

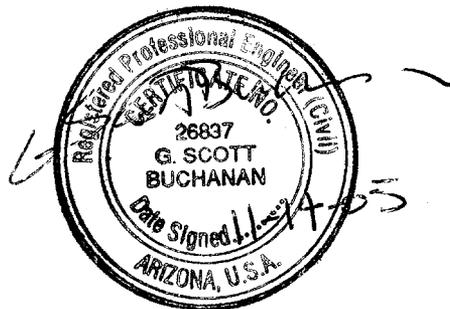
Sonoqui Wash Channelization
Chandler Heights Road to Queen Creek Wash
FCD 2002C037

**Conditional Letter of Map Revision
(CLOMR)**

Technical Data Notebook

Prepared by:
Stanley Consultants, Inc.
With Contributions from Sub-Consultant
WEST Consultants, Inc.

Prepared for:
**Flood Control District of Maricopa County,
Town of Queen Creek, and the Town of Gilbert**



November 2005

SCI Proj # 16955



Federal Emergency Management Agency

Washington, D.C. 20472

MAY 26 2006

ROUTING	
CONTRACTS	
ENG	FILE
REG	P & PM
ADMIN	O & M
PIO	LANDS
C-3	PLANNING
90.4	
MAY 26 2006	
FLOOD CONTROL DISTRICT	

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 06-09-B379R

The Honorable Wendy Feldman-Kerr
Mayor, Town of Queen Creek
22350 South Ellsworth Road
Queen Creek, AZ 85242

Community: Town of Queen Creek, AZ
Community No.: 040132

104

Dear Mayor Feldman-Kerr:

This responds to a request that the Department of Homeland Security's Federal Emergency Management Agency (FEMA) comment on the effects that a proposed project would have on the effective Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for Maricopa County, Arizona and Incorporated Areas (the effective FIRM and FIS report for your community), in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated February 8, 2006, Ms. Catherine W. Regester, P.E., CFM, Senior Engineer, Flood Control District of Maricopa County, requested that FEMA evaluate the effects that a new hydraulic analysis and proposed project along Sonoqui Wash from just upstream of Higley Road to approximately 1,000 feet upstream of Chandler Heights Road would have on the flood hazard information shown on the effective FIRM and FIS report. The proposed project will consist of channelization from approximately 1,000 feet downstream of Higley Road to just downstream of Chandler Heights Road and construction of four 10-foot by 5-foot concrete box culverts at Recker Road; three 2-foot-diameter concrete pipe culverts at Power Road, Sossaman Road, and Chandler Heights Road; a bridge at Higley Road; and a detention basin just downstream of Chandler Heights Road.

All data required to complete our review of this request for a Conditional Letter of Map Revision (CLOMR) were submitted with letters from Ms. Regester.

Because this revision request also affects the Town of Gilbert and the unincorporated areas of Maricopa County, separate CLOMRs for those communities were issued on the same date as this CLOMR.

We reviewed the submitted data and the data used to prepare the effective FIRM for your community and determined that the proposed project meets the minimum floodplain management criteria of the NFIP. We believe that, if the proposed project is constructed as shown on the topographic work maps entitled "Sonoqui Wash Channelization: Queen Creek Wash to Chandler Heights Road CLOMR," prepared by the Flood Control District of Maricopa County, revised May 3, 2006, and the data listed below are received, a revision to the FIRM would be warranted.

As a result of the proposed project, the elevations of the flood having 1-percent chance of being equaled or exceeded in any given year (base flood) decreased compared to the effective Base Flood Elevations (BFEs) for Sonoqui Wash from just upstream of Recker Road to approximately 2,000 feet upstream of Chandler Heights Road. The maximum decrease in BFE, 9.1 feet, will occur just downstream of Power Road. The entire base flood along Sonoqui Wash will be contained in the concrete-lined channel and culverts from just upstream of Recker Road to just downstream of Chandler Heights Road.

As a result of the proposed project, the width of the Special Flood Hazard Area (SFHA), the area that would be inundated by the base flood, will decrease compared to the effective SFHA width along the revised reach of Sonoqui Wash. The maximum decrease in SFHA width, approximately 2,600 feet, will occur approximately 1,500 feet downstream of Power Road.

Upon completion of the project, your community may submit the data listed below and request that we make a final determination on revising the effective FIRM and FIS report.

- Detailed application and certification forms, which were used in processing this request, 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, entitled "Overview & Concurrence Form," must be included. (A copy of this form is enclosed.)
- The detailed application and certification forms listed below may be required if as-built conditions differ from the preliminary plans. If required, please submit new forms (copies of which are enclosed) or annotated copies of the previously submitted forms showing the revised information.

Form 2, entitled "Riverine Hydrology & Hydraulics Form"

Form 3, entitled "Riverine Structures Form"

Hydraulic analyses, for as-built conditions, of the base flood, together with a topographic work map showing the revised floodplain boundaries, must be submitted with Form 2.

- Effective October 30, 2005, FEMA revised the fee schedule for reviewing and processing requests for conditional and final modifications to published flood information and maps. In accordance with this schedule, the current fee for this map revision request is \$4,000 and must be received before we can begin processing the request. Please note, however, that the fee schedule is subject to change, and requesters are required to submit the fee in effect at the time of the submittal. Payment of this fee shall be made in the form of a check or money order, made payable in U.S. funds to the National Flood Insurance Program, or by credit card. The payment must be forwarded to the following address:

Federal Emergency Management Agency
 Fee-Charge System Administrator
 P.O. Box 22787
 Alexandria, VA 22304

- As-built plans, certified by a registered professional engineer, of all proposed project elements
- Community acknowledgment of the map revision request

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 BFEs would change as a result of the project, a 90-day appeal period would be initiated, during which community officials and interested persons may appeal the revised BFEs based on scientific or technical data.

The basis of this CLOMR is, in whole or in part, a channel-modification/culvert/detention basin project. NFIP regulations, as cited in Paragraph 60.3(b)(7), require that communities assure that the flood-carrying

capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management regulations. Consequently, the ultimate responsibility for maintenance of the modified channel and culverts rests with your community.

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

If you have any questions regarding floodplain management regulations for your community or the NFIP in general, please contact the Consultation Coordination Officer (CCO) for your community. Information on the CCO for your community may be obtained by calling the Director, Federal Insurance and Mitigation Division of FEMA in Oakland, California, at (510) 627-7175. If you have any questions regarding this CLOMR, please call our Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,



Michael B. Godesky, Project Engineer
Engineering Management Section
Mitigation Division

For: William R. Blanton Jr., CFM, Acting Chief
Engineering Management Section
Mitigation Division

Enclosures

cc: The Honorable Max W. Wilson
Chairman, Maricopa County
Board of Supervisors

The Honorable Steven M. Berman
Mayor, Town of Gilbert

Mr. Richard L. Schaner
Public Works Director
Town of Queen Creek

Mr. Ted Collins, CFM
Principal Floodplain Administrator
Flood Control District of Maricopa County

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

Ms. Catherine W. Register, P.E., CFM
Senior Engineer
Flood Control District of Maricopa County

Mr. Lonnie K. Frost
Floodplain Administrator
Town of Gilbert

Mr. Brian Cosson, CFM
NFIP Coordinator
Office of Dam Safety and Flood Mitigation
Arizona Department of Water Resources



Federal Emergency Management Agency

Washington, D.C. 20472

MAY 26 2006

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 06-09-B379R

The Honorable Max W. Wilson
Chairman, Maricopa County
Board of Supervisors
301 West Jefferson Street, 10th Floor
Phoenix, AZ 85003

Community: Maricopa County, AZ
Community No.: 040037

104

Dear Mr. Wilson:

This responds to a request that the Department of Homeland Security's Federal Emergency Management Agency (FEMA) comment on the effects that a proposed project would have on the effective Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for Maricopa County, Arizona and Incorporated Areas, in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated February 8, 2006, Ms. Catherine W. Regester, P.E., CFM, Senior Engineer, Flood Control District of Maricopa County, requested that FEMA evaluate the effects that a new hydraulic analysis and proposed project along Sonoqui Wash from just upstream of Higley Road to approximately 1,000 feet upstream of Chandler Heights Road would have on the flood hazard information shown on the effective FIRM and FIS report. The proposed project will consist of channelization from approximately 1,000 feet downstream of Higley Road to just downstream of Chandler Heights Road and construction of four 10-foot by 5-foot concrete box culverts at Recker Road; three 2-foot-diameter concrete pipe culverts at Power Road, Sossaman Road, and Chandler Heights Road; a bridge at Higley Road; and a detention basin just downstream of Chandler Heights Road.

All data required to complete our review of this request for a Conditional Letter of Map Revision (CLOMR) were submitted with letters from Ms. Regester.

Because this revision request also affects the Towns of Gilbert and Queen Creek, separate CLOMRs for those communities were issued on the same date as this CLOMR.

We reviewed the submitted data and the data used to prepare the effective FIRM for your community and determined that the proposed project meets the minimum floodplain management criteria of the NFIP. We believe that, if the proposed project is constructed as shown on the topographic work maps entitled "Sonoqui Wash Channelization: Queen Creek Wash to Chandler Heights Road CLOMR," prepared by the Flood Control District of Maricopa County, revised May 3, 2006, and the data listed below are received, a revision to the FIRM would be warranted.

As a result of the proposed project, the elevations of the flood having 1-percent chance of being equaled or exceeded in any given year (base flood) decreased compared to the effective Base Flood Elevations (BFEs) for Sonoqui Wash from approximately 1,500 feet downstream of Recker Road to just upstream of Chandler Heights Road. The maximum decrease in BFE, 4.6 feet, will occur just downstream of Recker Road. The entire base flood along Sonoqui Wash will be contained in the concrete-lined channel and culverts from approximately 1,500 feet downstream of Recker Road to just downstream of Chandler Heights Road.

As a result of the proposed project, the width of the Special Flood Hazard Area (SFHA), the area that would be inundated by the base flood, will decrease compared to the effective SFHA width along the revised reach of Sonoqui Wash. The maximum decrease in SFHA width, approximately 3,400 feet, will occur approximately 1,500 feet downstream of Recker Road.

Upon completion of the project, your community may submit the data listed below and request that we make a final determination on revising the effective FIRM and FIS report.

- Detailed application and certification forms, which were used in processing this request, 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, entitled "Overview & Concurrence Form," must be included. (A copy of this form is enclosed.)
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Form 3, entitled "Riverine Structures Form"

Hydraulic analyses, for as-built conditions, of the base flood, together with a topographic work map showing the revised floodplain boundaries, must be submitted with Form 2.

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Federal Emergency Management Agency
 Fee-Charge System Administrator
 P.O. Box 22787
 Alexandria, VA 22304

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- Community acknowledgment of the map revision request

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 BFEs would change as a result of the project, a 90-day appeal period would be initiated, during which community officials and interested persons may appeal the revised BFEs based on scientific or technical data.

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

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

If you have any questions regarding floodplain management regulations for your community or the NFIP in general, please contact the Consultation Coordination Officer (CCO) for your community. Information on the CCO for your community may be obtained by calling the Director, Federal Insurance and Mitigation Division of FEMA in Oakland, California, at (510) 627-7175. If you have any questions regarding this CLOMR, please call our Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,



Michael B. Godesky, Project Engineer
Engineering Management Section
Mitigation Division

For: William R. Blanton Jr., CFM, Acting Chief
Engineering Management Section
Mitigation Division

Enclosures

cc: The Honorable Steven M. Berman
Mayor, Town of Gilbert

The Honorable Wendy Feldman-Kerr
Mayor, Town of Queen Creek

Mr. Ted Collins, CFM
Principal Floodplain Administrator
Flood Control District of Maricopa County

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

Ms. Catherine W. Regester, P.E., CFM
Senior Engineer
Flood Control District of Maricopa County

Mr. Lonnie K. Frost
Floodplain Administrator
Town of Gilbert

Mr. Richard L. Schaner
Public Works Director
Town of Queen Creek

Mr. Brian Cosson, CFM
NFIP Coordinator
Office of Dam Safety and Flood Mitigation
Arizona Department of Water Resources



Federal Emergency Management Agency

Washington, D.C. 20472

MAY 26 2006

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 06-09-B379R

The Honorable Steven M. Berman
Mayor, Town of Gilbert
50 East Civic Center Drive
Gilbert, AZ 85296

Community: Town of Gilbert, AZ
Community No.: 040044

104

Dear Mayor Berman:

This responds to a request that the Department of Homeland Security's Federal Emergency Management Agency (FEMA) comment on the effects that a proposed project would have on the effective Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for Maricopa County, Arizona and Incorporated Areas (the effective FIRM and FIS report for your community), in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated February 8, 2006, Ms. Catherine W. Regester, P.E., CFM, Senior Engineer, Flood Control District of Maricopa County, requested that FEMA evaluate the effects that a new hydraulic analysis and proposed project along Sonoqui Wash from just upstream of Higley Road to approximately 1,000 feet upstream of Chandler Heights Road would have on the flood hazard information shown on the effective FIRM and FIS report. The proposed project will consist of channelization from approximately 1,000 feet downstream of Higley Road to just downstream of Chandler Heights Road and construction of four 10-foot by 5-foot concrete box culverts at Recker Road; three 2-foot-diameter concrete pipe culverts at Power Road, Sossaman Road, and Chandler Heights Road; a bridge at Higley Road; and a detention basin just downstream of Chandler Heights Road.

All data required to complete our review of this request for a Conditional Letter of Map Revision (CLOMR) were submitted with letters from Ms. Regester.

Because this revision request also affects the Town of Queen Creek and the unincorporated areas of Maricopa County, separate CLOMRs for those communities were issued on the same date as this CLOMR.

We reviewed the submitted data and the data used to prepare the effective FIRM for your community and determined that the proposed project meets the minimum floodplain management criteria of the NFIP. We believe that, if the proposed project is constructed as shown on the topographic work maps entitled "Sonoqui Wash Channelization: Queen Creek Wash to Chandler Heights Road CLOMR," prepared by the Flood Control District of Maricopa County, revised May 3, 2006, and the data listed below are received, a revision to the FIRM would be warranted.

As a result of the proposed project, the elevations of the flood having 1-percent chance of being equaled or exceeded in any given year (base flood) decreased compared to the effective Base Flood Elevations (BFEs) for Sonoqui Wash from just upstream of Higley Road to just downstream of Recker Road. The maximum decrease in BFE, 12.5 feet, will occur just upstream of Higley Road. The entire base flood along Sonoqui Wash will be contained in the concrete-lined channel and culverts from approximately 1,000 feet downstream of Higley Road to just downstream of Recker Road.

As a result of the proposed project, the width of the Special Flood Hazard Area (SFHA), the area that would be inundated by the base flood, will decrease compared to the effective SFHA width along the revised reach of Sonoqui Wash. The maximum decrease in SFHA width, approximately 4,000 feet, will occur approximately 200 feet upstream of Higley Road.

Upon completion of the project, your community may submit the data listed below and request that we make a final determination on revising the effective FIRM and FIS report.

- Detailed application and certification forms, which were used in processing this request, 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, entitled "Overview & Concurrence Form," must be included. (A copy of this form is enclosed.)
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 Fee-Charge System Administrator
 P.O. Box 22787
 Alexandria, VA 22304

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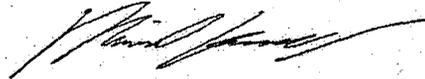
The basis of this CLOMR is, in whole or in part, a channel-modification/culvert/bridge project. NFIP regulations, as cited in Paragraph 60.3(b)(7), require that communities assure that the flood-carrying

capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management regulations. Consequently, the ultimate responsibility for maintenance of the modified channel, culverts, and bridge rests with your community.

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

If you have any questions regarding floodplain management regulations for your community or the NFIP in general, please contact the Consultation Coordination Officer (CCO) for your community. Information on the CCO for your community may be obtained by calling the Director, Federal Insurance and Mitigation Division of FEMA in Oakland, California, at (510) 627-7175. If you have any questions regarding this CLOMR, please call our Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,



Michael B. Godesky, Project Engineer
Engineering Management Section
Mitigation Division

For: William R. Blanton Jr., CFM, Acting Chief
Engineering Management Section
Mitigation Division

Enclosures

cc: The Honorable Max W. Wilson
Chairman, Maricopa County
Board of Supervisors

The Honorable Wendy Feldman-Kerr
Mayor, Town of Queen Creek

Mr. Lonnie K. Frost
Floodplain Administrator
Town of Gilbert

Mr. Ted Collins, CFM
Principal Floodplain Administrator
Flood Control District of Maricopa County

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

Ms. Catherine W. Regester, P.E., CFM
Senior Engineer
Flood Control District of Maricopa County

Mr. Richard L. Schaner
Public Works Director
Town of Queen Creek

Mr. Brian Cosson, CFM
NFIP Coordinator
Office of Dam Safety and Flood Mitigation
Arizona Department of Water Resources



Flood Control District of Maricopa County

Board of Directors
Fulton Brock, District 1
Don Stapley, District 2
Andrew Kunasek, District 3
Max 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

April 20, 2006

Michael Baker, Jr., Inc.
3601 Eisenhower Avenue, #600
Alexandria, VA 22304-6425

ATTN: Craig Kennedy, CFM

RE: Sonoqui Wash Channelization
Towns of Gilbert and Queen Creek, and Unincorporated County, Maricopa County, AZ
FEMA Case No.: 06-09-B379R

Dear Mr. Kennedy:

We are in receipt of your comment letter dated April 4, 2006. In response to your comments we offer the following:

1. The HEC-RAS modeling of the Higley Road Bridge and Sossaman Road and Chandler Heights Boulevard Culverts was reviewed and revised, as appropriate, to match the submitted design drawings. These changes resulted in no change to the proposed water surface elevations (WSELs).
2. Per your letter, Queen Creek was eliminated from the HEC-RAS model and the downstream boundary condition for Sonoqui Wash was revised to Normal Depth. The proposed weir at the downstream end of the sediment basin was chosen to begin the modeling as the weir serves as a control point. The proposed pipe under the weir serves, primarily, as a drain for the sediment basin and, therefore, was removed from the modeling. The change to normal depth resulted in changes in WSEL ranging from a maximum decrease of 1.57 ft at cross section 11+26 to a maximum increase of 0.15 ft at cross sections 21+53 and 22+00. Changes in WSEL occurred from cross sections 11+26 to 22+82. There were no changes upstream of cross section 22+82. (Cross section 22+82 is located on the downstream side of the drop structure immediately east of the proposed Higley Road Bridge.) The WSELs at the cross sections, the location of BFE 1312, and the floodplain limits within the channel downstream of the Higley Road Bridge have been revised to reflect the revised HEC-RAS modeling. The changes impact only work map sheet 1 of 9.

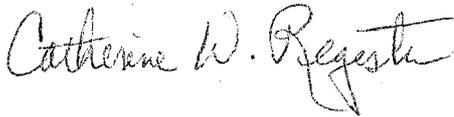
Mr. Craig Kennedy
Page 2 of 2
April 20, 2006

The following items are included in this submittal:

- Copy of FEMA comment letter dated April 4, 2006;
- CD containing the revised HEC-RAS files (reCLOMR.prj);
- Hard copy print-out of the revised HEC-RAS model cross section plots (TDN Appendix E.2) and summary output (TDN Appendix E.5);
- Hard copy mark-up of *Sonoqui Wash Channelization, Queen Creek Wash to Chandler Heights Road*, CLOMR work map sheet 1 of 9. Revised portions are shown within "clouds".
- Copy of revised *Sonoqui Wash Channelization, Queen Creek Wash to Chandler Heights Road*, CLOMR work map sheet 1 of 9 on 11" X 17" sheet (not a half-size) for TDN Appendix G.4.

If you have any questions, or require additional information, please feel free to call me at 602-506-4001.

Yours truly,



Catherine W. Regester, P.E., CFM
Senior Engineer

Enclosures: Listed above

Copies to (with enclosures):

Lonnie Frost
Town of Gilbert
1205 South Gilbert Road
Gilbert, AZ 85296

Dick Schaner, P.E.
Town of Queen Creek
22350 S Ellsworth Road
Queen Creek, AZ 85242

Copies to (w/o enclosures):

Mike Godesky
Hazards Study Branch, Mitigation Directorate
Federal Emergency Management Agency
500 C Street SW
Washington, D.C. 20472-0001

Ray Lenaburg
Department of Homeland Security, FEMA Region IX
1111 Broadway, Suite 1200
Oakland, CA 94607

Brian Cosson
NFIP State Coordinator
Arizona Department of Water Resources
Office of Dam Safety and Flood Mitigation
3550 N. Central Avenue
Phoenix, AZ 85012

G. Scott Buchanan
Stanley Consultants
1661 East Camelback Road, Suite 400
Phoenix, AZ 85016



NATIONAL FLOOD INSURANCE PROGRAM

FEMA NATIONAL SERVICE PROVIDER

FLOOD CONTROL DISTRICT RECEIVED	
APR 12 '06	
ICH & GM	FINANCE
PIO	PLANNING
ADMIN	ENV
REG	INSURANCE
COMM	FILE
040037 <i>CWR</i>	

April 4, 2006

Ms. Catherine W. Regester, P.E., CFM
 Senior Engineer
 Flood Control District of Maricopa County
 2801 West Durango Street
 Phoenix, AZ 85009-6399

IN REPLY REFER TO:
 Case No.: 06-09-B379R
 Communities: Towns of Gilbert and Queen Creek, and Maricopa County, AZ
 Community Nos.: 040044, 040132, and 040037

316-AD

Dear Ms. Regester:

This is in regard to your request dated February 8, 2006, 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:	Sonoqui Wash Channelization
Flooding Source:	Sonoqui Wash
FIRM Panel(s) Affected:	04013C2690H, 3060G, and 3075G

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 enclosed for your information.

FEMA receives a very large volume of requests and cannot maintain inactive requests for an indefinite period of time. In addition, as a result of the aftermath of recent hurricanes, many FEMA employees have been deployed to assist in disaster relief efforts. Therefore, we are unable to grant extensions for the submission of required data/fee 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.

We will continue to work expeditiously to review all submittals in accordance with National Flood Insurance Program (NFIP) regulations, and will aim to meet the regulatory timeframe for the review of all requests. However, requesters should be aware that delays may occur in the review process because of the current emergency situation. We appreciate the patience and cooperation of all requesters as FEMA assists in hurricane relief efforts.

3601 Eisenhower Avenue, Alexandria, VA 22304-6425 PH:1-877-FEMA MAP FX: 703.960.9125

The Mapping on Demand Team, under contract with the Federal Emergency Management Agency, is the National Service Provider for the National Flood Insurance Program

If you have general questions about your request, FEMA policy, or the NFIP, please call the FEMA Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627). If you have specific questions concerning your request, please call the Revisions Coordinator for your State, Mr. Craig Kennedy, CFM, who may be reached at (703) 960-8800, ext. 3091.

Sincerely,



Sheila M. Norlin, CFM
National LOMC Manager
Michael Baker Jr., Inc.

Enclosures

cc: Mr. Richard L. Schaner
Public Works Director
Town of Queen Creek

Mr. Lonnie K. Frost
Floodplain Administrator
Town of Gilbert

Mr. Ted Collins, CFM
Principal Floodplain Administrator
Flood Control District of Maricopa County

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

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Office of Dam Safety and Flood Mitigation
Arizona Department of Water Resources

Mr. Scott Buchanan, P.E.
Stanley Consultants, Inc.



NATIONAL FLOOD INSURANCE PROGRAM

FEMA NATIONAL SERVICE PROVIDER

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

Case No.: 06-09-B379R

Requester: Ms. Catherine W. Register, P.E., CFM

Communities: Towns of Gilbert and Queen
Creek, and Maricopa County, AZ

Community Nos.: 040044, 040132, and 040037

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

1. Our detailed review revealed that the Higley Road bridge and the culverts under Sossaman Road and under Chandler Heights Boulevard were not modeled in the submitted proposed conditions HEC-RAS hydraulic analysis as proposed in the plans entitled "Sonoqui Wash Channelization: Queen Creek Wash to Chandler Heights Road CLOMR," prepared by Stanley Consultants, Inc., dated October 2005. Please revise the proposed conditions HEC-RAS model to include these structures as proposed in the submitted plans.
2. Our detailed review revealed that the submitted HEC-RAS hydraulic model includes currently unstudied reaches of Queen Creek at the downstream end of the proposed revision. However, no topographic work maps or hydrologic analyses of the proposed revision along Queen Creek were included with your submittal. Please provide topographic work maps detailing existing conditions and proposed conditions along Queen Creek, hydrologic analyses supporting the discharges used, and plans for any existing or proposed structures along the proposed revision along Queen Creek. Otherwise, please remove Queen Creek from your model. In addition, if you remove Queen Creek from your hydraulic analyses, please revise the downstream boundary condition for Sonoqui Wash using Normal Depth.

Please send the required data 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.

3601 Eisenhower Avenue, Alexandria, VA 22304-6425 PH:1-877-FEMA MAP FX: 703.960.9125

The Mapping on Demand Team, under contract with the Federal Emergency Management Agency, is the
National Service Provider for the National Flood Insurance Program



Federal Emergency Management Agency

Washington, D.C. 20472

FEE SCHEDULE FOR PROCESSING REQUESTS FOR MAP CHANGES

This notice contains the fee schedule for processing certain types of requests for changes to National Flood Insurance Program (NFIP) maps. The fee schedule allows FEMA to further reduce the expenses to the NFIP by more fully recovering the costs associated with processing conditional and final map change requests. The fee schedule for map changes is effective for all requests dated October 30, 2005, or later and supersedes the fee schedule that was established on September 1, 2002.

To develop the fee schedule for conditional and final map change requests, FEMA evaluated the actual costs of reviewing and processing requests for Conditional Letters of Map Amendment (CLOMAs), Conditional Letters of Map Revision – Based on Fill (CLOMR-Fs), Conditional Letters of Map Revision (CLOMRs), Letters of Map Revision – Based on Fill (LOMR-Fs), Letters of Map Revision (LOMRs), and Physical Map Revisions (PMRs).

Based on our review of actual cost data for Fiscal Years 2004 and 2005, FEMA has established the following review and processing fees, which are to be submitted with all requests that are not otherwise exempted under 44 CFR 72.5.

Fee Schedule for Requests for CLOMAs, CLOMR-Fs, and LOMR-Fs

Request for single-lot/single-structure CLOMA and CLOMR-F.....	\$500
Request for single-lot/single structure LOMR-F	\$425
Request for single-lot/single-structure LOMR-F based on as-built information (CLOMR-F previously issued by us).....	\$325
Request for multiple-lot/multiple-structure CLOMA	\$700
Request for multiple-lot/multiple-structure CLOMR-F and LOMR-F	\$800
Request for multiple-lot/multiple-structure LOMR-F based on as-built information (CLOMR-F previously issued)	\$700

Fee Schedule for Requests for CLOMRs

Request based on new hydrology, bridge, culvert, channel, or combination of any of these.....	\$4,000
Request based on levee, berm, or other structural measure	\$5,000

Fee Schedule for Requests for LOMRs and PMRs

Requesters must submit the review and processing fees shown below with requests for LOMRs and PMRs that are not based on structural measures or alluvial fans.

Request based on bridge, culvert, channel, or combination thereof.....	\$4,400
Request based on levee, berm, or other structural measure	\$6,000
Request based on as-built information submitted as follow-up to CLOMR.....	\$4,000

Fees for CLOMRs, LOMRs, and PMRs Based on Structural Measures on Alluvial Fans

FEMA has revised the initial fee for requests for CLOMRs and LOMRs based on structural measures on alluvial fans to \$5,600. FEMA will also continue to recover the remainder of the review and processing costs by invoicing the requester before issuing a determination letter, consistent with current practice. The prevailing private-sector labor rate charged to FEMA (\$60 per hour) will be used to calculate the total reimbursable fees.

Payment Submission Requirements

Requesters must make fee payments for non-exempt requests before we render services. This payment must be in the form of a check or money order or by credit card payment. Please make all checks and money orders in U.S. funds payable to the *National Flood Insurance Program*. We will deposit all fees collected to the National Flood Insurance Fund, which is the source of funding for providing this service.



Flood Control District of Maricopa County

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2801 West Durango Street

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Phone: 602-506-1501

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February 8, 2006

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2801 West Durango Street
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Michael Baker, Jr. Inc.
3601 Eisenhower Avenue, #600
Alexandria, VA 22304-6425

ATTN: Craig Kennedy

RE: Sonoqui Wash Channelization, Chandler Heights Road to Queen Creek Wash
Conditional Letter of Map Revision (CLOMR)

Dear Mr. Kennedy:

Please find enclosed a CLOMR request for the subject wash from Higley Road to just upstream of Chandler Heights Road. The project addresses the flooding identified in the *Sonoqui Wash Floodplain Delineation Study* (FEMA Case No. 04-09-1717P) which is currently under review in your office. The following items are included in this submittal:

- *Sonoqui Wash Channelization, Chandler Heights Road to Queen Creek Wash, Conditional Letter of Map Revision (CLOMR), Technical Data Notebook (TDN)*, dated November 14, 2005. (Note: The FEMA forms, annotated FIRM panels, digital hydraulic models, and all pertinent back-up data are included in the TDN.)
- *Sonoqui Wash Channelization, Chandler Heights Road to Queen Creek Wash, Conditional Letter of Map Revision (CLOMR) Work Maps*, 1" = 100' scale, 1 ft contour interval, dated December 19, 2005, sheets 1 through 9 of 9.
- *Sonoqui Wash Channelization, Queen Creek Wash to Chandler Heights Road*, half-size construction drawings (notes, geometrics, details, plan & profiles, and grading sheets) dated October 2005.
- Check for \$4,400 to cover FEMA's required fees for the processing of the CLOMR.

The channelization project is a joint project between the Towns of Gilbert and Queen Creek and the Flood Control District of Maricopa County. If you have any questions or require additional information, please feel free to call me at 602-506-4001 or contact me by e-mail at cwr@mail.maricopa.gov.

Yours truly,

Catherine W. Regester, P.E., CFM
Senior Engineer

Enclosures: Listed above

Program of
Flood Control District of Maricopa County Library
Please Return to
2801 N. Central
Phoenix, AZ 85009

Sonoqui Wash Channelization
Chandler Heights Road to Queen Creek Wash
FCD 2002C037

**Conditional Letter of Map Revision
(CLOMR)**

Technical Data Notebook

Prepared by:
Stanley Consultants, Inc.
With Contributions from Sub-Consultant
WEST Consultants, Inc.

Prepared for:
**Flood Control District of Maricopa County,
Town of Queen Creek, and the Town of Gilbert**

November 2005

SCI Proj # 16955

Sonoqui Wash Channelization
Chandler Heights Road to Queen Creek Wash
FCD 2002C037

**Conditional Letter of Map Revision
(CLOMR)**

Technical Data Notebook

Prepared by:
Stanley Consultants, Inc.
With Contributions from Sub-Consultant
WEST Consultants, Inc.

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Town of Queen Creek, and the Town of Gilbert**

November 2005

SCI Proj # 16955

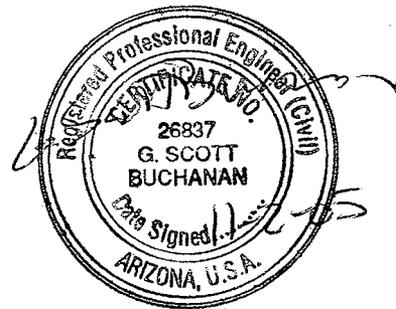


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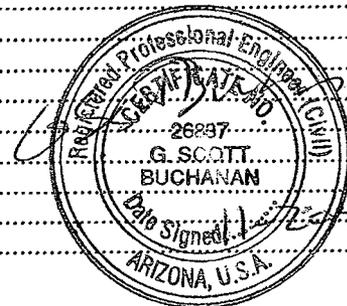


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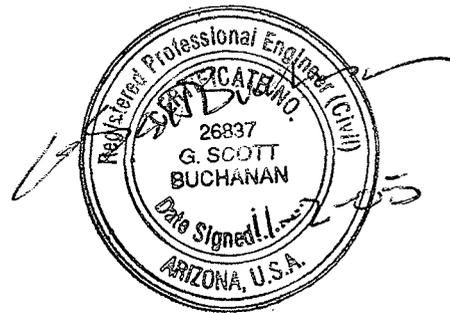
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- Appendix B: General Documentation and Correspondence
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- Appendix E: Hydraulic Analysis Documentation
- Appendix F: Erosion and Sediment Transportation Analyses Documentation
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1.0 INTRODUCTION

1.1 Purpose of Study

The Sonoqui Wash Channelization Project was initiated following the completion of the Queen Creek / Sanokai (now spelled Sonoqui) Wash Hydraulic Master Plan (HMP) prepared in September 2000 by consultant Huitt-Zollars, Inc. A floodplain delineation study from Higley Road to Riggs Road was completed by consultant Entellus, Inc. in 2004 and submitted to the Federal Emergency Management Agency (FEMA) for review. The Entellus delineation study was still in FEMA review as of the time this CLOMR was prepared. Results from the Entellus delineation study indicated potential breakout of flood flows and ponding in Sonoqui Wash. The HMP concluded that the most feasible solution to the flooding problem would be to construct a series of improvements. The HMP-recommended solutions incorporated in this project include increasing the cross section of Sonoqui Wash through channelization, and constructing an offline detention basin to reduce discharges. The objective of the HMP was to convey the 1%-annual-chance flow event within the newly constructed channel.

Proposed channel improvements extend from the confluence with Queen Creek Wash just downstream from Higley Road to upstream of Chandler Heights Road, a distance of approximately 4.25 miles. The project includes multiple roadway crossings, utility relocations, grade control / drop structures, a sedimentation basin, a confluence weir structure, a lateral diversion weir, and an off-line detention basin. A related but separate improvement project will construct a new bridge crossing at Higley Road. This bridge project is sponsored by the Town of Gilbert and will be constructed concurrently with the Sonoqui channel. This report documents the process necessary to request a Conditional Letter of Map Revision (CLOMR) for the channel improvements and bridge crossing listed above.

The outfall for the new Sonoqui Wash channel will be the Queen Creek Wash channel which will be reconstructed by the Flood Control District of Maricopa County as part of their Chandler Heights Detention Basin Project. The outfall for the Queen Creek channel is the East Maricopa Floodway, an existing major regional drain which currently has been delineated with an approximate flood insurance Zone A. The Queen Creek Channel improvements are completely designed and will be bid and constructed prior to the Sonoqui Wash Channelization Project construction. That portion of the Sonoqui Channelization Project downstream from Higley Road will be broken out and packaged (constructed) with the Queen Creek Wash channel and Chandler Heights Detention Basin Project.

1.2 Authority for Study

Stanley Consultants, Inc. performed the hydraulic analyses and design for this study for the Flood Control District of Maricopa County (FCDMC) under Contract FCD 2002C037. FCDMC is the primary contracting agency for this project but is acting in partnership with the Town of Queen Creek and the Town of Gilbert. Sub-consultants

on Stanley's project team include WEST Consultants (sediment transport), AMEC Earth and Environmental (geotechnical), Logan Simpson Design (landscape architecture), Cooper Aerial (aerial mapping), and The TBE Group (subsurface utility exploration). Regional hydrology for the project was supplied by FCDMC. Project management was contracted by FCDMC to Raju Shah, P.E. of Prestige Engineering Project coordination was accomplished primarily with Catherine Register, Michael Lopez, and Dennis Holcomb with FCDMC, Lonnie Frost with the Town of Gilbert, and Dick Schaner and David Martinez with the Town of Queen Creek.

1.3 Location of Study

The Sonoqui Wash Channelization Project is located within the Towns of Gilbert and Queen Creek as well as Unincorporated Maricopa County. The project extends from Section 29, Township 2 South, Range 7 East (Sec29, T2S, R7E) to Section 15, Township 2 South, Range 6 East (Sec15, T2S, R6E) for an approximate project length of 4.25 miles. The project is located on Flood Insurance Rate Maps (FIRMs) 04013C3060G and 04013C3075G. Sonoqui Wash is a tributary to Queen Creek Wash and subsequently to the East Maricopa Floodway. Relevant portions of the Higley Road Improvements Project including the Higley Road Bridge at Sonoqui Wash, are located in Sections 14 and 15, Township 2 South, Range 6 East (Sec15, T2S, R6E). Figures 1 and 2 show the project location and vicinity, respectively.

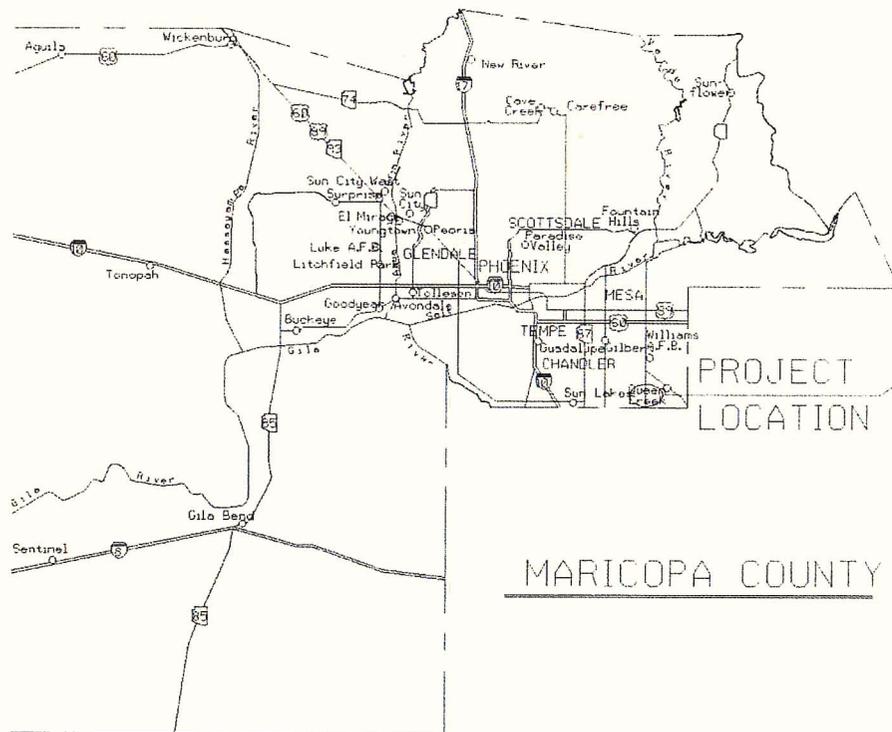


Figure 1 - Project Location Within Maricopa County

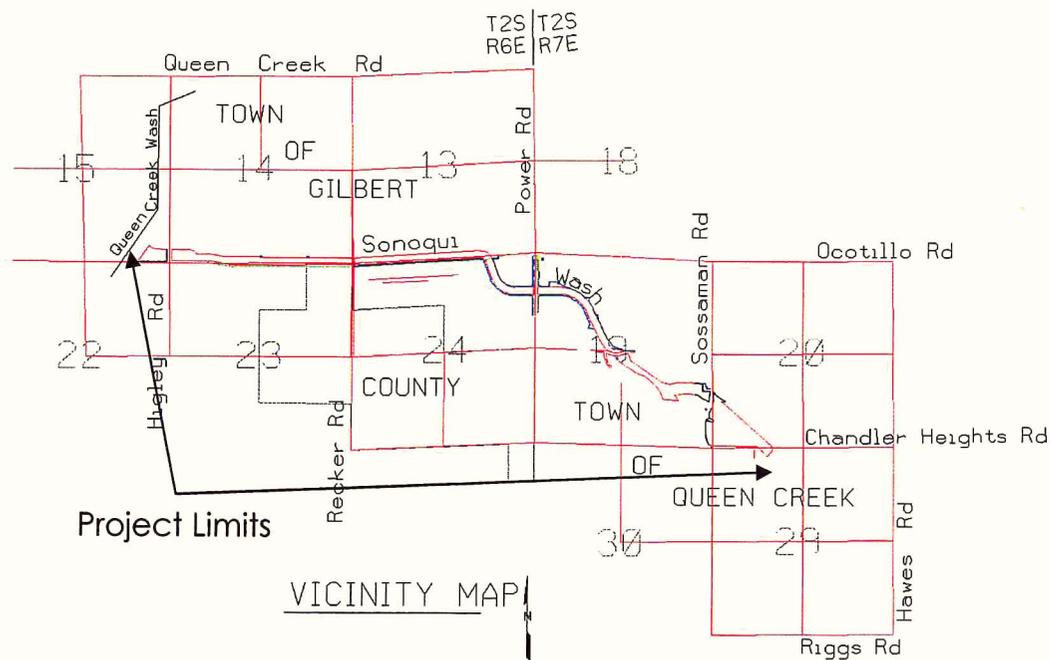


Figure 2 - Project Vicinity Map

1.4 Summary of Methodology

Regional project hydrology was prepared using HEC-1 and provided by FCDMC. The existing-condition floodplain delineation study for Sonoqui Wash from Higley Road to Riggs Road was previously prepared by Entellus, Inc. using HEC-RAS. Aerial mapping of the project corridor was provided by Cooper Aerial using conventional photogrammetric methods. The proposed channel contours were used to generate channel cross-sections for input into HEC-RAS. Channel roughness coefficients ("n" values) were estimated using USGS methods. HEC-6T modeling was used for sediment transport analysis. The U.S. Army Corps of Engineers' HEC-RAS software was used for the project: steady-flow modeling was used to determine the water surface elevations while an unsteady-flow model was used to model the performance of the offline-detention basin.

1.5 Coordination and Acknowledgements

This project has been coordinated with the following agencies:

- Flood Control District of Maricopa County.
- Town of Queen Creek
- Town of Gilbert

This CLOMR is submitted as a combination of two separate projects, the Sonoqui Wash Channelization project sponsored jointly by the FCDMC and Towns of Gilbert and Queen Creek and the Higley Road Bridge sponsored solely by the Town of Gilbert.

1.6 Study Results

Hydraulic analysis of the proposed design indicates a significant reduction of the 1%-annual-chance floodplain and general containment within the channel after construction of the improvements. In a few locations where the 100-year floodplain is not contained within the proposed channel proper, the floodplain is contained within the project right-of-way or within public road right-of way. At two isolated locations, the 100-year floodplain was not contained within the project or road rights-of-way but is significantly less than the existing condition floodplain. Reduction of the floodplain allows for a revision of the delineation previously submitted by Entellus, Inc.

2.0 FEMA FORMS AND ADWR ABSTRACTS

FEMA MT-2, Revisions to NFIP Maps, forms are located in Appendix A.

2.1: Study Documentation Abstract for FEMA Submittals		
2.1.1	Date Study Accepted	
2.1.2	Study Contractor Contact(s) Address Phone Internal Reference Number	Stanley Consultants, Inc. Scott Buchanan, P.E. 2929 E. Camelback Rd, Suite 130 Phoenix, AZ 85032 602-912-6500 Stanley Proj.# 16955
2.1.3	FEMA Technical Review Contractor	Pending
2.1.4	FEMA Regional Reviewer/Phone	Pending
2.1.5	State Technical Reviewer/Phone	Pending
2.1.6	Local Technical Reviewer Phone	FCDMC Cathy Register, PE, CFM 602-506-4601
2.1.7	Reach Description	Sonoqui Wash: Higley Rd to Chandler Heights Rd (approx. 4.23 miles) FIRM 04013C360H; 04013C3075H

2.2: Mapping Information		
2.2.1	Mapping for Hydrologic Study	N/A
2.2.2	Mapping for Hydraulic Study Type/Source Scale/ Date /	Aerial Photography 1" = 40' / Jan 30, 2004 / Cooper Aerial

2.3: Hydrology		
2.3.1	Model or Method Used	HEC-1 (USACE, Version 4.1)
2.3.2	Storm Duration	24 hour
2.3.3	Hyetograph Type	N/A
2.3.4	Frequencies Determined	100
2.3.5	List of Gages Used	N/A
2.3.6	Rainfall Amounts and Reference	Miller et al, 1973, <i>Precipitation-Frequency Atlas for Arizona</i>
2.3.7	Unique Conditions and Problems	N/A
2.3.8	Coordination of Q's	N/A

2.4: Hydraulics		
2.4.1	Model or Method Used	HEC-RAS (USACE, Version 3.1.2)
2.4.2	Regime	Steady Subcritical Flow
2.4.3	Freq for which profiles were computed	100 year recurrence
2.4.4	Method of Floodway Calculation	N/A
2.4.5	Unique Conditions and Problems	None encountered

2.5: Additional Study Information		
Item	Description/Discussion	

3.0 MAPPING AND SURVEY INFORMATION

Stanley Consultants performed a horizontal and vertical survey of existing sectional monuments to serve as project control. Stanley Consultants also performed a control survey, set the aerial mapping panels, and conducted a field survey of local improvement features such as roadways, fences, above-ground utilities, and structures.

3.1 Field Survey Information

As-built data was obtained for the project from Maricopa County, the Town of Gilbert, the Town of Queen Creek, various utility owners and irrigation districts. The vertical datum for these plans varied and many of the reference benchmarks were not recoverable. Existing topographic mapping was insufficient for the scale of this project.

Survey points for this study were collected using both GPS and total station survey equipment. Survey data point lists and copies of survey field books are included in Appendix C of this report.

All survey work performed for this study was done in accordance with Section 3.0 of the Flood Control District of Maricopa County's Consultant Guidelines dated December 1, 2003. All survey work meets the Federal Emergency Management Agency (FEMA) minimum criteria as defined in "FEMA Document 37, Flood Insurance Study Guidelines and Specifications for Study Contractors."

3.2 Mapping

Aerial mapping was sub-contracted to Cooper Aerial Surveys Co. and conducted under Cooper's Job No. 5060-011604. Two flight paths were used. The first, following a SE-NW azimuth, captured the south-eastern portion of the project, while the second, following an E-W azimuth, shot the western portion of the project to the confluence with Queen Creek Wash. Mapping was flown on two different flight dates. The primary flight date was January 30, 2004 and the secondary on May 26, 2005. A small reach about ½ mile long upstream from Recker Road was re-flown on the later date to reflect channel changes conducted by private development. Detailed narrative explanation of the survey control for aerial mapping is provided in Appendix C. Aerial photogrammetric accuracy was verified by the FCDMC to their accuracy requirements. Because an existing hydrology model was used for this study, the aerial mapping was used solely for design and hydraulic analysis.

Topography presented with this submittal is taken from the original aerial mapping, although top of bank elevations have been adjusted to match the new topography.

Jeff Cooper, with Cooper Aerial, is responsible for developing the mapping.

New one-foot contour mapping was developed for the length of the study as part of the Sonoqui Wash Channelization project. The topographic mapping generally extends at

least 400 ft on each side of the channel project centerline. Aerial photogrammetric imaging technology was used to develop the new topographic map. Digital and hard (mylar) copies of the mapping were provided to FCDMC as part of a separate submittal.

Comparison between mapping data collected for this project and the LOMR submittal by Entellus Inc. shows a horizontal offset between the two mapping documents. Inspection of common features indicates a uniform offset of 128.7 ft north and 122.4 ft east. The discrepancy likely owes to a difference in grid-to-ground factors used between the studies. No scaling discrepancies were discovered. A common vertical datum (NAVD 88) was used.

4.0 HYDROLOGY

4.1 Method Description

The 100-year discharges for Sonoqui was were obtained from the *Sonoqui Wash Floodplain Delineation Study* prepared by Entellus, Inc. on behalf of the Flood Control District of Maricopa County and submitted to FEMA September 2004 (FEMA Case No. 04-09-1717P).

Excepting for a flow split from along the wash between Chandler Heights Road and Sossaman Road (approximately Sta. 198+00 to Sta. 222+00), the 100-year peak discharge for the Sonoqui Wash channel within project limits is 2100 cfs according to the *Sonoqui Wash Floodplain Delineation Study*. The channelization of Sonoqui Wash as proposed in this project would eliminate the flow split and contain all flow within the channel therefore a 100-year peak discharge of 2100 cfs is also used between Chandler Heights Road and Sossaman Road.

Between Chandler Heights Road and Sossaman Road a lateral weir diverts flow from Sonoqui Wash during large storm events (including the 100-year flow) temporarily into an offline detention basin adjacent to the wash. The entire detention basin is included within the delineated floodplain, however, the hydrologic and hydraulic impact of the detention basin is ignored for a conservative delineation of the 100-year floodplain limits.

4.2 Parameter Estimation

See *Sonoqui Wash Floodplain Delineation Study* by Entellus, Inc.

4.2.1 Drainage Area Boundaries

See *Sonoqui Wash Floodplain Delineation Study* by Entellus, Inc.

4.2.2 Watershed Work Maps

See *Sonoqui Wash Floodplain Delineation Study* by Entellus, Inc.

4.2.3 Gage Data

See *Sonoqui Wash Floodplain Delineation Study* by Entellus, Inc.

4.2.4 Statistical Parameters

See *Sonoqui Wash Floodplain Delineation Study* by Entellus, Inc.

4.2.5 Precipitation

See *Sonoqui Wash Floodplain Delineation Study* by Entellus, Inc.

4.2.6 Physical Parameters

See *Sonoqui Wash Floodplain Delineation Study* by Entellus, Inc.

4.3 Problems Encountered During the Study

Modification of the future-condition HEC-1 model (SOSBASEX) was required to generate hydrographs for the sediment transport analysis.

Sediment Transport Hydrology

As part of the Sonoqui Wash Channelization design, a sediment transport analysis was required. To accomplish this, sub-consultant WEST Consultants (WEST) utilized a modification of the Corps of Engineers' HEC-6 program. The modification, HEC-6T, is a one-dimensional sediment transport model that is used to calculate water surface and sediment bed surface. For HEC-6T, inflow hydrographs are required for various return frequencies. The Flood Control District of Maricopa County provided the base 100 year hydrology (a modification of the Entellus hydrology identified as SOSBASEX) for the sediment transport analysis. This hydrology was modified to develop the hydrologic models for the 2-, 10-, 25-, 50- and 500-year return frequencies. This hydrology was then used for sediment transport analyses.

4.3.1 Special Problems and Solutions

No special problems were encountered with the project hydrology. The problems listed above are additional hydrologic features considered and do not represent an alteration to the regional hydrologic model used for delineation purposes.

4.3.2 Modeling Warning and Error Messages

See *Sonoqui Wash Floodplain Delineation Study* by Entellus, Inc.

4.4 Calibration

No calibration of the hydrology was conducted as part of this project. See *Sonoqui Wash Floodplain Delineation Study* by Entellus, Inc.

4.5 Final Results

4.5.1 Hydrologic Analysis Results

A uniform discharge of 2100 cfs is applied throughout Sonoqui Wash. An increased discharge of 5540 is applied to the downstream section of the model which accounts for backwater from the Queen Creek Wash. See the Table below.

River	Sta	Q (cfs)
Sonoqui Wash	256+23	2100
Sonoqui Wash	223+00	2100
Sonoqui Wash	214+00	2100
Sonoqui Wash	184+00	2100
Queen Creek Wash	10+00	5540

Table 1 – CLOMR Submittal Discharges

4.5.2 Verification of Results

Verification of hydrologic results of the previously accepted hydrology was not performed as part of this study.

5.0 HYDRAULICS

5.1 Method Description

The Sonoqui Wash Channel Improvements were designed using HEC-RAS (v. 3.1.2). The term "channel hydraulics" encompasses all of the aspects of channel design that were modeled with HEC-RAS including the main channel, confluence with the Queen Creek Wash channel, culvert and bridge hydraulics at the roadway crossings and the hydraulic aspect of the unsteady flow model used to design the Stage Stop Basin and its lateral weir (see Section 4 of this report).

The channel design typically incorporated landscape, aesthetic and multi-use input from sub-consultant Logan Simpson Design. Two HEC-RAS models were evolved in parallel through the design process; one with a base "n" value of 0.035 and the other with a base "n" value of 0.045. A range of "n" values was desired to reflect future landscaping for the project. The lower "n" value model ($n = 0.035$) was generally used to evaluate flow velocity and channel stability and the higher "n" value model ($n = 0.045$) was used to evaluate the water surface profile and floodplain extents. A discussion of "n" value selection is covered in more detail in Section 5.3.1.

Documentation for weir coefficients used at weir structures and roadway overflow sections is in the appendices with a summary printout of the 0.045 and 0.035 "n" value models.

HEC-RAS output files for the channel are included in Appendix E. HEC-RAS input files are on the CD in the back of this document.

Hydraulic sections were generally cut every 100 ft using INROADS software and imported into HEC-RAS. Cross sections were then added at weir, bridge / culvert and drop structure locations. The typical channel section has a 60 ft bottom with side slopes that vary between 4:1 to 8:1 (H:V).

A larger bottom width (up to about 160 ft) was used in the sediment basin between the Queen Creek Wash channel and Higley Road to facilitate sediment trapping function (refer to Section 6.1, Channel Stability and Sediment Transport). A slightly narrower bottom width of 50 ft was used in the narrow reach within the Rancho Jardines subdivision between Via del Jardin and Sossaman Road in order to fit the channel within the project corridor without having to acquire new right-of-way.

To meaningfully interface with the existing-condition floodplain delineation by Entellus, Inc., existing channel cross sections were incorporated into the upstream end of the HEC-RAS model, upstream of the proposed channel improvements.

Cross sections of the existing topography are used upstream of the project limit. Hydraulic sections in this reach incorporate ineffective flow areas to block out regions associated with old remnant channels and tributary channels that do not contribute to conveyance. This is similar to what was done by consultant Entellus in the existing condition floodplain delineation submitted to FEMA. The reach upstream from the

upstream limit of channel and grading improvements south of Chandler Heights Road also uses the same roughness coefficients as the Entellus study.

Backwater effects on local tributary flow were not considered and delineation was terminated at the project right-of-way in backwater situations. Delineation of the 100-year floodplain is limited to Sonoqui Wash, as identified in the attached MT-2 forms.

Although the channel design and improvements extend to Queen Creek Wash and upstream of Chandler Heights Road, this CLOMR applies only to Sonoqui Wash between Chandler Heights Road and the upstream boundary of the second upstream drop structure (Sta 19+48). Because the reach forms the downstream boundary condition for this CLOMR request, discussion of the reach hydraulics are included below.

5.2 Work Study Maps

FEMA Flood Insurance Rate Maps (FIRMS) depicting the existing condition floodplain extents and proposed floodplain extents are included in Appendix G.

5.3 Parameter Estimation

This section generally covers the selection of Manning's Roughness Coefficients ("n" values) and expansion and contraction coefficients.

5.3.1 Manning's Roughness Coefficients

The Sonoqui Wash project uses a combination of methodology and references to estimate roughness coefficients. The two primary references are *Estimated Manning's Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County, Arizona* by the USGS and *Drainage Design Manual for Maricopa County, Arizona – Volume II, Hydraulics* published by the FCDMC.

The methodology in the U.S.G.S. reference involves estimating a base "n" value that reflects the channel bed material then adds adjustment factors to account for surface irregularities, obstruction and vegetation. This reference incorporates examples primarily involving larger natural watercourses as opposed to engineered channels with designed landscaping. However, since Sonoqui Wash is intended to be a natural looking channel with native vegetation, the U.S.G.S. reference should help provide an adequate basis of estimate.

The Sonoqui Wash channel will be relatively straight and uniform with no obstructions with the exception of roadway crossings at Sossaman and Power Roads that are elevated above the channel bottom. The most significant adjustment to base roughness per the U.S.G.S. reference will be due to landscaping. The key to selecting the appropriate roughness coefficient will be in relating the type of plant material, its placement, density and state of anticipated maintenance to a representative value. To accomplish this, photographs were taken of existing channels with similar anticipated

landscape character and then compared to the photo examples in the U.S.G.S. reference.

The Sonoqui Wash project will only construct the channel and primary hydraulic structures. Hydro-seeding will be provided as construction is completed to help reduce soil loss, bank rilling and dust until the final landscaping is provided by the Towns of Gilbert and Queen Creek and by adjacent developers. It may be months or even years until the project is formally landscaped. Sub-consultant Logan Simpson Design prepared a Landscape Master Plan that will serve as the basis for future landscaping. In addition to using the Landscape Master Plan as a design guide, photos of comparably landscaped channels are presented at the back of this section to provide a visual image of what the future landscape design may look like.

Based on Logan Simpson Design's Landscape Master Plan and using the U.S.G.S. reference, roughness coefficients for typical channel reaches fall in a range between 0.035 and 0.045. To help assure that the final constructed and landscaped channel is consistent with this range of "n" values and that the landscaping and irrigation system (if one is used) is appropriate for the application, the following suggestions and observations are offered:

1. It is anticipated that most of the landscape plant material will be placed on or above the constructed banks of the channel. Vegetation on the channel bottom will be limited to native grass and small shrubs with relatively wide spacing. The density and size of plant material will increase as it moves up the channel slopes (i.e. the larger plant material and higher density groupings should be located in the upper half of the bank).
2. Generally, trees can be planted on the channel banks but it is recommended that they be limited to single trunk specimens and placed no closer to the toe of slope than 3 feet above the adjacent channel flow line as identified in the channel plan and profile sheets. It is recommended that no cacti or succulent plants be placed on the channel bottom or within the lower half of the channel bank. It is also recommended that trees and large shrubs not be placed within the drop structures, weirs or within immediate proximity (approximately 50') of culverts or bridges. Roughness coefficients for cross sections associated with weirs, drop structures and within the proximity of roads will generally reflect lower "n" values than for longer typical reaches between structures.
3. Any trees or large shrubs that are planted within the lower bank where there is continuous channel bank lining should restore any penetration of the bank lining material and filter fabric. Because of the potential for scour it is recommended that no permanent irrigation system such as PVC pipe be used lower than about 3 or 4 feet above the channel invert. A thin surface layer of decomposed granite or rock mulch if incorporated in the future landscape improvements will not have an appreciable impact on "n" value.

4. It is anticipated that "volunteer" native grass and small shrubs may become established on the drop structures themselves. However, this will be somewhat limited because there will only be a shallow layer (12") of native soil placed over the riprap for aesthetic purposes. Because of the relatively steep local hydraulic slope of these drop structures, it is anticipated that most or all of the native soil will be scoured away by any significant flow leaving mostly exposed rock surface below. This is the condition assumed for purposes of estimating "n" values at the drop structures. The Towns of Gilbert and Queen Creek will replace the soil cover at the drop structures that is lost due to scour in accordance with the project maintenance plan.
5. It is critical at certain locations that final landscaping is established and maintained within the limits of anticipated roughness. The two most critical locations where lack of maintenance would impact project performance are: a) the narrow reach within the Ranchos Jardines Subdivision from Station 170+00 to Station 185+00 (upstream from Via del Jardin for a distance of about 1,500 feet), and b) adjacent to the Stage Stop Detention Basin lateral weir just north of Chandler Heights Road.

The U.S.G.S. reference was used primarily to estimate roughness for the longer typical channel design reaches from structure to structure. Roughness coefficients for at-grade roadway dips, culverts and bridges, weirs and other similar features are based primarily on Sections 4 and 6 of the Drainage Design Manual. Tables 4.1 and 6.1 from the Drainage Design Manual are included in Appendix D.

At some locations, such as bridges, "n" values reflect a composite value based, for example, on an earth floor and concrete abutments. Typically, however, the "n" value analysis for the designed channel reaches was not broken into a composite of bed and bank but is simply a single value from top of bank to top of bank. Although "n" values are assigned for overbanks, they are typically not effective since flow is contained within the channel.

All "n" values were developed based on the anticipated flow conditions for a 100-year event. 100-year "n" values were not adjusted for use with other discharge frequencies. "n" values also assume a fixed bed condition even though it is anticipated that some scour of the channel bed will occur in places and there may be minor loss of bank material and exposure of the continuous channel bank lining as described in Section 6.3.

5.3.1.1 "n" Values from Previous Studies and Design Projects

Other previous studies and designs of similar projects were referenced to compare estimated roughness coefficients. Some of the observed coefficients from other studies and designs were adopted for use with the Sonoqui Wash project. For example, the reach upstream from the upper limit of channelization and grading upstream of Chandler Heights Road uses the same roughness coefficients as the existing-condition *Sonoqui Wash Floodplain Delineation Study* that was prepared by Entellus, Inc. for the Flood Control District of Maricopa County. These roughness coefficients are 0.068 and 0.056 for the left and right overbank respectively and 0.065 for channel.

Roughness coefficients from the design report prepared by consultant Dibble and Associates for the recently designed channel improvements in the Queen Creek Wash channel from Sossaman Road to Hawes Road were reviewed. Dibble "n" values were typically in the range of 0.028 to 0.030 for reaches at or near the bridge crossings at Sossaman and at Hawes Roads. Two "n" values were typically used for the channel reach between these two bridges. The channel was subdivided into two or three sub-sections with a 0.039 typically used in the center and 0.044 used along the banks.

5.3.2 Expansion and Contraction Coefficients

Expansion and contraction coefficients were established following the HEC-RAS "Hydraulic Reference Manual" guidance for expansion/contraction coefficients. Coefficients were generally set to the default values of 0.3 for expansion and 0.1 for contraction, except at roadway crossings. Dip crossings, such as at Chandler Heights Road, Sossaman Road, and Power Road create higher velocity-head flow during overtopping events, such as the 1%-annual-chance event, and require greater expansion and contraction coefficients. Expansion coefficients vary between 0.5 and 0.6 at crossing locations and contraction coefficients vary between 0.3 and 0.4. At drop structures, coefficients were not modified from default values. Reference materials are available in Appendix E.

5.4 Cross Section Description

Cross sections along the project were cut from a digital terrain model (DTM) using Inroads SelectCAD (08.02.00.00, Service Pack 7). The DTM was a composite of existing topography created by Cooper Aerial by photogrammetry from flights over the project area and DTM created from the design of the proposed channel improvements. Cross sections were cut uniformly every 100 feet. Additional cross sections were also cut at critical locations such as bridge/culvert crossings and drop structures.

5.5 Modeling Considerations

The modeling of project features and related parameters are addressed in this section. General features include drop structures, inline and lateral weirs, dip crossings with culverts, a bridge crossing, and an offline detention basin.

As a worst-case scenario, the sediment basin (located just upstream of the confluence with Queen Creek) is filled with sediment to the confluence-weir-crest during the 100-year discharge. Sediment transport analysis by WEST Consultants indicates significant filling of the basin during the 100-year event. The fixed sediment elevation option in HEC-RAS was used to model this scenario.

To delineate the floodplain in the off-line detention basin, the highest water surface across the lateral diversion weir was extended across the basin as a flat water surface.

To model potential reduced culvert capacity due to clogging, all culverts were decreased in size by one standard size (24" CMP reduced to 18", etc) in the HEC-RAS analysis.

5.5.1 Hydraulic Jump and Drop Analysis

HEC-RAS analysis shows hydraulic jump formation or potential jump formation in several areas; generally, these areas may be described as near drop structure toes. Analysis for the 1% -annual-chance flow event showed some "drowning" of jumps by backwater so the 10%-annual-chance flow event was also modeled. Results from both events reflect similar jump locations with Froude number magnitudes varying between the events. To prevent channel degradation beyond the anticipated general scour, grouted riprap spillways with dumped riprap aprons were designed based upon procedures following Arizona Department of Transportation "Roadway Design Guidelines" and the Federal Highway Administration's "Hydraulic Engineering Circular No. 11 – Design of Riprap Revetment". Dumped riprap aprons extend 20 feet beyond the toe of the drop structures and are separated from the grouted riprap by concrete cutoff walls which extend for a depth of 5 feet. Analysis by WEST Consultants using methods established by Arizona Department of Transportation research indicate a maximum equilibrium scour depth of 3.4 feet at downstream aprons of the drop structures for the size of dumped riprap selected.

Transitions

The channel outlet/confluence intersects Queen Creek Wash. Due to the size of the respective watersheds, coincidence of flow during major events is assumed at the confluence and hydraulic jump potential is minimized. For minor events, a dumped riprap apron extends below the weir located at the confluence of the streams and a cutoff wall prevents degradation of the structure's foundation.

HEC-RAS output shows the potential for jump formation at the upstream transition of the channel project. As the new development ties into existing topography at the formation location, any jump formation at this point is an existing condition. The jump does not appear in the HEC-RAS model submitted by Entellus for LOMR review due to a reduced contour interval and subsequent resolution of their study. The Entellus model shows a drop of approximately 2 feet between cross sections separated by 500 feet; the Stanley Consultants model shows the same drop of approximately 2 feet between cross sections separated by 100 feet. Again, this area falls outside of the modified channel reach and was not evident in previous models due to limitations of model resolution.

Drop Structures

Velocities immediately above, below, and on the structures were determined using a steady-state HEC-RAS simulation (with mixed flow). Interpolated cross sections were added to the HEC-RAS model ("n" = 0.035) at 5 foot intervals for the continuum between the station immediately downstream of the drop structure and the station immediately upstream. The 10 and 100-year recurrence events were modeled and maximum velocities on the structures were found to be split between the events (maximum velocities on structures 3 and 4 occurred during the 10-year event). Further, a future bridged condition at Power Road was modeled to account for a reduced backwater

effect at Structure # 5 (downstream station 136+35). Higher velocities at structure 5 were generated using the bridged condition and drove the revetment design.

Above and below the structures, the same evaluation process was used. Higher velocities occur above (upstream) of the structures than below (downstream), generally due to acceleration at the head of the drop and the formation of hydraulic jumps on the structures. Figure 3 shows a plot of Froude number versus station with supercritical or near-supercritical drop locations indicated.

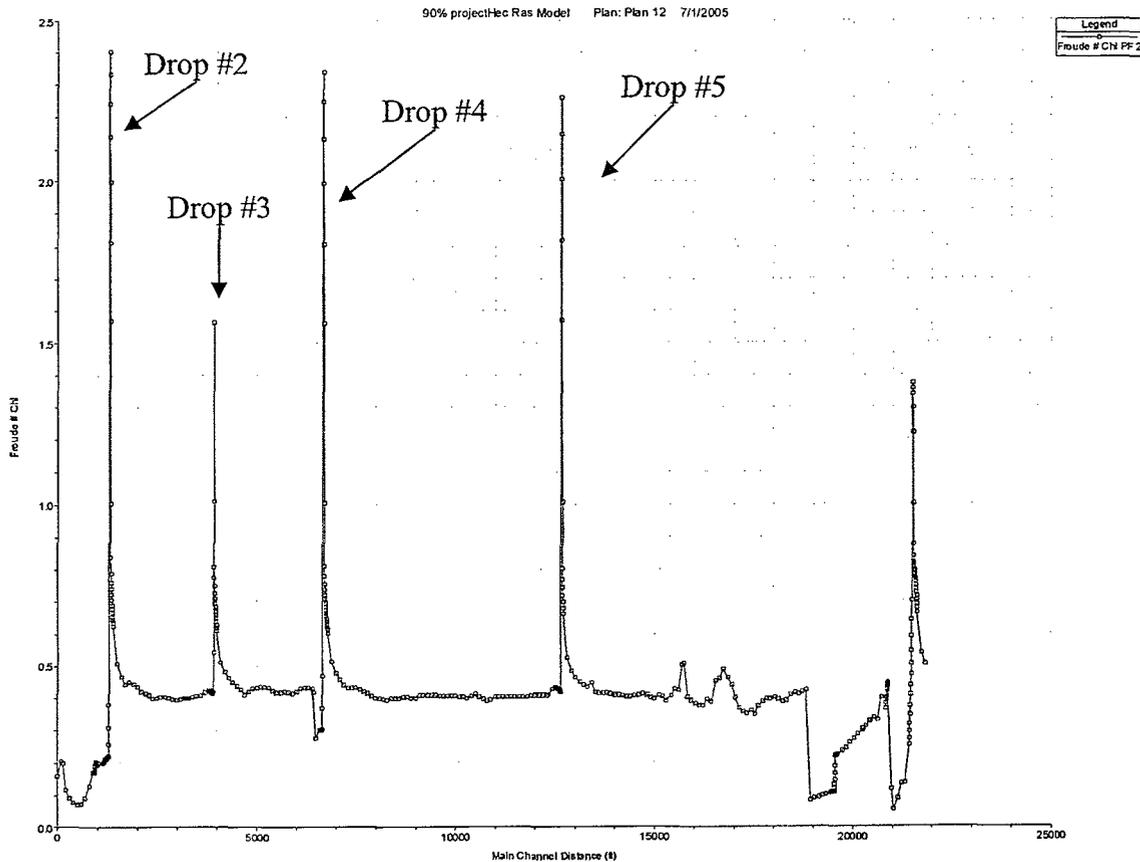


Figure 3 - Froude # vs Station (Q_{10} with bridge at Power Rd, $n = 0.035$)

5.5.2 Bridges and Culverts

Roadway crossing hydraulics are modeled using HEC-RAS. No formal clogging factors were applied at bridges or culverts. However, culverts were reduced by one standard size (6" diameter reductions) in the HEC-RAS model to account for loss in capacity due to clogging.

No obstruction is considered for handrails on top of any of the headwalls constructed with this project. Handrails are generally open rail type design. At Recker Road, the depth of overflow is less than the height to the lowest rail. At Power and Chandler Heights Roads, the culvert end treatment will be a flared end section with no headwall or

handrail. The culvert at Sossaman Road will have a headwall and handrail but these are set far enough back and low enough from the roadway controlling section and are relatively minor features in the overall cross section geometry that they were not considered obstructive.

At Recker Road, a dip crossing is recommended to preserve the historic thalweg during overflow events. A four-barrel 10'x5' (W x H) box culvert provides low-flow drainage. Overtopping depths of 6 inches to 1 foot occur during the 100-year event.

Similarly, Power Road is modeled as a culvert with a dip crossing above it. Three 24" diameter HDPE pipe culverts are modeled for low-flow drainage. The new channel alignment has been shifted south of the existing channel alignment at Power Road to accommodate the future commercial retail centers south of Ocotillo Roads on either side of Power Road. The roadway will overtop by approximately 4 ft. during a 100-year storm event. The culverts are not intended as a permanent drainage fixture and will be supplanted by a bridge in the future.

Via Del Jardin crosses Sonoqui Wash as a dip crossing with low-flow culverts. Three 18-inch diameter low flow culverts under the road provide drainage for small magnitude flows; overtopping of the roadway occurs during the 100-year discharge.

Sossaman Road will be reconstructed as a dip crossing with 3-24" CMP low flow culverts underneath. The roadway crossing overtops by approximately 3.5 ft during a 100-year event.

A culvert crossing and dip is modeled at Chandler Heights Road. A 3-24" HDPE temporary culvert was modeled. The 100-year flow overtops Chandler Heights Road by approximately 2.5 ft.

5.5.3 Levees and Dikes

No engineered levees or dikes are contained within the project limits.

5.5.4 Islands and Flow Splits

No islands or flow splits were included in the floodplain delineation analysis.

5.5.5 Ineffective Flow Areas

Ineffective flow areas are limited to the representation of areas of non-conveyance. In locations outside of the project limits, ineffective flow areas were matched to those used during the original floodplain delineation to provide continuity.

5.5.6 Supercritical Flow

Other than the jump locations mentioned above, supercritical flow does not develop within the project area.

5.6 Floodway Modeling

A floodway analysis was not performed as part of this study.

5.7 Problems Encountered During the Study

5.7.1 Special Problems and Solutions

No special problems were encountered and no special solutions were necessary.

5.7.2 Modeling Warning and Error Messages

Messages output from HEC-RAS within the project area include:

- 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 calculation.
- The velocity head has changed by more than 0.5 ft. This may indicate the need for additional cross sections.
- The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
- The energy loss was greater than 1.0 ft between the current and previous cross section. This may indicate the need for additional cross sections.
- 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.
- Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
- Culvert critical depth exceeds the height of the culvert.
- Hydraulic jump has occurred between this cross section and the previous upstream section.

These warning messages were reviewed and it was not considered necessary to modify the analysis to address remaining warning messages.

5.8 Calibration

General calibration was not required for this project as it is new construction.

Water's surface elevations were compared between the existing-condition model and the CLOMR model at sections upstream of the limits of channel improvements. These upstream sections were taken from the existing-condition model, but were placed using stationing from the CLOMR model (river miles from the Entellus study do not directly correspond to river miles from the CLOMR study). Water's surface elevations were found to differ by 0.18 ft at station 229+28.40 (Entellus Sta 4.11), which meets FEMA requirements.

5.9 Final Results

Plots of the final water surface profile and limits of inundation for the base flood are located in Appendix G.

5.9.1 Hydraulic Analysis Results

HEC-RAS output tables are located in Appendix E.

5.9.2 Verification of Results

The upstream water surface elevation at Sta 229+28.40 was compared with those from the existing-condition LOMR model by Entellus and found to match within tolerances specified by FEMA.

6.0 EROSION AND SEDIMENT TRANSPORT

Sediment transport calculations were performed WEST Consultants. Soil data was provided by AMEC Earth and Environmental.

6.1 Method Description

A sediment transport report by WEST Consultants is included in Appendix F of this notebook, as is a copy of soil boring logs by AMEC Earth and Environmental.

Sediment transport was calculated using Yang's Stream Power function in HEC-6T. A condition of zero sediment inflow was initially modeled with a recirculation model used to estimate the sediment concentration and gradation at the upstream end of the project.

HEC-RAS output for each cross section that did not border a drop structure or roadway crossing was used to generate a general scour estimate for each section and then averaged to produce an average scour depth for the channel. Three separate methods were used at each section and averaged to produce an average value for that section: the USBR Method, the Blanch Equation, and Lacey Equation. A fourth method is presented in "Computing Degradation and Local Scour", the Competent Velocity Approach, but this method produced unreasonable results for the fine-grained soils present in Sonoqui Wash and was not included in the analysis. A summary of results for the 10 and 100-year discharge scour depths is shown in Section 6.6.

Lateral erosion/migration was not considered due to the incorporation of continuous channel bank lining. Bank lining was sized using standard methods outlined in the Arizona Department of Transportation's *Roadway Design Guidelines* (RDG) (RDG and FCDMC's *Hydraulics Manual* are both based upon FHWA's *Hydraulic Engineering Circular No. 11 - Design of Riprap Revetment*).

6.2 Parameter Estimation

The presence of frequent drop structures and roadway crossings provide grade-control "hard points." As such, long-term channel aggradation and degradation were not evaluated in detail. WEST Consultants provided channel profiles associated with moving-bed models for the 10 and 100 year discharges. Due to modeling assumptions, WEST's analysis shows general degradation at the upstream end of the project and aggradation within the sedimentation basin at the downstream boundary. If sediment enters the project area from upstream, degradation observed in the model may be lessened.

Soil borings were conducted by AMEC Earth and Environmental, Inc. Boring logs and gradations were used in the sediment transport analysis and the general scour analysis. Gradation curves show predominantly silt-sized particles on the channel surface.

6.3 Modeling Considerations

As shown in Figure 6, the predominant D_{50} size for surface sediments within Sonoqui Wash falls in the silt/clay size fraction. The preponderance of fine-grained soils does not lend itself well to conventional bedload transport functions and modeling approaches/equations were considered for applicability before use. While the typical method of transport of these soils would be as suspended load, potential for saturation is high and bedload must be considered.

While a base "n" value of 0.045 was used to compute the water surface elevation and limits of inundation for this project, a base "n" value of 0.035 was used for sediment transport calculations. Use of the lower "n" value not only provides a worst-case, higher velocity, but also models the project condition immediately after construction, prior to the establishment of landscaping and vegetation. Were the design event to occur after the project has established vegetation consistent with an "n" value of 0.045, scour and sediment transport would be reduced.

Bulking was not considered due to low volumetric sediment transport rates. The average volumetric sediment concentration (Q_s/Q_w) for the 100-year discharge is 0.036.

Initial sediment concentration flowing into the project could not be determined from existing data. A recirculation model was used to estimate the sediment concentration boundary condition.

6.4 Problems Encountered During the Study

6.4.1 Special Problems and Solutions

Yang's Stream Power approach was selected by WEST Consultants as the most appropriate means of modeling sediment transport within Sonoqui Wash using HEC-6T. A re-circulation procedure was used at the upstream end of the project to estimate the initial sediment concentration flowing into the project.

6.4.2 Modeling Warning and Error Messages

None to report.

6.5 Calibration

Generally, calibration was not required as the Sonoqui Wash Channelization is a new design and cannot be calibrated to existing sediment transport conditions.

Calibration of the initial sediment discharge into the sediment transport model is described in the sediment transport report by WEST Consultants in Appendix F.

6.6 Final Results

Profiles from the HEC-6T movable-boundary model are in Appendix F. Generally, the model showed scour at the upstream end of the project and deposition at the downstream end. The sedimentation basin's efficiency during the 100-year discharge is estimated at 89% ($1 - Q_{s-out}/Q_{s-in}$).

6.6.1 Erosion and Sediment Transport Analysis Results

Soil gradation curves for shallow soils are shown below.

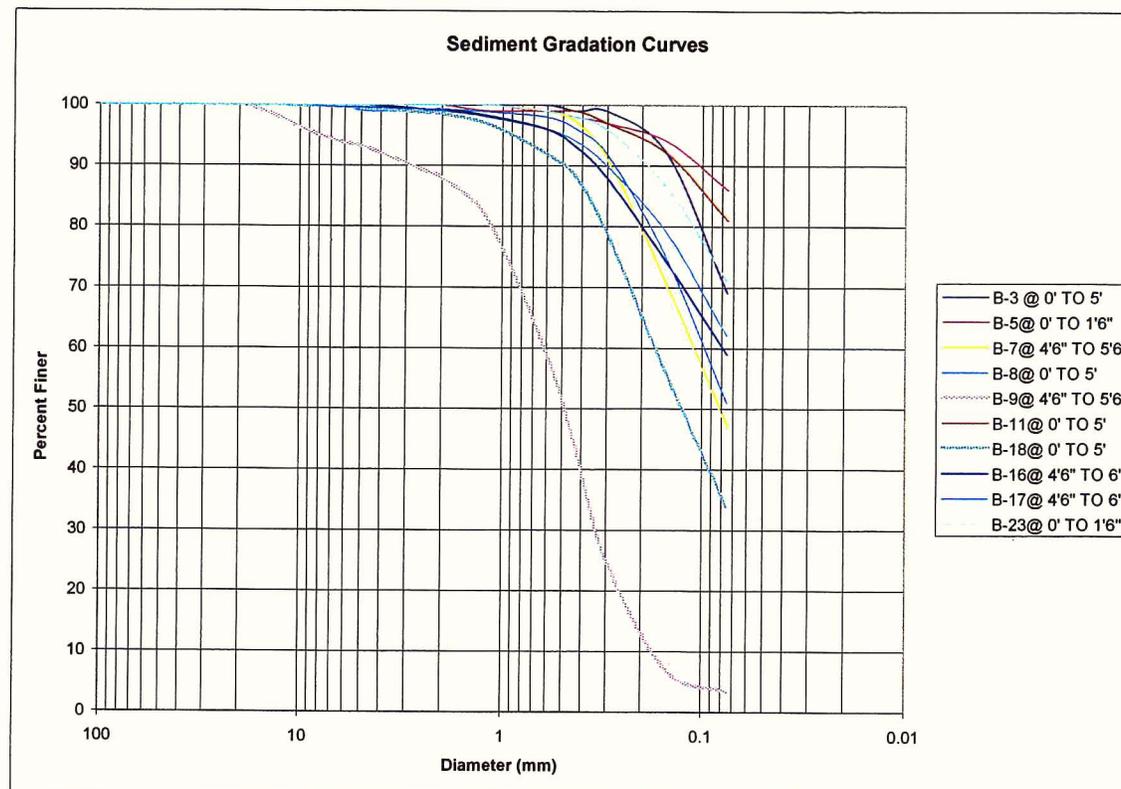


Figure 4 - Sonoqui Wash Sediment Gradation

Results from WEST Consultants' sediment transport analysis are shown in Appendix F.

6.6.2 Verification of Results

Because the sediment transport study was conducted to evaluate post-project conditions, comparison between calculated values and observed values is not possible. Sediment transport was not addressed in the original LOMR by Entellus Inc.

7.0 DRAFT FIS REPORT DATA

7.1 Summary of Discharges

Flow rates are per Entellus's *Sonoqui Wash Floodplain Delineation Study Technical Data Notebook* currently under FEMA LOMR review. A uniform discharge of 2100 cfs was applied through Sonoqui Wash for floodplain delineation.

7.2 Floodway Data

No floodway delineation was performed.

7.3 Annotated Flood Insurance Rate Maps (FIRMs)

Annotated Flood Insurance Rate Maps are located in Appendix G. Applicable FIRM panels for the Sonoqui Wash Channelization and Higley Road Improvements are 3060G and 3075G. Existing-condition floodplain extents are shown with post-project floodplain extents overlain. Neither set of extents is shown on current FIRM maps. Existing-condition delineation by Entellus Inc. is currently under LOMR review.

7.4 Flood Profiles

Flood profiles are located in Appendix G.

8.0 REFERENCES

8.1 Data Collection Summary

Entellus, Inc., *Sonoqui Wash Floodplain Delineation Study Technical Data Notebook*, FCD 2002C033-2 and -3; March 2004.

Huitt-Zollars, *Queen Creek/Sonokai Wash Hydraulic Master Plan (QC/SW HMP)*, FCD 98-26, September 2000.

Kirkham Michaels Consulting Engineers, RCHB.DAT, Chandler Heights Basin – Final Design HEC-1 Model, Flood Control District of Maricopa County; January 22, 2003.

Kirkham Michael Consulting Engineers, Plans for the Construction of Chandler Heights Peak Shaving Basin, 30% Design, Flood Control District of Maricopa County (FCD Contract No. 00-40); July 2002.

WEST Consultants, *Sonoqui Wash Channelization Channel Stability Analysis*, June 2005.

Wood Patel & Associates, Inc, *Design Study for Trilogy- Sonoqui Wash*, Town of Gilbert, City of Mesa and Flood Control District of Maricopa County; February 20, 2002.

8.2 Referenced Documents

Arizona Department of Transportation, *Roadway Design Guidelines*, May 1996.

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

Brown, S.A., and Clyde, E.S., *Hydraulic Engineering Circular 11: Design of Riprap Revetment (HEC-11)*, Federal Highway Administration; Republished 2000.

Brunner, Gary W. and Goodell, Chris R, *HEC-RAS Hydraulic Reference Manual*, September 2002.

Federal Emergency Management Agency, *Flood Insurance Study: Guidelines and Specifications for Study Contractors (FEMA 37)*, January 1995.

Flood Control District of Maricopa County (FCDMC), *Drainage Design Manual for Maricopa County, Arizona – Volume II, Hydraulics*, Flood Control District of Maricopa County; January 28, 1996.

Pemberton, E.L., and Lara, J.M., *Computing Degradation and Local Scour*, United States Bureau of Reclamation; January 1984.

Sabol, George V; Rumann, J.M.; Khalili, Davar; and Waters, Stephen D., *Drainage Design Manual for Maricopa County, Arizona – Volume I, Hydrology*, Flood Control District of Maricopa County; January 28, 1996.

Thomsen, B.W. and Hjalmerson, H.W., *Estimated Manning's Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County, Arizona*, United States Geological Survey, April 1991.

Appendices

Appendix A: FEMA Forms

Appendix B: General Documentation & Correspondence

B.1 Special Problem Reports

B.2 Telephone Reports

B.3 Meeting Minutes

B.4 General Correspondence

B.5 Contract Documents

Appendix C: Survey Field Notes

C.1 Survey Field notes for Aerial Mapping Control

C.2 Survey Field Notes for Hydrologic Modeling

C.3 Survey Field Notes for Hydraulic Modeling

Appendix D: Hydrologic Analysis Documentation

D.1 Precipitation Data

D.2 Physical Parameter Calculations

D.3 Hydrograph Routing Data

D.4 Reservoir Routing Data

D.5 Flow Splits and Diversion Data

D.6 Hydrologic Calculations

Appendix E: Hydraulic Analysis Documentation

E.1 Roughness Coefficient Estimation

E.2 Cross Section Plots

E.3 Expansion and Contraction Coefficients

E.4 Analysis of Structures

E.5 Hydraulic Calculations

Appendix F: Erosion & Sediment Transport Analyses Documentation

F.1 Soils Data

F.2 Sediment Transport Modeling Report

Appendix G: Maps, Profiles & Exhibits

G.1 Annotated FIRM Maps

G.2 Existing Conditions Maps (Entellus)

G.3 Flood Profiles

G.4 Work Maps

G.5 Other Maps & Exhibits

Appendix A: FEMA Forms

FEDERAL EMERGENCY MANAGEMENT AGENCY
OVERVIEW & CONCURRENCE FORM

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

PAPERWORK BURDEN DISCLOSURE NOTICE

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

A. REQUESTED RESPONSE FROM FEMA

This request is for a (check one):

- CLOMR: A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72).
- LOMR: A letter from FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See Parts 60 & 65 of the NFIP Regulations.)

B. OVERVIEW

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

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301	City of Katy	TX	480301	0005D	02/08/83
480287	Harris County	TX	48201C	0220G	09/28/90
	See attachment				

2. Flooding Source: Sonoqui Wash

3. Project Name/Identifier: Sonoqui Wash Channelization - FCDMC #2002C037

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

5. Basis for Request and Type of Revision:

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

- Physical Change Improved Methodology/Data
- Regulatory Floodway Revision Other (Attach Description)

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

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

- Types of Flooding: Riverine Coastal Shallow Flooding (e.g., Zones AO and AH)
- Alluvial fan Lakes Other (Attach Description)
- Structures: Channelization Levee/Floodwall Bridge/Culvert
- Dam Fill Other, Attach Description

C. REVIEW FEE

Has the review fee for the appropriate request category been included?

Yes

Fee amount: ~~\$4000~~ \$4,400

No, Attach Explanation

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

D. SIGNATURE

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

Name: Catherine W. Regester, P.E. CFM

Company: Flood Control District of Maricopa Count

Mailing Address:
2801 W Durango St
Phoenix, AZ 85009

Daytime Telephone No.:
602-506-4001

Fax No.:
602-506-4601

E-Mail Address: cwr@mail.maricopa.gov

Signature of Requester (required):

Catherine W. Regester

Date:

1/5/06

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

Community Official's Name and Title: Timothy S. Phillips, P.E., Chief Engineer & General Manager

Telephone No.:
602-506-4701

Community Name: Maricopa County

Community Official's Signature (required):

TSP

Date:

1/26/06

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

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

Certifier's Name: G. Scott Buchanan

License No.: 26837

Expiration Date:
3/31/2008

Company Name: Stanley Consultants

Telephone No.: 602-912-6500

Fax No.:
602-912-6577

Signature:

G. Scott Buchanan

Date:

11-2-05

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)

To Be Attached to MT-2 OVERVIEW & CONCURRENCE FORM for Sonoqui Wash Channelization, Queen Creek Wash to Chandler Heights Road

Response to B.1. The NFIP maps panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No	Effective Date
040044 040037	Town of Gilbert Maricopa County	AZ	04013C	3075G	09/30/05
040132 040044 040037	Town of Queen Creek Town of Gilbert Maricopa County	AZ	04013C	3060G	09/30/05
040044 040037 040048	Town of Gilbert Maricopa County City of Mesa	AZ	04013C	2690H	09/30/05
040132 040044 040037 040048	Town of Queen Creek Town of Gilbert Maricopa County City of Mesa	AZ	04013C	2695H	09/30/05

FEDERAL EMERGENCY MANAGEMENT AGENCY
OVERVIEW & CONCURRENCE FORM

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

PAPERWORK BURDEN DISCLOSURE NOTICE

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

A. REQUESTED RESPONSE FROM FEMA

This request is for a (check one):

- CLOMR: A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72).
- LOMR: A letter from FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See Parts 60 & 65 of the NFIP Regulations.)

B. OVERVIEW

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

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301	City of Katy	TX	480301	0005D	02/08/83
480287	Harris County	TX	48201C	0220G	09/28/90
	See attachment				

2. Flooding Source: Sonoqui Wash

3. Project Name/Identifier: FCDMC #2002C037

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

5. Basis for Request and Type of Revision:

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

- Physical Change Improved Methodology/Data
- Regulatory Floodway Revision Other (Attach Description)

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

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

- Types of Flooding: Riverine Coastal Shallow Flooding (e.g., Zones AO and AH)
- Alluvial fan Lakes Other (Attach Description)
- Structures: Channelization Levee/Floodwall Bridge/Culvert
- Dam Fill Other, Attach Description

C. REVIEW FEE

Has the review fee for the appropriate request category been included? Yes Fee amount: ~~\$4000~~ \$4,400
 No, Attach Explanation

Please see the FEMA Web site at http://www.fema.gov/fhm/frm_fees.shtml 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: Catherine W. Register, P.E. CFM	Company: Flood Control District of Maricopa Count	
Mailing Address: 2801 W Durango St Phoenix, AZ 85009	Daytime Telephone No.: 602-506-4001	Fax No.: 602-506-4601
	E-Mail Address: cwr@mail.maricopa.gov	

Signature of Requester (required): *Catherine W. Register* Date: *1/5/06*

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

Community Official's Name and Title: Lonnie Frost, Public Works Director	Telephone No.: 480-503-6842
--	--------------------------------

Community Name: Town of Gilbert	Community Official's Signature (required): <i>Lonnie Frost</i>	Date: <i>17 Jan 06</i>
---------------------------------	--	------------------------

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

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

Certifier's Name: G. Scott Buchanan	License No.: 26837	Expiration Date: 3/31/2008
-------------------------------------	--------------------	-------------------------------

Company Name: Stanley Consultants	Telephone No.: 602-912-6500	Fax No.: 602-912-6577
-----------------------------------	-----------------------------	--------------------------

Signature: *G. Scott Buchanan* Date: *11-2-05*

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

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

Seal (Optional)

To Be Attached to MT-2 OVERVIEW & CONCURRENCE FORM for Sonoqui Wash Channelization, Queen Creek Wash to Chandler Heights Road

Response to B.1. The NFIP maps panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No	Effective Date
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FEDERAL EMERGENCY MANAGEMENT AGENCY
OVERVIEW & CONCURRENCE FORM

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

PAPERWORK BURDEN DISCLOSURE NOTICE

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A. REQUESTED RESPONSE FROM FEMA

This request is for a (check one):

- CLOMR: A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72).
- LOMR: A letter from FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See Parts 60 & 65 of the NFIP Regulations.)

B. OVERVIEW

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

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301	City of Katy	TX	480301	0005D	02/08/83
480287	Harris County	TX	48201C	0220G	09/28/90
	See attachment				

2. Flooding Source: Sonoqui Wash

3. Project Name/Identifier: FCDMC #2002C037

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

5. Basis for Request and Type of Revision:

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

- Physical Change Improved Methodology/Data
- Regulatory Floodway Revision Other (Attach Description)

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

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

- Types of Flooding: Riverine Coastal Shallow Flooding (e.g., Zones AO and AH)
- Alluvial fan Lakes Other (Attach Description)
- Structures: Channelization Levee/Floodwall Bridge/Culvert
- Dam Fill Other, Attach Description

C. REVIEW FEE

Has the review fee for the appropriate request category been included? Yes Fee amount: ~~\$4000~~ \$4,400
 No, Attach Explanation

Please see the FEMA Web site at http://www.fema.gov/fhm/frm_fees.shtml 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: Catherine W. Regester, P.E. CFM		Company: Flood Control District of Maricopa Count	
Mailing Address: 2801 W Durango St Phoenix, AZ 85009		Daytime Telephone No.: 602-506-4001	Fax No.: 602-506-4601
E-Mail Address: cwr@mail.maricopa.gov			
Signature of Requester (required): <i>Catherine W. Regester</i>		Date: 1/5/06	

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

Community Official's Name and Title: Dick Schaner, Public Works Director		Telephone No.: 480-987-9887
Community Name: Town of Queen Creek	Community Official's Signature (required): <i>Richard L Schaner</i>	Date: 1-9-06

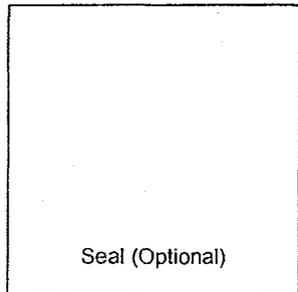
CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

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

Certifier's Name: G. Scott Buchanan	License No.: 26837	Expiration Date: 3/31/2008
Company Name: Stanley Consultants	Telephone No.: 602-912-6500	Fax No.: 602-912-6577
Signature: <i>G. Scott Buchanan</i>		Date: 11-2-05

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

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



To Be Attached to MT-2 OVERVIEW & CONCURRENCE FORM for Sonoqui Wash Channelization, Queen Creek Wash to Chandler Heights Road

Response to B.1. The NFIP maps panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No	Effective Date
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040132 040044 040037	Town of Queen Creek Town of Gilbert Maricopa County	AZ	04013C	3060G	09/30/05
040044 040037 040048	Town of Gilbert Maricopa County City of Mesa	AZ	04013C	2690H	09/30/05
040132 040044 040037 040048	Town of Queen Creek Town of Gilbert Maricopa County City of Mesa	AZ	04013C	2695H	09/30/05

To Be Attached to MT-2 OVERVIEW & CONCURRENCE FORM for Sonoqui Wash Channelization, Queen Creek Wash to Chandler Heights Road

Response to B.1. The NFIP maps panel(s) affected for all impacted communities is (are):

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040044 040037 040048	Town of Gilbert Maricopa County City of Mesa	AZ	04013C	2690H	09/30/05
040132 040044 040037 040048	Town of Queen Creek Town of Gilbert Maricopa County City of Mesa	AZ	04013C	2695H	09/30/05

FEDERAL EMERGENCY MANAGEMENT AGENCY
RIVERINE HYDROLOGY & HYDRAULICS FORM

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

PAPERWORK REDUCTION ACT

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

Flooding Source: Sonoqui 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 2) No existing analysis Improved data
 Alternative methodology Proposed Conditions (CLOMR) Changed physical condition of watershed

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

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

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

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

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

4. Review/Approval of Analysis

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

5. Impacts of Sediment Transport on Hydrology

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

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.)	
			Effective	Proposed/Revised
Downstream Limit	Sta 19+48	Trapezoidal	n/a	1311.82
Upstream Limit	Sta 229+28.40	Trapezoidal	1376.62	1376.80

2. Hydraulic Method Used

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

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

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

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

4. Models Submitted

Duplicate Effective Model*	Natural File Name: see attachment	Floodway File Name: n/a
Corrected Effective Model*	Natural File Name: n/a	Floodway File Name: n/a
Existing or Pre-Project Conditions Model	Natural File Name: see attachment	Floodway File Name: n/a
Revised or Post-Project Conditions Model	Natural File Name: see attachment	Floodway File Name: n/a
Other - (attach description)	Natural File Name: n/a	Floodway File Name: n/a

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

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

C. MAPPING REQUIREMENTS

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

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

D. COMMON REGULATORY REQUIREMENTS

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

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

- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

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

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

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

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

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

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

To Be Attached to MT-2 RIVERINE HYDROLOGY & HYDRAULICS FORM for
Sonoqui Wash Channelization, Queen Creek Wash to Chandler Heights Road

Response to B.4. Models Submitted:

Duplicate Effective Model	Natural File Name: FINAL_SONOQUIWASH.PRJ and FINAL_SONOQUIWASHSPLIT.PRJ
Corrected Effective Model	Natural File Name: n/a
Existing or Pre-Project Conditions Model	Natural File Name: FINAL_SONOQUIWASH.PRJ and FINAL_SONOQUIWASHSPLIT.PRJ
Revised or Post-Project Conditions Model	Natural File Name: CLOMR.PRJ
Other – (attach description)	Natural File Name: n/a

FINAL_SONOQUIWASH.PRJ and FINAL_SONOQUIWASHSPLIT.PRJ were previously submitted to FEMA by the
by Entellus on behalf of the Flood Control District of Maricopa County. Both of these models together serve as the
effective and existing conditions models.

No floodways were modeled.

FEDERAL EMERGENCY MANAGEMENT AGENCY
RIVERINE STRUCTURES FORM

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

PAPERWORK REDUCTION ACT

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

Flooding Source: Sonoqui 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 Structure

1. Name of Structure: Sonoqui Wash Channelization

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

Location of Structure: From Chandler Heights Rd to Queen Creek Wash

Downstream Limit/Cross Section: 19+48

Upstream Limit/Cross Section: 227+00

2. Name of Structure: Higley Road Bridge

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

Location of Structure: Intersection of Higley Road and Sonoqui Wash

Downstream Limit/Cross Section: Sta 20+27

Upstream Limit/Cross Section: Sta 21+53

3. Name of Structure: Chandler Heights Road Culverts

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

Location of Structure: Intersection of Chandler Heights Rd and Sonoqui Wash

Downstream Limit/Cross Section: Sta 219+60

Upstream Limit/Cross Section: Sta 218+55

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

B. CHANNELIZATION

Flooding Source: Sonoqui Wash

Name of Structure: Sonoqui Wash Channelization

1. Accessory Structures

The channelization includes (check one):

- | | |
|--|--|
| <input type="checkbox"/> Levees [Attach Section E (Levee/Floodwall)] | <input checked="" type="checkbox"/> Drop structures |
| <input type="checkbox"/> Superelevated sections | <input type="checkbox"/> Transitions in cross sectional geometry |
| <input checked="" type="checkbox"/> Debris basin/detention basin | <input type="checkbox"/> Energy dissipator |
| <input checked="" type="checkbox"/> Other (Describe): Lateral Diversion Weir | |

2. Drawing Checklist

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

3. Hydraulic Considerations

The channel was designed to carry 2100 (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):

4. Sediment Transport Considerations

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

C. BRIDGE/CULVERT

Flooding Source: Sonoqui Wash

Name of Structure: Higley Road Bridge

1. This revision reflects (check one):

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

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):

- | | |
|--|---|
| <input checked="" type="checkbox"/> Dimensions (height, width, span, radius, length) | <input checked="" type="checkbox"/> Erosion Protection |
| <input type="checkbox"/> Shape (culverts only) | <input checked="" type="checkbox"/> Low Chord Elevations – Upstream and Downstream |
| <input checked="" type="checkbox"/> Material | <input checked="" type="checkbox"/> Top of Road Elevations – Upstream and Downstream |
| <input type="checkbox"/> Beveling or Rounding | <input checked="" type="checkbox"/> Structure Invert Elevations – Upstream and Downstream |
| <input type="checkbox"/> Wing Wall Angle | <input checked="" type="checkbox"/> Stream Invert Elevations – Upstream and Downstream |
| <input checked="" type="checkbox"/> Skew Angle | <input checked="" type="checkbox"/> Cross-Section Locations |
| <input checked="" type="checkbox"/> Distances Between Cross Sections | |

4. Sediment Transport Considerations

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

D. DAM

Flooding Source:

Name of Structure:

1. This request is for (check one): Existing dam New dam Modification of existing dam

2. The dam was designed by (check one): Federal agency State agency Local government agency

Private organization Name of the agency or organization:

3. Does the project involve revised hydrology? Yes No

If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).

4. Does the submittal include debris/sediment yield analysis? Yes No

If yes, then fill out Section F (Sediment Transport).

If No, then attach your explanation for why debris/sediment analysis was not considered.

5. Does the Base Flood Elevation behind the dam or downstream of the dam change?

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

Stillwater Elevation Behind the Dam

FREQUENCY (% annual chance)

FIS

REVISED

10-year (10%)

50-year (2%)

100-year (1%)

500-year (0.2%)

Normal Pool Elevation

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

E. LEVEE/FLOODWALL (CONTINUED)

2. Freeboard (continued)

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

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

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

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

3. Closures

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

If opening exists, list all closures:

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

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

Note: Geotechnical and geologic data

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

4. Embankment Protection

a. The maximum levee slope landside is:

b. The maximum levee slope floodside is:

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

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

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

Attach references

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

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

E. LEVEE/FLOODWALL (CONTINUED)

4. Embankment Protection (continued)

- f. Is a bedding/filter analysis and design attached? Yes No
- g. Describe the analysis used for other kinds of protection used (include copies of the design analysis):

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

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

Overall height: Sta. ; height ft.

Limiting foundation soil strength:

Sta. , depth to

strength ϕ = degrees, c = psf

slope: SS = (h) to (v)

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

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

- c. Summary of stability analysis results:

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

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

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

If Yes, describe methodology used:

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

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

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

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

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability

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

UBC (1988) or Other (specify):

b. 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. 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.

E. LEVEE/FLOODWALL (CONTINUED)

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 NoIf No for any of the above, attach explanation.
- f. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. Yes No
If No, attach explanation.
- g. The rate of seepage through the levee system for the base flood is cfs
- h. The length of levee system used to drive this seepage rate in item g: ft.

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.

E. LEVEE/FLOODWALL (CONTINUED)

10. Operational Plan And Criteria

- a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? Yes No
- b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations?
 Yes No
- c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations?
 Yes No

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

11. Maintenance Plan

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

12. Operations and Maintenance Plan

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

F. SEDIMENT TRANSPORT

Flooding Source: Sonoqui Wash

Name of Structure: Sonoqui Wash Channelization

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 12.14 acre-feet

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

Sediment transport rate 3.6% (percent concentration by volume)

Method used to estimate sediment transport: Yang's Stream Power

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: HEC-18 Methods, USBR Method, Lacey Equation, and Blench Equation

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.

See attachment

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 RIVERINE STRUCTURES FORM for Sonoqui Wash Channelization, Queen Creek Wash to Chandler Heights Road

Section A

4. Name of Structure: Sossaman Road Culverts
Type (check one) Channelization Bridge/Culvert Levee/Floodwall Dam
Location of Structure: Intersection of Sossaman Road and Sonoqui Wash
Downstream Limit/Cross Section: Sta 197+90
Upstream Limit/Cross Section: Sta 199+21
5. Name of Structure: Power Road Culverts
Type (check one) Channelization Bridge/Culvert Levee/Floodwall Dam
Location of Structure: Intersection of Power Road and Sonoqui Wash
Downstream Limit/Cross Section: Sta 133+09
Upstream Limit/Cross Section: Sta 134+26
6. Name of Structure: Recker Road Culverts
Type (check one) Channelization Bridge/Culvert Levee/Floodwall Dam
Location of Structure: Intersection of Recker Road and Sonoqui Wash
Downstream Limit/Cross Section: Sta 74+34
Upstream Limit/Cross Section: Sta 75+06

Section B.3 Explanation

Hydraulic jumps potentially form at multiple locations in the Sonoqui Wash Channelization project.

Drop Structures

HEC-RAS analysis shows hydraulic jump formation or potential jump formation in several areas; generally, these areas may be described as near drop structure toes. Analysis for the 1% -annual-chance flow event showed some "drowning" of jumps by backwater so the 10%-annual-chance flow event was also modeled. Results from both events reflect similar jump locations with Froude number magnitudes varying between the events. To prevent channel degradation beyond the anticipated general scour, grouted riprap spillways with dumped riprap aprons have been designed on and below the structures, respectively. Velocity based design procedures following Arizona Department of Transportation Roadway Design Guidelines and the Federal Highway Administration's "Hydraulic Engineering Circular No. 11 - Design of Riprap Revetment". Dumped riprap aprons extend 20 feet beyond the toe of the drop structures and are separated from the grouted riprap by concrete cutoff walls which extend for a depth of 5 feet. Analysis by a subconsultant using methods established by Arizona Department of Transportation research indicate a maximum equilibrium scour depth of 3.4 feet at downstream aprons of the drop structures for the size of dumped riprap selected.

Transitions/Channel Outlet

The channel outlet/confluence intersects Queen Creek Wash. Due to the size of the respective watersheds, coincidence of flow during major events, such as the 1%-annual-chance flow event, is assumed at the confluence and hydraulic jump potential is minimized. For minor events, a dumped riprap apron extends below the weir located at the confluence of the streams and a cutoff wall prevents degradation of the structure's foundation.

Section C. Additional Bridges/Culverts

Flooding Source: Sonoqui Wash

Name of Structure: Chandler Heights Road Culverts

1. This revision reflects:

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

2. Hydraulic model used to analyze the structure: HEC-RAS

3. Attach plans of the structures certified by a registered professional engineer. The plan detail an information should include the following:

- | | |
|--|---|
| <input checked="" type="checkbox"/> Dimensions | <input checked="" type="checkbox"/> Erosion Protection |
| <input checked="" type="checkbox"/> Shape (culverts only) | <input type="checkbox"/> Low Chord Elevations – Upstream and Downstream |
| <input checked="" type="checkbox"/> Material | <input checked="" type="checkbox"/> Top of Road Elevations – Upstream and Downstream |
| <input checked="" type="checkbox"/> Beveling or Rounding | <input checked="" type="checkbox"/> Structure Invert Elevations – Upstream and Downstream |
| <input checked="" type="checkbox"/> Wing Wall Angle | <input type="checkbox"/> Stream Invert Elevations – Upstream and Downstream |
| <input type="checkbox"/> Skew Angle | <input checked="" type="checkbox"/> Cross-Section Locations |
| <input checked="" type="checkbox"/> Distances Between Cross Sections | |

4. Sediment Transport Considerations

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

Section C. Additional Bridges/Culverts (continued)

Flooding Source: Sonoqui Wash

Name of Structure: Sossaman Rd Culverts

1. This revision reflects:

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

2. Hydraulic model used to analyze the structure: HEC-RAS

3. Attach plans of the structures certified by a registered professional engineer. The plan detail an information should include the following:

- | | |
|--|---|
| <input checked="" type="checkbox"/> Dimensions | <input checked="" type="checkbox"/> Erosion Protection |
| <input checked="" type="checkbox"/> Shape (culverts only) | <input type="checkbox"/> Low Chord Elevations – Upstream and Downstream |
| <input checked="" type="checkbox"/> Material | <input checked="" type="checkbox"/> Top of Road Elevations – Upstream and Downstream |
| <input checked="" type="checkbox"/> Beveling or Rounding | <input checked="" type="checkbox"/> Structure Invert Elevations – Upstream and Downstream |
| <input checked="" type="checkbox"/> Wing Wall Angle | <input type="checkbox"/> Stream Invert Elevations – Upstream and Downstream |
| <input type="checkbox"/> Skew Angle | <input checked="" type="checkbox"/> Cross-Section Locations |
| <input checked="" type="checkbox"/> Distances Between Cross Sections | |

4. Sediment Transport Considerations

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

Section C. Additional Bridges/Culverts (continued)

Flooding Source: Sonoqui Wash

Name of Structure: Power Rd Culverts

1. This revision reflects:

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

2. Hydraulic model used to analyze the structure: HEC-RAS

3. Attach plans of the structures certified by a registered professional engineer. The plan detail an information should include the following:

- | | |
|--|---|
| <input checked="" type="checkbox"/> Dimensions | <input checked="" type="checkbox"/> Erosion Protection |
| <input checked="" type="checkbox"/> Shape (culverts only) | <input type="checkbox"/> Low Chord Elevations – Upstream and Downstream |
| <input checked="" type="checkbox"/> Material | <input checked="" type="checkbox"/> Top of Road Elevations – Upstream and Downstream |
| <input checked="" type="checkbox"/> Beveling or Rounding | <input checked="" type="checkbox"/> Structure Invert Elevations – Upstream and Downstream |
| <input checked="" type="checkbox"/> Wing Wall Angle | <input type="checkbox"/> Stream Invert Elevations – Upstream and Downstream |
| <input type="checkbox"/> Skew Angle | <input checked="" type="checkbox"/> Cross-Section Locations |
| <input checked="" type="checkbox"/> Distances Between Cross Sections | |

4. Sediment Transport Considerations

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

Section C. Additional Bridges/Culverts (continued)

Flooding Source: Sonoqui Wash

Name of Structure: Recker Rd Culverts

1. This revision reflects:

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

2. Hydraulic model used to analyze the structure: HEC-RAS

3. Attach plans of the structures certified by a registered professional engineer. The plan detail an information should include the following:

- | | |
|--|---|
| <input checked="" type="checkbox"/> Dimensions | <input checked="" type="checkbox"/> Erosion Protection |
| <input checked="" type="checkbox"/> Shape (culverts only) | <input type="checkbox"/> Low Chord Elevations – Upstream and Downstream |
| <input checked="" type="checkbox"/> Material | <input checked="" type="checkbox"/> Top of Road Elevations – Upstream and Downstream |
| <input checked="" type="checkbox"/> Beveling or Rounding | <input checked="" type="checkbox"/> Structure Invert Elevations – Upstream and Downstream |
| <input checked="" type="checkbox"/> Wing Wall Angle | <input type="checkbox"/> Stream Invert Elevations – Upstream and Downstream |
| <input type="checkbox"/> Skew Angle | <input checked="" type="checkbox"/> Cross-Section Locations |
| <input checked="" type="checkbox"/> Distances Between Cross Sections | |

4. Sediment Transport Considerations

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

Section F. Sediment Transport Addendum

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport:

As specified, bulked flows were not used to determine BFEs. Due to the low volumetric sediment concentration (3.6%), flow bulking was not considered during analysis. Additionally, the sediment transport rate is an average rate based upon an inflow hydrograph, not the steady-flow conditions considered for the CLOMR delineation.

Available sediment primarily falls within the silt/clay size-fraction and is transported as suspended load; the permissible erosive velocity for these soils has been estimated at 2 ft/s which is below the minimum velocity allowed in culverts. From this, sedimentation at roadway crossings is not anticipated.

The sedimentation basin located at the downstream limit of the project was modeled as sediment filled for the CLOMR analysis based upon high capture efficiencies observed during the sediment transport study. Although technically a future-condition, the BFE is conservatively based upon the "filled" condition.

Appendix B: General Documentation & Correspondence

B.1 Special Problem Reports

No special problems encountered.

B.2 Telephone Reports

No significant telephone correspondence occurred.

B.3 Meeting Minutes

Meeting Type	Date
Kickoff	11/25/2003
H&H	12/3/2003
Coordination	12/11/2003
Land Develop	12/18/2003
Coordination	1/8/2004
Coordination	1/12/2004
PAAC	1/15/2004
Ocotillo Rd	1/21/2004
Coordination	1/22/2004
Land Develop	1/28/2004
Land Develop	2/3/2004
Coordination	2/12/2004
Utility/Irrigation	2/18/2004
Utility/Irrigation	2/18/2004
Coordination	2/26/2004
Coordination	3/11/2004
Utility/Irrigation	3/17/2004
Utility/Irrigation	3/17/2004
PAAC	3/18/2004
Coordination	3/25/2004
Land Develop	4/5/2004
Coordination	4/8/2004
Coordination	4/22/2004
Coordination	5/13/2004
Coordination	5/27/2004
Coordination	6/10/2004
Coordination	6/24/2004
Coordination	7/8/2004
Coordination	7/15/2004
Coordination	8/3/2004
Coordination	9/9/2004
Coordination	10/14/2004
Coordination	10/22/2004
Coordination	11/15/2004
Coordination	12/9/2004
Coordination	1/12/2005
Coordination	3/10/2005

MEETING MINUTES

Date: 11-25-03

Place: FCDMC Office

Project/Purpose: Sonoqui Wash Kickoff Meeting

Attendees: See attached list

Notes By: E. Kidd

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. A project letter needs to be sent out notifying property owners within the Rancho Jardin subdivision area regarding the project. A project fact sheet describing the project features should be included. Raju will assist in determining the distribution area. This letter needs to be mailed by December 5th. It would be desirable to have some basic project information like location, project limits, objectives, features, sponsors, contact info, schedule, etc.
2. A well site on the north side of the proposed channel alignment between Recker and Power Roads was observed during a field visit. It serves the Trilogy golf course on the north side of the Ocotillo Road alignment. The well site appears to be in conflict with the channel alignment. The well site may need to be abandoned / relocated. Further coordination is needed on this issue. Stanley should contact Shawn Walters regarding well issues.
3. Utilities were briefly discussed. The Town of Queen Creek plans to extend a sewer force main across the channel alignment along Power Road. The Queen Creek Irrigation District owns an existing irrigation supply line that crosses Sonoqui Wash along the west side of Power Road. An existing Town of Gilbert 27" sewer line runs north in Higley Road to Ocotillo. The Town of Gilbert plans a future 24" water line in Higley Road that will cross the channel.
4. Administrative issues were discussed. Monthly progress reports will be submitted in accordance with new District guidelines. A time should be scheduled for monthly project meetings. Mondays and Fridays will be a bad time to hold project meetings. A contact list will be distributed to all parties attending. This list will be maintained by Stanley and re-issued when there are major changes.

Stanley is in the process of revising the project schedule. Copies of the revised schedule will be distributed at the first project meeting. A data collection letter is being prepared by the District and will be distributed when complete.

5. Three different hydrologic models were given to Stanley. A meeting will be scheduled to address H&H issues.
6. Kinder and gentler project expectations were discussed. The landscape theme shall be continuous and fit the surrounding area. Some right-of-way restrictions were discussed. Input is needed from the Towns of Gilbert and Queen Creek regarding establishing a PAAC Committee.
7. The Ocotillo Road alignment will transition from the south side of the section line to the north side at Higley Road. The alignment should be coordinated with The District. The Ocotillo Road alignment will be mainly south of the 310' dedicated right-of-way. The channel will be mainly north of the Roadway between Higley and Power Roads. Within Rancho Jardin, we only have approximately 140' strip. The Town of Gilbert plans construction of a bridge / culvert all weather crossing for Higley Road at Sonoqui Wash.
8. Local partners had some requests for the channel design. The Town of Queen Creek requested an equestrian trail through the Rancho Jardin subdivision. All of the residents of Rancho Jardin have access to the channel. The Town would like to continue providing access to the channel for horseback riding. Lonnie said the Higley Road Bridge must be designed to provide adequate clearance for horse and rider.
9. A public meeting is needed near the end of the pre-design phase. Logan Simpson will take the lead in preparing for it. Further coordination is required.
10. Local utilities were discussed. The overhead power is owned by SRP and early coordination with SRP is needed to identify conflicts and start relocations of several new and existing utilities within Higley Road and the Ocotillo alignment. An existing well site is owned by Power Ranch / Trilogy and will have to be coordinated with them for relocation. The Town of Queen Creek does not own or operate a water utility. The Town of Gilbert plans a 48" reclaimed water and a 24" potable water line along Higley Road. The reclaimed water line will come from the north and serve the proposed recharge / reclamation project at the northeast corner of Higley and Ocotillo.
11. Further coordination is needed for the recharge / reclamation site. Gilbert's consultant for the recharge / reclamation project is Corollo and they are just now initiating the permitting process for the project. Mr. Dick Johnson is the contact at Corollo. The recharge / reclamation project is scheduled to be operational in mid-2006.

12. The utility contact for the Town of Queen Creek is Mr. Dick Schaner. The utility contact for the Town of Gilbert is Mr. Mark Weiner and his phone number is 480-503-6848.
13. A meeting with adjacent developers is needed to make them aware of the Sonoqui Wash project and examine any impact they may have. A special meeting with the Sossaman Ranch developer is needed. The District will be responsible for setting this meeting up.
14. The Town of Gilbert has acquired one existing residential parcel on the south side of the Ocotillo Road alignment between Higley and Recker Roads and is looking at acquiring three or four other parcels east of that. The parcel that was acquired has a house on it that is currently being leased back to the former owner but will need to be demolished to accommodate the Sonoqui Channel and Ocotillo Road improvements.
15. MCDOT is planning to build a bridge at Chandler Heights Road. However, the project is not funded. FCD will be assisting MCDOT with the hydraulic and scour analysis for the new bridge. The contact at MCDOT is Andrew Wojakiewicz.
16. 404 Permit issues were discussed. Jurisdictional Delineations have not been initiated but should start soon. Bob Stevens asked Lonnie if the recharge / reclamation facility will be constructed before the channel will be constructed. Lonnie Frost said the Town of Gilbert is planning to have the project constructed by FY06/07. The recharge facility can be utilized for mitigation. Bob Stevens said the Corps of Engineers might consider cumulative impacts and that may require extensive mitigation. Raju asked Bob Stevens to provide a time frame when all of the above task will start and end. Bob Stevens will review the schedule put together by Scott Buchanan and modify as necessary to reflect actual time frame to complete these tasks.
17. The aerial photo control and ground and grid datum will be coordinated with FCDMC's John Stock and his group.
18. There are potential environmental impacts along the project. The district will be overseeing the hazmat, native plants and archeological inventories. More soil borings may be needed near the adobe manufacturing facility to establish the extent of its impacts. Theresa Pinto from FCD will be leading the native plant survey using District's "On-call" consultants. Theresa Pinto from FCD will be leading the archeological investigation using the District's "On-call" consultants.

Distribution:

Shah, Frost, Schaner, Buchanan, Frechette, Cooper, Simpson-Colebank, Huscher, Freeman

MEETING NOTES

Date: 12-3-03

Place: FCDMC Office

Project/Purpose: Sonoqui Wash Hydrology and Hydraulics Meeting (and other project business)

Attendees: R. Shah, C. Register, S. Buchanan, E. Kidd

Notes By: E. Kidd

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. A regular project meeting time was established for the 2nd and 4th Thursday of each month at 1:00 for the pre-design phase of the project. The first meeting will be 12-11-03. A revised schedule will be needed at the meeting. Adjacent Developers may be invited to the 12-11-03 meeting.
2. A right of entry letter is in progress and should go out next week. The District provided a Data Collection Letter to Stanley Consultants, Inc. This letter formally lists all the data provided to Stanley Consultants from the District.
3. Cathy stated that the Town of Queen Creek has an IGA with FCD whereby FCD handles the floodplain management review within the Town limits. However, Queen Creek does its own drainage clearance review and approval for local drainage. The Town of Gilbert handles all their own review, both floodplain and drainage. However, FCD has been seeing many land development projects in this area submitted to them on a "courtesy review" basis.
4. Survey datum concerns were discussed. Stanley will use NAVD 88 for their project vertical datum. This will be consistent with the recently adjusted Entellus datum. The Huitt Zollars HMP used the older Entellus topo before it was adjusted. Cathy believes that the adjustment from old to new Entellus topo is: $\text{old} + 2.31' = \text{new}$. The topo Kirkham Michael used for design of the Queen Creek and EMF improvements west of Higley Road is on 1929 vertical datum. We'll need to have a tie between the 1929 and 1988 vertical datum. The horizontal datum for our topo will be based on the County's GDACS coordinates which are on a "grid" system. Our topo will be based on "ground" coordinates and they will be tied to the County's GDACS grid coordinates through a conversion factor.
5. Flow rates for Sonoqui Wash were discussed. Cathy Register provided a table of flows from various future condition models she ran using different assumed conditions,

primarily with / without certain HMP project features. The main channel discharge from Chandler Heights Road to the EMF only varies by a few percent for both existing and future conditions. Therefore, it was mutually agreed to use the upper value of the discharge range for our design reach rounded up to the nearest 100 cfs. This equates to a flow of 3,100 cfs throughout the entire design reach for future land use, with project conditions. We mutually decided to add an extra 100 cfs to account for any minor adjustments that Cathy might need to make, resulting in a design discharge of 3,200 cfs. For existing conditions, rounding up to the nearest 100 cfs yields a flow rate of 2,100 cfs which will be used for the CLOMR for our entire reach.

6. Cathy stated that she had a meeting with the Pinal County Engineer recently and provided them with the hydrologic model from the HMP. Pinal County's intent is to require land developers in their jurisdiction to use the model to analyze their pre-vs-post development hydrology. Pinal County's drainage and floodplain requirements will probably continue to be an issue because of all the land development occurring in Pinal County and the concern over its potential to increase flows, even with the current Pinal County drainage design criteria.
7. The MCDOT bridge at Chandler Heights Road will be designed for 4,200 cfs. This is the future condition discharge with future land use conditions, future channelization and three future offline detention basins per the HMP recommended alternative. It's the discharge Cathy has been using for the concept level hydraulic models she's been running for MCDOT. 4,200 cfs is the flow that approaches Chandler Heights Road. The proposed Sossaman basin will reduce this flow downstream from Chandler Heights as reflected in the HMP. But Cathy will assume a flow of 4,200 cfs all the way through the bridge design reach downstream from Chandler Heights as if the basin has not been built. Cathy will be using 4,200 cfs for bridge design under both existing channel conditions (without any project whatsoever) and conditions with the bridge and the channelization that will occur from our project but with no Sossaman basin to see which is the worst case design scenario. Raj will email the contact information for MCDOT's project manager.
8. Stanley is responsible for contacting all of the utility companies and requesting atlases and as-builts etc. A Blue Stake ticket should be ordered as soon as possible. Stanley is responsible for identifying all utility conflicts. Stanley is also responsible for coordination and relocation design of any existing "wet" utilities. The District will be responsible for coordinating conflicts and relocations involving dry utilities.
9. Project meeting minutes will be emailed to the main parties involved. Any review comments from the project team will need to be submitted no later than the following project coordination meeting.
10. A list of PAAC members needs to be established. Stanley / Logan Simpson will be responsible for this task.

Distribution:

Shah, Buchanan, Regester, Kidd

MEETING NOTES

Date: 12/11/03

Place: Stanley Consultants, Inc. office

Project/Purpose: Sonoqui Wash Channelization Bi-Weekly Project Coordination Meeting

Attendees: See attached list

Notes By: E. Kidd

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. The contact list was discussed briefly. A few revisions to it were marked up at the meeting and turned back over to Stanley. David Martinez provided information regarding some utilities that had not yet been included in the contact list. He is also going to send the contact information for the Town of Queen Creek's Public Information Officer. Cell phone numbers were requested from those who were willing to provide them. A list of project related web sites will be added to the contact list. These changes will be incorporated by the next regular project meeting and the contact list will be distributed electronically to the project team. The contact list will be updated as needed by both Raj Shah and Scott Buchanan.
2. The sample invoice format was reviewed and found to be acceptable with revisions to Table B. Scott Buchanan will make the draft invoice in an Excel spreadsheet and the first invoice will be a combined one for the months of November and December.
3. The general project schedule needs to be reviewed and adjusted as necessary at least once monthly. Some scheduling concerns/issues were discussed. The FEMA review of the project can take up to one year. The first public meeting date needs to be adjusted (slide) by two to three weeks to accommodate the PAAC Committee meetings and the upcoming holidays. A list of potential PAAC members and meeting times needs to be put together. All of the adjacent developers should be asked to participate on the PAAC Committee.
4. Certain action items from the kickoff meeting were reviewed. The project introduction letter with project information fact sheet (flyer) should go out next week to residents in the Rancho Jardin area. A project information flyer is also needed for the first public meeting. Raj Shah will have FCD's public information officer send a copy of the draft information flyer to Dick Schaner, Lonnie Frost and Stanley for review.
5. Communication with the owner of the well on the north side of Ocotillo Road between Recker and Power Roads is important to find out if the District is going to have to

relocate the well or not. Stanley will continue to try and contact the well site's owner / engineer.

6. Project meeting times have been established as the second and fourth Thursday of the month at 1:00 p.m. starting in January '04. From here on, action items should be listed at the end of the meeting notes.
7. Special attention will be needed to determine the location and magnitude of point source flows into the Sonoqui channel as part of the hydrologic analysis. The discharge used for channel design will be 3,200 cfs and the CLOMR discharge will be 2,100 cfs. These discharges will be used over the entire project reach per the meeting of 12-03-03. Stanley is just starting the hydrologic model and hydraulic modeling will not be initiated until the project topo is acquired. The H & H analysis will be given to the District in several submittals. Pinal County is sending a copy of a hydrologic analysis of the East Branch of Sonoqui Wash to the District. This analysis was recently submitted to Pinal County by a consultant that is working on a residential development just south of the Maricopa / Pinal County line. The District may forward this hydrologic model to Stanley for review. Stanley will write up a brief description of how the 100-year HEC-1 model was converted to a 10-year model.
8. The right of entry letter should go out today. Raj Shah will provide a copy of the letter to Stanley so that their survey team will have it before going out in the field. ROW and easements need to be identified for the 30% submittal. TCE's need to be identified for the 60% submittal.
9. A meeting with John Stock to discuss panel layout, blind targets, datum and control is needed before Cooper can proceed with the aeriels.
10. A utility kickoff meeting is required at the 30% submittal. Gary Maier with the District will set this meeting up. The data collection report format was briefly discussed and all as-builts will be listed in the report.
11. A list of potential PAAC Committee members still needs to be started. Raj Shah will initiate this. After the PAAC members are established, a meeting date and time can be established. PAAC member selection is a critical item and should be decided as soon as possible. The PAAC committee should have a representative from Rancho Jardin and from the residential area south of the Sonoqui channel near Recker Road. Raj Shah will contact Dick Schaner about a representative from the Recker Road area. Lucia de Cordre will write the letter of invitation to potential PAAC attendees. The public meeting will need to be pushed back to accommodate the PAAC process.
12. A meeting with the adjacent developers is needed to coordinate the channelization. A meeting with Roger Nelson representing the Sossaman Ranch property and Matt Goodwin representing the Langley Ranch (Miller Holdings) is scheduled for next Thursday. Shah will be primarily responsible for coordinating with the adjacent developers. Their contact information needs to be added to the contact list. All of the adjacent developers will be invited to join the PAAC.
13. Environmental clearances have not been started yet. The hazardous materials

investigation at the adobe brick plant will start soon and is being done in-house by the District. The District will initiate the JD by the end of December. There is a potential wetland site along the existing channel just west of Power Road that needs a determination. An Archeological investigation for the entire project will be performed.

14. The geotechnical work schedule has some flexibility. Geotechnical work within any jurisdictional waters should probably wait until after the archeological investigation is complete so we know if there are any areas to avoid. Retaining walls may be required along the wash in the Rancho Jardin area. Wall locations will be provided to AMEC for additional geotech investigation. Potential culvert locations will also be provided to AMEC so soil corrosion potential can be evaluated at those locations. Work may be staged until potential drop and grade control structure locations are known. AMEC will need 15 days to complete fieldwork and an additional 15 days to write the report. A pavement section recommendation should be included in the report unless Gilbert and Queen Creek have standard requirements. AMEC will investigate whether the towns use standardized pavement section requirements.

15. The Town of Queen Creek will be getting a cable television community bulletin board for broadcasting local issues. Queen Creek's web site is also a good media for public information and will be added to the contact list. Queen Creek's web site could possibly be set up with a project specific page for Sonoqui Wash and a link to the page could be added to the Districts web page. David Martinez will provide the District's Public Information Officer with contact information for Queen Creek's web master.

16. Aztec Engineering is MCDOT's consultant for the Ocotillo Road Corridor Study from Power Road to Alma School Road. This study is just getting off the ground. Reed Kempton is MCDOT's contact and Mike Shirley is Aztec's contact for the study. They should be contacted to determine the scope of work for the project. Reed is a candidate for the PAAC committee. Raj Shah will contact him about this.

Action Items:

Responsible Party

Stanley Consultants, Inc

relocation.

Martinez.

sites.

Design.

Task

1. Update Contact List. Add project-related web sites, cell phone numbers and contact information provided at or received as a result of the project meeting.

2. Add action item list to meeting minutes.

3. Contact well owner / engineer to determine status of well

4. Contact irrigation districts and utilities as provided by David

5. Coordinate with West and AMEC to determine geotech test

6. Provide input to draft list of potential PAAC members.

7. Provide copy of Huitt-Zollers HMP to Logan Simpson

8. Set up meeting with John Stock to coordinate the control datum and panel layout

Flood Control District

1. Send draft copy of project letter to Dick Schaner for comment. Send out project letter and fact sheet.
2. Send out right-of-entry letter. Copy Stanley.
 3. Coordinate with adjacent developments to schedule meeting time and add their information to the project contact list.
 4. Contact MCDOT to determine scope of work and schedule for Ocotillo Road Corridor Study.
 5. Obtain a copy of the recent hydrologic analysis from Pinal County.
6. Provide Logan Simpson with FCD Landscape Aesthetic Design Guidelines for Basins and Channels, Chapter 20 of District's Consultant Guidelines providing the full Consultant scope for the landscape and aesthetics as well as multi-use components of the District's planning and design process, cost ceiling tables.
 7. Contact Schaner for PAAC representative for the Rancho Jardin and Recker areas.
 8. Write letter of invitation to potential PAAC members.

Queen Creek

1. Provide Queen Creek PIO contact information to FCD PIO.
2. Provide local irrigation district and utility owner contact information to Stanley.
 3. Develop project specific web page and cable TV bulletin board. Provide project web address to the District so link can be established.

Distribution:

Shah, Frost, Schaner, Buchanan, Freschette, Bergeson, Simpson-Colebank, Huscher, Richards

MEETING NOTES

Date: 12-18-03

Place: FCDMC Office

Project/Purpose: Coordination with Langley Ranch Development Engineer

Attendees: Raj Shah, Matt Goodwin, Scott Buchanan

Notes By: Scott Buchanan

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. Matt Goodwin of Goodwin and Marshall explained that their client, Miller Holdings, is moving toward finalization of the purchase of the Langley Ranch property from the City of Mesa at the end of December. They may continue leasing the property for agricultural operation until it is developed.
2. The property goes all the way up to Queen Creek Road and includes the Queen Creek Wash channel. They will be doing some improvements to the Queen Creek channel as part of their development. Matt said they will more than likely be starting their development at the north side of the property and phase toward the south.
3. Matt has been in contact with Cathy Register regarding the floodplain delineations for Queen Creek and for Sonoqui Wash. He would like to get the electronic files for both floodplain delineations and will pursue that through Cathy. Matt is aware of the Sonoqui Wash Channelization project through previous conversations and meetings he has had with the District and Town of Gilbert. Matt asked why the revised floodplain delineation for Sonoqui Wash that was being done by Entellus was going to be submitted to FEMA when completed instead of waiting for the Sonoqui channel plans to be completed and both could be submitted as part of the CLOMR package. Raj responded that there is an existing condition floodplain that is quite wide in places and that this needs to be reflected for floodplain management purposes.
4. The Town of Gilbert has told Matt that they will have to dedicate 155 feet of their property along the south section line (Ocotillo Road alignment) for the Sonoqui Wash channel. Raj told him that they may need to dedicate more than that because the channel and Ocotillo Road shift north as they approach Higley Road. Ocotillo Road will be centered on the section line at Higley Road when constructed in the future instead of being offset 100 feet south of the section line, which is the general alignment from Higley Road to Power Road. If the transition can occur within Gilbert's recharge facility property, then 155 feet should be adequate for Langley Ranch. Matt said it is a matter of simple roadway geometry

and he can do some preliminary analysis and let us know if the transition will impact them. Raj suggested that he submit that analysis to Gilbert for their concurrence. MCDOT should also be coordinated on this issue because they are doing a corridor study for Ocotillo Road from Alma School to Power Road. Raj said Gilbert is the entity acquiring the channel / road right-of-way dedication and they need to be satisfied with the alignment / width / geometry.

5. Matt said their project will be required by Gilbert to do the full width roadway improvements for Recker Road including the low-flow culvert / dip crossing that has been anticipated thru the Sonoqui Wash project. Matt would like to coordinate with us when the hydraulic parameters are set for the Recker crossing. Matt said that Gilbert will allow Langley Ranch to have one other access to Ocotillo Road at the north-south mid-section line (next to Gilbert's recharge property). If Langley Ranch does this, it is also envisioned as a low flow culvert / dip crossing like the concept at Recker Road. Raj said we will have to look at that when we get further into the hydraulics of the channel but right now there is no hydraulic design in the scope of work for a crossing between Recker and Higley.
 6. Langley and Gilbert have been discussing the possibility of adjusting the configuration of the recharge parcel so that it would have a curvilinear boundary with Langley Ranch and perhaps even extend up into the Langley property. The acreage of the recharge parcel would stay the same as it is currently. The frontage of both the recharge parcel and the Langley parcel along Higley Road and Ocotillo Road may change if this happens. Langley Ranch will be responsible for the half-width roadway improvements along their Higley Road frontage. Ultimately, Higley Road will be six lanes with a center median.
 7. Raj asked if Matt would like to serve in our Project Aesthetic Advisory Committee (PAAC) for this project. Matt said he would like to be included in the committee and we should notify him of the meeting locations, time and date.
-

Distribution:

Shah, Goodwin, Lonnie Frost

MEETING NOTES

Date: 1/8/04
Place: Stanley Consultant, Inc. - Upstairs Conf. Room

Project/Purpose: Sonoqui Wash Channelization

Attendees: R. Shah, L. de Cordre, T. Pinto, S. Stewart, S. Buchanan, E. Kidd, D. Martinez, S. Bergeson, D. Simpson-Colebank, J. Keller, J. Cleveland, D. Richards, S. Bergeson

Notes By: E. Kidd

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. Discussion took place about the aerial flight and panel layout. Scott said he met with their surveyors and Cooper aerial to discuss the panel layout and control survey.
2. Action Items from previous bi-weekly meeting were reviewed and discussed.
3. The invoice format looked okay to Raj and Stanley will prepare an invoice for November and December.
4. Project schedule was discussed with regard to the section on 404 tasks that had been updated by Raj and Bob Stevens. The suggestion was to get the archeological and biological plan in place before AMEC starts their geotechnical work.
5. H & H/Sediment Basin: Raj said Cathy is still reviewing the Entellus Study and will not be done for another couple of weeks. There seem to be no major flaws in their submittals and it may be ready to be submitted to FEMA in two to three months. Raj asked Dennis if the Sediment basin size recommended for Sonoqui Wash at the confluence of Queen Creek is very accurate. Raj said the District is planning to do an advance acquisition of the parcel located west of Higley Road and north of Ocotillo Road and would like to make sure that the basin size recommended is adequate. Dennis said since the study was done about 3 to 4 years ago based on preliminary hydraulics and geotech information and he was not directly involved in the study, He needs to go back and verify the information and he will get back to us.
6. Rights-of-way, Rights-of-entry: Raj said the letters were mailed out in the middle of December to all the property owners that would potentially be involved in acquisition for the project. There are a total of 12 properties. FCD received 5 signed copies back with no objection to entry. FCD will start calling the non-respondents if replies are not received by next week.
7. Survey and Mapping: Scott said he had a meeting with Stanley survey manager and Cooper Aerial to discuss the panel layouts and extent of mapping. The meeting took place around 12:30 at Stanley's office just prior to the coordination

meeting. Raj said that we want to make sure that the datum and panel layout is coordinated with John Stock of the District. Raj said that the survey and mapping is already behind by 4 to 6 weeks. It may push the hydraulic tasks for the same amount of time because we can't run the HEC-RAS model without the cross-sections. Raj said that Stanley should expedite the panel layout and provide adequate info to Cooper Aerial so, that we can get the flight completed and topo done before further delay.

8. Utilities: Scott said the utility "as-built" collection process is on going. More coordination is needed with the Irrigation Districts along the project to learn more about their operations, tailwater requirements and possible water rights. Stanley needs to determine tailwater requirements as soon as possible. Raj said that during a recent field recon, he has found what appears to be a water well in the middle of the Sonoqui Wash channel a few hundred feet north of the Via del Jardin dip crossing. It consists of an 8" – 10" diameter PVC pipe sticking out of the ground about 4 feet and has a metal rod protruding from the top. There are weeds around it and the ground is wet. Stanley will research this with ADWR and see if it is a well.
9. Adjacent Developments: Raj said he will contact two other developers that we have not coordinated with and that is: Marabella Vineyards and Shamrock Developments. A meeting is needed with Shawn Walters of Sunbelt Holdings to discuss the well site closing in detail. There was question as to who actually operates the Sossamen agricultural land. Dave Martinez will find out.
10. Landscaping/PAAC Meeting: Discussion will take place during Pre-PAAC meeting right after this meeting. Diane said she had concerned about the overall schedule. She felt the schedule was very tight and the delays in starting the first PAAC meeting will role over into many of the project tasks that follow. Scott showed his concern as well. The RSVP's to the PAAC invitations were expected by 1-9-04. Raj will directly contact any invitees that did not respond to get input and verify if they plan on attending. Raj will also contact those who responded "no" for their input. Raj said he will talk to Don and get back to the team about any adjustment in schedule.
11. Environmental: Raj said that Bob Stevens is working on the JD and he is planning to finish the middle of January and submit to COE for approval. Diane asked what our proposed mitigation plan is. Raj said that the first option is to provide mitigation on the Town of Gilbert's Recharge facility and the second option is to do on-site mitigation. Raj said Bob Stevens will be scheduling a meeting with the COE to discuss both of these options and see which one the COE prefers and we precede with that. Diane said she will be interested in knowing that information as soon as it is available. Theresa said that Archeological on-call contract has been awarded. She will be awarding the Environmental Phase 1 contract soon and she is going to be performing the biological survey herself. Diane said she needs all of that information for her report as soon as it's available.
12. Geotechnical: Scott said his team is working on providing the location of soil boring, test pits and sediment samples. He will make that information available to the District to pass it on to the Archeologist to get his clearance prior to testing. Discussion took place on what is the right process to get the geotechnical consultant to get out to the site for drilling holes for information. Stanley was directed to assume the proposed alignment in the Huitt-Zollers HMP was correct and to approximate the alignment change thru the Sossaman property per their preliminary plan to develop retail land use on the southwest corner of Power and

Ocotillo. Any additional geotech survey or testing needed due to alignment changes or other unknowns at this point will be picked up with one of the Districts on-call contracts.

13. Town of Gilbert: Raj said that he will set up a meeting with the Town of Gilbert, MCDOT, AZTEC, Stanley and the District to get consensus between all of the parties about the alignment and transition of Ocotillo Road centerline from Power to Higley Road. Lonnie Frost has a study prepared for the geometry of Ocotillo near Higley. Ken Martin is the Parks & Rec. planner for the Town of Gilbert.
14. Town of Queen Creek: None
15. Public Involvement: Will be discussed at Pre-PAAC Meeting right after this meeting
16. Other Items: The roadway crossings need to be looked at in greater detail to see what type of problems we may have and verify if the recommended action (dip, bridge) is adequate. The next meeting will be held January 22nd at the Flood Control District offices.

Action Items:

Responsible Party

Stanley Consultants, Inc

Task

1. Submit invoice for November and December 2003.
3. Contact Trilogy well owner to setup meeting time to discuss well closing requirements. Research the possible well site that Raj found north of Via del Jardin.
4. Contact irrigation districts to determine tailwater requirements and water rights.
5. Coordinate with West and AMEC to determine geotech
6. Set up meeting with John Stock to coordinate the control datum and panel layout.
7. Update Contact List. Add project-related web sites, cell phone numbers and contact information provided at or received as a result of the project meeting.
8. Collect as-built drawing and existing utility information
9. Examine roadway crossings to verify the proposed action (i.e. dip, bridge) is adequate.

test sites.

Flood Control District

entry.

1. Setup meeting with COE to discuss mitigation options and preferences
2. Call all non-responding parties to obtain proper right-of-
3. Setup meeting with representatives for Marbella Vineyards and Shamrock Development to discuss the project.
4. Contact non-responding PAAC invitees to verify if they will be attending and get input from all the invitees that will not be attending.
5. Determine if the project schedule can be adjusted.
6. Set up meeting with involved parties to discuss the Ocotillo Road alignment from Power Road to Higley Road.

West Consultants

1. Review and verify sediment basin size given in HMP

Distribution: Shah, Frost, Schaner, Buchanan, Freschette, Bergeson, Simpson-Colebank, Huscher, Richards

ACTION ITEMS

Date and Time: January 12, 2005 at 1:00

Place: FCD Offices

Project/Purpose: Sonoqui Wash Channelization Regular Coordination Meeting

Attendees:

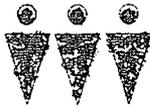
Notes By:

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

Action Items:

<u>Responsible Party</u>	<u>Task</u>
Stanley Consultants, Inc	<ol style="list-style-type: none">1. Revise Schedule2. Develop list of issues to be resolved3. Submit cost estimate for parcels needing maps and legals4. Finish Via Del Jardin exhibits
Flood Control District	<ol style="list-style-type: none">1. Set up utility coordination meeting2. Set up utility coordination meeting
Town of Queen Creek	<ol style="list-style-type: none">1. Confirm status of channel alignment exhibit w / Steve Sossaman2. Return comments on construction IGA to District3. Provide copy of Environmental report for CH basin parcel to District4. Check availability of Town Hall for second Public Meeting
West	<ol style="list-style-type: none">1. Determine minimum size of sediment basin
TBE	<ol style="list-style-type: none">1. Provide report for all potholes along project

Distribution: Shah, Frost, Schaner, Martinez, Richards, Simpson-Colebank



LOGAN SIMPSON
DESIGN INC.

MEETING NOTES

DISTRIBUTION DATE: January 28, 2004

MEETING DATE: January 15, 2004

LOCATION: Town of Queen Creek Town Hall
Time: 6:00 p.m.

