TUTHILL DIKE WASH CHANNELIZATION

Town of Buckeye, Maricopa County, Arizona

CONDITIONAL LETTER OF MAP REVISION SUBMITTAL

TECHNICAL DATA NOTEBOOK

Submitted to:
FEDERAL EMERGENCY MANAGEMENT AGENCY
Hazard Study Branch
Chief, Mathew Miller
Technical Services Division
500 C Street S.W.
Washington, DC 20472
(202) 646-2746

And

Flood Control District of Maricopa County
2801 W Durango
Phoenix, AZ 850096
(602) 506-1501

And

Town of Buckeye
100 N Apache
Buckeye, AZ 85326
(623) 386-2487

Prepared for:
DMB White Tank, LLC
c/o DMB Associates, Inc.
7600 East Doubletree Ranch Road
Suite 300
Scottsdale, AZ 85258
(480) 367-7000

Prepared by:
Wood, Patel & Associates, Inc.
2051 West Northern Avenue, Suite 100
Phoenix, AZ 85021
(602) 335-8500
E-mail: apatel@woodpatel.com

February 2002
WP #011416.02

Federal Emergency Management Agency

Washington, D.C. 20472

OCT 08 2002

RECEIVED

OCT 15 2002

WOOD / PATEL

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 02-09-1060R

The Honorable Don Stapley
Chairman, Maricopa County
Board of Supervisors
301 West Jefferson, 10th Floor
Phoenix, AZ 85003

Community: Maricopa County, AZ
Community No.: 040037

104

Dear Mr. Stapley:

This responds to a request that the 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 June 3, 2002, Mr. Ashok C. Patel, P.E., R.L.S., Principal, Wood, Patel & Associates, Inc., requested that FEMA evaluate the effects that updated topographic information, proposed channelization, and a proposed culvert under Indian School Road along Tuthill Dike Wash and updated topographic information and proposed channelization along Tractor Wash would have on the flood hazard information shown on the effective FIRM and FIS report.

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

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. The submitted corrected effective HEC-RAS hydraulic computer models for Tuthill Dike Wash and Tractor Wash, both dated October 2, 2002, were used as the base conditions models in our review of the proposed conditions models for this CLOMR request. We believe that, if the proposed project is constructed as shown on the topographic work maps entitled "Tuthill Dike Wash, Buckeye, AZ.," Sheets 1 and 2, and "Tractor Wash Buckeye, AZ.," Sheet 3A, all prepared by Wood, Patel & Associates, Inc., and dated April 17, 2002, and on the proposed construction plans entitled "Verrado, Buckeye, AZ., Tuthill Dike Wash &Tractor Wash - Phase I," Sheets 1 through 18, prepared by Wood, Patel & Associates, Inc., dated May 8, 2002, and the data listed below are received, a revision to the FIRM would be warranted.

As a result of the updated topographic information, proposed channelization, and proposed culvert, the elevations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) for Tuthill Dike Wash will decrease compared to the effective Base Flood Elevations (BFEs). The maximum decrease in BFE, 8.5 feet, will occur approximately 100 feet upstream of Thomas Road. The width of the Special Flood Hazard Area (SFHA), the area that would be inundated by the base flood, along Tuthill Dike Wash will increase in some areas, decrease in some areas, and shift in other areas

compared to the effective SFHA width. The maximum increase in SFHA width, approximately 90 feet, will occur approximately 100 feet upstream of Thomas Road and will be contained in the proposed channel. The maximum decrease in SFHA width, approximately 200 feet, will occur approximately 100 feet downstream of the confluence with Tractor Wash. The maximum shift in the SFHA, approximately 85 feet to the east, will occur approximately 200 feet downstream of the confluence with Tractor Wash and will be contained in the proposed channel. The width of the regulatory floodway along Tuthill Dike Wash will increase in some areas, decrease in some areas, and shift in other areas compared to the effective floodway width. The maximum increase in floodway width, approximately 90 feet, will occur approximately 100 feet upstream of Thomas Road and will be contained in the proposed channel. The maximum decrease in floodway width, approximately 150 feet, will occur just upstream of Indian School Road. The maximum shift in the regulatory floodway, approximately 85 feet to the east, will occur approximately 200 feet downstream of the confluence with Tractor Wash and will be contained in the proposed channel.

As a result of the updated topographic information and proposed channelization, the BFEs for Tractor Wash will increase in some areas and decrease in other areas compared to the effective BFEs. The maximum increase in BFE, 1.7 feet, will occur approximately 1,000 feet upstream of the confluence with Tuthill Dike Wash and will be contained in the proposed channel. The maximum decrease in BFE, 5.5 feet, will occur approximately 200 feet upstream of the confluence with Tuthill Dike Wash. The width of the SFHA along Tractor Wash will decrease in some areas and shift in other areas compared to the effective SFHA width. The maximum decrease in SFHA width, approximately 430 feet, will occur approximately 1,700 feet upstream of the confluence with Tuthill Dike Wash. The maximum shift in the SFHA to the north, approximately 70 feet, will occur approximately 1,300 feet upstream of the confluence with Tuthill Dike Wash and will be contained in the proposed channel. The maximum shift in the SFHA to the south, approximately 60 feet, will occur approximately 400 feet upstream of the confluence with Tuthill Dike Wash and will be contained in the proposed channel. The width of the regulatory floodway along Tractor Wash will decrease in some areas and shift in other areas compared to the effective floodway width. The maximum decrease in floodway width, approximately 70 feet, will occur approximately 1,700 feet upstream of the confluence with Tuthill Dike Wash. The maximum shift in the regulatory floodway to the north, approximately 70 feet, will occur approximately 1,300 feet upstream of the confluence with Tuthill Dike Wash and will be contained in the proposed channel. The maximum shift in the regulatory floodway to the south, approximately 60 feet, will occur approximately 400 feet upstream of the confluence with Tuthill Dike Wash and will be contained in the proposed channel.

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 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 "Revision Requester and Community Official 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 conceptual 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 4, entitled "Riverine Hydraulic Analysis Form"

Form 5, entitled "Riverine/Coastal Mapping Form"

Form 6, entitled "Channelization Form"

Form 7, entitled "Bridge/Culvert Form"

Hydraulic analyses, for as-built conditions, of the base flood and the regulatory floodway must be submitted with Form 4, and a topographic work map showing the revised floodplain and floodway boundaries must be submitted with Form 5.

- Effective September 1, 2002, 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 $3,800 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 3173
  Merrifield, VA 22116-3173

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

- Community acknowledgment of the map revision request

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

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

- An officially adopted maintenance plan for the channel and culvert along Tuthill Dike Wash, and for the channel along Tractor Wash. This plan, which may be in the form of a written statement from the community Chief Executive Officer, an ordinance, or other legislation, must describe

the nature of the maintenance activities, the frequency with which they will be performed, and the title of the local community official who will be responsible for ensuring that the maintenance activities are accomplished.

- The starting water-surface elevation (SWSEL) for a tributary should be based on the slope-area method at a cross section along the tributary that is located just upstream of the confluence with the main stream. The submitted proposed conditions HEC-RAS model for Tractor Wash used the slope-area method at a cross section along Tuthill Dike Wash that is downstream of the confluence. Please provide a HEC-RAS hydraulic model for Tractor Wash with the SWSEL computed by the slope-area method at a cross section along Tractor Wash that is located at the confluence with Tuthill Dike Wash.

- The submitted proposed conditions HEC-RAS hydraulic model for Tuthill Dike Wash shows the formation of a hydraulic jump just downstream of the culvert on Indian School Road, in the mixed flow regime. A hydraulic jump that occurs at this location could cause scour on the earthen channel bed. Please submit an analysis to demonstrate that the channel bed will not erode during the base flood or that adequate erosion protection will be provided. If erosion protection is to be provided, information and calculations must be submitted to show that the channel lining will provide adequate protection. In addition, FEMA accepts base floodplain boundary delineations based on supercritical flow depths only for concrete-lined, engineered channels. Because the constructed channel is not concrete-lined, critical depth is the minimum depth permissible to map the base floodplain boundary delineations for this reach, and the BFEs should be corrected to show critical depth as the minimum depth if the mixed flow regime is used.

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 channels and culvert 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 Chief, Community Mitigation Programs Branch, Mitigation Division of FEMA in Oakland, California, at (510) 627-7184. 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,

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

For: Matthew B. Miller, P.E., Chief
Hazards Study Branch
Federal Insurance and
Mitigation Administration

Enclosures

cc: Ms. Lynn M. Thomas, P.E., C.F.M.
Branch Manager
Floodplain Management
Flood Control District
of Maricopa County

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

Mr. Victor Calderon
NFIP Coordinator
Arizona Division of Emergency
Management

Mr. Ashok C. Patel, P.E., R.L.S.
Principal,
Wood, Patel & Associates, Inc.

Baker
Engineering & Energy

Michael Baker Jr., Inc.
A Unit of Michael Baker Corporation

3601 Eisenhower Avenue
Alexandria, VA 22304-6425
(703) 960-8800
FAX (703) 960-9125

Fax Transmittal

DATE AND TIME: 10/02/2022

TO: Mr. Ashok Patel and Mr. Shimin Zou

ORGANIZATION: Wood Patel

RECIPIENT'S FAX NO.: 602-335-8580

FROM: Sacha Tohme

MESSAGE:

Mr. Patel:

Please find attached the original e-mail with my comments. I have been trying unsuccessfully to send it to you and Mr. Zou by e-mail. If you have any questions, please call me.

TOTAL NUMBER OF PAGES (INCLUDING THIS COVER PAGE): 2

IF YOU **DO NOT** RECEIVE THE NUMBER OF PAGES INDICATED, PLEASE

CALL Sacha Tohme AT 703-960-8800 x3028 AS SOON AS POSSIBLE.

ChallengeUs.

From: Sacha Tohme
To: "APatel@WoodPatel.com".GWIA.gatedom
Date: 10/2/02 12:37PM
Subject: Tuthill Dike Wash CLOMR

Ash,

Please forward this e-mail to your engineer.
Following our phone conversation, please find attached my modified HEC-RAS model for Tuthill dike wash

1- please make sure that the corrected effective model for Tuthill dike wash looks exactly identical to the effective HEC-2 model, specifically between cross section 1.994 and 3.535, in both WSEL and Topwidths.
Please find attached my modified file "mbj tuthill corrected.zip".
Also be aware of the ineffective flow areas (HEC-2 doesn't show them in the topwidth, HEC-RAS does) and make the appropriate changes.

2-please make sure that the corrected effective model for tractor wash looks exactly identical to the effective HEC-2 model, specifically between cross section 0 and 0.347, in both WSEL and Topwidths.
Also be aware of the ineffective flow areas (HEC-2 doesn't show them in the topwidth, HEC-RAS does) and make the appropriate changes, specifically at cross section 0.305.

3-you should use know starting WSEL for Tuthill dike wash at both ends of the revised reach (1.994 and 3.535) instead of the slope area method

4-you should use know starting WSEL for tractor wash at the upstream end of the revised reach (0.347) instead of the slope area method

If you have any question, please call me

Sacha TOHME
Civil Associate
Michael Baker Jr. Inc.
3601 Eisenhower Avenue Suite 600
Alexandria, VA 22304
TEL: 703-960-8800 x 3028
FAX: 703-960-9125

Shimin Zou

From: Shimin Zou
Sent: Wednesday, October 02, 2002 4:36 PM
To: 'Sacha Tohme'
Cc: Ash Patel
Subject: Tuthill Wash CLOMR

Hi Sacha,

Thanks for your help in this matter. I have received your revised HEC-RAS files by email and your review comments by fax. Your revised HEC-RAS models look good to me. I modified the HEC-RAS models following your instructions. Specifically, I modified the Corrected Effective HEC-RAS models for both Tuthill and Tractor washes according to your comments No. 1 and No. 2. Both WSEL and Topwidth for both models now match very well with the Effective FIS HEC-2 models. As you pointed out that HEC-2 does not show the ineffective flow areas as part of the Topwidth while HEC-RAS does. Therefore, the Topwidth of the HEC-2 model at cross section 0.305 of the Tractor wash is different for the floodplain runs from the HEC-RAS model. But that difference does not have any impact on the final result.

I also changed the boundary conditions for all 4 models (Corrected Effective models, Design Condition models for both Tuthill and Tractor Washes) as you requested on your comments No. 3 and No. 4. All tie-in locations match the corresponding effective FIS models very well. All four (4) models are attached. We believe that these revisions plus the addenda we sent to you on July 3, 2002 should address your comments and complete the FEMA CLOMR package requirements.

If you need any clarification on these models, please feel free to contact me or Ash at (602) 335-8500. Thanks again for your help in resolving these issues.

Shimin Zou, Ph.D., P.E.
Senior Water Resources Engineer

Wood, Patel & Associates, Inc.
2051 West Northern Avenue, Suite 100
Phoenix, Arizona 85021
Phoenix: (602) 335-8500
Fax: (602) 335-8580
Email: szou@woodpatel.com
Website: www.woodpatel.com

Tuthill Dike Wash CLOMR, 10-2-2002,

Comments by Sacha

Changes have been made: 1,994 ~ 3,439

(1) corrected effective HEC-RAS model for Tuthill Wash
When "Run" check "option" → "conveyance method" ⇒ "HEC2 style"
"Known WSEL" were used as bounding conditions

(2) corrected effective HEC-RAS model for Tractor Wash, 0 ~ 0.347
same as above.
"effective flow area is coded for "0.305".

(3) Design model for Tuthill D/S slope = 0.008 LOWSEL = { 1130.93, 1130.94
U/S slope = 0.0084, WSEL = { 1230.62, 1231.21

(4) Design model for Tractor Wash : No change.
~~Both U/S and D/S tie-in cross sections match corrected effective~~
~~FIS model.~~

D/S slop = 0.024 D/S 9100 { 1203.99, 1203.99
U/S slop = 0.0125 U/S 1100.50 { 1237.15, 1237.16

From: Sacha Tohme
To: "APatel@WoodPatel.com".GWIA.gatedom
Date: 10/2/02 12:37PM
Subject: Tuthill Dike Wash CLOMR

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If you have any question, please call me

Sacha TOHME
Civil Associate
Michael Baker Jr. Inc.
3601 Eisenhower Avenue Suite 600
Alexandria, VA 22304
TEL: 703-960-8800 x 3028
FAX: 703-960-9125

HEC-RAS Plan: FIS River: Tuthill Wash Reach: Tuthill

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Tuthill	0	4057.00	1033.00	1039.05	1038.12	1040.10	0.004404	8.24	492.20	123.11	0.73
Tuthill	0	4057.00	1033.00	1039.06	1038.12	1040.11	0.004368	8.22	493.63	123.25	0.72
Tuthill	0.075	4057.00	1035.00	1040.85	1039.70	1041.56	0.002920	7.10	629.76	184.77	0.60
Tuthill	0.075	4057.00	1035.00	1040.84		1041.54	0.002833	6.98	618.25	163.36	0.59
Tuthill	0.186	4057.00	1038.50	1043.71	1043.71	1044.90	0.004574	9.36	549.65	294.12	0.76
Tuthill	0.186	4057.00	1038.50	1043.27	1043.27	1045.10	0.007412	11.16	392.51	112.70	0.96
Tuthill	0.314	4057.00	1042.50	1047.92	1047.92	1048.78	0.004322	7.77	651.13	504.73	0.71
Tuthill	0.314	4057.00	1042.50	1048.05	1047.26	1049.09	0.004613	8.18	496.05	133.67	0.74
Tuthill	0.415	4057.00	1047.20	1051.79	1051.79	1052.60	0.006430	8.25	733.66	607.37	0.84
Tuthill	0.415	4057.00	1047.20	1051.93	1051.93	1053.03	0.007370	9.01	541.52	235.00	0.90
Tuthill	0.54	4057.00	1053.00	1057.55	1057.55	1058.47	0.005501	8.46	671.64	399.77	0.80
Tuthill	0.54	4057.00	1053.00	1057.47	1057.47	1058.74	0.007169	9.51	495.09	197.28	0.91
Tuthill	0.634	4057.00	1056.80	1061.82	1061.82	1063.23	0.006126	10.44	515.91	212.23	0.87
Tuthill	0.634	4057.00	1056.80	1061.82	1061.82	1063.30	0.006287	10.57	471.80	154.02	0.89
Tuthill	0.729	4057.00	1060.70	1065.38	1065.38	1066.56	0.006406	8.95	530.83	277.68	0.86
Tuthill	0.729	4057.00	1060.70	1065.33	1065.19	1066.77	0.007706	9.65	423.27	131.48	0.93
Tuthill	0.823	4057.00	1064.50	1070.90	1070.90	1073.07	0.007743	11.84	349.29	92.31	0.98
Tuthill	0.823	4057.00	1064.50	1070.96	1070.96	1073.07	0.007416	11.68	354.61	92.56	0.96
Tuthill	0.917	4057.00	1069.30	1074.75	1074.68	1076.72	0.006807	11.34	374.83	117.40	0.92
Tuthill	0.917	4057.00	1069.30	1074.68	1074.63	1076.72	0.007164	11.53	362.57	93.42	0.94
Tuthill	1.012	4057.00	1075.70	1080.74	1080.74	1082.84	0.007957	11.63	352.76	92.40	0.98
Tuthill	1.012	4057.00	1075.70	1080.77	1080.77	1082.83	0.007797	11.56	355.14	92.20	0.97
Tuthill	1.067	4061.00	1078.64	1085.05	1085.05	1088.23	0.002000	14.31	283.74	133.10	1.00
Tuthill	1.067	4061.00	1078.64	1085.05	1085.05	1088.23	0.002788	14.31	283.74	44.30	1.00
Tuthill	1.0885	Culvert									
Tuthill	1.11	4061.00	1081.10	1093.00	1087.47	1093.56	0.000174	6.38	704.70	1242.92	0.33
Tuthill	1.11	4061.00	1081.10	1093.06	1087.47	1093.59	0.000221	6.15	709.20	72.00	0.31
Tuthill	1.118	5503.00	1081.50	1093.53		1093.69	0.000064	3.05	1724.18	180.00	0.18
Tuthill	1.118	5503.00	1081.50	1093.55		1093.71	0.000063	3.05	1728.35	180.00	0.18
Tuthill	1.152	5503.00	1082.00	1093.50		1093.74	0.000536	4.37	1494.39	220.00	0.28
Tuthill	1.152	5503.00	1082.00	1093.52		1093.76	0.000530	4.35	1499.54	220.00	0.28
Tuthill	1.198	5503.00	1085.30	1093.47		1094.05	0.001667	7.00	1077.93	263.67	0.48
Tuthill	1.198	5503.00	1085.30	1093.49		1094.06	0.001640	6.96	1084.17	263.72	0.48
Tuthill	1.26	6601.00	1091.50	1097.05	1097.05	1098.56	0.007110	11.77	776.95	237.62	0.95
Tuthill	1.26	6601.00	1091.50	1097.07	1097.07	1098.56	0.006990	11.70	781.36	237.67	0.94
Tuthill	1.287	6601.00	1094.00	1099.27	1099.27	1101.02	0.008099	10.68	631.64	193.45	0.98
Tuthill	1.287	6601.00	1094.00	1099.24	1099.24	1101.05	0.008470	10.81	613.02	171.04	0.99
Tuthill	1.313	6601.00	1095.00	1100.99	1100.99	1103.07	0.006659	12.58	634.08	159.91	0.95
Tuthill	1.313	6601.00	1095.00	1101.12	1101.12	1103.06	0.006055	12.19	654.75	159.86	0.91
Tuthill	1.322	6601.00	1095.00	1103.57		1103.71	0.000279	3.33	2768.23	638.15	0.21
Tuthill	1.322	6601.00	1095.00	1103.37		1103.64	0.000504	4.28	1616.88	233.40	0.27
Tuthill	1.362	6225.00	1082.00	1103.72	1091.24	1103.73	0.000012	1.20	7934.84	664.30	0.05
Tuthill	1.362	6225.00	1082.00	1103.58	1090.54	1103.69	0.000074	2.91	2649.39	222.61	0.12
Tuthill	1.422	6225.00	1098.50	1106.44	1106.44	1109.05	0.007805	12.96	480.19	92.21	1.00
Tuthill	1.422	6225.00	1098.50	1106.42	1106.42	1109.05	0.007899	13.02	478.18	92.06	1.01
Tuthill	1.518	6225.00	1106.90	1113.73	1113.73	1115.64	0.006686	12.13	705.13	223.93	0.94
Tuthill	1.518	6225.00	1106.90	1114.24	1114.24	1116.98	0.007142	13.35	485.52	100.28	0.98

HEC-RAS Plan: FIS River: Tuthill Wash Reach: Tuthill (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Tuthill	1.614	6225.00	1113.90	1123.40	1123.40	1125.76	0.005909	12.47	563.16	179.55	0.89
Tuthill	1.614	6225.00	1113.90	1123.36	1123.36	1125.76	0.006032	12.55	545.28	141.82	0.90
Tuthill	1.71	6168.00	1120.00	1130.92	1130.92	1133.59	0.007980	13.10	470.74	88.87	1.00
Tuthill	1.71	6168.00	1120.00	1130.93	1130.93	1133.59	0.007973	13.10	470.92	88.90	1.00
Tuthill	1.805	6168.00	1127.60	1138.15	1138.15	1141.02	0.007845	13.60	454.04	85.81	1.01
Tuthill	1.805	6168.00	1127.60	1138.17	1138.17	1141.02	0.007756	13.54	455.57	80.25	1.00
Tuthill	1.898	6168.00	1137.30	1145.53	1145.53	1147.82	0.006175	14.41	694.09	171.41	0.95
Tuthill	1.898	6168.00	1137.30	1145.24	1145.24	1148.01	0.007445	15.39	548.18	97.85	1.03
Tuthill	1.994	6168.00	1143.50	1152.38	1152.38	1154.90	0.006247	12.92	526.43	123.77	0.92
Tuthill	1.994	6168.00	1143.50	1152.44	1152.44	1154.90	0.006002	12.75	534.74	123.75	0.90
Tuthill	2.088	6168.00	1150.10	1159.46	1159.46	1161.82	0.006386	12.59	549.89	129.64	0.92
Tuthill	2.088	6168.00	1150.10	1159.31	1159.31	1162.15	0.007676	13.52	457.87	83.27	1.00
Tuthill	2.17	6110.00	1162.60	1167.40	1167.40	1169.16	0.008869	10.66	573.30	164.66	1.01
Tuthill	2.17	6110.00	1162.60	1167.40	1167.40	1169.16	0.008860	10.66	573.40	164.59	1.01
Tuthill	2.279	6110.00	1169.30	1176.63	1176.63	1179.18	0.007944	12.79	477.62	94.23	1.00
Tuthill	2.279	6110.00	1169.30	1176.62	1176.62	1179.18	0.008025	12.84	475.78	94.03	1.01
Tuthill	2.373	6110.00	1172.00	1180.46	1180.18	1182.05	0.004171	11.38	810.23	217.47	0.73
Tuthill	2.373	6110.00	1172.00	1180.33	1179.89	1182.35	0.005094	12.42	632.67	126.34	0.81
Tuthill	2.468	6110.00	1177.30	1185.70	1185.70	1187.46	0.004689	12.91	803.71	209.17	0.83
Tuthill	2.468	6110.00	1177.30	1185.02	1185.02	1187.17	0.006324	14.08	645.52	138.97	0.95
Tuthill	2.563	6110.00	1182.30	1191.39	1191.39	1192.85	0.003249	11.49	1018.39	352.84	0.71
Tuthill	2.563	6110.00	1182.30	1191.22	1191.22	1193.39	0.004397	13.18	680.61	155.19	0.82
Tuthill	2.659	6110.00	1185.80	1193.94	1193.94	1195.97	0.005444	13.08	722.72	190.77	0.88
Tuthill	2.659	6110.00	1185.80	1193.91	1193.91	1196.19	0.005891	13.57	624.80	131.45	0.91
Tuthill	2.753	3011.00	1190.30	1197.66		1198.49	0.003826	7.53	487.81	250.27	0.67
Tuthill	2.753	3011.00	1190.30	1197.93		1198.63	0.002970	6.94	514.77	192.33	0.60
Tuthill	2.848	3011.00	1193.20	1200.17	1200.17	1201.98	0.006454	11.51	340.61	114.34	0.90
Tuthill	2.848	3011.00	1193.20	1200.37	1200.37	1201.98	0.005469	10.88	364.57	116.00	0.84
Tuthill	2.943	3011.00	1195.80	1203.59		1204.76	0.004619	9.23	399.02	110.12	0.75
Tuthill	2.943	3011.00	1195.80	1203.41		1204.69	0.005262	9.67	378.67	106.98	0.80
Tuthill	3.057	3011.00	1199.40	1205.86		1207.56	0.005833	11.79	413.91	167.97	0.88
Tuthill	3.057	3011.00	1199.40	1205.91		1207.54	0.005514	11.53	369.73	99.77	0.85
Tuthill	3.148	3011.00	1200.00	1209.11	1208.37	1209.82	0.002623	7.69	621.82	234.47	0.58
Tuthill	3.148	3011.00	1200.00	1209.04	1208.18	1209.97	0.003150	8.42	471.44	122.30	0.63
Tuthill	3.25	3011.00	1210.90	1213.74	1213.74	1214.69	0.008901	8.11	426.04	245.54	0.95
Tuthill	3.25	3011.00	1210.90	1213.72	1213.72	1214.70	0.009276	8.23	404.95	210.01	0.96
Tuthill	3.344	1414.00	1212.80	1216.64		1216.83	0.001461	3.67	452.77	221.70	0.39
Tuthill	3.344	1414.00	1212.80	1216.66		1216.85	0.001414	3.63	430.98	171.57	0.39
Tuthill	3.439	1414.00	1213.50	1217.12		1217.20	0.000418	2.28	696.80	242.03	0.22
Tuthill	3.439	1414.00	1213.50	1217.15		1217.24	0.000483	2.43	586.40	175.17	0.23
Tuthill	3.535	1414.00	1214.80	1217.25	1217.25	1218.15	0.010635	7.63	190.79	112.54	0.99
Tuthill	3.535	1414.00	1214.80	1217.26	1217.26	1218.15	0.010455	7.59	191.82	112.52	0.99
Tuthill	3.631	1414.00	1218.20	1222.22	1222.22	1223.71	0.008767	9.88	150.26	54.96	0.99
Tuthill	3.631	1414.00	1218.20	1222.27	1222.27	1223.70	0.008314	9.72	152.92	55.04	0.96
Tuthill	3.724	1414.00	1226.60	1230.62	1230.62	1231.29	0.008441	7.88	283.05	197.45	0.92
Tuthill	3.724	1414.00	1226.60	1231.22	1231.22	1232.28	0.007564	8.70	197.94	94.18	0.90

HEC-RAS Plan: FIS River: Tuthill Wash Reach: Tuthill (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Tuthill	3.818	1414.00	1232.30	1236.24	1236.24	1236.85	0.006814	7.68	327.72	256.51	0.84
Tuthill	3.818	1414.00	1232.30	1236.31	1236.31	1237.39	0.009412	9.20	196.10	88.66	0.99
Tuthill	3.912	1414.00	1239.10	1243.13	1243.13	1244.30	0.006612	9.42	206.33	100.42	0.88
Tuthill	3.912	1414.00	1239.10	1243.19	1243.19	1244.29	0.006119	9.16	211.96	97.71	0.85
Tuthill	4.006	1261.00	1246.00	1249.67	1249.67	1250.86	0.010111	8.76	143.98	60.82	1.00
Tuthill	4.006	1261.00	1246.00	1249.66	1249.66	1250.86	0.010159	8.78	143.67	60.70	1.01
Tuthill	4.101	1261.00	1255.80	1257.85	1257.85	1258.46	0.009712	7.27	254.54	216.18	0.95
Tuthill	4.101	1261.00	1255.80	1257.99	1257.99	1258.68	0.009334	7.47	218.55	150.00	0.94
Tuthill	4.196	1261.00	1259.80	1263.02	1263.02	1264.11	0.008592	8.47	162.36	90.72	0.94
Tuthill	4.196	1261.00	1259.80	1263.06	1263.06	1264.11	0.008125	8.32	165.94	90.62	0.91
Tuthill	4.289	1261.00	1267.40	1270.35	1270.35	1271.03	0.008999	8.98	264.65	189.30	0.97
Tuthill	4.289	1261.00	1267.40	1270.32	1270.32	1271.16	0.010190	9.50	213.90	120.07	1.03
Tuthill	4.375	1261.00	1271.70	1274.40	1274.32	1275.20	0.009481	9.01	225.04	127.07	0.99
Tuthill	4.375	1261.00	1271.70	1274.50		1275.25	0.008217	8.60	215.73	97.92	0.93
Tuthill	4.469	1261.00	1275.10	1278.19		1278.78	0.005543	7.03	270.03	174.89	0.76
Tuthill	4.469	1261.00	1275.10	1278.15		1278.86	0.006374	7.47	218.05	105.38	0.82
Tuthill	4.563	1261.00	1278.10	1281.57	1281.57	1282.41	0.007382	7.86	215.43	153.05	0.87
Tuthill	4.563	1261.00	1278.10	1281.54	1281.50	1282.48	0.008116	8.18	183.77	96.54	0.91
Tuthill	4.653	1261.00	1279.70	1283.62		1283.95	0.001719	4.68	301.98	127.54	0.44
Tuthill	4.653	1261.00	1279.70	1283.68		1284.00	0.001600	4.57	303.57	109.05	0.43
Tuthill	4.725	1108.00	1283.00	1285.29	1285.29	1286.14	0.009350	7.55	166.13	111.89	0.94
Tuthill	4.725	1108.00	1283.00	1285.29	1285.29	1286.13	0.009418	7.56	163.01	99.79	0.95

HEC-RAS Plan: Design River: Tractor Wash Reach: Downstream

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Downstream	9100	3011.00	1199.68	1203.99	1203.99	1205.62	0.012362	10.25	293.66	90.91	1.01
Downstream	9100	3011.00	1199.68	1203.99	1203.99	1205.62	0.012362	10.25	293.66	90.91	1.01
Downstream	9300	3011.00	1200.90	1206.35	1205.43	1207.35	0.005951	8.05	374.06	96.01	0.72
Downstream	9300	3011.00	1200.90	1206.35	1205.43	1207.35	0.005956	8.05	373.94	95.99	0.72
Downstream	9450	3011.00	1201.86	1207.42		1208.09	0.003748	6.57	458.37	112.99	0.57
Downstream	9450	3011.00	1201.86	1207.42		1208.09	0.003749	6.57	458.33	112.99	0.57
Downstream	9655	3011.00	1203.00	1208.26		1208.69	0.002311	5.25	573.36	137.89	0.45
Downstream	9655	3011.00	1203.00	1208.26		1208.69	0.002311	5.25	573.34	137.89	0.45
Downstream	9820	1648.00	1204.72	1208.74		1209.32	0.004797	6.11	269.69	89.24	0.62
Downstream	9820	1648.00	1204.72	1208.74		1209.32	0.004798	6.11	269.68	89.24	0.62
Downstream	9898.3	1648.00	1206.59	1209.86	1209.86	1211.19	0.013274	9.26	177.87	67.42	1.01
Downstream	9898.3	1648.00	1206.59	1209.86	1209.86	1211.19	0.013274	9.26	177.87	67.42	1.01
Downstream	9985.3	1648.00	1208.71	1212.09		1212.44	0.003210	4.74	348.00	125.37	0.50
Downstream	9985.3	1648.00	1208.71	1212.09		1212.44	0.003210	4.74	348.00	125.37	0.50
Downstream	10067	1648.00	1210.82	1213.58	1213.58	1214.66	0.013893	8.36	197.17	90.86	1.00
Downstream	10067	1648.00	1210.82	1213.58	1213.58	1214.66	0.013893	8.36	197.17	90.86	1.00
Downstream	10195	1648.00	1212.93	1215.96		1216.53	0.006367	6.10	269.96	111.12	0.69
Downstream	10195	1648.00	1212.93	1215.96		1216.53	0.006367	6.10	269.96	111.12	0.69
Downstream	10325	1648.00	1215.01	1217.45	1217.43	1218.48	0.013824	8.16	202.05	96.27	0.99
Downstream	10325	1648.00	1215.01	1217.45	1217.43	1218.48	0.013824	8.16	202.05	96.27	0.99
Downstream	10458	1648.00	1217.09	1220.08	1219.84	1220.89	0.010418	7.22	228.27	105.85	0.87
Downstream	10458	1648.00	1217.09	1220.08	1219.84	1220.89	0.010418	7.22	228.27	105.85	0.87
Downstream	10564	1648.00	1219.21	1222.35	1222.35	1223.58	0.013540	8.93	184.57	75.37	1.01
Downstream	10564	1648.00	1219.21	1222.35	1222.35	1223.58	0.013540	8.93	184.57	75.37	1.01
Downstream	11000.30	1648.00	1221.60	1225.50	1225.50	1227.00	0.010243	10.65	178.01	61.21	0.95
Downstream	11000.30	1648.00	1221.60	1225.50	1225.50	1227.00	0.010243	10.65	178.01	61.21	0.95
Downstream	11000.34	1648.00	1222.70	1228.32	1228.32	1229.78	0.012222	9.76	174.82	67.11	0.99
Downstream	11000.34	1648.00	1222.70	1228.32	1228.32	1229.78	0.012150	9.74	174.96	65.00	0.98
Downstream	11000.38	1648.00	1225.30	1231.04	1231.04	1232.84	0.011414	10.78	158.67	53.01	0.98
Downstream	11000.38	1648.00	1225.30	1231.08	1231.08	1232.84	0.010990	10.66	160.75	52.00	0.96
Downstream	11000.45	1648.00	1230.00	1234.92		1235.67	0.005664	7.89	332.69	139.71	0.70
Downstream	11000.45	1648.00	1230.00	1234.90		1235.66	0.005799	7.95	329.13	138.00	0.71
Downstream	11000.50	1648.00	1233.60	1237.17	1237.17	1238.34	0.012655	8.74	197.44	93.94	0.98
Downstream	11000.50	1648.00	1233.60	1237.19	1237.19	1238.34	0.012184	8.64	199.93	93.00	0.96

HEC-RAS Plan: Design River: Tuthill Wash Reach: Tuthill

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Tuthill	1.71	6168.00	1120.00	1130.93	1130.93	1133.59	0.007976	13.10	470.84	88.88	1.00
Tuthill	1.71	6168.00	1120.00	1130.93	1130.93	1133.59	0.007976	13.10	470.84	88.88	1.00
Tuthill	1.805	6168.00	1127.60	1138.15	1138.15	1141.02	0.007845	13.60	454.04	85.81	1.01
Tuthill	1.805	6168.00	1127.60	1138.17	1138.17	1141.02	0.007756	13.54	455.57	80.25	1.00
Tuthill	1.898	6168.00	1137.30	1145.53	1145.53	1147.82	0.006175	14.41	694.09	171.41	0.95
Tuthill	1.898	6168.00	1137.30	1145.24	1145.24	1148.01	0.007445	15.39	548.18	97.85	1.03
Tuthill	1.994	6168.00	1143.50	1152.38	1152.38	1154.90	0.006247	12.92	526.43	123.77	0.92
Tuthill	1.994	6168.00	1143.50	1152.44	1152.44	1154.90	0.006002	12.75	534.74	123.75	0.90
Tuthill	3700	6168.00	1152.00	1156.79	1156.68	1158.73	0.009323	11.41	571.52	143.86	0.93
Tuthill	3700	6168.00	1152.00	1156.71	1156.68	1158.73	0.009865	11.61	560.85	143.12	0.96
Tuthill	3900	6168.00	1155.00	1159.55	1159.55	1161.54	0.011534	11.33	544.63	137.99	1.00
Tuthill	3900	6168.00	1155.00	1159.55	1159.55	1161.54	0.011534	11.33	544.63	137.99	1.00
Tuthill	4100	6110.00	1157.70	1162.22	1162.22	1164.18	0.011598	11.23	543.94	140.24	1.01
Tuthill	4100	6110.00	1157.70	1162.22	1162.22	1164.18	0.011598	11.23	543.94	140.24	1.01
Tuthill	4300	6110.00	1159.70	1164.73		1165.85	0.005731	8.50	718.98	166.14	0.72
Tuthill	4300	6110.00	1159.70	1164.73		1165.85	0.005731	8.50	718.98	166.14	0.72
Tuthill	4500	6110.00	1161.96	1165.95		1167.48	0.010436	9.93	615.25	176.37	0.94
Tuthill	4500	6110.00	1161.96	1165.95		1167.48	0.010436	9.93	615.25	176.37	0.94
Tuthill	4700	6110.00	1164.15	1168.05	1167.99	1169.71	0.011341	10.34	590.86	169.91	0.98
Tuthill	4700	6110.00	1164.15	1168.05	1167.99	1169.71	0.011341	10.34	590.86	169.91	0.98
Tuthill	4900	6110.00	1166.06	1170.38	1170.38	1172.26	0.011749	11.00	555.23	149.20	1.01
Tuthill	4900	6110.00	1166.06	1170.38	1170.38	1172.26	0.011749	11.00	555.23	149.20	1.01
Tuthill	5100	6110.00	1167.89	1172.81	1172.18	1174.10	0.007247	9.13	669.28	165.83	0.80
Tuthill	5100	6110.00	1167.89	1172.81	1172.18	1174.10	0.007247	9.13	669.28	165.83	0.80
Tuthill	5300	6110.00	1169.55	1174.37		1175.62	0.007329	8.95	682.81	176.06	0.80
Tuthill	5300	6110.00	1169.55	1174.37		1175.62	0.007329	8.95	682.81	176.06	0.80
Tuthill	5500	6110.00	1171.62	1175.91	1175.91	1177.80	0.011700	11.04	553.50	147.53	1.00
Tuthill	5500	6110.00	1171.62	1175.91	1175.91	1177.80	0.011700	11.04	553.50	147.53	1.00
Tuthill	5700	6110.00	1173.71	1178.35	1178.00	1179.88	0.008904	9.92	615.79	157.08	0.88
Tuthill	5700	6110.00	1173.71	1178.35	1178.00	1179.88	0.008904	9.92	615.79	157.08	0.88
Tuthill	5900	6110.00	1175.40	1180.23		1181.37	0.006423	8.55	714.21	178.24	0.75
Tuthill	5900	6110.00	1175.40	1180.23		1181.37	0.006423	8.55	714.21	178.24	0.75
Tuthill	6100	6110.00	1177.46	1181.74	1181.74	1183.54	0.011857	10.79	566.32	158.07	1.00
Tuthill	6100	6110.00	1177.46	1181.74	1181.74	1183.54	0.011857	10.79	566.32	158.07	1.00
Tuthill	6300	6110.00	1179.26	1183.97	1183.65	1185.54	0.009041	10.06	607.45	153.46	0.89
Tuthill	6300	6110.00	1179.26	1183.97	1183.65	1185.54	0.009041	10.06	607.45	153.46	0.89
Tuthill	6500	6110.00	1181.30	1186.11		1186.74	0.003512	6.35	961.99	238.69	0.56
Tuthill	6500	6110.00	1181.30	1186.11		1186.74	0.003512	6.35	961.99	238.69	0.56
Tuthill	6700	6110.00	1183.23	1187.06	1187.06	1188.59	0.012576	9.92	615.79	203.92	1.01
Tuthill	6700	6110.00	1183.23	1187.06	1187.06	1188.59	0.012576	9.92	615.79	203.92	1.01
Tuthill	6900	6110.00	1185.11	1189.46	1189.46	1191.29	0.011818	10.87	562.16	154.76	1.00
Tuthill	6900	6110.00	1185.11	1189.46	1189.46	1191.29	0.011818	10.87	562.16	154.76	1.00
Tuthill	7100	3011.00	1187.02	1192.20		1193.18	0.005747	7.93	379.74	97.06	0.71
Tuthill	7100	3011.00	1187.02	1192.20		1193.18	0.005747	7.93	379.74	97.06	0.71
Tuthill	7300	3011.00	1188.60	1193.36		1194.65	0.008423	9.14	329.31	90.55	0.84
Tuthill	7300	3011.00	1188.60	1193.36		1194.65	0.008423	9.14	329.31	90.55	0.84
Tuthill	7500	3011.00	1189.80	1195.13		1195.94	0.004729	7.24	415.77	105.34	0.64

HEC-RAS Plan: Design River: Tuthill Wash Reach: Tuthill (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Tuthill	7500	3011.00	1189.80	1195.13		1195.94	0.004729	7.24	415.77	105.34	0.64
Tuthill	7700	3011.00	1191.06	1196.11		1197.18	0.007074	8.32	362.06	100.91	0.77
Tuthill	7700	3011.00	1191.06	1196.11		1197.18	0.007074	8.32	362.06	100.91	0.77
Tuthill	7900	3011.00	1192.28	1197.60		1198.03	0.002502	5.26	572.92	145.68	0.47
Tuthill	7900	3011.00	1192.28	1197.60		1198.03	0.002502	5.26	572.92	145.68	0.47
Tuthill	8100	3011.00	1193.54	1197.80	1197.71	1199.29	0.011425	9.81	307.03	95.88	0.97
Tuthill	8100	3011.00	1193.54	1197.80	1197.71	1199.29	0.011425	9.81	307.03	95.88	0.97
Tuthill	8300	3011.00	1194.76	1199.96	1198.50	1200.57	0.003687	6.27	480.36	125.78	0.57
Tuthill	8300	3011.00	1194.76	1199.96	1198.50	1200.57	0.003687	6.27	480.36	125.78	0.57
Tuthill	8500	3011.00	1195.87	1200.79		1200.98	0.001061	3.45	872.41	220.43	0.31
Tuthill	8500	3011.00	1195.87	1200.79		1200.98	0.001061	3.45	872.41	220.43	0.31
Tuthill	8700	3011.00	1197.24	1200.60	1200.60	1201.96	0.012909	9.36	321.53	118.36	1.00
Tuthill	8700	3011.00	1197.24	1200.60	1200.60	1201.96	0.012909	9.36	321.53	118.36	1.00
Tuthill	8900	3011.00	1198.47	1202.88	1201.88	1203.55	0.004889	6.55	459.50	139.47	0.64
Tuthill	8900	3011.00	1198.47	1202.88	1201.88	1203.55	0.004889	6.55	459.50	139.47	0.64
Tuthill	9100	3011.00	1199.68	1203.99	1203.99	1205.62	0.012359	10.25	293.68	90.91	1.01
Tuthill	9100	3011.00	1199.68	1203.99	1203.99	1205.62	0.012359	10.25	293.68	90.91	1.01
Tuthill	9300	3011.00	1200.90	1206.35	1205.43	1207.35	0.005956	8.05	373.94	95.99	0.72
Tuthill	9300	3011.00	1200.90	1206.35	1205.43	1207.35	0.005956	8.05	373.94	95.99	0.72
Tuthill	9450	3011.00	1201.86	1207.42		1208.09	0.003749	6.57	458.33	112.99	0.57
Tuthill	9450	3011.00	1201.86	1207.42		1208.09	0.003749	6.57	458.33	112.99	0.57
Tuthill	9655	3011.00	1203.00	1208.26		1208.69	0.002311	5.25	573.34	137.89	0.45
Tuthill	9655	3011.00	1203.00	1208.26		1208.69	0.002311	5.25	573.34	137.89	0.45
Tuthill	10003.26	1414.00	1204.50	1208.83		1209.27	0.002482	5.62	278.68	80.63	0.48
Tuthill	10003.26	1414.00	1204.50	1208.83		1209.27	0.002482	5.62	278.68	80.63	0.48
Tuthill	10003.27	1414.00	1205.00	1208.89	1208.89	1210.42	0.002164	10.68	150.19	50.31	0.95
Tuthill	10003.27	1414.00	1205.00	1208.89	1208.89	1210.42	0.002164	10.68	150.19	50.31	0.95
Tuthill	10003.28	Culvert									
Tuthill	10003.30	1414.00	1205.50	1217.37	1209.35	1217.43	0.000024	2.38	763.49	100.61	0.12
Tuthill	10003.30	1414.00	1205.50	1217.37	1209.35	1217.43	0.000024	2.38	763.49	100.61	0.12
Tuthill	10003.31	1414.00	1205.80	1217.39		1217.43	0.000077	1.76	975.39	171.59	0.10
Tuthill	10003.31	1414.00	1205.80	1217.39		1217.43	0.000077	1.76	975.39	171.59	0.10
Tuthill	10003.32	1414.00	1211.00	1217.38		1217.44	0.000203	1.93	787.53	191.10	0.14
Tuthill	10003.32	1414.00	1211.00	1217.38		1217.44	0.000203	1.93	787.53	191.10	0.14
Tuthill	10003.34	1414.00	1212.30	1217.42		1217.48	0.000349	2.17	728.33	214.02	0.18
Tuthill	10003.34	1414.00	1212.30	1217.42		1217.48	0.000349	2.17	728.33	214.02	0.18
Tuthill	10003.43	1414.00	1213.50	1217.58		1217.64	0.000268	1.98	809.31	249.65	0.18
Tuthill	10003.43	1414.00	1213.50	1217.58		1217.65	0.000325	2.16	661.80	175.17	0.19
Tuthill	10003.53	1414.00	1214.80	1217.53		1218.20	0.006642	6.61	221.76	115.26	0.80
Tuthill	10003.53	1414.00	1214.80	1217.64		1218.24	0.005537	6.25	234.24	112.52	0.74
Tuthill	10003.63	1414.00	1218.20	1222.22	1222.22	1223.71	0.008767	9.88	150.26	54.96	0.99
Tuthill	10003.63	1414.00	1218.20	1222.27	1222.27	1223.70	0.008314	9.72	152.92	55.04	0.96
Tuthill	10003.72	1414.00	1226.60	1230.62	1230.62	1231.29	0.008441	7.88	283.05	197.45	0.92
Tuthill	10003.72	1414.00	1226.60	1231.22	1231.22	1232.28	0.007564	8.70	197.94	94.18	0.90

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HEC-RAS Plan: FIS River: Tractor Wash Reach: Downstream

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Downstream	0	3011.00	1210.90	1213.74	1213.74	1214.69	0.008912	8.11	425.86	245.50	0.95
Downstream	0	3011.00	1210.90	1213.74	1213.74	1214.70	0.008966	8.14	409.49	210.00	0.95
Downstream	0.037	1648.00	1210.00	1215.42	1214.24	1215.62	0.001787	3.95	612.81	316.12	0.38
Downstream	0.037	1648.00	1210.00	1215.44	1214.11	1215.77	0.002478	4.67	381.55	148.00	0.45
Downstream	0.095	1648.00	1203.50	1215.65		1215.72	0.000105	2.00	891.34	110.16	0.11
Downstream	0.095	1648.00	1203.50	1215.82		1215.88	0.000099	1.96	909.47	109.00	0.11
Downstream	0.188	1648.00	1205.80	1215.71		1215.78	0.000146	2.17	817.96	110.69	0.13
Downstream	0.188	1648.00	1205.80	1215.87		1215.94	0.000137	2.12	835.99	110.00	0.13
Downstream	0.251	1648.00	1219.30	1223.35	1223.35	1224.74	0.011350	9.54	187.16	81.10	0.96
Downstream	0.251	1648.00	1219.30	1223.39	1223.39	1224.73	0.010858	9.41	190.13	80.00	0.94
Downstream	0.305	1648.00	1221.10	1225.20	} 61	1225.23	0.000448	2.15	1427.58	441.99	0.20
Downstream	0.305	1648.00	1221.10	1225.70	}	1226.06	0.002279	5.27	402.38	108.00	0.45
Downstream	0.347	1648.00	1222.70	1228.32	1228.32	1229.78	0.012222	9.76	174.82	67.11	0.99
Downstream	0.347	1648.00	1222.70	1228.32	1228.32	1229.78	0.012150	9.74	174.96	65.00	0.98
Downstream	0.389	1648.00	1225.30	1231.04	1231.04	1232.84	0.011414	10.78	158.67	53.01	0.98
Downstream	0.389	1648.00	1225.30	1231.08	1231.08	1232.84	0.010990	10.66	160.75	52.00	0.96
Downstream	0.455	1648.00	1230.00	1234.92		1235.67	0.005667	7.89	332.62	139.71	0.70
Downstream	0.455	1648.00	1230.00	1234.90		1235.66	0.005803	7.95	329.04	138.00	0.71
Downstream	0.504	1648.00	1233.60	1237.17	1237.17	1238.34	0.012655	8.74	197.44	93.94	0.98
Downstream	0.504	1648.00	1233.60	1237.19	1237.19	1238.34	0.012184	8.64	199.93	93.00	0.96
Downstream	0.549	1648.00	1235.40	1239.66	1239.43	1240.67	0.007622	8.30	251.32	134.05	0.80
Downstream	0.549	1648.00	1235.40	1239.64	1239.43	1240.66	0.007861	8.39	247.71	132.77	0.81
Downstream	0.629	1648.00	1241.10	1244.53	1244.53	1245.76	0.013414	8.90	185.45	76.85	1.00
Downstream	0.629	1648.00	1241.10	1244.54	1244.54	1245.76	0.013111	8.86	186.32	76.00	0.99
Downstream	0.72	1295.00	1246.60	1249.80		1250.16	0.005995	6.05	336.81	152.76	0.67
Downstream	0.72	1295.00	1246.60	1250.23		1251.20	0.009518	8.47	195.11	83.00	0.87
Downstream	0.786	1295.00	1252.00	1255.42	1255.42	1256.78	0.011903	9.71	157.09	65.41	0.98
Downstream	0.786	1295.00	1252.00	1255.45	1255.45	1256.77	0.011477	9.60	158.83	64.00	0.96
Downstream	0.828	1295.00	1257.00	1261.73	1261.73	1263.17	0.011246	9.76	146.28	59.87	0.96
Downstream	0.828	1295.00	1257.00	1261.77	1261.77	1263.17	0.010708	9.61	148.82	59.00	0.94
Downstream	0.894	1295.00	1264.00	1269.27	1269.27	1270.71	0.011079	9.71	146.14	64.31	0.95
Downstream	0.894	1295.00	1264.00	1269.33	1269.33	1270.70	0.010399	9.52	149.84	64.00	0.92
Downstream	0.955	1295.00	1271.50	1277.38	1277.38	1278.87	0.013245	9.80	132.08	44.95	1.01
Downstream	0.955	1295.00	1271.50	1277.35	1277.35	1278.87	0.013396	9.90	130.75	44.00	1.01
Downstream	1.017	1295.00	1280.00	1286.76	1286.76	1288.54	0.012677	10.71	121.82	36.35	0.99
Downstream	1.017	1295.00	1280.00	1286.74	1286.74	1288.54	0.012764	10.78	121.00	35.00	1.00
Downstream	1.085	1295.00	1294.00	1299.69	1299.69	1301.12	0.013311	9.62	134.67	47.38	1.01
Downstream	1.085	1295.00	1294.00	1299.68	1299.68	1301.12	0.013328	9.64	134.29	47.00	1.01
Downstream	1.137	1295.00	1303.00	1307.16	1307.16	1308.62	0.010497	10.31	165.83	65.53	0.95
Downstream	1.137	1295.00	1303.00	1307.22	1307.22	1308.61	0.009786	10.07	169.73	64.00	0.92
Downstream	1.196	943.00	1315.00	1317.45	1317.45	1318.14	0.015508	6.72	142.70	103.93	0.99
Downstream	1.196	943.00	1315.00	1317.44	1317.44	1318.14	0.015497	6.74	142.02	102.00	0.99
Downstream	1.21	943.00	1324.00	1325.05	1325.05	1325.39	0.020315	4.77	202.85	303.97	1.00
Downstream	1.21	943.00	1324.00	1325.05	1325.05	1325.39	0.020271	4.78	202.51	302.00	1.00
Downstream	1.298	943.00	1314.00	1325.58	1318.26	1325.59	0.000063	0.92	1653.05	471.44	0.06
Downstream	1.298	943.00	1314.00	1325.58	1318.26	1325.59	0.000063	0.92	1652.95	470.00	0.06

HEC-RAS Plan: FIS River: Tractor Wash Reach: Downstream (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Downstream	1.364	943.00	1322.50	1326.39	1326.39	1327.09	0.027917	7.24	158.66	114.14	0.96
Downstream	1.364	943.00	1322.50	1326.40	1326.40	1327.09	0.026927	7.19	159.84	112.72	0.94
Downstream	1.416	943.00	1324.00	1328.39		1328.49	0.001946	2.63	419.19	201.92	0.27
Downstream	1.416	943.00	1324.00	1328.38		1328.48	0.001954	2.63	418.18	200.00	0.28
Downstream	1.478	943.00	1328.00	1330.08	1330.08	1330.52	0.019073	5.32	177.44	209.63	1.01
Downstream	1.478	943.00	1328.00	1330.10	1330.10	1330.52	0.018159	5.24	180.13	210.00	0.99
Downstream	1.58	943.00	1314.80	1330.66		1330.66	0.000001	0.31	3580.56	340.60	0.01
Downstream	1.58	943.00	1314.80	1330.65		1330.65	0.000001	0.31	3579.25	340.00	0.01
Downstream	1.669	943.00	1321.50	1330.64		1330.67	0.000137	1.43	955.99	184.50	0.09
Downstream	1.669	943.00	1321.50	1330.64		1330.66	0.000137	1.43	955.27	184.00	0.09
Downstream	1.769	943.00	1329.00	1332.49	1332.49	1333.58	0.027350	8.38	114.54	59.47	0.99
Downstream	1.769	943.00	1329.00	1332.52	1332.52	1333.58	0.026299	8.28	116.05	59.00	0.97
Downstream	1.862	943.00	1339.00	1341.69	1341.13	1341.98	0.011229	4.76	238.36	136.92	0.61
Downstream	1.862	943.00	1339.00	1342.05	1341.53	1342.57	0.013393	5.77	163.44	73.00	0.68
Downstream	1.93	943.00	1344.70	1347.66	1347.66	1348.60	0.030395	7.77	121.42	65.80	1.01
Downstream	1.93	943.00	1344.70	1347.87		1348.63	0.021221	6.98	135.02	65.00	0.85
Downstream	1.985	943.00	1350.10	1353.46	1353.07	1353.95	0.012148	5.88	197.66	132.91	0.67
Downstream	1.985	943.00	1350.10	1353.39		1354.07	0.016728	6.66	145.04	66.94	0.77
Downstream	2.047	943.00	1358.00	1362.06	1362.06	1363.11	0.020077	8.81	139.20	76.25	0.89
Downstream	2.047	943.00	1358.00	1362.15	1362.15	1363.10	0.017744	8.44	146.00	76.00	0.84
Downstream	2.092	472.00	1359.00	1364.28		1364.38	0.001261	2.59	195.82	60.67	0.23
Downstream	2.092	472.00	1359.00	1364.24		1364.34	0.001303	2.62	192.95	59.00	0.23
Downstream	2.144	472.00	1362.40	1365.00	1365.00	1365.82	0.028280	7.36	67.42	44.13	0.97
Downstream	2.144	472.00	1362.40	1365.00	1365.00	1365.82	0.028097	7.34	67.41	43.00	0.96
Downstream	2.186	472.00	1366.30	1369.30	1368.70	1369.56	0.010697	4.10	115.13	74.13	0.58
Downstream	2.186	472.00	1366.30	1369.30	1368.70	1369.56	0.010743	4.11	114.89	73.96	0.58
Downstream	2.238	472.00	1369.60	1372.23		1372.59	0.011106	4.85	97.45	51.87	0.61
Downstream	2.238	472.00	1369.60	1372.23		1372.59	0.011096	4.84	97.60	51.00	0.61
Downstream	2.288	472.00	1375.20	1377.35	1377.35	1378.02	0.034033	6.57	71.88	54.47	1.01
Downstream	2.288	472.00	1375.20	1377.34	1377.34	1378.02	0.033539	6.60	71.53	53.00	1.00
Downstream	2.341	472.00	1380.50	1383.30	1382.89	1383.77	0.013702	5.59	90.23	52.96	0.69
Downstream	2.341	472.00	1380.50	1383.29	1382.89	1383.76	0.013808	5.60	89.89	52.00	0.69
Downstream	2.387	472.00	1385.80	1388.16	1388.16	1389.04	0.031405	7.51	62.82	36.22	1.01
Downstream	2.387	472.00	1385.80	1388.14	1388.14	1389.04	0.031620	7.61	62.01	35.00	1.01
Downstream	2.442	472.00	1391.70	1394.42	1393.99	1394.80	0.013480	4.96	95.56	57.08	0.66
Downstream	2.442	472.00	1391.70	1394.42		1394.80	0.013418	4.94	95.86	56.00	0.66
Downstream	2.54	472.00	1406.40	1410.16	1410.16	1411.16	0.030926	8.03	58.85	30.99	1.01
Downstream	2.54	472.00	1406.40	1410.16	1410.16	1411.16	0.031149	8.01	58.89	30.00	1.01
Downstream	2.635	472.00	1426.00	1429.24	1429.24	1430.15	0.031236	7.65	61.72	34.29	1.00
Downstream	2.635	472.00	1426.00	1429.23	1429.23	1430.15	0.031383	7.68	61.47	34.00	1.01
Downstream	2.731	472.00	1448.70	1451.92	1451.92	1453.11	0.025608	8.88	57.00	25.77	0.98
Downstream	2.731	472.00	1448.70	1451.91	1451.91	1453.12	0.026321	8.96	56.05	24.00	0.99

