269.44 1101.5510273.25 1101.75
10278.24 1101.7710288.91 1101.9610293.28 1102.0810312.51 1102.2110315.02  1102.2
10315.94 1102.22

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9763.97     .04 9961.12    .04510051.86     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9961.1210051.86          200.764  172.52 164.388             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 9763.979871.195  1099.5        T
9871.19510315.94    1096        T
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Right Levee     Station=10109.34      Elevation= 1100.42

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.345

INPUT
Description:
Station Elevation Data    num=     102
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9824.48  1102.1 9827.67  1102.1 9828.93 1102.09  9837.3 1102.15 9840.45 1102.07
 9844.46 1101.99 9848.56 1101.96 9851.96 1101.95  9863.7 1101.94 9864.39 1101.93
 9865.25 1101.93 9875.81 1101.81 9877.16 1101.78 9879.21 1101.74 9881.54  1101.7
    9882 1101.67 9884.09 1101.58 9885.66 1101.52 9887.59 1101.45 9889.12 1101.42
 9889.58 1101.41 9892.02 1101.41 9893.45 1101.42 9894.86 1101.44 9896.42 1101.49
 9898.42  1101.6 9898.61 1101.61 9900.03 1101.64 9903.25 1101.65 9905.06 1101.67
 9909.54  1101.7 9911.11 1101.69 9915.28 1101.72 9922.42 1101.68 9926.23 1101.63
 9929.11 1101.58    9933 1101.61 9933.01 1101.61 9933.63  1101.6 9934.41 1101.59
 9937.25 1101.37 9938.06 1101.31  9938.7 1101.26 9939.31  1101.2 9940.98 1100.89
 9944.41 1100.12 9946.47 1099.73 9949.42 1099.04  9952.9 1098.45 9956.48    1098
  9956.6 1097.98  9956.7 1097.97 9962.84 1097.14 9966.76 1096.68  9969.7  1096.4
 9972.06 1096.46 9974.09 1096.48 9975.42 1096.42 9979.47 1096.48 9981.12 1096.51
  9983.2 1096.42 9987.55 1096.71 9995.55 1096.68 9999.99 1096.74 10000.1 1096.74
10004.58 1096.7810006.14 1096.9710007.12 1096.9710007.92 1095.4910013.46 1095.77
10014.88 1095.7810018.35 1096.0910018.68 1096.1210019.31 1096.2110020.89 1096.17
10040.48 1095.8610042.11 1095.9510052.99 1096.5310055.02 1096.6610058.64 1096.88
10061.05 1097.0710061.12 1097.0710062.23 1097.1310068.19 1097.3910068.96 1097.49
10072.28 1097.9110076.65 1098.7710079.45 1099.3310083.23 1100.41 10085.7 1101.02
10092.28 1102.8410093.07 1103.0310096.18 1103.3610098.79 1103.6510099.24 1103.65
10100.25 1103.6710101.25 1103.6810101.35 1103.6810103.67 1103.6310113.43 1103.58
10120.08 1103.4510121.79 1103.45

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9824.48     .04 9933.01    .04510092.28     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9933.0110092.28          186.771  154.73 162.492             .1       .3

INLINE STRUCTURE


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.344

INPUT
Description:
Distance from Upstream XS =       0
Deck/Roadway Width        =     6.5
Weir Coefficient          =     2.6
 Weir Embankment Coordinates    num =        5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9963.99 1097.01 9998.18 1096.7410005.51 1096.7810016.68 1096.56 10057.1 1096.78

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Weir crest shape                            = Broad Crested


CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.316

INPUT
Description:
Station Elevation Data    num=      80
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9883.51 1097.02    9887 1096.59 9893.19 1096.29 9895.88 1096.07 9901.86  1094.1
 9902.65 1093.86 9902.93 1093.79 9903.37 1093.71 9904.34 1093.48 9907.28  1092.9
10036.58  1092.910037.16 1092.9710040.49 1093.7110044.25 1094.6710045.53 1094.91
10048.86 1095.4710052.68 1096.0710054.81 1096.04 10059.4 1096.05 10064.3 1095.94
10064.86 1095.9210066.25 1095.9110081.66 1095.7510082.88 1095.7710086.98 1095.79
10087.99 1095.8310089.43 1095.8310093.99 1095.8410095.57 1095.8410101.05 1095.98
10102.48 1096.0510108.33 1096.1910110.03 1096.2410116.52 1096.3110120.03 1096.31
   10123 1096.3710124.99 1096.3710128.62 1096.3910131.72    109610137.52 1095.53
10137.64  1095.510137.76 1095.48 10138.1 1095.4710139.77 1095.3210140.26 1095.31
10141.81 1095.2210142.55 1095.2710144.27 1095.3710145.23 1095.4610148.61 1095.75
 10148.7 1095.7610148.85 1095.7810152.72 1096.2810155.41 1096.55 10159.8 1096.78
10162.73 1096.9410164.45    109710172.44 1097.3810174.77 1097.4510175.32 1097.49
10176.92 1097.61 10180.5 1097.91 10183.8 1098.2310189.32  1098.810190.06 1098.82
10196.41 1099.0610198.12  1098.910201.88 1098.5110203.21 1098.5310219.46 1098.83
10222.62 1098.9210227.32 1098.98 10228.4 1099.0410233.96 1099.2710241.83 1099.47
10241.95 1099.4710249.96 1099.8910252.43 1099.9410261.93  1100.210263.41 1100.27

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9883.51     .04 9895.88    .04510052.68     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9895.8810052.68          128.108  117.61 157.846             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
 9883.51    9887    1099       T
    988710139.85  1095.7       T
10139.8510263.41    1099       T

CROSS SECTION


RIVER: Lr El Mirage Wsh
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REACH: Lr El Mirage Wsh   RS: 0.294

INPUT
Description:
Station Elevation Data    num=     135
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9821.67 1098.65 9822.83 1098.66  9827.2 1098.63  9830.5 1098.62 9833.41 1098.84
 9834.32  1098.9 9834.79 1098.97 9836.49 1099.11 9839.16    1099 9839.33 1098.99
 9839.59 1098.97 9840.72 1098.65 9844.21 1097.68 9846.49 1097.11 9847.04 1096.96
 9848.62 1096.93 9853.55 1096.91 9855.67 1096.66 9858.25 1096.45 9861.13 1097.17
 9861.36 1097.22 9861.79 1097.31 9863.46 1097.58 9866.03 1097.81 9869.43 1097.89
 9870.97 1097.97 9873.25 1097.98 9875.58 1098.31 9876.66 1098.41  9877.3 1098.21
 9879.84 1097.24 9881.12 1096.98 9883.03 1096.37 9884.78 1096.16 9885.67 1096.04
 9887.04 1095.74 9888.03 1095.55 9888.49 1095.46 9890.25 1095.68 9892.92 1096.02
 9894.17 1096.22  9899.5 1096.49 9909.04 1096.77 9913.12 1096.74  9915.7 1096.71
 9916.92 1096.72 9921.83 1096.68 9922.58 1096.67  9929.4 1096.76 9929.78 1096.76
 9937.13  1096.7 9944.26 1096.27 9944.51 1096.25 9945.36 1096.18 9948.75 1095.84
 9950.26 1095.75 9950.62 1095.65 9951.04 1095.57 9953.53 1095.11 9955.84 1094.71
 9956.72 1094.49 9960.07  1093.8 9961.47 1093.58 9965.15  1092.910038.76  1092.9
10039.29 1093.1910040.17 1093.6510040.71 1093.8110043.58 1094.59 10043.9 1094.67
10044.46 1095.3310044.92 1095.9310049.74 1096.2110050.53 1096.2710054.04 1096.28
10055.87 1096.2210061.87 1095.8310062.75 1095.7610066.37 1095.5310070.36  1095.2
10081.72 1095.2510082.55 1095.2510090.28 1095.8710091.03 1095.9610094.92 1096.12
10097.33 1096.3810099.58  1096.510101.42 1096.6610105.04  1096.610110.01 1096.62
10114.58 1096.6110116.74 1096.53 10118.9 1096.4610120.67 1096.4410121.07 1096.44
10124.68 1096.4210130.54 1096.4210133.18 1096.4410134.46 1096.5210140.42 1096.67
10142.76 1096.8110145.01 1096.9410147.36 1097.0610149.95 1097.1810153.09 1097.32
 10157.2 1097.4810157.83 1097.4810158.62  1097.510162.58 1097.5410165.38 1097.56
10168.32  1097.710174.57 1097.8210181.57 1097.9410192.42 1098.1910193.37 1098.19
10195.41  1098.410196.05 1098.4610199.67 1098.8910199.82  1098.910200.42 1099.03
10202.68 1099.4210204.51 1099.9510205.84 1100.2810206.67 1100.3310210.76 1100.39
 10214.7 1100.0310219.62 1099.78 10222.5 1099.9210226.42 1100.1210226.91 1100.13
10229.33 1099.9510232.62 1099.9710233.71 1099.9610234.07 1099.9910236.83 1100.15

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9821.67     .04 9944.26    .04510050.53     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9944.2610050.53          166.923  152.94 224.316             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9950.2610044.92  1095.7       T
Left Levee      Station=  9929.4      Elevation= 1096.76

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.265

INPUT
Description:
Station Elevation Data    num=     115
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9876.55 1096.37  9881.9 1096.54 9894.24 1096.87 9897.22 1097.23 9898.04 1097.31
 9903.27 1097.28 9916.82 1097.17 9921.07 1097.07 9922.93 1097.03 9925.62 1096.96
 9933.11 1096.74 9940.04 1096.71 9942.73 1096.65 9948.84 1096.68 9949.21 1096.68
 9953.15 1096.66 9955.86 1096.63 9958.27 1096.64 9960.49 1096.56 9970.34 1096.58
 9975.39 1096.58 9977.89 1096.04 9978.31 1095.96 9978.65 1095.95 9982.63 1095.85
 9985.85 1096.52 9988.15 1097.04 9989.84 1096.66 9991.11 1096.37 9991.67 1096.07
 9993.21 1095.58  9995.2 1094.57 9995.26 1094.55 9996.48 1094.55 9997.14 1094.54
 9998.63 1094.52 9999.55 1094.52   10000 1094.6810001.49 1095.2210001.55 1095.25
10001.64 1095.29 10003.3  1095.410005.65 1095.3610014.63 1096.0810015.44  1096.1
10018.85 1096.0110025.44 1095.7110031.19  1095.410032.02 1095.3310038.34 1094.82
10041.92 1094.3710042.11 1094.3510042.98 1094.25 10046.4 1093.8710046.76 1093.87
10047.93 1093.8410048.67 1093.8410049.42 1093.8510051.23 1093.8710052.74 1093.87
10054.59 1093.8610058.98 1093.8310066.74 1093.9810068.53 1094.1410069.86 1094.29
10075.59 1094.9110078.55 1095.2410083.04 1095.6810083.34 1095.6910083.76 1095.69
10089.93 1095.7710094.52 1095.7810097.55 1095.7610101.09 1095.5210104.07 1095.38
10105.44  1095.310114.18 1094.7610134.78 1093.7310135.96 1093.7210154.95 1093.63
10157.95 1093.4110164.17 1093.1110168.17 1092.4410169.61 1092.3910173.37 1092.01
10173.64 1091.9910175.02 1091.5310178.08 1091.0110182.76 1090.4210188.72 1089.53
10189.79 1089.5310193.71  1089.510199.33 1089.4810203.08 1089.8810208.29 1090.39
10211.25 1090.8610216.77 1091.6110220.73 1092.31 10227.3 1092.6910231.95 1092.99
10233.56  1093.110239.08 1093.6610239.24 1093.6910239.46 1093.7510240.51 1093.92
10248.06 1095.2210249.19 1095.4910254.15 1096.6610256.08 1097.1310258.99 1097.85
10261.25 1098.4310261.71 1098.5310262.06 1098.64 10262.7 1098.7310269.22    1100

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9876.55     .05 9993.21    .04510014.63     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9993.2110014.63          252.619  242.25 194.652             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
   1001710094.52  1095.8       T
10094.52   10180 1093.63       T
   10180   10250  1095.8       T
Left Levee      Station= 9898.04      Elevation= 1097.31

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.219

INPUT
Description: ENDED DETAILED STUDY
Station Elevation Data    num=     150
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9902.85 1096.72 9904.12 1096.77 9906.81 1096.76 9909.47  1096.9 9910.93 1096.97
 9911.93 1096.98 9912.56 1096.95  9912.9 1096.95 9913.92 1096.84 9914.61 1096.74
 9915.46 1096.73 9927.12 1096.62 9930.11 1096.63 9932.43 1096.63 9936.71 1096.68
  9941.6 1096.54 9942.77 1096.56  9943.7 1096.58 9944.75 1096.54 9945.31 1096.56
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 9946.02 1096.56 9946.43 1096.54 9947.29 1096.46 9948.28 1096.37 9949.02 1096.27
 9952.04 1095.77  9954.2 1095.64 9962.63 1095.16 9963.98 1095.01 9964.95 1094.93
 9968.59 1094.61 9972.78 1094.36  9979.2 1094.12 9982.74 1093.94 9988.79 1093.93
 9992.17 1093.93 9997.04 1093.81   10000 1093.8110003.64  1093.810006.25 1093.82
10010.38 1093.8710017.48 1094.2810020.79 1094.8810021.91 1095.0810026.43  1095.5
10031.38 1095.8910032.32 1095.9310035.26 1096.0910037.74 1096.2410038.54  1096.3
10045.82 1096.5710045.99 1096.5710046.07 1096.5810046.28 1096.5810054.42 1096.65
10059.82 1096.7510066.73 1096.8510069.62 1096.9610076.75 1096.9210084.92 1096.93
10093.37 1096.8710098.94 1096.7910099.12 1096.7910099.38  1096.810106.16 1096.81
10109.62 1096.3510110.35 1096.2210114.62 1096.05 10115.5 1096.0310115.68 1096.12
10117.37 1096.8510118.91 1096.8410119.32 1096.8310119.67 1096.8210124.11 1096.82
10124.73 1096.8110126.19 1096.2810127.34 1096.0210129.45 1096.05 10130.1 1096.05
10133.36 1095.9810136.24 1095.8710138.99 1095.7810141.02 1095.6710141.27 1095.66
10146.35 1095.53 10147.1 1095.5310154.49 1095.6910154.99 1095.6910165.17 1095.64
10182.91 1096.1610184.69 1096.2210186.48 1096.25 10189.4 1096.2310199.83 1096.12
10210.55 1096.2710213.73 1096.3410222.39  1096.210224.43 1096.2110228.11 1096.22
10235.98 1095.9110238.36 1095.8210259.23 1094.5710265.87 1094.0910277.59 1093.31
10294.15 1093.1610300.68 1093.08 10312.2  1093.110312.57  1093.110315.36 1093.33
10326.01 1093.5610329.29 1093.6510339.27 1094.1910343.75 1094.4510346.32 1094.85
10353.91  1096.210357.77 1096.7510359.38 1096.9410364.45  1097.110365.91 1097.08
10368.23 1097.0910370.01 1097.1210371.56 1097.0710373.42 1097.12 10384.9 1097.47
10389.92 1097.7210392.01 1097.9910399.68 1099.06 10411.8 1101.4210413.94  1101.6
10417.01 1101.9410417.34 1102.2110417.64 1102.45   10420 1102.3510420.73 1102.38
10422.12 1102.4410423.36 1102.4610424.64 1102.5610425.75 1102.5910426.72 1102.61
10427.75 1102.5610428.68 1102.5510429.65 1102.5510440.51  1102.610442.29 1102.59
 10442.9 1102.5910444.43 1102.58 10445.1 1102.5810446.63 1102.5910452.26 1102.59

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9902.85     .05 9945.31    .04510045.82     .0510165.17     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9945.3110045.99                0       0       0              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
   10126   10186 1096.25       F
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SUMMARY OF MANNING'S N VALUES

River:Lr El Mirage Wsh

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7
Lr El Mirage Wsh	1.500	.04	.035	.04				
Lr El Mirage Wsh	1.436	.035	.04	.035	.04	.035		
Lr El Mirage Wsh	1.392	.035	.04	.035	.04			
Lr El Mirage Wsh	1.376	.04	.035	.04	.035			
Lr El Mirage Wsh	1.366	Culvert						
Lr El Mirage Wsh	1.357	.035	.04	.035	.04	.035		
Lr El Mirage Wsh	1.352	.035	.04	.035	.04	.035		
Lr El Mirage Wsh	1.347	.035	.04	.035	.04	.035		
Lr El Mirage Wsh	1.335	.035	.04	.035	.04	.035		
Lr El Mirage Wsh	1.318	.035	.04	.035	.04	.035		
Lr El Mirage Wsh	1.300	.035	.04	.035	.04	.035		
Lr El Mirage Wsh	1.231	.035	.04	.035	.04	.035		
Lr El Mirage Wsh	1.192	.04	.035	.04	.035	.04	.035	.04
Lr El Mirage Wsh	1.143	.035	.04	.035	.04	.035		
Lr El Mirage Wsh	1.098	.035	.04	.035	.04	.035		
Lr El Mirage Wsh	1.084	.035	.04	.035				
Lr El Mirage Wsh	1.069	.035	.04	.035	.04	.035		
Lr El Mirage Wsh	1.060	Culvert						
Lr El Mirage Wsh	1.046	.035	.035	.035				
Lr El Mirage Wsh	1.014	.035	.035	.035				
Lr El Mirage Wsh	0.978	.035	.035	.035				
Lr El Mirage Wsh	0.940	.035	.035	.035				
Lr El Mirage Wsh	0.892	.035	.035	.035				
Lr El Mirage Wsh	0.848	.04	.045	.04				
Lr El Mirage Wsh	0.785	.04	.045	.04				
Lr El Mirage Wsh	0.758	.04	.045	.04				
Lr El Mirage Wsh	0.726	.04	.045	.04				
Lr El Mirage Wsh	0.680	.04	.045	.04				
Lr El Mirage Wsh	0.646	.04	.045	.04				
Lr El Mirage Wsh	0.638	.04	.045	.04				
Lr El Mirage Wsh	0.634	Culvert						
Lr El Mirage Wsh	0.629	.03	.045	.03				
Lr El Mirage Wsh	0.610	.03	.045	.03				
Lr El Mirage Wsh	0.583	.03	.045	.03				
Lr El Mirage Wsh	0.533	.03	.045	.03				
Lr El Mirage Wsh	0.500	.03	.045	.03				
Lr El Mirage Wsh	0.493	.03	.045	.03				
Lr El Mirage Wsh	0.492	Bridge						
Lr El Mirage Wsh	0.491	.04	.045	.04				
Lr El Mirage Wsh	0.486	.04	.045	.04				
Lr El Mirage Wsh	0.431	.04	.045	.04				
Lr El Mirage Wsh	0.378	.04	.045	.04				
Lr El Mirage Wsh	0.345	.04	.045	.04				
Lr El Mirage Wsh	0.344	Inl Struct						
Lr El Mirage Wsh	0.316	.04	.045	.04				
Lr El Mirage Wsh	0.294	.04	.045	.04				
Lr El Mirage Wsh	0.265	.05	.045	.04				
Lr El Mirage Wsh	0.219	.05	.045	.05	.04			

SUMMARY OF REACH LENGTHS

River: Lr El Mirage Wsh

Reach	River Sta.	Left	Channel	Right
Lr El Mirage Wsh	1.500	336.537	341.38	346.306
Lr El Mirage Wsh	1.436	235.985	230.52	225.121
Lr El Mirage Wsh	1.392	106.417	84.6	67.435

Lr El Mirage Wsh	1.376	113.312	98.02	103.066
Lr El Mirage Wsh	1.366	Culvert		
Lr El Mirage Wsh	1.357	31.672	29.35	40.501
Lr El Mirage Wsh	1.352	27.999	25.96	25.99
Lr El Mirage Wsh	1.347	76.184	64.05	56.148
Lr El Mirage Wsh	1.335	90.186	90.26	93.888
Lr El Mirage Wsh	1.318	90.049	90.69	93.823
Lr El Mirage Wsh	1.300	366.044	367.42	376.759
Lr El Mirage Wsh	1.231	176.447	206.05	275.579
Lr El Mirage Wsh	1.192	183.719	259.78	404.145
Lr El Mirage Wsh	1.143	237.359	233.72	238.998
Lr El Mirage Wsh	1.098	80.464	74.2	85.789
Lr El Mirage Wsh	1.084	82.791	77.89	81.561
Lr El Mirage Wsh	1.069	117.663	121.52	118.169
Lr El Mirage Wsh	1.060	Culvert		
Lr El Mirage Wsh	1.046	173.838	171.01	183.572
Lr El Mirage Wsh	1.014	200.888	192.21	190.989
Lr El Mirage Wsh	0.978	207.457	201.61	199.811
Lr El Mirage Wsh	0.940	268.111	252.94	250.15
Lr El Mirage Wsh	0.892	240.253	228.8	223.465
Lr El Mirage Wsh	0.848	280.95	335.49	369.21
Lr El Mirage Wsh	0.785	148.273	142.54	137.798
Lr El Mirage Wsh	0.758	180.652	169.35	171.347
Lr El Mirage Wsh	0.726	317.172	241.5	220.931
Lr El Mirage Wsh	0.680	197.47	178.52	179.435
Lr El Mirage Wsh	0.646	41.697	41.03	44.619
Lr El Mirage Wsh	0.638	48.194	47.73	47.333
Lr El Mirage Wsh	0.634	Culvert		
Lr El Mirage Wsh	0.629	101.394	100.66	100.204
Lr El Mirage Wsh	0.610	142.218	143.1	144.798
Lr El Mirage Wsh	0.583	263.346	263.98	264.462
Lr El Mirage Wsh	0.533	176.53	173.45	173.415
Lr El Mirage Wsh	0.500	26.431	35.85	38.41
Lr El Mirage Wsh	0.493	19.026	10.88	9.936
Lr El Mirage Wsh	0.492	Bridge		
Lr El Mirage Wsh	0.491	43.874	26.68	27.762
Lr El Mirage Wsh	0.486	288.832	294.72	302.293
Lr El Mirage Wsh	0.431	361.758	277	194.234
Lr El Mirage Wsh	0.378	200.764	172.52	164.388
Lr El Mirage Wsh	0.345	186.771	154.73	162.492
Lr El Mirage Wsh	0.344	Inl Struct		
Lr El Mirage Wsh	0.316	128.108	117.61	157.846
Lr El Mirage Wsh	0.294	166.923	152.94	224.316
Lr El Mirage Wsh	0.265	252.619	242.25	194.652
Lr El Mirage Wsh	0.219	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Lr El Mirage Wsh

Reach	River Sta.	Contr.	Expan.
Lr El Mirage Wsh	1.500	.1	.3
Lr El Mirage Wsh	1.436	.1	.3
Lr El Mirage Wsh	1.392	.3	.5
Lr El Mirage Wsh	1.376	.3	.5
Lr El Mirage Wsh	1.366	Culvert	
Lr El Mirage Wsh	1.357	.3	.5
Lr El Mirage Wsh	1.352	.1	.3
Lr El Mirage Wsh	1.347	.1	.3
Lr El Mirage Wsh	1.335	.1	.3
Lr El Mirage Wsh	1.318	.1	.3
Lr El Mirage Wsh	1.300	.1	.3
Lr El Mirage Wsh	1.231	.1	.3
Lr El Mirage Wsh	1.192	.1	.3
Lr El Mirage Wsh	1.143	.1	.3
Lr El Mirage Wsh	1.098	.1	.3
Lr El Mirage Wsh	1.084	.3	.5
Lr El Mirage Wsh	1.069	.3	.5
Lr El Mirage Wsh	1.060	Culvert	
Lr El Mirage Wsh	1.046	.3	.5
Lr El Mirage Wsh	1.014	.1	.3
Lr El Mirage Wsh	0.978	.1	.3
Lr El Mirage Wsh	0.940	.1	.3
Lr El Mirage Wsh	0.892	.1	.3
Lr El Mirage Wsh	0.848	.1	.3
Lr El Mirage Wsh	0.785	.1	.3
Lr El Mirage Wsh	0.758	.1	.3
Lr El Mirage Wsh	0.726	.1	.3
Lr El Mirage Wsh	0.680	.1	.3
Lr El Mirage Wsh	0.646	.3	.5
Lr El Mirage Wsh	0.638	.3	.5
Lr El Mirage Wsh	0.634	Culvert	
Lr El Mirage Wsh	0.629	.3	.5
Lr El Mirage Wsh	0.610	.1	.3
Lr El Mirage Wsh	0.583	.1	.3
Lr El Mirage Wsh	0.533	.1	.3
Lr El Mirage Wsh	0.500	.3	.5
Lr El Mirage Wsh	0.493	.3	.5
Lr El Mirage Wsh	0.492	Bridge	
Lr El Mirage Wsh	0.491	.3	.5
Lr El Mirage Wsh	0.486	.1	.3
Lr El Mirage Wsh	0.431	.1	.3
Lr El Mirage Wsh	0.378	.1	.3
Lr El Mirage Wsh	0.345	.1	.3
Lr El Mirage Wsh	0.344	Inl Struct	
Lr El Mirage Wsh	0.316	.1	.3
Lr El Mirage Wsh	0.294	.1	.3
Lr El Mirage Wsh	0.265	.1	.3
Lr El Mirage Wsh	0.219	.1	.3

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : LEMWB_PreProj

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River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.500     Profile: PF 1
     Note:   Manning's n values were composited to a single value in the main channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.500     Profile: PF 2
     Note:   Manning's n values were composited to a single value in the main channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.436     Profile: PF 1
     Note:   Manning's n values were composited to a single value in the main channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.436     Profile: PF 2
     Note:   Manning's n values were composited to a single value in the main channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.392     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.392     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.376     Profile: PF 1
     Warning:When the Manning's n value for the channel was composited, the computed n value was larger [smaller] than the largest
             [smallest] user entered n value.  The n value has been set to the largest [smallest] entered value.  The user may
             wish to examine this cross section and enter a single n value for the entire channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.376     Profile: PF 2
     Warning:When the Manning's n value for the channel was composited, the computed n value was larger [smaller] than the largest
             [smallest] user entered n value.  The n value has been set to the largest [smallest] entered value.  The user may
             wish to examine this cross section and enter a single n value for the entire channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.366     Profile: PF 1     Culv: Culvert #1
     Note:   The normal depth exceeds the height of the culvert.  The program assumes that the normal depth is equal to the height
             of the culvert.
     Note:   Culvert critical depth exceeds the height of the culvert.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.366     Profile: PF 2     Culv: Culvert #1
     Note:   The normal depth exceeds the height of the culvert.  The program assumes that the normal depth is equal to the height
             of the culvert.
     Note:   Culvert critical depth exceeds the height of the culvert.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.357     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.357     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.352     Profile: PF 1
     Note:   Manning's n values were composited to a single value in the main channel.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.352     Profile: PF 2
     Note:   Manning's n values were composited to a single value in the main channel.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.347     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.347     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.335     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.335     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.318     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.318     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.300     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.300     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.231     Profile: PF 1
     Note:   Manning's n values were composited to a single value in the main channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.231     Profile: PF 2
     Note:   Manning's n values were composited to a single value in the main channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.192     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.192     Profile: PF 2
     Warning:Divided flow computed for this cross-section.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
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     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.143     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.143     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.098     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.098     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.084     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.084     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.046     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
     Note:   The user has entered an additional K headloss for this cross section.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.046     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.014     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Note:   The user has entered an additional K headloss for this cross section.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.014     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.978     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.978     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.940     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.940     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.892     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.892     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.848     Profile: PF 1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.848     Profile: PF 2
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.785     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.785     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.758     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.758     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.726     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.680     Profile: PF 1
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     Warning:Divided flow computed for this cross-section.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.680     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.646     Profile: PF 1
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.646     Profile: PF 2
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.638     Profile: PF 1
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.638     Profile: PF 2
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.634     Profile: PF 1     Culv: Culvert #1
     Warning:During subcritical analysis, with the exit loss set =1.0, the projected WSEL in culvert has a lower energy than the
             downstream energy.  Most likely, the downstream cross section blocks part of the culvert or the ineffective area is
             set too far in.  Instead of projecting the WSEL, the program did an energy balance to get the WSEL inside the culvert
             at the downstream end.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.634     Profile: PF 2     Culv: Culvert #1
     Warning:During subcritical analysis, with the exit loss set =1.0, the projected WSEL in culvert has a lower energy than the
             downstream energy.  Most likely, the downstream cross section blocks part of the culvert or the ineffective area is
             set too far in.  Instead of projecting the WSEL, the program did an energy balance to get the WSEL inside the culvert
             at the downstream end.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.629     Profile: PF 1
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.629     Profile: PF 2
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.610     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.610     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.583     Profile: PF 1
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.583     Profile: PF 2
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.533     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.533     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.500     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.500     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.493     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.493     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.492     Profile: PF 1 Upstream
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.492     Profile: PF 1 Downstream
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.492     Profile: PF 2 Upstream
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.492     Profile: PF 2 Downstream
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.491     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.491     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.486     Profile: PF 1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.486     Profile: PF 2
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
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        for the water surface and continued on with the calculations.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
        This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
        the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
        water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
        program defaulted to critical depth.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.431     Profile: PF 1
    Warning:Divided flow computed for this cross-section.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
        This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.378     Profile: PF 1
    Warning:Divided flow computed for this cross-section.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
        This may indicate the need for additional cross sections.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.378     Profile: PF 2
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
        This may indicate the need for additional cross sections.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.345     Profile: PF 2
    Warning:The encroachment was ignored because the encroachment was coded either outside of the cross section or inside of the
        channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.344     Profile: PF 2
    Warning:The encroachment was ignored because the encroachment was coded either outside of the cross section or inside of the
        channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.316     Profile: PF 1
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
        This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.316     Profile: PF 2
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
        This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.294     Profile: PF 1
    Warning:Divided flow computed for this cross-section.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
        This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
        the need for additional cross sections.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.294     Profile: PF 2
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
        This may indicate the need for additional cross sections.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.265     Profile: PF 1
    Warning:Divided flow computed for this cross-section.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.265     Profile: PF 2
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
        for the water surface and continued on with the calculations.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
        This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
        the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
        water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
        program defaulted to critical depth.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.219     Profile: PF 1
    Warning:Divided flow computed for this cross-section.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.219     Profile: PF 2
    Warning:Divided flow computed for this cross-section.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
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HEC-RAS Plan: LEMWB_PreProj River: Lr El Mirage Wsh Reach: Lr El Mirage Wsh

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lr El Mirage Wsh	1.500	PF 1	480.00	1109.98	1116.76		1116.77	0.000059	0.89	536.39	106.02	0.07
Lr El Mirage Wsh	1.500	PF 2	480.00	1109.98	1116.76		1116.78	0.000058	0.89	536.72	106.05	0.07
Lr El Mirage Wsh	1.436	PF 1	480.00	1109.01	1116.75		1116.76	0.000035	0.73	653.76	115.66	0.05
Lr El Mirage Wsh	1.436	PF 2	480.00	1109.01	1116.75		1116.76	0.000035	0.73	654.14	115.67	0.05
Lr El Mirage Wsh	1.392	PF 1	480.00	1108.76	1116.74		1116.75	0.000025	0.66	731.24	160.63	0.05
Lr El Mirage Wsh	1.392	PF 2	480.00	1108.76	1116.75		1116.75	0.000025	0.66	731.62	119.92	0.05
Lr El Mirage Wsh	1.376	PF 1	470.00	1106.86	1116.66	1111.69	1116.73	0.000938	2.04	230.25	113.15	0.25
Lr El Mirage Wsh	1.376	PF 2	470.00	1106.86	1116.66	1111.69	1116.73	0.000933	2.04	230.65	113.18	0.25
Lr El Mirage Wsh	1.366		Culvert									
Lr El Mirage Wsh	1.357	PF 1	470.00	1106.66	1111.91		1112.54	0.007644	6.36	73.91	32.33	0.66
Lr El Mirage Wsh	1.357	PF 2	470.00	1106.66	1111.89		1112.53	0.007779	6.40	73.41	32.20	0.66
Lr El Mirage Wsh	1.352	PF 1	470.00	1106.99	1111.98	1110.08	1112.27	0.002063	4.34	108.20	53.98	0.38
Lr El Mirage Wsh	1.352	PF 2	470.00	1106.99	1111.96	1110.08	1112.25	0.002095	4.36	107.69	53.82	0.39
Lr El Mirage Wsh	1.347	PF 1	470.00	1107.24	1112.04	1109.96	1112.18	0.001228	3.05	154.04	52.79	0.29
Lr El Mirage Wsh	1.347	PF 2	470.00	1107.24	1112.02	1109.96	1112.17	0.001250	3.07	153.22	52.67	0.29
Lr El Mirage Wsh	1.335	PF 1	470.00	1107.11	1112.09	1109.17	1112.12	0.000215	1.41	333.01	211.67	0.13
Lr El Mirage Wsh	1.335	PF 2	470.00	1107.11	1112.07	1109.17	1112.11	0.000219	1.42	331.36	211.54	0.13
Lr El Mirage Wsh	1.318	PF 1	470.00	1105.67	1112.10	1108.13	1112.11	0.000057	0.84	558.10	222.49	0.07
Lr El Mirage Wsh	1.318	PF 2	470.00	1105.67	1112.08	1108.12	1112.09	0.000057	0.85	555.89	222.38	0.07
Lr El Mirage Wsh	1.300	PF 1	470.00	1105.21	1112.10	1106.94	1112.10	0.000019	0.56	843.98	226.89	0.04
Lr El Mirage Wsh	1.300	PF 2	470.00	1105.21	1112.08	1106.94	1112.09	0.000019	0.56	841.25	226.74	0.04
Lr El Mirage Wsh	1.231	PF 1	470.00	1104.40	1112.10		1112.10	0.000005	0.32	1467.80	225.39	0.02
Lr El Mirage Wsh	1.231	PF 2	470.00	1104.40	1112.08		1112.08	0.000005	0.32	1463.81	225.29	0.02
Lr El Mirage Wsh	1.192	PF 1	470.00	1104.63	1112.10	1105.53	1112.10	0.000005	0.30	1550.22	340.45	0.02
Lr El Mirage Wsh	1.192	PF 2	470.00	1104.63	1112.08	1105.53	1112.08	0.000005	0.30	1545.90	340.22	0.02
Lr El Mirage Wsh	1.143	PF 1	470.00	1104.45	1112.09		1112.10	0.000021	0.59	797.34	133.46	0.04
Lr El Mirage Wsh	1.143	PF 2	470.00	1104.45	1112.07		1112.08	0.000021	0.59	794.98	133.35	0.04

HEC-RAS Plan: LEMWB_PreProj River: Lr El Mirage Wsh Reach: Lr El Mirage Wsh (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lr El Mirage Wsh	1.098	PF 1	470.00	1106.74	1112.06	1108.43	1112.08	0.000122	1.16	405.14	114.42	0.10
Lr El Mirage Wsh	1.098	PF 2	470.00	1106.74	1112.05	1108.43	1112.07	0.000123	1.17	403.37	114.16	0.10
Lr El Mirage Wsh	1.084	PF 1	190.00	1108.81	1111.72		1112.04	0.012554	4.52	42.02	36.21	0.74
Lr El Mirage Wsh	1.084	PF 2	190.00	1108.81	1111.67		1112.02	0.014278	4.73	40.21	35.72	0.78
Lr El Mirage Wsh	1.069	PF 1	190.00	1108.97	1111.56	1110.34	1111.66	0.001591	2.65	71.80	32.42	0.31
Lr El Mirage Wsh	1.069	PF 2	190.00	1108.97	1111.49	1110.34	1111.60	0.001760	2.73	69.53	32.39	0.33
Lr El Mirage Wsh	1.060		Culvert									
Lr El Mirage Wsh	1.046	PF 1	190.00	1108.22	1111.49	1109.59	1111.56	0.000693	2.09	91.12	32.82	0.22
Lr El Mirage Wsh	1.046	PF 2	190.00	1108.22	1111.42	1109.59	1111.49	0.000753	2.14	88.68	32.72	0.23
Lr El Mirage Wsh	1.014	PF 1	190.00	1109.47	1111.13		1111.26	0.003119	2.95	64.33	45.83	0.44
Lr El Mirage Wsh	1.014	PF 2	190.00	1109.47	1111.08		1111.23	0.003439	3.05	62.35	45.62	0.46
Lr El Mirage Wsh	0.978	PF 1	190.00	1108.31	1109.57	1109.55	1109.91	0.019364	4.66	40.81	58.26	0.98
Lr El Mirage Wsh	0.978	PF 2	190.00	1108.31	1109.57	1109.55	1109.91	0.019334	4.65	40.83	58.27	0.98
Lr El Mirage Wsh	0.940	PF 1	190.00	1106.66	1108.29		1108.41	0.003624	2.83	67.15	57.48	0.46
Lr El Mirage Wsh	0.940	PF 2	190.00	1106.66	1108.29		1108.41	0.003623	2.83	67.16	57.48	0.46
Lr El Mirage Wsh	0.892	PF 1	190.00	1106.02	1107.77		1107.83	0.001521	1.99	95.63	72.56	0.30
Lr El Mirage Wsh	0.892	PF 2	190.00	1106.02	1107.77		1107.83	0.001521	1.99	95.63	72.56	0.30
Lr El Mirage Wsh	0.848	PF 1	190.00	1105.03	1106.35	1106.35	1106.85	0.030402	5.66	33.58	34.25	1.01
Lr El Mirage Wsh	0.848	PF 2	190.00	1105.03	1106.35	1106.35	1106.85	0.030434	5.66	33.57	34.24	1.01
Lr El Mirage Wsh	0.785	PF 1	190.00	1100.87	1105.41		1105.42	0.000104	0.73	288.68	137.68	0.07
Lr El Mirage Wsh	0.785	PF 2	190.00	1100.87	1105.49		1105.50	0.000121	0.78	244.24	74.49	0.08
Lr El Mirage Wsh	0.758	PF 1	190.00	1103.55	1105.33	1104.62	1105.37	0.002595	1.69	112.70	121.14	0.30
Lr El Mirage Wsh	0.758	PF 2	190.00	1103.55	1105.42	1104.62	1105.46	0.001953	1.55	122.62	112.35	0.26
Lr El Mirage Wsh	0.726	PF 1	190.00	1101.66	1105.32		1105.33	0.000064	0.57	375.45	218.08	0.06
Lr El Mirage Wsh	0.726	PF 2	190.00	1101.66	1105.39		1105.40	0.000116	0.76	248.60	75.17	0.07
Lr El Mirage Wsh	0.680	PF 1	190.00	1101.72	1105.31		1105.31	0.000060	0.57	396.85	295.64	0.05
Lr El Mirage Wsh	0.680	PF 2	190.00	1101.72	1105.34		1105.36	0.000198	0.99	192.50	57.09	0.09

HEC-RAS Plan: LEMWB_PreProj River: Lr El Mirage Wsh Reach: Lr El Mirage Wsh (Continued)

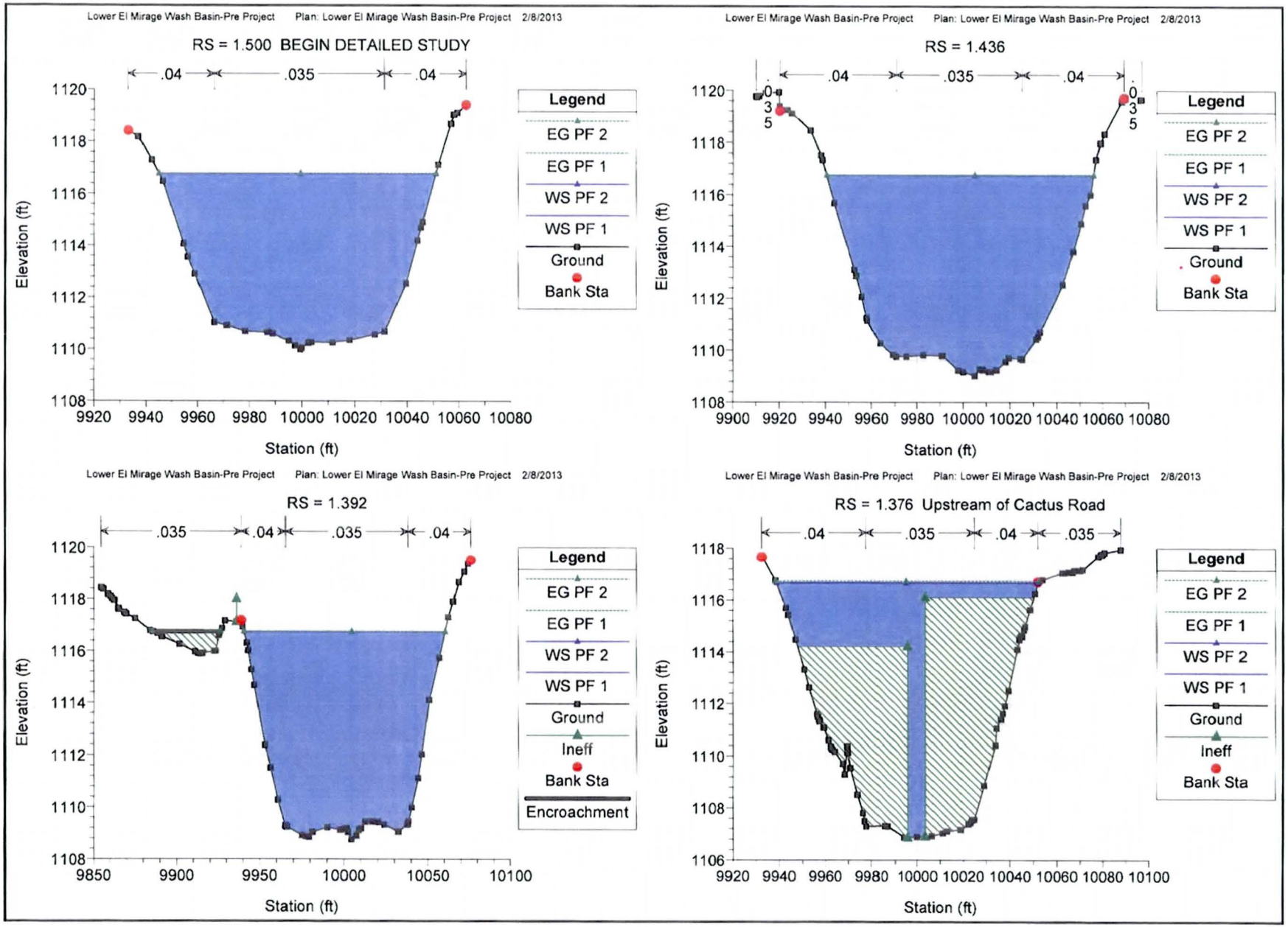
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lr El Mirage Wsh	0.646	PF 1	190.00	1102.00	1105.19	1103.47	1105.27	0.001481	2.31	83.25	88.14	0.26
Lr El Mirage Wsh	0.646	PF 2	190.00	1102.00	1105.19	1103.49	1105.28	0.001538	2.32	82.02	32.40	0.26
Lr El Mirage Wsh	0.638	PF 1	190.00	1102.24	1105.14	1103.63	1105.21	0.001479	2.12	89.76	40.18	0.25
Lr El Mirage Wsh	0.638	PF 2	190.00	1102.24	1105.14	1103.65	1105.21	0.001479	2.12	89.76	40.18	0.25
Lr El Mirage Wsh	0.634		Culvert									
Lr El Mirage Wsh	0.629	PF 1	190.00	1102.04	1105.13	1103.40	1105.19	0.001123	1.95	97.32	39.79	0.22
Lr El Mirage Wsh	0.629	PF 2	190.00	1102.04	1105.13	1103.41	1105.19	0.001123	1.95	97.32	39.79	0.22
Lr El Mirage Wsh	0.610	PF 1	190.00	1102.04	1105.00		1105.06	0.001582	1.90	99.89	56.87	0.25
Lr El Mirage Wsh	0.610	PF 2	190.00	1102.04	1105.00		1105.06	0.001582	1.90	99.89	56.87	0.25
Lr El Mirage Wsh	0.583	PF 1	190.00	1102.26	1104.58		1104.70	0.004265	2.84	66.80	43.70	0.41
Lr El Mirage Wsh	0.583	PF 2	190.00	1102.26	1104.58		1104.70	0.004266	2.84	66.79	43.70	0.41
Lr El Mirage Wsh	0.533	PF 1	190.00	1101.08	1103.38		1103.50	0.004835	2.87	66.19	47.02	0.43
Lr El Mirage Wsh	0.533	PF 2	190.00	1101.08	1103.38		1103.50	0.004831	2.87	66.21	47.02	0.43
Lr El Mirage Wsh	0.500	PF 1	190.00	1099.34	1103.15	1101.12	1103.18	0.000857	1.46	130.02	68.64	0.19
Lr El Mirage Wsh	0.500	PF 2	190.00	1099.34	1103.15	1101.12	1103.18	0.000857	1.46	130.03	68.64	0.19
Lr El Mirage Wsh	0.493	PF 1	190.00	1099.67	1103.08	1102.04	1103.13	0.001963	1.89	100.41	80.26	0.27
Lr El Mirage Wsh	0.493	PF 2	190.00	1099.67	1103.08	1102.04	1103.13	0.001962	1.89	100.42	80.26	0.27
Lr El Mirage Wsh	0.492		Bridge									
Lr El Mirage Wsh	0.491	PF 1	190.00	1099.60	1102.08	1101.56	1102.32	0.009642	3.95	48.07	54.13	0.60
Lr El Mirage Wsh	0.491	PF 2	190.00	1099.60	1102.08	1101.56	1102.32	0.009634	3.95	48.08	54.14	0.60
Lr El Mirage Wsh	0.486	PF 1	190.00	1099.64	1101.26	1101.26	1101.81	0.029754	5.93	32.05	29.82	1.01
Lr El Mirage Wsh	0.486	PF 2	190.00	1099.64	1101.26	1101.26	1101.81	0.029754	5.93	32.05	29.82	1.01
Lr El Mirage Wsh	0.431	PF 1	290.00	1092.94	1098.04		1098.12	0.002712	2.30	126.30	146.24	0.32
Lr El Mirage Wsh	0.431	PF 2	290.00	1092.94	1098.37		1098.43	0.001624	1.88	153.97	88.69	0.25
Lr El Mirage Wsh	0.378	PF 1	290.00	1092.94	1097.92	1096.47	1097.93	0.000245	0.79	352.40	230.48	0.10
Lr El Mirage Wsh	0.378	PF 2	290.00	1092.94	1098.04	1096.70	1098.08	0.000950	1.58	183.66	90.74	0.20
Lr El Mirage Wsh	0.345	PF 1	290.00	1095.49	1097.75	1096.99	1097.82	0.002821	2.04	142.41	112.74	0.32

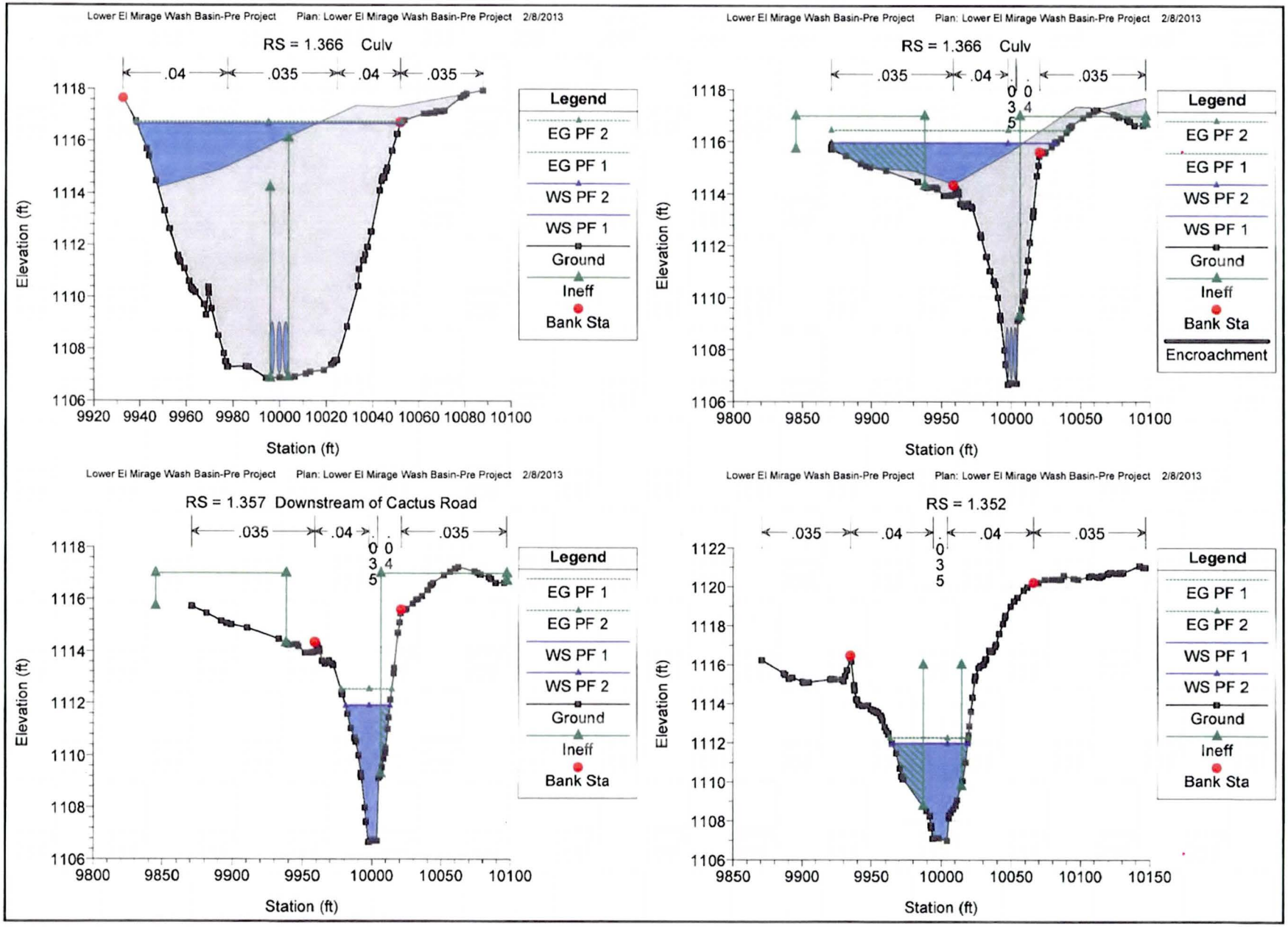
HEC-RAS Plan: LEMWB_PreProj River: Lr El Mirage Wsh Reach: Lr El Mirage Wsh (Continued)

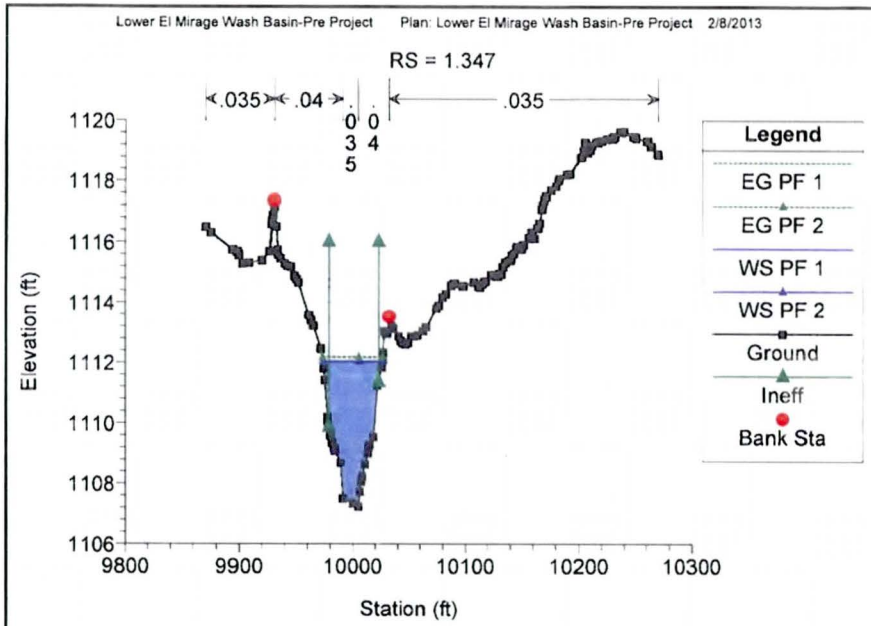
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lr El Mirage Wsh	0.345	PF 2	290.00	1095.49	1097.75	1096.99	1097.82	0.002826	2.04	142.33	112.73	0.32
Lr El Mirage Wsh	0.344		Inl Struct									
Lr El Mirage Wsh	0.316	PF 1	290.00	1092.90	1096.85		1096.87	0.001054	1.17	256.15	276.07	0.19
Lr El Mirage Wsh	0.316	PF 2	290.00	1092.90	1097.45		1097.46	0.000509	1.06	272.97	156.80	0.14
Lr El Mirage Wsh	0.294	PF 1	290.00	1092.90	1096.44	1096.21	1096.55	0.009187	2.49	110.96	170.12	0.52
Lr El Mirage Wsh	0.294	PF 2	290.00	1092.90	1097.32	1096.36	1097.37	0.001547	1.73	167.97	106.27	0.24
Lr El Mirage Wsh	0.265	PF 1	290.00	1094.52	1095.38	1094.68	1095.49	0.003465	1.19	110.30	204.39	0.30
Lr El Mirage Wsh	0.265	PF 2	290.00	1094.52	1096.37	1096.37	1096.66	0.022892	5.11	68.89	104.28	0.86
Lr El Mirage Wsh	0.219	PF 1	290.00	1093.80	1094.77	1094.20	1094.84	0.003001	1.43	142.45	143.18	0.30
Lr El Mirage Wsh	0.219	PF 2	290.00	1093.80	1094.82	1094.24	1094.90	0.003000	1.49	135.44	126.19	0.30