PROJECT: **Sonoqui Wash Channelization Project**
Town of Gilbert and Town of Queen Creek

SUBJECT: **PAAC Meeting # 1**

ATTENDEES: *Town of Gilbert:* Lonnie Frost, Kenny Martin
Town of Queen Creek: Dick Schaner, David Martinez
Flood Control District of Maricopa County: Raj Shah, Dennis Holcomb, Sally

Stewart

Stanley Consultants: Scott Buchanan, Elizabeth Kidd
Logan Simpson Design: Diane Simpson-Colebank, Jackie Keller, Jennifer Cleveland
Rancho De Jardine Subdivision: Rich and LeaAnn Fergusson, John Robinson,

Sharon Steinhaus,

Sunridge Development: Dan Reeb (The Reeb Group)
Langley Ranch: Dallas Paulsen (Goodwin and Marshall Inc.)

DISTRIBUTION: Attendees, Lucia de Cordre, Flood Control District of Maricopa County

DISCUSSION ITEMS:

1. Raj Shah, Project Manager, began the meeting by describing the purpose and role of the Project Aesthetic Advisory Committee (PAAC), the objectives of PAAC Meeting #1, and the project background. The following is a brief summary of those items:
 - a. Purpose and Role of the PAAC – is to assist in the identification of appropriate aesthetic and multi-use concepts, features and designs for the project; assist in providing information and plans on existing and future planned developments adjacent to or impacted by the project area; review and provide input on the project objectives, themes, design criteria, and preliminary and final site development plans; and provide comments and feedback prior to public meetings.

- b. Objectives of PAAC Meeting #1 – describe the purpose and role of the PAAC; provide an overview of the project including the project background; review the landscape aesthetic goals and objectives, landscape themes, and design guides for Sonoqui Wash; review the landscape and recreational objectives from the Towns' perspective; obtain updated information on planned development impacted by the project; and secure planning documents/information from the PAAC members.
 - c. Project Background – the purpose of the project is to provide flood control that would minimize the area of land being inundated during a 100 year event; the scope of the work is to channelize the wash to contain the 100 year flow within the banks of the channel; the project limits are from the Queen Creek Wash channel just west of Higley Road to Chandler Heights Road; the *Queen Creek/Sonokai Wash Hydraulic Master Plan (HMP)* has provided a guideline for hydraulics and landscape aesthetics to date, however this project will serve to update and verify that information specifically for Sonoqui Wash.
2. A member of the PAAC asked if there was a landscape committee for the HMP that generated the landscape themes. There was no formal landscape committee or PAAC that was formed for the HMP. No current PAAC members were a part of the HMP landscape and aesthetic input process.
3. Scott Buchanan presented the following items as an overview for some of the engineering considerations:
 - a. Higley Road crossing will be a bridge while Recker, Power, Via Del Jardin and Sossaman Roads will be a dip crossing. Chandler Heights may be bridged within the next five years and Ocotillo and Power Roads will eventually be bridged sometime in the future.
 - b. The channel will run parallel with Ocotillo Road and on the north side of the road.
 - c. The area of the channel through the Via Del Jardin subdivision is the narrowest part of the channel right-of-way (115' – 200' wide). The District will try to avoid the need to take any additional property for the channel construction.
 - d. The channel will be 3 – 5 feet deeper than what the existing wash elevation is.
 - e. The channel will “dog-leg” around the triangle property at Ocotillo and Power Roads, as this will be commercially developed in the future.
 - f. The intent of the project is to channelize the north fork of the wash at Sossaman Road.
 - g. Side drainages from adjacent developments will also impact the channel design and aesthetics.
 - h. The preliminary hydraulic analysis from the HMP reflected a certain amount of landscape vegetation in the channel.

4. Diane Simpson-Colebank presented the HMP Overview and Recommendations for landscape aesthetic goals and objectives as the baseline for developing the specific goals and objectives for the Sonoqui Wash project. Jackie Keller and Jennifer Cleveland facilitated and documented the review and input of those goals and objectives. The specific goals and objectives for Sonoqui Wash were created through a consensus of the meeting participants and are attached to these notes.
5. Some PAAC members felt that there was an impact to urban wildlife, such as hawks, where the Queen Creek Improvements were done and wanted to minimize the impacts to wildlife along Sonoqui Wash.
6. Dennis Holcomb stated that the HMP identified that the landscape theme for the Sonoqui Wash Channel would be a natural Sonoran Desert - Themed Channel. The PAAC agreed that the natural look was preferred.
7. The actual cross section of the channel was discussed so everyone could visualize how steep the sides would be in the most constrained areas. Side slopes were identified as being 4:1 typically and 6:1 to 8:1 where there was enough width to allow a gentler slope and meandering of the channel sides. The type, need, and location of drop structures were also discussed. Drop structures allow for a sudden drop in elevation in the bottom of the channel and are actually buried in the Queen Creek Wash project.
8. The PAAC then discussed the maximum height of drops that horses and novice riders could ideally negotiate. The PAAC agreed that the maximum height of a drop "or step" would be 12" to 18" to accommodate novice riders. It was also agreed that the best approach to the drop structures would be to incorporate a ramp on one side since the ramp would accommodate all rider levels.
9. Materials and aesthetics of the drop structures were also discussed. The PAAC felt that natural (boulder) features would be preferred to hard concrete that has more of an urban feel but it was acknowledged that boulders may be very expensive.
10. The PAAC agreed that a continuous equestrian trail and multi-use path is more important than aesthetics for the Sonoqui Wash channelization. Connectivity to nearby parks and other trails is the most important objective.
11. The equestrian trail and multi-use path should be separated where possible. The equestrian trail being located in the bottom of the channel and the multi-use on the top and sides of channel.
12. Maintaining existing private accesses from back yards is very important to the current residents, however in some areas, the channel width may require short retaining walls and a side linkage to the trail in the bottom will be provided instead of a direct perpendicular connection.
13. A dirt bottom for Sonoqui Wash would also be ideal for the equestrian path, although having an alternative surface material at the roadways for equestrian crossings needs to be considered for slip resistance. Concrete is too smooth for the horses to get a good footing.

14. The PAAC stated that they would prefer to keep the roadway crossing width to 3 lanes, or less, when crossing streets because sight distance is a problem at dip crossings. Sossaman Road tapers from 5 lanes to 3 lanes at Sonoqui Wash. The Town of Queen Creek's Circulation Plan recommends bridges at any crossing with more than three travel lanes so the equestrians don't have to cross traffic. A signalized crossing designed for equestrians would be ideal.
15. Since Ocotillo Road will have a meandering sidewalk along the north side, Lonnie Frost suggested a separate all weather path (possibly decomposed granite) for the multi-use path that would run parallel and connect to the one along Ocotillo Road. The distance between parallel hard surface paths will be evaluated in the design so a duplication of pathways and an excess of concrete or asphalt do not occur when not necessary.
16. The intent of the hard surface multi-use path is to provide a continuous linkage that meets the *American with Disabilities Act (ADA)* for public facilities. All public accesses also need to be ADA compliant. Private property accesses do not have to accommodate ADA requirements.
17. The PAAC agreed that the use of small retaining walls that would allow for gentler slopes could be used in the most constrained areas of the wash. The Town of Queen Creek will look at the possibility of purchasing more right-of-way in order to have more gentler slopes if the only other alternative is a concrete-lined channel due to the existing right-of-way and flood control constraints.
18. There will be no low flow channel in Sonoqui Wash and the steepest slopes will vary from 2 ½ :1 to 3:1, 6:1 meandering slopes being the preferred treatment.
19. The Town of Gilbert prefers to have trailheads and/or rest areas every one-half mile and at entry points. The PAAC agreed that that should be the intent for the entire project area.
20. The PAAC meeting was concluded with the following action items.

ACTION ITEMS:

Responsible Party	Task
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Logan Simpson Design Inc. (LSD)/Flood District	Control	1. LSD and Raj Shah to bring examples of drop structures to the next PAAC meeting.
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Town of Queen Creek		<ol style="list-style-type: none"> 1. David Martinez to coordinate getting files, plans, and/or information for the Town of Queen Creek's General Plan and the Parks, Recreation, Open Spaces Master Plan to LSD. 2. David to provide a copy of or information for Queen Creek's trails master plan and standards to LSD. 3. David to coordinate getting any private development plans adjacent to the wash corridor that have been submitted to the Town for review or approval.
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Town of Gilbert

1. Kenny Martin to coordinate getting files, plans, and/or information for the Town of Gilbert's General Plan and the Parks, Recreation, Open Spaces Master Plan to LSD.
2. Kenny to provide a copy of or information on Gilbert's trails master plan and/or standards to LSD.
3. Kenny to coordinate getting any private development plans adjacent to the wash corridor that have been submitted to the Town for review or approval.

Flood Control District

1. Raj to coordinate getting copies of the adjacent private developments impacted by the project to give to LSD.
2. Raj to provide photos of different types of flood control structures similar to the types being proposed for this project for the next PAAC meeting.

Any corrections or additions to these minutes should be directed to **Jackie Keller** at **Logan Simpson Design Inc.** (480-967-1343) within the next 7 calendar days.

MEETING NOTES

Date and Time: January 21, 2004 at 2:00p

Place: Aztec Engineering

Project/Purpose: Sonoqui Wash - Ocotillo Road Alignment and Corridor Study

Attendees: Raj Shah, Elizabeth Kidd, Bruce Ward, John Willett, Marina Stender

Notes By: Elizabeth Kidd

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. The proposed Ocotillo Roadway classification was discussed. The current MAG traffic model predicts a 2025 ADT of 30,000 vpd for Ocotillo Road from Higley Road to Greenfield Road. This volume of traffic would classify this portion of Ocotillo Road as a Principal Arterial Road. According to MCDOT Standards, a Principal Arterial requires six travel lanes of traffic and 130 ft of right-of-way. The model is currently being rerun to determine if the 2025 ADT will come down with some links removed. If so, the entire roadway can be classified as a Minor Arterial. Bruce expressed concern with the MAG model accuracy and believes that the entire new alignment should be classified as a Minor Arterial requiring four lanes of traffic. Aztec is currently waiting for MCDOT to run the revised MAG model. Results should be available in the next week or so.
2. MCDOT was planning to acquire 140 ft of right-of-way for the proposed Ocotillo Road alignment. The proposed Roadway and Sonoqui Wash will have a common right of way buffer for landscaping and sidewalks. Since there is shared right of way, only 110 ft of right of way would be required for the roadway.
3. Due to waterway and sediment basin locations, the proposed Ocotillo Road alignment from Higley Road to Greenfield Road will have to be a bridge for most of it's length. John expressed concern that the cost of the bridge may be significant enough to remove this piece of the alignment from the project.
4. There will be an offset transition of the roadway centerline at Higley Road. West of Higley Road the roadway will be centered on the section line. East of Higley Road the roadway would be offset 100 feet south of the section line. If normal MCDOT standards were used, this transition would require approximately 5000 ft. Reverse curves can and should be used to shorten the required transition length. Aztec will provide the transition design to Stanley as soon as it is available.
5. The bridge at Higley Road over Sonoqui Wash was discussed. John expressed concern about aligning the Ocotillo Road and Higley Road intersection. Fitting Ocotillo Road in will be a challenge so the Higley Road Bridge should be

designed first. Elizabeth stated that Stanley doesn't have a contract for the design at this time but we anticipate one in the near future. John asked who the Project Manager was for the Higley Road bridge design. Elizabeth stated that a Project Manager still had to be determined but he could call Scott Buchanan at Stanley in the interim.

6. Landscaping and Multiuse concepts for Sonoqui wash were discussed briefly. The Proposed roadway will have a sidewalk along both sides of the road unless otherwise constricted. Decomposed granite will be adequate for the multi-use path where there are sidewalks.
 7. Aztec is still evaluating alternative alignments. Several alternatives will be presented to the public on February 3, 2004. Comments will be assessed before proceeding with the final design. Aztec anticipates the Ocotillo Road concept plans being completed in late August or early September.
 8. Survey and mapping were briefly discussed. Bruce stated that several areas to the west of the Sonoqui Wash project limits had problems with their surveys. Bruce will send further information.
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Distribution: Shah, Buchanan, Willett, Ward, Kidd

MEETING NOTES

Date and Time: January 22, 2004 at 1:00

Place: FCDMC Office

Project/Purpose: Sonoqui Wash Channelization Regular Coordination Meeting

Attendees: Raj Shah, Lucia de Cordre, Cathy Regester, Scott Buchanan, Elizabeth Kidd, Davic Martinez, Seth Bergeson, Diane Simpson-Colebank, Jackie Keller, Daniel Frechette
Gary Freeman

Notes By: Elizabeth Kidd

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. Action Items from previous bi-weekly meeting were reviewed and discussed.
2. The irrigation line along Power Road was discussed. Stanley was directed to investigate who owned it, who uses it, what area it serves, etc.
3. The geotechnical exhibit showing boring locations was discussed. The District's 1000 ft spacing requirement should be observed. AMEC has already taken borings along Chandler Heights Road for the future MCDOT bridge so the proposed borings in this area should be moved further south of Chandler Heights Road. The District has right of entry for the irregular shaped parcel south of Chandler Heights Road. The new boring location should be within and accessible through this parcel. Three borings were proposed at the sediment basin parcel. One of these borings should be relocated to Power Road for the anticipated grade control structure. The boring locations should be coordinated with AMEC and West then given to FCD for review. Archeological clearance is required prior to testing. AMEC will need to document how they plan to enter each of the boring sites.
4. The aerial mapping exhibit was presented and discussed. Blind panels will be placed throughout the project. After the blind panel coordinate accuracy has been confirmed, they can also be used to tighten up the control for the mapping models. Seth noted that the blind panel locations looked acceptable. A meeting with John Stock is not necessary. The project will be coordinated via phone. The mapping will be tied to GDACS on grid but will correspond to ground coordinates as well.
5. Utility information is coming in slowly. A list of what has been gathered will be compiled for the next coordination meeting.
6. Bob Stevens has completed a draft of the JD and he will submit it to the Corps tomorrow for review.
7. Carter Burgess is the Engineer for Marbella Vineyards. Raj had an unexpected coordination meeting with Carter Burgess prior to today's coordination meeting.

Raj gave Jackie a set of the Marbella Vineyard landscaping plans that had been passed along to him. Raj also gave Stanley a set of subdivision improvement plans for the project. The meeting Raj had with Carter Burgess will count as a coordination meeting for the project. Raj will prepare and distribute meeting minutes when they are available.

8. JMI is the Engineer for Shamrock Estates. Raj will try to set up a meeting time with them.
9. Raj will email Jackie the contact information for Trilogy's consultant.
10. A meeting with Sunbelt Holdings to discuss the well site is scheduled for Jan 28th.
11. Progress has lagged on a number of the project tasks, most notably the survey and mapping. Scott will update the schedule with adjustments that have already been made by Raj and Bob regarding the 404 tasks and by Diane regarding her proposed PAAC-related revisions prior to the next coordination meeting. Although the schedule has slipped, there will be no contract modification at this time.
12. A meeting was held with AZTEC Engineering to discuss the Ocotillo Road alignment. A 110' ROW and the centerline shift were agreed upon. The Town of Gilbert will provide the transition design. Parsons Brinkerhoff is the Town's engineer for the Ocotillo Road geometrics. The Town of Gilbert will provide a copy of the geometrics to Stanley.
13. H & H/Sediment Basin: Raj said Cathy is still reviewing the Entellus Study and will not be done for another couple of weeks. Raj asked Gary if the sediment basin size recommended for Sonoqui Wash at the confluence of Queen Creek is accurate. Raj said the District is planning to do an advance acquisition of the parcel located west of Higley Road and north of Ocotillo Road and would like to make sure that the basin size recommended is adequate. Gary said since the study was done about 3 to 4 years ago based on preliminary hydraulics and geotech information, he needs to go back and examine the information and he will verify the basin size via email. A buffer area of about 30% needs to be included in the design so the District will most likely buy the entire 9-acre parcel.
14. Some DDMS errors were discovered with the Entellus HEC-1 model. The errors involved the time of concentration with sub-basins E1 and E2 at the upper end of the contributing area. Entellus will revise the model and should have results in about 2 months. The revised model will be included with the LOMR. Stanley was directed to go ahead with the 10-year model since the Entellus changes will only result in a small change in discharge for our project. Cathy provided Stanley with a table that summarized the results of changes to discharge resulting from preliminary corrections to the Entellus model. A note will be added to Stanley's 10-year HEC-1 model stating that it is based on a version of the Entellus model that was currently under revision.
15. The Manning's coefficients in the HMP should be evaluated as soon as possible. This should be done prior to the mapping so it is ready for use in the hydraulic model as soon as the mapping is available. The Flood Control District will have a field meeting to discuss and verify the 'n' values.
16. The first PAAC meeting had a good turnout. The purpose and role of the PAAC was identified, along with the project background description. The Queen Creek/Sonoqui Wash Hydraulic Master Plan Overview and Recommendations were discussed as a baseline for developing the landscape aesthetic goals and objectives. The HMP goals and objectives were then modified, creating project specific goals and objectives for Sonoqui Wash. Examples from other projects will be presented to the PAAC members at the next PAAC meeting so they can

see what has been proposed for aesthetic channel amenities elsewhere. Certain design alternatives may be too costly for the Sonoqui project and should be discussed with the PAAC members. The two remaining PAAC meetings will be pushed back within the original scheduled time. The second PAAC meeting is tentatively scheduled for March 18th with the pre-PAAC meeting occurring March 11th. Some hydraulic analysis results would be desirable prior to the second PAAC meeting. The third PAAC meeting should definitely not be held until after hydraulic results are complete. A fourth PAAC meeting will not be likely. LSD will be providing existing data exhibits for the second PAAC meeting. Field aerial photomaps at 1" = 100' and an overall aerial photomap at 1" = 500' will be generated to use for mapping all the exhibit information.

Action Items:

<u>Responsible Party</u>	<u>Task</u>
Stanley Consultants, Inc	<ol style="list-style-type: none"> 1. Research the irrigation line along Power Road. 2. Revise boring locations as discussed and coordinate with West and AMEC to determine the remaining geotech test sites. 3. Coordinate the control datum and panel layout with John Stock via phone and with Cooper. 4. Put together a list of utility information that has been received and what still needs to be collected. 5. Put together minutes from meeting with AZTEC and give to Raj. 6. Contact irrigation districts to determine tailwater requirements and water rights. 7. Consolidate and update the project schedule.
Flood Control District	<ol style="list-style-type: none"> 1. Distribute minutes from meeting with Marbella Vineyards. 2. Setup meeting with JMI to discuss Shamrock Estates. 4. Setup meeting with involved parties to discuss the Ocotillo Road alignment from Power Road to Higley Road. 5. Setup meeting with the Corps to discuss mitigation options and preferences
West Consultants	<ol style="list-style-type: none"> 1. Review and verify sediment basin size given in HMP
Logan Simpson Design	<ol style="list-style-type: none"> 1. Get landscape and aesthetic examples from other projects for the next PAAC meeting.

Distribution: Shah, Frost, Schaner, Buchanan, Freschette, Bergeson, Simpson-Colebank, Huscher, Richards

MEETING NOTES

Date and Time: January 28, 2004 at 10:00

Place: FCDMC Office

Project/Purpose: Coordination with Sunbelt Holdings Regarding Existing Trilogy Well Site

Attendees: Raj Shah, Joan Scarbrough, Tim Miller, Elizabeth Kidd

Notes By: Elizabeth Kidd

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. Raj started the meeting with a brief overview of the project scope and schedule. He said the design will be completed by February of 2005 and as soon as all the project partners bring their share of construction cost funding, the project could go to construction in the following Flood Control District fiscal year, which is FY 05/06.
2. Trilogy - Unit 7 will back up parallel to the wash. The grading for Unit 7 will be finalized in May of 2004. Development of Unit 7 will be completed by January 2005. Joan provided part of the preliminary plat depicting the grading and layout for Unit 7.
3. A new well has been drilled north of the existing well to a depth of 850 ft. A new power source is needed before it can be brought online. Sunbelt is currently working with SRP to get this power source in place. Sunbelt anticipates needing the existing overhead power source along Ocotillo Road alignment until the end of 2004 then it will be abandoned. Sunbelt / SRP will remove the existing power poles and electric line after they are no longer needed. Sunbelt hopes to have the power source for the entire subdivision switched by January of 2005.
4. Layne Christian will be responsible to abandon the existing well. A 20 ft deep seal is needed to properly close the well casing. Sunbelt will need to know the flow line and scour depth for the new Sonoqui channel. Once they have this they will close the well 5 to 7 ft deeper than is necessary. All equipment associated with the well will be removed so it doesn't interfere with the future channelization.
5. Joan expressed concern about the accuracy of the horizontal datum. Trilogy will have a block wall along the FCD ROW and they don't want to have to move it in the future because of a difference in datum. Joan will send Raj a copy of the Preliminary Plat and the Landscaping/ Open Space Plan.
6. Sunbelt is most concerned about revising the existing floodplain limits. They anticipate Unit 7 being out of the future revised floodplain. Any changes to the future floodplain (by Entellus) should be coordinated with Sunbelt.
7. Sunbelt would like to have a representative at the PAAC meetings. Jason Garcia with Sunbelt will be invited to join the PAAC. Joan will send Jason's contact

information to Raj.

8. Tim suggested checking the ADWR 35 Registered Well registry for information on wells built before 1987.
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Distribution:

All attendees and Scott Buchanan

Sonoqui Wash Channelization

Meeting Agenda – Sossaman Property February 3, 2004 10:00 AM @ SW Corner Power and Ocotillo Rds.

- 1.0 Overview of existing farm operation
 - a. Property limits
 - b. Crops by field and season; active fields –vs- inactive
 - c. Farm operator – contact name
 - d. Continuation of farming as the property develops
 - e.
- 2.0 Irrigation supply water
 - a. Irrigation district(s) – boundaries
 - b. Sources; wells, CAP water, other sources; onsite –vs- offsite
 - c. Schematic of supply system; ditches, stand pipes, gates, etc.
 - d. Dry-up period?
 - e.
- 3.0 Irrigation tail water
 - a. Schematic of tail water system
 - b. Locations of existing tail water inflow to Sonoqui Channel
 - c. Recovery of tail water from Sonoqui Channel; downstream users and water rights
 - d.
- 4.0 Irrigation district improvements –vs- private improvements
- 5.0 Existing well sites; abandonment
- 6.0 Phasing of farming / irrigation operation as the property develops
 - a. Supply facilities
 - b. Tail water facilities
 - c.
- 7.0 Re-alignment of Sonoqui Channel around commercial corners at Ocotillo and Power Roads
- 8.0 Sonoqui Channel crossing at Ocotillo Road, Power Road
- 9.0 Possible re-alignment of Sonoqui Wash just north of Via del Jardine as suggested in the Sonoqui / Queen Creek Wash Hydraulic Master Plan
- 10.0 Right-of-way dedication to the Town of Queen Creek through the Sossaman property; width and alignment
- 11.0 Other items

MEETING NOTES

Date and Time: February 12, 2004 at 12:30

Place: FCDMC Office

Project/Purpose: Sonoqui Wash Channelization Regular Coordination Meeting

Attendees: Raj Shah, Lucia de Cordre (and daughter), Cathy Regester, Bob Stevens, Theresa Pinto, Warren Rosebraugh, Scott Buchanan, Elizabeth Kidd, Dick Schaner, Tom Condit, Creighton Wright, David Martinez, Seth Bergeson, Diane Simpson-Colebank
Jackie Keller

Notes By: Elizabeth Kidd

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. The meeting started with an introduction of new attendees. They were Creighton Wright, with the Town of Queen Creek Parks and Recreation, Tom Condit, Town Engineer for Queen Creek and Warren Rosebraugh, FCD Engineering Department.
2. The project schedule was discussed in detail. Raj put together a revised schedule. Scott and Diane need to review it and provide any comments. All of the comments regarding schedule will go to Scott and Scott will revise the schedule accordingly once the change is reviewed and approved by the District. Additional time was not added to the schedule, it still shows the final plans to be completed by the end of this year. If a fourth PAAC meeting is required the schedule may shift by 30 to 45 days.
3. Survey and mapping schedule and progress was discussed. Seth said Cooper will deliver the first portion of the final mapping by the middle of March. Stanley has finished setting/surveying all the control panels. Seth will send his coordinates of the blind panels to John Stock to verify the accuracy requirements. Once John Stock approves the coordinates, Cooper can begin the mapping process. The mapping should be done in two sections. The diagonal flight line west of Power Road is one piece and the east-west piece is the other. Raj should be notified when the information is sent to John Stock so he can expedite the review by coordinating directly with John. Raj requested Cooper to expedite the project so we can try and recover some of the delay that we experienced during December and January.
4. Action Items from previous bi-weekly meeting were reviewed and discussed.
5. There is a CAP water delivery pipe along Power Road. Stanley has plans for the line from the Queen Creek Irrigation Water Delivery District. The line is in a

Federal easement and the FCD will be responsible for the cost of moving the line. The line runs all through the Town of Queen Creek. There is a 4 ft minimum cover requirement for the line the best time to move it is mid October to December.

6. Elizabeth presented Stanley's current data collection list of utility information.
7. Scott presented an aerial map with the soil boring locations. Some of the borings were shifted near the dip crossings to get representative samples at the dip crossings. Additional soil samples may be required to assist the pavement design. Dick thought we should have the geotech consultant recommend the typical pavement section since the Town's typical section may not be sufficient at these locations. Warren said that he has an on-call contract and there are sufficient funds available in it if additional samples are needed. Scott will be asking AMEC to provide a list of tests (PI, Atterberg limits, sieve analysis, gradation, shrink/swell factor, pH, resistivity, etc...) that will be included as a part of the soils report. We'll need input from WEST Consultants as to what test procedures and results they need to perform their channel stability and scour analyses.
8. The District's on-call archeologist will be reviewing the entire site for the geotech clearance. We should have that by the end of next week.
9. We have all of the rights-of-entry except for the Langley Ranch parcel. The Geotech Consultant can work in other areas until we get the ROE from Langley Ranch. Raj will provide the list to AMEC.
10. Entellus was asked to look at the floodplain break out at Sossaman and Chandler Heights. This additional effort will take another 30 days to complete. These revisions should be final and the hydrology package will be ready to go to FEMA in the next two months. Scott asked if Cathy can send him an e-files of where the Chandler Heights Bridge is located compared to the existing dip and the channel. Cathy has MicroStation files but they are on different datum and may not line up with our topo or the Entellus topo. She'll go ahead and send it to him and he can try and line it up. Stanley will be ready in next two to three weeks to set up a field meeting with FCD staff to review HEC-1 and HEC-RAS parameters such as concentration points and "n" values.
11. Raj raised some concerns regarding the HMP Sediment/Scour Analysis report by West Consultants. Raj would like to resolve or look at these potential problems early in the design. The main concerns were: 1) The HMP is recommending that all of the Sonoqui Wash banks need some type of bank erosion protection material. 2) There are two 3.5' drops recommended between Power and Sossaman Road. 3) Scour depths recommended in the report.
12. Diane and Jackie provided a written summary of their landscape tasks. The Pre-PAAC #2 has been scheduled for March 11, 2004. The PAAC #2 has been scheduled for March 18, 2004. The PAAC #3 has been tentatively scheduled for May 11, 2004. The first public meeting will be scheduled between May 11 and Memorial Day weekend. The PAAC meeting #2 will not be pushed back so, we should try and get all the information that needs to be collected and presented on PAAC #2 ready before the Pre-PAAC meeting. Some revisions were noted for the Goals and Objectives that LSD had drafted.
13. Bob Stevens has submitted the JD to the COE and has not heard who was assigned to review the permit. The JD only included the wash up to Chandler Heights Road. The District will have to make a decision internally whether to submit the reach upstream of Chandler Heights Road to the COE or not. Diane and Scott both requested an e-file of the JD. Bob will provide that to both. Dick

said the Town is interested in improving the wash from Chandler Heights to Riggs Road in the near future. The Town is currently acquiring some rights-of-way along the wash and the Town already owns some of the properties. The Town has plans for an equestrian park when the landfill closes at the northeast corner of Riggs and Hawes Roads.

14. Dick said that the Town has future plans for bringing a gravity sewer line under Sossaman Road and, we should coordinate the future invert of that sewer line with our low flow pipe under Sossaman Road. David Martinez will provide the sewer line plans to Stanley.
15. Scott talked about the Ranchos Jardines Irrigation District building located west of Sossaman Road. Apparently, there is a septic tank and leach pit or leach field constructed within the wash immediately south of the Irrigation Districts office building and parking lot. Dick said Maricopa County approved the septic tank permit but Queen Creek may have the site plans and will provide a copy of that to Stanley if available. There is a waste pipe that drains water from the well site into a retention basin located on Irrigation District property next to the wash.
16. Dick mentioned that he would like to use the aesthetic funds to underground the overhead power line that runs across the wash within the Ranchos Jardines subdivision. He said that will be something that the Town will take the lead on with SRP.
17. Dick mentioned that the Town may be proposing to Council that the Via del Jardine dip crossing at Sonoqui Wash be eliminated. With this concept, the roadway would be dead-ended on either side of the wash.
18. There seems to be an issue that has been raised, perhaps by developers along the Ocotillo Road alignment between Higley and Power Roads, of switching the Ocotillo Road alignment to the north side and the channel to the south side. The District will probably not consider this switch unless it is brought up and promoted by the Town of Gilbert. Raj will write a letter to both the Towns acknowledging the Ocotillo Road alignment issue and get concurrence from the Towns in order to move forward with 30% plans.
19. Raj provided copies of the schedule and copies of the adjacent development plans to Stanley and LSD.

Action Items:

Responsible Party

Stanley Consultants, Inc

Task

1. Revise boring locations as discussed and coordinate with West and AMEC to determine the remaining geotech test sites. Coordinate soils test to be provided by AMEC.
2. Contact irrigation districts to determine tailwater requirements and water rights.
3. Consolidate and update the project schedule.
4. Set up field meeting with the District to verify HEC-1 and HEC-2 parameters.
5. Make revisions / adjustments to project limits on Sossaman property and at Chandler Heights Road.

Flood Control District

1. Setup meeting with the Corps to discuss mitigation options and preferences.
2. Get landscape and aesthetic examples from other projects for the next PAAC meeting.
3. Provide an electronic copy of JD to Stanley and LSD.
4. Provide list/map of properties where ROE have been established.
5. Send a Microstation file showing the location of the Chandler Heights Bridge to Stanley.
6. Write a letter to the Towns of Queen Creek and Gilbert acknowledging the Ocotillo Road alignment issue and get concurrence form both Towns that the proposed roadway alignment will remain on the South side of the channel.

Town of Queen Creek
Road

1. Provide plan of proposed gravity line along Sossaman
2. Locate copy of septic tank and improvement / site plan for Ranchos Jardines Irrigation District and provide a copy to Stanley.

Cooper Aerial
verification and approval.

1. Send blind panel coordinates to John Stock for

West Consultants

1. Review and verify channel stability and bank protection recommendations given in HMP.
2. Provide input on geotech testing.

Logan Simpson Design

1. Get landscape and aesthetic examples from other projects for the next PAAC meeting.
2. Review and update project schedule.

Distribution: Shah, Frost, Schaner, Freschette, Bergeson, WEST Consultants, Simpson-Colebank

MEETING NOTES

Date and Time: February 18, 2004 at 3:00

Place: Rancho Jardines Irrigation District Office

Project/Purpose: Sonoqui Wash Channelization - Local Irrigation Facilities and Practices

Attendees: Raj Shah, Scott Buchanan, Elizabeth Kidd, Mike Jankovsky

Notes By: Elizabeth Kidd

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. Rancho Jardines Irrigation District has a line along the west side of Sossaman Road crossing Sonoqui wash. They are unsure of the exact location of this facility but think it runs along the east side of the sidewalk.
 2. Rancho Jardines Irrigation District has a septic tank site next to the wash. Visible evidence of the possible tank location was seen in the field. Mike believes the leach field for this is straight down and should not impact the wash improvements.
 3. There is a line coming off the well site into the wash for overflow and backflow. This line is not used very often but should be maintained with a ditch on the proposed plans.
 4. Mike pointed out the Irrigation Districts site property limits. The graded area on the parcel is not needed for detention and the Irrigation District offered to donate some of its land to the Flood Control District if needed to meet open space requirements.
 5. The well on site is very deep and could be used for drinking water. The Wash improvements will not impact the function ability of this well.
 6. Mike was provided two copies of a 1"=200ft exhibit outlining the Districts boundaries superimposed on an aerial photograph.
-

Distribution: Shah, Buchanan, Jankovsky

MEETING NOTES

Date and Time: February 18, 2004 at 2:00

Place: Queen Creek Irrigation District Office

Project/Purpose: Sonoqui Wash Channelization - Local Irrigation Facilities and Practices

Attendees: Raj Shah, Scott Buchanan, Elizabeth. Kidd, Dean Griffith

Notes By: Elizabeth Kidd

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. Queen Creek Irrigation District has a 50 foot easement (25'/25') for the pipe along Power Road. There are currently two blowout structures at the crossing which need to be replaced as part of the new design. A 12 inch drain to Sonoqui wash needs to be maintained in case of overflow. Queen Creek Irrigation District has another line along the Ocotillo Road alignment.
 2. The main pipe along Ocotillo has a capacity of about 10-12 cfs while the line at the Sossaman property delivers approximately 3-4 cfs to the Sossaman Farm.
 3. Gookin Engineers is the Districts on call engineer. Stanley will do all the design work related to the project. Queen Creek Irrigation District will review and construct the improvement. The Flood Control District will then be invoiced for all costs incurred as part of the improvement. Stanley should use the Gookin plans as an example to go by when designing the new crossing at Power Road. The pipe should be precast Class III 18" pipe with rubber or C-900 gaskets
 4. The Town of Gilberts Water Resource Director needs to be contacted to find out when/where they will take the Recharge facility. Dean gave her name as Kathy Rall. She should also be asked about plans for a water treatment facility south of the Sonoqui project area.
 5. Rancho Jardines does not receive CAP water.
 6. Raj will write a letter to get the permitting process started.
-

Distribution: Shah, Buchanan, Griffith

MEETING NOTES

Date and Time: February 26, 2004 at 1:00

Place: LSD Office

Project/Purpose: Sonoqui Wash Channelization Regular Coordination Meeting

Attendees: Raj Shah, Lucia de Cordre, Marina de Cordre , Cathy Regester, Sally Stewart, Scott Buchanan, Elizabeth Kidd, David Martinez, Seth Bergeson, Diane Simpson-Colebar Jackie Keller, Jennifer Cleveland, Dennis Richards, Daniel Frechette

Notes By: Elizabeth Kidd

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. Seth has received the go ahead from John Stock to get the mapping started. Cooper's team is working on getting the mapping done. The first portion should be done by March 18th and the second portion should be delivered by April 8th. The digital ortho photography will come after the entire topo is finished. Stanley will be picking up supplemental survey ground shots in the channel around Power Road, Sossaman Road and Higley Road in the areas obscured by vegetation. Stanley will have their survey crew out early next week, weather permitting. These points can hopefully be incorporated into the aerial model prior to generating contours. Seth will have to find out if they can do that and let Scott know if and how to give Cooper the survey information. John Stock is also going to be surveying a random 50 to 60 points as a cross check. Cooper considers this project a priority and they will try and get the topo done as fast as possible.
2. Scott explained the location of revised soil boring locations as shown on the aerial photo. Daniel will provide a list of tests he will be doing. Every test may not be performed at each boring. It will be determined in the field if the samples are similar enough that each test has to be run on each sample. AMEC is not planning to do a full-blown pavement analysis. Both the Towns of Queen Creek and Gilbert use a sieve analysis and plasticity index to determine the required pavement thickness. AMEC will be taking samples near the dips and determine if the Town's typical pavement section is adequate based on the geotechnical testing. David Martinez said that is fine with him on behalf of Town of Queen Creek. If the Towns are okay with this type of pavement section determination the District will accept it. Agronomy tests were discussed and a decision was made to go ahead and perform the tests as shown on the location map. Bioassay tests were discussed. Daniel will find out the cost and effort associated with doing them. If the cost and effort is the same, the District would like to

perform two agronomy and two bioassay tests instead of 4 agronomy test. Scott requested copies of Kirkham Michael's soil testing analysis from Raj and copies of the analysis for the Chandler Heights Bridge borings from AMEC. Raj asked Dennis for a copy of the Soil sampling done for the HMP to put in the Appendix of the Geotechnical report. There was discussion about whether test pits were necessary or if they could be eliminated and the cost associated with them used to compensate for the extra boring depth. Raj will ask FCD if anyone knows the reasoning or necessity of the test pits and get back to Scott and Daniel. Raj provided a copy of the ROE status to Daniel and Scott. Daniel needs to submit the access route and type of vehicle to be used for soil borings to Scott and Raj. Daniel will confirm in an email that a rubber tire vehicle will be used for all testing. Stanley is to provide the final layout of the soil borings (Microstation and Excel files) to Daniel by the end of next week. Daniel said he can have the field work done by the middle of March and the Geotechnical report in early April.

3. Entellus will be done with the changes to their hydrology model and hydraulics in about the next month (target March 23rd). It will be submitted to the communities of Queen Creek and Gilbert for their approval and will be sent to FEMA for review and approval. Scott needs to schedule a field meeting with Cathy and other FCD staff to discuss "n" values, local drainage and associated inflow concentration points and other hydrology/hydraulics issues. Cathy and Scott will coordinate and set up that meeting. Stanley would like to get concurrence with the District on what "n" values are to be used. Sonoqui Wash will be similar to Queen Creek Wash in terms of design discharge, channel slope and configuration, etc and it may be beneficial to review the design of the reach upstream from Power Road that was recently completed by Dibble and Associates for the Town of Queen Creek to understand their approach and "n" values. Cathy will provide Stanley with a copy of the drainage report for Power Ranch done by the developer's consultant. David Martinez will provide Stanley with a copy of the design documentation and plans for the Queen Creek channel prepared by Dibble & Associate.
4. The next PAAC Meeting date of March 18, 2004 was discussed and everyone in attendance agreed on the date. Gilbert has not confirmed the date or location, however. Once the location is confirmed, we can send out the invitation letters with the meeting date and place. The multi-use path design will follow Queen Creek Wash as an example. Dave Martinez will give LSD the plans for the Queen Creek multi use path. Stanley will provide LSD with the updated revised project limits. LSD needs to know the location of all hard structural features such as bridges and drop structures as soon as possible. The third PAAC meeting is scheduled for May 11th and the Public Meeting is scheduled between May 25th and May 27th.
5. Raj provided Stanley with copies of the letters sent to both of the Towns confirming the proposed Ocotillo Road alignment.
6. Raj provided Stanley with a copy of the permit letter sent to Dean Griffith with the Queen Creek Irrigation District.
7. Stanley requested assistance from Gary Maiers regarding contacting Qwest. Qwest is not being cooperative in providing useful information necessary to

determine specifically where their utilities are. Raj will ask Gary to talk to Stanley and see how he can assist on getting some "as-built" maps from Qwest.

8. Stanley will hand out copies of the most recent contact list at the next coordination meeting.
9. Meeting adjourned at about 4:30. Marina provided invaluable input to the meeting's overall ambiance.

Action Items:

Responsible Party

Stanley Consultants, Inc

Task

1. Revise boring locations as discussed and coordinate with West and AMEC to determine the remaining geotech test sites. Coordinate soils test to be provided by AMEC.
2. Set up field meeting with the District to verify HEC-1 and HEC-2 parameters and review local drainage.
3. Gather survey data along wash channel so it can be incorporated into the topo.
4. Provide an electronic copy of the new project limits to LSD.
5. Let LSD know the location of proposed structural features.
6. Gather utility maps and coordinate with Irrigation Districts

Flood Control District

1. Setup meeting with the Corps to discuss mitigation options and preferences.
2. Get landscape and aesthetic examples from other projects for the next PAAC meeting.
3. Provide an electronic copy of JD to Stanley and LSD.
4. Provide a copy of Kirkham Michael's soil analysis to Stanley Consultants.
6. Determine if test pits are necessary.
7. Provide Stanley with a copy of the drainage report for Power Ranch.
8. Coordinate obtaining as-built plans from utilities (specifically Qwest).

Town of Queen Creek
along Sossaman Road.

1. Provide plan / profile of proposed gravity sewer line
2. Locate copy of septic tank and improvement / site plan for Ranchos Jardines Irrigation District office and well site and provide a copy to Stanley.
3. Provide Stanley with a copy of the drainage report and plans for Queen Creek channel improvements completed by Dibble & Associates

4. Provide LSD with the multi use path example plans for Queen Creek Wash.

AMEC

1. Determine cost of performing bioassay tests.
2. Provide list of tests to be performed at each boring location.
3. Provide Stanley a copy of boring analysis along Chandler Heights Road that they had done for the proposed MCDOT bridge.
4. Submit access route plan and type of vehicle to be used to Stanley and FCD.
5. Send email to Scott confirming the use of rubber tire vehicle for borings.

Cooper Aerial
incorporated into

this information

1. Determine if/how Stanley's channel shots can be

the model, and let stanley know the best way to provide

West Consultants

1. Review and verify channel stability and bank protection recommendations given in HMP.
2. Provide input on geotech testing.
3. Provide a copy of soil analysis done for HMP to FCD

and Stanley.

Logan Simpson Design

1. Review and update project schedule for their tasks.
2. Continue with site analysis and exhibits.

Distribution: Shah, Frost, Schaner, Martinez, Freschette, Bergeson, Richards, Simpson-Colebank

MEETING NOTES

Date and Time: March 11, 2004 at 1:00

Place: LSD Office

Project/Purpose: Sonoqui Wash Channelization Regular Coordination Meeting

Attendees: Raj Shah, Lucia de Cordre, Sally Stewart, Gary Maiers, Scott Buchanan, Elizabeth Kidd, David Martinez, Seth Bergeson, Diane Simpson-Colebank, Jackie Keller, Jennifer Cleveland, Daniel Frechette

Notes By: Elizabeth Kidd

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. Stanley is currently picking up supplemental survey along the wash. They need a few more days to finish and should be done by the end of next week. Once the supplemental survey is done they will need to pick up section corners and other rights-of-way information. Supplemental survey points in the overgrown parts of the existing channel will be incorporated into the aerial model prior to generating contours. All of the control and blind panels can be seen in the aerial photographs. There is no need to keep them in the field and the surveyors will be directed to remove them.
2. Cooper considers this project a priority and they will try and get the topo done as fast as possible. The topo is still on schedule. The first portion should be done by March 18th and the second portion should be delivered by April 8th along with the digital ortho photography. Cooper will incorporate the supplemental survey points in the overgrown parts of the channel into the aerial model prior to generating contours. The contours tied to these points will be shown with a dashed line. As long as the surveyed area in the overgrown parts of the channel are relatively flat the model should be accurate. There may be discrepancies in areas of heavy brush cover. Cooper will clip the temporary piles of dirt and debris left at the Sunridge property from the model. Ground coordinate horizontal control is necessary since the topo will be used for the design and preparation of construction documents. Raj will find out from John Stock if there is also a need to have the mapping in grid coordinates. If John does not need grid coordinates then only ground coordinates will be required.
3. The District has received a Right of Entry letter from Grace Development. A few parcels were missing from the Right of Entry letter summary passed out at the previous meeting. Raj will look into getting letters from the three parcels discussed. One parcel is near Recker Road and the other two are near Via Del Jardin. Raj will also find out how long we are required to wait for non responding property owners before the District allows us to enter a parcel if necessary. Stanley requested the title reports for all of the parcels adjacent to the wash. Raj will check with John Palmieri regarding the status of the title reports. Stanley will

collect the necessary subdivision plats for the project. Dave Martinez will research who owns the Ranchos Jardines tract by examining the chain of title.

4. AMEC is scheduled to take the borings on March 18th and 19th. Steve Sossaman has requested that we wait to enter his fields until after the alignment at the commercial property is set. Steve doesn't want the trucks to go through his field more than once so the borings near the proposed commercial retail center will be done at another time with another mobilization. These borings will be scheduled around Steve's irrigation schedule. A meeting is being scheduled with Steve, Wood/Patel (Sossaman consultant), Roger Nelson (Sossaman development), the District, the Town of Queen Creek and Stanley to finalize the alignment through the proposed commercial parcel. Better coordination with Steve is necessary. David Martinez took a copy of the Geotech Exhibit and will give it to Steve Sossaman as soon as possible. Steve should be contacted before and after any geotech boring. Raj will call Steve to discuss any concerns he may have with the project. Borings B-1 and B-2 will also have to wait until the second mobilization since we have not received a Right of Entry letter for the parcel. Agronomy tests are out of the scope since they were taken out of the fee proposal. Stanley still needs to coordinate with Dennis/Gary to see if the test pits are required or not. Stanley also needs to find out at what depths West needs sieve analysis. According to the Consultant Guidelines, AMEC should also be providing pH and resistivity tests at the low flow crossings. Stanley received an email with the list of tests to be performed on the borings, pH and resistivity tests were not included. Every test may not be performed at each boring. It will be determined after reviewing the field samples where they are similar enough that each test doesn't have to be run on each sample. Stanley will forward the list of anticipated tests to Raj so he can have Warren review it and make sure we are getting everything we need for the design. Daniel provided Stanley and the District with a picture and dimensions of the truck that will be used for testing. Daniel needs to submit the access route for each soil boring to Scott and Raj. AMEC will have the first part of their field work done by the end of next week. Depending on when we receive the remaining Right of Entry letters the second mobilization may need to be done with an on call contract.
5. The District has received verbal approval from the Corps for using Gilbert's water reclamation site for mitigation and a meeting with the Corp of Engineers may not be necessary.
6. Raj and Lucia will provide examples and/or photographs of other projects that have similar aesthetic treatments for the flood control features for the PAAC #2 presentation. Raj and Lucia should get their examples to LSD by Tuesday afternoon so they can put them on an exhibit board or Power Point slide. Stanley will send LSD pictures that may be helpful before Tuesday evening.
7. Stanley should contact Corollo Engineering on a regular basis to coordinate Gilbert's reclamation facility.
8. David Martinez gave Stanley a few copies of Dibble's plans for the Queen Creek Wash channel improvements and plans for the septic field near Ranchos Jardines Irrigation District. David also described the location of a couple of proposed improvements along the project. An 18-inch gravity sewer line 33 feet

west of the section line is planned along Sossaman Road. Stanley's channel design will determine the depth that this line needs to be. Stanley will expedite their design in this area. A line is planned along Power Road to serve the proposed Basha's commercial center on the southwest corner of Chandler Heights Road and Power Road. This line will be a gravity line from Chandler Heights to the lift station (which is located 750 feet north of Brooks Farm Road) and a force main north of there. The gravity line between Chandler Heights and the lift station will be 60 feet east of the section line. The force main north of the lift station will be 52 feet east of the section line.

9. Raj gave Stanley a copy of the CLOMR Technical Data Notebook for Queen Creek between Sossaman Road and Hawes Road. Stanley will make a copy and return the original to the District as soon as possible.
10. Stanley will give the District a list of locations that need to be potholed.
11. Stanley will coordinate directly with Cathy to obtain copies of the drainage reports for the adjacent developments.
12. Raj will call AZTEC and MCDOT to determine the status of the Ocotillo Road alignment.
13. The JD is done and has been verbally approved. The limits of the JD were extended 800 feet upstream of Chandler Heights Road.
14. The Entellus hydrology won't go to FEMA for another two to three months.
15. The PAAC meeting will be held in the Queen Creek town council chambers. David will verify whether or not the adjacent room is available in order to hang all the graphics up at one time for comparison and reference during the meeting discussions.
16. LSD reviewed all the exhibits for the PAAC meeting with the study team. The following is a record of the comments discussed for each graphic.
 - a. Land Use Graphic – existing and planned will be shown on two separate graphics; zoning classifications will be shown on the future land uses; the future land uses should also show the Flood Control District's land as well as Queen Creek's open spaces. David will redline an aerial map indicating those parcels in order to show public vs. private land use. The city/county boundaries need to be adjusted. There is a county island along Recker Road.
 - b. Existing Visual Conditions – when each of the graphics are presented at the PAAC, the opportunities and constraints should be briefly identified; a key/legend and key notes should be on each graphic.
 - c. Landscape Character Areas – a legend and photographs representing each character area should be shown to help discern the characteristics for each area.
 - d. Transportation/Infrastructure – all easements should be shown and roads

of regional significance should be identified.

- e. Environmental Considerations – no changes, the study team approved this graphic
- f. Recreational/Multi-Use – remove the future school site shown on the Sossaman Estates conceptual zoning plan; the access points to existing residential properties should also be shown on the transportation/infrastructure exhibit; shown all potential connections to regional and community nodes/facilities

17. The public meeting is tentatively scheduled for the middle of May. Tuesday May 25th is the preferred date but the meeting could happen the week before.

18. Meeting adjourned at about 5:30. The meeting's overall ambiance just wasn't the same without Marina. Unfortunately she was not present to get her "drawing on walls" phase over with. Her mother may regret not bringing her when she discovers how big the walls of her room are compared to her coloring book.

Action Items:

Responsible Party

Stanley Consultants, Inc

Task

1. Coordinate with West to determine if test pits are necessary and the depth sieve analysis is required.
2. Forward the list of geotech tests to be performed to Raj.
3. Set up field meeting with the District to verify HEC-1 and HEC-2 parameters and review local drainage.
4. Gather survey data along wash channel and provide it to Cooper for incorporation in model.
5. Gather utility maps and coordinate with Irrigation Districts.
6. Coordinate getting adjacent developers' drainage reports with Cathy.
7. Provide the District with a list of pothole locations.
8. Copy CLOMR for Queen Creek and return original to Raj.
9. Remove control panels from field.

Flood Control District

1. Determine if grid coordinates are needed or if ground coordinates are sufficient.
2. Provide Logan Simpson Design and Stanley with FCD example project aesthetic sketches/photos for PAAC meeting.
3. Start process of getting ROE letters from the three missed parcel. Find out how long we're required to wait for non responding property owners before entering a parcel if necessary.
4. Provide title reports to Stanley
5. Provide an electronic copy of proposed JD limits to Stanley and LSD.

6. Provide a copy of Kirkham Michael's soil analysis to Stanley Consultants.
7. Determine if test pits are necessary and proposed geotech tests are adequate.
8. Call Steve Sossaman to discuss any concerns he may have with the project.
9. Coordinate with AZTEC and MCDOT to determine the status of the Ocotillo Road alignment.
10. Provide refreshments for the PAAC meeting.

Town of Queen Creek1.
along Sossaman

1. Provide plan / profile of proposed gravity sewer line Road.
2. Determine who owns Ranchos Jardines tract.
3. Provide Stanley with a complete set of the plans for Queen Creek channel improvements completed by Dibble & Associates.
4. Give Steve Sossaman a copy of the Geotech Exhibit.
5. Provide Queen Creek existing and future park names.
6. Provide existing and future areas of ownership for public vs. private land uses.
7. Check to see if the adjacent room next to the council chambers is available for the meeting.

AMEC

1. Call Steve Sossaman prior to and after drilling.
2. Provide Stanley a copy of boring analysis along Chandler Heights Road that they had done for the proposed MCDOT Bridge.
3. Submit access route plan and type of vehicle to be used to Stanley and FCD.

West Consultants

1. Review and verify channel stability and bank protection recommendations given in HMP.
2. Provide input on geotech testing.
3. Provide a copy of soil analysis done for HMP to FCD

and Stanley.

Logan Simpson Design

1. Review and update project schedule for their tasks.
2. Continue with site analysis and exhibits.
3. Refine exhibits as discussed.
4. Prepare exhibit board or power point presentation of the aesthetic examples of drop structures for the PAAC #2 meeting.

Distribution: Shah, Frost, Schaner, Martinez, Freschette, Bergeson, Richards, Simpson-Colebank

MEETING NOTES

Date and Time: March 17, 2004 at 1:30

Place: Queen Creek Water Company

Project/Purpose: Sonoqui Wash Channelization Project

Attendees: Paul Gardner and Michael Johnson (Queen Creek Water Company), Scott Buchana
Elizabeth Kidd

Notes By: Elizabeth Kidd

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. Stanley briefly went over the proposed project and the project boundaries.
2. Most of the utility maps necessary were provided to Stanley prior to the meeting. Stanley requested any additional information the Water Company may have regarding their facilities. There is some ambiguity as to where some of their lines are both horizontal and vertical. The Water Company has recently purchased a vacuum potholing truck to more accurately locate their facilities. The new equipment will be arriving shortly and QC Water will begin locating and documenting their facilities. Updated utility information that QC Water generates will be provided to Stanley as soon as it is available. QC Water Company will expedite locating facilities along the wash. However, their new information may not be available when needed for the project and we may have to perform our potholes as we had planned. Scott said we may need more than one pothole at some of the channel crossings because the depth and alignment may vary. Queen Creek Water Company provided Stanley with copies of the plan/profile sheet for Power Road that goes far enough south to cover the new alignment.
3. Mike and Paul said that the typical pipe cover for the older water lines constructed in the 1970's was 4 to 5 feet below grade. However, grade refers to what existed at the time of construction and there have been some changes in grade over time. When repairs and maintenance have been necessary they have found the older lines to be anywhere from 3 to 7 feet below current grade.
4. Queen Creek Water Company owns two parcels immediately west of the wash a few hundred feet north of Via del Jardin. There is a new well proposed near the west end of the western-most of the two parcels. Water lines from this well will not cross the wash until the surrounding area to the north is developed. There are two storage tanks approximately 100 feet in diameter that will be constructed on the two parcels. There was no exact schedule for the construction of the

proposed facilities on the two parcels. The proposed facilities will serve future development including the Sossaman property and schedule depends on the pace of development. Stanley pointed out that, based on preliminary information, the east edge of the eastern-most of the water company's two parcels appears to be in the existing Sonoqui Wash channel and may be impacted by our channel plans. Mike acknowledged this but said that they have no plans to fill or use any part of the property that might be in the channel. Their proposed well and storage tanks would all be located west (outside of) the channel.

5. Scott pointed out that it will be Stanley's responsibility to design any water line relocations that might be necessary because of the Sonoqui project. Potential relocations are anticipated at Power Road, Via del Jardin, Sossaman and Chandler Heights Road. Queen Creek Water Company will perform their own review of any plans for relocation of their lines. They agreed it would be acceptable to have the Flood Control District's contractor perform any relocations that were necessary.
6. Sunrise Engineering, Inc. is the water company's engineering consultant. Sunrise holds electronic copies of Queen Creek Water Company's plans and specifications. Standard or typical design details may be available electronically from Sunrise. Joel Watson is the Water Company's contact at Sunrise. Stanley was given his contact information.
7. Queen Creek Water Company is aware of the proposed sewer lines that the Town of Queen Creek will construct along Power and Sossaman Roads

Distribution: Gardner, Buchanan, File

MEETING NOTES

Date and Time: March 17, 2004 at 9:00

Place: San Tan Irrigation District

Project/Purpose: Sonoqui Wash Channelization Project

Attendees: Roger Agnes, Scott Buchanan, Elizabeth Kidd

Notes By: Elizabeth Kidd

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. Stanley briefly went over the proposed project and the project boundaries
2. The San Tan Irrigation District does not serve any portion of Sossaman Farms. The District serves residences and "mini ranches" of less than 5 acres. There are no large active farms currently being served by the District. The District will serve irrigation water to the proposed Sunridge development if the lots in that subdivision will be designed with flood irrigation.
3. The District does not use any CAP water for their supply. All their water comes from wells. Their water distribution system consists of pipes, open ditches, gates and stand pipes.
4. Stanley was given a map of the San Tan Irrigation District's existing facilities. The northern-most boundary of the San Tan Irrigation District is Ocotillo Road. The District does not have any existing or proposed facilities along Ocotillo Road or within or crossing the Sonoqui project limits. Roger did not anticipate any conflicts with the Sonoqui project.
5. The District does not have any tail water requirements related to Sonoqui Wash. Roger was not aware of any downstream water users or any water rights related to excess irrigation water that ends up in Sonoqui Wash. He was not aware of any practice of either conveyance or recovery of any excess irrigation water that ends up in the wash.
6. Stanley will send a full size copy of Sonoqui Exhibit 1 to Roger and will continue to keep Roger in the loop and coordinate the project's progress with him.

Distribution: Agnes, Buchanan, File



LOGAN SIMPSON
DESIGN INC.

MEETING NOTES

DISTRIBUTION DATE: April 5, 2004

MEETING DATE: March 18, 2004

LOCATION: Town of Queen Creek Town Hall
Time: 6:00 p.m.

PROJECT: **Sonoqui Wash Channelization Project**
Town of Gilbert and Town of Queen Creek

SUBJECT: **PAAC Meeting # 2**

ATTENDEES: *Town of Gilbert:* Kenny Martin
Town of Queen Creek: Dick Schaner, David Martinez
Flood Control District of Maricopa County: Raj Shah, Lucia de Cordre, Theresa Pinto, Sally Stewart
Stanley Consultants: Scott Buchanan, Elizabeth Kidd
Logan Simpson Design: Diane Simpson-Colebank, Jackie Keller, Jennifer Cleveland
Rancho De Jardine Subdivision: LeaAnn Fergusson, Sharon Steinhaur,
Trilogy Development: Jason Garcia (Sunbelt Holdings)
Langley Ranch: Dallas Paulsen (Goodwin and Marshall Inc.)
Michael Young (Wood/Patel)

DISTRIBUTION: Attendees; Lonnie Frost (Town of Gilbert)

DISCUSSION ITEMS:

1. Raj Shah, Project Manager, began the meeting by reviewing the results of PAAC Meeting #1 and distributing the revised *Landscape Aesthetic And Recreation Multi-Use Goals & Objectives* for the Sonoqui Wash Channelization Project. Also distributed were the Flood Control District of Maricopa County's *Aesthetic and Multiple-Use Design Guidelines for Channel Conveyance Facilities*. Raj explained that both documents would be providing the basis for aesthetic design to the extent possible, as physical and budget constraints will need to be considered also.
2. Raj then described the objectives of PAAC Meeting #2. The objectives were to:
 - a. Present and receive comments/feedback on the existing site data summary, site analysis, project level scenery resource assessment, and multi-use recreation assessment.

- b. Present and receive comments/feedback on the type, location, and extent of recreation facilities and activity spaces desired by the PAAC members to be located within the project area.
3. Jackie Keller then presented a summary of the following items, as identified above.
 - c. *Existing Data Summary* – Jackie described that all the base information collected from the Towns, private developers, county, and adjacent municipalities had been incorporated into the base map and provided the basis for all the meeting graphics.
 - d. *Existing Land Use/Ownership Map* – the following land uses were identified: residential, commercial, farmland, open space, vacant, and public land, as well as the jurisdictional boundaries. The Langley Ranch area needs to be revised to show as private (residential), not farmland.
 - e. *Planned Land Use/Zoning* – residential, commercial, business park, park/retention, and golf course land uses were identified. The existing and planned land uses were compared, and the trend of planned development indicated the dominant turnover of land use from farmland to residential.
 - f. *Existing Infrastructure* – identified the different levels of roads from regionally significant to informal farm roads, types of road crossings, wash and residential access points, overhead and surface utilities, drainage culverts, and informal dirt trails. Additional residential access points south of Chandler Heights Road need to be verified and shown on the map. Farm road crossings and utility easements are an opportunity to increase access to the wash corridor and provide additional space for trails and vegetation.
 - g. *Scenery Resource Assessment – Visual Conditions* – identified the existing visual conditions including disturbed areas, distinct features (natural and manmade), notable forms (transmission lines, vegetation, fencing, channel), sensitive view corridors, high channel bank (enclosure) areas, channel/bank stabilization, refuse dumping areas, and unobstructed views. Vegetation, views to the different, distinct mountain ranges, and sensitive view corridors are the main opportunities.
 - h. *Environmental Considerations* – identified the different types of habitat, vegetation, and topography; areas of hazardous material concerns, 404 permit considerations, and high social sensitivity; and historic features, graded/cleared areas, and a pump station. High points (views) are an opportunity. Hazardous material concerns, social impacts, and 404 mitigation may be constraints.
 - i. *Multi-Use Recreation Assessment* – identified existing and/or planned multi-use trails, on-road bike routes, equestrian trails, existing and proposed parks and open spaces, and notable community nodes within a 5 mile area of the project site. The Maricopa County Regional Trail System and Maricopa Association of Governments Multi-Use Trail were also

identified, as well as County Regional Parks. The assessment identified Sonoqui Wash as a major spine for connectivity from the Santan Mountains to the Roosevelt Canal/East Maricopa Floodway. It also identified Sonoqui Wash as the main multi-modal connection between three of the Town of Queen Creek's future planned parks.

- j. *Multi-Use/Aesthetic Improvement Opportunities and Constraints* – identified planned and potential recreation facilities, their types and locations, and aesthetic improvements relating to the flood control features. In addition to the information shown on the Multi-Use Recreation Assessment, the *Multi-Use/Aesthetic Improvement Opportunities and Constraints* included multi-use paths, private pathways and planned sidewalks within developments, potential trail connections and rest nodes, viewing opportunities, residential access, and interpretive features. Aesthetic improvements of flood control features included potential locations for bridges, dip crossings, bank stabilization, drop structures, and retaining walls.
 - k. *Example Flood Control Aesthetics* – a PowerPoint presentation of existing wash corridors, drop structures, and retaining walls was provided to gain input on the character desired for Sonoqui Wash. The PAAC preferred the natural Sonoran Desert, low maintenance examples shown.
4. Following the presentation of the above items, the meeting was opened for questions and discussion. The main concern of the PAAC was maintaining the views to the south to the Santan Mountain range. Trees and structures should not block the current views of the adjacent residents. View corridors around the residences should be considered and evaluated when planting trees.
 5. Planning should incorporate landscape and trail areas to accommodate both user groups – residents and trail users.
 6. Commercial developments should have a “four-sided” aesthetic that provides a “front” to the wash corridor, which would allow an ideal view and experience for both users – corridor and commercial users.
 7. The PAAC also agreed that the bridge aesthetics and other architectural and landscape features should have a consistent aesthetic from one end of the corridor to the other with the exception that Queen Creek will have an asphalt path, and Gilbert's will be concrete.
 8. The PAAC agreed that the direction of the *Multi-Use/Aesthetic Improvement Opportunities and Constraints* is the direction the project team should move forward with in design of the corridor.
 9. The Town of Gilbert does not want to show the master plan concept they currently have for the regional park at Ocotillo and Higley on the base maps.
 10. The PAAC meeting was concluded with the following action items.

ACTION ITEMS:

Responsible Party

Task

Stanley Consultants

1. To provide LSD with the engineering criteria for the channel by May 10th.

Any corrections or additions to these meeting notes should be directed to **Jackie Keller** at **Logan Simpson Design Inc.** (480-967-1343) within the next 7 calendar days.

MEETING NOTES

Date and Time: March 25, 2004 at 1:00

Place: FCD Office

Project/Purpose: Sonoqui Wash Channelization Regular Coordination Meeting

Attendees: Raj Shah, Cathy Regester, Lucia de Cordre, Theresa Pinto, Bob Stevens, Gary Mair, David Martinez, Scott Buchanan, Elizabeth Kidd, Diane Simpson-Colebank, Seth Bergeson

Notes By: Elizabeth Kidd

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have any questions, additions, or comments, please contact the writer immediately. If do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. AMEC completed most of the borings on March 18th and 19th. AMEC did not have the ROE required for B-1 and B-2 located within the Finney property. Borings B-13 and B-14 in Sossaman's field west of Power Road were skipped for now. These borings were put off until a later date to be determined by Mr. Sossaman's irrigation and / or harvest schedule. AMEC ran out of time and could not get to boring B-22 along Sossaman Road. AMEC will pick up the remaining borings (B-1, B-2, B-13, B-14 & B-22) during their final mobilization. All samples will be kept until the structures are located since additional tests may be needed. According to conversations with Gary Freeman of West Consultants, test pits are not necessary for this project. AMEC will be doing pH and resistivity tests at the low flow crossings in addition to the list of tests provided in Daniel's e-mail dated March 10, 2004. Warren asked that AMEC do shear tests, shrink and swell factors and recommend the foundation design for retaining walls and drop structures. AMEC is supposed to follow the Geotech portion of the Consultant Guidelines. If something is not covered by their scope we may be able to utilize their services through the "On-call" contract that AMEC has with Tom Renckly's group.
2. Stanley had a field meeting with District staff to discuss the inflow locations and other H & H parameters for the channel. Overall the channel design Q does not change significantly through the project reach so 3200 cfs should be used for the entire reach. There is minor flow coming into the channel from the north and south. There are some low points where the channel is currently accepting flows and we should not block these areas. Stanley needs to come to the District and look at the H & H information Cathy has for the surrounding developments. Stanley may have to call the developers and / or Towns to get copies of current drainage reports for the adjacent developments. Stanley was able to run the 2,

5, 10, 25, 50, 100 and 500-yr HEC-1 models. They will provide a representative hydrograph to West Consultant for each of the above return frequencies up to the 100-yr event for the scour and sediment transport analysis. West has not started any H & H work yet. Dennis or Gary will review the items submitted in HMP regarding the channel lining and get back to us. The project team needs to know whether erosion protection is needed along the entire channel. This information is needed a.s.a.p. so the landscape and aesthetic evaluation can move forward. The Entellus study came in yesterday (3/24) and is still a couple of weeks from submittal to FEMA.

3. Cooper delivered the diagonal piece of mapping to Stanley last Monday (3/22). The next piece is scheduled to be delivered by 4/8. Seth gave Cooper's staff a due date of 4/4 so the mapping may be ready by 4/5. This submittal will include the entire project area not just the second half. Elizabeth and Seth discussed the format of mapping to be delivered for the next piece. Stanley will notify Cooper of any other formatting issues and they will make sure the next piece is delivered according to the scope. John Stock is okay with the mapping being delivered in ground coordinates, however he would like to be provided with an equation to convert from ground to grid. Stanley has not checked the accuracy of the mapping with the field survey that Stanley did. Stanley's survey crew is picking up the section and mid-section corners and tying down the property corners. Some monuments have been destroyed and Stanley is going through the process of documenting the loss/corruption of these monuments.
4. All easements may not show up on the subdivision plats. For this reason Stanley still needs preliminary title reports for almost all of the properties backing up to the wash, especially within the Rancho Jardines sub-division. Stanley will prepare a list of these properties with the assessor parcel number and send it to Raj to forward to John P. Raj provided the latest copy of the status of rights-of-entry.
5. Bob Stevens brought a hard copy of the 404 JD map and said the COE had verbally approved the delineation. However, he is still waiting for written approval. Bob will either e-mail or burn a CD and provide it to Stanley and LSD. Bob is preparing a 404 application and would like to have preliminary plans to submit with it. For now, Bob will submit the plans Huitt Zollar's did for the HMP. More detailed information will be submitted to COE as we have 30% plans available. Theresa can provide her mitigation report in the next two to three weeks. She recommends the in-lieu fee mitigation option. The District will pay a set amount per acre for mitigating the impacted area offsite. For example if all parties agree that the area of mitigation is approximately 10 acres and it costs about \$8,000 per acre to mitigate then FCD will write a check for \$80,000 to COE and COE will sign-off on the permit. Discussion took place regarding onsite and offsite mitigation as well as what the area of impact is and the actual cost for mitigation per acre. In-lieu fees will be split with the town and developers. Raj said the District staff will meet internally and decide what is the best mitigation option and propose that to COE. Wayne Colebank from LSD has experience in fee in-lieu type of mitigation and may be able to provide more information on an appropriate per acre fee. Raj will discuss the fee issue with Dick Perrault if we decide on the fee in-lieu option. Landscaping cannot be counted towards mitigation requirements. The channel will not be landscaped by the District. The

Archeologist has completed his research and did not find anything of significance. Theresa provided a copy of the report to Diane and Raj. Scott requested a copy of it as well. Raj will provide one. Bob Stevens got two copies of the report to submit with the 404 application. Theresa's "on-call" consultant is working on the environmental Phase 1 and it should be completed by April 30th. Theresa needs to review LSD's findings about the Environmental Consideration/Vegetation issues and coordinate a habitat type for the final report. FCD will have to notify the Department of Agriculture before they advertise the project so they can put out a public notice stating that vegetation can be removed prior to FCD clearing the channel.

6. The SanTan Irrigation District does not have any conflicts with our project. Queen Creek Water Company (QCWC) may have a few water lines that need to be relocated. QCWC does have standard relocation details that they want us to use. They do not have a problem with Stanley designing the relocation and the District constructing them as part of the Sonoqui Wash project. QCWC's biggest line is 8 inches. QCWC is working on plans for a new storage tank and new wells within their property just north of Via Del Jardine and west of Sonoqui Wash. They don't have any preliminary design plans but their project should not impact the wash. Stanley needs to prepare a list of potholes that are needed and provide that for review by the next bi-weekly meeting. TBE needs to get started. If we need more potholes than budgeted, we can use District's "on-call" contract for additional potholes. Potholing is one thing the District does not like to cut corners.
7. The Town of Queen Creek will verify if we can have a public meeting in June, July or August. The proposed date for the next public meeting is 6/25/04. Public meeting notices will be posted in the paper, the Mayor's newsletter and on the Town's web site. Door hangers will not be used for the project.
8. The commercial property at the corner of Power Road and the Ocotillo Road alignment was discussed. There was general agreement that the 250' curve should be made larger if possible. There were concerns with the sight distance provided in the current plan. There was also concern that the layout would not provide "four-sided" aesthetics that would be favorable to views from Sonoqui Wash. Dick Schaner will review the plan and report back with his recommendations.
9. LSD will be submitting a written report containing existing data collection, site analysis, scenery resource, recreational opportunities and other information as described in scope of work. PAAC meeting #3 is tentatively scheduled for 6/15/04. LSD will need the hydraulics information by no later than 5/10/04 in order to generate material in time for PAAC meeting #3. Stanley will be starting their analysis as soon as possible. They will not wait for the second portion of the mapping due on April 8th. Stanley will try and provide as much information as they can by 5/10/04 but final hydraulic analysis will continue past then. LSD has most of the information needed to start their analysis. The submittal process will be as follows: Stanley will run the hydraulic model and provide a minimum and maximum width of channel using appropriate side slope (and retaining wall if necessary) to stay within available ROW to LSD. This exercise will be performed for several areas as necessary. LSD will take the minimum and maximum top

width and modify the x-section to look non-linear and aesthetically pleasing. It may take a couple of iterations to come up with agreeable aesthetics. Lucia feels that along the straight reach from Queen Creek Wash to Power Road, we may have to suggest a 2' wall on one side and 4:1 to 6:1 side slope on the other. The wall will be shifted along north and south bank similar to a checkerboard pattern. Stanley will also have to come up with couple of options for drop structure and retaining wall design as well as the treatments for headwalls and wing walls. The District will scan LSD's exhibits from PAAC meeting #2 and use them as a background for future use. Some text may be lost but the files should be easy to manipulate.

Action Items:

Responsible Party

Stanley Consultants, Inc

Task

1. Provide the District with a list of pothole locations
2. Get adjacent developers' drainage reports from Cathy or the developers
3. Gather utility maps and coordinate with Irrigation Districts
4. Remove control panels from field
5. Provide representative hydrographs to West for sediment transport analysis
6. Check aerial topo against supplemental field survey
7. Finish sectional control survey
8. Provide the District with a list of properties they need title reports for
9. Provide the District with the equation needed to convert between grid and ground coordinates

Flood Control District

1. Determine the preferred 404 mitigation option and research funding it if necessary
2. Provide Stanley with a copy of the Archeological report
3. Scan PAAC Meeting #2 exhibits and provide them to LSD
4. Provide title reports to Stanley
5. Provide an electronic copy of proposed JD limits to Stanley and LSD
6. Coordinate with AZTEC and MCDOT to determine the status of the Ocotillo Road alignment

Cooper

1. Complete remaining topo

Town of Queen Creek for adequacy

1. Review the proposed Sossaman commercial site plan
2. Research if a public meeting can be held in June, July or

August

3. Provide Queen Creek existing and future park names

	4. Provide existing and future areas of ownership for public vs. private land uses
Town of Gilbert	1. Verify the status of the Higley Road bridge design.
Ocotillo Road crossing	2. Coordinate plans for the future Recker Road and
West Consultants	1. Review and verify channel stability and bank protection recommendations given in HMP
and Stanley	2. Provide a copy of soil analysis done for HMP to FCD
Logan Simpson Design	1. Review and update project schedule for their tasks
	2. Continue with site analysis and exhibits
	3. Coordinate with the District to determine a habitat type
	4. Advise the District on in-lieu fees for mitigation

Distribution: Shah, Frost, Schaner, Martinez, Freschette, Bergeson, Richards, Simpson-Colebank

WOOD/PATEL
MEETING MINUTES

TO: Rajuh Shah – Flood Control District of Maricopa County
Scott Buchanan – Stanley Consultants
Jason Garcia – SheaComm/SunPower LLC

FROM: Michael Young – Wood/Patel

DATE: April 8, 2004

RE: Meeting held on April 5, 2004

WP #021746

SUBJECT: Trilogy Unit 7 and the Sonoqui Channel Project

- Trilogy is moving quickly toward development of Unit 7 which bounds the Sonoqui wash's north side near Recker Road. Grading is to begin on Trilogy Unit 7 in the next two weeks.
- Trilogy is providing at a minimum first flush for Units 6 and 7 on-site based on the *Design Study for the Sanokai Corridor* prepared by Wood/Patel.
- Where possible, Trilogy is providing full retention per TOG standards for the 50-year, 24-hour storm on-site. Where providing full on-site retention is not feasible, an interim retention basin along the Sonoqui corridor will provide full retention until the channel is constructed. When the channel is constructed an approximate 200 cfs direct discharge will impact the channel that FCDMC will coordinate with their project. At the meeting we discussed a direct discharge of 160 cfs, but after checking the report the actual flow rate is approximately 200 cfs.
- Trilogy has a channel direct discharge elevation of 1327.5 which will need to be coordinated with the channel design project because this elevation is below the flow line of the existing wash. FCDMC did not see this to be an issue because the channel will be approximately two (2) feet below this elevation.
- FCDMC may need a future temporary construction easement on at the southwest corner of Trilogy to coordinate the construction of the proposed channel and the existing Trilogy facilities. There may need to be a future drop structure built in this location with the channel project.
- The interim basin has 1.5:1 side slope on the north and 3:1 side slopes on the south. The 1.5:1 side slope on the north is a concern to the FCDMC for future fill construction of a 4:1 side slope in this area to complete the channel construction. Wood/Patel will review if these slopes can be modified. Wood/Patel noted that another issue is of accessibility and safety along the interim basin that may not allow the side slopes to change while maintaining the necessary volume and water surface elevation.
- Wood/Patel will move the drywell along the internal Unit 7 channel 40' to the north to avoid future relocation of the drywell.
- FCDMC to send electronic files and hard copies of the recent Corps of Engineers Jurisdictional Determination along the Sonoqui Wash. FCDMC stated that the JD is to the "high water mark" which includes the bottom and corridor of jurisdiction. Therefore as long as the construction does not impact the high water mark JD there should be no issue.

- Wood/Patel will review this JD to see if it impacts the Trilogy interim basin along the Sonoqui corridor.
- The existing wash flow rate is 2,100 cfs and the channel is being designed to a future flow rate of 3,200 cfs.
- Recker Road extension from Ficus to Ocotillo will not be completed with Trilogy but by others at some time in the future.
- Trilogy will be beginning future design of Unit 9 which bounds the Sonoqui from Unit 7 and easterly to Power Road. Wood/Patel will coordinate this design with FCDMC in the future.
- The channel project is on NAVD 88 datum.
- Wood/Patel can contact Todd Williams and Matt Ohler with FCDMC relating to first flush options and alternatives.
- FCDMC plans to have preliminary hydraulics completed near mid-May.
- Wood/Patel provided progress improvement plans and drainage reports for Unit 7 Phases A, B and C and will forward final approved documents in the future.

MEETING NOTES

Date and Time: April 8, 2004 at 1:00

Place: FCD Office

Project/Purpose: Sonoqui Wash Channelization Regular Coordination Meeting

Attendees: Raj Shah, Cathy Register, Lucia de Cordre, Sally Stewart, Gary Maiers, Scott Buchanan, Elizabeth Kidd, Diane Simpson-Colebank, Daniel Frechette, Travis Bix

Notes By: Elizabeth Kidd

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. Meeting started with Stanley updating the team on utility information. Stanley described all of the utilities within the project area and provided a table listing all of the utilities. A detailed map showing plans views of these utilities was also distributed to the team. Once TBE receives notice to proceed it should take 10 to 15 working days to complete all of the tests. The proposed tests will require permits from the respective local jurisdictions. TBE will also need Gilbert and Queen Creeks' approval for proposed traffic control measures during testing. Lonnie Frost from the Town of Gilbert and Dick Schaner from the Town of Queen Creek are the local contacts. If the Towns are not cooperating, TBE should contact one of the above people. If that does not resolve the issue then TBE should contact the District for assistance. There is a fiber optic line along the east side of Higley Road. The owner has not been identified and Stanley does not have any information on the line. Cox has a separate contact person for their coaxial and fiber optic lines. Both entities should be contacted to get a complete picture. Gary will send Stanley the contact information for Cox Fiber Optic. Travis supplied the team with a sample pothole data completion report. The Town of Queen Creek will be relocating an overhead line (12kv) crossing the channel in Ranchos Jardines. The details are still unknown but David Martinez can be contacted if more information is needed about the schedule and depth. Stanley will compile a list of the overhead utilities similar to the list of underground utilities. Stanley will provide recommendations on which facilities need to be relocated as a result of the project.
2. The status of Geotechnical Report was discussed. All of the fieldwork is done except for five potholes (two on the Finney property, two in Sossaman's field and one near Sossaman Road) that were not completed. These borings will be taken during next mobilization. AMEC is waiting to hear from the District and/or Steve Sossaman to coordinate the borings on Mr. Sossaman's property. These two borings depend on the layout of the proposed commercial site. These borings

cannot be taken until the alignment is set in this area. Sossaman's fields will be harvested in mid to late April. If the alignment is finalized, there will be a few days after harvest for AMEC to go in and get their final borings. If AMEC can't meet this schedule they will have to wait and get these borings just prior to the next irrigation time. AMEC received the District's e-mail regarding what is to be included in the soils report. AMEC agrees with all of the District's requests except for the Hydro-consolidation test. This test is necessary for structural design. We don't know exact location of the structures at this time and it will not be worth doing the hydro-consolidation test. This test was not included in AMEC's fee proposal. Stanley and the District agreed that we don't need the test at this point. Once we have the location of the structure identified we can use an "on-call" contract through Warren or Tom Rinckly to do the hydro-consolidation tests. AMEC will not wait for the five remaining borings to start their preliminary report. AMEC will have sieve analyses and stick diagrams with soil classifications ready if West Consultants and/or Stanley needs the information before the soils report is complete.

3. Rights-of-way/TCE and preliminary title reports were discussed. Each title report costs \$750. The acquisition of the proposed title reports will cost from \$30,000 to \$50,000. The District has decided that they will not order all of the title reports. Stanley should request title reports from the Towns for any property they own. Once the design has progressed it will be determined if there is a need for additional title reports. Raj met with Ken Green and Don Rerick of the District and they determined that there should be enough information from assessor's parcel maps and subdivision plats to identify property boundaries and any easements. If an easement is not shown on these maps, the District will take responsibility for and the risk associated with not recognizing an easement. Raj will provide Stanley with minutes from this meeting. Stanley is currently preparing the ROW map and will give it to the District as soon as it is available.
4. Cooper considers this project a priority and they will try and get the topo done as fast as possible. The topographic mapping should be available by April 9, 2004. Cooper will deliver the entire project along with all of the ortho photos.
5. Stanley is working on preparing a HEC-RAS model for the part of the mapping they already received from Cooper. The process is going smooth and as soon as they have complete mapping they should be able to complete a HEC-RAS model and have preliminary information to review. Stanley briefly went over the methods used to determine the proposed project limits. The District agrees with Stanley's rationale in this matter. Stanley will assume there are no channel overbanks unless a special situation occurs. If Stanley wants the District to review the location of cross-sections and/or other hydraulic parameters, Stanley can set up a meeting at their office to discuss them. The 100 year peak offsite flow from Trilogy is 198 cfs not 160 cfs.
6. Don Rerick has suggested that we include the first 1000 ft of Sonoqui Wash (up to Higley Road) with the Queen Creek Wash Improvements. These improvements are going to be advertised in July or August. This may not be possible since there are issues regarding the sediment basin and its location vs. the channel location. Raj said he will set up a meeting with Don Rerick, Scott

and himself to discuss potentially including this portion of the channel with Don's project.

7. West Consultants has reviewed the information in the Hydraulic Master Plan. For the most part the channel can be un-lined. At bends and around the structures we will probably have to provide toe-downs and/or armoring of the bank. The channel conditions are similar to Queen Creek Wash. It does not have channel lining except for at bends and other structures. West would like to review the preliminary hydraulics before suggesting where lining is required. The sediment analysis says the channel can withstand a velocity of 2-3 fps before it starts eroding. The HMP gives a channel velocity of 4-5 fps for Sonoqui Wash. West thinks that once the sediment balance is performed a velocity of 3-5 fps will be okay without some form of protection.
8. Public meeting dates were discussed. Sally suggested that it might not be a good idea to have the public meeting during the summer. District staff has coordinated with the project partners (Town of Queen Creek) and they do not believe that holding the public meeting in June will be a problem. The project team is revising the original schedule and proceeding with June 22nd, 23rd, and 24th as potential dates for the first public meeting at Queen Creek's Town Hall.
9. Discussion took place about the outstanding landscape and aesthetic tasks. LSD will have a draft of the Landscape and Aesthetics Report by April 22nd. Lucia will get all of the exhibits scanned and return them to LSD as soon as possible. LSD needs to coordinate with the District to make sure their vegetation survey matches the Districts. The cost of fee-in-lieu mitigation has been agreed upon by District staff and is approximately \$8,000 to \$10,000 per acre. The total jurisdictional area of disturbance is around 30 acres, however not all of that is covered with vegetation. The total impacted area for mitigation is around 19 acres. The Corps has approved the jurisdictional area and an electronic file has been sent to Stanley and LSD
10. There are issues that need to be resolved and/or clarified by the Town of Gilbert. The project team needs to know the status of the Higley Road bridge design. The District will not construct the channel if the Bridge is not designed and ready to go with the Channel Plans. An update on the status of Recharge Basin is needed. Can we use part of the site for mitigation? If yes, how much and which portion of it? The District would like to know if a temporary water supply is proposed until the Town brings the reclaimed water facility online. The District and MCDOT need to incorporate the dip at Recker road into their future Ocotillo Road crossing plans and early coordination will be beneficial for all parties. The status of and method for right-of-way dedication from adjacent developers needs to be discussed. There will be a need to purchase right-of-way in Un-incorporated areas between Recker Road and the Marbella Vineyard Sub-division. The District would like to know who's responsible for purchasing the south 155' of r/w from the current property owners. The status and design of the Ocotillo Road and Higley Road crossing and the Higley Road bridge needs to be coordinated with the District and MCDOT. Will the bridge plans be bid separate from the channel plans and how will the contractors coordinate this? Stanley will be attending a meeting with the Town of Gilbert on Monday 4/12 to discuss the future bridge and waterline projects. Raj asked Scott to mention the necessity for

coordinating the bridge and channel projects. The District will not do the channel project without the bridge.

Action Items:

Responsible Party

Stanley Consultants, Inc

Task

1. Gather utility maps and coordinate with Irrigation Districts
2. Remove control panels from field
3. Provide representative hydrograph to West for sediment transport analysis
4. Provide the District with the equation needed to convert between ground and grid coordinates
5. Provide a table of aboveground utilities and make recommendations
6. Determine who owns the fiber optic line along Higley Road
7. Provide the District with a copy of the utility maps for the project
8. Send AMEC a copy of the soils report from the HMP
9. Forward PAAC meeting #2 minutes to Raj
10. Send Raj the survey file with the project benchmarks
11. Send TBE the project contact list, Exhibit 1, a utility exhibit and the ASCII survey file with the project benchmarks

Flood Control District

1. Scan PAAC meeting #2 exhibits and provide them to LSD
2. Provide Stanley with a copy of the Archeological report
3. Review the pothole list provided by Stanley
4. Provide Stanley with the contact information for Cox fiber optic
5. Provide Stanley with notes from the title report meeting
6. Provide a copy of Kirkham Michael's soil analysis to Stanley Consultants
7. Set up meeting to discuss including the first 1000 ft of the project with another contract
8. Coordinate habitat type with LSD
9. Coordinate with AZTEC and MCDOT to determine the status of the Ocotillo Road alignment.
10. Provide Stanley with Kirkham Michael's electronic files showing the alignment of Queen Creek and the bank tie in.

Town of Queen Creek

1. Review the proposed Sossaman commercial site plan

Town of Gilbert

1. Verify the status of the Higley Road Bridge design
2. Coordinate plans for the future Recker Road and Ocotillo Road crossing

3. Coordinate plans for the water reclamation site and any associated utility work in the area
4. Coordinate plans for the future Ocotillo Road and Higley Road crossing

- | | |
|----------------------|---|
| Cooper | 1. Complete remaining topo |
| AMEC
to | 1. Start preliminary geotechnical report and provide soil information
Stanley and West as needed |
| West Consultants | 1. Provide a copy of soil analysis done for HMP to FCD
and Stanley |
| Logan Simpson Design | 1. Coordinate with the District to determine habitat type
2. Submit draft Landscape and
Aesthetics report to the District |
| TBE | 1. Review the pothole list provided
by Stanley |
-

Distribution: Shah, Frost, Schaner, Martinez, Frechette, Bergeson, Richards, Simpson-Colebank, Bix

MEETING NOTES

Date and Time: April 22, 2004 at 1:00

Place: Stanley Consultants upstairs conference room

Project/Purpose: Sonoqui Wash Channelization Regular Coordination Meeting

Attendees: Raj Shah, Cathy Register, Lucia de Cordre, Bob Stevens, Gary Maiers, Lonnie Frox, David Martinez, Scott Buchanan, Elizabeth Kidd, Diane Simpson-Colebank, Travis E (Travis sent a representative in his place)

Notes By: Elizabeth Kidd

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. Pothole locations along the project were discussed. Stanley will provide a list of 20 potholes to TBE by the next regular coordination meeting. The District doesn't want to pothole the RJID irrigation line along Sossaman Road at this time. They feel it's more important to focus on Queen Creek Water Company's facilities since their locations are poorly documented. Via Del Jardine is located in Town of Queen Creek ROW. David Martinez will verify if Sossaman Road belongs to MCDOT or the Town of Queen Creek. All other roadways are MCDOT ROW and the pothole permits will have to be obtained from them. David Martinez will contact SRP regarding the status of their overhead power crossing in Ranchos Jardines. It is not known if SRP will underground or abandon the line or if funding is available. David Martinez will provide a copy of the sewer force main plans along Sossaman Road. The owner of the fiber optic line along the east side of Higley Road is still unknown. It was suggested that Stanley call Mark Weiner at the Town of Gilbert to see who filed a permit for the installation.
2. Stanley will design the Higley Road bridge / culvert. The structure will be designed to accommodate equestrian traffic; however it may be a recommended dismount scenario. The Town of Gilbert will use a procurement separate from the channel for constructing the Higley bridge / culvert. It is currently scheduled for June of 05-06. The structure should be constructed before or concurrent with the Sonoqui Wash project. The District will not improve Sonoqui Wash without the Higley Road bridge.
3. The first phase of Gilbert's recharge facility will be online by April 2006. The recharge facility will be approximately 130 acres of riparian habitat. The District may use the site for part or all of their mitigation requirements. Lonnie will

coordinate directly with Bob to determine the feasibility of using the recharge facility for mitigation. Lonnie will organize a meeting this fall with all stakeholders to discuss mitigation options.

4. Recker Road will be classified as a major collector. It will be two lanes in each direction, with a painted center turn lane and two bike lanes. Stanley will do the hydraulic design for the crossing. Stanley's plans will only cover the area within the project limits. The Sunridge Development, currently in the planning and preliminary design stage, will meet and match our southern project limit. The Langley Ranch Development on the north side of the channel will do likewise. The Town of Gilbert is currently acquiring 155 feet of ROW along the south side of Ocotillo Road at the lot split parcels west of Recker Road. Plans for Trilogy currently show a retention basin with steep side slopes adjacent to the project. Lonnie will try to get Trilogy to modify their design to flatten this slope and set the top of slope further away from their perimeter wall while and still providing their retention volume requirements.
5. The Pre-PAAC meeting is scheduled for June 8th. PAAC meeting number three is scheduled for June 15th at the Town of Queen Creek Town Hall. The public meeting is scheduled for Wednesday June 23rd. Both council rooms are reserved for both the PAAC and public meetings.
6. The Town of Queen Creek is proceeding with the acquisition of property at the northwest corner of Sossaman Road and Chandler Heights Road. The alignment through the Sossaman commercial property is still under review by the Town of Queen Creek. David Martinez will confirm the proposed alignment / layout is acceptable to the Town. Stanley will then provide Steve Sossaman with the proposed channel alignment for his approval. David Martinez will coordinate with Steve Sossaman to determine the best time to enter his fields to obtain the last few soil borings.
7. Diane will help Stanley establish typical hydraulic reach limits based on habitat, existing character, etc. What will be presented to the PAAC and the public will generally be a single recommended design plan and profile for each sub-reach or, where necessary, one or two alternatives. Alternatives should focus primarily on the recommended channel sections but should include structures and hard features where necessary. The Town of Queen Creek is okay with burying the drop structures if they are necessary. Stanley is working on preparing a HEC-RAS model and will present it at the next coordination meeting for review and comment.
8. AMEC is done with their lab analysis and will finish the boring logs by next week. Once the logs are complete AMEC will provide a copy to West. Stanley is currently surveying the boring locations. AMEC should have a Draft Geotechnical report by the end of next week. David Martinez needs to determine when AMEC can enter Sossaman's field for the remaining borings. This will dictate when the final Geotechnical report can be completed.
9. Cooper is cleaning up their mapping from a CADD deliverable standpoint and will submit sealed mylars directly to the District. Cooper also needs to deliver the ortho photos in .tif format.

Action Items:

Responsible Party

Stanley Consultants, Inc

Task

1. Obtain and review utility map for the fiber optic line along Higley Road
2. Provide representative hydrograph to West for sediment transport analysis
3. Check topo and status of John Stocks' mapping verification
4. Create a summary table of above ground utilities similar to the underground utility table for use by Gary in his research into prior rights / permits / relocation
5. Send AMEC a copy of the soils report from the HMP
6. Send Raj the survey file with the project benchmarks and supplemental field survey
7. Send TBE the project contact list, Exhibit 1, a utility exhibit and the ASCII survey file with the project benchmarks
8. Update project schedule

Flood Control District

1. Review the pothole list provided by Stanley
2. Provide Stanley with notes from the title report meeting
3. Provide a copy of Kirkham Michael's soil analysis to Stanley Consultants / AMEC
4. Set up internal FCD meeting to discuss packaging the downstream end of Sonoqui project with first phase of Queen Creek / CHB project
5. Coordinate habitat type with LSD
6. Coordinate with AZTEC and MCDOT to determine the status of the Ocotillo Road alignment and typical section
7. Provide Stanley with Kirkham Michael's electronic files showing the Queen Creek and CHB geometry and design for Stanley's tie in

Town of Queen Creek

1. Review the proposed Sossaman commercial site plan
2. Provide Stanley with plans for the proposed sewer force main along Sossaman Rd
3. Determine status of SRP crossing through Ranchos Jardines
4. Contact Steve Sossaman to determine optimum time to get the last few geotech borings
5. Verify who owns/maintains Sossaman Road

Town of Gilbert
Ocotillo Road crossing

1. Coordinate plans for the future Recker Road and
2. Coordinate plans for the water reclamation site and any associated utility work in the area
3. Coordinate plans for the future Ocotillo Road and Higley Road crossing
4. require revisions to the Trilogy retention grading

Cooper
Cadd and mylar

1. Complete remaining mapping cleanup and deliver final

AMEC

1. Complete lab analysis
2. Draft geotechnical report
3. Investigate pavement recommendations

Logan Simpson Design

1. Coordinate with Stanley to determine hydraulic sections
2. Submit draft Landscape / Aesthetics / Existing Conditions report to the District

TBE

1. Review the pothole list provided by Stanley and initiate permit / blue stake
-

Distribution: Shah, Frost, Schaner, Martinez, Frechette, Bergeson, Richards, Simpson-Colebank, Bix

MEETING NOTES

Date and Time: May 13, 2004 at 1:00

Place: FCDMC conference room

Project/Purpose: Sonoqui Wash Channelization Regular Coordination Meeting

Attendees: Raj Shah, Cathy Register, Lucia de Cordre, Dennis Holcomb, Bob Stevens, Gary Maiers, Sally Stewart, David Martinez, Scott Buchanan, Elizabeth Kidd, Diane Simpson-Colebank, Jackie Keller, Jennifer Cleveland, Michael Book, Travis Bix, Gai Freeman

Notes By: Elizabeth Kidd

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. PAAC meeting #3 will be on Thursday June 17th and the public meeting is scheduled for Wednesday, June 23rd. David Martinez has the Town Hall reserved for the both dates. Michael Book from LSD distributed the public meeting notice for everyone to review. He said he would like to have comments returned to him by May 20th. Raj would like to see the Town of Gilbert and Town of Queen Creek's contact names and numbers on the notice. The meeting announcement will be in the local newspaper and door hangers will not be necessary according to the scope of work. Everyone agreed to a 1.5 hour long public meeting from 6:30 PM to 8:00 PM with an open house format. The pre-PAAC meeting is scheduled for June 8th at LSD's office. The pre-PAAC meeting will also serve as the regular coordination meeting normally held on the second Thursday (June 10th).
2. Stanley discussed the hydraulics models they have prepared. The models start at the center line of the Queen Creek Wash. A weir will be located on the east bank of the Queen Creek Channel with a low-flow pipe under it to drain water from the sediment basin. Several x-sections through the sediment basin are included in the model. The size and shape of the sediment basin is per LSD's concept design developed along with Kirkham Michael's plans. Multiple box culverts are modeled at Higley Road. Low flow culverts with a dip crossing have been modeled for Recker and Sossaman Road. A multiple cell box culvert is modeled at the future Ocotillo Road crossing. At Power Road, similar type box culvert is modeled to reflect future construction. Low-flow pipes and a dip will be modeled and constructed at Power Road for this project. An at-grade crossing is modeled at Via-Del Jardine. Stanley has several models including low "n" value and high "n" value runs, minimum and maximum width runs and a few others to account for meandering side slopes. Gary said he would like to review the hydraulic models and make sure an efficient bottom width is recommended to minimize the scour and sediment transport. The Corps of Engineers has

developed guidelines to establish an efficient channel and West would like to review Stanley's model before the final bottom widths and side slopes are recommended. Stanley's model does not contain any drop structures. There are a few areas within the model that have a supercritical flow regime and the flow velocity is in the range of 6 to 8 fps. Most of the flow is in the subcritical regime, however. But we may still need drop structures at certain locations. The model shows that the flows will be contained within the rights-of-way for a large portion of the project with 4:1 side slopes and a bottom width of 70'-80'. There may not be opportunities for a multi-use path or maintenance road on the top in some areas. In order to achieve that we may have to provide retaining walls or steep side slopes or reduced bottom width.

3. A discussion took place regarding how to break down the project into similar reaches so that typical channels can be illustrated to the public. According to hydraulic parameters, there might only be 2 or 3 reaches. 1) Higley Road to Via Del Jardin, 2) Via Del Jardin to Sossaman Road 3) Sossaman Road to Chandler Heights Road. Dennis thought there might need to be more reaches defined based on surrounding landscape characteristics. We may have different types of adjacent developments, commercial sites, retention basins, open space, farm land etc. which can break up the typical sections. LSD thinks there might be 8 to 10 different reaches according to adjacent characteristics. For some reaches we may have more than one cross-section and PAAC members will be asked to give us their preference and input. We will only present options included in the scope of work for this project to the PAAC and public. Future bridge crossings that are separate projects will not be included. Dennis suggested that we should undulate the side slopes by fixing the top hinge points and changing the side slopes while keeping the bottom width fixed. By alternating the side slopes, the toe will meander giving the channel a non-linear look. The District has successfully implemented this visual effect on the Laveen project. LSD submitted the Data Collection Report to Stanley. Stanley will be submitting it with their data collection report. LSD submitted the existing condition analysis/report today and would like to get comments back by next Friday (5/21). The Analysis/Report needs to go out to the PAAC members as soon as possible and no later than at least two weeks before the next PAAC meeting.
4. Theresa distributed the summary table of acreages and habitat types within the Sonoqui Project limits. There is approximately 18.9 acres of high and low density sonoran riparian scrubland that needs to be mitigated. The total in-lieu fee mitigation cost would be approximately \$173,250. Theresa is searching for the agency that has a need for funding to provide mitigation. She is also looking into purchasing land along the Gila River, which is already covered with habitat. Bob received an email from Lonnie Frost of Town of Gilbert documenting what the cost would be to mitigate within the Town of Gilbert recharge facility. The District has received approval of the delineation maps from the COE. The District is working on collecting information to submit to the COE for the 404 Permit application. The District would like to get the permit in hand by February 2005.
5. Stanley has located the owner of the fiber optic line along the east side of Higley Road. Cox is claiming ownership of it. Stanley also found another fiber optic line along the west side of Higley Road that is owned by Qwest. Stanley will be including a pothole on either side of the wash alignment for both of these utilities.

Stanley distributed an updated spreadsheet listing of the known underground utilities. Gary would like to have the spreadsheet electronically. Stanley will email it to him. TBE has a blanket permit with MCDOT to perform potholes within their right-of-way. TBE is ready to start. The District has provided an authorization letter to Stanley to start the potholes. Stanley needs to convey it to TBE to get that work going. The District would like to get the potholes started a.s.a.p. and have the work completed by the end of the fiscal year, which ends this June. TBE might not be able to get all of the work done by end of June but they will try. Stanley will be putting together a spreadsheet showing all of the above ground utilities within the project area. Most of the above ground facilities are overhead electric owned by SRP. SRP is in the process of designing an overhead line along Ocotillo Road which currently comes from the west and turns south along Higley Road. SRP is looking into continuing the line east along Ocotillo Road. Gary will be attending a meeting with SRP on Monday (5/17) and will find out more about what SRP is proposing to do.

6. AMEC is still waiting to complete 5 soil borings within the Sossaman and Finney properties. The final alignment through the Sossaman property needs to be provided to and approved by Steve Sossaman before he will allow us to enter his fields to complete the soil borings. The lab analysis is done except for sulfites for pipe corrosion. West did receive the sieve analysis and soil boring logs in pdf format from AMEC.
7. John Stock is still reviewing the final topo mapping submitted by Cooper. John has found some correction and/or bust and/or grid-vs-ground issue that he is working with Cooper to fix. After that Cooper can submit final sealed mylars.
8. There is a meeting scheduled for this Monday (5/17) between Stanley and Town of Gilbert to discuss the Scope of Work for the Higley Road Bridge. Other items are regular coordination items and will be tracked and coordinated with Town of Gilbert as the project progresses.
9. Stanley needs to update the schedule and show when the 30% design will be starting and when the complete final product will be delivered. Since there have been several delays in the schedule it is important to re-organize and set up our milestones accordingly. Stanley will update the schedule by the next biweekly meeting.

Action Items:

Responsible Party

Stanley Consultants, Inc

Task

1. Revise hydraulic model(s) and provide to West
2. Provide representative hydrograph to West for sediment transport analysis
3. Check topo and status of John Stocks' mapping verification
4. Create a summary table of above ground utilities similar to the underground utility table for use by Gary in his research into prior rights / permits / relocation
5. Revise Utility table and send Gary an electronic version

6. Send Raj the survey file with the project benchmarks and supplemental field survey
7. Send TBE the ASCII survey file with the project benchmarks
8. Update project schedule
9. Review the Analysis/Report summary prepared by LSD
10. Provide TBE with a copy of the District's authorization to proceed letter
11. Set up meeting with Steve Sossaman to discuss his future irrigation/facility needs

Flood Control District

1. Review the Analysis/Report summary prepared by LSD
2. Research mitigation options
3. Provide minutes from meeting with SRP

Town of Queen Creek
Steve Sossaman

1. Coordinate alignment through Sossaman property with Steve Sossaman
6. Provide Stanley with plans for the proposed sewer force main along Sossaman Rd
7. Determine status of SRP crossing through Ranchos Jardines

Town of Gilbert
Ocotillo Road crossing

1. Coordinate plans for the future Recker Road and Ocotillo Road crossing
2. Coordinate plans for the water reclamation site and any associated utility work in the area
3. Coordinate plans for the future Ocotillo Road and Higley Road crossing
4. Require revisions to the Trilogy retention grading

Cooper
remaining mapping cleanup

1. Coordinate topo discrepancies and complete and deliver final Cadd and mylar
2. Complete digital photo image

AMEC

1. Investigate pavement recommendations
4. Draft geotechnical report

Logan Simpson Design

1. Coordinate with Stanley to determine hydraulic sections
2. Revise and submit Public Meeting announcement

TBE

1. Review the pothole list provided by Stanley and initiate permit / blue stake
-

Distribution: Shah, Frost, Schaner, Martinez, Frechette, Bergeson, Richards, Simpson-Colebank, Bix

MEETING NOTES

Date and Time: May 27, 2004 at 1:00

Place: Stanley conference room

Project/Purpose: Sonoqui Wash Channelization Regular Coordination Meeting

Attendees: Raj Shah, Cathy Regester, Dennis Holcomb, Gary Maiers, David Martinez, Lonnie Frost, Scott Buchanan, Elizabeth Kidd, Jackie Keller, Travis Bix, Gary Freeman

Notes By: Elizabeth Kidd

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. TBE has surveyors scheduled to be in the field as early as next week. TBE has the necessary information to get the potholes started. They have a blanket permit for MCDOT roads/row. They do not have permits for the Town of Queen Creek or the Town of Gilbert but are pursuing them. The District will authorize the proposed cost of tracing with the intention that the funds will be used for potholes. The District would like to have as much work as possible completed by the end of the 03-04 fiscal year (June 30). The proposed overhead electric line along Ocotillo Road will not come down Ocotillo Road but will turn south and parallel Higley Road. The line shown on Cox's fiber atlas along Ocotillo Road is a proposed future line and will not be placed prior to the channel or roadway improvements. The Town of Gilbert has a proposed gravity sewer in the Ocotillo Road alignment from Higley Road to Recker road. The Town of Gilbert CIP shows it as a 15-inch line. The Town of Queen Creek wants to tie into this line. If Queen Creek does use this line it may need to be upsized to an 18-inch line. The line will be in the roadway right of way and will be built as part of the Vacquero (Sunridge Estates) offsite improvements.
2. The survey / aerial mapping has been checked and approved by John Stock. Cooper is working on the final clean up and should have sealed mylars in another two weeks or so.
3. The Town of Gilbert's typical section for a minor arterial street will be used for Ocotillo Road from Higley Road to Recker Road. The Town of Queen Creek approved using this typical through the entire Ocotillo alignment. Queen Creek's typical section for a minor arterial shows a raised landscaped median. All parties agreed that there would not be a landscaped median for any part of Ocotillo Road through the project limits.
4. Vacquero (Sunridge Estates) has some major design challenges that will likely delay their project. They have another development partner and the subdivision name has been changed from Sunridge to Vacquero. A meeting will be set up

next week with the District, Town of Queen Creek, developer and Stanley to discuss design issues. Most of the design challenges relate to offsite improvements or conditions like access, sewer and the recently delineated Sonoqui Wash floodplain. The Town of Queen Creek has told the developer and their engineer (Kimley-Horn) that they must obtain formal approval of the development with regard to the floodplain. They must somehow prove that their encroachment in the floodplain will not adversely impact any property around them.

5. The Higley Road crossing does not necessarily need to be a bridge. Boxes and super boxes should also be looked at. Gilbert will know in the next couple of weeks if the structure can be included in the Sonoqui Wash contract and if funding will be available to construct it prior to the channel. A proposal to rezone the Finney property has been submitted to the Town of Gilbert and a rezoning hearing is set for June 21st. Lonnie will verify if Trilogy has a grading permit or if the Town can still dictate that the developer provide an interim retention basin with a 5 foot bench at the top and 3:1 side slopes. The Town of Gilbert is in the process of acquiring ROW at the parcels along the southern edge of the wash ¼ mile west of Recker Road. The Town has already acquired one entire property ½ mile west of Recker.
6. There were a few comments on the Public Meeting Notice. The project limits should be extended to accurately represent the upstream and downstream limit of the project. The notice will be placed in the Tribune, Gilbert Independent and the Mayor's Newsletter for Queen Creek. Notices will also be posted on the Town of Queen Creek's website and cable channel. LSD will coordinate with the Town of Gilbert's PIO to determine if other opportunities exist to advertise the Public Meeting.
7. The District is looking to purchase land along the Gila River for mitigation. Gilbert's recharge site is still a secondary (backup) mitigation option.
8. The District and LSD would like to see the maximum area at the top of the channel. Seventy feet is plenty of room for horse traffic and Stanley should not widen the channel bottom at the cost of the top width. Berms can be incorporated into the design but a reasonable line of sight should be maintained. LSD should consult local police department requirements for sight distance. If necessary, channel can be offset further north at the recharge facility to better align with the sediment basin. When planning the recharge facility, the Town of Gilbert assumed a 250' wide corridor for the wash.
9. The District will order title reports for the two properties adjacent to the wash north of Via Del Jardin and for the 10 or 12 properties that may be impacted through the narrow portion of Ranchos Jardines. Stanley will send the necessary parcel numbers to Raj.
10. The draft environmental report indicated a few areas of concern. Specifically there were concerns over asbestos and lubricants among other potentially hazardous materials. The District is proceeding with testing in these areas.

Action Items:

Responsible Party
Stanley Consultants, Inc

Task

1. Create a summary table of above ground utilities similar to the underground utility table for use by Gary in his research into prior rights / permits / relocation
2. Provide the District with the parcel numbers that need title reports.
3. Send Raj the survey file with the project benchmarks and supplemental field survey
4. Update project schedule
5. Set up meeting with Steve Sossaman to discuss his future irrigation/facility needs

Flood Control District

1. Order title reports for parcels north of Via Del Jardine and through the narrow portion of Ranchos Jardines.

Town of Queen Creek
Steve Sossaman

1. Coordinate alignment through Sossaman property with
8. Provide Stanley with plans for the proposed sewer force main along Sossaman Rd
9. Determine status of SRP crossing through Ranchos Jardines

Town of Gilbert
Ocotillo Road crossing

1. Coordinate plans for the future Recker Road and
2. Coordinate plans for the water reclamation site and any associated utility work in the area
3. Coordinate plans for the future Ocotillo Road and Higley Road crossing
4. Require revisions to the Trilogy retention grading

Cooper
final Cadd and mylars
AMEC

1. Complete remaining mapping cleanup and deliver
1. Investigate pavement recommendations
5. Draft geotechnical report

Logan Simpson Design

1. Coordinate with Stanley to determine hydraulic sections
2. Coordinate with Gilbert PIO and revise and submit Public Meeting announcement
3. Coordinate berm sight distance requirements

TBE

1. Review the pothole list provided by Stanley and initiate permit / blue stake
-

Distribution: Shah, Frost, Schaner, Martinez, Frechette, Bergeson, Richards, Simpson-Colebank, Bix

MEETING NOTES

Date and Time: June 10, 2004 at 1:00

Place: Logan Simpson Design

Project/Purpose: Sonoqui Wash Channelization Regular Coordination Meeting and pre-PAAC Meeting #3 meeting

Attendees: Raj Shah, Cathy Regester, Dennis Holcomb, Bob Stevens, Theresa Pinto, David Martinez, Scott Buchanan, Elizabeth Kidd, Jackie Keller, Diane Simpson-Colebank, Jennifer Cleveland, Amy Schuchert, Daniel Frechette, Gary Freeman

Notes By: Elizabeth Kidd

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. TBE is proceeding with the potholes as provided by Stanley. Surveyors are in the field today staking the proposed locations. Arizona Blue Stake has been called and they have until Monday to complete the field markings. Travis will be in the field on Tuesday to check locations. If there are any discrepancies TBE will contact Stanley to setup a field meeting for clarification. TBE did not provide a time frame for completion however they will try to complete as much work as possible by the end of the fiscal year.
2. The District has ordered title reports for the properties along the narrow portion of Ranchos Jardines. Stanley should have the reports by July 1st.
3. The Town of Queen Creek has an 18-inch sanitary sewer line planned along the east side of Sossaman Road. The outlet end of this line has a proposed invert of 1355 ft. The wash is currently lower than the outlet elevation. The wash is low in this area because of the topography of the parcel at the corner of Chandler Heights Road and Sossaman Road. Stanley will look at raising the wash to eliminate the conflict.
4. Power Road, Sossaman Road and Higley Road still need borings before pavement recommendations can be made. The recommendations will be based on the Town of Gilberts typical sections. There is no as-built record of the existing pavement sections. AMEC will provide Stanley and the District with a maximum recommended temporary construction side slope in Ranchos Jardines by Monday. AMEC will submit the Geotechnical Report without the last 5 borings. The report will be amended as the final borings are taken and analyzed.

5. Roger Nelson has verbally approved the wash alignment through the commercial property at the corner of Power Road and the Ocotillo alignment. Roger still has concerns about the ROW needed for the future Ocotillo Road crossing. Raj will send Stanley an email documenting Roger's approval and concerns. Raj will also set up a meeting to discuss the commercial property as well as the rest of Sossaman's property. Sossaman started to harvest his crops yesterday. The meeting with Sossaman will also include discussion of the final boring locations and timing as well as his irrigation practices.
6. Widening the channel through Sossaman's property from Power Road to Via Del Jardin may reduce the need for ROW through Ranchos Jardines. Cathy briefly looked at this and got a drop in the WSE of 0.35 ft and 1.0 ft at the limits of Ranchos Jardines. Stanley will look at this option and see if it helps with the freeboard requirement. A copy of the HEC-RAS model needs to be provided to West to determine if a low flow channel is needed with this option.
7. The District needs a firm footprint of the area impacted before a 404 permit can be issued. Specifically, Bob needs to know the project limits and "final" alignment. The adobe plant is potentially an environmental problem and should be avoided. The District is still discussing in-lieu fees with the Town of Gilbert.
8. The District provided the project team with a picture of a buried box culvert on the Wildfire golf course. A field meeting can be arranged to view the structure. The box culvert option will be shown at the public meeting.
9. There are issues with the grading at Trilogy impacting the project topo. This issue will be addressed once Trilogy has completed their grading and can provide an electronic file. This file will be overlaid on the project topo to determine the extent of impact to the project topo. If there is a significant difference Cooper may have to re-fly the area.
10. The PAAC exhibits will show a 10 ft meandering sidewalk along the Ocotillo Road alignment. The PAAC will see three proposed typical sections along the Ocotillo Road alignment. None of the exhibits should show trees along the bottom of the channel for now. It is okay to show trees in the bottom of the basin on little islands. A preliminary plant palette should be provided to the PAAC and Public.

Action Items:

Responsible Party

Stanley Consultants, Inc

Task

1. Create a summary table of above ground utilities similar to the underground utility table for use by Gary in his research into prior rights / permits / relocation
2. Verify who owns the triangular parcel at south fork of wash in Ranchos Jardines
3. Look for Metric strip topo map at Chandler Heights Road
4. Update project schedule
5. Send Raj and the Towns a copy of the survey, topo and aerial .tif files

Flood Control District

1. Set up meeting with Steve Sossaman to discuss his future irrigation/facility needs, boring schedule and the commercial center property.

2. Call Dean Griffith to get update of irrigation crossing at Power Rd.

Town of Queen Creek

1. Check if the Town has record of ALTA survey for property with 25 ft encroachment and check the Towns policy on adverse possession.

2. Provide Stanley with plans for the proposed sewer force main along Power Rd

Town of Gilbert
Ocotillo Road crossing

1. Coordinate plans for the future Recker Road and

2. Coordinate plans for the water reclamation site and any associated utility work in the area

3. Coordinate plans for the future Ocotillo Road and Higley Road crossing

4. Require revisions to the Trilogy retention grading

Cooper
Cadd and mylars

1. Complete remaining mapping cleanup and deliver final

2. Submit Invoice

AMEC

1. Recommend construction side slopes

6. Draft geotechnical report

7. Submit invoice

Logan Simpson.Design

1. Submit invoice

2. Revise meeting exhibits

TBE

1. Coordinate pothole locations with Stanley and do potholes

2. Submit invoice

West

1. Review HEC-RAS Models

2. Submit Invoice

Distribution: Shah, Frost, Schaner, Martinez, Frechette, Bergeson, Richards, Simpson-Colebank, Bix

MEETING NOTES

Date and Time: June 24, 2004 at 1:00

Place: Logan Simpson Design

Project/Purpose: Sonoqui Wash Channelization Regular Coordination Meeting

Attendees: Raj Shah, Cathy Regester, Dennis Holcomb, Gary Maiers, David Martinez, Scott Buchanan, Elizabeth Kidd, Jackie Keller, Diane Simpson-Colebank, Daniel Frechetti, Gary Freeman, Travis Bix

Notes By: Elizabeth Kidd

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. Trilogy has made revisions to their temporary retention basin grading plans. Raj will ask Mike Young to provide as-builts and topo of the revised area and to find out when Trilogy will be finished with their grading. The project team will need additional topo at Higley Road north of the section line because the channel alignment has shifted to the north and encompasses a portion of Gilbert's recharge parcel. Cooper may have flown this area. Stanley will ask Cooper to provide a general cost estimate to get the additional mapping at Higley Road and at the Trilogy retention basin. As an alternative, the additional mapping may be done with the District's on call contract using field survey and amending the DTM. Stanley will coordinate with Cooper to determine the best way to go about getting the additional mapping. Raj will discuss the issue with Don Rerick and John Stock.
2. Steve Sossaman has verbally approved the alignment through the commercial center property. The District will have Wood Patel provide a hard copy of the alignment to Steve for his signature and final approval. Raj will set up a meeting to discuss any concerns Sossaman may have regarding the project. This meeting will also include discussion of Sossaman's irrigation practices and needs.
3. All of the geotech borings have been completed. A representative from the Finney property was not on site during testing. AMEC will save a portion of the Finney samples and provide them to Finney if Finney requests it. Laboratory results should come back on monday. The draft Geotechnical report will be submitted July 16th. Daniel can send any portion of the report earlier if needed. Daniel will send the boring logs to Stanley, West and the District as soon as they

are available. AMEC's initial effort will soon be concluded but additional geotech needs may be identified as we move into design. Any additional geotech tasks will be accomplished thru AMEC's on-call contract.

4. Stanley will send a revised pothole log to TBE as soon as possible. TBE is okay with the approved contract amount and will continue taking the requested potholes. TBE will take as many potholes as possible by the end of the fiscal year. The irrigation line on Sossaman's property can possibly be snaked to locate it. Stanley will create exhibits for the irrigation lines through Sossaman's property and Ranchos Jardines. These exhibits will help determine if potholing is necessary in these areas. If potholing is necessary at Sossaman's property one of Sossaman's representatives should be present during testing. TBE was instructed to hold off on potholing any more of the Queen Creek Water Company's lines. Stanley needs to get the utility poles surveyed so the utility poles to be relocated can be identified.
5. The District provided Stanley with the title reports for about a dozen of the residential lots through the narrowest part of Ranchos Jardines. The District needs an exhibit for the two parcels north of Via Del Jardin showing the top of bank and property line. The District's ROW Department will use this to start the acquisition process where the existing channel is on private property. The Town of Queen Creek is currently trying to acquire the parcel at the northeast corner of Chandler Heights and Sossaman Roads. The process should be complete in 45-60 days. The Town of Queen Creek will provide the title report for the triangular parcel north of the channel along the east side of Sossaman Road. If they do not have a title report, the District will order one. Once this parcel is checked for easements, Stanley needs to submit the ROW strip map.
6. Stanley needs to expedite the aerial mapping and final mylars. If additional mapping is needed, it will be reviewed and certified separate from the original aerial mapping. It is still unclear if this work will be done as an on call assignment or if Cooper would do it under a change order. Stanley will contact Cooper to get a cost estimate for the additional work.
7. Minor issues were identified in the Environmental report and there is no need for immediate concern with the environmental impacts. The District is still looking into in lieu fees for mitigation. Raj handed off a draft copy of the Klienfelder Phase 1 report to Diane. Diane will pass the report along to Stanley when she is done with it.
8. Stanley will send West the model with the widened channel section along Sossaman's property just north of Via Del Jardin. The stable channel slope is 0.002 ft/ft. The low flow crossings are currently acting as grade control structures. West tentatively suggested a 9 ft drop for the overall project. Some of this drop could be accommodated through the section north of Via Del Jardin. No drops are currently modeled.
9. LSD provided the project team with a copy of the public meeting comments. Diane will provide the project team with a CD containing the public meeting exhibits in .pdf format. The Town of Queen Creek will conduct other follow-up meetings by July 13th to meet with any homeowners along the wash who were

unable to attend the public meeting. Diane provided the Town with a hard copy of the public meeting exhibits.

Action Items:

Responsible Party

Stanley Consultants, Inc

Task

1. Create a summary table of above ground utilities similar to the underground utility table for use by Gary in his research into prior rights / permits / relocation
2. Get cost estimate for Higley and Trilogy mapping from Cooper
3. Send TBE revised pothole log and recommend areas for tracing
4. Update project schedule
5. Create exhibits highlighting the irrigation facilities at Ranchos Jardines and Sossaman's property
6. Provide District with exhibit for ROW acquisition at parcels north of Via Del Jardine
7. Provide West with HEC RAS models showing widened section along Sossaman's property

Flood Control District

1. Set up meeting with Steve Sossaman to discuss his future irrigation/facility needs and the commercial center property.
2. Find out when Trilogy will be finished with their grading along the channel

Town of Queen Creek

1. Provide Stanley with a copy of the title report for the triangular parcel north of the channel at Sossaman Road
3. Provide Stanley with plans for the proposed sewer force main along Power Rd

Town of Gilbert
Road crossing

1. Coordinate plans for the future Recker Road and Ocotillo
2. Coordinate plans for the water reclamation site and any associated utility work in the area
3. Coordinate plans for the future Ocotillo Road and Higley Road crossing

Cooper
Cadd and mylar

1. Complete remaining mapping cleanup and deliver final

AMEC

1. Provide boring logs to the project team
8. Draft geotechnical report

Logan Simpson Design

1. Provide Public Meeting exhibits in .pdf format
2. Review copy of Klienfelder report and pass along to Stanley

TBE

1. Coordinate pothole locations with Stanley and do potholes

West

1. Review HEC-RAS Models

Distribution: Shah, Frost, Schaner, Martinez, Frechette, Bergeson, Richards, Simpson-Colebank, Bix

MEETING NOTES

Date and Time: July 8, 2004 at 1:00

Place: FCDMC Offices

Project/Purpose: Sonoqui Wash Channelization Regular Coordination Meeting

Attendees: Raj Shah, Cathy Regester, Dennis Holcomb, Bob Stevens, David Martinez, Scott Buchanan, Elizabeth Kidd, Diane Simpson-Colebank, Gary Freeman, Travis Bix, Se Bergeson

Notes By: Elizabeth Kidd

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. The hydrology is still an issue. The East Branch of Sonoqui Wash will probably not be channelized in the near future. There are two basins (at Signal Butte and near the landfill) on the east branch that can be upsized to allow our design to fit primarily within the existing ROW. The District needs to look at the hydrology to determine if the peaks can be reduced. They also need to determine if they are confident in the Pinal County methods/standards.
2. TBE has completed some unauthorized tasks. Stanley need to look at what has been done compared to what was authorized. The District will pay for the first pothole to locate a utility. If no utility is found the District will not pay for another test hole unless it's authorized prior to digging. TBE provided a sealed copy of their findings. Ranchos Jardines Irrigation District says they do not have any lines crossing the wash. There is no irrigation easement shown on the plat. The project team will deal with this issue after 30% plans. The Town of Queen Creek may go out and dig at the potential crossing location.
3. The Town of Queen Creek may not have a title report for the triangle shaped parcel. They own the property but need to get a deed in order for the Assessor to transfer title.
4. Diane passed out the revised Landscape and Aesthetics report. The scope of work was discussed. Another meeting is needed to establish the scope of work and design process needed to finish the project.
5. Cooper has control and aerial images north of the project limits at Higley Road. If a decision is made to move the channel crossing north Cooper will only have to process the data at a minimal cost. Only a narrow strip of mapping is needed at

Trilogy. All of the controls are in place and a survey crew will not be required to map the area. Trilogy will be treated as a remapped area not a new project. Cooper will provide a formal cost estimate and schedule to do the mapping at Trilogy and at Higley Road.

6. A private developer will be designing the sanitary sewer line from Higley Road to Power Road.
7. The District needs a firm footprint of the area impacted before a 404 permit can be issued. Specifically, Bob needs to know the project limits and "final" alignment. The 404 permit will be submitted after 30% plans. Detours must be shown in the permit application. The Town of Gilbert is not eligible to receive in lieu fees for mitigation. If the Town of Gilbert were to be used the District would have to get the permit and oversee Gilbert's work.
8. The Town of Queen Creek is proceeding with purchasing part of one parcel at the narrowest point. This property is currently for sale and the owner is worried that an unknown row take would negatively impact the sale of his property.

Action Items:

Responsible Party

Stanley Consultants, Inc

Task

1. Create exhibit showing the wash alignment through the commercial center
2. Update schedule
3. Set up meeting to discuss scope and design approach
4. Provide a list of design hurdles to overcome prior to design

Flood Control District

1. Set up meeting with Steve Sossaman to discuss his future irrigation/facility needs, boring schedule and the commercial center property.
2. Provide Stanley with regional hydrology/flow
3. Verify the Trilogy is done grading next to the wash.

Town of Queen Creek

1. Check if the Town has record of ALTA survey for property with 25 ft encroachment and check the Towns policy on adverse possession.
4. Provide Stanley with plans for the proposed sewer force main along Power Rd
5. Get title report for triangular parcel north of wash at Sossaman Road

Town of Gilbert
Ocotillo Road crossing

1. Coordinate plans for the future Recker Road and
2. Coordinate plans for the water reclamation site and any associated utility work in the area
3. Coordinate plans for the future Ocotillo Road and Higley Road crossing

Cooper
Cadd and mylars

Higley Road

AMEC

West

1. Complete remaining mapping cleanup and deliver final
2. Complete cost estimate for remapping at Trilogy and

1. Submit Geotechnical Report

1. Review HEC-RAS Models
-

Distribution: Shah, Frost, Schaner, Martinez, Frechette, Bergeson, Richards, Simpson-Colebank, Bix

Sonoqui Wash Channelization
Coordination Meeting Agenda
July 15, 2004
2:00 PM @ Flood Control District Office

1.0 Status of landscape and aesthetic tasks to date

2.0 Combined hydraulic and landscape design procedure

3.0 Resolution of design issues and additional scope tasks:

- Hydrology related to channel design Q
- Revised hydraulic design if Q is reduced?
- Selection of design alternative @ Ranchos Jardines
- Off line detention basin @ Sossaman and Chandler Heights related to Ranchos Jardines alternative and hydrology
- Need for additional R/W thru Sossaman property north of Via del Jardin related to above two bullets
- Selection of upstream project limit related to revised channel design Q, future upstream channel and basin projects, off line basin at Sossaman and Chandler Heights and potential need for improvements to Chandler Heights Road and dip
- Potential future Town of Queen Creek local drainage project along Sossaman Road from Cloud Road to Chandler Heights Road
- Remaining geotech needs
- Remaining utility pothole and potential additional utility relocations
- Future proposed Town of Queen Creek sewer at Power and at Sossaman
- Proposed Town of Queen Creek sewer along Ocotillo Road
- Changes in channel topo adjacent to Trilogy
- Channel alignment shift north @ Higley Road with potential need for additional topo?
- Higley Road bridge / culvert (and related improvements)
- Revised schedule
- Frequency of future regular coordination meetings
-

MEETING NOTES

Date and Time: August 3, 2004 at 1:00

Place: Stanley Consultants

Project/Purpose: Sonoqui Wash Channelization Regular Coordination Meeting

Attendees: Raj Shah, Dennis Holcomb, Gary Maiers, Bob Stevens, Dick Schaner, David Martin, Lonnie Frost, Scott Buchanan, Elizabeth Kidd, Diane Simpson-Colebank, Jennifer Cleveland, Dennis Richards

Notes By: Elizabeth Kidd

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. Hydrology related to the design discharge is still an issue. The District needs to look at the hydrology to determine how much the future peak flows can be reduced. The design discharge that's been used since the beginning of the project was 3200 cfs. With corrections to some of the sub-basin errors that were discovered in the upper Pinal County portion of the contributing area, the revised estimated future developed land use condition with project discharge for Sonoqui Wash at Chandler Heights is now 2600 cfs. The District is considering designing Sonoqui Wash for 2100 cfs and including an off-line detention basin at Chandler Heights Road and Sossaman Road per the Hydraulic Master Plan (HMP) concept. This would attenuate the hydrograph peak by 500 cfs. According to recently revised hydrology, the off-line retention basin at Chandler Heights only needs to hold around 7 ac-ft in order to reduce the discharge from 2600 cfs to 2100 cfs. The HMP basin at the basin location was around 70 ac-ft of stored volume to reduce the flow from around 4400 cfs to 3200 cfs.
2. If only 7 ac-ft is needed now, it brought up the issues of whether the entire basin parcel should be acquired, whether the parcel acquisition would have been recommended by the HMP with such a small volume and discharge reduction, whether to consider making the basin volume larger, like 20 to 25 ac-ft, to further reduce the channel downstream or if the 500 cfs discharge reduction could be achieved with a basin on the channel parcel immediately south of Chandler Heights which the Town of Queen Creek will be acquiring anyway. Should we try to optimize the basin design to achieve the best balance between basin and channel? Up until now, it had not really been considered to try and reduce the channel design discharge below 2100 cfs which is the estimated existing condition discharge.

3. The Town of Queen Creek is in the process of acquiring the proposed basin parcel at Sossaman and Chandler Heights. The parcel has an "as-is" clause in the contract and the phase 1 environmental investigation revealed some glass and metal on the property. The Town has a consultant performing some x-ray / radar analysis before proceeding with the purchase. Dick will present the basin options to the Town Council on Wednesday night's session (August 4) and verify that the Town wants to still proceed with purchasing the entire parcel since it may not be as needed for a basin. The Town of Queen Creek has funds allotted this fiscal year to purchase the tract south Of Chandler Heights Road.
4. Another option discussed was to design the channel for 2600 cfs and exclude the off-line basin at Sossaman Road. In this scenario, the basin would be designed with phase 2. The Town of Queen Creek has already requested the District to partner Phase 2 and serve as the lead agency as they are currently doing with present project. If a basin is included in the Sonoqui Wash plans the basin and weir will only be rough graded and aesthetic features for them will not be designed under the current scope but would perhaps be done with phase 2 which goes up to Riggs Road. The District needs to evaluate these options and decide on a course of action.
5. Stanley will verify if any ROW is needed from the Queen Creek Water Company parcel north of Via Del Jardin on the west side of the channel.
6. The Town of Queen Creek would like to see a side slopes no steeper than 4 to 1 where possible. Queen Creek and Gilbert both agreed that they would prefer not to have a lined channel. Both Towns are aware that the East Maricopa Floodway (EMF) is having maintenance problems attributed to erosion, as might Sonoqui Wash if it remains an un-lined channel. Both Towns agreed that the additional maintenance was worth the tradeoff of an unlined channel. Stanley will verify what the maximum allowable design velocities will be based on the geotech results and see how this relates to the flow velocities with the current hydraulic model and anticipated reduced design discharge.
7. There are several houses located in the floodplain south of Chandler Heights Road. This is a shallow breakout area along the west overbank of the existing floodplain. The District wants to extend the project limits 800 ft south of Chandler Heights Road to get these homes out of the floodplain. This objective may require the Chandler Heights roadway dip to be reconstructed.
8. The project is still scheduled for completion in February 2005. Raj is currently drafting an IGA for the construction phase of the current channel project for the Towns of Queen Creek and Gilbert to review. Currently, the project only has a design IGA.
9. MCDOT is finishing the Chandler Heights Road Bridge DCR this month. The project is not funded in their current CIP and it is not known if and when construction will take place.
10. The sewer line along Ocotillo Road between Higley and Power is on hold until Vacquero moves ahead with their design. Stanley will reexamine the channel profile where it crosses Sossaman Road to see if it can be raised because the

current preliminary profile is causing problems for the gravity sewer being designed there by the Town's consultant. The channel profile will depend somewhat on where we end up with the design discharge.

11. Some of the utility poles and / or guy wires located within the project limits in the Ranchos Jardines tract will likely need to be relocated or replaced. If it is possible to leave the poles where they are but the down guys still conflict, the District would prefer steel poles that do not require down guys or lateral bracing.
12. The Town of Gilbert is currently doing an alignment study at Higley Road. Stanley Consultants is performing this task for the Town and it is supposed to be completed in about two weeks. Gilbert still intends to build the Higley bridge/culvert with the channel.
13. The Town of Gilbert is not eligible to receive in lieu fees for mitigation of impacted Waters of the U.S. A suitable entity would need to be identified and approved by the Corps to accept in lieu fees. The District is still looking to use the recharge site for at least part of the mitigation necessary for the Sonoqui project. The Corps main concern is that the mitigated area needs to be fenced off and protected for newly constructed habitat to grow and develop. The Town of Gilbert purchased the recharge site with public funds and the public can't be denied access to it. The Town may be able to use temporary fencing until vegetation is established to meet Corps requirements. Bob will coordinate a field visit to the Town of Gilbert's existing riparian / recharge facility near Greenfield and Guadalupe with the Corps. Gilbert will be going to design of the riparian / recharge site in the fall of this year.
14. Bob will be submitting the PCN package to the Corps at the end of August. Bob will use typical plan and section details to show the Corps what the project will be. He does not feel that he needs to wait until the 30% plans are available.
15. The regular coordination meetings will be held monthly on the first Thursday of the month. However, due to vacation plans, the next meeting is scheduled for September 9, 2004 (the second Thursday of Sept).

Action Items:

Responsible Party

Stanley Consultants, Inc

Task

1. Create exhibit showing the wash alignment through the commercial center and get this to David to pass along to Steve Sossaman for his approval
2. Verify if gravity channel bottom can be raised where it crosses the proposed Sossaman gravity sewer
3. Check ROW requirements on QCWC property
4. Provide TOG with proposed channel alignment through recharge site
5. Provide TOG and TOQC with the new topo files including what was recently added by Cooper Aerial near Higley Road

Flood Control District

1. Set up meeting with Steve Sossaman to discuss his future irrigation/facility needs
4. Provide Stanley with regional hydrology/flow
5. Keep current on Trilogy's progress on grading next to the wash
6. Set up visit to Riparian facility
7. Verify if TOG environmental society can accept in lieu fees

Town of Queen Creek

1. Check if the Town has record of any ALTA survey that documents the Ranchos Jardines lot that has encroached about 25 ft into the Sonoqui tract and check the Town's policy on adverse possession.
6. Provide Stanley with plans for the proposed sewer force main along Power Rd

Town of Gilbert crossings

1. Coordinate plans for the Higley and Recker Road
2. Coordinate plans for the water reclamation site and any associated utility work in the area

West

1. Provide estimate for maximum allowable velocities
-

Distribution: Shah, Frost, Schaner, Martinez, Frechette, Bergeson, Richards, Simpson-Colebank, Bix

MEETING NOTES

Date and Time: September 9, 2004 at 1:00

Place: Stanley Consultants

Project/Purpose: Sonoqui Wash Channelization Regular Monthly Coordination Meeting

Attendees: Raj Shah, Gary Maiers, Bob Stevens, Cathy Regester, David Martinez, Lonnie Frost
Scott Buchanan, Gary Freeman

Notes By: Scott Buchanan

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. Scott presented a preliminary draft of the right-of-way strip map Stanley prepared for the project. Scott brought up the issue of there not being any geometry that defines the north limit of the Marbella Vineyards subdivision. Apparently, neither AMEC (the original plat engineers) nor Carter-Burgess (current engineers) has defined any geometry that establishes the offset in the Ocotillo Road alignment going east from Higley Road. All there is available is an autocad line drawing with no geometry. The developer has not committed to any specific date by which they will start the plans and design for the north phase of Marbella Vineyards that would include this. All Stanley can do is approximate where their boundary and offset will be. If the final Carter-Burgess offset changes from this, it could leave the project either long or short of right-of-way. Stanley had assumed in their scope that this would already have been established by the time the project went to design. Stanley will take the lead and approximate the right-of-way and provide it to the project team and to Marbella Vineyard. Once agreed to by everyone, the right-of-way line will not change.
2. The Town of Queen Creek is still in the process of acquiring the proposed basin parcel at Sossaman and Chandler Heights Roads. The x-ray / radar analysis has been completed to investigate the presence of metal and broken glass and Queen Creek will be moving to the next step involving back hoe test pits as soon as they can get right-of-entry to do so. The Town of Queen Creek is also moving forward with buying the tract south Of Chandler Heights Road. David provided a copy of an ALTA survey for the Stage Stop basin parcel that had recently been completed.
3. Raj drafted a construction IGA for the project and submitted it to Gilbert and Queen Creek. Lonnie provided his preliminary review comments to Raj and said there will probably be additional comments to come from others at Gilbert. Raj

requested comments from Queen Creek. The District is targeting the January Board of Supervisors meeting to present the construction IGA for their approval.

4. The Town of Gilbert will be demolishing the house on the property they purchased for this project on the south side of Ocotillo Road half way between Higley and Recker Roads. This is scheduled for September 20, 2004. Gilbert is also moving ahead with acquisition of the three private properties east of the demolished house and is on schedule to have all of their acquisitions by May of 2005 in accordance with the draft construction IGA.
5. Stanley checked the channel alignment and right-of-way requirements adjacent to the property recently purchased by the Queen Creek Water Company north of Via del Jardin on the west side of the channel. The project limit on this side of the channel north of Via del Jardin generally follows the property line that generally follows the top of the bank. The existing wire fence on the west bank generally follows the property line. There may need to be some temporary construction easement along the west side of the channel north of Via del Jardin but it does not appear that any permanent right-of-way will be required from either the water company or the property south of the water company.
6. The exhibit that Stanley prepared for Steve Sossaman to sign that shows the alignment of the channel from Ocotillo Road to the third bend was delivered to David at the Town of Queen Creek the first week of August. David passed it along to Dick Schaner to give to Steve but it has not come back signed yet. Steve may be on vacation. David will find out the status.
7. The District will wait until 30% plans to meet with Steve Sossaman to discuss his irrigation needs and design for same per our project plans.
8. A field trip was conducted in August to the Town of Gilbert's recharge facility: the Riparian Preserve at Water Ranch located at the southeast corner of Guadalupe and Greenfield Roads. This facility is similar to the one planned by Gilbert at the northeast corner of Ocotillo and Higley Roads. The purpose of the field trip was to show the Corps of Engineers what the new recharge facility would be like in hopes of being able to use a portion of the new facility as part of the 404 mitigation plan for the Sonoqui Wash channel project. Present at the meeting was the Corps' reviewer, Sallie McGuire along with Lonnie Frost, Scott Anderson (director of the Riparian Institute that maintains the existing facility), Bob Stevens and Theresa Pinto. The field meeting went well and the Corps was impressed with the existing facility. The Corps was receptive to finding a way to accredit the Riparian Institute as an entity approved to receive in-lieu fees for mitigation and to count a portion of Gilbert's new recharge facility for mitigation lands. Gilbert is moving ahead with the design of the new recharge facility.
9. Bob has completed the Preconstruction Notification (PCN) package and will submit it to the Corps within the week. Copies of the PCN were provided to the Towns of Gilbert and Queen Creek. Scott asked if he could get a copy as well. Raj will get an extra copy to Stanley.

10. Gary stated that TBE is finalizing a proposal to complete the remaining five utility pothole investigations under their on-call contract and this work should be completed by the end of the month.

11. The District's hydrology staff has completed revisions to the regional hydrology for the channel design. The design discharge that's been used since the beginning of the project was 3200 cfs. With corrections to some of the sub-basin errors that were discovered in the upper Pinal County portion of the contributing area and the addition of the off-line detention basin at the Stage Stop Parcel, the design discharges have been reduced to a range of 1,850 cfs to 2,400 cfs. The existing condition discharge of 2,100 cfs that will be used for the CLOMR did not change. The starting concurrent condition hydraulic approach at the Sonoqui Wash channel confluence with the future improved Queen Creek Channel also did not change. The target volume for the new Stage Stop Basin will be approximately 25 ac-ft. The table below summarizes the channel design discharges that were agreed to in the meeting between Stanley and the District on August 26, 2004.

Sonoqui Wash Channelization
 Summary of Design Discharges – per 8/26/04 meeting

<u>Flow</u>	<u>Location</u>
2200 cfs	From upstream limit of project to downstream side of Stage Stop basin side weir
1850 cfs	From downstream side of Stage Stop basin side weir to future proposed local inflow channel just upstream of Sossaman Road
2100 cfs	From future proposed local inflow channel (above) to 100 ft upstream of Via del Jardin
2300 cfs	From 100 ft upstream of Via del Jardin to just upstream of Recker Road
2400 cfs	From just upstream of Recker Road to the confluence with Queen Creek

1. Stanley was able to raise the bottom of the channel in the preliminary hydraulic re-design based on the reduced discharge, generally about one foot. This will help reduce the excavation volume and provide needed clearance from the channel bottom to the top of the gravity sewer that Sunrise Engineering is designing for the Town of Queen Creek along Sossaman Road. David will have Sunrise Engineering send a print of their preliminary sewer plan and profile to Stanley. David will also see about getting a plan and profile to Stanley for the sewer that Hunter Engineering is designing for Grace Development along Power Road for the new Basha's store at the southwest corner of Chandler Heights and Power Roads.
2. MCDOT finished the Chandler Heights Road Bridge DCR. The project is not funded in their current CIP and it is not known if and when construction will take place. Raj will get a copy of the report to Stanley.
3. The Town of Gilbert is moving towards developing a scope of work for design of the bridge / culvert improvements at Higley Road along with the other associated utility and roadway improvements that they would like constructed at that location. Stanley Consultants has been selected to perform this design. Stanley recently completed a capital improvements study for the Higley Road Corridor from Chandler Heights Road to about ¾ mile north of Queen Creek Road. This study serves as the basis for the recommended design package at and adjacent to the Sonoqui Wash channel. The bridge / culvert design will be concurrent with the channel design so that both projects can be bid and constructed at the same time.

4. Next, there was a discussion about the drop structure that will be needed immediately upstream from the Higley Road bridge / culvert. According to the latest channel profile, the channel bottom needs to rise about 5 to 6 feet in grade upstream from Higley to return it to a more nominal, economical depth. Three options were discussed: a) a series of drops with a vertical maximum limit of 18" each for a total of 3 or 4 structures; b) a gradual drop over a distance of 100 to 200 feet that would necessitate a hard surface lining of the bottom and sides; c) a 10H : 1V sloping drop over a distance of 50 to 60 feet that would be hard surfaced on the bottom with buried armoring up the adjacent channel sides. Alternative c) was chosen as the best balance between cost, aesthetics and function. An equestrian ramp surfaced in earth could be incorporated in the sloping drop along one side of the channel. Or, alternatively, a pair of ramps, like a maintenance access road, could be incorporated into one side of the channel to allow equestrian traffic to bypass the sloping drop.
5. Scott asked if there was a specific preferred design discharge or return frequency desired for the combined low-flow culvert / dip crossings at Recker Road and at Sossaman Road. This was not established in the scope of work and is essentially up to Gilbert and Queen Creek. The project team decided that a reasonable target would be in the 200- to 500 cfs range for the culverts to pass without roadway overtopping and see what structures would be needed. The project team would then decide from somewhere in this range based on cost, function, aesthetics, etc.
6. The maximum desired side slope is still no steeper than 4H to 1V, even with the reduced channel design discharges. West still needs to verify what the maximum allowable design velocities will be based on the geotech results and see how this relates to the flow velocities with the preliminary revised hydraulic models. Based on Stanley's preliminary HEC-RAS, it appears that the reduced design discharge will help with the design through the narrowest part of the Ranchos Jardines tract. This reach contained a single cross section that was causing considerable problem where there was a very small isolated depression in one of the rear yards on the north side of the channel, possibly corresponding to an old local tributary channel. The freeboard requirement was very difficult to meet at that section. It was agreed by the project team that this local depression would be ignored and the grades along the north side of the channel tract (north project limit) would be used to evaluate the freeboard requirement. With this approach, it appeared that there was a good chance of the channel fitting in the narrow part of the Ranchos Jardines tract with a bottom width of 50 ft and 4H : 1V side slopes (and using the reduced design discharge). Even so, the fit would be tight. It appears that we can get by with some temporary construction easements and no permanent right-of-way takes.
7. Next, the channel re-design was discussed using the reduced discharge with regard to the aesthetic and multi-use objectives. If the reduced discharge allows the channel grade to be raised, it will be possible to reduce the channel bottom width or flatten the side slopes or use a rougher manning coefficient to reflect a greater level of landscaping (or a combination of all three). Or, should we be trying to keep the same bottom width, side slopes and roughness that we had before the discharge was reduced and use the shallower channel to create more buffer space from the top of bank to the project limit? The first option has the

potential benefit of increasing the amount, type and density of landscaping while creating a hydraulically less efficient channel that has lower flow velocities. The second option would better benefit the project's multi-use potential. The project team decided that the first option would be in the better interests of the project, primarily over concern about minimizing flow velocities that are already outside the maximum allowable range. The primary objective will be to minimize flow velocity with the reduced design discharge while providing at least the same amount of buffer area outside the channel that was present in the initial design presented to the public in June (prior to the reduction in design discharge).