SUMMARY PRINTOUT

	SECNO	Q	CWSEL	SSTA	STCHL	STCHR	ENDST	DIFWSX	TOPWID	DEPTH	ELMIN	10*KS	VCH
	.000	4057.00	1039.06	9945.48	9940.00	10075.00	10068.73	.00	123.25	6.06	1033.00	43.68	8.22
	.000	4057.00	1039.06	9945.48	9940.00	10075.00	10068.73	.00	123.25	6.06	1033.00	43.67	8.22
	.075	4057.00	1040.84	9888.88	9960.00	10070.00	10073.38	1.79	184.50	5.84	1035.00	27.90	6.93
	.075	4057.00	1040.84	9910.00	9960.00	10070.00	10073.36	1.78	163.36	5.84	1035.00	28.33	6.98
*	.186	4057.00	1043.71	9751.25	9970.00	10050.00	10068.55	2.87	294.60	5.21	1038.50	45.59	9.35
*	.186	4057.00	1043.25	9953.74	9970.00	10050.00	10066.26	2.41	112.53	4.75	1038.50	75.16	11.21
*	.314	4057.00	1047.99	9353.42	9950.00	10080.00	10079.95	4.28	535.64	5.49	1042.50	39.51	7.50
	.314	4057.00	1048.06	9945.41	9950.00	10080.00	10080.00	4.80	134.59	5.56	1042.50	45.66	8.16
*	.415	4057.00	1051.93	9545.90	9940.00	10060.00	10270.29	3.94	724.39	4.73	1047.20	47.17	7.29
*	.415	4057.00	1051.88	9940.00	9940.00	10060.00	10175.00	3.83	235.00	4.68	1047.20	77.95	9.18
*	.540	4057.00	1057.55	9911.75	9930.00	10040.00	10311.47	5.62	399.72	4.55	1053.00	53.00	8.31
*	.540	4057.00	1057.46	9912.87	9930.00	10040.00	10110.00	5.57	197.13	4.46	1053.00	72.54	9.54
*	.634	4057.00	1061.80	9950.98	9970.00	10040.00	10162.52	4.25	211.54	5.00	1056.80	59.83	10.29
*	.634	4057.00	1061.79	9951.07	9970.00	10040.00	10105.00	4.33	153.93	4.99	1056.80	64.21	10.63
*	.729	4057.00	1065.30	9953.52	9960.00	10085.00	10221.80	3.49	268.28	4.60	1060.70	70.72	9.25
	.729	4057.00	1065.34	9953.52	9960.00	10085.00	10085.00	3.55	131.48	4.64	1060.70	75.84	9.60
*	.823	4057.00	1070.92	9952.71	9955.00	10030.00	10045.27	5.62	92.56	6.42	1064.50	76.65	11.80
*	.823	4057.00	1070.94	9952.71	9955.00	10030.00	10045.27	5.60	92.56	6.44	1064.50	75.23	11.73
	.917	4057.00	1074.73	9956.30	9965.00	10040.00	10073.28	3.82	116.97	5.43	1069.30	68.23	11.34
	.917	4057.00	1074.71	9956.49	9965.00	10040.00	10050.00	3.77	93.51	5.41	1069.30	70.36	11.46
*	1.012	4057.00	1080.73	9936.36	9940.00	10020.00	10028.56	5.99	92.19	5.03	1075.70	80.31	11.66
*	1.012	4057.00	1080.75	9936.36	9940.00	10020.00	10028.56	6.04	92.20	5.05	1075.70	79.12	11.61

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	SECNO	Q	CWSEL	SSTA	STCHL	STCHR	ENDST	DIFWSX	TOPWID	DEPTH	ELMIN	10*KS	VCH
*	1.067	4061.00	1085.01	9977.70	9977.70	10022.00	10022.00	4.28	44.30	6.37	1078.64	20.40	14.40
*	1.067	4061.00	1085.01	9977.70	9977.70	10022.00	10022.00	4.26	44.30	6.37	1078.64	24.23	14.40
*	1.110	4061.00	1093.14	9950.00	9977.70	10022.00	10022.00	8.13	72.00	12.04	1081.10	1.66	6.29
*	1.110	4061.00	1093.16	9950.00	9977.70	10022.00	10022.00	8.15	72.00	12.06	1081.10	2.14	6.08
*	1.118	5503.00	1093.65	9920.00	9920.00	10030.00	10100.00	.51	180.00	12.15	1081.50	.61	3.02
*	1.118	5503.00	1093.64	9920.00	9920.00	10030.00	10100.00	.48	180.00	12.14	1081.50	.61	3.02
*	1.152	5503.00	1093.62	9930.00	9930.00	10045.00	10150.00	-.03	220.00	11.62	1082.00	5.06	4.27
*	1.152	5503.00	1093.61	9930.00	9930.00	10045.00	10150.00	-.03	220.00	11.61	1082.00	5.08	4.28
*	1.198	5503.00	1093.60	9936.00	9945.00	10030.00	10200.00	-.02	264.00	8.30	1085.30	15.17	6.77
*	1.198	5503.00	1093.59	9936.02	9945.00	10030.00	10200.00	-.02	263.98	8.29	1085.30	15.26	6.79
*	1.260	6601.00	1097.03	9962.42	9975.00	10045.00	10200.00	3.43	237.58	5.53	1091.50	72.04	11.82
*	1.260	6601.00	1097.03	9962.42	9975.00	10045.00	10200.00	3.44	237.58	5.53	1091.50	71.96	11.81
*	1.287	6601.00	1099.25	9973.76	9980.00	10145.00	10166.83	2.22	193.07	5.25	1094.00	82.25	10.73
*	1.287	6601.00	1099.21	9973.96	9980.00	10145.00	10145.00	2.18	171.04	5.21	1094.00	86.45	10.88
*	1.313	6601.00	1100.98	9920.14	9950.00	10025.00	10079.76	1.73	159.62	5.98	1095.00	64.05	12.31
*	1.313	6601.00	1100.98	9920.14	9950.00	10025.00	10079.77	1.76	159.63	5.98	1095.00	64.01	12.31
*	1.322	6601.00	1103.29	9877.18	9930.00	10110.00	10110.00	2.31	232.82	8.29	1095.00	5.11	4.29
*	1.322	6601.00	1103.29	9877.18	9930.00	10110.00	10110.00	2.31	232.82	8.29	1095.00	5.11	4.29
*	1.362	6225.00	1103.50	9878.68	9950.00	10045.00	10100.00	.22	221.32	21.50	1082.00	.70	2.83
*	1.362	6225.00	1103.50	9878.68	9950.00	10045.00	10100.00	.22	221.32	21.50	1082.00	.70	2.83
*	1.422	6225.00	1106.40	9948.99	9945.00	10045.00	10041.01	2.90	92.02	7.90	1098.50	79.69	13.06
*	1.422	6225.00	1106.40	9949.00	9945.00	10045.00	10041.00	2.90	92.01	7.90	1098.50	79.81	13.06

*	1.518	6225.00	1113.73	9969.41	9975.00	10055.00	10237.96	7.32	223.97	6.83	1106.90	63.46	11.82
*	1.518	6225.00	1114.26	9969.40	9975.00	10055.00	10069.94	7.86	100.54	7.36	1106.90	70.69	13.31
*	1.614	6225.00	1123.45	9967.73	9975.00	10055.00	10150.65	9.73	182.92	9.55	1113.90	56.71	12.29
*	1.614	6225.00	1123.35	9968.26	9975.00	10055.00	10110.00	9.09	141.74	9.45	1113.90	60.91	12.59
*	1.710	6168.00	1130.93	9967.67	9965.00	10070.00	10056.63	7.48	88.96	10.93	1120.00	79.58	13.09
*	1.710	6168.00	1130.94	9967.64	9965.00	10070.00	10056.80	7.60	89.16	10.94	1120.00	79.14	13.05
*	1.805	6168.00	1138.10	9969.75	9970.00	10050.00	10053.79	7.17	84.04	10.50	1127.60	80.51	13.70
*	1.805	6168.00	1138.10	9969.75	9970.00	10050.00	10050.00	7.15	80.25	10.50	1127.60	80.74	13.71
*	1.898	6168.00	1145.29	9972.07	9980.00	10020.00	10137.22	7.19	165.15	7.99	1137.30	62.27	14.15
*	1.898	6168.00	1145.20	9972.21	9980.00	10020.00	10070.00	7.10	97.79	7.90	1137.30	75.02	15.39
*	1.994	6168.00	1152.38	9969.06	9975.00	10050.00	10092.81	7.09	123.75	8.88	1143.50	62.41	12.91
*	1.994	6168.00	1152.40	9969.06	9975.00	10050.00	10092.81	7.20	123.75	8.90	1143.50	61.60	12.86

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	SECNO	Q	CWSEL	SSTA	STCHL	STCHR	ENDST	DIFWSX	TOPWID	DEPTH	ELMIN	10*KS	VCH
*	2.088	6168.00	1159.36	9971.61	9975.00	10055.00	10100.18	6.98	128.57	9.26	1150.10	67.93	12.83
*	2.088	6168.00	1159.28	9971.81	9975.00	10055.00	10055.00	6.88	83.19	9.18	1150.10	78.22	13.60
*	2.170	6110.00	1167.39	9964.34	9940.00	10135.00	10128.94	8.04	164.60	4.79	1162.60	89.04	10.67
*	2.170	6110.00	1167.39	9964.35	9940.00	10135.00	10128.89	8.11	164.54	4.79	1162.60	89.45	10.69
*	2.279	6110.00	1176.61	9945.88	9940.00	10045.00	10039.91	9.21	94.03	7.31	1169.30	80.64	12.86
*	2.279	6110.00	1176.60	9945.93	9940.00	10045.00	10039.90	9.21	93.96	7.30	1169.30	81.03	12.88
*	2.373	6110.00	1180.51	9950.04	9960.00	10015.00	10168.84	3.91	218.80	8.51	1172.00	37.63	10.86
	2.373	6110.00	1180.37	9952.76	9960.00	10015.00	10080.00	3.77	127.24	8.37	1172.00	47.66	12.07
*	2.468	6110.00	1184.94	9941.03	9975.00	10015.00	10120.81	4.43	179.79	7.64	1177.30	63.04	13.95
*	2.468	6110.00	1184.87	9941.55	9975.00	10015.00	10080.00	4.49	138.45	7.57	1177.30	66.70	14.24
*	2.563	6110.00	1191.10	9944.81	9980.00	10025.00	10288.70	6.15	343.89	8.80	1182.30	35.64	11.75
*	2.563	6110.00	1190.92	9948.00	9980.00	10025.00	10100.00	6.06	152.00	8.62	1182.30	48.55	13.52
*	2.659	6110.00	1193.87	9968.55	9975.00	10025.00	10158.41	2.78	189.86	8.07	1185.80	53.84	12.93
*	2.659	6110.00	1193.80	9968.67	9975.00	10025.00	10100.00	2.87	131.32	8.00	1185.80	62.18	13.79
*	2.753	3011.00	1197.53	9917.67	9975.00	10070.00	10162.31	3.66	240.61	7.23	1190.30	43.86	7.88
	2.753	3011.00	1197.96	9917.67	9975.00	10070.00	10110.00	4.17	192.33	7.66	1190.30	28.94	6.88
*	2.848	3011.00	1200.23	9964.14	9980.00	10025.00	10080.27	2.70	116.13	7.03	1193.20	58.81	11.09
*	2.848	3011.00	1200.20	9964.27	9980.00	10025.00	10079.49	2.24	115.22	7.00	1193.20	60.48	11.19
	2.943	3011.00	1203.43	9960.50	9945.00	10020.00	10067.89	3.19	107.39	7.63	1195.80	49.11	9.37
	2.943	3011.00	1203.46	9960.50	9945.00	10020.00	10067.90	3.26	107.40	7.66	1195.80	47.97	9.30
*	3.057	3011.00	1205.87	9975.33	9985.00	10020.00	10143.80	2.44	168.47	6.47	1199.40	52.35	11.18
	3.057	3011.00	1205.79	9975.51	9985.00	10020.00	10075.00	2.34	99.49	6.39	1199.40	58.13	11.68
	3.148	3011.00	1208.87	9976.87	9975.00	10030.00	10203.52	3.00	226.65	8.87	1200.00	30.81	8.14
	3.148	3011.00	1209.03	9977.70	9975.00	10030.00	10100.00	3.23	122.30	9.03	1200.00	31.77	8.45
*	3.250	3011.00	1213.72	9939.93	9970.00	10120.00	10184.43	4.85	244.49	2.82	1210.90	91.73	8.19
*	3.250	3011.00	1213.71	9939.99	9970.00	10120.00	10150.00	4.69	210.01	2.81	1210.90	92.78	8.23
	3.344	1414.00	1216.64	9978.40	9985.00	10115.00	10200.27	2.92	221.88	3.84	1212.80	14.09	3.61
	3.344	1414.00	1216.65	9978.43	9985.00	10115.00	10150.00	2.94	171.57	3.85	1212.80	14.07	3.62
*	3.439	1414.00	1217.11	9974.82	9980.00	10150.00	10216.65	.47	241.84	3.61	1213.50	4.18	2.27
*	3.439	1414.00	1217.15	9974.83	9980.00	10150.00	10150.00	.49	175.17	3.65	1213.50	4.84	2.43
*	3.535	1414.00	1217.25	9976.87	9980.00	10080.00	10089.39	.15	112.52	2.45	1214.80	106.74	7.64
*	3.535	1414.00	1217.26	9976.87	9980.00	10080.00	10089.39	.11	112.52	2.46	1214.80	105.15	7.60
*	3.631	1414.00	1222.23	9976.66	9980.00	10025.00	10031.71	4.98	55.05	4.03	1218.20	86.40	9.83
*	3.631	1414.00	1222.23	9976.66	9980.00	10025.00	10031.70	4.97	55.04	4.03	1218.20	85.89	9.81

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	SECNO	Q	CWSEL	SSTA	STCHL	STCHR	ENDST	DIFWSX	TOPWID	DEPTH	ELMIN	10*KS	VCH
*	3.724	1414.00	1230.42	9975.81	9980.00	10030.00	10169.19	8.19	193.38	3.82	1226.60	101.83	8.14
*	3.724	1414.00	1231.21	9975.82	9980.00	10030.00	10070.00	8.97	94.18	4.61	1226.60	76.84	8.74
*	3.818	1414.00	1236.20	9981.34	9985.00	10030.00	10236.35	5.78	255.01	3.90	1232.30	68.55	7.62
*	3.818	1414.00	1236.28	9981.34	9985.00	10030.00	10070.00	5.07	88.66	3.98	1232.30	98.32	9.33
*	3.912	1414.00	1243.08	9972.29	9980.00	10015.00	10071.64	6.89	99.34	3.98	1239.10	67.25	9.41
*	3.912	1414.00	1243.11	9972.29	9980.00	10015.00	10070.00	6.83	97.71	4.01	1239.10	64.70	9.29
*	4.006	1261.00	1249.66	9980.86	9980.00	10045.00	10041.56	6.57	60.70	3.66	1246.00	102.22	8.79
*	4.006	1261.00	1249.65	9980.88	9980.00	10045.00	10041.50	6.54	60.63	3.65	1246.00	102.92	8.82
*	4.101	1261.00	1257.84	9920.00	9975.00	10040.00	10135.33	8.18	215.32	2.04	1255.80	95.74	7.18
*	4.101	1261.00	1257.96	9920.00	9975.00	10040.00	10070.00	8.31	150.00	2.16	1255.80	97.22	7.55
*	4.196	1261.00	1263.02	9967.46	9965.00	10025.00	10058.08	5.18	90.62	3.22	1259.80	86.23	8.48
*	4.196	1261.00	1263.05	9967.46	9965.00	10025.00	10058.08	5.10	90.62	3.25	1259.80	82.04	8.34
*	4.289	1261.00	1270.34	9949.59	9985.00	10010.00	10138.71	7.32	189.12	2.94	1267.40	84.90	8.72
*	4.289	1261.00	1270.31	9950.06	9985.00	10010.00	10070.00	7.26	119.93	2.91	1267.40	101.19	9.44
	4.375	1261.00	1274.33	9992.08	9995.00	10025.00	10117.49	3.99	125.41	2.63	1271.70	99.41	9.05
	4.375	1261.00	1274.49	9992.08	9995.00	10025.00	10090.00	4.17	97.92	2.79	1271.70	82.99	8.62
	4.469	1261.00	1278.18	9984.54	9995.00	10045.00	10159.13	3.85	174.58	3.08	1275.10	54.39	6.96
	4.469	1261.00	1278.15	9984.62	9995.00	10045.00	10090.00	3.67	105.38	3.05	1275.10	63.52	7.46
*	4.563	1261.00	1281.57	9973.24	9985.00	10040.00	10126.25	3.39	153.01	3.47	1278.10	73.88	7.86
	4.563	1261.00	1281.53	9973.47	9985.00	10040.00	10070.00	3.38	96.53	3.43	1278.10	81.32	8.18
*	4.653	1261.00	1283.61	9960.95	9965.00	10040.00	10088.64	2.05	127.69	3.91	1279.70	17.11	4.67
*	4.653	1261.00	1283.68	9960.95	9965.00	10040.00	10070.00	2.15	109.05	3.98	1279.70	15.95	4.57
*	4.725	1108.00	1285.30	9970.14	9965.00	10040.00	10082.30	1.69	112.17	2.30	1283.00	92.27	7.52
*	4.725	1108.00	1285.29	9970.20	9965.00	10040.00	10070.00	1.61	99.80	2.29	1283.00	93.77	7.55

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TUTHILL DIKE WASH - WASH

SUMMARY PRINTOUT TABLE 110

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
	.000	1039.06	-.94	1040.11	123.25	.00	4057.00	.00	.00	.00	9940.00	10075.00	.00
	.000	1039.06	.00	1040.11	123.25	.00	4057.00	.00	123.25	9945.48	9940.00	10075.00	10068.73
	.075	1040.84	.00	1041.52	184.50	758.82	3296.64	1.55	.00	.00	9960.00	10070.00	.00
	.075	1040.84	-.01	1041.53	163.36	740.68	3314.79	1.53	163.38	9910.00	9960.00	10070.00	10073.38
*	.186	1043.71	.00	1044.90	294.60	428.50	3499.86	128.64	.00	.00	9970.00	10050.00	.00
*	.186	1043.25	-.46	1045.10	112.53	155.07	3785.63	116.30	118.55	9950.00	9970.00	10050.00	10068.55
*	.314	1047.99	.00	1048.79	535.64	391.03	3665.97	.00	.00	.00	9950.00	10080.00	.00
	.314	1048.06	.07	1049.09	134.59	.04	4056.96	.00	155.00	9925.00	9950.00	10080.00	10080.00
*	.415	1051.93	.00	1052.53	724.39	670.95	2744.45	641.59	.00	.00	9940.00	10060.00	.00
*	.415	1051.88	-.05	1053.02	235.00	.00	3407.42	649.58	235.00	9940.00	9940.00	10060.00	10175.00
*	.540	1057.55	.00	1058.43	399.72	42.96	3203.28	810.75	.00	.00	9930.00	10040.00	.00
*	.540	1057.46	-.09	1058.73	197.13	42.49	3580.08	434.43	198.25	9911.75	9930.00	10040.00	10110.00
*	.634	1061.80	.00	1063.16	211.54	210.06	3172.71	674.23	.00	.00	9970.00	10040.00	.00
*	.634	1061.79	-.02	1063.28	153.93	214.97	3265.15	576.88	154.02	9950.98	9970.00	10040.00	10105.00
*	.729	1065.30	.00	1066.56	268.28	12.93	3836.70	207.37	.00	.00	9960.00	10085.00	.00
	.729	1065.34	.04	1066.77	131.48	15.03	4041.97	.00	131.48	9953.52	9960.00	10085.00	10085.00
*	.823	1070.92	.00	1073.07	92.56	2.57	4040.92	13.51	.00	.00	9955.00	10030.00	.00
*	.823	1070.94	.02	1073.07	92.56	2.77	4039.64	14.59	92.56	9952.71	9955.00	10030.00	10045.27
	.917	1074.73	.00	1076.70	116.97	51.83	3985.72	19.45	.00	.00	9965.00	10040.00	.00

	.917	1074.71	-.03	1076.72	93.51	50.50	3993.93	12.57	93.70	9956.30	9965.00	10040.00 10050.00
*	1.012	1080.73	.00	1082.83	92.19	2.95	4048.78	5.27	.00	.00	9940.00	10020.00 .00
*	1.012	1080.75	.02	1082.83	92.20	3.18	4048.14	5.68	92.20	9936.36	9940.00	10020.00 10028.56
*	1.067	1085.01	.00	1088.23	44.30	.00	4061.00	.00	.00	.00	9977.70	10022.00 .00
*	1.067	1085.01	.00	1088.23	44.30	.00	4061.00	.00	44.30	9977.70	9977.70	10022.00 10022.00
*	1.110	1093.14	.00	1093.68	72.00	708.59	3352.41	.00	.00	.00	9977.70	10022.00 .00
*	1.110	1093.16	.03	1093.68	72.00	809.08	3251.92	.00	72.00	9950.00	9977.70	10022.00 10022.00
*	1.118	1093.65	.00	1093.81	180.00	.00	2898.01	2604.99	180.00	9920.00	9920.00	10030.00 10100.00
*	1.118	1093.64	-.01	1093.80	180.00	.00	2897.52	2605.48	180.00	9920.00	9920.00	10030.00 10100.00
*	1.152	1093.62	.00	1093.85	220.00	.00	3764.59	1738.41	220.00	9930.00	9930.00	10045.00 10150.00
*	1.152	1093.61	-.01	1093.84	220.00	.00	3765.19	1737.81	220.00	9930.00	9930.00	10045.00 10150.00
*	1.198	1093.60	.00	1094.14	264.00	50.19	3827.44	1625.36	275.00	9925.00	9945.00	10030.00 10200.00
*	1.198	1093.59	-.01	1094.13	263.98	50.02	3830.34	1622.65	275.00	9925.00	9945.00	10030.00 10200.00

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	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	1.260	1097.03	.00	1098.55	237.58	138.58	3925.92	2536.50	255.00	9945.00	9975.00	10045.00	10200.00
*	1.260	1097.03	.00	1098.55	237.58	138.65	3925.39	2536.96	255.00	9945.00	9975.00	10045.00	10200.00
*	1.287	1099.25	.00	1101.02	193.07	12.60	6554.93	33.47	.00	.00	9980.00	10145.00	.00
*	1.287	1099.21	-.03	1101.05	171.04	12.06	6588.94	.00	171.04	9973.96	9980.00	10145.00	10145.00
*	1.313	1100.98	.00	1102.96	159.62	610.87	5056.85	933.28	159.86	9920.14	9950.00	10025.00	10080.00
*	1.313	1100.98	.00	1102.96	159.63	610.99	5056.60	933.41	159.86	9920.14	9950.00	10025.00	10080.00
*	1.322	1103.29	.00	1103.56	232.82	594.12	6006.88	.00	234.10	9875.90	9930.00	10110.00	10110.00
*	1.322	1103.29	.00	1103.56	232.82	594.10	6006.90	.00	234.10	9875.90	9930.00	10110.00	10110.00
*	1.362	1103.50	.00	1103.61	221.32	550.32	4859.70	814.98	222.76	9877.24	9950.00	10045.00	10100.00
*	1.362	1103.50	.00	1103.61	221.32	550.31	4859.72	814.97	222.76	9877.24	9950.00	10045.00	10100.00
*	1.422	1106.40	.00	1109.05	92.02	.00	6225.00	.00	.00	.00	9945.00	10045.00	.00
*	1.422	1106.40	.00	1109.05	92.01	.00	6225.00	.00	96.01	9948.99	9945.00	10045.00	10045.00
*	1.518	1113.73	.00	1115.52	223.97	41.35	4942.83	1240.82	.00	.00	9975.00	10055.00	.00
*	1.518	1114.26	.53	1116.97	100.54	62.90	6125.60	36.50	120.60	9969.40	9975.00	10055.00	10090.00
*	1.614	1123.45	.00	1125.74	182.92	11.82	6049.90	163.28	.00	.00	9975.00	10055.00	.00
*	1.614	1123.35	-.11	1125.76	141.74	9.99	6088.93	126.09	142.28	9967.72	9975.00	10055.00	10110.00
*	1.710	1130.93	.00	1133.59	88.96	.00	6168.00	.00	.00	.00	9965.00	10070.00	.00
*	1.710	1130.94	.01	1133.59	89.16	.00	6168.00	.00	105.00	9965.00	9965.00	10070.00	10070.00
*	1.805	1138.10	.00	1141.02	84.04	.00	6167.93	.07	.00	.00	9970.00	10050.00	.00
*	1.805	1138.10	.00	1141.02	80.25	.00	6168.00	.00	80.25	9969.75	9970.00	10050.00	10050.00
*	1.898	1145.29	.00	1147.47	165.15	104.04	3941.38	2122.57	.00	.00	9980.00	10020.00	.00
*	1.898	1145.20	-.09	1147.98	97.79	108.94	4230.92	1828.14	97.93	9972.07	9980.00	10020.00	10070.00
*	1.994	1152.38	.00	1154.89	123.75	22.09	5985.94	159.97	.00	.00	9975.00	10050.00	.00
*	1.994	1152.40	.02	1154.89	123.75	22.57	5982.18	163.25	123.75	9969.06	9975.00	10050.00	10092.81
*	2.088	1159.36	.00	1161.81	128.57	5.18	5894.26	268.56	.00	.00	9975.00	10055.00	.00
*	2.088	1159.28	-.08	1162.15	83.19	4.71	6163.29	.00	83.55	9971.45	9975.00	10055.00	10055.00
*	2.170	1167.39	.00	1169.16	164.60	.00	6110.00	.00	.00	.00	9940.00	10135.00	.00
*	2.170	1167.39	-.01	1169.16	164.54	.00	6110.00	.00	164.59	9964.34	9940.00	10135.00	10128.93
*	2.279	1176.61	.00	1179.18	94.03	.00	6110.00	.00	.00	.00	9940.00	10045.00	.00
*	2.279	1176.60	-.01	1179.18	93.96	.00	6110.00	.00	94.03	9945.88	9940.00	10045.00	10039.91
*	2.373	1180.51	.00	1181.92	218.80	2.34	4486.02	1621.63	.00	.00	9960.00	10015.00	.00
	2.373	1180.37	-.14	1182.27	127.24	1.13	4892.54	1216.33	129.96	9950.04	9960.00	10015.00	10080.00
*	2.468	1184.94	.00	1187.04	179.79	449.44	3786.99	1873.57	.00	.00	9975.00	10015.00	.00
*	2.468	1184.87	-.08	1187.08	138.45	443.59	3822.84	1843.57	138.97	9941.03	9975.00	10015.00	10080.00

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	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	2.563	1191.10	.00	1192.63	343.89	348.43	4202.68	1558.89	.00	.00	9980.00	10025.00	.00
*	2.563	1190.92	-.17	1193.20	152.00	372.72	4728.33	1008.95	155.19	9944.81	9980.00	10025.00	10100.00
*	2.659	1193.87	.00	1195.83	189.86	47.76	4397.96	1664.27	.00	.00	9975.00	10025.00	.00
*	2.659	1193.80	-.08	1196.15	131.32	48.64	4637.09	1424.27	131.45	9968.55	9975.00	10025.00	10100.00
*	2.753	1197.53	.00	1198.44	240.61	102.69	2842.00	66.30	.00	.00	9975.00	10070.00	.00
	2.753	1197.96	.43	1198.64	192.33	167.09	2762.56	81.34	192.33	9917.67	9975.00	10070.00	10110.00
*	2.848	1200.23	.00	1201.89	116.13	60.41	2561.68	388.91	.00	.00	9980.00	10025.00	.00
*	2.848	1200.20	-.03	1201.89	115.22	58.35	2568.53	384.12	116.00	9964.00	9980.00	10025.00	10080.00
	2.943	1203.43	.00	1204.62	107.39	.00	2530.01	480.99	.00	.00	9945.00	10020.00	.00
	2.943	1203.46	.03	1204.63	107.40	.00	2527.37	483.63	107.40	9960.50	9945.00	10020.00	10067.90
*	3.057	1205.87	.00	1207.34	168.47	74.34	2197.03	739.63	.00	.00	9985.00	10020.00	.00
	3.057	1205.79	-.08	1207.47	99.49	74.43	2264.87	671.69	100.00	9975.00	9985.00	10020.00	10075.00
	3.148	1208.87	.00	1209.68	226.65	.00	2315.50	695.50	.00	.00	9975.00	10030.00	.00
	3.148	1209.03	.15	1209.96	122.30	.00	2465.91	545.09	122.30	9977.70	9975.00	10030.00	10100.00
*	3.250	1213.72	.00	1214.69	244.49	82.95	2785.74	142.31	.00	.00	9970.00	10120.00	.00
*	3.250	1213.71	.00	1214.70	210.01	83.01	2795.18	132.80	210.38	9939.62	9970.00	10120.00	10150.00
	3.344	1216.64	.00	1216.82	221.88	13.93	1266.85	133.22	.00	.00	9985.00	10115.00	.00
	3.344	1216.65	.02	1216.84	171.57	14.29	1282.57	117.14	171.57	9978.43	9985.00	10115.00	10150.00
*	3.439	1217.11	.00	1217.18	241.84	7.42	1297.41	109.18	.00	.00	9980.00	10150.00	.00
*	3.439	1217.15	.04	1217.24	175.17	8.28	1405.72	.00	175.17	9974.83	9980.00	10150.00	10150.00
*	3.535	1217.25	.00	1218.15	112.52	5.24	1395.62	13.14	.00	.00	9980.00	10080.00	.00
*	3.535	1217.26	.01	1218.15	112.52	5.30	1395.38	13.31	112.52	9976.87	9980.00	10080.00	10089.39
*	3.631	1222.23	.00	1223.70	55.05	12.22	1383.14	18.64	.00	.00	9980.00	10025.00	.00
*	3.631	1222.23	.01	1223.70	55.04	12.27	1383.00	18.72	55.04	9976.66	9980.00	10025.00	10031.70
*	3.724	1230.42	.00	1231.14	193.38	1.16	853.94	558.90	.00	.00	9980.00	10030.00	.00
*	3.724	1231.21	.79	1232.28	94.18	12.06	1262.13	139.81	94.18	9975.82	9980.00	10030.00	10070.00
*	3.818	1236.20	.00	1236.79	255.01	11.87	872.57	529.56	.00	.00	9985.00	10030.00	.00
*	3.818	1236.28	.09	1237.39	88.66	15.90	1104.35	293.75	88.66	9981.34	9985.00	10030.00	10070.00
*	3.912	1243.08	.00	1244.24	99.34	45.93	1163.59	204.48	.00	.00	9980.00	10015.00	.00
*	3.912	1243.11	.03	1244.24	97.71	46.48	1158.50	209.02	97.71	9972.29	9980.00	10015.00	10070.00
*	4.006	1249.66	.00	1250.86	60.70	.00	1261.00	.00	.00	.00	9980.00	10045.00	.00
*	4.006	1249.65	-.01	1250.86	60.63	.00	1261.00	.00	60.70	9980.86	9980.00	10045.00	10041.56
*	4.101	1257.84	.00	1258.43	215.32	135.94	842.89	282.17	.00	.00	9975.00	10040.00	.00
*	4.101	1257.96	.12	1258.67	150.00	170.23	943.26	147.51	150.00	9920.00	9975.00	10040.00	10070.00

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	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	4.196	1263.02	.00	1264.11	90.62	.00	1231.39	29.60	.00	.00	9965.00	10025.00	.00
*	4.196	1263.05	.04	1264.11	90.62	.00	1228.73	32.27	90.62	9967.46	9965.00	10025.00	10058.08
*	4.289	1270.34	.00	1270.99	189.12	168.54	575.92	516.54	.00	.00	9985.00	10010.00	.00
*	4.289	1270.31	-.03	1271.14	119.93	176.99	616.87	467.14	120.41	9949.59	9985.00	10010.00	10070.00
	4.375	1274.33	.00	1275.14	125.41	11.84	674.38	574.78	.00	.00	9995.00	10025.00	.00
	4.375	1274.49	.15	1275.24	97.92	13.00	682.86	565.14	97.92	9992.08	9995.00	10025.00	10090.00
	4.469	1278.18	.00	1278.76	174.58	35.76	915.71	309.53	.00	.00	9995.00	10045.00	.00
	4.469	1278.15	-.03	1278.86	105.38	37.11	971.75	252.14	105.46	9984.54	9995.00	10045.00	10090.00
*	4.563	1281.57	.00	1282.41	153.01	24.89	1089.25	146.86	.00	.00	9985.00	10040.00	.00
	4.563	1281.53	-.03	1282.47	96.53	24.78	1119.83	116.38	96.76	9973.24	9985.00	10040.00	10070.00

*	4.653	1283.61	.00	1283.94	127.69	4.18	1214.70	42.13	.00	.00	9965.00	10040.00	.00
*	4.653	1283.68	.07	1283.99	109.05	4.55	1209.83	46.63	109.05	9960.95	9965.00	10040.00	10070.00
*	4.725	1285.30	.00	1286.14	112.17	.00	1048.99	59.01	.00	.00	9965.00	10040.00	.00
*	4.725	1285.29	-.01	1286.13	99.80	.00	1045.74	62.26	99.86	9970.14	9965.00	10040.00	10070.00

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FLOODWAY DATA, TUTHILL DIKE WASH - WASH
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
.000	123.	494.	8.2	1039.1	1039.1	.0
.075	163.	618.	6.6	1040.8	1040.8	.0
.186	113.	391.	10.4	1043.2	1043.7	-.5
.314	135.	498.	8.2	1048.1	1048.0	.1
.415	235.	531.	7.6	1051.9	1051.9	.0
.540	197.	493.	8.2	1057.5	1057.6	-.1
.634	154.	467.	8.7	1061.8	1061.8	.0
.729	131.	425.	9.5	1065.3	1065.3	.0
.823	93.	353.	11.5	1070.9	1070.9	.0
.917	94.	364.	11.1	1074.7	1074.7	.0
1.012	92.	353.	11.5	1080.7	1080.7	.0
1.067	44.	282.	14.4	1085.0	1085.0	.0
1.110	72.	717.	5.7	1093.1	1093.1	.0
1.118	180.	1745.	3.2	1093.7	1093.7	.0
1.152	220.	1520.	3.6	1093.6	1093.6	.0
1.198	264.	1111.	5.0	1093.6	1093.6	.0
1.260	238.	773.	8.5	1097.0	1097.0	.0
1.287	171.	609.	10.8	1099.2	1099.2	.0
1.313	160.	631.	10.5	1101.0	1101.0	.0
1.322	233.	1598.	4.1	1103.3	1103.3	.0
1.362	221.	2633.	2.4	1103.5	1103.5	.0
1.422	92.	477.	13.1	1106.4	1106.4	.0
1.518	101.	487.	12.8	1114.2	1113.7	.5
1.614	142.	543.	11.5	1123.4	1123.5	-.1
1.710	89.	472.	13.1	1130.9	1130.9	.0
1.805	80.	450.	13.7	1138.1	1138.1	.0
1.898	98.	544.	11.3	1145.2	1145.3	-.1
1.994	124.	529.	11.7	1152.4	1152.4	.0
2.088	83.	455.	13.6	1159.3	1159.4	-.1
2.170	165.	572.	10.7	1167.4	1167.4	.0
2.279	94.	474.	12.9	1176.6	1176.6	.0
2.373	127.	639.	9.6	1180.4	1180.5	-.1
2.468	138.	625.	9.8	1184.8	1184.9	-.1
2.563	152.	635.	9.6	1190.9	1191.1	-.2
2.659	131.	610.	10.0	1193.8	1193.9	-.1
2.753	192.	520.	5.8	1197.9	1197.5	.4
2.848	115.	344.	8.7	1200.2	1200.2	.0
2.943	107.	385.	7.8	1203.4	1203.4	.0
3.057	99.	358.	8.4	1205.8	1205.9	-.1
3.148	122.	470.	6.4	1209.1	1208.9	.2
3.250	210.	405.	7.4	1213.7	1213.7	.0
3.344	172.	432.	3.3	1216.6	1216.6	.0

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FLOODWAY DATA, TUTHILL DIKE WASH - WASH
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE

3.439	175.	586.	2.4	1217.1	1217.1	.0
3.535	113.	191.	7.4	1217.3	1217.3	.0
3.631	55.	151.	9.4	1222.2	1222.2	.0
3.724	94.	197.	7.2	1231.2	1230.4	.8
3.818	89.	193.	7.3	1236.3	1236.2	.1
3.912	98.	205.	6.9	1243.1	1243.1	.0
4.006	61.	143.	8.8	1249.7	1249.7	.0
4.101	150.	214.	5.9	1257.9	1257.8	.1
4.196	91.	165.	7.6	1263.0	1263.0	.0
4.289	120.	213.	5.9	1270.3	1270.3	.0
4.375	98.	215.	5.9	1274.5	1274.3	.2
4.469	105.	218.	5.8	1278.2	1278.2	.0
4.563	97.	184.	6.9	1281.6	1281.6	.0
4.653	109.	304.	4.1	1283.7	1283.6	.1
4.725	100.	163.	6.8	1285.3	1285.3	.0

HEC-RAS Plan: Imported Pla River: RIVER-1 Reach: Reach-1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	0	4057.00	1033.00	1039.05	1038.12	1040.10	0.004404	8.24	492.20	123.11	0.73
Reach-1	0	4057.00	1033.00	1039.06	1038.12	1040.11	0.004368	8.22	493.63	123.25	0.72
Reach-1	0.075	4057.00	1035.00	1040.85		1041.53	0.002790	6.93	628.09	184.51	0.59
Reach-1	0.075	4057.00	1035.00	1040.84		1041.54	0.002833	6.98	618.25	163.36	0.59
Reach-1	0.186	4057.00	1038.50	1043.71	1043.71	1044.90	0.004573	9.36	549.76	294.18	0.76
Reach-1	0.186	4057.00	1038.50	1043.28	1043.28	1045.10	0.007378	11.14	393.13	112.75	0.95
Reach-1	0.314	4057.00	1042.50	1047.92	1047.92	1048.78	0.004299	7.76	653.29	506.52	0.71
Reach-1	0.314	4057.00	1042.50	1048.04	1047.27	1049.08	0.004625	8.19	495.63	133.42	0.74
Reach-1	0.415	4057.00	1047.20	1051.93	1051.93	1052.53	0.004751	7.31	824.97	721.00	0.73
Reach-1	0.415	4057.00	1047.20	1051.93	1051.93	1053.02	0.007377	9.01	541.06	235.00	0.90
Reach-1	0.54	4057.00	1053.00	1057.54	1057.54	1058.43	0.005351	8.34	668.71	398.99	0.79
Reach-1	0.54	4057.00	1053.00	1057.46	1057.46	1058.73	0.007234	9.53	493.09	197.16	0.91
Reach-1	0.634	4057.00	1056.80	1061.83	1061.83	1063.16	0.005865	10.22	516.85	212.42	0.86
Reach-1	0.634	4057.00	1056.80	1061.79	1061.79	1063.28	0.006436	10.64	466.22	153.92	0.90
Reach-1	0.729	4057.00	1060.70	1065.37	1065.37	1066.56	0.006502	9.00	527.24	276.25	0.86
Reach-1	0.729	4057.00	1060.70	1065.34	1065.19	1066.77	0.007590	9.61	425.26	131.48	0.92
Reach-1	0.823	4057.00	1064.50	1070.90	1070.90	1073.07	0.007746	11.84	349.24	92.30	0.98
Reach-1	0.823	4057.00	1064.50	1070.96	1070.96	1073.07	0.007416	11.68	354.61	92.56	0.96
Reach-1	0.917	4057.00	1069.30	1074.75	1074.69	1076.71	0.006768	11.31	375.10	117.52	0.92
Reach-1	0.917	4057.00	1069.30	1074.68	1074.63	1076.71	0.007132	11.50	362.66	93.42	0.94
Reach-1	1.012	4057.00	1075.70	1080.74	1080.74	1082.84	0.007930	11.62	353.15	92.47	0.98
Reach-1	1.012	4057.00	1075.70	1080.77	1080.77	1082.83	0.007797	11.56	355.14	92.20	0.97
Reach-1	1.067	4061.00	1078.64	1085.05	1085.05	1088.23	0.002002	14.32	283.67	133.08	1.00
Reach-1	1.067	4061.00	1078.64	1085.05	1085.05	1088.23	0.002790	14.32	283.67	44.30	1.00
Reach-1	1.0885	Culvert									
Reach-1	1.11	4061.00	1081.10	1093.00	1087.47	1093.56	0.000173	6.37	704.92	1243.59	0.33
Reach-1	1.11	4061.00	1081.10	1093.06	1087.47	1093.59	0.000221	6.15	709.23	72.00	0.31
Reach-1	1.118	5503.00	1081.50	1093.53		1093.69	0.000064	3.05	1724.64	180.00	0.18
Reach-1	1.118	5503.00	1081.50	1093.55		1093.71	0.000063	3.05	1728.39	180.00	0.18
Reach-1	1.152	5503.00	1082.00	1093.50		1093.74	0.000533	4.35	1494.84	220.00	0.28
Reach-1	1.152	5503.00	1082.00	1093.52		1093.76	0.000528	4.34	1499.52	220.00	0.28
Reach-1	1.198	5503.00	1085.30	1093.47		1094.05	0.001660	6.99	1078.51	263.67	0.48
Reach-1	1.198	5503.00	1085.30	1093.49		1094.06	0.001634	6.95	1084.46	263.73	0.48
Reach-1	1.26	6601.00	1091.50	1097.06	1097.06	1098.55	0.007017	11.71	779.48	237.65	0.94
Reach-1	1.26	6601.00	1091.50	1097.06	1097.06	1098.55	0.007017	11.71	779.48	237.65	0.94
Reach-1	1.287	6601.00	1094.00	1099.27	1099.27	1101.02	0.008057	10.66	632.75	193.58	0.97
Reach-1	1.287	6601.00	1094.00	1099.24	1099.24	1101.05	0.008470	10.81	613.02	171.04	0.99
Reach-1	1.313	6601.00	1095.00	1100.98	1100.98	1102.96	0.006411	12.32	631.00	159.63	0.93
Reach-1	1.313	6601.00	1095.00	1100.98	1100.98	1102.96	0.006398	12.31	631.43	159.64	0.93
Reach-1	1.322	6601.00	1095.00	1103.46		1103.58	0.000245	3.09	2700.70	606.38	0.19
Reach-1	1.322	6601.00	1095.00	1103.29		1103.56	0.000511	4.29	1597.73	232.83	0.27
Reach-1	1.362	6225.00	1082.00	1103.59		1103.60	0.000012	1.19	7848.81	661.70	0.05
Reach-1	1.362	6225.00	1082.00	1103.50		1103.61	0.000070	2.83	2632.94	221.31	0.12
Reach-1	1.422	6225.00	1098.50	1106.41	1106.41	1109.05	0.007925	13.03	477.72	92.07	1.01
Reach-1	1.422	6225.00	1098.50	1106.41	1106.41	1109.05	0.007941	13.04	477.36	92.04	1.01
Reach-1	1.518	6225.00	1106.90	1113.73	1113.73	1115.52	0.006335	11.82	705.92	224.06	0.91
Reach-1	1.518	6225.00	1106.90	1114.29	1114.29	1116.97	0.006919	13.22	490.54	101.24	0.97

HEC-RAS Plan: Imported Pla River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	1.614	6225.00	1113.90	1123.47	1123.47	1125.74	0.005608	12.25	576.92	184.00	0.87
Reach-1	1.614	6225.00	1113.90	1123.37	1123.37	1125.76	0.006011	12.54	546.11	141.85	0.90
Reach-1	1.71	6168.00	1120.00	1130.91	1130.91	1133.59	0.008032	13.14	469.33	88.63	1.01
Reach-1	1.71	6168.00	1120.00	1130.93	1130.93	1133.59	0.007964	13.09	471.17	88.94	1.00
Reach-1	1.805	6168.00	1127.60	1138.14	1138.14	1141.02	0.007870	13.61	453.57	85.59	1.01
Reach-1	1.805	6168.00	1127.60	1138.17	1138.17	1141.02	0.007756	13.54	455.57	80.25	1.00
Reach-1	1.898	6168.00	1137.30	1145.33	1145.33	1147.47	0.006076	14.03	661.08	166.23	0.93
Reach-1	1.898	6168.00	1137.30	1145.23	1145.23	1147.98	0.007375	15.31	547.53	97.84	1.03
Reach-1	1.994	6168.00	1143.50	1152.41	1152.41	1154.89	0.006131	12.84	529.98	124.05	0.91
Reach-1	1.994	6168.00	1143.50	1152.43	1152.43	1154.89	0.006030	12.77	533.42	123.75	0.90
Reach-1	2.088	6168.00	1150.10	1159.44	1159.44	1161.81	0.006443	12.61	546.82	129.41	0.92
Reach-1	2.088	6168.00	1150.10	1159.31	1159.31	1162.15	0.007665	13.52	458.07	83.28	1.00
Reach-1	2.17	6110.00	1162.60	1167.40	1167.40	1169.16	0.008869	10.66	573.30	164.66	1.01
Reach-1	2.17	6110.00	1162.60	1167.39	1167.39	1169.16	0.008906	10.67	572.50	164.59	1.01
Reach-1	2.279	6110.00	1169.30	1176.64	1176.64	1179.18	0.007933	12.79	477.85	94.25	1.00
Reach-1	2.279	6110.00	1169.30	1176.63	1176.63	1179.18	0.007963	12.81	476.94	94.03	1.00
Reach-1	2.373	6110.00	1172.00	1180.50		1181.92	0.003805	10.90	817.22	218.33	0.70
Reach-1	2.373	6110.00	1172.00	1180.35		1182.26	0.004828	12.12	635.47	126.77	0.79
Reach-1	2.468	6110.00	1177.30	1184.98	1184.98	1187.04	0.006156	13.84	661.23	181.71	0.93
Reach-1	2.468	6110.00	1177.30	1184.87	1184.87	1187.08	0.006661	14.24	624.91	138.47	0.97
Reach-1	2.563	6110.00	1182.30	1191.12	1191.12	1192.63	0.003507	11.68	925.42	344.59	0.73
Reach-1	2.563	6110.00	1182.30	1190.91	1190.91	1193.20	0.004892	13.55	633.38	151.76	0.86
Reach-1	2.659	6110.00	1185.80	1193.91	1193.91	1195.83	0.005255	12.82	717.60	190.39	0.86
Reach-1	2.659	6110.00	1185.80	1193.83	1193.83	1196.15	0.006084	13.69	614.51	131.39	0.93
Reach-1	2.753	3011.00	1190.30	1197.49		1198.43	0.004568	7.99	446.20	236.85	0.73
Reach-1	2.753	3011.00	1190.30	1197.94		1198.63	0.002961	6.93	515.34	192.33	0.60
Reach-1	2.848	3011.00	1193.20	1200.23	1200.23	1201.89	0.005921	11.11	347.55	115.92	0.86
Reach-1	2.848	3011.00	1193.20	1200.23	1200.23	1201.89	0.005915	11.11	347.69	115.83	0.86
Reach-1	2.943	3011.00	1195.80	1203.44		1204.63	0.004895	9.36	381.81	107.47	0.77
Reach-1	2.943	3011.00	1195.80	1203.43		1204.62	0.004900	9.36	381.61	107.40	0.77
Reach-1	3.057	3011.00	1199.40	1205.83		1207.35	0.005408	11.31	408.92	166.49	0.84
Reach-1	3.057	3011.00	1199.40	1205.81		1207.47	0.005759	11.65	359.71	99.52	0.87
Reach-1	3.148	3011.00	1200.00	1208.90		1209.70	0.003026	8.09	573.87	227.37	0.62
Reach-1	3.148	3011.00	1200.00	1209.02		1209.96	0.003187	8.46	469.42	122.30	0.63
Reach-1	3.25	3011.00	1210.90	1213.73	1213.73	1214.69	0.008946	8.12	425.26	245.36	0.95
Reach-1	3.25	3011.00	1210.90	1213.71	1213.71	1214.70	0.009287	8.23	404.80	210.00	0.96
Reach-1	3.344	1414.00	1212.80	1216.63		1216.82	0.001428	3.62	451.20	221.29	0.39
Reach-1	3.344	1414.00	1212.80	1216.66		1216.85	0.001410	3.62	431.39	171.57	0.39
Reach-1	3.439	1414.00	1213.50	1217.11		1217.18	0.000420	2.27	693.05	241.77	0.22
Reach-1	3.439	1414.00	1213.50	1217.15		1217.24	0.000482	2.43	586.70	175.17	0.23
Reach-1	3.535	1414.00	1214.80	1217.25	1217.25	1218.15	0.010635	7.63	190.79	112.54	0.99
Reach-1	3.535	1414.00	1214.80	1217.26	1217.26	1218.15	0.010455	7.59	191.82	112.52	0.99
Reach-1	3.631	1414.00	1218.20	1222.24	1222.24	1223.70	0.008544	9.79	151.38	55.14	0.97
Reach-1	3.631	1414.00	1218.20	1222.26	1222.26	1223.70	0.008374	9.73	152.39	55.04	0.97
Reach-1	3.724	1414.00	1226.60	1230.41	1230.41	1231.14	0.010330	8.18	241.77	193.22	1.00
Reach-1	3.724	1414.00	1226.60	1231.21	1231.21	1232.28	0.007619	8.72	197.43	94.18	0.90

HEC-RAS Plan: Imported Pla River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	3.818	1414.00	1232.30	1236.19	1236.19	1236.79	0.006947	7.65	314.80	254.78	0.85
Reach-1	3.818	1414.00	1232.30	1236.31	1236.31	1237.39	0.009400	9.19	196.15	88.66	0.99
Reach-1	3.912	1414.00	1239.10	1243.09	1243.09	1244.24	0.006684	9.39	202.11	99.47	0.88
Reach-1	3.912	1414.00	1239.10	1243.14	1243.14	1244.24	0.006314	9.21	206.66	97.71	0.86
Reach-1	4.006	1261.00	1246.00	1249.66	1249.66	1250.86	0.010210	8.79	143.46	60.72	1.01
Reach-1	4.006	1261.00	1246.00	1249.65	1249.65	1250.86	0.010275	8.81	143.12	60.65	1.01
Reach-1	4.101	1261.00	1255.80	1257.83	1257.83	1258.43	0.009779	7.24	249.55	214.78	0.95
Reach-1	4.101	1261.00	1255.80	1257.96	1257.96	1258.67	0.009726	7.55	214.06	150.00	0.96
Reach-1	4.196	1261.00	1259.80	1263.02	1263.02	1264.11	0.008634	8.48	162.03	90.59	0.94
Reach-1	4.196	1261.00	1259.80	1263.06	1263.06	1264.11	0.008125	8.32	165.94	90.62	0.91
Reach-1	4.289	1261.00	1267.40	1270.35	1270.35	1270.99	0.008333	8.66	265.85	189.65	0.94
Reach-1	4.289	1261.00	1267.40	1270.32	1270.32	1271.14	0.010026	9.41	213.59	120.02	1.03
Reach-1	4.375	1261.00	1271.70	1274.32	1274.31	1275.14	0.010110	9.10	214.93	125.17	1.02
Reach-1	4.375	1261.00	1271.70	1274.48	1274.27	1275.24	0.008405	8.65	213.89	97.92	0.94
Reach-1	4.469	1261.00	1275.10	1278.19	1278.02	1278.76	0.005373	6.93	270.27	174.97	0.75
Reach-1	4.469	1261.00	1275.10	1278.17	1277.90	1278.86	0.006252	7.42	219.37	105.41	0.81
Reach-1	4.563	1261.00	1278.10	1281.57	1281.57	1282.41	0.007323	7.84	216.20	153.36	0.87
Reach-1	4.563	1261.00	1278.10	1281.53	1281.51	1282.48	0.008254	8.22	182.69	96.46	0.92
Reach-1	4.653	1261.00	1279.70	1283.61		1283.94	0.001724	4.69	301.68	127.47	0.44
Reach-1	4.653	1261.00	1279.70	1283.69		1284.00	0.001592	4.57	304.13	109.05	0.43
Reach-1	4.725	1108.00	1283.00	1285.29	1285.29	1286.14	0.009383	7.56	165.90	111.81	0.95
Reach-1	4.725	1108.00	1283.00	1285.28	1285.28	1286.13	0.009505	7.59	162.48	99.77	0.95

Federal Emergency Management Agency

Washington, D.C. 20472

OCT 08 2002

RECEIVED

OCT 15 2002

WOOD / PATEL

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 02-09-1060R

The Honorable Don Stapley
Chairman, Maricopa County
Board of Supervisors
301 West Jefferson, 10th Floor
Phoenix, AZ 85003

Community: Maricopa County, AZ
Community No.: 040037

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Dear Mr. Stapley:

This responds to a request that the 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 June 3, 2002, Mr. Ashok C. Patel, P.E., R.L.S., Principal, Wood, Patel & Associates, Inc., requested that FEMA evaluate the effects that updated topographic information, proposed channelization, and a proposed culvert under Indian School Road along Tuthill Dike Wash and updated topographic information and proposed channelization along Tractor Wash would have on the flood hazard information shown on the effective FIRM and FIS report.