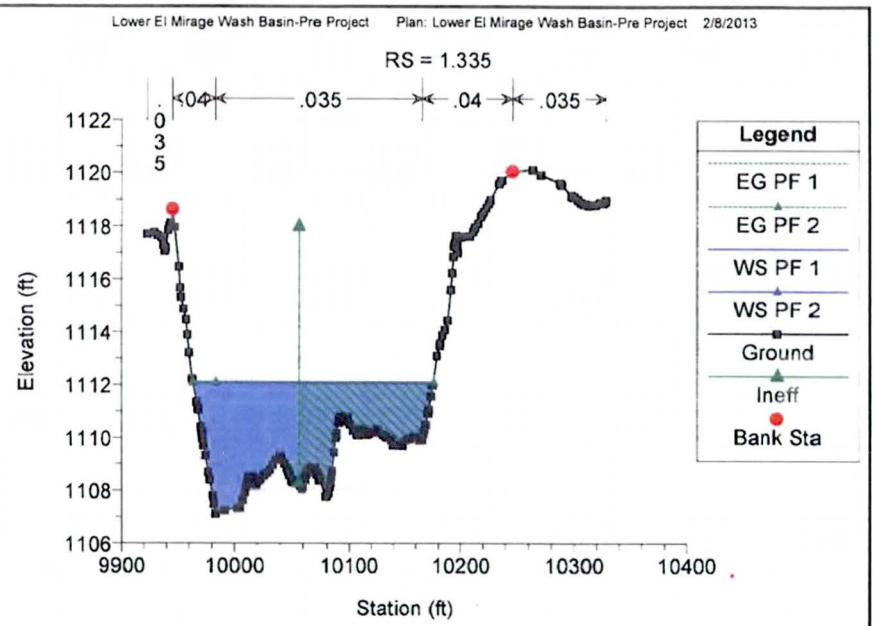
APPENDIX E.3

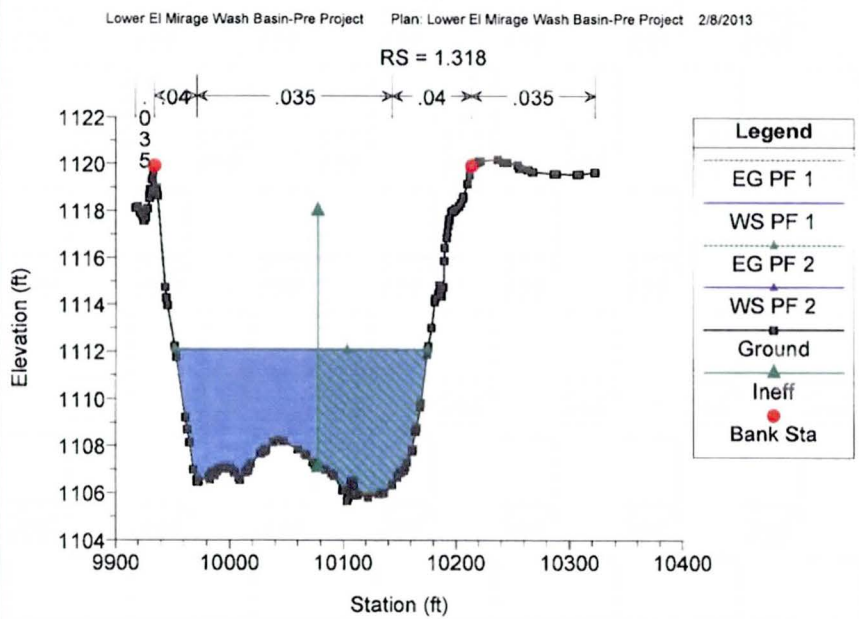
PRE-PROJECT CONDITIONS
HEC-RAS CROSS SECTION PLOTS

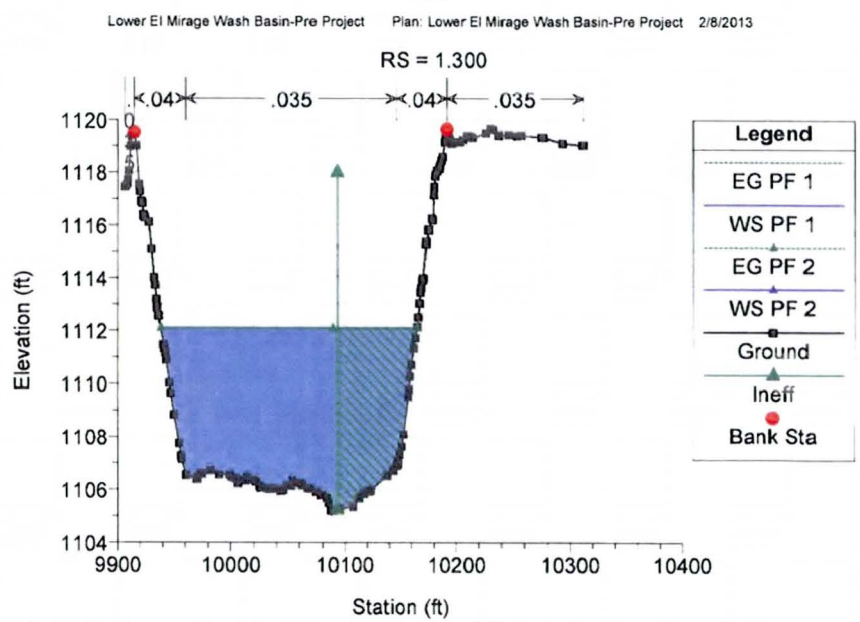

Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 1.500 BEGIN DETAILED STUDY
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 2
EG PF 1
WS PF 2
WS PF 1
Ground
Bank Sta
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 1.436
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 2
EG PF 1
WS PF 2
WS PF 1
Ground
Bank Sta
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 1.392
.035
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 2
EG PF 1
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta
Encroachment
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 1.376 Upstream of Cactus Road
.04
.035
.04
.035
Elevation (ft)
Station (ft)
Legend
EG PF 2
EG PF 1
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta

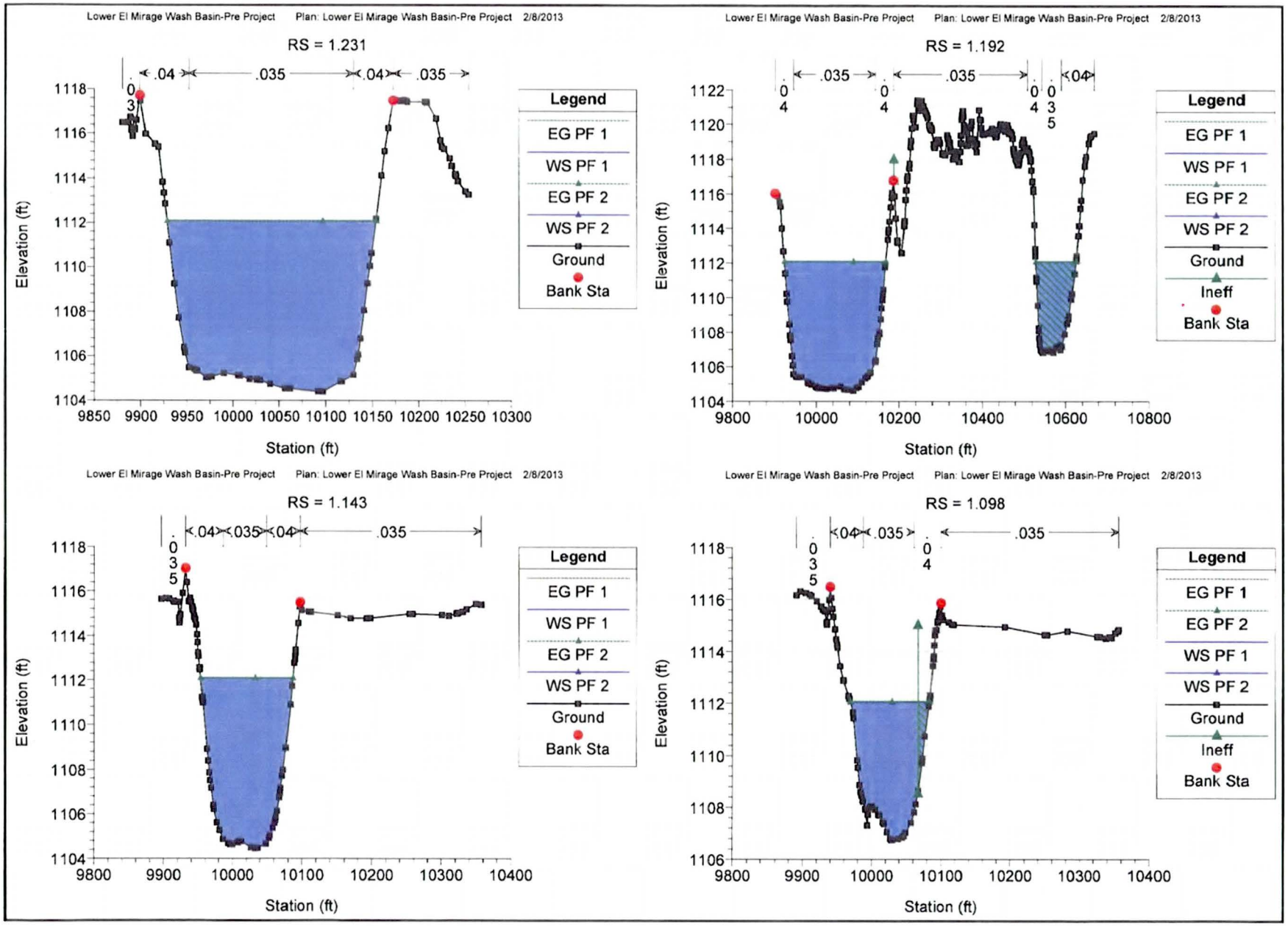

Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 1.366 Culv
.04 .035 .04 .035
Elevation (ft)
Station (ft)
Legend
EG PF 2
EG PF 1
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 1.366 Culv
.035 .04 .035
Elevation (ft)
Station (ft)
Legend
EG PF 2
EG PF 1
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta
Encroachment
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 1.357 Downstream of Cactus Road
.035 .04 .035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 1
WS PF 2
Ground
Ineff
Bank Sta
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 1.352
.035 .04 .04 .035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 1
WS PF 2
Ground
Ineff
Bank Sta

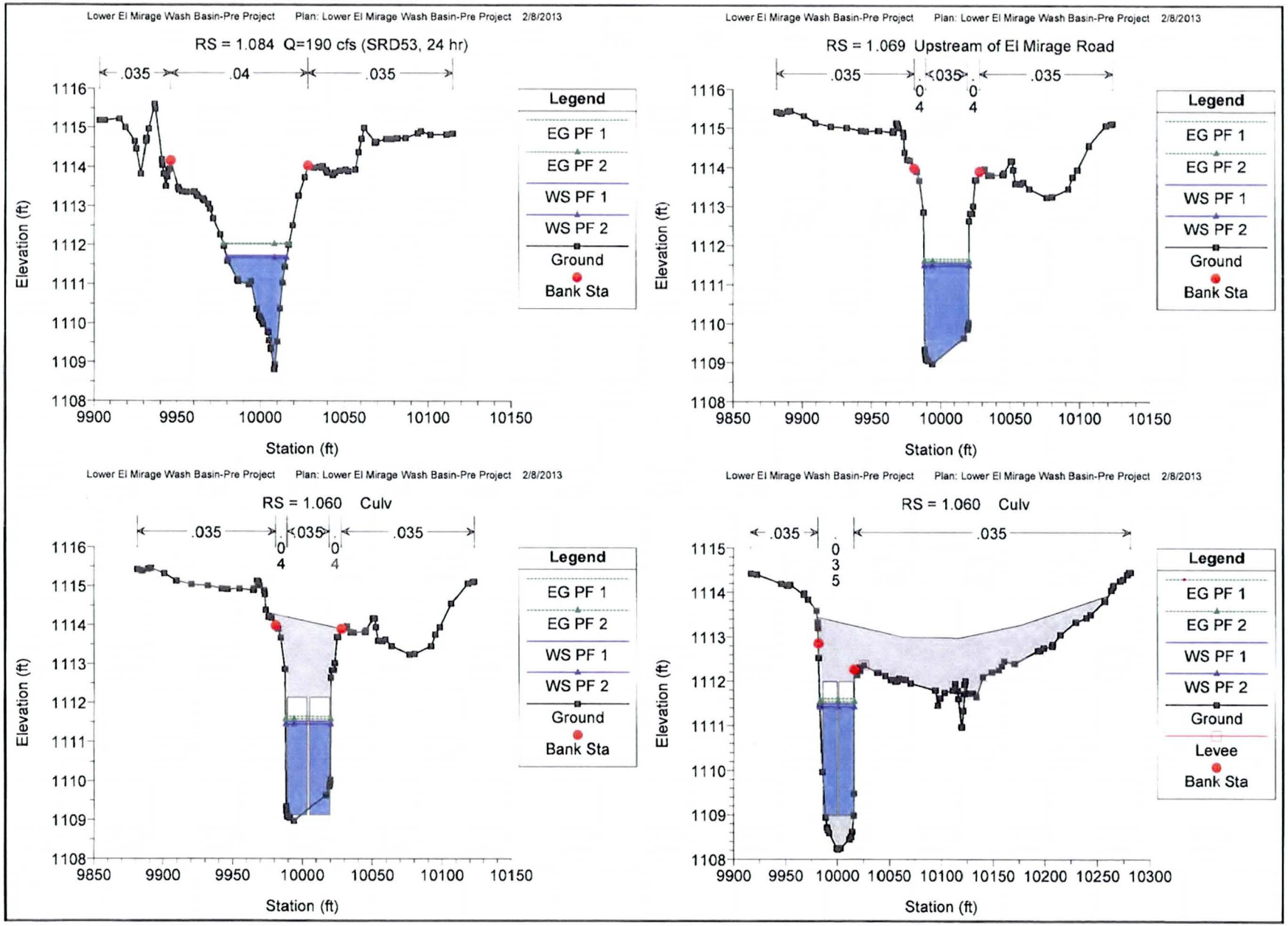

Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 1.347
.035
.04
.035
.04
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 1
WS PF 2
Ground
Ineff
Bank Sta

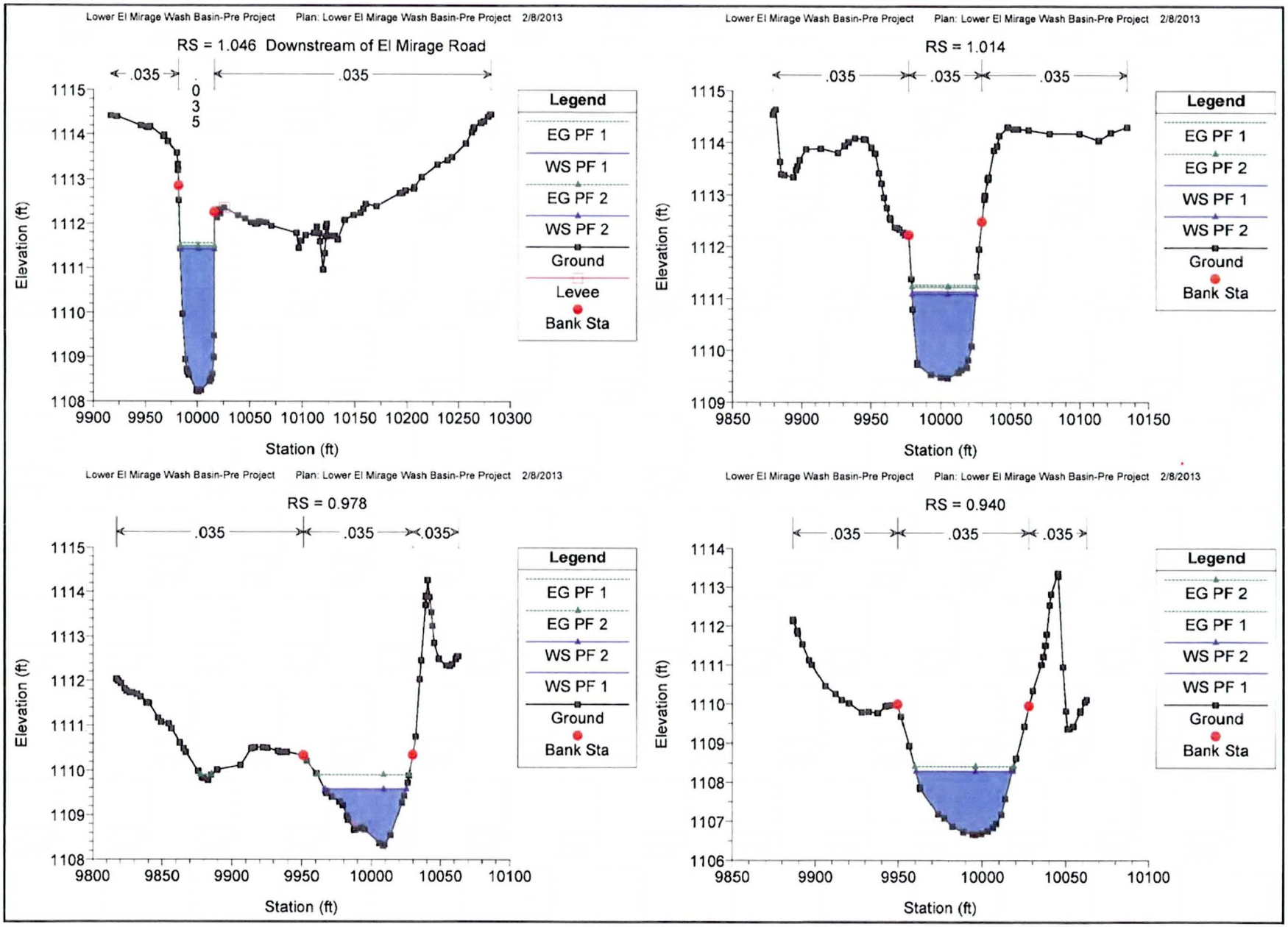

Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 1.335
.04
.035
.04
.035
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 1
WS PF 2
Ground
Ineff
Bank Sta

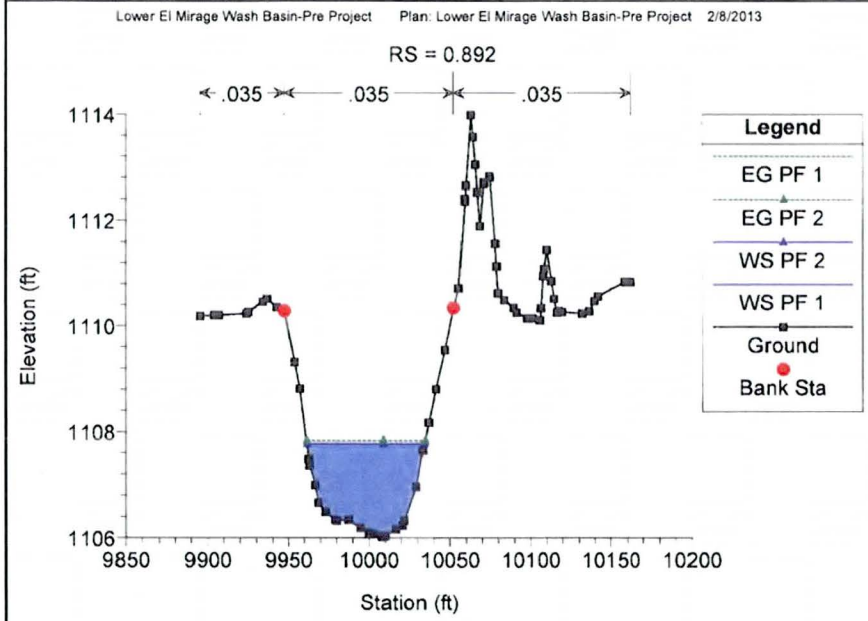

Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 1.318
.04
.035
.04
.035
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
EG PF 2
WS PF 2
Ground
Ineff
Bank Sta

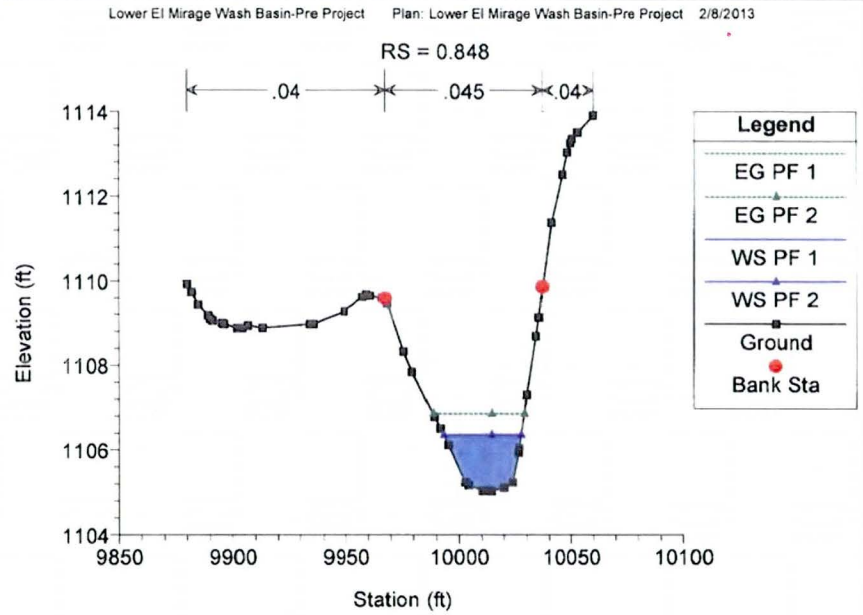

Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 1.300
.04
.035
.04
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
EG PF 2
WS PF 2
Ground
Ineff
Bank Sta

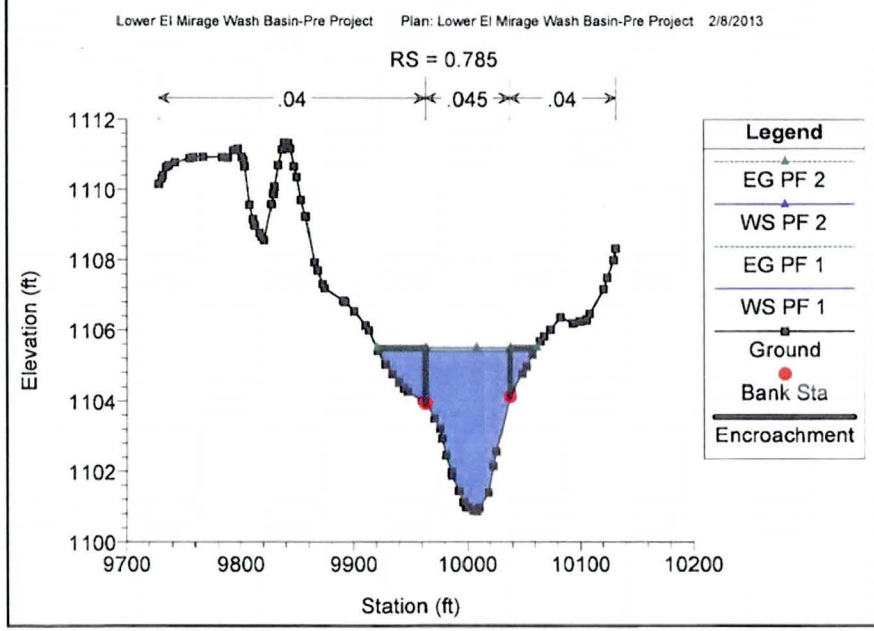

Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 1.231
.04
.035
.04
.035
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
EG PF 2
WS PF 2
Ground
Bank Sta
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 1.192
.035
.035
.04
.04
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
EG PF 2
WS PF 2
Ground
Ineff
Bank Sta
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 1.143
.04
.035
.04
.035
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
EG PF 2
WS PF 2
Ground
Bank Sta
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 1.098
.04
.035
.035
.04
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 1
WS PF 2
Ground
Ineff
Bank Sta

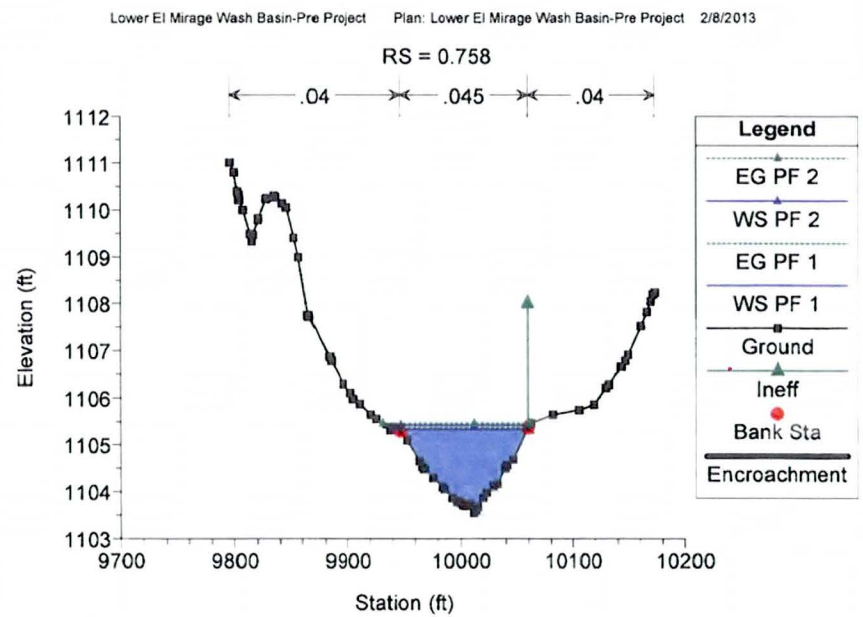

Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 1.084 Q=190 cfs (SRD53, 24 hr)
.035
.04
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 1
WS PF 2
Ground
Bank Sta
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 1.069 Upstream of El Mirage Road
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 1
WS PF 2
Ground
Bank Sta
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 1.060 Culv
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 1
WS PF 2
Ground
Bank Sta
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 1.060 Culv
.035
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 1
WS PF 2
Ground
Levee
Bank Sta

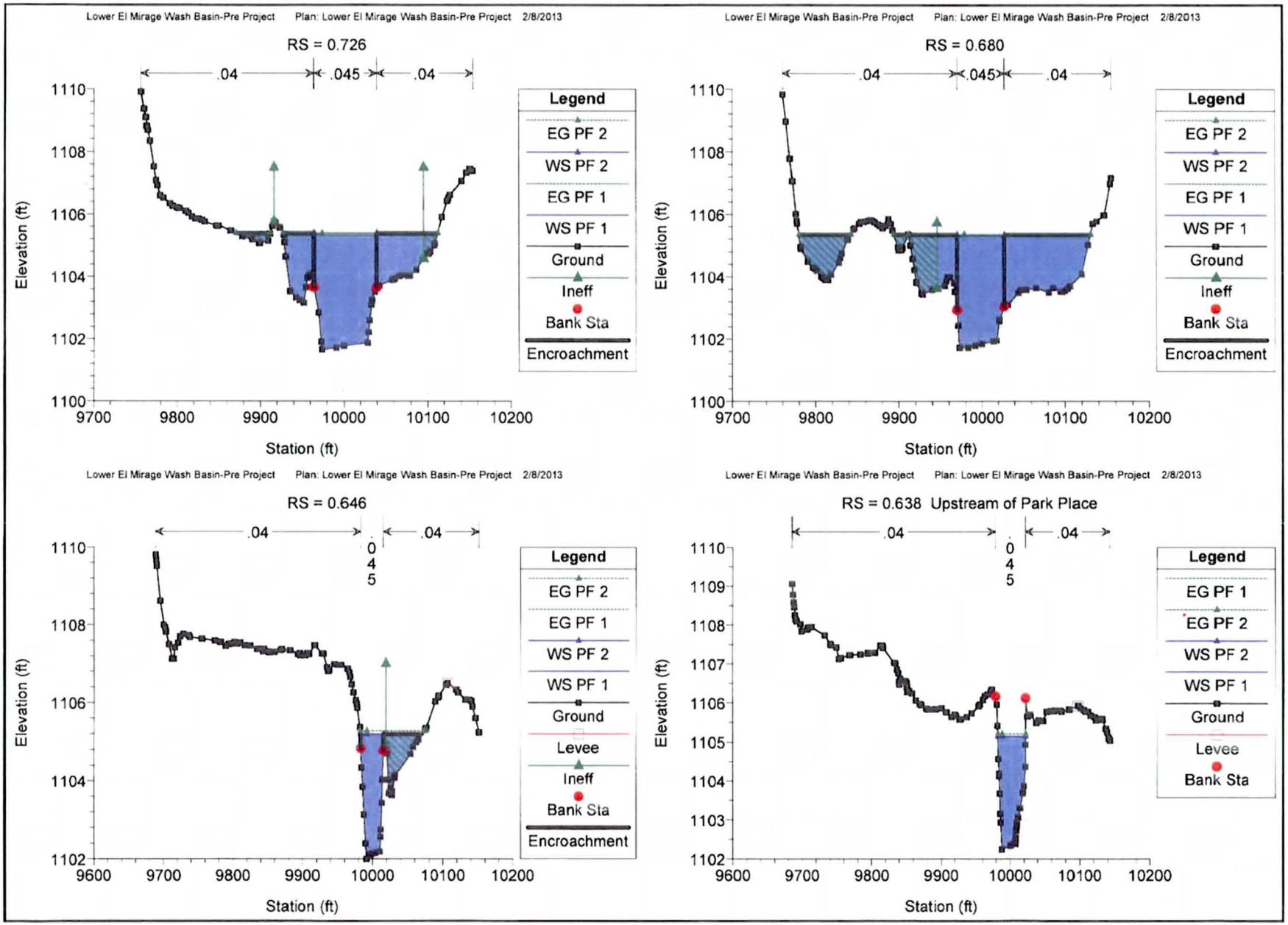

Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 1.046 Downstream of El Mirage Road
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
EG PF 2
WS PF 2
Ground
Levee
Bank Sta
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 1.014
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 1
WS PF 2
Ground
Bank Sta
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.978
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.940
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG PF 2
EG PF 1
WS PF 2
WS PF 1
Ground
Bank Sta

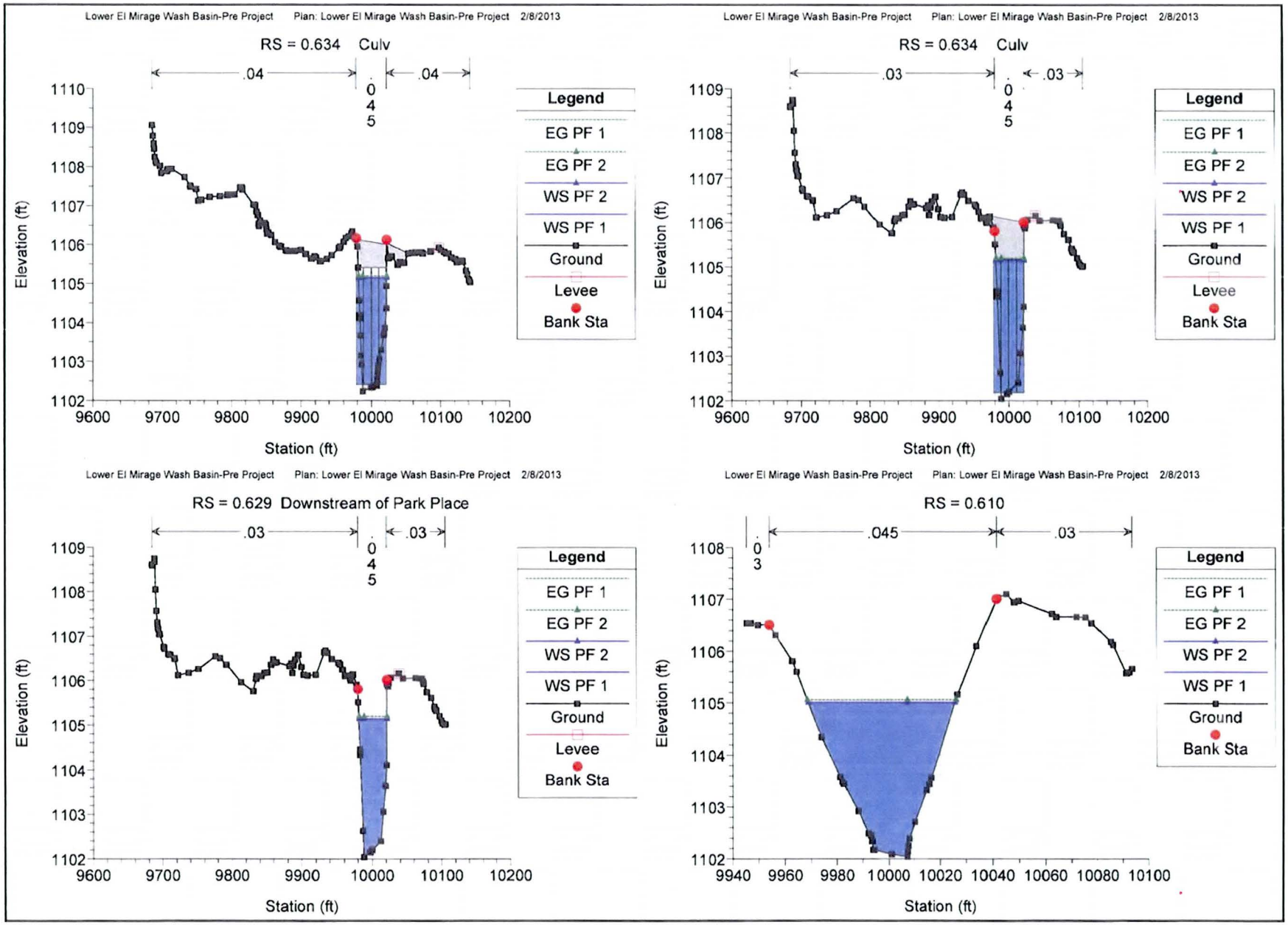

Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.892
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta

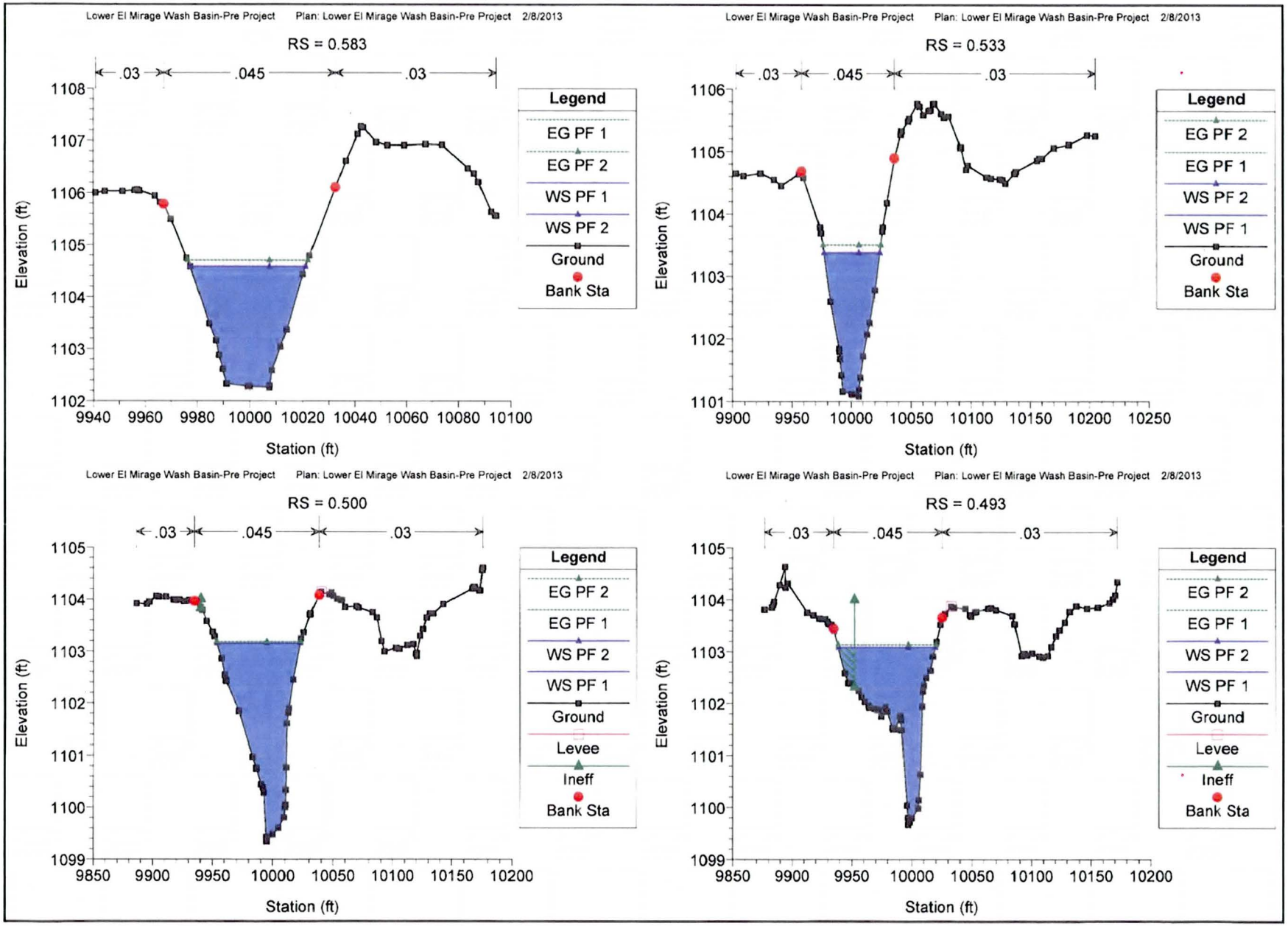

Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.848
.04
.045
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 1
WS PF 2
Ground
Bank Sta

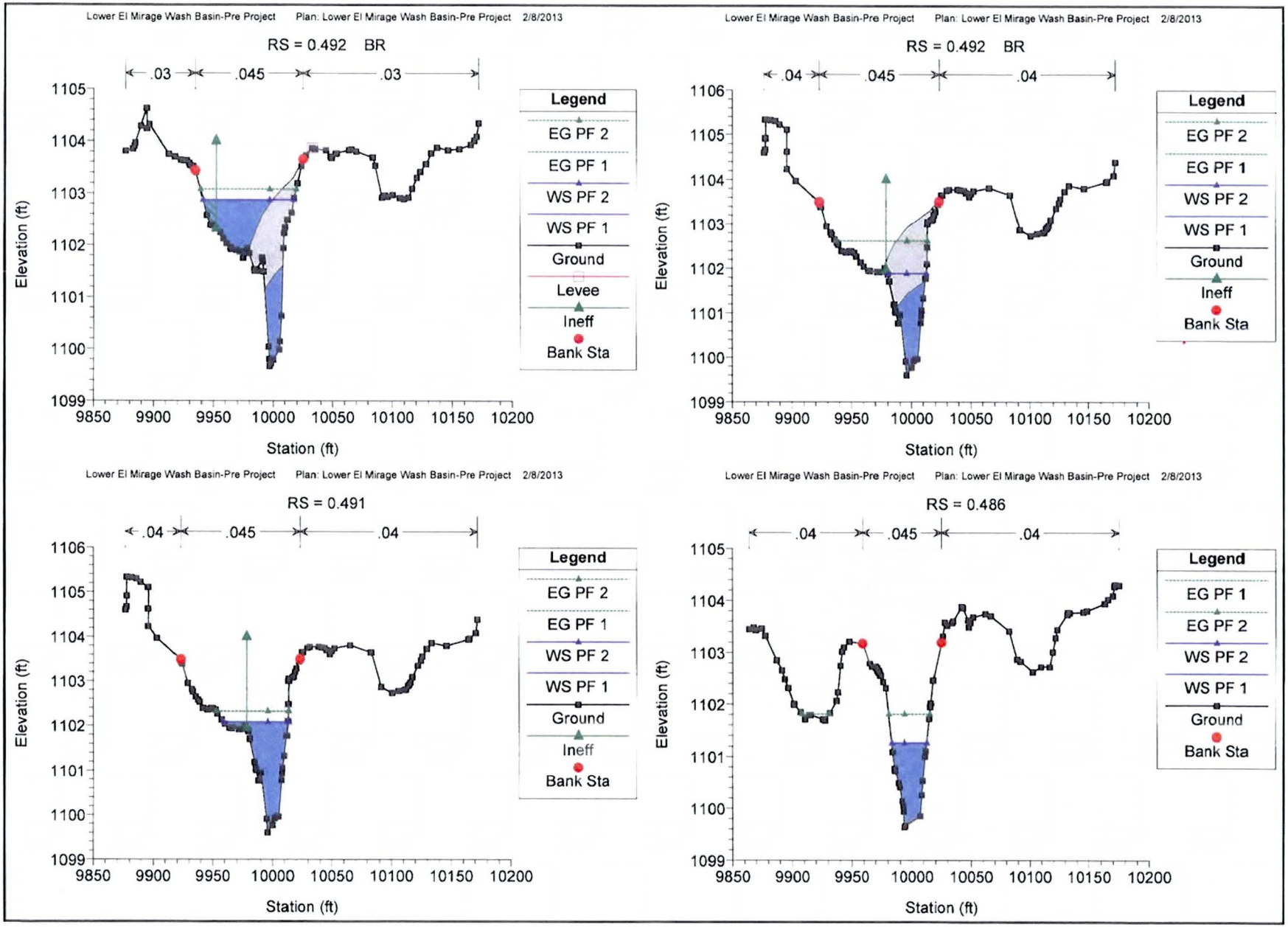

Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.785
.04
.045
.04
Elevation (ft)
Station (ft)
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment

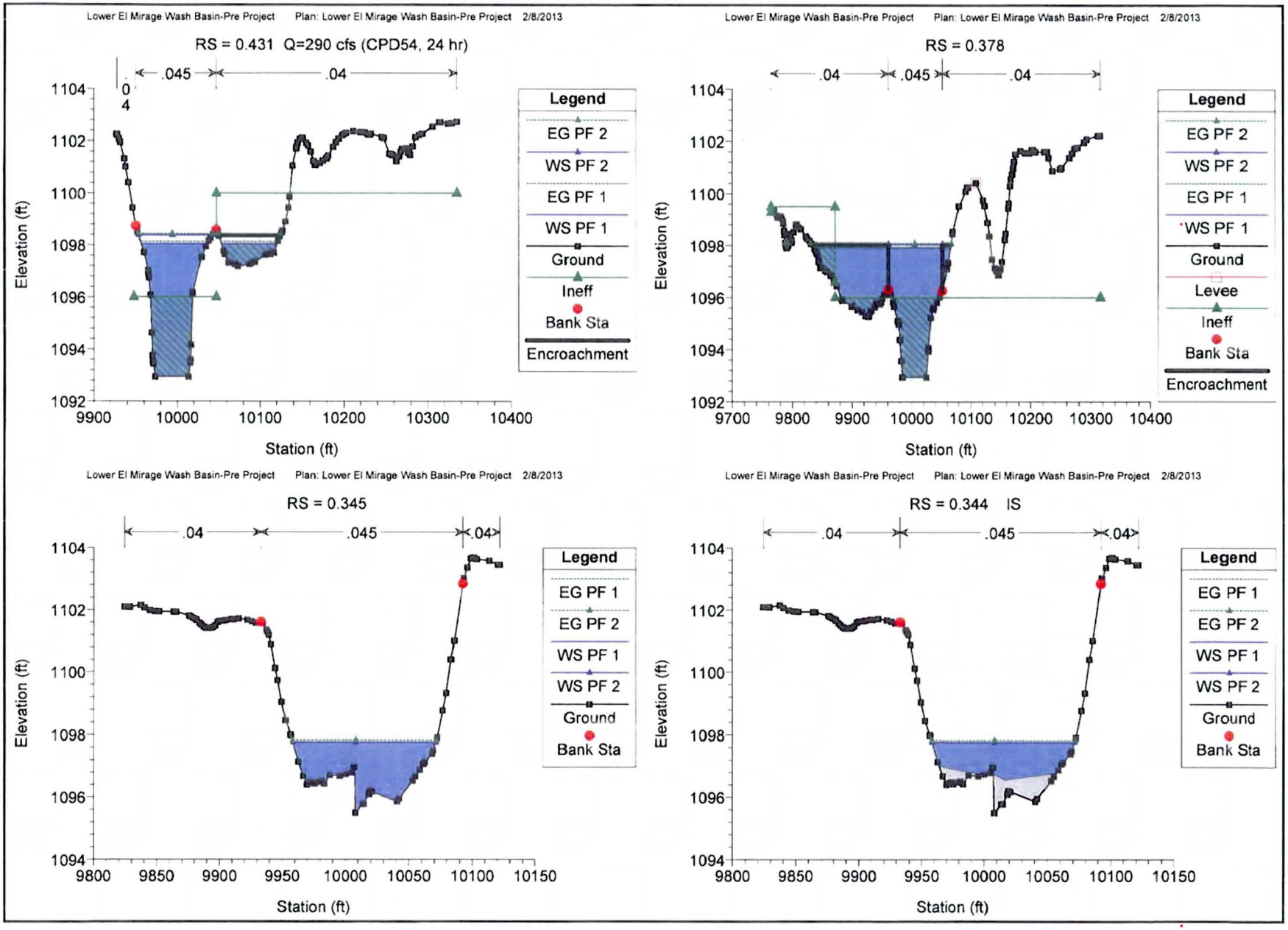

Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.758
.04
.045
.04
Elevation (ft)
Station (ft)
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Encroachment

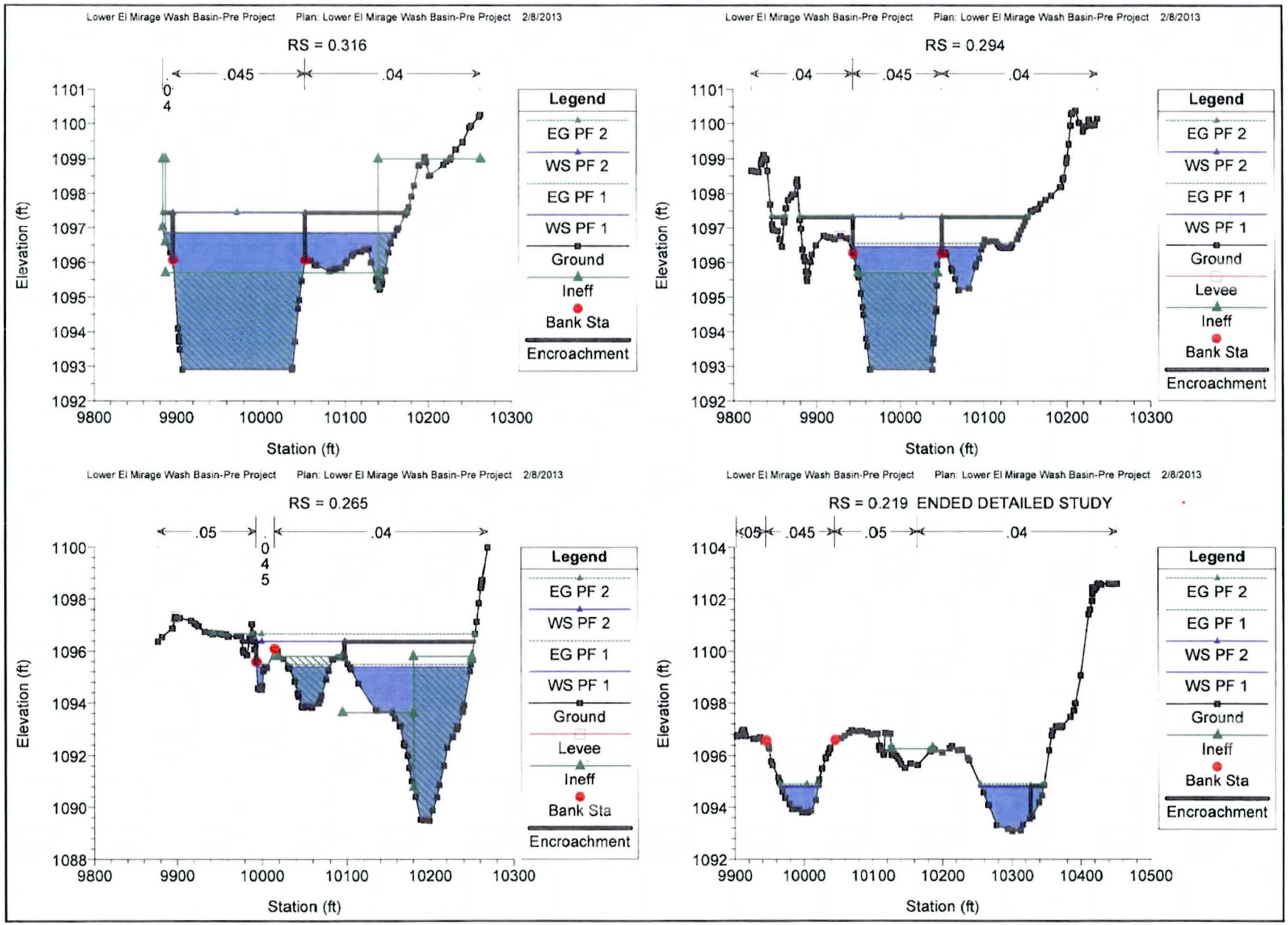

Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.726
.04
.045
.04
Elevation (ft)
Station (ft)
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Encroachment
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.680
.04
.045
.04
Elevation (ft)
Station (ft)
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Encroachment
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.646
.04
.045
.04
Elevation (ft)
Station (ft)
Legend
EG PF 2
EG PF 1
WS PF 2
WS PF 1
Ground
Levee
Ineff
Bank Sta
Encroachment
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.638 Upstream of Park Place
.04
.045
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Levee
Bank Sta


Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.634 Culv
.04
.045
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Levee
Bank Sta
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.634 Culv
.03
.045
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Levee
Bank Sta
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.629 Downstream of Park Place
.03
.045
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Levee
Bank Sta
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.610
.03
.045
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta


Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.583
.03
.045
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 1
WS PF 2
Ground
Bank Sta
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.533
.03
.045
.03
Elevation (ft)
Station (ft)
Legend
EG PF 2
EG PF 1
WS PF 2
WS PF 1
Ground
Bank Sta
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.500
.03
.045
.03
Elevation (ft)
Station (ft)
Legend
EG PF 2
EG PF 1
WS PF 2
WS PF 1
Ground
Levee
Ineff
Bank Sta
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.493
.03
.045
.03
Elevation (ft)
Station (ft)
Legend
EG PF 2
EG PF 1
WS PF 2
WS PF 1
Ground
Levee
Ineff
Bank Sta


Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.492 BR
.03 .045 .03
Elevation (ft)
Station (ft)
Legend
EG PF 2
EG PF 1
WS PF 2
WS PF 1
Ground
Levee
Ineff
Bank Sta
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.492 BR
.04 .045 .04
Elevation (ft)
Station (ft)
Legend
EG PF 2
EG PF 1
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.491
.04 .045 .04
Elevation (ft)
Station (ft)
Legend
EG PF 2
EG PF 1
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.486
.04 .045 .04
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta


Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.431 Q=290 cfs (CPD54, 24 hr)
.045
.04
Elevation (ft)
Station (ft)
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Encroachment
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.378
.04
.045
.04
Elevation (ft)
Station (ft)
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Levee
Ineff
Bank Sta
Encroachment
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.345
.04
.045
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 1
WS PF 2
Ground
Bank Sta
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.344 IS
.04
.045
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 1
WS PF 2
Ground
Bank Sta


Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.316
.045
.04
Elevation (ft)
Station (ft)
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Encroachment
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.294
.04
.045
.04
Elevation (ft)
Station (ft)
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Levee
Ineff
Bank Sta
Encroachment
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.265
.05
.04
Elevation (ft)
Station (ft)
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Levee
Ineff
Bank Sta
Encroachment
Lower El Mirage Wash Basin-Pre Project Plan: Lower El Mirage Wash Basin-Pre Project 2/8/2013
RS = 0.219 ENDED DETAILED STUDY
.05
.045
.05
.04
Elevation (ft)
Station (ft)
Legend
EG PF 2
EG PF 1
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta
Encroachment