8. Prior to the meeting, Scott discussed the upcoming design efforts with Jackie Keller of Logan Simpson Design and how the re-design would be coordinated with regard to the landscape and aesthetics input. It is still planned to hand the preliminary design off to LSD in two pieces – one upstream and one downstream from Power Road. The downstream reach will be handed off first. Scott will revise the project schedule and create new milestone dates related to design that will take us through the remainder of the project. Raj said that the project duration has been extended to the end of April, 2005, not including the FEMA review of the CLOMR.

9. The next regular monthly coordination meeting is tentatively scheduled for October 14th at the District. One of the objectives for this meeting will be to start planning for the second and last public involvement meeting.

Action Items:

Responsible Party and Task

Stanley Consultants, Inc:

1. Approximate the right-of-way limit adjacent to Marbella Vineyard and revise right-of-way strip map.
2. Revise project schedule.

Flood Control District:

1. Submit 404 PCN to Corps.
2. Get a copy of MCDOT's final Chandler Heights Bridge report to Stanley.

Town of Queen Creek:

1. Provide Stanley with plans for the proposed sewer force main along Power Rd and the proposed gravity sewer main along Sossaman Road.
2. Backhoe test pits on Stage Stop basin parcel.
3. Provide review comments to FCD re: draft construction IGA.
4. Confirm status of channel alignment exhibit with Steve Sossaman.

Town of Gilbert:

1. Finalize scope and contract for the design of the Higley Road bridge / culvert.
2. Provide review comments to FCD re: draft construction IGA.

West:

1. Provide revised estimate for maximum allowable channel velocities.

TBE:

1. Complete pothole proposal and remaining investigation.

Distribution: Shah, Frost, Schaner, Martinez, Frechette, Bergeson, Freeman, Simpson-Colebank, Bix

MEETING NOTES

Date and Time: October 14, 2004 at 1:00

Place: Logan Simpson Design

Project/Purpose: Sonoqui Wash Channelization Regular Monthly Coordination Meeting

Attendees: Raj Shah, Cathy Register, David Martinez, Lonnie Frost, Scott Buchanan, Elizabeth Kidd, Diane Simpson-Colebank, Jackie Keller, Jennifer Cleveland, Dennis Holcomb

Notes By: Scott Buchanan

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. Scott presented the status and overview of the hydraulic design for the channel and how this has changed with the reduction in discharge. There was still a concern with the capacity of the channel through the Ranchos Jardines subdivision in the narrowest part of that reach. The channel fits much better with the reduced discharge and it looks like there will be no need for right-of-way acquisition but the water surface is still not contained at river mile 1.66 and 1.67 on the north side.
2. Scott reviewed the status of preliminary hydraulic results and potential design configurations / alternatives regarding the Higley Road bridge. An alternatives package was being prepared for presentation to the Town of Gilbert council for their feedback at the council meeting on October 19th. Design alternatives include box culverts, con-arch or con-span structures, bridges spanning 40 feet and bridges spanning the entire top width of the channel.
3. Scott then reviewed the status and design issues associated with the other roadway crossings. Stanley's channel was designed to accommodate the future proposed Langley Ranch crossing at the half-mile point between Higley and Recker. The Recker Road crossing went through numerous design iterations with the biggest constraint being the roadway dip and it's proximity to the future Ocotillo Road intersection. The dip cannot be lowered enough to allow most of the flow to go over it. This crossing will require a bigger culvert (triple 8' x 5' concrete box) than originally scoped because a much larger proportion of flow must go under the road than over it. The Ocotillo crossing looks like a triple 12' x 8' concrete box will work hydraulically. One of these barrels could be made 10' high to accommodate equestrian or a 40' slab bridge could also work. Power Road is a temporary dip but the new channel alignment was presenting a

challenge because of its proximity to the existing channel and road dip. There may need to be as much as about 900' of roadway reconstructed to make this crossing meet design speed requirements. David asked if Stanley could make an exhibit showing the plan and profile for Power Road. The existing Via de Jardin dip is about 3.5' higher than the proposed channel profile but reconstructing it could present problems to existing driveways and access for properties on both side of the channel. Stanley will be looking at this dip in detail to determine if it can stay as-is or if it needs to be lowered to improve the water surface profile upstream. The channel profile at Sossaman Road looks like it will unavoidably conflict with the proposed sewer planned by the Town of Queen Creek. It looks like the water surface upstream from Sossaman will be higher than adjacent grade on the south side of the channel. We are trying to keep the road profile as high as possible to avoid conflict with adjacent improvements. In the next couple weeks, Stanley will be looking at Chandler Heights Road. If at all possible, we would like to end the channel at the north side of the road. If that will not lower the water surface and contain the floodplain upstream, we will next look into channelization upstream from the road and if that does not work, we will look at improving the existing dip or improving the dip and channelizing upstream.

4. The Town of Queen Creek is still moving ahead with buying the tract south Of Chandler Heights Road and the stage stop basin parcel. The appraisal of the stage stop parcel is moving along. Based in part on the results of initial testing, the town had some subsurface testing done and found an old landfill on the parcel. There was no hazardous material found. There are about 400 cubic yards estimated that will need to be excavated and hauled to a licensed landfill for disposal.
5. Raj said the initial appraisal for the sediment basin parcel (Finney property) would be done by the end of the month. The District was very concerned about the cost of the parcel being much higher than was originally expected. We need to determine how much volume is really needed to store on the property and maybe the project can get by without having to acquire the whole parcel. Raj requested that WEST look into this as soon as possible so we could define our project needs and move forward.
6. Stanley prepared an exhibit for Steve Sossaman to sign that shows the alignment of the channel from Ocotillo Road to the third bend. David was not sure if this was signed and will find out the status.
7. Next, the project team reviewed the preliminary layout of the channel alignment that LSD had done from Higley to Recker Road. The issue of alignment and project limits where the channel encroached into the Town of Gilbert's water recharge site were discussed and resolved. LSD will shift the channel alignment a little further south where it crosses Higley Road instead of going up to the limit of topographic coverage. This will still be consistent with what had been depicted to the PAAC and public in LSD's concept exhibit. Stanley had provided the preliminary channel layout to LSD from Higley to Power about a week prior to the meeting. Stanley handed off the next reach to LSD going up to Via de Jardin.

8. Bob Stevens completed the Preconstruction Notification (PCN) package and submitted it to the Corps. Raj still needs to get an extra copy of the PCN to Stanley.
9. MCDOT finished the Chandler Heights Road Bridge DCR. Raj will get a copy of the report to Stanley. MCDOT has scheduled a 40% design comment review / resolution meeting for later in the month. It would be good if Stanley and Queen Creek could attend this meeting.

Action Items:

Responsible Party and Task

Stanley Consultants, Inc:

3. Make an exhibit showing the proposed Power Road concept plan and profile.

Flood Control District:

3. Get a copy of the PCN to Stanley.
4. Get a copy of MCDOT's final Chandler Heights Bridge report to Stanley.

Town of Queen Creek:

5. Confirm status of channel alignment exhibit with Steve Sossaman.

Town of Gilbert:

3. Finalize scope and contract for the design of the Higley Road bridge / culvert.

Logan Simpson Design:

1. Complete the preliminary channel layout for the reach from Higley Road to Power Road.

West:

2. Provide revised estimate for sediment basin storage volume.

Distribution: Shah, Frost, Schaner, Martinez, Freeman, Simpson-Colebank

MEETING NOTES

Date and Time: October 22, 2004 at 9:30

Place: Town of Queen Creek

Project/Purpose: Sonoqui Wash Channelization October follow-up coordination meeting

Attendees: Raj Shah, Dick Schaner, David Martinez, Scott Buchanan

Notes By: Scott Buchanan

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. This was a follow-up coordination meeting the monthly coordination meeting of October 14th to discuss primarily the roadway crossings with the Town of Queen Creek. Dick asked if any of the roadways (Power, Via de Jardin, Sossaman or Chandler Heights) would meet current design speed standards. Scott responded that Stanley had not determined that yet. Dick stated that even in cases where we did not have to reconstruct an entire dip, we should at least know if the part that we might propose to leave as-is would meet current design standards.
2. Next, the posted speed limits were discussed. Scott had just completed a windshield survey of all the posted speed limits in the project area and will prepare an exhibit that shows what is current. All of the section line roads are posted at 45 mph except part of Recker which is 35 mph and Power Road from Ocotillo to Chandler Heights which is posted at 50 mph. Residential streets are generally posted at 25 mph. The design speed that will be used to evaluate whether a road meets current standards and that will be used for new design or reconstruction will be 5 mph over the posted speed.
3. Dick did not feel that the Recker Road Crossing could just be deleted from the project and the roadway dead-ended at the Sonoqui Wash channel. It's only a dirt road but it serves existing access and may be planned for future access of development south of the channel.
4. At Power Road, Dick suggested that we center the channel in 200' right-of-way and that we center the dip in the channel. He also suggested that we fill the existing dip instead of leaving it and match existing road grade just north of the dip. Currently the posted speed is 50 mph. Use design speed of 50 assuming future posted speed of 45 (same as Power north of Ocotillo). The Power Road right-of-way from Brooks Farm Road north to Ocotillo Road belongs to Queen

Creek and they can re-post the speed limit to 45 mph. Keep the fill slope on west side a minimum of 10 feet away from the Queen Creek Irrigation District pipe. Steve Sossaman will probably make the old channel available for fill to the contractor. Low flow pipes only need to be small, like 24", with no specific design discharge or return frequency.

5. Dick will ask the Queen Creek Mayor if dead-ending Via de Jardin is possible. If so, the issue would need to go public. Conceptually, it would be dead-ended just past the driveway on the east and at east side of intersection on west side. On west side, right-of-way would be abandoned to property owner on the south. We would need to maintain water / utility easement.
6. If we cannot count on dead-ending Via de Jardin, our first choice would be to leave the existing dip alone. The existing dip is about 3.5 feet above our channel flow line. If we do need to reconstruct Via de Jardin and lower it, lower it only as little as necessary to meet hydraulic objectives. If reconstruction is necessary, we could potentially straighten the alignment out. If it helps upstream in narrowest part of Ranchos Jardines (river mile 166 – 167), use the full effective flow width of the tract upstream of Via de Jardin. If we need low flow pipes, they only need to be small diameter, like 24", with no specific design discharge or return frequency.
7. At the narrowest part of Ranchos Jardines, we have a 50' wide channel bottom, \pm 3.7 to 1 side slopes and a 0.2% channel slope. This nets us about 20 feet total from top of channel to property lines on each side. This channel configuration looks okay for all Via de Jardin and "n" value scenarios. However, our computed water surface is outside of the north project limit at river miles 166 and 167 no matter what we do at the Via de Jardin dip. The water surface is outside the project even if we lower the dip all the way down to the channel bottom, use all the effective flow area and use an "n" of 0.025. We will probably not meet freeboard requirements in any scenario at those stations. At this location, our design discharge and existing condition discharge are virtually the same. Can we look the other way regarding either containment or freeboard at these stations? If so, we would not be meeting our original project objectives.
8. There are two potential structural alternatives to consider at the above location. One alternative would be to fill parts of two back yards on the north side at these river stations to above a 1358 foot elevation to contain the flow. The other alternative would be to construct a flap gate within the project limit at the mouth of the little offsite tributary channel that is causing the problem. Would this meet FEMA's requirements?
9. Scott asked in general, should we leave the areas outside the channel in the wider reaches of the Ranchos Jardines tract as-is or regrade them? It was decided that we should re-grade and fill as necessary for hydraulic purposes. We should leave it alone if it helps us lower water surface profile at critical reaches. And we should get input from LSD if it should be regarded to provide aesthetic and multi-use continuity.
10. Dick / David will research the site plan for the Ranchos Jardines Irrigation District (RJID) parcel. Dick recalls there is sizable drainage easement called out on site

plan. If so, we can use that corner (southwest corner) of their parcel for our project. Question: was that easement ever recorded? The southwest corner of RJID parcel is not needed by them to serve any retention/open space needs. Would it help us to widen the channel adjacent to RJID parcel (wider bottom or flatter side slopes) to achieve a lower water surface at the Sossaman Road crossing?

11. At Sossaman Road we should raise the channel and road profile another foot if possible from where it is right now. We can stand a water surface upstream from Sossaman of 1367 feet if necessary. We'll fill in along south bank for $\pm 100'$ to the south up to above a 1367 foot elevation so this does not look like a levee to FEMA. For freeboard, use a minimum standard there of existing condition discharge with no (or little) freeboard. Fill concept needs to be just enough to convince FEMA that it's not a levee. This concept will not change any existing drainage patterns.
12. Even if we raise the profiles up as described above, we're going to unavoidably hit the future sewer that the Town of Queen Creek has Sunrise Engineering designing along Sossaman. We're nowhere close to avoiding this. Dick concluded that a lift station will likely be needed just south of the channel just east of Sossaman Road.
13. Stanley needs to sketch a typical roadway section for Sossaman Road and submit it to Dick. There will be two 12' travel lanes, a 14' center turn lane, two 5' bike lanes, super elevation at the curve, 50 mph design speed, 6" vertical curb and gutter on at least the east side, extend the existing 5' sidewalk south on east side. There will probably be an equestrian trail along west side of Sossaman. Our project will only replace in-kind roadway but our design needs to accommodate future typical section. Our typical design section (when approved) will apply within our channel right-of-way. The necessary taper/flair to future 5-lane configuration north of our project will take place north of our project. Existing painted median of 3-lane configuration north of channel tapers to no painted median and two lanes only at dip.
14. At Chandler Heights, the following options were discussed per the recent change order scope of work. Our first choice is to only extent the channel upstream to the north side of Chandler Heights and not reconstruct the existing dip or channelize upstream. If this does not meet our hydraulic objectives, we'll first try grading upstream only without touching the dip. If this does not work, we'll look at both grading upstream and reconstructing the dip. If the dip must be reconstructed, we'll look at widening it first, then lowering it, then a combination of widening and lowering, if necessary. In all cases, we'll only do the minimum necessary to meet our hydraulic goals. We are using a slightly different alignment than MCDOT used to reduce the skew angle but our alignment crosses Chandler Heights at the same MCDOT station.

Action Items:

Responsible Party and Task

Stanley Consultants, Inc:

4. Continue hydraulic modeling to address the issues discussed above.

5. Sketch a typical roadway section for Sossaman Road.
6. Prepare a figure that shows the existing posted speed limits in the project area.

Town of Queen Creek:

6. Find out if Via de Jardin can be dead-ended at Sonoqui Wash.
 7. Research the Ranchos Jardines Irrigation District drainage easement.
-

Distribution: Shah, Frost, Schaner, Martinez, Simpson-Colebank

MEETING NOTES

Date and Time: November 15, 2004 at 1:00

Place: LSD Offices

Project/Purpose: Sonoqui Wash Channelization Regular Coordination Meeting

Attendees: Raj Shah, Dennis Holcomb, Bob Stevens, David Martinez, Scott Buchanan, Elizabeth Kidd, Diane Simpson-Colebank, Jackie Keller, Jennifer Cleveland, Gary Freeman

Notes By: Elizabeth Kidd, Scott Buchanan

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. The team discussed the sediment basin parcel requirements. With the new channel design, it was anticipated that there would be less sediment conveyed to the basin. According to West's initial analysis, most of the sediment will drop out in the first half of the basin as currently designed. The basin can potentially be narrowed but probably does not want to be eliminated. Raj will look into the alternative of increasing the size of the Queen Creek sediment basin near the EMF and decreasing or eliminating the Sonoqui basin. WEST Consultants needs to complete their sediment analysis so we can figure out what is the minimum required sediment basin configuration. Lonnie expressed concern over the need for the FCD to help with sediment removal maintenance of the basin. Maintenance responsibilities need to be clarified in the IGA. Lonnie questioned the basis for sediment basin parcel appraisal and why the floodplain ends at Higley Road. Raj will also see about extending the floodplain study beyond Higley Road.
2. There is currently 33' of ROW along Ocotillo Road west of Higley Road. Lonnie said that the Town of Gilbert's current ROW requirement for Ocotillo is 70' half width of ROW and this is what the Town would require Finney to dedicate when that property develops. It should be clarified that the Ocotillo Road ROW from Higley to Power is still 110 ft total width because this was established at the beginning of the project. Scott said that Stanley has not performed any detailed horizontal geometry for the Ocotillo ROW. The alignment adjacent to Marbella Vineyards is only an approximate representation based on a preliminary plat from the Marbella consultant. The horizontal alignment where Ocotillo Road crosses the Sonoqui Channel west of Power Road is also only a concept level alignment. Stanley only conducted a hydraulic analysis for the future culvert / bridge crossing in relation to the channel and did not do any detailed analysis of the roadway geometrics or ROW for Ocotillo Road. Raj agreed that detailed analysis was not in Stanley's scope.

3. Goodwin and Marshall has not responded to Stanley's request for input on the channel design at the new location where they will have a future roadway crossing. Lonnie provided a copy of The Bridges (formerly Langley Ranch) Zoning Amendment showing the layout of the Bridges development. Stanley will proceed with the channel design adjacent to their project. Stanley will move the drop to upstream of the future "Bridges" road crossing at a quarter mile west of Recker. Stanley will hold LSD's top and toe of channel through this area as close to the north side of the channel as possible, like at Recker Road.
4. There will be a decomposed granite path along the north side of the project adjacent to the Town of Gilbert recharge property. The Bridges project shows what appear to be private drives that end at the Sonoqui north ROW line. These could serve as access points from the Bridges to the Sonoqui corridor but it was not known if this was the intent of the Bridges development. At this point, no trail or trail connection will be provided to the Bridges by the Sonoqui project. However, residents of the Bridges could still access the Sonoqui project. A 10 foot wide, more or less level corridor will be reserved along the north side of the project adjacent to Bridges and Power Ranch (Trilogy) to provide for maintenance access.
5. Stanley will prepare a preliminary cost estimate for the triple barrel box culvert at Recker Road and a hypothetical low flow culvert that would have been constructed based on the initial scope of work design concept. This cost estimate would serve as the basis for establishing cost sharing between the Town of Gilbert and the District.
6. The Town of Gilbert is in the process of acquiring the ROW needed for the project. The house on the property closest to the wash on the south side between Higley and Recker has been moved and the site is clear.
7. Raj has received initial review comments on the construction IGA from the Town of Gilbert. No comments have been received from the Town of Queen Creek yet. The District would like to finalize the construction IGA and send it to the Board of Supervisors in January '05.
8. The issue of whether to grade the overbank area outside of the channel was discussed. This issue applies mainly in wider parts of the Ranchos Jardines tract where there is existing vegetation like creosote bush and mesquite. There are areas where re-grading is not necessary for hydraulic purposes and the re-grading would only be for aesthetic continuity. But re-grading would require removing existing vegetation. This may create negative public perception since it may be some time before the graded areas are re-landscaped. Dennis suggested using "tall pot" plants along the project in areas where existing vegetation will be disturbed. Tall pot plants are produced by starting seedlings in a clear plastic tube and special soil mix. These plants have shown a very rapid growth rate on other projects. Right now there is no budget in the project for any landscaping. The project team will need to carefully consider what areas really need to be re-graded for other than hydraulic purposes when the project gets to the 60 % design stage.

9. The proposed grade needs to match existing grades within project limits and the grades need to drain back into channel. Mounds that elevate along perimeter fences or walls will not be allowed for privacy and security reasons.
10. Different weir options were discussed at the proposed stage stop basin parcel. The proposed weir is estimated to be approximately 300' long and will need to be a hardened structure. Scott explained to the landscape architects in attendance the need for the weir and adjacent channel to be straight and uniform. The LA's believed Scott's explanation to be engineering poo and challenged that the weir could be curvy and non-uniform. Scott viewed this suggestion as hydraulic anarchy and attempted to reinforce his straight and uniform position. A rumble nearly broke out between opposing sides. Dennis suggested breaking the weir up into sections and that the team should look at a curved weir that was built in Ahwatukee located in a park off of Ray Road. Jackie suggested at least meandering the back of the weir and "sculpting" it to fit the theme of the project if the front of the weir did, in fact, need to be straight. Scott listened politely all the time thinking to himself that the universe was somehow turning upside down. The meeting ended in deadlock with the curvy and straight factions both feeling they had scored major victories against the other. More on this later.
11. The next coordination meeting is scheduled for Dec 9th at 1:00.

Action Items:

<u>Responsible Party</u>	<u>Task</u>
Stanley Consultants, Inc	<ol style="list-style-type: none"> 1. Prepare cost estimate for Recker Road culvert options 2. Reconfigure the channel at the Bridges crossing
Flood Control District	<ol style="list-style-type: none"> 1. See if floodplain study can be extended past Higley Road 2. Determine if Queen Creek basin can be used and reduce / eliminate the Sonoqui basin
Town of Queen Creek	<ol style="list-style-type: none"> 1. Confirm status of channel alignment exhibit w / Steve Sossaman 2. Return comments on construction IGA to District
Town of Gilbert improvements	<ol style="list-style-type: none"> 1. Finalize scope and contract for Higley Rd Bridge
West	<ol style="list-style-type: none"> 1. Determine minimum size of sediment basin

Distribution: Shah, Frost, Schaner, Martinez, Richards, Simpson-Colebank

MEETING NOTES

Date and Time: December 9, 2004 at 1:00

Place: FCD Offices

Project/Purpose: Sonoqui Wash Channelization Regular Coordination Meeting

Attendees: Raj Shah, Dennis Holcomb, David Martinez, Scott Buchanan, Elizabeth Kidd, Jackie Keller, Gary Maiers

Notes By: Elizabeth Kidd

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

1. SRP is putting in 69 kv lines along Ocotillo Road. Dick thinks these lines are planned for the north side of the road. SRP is having a public meeting tonight and someone from the District will try to stop by and pick up the project handouts. The District needs to get right of way for the Sonoqui Wash project before SRP does. Raj will set up a meeting with adjacent land owners to let them know what the District needs for their project. A multi jurisdictional wastewater treatment plant is planned along the south side of Ocotillo Rd near the house that was removed.
2. TBE needs to submit a report for the work done along the project corridor. Raj will set up a utility coordination meeting at the beginning of the year. Stanley should check MCDOT's 40% plans for any unknown utilities along Chandler Heights Road. Stanley will send a list of utility contacts to Raj and Gary. Pdf images or the 30% plans need to be but on the Districts ftp site a couple weeks prior to the utility coordination meeting.
3. The District has submitted an offer to buy the entire Finney parcel even though only part of it is needed for the improvements. The remainder parcel will be sold after the project is constructed. A 60 ft wide channel will work as a sediment basin according to WEST's analysis. The project team will minimize the footprint of the channel through the Finney property.
4. 30% plans are progressing. Stanley is currently in their second round of pickup survey. Crews are picking up and identifying trees greater than 6 inches in diameter. An exhibit showing removals is needed for the next public meeting. December 23rd is the anticipated submittal date for 30% plans. The District wants to do the channel improvements all at once rather than doing channel

improvements with Higley Road. The District has a meeting set up with the Town of Gilbert on December 17th to discuss this issue.

5. Stanley presented design issues at Ocotillo Road. Stanley will assume a 10 ft high culvert in the 30% design model. The structure selection report will state 10 ft is the minimum height and 12 ft is preferred. The District would also like to see a typical section showing the channel invert. Stanley is putting together three exhibits for the Town of Queen Creek at Via del Jardin to show the three different channel options. Stanley has a working profile design at Sossaman Road but still needs comments from the Town of Queen Creek. The Chandler Heights dip crossing needs to be widened to the west by about 75 ft with some relatively minor grading south of the road to prevent breakouts upstream. The future bridge will also work at Chandler Heights Road. MCDOT has not progressed their bridge design.
6. Stanley is putting together a manhour estimate for the maps and legals needed for the project. Stanley will wait for a signed copy of the Sossaman farms alignment exhibit before starting the maps and legals. Stanley will verify that they have all of the title reports needed to do maps and legals. A map and legal would also be needed for the Ranchos Jardines Irrigation District property.
7. The stage stop parcel is in negotiations. The District requested a copy of the environmental report done for the parcel. Acquisition of the property south of Chandler Heights is in progress as well. Raj will call Lonnie to verify the status of the Town of Gilberts acquisitions.
8. The Entellus CLOMR is in review at FEMA.
9. The next coordination meeting is scheduled for the second week in January.

Action Items:

Responsible Party

Stanley Consultants, Inc

Task

1. 30% plan submittal
2. Send utility contact list to the District
3. Verify they have title report for parcels needing maps and legals

Flood Control District

1. Set up meeting w / adjacent land owners to discuss ROW needs
2. Set up utility coordination meeting
3. Call Lonnie to check status of property acquisitions

Town of Queen Creek

1. Confirm status of channel alignment exhibit w / Steve Sossaman
5. Return comments on construction IGA to District
6. Provide feedback on Sossaman Road design
7. Provide copy of Environmental report for CH basin

parcel to District

Town of Gilbert
improvements

1. Finalize scope and contract for Higley Rd Bridge

West

sediment basin

1. Determine minimum size of

TBE

along project

1. Provide report for all potholes

Distribution: Shah, Frost, Schaner, Martinez, Richards, Simpson-Colebank

ACTION ITEMS

Date and Time: January 12, 2005 at 1:00

Place: FCD Offices

Project/Purpose: Sonoqui Wash Channelization Regular Coordination Meeting

Attendees:

Notes By:

The following meeting notes set forth our understanding of the discussions and decisions made at this meeting. If you have a questions, additions, or comments, please contact the writer immediately. If we do not hear from you, we will assume that our understandings are the same. We are proceeding based on the contents of these meeting notes.

Action Items:

<u>Responsible Party</u>	<u>Task</u>
Stanley Consultants, Inc	<ol style="list-style-type: none">1. Revise Schedule2. Develop list of issues to be resolved3. Submit cost estimate for parcels needing maps and legals4. Finish Via Del Jardin exhibits
Flood Control District	<ol style="list-style-type: none">1. Set up utility coordination meeting2. Set up utility coordination meeting
Town of Queen Creek	<ol style="list-style-type: none">1. Confirm status of channel alignment exhibit w / Steve Sossaman8. Return comments on construction IGA to District9. Provide copy of Environmental report for CH basin parcel to District10. Check availability of Town Hall for second Public Meeting
West	<ol style="list-style-type: none">1. Determine minimum size of sediment basin
TBE	<ol style="list-style-type: none">1. Provide report for all potholes along project

Distribution: Shah, Frost, Schaner, Martinez, Richards, Simpson-Colebank

Sonoqui Wash Channelization

Coordination Meeting Agenda

March 10, 2005

1:00 PM @ Flood Control District

- 1.0 Previous action items
- 2.0 Status and overview of 60% plan production
- 3.0 Status of Higley Road Bridge / Higley Road improvements
- 4.0 Status and design issues for other roadway crossings:
 - a. Future Bridges (Langley Ranch) access
 - b. Recker Road
 - c. Ocotillo Road
 - d. Power Road
 - e. Via del Jardin
 - f. Sossaman Road
 - g. Chandler Heights Road dip
 - h. Chandler Heights Road bridge (MCDOT)
- 5.0 Status of pre-design tasks
 - a. Survey report
 - b. Base mapping / mylars / remaining survey
 - c. Title reports, maps and legal descriptions
- 6.0 Status of property acquisition
 - a. Stage stop basin parcel
 - b. Channel parcel south of Chandler Heights Road
 - c. Ranchos Jardines Irrigation District parcel
 - d. Gilbert acquisitions and dedications
- 7.0 Sediment basin design and property (Finney) acquisition
- 8.0 Status of construction IGA
- 9.0 Status of CLOMR and Entellus floodplain study
- 10.0 Queen Creek Wash flood damage
- 11.0 Bank protection for Sonoqui channel
- 12.0 Second public involvement meeting
- 13.0 Other items

B.4 General Correspondence

No significant general correspondence.

B.5 Contract Documents



SCOPE OF WORK

JULY 14, 2003

CONTRACT FCD 2002C037

SONOQUI WASH CHANNELIZATION

From

QUEEN CREEK WASH TO CHANDLER HEIGHTS ROAD

EXHIBIT A

GENERAL SCOPE OF WORK

CONTRACT FCD 2002C037

SONOQUI WASH CHANNELIZATION

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- 18.0 DIGITAL ORTHOPHOTOS
- 19.0 DESIGN REFERENCES, SPECIFICATIONS AND STANDARDS

D LANDSCAPE

20.0 LANDSCAPE PLANNING AND DESIGN

A PROJECT DESCRIPTION

1.0 GENERAL DESCRIPTION

Goal of the project: The Sonoqui Wash Floodplain Delineation Study from Higley Road to Riggs Road indicated that significant ponding and breakouts of flood flows occur along the wash. Results from the Queen Creek & Sanokai Wash Hydraulic Master Plan for Queen Creek and Sonoqui Washes indicate that the most feasible solution to contain breakouts from Sonoqui Wash is to increase the cross section of the wash to contain the 100-year flood flows.

The purpose of this project is to design, construct, operate and maintain a conveyance channel, including a sedimentation basin, capable of containing a 100-year storm event within the existing natural alignment of the wash upstream from the Queen Creek Channel for a length of approximately 3.50 miles. The scope of work shall include a pre-design study to determine the exact alignment of the Sonoqui Wash Channel and location of the upstream limit of the project.

The scope of work shall include the preparation of a general master plan for landscaping and recreational improvements to the channel and sediment basin. This plan shall be based on the Towns of Gilbert and Queen Creek existing General Plans and Design Guidelines. Input from the towns will be critical to the development of this plan.

2.0 PURPOSE

The purpose of this contract is to prepare plans, special provisions and engineer's estimates for the construction of the Sonoqui Wash Channelization from Approximately Chandler Heights Road to the confluence with Queen Creek.

3.0 LOCATION

The project is located within the Towns of Gilbert and Queen Creek and unincorporated Maricopa County. The 3.5-mile wash parallels the Ocotillo Road alignment from Power Road to the confluence with Queen Creek. From Chandler Heights Road to Power Road the channel flows in a northwesterly direction.

4.0 AGENCIES

The DISTRICT will be the lead agency. The Towns of Gilbert and Queen Creek are project partners contributing 50% of the project cost. The Towns of Gilbert and Queen Creek shall review the 30%, 60%, 90% and final plan submittals. The towns shall review and comment on or approve the project plans within three weeks of submittal.

5.0 CONTRACT TIME

The contract shall be completed within 59 weeks from the Notice to Proceed date for final deliverables for plans and specifications, and within 68 weeks from the Notice to Proceed date for final deliverables for the CLOMR.

6.0 REFERENCE MATERIAL

Queen Creek /Sanokai Wash Hydraulic Master Plan, Prepared by Huitt-Zollars,
Dated September, 2000.

Sanokai Wash Floodplain Delineation Study (FDS), Prepared by Entellus, -
Dated 1999.

Queen Creek Area Drainage Master Study (ADMS), Prepared by Wood &
Associates, Dated 1991.

The downstream project limits will tie into the Queen Creek Wash improvements designed as part of the Chandler Heights EMF Mitigation Basin design. Preliminary channel section, line and grade for the Sonoqui Wash Channel as prepared by the basin consultant will be used as the basis of this tie.

A preliminary plan for a sedimentation basin for the Sonoqui Wash Channel located on the west side of Higley Road, prepared by the basin consultant, will be used as a guide in development of any such basin for this project.

B SCHEDULE

1.0 KICK OFF MEETING1 weeks from NTP

2.0 DESIGN

2.1 Pre-design Submittal.....27 weeks from NTP

2.2 Pre-design Review Meeting.....30 weeks from NTP

2.3 30% Design Submittal29 weeks from NTP

2.4 Value Engineering Meeting.....32 weeks from NTP

2.5 30% Design Review Meeting33 weeks from NTP

2.6 60% Design Submittal40 weeks from NTP

2.7 Constructability Analysis43 weeks from NTP

2.8 60% Design Review Meeting44 weeks from NTP

2.9 90% Design Submittal.....50 weeks from NTP

2.10 90% Design Review Meeting53 weeks from NTP

2.11 100% Submittal 56 weeks from NTP

2.12 Final Review Meeting57 weeks from NTP

3.0 FINAL DESIGN, PLANS AND SPECIFICATIONS DELIVERABLES.....59 weeks from NTP

4.0 CLOMR SUBMITTAL

4.1 CLOMR Data Submittal.....48 weeks from NTP

4.2 CLOMR Data Review Meeting.....52 weeks from NTP

4.3 FCD Submit CLOMR to FEMA.....55 weeks from NTP

4.4 FEMA CLOMR Review Complete63 weeks from NTP

4.5 Response to FEMA CLOMR Review68 weeks from NTP

C CONSULTANT SERVICES

Except as otherwise amended in this scope of work, completion of this CONSULTANT service contract shall be in accordance with the Flood Control District of Maricopa County’s “Consultant Guidelines,” dated April 15, 2003, or the latest revision.

1.0 GENERAL PROVISIONS

2.0 SCHEDULE AND PROJECT COORDINATION

2.4 MEETINGS - PROJECT COORDINATION

The CONSULTANT shall hold bi-weekly or monthly project coordination meetings and other meetings as necessary, with stakeholders invited as required.

3.0 SURVEY, PHOTOGRAMMETRY, AND MAPPING

Add the following:

The CONSULTANT shall provide topographic mapping at 1-foot contours for the length of the project. The topographic mapping shall extend 400-feet on each side of the centerline of the proposed channel.

If the CONSULTANT chooses to use aerial mapping to produce the topographic map, the CONSULTANT shall provide digital and hard copies of the aerial photos to the DISTRICT. The submittal shall include the original scale of the mapping, the date of the flight and a plate index of the mapping. The digital version shall be in TIF format.

4.0 DATA DELIVERY STANDARDS

Replace the first sentence with:

The CONSULTANT shall use CAD FORMAT for data deliverables.

4.2 CAD FORMAT

4.2.1 Delete the first paragraph and replace with:

CONSULTANT shall follow the CADD standards and shall deliver digital data in Micro Station Version 7.1 or newer per the following specs book: "Data Delivery Specifications: Computer Aided Drafting & Design REV 1.0 January 2000" Flood Control District of Maricopa County, latest edition. And, in accordance with Tables 4.2.2, 4.2.3, 4.2.4.

5.0 PUBLIC INVOLVEMENT

Replace Section 5.0 PUBLIC INVOLVEMENT with the following:

5.1 PUBLIC MEETINGS

Add to this Section the Following:

PURPOSE

The CONSULTANT shall conduct two (2) public meetings for the project, in areas near the project site, at the Pre-design and 60% submittals of the project.

5.1.1 **Optional Task** – The CONSULTANT may be asked to provide up to ten exhibits for each of the two (2) public meetings, which shall include color exhibits depicting the landscape theme, multi-use considerations, typical cross sections and project schedule. **This optional task is not authorized with the Notice to Proceed; it may be authorized in writing by the DISTRICT**

based upon specific need as determined by the DISTRICT during the contract period.

The CONSULTANT shall be responsible for providing materials for other project scope task items (design plans, landscape aesthetic information) may also be necessary to provide information at public meetings. The CONSULTANT shall provide refreshments for the public meetings.

The CONSULTANT shall provide to the DISTRICT electronic copies of public meeting exhibits for the DISTRICT's use in posting on the DISTRICT's web site. Additionally, the CONSULTANT shall provide an 8.5" X 11" project fact sheet from which the DISTRICT can make copies for the public meetings.

The CONSULTANT shall be responsible for securing the meeting location. The meetings may be open-house type or may include a presentation. The CONSULTANT shall attend the public meetings to provide information to the public and/or to make presentations as necessary. The CONSULTANT shall maintain a sign up sheet and prepare minutes of the public meeting, including comments from the public.

The CONSULTANT shall ensure that the public meetings do not conflict with other relevant council meetings, board meetings, or community interest meetings. The CONSULTANT shall advertise the public meetings in local newspapers. The CONSULTANT shall place an advertisement two weeks and one week prior to each public meeting in the East Valley Tribune and Gilbert Independent. The advertisements will be equivalent to a two (2)-column by 8-inch notice.

All presentation materials, information sheets, public notices and electronic information shall be provided in accordance with the DISTRICT's "Public Involvement and Public Information Guidelines" dated July 1, 2002.

6.0 RIGHTS-OF-WAY AND EASEMENTS

- 6.1.1 Add to this section the following: The DISTRICT will acquire rights-of-entry for site investigations including geotechnical investigations.
- 6.1.2 The CONSULTANT will identify parcels that may be affected by the project so that the District can order title reports.
- 6.4 Replace this section with the following: The CONSULTANT shall identify and dimension the rights-of-way and easements required for the project features on the 30% plans, and tie the rights-of-way into section surveys. The project rights-of-way that have been identified by the DISTRICT for acquisition shall also be indicated on the project plans. If dimensioning and tying the rights-of-way on the plans is not possible due to space limitations, the CONSULTANT shall provide this information on a separate plan or exhibit.

- 6.5 Add to this section the following: The CONSULTANT shall identify any temporary construction easements required to complete the project, and dimension these limits on the 30% plans, with ties to existing monumentation.

Add the following section:

6.6 Section Survey

The Maricopa County GDACS (Geodetic Densification and Cadastral Survey) shall be used for the Section Survey. The DISTRICT shall provide the information. The CONSULTANT may be required to provide limited field verification to tie existing monumentation, which is used to describe parcels for rights-of-way acquisition, to the GDACS.

Add the following section:

6.7 Project Control Survey

6.7.1 CONSULTANT shall prepare a separate geometric sheet showing section lines, project control survey centerline, proposed right-of-way and approximate property lines affected by the project based upon available assessors information. The approximate property lines will not be annotated, however the book/map/page information from the assessors information will be provided. The Geometric sheet shall be made a part of the design plans and the items shown on the Geometric sheet shall also be shown on the design plans.

6.7.2 The project control survey centerline and proposed right-of-way lines shall be tied to the Maricopa County GDACS. Where the project control survey centerline and proposed right-of-way lines intersect with a section or mid-section line, a bearing and distance tie to the nearest section, quarter section and center section, shall be shown in both directions.

6.7.3 All elements required shall be clearly annotated and labeled. A legend and line and curve tables may be used. Curves shall include the delta angle, radius and arc-length. Local Tangent bearings shall be annotated for non-tangent curves.

Add the following section:

6.8 Right-of-way Deliverables

6.8.1 Field verification of GDACS section survey data and location of monuments for review on or before 30% submittal.

6.8.2 Field notes of section survey.

- 6.8.3 Electronic DGN file of the geometric sheet, showing the entire project in one file (not broken into sheets), at each submittal.
- 6.8.5 The right-of-way plan sheet shall be provided as a "strip map" at 1" = 200' scale.

7.0 ENVIRONMENTAL REQUIREMENTS

Delete this section and replace it with the following:

If Jurisdictional Delineation, Hazardous Materials, Historic Property and/or Biological Survey investigation or documentation is required for the Project; the DISTRICT shall perform this work. The CONSULTANT shall be required to provide information regarding the Project that would otherwise be generated in the design of the Project, to assist in the performance of this work. Generally, these will include reports, data and drawings that can be referenced by appendix in the documents prepared by the DISTRICT. The CONSULTANT shall provide the alternative analysis of the configuration and alignment of the Sonoqui Wash Channel for the 404 permit. The DISTRICT shall obtain the permit. **The Alternatives Analysis shall be in accordance with 404 B.1 Checklist.**

8.0 GEOTECHNICAL INVESTIGATION

8.2 LAB TEST

8.2.3 Add the following to this section:

Include a minimum of four (4) agronomy tests along the length of the proposed channel improvements.

9.0 HYDROLOGY

Add to this section the following:

A hydrologic model has been prepared as part of the Sanokai Wash Floodplain Delineation Study (FDS), Prepared by Entellus - Dated 1999. This model was updated and modified slightly in the Queen Creek/ Sanokai Wash Hydraulic Master Plan (HMP) Prepared by Huitt-Zollars, Dated 2000. The Huitt-Zollars model shall be provided to the CONSULTANT for use as the hydrologic basis for design of the project.

The CONSULTANT shall use the Huitt-Zollars future completely developed land use condition model as the basis for the hydraulic design of channelization improvements.

The CONSULTANT shall use the Huitt-Zollars existing condition model as the basis for the floodplain delineation study and Conditional Letter of Map Revision (CLOMR) as described in Section 11 of this Scope of Work. The CONSULTANT shall create a 10-year return frequency model from the Huitt-Zollars future condition model for use in the sediment transport and channel stability design.

The CONSULTANT shall investigate the need to provide for irrigation tail water from adjacent farming operations. Irrigation tail water may need to be accommodated within the Sonoqui Wash Channel for an interim period after channelization improvements have been performed until such time that the adjacent agricultural land is developed.

9.7 MEETINGS

Delete this section, and replace with the following:

One meeting shall be held with DISTRICT staff to review the completed hydrologic model and assumptions. The CONSULTANT shall include field meetings to verify hydrological model and side drainage assumptions (minimum of three).

9.8 REVIEW AND APPROVAL

Delete this section, and replace with the following:

It is anticipated that the CONSULTANT will obtain approval from the DISTRICT at the review meeting for the hydrologic model and assumptions.

9.9 THE HYDROLOGIC REPORT

9.9.1 Delete this section and replace with the following:

The findings of the hydrologic study will be presented in the Design Data Report. No separate hydrology report is necessary.

10 HYDRAULICS

Add to this section the following:

The CONSULTANT shall produce a new model using the Queen Creek/ Sanokai Wash HMP and the new mapping as the basis of the hydraulic design. The Queen Creek/ Sanokai Wash HMP, prepared by Huitt Zollars, model shall be provided to the CONSULTANT for use in this design.

Hydraulics shall be provided within the project limits and shall extend upstream and downstream as required to ensure proper function of the Project improvements and the future planned channel improvements.

The CONSULTANT shall run the profiles for the future conditions for the Project design (a separate profile shall be run for the existing conditions for the CLOMR).

The CONSULTANT shall include a structure selection report for the following crossings: Higley Road, Ocotillo Road, and Power Road. The purpose is to provide hydraulic modeling information to design the channel section at the road crossings. The CONSULTANT will not be tasked to provide complete plans and specifications for these structures under this contract.

Recker Road, Sossaman Road, and Via Del Jardin shall be designed as low flow crossings. The CONSULTANT shall provide complete plans and specifications for these structures under this contract.

The CONSULTANT shall coordinate the hydraulic models with Maricopa County Department of Transportation (MCDOT) who is currently designing a bridge crossing at Chandler Heights Road.

11 FLOODPLAIN DELINEATION STUDIES

Delete this section, and replace with the following:

The CONSULTANT shall generate the CLOMR technical data notebook for the Project, per the ADWR State Standards Attachment 1-97 (SSA1-97) using the ADWR/FEMA Submittals outline. The CLOMR package will include, but not be limited to the existing hydrology, the hydraulic analysis (including cross-section identification), new floodway/floodplain delineation, and FEMA forms and other miscellaneous information as necessary. The CONSULTANT shall run the profiles for the existing conditions for the CLOMR (a separate profile shall be run for the future conditions for the Project design). The CLOMR package shall be submitted to the DISTRICT with the 90% submittal.

The DISTRICT will take the lead to submit the CLOMR information to FEMA. The CONSULTANT shall make corrections to the CLOMR technical data notebook, and hydraulic models as deemed necessary by FEMA.

12 PLANNING STUDIES

Delete this section.

13 PRE-DESIGN STUDY

Only Section 13.5 CLOMR requirements are excluded.

14 FINAL DESIGN AND CONSTRUCTION DOCUMENTS

14.1.1 TRAFFIC

14.1.1.1 Add the following to this section:

Optional Task - The CONSULTANT may be asked to design and to develop and prepare plan and profile sheets for roadway improvements for at-grade crossings of Higley Road, Ocotillo Road, and Power Road. **This optional task is not authorized with the Notice to Proceed; it may be authorized in writing by the DISTRICT based upon specific need as determined by the DISTRICT during the contract period.**

Optional Task - The CONSULTANT may be asked to design and to develop and prepare signing and striping plans for roadway improvements for at-grade crossings of Recker Road, Sossaman Road, Via Del Jardin, Higley Road, Ocotillo Road, and Power Road. **This optional task is not authorized with the Notice to Proceed; it may be authorized in writing by the DISTRICT based upon specific need as determined by the DISTRICT during the contract period.**

14.1.3 UTILITIES

14.1.3.3 Add the following to this section:

Optional Task - In addition to performing a records research within the Project area, the CONSULTANT shall designate the utilities along the Project corridor utilizing electronic tracing or other equipment, and as necessary will obtain pothole data. Overhead utilities shall be designated visually. The CONSULTANT shall prepare a proposed designating plan for approval by the DISTRICT prior to undertaking the utility designating activities. The resulting information shall be included in the 30% submittal. The CONSULTANT shall include 20 potholes for the Project, and shall submit the proposed pothole plan for approval by the DISTRICT prior to completing the potholes. **This optional task for designating and pothole activities is not authorized with the Notice to Proceed; it may be authorized in writing by the DISTRICT based upon specific need**

as determined by the DISTRICT during the contract period.

14.1.3.6 Add the following to this section:

Meetings shall be held as required to coordinate utility relocations for the project, and shall be organized by the CONSULTANT. Utility coordination meetings will be held as required to effectively coordinate the utility relocations.

14.1.3.7 Replace this section with the following:

The CONSULTANT shall provide for the preferred alternative design calculations, plans, and specifications for the relocation of the municipal utilities, including:

- a. Water lines
- b. Sewer lines

14.2 No Additions

14.3 No Additions

14.4 **30% SUBMITTAL**

14.4.2.4 Add to this section the following:

The rights-of-way and easements required shall be dimensioned and tied to monumentation to allow DISTRICT staff to prepare legal descriptions for the project. Rights-of-Way acquired by the DISTRICT shall be identified on the project plans.

14.4.2.5 Add to this section the following:

All required designating and potholing shall be complete and the information shown on the plans.

14.4.2.6 Add to this section the following:

The DISTRICT will require a formal Value Engineering (VE) study to be conducted at the 30% level of project completion, by an independent VE Team, facilitated by a Certified Value Specialist,

14.4.2.7 Add to this section the following:

The DISTRICT shall be responsible for scheduling, coordinating, and hiring the third party VE Facilitator, outside expert Team Members and planning of the VE

workshop. The DISTRICT will be responsible to notify and coordinate participation by other agencies.

14.5 No additions

14.6 90% SUBMITTAL

Add to this section the following:

14.6.9 CLOMR SUBMITTAL

Submit three (3) copies to the DISTRICT.

15 QUALITY ASSURANCE/QUALITY CONTROL

No additions.

16 MAINTENANCE PLAN

Delete this section and replace with the following:

A section is to be included in the design report that summarizes criteria used in design that will need to be ensured in the operation and maintenance effort (vegetation limits, cleaning of grates, etc.)

17 CADD/DRAFTING STANDARDS

No Additions

18 DIGITAL ORTHOPHOTOS

Delete this section.

19 DESIGN REFERENCES, SPECIFICATIONS AND STANDARDS

No Additions

D LANDSCAPE

20 LANDSCAPE PLANNING AND DESIGN

20.3 Landscape Architectural Project Pre-Design

20.3.1.1 General Provisions Purpose and Scope

The purpose of this chapter is to provide all professional landscape architectural services for completion of project site development plans, conceptual landscape designs for project component features, cost estimates and identification of right of way requirements necessary to fully integrate landscape aesthetics and

recreation multi-use needs and opportunities into project pre-design. The work encompassed within this scope includes, but is not limited to: preparation of schedule; preparation of base map materials; review of existing documents; completing a site analysis, project level scenery resource assessment, a recreation and multi-use assessments, and a site development master plan and project feature conceptual aesthetic design alternatives; providing an analysis of the alternatives; preparing a final site development master plan and project feature conceptual designs; preliminary site, landscape and project feature aesthetic design plans; and grading concepts. The work also includes participation in Project Aesthetics Advisory Committee meetings. The landscape theme and project aesthetic and multi-use design guidelines will be based on the *Queen Creek/Sanokai Wash Hydraulic Master Plan* (FCD 98-26) prepared for the DISTRICT by Huitt-Zollars (September 2000).

20.3.1.2 Goals and Objectives

The DISTRICT's aesthetics and open space goal is to enhance the year round value of its flood protection facilities by incorporating features that will help preserve natural Sonoran Desert landscapes, protect and enhance local community character, enhance the aesthetic value of its properties and provide public opportunities for recreation open space activities. The DISTRICT will provide the CONSULTANT with a list of project specific goals and objectives for flood protection, landscape aesthetics, recreation multi-uses, and other resources, issues and concerns at the project kickoff meeting.

The expenditure of public funds by the Flood Control District for landscape aesthetic and multi-use treatments is subject to the authority and limitations of the District's "Policy for the Aesthetic Treatment and Landscaping of Flood Control Projects", and the budgetary limitations specified by the DISTRICT. Use of DISTRICT funds for aesthetic and multi-use treatments is limited to features that are incidental to, or are part of, the flood control structure. While the DISTRICT may not be able to carry out all of the aesthetic and multi-use recommendations presented, these elements are included to illustrate potential open space opportunities associated with DISTRICT flood protection features and measures and to attract partnerships with other stakeholders in the community who may be interested in sponsoring their implementation.

The DISTRICT will provide direction to the CONSULTANT and the CONSULTANT Landscape Architect regarding the interpretation of the DISTRICT's fiscal authority and limitations, as necessary.

20.3.1.3 Staff Qualifications, Roles and Responsibilities:

- A. All work pertaining to preparation of landscape architectural site design, final design and construction documents shall be directed and carried out by a landscape architect licensed in the State of Arizona.
- B. In accordance with DISTRICT policy, landscape aesthetics shall be fully integrated at the beginning and throughout all phases of project planning and final design. The CONSULTANT Landscape Architect shall exercise a lead role in all activities and provision of all deliverables

related to the integration of landscape aesthetics and recreation multi-use opportunities into the project. The CONSULTANT Landscape Architect shall actively participate as a member of the project design team in all planning phases, including all team meetings, workshops, and public meetings.

20.3.1.4 Task Coordination and Project Status Updates:

- A. The CONSULTANT shall be responsible for fully coordinating all project work to ensure that all landscape architectural tasks and deliverables under this chapter are completed and carried out in a timely and effective manner. This shall include delivery of data, maps, drawings, photos and reports prepared by other members of the CONSULTANT's team.
- B. The CONSULTANT Landscape Architect shall coordinate and fully integrate the tasks in the Landscape Architecture Scope of Work into the Work Plans and Schedule for other CONSULTANT's working concurrently on the Project that are identified by the DISTRICT.
- C. The CONSULTANT Landscape Architect shall provide project status updates regarding accomplishment of the Landscape Architectural work to the DISTRICT as a part of all regularly scheduled progress reports identified for the project.
- D. The CONSULTANT Landscape Architect shall regularly consult with the DISTRICT's Project Manager and Landscape Planner to ensure that work accomplishments and deliverables meet the DISTRICT's needs at the project progress meetings.

20.3.1.5 Deliverables

- A. General: All deliverables provided under this Chapter Section, including finals of all reports, exhibits, and illustrations shall be sealed by a professional landscape architect registered in the State of Arizona. All deliverables shall be appropriately titled, shall identify the DISTRICT and the CONSULTANT by name, and shall include the official logos of the DISTRICT and the CONSULTANT. All deliverables shall include the names of the project managers of the DISTRICT and the CONSULTANT. All deliverables shall include the date upon which they were completed and delivered to the DISTRICT.
- B. Narrative Reports: The CONSULTANT Landscape Architect shall provide nine (9) hard copies in 8.5"x11" format, and three (3) digital copy on CD ROM in Microsoft Word or Adobe Acrobat pdf format for the reports specified as deliverables in the following sections. All documentation except for the Final Site Development Master Plan Report will be in the format of summary memorandums consisting of

narratives using bulleted text where appropriate. Large size maps and other graphic illustrations may be included as foldouts.

- C. Exhibits: Exhibits specified as deliverables in the following sections created by the CONSULTANT Landscape Architect shall be provided as part of Task 20.3.1.5.B in TIFF format on CDROM. All hand-drawn exhibits larger than 8.5 inches by 11 inches will be scanned by the DISTRICT to create a TIFF file for all work products specified in this Scope of Work. Exhibits prepared for the public meetings will be submitted to the DISTRICT as part of Task 5.1.
- D. Microsoft PowerPoint Presentation: Delete from Scope of Work.
- E. Photographs: The photographs used in reports or exhibits will be in a high quality JPEG format. The CONSULTANT Landscape Architect shall also include information on the location of the photographs, which may be a photocopy of the CONSULTANT Landscape Architect's field notes or a notation on the location of the photograph in the report or exhibit caption. A separate narrative document or CD ROM will not be developed specifically for photograph documentation.

20.3.1.6 References

The CONSULTANT Landscape Architect shall utilize the references listed below as a guide for carrying out the landscape architectural pre-design activities. The DISTRICT will provide the following in digital form on CDROM to the CONSULTANT Landscape Architect at the project kick-off meeting:

- A. Policy for the Aesthetic Treatment and Landscaping of Flood Control Projects, FCDMC, 1992.
- B. Revised Cost Ceiling Tables for Landscaping and Project Aesthetic Features, FCDMC, 4/26/01.
- C. References cited in Chapter Sections 20.1 and 20.2.

20.3.1.7 Meetings:

- A. Kick-off and Submittal Review Meetings:
 - 1. The CONSULTANT Landscape Architect shall attend and actively participate in the project kick-off meeting and all submittal review meetings.
 - 2. The CONSULTANT Landscape Architect shall review with the DISTRICT the following either at the regularly scheduled project progress meetings or up to three (3) separate review meetings:
 - a. Project Scope of Work.
 - b. Project Base Map and Regional Context Map.
 - c. Existing Data Review and Summary.

- d. Site Analysis, Recreation Open Space Needs Assessment, Scenery Resource Assessment.
 - e. Alternatives and Alternatives Analysis, Cost Estimate, ROW requirements.
 - f. Final Plan.
3. The CONSULTANT Landscape Architect shall provide and review with the DISTRICT's Landscape Planner, all materials, plans, graphic illustrations, and reports, to be presented at the Project Aesthetics Advisory Committee (PAAC) in preliminary form, a minimum of 10 days prior to the scheduled date of each PAAC as directed by the DISTRICT. The CONSULTANT Landscape Architect shall make all changes and revisions requested by the DISTRICT's Landscape Planner prior to their presentation at PAAC. A pre-PAAC meeting is not anticipated prior to the initial PAAC meeting.

B. Public Meetings:

The CONSULTANT Landscape Architect shall attend and actively participate in all public meetings identified in the project Scope of Work. The CONSULTANT Landscape Architect shall not be required to attend or make presentations to town councils or other municipal-sponsored meetings.

C. Project Aesthetic Advisory Committee (PAAC) Meetings

1. The DISTRICT will form and utilize a PAAC, in accordance with the DISTRICT's Landscaping and Aesthetics Policy, to provide reviews of work submitted by the CONSULTANT Landscape Architect and assist in the identification of appropriate aesthetic and multi-use concepts, features and designs to be incorporated into the final plans and construction documents for the project. The PAAC will review the project aesthetic and multi-use recreation objectives, data collection, site analysis, needs assessment, existing conditions site plan, project landscape themes, aesthetic and multi-use design criteria, and preliminary and final site development plans.
2. The DISTRICT will assemble the PAAC. The PAAC will be composed of: 1) the CONSULTANT's Project Manager, Landscape Architect and other appropriate staff; 2) the DISTRICT's Project Manager, Landscape Planner, Ecologist and Public Involvement Coordinator; 3) other landscape architects and aesthetics knowledge experts capable of providing peer reviews and creative input; 4) local community parks and recreation department representatives; 5) cooperative agency representatives; 6) local neighborhood representatives; and other individuals as appropriate.
3. The CONSULTANT Landscape Architect shall participate in all activities of the PAAC through the end of the contract.

4. The CONSULTANT Landscape Architect shall provide a schedule for four (4) PAAC meetings, within 14 calendar days of the Notice to Proceed. PAAC meetings will be scheduled a minimum of ten (10) working days prior to each corresponding public meeting, to allow time for incorporating PAAC review comments and feedback prior to the public meetings. Unless otherwise indicated by the DISTRICT, the purpose and desired outcomes of the four PAAC Meetings shall be as follows:

a. PAAC Meeting #1:

1. Describe the purpose and role of the PAAC.
2. Provide an overview of the project, including the purpose, need and scope, location and extent, project design process and schedule.
3. Review the landscape aesthetic goals and objectives, landscape themes and their application, and aesthetics design guides developed in the Queen Creek/Sanokai Wash Hydraulic Master Plan.
4. Review the landscape and recreational objectives documented in other information from the Towns of Queen Creek and Gilbert, and any other pertinent studies.
5. Update information on planned developments within the project corridor.
6. Secure existing planning documents on the project and surrounding area as provided by the PAAC members.

PAAC Meeting #1 will be conducted as a workshop, facilitated by the CONSULTANT Landscape Architect. All existing studies and documents used by the CONSULTANT Landscape Architect for the project will be provided either by the DISTRICT or the PAAC members.

PAAC Meeting #1 will be the CONSULTANT LANDSCAPE ARCHITECT opportunity to review with the PAAC all of the existing data such as Towns' planning documents, design guides, recreation plans, etc, not only the *Queen Creek/Sanokai Wash Hydraulic Master Plan*. The CONSULTANT Landscape Architect shall use this meeting to identify any changes, issues, updates, or additional objectives to the above prior to going into the field for analysis.

b. PAAC Meeting #2

1. Present a summary and solicit feedback regarding the existing and Summary, Site Analysis, Project Level Scenery Resource Assessment, and Multi-use Recreation Assessment.

2. Present and receive feedback on the type, location and extent of recreation facilities and activity spaces desired by the PAAC members to be located within the project area.

PAAC Meeting #2 will be conducted as a workshop, facilitated by the CONSULTANT Landscape Architect.

c. PAAC Meeting #3:

1. Present and receive feedback on the Draft Site Development, Alternative Aesthetic Design Concepts for the project features, alternatives analysis, cost estimate, and recommended right-of-way acquisition.

PAAC Meeting #3 will be conducted as a workshop, facilitated by the CONSULTANT Landscape Architect, and in conjunction with the first public meeting. The objective will be for the PAAC to hear what the public meeting comments are, thereby enabling the PAAC to make a final decision on aesthetic and landscape recommendations.

d. Optional Task - PAAC Meeting #4:

1. Present the Final Site Development Concept Designs, and cost estimate.

PAAC Meeting #4 will be facilitated by the CONSULTANT Landscape Architect. This meeting will be conducted only if determined to be necessary. These presentations may occur instead during the second public meeting. **This optional task is not authorized with the Notice to Proceed; it may be authorized in writing by the DISTRICT based upon specific need as determined by the DISTRICT during the contract period.**

5. The CONSULTANT Landscape Architect shall be responsible for preparing the agenda, sending out meeting notices, making presentations, and documenting and distributing notes of the PAAC meetings.
6. The DISTRICT will have responsibility for obtaining agreement and consensus within the PAAC.
7. The CONSULTANT Landscape Architect shall incorporate all recommendations of the PAAC approved by the DISTRICT, into all public meeting materials prior to their presentation to the public or other entities.
8. The CONSULTANT Landscape Architect shall provide refreshments for each PAAC meeting.
9. All PAAC meetings will be held in the vicinity of the Towns of Gilbert or Queen Creek and will be no longer than 4 hours each.

The CONSULTANT Landscape Architect shall complete all pre-work tasks and provide all deliverables identified in this Section to the satisfaction of the DISTRICT prior to commencing work on tasks identified in subsequent Sections of this scope.

20.3.2.1 Review

The CONSULTANT Landscape Architect shall review: 1) the scope of work for the project; 2) the DISTRICT's list of project specific goals and objective; 3) all background reports pertaining to the project, including all available planning studies; and 4) all references cited in this Chapter.

20.3.2.2 Pre-Planning Meeting with the DISTRICT Landscape Planner

The CONSULTANT Landscape Architect shall meet with the DISTRICT's Project Manager and Landscape Planner to review the scope of work and receive any needed clarification regarding task accomplishment, delivery standards and scheduling requirements.

20.3.2.3 Schedule

- A. Within ten (10) days of the Notice to Proceed, the CONSULTANT Landscape Architect shall submit a schedule for carrying out all project tasks and providing all deliverables identified in this Chapter to the DISTRICT for review and approval.
- B. The CONSULTANT Landscape Architect shall provide a schedule for carrying out and coordinating all of the tasks and providing all of the deliverables identified in this Chapter. The CONSULTANT Landscape Architect shall revise the schedule as requested by the DISTRICT. The CONSULTANT Landscape Architect shall clarify work method or steps undertaken to complete the scope of work as requested by the DISTRICT.
- C. Deliverables:
 - 1. Landscape Architecture Project Schedule

20.3.3 Site Development Master Planning and Facility Concept Design

The CONSULTANT Landscape Architect shall carry out the tasks described in the following sections and provide a Project Site Development Master Plan and Facility Aesthetic and Multi-Use Concept Designs equivalent to a 15% design submittal.

20.3.3.1 Base Maps

- A. The CONSULTANT Landscape Architect shall prepare Project Base Map that delineates the boundaries of the project area provided by the CONSULTANT engineer using the most current survey base

information. The Base Map shall delineate the limits of all DISTRICT property lines. The CONSULTANT Landscape Architect shall review the Project Base Map with the DISTRICT project manager and landscape planner prior to proceeding with subsequent work tasks.

B. The CONSULTANT Landscape Architect shall prepare a Regional Context Base Map. The Regional Context Base Map will extend a distance of approximately five (5) miles beyond the boundary of the project area. The CONSULTANT Landscape Architect shall use the Regional Context Base Map for the Multi-Use Opportunities Assessment. The CONSULTANT Landscape Architect shall review the Regional Context Map with the DISTRICT project manager and landscape planner prior to proceeding with subsequent work tasks.

C. Deliverables:

1. Project Base Map at 1"=200' with 10' contours on most current aerial photo base as provided by the CONSULTANT engineer.
2. Regional Context Base Map at an appropriate scale.

20.3.3.2 Existing Data review and Summary

A. The CONSULTANT Landscape Architect shall review all existing planning studies including Area Drainage Master Plans, Water Course Master Plans, Landscape Aesthetics and Multi-Use Opportunities Assessments, and any Pre-Design studies that encompass all or part of the project area. The CONSULTANT Landscape Architect shall review all other existing community, agency, and private development plans that are available and pertinent to the project provided by the DISTRICT, the Towns of Gilbert and Queen Creek, and PAAC. The CONSULTANT Landscape Architect shall review this information for completeness, current conditions, and identify additional needed information.

B. The CONSULTANT Landscape Architect shall provide a written brief summary using bulleted text where appropriate of existing information pertaining to scenery resources, including landscape character, scenic quality, visual sensitivity, landscape themes aesthetic improvement opportunities, scenic feature preservation constraints, and aesthetic design guides that pertain to the project area and its context. The CONSULTANT Landscape Architect shall provide a map as a layer to the Project Base Map showing the location of the landscape themes and other scenery resource features, opportunities and constraints based on the existing data.

C. The CONSULTANT Landscape Architect shall provide a written brief summary using bulleted text where appropriate describing the recreation multi-use opportunities, constraints and guidelines that apply to the project area and its context based on existing data. The CONSULTANT Landscape Architect shall provide a map as a layer to the Project Base

Map that identifies the type, location and extent of any identified recreation multi-use features.

- D. The CONSULTANT Landscape Architect shall provide a written brief summary using bulleted text where appropriate identifying all other resource opportunities and constraints that may affect the planning and design of aesthetic and multi-use features within the project area or within the regional context area including: environmental, cultural and historical factors based on existing data. The CONSULTANT Landscape Architect shall provide a map exhibit as a layer to the Project Base Map that identifies the other resources opportunities and constraints.
- E. The CONSULTANT Landscape Architect shall review the Summary of Existing Data with the DISTRICT Project Manager and landscape planner prior to proceeding with subsequent work tasks. This review will occur during a regularly scheduled project progress meeting.
- F Deliverables:
 - 1. Memorandum Summarizing Existing Data that consists of summaries of the task in 20.3.3.2.
 - 2. Existing Data Exhibits may include the following:
 - a. Scenery Resources
 - b. Recreation Multi-use Opportunities and Constraints
 - c. Other Resource Opportunities and Constraints

20.3.3.3 Site Analysis

- A. The CONSULTANT Landscape Architect shall visit the project site and context area, record observations of the physical environment, and photo-document these observations. The project site analysis shall include, but is not limited to, documentation of existing and future land uses, zoning, vehicular circulation, traffic control, adjacent parking, trails systems and street crossings, public and private recreational facilities, above and below ground utilities, topography, existing vegetation, and drainage features. The CONSULTANT Landscape Architect shall perform a project site analysis that identifies and describes the physical and functional relationship of the project area to adjacent land use areas, including the need for physical connection with, or separation from, the proposed flood protection facility.
- B. The CONSULTANT Landscape Architect shall photo document the observations identified and described in the project site analysis. The photographs shall be in digital high quality JPEG format with a minimum print size of 4"x5" at a resolution of 144 pixels per inch produced in the camera without enlargement. The photographs shall be included in the memorandum summarizing the site analysis observations. The labor effort for this task is provided in 20.3.3.3.A.

C. The CONSULTANT Landscape Architect shall review information provided by the CONSULTANT engineer on the flood protection functional requirements of the project, including the type, extent, depth and location of all known project components, including over bank areas, side slopes, bottom areas, low flow features, inlets, outlets, drop structures, energy dissipaters, weirs, and other project elements. These flood protection elements will be provided to the CONSULTANT Landscape Architect by the CONSULTANT engineer and the DISTRICT as a separate layer on the 200-scale Project Base Map. The CONSULTANT Landscape Architect shall meet with the CONSULTANT engineer to review and revise as necessary the project's flood protection project functional components and requirements as part of the regularly scheduled project progress meeting. The CONSULTANT Landscape Architect shall generally identify and describe the aesthetic and recreation multi-use impact potential and degree of flexibility that exists with regard to modifying the location, type, size, depth, configuration, and other design aspects of the various components and features of the proposed flood protection facility.

D. Deliverables:

1. Site Analysis Exhibit at a scale of 1"=200'.
2. Summary Memorandum with photographs illustrating the site analysis observations including addressing applicable Flood Protection Facility Components and Requirements.
3. Summary Memorandum of Flood Protection Facility Components and Requirements.

20.3.3.4 Recreation and Multi-Use Assessment:

A. The CONSULTANT Landscape Architect shall identify the type, location and extent of recreation facilities and activity spaces located within the project area and within the regional context area. The CONSULTANT Landscape Architect shall expand, modify and refine the Recreation and Multi-Use Assessment using bulleted text where appropriate and the exhibit developed in the Existing Data Review task based upon the information from the PAAC.

B. Deliverables:

1. Recreation and Multi-Use Assessment Exhibits using Project Area and Regional Context Base Maps.
2. Memorandum summarizing the Recreation and Multi-Use Assessment.

20.3.3.5 Project Level Scenery Resources Assessment

- A. The CONSULTANT Landscape Architect shall prepare a project level assessment of scenery resources within the project area. The project level assessment of scenery resources will build upon, expand, and refine the Project Level Scenery Resources Summary and Exhibit developed in the preceding Existing Data Review and Summary task. The labor effort for this task is provided in 20.3.3.5.B.
- B Using the Project Site Analysis and the Existing Data Review and Summary Exhibits, the CONSULTANT Landscape Architect shall visit the project area and identify and document general landscape character zones in terms of the physical and visual attributes within the project area. No more than six zones are anticipated for the project area and up to two field days may be required to obtain the information. The CONSULTANT Landscape Architect shall during the analysis of each landscape character zone describe the general overall scenic quality of a zone by identifying features to preserve, the scenic integrity noting visually discordant features, and the visual sensitivity recording features in the foreground area and focal points. The CONSULTANT Landscape Architect shall identify sensitive focal point areas within the project area that are visible from major travel ways and use areas located adjacent to the project area, including areas that form the terminus of street and trail axes based on information provided by the PAAC and site observations. The documentation of the Project Level Scenery Resources will consist of a narrative using bulleted text where appropriate, exhibits, and photographs of the scenic features within the project area that should be preserved, any visually discordant features that could be improved or screened through aesthetic treatments, and any opportunities for enhancement of public viewing opportunities from the project area.
- C. The CONSULTANT Landscape Architect shall photograph the project area including photographs of the general landscape character zones. The photographs shall be in digital high quality JPEG format with a minimum print size of 4"x5" at a resolution of 144 pixels per inch produced in the camera without enlargement. The labor effort for this task is provided in 20.3.3.5.B.

C. Deliverables:

1. Project Level Scenery Resources Assessment Exhibit at a scale of 1"=200'.
2. Memorandum Summarizing the Project Level Scenery Resources Assessment.

20.3.3.6 Landscape Aesthetic Goals and Objectives

- A. The CONSULTANT Landscape Architect shall expand, refine and modify the overall aesthetic concept, landscape themes and aesthetic design guides documented in the Existing Data Summary and Exhibit, as appropriate, based on new information developed in the project level assessment of scenery resources and from input from the PAAC.

- B. The CONSULTANT Landscape Architect shall meet with the PAAC and the DISTRICT to review the updated landscape themes and project aesthetic design guides. The CONSULTANT Landscape Architect shall revise the landscape themes and project aesthetic design guides based on the review comments approved by the DISTRICT as part of the PAAC Meeting #2. The revised landscape aesthetic goals and objectives will be included as part of the PAAC Meeting #2 meeting notes. A separate revised landscape aesthetic goals and objectives memorandum will not be developed.

20.3.3.7 Summary of Existing and Planned Conditions

- A. The CONSULTANT Landscape Architect shall review the Project Site Analysis, Recreation and Multi-Use Assessment, the Project Level Scenery Resources Assessment and the revised Landscape Aesthetics Goals and Objectives with the DISTRICT Project Manager and landscape planner prior to proceeding with subsequent work tasks at a regularly scheduled project progress meeting. The CONSULTANT Landscape Architect shall take the previous memorandums of the summaries of information on the Site Analysis, Recreation and Multi-Use Assessment, Project Level Scenery Resources Assessment, and the revised Landscape Aesthetics Goals and Objectives and compile the information in a narrative reflecting the project area's Existing and Planned Conditions.
- B. The CONSULTANT Landscape Architect shall make all changes and additions to the Summary of Existing and Planned Conditions requested by the DISTRICT.

20.3.3.8 Draft Site Development Master Plan and Feature Concept designs

- A. Using the Sonoqui Wash Landscape, Aesthetics, and Recreation and Multi-Use Assessment, the CONSULTANT Landscape Architect shall prepare one draft site development concept plan that encompass the entire project area, its segments and sub-segments as appropriate to the project area. The site development concept plan will be designed to achieve the functional flood protection requirements of the project, the landscape aesthetic and recreation and multi-use goals and objectives, and other identified requirements. The draft site development concept plan shall include: a layout of the overall form and configuration of the project; a conceptual grading; the general location, layout and configuration of flood protection, aesthetic and recreation multi-use project features and structural components, including bottom area treatments, side slope treatments, over bank area treatments, O&M road layout, recreation facilities, public entry points and other nodal features; and a preliminary planting design concept that shows the general layout and arrangement of vegetative plant masses proposed to achieve visual unity, create spatial definition, view enframing, screening of discordant features, and accents at nodal and other special emphasis

areas. The CONSULTANT Landscape Architect shall provide a color rendered illustration of the project concept plan at 200 scale and one perspective sketch for up to five (5) typical areas or conditions of the project. Preparation of low elevation aerial oblique color rendered perspective sketches will not be required. The CONSULTANT Landscape Architect shall provide perspective sketches taken from the ground plane.

B. The CONSULTANT Landscape Architect shall provide aesthetic design alternatives for the structural components of the project including, but not limited to, drop structures, inlets and outlets, culvert structures, pedestrian bridges, fences and railings, other nodal facilities, wall treatments, and paving patterns. The CONSULTANT Landscape Architect shall provide photographs, sketches, cross sections, or other graphic materials to illustrate the two aesthetic design alternatives for up to 8 structural components of the project.

C. Deliverables:

1. Memorandum describing the Draft Site Development Concept Plan.
2. Draft Site Development Concept Plan, color rendered, at a scale of 1"=200'.
3. Color Rendered Perspective Sketch for up to five (5) typical areas or conditions.
4. Draft Graphic Illustrations of two Aesthetic Treatment Alternatives for up to eight (8) Project Structural Components and other features.

20.3.3.9 Draft Site Development Master Plan and Feature Concept Designs Analysis and Review

A. The CONSULTANT Landscape Architect shall provide a summary of the qualitative differences between the two aesthetic design alternatives for the 8 structural components of the project. The analysis will also include how well the Draft Site Development Concept Plan achieves the landscape aesthetics goals and objectives; recreation needs identified in the needs assessment, and other project requirements including environmental, cultural and historical resource goals.

B. The CONSULTANT Landscape Architect shall provide a cost estimate for the landscaping and aesthetics features for each alternative in a level of magnitude format, using the most up to date Landscaping and Aesthetics Cost Ceiling Tables available from the DISTRICT and recent experience.

C. The CONSULTANT Landscape Architect shall make recommendations regarding acquisition of additional rights of way needed to meet the project landscape aesthetics objectives.

D. The CONSULTANT Landscape Architect shall review the Draft Site Development Concept Plan and the Feature Concept Design Alternatives Analysis with the DISTRICT and with the PAAC at the PAAC Meeting #3. The review meeting with the DISTRICT is included in Task 20.3.1.7. The CONSULTANT Landscape Architect shall identify and document all changes and additions recommended to the alternatives for the preferred alternative as part of the PAAC Meeting #3 meeting notes.

E. Deliverables:

1. Memorandum, documenting the Draft Site Development Concept Plan and Feature Concept Design Analysis and Review.

20.3.3.10 Final Site Development Master Plan and Feature Concept Designs

A. The CONSULTANT Landscape Architect shall prepare a final site development master plan for the project area at 200 scale, based upon the analysis and review of the concept plan and design feature alternatives. The CONSULTANT Landscape Architect shall incorporate all recommendations from the review that are approved by the DISTRICT.

B. The CONSULTANT Landscape Architect shall modify the draft perspective sketches provided in Task 20.3.3.9, based upon the review of the Draft Site Development Master Plan and Feature Concept Design Alternatives, and provide the DISTRICT with final color rendered perspective sketches that illustrate the overall aesthetic treatment concepts contained in the Final Site Development Master Plan. Up to five (5) final perspective sketches will be provided and will be board mounted.

C. The CONSULTANT Landscape Architect shall provide final color rendered, board mounted, illustrations of up to eight (8) preferred aesthetic concept designs for the structural components and other features of the project area, based upon the review comments obtained from Task 20.3.3.9.

D. The CONSULTANT Landscape Architect shall prepare an updated magnitude of cost estimate based for the Final Site Development Master Plan aesthetic features and components. The CONSULTANT Landscape Architect shall provide an updated recommendation of additional right of way required to provide the aesthetic and multi-use features contained in the Final Site Development Master Plan.

E. The CONSULTANT Landscape Architect shall provide a Final Site Development Master Plan Report that includes a narrative description of the Final Site Development Master Plan, and previously prepared memorandums of all of the deliverables specified in Chapter 20.3. Large size exhibits and illustrations may be reduced in size or included as foldouts in the report. The Final Site Development Master Plan Report will be organized logically and shall include a table of contents of the materials provided in the Pre-Design Study.

F. The CONSULTANT Landscape Architect shall revise the Final Site Development Master Plan and Preliminary Feature Concept Designs based on comments from the DISTRICT and PAAC. The CONSULTANT Landscape Architect shall make all changes and additions requested by the DISTRICT. Changes to the Final Site Development Master Plan and Preliminary Feature Concept Designs are anticipated to be minor.

G. Deliverables:

1. Final Magnitude of Cost Estimate.
2. Final Estimate of Right of Way Requirements.
3. Final Site Development Master Plan Exhibit, at a scale of 1"=200', color rendered.
4. Up to five (5) final perspective sketches for the Final Site Development Master Plan.
5. Up to eight (8) final color rendered illustrations of the aesthetic treatments of the structural components and other project features.
6. Final Site Development Master Plan Report

TASK 20. 4.1 TO TASK 20.4.3.5 - DELETE FROM SCOPE OF WORK

20.4.3.6 Preliminary Design

A. Using the information from the Existing Data Review and Summary, the Project Requirements Update, and the Detailed Site Analysis, the CONSULTANT Landscape Architect shall modify and refine the overall form and configuration of the project and its features, the grading design concept, planting design concept and the aesthetic design concepts for the structural components and other project features contained in the pre-design Site Development Master Plan, to best meet the project functional, aesthetic, recreation and other goals, objectives, landscape themes and design guides.

B. Preliminary Site Plan

The CONSULTANT Landscape Architect shall prepare a Preliminary Site Plan at 40 scale, using the project base map. The Preliminary Site Plan prepared by the CONSULTANT engineer shall depict the approximate size, extent, configuration and arrangement of the project features, including flood protection facility over bank areas, side slopes, bottom areas, low flow features, grade control structures, inlets, outlets, energy dissipaters, walls, bridges, maintenance roads, and walks and trails. The CONSULTANT Landscape Architect shall prepare the public entry facilities, and other recreation and multi-use components. The

CONSULTANT Landscape Architect shall indicate rights of way requirements for the project.

C. Grading Concept

The CONSULTANT Landscape Architect shall prepare hand-drawn Grading Concept on trace paper at 20 scale for up to 12 selected locations within the project area using the Preliminary Site Plan as a base. In addition, illustrative cross sections, as needed, will be provided to the CONSULTANT engineer. The Grading Concept could include landscape berming of over bank areas, side slope warping and terracing, bottom area meandering and other landform treatments. The areas to be graded will be selected based on their contribution to the overall function and aesthetic of the project as agreed to by the DISTRICT's Landscape Planner. Unless otherwise specified by the DISTRICT, the Grading Concept will be represented with one-foot contour lines and include spot elevations, as necessary, to convey the design intent. The CONSULTANT engineer will develop initial grading contours based on the CONSULTANT Landscape Architect's input. The Grading Plan shall be designed by CONSULTANT engineer to meet the project flood capacity and drainage requirements specified by the DISTRICT.

D. Preliminary Project Feature Aesthetic Designs

The CONSULTANT Landscape Architect modify, refine and update selected Feature Concept Designs contained in the Site Development Master Plan in support of the design activities of the CONSULTANT engineer.

E. Preliminary Planting Plan

The CONSULTANT Landscape Architect shall prepare a Preliminary Planting Plan identifying the planting objectives for up to six selected locations within the project area; the Plan will be prepared at a scale agreed to by the DISTRICT's Landscape Planner during the project activities. The Preliminary Site Plan and Grading Plan will serve as a base for the planting plan. The Preliminary Planting Plan will provide the general layout and configuration of major groupings of plant materials, including trees, shrubs, and ground covers for typical planting zones along the project length. The planting plan locations shall be chosen in coordination with the DISTRICT's Landscape Planner. The CONSULTANT Landscape Architect shall provide a list of proposed plant species. The Preliminary Planting Plan shall include and identify vegetation planting for screening unsightly on/off sight features, view enframent, spatial definition, view terminus treatment and nodal area accent planting, and treatments for recreation activity areas that may be associated with the selected locations.

F. Construction Document Review

The CONSULTANT Landscape Architect shall review the 60%, 90%, 99%, and 100% construction document submittals and the Special Provisions.

G. Preliminary Design Deliverables:

1. All submitted items shall be dated and marked "30% Submittal".
2. Four (4) copies of the Preliminary Site delivered as a single strip map of the entire project area. The Grading Concept and Landscape Plans will be separate sheets for those portions of the project included in the design area for those items.
3. Four (4) copies of the Preliminary Project Feature Aesthetic Designs

Appendix C: Survey Field Notes

C.1 Survey Field notes for Aerial Mapping Control

SONOQUI WASH CHANNELIZATION FROM QUEEN CREEK WASH TO CHANDLER HEIGHTS ROAD

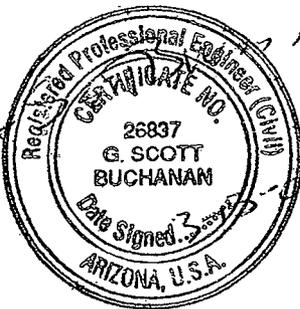
Contract
FCD 2002C037

SURVEY REPORT

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

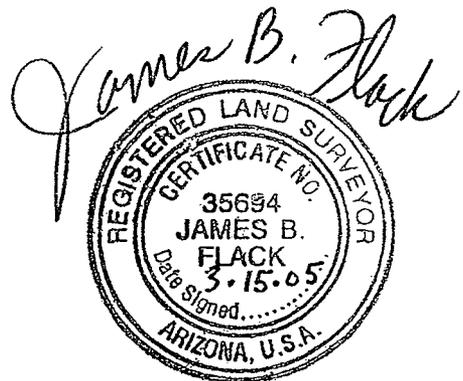


Prepared by:
Stanley Consultants, Inc.
2929 East Camelback Road, Suite 130
Phoenix, Arizona 85016



SCI Project #16955

March 2005



March 2005

**SONOQUI WASH CHANNELIZATION
FROM QUEEN CREEK WASH TO CHANDLER HEIGHTS ROAD
FCD 2002C037**

SURVEY REPORT

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LIST OF APPENDICIES

- Appendix A: Survey Data Point Lists
- Appendix B: Survey Field Books

Pocket inside back cover: Electronic computer files on CD

1.0 INTRODUCTION

The Sonoqui Wash Channelization Project is situated in the southeast area of Maricopa County. The project limits include portions of the Town of Queen Creek, the Town of Gilbert and Unincorporated Maricopa County. Location and vicinity maps (Figures 1 and 2) depicting the project are included on pages 3 and 4.

The objective of the project is to design a channel that will convey the 100-year design discharge in Sonoqui Wash from roughly Chandler Heights Road at the upstream limit of the project to Queen Creek Wash (just west of Higley Road) at the downstream limit.

This survey report covers the field survey data that was collected by Stanley Consultants for use in aerial mapping control and supplemental field survey of existing drainage features, roadways and utilities needed for the design of the project and to evaluate hydrology and hydraulics. Field surveys supplement as-built data collected at the beginning of the study.

As-built data was obtained for the project from Maricopa County, the Town of Gilbert, the Town of Queen Creek and various utilities and irrigation districts. The vertical datum for these plans varied and many of the referenced benchmarks were not recoverable. A complete list of as-built data and other plans and topographic mapping that was collected for this project is included in the Data Collection Report under separate cover.

The only comprehensive topography available that covers the entire project and its contributing drainage area is from USGS quadrangle maps with a contour interval of 10 feet. Two-foot contour mapping and the associated aerial photography were available from the Flood Control District of Maricopa County for the area included in the floodplain delineation study for Sonoqui Wash that was conducted for the District by consultant Entellus. This topography did not cover the entire area of the Sonoqui Wash Channelization Project. Nor was it considered to be detailed or accurate enough to serve as the basis for design.

There was also one-foot contour mapping available from the Flood Control District that had been acquired for design of the East Maricopa Floodway Chandler Heights Capacity Mitigation Basin. Kirkham Michael was the District's design consultant for that project. This topography only covered the area west of Higley Road.

New one-foot contour mapping was developed for the length of the study as part of the Sonoqui Wash Channelization project. The topographic mapping generally extends at least 400 ft on each side of the project centerline. Aerial photogrammetric imaging technology was used to develop the new topographic map. Digital and hard (mylar) copies of the mapping were provided to the District as part of a separate submittal.

Survey points for this study were collected using both GPS and total station survey equipment. Survey data point lists and copies of survey field books are included in Appendices A and B of this report, respectively. An electronic ASCII text file corresponding to the point list in Appendix A is included on disc in the pocket at the back of this report.

All survey work performed for this study was done in accordance with Section 3.0 of the Flood Control District of Maricopa County's Consultant Guidelines dated December 1, 2003. All survey work meets the Federal Emergency Management Agency (FEMA) minimum criteria as defined in "FEMA Document 37, Flood Insurance Study Guidelines and Specifications for Study Contractors".

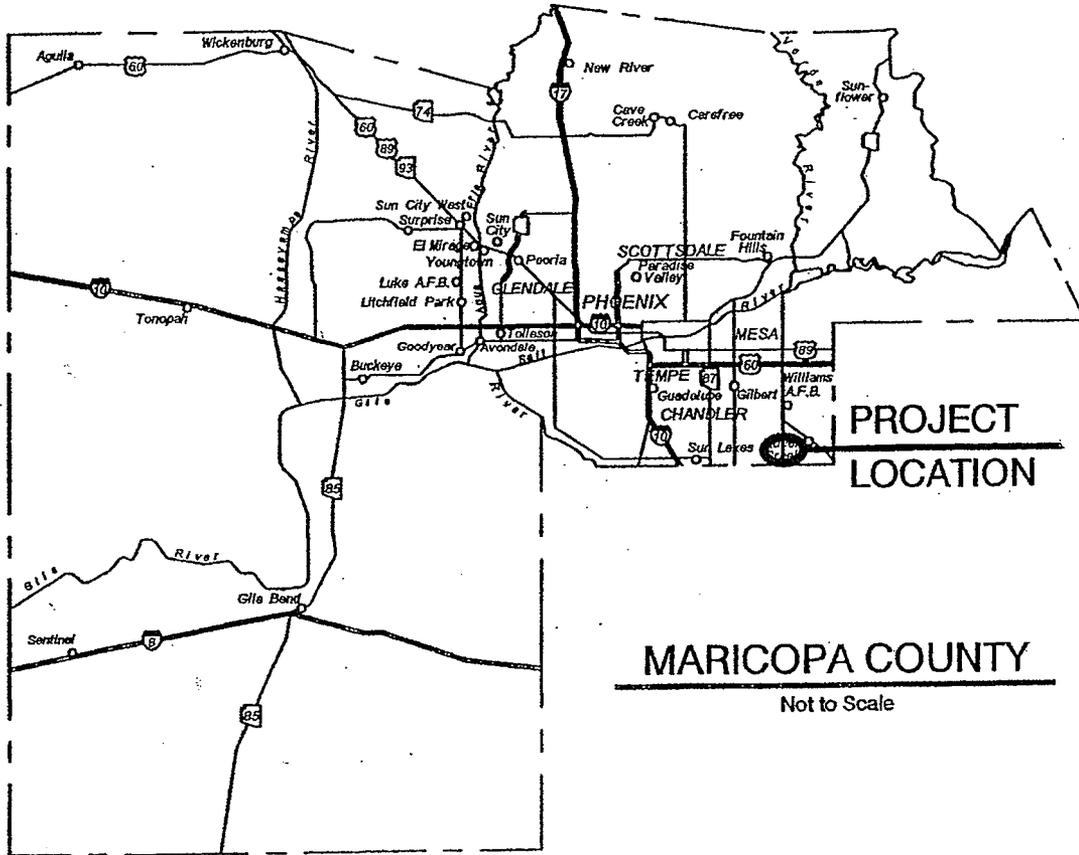


Figure 1, Project Location Map
 Sonoqui Wash Channelization

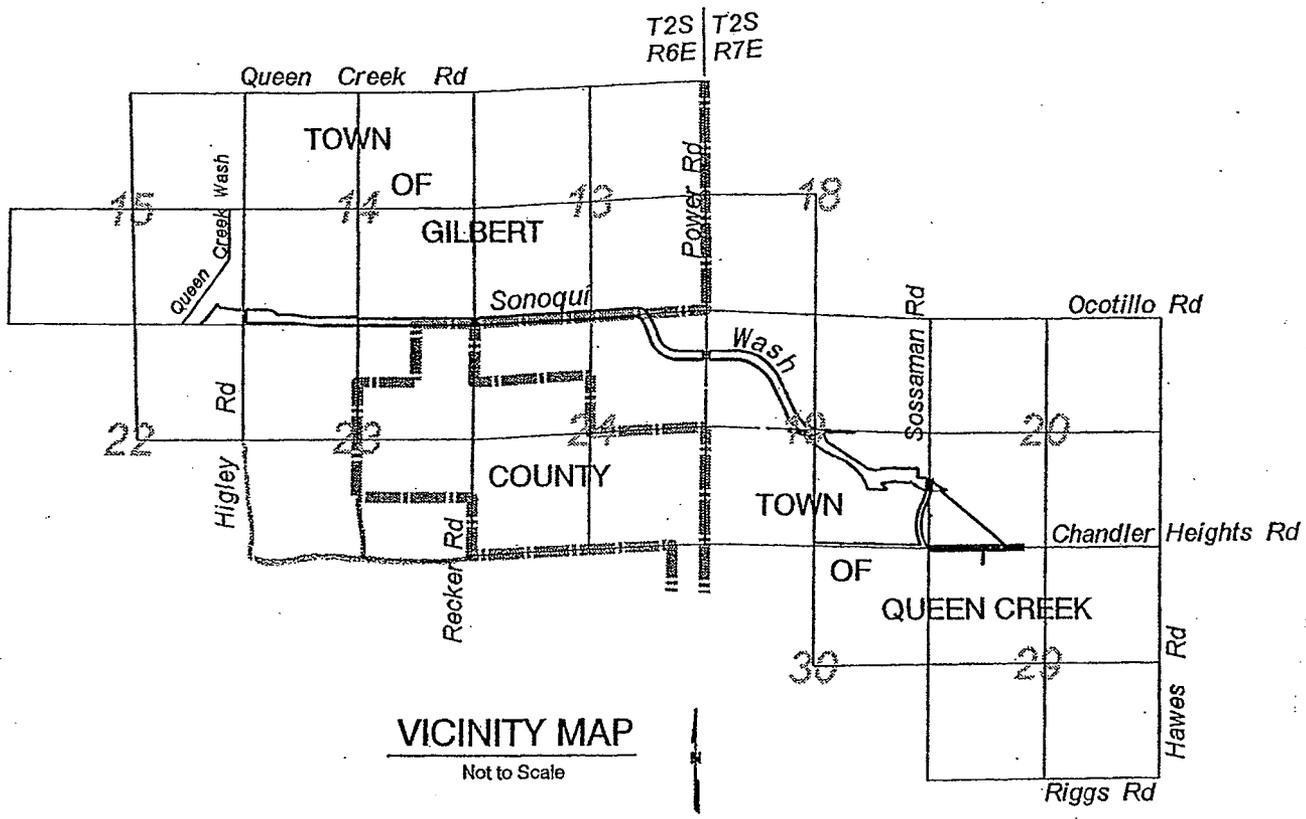


Figure 2, Project Vicinity Map
Sonomoqui Wash Channelization

2.0 DESCRIPTION OF SURVEY CONTROL

The survey was based on the GDACS control system for Maricopa County. The monuments utilized for this project are: 2DL1, 2EM1, AND 2DN1.

2.1 Vertical and Horizontal Datum

The GDACS control monuments were utilized for the horizontal control system using the published NAD83 State Plane Coordinate System with the international feet as the unit of measurement. Using a calculated combined scale factor, as shown on the attached spreadsheet, the survey was performed using ground coordinates. All horizontal control monuments are listed in Table 1.

The vertical control for the survey was based on the same GDACS monuments, using the published North American Vertical Datum of 1988 (NAVD 88). The conversion factor used to convert the project elevations from NAVD 88 to NGVD 29 was (-) 1.62 feet. $\text{NAVD } 88 - 1.62 \text{ ft} = \text{NGVD } 29$. This conversion factor was calculated by utilizing the NGS Vertcon software and the GDACS project control monuments to calculate an average conversion factor. This factor was used in comparing data with NGVD 29 elevations.

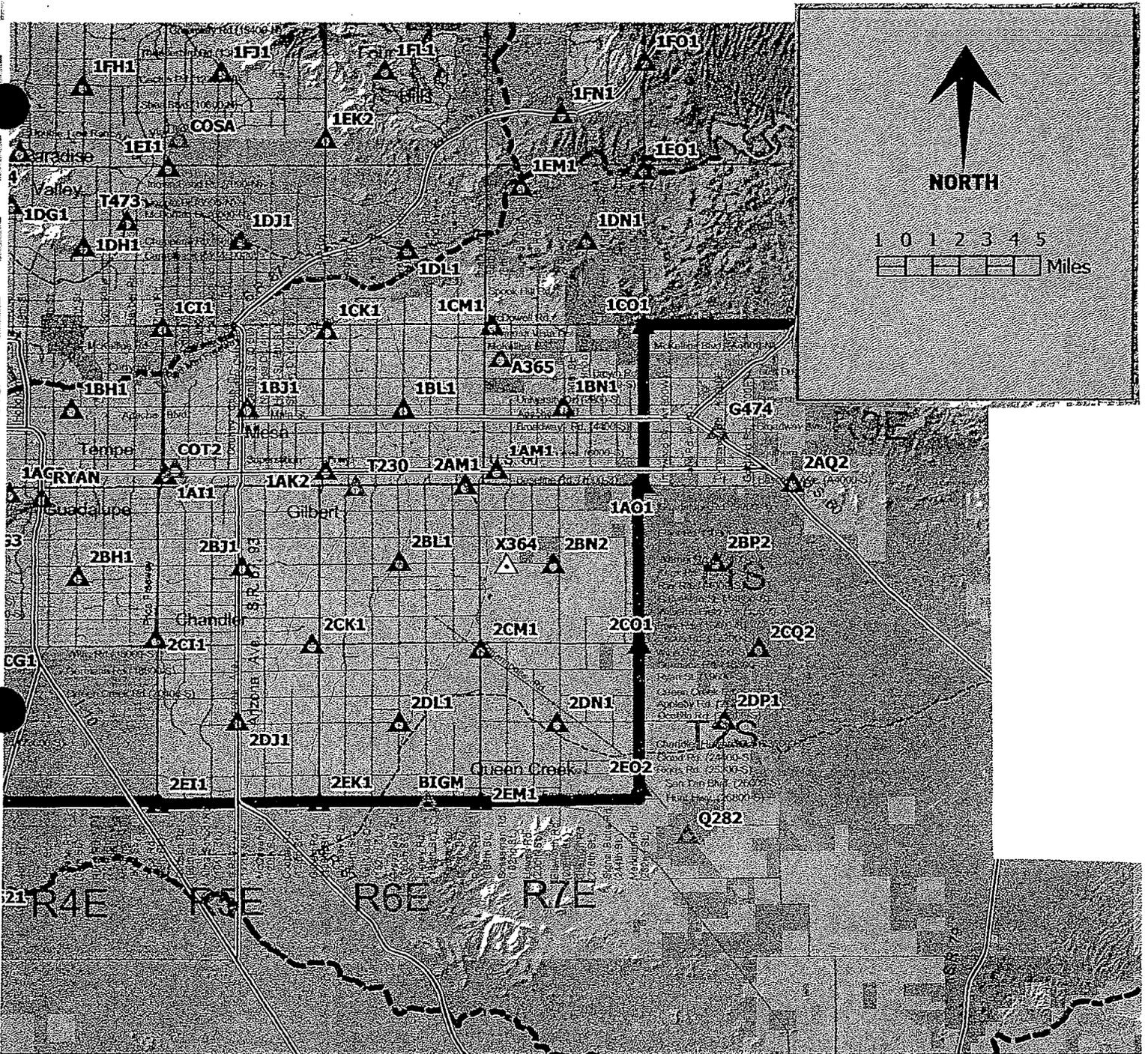
2.2 Vertical and Horizontal Control for Aerial Mapping

To improve the accuracy of the GPS RTK solution, quick static sessions were performed to provide some control panel points in the panel network. Using these panel points and the GDACS monuments produced a very tight resolution. As a check, some panels were surveyed by level loop from a control panel point. The main panels were then set as well as the blind panels. The blind panel information was coordinated with the Flood Control District. The District verified that the aerial photogrammetry met their accuracy requirements.

2.3 Project Control and Benchmarks

The following primary GDACS points were incorporated in the base control..

- 2DL1
Near Ocotillo Road and Greenfield Road
Northing (ft) 818224.68464
Easting (ft) 754679.39509
NGVD 88 ELEV (ft) 1303.48
- 2EM1
Near Power Road and Hunt Highway
Northing (ft) 802575.76817
Easting (ft) 770735.55928
NGVD 88 ELEV (ft) 1446.181
- 2DN1
Near Ocotillo Road and a park 600 ft west of Ellsworth Road
Northing (ft) 818195.54612
Easting (ft) 78725.87384
NGVD 88 ELEV (ft) 1398.845



G DACS Control for Maricopa County

Figure 3, Nearest GDACS Primary Control Points

Sonoqui Wash Channelization

SONOQUI WASH CONTROL

SCI Project #

Mar-05

Combined Scale Factor Calcs

<u>Point</u>	<u>Grid Scale</u>	<u>Elev</u>	<u>Sea Level Scale Factor</u>
1	0.99990341	1303	1.000062329
0	0.99990487	1335	1.000063857
2	0.99990839	1398.8	1.000066911
3	<u>0.99990571</u>	<u>1446.2</u>	<u>1.000069175</u>
AVG	0.999905595		1.000065568

Combined Scale Factor:

1.000159988

NGS monuments used in Static Networks

<u>Grid Coordinates-Meters</u>			<u>Ground Coordinates</u>			<u>NGVD 88</u>		
1	249354.99	229989.484	1	818224.68464	754679.39509	1303.048	2DL1	H & V
2	244525.013	234882.62	2	802375.76817	770735.55928	1446.181	2EM1	H & V
3	249346.110	239450.937	3	818195.54612	785725.87384	1398.845	2DN1	H & V

Control Panels used for Static and RTK Networks

<u>Grid Coordinates-Feet</u>			<u>Ground Coordinates</u>			<u>NGVD 88</u>		
203	819710.404	760180.639	203	819841.54807	760302.25900	1319.911	Panel 203	H & V
218	818501.4	770777.776	218	818632.35064	770901.09142	1356.579	Panel 218	H & V
228	810916.44	778241.482	228	811046.17713	778365.99152	1378.556	Panel 228	H & V

Localization text points

<u>Grid Coordinate (RTK observed on Grid)</u>			<u>Ground Coordinates</u>		
1031	812747.5806	776830.7084	1031	812877.61070	776954.99222
1034	817587.7357	770511.601	1034	817718.54016	770634.87383
1038	817869.9453	760169.15	1038	818000.79491	760290.76816

Independent Check Points

<u>Grid Coordinates-Meters</u>			<u>Ground Coordinates</u>			<u>Remarks</u>	
500	244454.304	231755.209	500	802143.74615	760473.38294	Horz	Big Max
501	249353.542	233232.154	501	818219.93322	765319.77826	Horz	San
502	244505.729	238060.701	502	802312.49033	781164.00238	Horz	T2S R7E Sec 33 SE cor
503	252190	239600	503	827527.38664	786215.00392	1394.01	Vert. E 517
504	250220	239680	504	821063.09800	786477.51310	1399.81	Vert. S 364
	818137.000	759967.000		818267.89234	760088.58582		
	818108.000	761042.000		818238.88770	761163.75781		

Table 1, Project Control Points
Sonoqui Wash Channelization

3.0 SUPPLEMENTAL FIELD SURVEY

Stanley Consultants' survey crew obtained field coordinate data for physical features along the project corridor that would relate to the anticipated design. At roadway crossings, field shots were taken along edge of pavement and centerline and where present, curb and gutter. Points were also collected for above ground utilities like power poles and visible surface features of underground utilities such as manhole covers, water valves and utility marker paddles.

Fences and gates along the existing wash corridor were located. Trees larger than 6-inch diameter trunk were located in certain reaches, and all trees larger than 12-inch diameter trunk were located for the entire project. Also located were pipe culverts, irrigation tail water pipes and standpipes. Stanley survey crews also took survey shots at the locations of geotech borings after they had been completed.

ZDL1

Questions concerning the VERTCON process may be mailed to NGS

Latitude: 33 14 55.62894

Longitude: 111 44 17.52705

NAVD 88 height: 1303.048 FT

Datum shift (NAVD 88 minus NGVD 29): 1.624 feet

Converted to NGVD 29 height: 1301.424 feet

2DNI

Questions concerning the VERTCON process may be mailed to NGS

Latitude: 33 14 54.66694

Longitude: 111 38 11.99192

NAVD 88 height: 1398.845 FT

Datum shift (NAVD 88 minus NGVD 29): 1.601 feet

Converted to NGVD 29 height: 1397.244 feet

ZEM 1

Questions concerning the VERTCON process may be mailed to NGS

Latitude: 33 12 18.52624

Longitude: 111 41 08.89604

NAVD 88 height: 1446.181 FT

Datum shift (NAVD 88 minus NGVD 29): 1.621 feet

Converted to NGVD 29 height: 1444.560 feet

SONOQUI WASH CHANNELIZATION
FROM QUEEN CREEK WASH TO CHANDLER HEIGHTS ROAD
FCD 2002C037

SURVEY REPORT

APPENDIX A
SURVEY DATA POINT LISTS

Sonoqui Wash Survey Points

Ground Coordinates
By: Stanley Consultants

Point #	Northing	Easting	Elevation	Description
1	818224.6846	754679.3951	1303.0480	2DL1
2	802375.7682	770735.5593	1446.1810	2EM1
3	818195.5461	785725.8738	1398.8450	2DN1
203	819841.5481	760302.2590	1319.9110	PANEL 203
218	818632.3506	770901.0914	1356.5800	PANEL 218
228	811046.1771	778365.9915	1378.5560	PANEL 228
2000	819799.7956	758448.6207	1314.1719	PP 200
2001	817818.5267	758448.1025	1311.9698	PP 201
2002	816728.5470	758448.1320	1313.6626	PP 202
2003	817004.0118	760407.4427	1318.1674	PP 205
2004	818000.8393	760290.8306	1317.8648	BLIND 1
2005	818958.4925	760368.2297	1318.7127	PP 204
2006	819841.5450	760302.2700	1319.8693	PP 203
2007	817754.1608	761460.7762	1320.8526	PP 206
2008	817978.7630	762654.3150	1324.1324	BLIND 2
2009	817775.1874	763665.8607	1327.2764	PP 208
2010	818583.0085	762606.3476	1324.8373	PP 207
2011	818937.7902	764725.2049	1332.0437	PP 209
2012	817233.5595	764727.8000	1331.2501	PP 210
2013	818023.2552	765979.8553	1335.1568	BLIND 3
2014	817600.9328	766882.4686	1338.8760	PP 212
2015	817904.5059	767967.4301	1342.1160	PP 213
2016	818169.0966	769106.5762	1346.5236	BLIND 4
2017	817718.5700	770634.9153	1351.7574	BLIND 5
2018	817011.1906	770117.7020	1350.6093	PP 216
2019	818830.3878	769031.9854	1347.4090	PP 215
2020	818942.2165	765806.8391	1336.9238	PP 211
2021	818788.1428	768002.8735	1344.3283	PP 214
2022	818632.3779	770901.1421	1356.5637	PP 218
2023	817032.8159	771026.6052	1352.6227	PP 217
2024	817364.9376	772632.7047	1357.9421	PP 219
2025	816565.9477	773395.6379	1359.1525	PP 220
2026	815949.4817	772735.6608	1357.2144	BLIND 6
2027	815248.2952	772416.4934	1357.7039	PP 221
2028	814807.6378	773438.7813	1361.2167	PP 222
2029	813387.3146	774936.5452	1366.4633	PP 230
2030	812856.6124	775727.3773	1369.6822	PP 225
2031	813905.6764	775268.9143	1366.5140	BLIND 7
2032	814784.9146	775867.2762	1369.3454	PP 224
2033	815574.4922	775294.6266	1364.4045	PP 223
2034	812877.6298	776955.2706	1371.6323	BLIND 8
2035	813522.3447	777447.9800	1376.0173	PP 226
2036	812528.9955	779361.5302	1381.0959	PP 229
2037	811046.1209	778366.0028	1378.5930	PP 228
2038	811638.1865	777506.4576	1376.5960	PP 227
2039	819692.9997	759880.8230	1324.3916	TOP
2040	819693.4310	759933.4856	1313.1453	TOE

Sonoqui Wash Survey Points

Ground Coordinates
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Point #	Northing	Easting	Elevation	Description
2041	819691.8450	759954.9283	1312.0475	CL WASH
2042	819678.4922	759977.2966	1312.7020	TOE
2043	819676.2940	760023.1511	1326.9193	TOP
2044	818996.4003	759619.6066	1311.0064	CL WASH
2045	818977.3454	759641.2518	1312.7437	TOE
2046	818958.5600	759657.6464	1320.7641	TOP
2047	818169.5329	759091.5682	1316.9408	PP
2048	818106.5260	759130.6829	1316.5933	WV BOX
2049	818103.2946	759130.6531	1317.9719	WATERSPOUT
2050	818125.1903	759229.3734	1317.1683	RECLAIM WV
2051	818167.1845	759375.0140	1316.9234	PP
2052	818116.5591	759392.1637	1316.7853	SSMH
2053	818064.3458	759507.1078	1315.8266	NG
2054	817961.2016	759505.6715	1315.7612	NG
2055	818167.5872	759645.5769	1316.7543	PP
2056	818166.5558	759934.6808	1316.6826	PP
2057	818167.8978	759994.2296	1317.0758	GUYWIRE
2058	818167.6459	760000.4050	1317.1509	GUYWIRE
2059	818177.4542	760015.7889	1317.5622	PP
2060	818224.9109	760017.5165	1317.1954	GUYWIRE
2061	818230.4909	760017.1578	1317.4880	GUYWIRE
2062	819676.6103	760053.5528	1327.4064	EP
2063	819675.8308	760084.3708	1327.2442	EP
2064	819680.3865	760161.0058	1319.7133	NG
2065	819066.9351	760029.7203	1322.2110	TELCO MH
2066	818219.9750	760045.8721	1318.8483	RECLAIM WV
2067	818229.5457	760046.3822	1318.8385	RECLAIM WV
2068	818230.2708	760046.3789	1318.8335	RECLAIM WV
2069	817903.9586	760020.0686	1317.6297	PP
2070	817616.2299	760022.7480	1317.6513	PP
2071	817618.9388	759935.9944	1316.1751	NG
2072	817616.7521	760046.6331	1318.1498	EP
2073	817615.0077	760076.3401	1318.1586	EP
2074	817614.2364	760184.2896	1317.5713	NG
2075	817611.8590	760021.8148	1317.6237	WV BOX
2076	817612.1728	760018.8396	1319.0819	WATERSPOUT
2077	817466.3520	760033.2364	1317.5708	TELCO MH
2078	817346.1366	760061.3861	1318.6777	SSMH
2079	817848.8700	760096.2044	1317.8450	CATV MH
2080	818038.7583	760055.4706	1318.8834	SSMH
2081	818187.3628	760112.9411	1321.2004	SIGN
2082	818819.4386	760112.3908	1321.8510	SIGN
2083	818851.5249	760092.3267	1320.2555	CATV MH
2084	818134.0832	760244.0000	1316.5258	CL CHANNEL
2085	818128.8993	760492.0059	1316.7035	CL CHANNEL
2086	818125.6004	760681.9232	1317.5441	CL CHANNEL

Sonoqui Wash Survey Points

Ground Coordinates

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Point #	Northing	Easting	Elevation	Description
2087	818130.8996	760895.8744	1318.1860	CL CHANNEL
2088	818129.1682	761125.8485	1318.2553	CL CHANNEL
2089	818129.8745	761329.9011	1318.6360	CL CHANNEL
2090	818132.8240	761535.4385	1319.6508	CL CHANNEL
2091	818129.9720	761740.3720	1320.0832	CL CHANNEL
2092	818238.4174	761741.6899	1322.3610	NG
2093	818033.5987	761736.0704	1321.3771	NG
2094	818130.7335	761942.1384	1320.3570	CL CHANNEL
2095	818134.0283	762190.2738	1321.5514	CL CHANNEL
2096	818140.9722	762394.9630	1323.0920	CL CHANNEL
2097	818112.5194	762629.2709	1323.2157	CL CHANNEL
2098	818110.6273	762817.1911	1322.7448	CL CHANNEL
2099	818114.8052	763030.8943	1322.9316	CL CHANNEL
2100	818106.5435	763275.9446	1323.1619	CL CHANNEL
2101	818110.4464	763527.1190	1322.1768	CL CHANNEL
2102	818117.7802	763810.1797	1324.2907	CL CHANNEL
2103	818157.1456	764075.9292	1328.0709	CL CHANNEL
2104	818163.8724	764161.7959	1329.7339	CL DIRTROAD
2105	818156.6443	764184.7129	1329.0807	CL DIRTROAD
2106	818132.0702	764304.6330	1329.0466	NG
2107	818131.3045	764392.5696	1327.5843	TOP ABAND CMP 12
2108	818129.9396	764394.2035	1325.8640	CL CHANNEL
2109	818136.9147	764636.4095	1326.5849	CL CHANNEL
2110	818141.5915	764858.5788	1329.6848	CL CHANNEL
2111	818157.6293	765178.7137	1331.3460	CL CHANNEL
2112	818178.1767	765341.9462	1332.3754	CL CHANNEL
2113	818175.2471	765384.8887	1334.2248	CL RECKER
2114	818153.7902	765404.6560	1336.0723	WATER MKR
2115	818217.7031	765413.3148	1337.5772	WATER MKR
2116	818270.0635	765419.1173	1333.2697	WATER MKR
2117	818362.4010	765341.8267	1334.5520	NG
2118	818363.6186	765421.0888	1334.9575	NG
2119	818057.3698	765341.4724	1333.2344	NG
2120	818047.0935	765429.5669	1334.4307	NG
2121	818145.7236	765388.5734	1334.2504	1" IRON PIPE
2122	818278.5935	766411.6511	1340.2246	TOP
2123	818307.3404	766409.5143	1333.7591	BOTTOM
2124	818337.0928	766409.2425	1337.8554	TOP
2125	818432.7296	766407.0511	1338.2720	NG
2126	818413.2560	768052.1814	1345.0931	FENCE CORNER
2127	818386.9434	768054.4746	1345.3031	FENCE CORNER
2128	818388.1831	768079.8650	1345.5726	FENCE CORNER
2129	818416.1262	768077.8086	1345.2774	FENCE CORNER
2130	818461.2883	769858.8719	1351.3687	PP
2131	818475.9789	770104.1714	1352.3774	PP
2132	818524.5087	770583.7773	1354.3848	STAND PIPE

Sonoqui Wash Survey Points

Ground Coordinates
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Point #	Northing	Easting	Elevation	Description
2133	818445.2226	770673.1722	1356.7131	ADOBE SIGN
2134	818444.8718	770677.1609	1354.3529	ADOBE SIGN
2135	818441.5914	770680.0938	1354.6363	ADOBE SIGN
2136	818439.0117	770680.9282	1354.5770	ADOBE SIGN
2137	818422.7980	769211.1178	1346.6612	PP
2138	818386.7085	769290.6912	1343.1960	TRASH
2139	818337.5006	769293.0711	1347.6793	TRASH
2140	818337.9888	769531.5248	1348.0957	TRASH
2141	818387.4578	769535.6783	1344.1521	TRASH
2142	818439.5237	769487.9504	1349.9243	PP
2143	818377.4678	769725.9869	1344.7672	TRASH
2144	818421.4022	769758.0128	1350.9757	TRASH
2145	818292.3779	769978.8144	1346.5038	TRASH
2146	818218.3978	769918.6712	1352.1667	TRASH
2147	818262.6383	768054.4882	1342.3611	TOP IRR PIPE
2148	818280.4997	768056.5592	1342.5832	TOP IRR PIPE
2149	818274.4959	767821.6114	1344.7056	NG
2150	818160.8490	767824.0956	1341.2360	NG
2151	818185.6671	770031.8838	1345.1039	TOE
2152	818245.6123	770065.3045	1345.6252	TOE
2153	818192.4176	770185.6343	1346.5631	TOE
2154	818141.1520	770164.1982	1346.7967	TOE
2155	818045.4207	770332.4178	1346.2341	TOE
2156	818098.0809	770358.1579	1346.7928	TOE
2157	817983.1433	770475.1256	1346.6426	TOE
2158	817899.8666	770611.8561	1347.2584	TOE
2159	817857.3182	770688.9446	1347.0313	TOE
2160	817940.2479	770688.5381	1347.5960	TOE
2161	818004.5701	770500.3267	1346.6537	TOE
2163	818011.8834	770647.9036	1351.4024	NG
2165	817995.2888	770650.0147	1356.1173	STAND PIPE
2166	817949.0893	770679.8691	1348.9678	HEADWALL
2167	817939.5601	770679.9235	1348.6980	HEADWALL
2168	817975.2989	770678.4245	1350.8960	PP
2169	817919.2832	770739.7462	1349.7438	HEADWALL
2170	817929.5083	770739.7792	1349.8841	HEADWALL
2171	817759.2489	770825.1999	1350.4973	TOP TW PIPE
2172	817778.6239	770835.8022	1350.3454	TOP TW PIPE
2173	817816.6095	770650.0600	1357.4222	STAND PIPE
2174	817728.8731	770675.2811	1352.5822	PP
2175	817485.5602	770677.4602	1352.4152	PP/GAS MRKR
2176	817238.9210	770675.5651	1353.1073	PP
2177	817044.8725	770694.8582	1353.3188	EP
2178	817042.9912	770592.7448	1351.4326	NG
2179	817046.5740	770722.5516	1353.1045	EP
2180	817048.0054	770827.5172	1352.0463	NG

Sonoqui Wash Survey Points

Ground Coordinates
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Point #	Northing	Easting	Elevation	Description
2181	817233.3564	770736.7003	1351.9535	SIGN
2182	817411.7228	770740.6448	1352.0859	CATV MH
2183	817417.3371	770742.9457	1353.3400	TELCO RISER
2184	817610.9100	770744.0057	1350.5111	1" H2O SERV
2185	817811.3665	770740.8002	1351.5737	SIGN
2186	817952.0207	770737.3310	1354.1554	SIGN
2187	818039.1888	770681.3646	1353.0106	SIGN
2188	817740.3215	770685.0575	1352.5532	SIGN
2189	817496.1943	771498.7742	1354.1463	TOP TW PIPE
2190	817516.6837	771508.4582	1354.7986	TOP TW PIPE
2191	817146.2340	772554.4610	1359.5421	STAND PIPE
2192	816639.9639	772521.9866	1360.3782	STEEL PIPE
2193	816590.8366	772512.2141	1357.1670	SUMP PUMP
2194	816481.8252	772511.7428	1361.8536	STEEL PIPE
2195	816734.5379	772334.2737	1356.5174	TOP TW PIPE
2196	816727.9248	772315.8290	1354.4453	TOP TW PIPE
2197	816493.2678	772476.8489	1350.1392	NG IN SUMP
2198	816546.5780	772492.4497	1351.9514	NG IN SUMP
2199	816284.7789	772498.3440	1351.4567	PVC PIPE W/ ROD
2200	816248.2813	772496.2695	1351.6999	POST
2201	816244.8648	772546.4418	1356.4138	TOP TW PIPE
2202	816254.1333	772564.3294	1356.5884	TOP TW PIPE
2203	816384.7078	772044.9488	1353.9080	CL CONC DITCH
2204	816333.9898	772314.3097	1354.1400	CL CONC DITCH
2205	815916.1796	772658.4353	1350.7219	DEBRIS PER
2206	815905.1587	772639.7266	1358.7736	DEBRIS PER
2207	816062.2343	772552.9356	1358.5095	DEBRIS PER
2208	816086.9001	772567.3653	1351.0246	DEBRIS PER
2209	815719.2779	772818.8634	1352.0381	DEBRIS PER
2210	815697.5596	772804.2366	1361.0213	DEBRIS PER
2211	815669.6402	772723.0692	1357.6755	EP
2212	815687.5044	772534.8447	1356.8992	EP
2213	815688.4360	772458.7667	1357.0040	EP
2214	815689.3771	772434.8208	1356.8484	EP
2215	815690.5243	772372.0250	1356.7105	EP
2216	815690.5163	772335.8995	1356.7405	EP
2217	815692.1506	772275.6913	1356.4514	EP
2218	815710.9777	771932.9089	1355.8337	EP
2219	815714.0615	771905.3553	1355.4695	EP
2220	815812.7616	771903.0920	1355.1539	NG
2221	815582.1245	771901.3843	1355.4112	EP
2222	815680.7448	771975.9520	1356.0753	EP
2223	815679.6789	771993.7641	1356.1558	EP
2224	815677.7499	772023.4035	1356.1682	EP
2225	815676.6511	772041.0583	1356.1353	EP
2226	815667.1174	772198.8472	1356.4510	EP

Sonoqui Wash Survey Points

Ground Coordinates
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Point #	Northing	Easting	Elevation	Description
2227	815666.5254	772217.1827	1356.4213	EP
2228	815663.5794	772364.1356	1356.5084	EP
2229	815662.6468	772396.3568	1356.6073	EP
2230	815655.0783	772642.7184	1357.1566	EP
2231	815652.3018	772669.0114	1357.1932	EP
2232	815614.5032	773456.0885	1359.5087	WL
2233	815616.5438	773509.6487	1360.2344	WL
2234	815614.2053	773630.8649	1360.1900	WV BOX
2235	815597.4948	774067.3035	1360.8074	WL
2236	815590.1935	774412.4994	1361.1239	EP
2237	815551.4460	774413.6382	1362.0163	NG
2238	815615.9281	774412.6917	1361.3991	EP
2239	815660.7939	774413.0356	1361.3623	NG
2240	815607.3983	774069.5830	1360.5125	EP
2241	815607.1552	774056.9290	1360.5009	EP
2242	815609.6783	773938.4955	1360.6308	EP
2243	815608.9207	773922.6754	1360.6687	EP
2244	815618.7336	773716.5489	1359.8578	EP
2245	815619.5953	773700.7693	1359.7650	EP
2246	815624.4861	773584.5049	1359.6526	EP
2247	815624.4057	773567.1962	1359.7840	EP
2248	815625.1207	773485.5664	1359.5326	EP
2249	815624.9410	773466.5728	1358.8206	EP
2250	815549.6326	773050.4320	1356.1970	FENCE CORNER
2251	815543.3751	773051.1588	1356.6713	CL 12' GATE
2252	815536.4781	773051.4250	1358.5667	FENCE
2253	815483.2983	773092.8449	1362.0222	FENCE
2254	815432.3144	773139.2481	1360.2747	GUYWIRE
2255	815426.6645	773142.8319	1360.1941	GUYWIRE
2256	815423.3480	773144.9727	1360.1106	GUYWIRE
2257	815409.5642	773150.4747	1361.7879	FENCE
2258	815337.2329	773195.0000	1360.2689	FENCE
2259	815236.7927	773358.5821	1360.7835	FENCE
2260	815138.7540	773516.0884	1360.6798	CL 10' GATE
2261	815110.7405	773562.1611	1361.5004	CL 5' GATE
2262	815055.7628	773650.1411	1361.9993	FENCE
2263	815058.1044	773671.6502	1362.4230	POOP
2264	815060.2546	773738.0341	1359.2556	POOP
2265	815004.3247	773780.7121	1361.6072	CL 10' GATE
2266	814995.5140	773803.3827	1362.9160	CL 5' GATE
2267	814942.8101	773933.8589	1362.6100	FENCE
2268	814817.6059	774085.2831	1362.8468	FENCE COR N&W
2269	814809.8074	774103.6365	1364.2538	FENCE COR S&W
2270	814803.1308	774137.2461	1361.1362	FENCE
2271	814733.5371	774203.4252	1361.8153	FENCE
2272	814732.0628	774216.0125	1361.5538	FENCE

Sonoqui Wash Survey Points

Ground Coordinates
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Point #	Northing	Easting	Elevation	Description
2273	814680.9568	774248.4126	1360.5499	FENCE COR SW&NW
2274	814653.5802	774215.5241	1362.0671	CL 12' GATE
2275	814640.1166	774199.0914	1364.2096	FENCE CORNER
2276	814641.5578	774203.7943	1362.6194	CL CONC DITCH
2277	814629.0275	774212.4952	1362.6952	CL CONC DITCH
2278	814625.6227	774209.8989	1364.0425	FENCE CORNER
2279	814635.3179	774202.6932	1364.2461	CL 5' GATE
2280	814634.1954	774222.3303	1363.1440	CL 12' GATE
2281	814648.6239	774243.1792	1363.4323	FENCE CORNER
2282	814645.3273	774253.3103	1363.7146	FENCE CORNER
2283	814506.3313	774346.1917	1365.3078	FENCE CORNER
2284	814491.4290	774321.3150	1363.7623	CL 12' GATE
2285	814485.7752	774312.5565	1363.0534	CL CONC DITCH
2286	814483.9529	774308.4566	1364.4597	FENCE CORNER
2287	814731.4382	774645.2400	1364.8976	FENCE CORNER
2288	814741.8802	774582.3905	1363.2605	CL 6' GATE
2289	814765.5175	774435.1985	1363.3162	FENCE CORNER
2290	814815.9711	774455.9022	1363.1211	FENCE CORNER
2291	814861.2298	774376.6775	1363.2255	CL 4' GATE
2292	814867.4897	774365.3091	1366.3863	FENCE
2293	814908.6445	774314.0565	1362.6489	CL 12' GATE
2294	814918.4252	774301.4842	1362.6951	FENCE COR E&S
2295	814881.0438	774263.8821	1360.9218	FENCE POST
2296	814975.2676	774124.2549	1359.5305	FENCE COR E&N
2297	815013.7269	774046.9750	1358.8957	1" H2O SPIGOT
2298	815012.9467	774045.7647	1359.3330	CONC TROUGH
2299	815013.3866	774043.3316	1359.8082	CONC TROUGH
2300	815007.0877	774042.2641	1361.2648	CONC TROUGH
2301	815006.5669	774044.7586	1360.5367	CONC TROUGH
2302	815091.2840	773951.0674	1357.5554	CL 5' GATE
2303	815102.5872	773906.9500	1358.3666	OHE
2304	815068.0698	773868.9173	1356.8376	OHE
2305	815021.5516	773818.8071	1357.8121	OHE
2306	815142.4485	773875.5685	1357.8086	CL 4' GATE
2307	815183.6865	773814.1343	1358.5436	FENCE COR E&S
2308	815234.0072	773738.7318	1357.2942	FENCE COR E&N
2309	815259.8488	773700.9605	1356.7794	CL 8' GATE
2310	815316.7839	773617.1693	1357.7663	CL 6' GATE
2311	815377.4007	773515.2800	1357.2027	FENCE CORNER
2312	815558.3350	773438.1174	1356.8782	FENCE COR E&S
2313	815596.1461	773422.5222	1358.4407	2" IP
2314	814608.0721	775719.6907	1368.1534	COR PRK LOT
2315	814639.4815	775718.1129	1368.2209	COR PRK LOT
2316	814656.0330	775696.9657	1366.3969	HEADWALL
2317	814657.9026	775697.5598	1366.4023	HEADWALL
2318	814660.8653	775694.2932	1366.3518	HEADWALL

Sonoqui Wash Survey Points

Ground Coordinates
By: Stanley Consultants

Point #	Northing	Easting	Elevation	Description
2319	814659.9565	775692.4152	1366.4006	HEADWALL
2320	814659.0445	775695.4421	1363.1896	INV 18"
2321	814608.5588	775761.2949	1368.4095	COR PRK LOT
2322	814627.3675	775761.6371	1368.4742	PRK LOT
2323	814680.5802	775794.0007	1368.6734	DW
2324	814683.7843	775845.5532	1368.4105	DW
2325	814699.8936	775845.6858	1368.5322	DW
2326	814695.8678	775780.3782	1368.6544	DW
2327	814680.6509	775770.5711	1368.4298	DW
2328	814581.6947	775820.8003	1368.2129	CL 5' S/W
2329	814681.9689	775819.5663	1368.5590	CL 5' S/W
2330	814797.1619	775893.1292	1369.0770	B/C
2331	814797.1327	775892.4105	1368.6142	GUTT
2332	814709.5388	775892.6137	1368.0498	SD/GUTT
2333	814643.7498	775806.7206	1367.3296	TELCO RISER
2334	814294.5380	775831.6946	1365.8282	HEADWALL
2335	814284.6309	775831.5652	1365.7477	HEADWALL
2336	814287.8644	775830.7763	1362.6856	INV 24"
2337	814291.4168	775830.4800	1362.2489	INV 24"
2338	814241.0706	775814.9620	1367.0533	IRR CNTL BOX
2339	814240.5012	775822.9287	1365.5291	WL BLUSTK
2340	814254.9968	775818.1798	1366.3933	WL BLUSTK
2341	814228.7053	775812.9810	1366.5142	WL BLUSTK
2342	814186.2149	775906.6532	1368.1353	TELCO RISER
2343	814250.4462	775907.0849	1364.3277	TELCO RISER
2344	814252.0124	775907.3309	1364.0469	CATV RISER
2345	814274.5632	775915.8930	1365.8894	HEADWALL
2346	814276.1426	775913.5797	1365.8768	HEADWALL
2347	814282.9741	775914.4072	1365.7702	HEADWALL
2348	814284.1911	775916.8617	1365.7385	HEADWALL
2349	814281.3952	775914.8416	1362.3402	INV 24"
2350	814277.2973	775914.4476	1362.4360	INV 24"
2351	814322.4604	775890.9859	1368.0328	TELCO BLUSTK
2352	814348.2142	775891.3561	1367.6029	TELCO BLUSTK
2353	814333.0159	775908.1001	1366.4449	HEADWALL
2354	814335.7303	775914.6206	1366.3285	HEADWALL
2355	814333.9230	775911.5158	1362.9454	INV 24"
2356	814287.8223	775936.2431	1362.0689	BOTTOM
2357	814261.0232	775983.8308	1362.4980	BOTTOM
2358	814221.5174	776046.3468	1363.3596	BOTTOM
2359	814187.4472	776061.4709	1363.6485	BOTTOM
2360	814152.5509	776139.4737	1363.4114	BOTTOM
2361	814104.9453	776190.7839	1363.7410	BOTTOM
2362	814073.4947	776237.7383	1363.6519	BOTTOM
2363	813995.6156	776325.3357	1364.5451	BOTTOM
2364	813766.9702	775796.5731	1366.2080	FENCE COR

Sonoqui Wash Survey Points

Ground Coordinates
By: Stanley Consultants

Point #	Northing	Easting	Elevation	Description
2365	813751.3179	775894.9947	1365.5854	FENCE COR
2366	813652.8336	775878.9804	1365.9223	FENCE COR
2367	813652.9652	775876.6131	1365.9753	CL 4' GATE
2368	813668.1925	775780.5151	1366.5484	FENCE COR
2369	813442.9289	775610.6406	1368.2879	HEADWALL
2370	813431.9909	775609.8125	1368.2086	HEADWALL
2371	813424.7929	775668.6022	1367.5305	HEADWALL
2372	813436.6107	775668.8970	1367.5325	HEADWALL
2373	813432.5758	775669.7689	1364.6346	INV 24"
2374	813428.4697	775669.2567	1364.8966	INV 24"
2375	813435.8436	775609.1602	1365.3329	INV 24"
2376	813358.7754	775518.4827	1368.2007	CL CONC DITCH
2377	813310.6694	775572.8588	1368.3110	CL CONC DITCH <
2378	813205.5676	775603.3898	1368.5250	CL CONC DITCH
2379	813075.0544	775640.8124	1368.6943	CL CONC DITCH
2380	813074.6210	775640.7669	1370.2547	TOP 8" PVC
2381	813069.9055	775641.9958	1371.4188	WV
2382	813042.4112	775649.5668	1369.9245	5" IRR SPOUT
2383	813038.1677	775650.9204	1369.6246	WV
2384	813338.5451	775628.8041	1367.9402	EP
2385	813339.2223	775656.2043	1367.2422	EP
2386	813343.1859	775757.7112	1365.3099	NG
2387	812895.2838	775888.6379	1370.8435	EP@DW
2388	812895.5462	775921.1973	1370.8553	EP@DW
2389	812895.4425	775959.0565	1370.8707	EP@DW
2390	812895.6397	775981.9346	1370.9041	EP@DW
2391	812895.4865	776002.2184	1370.9465	EP@DW
2392	812894.9934	776030.8733	1371.0373	EP@DW
2393	812895.9306	776133.7882	1371.1894	EP@DW
2394	812895.9051	776149.5032	1371.2760	EP@DW
2395	812894.5011	776258.7670	1371.1954	EP@DW
2396	812894.9619	776274.6344	1371.3088	EP@DW
2397	812895.3887	776325.4149	1371.4635	EP@DW
2398	812895.6006	776340.7949	1371.5802	EP@DW
2399	812897.8044	776699.4088	1372.0912	EP@DW
2400	812897.6495	776716.7473	1372.1161	EP@DW
2401	812897.8077	776776.2977	1372.2475	EP@DW
2402	812898.1882	776793.7515	1372.4120	EP@DW
2403	812898.6388	776872.4714	1372.4681	EP@DW
2404	812898.6055	776891.0356	1372.4342	EP@DW
2405	812899.8281	776997.0808	1372.6978	EP@DW
2406	812899.6587	777012.2662	1372.7096	EP@DW
2407	812840.3806	777080.2447	1374.8095	FH
2408	812842.4621	777080.1896	1373.0014	WV
2409	812844.1694	777083.2173	1373.0547	WV
2410	812952.4459	777235.6862	1374.2568	PP

Sonoqui Wash Survey Points

Ground Coordinates
By: Stanley Consultants

Point #	Northing	Easting	Elevation	Description
2411	812886.9853	777363.5636	1371.6838	SIGN
2412	812953.7559	777455.6873	1370.9635	PP
2413	812942.9870	777548.1389	1368.4121	RIP-RAP
2414	812945.3866	777717.9835	1373.2981	RIP-RAP
2415	812954.6587	777725.6848	1374.9398	PP
2416	812943.2894	777765.8245	1374.4314	SIGN
2417	812967.0900	777662.1762	1374.5120	WV
2418	812965.7303	777595.4867	1374.6057	TELCO PEDESTAL
2419	812959.4918	777560.2838	1374.4939	RIP-RAP
2420	813044.3413	777474.8472	1376.5783	RIP-RAP
2421	813198.0865	777297.2163	1376.1441	RIP-RAP
2422	813176.0932	777286.7102	1368.7938	RIP-RAP
2423	813286.3266	777223.5838	1375.9232	CL 4' GATE
2424	813333.2983	777169.7494	1375.8557	CL 4' GATE
2425	813520.1798	776909.7590	1365.8520	DEBRIS
2426	813533.6975	776930.8621	1374.6833	DEBRIS
2427	813578.2784	776887.1885	1374.8874	CL 4' GATE
2428	813610.8571	776849.3562	1374.3604	CL 4' GATE
2429	813636.1872	776807.1547	1373.7342	DEBRIS
2430	813612.8905	776783.8762	1365.5644	DEBRIS
2431	812981.7873	778451.9601	1380.3360	FH
2432	812981.9498	778461.2892	1378.6831	WV
2433	812957.1934	778205.4569	1377.6881	PP
2434	812905.5843	778154.2297	1377.8397	EP@DW
2435	812905.5050	778136.6843	1377.6772	EP@DW
2436	812943.5150	777765.7596	1374.4754	SIGN
2437	812880.1963	777629.4051	1372.4006	TELCO MH
2438	812927.7862	777472.5765	1371.1631	32' O/S WL BLSTK

Sonoqui Wash Survey Points

Ground Coordinates

By: Stanley Consultants

Point #	Northing	Easting	Elevation	Description
2439	820800.2244	760061.4016	1328.2496	BC
2440	818138.8038	762723.5694	1324.9658	AC SEC 14/28
2441	818145.7397	765388.5670	1334.2307	BROKEN 1" IP
2442	818304.9835	768049.5344	1342.1821	AC SEC 13/24
2443	818233.1827	775855.2802	1370.0941	BC
2444	815570.5689	775857.6172	1369.3723	BC SEC 19/20
2445	812907.7942	775859.8688	1370.6092	BC
2446	812976.7648	773226.5199	1362.4236	BCHH
2447	812920.9492	778497.8593	1378.4542	BCHH
2448	812935.0427	781130.1005	1386.2111	BCHH
2449	810244.2056	775864.1017	1376.0176	2" AC FLUSH
2450	810262.1851	778519.3069	1381.2425	FD PK NAIL

Sonoqui Wash Survey Points

Ground Coordinates

By: Stanley Consultants

Point #	Northing	Easting	Elevation	Description
2475	823434.6925	758319.1970	1314.8462	BM#1
2476	818294.0182	757227.9102	1311.5264	BM#2
2477	820811.3074	754730.2682	1305.2165	BC FLUSH
2478	823463.9867	757407.4908	1308.3622	BC FLUSH\BROKEN
2479	818146.6544	757552.3568	1310.1445	BC
2480	823477.1326	762696.8444	1322.6110	2" AC
2481	823605.2974	767977.3795	1337.7622	BC FLUSH
2482	821096.3629	770669.2700	1347.0295	ADOT BC
2483	818464.5130	770710.3939	1354.4703	BCHH
2484	815753.3342	770708.6680	1353.5580	1/2" REBAR IN HH
2485	818351.8984	773225.5475	1360.1172	BCHH
2486	818240.6320	778480.4422	1376.4769	2" AC
2487	815591.1923	781117.5671	1384.6405	BCHH

Sonoqui Wash Survey Points

Ground Coordinates

By: Stanley Consultants

Point #	Northing	Easting	Elevation	Description
2526	818111.6934	759985.1775	1318.6311	SSMH
2527	818242.3539	760123.4819	1317.5851	FENCE POST
2528	818211.4173	760136.9574	1317.1646	FENCE line
2529	818172.0043	760164.8239	1317.6010	FENCE line
2530	818103.8136	760226.0338	1317.3678	FENCE POST
2531	818184.8588	760428.9215	1318.2175	mesq 20' sou
2532	818211.4208	760517.9319	1318.2757	mesq 20' sou
2533	818250.1621	760759.7824	1319.2325	mesq 20' sou
2534	818173.7723	760782.4515	1319.0617	mesq 20' sou
2535	818152.0499	760835.0178	1319.3441	cott 20' sou
2536	818195.0349	760982.8083	1319.6679	mesq 20' sou
2537	818243.0643	761025.1328	1319.9749	mesq 20' sou
2538	818241.1386	761149.1197	1320.3269	mesq 20' sou
2539	818280.1677	761575.5413	1321.7177	mesq 20' sou
2540	818150.8006	761698.9126	1321.7591	tree 20' sou
2541	818159.8412	761780.3841	1322.3942	mesq 20' sou
2542	818233.8774	761937.9031	1323.0033	mesq 20' sou
2543	818180.3386	762389.4999	1324.6936	mesq 20' sou
2544	818186.1318	762456.8937	1324.9383	mesq 20' sou
2545	818197.5130	762565.5932	1324.3169	mesq 20' sou
2546	818289.5835	762623.2538	1325.0644	mesq 20' sou
2547	818320.1159	762641.9903	1324.8865	mesq 20' sou
2548	818282.5046	762561.8246	1325.0592	DEBRIS PER
2549	818253.6212	762543.0825	1325.7467	DEBRIS PER
2550	818217.7226	762629.4199	1326.1083	DEBRIS PER
2551	818253.1106	762655.5306	1325.5203	DEBRIS PER
2552	818077.3278	762708.7781	1332.2083	SIGN
2553	818117.4513	762482.5323	1326.9145	SIGN
2554	818311.2174	762500.7326	1324.9941	mesq 20' sou
2555	818187.3589	762698.7878	1324.4173	TOP TW PIPE
2556	818131.8699	762673.6738	1325.1710	mesq 20' sou
2557	818175.2528	762769.7434	1325.4268	mesq 20' sou
2558	818171.4214	762824.5506	1325.7192	mesq 20' sou
2559	818165.2927	762839.7097	1327.3590	mesq 20' sou
2560	818162.2775	762851.8375	1327.4915	mesq 20' sou
2561	818181.0879	762889.1898	1325.3749	mesq 20' sou
2562	818179.7066	762913.6399	1325.4914	mesq 20' sou
2563	818173.6502	762927.3322	1325.5867	mesq 20' sou
2564	818180.0899	762960.7342	1325.6238	mesq 20' sou
2565	818136.7748	762981.1489	1325.5351	mesq 20' wes
2566	818170.0617	763020.3988	1327.1828	mesq 20' sou
2567	818167.4517	763042.7935	1327.8392	mesq 20' sou
2568	818176.6912	763063.4769	1326.0776	mesq 20' sou
2569	818128.5795	763086.0766	1324.7222	mesq 20' wes
2570	818158.6150	763105.5619	1328.0358	mesq 20' sou
2571	818139.1097	763127.0902	1325.7751	mesq 20' wes
2572	818142.5806	763247.1854	1326.3872	mesq 20' wes

Sonoqui Wash Survey Points

Ground Coordinates
By: Stanley Consultants

Point #	Northing	Easting	Elevation	Description
2573	818145.3005	763241.7643	1326.5509	mesq 20' sou
2574	818174.8309	763229.3637	1327.0356	mesq 20' sou
2575	818173.6577	763577.1705	1329.3780	mesq 20' sou
2576	818164.1535	763577.5295	1330.1968	mesq 20' sou
2577	818164.4515	763638.4064	1329.9831	mesq 20' sou
2578	818144.1637	763679.3387	1326.7469	mesq 20' sou
2579	818199.0028	763756.6847	1327.7974	mesq 20' sou
2580	818147.0992	763786.9111	1327.1545	mesq 20' wes
2581	818138.5622	763795.6538	1326.9589	mesq 20' sou
2582	818190.1627	763842.7308	1328.3557	mesq 20' sou
2583	818156.8276	763870.4852	1328.7127	mesq 20' wes
2584	818192.1504	763896.7971	1328.3583	mesq 20' sou
2585	818151.9711	763942.3677	1328.4460	mesq 20' wes
2586	818181.8713	764019.0472	1330.5019	mesq 20' sou
2587	818210.5450	764078.5246	1328.2317	TOP TW PIPE
2588	818185.3370	764394.0630	1332.8299	mesq 20' sou
2589	818160.6724	764429.3372	1330.5835	mesq 20' sou
2590	818179.5532	764506.7311	1332.0488	mesq 20' sou
2591	818102.3399	764397.6588	1330.4631	CONST MAT
2592	818068.9658	764400.3348	1330.0189	CONST MAT
2593	818076.2884	764509.4567	1330.5651	CONST MAT
2594	818107.1902	764508.2456	1330.8028	CONST MAT
2595	818120.3391	764634.3854	1331.0024	CONST MAT
2596	818095.9079	764636.0437	1330.9628	CONST MAT
2597	818100.8515	764713.0726	1331.5997	CONST MAT
2598	818124.7031	764711.6559	1331.8043	CONST MAT
2599	818192.9285	764557.4813	1333.1470	mesq 20' sou
2600	818205.5158	764572.9735	1332.2445	mesq 20' sou
2601	818195.0956	764591.8432	1333.0891	mesq 20' sou
2602	818138.1937	764572.9912	1326.3597	mesq 20' nor
2603	818141.3044	764579.5074	1326.1002	mesq 20' nor
2604	818133.6087	764593.5763	1326.1597	mesq 20' nor
2605	818139.2578	764604.7844	1326.2791	mesq 20' nor
2606	818187.9164	764621.3466	1333.4048	mesq 20' sou
2607	818203.1033	764649.7183	1333.1426	mesq 20' sou
2608	818204.4357	764678.0290	1333.2070	mesq 20' sou
2609	818199.2207	764758.9557	1334.1070	mesq 20' sou
2610	818189.0373	764774.4513	1333.8763	mesq 20' sou
2611	818157.4496	764802.9265	1330.9122	mesq 20' wes
2612	818185.6197	764822.0534	1332.9534	mesq 20' sou
2613	818186.1474	764841.5662	1333.0941	mesq 20' sou
2614	818189.5434	764874.8021	1333.3019	mesq 20' sou
2615	818200.6092	764880.7085	1334.5362	mesq 20' sou
2616	818192.8057	764888.1379	1334.3445	mesq 20' sou
2617	818185.6902	764887.7320	1332.7916	mesq 20' sou
2618	818186.4608	764909.3672	1332.5942	mesq 20' sou