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

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. The submitted corrected effective HEC-RAS hydraulic computer models for Tuthill Dike Wash and Tractor Wash, both dated October 2, 2002, were used as the base conditions models in our review of the proposed conditions models for this CLOMR request. We believe that, if the proposed project is constructed as shown on the topographic work maps entitled "Tuthill Dike Wash, Buckeye, AZ.," Sheets 1 and 2, and "Tractor Wash Buckeye, AZ.," Sheet 3A, all prepared by Wood, Patel & Associates, Inc., and dated April 17, 2002, and on the proposed construction plans entitled "Verrado, Buckeye, AZ., Tuthill Dike Wash &Tractor Wash - Phase I," Sheets 1 through 18, prepared by Wood, Patel & Associates, Inc., dated May 8, 2002, and the data listed below are received, a revision to the FIRM would be warranted.

As a result of the updated topographic information, proposed channelization, and proposed culvert, the elevations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) for Tuthill Dike Wash will decrease compared to the effective Base Flood Elevations (BFEs). The maximum decrease in BFE, 8.5 feet, will occur approximately 100 feet upstream of Thomas Road. The width of the Special Flood Hazard Area (SFHA), the area that would be inundated by the base flood, along Tuthill Dike Wash will increase in some areas, decrease in some areas, and shift in other areas

compared to the effective SFHA width. The maximum increase in SFHA width, approximately 90 feet, will occur approximately 100 feet upstream of Thomas Road and will be contained in the proposed channel. The maximum decrease in SFHA width, approximately 200 feet, will occur approximately 100 feet downstream of the confluence with Tractor Wash. The maximum shift in the SFHA, approximately 85 feet to the east, will occur approximately 200 feet downstream of the confluence with Tractor Wash and will be contained in the proposed channel. The width of the regulatory floodway along Tuthill Dike Wash will increase in some areas, decrease in some areas, and shift in other areas compared to the effective floodway width. The maximum increase in floodway width, approximately 90 feet, will occur approximately 100 feet upstream of Thomas Road and will be contained in the proposed channel. The maximum decrease in floodway width, approximately 150 feet, will occur just upstream of Indian School Road. The maximum shift in the regulatory floodway, approximately 85 feet to the east, will occur approximately 200 feet downstream of the confluence with Tractor Wash and will be contained in the proposed channel.

As a result of the updated topographic information and proposed channelization, the BFEs for Tractor Wash will increase in some areas and decrease in other areas compared to the effective BFEs. The maximum increase in BFE, 1.7 feet, will occur approximately 1,000 feet upstream of the confluence with Tuthill Dike Wash and will be contained in the proposed channel. The maximum decrease in BFE, 5.5 feet, will occur approximately 200 feet upstream of the confluence with Tuthill Dike Wash. The width of the SFHA along Tractor Wash will decrease in some areas and shift in other areas compared to the effective SFHA width. The maximum decrease in SFHA width, approximately 430 feet, will occur approximately 1,700 feet upstream of the confluence with Tuthill Dike Wash. The maximum shift in the SFHA to the north, approximately 70 feet, will occur approximately 1,300 feet upstream of the confluence with Tuthill Dike Wash and will be contained in the proposed channel. The maximum shift in the SFHA to the south, approximately 60 feet, will occur approximately 400 feet upstream of the confluence with Tuthill Dike Wash and will be contained in the proposed channel. The width of the regulatory floodway along Tractor Wash will decrease in some areas and shift in other areas compared to the effective floodway width. The maximum decrease in floodway width, approximately 70 feet, will occur approximately 1,700 feet upstream of the confluence with Tuthill Dike Wash. The maximum shift in the regulatory floodway to the north, approximately 70 feet, will occur approximately 1,300 feet upstream of the confluence with Tuthill Dike Wash and will be contained in the proposed channel. The maximum shift in the regulatory floodway to the south, approximately 60 feet, will occur approximately 400 feet upstream of the confluence with Tuthill Dike Wash and will be contained in the proposed channel.

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 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 "Revision Requester and Community Official 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 conceptual 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 4, entitled "Riverine Hydraulic Analysis Form"

Form 5, entitled "Riverine/Coastal Mapping Form"

Form 6, entitled "Channelization Form"

Form 7, entitled "Bridge/Culvert Form"

Hydraulic analyses, for as-built conditions, of the base flood and the regulatory floodway must be submitted with Form 4, and a topographic work map showing the revised floodplain and floodway boundaries must be submitted with Form 5.

- Effective September 1, 2002, 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 $3,800 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 3173
  Merrifield, VA 22116-3173

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

- Community acknowledgment of the map revision request

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

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

- An officially adopted maintenance plan for the channel and culvert along Tuthill Dike Wash, and for the channel along Tractor Wash. This plan, which may be in the form of a written statement from the community Chief Executive Officer, an ordinance, or other legislation, must describe

the nature of the maintenance activities, the frequency with which they will be performed, and the title of the local community official who will be responsible for ensuring that the maintenance activities are accomplished.

- The starting water-surface elevation (SWSEL) for a tributary should be based on the slope-area method at a cross section along the tributary that is located just upstream of the confluence with the main stream. The submitted proposed conditions HEC-RAS model for Tractor Wash used the slope-area method at a cross section along Tuthill Dike Wash that is downstream of the confluence. Please provide a HEC-RAS hydraulic model for Tractor Wash with the SWSEL computed by the slope-area method at a cross section along Tractor Wash that is located at the confluence with Tuthill Dike Wash.

- The submitted proposed conditions HEC-RAS hydraulic model for Tuthill Dike Wash shows the formation of a hydraulic jump just downstream of the culvert on Indian School Road, in the mixed flow regime. A hydraulic jump that occurs at this location could cause scour on the earthen channel bed. Please submit an analysis to demonstrate that the channel bed will not erode during the base flood or that adequate erosion protection will be provided. If erosion protection is to be provided, information and calculations must be submitted to show that the channel lining will provide adequate protection. In addition, FEMA accepts base floodplain boundary delineations based on supercritical flow depths only for concrete-lined, engineered channels. Because the constructed channel is not concrete-lined, critical depth is the minimum depth permissible to map the base floodplain boundary delineations for this reach, and the BFEs should be corrected to show critical depth as the minimum depth if the mixed flow regime is used.

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 channels and culvert 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 Chief, Community Mitigation Programs Branch, Mitigation Division of FEMA in Oakland, California, at (510) 627-7184. 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,

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

For: Matthew B. Miller, P.E., Chief
Hazards Study Branch
Federal Insurance and
Mitigation Administration

Enclosures

cc: Ms. Lynn M. Thomas, P.E., C.F.M.
Branch Manager
Floodplain Management
Flood Control District
of Maricopa County

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

Mr. Victor Calderon
NFIP Coordinator
Arizona Division of Emergency
Management

Mr. Ashok C. Patel, P.E., R.L.S.
Principal,
Wood, Patel & Associates, Inc.

WOOD, PATEL & ASSOC., INC.

Civil Engineers, Hydrologists, Land Surveyors

2051 West Northern Avenue, Suite 100

Phoenix, AZ 85021

(602) 335-8500 • FAX (602) 335-8580

LETTER OF TRANSMITTAL

DATE: July 3, 2002	JOB NO. 011416.02
ATTENTION: Sacha Tohme	
RE: Tuthill Dike Wash CLOMR	
FEMA Case No. 02-09-1060R	

TO: Michael Baker, Jr. Inc.

3601 Eisenhower Avenue, Suite 600

Alexandria, VA 22304

WE ARE SENDING YOU ■Attached □ Under separate cover via _____ the following items:

□ Shop drawings □ Prints □ Plans □ Samples □ Specifications
□ Copy of letter □ Change Order ■ Other (see below)

COPIES	DATE	NO.	DESCRIPTION
1	7/3/2002		Addenda to CLOMR TDN Package

THESE ARE TRANSMITTED as checked below:

□ For approval □ Approved as submitted □ Approved as noted
□ For your use ■ As requested □ For review and comment

Remarks:

Sacha,

Attached are the addenda to the TDN for the Tuthill Dike Wash CLOMR (See attached list). Please insert them into appropriate sections of the TDN as you review. We believe that the attached information addresses your comments. If you require any additional information, please contact me or Ash Patel at (602) 335-8500. Thanks for your help in resolving these issues.

Shimin Zou

COPY TO: File

SIGNED: Shimin Zou

FORMS\TRANSMIT.GEN

List of Addenda to the Tuthill Dike Wash CLOMR TDN:

1. Review Comments

2. HEC-RAS profile table and plot for downstream portion of Tractor Wash which has tie-in to the effective FIS with Tuthill Dike Wash at Station 3.148

3. FEMA form MT-2 Form 4 – Riverine Hydraulic Analysis

4. Work Map 3A/3 to show the revised base flood and floodway boundary delineations which have tied into the boundary delineations shown on the effective FIRM at the limits of the revision.

5. A floppy disk with HEC-RAS electronic files.

NATIONAL FLOOD INSURANCE PROGRAM

FEMA MAP COORDINATION CONTRACTOR

RECEIVED

JUN 21 2002

WOOD / PATEL

June 17, 2002

Mr. Ashok C. Patel, P.E., R.L.S.
Project Manager,
Wood, Patel & Associates, Inc.
2051 West Northern, Suite 100
Phoenix, AZ 85021

IN REPLY REFER TO:
Case No.: 02-09-1060R
Community: Maricopa County, AZ
Community No.: 040037

316-ACK.FRQ

Dear Mr. Patel:

This responds to your request dated June 3, 2002, that the 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:	Tuthill Dike Wash Channelization
Flooding Sources:	Tuthill Dike Wash and Tractor Wash
FIRM Panel(s) Affected:	04013C2035 G and 2055 F

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

Paragraph 65.6(a)(2) of the National Flood Insurance Program (NFIP) regulations states that to avoid discontinuities between revised and unrevised flood data, hydraulic analyses submitted by revision requesters must be extensive enough to ensure a logical transition between the revised flood elevations, floodplain boundaries, and floodways and those developed previously for areas not affected by the revision. Please revise the submitted proposed conditions hydraulic model for Tractor Wash so that the elevations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) computed at the downstream end of the revised reach match those computed at the same cross section in the effective hydraulic model within a maximum of 0.5 foot, and within 0.0 feet if practical. In addition, the revised base flood and floodway boundary delineations must tie into the boundary delineations shown on the effective FIRM at the downstream limit of the revision. Please submit a topographic work map to show the tie-ins between the effective and proposed floodplain and floodway boundary delineations for Tractor Wash.

All required items are to be submitted to us at the address shown at the bottom of this page. If all required items are not submitted within 90 days of the date of this letter, we will treat any subsequent request as an original submittal, and it will be subject to all submittal/payment procedures.

If you are unable to meet the 90-day deadline for submittal of required items, and would like FEMA to continue processing your request, you must request an extension of the deadline. This request must be submitted to us in writing and must provide (1) the reason why the data cannot be submitted within the requested timeframe, and (2) a new date for the submittal of the data. FEMA receives a very large volume of requests and cannot maintain inactive requests for an indefinite period of time. Therefore, the fees will be forfeited for any request for which neither the requested data nor a written extension request is received within 90 days.

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

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, Pernille Buch-Pedersen, who may be reached at (703) 317-6224.

Sincerely,

Andrea L. Ryon, P.E., Director
Engineering Division
Michael Baker Jr., Inc.

cc: Ms. Lynn M. Thomas, P.E., C.F.M.
Branch Manager
Floodplain Management
Flood Control District
of Maricopa County

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

Mr. Victor Calderon
NFIP Coordinator
Arizona Division of Emergency
Management

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDRAULIC ANALYSIS**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the 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, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Note: Fill out one form for each flooding source studied

Community Name: Town of Buckeye, Arizona

Flooding Source: Tuthill Dike Wash - Tractor Wash

Project Name/Identifier: Tuthill Dike Wash Channelization

1. REACH TO BE REVISED

Describe the limits of the revision OR submit a copy of the FIRM with the revision area clearly highlighted.
Copy of FIRM(s) attached depicting area of the revision (highlighted, or circled)? ☒ Yes

Downstream Limit: Confluence with Tuthill Dike Wash

Upstream Limit: About 1830 ft upstream of the confluence with Tuthill Dike Wash (near RM 0.347 of the Effective FIS)

2. MODELS SUBMITTED

Requirements: for areas which have detailed flooding:	**for areas which do not have detailed flooding:**
Full input and output listings along with files on diskette for each of the models listed below (items 1-4) and a summary of the source of input parameters used in the models must be provided. The summary must include a description of any changes made from model to model (e.g., Duplicate Effective model to Corrected Effective model). At a minimum, the Duplicate Effective (item 1) and the Revised or Post-Project Conditions (item 4) models must be submitted. See instructions for directions on when other models may be required.	Only the 100-year (Base) flood profile is required. A hydraulic model is not required for areas which do not have detailed flooding; however, BFEs may not be added to the revised FIRM. If a hydraulic model is developed for the area, items 3 and 4 described below must be submitted.

If hydraulic models are not developed, hydraulic analyses (including all calculations) for existing or pre-project conditions and revised or post-project conditions must be submitted.

1. Duplicate Effective Model ☒ **Natural** **File Name** Tractor2.Dat ☒ **Floodway** **File Name** Tractor2.Dat
Copies of the hydraulic analysis used in the effective FIS (10-, 50-, 100-, and 500-year multi-profile runs and the floodway run) must be obtained from the requester's equipment to produce the Duplicate Effective model. This is required to assure that the data has been transferred correctly to the requester's equipment and to assure that the revised data are the appropriate data to provide a continuous FIS model upstream and downstream of the revised reach.

Responses to TTMA comments
(1) MT-2 Form 4
(2) HEC-RAS printout
(3) Work map 3A/3
(4) Floppy Disk
7/11/2002

2. Corrected Effective Model ☒ **Natural** **File Name** Tractor2.Prj
The Corrected Effective model is the model that corrects the Duplicate Effective model, adds any additional cross sections to the Duplicate Effective model topographic information than that used in the currently effective model. The Correctly Effective model has made physical changes since the date of the effective model. An error could be a technical error or any construction in the floodplain that occurred prior to the date of the effective model but was not the model.

3. Existing or Pre-Project Conditions Model ☐ **Natural** **File Name** N/A
The Duplicate Effective model or Corrective Effective model existing or Pre-Project Conditions model to reflect any modifications that have occurred within the Effective model but prior to the construction of the project for which the revision is based has occurred since the date of the effective model, then this model would be identical to the Duplicate Effective model.

4. Revised or Post-Project Conditions Model ☒ **Natural** **File Name** Tractor1.Prj ☒ **Floodway** **File Name** Tractor.Prj
The Existing or Pre-Project Conditions model (or Duplicate Effective model or Corrected Effective model, as appropriate) is revised to reflect revised or post-project conditions. This model must incorporate any physical changes to the floodplain since the effective model was produced as well as the effects of the project. When the request is for the proposed project this model must reflect proposed conditions.

5. Other – Please attach a sheet describing all other models submitted along with the file names. ☐ **Natural** ☐ **Floodway**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

3. STARTING WATER-SURFACE ELEVATIONS

Explain how they were determined. Explanation Attached? ☒ Yes ☐ No

NOTE: If the effective study is an approximate study, the slope/area method is recommended. For detailed analysis studies, using a known water-surface elevation is recommended.

4. RESULTS (from the model used to revise the 100-year water surface elevations)

If the results indicate any of the following, attach an explanation - to this form, or to the hydraulic model printout- as to the reasonableness of the situation.

☐ Supercritical depth ☐ Critical Depth ☐ Drawdowns ☐ Negative Floodway Surcharges

☐ Floodway Surcharges Greater Than Maximum Allowed by Community/State

☐ Water surface elevations higher than the end points of cross sections.

☐ Floodway discharge is different than the Natural 100-year (base) flood discharge.

☐ Project causes 100-year floodplain or floodway elevations to increase (state if increases are located off the requester's property)

Explanation attached with Form ☐ **Explanation provided on attached printout** ☐

If Hydraulic model used is HEC-2, has it been checked with FEMA'S CHECK-2 computer program? ☒ **Yes** ☐ **No**
(see instructions for information on how to obtain CHECK-2)

5. REVISED FIRM/FBFM AND FLOOD PROFILES

1. Profile Transition

a. 100-Year Water-Surface Elevations - indicate the difference in water surface elevations where the project 100-year elevations tie into the existing 100-year water surface elevations at each end of the project.

Downstream End 3.148 within 0.1 (feet) *Cross-Section #* Upstream End 110+00.34 within 0.0 (feet) *Cross-Section #*

b. Floodway Elevations - indicate the difference in water surface elevations where the project floodway elevations tie into the existing floodway water surface elevations at each end of the project.

Downstream End 3.148 within 0.0 (feet) *Cross-Section #* Upstream End 110+00.34 within 0.0 (feet) *Cross-Section #*

c. Floodway widths - indicate the difference in floodway widths where the project floodway widths tie into the existing floodway width at each end of the project.

Downstream End 3.148 within 0.0 (feet) *Cross-Section #* Upstream End 110+00.34 within 0.0 (feet) *Cross-Section #*

2. Profile Checklist (check box if information has been provided on profile)

The following information (unless in parentheses) must be included at the same scale as the existing profiles for this project:

☒ Stream Name ☐ Community Name ☐ Corporate Limits labeled ☒ Study limits labeled

☒ Confluences labeled ☒ Channel Stationing ☒ Streambed profiled ☒ Cross Sections labeled

☒ Horizontal/Vertical Scales indicated ☒ 100-year elevs profiled*

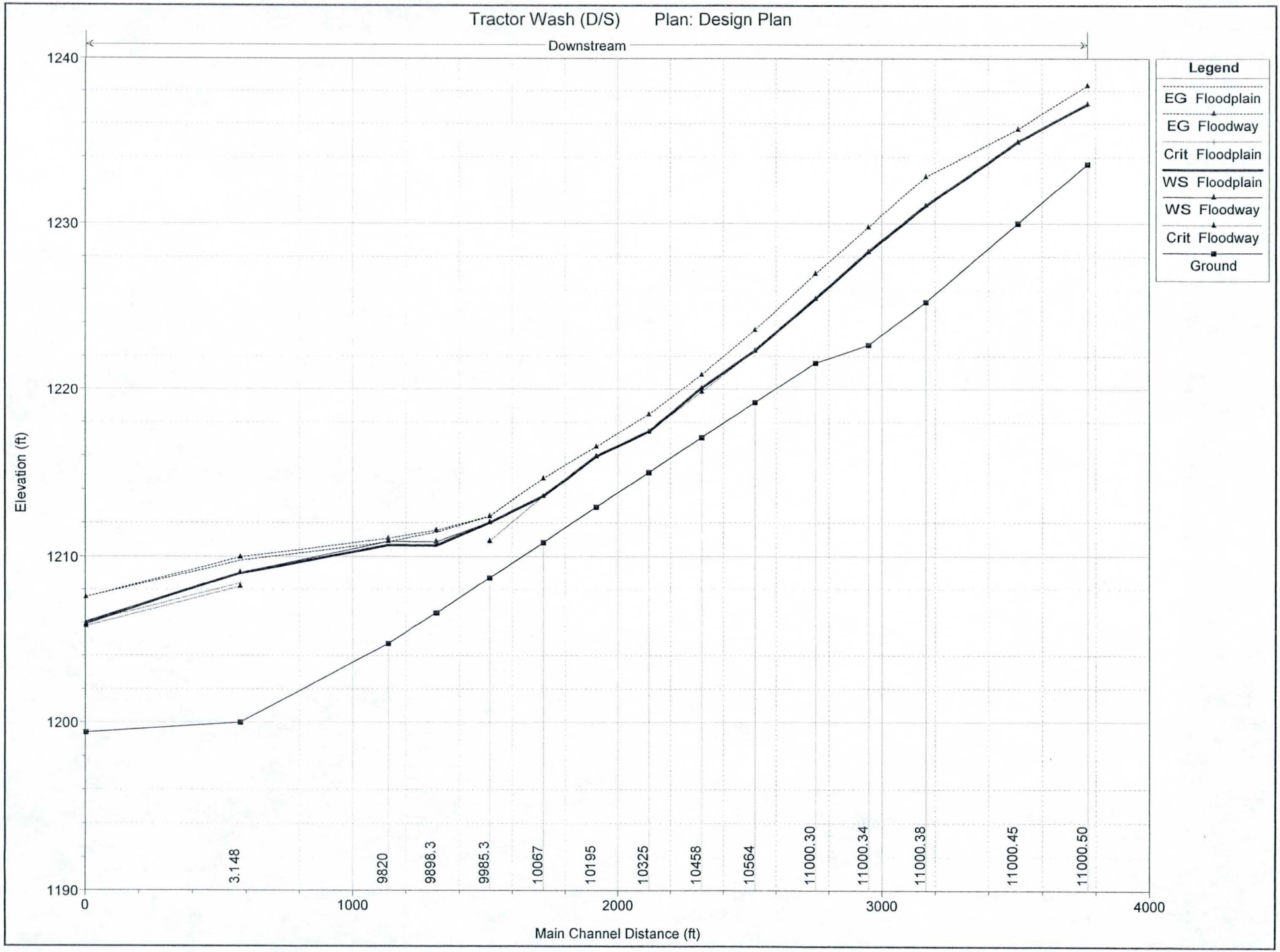
☐ Road Crossings ☐ Labeled ☐ Low Chord Elevations ☐ Top of Road Elevations

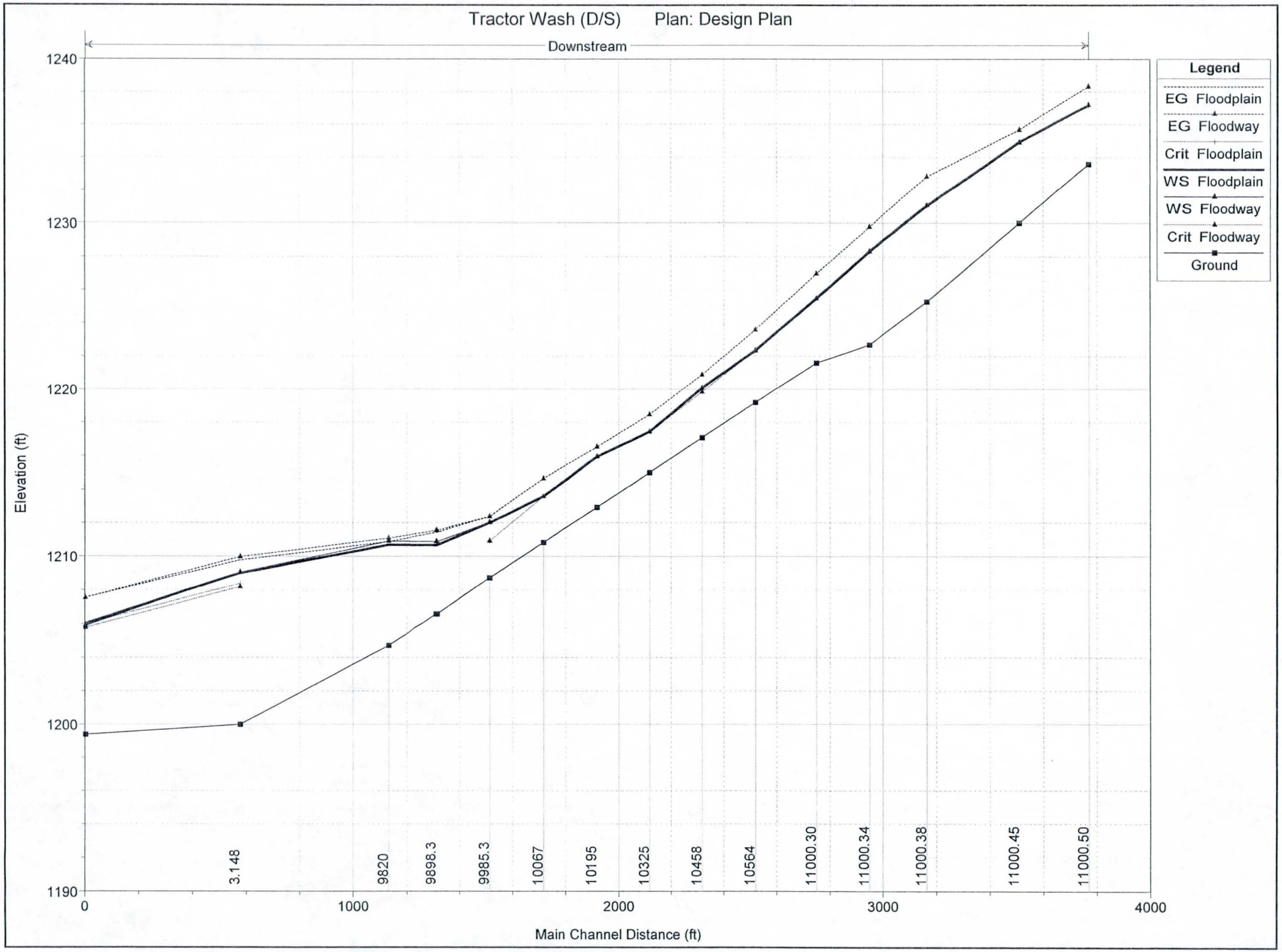
*All recurrence intervals in the effective study must also be profiled.

Floodway Data Table

Attach a Floodway Data Table for each cross section listed in the published Floodway Data table in the FIS report.

Floodway Data Table Attached ☐ **Yes** ☒ **Not Required**


Tractor Wash (D/S) Plan: Design Plan
Downstream
Legend
EG Floodplain
EG Floodway
Crit Floodplain
WS Floodplain
WS Floodway
Crit Floodway
Ground
Elevation (ft)
1240
1230
1220
1210
1200
1190
0
1000
2000
3000
4000
Main Channel Distance (ft)
3.148
9820
9898.3
9985.3
10067
10195
10325
10458
10564
11000.30
11000.34
11000.38
11000.45
11000.50


Tractor Wash (D/S) Plan: Design Plan
Downstream
Legend
EG Floodplain
EG Floodway
Crit Floodplain
WS Floodplain
WS Floodway
Crit Floodway
Ground
Elevation (ft)
1240
1230
1220
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1200
1190
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1000
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Main Channel Distance (ft)
3.148
9820
9898.3
9985.3
10067
10195
10325
10458
10564
11000.30
11000.34
11000.38
11000.45
11000.50

HEC-RAS Plan: Design River: Tractor Wash Reach: Downstream

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Downstream	3.057	3011.00	1199.40	1206.02	1206.02	1207.54	0.005125	11.26	441.54	176.06	0.83
Downstream	3.057	3011.00	1199.40	1205.89	1205.78	1207.54	0.005589	11.59	367.89	99.73	0.86
Downstream	3.148	3011.00	1200.00	1209.01	1208.37	1209.77	0.002849	7.93	598.38	231.03	0.60
Downstream	3.148	3011.00	1200.00	1209.05	1208.18	1209.97	0.003129	8.40	472.63	122.30	0.63
Downstream	9820	1648.00	1204.72	1210.68		1210.88	0.001050	3.55	463.97	110.65	0.31
Downstream	9820	1648.00	1204.72	1210.90		1211.07	0.000913	3.38	487.83	113.00	0.29
Downstream	9898.3	1648.00	1206.59	1210.66		1211.43	0.005957	7.02	234.67	73.78	0.69
Downstream	9898.3	1648.00	1206.59	1210.87		1211.55	0.004941	6.58	250.48	75.46	0.64
Downstream	9985.3	1648.00	1208.71	1211.99	1210.92	1212.37	0.003555	4.90	336.16	124.12	0.52
Downstream	9985.3	1648.00	1208.71	1212.03	1210.92	1212.39	0.003435	4.85	340.07	124.53	0.52
Downstream	10067	1648.00	1210.82	1213.58	1213.58	1214.66	0.013896	8.36	197.15	90.86	1.00
Downstream	10067	1648.00	1210.82	1213.58	1213.58	1214.66	0.013900	8.36	197.13	90.86	1.00
Downstream	10195	1648.00	1212.93	1215.96		1216.53	0.006366	6.10	269.97	111.12	0.69
Downstream	10195	1648.00	1212.93	1215.96		1216.53	0.006365	6.10	269.99	111.13	0.69
Downstream	10325	1648.00	1215.01	1217.45	1217.43	1218.48	0.013827	8.16	202.04	96.27	0.99
Downstream	10325	1648.00	1215.01	1217.45	1217.43	1218.48	0.013827	8.16	202.04	96.27	0.99
Downstream	10458	1648.00	1217.09	1220.08	1219.84	1220.89	0.010416	7.22	228.28	105.85	0.87
Downstream	10458	1648.00	1217.09	1220.08	1219.84	1220.89	0.010416	7.22	228.28	105.85	0.87
Downstream	10564	1648.00	1219.21	1222.35	1222.35	1223.58	0.013547	8.93	184.53	75.36	1.01
Downstream	10564	1648.00	1219.21	1222.35	1222.35	1223.58	0.013547	8.93	184.53	75.36	1.01
Downstream	11000.30	1648.00	1221.60	1225.50	1225.50	1227.00	0.010243	10.65	178.01	61.21	0.95
Downstream	11000.30	1648.00	1221.60	1225.50	1225.50	1227.00	0.010243	10.65	178.01	61.21	0.95
Downstream	11000.34	1648.00	1222.70	1228.32	1228.32	1229.78	0.012222	9.76	174.82	67.11	0.99
Downstream	11000.34	1648.00	1222.70	1228.32	1228.32	1229.78	0.012150	9.74	174.96	65.00	0.98
Downstream	11000.38	1648.00	1225.30	1231.04	1231.04	1232.84	0.011414	10.78	158.67	53.01	0.98
Downstream	11000.38	1648.00	1225.30	1231.08	1231.08	1232.84	0.010990	10.66	160.75	52.00	0.96
Downstream	11000.45	1648.00	1230.00	1234.92		1235.67	0.005664	7.89	332.69	139.71	0.70
Downstream	11000.45	1648.00	1230.00	1234.90		1235.66	0.005799	7.95	329.13	138.00	0.71

HEC-RAS Plan: Design River: Tractor Wash Reach: Downstream (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Downstream	11000.50	1648.00	1233.60	1237.17	1237.17	1238.34	0.012655	8.74	197.44	93.94	0.98
Downstream	11000.50	1648.00	1233.60	1237.19	1237.19	1238.34	0.012184	8.64	199.93	93.00	0.96

WOOD/PATEL

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS • CONSTRUCTION MANAGERS

arrel E. Wood, P.E., R.L.S.
Ashok C. Patel, P.E., R.L.S.
James S. Campbell, P.E.
Gordon W. R. Wark, P.E.
Thomas R. Gettings, R.L.S.
Randall Beck, P.E.
Timothy A. Huval, P.E.
Jack K. Moody, P.E.
Scott A. Nelson, R.L.S.
Richard L. Hiner, P.E.
Leslie J. Kland, P.E.
Curtis L. Brown, P.E., R.L.S.
Paul M. Haas, P.E.
Shimin Zou, Ph.D., P.E.
Michael T. Young, P.E.
Shawn D. Gustafson, P.E.
Joseph C. Daconta, P.E.
Robert S. Unger, R.L.S.
Steven J. Rinkeviczie, P.E.
Sherrick H. Campbell, P.E.
James L. Condit, P.E.
Sandra J. Lie, P.E.
Joel P. McCarty, P.E.
Michael Weinberg, P.E.

June 3, 2002

Mr. Matthew B. Miller
Federal Emergency Management Agency (FEMA)
Hazard Identification Branch
500 C Street, SW
Room 428
Washington, DC 20472

Subject: **Tuthill Dike Wash**
Request for Conditional Letter of Map Revision
Town of Buckeye, AZ
Community No. 040037, Map No. 04013C, Panels 1570F and 2035G
FEMA Case No. Pending
WP# 011416.02

Dear Mr. Miller:

We are pleased to submit this package respectfully requesting a Conditional Letter of Map Revision (CLOMR) for the Tuthill Dike Wash floodplain delineation within the Town of Buckeye, Arizona.

All appropriate hydrologic and hydraulic (scientific) data, including detailed topographical information, have been included in the enclosed Technical Data Notebook (TDN). All applicable FEMA MT-2 forms have also been included in the TDN.

It should be noted that all of the land adjacent to this project of both sides of the entire study reach are owned by one landowner, our client, DMB White Tank, LLC in partnership with the Caterpillar Foundation. Therefore, there is no need to advertise for public comment on this project.

In addition, a detailed review of the Tuthill Dike Wash Floodplain Delineation and Channelization TDN has been performed by the Flood Control District of Maricopa County (FCDMC) and the Town of Buckeye, Arizona for its completeness and adequacy and has been approved for submittal to FEMA by both agencies.

It is hoped that the TDN is complete and addresses all issues in conjunction with the CLOMR request.

The review fee was paid via FEMA MT-2 Form 2 on June 3, 2002 (copy attached).

Should you have any questions or need any clarification on this TDN, please do not hesitate to contact us. My email address is: apatel@woodpatel.com.

Very truly yours,

WOOD, PATEL & ASSOCIATES, INC.

Ashok C. Patel, P.E., R.L.S.
Principal

ACP/km

cc: Woodrow C. Scoutten, Town Engineer, Town of Buckeye
Lynn M. Thomas, P.E., Flood Control District of Maricopa County
Cathy Regester, P.E., Flood Control District of Maricopa County

Y:\WP\General Correspondence\011416.02 Tuthill Dike Wash Request for CLOMR.doc

WOOD/PATEL fax transmittal

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS • CONSTRUCTION MANAGERS

TO: Odette Anderson	PAGES: ~~2~~ 4
	DATE: 6/3/02
PHONE:	TIME: 9 AM (AZ)
FAX: 703-849-0282	

FROM: Ash Patel

PROJECT: Tuthill Dike Wash channelization **JOB NO.:**

COMMENTS: Fee submittal

please assign a case number to this submittal

& email to apatel@woodpatel.com.

thanks!

☐ copy to: ☐ hard copy to follow in mail

Wood, Patel & Associates, Inc.• 2051 West Northern, Suite 100 • Phoenix, Arizona 85021 • (602) 335-8500 • Fax (602) 335-8580
E-Mail: woodpatel@woodpatel.com

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FEDERAL EMERGENCY MANAGEMENT AGENCY

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O.M.B. Burden No. 3067-0148
Expires April 30, 2001

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Revisions Fee-Collection System Administrator
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Merrifield, Virginia 22116
Fax: (703) 849-0282

Case # _____(if known) Amount: $3,100

☒ FEE ☐ ADDITIONAL FEE ☐ INVOICE

☐ VISA ☑ MASTERCARD

CARD NUMBER: [redacted]

EXPIRATION DATE: 04/04

Ashok C Patel
Signature

NAME *(AS IT APPEARS ON CARD)*: Ashok C. Patel (Wood, Patel & Assoc. Inc)
(please print)

ADDRESS: 2051 W Northern Ave, Suite 100 Phoenix, AZ 85021
(for your credit card receipt- please print)

DAYTIME PHONE: 602-335-8500

NOTICE: A COPY OF FORM 1, BEING SUBMITTED FOR THIS REQUEST MUST BE ATTACHED TO THIS FORM.

6/3/02
Ref: Tuthill Wash
WP# 011402.02 PUB # 2

TUTHILL DIKE WASH CHANNELIZATION
Town of Buckeye, Maricopa County, Arizona

CONDITIONAL LETTER OF MAP REVISION SUBMITTAL
TECHNICAL DATA NOTEBOOK

February 11, 2002

WP #011416.02

Submitted to:

Federal Emergency Management Agency
Hazard Study Branch
Mr. Matthew Miller, Chief
Technical Services Division
500 C Street Southwest
Washington, D.C. 20472
Phone: (202) 646-2746

And:

Flood Control District of Maricopa County
2801 West Durango
Phoenix, AZ 85096
Phone: (602) 506-1501

And:

Town of Buckeye
100 North Apache
Buckeye, AZ 85326
Phone: (623) 386-2487

Prepared for:

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Suite 300
Scottsdale, AZ 85258
Phone: (480) 367-7000

Prepared by:

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Email: apatel@woodpatel.com

Engineer **Peer Reviewer**

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Exhibit A	Existing Floodplain Maps
Exhibit B	Proposed Construction Plans
Exhibit C	Study Work Maps
Exhibit D	Annotated FIRM Panels

jmb
Y:\WP\Reports\Public Works Dept\011416.02 Tuthill Dike Wash CLOMR TDN.doc

1.0 INTRODUCTION

1.1 Project Location

The project site is located within Whitestone Master Planned Community, an 8,800-acre site located on the eastern base of the White Tank Mountains. More specifically, the portion of Tuthill Dike Wash for which this CLOMR has been prepared is located within Sections 30 and 31, Township 2 North, Range 2 West. For a graphic location of the site, please refer to Figure 1, *Vicinity Map*.

1.2 Purposes and Scope

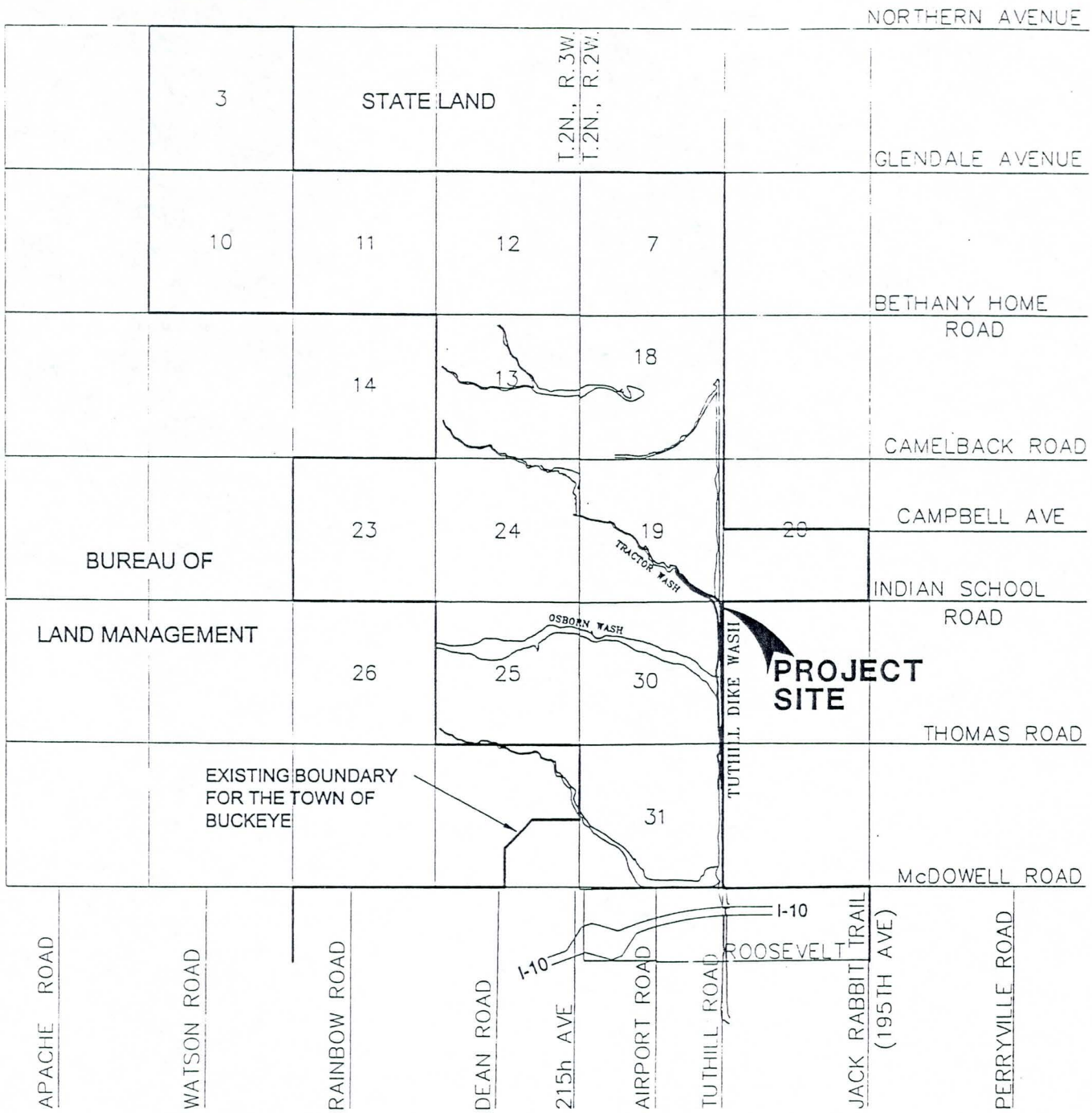
From the mid-1940s until 1988, this site was used by Caterpillar for heavy equipment testing, product demonstrations and product development. The study reaches include portion of Tuthill Dike Wash along Tuthill Road alignment from 980 feet north of Indian School Road to about 1,370 feet south of Thomas Road, and a portion of Tractor Wash about 1,830 feet upstream of Tuthill Dike Wash.

As part of the master plan for this community, improvements proposed for the washes include channelization of the study reaches and construction of a Con-span Arch culvert over Tuthill Dike Wash along the Indian School Road alignment to contain the Effective Flood Insurance Study (FIS) flows. Channelization of the washes will revise horizontal and vertical alignment and cross section geometry, reduce horizontal slopes as well as velocities at some reaches, improve the uniformity of the wash conveyance, therefore, increase the stability of the washes. According to FEMA floodplain management policy, these proposed modifications to the wash corridors require a Conditional Letter of Map Revision (CLOMR).

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Panels 04013C2055F and 04013C2035F dated July 19, 2001, designate Tuthill Dike Wash and Tractor Wash in the study reaches as a Special Flood Hazard Area, Zone AE (see Exhibit A).

> *Zone "AE" is defined as: A special flood hazard area that corresponds to the 100-year floodplains and the base flood elevations for this zone are determined in the FIS by detailed methods.*

This report will document the engineering analysis and MT-2 forms necessary to meet the FEMA requirements for a CLOMR. Once the CLOMR is issued, the channel design will be finalized, the channel will be built, and a set of as-built plans will be prepared for the Letter of Map Revision (LOMR) submittal.



DMB

FIGURE 1
VICINITY MAP

WHITESTONE
TUTHILL DIKE WASH

WOOD/PATEL
ASSOCIATES
Civil Engineers
Hydrologists
Land Surveyors
(602) 335-8500

1.3 Methods of Analysis

The following methods of analysis are used for this project:

- Hydrology - In 1995, the Federal Emergency Management Agency (FEMA) published a revised Flood Insurance Study for Maricopa County, Arizona, and Incorporated Areas that included Tuthill Dike Wash. The 2001 FIS documents adopted all work previously performed in the 1995 FIS for the study areas. We are utilizing this FEMA accepted hydrology; therefore, no new hydrologic data is required for this CLOMR.

- Hydraulics - The existing wash and proposed channelization conditions were modeled utilizing the COE's HEC-RAS, version 3.0.1, March 2001, hydraulic modeling software.

The HEC-2 model used as the base model for this study was prepared by The WLB Group, Inc., October 1992, as part of the White Tanks/Agua Fria Area Drainage Master Study for the Flood Control District of Maricopa County. The base model was studied using sub-critical flow regime and was adopted by FEMA for the purpose of the regulatory FIRM. In order to match the base model and tie into the FIS floodplain and floodway at the upstream and downstream limits of the reaches, the channelized reaches were modeled using the same flow regime as the FIS model. The hydrologic and hydraulic modeling results for Effective FIS are shown in Appendix B.

2.0 FEMA MT-2 FORMS

The basis of this CLOMR is better scientific data, including better quality mapping and hydraulic analysis, and physical changes of the watercourse; therefore, the appropriate FEMA forms from the current FEMA MT-2 packet are as follows:

Form 1 - Revision Requestor and Community Official Form

Form 4 - Riverine Hydraulic Analysis Form

Form 5 - Riverine/Coastal Mapping Form

Form 6 - Channelization Form

Form 7 – Bridge/Culvert Form

2.1 Form 1 – Revision Requestor and Community Official Form

The attached "Revision Requestor and Community Official Form" is provided per FEMA requirements for submittals. The basis for this revision request is physical change, specifically, channelization/flow containment by excavation of the wash corridors.

It should be noted that the preparation of this CLOMR utilizes better scientific data than the regulatory FIRM including: one (1) foot contours tied to FEMA's ERM, more accurate spot elevations, detailed aerial photographic mapping and a better understanding of the site conditions.

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

Public reporting burden for this form is estimated to average 2.13 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the 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, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

1. REQUESTED RESPONSE FROM FEMA

This request is for a:

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

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

☐ Other Describe: _____

2. OVERVIEW

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

☒ Physical Change ☒ Improved Methodology/Data ☐ Floodway Revision

☐ Other Describe: _____

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

2. Flooding Source: Tuthill Dike Wash

3. Project Name/Identifier: Tuthill Dike Wash Channelization

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

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

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301 480287	Katy, City Harris County	TX TX	480301 48201C	0005D 0220G	02/08/83 09/28/90
040037	Maricopa County, Unincorporated Areas	AZ	04013C	2055F	07/19/01
040037	Maricopa County, Unincorporated Areas	AZ	04013C	2035G	07/19/01

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

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

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

4. ENCROACHMENT INFORMATION

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

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

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

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

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

5. MAINTENANCE RESPONSIBILITY

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

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

6. REVIEW FEE

The review fee for the appropriate request category has been included. ☒ Yes Fee amount: $3,100

OR

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

Please see Instructions for Fee Amounts

7. SIGNATURE

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

Signature of Revision Requester

Ashok C. Patel, P.E. - Project Manager
Printed Name and Title of Revision Requester

Wood, Patel & Associates, Inc.
Company Name

Telephone No.: (602) 335-8500 Date: 2/12/02

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

Signature of Community Official

Lynn M. Thomas, P.E. - Floodplain Branch Manager
Printed Name and Title of Community Official

Flood Control District of Maricopa County
Community Name

Telephone No.: (602)-506-1501 Date: _____

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

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

Signature

Ashok C. Patel, P.E. - Project Manager
Printed Name and Title of Revision Requester

Registr No. 10512 Expires (Date) 12/04 State AZ

Type of License/Expertise: Civil

Check which forms have been included with this request

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

Table 1 Summary of Duplicate Effective Modeling Results

Wash Name	River Sta	Top Width (ft)	Flow Area (sq ft)	Vel Total (ft/s)	W.S. Elev W/Floodway (ft)	W.S. Elev W/O Floodway (ft)	Elevation Difference (ft)
Tuthill Dike Wash	1.710	89	472	13.1	1130.9	1130.9	0.0
	1.805	80	450	13.7	1138.1	1138.1	0.0
	1.898	98	544	11.3	1145.2	1145.3	-0.1
	1.994	124	529	11.7	1152.4	1152.4	0.0
	2.088	83	455	13.6	1159.3	1159.4	-0.1
	2.170	165	572	10.7	1167.4	1167.4	0.0
	2.279	94	474	12.9	1176.6	1176.6	0.0
	2.373	127	639	9.6	1180.4	1180.5	-0.1
	2.468	138	625	9.8	1184.8	1184.9	-0.1
	2.563	152	635	9.6	1190.9	1191.1	-0.2
	2.659	131	610	10.0	1193.8	1193.9	-0.1
	2.753	192	520	5.8	1197.9	1197.5	0.4
	2.848	115	344	8.7	1200.2	1200.2	0.0
	2.943	107	385	7.8	1203.4	1203.4	0.0
	3.057	99	358	8.4	1205.8	1205.9	-0.1
	3.148	122	470	6.4	1209.1	1208.9	0.2
	3.250	210	405	7.4	1213.7	1213.7	0.0
	3.344	172	432	3.3	1216.6	1216.6	0.0
	3.439	175	586	2.4	1217.1	1217.1	0.0
	3.535	113	191	7.4	1217.3	1217.3	0.0
	3.631	55	151	9.4	1222.2	1222.2	0.0
	3.724	94	197	7.2	1231.2	1230.4	0.8
Tractor Wash	0.000	210	406	7.4	1213.7	1213.7	0.0
	0.037	148	383	4.3	1215.4	1215.4	0.0
	0.095	109	910	1.8	1215.9	1215.7	0.2
	0.188	110	837	2.0	1215.9	1215.7	0.2
	0.251	80	188	8.7	1223.4	1223.4	0.0
	0.305	108	403	4.1	1225.7	1225.6	0.1
	0.347	65	172	9.6	1228.3	1228.3	0.0
	0.389	52	159	10.4	1231.0	1231.0	0.0
	0.455	138	332	5.0	1234.9	1234.9	0.0
	0.504	93	197	8.4	1237.2	1237.2	0.0
	0.549	134	251	6.6	1239.7	1239.7	0.0

2.2 Form 4 – Riverine Hydraulic Analysis Form

The attached "Riverine Hydraulic Analysis Forms" are provided per FEMA requirements for submittals. Responses to questions in the following sections require further explanation:

Models Submitted
Duplicate Effective Models

The HEC-2 models used for this regulatory FIS were prepared by The WLB Group, Inc., October 1992, as part of the *White Tanks/Agua Fria Area Drainage Master Study* (ADMS). The models were subsequently approved by FEMA through their LOMR process. These models were run to create and verify a HEC-2 *Duplicate Effective Models* and the modeling results were shown in Table 1. Note that there are minor negative surcharges in the effective FIS.

Corrected Effective Models

The *Duplicate Effective Models* were converted to HEC-RAS and run to create a *HEC-RAS Corrected Effective Models*. As shown in Tables 1 and 2, the results of the *HEC-RAS Corrected Effective Models* are comparable to the *Duplicate Effective Models*.

Revised or Post-Project Condition Models

The *Post-Project Conditions Models* were obtained by replacing the geometric data for the segments of the existing study wash geometry with the proposed incised earthen trapezoidal channel section cross section geometry data. Since flows are contained along the entire project reaches with the proposed improvements modeled, the floodway and floodplain limits were identical in these areas.

The proposed channelization for downstream portion of Tractor Wash
Stations 96+55 (confluence with Tuthill Dike Wash) and 110+00.34 (near R
the effective FIS), and the proposed earthen trapezoidal channel section for T
Wash is between Stations RM 1.994 and 100+03.43 (at RM 3.439 in the effec
shown in Exhibit B. Since the cross sections stations in the *Post-Projec*
Models are different than those used in the effective FIS, their relati
documented in Appendix C.

Starting Water-Surface Elevations

The starting water-surface elevations for the most downstream cross sections for the *Post-Project Condition Models* were determined by using the energy slopes of the effective FIS study with the Normal Depth boundary condition method.

2.2 Form 4 – Riverine Hydraulic Analysis Form

The attached "Riverine Hydraulic Analysis Forms" are provided per FEMA requirements for submittals. Responses to questions in the following sections require further explanation:

Models Submitted
Duplicate Effective Models

The HEC-2 models used for this regulatory FIS were prepared by The WLB Group, Inc., October 1992, as part of the *White Tanks/Agua Fria Area Drainage Master Study* (ADMS). The models were subsequently approved by FEMA through their LOMR process. These models were run to create and verify a HEC-2 *Duplicate Effective Models* and the modeling results were shown in Table 1. Note that there are minor negative surcharges in the effective FIS.

Corrected Effective Models

The *Duplicate Effective Models* were converted to HEC-RAS and run to create a *HEC-RAS Corrected Effective Models*. As shown in Tables 1 and 2, the results of the *HEC-RAS Corrected Effective Models* are comparable to the *Duplicate Effective Models*.

Revised or Post-Project Condition Models

The *Post-Project Conditions Models* were obtained by replacing the geometric data for the segments of the existing study wash geometry with the proposed incised earthen trapezoidal channel section cross section geometry data. Since flows are contained along the entire project reaches with the proposed improvements modeled, the floodway and floodplain limits were identical in these areas.

The proposed channelization for downstream portion of Tractor Wash is between Stations 96+55 (confluence with Tuthill Dike Wash) and 110+00.34 (near RM 0.347 in the effective FIS), and the proposed earthen trapezoidal channel section for Tuthill Dike Wash is between Stations RM 1.994 and 100+03.43 (at RM 3.439 in the effective FIS) as shown in Exhibit B. Since the cross sections stations in the *Post-Project Condition Models* are different than those used in the effective FIS, their relationships are documented in Appendix C.

Starting Water-Surface Elevations

The starting water-surface elevations for the most downstream cross sections for the *Post-Project Condition Models* were determined by using the energy slopes of the effective FIS study with the Normal Depth boundary condition method.

Results

The *Duplicate Effective Models* and the *Correcte* [redacted] le to the Effective FIS as shown in Tables 1 and 2.

The HEC-RAS output profile tables for the *Post-Project Conditions Models* are shown in Table 3. The water surface profiles are shown as Figure 2, and cross sections are shown in Appendix C.

For Tractor Wash improvement area, the computed 100-year floodwater surface elevation from the *Corrected Effective Model* at the upstream cross section is 1228.3 ft (Station 110+00.34, RM 0.347 in the effective FIS). The computed 100-year floodwater surface elevation from the *Post-Project Conditions Model* at the matching upstream cross section is also 1228.3 ft. Water surface elevation at downstream from the *Post-Project Conditions Model* matches the water surface elevation from the Tuthill Dike Wash *Post-Project Conditions Model* at Station 96+55, which is equal to 1208.3 ft.

For Tuthill Dike Wash improvement area, the computed 100-year floodwater surface elevation from the *Corrected Effective Model at* the downstream cross section of the study reach is 1152.4 ft (Station 1.994), and at the upstream cross section it is 1217.3 ft (Station 100+03.53, RM 3.535 in the effective FIS). The computed 100-year floodwater surface elevation from the *Post-Project Conditions Model* at the matching downstream cross section is also 1152.4 ft, and at the upstream cross section it is 1217.3 ft. Water surface elevations at both upstream and downstream tie-in locations are matching those from effective FIS models very well.

Revised FIRM/FBFM and Flood Profiles

The study reach for downstream portion of Tractor Wash is 0.347 miles long, and the study reach for Tuthill Dike Wash is 1.445 miles long. The computed water surface profiles are plotted in Figure 2. Since flows within the study reaches are contained by channelization and embankment fill, the *Post-Project Conditions Models* floodplain and floodway are shown as coincidental.

Results

The *Duplicate Effective Models* and the *Corrected Effective Models* are comparable to the Effective FIS as shown in Tables 1 and 2.

The HEC-RAS output profile tables for the *Post-Project Conditions Models* are shown in Table 3. The water surface profiles are shown as Figure 2, and cross sections are shown in Appendix C.

For Tractor Wash improvement area, the computed 100-year floodwater surface elevation from the *Corrected Effective Model* at the upstream cross section is 1228.3 ft (Station 110+00.34, RM 0.347 in the effective FIS). The computed 100-year floodwater surface elevation from the *Post-Project Conditions Model* at the matching upstream cross section is also 1228.3 ft. Water surface elevation at downstream from the *Post-Project Conditions Model* matches the water surface elevation from the Tuthill Dike Wash *Post-Project Conditions Model* at Station 96+55, which is equal to 1208.3 ft.

For Tuthill Dike Wash improvement area, the computed 100-year floodwater surface elevation from the *Corrected Effective Model at* the downstream cross section of the study reach is 1152.4 ft (Station 1.994), and at the upstream cross section it is 1217.3 ft (Station 100+03.53, RM 3.535 in the effective FIS). The computed 100-year floodwater surface elevation from the *Post-Project Conditions Model* at the matching downstream cross section is also 1152.4 ft, and at the upstream cross section it is 1217.3 ft. Water surface elevations at both upstream and downstream tie-in locations are matching those from effective FIS models very well.

Revised FIRM/FBFM and Flood Profiles

The study reach for downstream portion of Tractor Wash is 0.347 miles long, and the study reach for Tuthill Dike Wash is 1.445 miles long. The computed water surface profiles are plotted in Figure 2. Since flows within the study reaches are contained by channelization and embankment fill, the *Post-Project Conditions Models* floodplain and floodway are shown as coincidental.