APPENDIX E.4

POST-PROJECT CONDITIONS HEC-RAS OUTPUT

```
                    HEC-RAS Version 4.1.0 Jan 2010
                     U.S. Army Corps of Engineers
                    Hydrologic Engineering Center
                          609 Second Street
                          Davis, California

          X     X  XXXXXX    XXXX        XXXX       XX      XXXX
          X     X  X        X    X       X   X     X  X    X
          X     X  X        X            X   X    X    X   X
          XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
          X     X  X        X            X  X     X    X        X
          X     X  X        X    X       X   X    X    X        X
          X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Lower El Mirage Wash Basin-Post Project
Project File : LEMWB_PostProj.prj
Run Date and Time: 2/22/2013 10:29:05 AM

Project in English units

Project Description:
Lower El Mirage Wash Basin, Project FCDMC 2012C018. Post project modeling of the 100% design. Completed in January 2013.

RAS model is prepared by Dibble
Engineering in support of a CLOMR for the Lower El Mirage Wash Basin.

Reach
Description:
From a point approx. 1160' upstream of the confluence with the Agua Fria River (River Mile 0.219) to a point approximately 500 feet north and 1,200 feet west of the intersection of Cactus Road and El Mirage Road (River Mile 1.514), a distance of 1.295 river miles.

The Cross-section data were
generated by Civil3d. The mapped hydraulic base line represents the 10,000-station point of the HEC-RAS model.

Topographic mapping is based on
2012 aerial photography and supplied by Cooper Aerial Mapping Co. at 1"=40' scale and with 1' contour interval. Aerial data was collected in April of 2012. This mapping is based on the project benchmark NGS Monument 4GA2, and uses the North American Vertical Datum of 1988 (NAVD88). Field reconnaissance performed on September 18, 2012.

ischarge data is from the Lower El Mirage Wash Basin
C-1 model. The basis of hydrology for the watershed contributing to this
oject is the Loop 303/White Tanks ADMPU Area Hydrologic Analysis, Existing Conditions without CIP, completed in 2009. This model includes capital improvement projects anticipated to be performed in the coming years. The model represents a 100-year return period and a 24-hour duration. Several revisions were made to the ADMPU model in order to correct inaccuracies and to model the proposed condition for the Lower El Mirage Wash Basin project. See the project design report for additional information.

Hydrologic concentration points
are noted in cross-section descriptions using the corresponding HEC-1 ID's. The flow rates have been rounded to the nearest 10 cubic feet per second (cfs). Flow rates obtained from HEC-1 are applied at the downstream end of the relevant sub-basin.

River Mile (RM) stationing is based upon the estimated
tie in point with downstream receiving waters. This point represents RM 0.000. The assumed starting WS Elevation is based upon normal depth in the study wash.

Horizontal and Vertical Coordinate Basis for this project is as follows:

Horizontal--Arizona State Plane, Central Region, NAD 1983
Vertical--NAVD
1988

PLAN DATA

Plan Title: Lower El Mirage Wash Basin-Post Project
Plan File : j:\2011\101122_01-Lower_El_Mirage_Wash\Design Notebook\Calculations and Analysis\Drainage\HEC-RAS\Proposed Conditions Model\LEMWB_PostProj.p01

Geometry Title: Lower El Mirage Wash Basin-Post Project
Geometry File : j:\2011\101122_01-Lower_El_Mirage_Wash\Design Notebook\Calculations and Analysis\Drainage\HEC-RAS\Proposed Conditions Model\LEMWB_PostProj.g01

Flow Title : Lower El Mirage Wash Basin-Post Project
Flow File : j:\2011\101122_01-Lower_El_Mirage_Wash\Design Notebook\Calculations and Analysis\Drainage\HEC-RAS\Proposed Conditions Model\LEMWB_PostProj.f01

Plan Summary Information:

Number of:	Cross Sections =	42	Multiple Openings =	0
	Culverts =	3	Inline Structures =	1
	Bridges =	1	Lateral Structures =	0

Computational Information

Water surface calculation tolerance	=	0.01
Critical depth calculation tolerance	=	0.01
Maximum number of iterations	=	20
Maximum difference tolerance	=	0.3
Flow tolerance factor	=	0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method: Average Conveyance
    Computational Flow Regime: Subcritical Flow

Encroachment Data
   Equal Conveyance = True
   Left Offset = 0
   Right Offset = 0

River = Lr El Mirage Wsh Reach = Lr El Mirage Wsh

RS	Profile	Method	Value1	Value2
1.514	PF 2	1	9933.0410062.86	
1.449	PF 2	1	9920.3310069.35	
1.406	PF 2	1	9938.6810075.97	
1.390	PF 2	1	9847.4610099.69	
1.371	PF 2	1	9844.7810097.02	
1.365	PF 2	1	9870.6710146.76	
1.360	PF 2	1	9869.5410269.47	
1.348	PF 2	1	9921.8410237.05	
1.329	PF 2	1	9912.6910243.77	
1.312	PF 2	1	9922.27 10269.1	
1.242	PF 2	1	9905.4110240.88	
1.200	PF 2	1	9877.4210646.87	
1.115	PF 2	1	9615.410076.01	
1.069	PF 2	1	9923.610110.43	
1.047	PF 2	1	9938.9210061.36	
1.020	PF 2	1	9952.4610041.13	
1.014	PF 2	1	9939.8810028.84	
0.978	PF 2	1	9951.1310032.36	
0.940	PF 2	1	9949.5210027.72	
0.892	PF 2	1	9947.5810052.62	
0.848	PF 2	1	9967.7110037.17	
0.785	PF 2	1	9963.1610037.65	
0.758	PF 2	1	9947.1210059.47	
0.726	PF 2	1	9964.1210039.29	
0.680	PF 2	1	9970.1310027.22	
0.646	PF 2	1	9982.9 10015.3	
0.638	PF 2	1	9978.9910022.38	
0.629	PF 2	1	9979.810021.09	
0.610	PF 2	1	9954.07 10041.7	
0.583	PF 2	1	9967.1810032.58	
0.533	PF 2	1	9958.1710036.28	
0.500	PF 2	1	9935.0510038.01	
0.493	PF 2	1	9929.7810029.99	
0.491	PF 2	1	9922.8610023.07	
0.486	PF 2	1	9958.9310024.94	
0.431	PF 2	1	9950.2810047.02	
0.378	PF 2	1	9961.1210051.86	
0.345	PF 2	1		
0.316	PF 2	1	9895.8810052.68	
0.294	PF 2	1	9944.2610050.53	
0.265	PF 2	1	9993.2110097.55	
0.219	PF 2	1	9945.3110327.11	

FLOW DATA

Flow Title: Lower El Mirage Wash Basin-Post Project
Flow File : j:\2011\101122_01-Lower_El_Mirage_Wash\Design Notebook\Calculations and Analysis\Drainage\HEC-RAS\Proposed Conditions Model\LEMWB_PostProj.f01

Flow Data (cfs)

River	Reach	RS	PF 1	PF 2
Lr El Mirage Wsh	Lr El Mirage Wsh	1.514	480	480
Lr El Mirage Wsh	Lr El Mirage Wsh	1.390	470	470
Lr El Mirage Wsh	Lr El Mirage Wsh	1.047	160	160
Lr El Mirage Wsh	Lr El Mirage Wsh	0.431	290	290

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Lr El Mirage Wsh	Lr El Mirage Wsh	PF 1	Normal S = 0.0055	Normal S = 0.003

GEOMETRY DATA

Geometry Title: Lower El Mirage Wash Basin-Post Project
Geometry File : j:\2011\101122_01-Lower_El_Mirage_Wash\Design Notebook\Calculations and Analysis\Drainage\HEC-RAS\Proposed Conditions Model\LEMWB_PostProj.g01

CROSS SECTION

RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh RS: 1.514

INPUT
Description: BEGIN DETAILED STUDY

Q=480 cfs (CPD42, 24 hr)
Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9933.04	1118.4	9936.86	1118.17	9942.15	1117.29	9946.54	1116.48	9954.49	1114.05
9956.17	1113.55	9958.79	1112.9	9966.38	1111.03	9971.18	1110.91	9978.3	1110.69
9986.85	1110.65	9987.48	1110.65	9988.85	1110.6	9994.92	1110.32	9997.4	1110.14
9999.4	1109.98	10000	1110.03	10002.46	1110.23	10002.69	1110.24	10003.46	1110.26
10011.64	1110.24	10017.91	1110.34	10027.55	1110.57	10031.41	1110.68	10039.55	1112.53

```
10043.98 1114.1810045.37 1114.6910045.93 1114.9110052.01 1117.1110056.96 1118.67
10058.14 1119.0310059.33  1119.110062.86  1119.4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9933.04     .04 9966.38    .03510031.41     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9933.0410062.86          336.537  341.38 346.306             .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.449

INPUT
Description:
Station Elevation Data    num=      59
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9910.09 1119.77 9910.42 1119.75  9911.2 1119.78 9914.19  1119.9 9919.95 1119.93
 9920.24 1119.39 9920.33  1119.2  9921.6 1119.24 9923.64 1119.25 9925.47 1119.11
  9933.5 1118.45    9938 1117.51 9938.51 1117.34 9943.81 1115.67 9952.52  1113.1
 9953.31 1112.87 9955.67 1112.05 9957.95 1111.25 9958.23 1111.15 9963.66 1110.26
 9969.19 1109.82 9970.66 1109.76 9975.29 1109.76 9982.87 1109.81 9990.89 1109.79
 9991.19 1109.79  9991.3 1109.78 9997.93 1109.22   10000 1109.1710004.91 1109.01
10007.12 1109.2710008.15 1109.2510008.62 1109.2310011.03 1109.1710011.72 1109.17
10014.07 1109.2310014.23 1109.2410018.13 1109.55 10019.5  1109.710024.39 1109.67
10025.24 1109.6410031.23 1110.42 10031.9  1110.510032.14 1110.5410032.94  1110.7
10042.64 1112.5310047.16 1113.8110050.59  1114.910052.46 1115.58 10054.8    1116
10057.07 1117.3610059.07 1117.98 10060.8 1118.3310068.32 1119.5810069.35 1119.71
10072.27 1119.7110075.35 1119.6510076.25 1119.6610076.92 1119.66

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9910.09    .035 9920.33     .04 9970.66    .03510025.24     .0410069.35    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9920.3310069.35          235.985  230.52 225.121             .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.406

INPUT
Description:
Station Elevation Data    num=      81
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9854.42 1118.44 9854.96 1118.42    9856 1118.38  9858.5 1118.19 9858.79 1118.17
 9858.88 1118.16 9860.42  1118.1 9861.25 1118.02  9862.3 1117.95 9864.84 1117.64
 9865.25  1117.6  9868.3 1117.48 9868.92 1117.45 9869.61 1117.42 9874.96 1117.25
 9883.84 1116.79 9885.62 1116.74 9888.53 1116.68 9890.74 1116.58 9891.12 1116.55
 9901.51 1116.26 9911.07 1115.97 9912.75 1115.91 9913.75 1115.91 9914.11  1115.9
 9914.34 1115.89 9915.01  1115.9 9915.37 1115.91 9922.38 1115.99 9923.36    1116
 9925.26  1116.6 9925.72 1116.67 9927.26 1116.87 9929.08 1117.17 9935.79 1117.12
 9938.68 1117.18 9939.62 1116.94 9942.21 1116.31 9943.03 1116.02 9945.04 1115.28
 9946.72 1114.67 9953.25 1112.38 9956.43 1111.51 9960.84 1110.27 9965.32 1109.29
  9965.5 1109.26 9966.21 1109.23 9975.25 1108.91 9977.62 1108.87 9979.53 1108.85
 9981.29 1109.03 9981.37 1109.03  9981.5 1109.04 9990.21 1109.21 9997.83 1109.12
   10000 1109.1510001.49 1109.1810002.36 1109.0310004.36 1108.7610007.42  1108.9
10008.91 1109.1210010.34 1109.1810012.63 1109.4310016.83 1109.4410020.18 1109.42
10023.86 1109.3210032.29 1109.0510037.33 1109.3210037.91 1109.36 10038.2 1109.45
10040.17 1109.9910044.18 1111.1210046.29 1112.04 10050.7 1114.1110056.82 1115.75
10062.34 1117.3110065.26 1117.9110068.61 1118.6610071.92 1119.0610074.16 1119.38
10075.97 1119.51

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val
 9854.42    .035 9938.68     .04 9965.32    .03510037.91     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9938.6810075.97          106.417    84.6  67.435             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9854.42 9935.79    1118       T

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.390

INPUT
Description: Upstream of Cactus Road

Q=470 cfs (SRD42, 24 hr)
Station Elevation Data    num=      76
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9932.45 1117.66  9932.8 1117.62 9932.85 1117.62 9938.25 1116.76 9942.89  1115.7
 9943.91 1115.43 9947.01 1114.48 9950.63 1113.32 9952.77 1112.62 9956.25 1111.59
 9956.57  1111.5 9957.11 1111.38 9957.37 1111.33 9959.18 1111.09 9961.23  1110.6
 9962.13 1110.35 9962.45  1110.3  9962.9 1110.24 9963.97 1110.17 9967.56 1109.71
 9968.33  1109.3  9969.5 1110.37  9969.6 1110.14 9970.75 1109.55 9973.73 1108.52
 9976.16 1107.81  9976.8 1107.49  9977.6 1107.29 9985.56 1107.31 9986.74 1107.29
 9994.08 1106.87 9995.02 1106.86 10006.4 1106.9210011.17 1107.0310013.05  1107.1
10018.84 1107.1710022.08 1107.3810023.06 1107.4310023.57 1107.5310023.99 1107.55
10024.23 1107.5510024.66 1107.56 10028.9 1108.8610033.62 1110.4110034.11 1111.06
10035.89  1111.4 10036.2 1111.3910036.83 1111.6210037.75 1111.9110039.38 1112.51
10043.11  1114.110043.88 1114.4710044.21 1114.5810044.61 1114.6310045.01 1114.63
10045.21 1114.5910045.95 1114.8510046.46 1114.9810048.51 1115.6310050.68 1116.25
10051.95  1116.710053.85 1116.7910062.27 1117.05 10063.3 1117.0510065.04 1117.08
10066.63 1117.0810067.45 1117.1310067.84 1117.1510070.14 1117.1410071.13 1117.17
10077.98 1117.6710079.12 1117.7510079.71 1117.7710079.83 1117.7710080.73 1117.83
10087.85 1117.95
```

```
Manning's n Values          num=        4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9932.45     .04  9977.6    .03510024.66     .0410051.95    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9932.4510051.95          113.312   98.02 103.066             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 9932.45 9995.71 1114.22        T
10003.5310087.85  1116.1        T

CULVERT


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.379

INPUT
Description:
Distance from Upstream XS =     29.5
Deck/Roadway Width        =       46
Weir Coefficient          =      2.6
Upstream  Deck/Roadway Coordinates
    num=        5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
9947.821 1114.22         9974.281  1114.9         10032.53 1117.36
10049.61 1117.31         10080.73 1117.83

Upstream Bridge Cross Section Data
Station Elevation Data    num=      76
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9932.45 1117.66  9932.8 1117.62 9932.85 1117.62 9938.25 1116.76 9942.89  1115.7
 9943.91 1115.43 9947.01 1114.48 9950.63 1113.32 9952.77 1112.62 9956.25 1111.59
 9956.57  1111.5 9957.11 1111.38 9957.37 1111.33 9959.18 1111.09 9961.23  1110.6
 9962.13 1110.35 9962.45  1110.3  9962.9 1110.24 9963.97 1110.17 9967.56 1109.71
 9968.33  1109.3  9969.5 1110.37  9969.6 1110.14 9970.75 1109.55 9973.73 1108.52
 9976.16 1107.81  9976.8 1107.49  9977.6 1107.29 9985.56 1107.31 9986.74 1107.29
 9994.08 1106.87 9995.02 1106.86 10006.4 1106.9210011.17 1107.0310013.05  1107.1
10018.84 1107.1710022.08 1107.3810023.06 1107.4310023.57 1107.5310023.99 1107.55
10024.23 1107.5510024.66 1107.56 10028.9 1108.8610033.62 1110.4110034.11 1111.06
10035.89  1111.4 10036.2 1111.3910036.83 1111.6210037.75 1111.9110039.38 1112.51
10043.11  1114.110043.88 1114.4710044.21 1114.5810044.61 1114.6310045.01 1114.63
10045.21 1114.5910045.95 1114.8510046.46 1114.9810048.51 1115.6310050.68 1116.25
10051.95  1116.710053.85 1116.7910062.27 1117.05 10063.3 1117.0510065.04 1117.08
10066.63 1117.0810067.45 1117.1310067.84 1117.1510070.14 1117.1410071.13 1117.17
10077.98 1117.6710079.12 1117.7510079.71 1117.7710079.83 1117.7710080.73 1117.83
10087.85 1117.95

Manning's n Values          num=        4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9932.45     .04  9977.6    .03510024.66     .0410051.95    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9932.4510051.95             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 9932.45 9995.71 1114.22        T
10003.5310087.85  1116.1        T

Downstream  Deck/Roadway Coordinates
    num=        7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
9903.887     1115    11069930.797 1114.89    11069958.837 1114.39    1106
9998.517  1115.6    110610046.62 1117.36    110610066.39 1117.31    1106
10097.02 1117.69    1106

Downstream Bridge Cross Section Data
Station Elevation Data    num=      99
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9844.78     1117 9861.45     1116 9870.67 1115.74 9871.29 1115.72 9881.38 1115.46
 9892.09 1115.16 9895.96 1115.07 9899.12 1115.02 9910.43  1114.9 9932.99 1114.47
 9933.16 1114.46 9938.39  1114.3 9938.51 1114.31  9946.5 1114.17 9947.69 1114.11
 9951.15     1114 9954.06 1113.84  9955.1 1113.75 9958.42 1113.58 9961.32 1113.36
 9962.91 1113.26    9966    1113 9967.27 1112.89    9968  1112.8  9971.2 1112.52
 9973.54 1112.25 9974.47 1112.16 9975.76    1112  9977.5  1111.8 9979.73 1111.46
 9981.45 1111.25 9983.18    1111 9986.21 1110.52 9987.35 1110.37 9989.88    1110
 9991.48 1109.68 9993.52 1109.41 9994.38    1109 9994.57 1108.39 9995.53    1108
 9995.61 1107.23 9995.88    1107    9996 1106.91 9997.08 1106.88   10000 1106.75
 10000.7 1106.71 10000.8 1106.73 10003.7 1106.88 10004.6    110910005.79 1109.17
10006.73 1109.2410006.88 1109.2510007.09 1109.2710010.33    111010011.36 1110.34
10013.17 1110.9810013.23    111110013.39 1111.0410016.88    111210018.03 1112.31
10020.63    111310021.58 1113.2810023.98    111410024.29 1114.1210024.66 1114.21
10027.25    111510027.95 1115.1310028.62 1115.2610031.02 1115.6710033.09 1115.97
10033.17 1115.9810033.35    111610035.72 1116.1810037.15 1116.2810041.88 1116.48
10043.42 1116.5410044.62 1116.5810045.45 1116.5910047.58 1116.6710050.57 1116.67
10050.65 1116.6810050.98  1116.710051.86 1116.7410056.45 1116.9710057.59 1117.09
10059.44 1117.1210064.29 1117.1910066.46 1117.1610068.32 1117.1310072.94 1117.07
10075.57 1117.0310077.78 1116.9710079.34 1116.92 10083.2 1116.8510085.07  1116.8
10086.28 1116.7310089.04 1116.6210095.43 1116.6210097.02 1116.71

Manning's n Values          num=        2
     Sta   n Val     Sta   n Val
 9844.78    .035 9951.15    .045

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9958.4210020.63             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
   1000710097.02    1117        T
 9844.78    9938    1117        T

Upstream Embankment side slope              =       5 horiz. to 1.0 vertical
Downstream Embankment side slope            =       3 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
```

```
Energy head used in spillway design          =
Spillway height used in design               =
Weir crest shape                             = Broad Crested

Number of Culverts =  1

Culvert Name      Shape      Rise    Span
Culvert #1      Circular       2
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 2 - Groove end entrance with headwall
Solution Criteria = Outlet control
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                1.2    96.8     .013     .013        0                  .2                 1
Number of Barrels =  3
Upstream   Elevation =  1107.03
Centerline Stations
    Sta.    Sta.    Sta.
9996.7149999.80910002.53
Downstream Elevation =  1106.88
Centerline Stations
    Sta.    Sta.    Sta.
9997.081   1000010002.77

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.371

INPUT
Description: Downstream of Cactus Road
Station Elevation Data     num=       99
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9844.78    1117 9861.45    1116 9870.67 1115.74 9871.29 1115.72 9881.38 1115.46
 9892.09 1115.16 9895.96 1115.07 9899.12 1115.02 9910.43  1114.9 9932.99 1114.47
 9933.16 1114.46 9938.39  1114.3 9938.51 1114.31  9946.5 1114.17 9947.69 1114.11
 9951.15    1114 9954.06 1113.84  9955.1 1113.75 9958.42 1113.58 9961.32 1113.36
 9962.91 1113.26    9966    1113 9967.27 1112.89    9968  1112.8  9971.2 1112.52
 9973.54 1112.25 9974.47 1112.16 9975.76    1112  9977.5  1111.8 9979.73 1111.46
 9981.45 1111.25 9983.18    1111 9986.21 1110.52 9987.35 1110.37 9989.88    1110
 9991.48 1109.68 9993.52 1109.41 9994.38    1109 9994.57 1108.39 9995.53    1108
 9995.61 1107.23 9995.88    1107    9996 1106.91 9997.08 1106.88   10000 1106.75
 10000.7 1106.71 10000.8 1106.73 10003.7 1106.88 10004.6    110910005.79 1109.17
10006.73 1109.2410006.88 1109.2510007.09 1109.2710010.33    111010011.36 1110.34
10013.17 1110.9810013.23    111110013.39 1111.0410016.88    111210018.03 1112.31
10020.63    111310021.58 1113.2810023.98    111410024.29 1114.1210024.66 1114.21
10027.25    111510027.95 1115.1310028.62 1115.2610031.02 1115.6710033.09 1115.97
10033.17 1115.9810033.35    111610035.72 1116.1810037.15 1116.2810041.88 1116.48
10043.42 1116.5410044.62 1116.5810045.45 1116.5910047.58 1116.6710050.57 1116.67
10050.65 1116.6810050.98  1116.710051.86 1116.7410056.45 1116.9710057.59 1117.09
10059.44 1117.1210064.29 1117.1910066.46 1117.1610068.32 1117.1310072.94 1117.07
10075.57 1117.0310077.78 1116.9710079.34 1116.92 10083.2 1116.8510085.07  1116.8
10086.28 1116.7310089.04 1116.6210095.43 1116.6210097.02 1116.71

Manning's n Values         num=        2
     Sta   n Val     Sta   n Val
 9844.78    .035 9951.15    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9958.4210020.63          31.672   29.35  40.501             .3       .5
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
   1000710097.02    1117       T
 9844.78    9938    1117       T

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.365

INPUT
Description:
Station Elevation Data     num=       97
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9870.67 1116.24 9886.31 1115.56 9895.63 1115.37 9901.58 1115.33 9915.12  1115.4
 9916.76 1115.38 9917.96 1115.39 9921.33 1115.33 9923.24 1115.29 9925.27 1115.24
 9926.06 1115.24 9928.21 1115.18  9933.5    1115 9933.59    1115 9939.51 1114.58
 9945.41 1114.11 9946.09 1114.06 9946.78    1114 9951.22 1113.55 9956.41    1113
 9958.11 1112.84 9960.77  1112.6 9966.91    1112 9968.35 1111.79 9973.14    1111
 9978.07 1110.11 9978.71    1110 9979.57 1109.84 9981.06 1109.55 9983.16 1109.16
 9983.92    1109 9984.76 1108.83 9989.16    1108 9992.26 1107.38 9994.02    1107
 9994.24 1106.94 9994.74 1106.82 9999.13 1106.98 9999.64    110710000.01 1107.01
10003.63 1107.1310004.02 1107.1510004.07 1107.1510008.27    110810010.74 1108.71
10011.78    110910012.44 1109.21 10014.8    111010015.09 1110.0810015.29 1110.13
10029.07 1110.8410030.45 1110.7710039.17 1110.4210041.83 1110.3210045.65 1110.49
10049.15 1110.0710049.28 1110.0810049.55 1110.0610049.97    111010051.65 1109.95
10054.35 1109.8410056.67 1109.9410058.37 1109.9310061.35 1109.7910065.16 1109.93
 10066.8 1109.9310068.35 1109.7910068.49 1109.7710071.29  1109.310071.61    1109
10085.07    110910085.38  1109.310087.58 1109.7610089.08 1109.92 10089.7 1110.02
 10091.4  1110.310091.63 1110.3510099.35    1112 10102.6 1112.6910104.04    1113
 10108.3 1113.9110108.76    111410109.64 1114.19 10120.7 1116.5310127.63 1117.99
10127.72 1118.0110130.91 1118.6710132.53    111910135.33 1119.5910137.36    1120
10139.85 1120.5310142.69 1121.0710142.78 1121.0610144.39 1121.0310145.39 1121.04
10146.18    112110146.76    1121