Sonoqui Wash Survey Points

Ground Coordinates

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Point #	Northing	Easting	Elevation	Description
2619	818155.3825	764905.0020	1330.8407	mesq 20' wes
2620	818098.6849	764960.1510	1332.4689	mesq 20' nor
2621	818145.3443	764952.7712	1330.0313	mesq 20' nor
2622	818149.4215	764965.8804	1330.3583	mesq 20' nor
2623	818151.7405	764991.4457	1330.1865	mesq 20' nor
2624	818157.5706	765027.2549	1330.8268	mesq 20' nor
2625	818149.5719	765043.6266	1330.4845	mesq 20' nor
2626	818144.9278	765062.5670	1330.7189	mesq 20' nor
2627	818148.5461	765072.6077	1330.3339	mesq 20' nor
2628	818146.8437	765086.9664	1330.5597	mesq 20' nor
2629	818151.6814	765093.0724	1330.4355	mesq 20' nor
2630	818156.1124	765106.2329	1330.4518	mesq 20' nor
2631	818151.2152	765150.1821	1330.8729	mesq 20' nor
2632	818148.7510	765164.9979	1331.1452	mesq 20' nor
2633	818181.4032	765157.4590	1333.3672	mesq 20' wes
2634	818201.6863	765092.7253	1335.2937	mesq 20' wes
2635	818218.3006	765019.8330	1333.9229	mesq 20' sou
2636	818206.2275	764998.5616	1334.8141	mesq 20' sou
2637	818211.4591	764973.9582	1334.4639	mesq 20' sou
2638	818202.7162	764946.5876	1334.7147	mesq 20' sou
2639	818227.1385	765236.0604	1333.6157	mesq 20' sou
2640	818156.0740	765242.6456	1331.8432	mesq 20' nor
2641	818225.8965	765300.0890	1339.3874	SIGN
2642	818129.5646	765284.5084	1338.2153	SIGN
2643	818090.1674	765414.3954	1335.5076	PP 5' east
2644	817837.5507	765413.9727	1334.2632	PP 5' east
2645	818343.5727	765418.2117	1334.9073	PP 5' east
2646	818596.3012	765414.3146	1334.6105	PP 5' east
2647	818257.6915	765421.7955	1332.6325	CL fence
2648	818215.1134	765417.0068	1337.0104	FENCE COR
2649	818211.7610	765442.6796	1336.0352	FENCE line
2650	818216.0569	765506.3593	1336.0042	FENCE line
2651	818118.6551	765455.0314	1334.4193	DEBRIS PER
2652	818075.3107	765451.7610	1336.5170	DEBRIS PER
2653	818079.6399	765496.6077	1334.7720	DEBRIS PER
2654	818055.9666	765544.5809	1335.1138	DEBRIS PER
2655	818074.8897	765644.3686	1334.7358	DEBRIS PER
2656	818089.4191	765643.5246	1334.8230	DEBRIS PER
2657	818108.1804	765555.0849	1334.9630	DEBRIS PER
2658	818125.9748	765540.2873	1335.1548	DEBRIS PER
2659	818110.4687	765905.8241	1335.6022	DEBRIS PER
2660	818115.8945	765979.6898	1335.1633	DEBRIS PER
2661	818129.6128	765977.2057	1335.4002	DEBRIS PER
2662	818125.2725	765904.6340	1335.4555	DEBRIS PER
2663	818111.2838	761265.7063	1321.9736	SIGN
2664	818103.6753	760522.8769	1319.5931	mesq 20' nor

Sonoqui Wash Survey Points

Ground Coordinates
By: Stanley Consultants

Point #	Northing	Easting	Elevation	Description
2665	818101.1225	760296.4403	1317.5653	mesq 20' nor
2666	818218.3905	760299.0940	1320.0980	mesq 20' sou
2667	818095.9090	760262.9289	1318.3401	tree 20' nor
2668	818250.4503	765991.6549	1337.1546	FENCE ANG PT
2669	818281.6203	766535.3015	1341.0771	FENCE ANG PT
2670	818296.6394	766903.9548	1340.4599	FENCE ANG PT
2671	818309.6717	767167.3054	1341.4039	FENCE ANG PT
2672	818342.0131	767786.7031	1343.8871	FENCE ANG PT
2673	818345.0042	767886.8703	1343.8253	FENCE ANG PT
2674	818368.2376	768070.0514	1345.7772	FENCE ANG PT
2675	818402.4907	768652.2220	1348.7442	FENCE ANG PT
2676	818430.5216	769165.2043	1348.9420	FENCE
2677	818484.5033	770157.1282	1352.4935	FENCE COR S&W
2678	818452.7574	770169.3518	1351.5160	FENCE COR E&N
2679	818450.4602	770319.2840	1351.9360	FENCE END
2680	818356.2172	768100.8989	1345.2567	PP 5' east
2681	818354.4782	768079.4933	1346.1275	GUYWIRE
2682	818363.3551	768148.2075	1344.4564	T/PIPE 10"
2683	818363.3434	768149.1211	1344.5050	T/PIPE 10"
2684	818372.3077	768371.7938	1345.0016	PP 5' east
2685	818388.9783	768649.5056	1345.8135	PP 5' east
2686	818405.6967	768929.4355	1346.2056	PP 5' east
2687	818445.3699	769072.1429	1349.3557	STAND PIPE
2688	818463.8605	769417.6324	1351.4907	IRR CNTL VALVE
2689	818490.5141	770346.1406	1352.6893	PP 5' east
2690	818505.6299	770592.1307	1354.3181	PP 5' east
2691	818507.7074	770624.7867	1354.9695	GUYWIRE
2692	818336.2302	770696.3741	1354.1436	EP
2693	818214.2056	770697.3667	1353.2803	EP
2694	818089.4490	770697.1789	1350.5190	EP
2695	817990.9229	770697.0326	1348.6760	EP
2696	817895.6747	770697.4856	1347.8477	EP
2697	817831.6301	770697.4600	1347.7382	EP
2698	817767.7198	770697.7098	1347.9910	EP
2699	817643.6616	770697.3043	1350.0137	EP
2700	817569.3659	770696.7532	1351.6922	EP
2701	817483.5085	770696.1926	1352.7687	EP
2702	817388.6757	770695.8825	1353.1559	EP
2703	817294.7873	770695.6218	1353.2129	EP
2704	817294.8525	770722.8378	1353.1448	EP
2705	817388.3393	770722.7491	1353.0048	EP
2706	817483.0872	770723.2619	1352.7687	EP
2707	817569.3233	770723.7046	1351.9329	EP
2708	817642.6841	770724.2593	1350.3659	EP
2709	817767.8920	770726.8241	1348.5501	EP
2710	817831.5830	770727.4327	1348.1366	EP

Sonoqui Wash Survey Points

Ground Coordinates
By: Stanley Consultants

Point #	Northing	Easting	Elevation	Description
2711	817895.4352	770728.8109	1348.0982	EP
2712	817990.7566	770730.7226	1348.9787	EP
2713	818089.2242	770732.9304	1350.8289	EP
2714	818213.6121	770735.9321	1353.2362	EP
2715	818336.0097	770736.6576	1354.1556	EP
2716	817165.2416	770695.5131	1353.3651	EP
2717	817163.6164	770722.6584	1353.3406	EP
2718	816890.3075	770734.8548	1352.1031	GAS MARKER
2719	816889.4155	770677.4902	1352.1589	GAS MARKER
2720	816934.0393	770741.6766	1352.0427	COX FIBER UG
2721	817241.9594	770741.4125	1351.9706	COX FIBER UG
2722	817549.7037	770742.8707	1351.3924	COX FIBER UG
2723	817126.2405	772160.9821	1356.0798	DEBRIS PER
2724	817175.2535	772083.1375	1356.3112	DEBRIS PER
2725	817154.4622	772071.1576	1350.7485	DEBRIS PER
2726	817088.9575	772119.4994	1350.4950	DEBRIS PER
2727	816751.7525	772348.9082	1355.6691	TOP TW PIPE
2728	816767.2504	772361.0742	1356.6313	TOP TW PIPE
2729	815670.8737	772862.8014	1353.0919	DEBRIS PER
2730	815658.6398	772839.0155	1360.6266	DEBRIS PER
2731	815591.9996	772961.9936	1357.6938	DEBRIS PER
2732	815612.7516	772975.8074	1352.7392	DEBRIS PER
2733	815586.0270	772743.3399	1357.4863	EP
2734	815588.9541	772735.0455	1357.6825	WV
2735	815583.9341	772769.2185	1357.7157	EP
2736	815614.8205	772805.9812	1358.1654	EP
2737	815639.5906	772814.5625	1358.2658	EP
2738	815620.2778	772865.1986	1359.1183	EP
2739	815602.1898	772841.1967	1358.5027	EP@DW
2740	815595.1064	772859.1100	1358.5717	EP@DW
2741	815582.5371	772892.7157	1359.1507	EP
2742	815606.0329	772901.6440	1359.4844	EP
2743	815591.7433	772952.0576	1358.3350	EP
2744	815565.8669	772948.9966	1358.7177	EP
2745	815563.1150	773006.6857	1356.1482	EP@DW
2746	815589.2920	773004.2224	1355.7411	EP
2747	815557.6841	772985.6445	1357.6415	WL BLUSTK
2748	815557.0615	773006.7054	1356.7784	WL BLUSTK
2749	815562.0875	772989.4467	1357.0264	EP@DW
2750	815564.5199	773058.8623	1353.2719	EP
2751	815592.4611	773056.9568	1353.4578	EP
2752	815596.0831	773108.7248	1352.7350	EP
2753	815569.8648	773113.0431	1352.5250	EP
2754	815561.3396	773092.7496	1352.4696	WL BLUSTK
2755	815574.7857	773166.1239	1352.5092	EP
2756	815599.6545	773161.5021	1352.7102	EP

Sonoqui Wash Survey Points

Ground Coordinates
By: Stanley Consultants

Point #	Northing	Easting	Elevation	Description
2757	815606.5569	773219.3654	1353.3019	EP
2758	815580.7398	773223.5801	1352.9031	EP
2759	815588.5515	773282.9097	1353.5209	EP
2760	815615.7476	773278.7602	1353.9783	EP
2761	815625.1147	773333.0275	1354.5491	EP
2762	815597.2930	773337.0582	1353.9941	EP
2763	815611.8527	773391.3576	1355.5604	EP
2764	815636.4454	773385.5543	1355.5611	EP
2765	815597.7432	773371.0648	1354.7520	WL BLUSTK
2766	815602.1928	773387.5380	1355.4930	WL BLUSTK
2767	815622.5843	773438.9685	1357.2371	EP
2768	815648.5181	773434.4040	1357.1748	EP
2769	815651.1467	773492.4419	1359.1476	EP
2770	815650.1488	773547.4015	1359.5086	EP
2771	815645.7689	773602.6340	1359.4580	EP
2772	815644.0886	773655.8023	1359.6805	EP
2773	815641.7889	773711.8483	1359.7758	EP
2774	815622.6692	773639.6058	1359.6219	EP
2775	815601.4698	773342.2543	1354.3718	mesq 20' sou
2776	815599.2460	773336.0380	1354.1827	mesq 20' sou
2777	815588.5201	773293.2685	1353.3123	mesq 20' sou
2778	815595.3735	773273.0642	1353.7738	mesq 20' sou
2779	815594.2055	773245.5709	1353.5714	mesq 20' sou
2780	815585.0475	773201.1362	1353.0246	mesq 20' sou
2781	815583.9538	773180.9803	1352.9071	mesq 20' sou
2782	815575.3001	773134.7433	1352.6249	mesq 20' sou
2783	815575.1710	773114.5147	1352.6606	mesq 20' sou
2784	815524.7094	773143.4141	1352.4135	mesq 20' nor
2785	815531.7168	773198.5048	1352.9855	mesq 20' nor
2786	815499.8643	773219.5886	1353.8791	pv 20' north
2787	815487.7352	773258.5185	1353.4569	pv 20' nor
2788	815502.9727	773309.3704	1353.6512	pv 20' north
2789	815517.5639	773369.2544	1356.4136	mesq 20' sou
2790	815554.0298	773406.1763	1356.3705	mesq 20' eas
2791	815540.8612	773419.8910	1356.9918	mesq 20' eas
2792	815514.9682	773425.6907	1356.7690	mesq 20' eas
2793	815469.6452	773437.8845	1357.3024	mesq 20' eas
2794	815478.7001	773429.2288	1356.8516	mesq 20' sou
2795	815490.3804	773342.4369	1353.6531	mesq 20' sou
2796	815498.1723	773306.7781	1352.0227	mesq 20' sou
2797	815477.3151	773253.8789	1351.6136	mesq 20' sou
2798	815468.0623	773199.8580	1355.3243	mesq 20' sou
2799	815471.6977	773187.5099	1355.2587	mesq 20' sou
2800	815445.6556	773308.0320	1354.4970	mesq 20' sou
2801	815458.6486	773455.9274	1357.2847	pv 20' east
2802	815435.0173	773460.5798	1356.9468	mesq 20' eas

Sonoqui Wash Survey Points

Ground Coordinates
By: Stanley Consultants

Point #	Northing	Easting	Elevation	Description
2803	815408.7781	773467.3632	1356.8586	pv 20' south
2804	815390.5528	773453.0847	1356.8028	pv 20' south
2805	815393.9116	773481.7294	1357.1104	pv 20' south
2806	815402.8356	773407.5917	1352.6443	pv 20' west
2807	815411.4133	773404.0784	1352.4196	pv 20' west
2808	815385.1976	773311.9017	1355.6280	mesq 20' eas
2809	815319.0497	773290.8451	1357.5174	mesq 20' sou
2810	815341.2846	773303.1996	1356.5196	mesq 20' sou
2811	815328.9806	773350.9331	1356.4048	mesq 20' sou
2812	815331.8752	773364.0761	1356.4101	mesq 20' sou
2813	815343.5696	773359.8454	1356.0236	mesq 20' sou
2814	815351.5149	773465.0973	1352.5276	pv 20' east
2815	815338.0792	773442.9761	1357.1206	pv 20' east
2816	815346.4369	773487.8029	1356.1063	pv 20' east
2817	815314.2843	773444.8055	1355.5433	pv 20' east
2818	815314.7298	773461.2072	1356.2567	pv 20' south
2819	815328.2918	773419.4109	1355.6497	mesq 20' sou
2820	815320.2967	773418.4808	1355.6934	mesq 20' wes
2821	815298.5968	773408.4730	1355.6054	mesq 20' wes
2822	815267.6261	773412.4881	1356.5294	mesq 20' nor
2823	815267.4066	773423.8639	1355.9757	mesq 20' nor
2824	815287.8688	773446.7893	1356.0444	pv 20' east
2825	815265.5658	773475.3228	1356.4779	pv 20' east
2826	815249.9196	773482.2190	1356.2300	mesq 20' eas
2827	815227.3714	773472.2434	1357.8919	mesq 20' eas
2828	815286.1763	773534.5828	1355.8310	pv 20' north
2829	815295.1013	773563.4004	1356.3344	pv 20' north
2830	815284.0165	773592.2418	1357.5368	pv 20' east
2831	815281.4954	773629.5694	1358.9807	mesq 20' nor
2832	815272.3554	773623.1156	1359.0569	mesq 20' sou
2833	815268.1818	773596.1563	1359.9794	mesq 20' sou
2834	815158.3809	773603.7104	1353.5710	mesq 20' wes
2835	815165.1090	773628.5947	1353.5099	mesq 20' eas
2836	815197.5743	773740.4735	1358.2317	mesq 20' eas
2837	815117.0147	773688.8792	1353.8556	mesq 20' wes
2838	815110.4972	773691.2249	1353.9349	mesq 20' wes
2839	815107.1702	773705.1120	1354.0426	mesq 20' wes
2840	815095.0925	773710.2334	1353.9839	mesq 20' sou
2841	815102.2808	773738.5517	1353.9955	mesq 20' sou
2842	815068.1256	773741.9572	1356.6807	mesq 20' sou
2843	815070.3924	773795.1838	1357.0858	mesq 20' wes
2844	815068.3431	773810.5956	1357.3528	mesq 20' wes
2845	815068.8900	773809.9229	1357.3669	mesq 20' nor
2846	815049.9220	773816.3054	1356.6474	mesq 20' sou
2847	815054.6346	773857.0073	1357.6737	mesq 20' wes
2848	815095.5678	773897.9350	1358.4196	mesq 20' eas

Sonoqui Wash Survey Points

Ground Coordinates
By: Stanley Consultants

Point #	Northing	Easting	Elevation	Description
2849	815097.6277	773913.3026	1358.3782	mesq 20' sou
2850	815035.6928	773906.0994	1357.5237	mesq 20' wes
2851	815068.6400	773982.3079	1358.9165	mesq 20' sou
2852	815041.3793	773940.2249	1357.8922	mesq 20' sou
2853	815018.5998	773941.1131	1358.5182	mesq 20' sou
2854	815024.3024	773923.1310	1357.9007	mesq 20' sou
2855	814966.3142	774011.8248	1357.9196	mesq 20' sou
2856	814975.2795	774020.5277	1358.1761	mesq 20' sou
2857	814982.2782	774033.5405	1358.1513	mesq 20' sou
2858	814993.1386	774056.4058	1358.0196	mesq 20' sou
2859	814996.8361	774069.6124	1358.6184	mesq 20' sou
2860	814947.1943	774043.1805	1358.1675	mesq 20' wes
2861	814931.6651	774045.1226	1357.9774	mesq 20' wes
2862	814924.2652	774068.0804	1357.7615	mesq 20' sou
2863	814924.2686	774064.7371	1358.0275	mesq 20' eas
2864	814953.4894	774091.9554	1359.1613	mesq 20' sou
2865	814926.7806	774138.1091	1358.1541	mesq 20' wes
2866	814893.9978	774109.9712	1358.1057	mesq 20' nor
2867	814897.4986	774121.2305	1357.3864	mesq 20' wes
2868	814878.6551	774113.3516	1357.9846	mesq 20' wes
2869	814890.6366	774081.9944	1358.3169	mesq 20' wes
2870	814829.9737	774075.6633	1362.8208	mesq 20' nor
2871	814850.7783	774116.0719	1358.6494	mesq 20' sou
2872	814870.8348	774183.8822	1358.6667	mesq 20' sou
2873	814806.1302	774210.7771	1359.2118	mesq 30' wes
2874	814874.2702	774318.9040	1362.6009	mesq 20' eas
2875	814830.7860	774330.8914	1362.6576	mesq 20' eas
2876	814777.4095	774334.4879	1356.5411	mesq 20' eas
2877	814762.4410	774306.7405	1359.8599	mesq 20' wes
2878	814686.4758	774294.8841	1355.7050	mesq 20' wes
2879	814718.4502	774270.4963	1358.0377	mesq 20' sou
2880	814699.4621	774391.0934	1360.5788	mesq 20' nor
2881	814658.5992	774391.2669	1359.7182	mesq 20' nor
2882	814649.8745	774374.5909	1354.5916	mesq 20' nor
2883	814644.4607	774489.3019	1358.5647	mesq 20' wes
2884	814627.5960	774508.9020	1358.3074	mesq 20' wes
2885	814617.3547	774512.2726	1358.0632	mesq 20' sou
2886	814663.5525	774579.4103	1363.9961	mesq 20' sou
2887	814665.5766	774597.4345	1363.1353	mesq 20' sou
2888	814626.6802	774609.3047	1364.5159	mesq 20' wes
2889	814609.8890	774634.9146	1362.7132	mesq 20' wes
2890	814642.3115	774723.7976	1364.4684	mesq 20' wes
2891	814653.5519	774691.6492	1363.7646	mesq 20' wes
2892	814878.2777	774009.2710	1363.2612	CL 10' GATE
2893	815411.9652	773156.7202	1361.1910	PP 5' west
2894	815432.2506	773139.2946	1360.3056	GUYWIRE

Sonoqui Wash Survey Points

Ground Coordinates
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Point #	Northing	Easting	Elevation	Description
2895	815426.7594	773142.5390	1360.3300	GUYWIRE
2896	815423.4014	773145.0277	1360.4249	GUYWIRE
2897	815411.0014	773167.8224	1361.2413	GUYWIRE
2898	815340.7669	773199.2970	1360.3221	PP 5' west
2899	815259.0754	773328.9206	1360.5567	PP 5' west
2900	815269.6106	773339.3759	1358.0904	GUYWIRE
2901	815271.0507	773342.3897	1357.9747	GUYWIRE
2902	815275.8185	773348.2922	1357.6197	GUYWIRE
2903	815162.7675	773486.0846	1361.4176	PP 5' west
2904	815061.0412	773651.8225	1362.3104	PP 5' south
2905	815004.2884	773795.9400	1361.5795	PP 5' south
2906	815050.2921	773850.8821	1357.4505	one nw-se
2907	814949.5437	773935.2032	1360.3577	PP 5' south
2908	814954.3902	773944.4718	1359.0387	GUYWIRE
2909	814958.9179	773948.6357	1358.2377	GUYWIRE
2910	814829.0301	774101.8429	1363.9286	GUYWIRE
2911	814827.4239	774100.0682	1363.6074	GUYWIRE
2912	814817.2433	774090.6741	1362.6208	PP 5' south
2913	814668.5475	774238.4789	1361.7274	PP 5' north
2914	814676.4788	774243.5476	1362.0183	GUYWIRE
2915	814680.7015	774248.1971	1361.2586	GUYWIRE
2916	814526.9135	774374.8096	1359.2852	GUYWIRE
2917	814526.4730	774373.4338	1359.2106	GUYWIRE
2918	814499.4622	774365.0427	1361.4141	GUYWIRE
2919	814513.4769	774358.8424	1360.4345	PP 5' west
2920	814326.7697	774433.4744	1364.7239	PP 5' south
2921	814317.8216	774424.2586	1364.8348	GUYWIRE
2922	814313.6893	774414.4744	1364.6407	GUYWIRE
2923	814194.4362	774581.7475	1365.0995	PP 5' south
2924	814057.9108	774736.8463	1365.9450	PP 5' south
2925	814048.3977	774731.9780	1366.5932	GUYWIRE
2926	814045.1304	774732.1832	1366.4699	PP 5' west
2927	813909.3150	774905.2736	1366.6918	PP 5' south
2928	813760.4462	775074.0397	1367.3211	PP 5' south
2929	813758.2073	775075.9982	1367.2802	GUYWIRE
2930	813563.1588	775300.3186	1367.6701	GUYWIRE
2931	813563.4902	775296.4532	1367.9034	PP 5' south
2932	813407.1315	775474.4470	1369.4253	PP 5' south
2933	813387.9861	775491.7353	1369.9064	GUYWIRE
2934	813386.7193	775492.6860	1369.9113	GUYWIRE
2935	814267.6362	775823.9447	1365.2032	mesq 20' wes
2936	814281.3939	775824.5577	1363.8738	mesq 20' wes
2937	814292.2071	775790.1540	1363.3394	mesq 20' wes
2938	814319.8177	775794.1142	1362.8962	mesq 20' wes
2939	814324.9759	775790.2997	1362.5012	mesq 20' wes
2940	814336.6075	775758.5631	1362.8768	mesq 20' sou

Sonoqui Wash Survey Points

Ground Coordinates
By: Stanley Consultants

Point #	Northing	Easting	Elevation	Description
2941	814349.6577	775750.2106	1363.1237	mesq 20' sou
2942	814359.3992	775735.9216	1362.9370	mesq 20' sou
2943	814366.7880	775716.3223	1362.7337	mesq 20' sou
2944	814339.1838	775692.0830	1361.8915	mesq 20' eas
2945	814328.0465	775712.9538	1361.9154	mesq 20' eas
2946	814302.0523	775704.8499	1363.5892	mesq 20' eas
2947	814266.5058	775743.2134	1365.7860	mesq 20' nor
2948	814255.5592	775749.8931	1367.2041	mesq 20' nor
2949	814351.3900	775685.6847	1362.5929	mesq 20' nor
2950	814368.1627	775659.7442	1361.6078	mesq 20' nor
2951	814391.9130	775690.0932	1362.9375	mesq 20' nor
2952	814386.3851	775714.8507	1362.8236	mesq 20' nor
2953	814712.3124	775668.3986	1366.9018	pv 20' nor
2954	814737.9516	775742.9466	1366.1521	pv 20' east
2955	814720.0625	775588.6930	1362.3249	mesq 20' nor
2956	814677.9606	775548.8613	1361.5352	mesq 20' nor
2957	814675.6647	775532.4180	1361.6924	mesq 20' nor
2958	814695.9186	775520.5174	1361.4196	mesq 20' nor
2959	814681.3080	775497.6386	1361.3690	mesq 20' nor
2960	814662.6501	775370.7260	1362.9804	mesq 20' nor
2961	814708.7688	775385.7556	1361.2199	mesq 20' wes
2962	814685.4867	775350.2549	1362.2760	mesq 20' nor
2963	814404.8240	775579.6404	1362.7484	mesq 20' nor
2964	814404.6269	775600.4515	1362.2712	mesq 20' sou
2965	814412.0099	775575.3212	1362.5446	mesq 20' sou
2966	814395.9739	775541.0963	1361.5574	mesq 20' wes
2967	814429.0852	775506.3336	1360.3051	mesq 20' sou
2968	814436.7195	775502.2339	1360.0869	mesq 20' wes
2969	814463.0118	775446.1609	1362.0367	mesq 20' sou
2970	814399.1510	775473.6162	1366.2474	mesq 20' eas
2971	814501.0784	775337.9733	1360.5911	mesq 20' sou
2972	814503.8992	775303.9638	1360.3517	mesq 20' sou
2973	814537.6594	775219.5343	1360.8077	mesq 20' nor
2974	814631.1504	775122.1621	1365.0473	mesq 20' nor
2975	814546.0392	775086.8548	1360.5377	mesq 20' nor
2976	814688.2459	775116.2162	1363.2360	mesq 20' nor
2977	814719.7334	775238.7834	1363.1121	mesq 20' nor
2978	814503.9344	774973.3336	1359.7073	mesq 20' sou
2979	814479.6349	774903.4070	1359.4505	mesq 20' nor
2980	814475.1775	774863.4364	1358.9106	mesq 20' nor
2981	814478.0811	774852.9453	1359.2346	mesq 20' nor
2982	814457.4207	774817.1894	1358.0412	mesq 20' nor
2983	814456.7518	774677.7064	1359.2962	mesq 20' nor
2984	814436.8943	774688.1024	1359.5665	mesq 20' nor
2985	814400.1155	774636.8084	1361.1088	mesq 20' nor
2986	814426.3591	774566.0774	1353.6138	mesq 20' nor

Sonoqui Wash Survey Points

Ground Coordinates
By: Stanley Consultants

Point #	Northing	Easting	Elevation	Description
2987	814765.1865	775276.3578	1366.7784	CL 3' GATE
2988	814772.7147	775027.8678	1366.3830	CL 8' GATE
2989	814755.9610	774804.1438	1365.3445	CL 5' GATE
2990	814741.6307	774582.6576	1363.4746	CL 6' GATE
2991	815105.0915	773932.5638	1357.7885	GUYWIRE
2992	815111.0400	773923.9834	1358.6776	GUYWIRE
2993	815111.1239	773923.9968	1358.7031	pp 5 nw inline
2994	815219.2881	773771.2039	1358.1610	PP 5' west
2995	815305.0295	773808.2780	1360.0948	PP w/lt 5' west
2996	815320.2556	773610.0391	1357.9043	PP w/lt 5' east
2997	815331.1505	773593.7776	1357.7329	GUYWIRE
2998	815333.7026	773589.0511	1358.0223	GUYWIRE
2999	814399.0669	774367.4959	1364.4390	CL 3' GATE
3000	814313.9800	774427.0571	1364.6126	CL 3' GATE
3001	814286.1679	774455.5025	1364.8728	CL 6' GATE
3002	814166.3826	774594.9642	1365.5176	CL 6' GATE
3003	814162.7652	774599.0531	1365.5016	CL 4' GATE
3004	814045.6550	774727.9657	1366.2495	CL 3' GATE
3005	813975.5484	774806.2977	1366.3595	CL 3' GATE
3006	813881.7332	774919.2280	1367.2843	CL 4' GATE
3007	813848.8697	774956.1454	1367.5804	CL 5' GATE
3008	813751.9133	775066.1802	1367.9180	CL 3' GATE
3009	813742.8813	775076.5827	1368.0367	CL 4' GATE
3010	813651.2767	775181.9045	1368.2403	CL 3' GATE
3011	813278.8956	775636.2176	1368.0579	EP
3012	813283.2689	775662.6610	1367.2466	EP
3013	813360.8914	775654.1427	1367.3461	EP
3014	813358.5363	775627.7497	1367.9549	EP
3015	813429.3701	775624.9452	1368.1430	EP
3016	813429.6253	775651.4808	1367.4818	EP
3017	813502.4317	775655.3250	1367.3422	EP
3018	813505.0268	775628.3956	1368.2128	EP
3019	813577.8123	775636.6022	1368.2588	EP
3020	813572.5185	775662.9157	1367.5148	EP
3021	813644.2989	775677.4948	1367.7572	EP
3022	813650.2281	775650.7727	1368.4334	EP
3023	813723.2141	775670.0229	1368.8562	EP
3024	813715.1062	775696.6724	1368.0800	EP
3025	813785.4465	775720.9780	1368.6620	EP
3026	813795.4937	775695.5373	1369.3223	EP
3027	813861.1211	775723.7359	1369.7904	EP
3028	813849.3444	775749.0809	1369.3324	EP
3029	813934.4236	775787.1746	1369.4354	EP
3030	813945.4715	775762.4229	1369.2882	EP@DW
3031	814014.4977	775790.2977	1367.6674	EP@DW
3032	814004.3146	775816.2306	1368.6915	EP

Sonoqui Wash Survey Points

Ground Coordinates
By: Stanley Consultants

Point #	Northing	Easting	Elevation	Description
3033	814070.8512	775839.1819	1367.8537	EP
3034	814079.2283	775811.6172	1366.6204	EP
3035	814148.3906	775829.1879	1365.9631	EP
3036	814141.1078	775860.2098	1367.0944	EP
3037	814207.8304	775876.2191	1367.2727	EP
3038	814212.7634	775840.0003	1365.6597	EP
3039	814293.7376	775846.5989	1365.7855	EP
3040	814242.4420	775882.3010	1367.9915	t/c b/c
3041	814290.6894	775888.4026	1368.0362	t/c b/c
3042	814378.7697	775893.7400	1368.3203	t/c b/c
3043	814379.3794	775848.2815	1365.9262	EP
3044	814456.8627	775848.7625	1366.2929	EP
3045	814457.5610	775893.6566	1368.3837	t/c b/c
3046	814529.7933	775893.5919	1368.5563	t/c b/c
3047	814528.7848	775849.0265	1367.0675	EP
3048	814601.6715	775847.0079	1367.8564	EP
3049	814601.9615	775893.4750	1368.7449	t/c b/c
3050	814680.6870	775893.2786	1368.8298	t/c b/c
3051	814682.1014	775833.9930	1368.0208	T/18" CMP
3052	814701.9495	775833.9698	1368.1581	T/18" CMP
3053	814749.2686	775831.5767	1368.2295	T/18" CMP
3054	814781.3567	775831.4904	1368.2336	T/18" CMP
3055	814768.8188	775788.8312	1368.8996	CL 12' GATE
3056	814756.3559	775846.3612	1368.9244	EP
3057	814756.7077	775867.1345	1369.2403	CL
3058	814756.9595	775893.1193	1368.9794	t/c b/c
3059	814757.2759	775902.5045	1368.5053	CL 5' S/W
3060	814764.5828	775903.9795	1368.4955	pine 5' east
3061	814739.8588	775904.2101	1368.3602	pine 5' east
3062	814701.6415	775904.3484	1368.2563	tree 5' east
3063	814679.4560	775906.2636	1368.2244	tree 5' east
3064	814658.8225	775903.3156	1368.1887	tree 5' east
3065	814641.2349	775905.3800	1367.8931	tree 5' east
3066	814623.2721	775904.2313	1368.0841	tree 5' east
3067	814589.2175	775905.5467	1367.9977	pine 5' east
3068	814573.7308	775892.2546	1368.0781	tree 5' east
3069	814557.3407	775905.8913	1367.9422	tree 5' east
3070	814543.4864	775887.5504	1368.0343	tree 10' east
3071	814520.3711	775888.2160	1367.9302	tree 10' east
3072	814507.7252	775903.5063	1367.8536	tree 10' east
3073	814487.9149	775906.9011	1367.8914	tree 10' east
3074	814472.9360	775930.8881	1370.3603	tree 10' north
3075	814457.7076	775938.6971	1369.9134	tree 10' east
3076	814408.3655	775961.5876	1369.6790	tree 10' east
3077	813952.5097	775748.9124	1368.9456	WV
3078	813953.4529	775746.8790	1371.3798	FH

Sonoqui Wash Survey Points

Ground Coordinates
By: Stanley Consultants

Point #	Northing	Easting	Elevation	Description
3079	813985.6186	775724.0793	1368.3014	DW
3080	814003.5759	775688.8999	1368.0152	DW
3081	814018.1817	775694.0366	1368.1628	DW
3082	814000.1947	775734.1026	1368.4533	DW
3083	814017.2683	775768.7050	1368.6119	mailbox
3084	814049.7435	775770.8389	1368.9814	PP 10' west
3085	814164.8573	775788.9470	1368.3415	lightpole
3086	814027.4544	775795.5826	1367.5168	OHE
3087	814003.2134	775830.7012	1369.0365	PP 5' east
3088	814134.2617	775869.6208	1367.5684	OHE
3089	814189.4085	775882.8763	1367.2672	SIGN
3090	814253.9119	775897.6576	1367.0237	PP 5' east
3091	814283.2330	775907.9951	1365.6874	GUYWIRE
3092	814300.0690	775912.1497	1365.1936	1" IRON PIPE
3093	814517.4966	775888.8308	1368.0580	WV 10' east
3094	814510.4812	775903.2176	1367.9570	CL 5' S/W
3095	814565.5883	775903.3805	1368.1820	CL 5' S/W
3096	814620.2225	775903.0786	1368.2467	CL 5' S/W
3097	814675.3214	775902.9061	1368.2946	CL 5' S/W
3098	814725.4104	775902.8930	1368.3795	CL 5' S/W
3099	814734.6513	775894.8001	1372.2420	SIGN
3100	814726.6452	775920.3790	1369.6347	trans pad
3101	814719.2898	775920.3412	1369.5546	trans pad
3102	814719.2268	775914.9787	1369.5772	trans pad
3103	814726.6379	775914.9705	1369.7241	trans pad
3104	814610.3814	775915.2707	1369.9913	trans pad
3105	814610.2817	775920.0169	1369.9986	trans pad
3106	814604.8824	775919.9636	1370.0101	trans pad
3107	814604.8585	775915.1069	1370.0509	trans pad
3108	814601.9427	775915.5941	1369.9911	trans pad
3109	814601.5357	775921.9449	1370.2006	trans pad
3110	814597.4869	775921.8295	1370.2783	trans pad
3111	814597.7066	775915.5204	1370.1037	trans pad
3112	814594.7945	775911.0530	1371.9745	TELCO RISER
3113	814779.8226	775913.5245	1368.7389	block wall
3114	814729.6977	775913.6194	1369.2645	block wall
3115	814729.6214	775923.7393	1369.1725	block wall
3116	814715.9386	775923.5413	1368.9568	block wall
3117	814715.6686	775913.5315	1368.9726	block wall
3118	814665.0118	775913.6627	1368.7472	block wall
3119	814613.8776	775913.9064	1368.8466	block wall
3120	814613.4290	775925.1606	1368.7663	block wall
3121	814594.5091	775924.8690	1369.3908	block wall
3122	814594.4028	775913.8940	1369.2297	block wall
3123	814517.6143	775913.7269	1370.6618	block wall
3124	814450.3137	775958.7549	1371.1459	block wall

Sonoqui Wash Survey Points

Ground Coordinates
By: Stanley Consultants

Point #	Northing	Easting	Elevation	Description
3125	814405.0458	775989.1413	1371.3677	block wall
3126	814369.2585	776040.0816	1371.5484	CL 4' GATE
3127	814298.9635	776141.0860	1371.5706	block wall
3128	814256.1884	776250.8641	1371.2694	block wall
3129	814256.2836	776264.4056	1371.5083	CL 4' GATE
3130	814256.3092	776271.1210	1371.5758	CL 4' GATE
3131	814256.4860	776325.9853	1371.2923	block wall
3132	813950.9205	776455.4356	1373.6615	CL 8' GATE
3133	813828.0301	776597.8245	1374.1635	CL 6' GATE
3134	813682.4074	776766.8657	1374.1549	CL 3' GATE
3135	813610.6693	776849.5290	1374.3750	CL 4' GATE
3136	813578.2721	776887.2455	1374.8991	CL 4' GATE
3137	813333.2887	777169.8099	1375.9185	CL 4' GATE
3138	813286.4784	777223.6896	1375.9475	CL 4' GATE

SONOQUI WASH CHANNELIZATION
FROM QUEEN CREEK WASH TO CHANDLER HEIGHTS ROAD
FCD 2002C037

SURVEY REPORT

APPENDIX B
FIELD BOOKS

Projects (continued)

1-21-04

DZT MH

SET BASE PT #99

W. OF FARM FIELD S. OF
POWER RANCH OFF OF TRILOGY
GOLF COURSE

LATITUDE = 33.151469916

LONGITUDE = -111.41411759

ELLIPSE HEIGHT = 1280.875984

"SONOQUIGUA AB.

1 FEB -04"

BASE STATION LOCATION

33° 15' 14.69916" N

111° 41' 41.17590" W

1280.876 ft.

MAP TO BASE PT #99

GREEN CREEK RD.

DODDILL RD.

LECKER RD.

POWER RD.

POWER
RANCH

BASE
PT #99

TRILOGY

FARM
FIELD

LOCALIZATION SETUP

#2 ZEM 1 (H) NORTH OF HWY HWY. EAST OF POWER RD
 N ERR = 0.00
 E ERR = 0.00

#3 ZDN 1 (H) SOUTH OF DEPTHD WEST OF ELLSWORTH
 N ERR = 0.00
 E ERR = 0.00

SCALE = 0.999850598

ROTATION = $-0^{\circ}07'18.107''$

DELTA N = 491980.973 FT.

DELTA E = 489772.67 FT.

ORIGIN N = 318175.07 FT

ORIGIN E = 338333.559 FT

✓ PT #1 ZDL1

N = .06

E = .08

SALQUI WASH (GRID)
 1-21-04

DOMINIC ZOEN
 MIKE HUTCHINSON

115
SET ZEBAR + CAP #21780

1000	PP 200	NO ELEV.
1001	PP 201	
1002	PP 202	
1003	PP 205	
1004	PP 206	
1005	PP 204	
1006	PP 203	
1007	PP 207	
1008	PP 209	
1009	PP 208	
1010	PP 210	

- MOVED -
- MOVED -

MOVED -

1-23-04 FILE: SANDQUI GRID

DZ X MH CONT. W/ PANELS

✓ PT # 1 ZDL1
N# .06 E: .07

1011	PP 211
1012	PP 212
1013	PP 213
1014	PP 216
1015	PP 217
1016	PP 218
1017	PP 215
1018	PP 214
1019	PP 219
1020	PP 220
1021	PP 221
1022	PP 222
1023	PP 230
1024	PP 225
1025	PP 224

MOVED -
MOVED -
MOVED -

MOVED -

MOVED -
MOVED -
MOVED -
MOVED -
MOVED -
MOVED -

1026 PP#223

MOVED -

1-26-04

File: SANDRAI GRID

02 T.M.H

CONT. W/ PANELS

√ PT #1 ZDL4

N= 04

E= .12

1027 PP#227

MOVED -

1028 PP#228

MOVED -

1029 PP#229

MOVED -

1030 PP#226

MOVED -

START SETTING BLIND PANELS

1031 PP"Y" #8

1032 PP"Y" #7

1033 PP"Y" #6

1034 PP"Y" #5

1035 PP"Y" #4

1036 PP"Y" #3

1037 PP"Y" #2

1038 PP"Y" #1

DZL	SET BASE @ #2009 -	EVE: SMOO
12/7/04	LOCATE TREES / MISC.	Colo 50°
VED PT # 2017		
N = .05	E = .08	EL = .09
2526	SSMH	
2527	FENCE POST ("T" POST)	
2528	FENCE LINE	
2529	FENCE LINE	
2530	FENCE POST	
2531	MESQUITE TREE	20' SOUTH w/ 12" TRUNK 25' CANOPY
2532	"	" " w/ 14" TRUNK 30' "
2533	"	" " w/ 12" " 40' "
2534	"	" " w/ 14" " 40' "
2535	① COTTONWOOD TREE	" " w/ 12" " 30' " *
2536	MESQUITE TREE	" " w/ 14" " 30' "
2537	"	" " w/ 12" " 30' "
2538	"	" " w/ 24" " 40' "
2539	"	" " w/ 12" " 40' "
2540	② COTTONWOOD TREE	" " w/ 20" " 30' " *
2541	MESQUITE TREE	" " w/ 12" " 40' "
2542	"	" " w/ 16" " 40' "
2543	"	" " w/ 12" " 40' "
2544	"	" " w/ 12" " 40' "
2545	"	" " w/ 12" " 40' "
2546	"	" " w/ 16" " 40' "
2547	"	" " w/ 12" " 20' "
2549	DEBRIS PERIMETER	
2549	"	"
2550	"	"
2551	DEBRIS PERIMETER	
2552	NO DUMPING SIGN	
2553	"	"

* SHOT TAKEN IS 20' NORTH OF TREE ↓

* TRASH *

2554	MESQUITE TREE	20' SOUTH	W/14" TRUNK	30' CANOPY
2555	TOP 12" TAILWATER PIPE (SOUTH END)			
2556	MESQUITE TREE	20' SOUTH	W/12" TRUNK	30' CANOPY
2557	"	"	W/18"	40' "
2558	"	"	W/12"	30' "
2559	"	"	W/12"	30' "
2560	"	"	W/12"	30' "
2561	"	"	W/12"	30' "
2562	"	"	W/14"	30' "
2563	"	"	W/16"	40' "
2564	"	"	W/16"	40' "
2565	MESQUITE TREE	20' WEST	W/12"	20' "
2566	"	20' SOUTH	W/12"	30' "
2567	"	"	W/14"	30' "
2568	"	"	W/16"	40' "
2569	"	20' WEST	W/12"	20' "
2570	"	20' SOUTH	W/12"	40' "
2571	"	20' WEST	W/12"	30' "
2572	"	20' WEST	W/20"	40' "
2573	"	20' SOUTH	W/16"	40' "
2574	"	"	W/12"	30' "
2575	"	"	W/12"	20' "
2576	"	"	W/12"	20' "
2577	"	"	W/20"	40' "
2578	"	"	W/20"	40' "
2579	"	"	W/12"	30' "
2580	"	20' WEST	W/20"	40' "
2581	"	20' SOUTH	W/20"	40' "
2582	"	"	W/12"	20' "
2583	"	20' WEST	W/18"	40' "
2584	"	20' SOUTH	W/20"	40' "
2585	"	20' WEST	W/20"	40' "
2586	"	20' SOUTH	W/18"	40' "

SHOT TAKEN IS 20' EAST OF TREE

2587	TOP	12"	TAILWATER PIPE			
2588	MESQUITE TREE	20' SOUTH	W/12"	TRUNK	30' CANOPY	
2589	"	"	"	W/16"	"	40' "
2590	"	"	"	W/18"	"	40' "
2591	CONSTRUCTION MATERIALS / STORAGE PERIMETER					
2592						
2593						
2594						
2595						
2596						
2597						
2598	CONSTRUCTION MATERIALS / STORAGE PERIMETER					
2599	MESQUITE TREE	20' SOUTH	W/12"	TRUNK	30' CANOPY	
2600	"	"	"	W/12"	"	30' CANOPY
2601	"	"	"	W/16"	"	40' "
2602	"	"	20' NORTH	W/12"	"	20' "
2603	"	"	"	W/20"	"	40' "
2604	"	"	"	W/20"	"	40' "
2605	"	"	"	W/12"	"	20' "
2606	"	"	20' SOUTH	W/20"	"	40' "
2607	"	"	"	W/16"	"	30' "
2608	"	"	"	W/14"	"	30' "
2609	"	"	"	W/20"	"	30' "
2610	"	"	"	W/16"	"	30' "
2611	"	"	20' WEST	W/20"	"	40' "
2612	"	"	20' SOUTH	W/16"	"	30' "
2613	"	"	"	W/20"	"	40' "
2614	"	"	"	W/12"	"	30' "
2615	"	"	"	W/12"	"	30' "
2616	"	"	"	W/12"	"	20' "
2617	"	"	"	W/12"	"	20' "
2618	"	"	20' SOUTH	W/14"	"	30' "
2619	MESQUITE TREE	20' WEST	W/12"	TRUNK	30' CANOPY	

SHOTS WERE TAKEN 20' SOUTH OF TREE

2620	MESQUITE TREE	20'	NORTH	W/14"	TRUNK	30'	CANOPY
2621	"	"	"	W/16"	"	30'	"
2622	"	"	"	W/16"	"	40'	"
2623	"	"	"	W/14"	"	30'	"
2624	"	"	"	W/14"	"	40'	"
2625	"	"	"	W/18"	"	40'	"
2626	"	"	"	W/18"	"	30'	"
2627	"	"	"	W/12"	"	20'	"
2628	"	"	"	W/12"	"	20'	"
2629	"	"	"	W/20"	"	30'	"
2630	"	"	"	W/20"	"	40'	"
2631	"	"	"	W/12"	"	20'	"
2632	"	"	20' NORTH	W/2"	"	20'	"
2633	"	"	20' WEST	W/20"	"	40'	"
2634	"	"	20' WEST	W/20"	"	40'	"
2635	"	"	20' SOUTH	W/12"	"	30'	"
2636	"	"	"	W/20"	"	30'	"
2637	"	"	"	W/12"	"	30'	"
2638	"	"	"	W/20"	"	40'	"
2639	"	"	"	W/16"	"	30'	"
2640	"	"	20' NORTH	W/20"	"	40'	"
2641	NO DUMPING SIGN ☒						
2642	NO DUMPING SIGN ☒						
2643	POWER POLE 5' EAST						
2644	"	"	"	"	"	"	"
2645	"	"	"	"	"	"	"
2646	POWER POLE 5' EAST						
2647	☒ WIRE FENCE						
2648	☒ FENCE CORNER						
2649	☒ WIRE FENCE ANGL. PT.						
2650	☒ WIRE FENCE						
2651	DEBRIS PERIMETER						
2652	"	"	"	"	"	"	"
2653	DEBRIS PERIMETER						

* SHOT TAKEN 5' WEST OF PPO

2654 DEBRIS PERIMETER

2655

2656

2657

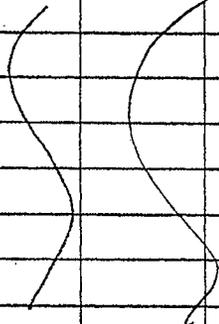
2658

2659

2660

2661

2662 DEBRIS PERIMETER



DIAMH
 12/9/04
 * CONT w/ VERTICAL TIES/WIRE & SOLD 50°
 - SPT BASE @ # 2030
 FILE SANDWICH RECORD

VED PT # 2034
 N = .04
 E = .04
 V = .07

2663 NO DIMENSION SIGN

2664 MESQUITE TREE 20' NORTH w/ 1/2" TIE 30' CAUSWAY

2665 " " " w/ 1/8" " 30' "

2666 " " " 20' SOUTH w/ 1/8" " 40' "

2667 " " " 20' NORTH w/ 1/2" " 20' "

2668 EDGE AREA PT.

2669

2670

2671

2672

2673

2674

2675 FENCE AREA PT.

2676 FENCE

2677 FENCE COR

2678 FENCE COR

2679 FENCE END

2680 PP 5' EAST

2681 GUY WIRE

2682 TOP 10" DRAIN PIPE

2683 TOP 10" DRAIN PIPE

2684 PP 5' EAST

2685 " " "

2686 PP 5' EAST

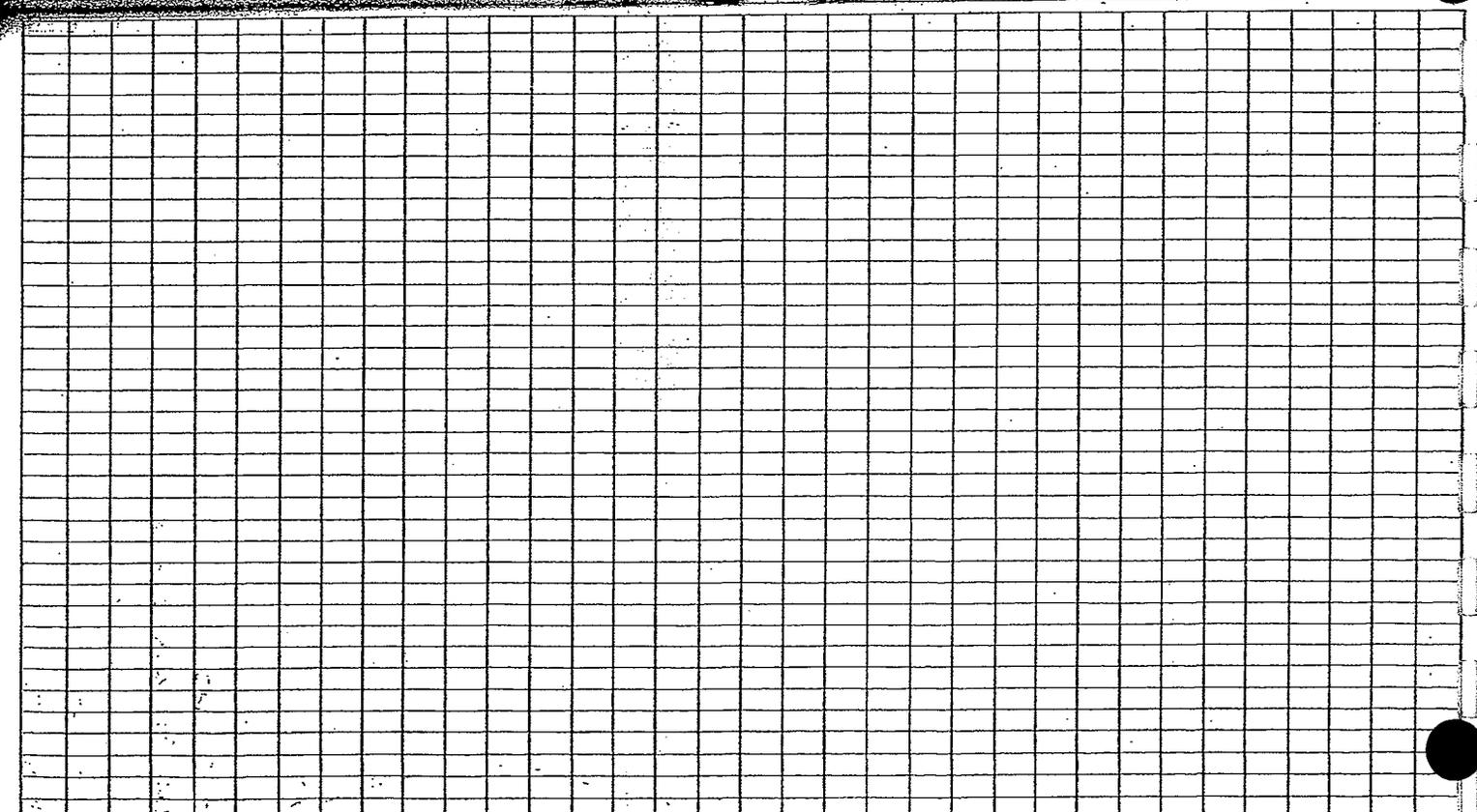
2687 CONCRETE STAND PIPE

2688 IRRIGATION CONTROL VALVE

2689 PP 5' EAST

2690 PP 5' EAST

2691



2691 GUY WIRE

2692 EP

2693

2694

2695

2696

2697

2698

2699

2700

2701

2702

2703

2704

2705

2706

2707

2708

2709

2710

2711

2712

2713

2714

2715

2716

2717 EP

2718 GAS MARKER

2719 GAS MARKER

2720 COX FIBER OPTIC UG PIN FLAG

2721 " " " " " "

2722 COX FIBER OPTIC UG PIN FLAG

2723 DOBBS PERIMETER

EDGE OF PAVEMENT

2724 DEBRIS PERIMETER

2725 " "

2726 DEBRIS PERIMETER

2727 TOP 10" TAILWATER PIPE

2728 TOP 10" TAILWATER PIPE

2729 DEBRIS PERIMETER

2730 { }

2731 { }

2732 DEBRIS PERIMETER

2733 EP

2734 WV

2735 EP

2736 { }

2737 { }

2738 EP

2739 EP @ DW

2740 EP @ DW

2741 EP

2742 { }

2743 { }

2744 EP

2745 EP @ DW

2746 EP

2747 W/L BLUE STAKE

2748 W/L BLUE STAKE

2749 EP @ DW

2750 EP

2751 { }

2752 { }

2753 EP

2754 W/L BLUE STAKE

2755 EP

2756 EP

2757 EP

2758

2759

2760

2761

2762

2763

2764 EP

2765 W/L BLUE STAKE

2766 W/L BLUE STAKE

2767 EP

2768

2769

2770

2771

2772

2773

2774 EP

DZAMH + SET BASE @ #2030 - FIRE SQUAD FRONTS

12/13/04 * CONT w/ TOPCO *

VED PT #2084

N = .04

E = .03

V = .06

2775 MESQUITE TREE 20' SOUTH w/ 6" TRUNK 30' CANOPY

2776 " " " " w/ 6" " 20' "

2777 " " " " w/ 12" " 20' "

2778 " " " " w/ 10" " 30' "

2779 " " " " w/ 10" " 20' "

2780 " " " " w/ 8" " 30' "

2781 " " " " w/ 6" " 20' "

2782 " " " " w/ 20" " 40' "

2783 " " " " w/ 12" " 30' "

2784 " " 20' NORTH w/ 12" " 20' "

2785 " " " " w/ 8" " 30' "

2786 PALO VERDE " " " w/ 12" " 30' "

2787 PALO VERDE " " " w/ 20" " 40' "

2788 PALO VERDE " " " w/ 10" " 20' "

2789 MESQUITE TREE 20' SOUTH w/ 6" " 10' "

2790 " " " " EAST w/ 8" " 15' "

2791 " " " " w/ 8" " 20' "

2792 " " " " w/ 12" " 20' "

2793 " " " " w/ 10" " 15' "

2794 " " " " SOUTH w/ 16" " 30' "

2795 " " " " w/ 10" " 20' "

2796 " " " " w/ 8" " 15' "

2797 " " " " w/ 10" " 15' "

2798 " " " " w/ 12" " 15' "

2799 " " " " w/ 6" " 10' "

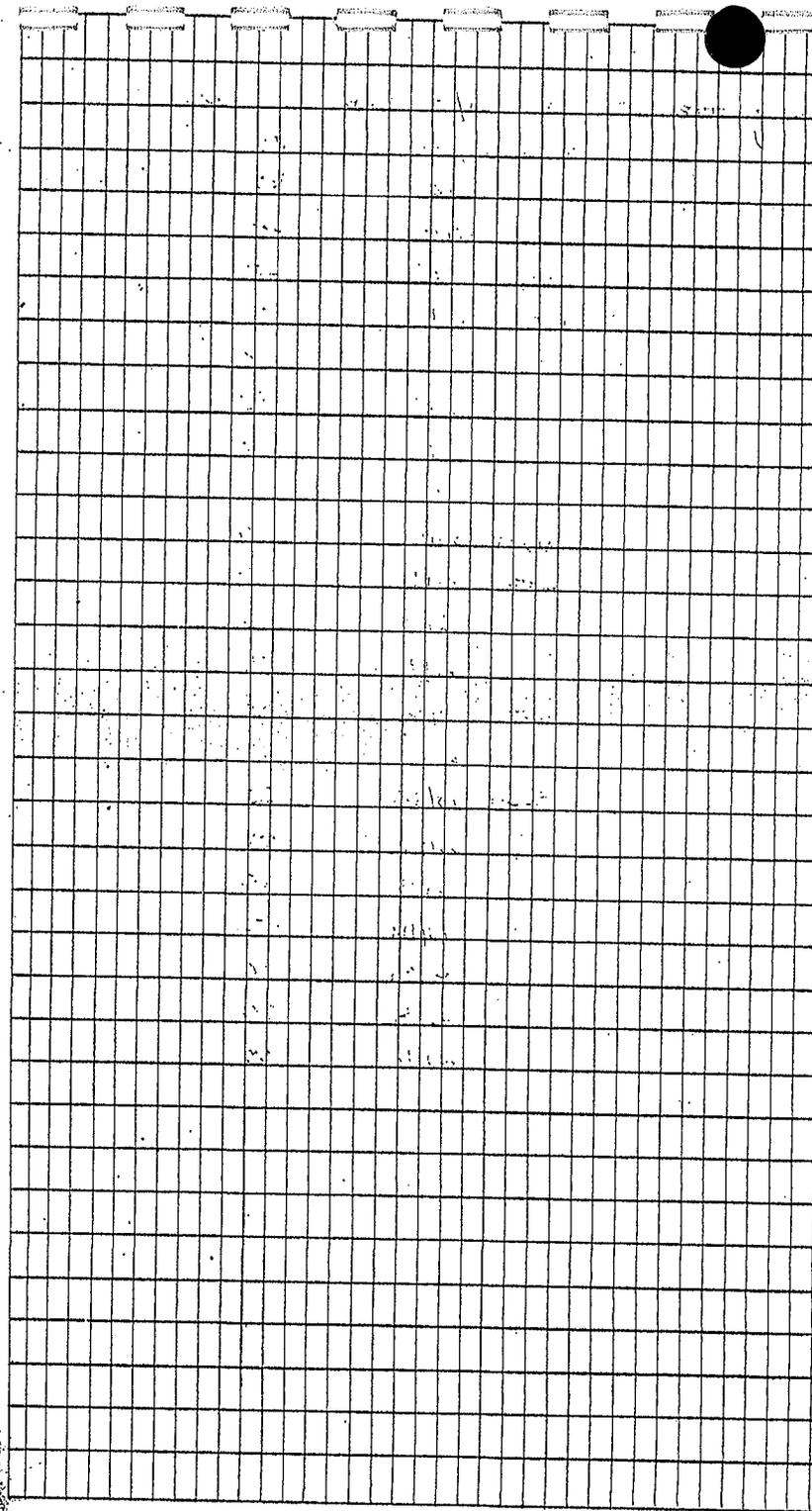
2800 " " " " w/ 10" " 20' "

2801 PALO VERDE " " EAST w/ 10" " 30' "

2802 MESQUITE TREE " " EAST w/ 8" " 15' "

- MULTI TRUNKS 6" -

2836	MESQUITE	TREE	20'	EAST	w/10"	TRUNK	20'	CANOPY
2837	"	"	"	WEST	w/14"	"	30'	"
2838	"	"	"	"	w/12"	"	30'	"
2839	"	"	"	"	w/10"	"	20'	"
2840	"	"	"	SOUTH	w/8"	"	30'	"
2841	"	"	"	SOUTH	w/14"	"	30'	"
2842	"	"	"	SOUTH	w/14"	"	20'	"
2843	"	"	"	WEST	w/14"	"	40'	"
2844	"	"	"	"	w/12"	"	20'	"
2845	"	"	"	NORTH	w/8"	"	10'	"
2846	"	"	"	SOUTH	w/10"	"	20'	"
2847	"	"	"	WEST	w/12"	"	20'	"
2848	"	"	"	EAST	w/10"	"	20'	"
2849	"	"	"	SOUTH	w/16"	"	30'	"
2850	"	"	"	WEST	w/16"	"	30'	"
2851	"	"	"	SOUTH	w/10"	"	20'	"
2852	"	"	"	SOUTH	w/10"	"	20'	"
2853	"	"	"	"	w/8"	"	20'	"
2854	"	"	"	"	w/8"	"	20'	"
2855	"	"	"	"	w/16"	"	40'	"
2856	"	"	"	"	w/8"	"	20'	"
2857	"	"	"	"	w/14"	"	30'	"
2858	"	"	"	"	w/14"	"	30'	"
2859	"	"	"	"	w/16"	"	30'	"
2860	"	"	"	WEST	w/14"	"	30'	"
2861	"	"	"	"	w/8"	"	20'	"
2862	"	"	"	"	w/16"	"	30'	"
2863	"	"	"	EAST	w/8"	"	15'	"
2864	"	"	"	SOUTH	w/14"	"	30'	"
2865	"	"	"	WEST	w/8"	"	15'	"
2866	"	"	"	NORTH	w/8"	"	20'	"
2867	"	"	"	WEST	w/8"	"	15'	"
2868	"	"	"	WEST	w/8"	"	15'	"



2879	MESQUITE TREE	20'	WEST	W/8"	TRUNK	20'	CANOPY
2870	"	"	"	NORTH	W/20"	"	40'
2871	"	"	"	SOUTH	W/20"	"	40'
2872	"	"	"	"	W/20"	"	40'
2873	"	"	30'	WEST	W/24"	"	50'
2874	"	"	20'	EAST	W/10"	"	20'
2875	"	"	"	"	W/8"	"	20'
2876	"	"	"	"	W/8"	"	20'
2877	"	"	"	WEST	W/18"	"	30'
2878	"	"	"	"	W/18"	"	40'
2879	"	"	"	SOUTH	W/12"	"	30'
2880	"	"	"	NORTH	W/14"	"	30'
2881	"	"	"	"	W/14"	"	20'
2882	"	"	"	"	W/8"	"	15'
2883	"	"	"	WEST	W/6"	"	10'
2884	"	"	"	"	W/6"	"	10'
2885	"	"	"	SOUTH	W/8"	"	20'
2886	"	"	"	"	W/24"	"	30'
2887	"	"	"	"	W/14"	"	15'
2888	"	"	"	WEST	W/14"	"	20'
2889	"	"	"	"	W/24"	"	30'
2890	"	"	"	"	W/8"	"	20'
2891	"	"	"	"	W/6"	"	10'
2892	E 10' GATE						

DZT

- SET BASE @ #2030 -

FILE - SMOOVI GRASS

12/14/04

* CONT 11/7/02 *

1/ED AT #2034

N = .04

E = .04

V = .07

2893 5' WEST PP

2894 GUYWIRE

2895

2896

2897 GUYWIRE

2898 5' WEST PP

2899 5' WEST PP

2900 GUYWIRE

2901 "

2902 GUYWIRE

2903 5' WEST PP

2904 5' SOUTH PP

2905 5' SOUTH PP

2906 OHE NW-SE

2907 5' SOUTH PP

2908 GUYWIRE

2909 GUYWIRE

2910 "

2911 GUYWIRE

2912 5' SOUTH PP

2913 5' NORTH PP

2914 GUYWIRE

2915 GUYWIRE

2916

2917

2918 GUYWIRE

2919 5' WEST PP

2920 5' SOUTH PP

2921	GUYWIRE					
2922	GUYWIRE					
2923	5' SOUTH PP					
2924	5' SOUTH PP					
2925	GUYWIRE					
2926	5' WEST PP					
2927	5' SOUTH PP					
2928	5' SOUTH PP					
2929	GUYWIRE					
2930	GUYWIRE					
2931	5' SOUTH PP					
2932	5' SOUTH PP					
2933	GUYWIRE					
2934	GUYWIRE					
2935	MESQUITE	TREE	20' WEST	W/ 20"	TRUNK 40'	CANOPY
2936	"	"	"	"	W/ 14"	" 30' "
2937	"	"	"	"	W/ 20"	" 40' "
2938	"	"	"	"	W/ 16"	" 20' "
2939	"	"	"	"	W/ 16"	" 20' "
2940	"	"	"	SOUTH	W/ 12"	" 30' "
2941	"	"	"	"	W/ 10"	" 30' "
2942	"	"	"	"	W/ 10"	" 30' "
2943	"	"	"	"	W/ 16"	" 20' "
2944	"	"	"	EAST	W/ 16"	" 15' "
2945	"	"	"	"	W/ 8"	" 30' "
2946	"	"	"	"	W/ 14"	" 30' "
2947	"	"	"	NORTH	W/ 6"	" 20' "
2948	"	"	"	"	W/ 16"	" 20' "
2949	"	"	"	"	W/ 16"	" 30' "
2950	"	"	"	"	W/ 5"	" 15' "
2951	"	"	"	"	W/ 20"	" 30' "
2952	"	"	"	"	W/ 20"	" 30' "
2953	PAID VERDE	"	"	"	W/ 8"	" 20' "

2954	PAVON VERDE	TREE	20'	EAST	w/12"	TRUNK	30'	CANOPY
2955	MESQUITE	TREE	20'	NORTH	w/14"	"	30'	"
2956	"	"	"	"	w/10"	"	20'	"
2957	"	"	"	"	w/10"	"	20'	"
2958	"	"	"	"	w/12"	"	30'	"
2959	"	"	"	"	w/12"	"	30'	"
2960	"	"	"	"	w/14"	"	30'	"
2961	"	"	"	WEST	w/8"	"	20'	"
2962	"	"	"	NORTH	w/8"	"	20'	"
2963	"	"	"	"	w/8"	"	20'	"
2964	"	"	"	SOUTH	w/16"	"	40'	"
2965	"	"	"	"	w/10"	"	20'	"
2966	"	"	"	WEST	w/12"	"	30'	"
2967	"	"	"	SOUTH	w/8"	"	20'	"
2968	"	"	"	WEST	w/20"	"	40'	"
2969	"	"	"	SOUTH	w/20"	"	40'	"
2970	"	"	"	EAST	w/16"	"	30'	"
2971	"	"	"	SOUTH	w/16"	"	40'	"
2972	"	"	"	"	w/16"	"	30'	"
2973	"	"	"	NORTH	w/12"	"	40'	"
2974	"	"	"	NORTH	w/20"	"	30'	"
2975	"	"	"	"	w/12"	"	20'	"
2976	"	"	"	"	w/6"	"	15'	"
2977	"	"	"	"	w/20"	"	40'	"
2978	"	"	"	SOUTH	w/16"	"	40'	"
2979	"	"	"	NORTH	w/12"	"	15'	"
2980	"	"	"	"	w/2"	"	20'	"
2981	"	"	"	"	w/10"	"	15'	"
2982	"	"	"	"	w/20"	"	30'	"
2983	"	"	"	"	w/8"	"	15'	"
2984	"	"	"	"	w/6"	"	15'	"
2985	"	"	"	"	w/12"	"	40'	"
2986	"	"	"	"	w/6"	"	15'	"

12-16-04 12-22-04 - SET BASE @ # 2030 -

FILE: SMOUQUI GRASS

DZKM * CON W/ TOPO *

VED PT # 2034

N = .04

E = .04

V = .06

2997 E 3' GATE

2998 E 8' GATE

2999 E 5' GATE

2990 E 6' GATE

2991 GUYWIRE

2992 GUYWIRE

2993 5' NORTH WEST PP INLINE W/ GUYWIRES (#2991 + 2992)

2994 5' WEST PP

2995 5' WEST PP W/ LIGHT

2996 5' EAST PP W/ LIGHT

2997 GUYWIRE

2998 GUYWIRE

2999 E 3' GATE

3000 E 3' GATE

3001 E 6' GATE

3002 E 6' GATE

3003 E 4' GATE

3004 E 3' GATE

3005 E 3' GATE

3006 E 4' GATE

3007 E 5' GATE

3008 E 3' GATE

3009 E 4' GATE

3010 E 3' GATE

3011 EP

3012

3013

3014 EP

3015 EP

3029 EP

3030 EP @ DW

3031 EP @ DW

3032 EP

3039 EP

3040 TBC

3041 TBC

3042 TBC

3043 EP

3044 EP

3045 TBC

3046 TBC

3047 EP

3048 EP

3049 TBC

3050 TBC

3051 TOP 18" CMP

3052

3053

3054 TOP 18" CMP

3055 E 12' GATE

3056 EP

3057 E PUMPT

3058 TBC

3059 E 5' SW

3060 PINE TREE 5' EAST w/10' TRUNK 10' CANOPY

TOP BACK OF CURB

E 5' SIDEWALK

3061	PINE TREE	5'	EAST	W/10"	TRUNK	10'	CANOPY
3062	? TREE	"	"	W/10"	"	10'	"
3063	? "	"	"	"	"	"	"
3064	? "	"	"	"	"	"	"
3065	? "	"	"	"	"	"	"
3066	? "	"	"	"	"	"	"
3067	PINE TREE	"	"	W/8"	"	10'	"
3068	"	"	"	W/10"	"	10'	"
3069	"	"	"	W/10"	"	10'	"
3070	"	"	10'	W/12"	"	15'	"
3071	"	"	10'	W/12"	"	15'	"
3072	"	"	10'	W/8"	"	10'	"
3073	? "	"	10'	W/8"	"	20'	"
3074	? "	"	10'	NORTH W/8"	"	20'	"
3075	? "	"	10'	EAST W/8"	"	20'	"
3076	PINE TREE	10'	EAST	W/10"	"	10'	"
3077	WV						
3078	FH						
3079	DW						
3080	DW						
3081	DW						
3082	DW						
3083	MAILBOX						
3084	POWER POLE	10'	WEST				
3085	LIGHT POLE						
3086	OHE						
3087	PP	5'	EAST				
3088	OHE						
3089	SIGN						
3090	PP	5'	EAST				
3091	GUYWIRE						
3092	1" IRON PIPE						
3093	WV	10'	EAST				

FIRE HYDRANT

3094	⊕ 5' SW END	
3095	⊕ 5' SW	
3096	}	
3097		
3098	⊕ 5' SW	
3099	SIGN	
3100	COR TRANS PAD	
3101	}	
3102		
3103		COR TRANS PAD
3104		
3105		
3106		
3107		
3108		
3109		
3110		
3111	COR TRANS PAD	
3112	⊕ CABLE TRANSFORMER / W/ TELCO RISE 3' SOUTH OF SHOT	
3113	⊕ BW	
3114	}	
3115		
3116		
3117		
3118		
3119		
3120		
3121		
3122		
3123		
3124		
3125		⊕ BW
3126	⊕ 4' BASE	

BORROW

3127

E BW

3128

E BW

3129

E 4' GATE

3130

E 4' GATE

3131

E BW

3132

E 8' GATE

3133

E 6' GATE

3134

E 3' GATE

3135

E 4' GATE

3136

{

3137

}

3138

E 4' GATE

C.2 Survey Field Notes for Hydrologic Modeling

Hydrology is from existing delineation study by Entellus. No surveying was required for hydrologic modeling.

C.3 Survey Field Notes for Hydraulic Modeling

The survey for hydraulic modeling was performed concurrently with the survey for Aerial Mapping Control. Refer to Appendix C.1 for field notes.

Appendix D: Hydrologic Analysis Documentation

D.1 Precipitation Data

All precipitation data from *Sonoqui Wash Floodplain Delineation Report* by Entellus, Inc.

D.2 Physical Parameter Calculations

All existing physical parameter data from *Sonoqui Wash Floodplain Delineation Report* by Entellus, Inc.

D.3 Hydrograph Routing Data

All routing data from *Sonoqui Wash Floodplain Delineation Report* by Entellus, Inc.

D.4 Reservoir Routing Data

All reservoir data from *Sonoqui Wash Floodplain Delineation Report* by Entellus, Inc.

D.5 Flow Splits and Diversion Data

No flow splits or diversions are presented in the analysis provided.

D.6 Hydrologic Calculations

No additional hydrologic calculations were performed for the analysis provided.

Appendix E: Hydraulic Analysis Documentation

E.1 Roughness Coefficient Estimation

E.1.2 Representative Photographs

The following photos are presented as representative of the character and density of landscaping described in the above section.

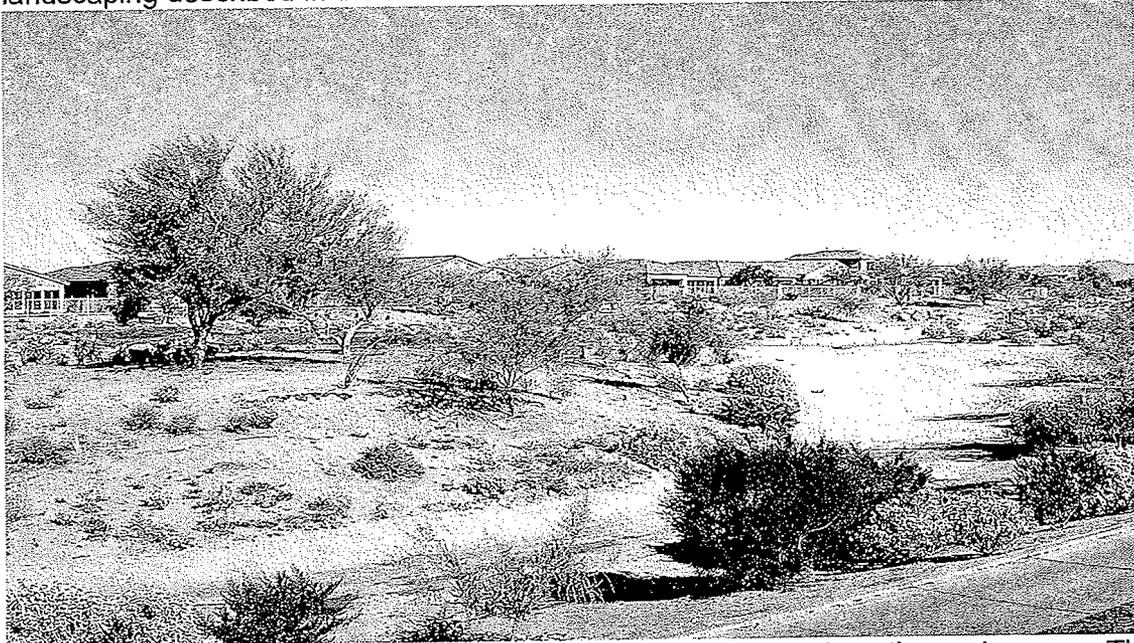


Photo Plate 1 - Urban channel with native landscaping. Location unknown. This density and type of landscaping would correspond to a roughness coefficient in the range of 0.030 to 0.035.

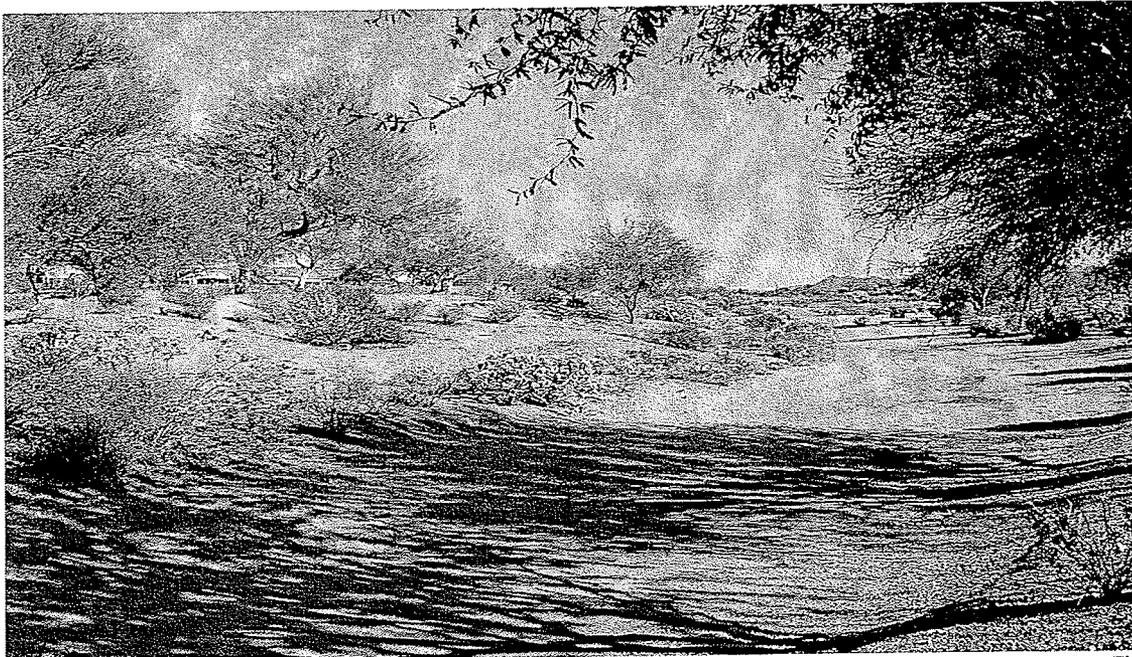


Photo Plate 2 - Urban channel with native landscaping. Location unknown. This landscaping is similar to that in Photo Plate 1 and appears to be regularly maintained.

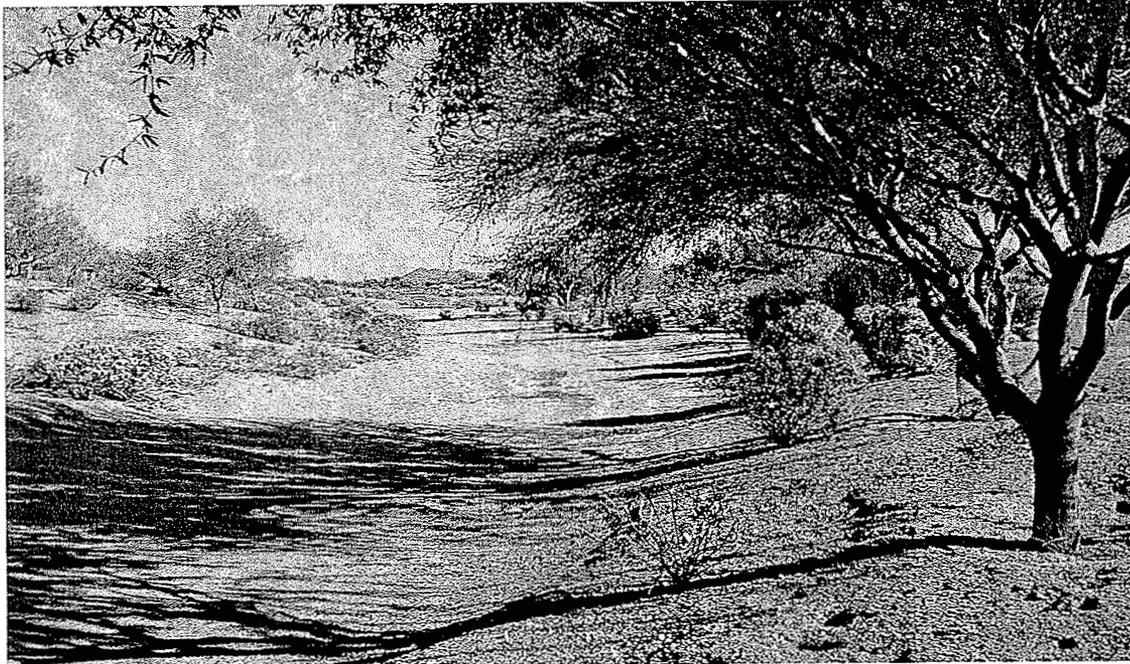


Photo Plate 3 - Urban channel with native landscaping. Same location as Photo Plate 2. Although this channel is smaller in scale compared to Sonoqui Wash, the landscaping is similar in plant type, placement and density to that envisioned for the Sonoqui project.

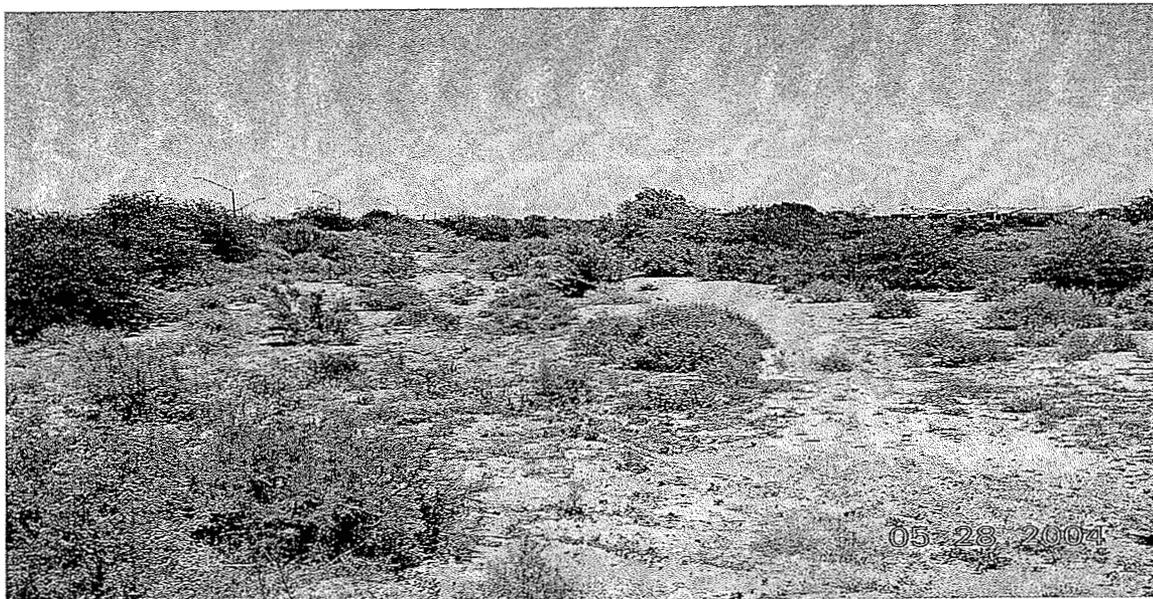


Photo Plate 4 – Queen Creek channel with native landscaping looking upstream from Recker Road in Trilogy. This density and type of landscaping would correspond to a roughness coefficient in the range of 0.045 to 0.055. This landscaping does not appear to be regularly maintained.



Photo Plate 5 – Queen Creek channel with native landscaping looking upstream from just south of Ocotillo Road. This channel has a very well defined trapezoidal section, a bottom of coarse sand and virtually all of the native vegetation located on the channel bank (little or none on the bottom). This channel would correspond to a roughness coefficient in the range of 0.040 to 0.045.

E.1.2 Roughness Coefficient Guidance

TABLE 4.1
VALUES OF ROUGHNESS AND FRICTION FORMULA COEFFICIENTS FOR CLOSED CONDUITS

Conduit Material	Manning's n
Asbestos Cement Pipe	0.013
Brick	0.015
Cast Iron Pipe	
Cement lined & seal coated	0.013
Concrete (monolithic)	
Smooth forms	0.013
Rough forms	0.017
Concrete Pipe	0.013
Corrugated Metal Pipe (1/2 x 2 2/3 inch corrugations)	
Plain	0.024
Paved invert	0.020
Spun asphalt lined	0.013
Corrugated Polyethylene Pipe	
15" Diameter	0.018
18" to 36" Diameter	0.020
Plastic Pipe (smooth)	0.013
Vitrified Clay	
Pipes	0.013
Liner plates	0.013

Table 4.1 from Flood Control District of Maricopa County Hydraulics Manual

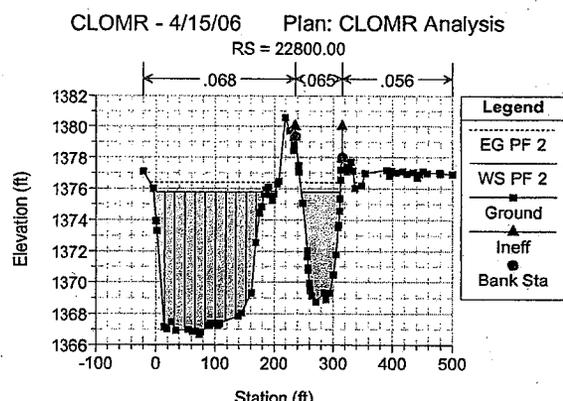
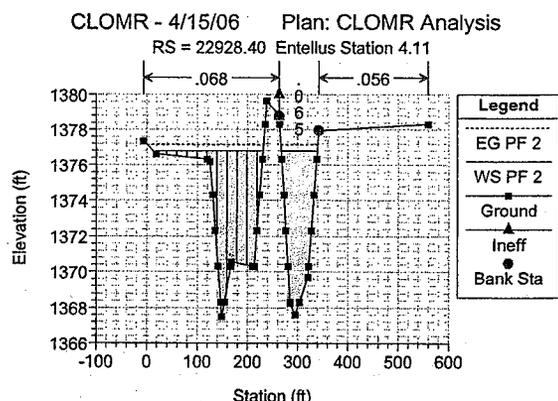
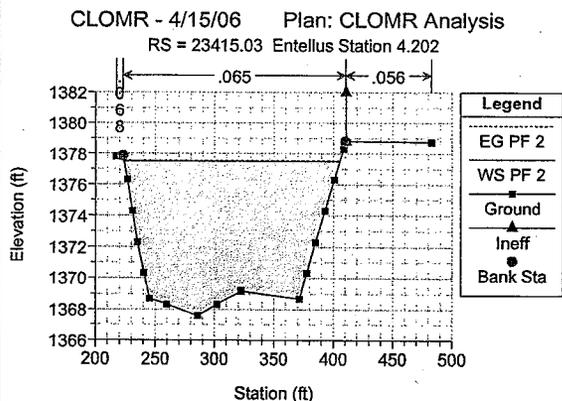
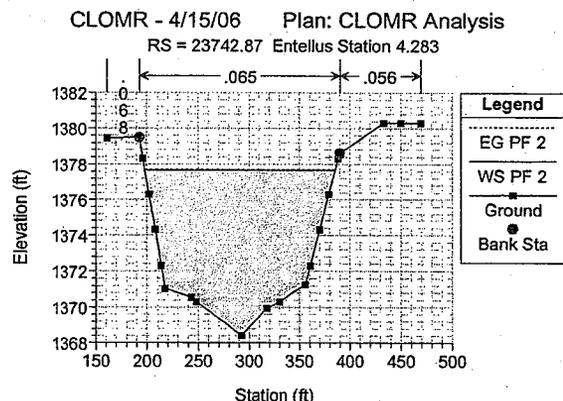
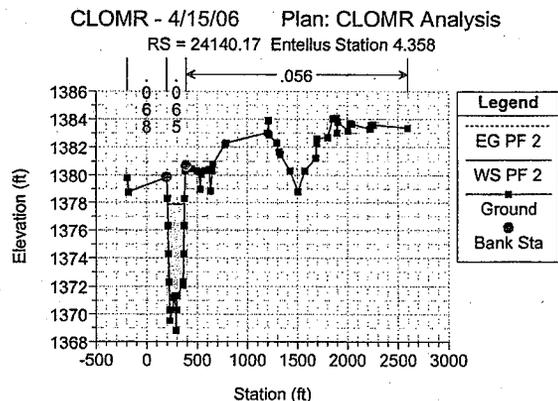
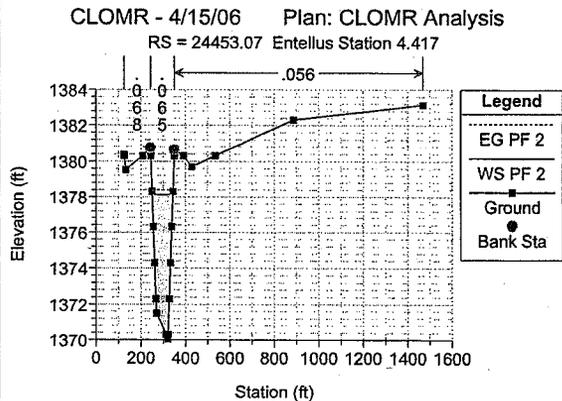
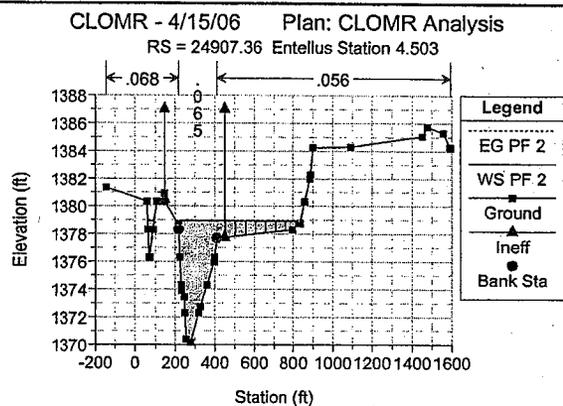
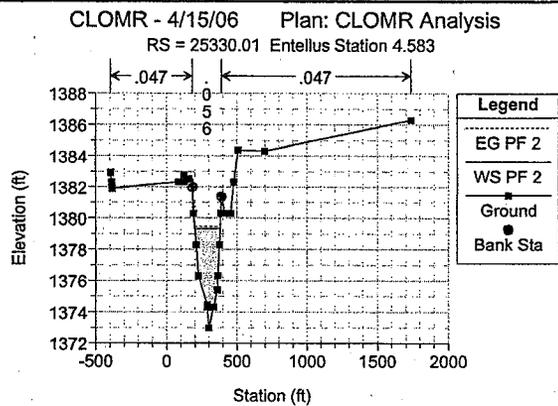
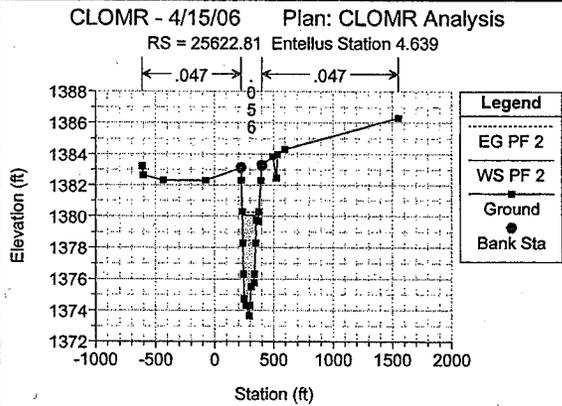
TABLE 6.1
MANNING'S ROUGHNESS COEFFICIENTS
(1)

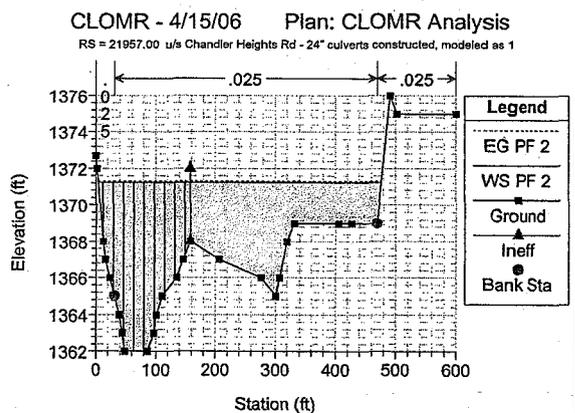
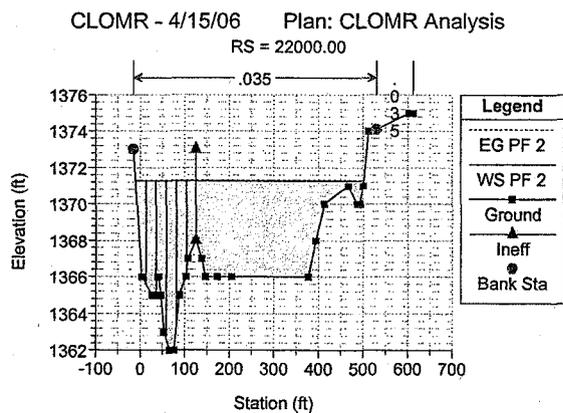
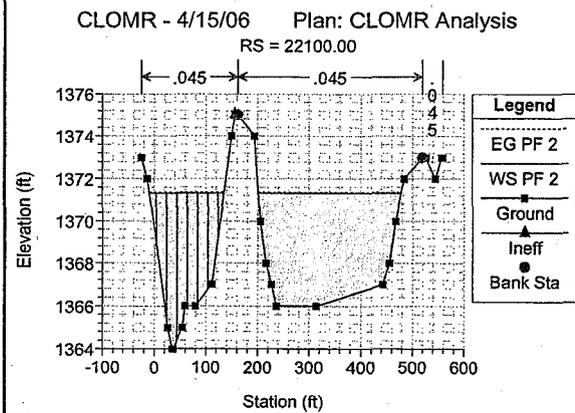
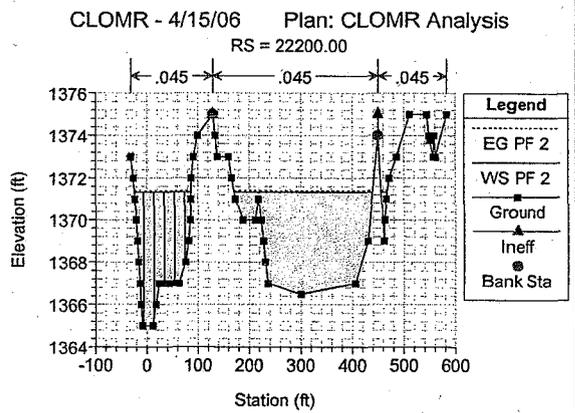
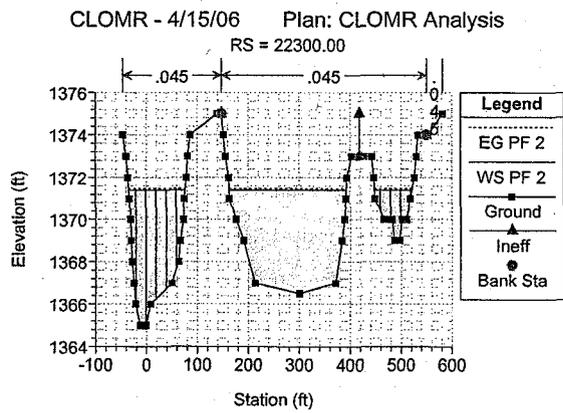
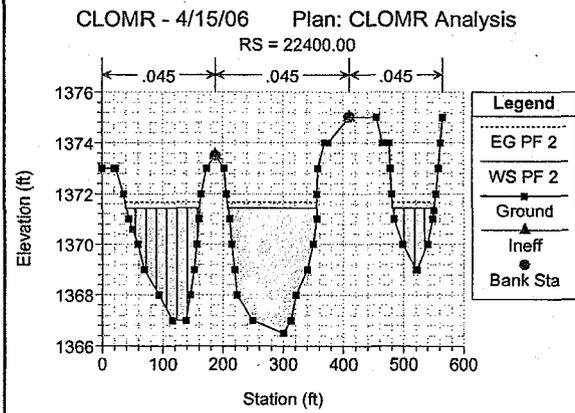
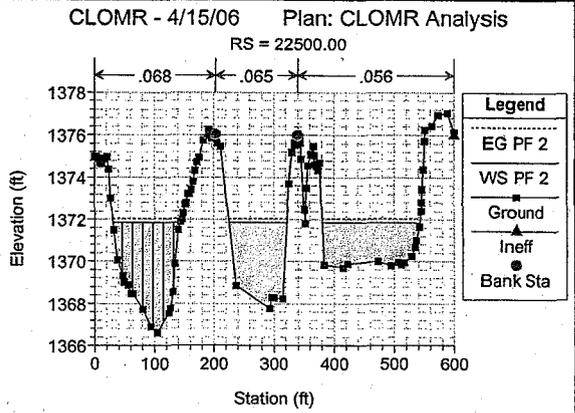
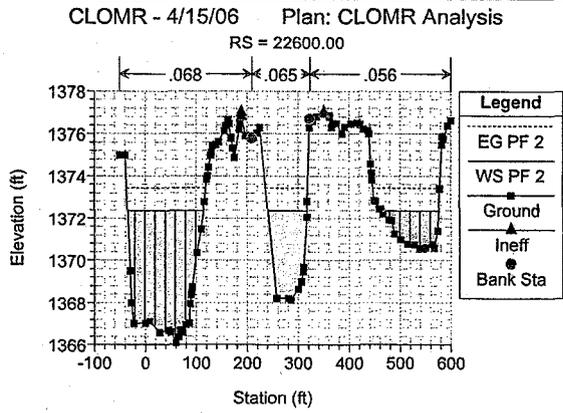
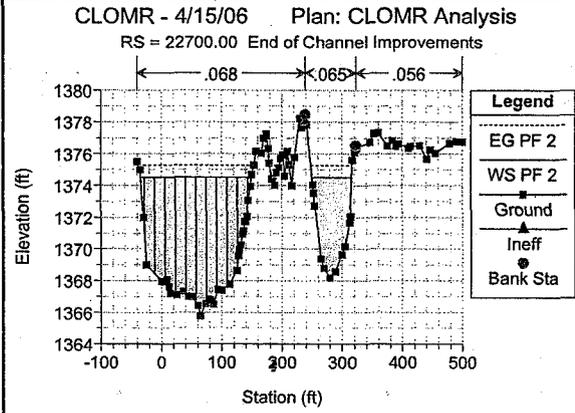
Channel Material	Roughness Coefficient (<i>n</i>)		
	Minimum	Normal	Maximum
Concrete:			
Trowel finish	0.011	0.013	0.015
Float finish	0.013	0.015	0.016
Unfinished	0.014	0.017	0.020
Shotcrete, good section	0.016	0.019	0.023
Shotcrete, wavy section	0.018	0.022	0.025
Soil cement	0.018	0.020	0.025
Constructed channels with earthen bed			
Clean earth; straight	0.018	0.022	0.025
Earth with grass and forbs	0.020	0.025	0.030
Earth with sparse trees and shrubs	0.024	0.032	0.040
Shotcrete	0.018	0.022	0.025
Soil cement	0.022	0.025	0.028
Concrete	0.017	0.020	0.024
Riprap	0.023	0.032	0.036

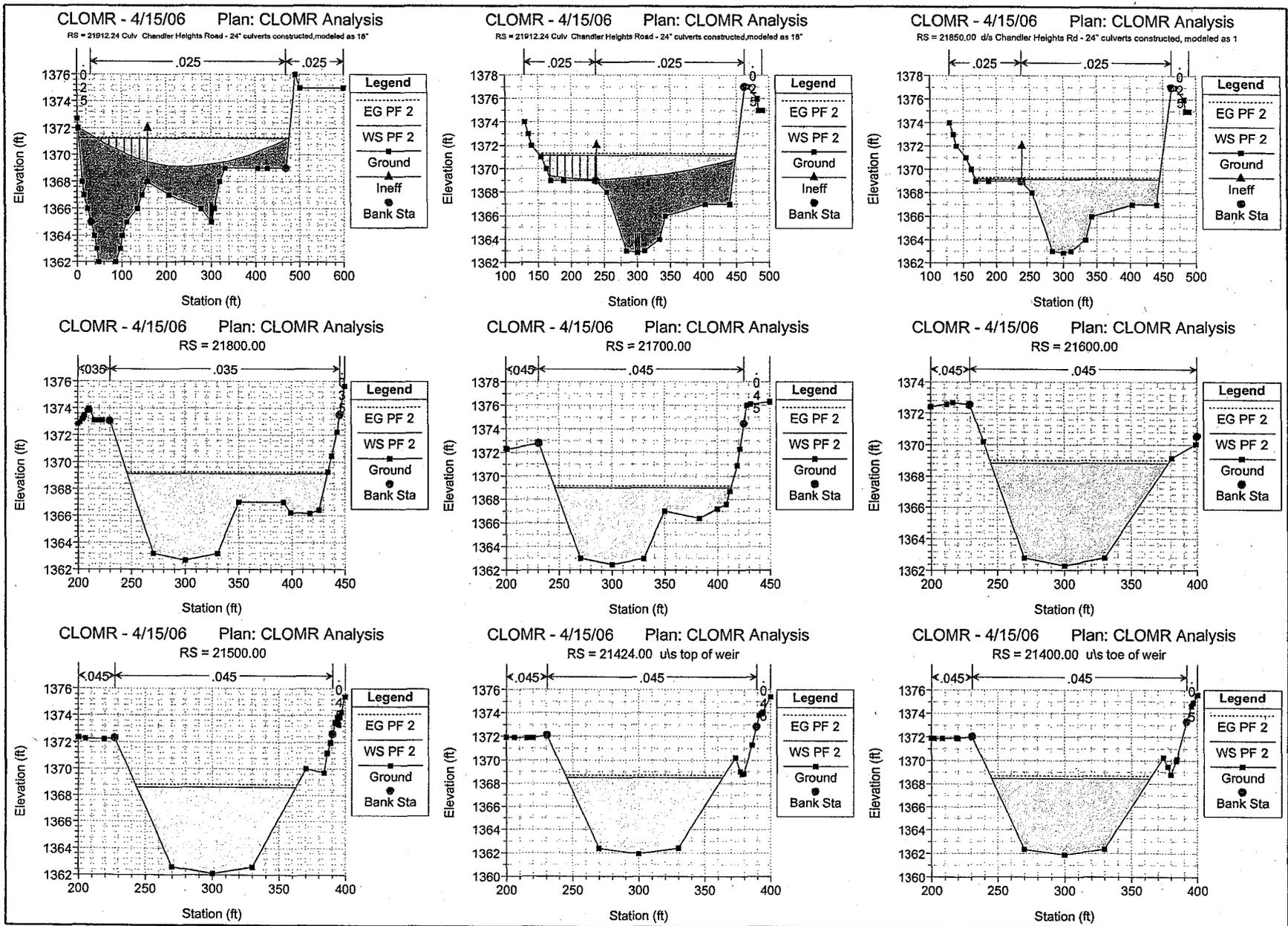
1. From: Simons, Li and Associates, 1988. Adapted from Chow (1959) and Aldridge and Garret (1973)

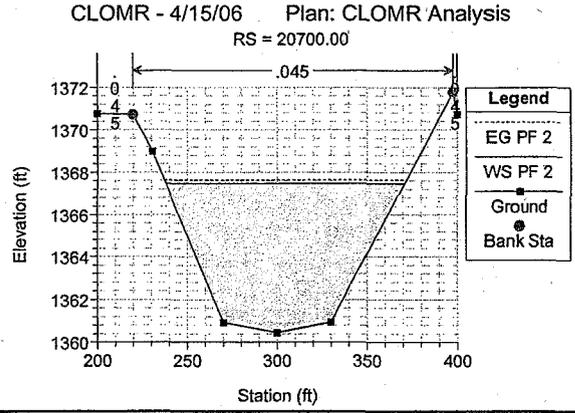
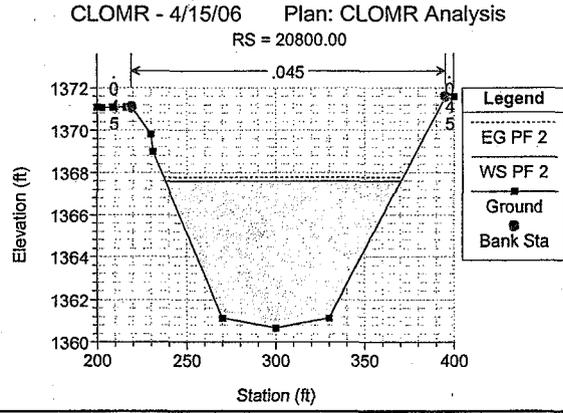
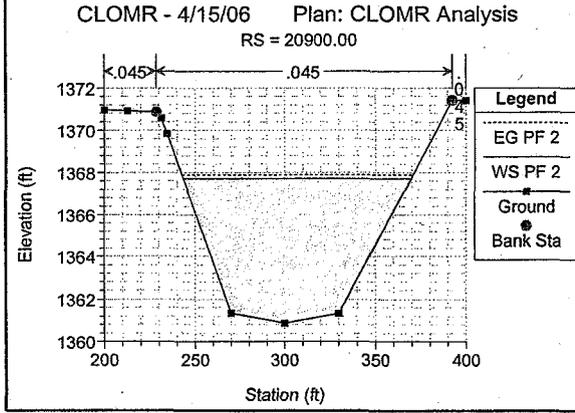
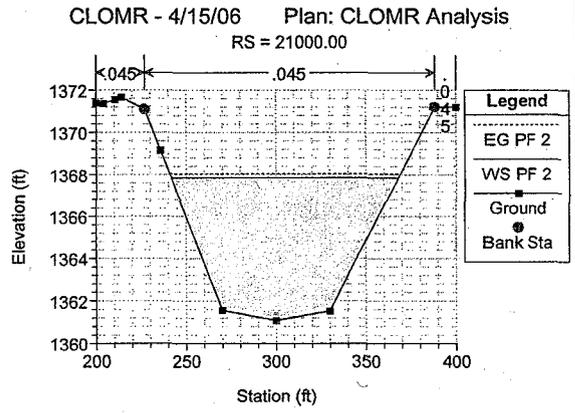
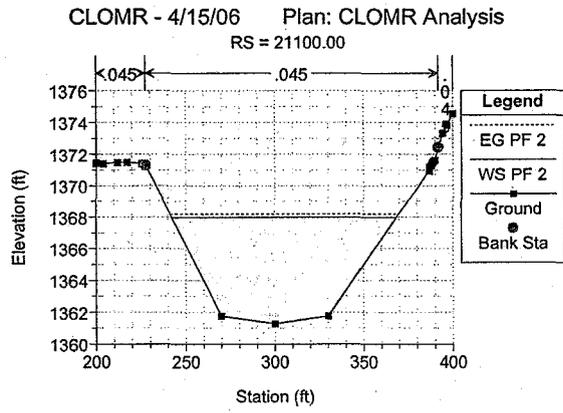
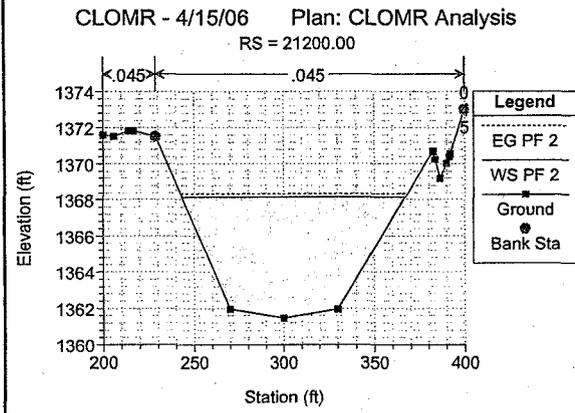
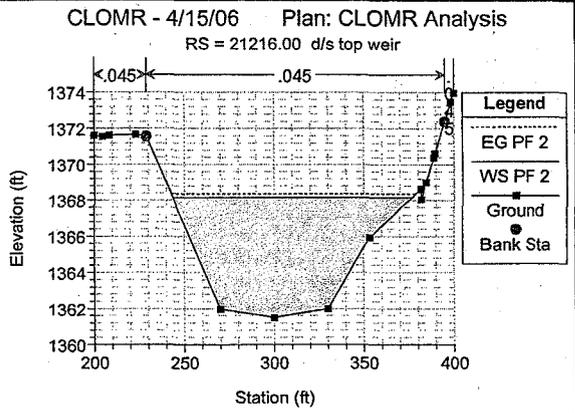
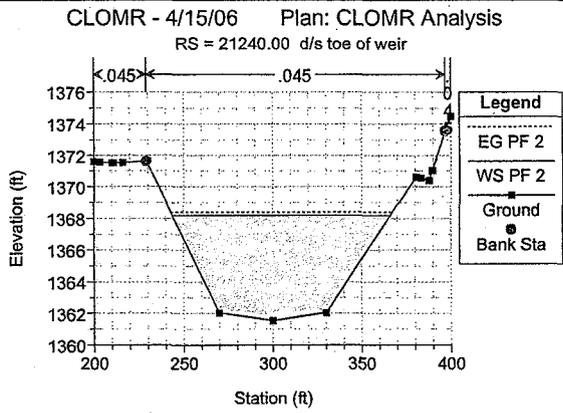
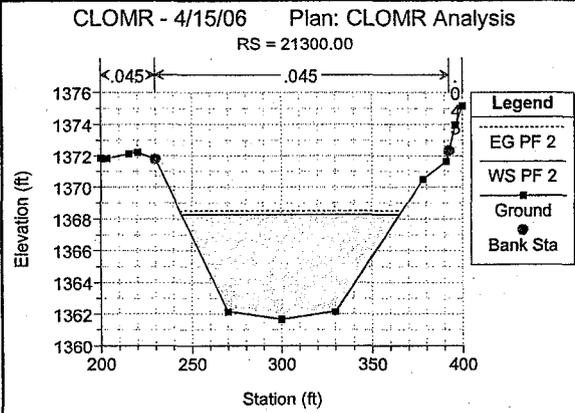
Table 6.1 from Flood Control District of Maricopa Country Hydraulics Manual

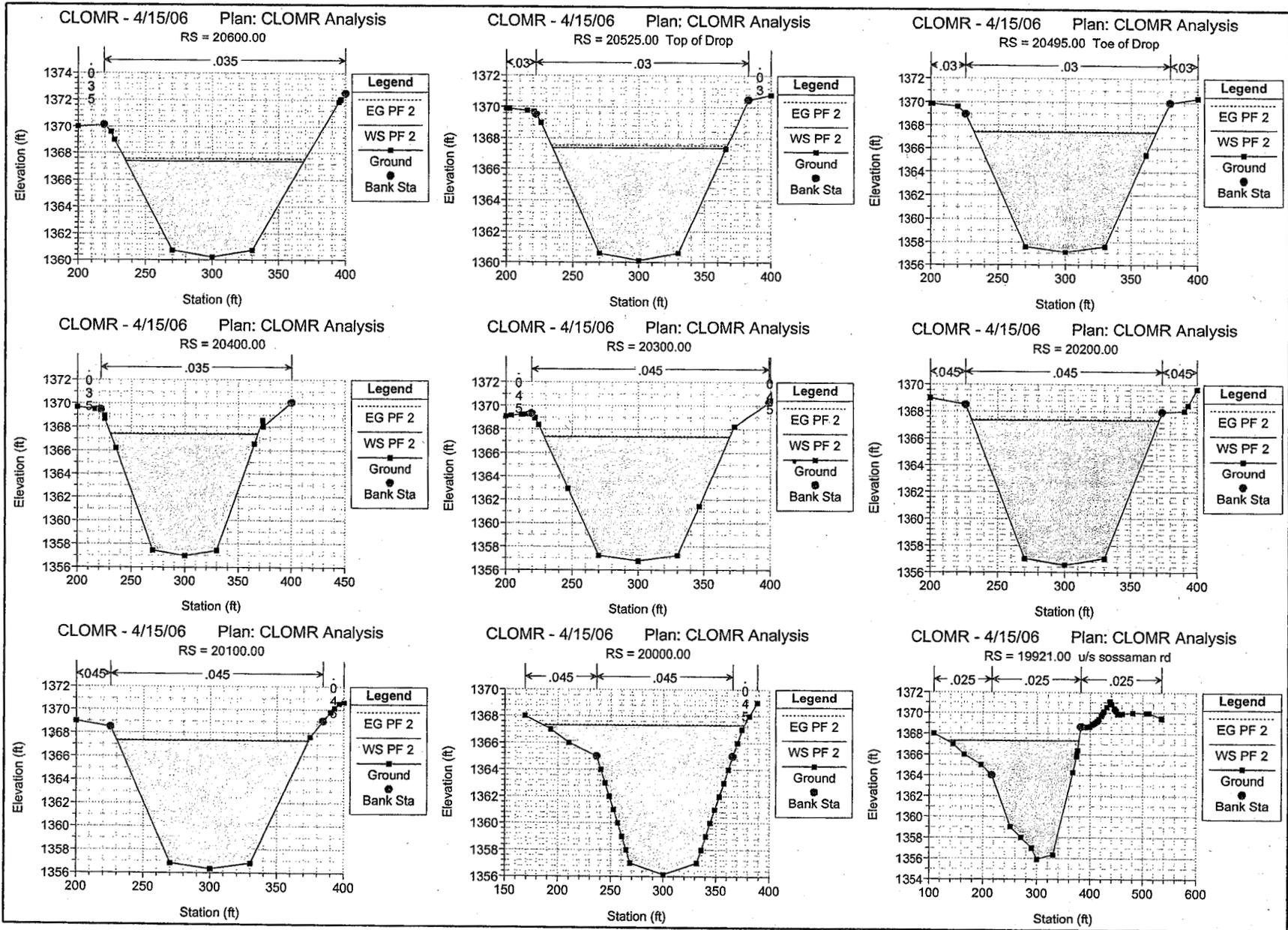
E.2 Cross Section Plots





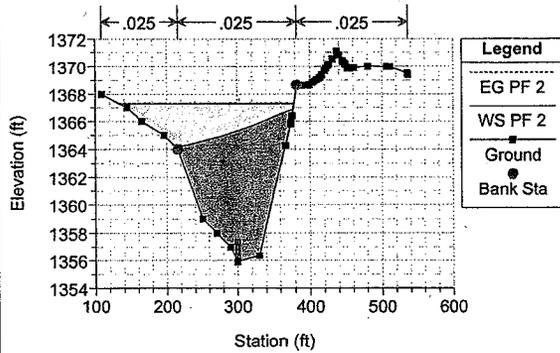






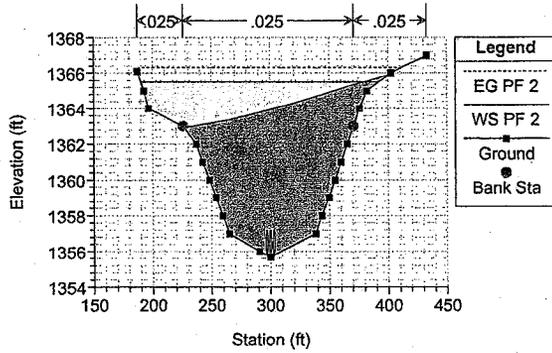
CLOMR - 4/15/06 Plan: CLOMR Analysis

RS = 19842.36 Culv Sossaman Road - 24" culverts constructed, modeled as 18" to acco



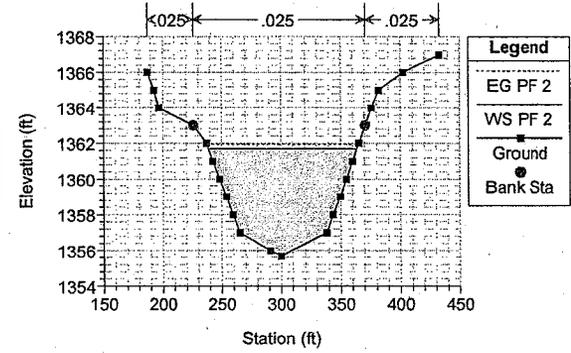
CLOMR - 4/15/06 Plan: CLOMR Analysis

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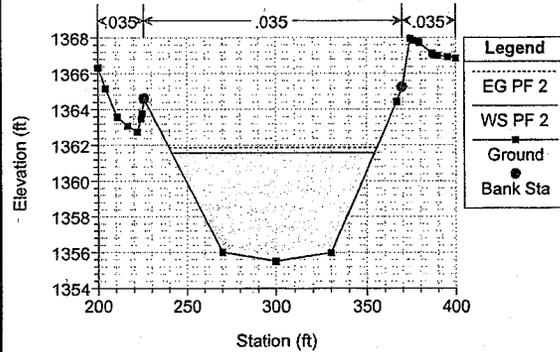
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RS = 19790.00 d/s sossaman rd



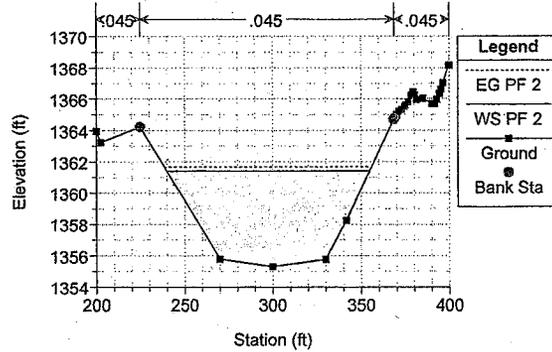
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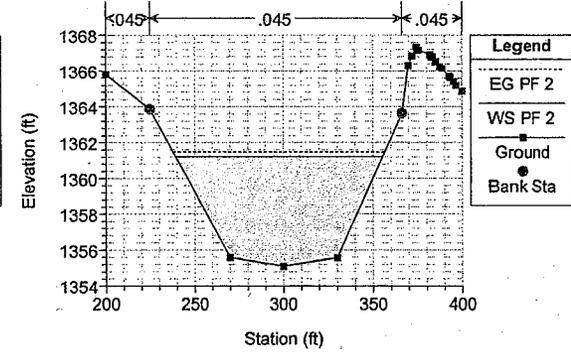
CLOMR - 4/15/06 Plan: CLOMR Analysis

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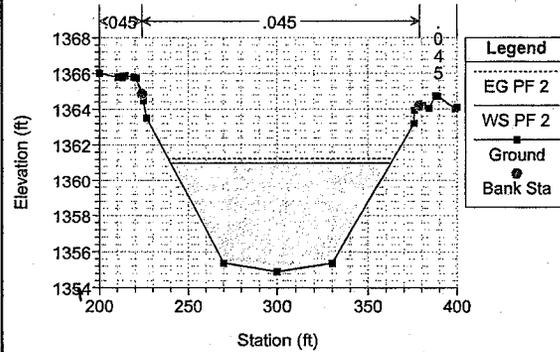
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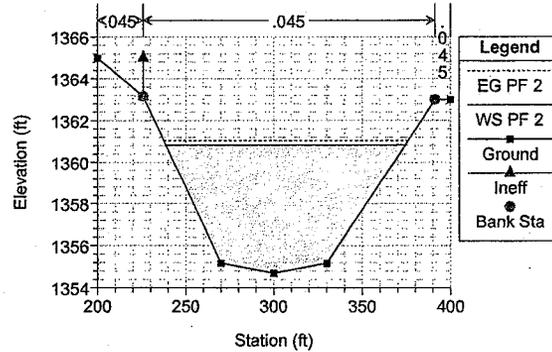
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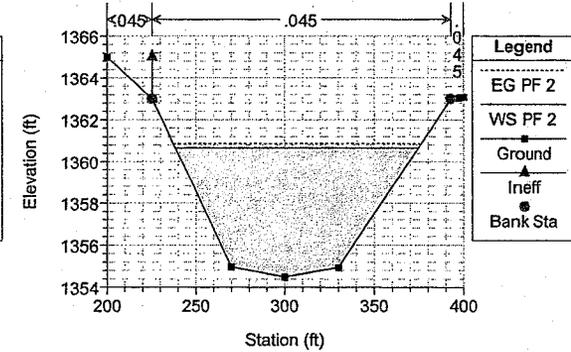
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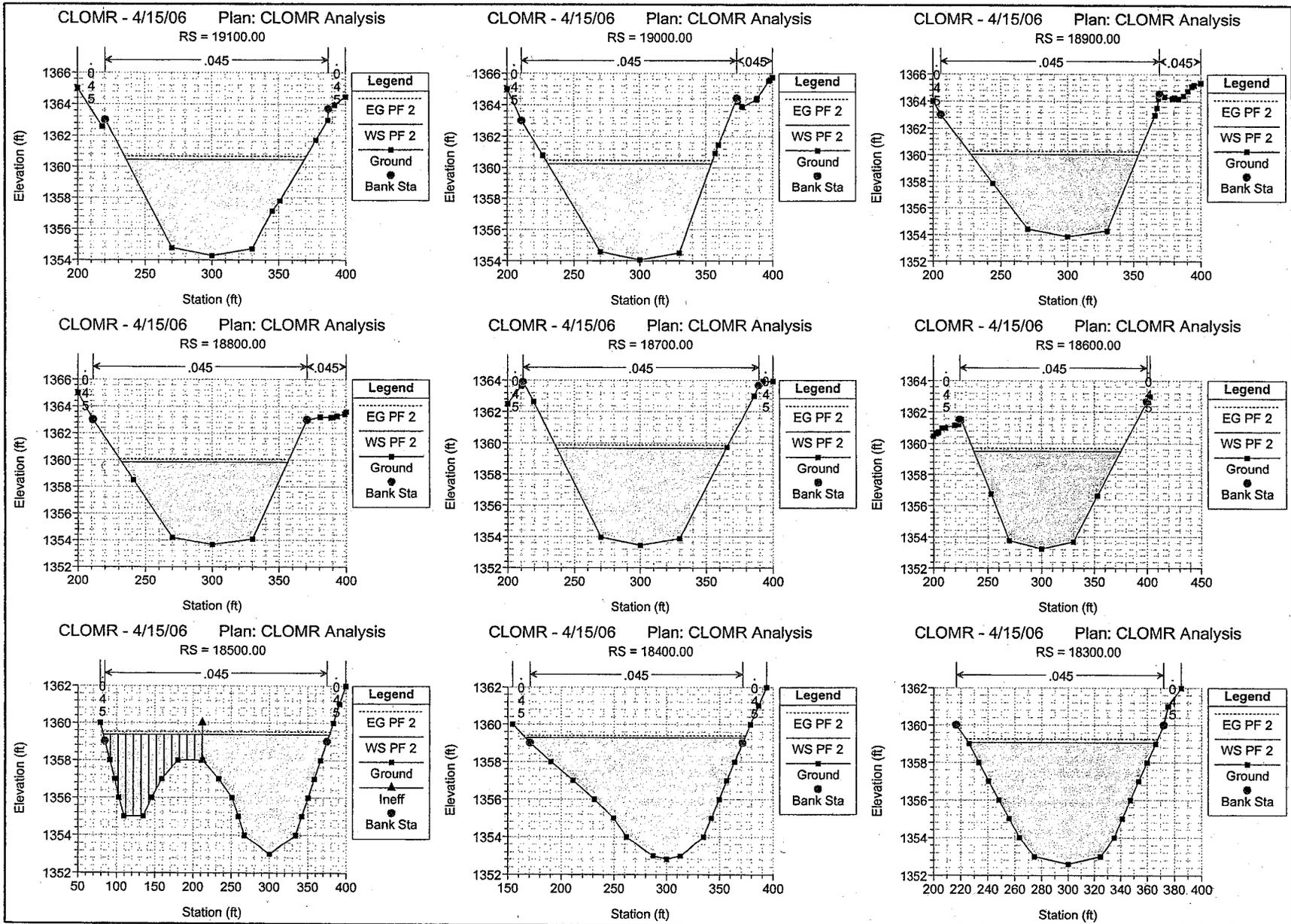
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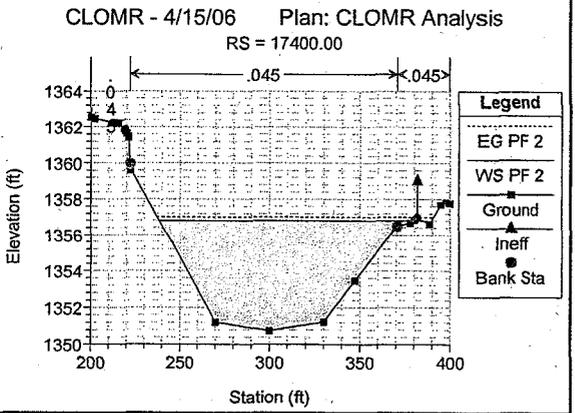
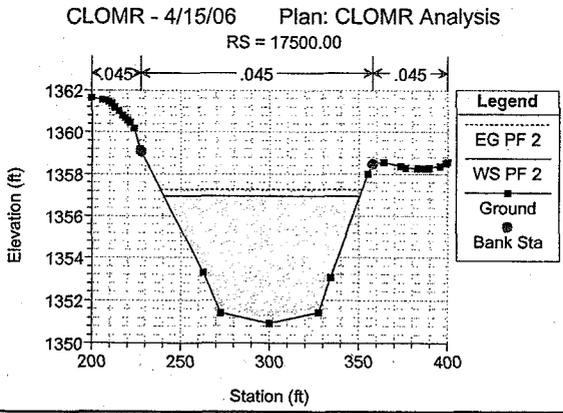
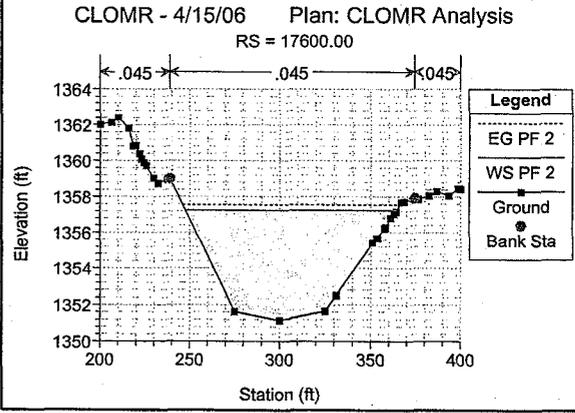
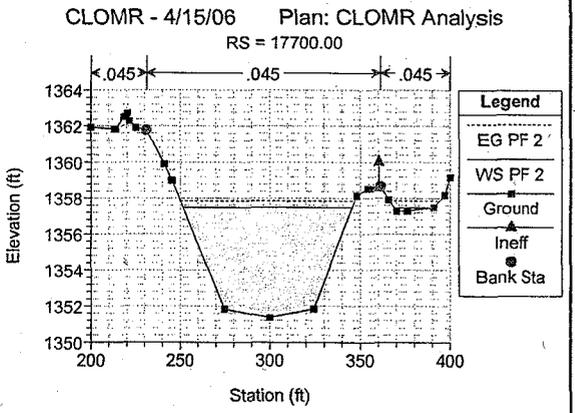
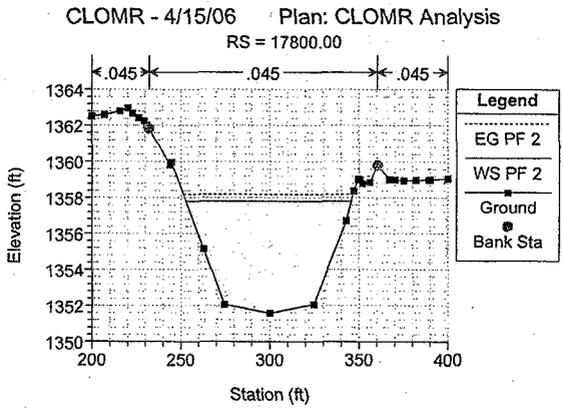
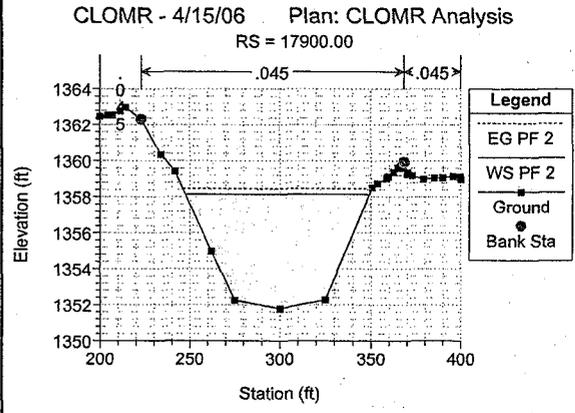
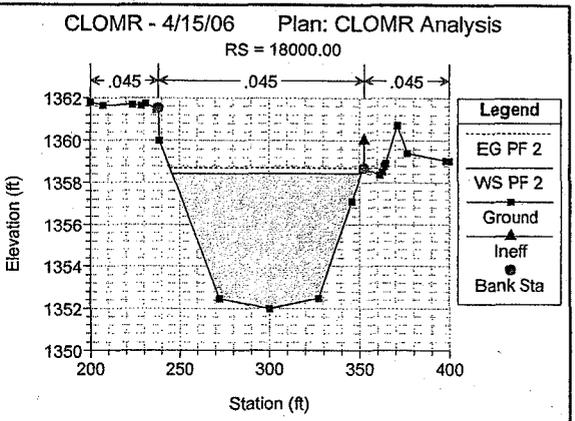
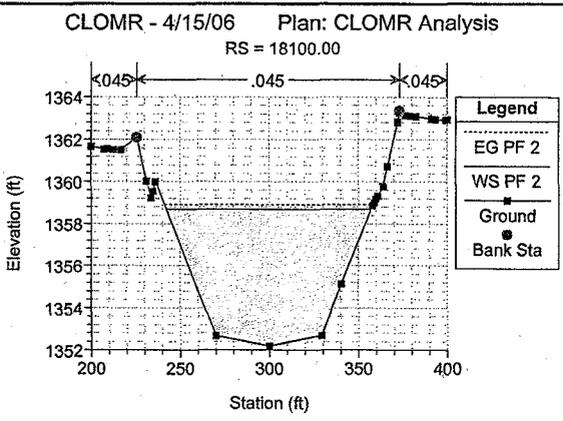
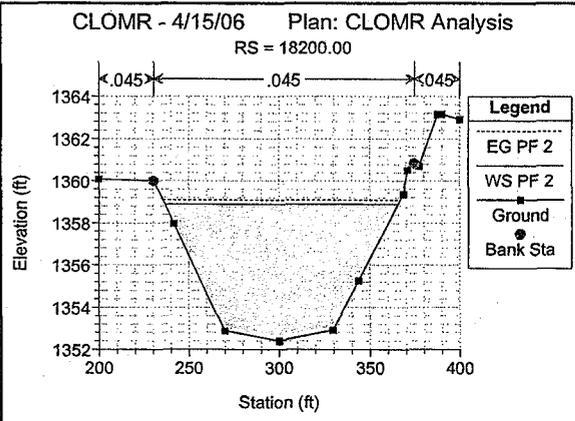


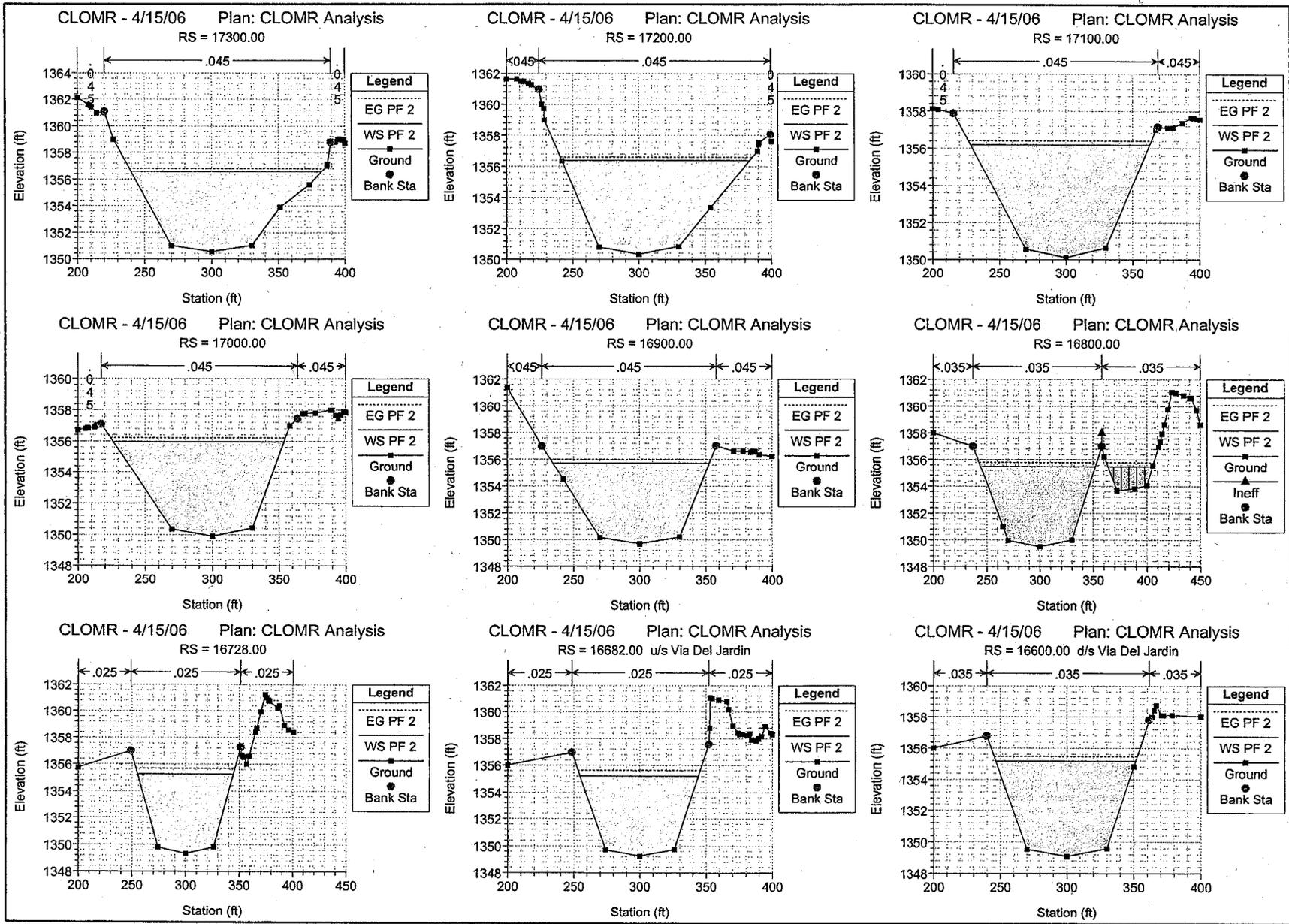
CLOMR - 4/15/06 Plan: CLOMR Analysis

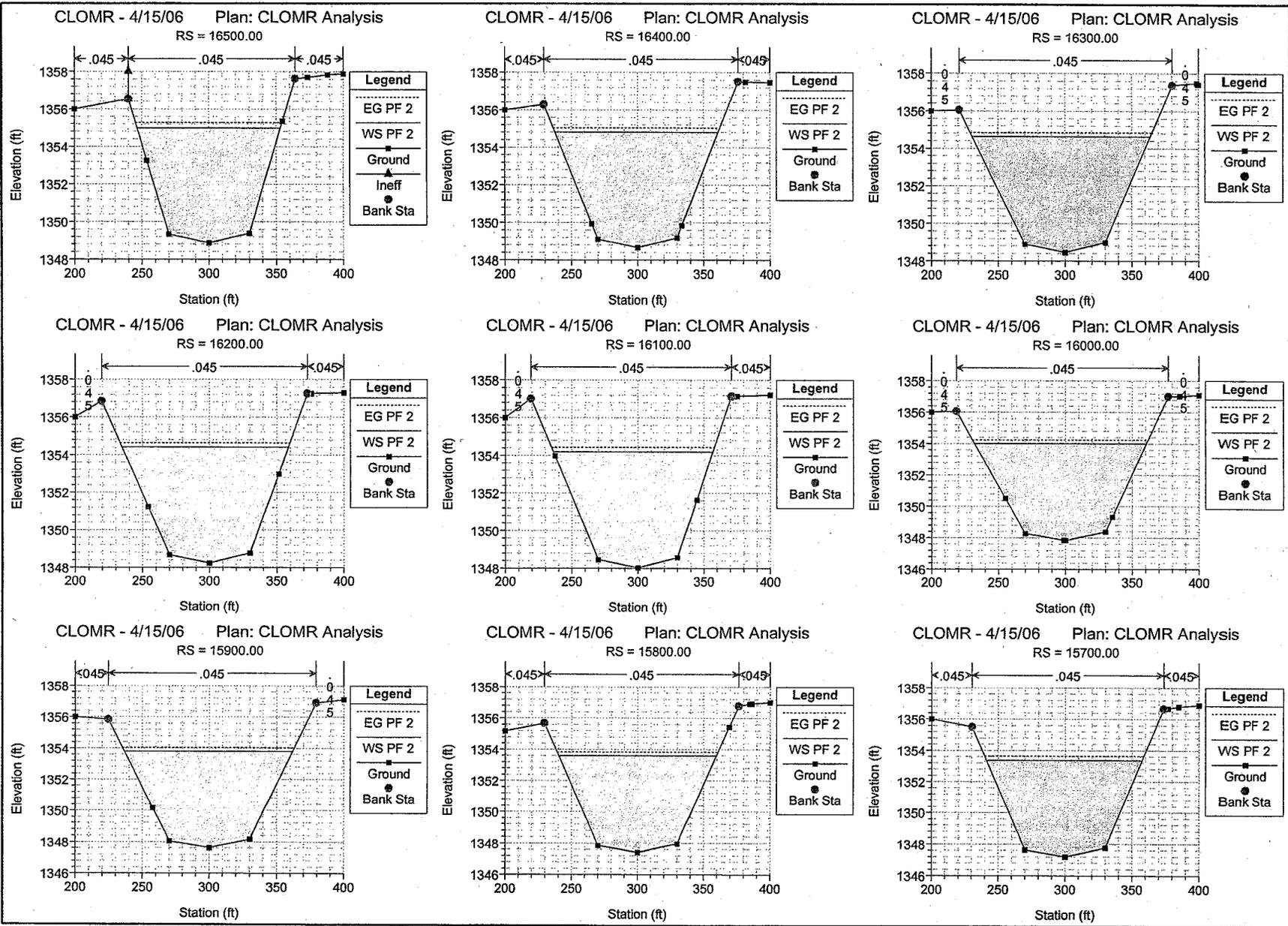
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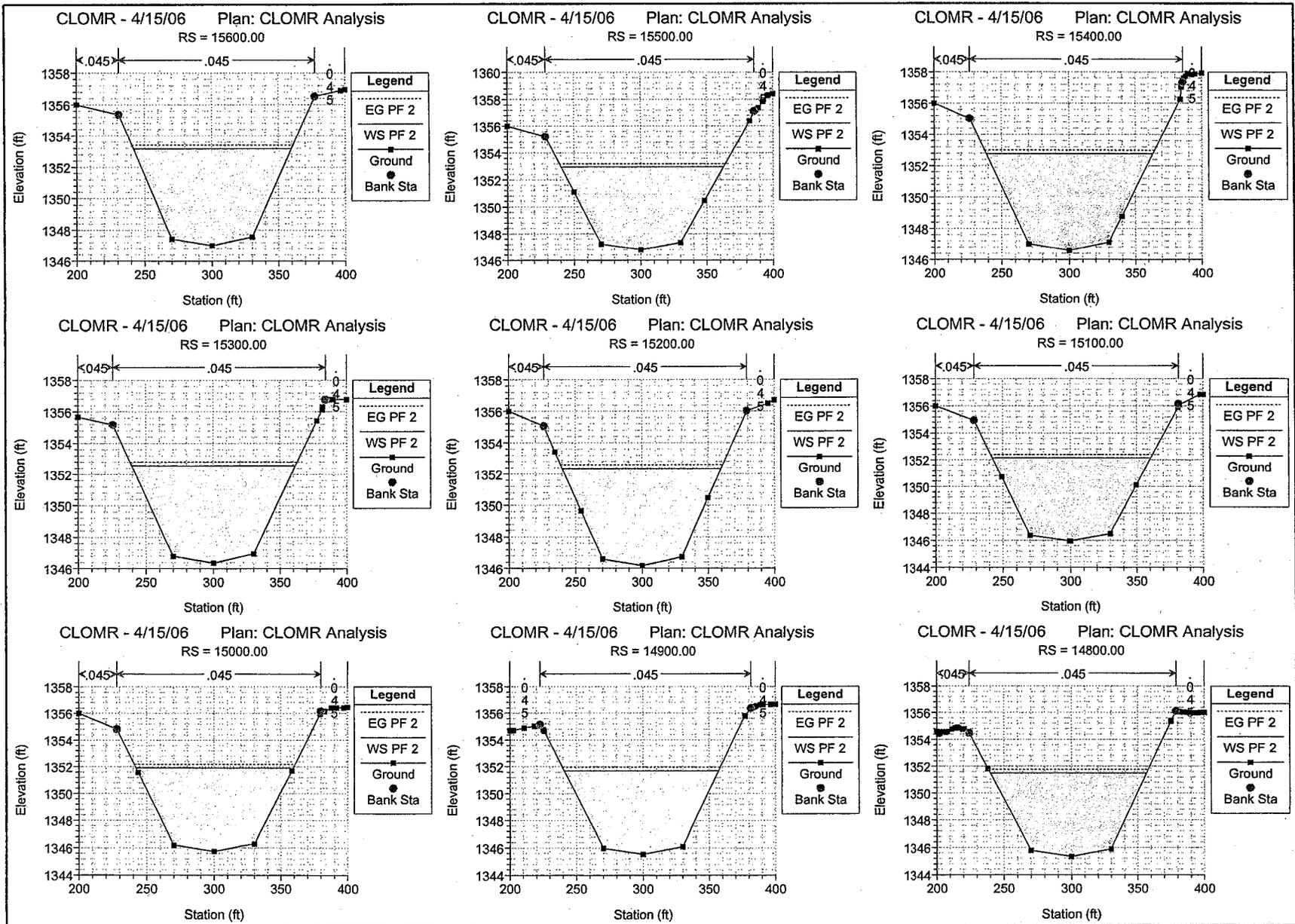