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDRAULIC ANALYSIS**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the [illegible]. 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, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Note: Fill out one form for each flooding source studied

Community Name: Town of Buckeye, Arizona

Flooding Source: Tuthill Dike Wash

Project Name/Identifier: Tuthill Dike Wash Channelization

1. REACH TO BE REVISED

Describe the limits of the revision OR submit a copy of the FIRM with the revision area clearly highlighted.
Copy of FIRM(s) attached depicting area of the revision (highlighted, or circled)? ☒ Yes

Downstream Limit: 1370 ft south of Thomas Road (near RM 1.994 of the Effective FIS)

Upstream Limit: 980 ft north of Indian School Road (near RM 3.439 of the Effective FIS)

2. MODELS SUBMITTED

Requirements: for areas which have detailed flooding:	for areas which do not have detailed flooding:
Full input and output listings along with files on diskette for each of the models listed below (items 1-4) and a summary of the source of input parameters used in the models must be provided. The summary must include a description of any changes made from model to model (e.g., Duplicate Effective model to Corrected Effective model). At a minimum, the Duplicate Effective (item 1) and the Revised or Post-Project Conditions (item 4) models must be submitted. See instructions for directions on when other models may be required.	Only the 100-year (Base) flood profile is required. A hydraulic model is not required for areas which do not have detailed flooding; however, BFEs may not be added to the revised FIRM. If a hydraulic model is developed for the area, items 3 and 4 described below must be submitted.

[illegible]ydraulic models are not developed, hydraulic analyses (including all calculations) for existing or pre-project conditions and revised or post-project conditions must be submitted.

1. Duplicate Effective Model ☒ Natural File Name Tuthill2.Dat ☒ Floodway File Name Tuthill2.Dat

Copies of the hydraulic analysis used in the effective FIS, referred to as the effective models (10-, 50-, 100-, and 500-year multi-profile runs and the floodway run) must be obtained and then reproduced on the requester's equipment to produce the Duplicate Effective model. This is required to assure that the effective models input data has been transferred correctly to the requester's equipment and to assure that the revised data will be integrated into the effective data to provide a continuous FIS model upstream and downstream of the revised reach.

2. Corrected Effective Model ☒ Natural File Name Tuthill2.Prj ☒ Floodway File Name Tuthill2.Prj

The Corrected Effective model is the model that corrects any errors that occur in the Duplicate Effective model, adds any additional cross sections to the Duplicate Effective model, or incorporates more detailed topographic information than that used in the currently effective model. The Correctly Effective model must not reflect any man-made physical changes since the date of the effective model. An error could be a technical error in the modeling procedures, or any construction in the floodplain that occurred prior to the date of the effective model but was not incorporated into the effective model.

3. Existing or Pre-Project Conditions Model ☐ Natural File Name N/A ☐ Floodway File Name N/A

The Duplicate Effective model or Corrective Effective model is modified to produce the Existing or Pre-Project Conditions model to reflect any modifications that have occurred within the floodplain since the date of the Effective model but prior to the construction of the project for which the revision is being requested. If no modification has occurred since the date of the effective model, then this model would be identical to the Corrected Effective model or Duplicate Effective model.

4. Revised or Post-Project Conditions Model ☒ Natural File Name Tuthill.Prj ☒ Floodway File Name Tuthill.Prj

The Existing or Pre-Project Conditions model (or Duplicate Effective model or Corrected Effective model, as appropriate) is revised to reflect revised or post-project conditions. This model must incorporate any physical changes to the floodplain since the effective model was produced as well as the effects of the project. When the request is for the proposed project this model must reflect proposed conditions.

[illegible]ther – Please attach a sheet describing all other models submitted along with the file names. ☐ Natural ☐ Floodway

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

3. STARTING WATER-SURFACE ELEVATIONS

Explain how they were determined. Explanation Attached? ☒ Yes ☐ No

NOTE: If the effective study is an approximate study, the slope/area method is recommended. For detailed analysis studies, using a known water-surface elevation is recommended.

4. RESULTS (from the model used to revise the 100-year water surface elevations)

If the results indicate any of the following, attach an explanation - to this form, or to the hydraulic model printout- as to the reasonableness of the situation.

☐ Supercritical depth ☐ Critical Depth ☐ Drawdowns ☐ Negative Floodway Surcharges

☐ Floodway Surcharges Greater Than Maximum Allowed by Community/State

☐ Water surface elevations higher than the end points of cross sections.

☐ Floodway discharge is different than the Natural 100-year (base) flood discharge.

☐ Project causes 100-year floodplain or floodway elevations to increase (state if increases are located off the requester's property)

Explanation attached with Form ☐ **Explanation provided on attached printout** ☐

If Hydraulic model used is HEC-2, has it been checked with FEMA'S CHECK-2 computer program? ☒ Yes ☐ No
(see instructions for information on how to obtain CHECK-2)

5. REVISED FIRM/FBFM AND FLOOD PROFILES

1. **Profile Transition**

a. 100-Year Water-Surface Elevations - indicate the difference in water surface elevations where the project 100-year elevations tie into the existing 100-year water surface elevations at each end of the project.

Downstream End 1.994 within 0.0 (feet) Upstream End 100+03.53 within 0.0 (feet)
Cross-Section # *Cross-Section #*

b. Floodway Elevations - indicate the difference in water surface elevations where the project floodway elevations tie into the existing floodway water surface elevations at each end of the project.

Downstream End 1.994 within 0.0 (feet) Upstream End 100+03.53 within 0.0 (feet)
Cross-Section # *Cross-Section #*

c. Floodway widths - indicate the difference in floodway widths where the project floodway widths tie into the existing floodway width at each end of the project.

Downstream End 1.994 within 0.0 (feet) Upstream End 100+03.53 within 0.0 (feet)
Cross-Section # *Cross-Section #*

2. **Profile Checklist (check box if information has been provided on profile)**

The following information (unless in parentheses) must be included at the same scale as the existing profiles for this project:

☒ Stream Name ☒ Community Name ☐ Corporate Limits labeled ☒ Study limits labeled

☒ Confluences labeled ☒ Channel Stationing ☒ Streambed profiled ☒ Cross Sections labeled

☒ Horizontal/Vertical Scales indicated ☒ 100-year elevs profiled*

☐ Road Crossings ☐ Labeled ☐ Low Chord Elevations ☐ Top of Road Elevations

*All recurrence intervals in the effective study must also be profiled.

Floodway Data Table

Attach a Floodway Data Table for each cross section listed in the published Floodway Data table in the FIS report.

Floodway Data Table Attached ☐ Yes ☒ **Not Required**

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDRAULIC ANALYSIS**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

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You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Note: Fill out one form for each flooding source studied

Community Name: Town of Buckeye, Arizona

Flooding Source: Tuthill Dike Wash - Tractor Wash

Project Name/Identifier: Tuthill Dike Wash Channelization

1. REACH TO BE REVISED

Describe the limits of the revision OR submit a copy of the FIRM with the revision area clearly highlighted.
Copy of FIRM(s) attached depicting area of the revision (highlighted, or circled)? ☒ Yes

Downstream Limit: Confluence with Tuthill Dike Wash

Upstream Limit: About 1830 ft upstream of the confluence with Tuthill Dike Wash (near RM 0.347 of the Effective FIS)

2. MODELS SUBMITTED

Requirements: for areas which have detailed flooding:	for areas which do not have detailed flooding:
Full input and output listings along with files on diskette for each of the models listed below (items 1-4) and a summary of the source of input parameters used in the models must be provided. The summary must include a description of any changes made from model to model (e.g., Duplicate Effective model to Corrected Effective model). At a minimum, the Duplicate Effective (item 1) and the Revised or Post-Project Conditions (item 4) models must be submitted. See instructions for directions on when other models may be required.	Only the 100-year (Base) flood profile is required. A hydraulic model is not required for areas which do not have detailed flooding; however, BFEs may not be added to the revised FIRM. If a hydraulic model is developed for the area, items 3 and 4 described below must be submitted.

If hydraulic models are not developed, hydraulic analyses (including all calculations) for existing or pre-project conditions and revised or post-project conditions must be submitted.

1. Duplicate Effective Model ☒ Natural File Name Tractor2.Dat ☒ Floodway File Name Tractor2.Dat

Copies of the hydraulic analysis used in the effective FIS, referred to as the effective models (10-, 50-, 100-, and 500-year multi-profile runs and the floodway run) must be obtained and then reproduced on the requester's equipment to produce the Duplicate Effective model. This is required to assure that the effective models input data has been transferred correctly to the requester's equipment and to assure that the revised data will be integrated into the effective data to provide a continuous FIS model upstream and downstream of the revised reach.

2. Corrected Effective Model ☒ Natural File Name Tractor2.Prj ☒ Floodway File Name Tractor2.Prj

The Corrected Effective model is the model that corrects any errors that occur in the Duplicate Effective model, adds any additional cross sections to the Duplicate Effective model, or incorporates more detailed topographic information than that used in the currently effective model. The Correctly Effective model must not reflect any man-made physical changes since the date of the effective model. An error could be a technical error in the modeling procedures, or any construction in the floodplain that occurred prior to the date of the effective model but was not incorporated into the effective model.

3. Existing or Pre-Project Conditions Model ☐ Natural File Name N/A ☐ Floodway File Name N/A

The Duplicate Effective model or Corrective Effective model is modified to produce the Existing or Pre-Project Conditions model to reflect any modifications that have occurred within the floodplain since the date of the Effective model but prior to the construction of the project for which the revision is being requested. If no modification has occurred since the date of the effective model, then this model would be identical to the Corrected Effective model or Duplicate Effective model.

4. Revised or Post-Project Conditions Model ☒ Natural File Name Tractor.Prj ☒ Floodway File Name Tractor.Prj

The Existing or Pre-Project Conditions model (or Duplicate Effective model or Corrected Effective model, as appropriate) is revised to reflect revised or post-project conditions. This model must incorporate any physical changes to the floodplain since the effective model was produced as well as the effects of the project. When the request is for the proposed project this model must reflect proposed conditions.

Other – Please attach a sheet describing all other models submitted along with the file names. ☐ Natural ☐ Floodway

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

3. STARTING WATER-SURFACE ELEVATIONS

Explain how they were determined. Explanation Attached? ☒ Yes ☐ No

NOTE: If the effective study is an approximate study, the slope/area method is recommended. For detailed analysis studies, using a known water-surface elevation is recommended.

4. RESULTS (from the model used to revise the 100-year water surface elevations)

If the results indicate any of the following, attach an explanation - to this form, or to the hydraulic model printout- as to the reasonableness of the situation.

☐ Supercritical depth ☐ Critical Depth ☐ Drawdowns ☐ Negative Floodway Surcharges

☐ Floodway Surcharges Greater Than Maximum Allowed by Community/State

☐ Water surface elevations higher than the end points of cross sections.

☐ Floodway discharge is different than the Natural 100-year (base) flood discharge.

☐ Project causes 100-year floodplain or floodway elevations to increase (state if increases are located off the requester's property)

Explanation attached with Form ☐ **Explanation provided on attached printout** ☐

If Hydraulic model used is HEC-2, has it been checked with FEMA'S CHECK-2 computer program? ☒ Yes ☐ No
(see instructions for information on how to obtain CHECK-2)

5. REVISED FIRM/FBFM AND FLOOD PROFILES

1. **Profile Transition**

a. 100-Year Water-Surface Elevations - indicate the difference in water surface elevations where the project 100-year elevations tie into the existing 100-year water surface elevations at each end of the project.

Downstream End N/A within 0.0 (feet) *Cross-Section #* Upstream End 110+00.34 within 0.0 (feet) *Cross-Section #*

b. Floodway Elevations - indicate the difference in water surface elevations where the project floodway elevations tie into the existing floodway water surface elevations at each end of the project.

Downstream End N/A within 0.0 (feet) *Cross-Section #* Upstream End 110+00.34 within 0.0 (feet) *Cross-Section #*

c. Floodway widths - indicate the difference in floodway widths where the project floodway widths tie into the existing floodway width at each end of the project.

Downstream End N/A within 0.0 (feet) *Cross-Section #* Upstream End 110+00.34 within 0.0 (feet) *Cross-Section #*

2. **Profile Checklist (check box if information has been provided on profile)**

The following information (unless in parentheses) must be included at the same scale as the existing profiles for this project:

☒ Stream Name ☐ Community Name ☐ Corporate Limits labeled ☒ Study limits labeled

☒ Confluences labeled ☒ Channel Stationing ☒ Streambed profiled ☒ Cross Sections labeled

☒ Horizontal/Vertical Scales indicated ☒ 100-year elevs profiled*

☐ Road Crossings ☐ Labeled ☐ Low Chord Elevations ☐ Top of Road Elevations

*All recurrence intervals in the effective study must also be profiled.

Floodway Data Table

Attach a Floodway Data Table for each cross section listed in the published Floodway Data table in the FIS report.

Floodway Data Table Attached ☐ **Yes** ☒ **Not Required**

2.3 Riverine/Costal Mapping Form

The attached "Riverine/Coastal Mapping Form" is provided per FEMA requirements for submittals. Responses to questions in the following sections require further explanation:

Mapping Changes

a.	The revised reaches in the effective FIS were defined as detailed study areas; therefore, they are not approximate 100-year floodplains;
f.	Current community boundaries are outside of the revision work maps limits.
l.	National Geodetic Vertical Datum is used in this study.
m., n., and o.	The study washes are riverine systems not coastal region.

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE / COASTAL MAPPING**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the 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, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Note: Fill out one form for each flooding source studied

Community Name: Town of Buckeye, Arizona

Flooding Source: Tuthill Dike Wash

Project Name/Identifier: Tuthill Dike Wash Channelization

This is a ☒ Manual ☐ Digital submission. *Digital map submissions may be used to update digital FIRMs (DFIRMs). For updating DFIRMs, these submissions must be coordinated with FEMA Headquarters as far in advance as possible.*

1. MAPPING CHANGES

1. A topographic workmap must be submitted showing the following information (check N/A when not applicable):

a. Revised approximate 100-year floodplain boundaries (Zone A)	☐ Yes	☒ No	☐ N/A
b. Revised detailed 100- and 500-year floodplain boundaries.	☒ Yes	☐ No	☐ N/A
c. Revised floodway boundaries	☒ Yes	☐ No	☐ N/A
d. Location and alignment of all cross sections with stationing control indicated.	☒ Yes	☐ No	☐ N/A
e. Stream alignments, road alignments and dam alignments.	☒ Yes	☐ No	☐ N/A
f. Current community boundaries.	☐ Yes	☐ No	☐ N/A
g. Effective 100- year floodplain and floodway boundaries from FIRM/FBFM reduced or enlarged to the scale of the topographic workmap	☒ Yes	☐ No	☐ N/A
h. Tie-ins between the effective and revised 100-, 500-year and floodway boundaries	☒ Yes	☐ No	☐ N/A
i. The requester's property boundaries and community easements	☒ Yes	☐ No	☐ N/A
j. The signed certification of a registered professional engineer	☒ Yes	☐ No	☐ N/A
k. Location and description of reference marks	☒ Yes	☐ No	☐ N/A
l. Vertical datum (example: NGVD, NAVD)	☒ Yes	☐ No	☐ N/A
m. Coastal zone designations tie into adjacent areas not being revised	☐ Yes	☐ No	☒ N/A
n. Location and alignment of all coastal transects used to revise the coastal analyze	☐ Yes	☐ No	☒ N/A
o. V-zone has been delineated to extend landward to the heel of the primary frontal dune	☐ Yes	☐ No	☒ N/A

If any items are marked No or N/A please attach an explanation.

2. What is the source and date of the updated topographic information (example: orthophoto maps, July 1985; filed survey, May 1979, beach profile, June 1987 etc.)? Aerial Mapping Company, March 1999

3. What is the scale and contour interval of the following workmaps?

Effective FIS	Scale 400	Contour Interval 2
Revision Request	Scale 200	Contour Interval 1

NOTE: Revised topographic information must be of equal or greater detail than effective.

4. Attach an annotated FIRM/FBFM at the scale of the effective FIRM/FBFM showing the revised 100- and 500-year floodplain and the floodway boundaries and how they tie into those shown on the effective FIRM/FBFM downstream and upstream of the revisions or adjacent to the area of revision for coastal studies. **FIRM/FBFM attached?** ☒ **Yes** ☐ **No**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

2. EARTH FILL PLACEMENT

The fill is: ☐ Existing ☐ Proposed

2. Has fill been/will be placed in the regulatory floodway? ☐ Yes ☒ No
If Yes, please attach completed Riverine Hydraulic Analysis Form (Form 4).

3. Has fill been/will be placed in floodway fringe (*area between the floodway and 100-year floodplain boundaries*)? ☐ Yes ☒ No

If Yes, then complete A, B, C, and D below.

a. Are fill slopes for granular materials steeper than one vertical on one-and-one-half horizontal? ☐ Yes ☐ No

If Yes, justify steeper slopes

b. Is adequate erosion protection provided for fill slopes exposed to moving flood waters? (*Slopes exposed to flows with velocities of up to 5 feet per second (fps) during the 100-year flood must, at a minimum, be protected by a cover of grass, vines, weeds, or similar vegetation; slopes exposed to flows with velocities greater than 5 fps during the 100-year flood must, at a minimum, be protected by stone or rock riprap.)*

☐ Yes ☐ No

If No, describe erosion protection provided

c. Has all fill placed in revised 100-year floodplain been compacted to 95 percent of the maximum density obtainable with the Standard Proctor Test Method or acceptable equivalent method? ☐ Yes ☐ No

d. Can structures conceivably be constructed on the fill at any time in the future? ☐ Yes ☐ No

If Yes, attach certification of fill compaction (item 3c. above) by the community's NFIP permit official, a registered professional engineer, or an accredited soils engineer in accordance with Subparagraph 65.5(a)(6) of the NFIP regulations.

Fill certification attached ☐ Yes ☐ No

4. Has fill been/will be placed in a V zone? ☐ Yes ☒ No

If Yes, is the fill protected from erosion by a flood control structure such as a revetment or seawall?

☐ Yes ☐ No

If Yes, attach the Coastal Structures Form (Form 10).

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE / COASTAL MAPPING**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

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You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Note: Fill out one form for each flooding source studied

Community Name: Town of Buckeye, Arizona

Flooding Source: Tuthill Dike Wash - Tractor Wash

Project Name/Identifier: Tuthill Dike Wash Channelization

This is a ☒ Manual ☐ Digital submission. *Digital map submissions may be used to update digital FIRMs (DFIRMs). For updating DFIRMs, these submissions must be coordinated with FEMA Headquarters as far in advance as possible.*

1. MAPPING CHANGES

1. A topographic workmap must be submitted showing the following information (check N/A when not applicable):

a. Revised approximate 100-year floodplain boundaries (Zone A)	☐ Yes	☒ No	☐ N/A
b. Revised detailed 100- and 500-year floodplain boundaries.	☒ Yes	☐ No	☐ N/A
c. Revised floodway boundaries	☒ Yes	☐ No	☐ N/A
d. Location and alignment of all cross sections with stationing control indicated.	☒ Yes	☐ No	☐ N/A
e. Stream alignments, road alignments and dam alignments.	☒ Yes	☐ No	☐ N/A
f. Current community boundaries.	☐ Yes	☐ No	☐ N/A
g. Effective 100- year floodplain and floodway boundaries from FIRM/FBFM reduced or enlarged to the scale of the topographic workmap	☒ Yes	☐ No	☐ N/A
h. Tie-ins between the effective and revised 100-, 500-year and floodway boundaries	☒ Yes	☐ No	☐ N/A
i. The requester's property boundaries and community easements	☒ Yes	☐ No	☐ N/A
j. The signed certification of a registered professional engineer	☒ Yes	☐ No	☐ N/A
k. Location and description of reference marks	☒ Yes	☐ No	☐ N/A
l. Vertical datum (example: NGVD, NAVD)	☒ Yes	☐ No	☐ N/A
m. Coastal zone designations tie into adjacent areas not being revised	☐ Yes	☐ No	☒ N/A
n. Location and alignment of all coastal transects used to revise the coastal analyze	☐ Yes	☐ No	☒ N/A
o. V-zone has been delineated to extend landward to the heel of the primary frontal dune	☐ Yes	☐ No	☒ N/A

If any items are marked No or N/A please attach an explanation.

2. What is the source and date of the updated topographic information (example: orthophoto maps, July 1985; filed survey, May 1979, beach profile, June 1987 etc.)? Aerial Mapping Company, March 1999

3. What is the scale and contour interval of the following workmaps?

Effective FIS	Scale 400	Contour Interval 2
Revision Request	Scale 200	Contour Interval 1

NOTE: Revised topographic information must be of equal or greater detail than effective.

4. Attach an annotated FIRM/FBFM at the scale of the effective FIRM/FBFM showing the revised 100- and 500-year floodplain and the floodway boundaries and how they tie into those shown on the effective FIRM/FBFM downstream and upstream of the revisions or adjacent to the area of revision for coastal studies. **FIRM/FBFM attached?** ☒ **Yes** ☐ **No**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

2. EARTH FILL PLACEMENT

The fill is: ☐ Existing ☐ Proposed

2. Has fill been/will be placed in the regulatory floodway? ☐ Yes ☒ No
If Yes, please attach completed Riverine Hydraulic Analysis Form (Form 4).

3. Has fill been/will be placed in floodway fringe (*area between the floodway and 100-year floodplain boundaries*)? ☐ Yes ☒ No

If Yes, then complete A, B, C, and D below.

a. Are fill slopes for granular materials steeper than one vertical on one-and-one-half horizontal? ☐ Yes ☐ No

If Yes, justify steeper slopes

b. Is adequate erosion protection provided for fill slopes exposed to moving flood waters? (*Slopes exposed to flows with velocities of up to 5 feet per second (fps) during the 100-year flood must, at a minimum, be protected by a cover of grass, vines, weeds, or similar vegetation; slopes exposed to flows with velocities greater than 5 fps during the 100-year flood must, at a minimum, be protected by stone or rock riprap.)*

☐ Yes ☐ No

If No, describe erosion protection provided

c. Has all fill placed in revised 100-year floodplain been compacted to 95 percent of the maximum density obtainable with the Standard Proctor Test Method or acceptable equivalent method? ☐ Yes ☐ No

d. Can structures conceivably be constructed on the fill at any time in the future? ☐ Yes ☐ No

If Yes, attach certification of fill compaction (item 3c. above) by the community's NFIP permit official, a registered professional engineer, or an accredited soils engineer in accordance with Subparagraph 65.5(a)(6) of the NFIP regulations.

Fill certification attached ☐ **Yes** ☐ **No**

4. Has fill been/will be placed in a V zone? ☐ Yes ☒ No

If Yes, is the fill protected from erosion by a flood control structure such as a revetment or seawall?

☐ Yes ☐ No

If Yes, attach the Coastal Structures Form (Form 10).

2.4 Form 6 – Channelization Form

The attached "Channelization Forms" are provided per FEMA requirements for submittals, and construction plans are included in Exhibit B.

The constraint for the *Post-Project Conditions Models* is to match or be similar to the pre-development wash condition at the upstream and downstream limits of the project reaches. The finalized channelization concept is a trapezoidal channel with varied bottom width and minimal 4:1 side slopes. Concrete bank protection is buried by natural soil backfill along both banks except a portion on the west bank from Station 88+24 to Station 97+62 where adequate setbacks are provided.

The channelization segment for downstream Tractor Wash is about 0.347 miles long, and the study reach for Tuthill Dike Wash is about 1.445 miles long. The overall channel depth varies from 4.0 feet to 12.0 feet.

FEDERAL EMERGENCY MANAGEMENT AGENCY **CHANNELIZATION**	O.M.B. Burden No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.75 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the 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, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Community Name: Town of Buckeye, Arizona

Flooding Source: Tuthill Dike Wash

Project Name/Identifier: Tuthill Dike Wash Channelization

1. REACH TO BE REVISED

Describe the limits of the revision **OR** submit a copy of the FIRM with the revision area clearly highlighted.
Copy of FIRM(s) attached depicting area of the revision (highlighted, or circled)? ☒ Yes

Downstream Limit: 1370 ft south of Thomas Road (near RM 1.994 of the Effective FIS)

Upstream Limit: 980 ft north of Indian School Road (near RM 3:439 of the Effective FIS)

2. CHANNEL DESCRIPTION

Attach the following information about the channel (check box if information has been provided):

- ☐ Description of the inlet and outlet
- ☒ Description of the shape of the channel *(both cross sectional and planimetric configuration)* and its lining *(channel bottom and sides)*:

3. ACCESSORY STRUCTURES

The channelization includes:

- ☐ Levees *(Attach Levee/Floodwall System Analysis Form - Form 8)*
- ☒ Drop structures
- ☐ Superelevated sections
- ☐ Transitions in cross sectional geometry
- ☐ Debris basin/detention basin
- ☐ Energy dissipater
- ☐ Other (Describe):

4. DRAWING CHECKLIST

Attach the plans of the channelization certified by a registered professional engineer. The plan detail and information should include (check box if information has been provided):

- ☒ Channel alignment and locations of inlet, outlet, and accessory structures
- ☒ Channel lining
- ☒ Typical cross sections and profiles of channel banks and invert

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

5. HYDRAULIC CONSIDERATIONS

1. The channel was designed to carry _____ (cfs) and/or the 100-year flood.

The design elevation in the channel based on:

- ☒ Subcritical flow
- ☐ Critical flow
- ☐ Supercritical flow
- ☐ Energy grade line

3. **If there is the potential for a hydraulic jump at the following locations, check the box(es) that apply and attach an explanation of how the hydraulic jump is controlled without affecting the stability of the channel.**

Inlet to channel?	☐ Yes
Outlet of channel?	☐ Yes
At Drop Structures?	☐ Yes
At Transitions?	☐ Yes
Other locations?	☐ Yes

Explanation Attached? ☐ Yes ☐ No ☐ N/A

6. SEDIMENT TRANSPORT CONSIDERATIONS

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the 100-year (base flood) water-surface elevations; and/or based on the stream geomorphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including sewer and deposition) to affect the base flood water-surface elevations, then provide the following information **(Check the box if provided):**

- ☒ Estimated sediment load
- ☒ Method used to estimate sediment transport
- ☒ Method used to estimate scour and/or deposition
- ☐ Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport

FEDERAL EMERGENCY MANAGEMENT AGENCY **CHANNELIZATION**	O.M.B. Burden No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.75 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the 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, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Community Name: Town of Buckeye, Arizona

Flooding Source: Tuthill Dike Wash - Tractor Wash

Project Name/Identifier: Tuthill Dike Wash Channelization

1. REACH TO BE REVISED

Describe the limits of the revision **OR** submit a copy of the FIRM with the revision area clearly highlighted.
Copy of FIRM(s) attached depicting area of the revision (highlighted, or circled)? ☒ Yes

Downstream Limit: Confluence with Tuthill Dike Wash

Upstream Limit: About 1830 ft upstream of the confluence with Tuthill Dike Wash (near RM .347 of the Effective FIS)

2. CHANNEL DESCRIPTION

Attach the following information about the channel (check box if information has been provided):

☐ Description of the inlet and outlet

☒ Description of the shape of the channel *(both cross sectional and planimetric configuration)* and its lining *(channel bottom and sides)*:

3. ACCESSORY STRUCTURES

The channelization includes:

☐ Levees *(Attach Levee/Floodwall System Analysis Form - Form 8)*
☐ Drop structures
☐ Superelevated sections
☐ Transitions in cross sectional geometry
☐ Debris basin/detention basin
☐ Energy dissipater
☐ Other (Describe):

4. DRAWING CHECKLIST

Attach the plans of the channelization certified by a registered professional engineer. The plan detail and information should include (check box if information has been provided):

☒ Channel alignment and locations of inlet, outlet, and accessory structures

☒ Channel lining

☒ Typical cross sections and profiles of channel banks and invert

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

5. HYDRAULIC CONSIDERATIONS

1. The channel was designed to carry _____ (cfs) and/or the 100-year flood.

The design elevation in the channel based on:

- ☒ Subcritical flow
- ☐ Critical flow
- ☐ Supercritical flow
- ☐ Energy grade line

3. **If there is the potential for a hydraulic jump at the following locations, check the box(es) that apply and attach an explanation of how the hydraulic jump is controlled without affecting the stability of the channel.**

Inlet to channel?	☐ Yes
Outlet of channel?	☐ Yes
At Drop Structures?	☐ Yes
At Transitions?	☐ Yes
Other locations?	☐ Yes

Explanation Attached? ☐ Yes ☐ No ☐ N/A

6. SEDIMENT TRANSPORT CONSIDERATIONS

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the 100-year (base flood) water-surface elevations; and/or based on the stream geomorphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including sewer and deposition) to affect the base flood water-surface elevations, then provide the following information **(Check the box if provided):**

- ☒ Estimated sediment load
- ☒ Method used to estimate sediment transport
- ☒ Method used to estimate scour and/or deposition
- ☐ Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport

2.5 Form 7 – Bridge/Culvert Form

The attached "Bridge/Culvert Form" is provided per FEMA requirements for submittals, and construction plans are included in Exhibit B.

The culvert under the future alignment of Indian School Road is designed as a 150-foot long, 16-foot by 10-foot concrete arch. The culvert is designed with a bottom slope of 0.33%. The culvert invert elevations are 1205.0 downstream and 1205.5 upstream. The proposed top of curb elevation on Indian School Road at the culvert will be approximately 1218.0. In order to minimize the limits of disturbance to the channel upstream of the culvert, a 5.5-foot drop inlet will be designed at the inlet to the culvert. The culvert inlet and outlet will be provided with riprap protection.

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT**	O.M.B. Burden No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2 hours per response. The burden estimate includes the ıe for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and mpleting and reviewing the 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, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Community Name: Town of Buckeye, Arizona

Flooding Source: Tuthill Dike Wash

Project Name/Identifier: Tuthill Dike Wash Channelization

1. IDENTIFIER

1. Name of structure (roadway, railroad, etc.): Indian School Road

2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier):

   100+03.28

3. This revision reflects (check one of the following):

   ☒ 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

4. 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 structure(s). *(Attach justification)*

   Justification attached ☐ Yes ☐ No ☒ N/A

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

2. DRAWING CHECKLIST

Attach plans of the structure(s) certified by a registered professional engineer. The plan detail and information should include the following (check the boxes if the information has been provided):

- ☒ Dimensions (height, width, span, radius, length)
- ☒ Shape (culverts only)
- ☒ Material
- ☒ Beveling or Rounding
- ☒ Wing Wall Angle
- ☒ Low Chord Elevations - Upstream and Downstream
- ☒ Top of Road Elevations - Upstream and Downstream
- ☒ Structure Invert Elevations - Upstream and Downstream
- ☒ Stream Invert Elevations - Upstream and Downstream
- ☒ Skew Angle
- ☒ Cross-Section Locations
- ☒ Distances Between Cross Sections
- ☒ Erosion Protection

3. SEDIMENT TRANSPORT CONSIDERATIONS

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the 100-year (base flood) water-surface elevations; and/or based on the stream geomorphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including sewer and deposition) to affect the base flood elevations, then provide the following information **(Check the box if provided):**

- ☐ Estimated sediment load
- ☐ Method used to estimate sediment transport
- ☐ Method used to estimate scour and/or deposition
- ☐ Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport

3.0 SURVEY AND MAPPING INFORMATION

3.1 Field Survey Information

Wood, Patel, & Associates, Inc. provided field survey information and the elevation reference marks are shown on the work maps (see Exhibit C).

3.2 Mapping

Detailed mapping exceeding FEMA 37 standards for Flood Insurance Study (FIS) mapping requirements was developed for this study area by Aerial Mapping Company. The flight date was March 1999. The 1-foot contour maps at a scale of 1 inch = 100 feet were produced as work maps and are shown on Exhibit C.

4.0 HYDROLOGY AND HYDRAULICS

4.1 Hydrology

As discussed above, no new hydrologic analysis was conducted for this study. The 100-year flows were applied based on the effective FIS model for both Tuthill Dike Wash and Tractor Wash.

4.2 Hydraulic Model

The original effective FIS HEC-2 models were prepared by The WLB Group, dated October 1992. More cross sections are added with new designed geometric dimensions in the post-project conditions HEC-RAS models. Manning's n-value of 0.035 was used for both washes in the channelized segments.

4.3 Cross Section Description

The study reaches of both Tuthill Dike Wash and Tractor Wash, as shown on Exhibit C, were modeled by HEC-RAS, and the cross section plots are provided in Appendix C. The selected locations of the channel banks and assigned Manning's n-values are shown on the plots. The cross sections were selected based on the following criteria:

- They are representative of the local channel reach.
- They are oriented perpendicular to the direction of flow with the perspective of looking downstream.
- They do not include ineffective flow areas.
- They are large enough to contain the 100-year peak discharge.

The work maps for *Post-Project Conditions Models* are included in Exhibit C.

4.4 Parameter Estimation

According to the planned vegetation and the channel earth bottom, the Manning's n-value of 0.035 was used for the entire channel modification reaches. The horizontal expansion and contraction coefficients are 0.30 and 0.10, respectively, since the channel geometric changes are very gradual.

4.5 Modeling Conditions

Tuthill Dike Wash and the downstream reach of Tractor Wash were modeled separately as the same as in the effective FIS.

4.6 Floodway Modeling

Because the 100-year flow is contained in the modified channel reaches, the top widths of both floodway and floodplain are the same in these reaches and the floodway and floodplain are delineated as coincidental.

4.7 Problems Encountered During the Study

No problems were encountered during the hydraulic modeling process.

4.8 Calibration

No calibration of hydraulic parameters is performed for this study.

4.9 Final Results

The duplicate Effective FIS HEC-2 models output files are included in Appendix A and the HEC-RAS models summary output tables are shown in Tables 2 and 3. The *Post-Project Conditions Models* water surface profiles are shown in Figure 2 and cross sections are included in Appendix C. The hydraulic modeling results show that the water surface elevations form post-project conditions are matching the water surface elevations of the effective FIS models very well at the tie-in locations and the proposed channels contain the 100-year base flows.

Table 2 Corrected FIS Model Results (HEC-RAS Output Tables)

HEC-RAS Plan: FIS River: Tuthill Wash Reach: Tuthill

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Tuthill	4.725	1108.00	1283.00	1285.29	1285.29	1286.14	0.009350	7.55	166.13	111.89	0.94
Tuthill	4.725	1108.00	1283.00	1285.29	1285.29	1286.13	0.009418	7.56	163.01	99.79	0.95
Tuthill	4.653	1261.00	1279.70	1283.62		1283.95	0.001719	4.68	301.98	127.54	0.44
Tuthill	4.653	1261.00	1279.70	1283.68		1284.00	0.001600	4.57	303.57	109.05	0.43
Tuthill	4.563	1261.00	1278.10	1281.57	1281.57	1282.41	0.007382	7.86	215.43	153.05	0.87
Tuthill	4.563	1261.00	1278.10	1281.54	1281.50	1282.48	0.008116	8.18	183.77	96.54	0.91
Tuthill	4.469	1261.00	1275.10	1278.19		1278.78	0.005543	7.03	270.03	174.89	0.76
Tuthill	4.469	1261.00	1275.10	1278.15		1278.86	0.006374	7.47	218.05	105.38	0.82
Tuthill	4.375	1261.00	1271.70	1274.40	1274.32	1275.20	0.009481	9.01	225.04	127.07	0.99
Tuthill	4.375	1261.00	1271.70	1274.50		1275.25	0.008217	8.60	215.73	97.92	0.93
Tuthill	4.289	1261.00	1267.40	1270.35	1270.35	1271.03	0.008999	8.98	264.65	189.30	0.97
Tuthill	4.289	1261.00	1267.40	1270.32	1270.32	1271.16	0.010190	9.50	213.90	120.07	1.03
Tuthill	4.196	1261.00	1259.80	1263.02	1263.02	1264.11	0.008592	8.47	162.36	90.72	0.94
Tuthill	4.196	1261.00	1259.80	1263.06	1263.06	1264.11	0.008125	8.32	165.94	90.62	0.91
Tuthill	4.101	1261.00	1255.80	1257.85	1257.85	1258.46	0.009712	7.27	254.54	216.18	0.95
Tuthill	4.101	1261.00	1255.80	1257.99	1257.99	1258.68	0.009334	7.47	218.55	150.00	0.94
Tuthill	4.006	1261.00	1246.00	1249.67	1249.67	1250.86	0.010111	8.76	143.98	60.82	1.00
Tuthill	4.006	1261.00	1246.00	1249.66	1249.66	1250.86	0.010159	8.78	143.67	60.70	1.01
Tuthill	3.912	1414.00	1239.10	1243.13	1243.13	1244.30	0.006612	9.42	206.33	100.42	0.88
Tuthill	3.912	1414.00	1239.10	1243.19	1243.19	1244.29	0.006119	9.16	211.96	97.71	0.85
Tuthill	3.818	1414.00	1232.30	1236.24	1236.24	1236.85	0.006814	7.68	327.72	256.51	0.84
Tuthill	3.818	1414.00	1232.30	1236.31	1236.31	1237.39	0.009412	9.20	196.10	88.66	0.99
Tuthill	3.724	1414.00	1226.60	1230.62	1230.62	1231.29	0.008441	7.88	283.05	197.45	0.92
Tuthill	3.724	1414.00	1226.60	1231.22	1231.22	1232.28	0.007564	8.70	197.94	94.18	0.90
Tuthill	3.631	1414.00	1218.20	1222.22	1222.22	1223.71	0.008767	9.88	150.26	54.96	0.99
Tuthill	3.631	1414.00	1218.20	1222.27	1222.27	1223.70	0.008314	9.72	152.92	55.04	0.96
Tuthill	3.535	1414.00	1214.80	1217.25	1217.25	1218.15	0.010635	7.63	190.79	112.54	0.99
Tuthill	3.535	1414.00	1214.80	1217.26	1217.26	1218.15	0.010455	7.59	191.82	112.52	0.99
Tuthill	3.439	1414.00	1213.50	1217.12		1217.20	0.000418	2.28	696.80	242.03	0.22
Tuthill	3.439	1414.00	1213.50	1217.15		1217.24	0.000483	2.43	586.40	175.17	0.23
Tuthill	3.344	1414.00	1212.80	1216.64		1216.83	0.001461	3.67	452.77	221.70	0.39
Tuthill	3.344	1414.00	1212.80	1216.66		1216.85	0.001414	3.63	430.98	171.57	0.39
Tuthill	3.25	3011.00	1210.90	1213.74	1213.74	1214.69	0.008901	8.11	426.04	245.54	0.95
Tuthill	3.25	3011.00	1210.90	1213.72	1213.72	1214.70	0.009276	8.23	404.95	210.01	0.96
Tuthill	3.148	3011.00	1200.00	1209.11	1208.37	1209.82	0.002623	7.69	621.82	234.47	0.58
Tuthill	3.148	3011.00	1200.00	1209.04	1208.18	1209.97	0.003150	8.42	471.44	122.30	0.63
Tuthill	3.057	3011.00	1199.40	1205.86		1207.56	0.005833	11.79	413.91	167.97	0.88
Tuthill	3.057	3011.00	1199.40	1205.91		1207.54	0.005514	11.53	369.73	99.77	0.85
Tuthill	2.943	3011.00	1195.80	1203.59		1204.76	0.004619	9.23	399.02	110.12	0.75
Tuthill	2.943	3011.00	1195.80	1203.41		1204.69	0.005262	9.67	378.67	106.98	0.80
Tuthill	2.848	3011.00	1193.20	1200.17	1200.17	1201.98	0.006454	11.51	340.61	114.34	0.90
Tuthill	2.848	3011.00	1193.20	1200.37	1200.37	1201.98	0.005469	10.88	364.57	116.00	0.84
Tuthill	2.753	3011.00	1190.30	1197.66		1198.49	0.003826	7.53	487.81	250.27	0.67
Tuthill	2.753	3011.00	1190.30	1197.93		1198.63	0.002970	6.94	514.77	192.33	0.60
Tuthill	2.659	6110.00	1185.80	1193.94	1193.94	1195.97	0.005444	13.08	722.72	190.77	0.88
Tuthill	2.659	6110.00	1185.80	1193.91	1193.91	1196.19	0.005891	13.57	624.80	131.45	0.91
Tuthill	2.563	6110.00	1182.30	1191.39	1191.39	1192.85	0.003249	11.49	1018.39	352.84	0.71
Tuthill	2.563	6110.00	1182.30	1191.22	1191.22	1193.39	0.004397	13.18	680.61	155.19	0.82
Tuthill	2.468	6110.00	1177.30	1185.70	1185.70	1187.46	0.004689	12.91	803.71	209.17	0.83
Tuthill	2.468	6110.00	1177.30	1185.02	1185.02	1187.17	0.006324	14.08	645.52	138.97	0.95

HEC-RAS Plan: FIS River: Tuthill Wash Reach: Tuthill (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Tuthill	2.373	6110.00	1172.00	1180.46	1180.18	1182.05	0.004171	11.38	810.23	217.47	0.73
Tuthill	2.373	6110.00	1172.00	1180.33	1179.89	1182.35	0.005094	12.42	632.67	126.34	0.81
Tuthill	2.279	6110.00	1169.30	1176.63	1176.63	1179.18	0.007944	12.79	477.62	94.23	1.00
Tuthill	2.279	6110.00	1169.30	1176.62	1176.62	1179.18	0.008025	12.84	475.78	94.03	1.01
Tuthill	2.17	6110.00	1162.60	1167.40	1167.40	1169.16	0.008869	10.66	573.30	164.66	1.01
Tuthill	2.17	6110.00	1162.60	1167.40	1167.40	1169.16	0.008860	10.66	573.40	164.59	1.01
Tuthill	2.088	6168.00	1150.10	1159.46	1159.46	1161.82	0.006386	12.59	549.89	129.64	0.92
Tuthill	2.088	6168.00	1150.10	1159.31	1159.31	1162.15	0.007676	13.52	457.87	83.27	1.00
Tuthill	1.994	6168.00	1143.50	1152.38	1152.38	1154.90	0.006247	12.92	526.43	123.77	0.92
Tuthill	1.994	6168.00	1143.50	1152.44	1152.44	1154.90	0.006002	12.75	534.74	123.75	0.90
Tuthill	1.898	6168.00	1137.30	1145.53	1145.53	1147.82	0.006175	14.41	694.09	171.41	0.95
Tuthill	1.898	6168.00	1137.30	1145.24	1145.24	1148.01	0.007445	15.39	548.18	97.85	1.03
Tuthill	1.805	6168.00	1127.60	1138.15	1138.15	1141.02	0.007845	13.60	454.04	85.81	1.01
Tuthill	1.805	6168.00	1127.60	1138.17	1138.17	1141.02	0.007756	13.54	455.57	80.25	1.00
Tuthill	1.71	6168.00	1120.00	1130.92	1130.92	1133.59	0.007980	13.10	470.74	88.87	1.00
Tuthill	1.71	6168.00	1120.00	1130.93	1130.93	1133.59	0.007973	13.10	470.92	88.90	1.00
Tuthill	1.614	6225.00	1113.90	1123.40	1123.40	1125.76	0.005909	12.47	563.16	179.55	0.89
Tuthill	1.614	6225.00	1113.90	1123.36	1123.36	1125.76	0.006032	12.55	545.28	141.82	0.90
Tuthill	1.518	6225.00	1106.90	1113.73	1113.73	1115.64	0.006686	12.13	705.13	223.93	0.94
Tuthill	1.518	6225.00	1106.90	1114.24	1114.24	1116.98	0.007142	13.35	485.52	100.28	0.98
Tuthill	1.422	6225.00	1098.50	1106.44	1106.44	1109.05	0.007805	12.96	480.19	92.21	1.00
Tuthill	1.422	6225.00	1098.50	1106.42	1106.42	1109.05	0.007899	13.02	478.18	92.06	1.01
Tuthill	1.362	6225.00	1082.00	1103.72	1091.24	1103.73	0.000012	1.20	7934.84	664.30	0.05
Tuthill	1.362	6225.00	1082.00	1103.58	1090.54	1103.69	0.000074	2.91	2649.39	222.61	0.12
Tuthill	1.322	6601.00	1095.00	1103.57		1103.71	0.000279	3.33	2768.23	638.15	0.21
Tuthill	1.322	6601.00	1095.00	1103.37		1103.64	0.000504	4.28	1616.88	233.40	0.27
Tuthill	1.313	6601.00	1095.00	1100.99	1100.99	1103.07	0.006659	12.58	634.08	159.91	0.95
Tuthill	1.313	6601.00	1095.00	1101.12	1101.12	1103.06	0.006055	12.19	654.75	159.86	0.91
Tuthill	1.287	6601.00	1094.00	1099.27	1099.27	1101.02	0.008099	10.68	631.64	193.45	0.98
Tuthill	1.287	6601.00	1094.00	1099.24	1099.24	1101.05	0.008470	10.81	613.02	171.04	0.99
Tuthill	1.26	6601.00	1091.50	1097.05	1097.05	1098.56	0.007110	11.77	776.95	237.62	0.95
Tuthill	1.26	6601.00	1091.50	1097.07	1097.07	1098.56	0.006990	11.70	781.36	237.67	0.94
Tuthill	1.198	5503.00	1085.30	1093.47		1094.05	0.001667	7.00	1077.93	263.67	0.48
Tuthill	1.198	5503.00	1085.30	1093.49		1094.06	0.001640	6.96	1084.17	263.72	0.48
Tuthill	1.152	5503.00	1082.00	1093.50		1093.74	0.000536	4.37	1494.39	220.00	0.28
Tuthill	1.152	5503.00	1082.00	1093.52		1093.76	0.000530	4.35	1499.54	220.00	0.28
Tuthill	1.118	5503.00	1081.50	1093.53		1093.69	0.000064	3.05	1724.18	180.00	0.18
Tuthill	1.118	5503.00	1081.50	1093.55		1093.71	0.000063	3.05	1728.35	180.00	0.18
Tuthill	1.11	4061.00	1081.10	1093.00	1087.47	1093.56	0.000174	6.38	704.70	1242.92	0.33
Tuthill	1.11	4061.00	1081.10	1093.06	1087.47	1093.59	0.000221	6.15	709.20	72.00	0.31
Tuthill	1.0885	Culvert									
Tuthill	1.067	4061.00	1078.64	1085.05	1085.05	1088.23	0.002000	14.31	283.74	133.10	1.00
Tuthill	1.067	4061.00	1078.64	1085.05	1085.05	1088.23	0.002788	14.31	283.74	44.30	1.00
Tuthill	1.012	4057.00	1075.70	1080.74	1080.74	1082.84	0.007957	11.63	352.76	92.40	0.98
Tuthill	1.012	4057.00	1075.70	1080.77	1080.77	1082.83	0.007797	11.56	355.14	92.20	0.97
Tuthill	0.917	4057.00	1069.30	1074.75	1074.68	1076.72	0.006807	11.34	374.83	117.40	0.92
Tuthill	0.917	4057.00	1069.30	1074.68	1074.63	1076.72	0.007164	11.53	362.57	93.42	0.94
Tuthill	0.823	4057.00	1064.50	1070.90	1070.90	1073.07	0.007743	11.84	349.29	92.31	0.98
Tuthill	0.823	4057.00	1064.50	1070.96	1070.96	1073.07	0.007416	11.68	354.61	92.56	0.96

HEC-RAS Plan: FIS River: Tuthill Wash Reach: Tuthill (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Tuthill	0.729	4057.00	1060.70	1065.38	1065.38	1066.56	0.006406	8.95	530.83	277.68	0.86
Tuthill	0.729	4057.00	1060.70	1065.33	1065.19	1066.77	0.007706	9.65	423.27	131.48	0.93
Tuthill	0.634	4057.00	1056.80	1061.82	1061.82	1063.23	0.006126	10.44	515.91	212.23	0.87
Tuthill	0.634	4057.00	1056.80	1061.82	1061.82	1063.30	0.006287	10.57	471.80	154.02	0.89
Tuthill	0.54	4057.00	1053.00	1057.55	1057.55	1058.47	0.005501	8.46	671.64	399.77	0.80
Tuthill	0.54	4057.00	1053.00	1057.47	1057.47	1058.74	0.007169	9.51	495.09	197.28	0.91
Tuthill	0.415	4057.00	1047.20	1051.79	1051.79	1052.60	0.006430	8.25	733.66	607.37	0.84
Tuthill	0.415	4057.00	1047.20	1051.93	1051.93	1053.03	0.007370	9.01	541.52	235.00	0.90
Tuthill	0.314	4057.00	1042.50	1047.92	1047.92	1048.78	0.004322	7.77	651.13	504.73	0.71
Tuthill	0.314	4057.00	1042.50	1048.05	1047.26	1049.09	0.004613	8.18	496.05	133.67	0.74
Tuthill	0.186	4057.00	1038.50	1043.71	1043.71	1044.90	0.004574	9.36	549.65	294.12	0.76
Tuthill	0.186	4057.00	1038.50	1043.27	1043.27	1045.10	0.007412	11.16	392.51	112.70	0.96
Tuthill	0.075	4057.00	1035.00	1040.85	1039.70	1041.56	0.002920	7.10	629.76	184.77	0.60
Tuthill	0.075	4057.00	1035.00	1040.84		1041.54	0.002833	6.98	618.25	163.36	0.59
Tuthill	0	4057.00	1033.00	1039.05	1038.12	1040.10	0.004404	8.24	492.20	123.11	0.73
Tuthill	0	4057.00	1033.00	1039.06	1038.12	1040.11	0.004368	8.22	493.63	123.25	0.72

HEC-RAS Plan: FIS River: Tractor Wash Reach: Downstream

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Downstream	2.731	472.00	1448.70	1451.92	1451.92	1453.11	0.025608	8.88	57.00	25.77	0.98
Downstream	2.731	472.00	1448.70	1451.91	1451.91	1453.12	0.026321	8.96	56.05	24.00	0.99
Downstream	2.635	472.00	1426.00	1429.24	1429.24	1430.15	0.031236	7.65	61.72	34.29	1.00
Downstream	2.635	472.00	1426.00	1429.23	1429.23	1430.15	0.031383	7.68	61.47	34.00	1.01
Downstream	2.54	472.00	1406.40	1410.16	1410.16	1411.16	0.030926	8.03	58.85	30.99	1.01
Downstream	2.54	472.00	1406.40	1410.16	1410.16	1411.16	0.031149	8.01	58.89	30.00	1.01
Downstream	2.442	472.00	1391.70	1394.42	1393.99	1394.80	0.013480	4.96	95.56	57.08	0.66
Downstream	2.442	472.00	1391.70	1394.42		1394.80	0.013418	4.94	95.86	56.00	0.66
Downstream	2.387	472.00	1385.80	1388.16	1388.16	1389.04	0.031405	7.51	62.82	36.22	1.01
Downstream	2.387	472.00	1385.80	1388.14	1388.14	1389.04	0.031620	7.61	62.01	35.00	1.01
Downstream	2.341	472.00	1380.50	1383.30	1382.89	1383.77	0.013702	5.59	90.23	52.96	0.69
Downstream	2.341	472.00	1380.50	1383.29	1382.89	1383.76	0.013808	5.60	89.89	52.00	0.69
Downstream	2.288	472.00	1375.20	1377.35	1377.35	1378.02	0.034033	6.57	71.88	54.47	1.01
Downstream	2.288	472.00	1375.20	1377.34	1377.34	1378.02	0.033539	6.60	71.53	53.00	1.00
Downstream	2.238	472.00	1369.60	1372.23		1372.59	0.011106	4.85	97.45	51.87	0.61
Downstream	2.238	472.00	1369.60	1372.23		1372.59	0.011096	4.84	97.60	51.00	0.61
Downstream	2.186	472.00	1366.30	1369.30	1368.70	1369.56	0.010697	4.10	115.13	74.13	0.58
Downstream	2.186	472.00	1366.30	1369.30	1368.70	1369.56	0.010743	4.11	114.89	73.96	0.58
Downstream	2.144	472.00	1362.40	1365.00	1365.00	1365.82	0.028280	7.36	67.42	44.13	0.97
Downstream	2.144	472.00	1362.40	1365.00	1365.00	1365.82	0.028097	7.34	67.41	43.00	0.96
Downstream	2.092	472.00	1359.00	1364.28		1364.38	0.001261	2.59	195.82	60.67	0.23
Downstream	2.092	472.00	1359.00	1364.24		1364.34	0.001303	2.62	192.95	59.00	0.23
Downstream	2.047	943.00	1358.00	1362.06	1362.06	1363.11	0.020077	8.81	139.20	76.25	0.89
Downstream	2.047	943.00	1358.00	1362.15	1362.15	1363.10	0.017744	8.44	146.00	76.00	0.84
Downstream	1.985	943.00	1350.10	1353.46	1353.07	1353.95	0.012148	5.88	197.66	132.91	0.67
Downstream	1.985	943.00	1350.10	1353.39		1354.07	0.016728	6.66	145.04	66.94	0.77
Downstream	1.93	943.00	1344.70	1347.66	1347.66	1348.60	0.030395	7.77	121.42	65.80	1.01
Downstream	1.93	943.00	1344.70	1347.87		1348.63	0.021221	6.98	135.02	65.00	0.85
Downstream	1.862	943.00	1339.00	1341.69	1341.13	1341.98	0.011229	4.76	238.36	136.92	0.61
Downstream	1.862	943.00	1339.00	1342.05	1341.53	1342.57	0.013393	5.77	163.44	73.00	0.68
Downstream	1.769	943.00	1329.00	1332.49	1332.49	1333.58	0.027350	8.38	114.54	59.47	0.99
Downstream	1.769	943.00	1329.00	1332.52	1332.52	1333.58	0.026299	8.28	116.05	59.00	0.97
Downstream	1.669	943.00	1321.50	1330.64		1330.67	0.000137	1.43	955.99	184.50	0.09
Downstream	1.669	943.00	1321.50	1330.64		1330.66	0.000137	1.43	955.27	184.00	0.09
Downstream	1.58	943.00	1314.80	1330.66		1330.66	0.000001	0.31	3580.56	340.60	0.01
Downstream	1.58	943.00	1314.80	1330.65		1330.65	0.000001	0.31	3579.25	340.00	0.01
Downstream	1.478	943.00	1328.00	1330.08	1330.08	1330.52	0.019073	5.32	177.44	209.63	1.01
Downstream	1.478	943.00	1328.00	1330.10	1330.10	1330.52	0.018159	5.24	180.13	210.00	0.99
Downstream	1.416	943.00	1324.00	1328.39		1328.49	0.001946	2.63	419.19	201.92	0.27
Downstream	1.416	943.00	1324.00	1328.38		1328.48	0.001954	2.63	418.18	200.00	0.28
Downstream	1.364	943.00	1322.50	1326.39	1326.39	1327.09	0.027917	7.24	158.66	114.14	0.96
Downstream	1.364	943.00	1322.50	1326.40	1326.40	1327.09	0.026927	7.19	159.84	112.72	0.94
Downstream	1.298	943.00	1314.00	1325.58	1318.26	1325.59	0.000063	0.92	1653.05	471.44	0.06
Downstream	1.298	943.00	1314.00	1325.58	1318.26	1325.59	0.000063	0.92	1652.95	470.00	0.06
Downstream	1.21	943.00	1324.00	1325.05	1325.05	1325.39	0.020315	4.77	202.85	303.97	1.00
Downstream	1.21	943.00	1324.00	1325.05	1325.05	1325.39	0.020271	4.78	202.51	302.00	1.00
Downstream	1.196	943.00	1315.00	1317.45	1317.45	1318.14	0.015508	6.72	142.70	103.93	0.99