Manning's n Values         num=        3
     Sta   n Val     Sta   n Val     Sta   n Val
 9870.67    .035  9933.5    .04510142.69    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9933.510029.07          28.041   25.87  40.642             .1       .3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
 9870.67    9957    1116       F
   1003210146.76    1116       F
```

CROSS SECTION

RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh RS: 1.360

INPUT
Description:
Station Elevation Data num= 147

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9869.54	1116.48	9874.1	1116.29	9893.49	1115.74	9897.21	1115.62	9907.84	1115.95
9910.29	1116	9910.54	1116	9913.47	1116.09	9914.89	1116.15	9917.23	1116.22
9918.92	1116.24	9921.28	1116.36	9922.61	1116.37	9925.46	1116.52	9926.38	1116.51
9927.44	1116.47	9930.23	1116.69	9930.89	1116.6	9933.79	1116	9934.5	1115.94
9936.74	1115.7	9942.01	1115.16	9942.72	1115.05	9943.31	1115	9954.63	1114.12
9956.1	1114	9956.91	1113.87	9962.86	1113	9963.68	1112.85	9967.48	1112.17
9968.52	1112	9973.82	1111.02	9973.92	1111	9974.09	1110.97	9979.33	1110
9981.99	1109.37	9983.59	1109	9987.71	1108.1	9988.18	1108	9989.63	1107.61
9992.81	1106.75	9998.88	1106.7810000.01		1106.7810002.74		1106.8110006.55		1107.7
10007.88	110810009.27		1108.3610011.69		110910017.31		1109.7710017.93		1109.89
10018.2	1109.9410018.54		1110 10028.6		1110.4310038.53		111010057.06		1109.34
10057.67	1109.3410064.15		1109.310064.39		1109.310071.74		1109.2810071.95		1109.06
10072.28	1108.7410102.61		1108.7610103.14		1109.2510103.25		1109.2710107.35		1109.91
10109.54	1110.2610111.63		1110.6210113.97		111110119.81		111210122.43		1112.43
10126.06	111310128.43		1113.38 10132.6		111410134.14		1114.2410139.35		1115
10139.44	1115.01 10143.7		1115.62 10146.6		111610148.02		1116.1910149.93		1116.42
10152.63	1116.7510157.16		1117.2410159.03		1117.4310161.63		1117.710162.61		1117.78
10165.25	111810165.84		1118.05 10166.1		1118.0710169.59		1118.3610170.91		1118.44
10172.94	1118.5710174.91		1118.6910175.94		1118.7410178.58		1118.8510182.16		1118.99
10182.31	1118.9910182.58		111910186.99		1119.0910187.29		1119.110190.49		1119.12
10190.87	1119.1210193.97		1119.1410194.42		1119.1410197.57		1119.1110197.91		1119.11
10201.19	1119.0710201.42		1119.07 10204.1		111910204.92		1118.9810204.99		1118.97
10208.33	1118.8810208.68		1118.8610211.74		1118.7710212.37		1118.7510213.07		1118.74
10215.48	1118.7110216.25		1118.7110218.56		1118.68 10219.4		1118.6910221.67		1118.7
10222.43	1118.7210224.83		1118.74 10225.5		1118.7610228.12		1118.8210228.57		1118.84
10231.52	1118.9110231.76		1118.9210235.04		1119.0410235.21		1119.04 10238.5		1119.15
10240.99	1119.2710242.12		1119.310244.25		1119.410245.95		1119.4610247.59		1119.55
10250.01	1119.6310251.17		1119.6910254.36		1119.82 10254.9		1119.8510258.56		1120
10258.94	1120.0210261.41		1120.1910262.23		1120.2210265.34		1120.3510267.81		1120.39
10269.26	1120.410269.47		1120.4						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
9869.54	.035	9933.79	.045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
9930.23 10028.6 78.839 66.31 48.457 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1005	110269.47	1116	F

CROSS SECTION

RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh RS: 1.348

INPUT
Description:
Station Elevation Data num= 165

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9884.74	1117.7	9891	1117.76	9894.05	1117.66	9897.35	1117.58	9897.6	1117.61
9897.68	1117.61	9897.8	1117.6	9897.88	1117.59	9899.46	1117.98	9901.88	1118.59
9902.36	1118.52	9904.73	1118.07	9904.99	1117.98	9906.24	1117.56	9906.45	1117.63
9907.75	1118.05	9908.43	1118.06	9912.61	1118.1	9914.49	1118.11	9914.79	1118.11
9915.43	1118.12	9921.84	1118.12	9922.08	1118.09	9922.63	1118	9928.12	1117.24
9929.79	1117	9930.86	1116.84	9937.08	1116	9940.35	1115.54	9944.29	1115
9950.35	1114.21	9951.91	1114	9959.49	1113	9961.15	1112.79	9961.82	1112.7
9967.22	1112	9969.19	1111.73	9974.19	1111	9978.08	1110.48	9981.43	1110
9982.45	1109.91	9982.96	1109.75	9984.12	1109.38	9984.41	1109.46	9985.77	1109.86
9986.88	1110	9986.99	1110.01	9990.57	1110.38	9991.93	1110.46	9997.57	1110.35
10000	1110.3110000.62		1110.29 10002.1		1110.2510003.52		1110.2210003.94		1110.21
10004.73	1110.1910007.51		1110.1310011.19		1110.0310012.18		1110.0110012.51		1110
10013.73	1109.9710016.53		1109.5610017.07		1109.4410017.66		1108.7810017.86		1108.66
10021.75	1108.6610025.24		1108.6710031.26		1108.6710034.73		1108.6810087.74		1108.71
10090.12	1108.7210103.38		1108.7210105.02		1108.7310105.45		1109.0610105.67		1109.23
10106.87	1109.3810107.15		1109.4210113.55		1110.2210114.35		1110.3110120.17		1110.89
10121.39	111110125.38		1111.38 10127.4		1111.5410129.52		1111.72 10132.7		1111.91
10133.07	1111.94 10134.1		1112 10136.3		1112.1510136.95		1112.1910139.64		1112.34
10141.08	1112.4110143.05		1112.5210145.27		1112.6310146.54		1112.6810149.35		1112.78
10150.11	1112.8110153.47		1112.93 10153.7		1112.94 10153.9		1112.9410156.57		1113
10157.32	1113.0210157.38		1113.0210160.86		1113.0910161.19		1113.110164.43		1113.11
10164.83	1113.1110167.99		1113.1310169.01		1113.1310169.44		1113.1210171.98		1113.14
10172.47	1113.1410174.96		1113.16 10175.6		1113.1610178.07		1113.2110180.22		1113.27
10181.56	1113.2810183.56		1113.3610185.53		1113.4210187.28		1113.4810188.17		1113.52
10194.81	1113.84 10197.4		111410198.26		1114.0510201.15		1114.2310202.06		1114.29
10203.65	1114.410205.94		1114.5710209.15		1114.810209.91		1114.8610214.24		1115.22
10216.01	1115.3810218.87		1115.6310222.91		111610223.52		1116.0510223.96		1116.1
10227.92	1116.49	10232	1116.910232.46		1116.9410237.05		1117.4610241.84		1117.99
10241.92	1118 10246.9		1118.5710249.96		1118.9310251.14		1118.9910251.25		1119
10257.77	1119.0410259.87		1119.0510263.17		1119.0510263.75		1119.0310263.81		1119.04
10268.77	1119.9710268.84		1119.9610273.77		1118.8910274.49		1118.8410274.73		1118.82
10277.2	1118.8410277.29		1118.8410277.91		1118.8110280.83		1118.8110284.67		1118.87
10284.87	1118.8710285.63		1118.910287.85		1118.8810289.02		1118.9210290.17		1118.97

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9884.74	.035	9897.6	.04	510232.46	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
9921.8 410237.05 90.351 98.62 105.803 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1004	310290.17	1118	F

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CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.329

INPUT
Description:
Station Elevation Data     num=      141
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  9894.1 1118.12 9894.62 1118.13 9896.19 1118.17 9896.63 1118.14 9897.82 1117.99
 9898.83 1117.92 9900.28 1117.84 9901.04 1117.77  9901.7 1117.58  9902.8 1117.72
 9902.91 1117.71 9903.04 1117.75 9904.86 1118.09 9906.31 1118.54 9906.62 1118.42
 9906.63 1118.33 9906.64  1118.2 9906.69 1117.67 9908.62 1118.15 9910.69 1118.67
 9912.69 1118.67 9921.74  1115.9  9924.7    1115  9928.9 1113.79 9929.86 1113.51
 9931.02 1113.13 9931.41    1113 9932.46 1113.32 9932.95 1113.48 9940.16  1113.5
 9942.12 1113.48 9947.37 1113.45 9951.21 1113.01 9951.32 1112.99 9958.52 1112.26
 9960.03 1111.77 9960.09 1111.75 9961.65 1112.39 9963.31 1112.37 9968.95 1112.31
 9976.25 1112.31 9976.63 1112.24 9977.89 1112.03 9978.06    1112 9978.12 1111.99
 9983.02    1111 9983.76 1110.84  9987.7    1110 9989.63 1109.61 9992.73    1109
 9997.01 1108.14 9997.67    1108 9997.96 1107.99   10000 1107.9110009.82 1107.97
10012.78 1107.9810016.06    110810018.37 1108.0310022.09 1108.0710022.72 1108.07
10026.06 1108.1110027.52 1108.1210032.32 1108.1710034.72 1108.1910037.11 1108.22
10041.91 1108.2710043.79 1108.28 10051.5 1108.3610053.05 1108.38 10056.3 1108.41
10057.72 1108.42 10061.1 1108.4610062.42 1108.47 10065.9 1108.5110067.12 1108.52
10070.69 1108.5610076.57 1108.6110129.38 1109.1510134.21 1109.1910135.44 1109.21
10139.03 1109.2410140.35 1109.2610143.13 1109.2810145.26  1109.310148.63 1109.34
10150.17 1109.3510153.39 1109.3910155.08  1109.410164.91  1109.510167.47 1109.53
10172.04 1109.5710176.49 1109.6210184.56  1109.710184.72  1109.7 10185.2 1109.71
10200.28    111010201.17 1110.0810202.89 1110.2310206.08 1110.9110206.48    1111
10209.14 1111.5710211.12    111210211.36 1112.0510215.86    111310220.52    1114
10222.89 1114.5210225.12    111510228.28 1115.6710229.81    111610234.07 1116.91
10234.47    111710236.09 1117.3510239.13    111810239.81 1118.1510243.77    1119
10244.25  1119.110246.28 1119.5510248.86 1119.8610250.06    112010251.08 1120.17
10256.16    112110257.98 1121.2610258.51 1121.3310259.05 1121.2510260.86    1121
10266.86    1120 10271.4 1119.6410271.71 1119.62 10272.6 1119.5510277.13 1120.47
10277.19 1120.48 10277.6 1120.5610282.22 1119.63 10282.6 1119.5610283.25 1119.56
10283.38 1119.5510283.47 1119.5510283.91 1119.5610285.37 1119.5710298.75 1119.64
10299.53 1119.65

Manning's n Values         num=        3
     Sta   n Val     Sta   n Val     Sta   n Val
  9894.1    .035 9908.62    .04510246.28    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9912.6910243.77           99.994    92.2 105.714             .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
   1007910299.53    1118        F

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.312

INPUT
Description:
Station Elevation Data     num=       64
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9913.67 1117.45  9913.9 1117.45 9915.01 1117.51 9916.05 1117.58  9916.5 1117.72
  9917.4 1118.06 9918.99 1118.99 9919.72 1119.39  9921.3 1119.44 9921.86 1119.45
 9922.27 1119.52 9922.58 1119.45 9924.48 1119.01 9924.85 1118.38 9925.31 1117.77
 9925.71 1117.25 9929.71 1118.25 9931.71 1118.25 9933.92 1117.65 9947.88 1113.94
 9959.82  1110.8 9961.34 1110.31 9962.85 1110.97 9968.81 1110.95 9969.91 1110.95
 9972.91 1110.98 9973.78 1110.99 9976.97 1111.02 9977.05 1111.01 9979.38 1110.68
 9986.34 1109.72 9991.41    1109 9992.06 1108.91 9998.52    1108 9998.93 1107.94
   10000 1107.7810000.08 1107.7710011.93    1108 10040.8  1108.510205.83 1110.16
10231.75 1110.8410237.09 1111.9910237.22 1112.0210241.88    1113 10245.4 1113.75
10246.62    111410248.66 1114.4310251.39    111510253.04 1115.3510260.72 1116.94
10261.03    111710264.64 1117.7410267.79 1118.38 10269.1 1118.6510272.09 1118.76
10274.86 1118.8510279.87    111910291.64 1119.18 10293.8 1119.6110296.64 1120.18
10300.77 1119.3410301.64 1119.1610318.49 1119.03 10319.1 1119.03

Manning's n Values         num=        3
     Sta   n Val     Sta   n Val     Sta   n Val
 9913.67    .035 9924.48    .045 10269.1    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9922.27 10269.1          367.079  368.26 372.234             .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
   10125 10319.1    1118        F

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.242

INPUT
Description:
Station Elevation Data     num=       56
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9886.38 1116.49 9890.56 1116.49 9892.99  1116.5 9895.11 1116.75 9896.49 1116.15
 9897.64 1115.87  9899.9 1116.17 9900.39 1116.22 9901.72  1116.6 9905.41  1117.7
 9906.15 1117.47 9911.65 1115.97 9916.11 1115.65 9916.38 1115.63 9916.68 1115.61
  9920.3 1116.51 9920.68 1116.61 9922.68 1116.61 9929.87    1115 9931.97 1114.55
 9939.36    1113 9947.54  1111.3 9953.89    1110 9958.12 1109.16 9959.32 1108.92
 9959.44 1108.88 9960.85 1108.42 9960.99 1108.48 9962.29 1109.07 9965.84 1109.05
 9969.41 1109.02 9976.53 1109.07  9979.6 1108.82 9989.88    1108 9992.62 1107.79
  9999.9 1107.22   10000 1107.2210038.32 1108.1810203.37 1109.8510207.25 1109.97
 10208.5    111010213.31 1110.9110213.81    111110214.44 1111.0410215.98 1111.12
 10235.9    111610236.81 1116.2310236.99 1116.2810240.35  1116.910240.88    1117
10245.16 1117.8510245.89    111810255.14 1119.8510255.91    112010257.41  1120.2
10260.22 1120.58
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9886.38    .035 9916.38    .04510240.88    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9905.4110240.88          181.216   222.8 371.089             .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
   1022810260.22    1116       F

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.200

INPUT
Description:
Station Elevation Data    num=     257
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9877.42 1115.71 9877.93 1115.74 9877.94  1115.1 9879.45 1115.56 9881.97 1116.31
 9883.83 1116.13 9884.16 1116.09 9884.75 1116.04 9885.12    1116 9887.86 1115.57
 9891.45    1115 9892.44 1114.85 9897.82    1114 9903.93 1113.05 9904.23    1113
 9904.34 1112.98 9905.92 1112.73 9910.12 1112.04  9910.4    1112 9911.02  1111.9
 9916.54    1111 9920.49 1110.39 9922.98    1110 9929.47    1109 9933.32 1108.56
 9933.62 1108.53 9935.04 1108.06 9935.12 1108.03 9935.34  1108.1 9936.55 1108.53
 9938.84 1108.56 9943.58 1108.63 9945.98 1108.58 9946.95 1108.53 9949.64 1108.46
 9952.18  1108.4    9953 1108.39 9953.95 1108.32 9955.29 1108.32 9956.29 1108.27
 9959.45  1108.3 9960.51 1108.32 9962.15 1108.33 9964.49 1108.34 9968.31 1108.34
 9970.92 1108.35 9974.84 1108.35 9975.44 1108.39 9976.11 1108.41 9977.81 1108.48
 9978.08 1108.47 9979.77 1108.29 9981.25 1108.24 9984.03 1108.19 9985.87 1108.17
 9989.13 1108.01 9989.25 1108.01 9989.45    1108 9991.17 1107.89 9992.35 1107.82
 9994.67 1107.15    9996 1106.8210004.06 1106.8210004.51  1107.410005.22 1107.41
10006.59 1107.6110007.98 1107.9110008.49 1107.9910010.31  1108.110011.28 1108.12
10012.36 1108.14 10015.1 1108.2610017.06 1108.2910018.71 1108.3710021.19  1108.4
10022.23 1108.4510030.19 1108.5710030.91 1108.5610037.22 1108.6410037.94 1108.62
   10041 1108.66 10041.8 1108.65 10044.8 1108.6710045.74 1108.65 10048.6 1108.68
10049.96 1108.6510052.65 1108.6710054.31 1108.6310056.82 1108.6410062.46 1108.68
10063.82 1108.6310065.72 1108.5710067.71 1108.5410070.18 1108.4510071.79 1108.43
10075.06  1108.310076.17 1108.2910077.14 1108.2710080.99 1108.1110081.38  1108.1
 10083.9    110810085.51 1107.95 10088.4 1107.8710088.62 1107.8510088.73 1107.83
10092.04 1107.4910095.41 1107.1310098.81 1106.8310105.73 1106.8310108.61 1106.84
10115.87 1106.8410117.39 1106.8510126.23 1106.8510129.89 1107.0510130.87  1107.1
 10133.9 1107.2710136.32 1107.38   10138 1107.4810140.67 1107.63 10141.5 1107.68
10144.95 1107.8710145.04 1107.8710149.08 1107.8810163.09 1107.8810165.27 1107.89
10166.82 1107.9510169.79 1107.9810170.73 1107.9810172.89    110810174.51 1108.11
10177.68 1108.3410179.16 1108.4410179.52 1108.4610180.93 1108.57 10184.2 1108.76
10186.52 1108.9310187.38 1108.9910187.53    110910187.61    110910188.64 1109.03
10202.29 1109.6610204.73 1109.7810207.91    111010209.68    111010215.31 1110.03
10220.16 1110.0710228.89 1110.1210241.97 1110.2410242.72 1110.2410246.27 1110.26
10247.03 1110.2610250.66 1110.2710251.37 1110.2710254.63 1110.2910255.59 1110.29
10258.58  1110.310260.94  1110.310263.91 1110.3110265.29 1110.3110296.85 1110.45
10298.67 1110.4610303.31 1110.4610305.15 1110.4710316.02 1110.4710317.88 1110.48
10324.18 1110.4810326.41 1110.4710328.26 1110.4810330.49 1110.4710336.83 1110.47
10339.12 1110.4610343.24 1110.4610345.59 1110.4510347.37 1110.4510349.75 1110.44
10352.19 1110.4410353.92 1110.43 10356.4 1110.4310358.95 1110.4210360.64 1110.41
10363.24  1110.410364.87  1110.410373.16 1110.3710374.69 1110.3610377.64 1110.35
10379.09 1110.3410382.13 1110.33 10385.3 1110.3110386.64 1110.3110389.93 1110.29
10391.16 1110.2810394.56 1110.2710398.14 1110.2510401.92 1110.2210402.93 1110.22
10406.86  1110.210407.74 1110.1910411.83 1110.1610416.18 1110.1410416.82 1110.13
10421.35 1110.11 10426.2 1110.0710426.55 1110.0710436.86    111010437.05    1110
10441.94 1109.94 10442.2 1109.9410446.79 1109.8910447.28 1109.8910447.81 1109.88
 10452.3 1109.8410458.25 1109.7710463.36 1109.7210464.74  1109.710466.27 1109.69
10477.35 1109.5710479.68 1109.54 10485.4 1109.4810488.37 1109.4410491.03 1109.41
10494.34 1109.3810496.57 1109.3510505.98 1109.24 10510.5 1109.1810511.65 1109.17
10525.44    1109   10532 1108.9810540.44 1108.9210546.04 1108.8510546.48  1108.7
10547.57 1108.3510549.09 1108.8510564.85 1108.5410568.98 1107.54 10577.3 1107.54
10579.91 1108.1710581.49 1108.5410582.66 1108.77 10583.9    110910586.22 1109.44
10593.86 1110.9210595.08 1111.1710599.17    111210601.79 1112.6210603.44    1113
10606.84 1113.8310607.58    111410610.57 1114.7110611.82    111510614.17 1115.55
10616.07    111610617.89 1116.3910626.97 1118.3110633.14 1118.9610636.31 1119.28
10639.49 1119.3510646.87 1119.48

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
 9877.42    .04510633.14    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9877.4210345.59          361.242  446.53 648.669             .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
10197.8810646.87    1118       F

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.115

INPUT
Description:
Station Elevation Data    num=     112
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  9615.4 1115.65 9622.47 1115.68 9626.72 1115.66 9632.91 1115.56  9634.3 1115.51
  9639.5 1115.51 9640.95  1114.8 9641.29 1114.58 9641.59 1114.67 9642.65 1114.95
 9646.15 1115.91 9650.26 1117.01 9650.46 1116.86 9650.76 1116.74 9652.22 1116.67
 9672.47    1116 9672.73    1116 9677.52 1115.97 9678.71 1115.97 9684.23 1115.94
 9687.02 1115.92 9691.68  1115.9 9694.32 1115.88  9699.1 1115.86 9703.88 1115.83
 9707.01 1115.82 9731.98 1115.58 9732.86 1115.57 9736.51 1115.56 9737.43 1115.55
 9741.04 1115.53    9742 1115.52 9745.55 1115.51 9746.56  1115.5 9750.06 1115.48
 9751.14 1115.47 9754.58 1115.45 9755.72 1115.44 9759.09 1115.43  9760.3 1115.42
 9763.59  1115.4 9764.87 1115.39 9769.45 1115.36 9772.46 1115.33 9773.94 1115.32
 9776.83 1115.29 9778.47 1115.27 9781.21 1115.25 9783.01 1115.23 9785.56 1115.21
 9787.55 1115.19 9789.88 1115.16 9796.72  1115.1 9798.34 1115.08 9804.65 1115.02
 9806.15 1115.01 9807.02    1115 9807.36    1115 9808.03 1114.99 9808.97 1114.98
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 9809.63 1114.98 9827.36 1114.87 9833.46 1114.82 9838.54 1114.79 9850.22  1114.7
  9851.8 1114.69 9856.36 1114.65 9857.59 1114.96 9860.36 1115.65 9862.36 1115.65
 9866.23 1115.24 9868.42    1115 9870.63 1114.72 9876.55    1114 9882.98    1113
 9887.48 1112.34 9889.85    1112 9892.71 1111.61 9897.39    1111 9900.36 1110.71
 9907.71 1110.02 9907.89    1110 9916.74    1109 9949.23 1108.75 9950.01 1108.75
 9951.51 1108.25 9951.74 1108.32 9953.01 1108.75 9960.07 1108.85 9963.54 1108.87
 9967.07  1108.9    9979    1108 9991.86 1107.08 9995.91 1106.0810003.79 1106.08
10005.38 1106.4510008.03 1107.0810029.12 1107.6410030.15 1107.8310031.06    1108
10041.04 1109.7710042.37    111010043.11 1110.1310053.34    111210058.58 1112.94
10058.89    111310059.06 1113.0310061.91 1113.5510065.29 1113.8810066.54    1114
10075.44    111510076.01 1115.05

Manning's n Values        num=        5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
  9615.4    .035 9860.36    .045 9967.07    .05510029.12    .04510061.91    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9862.3610076.01          235.043  242.91 249.235             .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.069

INPUT
Description:
Station Elevation Data    num=     119
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9654.84 1116.16 9660.36 1116.31  9668.8 1116.24 9674.31 1116.18 9677.05 1116.14
 9684.56 1115.94 9690.97 1115.73 9693.78  1115.6 9694.27 1115.57 9694.68 1115.53
 9695.23 1115.48 9700.64 1115.35 9709.42 1115.16 9713.54 1115.06 9716.47    1115
 9719.82 1114.99    9720 1114.99 9724.18 1114.98 9724.57 1114.98 9728.59 1114.97
 9758.56 1114.76 9763.93 1114.73 9827.79 1114.29  9851.8 1114.14 9885.87 1114.15
 9889.87 1115.15 9891.87 1115.15 9892.97 1115.06 9893.63    1115 9895.05 1114.88
 9905.78    1114 9906.38 1113.96  9907.7 1113.54 9907.87 1113.49 9908.08 1113.55
 9909.42 1113.95 9912.54 1113.95 9916.51 1113.96 9923.09 1113.99  9923.6 1113.99
  9924.6 1113.98 9925.79 1113.98 9926.49 1113.92 9927.02 1113.86 9929.97 1113.67
 9932.46 1113.35 9933.76 1113.21 9935.24    1113 9940.87 1112.12 9941.68    1112
 9941.89 1111.97 9942.48 1111.88 9948.15    1111 9950.26 1110.65 9954.26    1110
 9960.82 1109.11 9961.62    1109 9962.19 1108.92 9968.97    1108 9971.73 1107.53
 9972.65 1107.37 9981.04 1107.07 9983.09    1107 9992.01 1106.72 9994.54 1106.09
 9996.05 1105.7210001.17 1105.7210004.12 1105.7110005.04 1105.9410008.16 1106.71
10026.46 1107.0510026.94 1107.0610030.94 1107.6410033.39    1108 10034.3 1108.14
10039.74    1109 10040.3 1109.0910049.43  1109.410051.02 1109.4610052.67 1109.44
10054.36 1109.4410058.83 1109.4910060.15 1109.5310061.75 1109.5910063.73 1109.63
10065.44 1109.7210067.75 1109.8510069.87    111010071.08 1110.0910071.73 1110.15
10074.95 1110.4110078.81  1110.810079.64 1110.8810079.98 1110.9210080.63    1111
10084.91 1111.5610088.03 1112.0410090.69 1112.4210098.75 1113.7310099.23  1113.8
 10099.3  1113.810101.43 1113.9110102.29 1113.9510103.39 1113.9310103.57 1113.95
10104.63 1113.9410104.85 1113.9610105.05 1113.9910105.23 1114.0110107.62 1114.16
10108.99  1114.210109.11  1114.210110.29 1114.2310110.43 1114.3110110.97 1114.93
10112.66 1114.9710115.21 1114.9310116.82 1114.9110120.55 1114.83

Manning's n Values        num=        5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9654.84    .035 9889.87    .045 9981.04    .05510030.94    .04510116.82    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9923.610110.43          145.193  117.73 145.066             .3       .5

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.047

INPUT
Description: Upstream of El Mirage Road

Q=160 cfs (SRD53, 24 hr)
Station Elevation Data    num=     105
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9860.72 1115.69  9868.5 1115.69 9873.64 1115.66  9874.5 1115.64 9878.54 1115.64
 9879.56 1115.61 9883.41 1115.61 9887.17  1115.6 9888.33 1115.56 9889.93  1115.5
 9896.04  1115.3 9902.14 1115.04    9908 1115.07 9909.73 1114.12 9912.82 1113.82
 9913.26 1113.78 9922.21 1113.92 9922.37 1113.92 9926.98 1113.95 9931.28 1113.99
 9931.67 1113.99 9934.82 1114.18 9938.92 1114.32 9940.21 1114.21 9942.33 1114.01
  9942.4    1114 9946.48 1113.67 9948.54 1113.49 9950.56 1113.33 9951.59 1113.25
 9954.62 1113.02 9954.82    1113 9958.16 1112.73 9959.53 1112.61  9961.7 1112.46
 9964.43 1112.24 9965.29 1112.18 9967.49    1112 9968.95 1111.87  9969.5 1111.81
 9973.11 1111.51 9975.82 1111.25 9979.78    1111 9980.58 1110.94  9980.8 1110.93
 9984.38 1110.84 9984.81 1110.84 9988.13 1110.92 9988.42 1110.93 9989.19    1111
 9992.66 1111.26 9994.32 1111.43 9994.92 1107.53 9995.27 1105.72    9996 1105.54
   10004 1105.5410004.72 1105.7210005.07 1107.5610005.66 1111.4410005.86 1111.42
10010.44 1111.1810011.63 1111.0810016.42 1111.0810016.61 1111.0910021.07 1111.27
 10021.7 1111.3110025.51  1111.6 10026.9 1111.6910027.02  1111.710029.51 1111.95
 10031.7 1112.0910033.46 1112.2610036.38 1112.4910037.33 1112.5910041.02 1112.87
10042.44    111310045.08  1113.210046.24  1113.310051.87 1113.7410054.67    1114
10056.51 1114.0910056.97 1114.0810059.09 1113.9710059.93 1113.9610061.36  1114.2
 10064.1 1114.2910065.67 1114.2810067.21 1114.2210067.63 1114.2210068.98 1114.21
10070.01 1114.3410071.88 1114.3210074.28 1114.3710075.47 1114.3610076.28 1114.35
10077.79 1114.3410078.58  1114.410080.95 1114.3910081.53 1114.3910083.26 1114.38
10085.52 1114.36 10086.2 1114.3610087.74 1114.3510101.69 1114.6310102.79 1114.65

Manning's n Values        num=        5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9860.72    .035 9938.92    .045    9996    .055   10004    .04510061.36    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9938.9210061.36          142.419  142.05 142.219             .3       .5
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
 9860.72 9994.32 1114.61       T
10005.6610102.79 1114.61       T
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CULVERT


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.030

INPUT
Description:
Distance from Upstream XS =      67
Deck/Roadway Width        =      50
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=        4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
 9957.03 1112.98    1104 9982.25 1112.97    110410034.49 1113.27    1104
10051.52 1113.42    1104

Upstream Bridge Cross Section Data
Station Elevation Data    num=      105
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9860.72 1115.69  9868.5 1115.69 9873.64 1115.66  9874.5 1115.64 9878.54 1115.64
 9879.56 1115.61 9883.41 1115.61 9887.17  1115.6 9888.33 1115.56 9889.93  1115.5
 9896.04  1115.3 9902.14 1115.04    9908 1115.07 9909.73 1114.12 9912.82 1113.82
 9913.26 1113.78 9922.21 1113.92 9922.37 1113.92 9926.98 1113.95 9931.28 1113.99
 9931.67 1113.99 9934.82 1114.18 9938.92 1114.32 9940.21 1114.21 9942.33 1114.01
  9942.4    1114 9946.48 1113.67 9948.54 1113.49 9950.56 1113.33 9951.59 1113.25
 9954.62 1113.02 9954.82    1113 9958.16 1112.73 9959.53 1112.61  9961.7 1112.46
 9964.43 1112.24 9965.29 1112.18 9967.49    1112 9968.95 1111.87  9969.5 1111.81
 9973.11 1111.51 9975.82 1111.25 9979.78    1111 9980.58 1110.94  9980.8 1110.93
 9984.38 1110.84 9984.81 1110.84 9988.13 1110.92 9988.42 1110.93 9989.19    1111
 9992.66 1111.26 9994.32 1111.43 9994.92 1107.53 9995.27 1105.72    9996 1105.54
   10004 1105.5410004.72 1105.7210005.07 1107.5610005.66 1111.4410005.86 1111.42
10010.44 1111.1810011.63 1111.0810016.42 1111.0810016.61 1111.0910021.07 1111.27
 10021.7 1111.3110025.51  1111.6 10026.9 1111.6910027.02  1111.710029.51 1111.95
 10031.7 1112.0910033.46 1112.2610036.38 1112.4910037.33 1112.5910041.02 1112.87
10042.44    111310045.08  1113.210046.24  1113.310051.87 1113.7410054.67    1114
10056.51 1114.0910056.97 1114.0810059.09 1113.9710059.93 1113.9610061.36  1114.2
 10064.1 1114.2910065.67 1114.2810067.21 1114.2210067.63 1114.2210068.98 1114.21
10070.01 1114.3410071.88 1114.3210074.28 1114.3710075.47 1114.3610076.28 1114.35
10077.79 1114.3410078.58  1114.410080.95 1114.3910081.53 1114.3910083.26 1114.38
10085.52 1114.36 10086.2 1114.3610087.74 1114.3510101.69 1114.6310102.79 1114.65

Manning's n Values        num=        5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9860.72    .035 9938.92    .045    9996    .055   10004    .04510061.36    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9938.9210061.36            .3       .5
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
 9860.72 9994.32 1114.61       T
10005.6610102.79 1114.61       T

Downstream  Deck/Roadway Coordinates
    num=        3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
 9904.83 1113.01    1104 9982.13 1112.97    110410037.41 1113.29    1104

Downstream Bridge Cross Section Data
Station Elevation Data    num=      65
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9897.76 1113.14 9900.79 1113.14 9903.08  1113.1 9909.31 1112.78 9910.84 1112.76
 9912.47 1112.73  9914.8 1112.46 9915.75 1112.44 9918.71 1112.41 9922.74 1112.27
 9925.99 1112.27 9931.01 1112.23 9934.88 1112.17 9940.01 1112.13 9944.25 1112.13
 9949.52 1112.09 9952.46  1112.1 9962.72 1111.43 9970.97 1111.33 9972.25 1111.33
 9973.52 1111.34 9975.43 1111.25 9976.39 1111.26 9978.76 1111.17  9979.4 1111.17
 9980.08 1111.18  9982.5 1111.11 9982.93 1111.11 9985.66 1111.08 9985.99 1111.09
 9986.86 1111.09 9987.26  1111.1 9993.06 1111.13 9994.73 1111.46 9995.36 1107.25
 9995.67 1105.73 9996.43 1105.44 9996.54  1105.410003.53  1105.410003.63 1105.44
10004.33 1105.7310004.64 1107.2410005.27 1111.4710007.47 1111.3810010.81 1111.19
10013.38 1111.2210014.37 1111.2610016.71 1111.3910018.74 1111.54 10020.2 1111.67
10023.28    1112 10025.1  1112.110031.11 1112.4510038.53 1113.4410038.82 1113.48
10039.61 1113.5710040.43 1113.6610041.13  1113.710041.46 1113.7110043.52 1113.74
 10044.1 1113.7710045.34 1113.7910046.79 1113.81 10058.9 1113.6510074.25 1113.74

Manning's n Values        num=        5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9897.76    .035 9952.46     .03 9994.73    .04510005.27     .0310041.13    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9952.4610041.13            .3       .5

Upstream Embankment side slope              =      75 horiz. to 1.0 vertical
Downstream Embankment side slope            =      75 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular      5
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 2 - Groove end entrance with headwall
Solution Criteria = Outlet control
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
              1.2   140.4     .013     .013        0                  .2                 1
Upstream   Elevation =  1105.61
           Centerline Station =  10000
Downstream Elevation =  1105.4
           Centerline Station =  10000

CROSS SECTION
```

```
RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.020

INPUT
Description: Downstream of El Mirage Road
Station Elevation Data    num=      65
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9897.76 1113.14 9900.79 1113.14 9903.08  1113.1 9909.31 1112.78 9910.84 1112.76
 9912.47 1112.73  9914.8 1112.46 9915.75 1112.44 9918.71 1112.41 9922.74 1112.27
 9925.99 1112.27 9931.01 1112.23 9934.88 1112.17 9940.01 1112.13 9944.25 1112.13
 9949.52 1112.09 9952.46  1112.1 9962.72 1111.43 9970.97 1111.33 9972.25 1111.33
 9973.52 1111.34 9975.43 1111.25 9976.39 1111.26 9978.76 1111.17  9979.4 1111.17
 9980.08 1111.18  9982.5 1111.11 9982.93 1111.11 9985.66 1111.08 9985.99 1111.09
 9986.86 1111.09 9987.26  1111.1 9993.06 1111.13 9994.73 1111.46 9995.36 1107.25
 9995.67 1105.73 9996.43 1105.44 9996.54  1105.410003.53  1105.410003.63 1105.44
10004.33 1105.7310004.64 1107.2410005.27 1111.4710007.47 1111.3810010.81 1111.19
10013.38 1111.2210014.37 1111.2610016.71 1111.3910018.74 1111.54 10020.2 1111.67
10023.28    1112 10025.1  1112.110031.11 1112.4510038.53 1113.4410038.82 1113.48
10039.61 1113.5710040.43 1113.6610041.13  1113.710041.46 1113.7110043.52 1113.74
 10044.1 1113.7710045.34 1113.7910046.79 1113.81 10058.9 1113.6510074.25 1113.74

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9897.76    .035 9952.46     .03 9994.73    .04510005.27     .0310041.13    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9952.4610041.13           33.477   31.59  31.979             .3       .5

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 1.014

INPUT
Description:
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9865.68 1114.54 9866.51  1114.6 9867.81 1114.64 9871.11 1113.64  9871.7  1113.4
 9874.13 1113.38 9880.59 1113.34 9882.46 1113.48  9883.6 1113.55 9885.13 1113.67
 9889.88 1113.88 9900.63 1113.89 9913.16 1113.81 9917.76 1113.94  9920.7 1114.01
 9925.28 1114.08  9931.8 1114.07 9933.13 1114.06 9937.41 1113.91 9939.88  1113.8
 9942.63 1113.42 9944.29 1113.22 9946.22 1112.95  9948.2 1112.83 9948.71 1112.81
 9957.67 1111.37 9960.25 1110.95 9963.951110.359 9967.76 1109.75 9972.22    1109
 9974.58 1108.25 9983.15 1105.43 9993.78 1105.4310001.61 1108.4310003.09    1109
10006.01 1109.7110016.651112.19110022.22 1113.4910022.42 1113.5110024.91 1113.86
 10027.2 1113.9310028.84 1114.1310034.73 1114.2910034.98  1114.310039.36 1114.26
10042.17 1114.2610049.91 1114.2410065.13 1114.1710086.51 1114.1710100.68 1114.04
10109.65 1114.1910121.36  1114.3

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9865.68    .035 9939.88     .03 9983.15    .04510003.09     .0310028.84    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9939.8810028.84           194.325  192.21 191.135             .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.978

INPUT
Description:
Station Elevation Data    num=      63
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9817.05 1112.04 9817.46 1112.03  9818.4 1111.99 9820.29 1111.94 9822.92 1111.82
 9824.38 1111.77 9826.54 1111.73  9828.5 1111.73 9832.04  1111.7 9834.62 1111.64
 9838.79 1111.51 9839.08  1111.5 9840.15  1111.5 9847.01 1111.17 9849.17 1111.08
 9854.72 1111.04 9856.59 1110.93  9862.5 1110.62 9865.19 1110.49 9866.96 1110.41
 9875.83 1109.99 9878.65 1109.84 9879.81 1109.82 9882.92 1109.78 9885.05  1109.9
 9889.44 1110.01 9889.68 1110.02 9906.19 1110.12 9913.86 1110.49 9914.64 1110.51
 9916.12 1110.52 9922.17 1110.52  9925.3 1110.51 9933.11 1110.44 9934.89 1110.41
 9939.13 1110.42 9951.13 1110.34 9953.72 1110.22 9960.52 1109.94 9966.96 1109.54
 9967.88 1109.49  9968.6 1109.47 9969.47 1109.45 9970.65 1109.44 9971.71 1109.17
 9987.48 1105.2410012.52 1105.23 10027.4 1108.9510028.92 1109.3210029.461109.456
10032.36 1110.1910044.14 1113.1210044.38 1113.0310044.96 1112.8610048.39 1112.51
 10048.5  1112.510054.15 1112.3510054.85 1112.3510056.79 1112.3410058.17 1112.38
10060.85  1112.510061.75 1112.5610062.59 1112.56

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9817.05    .035 9951.13     .0310032.36    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9951.1310032.36           203.474  201.61 199.738             .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.940

INPUT
Description:
Station Elevation Data    num=      38
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9886.23 1112.17 9886.49 1112.13 9888.74 1111.88 9889.25 1111.81 9891.97 1111.54
 9895.95 1111.13 9897.66 1111.01 9905.91 1110.46 9912.14 1110.26 9915.97  1110.1
 9920.23 1110.02  9927.8 1109.79 9932.01  1109.8 9937.42 1109.77 9942.27 1109.94
 9943.16 1109.96 9943.79 1109.96 9946.01 1109.97 9949.52 1109.98    9952  1109.6
 9954.37 1109.23 9967.43 1109.04 9971.74 1108.97  9987.5 1105.0310012.51 1105.03
10027.721108.83310045.39 1113.2410046.67 1112.2710048.19 1110.9510050.08 1109.82
10051.06 1109.3610052.01 1109.3610054.46 1109.4210058.39 1109.7910058.55  1109.8
```

```
10058.71 1109.8210061.39 1110.0510062.53 1110.11

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9886.23    .035 9949.52     .0310027.72    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9949.5210027.72          257.892  252.94 248.284             .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.892

INPUT
Description:
Station Elevation Data    num=      69
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9895.34 1110.18 9904.04  1110.2 9906.99  1110.2  9923.9 1110.23 9924.22 1110.23
 9925.32 1110.26 9934.34 1110.46 9936.86 1110.51 9942.78 1110.35 9947.58 1110.28
  9951.9 1109.63 9956.29 1108.95 9971.73 1108.72 9976.23 1107.59 9987.49 1104.78
10012.51 1104.7810018.11 1106.1810020.08 1106.2210020.67 1106.23 10021.7 1106.32
10029.27 1106.9610033.27 1107.6410036.62 1108.1710041.16  1108.810046.94 1109.54
10052.62 1110.3310055.58 1110.71 10059.4 1112.35 10059.5  1112.410060.05 1112.65
10063.31 1113.9910064.46 1113.5710065.84 1113.0410067.11 1112.5210068.64 1111.89
 10071.2 1112.6810071.27  1112.710071.35  1112.710074.82 1112.8210074.89  1112.8
10078.11 1111.5610078.88 1111.13 10079.9 1110.6210083.78 1110.4910089.62 1110.34
10091.41 1110.2510097.96 1110.1410101.38 1110.1410106.07  1110.110106.49 1110.33
10107.79 1110.9510108.38 1111.0810110.26 1111.4410113.07 1110.8510114.66 1110.51
10116.43 1110.2510117.26 1110.2710117.47 1110.2710117.72 1110.2810119.91 1110.26
10132.07 1110.2310136.48 1110.2710139.75 1110.4710141.98 1110.5610158.57 1110.84
10159.18 1110.8310159.62 1110.8310159.89 1110.8410162.18 1110.83

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9895.34    .035 9947.58     .0310052.62    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9947.5810052.62          232.214   228.8 226.427             .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.848

INPUT
Description:
Station Elevation Data    num=      43
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9879.95 1109.93 9882.07 1109.74 9884.77 1109.43 9889.12 1109.17 9890.07 1109.09
 9891.21 1109.05 9895.38 1108.99 9896.26 1108.97 9902.19 1108.87 9904.07 1108.87
 9906.67 1108.93 9913.21 1108.88 9934.21 1108.97  9935.2 1108.97 9949.28 1109.27
 9957.42 1109.62 9959.16 1109.68 9960.84 1109.65 9967.29 1109.58 9967.711109.475
 9983.68 1105.49 9986.71 1104.74 9987.45 1104.55 10012.6 1104.5510013.76 1104.84
10014.53 1105.0310014.63 1105.0310018.82  1105.110023.59 1105.2410026.26 1105.93
 10026.4 1105.9510026.61 1106.0410030.08  1107.310034.17 1108.6810035.45 1109.13
10037.17 1109.86 10040.9 1111.3810046.12  1112.510048.24 1113.0310049.75 1113.25
 10050.4 1113.3510052.96 1113.51   10060 1113.91

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9879.95     .03 9967.71    .04510037.17     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9967.7110037.17          286.107  335.49 372.789             .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.785

INPUT
Description:
Station Elevation Data    num=      93
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9728.17 1110.15  9730.3 1110.31 9731.54  1110.4 9734.28 1110.63  9736.7 1110.68
 9742.18 1110.77 9755.28 1110.89 9758.31 1110.91 9766.65 1110.92 9783.91 1110.91
 9788.65  1110.9 9793.82 1111.11 9796.97 1111.16 9800.86 1110.92 9802.47 1110.83
 9803.27 1110.65 9807.75 1109.57 9810.78 1109.16 9811.81    1109 9812.85 1108.97
  9816.7 1108.76 9818.41 1108.66 9820.71 1108.56 9827.14 1109.58 9828.77 1109.86
 9829.79 1110.08 9832.83 1110.69 9836.42 1111.13 9838.38 1111.33 9841.08 1111.31
 9842.38 1111.32 9843.82 1111.16 9847.18 1110.65 9849.54 1110.35 9853.25  1109.7
 9857.42 1109.24 9857.52 1109.23 9857.59 1109.22 9865.32 1107.93 9868.04  1107.7
 9872.25 1107.31 9873.96 1107.19 9891.08 1106.83 9892.59  1106.8 9900.54 1106.53
 9910.49 1106.14 9913.44 1105.99 9921.89 1105.41 9928.14 1105.02 9933.91 1104.75
 9939.55 1104.53  9944.5 1104.35 9947.92 1104.27 9960.12 1104.02 9963.16 1103.95
 9964.54 1103.92 9970.91 1103.51 9975.99 1103.22 9978.04 1102.94  9981.3 1102.46
 9986.06 1101.97 9986.42 1101.92 9986.85 1101.88 9992.81 1101.45 9996.72 1101.12
 9999.06 1100.99   10000 1100.9810005.19 1100.8910007.76 1100.8710008.62 1100.88
10010.52 1100.9610018.49 1101.3910023.22 1102.1510025.73 1102.5610037.65 1104.14
10038.11  1104.210039.09 1104.2610048.61 1104.76 10052.5 1104.9710057.78 1105.31
10064.65 1105.6810067.59 1105.8210073.43 1106.01 10082.4 1106.3610093.55 1106.19
10099.66 1106.2410105.03 1106.2710105.85  1106.310108.23 1106.4610120.85 1107.16
10124.27 1107.4910129.94 1107.9910131.44 1108.33

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9728.17     .04 9963.16    .04510037.65     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9963.1610037.65          148.161  142.54 137.432             .1       .3

CROSS SECTION
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```
RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.758

INPUT
Description:
Station Elevation Data    num=      79
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9796.01 1111.01 9799.65  1110.8  9802.5 1110.39  9803.5 1110.32 9804.27 1110.21
  9807.4    1110 9813.34 1109.49 9815.04 1109.33 9816.23 1109.47 9820.57 1109.79
 9820.89 1109.82 9827.35 1110.23 9828.47 1110.25 9834.83  1110.3 9835.59 1110.27
 9841.64 1110.14 9845.47 1110.05 9852.19 1109.41 9856.51 1108.99 9864.78 1107.75
 9864.86 1107.74 9865.31 1107.72 9883.28 1106.87 9884.86 1106.78 9895.48 1106.29
 9902.07 1106.11 9905.07 1105.98 9910.96 1105.87 9920.54 1105.65 9925.79 1105.56
 9938.52 1105.31 9947.11 1105.29 9947.12 1105.29  9952.9  1105.1 9963.94 1104.65
 9966.71 1104.53 9968.43 1104.48 9975.76 1104.29  9983.9  1104.1 9985.56 1104.05
 9985.68 1104.05 9992.86 1103.87  9996.4 1103.81 9997.03 1103.79 9997.29 1103.78
 9999.47 1103.78 9999.54 1103.77   10000 1103.7610002.13 1103.7210002.37 1103.72
10004.53  1103.710007.59 1103.7410007.99 1103.7410011.45 1103.5510013.44  1103.6
   10015 1103.67 10019.7 1103.8710022.96 1103.9810028.74 1104.1210032.54 1104.16
10039.28  1104.510040.62 1104.5610046.07 1104.6810059.47 1105.3610060.79 1105.45
10062.29 1105.4710081.46 1105.6510105.58 1105.7410119.05 1105.8610129.96 1106.22
10132.55 1106.2810143.35 1106.6610146.63 1106.7910149.16 1106.9110160.79 1107.52
10166.16 1107.8210169.72 1108.0410171.42 1108.1910173.27 1108.23

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9796.01     .04 9947.12    .04510059.47     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9947.1210059.47          177.634  169.35 174.678             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
   1005910173.27    1108       F

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.726

INPUT
Description:
Station Elevation Data    num=      95
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9756.86 1109.91  9760.2 1109.37 9762.41 1109.09  9763.5 1108.81 9764.76 1108.68
 9767.38 1108.34 9772.01 1107.53 9774.61 1107.09 9776.47 1106.93 9779.78 1106.61
 9784.07 1106.53 9791.74 1106.35 9794.93 1106.27 9800.07 1106.22 9801.85  1106.2
 9803.06  1106.2 9810.35 1106.11 9811.15 1106.11 9813.89 1106.05 9818.19 1105.93
 9822.34 1105.87  9825.9 1105.86 9830.16 1105.82 9833.16 1105.76 9847.11 1105.63
 9848.85 1105.62 9850.14 1105.63 9878.64 1105.29 9890.64 1105.19 9898.97 1105.07
 9899.13 1105.07 9899.52 1105.08 9909.55 1105.14 9911.88 1105.37 9914.65 1105.62
 9916.34 1105.78 9917.46 1105.73 9918.63 1105.74 9923.03 1105.59 9923.28 1105.59
 9923.93 1105.56 9928.49 1105.33 9929.18  1105.1 9930.42 1104.64 9935.73 1103.54
 9935.81 1103.52 9935.87 1103.52 9942.77 1103.33 9947.35 1103.24  9952.5 1103.16
 9955.06 1103.66 9956.64 1103.96 9957.66 1103.99 9958.55 1104.06 9960.73 1104.08
 9961.77 1104.06 9964.121103.662  9969.8 1102.84 9972.83  1101.9 9973.58 1101.66
 9991.33 1101.71   10000 1101.7710028.78 1101.8710029.94 1102.2210030.98  1102.6
10033.41  1103.110034.23 1103.2510037.17 1103.5110039.29 1103.6510042.66 1103.71
10057.71 1103.8910059.55  1103.910061.07 1103.92 10066.3 1104.0110069.06 1104.05
10076.43 1104.0210078.17 1104.0210078.73 1104.0310086.76 1104.2110094.61 1104.57
   10101 1104.7310101.73 1104.7610103.11  1104.810107.97 1104.9910108.74 1105.06
10117.22 1105.9110123.64 1106.43   10125 1106.5210127.08 1106.6210140.74 1107.07
10146.39 1107.3410150.23 1107.4510151.15 1107.4510153.62 1107.39 10154.2  1107.4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9756.86     .04 9964.12    .04510039.29     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9964.1210039.29          323.178   241.5   219.2             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 9756.86 9916.34  1107.5       T
   10085 10154.2  1107.5       T

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.680

INPUT
Description:
Station Elevation Data    num=      89
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9760.21 1109.83 9764.08 1108.95 9768.65 1107.78 9771.71 1107.07  9775.8 1106.02
  9776.7  1105.8 9777.28 1105.71 9781.43 1104.95  9782.1  1104.9 9790.48 1104.48
 9796.45  1104.3  9799.3 1104.25  9801.7 1104.19 9806.95 1104.01 9809.09 1103.96
 9811.93  1103.9 9814.99  1103.9  9818.4 1104.07 9827.93 1104.45 9829.66  1104.6
 9831.74 1104.74 9838.43 1105.18 9845.05 1105.51 9846.48 1105.55  9852.2  1105.7
 9854.04 1105.76 9857.65 1105.76 9859.89 1105.78 9863.37  1105.8 9865.96 1105.82
 9868.25  1105.8 9870.69 1105.75 9874.54 1105.69 9876.76 1105.63 9880.26 1105.56
 9884.07 1105.63 9886.41  1105.7  9887.4 1105.85 9890.31  1105.7 9892.09 1105.48
 9898.75 1104.95 9899.85 1104.85 9902.38 1104.85 9903.99 1104.92 9910.89 1105.36
 9913.46    1105 9916.33 1104.57 9918.37 1104.21 9920.57 1103.83 9920.77 1103.81
 9927.02 1103.48 9928.01 1103.46  9928.7 1103.44 9939.75 1103.59  9955.1 1103.72
 9957.07 1103.86 9958.49    1104 9961.41 1103.98 9966.25 1103.79 9967.57 1103.52
 9970.131102.942  9971.3 1102.44 9972.78 1101.72 9983.16 1101.7210013.87 1101.92
10017.76 1101.9510020.89 1102.5810021.16 1102.62 10021.6 1102.6410027.221103.049
10031.94 1103.1110044.06 1103.4910046.41 1103.5810053.81 1103.5910065.71 1103.64
10080.46 1103.5110085.66 1103.64 10094.5 1103.5310096.57 1103.5210099.97 1103.56
 10103.6 1103.6210105.72  1103.7 10119.6 1104.0910127.18 1105.0210132.96 1105.71
10137.62 1105.7810146.39 1105.9810153.47 1106.9810154.88 1107.17
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9760.21     .04 9970.13    .04510027.22     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9970.1310027.22          197.47  178.52 179.435             .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
 9760.21    9951 1105.75        T

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.646

INPUT
Description:
Station Elevation Data    num=     129
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9688.51 1109.81 9688.72 1109.79 9689.62 1109.67 9690.43 1109.51  9695.3 1108.62
 9700.73    1108 9702.61 1107.93 9703.53 1107.85 9704.07 1107.82 9708.41  1107.5
  9712.9 1107.13 9714.37 1107.13 9716.47 1107.43 9720.86 1107.54  9723.8 1107.71
 9728.53 1107.77 9736.36 1107.73  9738.3 1107.69 9755.32 1107.65 9755.46 1107.65
 9774.04  1107.6 9774.17  1107.6 9781.51 1107.57 9783.18 1107.56 9789.97 1107.46
 9793.89 1107.51 9797.79 1107.52 9801.98 1107.56 9806.42 1107.52 9810.64 1107.55
 9817.07 1107.48 9825.63 1107.47 9835.38 1107.38 9839.99 1107.39  9843.1 1107.32
 9843.41 1107.32 9844.89 1107.39 9851.07 1107.32 9852.06  1107.3 9859.39 1107.31
 9868.21 1107.36 9870.33 1107.38 9870.59 1107.38 9870.94 1107.37 9881.75 1107.35
 9893.36 1107.25 9895.93 1107.28 9896.82 1107.22 9903.42 1107.22  9906.6 1107.28
 9908.82 1107.25 9909.33 1107.25 9917.05 1107.48 9927.12 1107.27 9927.83 1107.27
  9929.7 1107.26  9934.9 1106.91 9936.64 1106.81 9936.97 1106.82 9937.88 1106.83
 9945.48 1106.99 9950.55 1106.97 9954.86 1106.97 9963.88 1106.87 9964.54 1106.86
 9966.42 1106.77 9967.63 1106.66 9969.82 1106.47 9972.33 1106.26 9976.05 1106.06
 9977.31 1105.97 9978.01 1105.87 9981.92 1105.37  9982.9 1104.84 9984.29 1104.34
 9986.15 1103.84 9987.82 1103.13 9990.62 1102.39    9992    1102 9995.86  1102.1
 9996.62  1102.1 9999.99 1102.1310003.95 1102.1510009.25 1102.1910010.44 1102.19
10011.42 1102.5610011.99 1102.75 10013.1 1103.4310013.92 1104.03 10015.3 1104.79
10018.68 1104.9210020.69  1104.710022.63 1104.0310023.54 1103.6810024.07 1103.69
10025.52 1103.74 10026.2 1103.8210026.47 1103.6510026.53 1103.65 10027.9 1103.62
10028.04 1103.7310031.55 1104.0710031.94 1104.1110032.14 1104.1310032.21 1104.14
10032.39 1104.14 10032.7 1104.1510053.63 1104.6910057.34 1104.8810062.01 1104.99
10065.44 1105.0610074.86 1105.3110076.06 1105.3510089.08 1106.0310093.11 1106.13
10093.82 1106.16 10093.9 1106.1610094.51 1106.1810104.93 1106.46 10107.1  1106.5
10119.18 1106.3310121.49 1106.2610131.63 1106.08 10137.9 1106.0710140.73 1106.05
10142.31  1105.910146.58  1105.610151.31 1105.2410151.77 1105.23

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9688.51     .04  9982.9    .045 10015.3     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         9982.9 10015.3          41.697   41.03  44.619             .3       .5
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
10018.6810151.77    1107        T
Right Levee     Station= 10107.1      Elevation=  1106.5

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.638

INPUT
Description: Upstream of Park Place
Station Elevation Data    num=     142
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9685.18 1109.06 9686.62 1108.78 9687.44 1108.59 9688.18 1108.46 9689.36 1108.25
 9690.18 1108.14 9691.53  1108.1 9697.06 1108.02 9698.97 1107.84 9707.38 1107.89
 9708.13 1107.93 9709.35 1107.94 9713.37 1107.95 9732.61 1107.74 9740.36 1107.52
 9740.84  1107.5 9741.53 1107.49 9749.23 1107.43 9752.52 1107.13 9755.53 1107.16
 9755.96 1107.15 9768.31 1107.23  9768.9 1107.23 9783.51 1107.25    9784 1107.25
 9794.62 1107.27 9794.88 1107.28 9794.96 1107.29 9804.78 1107.29 9812.66 1107.48
 9814.64 1107.47 9815.26 1107.48 9815.71 1107.45 9816.23 1107.42 9832.25 1107.03
  9834.3 1107.02 9836.93 1106.85 9838.39 1106.76 9839.46 1106.54 9839.78 1106.47
 9839.98 1106.48 9841.54 1106.62 9848.23 1106.56 9849.95 1106.51 9850.62  1106.4
  9851.4 1106.28 9852.03 1106.31 9852.65 1106.29  9853.5 1106.31 9857.81 1106.24
 9863.41 1106.06 9869.33 1105.97 9871.26 1105.95 9871.69 1105.94 9878.74 1105.85
 9880.88 1105.83 9890.01 1105.83 9891.89 1105.84 9900.15 1105.86 9900.58 1105.86
  9906.7 1105.76 9908.13 1105.75 9914.85 1105.64 9919.68  1105.7 9921.58 1105.67
 9926.99 1105.57 9927.18 1105.57 9928.14 1105.58 9936.89 1105.63 9944.27 1105.73
 9954.42 1105.91 9956.13 1105.95 9960.75 1106.07  9963.6 1106.17 9967.61 1106.21
 9972.06 1106.29 9973.59 1106.34 9978.21 1106.18 9978.99 1106.16 9980.47 1105.95
 9981.57 1105.41 9983.13 1104.57 9983.92 1104.19 9984.05 1104.12    9985 1103.67
 9985.74 1103.15 9986.52 1102.93 9988.13 1102.24   10000 1102.34 10001.7 1102.35
10005.76 1102.3810007.71 1102.3810007.79 1102.4310008.02 1102.4810008.32 1102.54
10009.01 1102.7210009.39 1102.8210009.74 1102.8910011.42 1103.0610014.29  1103.3
10018.06 1103.6810018.68 1103.7210019.88 1103.8710022.16 1104.3710022.23 1104.94
10022.37 1106.0910022.38 1106.1210024.72 1105.6510026.24 1105.6710029.59  1105.7
 10038.1 1105.4810041.07 1105.5510047.51 1105.5310053.31 1105.7710058.48 1105.79
10062.69 1105.78 10064.5  1105.8 10072.3  1105.810074.24 1105.7710085.18 1105.82
10085.26 1105.8310086.13 1105.8310097.47 1105.9210100.73 1105.86 10105.6 1105.81
10105.98 1105.8110108.34 1105.7710111.71 1105.7710115.39 1105.6710121.16 1105.63
10123.26 1105.5510127.37 1105.5910131.13 1105.5910131.64 1105.5810131.73 1105.58
10131.86 1105.5710132.12 1105.5610136.86 1105.3310138.62 1105.2410140.71 1105.11
10141.64 1105.0810143.05 1105.04

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9685.18     .04 9978.99    .04510022.38     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9978.9910022.38          48.194   47.73  47.333             .3       .5
Right Levee     Station=10097.47      Elevation= 1105.92
```

```
CULVERT


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.634

INPUT
Description:
Distance from Upstream XS =       1
Deck/Roadway Width        =      46
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
9979.223 1106.13    110210022.35    1106    110210025.32 1106.01    1102
10053.45 1105.77    1102

Upstream Bridge Cross Section Data
Station Elevation Data    num=     142
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9685.18 1109.06 9686.62 1108.78 9687.44 1108.59 9688.18 1108.46 9689.36 1108.25
 9690.18 1108.14 9691.53  1108.1 9697.06 1108.02 9698.97 1107.84 9707.38 1107.89
 9708.13 1107.93 9709.35 1107.94 9713.37 1107.95 9732.61 1107.74 9740.36 1107.52
 9740.84  1107.5 9741.53 1107.49 9749.23 1107.43 9752.52 1107.13 9755.53 1107.16
 9755.96 1107.15 9768.31 1107.23  9768.9 1107.23 9783.51 1107.25    9784 1107.25
 9794.62 1107.27 9794.88 1107.28 9794.96 1107.29 9804.78 1107.29 9812.66 1107.48
 9814.64 1107.47 9815.26 1107.48 9815.71 1107.45 9816.23 1107.42 9832.25 1107.03
  9834.3 1107.02 9836.93 1106.85 9838.39 1106.76 9839.46 1106.54 9839.78 1106.47
 9839.98 1106.48 9841.54 1106.62 9848.23 1106.56 9849.95 1106.51 9850.62  1106.4
  9851.4 1106.28 9852.03 1106.31 9852.65 1106.29  9853.5 1106.31 9857.81 1106.24
 9863.41 1106.06 9869.33 1105.97 9871.26 1105.95 9871.69 1105.94 9878.74 1105.85
 9880.88 1105.83 9890.01 1105.83 9891.89 1105.84 9900.15 1105.86 9900.58 1105.86
  9906.7 1105.76 9908.13 1105.75 9914.85 1105.64 9919.68  1105.7 9921.58 1105.67
 9926.99 1105.57 9927.18 1105.57 9928.14 1105.58 9936.89 1105.63 9944.27 1105.73
 9954.42 1105.91 9956.13 1105.95 9960.75 1106.07  9963.6 1106.17 9967.61 1106.21
 9972.06 1106.29 9973.59 1106.34 9978.21 1106.18 9978.99 1106.16 9980.47 1105.95
 9981.57 1105.41 9983.13 1104.57 9983.92 1104.19 9984.05 1104.12    9985 1103.67
 9985.74 1103.15 9986.52 1102.93 9988.13 1102.24   10000 1102.34 10001.7 1102.35
10005.76 1102.3810007.71 1102.3810007.79 1102.4310008.02 1102.4810008.32 1102.54
10009.01 1102.7210009.39 1102.8210009.74 1102.8910011.42 1103.0610014.29  1103.3
10018.06 1103.6810018.68 1103.7210019.88 1103.8710022.16 1104.3710022.23 1104.94
10022.37 1106.0910022.38 1106.1210024.72 1105.6510026.24 1105.6710029.59  1105.7
 10038.1 1105.4810041.07 1105.5510047.51 1105.5310053.31 1105.7710058.48 1105.79
10062.69 1105.78 10064.5  1105.8 10072.3  1105.810074.24 1105.7710085.18 1105.82
10085.26 1105.8310086.13 1105.8310097.47 1105.9210100.73 1105.86 10105.6 1105.81
10105.98 1105.8110108.34 1105.7710111.71 1105.7710115.39 1105.6710121.16 1105.63
10123.26 1105.5510127.37 1105.5910131.13 1105.5910131.64 1105.5810131.73 1105.58
10131.86 1105.5710132.12 1105.5610136.86 1105.3310138.62 1105.2410140.71 1105.11
10141.64 1105.0810143.05 1105.04

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9685.18     .04 9978.99    .04510022.38     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9978.9910022.38              .3       .5
Right Levee     Station=10097.47      Elevation= 1105.92

Downstream  Deck/Roadway Coordinates
    num=       3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
9973.683 1106.12    11029979.883 1106.14    110210025.16    1106    1102

Downstream Bridge Cross Section Data
Station Elevation Data    num=     104
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9684.47 1108.61 9685.11 1108.59  9687.8 1108.75 9688.08 1108.67 9689.34 1108.05
  9690.7 1107.57 9692.01 1107.31 9692.83  1107.2  9693.7 1107.16  9694.6 1107.05
 9695.89 1107.04 9701.18 1106.76 9702.16 1106.74 9702.45 1106.72 9708.24  1106.6
 9710.45 1106.58 9716.75 1106.51  9717.2 1106.49 9721.76 1106.12 9737.28 1106.17
 9751.18 1106.26 9775.91 1106.55 9783.07 1106.51 9791.91 1106.36 9813.09 1105.96
  9830.6 1105.76 9834.75 1106.04 9835.86  1106.1 9842.04  1106.1 9846.68 1106.17
 9850.75 1106.18 9856.35 1106.36 9859.12 1106.48 9861.66 1106.41 9864.25 1106.42
 9882.56 1106.33 9885.04 1106.37 9885.58 1106.39 9885.91 1106.34 9886.43 1106.17
 9887.97 1106.34 9888.13 1106.35 9890.61 1106.48 9894.64 1106.58 9895.15 1106.59
 9895.53 1106.59 9899.73 1106.31 9902.91 1106.13 9908.57 1106.11 9919.86 1106.13
  9932.1 1106.64 9933.78 1106.68  9937.1 1106.63 9943.18 1106.49 9952.32 1106.41
 9954.27 1106.37 9957.96 1106.25 9961.61  1106.1 9962.19  1106.1 9964.07 1106.11
 9969.14 1106.05 9969.45    1106 9972.41 1106.13 9973.24 1106.14 9977.74  1105.9
 9979.49 1105.83  9979.8  1105.8 9980.35 1105.51 9982.84 1104.46 9983.16 1104.34
 9987.45 1102.63 9988.74 1102.04 9997.16 1102.15   10000  1102.210012.36  1102.4
10012.45  1102.410015.91 1103.0610019.51 1103.6410020.95 1104.1110021.09 1105.93
10021.09 1106.0110022.22 1105.9110022.77 1105.8710023.86 1105.9410026.57 1106.07
10038.15 1106.16 10043.9 1106.0510062.28 1106.0610068.42 1106.0510071.58 1106.05
10073.01 1105.98 10074.1 1105.9310078.87 1105.74 10084.7 1105.6110089.33 1105.41
10090.17 1105.3610091.89 1105.3310092.16 1105.3210092.24 1105.33 10097.2  1105.2
10099.77  1105.110101.67 1105.0410104.47 1105.0110105.61 1105.02

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9684.47     .03  9979.8    .04510021.09     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9979.810021.09              .3       .5
Right Levee     Station=10038.15      Elevation= 1106.16

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1
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Culvert Name      Shape      Rise    Span
Culvert #1          Box        3      10
FHWA Chart # 10- 90 degree headwall; chamfered or beveled inlet
FHWA Scale # 3 - Inlet edges beveled 1 in/ft at 33.7 degrees (1:1.5)
Solution Criteria = Outlet control
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 1      46     .014     .014        0                  .2                 1
Number of Barrels =  4
Upstream   Elevation =  1102.41
Centerline Stations
    Sta.    Sta.    Sta.    Sta.
9983.9589994.79810005.6310016.34
Downstream Elevation =  1102.18
Centerline Stations
    Sta.    Sta.    Sta.    Sta.
9983.1619994.10710004.8310015.76

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.629

INPUT
Description: Downstream of Park Place
Station Elevation Data    num=     104
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9684.47 1108.61 9685.11 1108.59  9687.8 1108.75 9688.08 1108.67 9689.34 1108.05
  9690.7 1107.57 9692.01 1107.31 9692.83  1107.2  9693.7 1107.16  9694.6 1107.05
 9695.89 1107.04 9701.18 1106.76 9702.16 1106.74 9702.45 1106.72 9708.24  1106.6
 9710.45 1106.58 9716.75 1106.51  9717.2 1106.49 9721.76 1106.12 9737.28 1106.17
 9751.18 1106.26 9775.91 1106.55 9783.07 1106.51 9791.91 1106.36 9813.09 1105.96
  9830.6 1105.76 9834.75 1106.04 9835.86  1106.1 9842.04  1106.1 9846.68 1106.17
 9850.75 1106.18 9856.35 1106.36 9859.12 1106.48 9861.66 1106.41 9864.25 1106.42
 9882.56 1106.33 9885.04 1106.37 9885.58 1106.39 9885.91 1106.34 9886.43 1106.17
 9887.97 1106.34 9888.13 1106.35 9890.61 1106.48 9894.64 1106.58 9895.15 1106.59
 9895.53 1106.59 9899.73 1106.31 9902.91 1106.13 9908.57 1106.11 9919.86 1106.13
  9932.1 1106.64 9933.78 1106.68  9937.1 1106.63 9943.18 1106.49 9952.32 1106.41
 9954.27 1106.37 9957.96 1106.25 9961.61  1106.1 9962.19  1106.1 9964.07 1106.11
 9969.14 1106.05 9969.45    1106 9972.41 1106.13 9973.24 1106.14 9977.74  1105.9
 9979.49 1105.83  9979.8  1105.8 9980.35 1105.51 9982.84 1104.46 9983.16 1104.34
 9987.45 1102.63 9988.74 1102.04 9997.16 1102.15   10000  1102.210012.36  1102.4
10012.45  1102.410015.91 1103.0610019.51 1103.6410020.95 1104.1110021.09 1105.93
10021.09 1106.0110022.22 1105.9110022.77 1105.8710023.86 1105.9410026.57 1106.07
10038.15 1106.16 10043.9 1106.0510062.28 1106.0610068.42 1106.0510071.58 1106.05
10073.01 1105.98 10074.1 1105.9310078.87 1105.74 10084.7 1105.6110089.33 1105.41
10090.17 1105.3610091.89 1105.3310092.16 1105.3210092.24 1105.33 10097.2  1105.2
10099.77  1105.110101.67 1105.0410104.47 1105.0110105.61 1105.02

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9684.47     .03  9979.8    .04510021.09     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9979.810021.09          101.394  100.66 100.204            .3       .5
Right Levee     Station=10038.15      Elevation= 1106.16

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.610

INPUT
Description:
Station Elevation Data    num=      45
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9945.38 1106.54 9946.99 1106.54 9949.69  1106.5 9953.63 1106.52 9953.79 1106.52
 9954.07  1106.5 9956.41 1106.31  9962.8 1105.81 9964.33  1105.6 9973.98 1104.34
 9981.36 1103.58 9982.08 1103.49 9982.63 1103.45 9988.24 1102.92  9992.3 1102.49
 9993.27 1102.45 9993.62 1102.34 9994.06 1102.17 10000.9 1102.0910007.31 1102.04
10007.52 1102.1410007.74 1102.2610008.11 1102.39 10010.3 1102.7110014.84 1103.32
10015.88 1103.4410016.66 1103.5610026.77 1105.1610034.11  1106.1 10041.7    1107
10042.08 1107.0310045.37  1107.110048.32 1106.9410049.86 1106.9710062.58 1106.72
10064.23 1106.6610071.92 1106.6610075.44 1106.6510077.83 1106.5410085.26 1106.18
 10086.1 1106.1210091.39 1105.57 10092.3 1105.5910093.33 1105.6610093.47 1105.66

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9945.38     .03 9954.07    .045 10041.7     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9954.07 10041.7          142.218   143.1 144.798            .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.583

INPUT
Description:
Station Elevation Data    num=      44
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9940.82    1106 9944.43 1106.03 9951.29 1106.03 9956.01 1106.05 9956.83 1106.05
 9956.98 1106.06  9957.4 1106.04  9957.9 1106.04 9963.72 1105.94 9965.71 1105.82
 9967.18 1105.78 9969.82  1105.5 9975.93 1104.74 9977.34 1104.58 9984.65 1103.49
 9987.23 1103.16 9988.35 1102.88 9989.76 1102.61 9991.14 1102.33 9999.17 1102.28
   10000 1102.2810007.36 1102.2610007.55  1102.310008.33 1102.59 10011.6 1103.04
10013.94 1103.3710020.05 1104.4310022.55 1104.7910032.58  1106.110036.57 1106.61
10041.18 1107.1210042.37 1107.2710043.37 1107.25 10048.2 1106.9710052.62 1106.91
10059.13 1106.9110067.49 1106.93 10073.8 1106.9210083.72 1106.4710086.06 1106.37
 10087.6 1106.2110092.67 1105.6410094.05 1105.5710094.59 1105.56

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
```

```
 9940.82     .03 9967.18    .04510032.58     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9967.1810032.58           263.346  263.98 264.462             .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.533

INPUT
Description:
Station Elevation Data    num=      61
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9902.68 1104.65 9909.04 1104.61 9923.46 1104.65 9934.86 1104.55  9941.1 1104.45
 9955.85 1104.64 9958.17 1104.68 9959.83 1104.58 9973.74 1103.79 9974.51 1103.69
 9982.62  1102.6 9989.97 1101.84 9990.43 1101.79 9990.88 1101.68 9992.03 1101.42
 9993.06 1101.1610006.24 1101.0810006.59 1101.1910007.65 1101.3810010.08 1101.72
10013.41 1102.0710015.61 1102.2610020.11 1102.7810026.03 1103.7210026.39 1103.79
   10030 1104.1810036.28 1104.89 10041.5 1105.2710042.11 1105.32 10042.2 1105.32
10047.44 1105.4810048.43 1105.5210055.29 1105.7710057.04 1105.7210060.32 1105.58
10064.76 1105.6510065.98 1105.6610068.63 1105.7610069.22 1105.7710075.07  1105.6
10077.26 1105.54 10081.3 1105.5610091.13 1105.0710091.31 1105.0710091.38 1105.06
10095.73 1104.7110097.15 1104.7810113.34 1104.5910116.62 1104.5710124.25 1104.56
10126.64 1104.5510129.01 1104.4910136.68 1104.6510137.79 1104.6810155.83 1104.86
10157.75 1104.8910159.69 1104.89 10170.1 1105.0610182.88 1105.1110197.85 1105.26
10205.16 1105.25

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9902.68     .03 9958.17    .04510036.28     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9958.1710036.28           176.53  173.45 173.415             .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.500

INPUT
Description:
Station Elevation Data    num=      90
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9886.43 1103.92 9894.88 1103.91 9895.03 1103.91 9896.83 1103.95  9897.1 1103.95
 9902.88 1104.06 9905.04 1104.05 9911.01 1104.05 9917.51 1103.99 9918.97 1103.99
 9919.29 1103.98 9922.12 1103.99 9926.14 1103.96 9926.51 1103.96 9930.56 1103.98
 9931.86 1103.97 9935.05 1103.96 9939.63 1103.84  9941.3 1103.79 9944.88 1103.58
 9950.05 1103.37 9951.58 1103.29 9957.63 1102.86 9957.76 1102.86 9960.12 1102.54
 9960.92 1102.44 9961.25 1102.42 9971.66 1101.85 9971.89 1101.84 9983.26 1100.97
 9986.28 1100.76 9986.34 1100.75 9986.42 1100.74 9990.12 1100.44 9991.61 1100.38
  9992.5 1100.28 9994.48 1099.43 9994.68 1099.34 9995.14 1099.3510004.62  1099.6
10009.24  1099.810010.09    110010010.42 1100.0510010.64 1100.3310010.98 1100.77
10011.44 1101.6110012.36 1101.8110012.99  1101.910016.62 1102.4510023.03 1103.25
10025.26 1103.3610030.36  1103.710030.83 1103.7310038.011104.07910038.86 1104.12
10039.73 1104.1410046.97 1104.0910048.56 1104.13   10050 1104.0710053.46 1104.01
10056.15 1103.9910057.01 1103.9810059.49 1103.8510069.47 1103.87 10071.3 1103.84
10082.96 1103.7510086.56 1103.6510090.41  1103.210093.06    1103   10103 1103.07
10105.49 1103.0510112.32 1103.1210117.35 1103.1410119.84 1102.9610120.35 1102.91
10120.64 1102.9710123.35  1103.310125.53 1103.4310128.71 1103.6510131.28 1103.73
10134.23 1103.73 10142.7 1103.9110167.04 1104.2110167.96 1104.2310168.97 1104.24
10169.51 1104.21 10173.2 1104.1710175.33 1104.5610175.63 1104.6110175.68 1104.61

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9886.43     .03 9935.05    .04510038.01     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9935.0510038.01           26.431   35.85   38.41             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9886.43    9940    1104       T
Right Levee     Station=10039.73      Elevation= 1104.14

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.493

INPUT
Description:
Station Elevation Data    num=      95
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9876.55 1103.81 9882.75 1103.85 9883.96  1103.9 9884.67 1103.96  9889.5 1104.28
 9894.25 1104.63 9894.29 1104.23 9896.21 1104.31 9912.81 1103.75 9917.93  1103.7
 9922.88 1103.64 9925.36 1103.63  9927.6 1103.63  9929.6 1103.58 9930.26 1103.54
 9932.01 1103.52 9932.25 1103.52 9933.18 1103.51 9934.71 1103.44 9935.42  1103.4
 9944.21 1102.58 9947.26 1102.39 9947.79 1102.39 9949.11 1102.38 9951.35 1102.33
 9955.75 1102.24 9958.06 1102.12 9960.98 1102.03    9964 1101.96 9964.76 1101.93
 9964.97 1101.92 9969.17  1101.9 9971.62 1101.88 9972.54 1101.88 9974.68 1101.75
 9978.22 1101.93 9979.68 1101.84 9983.96 1101.53 9984.34 1101.53  9984.5  1101.5
 9986.26  1101.5 9990.29 1101.76 9990.64 1101.74 9991.01 1101.68 9991.71 1101.49
 9995.92 1100.04  9996.5  1099.8  9996.8 1099.67 9998.25 1099.72   10000 1099.79
10005.21 1099.9810005.67 1100.1410007.17 1100.6410008.71 1101.9410009.25 1102.23
10010.09 1102.3410012.11 1102.49 10015.3 1102.6310017.34 1102.9110020.44 1103.19
10023.72 1103.5210025.05 1103.6510027.46 1103.7310032.57 1103.8710034.96 1103.85
10044.29 1103.8310048.02  1103.710048.79 1103.6910049.22 1103.6810052.57 1103.76
10053.68 1103.7710063.44 1103.8310065.79 1103.8410069.88  1103.810083.79 1103.69
10085.47 1103.5310091.38 1102.92 10094.1 1102.9610096.18 1102.9310100.34 1102.97
10106.42 1102.9110109.65 1102.8910113.58 1102.9210116.57 1103.09 10120.6  1103.3
10123.59 1103.41   10128 1103.5610132.21 1103.7710137.12 1103.8810146.54 1103.83
10155.61 1103.8510165.42 1103.9310168.39 1104.0110170.36 1104.0810172.07 1104.34
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9876.55     .03 9934.71    .04510025.05     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9934.7110025.05           19.026   10.88   9.936             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9876.55    9963    1104       F
Right Levee     Station=10032.57      Elevation= 1103.87

BRIDGE


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.492

INPUT
Description:
Distance from Upstream XS =       1
Deck/Roadway Width        =     7.5
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
9978.765 1101.89 1100.399990.325 1102.58 1101.0810001.25 1102.93 1101.43
10016.51  1103.3  1101.810025.05 1103.65 1102.15

Upstream Bridge Cross Section Data
Station Elevation Data    num=      95
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9876.55 1103.81 9882.75 1103.85 9883.96  1103.9 9884.67 1103.96  9889.5 1104.28
 9894.25 1104.63 9894.29 1104.23 9896.21 1104.31 9912.81 1103.75 9917.93  1103.7
 9922.88 1103.64 9925.36 1103.63  9927.6 1103.63  9929.6 1103.58 9930.26 1103.54
 9932.01 1103.52 9932.25 1103.52 9933.18 1103.51 9934.71 1103.44 9935.42  1103.4
 9944.21 1102.58 9947.26 1102.39 9947.79 1102.39 9949.11 1102.38 9951.35 1102.33
 9955.75 1102.24 9958.06 1102.12 9960.98 1102.03    9964 1101.96 9964.76 1101.93
 9964.97 1101.92 9969.17  1101.9 9971.62 1101.88 9972.54 1101.88 9974.68 1101.75
 9978.22 1101.93 9979.68 1101.84 9983.96 1101.53 9984.34 1101.53  9984.5  1101.5
 9986.26  1101.5 9990.29 1101.76 9990.64 1101.74 9991.01 1101.68 9991.71 1101.49
 9995.92 1100.04  9996.5  1099.8  9996.8 1099.67 9998.25 1099.72   10000 1099.79
10005.21 1099.9810005.67 1100.1410007.17 1100.6410008.71 1101.9410009.25 1102.23
10010.09 1102.3410012.11 1102.49 10015.3 1102.6310017.34 1102.9110020.44 1103.19
10023.72 1103.5210025.05 1103.6510027.46 1103.7310032.57 1103.8710034.96 1103.85
10044.29 1103.8310048.02  1103.710048.79 1103.6910049.22 1103.6810052.57 1103.76
10053.68 1103.7710063.44 1103.8310065.79 1103.8410069.88  1103.810083.79 1103.69
10085.47 1103.5310091.38 1102.92 10094.1 1102.9610096.18 1102.9310100.34 1102.97
10106.42 1102.9110109.65 1102.8910113.58 1102.9210116.57 1103.09 10120.6  1103.3
10123.59 1103.41   10128 1103.5610132.21 1103.7710137.12 1103.8810146.54 1103.83
10155.61 1103.8510165.42 1103.9310168.39 1104.0110170.36 1104.0810172.07 1104.34

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9876.55     .03 9934.71    .04510025.05     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9934.7110025.05             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9876.55    9963    1104       F
Right Levee     Station=10032.57      Elevation= 1103.87

Downstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
9975.005 1101.97 1100.479985.255 1102.58 1101.089996.195 1102.93 1101.43
10015.75  1103.3  1101.810024.67 1103.65 1102.14

Downstream Bridge Cross Section Data
Station Elevation Data    num=     103
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9876.55  1104.6 9877.51 1104.67 9877.55 1104.91 9877.65 1105.33 9881.83 1105.32
 9885.88  1105.3  9889.5 1105.22 9895.71  1105.1 9895.77 1104.62  9895.8 1104.23
  9903.1 1103.97 9922.85 1103.49 9922.861103.489  9923.3 1103.44 9923.61 1103.42
 9924.12 1103.38  9928.9 1102.95 9932.52 1102.81 9933.23 1102.76 9935.69 1102.65
 9937.62 1102.58 9938.92 1102.53 9941.72 1102.39 9944.96 1102.37 9945.48 1102.36
 9946.86 1102.37 9948.47 1102.39  9949.8 1102.39 9952.17 1102.35 9953.79 1102.27
 9957.25 1102.13 9960.15 1102.04 9963.98 1101.95 9965.73 1101.94 9971.61 1101.92
 9972.68 1101.92 9977.01 1102.01 9978.68 1101.92 9979.86 1101.87 9980.98 1101.71
 9984.89 1101.19 9985.88 1101.05 9986.29 1101.01 9988.14 1100.77 9990.17 1100.96
  9994.8 1099.91 9995.61  1099.6 9999.92 1099.77   10000 1099.7710001.86 1099.92
 10003.3 1099.9510005.21 1099.9610007.72 1100.7810008.17 1100.9310008.61 1101.06
10010.09 1101.3310011.71 1101.77 10012.1 1101.7710013.23  1102.110013.43 1102.48
10013.55    110310013.69 1103.0510016.47 1103.0810017.69  1103.110018.67  1103.2
10019.97 1103.2810022.09 1103.4410023.07  1103.510024.67 1103.6410024.72 1103.65
10025.64 1103.6510029.55 1103.75 10031.5 1103.77 10038.8 1103.7810040.97 1103.76
 10043.9 1103.7510045.54  1103.710048.32 1103.6110049.86 1103.6810052.12 1103.74
10065.32 1103.8110083.12 1103.6510091.42 1102.8710100.65 1102.7310105.97 1102.78
10111.22  1102.810112.17 1102.81   10114 1102.8910114.96 1102.9210115.96 1102.97
 10117.6 1103.0910122.23 1103.3510124.81 1103.47 10126.1 1103.5610129.65 1103.73
10133.42 1103.8610145.85  1103.810146.06  1103.810164.31 1103.9410164.88 1103.94
10165.26 1103.9610170.62 1104.0910172.06 1104.39

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9876.55     .04 9922.86    .04510023.07     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9922.8610023.07             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9876.55    9977    1104       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
```

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Elevation at which weir flow begins          =
Energy head used in spillway design          =
Spillway height used in design               =
Weir crest shape                             = Broad Crested

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.491

INPUT
Description:
Station Elevation Data    num=     103
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9876.55  1104.6 9877.51 1104.67 9877.55 1104.91 9877.65 1105.33 9881.83 1105.32
 9885.88  1105.3  9889.5 1105.22 9895.71  1105.1 9895.77 1104.62  9895.8 1104.23
  9903.1 1103.97 9922.85 1103.49 9922.861103.489  9923.3 1103.44 9923.61 1103.42
 9924.12 1103.38  9928.9 1102.95 9932.52 1102.81 9933.23 1102.76 9935.69 1102.65
 9937.62 1102.58 9938.92 1102.53 9941.72 1102.39 9944.96 1102.37 9945.48 1102.36
 9946.86 1102.37 9948.47 1102.39  9949.8 1102.39 9952.17 1102.35 9953.79 1102.27
 9957.25 1102.13 9960.15 1102.04 9963.98 1101.95 9965.73 1101.94 9971.61 1101.92
 9972.68 1101.92 9977.01 1102.01 9978.68 1101.92 9979.86 1101.87 9980.98 1101.71
 9984.89 1101.19 9985.88 1101.05 9986.29 1101.01 9988.14 1100.77 9990.17 1100.96
  9994.8 1099.91 9995.61  1099.6 9999.92 1099.77   10000 1099.7710001.86 1099.92
 10003.3 1099.9510005.21 1099.9610007.72 1100.7810008.17 1100.9310008.61 1101.06
10010.09 1101.3310011.71 1101.77 10012.1 1101.7710013.23  1102.110013.43 1102.48
10013.55    110310013.69 1103.0510016.47 1103.0810017.69  1103.110018.67  1103.2
10019.97 1103.2810022.09 1103.4410023.07  1103.510024.67 1103.6410024.72 1103.65
10025.64 1103.6510029.55 1103.75 10031.5 1103.77 10038.8 1103.7810040.97 1103.76
 10043.9 1103.7510045.54  1103.710048.32 1103.6110049.86 1103.6810052.12 1103.74
10065.32 1103.8110083.12 1103.6510091.42 1102.8710100.65 1102.7310105.97 1102.78
10111.22  1102.810112.17 1102.81   10114 1102.8910114.96 1102.9210115.96 1102.97
 10117.6 1103.0910122.23 1103.3510124.81 1103.47 10126.1 1103.5610129.65 1103.73
10133.42 1103.8610145.85  1103.810146.06  1103.810164.31 1103.9410164.88 1103.94
10165.26 1103.9610170.62 1104.0910172.06 1104.39

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9876.55     .04 9922.86    .04510023.07     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9922.8610023.07           43.874   26.68  27.762             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9876.55    9977    1104       F

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.486

INPUT
Description:
Station Elevation Data    num=      94
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9863.86 1103.45 9867.68 1103.48 9869.56 1103.43 9874.17 1103.46  9874.5 1103.46
 9877.21 1103.32 9886.83 1102.85 9891.25 1102.65 9893.68 1102.48 9896.61 1102.31
 9901.18 1102.01 9901.46 1101.99 9906.86 1101.85 9910.48 1101.73 9910.69 1101.72
 9910.86 1101.71 9914.21 1101.79 9915.29 1101.79 9925.81 1101.71 9926.98 1101.71
  9927.4 1101.69 9931.23 1101.83 9937.07 1102.07 9938.33 1102.23 9940.34 1102.74
 9941.82 1103.02  9943.4  1103.1 9948.05 1103.21 9958.93 1103.17 9965.28 1102.79
  9967.2 1102.73 9969.51 1102.73 9970.37  1102.7 9971.59 1102.65 9972.48 1102.61
 9973.58 1102.55 9975.59 1102.43 9977.75 1102.31 9983.48 1101.09 9985.11 1100.77
 9985.64 1100.73 9988.55 1100.49 9989.49 1100.41 9991.56 1100.14  9992.6 1100.06
 9992.84 1099.94 9993.48 1099.64 9994.58 1099.6610006.92 1099.8510008.33 1100.26
 10009.2 1100.5310011.13    110110011.79 1101.1110014.55 1101.7210015.58 1101.95
10015.87 1102.0210017.93 1102.4610024.941103.18810025.33 1103.2310026.06 1103.31
10027.61 1103.5810029.61 1103.52 10033.9 1103.5710034.87  1103.610042.08 1103.88
10042.75 1103.8610047.08 1103.6210047.72 1103.4910049.23 1103.5710051.45 1103.68
10062.16 1103.7410066.36  1103.7 10082.3 1103.4110089.04 1102.8710091.89 1102.83
10102.17 1102.6210109.53 1102.7210116.51 1102.72 10119.2 1103.0110121.78 1103.28
10123.02 1103.4410131.73 1103.7310132.71 1103.7710133.85 1103.7610145.42 1103.78
10148.48  1103.810163.15 1103.9410165.58 1104.0210169.71 1104.0910170.96 1104.27
10171.23 1104.2810171.34 1104.2910171.53  1104.310174.93 1104.29