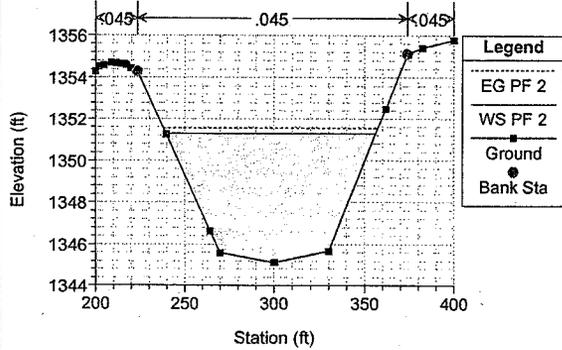




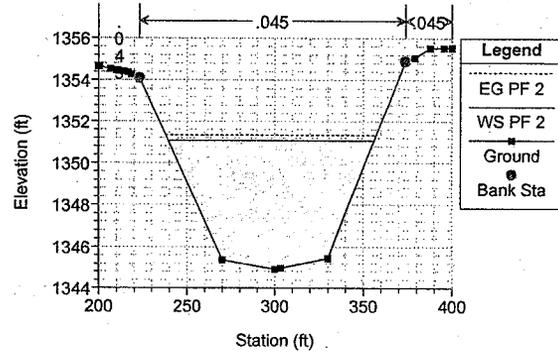




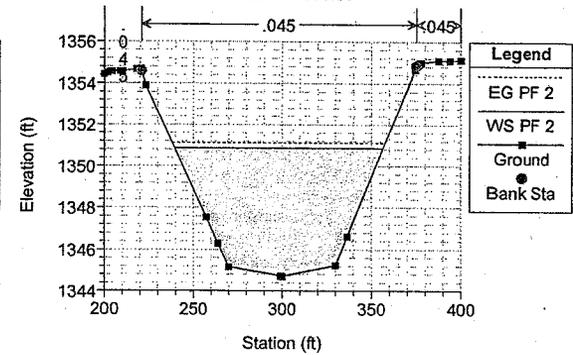
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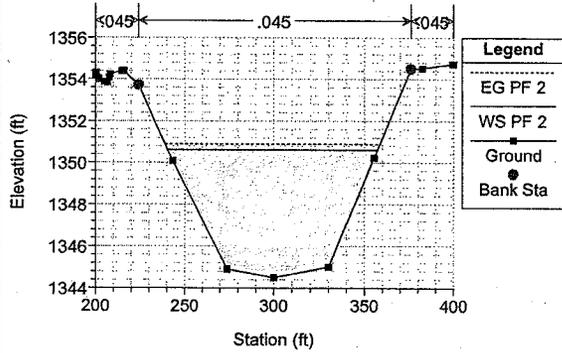
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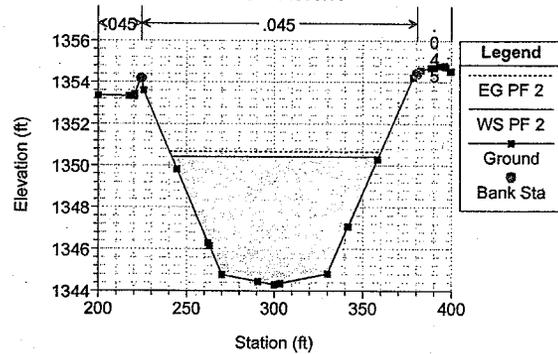
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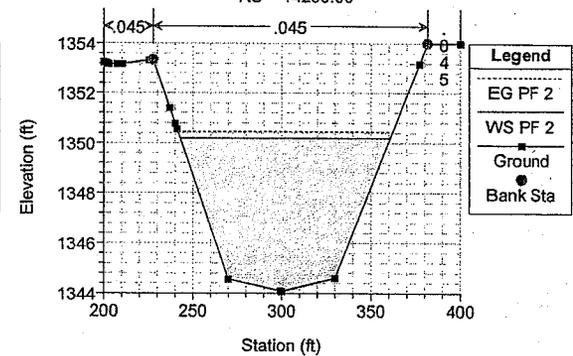
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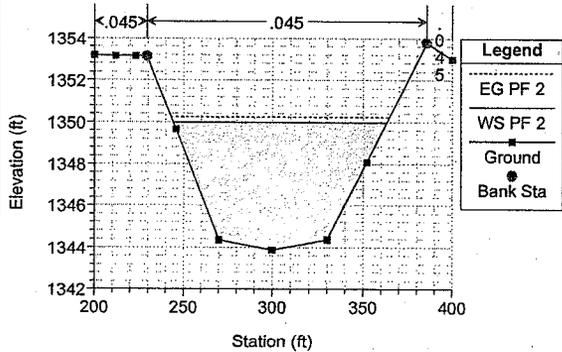
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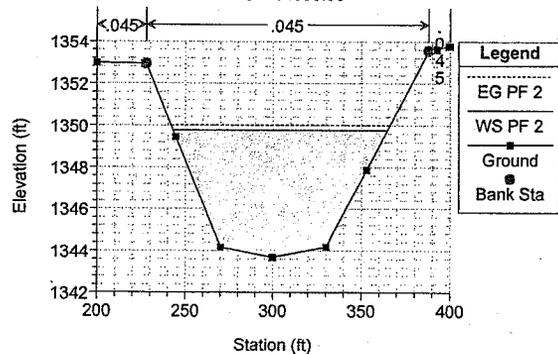
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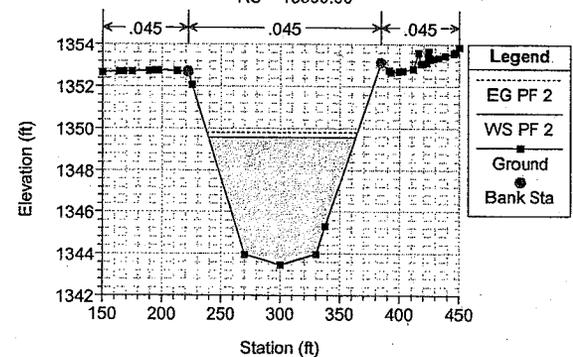
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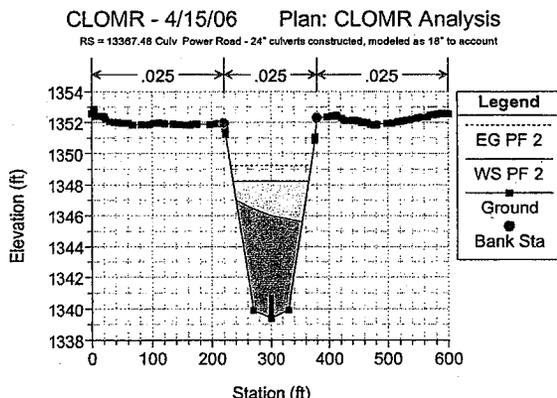
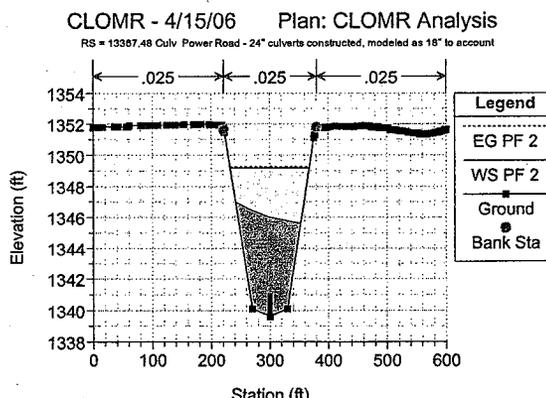
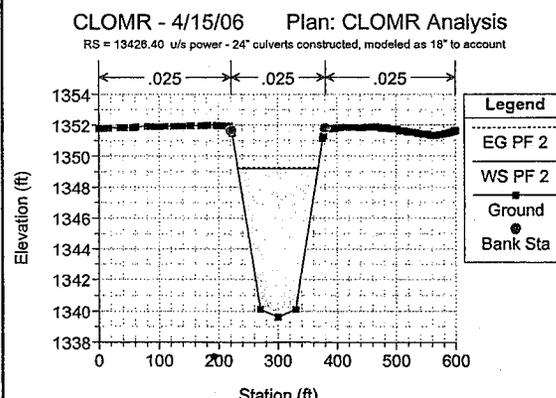
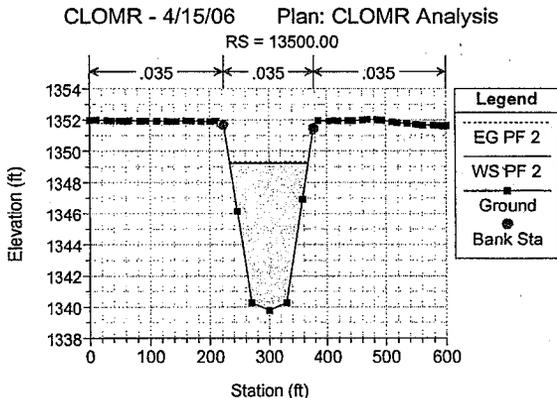
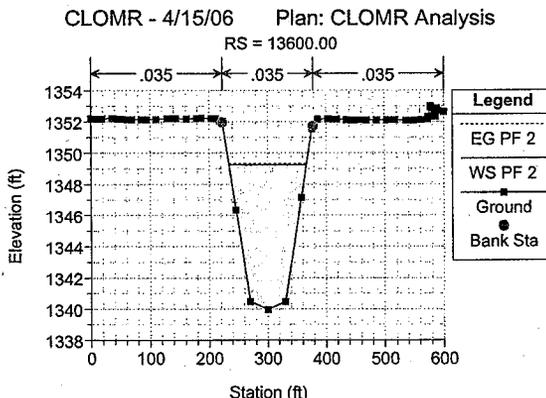
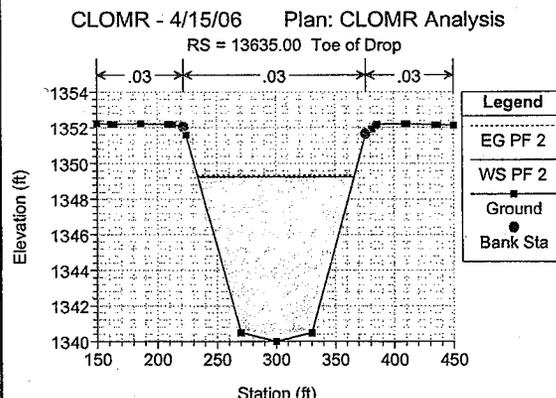
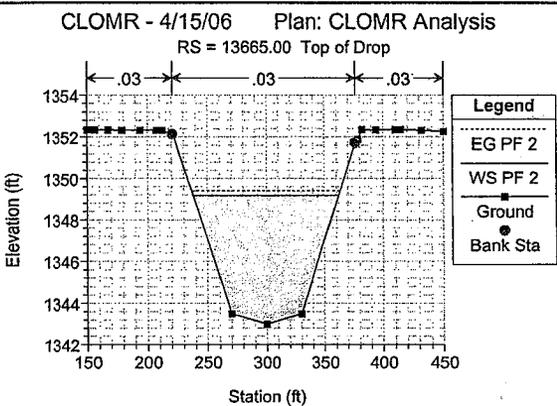
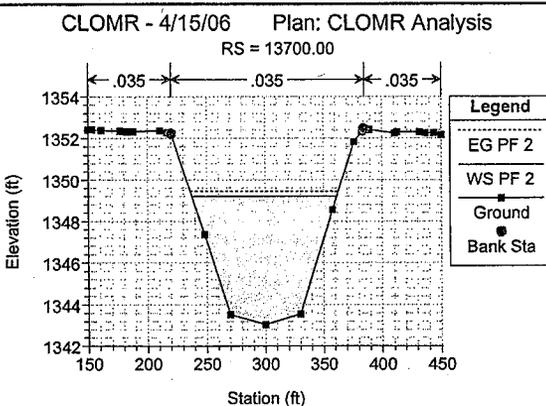
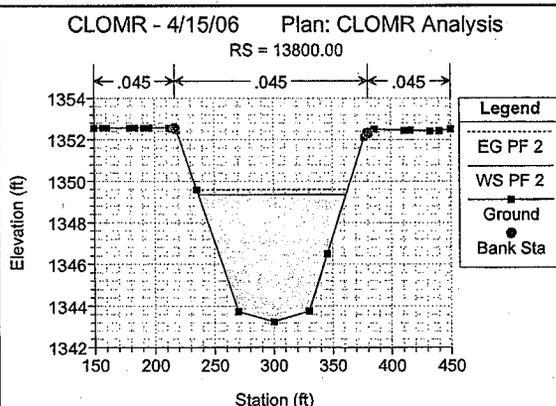


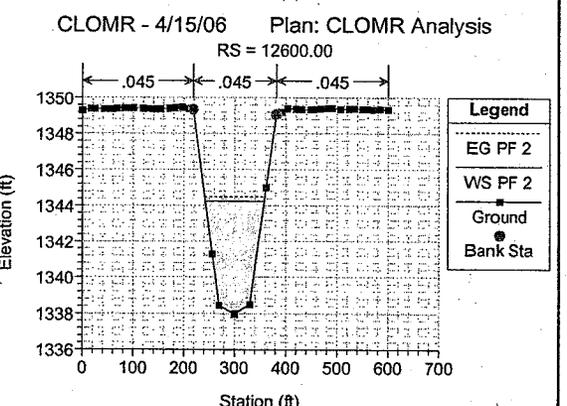
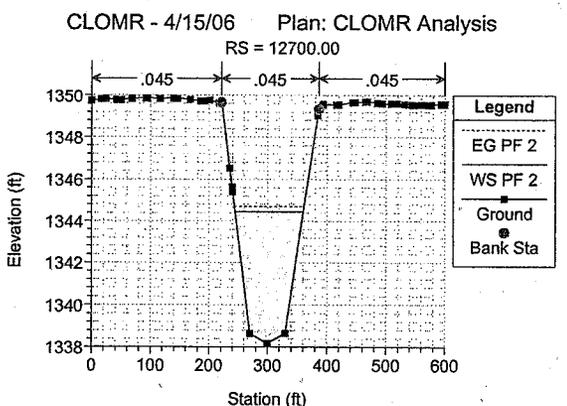
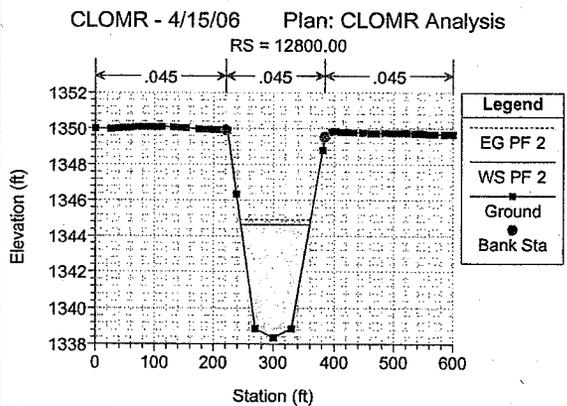
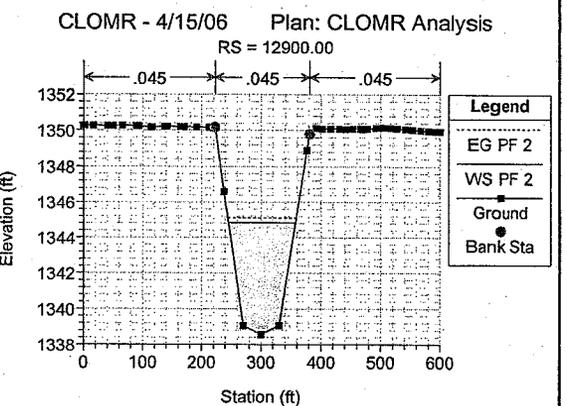
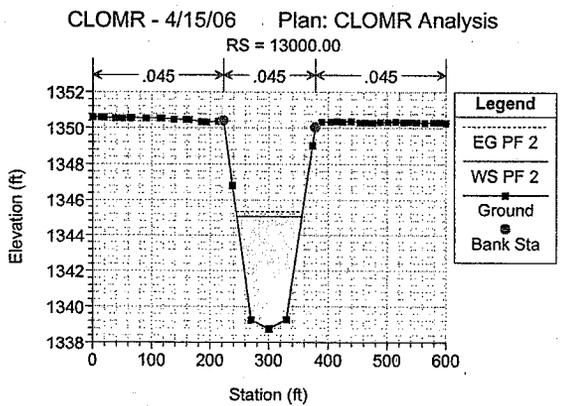
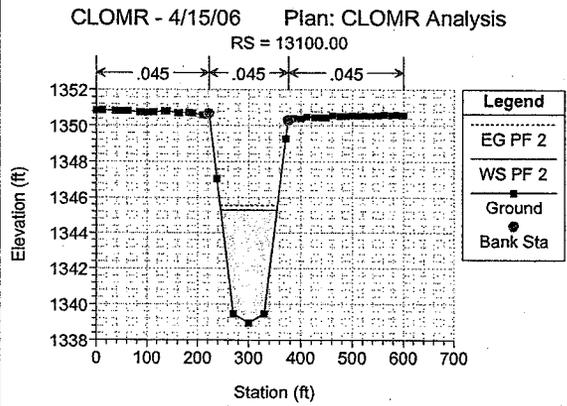
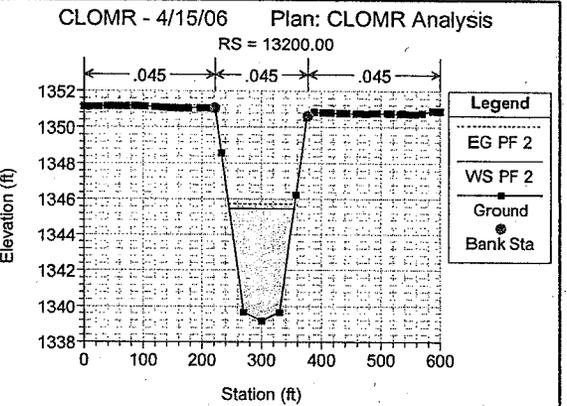
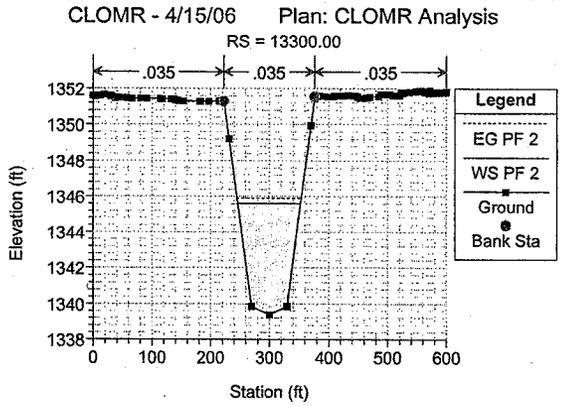
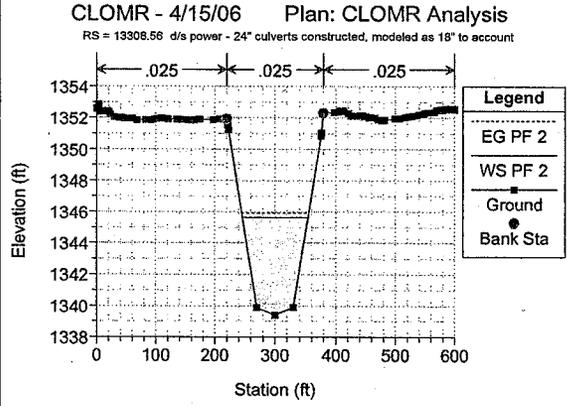
CLOMR - 4/15/06 Plan: CLOMR Analysis
RS = 14000.00

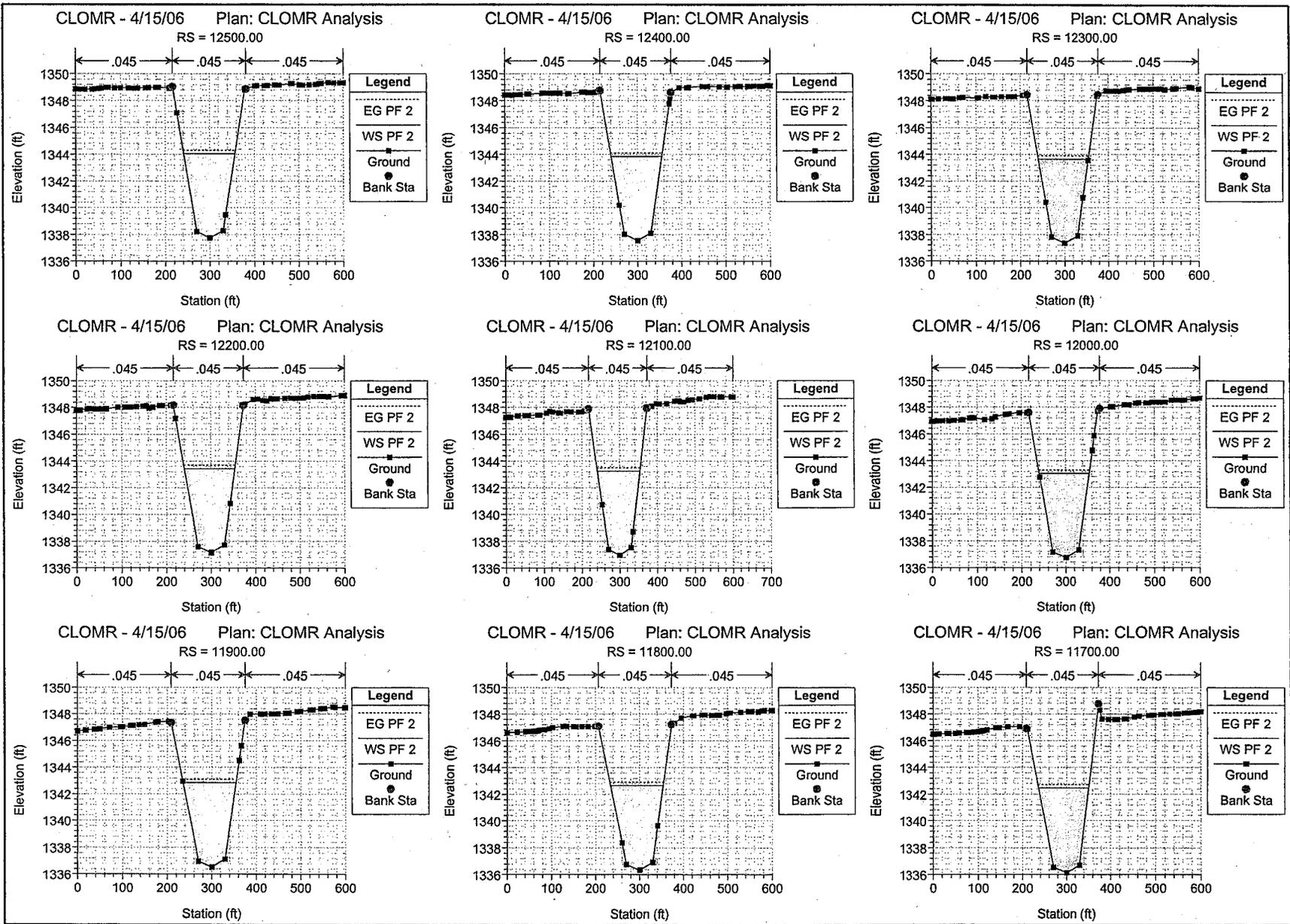


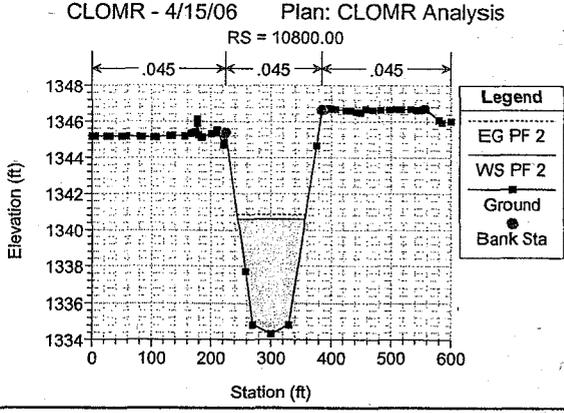
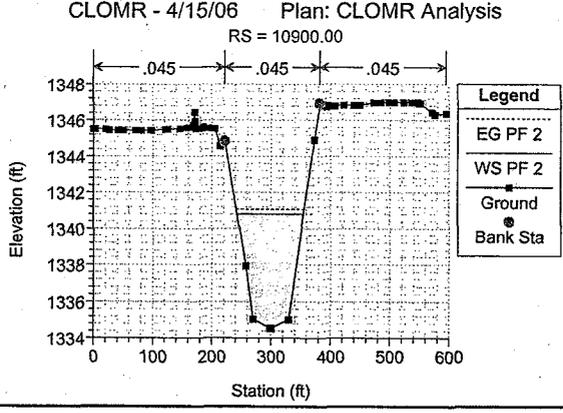
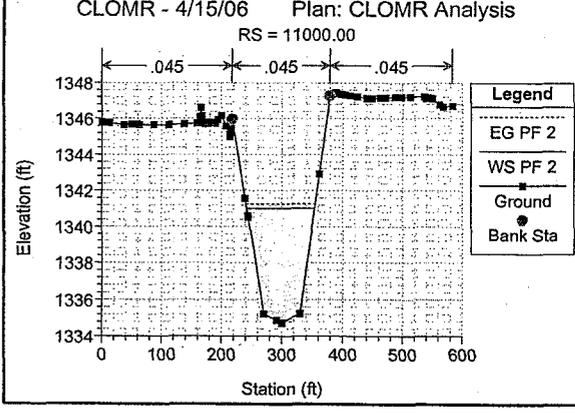
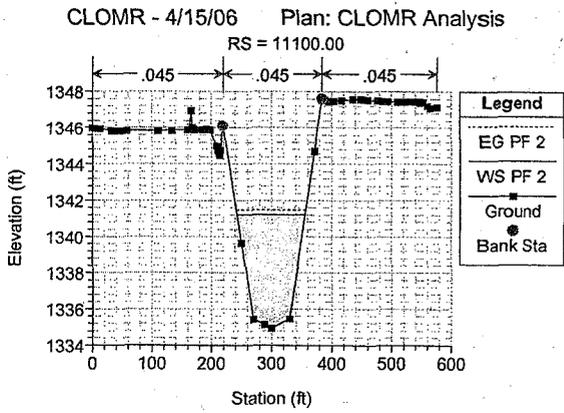
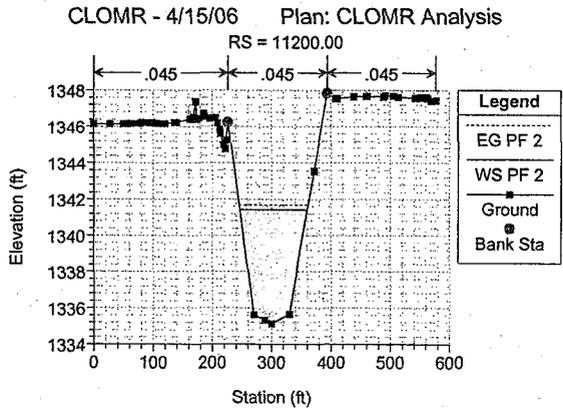
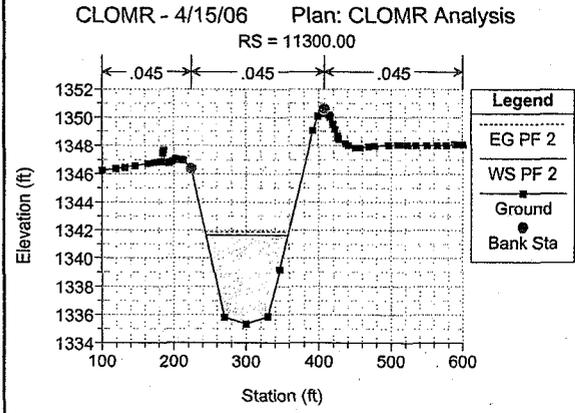
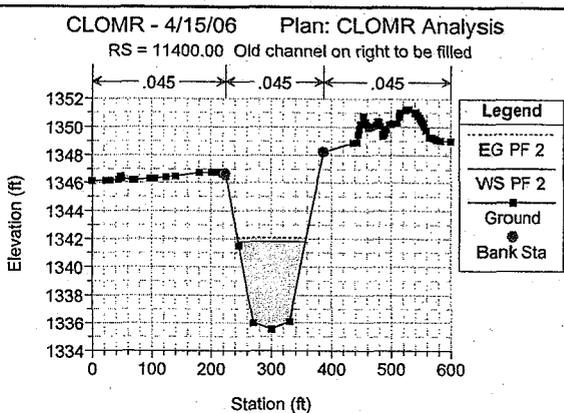
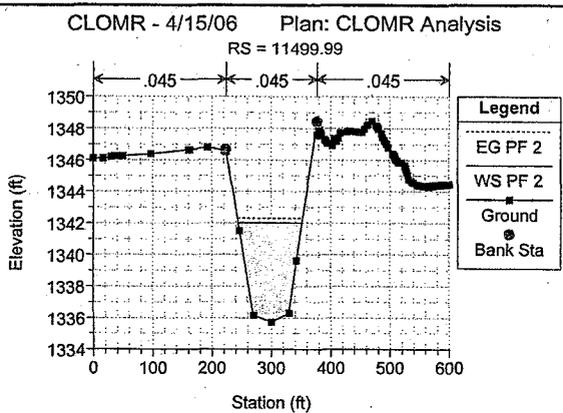
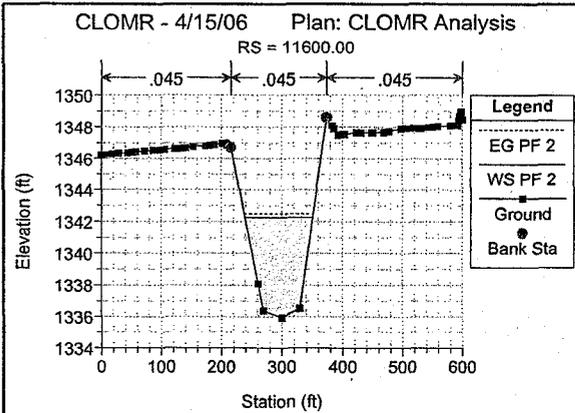
CLOMR - 4/15/06 Plan: CLOMR Analysis
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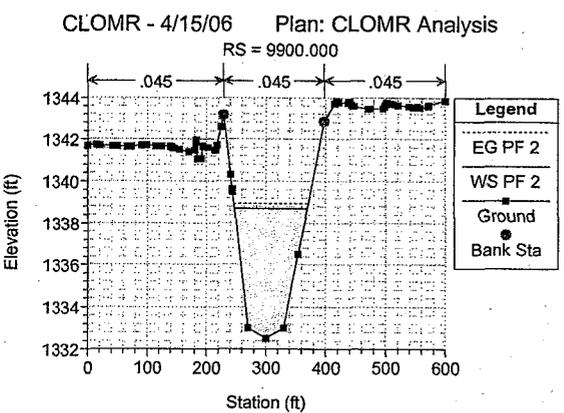
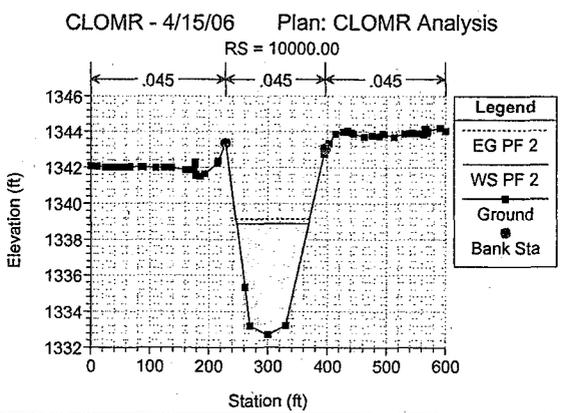
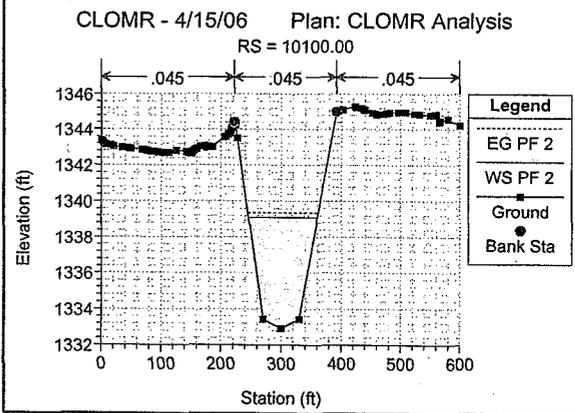
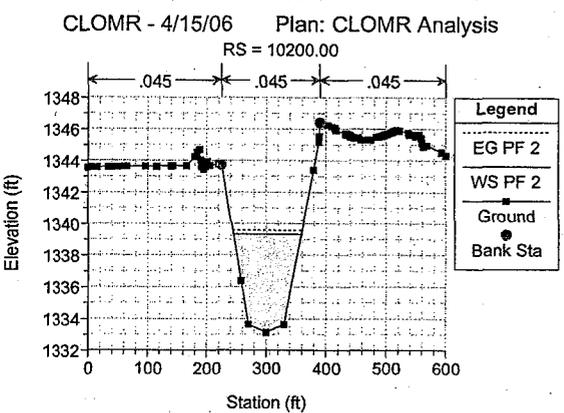
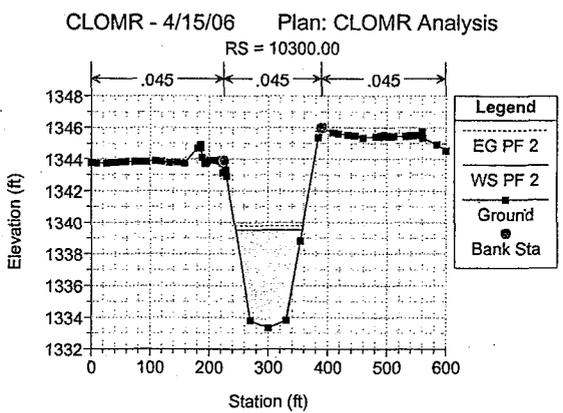
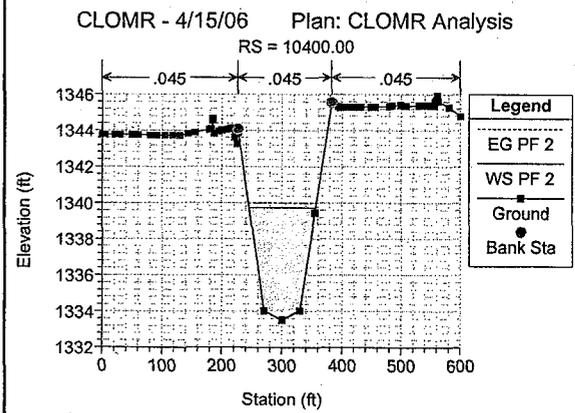
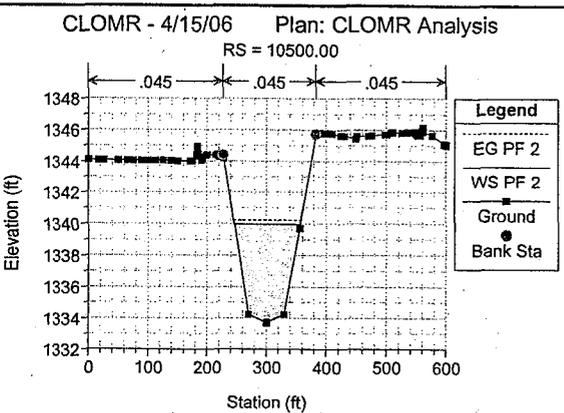
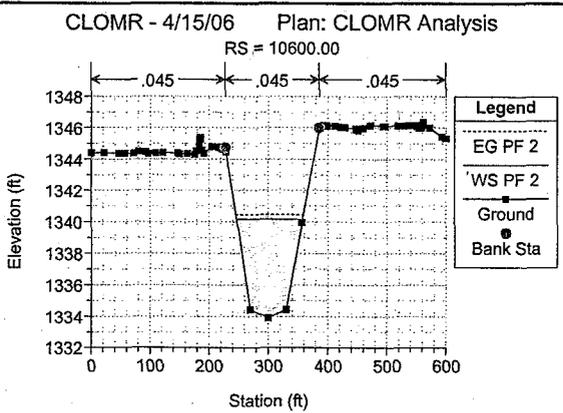
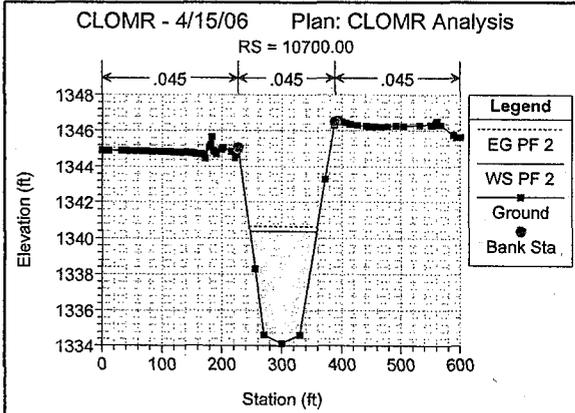


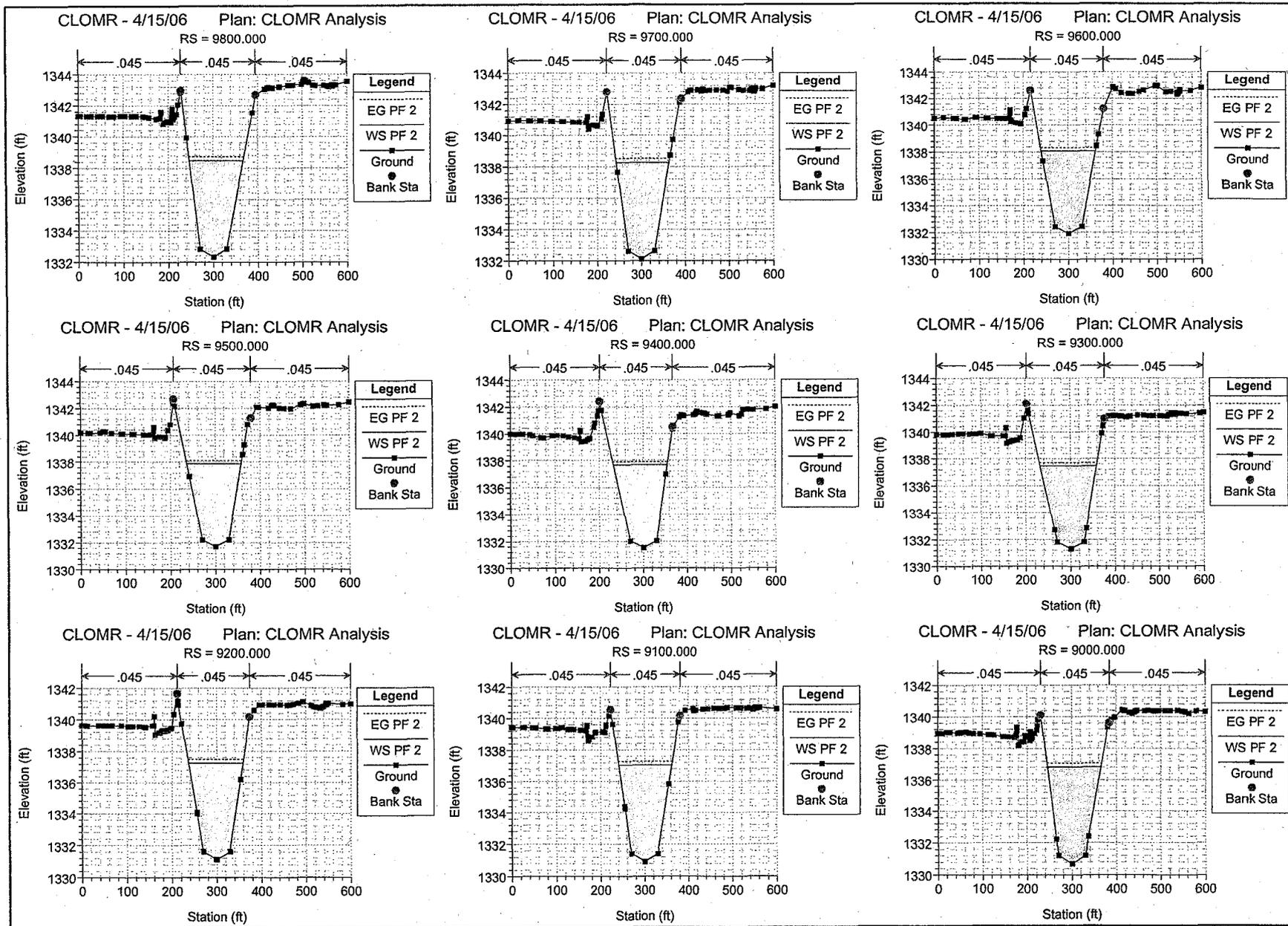


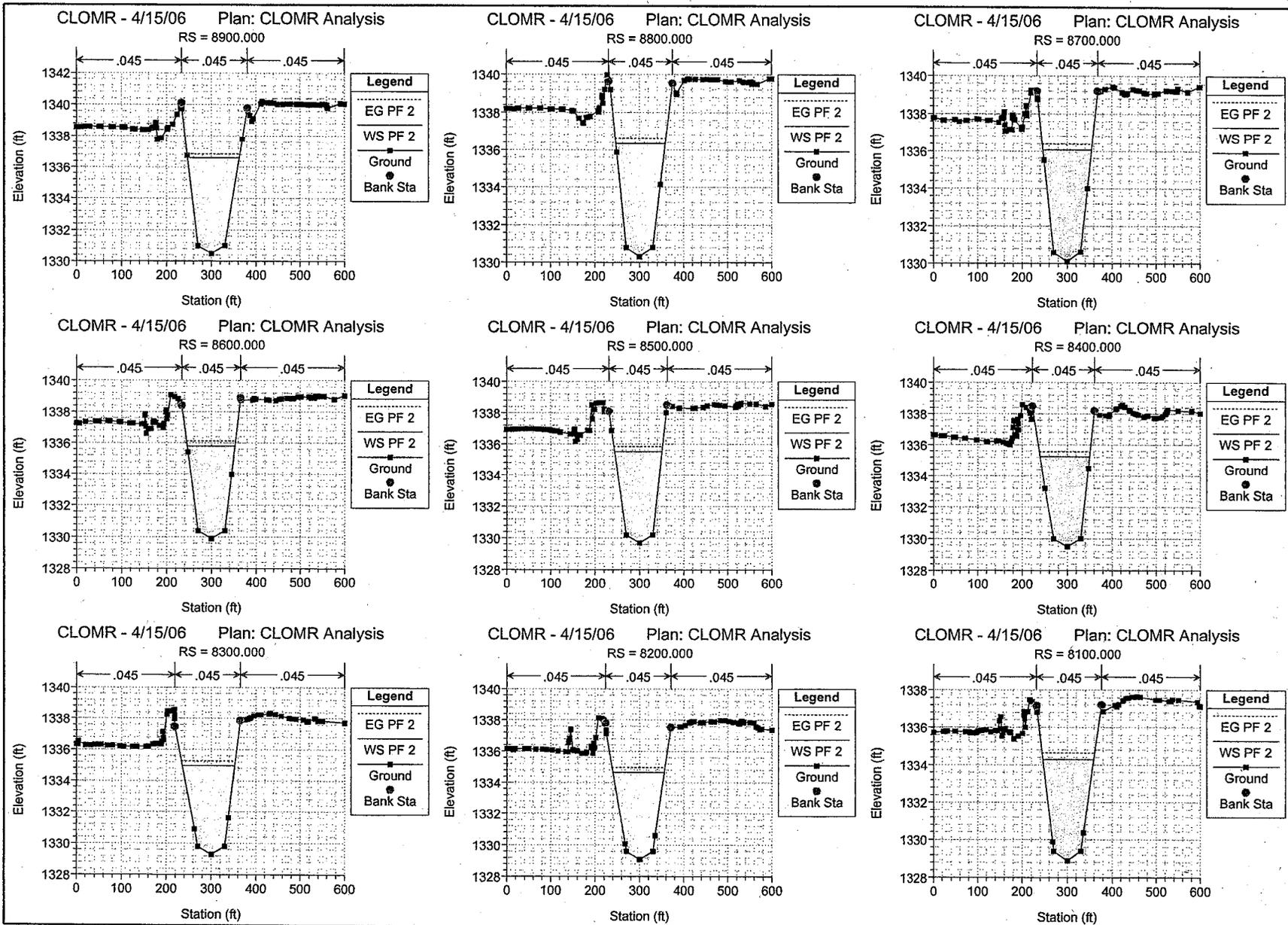


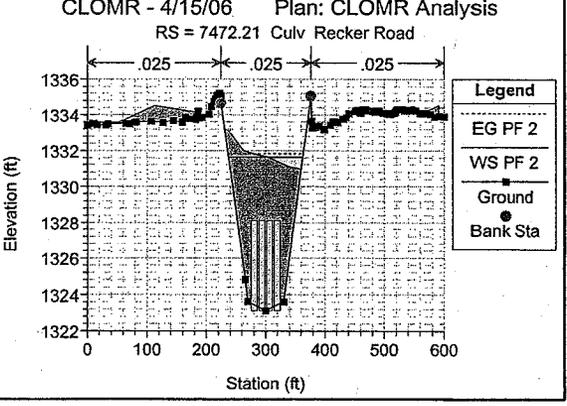
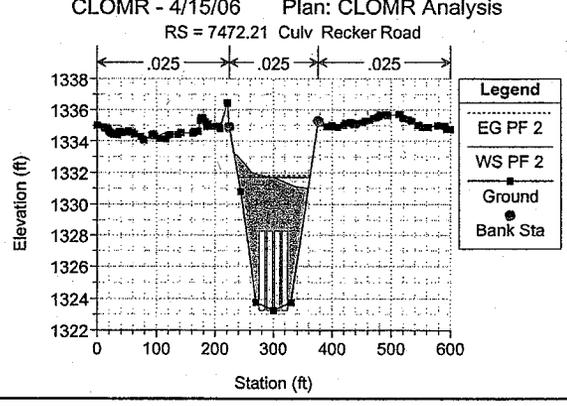
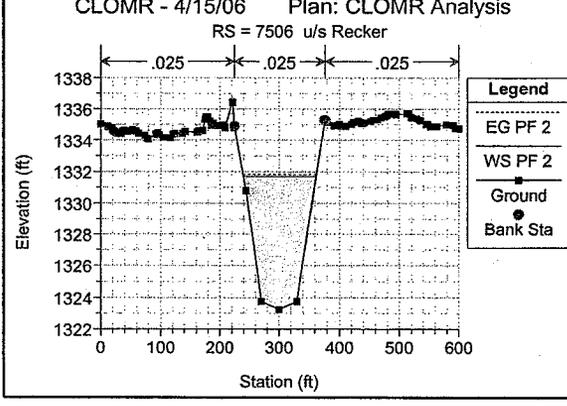
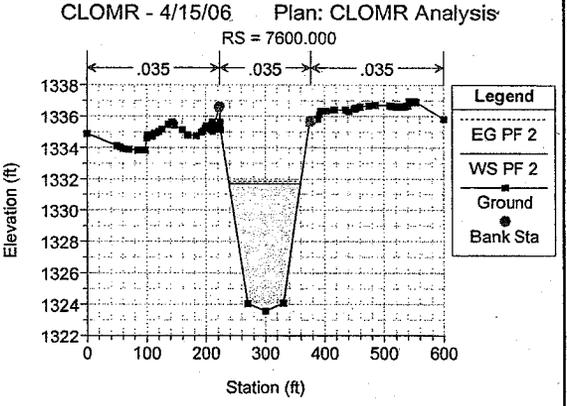
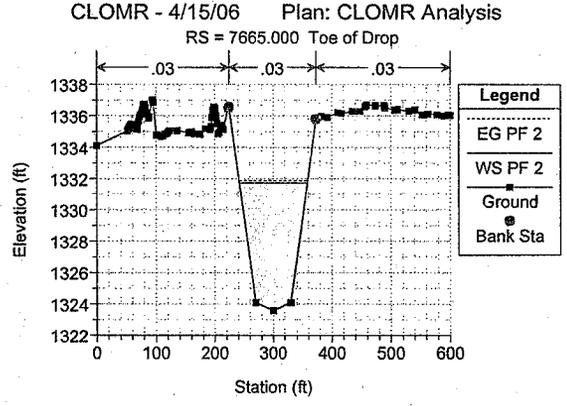
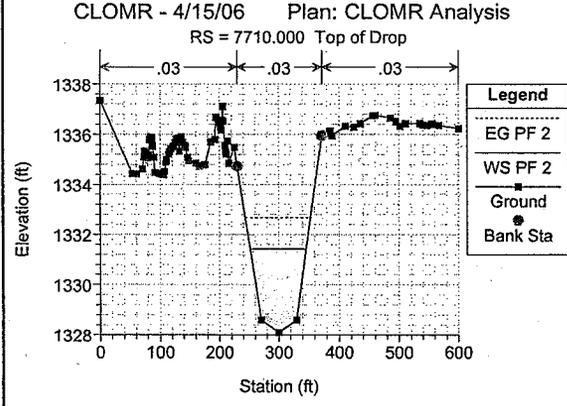
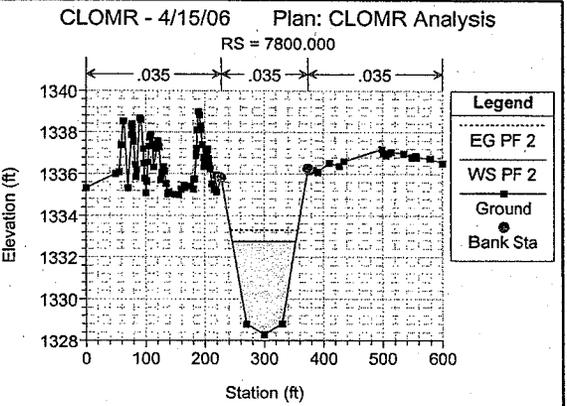
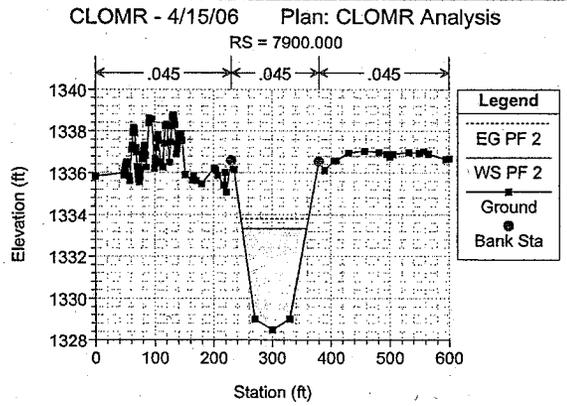
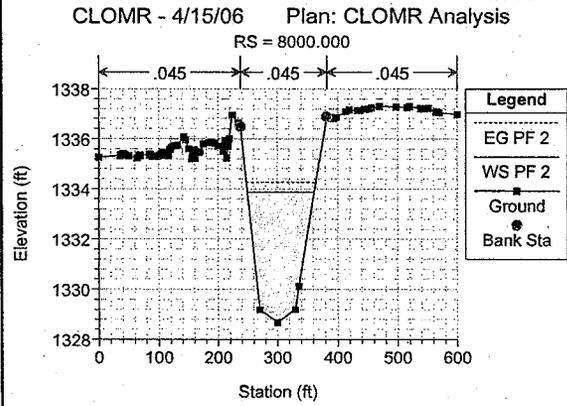


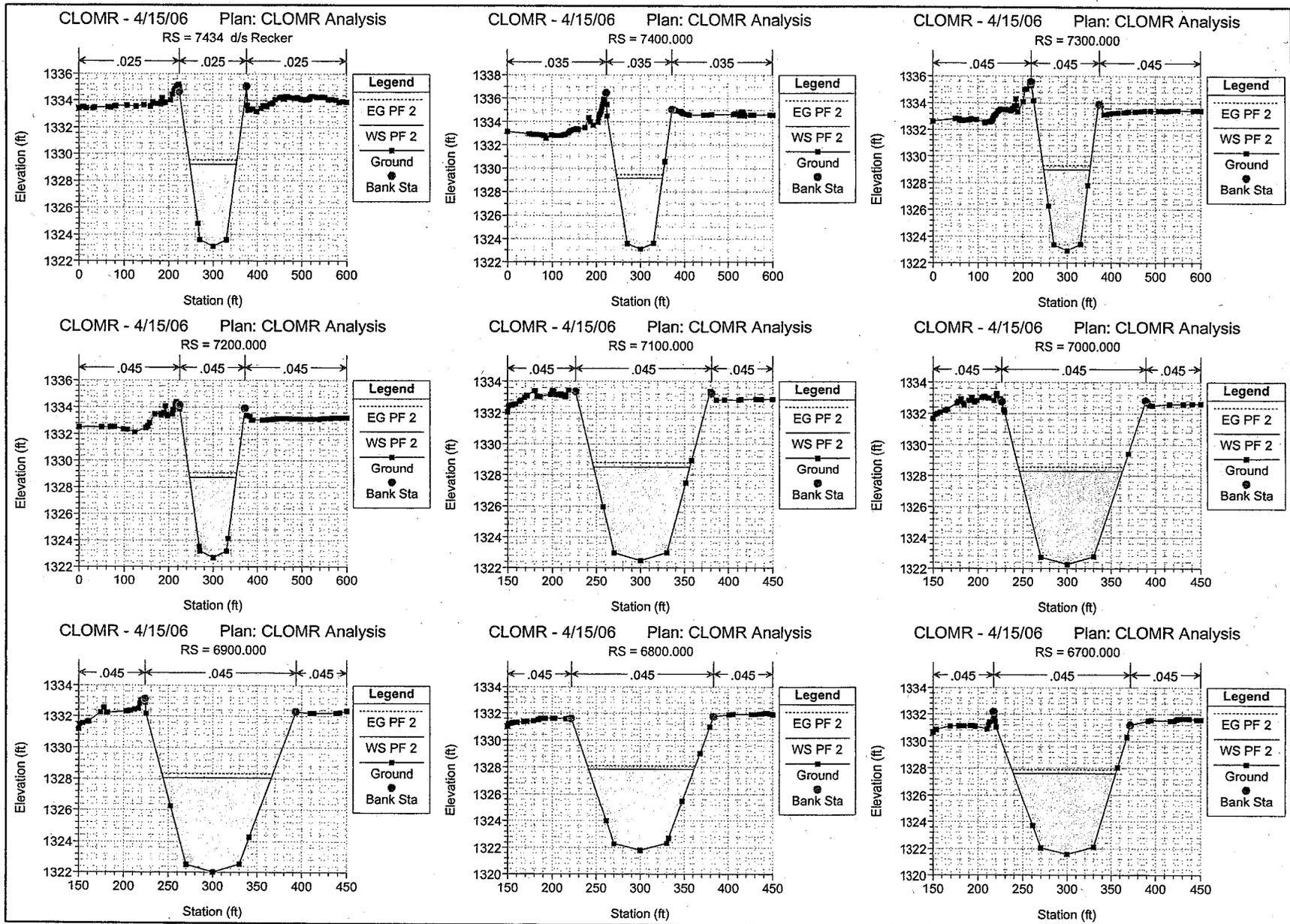


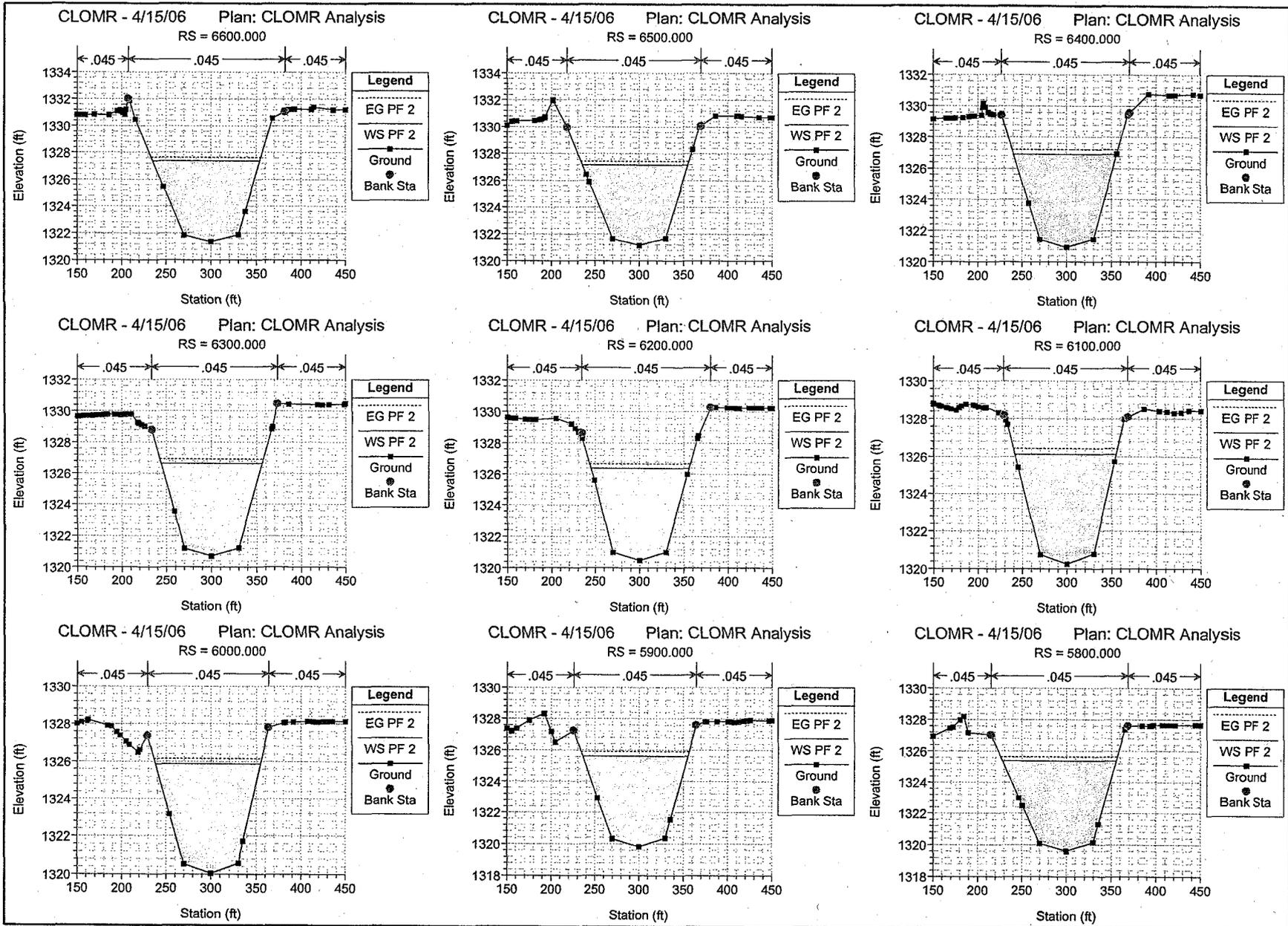


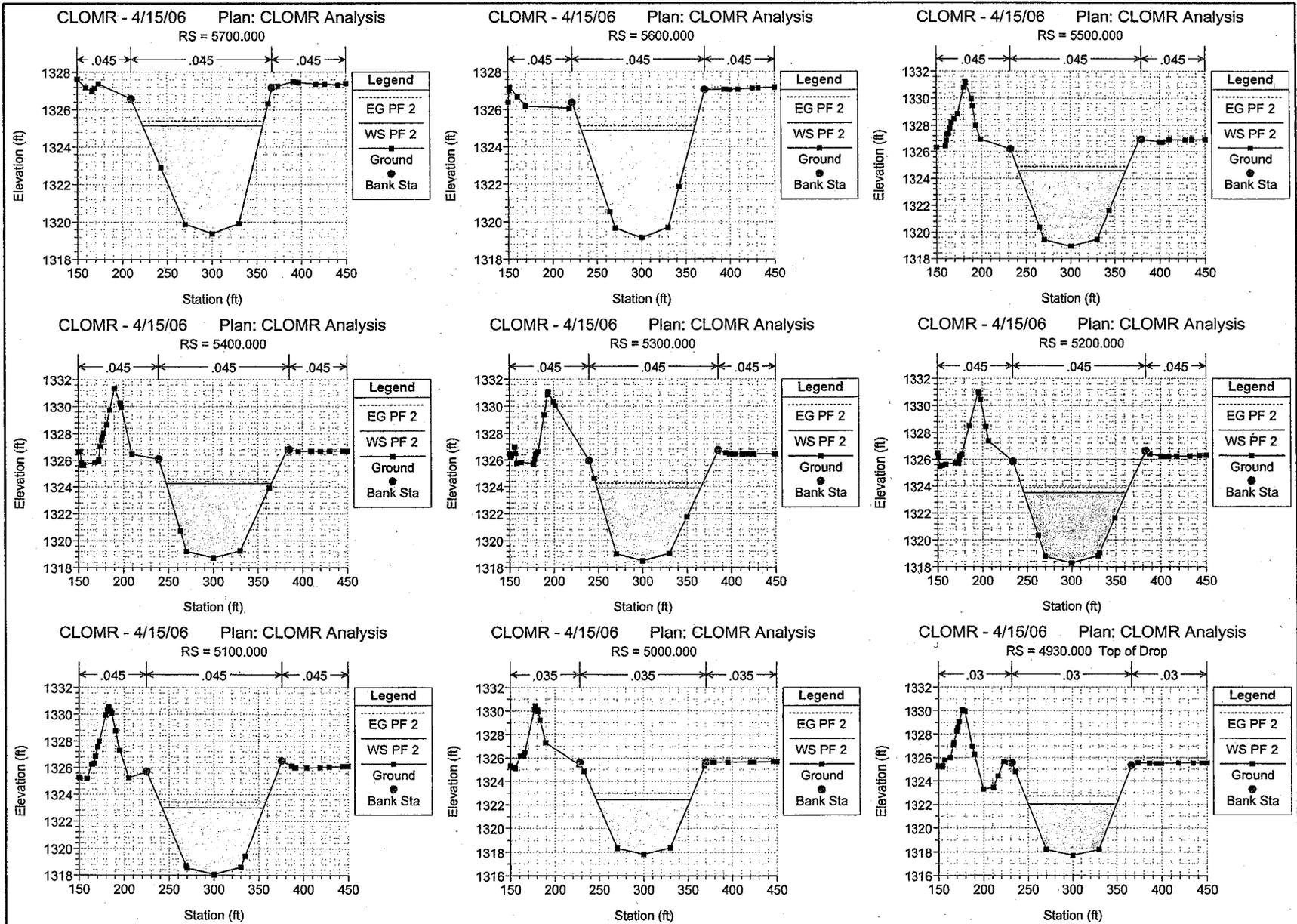


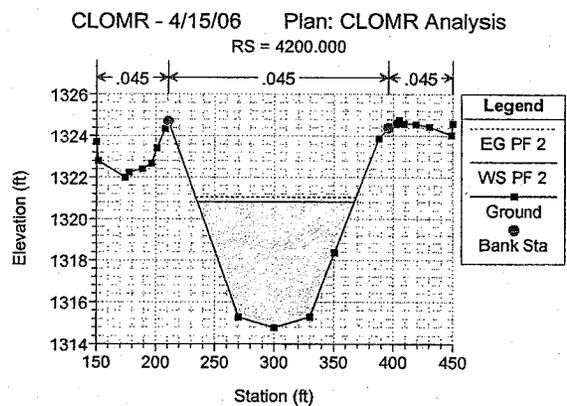
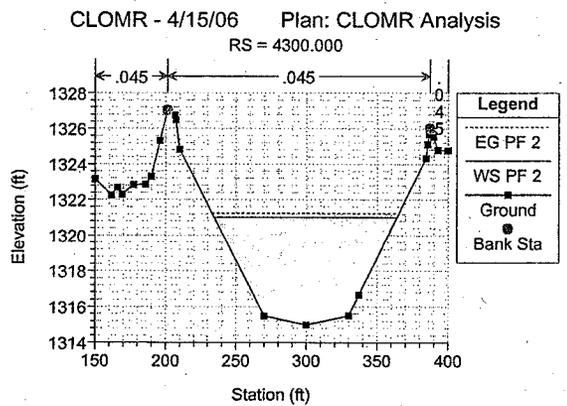
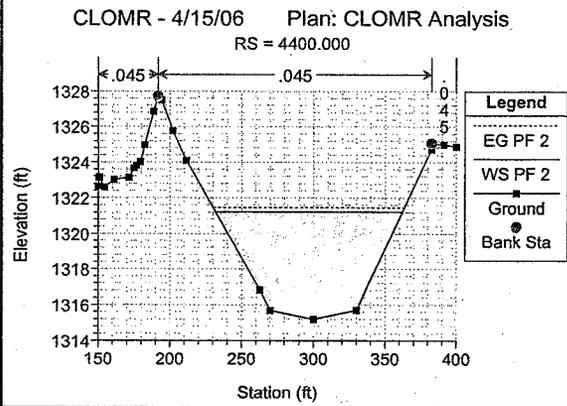
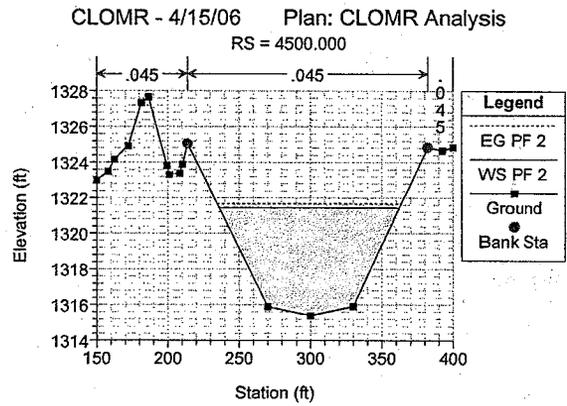
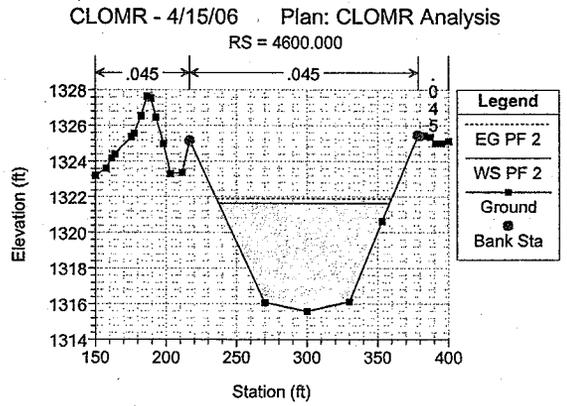
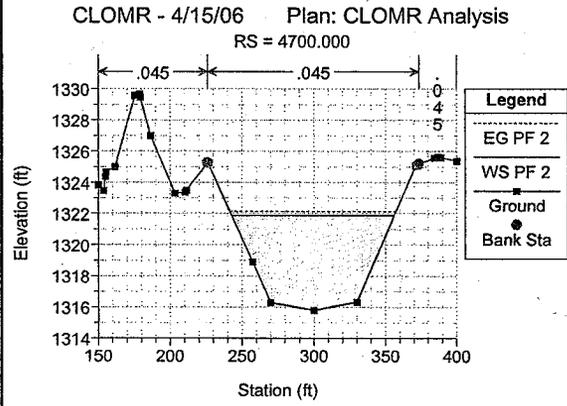
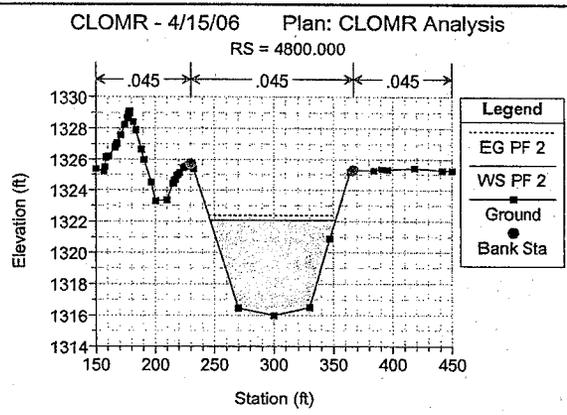
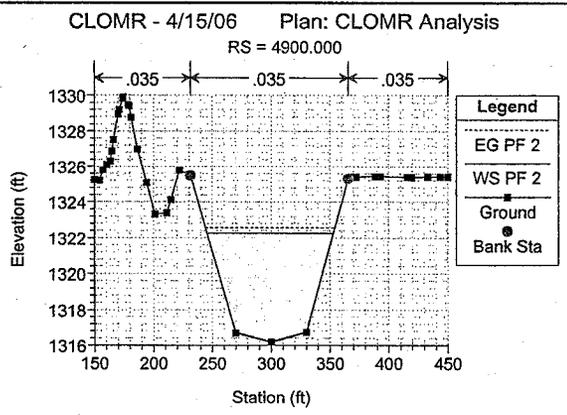
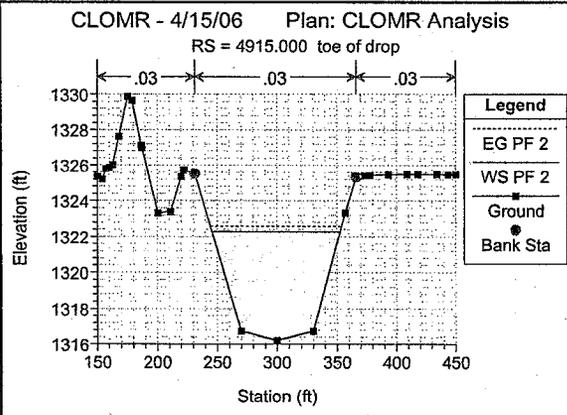


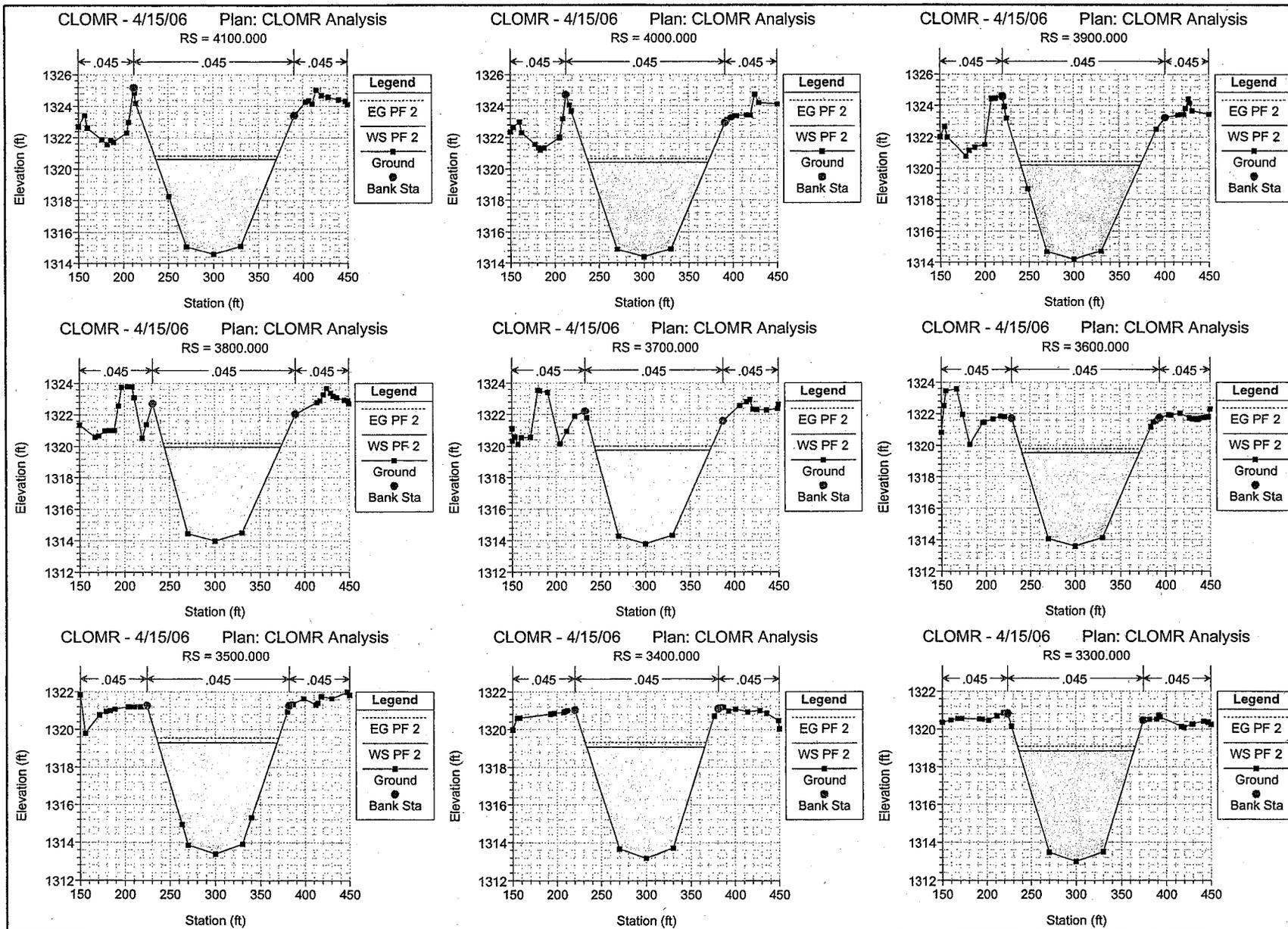


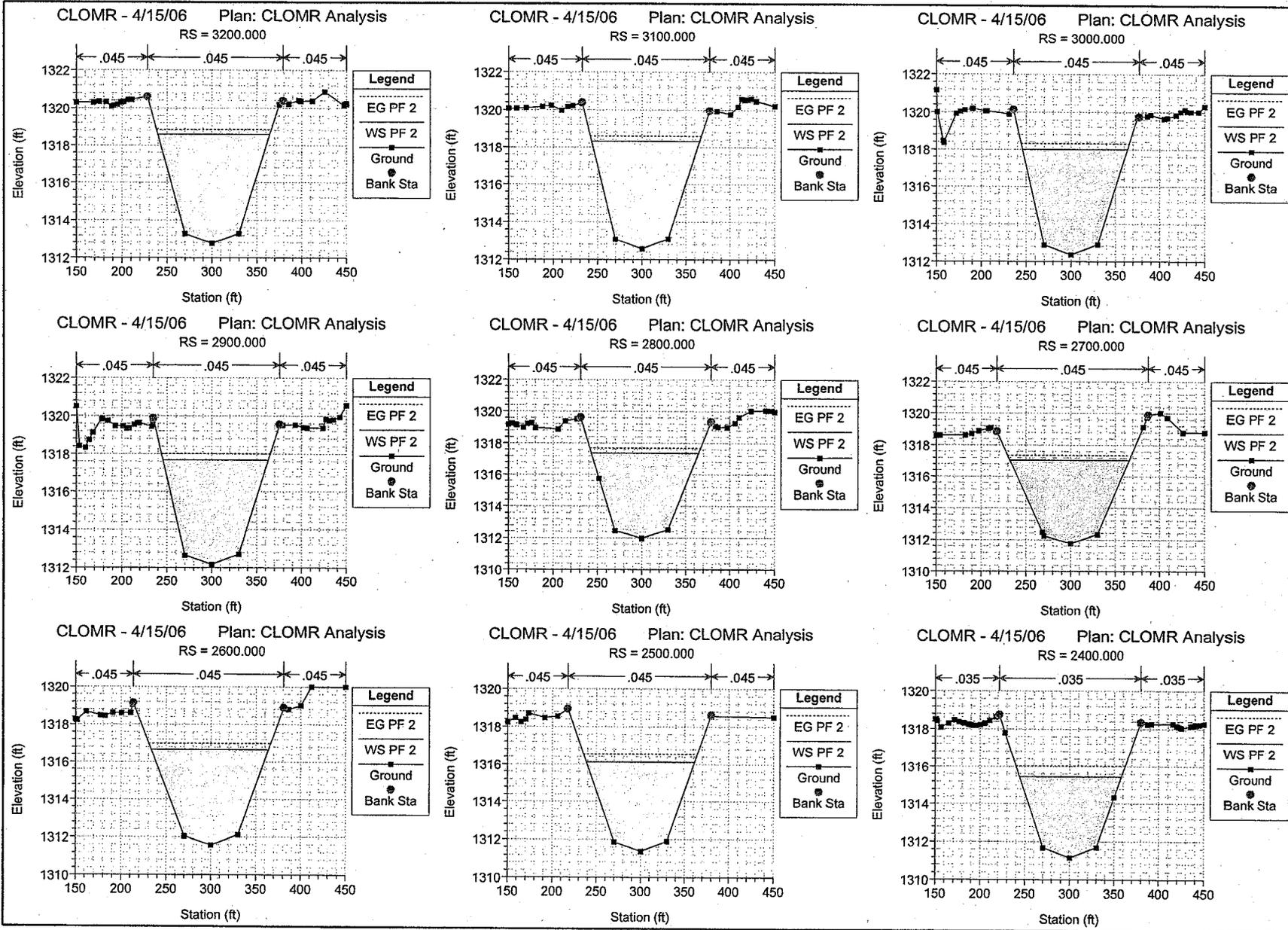


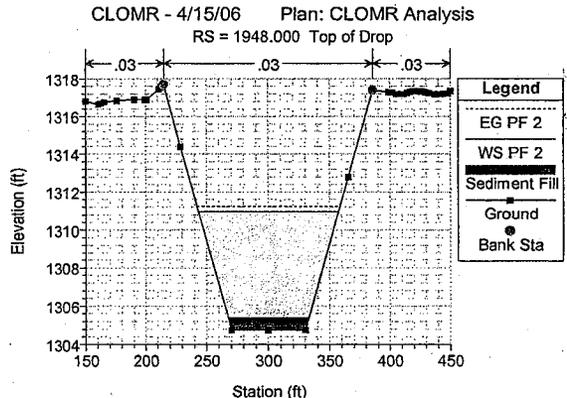
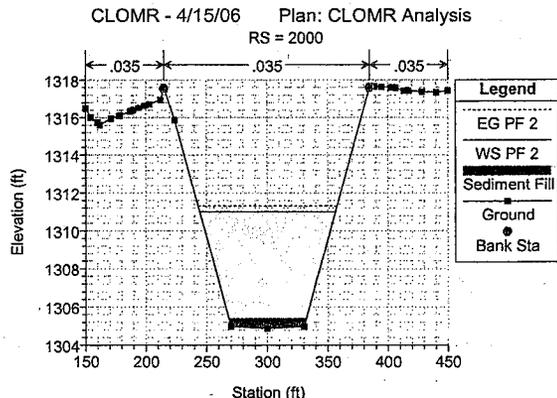
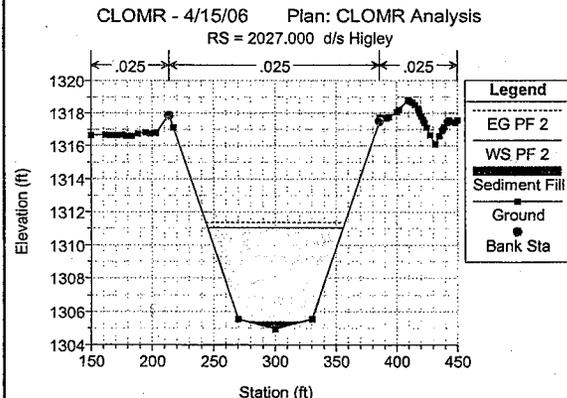
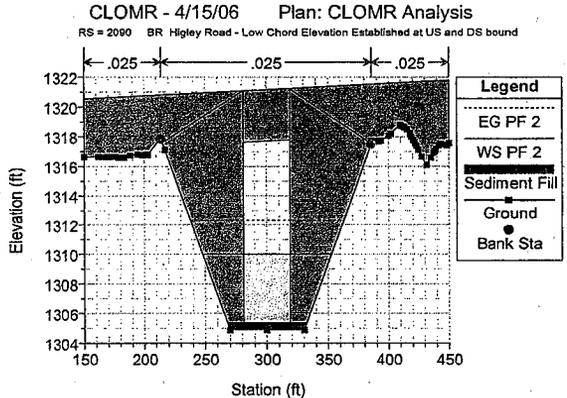
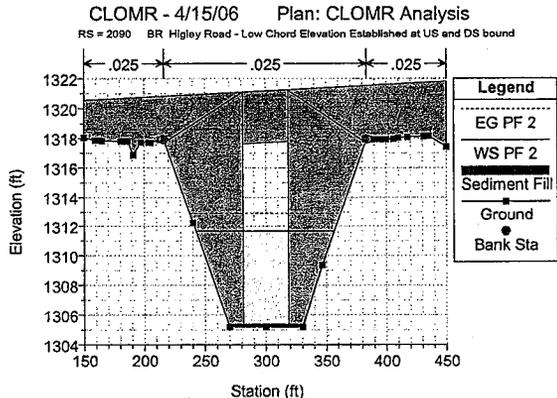
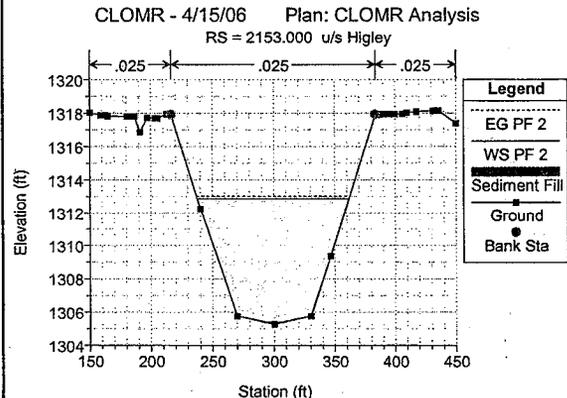
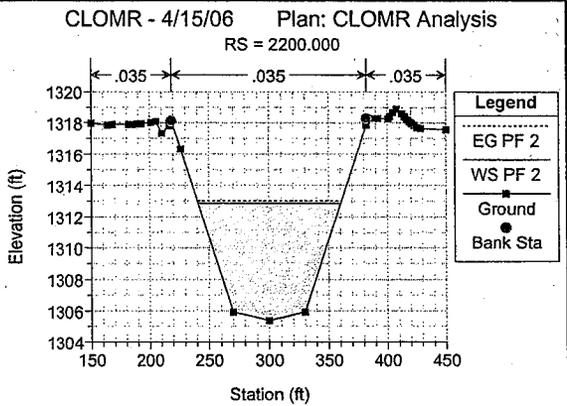
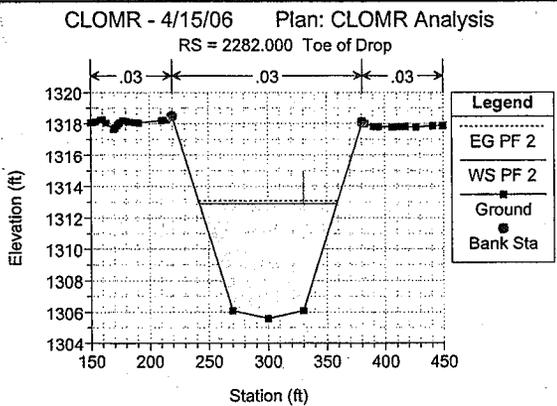
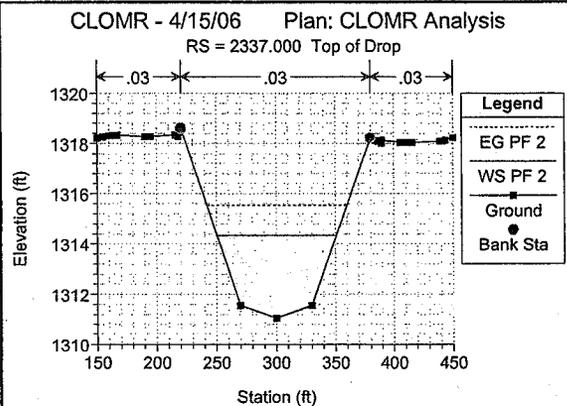


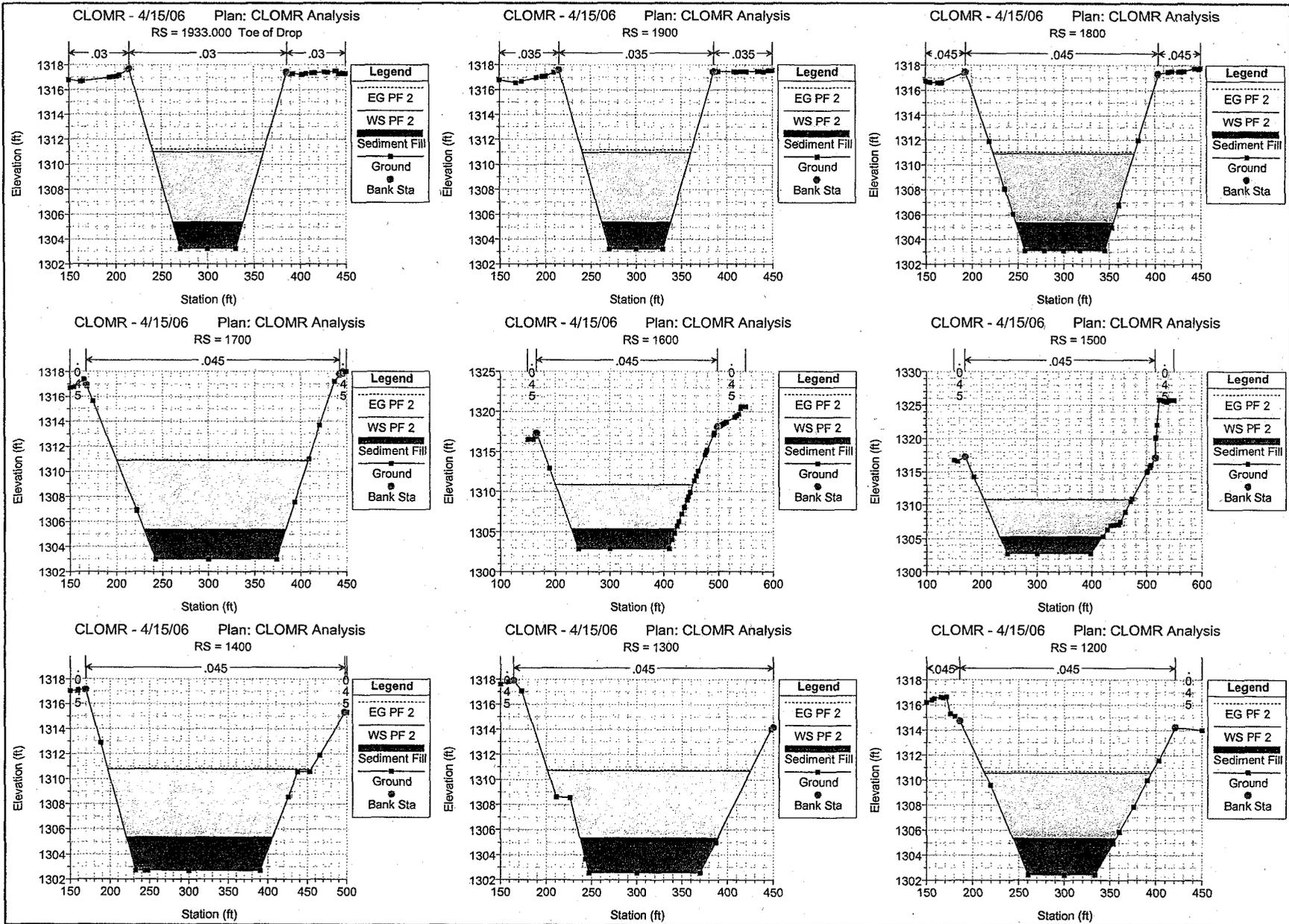




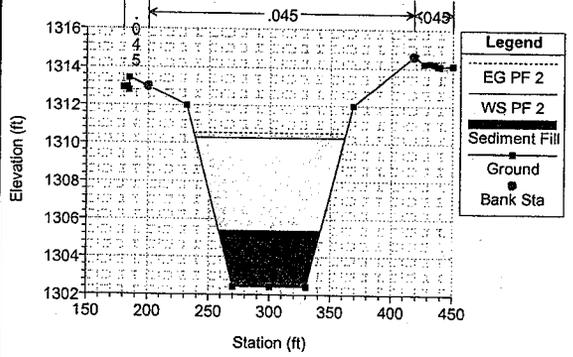




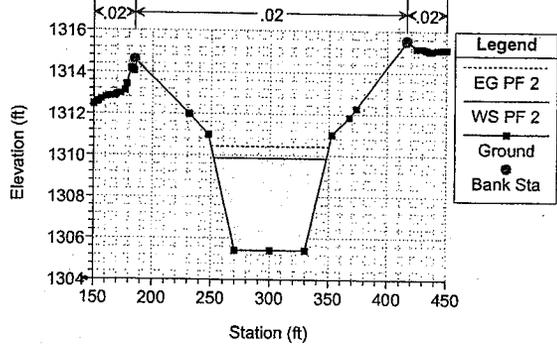


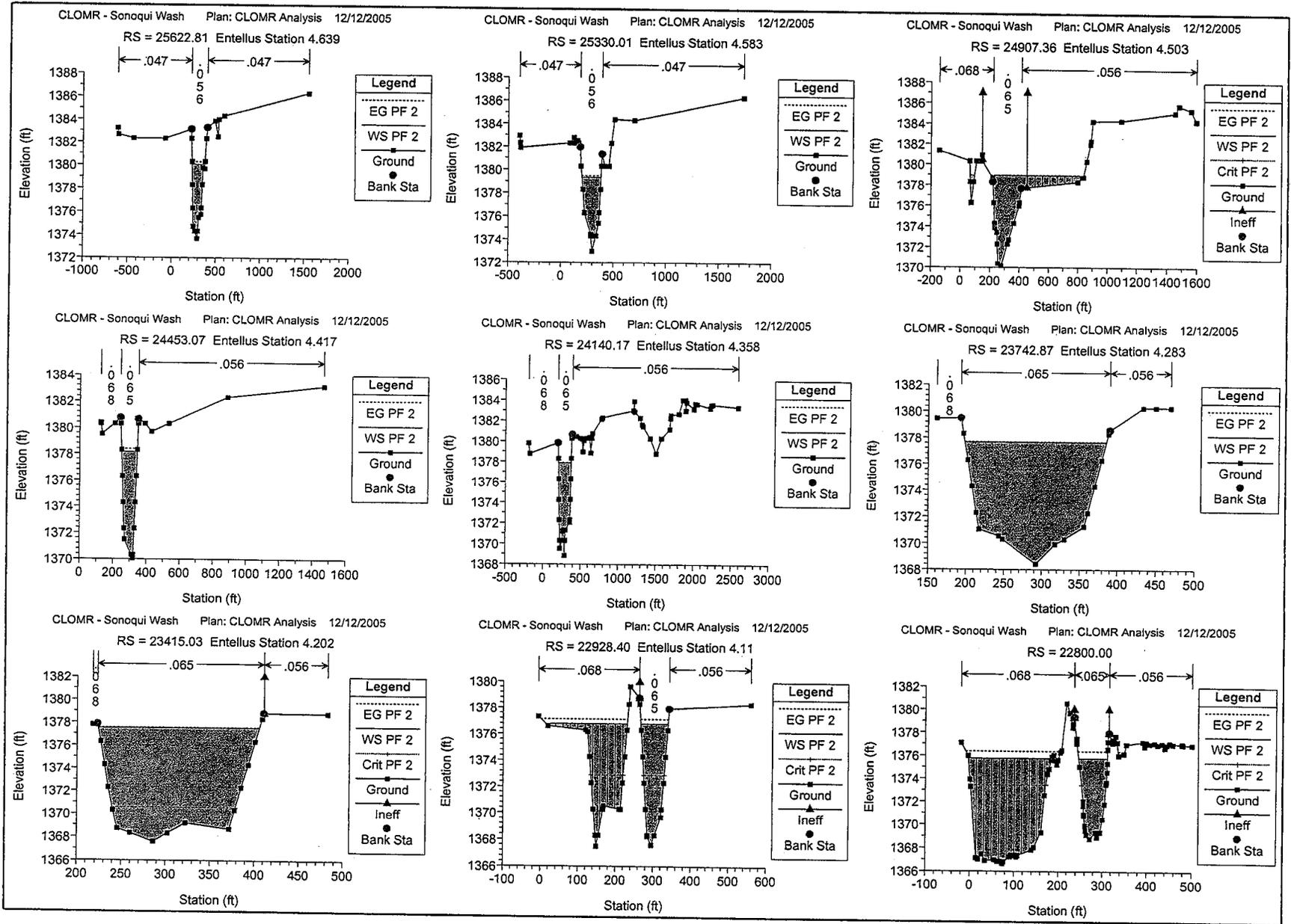


CLOMR - 4/15/06 Plan: CLOMR Analysis
RS = 1146

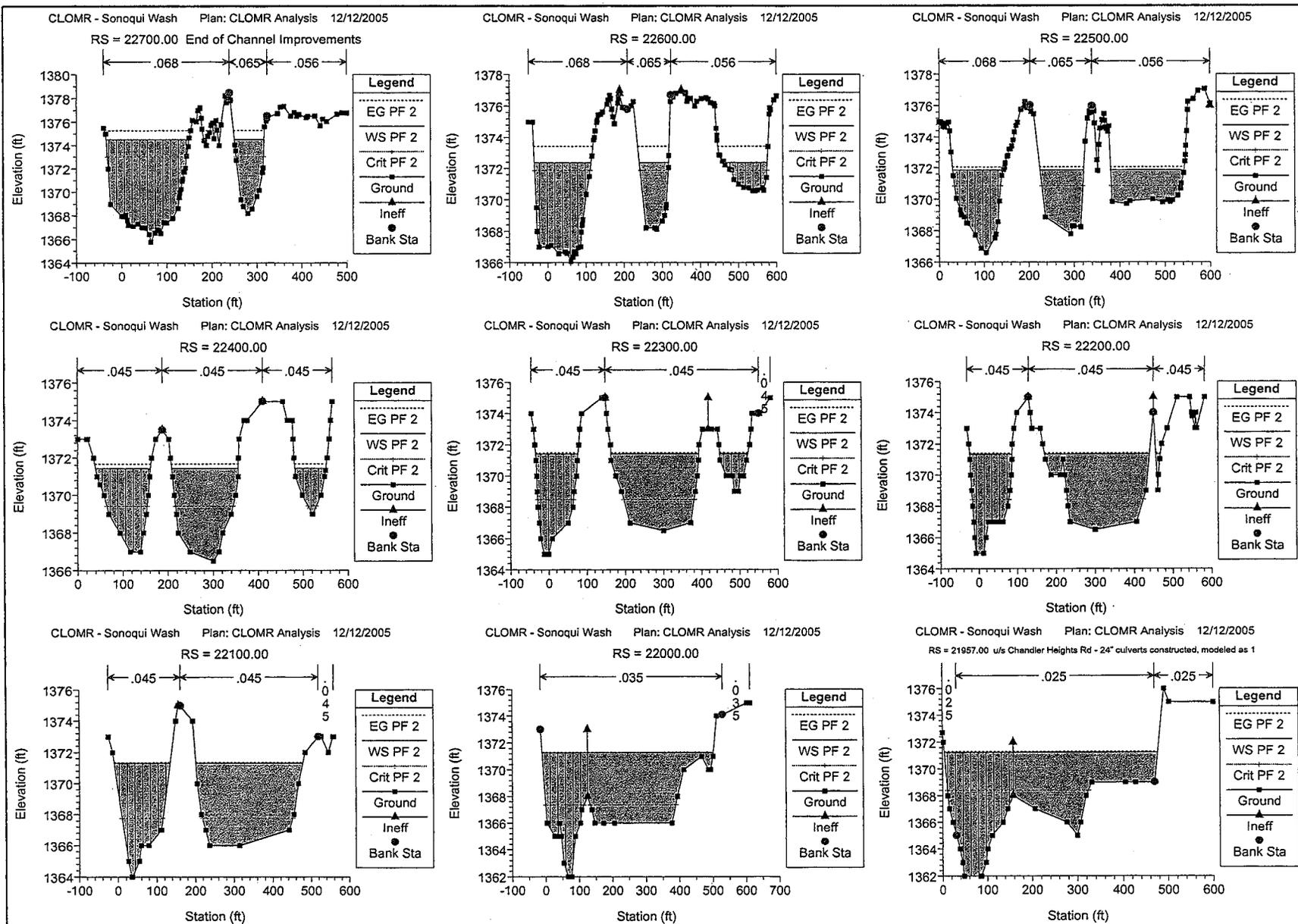


CLOMR - 4/15/06 Plan: CLOMR Analysis
RS = 1126 Upstream Cross Section of Weir

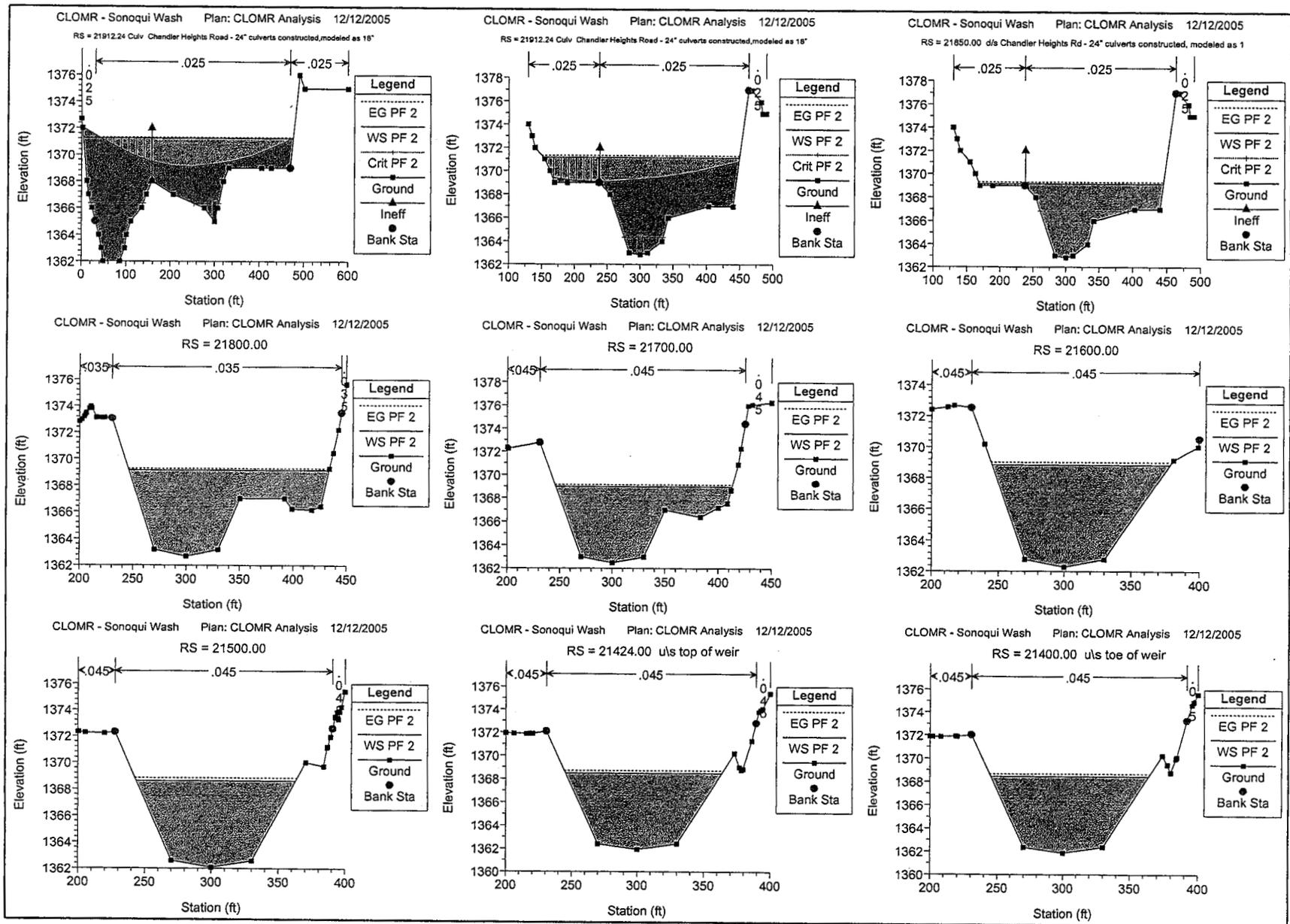




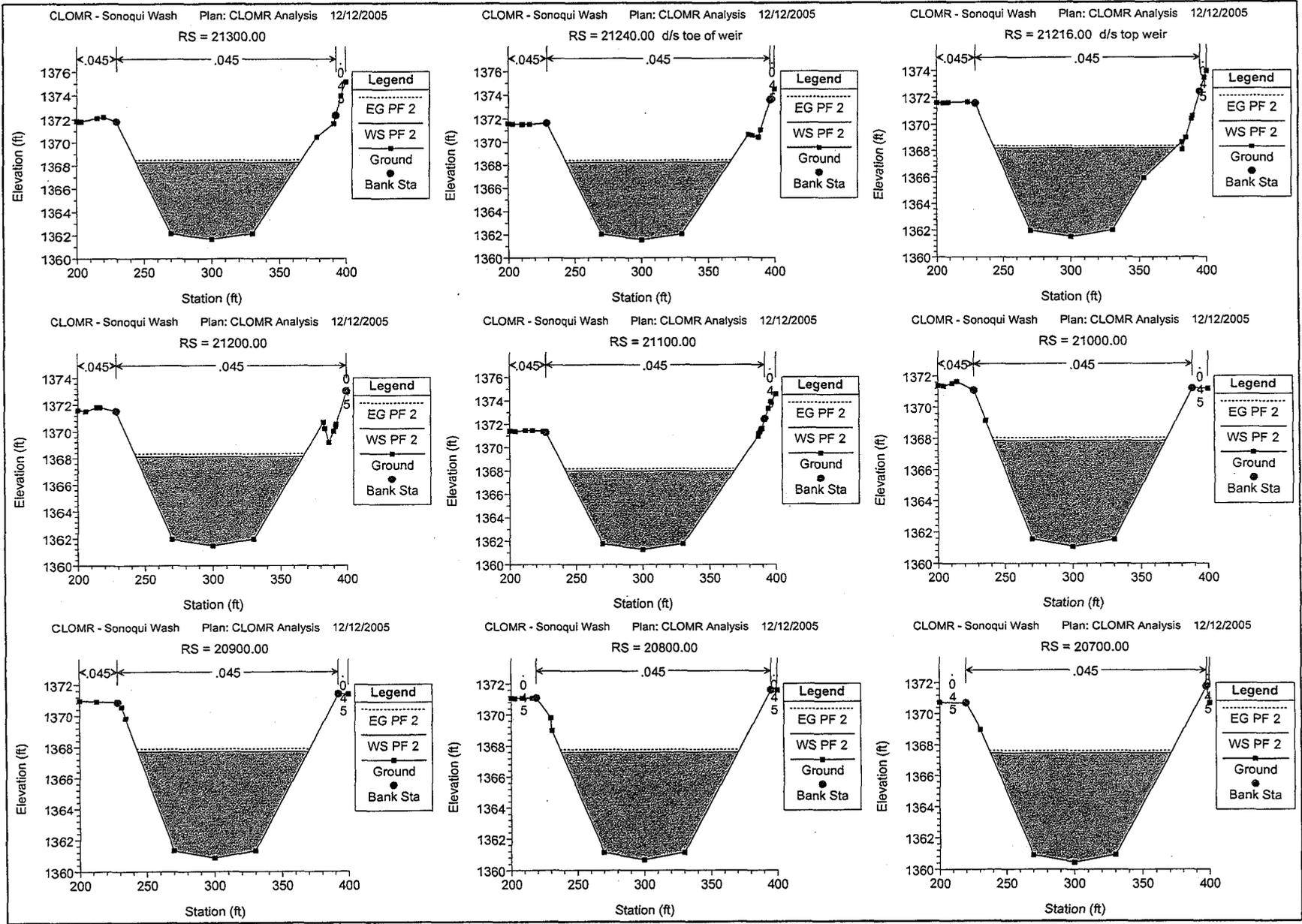
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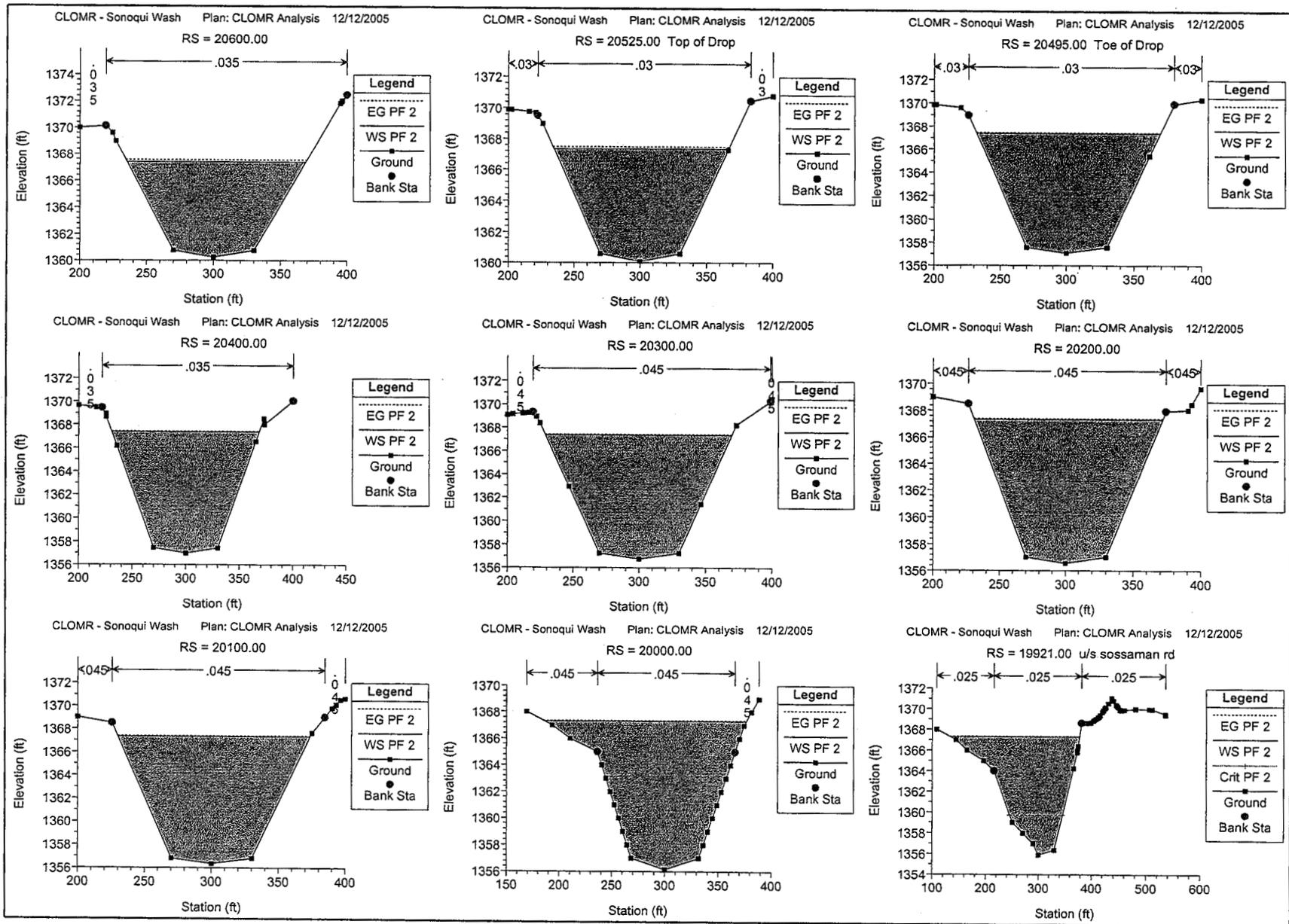
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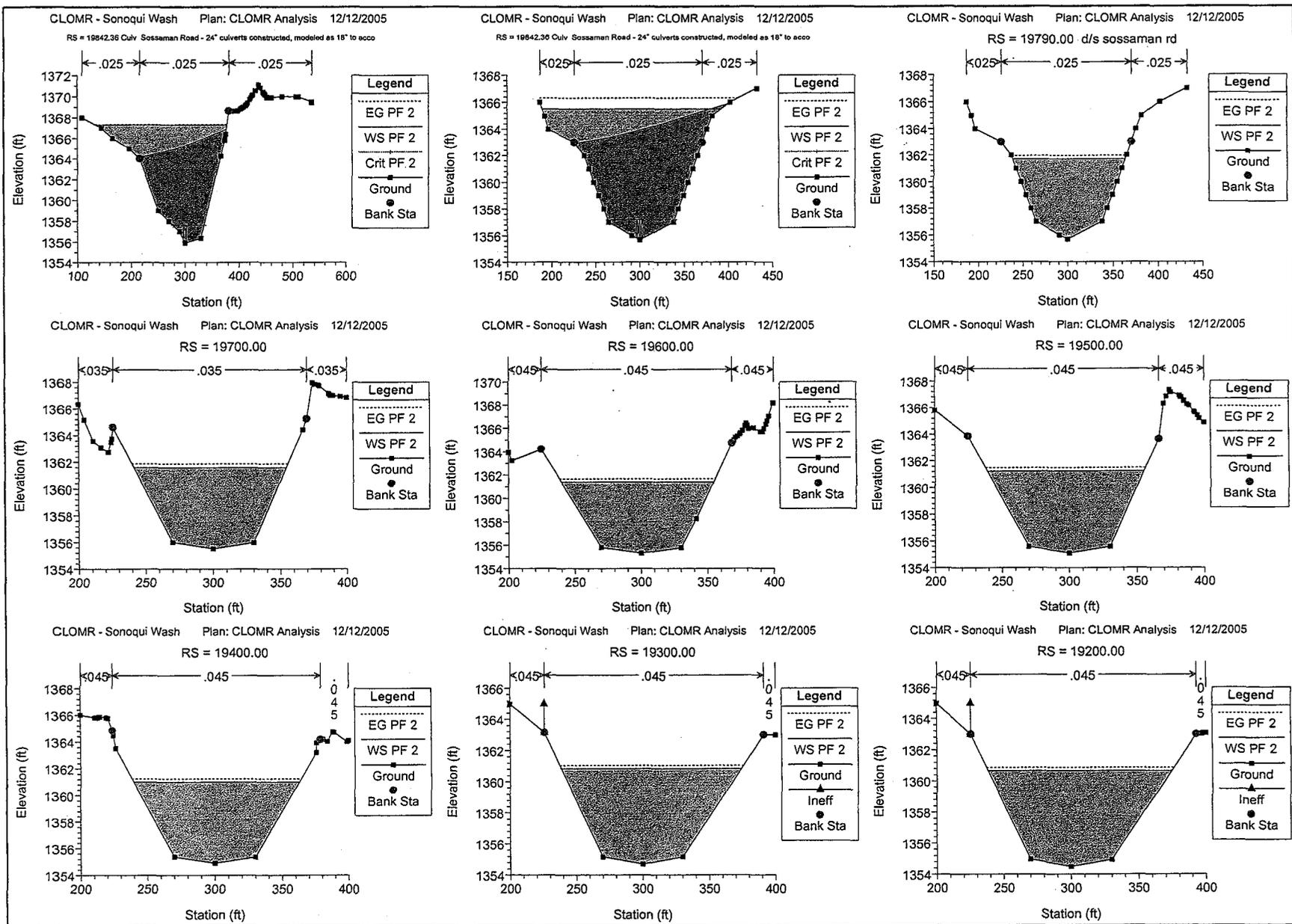
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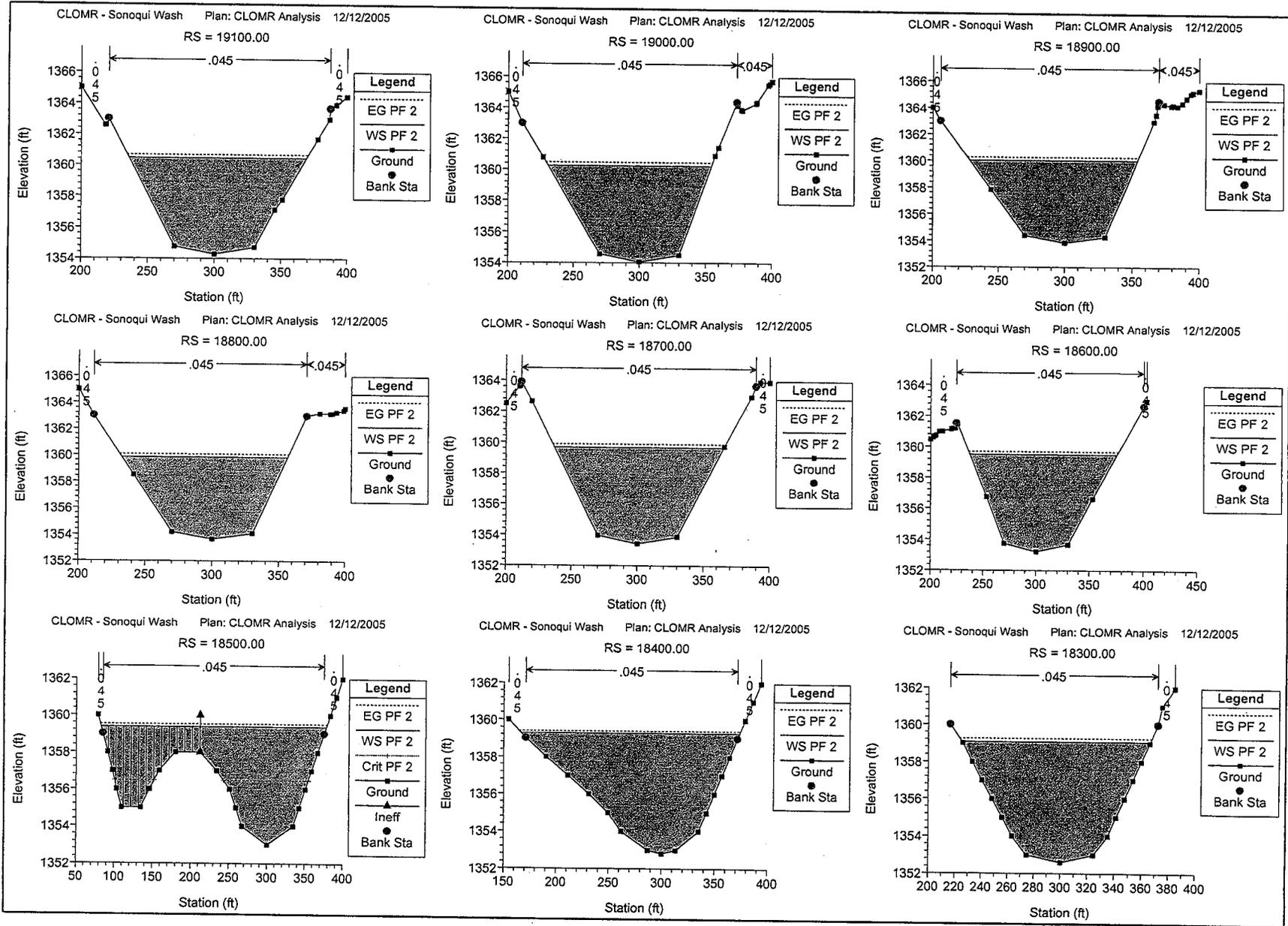
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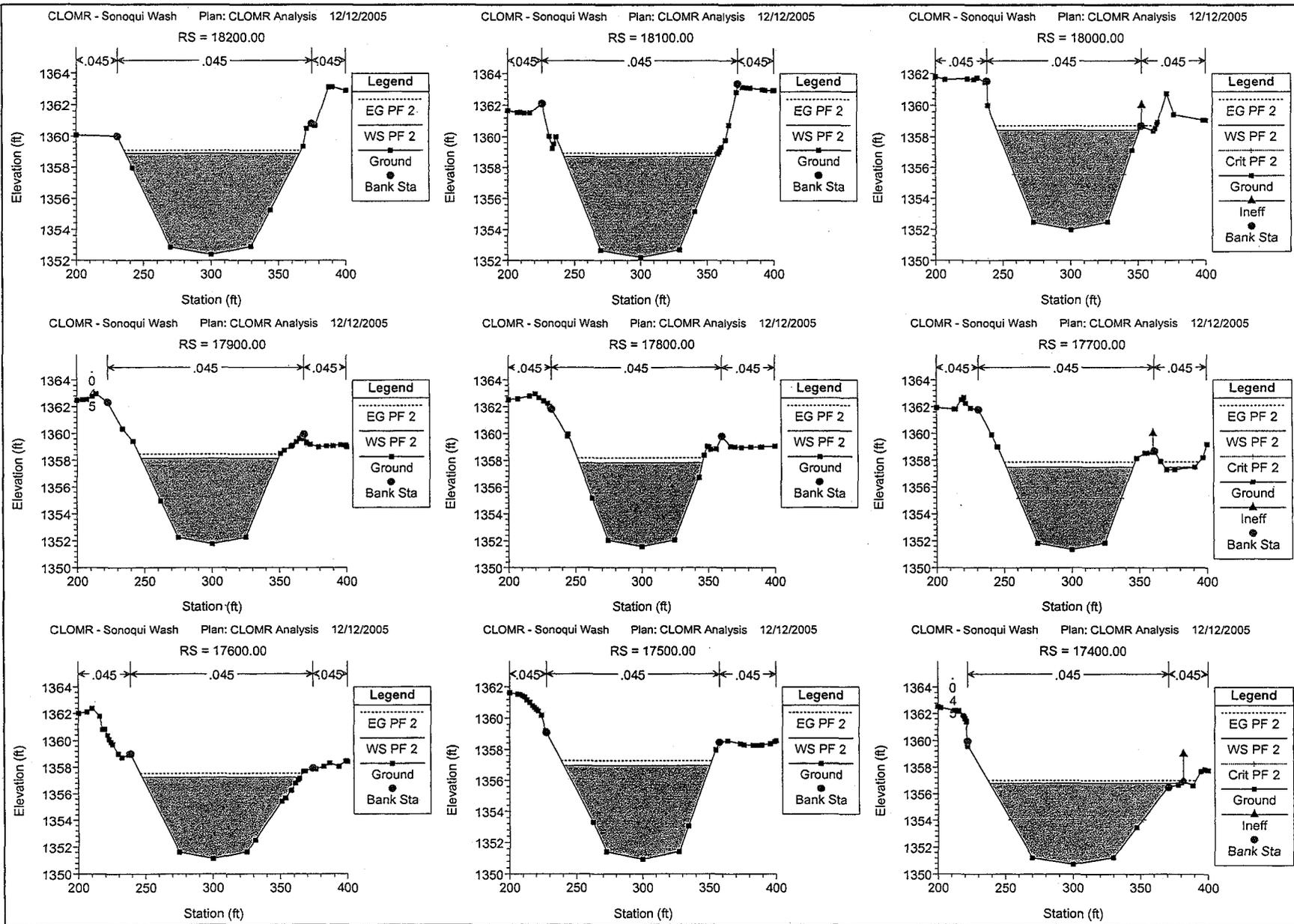
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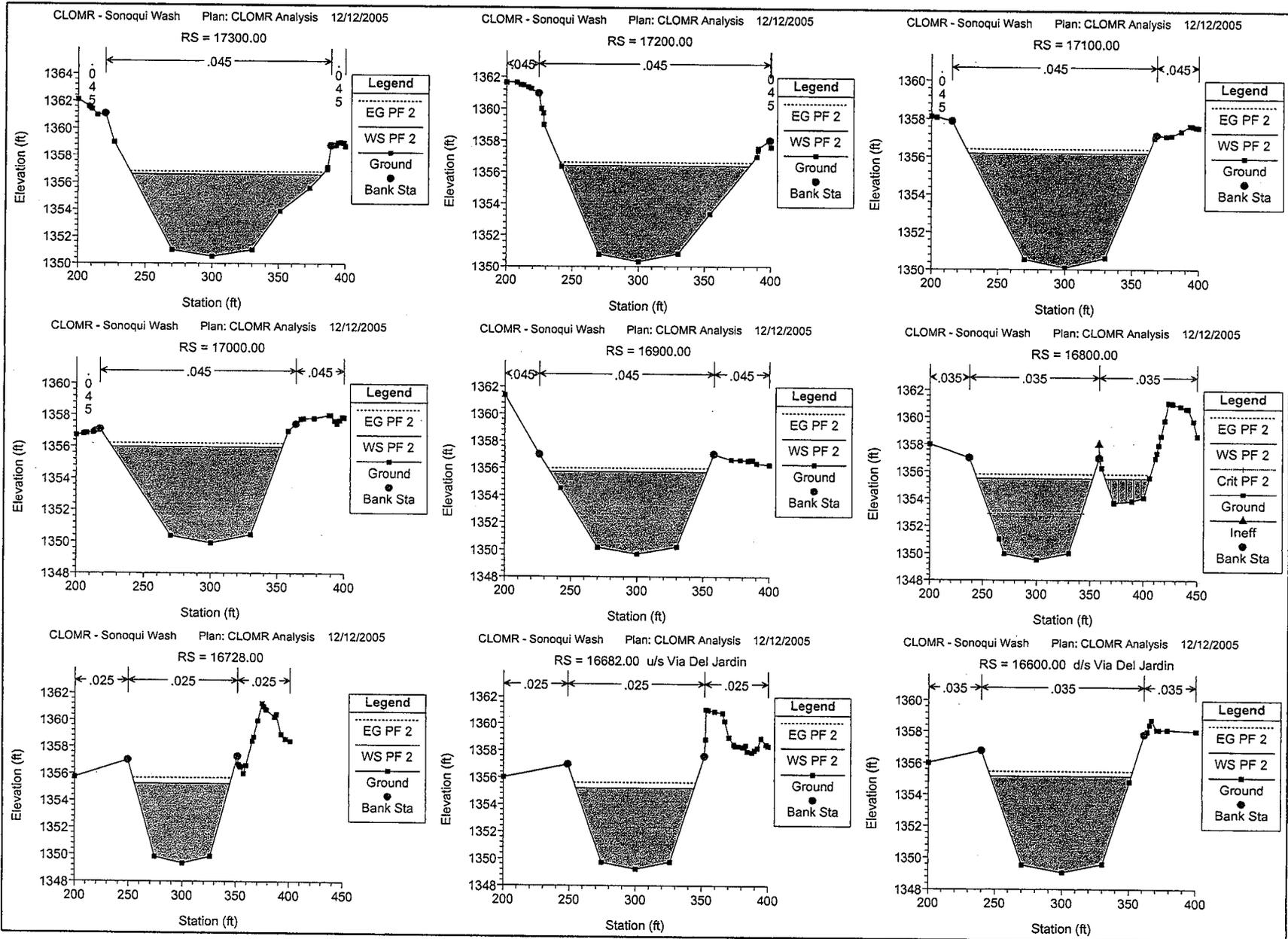
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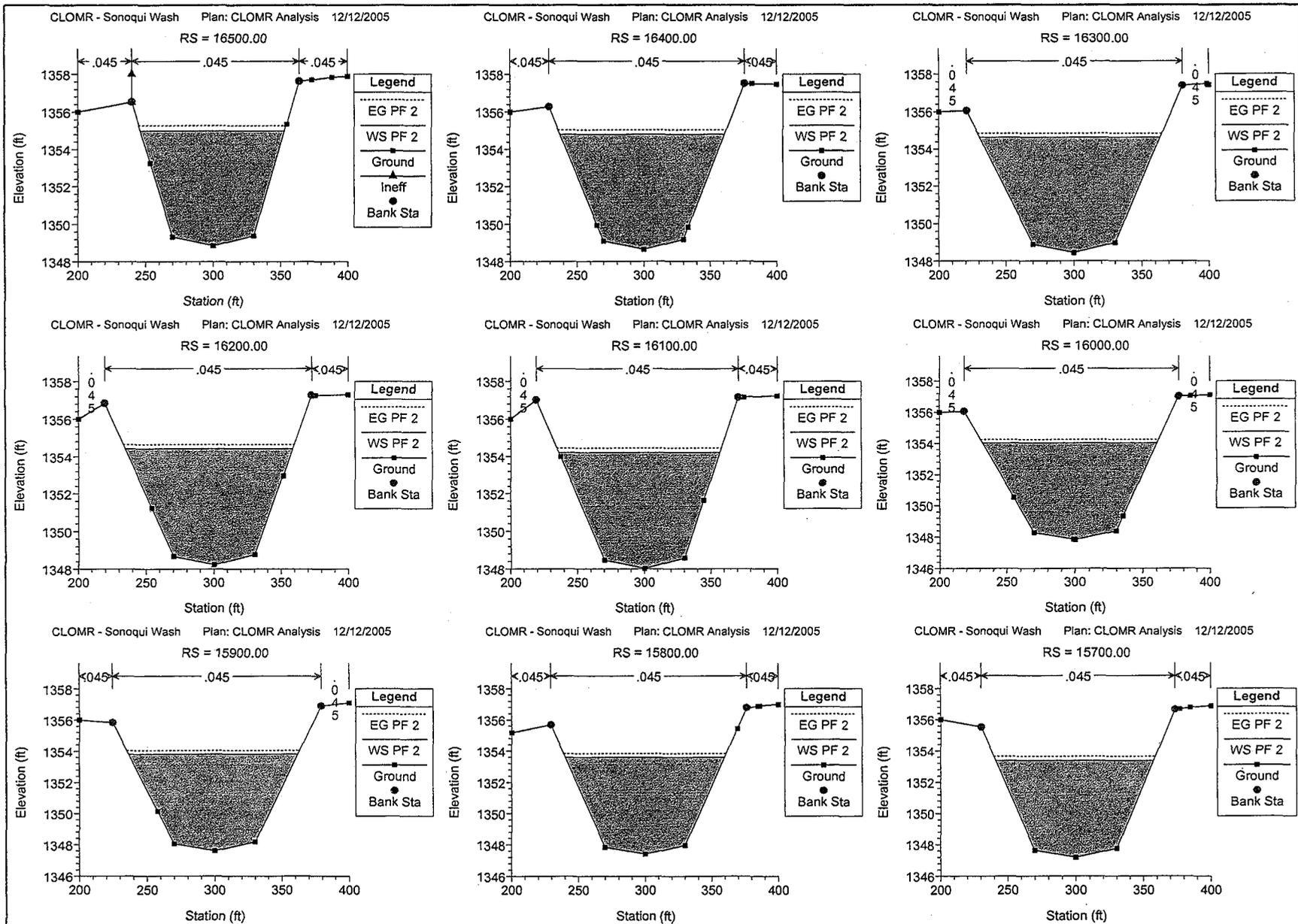
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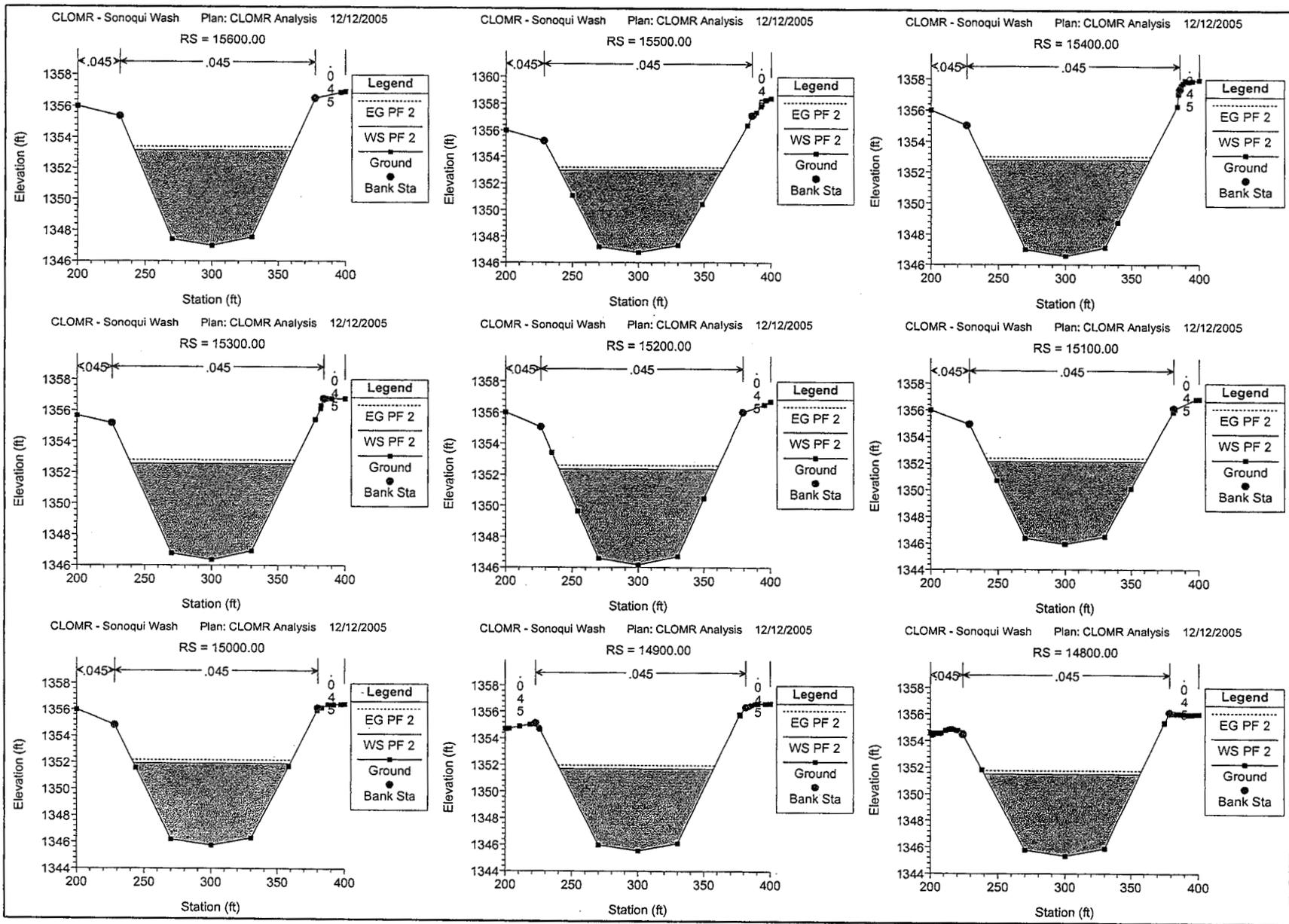
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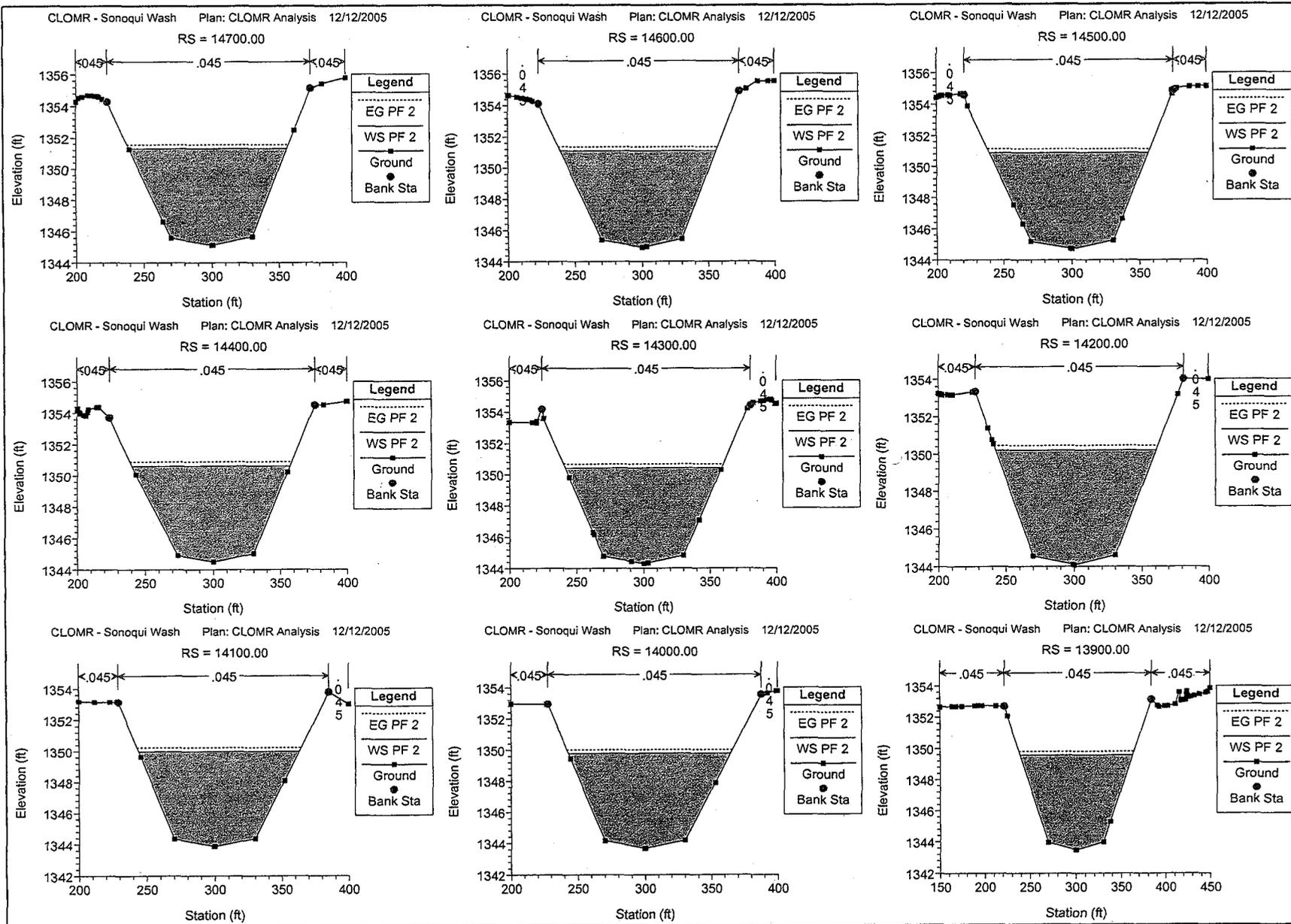
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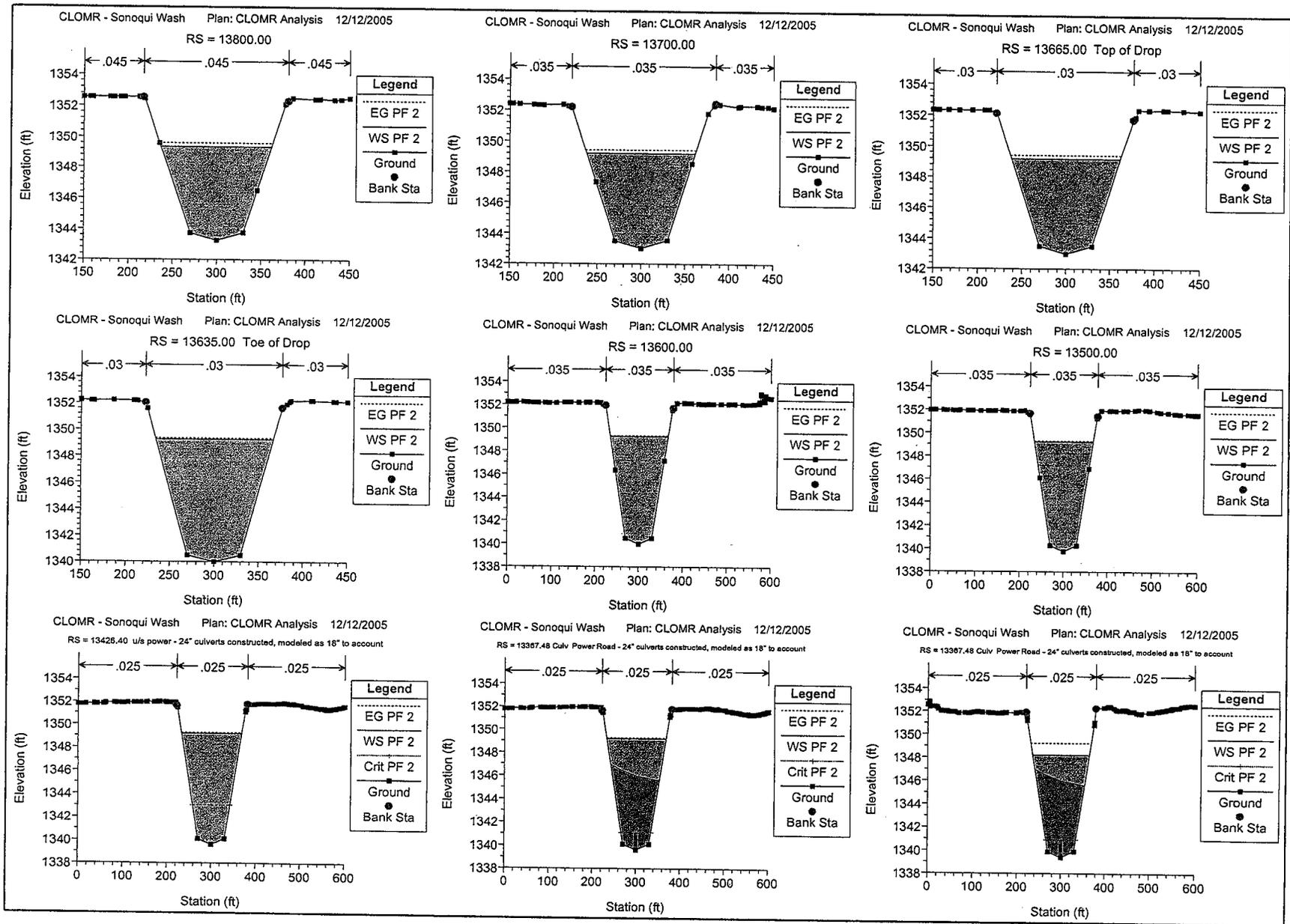
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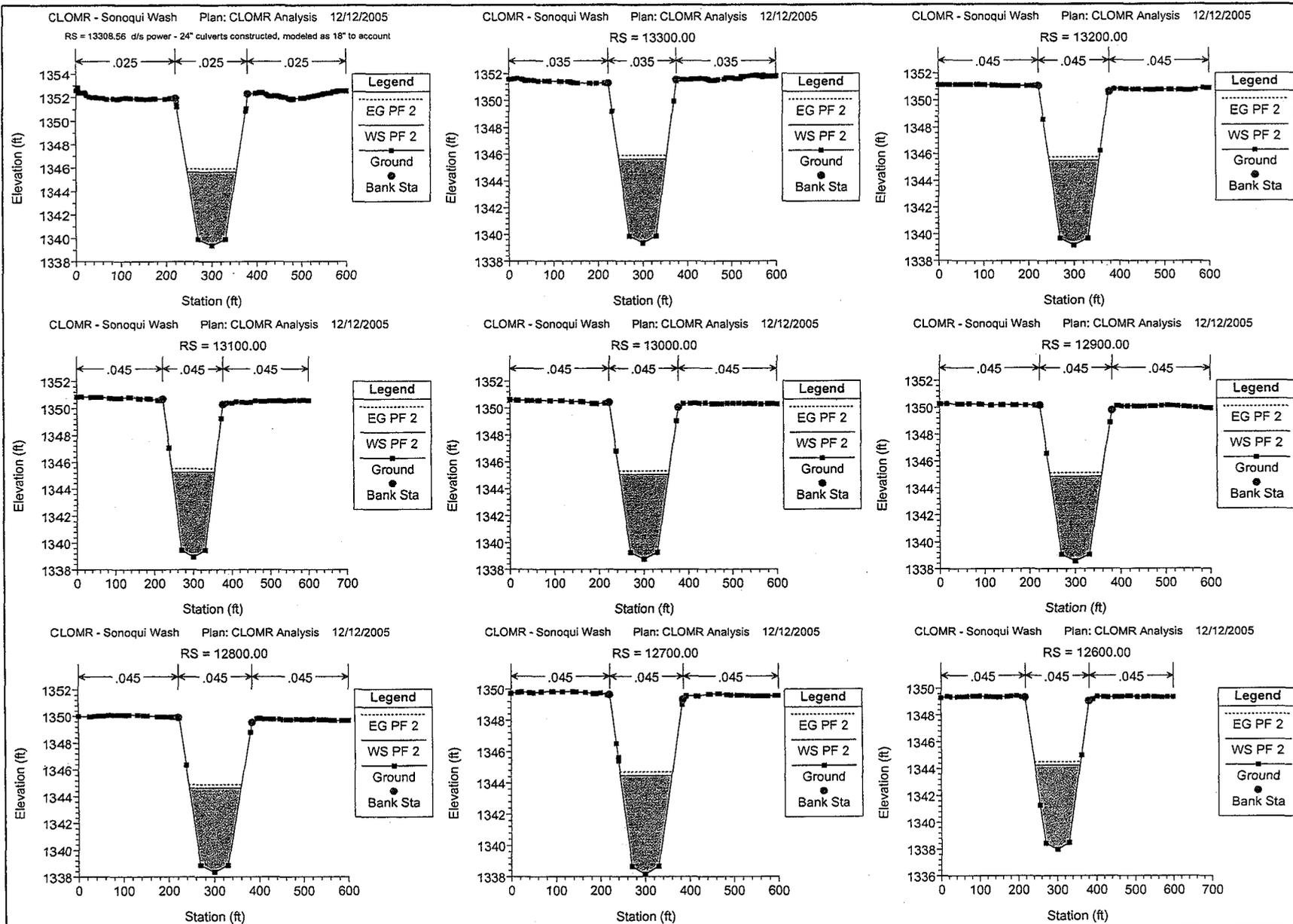
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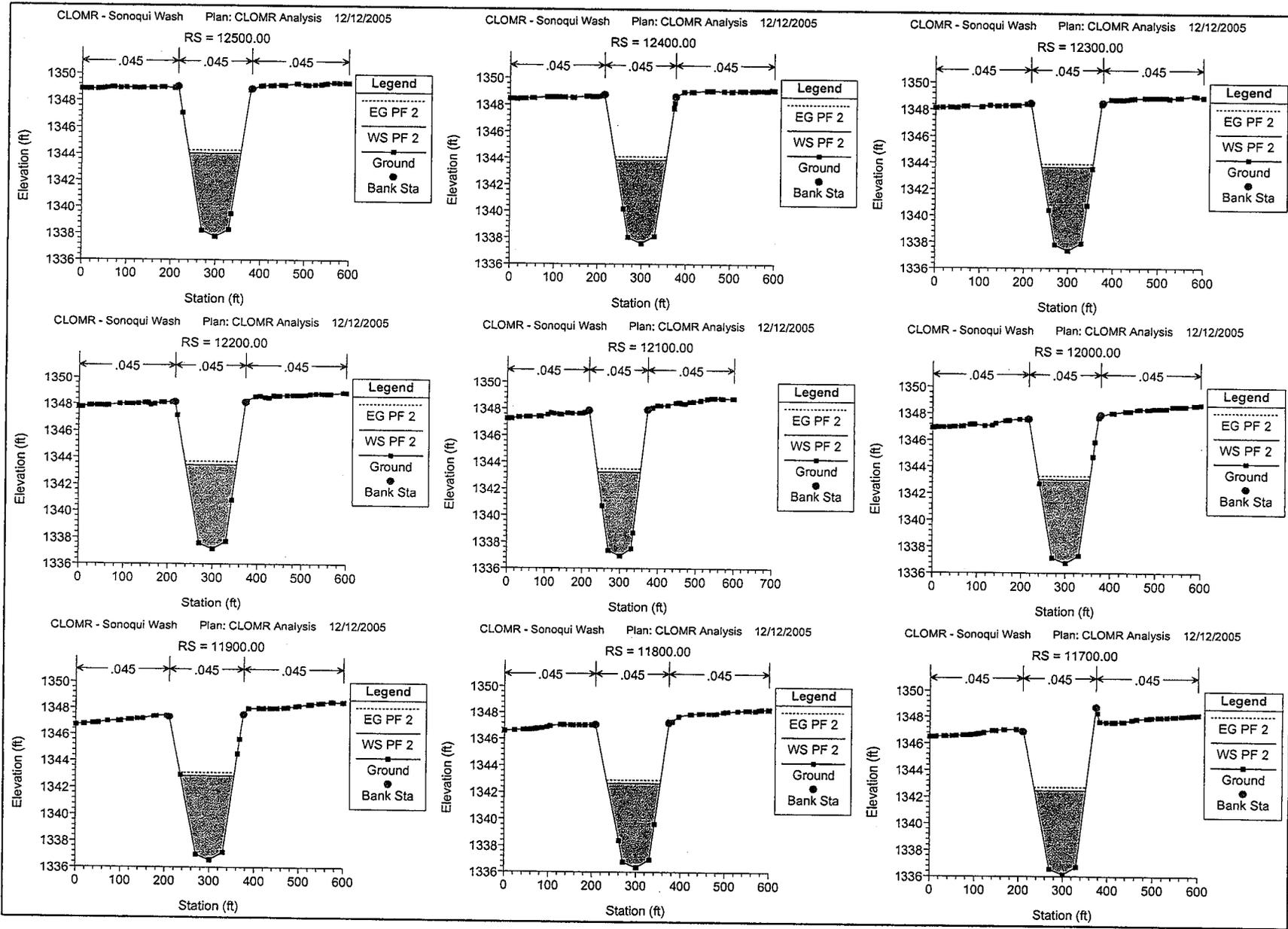
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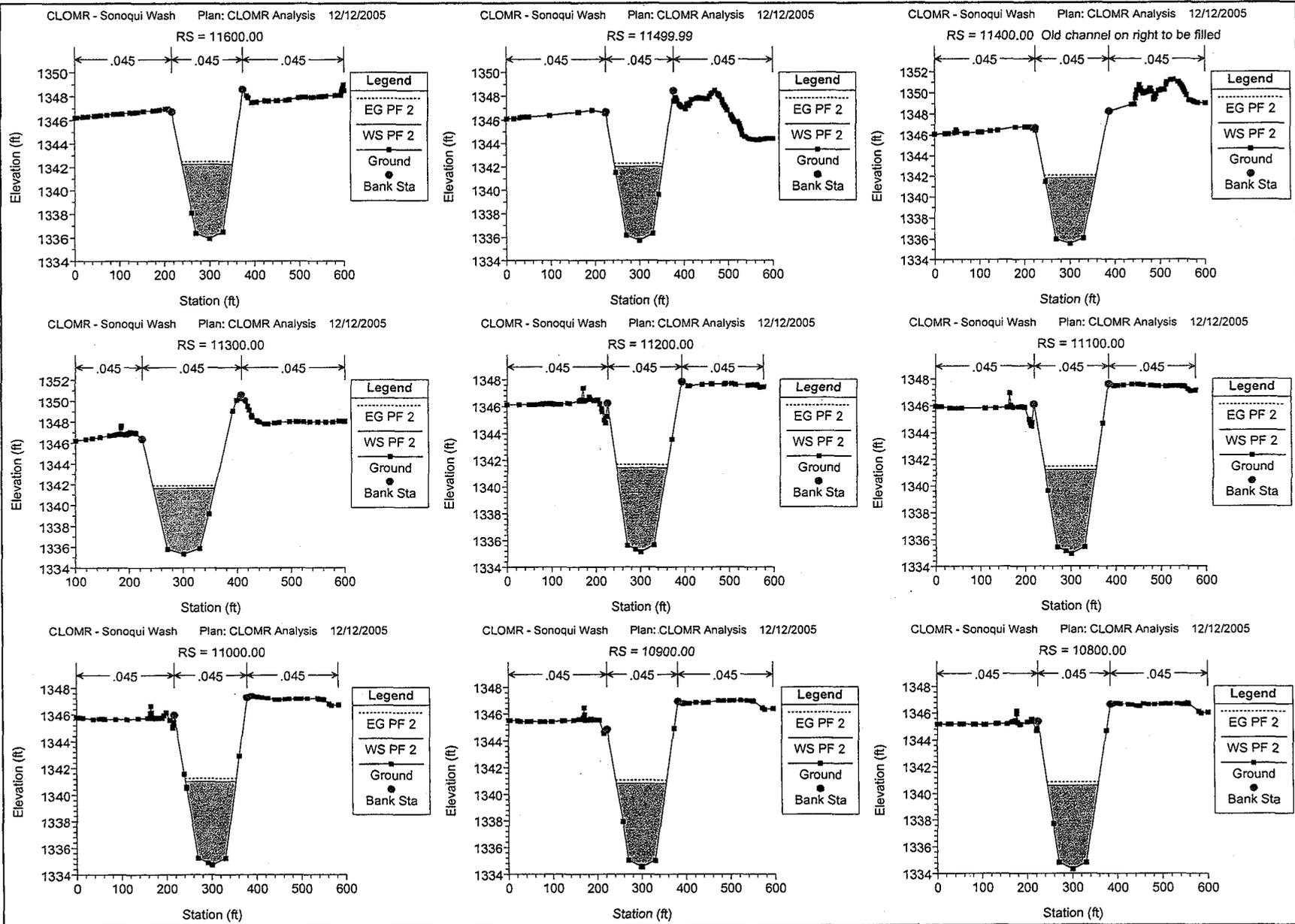
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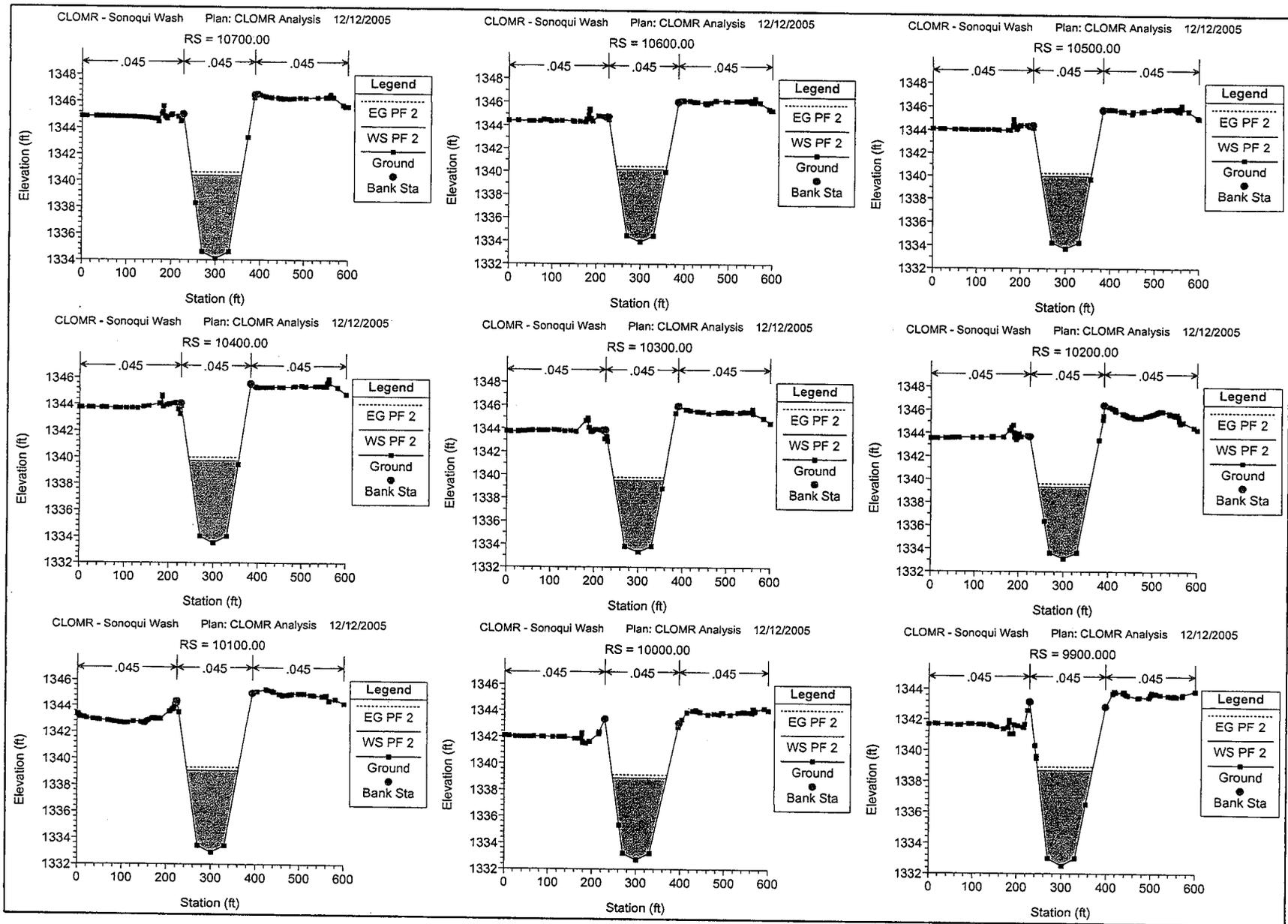
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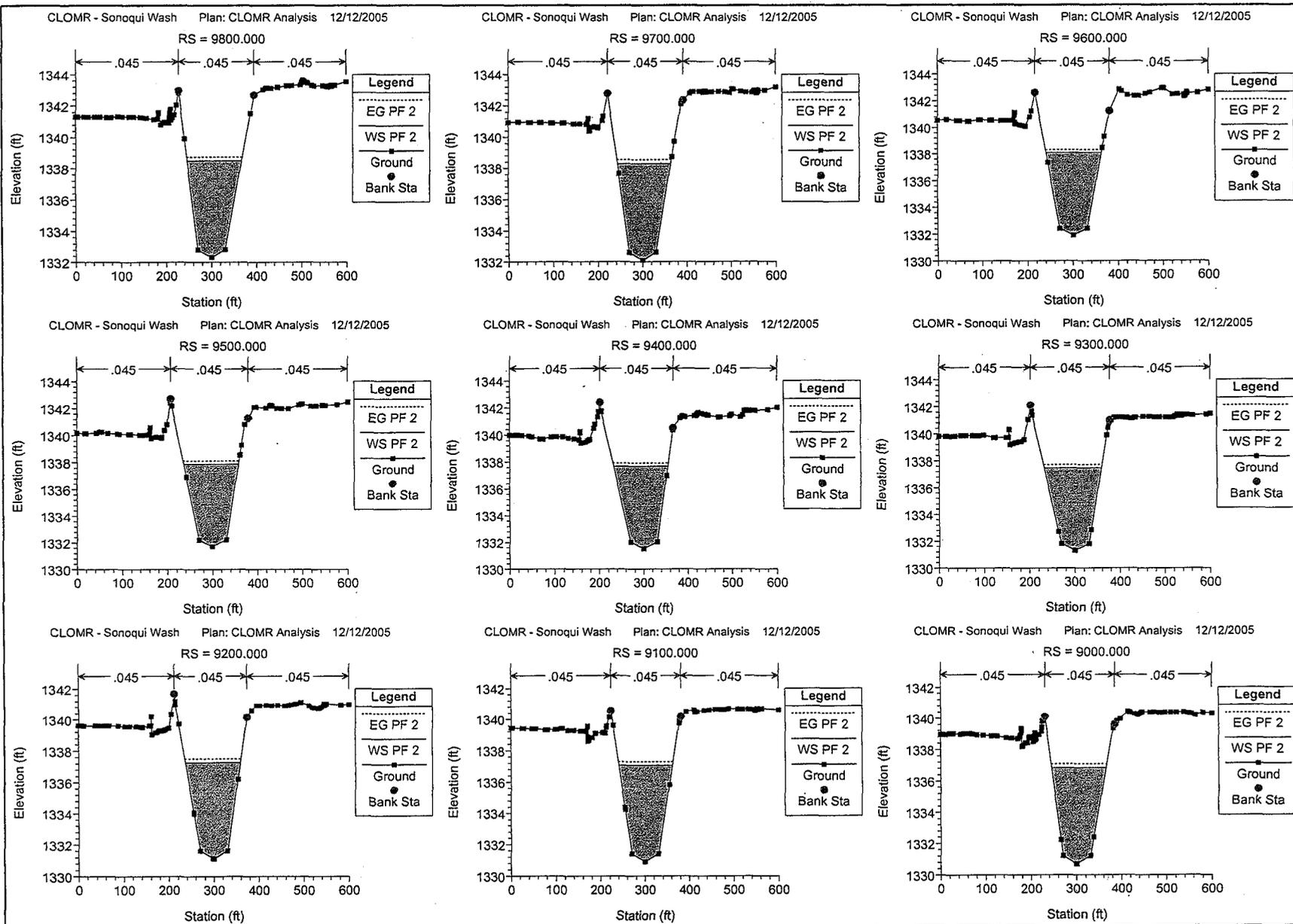
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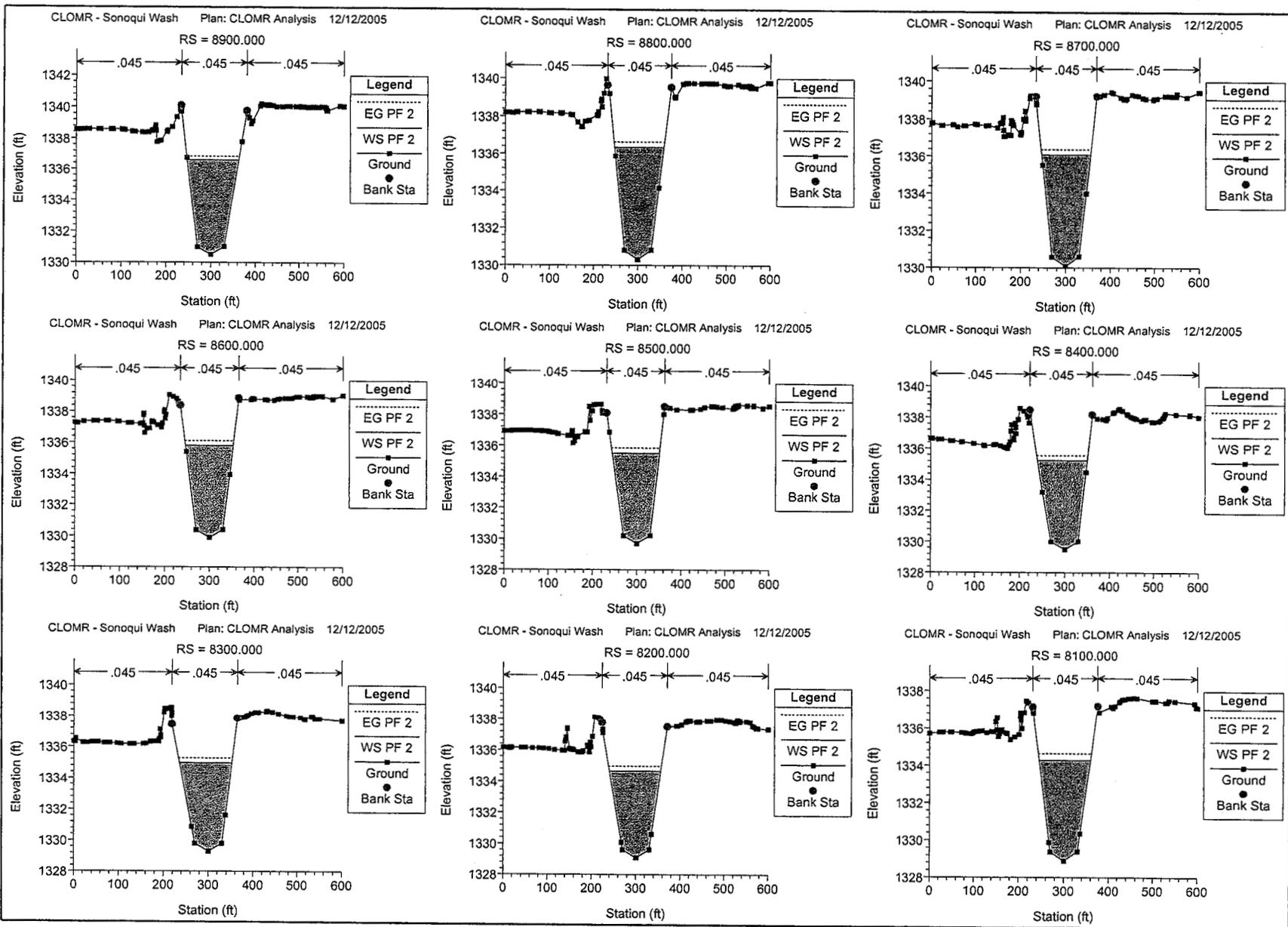
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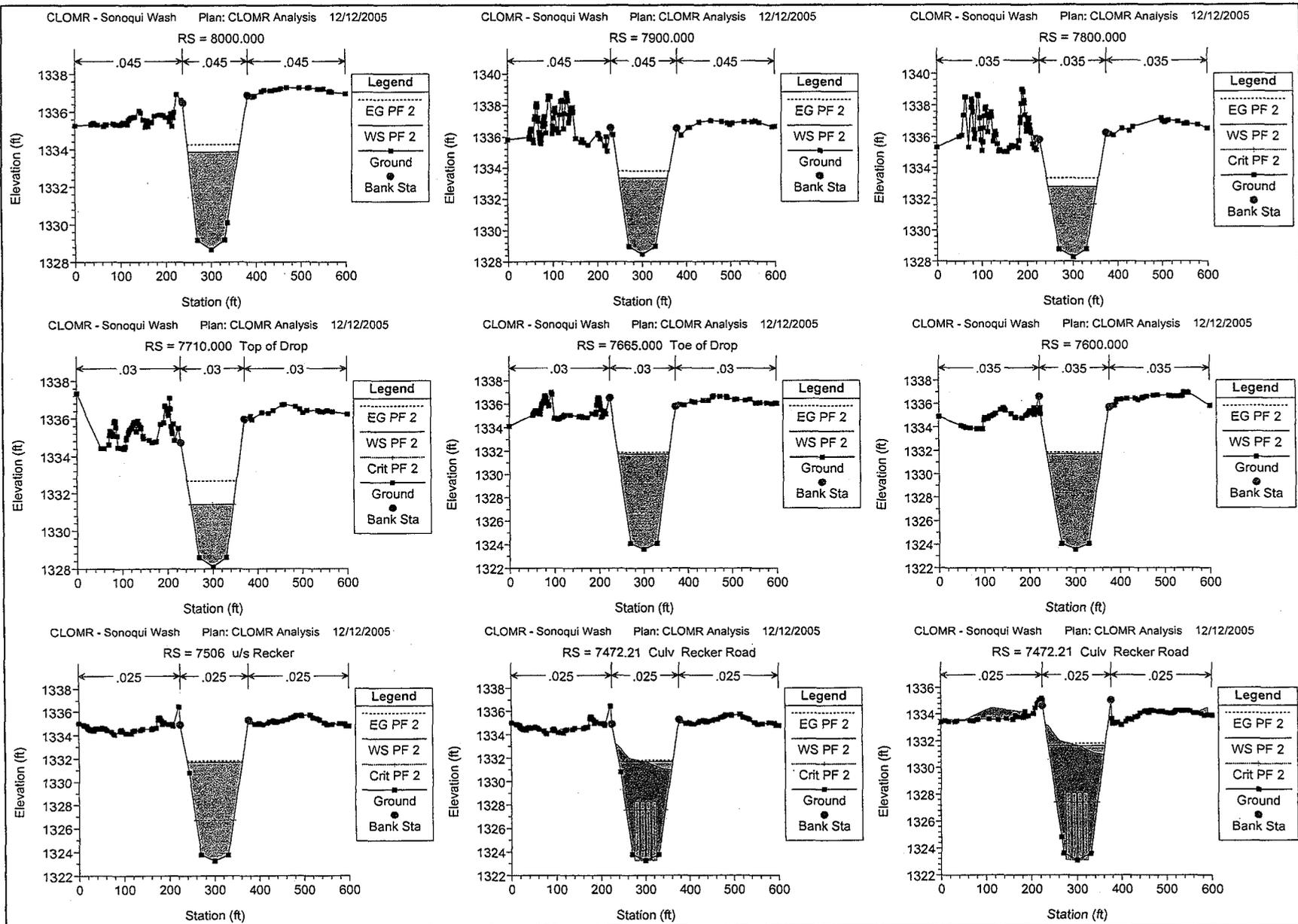
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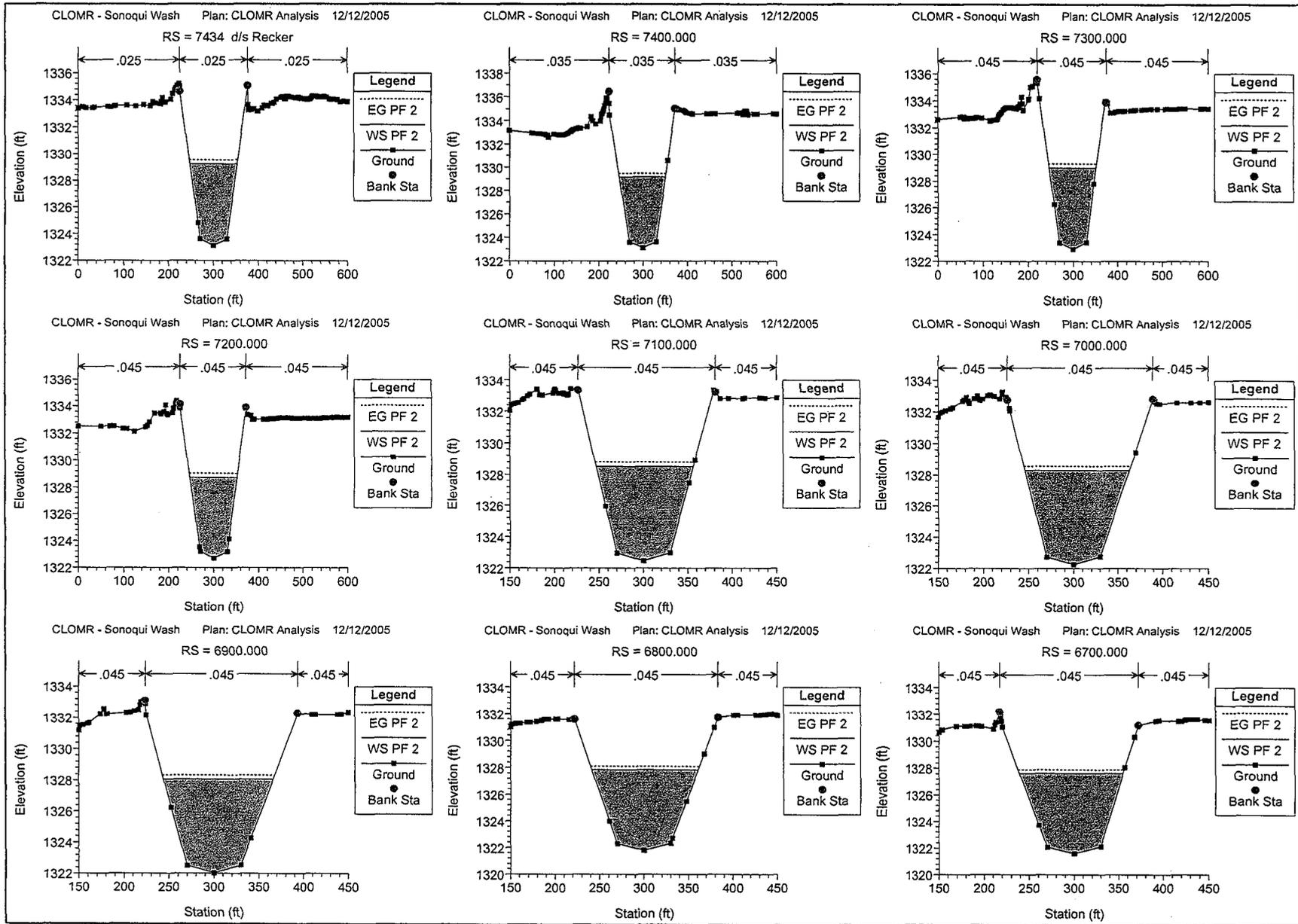