HEC-RAS Plan: FIS River: Tractor Wash Reach: Downstream (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Downstream	1.196	943.00	1315.00	1317.44	1317.44	1318.14	0.015497	6.74	142.02	102.00	0.99
Downstream	1.137	1295.00	1303.00	1307.16	1307.16	1308.62	0.010497	10.31	165.83	65.53	0.95
Downstream	1.137	1295.00	1303.00	1307.22	1307.22	1308.61	0.009786	10.07	169.73	64.00	0.92
Downstream	1.085	1295.00	1294.00	1299.69	1299.69	1301.12	0.013311	9.62	134.67	47.38	1.01
Downstream	1.085	1295.00	1294.00	1299.68	1299.68	1301.12	0.013328	9.64	134.29	47.00	1.01
Downstream	1.017	1295.00	1280.00	1286.76	1286.76	1288.54	0.012677	10.71	121.82	36.35	0.99
Downstream	1.017	1295.00	1280.00	1286.74	1286.74	1288.54	0.012764	10.78	121.00	35.00	1.00
Downstream	0.955	1295.00	1271.50	1277.38	1277.38	1278.87	0.013245	9.80	132.08	44.95	1.01
Downstream	0.955	1295.00	1271.50	1277.35	1277.35	1278.87	0.013396	9.90	130.75	44.00	1.01
Downstream	0.894	1295.00	1264.00	1269.27	1269.27	1270.71	0.011079	9.71	146.14	64.31	0.95
Downstream	0.894	1295.00	1264.00	1269.33	1269.33	1270.70	0.010399	9.52	149.84	64.00	0.92
Downstream	0.828	1295.00	1257.00	1261.73	1261.73	1263.17	0.011246	9.76	146.28	59.87	0.96
Downstream	0.828	1295.00	1257.00	1261.77	1261.77	1263.17	0.010708	9.61	148.82	59.00	0.94
Downstream	0.786	1295.00	1252.00	1255.42	1255.42	1256.78	0.011903	9.71	157.09	65.41	0.98
Downstream	0.786	1295.00	1252.00	1255.45	1255.45	1256.77	0.011477	9.60	158.83	64.00	0.96
Downstream	0.72	1295.00	1246.60	1249.80		1250.16	0.005995	6.05	336.81	152.76	0.67
Downstream	0.72	1295.00	1246.60	1250.23		1251.20	0.009518	8.47	195.11	83.00	0.87
Downstream	0.629	1648.00	1241.10	1244.53	1244.53	1245.76	0.013414	8.90	185.45	76.85	1.00
Downstream	0.629	1648.00	1241.10	1244.54	1244.54	1245.76	0.013111	8.86	186.32	76.00	0.99
Downstream	0.549	1648.00	1235.40	1239.66	1239.43	1240.67	0.007622	8.30	251.32	134.05	0.80
Downstream	0.549	1648.00	1235.40	1239.64	1239.43	1240.66	0.007861	8.39	247.71	132.77	0.81
Downstream	0.504	1648.00	1233.60	1237.17	1237.17	1238.34	0.012655	8.74	197.44	93.94	0.98
Downstream	0.504	1648.00	1233.60	1237.19	1237.19	1238.34	0.012184	8.64	199.93	93.00	0.96
Downstream	0.455	1648.00	1230.00	1234.92		1235.67	0.005667	7.89	332.62	139.71	0.70
Downstream	0.455	1648.00	1230.00	1234.90		1235.66	0.005803	7.95	329.04	138.00	0.71
Downstream	0.389	1648.00	1225.30	1231.04	1231.04	1232.84	0.011414	10.78	158.67	53.01	0.98
Downstream	0.389	1648.00	1225.30	1231.08	1231.08	1232.84	0.010990	10.66	160.75	52.00	0.96
Downstream	0.347	1648.00	1222.70	1228.32	1228.32	1229.78	0.012222	9.76	174.82	67.11	0.99
Downstream	0.347	1648.00	1222.70	1228.32	1228.32	1229.78	0.012150	9.74	174.96	65.00	0.98
Downstream	0.305	1648.00	1221.10	1225.20		1225.23	0.000448	2.15	1427.58	441.99	0.20
Downstream	0.305	1648.00	1221.10	1225.70		1226.06	0.002279	5.27	402.38	108.00	0.45
Downstream	0.251	1648.00	1219.30	1223.35	1223.35	1224.74	0.011350	9.54	187.16	81.10	0.96
Downstream	0.251	1648.00	1219.30	1223.39	1223.39	1224.73	0.010858	9.41	190.13	80.00	0.94
Downstream	0.188	1648.00	1205.80	1215.71		1215.78	0.000146	2.17	817.96	110.69	0.13
Downstream	0.188	1648.00	1205.80	1215.87		1215.94	0.000137	2.12	835.99	110.00	0.13
Downstream	0.095	1648.00	1203.50	1215.65		1215.72	0.000105	2.00	891.34	110.16	0.11
Downstream	0.095	1648.00	1203.50	1215.82		1215.88	0.000099	1.96	909.47	109.00	0.11
Downstream	0.037	1648.00	1210.00	1215.42	1214.24	1215.62	0.001787	3.95	612.81	316.12	0.38
Downstream	0.037	1648.00	1210.00	1215.44	1214.11	1215.77	0.002478	4.67	381.55	148.00	0.45
Downstream	0	3011.00	1210.90	1213.74	1213.74	1214.69	0.008912	8.11	425.86	245.50	0.95
Downstream	0	3011.00	1210.90	1213.74	1213.74	1214.70	0.008966	8.14	409.49	210.00	0.95

Table 3 HEC-RAS Output Summary Tables for Post-Project Conditions Models

HEC-RAS Plan: Design River: Tuthill Wash Reach: Tuthill

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Tuthill	10003.72	1414.00	1226.60	1230.62	1230.62	1231.29	0.008441	7.88	283.05	197.45	0.92
Tuthill	10003.72	1414.00	1226.60	1231.22	1231.22	1232.28	0.007564	8.70	197.94	94.18	0.90
Tuthill	10003.63	1414.00	1218.20	1222.22	1222.22	1223.71	0.008767	9.88	150.26	54.96	0.99
Tuthill	10003.63	1414.00	1218.20	1222.27	1222.27	1223.70	0.008314	9.72	152.92	55.04	0.96
Tuthill	10003.53	1414.00	1214.80	1217.25	1217.25	1218.15	0.010635	7.63	190.79	112.54	0.99
Tuthill	10003.53	1414.00	1214.80	1217.26	1217.26	1218.15	0.010455	7.59	191.82	112.52	0.99
Tuthill	10003.43	1414.00	1213.50	1216.81		1216.90	0.000590	2.53	621.38	236.78	0.26
Tuthill	10003.43	1414.00	1213.50	1216.82		1216.93	0.000682	2.70	527.58	174.69	0.27
Tuthill	10003.34	1414.00	1212.30	1216.41		1216.54	0.000914	2.97	522.45	196.90	0.28
Tuthill	10003.34	1414.00	1212.30	1216.41		1216.54	0.000914	2.97	522.45	196.90	0.28
Tuthill	10003.32	1414.00	1211.00	1216.34		1216.43	0.000416	2.42	603.91	160.84	0.20
Tuthill	10003.32	1414.00	1211.00	1216.34		1216.43	0.000416	2.42	603.91	160.84	0.20
Tuthill	10003.31	1414.00	1205.80	1216.36		1216.42	0.000119	2.05	810.45	148.03	0.12
Tuthill	10003.31	1414.00	1205.80	1216.36		1216.42	0.000119	2.05	810.45	148.03	0.12
Tuthill	10003.30	1414.00	1205.50	1216.33	1209.35	1216.41	0.000036	2.72	662.25	94.64	0.15
Tuthill	10003.30	1414.00	1205.50	1216.33	1209.35	1216.41	0.000036	2.72	662.25	94.64	0.15
Tuthill	10003.28	Culvert									
Tuthill	10003.27	1414.00	1205.00	1208.89	1208.89	1210.42	0.002164	10.68	150.19	50.31	0.95
Tuthill	10003.27	1414.00	1205.00	1208.89	1208.89	1210.42	0.002164	10.68	150.19	50.31	0.95
Tuthill	10003.26	1414.00	1204.50	1208.83		1209.27	0.002482	5.62	278.68	80.63	0.48
Tuthill	10003.26	1414.00	1204.50	1208.83		1209.27	0.002482	5.62	278.68	80.63	0.48
Tuthill	9655	3011.00	1203.00	1208.26		1208.69	0.002311	5.25	573.34	137.89	0.45
Tuthill	9655	3011.00	1203.00	1208.26		1208.69	0.002311	5.25	573.34	137.89	0.45
Tuthill	9450	3011.00	1201.86	1207.42		1208.09	0.003749	6.57	458.33	112.99	0.57
Tuthill	9450	3011.00	1201.86	1207.42		1208.09	0.003749	6.57	458.33	112.99	0.57
Tuthill	9300	3011.00	1200.90	1206.35	1205.43	1207.35	0.005956	8.05	373.94	95.99	0.72
Tuthill	9300	3011.00	1200.90	1206.35	1205.43	1207.35	0.005956	8.05	373.94	95.99	0.72
Tuthill	9100	3011.00	1199.68	1203.99	1203.99	1205.62	0.012359	10.25	293.68	90.91	1.01
Tuthill	9100	3011.00	1199.68	1203.99	1203.99	1205.62	0.012359	10.25	293.68	90.91	1.01
Tuthill	8900	3011.00	1198.47	1202.88	1201.88	1203.55	0.004889	6.55	459.50	139.47	0.64
Tuthill	8900	3011.00	1198.47	1202.88	1201.88	1203.55	0.004889	6.55	459.50	139.47	0.64
Tuthill	8700	3011.00	1197.24	1200.60	1200.60	1201.96	0.012909	9.36	321.53	118.36	1.00
Tuthill	8700	3011.00	1197.24	1200.60	1200.60	1201.96	0.012909	9.36	321.53	118.36	1.00
Tuthill	8500	3011.00	1195.87	1200.79		1200.98	0.001061	3.45	872.41	220.43	0.31
Tuthill	8500	3011.00	1195.87	1200.79		1200.98	0.001061	3.45	872.41	220.43	0.31
Tuthill	8300	3011.00	1194.76	1199.96	1198.50	1200.57	0.003687	6.27	480.36	125.78	0.57
Tuthill	8300	3011.00	1194.76	1199.96	1198.50	1200.57	0.003687	6.27	480.36	125.78	0.57
Tuthill	8100	3011.00	1193.54	1197.80	1197.71	1199.29	0.011425	9.81	307.03	95.88	0.97
Tuthill	8100	3011.00	1193.54	1197.80	1197.71	1199.29	0.011425	9.81	307.03	95.88	0.97
Tuthill	7900	3011.00	1192.28	1197.60		1198.03	0.002502	5.26	572.92	145.68	0.47
Tuthill	7900	3011.00	1192.28	1197.60		1198.03	0.002502	5.26	572.92	145.68	0.47
Tuthill	7700	3011.00	1191.06	1196.11		1197.18	0.007074	8.32	362.06	100.91	0.77
Tuthill	7700	3011.00	1191.06	1196.11		1197.18	0.007074	8.32	362.06	100.91	0.77
Tuthill	7500	3011.00	1189.80	1195.13		1195.94	0.004729	7.24	415.77	105.34	0.64
Tuthill	7500	3011.00	1189.80	1195.13		1195.94	0.004729	7.24	415.77	105.34	0.64
Tuthill	7300	3011.00	1188.60	1193.36		1194.65	0.008423	9.14	329.31	90.55	0.84
Tuthill	7300	3011.00	1188.60	1193.36		1194.65	0.008423	9.14	329.31	90.55	0.84
Tuthill	7100	3011.00	1187.02	1192.20		1193.18	0.005747	7.93	379.74	97.06	0.71
Tuthill	7100	3011.00	1187.02	1192.20		1193.18	0.005747	7.93	379.74	97.06	0.71

HEC-RAS Plan: Design River: Tuthill Wash Reach: Tuthill (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Tuthill	6900	6110.00	1185.11	1189.46	1189.46	1191.29	0.011818	10.87	562.16	154.76	1.00
Tuthill	6900	6110.00	1185.11	1189.46	1189.46	1191.29	0.011818	10.87	562.16	154.76	1.00
Tuthill	6700	6110.00	1183.23	1187.06	1187.06	1188.59	0.012576	9.92	615.79	203.92	1.01
Tuthill	6700	6110.00	1183.23	1187.06	1187.06	1188.59	0.012576	9.92	615.79	203.92	1.01
Tuthill	6500	6110.00	1181.30	1186.11		1186.74	0.003512	6.35	961.99	238.69	0.56
Tuthill	6500	6110.00	1181.30	1186.11		1186.74	0.003512	6.35	961.99	238.69	0.56
Tuthill	6300	6110.00	1179.26	1183.97	1183.65	1185.54	0.009041	10.06	607.45	153.46	0.89
Tuthill	6300	6110.00	1179.26	1183.97	1183.65	1185.54	0.009041	10.06	607.45	153.46	0.89
Tuthill	6100	6110.00	1177.46	1181.74	1181.74	1183.54	0.011857	10.79	566.32	158.07	1.00
Tuthill	6100	6110.00	1177.46	1181.74	1181.74	1183.54	0.011857	10.79	566.32	158.07	1.00
Tuthill	5900	6110.00	1175.40	1180.23		1181.37	0.006423	8.55	714.21	178.24	0.75
Tuthill	5900	6110.00	1175.40	1180.23		1181.37	0.006423	8.55	714.21	178.24	0.75
Tuthill	5700	6110.00	1173.71	1178.35	1178.00	1179.88	0.008904	9.92	615.79	157.08	0.88
Tuthill	5700	6110.00	1173.71	1178.35	1178.00	1179.88	0.008904	9.92	615.79	157.08	0.88
Tuthill	5500	6110.00	1171.62	1175.91	1175.91	1177.80	0.011700	11.04	553.50	147.53	1.00
Tuthill	5500	6110.00	1171.62	1175.91	1175.91	1177.80	0.011700	11.04	553.50	147.53	1.00
Tuthill	5300	6110.00	1169.55	1174.37		1175.62	0.007329	8.95	682.81	176.06	0.80
Tuthill	5300	6110.00	1169.55	1174.37		1175.62	0.007329	8.95	682.81	176.06	0.80
Tuthill	5100	6110.00	1167.89	1172.81	1172.18	1174.10	0.007247	9.13	669.28	165.83	0.80
Tuthill	5100	6110.00	1167.89	1172.81	1172.18	1174.10	0.007247	9.13	669.28	165.83	0.80
Tuthill	4900	6110.00	1166.06	1170.38	1170.38	1172.26	0.011749	11.00	555.23	149.20	1.01
Tuthill	4900	6110.00	1166.06	1170.38	1170.38	1172.26	0.011749	11.00	555.23	149.20	1.01
Tuthill	4700	6110.00	1164.15	1168.05	1167.99	1169.71	0.011341	10.34	590.86	169.91	0.98
Tuthill	4700	6110.00	1164.15	1168.05	1167.99	1169.71	0.011341	10.34	590.86	169.91	0.98
Tuthill	4500	6110.00	1161.96	1165.95		1167.48	0.010436	9.93	615.25	176.37	0.94
Tuthill	4500	6110.00	1161.96	1165.95		1167.48	0.010436	9.93	615.25	176.37	0.94
Tuthill	4300	6110.00	1159.70	1164.73		1165.85	0.005731	8.50	718.98	166.14	0.72
Tuthill	4300	6110.00	1159.70	1164.73		1165.85	0.005731	8.50	718.98	166.14	0.72
Tuthill	4100	6110.00	1157.70	1162.22	1162.22	1164.18	0.011598	11.23	543.94	140.24	1.01
Tuthill	4100	6110.00	1157.70	1162.22	1162.22	1164.18	0.011598	11.23	543.94	140.24	1.01
Tuthill	3900	6168.00	1155.00	1159.55	1159.55	1161.54	0.011534	11.33	544.63	137.99	1.00
Tuthill	3900	6168.00	1155.00	1159.55	1159.55	1161.54	0.011534	11.33	544.63	137.99	1.00
Tuthill	3700	6168.00	1152.00	1156.79	1156.68	1158.73	0.009323	11.41	571.52	143.86	0.93
Tuthill	3700	6168.00	1152.00	1156.71	1156.68	1158.73	0.009865	11.61	560.85	143.12	0.96
Tuthill	1.994	6168.00	1143.50	1152.38	1152.38	1154.90	0.006247	12.92	526.43	123.77	0.92
Tuthill	1.994	6168.00	1143.50	1152.44	1152.44	1154.90	0.006002	12.75	534.74	123.75	0.90
Tuthill	1.898	6168.00	1137.30	1145.53	1145.53	1147.82	0.006175	14.41	694.09	171.41	0.95
Tuthill	1.898	6168.00	1137.30	1145.24	1145.24	1148.01	0.007445	15.39	548.18	97.85	1.03
Tuthill	1.805	6168.00	1127.60	1138.15	1138.15	1141.02	0.007845	13.60	454.04	85.81	1.01
Tuthill	1.805	6168.00	1127.60	1138.17	1138.17	1141.02	0.007756	13.54	455.57	80.25	1.00
Tuthill	1.71	6168.00	1120.00	1130.93	1130.93	1133.59	0.007976	13.10	470.84	88.88	1.00
Tuthill	1.71	6168.00	1120.00	1130.93	1130.93	1133.59	0.007976	13.10	470.84	88.88	1.00

HEC-RAS Plan: Design River: Tractor Wash Reach: Downstream

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Downstream	11000.50	1648.00	1233.60	1237.17	1237.17	1238.34	0.012655	8.74	197.44	93.94	0.98
Downstream	11000.50	1648.00	1233.60	1237.19	1237.19	1238.34	0.012184	8.64	199.93	93.00	0.96
Downstream	11000.45	1648.00	1230.00	1234.92		1235.67	0.005664	7.89	332.69	139.71	0.70
Downstream	11000.45	1648.00	1230.00	1234.90		1235.66	0.005799	7.95	329.13	138.00	0.71
Downstream	11000.38	1648.00	1225.30	1231.04	1231.04	1232.84	0.011414	10.78	158.67	53.01	0.98
Downstream	11000.38	1648.00	1225.30	1231.08	1231.08	1232.84	0.010990	10.66	160.75	52.00	0.96
Downstream	11000.34	1648.00	1222.70	1228.32	1228.32	1229.78	0.012222	9.76	174.82	67.11	0.99
Downstream	11000.34	1648.00	1222.70	1228.32	1228.32	1229.78	0.012150	9.74	174.96	65.00	0.98
Downstream	11000.30	1648.00	1221.60	1225.50	1225.50	1227.00	0.010243	10.65	178.01	61.21	0.95
Downstream	11000.30	1648.00	1221.60	1225.50	1225.50	1227.00	0.010243	10.65	178.01	61.21	0.95
Downstream	10564	1648.00	1219.21	1222.35	1222.35	1223.58	0.013540	8.93	184.57	75.37	1.01
Downstream	10564	1648.00	1219.21	1222.35	1222.35	1223.58	0.013540	8.93	184.57	75.37	1.01
Downstream	10458	1648.00	1217.09	1220.08	1219.84	1220.89	0.010418	7.22	228.27	105.85	0.87
Downstream	10458	1648.00	1217.09	1220.08	1219.84	1220.89	0.010418	7.22	228.27	105.85	0.87
Downstream	10325	1648.00	1215.01	1217.45	1217.43	1218.48	0.013824	8.16	202.05	96.27	0.99
Downstream	10325	1648.00	1215.01	1217.45	1217.43	1218.48	0.013824	8.16	202.05	96.27	0.99
Downstream	10195	1648.00	1212.93	1215.96		1216.53	0.006367	6.10	269.96	111.12	0.69
Downstream	10195	1648.00	1212.93	1215.96		1216.53	0.006367	6.10	269.96	111.12	0.69
Downstream	10067	1648.00	1210.82	1213.58	1213.58	1214.66	0.013893	8.36	197.17	90.86	1.00
Downstream	10067	1648.00	1210.82	1213.58	1213.58	1214.66	0.013893	8.36	197.17	90.86	1.00
Downstream	9985.3	1648.00	1208.71	1212.09		1212.44	0.003210	4.74	348.00	125.37	0.50
Downstream	9985.3	1648.00	1208.71	1212.09		1212.44	0.003210	4.74	348.00	125.37	0.50
Downstream	9898.3	1648.00	1206.59	1209.86	1209.86	1211.19	0.013274	9.26	177.87	67.42	1.01
Downstream	9898.3	1648.00	1206.59	1209.86	1209.86	1211.19	0.013274	9.26	177.87	67.42	1.01
Downstream	9820	1648.00	1204.72	1208.74		1209.32	0.004797	6.11	269.69	89.24	0.62
Downstream	9820	1648.00	1204.72	1208.74		1209.32	0.004798	6.11	269.68	89.24	0.62
Downstream	9655	3011.00	1203.00	1208.26		1208.69	0.002311	5.25	573.36	137.89	0.45
Downstream	9655	3011.00	1203.00	1208.26		1208.69	0.002311	5.25	573.34	137.89	0.45
Downstream	9450	3011.00	1201.86	1207.42		1208.09	0.003748	6.57	458.37	112.99	0.57
Downstream	9450	3011.00	1201.86	1207.42		1208.09	0.003749	6.57	458.33	112.99	0.57
Downstream	9300	3011.00	1200.90	1206.35	1205.43	1207.35	0.005951	8.05	374.06	96.01	0.72
Downstream	9300	3011.00	1200.90	1206.35	1205.43	1207.35	0.005956	8.05	373.94	95.99	0.72
Downstream	9100	3011.00	1199.68	1203.99	1203.99	1205.62	0.012362	10.25	293.66	90.91	1.01
Downstream	9100	3011.00	1199.68	1203.99	1203.99	1205.62	0.012362	10.25	293.66	90.91	1.01

5.0 EROSION AND SEDIMENT TRANSPORT

5.1 Methodologies

The purpose of this scour analysis is to estimate the required toedown depths for the proposed bank protection of the channelized segments in both portion of Tractor Wash and Tuthill Dike Wash.

Because the channel segment for the culvert and transition areas are protected using concrete or grouted riprap lining, no bridge local scour estimation is necessary for this study. Also, the subject channel segments are relatively uniform, so it is assumed that the general scour will be minimal. However, there is a bend at the confluence of Tractor Wash and Tuthill Dike Wash and grade control structures are proposed to limit the channel bottom long-term erosion depth to 2.0 feet. Therefore, long-term aggradation/degradation, bend scour, sill scour, bed-form troughs, and low flow incisement were analyzed in this study. The following sections present the technical discussion of the engineering assumptions and methodologies used for the estimations of the above-mentioned scour components.

The hydraulic parameters used in the scour analysis were from hydraulic modeling results of previous section. Soil analysis information was provided by Geotechnical and Environmental Consultants, Inc. (see References 6 and 7). D_{16}, D_{50}, and D_{84} values of the channel bottom soil were estimated from the soil sieve analysis curves.

5.1.1 Sediment Transport Capacity Estimation

The Empirical Power Relationship (Zeller and Fullerton, 1983) was used to estimate the sediment transport capacity for each reach of the channel. The representative cross sections chosen for the analysis are Station 98+98.3 for the downstream Tractor Wash, Station 75+00 for the channel segment of Stations between 69+00 and 96+55, and Station 49+00 for the channel segment of Stations between 43+00 and 69+00 of the Tuthill Dike Wash.

5.1.2 Watershed Load Estimation

In order to estimate the long-term aggradation/degradation trend of the channel, the watershed sediment load into the subject channel should be estimated first.

The inflowing sediment loads for the three segments were estimated in a previous study and are 5.52 cfs for the downstream of Tractor Wash, 5.58 cfs for the reach between 69+00 and 96+55, and 14.29 cfs for the reach between 43+00 and 69+00 in Tuthill Dike Wash.

5.1.3 Long-Term Aggradation/Degradation – Equilibrium Slope Analysis

Equilibrium slope analysis was utilized to estimate the long-term gradation changes in the study washes. The equilibrium channel slope is defined as the slope at which the channel's sediment transporting capacity is equal to the incoming sediment supply. Under this condition, the channel neither aggrades nor degrades. When the present slope of the channel is greater than the equilibrium slope, the channel will degrade in order to reach its equilibrium slope.

The calculation of the equilibrium slope, which the channel will conform to, is accomplished by using the definition of a channel in equilibrium. That is, $Q_{s\,in} = Q_{s\,out}$, where $Q_{s\,in}$ represents the supply rate of sediment into the channel and $Q_{s\,out}$ represents the sediment transport rate out of the channel.

The procedure begins with a determination of the sediment transport rate into the channel. The upstream sediment supply was assumed to be the watershed sediment load and to be in equilibrium. Since a uniform flow condition was assumed to exist in each of the channel reaches, Manning's equation was used (in an iterative process) to calculate the final equilibrium slope. The slope of the study reach was varied until the resulting sediment transport capacity equaled the incoming sediment supply for that reach. Once a slope was found at which the incoming sediment supply equaled the sediment load in the channel reach, this slope was assumed to be the equilibrium slope for that reach and the analysis of the next reach was initiated. This procedure was repeated until all reaches had been analyzed. A spreadsheet was developed to perform these calculations and the output files are included in Appendix D. The 10-year flow was assumed to be the dominant flow condition. Note that grade control structures are proposed to limit the channel bottom long-term erosion depth to 2.0 feet.

5.1.4 Bend Scour Estimation

Zeller's equation (1981) was used to estimate the bend scour magnitude. The input data and calculations were shown in a spreadsheet output and included in Appendix D. The 100-year flow was used in the bend scour calculation. THE bend scour was calculated for Tractor Wash near Station 98+20.

5.1.5 Sill Scour Estimation

The equation recommended by the Bureau of Reclamation (1984) was used to estimate the sill scour depth at the grade control structures. The input data and calculations were given in a spreadsheet output and included in Appendix D. The 100-year flow was used in the sill scour computation.

5.1.6 Bed-Form Troughs Estimation

The relationship developed by Kennedy (1963) was used to estimate the depth of antidune troughs (below the existing channel bed) and the equation developed by Simons and Senturk (1977) was applied to compute the dune heights. Whichever is greater was used as the bed-form trough depth. The input data and calculation were shown in Appendix D. The 100-year flow was used in the bed-form trough estimation.

5.2 Toedown Depth Estimation for Bank Protection

5.2.1 Scour Estimation Results

The equilibrium slope analysis results show that the equilibrium slope is 0.018500 ft/ft (0.010833 ft/ft design slope) for the downstream Tractor Wash, 0.005220 ft/ft (0.006626 ft/ft design slope) for the channel segment of Stations between 69+00 and 96+55, and 0.005380 ft/ft (0.009719 ft/ft design slope) for the channel segment of Stations between 43+00 and 69+00 of the Tuthill Dike Wash. These numbers indicate that there is no long-term scour potential for the downstream Tractor Wash. Two grade control structures for the channel segment between 69+00 and 96+55 and 6 grade control structures for the channel segment between 43+00 and 69+00 are needed in order to limit the long-term scour depth less than or equal to 2.0 feet.

The low flow incisement is assumed to be 15% of the 100-year flow depth. Therefore, the low flow incisement is 0.4 feet for the downstream Tractor Wash, 0.8 feet for the channel segment of Stations between 69+00 and 96+55, and 0.7 feet for the channel segment of Stations between 43+00 and 69+00 of the Tuthill Dike Wash.

5.2.2 Local Scour Components

Sill scour is anticipated at the downstream side of the grade control structure. The estimated sill scour depth is 4.0 feet for the channel segment of Stations between 69+00 and 96+55 and 5.5 feet for the channel segment of Stations between 43+00 and 69+00 of the Tuthill Dike Wash. This type of scour will be limited to a localized area and can be significantly reduced or eliminated by providing riprap protection. Since riprap protection will be provided, this local scour is eliminated in the computation of the toedown depth. Bend scour also occurs in a local area near the confluence of the Tractor Wash and Tuthill Dike Wash and is estimated to be 1.7 feet.

5.2.3 Toedown Depths

Toedown depth = {long-term degradation + bed-form troughs + low flow incisement + local scour (if applicable)} x safety factor

Downstream Tractor Wash Other Than the Bend:

Toedown depth = (0.0 + 0.9 +0.4) x 1.3 = 2.0 feet

Downstream Tractor Wash Near the Bend:

Toedown depth = (0.0 + 0.9 + 0.4 + 1.7) x 1.3 = 4.0 feet

Tuthill Dike Wash between Stations 69+00 and 96+55:

Toedown depth = (2.0 + 0.7 + 0.8) x 1.3 = 5.0 feet

Tuthill Dike Wash between Stations 43+00 and 69+00:

Toedown depth: (2.0 + 1.7 + 0.7) x 1.3 = 6.0 feet

These results were used for the bank protection toedown depth design parameters.

6.0 DRAFT FIS REPORT DATA

6.1 Summary of Discharge

Table 4 provides a summary of discharges in FEMA format for the study area from *Flood Insurance Study, Maricopa County Arizona and Unincorporated Areas, Volume 1 of 12,* revised September 30, 1995.

TABLE 4

Summary of Discharges in FEMA Format

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (cfs)			
		10-year	50-year	100-year	500-year
Tuthill Dike Wash – At McDowell Road and the confluence with Bulldozer Wash	14.56	--[1]	--[1]	6,601	--[1]
Tuthill Dike Wash – At Thomas Road and the confluence with Caterpillar Wash	12.86	--[1]	--[1]	6,110	--[1]
Tuthill Dike Wash – At Indian School Road and the confluence with Tractor Wash	7.45	--[1]	--[1]	3,011	--[1]
Tractor Wash – Just upstream of the confluence with Tuthill Dike Wash	2.16	--[1]	--[1]	1,648	--[1]

--[1] Not Computed

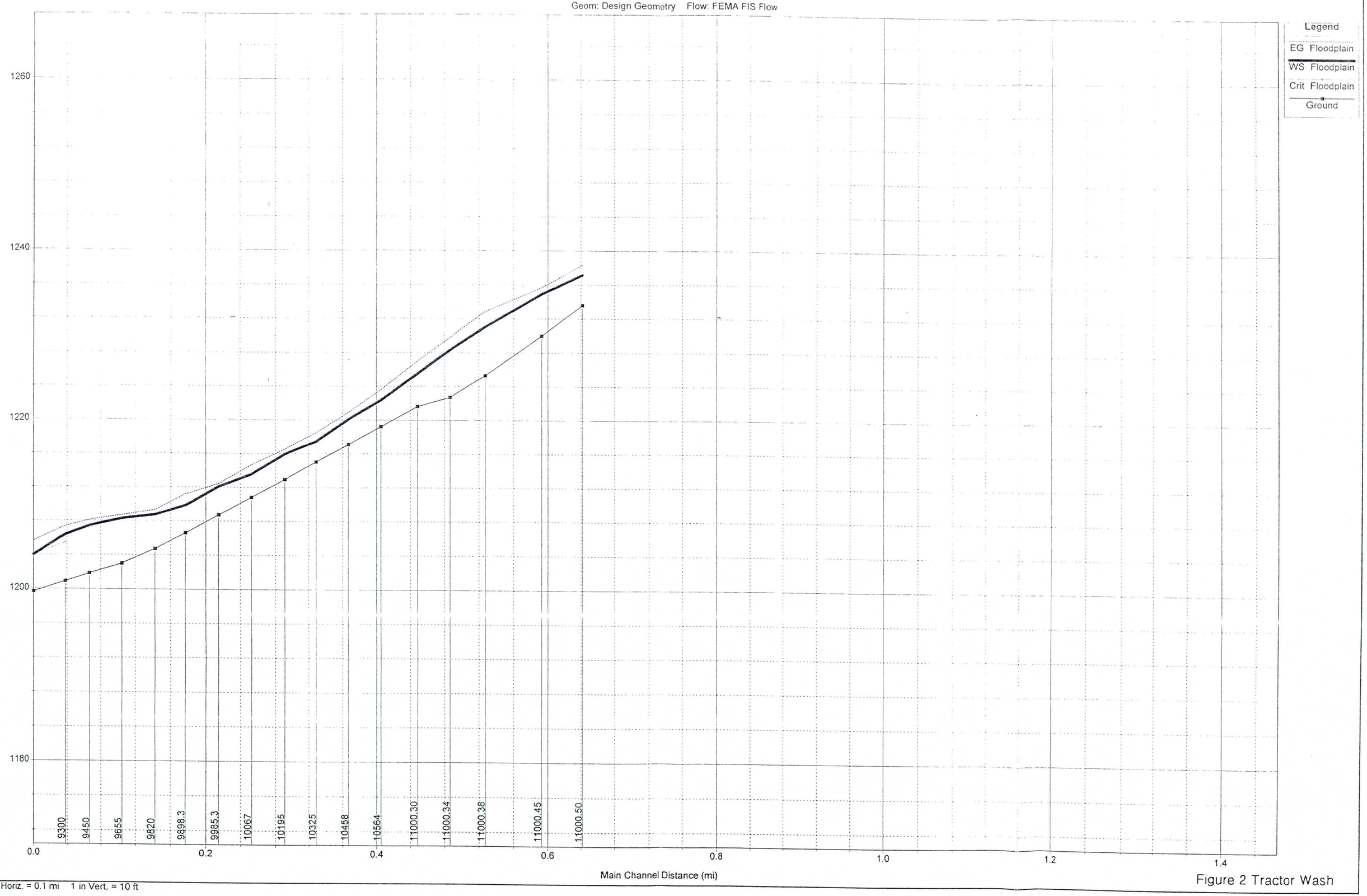
6.2 Annotated Flood Insurance Rate Map

The 100-year effective FIS flows are contained within the proposed study reaches as documented in this report. Exhibit D contains the revisions to the effective FIRM panels 04013C2035 G and 04013C2055 F. Refer to Exhibit C for *Post-Project Conditions Model* Work Maps.

6.3 Flood Profiles

Figure 2 contains the 100-year peak flow flood profiles for the *Post-Project Conditions Models* for the study reaches of both downstream Tractor Wash and Tuthill Dike Wash.

Tractor Wash (D/S) Plan: Design Plan
Geom: Design Geometry Flow: FEMA FIS Flow

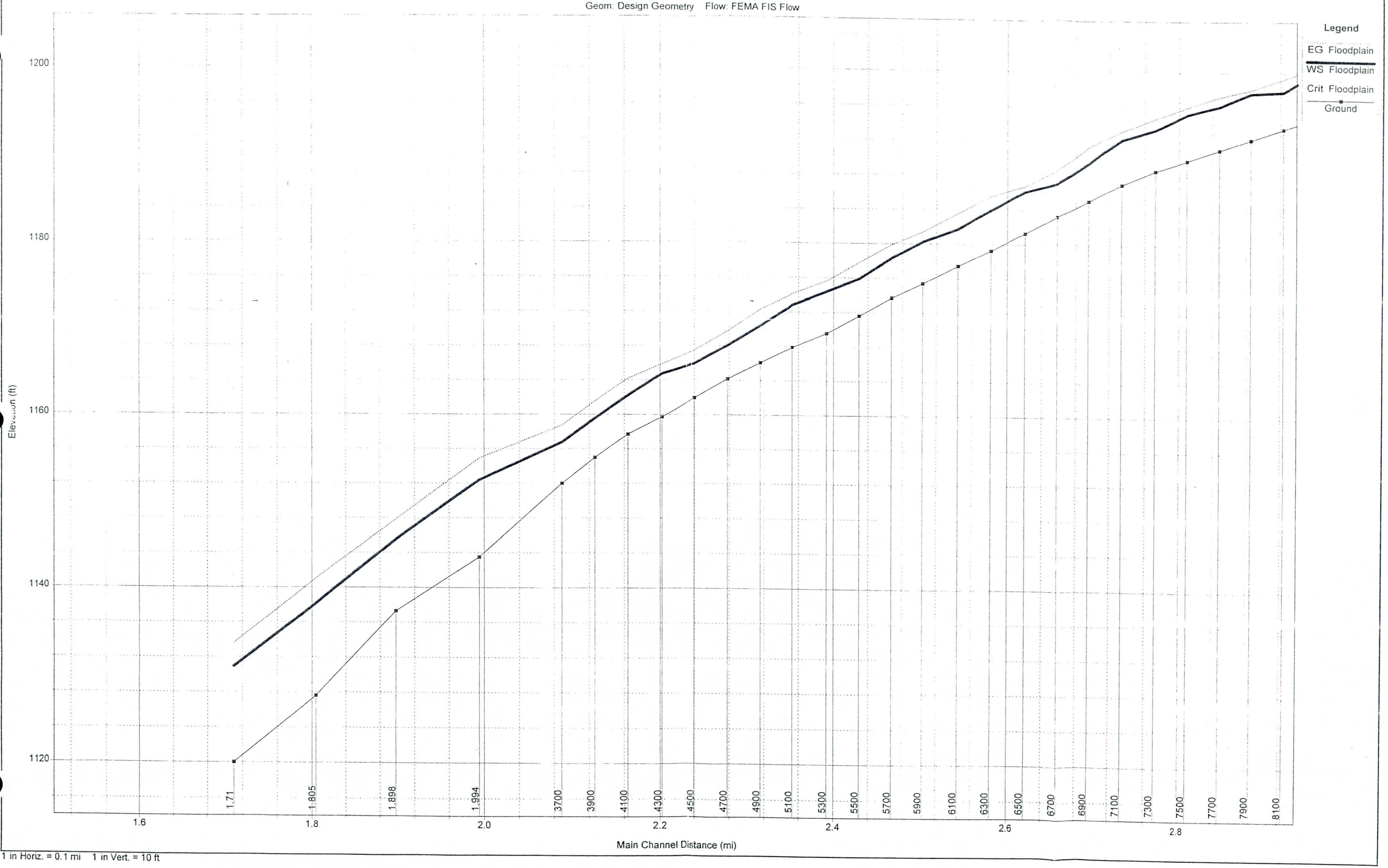


1 in Horiz. = 0.1 mi 1 in Vert. = 10 ft

Figure 2 Tractor Wash

Tuthill Channel Plan: Design Plan

Geom: Design Geometry Flow: FEMA FIS Flow

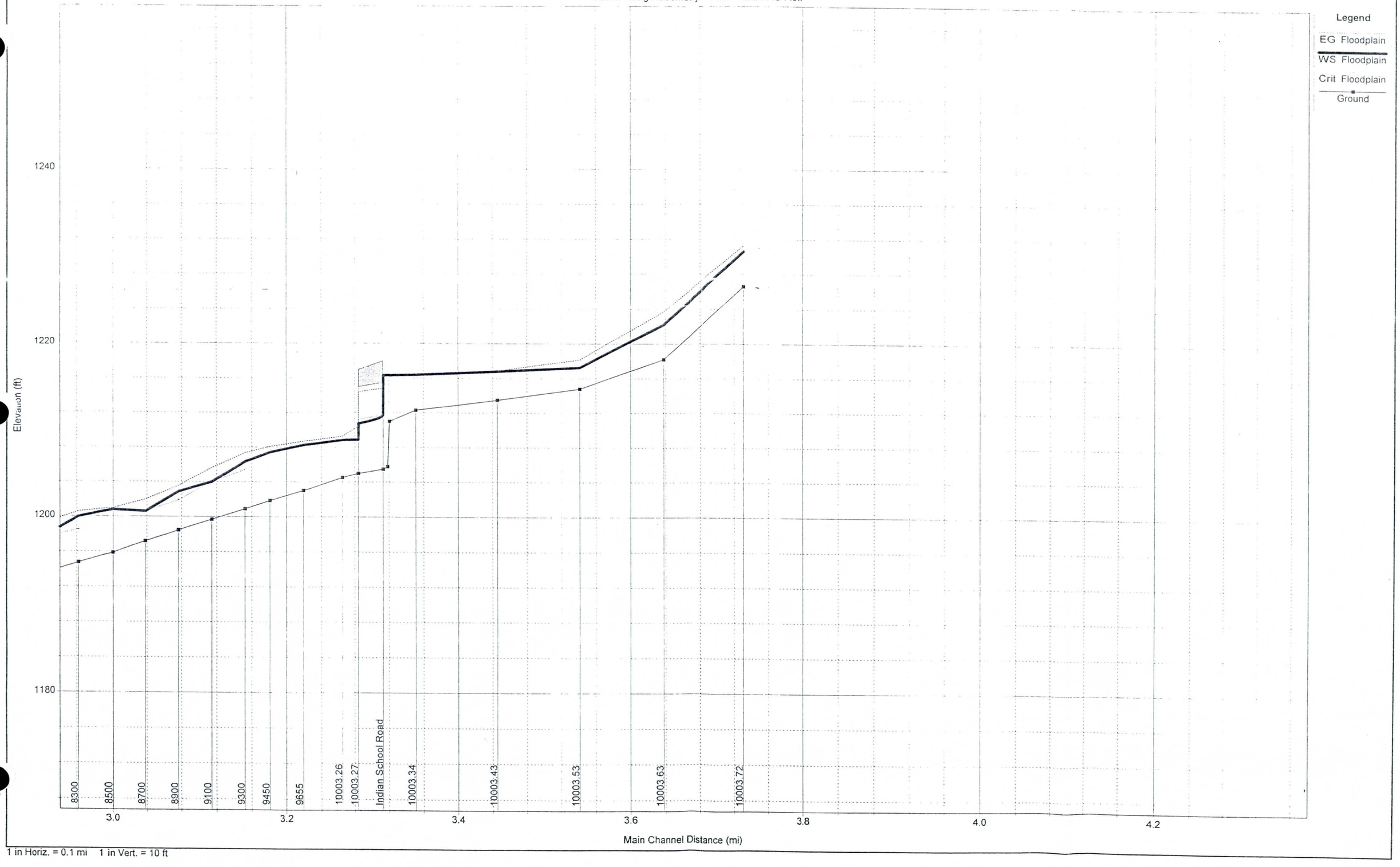


1 in Horiz. = 0.1 mi 1 in Vert. = 10 ft

Figure 2 Tuthill Dike Wash

Tuthill Channel Plan: Design Plan

Geom: Design Geometry Flow: FEMA FIS Flow



1 in Horiz. = 0.1 mi 1 in Vert. = 10 ft

7.0 REFERENCES

1. The WLB Group, Inc., *White Tanks/Agua Fria Area Drainage Master Study*, October 1992.

2. U.S. Army Corps of Engineers, Hydrologic Modeling Center, *HEC-2 Water Surface Profiles User's Manual*, 1991.

3. FEMA, *Flood Insurance Study, Maricopa County and Incorporated Areas, Arizona*, 1995.

4. ADWR, *Design Manual for Engineering Analysis of Fluvial Systems*, 1985.

5. Pemberton, E. and J. Lara, *Computing Degradation and Local Scour, Technical Guideline for Bureau of Reclamation*, 1984.

6. Geotechnical and Environmental Consultants, Inc., *Osborn Wash and Tractor Wash Drainage Channel Evaluation, Proposed Whitestone Development– Indian School Road and Jackrabbit Trail, Buckeye, Arizona*, September 2001.

7. Geotechnical and Environmental Consultants, Inc., *Geotechnical Report: Tuthill Road Levee and Thuthill Wash Evaluation, Proposed Whitestone Development– Indian School Road and Jackrabbit Trail, Buckeye, Arizona*, October 2001.

8. FEMA, *Flood Insurance Study, Maricopa County and Incorporated Areas, Arizona*, 2001.

Appendix A
HEC-2 Models Output Files

Appendix A1
HEC-2 Output for Regulatory FIRM Conditions
Duplicate Effective Model (Tuthill Dike Wash)

Appendix A2
HEC-2 Output for Regulatory FIRM Conditions
Duplicate Effective Model (Tractor Wash)

Appendix A1
HEC-2 Output for Regulatory FIRM Conditions
Duplicate Effective Model (Tuthill Dike Wash)

```
1*****************************************

 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE    18JAN02    TIME   15:45:38 *
 *****************************************

 ***************************************
 *  U.S. ARMY CORPS OF ENGINEERS       *
 *  HYDROLOGIC ENGINEERING CENTER      *
 *  609 SECOND STREET, SUITE D         *
 *  DAVIS, CALIFORNIA 95616-4687       *
 *        (916) 756-1104               *
 ***************************************

                                X     X  XXXXXXX   XXXXX              XXXXX
                                X     X  X        X     X            X     X
                                X     X  X        X                        X
                                XXXXXXX  XXXX     X          XXXXX    XXXXX
                                X     X  X        X                   X
                                X     X  X        X     X             X
                                X     X  XXXXXXX  XXXXX               XXXXXXX
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                                                        THIS RUN EXECUTED 18JAN02    15:45:38

 ************************************
  HEC-2 WATER SURFACE PROFILES

  Version   4.6.2;  May 1991
 ************************************

 T1      WHITE TANKS / AGUA FRIA AREA DRAINAGE MASTER STUDY
 T2      100 - YEAR STORM EVENT      FLOODPLAIN RUN        FILE: 5.H2I
 T3      TUTHILL DIKE WASH - WASH "5" - WHITE TANK STRUCTURE #4 NORTH

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0         2         0         0    0.0044         0         0         0    1040.0         0

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       1         0         0         0         0         0         0         0         0         0


 J3  VARIABLE CODES FOR SUMMARY PRINTOUT

      38        43         1        53        21        22        54        51         4         8
      42         5        26         0       110         0       200

 NC      .03       .04       .03        .1        .3
 QT        2      4057      4057
 ET                          9.1                                                  9945.48   10068.73

           Q @ X1 = 0.000 TO X1  = 1.012 EQUALS Q AT I6CWT4
           Q = 4057 CFS

           MATCH FLOODPLAIN INTO 100-YEAR PONDING WSEL BEHIND WHITE TANKS
           STRUCTURE # 4

 X1    0.000         8      9940     10075         0         0         0
 GR     1042      9880      1040      9940      1034      9975      1033     10000      1034     10035
 GR     1040     10075      1050     10120      1054     10140

 ET                          9.1                                                  9910   10073.38
 X1    0.075         8      9960     10070       400       400       400
 GR     1042      9860      1040      9910      1036      9960      1035     10000      1036     10025
 GR     1040     10070      1050     10110      1054     10125

 ET                          9.1                                                  9950   10068.55
 X1    0.186         9      9970     10050       580       580       580
 GR     1044      9730    1042.5      9840      1044      9950      1040      9970    1038.5     10000
 GR     1039     10040      1040     10050      1050     10100      1054     10130
1
```

```
ET                      9.1                                                 9925       10080
X1    0.314        14   9950      10080       500        720        680
GR     1050      9135   1048       9350      1047       9680       1048      9760       1049       9870
GR     1048      9950   1044       9970    1042.5      10000       1044     10050       1046      10070
GR     1048     10080   1050      10090      1052      10100       1054     10110

ET                      9.1                                                 9940       10175
X1    0.415        13   9940      10060       300        800        530
GR   1052.3      9250 1051.8       9650      1051       9875       1050      9940     1049.5       9960
GR   1047.2     10000   1048      10010      1050      10060     1051.2     10100       1050      10140
GR     1052     10275   1052      10315    1052.3      10335

ET                      9.1                                                9911.75     10110
X1    0.540        11   9930      10040       660        650        660
GR   1057.7      9910   1056       9930      1054       9960       1053     10000       1054      10030
GR     1056     10040   1056      10050    1055.3      10060       1056     10070     1056.9      10250
GR   1057.8     10335

ET                      9.1                                                9950.98     10105
X1    0.634        10   9970      10040       495        495        495
GR   1062.4      9935   1062       9950      1058       9970     1056.8     10000       1058      10040
GR     1060     10055 1060.3      10105      1062      10170       1062     10240     1062.3      10290

ET                      9.1                                                9953.52     10085
X1    0.729        16   9960      10085       500        500        500
GR   1069.6      9920   1068       9940      1066       9950       1064      9960       1062       9970
GR   1060.7     10000   1062      10030    1061.7      10040       1062     10055       1064      10085
GR   1065.8     10275 1065.5      10385      1066      10460     1065.8     10485       1066      10505
GR     1068     10625

ET                      9.1                                                9952.71   10045.27
X1    0.823        11   9955      10030       495        495        495
GR     1076      9925   1074       9940      1072       9950       1070      9955       1068       9960
GR     1066      9965 1064.5      10000      1066      10010       1068     10020       1070      10030
GR   1071.2     10050

ET                      9.1                                                9956.30     10050
X1    0.917        11   9965      10040       500        500        500
GR   1079.6      9915   1078       9940      1076       9950       1074      9960       1072       9965
GR     1070      9970 1069.3      10000      1070      10030       1074     10040       1076      10130
GR   1076.2     10150

ET                      9.1                                                9936.36   10028.56
X1    1.012        11   9940      10020       500        500        500
GR   1085.6      9920   1084       9925      1082       9930       1080      9940       1078       9945
GR     1076      9950 1075.7      10000      1076      10010       1078     10015       1080      10020
GR   1081.7     10040
```

1


```
NC     .016       .016       .016         .3         .5
QT        2       4061       4061
ET                          9.11                                            9977.7       10022
```

Q @ X1 = 1.067 TO X1 = 1.110 EQUALS Q AT CP43 (AFTER DIVERT)
Q = 4061 CFS
FLOW LEFT OVER AFTER WEIR FLOW OVER DIKE UPSTREAM OF CULVERT

4 - 10ft x 8ft x 227ft BC AT INTERSTATE 10

```
X1    1.067         7   9977.7    10022.0        293        293        293
X3       10                                                          1088       1088
GR    1088      9915.0  1078.64     9977.7     1078.64    9978.64    1078.64   10000.0    1078.64    10021.4
GR  1078.9     10022.0     1086      10075

SC    4.016        .5        2.6          0          8         10        227        8.1    1081.16    1078.64
ET                          9.11                                                 9950       10022
```