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9863.86     .04 9958.93    .04510024.94     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9958.9310024.94          288.832  294.72 302.293             .1       .3

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.431
```

```
INPUT
Description: Q=290 cfs  (CPD54, 24 hr)
Station Elevation Data    num=     117
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  9927.3 1102.25 9927.36 1102.25 9927.91 1102.22 9929.75 1102.08 9931.22 1101.95
 9936.36 1101.32 9937.67 1101.01 9941.51 1100.41  9946.6 1099.44 9950.281098.732
 9952.25 1098.51 9960.08 1097.72 9964.77 1097.02  9965.1 1096.96 9965.33 1096.92
 9965.56 1096.84 9965.88 1096.74 9967.79 1096.08 9969.24 1094.63 9970.08 1093.76
 9970.58 1093.57 9970.84 1093.51 9971.36 1093.44 9973.47 1092.9410013.84 1092.94
10015.97 1093.4710016.52 1093.5910017.03 1094.1610018.63 1096.1610018.97 1096.19
10029.18 1097.5210029.77 1097.5410034.65 1097.9510038.07 1098.1710040.39 1098.26
10043.02 1098.4110047.02 1098.5610047.55 1098.58   10048 1098.5810050.43 1098.34
10055.85 1097.77 10057.4 1097.6410062.05 1097.3310063.67 1097.3110069.84 1097.26
10073.32 1097.1810087.16 1097.2610089.76  1097.310093.64 1097.3510105.77 1097.62
10111.24 1097.67 10112.4 1097.6410116.47  1097.710116.63 1097.7110121.72 1098.16
10123.86 1098.3310125.61 1098.4910126.85 1098.5610130.17 1098.9110133.67 1099.45
10134.99 1099.8610138.83 1101.0610143.25 1101.7210143.82 1101.7910145.11 1101.93
10147.55 1102.0710150.37 1102.1110150.76 1102.1210151.27 1102.1110155.41 1101.92
10157.78 1101.8310160.55 1101.5910163.98 1101.2310166.15 1101.0810171.39 1101.16
10175.09 1101.2610178.89 1101.3310179.59 1101.3310180.51 1101.3910181.82 1101.45
 10187.7 1101.7710191.13 1101.95 10193.9 1102.0810198.49 1102.2110200.51 1102.26
10202.97  1102.310211.57 1102.3610219.69 1102.3310221.79 1102.3310225.28 1102.32
10228.66 1102.2410231.16 1102.2310232.33 1102.2610245.32 1102.1410247.81 1102.11
10254.54 1101.5110256.53 1101.4910258.64 1101.4610262.96 1101.2210265.89 1101.41
10267.76 1101.59 10269.2  1101.710274.52 1101.72 10276.9 1101.5510278.13 1101.56
10279.42 1101.4710282.28 1101.7910285.59 1102.14 10289.9 1102.2210293.57 1102.26
10305.63 1102.5410313.81 1102.7110315.27 1102.7110324.73 1102.6510328.72 1102.67
10334.73 1102.7210334.77 1102.72

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  9927.3     .04 9950.28    .04510047.02     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9950.2810047.02          361.758     277 194.234             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    994810047.02    1096       T
10047.0210334.77    1100       T

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.378

INPUT
Description:
Station Elevation Data    num=     156
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9763.97 1099.29 9764.44 1099.31    9769 1099.37 9769.78 1099.36 9773.98 1099.17
 9775.36 1099.09 9778.63 1099.13 9780.18 1099.13 9780.97 1099.14 9782.71 1099.05
 9784.93 1098.95 9785.04 1098.91 9785.25 1098.85 9786.32 1098.57 9787.16  1098.4
 9788.28  1098.1  9788.4 1098.08 9789.51 1097.97 9789.99 1097.95 9790.76  1097.9
 9792.25 1097.97 9792.73 1098.04 9794.77 1098.44 9794.95 1098.42 9795.86 1098.33
 9797.85 1098.16 9798.32 1098.11 9799.16  1098.2 9801.67 1098.52 9805.81 1098.78
 9806.51 1098.83 9807.53 1098.81 9810.15 1098.71 9814.18 1098.62 9822.42 1098.35
  9824.6 1098.26 9828.64 1098.18 9831.16 1098.07 9832.29 1098.05 9837.63 1097.86
  9839.7 1097.76 9841.23 1097.67 9843.91 1097.44 9844.78 1097.37 9846.92 1097.14
 9849.17 1097.14 9855.01 1097.03 9857.98 1096.99 9864.12 1096.85 9864.61 1096.84
 9864.75 1096.84 9869.29 1096.69 9869.97 1096.64 9874.62 1096.43 9883.01 1095.95
 9883.68 1095.91 9884.32 1095.88    9899 1095.67 9899.37 1095.66 9899.72 1095.66
  9909.6 1095.52 9916.63 1095.44 9922.56  1095.3 9927.71 1095.27 9928.74 1095.33
 9931.02 1095.45 9932.64 1095.51 9937.56 1095.63 9937.71 1095.64 9937.92 1095.64
 9940.13 1095.74  9940.9 1095.78 9946.27 1095.76 9948.87 1095.82 9950.73 1095.96
 9953.73 1096.14 9955.46 1096.14 9961.12 1096.33 9962.39 1096.24 9965.45 1096.14
 9968.82 1095.83 9971.13 1095.66 9976.89  1095.1 9978.33 1095.01 9978.99 1094.96
 9980.45 1094.37 9982.85 1093.57 9984.58 1092.9410024.95 1092.94 10028.1 1093.93
10028.33 1094.01 10028.5 1094.0510028.57 1094.07 10032.4 1095.2310036.15 1095.54
10036.94 1095.6110037.63 1095.6110042.69  1095.810047.38 1096.0210051.86 1096.26
10060.51  1097.110060.63 1097.1210062.14 1097.3510069.24 1098.4410069.56 1098.48
10070.06 1098.5410080.15 1099.5310091.28 1100.09 10093.6 1100.2410095.83 1100.25
10109.34 1100.4210121.09 1099.76 10123.2 1099.5410128.32 1098.8910131.33 1098.36
10135.43 1097.4710140.24 1097.1410142.51 1097.0310146.17 1096.8610146.95 1096.87
10149.67 1097.0810150.05  1097.110152.05 1097.3710157.31 1098.2310158.27 1098.46
10162.98 1099.4510163.84 1099.64 10166.1  1100.310167.63 1100.5610169.32 1100.74
10170.86 1100.98 10172.7 1101.2310174.99 1101.5110183.26 1101.65 10190.8 1101.57
10197.96 1101.57 10202.5 1101.6810204.26 1101.6910205.22 1101.6610208.84  1101.6
10223.21 1101.6110227.48 1101.6210229.97 1101.3810236.53 1100.8810249.58 1100.95
10250.72 1100.9610251.97    110110264.73 1101.3810269.44 1101.5510273.25 1101.75
10278.24 1101.7710288.91 1101.9610293.28 1102.0810312.51 1102.2110315.02  1102.2
10315.94 1102.22

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9763.97     .04 9961.12    .04510051.86     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9961.1210051.86          200.764  172.52 164.388             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 9763.979871.195  1099.5       T
    987210315.94    1096       T
Right Levee     Station=10109.34      Elevation= 1100.42

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.345

INPUT
Description:
Station Elevation Data    num=     102
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9824.48  1102.1 9827.67  1102.1 9828.93 1102.09  9837.3 1102.15 9840.45 1102.07
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 9844.46 1101.99 9848.56 1101.96 9851.96 1101.95  9863.7 1101.94 9864.39 1101.93
 9865.25 1101.93 9875.81 1101.81 9877.16 1101.78 9879.21 1101.74 9881.54  1101.7
    9882 1101.67 9884.09 1101.58 9885.66 1101.52 9887.59 1101.45 9889.12 1101.42
 9889.58 1101.41 9892.02 1101.41 9893.45 1101.42 9894.86 1101.44 9896.42 1101.49
 9898.42  1101.6 9898.61 1101.61 9900.03 1101.64 9903.25 1101.65 9905.06 1101.67
 9909.54  1101.7 9911.11 1101.69 9915.28 1101.72 9922.42 1101.68 9926.23 1101.63
 9929.11 1101.58    9933 1101.61 9933.01 1101.61 9933.63  1101.6 9934.41 1101.59
 9937.25 1101.37 9938.06 1101.31  9938.7 1101.26 9939.31  1101.2 9940.98 1100.89
 9944.41 1100.12 9946.47 1099.73 9949.42 1099.04  9952.9 1098.45 9956.48    1098
  9956.6 1097.98  9956.7 1097.97 9962.84 1097.14 9966.76 1096.68  9969.7  1096.4
 9972.06 1096.46 9974.09 1096.48 9975.42 1096.42 9979.47 1096.48 9981.12 1096.51
  9983.2 1096.42 9987.55 1096.71 9995.55 1096.68 9999.99 1096.74 10000.1 1096.74
10004.58 1096.7810006.14 1096.9710007.12 1096.9710007.92 1095.4910013.46 1095.77
10014.88 1095.7810018.35 1096.0910018.68 1096.1210019.31 1096.2110020.89 1096.17
10040.48 1095.8610042.11 1095.9510052.99 1096.5310055.02 1096.6610058.64 1096.88
10061.05 1097.0710061.12 1097.0710062.23 1097.1310068.19 1097.3910068.96 1097.49
10072.28 1097.9110076.65 1098.7710079.45 1099.3310083.23 1100.41 10085.7 1101.02
10092.28 1102.8410093.07 1103.0310096.18 1103.3610098.79 1103.6510099.24 1103.65
10100.25 1103.6710101.25 1103.6810101.35 1103.6810103.67 1103.6310113.43 1103.58
10120.08 1103.4510121.79 1103.45

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9824.48     .04 9933.01    .04510092.28     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9933.0110092.28          186.771  154.73 162.492             .1       .3

INLINE STRUCTURE


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.344

INPUT
Description:
Distance from Upstream XS =       0
Deck/Roadway Width        =     6.5
Weir Coefficient          =     2.6
 Weir Embankment Coordinates    num =        5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9963.99 1097.01 9998.18 1096.7410005.51 1096.7810016.68 1096.56 10057.1 1096.78

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Weir crest shape                            = Broad Crested


CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.316

INPUT
Description:
Station Elevation Data    num=      80
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9883.51 1097.02    9887 1096.59 9893.19 1096.29 9895.88 1096.07 9901.86  1094.1
 9902.65 1093.86 9902.93 1093.79 9903.37 1093.71 9904.34 1093.48 9907.28  1092.9
10036.58  1092.910037.16 1092.9710040.49 1093.7110044.25 1094.6710045.53 1094.91
10048.86 1095.4710052.68 1096.0710054.81 1096.04 10059.4 1096.05 10064.3 1095.94
10064.86 1095.9210066.25 1095.9110081.66 1095.7510082.88 1095.7710086.98 1095.79
10087.99 1095.8310089.43 1095.8310093.99 1095.8410095.57 1095.8410101.05 1095.98
10102.48 1096.0510108.33 1096.1910110.03 1096.2410116.52 1096.3110120.03 1096.31
   10123 1096.3710124.99 1096.3710128.62 1096.3910131.72    109610137.52 1095.53
10137.64  1095.510137.76 1095.48 10138.1 1095.4710139.77 1095.3210140.26 1095.31
10141.81 1095.2210142.55 1095.2710144.27 1095.3710145.23 1095.4610148.61 1095.75
 10148.7 1095.7610148.85 1095.7810152.72 1096.2810155.41 1096.55 10159.8 1096.78
10162.73 1096.9410164.45    109710172.44 1097.3810174.77 1097.4510175.32 1097.49
10176.92 1097.61 10180.5 1097.91 10183.8 1098.2310189.32  1098.810190.06 1098.82
10196.41 1099.0610198.12  1098.910201.88 1098.5110203.21 1098.5310219.46 1098.83
10222.62 1098.9210227.32 1098.98 10228.4 1099.0410233.96 1099.2710241.83 1099.47
10241.95 1099.4710249.96 1099.8910252.43 1099.9410261.93  1100.210263.41 1100.27

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9883.51     .04 9895.88    .04510052.68     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9895.8810052.68          128.108  117.61 157.846             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
 9883.51 9889.51    1099       T
 9889.5110139.31  1095.7       T
10139.3110263.41    1099       T

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.294

INPUT
Description:
Station Elevation Data    num=     135
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9821.67 1098.65 9822.83 1098.66  9827.2 1098.63  9830.5 1098.62 9833.41 1098.84
 9834.32  1098.9 9834.79 1098.97 9836.49 1099.11 9839.16    1099 9839.33 1098.99
 9839.59 1098.97 9840.72 1098.65 9844.21 1097.68 9846.49 1097.11 9847.04 1096.96
 9848.62 1096.93 9853.55 1096.91 9855.67 1096.66 9858.25 1096.45 9861.13 1097.17
 9861.36 1097.22 9861.79 1097.31 9863.46 1097.58 9866.03 1097.81 9869.43 1097.89
 9870.97 1097.97 9873.25 1097.98 9875.58 1098.31 9876.66 1098.41  9877.3 1098.21
 9879.84 1097.24 9881.12 1096.98 9883.03 1096.37 9884.78 1096.16 9885.67 1096.04
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 9887.04 1095.74 9888.03 1095.55 9888.49 1095.46 9890.25 1095.68 9892.92 1096.02
 9894.17 1096.22  9899.5 1096.49 9909.04 1096.77 9913.12 1096.74  9915.7 1096.71
 9916.92 1096.72 9921.83 1096.68 9922.58 1096.67  9929.4 1096.76 9929.78 1096.76
 9937.13  1096.7 9944.26 1096.27 9944.51 1096.25 9945.36 1096.18 9948.75 1095.84
 9950.26 1095.75 9950.62 1095.65 9951.04 1095.57 9953.53 1095.11 9955.84 1094.71
 9956.72 1094.49 9960.07  1093.8 9961.47 1093.58 9965.15  1092.910038.76  1092.9
10039.29 1093.1910040.17 1093.6510040.71 1093.8110043.58 1094.59 10043.9 1094.67
10044.46 1095.3310044.92 1095.9310049.74 1096.2110050.53 1096.2710054.04 1096.28
10055.87 1096.2210061.87 1095.8310062.75 1095.7610066.37 1095.5310070.36  1095.2
10081.72 1095.2510082.55 1095.2510090.28 1095.8710091.03 1095.9610094.92 1096.12
10097.33 1096.3810099.58  1096.510101.42 1096.6610105.04  1096.610110.01 1096.62
10114.58 1096.6110116.74 1096.53 10118.9 1096.4610120.67 1096.4410121.07 1096.44
10124.68 1096.4210130.54 1096.4210133.18 1096.4410134.46 1096.5210140.42 1096.67
10142.76 1096.8110145.01 1096.9410147.36 1097.0610149.95 1097.1810153.09 1097.32
 10157.2 1097.4810157.83 1097.4810158.62  1097.510162.58 1097.5410165.38 1097.56
10168.32  1097.710174.57 1097.8210181.57 1097.9410192.42 1098.1910193.37 1098.19
10195.41  1098.410196.05 1098.4610199.67 1098.8910199.82  1098.910200.42 1099.03
10202.68 1099.4210204.51 1099.9510205.84 1100.2810206.67 1100.3310210.76 1100.39
 10214.7 1100.0310219.62 1099.78 10222.5 1099.9210226.42 1100.1210226.91 1100.13
10229.33 1099.9510232.62 1099.9710233.71 1099.9610234.07 1099.9910236.83 1100.15

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9821.67     .04 9944.26    .04510050.53     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9944.2610050.53          166.923  152.94 224.316             .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
 9950.2610044.92  1095.7       T
Left Levee      Station=  9929.4      Elevation= 1096.76

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.265

INPUT
Description:
Station Elevation Data    num=     115
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9876.55 1096.37  9881.9 1096.54 9894.24 1096.87 9897.22 1097.23 9898.04 1097.31
 9903.27 1097.28 9916.82 1097.17 9921.07 1097.07 9922.93 1097.03 9925.62 1096.96
 9933.11 1096.74 9940.04 1096.71 9942.73 1096.65 9948.84 1096.68 9949.21 1096.68
 9953.15 1096.66 9955.86 1096.63 9958.27 1096.64 9960.49 1096.56 9970.34 1096.58
 9975.39 1096.58 9977.89 1096.04 9978.31 1095.96 9978.65 1095.95 9982.63 1095.85
 9985.85 1096.52 9988.15 1097.04 9989.84 1096.66 9991.11 1096.37 9991.67 1096.07
 9993.21 1095.58  9995.2 1094.57 9995.26 1094.55 9996.48 1094.55 9997.14 1094.54
 9998.63 1094.52 9999.55 1094.52   10000 1094.6810001.49 1095.2210001.55 1095.25
10001.64 1095.29 10003.3  1095.410005.65 1095.3610014.63 1096.0810015.44  1096.1
10018.85 1096.0110025.44 1095.7110031.19  1095.410032.02 1095.3310038.34 1094.82
10041.92 1094.3710042.11 1094.3510042.98 1094.25 10046.4 1093.8710046.76 1093.87
10047.93 1093.8410048.67 1093.8410049.42 1093.8510051.23 1093.8710052.74 1093.87
10054.59 1093.8610058.98 1093.8310066.74 1093.9810068.53 1094.1410069.86 1094.29
10075.59 1094.9110078.55 1095.2410083.04 1095.6810083.34 1095.6910083.76 1095.69
10089.93 1095.7710094.52 1095.7810097.55 1095.7610101.09 1095.5210104.07 1095.38
10105.44  1095.310114.18 1094.7610134.78 1093.7310135.96 1093.7210154.95 1093.63
10157.95 1093.4110164.17 1093.1110168.17 1092.4410169.61 1092.3910173.37 1092.01
10173.64 1091.9910175.02 1091.5310178.08 1091.0110182.76 1090.4210188.72 1089.53
10189.79 1089.5310193.71  1089.510199.33 1089.4810203.08 1089.8810208.29 1090.39
10211.25 1090.8610216.77 1091.6110220.73 1092.31 10227.3 1092.6910231.95 1092.99
10233.56  1093.110239.08 1093.6610239.24 1093.6910239.46 1093.7510240.51 1093.92
10248.06 1095.2210249.19 1095.4910254.15 1096.6610256.08 1097.1310258.99 1097.85
10261.25 1098.4310261.71 1098.5310262.06 1098.64 10262.7 1098.7310269.22    1100

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9876.55     .05 9993.21    .04510014.63     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9993.2110014.63          252.619  242.25 194.652             .1       .3
Ineffective Flow     num=        3
   Sta L   Sta R    Elev  Permanent
   1001710094.52  1095.8       T
10094.52   10180 1093.63       T
   10180   10250  1095.8       T
Left Levee      Station= 9898.04      Elevation= 1097.31

CROSS SECTION


RIVER: Lr El Mirage Wsh
REACH: Lr El Mirage Wsh   RS: 0.219

INPUT
Description: END DETAILED STUDY
Station Elevation Data    num=     150
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9902.85 1096.72 9904.12 1096.77 9906.81 1096.76 9909.47  1096.9 9910.93 1096.97
 9911.93 1096.98 9912.56 1096.95  9912.9 1096.95 9913.92 1096.84 9914.61 1096.74
 9915.46 1096.73 9927.12 1096.62 9930.11 1096.63 9932.43 1096.63 9936.71 1096.68
  9941.6 1096.54 9942.77 1096.56  9943.7 1096.58 9944.75 1096.54 9945.31 1096.56
 9946.02 1096.56 9946.43 1096.54 9947.29 1096.46 9948.28 1096.37 9949.02 1096.27
 9952.04 1095.77  9954.2 1095.64 9962.63 1095.16 9963.98 1095.01 9964.95 1094.93
 9968.59 1094.61 9972.78 1094.36  9979.2 1094.12 9982.74 1093.94 9988.79 1093.93
 9992.17 1093.93 9997.04 1093.81   10000 1093.8110003.64  1093.810006.25 1093.82
10010.38 1093.8710017.48 1094.2810020.79 1094.8810021.91 1095.0810026.43  1095.5
10031.38 1095.8910032.32 1095.9310035.26 1096.0910037.74 1096.2410038.54  1096.3
10045.82 1096.5710045.99 1096.5710046.07 1096.5810046.28 1096.5810054.42 1096.65
10059.82 1096.7510066.73 1096.8510069.62 1096.9610076.75 1096.9210084.92 1096.93
10093.37 1096.8710098.94 1096.7910099.12 1096.7910099.38  1096.810106.16 1096.81
10109.62 1096.3510110.35 1096.2210114.62 1096.05 10115.5 1096.0310115.68 1096.12
10117.37 1096.8510118.91 1096.8410119.32 1096.8310119.67 1096.8210124.11 1096.82
10124.73 1096.8110126.19 1096.2810127.34 1096.0210129.45 1096.05 10130.1 1096.05
10133.36 1095.9810136.24 1095.8710138.99 1095.7810141.02 1095.6710141.27 1095.66
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```
10146.35 1095.53 10147.1 1095.5310154.49 1095.6910154.99 1095.6910165.17 1095.64
10182.91 1096.1610184.69 1096.2210186.48 1096.25 10189.4 1096.2310199.83 1096.12
10210.55 1096.2710213.73 1096.3410222.39  1096.210224.43 1096.2110228.11 1096.22
10235.98 1095.9110238.36 1095.8210259.23 1094.5710265.87 1094.0910277.59 1093.31
10294.15 1093.1610300.68 1093.08 10312.2  1093.110312.57  1093.110315.36 1093.33
10326.01 1093.5610329.29 1093.6510339.27 1094.1910343.75 1094.4510346.32 1094.85
10353.91  1096.210357.77 1096.7510359.38 1096.9410364.45  1097.110365.91 1097.08
10368.23 1097.0910370.01 1097.1210371.56 1097.0710373.42 1097.12 10384.9 1097.47
10389.92 1097.7210392.01 1097.9910399.68 1099.06 10411.8 1101.4210413.94  1101.6
10417.01 1101.9410417.34 1102.2110417.64 1102.45   10420 1102.3510420.73 1102.38
10422.12 1102.4410423.36 1102.4610424.64 1102.5610425.75 1102.5910426.72 1102.61
10427.75 1102.5610428.68 1102.5510429.65 1102.5510440.51  1102.610442.29 1102.59
 10442.9 1102.5910444.43 1102.58 10445.1 1102.5810446.63 1102.5910452.26 1102.59

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9902.85     .05 9945.31    .04510045.82     .0510165.17     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9945.3110045.82              0       0       0              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
   10126   10186 1096.25       F
```

SUMMARY OF MANNING'S N VALUES

River:Lr El Mirage Wsh

Reach	River Sta.	n1	n2	n3	n4	n5
Lr El Mirage Wsh	1.514	.04	.035	.04		
Lr El Mirage Wsh	1.449	.035	.04	.035	.04	.035
Lr El Mirage Wsh	1.406	.035	.04	.035	.04	
Lr El Mirage Wsh	1.390	.04	.035	.04	.035	
Lr El Mirage Wsh	1.379	Culvert				
Lr El Mirage Wsh	1.371	.035	.045			
Lr El Mirage Wsh	1.365	.035	.045	.035		
Lr El Mirage Wsh	1.360	.035	.045			
Lr El Mirage Wsh	1.348	.035	.045	.035		
Lr El Mirage Wsh	1.329	.035	.045	.035		
Lr El Mirage Wsh	1.312	.035	.045	.035		
Lr El Mirage Wsh	1.242	.035	.045	.035		
Lr El Mirage Wsh	1.200	.045	.035			
Lr El Mirage Wsh	1.115	.035	.045	.055	.045	.035
Lr El Mirage Wsh	1.069	.035	.045	.055	.045	.035
Lr El Mirage Wsh	1.047	.035	.045	.055	.045	.035
Lr El Mirage Wsh	1.030	Culvert				
Lr El Mirage Wsh	1.020	.035	.03	.045	.03	.035
Lr El Mirage Wsh	1.014	.035	.03	.045	.03	.035
Lr El Mirage Wsh	0.978	.035	.03	.035		
Lr El Mirage Wsh	0.940	.035	.03	.035		
Lr El Mirage Wsh	0.892	.035	.03	.035		
Lr El Mirage Wsh	0.848	.03	.045	.03		
Lr El Mirage Wsh	0.785	.04	.045	.04		
Lr El Mirage Wsh	0.758	.04	.045	.04		
Lr El Mirage Wsh	0.726	.04	.045	.04		
Lr El Mirage Wsh	0.680	.04	.045	.04		
Lr El Mirage Wsh	0.646	.04	.045	.04		
Lr El Mirage Wsh	0.638	.04	.045	.04		
Lr El Mirage Wsh	0.634	Culvert				
Lr El Mirage Wsh	0.629	.03	.045	.03		
Lr El Mirage Wsh	0.610	.03	.045	.03		
Lr El Mirage Wsh	0.583	.03	.045	.03		
Lr El Mirage Wsh	0.533	.03	.045	.03		
Lr El Mirage Wsh	0.500	.03	.045	.03		
Lr El Mirage Wsh	0.493	.03	.045	.03		
Lr El Mirage Wsh	0.492	Bridge				
Lr El Mirage Wsh	0.491	.04	.045	.04		
Lr El Mirage Wsh	0.486	.04	.045	.04		
Lr El Mirage Wsh	0.431	.04	.045	.04		
Lr El Mirage Wsh	0.378	.04	.045	.04		
Lr El Mirage Wsh	0.345	.04	.045	.04		
Lr El Mirage Wsh	0.344	Inl Struct				
Lr El Mirage Wsh	0.316	.04	.045	.04		
Lr El Mirage Wsh	0.294	.04	.045	.04		
Lr El Mirage Wsh	0.265	.05	.045	.04		
Lr El Mirage Wsh	0.219	.05	.045	.05	.04	

SUMMARY OF REACH LENGTHS

River: Lr El Mirage Wsh

Reach	River Sta.	Left	Channel	Right
Lr El Mirage Wsh	1.514	336.537	341.38	346.306
Lr El Mirage Wsh	1.449	235.985	230.52	225.121
Lr El Mirage Wsh	1.406	106.417	84.6	67.435
Lr El Mirage Wsh	1.390	113.312	98.02	103.066
Lr El Mirage Wsh	1.379	Culvert		
Lr El Mirage Wsh	1.371	31.672	29.35	40.501
Lr El Mirage Wsh	1.365	28.041	25.87	40.642
Lr El Mirage Wsh	1.360	78.839	66.31	48.457
Lr El Mirage Wsh	1.348	90.351	98.62	105.803
Lr El Mirage Wsh	1.329	99.994	92.2	105.714
Lr El Mirage Wsh	1.312	367.079	368.26	372.234
Lr El Mirage Wsh	1.242	181.216	222.8	371.089
Lr El Mirage Wsh	1.200	361.242	446.53	648.669
Lr El Mirage Wsh	1.115	235.043	242.91	249.235
Lr El Mirage Wsh	1.069	145.193	117.73	145.066
Lr El Mirage Wsh	1.047	142.419	142.05	142.219
Lr El Mirage Wsh	1.030	Culvert		

Lr El Mirage Wsh	1.020	33.477	31.59	31.979
Lr El Mirage Wsh	1.014	194.325	192.21	191.135
Lr El Mirage Wsh	0.978	203.474	201.61	199.738
Lr El Mirage Wsh	0.940	257.892	252.94	248.284
Lr El Mirage Wsh	0.892	232.214	228.8	226.427
Lr El Mirage Wsh	0.848	286.107	335.49	372.789
Lr El Mirage Wsh	0.785	148.161	142.54	137.432
Lr El Mirage Wsh	0.758	177.634	169.35	174.678
Lr El Mirage Wsh	0.726	323.178	241.5	219.2
Lr El Mirage Wsh	0.680	197.47	178.52	179.435
Lr El Mirage Wsh	0.646	41.697	41.03	44.619
Lr El Mirage Wsh	0.638	48.194	47.73	47.333
Lr El Mirage Wsh	0.634	Culvert		
Lr El Mirage Wsh	0.629	101.394	100.66	100.204
Lr El Mirage Wsh	0.610	142.218	143.1	144.798
Lr El Mirage Wsh	0.583	263.346	263.98	264.462
Lr El Mirage Wsh	0.533	176.53	173.45	173.415
Lr El Mirage Wsh	0.500	26.431	35.85	38.41
Lr El Mirage Wsh	0.493	19.026	10.88	9.936
Lr El Mirage Wsh	0.492	Bridge		
Lr El Mirage Wsh	0.491	43.874	26.68	27.762
Lr El Mirage Wsh	0.486	288.832	294.72	302.293
Lr El Mirage Wsh	0.431	361.758	277	194.234
Lr El Mirage Wsh	0.378	200.764	172.52	164.388
Lr El Mirage Wsh	0.345	186.771	154.73	162.492
Lr El Mirage Wsh	0.344	Inl Struct		
Lr El Mirage Wsh	0.316	128.108	117.61	157.846
Lr El Mirage Wsh	0.294	166.923	152.94	224.316
Lr El Mirage Wsh	0.265	252.619	242.25	194.652
Lr El Mirage Wsh	0.219	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Lr El Mirage Wsh

Reach	River Sta.	Contr.	Expan.
Lr El Mirage Wsh	1.514	.1	.3
Lr El Mirage Wsh	1.449	.1	.3
Lr El Mirage Wsh	1.406	.3	.5
Lr El Mirage Wsh	1.390	.3	.5
Lr El Mirage Wsh	1.379	Culvert	
Lr El Mirage Wsh	1.371	.3	.5
Lr El Mirage Wsh	1.365	.1	.3
Lr El Mirage Wsh	1.360	.1	.3
Lr El Mirage Wsh	1.348	.1	.3
Lr El Mirage Wsh	1.329	.1	.3
Lr El Mirage Wsh	1.312	.1	.3
Lr El Mirage Wsh	1.242	.1	.3
Lr El Mirage Wsh	1.200	.1	.3
Lr El Mirage Wsh	1.115	.1	.3
Lr El Mirage Wsh	1.069	.3	.5
Lr El Mirage Wsh	1.047	.3	.5
Lr El Mirage Wsh	1.030	Culvert	
Lr El Mirage Wsh	1.020	.3	.5
Lr El Mirage Wsh	1.014	.1	.3
Lr El Mirage Wsh	0.978	.1	.3
Lr El Mirage Wsh	0.940	.1	.3
Lr El Mirage Wsh	0.892	.1	.3
Lr El Mirage Wsh	0.848	.1	.3
Lr El Mirage Wsh	0.785	.1	.3
Lr El Mirage Wsh	0.758	.1	.3
Lr El Mirage Wsh	0.726	.1	.3
Lr El Mirage Wsh	0.680	.1	.3
Lr El Mirage Wsh	0.646	.3	.5
Lr El Mirage Wsh	0.638	.3	.5
Lr El Mirage Wsh	0.634	Culvert	
Lr El Mirage Wsh	0.629	.3	.5
Lr El Mirage Wsh	0.610	.1	.3
Lr El Mirage Wsh	0.583	.1	.3
Lr El Mirage Wsh	0.533	.1	.3
Lr El Mirage Wsh	0.500	.3	.5
Lr El Mirage Wsh	0.493	.3	.5
Lr El Mirage Wsh	0.492	Bridge	
Lr El Mirage Wsh	0.491	.3	.5
Lr El Mirage Wsh	0.486	.1	.3
Lr El Mirage Wsh	0.431	.1	.3
Lr El Mirage Wsh	0.378	.1	.3
Lr El Mirage Wsh	0.345	.1	.3
Lr El Mirage Wsh	0.344	Inl Struct	
Lr El Mirage Wsh	0.316	.1	.3
Lr El Mirage Wsh	0.294	.1	.3
Lr El Mirage Wsh	0.265	.1	.3
Lr El Mirage Wsh	0.219	.1	.3

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : LEMWB_Post Proj

```
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.514     Profile: PF 1
     Note:   Manning's n values were composited to a single value in the main channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.514     Profile: PF 2
     Note:   Manning's n values were composited to a single value in the main channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.449     Profile: PF 1
     Note:   Manning's n values were composited to a single value in the main channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.449     Profile: PF 2
     Note:   Manning's n values were composited to a single value in the main channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.406     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
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     Note:   Manning's n values were composited to a single value in the main channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.406     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.390     Profile: PF 1
     Warning:When the Manning's n value for the channel was composited, the computed n value was larger [smaller] than the largest
             [smallest] user entered n value.  The n value has been set to the largest [smallest] entered value.  The user may
             wish to examine this cross section and enter a single n value for the entire channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.390     Profile: PF 2
     Warning:When the Manning's n value for the channel was composited, the computed n value was larger [smaller] than the largest
             [smallest] user entered n value.  The n value has been set to the largest [smallest] entered value.  The user may
             wish to examine this cross section and enter a single n value for the entire channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.379     Profile: PF 1     Culv: Culvert #1
     Note:   The normal depth exceeds the height of the culvert.  The program assumes that the normal depth is equal to the height
             of the culvert.
     Note:   Culvert critical depth exceeds the height of the culvert.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.379     Profile: PF 2     Culv: Culvert #1
     Note:   The normal depth exceeds the height of the culvert.  The program assumes that the normal depth is equal to the height
             of the culvert.
     Note:   Culvert critical depth exceeds the height of the culvert.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.371     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.371     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.365     Profile: PF 1
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.365     Profile: PF 2
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.360     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.360     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.348     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.348     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.329     Profile: PF 1
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.329     Profile: PF 2
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.312     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:When the Manning's n value for the channel was composited, the computed n value was larger [smaller] than the largest
             [smallest] user entered n value.  The n value has been set to the largest [smallest] entered value.  The user may
             wish to examine this cross section and enter a single n value for the entire channel.
     Note:   Manning's n values were composited to a single value in the main channel.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.312     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:When the Manning's n value for the channel was composited, the computed n value was larger [smaller] than the largest
             [smallest] user entered n value.  The n value has been set to the largest [smallest] entered value.  The user may
             wish to examine this cross section and enter a single n value for the entire channel.
     Note:   Manning's n values were composited to a single value in the main channel.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.242     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.242     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.200     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.200     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.069     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.069     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.030     Profile: PF 1     Culv: Culvert #1
     Note:   The normal depth exceeds the height of the culvert.  The program assumes that the normal depth is equal to the height
             of the culvert.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.030     Profile: PF 2     Culv: Culvert #1
     Note:   The normal depth exceeds the height of the culvert.  The program assumes that the normal depth is equal to the height
             of the culvert.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.020     Profile: PF 1
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.020     Profile: PF 2
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.014     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
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River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 1.014     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.892     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.892     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.848     Profile: PF 1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.848     Profile: PF 2
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.785     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.785     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.758     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.758     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.726     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.680     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.680     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.646     Profile: PF 1
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.646     Profile: PF 2
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.638     Profile: PF 1
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.638     Profile: PF 2
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.634     Profile: PF 1     Culv: Culvert #1
     Warning:During subcritical analysis, with the exit loss set =1.0, the projected WSEL in culvert has a lower energy than the
             downstream energy.  Most likely, the downstream cross section blocks part of the culvert or the ineffective area is
             set too far in.  Instead of projecting the WSEL, the program did an energy balance to get the WSEL inside the culvert
             at the downstream end.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.634     Profile: PF 2     Culv: Culvert #1
     Warning:During subcritical analysis, with the exit loss set =1.0, the projected WSEL in culvert has a lower energy than the
             downstream energy.  Most likely, the downstream cross section blocks part of the culvert or the ineffective area is
             set too far in.  Instead of projecting the WSEL, the program did an energy balance to get the WSEL inside the culvert
             at the downstream end.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.629     Profile: PF 1
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.629     Profile: PF 2
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.610     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.610     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.583     Profile: PF 1
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.583     Profile: PF 2
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.533     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.533     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.500     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.500     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.493     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.493     Profile: PF 2
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     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.492     Profile: PF 1 Upstream
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.492     Profile: PF 1 Downstream
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.492     Profile: PF 2 Upstream
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.492     Profile: PF 2 Downstream
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.491     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.491     Profile: PF 2
     Warning:Divided flow computed for this cross-section.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.486     Profile: PF 1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.486     Profile: PF 2
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.431     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.378     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.378     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.345     Profile: PF 2
     Warning:The encroachment was ignored because the encroachment was coded either outside of the cross section or inside of the
             channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.344     Profile: PF 2
     Warning:The encroachment was ignored because the encroachment was coded either outside of the cross section or inside of the
             channel.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.316     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.316     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.294     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.294     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.265     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.265     Profile: PF 2
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.219     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: Lr El Mirage Wsh  Reach: Lr El Mirage Wsh     RS: 0.219     Profile: PF 2
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Warning:Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

HEC-RAS Plan: LEMWB_Post Proj River: Lr El Mirage Wsh Reach: Lr El Mirage Wsh

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lr El Mirage Wsh	1.514	PF 1	480.00	1109.98	1116.76		1116.77	0.000058	0.89	536.50	106.03	0.07
Lr El Mirage Wsh	1.514	PF 2	480.00	1109.98	1116.76		1116.77	0.000058	0.89	536.50	106.03	0.07
Lr El Mirage Wsh	1.449	PF 1	480.00	1109.01	1116.75		1116.76	0.000035	0.73	653.89	115.66	0.05
Lr El Mirage Wsh	1.449	PF 2	480.00	1109.01	1116.75		1116.76	0.000035	0.73	653.89	115.66	0.05
Lr El Mirage Wsh	1.406	PF 1	480.00	1108.76	1116.74		1116.75	0.000025	0.66	731.37	160.69	0.05
Lr El Mirage Wsh	1.406	PF 2	480.00	1108.76	1116.74		1116.75	0.000025	0.66	731.37	119.91	0.05
Lr El Mirage Wsh	1.390	PF 1	470.00	1106.86	1116.66	1111.69	1116.73	0.000935	2.04	230.42	113.16	0.25
Lr El Mirage Wsh	1.390	PF 2	470.00	1106.86	1116.66	1111.69	1116.73	0.000935	2.04	230.42	113.16	0.25
Lr El Mirage Wsh	1.379		Culvert									
Lr El Mirage Wsh	1.371	PF 1	470.00	1106.71	1111.81		1112.41	0.011448	6.20	75.82	38.78	0.68
Lr El Mirage Wsh	1.371	PF 2	470.00	1106.71	1111.81		1112.41	0.011448	6.20	75.82	38.78	0.68
Lr El Mirage Wsh	1.365	PF 1	470.00	1106.82	1111.95	1109.76	1112.06	0.001746	2.70	175.38	131.81	0.29
Lr El Mirage Wsh	1.365	PF 2	470.00	1106.82	1111.95	1109.76	1112.06	0.001746	2.70	175.38	131.81	0.29
Lr El Mirage Wsh	1.360	PF 1	470.00	1106.75	1111.94	1109.65	1112.01	0.001053	2.21	223.43	150.60	0.22
Lr El Mirage Wsh	1.360	PF 2	470.00	1106.75	1111.94	1109.65	1112.01	0.001053	2.21	223.43	150.60	0.22
Lr El Mirage Wsh	1.348	PF 1	470.00	1108.66	1111.73	1110.73	1111.88	0.003790	3.20	146.95	160.37	0.40
Lr El Mirage Wsh	1.348	PF 2	470.00	1108.66	1111.73	1110.74	1111.88	0.003790	3.20	146.95	160.37	0.40
Lr El Mirage Wsh	1.329	PF 1	470.00	1107.91	1111.72	1109.23	1111.75	0.000434	1.48	316.73	230.34	0.15
Lr El Mirage Wsh	1.329	PF 2	470.00	1107.91	1111.72	1109.23	1111.75	0.000434	1.48	316.73	230.34	0.15
Lr El Mirage Wsh	1.312	PF 1	470.00	1107.77	1111.70	1109.38	1111.71	0.000279	1.05	446.14	279.31	0.11
Lr El Mirage Wsh	1.312	PF 2	470.00	1107.77	1111.70	1109.36	1111.71	0.000279	1.05	446.14	279.31	0.11
Lr El Mirage Wsh	1.242	PF 1	470.00	1107.22	1111.65	1108.96	1111.66	0.000094	0.63	749.49	272.27	0.07
Lr El Mirage Wsh	1.242	PF 2	470.00	1107.22	1111.65	1108.97	1111.66	0.000094	0.63	749.49	272.27	0.07
Lr El Mirage Wsh	1.200	PF 1	470.00	1106.82	1111.64	1108.24	1111.64	0.000040	0.48	987.23	684.75	0.05
Lr El Mirage Wsh	1.200	PF 2	470.00	1106.82	1111.64	1108.24	1111.64	0.000040	0.48	987.23	684.75	0.05
Lr El Mirage Wsh	1.115	PF 1	470.00	1106.08	1111.59		1111.60	0.000237	0.99	476.76	158.22	0.10
Lr El Mirage Wsh	1.115	PF 2	470.00	1106.08	1111.59		1111.60	0.000237	0.99	476.76	158.22	0.10

HEC-RAS Plan: LEMWB_Post Proj River: Lr El Mirage Wsh Reach: Lr El Mirage Wsh (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lr El Mirage Wsh	1.069	PF 1	470.00	1105.71	1111.53		1111.55	0.000244	1.06	441.97	139.91	0.11
Lr El Mirage Wsh	1.069	PF 2	470.00	1105.71	1111.53		1111.55	0.000244	1.06	441.97	139.91	0.11
Lr El Mirage Wsh	1.047	PF 1	160.00	1105.54	1111.37	1107.60	1111.48	0.001230	2.64	60.52	46.18	0.20
Lr El Mirage Wsh	1.047	PF 2	160.00	1105.54	1111.37	1107.60	1111.48	0.001230	2.64	60.52	46.18	0.20
Lr El Mirage Wsh	1.030		Culvert									
Lr El Mirage Wsh	1.020	PF 1	160.00	1105.40	1107.74	1107.60	1108.66	0.028661	7.69	20.79	9.43	0.91
Lr El Mirage Wsh	1.020	PF 2	160.00	1105.40	1107.74	1107.60	1108.66	0.028661	7.69	20.79	9.43	0.91
Lr El Mirage Wsh	1.014	PF 1	160.00	1105.43	1107.62		1107.92	0.007901	4.33	36.91	23.02	0.60
Lr El Mirage Wsh	1.014	PF 2	160.00	1105.43	1107.62		1107.92	0.007901	4.33	36.91	23.02	0.60
Lr El Mirage Wsh	0.978	PF 1	160.00	1105.23	1107.32		1107.40	0.001106	2.30	69.63	41.75	0.31
Lr El Mirage Wsh	0.978	PF 2	160.00	1105.23	1107.32		1107.40	0.001106	2.30	69.62	41.75	0.31
Lr El Mirage Wsh	0.940	PF 1	160.00	1105.03	1107.09		1107.17	0.001159	2.34	68.48	41.49	0.32
Lr El Mirage Wsh	0.940	PF 2	160.00	1105.03	1107.09		1107.17	0.001161	2.34	68.45	41.48	0.32
Lr El Mirage Wsh	0.892	PF 1	160.00	1104.78	1106.76	1105.80	1106.85	0.001428	2.36	67.78	47.40	0.35
Lr El Mirage Wsh	0.892	PF 2	160.00	1104.78	1106.76	1105.80	1106.85	0.001431	2.36	67.72	47.38	0.35
Lr El Mirage Wsh	0.848	PF 1	160.00	1104.55	1105.53	1105.53	1105.92	0.033062	5.03	31.78	41.18	1.01
Lr El Mirage Wsh	0.848	PF 2	160.00	1104.55	1105.53	1105.53	1105.92	0.032639	5.01	31.91	41.20	1.00
Lr El Mirage Wsh	0.785	PF 1	160.00	1100.87	1105.20		1105.20	0.000097	0.67	260.24	130.69	0.07
Lr El Mirage Wsh	0.785	PF 2	160.00	1100.87	1105.27		1105.27	0.000108	0.70	227.26	74.49	0.07
Lr El Mirage Wsh	0.758	PF 1	160.00	1103.55	1105.11	1104.55	1105.16	0.003556	1.80	88.94	101.81	0.34
Lr El Mirage Wsh	0.758	PF 2	160.00	1103.55	1105.18	1104.55	1105.23	0.002813	1.65	96.85	105.63	0.30
Lr El Mirage Wsh	0.726	PF 1	160.00	1101.66	1105.11		1105.11	0.000062	0.54	332.13	187.49	0.05
Lr El Mirage Wsh	0.726	PF 2	160.00	1101.66	1105.16		1105.17	0.000104	0.69	231.45	75.17	0.07
Lr El Mirage Wsh	0.680	PF 1	160.00	1101.72	1105.09		1105.10	0.000061	0.55	348.71	281.10	0.05
Lr El Mirage Wsh	0.680	PF 2	160.00	1101.72	1105.12		1105.13	0.000174	0.89	179.91	57.09	0.09
Lr El Mirage Wsh	0.646	PF 1	160.00	1102.00	1104.99	1103.34	1105.06	0.001396	2.12	75.92	79.35	0.24
Lr El Mirage Wsh	0.646	PF 2	160.00	1102.00	1104.99	1103.35	1105.06	0.001418	2.12	75.46	32.40	0.24

HEC-RAS Plan: LEMWB_Post Proj River: Lr El Mirage Wsh Reach: Lr El Mirage Wsh (Continued)

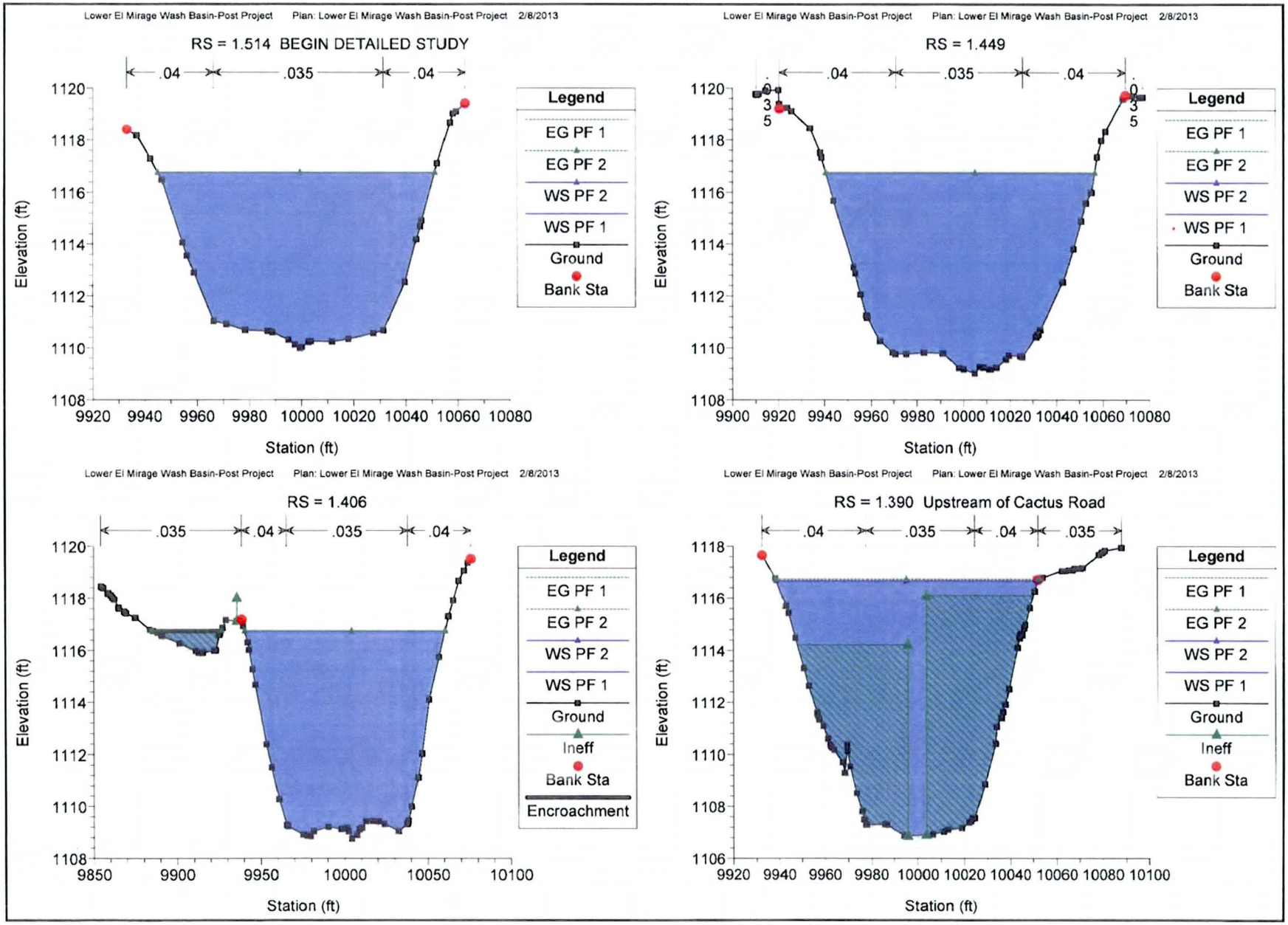
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lr El Mirage Wsh	0.638	PF 1	160.00	1102.24	1104.94	1103.52	1105.00	0.001403	1.96	81.76	39.78	0.24
Lr El Mirage Wsh	0.638	PF 2	160.00	1102.24	1104.94	1103.52	1105.00	0.001403	1.96	81.76	39.78	0.24
Lr El Mirage Wsh	0.634		Culvert									
Lr El Mirage Wsh	0.629	PF 1	160.00	1102.04	1104.94	1103.29	1104.99	0.001031	1.79	89.47	39.30	0.21
Lr El Mirage Wsh	0.629	PF 2	160.00	1102.04	1104.94	1103.28	1104.99	0.001031	1.79	89.47	39.30	0.21
Lr El Mirage Wsh	0.610	PF 1	160.00	1102.04	1104.81		1104.86	0.001534	1.79	89.20	54.17	0.25
Lr El Mirage Wsh	0.610	PF 2	160.00	1102.04	1104.81		1104.86	0.001534	1.79	89.20	54.17	0.25
Lr El Mirage Wsh	0.583	PF 1	160.00	1102.26	1104.40		1104.51	0.004171	2.70	59.32	41.33	0.40
Lr El Mirage Wsh	0.583	PF 2	160.00	1102.26	1104.40		1104.51	0.004171	2.70	59.32	41.33	0.40
Lr El Mirage Wsh	0.533	PF 1	160.00	1101.08	1103.20		1103.32	0.004940	2.76	58.07	44.58	0.43
Lr El Mirage Wsh	0.533	PF 2	160.00	1101.08	1103.20		1103.32	0.004937	2.75	58.08	44.59	0.43
Lr El Mirage Wsh	0.500	PF 1	160.00	1099.34	1102.99	1100.97	1103.02	0.000751	1.34	119.58	65.19	0.17
Lr El Mirage Wsh	0.500	PF 2	160.00	1099.34	1102.99	1100.97	1103.02	0.000751	1.34	119.58	65.19	0.17
Lr El Mirage Wsh	0.493	PF 1	160.00	1099.67	1102.91	1101.82	1102.97	0.002154	1.97	81.02	76.62	0.28
Lr El Mirage Wsh	0.493	PF 2	160.00	1099.67	1102.91	1101.82	1102.97	0.002154	1.97	81.02	76.62	0.28
Lr El Mirage Wsh	0.492		Bridge									
Lr El Mirage Wsh	0.491	PF 1	160.00	1099.60	1101.92	1101.44	1102.14	0.009647	3.74	42.79	36.25	0.59
Lr El Mirage Wsh	0.491	PF 2	160.00	1099.60	1101.92	1101.44	1102.14	0.009642	3.74	42.79	36.34	0.59
Lr El Mirage Wsh	0.486	PF 1	160.00	1099.64	1101.13	1101.13	1101.63	0.030886	5.69	28.10	28.57	1.01
Lr El Mirage Wsh	0.486	PF 2	160.00	1099.64	1101.13	1101.13	1101.63	0.030886	5.69	28.10	28.57	1.01
Lr El Mirage Wsh	0.431	PF 1	290.00	1092.94	1098.04		1098.12	0.002712	2.30	126.30	146.24	0.32
Lr El Mirage Wsh	0.431	PF 2	290.00	1092.94	1098.37		1098.43	0.001624	1.88	153.97	88.69	0.25
Lr El Mirage Wsh	0.378	PF 1	290.00	1092.94	1097.92	1096.47	1097.93	0.000245	0.79	352.40	230.48	0.10
Lr El Mirage Wsh	0.378	PF 2	290.00	1092.94	1098.04	1096.70	1098.08	0.000950	1.58	183.66	90.74	0.20
Lr El Mirage Wsh	0.345	PF 1	290.00	1095.49	1097.75	1096.99	1097.82	0.002821	2.04	142.41	112.74	0.32
Lr El Mirage Wsh	0.345	PF 2	290.00	1095.49	1097.75	1096.99	1097.82	0.002826	2.04	142.33	112.73	0.32
Lr El Mirage Wsh	0.344		Inl Struct									