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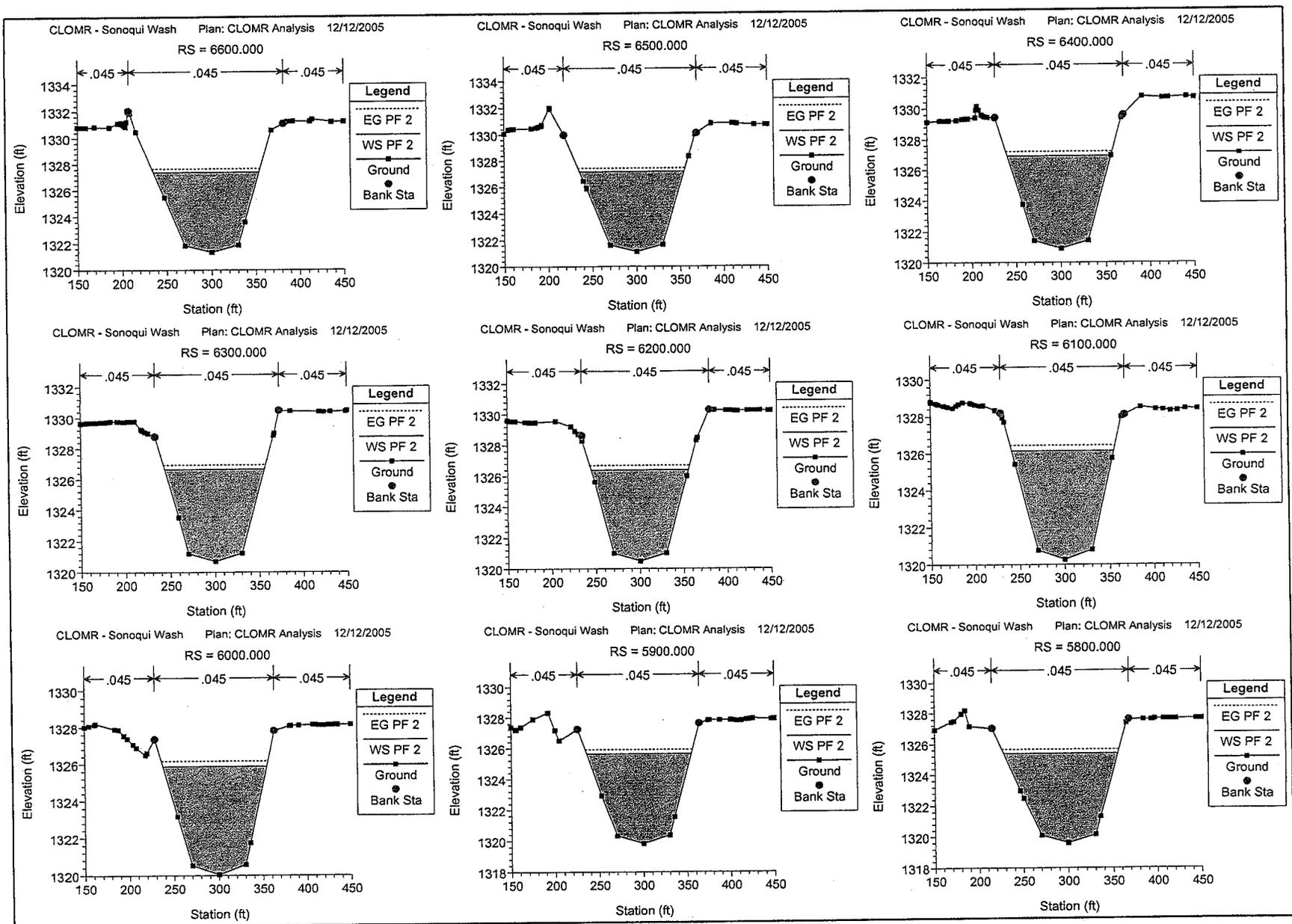


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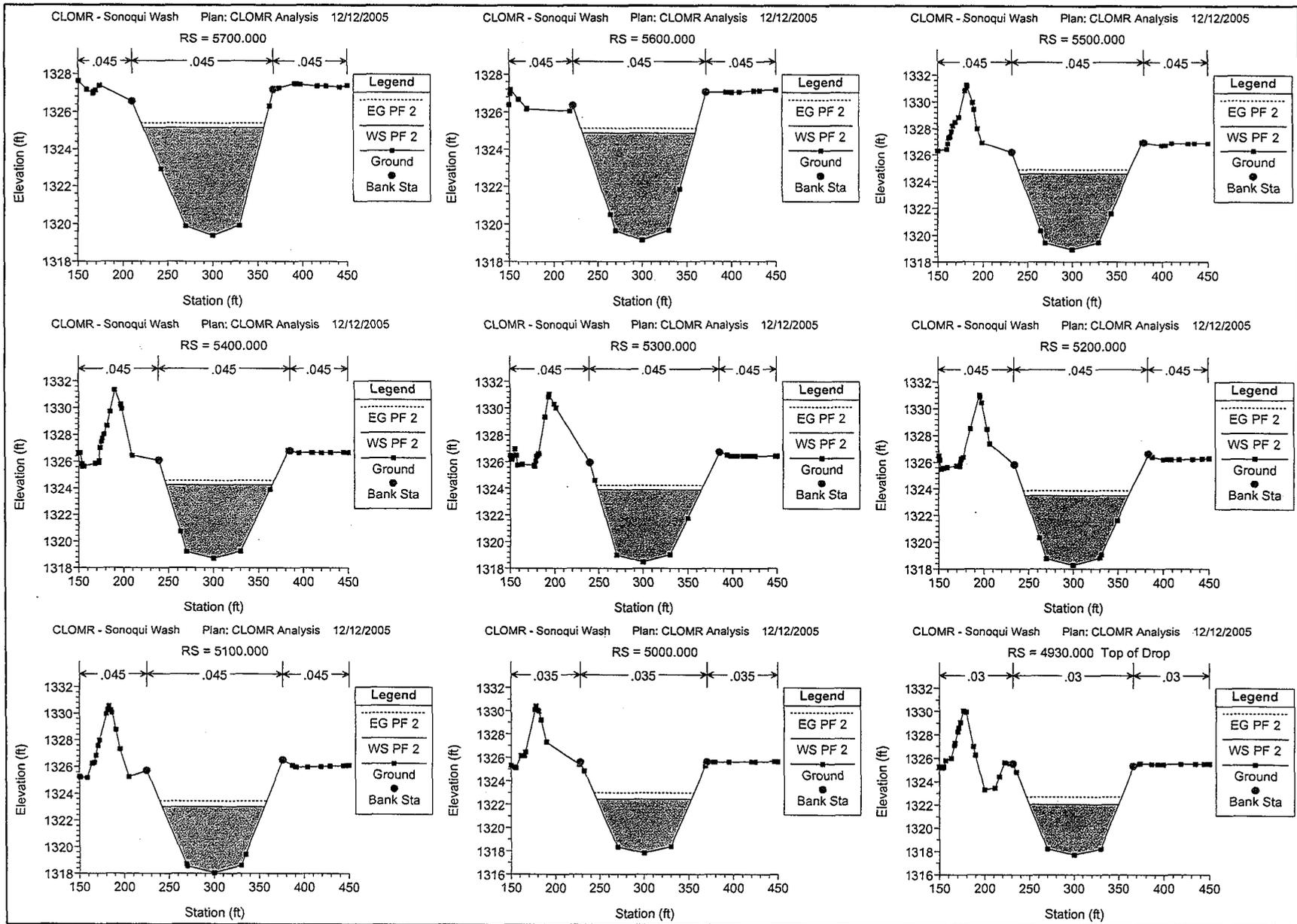




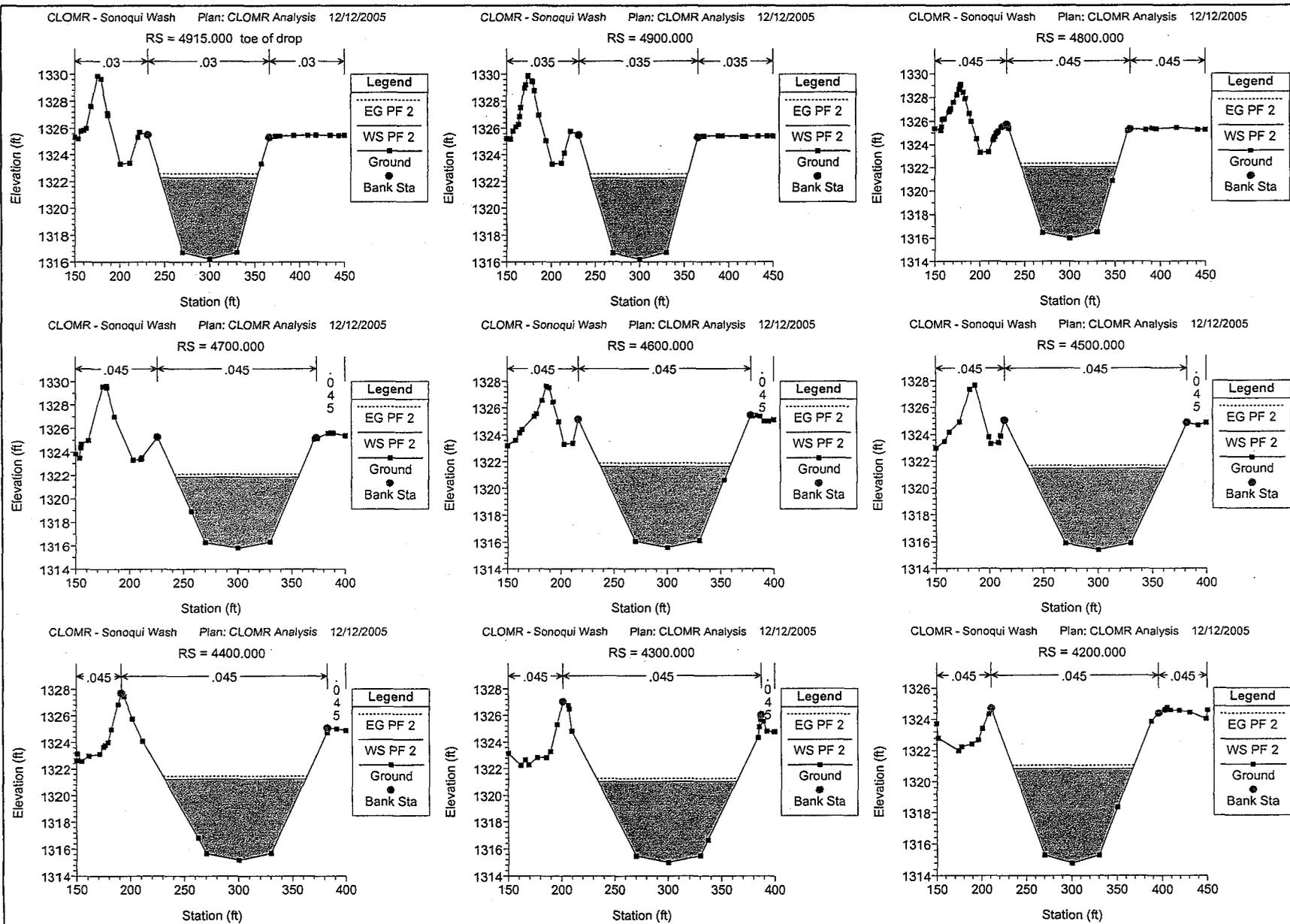
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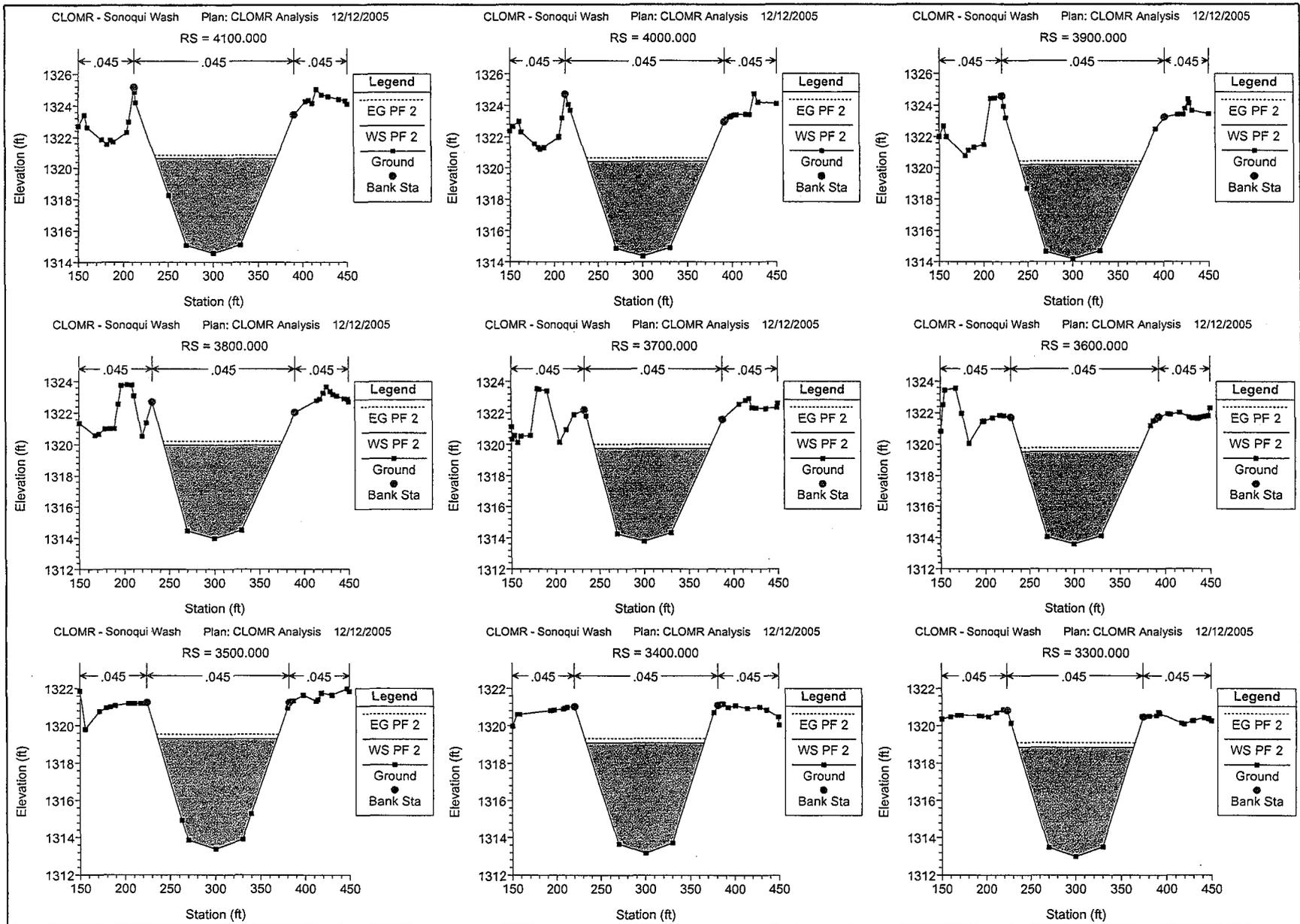
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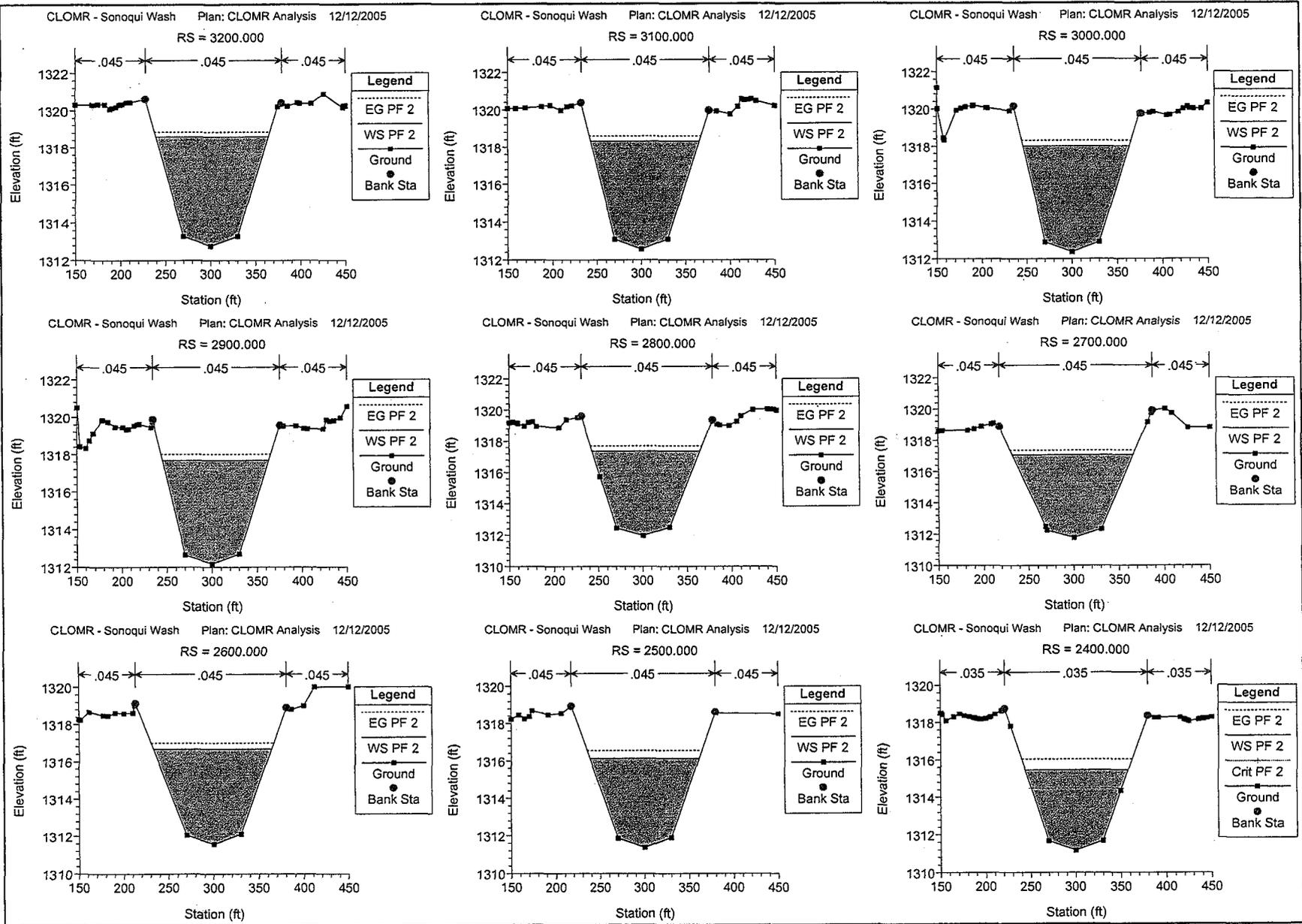
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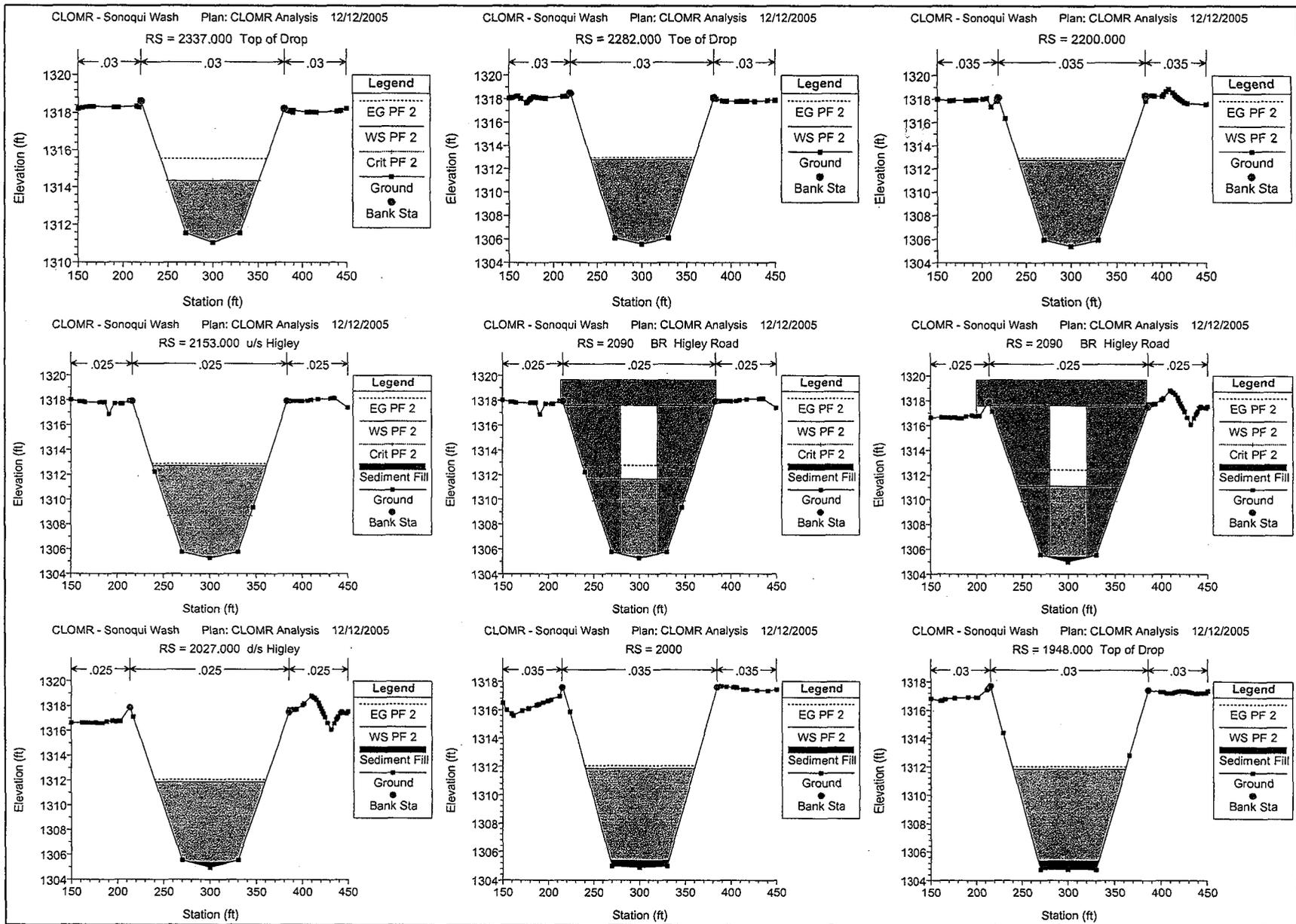
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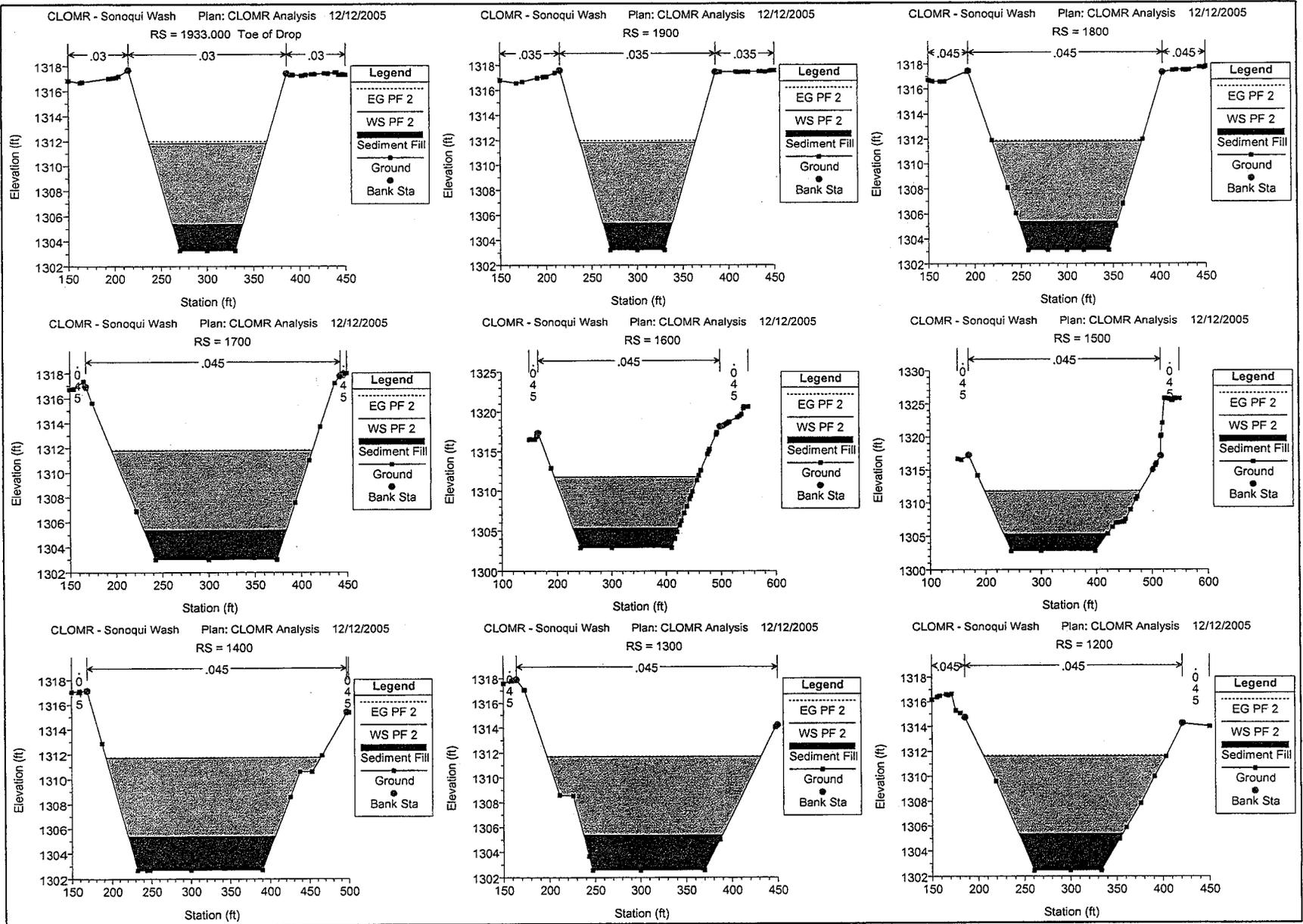
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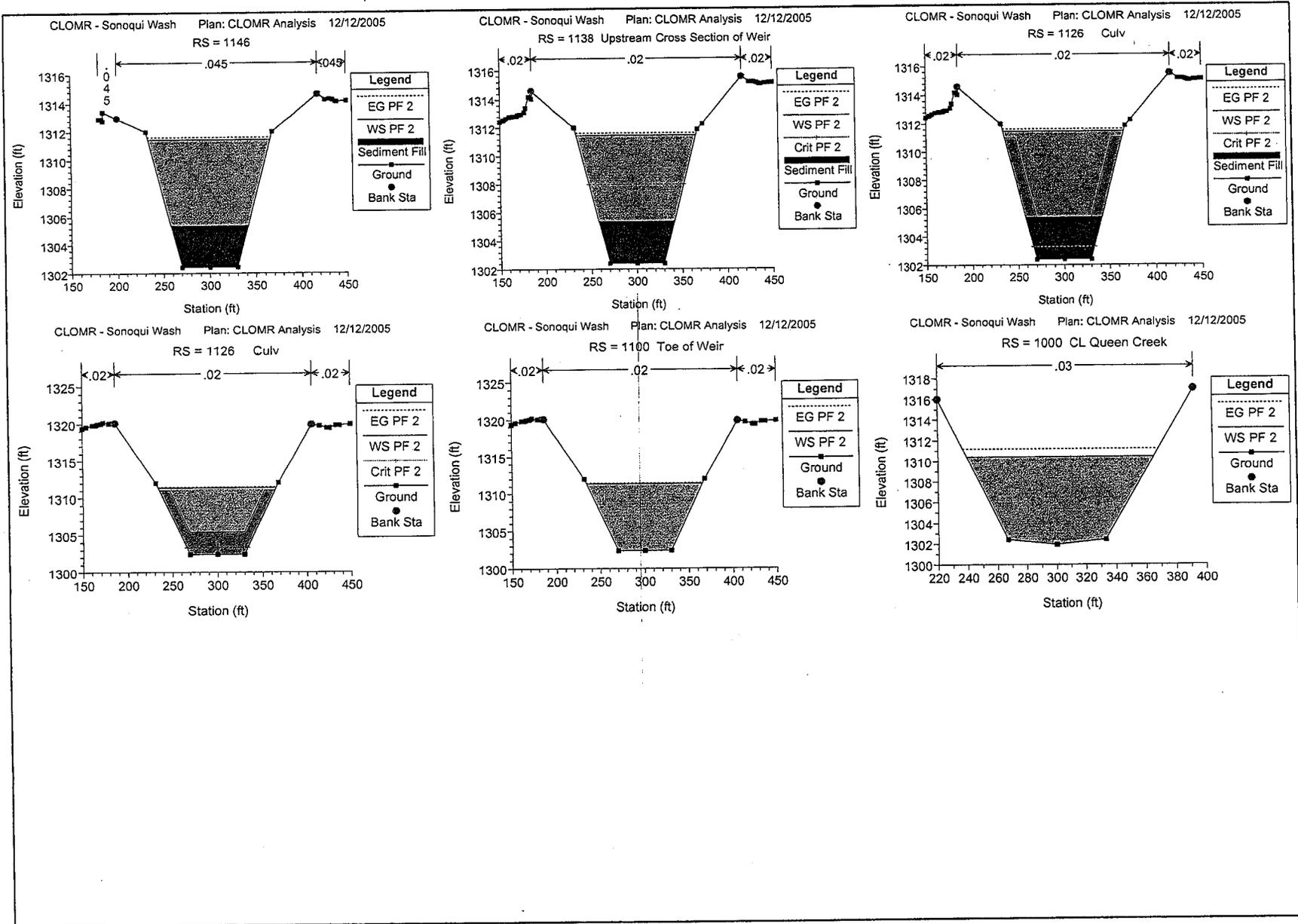
SUPERSEDED



SUPERSEDED



SUPERSEDED



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E.3 Expansion and Contraction Coefficients

Expansion and contraction coefficients were determined following guidance in *HEC-RAS Hydraulic Reference Manual* Table 5.2.

Table 5.2
Subcritical Flow Contraction and Expansion Coefficients

	Contraction	Expansion
No transition loss computed	0.0	0.0
Gradual transitions	0.1	0.3
Typical Bridge sections	0.3	0.5
Abrupt transitions	0.6	0.8

HEC-RAS Hydraulic Reference Manual Table 5.2

E.4 Analysis of Structures

Hydraulic analysis of structures was performed using HEC-RAS v. 3.1.2. Overtopping of roadway dip crossings was modeled as broad-crested weir flow. Weir coefficients for overtopping were selected following guidance in Figure 5.17 of the FCDMC's *Drainage Design Manual for Maricopa County, Arizona – Volume II, Hydraulics*. The weir located at the confluence of Sonoqui Wash and Queen Creek was modeled as a broad-crested weir using the roadway crossing feature of HEC-RAS. A summary of weir coefficients used in the HEC-RAS model follows.

Structure Name	Weir Coefficient
Confluence Weir	2.6
Recker Road	3.05
Power Road	3.05
Sossaman Road	3.05
Chandler Heights Road	3.05

FIGURE 5.17
DISCHARGE COEFFICIENT AND SUBMERGENCE FACTOR FOR ROADWAY OVERTOPPING
 (USDOT, FWHA, HDS-5, 1985)

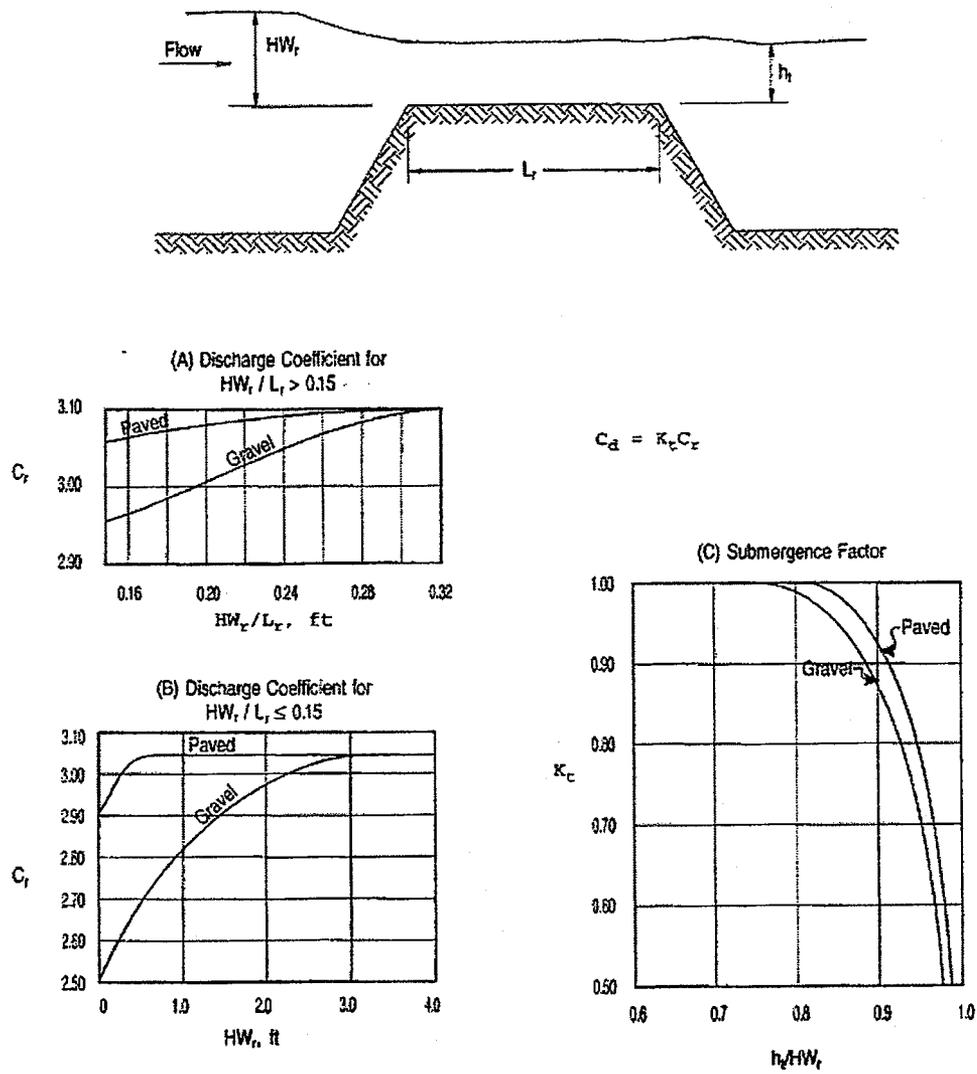
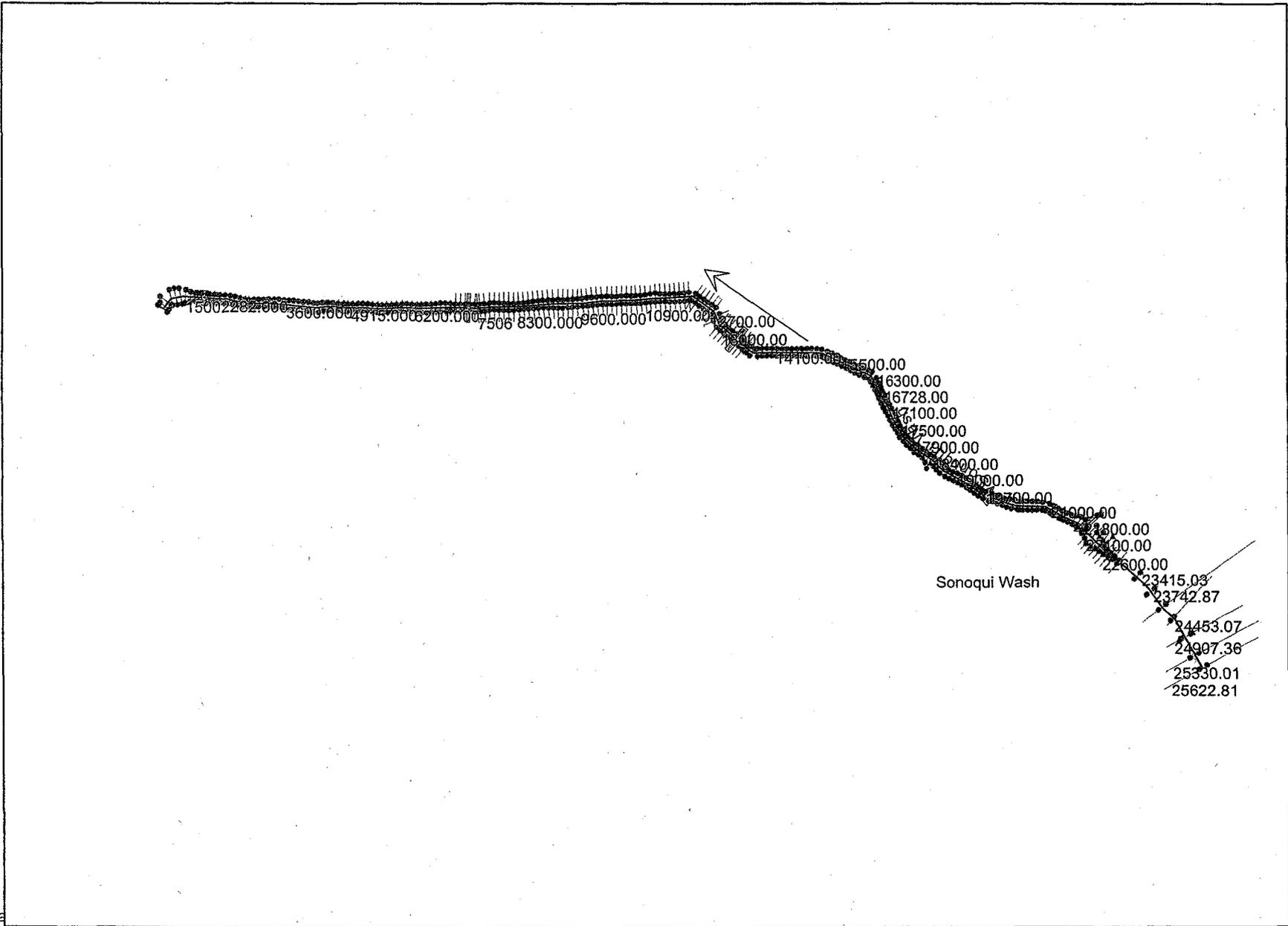


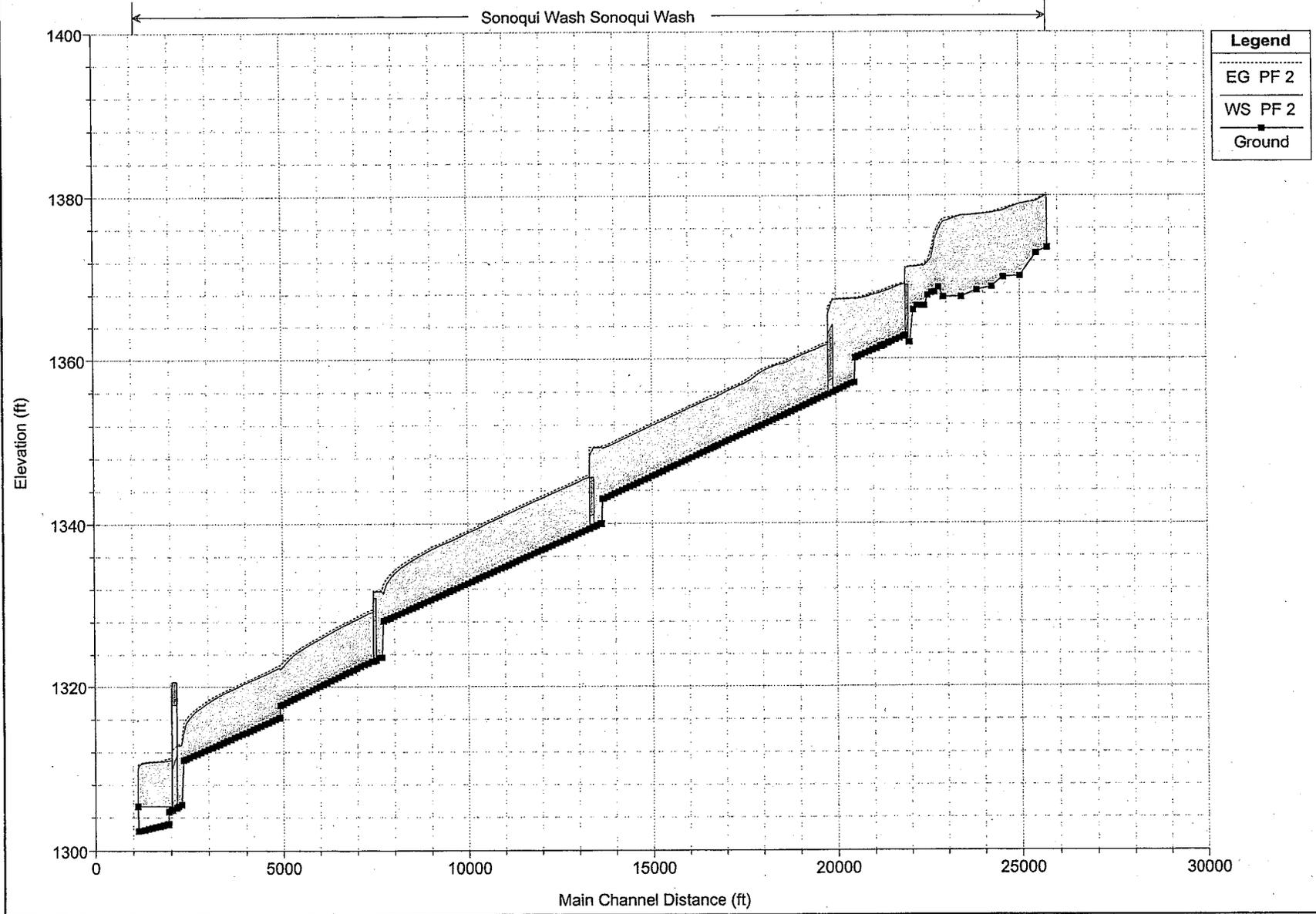
Figure 5.17 from Flood Control District of Maricopa County Hydraulics Manual

E.5 Hydraulic Calculations



Partial GIS data

CLOMR - 4/15/06 Plan: CLOMR Analysis



HEC-RAS Plan: CLOMR River: Sonoqui Wash Reach: Sonoqui Wash Profile: PF 2

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Frroude # Ch
Sonoqui Wash	26622.81	PF 2	2100.00	1373.68	1380.05		1380.27	0.003349	3.77	557.33	143.54	0.34
Sonoqui Wash	26336.61	PF 2	2100.00	1372.99	1379.34		1379.48	0.002100	3.00	699.99	179.91	0.27
Sonoqui Wash	24907.36	PF 2	2100.00	1370.15	1378.93	1374.06	1378.98	0.000695	1.90	1136.33	660.42	0.14
Sonoqui Wash	24453.07	PF 2	2100.00	1370.03	1378.13		1378.38	0.003105	3.99	526.00	92.26	0.29
Sonoqui Wash	24140.17	PF 2	2100.00	1368.84	1377.87		1377.93	0.000673	1.98	1060.63	170.75	0.14
Sonoqui Wash	23742.87	PF 2	2100.00	1368.42	1377.66		1377.70	0.000468	1.72	1222.70	187.07	0.12
Sonoqui Wash	23415.03	PF 2	2100.00	1367.60	1377.51	1370.56	1377.54	0.000302	1.52	1381.33	181.80	0.10
Sonoqui Wash	22928.70	PF 2	2100.00	1367.60	1376.79	1372.90	1377.15	0.004163	4.78	439.67	290.50	0.34
Sonoqui Wash	22800.00	PF 2	2100.00	1368.78	1375.78	1373.46	1376.37	0.008739	6.19	339.40	262.25	0.48
Sonoqui Wash	22700.00	PF 2	2100.00	1368.19	1374.52	1373.01	1375.29	0.013279	7.05	297.82	259.20	0.58
Sonoqui Wash	22600.00	PF 2	2100.00	1368.13	1372.36	1371.86	1373.42	0.026982	8.29	253.35	337.62	0.80
Sonoqui Wash	22500.00	PF 2	2100.00	1367.79	1371.85	1370.83	1372.04	0.006092	3.82	604.99	370.94	0.38
Sonoqui Wash	22400.00	PF 2	2100.00	1366.50	1371.43	1369.42	1371.66	0.002518	3.91	537.32	337.53	0.36
Sonoqui Wash	22300.00	PF 2	2100.00	1366.50	1371.40	1368.48	1371.49	0.000789	2.31	908.59	415.18	0.21
Sonoqui Wash	22200.00	PF 2	2100.00	1366.50	1371.33	1368.41	1371.40	0.000809	2.19	958.38	390.21	0.20
Sonoqui Wash	22100.00	PF 2	2100.00	1366.00	1371.30	1367.76	1371.34	0.000373	1.72	1224.27	421.64	0.14
Sonoqui Wash	22000.00	PF 2	2100.00	1362.00	1371.28	1367.35	1371.31	0.000174	1.40	1495.61	513.06	0.12
Sonoqui Wash	21957.00	PF 2	2100.00	1362.00	1371.25	1368.38	1371.30	0.000200	1.93	1091.42	472.35	0.18
Sonoqui Wash	21912.24											
Sonoqui Wash	21850.00	PF 2	2100.00	1362.84	1369.16	1366.84	1369.30	0.000502	3.00	700.68	276.36	0.29
Sonoqui Wash	21800.00	PF 2	2100.00	1362.69	1369.14		1369.27	0.000795	2.92	719.91	187.68	0.26
Sonoqui Wash	21700.00	PF 2	2100.00	1362.49	1369.00		1369.16	0.001519	3.19	657.65	166.87	0.28
Sonoqui Wash	21600.00	PF 2	2100.00	1362.28	1368.81		1369.00	0.001555	3.52	596.74	133.18	0.29
Sonoqui Wash	21500.00	PF 2	2100.00	1362.08	1368.61		1368.84	0.001714	3.79	554.44	119.00	0.31
Sonoqui Wash	21424.00	PF 2	2100.00	1361.93	1368.48		1368.71	0.001691	3.78	555.14	118.08	0.31
Sonoqui Wash	21400.00	PF 2	2100.00	1361.88	1368.44		1368.66	0.001674	3.76	557.93	118.68	0.31
Sonoqui Wash	21300.00	PF 2	2100.00	1361.67	1368.29		1368.50	0.001603	3.69	569.57	121.04	0.30
Sonoqui Wash	21240.00	PF 2	2100.00	1361.55	1368.20		1368.40	0.001561	3.64	576.94	122.59	0.30
Sonoqui Wash	21216.00	PF 2	2100.00	1361.50	1368.16		1368.36	0.001606	3.55	591.88	133.57	0.30
Sonoqui Wash	21200.00	PF 2	2100.00	1361.47	1368.13		1368.33	0.001538	3.61	581.37	123.54	0.29
Sonoqui Wash	21100.00	PF 2	2100.00	1361.27	1367.99		1368.18	0.001461	3.53	595.56	126.32	0.29
Sonoqui Wash	21000.00	PF 2	2100.00	1361.07	1367.85		1368.04	0.001412	3.49	601.83	126.42	0.28
Sonoqui Wash	20900.00	PF 2	2100.00	1360.86	1367.71		1367.90	0.001366	3.46	607.48	126.14	0.28
Sonoqui Wash	20800.00	PF 2	2100.00	1360.66	1367.59		1367.76	0.001249	3.30	636.11	132.53	0.27
Sonoqui Wash	20700.00	PF 2	2100.00	1360.46	1367.47		1367.64	0.001197	3.26	645.00	132.86	0.26
Sonoqui Wash	20600.00	PF 2	2100.00	1360.25	1367.39		1367.55	0.000684	3.19	657.64	133.57	0.25
Sonoqui Wash	20525.00	PF 2	2100.00	1360.10	1367.35		1367.50	0.000483	3.17	661.95	131.76	0.25
Sonoqui Wash	20495.00	PF 2	2100.00	1357.10	1367.40		1367.47	0.000139	2.14	979.96	137.07	0.14
Sonoqui Wash	20400.00	PF 2	2100.00	1356.98	1367.39		1367.46	0.000180	2.11	996.29	137.64	0.14
Sonoqui Wash	20300.00	PF 2	2100.00	1356.77	1367.37		1367.43	0.000274	2.04	1030.47	140.71	0.13
Sonoqui Wash	20200.00	PF 2	2100.00	1356.56	1367.34		1367.41	0.000259	2.00	1048.70	140.67	0.13
Sonoqui Wash	20100.00	PF 2	2100.00	1356.35	1367.32		1367.38	0.000239	1.94	1081.51	143.38	0.12
Sonoqui Wash	20000.00	PF 2	2100.00	1356.14	1367.30		1367.36	0.000192	1.88	1169.14	190.58	0.11
Sonoqui Wash	19921.00	PF 2	2100.00	1355.90	1367.31	1359.74	1367.35	0.000045	1.58	1418.32	245.01	0.10
Sonoqui Wash	19842.36											
Sonoqui Wash	19790.00	PF 2	2100.00	1355.68	1361.69		1361.95	0.000722	4.08	514.67	125.08	0.35
Sonoqui Wash	19700.00	PF 2	2100.00	1355.52	1361.59		1361.86	0.001384	4.21	498.43	113.23	0.35
Sonoqui Wash	19600.00	PF 2	2100.00	1355.31	1361.42		1361.69	0.002172	4.12	509.25	114.93	0.35
Sonoqui Wash	19500.00	PF 2	2100.00	1355.10	1361.21		1361.47	0.002195	4.12	509.65	116.11	0.35
Sonoqui Wash	19400.00	PF 2	2100.00	1354.90	1361.01		1361.25	0.002078	3.96	529.95	123.07	0.34
Sonoqui Wash	19300.00	PF 2	2100.00	1354.69	1360.83		1361.04	0.001869	3.69	568.39	135.62	0.32
Sonoqui Wash	19200.00	PF 2	2100.00	1354.48	1360.65		1360.86	0.001833	3.67	572.47	136.10	0.32
Sonoqui Wash	19100.00	PF 2	2100.00	1354.27	1360.45		1360.67	0.001880	3.73	563.40	133.25	0.32
Sonoqui Wash	19000.00	PF 2	2100.00	1354.06	1360.24		1360.47	0.002000	3.91	537.31	123.70	0.33
Sonoqui Wash	18900.00	PF 2	2100.00	1353.86	1360.04		1360.27	0.001958	3.86	544.47	125.89	0.33
Sonoqui Wash	18800.00	PF 2	2100.00	1353.65	1359.84		1360.08	0.001973	3.89	540.20	124.15	0.33
Sonoqui Wash	18700.00	PF 2	2100.00	1353.44	1359.66		1359.88	0.001887	3.79	554.13	128.05	0.32
Sonoqui Wash	18600.00	PF 2	2100.00	1353.23	1359.49		1359.69	0.001736	3.59	585.27	138.07	0.31
Sonoqui Wash	18500.00	PF 2	2100.00	1353.02	1359.37	1356.48	1359.52	0.001376	3.14	669.76	295.25	0.27
Sonoqui Wash	18400.00	PF 2	2100.00	1352.82	1359.28		1359.39	0.001120	2.71	775.06	207.28	0.24
Sonoqui Wash	18300.00	PF 2	2100.00	1352.61	1359.07		1359.25	0.001556	3.44	610.18	141.24	0.29
Sonoqui Wash	18200.00	PF 2	2100.00	1352.40	1358.89		1359.09	0.001630	3.62	580.79	129.01	0.30
Sonoqui Wash	18100.00	PF 2	2100.00	1352.19	1358.68		1358.91	0.001831	3.92	535.90	114.72	0.32
Sonoqui Wash	18000.00	PF 2	2100.00	1351.98	1358.42	1355.55	1358.71	0.002216	4.29	489.51	107.64	0.35
Sonoqui Wash	17900.00	PF 2	2100.00	1351.78	1358.14		1358.46	0.002627	4.58	458.51	101.67	0.38
Sonoqui Wash	17800.00	PF 2	2100.00	1351.57	1357.81		1358.18	0.002956	4.91	427.48	92.89	0.40
Sonoqui Wash	17700.00	PF 2	2100.00	1351.36	1357.47	1355.14	1357.87	0.003290	5.06	415.36	114.83	0.42
Sonoqui Wash	17600.00	PF 2	2100.00	1351.15	1357.24		1357.54	0.002727	4.39	478.72	117.00	0.38
Sonoqui Wash	17500.00	PF 2	2100.00	1350.94	1356.95		1357.26	0.002753	4.50	466.17	110.07	0.39
Sonoqui Wash	17400.00	PF 2	2100.00	1350.74	1356.78	1354.06	1357.00	0.001973	3.79	555.13	145.46	0.33
Sonoqui Wash	17300.00	PF 2	2100.00	1350.53	1356.59		1356.80	0.002031	3.71	565.73	142.78	0.33
Sonoqui Wash	17200.00	PF 2	2100.00	1350.32	1356.40		1356.60	0.001882	3.64	577.30	141.81	0.32
Sonoqui Wash	17100.00	PF 2	2100.00	1350.11	1356.19		1356.41	0.001957	3.76	558.62	134.46	0.33
Sonoqui Wash	17000.00	PF 2	2100.00	1349.90	1355.97		1356.21	0.002071	3.90	538.29	127.66	0.33
Sonoqui Wash	16900.00	PF 2	2100.00	1349.70	1355.72		1355.99	0.002276	4.13	507.88	118.34	0.35
Sonoqui Wash	16800.00	PF 2	2100.00	1349.49	1355.50	1352.91	1355.80	0.001491	4.39	478.64	149.39	0.37
Sonoqui Wash	16728.00	PF 2	2100.00	1349.34	1355.26		1355.70	0.001114	5.29	396.69	89.43	0.44
Sonoqui Wash	16682.00	PF 2	2100.00	1349.24	1355.21		1355.64	0.001082	5.25	400.27	89.46	0.44
Sonoqui Wash	16600.00	PF 2	2100.00	1349.07	1355.16		1355.46	0.001457	4.41	476.66	104.94	0.36
Sonoqui Wash	16500.00	PF 2	2100.00	1348.87	1354.99		1355.28	0.002344	4.34	483.58	106.67	0.36
Sonoqui Wash	16400.00	PF 2	2100.00	1348.66	1354.80		1355.04	0.002044	3.94	533.17	123.39	0.33

HEC-RAS Plan: CLOMR River: Sonoqui Wash Reach: Sonoqui Wash Profile: PF 2 (Continued)

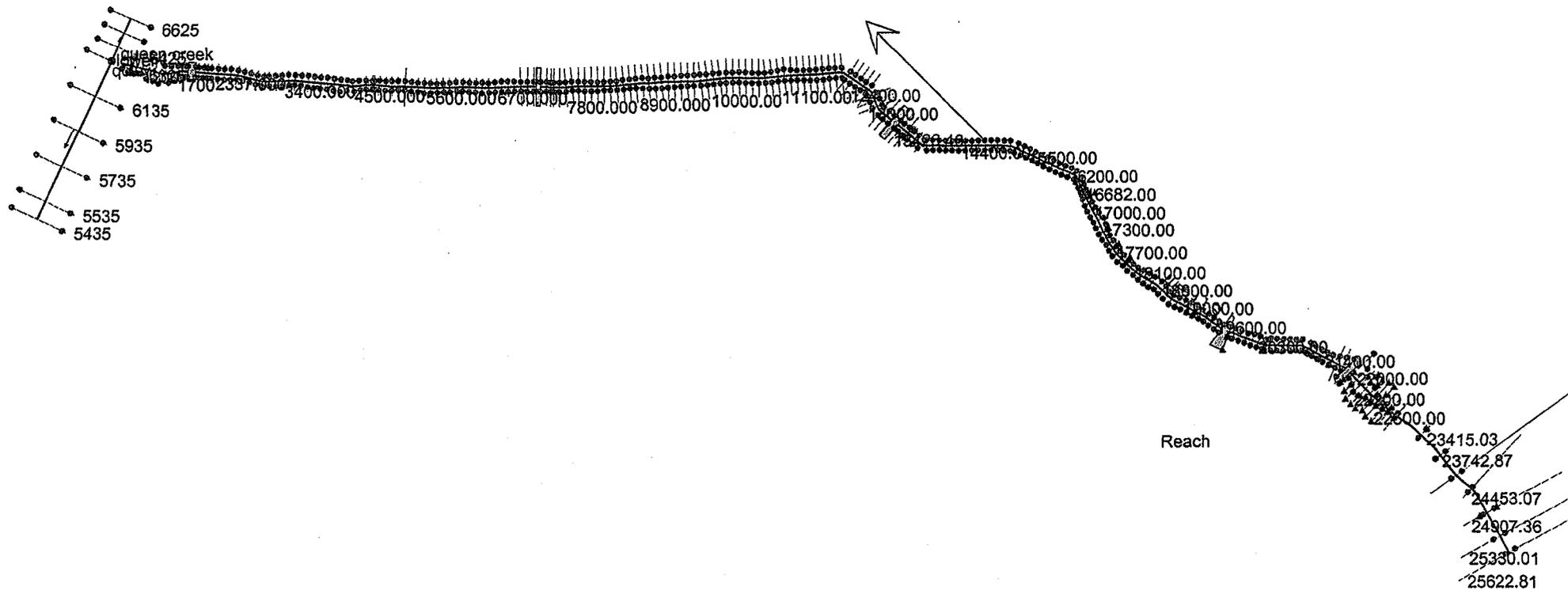
Reach	River Sta	Profile	Q Total (cfs)	Min. Chl Elev (ft)	W/S Elev (ft)	Chl. W/S (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel. Chl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sonoqui Wash	16800.00	PF 2	2100.00	1348.45	1354.62		1354.84	0.001875	3.73	563.63	133.11	0.32
Sonoqui Wash	16200.00	PF 2	2100.00	1348.24	1354.41		1354.64	0.002013	3.92	536.37	123.81	0.33
Sonoqui Wash	16100.00	PF 2	2100.00	1348.03	1354.19		1354.44	0.002057	3.98	527.98	120.93	0.34
Sonoqui Wash	16000.00	PF 2	2100.00	1347.83	1354.01		1354.23	0.001927	3.81	551.53	128.61	0.32
Sonoqui Wash	15900.00	PF 2	2100.00	1347.62	1353.81		1354.04	0.001965	3.87	542.76	125.32	0.33
Sonoqui Wash	15800.00	PF 2	2100.00	1347.41	1353.59		1353.84	0.002071	4.01	524.01	119.25	0.34
Sonoqui Wash	15700.00	PF 2	2100.00	1347.20	1353.37		1353.63	0.002127	4.08	514.84	116.30	0.34
Sonoqui Wash	15600.00	PF 2	2100.00	1346.99	1353.16		1353.41	0.002102	4.04	519.29	117.83	0.34
Sonoqui Wash	15500.00	PF 2	2100.00	1346.79	1352.96		1353.20	0.002030	3.94	532.57	122.37	0.33
Sonoqui Wash	15400.00	PF 2	2100.00	1346.58	1352.76		1353.00	0.001987	3.89	539.52	124.48	0.33
Sonoqui Wash	15300.00	PF 2	2100.00	1346.37	1352.56		1352.80	0.002012	3.94	533.65	122.17	0.33
Sonoqui Wash	15200.00	PF 2	2100.00	1346.16	1352.35		1352.59	0.002058	4.00	525.61	119.66	0.34
Sonoqui Wash	15100.00	PF 2	2100.00	1345.95	1352.14		1352.39	0.002070	4.02	523.02	118.58	0.34
Sonoqui Wash	15000.00	PF 2	2100.00	1345.75	1351.93		1352.18	0.002092	4.04	519.47	117.52	0.34
Sonoqui Wash	14900.00	PF 2	2100.00	1345.54	1351.71		1351.97	0.002124	4.08	514.88	116.21	0.34
Sonoqui Wash	14800.00	PF 2	2100.00	1345.33	1351.50		1351.76	0.002121	4.07	516.06	116.74	0.34
Sonoqui Wash	14700.00	PF 2	2100.00	1345.12	1351.29		1351.54	0.002125	4.07	515.68	116.70	0.34
Sonoqui Wash	14600.00	PF 2	2100.00	1344.91	1351.07		1351.33	0.002127	4.07	515.63	116.78	0.34
Sonoqui Wash	14500.00	PF 2	2100.00	1344.70	1350.86		1351.12	0.002131	4.07	515.70	116.98	0.34
Sonoqui Wash	14400.00	PF 2	2100.00	1344.50	1350.63		1350.90	0.002303	4.17	503.68	116.97	0.35
Sonoqui Wash	14300.00	PF 2	2100.00	1344.29	1350.41		1350.67	0.002173	4.09	513.30	117.34	0.34
Sonoqui Wash	14200.00	PF 2	2100.00	1344.08	1350.19		1350.45	0.002179	4.09	513.87	117.95	0.35
Sonoqui Wash	14100.00	PF 2	2100.00	1343.87	1349.98		1350.23	0.002165	4.07	516.55	118.94	0.34
Sonoqui Wash	14000.00	PF 2	2100.00	1343.67	1349.77		1350.02	0.002135	4.01	523.16	121.56	0.34
Sonoqui Wash	13900.00	PF 2	2100.00	1343.46	1349.56		1349.80	0.002100	3.96	529.76	123.94	0.34
Sonoqui Wash	13800.00	PF 2	2100.00	1343.25	1349.35		1349.59	0.002082	3.94	532.98	125.06	0.34
Sonoqui Wash	13700.00	PF 2	2100.00	1343.04	1349.20		1349.43	0.002132	3.93	534.53	123.90	0.33
Sonoqui Wash	13685.00	PF 2	2100.00	1343.00	1349.16		1349.40	0.000902	3.92	535.16	123.87	0.33
Sonoqui Wash	13635.00	PF 2	2100.00	1340.00	1349.25		1349.34	0.000207	2.45	857.10	132.51	0.17
Sonoqui Wash	13600.00	PF 2	2100.00	1339.97	1349.24		1349.33	0.000280	2.45	858.59	132.37	0.17
Sonoqui Wash	13500.00	PF 2	2100.00	1339.77	1349.22		1349.31	0.000259	2.37	884.27	134.31	0.16
Sonoqui Wash	13426.40	PF 2	2100.00	1339.61	1349.21	1343.02	1349.29	0.000124	2.32	905.66	135.88	0.16
Sonoqui Wash	13367.48			Culvert								
Sonoqui Wash	13308.56	PF 2	2100.00	1339.40	1345.64		1345.91	0.000673	4.23	496.87	108.10	0.35
Sonoqui Wash	13300.00	PF 2	2100.00	1339.37	1345.62		1345.90	0.001318	4.26	494.41	106.64	0.35
Sonoqui Wash	13200.00	PF 2	2100.00	1339.16	1345.47		1345.74	0.002090	4.16	504.32	108.70	0.34
Sonoqui Wash	13100.00	PF 2	2100.00	1338.96	1345.26		1345.53	0.002090	4.16	505.37	109.31	0.34
Sonoqui Wash	13000.00	PF 2	2100.00	1338.76	1345.05		1345.32	0.002080	4.14	507.74	110.24	0.34
Sonoqui Wash	12900.00	PF 2	2100.00	1338.56	1344.85		1345.11	0.002051	4.09	513.17	112.08	0.34
Sonoqui Wash	12800.00	PF 2	2100.00	1338.36	1344.65		1344.91	0.002019	4.04	519.43	114.23	0.33
Sonoqui Wash	12700.00	PF 2	2100.00	1338.16	1344.45		1344.70	0.001995	4.01	523.79	115.67	0.33
Sonoqui Wash	12600.00	PF 2	2100.00	1337.96	1344.25		1344.50	0.001993	4.01	523.93	115.64	0.33
Sonoqui Wash	12500.00	PF 2	2100.00	1337.75	1344.05		1344.30	0.001994	4.01	523.64	115.52	0.33
Sonoqui Wash	12400.00	PF 2	2100.00	1337.55	1343.85		1344.10	0.001994	4.02	522.94	115.13	0.33
Sonoqui Wash	12300.00	PF 2	2100.00	1337.35	1343.65		1343.90	0.002003	4.03	521.33	114.61	0.33
Sonoqui Wash	12200.00	PF 2	2100.00	1337.15	1343.45		1343.70	0.002009	4.04	519.72	113.96	0.33
Sonoqui Wash	12100.00	PF 2	2100.00	1336.95	1343.25		1343.50	0.002029	4.07	516.59	113.05	0.34
Sonoqui Wash	12000.00	PF 2	2100.00	1336.75	1343.05		1343.30	0.002004	4.03	521.16	114.54	0.33
Sonoqui Wash	11900.00	PF 2	2100.00	1336.54	1342.86		1343.10	0.001919	3.92	536.26	119.24	0.33
Sonoqui Wash	11800.00	PF 2	2100.00	1336.34	1342.67		1342.91	0.001887	3.88	541.20	120.49	0.32
Sonoqui Wash	11700.00	PF 2	2100.00	1336.14	1342.46		1342.71	0.001965	4.00	525.47	115.20	0.33
Sonoqui Wash	11600.00	PF 2	2100.00	1335.94	1342.25		1342.51	0.002032	4.09	514.05	111.74	0.34
Sonoqui Wash	11499.99	PF 2	2100.00	1335.74	1342.03		1342.30	0.002137	4.20	499.47	107.88	0.34
Sonoqui Wash	11400.00	PF 2	2100.00	1335.54	1341.83		1342.09	0.002055	4.09	512.94	112.12	0.34
Sonoqui Wash	11300.00	PF 2	2100.00	1335.34	1341.63		1341.88	0.002001	4.04	519.30	113.40	0.33
Sonoqui Wash	11200.00	PF 2	2100.00	1335.13	1341.43		1341.68	0.002023	4.05	518.56	113.92	0.33
Sonoqui Wash	11100.00	PF 2	2100.00	1334.93	1341.22		1341.48	0.002044	4.08	515.22	112.96	0.34
Sonoqui Wash	11000.00	PF 2	2100.00	1334.73	1341.01		1341.27	0.002071	4.10	511.57	112.02	0.34
Sonoqui Wash	10900.00	PF 2	2100.00	1334.53	1340.80		1341.06	0.002096	4.11	511.32	112.91	0.34
Sonoqui Wash	10800.00	PF 2	2100.00	1334.33	1340.59		1340.85	0.002092	4.12	509.26	111.61	0.34
Sonoqui Wash	10700.00	PF 2	2100.00	1334.13	1340.38		1340.65	0.002098	4.12	509.45	111.95	0.34
Sonoqui Wash	10600.00	PF 2	2100.00	1333.92	1340.17		1340.43	0.002116	4.14	507.41	111.53	0.34
Sonoqui Wash	10500.00	PF 2	2100.00	1333.72	1339.95		1340.22	0.002148	4.17	503.82	110.81	0.34
Sonoqui Wash	10400.00	PF 2	2100.00	1333.52	1339.73		1340.01	0.002162	4.17	503.08	110.95	0.35
Sonoqui Wash	10300.00	PF 2	2100.00	1333.32	1339.52		1339.79	0.002167	4.16	504.32	111.86	0.35
Sonoqui Wash	10200.00	PF 2	2100.00	1333.12	1339.31		1339.57	0.002149	4.12	509.55	114.13	0.34
Sonoqui Wash	10100.00	PF 2	2100.00	1332.92	1339.09		1339.36	0.002152	4.11	510.47	114.80	0.34
Sonoqui Wash	10000.00	PF 2	2100.00	1332.71	1338.90		1339.14	0.002040	3.96	530.63	121.63	0.33
Sonoqui Wash	9900.00	PF 2	2100.00	1332.51	1338.69		1338.94	0.002029	3.94	532.73	122.39	0.33
Sonoqui Wash	9800.00	PF 2	2100.00	1332.31	1338.49		1338.73	0.002061	3.98	527.84	120.97	0.34
Sonoqui Wash	9700.00	PF 2	2100.00	1332.11	1338.28		1338.52	0.002071	3.99	526.67	120.80	0.34
Sonoqui Wash	9600.00	PF 2	2100.00	1331.91	1338.07		1338.32	0.002060	3.97	529.39	121.92	0.34
Sonoqui Wash	9500.00	PF 2	2100.00	1331.71	1337.87		1338.11	0.002059	3.96	529.92	122.18	0.34
Sonoqui Wash	9400.00	PF 2	2100.00	1331.51	1337.66		1337.91	0.002049	3.94	532.42	123.13	0.33
Sonoqui Wash	9300.00	PF 2	2100.00	1331.30	1337.47		1337.70	0.001996	3.87	541.97	126.35	0.33
Sonoqui Wash	9200.00	PF 2	2100.00	1331.10	1337.25		1337.50	0.002062	3.96	530.32	122.55	0.34
Sonoqui Wash	9100.00	PF 2	2100.00	1330.90	1337.04		1337.29	0.002109	4.01	523.60	120.68	0.34
Sonoqui Wash	9000.00	PF 2	2100.00	1330.70	1336.82		1337.07	0.002138	4.03	520.54	120.12	0.34
Sonoqui Wash	8900.00	PF 2	2100.00	1330.50	1336.59		1336.85	0.002246	4.15	505.55	115.74	0.35
Sonoqui Wash	8800.00	PF 2	2100.00	1330.30	1336.33		1336.62	0.002395	4.30	488.39	111.33	0.36
Sonoqui Wash	8700.00	PF 2	2100.00	1330.10	1336.07		1336.37	0.002525	4.41	476.25	108.70	0.37

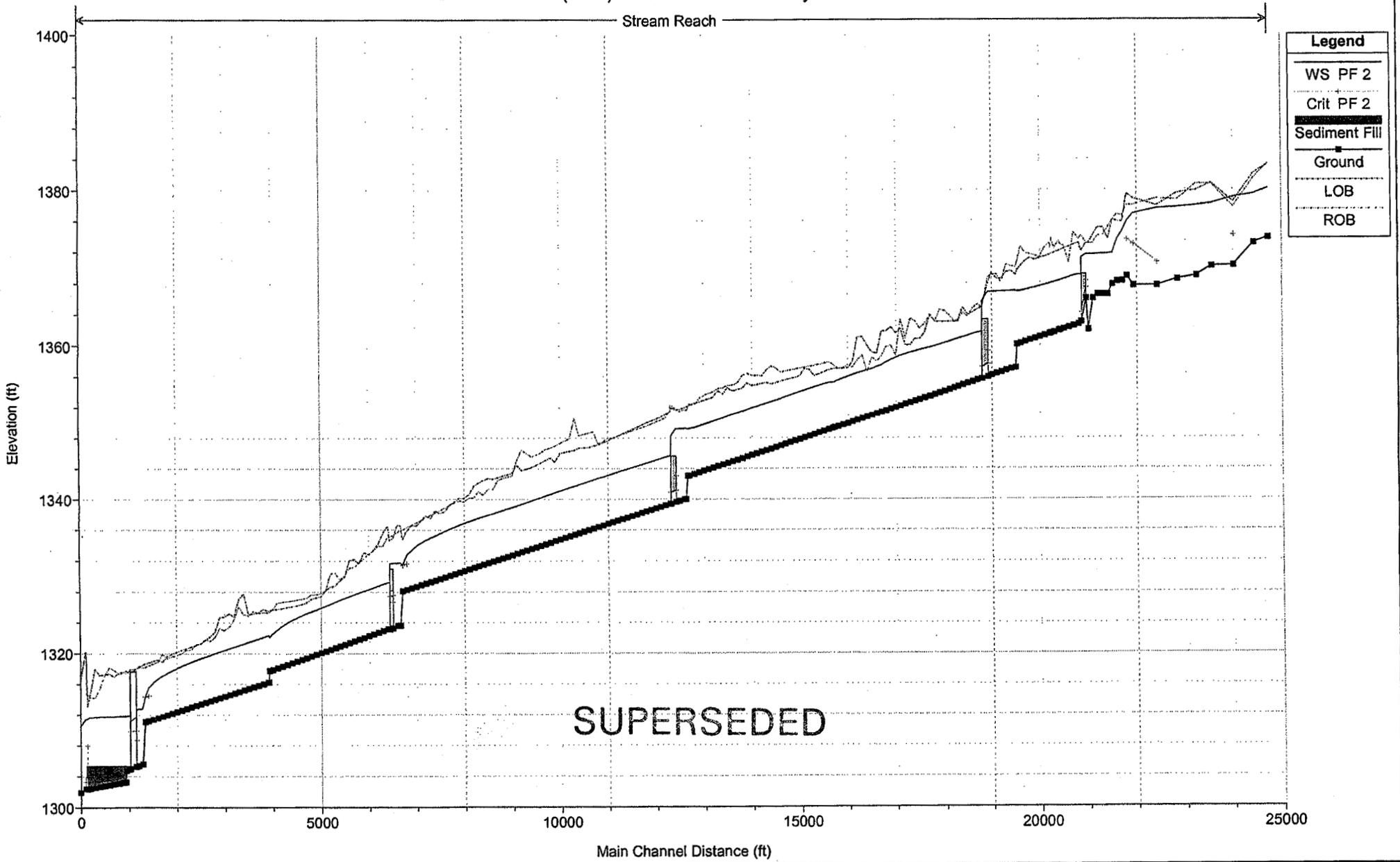
HEC-RAS Plan: CLOMR River: Sonoqui Wash Reach: Sonoqui Wash Profile: PF 2 (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	LWS Ele (ft)	CHWS (ft)	E.G. Elev (ft)	E.G. Slope (ft/h)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Ch
Sonoqui Wash	8600.000	PF 2	2100.00	1329.89	1335.80		1336.11	0.002668	4.51	465.24	106.83	0.38
Sonoqui Wash	8500.000	PF 2	2100.00	1329.69	1335.51		1335.84	0.002806	4.59	457.84	106.61	0.39
Sonoqui Wash	8400.000	PF 2	2100.00	1329.49	1335.24		1335.56	0.002802	4.52	464.49	110.53	0.39
Sonoqui Wash	8300.000	PF 2	2100.00	1329.29	1334.96		1335.27	0.002854	4.44	472.60	117.23	0.39
Sonoqui Wash	8200.000	PF 2	2100.00	1329.09	1334.65		1334.97	0.003092	4.57	459.63	116.19	0.40
Sonoqui Wash	8100.000	PF 2	2100.00	1328.89	1334.29		1334.64	0.003481	4.77	440.03	113.88	0.43
Sonoqui Wash	8000.000	PF 2	2100.00	1328.68	1333.87		1334.26	0.004034	5.01	419.24	112.71	0.46
Sonoqui Wash	7900.000	PF 2	2100.00	1328.48	1333.33		1333.80	0.005214	5.46	384.48	110.12	0.52
Sonoqui Wash	7800.000	PF 2	2100.00	1328.28	1332.74	1331.62	1333.31	0.004338	6.07	345.86	107.42	0.60
Sonoqui Wash	7710.000	PF 2	2100.00	1328.10	1331.43	1331.43	1332.68	0.009923	8.98	233.96	94.88	1.01
Sonoqui Wash	7685.000	PF 2	2100.00	1323.60	1331.73		1331.88	0.000364	3.05	688.14	116.43	0.22
Sonoqui Wash	7600.000	PF 2	2100.00	1323.57	1331.71		1331.85	0.000474	2.96	708.43	121.46	0.22
Sonoqui Wash	7506	PF 2	2100.00	1323.25	1331.69	1326.69	1331.81	0.000217	2.86	734.69	122.40	0.21
Sonoqui Wash	7472.21											
Sonoqui Wash	7434	PF 2	2100.00	1323.11	1329.22		1329.52	0.000746	4.40	477.22	105.55	0.36
Sonoqui Wash	7400.000	PF 2	2100.00	1323.13	1329.17		1329.48	0.001510	4.47	469.84	103.98	0.37
Sonoqui Wash	7300.000	PF 2	2100.00	1322.91	1328.99		1329.29	0.002443	4.42	474.94	105.13	0.37
Sonoqui Wash	7200.000	PF 2	2100.00	1322.68	1328.74		1329.05	0.002455	4.43	474.56	105.35	0.37
Sonoqui Wash	7100.000	PF 2	2100.00	1322.47	1328.51		1328.80	0.002406	4.33	484.47	109.42	0.36
Sonoqui Wash	7000.000	PF 2	2100.00	1322.25	1328.29		1328.56	0.002277	4.16	505.30	116.85	0.35
Sonoqui Wash	6900.000	PF 2	2100.00	1322.02	1328.08		1328.33	0.002185	4.03	520.62	122.19	0.34
Sonoqui Wash	6800.000	PF 2	2100.00	1321.80	1327.85		1328.11	0.002230	4.09	513.62	119.94	0.35
Sonoqui Wash	6700.000	PF 2	2100.00	1321.58	1327.61		1327.88	0.002311	4.18	502.14	116.35	0.35
Sonoqui Wash	6600.000	PF 2	2100.00	1321.36	1327.39		1327.65	0.002276	4.13	508.62	118.80	0.35
Sonoqui Wash	6500.000	PF 2	2100.00	1321.14	1327.16		1327.42	0.002281	4.12	509.23	119.40	0.35
Sonoqui Wash	6400.000	PF 2	2100.00	1320.92	1326.91		1327.19	0.002379	4.23	496.94	115.83	0.36
Sonoqui Wash	6300.000	PF 2	2100.00	1320.70	1326.65		1326.94	0.002526	4.36	481.80	112.05	0.37
Sonoqui Wash	6200.000	PF 2	2100.00	1320.48	1326.38		1326.69	0.002620	4.42	474.80	111.04	0.38
Sonoqui Wash	6100.000	PF 2	2100.00	1320.26	1326.13		1326.42	0.002597	4.37	480.80	113.89	0.37
Sonoqui Wash	6000.000	PF 2	2100.00	1320.04	1325.87		1326.16	0.002576	4.31	486.74	116.83	0.37
Sonoqui Wash	5900.000	PF 2	2100.00	1319.82	1325.62		1325.90	0.002585	4.29	489.84	119.07	0.37
Sonoqui Wash	5800.000	PF 2	2100.00	1319.60	1325.38		1325.64	0.002449	4.10	511.96	127.87	0.36
Sonoqui Wash	5700.000	PF 2	2100.00	1319.38	1325.15		1325.40	0.002379	3.98	527.02	134.60	0.35
Sonoqui Wash	5600.000	PF 2	2100.00	1319.16	1324.87		1325.15	0.002615	4.20	500.25	126.79	0.37
Sonoqui Wash	5500.000	PF 2	2100.00	1318.94	1324.57		1324.87	0.002862	4.39	478.07	121.05	0.39
Sonoqui Wash	5400.000	PF 2	2100.00	1318.72	1324.25		1324.57	0.003131	4.56	460.22	117.65	0.41
Sonoqui Wash	5300.000	PF 2	2100.00	1318.50	1323.89		1324.24	0.003441	4.71	445.63	116.54	0.42
Sonoqui Wash	5200.000	PF 2	2100.00	1318.28	1323.50		1323.87	0.003886	4.90	428.74	115.99	0.45
Sonoqui Wash	5100.000	PF 2	2100.00	1318.06	1323.01		1323.44	0.004766	5.25	399.89	113.63	0.49
Sonoqui Wash	5000.000	PF 2	2100.00	1317.84	1322.46		1323.00	0.003877	5.89	356.49	106.44	0.57
Sonoqui Wash	4930.000	PF 2	2100.00	1317.72	1322.06		1322.72	0.003683	6.52	322.05	100.06	0.64
Sonoqui Wash	4915.000	PF 2	2100.00	1316.22	1322.28		1322.58	0.001074	4.37	480.25	107.28	0.36
Sonoqui Wash	4915.000	PF 2	2100.00	1316.19	1322.27		1322.56	0.001454	4.36	481.37	107.50	0.36
Sonoqui Wash	4900.000	PF 2	2100.00	1315.99	1322.07		1322.38	0.002430	4.41	476.24	105.45	0.37
Sonoqui Wash	4800.000	PF 2	2100.00	1315.79	1321.85		1322.13	0.002324	4.23	495.91	113.15	0.36
Sonoqui Wash	4700.000	PF 2	2100.00	1315.59	1321.64		1321.90	0.002208	4.06	517.21	121.15	0.35
Sonoqui Wash	4600.000	PF 2	2100.00	1315.39	1321.43		1321.68	0.002137	3.96	530.61	126.17	0.34
Sonoqui Wash	4500.000	PF 2	2100.00	1315.19	1321.23		1321.46	0.002102	3.89	540.20	130.39	0.34
Sonoqui Wash	4400.000	PF 2	2100.00	1314.98	1321.02		1321.25	0.002101	3.90	538.90	129.56	0.34
Sonoqui Wash	4300.000	PF 2	2100.00	1314.78	1320.81		1321.04	0.002076	3.86	544.51	131.80	0.33
Sonoqui Wash	4200.000	PF 2	2100.00	1314.58	1320.61		1320.83	0.002055	3.82	549.46	133.84	0.33
Sonoqui Wash	4100.000	PF 2	2100.00	1314.38	1320.40		1320.63	0.002051	3.82	550.42	134.22	0.33
Sonoqui Wash	4000.000	PF 2	2100.00	1314.18	1320.19		1320.42	0.002089	3.85	544.78	132.59	0.34
Sonoqui Wash	3900.000	PF 2	2100.00	1313.98	1319.97		1320.21	0.002162	3.93	534.08	129.41	0.34
Sonoqui Wash	3800.000	PF 2	2100.00	1313.78	1319.74		1319.99	0.002211	3.97	529.06	128.52	0.34
Sonoqui Wash	3700.000	PF 2	2100.00	1313.58	1319.52		1319.77	0.002208	3.95	532.03	130.24	0.34
Sonoqui Wash	3600.000	PF 2	2100.00	1313.38	1319.31		1319.55	0.002196	3.92	535.94	132.20	0.34
Sonoqui Wash	3500.000	PF 2	2100.00	1313.18	1319.08		1319.32	0.002221	3.93	534.36	132.35	0.34
Sonoqui Wash	3400.000	PF 2	2100.00	1312.98	1318.84		1319.09	0.002351	4.05	518.52	128.04	0.35
Sonoqui Wash	3300.000	PF 2	2100.00	1312.77	1318.58		1318.85	0.002485	4.16	504.81	124.79	0.36
Sonoqui Wash	3200.000	PF 2	2100.00	1312.57	1318.31		1318.59	0.002642	4.27	491.88	122.39	0.38
Sonoqui Wash	3100.000	PF 2	2100.00	1312.37	1318.00		1318.31	0.002916	4.47	470.25	117.71	0.39
Sonoqui Wash	3000.000	PF 2	2100.00	1312.17	1317.69		1318.01	0.003133	4.56	460.46	117.90	0.41
Sonoqui Wash	2900.000	PF 2	2100.00	1311.97	1317.36		1317.69	0.003311	4.58	458.02	121.41	0.42
Sonoqui Wash	2800.000	PF 2	2100.00	1311.77	1317.05		1317.35	0.003282	4.40	477.34	133.96	0.41
Sonoqui Wash	2700.000	PF 2	2100.00	1311.57	1316.66		1316.99	0.003823	4.65	451.65	130.82	0.44
Sonoqui Wash	2600.000	PF 2	2100.00	1311.37	1316.12		1316.54	0.005136	5.21	403.27	122.97	0.51
Sonoqui Wash	2500.000	PF 2	2100.00	1311.17	1315.45	1314.47	1316.03	0.004796	6.11	343.66	114.17	0.62
Sonoqui Wash	2400.000	PF 2	2100.00	1311.06	1314.35	1314.35	1315.55	0.009993	8.79	238.99	100.70	1.01
Sonoqui Wash	2337.000	PF 2	2100.00	1305.60	1312.91		1313.09	0.000524	3.41	616.50	116.71	0.26
Sonoqui Wash	2282.000	PF 2	2100.00	1305.39	1312.87		1313.04	0.000656	3.29	637.33	119.21	0.25
Sonoqui Wash	2200.000	PF 2	2100.00	1305.40	1312.86	1308.68	1313.01	0.000301	3.14	668.07	123.90	0.24
Sonoqui Wash	2153.000	PF 2	2100.00									
Sonoqui Wash	2090	Bridge										
Sonoqui Wash	2027.000	PF 2	2100.00	1305.40	1311.05		1311.35	0.000795	4.40	476.82	110.73	0.37
Sonoqui Wash	2000	PF 2	2100.00	1305.40	1311.03		1311.31	0.001406	4.25	494.00	111.91	0.36
Sonoqui Wash	1948.000	PF 2	2100.00	1305.40	1310.98		1311.25	0.001011	4.19	500.96	114.10	0.35
Sonoqui Wash	1933.000	PF 2	2100.00	1305.40	1311.00		1311.22	0.000791	3.81	550.89	120.24	0.31
Sonoqui Wash	1900	PF 2	2100.00	1305.40	1310.96		1311.19	0.001100	3.84	546.87	120.00	0.32
Sonoqui Wash	1800	PF 2	2100.00	1305.40	1310.90		1311.04	0.001015	2.92	719.66	154.46	0.24
Sonoqui Wash	1700	PF 2	2100.00	1305.40	1310.88		1310.95	0.000518	2.12	990.89	207.99	0.17
Sonoqui Wash	1600	PF 2	2100.00	1305.40	1310.85		1310.90	0.000338	1.72	1217.97	253.24	0.14

HEC-RAS Plan: CLOMR River: Sonoqui Wash Reach: Sonoqui Wash Profile: PF 2 (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Chl W.S. (ft)	P.E. Elev (ft)	E.G. Slope (ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sonoqui Wash	1600	PF 2	2100.00	1305.40	1310.82		1310.86	0.000323	1.66	1265.02	269.63	0.14
Sonoqui Wash	1400	PF 2	2100.00	1305.40	1310.78		1310.83	0.000416	1.82	1151.99	257.48	0.15
Sonoqui Wash	1300	PF 2	2100.00	1305.40	1310.70		1310.77	0.000579	2.13	985.66	223.54	0.18
Sonoqui Wash	1200	PF 2	2100.00	1305.40	1310.57		1310.68	0.001032	2.75	764.04	182.42	0.24
Sonoqui Wash	1146	PF 2	2100.00	1305.40	1310.29		1310.56	0.002430	4.15	506.02	123.09	0.36
Sonoqui Wash	1126	PF 2	2100.00	1305.40	1309.87	1308.52	1310.43	0.001202	6.04	347.67	95.72	0.56





SUPERSEDED

HEC-RAS Plan: CLOMR River: Stream Reach: Reach Profile: PF 2

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach	25622.81	PF 2	2100.00	1373.68	1380.05		1380.27	0.003349	3.77	557.33	143.54	0.34
Reach	25330.01	PF 2	2100.00	1372.99	1379.34		1379.48	0.002100	3.00	699.99	179.91	0.27
Reach	24907.36	PF 2	2100.00	1370.15	1378.93	1374.06	1378.98	0.000695	1.90	1136.33	660.42	0.14
Reach	24453.07	PF 2	2100.00	1370.03	1378.13		1378.38	0.003105	3.99	526.00	92.26	0.29
Reach	24140.17	PF 2	2100.00	1368.84	1377.87		1377.93	0.000673	1.98	1060.63	170.75	0.14
Reach	23742.87	PF 2	2100.00	1368.42	1377.66		1377.70	0.000468	1.72	1222.70	187.07	0.12
Reach	23415.03	PF 2	2100.00	1367.60	1377.51	1370.56	1377.54	0.000302	1.52	1381.33	181.80	0.10
Reach	22928.40	PF 2	2100.00	1367.60	1376.79	1372.90	1377.15	0.004163	4.78	439.67	290.50	0.34
Reach	22800.00	PF 2	2100.00	1368.78	1375.78	1373.46	1376.37	0.008739	6.19	339.40	262.25	0.48
Reach	22700.00	PF 2	2100.00	1368.19	1374.52	1373.01	1375.29	0.013279	7.05	297.82	259.20	0.58
Reach	22600.00	PF 2	2100.00	1368.13	1372.36	1371.86	1373.42	0.026982	8.29	253.35	337.62	0.80
Reach	22500.00	PF 2	2100.00	1367.79	1371.85	1370.83	1372.04	0.006092	3.82	604.99	370.94	0.38
Reach	22400.00	PF 2	2100.00	1366.50	1371.43	1369.42	1371.66	0.002518	3.91	537.32	337.53	0.36
Reach	22300.00	PF 2	2100.00	1366.50	1371.40	1368.48	1371.49	0.000789	2.31	908.59	415.18	0.21
Reach	22200.00	PF 2	2100.00	1366.50	1371.33	1368.41	1371.40	0.000809	2.19	958.38	390.21	0.20
Reach	22100.00	PF 2	2100.00	1366.00	1371.30	1367.76	1371.34	0.000373	1.72	1224.27	421.64	0.14
Reach	22000.00	PF 2	2100.00	1362.00	1371.28	1367.35	1371.31	0.000174	1.40	1495.61	513.06	0.12
Reach	21957.00	PF 2	2100.00	1362.00	1371.25	1368.38	1371.30	0.000200	1.93	1091.42	472.35	0.18
Reach	21912.24	Culvert										
Reach	21850.00	PF 2	2100.00	1362.84	1369.16	1366.84	1369.30	0.000502	3.00	700.68	276.36	0.29
Reach	21800.00	PF 2	2100.00	1362.69	1369.14		1369.27	0.000795	2.92	719.91	187.68	0.26
Reach	21700.00	PF 2	2100.00	1362.49	1369.00		1369.16	0.001519	3.19	657.65	166.87	0.28
Reach	21600.00	PF 2	2100.00	1362.28	1368.81		1369.00	0.001555	3.62	596.74	133.18	0.29
Reach	21500.00	PF 2	2100.00	1362.08	1368.61		1368.84	0.001714	3.79	554.44	119.00	0.31
Reach	21424.00	PF 2	2100.00	1361.93	1368.48		1368.71	0.001691	3.78	555.14	118.08	0.31
Reach	21400.00	PF 2	2100.00	1361.88	1368.44		1368.66	0.001674	3.76	557.93	118.88	0.31
Reach	21300.00	PF 2	2100.00	1361.67	1368.29		1368.50	0.001603	3.89	569.57	121.04	0.30
Reach	21240.00	PF 2	2100.00	1361.55	1368.20		1368.40	0.001581	3.64	576.94	122.59	0.30
Reach	21216.00	PF 2	2100.00	1361.50	1368.16		1368.36	0.001606	3.55	591.88	133.57	0.30
Reach	21200.00	PF 2	2100.00	1361.47	1368.13		1368.33	0.001538	3.61	581.37	123.54	0.29
Reach	21100.00	PF 2	2100.00	1361.27	1367.99		1368.18	0.001461	3.53	595.56	126.32	0.29
Reach	21000.00	PF 2	2100.00	1361.07	1367.85		1368.04	0.001412	3.49	601.83	126.42	0.28
Reach	20900.00	PF 2	2100.00	1360.86	1367.71		1367.90	0.001366	3.46	607.48	126.14	0.28
Reach	20800.00	PF 2	2100.00	1360.66	1367.59		1367.76	0.001249	3.30	636.11	132.53	0.27
Reach	20700.00	PF 2	2100.00	1360.46	1367.47		1367.64	0.001197	3.26	645.00	132.86	0.26
Reach	20600.00	PF 2	2100.00	1360.25	1367.39		1367.55	0.000684	3.19	657.64	133.57	0.25
Reach	20525.00	PF 2	2100.00	1360.10	1367.35		1367.50	0.000483	3.17	661.95	131.76	0.25
Reach	20495.00	PF 2	2100.00	1357.10	1367.40		1367.47	0.000139	2.14	979.96	137.07	0.14
Reach	20400.00	PF 2	2100.00	1356.98	1367.39		1367.46	0.000180	2.11	996.29	137.64	0.14
Reach	20300.00	PF 2	2100.00	1356.77	1367.37		1367.43	0.000274	2.04	1030.47	140.71	0.13
Reach	20200.00	PF 2	2100.00	1356.56	1367.34		1367.41	0.000259	2.00	1048.70	140.67	0.13
Reach	20100.00	PF 2	2100.00	1356.35	1367.32		1367.38	0.000239	1.94	1081.51	143.38	0.12
Reach	20000.00	PF 2	2100.00	1356.14	1367.30		1367.36	0.000192	1.88	1169.14	190.58	0.11
Reach	19921.00	PF 2	2100.00	1355.90	1367.31	1359.74	1367.35	0.000045	1.58	1418.32	245.01	0.10
Reach	19842.36	Culvert										
Reach	19790.00	PF 2	2100.00	1355.68	1361.69		1361.95	0.000722	4.08	514.67	125.08	0.35
Reach	19700.00	PF 2	2100.00	1355.52	1361.59		1361.86	0.001384	4.21	498.43	113.23	0.35
Reach	19600.00	PF 2	2100.00	1355.31	1361.42		1361.69	0.002172	4.12	509.25	114.93	0.35
Reach	19500.00	PF 2	2100.00	1355.10	1361.21		1361.47	0.002195	4.12	509.65	116.11	0.35
Reach	19400.00	PF 2	2100.00	1354.90	1361.01		1361.25	0.002078	3.96	529.95	123.07	0.34
Reach	19300.00	PF 2	2100.00	1354.69	1360.83		1361.04	0.001869	3.69	568.39	135.62	0.32
Reach	19200.00	PF 2	2100.00	1354.48	1360.65		1360.86	0.001833	3.67	572.47	136.10	0.32
Reach	19100.00	PF 2	2100.00	1354.27	1360.45		1360.67	0.001880	3.73	563.40	133.25	0.32
Reach	19000.00	PF 2	2100.00	1354.06	1360.24		1360.47	0.002000	3.91	537.31	123.70	0.33
Reach	18900.00	PF 2	2100.00	1353.86	1360.04		1360.27	0.001958	3.86	544.47	125.89	0.33
Reach	18800.00	PF 2	2100.00	1353.65	1359.84		1360.08	0.001973	3.89	540.20	124.15	0.33
Reach	18700.00	PF 2	2100.00	1353.44	1359.66		1359.88	0.001887	3.79	554.13	128.05	0.32
Reach	18600.00	PF 2	2100.00	1353.23	1359.49		1359.69	0.001736	3.59	585.27	138.07	0.31
Reach	18500.00	PF 2	2100.00	1353.02	1359.37	1356.48	1359.52	0.001376	3.14	669.76	295.25	0.27
Reach	18400.00	PF 2	2100.00	1352.82	1359.28		1359.39	0.001120	2.71	775.06	207.28	0.24
Reach	18300.00	PF 2	2100.00	1352.61	1359.07		1359.25	0.001556	3.44	610.18	141.24	0.29
Reach	18200.00	PF 2	2100.00	1352.40	1358.89		1359.09	0.001630	3.62	580.79	129.01	0.30
Reach	18100.00	PF 2	2100.00	1352.19	1358.68		1358.91	0.001831	3.92	535.90	114.72	0.32
Reach	18000.00	PF 2	2100.00	1351.98	1358.42	1355.55	1358.71	0.002216	4.29	489.51	107.64	0.35
Reach	17900.00	PF 2	2100.00	1351.78	1358.14		1358.46	0.002627	4.58	458.51	101.67	0.38
Reach	17800.00	PF 2	2100.00	1351.57	1357.81		1358.18	0.002956	4.91	427.48	92.89	0.40
Reach	17700.00	PF 2	2100.00	1351.36	1357.47	1355.14	1357.87	0.003290	5.06	415.36	114.83	0.42
Reach	17600.00	PF 2	2100.00	1351.15	1357.24		1357.54	0.002727	4.39	478.72	117.00	0.38
Reach	17500.00	PF 2	2100.00	1350.94	1356.95		1357.26	0.002753	4.50	466.17	110.07	0.39
Reach	17400.00	PF 2	2100.00	1350.74	1356.78	1354.06	1357.00	0.001973	3.79	555.13	145.46	0.33
Reach	17300.00	PF 2	2100.00	1350.53	1356.59		1356.80	0.002031	3.71	565.73	142.78	0.33
Reach	17200.00	PF 2	2100.00	1350.32	1356.40		1356.60	0.001882	3.64	577.30	141.81	0.32
Reach	17100.00	PF 2	2100.00	1350.11	1356.19		1356.41	0.001957	3.76	568.62	134.46	0.33
Reach	17000.00	PF 2	2100.00	1349.90	1355.97		1356.21	0.002071	3.90	538.29	127.66	0.33
Reach	16900.00	PF 2	2100.00	1349.70	1355.72		1355.99	0.002276	4.13	507.88	118.34	0.35
Reach	16800.00	PF 2	2100.00	1349.49	1355.50	1352.91	1355.80	0.001491	4.39	478.64	149.39	0.37

SUPERSEDED BY 4/15/06 MODEL

HEC-RAS Plan: CLOMR River: Stream Reach: Reach Profile: PF 2 (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach	16728.00	PF 2	2100.00	1349.34	1355.26		1355.70	0.001114	5.29	396.69	89.43	0.44
Reach	16682.00	PF 2	2100.00	1349.24	1355.21		1355.64	0.001082	5.25	400.27	89.46	0.44
Reach	16600.00	PF 2	2100.00	1349.07	1355.16		1355.46	0.001457	4.41	476.66	104.94	0.36
Reach	16500.00	PF 2	2100.00	1348.87	1354.99		1355.28	0.002344	4.34	483.58	106.67	0.36
Reach	16400.00	PF 2	2100.00	1348.66	1354.80		1355.04	0.002044	3.94	533.17	123.39	0.33
Reach	16300.00	PF 2	2100.00	1348.45	1354.62		1354.84	0.001875	3.73	563.63	133.11	0.32
Reach	16200.00	PF 2	2100.00	1348.24	1354.41		1354.64	0.002013	3.92	536.37	123.81	0.33
Reach	16100.00	PF 2	2100.00	1348.03	1354.19		1354.44	0.002057	3.98	527.98	120.93	0.34
Reach	16000.00	PF 2	2100.00	1347.83	1354.01		1354.23	0.001927	3.81	551.53	128.61	0.32
Reach	15900.00	PF 2	2100.00	1347.62	1353.81		1354.04	0.001965	3.87	542.76	125.32	0.33
Reach	15800.00	PF 2	2100.00	1347.41	1353.59		1353.84	0.002071	4.01	524.01	119.25	0.34
Reach	15700.00	PF 2	2100.00	1347.20	1353.37		1353.63	0.002127	4.08	514.84	116.30	0.34
Reach	15600.00	PF 2	2100.00	1346.99	1353.16		1353.41	0.002102	4.04	519.29	117.93	0.34
Reach	15500.00	PF 2	2100.00	1346.79	1352.96		1353.20	0.002030	3.94	532.57	122.37	0.33
Reach	15400.00	PF 2	2100.00	1346.58	1352.76		1353.00	0.001987	3.89	539.52	124.48	0.33
Reach	15300.00	PF 2	2100.00	1346.37	1352.56		1352.80	0.002012	3.94	533.65	122.17	0.33
Reach	15200.00	PF 2	2100.00	1346.16	1352.35		1352.59	0.002058	4.00	525.61	119.56	0.34
Reach	15100.00	PF 2	2100.00	1345.95	1352.14		1352.39	0.002070	4.02	523.02	118.58	0.34
Reach	15000.00	PF 2	2100.00	1345.75	1351.93		1352.18	0.002092	4.04	519.47	117.52	0.34
Reach	14900.00	PF 2	2100.00	1345.54	1351.71		1351.97	0.002124	4.08	514.88	116.21	0.34
Reach	14800.00	PF 2	2100.00	1345.33	1351.50		1351.76	0.002121	4.07	516.06	116.74	0.34
Reach	14700.00	PF 2	2100.00	1345.12	1351.29		1351.54	0.002125	4.07	515.68	116.70	0.34
Reach	14600.00	PF 2	2100.00	1344.91	1351.07		1351.33	0.002127	4.07	515.63	116.78	0.34
Reach	14500.00	PF 2	2100.00	1344.70	1350.86		1351.12	0.002131	4.07	515.70	116.98	0.34
Reach	14400.00	PF 2	2100.00	1344.50	1350.63		1350.90	0.002303	4.17	503.68	116.97	0.35
Reach	14300.00	PF 2	2100.00	1344.29	1350.41		1350.67	0.002173	4.09	513.30	117.34	0.34
Reach	14200.00	PF 2	2100.00	1344.08	1350.19		1350.45	0.002179	4.09	513.87	117.95	0.35
Reach	14100.00	PF 2	2100.00	1343.87	1349.98		1350.23	0.002165	4.07	516.55	118.94	0.34
Reach	14000.00	PF 2	2100.00	1343.67	1349.77		1350.02	0.002135	4.01	523.16	121.56	0.34
Reach	13900.00	PF 2	2100.00	1343.46	1349.56		1349.80	0.002100	3.96	529.76	123.94	0.34
Reach	13800.00	PF 2	2100.00	1343.25	1349.35		1349.59	0.002082	3.94	532.99	125.06	0.34
Reach	13700.00	PF 2	2100.00	1343.04	1349.20		1349.43	0.001232	3.93	534.53	123.90	0.33
Reach	13665.00	PF 2	2100.00	1343.00	1349.16		1349.40	0.000902	3.92	535.16	123.87	0.33
Reach	13635.00	PF 2	2100.00	1340.00	1349.25		1349.34	0.000207	2.45	857.10	132.51	0.17
Reach	13600.00	PF 2	2100.00	1339.97	1349.24		1349.33	0.000280	2.45	858.59	132.37	0.17
Reach	13500.00	PF 2	2100.00	1339.77	1349.22		1349.31	0.000259	2.37	884.27	134.31	0.16
Reach	13426.40	PF 2	2100.00	1339.61	1349.21	1343.02	1349.29	0.000124	2.32	905.66	135.88	0.16
Reach	13367.48		Culvert									
Reach	13308.56	PF 2	2100.00	1339.40	1345.64		1345.91	0.000673	4.23	496.87	108.10	0.35
Reach	13300.00	PF 2	2100.00	1339.37	1345.62		1345.90	0.001318	4.25	494.41	106.64	0.35
Reach	13200.00	PF 2	2100.00	1339.16	1345.47		1345.74	0.002090	4.16	504.32	108.70	0.34
Reach	13100.00	PF 2	2100.00	1338.96	1345.26		1345.53	0.002090	4.16	505.37	109.31	0.34
Reach	13000.00	PF 2	2100.00	1338.76	1345.05		1345.32	0.002080	4.14	507.74	110.24	0.34
Reach	12900.00	PF 2	2100.00	1338.56	1344.85		1345.11	0.002051	4.09	513.17	112.08	0.34
Reach	12800.00	PF 2	2100.00	1338.36	1344.65		1344.91	0.002019	4.04	519.43	114.23	0.33
Reach	12700.00	PF 2	2100.00	1338.16	1344.45		1344.70	0.001995	4.01	523.79	115.67	0.33
Reach	12600.00	PF 2	2100.00	1337.96	1344.25		1344.50	0.001993	4.01	523.93	115.64	0.33
Reach	12500.00	PF 2	2100.00	1337.75	1344.05		1344.30	0.001994	4.01	523.64	115.52	0.33
Reach	12400.00	PF 2	2100.00	1337.55	1343.85		1344.10	0.001994	4.02	522.94	115.13	0.33
Reach	12300.00	PF 2	2100.00	1337.35	1343.65		1343.90	0.002003	4.03	521.33	114.61	0.33
Reach	12200.00	PF 2	2100.00	1337.15	1343.45		1343.70	0.002009	4.04	519.72	113.96	0.33
Reach	12100.00	PF 2	2100.00	1336.95	1343.25		1343.50	0.002029	4.07	516.59	113.05	0.34
Reach	12000.00	PF 2	2100.00	1336.75	1343.05		1343.30	0.002004	4.03	521.16	114.54	0.33
Reach	11900.00	PF 2	2100.00	1336.54	1342.86		1343.10	0.001919	3.92	536.26	119.24	0.33
Reach	11800.00	PF 2	2100.00	1336.34	1342.67		1342.91	0.001887	3.88	541.20	120.49	0.32
Reach	11700.00	PF 2	2100.00	1336.14	1342.46		1342.71	0.001965	4.00	525.47	115.20	0.33
Reach	11600.00	PF 2	2100.00	1335.94	1342.25		1342.51	0.002032	4.09	514.05	111.74	0.34
Reach	11499.99	PF 2	2100.00	1335.74	1342.03		1342.30	0.002137	4.20	499.47	107.88	0.34
Reach	11400.00	PF 2	2100.00	1335.54	1341.83		1342.09	0.002055	4.09	512.94	112.12	0.34
Reach	11300.00	PF 2	2100.00	1335.34	1341.63		1341.88	0.002001	4.04	519.30	113.40	0.33
Reach	11200.00	PF 2	2100.00	1335.13	1341.43		1341.68	0.002023	4.05	518.56	113.92	0.33
Reach	11100.00	PF 2	2100.00	1334.93	1341.22		1341.48	0.002044	4.08	515.22	112.96	0.34
Reach	11000.00	PF 2	2100.00	1334.73	1341.01		1341.27	0.002071	4.10	511.57	112.02	0.34
Reach	10900.00	PF 2	2100.00	1334.53	1340.80		1341.06	0.002096	4.11	511.32	112.91	0.34
Reach	10800.00	PF 2	2100.00	1334.33	1340.59		1340.85	0.002092	4.12	509.26	111.61	0.34
Reach	10700.00	PF 2	2100.00	1334.13	1340.38		1340.65	0.002098	4.12	509.45	111.95	0.34
Reach	10600.00	PF 2	2100.00	1333.92	1340.17		1340.43	0.002116	4.14	507.41	111.53	0.34
Reach	10500.00	PF 2	2100.00	1333.72	1339.95		1340.22	0.002148	4.17	503.82	110.81	0.34
Reach	10400.00	PF 2	2100.00	1333.52	1339.73		1340.01	0.002162	4.17	503.08	110.95	0.35
Reach	10300.00	PF 2	2100.00	1333.32	1339.52		1339.79	0.002167	4.16	504.32	111.86	0.35
Reach	10200.00	PF 2	2100.00	1333.12	1339.31		1339.57	0.002149	4.12	509.55	114.13	0.34
Reach	10100.00	PF 2	2100.00	1332.92	1339.09		1339.36	0.002152	4.11	510.47	114.80	0.34
Reach	10000.00	PF 2	2100.00	1332.71	1338.90		1339.14	0.002040	3.96	530.63	121.63	0.33
Reach	9900.000	PF 2	2100.00	1332.51	1338.69		1338.94	0.002029	3.94	532.73	122.39	0.33
Reach	9800.000	PF 2	2100.00	1332.31	1338.49		1338.73	0.002061	3.98	527.94	120.97	0.34
Reach	9700.000	PF 2	2100.00	1332.11	1338.28		1338.52	0.002071	3.99	526.67	120.80	0.34

SUPERSEDED

HEC-RAS Plan: CLOMR River: Stream Reach: Reach Profile: PF 2 (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach	9600.000	PF 2	2100.00	1331.91	1338.07		1338.32	0.002060	3.97	529.39	121.92	0.34
Reach	9500.000	PF 2	2100.00	1331.71	1337.87		1338.11	0.002059	3.96	529.92	122.18	0.34
Reach	9400.000	PF 2	2100.00	1331.51	1337.66		1337.91	0.002049	3.94	532.42	123.13	0.33
Reach	9300.000	PF 2	2100.00	1331.30	1337.47		1337.70	0.001996	3.87	541.97	126.35	0.33
Reach	9200.000	PF 2	2100.00	1331.10	1337.25		1337.50	0.002062	3.96	530.32	122.55	0.34
Reach	9100.000	PF 2	2100.00	1330.90	1337.04		1337.29	0.002109	4.01	523.60	120.68	0.34
Reach	9000.000	PF 2	2100.00	1330.70	1336.82		1337.07	0.002138	4.03	520.54	120.12	0.34
Reach	8900.000	PF 2	2100.00	1330.50	1336.59		1336.85	0.002246	4.15	505.55	115.74	0.35
Reach	8800.000	PF 2	2100.00	1330.30	1336.33		1336.62	0.002395	4.30	488.39	111.33	0.36
Reach	8700.000	PF 2	2100.00	1330.10	1336.07		1336.37	0.002525	4.41	476.25	108.70	0.37
Reach	8600.000	PF 2	2100.00	1329.89	1335.80		1336.11	0.002668	4.51	465.24	106.83	0.38
Reach	8500.000	PF 2	2100.00	1329.69	1335.51		1335.84	0.002806	4.59	457.84	106.61	0.39
Reach	8400.000	PF 2	2100.00	1329.49	1335.24		1335.56	0.002802	4.52	464.49	110.53	0.39
Reach	8300.000	PF 2	2100.00	1329.29	1334.96		1335.27	0.002854	4.44	472.60	117.23	0.39
Reach	8200.000	PF 2	2100.00	1329.09	1334.65		1334.97	0.003092	4.57	459.63	116.19	0.40
Reach	8100.000	PF 2	2100.00	1328.89	1334.29		1334.64	0.003481	4.77	440.03	113.88	0.43
Reach	8000.000	PF 2	2100.00	1328.68	1333.87		1334.26	0.004034	5.01	419.24	112.71	0.46
Reach	7900.000	PF 2	2100.00	1328.48	1333.33		1333.80	0.005214	5.46	384.48	110.12	0.52
Reach	7800.000	PF 2	2100.00	1328.28	1332.74	1331.62	1333.31	0.004338	6.07	345.86	107.42	0.60
Reach	7710.000	PF 2	2100.00	1328.10	1331.43	1331.43	1332.68	0.009923	8.98	233.96	94.88	1.01
Reach	7665.000	PF 2	2100.00	1323.60	1331.73		1331.88	0.000364	3.05	688.14	116.43	0.22
Reach	7600.000	PF 2	2100.00	1323.57	1331.71		1331.85	0.000474	2.96	708.43	121.46	0.22
Reach	7506	PF 2	2100.00	1323.25	1331.69	1326.69	1331.81	0.000217	2.86	734.69	122.40	0.21
Reach	7472.21		Culvert									
Reach	7434	PF 2	2100.00	1323.11	1329.22		1329.52	0.000746	4.40	477.22	105.55	0.36
Reach	7400.000	PF 2	2100.00	1323.13	1329.17		1329.48	0.001510	4.47	469.84	103.98	0.37
Reach	7300.000	PF 2	2100.00	1322.91	1328.99		1329.29	0.002443	4.42	474.94	105.13	0.37
Reach	7200.000	PF 2	2100.00	1322.68	1328.74		1329.05	0.002455	4.43	474.56	105.35	0.37
Reach	7100.000	PF 2	2100.00	1322.47	1328.51		1328.80	0.002406	4.33	484.47	109.42	0.36
Reach	7000.000	PF 2	2100.00	1322.25	1328.29		1328.56	0.002277	4.16	505.30	116.85	0.35
Reach	6900.000	PF 2	2100.00	1322.02	1328.08		1328.33	0.002185	4.03	520.62	122.19	0.34
Reach	6800.000	PF 2	2100.00	1321.80	1327.85		1328.11	0.002230	4.09	513.62	119.94	0.35
Reach	6700.000	PF 2	2100.00	1321.58	1327.61		1327.88	0.002311	4.18	502.14	116.35	0.35
Reach	6600.000	PF 2	2100.00	1321.36	1327.39		1327.65	0.002276	4.13	508.62	118.80	0.35
Reach	6500.000	PF 2	2100.00	1321.14	1327.16		1327.42	0.002281	4.12	509.23	119.40	0.35
Reach	6400.000	PF 2	2100.00	1320.92	1326.91		1327.19	0.002379	4.23	496.94	115.83	0.36
Reach	6300.000	PF 2	2100.00	1320.70	1326.65		1326.94	0.002526	4.36	481.80	112.05	0.37
Reach	6200.000	PF 2	2100.00	1320.48	1326.38		1326.69	0.002620	4.42	474.80	111.04	0.38
Reach	6100.000	PF 2	2100.00	1320.26	1326.13		1326.42	0.002597	4.37	480.80	113.89	0.37
Reach	6000.000	PF 2	2100.00	1320.04	1325.87		1326.16	0.002576	4.31	486.74	116.83	0.37
Reach	5900.000	PF 2	2100.00	1319.82	1325.62		1325.90	0.002585	4.29	489.84	119.07	0.37
Reach	5800.000	PF 2	2100.00	1319.60	1325.38		1325.64	0.002449	4.10	511.96	127.87	0.36
Reach	5700.000	PF 2	2100.00	1319.38	1325.15		1325.40	0.002379	3.98	527.02	134.60	0.35
Reach	5600.000	PF 2	2100.00	1319.16	1324.87		1325.15	0.002615	4.20	500.25	126.79	0.37
Reach	5500.000	PF 2	2100.00	1318.94	1324.57		1324.87	0.002862	4.39	478.07	121.05	0.39
Reach	5400.000	PF 2	2100.00	1318.72	1324.25		1324.57	0.003131	4.56	460.22	117.65	0.41
Reach	5300.000	PF 2	2100.00	1318.50	1323.89		1324.24	0.003441	4.71	445.63	116.54	0.42
Reach	5200.000	PF 2	2100.00	1318.28	1323.50		1323.87	0.003886	4.90	428.74	115.99	0.45
Reach	5100.000	PF 2	2100.00	1318.06	1323.01		1323.44	0.004766	5.25	399.89	113.63	0.49
Reach	5000.000	PF 2	2100.00	1317.84	1322.46		1323.00	0.003877	5.89	356.49	106.44	0.57
Reach	4930.000	PF 2	2100.00	1317.72	1322.06		1322.72	0.003683	6.52	322.05	100.06	0.64
Reach	4915.000	PF 2	2100.00	1316.22	1322.28		1322.58	0.001074	4.37	480.25	107.28	0.36
Reach	4900.000	PF 2	2100.00	1316.19	1322.27		1322.56	0.001454	4.36	481.37	107.50	0.36
Reach	4800.000	PF 2	2100.00	1315.99	1322.07		1322.38	0.002430	4.41	476.24	105.45	0.37
Reach	4700.000	PF 2	2100.00	1315.79	1321.85		1322.13	0.002324	4.23	495.91	113.15	0.36
Reach	4600.000	PF 2	2100.00	1315.59	1321.64		1321.90	0.002208	4.06	517.21	121.15	0.35
Reach	4500.000	PF 2	2100.00	1315.39	1321.43		1321.68	0.002137	3.96	530.61	126.17	0.34
Reach	4400.000	PF 2	2100.00	1315.19	1321.23		1321.46	0.002102	3.89	540.20	130.39	0.34
Reach	4300.000	PF 2	2100.00	1314.98	1321.02		1321.25	0.002101	3.90	538.90	129.56	0.34
Reach	4200.000	PF 2	2100.00	1314.78	1320.81		1321.04	0.002076	3.86	544.51	131.80	0.33
Reach	4100.000	PF 2	2100.00	1314.58	1320.61		1320.83	0.002055	3.82	549.46	133.84	0.33
Reach	4000.000	PF 2	2100.00	1314.38	1320.40		1320.63	0.002051	3.82	550.42	134.22	0.33
Reach	3900.000	PF 2	2100.00	1314.18	1320.19		1320.42	0.002089	3.85	544.78	132.59	0.34
Reach	3800.000	PF 2	2100.00	1313.98	1319.97		1320.21	0.002162	3.93	534.08	129.41	0.34
Reach	3700.000	PF 2	2100.00	1313.78	1319.74		1319.99	0.002211	3.97	529.06	128.52	0.34
Reach	3600.000	PF 2	2100.00	1313.58	1319.52		1319.77	0.002208	3.95	532.03	130.24	0.34
Reach	3500.000	PF 2	2100.00	1313.38	1319.31		1319.55	0.002196	3.92	535.94	132.20	0.34
Reach	3400.000	PF 2	2100.00	1313.18	1319.08		1319.32	0.002221	3.93	534.36	132.35	0.34
Reach	3300.000	PF 2	2100.00	1312.98	1318.84		1319.09	0.002351	4.05	518.52	128.04	0.35
Reach	3200.000	PF 2	2100.00	1312.77	1318.58		1318.85	0.002485	4.16	504.81	124.79	0.36
Reach	3100.000	PF 2	2100.00	1312.57	1318.31		1318.59	0.002642	4.27	491.88	122.39	0.38
Reach	3000.000	PF 2	2100.00	1312.37	1318.00		1318.31	0.002916	4.47	470.25	117.71	0.39
Reach	2900.000	PF 2	2100.00	1312.17	1317.69		1318.01	0.003133	4.56	460.47	117.90	0.41
Reach	2800.000	PF 2	2100.00	1311.97	1317.36		1317.69	0.003311	4.58	458.03	121.41	0.42
Reach	2700.000	PF 2	2100.00	1311.77	1317.05		1317.35	0.003281	4.40	477.36	133.96	0.41
Reach	2600.000	PF 2	2100.00	1311.57	1316.66		1316.99	0.003823	4.65	451.67	130.83	0.44