PORTION OF FLOW FOR THE NEXT FOUR CROSS SECTIONS UPSTREAM
IS LOST AS WEIR FLOW OVER THE DIKE TO THE EAST
APPROXIMATELY 1440 CFS FLOWS EAST OVER DIKE

```
          EFFECTIVE FLOW OPTION IS INCORPORATED FOR THE NEXT 5 UPSTREAM CROSS
          SECTIONS AS A RESULT OF PONDING AND UPSTREAM AND DOWNSTREAM EXPANSION
          AND CONTRATION FLOW SITUATIONS.

          ACTUAL MAPPED LIMITS CORRESPOND TO WATER SURFACE ELEVATIONS AND ARE
          SHOWN CORRECTLY ON THE FLOODPLAIN WORK MAP.

X1    1.110        8     9977.7    10022.0       227       227       227
X2        0        0          2    1089.16    1091.5
X3       10                                                          1092      1099
BT        5     9950       1092                9978.6      1099       10000      1099
BT    10022     1099                  10100      1099
GR     1092     9950    1081.16     9977.7    1081.1    9978.6    1081.1     10000    1081.1    10021.
GR   1081.1    10022       1088      10100      1096     11850

QT        2     5503       5503
ET                            9.1                                                  9920      10100

          Q @ X1 = 1.118 TO X1  = 1.198 EQUALS STORAGE ROUTED Q AT CP43
          Q = 5503 CFS

X1    1.118       13       9920      10030        40        40        40
X3                                    9920                 10100
GR     1096     9500       1094       9860    1091.5      9920      1090      9945    1081.52    9978.6
GR   1081.5    10000     1081.5     10021.    1081.5   10021.4      1082     10030       1084     10200
GR     1086    10260       1088      10500      1096     11850
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NC      .03       .04        .03         .1         .3
ET                            9.1                                                  9930      10150
X1    1.152       15       9930      10045        180       180       180
X3                                    9930                 10150
GR     1093     9930       1086       9980      1082     10000      1082     10025       1086     10045
GR     1088    10080     1087.5     10110    1088.5     10175      1088     10215       1087     10330
GR   1088.5    10365       1088      10410      1090     10480    1090.2     10515     1095.5     10900

ET                            9.1                                                  9925      10200
X1    1.198       18       9945      10030        235       235       240
X3                                    9925                 10200
GR   1095.8     9925       1094       9935      1092      9940      1090      9945       1088      9960
GR     1086     9975     1085.3      10000      1086     10015      1088     10020       1090     10030
GR     1091    10080       1090      10190      1090     10225    1090.3     10350     1091.1     10420
GR     1092    10480       1094      10600      1096     10800

NC      .03       .04        .03         .3         .5
QT        2     6601       6601
ET                            9.1                                                  9945      10200

          Q @ X1 = 1.260 TO X1 = 1.322 EQUALS ROUTED Q AT CP42
          Q = 6601 CFS


          UPSTREAM OF MCDOWELL ROAD

X1    1.260       14       9975      10045        340       315       330
X3                                    9945                 10200
GR   1100.3     9945       1100       9955      1098      9960      1096      9965       1094      9975
GR     1092     9980     1091.5      10000      1092     10020      1094     10045     1094.7     10210
GR     1096    10335       1096      10370      1098     10395      1100     10405

ET                            9.1                                                           9973.96   10145
X1    1.287       10       9980      10145        160       120       140
GR   1101.7     9960       1100       9970      1098      9980      1096      9990       1094     10000
GR     1096    10110       1098      10145      1100     10180      1102     10190     1102.4     10220

ET                  6.1       9.1                          9920.14   10080                9920.14   10080

          THE NEXT THREE UPSTREAM CROSS SECTIONS FLOW THROUGH A DETENTIION
          BASIN AND EFFECTIVE FLOW LIMITS ARE IMPOSED TO MODEL THIS SITUATION
          CORRECTLY.  MAPPED LIMITS ARE SMOWN ON THE FLOODPLAIN MAP TO
          CORRECTLY DEPICT THE ACTUAL PONDING AREA.

          CONFLUENCE OF BULLDOZER WASH

X1    1.313       11       9950      10025        145       135       140
```

```
GR   1106.3      9880      1106      9895      1104      9905      1100      9925      1096      9950
GR     1095     10000      1096     10025      1098     10050      1100     10070      1102     10090
GR   1102.2     10175
1
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ET                 6.1       9.1                          9875.9     10110                9875.9     10110
X1     1.322         8      9930     10110       150       150        50
GR    1107.2      9850      1100      9900      1096      9930      1095     10000      1096     10110
GR      1100     10270      1103     10350    1103.7     10550

QT         2      6225      6225
NC       .03       .04       .03        .1        .3
ET                 6.1       9.1                          9877.24    10100                9877.24    10100

          Q AT X1 = 1.362 TO X1 = 1.614 EQUALS (Q AT CP39 + 1/5 HYDROGRAPH AT 42)
          Q = 6018 + 1/5(1029) = 6225 CFS

X1     1.362        36      9950     10045       150       300       210
GR    1108.5      9835      1108      9840      1106      9850      1104      9870      1102      9905
GR      1100      9920      1098      9925      1096      9930      1094      9935      1092      9940
GR      1090      9950      1088      9960      1086      9970      1084      9980      1082     10000
GR      1082     10010      1084     10015      1086     10025      1088     10035      1090     10045
GR      1092     10060      1094     10075      1094     10130      1092     10150      1090     10165
GR      1090     10185      1092     10505      1094     10510      1096     10520      1098     10525
GR      1100     10530      1102     10535      1104     10540      1106     10545      1108     10550
GR      1110     10555

NC       .04       .05       .03
ET                           9.1                                                          9948.99    10045
X1     1.422        19      9945     10045       315       315       315
GR    1111.5      9910      1110      9935      1108      9945      1106      9950      1104      9960
GR      1102      9965      1100      9980    1098.5     10000      1100     10020      1102     10030
GR      1104     10035      1106     10040      1108     10045      1110     10050      1112     10060
GR      1114     10220      1114     10390      1112     10430      1110     10580

ET                           9.1                                                          9969.4     10090
X1     1.518        21      9975     10055       495       495       505
GR      1120      9960      1110      9975      1108      9985    1106.9     10000      1108     10030
GR      1110     10040      1112     10055      1114     10065    1115.3     10090      1114     10105
GR      1112     10120      1110     10130    1109.4     10145      1110     10155      1112     10170
GR    1113.8     10185      1112     10200    1111.2     10215      1112     10225      1114     10240
GR    1115.3     10265

ET                           9.1                                                          9967.72    10110
X1     1.614        17      9975     10055       510       505       510
GR      1130      9915      1128      9945      1126      9955      1124      9965      1122      9975
GR      1120      9980      1118      9985      1116      9990      1114      9995    1113.9     10000
GR      1114     10010      1116     10020      1118     10030      1120     10045      1122     10055
GR    1122.7     10110      1124     10180

QT         2      6168      6168
ET                           9.1                                                           9965     10070

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          Q @ X1 = 1.710 TO 2.088 EQUALS (Q AT 1.299 + Q AT CP39)/2
          Q = (6225 + 6110)/2 = 6168 CFS

X1     1.710        23      9965     10070       505       510       505
GR      1137      9925      1136      9955      1134      9960      1132      9965      1130      9970
GR      1128      9980      1126      9985      1124      9990      1122      9995      1120     10000
GR      1122     10010      1124     10020      1124     10025      1124     10030      1126     10035
GR      1128     10040      1130     10045      1132     10070    1132.4     10120      1132     10175
GR    1131.5     10200      1132     10230    1132.7     10315

ET                           9.1                                                          9969.75    10050
X1     1.805        20      9970     10050       500       500       500
GR    1146.1      9925      1146      9950      1144      9955      1142      9960      1140      9965
GR      1138      9970      1136      9975      1134      9980      1132      9985      1130      9990
GR      1128      9995    1127.6     10000      1128     10005      1130     10015      1132     10020
GR      1134     10030      1136     10040      1138     10050      1140     10125    1141.1     10160

ET                           9.1                                                          9972.07    10070
```

```
X1    1.898        16       9980      10020       495       495       495
GR   1151.8      9930       1150       9965      1140      9980      1138      9990    1137.3     10000
GR     1138     10010       1140      10020      1141     10025      1140     10030    1139.7     10045
GR     1140     10060       1142      10070      1144     10105      1146     10155      1148     10195
GR     1150     10240

ET                          9.1                                                        9969.06   10092.81
X1    1.994        15       9975      10050       505       505       505
GR   1157.8      9925       1156       9960      1150      9975      1144      9990    1143.5     10000
GR     1144     10005       1146      10010    1147.3     10020      1146     10025    1145.7     10030
GR     1146     10035       1150      10050      1152     10090      1154     10105    1154.5     10150

ET                          9.1                                                        9971.45     10055
X1    2.088        18       9975      10055       495       495       495
GR   1164.7      9925       1164       9945      1162      9955      1160      9970      1158      9975
GR     1152      9985     1150.1      10000      1152     10015      1154     10030      1159     10055
GR   1156.3     10075       1158      10090      1160     10105      1161     10190    1160.5     10280
GR     1162     10295       1163      10350      1164     10395

QT        2      6110       6110
ET                          9.1                                                        9964.34   10128.93

          Q @ X1 = 2.170 TO X1  = 2.659 EQUALS Q AT CP39
          Q = 6110 CFS

X1    2.170        11       9940      10135       430       445       435
GR   1170.7      9940       1170       9960      1164      9970    1162.6     10000      1164     10025
GR     1164     10055     1162.7      10080      1164     10105      1166     10115      1168     10135
GR     1169     10165

ET                          9.1                                                        9945.88   10039.91
1
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          UPSTREAM OF THOMAS ROAD EXTENDED

X1    2.279         5       9940      10045       580       570       575
GR   1177.6      9940       1170       9985    1169.3     10000      1170     10030      1180     10045

ET                          9.1                                                        9950.04     10080
X1    2.373        12       9960      10015       495       495       495
GR   1181.8      9925       1180       9960      1174      9960      1172     10000      1174     10015
GR     1176     10040       1178      10055      1179     10080      1178     10110      1178     10130
GR     1180     10165       1182      10180

ET                          9.1                                                        9941.03     10080
X1    2.468        13       9975      10015       505       505       505
GR   1188.5      9910       1188       9920      1180      9975      1178      9985    1177.3     10000
GR     1178     10010       1180      10015      1180     10025    1179.1     10040      1180     10055
GR     1182     10065       1184      10080    1185.5     10145

ET                          9.1                                                        9944.81     10100


          CONFLUENCE OF CATERPILLAR WASH

X1    2.563        13       9980      10025       500       500       500
GR   1191.9      9930       1190       9965      1184      9980    1182.3     10000      1184     10025
GR     1186     10035       1188      10045      1190     10120    1190.6     10170      1190     10200
GR     1188     10230       1190      10275      1192     10300

ET                          9.1                                                        9968.55     10100
X1    2.659        13       9975      10025       505       505       505
GR   1196.3      9940       1196       9965      1190      9975      1188      9985      1186      9990
GR   1185.8     10000       1186      10005      1188     10025      1190     10045      1192     10115
GR     1192     10135       1194      10160    1194.4     10185

QT        2      3011       3011
ET                          9.1                                                        9917.67     10110

          Q @ X1=3.753 TO X1=3.250 EQUALS Q @ CP27
          Q = 3011 CFS

X1    2.753        20       9975      10070       495       495       500
GR   1200.3      9895       1200       9905    1196.1      9925    1197.3      9960      1196      9975
GR   1195.8      9980       1196       9985    1190.3     10000      1192     10015      1194     10020
```

```
GR   1194.5      10030       1194      10040      1193.5      10045       1194      10055       1196      10070
GR   1197.6      10110     1196.8      10135        1198      10180       1200      10235       1202      10315

ET                           9.1                                                                9964      10080
X1    2.848         14       9980      10025         495        495        500
GR   1204.1       9950       1200       9965        1198       9980       1196       9990     1193.2      10000
GR     1194      10015     1197.9      10025      1196.4      10035       1198      10045       1200      10075
GR     1202      10120       1204      10190        1206      10320       1208      10435
1
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ET                           9.1                                                                9960.5    10067.9
X1    2.943         15       9945      10020         500        500        500
GR   1207.1       9945       1200       9975        1198       9985       1196       9995     1195.8      10000
GR     1200      10015     1200.5      10020        1200      10025     1199.1      10035       1200      10040
GR     1202      10050       1204      10075        1206      10225       1208      10315       1210      10405

ET                           9.1                                                                9975      10075
X1    3.057         17       9985      10020         505        510        510
GR   1210.4       9920       1210       9935        1208       9970       1202       9985       1200       9995
GR   1199.4      10000       1200      10015        1202      10020     1203.1      10025       1202      10030
GR   1201.5      10035       1202      10040        1204      10055       1206      10150       1208      10250
GR     1210      10365       1212      10490

ET                           9.1                                                                9977.7    10100
X1    3.148         11       9975      10030         575        580        575
GR   1214.5       9940       1214       9965        1210       9975       1204       9985       1200       9995
GR     1204      10015       1206      10030        1208      10175       1210      10240       1212      10420
GR     1214      10600

ET                           9.1                                                               9939.62    10150

          DOWNSTREAM OF INDIAN SCHOOL ROAD EXTENDED

          CONFLUENCE OF TRACTOR WASH

X1    3.250         12       9970      10120         515        505        535
GR   1220.4       9830       1220       9840        1218       9845       1216       9900       1214       9935
GR     1212       9970     1210.9      10000        1212      10120       1214      10195       1216      10375
GR     1218      10480       1220      10580

QT       2       1414       1414
ET                           9.1                                                               9978.43    10150

          Q @ X1 = 3.344 TO X1 = 3.912 EQUALS Q AT CP25
          Q = 1414 CFS

X1    3.344         14       9985      10115         495        505        500
GR     1220       9965       1218       9975        1214       9985     1212.8      10000       1214      10015
GR   1214.5      10035       1214      10055        1214      10115       1216      10165       1218      10275
GR     1220      10355       1222      10385        1224      10405       1226      10435

ET                           9.1                                                               9974.83    10150
X1    3.439         11       9980      10150         500        500        500
GR     1222       9960       1220       9970        1214       9980     1213.5      10000       1214      10150
GR     1216      10200       1218      10230        1220      10295       1222      10340       1224      10370
GR     1226      10400

ET                           9.1                                                               9976.87   10089.39
X1    3.535         14       9980      10080         500        500        505
GR   1228.1       9950       1228       9955        1220       9970       1216       9980     1214.9      10000
GR     1216      10030     1214.8      10075        1216      10080       1218      10095       1220      10125
GR     1222      10185       1224      10355        1226      10515       1228      10640
1
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ET                           9.1                                                               9976.66    10031.7
X1    3.631          9       9980      10025         510        510        510
GR   1231.2       9920       1230       9965        1220       9980     1218.2      10000       1220      10025
GR     1222      10030       1224      10045        1226      10075     1226.3      10095

             9.1                                                                               9975.82    10070
X1    3.724         17       9980      10030         495        480        490
GR   1236.6       9920       1236       9940        1234       9950       1232       9960       1230       9980
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GR     1228        9995      1226.6       10000        1228       10015        1230       10030        1230       10070
GR     1230       10115        1228       10125        1228       10130        1228       10145        1228       10155
GR     1230       10165        1232       10185

ET                                9.1                                                                  9981.34       10070
X1    3.818          24        9985       10030         495         500         495
GR     1243        9935        1242        9965        1240        9975        1234        9985        1232.3       10000
GR     1234       10015      1235.3       10030        1234       10060      1235.8       10135       1235.3       10155
GR   1235.7       10180      1235.6       10205        1236       10230        1238       10295       1238.2       10310
GR     1238       10320      1236.8       10340        1238       10360      1238.5       10405       1238.7       10460
GR     1238       10520      1236.6       10550        1238       10570        1240       10605

ET                                9.1                                                                  9972.29       10070
X1    3.912          20        9980       10015         495         495         495
GR   1250.2        9900        1250        9905        1248        9960        1240        9980        1239.1       10000
GR     1240       10015        1242       10030        1242       10035      1241.8       10040         1242       10050
GR     1244       10090      1244.9       10135      1244.4       10160      1244.8       10220       1244.3       10290
GR     1246       10375      1246.9       10460      1247.6       10510      1246.4       10570         1248       10610

QT        2        1261        1261
ET                                9.1                                                                  9980.86     10041.56

          Q @ X1 = 4.006 TO X1 = 4.653 EQUALS (Q AT CP25 + Q AT CP22A)/2
          Q = (1414 + 1108)/2 = 1261 CFS

X1    4.006          12        9980       10045         500         505         500
GR   1255.3        9940        1254        9970        1250        9980        1246        9990         1246       10000
GR     1246       10010        1248       10025        1250       10045        1252       10075       1253.4       10190
GR     1254       10280      1254.6       10315

ET                                9.1                                                                     9920       10070
X1    4.101          17        9975       10040         495         500         500
GR     1263        9840        1262        9895        1260        9910        1258        9915        1257.2        9940
GR   1256.5        9975        1256        9980      1255.8       10000        1256       10020       1256.5       10040
GR   1256.8       10105        1258       10140        1260       10210        1261       10275         1262       10340
GR     1264       10380        1266       10435

ET                                9.1                                                                  9967.46     10058.08
X1    4.196          11        9965       10025         500         495         500
GR   1268.4        9895        1268        9900        1266        9955        1264        9965         1262        9970
GR     1260        9980      1259.8       10000        1260       10010        1262       10025         1264       10090
GR   1265.1       10100
1
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ET                                9.1                                                                  9949.59       10070

          UPSTREAM OF CAMELBACK ROAD EXTENDED

X1    4.289          15        9985       10010         495         495         495
GR   1273.5        9885        1272        9895      1271.9        9925        1270        9955         1268        9985
GR   1267.4       10000        1268       10010        1270       10125        1272       10205       1272.2       10240
GR     1272       10280      1271.8       10295        1272       10315        1274       10365         1276       10460

ET                                9.1                                                                  9992.08       10090
X1    4.375          15        9995       10025         445         445         450
GR   1276.5        9920      1276.3        9925      1276.6        9960        1276        9990         1272        9995
GR   1271.7       10000        1272       10025      1272.7       10055      1272.2       10070         1274       10110
GR     1276       10155        1278       10270        1280       10380        1282       10470         1284       10530

ET                                9.1                                                                  9984.54       10090
X1    4.469          13        9995       10045         500         500         500
GR   1281.2        9920      1280.7        9955        1280        9980        1278        9985         1276        9995
GR   1275.1       10000        1276       10045      1276.9       10050      1276.1       10055         1278       10150
GR     1280       10250        1282       10300      1283.6       10365

ET                                9.1                                                                  9973.24       10070
X1    4.563          10        9985       10040         500         495         495
GR   1283.2        9950        1282        9970        1280        9985      1278.1       10000         1280       10040
GR     1282       10150        1284       10230        1286       10300        1288       10380         1290       10475

ET                                9.1                                                                  9960.95       10070
X     4.653          12        9965       10040         475         475         475
      1285.7        9905      1284.8        9940        1284        9960        1282        9965         1280        9975
GR   1279.7       10000        1280       10030        1282       10040        1284       10100         1286       10200
GR     1286       10230        1288       10245
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QT        2       1108       1108
ET                            9.1                                                                    9970.14       10070

          Q @ X1= 4.725 EQUALS Q @ CP22A

          Q = 1108 CFS

          CONFLUENCE OF CATERPILLAR DIKE WASH

X1    4.725          8       9965      10040        380         380         380
GR   1286.5       9965       1283       9980       1283       10000        1283       10020        1284       10040
GR     1286      10105       1288      10225       1290       10360
1
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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*PROF 1

CCHV=     .100 CEHV=     .300
*SECNO  .000

          Q @ X1 = 0.000 TO X1  = 1.012 EQUALS Q AT I6CWT4
          Q = 4057 CFS

          MATCH FLOODPLAIN INTO 100-YEAR PONDING WSEL BEHIND WHITE TANKS
          STRUCTURE # 4

     .000      6.06   1039.06       .00   1040.00   1040.11      1.05       .00       .00   1040.00
  4057.0         .0    4057.0        .0        .0     493.6        .0        .0        .0   1040.00
     .00       .00      8.22       .00       .000      .030      .000      .000   1033.00   9945.48
 .004368        0.       0.         0.         0         0         4       .00    123.25  10068.73


*SECNO  .075
     .075      5.84   1040.84       .00       .00   1041.52       .68      1.38       .04   1036.00
  4057.0     758.8    3296.6       1.5     151.2     475.4       1.4       5.1       1.4   1040.00
     .02      5.02      6.93      1.08      .030      .030      .040      .000   1035.00   9888.88
 .002790      400.      400.      400.         2         0         0       .00    184.50  10073.38


*SECNO  .186

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     .186      5.21   1043.71   1043.71       .00   1044.90      1.19      2.04       .15   1040.00
  4057.0     428.5    3499.9     128.6     141.8     374.3      34.4      13.0       4.6   1040.00
     .04      3.02      9.35      3.74      .030      .030      .040      .000   1038.50   9751.25
 .004559      580.      580.      580.         3         8         0       .00    294.60  10068.55


*SECNO  .314

3265 DIVIDED FLOW

1
   18JAN02      15:45:38                                                                                                  PAGE   12

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
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```
      .314      5.49   1047.99   1047.99       .00   1048.79       .80      2.81       .04   1048.00
    4057.0     391.0    3666.0        .0     200.8     488.7        .0      22.0       9.8   1048.00
       .06      1.95      7.50       .00      .030      .030      .000      .000   1042.50   9353.42
   .003951      500.       680.      720.         2         8         0       .00    535.64  10079.95


*SECNO  .415
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      .415      4.73   1051.93   1051.93       .00   1052.53       .60      2.25       .02   1050.00
    4057.0     671.0    2744.5     641.6     219.0     376.6     232.2      30.8       16.1   1050.00
       .09      3.06      7.29      2.76      .030      .030      .040      .000   1047.20   9545.90
   .004717      300.       530.      800.         9         9         0       .00    724.39  10270.29


*SECNO  .540
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      .540      4.55   1057.55   1057.55       .00   1058.43       .88      3.29       .08   1056.00
    4057.0      43.0    3203.3     810.8      14.1     385.6     271.7      42.1       24.5   1056.00
       .11      3.04      8.31      2.98      .030      .030      .040      .000   1053.00   9911.75
   .005300      660.       660.      650.        11         8         0       .00    399.72  10311.47


*SECNO  .634
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      .634      5.00   1061.80   1061.80       .00   1063.16      1.35      2.78       .14   1058.00
    4057.0     210.1    3172.7     674.2      36.2     308.3     168.0      48.9       28.0   1058.00
       .13      5.81     10.29      4.01      .030      .030      .040      .000   1056.80   9950.98
   .005983      495.       495.      495.        20         8         0       .00    211.54  10162.52


*SECNO  .729
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      .729      4.60   1065.30   1065.30       .00   1066.56      1.26      3.25       .01   1064.00
    4057.0      12.9    3836.7     207.4       4.2     414.8      88.6      54.7       30.7   1064.00
       .14      3.08      9.25      2.34      .030      .030      .040      .000   1060.70   9953.52
   .007072      500.       500.      500.         2         8         0       .00    268.28  10221.80


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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO  .823

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      .823      6.42   1070.92   1070.92       .00   1073.07      2.15      3.64       .27   1070.00
    4057.0       2.6    4040.9      13.5       1.0     342.5       7.0      59.6      32.8   1070.00
       .15      2.45     11.80      1.93      .030      .030      .040      .000   1064.50   9952.71
   .007665      495.       495.      495.        20        11         0       .00     92.56  10045.27


*SECNO  .917
      .917      5.43   1074.73   1074.70       .00   1076.70      1.97      3.61       .02   1072.00
    4057.0      51.8    3985.7      19.4      10.1     351.5      12.3      63.7      34.0   1074.00
       .17      5.15     11.34      1.58      .030      .030      .040      .000   1069.30   9956.30
   .006823      500.       500.      500.         2        12         0       .00    116.97  10073.28


*SECNO 1.012
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
```

```
     1.012       5.03    1080.73    1080.73        .00    1082.83       2.11       3.70        .04    1080.00
    4057.0         3.0     4048.8        5.3        1.3      347.2        3.1       67.9       35.2    1080.00
       .18        2.23       11.66       1.69       .030       .030       .040       .000    1075.70    9936.36
   .008031        500.        500.        500.         20         11          0        .00      92.19   10028.56


CCHV=      .300 CEHV=      .500
*SECNO 1.067

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1088.00 ELREA=      1088.00


          Q @ X1 = 1.067 TO X1 = 1.110 EQUALS Q AT CP43 (AFTER DIVERT)
1
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          Q = 4061 CFS
          FLOW LEFT OVER AFTER WEIR FLOW OVER DIKE UPSTREAM OF CULVERT

          4 - 10ft x 8ft x 227ft BC AT INTERSTATE 10


     1.067       6.37    1085.01    1085.01        .00    1088.23       3.22       1.06        .56    1078.64
    4061.0         .0     4061.0         .0         .0      282.0         .0       70.0       35.7    1078.90
       .18         .00       14.40        .00       .000       .016       .000       .000    1078.64    9977.70
   .002040        293.        293.        293.         20         11          0        .00      44.30   10022.00


 PECIAL CULVERT

SC  CUNO       CUNV       ENTLC      COFQ       RDLEN      RISE       SPAN       CULVLN     CHRT       SCL        ELCHU      ELCHD
     4          .016        .50       2.60        .00       8.00      10.00      227.00      8          1       1081.16    1078.64

CHART  8 - BOX CULVERT WITH FLARED WINGWALLS; NO INLET TOP EDGE BEVEL
SCALE  1 - WINGWALLS FLARED 30 TO 75 DEGREES

*SECNO 1.110

SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG =    1093.68
3280 CROSS SECTION      1.11 EXTENDED      1.14 FEET


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.51

SPECIAL CULVERT

     EGIC       EGOC        H4       QWEIR      QCULV       VCH       ACULV      ELTRD     WEIRLN
   1093.80    1093.13       5.46        14.      4024.      6.286      320.0    1092.00         7.


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1092.00 ELREA=      1099.00


          PORTION OF FLOW FOR THE NEXT FOUR CROSS SECTIONS UPSTREAM
          IS LOST AS WEIR FLOW OVER THE DIKE TO THE EAST
          APPROXIMATELY 1440 CFS FLOWS EAST OVER DIKE

          EFFECTIVE FLOW OPTION IS INCORPORATED FOR THE NEXT 5 UPSTREAM CROSS
          SECTIONS AS A RESULT OF PONDING AND UPSTREAM AND DOWNSTREAM EXPANSION
          AND CONTRATION FLOW SITUATIONS.

          ACTUAL MAPPED LIMITS CORRESPOND TO WATER SURFACE ELEVATIONS AND ARE
          SHOWN CORRECTLY ON THE FLOODPLAIN WORK MAP.

     1.110      12.04    1093.14        .00        .00    1093.68        .55       5.46        .00    1081.16
    4061.0      708.6     3352.4         .0      181.7      533.3         .0       72.6       36.0    1081.10
```

```
      .20      3.90      6.29       .00      .016      .016      .000      .000   1081.10   9950.00
   .000166      227.      227.      227.         2         0         0       .00     72.00  10022.00


1
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     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

 *SECNO 1.118

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.23


 3470 ENCROACHMENT STATIONS=     9920.0   10100.0  TYPE=       1  TARGET=      180.000

           Q @ X1 = 1.118 TO X1  = 1.198 EQUALS STORAGE ROUTED Q AT CP43
           Q = 5503 CFS

     1.118     12.15   1093.65       .00       .00   1093.81       .16       .00       .12   1091.50
    5503.0        .0    2898.0    2605.0        .0     959.9     786.8      73.8      36.1   1082.00
       .20       .00      3.02      3.31      .000      .016      .016      .000   1081.50   9920.00
   .000061       40.       40.       40.         2         0         0       .00    180.00  10100.00


 CCHV=      .100 CEHV=      .300
 *SECNO 1.152

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .35


 3470 ENCROACHMENT STATIONS=     9930.0   10150.0  TYPE=       1  TARGET=      220.000
     1.152     11.62   1093.62       .00       .00   1093.85       .23       .02       .02   1143.00
    5503.0        .0    3764.6    1738.4        .0     881.6     640.6      80.5      36.9   1086.00
       .21       .00      4.27      2.71      .000      .030      .040      .000   1082.00   9930.00
   .000506       180.      180.      180.         2         0         0       .00    220.00  10150.00


 *SECNO 1.198

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .58


 3470 ENCROACHMENT STATIONS=     9925.0   10200.0  TYPE=       1  TARGET=      275.000
     1.198      8.30   1093.60       .00       .00   1094.14       .54       .19       .09   1090.00
    5503.0      50.2    3827.4    1625.4      16.2     565.0     532.0      87.7      38.2   1090.00
       .22      3.10      6.77      3.06      .030      .030      .040      .000   1085.30   9936.00
   .001517       235.      240.      235.         2         0         0       .00    264.00  10200.00


 CCHV=      .300 CEHV=      .500
1
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     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


 *SECNO 1.260

 3301 HV CHANGED MORE THAN HVINS

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9945.0   10200.0  TYPE=       1  TARGET=      255.000

           Q @ X1 = 1.260 TO X1 = 1.322 EQUALS ROUTED Q AT CP42
           Q = 6601 CFS
```

UPSTREAM OF MCDOWELL ROAD

1.260	5.53	1097.03	1097.03	.00	1098.55	1.52	.99	.49	1094.00
6601.0	138.6	3925.9	2536.5	21.6	332.2	418.8	94.7	40.1	1094.00
.23	6.40	11.82	6.06	.030	.030	.040	.000	1091.50	9962.42
.007204	340.	330.	315.	20	23	0	.00	237.58	10200.00

*SECNO 1.287
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1.287	5.25	1099.25	1099.25	.00	1101.02	1.78	1.05	.13	1098.00
6601.0	12.6	6554.9	33.5	3.9	610.9	13.6	96.8	40.7	1098.00
.24	3.24	10.73	2.46	.030	.030	.040	.000	1094.00	9973.76
.008225	160.	140.	120.	20	11	0	.00	193.07	10166.83

*SECNO 1.313
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9920.1 10080.0 TYPE= 1 TARGET= 159.860

THE NEXT THREE UPSTREAM CROSS SECTIONS FLOW THROUGH A DETENTIION
BASIN AND EFFECTIVE FLOW LIMITS ARE IMPOSED TO MODEL THIS SITUATION
CORRECTLY. MAPPED LIMITS ARE SMOWN ON THE FLOODPLAIN MAP TO
CORRECTLY DEPICT THE ACTUAL PONDING AREA.

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CONFLUENCE OF BULLDOZER WASH

1.313	5.98	1100.98	1100.98	.00	1102.96	1.99	1.01	.11	1096.00
6601.0	610.9	5056.8	933.3	76.8	410.7	143.7	98.9	41.3	1096.00
.24	7.96	12.31	6.50	.030	.030	.040	.000	1095.00	9920.14
.006405	145.	140.	135.	3	8	0	.00	159.62	10079.76

*SECNO 1.322

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 3.54

3470 ENCROACHMENT STATIONS= 9875.9 10110.0 TYPE= 1 TARGET= 234.100

1.322	8.29	1103.29	.00	.00	1103.56	.27	.08	.51	1096.00
6601.0	594.1	6006.9	.0	196.1	1401.6	.0	100.6	41.7	100000.00
.25	3.03	4.29	.00	.030	.030	.000	.000	1095.00	9877.18
.000511	150.	50.	150.	3	0	0	.00	232.82	10110.00

CCHV= .100 CEHV= .300
*SECNO 1.362

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.54

3470 ENCROACHMENT STATIONS= 9877.2 10100.0 TYPE= 1 TARGET= 222.760

Q AT X1 = 1.362 TO X1 = 1.614 EQUALS (Q AT CP39 + 1/5 HYDROGRAPH AT 42)
Q = 6018 + 1/5(1029) = 6225 CFS

1.362	21.50	1103.50	.00	.00	1103.61	.10	.03	.02	1090.00
6225.0	550.3	4859.7	815.0	332.5	1717.9	582.7	111.1	42.7	1090.00
.27	1.66	2.83	1.40	.030	.030	.040	.000	1082.00	9878.68
.000070	150.	210.	300.	2	0	0	.00	221.32	10100.00

SECNO 1.422

3301 HV CHANGED MORE THAN HVINS

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3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     1.422      7.90   1106.40   1106.40       .00   1109.05      2.65       .07       .76   1108.00
    6225.0        .0    6225.0        .0        .0     476.8        .0     122.3      43.9   1108.00
       .27       .00     13.06       .00      .000      .030      .000      .000   1098.50   9948.99
   .007969       315.      315.      315.        20        22         0       .00     92.02  10041.01


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 1.518

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     1.518      6.83   1113.73   1113.73       .00   1115.52      1.79      3.57       .09   1110.00
    6225.0      41.3    4942.8    1240.8      10.4     418.0     276.9     129.1      45.7   1112.00
       .29      3.97     11.82      4.48      .040      .030      .050      .000   1106.90   9969.41
   .006346       495.      505.      495.        20        15         0       .00     223.97  10237.96


*SECNO 1.614
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     1.614      9.55   1123.45   1123.45       .00   1125.74      2.28      3.05       .15   1122.00
    6225.0      11.8    6049.9     163.3       5.3     492.1      76.1     136.6      48.0   1122.00
       .30      2.23     12.29      2.15      .040      .030      .050      .000   1113.90   9967.73
   .005671       510.      510.      505.        20        11         0       .00     182.92  10150.65


*SECNO 1.710
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

          Q @ X1 = 1.710 TO 2.088 EQUALS (Q AT 1.299 + Q AT CP39)/2
          Q = (6225 + 6110)/2 = 6168 CFS

     1.710      10.93   1130.93   1130.93       .00   1133.59      2.66      3.37       .11   1132.00
    6168.0        .0    6168.0        .0        .0     471.3        .0     142.7      49.6   1132.00
       .31       .00     13.09       .00      .000      .030      .000      .000   1120.00   9967.67
   .007958       505.      505.      510.        20         8         0       .00     88.96  10056.63


*SECNO 1.805
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
1
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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3720 CRITICAL DEPTH ASSUMED
     1.805      10.50   1138.10   1138.10       .00   1141.02      2.92      4.00       .08   1138.00
    6168.0        .0    6167.9        .1        .0     450.1        .2     147.9      50.6   1138.00
       .32       .03     13.70       .36      .040      .030      .050      .000   1127.60   9969.75
   .008051       500.      500.      500.        20        11         0       .00     84.04  10053.79
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*SECNO 1.898

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1.898	7.99	1145.29	1145.29	.00	1147.47	2.18	3.49	.07	1140.00
6168.0	104.0	3941.4	2122.6	21.0	278.6	354.8	154.2	52.0	1140.00
.33	4.96	14.15	5.98	.040	.030	.050	.000	1137.30	9972.07
.006227	495.	495.	495.	20	15	0	.00	165.15	10137.22

*SECNO 1.994
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1.994	8.88	1152.38	1152.38	.00	1154.89	2.52	3.15	.10	1150.00
6168.0	22.1	5985.9	160.0	7.1	463.6	55.5	161.1	53.7	1150.00
.34	3.13	12.91	2.88	.040	.030	.050	.000	1143.50	9969.06
.006241	505.	505.	505.	20	8	0	.00	123.75	10092.81

*SECNO 2.088
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2.088	9.26	1159.36	1159.36	.00	1161.81	2.45	3.22	.01	1158.00
6168.0	5.2	5894.3	268.6	2.3	459.6	74.1	167.1	55.1	1159.00
.36	2.25	12.83	3.62	.040	.030	.050	.000	1150.10	9971.61
.006793	495.	495.	495.	20	8	0	.00	128.57	10100.18

*SECNO 2.170

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

Q @ X1 = 2.170 TO X1 = 2.659 EQUALS Q AT CP39
Q = 6110 CFS

2.170	4.79	1167.39	1167.39	.00	1169.16	1.77	3.37	.07	1170.70
6110.0	.0	6110.0	.0	.0	572.5	.0	172.6	56.6	1168.00
.37	.00	10.67	.00	.000	.030	.000	.000	1162.60	9964.34
.008904	430.	435.	445.	20	11	0	.00	164.60	10128.94

*SECNO 2.279

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

UPSTREAM OF THOMAS ROAD EXTENDED

2.279	7.31	1176.61	1176.61	.00	1179.18	2.57	4.87	.24	1177.60
6110.0	.0	6110.0	.0	.0	475.0	.0	179.6	58.3	1180.00
.38	.00	12.86	.00	.000	.030	.000	.000	1169.30	9945.88
.008064	580.	575.	570.	20	14	0	.00	94.03	10039.91

*SECNO 2.373

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.46

2.373	8.51	1180.51	.00	.00	1181.92	1.41	2.63	.12	1180.00
6110.0	2.3	4486.0	1621.6	2.6	413.2	405.3	186.9	60.1	1174.00
.39	.92	10.86	4.00	.040	.030	.050	.000	1172.00	9950.04
.003763	495.	495.	495.	2	0	0	.00	218.80	10168.84

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 2.468

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2.468	7.64	1184.94	1184.94	.00	1187.04	2.09	2.42	.21	1180.00
6110.0	449.4	3787.0	1873.6	83.9	271.4	298.9	195.5	62.4	1180.00
.41	5.35	13.95	6.27	.040	.030	.050	.000	1177.30	9941.03
.006304	505.	505.	505.	20	11	0	.00	179.79	10120.81

*SECNO 2.563

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

CONFLUENCE OF CATERPILLAR WASH

2.563	8.80	1191.10	1191.10	.00	1192.63	1.54	2.32	.06	1184.00
6110.0	348.4	4202.7	1558.9	72.5	357.6	487.5	204.5	65.4	1184.00
.42	4.81	11.75	3.20	.040	.030	.050	.000	1182.30	9944.81
.003564	500.	500.	500.	20	8	0	.00	343.89	10288.70

*SECNO 2.659
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2.659	8.07	1193.87	1193.87	.00	1195.83	1.96	2.19	.13	1190.00
6110.0	47.8	4398.0	1664.3	12.5	340.1	357.9	213.9	68.5	1188.00
.44	3.82	12.93	4.65	.040	.030	.050	.000	1185.80	9968.55
.005384	505.	505.	505.	20	11	0	.00	189.86	10158.41

*SECNO 2.753

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .55

Q @ X1=3.753 TO X1=3.250 EQUALS Q @ CP27
Q = 3011 CFS

2.753	7.23	1197.53	1197.04	.00	1198.44	.91	2.51	.10	1196.00
3011.0	102.7	2842.0	66.3	47.4	360.4	47.4	220.6	71.0	1196.00
.45	2.17	7.88	1.40	.040	.030	.050	.000	1190.30	9917.67
.004386	495.	500.	495.	7	12	0	.00	240.61	10162.31

*SECNO 2.848

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2.848	7.03	1200.23	1200.23	.00	1201.89	1.66	2.52	.22	1198.00
3011.0	60.4	2561.7	388.9	18.6	231.0	98.8	225.2	73.0	1197.90
.47	3.25	11.09	3.93	.040	.030	.050	.000	1193.20	9964.14
.005881	495.	500.	495.	2	8	0	.00	116.13	10080.27

*SECNO 2.943

2.943	7.63	1203.43	.00	.00	1204.62	1.19	2.68	.05	1207.10
3011.0	.0	2530.0	481.0	.0	270.0	111.2	229.4	74.3	1200.50
.48	.00	9.37	4.32	.000	.030	.050	.000	1195.80	9960.50
.004911	500.	500.	500.	2	0	0	.00	107.39	10067.89

*SECNO 3.057
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3.057	6.47	1205.87	1205.87	.00	1207.34	1.48	2.59	.09	1202.00
3011.0	74.3	2197.0	739.6	18.7	196.4	200.4	234.0	75.9	1202.00
.50	3.97	11.18	3.69	.040	.030	.050	.000	1199.40	9975.33
.005235	505.	510.	510.	2	12	0	.00	168.47	10143.80

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 3.148

3301 HV CHANGED MORE THAN HVINS

3.148	8.87	1208.87	.00	.00	1209.68	.81	2.27	.07	1210.00
3011.0	.0	2315.5	695.5	.0	284.3	284.8	240.6	78.5	1206.00
.52	.00	8.14	2.44	.000	.030	.050	.000	1200.00	9976.87
.003081	575.	575.	580.	1	0	0	.00	226.65	10203.52

*SECNO 3.250
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

DOWNSTREAM OF INDIAN SCHOOL ROAD EXTENDED

CONFLUENCE OF TRACTOR WASH

3.250	2.82	1213.72	1213.72	.00	1214.69	.97	2.62	.05	1212.00
3011.0	82.9	2785.7	142.3	25.8	340.2	55.3	246.5	81.3	1212.00
.54	3.21	8.19	2.57	.040	.030	.050	.000	1210.90	9939.93
.009173	515.	535.	505.	20	17	0	.00	244.49	10184.43

*SECNO 3.344

3301 HV CHANGED MORE THAN HVINS

Q @ X1 = 3.344 TO X1 = 3.912 EQUALS Q AT CP25
Q = 1414 CFS

3.344	3.84	1216.64	.00	.00	1216.82	.18	2.05	.08	1214.00
1414.0	13.9	1266.8	133.2	8.7	351.4	93.4	251.6	84.0	1214.00
.58	1.60	3.61	1.43	.040	.030	.050	.000	1212.80	9978.40
.001409	495.	500.	505.	3	0	0	.00	221.88	10200.27

*SECNO 3.439

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.84

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
3.439	3.61	1217.11	.00	.00	1217.18	.07	.35	.01	1214.00
1414.0	7.4	1297.4	109.2	8.1	571.2	114.8	258.1	86.7	1214.00
.65	.92	2.27	.95	.040	.030	.050	.000	1213.50	9974.82
.000418	500.	500.	500.	3	0	0	.00	241.84	10216.65

*SECNO 3.535

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3.535	2.45	1217.25	1217.25	.00	1218.15	.90	.59	.25	1216.00
1414.0	5.2	1395.6	13.1	2.0	182.7	5.9	263.3	88.7	1216.00
.67	2.67	7.64	2.23	.040	.030	.050	.000	1214.80	9976.87
.010674	500.	505.	500.	20	19	0	.00	112.52	10089.39

*SECNO 3.631

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3.631	4.03	1222.23	1222.23	.00	1223.70	1.47	4.88	.17	1220.00
1414.0	12.2	1383.1	18.6	3.7	140.8	6.3	265.3	89.7	1220.00
.68	3.28	9.83	2.94	.040	.030	.050	.000	1218.20	9976.66
.008640	510.	510.	510.	3	14	0	.00	55.05	10031.71

*SECNO 3.724

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3.724	3.82	1230.42	1230.42	.00	1231.14	.72	4.57	.07	1230.00
1414.0	1.2	853.9	558.9	.9	104.9	137.4	267.5	91.1	1230.00
.70	1.32	8.14	4.07	.040	.030	.050	.000	1226.60	9975.81
.010183	495.	490.	480.	15	12	0	.00	193.38	10169.19

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV

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    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

*SECNO 3.818
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     3.818      3.90   1236.20   1236.20       .00   1236.79       .60      4.11       .01   1234.00
    1414.0      11.9     872.6     529.6       4.0     114.5     198.0     270.7      93.6   1235.30
       .73      2.95      7.62      2.68      .040      .030      .050      .000   1232.30   9981.34
   .006855      495.      495.      500.         4         5         0       .00    255.01  10236.35


*SECNO 3.912

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     3.912      3.98   1243.08   1243.08       .00   1244.24      1.16      3.36       .17   1240.00
    1414.0      45.9     1163.6     204.5      11.9     123.6      66.1     273.6      95.7   1240.00
       .74      3.87      9.41      3.09      .040      .030      .050      .000   1239.10   9972.29
   .006725      495.      495.      495.        20         8         0       .00     99.34  10071.64


*SECNO 4.006
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

          Q @ X1 = 4.006 TO X1 = 4.653 EQUALS (Q AT CP25 + Q AT CP22A)/2
          Q = (1414 + 1108)/2 = 1261 CFS

     4.006      3.66   1249.66   1249.66       .00   1250.86      1.20      4.06       .01   1250.00
    1261.0         .0     1261.0        .0        .0     143.4        .0     275.6      96.6   1250.00
       .76        .00      8.79       .00      .000      .030      .000      .000   1246.00   9980.86
   .010222      500.      500.      505.        20        11         0       .00     60.70  10041.56


*SECNO 4.101

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     4.101      2.04   1257.84   1257.84       .00   1258.43       .59      4.94       .06   1256.50
    1261.0     135.9     842.9     282.2      41.0     117.3      93.1     277.9      98.2   1256.50
       .78      3.31      7.18      3.03      .040      .030      .050      .000   1255.80   9920.00
   .009574      495.      500.      500.         5        11         0       .00    215.32  10135.33


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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO 4.196

3301 HV CHANGED MORE THAN HVINS


7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     4.196      3.22   1263.02   1263.02       .00   1264.11      1.09      4.53       .15   1264.00
    1261.0         .0     1231.4      29.6        .0     145.3      16.8     280.2      99.9   1262.00
       .80        .00      8.48      1.76      .000      .030      .050      .000   1259.80   9967.46
   .008623      500.      500.      495.         2        14         0       .00     90.62  10058.08