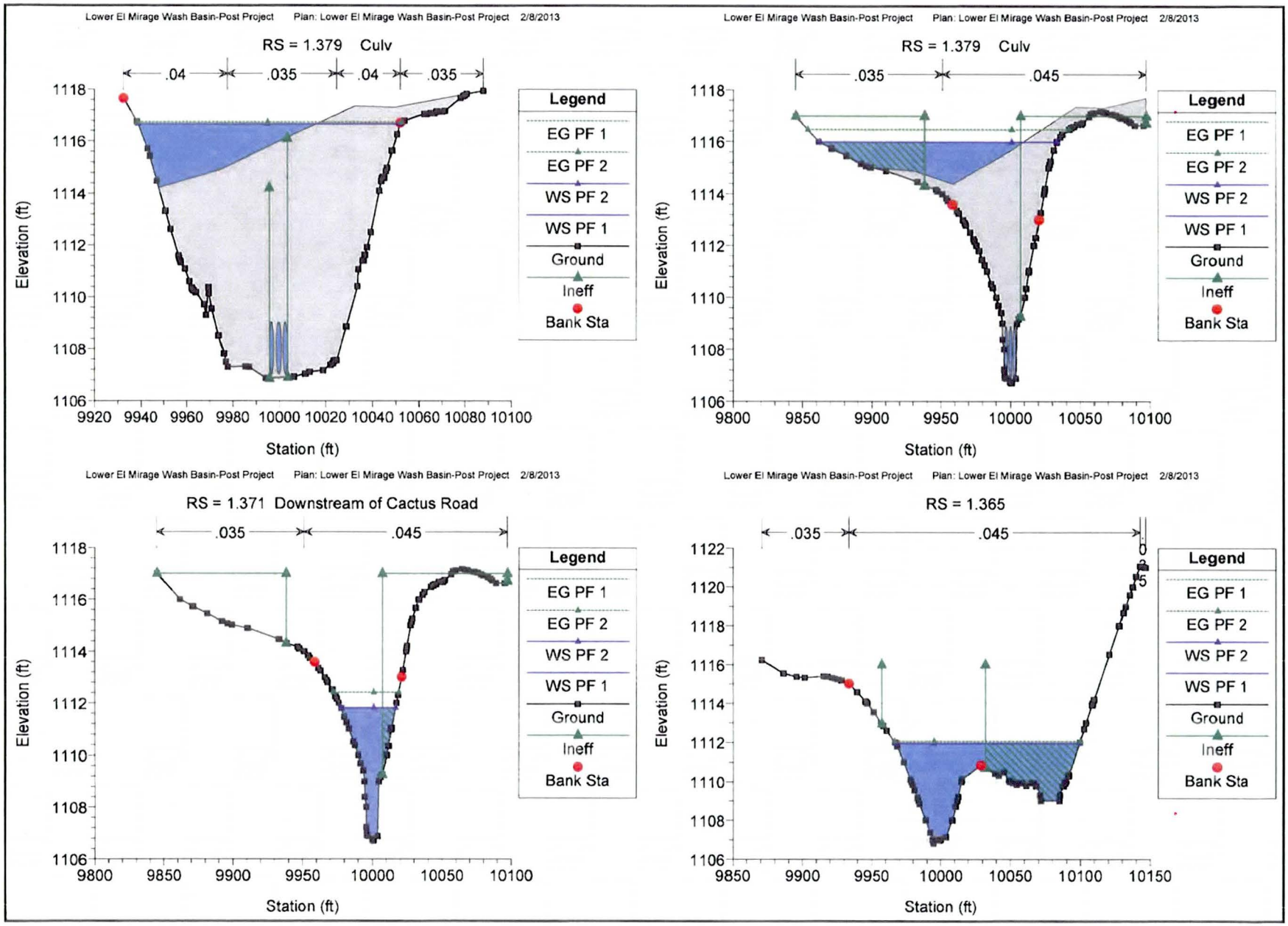
HEC-RAS Plan: LEMWB_Post Proj River: Lr El Mirage Wsh Reach: Lr El Mirage Wsh (Continued)

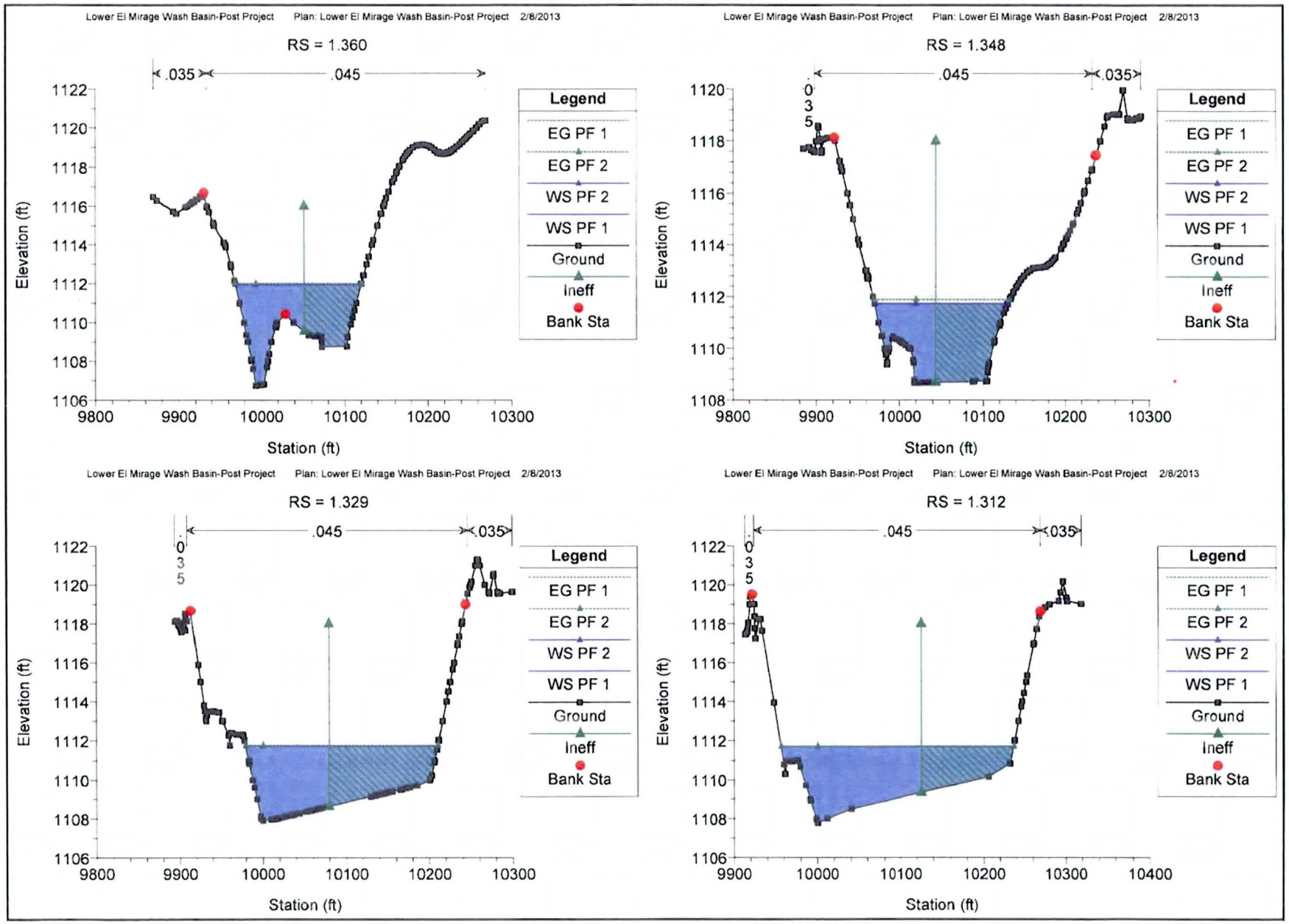
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lr El Mirage Wsh	0.316	PF 1	290.00	1092.90	1096.85		1096.87	0.001059	1.17	254.98	276.09	0.19
Lr El Mirage Wsh	0.316	PF 2	290.00	1092.90	1097.45		1097.46	0.000509	1.06	272.97	156.80	0.14
Lr El Mirage Wsh	0.294	PF 1	290.00	1092.90	1096.44	1096.21	1096.55	0.009187	2.49	110.96	170.12	0.52
Lr El Mirage Wsh	0.294	PF 2	290.00	1092.90	1097.32	1096.36	1097.37	0.001547	1.73	167.97	106.27	0.24
Lr El Mirage Wsh	0.265	PF 1	290.00	1094.52	1095.38	1094.68	1095.49	0.003465	1.19	110.30	204.39	0.30
Lr El Mirage Wsh	0.265	PF 2	290.00	1094.52	1096.37	1096.37	1096.66	0.022950	5.12	68.85	104.34	0.86
Lr El Mirage Wsh	0.219	PF 1	290.00	1093.80	1094.77	1094.20	1094.84	0.003001	1.43	142.45	143.18	0.30
Lr El Mirage Wsh	0.219	PF 2	290.00	1093.80	1094.82	1094.24	1094.90	0.003000	1.49	135.44	126.19	0.30

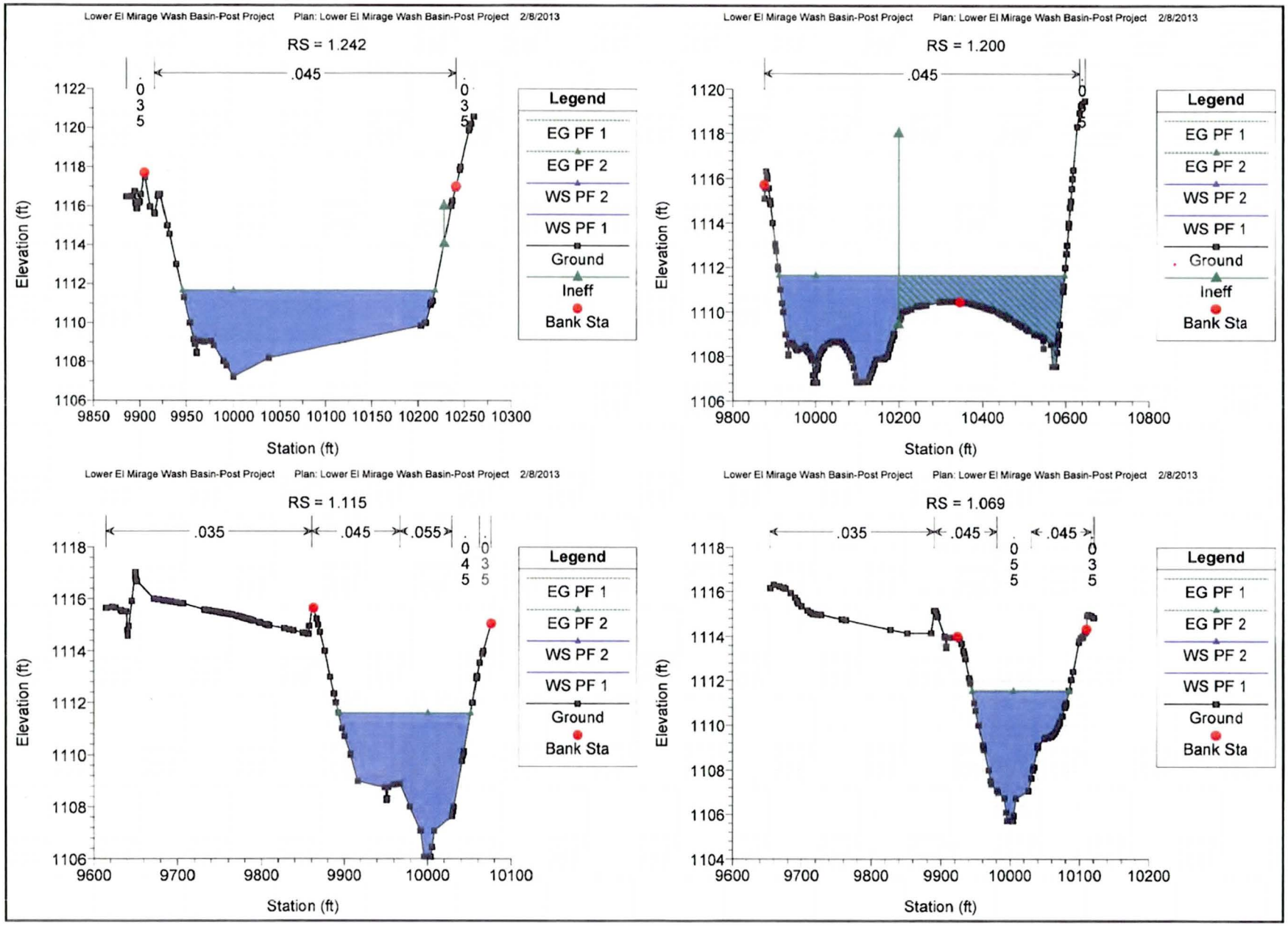
APPENDIX E.5

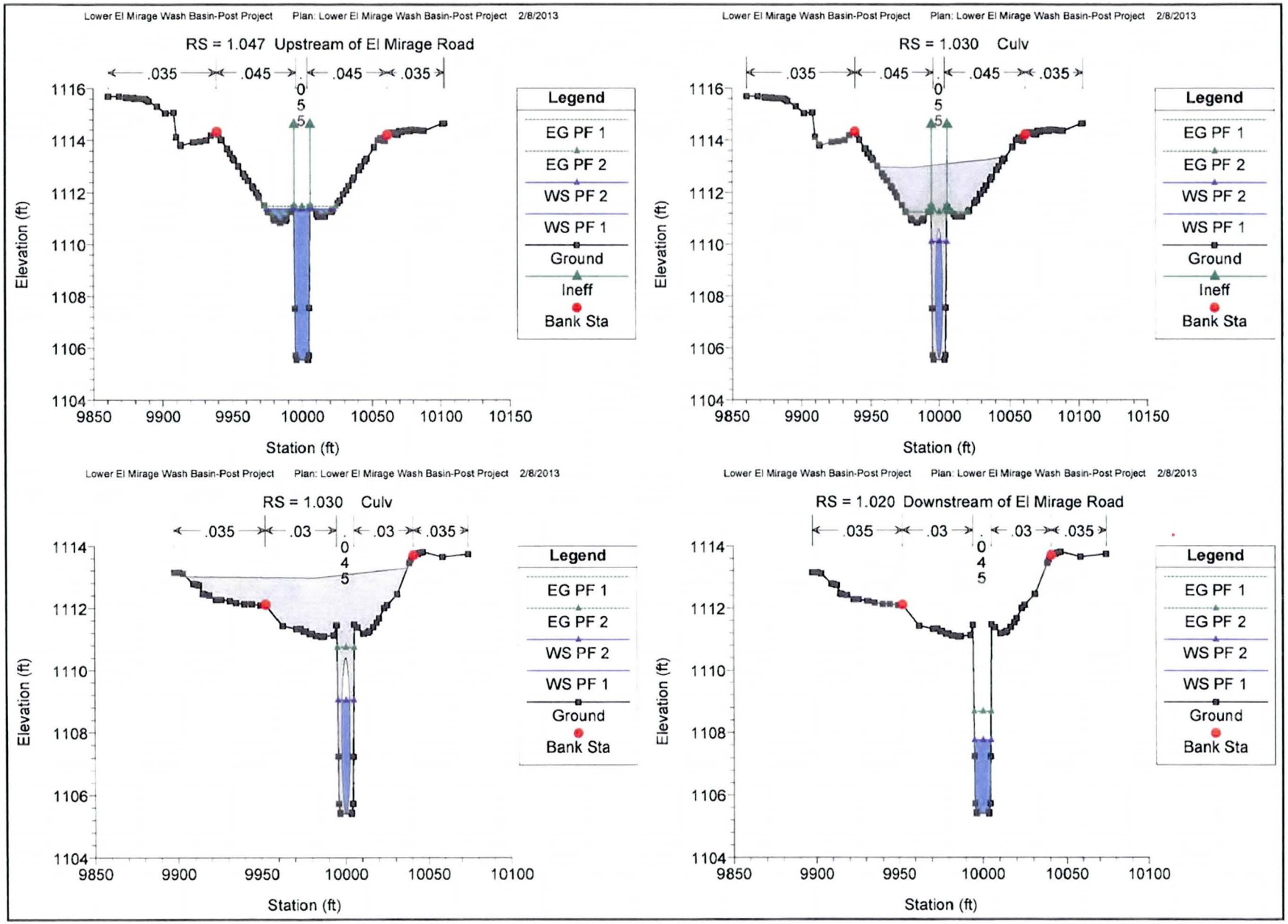
POST-PROJECT CONDITIONS HEC-RAS CROSS SECTION PLOTS

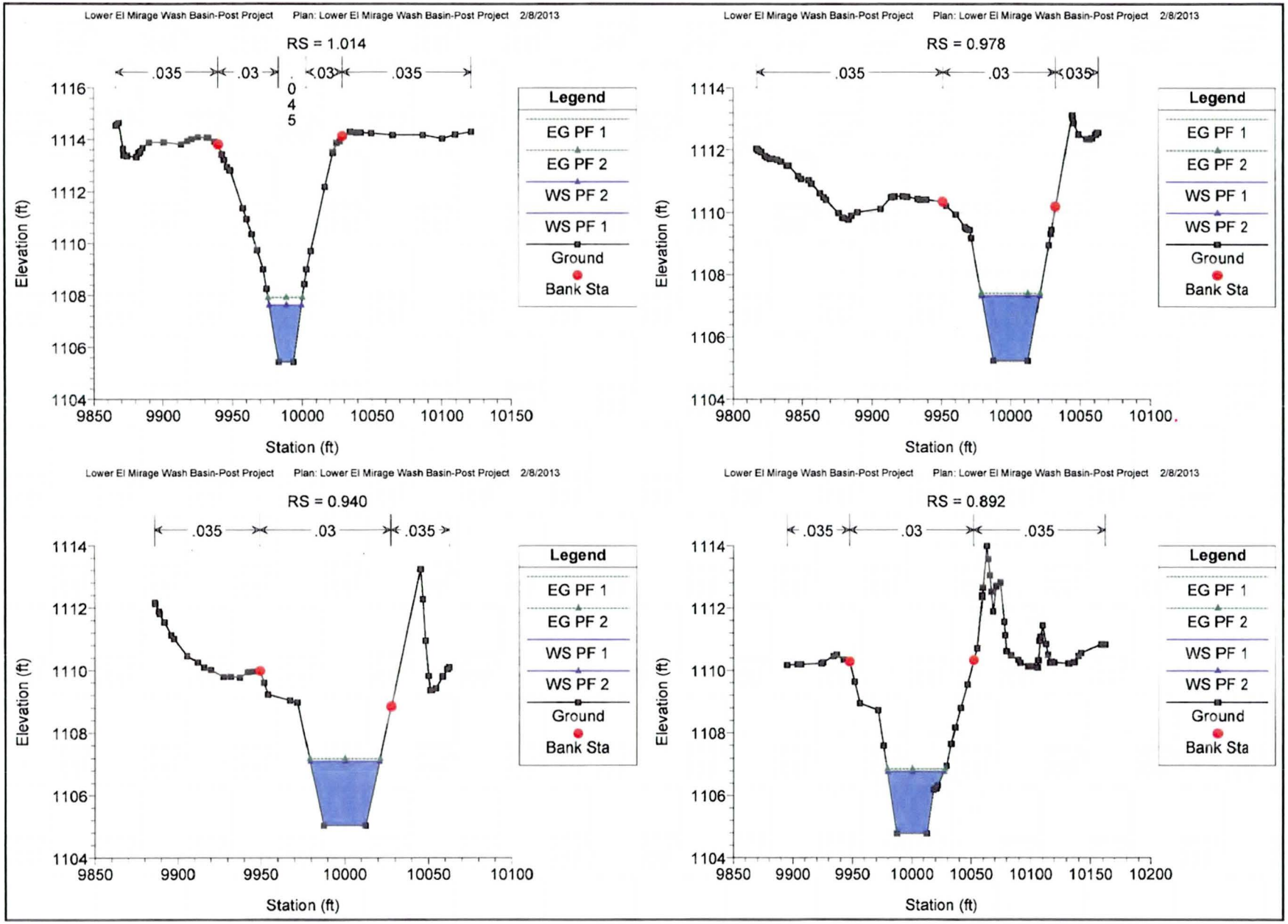

Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 1.514 BEGIN DETAILED STUDY
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 1.449
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 1.406
.035
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta
Encroachment
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 1.390 Upstream of Cactus Road
.04
.035
.04
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta

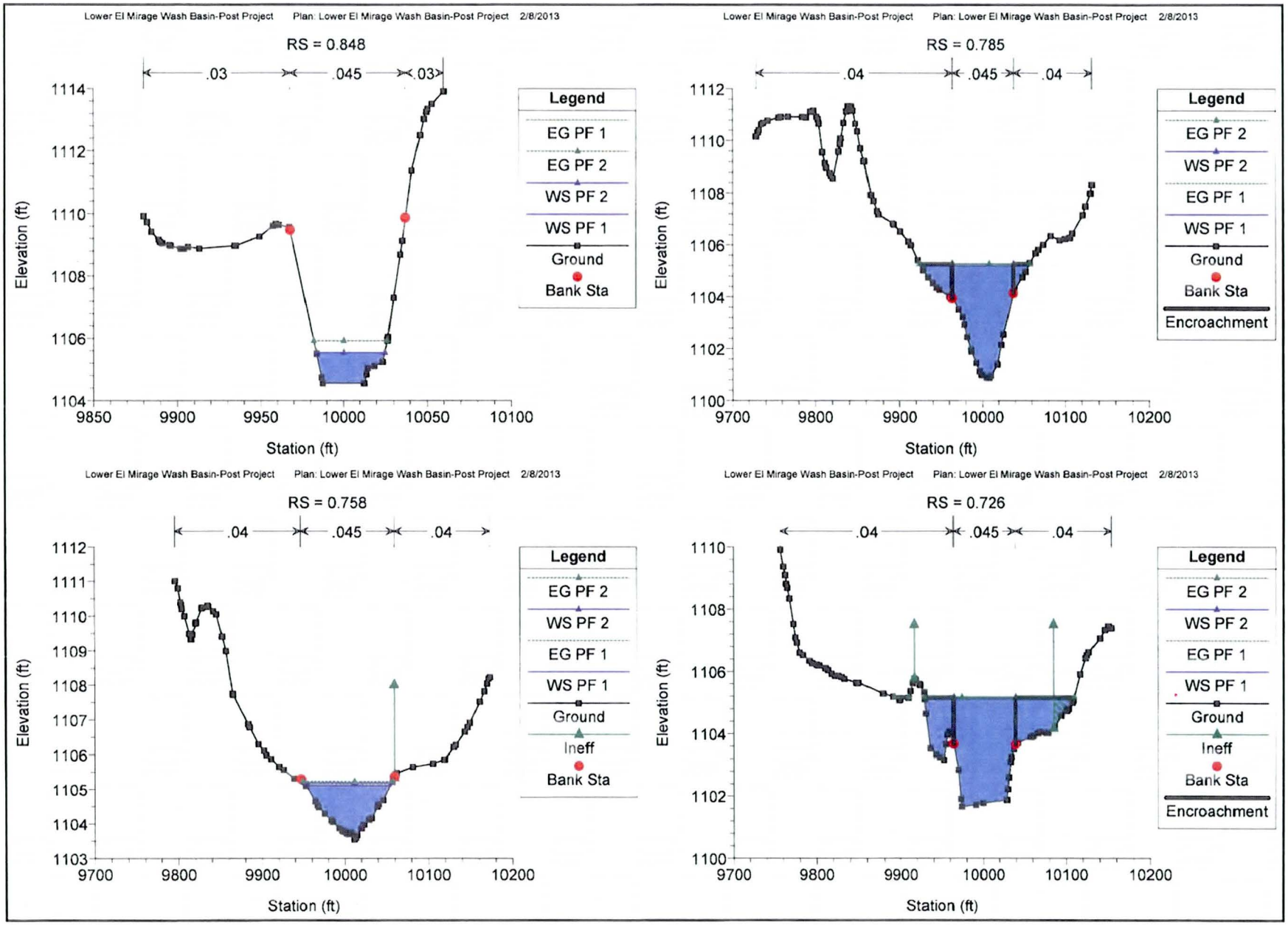

Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 1.379 Culv
.04 .035 .04 .035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 1.379 Culv
.035 .045
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 1.371 Downstream of Cactus Road
.035 .045
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 1.365
.035 .045
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta


Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 1.360
.035
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 1.348
.045
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 1.329
.045
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 1.312
.045
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta


Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 1.242
.045
.035
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 1.200
.045
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 1.115
.035
.045
.055
.045
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 1.069
.035
.045
.055
.045
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta

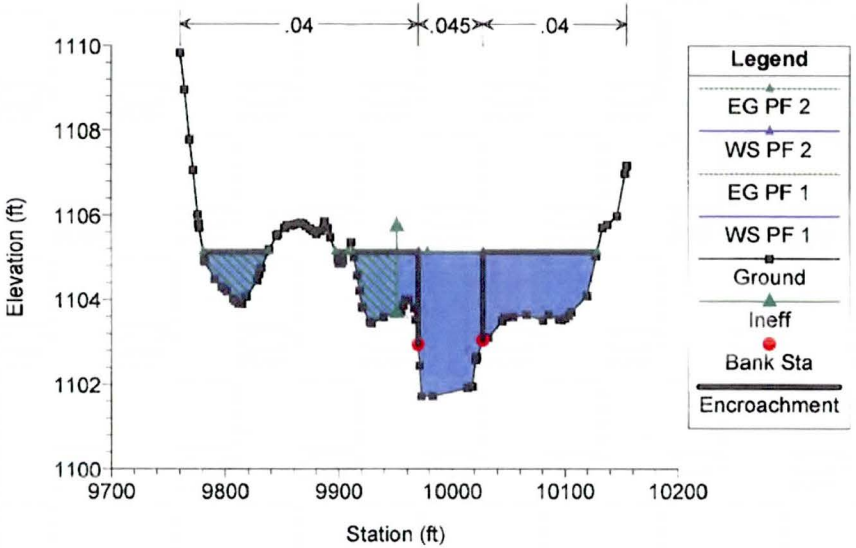

Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 1.047 Upstream of El Mirage Road
.035 .045 .05 .045 .035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 1.030 Culv
.035 .045 .05 .045 .035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 1.030 Culv
.035 .03 .045 .03 .035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 1.020 Downstream of El Mirage Road
.035 .03 .045 .03 .035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta


Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 1.014
.035
.03
.045
.03
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.978
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 1
WS PF 2
Ground
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.940
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 1
WS PF 2
Ground
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.892
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 1
WS PF 2
Ground
Bank Sta


Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.848
.03
.045
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.785
.04
.045
.04
Elevation (ft)
Station (ft)
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.758
.04
.045
.04
Elevation (ft)
Station (ft)
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.726
.04
.045
.04
Elevation (ft)
Station (ft)
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Encroachment

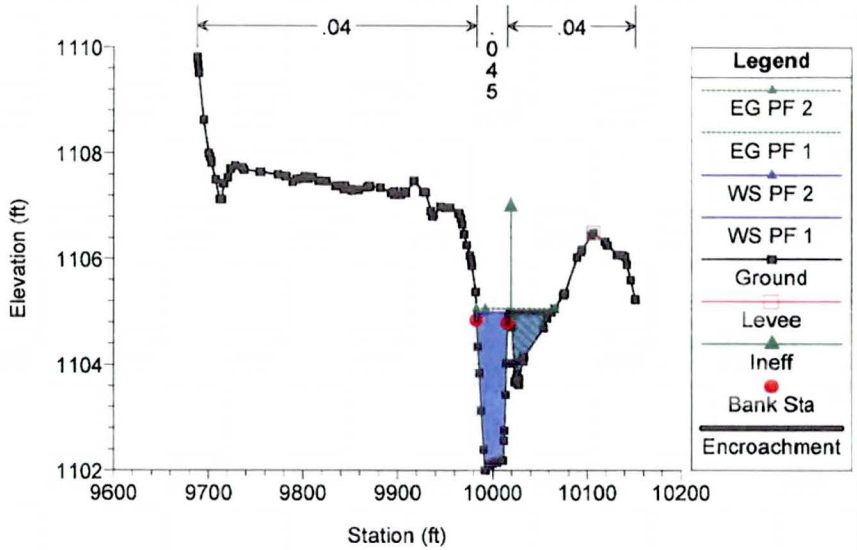
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013

RS = 0.680



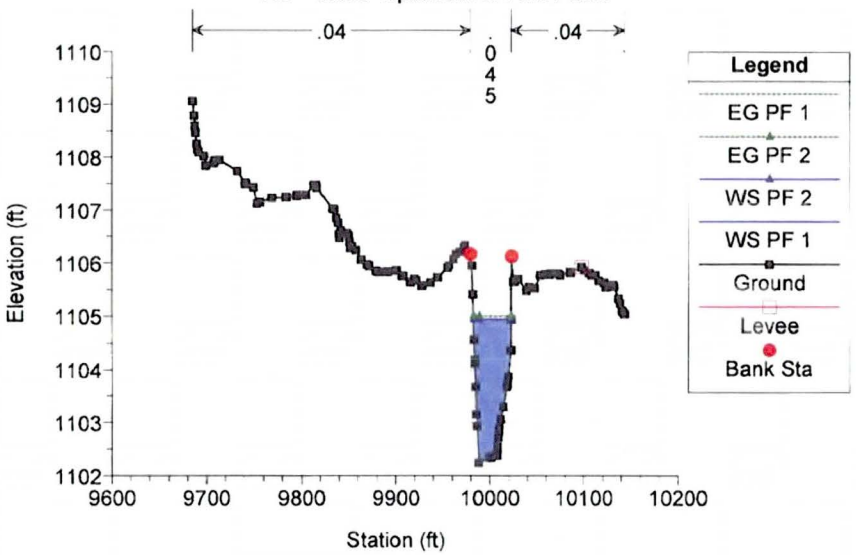
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013

RS = 0.646



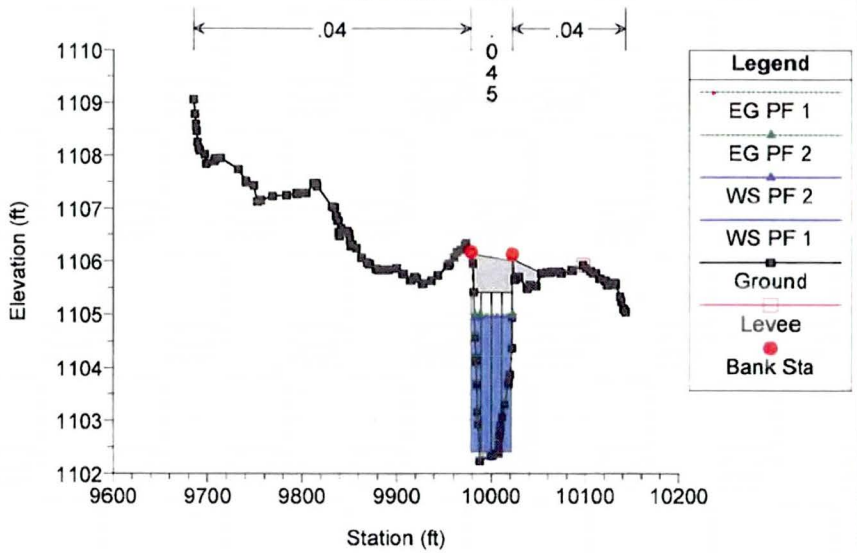
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013

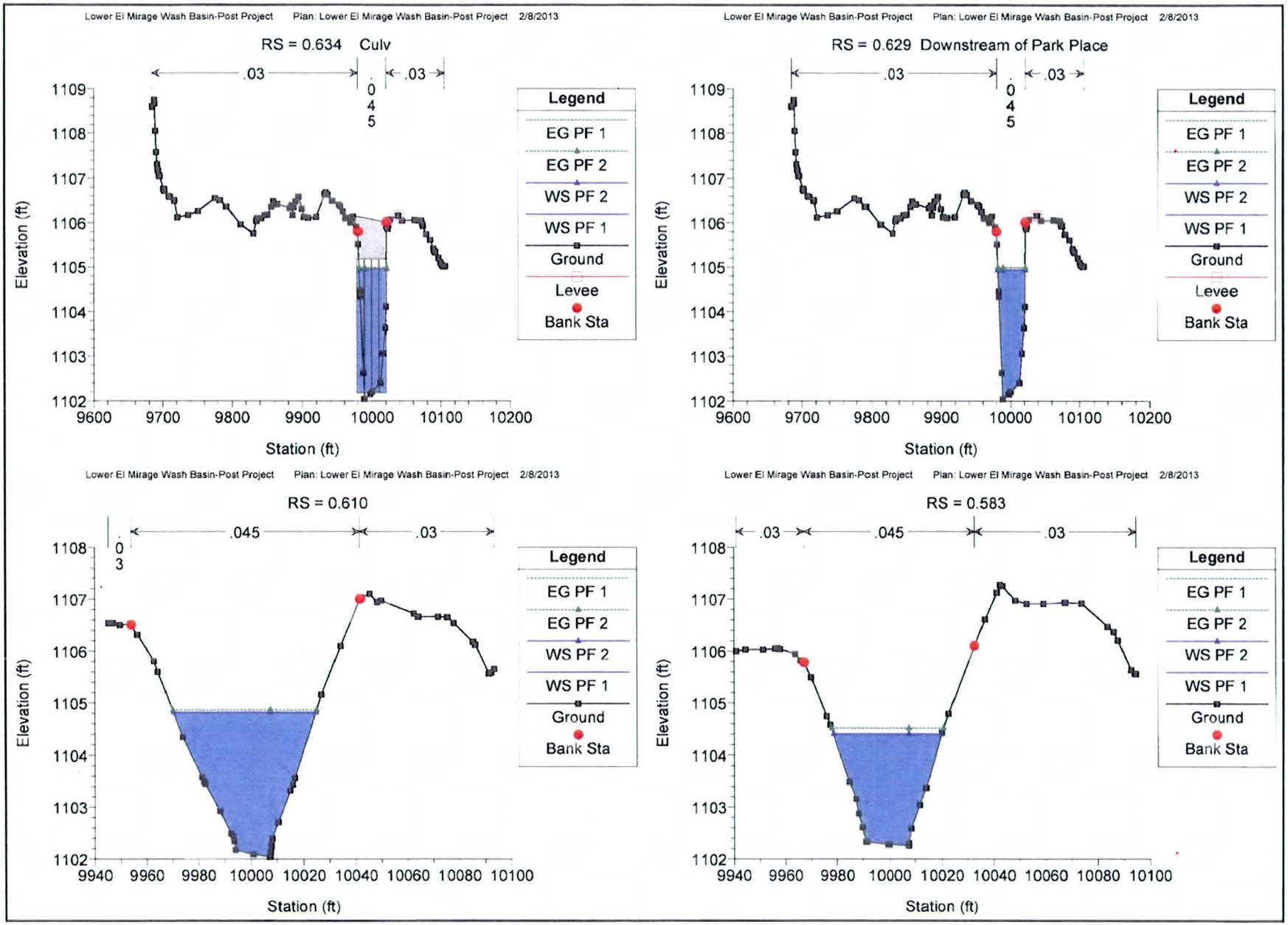
RS = 0.638 Upstream of Park Place

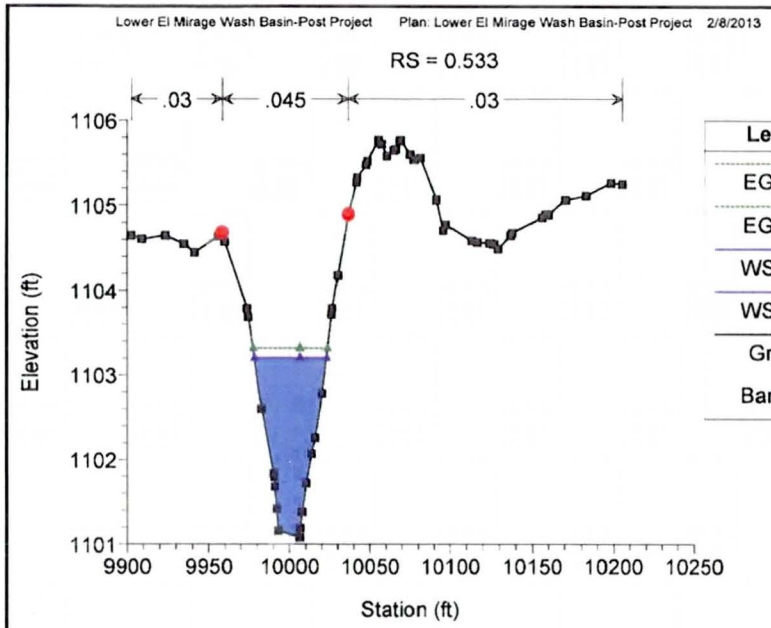


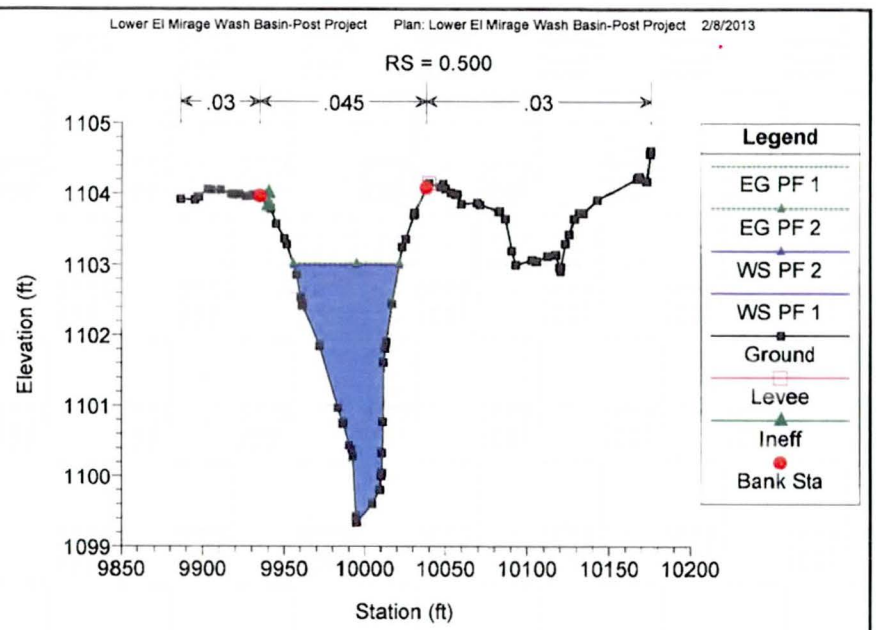
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013

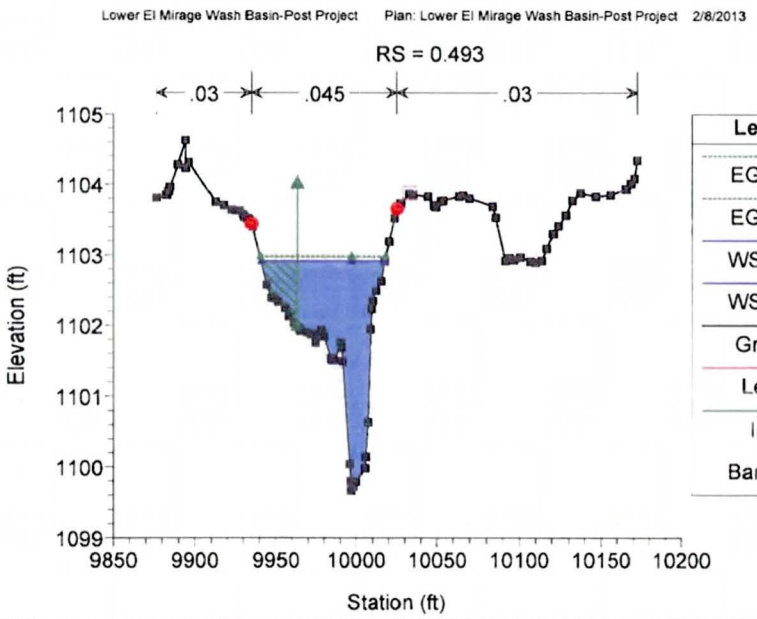
RS = 0.634 Culv

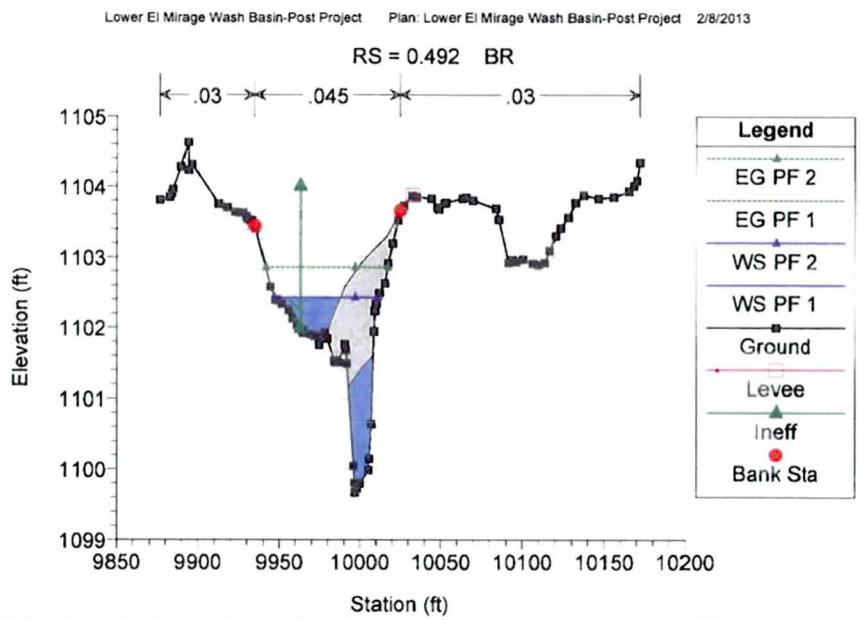


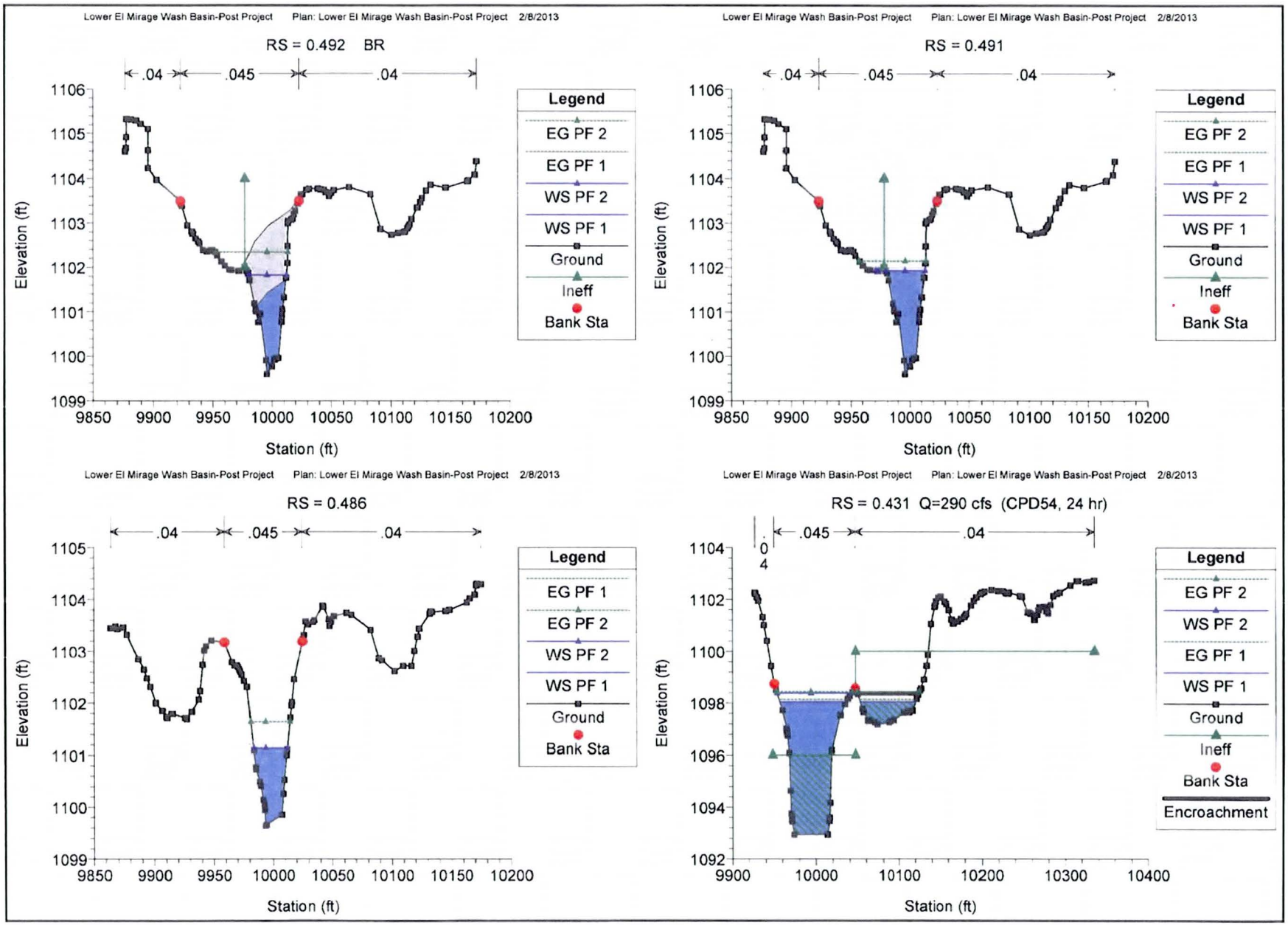

Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.634 Culv
.03
.045
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Levee
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.629 Downstream of Park Place
.03
.045
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Levee
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.610
.03
.045
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.583
.03
.045
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta

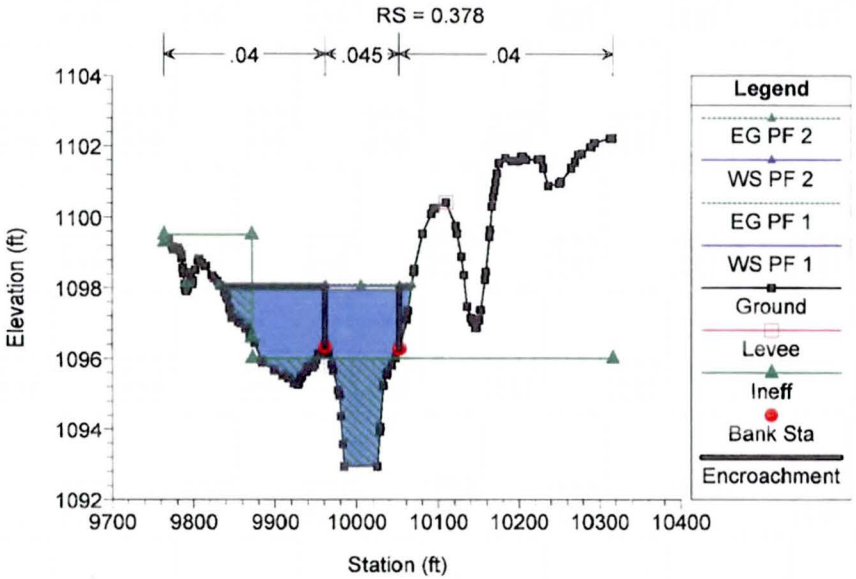

Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.533
.03
.045
.03
Elevation (ft)
Station (ft)
Legend
EG PF 2
EG PF 1
WS PF 2
WS PF 1
Ground
Bank Sta

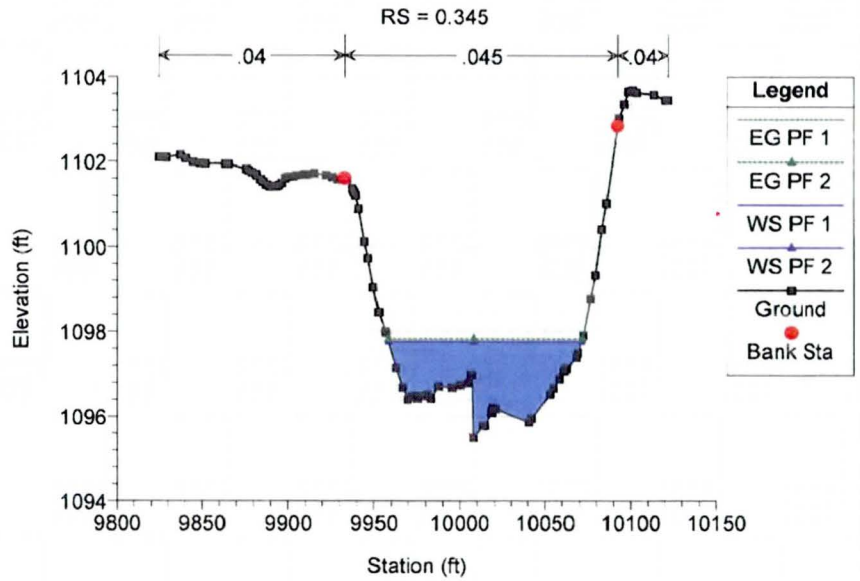

Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.500
.03
.045
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Levee
Ineff
Bank Sta

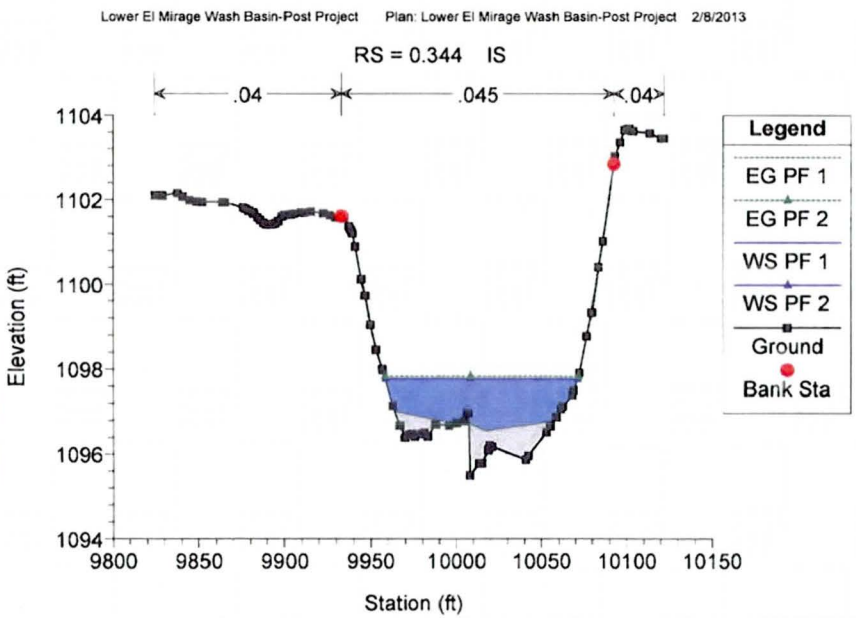

Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.493
.03
.045
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Levee
Ineff
Bank Sta

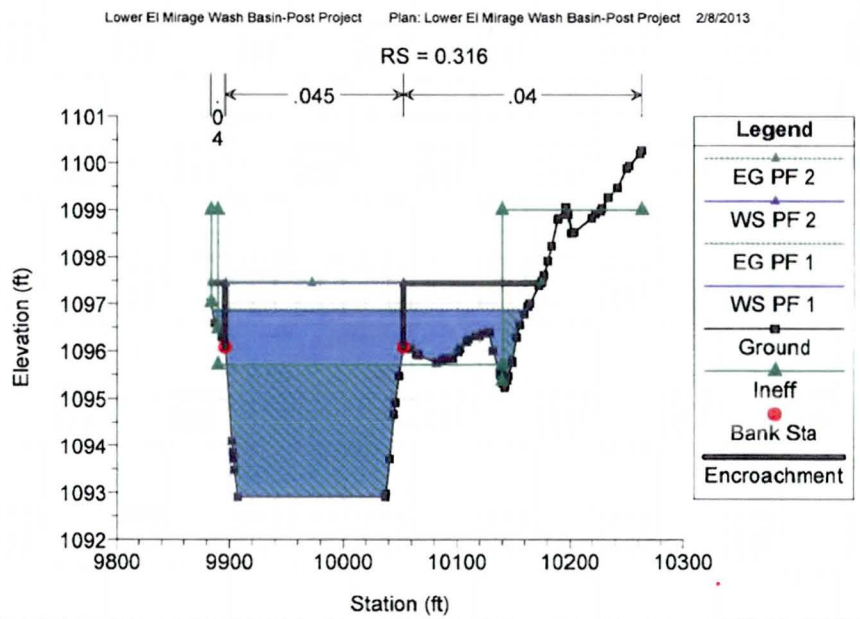

Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.492 BR
.03
.045
.03
Elevation (ft)
Station (ft)
Legend
EG PF 2
EG PF 1
WS PF 2
WS PF 1
Ground
Levee
Ineff
Bank Sta


Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.492 BR
.04 .045 .04
Elevation (ft)
Station (ft)
Legend
EG PF 2
EG PF 1
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.491
.04 .045 .04
Elevation (ft)
Station (ft)
Legend
EG PF 2
EG PF 1
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.486
.04 .045 .04
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.431 Q=290 cfs (CPD54, 24 hr)
.045 .04
Elevation (ft)
Station (ft)
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Encroachment


Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.378
.04
.045
.04
Elevation (ft)
Station (ft)
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Levee
Ineff
Bank Sta
Encroachment


Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.345
.04
.045
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 1
WS PF 2
Ground
Bank Sta


Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.344 IS
.04
.045
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 1
WS PF 2
Ground
Bank Sta


Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.316
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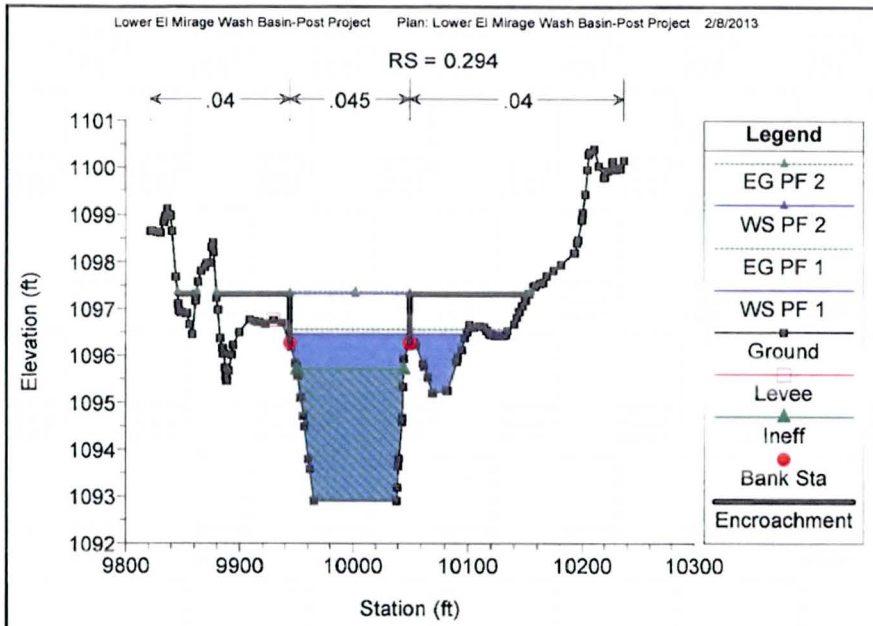
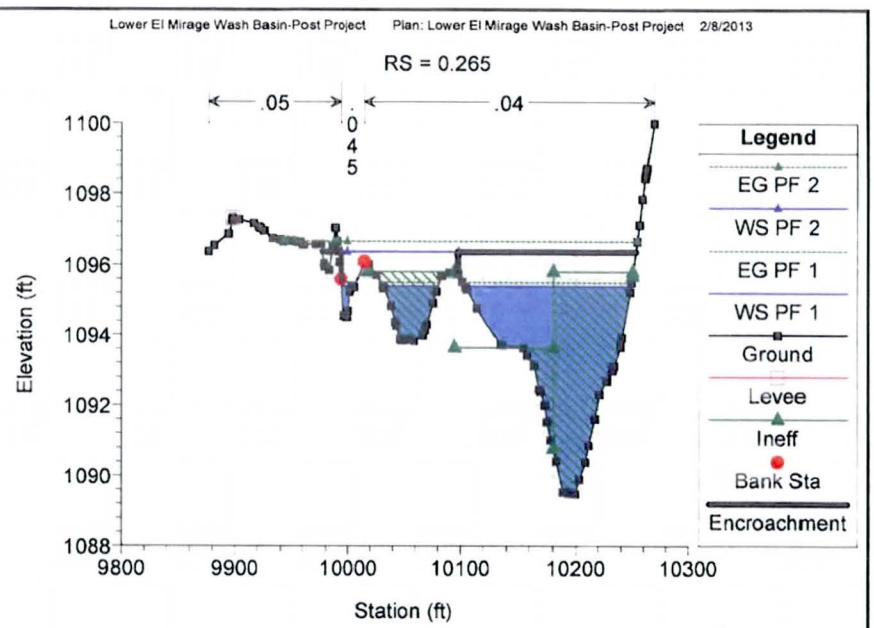
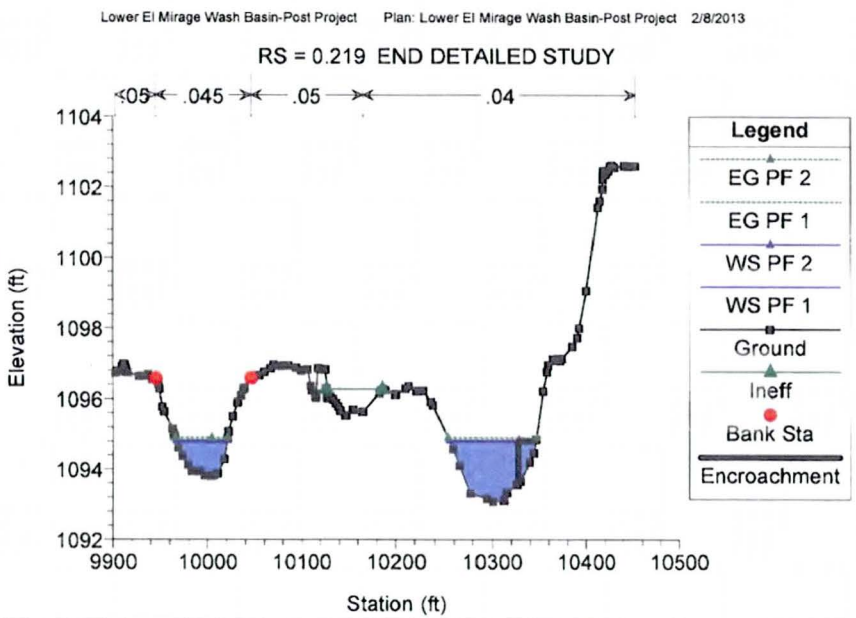
.04
Elevation (ft)
Station (ft)
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Encroachment


Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.294
.04
.045
.04
Elevation (ft)
Station (ft)
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Levee
Ineff
Bank Sta
Encroachment


Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.265
.05
.04
Elevation (ft)
Station (ft)
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Levee
Ineff
Bank Sta
Encroachment


Lower El Mirage Wash Basin-Post Project Plan: Lower El Mirage Wash Basin-Post Project 2/8/2013
RS = 0.219 END DETAILED STUDY
.05
.045
.05
.04
Elevation (ft)
Station (ft)
Legend
EG PF 2
EG PF 1
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta
Encroachment

APPENDIX F

EROSION AND SEDIMENT TRANSPORT ANALYSIS SUPPORTING DOCUMENTATION

Project

Reference	LEMW_SEDIMENT
Title	Loop 303/ White Tanks ADMPU AHA
Location	Maricopa County
Agency	Flood Control District of Maricopa County

Project Defaults

Model	HEC1
Soils Agency	FCDMC
Land Use Agency	FCDMC
Rainfall	NOAA14
Roads Agency	MCDOT

HEC-1 Defaults

Unit Hydrograph	S-Graph
Loss Method	Green-Ampt
Duration	24 Hour
Tabulation Interval	5
No. Ordinates	2000
Output	3

Comments

Section ID	Flow Type	Entire Section Q (cfs)	Slope (f/f)	Man'g N	W.P. (ft)	Hyd Depth (ft)	Area (sq ft)	Max Depth (ft)	Vel (f/s)	Channel Sec Hyd Depth (ft)	Vel (ft/sec)	Froude Num
SEDIMENT YIELD	Design	654	0.003300	0.026	83.52	1.69	140.58	2.15	4.65	1.69	4.65	0.63
	Dominant	113	0.003300	0.026	73.99	0.63	46.63	.96	2.42	0.63	2.42	0.54

Flood Control District of Maricopa County
Drainage Design Management System
RIVER MECHANICS - WASH LOAD
Project Reference: LEMW_SEDIMENT

Sediment Area ID	Area (sq mi)	SDR (%)	Soil and Erosion Factors: Soil Erodibility Factor (K)	Erosion Control Factor (P)	Specific Weight (lb/cu ft)	Land Use Factors: Effects of Canopy Cover (Ci)	Effects of Vegetation (Cii)	Effects of Tillage (Ciii)	Cover Management Factor (C)	Percent Impervious (%)	Topographic Factors: Slope Length (ft)	Slope (%)	Topographic Factor (LS)
ID: SED1			**Specific Weight Method: Channel Bed Material Soil Sample**					**Bed Material Soil Sample D10 (mm): 0.18**					
SED1	9.8700	48.8	0.31	1.0	85.28	0.71	0.86	0.32	0.20	34	100	0.43	0.09

* Non Default Value

Flood Control District of Maricopa County
Drainage Design Management System
RIVER MECHANICS - BED LOAD
Project Reference: LEMW_SEDIMENT

	Slope (ft/ft)	Manning's n	D16 (mm)	D50 (mm)	D84 (mm)		Average Velocity (ft/sec)	Hydraulic Depth (ft)	Normal Depth (ft)	Average Width (ft)	Bed Load per Foot, qs (cfs/ft)	Bed Load (cfs)
ID: SED1	0.003300	0.026	0.330	1.100	4.800	**2 Year:**	0.69	0.11	0.40	18.13	-	-
Cross Section ID: SEDIMENT YIELD						**5 Year:**	1.77	0.38	0.69	39.30	-	0.01
						10 Year:	2.42	0.63	0.96	48.64	-	0.04
						25 Year:	3.23	0.98	1.35	56.41	-	0.16
						50 Year:	3.79	1.23	1.62	60.10	0.01	0.31
						100 Year:	4.65	1.69	2.15	65.42	0.01	0.74
						Design:	-	-	-	-	-	-

Flood Control District of Maricopa County
Drainage Design Management System
RIVER MECHANICS - SEDIMENT
Project Reference: LEMW_SEDIMENT

ID: SED1
Return Periods for Analysis: All

	Q (cfs)	Volume (ac-ft)	Wash Load (ac-ft)	Bed Load (ac-ft)	Total Yield (ac-ft)
2 Year:	5	2.62	-	-	-
5 Year:	48	16.27	0.004	0.004	0.008
10 Year:	113	30.97	0.009	0.012	0.021
25 Year:	246	53.06	0.019	0.034	0.053
50 Year:	369	90.57	0.031	0.076	0.107
100 Year:	654	156.89	0.059	0.178	0.237
Design:	-	-	-	-	-
Annual:			0.004	0.007	0.011

August 17, 2012
Project No. 603785001

Mr. Kevin Roberts, P.E.
Dibble Engineering
7500 North Dreamy Draw Drive, Suite 200
Phoenix, Arizona 85020

Subject: Addendum No. 1 to Geotechnical Soil Sampling and Analysis
Dated July 16, 2012
Lower El Mirage Wash Basin
El Mirage, Arizona

Dear Mr. Roberts:

Per your request, we have performed the soil sampling and analysis for the upstream portion of Lower El Mirage Wash Basin in El Mirage, Arizona (Figure 1). The purpose of our evaluation was to conduct additional laboratory testing at the site on the upstream side of the project (Figure 2) for soil analysis for the construction of a new basin. This letter presents our findings as well as the results of the laboratory tests at the project site.

SCOPE OF SERVICES

The scope of our services for the project generally included:

- Drilling, logging, and sampling one exploratory boring to approximately 3 feet below ground surface (bgs). The boring log is presented on Figure 3.
- Performing laboratory testing on the collected sample. The laboratory testing consisted of particle-size gradation, Atterberg limits, and agronomic testing. The laboratory test results are presented on Figures 4 and 5, and the agronomic test analysis is attached to this letter.
- Presenting our findings in this data report.

FIELD EXPLORATION

On July 25, 2012, Ninyo & Moore conducted subsurface sampling at the site to collect site soils for laboratory testing. Our field work consisted of drilling, logging, and sampling one exploratory boring to approximately 3 feet bgs. The boring was drilled using manual excavation

equipment. The location of the boring is depicted on the Figure 2. The boring log is presented on Figure 3.

The soil samples collected from our field activities were transported to the Ninyo & Moore laboratory for laboratory testing. The testing included particle-size gradation, Atterberg limits, and agronomic testing. The results of the laboratory testing are presented on the Figures 4 and 5. The agronomic test results are attached.

SUBSURFACE CONDITIONS

Alluvium was encountered at the surface of our boring and extended to the total explored depth. The alluvium generally consisted of well graded sand with silt and gravel in our boring. Cobbles and possible boulders were also encountered in our boring.

We appreciate the opportunity to be of service to you during this phase of the project.

Sincerely,
NINYO & MOORE

REGISTERED GEOLOGIST
CERTIFICATE NO.
49080
JEFFREY
RODGERS
Date Signed 8/17/12
ARIZONA, U.S.A.

Jeffrey S. Rodgers, RG
Project Geologist

EXPIRES: 03/31/15

Steven D. Nowaczyk, PE
Principal Engineer

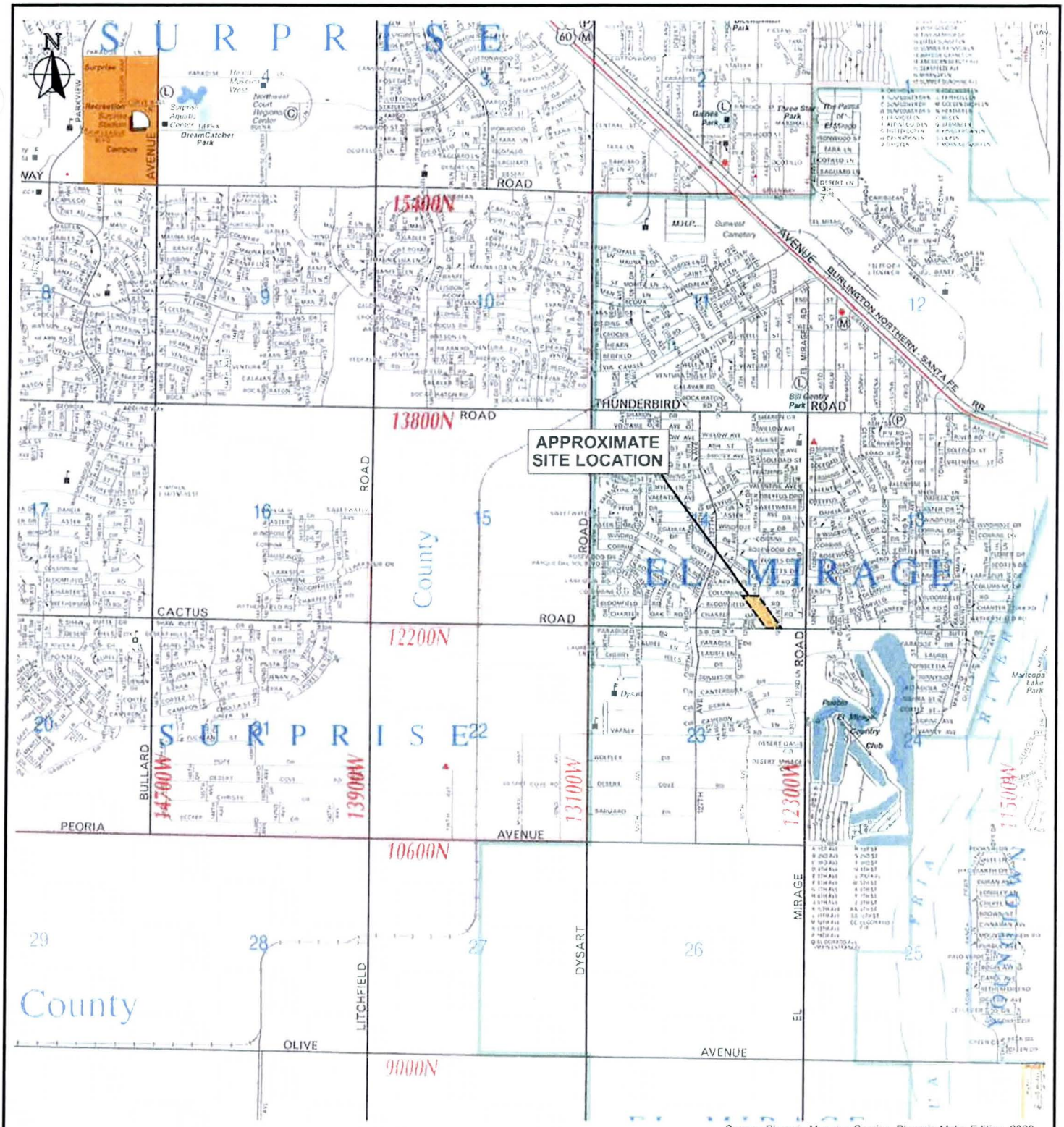
Registered Professional Engineer (Civil)
CERTIFICATE NO.
34866
STEVEN D.
NOWACZYK
Date Signed 8-17-12
ARIZONA U.S.A.

EXPIRES 06/30/2015

JSR/SDN/clj

Distribution: (1) Addressee

Attachments: Figure 1 – Site Location
Figure 2 – Boring Location
Figure 3 – Boring Log
Figures 4 and 5 – Laboratory Test Results
Motzz Laboratory Soil Analysis Report



0 3000

Approximate Scale:
1 inch = 3000 feet

Note: Dimensions, directions and locations are approximate.

Ninyo & Moore	SITE LOCATION	FIGURE
PROJECT NO: 603785001 / DATE: 8/12	LOWER EL MIRAGE WASH BASIN CACTUS ROAD AND EL MIRAGE ROAD EL MIRAGE, ARIZONA	1

file no: 3785vmap0812

Source: NAVTEQ, 06/08/12.

0 300

Approximate Scale:
1 inch = 300 feet

Note: Dimensions, directions, and locations are approximate.

Ninyo & Moore	BORING LOCATION	FIGURE
PROJECT NO: 603785001 / DATE: 8/12	LOWER EL MIRAGE WASH BASIN CACTUS ROAD AND EL MIRAGE ROAD EL MIRAGE, ARIZONA	2

file no: 3785blrn0812

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SW-SM	ALLUVIUM: Brown, damp, loose, well-graded SAND with silt and gravel; cobbles and possible boulders.
								Total Depth = 2.7 feet. Groundwater not encountered during drilling. Backfilled on 7/25/12 promptly after completion of drilling. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
5								
10								
15								
20								

DATE DRILLED 7/25/12 BORING NO. B-1

GROUND ELEVATION -- SHEET 1 OF 1

METHOD OF DRILLING Hand Auger

DRIVE WEIGHT -- DROP --

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

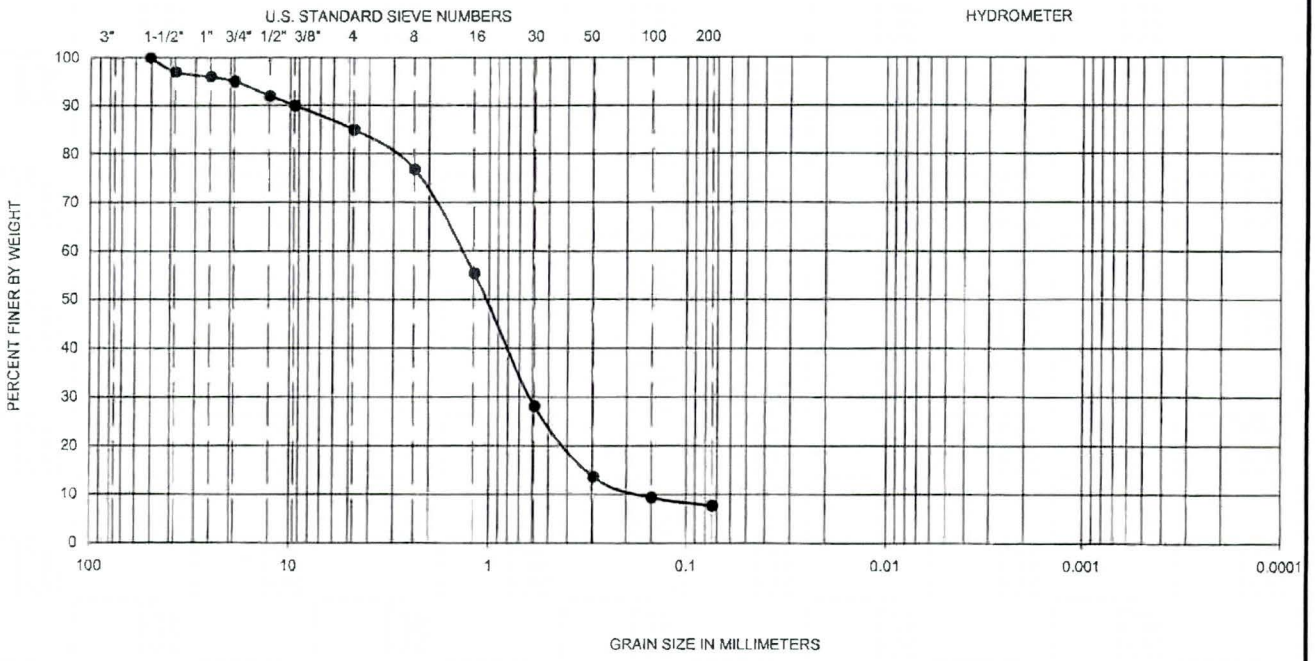
Ninyo & Moore

BORING LOG

Lower El Mirage Wash Basin
El Mirage, Arizona

PROJECT NO.	DATE	FIGURE
603785001	8/12	3

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay



Symbol	Hole No.	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	U.S.C.S
●	B-1	1-2.5	--	--	NP	0.18	0.64	1.50	8.6	1.5	8	SW-SM

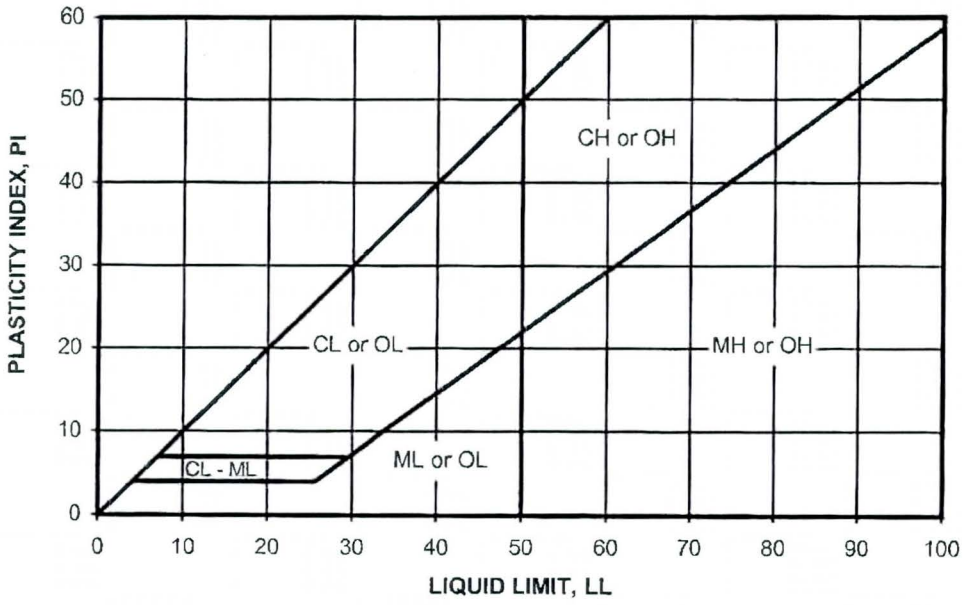
PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

NP - INDICATES NON-PLASTIC

Ninyo & Moore	GRADATION TEST RESULTS	FIGURE
PROJECT NO. / DATE	LOWER EL MIRAGE WASH BASIN CACTUS ROAD AND EL MIRAGE ROAD EL MIRAGE, ARIZONA	4
603785001 / 8/12		

SYMBOL	LOCATION	DEPTH (FT)	LIQUID LIMIT, LL	PLASTIC LIMIT, PL	PLASTICITY INDEX, PI	USCS CLASSIFICATION (Fraction Finer Than No. 40 Sieve)	USCS (Entire Sample)
●	B-1	1-2.5	--	--	NP	ML	SW-SM

NP - INDICATES NON-PLASTIC



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4318

Ninyo & Moore	ATTERBERG LIMITS TEST RESULTS	FIGURE
PROJECT NO. / DATE	LOWER EL MIRAGE WASH BASIN CACTUS ROAD AND EL MIRAGE ROAD EL MIRAGE, ARIZONA	5
603785001 / 8/12		

Flood Control District of Maricopa County
Drainage Design Management System
RIVER MECHANICS - RIPRAP
Project Reference: 101122.01 LEMWB RR

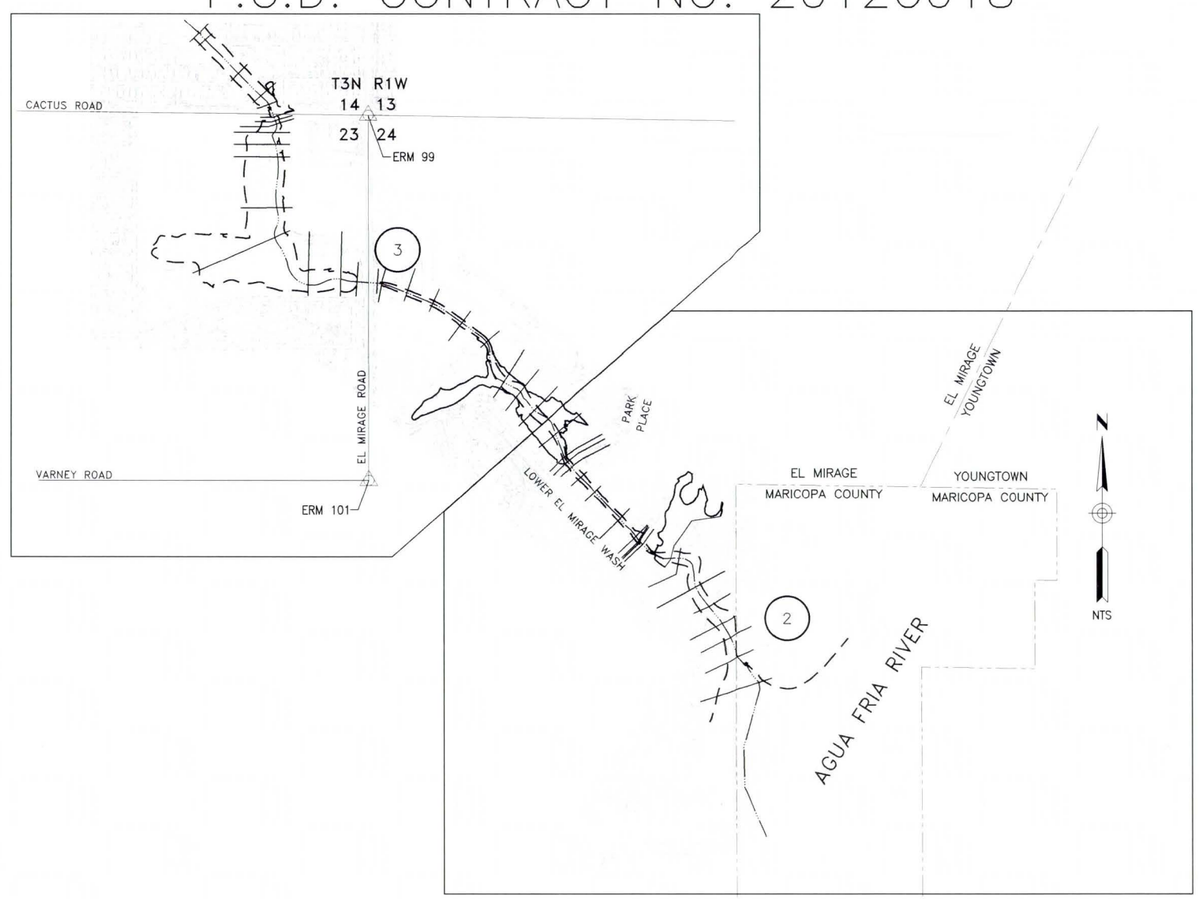
ID	Type	Section ID	Design Q (cfs)	Slope (ft/ft)	Width (ft)	Average Velocity (ft/s)	Specific Weight Stone (lb/cu ft)	Specific Weight Water (lb/cu ft)	Bank Angle (degrees)	D50 (ft)
125DD	Sloped Drop Structure/Rock Chute		85	0.07	8.00	-	-	-	-	0.59
125TH	Channel Bed on Straight Reach		-	-	-	12.50	150.00	62.40	-	2.13
BOOLD	Sloped Drop Structure/Rock Chute		20	0.34	8.00	-	-	-	-	0.54
BSNOU	Channel Bed on Straight Reach		-	-	-	8.70	150.00	62.43	-	1.03
CACT	Channel Bed on Straight Reach		-	-	-	6.40	150.00	62.43	-	0.56
CANTB	Channel Bed on Straight Reach		-	-	-	7.10	150.00	62.43	-	0.69
COEMD	Sloped Drop Structure/Rock Chute		13	0.16	8.00	-	-	-	-	0.34
EMWC	Channel Bed on Straight Reach		-	-	-	5.60	150.00	62.43	-	0.43

APPENDIX G

CLOMR FLOODPLAIN WORK MAP

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

CONDITIONAL LETTER OF MAP REVISION
LOWER EL MIRAGE WASH
F.C.D. CONTRACT NO. 2012C018



NOTES

1. ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.
2. ALL HORIZONTAL COORDINATES USE ARIZONA STATE PLANE COORDINATES BASED ON THE 1983 NORTH AMERICAN DATUM.
3. MAPPING FOR THIS PROJECT IS PERFORMED BY COOPER AERIAL MAPPING COMPANY. APRIL, 2012 FLIGHT DATE.
4. FLOODPLAIN LIMITS IN THIS STUDY ARE PLOTTED AT EACH HEC-RAS CROSS SECTION ON THE BASIS OF STARTING (Sta WS Lft) AND ENDING (Sta WS Rt) STATIONS UNLESS THERE IS INEFFECTIVE FLOW AREA OR A CONFLICT WITH TOPOGRAPHIC CONTOURS, IN WHICH CASE, THE CONTOURS TAKE PRECEDENCE.
5. THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000 UNLESS NOTED OTHERWISE.

STATEMENTS OF PROFESSIONAL REGISTRANTS

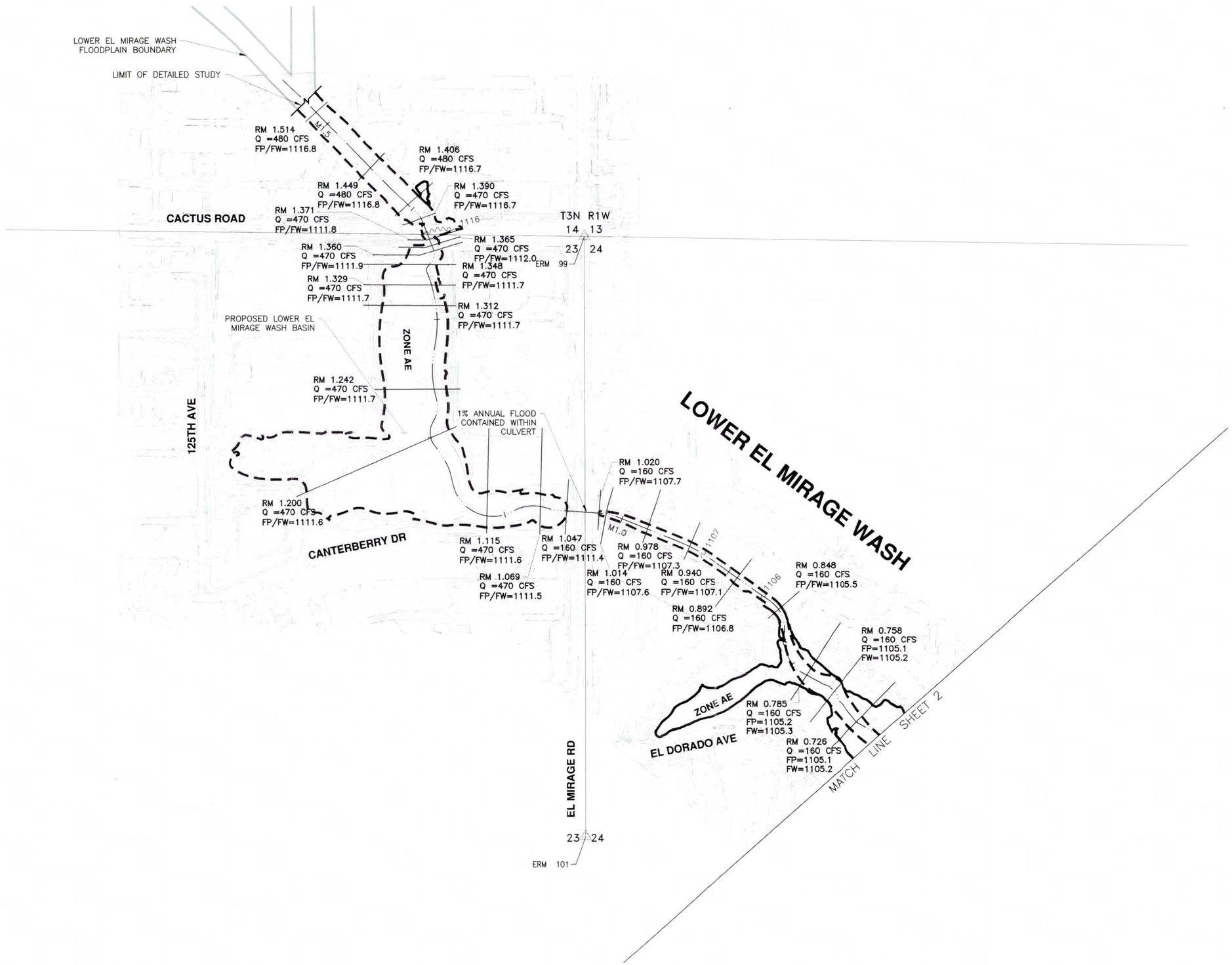
THE HYDROLOGIC VALUES AND FLOODPLAIN DELINEATION WAS PREPARED UNDER MY DIRECT SUPERVISION:

Dibble Engineering			
	JWL	01/29/13	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
	JEP	01/29/13	
	GTS	01/29/13	
	JEP	01/29/13	
			1 3

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 40' HORIZONTAL SCALE AND 1' CONTOUR INTERVALS.

AERIAL MAPPING PERFORMED BY COOPER AERIAL MAPPING COMPANY. APRIL, 2012 FLIGHT DATE

GROUND CONTROL SURVEY DATA PROVIDED BY DIBBLE ENGINEERING



LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 M13.0
CROSS SECTION	RM 0.100 Q = CFS FP= 1888.7 FW= 1889.7
ELEVATION REFERENCE MARK	ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

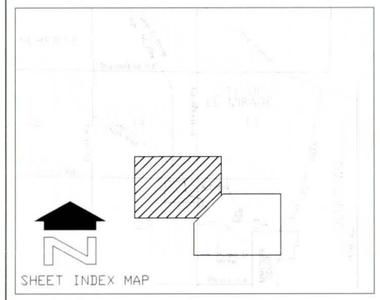
ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988. CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 1.87'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
99	1118.24	BRASS CAP IN HANDHOLE AT INTERSECTION OF CACTUS ROAD AND EL MIRAGE ROAD
101	1109.75	BRASS CAP IN HANDHOLE AT INTERSECTION OF VARNEY ROAD AND EL MIRAGE ROAD

-200' 0' 200' 400'

SCALE: 1"= 200 FEET
CONTOUR INTERVAL = 2 FEET



3			
2			
1			
NO.	REVISION	BY	DATE

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

CONDITIONAL LETTER OF MAP REVISION

LOWER EL MIRAGE WASH

FCD CONTRACT NO 2012C018

Dibble Engineering

DESIGNED	JWL	01/29/12
DRAWN	JEP	01/29/12
REVIEWED	GTS	01/29/12
APPROVED	JEP	01/29/12

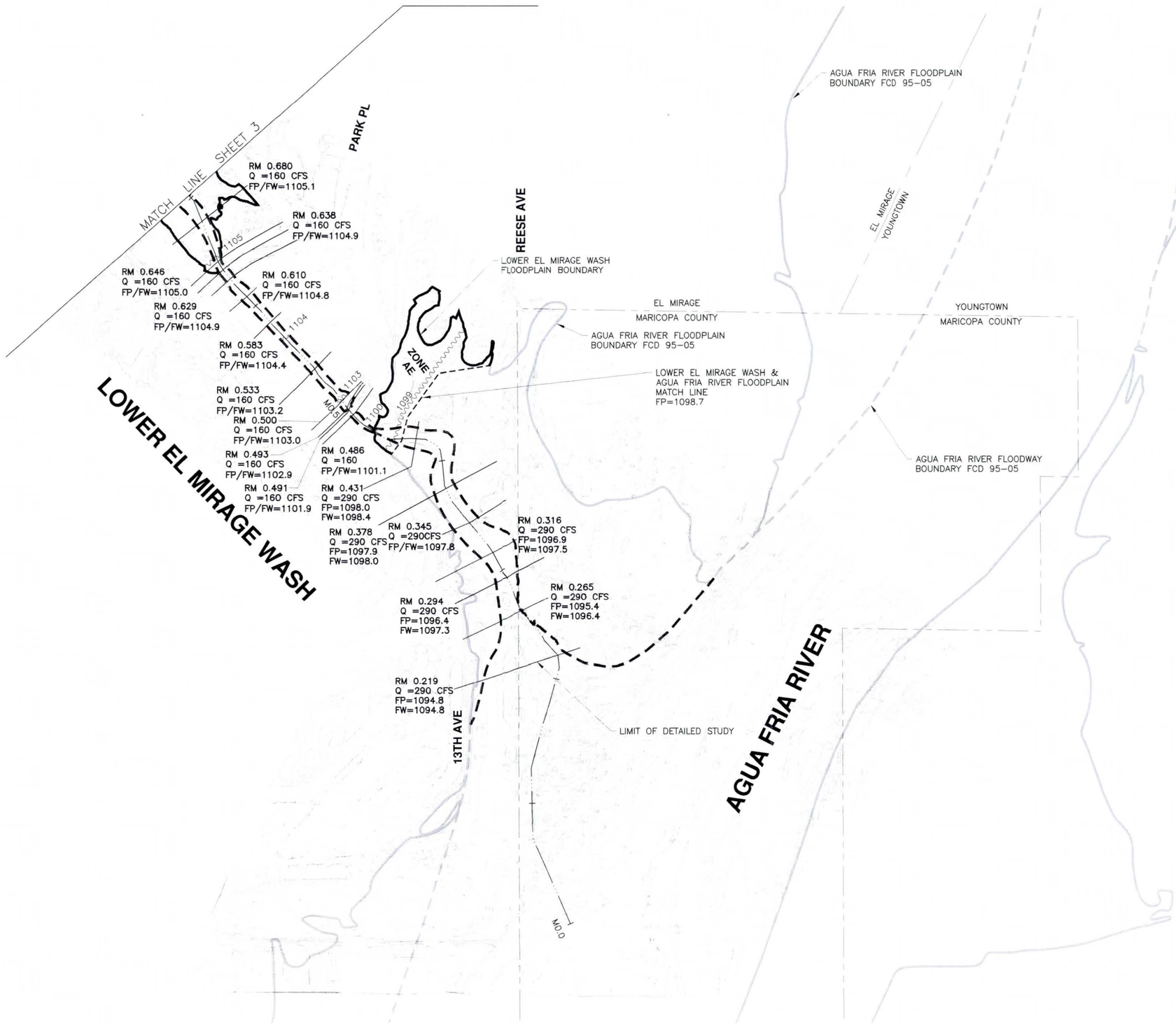
37878 JOSHUA E. PAPWORTH Date Signed 2/8/13 ARIZONA U.S.A. Expires 09/30/14

FILE: J:\2011\101122_01-Lower_El_Mirage_Wash\CAD\FCDMC Plans\1122_01-PLANS.dwg DATE:Feb. 08 2013 TIME: 10:58 am

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 40' HORIZONTAL SCALE AND 1' CONTOUR INTERVALS.

AERIAL MAPPING PERFORMED BY COOPER AERIAL MAPPING COMPANY. APRIL, 2012 FLIGHT DATE.

GROUND CONTROL SURVEY DATA PROVIDED BY DIBBLE ENGINEERING.



LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 M13.0
CROSS SECTION	RM 0.100 Q = CFS FP= 1888.7 FW= 1889.7
ELEVATION REFERENCE MARK	ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988. CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 1.87'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
99	1118.24	BRASS CAP IN HANDHOLE AT INTERSECTION OF CACTUS ROAD AND EL MIRAGE ROAD
101	1109.75	BRASS CAP IN HANDHOLE AT INTERSECTION OF VARNEY ROAD AND EL MIRAGE ROAD

-200' 0' 200' 400'

SCALE: 1"= 200 FEET
CONTOUR INTERVAL = 2 FEET

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

CONDITIONAL LETTER OF MAP REVISION

LOWER EL MIRAGE WASH

FCD CONTRACT NO 2012C018

Dibble Engineering

37878 JOSHUA E. PAPWORTH Date Signed 2/6/13 ARIZONA, U.S.A. Expires 09/30/14

	JWL	01/29/13
	JEP	01/29/13
	GTS	01/29/13
	JEP	01/29/13

FILE:J:\2011\101122_01-Lower_El_Mirage_Wash\CAD\FCDMC Plans\1122_01-PLANS.dwg DATE:Feb. 06 2013 TIME: 04:50 pm

APPENDIX H

FEMA DOCUMENTS

APPENDIX H.1

MT-2 FORMS

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

OVERVIEW & CONCURRENCE FORM

O.M.B No. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless it displays a valid OMB control number. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a (NFIP) Flood Insurance Rate Maps (FIRM).

A. REQUESTED RESPONSE FROM DHS-FEMA

This request is for a (check one):

☒ CLOMR: A letter from DHS-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 DHS-FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See 44 CFR Ch. 1, Parts 60, 65 & 72)

B. OVERVIEW

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

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Example: 480301 480287	City of Katy Harris County	TX TX	48473C 48201C	0005D 0220G	02/08/83 09/28/90
040041	City of El Mirage	AZ	04013C	1605J	09/30/05
040037	Maricopa County Unincorporated Areas	AZ	04013C	1605J	09/30/05

2. a. Flooding Source: Lower El Mirage Wash

   b. Types of Flooding: ☒ Riverine ☐ Coastal ☐ Shallow Flooding (e.g., Zones AO and AH) ☐ Alluvial fan ☐ Lakes ☐ Other (Attach Description)

3. Project Name/Identifier: Lower El Mirage Wash Basin

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

5. Basis for Request and Type of Revision:

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

   ☒ Physical Change ☐ Improved Methodology/Data ☒ Regulatory Floodway Revision ☒ Base Map Changes
   ☐ Coastal Analysis ☒ Hydraulic Analysis ☒ Hydrologic Analysis ☐ Corrections
   ☐ Weir-Dam Changes ☐ Levee Certification ☐ Alluvial Fan Analysis ☐ Natural Changes
   ☒ New Topographic Data ☐ Other (Attach Description)

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

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

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

☐ Dam ☐ Fill ☐ Other (Attach Description)

6. ☒ Documentation of ESA compliance is submitted (required to initiate CLOMR review). Please refer to the instructions for more information.

C. REVIEW FEE

Has the review fee for the appropriate request category been included? ☒ Yes Fee amount: $4,400

☐ No, Attach Explanation

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

D. SIGNATURE

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

Name: MICHAEL DUNCAN, P.E., CFM	Company: Flood Control District of Maricopa County	
Mailing Address: 2801 W. DURANGO ST PHOENIX AZ 85009	Daytime Telephone No.: 602-506-4732	Fax No.: 602-506-8561
	E-Mail Address: mwd@mail.maricopa.gov	
Signature of Requester (required): Michael Duncan	Date: 3-6-2013	

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirements for when fill is placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. For Conditional LOMR requests, the applicant has documented Endangered Species Act (ESA) compliance to FEMA prior to FEMA's review of the Conditional LOMR application. For LOMR requests, I acknowledge that compliance with Sections 9 and 10 of the ESA has been achieved independently of FEMA's process. For actions authorized, funded, or being carried out by Federal or State agencies, documentation from the agency showing its compliance with Section 7(a)(2) of the ESA will be submitted. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title: Sue McDermott, Deputy City Manager and City Engineer	Community Name: El Mirage	
Mailing Address: 12145 NW Grand Ave El Mirage AZ 85335	Daytime Telephone No.: 623-876-2948	Fax No.: 623-876-4606
	E-Mail Address:	
Community Official's Signature (required): Sue McDermott	Date: 3/4/13	

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.2(b) and as described in the MT-2 Forms Instructions. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: Josh Papworth, P.E.	License No.: 37878	Expiration Date: 9/30/14
Company Name: Dibble & Associates Consulting Engineers	Telephone No.: 602-957-1155	Fax No.: 602-957-2838
Signature:	Date: 2-22-13	E-Mail Address:

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

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

☐ Dam ☐ Fill ☐ Other (Attach Description)

6. ☒ Documentation of ESA compliance is submitted (required to initiate CLOMR review). Please refer to the instructions for more information.

C. REVIEW FEE

Has the review fee for the appropriate request category been included? ☒ Yes Fee amount: $4,400

☐ No, Attach Explanation

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Mailing Address:	Daytime Telephone No.:	Fax No.:
	E-Mail Address:	
Signature of Requester (required):	Date:	

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Community Official's Name and Title: Timothy S. Phillips PE, Chief Engineer and General Manager, FCDMC	Community Name: El Mirage;Maricopa County	
Mailing Address: 2801 West Durango Street Phoenix, AZ 85009	Daytime Telephone No.: (602) 506-1501	Fax No.: (602) 506-4601
	E-Mail Address:	
Community Official's Signature (required):	Date: 3/25/13	

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Signature:	Date: 2.22.13	E-Mail Address:

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

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

Seal (Optional)

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

OVERVIEW & CONCURRENCE FORM

O.M.B No. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless it displays a valid OMB control number. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a (NFIP) Flood Insurance Rate Maps (FIRM).

A. REQUESTED RESPONSE FROM DHS-FEMA

This request is for a (check one):

☒ CLOMR: A letter from DHS-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).

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2. a. Flooding Source: Lower El Mirage Wash

   b. Types of Flooding: ☒ Riverine ☐ Coastal ☐ Shallow Flooding (e.g., Zones AO and AH) ☐ Alluvial fan ☐ Lakes ☐ Other (Attach Description)

3. Project Name/Identifier: Lower El Mirage Wash

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

5. Basis for Request and Type of Revision:

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

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

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

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Has the review fee for the appropriate request category been included? ☒ Yes Fee amount: $4,400

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Name:	Company:	
Mailing Address:	Daytime Telephone No.:	Fax No.:
	E-Mail Address:	
Signature of Requester (required):	Date:	

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirements for when fill is placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. For Conditional LOMR requests, the applicant has documented Endangered Species Act (ESA) compliance to FEMA prior to FEMA's review of the Conditional LOMR application. For LOMR requests, I acknowledge that compliance with Sections 9 and 10 of the ESA has been achieved independently of FEMA's process. For actions authorized, funded, or being carried out by Federal or State agencies, documentation from the agency showing its compliance with Section 7(a)(2) of the ESA will be submitted. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title: Sue McDermott, Deputy City Manager and City Engineer	Community Name: El Mirage	
Mailing Address: 12145 NW Grand Ave El Mirage AZ 85335	Daytime Telephone No.: 623-876-2948	Fax No.: 623-876-4606
	E-Mail Address:	
Community Official's Signature (required):	Date:	

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Certifier's Name: Josh Papworth, P.E.	License No.: 37878	Expiration Date: 9/30/14
Company Name: Dibble & Associates Consulting Engineers	Telephone No.: 602-957-1155	Fax No.: 602-957-2838
Signature:	Date: 2·22·13	E-Mail Address:

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☐ Dam ☐ Fill ☐ Other (Attach Description)

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Community Official's Name and Title: Timothy S. Phillips PE, Chief Engineer and General Manager, FCDMC	Community Name: El Mirage;Maricopa County	
Mailing Address: 2801 West Durango Street Phoenix, AZ 85009	Daytime Telephone No.: (602) 506-1501	Fax No.: (602) 506-4601
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Community Official's Signature (required):	Date:	

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

Form Name and (Number)	Required if ...
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☐ Coastal Structures Form (Form 5)	Addition/revision of coastal structure
☐ Alluvial Fan Flooding Form (Form 6)	Flood control measures on alluvial fans

Seal (Optional)

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

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DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a NFIP Flood Insurance Rate Maps (FIRM).

Flooding Source: Lower El Mirage Wash

Note: Fill out one form for each flooding source studied

A. HYDROLOGY

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

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

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

Location	Drainage Area (Sq. Mi.)	Effective/FIS (cfs)	Revised (cfs)
@ conf w/ Agua Fria River	27.82	1,753	294
@ conf w/LEMW Tributary	26.93	1,771	480

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

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model → Specify Model: LEMWB_POST.dat
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters), and documentation to support the new analysis.

4. Review/Approval of Analysis

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

5. Impacts of Sediment Transport on Hydrology

Is the hydrology for the revised flooding source(s) affected by sediment transport? ☐ Yes ☒ No

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation..

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit*	Confluence w/Agua Fria River	See Attached	1098.7	1098.7
Upstream Limit*	730' U/S of Cactus Road	1.514	1117.1	1116.8

*Proposed/Revised elevations must tie-into the Effective elevations within 0.5 foot at the downstream and upstream limits of revision.

2. Hydraulic Method/Model Used: HEC-RAS, Version 4.1.0

3. Pre-Submittal Review of Hydraulic Models*

DHS-FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS.

4.

Models Submitted	Natural Run		Floodway Run		Datum
Duplicate Effective Model*	File Name: LEMW_DupEff	Plan Name: LEMW_DupEff	File Name: LEMW_DupEff	Plan Name: LEMW_DupEff	NGVD 1929
Corrected Effective Model*	File Name:	Plan Name:	File Name:	Plan Name:	
Existing or Pre-Project Conditions Model	File Name: LEMWB_PreProj	Plan Name: LEMWB_PreProj	File Name: LEMWB_PreProj	Plan Name: LEMWB_PreProj	NAVD 1988
Revised or Post-Project Conditions Model	File Name: LEMWB_PostProj	Plan Name: LEMWB_PostProj	File Name: LEMWB_PostProj	Plan Name: LEMWB_PostProj	NAVD 1988
Other - (attach description)	File Name:	Plan Name:	File Name:	Plan Name:	

* For details, refer to the corresponding section of the instructions.

☒ Digital Models Submitted? (Required)

C. MAPPING REQUIREMENTS

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

☒ Digital Mapping (GIS/CADD) Data Submitted (preferred)

Topographic Information: One-foot interval contour mapping

Source: Cooper Aerial Mapping Company Date: April, 2012

Accuracy: 1"=40'

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

☒ Annotated FIRM and/or FBFM (Required)

D. COMMON REGULATORY REQUIREMENTS*

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

   a. For CLOMR requests, if either of the following is true, please submit **evidence of compliance with Section 65.12 of the NFIP regulations**:

      - The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot compared to pre-project conditions.
      - The proposed project encroaches upon a SFHA with or without BFEs established and would result in increases above 1.00 foot compared to pre-project conditions.

   b. Does this LOMR request cause increase in the BFE and/or SFHA compared with the effective BFEs and/or SFHA? ☐ Yes ☐ No

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

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

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

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

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

4. For CLOMR requests, please submit documentation to FEMA and the community to show that you have complied with Sections 9 and 10 of the Endangered Species Act (ESA).

For actions authorized, funded, or being carried out by Federal or State agencies, please submit documentation from the agency showing its compliance with Section 7(a)(2) of the ESA. Please see the MT-2 instructions for more detail.

* Not inclusive of all applicable regulatory requirements. For details, see 44 CFR parts 60 and 65.

To Be Attached to MT-2 Form 2 for Lower El Mirage Wash

In response to Item A.5, Effects of Sediment Transport on Hydrology

The contributing watershed for the study wash is nearly completely developed and urban in nature. Sediment yield from the watershed has been estimated and concluded to be insignificant to project hydrology for the 100-year design storm.

To Be Attached to MT-2 Form 2 for Lower El Mirage Wash

In response to Item D.1, Please Submit Evidence of Compliance with Section 65.12 of the NFIP Regulations

(1) Request for Conditional Approval of Map Change and the Appropriate Fee

Provided herein. Form 1 provides fee information.

(2) Requirement of an Evaluation of Alternatives

The project considered a number of alternatives, documented in the report *Lower El Mirage Wash Phase 2 – Analysis and Recommendations Design Concept Report*. [Provided with electronic files] However, the desired layout requires relocation of the regulatory floodway. Further, the effect of the project is a net reduction of flood hazards.

(3) Documentation of Individual Legal Notice to All Impacted Property Owners

Documentation of property owner notifications is provided in Section H.2.

(4) Concurrence of the Chief Executive Officer of Any Other Communities Impacted by the Proposed Actions

There are no other communities impacted by the proposed actions.

(5) Certification that No Structures are Located in Areas Which Would be Impacted by the Increased Base Flood Elevation

Base flood elevations are not increased.

(6) A Request for Revision of Base Flood Elevation Determination According to the Provisions of § 65.6

Provided herein.

(7) A Request for Floodway Revision According to the Provisions of § 65.7

Provided herein.

In response to Item D.4, Please Submit Documentation of Compliance with Sections 9 and 10 of the Endangered Species Act (ESA).

An environmental review was conducted for the project area and is included in Appendix H.4. Based on this data, no special species or critical habitat on the *Threatened and Endangered Species List* exists within 3 miles of the project site. Therefore, it is reasonable to conclude that the project will have "no effect" on endangered species and their habitats.

DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

O.M.B. NO. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 7 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20598-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program; Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a NFIP Flood Insurance Rate Maps (FIRM).

Flooding Source: Lower El Mirage Wash

Note: Fill out one form for each flooding source studied.

A. GENERAL

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

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

Description Of Modeled Structure

1. Name of Structure: El Mirage Road Culvert

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

   Location of Structure: El Mirage Road

   Downstream Limit/Cross Section: 1.020

   Upstream Limit/Cross Section: 1.047

2. Name of Structure: Lower El Mirage Wash Channelization

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

   Location of Structure: East of El Mirage Road and northwest of the Pueblo Golf Course

   Downstream Limit/Cross Section: 0.848

   Upstream Limit/Cross Section: 1.020

3. Name of Structure: Park Place Culvert

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

   Location of Structure: Park Place

   Downstream Limit/Cross Section: 0.629

   Upstream Limit/Cross Section: 0.638

NOTE: FOR MORE STRUCTURES, ATTACH ADDITIONAL PAGES AS NEEDED.

B. CHANNELIZATION

Flooding Source: Lower El Mirage Wash

Name of Structure: Lower El Mirage Wash Channelization

1. Hydraulic Considerations

The channel was designed to carry 163 (cfs) and/or the 100-year flood.
The design elevation in the channel is based on (check one):

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

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

☒ Inlet to channel ☐ Outlet of channel ☐ At Drop Structures ☐ At Transitions

☐ Other locations (specify): _____

2. Channel Design Plans

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

3. Accessory Structures

The channelization includes (check one):

☐ Levees [Attach Section E (Levee/Floodwall)] ☐ Drop structures ☐ Superelevated sections

☐ Transitions in cross sectional geometry ☐ Debris basin/detention basin [Attach Section D (Dam/Basin)] ☐ Energy dissipator

☐ Weir ☐ Other (Describe):

4. Sediment Transport Considerations

Are the hydraulics of the channel affected by sediment transport? ☐ Yes ☒ No

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

C. BRIDGE/CULVERT

Flooding Source: Lower El Mirage Wash

Name of Structure: El Mirage Road Culvert

1. This revision reflects (check one):

☐ Bridge/culvert not modeled in the FIS

☒ Modified bridge/culvert previously modeled in the FIS

☐ Revised analysis of bridge/culvert previously modeled in the FIS

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

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

☒ Dimensions (height, width, span, radius, length)

☒ Shape (culverts only)

☒ Material

☒ Beveling or Rounding

☒ Wing Wall Angle

☒ Skew Angle

☒ Distances Between Cross Sections

☒ Erosion Protection

☒ Low Chord Elevations – Upstream and Downstream

☒ Top of Road Elevations – Upstream and Downstream

☒ Structure Invert Elevations – Upstream and Downstream

☒ Stream Invert Elevations – Upstream and Downstream

☒ Cross-Section Locations

4. Sediment Transport Considerations

Are the hydraulics of the structure affected by sediment transport? ☐ Yes ☒ No

If Yes, then fill out Section F (Sediment Transport) of Form 3. If no, then attach an explanation.