SUPERSEDED

HEC-RAS Plan: CLOMR River: Stream Reach: Reach Profile: PF 2 (Continued)

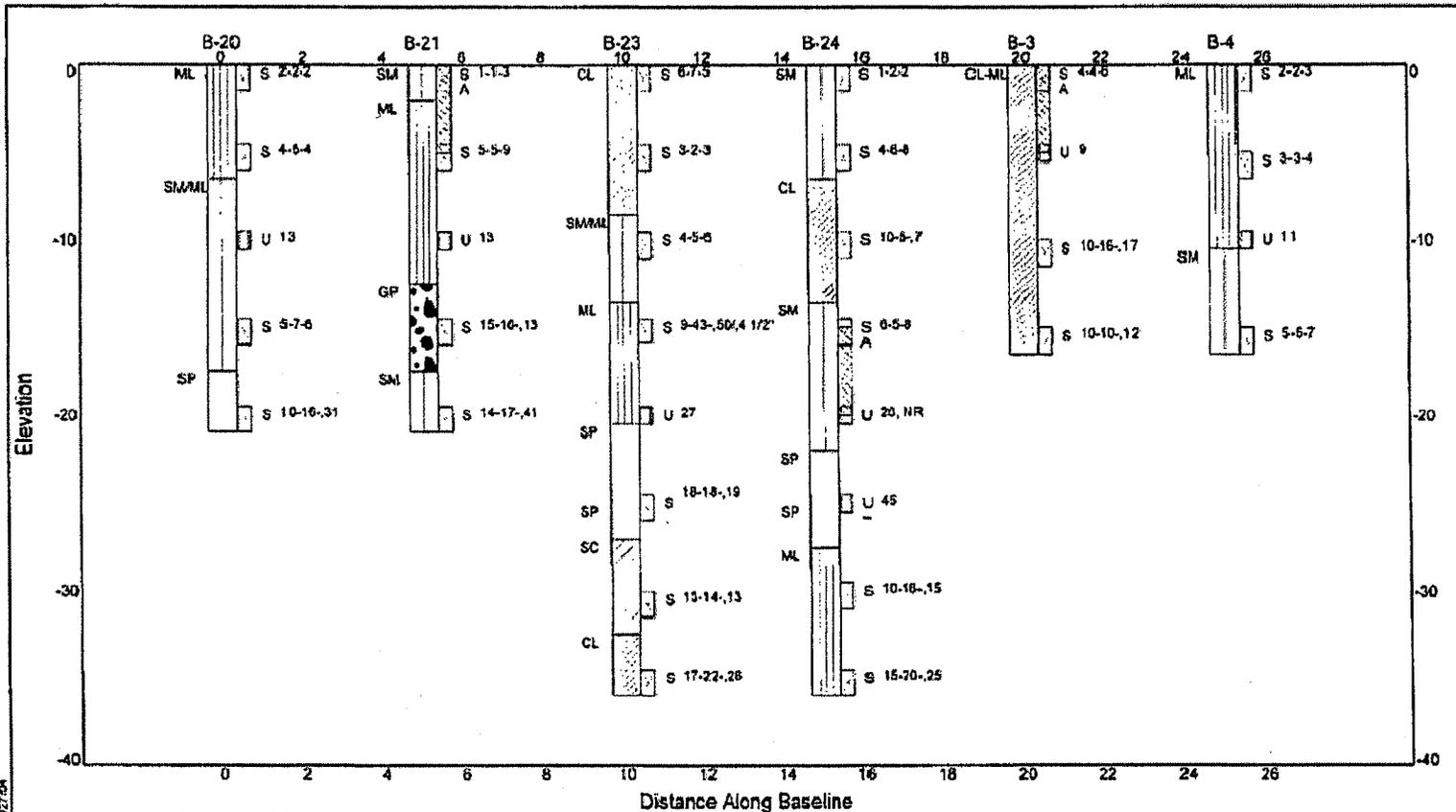
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach	2500.000	PF 2	2100.00	1311.37	1316.12		1316.54	0.005135	5.21	403.30	122.97	0.51
Reach	2400.000	PF 2	2100.00	1311.17	1315.45	1314.47	1316.03	0.004794	6.11	343.71	114.17	0.62
Reach	2337.000	PF 2	2100.00	1311.06	1314.35	1314.35	1315.55	0.010009	8.79	238.86	100.68	1.01
Reach	2282.000	PF 2	2100.00	1305.60	1312.77		1312.96	0.000568	3.50	599.94	115.52	0.27
Reach	2200.000	PF 2	2100.00	1305.39	1312.72		1312.90	0.000709	3.39	620.01	117.96	0.26
Reach	2153.000	PF 2	2100.00	1305.40	1312.71	1308.68	1312.87	0.000325	3.23	649.92	122.64	0.25
Reach	2090		Bridge									
Reach	2027.000	PF 2	2100.00	1305.40	1311.86		1312.07	0.000479	3.68	570.10	118.26	0.30
Reach	2000	PF 2	2100.00	1305.40	1311.85		1312.05	0.000851	3.57	588.76	118.97	0.28
Reach	1948.000	PF 2	2100.00	1305.40	1311.82		1312.01	0.000601	3.50	600.48	121.46	0.28
Reach	1933.000	PF 2	2100.00	1305.40	1311.83		1311.99	0.000479	3.21	654.37	126.76	0.25
Reach	1900	PF 2	2100.00	1305.40	1311.81		1311.97	0.000659	3.22	651.98	126.63	0.25
Reach	1800	PF 2	2100.00	1305.40	1311.79		1311.88	0.000600	2.44	859.09	162.06	0.19
Reach	1700	PF 2	2100.00	1305.40	1311.77		1311.82	0.000305	1.78	1181.38	216.79	0.13
Reach	1600	PF 2	2100.00	1305.40	1311.76		1311.79	0.000198	1.45	1452.78	263.24	0.11
Reach	1500	PF 2	2100.00	1305.40	1311.74		1311.77	0.000186	1.38	1518.87	280.78	0.10
Reach	1400	PF 2	2100.00	1305.40	1311.72		1311.75	0.000232	1.50	1400.86	270.71	0.12
Reach	1300	PF 2	2100.00	1305.40	1311.68		1311.72	0.000313	1.74	1208.55	234.44	0.13
Reach	1200	PF 2	2100.00	1305.40	1311.60		1311.67	0.000535	2.19	960.42	197.30	0.17
Reach	1146	PF 2	2100.00	1305.40	1311.45		1311.61	0.001140	3.21	654.03	132.37	0.25
Reach	1138	PF 2	2100.00	1305.40	1311.44	1307.97	1311.60	0.000226	3.22	652.37	132.03	0.26
Reach	1126		Culvert									
Reach	1100	PF 2	2100.00	1302.40	1311.34		1311.43	0.000092	2.45	856.17	131.52	0.17
Reach	1000	PF 2	5540.00	1301.93	1310.41		1311.18	0.001817	7.06	784.27	126.03	0.50

SUPERSEDED

BY 4/15/06 MODEL

Appendix F: Erosion & Sediment Transport Analyses Documentation

F.1 Soils Data



PAGE(S) 001, 3117001097, GP1, AS200, PHELOUT, 4/27/04

Borehole	North	East	Elev.	Depth
B-20	0	40	0.0	21.0
B-21	0	45	0.0	21.0
B-23	0	50	0.0	36.0
B-24	0	55	0.0	36.0
B-3	0	60	0.0	16.5
B-4	0	65	0.0	16.5

DISTANCES:

Beginning 0

Ending 26

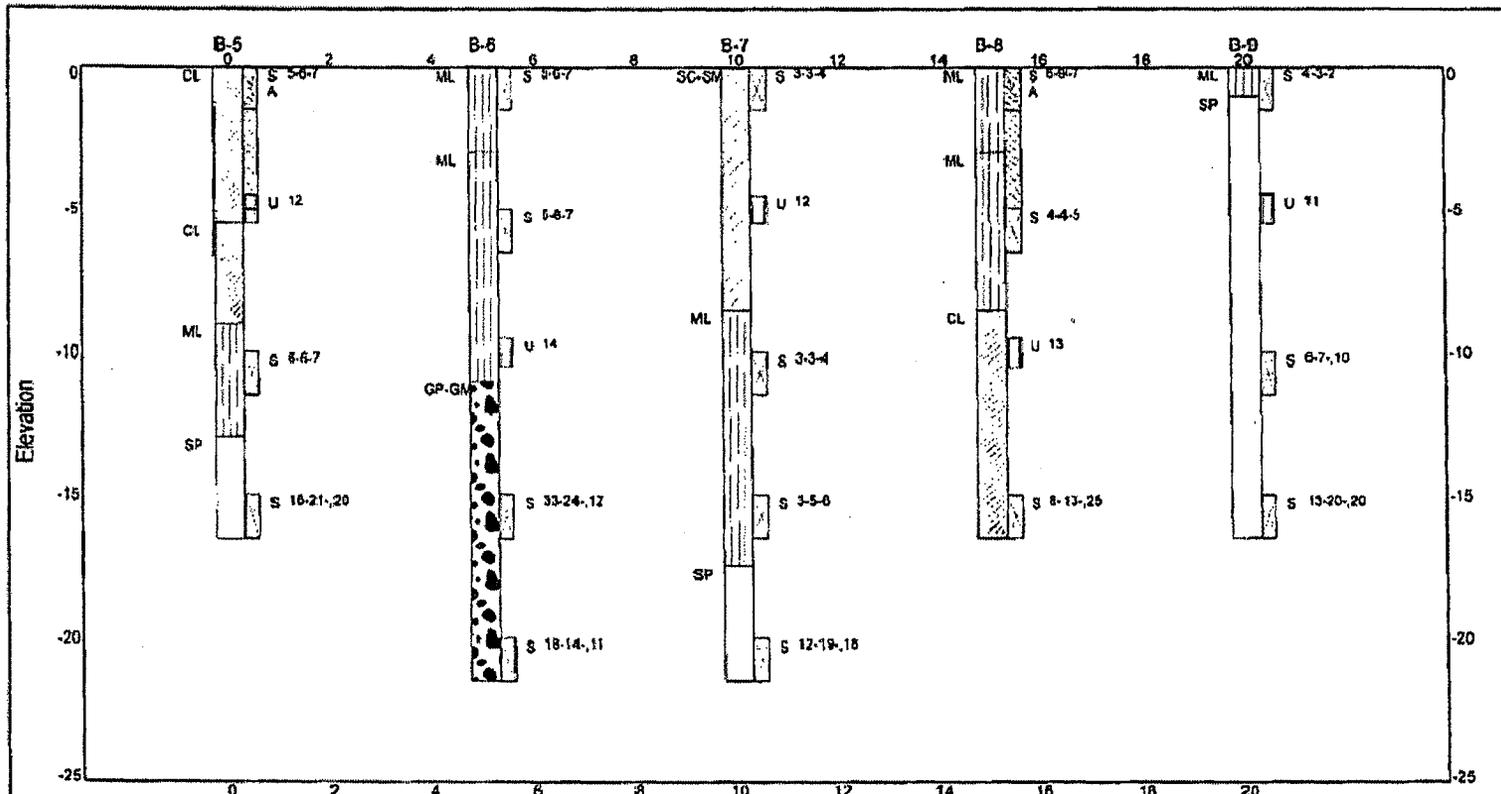
VIEWING ANGLES (degrees):

Horizontal 0.0

Vertical 0.0

Position	North	East
Left, Front	0	40
Right, Front	0	66
Left, Back	0	40
Right, Back	0	66

SUBSURFACE FENCE DIAGRAM		
Sonoqui Wash Channelization		
PROJECT #	DATE	PLATE
3-117-001097	Apr 04	1



FAC/ME/ML 3117201097 GP1 AC/KA P/PL/GD1 42/03

Borehole	North	East	Elev.	Depth
B-5	0	70	0.0	16.5
B-6	0	75	0.0	21.5
B-7	0	80	0.0	21.5
B-8	0	85	0.0	16.5
B-9	0	90	0.0	16.5

DISTANCES:

Beginning 0

Ending 21

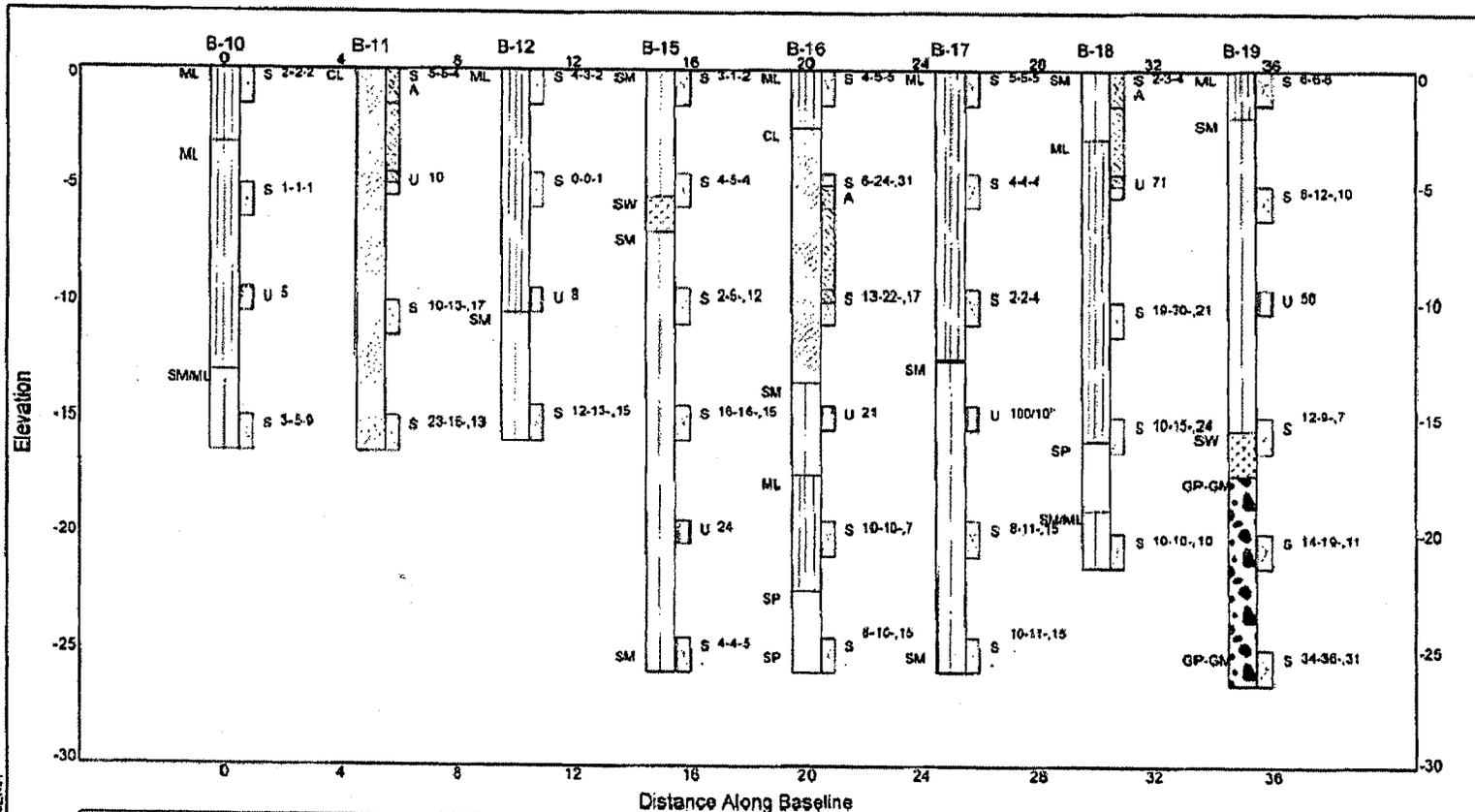
VIEWING ANGLES (degrees):

Horizontal 0.0

Vertical 0.0

Position	North	East
Left, Front	0	70
Right, Front	0	91
Left, Back	0	70
Right, Back	0	91

SUBSURFACE FENCE DIAGRAM		
Sonoqui Wash Channelization		
PROJECT #	DATE	PLATE
3-117-001097	Apr 04	1



PAGE NO. 3117001097 GP-3 AGRO PROJ. DIST. 42/224

Borehole	North	East	Elev.	Depth
B-10	0	0	0.0	16.5
B-11	0	5	0.0	16.5
B-12	0	10	0.0	16.5
B-15	0	15	0.0	26.0
B-16	0	20	0.0	26.0
B-17	0	25	0.0	26.0
B-18	0	30	0.0	21.5
B-19	0	35	0.0	26.5

DISTANCES:

Beginning 0
 Ending 36
VIEWING ANGLES (degrees):
 Horizontal 0.0
 Vertical 0.0

Position	North	East
Left, Front	0	0
Right, Front	0	36
Left, Back	0	0
Right, Back	0	36

SUBSURFACE FENCE DIAGRAM SONOQUI FENCE		
Sonoqui Wash Channelization		
PROJECT #	DATE	PLATE
3-117-001097	Apr 04	1

Location & Depth	USCS	LL	PI	#200	#100	#50	#40	#30	#16	#10	#8	#4	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	3"	6"	
B-3 @ 0' TO 5'	CL-ML	23	6	69	92	99	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
B-4 @ 9'6" TO 10'6"	ML	19	2	61	78	91	95	98	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100
B-5 @ 0' TO 1'6"	CL	42	20	86	94	97	98	99	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100
B-6 @ 15' TO 16'6"	GP-GM	NV	NP	11	14	18	21	24	31	37	40	50	54	61	67	75	93	100	100	100	100	100	100
B-7 @ 4'6" TO 5'6"	SC-SM	24	6	47	70	91	97	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
B-8 @ 9'6" TO 10'6"	CL	34	14	90	94	97	98	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
B-8 @ 0' TO 5'	ML	NV	NP	62	79	90	94	96	98	99	99	99	100	100	100	100	100	100	100	100	100	100	100
B-9 @ 4'6" TO 5'6"	SP	NV	NP	3.4	7	25	43	59	81	88	89	93	94	96	98	100	100	100	100	100	100	100	100
B-10 @ 10' TO 11'6"	ML	20	1	72	84	94	97	99	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100
B-11 @ 0' TO 5'	CL	32	13	81	92	97	99	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
B-18 @ 0' TO 5'	SM	NV	NP	34	55.9	79	88	92	96.9	98.5	98.7	99.5	99.7	99.8	100	100	100	100	100	100	100	100	100
B-19 @ 20' TO 21'6"	GP-GM	NV	NP	10	13.4	20	23	26	31.4	36.6	39.2	50.2	56.5	69.8	77.1	81.9	92.6	100	100	100	100	100	100
B-12 @ 9'6" TO 10'6"	ML	21	2	69	77.3	92	97	99	99.8	100	100	100	100	100	100	100	100	100	100	100	100	100	100
B-15 @ 14'6" TO 16'	SM	NV	NP	42	51.8	63	68	72	77.3	82.7	85.2	91.5	93.6	96.1	99.4	100	100	100	100	100	100	100	100
B-16 @ 4'6" TO 6'	CL	26	8	59	74.1	88	93	96	98.2	99.3	99.3	100	100	100	100	100	100	100	100	100	100	100	100
B-17 @ 4'6" TO 6'	ML	20	1	51	74.8	92	96	98	98.9	99.3	99.3	99.6	99.6	100	100	100	100	100	100	100	100	100	100
B-20 @ 9'6" TO 10'6"	ML	NV	NP	51	68	84	89	92	96	98	98.6	100	100	100	100	100	100	100	100	100	100	100	100
B-21 @ 14'6" TO 16'	GP	NV	NP	4.9	6.75	10	13	16	22.8	28.8	31.1	40.7	46.3	57.3	73.4	83.9	83.9	100	100	100	100	100	100
B-23 @ 0' TO 1'6"	CL	32	11	71	86.5	96	98	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
B-24 @ 9'6" TO 11'	CL	35	12	80	89.7	96	97	99	99.6	100	100	100	100	100	100	100	100	100	100	100	100	100	100

AMEC Soil Size Fractions by
Weight (Percent Finer)

F.2 Sediment Transport Modeling Report

Sonoqui Wash Channelization Channel Stability Analysis

Contract No.: FCD 2002C037

Prepared for:

Stanley Consultants, Inc.
2929 East Camelback Road, Suite 130
Phoenix, AZ 85016

Prepared by:



WEST Consultants, Inc
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Tempe, AZ 85284-1137

September 2005



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1. Permissible Velocity Analysis

WEST Consultants provided a channel stability analysis for an unlined channel. This analysis was based on permissible velocities as specified in Section 10.3 of the Consultant Guidelines. The soil gradation data obtained by AMEC was evaluated and utilized to predict permissible velocities for Sonoqui Wash project reach.

AMEC obtained soil samples at twenty-five locations throughout the project area. Table 1 shows the location and sampling depths, USCS soil class and description, and maximum allowable velocities based on U.S. Army Corps of Engineers' Engineering Manual EM 1110-2-1601 (USACE, 1994), the maximum allowable velocity based on Fortier and Scobey (1926), and the maximum allowable velocity predicted using ARS Publication 667, "Stability Design of Grass Lined Open Channels" (ARS, 1987).

The gradation plots of the AMEC data are shown in Figure 1. It can be noted that the gradations are relatively well clustered in the upper right corner of the plot with the exception of five samples. Three of these five samples have significant amounts of gravel while the other two samples contain primarily sand with few fines. These five samples are highlighted in Table 1 and consist of three samples taken in the 14.5 to 16 ft. range, and one sample taken in the 20 to 21.5 ft. range.

Of the coarser samples, two are predominately sands and three have significant amounts of gravel. These samples, highlighted in Table 1, were taken at depths below the expected excavation depth for the channel and therefore were not used in the analysis.

Based on the soil samples obtained for the Sonoqui Wash project reach, the maximum permissible velocity is on the order of 2.0 fps for the channel and banks. This permissible velocity is significantly lower than the design velocities in the channel indicating protection may be required. It may be possible to use smaller materials and armor the surface of the bed or banks so as to reduce erosion and not interfere with plantings and landscaping in the channel and on the banks.

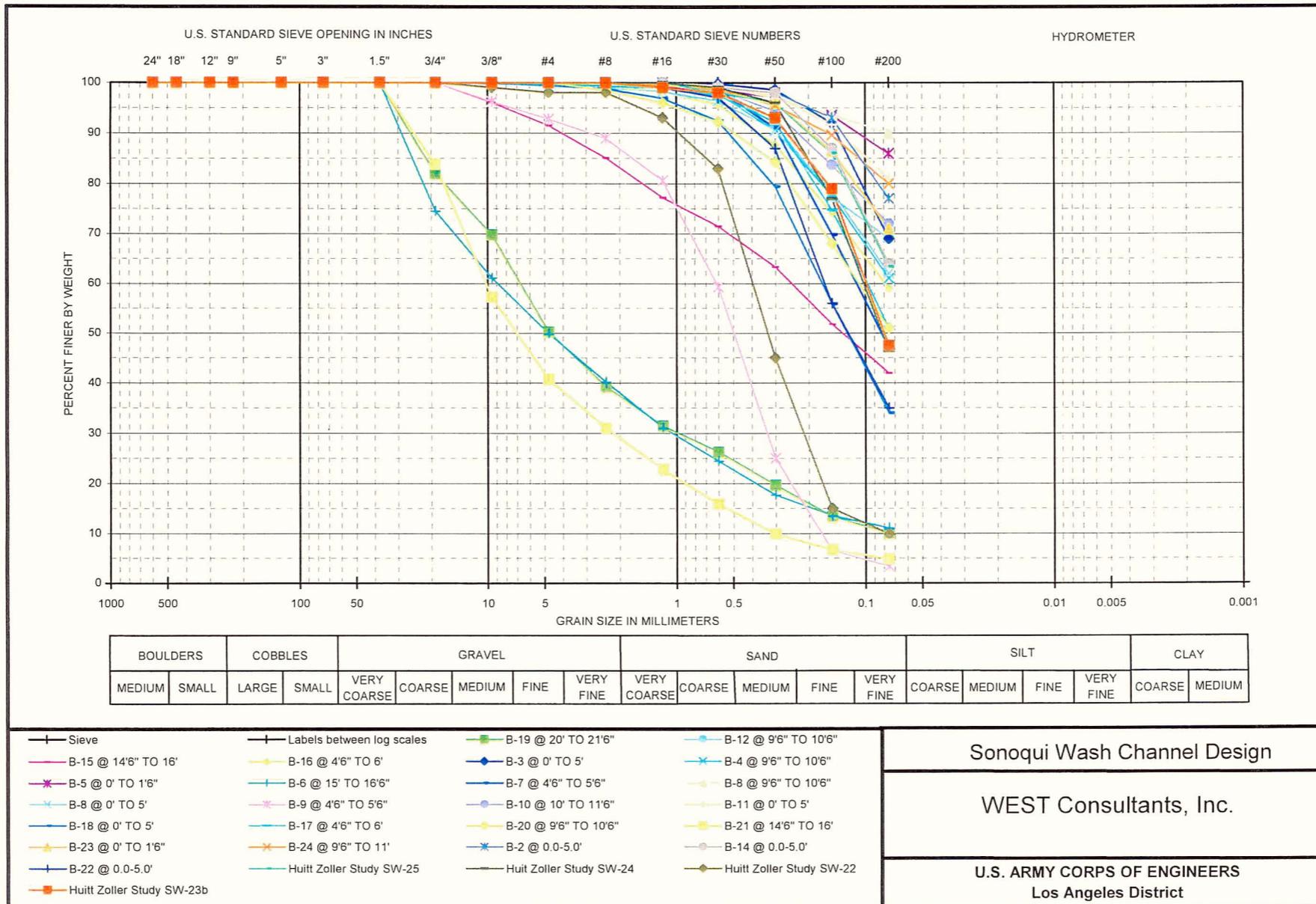


Figure 1. Soil Gradations for Sonoqui Wash Samples

Table 1. Boring location, depth, soil classification and maximum allowable velocity

Location and Depth	USCS	Soil Description	Maximum Allowable Velocity (ft/sec)		
			(Corps 1601)	Scobey	(ARS 667)
B-3 @ 0' TO 5'	CL-ML	Silt Clay Mix	3.5	2	1.4
B-4 @ 9.5' TO 10.5'	ML	Very Fine Sand	2.0	1.5	1.4
B-5 @ 0' TO 1.5'	CL	Silt Clay	3.5	3	3.8
B-6 @ 15' TO 16.5'	GP-GM	Coarse Well Graded 10% Passing No. 200 Sieve	6.0	3.75	5.2
B-7 @ 4.5' TO 5.5'	SC-SM	Sandy Silt; More than 12% Passing No. 200 Sieve	2.0	2	1.4
B-8 @ 9.5' TO 10.5'	CL	Silt Clay	3.5	2	2.4
B-8 @ 0' TO 5'	ML	Very Fine Sand	2.0	1.5	1.4
B-9 @ 4.5' TO 5.5'	SP	Poorly Graded Sand	4.0	2	1.4
B-10 @ 10' TO 11.5'	ML	Very Fine Sand	2.0	1.5	1.4
B-11 @ 0' TO 5'	CL	Silt Clay	3.5	2	2.4
B-18 @ 0' TO 5'	SM	Silty Sand	2.0	2	1.4
B-19 @ 20' TO 21.5'	GP-GM	Coarse Well Graded 10% Passing No. 200 Sieve	6.0	3.75	4.1
B-12 @ 9.5' TO 10.5'	ML	Very Fine Sand	2.0	1.5	1.4
B-15 @ 14.5' TO 16'	SM	Silty Sand	2.0	2	1.4
B-16 @ 4.5' TO 6'	CL	Silt Clay	3.5	3	1.4
B-17 @ 4.5' TO 6'	ML	Very Fine Sand	2.0	1.5	1.4
B-20 @ 9.5' TO 10.5'	ML	Very Fine Sand	2.0	1.5	1.4
B-21 @ 14.5' TO 16'	GP	Poorly Graded Gravels and Sandy Gravel Mixture	4.0	3.75	4.4
B-23 @ 0' TO 1.5'	CL	Silt Clay	3.5	2	2.2
B-24 @ 9.5' TO 11'	CL	Silt Clay	3.5	2	2.7
B-2 @ 0.0-5.0'	CL	Silt Clay	3.5	2	2.2
B-14 @ 0.0-5.0'	CL-ML	Silt Clay Mix	3.5	1.5	1.4
B-22 @ 0.0-5.0'	SM	Silty Sand	2.0		1.4

2. Sediment Transport Analysis

Sediment transport modeling (HEC-6T) was performed for the purpose of evaluating the overall stability of the proposed Sonoqui Wash channel and to evaluate the performance of the proposed sediment basin located downstream of Higley Road. The HEC-6T model was developed from the 90% Project HEC-RAS model provided by Stanley Consultants on May 18, 2005. The HEC-RAS model included the location and configuration of the six proposed grade control structures. These structures were identified as hard points for the HEC-6T modeling of Sonoqui Wash. The geometry of this model included a sediment basin with a 60 foot wide weir at the Queen Creek/Sonoqui Wash confluence and basin bottom width up to 160 feet.

2.1 Hydrologic Data

Stanley Consultants provided the HEC-1 input files from which the 2-, 5-, 10-, 25-, 50-, and 100-year event hydrographs were generated. The 100- and the 10-year events were utilized in the sediment transport analysis. Analysis was conducted to distribute the flows of the 100-year event at four local inflow locations along the study reach. The hydrologic points of interest identified from the HEC-1 model to adjust the 100-year hydrographs for local inflow were the flow concentration points CP-C7, CP-C7A, CP-D2, CP-N5 (Figure 2), and the detention basin at Sossaman Road. The flow adjustment was conducted in the downstream direction at the local inflow points. Over the hydrologic time period, the detention basin hydrograph (peak flow of 1850 cfs) ordinates were subtracted from those of CP-C7, and CP-C7A to establish two sets of local inflow discharges. Next, the flow ordinates of CP-D2 were subtracted from CP-C7A, and subsequently, the flow ordinates of CP-N5 were subtracted from the upstream concentration point CP-D2 to generate two more sets of local inflow discharges. These local inflows were incorporated within the HEC-6T hydrologic record for the 100-year event. The only 10-year event hydrograph generated was located in the upstream end of the study reach, requiring no additional effort to distribute flows along the study reach.

2.2 Sediment Transport Model

The HEC-6T sediment transport model was developed from the HEC-RAS model provided by Stanley Consultants. Gradation data provided by AMEC (Figure 1) was used for the analysis. It can be noted from Figure 1 that the gradations are relatively well clustered in the upper right corner of the curve with the exception of five samples. Three of these five samples have significant amounts of gravel while the other two samples contain primarily sand with few fines. These five samples consist of three samples taken in the 14.5 to 16 ft. range below the surface, and one sample taken in the 20 to 21.5 ft. range below the surface. Yang's Stream Power function was the chosen transport function because the function is suitable for most sand bed conditions of the Southwest, and based on the related project experience. The movable boundary limits for the Sonoqui Wash channel were defined from top of the left bank to the top of the right bank. Tailwater rating curves were developed for 100-year and 10-year events using the HEC-RAS model. The rating curves were used to establish the downstream water surface elevation. Local inflows were introduced in the HEC-6T model at the flow change location cross sections: 20300, 19300, 15600, and 6600 (Figure 2).

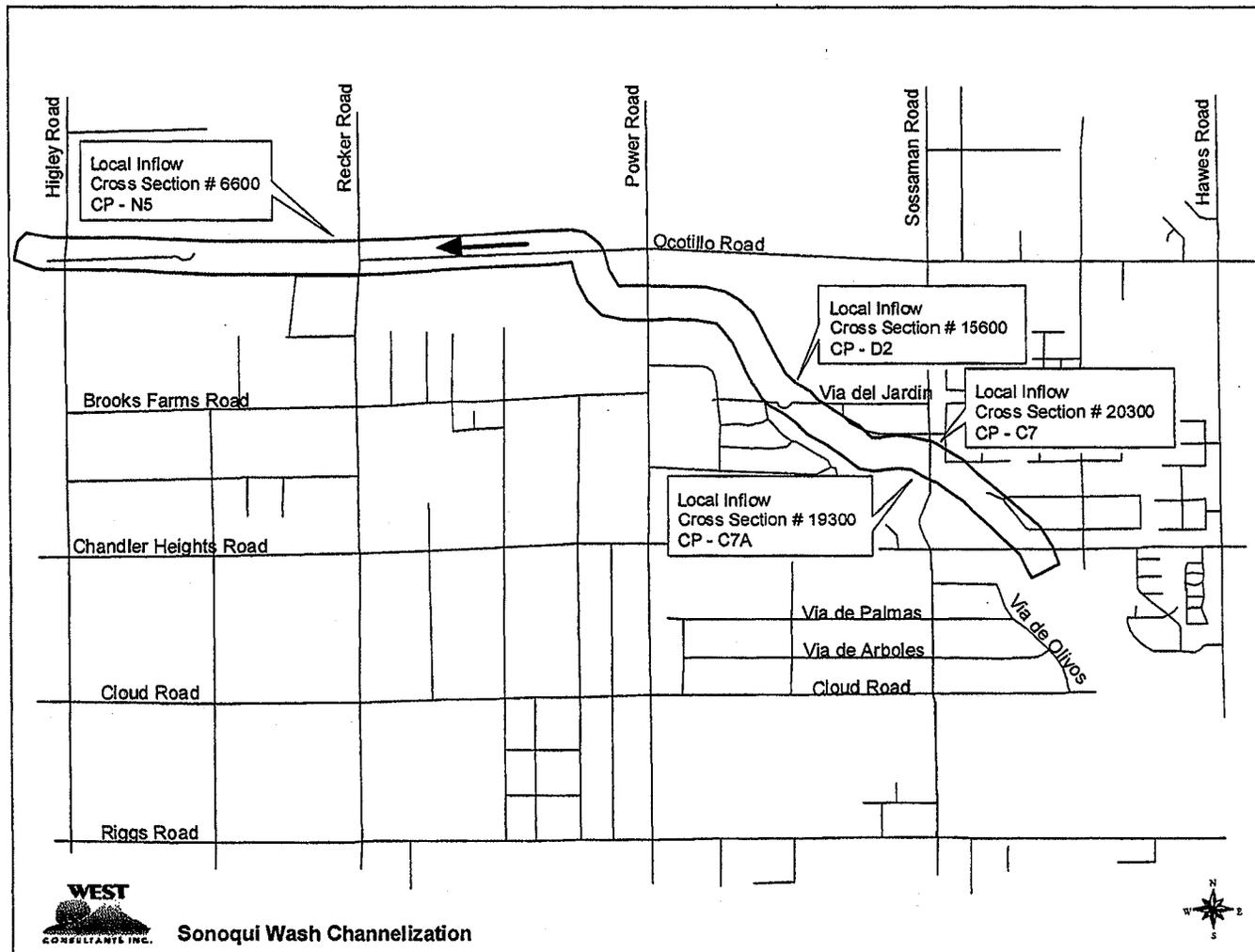


Figure 2. Local Inflow Locations

The equilibrium bed material load at the upstream reach of the model was calculated for a range of constant discharges up to 3,200 cfs to develop a sediment-water discharge rating curve. The sediment re-circulation option in HEC-6T was used to accomplish this task using the upstream cross sections 21800, 21700, 21600, 21500, 21424, 21400, 21300, 21240, 21216, 21200, 21100, 21000, 20900, 20800, 20700, and 20600. It is desirable to run the re-circulation option at an upstream segment of the river reach where the bed slope (along thalweg) remains uniform. The aforementioned cross sections immediately downstream of Chandler Heights Road were suitable for this purpose.

The re-circulation model simulation was initiated with zero sediment entering the model. The simulation was repeated for several events representing a single discharge. The calculated sediment concentrations for the first event were used as the sediment inflow for the second event and so forth. This procedure was continued for each constant discharge until the sediment concentration converged. The fractions for the different types of materials from very coarse to very fine sand were collected for each constant discharge as the inflowing sediment load, and used as the inflow at the upstream end of the model. The sum of the fractions for each discharge total one (1). The same sediment load and fractions were input at the local inflow locations. It is noted that running a constant discharge over a period of time in the HEC-6T recirculation option essentially attempts to make linear a nonlinear phenomenon, and therefore can result in some oscillation in the total incoming load at low and high flows for a given bed slope and cross section geometry.

2.3 Sediment Transport Results

Based on the channel configuration and associated HEC-RAS model, sediment transport analyses were conducted for a single 100-year event, and a single 10-year event. The 100-year and 10-year peak discharges are 2,400 cfs and 1,180 cfs, respectively, at the sediment basin. The HEC-6T models reflect a Manning's n value of 0.035.

The relative stability of the proposed Sonoqui Wash channel is shown in Figures 3 and 4. Figure 3 compares the initial average bed elevation with the average bed elevation following the routing of a 100-year hydrograph through the system. The results of the sediment transport analysis for a 100-year event show the proposed channel to be relatively stable with minor degradation in the vicinity of Via del Jardin and between Power Road and Recker Road. Figure 4 compares the initial average bed elevation with the average bed elevation following the routing of a 10-year hydrograph through the system. The results for the 10-year event also indicate the proposed channel to be relatively stable with little variation in average bed elevation within the project reach.

The sediment basin located downstream of Higley Road was evaluated and the volume of sediment deposited for the 100-year and 10-year event estimated by the HEC-6T sediment transport analyses. The volume of sediment deposited within the proposed sediment basin was estimated using the "\$VOL A" command in HEC-6T. This command, when introduced in the .T5 input file just before the \$\$END command, generates a table (titled "Vol 1") in the .T6 output file showing the accumulated sediment volume deposited at a 'reach' in cubic yards. The 'reach' is defined by half the distance to a cross section on either side (upstream and

downstream). The volume is computed within HEC-6T from sediment passing each section in tons (also shown in the "Vol 1" table), and the units are converted from weight to volume using the specific weight of bed material. HEC-6T does not associate the change in volume with the actual cross sections for this computation. Table 2 lists the volume in cubic yards at the depositing 'reach' (defined by the cross sections) in the sediment basin, and the total volume for a 100-year event and a 10-year event. These values were taken directly from the "Vol 1" table in the HEC-6T .T6 output file for each event. The negative numbers in the "Vol 1" table refer to erosion and the positive numbers refer to deposition in the particular 'reach'.

Table 2 provides a summary of the estimated volume of sediment deposited for each condition evaluated. The volume is estimated to be 17,435 cubic yards for a single 100-year event, and 5,412 cubic yards for a single 10-year event.

Table 2. Volume Deposited in Sediment Basin

Cross Section No.	Volume (cubic yards)	
	100-Year Event	10-Year Event
2027	181	162
2000	565	518
1948	463	426
1933	499	466
1900	1,430	965
1800	2,875	1,216
1700	4,152	837
1600	3,483	521
1500	1,747	209
1400	1,057	65
1300	665	21
1200	318	6
Total	17,435	5,412

The relative efficiency of the sediment basin can be obtained by comparing the total sediment passing a cross section upstream of the sediment basin with the total sediment passing the cross section at the downstream end of the sediment basin at a given time in the hydrologic record. For the sediment basin configuration proposed, the results of the HEC-6T modeling indicate that during a 100-year event 89% of the sediment conveyed to the basin will be deposited and during a single 10-year event more than 99% of the sediment conveyed to the basin will be deposited within the basin.

Since deposition within the sediment basin increases the bed elevation and modifies flow conditions downstream of Higley Road, HEC-RAS was updated for the post 100-year event to evaluate the channel capacity and resulting change in water-surface profiles due to these changes. HEC-RAS was updated based on the bed elevation obtained from the HEC-6T analysis following a single 100-year event. The HEC-RAS results for the post 100-year conditions indicate that no overtopping of the banks would occur.

3. Scour at Grade Control Structures

Scour for the six grade control structures in the study reach was estimated using a method developed for the Arizona Department of Transportation (ADOT, 1983) for sloping sills. There are a number of different methods available for estimating scour at grade-control / drop structures. Many of these methods are for either a vertical drop or a 1 vertical to 1 horizontal (1V:1H) sill. The ADOT method is for a 1 vertical to 4 horizontal (1V:4H) sill. The grade-control structures proposed for Sonoqui Wash include sloping sills of 1 vertical to 10 horizontal (1V:10H).

The ADOT equation for estimating scour for sloping sills is as follows:

$$\frac{D_s}{y_c} = 4 \left(\frac{y_c}{d_m} \right)^{0.2} - 3 \left(\frac{d_{rr}}{y_c} \right)^{0.1}$$

$$d_s = D_s - y_n$$

where,

- d_s = depth scour below the stream bed, ft
- D_s = depth of scour measured from downstream tailwater, ft
- y_c = critical depth, ft
- y_n = normal depth in downstream channel, ft
- d_m = size of material being scoured, ft
- d_{rr} = size of riprap material along the sloping sill or grade control structure, ft

The grade control structures proposed for Sonoqui Wash have a grouted riprap sloping sill with a riprap apron at the toe of the sloping sill. When protection is provided in the form of a riprap apron at the toe of the sill, d_m is the median size of the material used for protection. It is recommended that the apron extend about 20 feet with a layer 1-1/2 or 2 stones in thickness. From the 90% plans developed by Stanley Consultants for Sonoqui Wash, both d_m and d_{rr} are 12 inches or 1 foot. Table 3 provides a summary of scour depths at the grade control sites. Scour calculations are included in the appendix.

Table 3. Scour at Grade Control Structures

Location of Grade Control Structure	Scour, d_s , in feet
Upstream of Sossaman Road	2.6
Upstream of Power Road	2.8
Upstream of Recker Road	2.9
Between Higley and Recker Roads	3.5
Upstream of Higley Road	1.4
Downstream of Higley Road	1.4

4. Summary

This section provides documentation for the permissible velocity analysis for channel stabilization, and sediment transport analysis to help establish the volume and configuration of the sediment basin located at the downstream end of the project. The maximum permissible velocity is on the order of 2.0 fps for the channel and banks. This permissible velocity is significantly lower than the design velocities in the channel indicating protection may be required.

A sediment basin with a maximum bottom width of 160-feet was evaluated and the volume of sediment deposited within the basin estimated for the 100-year and 10-year events. The volume is estimated to be 17,435 cubic yards for a single 100-year event, and 5,412 cubic yards for a single 10-year event. The relative efficiency (i.e., sediment deposited vs. sediment conveyed to basin) of the proposed sediment basin was determined to be 89% during a single 100-year event and 99% for a single 10-year event. Inspection and maintenance of the sediment basin will be required with sediment removed immediately following any large event such as a 100-year event. The sediment basin should be inspected after each significant event.

A scour analysis was conducted for each of the six grade control structures. The ADOT method used for this purpose typically gives conservative results and is based on a sloping sill of 1V:4H. The Sonoqui Wash structures have a sloping sill of 1V:10H. Therefore, no safety factor was added to the scour depth calculated.

References

- Agricultural Research Service (1987). "Stability Design of Grass-Lined Open Channels." Agriculture Handbook Number 667, U.S. Department of Agriculture, Washington, D.C.
- Arizona Department of Transportation (1983). "Scour At Sill Structures." Report No.: FHWA/AZ 83/184, prepared for ADOT by E.M. Laursen, and M.W. Flick, The University of Arizona.
- Fortier, S., and Scobey, F.C. (1926). "Permissible Canal Velocities." Transactions - American Society of Civil Engineers, Volume 89, pp 940-956.
- U.S. Army Corps of Engineers (1994). "Hydraulic Design of Flood Control Channels." EM - 1110-2-1601, Washington, D.C.
- WEST Consultants, Inc. (2000). "Sediment Transport Analysis - Queen Creek & Sonokai Wash Hydraulic Master Plan East Maricopa Floodway Capacity Mitigation Study." Prepared for Huitt-Zollars, Inc.

Sonoqui Wash Channelization
Average Bed Elevation for 100-Year Event

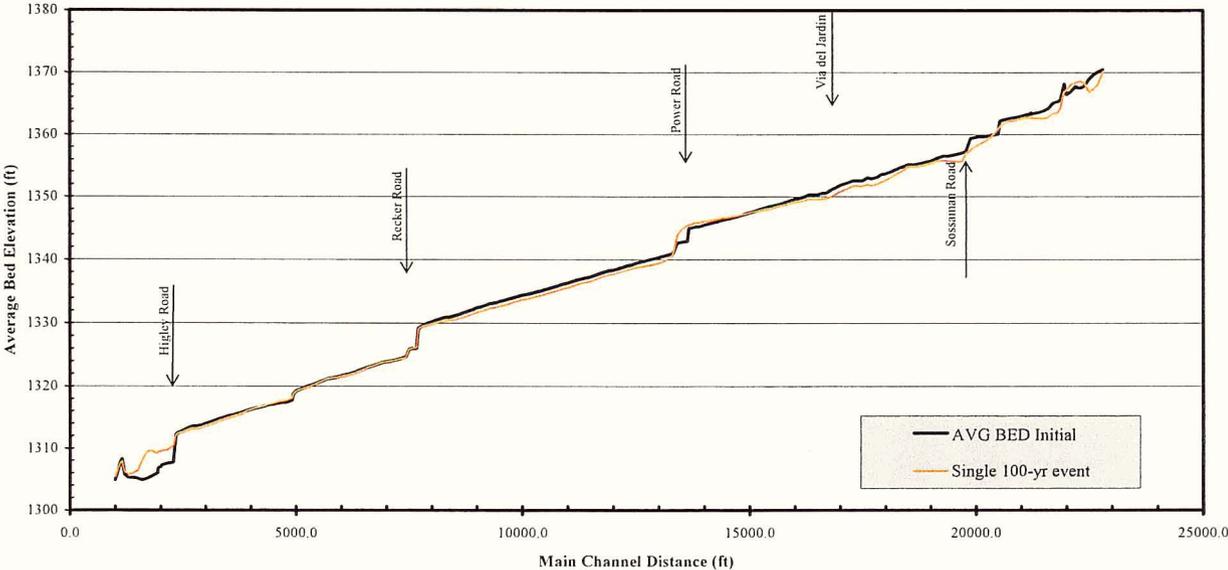


Figure 3. Average Bed Elevation Profile for 100-year Event

Sonoqui Wash Channelization
Average Bed Elevation for 10-Year Event

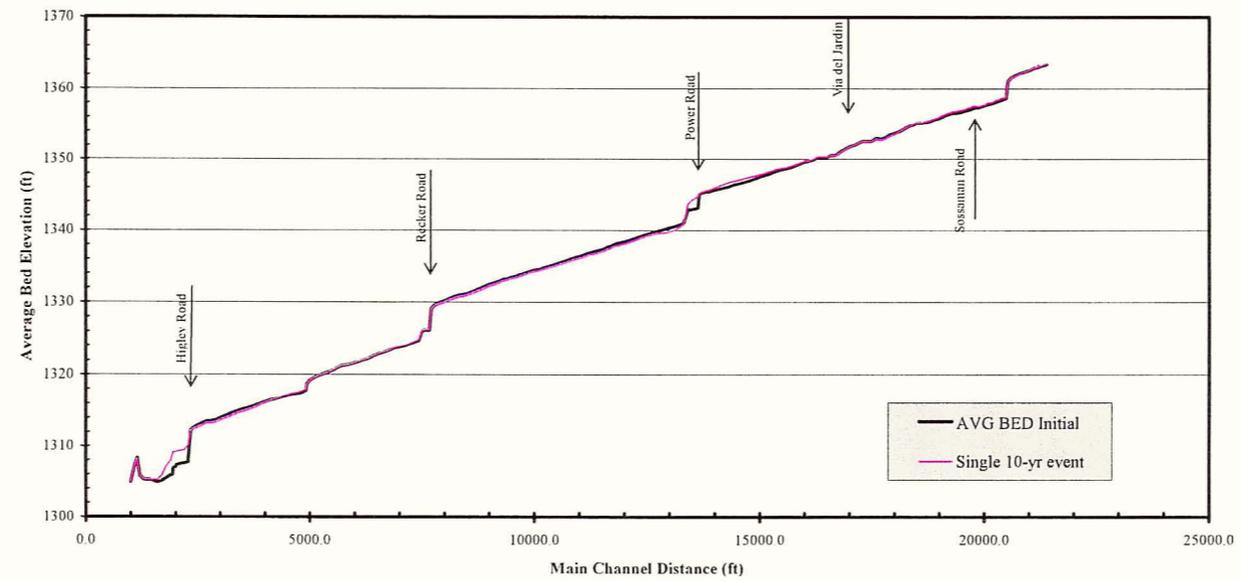


Figure 4. Average Bed Elevation Profile for 10-year Event



Scour Equation

ADOT (1983). "Scour At Sill Structures." Report No. FHWA/AZ 83/184.

$$\frac{D_s}{y_c} = 4 \left(\frac{y_c}{d_m} \right)^{0.2} - 3 \left(\frac{d_{rr}}{y_c} \right)^{0.1}$$

$$d_s = D_s - y_n$$

D_s = Depth measured from downstream water surface to bottom of scour hole, ft.

y_c = Critical depth of flow at structure, ft.

d_m = Median bed-material size (if bottom of scour hole protected, use median size of protection), ft.

d_{rr} = Median stone size of material protecting surface of sill, ft.

y_n = Normal depth of flow in downstream channel, ft.

d_s = Depth of scour below streambed ($D_s - y_n$), ft.

LOCATION 1

Upstream of Sossaman Road

$$y_c = 3.46 \text{ ft.}$$

$$y_n = 6.00 \text{ ft.}$$

$$d_m = 12 \text{ in} = 1 \text{ ft.} \quad (\text{median size of protection at the bottom of scour hole})$$

$$d_{rr} = 12 \text{ in} = 1 \text{ ft.}$$

$$\begin{aligned} \frac{D_s}{y_c} &= 4 \left(\frac{y_c}{d_m} \right)^{0.2} - 3 \left(\frac{d_{rr}}{y_c} \right)^{0.1} \\ &= 4 \left(\frac{3.46}{1} \right)^{0.2} - 3 \left(\frac{1}{3.46} \right)^{0.1} = 2.49 \end{aligned}$$

$$\begin{aligned} D_s &= 2.49 y_c = 2.49 (3.46) \\ &= 8.62 \text{ ft.} \end{aligned}$$

$$\begin{aligned} d_s &= D_s - y_n \\ &= 8.62 - 6.00 \\ &= \underline{2.6 \text{ ft.}} \end{aligned}$$

LOCATION 2

Upstream of Power Road

$$y_c = 3.55 \text{ ft.}$$

$$y_n = 6.10 \text{ ft.}$$

$$d_m = d_{rr} = 12 \text{ in.} = 1 \text{ ft.}$$

$$\frac{D_s}{y_c} = 4 \left(\frac{3.55}{1} \right)^{0.2} - 3 \left(\frac{1}{3.55} \right)^{0.1} = 2.51$$

$$D_s = 2.51 y_c = 2.51 (3.55)$$

$$= 8.91 \text{ ft.}$$

$$d_s = D_s - y_n = 8.91 - 6.10 = \underline{2.8 \text{ ft.}}$$

LOCATION 3

Upstream of Recker Road

$$y_c = 3.51 \text{ ft.}$$

$$y_n = 5.80 \text{ ft.}$$

$$d_m = d_{rr} = 12 \text{ in.} = 1 \text{ ft.}$$

$$\frac{D_s}{y_c} = 4 \left(\frac{3.51}{1} \right)^{0.2} - 3 \left(\frac{1}{3.51} \right)^{0.1} = 2.49$$

$$D_s = 2.49 y_c = 2.49 (3.51)$$

$$= 8.74 \text{ ft.}$$

$$d_s = D_s - y_n = 8.74 - 5.80 = \underline{2.9 \text{ ft.}}$$

LOCATION 4

Between Higley & Recker Roads

$$y_c = 3.63 \text{ ft.}$$

$$y_n = 5.70 \text{ ft.}$$

$$d_m = d_{rr} = 12 \text{ in.} = 1 \text{ ft.}$$

$$\frac{D_s}{y_c} = 4 \left(\frac{3.63}{1} \right)^{0.2} - 3 \left(\frac{1}{3.63} \right)^{0.1} = 2.54$$

$$D_s = 2.54 y_c = 2.54 (3.63) \\ = 9.22$$

$$d_s = D_s - y_n = 9.22 - 5.70 = \underline{3.5 \text{ ft.}}$$

LOCATION 5

Upstream of Higley Road

$$y_c = 3.55 \text{ ft.}$$

$$y_n = 7.50 \text{ ft.}$$

$$d_m = d_{rr} = 12 \text{ in.} = 1 \text{ ft.}$$

$$\frac{D_s}{y_c} = 4 \left(\frac{3.55}{1} \right)^{0.2} - 3 \left(\frac{1}{3.55} \right)^{0.1} = 2.51$$

$$D_s = 2.51 y_c = 2.51 (3.55) = 8.91 \text{ ft.}$$

$$d_s = D_s - y_n = 8.91 - 7.50 = \underline{1.4 \text{ ft.}}$$

LOCATION 6

Downstream of Higley Road

$$y_c = 3.38 \text{ ft.}$$

$$y_n = 6.9 \text{ ft.}$$

$$d_m = d_{rr} = 12 \text{ in.} = 1 \text{ ft.}$$

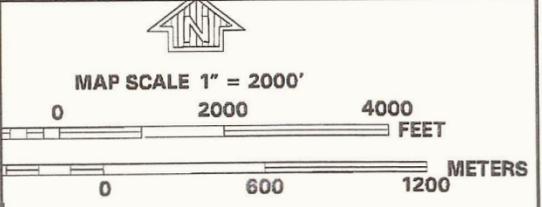
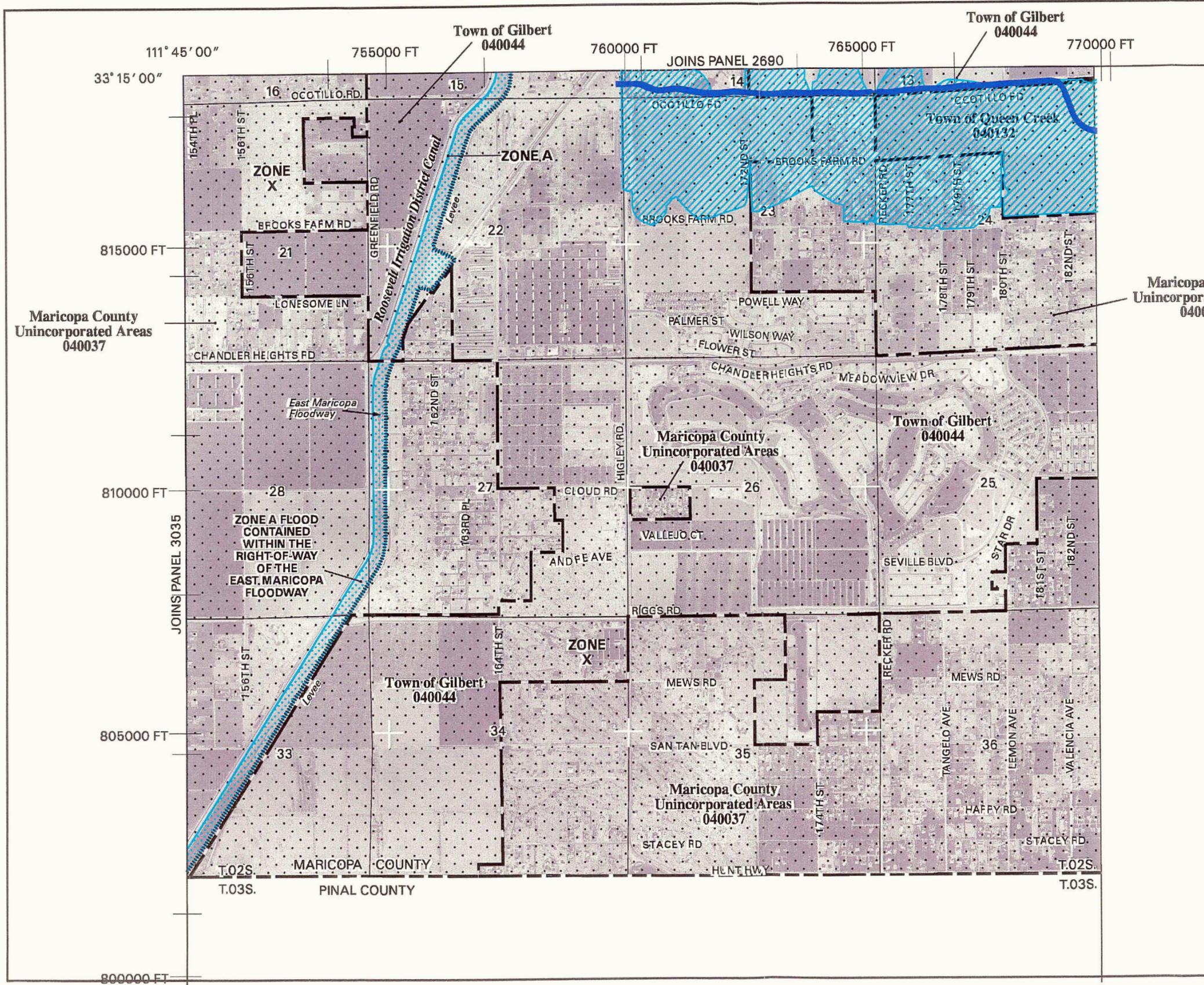
$$\frac{D_s}{y_c} = 4 \left(\frac{3.38}{1} \right)^{0.2} - 3 \left(\frac{1}{3.38} \right)^{0.1} = 2.44$$

$$D_s = 2.44 y_c = 2.44 (3.38) = 8.25 \text{ ft.}$$

$$d_s = D_s - y_n = 8.25 - 6.90 = \underline{1.4 \text{ ft.}}$$

Appendix G: Maps, Profiles & Exhibits

G.1 Annotated FIRM Maps



- REVISED FLOODPLAIN ZONE AE
- EXISTING CONDITION FLOODPLAIN ZONE AE

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 3075H

FIRM FLOOD INSURANCE RATE MAP
MARICOPA COUNTY, ARIZONA
 AND INCORPORATED AREAS

PANEL 3075 OF 4350
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

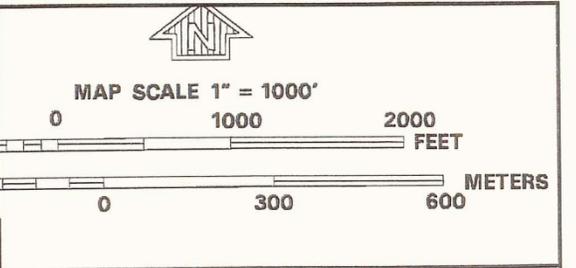
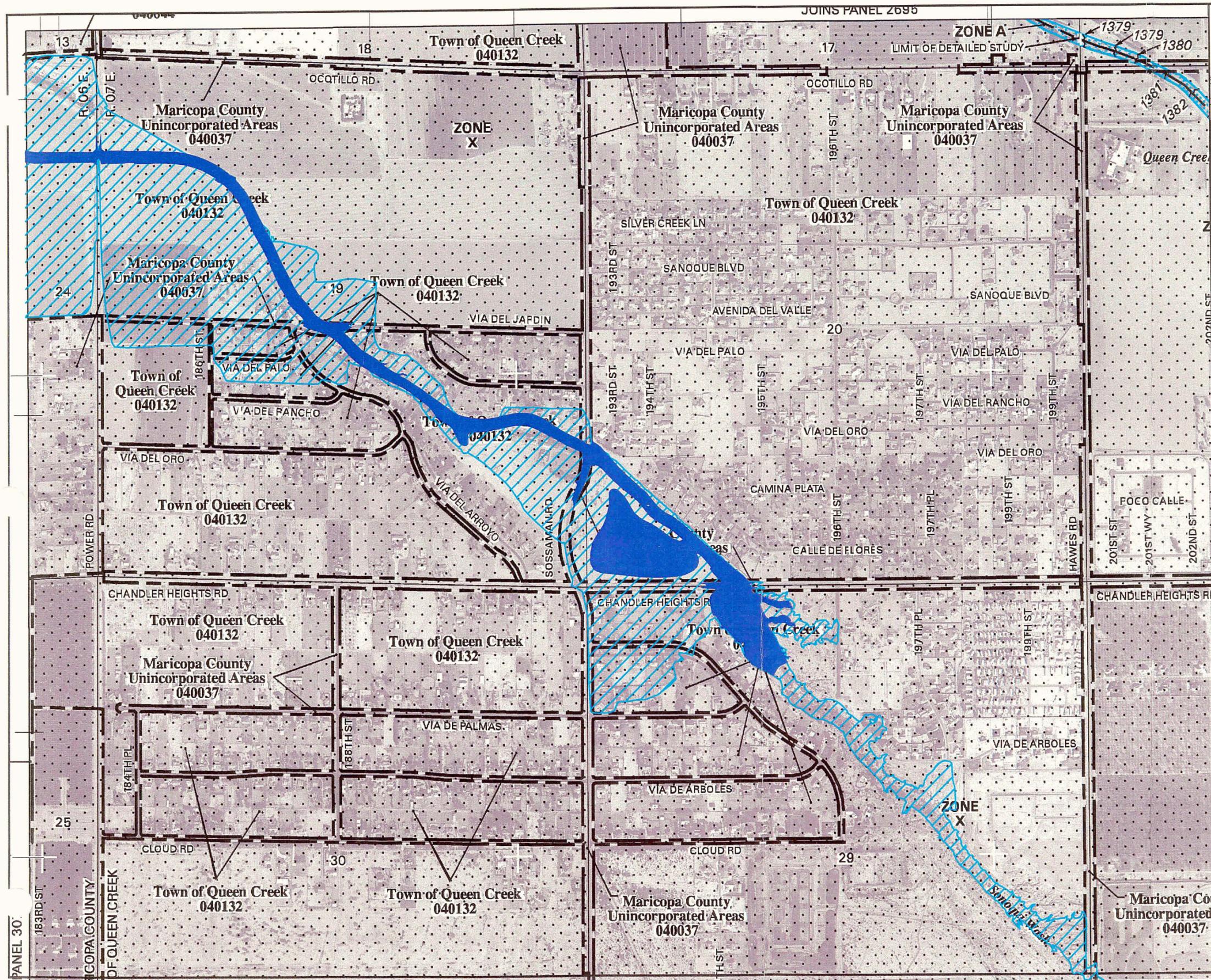
CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
GILBERT, TOWN OF	040044	3075	H
MARICOPA COUNTY	040037	3075	H
QUEEN CREEK, TOWN OF	040132	3075	H

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 04013C3075H
MAP REVISED SEPTEMBER 30, 2005
 Federal Emergency Management Agency

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- REVISED FLOODPLAIN ZONE AE
- EXISTING CONDITION FLOODPLAIN ZONE AE

NFP

PANEL 3060H

**FIRM
FLOOD INSURANCE RATE MAP
MARICOPA COUNTY,
ARIZONA
AND INCORPORATED AREAS**

PANEL 3060 OF 4350

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

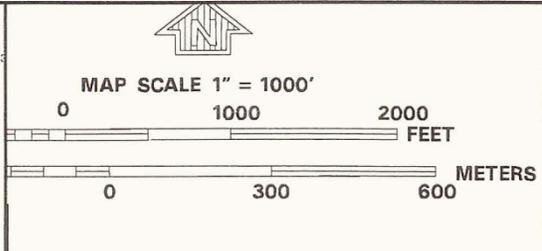
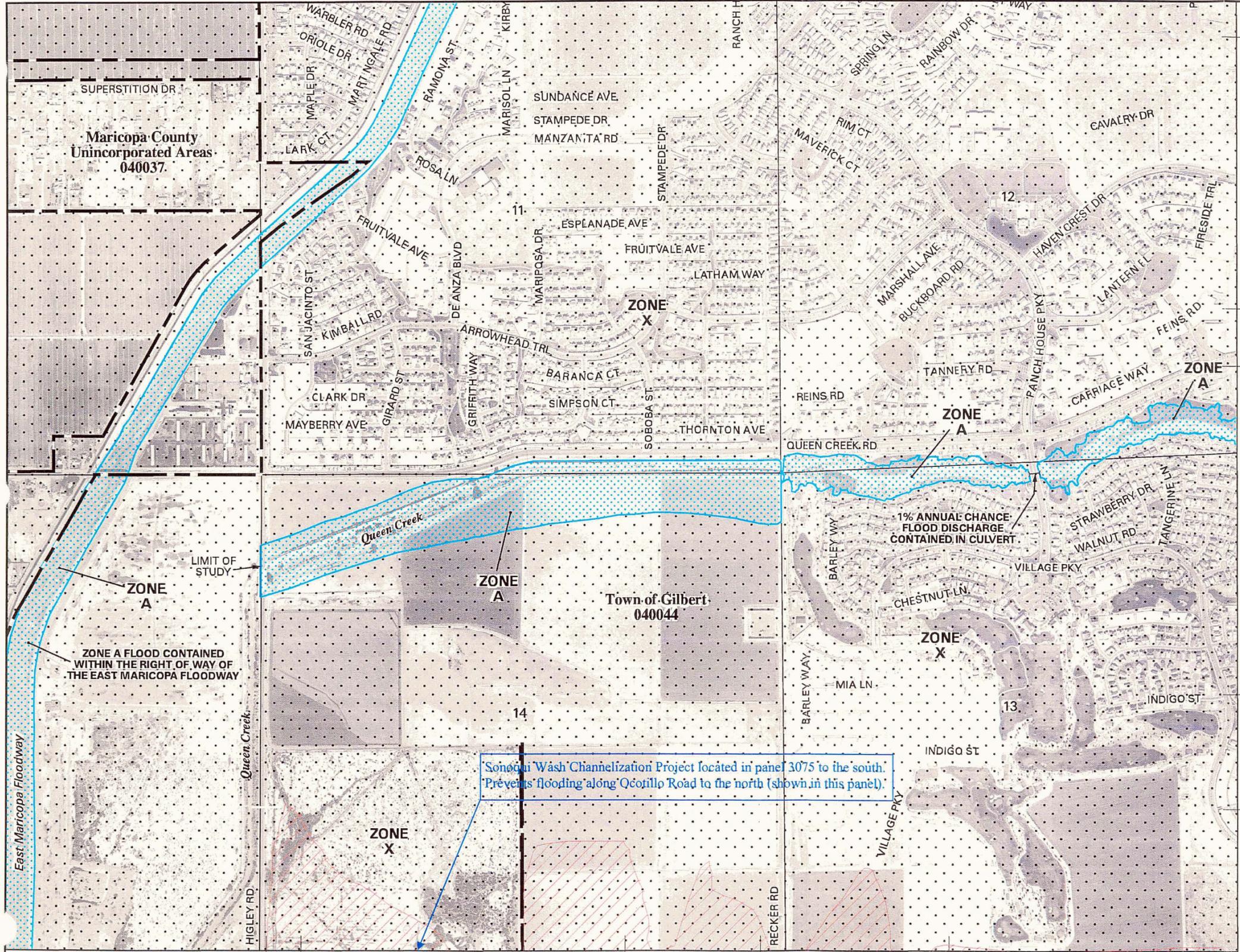
COMMUNITY	NUMBER	PANEL	SUFFIX
GILBERT, TOWN OF	040044	3050	H
MARICOPA COUNTY	040037	3050	H
QUEEN CREEK, TOWN OF	040132	3050	H

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**MAP NUMBER
04013C3060H
MAP REVISED
SEPTEMBER 30, 2005**

Federal Emergency Management Agency

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 Existing Condition Floodplain Zone AE (Entellus Study)

NFIP PANEL 2690H

FIRM FLOOD INSURANCE RATE MAP
MARICOPA COUNTY, ARIZONA
 AND INCORPORATED AREAS

PANEL 2690 OF 4350
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

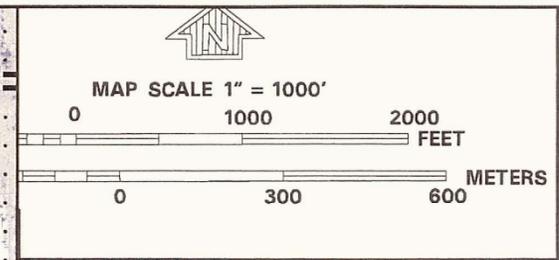
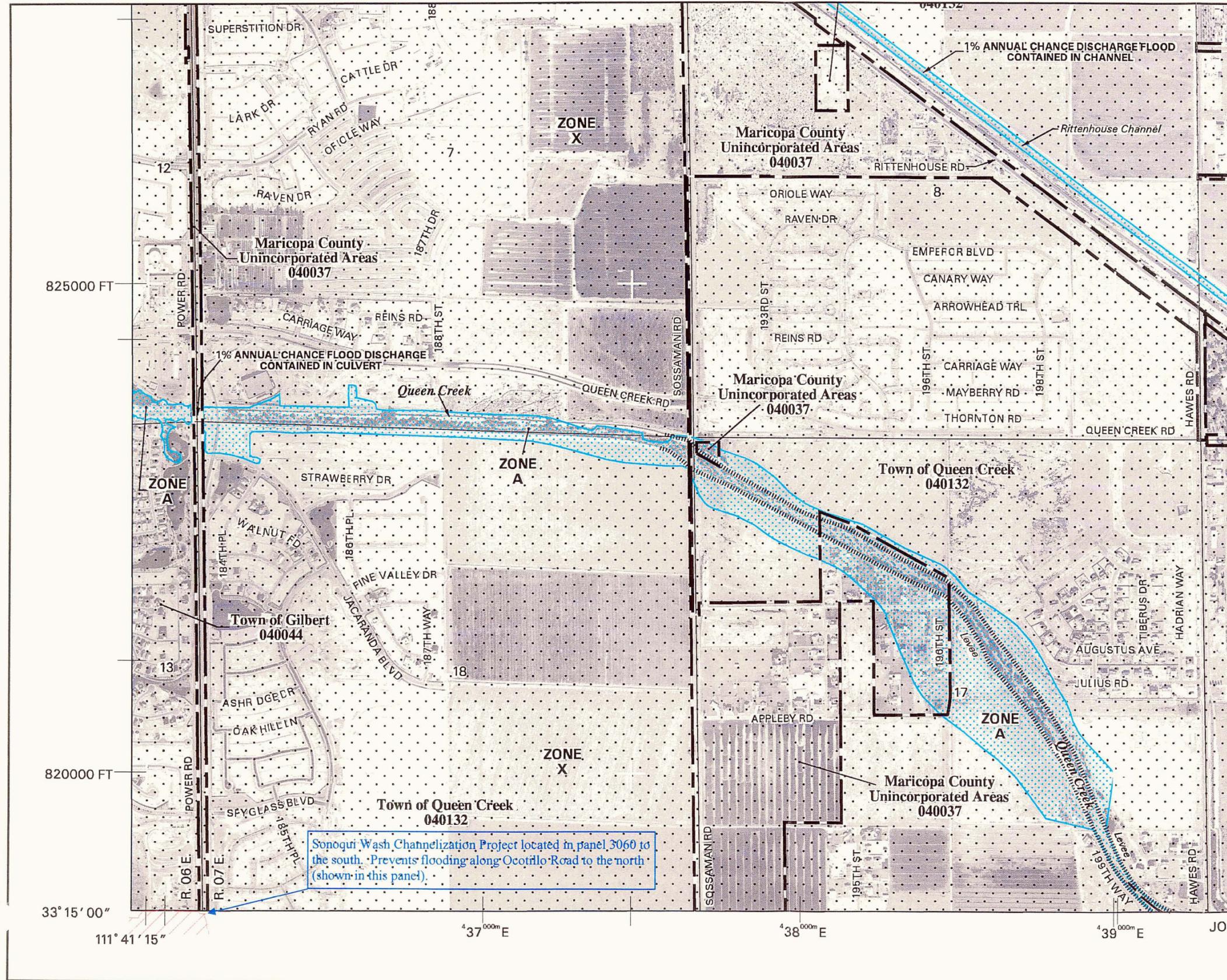
COMMUNITY	NUMBER	PANEL	SUFFIX
GILBERT, TOWN OF	040044	2690	H
MARICOPA COUNTY	040037	2690	H
MESA, CITY OF	040048	2690	H

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 **MAP NUMBER**
04013C2690H
MAP REVISED
SEPTEMBER 30, 2005
 Federal Emergency Management Agency

JOINS PANEL 3075 4 33 000m E 4 34 000m E 4 35 000m E 111° 41'

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 Existing Condition Floodplain Zone AE (Entellus Study)

NFP

PANEL 2695H

FIRM
FLOOD INSURANCE RATE MAP
MARICOPA COUNTY,
ARIZONA
AND INCORPORATED AREAS

PANEL 2695 OF 4350

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
GILBERT, TOWN OF	040044	2695	H
MARICOPA COUNTY	040037	2695	H
MESA, CITY OF	040048	2695	H
QUEEN CREEK, TOWN OF	040132	2695	H

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**
04013C2695H
MAP REVISED
SEPTEMBER 30, 2005
Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

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G.2 Existing Conditions Maps (Entellus)

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY SONOQUI WASH FLOODPLAIN DELINEATION FCD 2002C033-2 and -3

AERIAL MAPPING

Aerial Mapping Company
3141 West Clarendon Avenue
Phoenix, Az. 85017

GROUND CONTROL

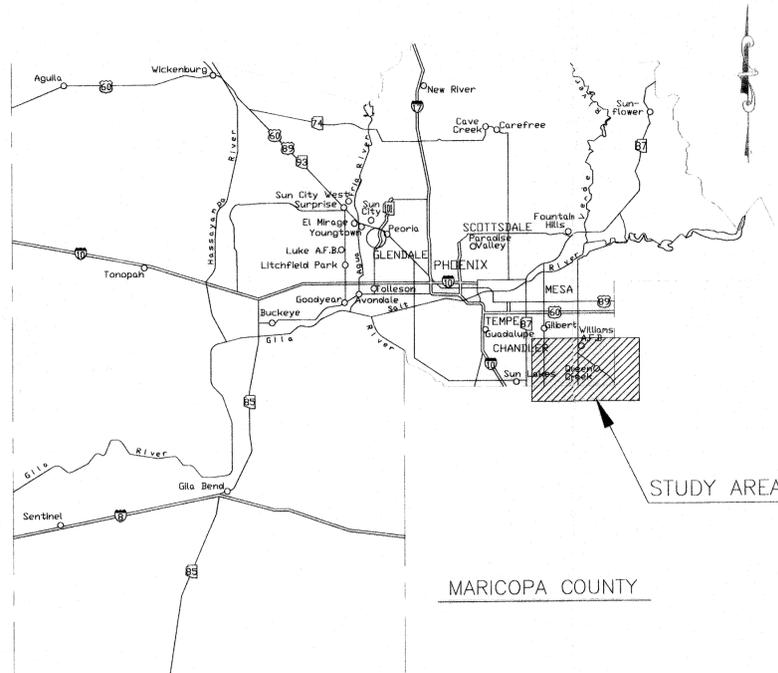
Collins/Pina Consulting Engineers, Inc.
3800 North Central Avenue, Suite 200
Phoenix, Az. 85012

HYDROLOGY

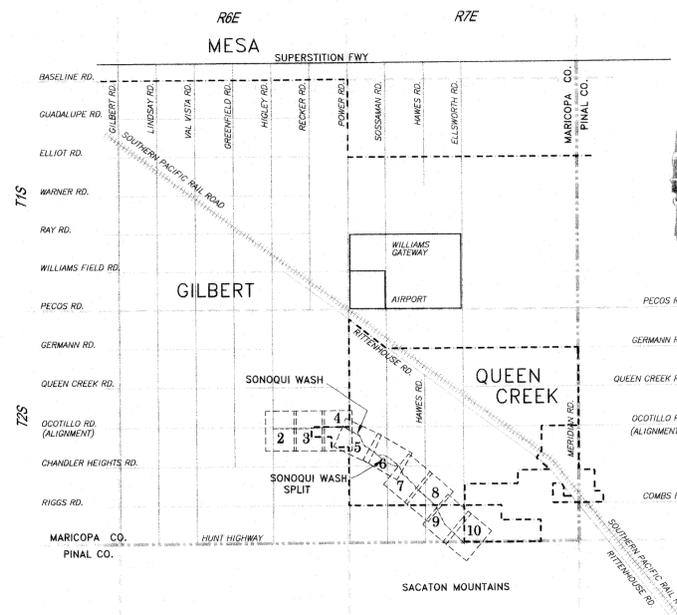
Entellus, Inc.
2255 North 44th Street, Suite 125
Phoenix, Az. 85008-3279

HYDRAULICS

Entellus, Inc.
2255 North 44th Street, Suite 125
Phoenix, Az. 85008-3279



LOCATION MAP



2255 N. 44th Street Suite 125 Phoenix, AZ 85008-3279 Tel: 602.244.2566 Fax: 602.244.8947 E-mail: www.Entellus.com			
DESIGN	BY	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	HAA	03/04	
PLANS	KBA/RJR	03/04	RECOMMENDED BY: _____
PLANS CHK.	HAA	03/04	APPROVED BY: _____
SUBMITTED BY: _____	DATE: _____	CHIEF ENGINEER AND GENERAL MANAGER	
			SHEET 1 OF 10

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
SONOQUI WASH
FLOODPLAIN DELINEATION
CONTRACT NO. FCD 2002CO33-2 and -3

LEGEND

- ZONE AE
- ZONE A02
- ZONE A01
- ZONE A
- ZONE AH
- HYDRAULIC BASE LINE WITH RIVER MILE
- CROSS SECTION
- ELEVATION REFERENCE MARK
- BASE FLOOD ELEVATIONS
- ZONE DESIGNATIONS SECTION LINE
- CORPORATE LIMITS: QUEEN CREEK LIMIT AND GILBERT LIMIT
- COUNTY BOUNDARY
- LIMITS OF DETAILED STUDY
- LIMITS OF STUDY

ELEVATION REFERENCE MARKS

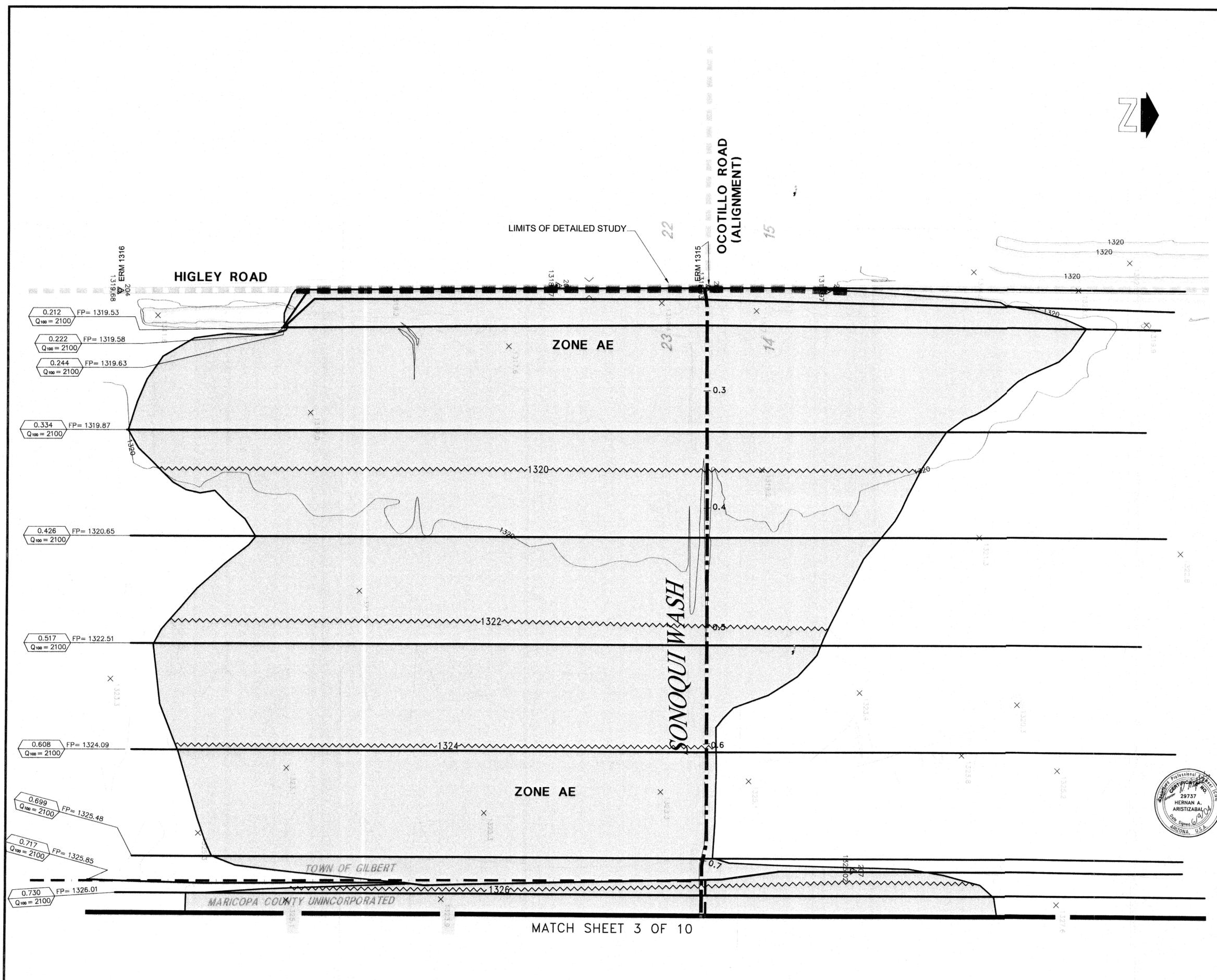
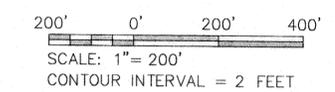
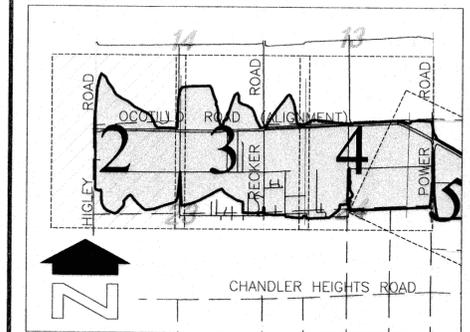
NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988

I.D. NUMBER	ELEV. (FT)	DESCRIPTION/LOCATION
1315	1318.09	ADOT Brass Cap in hand hole at Higley Road crossing of Sonoqui Wash, being on the northwest corner of Section 23, Township 2 South, Range 6 East.
1316	1318.66	ADOT Brass Cap in hand hole in Higley Road, being the west 1/4 corner of Section 23, Township 2 South, Range 6 East.
1326	1328.32	ADOT Brass Cap in hand hole in Higley Road, being the west 1/4 corner of Section 14, Township 2 South, Range 6 East.

NOTES

SHEET 2: TOWNSHIP 2 SOUTH, RANGE 6 EAST

INDEX MAP



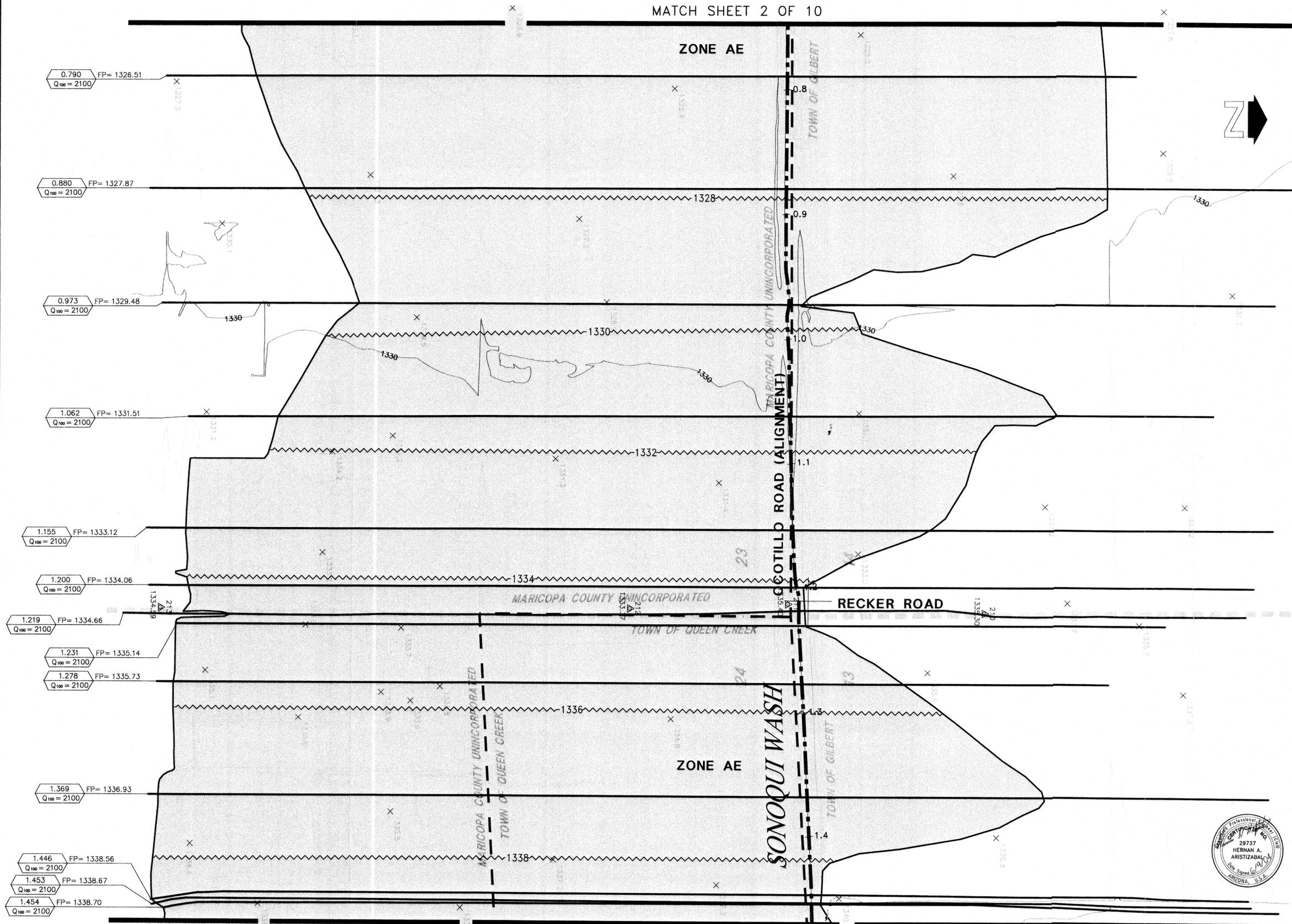
MATCH SHEET 3 OF 10

		2255 N. 44th Street, Suite 125 Phoenix, AZ 85008-3279 Tel: 602.244.2566 Fax: 602.244.8947 E-mail: www.Entellus.com
DESIGN	BY AMG	DATE 4/04
DESIGN CHK.	HAA	4/04
PLANS	KBA/RJR	4/04
PLANS CHK.	HAA	4/04
SUBMITTED BY:	DATE:	
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY		RECOMMENDED BY: _____ DATE: _____ APPROVED BY: _____ DATE: _____ CHIEF ENGINEER AND GENERAL MANAGER
SHEET 2		OF 10

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
SONOQUI WASH
FLOODPLAIN DELINEATION
CONTRACT NO. FCD 2002C033-2 and -3

MATCH SHEET 2 OF 10

ZONE AE



LEGEND

- ZONE AE
- ZONE AO2
- ZONE AO1
- ZONE A
- ZONE AH
- HYDRAULIC BASE LINE WITH RIVER MILE
- CROSS SECTION
- ELEVATION REFERENCE MARK
- BASE FLOOD ELEVATIONS
- ZONE DESIGNATIONS SECTION LINE
- CORPORATE LIMITS: QUEEN CREEK LIMIT AND GILBERT LIMIT
- COUNTY BOUNDARY
- LIMITS OF DETAILED STUDY
- LIMITS OF STUDY

ELEVATION REFERENCE MARKS

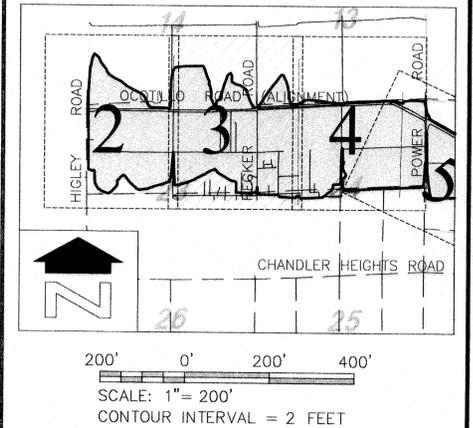
NOTE: ALL ELEVATIONS ARE BASED ON, NORTH AMERICAN VERTICAL DATUM OF 1988

I.D. NUMBER	ELEV. (FT)	DESCRIPTION/LOCATION
1315	1318.09	ADOT Brass Cap in hand hole at Higley Road crossing of Sonoqui Wash, being on the northwest corner of Section 23, Township 2 South, Range 6 East.
1316	1318.66	ADOT Brass Cap in hand hole in Higley Road, being the west 1/4 corner of Section 23, Township 2 South, Range 6 East.
1326	1328.32	ADOT Brass Cap in hand hole in Higley Road, being the west 1/4 corner of Section 14, Township 2 South, Range 6 East.

NOTES

SHEET 3: TOWNSHIP 2 SOUTH, RANGE 6 EAST

INDEX MAP



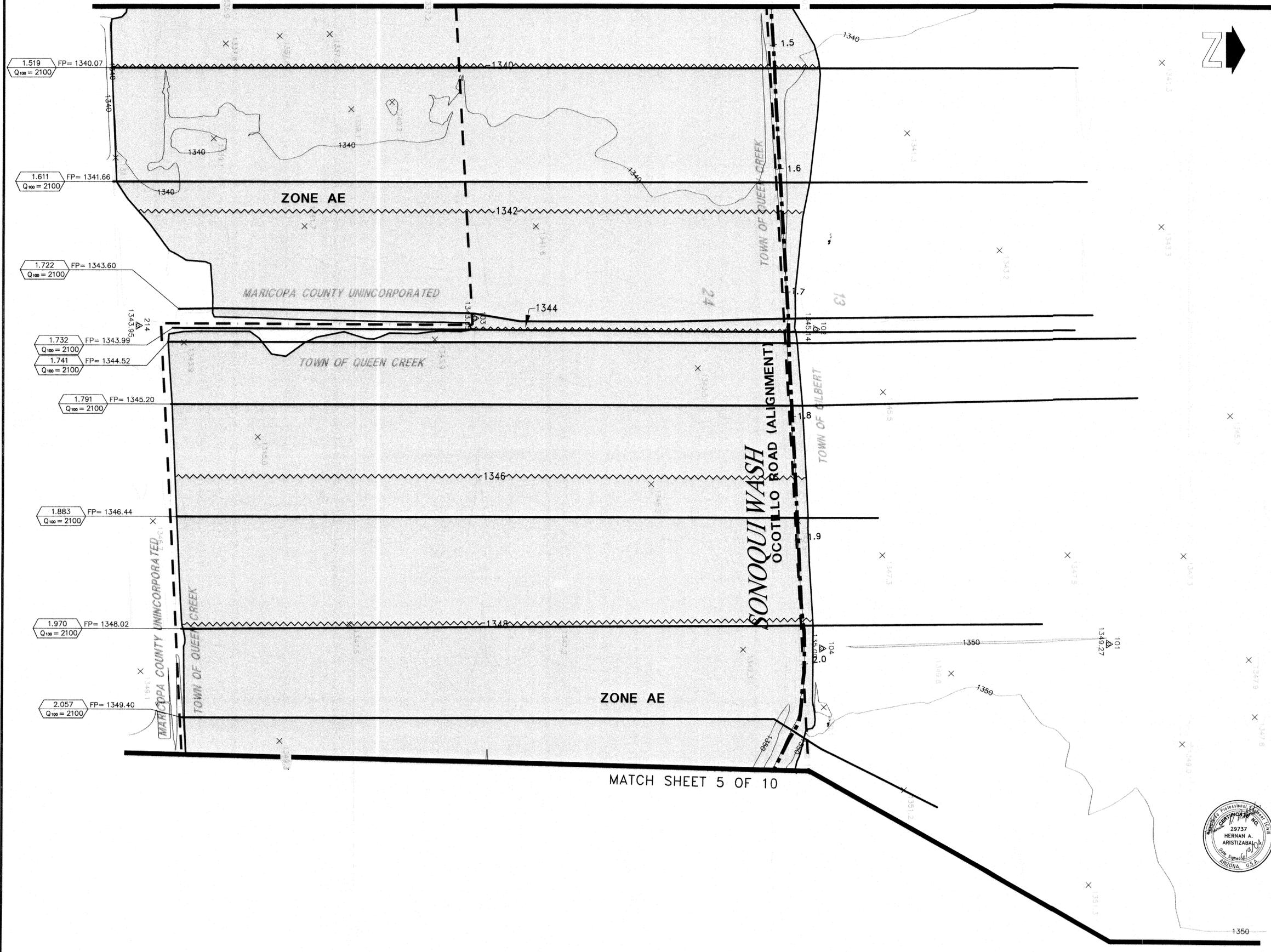
2255 N. 44th Street Suite 125
Phoenix, AZ 85008-8279
Tel 602.244.2566
Fax 602.244.8947
E-mail www.Entellus.com

DESIGN	BY AMG	DATE 4/04	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	HAA	4/04	
PLANS	KBA/RJR	4/04	RECOMMENDED BY: DATE
PLANS CHK.	HAA	4/04	APPROVED BY: DATE
SUBMITTED BY:	DATE:		CHIEF ENGINEER AND GENERAL MANAGER
SHEET 3 OF 10			

MATCH SHEET 4 OF 10

MATCH SHEET 3 OF 10

MATCH SHEET 5 OF 10



FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
SONOQUI WASH
FLOODPLAIN DELINEATION
CONTRACT NO. FCD 2002C033-2 and -3

LEGEND

- ZONE AE
- ZONE A02
- ZONE A01
- ZONE A
- ZONE AH
- HYDRAULIC BASE LINE WITH RIVER MILE
- CROSS SECTION
- ELEVATION REFERENCE MARK
- BASE FLOOD ELEVATIONS
- ZONE DESIGNATIONS **ZONE AE**
- SECTION LINE
- CORPORATE LIMITS: QUEEN CREEK LIMIT AND GILBERT LIMIT
- COUNTY BOUNDARY
- LIMITS OF DETAILED STUDY
- LIMITS OF STUDY

ELEVATION REFERENCE MARKS

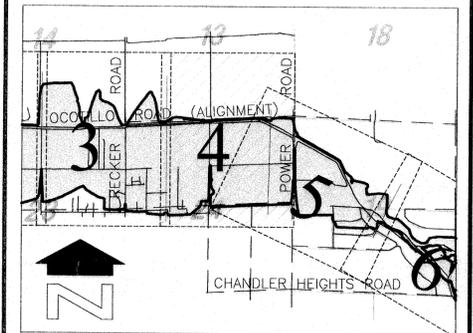
NOTE: ALL ELEVATIONS ARE BASED ON, NORTH AMERICAN VERTICAL DATUM OF 1988

I.D. NUMBER	ELEV. (FT)	DESCRIPTION/LOCATION
1346	1348.40	MCHD Brass Cap in hand hole in Power Road, being the west 1/4 corner of Section 18, Township 2 South, Range 7 East.
1351	1353.65	Rebar in hand hole at the intersection of Brooks Farms Road and Power Road, being the west 1/4 corner of Section 19, Township 2 South, Range 7 East.

NOTES

SHEET 4: TOWNSHIP 2 SOUTH, RANGE 6 EAST
SECTION 13 AND 14

INDEX MAP



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



Entellus
2255 N. 44th Street Suite 125
Phoenix, AZ 85008.3279
Tel 602.244.2566
Fax 602.244.8947
E-mail www.Entellus.com

DESIGN	BY: AMG	DATE: 4/04	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	HAA	4/04	
PLANS	KBA/RJR	4/04	RECOMMENDED BY:
PLANS CHK.	HAA	4/04	APPROVED BY:
SUBMITTED BY:	DATE:		CHIEF ENGINEER AND GENERAL MANAGER
			SHEET 4 OF 10

R:\3101310001\Final-CD\Hydraulics\Draw\plan_02.dwg DATE: 06/06/04

FLIGHT DATE 11-5-97. Revised : 06-06-03
BY: AERIAL MAPPING COMPANY INC.

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS
1" = 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS AND BASED ON GROUND CONTROL SURVEY
DATA PROVIDED BY: COLLINS/PINA CONSULTING ENGINEERS, INC.

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
SONOQUI WASH
FLOODPLAIN DELINEATION
CONTRACT NO. FCD 2002C033-2 and -3

LEGEND

- ZONE AE
- ZONE AO2
- ZONE AO1
- ZONE A
- ZONE AH
- HYDRAULIC BASE LINE WITH RIVER MILE
- CROSS SECTION
- ELEVATION REFERENCE MARK
- BASE FLOOD ELEVATIONS
- ZONE DESIGNATIONS **ZONE AE**
- SECTION LINE
- CORPORATE LIMITS: QUEEN CREEK LIMIT AND GILBERT LIMIT
- COUNTY BOUNDARY
- LIMITS OF DETAILED STUDY
- LIMITS OF STUDY

ELEVATION REFERENCE MARKS

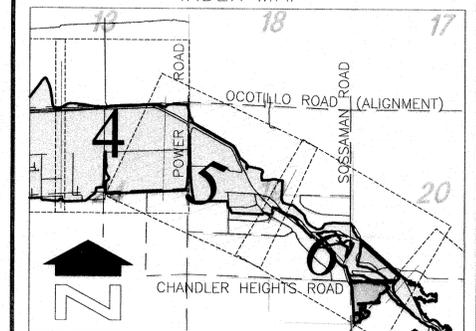
NOTE: ALL ELEVATIONS ARE BASED ON, NORTH AMERICAN VERTICAL DATUM OF 1988

I.D. NUMBER	ELEV. (FT)	DESCRIPTION/LOCATION
1346	1348.40	MCHD Brass Cap in hand hole in Power Road, being the west 1/4 corner of Section 18, Township 2 South, Range 7 East.
1351	1353.65	Rebar in hand hole at the intersection of Brooks Farms Road and Power Road, being the west 1/4 corner of Section 19, Township 2 South, Range 7 East.

NOTES

SHEET 5: TOWNSHIP 2 SOUTH, RANGE 6 EAST AND TOWNSHIP 2 SOUTH, RANGE 7 EAST.

INDEX MAP

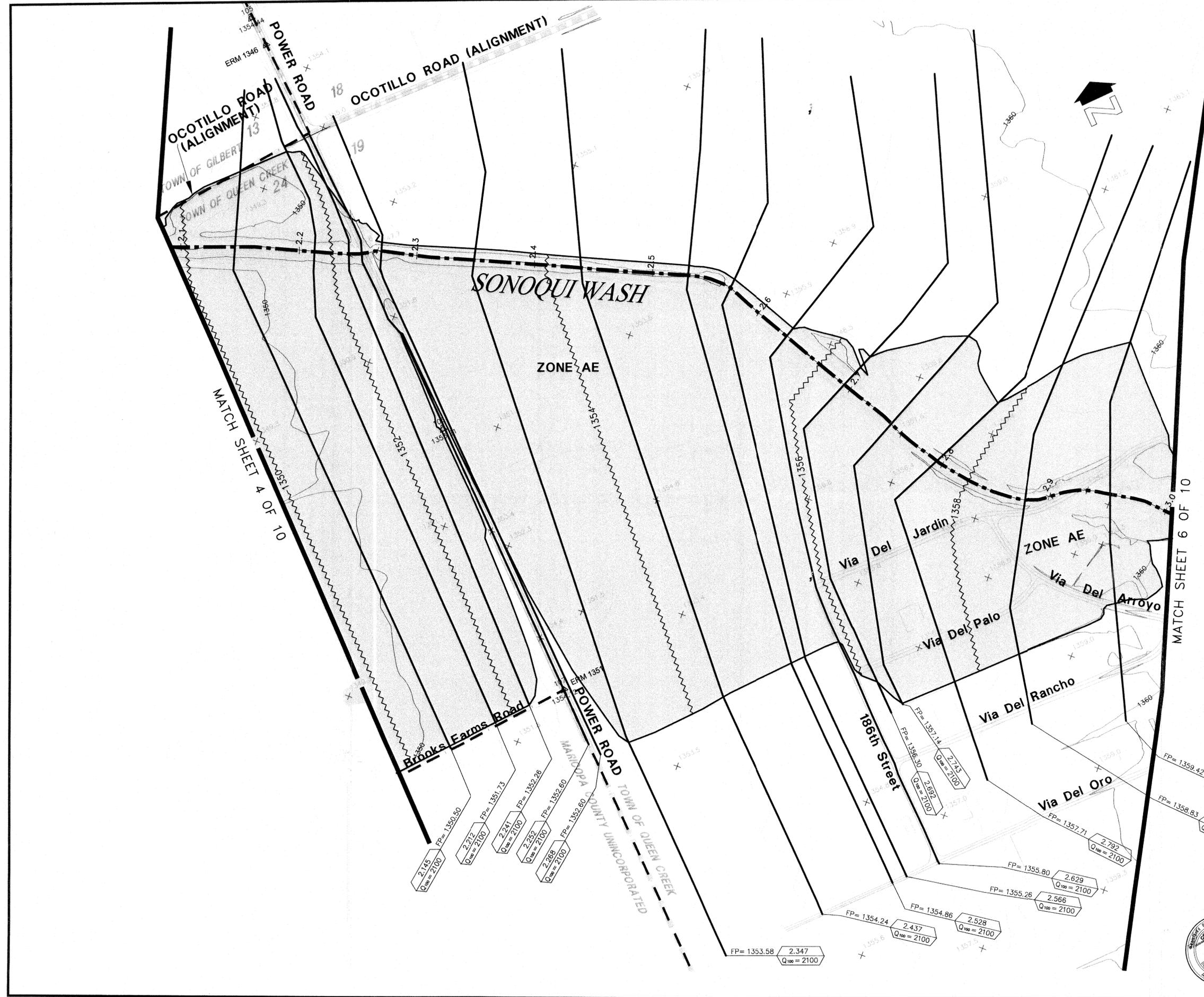


200' 0' 200' 400'

SCALE: 1" = 200'
CONTOUR INTERVAL = 2 FEET

Entellus
2255 N. 44th Street, Suite 125
Phoenix, AZ 85008-3279
Tel: 602.244.2896
Fax: 602.244.8947
E-mail: www.entellus.com

DESIGN	BY: AMG	DATE: 4/04	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	HAA	4/04	RECOMMENDED BY:
PLANS	KBA/RJR	4/04	DATE:
PLANS CHK.	HAA	4/04	APPROVED BY:
SUBMITTED BY:			DATE:
			CHEF ENGINEER AND GENERAL MANAGER
			SHEET 5 OF 10



FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
SONOQUI WASH
FLOODPLAIN DELINEATION
CONTRACT NO. FCD 2002C033-2 and -3

LEGEND

- ZONE AE
- ZONE A02
- ZONE A01
- ZONE A
- ZONE AH
- HYDRAULIC BASE LINE WITH RIVER MILE
- CROSS SECTION
- ELEVATION REFERENCE MARK
- BASE FLOOD ELEVATIONS
- ZONE DESIGNATIONS
- SECTION LINE
- CORPORATE LIMITS: QUEEN CREEK LIMIT AND GILBERT LIMIT
- COUNTY BOUNDARY
- LIMITS OF DETAILED STUDY
- LIMITS OF STUDY

ELEVATION REFERENCE MARKS

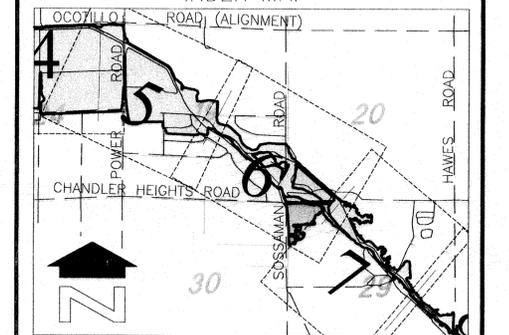
NOTE: ALL ELEVATIONS ARE BASED ON, NORTH AMERICAN VERTICAL DATUM OF 1988

I.D. NUMBER	ELEV. (FT)	DESCRIPTION / LOCATION
1352	1355.02	Rebar in hand hole at the Intersection of Power Road and Chandler Heights Road, being the southwest corner of Section 19, Township 2 South, Range 7 East.
1368	1370.64	Brass Cap in hand hole (not stamped) at Chandler Heights road east of Sossaman Road, being the northwest corner of Section 29, Township 2 South, Range 7 East.

NOTES

SHEET 6: TOWNSHIP 2 SOUTH, RANGE 7 EAST

INDEX MAP

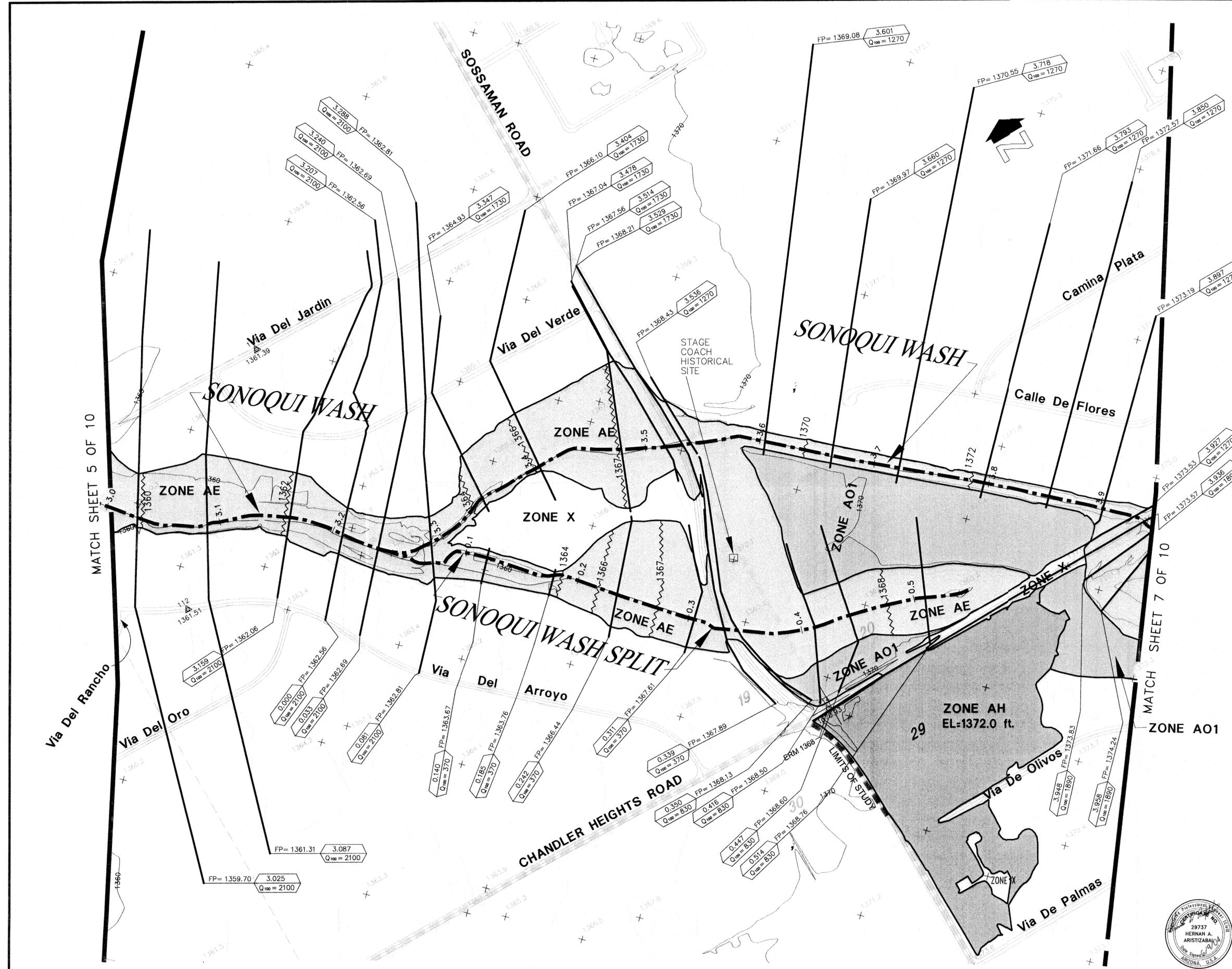


200' 0' 200' 400'

SCALE: 1" = 200'
CONTOUR INTERVAL = 2 FEET

Entellus
2255 N. 44th Street, Suite 125
Phoenix, AZ 85008.8279
Tel 602.244.2566
Fax 602.244.8947
E-mail www.Entellus.com

DESIGN	BY AMG	DATE 4/04	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	HAA	4/04	RECOMMENDED BY:
PLANS	KBA/RJR	4/04	DATE
PLANS CHK.	HAA	4/04	APPROVED BY:
SUBMITTED BY:	DATE:		CHEF ENGINEER AND GENERAL MANAGER
			SHEET 6 of 10



FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
SONOQUI WASH
FLOODPLAIN DELINEATION
CONTRACT NO. FCD 2002C033-2 and -3

LEGEND

- ZONE AE
- ZONE A02
- ZONE A01
- ZONE A
- ZONE AH
- HYDRAULIC BASE LINE WITH RIVER MILE
- CROSS SECTION
- ELEVATION REFERENCE MARK
- BASE FLOOD ELEVATIONS
- ZONE DESIGNATIONS **ZONE AE**
- SECTION LINE
- CORPORATE LIMITS; QUEEN CREEK LIMIT AND GILBERT LIMIT
- COUNTY BOUNDARY
- LIMITS OF DETAILED STUDY
- LIMITS OF STUDY

ELEVATION REFERENCE MARKS

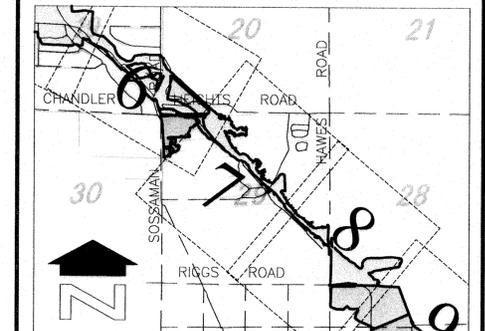
NOTE: ALL ELEVATIONS ARE BASED ON, NORTH AMERICAN VERTICAL DATUM OF 1988

I.D. NUMBER	ELEV. (FT)	DESCRIPTION/LOCATION
1368	1370.64	Brass Cap in hand hole (not stamped) at Chandler Heights road east of Sossaman Road, being the northwest corner of Section 29, Township 2 South, Range 7 East.

NOTES

SHEET 7: TOWNSHIP 2 SOUTH, RANGE 7 EAST

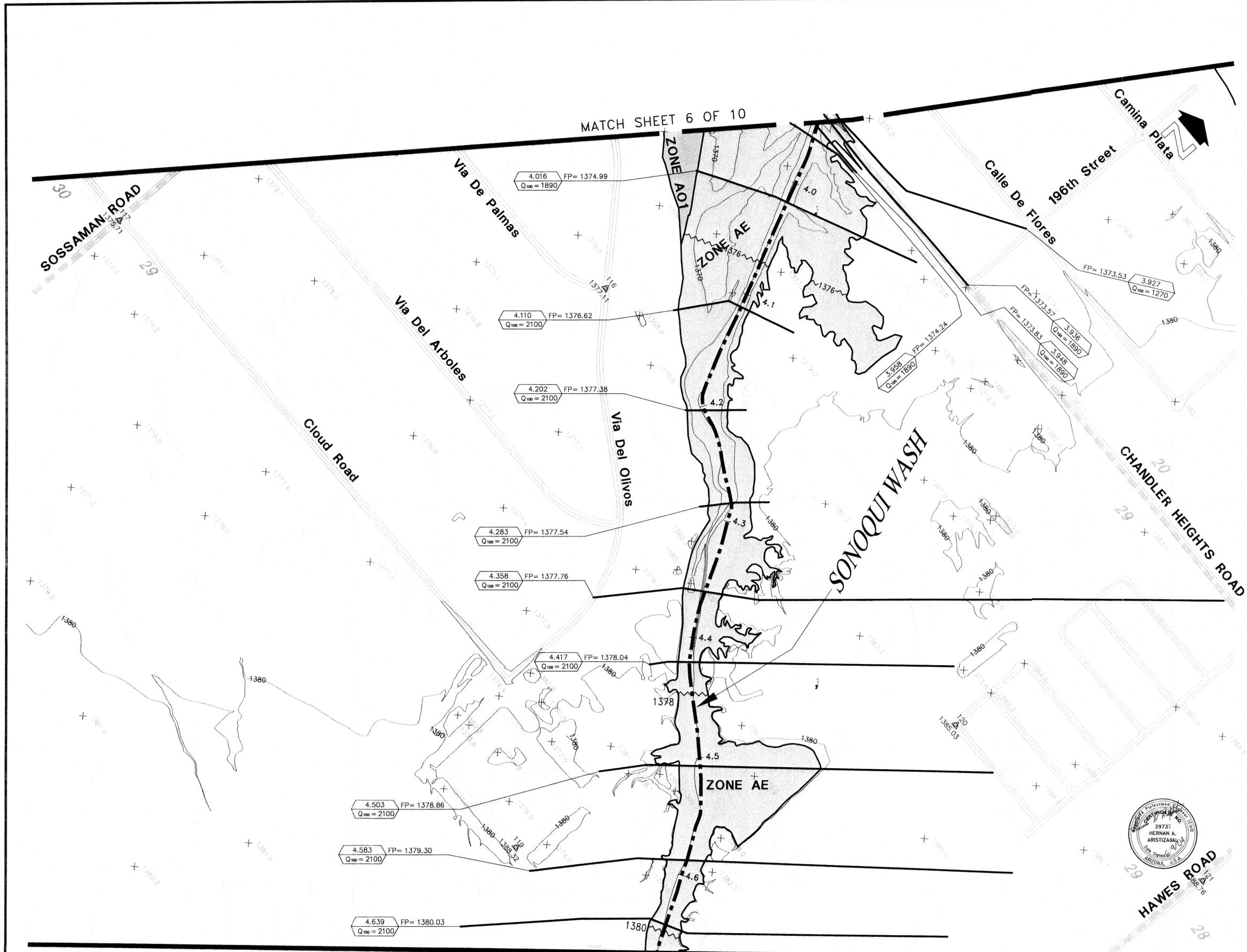
INDEX MAP



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

Entellus
2255 N. 44th Street, Suite 125
Phoenix, AZ 85008-3279
Tel: 602.244.2566
Fax: 602.244.8947
E-mail: www.Entellus.com

DESIGN	BY AMG	DATE 4/04	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	HAA	4/04	RECOMMENDED BY:
PLANS	KBA/RJR	4/04	DATE
PLANS CHK.	HAA	4/04	APPROVED BY:
SUBMITTED BY:			DATE
			CHIEF ENGINEER AND GENERAL MANAGER
			SHEET 7 OF 10



MATCH SHEET 6 OF 10

MATCH SHEET 8 OF 10

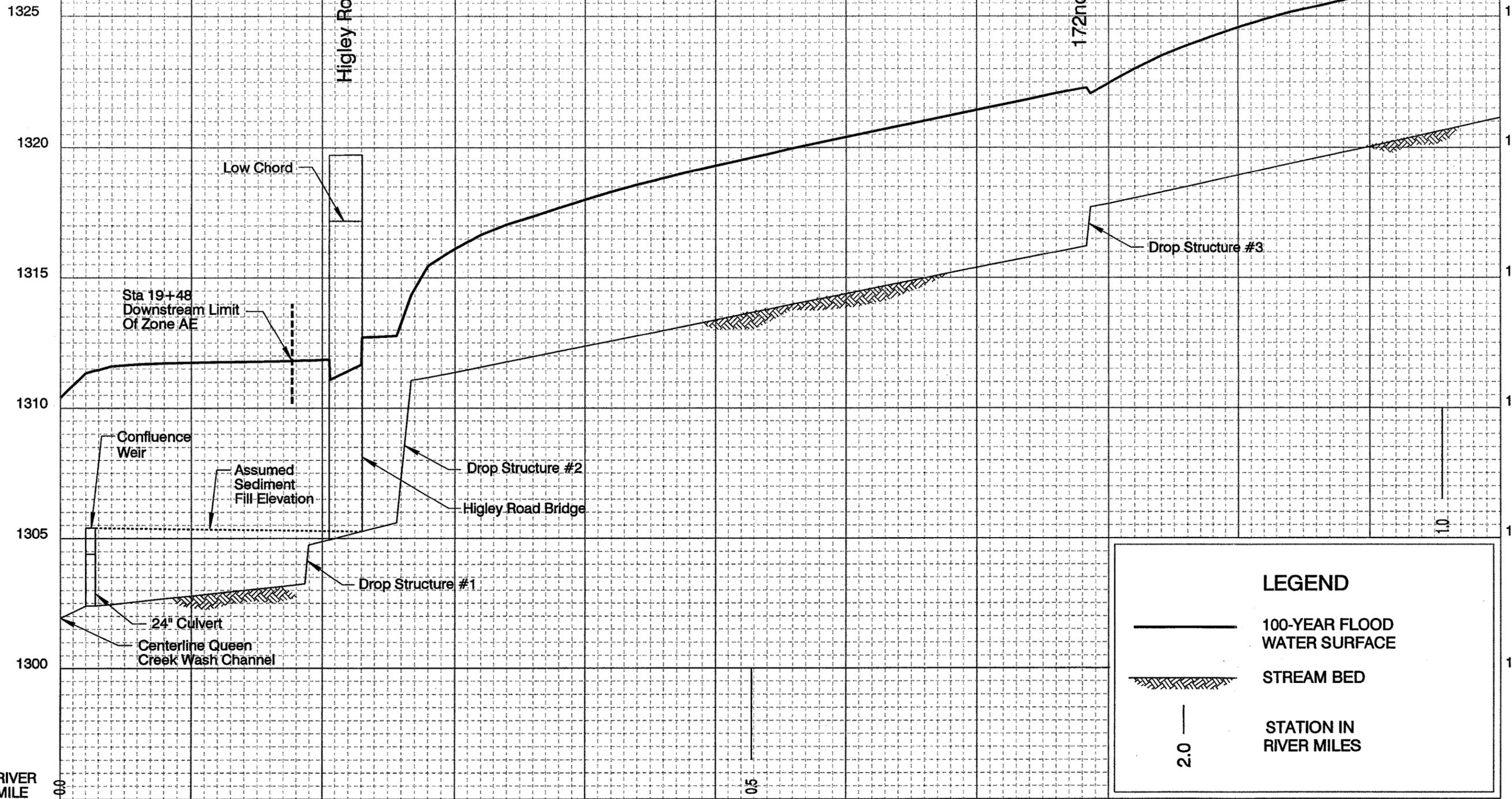
THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS
1" = 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS AND BASED ON GROUND CONTROL SURVEY
DATA PROVIDED BY, COLLINS/PINA CONSULTING ENGINEERS, INC.

G.3 Flood Profiles

ELEVATION IN FEET

RIVER MILE

FEET 1000 1500 2000 2500 3000 3500 4000 4500 5000 5500 6000 6500



FLOOD PROFILES

SONOQUI WASH CHANNELIZATION CLOMR

FEDERAL EMERGENCY MANAGEMENT AGENCY

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
TOWN OF GILBERT
TOWN OF QUEEN CREEK

LEGEND

— 100-YEAR FLOOD WATER SURFACE

▨ STREAM BED

— 2.0 — STATION IN RIVER MILES

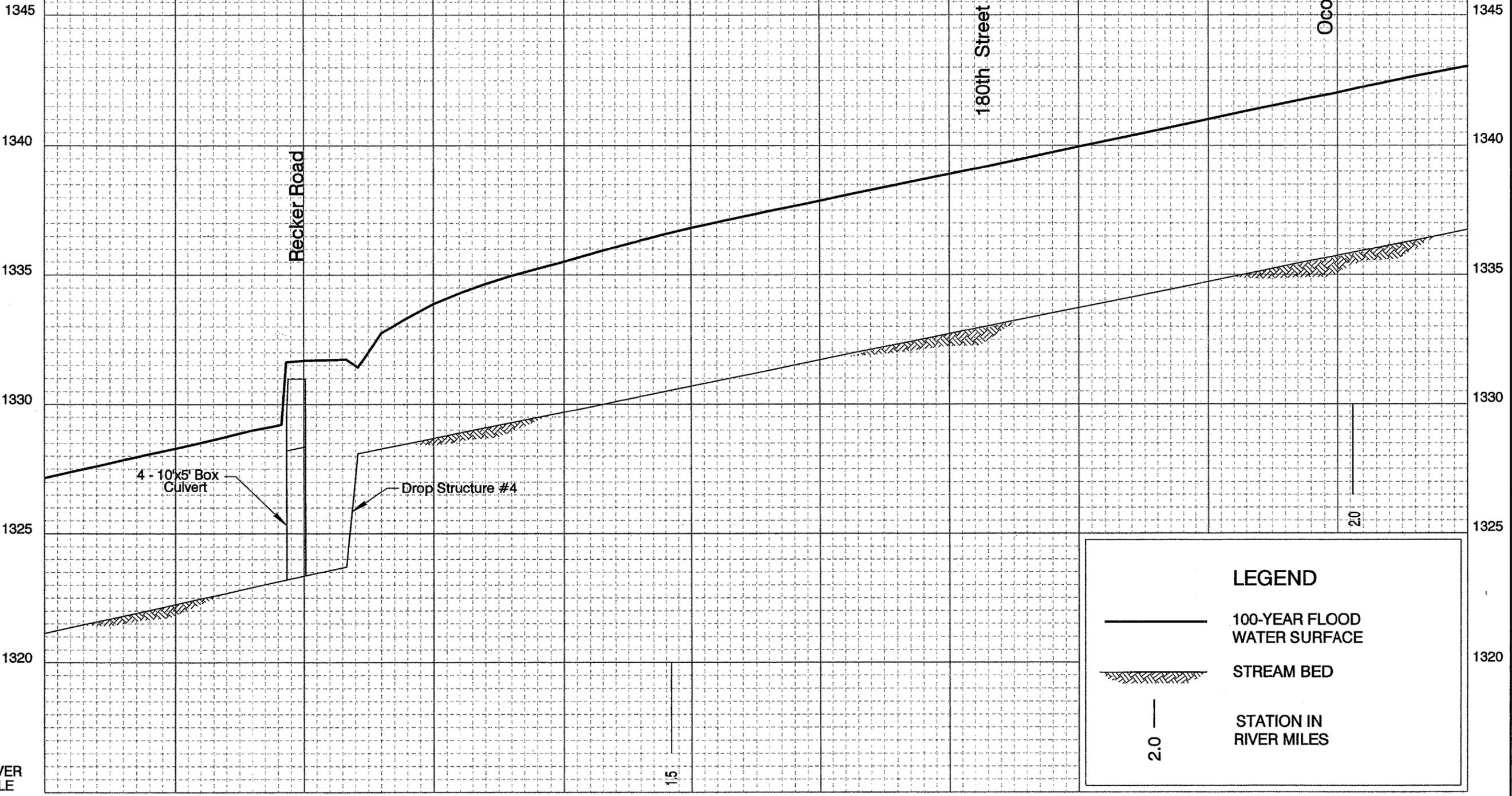
— 1.0 —

Stanley Consultants INC.
 2929 East Camelback Road, Suite 130, Phoenix, Arizona 85016-4425
 www.stanleygroup.com

ELEVATION IN FEET

RIVER MILE

FEET 6500 7000 7500 8000 8500 9000 9500 10000 10500 11000 11500 12000



LEGEND

— 100-YEAR FLOOD WATER SURFACE

▨ STREAM BED

— 2.0 — STATION IN RIVER MILES

FLOOD PROFILES

SONOQUI WASH CHANNELIZATION CLOMR

FEDERAL EMERGENCY MANAGEMENT AGENCY

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
TOWN OF GILBERT
TOWN OF QUEEN CREEK

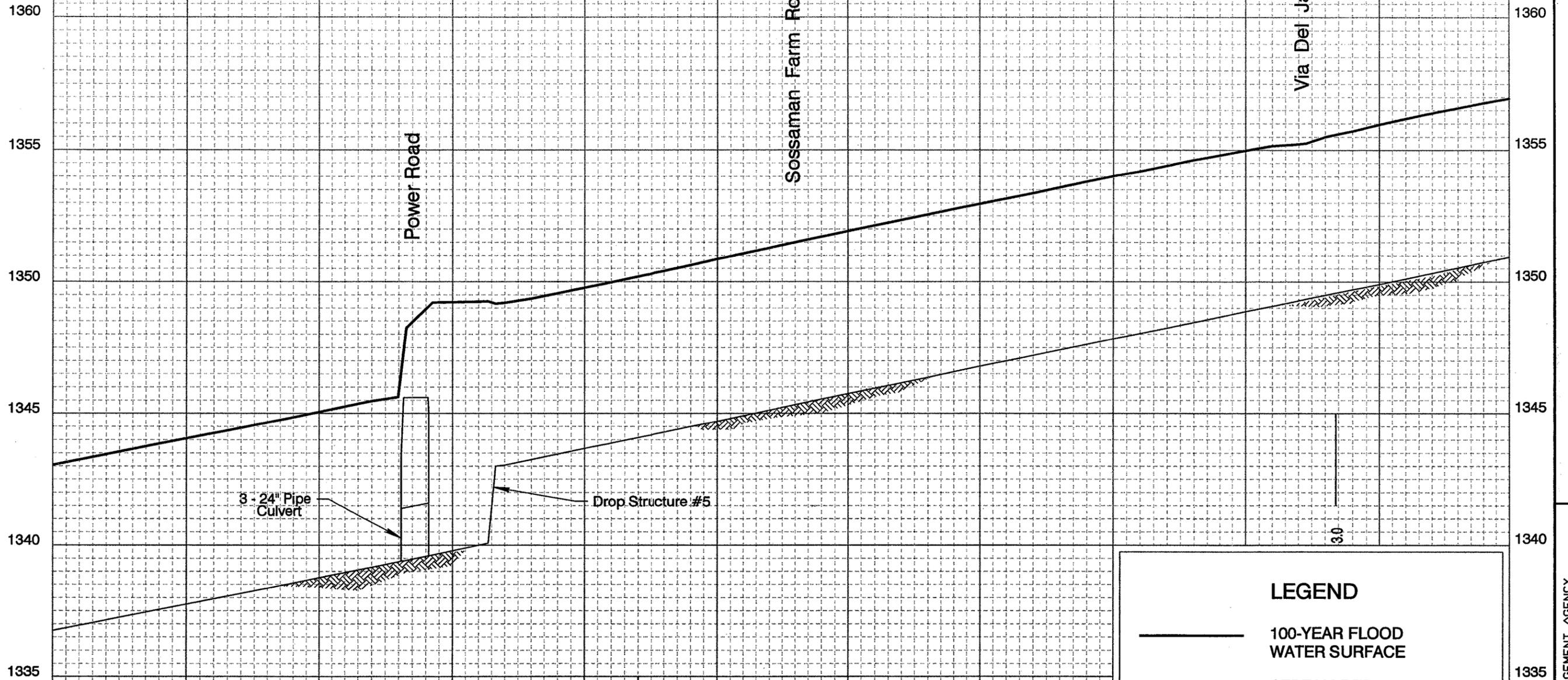
Stanley Consultants INC.
 2929 East Camelback Road, Suite 130, Phoenix, Arizona 85016-4425
 www.stanleygroup.com

11/2/2005 q:176955\CADD\DMCHANNEL\176955_FP02.dgn

ELEVATION IN FEET

RIVER MILE

FEET 12000 12500 13000 13500 14000 14500 15000 15500 16000 16500 17000 17500



LEGEND

-  100-YEAR FLOOD WATER SURFACE
-  STREAM BED
-  STATION IN RIVER MILES

2.0

3.0

FLOOD PROFILES

SONOQUI WASH CHANNELIZATION CLOMR

FEDERAL EMERGENCY MANAGEMENT AGENCY

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
TOWN OF GILBERT
TOWN OF QUEEN CREEK



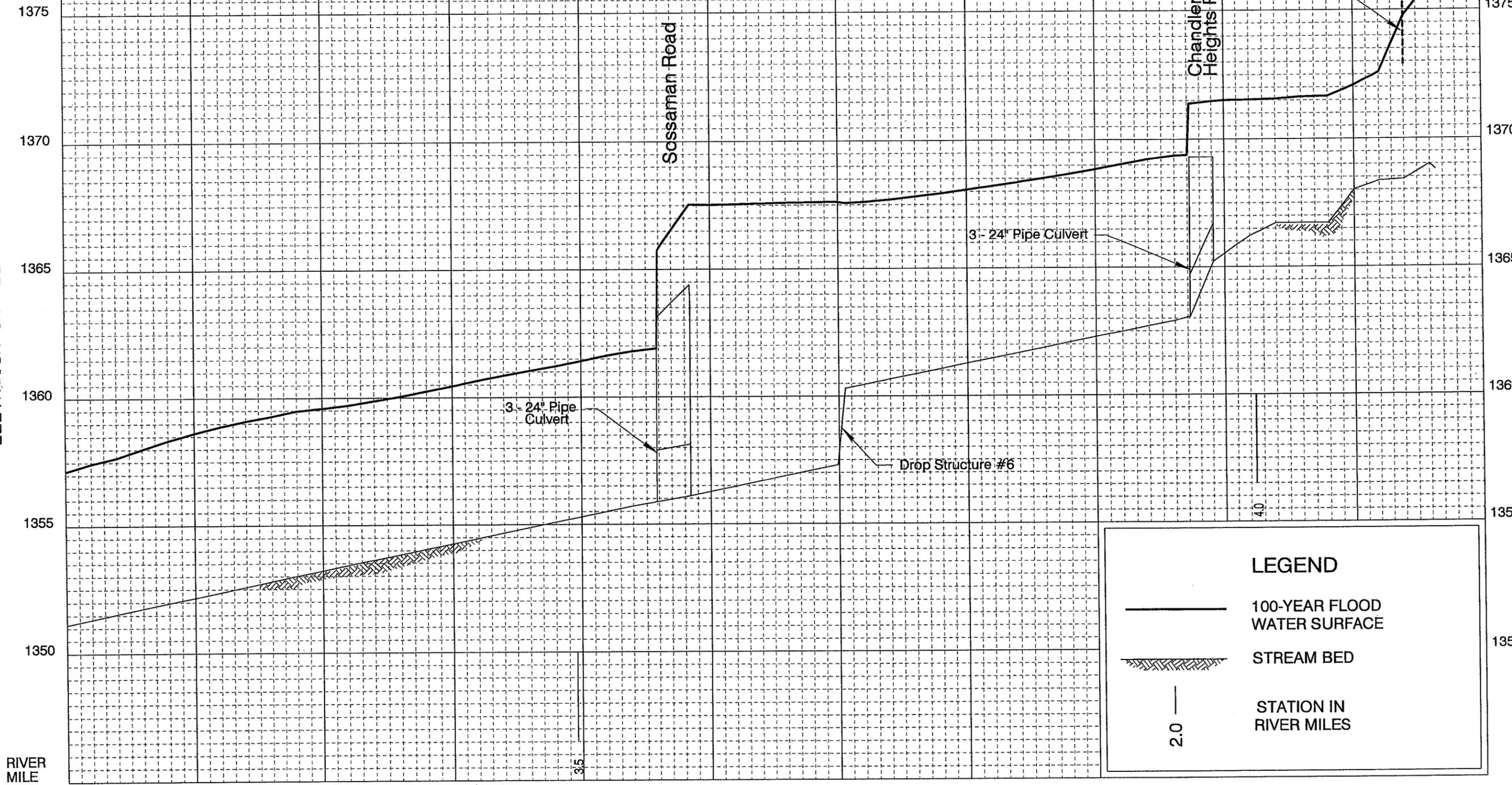
Stanley Consultants INC.
2929 East Camelback Road, Suite 130, Phoenix, Arizona 85016-4425
www.stanleygroup.com

11/2/2005 q:\16955\cadd\dmchannel\16955_1.p03.dgn

ELEVATION IN FEET

RIVER MILE

FEET 17500 18000 18500 19000 19500 20000 20500 21000 21500 22000 22500 23000



FLOOD PROFILES

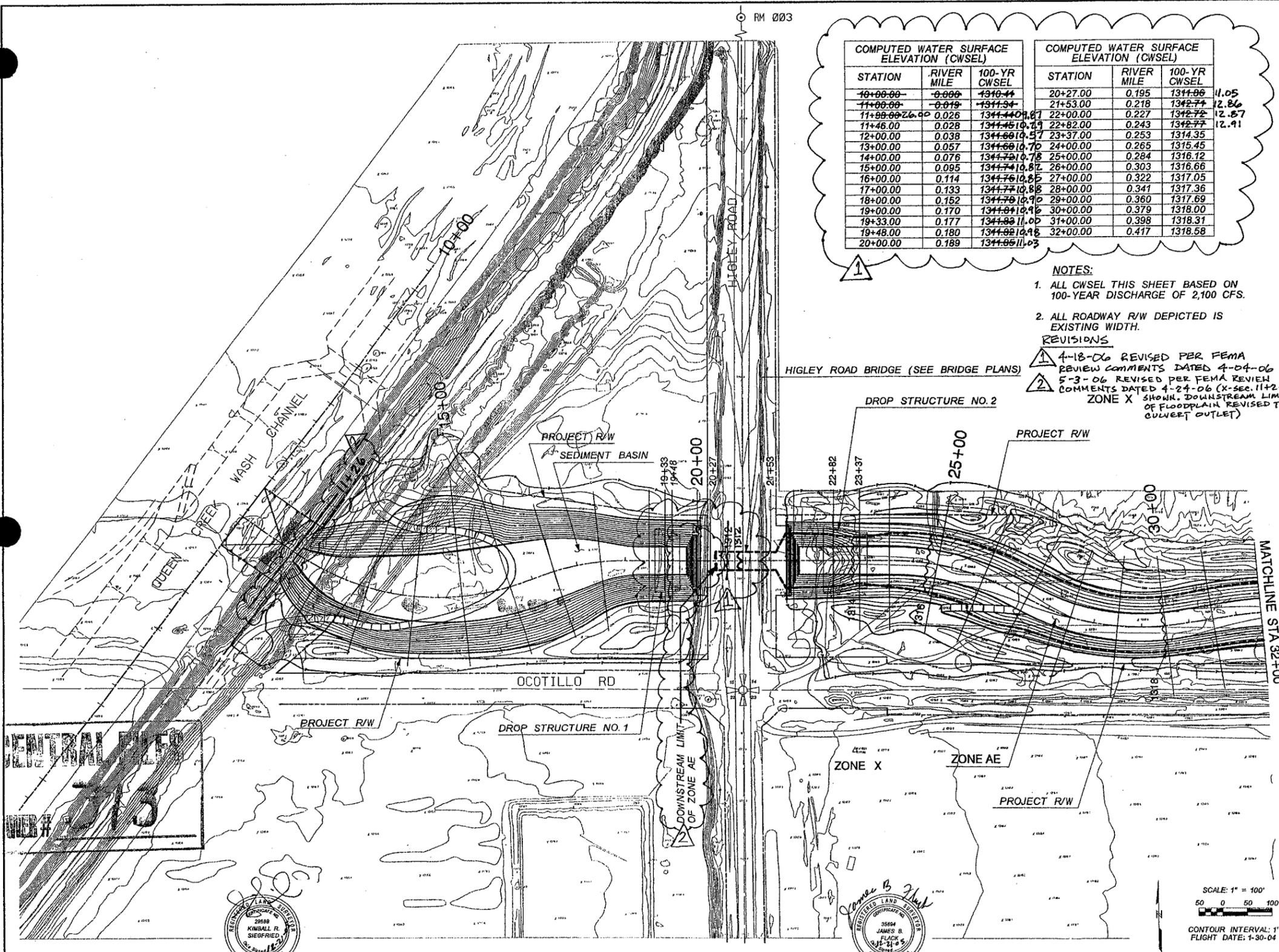
SONOQUI WASH CHANNELIZATION CLOMR

FEDERAL EMERGENCY MANAGEMENT AGENCY

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
TOWN OF GILBERT
TOWN OF QUEEN CREEK


Stanley Consultants INC.
 2929 East Camelback Road, Suite 130, Phoenix, Arizona 85016-4425
 www.stanleygroup.com

G.4 Work Maps

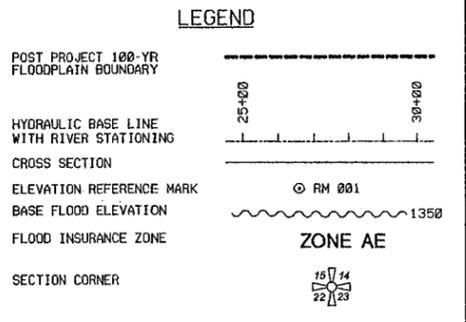


COMPUTED WATER SURFACE ELEVATION (CWSEL)			COMPUTED WATER SURFACE ELEVATION (CWSEL)		
STATION	RIVER MILE	100-YR CWSEL	STATION	RIVER MILE	100-YR CWSEL
10+00.00	-0.000	1310.44	20+27.00	0.195	1311.06
11+00.00	-0.019	1311.34	21+53.00	0.218	1312.77
11+99.00	0.000	1311.40	22+00.00	0.227	1312.72
11+46.00	0.028	1311.45	22+82.00	0.243	1312.77
12+00.00	0.038	1311.60	23+37.00	0.253	1314.35
13+00.00	0.057	1311.69	24+00.00	0.265	1315.45
14+00.00	0.076	1311.79	25+00.00	0.284	1316.12
15+00.00	0.095	1311.74	26+00.00	0.303	1316.66
16+00.00	0.114	1311.76	27+00.00	0.322	1317.05
17+00.00	0.133	1311.77	28+00.00	0.341	1317.36
18+00.00	0.152	1311.79	29+00.00	0.360	1317.69
19+00.00	0.170	1311.81	30+00.00	0.379	1318.00
19+33.00	0.177	1311.89	31+00.00	0.398	1318.31
19+48.00	0.180	1311.82	32+00.00	0.417	1318.58
20+00.00	0.189	1311.89			

NOTES:
 1. ALL CWSEL THIS SHEET BASED ON 100-YEAR DISCHARGE OF 2,100 CFS.
 2. ALL ROADWAY R/W DEPICTED IS EXISTING WIDTH.