 SECNO 4.289
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
```

UPSTREAM OF CAMELBACK ROAD EXTENDED

4.289	2.94	1270.34	1270.34	.00	1270.99	.64	4.24	.04	1268.00
1261.0	168.5	575.9	516.5	41.2	66.1	156.8	282.6	101.5	1268.00
.82	4.09	8.72	3.30	.040	.030	.050	.000	1267.40	9949.59
.008490	495.	495.	495.	12	15	0	.00	189.12	10138.71

*SECNO 4.375

4.375	2.63	1274.33	.00	.00	1275.14	.80	4.10	.05	1272.00
1261.0	11.8	674.4	574.8	3.4	74.5	138.3	285.1	103.1	1272.00
.84	3.48	9.05	4.16	.040	.030	.050	.000	1271.70	9992.08
.009941	445.	450.	445.	3	0	0	.00	125.41	10117.49

*SECNO 4.469

4.469	3.08	1278.18	.00	.00	1278.76	.57	3.59	.02	1276.00
1261.0	35.8	915.7	309.5	11.9	131.6	125.5	287.9	104.8	1276.00
.86	3.01	6.96	2.47	.040	.030	.050	.000	1275.10	9984.54
.005439	500.	500.	500.	4	0	0	.00	174.58	10159.13

*SECNO 4.563
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4.563	3.47	1281.57	1281.57	.00	1282.41	.84	3.12	.08	1280.00
1261.0	24.9	1089.2	146.9	9.2	138.5	67.6	290.6	106.7	1280.00
.88	2.70	7.86	2.17	.040	.030	.050	.000	1278.10	9973.24
.007388	500.	495.	495.	3	8	0	.00	153.01	10126.25

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4.653

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.08

4.653	3.91	1283.61	.00	.00	1283.94	.33	1.48	.05	1282.00
1261.0	4.2	1214.7	42.1	3.3	259.9	39.4	293.5	108.2	1282.00
.91	1.27	4.67	1.07	.040	.030	.050	.000	1279.70	9960.95
.001711	475.	475.	475.	3	0	0	.00	127.69	10088.64

*SECNO 4.725

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

Q @ X1= 4.725 EQUALS Q @ CP22A
Q = 1108 CFS

CONFLUENCE OF CATERPILLAR DIKE WASH

4.725	2.30	1285.30	1285.30	.00	1286.14	.84	1.21	.15	1286.50
1108.0	.0	1049.0	59.0	.0	139.5	27.5	295.5	109.3	1284.00
.93	.00	7.52	2.14	.000	.030	.050	.000	1283.00	9970.14
.009227	380.	380.	380.	20	11	0	.00	112.17	10082.30

ROFILE FOR STREAM TUTHILL DIKE WASH - WASH

PLOTTED POINTS (BY PRIORITY) E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA

ELEVATION SECNO	1033. CUMDIS	1083.	1133.	1183.	1233.	1283.	1333.	1383.	1433.	1483.
.00	0.	IEM	.	.	.	.	.	.	.	.	.
	50.	IEM	.	.	.	.	.	.	.	.	.
	100.	IEM	.	.	.	.	.	.	.	.	.
	150.	IWE	.	.	.	.	.	.	.	.	.
	200.	IWE	.	.	.	.	.	.	.	.	.
	250.	IWE	.	.	.	.	.	.	.	.	.
	300.	IWE	.	.	.	.	.	.	.	.	.
	350.	ILE	.	.	.	.	.	.	.	.	.
.08	400.	ILE	.	.	.	.	.	.	.	.	.
	450.	ILE	.	.	.	.	.	.	.	.	.
	500.	CIE	.	.	.	.	.	.	.	.	.
	550.	CIE	.	.	.	.	.	.	.	.	.
	600.	CIE	.	.	.	.	.	.	.	.	.
	650.	CIE	.	.	.	.	.	.	.	.	.
	700.	CIE	.	.	.	.	.	.	.	.	.
	750.	CIE	.	.	.	.	.	.	.	.	.
	800.	CIE	.	.	.	.	.	.	.	.	.
	850.	CIE	.	.	.	.	.	.	.	.	.
	900.	CIE	.	.	.	.	.	.	.	.	.
	950.	CIE	.	.	.	.	.	.	.	.	.
.19	1000.	.IE	.	.	.	.	.	.	.	.	.
	1050.	.IE	.	.	.	.	.	.	.	.	.
	1100.	.IE	.	.	.	.	.	.	.	.	.
	1150.	.IWE	.	.	.	.	.	.	.	.	.
	1200.	.IWE	.	.	.	.	.	.	.	.	.
	1250.	.IWE	.	.	.	.	.	.	.	.	.
	1300.	.ILE	.	.	.	.	.	.	.	.	.
	1350.	. IE	.	.	.	.	.	.	.	.	.
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	1450.	. IE	.	.	.	.	.	.	.	.	.
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	1550.	. IE	.	.	.	.	.	.	.	.	.
	1600.	. IE	.	.	.	.	.	.	.	.	.
	1650.	. IE	.	.	.	.	.	.	.	.	.
.31	1700.	. IE	.	.	.	.	.	.	.	.	.
	1750.	. IE	.	.	.	.	.	.	.	.	.
	1800.	. IE	.	.	.	.	.	.	.	.	.
	1850.	. IEM	.	.	.	.	.	.	.	.	.
	1900.	. IEM	.	.	.	.	.	.	.	.	.
	1950.	. IWE	.	.	.	.	.	.	.	.	.
	2000.	. IWE	.	.	.	.	.	.	.	.	.
	2050.	. IE	.	.	.	.	.	.	.	.	.
	2100.	. IE	.	.	.	.	.	.	.	.	.
	2150.	. IE	.	.	.	.	.	.	.	.	.
.41	2200.	. IE	.	.	.	.	.	.	.	.	.
	2250.	. IE	.	.	.	.	.	.	.	.	.
	2300.	. IE	.	.	.	.	.	.	.	.	.
	2350.	. IE	.	.	.	.	.	.	.	.	.
	2400.	. IE	.	.	.	.	.	.	.	.	.
	2450.	. IE	.	.	.	.	.	.	.	.	.
	2500.	. IE	.	.	.	.	.	.	.	.	.
	2550.	. IWE	.	.	.	.	.	.	.	.	.
	2600.	. WE	.	.	.	.	.	.	.	.	.
	2650.	. IE	.	.	.	.	.	.	.	.	.
	2700.	. IE	.	.	.	.	.	.	.	.	.
	2750.	. IE	.	.	.	.	.	.	.	.	.
	2800.	. IE	.	.	.	.	.	.	.	.	.
.54	2850.	. IE	.	.	.	.	.	.	.	.	.
	2900.	. IE	.	.	.	.	.	.	.	.	.
	2950.	. IE	.	.	.	.	.	.	.	.	.
	3000.	. IE	.	.	.	.	.	.	.	.	.
	3050.	. IE	.	.	.	.	.	.	.	.	.
	3100.	. IWE	.	.	.	.	.	.	.	.	.
	3150.	. IWE	.	.	.	.	.	.	.	.	.
	3200.	. IE	.	.	.	.	.	.	.	.	.
	3250.	. IE	.	.	.	.	.	.	.	.	.
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.63	3350.	. IE	.	.	.	.	.	.	.	.	.
	3400.	. IE	.	.	.	.	.	.	.	.	.
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        3500.  .    IE   .
        3550.  .    IE   .
        3600.  .    IE   .
        3650.  .    IEM  .
        3700.  .    IWE  .
        3750.  .    IWE  .
        3800.  .    IWE  .
   .73  3850.  .     WE  .
        3900.  .     IE  .
        3950.  .     IE  .
        4000.  .     IE  .
        4050.  .     IE  .
        4100.  .     IE  .
        4150.  .    IWE  .
        4200.  .    IWE  .
        4250.  .    IWE  .
        4300.  .    IWE  .
   .82  4350.  .    ILE  .
        4400.  .    ILE  .
        4450.  .    ILE  .
        4500.  .     IE  .
        4550.  .     IE  .
        4600.  .     IE  .
        4650.  .     IE  .
        4700.  .    IWE.
        4750.  .    IWE.
        4800.  .    IWE.
   .92  4850.  .    IWE.
        4900.  .    IWE.
        4950.  .     IE.
        5000.  .     IE.
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        5200.  .    IWE
        5250.  .    IWE
        5300.  .    IWE
  1.01  5350.  .     IE
        5400.  .     IE
        5450.  .     IE
        5500.  .    IWE
        5550.  .    IWE
        5600.  .    IWE
  1.07  5650.  .    IWE
        5700.  C    I.E
        5750.  C    I.WE
        5800.  C    I.WE
        5850.  C     I E
  1.11  5900.  C     I E
  1.12  5950.  C     I EM

        6000.  C     I EM L
        6050.  C     I EM   L
  1.15  6100.  C     IREM     L
        6150.  C     IREM      L
        6200.  C     IREM    L
        6250.  C     IREM L
        6300.  C     IREL
  1.20  6350.  C     ILEM
        6400.  C     .IEM
        6450.  C     .IEM
        6500.  C     .IWE
        6550.  C     .ILE
        6600.  C     .ILE
  1.26  6650.  .     . IE
        6700.  .     . IEM
        6750.  .     . IEM
  1.29  6800.  .     . IWE
        6850.  .     . IWE
        6900.  .     . IWE
  1.31  6950.  .     . ILE
  1.32  7000.  C     . ILE                                                    R
        7050.  C     . I E                                                    R
        7100.  C     .IL EM                                                   R
        7150.  C     .IL EM                                                   R
  1.36  7200.  C     IL  EM
        7250.  C     I L EM
        7300.  C     .I LEM
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        7350.  C          .I LWE    .         .         .         .         .         .         .         .         .
        7400.  C          . I WE    .         .         .         .         .         .         .         .         .
        7450.  C          . I LE    .         .         .         .         .         .         .         .         .
        7500.  .    C     . I E     .         .         .         .         .         .         .         .         .
1.42    7550.  .          . I E     .         .         .         .         .         .         .         .         .
        7600.  .          . I EM    .         .         .         .         .         .         .         .         .
        7650.  .          . I EM    .         .         .         .         .         .         .         .         .
        7700.  .          .  IWE    .         .         .         .         .         .         .         .         .
        7750.  .          .  IWE    .         .         .         .         .         .         .         .         .
        7800.  .          .  IWE    .         .         .         .         .         .         .         .         .
        7850.  .          .  ILE    .         .         .         .         .         .         .         .         .
        7900.  .          .  ILE    .         .         .         .         .         .         .         .         .
        7950.  .          .  ILE    .         .         .         .         .         .         .         .         .
        8000.  .          .   IE    .         .         .         .         .         .         .         .         .
1.52    8050.  .          .  IWE    .         .         .         .         .         .         .         .         .
        8100.  .          .  IWE    .         .         .         .         .         .         .         .         .
        8150.  .          .  ILE    .         .         .         .         .         .         .         .         .
        8200.  .          .  ILE    .         .         .         .         .         .         .         .         .
        8250.  .          .  ILE    .         .         .         .         .         .         .         .         .
        8300.  .          .  I WE   .         .         .         .         .         .         .         .         .
        8350.  .          .   IWE   .         .         .         .         .         .         .         .         .
        8400.  .          .   IWE   .         .         .         .         .         .         .         .         .
        8450.  .          .   ILE   .         .         .         .         .         .         .         .         .
        8500.  .          .   I E   .         .         .         .         .         .         .         .         .
1.61    8550.  .          .   I WE.  .         .         .         .         .         .         .         .         .
        8600.  .          .   I WE.  .         .         .         .         .         .         .         .         .
        8650.  .          .   I WE.  .         .         .         .         .         .         .         .         .
        8700.  .          .    ILE.  .         .         .         .         .         .         .         .         .
        8750.  .          .    I E.  .         .         .         .         .         .         .         .         .
        8800.  .          .    I E.  .         .         .         .         .         .         .         .         .
        8850.  .          .    I E.  .         .         .         .         .         .         .         .         .
        8900.  .          .    I WE  .         .         .         .         .         .         .         .         .
        8950.  .          .    I WE  .         .         .         .         .         .         .         .         .
        9000.  .          .    I WE  .         .         .         .         .         .         .         .         .
1.71    9050.  .          .    I  E  .         .         .         .         .         .         .         .         .
        9100.  .          .     I E  .         .         .         .         .         .         .         .         .
        9150.  .          .     I E  .         .         .         .         .         .         .         .         .
        9200.  .          .     I WE .         .         .         .         .         .         .         .         .
        9250.  .          .     I WE .         .         .         .         .         .         .         .         .
        9300.  .          .     I WE .         .         .         .         .         .         .         .         .
        9350.  .          .     I WE .         .         .         .         .         .         .         .         .
        9400.  .          .     I .E .         .         .         .         .         .         .         .         .
        9450.  .          .      I.E .         .         .         .         .         .         .         .         .
        9500.  .          .      I.E .         .         .         .         .         .         .         .         .
1.80    9550.  .          .      I.WE .        .         .         .         .         .         .         .         .
        9600.  .          .      I.WE .        .         .         .         .         .         .         .         .
        9650.  .          .      I.WE .        .         .         .         .         .         .         .         .
        9700.  .          .       IWE .        .         .         .         .         .         .         .         .
        9750.  .          .       ILE .        .         .         .         .         .         .         .         .
        9800.  .          .       ILEM .       .         .         .         .         .         .         .         .
        9850.  .          .       ILEM .       .         .         .         .         .         .         .         .
        9900.  .          .       ILWE .       .         .         .         .         .         .         .         .
        9950.  .          .       ILWE .       .         .         .         .         .         .         .         .
       10000.  .          .       .IWE .       .         .         .         .         .         .         .         .
1.90   10050.  .          .       .IWE .       .         .         .         .         .         .         .         .
       10100.  .          .       .ILE .       .         .         .         .         .         .         .         .
       10150.  .          .       .ILEM .      .         .         .         .         .         .         .         .
       10200.  .          .       .ILEM .      .         .         .         .         .         .         .         .
       10250.  .          .       .ILEM .      .         .         .         .         .         .         .         .
       10300.  .          .       .ILWE .      .         .         .         .         .         .         .         .
       10350.  .          .        . IWE .     .         .         .         .         .         .         .         .
       10400.  .          .        . IWE .     .         .         .         .         .         .         .         .
       10450.  .          .        . ILE .     .         .         .         .         .         .         .         .
       10500.  .          .        . ILE .     .         .         .         .         .         .         .         .
1.99   10550.  .          .        . ILE .     .         .         .         .         .         .         .         .
       10600.  .          .        . I WE .    .         .         .         .         .         .         .         .
       10650.  .          .        . I WE .    .         .         .         .         .         .         .         .
       10700.  .          .        . I WE .    .         .         .         .         .         .         .         .
       10750.  .          .        .  IWE .    .         .         .         .         .         .         .         .
       10800.  .          .        .  ILE .    .         .         .         .         .         .         .         .
       10850.  .          .        .  ILE .    .         .         .         .         .         .         .         .
       10900.  .          .        .  I EM .   .         .         .         .         .         .         .         .
       10950.  .          .        .  I EM .   .         .         .         .         .         .         .         .
       11000.  .          .        .  I WE .   .         .         .         .         .         .         .         .
2.09   11050.  .          .        .  I WE .   .         .         .         .         .         .         .         .
       11100.  .          .        .   IWE .   .         .         .         .         .         .         .         .
       11150.  .          .        .   I E .   .         .         .         .         .         .         .         .
       11200.  .          .        .   I EM .  .         .         .         .         .         .         .         .
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        11250.  .       .       .    IEM  .       .       .       .       .       .       .       .
        11300.  .       .       .    IWE  .       .       .       .       .       .       .       .
        11350.  .       .       .    IWE  .       .       .       .       .       .       .       .
        11400.  .       .       .    I E  .       .       .       .       .       .       .       .
        11450.  .       .       .     IE  .       .       .       .       .       .       .       .
  2.17  11500.  .       .       .    IEL  .       .       .       .       .       .       .       .
        11550.  .       .       .    IEL  .       .       .       .       .       .       .       .
        11600.  .       .       .    IWE  .       .       .       .       .       .       .       .
        11650.  .       .       .    IWE  .       .       .       .       .       .       .       .
        11700.  .       .       .    I E  .       .       .       .       .       .       .       .
        11750.  .       .       .     IE  .       .       .       .       .       .       .       .
        11800.  .       .       .     IE  .       .       .       .       .       .       .       .
        11850.  .       .       .     IE  .       .       .       .       .       .       .       .
        11900.  .       .       .    IWE. .       .       .       .       .       .       .       .
        11950.  .       .       .    IWE. .       .       .       .       .       .       .       .
        12000.  .       .       .    IWE. .       .       .       .       .       .       .       .
  2.28  12050.  .       .       .    I E. .       .       .       .       .       .       .       .
        12100.  .   C   .       .    I E. .       .       .       .       .       .       .       .
        12150.  C       .       .    I E. .       .       .       .       .       .       .       .
        12200.  C       .       .    I E. .       .       .       .       .       .       .       .
        12250.  C       .       .    I E. .       .       .       .       .       .       .       .
        12300.  C       .       .     IWE .       .       .       .       .       .       .       .
        12350.  C       .       .     IWE .       .       .       .       .       .       .       .

        12400.  C       .       .     IWE .       .       .       .       .       .       .       .
        12450.  C       .       .     IWE .       .       .       .       .       .       .       .
        12500.  C       .       .     IWE .       .       .       .       .       .       .       .
  2.37  12550.  C       .       .     ILE .       .       .       .       .       .       .       .
        12600.  C       .       .     ILE .       .       .       .       .       .       .       .
        12650.  C       .       .     ILE .       .       .       .       .       .       .       .
        12700.  C       .       .     ILE .       .       .       .       .       .       .       .
        12750.  C       .       .     ILE .       .       .       .       .       .       .       .
        12800.  C       .       .     ILE .       .       .       .       .       .       .       .
        12850.  C       .       .     ILE .       .       .       .       .       .       .       .
        12900.  C       .       .      IE .       .       .       .       .       .       .       .
        12950.  C       .       .     IWE .       .       .       .       .       .       .       .
        13000.  .   C   .       .     IWE .       .       .       .       .       .       .       .
  2.47  13050.  .       .       .     IWE .       .       .       .       .       .       .       .
        13100.  .       .       .     I.E .       .       .       .       .       .       .       .
        13150.  .       .       .     ILE .       .       .       .       .       .       .       .
        13200.  .       .       .     ILE .       .       .       .       .       .       .       .
        13250.  .       .       .     ILE .       .       .       .       .       .       .       .
        13300.  .       .       .     ILE .       .       .       .       .       .       .       .
        13350.  .       .       .     ILE .       .       .       .       .       .       .       .
        13400.  .       .       .      IWE .      .       .       .       .       .       .       .
        13450.  .       .       .      IWE .      .       .       .       .       .       .       .
        13500.  .       .       .      IWE .      .       .       .       .       .       .       .
  2.56  13550.  .       .       .      I E .      .       .       .       .       .       .       .
        13600.  .       .       .      I E .      .       .       .       .       .       .       .
        13650.  .       .       .      I E .      .       .       .       .       .       .       .
        13700.  .       .       .      ILE .      .       .       .       .       .       .       .
        13750.  .       .       .      ILE .      .       .       .       .       .       .       .
        13800.  .       .       .      ILE .      .       .       .       .       .       .       .
        13850.  .       .       .      ILE .      .       .       .       .       .       .       .
        13900.  .       .       .      ILE .      .       .       .       .       .       .       .
        13950.  .       .       .      ILE .      .       .       .       .       .       .       .
        14000.  .       .       .      ILE .      .       .       .       .       .       .       .
  2.66  14050.  .       .       .      .IWE .     .       .       .       .       .       .       .
        14100.  .       .       .      .IWE .     .       .       .       .       .       .       .
        14150.  .       .       .      .IWE .     .       .       .       .       .       .       .
        14200.  .       .       .      .IWE .     .       .       .       .       .       .       .
        14250.  .       .       .      .IWE .     .       .       .       .       .       .       .
        14300.  .       .       .      .ICE .     .       .       .       .       .       .       .
        14350.  .       .       .      .ILE .     .       .       .       .       .       .       .
        14400.  .       .       .      .ILE .     .       .       .       .       .       .       .
        14450.  .       .       .      .ILE .     .       .       .       .       .       .       .
        14500.  .       .       .      .ILE .     .       .       .       .       .       .       .
  2.75  14550.  .       .       .      .I E .     .       .       .       .       .       .       .
        14600.  .       .       .      . IEM .    .       .       .       .       .       .       .
        14650.  .       .       .      . IEM .    .       .       .       .       .       .       .
        14700.  .       .       .      . IEM .    .       .       .       .       .       .       .
        14750.  .       .       .      . IEM .    .       .       .       .       .       .       .
        14800.  .       .       .      . IEM .    .       .       .       .       .       .       .
        14850.  .       .       .      . IWE .    .       .       .       .       .       .       .
        14900.  .       .       .      . IWE .    .       .       .       .       .       .       .
        14950.  .       .       .      . IWE .    .       .       .       .       .       .       .
        15000.  .       .       .      . IWE .    .       .       .       .       .       .       .
  2.85  15050.  .       .       .      . IWE .    .       .       .       .       .       .       .
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        15100.  .       C.      .       . ILE     .       .       .       .       .       .       .
        15150.  C       .       .       . ILE     .       .       .       .       .       .       .
        15200.  C       .       .       . IRE     .       .       .       .       .       .       .
        15250.  C       .       .       . IRE     .       .       .       .       .       .       .
        15300.  C       .       .       . IREM    .       .       .       .       .       .       .
        15350.  C       .       .       . IREM    .       .       .       .       .       .       .
        15400.  C       .       .       . IREM    .       .       .       .       .       .       .
        15450.  C       .       .       . IREM    .       .       .       .       .       .       .
        15500.  C       .       .       .  IEL    .       .       .       .       .       .       .
2.94    15550.  C       .       .       .  IEL    .       .       .       .       .       .       .
        15600.  C       .       .       .  IEL    .       .       .       .       .       .       .
        15650.  C       .       .       .  IEL    .       .       .       .       .       .       .
        15700.  C       .       .       .  IEL    .       .       .       .       .       .       .
        15750.  C       .       .       .  IWE    .       .       .       .       .       .       .
        15800.  C       .       .       .  IWE    .       .       .       .       .       .       .
        15850.  C       .       .       .  IWE    .       .       .       .       .       .       .
        15900.  C       .       .       .  IWE    .       .       .       .       .       .       .
        15950.  C       .       .       .  IWE    .       .       .       .       .       .       .
        16000.  .       C       .       .  ILE    .       .       .       .       .       .       .
3.06    16050.  .       .       .       .  ILE    .       .       .       .       .       .       .
        16100.  .       .       C       .  ILEM   .       .       .       .       .       .       .
        16150.  C       .       .       .  ILEM   .       .       .       .       .       .       .
        16200.  C       .       .       .  ILEM   .       .       .       .       .       .       .
        16250.  C       .       .       .  ILEM   .       .       .       .       .       .       .
        16300.  C       .       .       .  ILEM   .       .       .       .       .       .       .
        16350.  C       .       .       .  IREM   .       .       .       .       .       .       .
        16400.  C       .       .       .  IREM   .       .       .       .       .       .       .
        16450.  C       .       .       .  IREM   .       .       .       .       .       .       .
        16500.  C       .       .       .  IREM   .       .       .       .       .       .       .
        16550.  C       .       .       .  IREM   .       .       .       .       .       .       .
        16600.  C       .       .       .  I EM   .       .       .       .       .       .       .
3.15    16650.  C       .       .       .  I EM   .       .       .       .       .       .       .
        16700.  C       .       .       .   IEM   .       .       .       .       .       .       .
        16750.  C       .       .       .   IWE   .       .       .       .       .       .       .
        16800.  C       .       .       .   IWEM  .       .       .       .       .       .       .
        16850.  C       .       .       .   IREM  .       .       .       .       .       .       .
        16900.  C       .       .       .   IREM  .       .       .       .       .       .       .
        16950.  C       .       .       .    IEM  .       .       .       .       .       .       .
        17000.  C       .       .       .    IEM  .       .       .       .       .       .       .
        17050.  C       .       .       .    IEM  .       .       .       .       .       .       .
        17100.  C       .       .       .    IEM  .       .       .       .       .       .       .
        17150.  .       .       .       C    IEM  .       .       .       .       .       .       .
3.25    17200.  .       .       .       .     EM  .       .       .       .       .       .       .
        17250.  .       .       C       .     EM  .       .       .       .       .       .       .
        17300.  C       .       .       .     EM  .       .       .       .       .       .       .
        17350.  C       .       .       .     EM  .       .       .       .       .       .       .
        17400.  C       .       .       .     WE  .       .       .       .       .       .       .
        17450.  C       .       .       .     WE  .       .       .       .       .       .       .
        17500.  C       .       .       .     WE  .       .       .       .       .       .       .
        17550.  C       .       .       .     IE  .       .       .       .       .       .       .
        17600.  C       .       .       .     IE  .       .       .       .       .       .       .
        17650.  C       .       .       .     IE  .       .       .       .       .       .       .
3.34    17700.  C       .       .       .     IE  .       .       .       .       .       .       .
        17750.  C       .       .       .     IE  .       .       .       .       .       .       .
        17800.  C       .       .       .     IE  .       .       .       .       .       .       .
        17850.  C       .       .       .    IEM  .       .       .       .       .       .       .
        17900.  C       .       .       .    IEM  .       .       .       .       .       .       .
        17950.  C       .       .       .    IEM  .       .       .       .       .       .       .
        18000.  C       .       .       .    IEM  .       .       .       .       .       .       .
        18050.  C       .       .       .    IEM  .       .       .       .       .       .       .
        18100.  C       .       .       .    IEM  .       .       .       .       .       .       .
        18150.  C       .       .       .    IEM  .       .       .       .       .       .       .
3.44    18200.  C       .       .       .    IEM  .       .       .       .       .       .       .
        18250.  C       .       .       .    IEM  .       .       .       .       .       .       .
        18300.  C       .       .       .    IEM  .       .       .       .       .       .       .
        18350.  C       .       .       .    IEM  .       .       .       .       .       .       .
        18400.  C       .       .       .    IEM  .       .       .       .       .       .       .
        18450.  C       .       .       .    IEM  .       .       .       .       .       .       .
        18500.  C       .       .       .    IE M.       .       .       .       .       .       .
        18550.  C       .       .       .    IE M.       .       .       .       .       .       .
        18600.  C       .       .       .    IE M.       .       .       .       .       .       .
        18650.  .       C       .       .    IE M.       .       .       .       .       .       .
3.54    18700.  .       .       .       .    IE M.       .       .       .       .       .       .
        18750.  .       .       .       .    IE M.       .       .       .       .       .       .

        18800.  .       .       .       .    IE M.       .       .       .       .       .       .
        18850.  .       .       .       .     E M.       .       .       .       .       .       .
        18900.  .       .       .       .     E M.       .       .       .       .       .       .
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      18950.                    WEM.
      19000.                    WEM.
      19050.                    IEM.
      19100.                    IEM.
      19150.                    IEM.
3.63  19200.                    IEM.
      19250.                    IEM.
      19300.                    IEM.
      19350.                     WE.
      19400.                     IE.
      19450.                     IE.
      19500.                     IE.
      19550.                     IE.
      19600.                    IEM
      19650.                     WE
3.72  19700.                     WE
      19750.                     IE
      19800.                     IE
      19850.                     IE
      19900.                     IE
      19950.                    IEM
      20000.                    IEM
      20050.                     EM
      20100.                     WE
      20150.                     IE
3.82  20200.                     IE
      20250.                    IEM
      20300.                    IEM
      20350.                    IEM
      20400.                    IEM
      20450.                    .WE
      20500.                    .WE
      20550.                    .IEM
      20600.                    .IEM
3.91  20650.                    .IEM
      20700.                    .IEM
      20750.                    .IWE
      20800.                    . WE
      20850.                    . IEM
      20900.                    . IEM
      20950.                    . IEM
      21000.                    . IEM
      21050.                    . IEM
      21100.                    . IEM
4.01  21150.                    .  WE
      21200.                    .  WE
      21250.                    .  IEM
      21300.                    .  IEM
      21350.                    .  IEM
      21400.                    .   EM
      21450.                    .   EM
      21500.                    .   WE
      21550.                    .   IEM
      21600.                    .   IEM
4.10  21650.                    .   EM
      21700.                    .   EM
      21750.                    .   EM
      21800.                    .   EM
      21850.                    .   WE
      21900.                    .   WE
      21950.                    .   IE
      22000.                    .   IE
      22050.                    .   IE
      22100.                    .   IE
4.20  22150.                    .   IE
      22200.                    .    EM
      22250.                    .    EM
      22300.                    .    WE
      22350.                    .    IE
      22400.                    .    IE
      22450.                    .    IE
      22500.                    .    IEM
      22550.                    .     EM
      22600.                    .     EM
4.29  22650.                    .     WE
      22700.                C   .     IE
      22750.  C                 .     IE
      22800.  C                 .     IE
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        22850.  C          .         .         .         .    IE .         .         .         .         .         .
        22900.  C          .         .         .         .    IE .         .         .         .         .         .
        22950.  C          .         .         .         .    IEM.         .         .         .         .         .
        23000.  C          .         .         .         .     EM.         .         .         .         .         .
        23050.  C          .         .         .         .     EM.         .         .         .         .         .
  4.38  23100.  C          .         .         .         .     EM.         .         .         .         .         .
        23150.  C          .         .         .         .     WE.         .         .         .         .         .
        23200.  C          .         .         .         .     WE.         .         .         .         .         .
        23250.  C          .         .         .         .     WE.         .         .         .         .         .
        23300.  C          .         .         .         .     IE.         .         .         .         .         .
        23350.  C          .         .         .         .     IE.         .         .         .         .         .
        23400.  C          .         .         .         .     IE.         .         .         .         .         .
        23450.  C          .         .         .         .     IE.         .         .         .         .         .
        23500.  C          .         .         .         .     IE.         .         .         .         .         .
        23550.  C          .         .         .         .    IEM         .         .         .         .         .
  4.47  23600.  C          .         .         .         .    IEM         .         .         .         .         .
        23650.  C          .         .         .         .    IEM         .         .         .         .         .
        23700.  C          .         .         .         .     EM         .         .         .         .         .
        23750.  C          .         .         .         .     EM         .         .         .         .         .
        23800.  C          .         .         .         .     EM         .         .         .         .         .
        23850.  C          .         .         .         .     WE         .         .         .         .         .
        23900.  C          .         .         .         .     WE         .         .         .         .         .
        23950.  C          .         .         .         .     IE         .         .         .         .         .
        24000.  .C         .         .         .         .    IE         .         .         .         .         .
        24050.  .          .         .         .     C   .    IE         .         .         .         .         .
  4.56  24100.  .          .         .         .         .    IE         .         .         .         .         .
        24150.  .          .         .         .  C      .    IE         .         .         .         .         .
        24200.  C          .         .         .         .    IE         .         .         .         .         .
        24250.  C          .         .         .         .    IE         .         .         .         .         .
        24300.  C          .         .         .         .    IE         .         .         .         .         .
        24350.  C          .         .         .         .    IE         .         .         .         .         .
        24400.  C          .         .         .         .    IE         .         .         .         .         .
        24450.  C          .         .         .         .    IE         .         .         .         .         .
        24500.  C          .         .         .         .    IE         .         .         .         .         .
        24550.  C          .         .         .         .   IEM         .         .         .         .         .
  4.65  24600.  C          .         .         .         .   IEM         .         .         .         .         .
        24650.  C          .         .         .         .   IEM         .         .         .         .         .
        24700.  C          .         .         .         .    EM         .         .         .         .         .
        24750.  C          .         .         .         .    EM         .         .         .         .         .
        24800.  C          .         .         .         .    EM         .         .         .         .         .
        24850.  C          .         .         .         .    EM         .         .         .         .         .
        24900.  C          .         .         .         .    WE         .         .         .         .         .
  4.72  24950.  .          .         .         .         .    WE         .         .         .         .         .
1
    18JAN02      15:45:38                                                                          PAGE   28

 T1      WHITE TANKS/AGUA FRIA AREA DRAINAGE MASTER STUDY
 T2      100-YEAR STORM EVENT        FLOODWAY RUN
 T3      TUTHILL DIKE WASH - WASH "5"

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                 3                                                                  1039.06

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      15                 -1


1
    18JAN02      15:45:38                                                                          PAGE   29

     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA

     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

 *PROF 2


CCHV=      .100 CEHV=      .300
*SECNO   .000
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3470 ENCROACHMENT STATIONS=     9945.5   10068.7  TYPE=       1  TARGET=      123.250

          Q @ X1 = 0.000 TO X1  = 1.012 EQUALS Q AT I6CWT4
          Q = 4057 CFS

          MATCH FLOODPLAIN INTO 100-YEAR PONDING WSEL BEHIND WHITE TANKS
          STRUCTURE # 4

      .000      6.06   1039.06       .00   1039.06   1040.11      1.05       .00       .00 100000.00
   4057.0        .0    4057.0        .0        .0     493.6        .0        .0        .0 100000.00
      .00       .00      8.22       .00      .000      .030      .000      .000   1033.00   9945.48
  .004367        0.        0.        0.         0         0         0       .00    123.25  10068.73


*SECNO  .075

3470 ENCROACHMENT STATIONS=     9910.0   10073.4  TYPE=       1  TARGET=      163.380
      .075      5.84   1040.84       .00   1040.84   1041.53       .70      1.39       .04   1036.00
   4057.0     740.7    3314.8        1.5     142.0     474.8       1.4       5.1       1.3   1040.00
      .02      5.22      6.98       1.09      .030      .030      .040      .000   1035.00   9910.00
  .002833      400.      400.       400.         2         0         0       .00    163.36  10073.36


*SECNO  .186

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9950.0   10068.5  TYPE=       1  TARGET=      118.550
      .186      4.75   1043.25   1043.25   1043.71   1045.10      1.85      2.52       .35   1040.00
   4057.0     155.1    3785.6     116.3      26.5     337.7      26.5      11.8       3.2   1040.00
      .03      5.86     11.21      4.40      .030      .030      .040      .000   1038.50   9953.74
  .007516      580.      580.       580.         3        15         0       .00    112.53  10066.26


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   18JAN02      15:45:38                                                                    PAGE   30

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO  .314

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=     9925.0   10080.0  TYPE=       1  TARGET=      155.000
      .314      5.56   1048.06       .00   1047.99   1049.09      1.03      3.91       .08   1048.00
   4057.0        .0    4057.0        .0        .1     497.5        .0      18.7       5.0 100000.00
      .05       .31      8.16       .00      .030      .030      .000      .000   1042.50   9945.41
  .004566      500.      680.       720.         2         0         0       .00    134.59  10080.00


*SECNO  .415
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9940.0   10175.0  TYPE=       1  TARGET=      235.000
      .415      4.68   1051.88   1051.88   1051.93   1053.02      1.14      3.23       .03   1050.00
   4057.0        .0    3407.4     649.6        .0     371.1     159.6      25.5       7.6   1050.00
      .07       .00      9.18      4.07      .000      .030      .040      .000   1047.20   9940.00
  .007795      300.      530.       800.         2        15         0       .00    235.00  10175.00


*SECNO  .540
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9911.8   10110.0  TYPE=       1  TARGET=      198.250
```

.540	4.46	1057.46	1057.46	1057.55	1058.73	1.28	4.95	.04	1056.00
4057.0	42.5	3580.1	434.4	12.5	375.2	104.9	33.2	10.9	1056.00
.09	3.41	9.54	4.14	.030	.030	.040	.000	1053.00	9912.87
.007254	660.	660.	650.	3	11	0	.00	197.13	10110.00

*SECNO .634
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9951.0 10105.0 TYPE= 1 TARGET= 154.020

.634	4.99	1061.79	1061.79	1061.80	1063.28	1.49	3.37	.06	1058.00
4057.0	215.0	3265.2	576.9	35.9	307.1	123.7	38.6	12.9	1058.00
.11	6.00	10.63	4.67	.030	.030	.040	.000	1056.80	9951.07
.006421	495.	495.	495.	2	8	0	.00	153.93	10105.00

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO .729

3470 ENCROACHMENT STATIONS= 9953.5 10085.0 TYPE= 1 TARGET= 131.480

.729	4.64	1065.34	.00	1065.30	1066.77	1.43	3.48	.01	1064.00
4057.0	15.0	4042.0	.0	4.5	420.8	.0	43.8	14.5	100000.00
.12	3.33	9.60	.00	.030	.030	.000	.000	1060.70	9953.52
.007584	500.	500.	500.	1	0	0	.00	131.48	10085.00

*SECNO .823

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9952.7 10045.3 TYPE= 1 TARGET= 92.560

.823	6.44	1070.94	1070.94	1070.92	1073.07	2.13	3.74	.21	1070.00
4057.0	2.8	4039.6	14.6	1.1	344.3	7.4	48.2	15.8	1070.00
.13	2.50	11.73	1.98	.030	.030	.040	.000	1064.50	9952.71
.007523	495.	495.	495.	9	11	0	.00	92.56	10045.27

*SECNO .917

3470 ENCROACHMENT STATIONS= 9956.3 10050.0 TYPE= 1 TARGET= 93.700

.917	5.41	1074.71	1074.62	1074.73	1076.72	2.01	3.64	.01	1072.00
4057.0	50.5	3993.9	12.6	9.7	348.7	5.9	52.3	16.9	1074.00
.15	5.18	11.46	2.13	.030	.030	.040	.000	1069.30	9956.49
.007036	500.	500.	500.	0	15	0	.00	93.51	10050.00

*SECNO 1.012
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9936.4 10028.6 TYPE= 1 TARGET= 92.199

1.012	5.05	1080.75	1080.75	1080.73	1082.83	2.09	3.73	.02	1080.00
4057.0	3.2	4048.1	5.7	1.4	348.7	3.3	56.4	17.9	1080.00
.16	2.28	11.61	1.74	.030	.030	.040	.000	1075.70	9936.36
.007912	500.	500.	500.	5	11	0	.00	92.20	10028.56

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

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CCHV=      .300 CEHV=      .500
*SECNO 1.067

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9977.7   10022.0  TYPE=       1  TARGET=       44.300

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1088.00 ELREA=      1088.00


          Q @ X1 = 1.067 TO X1 = 1.110 EQUALS Q AT CP43 (AFTER DIVERT)
          Q = 4061 CFS
          FLOW LEFT OVER AFTER WEIR FLOW OVER DIKE UPSTREAM OF CULVERT

          4 - 10ft x 8ft x 227ft BC AT INTERSTATE 10

    1.067      6.37   1085.01   1085.01   1085.01   1088.23      3.22      1.18       .57   1078.64
  4061.0         .0    4061.0        .0        .0     282.0        .0      58.5      18.4 100000.00
     .16        .00     14.40        .00       .000      .016       .000      .000   1078.64   9977.70
 .002423      293.      293.      293.        20        11         0       .00     44.30  10022.00


SPECIAL CULVERT

SC  CUNO      CUNV      ENTLC     COFQ      RDLEN     RISE      SPAN      CULVLN    CHRT      SCL       ELCHU     ELCHD
     4          .016      .50      2.60       .00      8.00     10.00     227.00     8         1      1081.16   1078.64

CHART  8 - BOX CULVERT WITH FLARED WINGWALLS; NO INLET TOP EDGE BEVEL
SCALE  1 - WINGWALLS FLARED 30 TO 75 DEGREES

*SECNO 1.110
BTCARD, BRIDGE STENCL=     9950.00   STENCR=   10022.00

SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG =   1093.68

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.37

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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


SPECIAL CULVERT

     EGIC      EGOC       H4      QWEIR     QCULV       VCH      ACULV     ELTRD    WEIRLN
  1093.80   1093.13      5.46       14.      4024.     6.084      320.0  1092.00        7.


3470 ENCROACHMENT STATIONS=     9950.0   10022.0  TYPE=       1  TARGET=       72.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1092.00 ELREA=      1099.00


          PORTION OF FLOW FOR THE NEXT FOUR CROSS SECTIONS UPSTREAM
          IS LOST AS WEIR FLOW OVER THE DIKE TO THE EAST
          APPROXIMATELY 1440 CFS FLOWS EAST OVER DIKE

          EFFECTIVE FLOW OPTION IS INCORPORATED FOR THE NEXT 5 UPSTREAM CROSS
          SECTIONS AS A RESULT OF PONDING AND UPSTREAM AND DOWNSTREAM EXPANSION
          AND CONTRATION FLOW SITUATIONS.

          ACTUAL MAPPED LIMITS CORRESPOND TO WATER SURFACE ELEVATIONS AND ARE
```

SHOWN CORRECTLY ON THE FLOODPLAIN WORK MAP.

1.110	12.06	1093.16	.00	1093.14	1093.68	.52	5.46	.00	1081.16
4061.0	809.1	3251.9	.0	182.4	534.5	.0	61.1	18.7	100000.00
.18	4.44	6.08	.00	.016	.016	.000	.000	1081.10	9950.00
.000214	227.	227.	227.	2	0	0	.00	72.00	10022.00

*SECNO 1.118

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.53

3470 ENCROACHMENT STATIONS= 9920.0 10100.0 TYPE= 1 TARGET= 180.000

Q @ X1 = 1.118 TO X1 = 1.198 EQUALS STORAGE ROUTED Q AT CP43
Q = 5503 CFS

1.118	12.14	1093.64	.00	1093.65	1093.80	.16	.00	.11	1091.50
5503.0	.0	2897.5	2605.5	.0	959.0	786.2	62.3	18.8	1082.00
.18	.00	3.02	3.31	.000	.016	.016	.000	1081.50	9920.00
.000061	40.	40.	40.	2	0	0	.00	180.00	10100.00

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= .100 CEHV= .300
*SECNO 1.152

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .35

3470 ENCROACHMENT STATIONS= 9930.0 10150.0 TYPE= 1 TARGET= 220.000

1.152	11.61	1093.61	.00	1093.62	1093.84	.23	.02	.02	1143.00
5503.0	.0	3765.2	1737.8	.0	880.7	639.7	69.0	19.6	1086.00
.19	.00	4.28	2.72	.000	.030	.040	.000	1082.00	9930.00
.000508	180.	180.	180.	2	0	0	.00	220.00	10150.00

*SECNO 1.198

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .58

3470 ENCROACHMENT STATIONS= 9925.0 10200.0 TYPE= 1 TARGET= 275.000

1.198	8.29	1093.59	.00	1093.60	1094.13	.54	.19	.09	1090.00
5503.0	50.0	3830.3	1622.6	16.1	564.2	530.5	76.2	21.0	1090.00
.20	3.10	6.79	3.06	.030	.030	.040	.000	1085.30	9936.02
.001526	235.	240.	235.	2	0	0	.00	263.98	10200.00

CCHV= .300 CEHV= .500
*SECNO 1.260

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9945.0 10200.0 TYPE= 1 TARGET= 255.000

Q @ X1 = 1.260 TO X1 = 1.322 EQUALS ROUTED Q AT CP42
Q = 6601 CFS

UPSTREAM OF MCDOWELL ROAD

1.260	5.53	1097.03	1097.03	1097.03	1098.55	1.52	1.00	.49	1094.00
6601.0	138.7	3925.4	2537.0	21.7	332.3	419.0	83.2	22.8	1094.00

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      .21      6.40     11.81      6.05      .030      .030      .040      .000   1091.50   9962.42
  .007196      340.      330.      315.        20        23         0       .00    237.58  10200.00

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     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

 *SECNO 1.287
 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9974.0   10145.0  TYPE=       1  TARGET=      171.040
      1.287      5.21   1099.21   1099.21   1099.25   1101.05      1.84      1.07       .16   1098.00
     6601.0      12.1    6588.9        .0       3.7     605.4        .0      85.3      23.4 100000.00
        .22      3.27     10.88       .00       .030      .030      .000      .000   1094.00   9973.96
   .008645      160.      140.      120.        20        11         0       .00    171.04  10145.00

 *SECNO 1.313
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9920.1   10080.0  TYPE=       1  TARGET=      159.860

           THE NEXT THREE UPSTREAM CROSS SECTIONS FLOW THROUGH A DETENTIION
           BASIN AND EFFECTIVE FLOW LIMITS ARE IMPOSED TO MODEL THIS SITUATION
           CORRECTLY.  MAPPED LIMITS ARE SMOWN ON THE FLOODPLAIN MAP TO
           CORRECTLY DEPICT THE ACTUAL PONDING AREA.

           CONFLUENCE OF BULLDOZER WASH

      1.313      5.98   1100.98   1100.98   1100.98   1102.96      1.99      1.03       .08   1096.00
     6601.0     611.0    5056.6     933.4      76.8     410.8     143.7      87.3      24.0   1096.00
        .22      7.96     12.31      6.49       .030      .030      .040      .000   1095.00   9920.14
   .006401      145.      140.      135.         3         8         0       .00    159.63  10079.77

 *SECNO 1.322

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.54


 3470 ENCROACHMENT STATIONS=     9875.9   10110.0  TYPE=       1  TARGET=      234.100
      1.322      8.29   1103.29       .00   1103.29   1103.56       .27       .08       .51   1096.00
     6601.0     594.1    6006.9        .0      196.1    1401.6        .0      89.1      24.3 100000.00
        .22      3.03      4.29       .00       .030      .030      .000      .000   1095.00   9877.18
   .000511      150.       50.      150.         3         0         0       .00    232.82  10110.00

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     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV

     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

 CCHV=      .100 CEHV=      .300
 *SECNO 1.362


 302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.54
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3470 ENCROACHMENT STATIONS=     9877.2   10100.0  TYPE=       1  TARGET=      222.760

        Q AT X1 = 1.362 TO X1 = 1.614 EQUALS (Q AT CP39 + 1/5 HYDROGRAPH AT 42)
        Q = 6018 + 1/5(1029) = 6225 CFS

     1.362     21.50   1103.50       .00   1103.50   1103.61       .10       .03       .02   1090.00
    6225.0     550.3    4859.7     815.0     332.5    1717.9     582.7      99.5      25.4   1090.00
       .25      1.66      2.83      1.40      .030      .030      .040      .000   1082.00   9878.68
   .000070      150.      210.      300.         2         0         0       .00    221.32  10100.00


*SECNO 1.422

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9949.0   10045.0  TYPE=       1  TARGET=       96.010
     1.422      7.90   1106.40   1106.40   1106.40   1109.05      2.65       .07       .76 100000.00
    6225.0        .0    6225.0        .0        .0     476.5        .0     110.7      26.5 100000.00
       .25       .00     13.06       .00      .000      .030      .000      .000   1098.50   9949.00
  *.007981      315.      315.      315.        20        22         0       .00     92.01  10041.00


*SECNO 1.518
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9969.4   10090.0  TYPE=       1  TARGET=      120.600
     1.518      7.36   1114.26   1114.26   1113.73   1116.97      2.71      3.79       .02   1110.00
    6225.0      62.9    6125.6      36.5      13.4     460.3      13.2     116.3      27.6   1112.00
       .26      4.70     13.31      2.76      .040      .030      .050      .000   1106.90   9969.40
   .007069      495.      505.      495.        20        11         0       .00    100.54  10069.94


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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO 1.614
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9967.7   10110.0  TYPE=       1  TARGET=      142.280
     1.614      9.45   1123.35   1123.35   1123.45   1125.76      2.41      3.34       .03   1122.00
    6225.0      10.0    6088.9     126.1       4.5     483.6      54.9     122.3      29.1   1122.00
       .28      2.20     12.59      2.30      .040      .030      .050      .000   1113.90   9968.26
   .006091      510.      510.      505.        20        11         0       .00    141.74  10110.00


*SECNO 1.710
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9965.0   10070.0  TYPE=       1  TARGET=      105.000

          Q @ X1 = 1.710 TO 2.088 EQUALS (Q AT 1.299 + Q AT CP39)/2
          Q = (6225 + 6110)/2 = 6168 CFS

     1.710     10.94   1130.94   1130.94   1130.93   1133.59      2.65      3.49       .07   1132.00
    6168.0        .0    6168.0        .0        .0     472.5        .0     128.2      30.4 100000.00
       .29       .00     13.05       .00      .000      .030      .000      .000   1120.00   9967.64
   .007914      505.      505.      510.        20         8         0       .00     89.16  10056.80


*SECNO 1.805
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
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 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9969.8   10050.0  TYPE=      1  TARGET=       80.250
      1.805     10.50   1138.10   1138.10   1138.10   1141.02      2.92      4.00       .08   1138.00
     6168.0       .0    6168.0        .0        .0     449.9        .0     133.5      31.4 100000.00
        .30       .03     13.71       .00      .040      .030      .000      .000   1127.60   9969.75
    .008074      500.      500.      500.        20        11         0       .00     80.25  10050.00


 *SECNO 1.898
 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
1
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     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9972.1   10070.0  TYPE=      1  TARGET=       97.930
      1.898      7.90   1145.20   1145.20   1145.29   1147.98      2.78      3.85       .01   1140.00
     6168.0     108.9    4230.9    1828.1      20.2     274.8     249.3     139.2      32.4   1140.00
        .31      5.38     15.39      7.33      .040      .030      .050      .000   1137.30   9972.21
    .007502      495.      495.      495.        20        19         0       .00     97.79  10070.00


 *SECNO 1.994
 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9969.1   10092.8  TYPE=      1  TARGET=      123.750
      1.994      8.90   1152.40   1152.40   1152.38   1154.89      2.49      3.42       .03   1150.00
     6168.0      22.6    5982.2     163.3       7.2     465.3      56.5     145.4      33.7   1150.00
        .32      3.14     12.86      2.89      .040      .030      .050      .000   1143.50   9969.06
    .006160      505.      505.      505.        20         8         0       .00    123.75  10092.81


 *SECNO 2.088
 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9971.5   10055.0  TYPE=      1  TARGET=       83.550
      2.088      9.18   1159.28   1159.28   1159.36   1162.15      2.87      3.42       .11   1158.00
     6168.0       4.7    6163.3        .0       2.0     453.1        .0     151.0      34.8 100000.00
        .33      2.32     13.60       .00      .040      .030      .000      .000   1150.10   9971.81
    .007822      495.      495.      495.        20         8         0       .00     83.19  10055.00


 *SECNO 2.170

 3301 HV CHANGED MORE THAN HVINS

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9964.3   10128.9  TYPE=      1  TARGET=      164.590

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          Q @ X1 = 2.170 TO X1  = 2.659 EQUALS Q AT CP39
          Q = 6110 CFS

      2.170      4.79   1167.39   1167.39   1167.39   1169.16      1.77      3.63       .11 100000.00
     6110.0        .0    6110.0        .0        .0     571.6        .0     156.1      36.1 100000.00
        .34       .00     10.69       .00      .000      .030      .000      .000   1162.60   9964.35
    .008945      430.      435.      445.        20        11         0       .00    164.54  10128.89
```

*SECNO 2.279

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9945.9 10039.9 TYPE= 1 TARGET= 94.030

UPSTREAM OF THOMAS ROAD EXTENDED

2.279	7.30	1176.60	1176.60	1176.61	1179.18	2.58	4.89	.24	100000.00
6110.0	.0	6110.0	.0	.0	474.2	.0	163.0	37.8	100000.00
.35	.00	12.88	.00	.000	.030	.000	.000	1169.30	9945.93
.008103	580.	575.	570.	20	14	0	.00	93.96	10039.90

*SECNO 2.373

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 9950.0 10080.0 TYPE= 1 TARGET= 129.960

2.373	8.37	1180.37	.00	1180.51	1182.27	1.90	3.02	.07	1180.00
6110.0	1.1	4892.5	1216.3	1.3	405.5	231.7	169.3	39.0	1174.00
.37	.84	12.07	5.25	.040	.030	.050	.000	1172.00	9952.76
.004766	495.	495.	495.	2	0	0	.00	127.24	10080.00

*SECNO 2.468
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9941.0 10080.0 TYPE= 1 TARGET= 138.970

2.468	7.57	1184.87	1184.87	1184.94	1187.08	2.22	2.83	.10	1180.00
6110.0	443.6	3822.8	1843.6	81.4	268.4	274.8	176.7	40.6	1180.00
.38	5.45	14.24	6.71	.040	.030	.050	.000	1177.30	9941.55
.006670	505.	505.	505.	20	11	0	.00	138.45	10080.00

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 2.563
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9944.8 10100.0 TYPE= 1 TARGET= 155.190

CONFLUENCE OF CATERPILLAR WASH

2.563	8.62	1190.92	1190.92	1191.10	1193.20	2.28	2.83	.02	1184.00
6110.0	372.7	4728.3	1008.9	66.7	349.8	218.9	183.9	42.3	1184.00
.39	5.59	13.52	4.61	.040	.030	.050	.000	1182.30	9948.00
.004855	500.	500.	500.	20	8	0	.00	152.00	10100.00

*SECNO 2.659
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9968.5 10100.0 TYPE= 1 TARGET= 131.450