B. CHANNELIZATION

Flooding Source: _____

Name of Structure: _____

1. Hydraulic Considerations

The channel was designed to carry _____ (cfs) and/or the _____-year flood.
The design elevation in the channel is based on (check one):

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

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

☐ Inlet to channel ☐ Outlet of channel ☐ At Drop Structures ☐ At Transitions

☐ Other locations (specify): _____

2. Channel Design Plans

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

3. Accessory Structures

The channelization includes (check one):

☐ Levees [Attach Section E (Levee/Floodwall)] ☐ Drop structures ☐ Superelevated sections

☐ Transitions in cross sectional geometry ☐ Debris basin/detention basin [Attach Section D (Dam/Basin)] ☐ Energy dissipator

☐ Weir ☐ Other (Describe):

4. Sediment Transport Considerations

Are the hydraulics of the channel affected by sediment transport? ☐ Yes ☐ No

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

C. BRIDGE/CULVERT

Flooding Source: Lower El Mirage Wash

Name of Structure: Park Place Culvert

1. This revision reflects (check one):

☒ Bridge/culvert not modeled in the FIS

☐ Modified bridge/culvert previously modeled in the FIS

☐ Revised analysis of bridge/culvert previously modeled in the FIS

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

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

☒ Dimensions (height, width, span, radius, length)

☒ Shape (culverts only)

☐ Material

☐ Beveling or Rounding

☐ Wing Wall Angle

☐ Skew Angle

☐ Distances Between Cross Sections

☐ Erosion Protection

☒ Low Chord Elevations – Upstream and Downstream

☒ Top of Road Elevations – Upstream and Downstream

☒ Structure Invert Elevations – Upstream and Downstream

☒ Stream Invert Elevations – Upstream and Downstream

☐ Cross-Section Locations

4. Sediment Transport Considerations

Are the hydraulics of the structure affected by sediment transport? ☐ Yes ☒ No

If Yes, then fill out Section F (Sediment Transport) of Form 3. If no, then attach an explanation.

B. CHANNELIZATION

Flooding Source: _____

Name of Structure: _____

1. Hydraulic Considerations

The channel was designed to carry _____ (cfs) and/or the _____-year flood.
The design elevation in the channel is based on (check one):

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

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

☐ Inlet to channel ☐ Outlet of channel ☐ At Drop Structures ☐ At Transitions

☐ Other locations (specify): _____

2. Channel Design Plans

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

3. Accessory Structures

The channelization includes (check one):

☐ Levees [Attach Section E (Levee/Floodwall)] ☐ Drop structures ☐ Superelevated sections

☐ Transitions in cross sectional geometry ☐ Debris basin/detention basin [Attach Section D (Dam/Basin)] ☐ Energy dissipator

☐ Weir ☐ Other (Describe):

4. Sediment Transport Considerations

Are the hydraulics of the channel affected by sediment transport? ☐ Yes ☐ No

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

C. BRIDGE/CULVERT

Flooding Source: Lower El Mirage Wash

Name of Structure: Golf Cart Path Bridge

1. This revision reflects (check one):

☒ Bridge/culvert not modeled in the FIS

☐ Modified bridge/culvert previously modeled in the FIS

☐ Revised analysis of bridge/culvert previously modeled in the FIS

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

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

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

4. Sediment Transport Considerations

Are the hydraulics of the structure affected by sediment transport? ☐ Yes ☒ No

If Yes, then fill out Section F (Sediment Transport) of Form 3. If no, then attach an explanation.

B. CHANNELIZATION

Flooding Source: _____

Name of Structure: _____

1. Hydraulic Considerations

The channel was designed to carry _____ (cfs) and/or the _____-year flood.
The design elevation in the channel is based on (check one):

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

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

☐ Inlet to channel ☐ Outlet of channel ☐ At Drop Structures ☐ At Transitions

☐ Other locations (specify): _____

2. Channel Design Plans

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

3. Accessory Structures

The channelization includes (check one):

☐ Levees [Attach Section E (Levee/Floodwall)] ☐ Drop structures ☐ Superelevated sections

☐ Transitions in cross sectional geometry ☐ Debris basin/detention basin [Attach Section D (Dam/Basin)] ☐ Energy dissipator

☐ Weir ☐ Other (Describe):

4. Sediment Transport Considerations

Are the hydraulics of the channel affected by sediment transport? ☐ Yes ☐ No

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

C. BRIDGE/CULVERT

Flooding Source: Lower El Mirage Wash

Name of Structure: Cactus Road Culvert

1. This revision reflects (check one):

☐ Bridge/culvert not modeled in the FIS

☐ Modified bridge/culvert previously modeled in the FIS

☒ Revised analysis of bridge/culvert previously modeled in the FIS

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

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

☐ Dimensions (height, width, span, radius, length)

☐ Shape (culverts only)

☐ Material

☐ Beveling or Rounding

☐ Wing Wall Angle

☐ Skew Angle

☐ Distances Between Cross Sections

☐ Erosion Protection

☐ Low Chord Elevations – Upstream and Downstream

☐ Top of Road Elevations – Upstream and Downstream

☐ Structure Invert Elevations – Upstream and Downstream

☐ Stream Invert Elevations – Upstream and Downstream

☐ Cross-Section Locations

4. Sediment Transport Considerations

Are the hydraulics of the structure affected by sediment transport? ☐ Yes ☒ No

If Yes, then fill out Section F (Sediment Transport) of Form 3. If no, then attach an explanation.

D. DAM/BASIN

Flooding Source: Lower El Mirage Wash
Name of Structure: Lower El Mirage Wash Basin

1. This request is for (check one): ☐ Existing dam/basin ☐ New dam/basin ☒ Modification of existing dam/basin

2. The dam/basin was designed by (check one): ☐ Federal agency ☐ State agency ☐ Private organization ☒ Local government agency

   Name of the agency or organization: Flood Control District of Maricopa County

3. The Dam was permitted as (check one): ☐ Federal Dam ☐ State Dam

   Provide the permit or identification number (ID) for the dam and the appropriate permitting agency or organization

   Permit or ID number _____ Permitting Agency or Organization _____

   a. ☐ Local Government Dam ☐ Private Dam

   Provided related drawings, specification and supporting design information.

4. Does the project involve revised hydrology? ☒ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).

   Was the dam/basin designed using critical duration storm? (must account for the maximum volume of runoff)

   ☐ Yes, provide supporting documentation with your completed Form 2.

   ☒ No, provide a written explanation and justification for not using the critical duration storm.

5. Does the submittal include debris/sediment yield analysis? ☐ Yes ☒ No

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

6. Does the Base Flood Elevation behind the dam/basin or downstream of the dam/basin change? ☒ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

FREQUENCY (% annual chance)	Stillwater Elevation Behind the Dam/Basin FIS	REVISED
10-year (10%)	_____	_____
50-year (2%)	_____	_____
100-year (1%)	1113.2	1112.0
500-year (0.2%)	_____	_____
Normal Pool Elevation	_____	_____

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

E. LEVEE/FLOODWALL

1. System Elements

a. This Levee/Floodwall analysis is based on (check one): ☐ upgrading of an existing levee/floodwall system ☐ a newly constructed levee/floodwall system ☐ reanalysis of an existing levee/floodwall system

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

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

c. Structural Type (check one): ☐ monolithic cast-in place reinforced concrete ☐ reinforced concrete masonry block ☐ sheet piling
☐ Other (describe): _____

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

☐ Yes ☐ No

If Yes, by which agency? _____

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

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

2. Freeboard

a. The minimum freeboard provided above the BFE is:

Riverine

3.0 feet or more at the downstream end and throughout ☐ Yes ☐ No

3.5 feet or more at the upstream end ☐ Yes ☐ No

4.0 feet within 100 feet upstream of all structures and/or constrictions ☐ Yes ☐ No

Coastal

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

2.0 feet above the 1%-annual-chance stillwater surge elevation ☐ Yes ☐ No

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

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

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

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

3. Closures

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

If opening exists, list all closures:

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

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

Note: Geotechnical and geologic data

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

4. Embankment Protection

a. The maximum levee slope land side is: _____

b. The maximum levee slope flood side is: _____

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

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

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

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

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

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

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

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

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

☐ Overall height: Sta.: _____, height _____ ft.

☐ Limiting foundation soil strength:

Strength ϕ = _____ degrees, c = _____ psf

Slope: SS = _____ (h) to _____ (v)

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

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

c. Summary of stability analysis results:

E. LEVEE/FLOODWALL (CONTINUED)

5. Embankment And Foundation Stability (continued)

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

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

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

If Yes, describe methodology used:

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

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

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

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

Attach engineering analysis to support construction plans.

6. Floodwall And Foundation Stability

a. Describe analysis submittal based on Code (check one): ☐ UBC (1988) ☐ Other (specify): _____

b. Stability analysis submitted provides for: ☐ Overturning ☐ Sliding If not, explain: _____

c. Loading included in the analyses were: ☐ Lateral earth @ P_A = _____ psf; P_p = _____ psf

☐ Surcharge-Slope @ _____, ☐ surface _____ psf

☐ Wind @ P_w = _____ psf

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

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

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

d. Summary of Stability Analysis Results: Factors of Safety.
Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

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

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)
Note: (Extend table on an added sheet as needed and reference)

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability (continued)

e. Foundation bearing strength for each soil type:

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

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

Attach engineering analysis to support construction plans.

7. Settlement

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

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

c. Settlement of the levee crest is determined to be primarily from : ☐ Foundation consolidation ☐ Embankment compression ☐ Other (Describe): _____

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

Attach engineering analysis to support construction plans.

8. Interior Drainage

a. Specify size of each interior watershed:

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

b. Relationships Established

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

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

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

e. Which flooding conditions were analyzed?

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

If No for any of the above, attach explanation.

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

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

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

E. LEVEE/FLOODWALL (CONTINUED)

8. Interior Drainage (continued)

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

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

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

Will the operation be automatic? ☐ Yes ☐ No

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

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

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

9. Other Design Criteria

a. The following items have been addressed as stated:

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

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

Attach supporting documentation

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

d. Sediment Transport Considerations:

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

10. Operational Plan And Criteria

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

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

c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations?
☐ Yes ☐ No If the answer is No to any of the above, please attach supporting documentation.

E. LEVEE/FLOODWALL (CONTINUED)

11. Maintenance Plan

Please attach a copy of the fomal maintenance plan for the levee/floodwall

12. Operations and Maintenance Plan

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

CERTIFICATION OF THE LEVEE DOCUMENTION

This certification is to be signed and sealed by a licensed registered professional engineer authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.10(e) and as described in the MT-2 Forms Instructions. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: _____ License No.: _____ Expiration Date: _____

Company Name: _____ Telephone No.: _____ Fax No.: _____

Signature: _____ Date: _____ E-Mail Address: _____

F. SEDIMENT TRANSPORT

Flooding Source: _____

Name of Structure: _____

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

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

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

Sediment transport rate _____ (percent concentration by volume)

Method used to estimate sediment transport: _____

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

Method used to estimate scour and/or deposition: _____

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport: _____

Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

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

To Be Attached to MT-2 Form 3 for Lower El Mirage Wash

In response to Item A, Description of Modeled Structures

(4) Name of Structure: Golf Cart Path Bridge

Type: Bridge/Culvert

Location of Structure: 745' Downstream of Park Place

Downstream Limit/Cross Section: 0.491

Upstream Limit/Cross Section: 0.493

(5) Name of Structure: Cactus Road Culvert

Type: Bridge/Culvert

Location of Structure: Cactus Road & Lower El Mirage Wash

Downstream Limit/Cross Section: 1.371

Upstream Limit/Cross Section: 1.390

In response to Item B.4. Sediment Transport Considerations

The contributing watershed for the study wash is nearly completely developed and urban in nature. Sediment yield from the watershed has been estimated and concluded to be insignificant to the channel hydraulics for the 100-year design storm event.

In response to Item C.3. Attach Plans of the Structures Certified by a Registered Professional Engineer

100% level plans for the El Mirage Road Culvert, to be constructed with the proposed basin, are provided as a separately bound document.

Plans are not available for the Cactus Road Culvert, Park Place Culvert and the Golf Cart Path Bridge, all existing structures. Analysis is based on field survey and aerial topographic mapping. Field survey was conducted by the Flood Control District of Maricopa County, 2010. Field notes and headwall sketches can be found in Appendix C.3 of this Technical Data Notebook.

In response to Item C.4. Sediment Transport Considerations

The contributing watershed for the study wash is nearly completely developed and urban in nature. Sediment yield from the watershed has been estimated and concluded to be insignificant to the structure hydraulics for the 100-year design storm event.

In response to Item D.4. Critical Duration Storm

The basin is designed based on local flood control requirements for incised regional detention basins. The design storm is the 100-year 24-hour storm.

In response to Item D.7. Operation and Maintenance Plan

A Operation and Maintenance Plan is provided in Section H.3.

APPENDIX H.2

PROPERTY OWNER NOTIFICATION LETTERS

Dibble Engineering

7500 North Dreamy Draw Drive
Suite 200

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CERTIFIED MAIL™ RECEIPT
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7007 0710 0005 4271 1268

Sent To ROBERTS PROPERTIES LTD
Street, Apt. No.; or PO Box No. 801 A STREET
City, State, ZIP+4 SAN RAFAEL, CA 94901 0000

PS Form 3800, August 2006 See Reverse for Instructions

February 13, 2013

Roberts Properties, Ltd
801 A Street
San Rafael, CA 949010000

Via Certified Mail

Re: Notification of Floodway Revision for Lower El Mirage Wash

Dear Sir or Madam:

The Flood Insurance Rate Map (FIRM) for a community depicts the floodplain, the area which has been determined to be subject to a 1% (100-year) or greater chance of flooding in any given year. The floodway is the portion of the floodplain that includes the channel of a river or other watercourse and the adjacent land area that must be reserved in order to discharge the base flood without cumulatively increasing the water-surface elevation by more than a designated height. The FIRM is used to determine flood insurance rates and to help the community with floodplain management.

Dibble Engineering is applying for a Conditional Letter of Map Revision (CLOMR) from the Federal Emergency Management Agency (FEMA) on behalf of the City of El Mirage and the Flood Control District of Maricopa County to revise FIRM: 04013C, Panel #1605J for El Mirage, Arizona along the Lower El Mirage Wash, generally located between Cactus Road and the Agua Fria River. The City is proposing to construct a detention basin upstream of your property to manage area stormwater. As a result of the floodway revision the floodway shall narrow with a maximum narrowing of approximately 210 feet at a point approximately 1000 feet downstream of El Mirage Road.

This letter is to inform you that the proposed project may have some impact on the floodway on your property. If you have any questions or concerns about the proposed project or its effect on your property, you may contact Mike Duncan at the Flood Control District of Maricopa County at (602) 506-4732.

Sincerely,
Dibble Engineering

Josh Papworth, PE, CFM
Project Engineer

cc: Mike Duncan, PE, CFM, The Flood Control District of Maricopa County
Jorge Gastelum, PE, City of El Mirage

Dibble Engineering

7500 North Dreamy Draw Drive
Suite 200
Phoenix, Arizona 85020

7007 0710 0005 4271 1275

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Total Postage & Fees	$ 6.11

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Sent To BUREAU OF LAND MANAGEMENT ATTN. REM HAWES, HASSAYAMPA FIELD OFFICE
Street, Apt. No.; or PO Box No. 21605 NORTH 7th AVENUE
City, State, ZIP+4 PHOENIX, AZ 85027-2929

PS Form 3800, August 2006 See Reverse for Instructions

February 13, 2013

Rem Hawes
Bureau of Land Management
Hassayampa Field Office
21605 North 7th Avenue
Phoenix, AZ 85027-2929

Re: Notification of Floodway Revision for Lower El Mirage Wash

Via Certified Mail

Dear Mr. Hawes:

The Flood Insurance Rate Map (FIRM) for a community depicts the floodplain, the area which has been determined to be subject to a 1% (100-year) or greater chance of flooding in any given year. The floodway is the portion of the floodplain that includes the channel of a river or other watercourse and the adjacent land area that must be reserved in order to discharge the base flood without cumulatively increasing the water-surface elevation by more than a designated height. The FIRM is used to determine flood insurance rates and to help the community with floodplain management.

The City of El Mirage is aware that Dibble Engineering applying for a Conditional Letter of Map Revision (CLOMR) from the Federal Emergency Management Agency (FEMA) on behalf of the City of El Mirage to revise FIRM : 04013C, Panel #1605J for El Mirage, Arizona along the Lower El Mirage Wash, generally located between Cactus Road and the Agua Fria River. The City is proposing to construct a detention basin to manage area stormwater. As a result of the revision the El Mirage Wash floodway shall narrow with a maximum narrowing of 350 feet at a point approximately 1700' north of Peoria Avenue, at its confluence with the Agua Fria River.

This letter is to inform you that the proposed project may have some impact on the floodway on your property. If you have any questions or concerns about the proposed project or its effect on your property, you may contact Mike Duncan at the Flood Control District of Maricopa County at (602) 506-4732.

Sincerely,
Dibble Engineering

Josh Papworth, PE, CFM
Project Engineer

cc: Mike Duncan, PE, CFM, The Flood Control District of Maricopa County
Jorge Gastelum, PE, City of El Mirage

Dibble Engineering

7500 North Dreamy Draw Drive
Suite 200
Phoenix, Arizona 85020
phone 602.957.1155

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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$ 6.11

Postmark Here
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13 2013
USPS

Sent To CITY OF EL MIRAGE
ATTN MS. SUE McDERMOTT/CITY ENGINEER
Street, Apt. No.; or PO Box No. 12145 NW GRAND AVE
City, State, ZIP+4 EL MIRAGE AZ 85335-2955

PS Form 3800, August 2006 See Reverse for Instructions

February 13, 2013

Ms. Sue McDermott
City Engineer
City of El Mirage
12145 NW Grand Ave
El Mirage AZ 85335

Via Certified Mail

Re: Notification of Increases in 1% (100-year) Annual Chance Water
Lower El Mirage Wash Basin
Dibble Project No. 101122.01

Dear Ms. McDermott:

The Flood Insurance Rate Map (FIRM) for a community depicts the floodplain, the area which has been determined to be subject to a 1% (100-year) or greater chance of flooding in any given year. The floodway is the portion of the floodplain that includes the channel of a river or other watercourse and the adjacent land area that must be reserved in order to discharge the base flood without cumulatively increasing the water-surface elevation by more than a designated height. The FIRM is used to determine flood insurance rates and to help the community with floodplain management.

Dibble Engineering is applying for a Conditional Letter of Map Revision (CLOMR) from the Federal Emergency Management Agency (FEMA) on behalf of the City of El Mirage and the Flood Control District of Maricopa County to revise FIRM: 04013C, Panel #1605J for El Mirage, Arizona along the Lower El Mirage Wash, generally located between Cactus Road and the Agua Fria River. The City is proposing to construct a detention basin upstream of your property to manage area stormwater. As a result of the floodway revision the floodway shall widen with a maximum widening of approximately 540 feet at a point approximately 750 feet upstream of El Mirage Road. The proposed floodway is entirely contained within the proposed flood control detention basin.

This letter is to inform you that the proposed project may have some impact on the floodway on your property. If you have any questions or concerns about the proposed project or its effect on your property, you may contact Mike Duncan at the Flood Control District of Maricopa County at (602) 506-4732.

Sincerely,
Dibble Engineering

Josh Papworth, PE, CFM
Project Engineer

cc: Mike Duncan, PE, CFM, The Flood Control District of Maricopa County

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

BUREAU OF LAND MANAGEMENT
ATTN. REM HAWES
HASSAYAMPA FIELD OFFICE
21605 NORTH 7th AVENUE
PHOENIX, AZ 85027-2929

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☒ Agent ☐ Addressee

B. Received by (Printed Name) MOTTET
C. Date of Delivery 2-14-13

D. Is delivery address different from Item 1? ☐ Yes
If YES, enter delivery address below: ☒ No

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☒ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7007 0710 0005 4271 1275

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

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1. Article Addressed to:

CITY OF EL MIRAGE
ATTN. MS. SUE McDERMOTT
CITY ENGINEER
12145 NW GRAND AVE
EL MIRAGE, AZ
85335-2955

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by (Printed Name) [signature]
C. Date of Delivery 2/14/13

D. Is delivery address different from Item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☒ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

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PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

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- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

ROBERTS PROPERTIES LTD

801 A. STREET
SAN RAFAEL, CA
94901 0000

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X Shirley Dooke ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☑ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

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APPENDIX H.3

OPERATION AND MAINTENANCE PLAN

STORAGE BASIN OPERATION & MAINTENANCE PLAN

1. Introduction

The Lower El Mirage Wash Basin along Lower El Mirage Wash provides protection to the downstream properties between the basin site and the Agua Fria River from the 1% annual-chance (base) flood. The operational and maintenance criteria established in this section must be implemented for the basin system to be recognized by FEMA. The City of El Mirage (City) participates in the National Flood Insurance Plan (NFIP) and has included these items as an addendum to the City's NFIP Operation & Maintenance Plan (O & M Plan). The Lower El Mirage Wash Basin is located at the southwest corner of Cactus Road and El Mirage Road, in El Mirage, Arizona.

2. Purpose

The purpose of the Storage Basin O&M Plan is to encourage that all drainage facilities are maintained and kept clear from objects that may impede the flow of storm water runoff and ensure compliance with the criteria as set by FEMA.

This policy must document the formal procedures that ensure the stability, conveyance, and overall integrity of the basin system are maintained. The policy specifies the inspection and maintenance activities to be performed, the frequency of their performance, and the person(s) by name or office responsible for their performance.

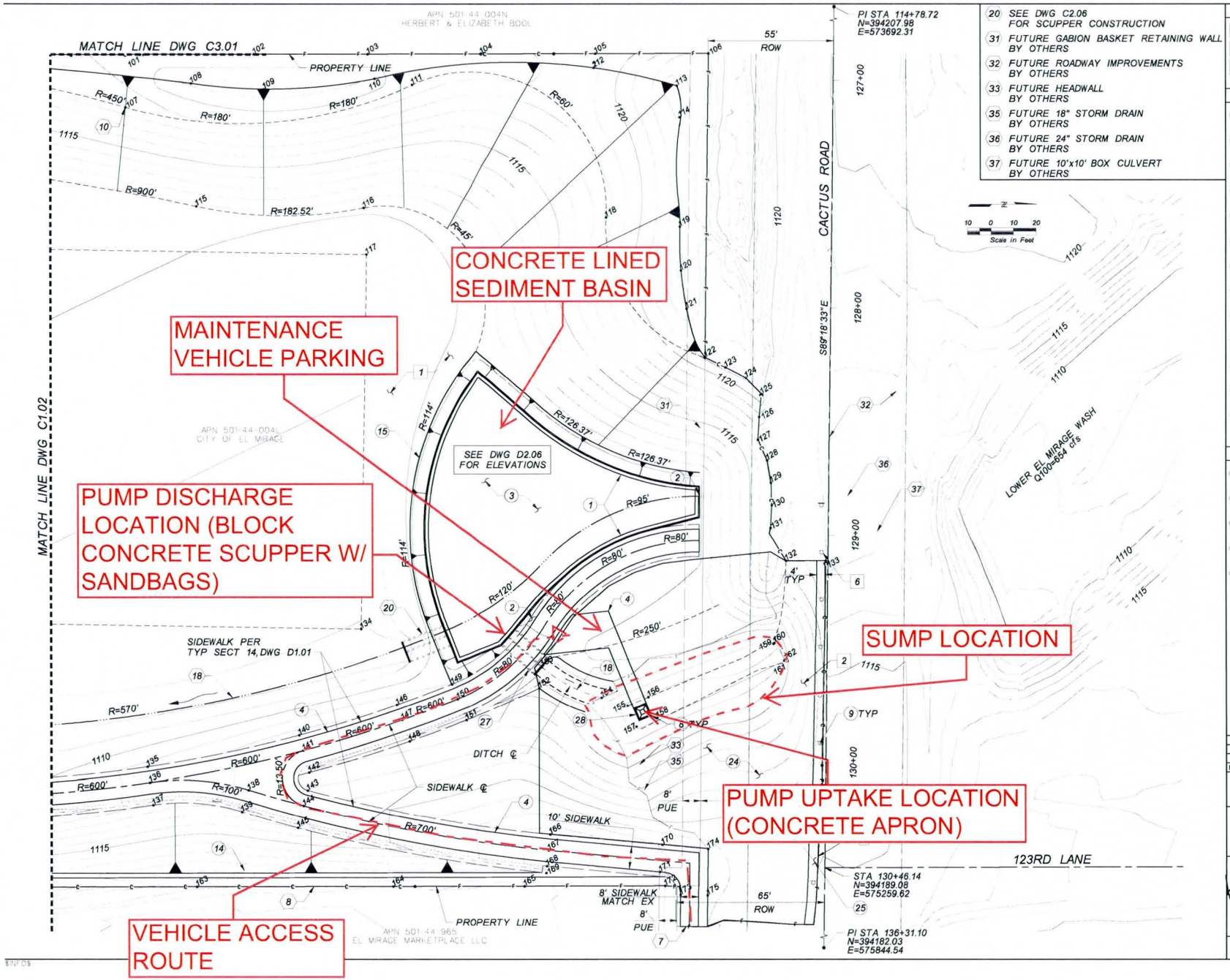
3. Inspection and Maintenance

- The responsible person shall, at a minimum, visually inspect each drainage facility annually.
- The responsible person shall schedule the cleaning at the established service levels stated below, **unless** there is an occurrence of a severe storm event. Storm inspections will be conducted within twenty-four (24) hours of a severe storm event. A severe storm event is defined as a minimum of one-half (½) inch of rainfall in a twenty-four (24) hour period.
- Maintenance of the detention basin shall include removal and off-site disposal of accumulated sediment in the concrete lined sediment basin and any other areas of accumulated sediment on the site.
- The responsible person shall pump the sump location shown on the attached Pumping Plan after every storm event to remove any standing water.
- The inspections will be recorded on the attached **Maintenance Inspection Report** and any maintenance performed as a result of the inspections will be recorded on the **Drainage Problem Report**. These reports should be kept on file at the City of El Mirage Public Works Department office.
- The responsibility for this policy is the City of El Mirage Public Works Department.
- The established service levels and responsible parties are presented in the following table.

Facility	Minimum Frequency	Responsible Party
Detention Basin	Inspect Annually and Maintain as Needed	City of El Mirage, Public Works Department
Sump Area (See Attached Pumping Plan)	Pump After Every Storm Event	City of El Mirage, Public Works Department
Side Inlets, Chutes or Drains	Inspect Annually and Maintain as Needed	City of El Mirage, Public Works Department
Pipe Culvert-Cactus Road*	Inspect Annually and Maintain as Needed	City of El Mirage, Public Works Department
Pipe Culvert-El Mirage Road*	Inspect Annually and Maintain as Needed	City of El Mirage, Public Works Department
Irrigation & Landscaping	Inspect Annually and Maintain as Needed	City of El Mirage, Public Works Department

*Includes the stability of the roadway from deterioration of the supporting earthen embankments.

PUMPING PLAN



20	SEE DWG C2.06 FOR SCUPPER CONSTRUCTION
31	FUTURE GABION BASKET RETAINING WALL BY OTHERS
32	FUTURE ROADWAY IMPROVEMENTS BY OTHERS
33	FUTURE HEADWALL BY OTHERS
35	FUTURE 18" STORM DRAIN BY OTHERS
36	FUTURE 24" STORM DRAIN BY OTHERS
37	FUTURE 10'x10' BOX CULVERT BY OTHERS

REMOVE

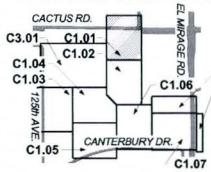
1	CLEAR & GRUB	
2	REMOVE EXISTING RIPRAP	167 C
6	REMOVE HAZARD MARKERS	3 E

CONSTRUCT

1	CURB & GUTTER PER MAG DTL 220-A	369 L
2	CURB OPENING PER DTL 4, DWG D2.04	1 E
3	CONCRETE PAVEMENT PER TYP SECT 1, DWG D1.01	6,865 S
4	SIDEWALK PER MAG DTL 230	6,264 S
8	OM2-2V SIGN, POST & BASE PER DTL 4, DWG D2.04	4 E
9	OM3-R SIGN, POST & BASE PER DTL 4, DWG D2.04	9 E
14	DIVERSION BERM PER TYP SECT 5, DWG D1.01, H=12"	215 L
15	SEDIMENT BASIN BERM PER TYP SECT 6, DWG D1.01	157 L
18	DITCH PER TYP SECT 9, DWG D1.01	30 L
24	RIPRAP EROSION PROTECTION PER TYP SECT 3, DWG D1.01	1,677 C
25	RIPRAP EROSION PROTECTION PER TYP SECT 4, DWG D1.01	72 C
27	CONCRETE SCUPPER PER DTL 2, DWG D2.04, SKEW=0°	1 E
28	CONCRETE BASIN PER DTL 3, DWG D2.04	1 E

REFERENCE

6	MATCH EXISTING GRADE AT EDGE OF PAVEMENT
7	MATCH GRADE & WIDTH AT EXISTING SIDEWALK
8	MATCH EXISTING GRADE AT PROPERTY LINE
10	SEE DWG C1.09 FOR CONTROL POINT DATA
18	SEE DWG C2.05 & C2.06 FOR SWALE CONSTRUCTION



NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

LOWER EL MIRAGE WASH BASIN
FCD NO. 2012-C018

	BY	DATE
DESIGNED	J. Laipple	01/24/201
DRAWN	Staff	01/24/201
CHECKED	K. Roberts	01/24/201

Dibble Engineering
7500 N. Dreamy Draw Drive Suite 200 Phoenix, AZ 85020 P 602.957.1155

DRAWING NO. C1.01 | BASIN PLAN | SHEET 16 of 7

City of EL MIRAGE Arizona

GRAND HERITAGE, BRIGHT FUTURE!

CITY OF EL MIRAGE PUBLIC WORKS DEPARTMENT
Lower El Mirage Wash Basin Maintenance Inspection Report

O&M Div. Mgr._____

Inspection Date:_____

Date of Last Inspection:_____ Existing Weather Conditions:_____

Inspectors:_____ Recent Rainfall: Yes ☐ No ☐

Yes	No	**Detention Basin (Located at SW Corner of Cactus Road and El Mirage Road)**
☐	☐	Maintenance concerns with drains, spillways & side inlets
☐	☐	Adverse vegetation
☐	☐	Sediment/silt buildup in concrete lined sediment basin or other areas
☐	☐	Fencing, signs, or access gate concerns
☐	☐	Trash/debris concerns
☐	☐	Rodent or animal burrows or holes
☐	☐	Access ramp in need of maintenance
☐	☐	Evidence of erosion, rilling, or collapse of earthen embankment
☐	☐	Other concerns
		See Comments: _____
		Side Inlets, Chutes, or Drains
☐	☐	Erosion concerns at pipe outlets
☐	☐	Evidence of erosion, rilling, or collapse of earthen embankment
☐	☐	Adverse vegetation
☐	☐	Other concerns
		See Comments: _____
		Pipe Culverts-Cactus Road, El Mirage Road
☐	☐	Erosion concerns at inlets and outlets
☐	☐	Concrete concerns (cracks, spalling, exposed reinforcement) etc.
☐	☐	Adverse vegetation
☐	☐	Sediment/silt buildup
☐	☐	Debris against inclined and vertical grates at culvert headwalls
☐	☐	Vertical and inclined grates at culvert headwalls are damaged or unsecured
☐	☐	Evidence of erosion, rilling, or collapse of roadway embankment
☐	☐	Other concerns
		See Comments: _____
		Irrigation & Landscaping
☐	☐	Vandalism
☐	☐	Insufficient or excessive watering
☐	☐	Trees are in need of maintenance
☐	☐	Additional plants or trees needed
☐	☐	Grounds need attention
☐	☐	Other concerns
		See Comments: _____

Maintenance Inspection Report Comments
Enter Date Here:_____

Comment #1:

Comment #2:

Comment #3:

Comment #4:

Comment #5:

Comment #6:

Comment #7:

Comment #8:

Comment #9:

Comment #10:

City of EL MIRAGE Arizona
GRAND HERITAGE, BRIGHT FUTURE!

CITY OF EL MIRAGE PUBLIC WORKS DEPARTMENT
Lower El Mirage Wash Basin

DRAINAGE PROBLEM REPORT

Date: _____ Inspector: _____

Type of inspection: ☐ Post-storm ☐ Complaint ☐ Routine

Location: (Identify stream or basin name, downstream and upstream streets or reference points, and location of problem. Provide sketch as needed.)

Type of problem: ☐Trash ☐ Minor ☐ Obstruction ☐ Structural

Recommended maintenance: _____

_____

_____

Is equipment needed? _____ If so, list equipment needed: _____

_____

Date: _____

Work order description: _____

_____

_____

_____

Work order number: _____

Date: _____ Foreman: _____

Maintenance performed: _____

_____

_____

_____

Inspected by: _____

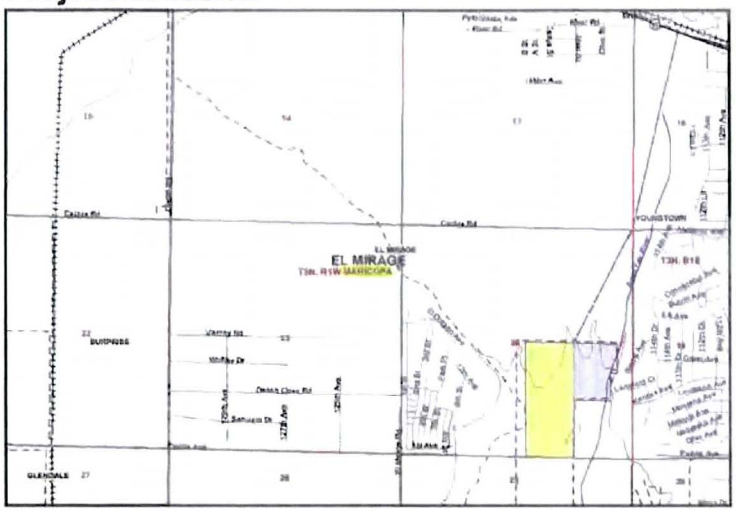
Use other side for additional recommendations for this site.

APPENDIX H.4

ENVIRONMENTAL REVIEW

Arizona's On-line Environmental Review Tool
Search ID: 20130207019585
Project Name: Lower El Mirage Wash Basin
Date: 2/7/2013 3:54:30 PM

Project Location



Project Name: Lower El Mirage Wash Basin
Submitted By: Josh Papworth
On behalf of: FCDMC
Project Search ID: 20130207019585
Date: 2/7/2013 3:54:23 PM
Project Category: Recreation Areas,Park and/or associated facilities,Creation/Construction of new facilities
Project Coordinates (UTM Zone 12-NAD 83): 376855.602, 3717732.813 meter
County: MARICOPA
USGS 7.5 Minute Quadrangle ID: 1249
Quadrangle Name: EL MIRAGE
Project locality is not anticipated to change

The Department appreciates the opportunity to provide in-depth comments and project review when additional information or environmental documentation becomes available.

Special Status Species Occurrences/Critical Habitat/Tribal Lands within 3 miles of Project Vicinity:

No special status species were documented as occurring within the project vicinity. However, further field investigations of the project area are highly recommended. Site visits may reveal previously unrecorded resources of special concern in locations where they are currently undocumented.

No proposed or designated critical habitat is within the project vicinity.

No Indian tribal lands are within the project vicinity.

Location Accuracy Disclaimer

Project locations are assumed to be both precise and accurate for the purposes of environmental review. The creator/owner of the Project Review Receipt is solely responsible for the project location and thus the correctness of the Project Review Receipt content.

 APPLICATION INITIALS: _____

Please review the entire receipt for project type recommendations and/or species or location information and retain a copy for future reference. If any of the information you provided did not accurately reflect this project, or if project plans change, another review should be conducted, as this determination may not be valid.

Arizona's On-line Environmental Review Tool:

1. This On-line Environmental Review Tool inquiry has generated recommendations regarding the potential impacts of your project on Special Status Species (SSS) and other wildlife of Arizona. SSS include all U.S. Fish and Wildlife Service federally listed, U.S. Bureau of Land Management sensitive, U.S. Forest Service sensitive, and Arizona Game and Fish Department (Department) recognized species of concern.
2. These recommendations have been made by the Department, under authority of Arizona Revised Statutes Title 5 (Amusements and Sports), 17 (Game and Fish), and 28 (Transportation). These recommendations are preliminary in scope, designed to provide early considerations for all species of wildlife, pertinent to the project type you entered.
3. This receipt, generated by the automated On-line Environmental Review Tool does not constitute an official project review by Department biologists and planners. Further coordination may be necessary as appropriate under the National Environmental Policy Act (NEPA) and/or the Endangered Species Act (ESA).

The U.S. Fish and Wildlife Service (USFWS) has regulatory authority over all federally listed species under the ESA. Contact USFWS Ecological Services Offices: http://arizonaes.fws.gov/.

Phoenix Main Office
2321 W. Royal Palm Road, Suite 103
Phoenix, AZ 85021
Phone 602-242-0210
Fax 602-242-2513

Tucson Sub-Office
201 North Bonita, Suite 141
Tucson, AZ 85745
Phone 520-670-6144
Fax 520-670-6154

Flagstaff Sub-Office
323 N. Leroux Street, Suite 101
Flagstaff, AZ 86001
Phone 928-226-0614
Fax 928-226-1099

Disclaimer:

1. This is a preliminary environmental screening tool. It is not a substitute for the potential knowledge gained by having a biologist conduct a field survey of the project area.
2. The Department's Heritage Data Management System (HDMS) data is not intended to include potential distribution of special status species. Arizona is large and diverse with plants, animals, and environmental conditions that are ever changing. Consequently, many areas may contain species that biologists do not know about or species previously noted in a particular area may no longer occur there.
3. Not all of Arizona has been surveyed for special status species, and surveys that have been conducted have varied greatly in scope and intensity. Such surveys may reveal previously undocumented population of species of special concern.
4. HDMS data contains information about species occurrences that have actually been reported to the Department.

Arizona Game and Fish Department Mission

To conserve, enhance, and restore Arizona's diverse wildlife resources and habitats through aggressive protection and

 APPLICATION INITIALS: _____

management programs, and to provide wildlife resources and safe watercraft and off-highway vehicle recreation for the enjoyment, appreciation, and use by present and future generations.

Project Category: Recreation Areas,Park and/or associated facilities,Creation/Construction of new facilities

Project Type Recommendations:

All degraded and disturbed lands should be restored to their natural state. Vegetation restoration projects (including treatments of invasive or exotic species) should have a completed site-evaluation plan (identifying environmental conditions necessary to re-establish native vegetation), a revegetation plan (species, density, method of establishment), a short and long-term monitoring plan, including adaptive management guidelines to address needs for replacement vegetation.

Based on the project type entered; coordination with State Historic Preservation Office may be required http://azstateparks.com/SHPO/index.html

Consider incorporating project components that may allow for the inclusion to promote, enhance, create, or restore wildlife habitat. Contact Project Evaluation Program for further information and opportunities - http://www.azgfd.gov/inside_azgfd/agency_directory.shtml.

Development plans should provide for open natural space for wildlife movement, while also minimizing the potential for wildlife-human interactions through design features. Please contact Project Evaluation Program for more information on living with urban wildlife.

During planning and construction, minimize potential introduction or spread of exotic invasive species. Invasive species can be plants, animals (exotic snails), and other organisms (e.g. microbes), which may cause alteration to ecological functions or compete with or prey upon native species and can cause social impacts (e.g. livestock forage reduction, increase wildfire risk). The terms noxious weed or invasive plants are often used interchangeably. Precautions should be taken to wash all equipment utilized in the project activities before and after project activities to reduce the spread of invasive species. Arizona has noxious weed regulations (Arizona Revised Statutes, Rules R3-4-244 and R3-4-245). See Arizona Department of Agriculture website for restricted plants http://www.azda.gov/PSD/quarantine5.htm. Additionally, the U.S. Department of Agriculture has information regarding pest and invasive plant control methods including: pesticide, herbicide, biological control agents, and mechanical control: http://www.usda.gov/wps/portal/usdahome. The Department regulates the importation, purchasing, and transportation of wildlife and fish (Restricted Live Wildlife), please refer to the hunting regulations for further information http://www.azgfd.gov/h_f/hunting_rules.shtml.

During the planning stages of your project, please consider the local or regional needs of wildlife in regards to movement, connectivity, and access to habitat needs. Loss of this permeability prevents wildlife from accessing resources, finding mates, reduces gene flow, prevents wildlife from re-colonizing areas where local extirpations may have occurred, and ultimately prevents wildlife from contributing to ecosystem functions, such as pollination, seed dispersal, control of prey numbers, and resistance to invasive species. In many cases, streams and washes provide natural movement corridors for wildlife and should be maintained in their natural state. Uplands also support a large diversity of species, and should be contained within important

 APPLICATION INITIALS: _____

wildlife movement corridors. In addition, maintaining biodiversity and ecosystem functions can be facilitated through improving designs of structures, fences, roadways, and culverts to promote passage for a variety of wildlife.

Minimization and mitigation of impacts to wildlife and fish species due to changes in water quality, quantity, chemistry, temperature, and alteration to flow regimes (timing, magnitude, duration, and frequency of floods) should be evaluated. Minimize impacts to springs, in-stream flow, and consider irrigation improvements to decrease water use. If dredging is a project component, consider timing of the project in order to minimize impacts to spawning fish and other aquatic species (including spawning seasons), and to reduce spread of exotic invasive species. We recommend early direct coordination with Project Evaluation Program for projects that could impact water resources, wetlands, streams, springs, and/or riparian habitats.

Minimize impacts to wildlife and wildlife habitat by staying on designated roads and trails, and by minimizing use during spring and summer breeding periods. Additional information concerning OHV use is located at:
http://www.azgfd.gov/outdoor_recreation/habitat_ohv_areas.shtml

Planning: consider impacts of lighting intensity on mammals and birds and develop measures or alternatives that can be taken to increase human safety while minimizing potential impacts to wildlife. Conduct wildlife surveys to determine species within project area, and evaluate proposed activities based on species biology and natural history to determine if artificial lighting may disrupt behavior patterns or habitat use.

Recommendations will be dependant upon goals of the fence project and the wildlife species expected to be impacted by the project. General guidelines for ensuring wildlife-friendly fences include: barbless wire on the top and bottom with the maximum fence height 42", minimum height for bottom 16". Modifications to this design may be considered for fencing anticipated to be routinely encountered by elk, bighorn sheep or pronghorn (e.g., Pronghorn fencing would require 18" minimum height on the bottom). Please refer to the Department's Fencing Guidelines located at
http://www.azgfd.gov/hgis/guidelines.aspx.

The Department recommends that wildlife surveys are conducted to determine if noise-sensitive species occur within the project area. Avoidance or minimization measures could include conducting project activities outside of breeding seasons.

Trenches should be covered or back-filled as soon as possible. Incorporate escape ramps in ditches or fencing along the perimeter to deter small mammals and herptefauna (snakes, lizards, tortoise) from entering ditches.

Recommendations Disclaimer:

1. Potential impacts to fish and wildlife resources may be minimized or avoided by the recommendations generated from information submitted for your proposed project.
2. These recommendations are proposed actions or guidelines to be considered during **preliminary project development**.
3. Additional site specific recommendations may be proposed during further NEPA/ESA analysis or through coordination with affected agencies.
4. Making this information directly available does not substitute for the Department's review of project proposals, and should not decrease our opportunity to review and evaluate additional project information and/or new project proposals.
5. The Department is interested in the conservation of all fish and wildlife resources, including those Special Status Species listed on this receipt, and those that may have not been documented within the project vicinity as well as other game and nongame wildlife.

 APPLICATION INITIALS: _____

6. **Further coordination requires the submittal of this initialed and signed Environmental Review Receipt with a cover letter and project plans or documentation that includes project narrative, acreage to be impacted, how construction or project activity(s) are to be accomplished, and project locality information (including site map).**
7. Upon receiving information by AZGFD, please allow 30 days for completion of project reviews. Mail requests to:

Project Evaluation Program, Habitat Branch
Arizona Game and Fish Department
5000 West Carefree Highway
Phoenix, Arizona 85086-5000
Phone Number: (623) 236-7600
Fax Number: (623) 236-7366

Terms of Use

By using this site, you acknowledge that you have read and understand the terms of use. Department staff may revise these terms periodically. If you continue to use our website after we post changes to these terms, it will mean that you accept such changes. If at any time you do not wish to accept the Terms, you may choose not to use the website.

1. This Environmental Review and project planning website was developed and intended for the purpose of screening projects for potential impacts on resources of special concern. By indicating your agreement to the terms of use for this website, you warrant that you will not use this website for any other purpose.
2. Unauthorized attempts to upload information or change information on this website are strictly prohibited and may be punishable under the Computer Fraud and Abuse Act of 1986 and/or the National Information Infrastructure Protection Act .
3. The Department reserves the right at any time, without notice, to enhance, modify, alter, or suspend the website and to terminate or restrict your access to the website.
4. This Environmental Review is based on the project study area that was entered. The review must be redone if the project study area, location, or the type of project changes. If additional information becomes available, this review may need to be reconsidered.
5. A signed and initialed copy of the Environmental Review Receipt indicates that the entire receipt has been read by the signer of the Environmental Review Receipt.

Security:

The Environmental Review and project planning web application operates on a complex State computer system. This system is monitored to ensure proper operation, to verify the functioning of applicable security features, and for other like purposes. Anyone using this system expressly consents to such monitoring and is advised that if such monitoring reveals possible evidence of criminal activity, system personnel may provide the evidence of such monitoring to law enforcement officials. Unauthorized attempts to upload or change information; to defeat or circumvent security measures; or to utilize this system for other than its intended purposes are prohibited.

This website maintains a record of each environmental review search result as well as all contact information. This information is maintained for internal tracking purposes. Information collected in this application will not be shared outside of the purposes of the Department.

If the Environmental Review Receipt and supporting material are not mailed to the Department or other appropriate agencies within six (6) months of the Project Review Receipt date, the receipt is considered to be null and void, and a new review must be initiated.

 APPLICATION INITIALS: _____

Arizona's On-line Environmental Review Tool
Search ID: 20130207019585
Project Name: Lower El Mirage Wash Basin
Date: 2/7/2013 3:54:30 PM

Print this Environmental Review Receipt using your Internet browser's print function and keep it for your records. Signature of this receipt indicates the signer has read and understands the information provided.

Signature: _____

Date: 2.6.13

Proposed Date of Implementation: 2013

Please provide point of contact information regarding this Environmental Review.

Application or organization responsible for project implementation

Agency/organization: FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Contact Name: MIKE DUNCAN

Address: 2801 W. DURANGO ST.

City, State, Zip: PHOENIX, AZ 85009

Phone: 602-506-1501

E-mail: _____

Person Conducting Search (if not applicant)

Agency/organization: DIBBLE ENGINEERING

Contact Name: JOSH PARWORTH

Address: 7500 N. DREAMY DRAW DR SUITE 200

City, State, Zip: PHOENIX, AZ, 85020

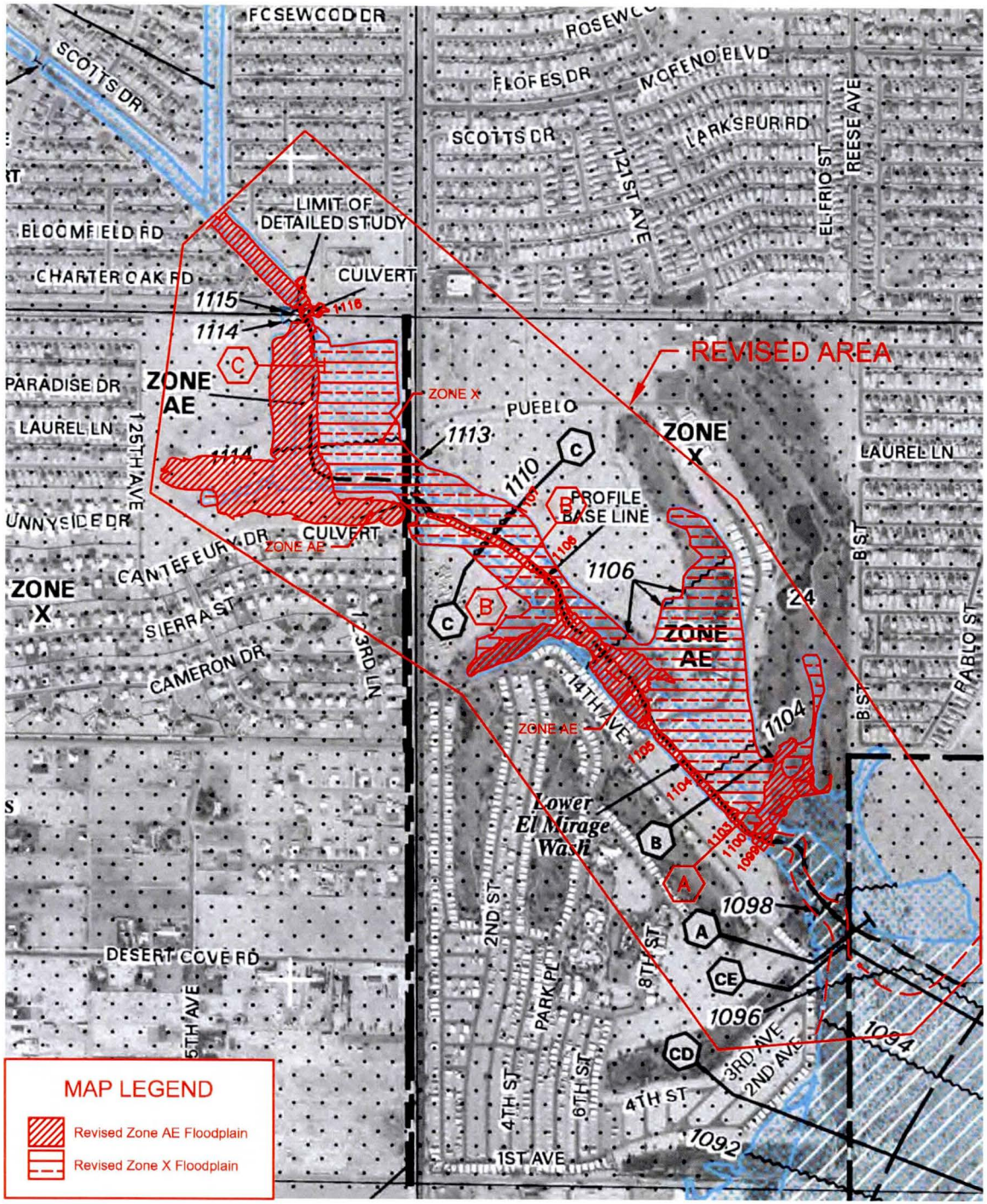
Phone: 602 957 1155

E-mail: _____

 APPLICATION INITIALS: _____

APPENDIX H.5

CURRENT EFFECTIVE FIRM PANELS WITH PROPOSED FLOODPLAIN



MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1605J

FIRM
FLOOD INSURANCE RATE MAP
MARICOPA COUNTY, ARIZONA
AND INCORPORATED AREAS

PANEL 1605 OF 4350

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EL MIRAGE, CITY OF	040041	1605	J
GLENDALE, CITY OF	040045	1605	J
MARICOPA COUNTY	040037	1605	J
SURPRISE, CITY OF	040053	1605	J

ANNOTATED FIRM MAP

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

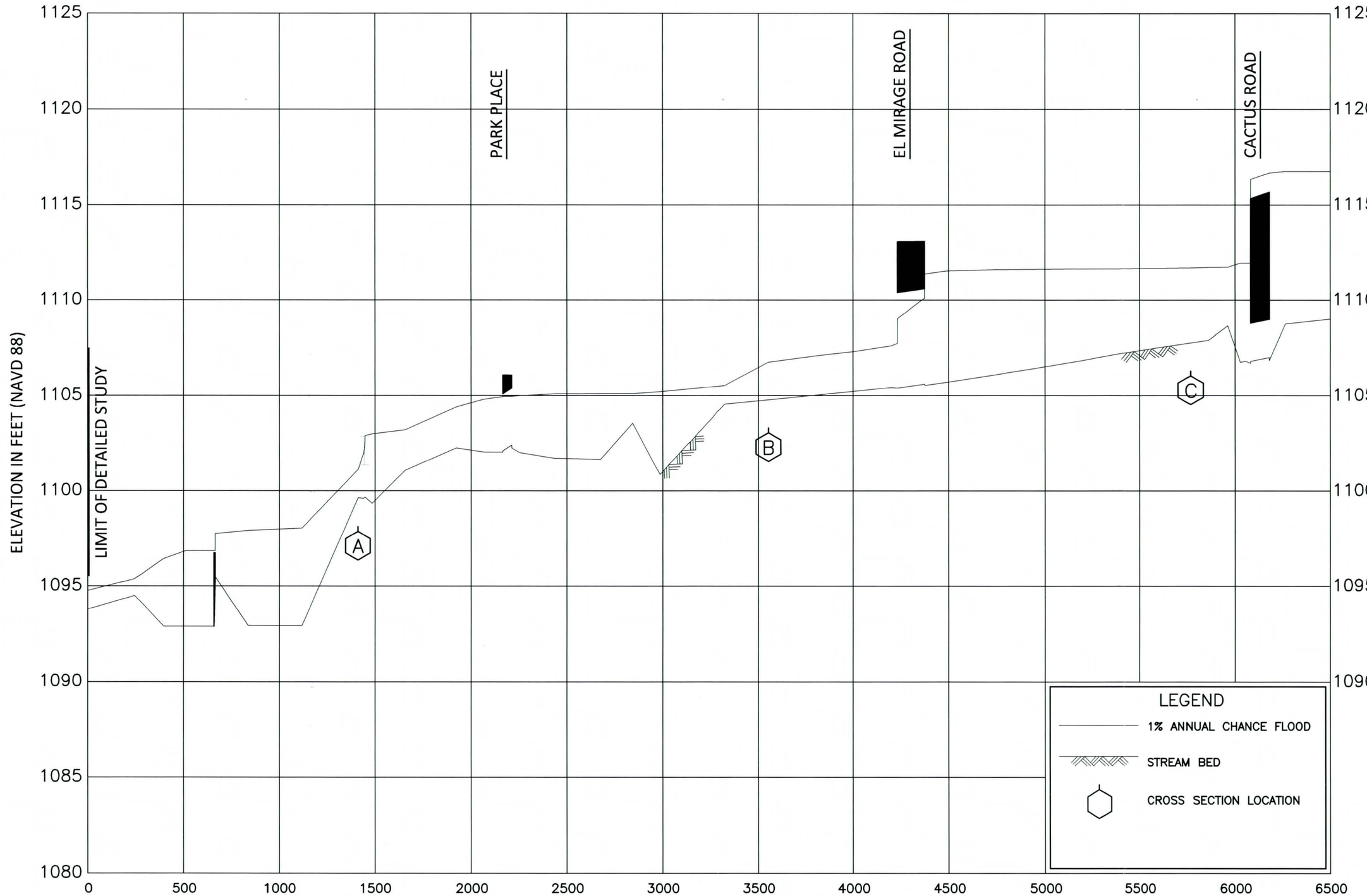
MAP NUMBER
04013C1605J

MAP REVISED
SEPTEMBER 30, 2005

Federal Emergency Management Agency

APPENDIX H.6

FLOODPLAIN PROFILES



FLOOD PROFILES

LOWER EL MIRAGE WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND UNINCORPORATED AREAS

01P