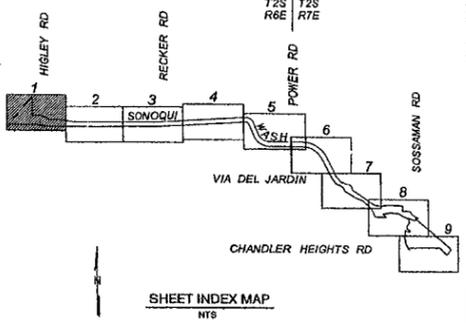
REVISIONS
 1-18-06 REVISED PER FEMA REVIEW COMMENTS DATED 4-04-06
 5-3-06 REVISED PER FEMA REVIEW COMMENTS DATED 4-24-06 (X-SEC. 11+26 ZONE X SHOWS DOWNSTREAM LIMIT OF FLOODPLAIN REVISED TO CULVERT OUTLET)

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 IN COOPERATION WITH THE TOWN OF GILBERT AND THE TOWN OF QUEEN CREEK
 SONOQUI WASH CHANNELIZATION
 QUEEN CREEK WASH TO CHANDLER HEIGHTS RD
 FCD CONSTRUCTION CONTRACT 2004C074
 CLOMR



ELEVATION REFERENCE MARKS
 NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

ID NUMBER	ELEVATION (FT)	DESCRIPTION LOCATION
RM 001	1354.4703	BCH AT CORNER OF OCOTILLO RD & POWER RD
RM 002	1378.6092	BC AT CORNER OF SOSSAMAN RD & CHANDLER HEIGHTS RD
RM 003	1328.2496	FD BC HIGLEY RD 1/2 MI NORTH OF OCOTILLO RD



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 ENGINEERING DIVISION

TOWN OF QUEEN CREEK TOWN OF GILBERT

SONOQUI WASH CHANNELIZATION
 QUEEN CREEK WASH TO CHANDLER HEIGHTS ROAD
 CLOMR

	BY	DATE
DESIGNED	NDV	10/05
DRAWN	LRJ	10/05
CHECKED	GSB	10/05

Stanley Consultants Inc. 2979 East Camelback Road Suite 130 Phoenix, Arizona 85016-4015
 www.stanleyconsultants.com (602) 917-6500

EXHIBIT A SONOQUI WASH CHANNELIZATION CLOMR SHEET OF 1 9

REVISED 4-18-06
 REVISED 5-3-06

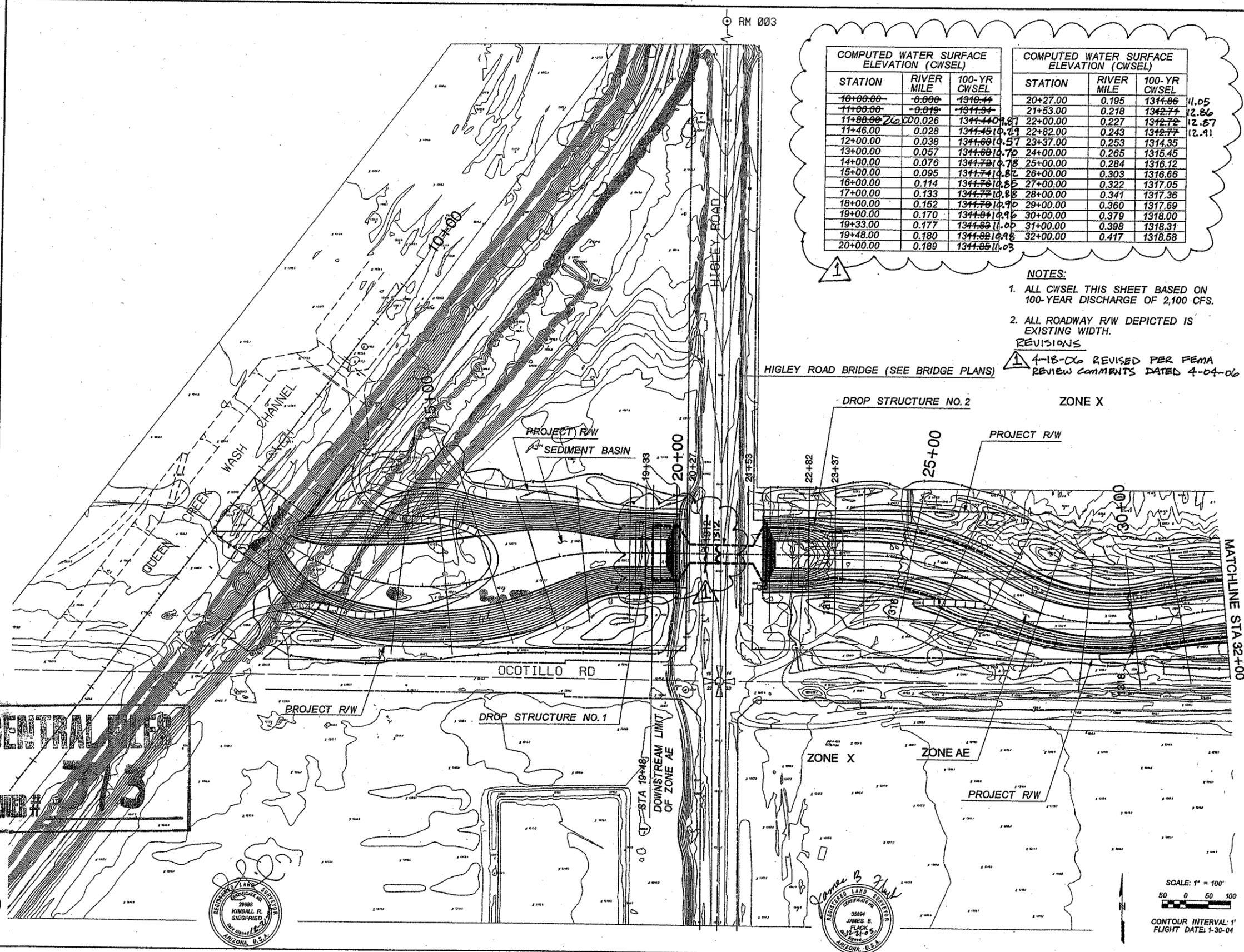
COOPER AERIAL SURVEY CO. I, KIMBALL R. SIEGFRIED, ARIZONA REGISTERED LAND SURVEYOR #29888 CERTIFY THAT THIS MAP HAS BEEN PRODUCED BY PHOTOGRAMMETRIC METHODS AND MEETS NATIONAL MAPPING ACCURACY STANDARDS FOR 1 FOOT CONTOUR INTERVAL MAP AT A SCALE OF 1"=40'. THE ABOVE IS SUBJECT TO THE FIELD CONTROL ACCURACY PROVIDED BY STANLEY CONSULTANTS.

STANLEY CONSULTANTS I, JAMES B. FLACK, ARIZONA REGISTERED LAND SURVEYOR #3564 CERTIFY THAT THE HORIZONTAL AND VERTICAL SURVEY CONTROL USED TO PRODUCE PHOTOGRAMMETRIC MAPPING FOR THIS PROJECT IS CORRECT AND ACCURATE WITHIN CONTRACT SPECIFICATIONS.

James B. Flack 3564 JAMES B. FLACK ARIZONA REGISTERED LAND SURVEYOR #3564 ARIZONA, U.S.A.

SCALE: 1" = 100'
 50 0 50 100
 CONTOUR INTERVAL: 1'
 FLIGHT DATE: 1-30-04

Drawer 313



COMPUTED WATER SURFACE ELEVATION (CWSEL)			COMPUTED WATER SURFACE ELEVATION (CWSEL)		
STATION	RIVER MILE	100-YR CWSEL	STATION	RIVER MILE	100-YR CWSEL
10+00.00	0.000	1310.44	20+27.00	0.195	1311.86
11+00.00	0.019	1311.34	21+53.00	0.218	1312.74
11+00.00	0.026	1311.40	22+00.00	0.227	1312.72
11+46.00	0.028	1311.45	22+82.00	0.243	1312.77
12+00.00	0.038	1311.50	23+37.00	0.253	1312.85
13+00.00	0.057	1311.60	24+00.00	0.265	1312.95
14+00.00	0.076	1311.70	25+00.00	0.284	1313.12
15+00.00	0.095	1311.79	26+00.00	0.303	1313.28
16+00.00	0.114	1311.88	27+00.00	0.322	1313.45
17+00.00	0.133	1311.97	28+00.00	0.341	1313.62
18+00.00	0.152	1312.06	29+00.00	0.360	1313.80
19+00.00	0.170	1312.15	30+00.00	0.379	1313.98
19+33.00	0.177	1312.24	31+00.00	0.398	1314.16
19+48.00	0.180	1312.33	32+00.00	0.417	1314.34
20+00.00	0.189	1312.42			

NOTES:

- ALL CWSEL THIS SHEET BASED ON 100-YEAR DISCHARGE OF 2,100 CFS.
- ALL ROADWAY R/W DEPICTED IS EXISTING WIDTH.

REVISIONS

1-18-06 REVISED PER FEMA REVIEW COMMENTS DATED 4-04-06

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

IN COOPERATION WITH THE TOWN OF GILBERT AND THE TOWN OF QUEEN CREEK

SONOQUI WASH CHANNELIZATION
 QUEEN CREEK WASH TO CHANDLER HEIGHTS RD
 FCD CONSTRUCTION CONTRACT 2004C074
 CLOMR

LEGEND

POST PROJECT 100-YR FLOODPLAIN BOUNDARY: [Symbol]

HYDRAULIC BASE LINE WITH RIVER STATIONING: [Symbol]

CROSS SECTION: [Symbol]

ELEVATION REFERENCE MARK: [Symbol]

BASE FLOOD ELEVATION: [Symbol]

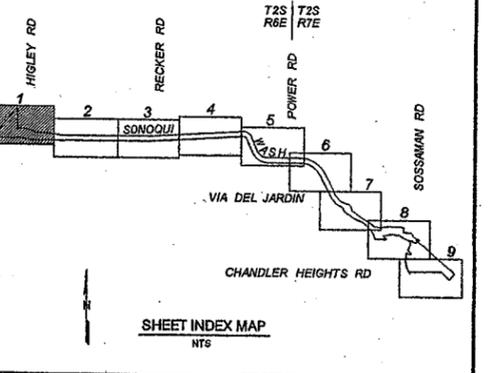
FLOOD INSURANCE ZONE: ZONE AE

SECTION CORNER: [Symbol]

ELEVATION REFERENCE MARKS

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

ID NUMBER	ELEVATION (FT)	DESCRIPTION LOCATION
RM 001	1354.4703	BCH AT CORNER OF OCOTILLO RD & POWER RD
RM 002	1370.6092	BC AT CORNER OF SOSSAMAN RD & CHANDLER HEIGHTS RD
RM 003	1328.2496	FD BC HIGLEY RD 1/2 MI NORTH OF OCOTILLO RD



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 ENGINEERING DIVISION

TOWN OF QUEEN CREEK TOWN OF GILBERT

SONOQUI WASH CHANNELIZATION
 QUEEN CREEK WASH TO CHANDLER HEIGHTS ROAD
 CLOMR

DESIGNED	BY	DATE
NDV	NDV	10/05
DRAWN	LRJ	10/05
CHECKED	GSB	10/05

Stanley Consultants Inc. 2009 East Camelback Road, Suite 150, Phoenix, Arizona 85016-4425
 www.stanleyconsultants.com 602.942.6200

EXHIBIT A SONOQUI WASH CHANNELIZATION CLOMR SHEET OF 1 9

CENTRAL
 DRAWER # 313



COOPER AERIAL SURVEY CO. I, KIMBALL R. SIEGFRIED, ARIZONA REGISTERED LAND SURVEYOR #29888 CERTIFY THAT THIS MAP HAS BEEN PRODUCED BY PHOTOGRAMMETRIC METHODS AND MEETS NATIONAL MAPPING ACCURACY STANDARDS FOR 1 FOOT CONTOUR INTERVAL MAP AT A SCALE OF 1"=40'. THE ABOVE IS SUBJECT TO THE FIELD CONTROL ACCURACY PROVIDED BY STANLEY CONSULTANTS.

STANLEY CONSULTANTS I, JAMES B. FLACK, ARIZONA REGISTERED LAND SURVEYOR #35694 CERTIFY THAT THE HORIZONTAL AND VERTICAL SURVEY CONTROL USED TO PRODUCE PHOTOGRAMMETRIC MAPPING FOR THIS PROJECT IS CORRECT AND ACCURATE WITHIN CONTRACT SPECIFICATIONS.

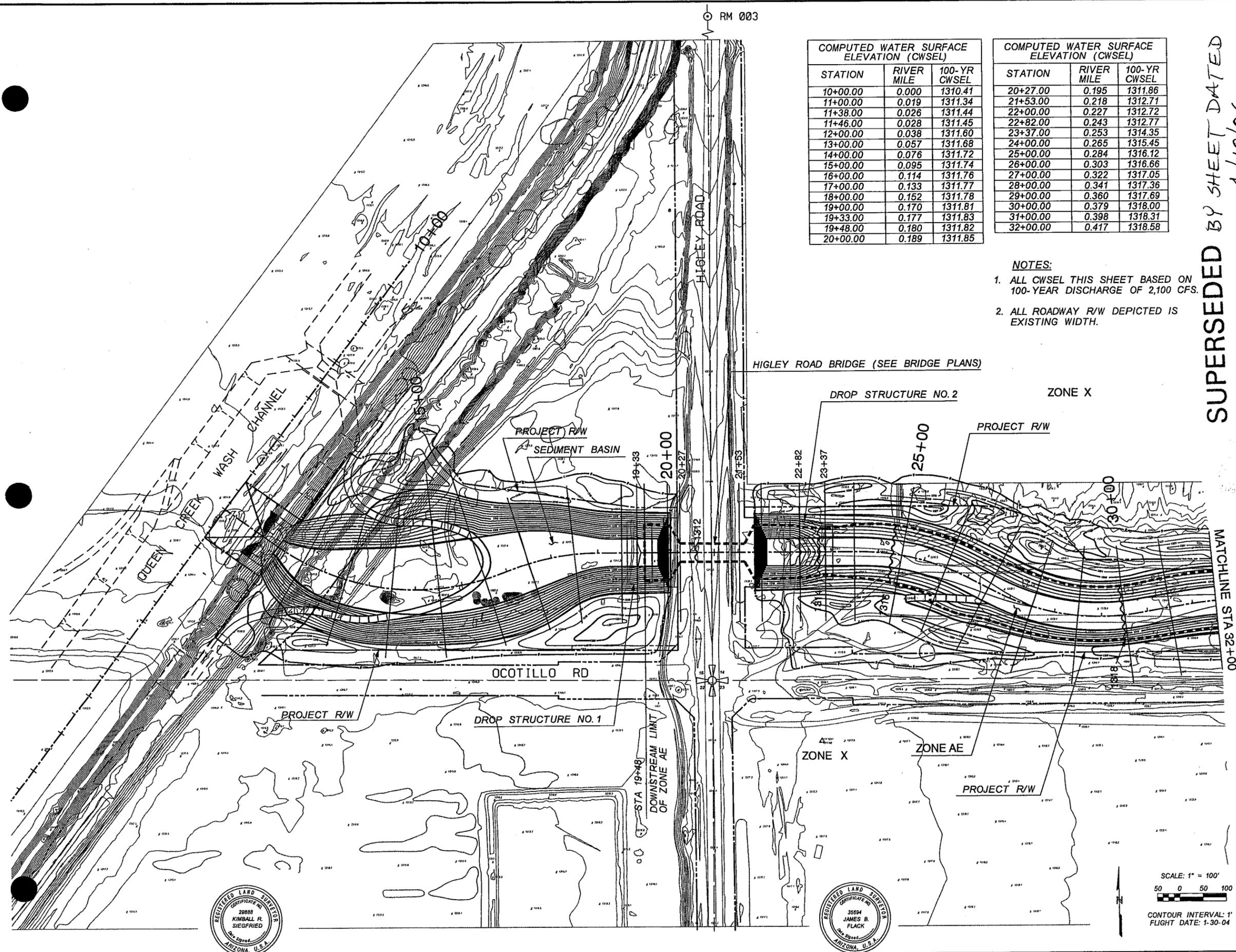
SUPERSEDED BY SHEET DATED 5/3/06

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 IN COOPERATION WITH THE TOWN OF GILBERT AND THE TOWN OF QUEEN CREEK
 SONOQUI WASH CHANNELIZATION
 QUEEN CREEK WASH TO CHANDLER HEIGHTS RD
 FCD CONSTRUCTION CONTRACT 2004C074
 CLOMR

SUPERSEDED BY SHEET DATED 4/18/06

COMPUTED WATER SURFACE ELEVATION (CWSEL)			COMPUTED WATER SURFACE ELEVATION (CWSEL)		
STATION	RIVER MILE	100-YR CWSEL	STATION	RIVER MILE	100-YR CWSEL
10+00.00	0.000	1310.41	20+27.00	0.195	1311.86
11+00.00	0.019	1311.34	21+53.00	0.218	1312.71
11+38.00	0.026	1311.44	22+00.00	0.227	1312.72
11+46.00	0.028	1311.45	22+82.00	0.243	1312.77
12+00.00	0.038	1311.60	23+37.00	0.253	1314.35
13+00.00	0.057	1311.68	24+00.00	0.265	1315.45
14+00.00	0.076	1311.72	25+00.00	0.284	1316.12
15+00.00	0.095	1311.74	26+00.00	0.303	1316.66
16+00.00	0.114	1311.76	27+00.00	0.322	1317.05
17+00.00	0.133	1311.77	28+00.00	0.341	1317.36
18+00.00	0.152	1311.78	29+00.00	0.360	1317.69
19+00.00	0.170	1311.81	30+00.00	0.379	1318.00
19+33.00	0.177	1311.83	31+00.00	0.398	1318.31
19+48.00	0.180	1311.82	32+00.00	0.417	1318.58
20+00.00	0.189	1311.85			

- NOTES:**
- ALL CWSEL THIS SHEET BASED ON 100-YEAR DISCHARGE OF 2,100 CFS.
 - ALL ROADWAY R/W DEPICTED IS EXISTING WIDTH.

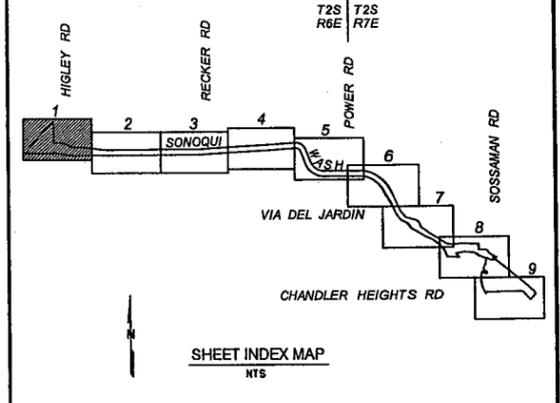


LEGEND

POST PROJECT 100-YR FLOODPLAIN BOUNDARY	-----
HYDRAULIC BASE LINE WITH RIVER STATIONING	-----
CROSS SECTION	-----
ELEVATION REFERENCE MARK	○ RM 001
BASE FLOOD ELEVATION	~~~~~ 1350
FLOOD INSURANCE ZONE	ZONE AE
SECTION CORNER	15 14 22 23

ELEVATION REFERENCE MARKS
 NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

ID NUMBER	ELEVATION (FT)	DESCRIPTION LOCATION
RM 001	1354.4703	BCH AT CORNER OF OCOTILLO RD & POWER RD
RM 002	1370.6092	BC AT CORNER OF SOSSAMAN RD & CHANDLER HEIGHTS RD
RM 003	1328.2496	FD BC HIGLEY RD 1/2 MI NORTH OF OCOTILLO RD



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 ENGINEERING DIVISION

TOWN OF QUEEN CREEK TOWN OF GILBERT

SONOQUI WASH CHANNELIZATION
 QUEEN CREEK WASH TO CHANDLER HEIGHTS ROAD
 CLOMR

	BY	DATE
DESIGNED	NDV	10/05
DRAWN	LRJ	10/05
CHECKED	GSB	10/05

Stanley Consultants Inc. 2225 East Camelback Road, Suite 130, Phoenix, Arizona 85016-4425
 www.stanleygroup.com (602) 912-6200

EXHIBIT A SHEET OF 9

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
IN COOPERATION WITH
THE TOWN OF GILBERT AND
THE TOWN OF QUEEN CREEK
SONOQUI WASH CHANNELIZATION
QUEEN CREEK WASH TO CHANDLER HEIGHTS RD
FCD CONSTRUCTION CONTRACT 2004C074
CLOMR

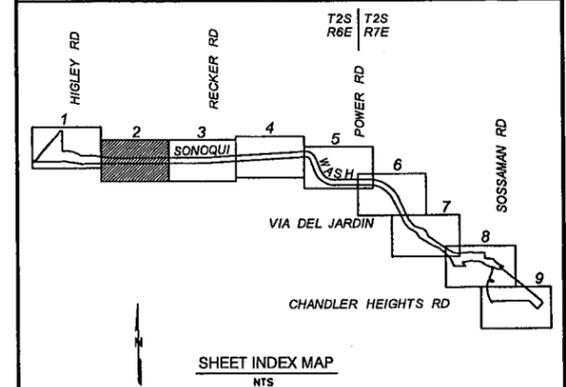
LEGEND

POST PROJECT 100-YR FLOODPLAIN BOUNDARY	-----
HYDRAULIC BASE LINE WITH RIVER STATIONING	-----
CROSS SECTION	-----
ELEVATION REFERENCE MARK	⊙ RM 001
BASE FLOOD ELEVATION	~~~~~ 1350
FLOOD INSURANCE ZONE	ZONE AE
SECTION CORNER	15 14 22 23

ELEVATION REFERENCE MARKS

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

ID NUMBER	ELEVATION (FT)	DESCRIPTION LOCATION
RM 001	1354.4703	BCHH AT CORNER OF OCOTILLO RD & POWER RD
RM 002	1370.6092	BC AT CORNER OF SOSSAMAN RD & CHANDLER HEIGHTS RD
RM 003	1328.2496	FD BC HIGLEY RD 1/2 MI NORTH OF OCOTILLO RD



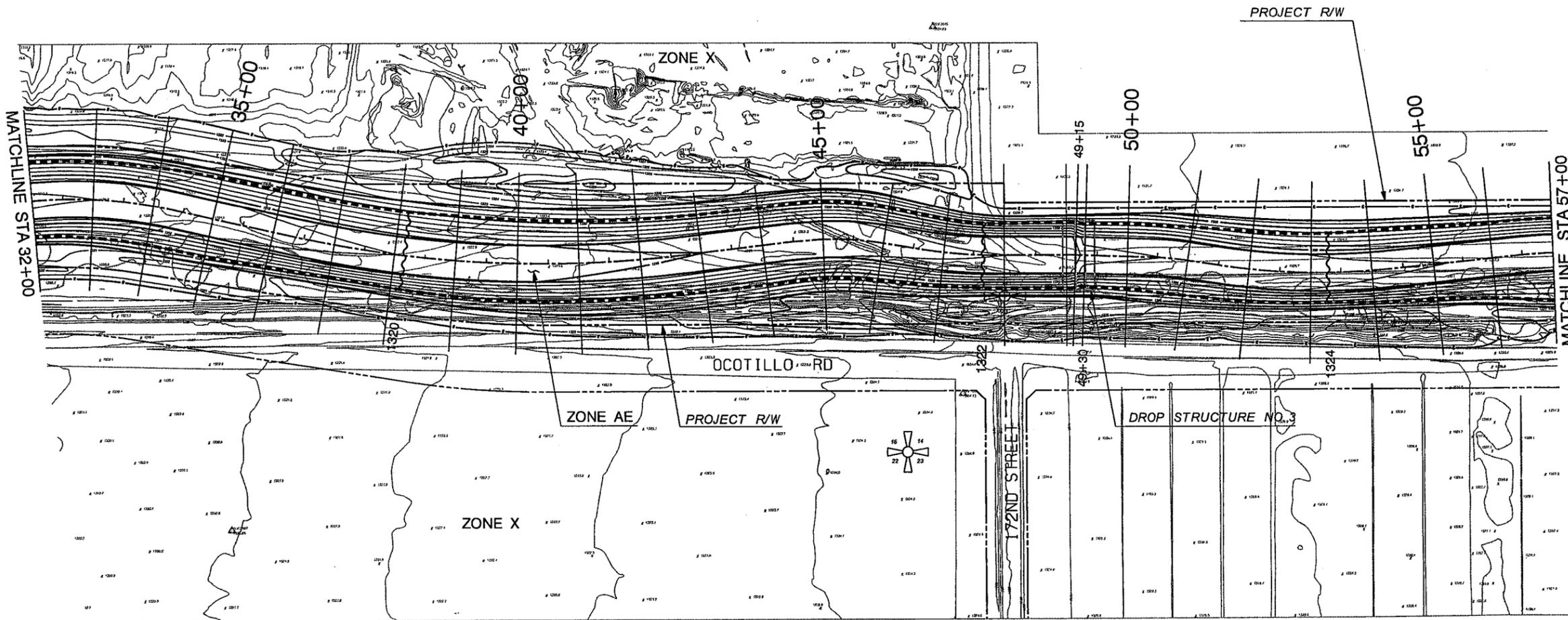
FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION



SONOQUI WASH CHANNELIZATION
QUEEN CREEK WASH TO CHANDLER HEIGHTS ROAD
CLOMR

	BY	DATE
DESIGNED	NDV	10/05
DRAWN	LRJ	10/05
CHECKED	GJB	10/05

Stanley Consultants Inc. 2009 East Camelback Road, Suite 130, Phoenix, Arizona 85016-4125
www.stanleygroup.com (602) 612-6500

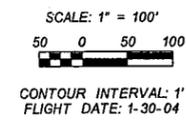


STATION	RIVER MILE	100-YR CWSEL
32+00.00	0.417	1318.58
33+00.00	0.436	1318.84
34+00.00	0.455	1319.08
35+00.00	0.473	1319.31
36+00.00	0.492	1319.52
37+00.00	0.511	1319.74
38+00.00	0.530	1319.97
39+00.00	0.549	1320.19
40+00.00	0.568	1320.40
41+00.00	0.587	1320.61
42+00.00	0.606	1320.81
43+00.00	0.625	1321.02
44+00.00	0.644	1321.23
45+00.00	0.663	1321.43

STATION	RIVER MILE	100-YR CWSEL
46+00.00	0.682	1321.64
47+00.00	0.701	1321.85
48+00.00	0.720	1322.07
49+00.00	0.739	1322.27
49+15.00	0.741	1322.28
49+30.00	0.744	1322.06
50+00.00	0.758	1322.46
51+00.00	0.777	1323.01
52+00.00	0.795	1323.50
53+00.00	0.814	1323.89
54+00.00	0.833	1324.25
55+00.00	0.852	1324.57
56+00.00	0.871	1324.87
57+00.00	0.890	1325.15

NOTES:

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STANLEY CONSULTANTS

J. JAMES B. FLACK, ARIZONA REGISTERED LAND SURVEYOR #35694 CERTIFY THAT THE HORIZONTAL AND VERTICAL SURVEY CONTROL USED TO PRODUCE PHOTOGRAMMETRIC MAPPING FOR THIS PROJECT IS CORRECT AND ACCURATE WITHIN CONTRACT SPECIFICATIONS.

EXHIBIT A SONOQUI WASH CHANNELIZATION CLOMR SHEET OF 2 9

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 IN COOPERATION WITH THE TOWN OF GILBERT AND THE TOWN OF QUEEN CREEK
 SONOQUI WASH CHANNELIZATION
 QUEEN CREEK WASH TO CHANDLER HEIGHTS RD
 FCD CONSTRUCTION CONTRACT 2004C074
 CLOMR

LEGEND

POST PROJECT 100-YR FLOODPLAIN BOUNDARY: - - - - -

HYDRAULIC BASE LINE WITH RIVER STATIONING: 25+00 30+00

CROSS SECTION: [Symbol]

ELEVATION REFERENCE MARK: ○ RM 001

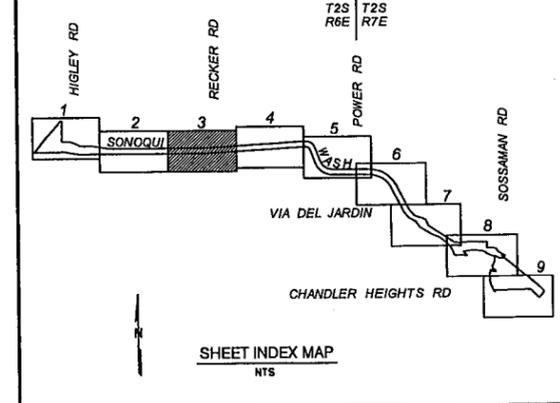
BASE FLOOD ELEVATION: ~~~~~ 1350

FLOOD INSURANCE ZONE: ZONE AE

SECTION CORNER: [Symbol]

ELEVATION REFERENCE MARKS
 NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

ID NUMBER	ELEVATION (FT)	DESCRIPTION	LOCATION
RM 001	1354.4703	BCHN AT CORNER OF OCOILLO RD & POWER RD	
RM 002	1370.6092	BC AT CORNER OF SOSSAMAN RD & CHANDLER HEIGHTS RD	
RM 003	1328.2496	FD BC HIGLEY RD 1/2 MI NORTH OF OCOILLO RD	



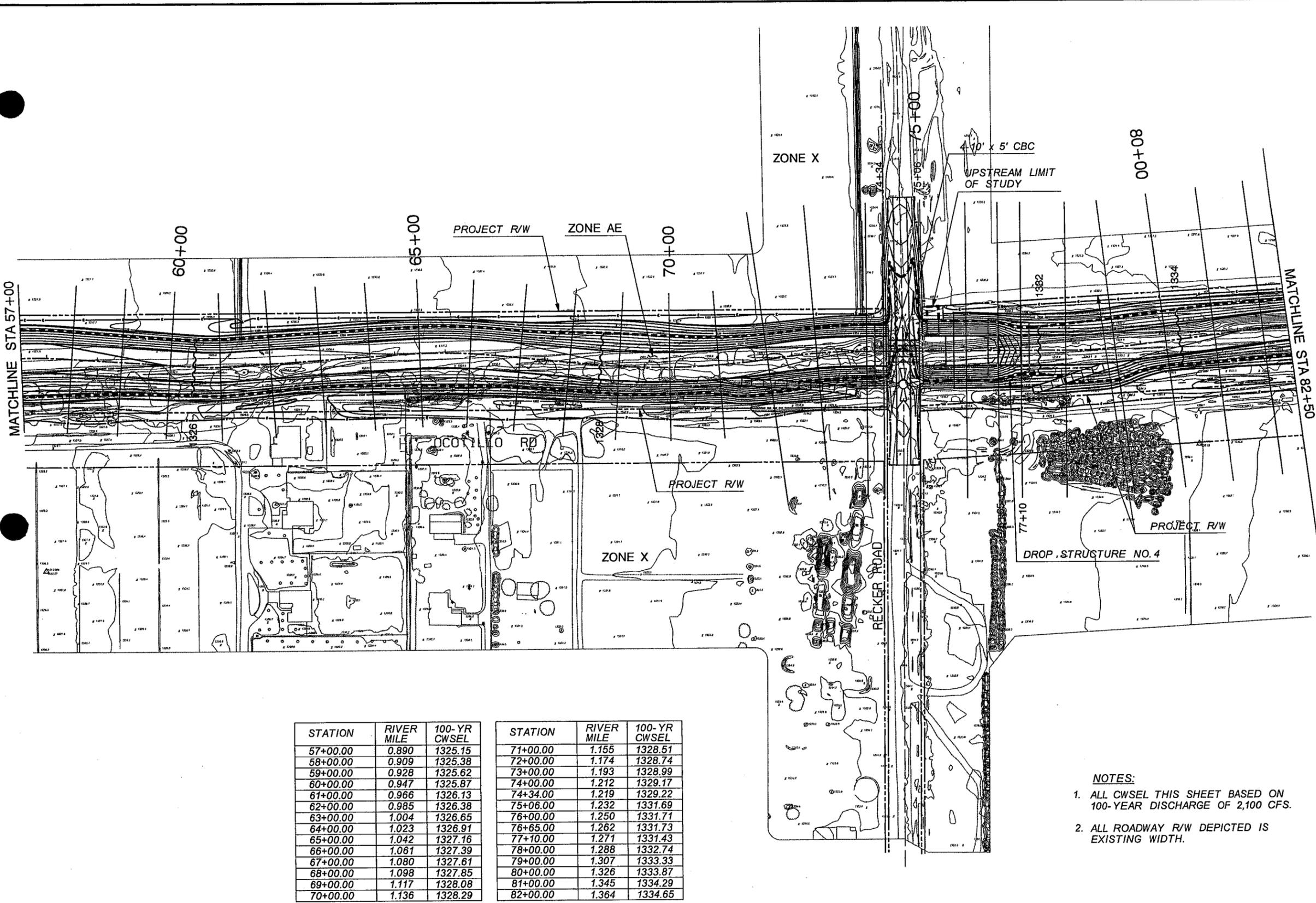
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

TOWN OF QUEEN CREEK TOWN OF GILBERT

SONOQUI WASH CHANNELIZATION
 QUEEN CREEK WASH TO CHANDLER HEIGHTS ROAD
 CLOMR

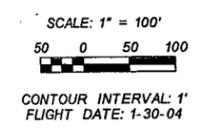
	BY	DATE
DESIGNED	NDV	10/05
DRAWN	LRJ	10/05
CHECKED	GSB	10/05

Stanley Consultants Inc. 2929 East Camelback Road, Suite 130, Phoenix, Arizona 85016-4425
 www.stanleygroup.com (602) 912-6500



STATION	RIVER MILE	100-YR CWSEL	STATION	RIVER MILE	100-YR CWSEL
57+00.00	0.890	1325.15	71+00.00	1.155	1328.51
58+00.00	0.909	1325.38	72+00.00	1.174	1328.74
59+00.00	0.928	1325.62	73+00.00	1.193	1328.99
60+00.00	0.947	1325.87	74+00.00	1.212	1329.17
61+00.00	0.966	1326.13	74+34.00	1.219	1329.22
62+00.00	0.985	1326.38	75+06.00	1.232	1331.69
63+00.00	1.004	1326.65	76+00.00	1.250	1331.71
64+00.00	1.023	1326.91	76+65.00	1.262	1331.73
65+00.00	1.042	1327.16	77+10.00	1.271	1331.43
66+00.00	1.061	1327.39	78+00.00	1.288	1332.74
67+00.00	1.080	1327.61	79+00.00	1.307	1333.33
68+00.00	1.098	1327.85	80+00.00	1.326	1333.87
69+00.00	1.117	1328.08	81+00.00	1.345	1334.29
70+00.00	1.136	1328.29	82+00.00	1.364	1334.65

- NOTES:**
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 - ALL ROADWAY R/W DEPICTED IS EXISTING WIDTH.



COOPER AERIAL SURVEY CO., I. KIMBALL R. SIEGFRIED, ARIZONA REGISTERED LAND SURVEYOR #29888 CERTIFY THAT THIS MAP HAS BEEN PRODUCED BY PHOTOGRAMMETRIC METHODS AND MEETS NATIONAL MAPPING ACCURACY STANDARDS FOR 1 FOOT CONTOUR INTERVAL MAP AT A SCALE OF 1"=40'. THE ABOVE IS SUBJECT TO THE FIELD CONTROL ACCURACY PROVIDED BY STANLEY CONSULTANTS.

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FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

IN COOPERATION WITH
THE TOWN OF GILBERT AND
THE TOWN OF QUEEN CREEK

SONOQUI WASH CHANNELIZATION
QUEEN CREEK WASH TO CHANDLER HEIGHTS RD
FCD CONSTRUCTION CONTRACT 2004C074
CLOMR

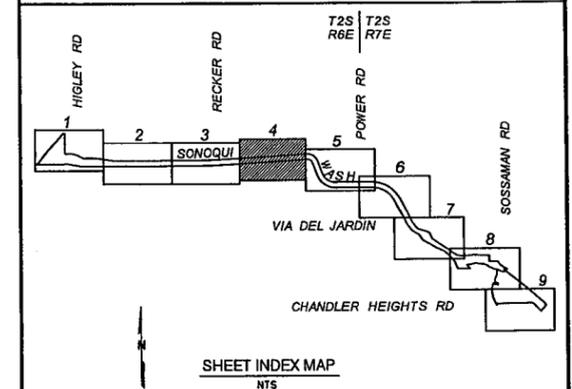
LEGEND

POST PROJECT 100-YR FLOODPLAIN BOUNDARY	-----
HYDRAULIC BASE LINE WITH RIVER STATIONING	-----
CROSS SECTION	
ELEVATION REFERENCE MARK	○ RM 001
BASE FLOOD ELEVATION	~~~~~ 1350
FLOOD INSURANCE ZONE	ZONE AE
SECTION CORNER	15 14 22 23

ELEVATION REFERENCE MARKS

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

ID NUMBER	ELEVATION (FT)	DESCRIPTION LOCATION
RM 001	1354.4783	BCHH AT CORNER OF OCOTILLO RD & POWER RD
RM 002	1378.6892	BC AT CORNER OF SOSSAMAN RD & CHANDLER HEIGHTS RD
RM 003	1328.2496	FD BC HIGLEY RD 1/2 MI NORTH OF OCOTILLO RD



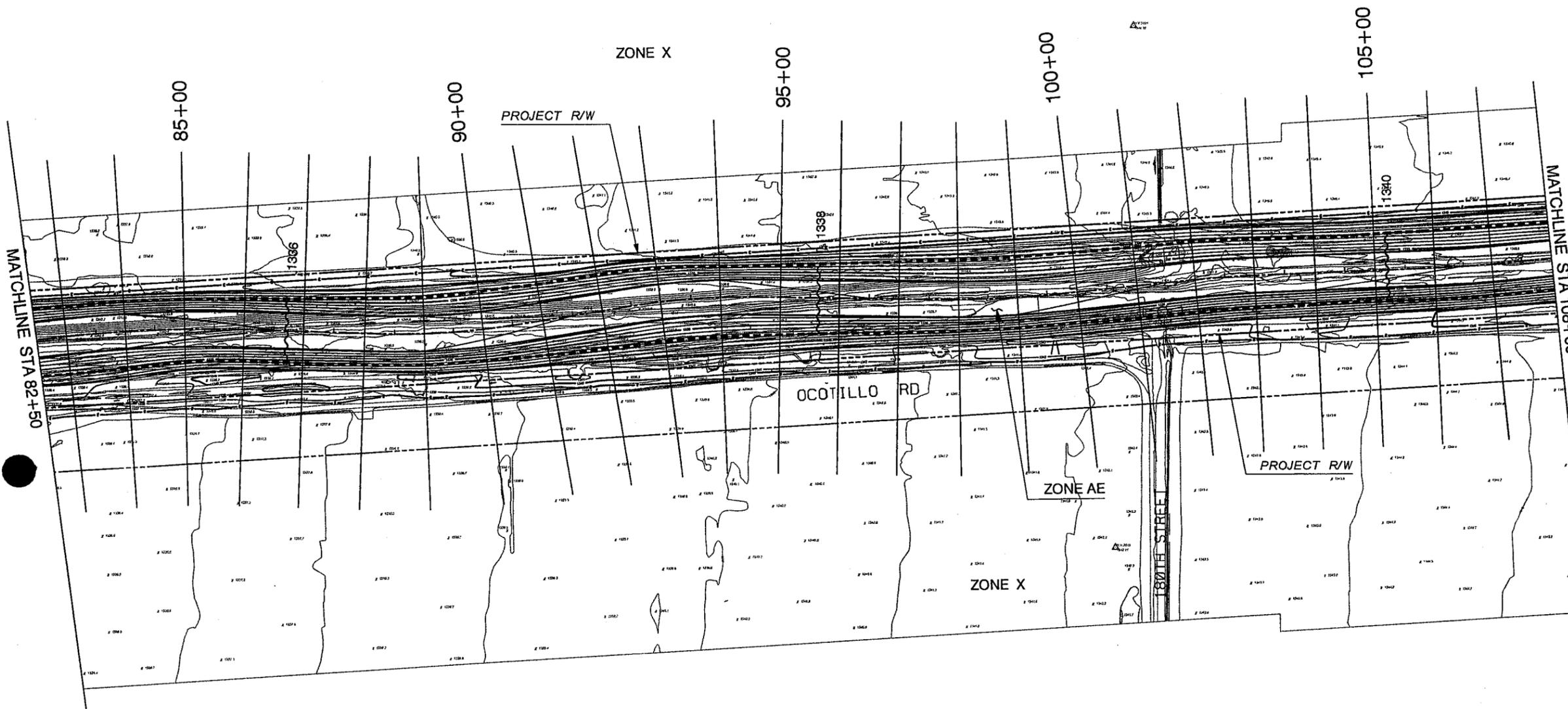
FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION



SONOQUI WASH CHANNELIZATION
QUEEN CREEK WASH TO CHANDLER HEIGHTS ROAD
CLOMR

DESIGNED	BY	DATE
NDV	NDV	10/05
LRJ	LRJ	10/05
GSB	GSB	10/05

Stanley Consultants Inc. 2029 East Camelback Road, Suite 130, Phoenix, Arizona 85016-4425
www.stanleygroup.com (602) 912-6500



STATION	RIVER MILE	100-YR CWSEL	STATION	RIVER MILE	100-YR CWSEL
83+00.00	1.383	1334.96	96+00.00	1.629	1338.07
84+00.00	1.402	1335.24	97+00.00	1.648	1338.28
85+00.00	1.420	1335.51	98+00.00	1.667	1338.49
86+00.00	1.439	1335.80	99+00.00	1.686	1338.69
87+00.00	1.458	1336.07	100+00.00	1.705	1338.90
88+00.00	1.477	1336.33	101+00.00	1.723	1339.09
89+00.00	1.496	1336.59	102+00.00	1.742	1339.31
90+00.00	1.515	1336.82	103+00.00	1.761	1339.52
91+00.00	1.534	1337.04	104+00.00	1.780	1339.73
92+00.00	1.553	1337.25	105+00.00	1.799	1339.95
93+00.00	1.572	1337.47	106+00.00	1.818	1340.17
94+00.00	1.591	1337.66	107+00.00	1.837	1340.38
95+00.00	1.610	1337.87	108+00.00	1.856	1340.59

- NOTES:
- ALL CWSEL THIS SHEET BASED ON 100-YEAR DISCHARGE OF 2,100 CFS.
 - ALL ROADWAY R/W DEPICTED IS EXISTING WIDTH.

SCALE: 1" = 100'

50 0 50 100

CONTOUR INTERVAL: 1'

FLIGHT DATE: 1-30-04



COOPER AERIAL SURVEY CO. 1. KIMBALL R. SIEGFRIED, ARIZONA REGISTERED LAND SURVEYOR #29888 CERTIFY THAT THIS MAP HAS BEEN PRODUCED BY PHOTOGRAHMETRIC METHODS AND MEETS NATIONAL MAPPING ACCURACY STANDARDS FOR 1 FOOT CONTOUR INTERVAL MAP AT A SCALE OF 1"=48'. THE ABOVE IS SUBJECT TO THE FIELD CONTROL ACCURACY PROVIDED BY STANLEY CONSULTANTS.

STANLEY CONSULTANTS 1. JAMES B. FLACK, ARIZONA REGISTERED LAND SURVEYOR #35694 CERTIFY THAT THE HORIZONTAL AND VERTICAL SURVEY CONTROL USED TO PRODUCE PHOTOGRAMMETRIC MAPPING FOR THIS PROJECT IS CORRECT AND ACCURATE WITHIN CONTRACT SPECIFICATIONS.

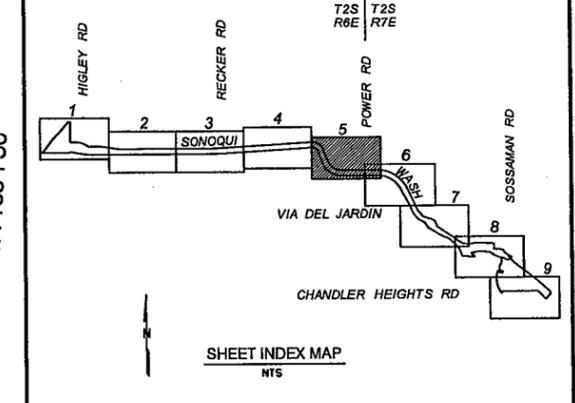
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 IN COOPERATION WITH THE TOWN OF GILBERT AND THE TOWN OF QUEEN CREEK
 SONOQUI WASH CHANNELIZATION
 QUEEN CREEK WASH TO CHANDLER HEIGHTS RD
 FCD CONSTRUCTION CONTRACT 2004C074
 CLOMR

LEGEND

POST PROJECT 100-YR FLOODPLAIN BOUNDARY	-----
HYDRAULIC BASE LINE WITH RIVER STATIONING	-----
CROSS SECTION	-----
ELEVATION REFERENCE MARK	○ RM 001
BASE FLOOD ELEVATION	~~~~~ 1350
FLOOD INSURANCE ZONE	ZONE AE
SECTION CORNER	15 14 22 23

ELEVATION REFERENCE MARKS
 NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

ID NUMBER	ELEVATION (FT)	DESCRIPTION	LOCATION
RM 001	1354.4703	BCHM AT CORNER OF OCOTILLO RD & POWER RD	
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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 ENGINEERING DIVISION

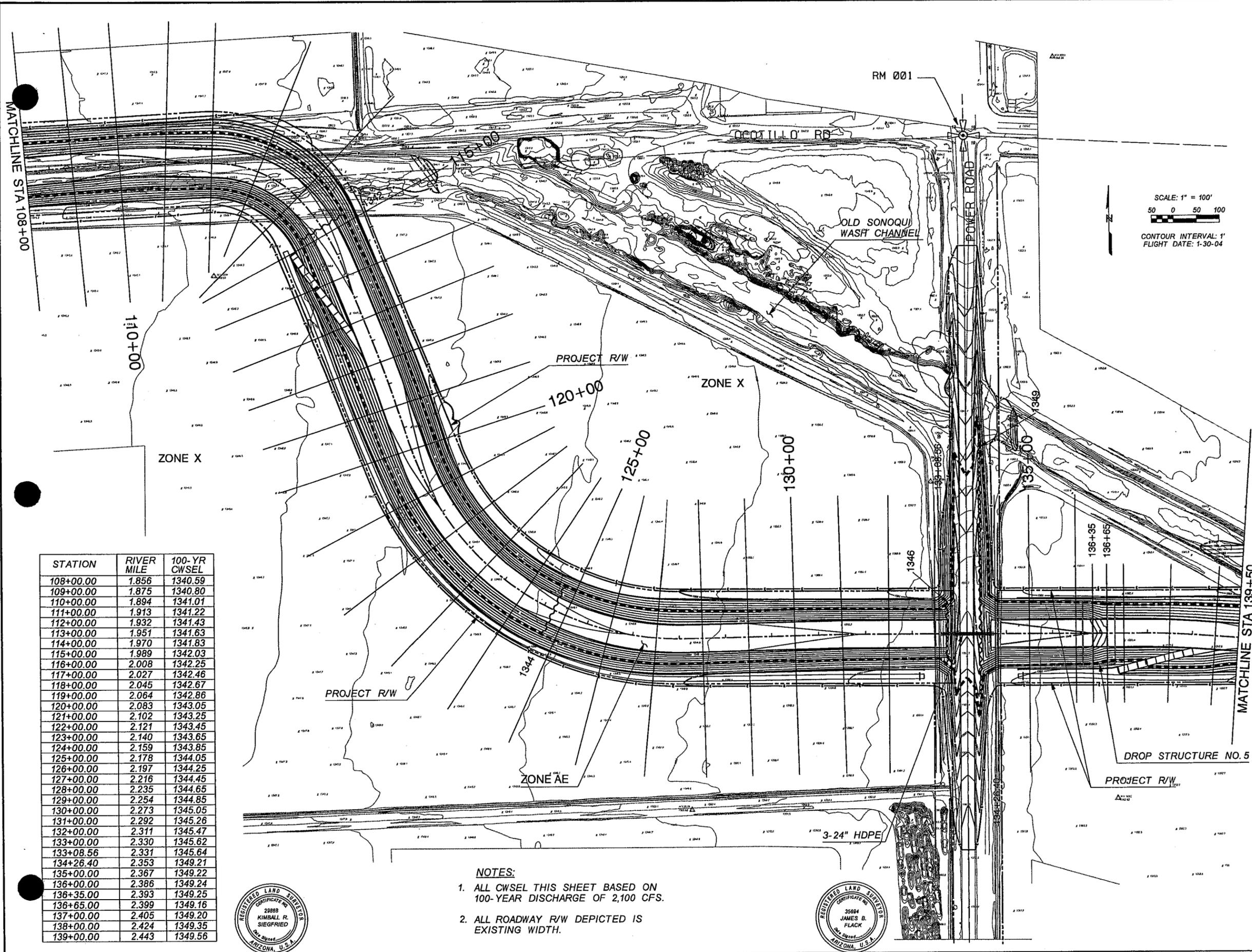
TOWN OF QUEEN CREEK TOWN OF GILBERT

SONOQUI WASH CHANNELIZATION
 QUEEN CREEK WASH TO CHANDLER HEIGHTS ROAD
 CLOMR

DESIGNED	BY	DATE
DRAWN	NDV	10/05
CHECKED	LRJ	10/05
	GSB	10/05

Stanley Consultants Inc. 2020 East Camelback Road, Suite 130, Phoenix, Arizona 85016-4425
 www.stanleygroup.com (602) 912-8500

EXHIBIT A SONOQUI WASH CHANNELIZATION CLOMR SHEET OF 5 9



STATION	RIVER MILE	100-YR CWSEL
108+00.00	1.856	1340.59
109+00.00	1.875	1340.80
110+00.00	1.894	1341.01
111+00.00	1.913	1341.22
112+00.00	1.932	1341.43
113+00.00	1.951	1341.63
114+00.00	1.970	1341.83
115+00.00	1.989	1342.03
116+00.00	2.008	1342.25
117+00.00	2.027	1342.46
118+00.00	2.045	1342.67
119+00.00	2.064	1342.86
120+00.00	2.083	1343.05
121+00.00	2.102	1343.25
122+00.00	2.121	1343.45
123+00.00	2.140	1343.65
124+00.00	2.159	1343.85
125+00.00	2.178	1344.05
126+00.00	2.197	1344.25
127+00.00	2.216	1344.45
128+00.00	2.235	1344.65
129+00.00	2.254	1344.85
130+00.00	2.273	1345.05
131+00.00	2.292	1345.26
132+00.00	2.311	1345.47
133+00.00	2.330	1345.62
133+08.56	2.331	1345.64
134+26.40	2.353	1349.21
135+00.00	2.367	1349.22
136+00.00	2.386	1349.24
136+35.00	2.393	1349.25
136+65.00	2.399	1349.16
137+00.00	2.405	1349.20
138+00.00	2.424	1349.35
139+00.00	2.443	1349.56



NOTES:

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- ALL ROADWAY R/W DEPICTED IS EXISTING WIDTH.

COOPER AERIAL SURVEY CO. 1. KIMBALL R. SIEGFRIED, ARIZONA REGISTERED LAND SURVEYOR #29888 CERTIFY THAT THIS MAP HAS BEEN PRODUCED BY PHOTOGRAMMETRIC METHODS AND MEETS NATIONAL MAPPING ACCURACY STANDARDS FOR 1 FOOT CONTOUR INTERVAL MAP AT A SCALE OF 1" = 48". THE ABOVE IS SUBJECT TO THE FIELD CONTROL ACCURACY PROVIDED BY STANLEY CONSULTANTS.

STANLEY CONSULTANTS

1. JAMES B. FLACK, ARIZONA REGISTERED LAND SURVEYOR #35894 CERTIFY THAT THE HORIZONTAL AND VERTICAL SURVEY CONTROL USED TO PRODUCE PHOTOGRAMMETRIC MAPPING FOR THIS PROJECT IS CORRECT AND ACCURATE WITHIN CONTRACT SPECIFICATIONS.

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

IN COOPERATION WITH
THE TOWN OF GILBERT AND
THE TOWN OF QUEEN CREEK

SONOQUI WASH CHANNELIZATION
QUEEN CREEK WASH TO CHANDLER HEIGHTS RD
FCD CONSTRUCTION CONTRACT 2004C074

CLOMR

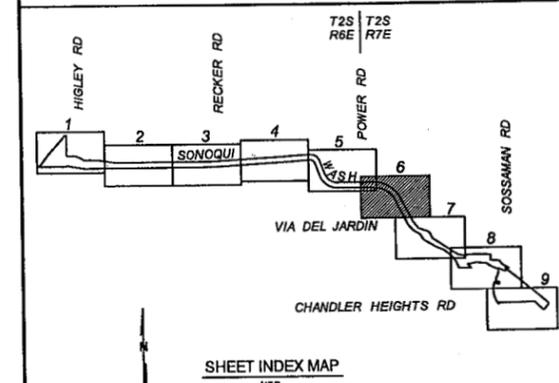
LEGEND

POST PROJECT 100-YR FLOODPLAIN BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER STATIONING	
CROSS SECTION	
ELEVATION REFERENCE MARK	
BASE FLOOD ELEVATION	
FLOOD INSURANCE ZONE	ZONE AE
SECTION CORNER	

ELEVATION REFERENCE MARKS

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

ID NUMBER	ELEVATION (FT)	DESCRIPTION LOCATION
RM 001	1354.4703	BCH AT CORNER OF OCOTILLO RD & POWER RD
RM 002	1370.6092	BC AT CORNER OF SOSSAMAN RD & CHANDLER HEIGHTS RD
RM 003	1328.2496	FD BC HIGLEY RD 1/2 MI NORTH OF OCOTILLO RD



FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION



TOWN OF QUEEN CREEK

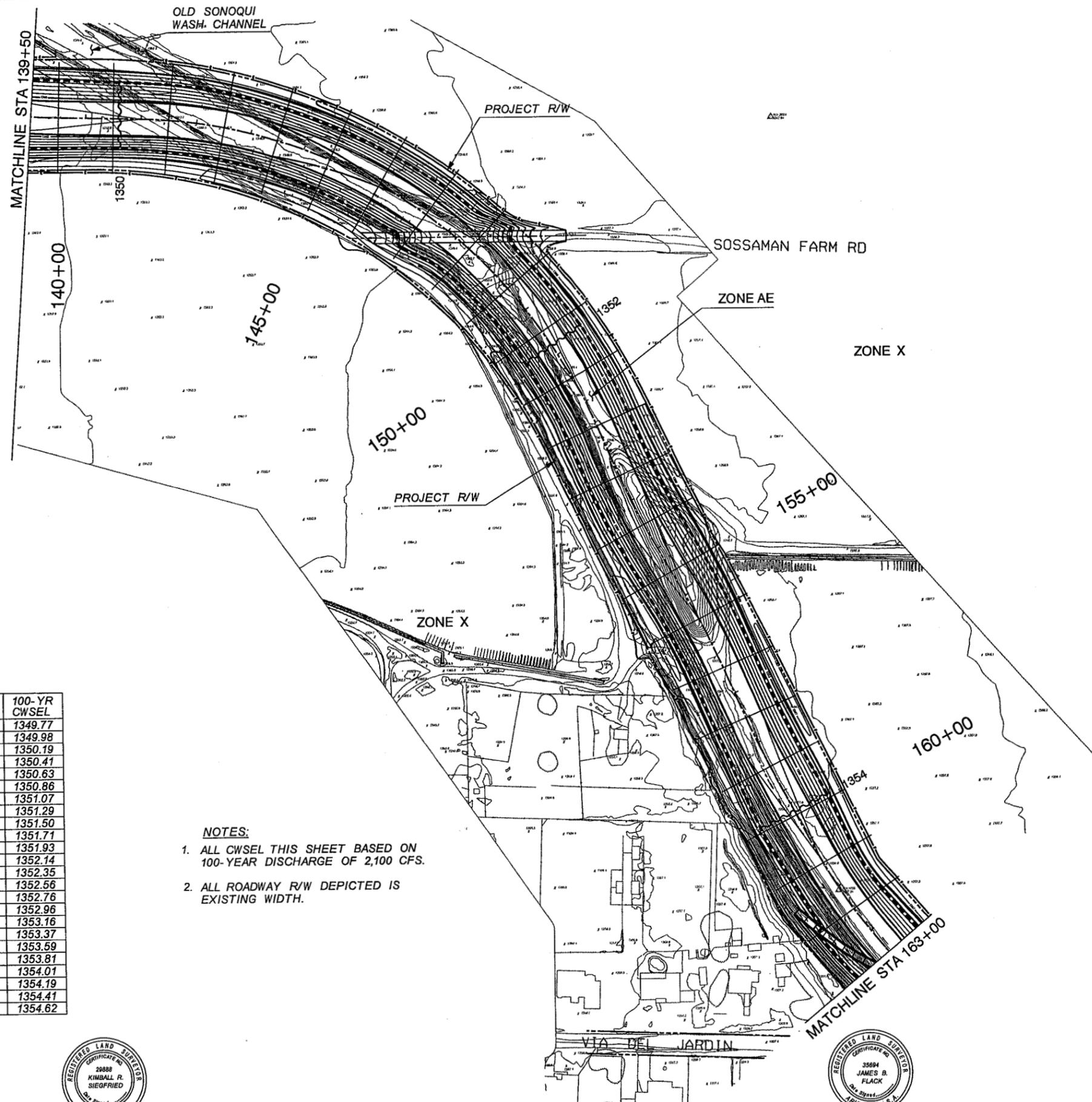


TOWN OF GILBERT

SONOQUI WASH CHANNELIZATION
QUEEN CREEK WASH TO CHANDLER HEIGHTS ROAD
CLOMR

	BY	DATE
DESIGNED	NDV	10/05
DRAWN	LRJ	10/05
CHECKED	GSB	10/05

EXHIBIT A SONOQUI WASH CHANNELIZATION CLOMR SHEET OF 6 9



STATION	RIVER MILE	100-YR CWSEL
140+00.00	2.462	1349.77
141+00.00	2.481	1349.98
142+00.00	2.500	1350.19
143+00.00	2.519	1350.41
144+00.00	2.538	1350.63
145+00.00	2.557	1350.86
146+00.00	2.576	1351.07
147+00.00	2.595	1351.29
148+00.00	2.614	1351.50
149+00.00	2.633	1351.71
150+00.00	2.652	1351.93
151+00.00	2.670	1352.14
152+00.00	2.689	1352.35
153+00.00	2.708	1352.56
154+00.00	2.727	1352.76
155+00.00	2.746	1352.96
156+00.00	2.765	1353.16
157+00.00	2.784	1353.37
158+00.00	2.803	1353.59
159+00.00	2.822	1353.81
160+00.00	2.841	1354.01
161+00.00	2.860	1354.19
162+00.00	2.879	1354.41
163+00.00	2.898	1354.62

- NOTES:
- ALL CWSEL THIS SHEET BASED ON 100-YEAR DISCHARGE OF 2,100 CFS.
 - ALL ROADWAY R/W DEPICTED IS EXISTING WIDTH.

SCALE: 1" = 100'
50 0 50 100
CONTOUR INTERVAL: 1'
FLIGHT DATE: 1-30-04



FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
IN COOPERATION WITH
THE TOWN OF GILBERT AND
THE TOWN OF QUEEN CREEK
SONOQUI WASH CHANNELIZATION
QUEEN CREEK WASH TO CHANDLER HEIGHTS RD
FCD CONSTRUCTION CONTRACT 2004C074
CLOMR

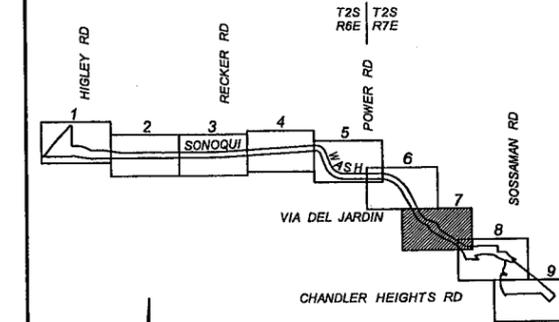
LEGEND

POST PROJECT 100-YR FLOODPLAIN BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER STATIONING	
CROSS SECTION	
ELEVATION REFERENCE MARK	
BASE FLOOD ELEVATION	
FLOOD INSURANCE ZONE	ZONE AE
SECTION CORNER	

ELEVATION REFERENCE MARKS

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

ID NUMBER	ELEVATION (FT)	DESCRIPTION LOCATION
RM 001	1354.4703	BCMH AT CORNER OF OCOTILLO RD & POWER RD
RM 002	1370.6092	BC AT CORNER OF SOSSAMAN RD & CHANDLER HEIGHTS RD
RM 003	1328.2496	FD BC HIGLEY RD 1/2 MI NORTH OF OCOTILLO RD



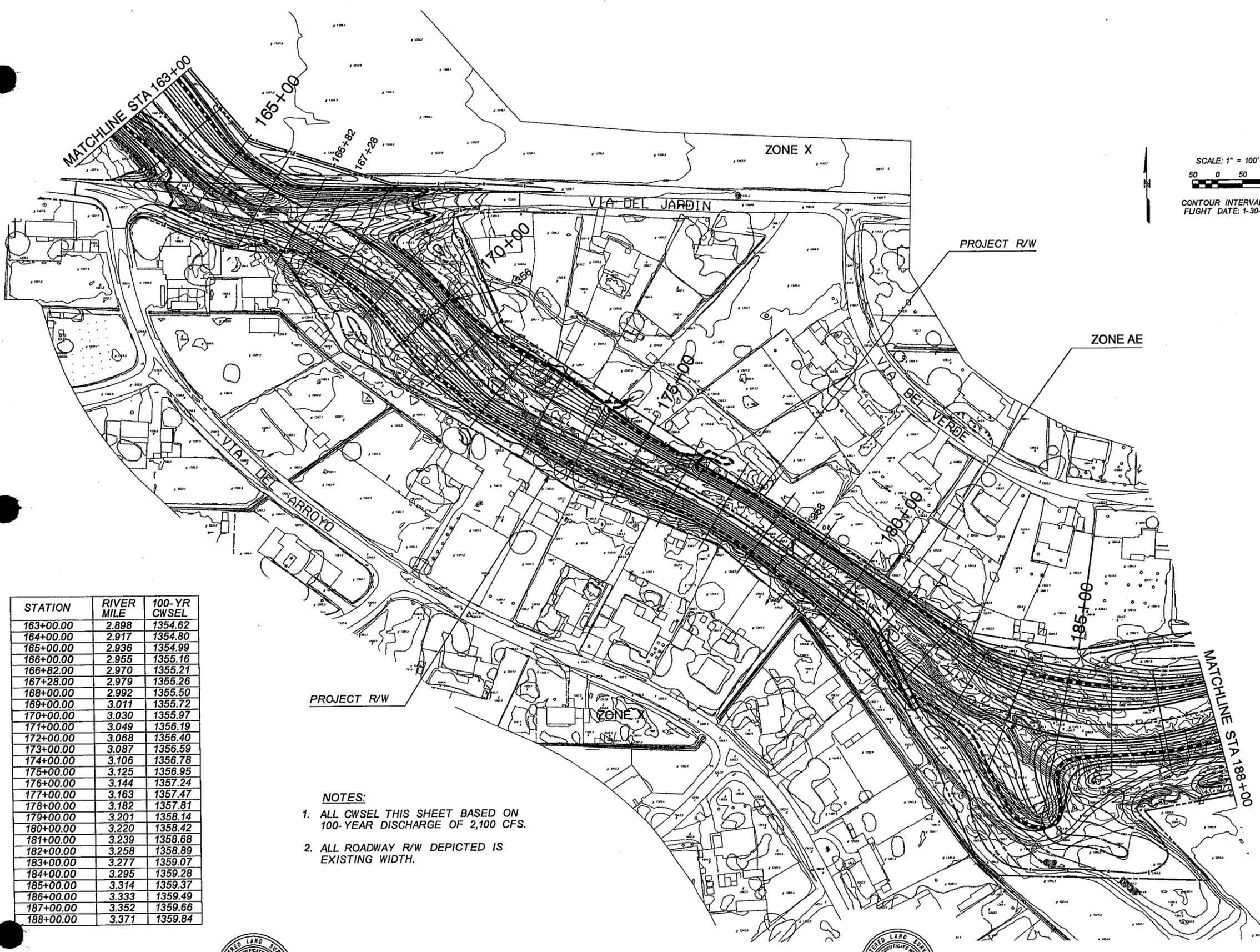
FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION



SONOQUI WASH CHANNELIZATION
QUEEN CREEK WASH TO CHANDLER HEIGHTS ROAD
CLOMR

	BY	DATE
DESIGNED	NDV	10/05
DRAWN	LRJ	10/05
CHECKED	GSB	10/05

EXHIBIT A SONOQUI WASH CHANNELIZATION CLOMR SHEET OF 7 9



SCALE: 1" = 100'
50 0 50 100
CONTOUR INTERVAL: 1'
FLIGHT DATE: 1-30-04

STATION	RIVER MILE	100-YR CWSEL
163+00.00	2.898	1354.62
164+00.00	2.917	1354.80
165+00.00	2.936	1354.99
166+00.00	2.955	1355.16
166+82.00	2.970	1355.21
167+28.00	2.979	1355.26
168+00.00	2.992	1355.50
169+00.00	3.011	1355.72
170+00.00	3.030	1355.97
171+00.00	3.049	1356.19
172+00.00	3.068	1356.40
173+00.00	3.087	1356.59
174+00.00	3.106	1356.78
175+00.00	3.125	1356.95
176+00.00	3.144	1357.24
177+00.00	3.163	1357.47
178+00.00	3.182	1357.81
179+00.00	3.201	1358.14
180+00.00	3.220	1358.42
181+00.00	3.239	1358.68
182+00.00	3.258	1358.89
183+00.00	3.277	1359.07
184+00.00	3.295	1359.28
185+00.00	3.314	1359.37
186+00.00	3.333	1359.49
187+00.00	3.352	1359.66
188+00.00	3.371	1359.84

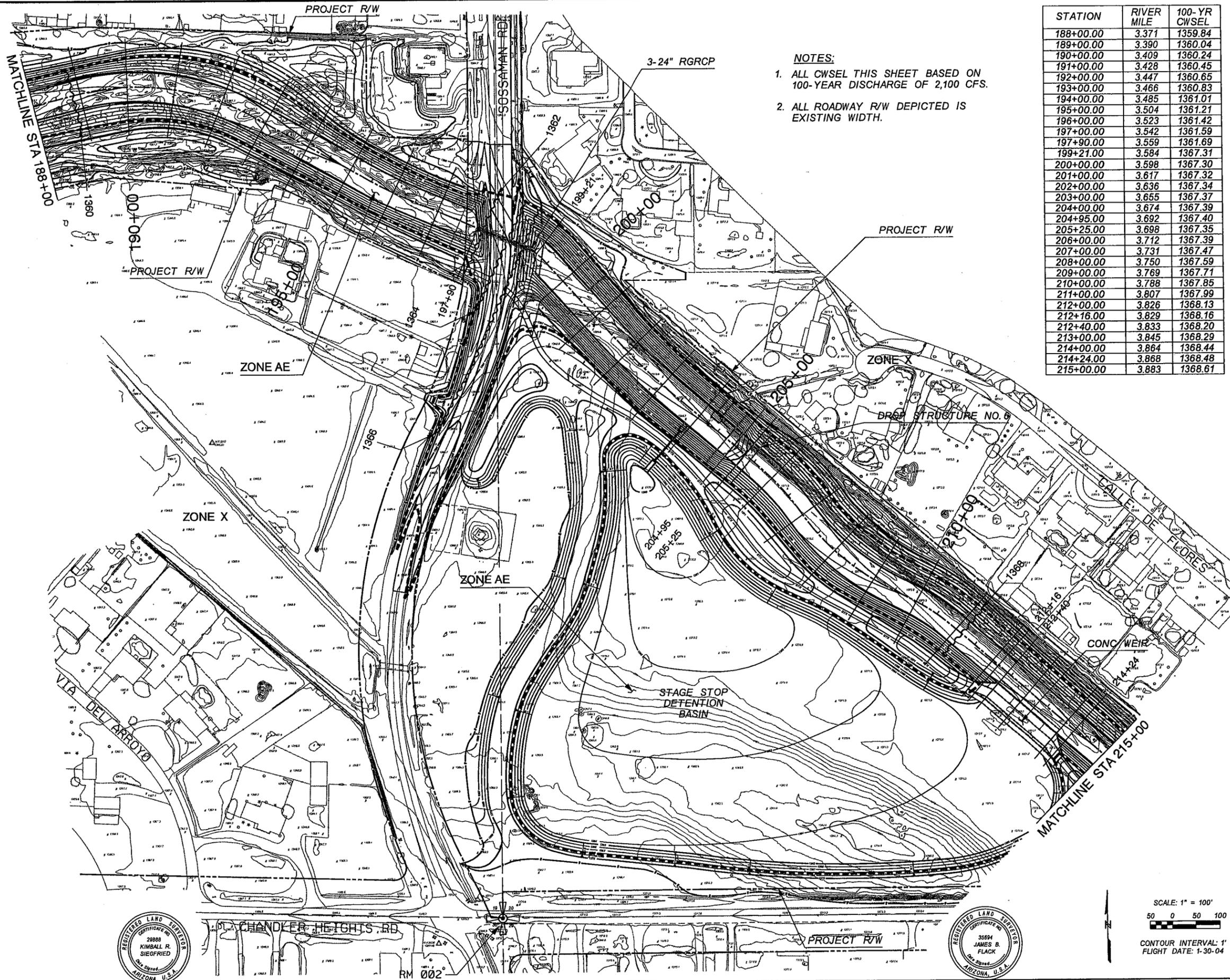
- NOTES:
- ALL CWSEL THIS SHEET BASED ON 100-YEAR DISCHARGE OF 2,100 CFS.
 - ALL ROADWAY R/W DEPICTED IS EXISTING WIDTH.



COOPER AERIAL SURVEY CO. I, KIMBALL R. SIEGFRIED, ARIZONA REGISTERED LAND SURVEYOR #29888 CERTIFY THAT THIS MAP HAS BEEN PRODUCED BY PHOTOGRAMMETRIC METHODS AND MEETS NATIONAL MAPPING ACCURACY STANDARDS FOR 1 FOOT CONTOUR INTERVAL MAP AT A SCALE OF 1"=48'. THE ABOVE IS SUBJECT TO THE FIELD CONTROL ACCURACY PROVIDED BY STANLEY CONSULTANTS.

STANLEY CONSULTANTS

I, JAMES B. FLACK, ARIZONA REGISTERED LAND SURVEYOR #35694 CERTIFY THAT THE HORIZONTAL AND VERTICAL SURVEY CONTROL USED TO PRODUCE PHOTOGRAMMETRIC MAPPING FOR THIS PROJECT IS CORRECT AND ACCURATE WITHIN CONTRACT SPECIFICATIONS.



- NOTES:**
1. ALL CWSL THIS SHEET BASED ON 100-YEAR DISCHARGE OF 2,100 CFS.
 2. ALL ROADWAY R/W DEPICTED IS EXISTING WIDTH.

STATION	RIVER MILE	100-YR CWSL
188+00.00	3.371	1359.84
189+00.00	3.390	1360.04
190+00.00	3.409	1360.24
191+00.00	3.428	1360.45
192+00.00	3.447	1360.65
193+00.00	3.466	1360.83
194+00.00	3.485	1361.01
195+00.00	3.504	1361.21
196+00.00	3.523	1361.42
197+00.00	3.542	1361.59
197+90.00	3.559	1361.69
199+21.00	3.584	1367.31
200+00.00	3.598	1367.30
201+00.00	3.617	1367.32
202+00.00	3.636	1367.34
203+00.00	3.655	1367.37
204+00.00	3.674	1367.39
204+95.00	3.692	1367.40
205+25.00	3.698	1367.35
206+00.00	3.712	1367.39
207+00.00	3.731	1367.47
208+00.00	3.750	1367.59
209+00.00	3.769	1367.71
210+00.00	3.788	1367.85
211+00.00	3.807	1367.99
212+00.00	3.826	1368.13
212+16.00	3.829	1368.16
212+40.00	3.833	1368.20
213+00.00	3.845	1368.29
214+00.00	3.864	1368.44
214+24.00	3.868	1368.48
215+00.00	3.883	1368.61

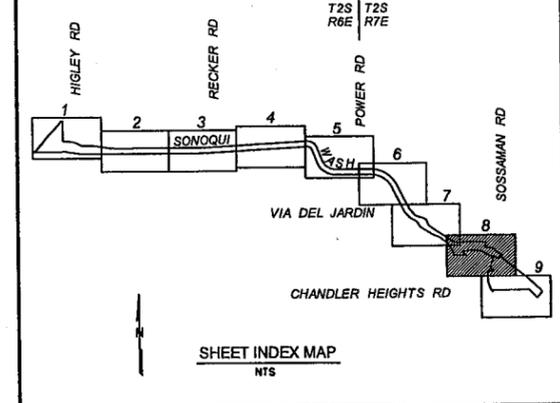
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 IN COOPERATION WITH THE TOWN OF GILBERT AND THE TOWN OF QUEEN CREEK
SONOQUI WASH CHANNELIZATION
 QUEEN CREEK WASH TO CHANDLER HEIGHTS RD
 FCD CONSTRUCTION CONTRACT 2004C074
CLOMR

LEGEND

POST PROJECT 100-YR FLOODPLAIN BOUNDARY	-----
HYDRAULIC BASE LINE WITH RIVER STATIONING	-----
CROSS SECTION	-----
ELEVATION REFERENCE MARK	○ RM 001
BASE FLOOD ELEVATION	~~~~~ 1350
FLOOD INSURANCE ZONE	ZONE AE
SECTION CORNER	15 14 22 23

ELEVATION REFERENCE MARKS
 NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

ID NUMBER	ELEVATION (FT)	DESCRIPTION LOCATION
RM 001	1354.4703	BCHH AT CORNER OF OCOTILLO RD & POWER RD
RM 002	1370.6092	BC AT CORNER OF SOSSAMAN RD & CHANDLER HEIGHTS RD
RM 003	1328.2496	FD BC HIGLEY RD 1/2 MI NORTH OF OCOTILLO RD



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

TOWN OF QUEEN CREEK TOWN OF GILBERT

SONOQUI WASH CHANNELIZATION
 QUEEN CREEK WASH TO CHANDLER HEIGHTS ROAD
CLOMR

	BY	DATE
DESIGNED	NDV	10/05
DRAWN	LRJ	10/05
CHECKED	GSB	10/05

Stanley Consultants Inc. 2839 East Camelback Road, Suite 130, Phoenix, Arizona 85016-4425
 www.stanleygrp.com (602) 912-6500

EXHIBIT A SONOQUI WASH CHANNELIZATION CLOMR SHEET OF 8 9

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

IN COOPERATION WITH
THE TOWN OF GILBERT AND
THE TOWN OF QUEEN CREEK

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QUEEN CREEK WASH TO CHANDLER HEIGHTS RD
FCD CONSTRUCTION CONTRACT 2004C074
CLOMR

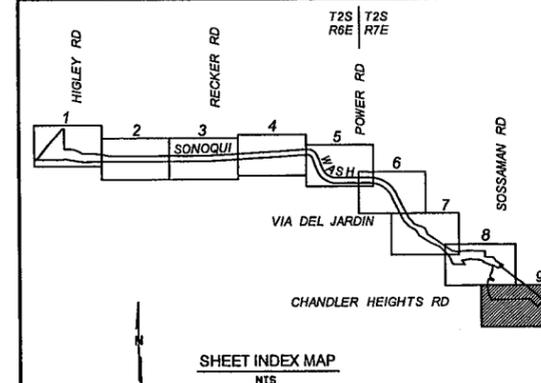
LEGEND

POST PROJECT 100-YR FLOODPLAIN BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER STATIONING	
CROSS SECTION	
ELEVATION REFERENCE MARK	
BASE FLOOD ELEVATION	1350
FLOOD INSURANCE ZONE	ZONE AE
SECTION CORNER	

ELEVATION REFERENCE MARKS

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

ID NUMBER	ELEVATION (FT)	DESCRIPTION LOCATION
RM 001	1354.4783	BCHM AT CORNER OF OCOTILLO RD & POWER RD
RM 002	1370.6092	BC AT CORNER OF SOSSAMAN RD & CHANDLER HEIGHTS RD
RM 003	1328.2496	FD BC HIGLEY RD 1/2 MI NORTH OF OCOTILLO RD



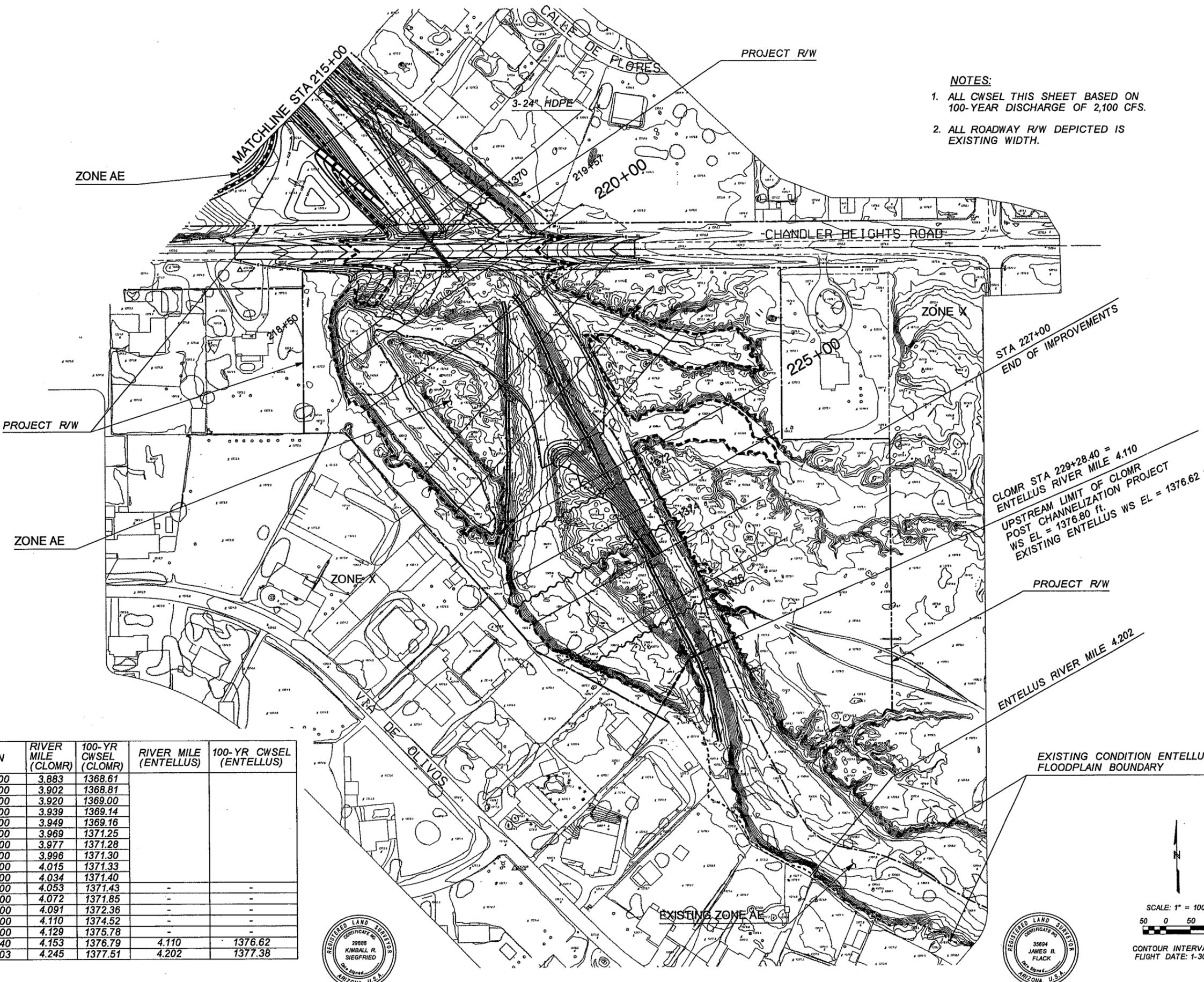
FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION



SONOQUI WASH CHANNELIZATION
QUEEN CREEK WASH TO CHANDLER HEIGHTS ROAD
CLOMR

	BY	DATE
DESIGNED	NDV	10/05
DRAWN	LRJ	10/05
CHECKED	GSB	10/05

Stanley Consultants
2619 East Camelback Road, Suite 100, Phoenix, Arizona 85016-4405
www.stanleygroup.com (602) 912-6500



- NOTES:
- ALL CWSEL THIS SHEET BASED ON 100-YEAR DISCHARGE OF 2,100 CFS.
 - ALL ROADWAY R/W DEPICTED IS EXISTING WIDTH.

CLOMR STA 229+28.40 =
ENTELLUS RIVER MILE 4.110
UPSTREAM LIMIT OF CLOMR
POST CHANNELIZATION PROJECT
WS EL = 1376.80 ft.
EXISTING ENTELLUS WS EL = 1376.62 ft.

STATION	RIVER MILE (CLOMR)	100-YR CWSEL (CLOMR)	RIVER MILE (ENTELLUS)	100-YR CWSEL (ENTELLUS)
215+00.00	3.883	1368.61		
216+00.00	3.902	1368.81		
217+00.00	3.920	1369.00		
218+00.00	3.939	1369.14		
218+50.00	3.949	1369.16		
219+57.00	3.969	1371.25		
220+00.00	3.977	1371.28		
221+00.00	3.996	1371.30		
222+00.00	4.015	1371.33		
223+00.00	4.034	1371.40		
224+00.00	4.053	1371.43		
225+00.00	4.072	1371.85		
226+00.00	4.091	1372.36		
227+00.00	4.110	1374.52		
228+00.00	4.129	1375.78		
229+28.40	4.153	1376.79	4.110	1376.62
234+15.03	4.245	1377.51	4.202	1377.38



SCALE: 1" = 100'
50 0 50 100
CONTOUR INTERVAL: 1'
FLIGHT DATE: 1-30-04

COOPER AERIAL SURVEY CO. 1. KIMBALL R. SIEGFRIED, ARIZONA REGISTERED LAND SURVEYOR #29888 CERTIFY THAT THIS MAP HAS BEEN PRODUCED BY PHOTOGRAHIC METHODS AND MEETS NATIONAL MAPPING ACCURACY STANDARDS FOR 1 FOOT CONTOUR INTERVAL MAP AT A SCALE OF 1"=48". THE ABOVE IS SUBJECT TO THE FIELD CONTROL ACCURACY PROVIDED BY STANLEY CONSULTANTS.

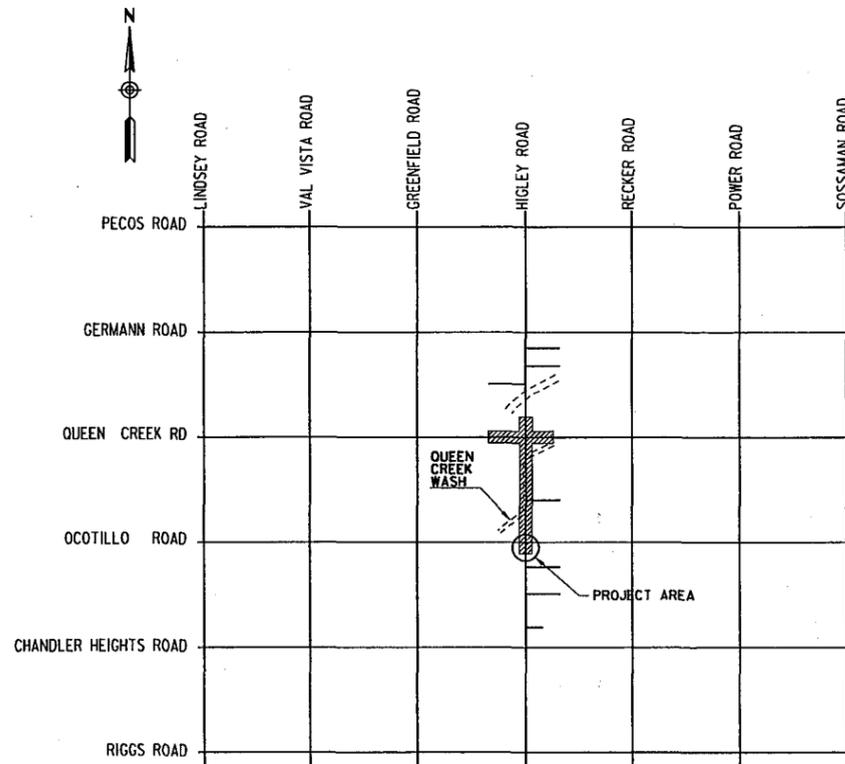
STANLEY CONSULTANTS 1. JAMES B. FLACK, ARIZONA REGISTERED LAND SURVEYOR #35694 CERTIFY THAT THE HORIZONTAL AND VERTICAL SURVEY CONTROL USED TO PRODUCE PHOTOGRAHIC MAPPING FOR THIS PROJECT IS CORRECT AND ACCURATE WITHIN CONTRACT SPECIFICATIONS.

G.5 Other Maps & Exhibits

TOWN OF GILBERT

HIGLEY ROAD IMPROVEMENTS

OCOTILLO ROAD TO QUEEN CREEK ROAD
HIGLEY ROAD BRIDGE AT SONOQUI WASH
(PROJECT NO. ST050)



VICINITY MAP
NTS



GILBERT
ARIZONA

MAYOR

STEVEN M. BERMAN

VICE MAYOR

LES PRESMYK

TOWN COUNCIL

DAVE CROZIER

LARRY MORRISON

STEVEN BERMAN

DON SKOUSEN

STEVE URIE

JOAN KRUEGER

TOWN MANAGER

GEORGE PETIT

TOWN CLERK

CATHY TEMPLETON, CMC

TOWN ENGINEER

RICK ALLRED, P.E.

PUBLIC WORKS DIRECTOR

LONNIE K. FROST

BENCHMARK

BRASS CAP IN HANDHOLE
AT INTERSECTION OF HIGLEY ROAD
AND QUEEN CREEK ROAD
ELEVATION = 1320.276
TOWN OF GILBERT DATUM NAVD 88

SHEET INDEX

G-1.1	COVER SHEET
G-1.2	KEY MAP
G-1.3	GENERAL NOTES
G-1.4	TYPICAL SECTIONS
G-1.5	QUANTITY SUMMARY
G-1.6	NEW PIPE SUMMARY
G-2.1	SIDEWALK & MEDIAN GEOMETRY
G-3.1	RIGHT OF WAY GEOMETRY
P-1.1	HIGLEY ROAD PLAN & PROFILE
P-2.1 - P-2.4	HIGLEY ROAD DETOUR
D-1.0	DRAINAGE NOTES
D-1.1 - D-1.2	DRAINAGE PLANS
D-2.1	DRAINAGE PROFILES - LATERALS
D-3.1 - D-3.8	DRAINAGE DETAILS
S-1.1 - S-1.14	SONOQUI WASH BRIDGE
T1-2.1 - T1-2.4	TRAFFIC CONTROL PLANS

APPROVALS

TOWN ENGINEER _____

DATE _____

AS-BUILT CERTIFICATION

I HEREBY CERTIFY THAT THE *AS-BUILT* IMPROVEMENTS AS SHOWN
HEREON ARE LOCATED AS NOTED, AND THE LOCATIONS ARE
CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

REGISTERED PROFESSIONAL ENGINEER _____

DATE _____

NO-CONFLICT SIGNATURE BLOCK				
UTILITY	UTILITY COMPANY	NAME OF COMPANY REPRESENTATIVE	TELEPHONE NUMBER	DATE SIGNED
WATER	TOWN OF GILBERT	BILL TAYLOR	480 503 6470	
SANITARY SEWER	TOWN OF GILBERT	MARK HORN	480 503 6420	
ELECTRIC	SRP	GREG WILSON	602 236 8092	
TELEPHONE	QWEST COMM.	AL SOTO	480 831 4702	
NATURAL GAS	SOUTHWEST GAS CORP.	GENE FLOREZ	602 484 5302	
CABLE TV	COX CABLE	ROGER YENSEN	602 694 2276	
IRRIGATION	R.W.C.D.	SHANE LEONARD	480 988 9586	
ELEC TRANS	SRP	BRENT BORNMANN	602 236 8073	

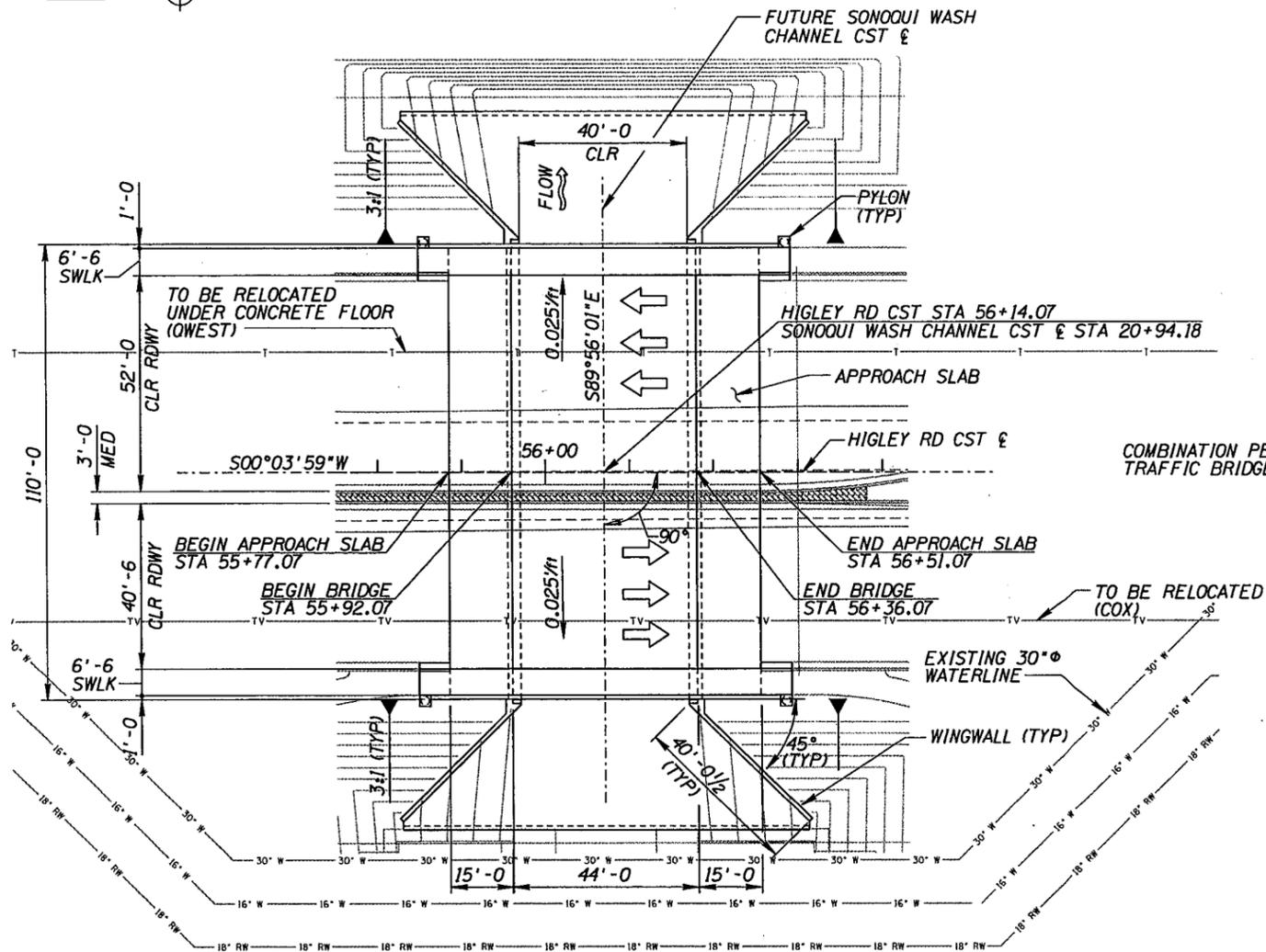
HIGLEY ROAD IMPROVEMENTS
(PROJECTS NO ST050)

1616 East Camelback Road,
Phoenix, Arizona 85016
Phone: 602 972-6500

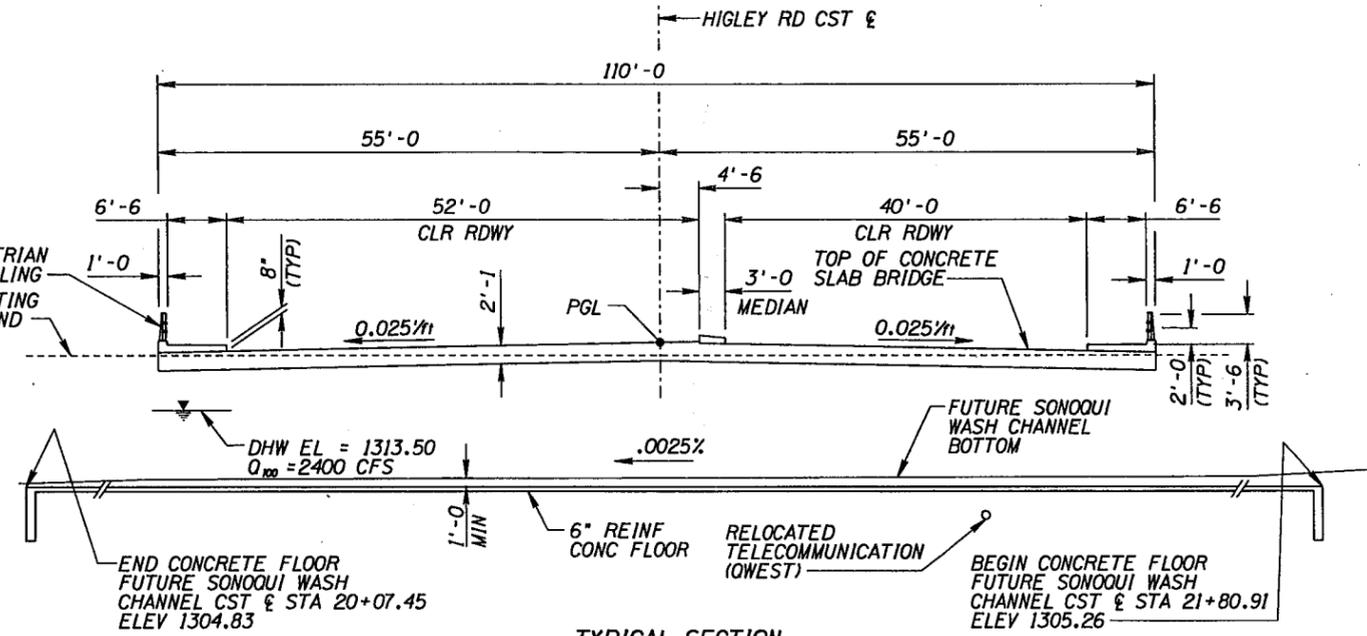


PRELIMINARY

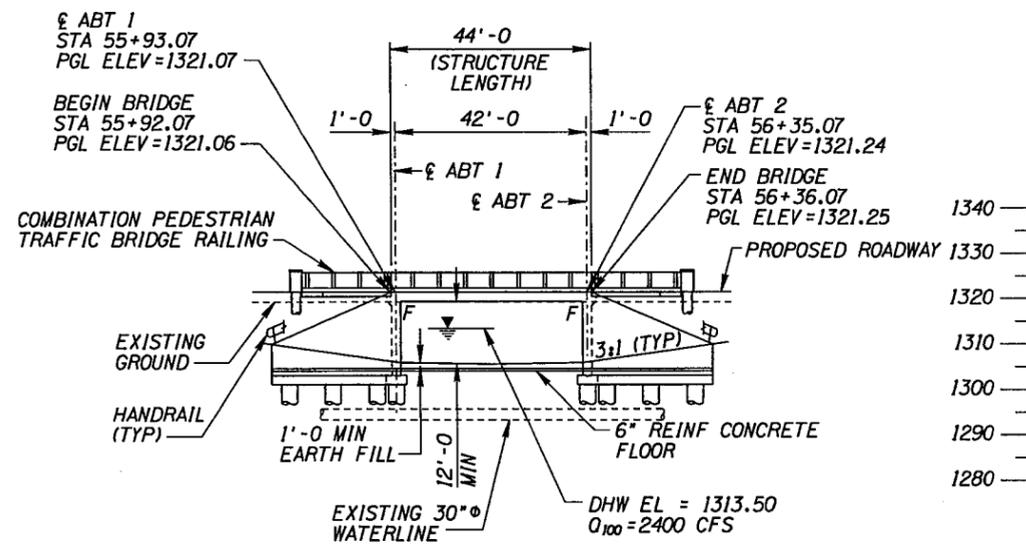
100%
NOT FOR
CONSTRUCTION
OR RECORDING



PLAN
SCALE: 1" = 20'
NEW CAST-IN-PLACE SINGLE SPAN SLAB BRIDGE
SKEW=0°



TYPICAL SECTION
(LOOKING AHEAD STATION)
SCALE: 1" = 10'



ELEVATION
SCALE: 1" = 20'

INDEX OF DRAWINGS

S-1.01	GENERAL PLAN, ELEVATION & TYPICAL SECTION
S-1.02	GENERAL NOTES & QUANTITIES
S-1.03	FOUNDATION DATA
S-1.04	FOUNDATION PLAN
S-1.05	ABUTMENT PLAN & ELEVATION
S-1.06	ABUTMENT SECTIONS & DETAILS
S-1.07	WINGWALL SECTIONS & DETAILS
S-1.08	DECK DETAILS
S-1.09	APPROACH & MOMENT SLAB DETAILS
S-1.10	RAILING & SIDEWALK DETAILS
S-1.11	RAILING DETAILS
S-1.12	PYLON DETAILS
S-1.13	HANDRAIL DETAILS
S-1.14	MISCELLANEOUS DETAILS

DATE	REVISION	BY
PRELIMINARY 100% NOT FOR CONSTRUCTION OR RECORDING		
1616 East Camelback Road, Suite 400 Phoenix, Arizona 85016 Phone: (602) 912-6500 		
SONOQUI WASH BRIDGE GENERAL PLAN, ELEVATION & TYPICAL SECTION		
HIGLEY ROAD IMPROVEMENTS		
SCALE	DESIGN	DATE
AS NOTED	JAL	10/05
	DRAWN	BID NO.
	AEM	AS-BUILT
		PROJECT
		ST-050
		DRAWING NO.
		S-1.01
		OF

GENERAL NOTES:

CONSTRUCTION SPECIFICATION - MARICOPA ASSOCIATION OF GOVERNMENTS (MAG) UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1998 EDITION, INCLUDING REVISIONS THROUGH 2004.

DESIGN SPECIFICATIONS - AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 17th EDITION, 2002. ADOT BRIDGE AND DESIGN DETAILING MANUAL, 1994, AS APPLICABLE.

WHERE NOTED, REFERENCES ARE ALSO MADE TO THE ARIZONA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2000 EDITION.

DEAD LOAD - DEAD LOAD INCLUDES ALLOWANCE FOR 25 POUNDS PER SQUARE FOOT TOTAL FOR FUTURE WEARING SURFACE.

LOADING CLASS - HS20-44

SEISMIC PERFORMANCE - CATEGORY A (Acc = 0.03 g)

REINFORCING STEEL SHALL CONFORM TO ASTM SPECIFICATION A615/A615M-96A. ALL REINFORCING STEEL SHALL BE FURNISHED AS GRADE 60.

ALL BENDS AND HOOKS SHALL MEET THE REQUIREMENTS OF AASHTO ARTICLE 8.23. ALL BEND DIMENSIONS FOR REINFORCING STEEL SHALL BE OUT-TO-OUT OF BARS. ALL PLACEMENT DIMENSIONS FOR REINFORCING STEEL SHALL BE TO CENTER OF BARS UNLESS NOTED OTHERWISE.

ALL REINFORCING STEEL SHALL HAVE 2 INCHES CLEAR COVER UNLESS NOTED OTHERWISE. REINFORCING STEEL IN CONCRETE PLACED DIRECTLY AGAINST EARTH SHALL HAVE 3 INCHES CLEAR COVER.

ANY CONSTRUCTION JOINT NOT SHOWN ON THE PROJECT PLANS WILL REQUIRE THE APPROVAL OF ENGINEER PRIOR TO CONSTRUCTION.

STRESSES:

SUPERSTRUCTURE (INCLUDING SIDEWALKS & PARAPETS) CLASS AA	f'c = 4000 PSI
ABUTMENTS, DRILLED SHAFTS & DRILLED SHAFT CAP BEAMS CLASS AA	f'c = 4000 PSI
APPROACH SLABS (INCLUDING CONCRTE SIDEWALKS, PARAPETS & PYLONS) CLASS A	f'c = 3000 PSI
WINGWALLS, CONCRETE FLOOR & CUTOFF WALLS CLASS A	f'c = 3000 PSI

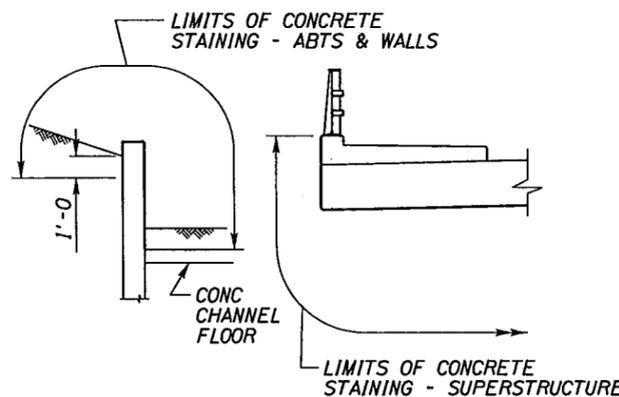
ALL CONCRETE SHALL BE MAG CLASS A OR AA UNLESS NOTED OTHERWISE.

CHAMFER ALL EXPOSED CORNERS 3/4" UNLESS NOTED OTHERWISE.

DIMENSIONS SHALL NOT BE SCALED FROM DRAWINGS.

ALL STATIONS AND OFFSETS ARE MEASURED WITH RESPECT TO THE HIGLEY ROAD CST &.

THE STRUCTURE BACKFILL SHALL CONFORM TO THE REQUIREMENTS OF THE MAG STD SPECIFICATIONS. THREE FEET OF STRUCTURE BACKFILL MATERIAL SHALL BE PLACED AGAINST THE ABUTMENT BACKWALL, WINGWALL AND RETAINING WALLS. COSTS SHALL BE INCLUDED IN THE PRICE OF CONCRETE STRUCTURES.



CONCRETE STAINING DETAIL
SCALE: NONE

FLOOD CONTROL DISTRICT NOTES:

ALL CONSTRUCTION WITHIN FLOOD CONTROL DISTRICT (DISTRICT) RIGHTS-OF-WAY SHALL CONFORM TO THE LATEST MARICOPA ASSOCIATION OF GOVERNMENTS' (MAG) SPECIFICATIONS.

CONTRACTOR MUST OBTAIN THE NECESSARY PERMITS PRIOR TO COMMENCEMENT OF CONSTRUCTION WITHIN DISTRICT RIGHT-OF-WAY AND MAINTAIN A COPY OF THE PERMITS ON THE PROJECT SITE AT ALL TIMES.

NOTIFY THE DISTRICT'S PERMITS INSPECTOR AT 602-506-4727 OR 602-506-4723 AT LEAST 48 HOURS PRIOR TO ANY WORK BEING PERFORMED IN THE DISTRICT'S RIGHT-OF-WAY.

CONTRACTOR PERFORMING EXCAVATION OPERATIONS IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL UNDERGROUND UTILITIES.

ALL COMPACTION AND BACKFILL WITHIN DISTRICT'S RIGHT-OF-WAY SHALL CONFORM TO THE LATEST MAG SPECIFICATIONS UNLESS STIPULATED OTHERWISE IN THE DISTRICT'S PERMIT.

ANY DAMAGE TO THE DISTRICT'S STRUCTURES, EQUIPMENT, MATERIALS, VEGETATION, AND/OR PROPERTY SHALL BE REPLACED AND/OR REPAIRED IN-KIND TO THE SATISFACTION OF DISTRICT.

IN ACCORDANCE WITH MAG SPECIFICATION SECTION 206, STRUCTURE EXCAVATION AND BACKFILL SHALL NOT BE PAID AS SEPARATE BID ITEMS BUT SHALL BE CONSIDERED SUBSIDIARY TO THE BID ITEM PORTLAND CEMENT CONCRETE CLASS AA.

CONCRETE STAINING NOTES:

THE FOLLOWING EXPOSED CONCRETE SURFACES SHALL BE STAINED: ABUTMENTS AND WINGWALLS; ALL EXPOSED SURFACES (FRONT FACE, TOP, BACK FACE AND WALL ENDS) TO A DEPTH OF 1'-0" BELOW FINISHED GRADE OR TO THE TOP OF CHANNEL CONCRETE FLOOR SLAB.

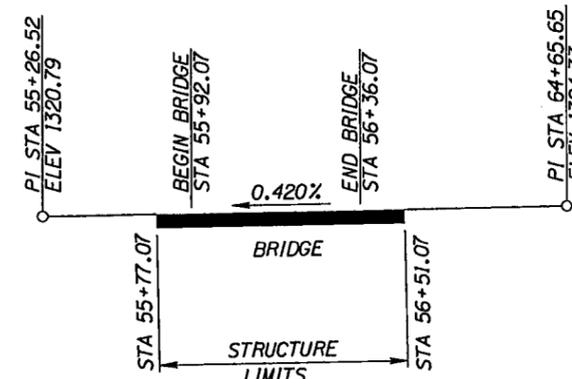
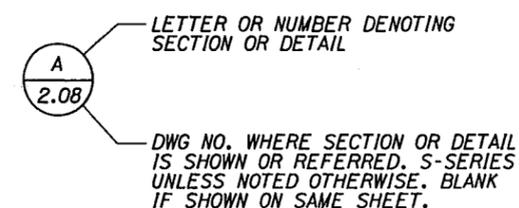
SUPERSTRUCTURE: BOTTOM SURFACE OF CONCRETE SLAB AND EXTERIOR SIDES OF CONCRETE SLAB, SIDEWALK AND RAILING CURB.

THE FOLLOWING CONCRETE SURFACES SHALL BE EXCLUDED FROM STAINING: SIDEWALKS, CURBS, TRAFFIC SIDE OF CONCRETE BARRIERS AND BRIDGE DECK ROADWAY SURFACE. PRECAST CONCRETE PYLON CAP.

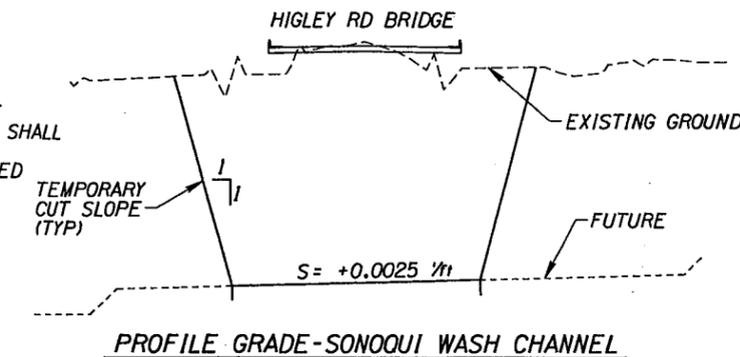
CONCRETE STAIN SHALL BE THE FOLLOWING DECORATIVE COATING CUSTOM COLOR OR APPROVED EQUAL: *5234D, WARMTH, DILUTED BY 25%, BY FRAZEE PAINT COMPANY, PHOENIX, AZ. THE STAINING PRODUCT SPECIFIED ABOVE SHALL BE APPLIED AFTER CONCRETE HAS CURED AND ACCORDING TO PROPER PREP PER MANUFACTURER'S WRITTEN RECOMMENDATIONS.

THE COLOR SHALL CONFORM TO THE COLOR REQUIREMENTS WITH RESPECT TO HUE AND CHROMA. A 5-FOOT BY 5-FOOT TEST PANEL SHALL BE MADE AND THE COLOR SHALL BE APPROVED BY THE LANDSCAPE ARCHITECT OR ENGINEER PRIOR TO USE. THE COST OF THE CONCRETE STAIN AND CONCRETE TEST PANELS SHALL BE CONSIDERED INCIDENTAL AND INCLUDED IN THE PRICE OF CONCRETE STRUCTURES.

LEGEND:



PROFILE GRADE-HIGLEY RD

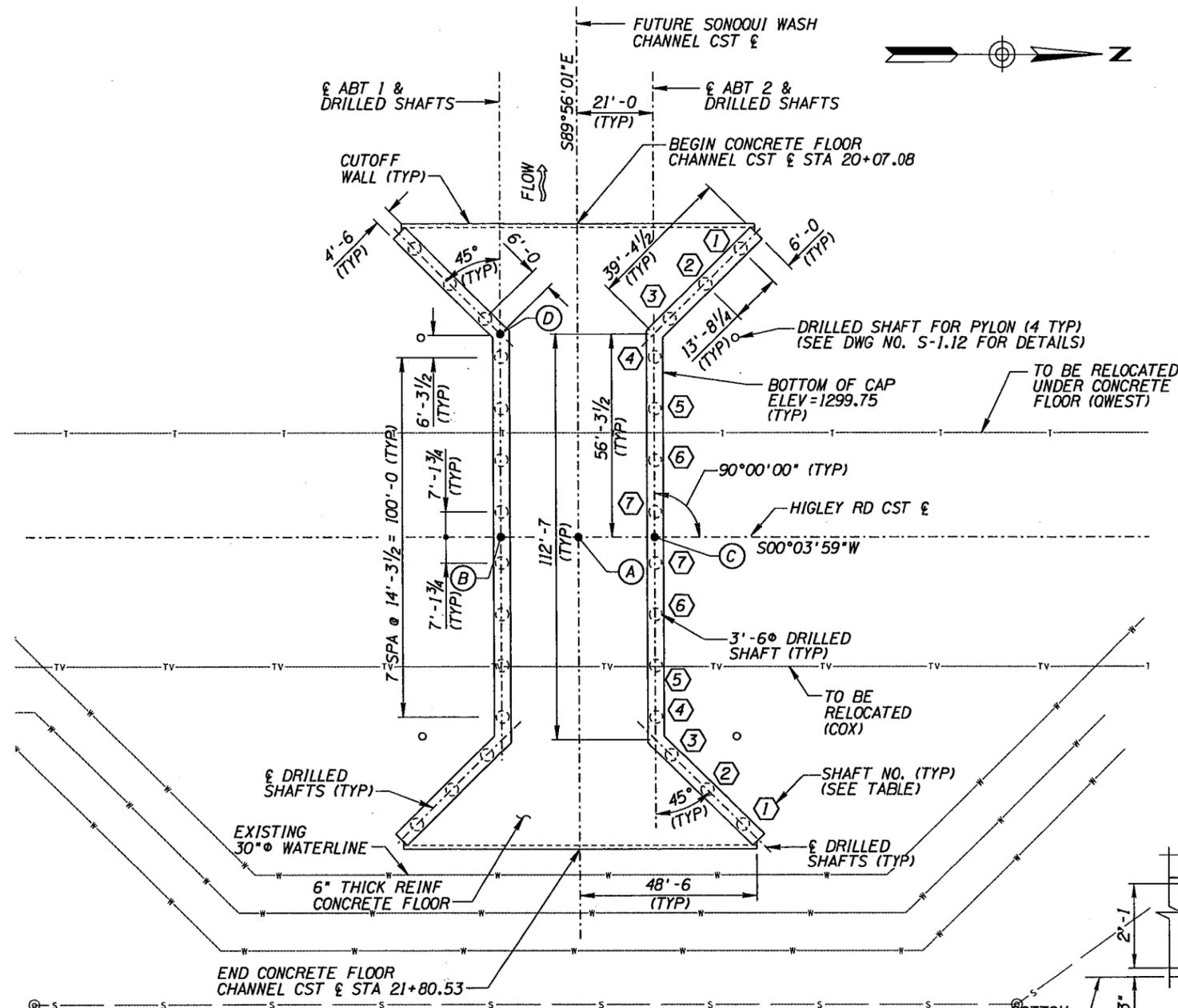


PROFILE GRADE-SONOQUI WASH CHANNEL

APPROXIMATE QUANTITIES

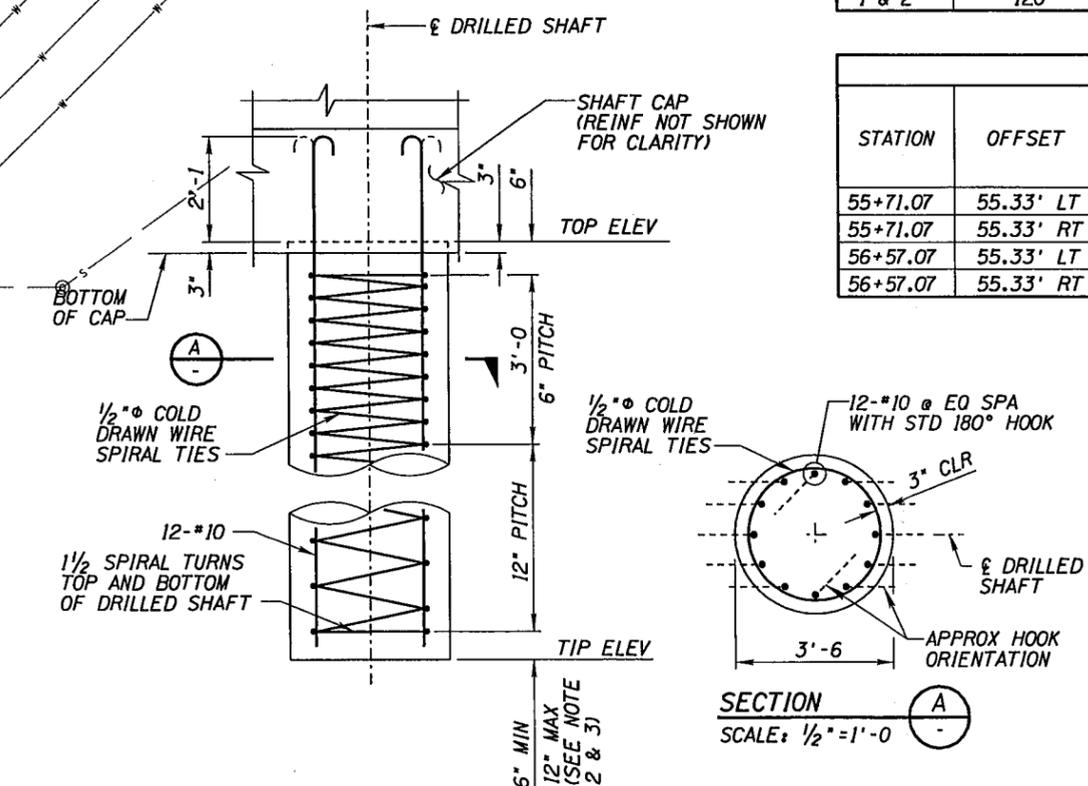
DESCRIPTION	(MAG SECTION 505) PORTLAND CEMENT CONCRETE CLASS A f'c=3000 PSI (CY)	(MAG SECTION 505) PORTLAND CEMENT CONCRETE CLASS AA f'c=4000 PSI (CY)	(MAG SECTION 505) REINFORCING STEEL (LBS)	DRILLED SHAFT FOUNDATIONS (LF)		(MAG SECTION 505) BRIDGE TRAFFIC & PEDESTRIAN RAIL STEEL TUBE (LF)	(MAG SECTION 220) PLAIN RIPRAP D ₅₀ =12" THICKNESS = 24" (CY)	(MAG SECTION 505) (42") HANDRAIL (LF)
				24" DIAMETER	42" DIAMETER			
ABUTMENT 1		184	41205		480		68	82
ABUTMENT 2		185	41205		480		68	82
SUPERSTRUCTURE		421	40978					
WINGWALLS	104	73	24267					
APPROACH SLABS & MISC	355		38823	32		168		
TOTAL	459	863	186478	32	960	168	136	164

DATE	REVISION	BY
PRELIMINARY 100% NOT FOR CONSTRUCTION OR RECORDING		1616 East Camelback Road, Suite 400 Phoenix, Arizona 85016 Phone: (602) 912-6500
SHEET TITLE SONOQUI WASH BRIDGE GENERAL NOTES & QUANTITIES		
PROJECT TITLE HIGLEY ROAD IMPROVEMENTS		
SCALE	DESIGN	DATE
AS NOTED	JAL AEM	10/05
	AS-BUILT	PROJECT
	SI-050	DRAWING NO.
		S-1.02
		OF



FOUNDATION PLAN
SCALE: 1" = 20'

LOCATION	HIGLEY RD CST E	NORTHING	EASTING
(A) SONOQUI WASH CHANNEL CST E STA 20+93.81	STA 56+14.07	2005929.20	1947626.35
(B) E ABT 1 WORK PT	STA 55+93.07	2005908.20	1947626.32
(C) E ABT 2 WORK PT	STA 56+35.07	2005950.20	1947626.37
(D) INTERSECTION E ABT 1 & E WINGWALL DRILLED SHAFTS WORK PT	STA 55+93.07	2005908.27	1947570.03



DRILLED SHAFT ELEVATION AT ABUTMENTS & WINGWALLS
SCALE: 1/2" = 1'-0"

DRILLED SHAFT NOTES:

- DRILLED SHAFTS SHALL BE IN ACCORDANCE WITH THE SPECIAL PROVISIONS.
- IF THE TIP OF THE DRILLED SHAFT IS EXTENDED LESS THAN OR EQUAL TO 3'-0 BELOW THE ELEVATION SHOWN ON THE PLANS, THE REINFORCING STEEL CAGE NEED NOT BE MODIFIED AND THE RESULTING CLEARANCE (COVER) TO BE TIP OF THE DRILLED SHAFT SHALL BE 3'-3 MAX.
- IF THE TIP OF THE DRILLED SHAFT IS EXTENDED MORE THAN 3'-0 BELOW THE ELEVATION SHOWN ON THE PLANS, A MODIFICATION TO THE REINFORCING STEEL CAGE MAY BE REQUIRED. THE ENGINEER SHALL BE NOTIFIED TO DETERMINE THE EXTENT OF MODIFICATIONS, IF ANY.
- DRILLED SHAFT SPIRAL REINFORCEMENT SHALL BE 1/2" COLD DRAWN STEEL WIRE CONFORMING TO AASHTO M-32 EXCEPT THAT THE MINIMUM TENSILE STRENGTH SHALL BE 60,000 PSI.
- ANCHORAGE OF THE SPIRAL REINFORCEMENT SHALL BE PROVIDED BY 1 1/2 EXTRA TURNS OF THE SPIRAL AT THE END OF THE SPIRAL UNIT. SPLICES IN SPIRAL REINFORCEMENT SHALL BE LAP SPLICES OF 48 BAR DIAMETERS BUT NOT LESS THAN 12 INCHES OR SHALL BE WELDED.
- ANY CONSTRUCTION JOINT NOT SHOWN ON THE PROJECT PLANS REQUIRE THE APPROVAL OF THE ENGINEER PRIOR TO CONSTRUCTION.
- CAVING SOIL CONDITIONS ARE ANTICIPATED AND DRILLED SHAFT CONSTRUCTION MAY REQUIRE SOIL STABILIZATION OR THE USE OF TEMPORARY CASING. SEE GEOTECHNICAL ENGINEERING REPORT FOR THIS PROJECT BY AMEC EARTH & ENVIRONMENTAL, DATED AUGUST 31, 2005.
- IF SLURRY ASSISTED DRILLING IS REQUIRED PROVIDE FOUR EQUALLY SPACED 2" DIAMETER SCH 40 BLACK STEEL PIPES TO ALLOW FOR INSPECTION OF THE DRILLED SHAFT FOUNDATIONS BY MEANS OF A CROSS HOLE SONIC LOGGING DEVICE. THESE PIPES SHALL BE SECURED TIGHTLY TO THE INSIDE OF THE REINFORCING CAGE AND SHALL EXTEND FROM THE BOTTOM OF THE REINF CAGE TO 12" ABOVE THE TOP OF DRILLED SHAFTS WITH CAPS AT EACH END.
- ONE 3'-6 DIAMETER CONFIRMATION SHAFT CONFORMING TO THE SPECIAL PROVISIONS IS REQUIRED. THE SHAFT SHALL BE THE FIRST SHAFT CONSTRUCTED FOR ABUTMENT 1 OR ABUTMENT 2. (EXCLUDING PYLON SHAFTS).
- CONTRACTOR SHALL VERIFY UNDERGROUND UTILITY LOCATIONS PRIOR TO DRILLING. DEVIATIONS FROM THE LOCATIONS SHOWN SHALL BE REPORTED TO THE ENGINEER FOR EVALUATION PRIOR TO DRILLING.

ABUTMENTS & WINGWALLS DRILLED SHAFTS					
SHAFT NO.	VERTICAL DESIGN LOAD PER SHAFT (KIPS)	SHAFT DIAMETER (FT)	TOP OF DRILLED SHAFT ELEV	TIP ELEV	SHAFT LENGTH (FT)
3 - 7	390	3'-6	1300.00	1262.00	38'-0
3 - 7	390	3'-6	1300.00	1262.00	38'-0
1 & 2	120	3'-6	1300.00	1275.00	25'-0

PYLON DRILLED SHAFTS					
STATION	OFFSET	SHAFT DIAMETER (FT)	TOP OF DRILLED SHAFT ELEV	TIP ELEV	SHAFT LENGTH (FT)
55+71.07	55.33' LT	2'-0	1320.21	1312.21	8'-0
55+71.07	55.33' RT	2'-0	1320.21	1312.21	8'-0
56+57.07	55.33' LT	2'-0	1323.81	1315.81	8'-0
56+57.07	55.33' RT	2'-0	1323.81	1315.81	8'-0

DATE: _____ REVISION: _____ BY: _____

GILBERT ARIZONA

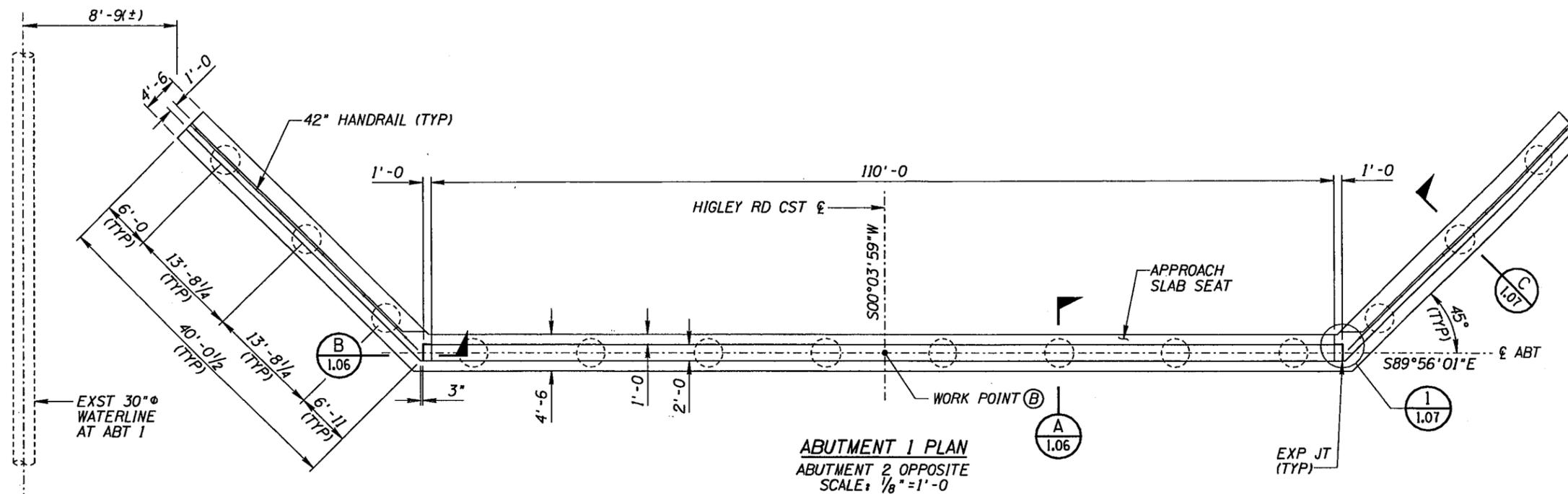
PRELIMINARY
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1516 East Camelback Road, Suite 400
Phoenix, Arizona 85016
Phone: (602) 912-6500
Stanley Consultants Inc.

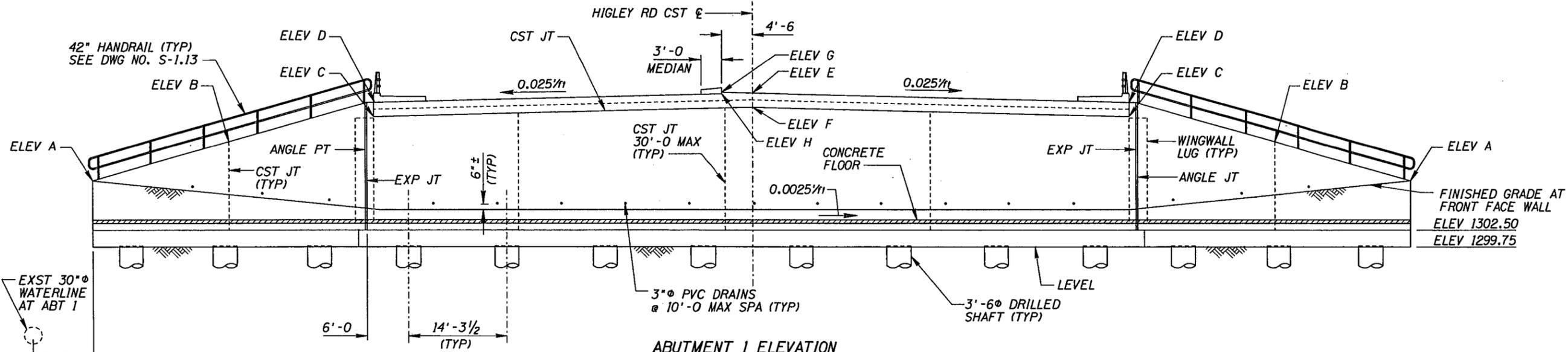
SHEET TITLE: **SONOQUI WASH BRIDGE FOUNDATION PLAN**

PROJECT TITLE: **HIGLEY ROAD IMPROVEMENTS**

SCALE	DESIGN	DATE	BID NO.	DRAWING NO.
AS NOTED	JML	10/05		S-1.04
	DRN	AS-BUILT	PROJECT	
	AEM		ST-050	OF



ABUTMENT 1 PLAN
 ABUTMENT 2 OPPOSITE
 SCALE: 1/8" = 1'-0"



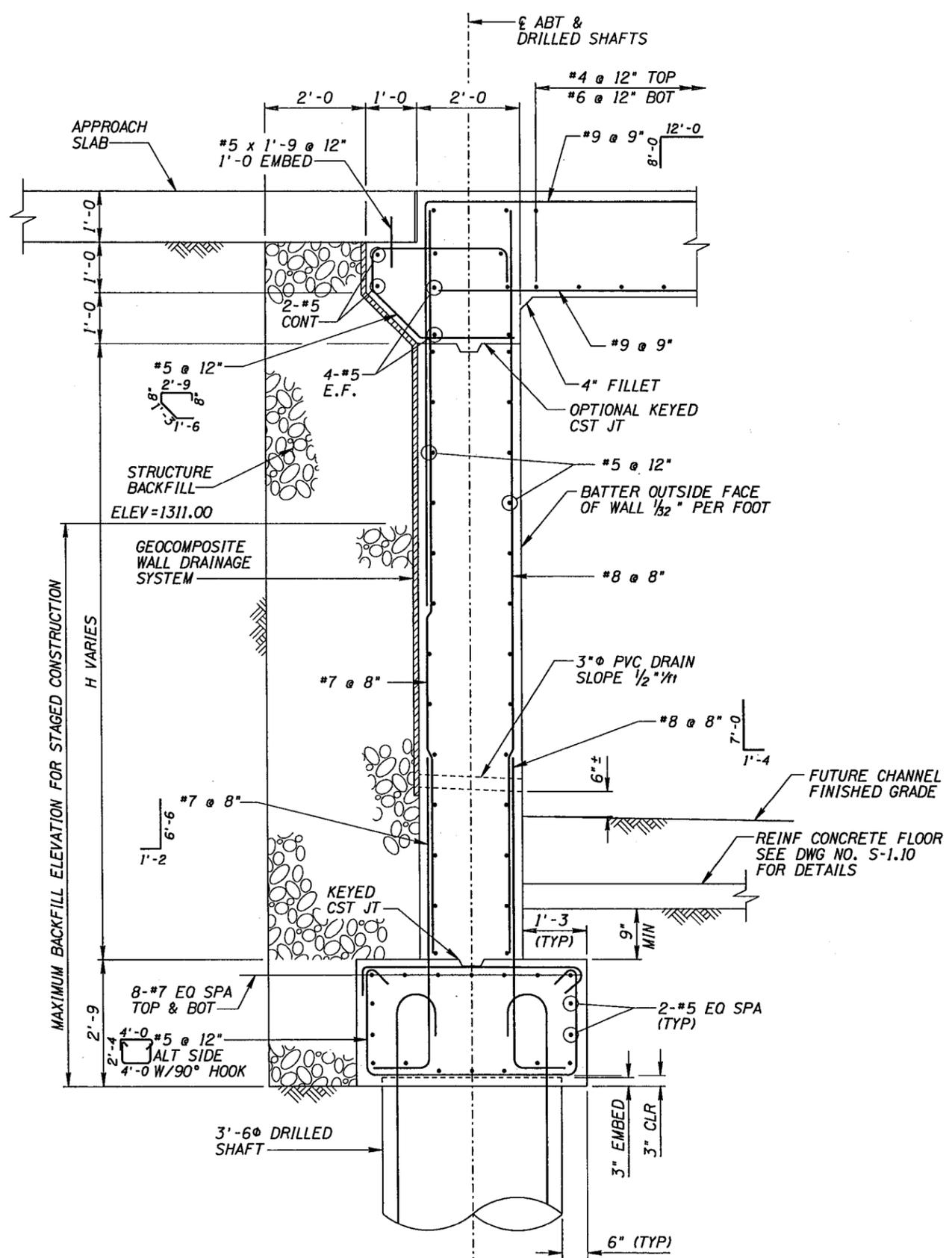
ABUTMENT 1 ELEVATION
 LOOKING BACK STATION
 ABUTMENT 2 OPPOSITE
 SCALE: 1/8" = 1'-0"

ABUTMENT ELEVATION TABLE		
	ABT 1	ABT 2
ELEV A	1310.58	1310.58
ELEV B	1315.13	1315.22
ELEV C	1317.61	1317.79
ELEV D	1319.69	1319.87
ELEV E	1321.07	1321.25
ELEV F	1318.99	1319.17
ELEV G	1321.18	1321.36
ELEV H	1320.95	1321.13

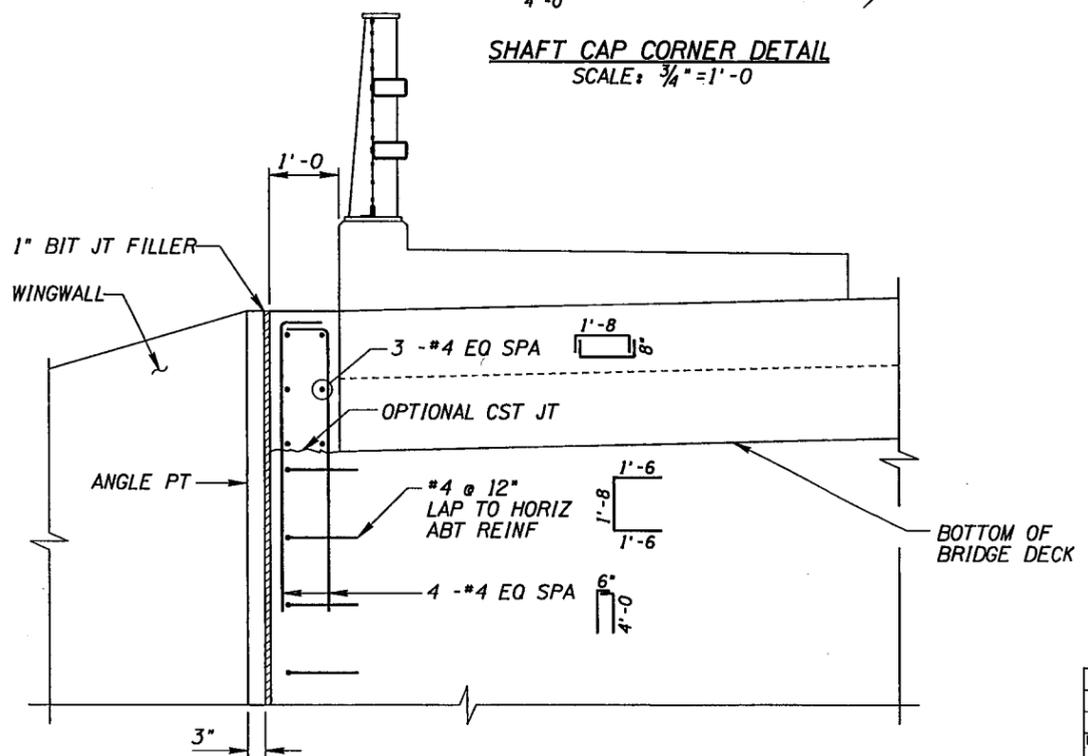
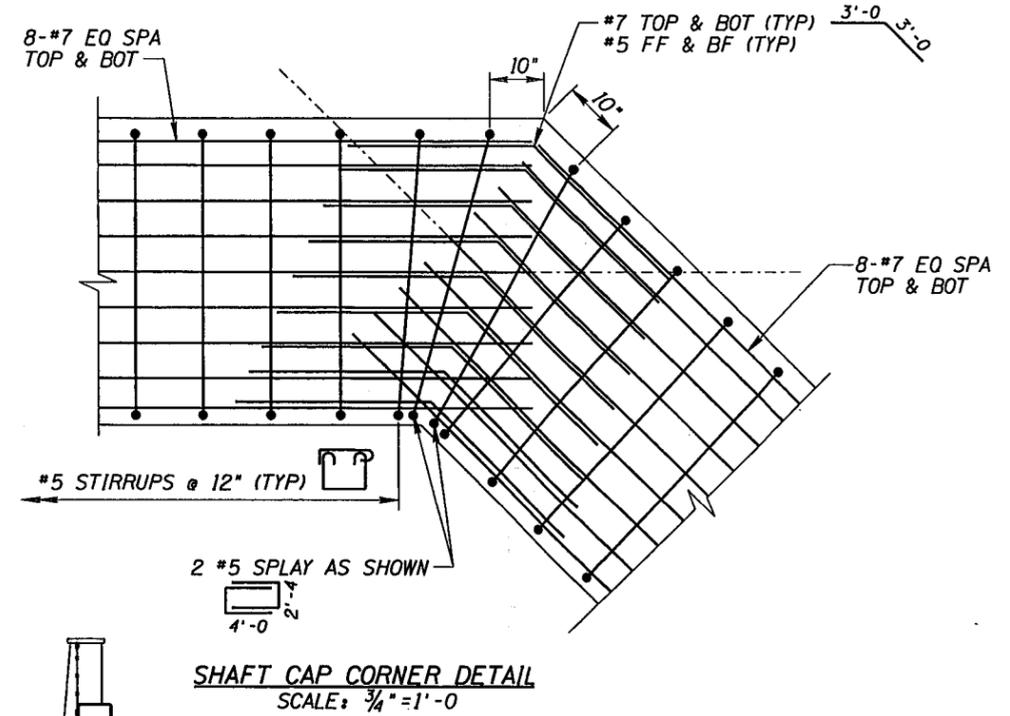
NOTES:

- ELEVATIONS INDICATED ARE AT ϵ OF ABUTMENT AND WINGWALLS.
- PROVIDE VERTICAL CONSTRUCTION JOINTS AT MAX SPACING = 30'-0" LOCATE 1' TO 3' FROM EDGE OF DRILLED SHAFTS.
- ABUTMENT AND WINGWALL BACKFILL SHALL BE LIMITED TO ELEV 1311.00 UNTIL DECK CONCRETE HAS REACHED 80% OF ITS COMPRESSIVE STRENGTH.

DATE	REVISION	BY
PRELIMINARY 100% NOT FOR CONSTRUCTION OR RECORDING		1616 East Camelback Road, Suite 400 Phoenix, Arizona 85016 Phone: (602) 912-6500
SONOQUI WASH BRIDGE ABUTMENT PLAN & ELEVATION		
HIGLEY ROAD IMPROVEMENTS		
SCALE	DESIGN	DATE
AS NOTED	JAL	10/05
	DRABH	AS-BUILT
	INFO	PROJECT
		ST-050
BID NO.	DRAWING NO.	
	S-1.05	
	OF	



SECTION A
SCALE: 3/4" = 1'-0" 1.05



SECTION B
SCALE: 3/4" = 1'-0" 1.05

- NOTES:**
- FOR LAP SPLICES AT LOCATIONS OTHER THAN CONSTRUCTION JOINTS; TOP BARS SHALL BE LAP SPLICED AT MIDSPAN BETWEEN DRILLED SHAFTS AND BOTTOM BARS SHALL BE LAP SPLICED AT DRILLED SHAFTS. MIN LAP LENGTHS:
 #5 BARS - 2'-6"
 #7 TOP BARS - 3'-8"
 #7 BOT BARS - 2'-10"
 - PLACEMENT OF STRUCTURE BACKFILL SHALL BE LIMITED TO ELEV 1311.00. AFTER DECK CONCRETE HAS BEEN PLACED AND ATTAINED 80% OF IT'S SPECIFIED COMPRESSIVE STRENGTH THE REMAINING STRUCTURE BACKFILL MAY BE PLACED.

DATE	REVISION	BY
PRELIMINARY 100% NOT FOR CONSTRUCTION OR RECORDING		1616 East Camelback Road, Suite 400 Phoenix, Arizona 85016 Phone: (602) 912-6500
SONOQUI WASH BRIDGE ABUTMENT SECTIONS & DETAILS		
HIGLEY ROAD IMPROVEMENTS		
SCALE	DESIGN	DATE
AS NOTED	JAL	10/05
	DRAWN	AS-BUILT
	NFD	PROJECT
		ST-050
		OF