2.659	8.00	1193.80	1193.80	1193.87	1196.15	2.35	2.76	.02	1190.00
6110.0	48.6	4637.1	1424.3	12.0	336.3	261.4	191.1	43.9	1188.00

```
      .40      4.05     13.79      5.45      .040      .030      .050      .000   1185.80   9968.67
  .006218      505.      505.       505.         2        11         0       .00    131.32  10100.00


*SECNO 2.753

3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=     9917.7   10110.0  TYPE=       1  TARGET=      192.330

          Q @ X1=3.753 TO X1=3.250 EQUALS Q @ CP27
          Q = 3011 CFS

    2.753      7.66   1197.96       .00   1197.53   1198.64       .68      2.33       .17   1196.00
   3011.0     167.1    2762.6      81.3      72.1     401.4      46.4     197.6      45.7   1196.00
      .42      2.32      6.88      1.75      .040      .030      .050      .000   1190.30   9917.67
  .002894      495.      500.       495.         3         0         0       .00    192.33  10110.00


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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

*SECNO 2.848

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
.720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9964.0   10080.0  TYPE=       1  TARGET=      116.000
    2.848      7.00   1200.20   1200.20   1200.23   1201.89      1.69      2.02       .30   1198.00
   3011.0      58.4    2568.5     384.1      18.1     229.5      96.9     202.5      47.5   1197.90
      .44      3.23     11.19      3.96      .040      .030      .050      .000   1193.20   9964.27
  .006048      495.      500.       495.        20        11         0       .00    115.22  10079.49


*SECNO 2.943

3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=     9960.5   10067.9  TYPE=       1  TARGET=      107.400
    2.943      7.66   1203.46       .00   1203.43   1204.63      1.17      2.68       .05 100000.00
   3011.0        .0    2527.4     483.6        .0     271.8     112.7     206.7      48.8   1200.50
      .45       .00      9.30      4.29      .000      .030      .050      .000   1195.80   9960.50
  .004797      500.      500.       500.         2         0         0       .00    107.40  10067.90


*SECNO 3.057

3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=     9975.0   10075.0  TYPE=       1  TARGET=      100.000
    3.057      6.39   1205.79       .00   1205.87   1207.47      1.67      2.69       .15   1202.00
   3011.0      74.4    2264.9     671.7      18.0     193.9     146.6     211.1      50.0   1202.00
      .47      4.13     11.68      4.58      .040      .030      .050      .000   1199.40   9975.51
  .005813      505.      510.       510.         2         0         0       .00     99.49  10075.00


*SECNO 3.148

3301 HV CHANGED MORE THAN HVINS


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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
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     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 3470 ENCROACHMENT STATIONS=      9977.7   10100.0  TYPE=       1  TARGET=       122.300
      3.148       9.03    1209.03        .00    1208.87    1209.96        .93       2.42        .07  100000.00
     3011.0        .0     2465.9      545.1         .0      291.9      178.0      216.5       51.5    1206.00
        .49        .00       8.45       3.06       .000       .030       .050       .000    1200.00    9977.70
    .003177       575.       575.       580.          2          0          0        .00     122.30   10100.00


 *SECNO 3.250
 3585 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=      9939.6   10150.0  TYPE=       1  TARGET=       210.380

           DOWNSTREAM OF INDIAN SCHOOL ROAD EXTENDED

           CONFLUENCE OF TRACTOR WASH

      3.250       2.81    1213.71    1213.71    1213.72    1214.70        .99       2.69        .02    1212.00
     3011.0       83.0     2795.2      132.8       25.7      339.7       39.4      221.8       53.5    1212.00
        .51       3.23       8.23       3.37       .040       .030       .050       .000    1210.90    9939.99
    .009278       515.       535.       505.         20         17          0        .00     210.01   10150.00


 *SECNO 3.344

 3301 HV CHANGED MORE THAN HVINS


 3470 ENCROACHMENT STATIONS=      9978.4   10150.0  TYPE=       1  TARGET=       171.570

           Q @ X1 = 3.344 TO X1 = 3.912 EQUALS Q AT CP25
           Q = 1414 CFS

      3.344       3.85    1216.65        .00    1216.64    1216.84        .19       2.06        .08    1214.00
     1414.0       14.3     1282.6      117.1         8.9      354.1       68.7      226.6       55.7    1214.00
        .55       1.61       3.62       1.71       .040       .030       .050       .000    1212.80    9978.43
    .001407       495.       500.       505.          3          0          0        .00     171.57   10150.00


 *SECNO 3.439
1
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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.71


 3470 ENCROACHMENT STATIONS=      9974.8   10150.0  TYPE=       1  TARGET=       175.170
      3.439       3.65    1217.15        .00    1217.11    1217.24        .09        .38        .01    1214.00
     1414.0        8.3     1405.7         .0         8.3      577.8         .0      232.5       57.6  100000.00
        .61       1.00       2.43        .00        .040       .030       .000       .000    1213.50    9974.83
    .000484       500.       500.       500.          3          0          0        .00     175.17   10150.00


 *SECNO 3.535

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=      9976.9   10089.4  TYPE=       1  TARGET=       112.520
      3.535       2.46    1217.26    1217.26    1217.25    1218.15        .89        .66        .24    1216.00
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    1414.0       5.3    1395.4      13.3       2.0     183.5       6.0     237.0      59.3   1216.00
       .62      2.67      7.60      2.24      .040      .030      .050      .000   1214.80   9976.87
   .010515      500.       505.      500.         3        19         0       .00    112.52  10089.39

*SECNO 3.631

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9976.7   10031.7  TYPE=       1  TARGET=       55.040
     3.631      4.03   1222.23   1222.23   1222.23   1223.70      1.46      4.83       .17   1220.00
    1414.0      12.3    1383.0      18.7       3.7     141.0       6.4     239.0      60.3   1220.00
       .64      3.28      9.81      2.94      .040      .030      .050      .000   1218.20   9976.66
   .008589      510.       510.      510.         3        14         0       .00     55.04  10031.70

*SECNO 3.724
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3470 ENCROACHMENT STATIONS=     9975.8   10070.0  TYPE=       1  TARGET=       94.180
     3.724      4.61   1231.21   1231.21   1230.42   1232.28      1.07      3.97       .04   1230.00
    1414.0      12.1    1262.1      139.8       4.2     144.4      48.3     240.9      61.1   1230.00
       .66      2.89      8.74      2.90      .040      .030      .050      .000   1226.60   9975.82
   .007684      495.       490.      480.        20         8         0       .00     94.18  10070.00

*SECNO 3.818
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9981.3   10070.0  TYPE=       1  TARGET=       88.660
     3.818      3.98   1236.28   1236.28   1236.20   1237.39      1.11      4.29       .01   1234.00
    1414.0      15.9    1104.3      293.8       4.3     118.4      70.5     243.2      62.2   1235.30
       .67      3.67      9.33      4.16      .040      .030      .050      .000   1232.30   9981.34
   .009832      495.       495.      500.         3        15         0       .00     88.66  10070.00

*SECNO 3.912
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9972.3   10070.0  TYPE=       1  TARGET=       97.710
     3.912      4.01   1243.11   1243.11   1243.08   1244.24      1.13      3.91       .00   1240.00
    1414.0      46.5    1158.5      209.0      12.1     124.7      67.8     245.4      63.2   1240.00
       .69      3.84      9.29      3.08      .040      .030      .050      .000   1239.10   9972.29
   .006470      495.       495.      495.         4         5         0       .00     97.71  10070.00

*SECNO 4.006
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9980.9   10041.6  TYPE=       1  TARGET=       60.699

          Q @ X1 = 4.006 TO X1 = 4.653 EQUALS (Q AT CP25 + Q AT CP22A)/2
          Q = (1414 + 1108)/2 = 1261 CFS

     4.006      3.65   1249.65   1249.65   1249.66   1250.86      1.21      3.98       .02 100000.00
    1261.0        .0    1261.0        .0        .0     143.0        .0     247.4      64.1 100000.00
       .70        .00      8.82       .00      .000      .030      .000      .000   1246.00   9980.88
   .010292      500.       500.      505.        20        11         0       .00     60.63  10041.50
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4.101
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9920.0 10070.0 TYPE= 1 TARGET= 150.000

4.101	2.16	1257.96	1257.96	1257.84	1258.67	.71	5.00	.05	1256.50
1261.0	170.2	943.3	147.5	47.5	125.0	41.6	249.5	65.3	1256.50
.73	3.58	7.55	3.54	.040	.030	.050	.000	1255.80	9920.00
.009722	495.	500.	500.	5	14	0	.00	150.00	10070.00

*SECNO 4.196
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9967.5 10058.1 TYPE= 1 TARGET= 90.620

4.196	3.25	1263.05	1263.05	1263.02	1264.11	1.05	4.45	.10	100000.00
1261.0	.0	1228.7	32.3	.0	147.3	18.0	251.6	66.7	1262.00
.74	.00	8.34	1.79	.000	.030	.050	.000	1259.80	9967.46
.008204	500.	500.	495.	2	14	0	.00	90.62	10058.08

*SECNO 4.289
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9949.6 10070.0 TYPE= 1 TARGET= 120.410

UPSTREAM OF CAMELBACK ROAD EXTENDED

4.289	2.91	1270.31	1270.31	1270.34	1271.14	.83	4.50	.02	1268.00
1261.0	177.0	616.9	467.1	40.2	65.3	107.5	253.8	67.9	1268.00
.76	4.41	9.44	4.35	.040	.030	.050	.000	1267.40	9950.06
.010119	495.	495.	495.	12	15	0	.00	119.93	10070.00

*SECNO 4.375

3470 ENCROACHMENT STATIONS= 9992.1 10090.0 TYPE= 1 TARGET= 97.920

4.375	2.79	1274.49	.00	1274.33	1275.24	.75	4.09	.01	1272.00
1261.0	13.0	682.9	565.1	3.9	79.2	131.6	256.0	69.0	1272.00
.78	3.37	8.62	4.29	.040	.030	.050	.000	1271.70	9992.08
.008299	445.	450.	445.	3	0	0	.00	97.92	10090.00

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4.469

3470 ENCROACHMENT STATIONS= 9984.5 10090.0 TYPE= 1 TARGET= 105.460

4.469	3.05	1278.15	.00	1278.18	1278.86	.71	3.61	.00	1276.00
1261.0	37.1	971.8	252.1	11.6	130.2	76.4	258.5	70.2	1276.00
.80	3.21	7.46	3.30	.040	.030	.050	.000	1275.10	9984.62
.006352	500.	500.	500.	4	0	0	.00	105.38	10090.00

*SECNO 4.563

3470 ENCROACHMENT STATIONS= 9973.2 10070.0 TYPE= 1 TARGET= 96.760

4.563	3.43	1281.53	1281.51	1281.57	1282.47	.94	3.54	.07	1280.00
1261.0	24.8	1119.8	116.4	8.9	136.8	37.9	260.8	71.3	1280.00
.82	2.80	8.18	3.07	.040	.030	.050	.000	1278.10	9973.47
.008132	500.	495.	495.	4	8	0	.00	96.53	10070.00

*SECNO 4.653

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.26

3470 ENCROACHMENT STATIONS= 9961.0 10070.0 TYPE= 1 TARGET= 109.050

4.653	3.98	1283.68	.00	1283.61	1283.99	.31	1.46	.06	1282.00
1261.0	4.5	1209.8	46.6	3.6	264.7	35.6	263.4	72.5	1282.00
.85	1.28	4.57	1.31	.040	.030	.050	.000	1279.70	9960.95
.001595	475.	475.	475.	3	0	0	.00	109.05	10070.00

*SECNO 4.725

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9970.1 10070.0 TYPE= 1 TARGET= 99.860

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Q @ X1= 4.725 EQUALS Q @ CP22A
Q = 1108 CFS

CONFLUENCE OF CATERPILLAR DIKE WASH

4.725	2.29	1285.29	1285.29	1285.30	1286.13	.84	1.15	.16	100000.00
1108.0	.0	1045.7	62.3	.0	138.5	24.8	265.4	73.4	1284.00
.87	.00	7.55	2.51	.000	.030	.050	.000	1283.00	9970.20
.009377	380.	380.	380.	20	11	0	.00	99.80	10070.00

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THIS RUN EXECUTED 18JAN02 15:45:39

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

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

TUTHILL DIKE WASH - WASH

SUMMARY PRINTOUT

SECNO	Q	CWSEL	SSTA	STCHL	STCHR	ENDST	DIFWSX	TOPWID	DEPTH	ELMIN	10*KS	VCH
.000	4057.00	1039.06	9945.48	9940.00	10075.00	10068.73	.00	123.25	6.06	1033.00	43.68	8.22
.000	4057.00	1039.06	9945.48	9940.00	10075.00	10068.73	.00	123.25	6.06	1033.00	43.67	8.22
.075	4057.00	1040.84	9888.88	9960.00	10070.00	10073.38	1.79	184.50	5.84	1035.00	27.90	6.93

6.98	.075	4057.00	1040.84	9910.00	9960.00	10070.00	10073.36	1.78	163.36	5.84	1035.00	28.33
* 9.35	.186	4057.00	1043.71	9751.25	9970.00	10050.00	10068.55	2.87	294.60	5.21	1038.50	45.59
* 11.21	.186	4057.00	1043.25	9953.74	9970.00	10050.00	10066.26	2.41	112.53	4.75	1038.50	75.16
* 7.50	.314	4057.00	1047.99	9353.42	9950.00	10080.00	10079.95	4.28	535.64	5.49	1042.50	39.51
8.16	.314	4057.00	1048.06	9945.41	9950.00	10080.00	10080.00	4.80	134.59	5.56	1042.50	45.66
* 7.29	.415	4057.00	1051.93	9545.90	9940.00	10060.00	10270.29	3.94	724.39	4.73	1047.20	47.17
* 9.18	.415	4057.00	1051.88	9940.00	9940.00	10060.00	10175.00	3.83	235.00	4.68	1047.20	77.95
* 8.31	.540	4057.00	1057.55	9911.75	9930.00	10040.00	10311.47	5.62	399.72	4.55	1053.00	53.00
* 9.54	.540	4057.00	1057.46	9912.87	9930.00	10040.00	10110.00	5.57	197.13	4.46	1053.00	72.54
* 10.29	.634	4057.00	1061.80	9950.98	9970.00	10040.00	10162.52	4.25	211.54	5.00	1056.80	59.83
* 10.63	.634	4057.00	1061.79	9951.07	9970.00	10040.00	10105.00	4.33	153.93	4.99	1056.80	64.21
* 9.25	.729	4057.00	1065.30	9953.52	9960.00	10085.00	10221.80	3.49	268.28	4.60	1060.70	70.72
9.60	.729	4057.00	1065.34	9953.52	9960.00	10085.00	10085.00	3.55	131.48	4.64	1060.70	75.84
* 11.80	.823	4057.00	1070.92	9952.71	9955.00	10030.00	10045.27	5.62	92.56	6.42	1064.50	76.65
* 1.73	.823	4057.00	1070.94	9952.71	9955.00	10030.00	10045.27	5.60	92.56	6.44	1064.50	75.23
11.34	.917	4057.00	1074.73	9956.30	9965.00	10040.00	10073.28	3.82	116.97	5.43	1069.30	68.23
11.46	.917	4057.00	1074.71	9956.49	9965.00	10040.00	10050.00	3.77	93.51	5.41	1069.30	70.36
* 11.66	1.012	4057.00	1080.73	9936.36	9940.00	10020.00	10028.56	5.99	92.19	5.03	1075.70	80.31
* 11.61	1.012	4057.00	1080.75	9936.36	9940.00	10020.00	10028.56	6.04	92.20	5.05	1075.70	79.12

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VCH	SECNO	Q	CWSEL	SSTA	STCHL	STCHR	ENDST	DIFWSX	TOPWID	DEPTH	ELMIN	10*KS
* 14.40	1.067	4061.00	1085.01	9977.70	9977.70	10022.00	10022.00	4.28	44.30	6.37	1078.64	20.40
* 14.40	1.067	4061.00	1085.01	9977.70	9977.70	10022.00	10022.00	4.26	44.30	6.37	1078.64	24.23
* 6.29	1.110	4061.00	1093.14	9950.00	9977.70	10022.00	10022.00	8.13	72.00	12.04	1081.10	1.66
* 6.08	1.110	4061.00	1093.16	9950.00	9977.70	10022.00	10022.00	8.15	72.00	12.06	1081.10	2.14
* 3.02	1.118	5503.00	1093.65	9920.00	9920.00	10030.00	10100.00	.51	180.00	12.15	1081.50	.61
* 3.02	1.118	5503.00	1093.64	9920.00	9920.00	10030.00	10100.00	.48	180.00	12.14	1081.50	.61
* 4.27	1.152	5503.00	1093.62	9930.00	9930.00	10045.00	10150.00	-.03	220.00	11.62	1082.00	5.06
* 4.28	1.152	5503.00	1093.61	9930.00	9930.00	10045.00	10150.00	-.03	220.00	11.61	1082.00	5.08
77	1.198	5503.00	1093.60	9936.00	9945.00	10030.00	10200.00	-.02	264.00	8.30	1085.30	15.17

* 6.79	1.198	5503.00	1093.59	9936.02	9945.00	10030.00	10200.00	-.02	263.98	8.29	1085.30	15.26
* 11.82	1.260	6601.00	1097.03	9962.42	9975.00	10045.00	10200.00	3.43	237.58	5.53	1091.50	72.04
* 11.81	1.260	6601.00	1097.03	9962.42	9975.00	10045.00	10200.00	3.44	237.58	5.53	1091.50	71.96
* 10.73	1.287	6601.00	1099.25	9973.76	9980.00	10145.00	10166.83	2.22	193.07	5.25	1094.00	82.25
* 10.88	1.287	6601.00	1099.21	9973.96	9980.00	10145.00	10145.00	2.18	171.04	5.21	1094.00	86.45
* 12.31	1.313	6601.00	1100.98	9920.14	9950.00	10025.00	10079.76	1.73	159.62	5.98	1095.00	64.05
* 12.31	1.313	6601.00	1100.98	9920.14	9950.00	10025.00	10079.77	1.76	159.63	5.98	1095.00	64.01
* 4.29	1.322	6601.00	1103.29	9877.18	9930.00	10110.00	10110.00	2.31	232.82	8.29	1095.00	5.11
* 4.29	1.322	6601.00	1103.29	9877.18	9930.00	10110.00	10110.00	2.31	232.82	8.29	1095.00	5.11
* 2.83	1.362	6225.00	1103.50	9878.68	9950.00	10045.00	10100.00	.22	221.32	21.50	1082.00	.70
* 2.83	1.362	6225.00	1103.50	9878.68	9950.00	10045.00	10100.00	.22	221.32	21.50	1082.00	.70
* 13.06	1.422	6225.00	1106.40	9948.99	9945.00	10045.00	10041.01	2.90	92.02	7.90	1098.50	79.69
* 13.06	1.422	6225.00	1106.40	9949.00	9945.00	10045.00	10041.00	2.90	92.01	7.90	1098.50	79.81
* 11.82	1.518	6225.00	1113.73	9969.41	9975.00	10055.00	10237.96	7.32	223.97	6.83	1106.90	63.46
* 3.31	1.518	6225.00	1114.26	9969.40	9975.00	10055.00	10069.94	7.86	100.54	7.36	1106.90	70.69
* 12.29	1.614	6225.00	1123.45	9967.73	9975.00	10055.00	10150.65	9.73	182.92	9.55	1113.90	56.71
* 12.59	1.614	6225.00	1123.35	9968.26	9975.00	10055.00	10110.00	9.09	141.74	9.45	1113.90	60.91
* 13.09	1.710	6168.00	1130.93	9967.67	9965.00	10070.00	10056.63	7.48	88.96	10.93	1120.00	79.58
* 13.05	1.710	6168.00	1130.94	9967.64	9965.00	10070.00	10056.80	7.60	89.16	10.94	1120.00	79.14
* 13.70	1.805	6168.00	1138.10	9969.75	9970.00	10050.00	10053.79	7.17	84.04	10.50	1127.60	80.51
* 13.71	1.805	6168.00	1138.10	9969.75	9970.00	10050.00	10050.00	7.15	80.25	10.50	1127.60	80.74
* 14.15	1.898	6168.00	1145.29	9972.07	9980.00	10020.00	10137.22	7.19	165.15	7.99	1137.30	62.27
* 15.39	1.898	6168.00	1145.20	9972.21	9980.00	10020.00	10070.00	7.10	97.79	7.90	1137.30	75.02
* 12.91	1.994	6168.00	1152.38	9969.06	9975.00	10050.00	10092.81	7.09	123.75	8.88	1143.50	62.41
* 12.86	1.994	6168.00	1152.40	9969.06	9975.00	10050.00	10092.81	7.20	123.75	8.90	1143.50	61.60

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VCH	SECNO	Q	CWSEL	SSTA	STCHL	STCHR	ENDST	DIFWSX	TOPWID	DEPTH	ELMIN	10*KS
* 12.83	2.088	6168.00	1159.36	9971.61	9975.00	10055.00	10100.18	6.98	128.57	9.26	1150.10	67.93
* 13.60	2.088	6168.00	1159.28	9971.81	9975.00	10055.00	10055.00	6.88	83.19	9.18	1150.10	78.22
.67	2.170	6110.00	1167.39	9964.34	9940.00	10135.00	10128.94	8.04	164.60	4.79	1162.60	89.04

* 10.69	2.170	6110.00	1167.39	9964.35	9940.00	10135.00	10128.89	8.11	164.54	4.79	1162.60	89.45
* 12.86	2.279	6110.00	1176.61	9945.88	9940.00	10045.00	10039.91	9.21	94.03	7.31	1169.30	80.64
* 12.88	2.279	6110.00	1176.60	9945.93	9940.00	10045.00	10039.90	9.21	93.96	7.30	1169.30	81.03
* 10.86	2.373	6110.00	1180.51	9950.04	9960.00	10015.00	10168.84	3.91	218.80	8.51	1172.00	37.63
12.07	2.373	6110.00	1180.37	9952.76	9960.00	10015.00	10080.00	3.77	127.24	8.37	1172.00	47.66
* 13.95	2.468	6110.00	1184.94	9941.03	9975.00	10015.00	10120.81	4.43	179.79	7.64	1177.30	63.04
* 14.24	2.468	6110.00	1184.87	9941.55	9975.00	10015.00	10080.00	4.49	138.45	7.57	1177.30	66.70
* 11.75	2.563	6110.00	1191.10	9944.81	9980.00	10025.00	10288.70	6.15	343.89	8.80	1182.30	35.64
* 13.52	2.563	6110.00	1190.92	9948.00	9980.00	10025.00	10100.00	6.06	152.00	8.62	1182.30	48.55
* 12.93	2.659	6110.00	1193.87	9968.55	9975.00	10025.00	10158.41	2.78	189.86	8.07	1185.80	53.84
* 13.79	2.659	6110.00	1193.80	9968.67	9975.00	10025.00	10100.00	2.87	131.32	8.00	1185.80	62.18
* 7.88	2.753	3011.00	1197.53	9917.67	9975.00	10070.00	10162.31	3.66	240.61	7.23	1190.30	43.86
6.88	2.753	3011.00	1197.96	9917.67	9975.00	10070.00	10110.00	4.17	192.33	7.66	1190.30	28.94
* 11.09	2.848	3011.00	1200.23	9964.14	9980.00	10025.00	10080.27	2.70	116.13	7.03	1193.20	58.81
* .19	2.848	3011.00	1200.20	9964.27	9980.00	10025.00	10079.49	2.24	115.22	7.00	1193.20	60.48
9.37	2.943	3011.00	1203.43	9960.50	9945.00	10020.00	10067.89	3.19	107.39	7.63	1195.80	49.11
9.30	2.943	3011.00	1203.46	9960.50	9945.00	10020.00	10067.90	3.26	107.40	7.66	1195.80	47.97
* 11.18	3.057	3011.00	1205.87	9975.33	9985.00	10020.00	10143.80	2.44	168.47	6.47	1199.40	52.35
11.68	3.057	3011.00	1205.79	9975.51	9985.00	10020.00	10075.00	2.34	99.49	6.39	1199.40	58.13
8.14	3.148	3011.00	1208.87	9976.87	9975.00	10030.00	10203.52	3.00	226.65	8.87	1200.00	30.81
8.45	3.148	3011.00	1209.03	9977.70	9975.00	10030.00	10100.00	3.23	122.30	9.03	1200.00	31.77
* 8.19	3.250	3011.00	1213.72	9939.93	9970.00	10120.00	10184.43	4.85	244.49	2.82	1210.90	91.73
* 8.23	3.250	3011.00	1213.71	9939.99	9970.00	10120.00	10150.00	4.69	210.01	2.81	1210.90	92.78
3.61	3.344	1414.00	1216.64	9978.40	9985.00	10115.00	10200.27	2.92	221.88	3.84	1212.80	14.09
3.62	3.344	1414.00	1216.65	9978.43	9985.00	10115.00	10150.00	2.94	171.57	3.85	1212.80	14.07
* 2.27	3.439	1414.00	1217.11	9974.82	9980.00	10150.00	10216.65	.47	241.84	3.61	1213.50	4.18
* 2.43	3.439	1414.00	1217.15	9974.83	9980.00	10150.00	10150.00	.49	175.17	3.65	1213.50	4.84
* 7.64	3.535	1414.00	1217.25	9976.87	9980.00	10080.00	10089.39	.15	112.52	2.45	1214.80	106.74
* 7.60	3.535	1414.00	1217.26	9976.87	9980.00	10080.00	10089.39	.11	112.52	2.46	1214.80	105.15
*	3.631	1414.00	1222.23	9976.66	9980.00	10025.00	10031.71	4.98	55.05	4.03	1218.20	86.40
	3.631	1414.00	1222.23	9976.66	9980.00	10025.00	10031.70	4.97	55.04	4.03	1218.20	85.89

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VCH	SECNO	Q	CWSEL	SSTA	STCHL	STCHR	ENDST	DIFWSX	TOPWID	DEPTH	ELMIN	10*KS
* 8.14	3.724	1414.00	1230.42	9975.81	9980.00	10030.00	10169.19	8.19	193.38	3.82	1226.60	101.83
* 8.74	3.724	1414.00	1231.21	9975.82	9980.00	10030.00	10070.00	8.97	94.18	4.61	1226.60	76.84
* 7.62	3.818	1414.00	1236.20	9981.34	9985.00	10030.00	10236.35	5.78	255.01	3.90	1232.30	68.55
* 9.33	3.818	1414.00	1236.28	9981.34	9985.00	10030.00	10070.00	5.07	88.66	3.98	1232.30	98.32
* 9.41	3.912	1414.00	1243.08	9972.29	9980.00	10015.00	10071.64	6.89	99.34	3.98	1239.10	67.25
* 9.29	3.912	1414.00	1243.11	9972.29	9980.00	10015.00	10070.00	6.83	97.71	4.01	1239.10	64.70
* 8.79	4.006	1261.00	1249.66	9980.86	9980.00	10045.00	10041.56	6.57	60.70	3.66	1246.00	102.22
* 8.82	4.006	1261.00	1249.65	9980.88	9980.00	10045.00	10041.50	6.54	60.63	3.65	1246.00	102.92
* 7.18	4.101	1261.00	1257.84	9920.00	9975.00	10040.00	10135.33	8.18	215.32	2.04	1255.80	95.74
* 7.55	4.101	1261.00	1257.96	9920.00	9975.00	10040.00	10070.00	8.31	150.00	2.16	1255.80	97.22
* 8.48	4.196	1261.00	1263.02	9967.46	9965.00	10025.00	10058.08	5.18	90.62	3.22	1259.80	86.23
* 7.34	4.196	1261.00	1263.05	9967.46	9965.00	10025.00	10058.08	5.10	90.62	3.25	1259.80	82.04
* 8.72	4.289	1261.00	1270.34	9949.59	9985.00	10010.00	10138.71	7.32	189.12	2.94	1267.40	84.90
* 9.44	4.289	1261.00	1270.31	9950.06	9985.00	10010.00	10070.00	7.26	119.93	2.91	1267.40	101.19
9.05	4.375	1261.00	1274.33	9992.08	9995.00	10025.00	10117.49	3.99	125.41	2.63	1271.70	99.41
8.62	4.375	1261.00	1274.49	9992.08	9995.00	10025.00	10090.00	4.17	97.92	2.79	1271.70	82.99
6.96	4.469	1261.00	1278.18	9984.54	9995.00	10045.00	10159.13	3.85	174.58	3.08	1275.10	54.39
7.46	4.469	1261.00	1278.15	9984.62	9995.00	10045.00	10090.00	3.67	105.38	3.05	1275.10	63.52
* 7.86	4.563	1261.00	1281.57	9973.24	9985.00	10040.00	10126.25	3.39	153.01	3.47	1278.10	73.88
8.18	4.563	1261.00	1281.53	9973.47	9985.00	10040.00	10070.00	3.38	96.53	3.43	1278.10	81.32
* 4.67	4.653	1261.00	1283.61	9960.95	9965.00	10040.00	10088.64	2.05	127.69	3.91	1279.70	17.11
* 4.57	4.653	1261.00	1283.68	9960.95	9965.00	10040.00	10070.00	2.15	109.05	3.98	1279.70	15.95
* 7.52	4.725	1108.00	1285.30	9970.14	9965.00	10040.00	10082.30	1.69	112.17	2.30	1283.00	92.27
* 7.55	4.725	1108.00	1285.29	9970.20	9965.00	10040.00	10070.00	1.61	99.80	2.29	1283.00	93.77

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TUTHILL DIKE WASH - WASH

SUMMARY PRINTOUT TABLE 110

STENCR	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR

	.000	1039.06	-.94	1040.11	123.25	.00	4057.00	.00	.00	.00	9940.00	10075.00
.00												
	.000	1039.06	.00	1040.11	123.25	.00	4057.00	.00	123.25	9945.48	9940.00	10075.00
10068.73												
	.075	1040.84	.00	1041.52	184.50	758.82	3296.64	1.55	.00	.00	9960.00	10070.00
.00												
	.075	1040.84	-.01	1041.53	163.36	740.68	3314.79	1.53	163.38	9910.00	9960.00	10070.00
10073.38												
*	.186	1043.71	.00	1044.90	294.60	428.50	3499.86	128.64	.00	.00	9970.00	10050.00
.00												
*	.186	1043.25	-.46	1045.10	112.53	155.07	3785.63	116.30	118.55	9950.00	9970.00	10050.00
10068.55												
*	.314	1047.99	.00	1048.79	535.64	391.03	3665.97	.00	.00	.00	9950.00	10080.00
.00												
	.314	1048.06	.07	1049.09	134.59	.04	4056.96	.00	155.00	9925.00	9950.00	10080.00
10080.00												
*	.415	1051.93	.00	1052.53	724.39	670.95	2744.45	641.59	.00	.00	9940.00	10060.00
.00												
*	.415	1051.88	-.05	1053.02	235.00	.00	3407.42	649.58	235.00	9940.00	9940.00	10060.00
10175.00												
*	.540	1057.55	.00	1058.43	399.72	42.96	3203.28	810.75	.00	.00	9930.00	10040.00
.00												
*	.540	1057.46	-.09	1058.73	197.13	42.49	3580.08	434.43	198.25	9911.75	9930.00	10040.00
10110.00												
*	.634	1061.80	.00	1063.16	211.54	210.06	3172.71	674.23	.00	.00	9970.00	10040.00
.00												
*	.634	1061.79	-.02	1063.28	153.93	214.97	3265.15	576.88	154.02	9950.98	9970.00	10040.00
10105.00												
*	.729	1065.30	.00	1066.56	268.28	12.93	3836.70	207.37	.00	.00	9960.00	10085.00
.00												
	.729	1065.34	.04	1066.77	131.48	15.03	4041.97	.00	131.48	9953.52	9960.00	10085.00
10085.00												
*	.823	1070.92	.00	1073.07	92.56	2.57	4040.92	13.51	.00	.00	9955.00	10030.00
.00												
*	.823	1070.94	.02	1073.07	92.56	2.77	4039.64	14.59	92.56	9952.71	9955.00	10030.00
10045.27												
	.917	1074.73	.00	1076.70	116.97	51.83	3985.72	19.45	.00	.00	9965.00	10040.00
.00												
	.917	1074.71	-.03	1076.72	93.51	50.50	3993.93	12.57	93.70	9956.30	9965.00	10040.00
10050.00												
*	1.012	1080.73	.00	1082.83	92.19	2.95	4048.78	5.27	.00	.00	9940.00	10020.00
.00												
*	1.012	1080.75	.02	1082.83	92.20	3.18	4048.14	5.68	92.20	9936.36	9940.00	10020.00
10028.56												
*	1.067	1085.01	.00	1088.23	44.30	.00	4061.00	.00	.00	.00	9977.70	10022.00
.00												
*	1.067	1085.01	.00	1088.23	44.30	.00	4061.00	.00	44.30	9977.70	9977.70	10022.00
10022.00												
*	1.110	1093.14	.00	1093.68	72.00	708.59	3352.41	.00	.00	.00	9977.70	10022.00
.00												
*	1.110	1093.16	.03	1093.68	72.00	809.08	3251.92	.00	72.00	9950.00	9977.70	10022.00
10022.00												
*	1.118	1093.65	.00	1093.81	180.00	.00	2898.01	2604.99	180.00	9920.00	9920.00	10030.00
10100.00												
*	1.118	1093.64	-.01	1093.80	180.00	.00	2897.52	2605.48	180.00	9920.00	9920.00	10030.00
10100.00												
*	1.152	1093.62	.00	1093.85	220.00	.00	3764.59	1738.41	220.00	9930.00	9930.00	10045.00
10150.00												
*	1.152	1093.61	-.01	1093.84	220.00	.00	3765.19	1737.81	220.00	9930.00	9930.00	10045.00
10150.00												
	1.198	1093.60	.00	1094.14	264.00	50.19	3827.44	1625.36	275.00	9925.00	9945.00	10030.00
10200.00												

* 10200.00	1.198	1093.59	-.01	1094.13	263.98	50.02	3830.34	1622.65	275.00	9925.00	9945.00	10030.00

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STENCR	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR
* 10200.00	1.260	1097.03	.00	1098.55	237.58	138.58	3925.92	2536.50	255.00	9945.00	9975.00	10045.00
* 10200.00	1.260	1097.03	.00	1098.55	237.58	138.65	3925.39	2536.96	255.00	9945.00	9975.00	10045.00
* .00	1.287	1099.25	.00	1101.02	193.07	12.60	6554.93	33.47	.00	.00	9980.00	10145.00
* 10145.00	1.287	1099.21	-.03	1101.05	171.04	12.06	6588.94	.00	171.04	9973.96	9980.00	10145.00
* 10080.00	1.313	1100.98	.00	1102.96	159.62	610.87	5056.85	933.28	159.86	9920.14	9950.00	10025.00
* 10080.00	1.313	1100.98	.00	1102.96	159.63	610.99	5056.60	933.41	159.86	9920.14	9950.00	10025.00
* 10110.00	1.322	1103.29	.00	1103.56	232.82	594.12	6006.88	.00	234.10	9875.90	9930.00	10110.00
* 10110.00	1.322	1103.29	.00	1103.56	232.82	594.10	6006.90	.00	234.10	9875.90	9930.00	10110.00
* 10100.00	1.362	1103.50	.00	1103.61	221.32	550.32	4859.70	814.98	222.76	9877.24	9950.00	10045.00
* 10100.00	1.362	1103.50	.00	1103.61	221.32	550.31	4859.72	814.97	222.76	9877.24	9950.00	10045.00
* 00	1.422	1106.40	.00	1109.05	92.02	.00	6225.00	.00	.00	.00	9945.00	10045.00
* 10045.00	1.422	1106.40	.00	1109.05	92.01	.00	6225.00	.00	96.01	9948.99	9945.00	10045.00
* .00	1.518	1113.73	.00	1115.52	223.97	41.35	4942.83	1240.82	.00	.00	9975.00	10055.00
* 10090.00	1.518	1114.26	.53	1116.97	100.54	62.90	6125.60	36.50	120.60	9969.40	9975.00	10055.00
* .00	1.614	1123.45	.00	1125.74	182.92	11.82	6049.90	163.28	.00	.00	9975.00	10055.00
* 10110.00	1.614	1123.35	-.11	1125.76	141.74	9.99	6088.93	126.09	142.28	9967.72	9975.00	10055.00
* .00	1.710	1130.93	.00	1133.59	88.96	.00	6168.00	.00	.00	.00	9965.00	10070.00
* 10070.00	1.710	1130.94	.01	1133.59	89.16	.00	6168.00	.00	105.00	9965.00	9965.00	10070.00
* .00	1.805	1138.10	.00	1141.02	84.04	.00	6167.93	.07	.00	.00	9970.00	10050.00
* 10050.00	1.805	1138.10	.00	1141.02	80.25	.00	6168.00	.00	80.25	9969.75	9970.00	10050.00
* .00	1.898	1145.29	.00	1147.47	165.15	104.04	3941.38	2122.57	.00	.00	9980.00	10020.00
* 10070.00	1.898	1145.20	-.09	1147.98	97.79	108.94	4230.92	1828.14	97.93	9972.07	9980.00	10020.00
* .00	1.994	1152.38	.00	1154.89	123.75	22.09	5985.94	159.97	.00	.00	9975.00	10050.00
* 10092.81	1.994	1152.40	.02	1154.89	123.75	22.57	5982.18	163.25	123.75	9969.06	9975.00	10050.00
* .00	2.088	1159.36	.00	1161.81	128.57	5.18	5894.26	268.56	.00	.00	9975.00	10055.00
* 10055.00	2.088	1159.28	-.08	1162.15	83.19	4.71	6163.29	.00	83.55	9971.45	9975.00	10055.00
* .00	2.170	1167.39	.00	1169.16	164.60	.00	6110.00	.00	.00	.00	9940.00	10135.00

*	2.170	1167.39	-.01	1169.16	164.54	.00	6110.00	.00	164.59	9964.34	9940.00	10135.00
10128.93												
*	2.279	1176.61	.00	1179.18	94.03	.00	6110.00	.00	.00	.00	9940.00	10045.00
.00												
*	2.279	1176.60	-.01	1179.18	93.96	.00	6110.00	.00	94.03	9945.88	9940.00	10045.00
10039.91												
*	2.373	1180.51	.00	1181.92	218.80	2.34	4486.02	1621.63	.00	.00	9960.00	10015.00
.00												
	2.373	1180.37	-.14	1182.27	127.24	1.13	4892.54	1216.33	129.96	9950.04	9960.00	10015.00
10080.00												
*	2.468	1184.94	.00	1187.04	179.79	449.44	3786.99	1873.57	.00	.00	9975.00	10015.00
.00												
*	2.468	1184.87	-.08	1187.08	138.45	443.59	3822.84	1843.57	138.97	9941.03	9975.00	10015.00
10080.00												

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STENCR	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR
*	2.563	1191.10	.00	1192.63	343.89	348.43	4202.68	1558.89	.00	.00	9980.00	10025.00
.00												
*	2.563	1190.92	-.17	1193.20	152.00	372.72	4728.33	1008.95	155.19	9944.81	9980.00	10025.00
10100.00												
*	2.659	1193.87	.00	1195.83	189.86	47.76	4397.96	1664.27	.00	.00	9975.00	10025.00
.00												
*	2.659	1193.80	-.08	1196.15	131.32	48.64	4637.09	1424.27	131.45	9968.55	9975.00	10025.00
10100.00												
*	2.753	1197.53	.00	1198.44	240.61	102.69	2842.00	66.30	.00	.00	9975.00	10070.00
.00												
	2.753	1197.96	.43	1198.64	192.33	167.09	2762.56	81.34	192.33	9917.67	9975.00	10070.00
10110.00												
*	2.848	1200.23	.00	1201.89	116.13	60.41	2561.68	388.91	.00	.00	9980.00	10025.00
.00												
*	2.848	1200.20	-.03	1201.89	115.22	58.35	2568.53	384.12	116.00	9964.00	9980.00	10025.00
10080.00												
	2.943	1203.43	.00	1204.62	107.39	.00	2530.01	480.99	.00	.00	9945.00	10020.00
.00												
	2.943	1203.46	.03	1204.63	107.40	.00	2527.37	483.63	107.40	9960.50	9945.00	10020.00
10067.90												
*	3.057	1205.87	.00	1207.34	168.47	74.34	2197.03	739.63	.00	.00	9985.00	10020.00
.00												
	3.057	1205.79	-.08	1207.47	99.49	74.43	2264.87	671.69	100.00	9975.00	9985.00	10020.00
10075.00												
	3.148	1208.87	.00	1209.68	226.65	.00	2315.50	695.50	.00	.00	9975.00	10030.00
.00												
	3.148	1209.03	.15	1209.96	122.30	.00	2465.91	545.09	122.30	9977.70	9975.00	10030.00
10100.00												
*	3.250	1213.72	.00	1214.69	244.49	82.95	2785.74	142.31	.00	.00	9970.00	10120.00
.00												
*	3.250	1213.71	.00	1214.70	210.01	83.01	2795.18	132.80	210.38	9939.62	9970.00	10120.00
10150.00												
	3.344	1216.64	.00	1216.82	221.88	13.93	1266.85	133.22	.00	.00	9985.00	10115.00
.00												
	3.344	1216.65	.02	1216.84	171.57	14.29	1282.57	117.14	171.57	9978.43	9985.00	10115.00
10150.00												
*	3.439	1217.11	.00	1217.18	241.84	7.42	1297.41	109.18	.00	.00	9980.00	10150.00
.00												
*	3.439	1217.15	.04	1217.24	175.17	8.28	1405.72	.00	175.17	9974.83	9980.00	10150.00
10150.00												
*	3.535	1217.25	.00	1218.15	112.52	5.24	1395.62	13.14	.00	.00	9980.00	10080.00
.00												

* 3.535	1217.26	.01	1218.15	112.52	5.30	1395.38	13.31	112.52	9976.87	9980.00	10080.00
10089.39											
* 3.631	1222.23	.00	1223.70	55.05	12.22	1383.14	18.64	.00	.00	9980.00	10025.00
.00											
* 3.631	1222.23	.01	1223.70	55.04	12.27	1383.00	18.72	55.04	9976.66	9980.00	10025.00
10031.70											
* 3.724	1230.42	.00	1231.14	193.38	1.16	853.94	558.90	.00	.00	9980.00	10030.00
.00											
* 3.724	1231.21	.79	1232.28	94.18	12.06	1262.13	139.81	94.18	9975.82	9980.00	10030.00
10070.00											
* 3.818	1236.20	.00	1236.79	255.01	11.87	872.57	529.56	.00	.00	9985.00	10030.00
.00											
* 3.818	1236.28	.09	1237.39	88.66	15.90	1104.35	293.75	88.66	9981.34	9985.00	10030.00
10070.00											
* 3.912	1243.08	.00	1244.24	99.34	45.93	1163.59	204.48	.00	.00	9980.00	10015.00
.00											
* 3.912	1243.11	.03	1244.24	97.71	46.48	1158.50	209.02	97.71	9972.29	9980.00	10015.00
10070.00											
* 4.006	1249.66	.00	1250.86	60.70	.00	1261.00	.00	.00	.00	9980.00	10045.00
.00											
* 4.006	1249.65	-.01	1250.86	60.63	.00	1261.00	.00	60.70	9980.86	9980.00	10045.00
10041.56											
* 4.101	1257.84	.00	1258.43	215.32	135.94	842.89	282.17	.00	.00	9975.00	10040.00
.00											
* 4.101	1257.96	.12	1258.67	150.00	170.23	943.26	147.51	150.00	9920.00	9975.00	10040.00
10070.00											

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SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR
STENCR											
* 4.196	1263.02	.00	1264.11	90.62	.00	1231.39	29.60	.00	.00	9965.00	10025.00
.00											
* 4.196	1263.05	.04	1264.11	90.62	.00	1228.73	32.27	90.62	9967.46	9965.00	10025.00
10058.08											
* 4.289	1270.34	.00	1270.99	189.12	168.54	575.92	516.54	.00	.00	9985.00	10010.00
.00											
* 4.289	1270.31	-.03	1271.14	119.93	176.99	616.87	467.14	120.41	9949.59	9985.00	10010.00
10070.00											
4.375	1274.33	.00	1275.14	125.41	11.84	674.38	574.78	.00	.00	9995.00	10025.00
.00											
4.375	1274.49	.15	1275.24	97.92	13.00	682.86	565.14	97.92	9992.08	9995.00	10025.00
10090.00											
4.469	1278.18	.00	1278.76	174.58	35.76	915.71	309.53	.00	.00	9995.00	10045.00
.00											
4.469	1278.15	-.03	1278.86	105.38	37.11	971.75	252.14	105.46	9984.54	9995.00	10045.00
10090.00											
* 4.563	1281.57	.00	1282.41	153.01	24.89	1089.25	146.86	.00	.00	9985.00	10040.00
.00											
4.563	1281.53	-.03	1282.47	96.53	24.78	1119.83	116.38	96.76	9973.24	9985.00	10040.00
10070.00											
* 4.653	1283.61	.00	1283.94	127.69	4.18	1214.70	42.13	.00	.00	9965.00	10040.00
.00											
* 4.653	1283.68	.07	1283.99	109.05	4.55	1209.83	46.63	109.05	9960.95	9965.00	10040.00
10070.00											
* 4.725	1285.30	.00	1286.14	112.17	.00	1048.99	59.01	.00	.00	9965.00	10040.00
.00											
* 4.725	1285.29	-.01	1286.13	99.80	.00	1045.74	62.26	99.86	9970.14	9965.00	10040.00
10070.00											

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SUMMARY OF ERRORS AND SPECIAL NOTES

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CAUTION SECNO=       .186  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .186  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .186  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .186  PROFILE=  2  MINIMUM SPECIFIC ENERGY

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CAUTION SECNO=       .314  PROFILE=  1  MINIMUM SPECIFIC ENERGY

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CAUTION SECNO=       .415  PROFILE=  1  MINIMUM SPECIFIC ENERGY
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CAUTION SECNO=       .415  PROFILE=  2  MINIMUM SPECIFIC ENERGY

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CAUTION SECNO=       .540  PROFILE=  1  MINIMUM SPECIFIC ENERGY
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CAUTION SECNO=       .540  PROFILE=  2  MINIMUM SPECIFIC ENERGY

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CAUTION SECNO=       .634  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .634  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
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CAUTION SECNO=       .634  PROFILE=  2  MINIMUM SPECIFIC ENERGY

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CAUTION SECNO=      1.012  PROFILE=  2  MINIMUM SPECIFIC ENERGY

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WARNING SECNO=      1.110  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=      1.110  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      1.118  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=      1.118  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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WARNING SECNO=      1.152  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=      1.152  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      1.198  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=      1.198  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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 WARNING SECNO=      1.362  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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 CAUTION SECNO=      1.898  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      1.898  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=      1.898  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      1.898  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      1.898  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=      1.994  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      1.994  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      1.994  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=      1.994  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      1.994  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      1.994  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=      2.088  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.088  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      2.088  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=      2.088  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.088  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      2.088  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=      2.170  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.170  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      2.170  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
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 CAUTION SECNO=      2.170  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.170  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      2.170  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=      2.279  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.279  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      2.279  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=      2.279  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.279  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      2.279  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=      2.373  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=      2.468  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.468  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      2.468  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=      2.468  PROFILE=  2  CRITICAL DEPTH ASSUMED
1
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 CAUTION SECNO=      2.468  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      2.468  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=      2.563  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.563  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      2.563  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=      2.563  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.563  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      2.563  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=      2.659  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.659  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      2.659  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=      2.659  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.659  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=      2.753  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=      2.848  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.848  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      2.848  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.848  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      2.848  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=      3.057  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      3.057  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=      3.250  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      3.250  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      3.250  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=      3.250  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      3.250  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      3.250  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=      3.439  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      3.439  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=      3.535  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      3.535  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      3.535  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=      3.535  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      3.535  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=      3.631  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      3.631  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      3.631  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      3.631  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=      3.724  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      3.724  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      3.724  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      3.724  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      3.724  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

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CAUTION SECNO=      3.818  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      3.818  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=      3.818  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      3.818  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=      3.912  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      3.912  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=      3.912  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=      3.912  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      3.912  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=      4.006  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      4.006  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=      4.006  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=      4.006  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      4.006  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=      4.006  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=      4.101  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      4.101  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=      4.101  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      4.101  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=      4.196  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      4.196  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=      4.196  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      4.196  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=      4.289  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      4.289  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=      4.289  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      4.289  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=      4.563  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      4.563  PROFILE=  1  MINIMUM SPECIFIC ENERGY

WARNING SECNO=      4.653  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=      4.653  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=      4.725  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      4.725  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=      4.725  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=      4.725  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      4.725  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=      4.725  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

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FLOODWAY DATA,   TUTHILL DIKE WASH - WASH
PROFILE NO.  2

            ------- FLOODWAY -------      WATER SURFACE ELEVATION
  STATION    WIDTH    SECTION    MEAN      WITH    WITHOUT  DIFFERENCE
                       AREA    VELOCITY  FLOODWAY  FLOODWAY

      .000    123.      494.     8.2     1039.1    1039.1       .0
      .075    163.      618.     6.6     1040.8    1040.8       .0
      .186    113.      391.    10.4     1043.2    1043.7      -.5
      .314    135.      498.     8.2     1048.1    1048.0       .1
      .415    235.      531.     7.6     1051.9    1051.9       .0
      .540    197.      493.     8.2     1057.5    1057.6      -.1
      .634    154.      467.     8.7     1061.8    1061.8       .0
      .729    131.      425.     9.5     1065.3    1065.3       .0
      .823     93.      353.    11.5     1070.9    1070.9       .0
      .917     94.      364.    11.1     1074.7    1074.7       .0
     1.012     92.      353.    11.5     1080.7    1080.7       .0
     1.067     44.      282.    14.4     1085.0    1085.0       .0
     1.110     72.      717.     5.7     1093.1    1093.1       .0
     1.118    180.     1745.     3.2     1093.7    1093.7       .0
     1.152    220.     1520.     3.6     1093.6    1093.6       .0
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1.198	264.	1111.	5.0	1093.6	1093.6	.0
1.260	238.	773.	8.5	1097.0	1097.0	.0
1.287	171.	609.	10.8	1099.2	1099.2	.0
1.313	160.	631.	10.5	1101.0	1101.0	.0
1.322	233.	1598.	4.1	1103.3	1103.3	.0
1.362	221.	2633.	2.4	1103.5	1103.5	.0
1.422	92.	477.	13.1	1106.4	1106.4	.0
1.518	101.	487.	12.8	1114.2	1113.7	.5
1.614	142.	543.	11.5	1123.4	1123.5	-.1
1.710	89.	472.	13.1	1130.9	1130.9	.0
1.805	80.	450.	13.7	1138.1	1138.1	.0
1.898	98.	544.	11.3	1145.2	1145.3	-.1
1.994	124.	529.	11.7	1152.4	1152.4	.0
2.088	83.	455.	13.6	1159.3	1159.4	-.1
2.170	165.	572.	10.7	1167.4	1167.4	.0
2.279	94.	474.	12.9	1176.6	1176.6	.0
2.373	127.	639.	9.6	1180.4	1180.5	-.1
2.468	138.	625.	9.8	1184.8	1184.9	-.1
2.563	152.	635.	9.6	1190.9	1191.1	-.2
2.659	131.	610.	10.0	1193.8	1193.9	-.1
2.753	192.	520.	5.8	1197.9	1197.5	.4
2.848	115.	344.	8.7	1200.2	1200.2	.0
2.943	107.	385.	7.8	1203.4	1203.4	.0
3.057	99.	358.	8.4	1205.8	1205.9	-.1
3.148	122.	470.	6.4	1209.1	1208.9	.2
3.250	210.	405.	7.4	1213.7	1213.7	.0
3.344	172.	432.	3.3	1216.6	1216.6	.0

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FLOODWAY DATA, TUTHILL DIKE WASH - WASH
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
3.439	175.	586.	2.4	1217.1	1217.1	.0
3.535	113.	191.	7.4	1217.3	1217.3	.0
3.631	55.	151.	9.4	1222.2	1222.2	.0
3.724	94.	197.	7.2	1231.2	1230.4	.8
3.818	89.	193.	7.3	1236.3	1236.2	.1
3.912	98.	205.	6.9	1243.1	1243.1	.0
4.006	61.	143.	8.8	1249.7	1249.7	.0
4.101	150.	214.	5.9	1257.9	1257.8	.1
4.196	91.	165.	7.6	1263.0	1263.0	.0
4.289	120.	213.	5.9	1270.3	1270.3	.0
4.375	98.	215.	5.9	1274.5	1274.3	.2
4.469	105.	218.	5.8	1278.2	1278.2	.0
4.563	97.	184.	6.9	1281.6	1281.6	.0
4.653	109.	304.	4.1	1283.7	1283.6	.1
4.725	100.	163.	6.8	1285.3	1285.3	.0

*SECNO 1.898

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1.898	7.99	1145.29	1145.29	.00	1147.47	2.18	3.49	.07	1140.00
6168.0	104.0	3941.4	2122.6	21.0	278.6	354.8	154.2	52.0	1140.00
.33	4.96	14.15	5.98	.040	.030	.050	.000	1137.30	9972.07
.006227	495.	495.	495.	20	15	0	.00	165.15	10137.22

*SECNO 1.994
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1.994	8.88	1152.38	1152.38	.00	1154.89	2.52	3.15	.10	1150.00
6168.0	22.1	5985.9	160.0	7.1	463.6	55.5	161.1	53.7	1150.00
.34	3.13	12.91	2.88	.040	.030	.050	.000	1143.50	9969.06
.006241	505.	505.	505.	20	8	0	.00	123.75	10092.81

*SECNO 2.088
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2.088	9.26	1159.36	1159.36	.00	1161.81	2.45	3.22	.01	1158.00
6168.0	5.2	5894.3	268.6	2.3	459.6	74.1	167.1	55.1	1159.00
.36	2.25	12.83	3.62	.040	.030	.050	.000	1150.10	9971.61
.006793	495.	495.	495.	20	8	0	.00	128.57	10100.18

*SECNO 2.170

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

Q @ X1 = 2.170 TO X1 = 2.659 EQUALS Q AT CP39
Q = 6110 CFS

2.170	4.79	1167.39	1167.39	.00	1169.16	1.77	3.37	.07	1170.70
6110.0	.0	6110.0	.0	.0	572.5	.0	172.6	56.6	1168.00
.37	.00	10.67	.00	.000	.030	.000	.000	1162.60	9964.34
.008904	430.	435.	445.	20	11	0	.00	164.60	10128.94

*SECNO 2.279

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

UPSTREAM OF THOMAS ROAD EXTENDED

2.279	7.31	1176.61	1176.61	.00	1179.18	2.57	4.87	.24	1177.60
6110.0	.0	6110.0	.0	.0	475.0	.0	179.6	58.3	1180.00
.38	.00	12.86	.00	.000	.030	.000	.000	1169.30	9945.88
.008064	580.	575.	570.	20	14	0	.00	94.03	10039.91

*SECNO 2.373

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.46

2.373	8.51	1180.51	.00	.00	1181.92	1.41	2.63	.12	1180.00
6110.0	2.3	4486.0	1621.6	2.6	413.2	405.3	186.9	60.1	1174.00
.39	.92	10.86	4.00	.040	.030	.050	.000	1172.00	9950.04
.003763	495.	495.	495.	2	0	0	.00	218.80	10168.84

1

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 2.468

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2.468	7.64	1184.94	1184.94	.00	1187.04	2.09	2.42	.21	1180.00
6110.0	449.4	3787.0	1873.6	83.9	271.4	298.9	195.5	62.4	1180.00
.41	5.35	13.95	6.27	.040	.030	.050	.000	1177.30	9941.03
.006304	505.	505.	505.	20	11	0	.00	179.79	10120.81

*SECNO 2.563

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

CONFLUENCE OF CATERPILLAR WASH

2.563	8.80	1191.10	1191.10	.00	1192.63	1.54	2.32	.06	1184.00
6110.0	348.4	4202.7	1558.9	72.5	357.6	487.5	204.5	65.4	1184.00
.42	4.81	11.75	3.20	.040	.030	.050	.000	1182.30	9944.81
.003564	500.	500.	500.	20	8	0	.00	343.89	10288.70

*SECNO 2.659
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2.659	8.07	1193.87	1193.87	.00	1195.83	1.96	2.19	.13	1190.00
6110.0	47.8	4398.0	1664.3	12.5	340.1	357.9	213.9	68.5	1188.00
.44	3.82	12.93	4.65	.040	.030	.050	.000	1185.80	9968.55
.005384	505.	505.	505.	20	11	0	.00	189.86	10158.41

*SECNO 2.753

1

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .55

Q @ X1=3.753 TO X1=3.250 EQUALS Q @ CP27
Q = 3011 CFS

2.753	7.23	1197.53	1197.04	.00	1198.44	.91	2.51	.10	1196.00
3011.0	102.7	2842.0	66.3	47.4	360.4	47.4	220.6	71.0	1196.00
.45	2.17	7.88	1.40	.040	.030	.050	.000	1190.30	9917.67
.004386	495.	500.	495.	7	12	0	.00	240.61	10162.31

*SECNO 2.848

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2.848	7.03	1200.23	1200.23	.00	1201.89	1.66	2.52	.22	1198.00
3011.0	60.4	2561.7	388.9	18.6	231.0	98.8	225.2	73.0	1197.90
.47	3.25	11.09	3.93	.040	.030	.050	.000	1193.20	9964.14
.005881	495.	500.	495.	2	8	0	.00	116.13	10080.27

*SECNO 2.943

2.943	7.63	1203.43	.00	.00	1204.62	1.19	2.68	.05	1207.10
3011.0	.0	2530.0	481.0	.0	270.0	111.2	229.4	74.3	1200.50
.48	.00	9.37	4.32	.000	.030	.050	.000	1195.80	9960.50
.004911	500.	500.	500.	2	0	0	.00	107.39	10067.89

*SECNO 3.057
7185 MINIMUM SPECIFIC ENERGY
7720 CRITICAL DEPTH ASSUMED

3.057	6.47	1205.87	1205.87	.00	1207.34	1.48	2.59	.09	1202.00
3011.0	74.3	2197.0	739.6	18.7	196.4	200.4	234.0	75.9	1202.00
.50	3.97	11.18	3.69	.040	.030	.050	.000	1199.40	9975.33
.005235	505.	510.	510.	2	12	0	.00	168.47	10143.80

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 3.148

3301 HV CHANGED MORE THAN HVINS

3.148	8.87	1208.87	.00	.00	1209.68	.81	2.27	.07	1210.00
3011.0	.0	2315.5	695.5	.0	284.3	284.8	240.6	78.5	1206.00
.52	.00	8.14	2.44	.000	.030	.050	.000	1200.00	9976.87
.003081	575.	575.	580.	1	0	0	.00	226.65	10203.52

*SECNO 3.250
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

DOWNSTREAM OF INDIAN SCHOOL ROAD EXTENDED

CONFLUENCE OF TRACTOR WASH

3.250	2.82	1213.72	1213.72	.00	1214.69	.97	2.62	.05	1212.00
3011.0	82.9	2785.7	142.3	25.8	340.2	55.3	246.5	81.3	1212.00
.54	3.21	8.19	2.57	.040	.030	.050	.000	1210.90	9939.93
.009173	515.	535.	505.	20	17	0	.00	244.49	10184.43

*SECNO 3.344

3301 HV CHANGED MORE THAN HVINS

Q @ X1 = 3.344 TO X1 = 3.912 EQUALS Q AT CP25
Q = 1414 CFS

3.344	3.84	1216.64	.00	.00	1216.82	.18	2.05	.08	1214.00
1414.0	13.9	1266.8	133.2	8.7	351.4	93.4	251.6	84.0	1214.00
.58	1.60	3.61	1.43	.040	.030	.050	.000	1212.80	9978.40
.001409	495.	500.	505.	3	0	0	.00	221.88	10200.27

*SECNO 3.439

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.84

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
3.439	3.61	1217.11	.00	.00	1217.18	.07	.35	.01	1214.00
1414.0	7.4	1297.4	109.2	8.1	571.2	114.8	258.1	86.7	1214.00
.65	.92	2.27	.95	.040	.030	.050	.000	1213.50	9974.82
.000418	500.	500.	500.	3	0	0	.00	241.84	10216.65

*SECNO 3.535

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3.535	2.45	1217.25	1217.25	.00	1218.15	.90	.59	.25	1216.00
1414.0	5.2	1395.6	13.1	2.0	182.7	5.9	263.3	88.7	1216.00
.67	2.67	7.64	2.23	.040	.030	.050	.000	1214.80	9976.87
.010674	500.	505.	500.	20	19	0	.00	112.52	10089.39

*SECNO 3.631

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3.631	4.03	1222.23	1222.23	.00	1223.70	1.47	4.88	.17	1220.00
1414.0	12.2	1383.1	18.6	3.7	140.8	6.3	265.3	89.7	1220.00
.68	3.28	9.83	2.94	.040	.030	.050	.000	1218.20	9976.66
.008640	510.	510.	510.	3	14	0	.00	55.05	10031.71

*SECNO 3.724

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3.724	3.82	1230.42	1230.42	.00	1231.14	.72	4.57	.07	1230.00
1414.0	1.2	853.9	558.9	.9	104.9	137.4	267.5	91.1	1230.00
.70	1.32	8.14	4.07	.040	.030	.050	.000	1226.60	9975.81
.010183	495.	490.	480.	15	12	0	.00	193.38	10169.19

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV

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     TIME        VLOB        VCH        VROB        XNL        XNCH        XNR        WTN        ELMIN      SSTA
     SLOPE       XLOBL       XLCH       XLOBR       ITRIAL     IDC         ICONT      CORAR      TOPWID     ENDST

*SECNO 3.818
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      3.818       3.90     1236.20     1236.20        .00     1236.79        .50       4.11        .01     1234.00
     1414.0       11.9      872.6       529.6         4.0      114.5       198.0      270.7        93.6     1235.30
        .73       2.95        7.62        2.68        .040       .030        .050       .000     1232.30     9981.34
    .006855       495.       495.        500.           4          5           0        .00      255.01    10236.35


*SECNO 3.912

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      3.912       3.98     1243.08     1243.08        .00     1244.24       1.16       3.36        .17     1240.00
     1414.0       45.9      1163.6       204.5        11.9      123.6        66.1      273.6        95.7     1240.00
        .74       3.87        9.41        3.09        .040       .030        .050       .000     1239.10     9972.29
    .006725       495.       495.        495.          20          8           0        .00       99.34    10071.64


*SECNO 4.006
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

          Q @ X1 = 4.006 TO X1 = 4.653 EQUALS (Q AT CP25 + Q AT CP22A)/2
          Q = (1414 + 1108)/2 = 1261 CFS

      4.006       3.66     1249.66     1249.66        .00     1250.86       1.20       4.06        .01     1250.00
     1261.0         .0      1261.0         .0          .0      143.4         .0       275.6        96.6     1250.00
        .76         .00        8.79        .00        .000       .030        .000       .000     1246.00     9980.86
    .010222       500.       500.        505.          20         11           0        .00       60.70    10041.56


*SECNO 4.101

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      4.101       2.04     1257.84     1257.84        .00     1258.43        .59       4.94        .06     1256.50
     1261.0       135.9      842.9       282.2         41.0      117.3        93.1      277.9        98.2     1256.50
        .78       3.31        7.18        3.03        .040       .030        .050       .000     1255.80     9920.00
    .009574       495.       500.        500.           5          11          0        .00      215.32    10135.33


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     SECNO       DEPTH       CWSEL      CRIWS      WSELK      EG          HV         HL         OLOSS      L-BANK ELEV
     Q           QLOB        QCH        QROB       ALOB       ACH         AROB       VOL        TWA        R-BANK ELEV
     TIME        VLOB        VCH        VROB       XNL        XNCH        XNR        WTN        ELMIN      SSTA
     SLOPE       XLOBL       XLCH       XLOBR      ITRIAL     IDC         ICONT      CORAR      TOPWID     ENDST


*SECNO 4.196

3301 HV CHANGED MORE THAN HVINS


7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      4.196       3.22     1263.02     1263.02        .00     1264.11       1.09       4.53        .15     1264.00
     1261.0         .0      1231.4        29.6          .0      145.3        16.8      280.2        99.9     1262.00
        .80         .00        8.48        1.76        .000       .030        .050       .000     1259.80     9967.46
    .008623       500.       500.        495.           2          14          0        .00       90.62    10058.08


 SECNO 4.289
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
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UPSTREAM OF CAMELBACK ROAD EXTENDED

4.289	2.94	1270.34	1270.34	.00	1270.99	.64	4.24	.04	1268.00
1261.0	168.5	575.9	516.5	41.2	66.1	156.8	282.6	101.5	1268.00
.82	4.09	8.72	3.30	.040	.030	.050	.000	1267.40	9949.59
.008490	495.	495.	495.	12	15	0	.00	189.12	10138.71

*SECNO 4.375

4.375	2.63	1274.33	.00	.00	1275.14	.80	4.10	.05	1272.00
1261.0	11.8	674.4	574.8	3.4	74.5	138.3	285.1	103.1	1272.00
.84	3.48	9.05	4.16	.040	.030	.050	.000	1271.70	9992.08
.009941	445.	450.	445.	3	0	0	.00	125.41	10117.49

*SECNO 4.469

4.469	3.08	1278.18	.00	.00	1278.76	.57	3.59	.02	1276.00
1261.0	35.8	915.7	309.5	11.9	131.6	125.5	287.9	104.8	1276.00
.86	3.01	6.96	2.47	.040	.030	.050	.000	1275.10	9984.54
.005439	500.	500.	500.	4	0	0	.00	174.58	10159.13

*SECNO 4.563
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4.563	3.47	1281.57	1281.57	.00	1282.41	.84	3.12	.08	1280.00
1261.0	24.9	1089.2	146.9	9.2	138.5	67.6	290.6	106.7	1280.00
.88	2.70	7.86	2.17	.040	.030	.050	.000	1278.10	9973.24
.007388	500.	495.	495.	3	8	0	.00	153.01	10126.25

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4.653

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.08

4.653	3.91	1283.61	.00	.00	1283.94	.33	1.48	.05	1282.00
1261.0	4.2	1214.7	42.1	3.3	259.9	39.4	293.5	108.2	1282.00
.91	1.27	4.67	1.07	.040	.030	.050	.000	1279.70	9960.95
.001711	475.	475.	475.	3	0	0	.00	127.69	10088.64

*SECNO 4.725

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

Q @ X1= 4.725 EQUALS Q @ CP22A
Q = 1108 CFS

CONFLUENCE OF CATERPILLAR DIKE WASH

4.725	2.30	1285.30	1285.30	.00	1286.14	.84	1.21	.15	1286.50
1108.0	.0	1049.0	59.0	.0	139.5	27.5	295.5	109.3	1284.00
.93	.00	7.52	2.14	.000	.030	.050	.000	1283.00	9970.14
.009227	380.	380.	380.	20	11	0	.00	112.17	10082.30

ROFILE FOR STREAM TUTHILL DIKE WASH - WASH

PLOTTED POINTS (BY PRIORITY) E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA

ELEVATION SECNO	1033. CUMDIS	1083.	1133.	1183.	1233.	1283.	1333.	1383.	1433.	1483.
.00	0.	IEM	.	.	.	.	.	.	.	.	.
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	150.	IWE	.	.	.	.	.	.	.	.	.
	200.	IWE	.	.	.	.	.	.	.	.	.
	250.	IWE	.	.	.	.	.	.	.	.	.
	300.	IWE	.	.	.	.	.	.	.	.	.
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	450.	ILE	.	.	.	.	.	.	.	.	.
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	650.	CIE	.	.	.	.	.	.	.	.	.
	700.	CIE	.	.	.	.	.	.	.	.	.
	750.	CIE	.	.	.	.	.	.	.	.	.
	800.	CIE	.	.	.	.	.	.	.	.	.
	850.	CIE	.	.	.	.	.	.	.	.	.
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  1.12  5950.  C     I EM

        6000.  C     I EM L
        6050.  C     I EM   L
  1.15  6100.  C     IREM     L
        6150.  C     IREM      L
        6200.  C     IREM    L
        6250.  C     IREM L
        6300.  C     IREL
  1.20  6350.  C     ILEM
        6400.  C     .IEM
        6450.  C     .IEM
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        7150.  C     .IL EM                                                   R
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        8100.  .         .  IWE    .         .         .         .         .         .         .         .         .
        8150.  .         .  ILE    .         .         .         .         .         .         .         .         .
        8200.  .         .  ILE    .         .         .         .         .         .         .         .         .
        8250.  .         .  ILE    .         .         .         .         .         .         .         .         .
        8300.  .         .  I WE   .         .         .         .         .         .         .         .         .
        8350.  .         .   IWE   .         .         .         .         .         .         .         .         .
        8400.  .         .  IWE    .         .         .         .         .         .         .         .         .
        8450.  .         .  ILE    .         .         .         .         .         .         .         .         .
        8500.  .         .  I E    .         .         .         .         .         .         .         .         .
1.61    8550.  .         .  I WE.  .         .         .         .         .         .         .         .         .
        8600.  .         .  I WE.  .         .         .         .         .         .         .         .         .
        8650.  .         .  I WE.  .         .         .         .         .         .         .         .         .
        8700.  .         .   ILE.  .         .         .         .         .         .         .         .         .
        8750.  .         .   I E.  .         .         .         .         .         .         .         .         .
        8800.  .         .   I E.  .         .         .         .         .         .         .         .         .
        8850.  .         .   I E.  .         .         .         .         .         .         .         .         .
        8900.  .         .   I WE  .         .         .         .         .         .         .         .         .
        8950.  .         .   I WE  .         .         .         .         .         .         .         .         .
        9000.  .         .   I WE  .         .         .         .         .         .         .         .         .
1.71    9050.  .         .   I  E  .         .         .         .         .         .         .         .         .
        9100.  .         .    I E  .         .         .         .         .         .         .         .         .
        9150.  .         .    I E  .         .         .         .         .         .         .         .         .
        9200.  .         .    I WE .         .         .         .         .         .         .         .         .
        9250.  .         .    I WE .         .         .         .         .         .         .         .         .
        9300.  .         .    I WE .         .         .         .         .         .         .         .         .
        9350.  .         .    I WE .         .         .         .         .         .         .         .         .
        9400.  .         .    I .E .         .         .         .         .         .         .         .         .
        9450.  .         .     I.E .         .         .         .         .         .         .         .         .
        9500.  .         .     I.E .         .         .         .         .         .         .         .         .
1.80    9550.  .         .     I.WE.         .         .         .         .         .         .         .         .
        9600.  .         .     I.WE.         .         .         .         .         .         .         .         .
        9650.  .         .     I.WE.         .         .         .         .         .         .         .         .
        9700.  .         .      IWE .         .         .         .         .         .         .         .         .
        9750.  .         .      ILE .         .         .         .         .         .         .         .         .
        9800.  .         .      ILEM.         .         .         .         .         .         .         .         .
        9850.  .         .      ILEM.         .         .         .         .         .         .         .         .
        9900.  .         .      ILWE.         .         .         .         .         .         .         .         .
        9950.  .         .      ILWE.         .         .         .         .         .         .         .         .
       10000.  .         .      .IWE .         .         .         .         .         .         .         .         .
1.90   10050.  .         .      .IWE .         .         .         .         .         .         .         .         .
       10100.  .         .      .ILE .         .         .         .         .         .         .         .         .
       10150.  .         .      .ILEM.         .         .         .         .         .         .         .         .
       10200.  .         .      .ILEM.         .         .         .         .         .         .         .         .
       10250.  .         .      .ILEM.         .         .         .         .         .         .         .         .
       10300.  .         .      .ILWE.         .         .         .         .         .         .         .         .
       10350.  .         .       . IWE.         .         .         .         .         .         .         .         .
       10400.  .         .       . IWE.         .         .         .         .         .         .         .         .
       10450.  .         .       . ILE.         .         .         .         .         .         .         .         .
       10500.  .         .       . ILE.         .         .         .         .         .         .         .         .
1.99   10550.  .         .       . ILE.         .         .         .         .         .         .         .         .
       10600.  .         .       . I WE.         .         .         .         .         .         .         .         .
       10650.  .         .       . I WE.         .         .         .         .         .         .         .         .
       10700.  .         .       . I WE.         .         .         .         .         .         .         .         .
       10750.  .         .       .  IWE.         .         .         .         .         .         .         .         .
       10800.  .         .       .  ILE.         .         .         .         .         .         .         .         .
       10850.  .         .       .  ILE.         .         .         .         .         .         .         .         .
       10900.  .         .       .  I EM.         .         .         .         .         .         .         .         .
       10950.  .         .       .  I EM.         .         .         .         .         .         .         .         .
       11000.  .         .       .  I WE.         .         .         .         .         .         .         .         .
2.09   11050.  .         .       .  I WE.         .         .         .         .         .         .         .         .
       11100.  .         .       .   IWE.         .         .         .         .         .         .         .         .
       11150.  .         .       .   I E.         .         .         .         .         .         .         .         .
       11200.  .         .       .   I EM.         .         .         .         .         .         .         .         .
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        11250.  .       .       .   IEM  .       .       .       .       .       .       .       .
        11300.  .       .       .   IWE  .       .       .       .       .       .       .       .
        11350.  .       .       .   IWE  .       .       .       .       .       .       .       .
        11400.  .       .       .   I E  .       .       .       .       .       .       .       .
        11450.  .       .       .    IE  .       .       .       .       .       .       .       .
   2.17 11500.  .       .       .   IEL  .       .       .       .       .       .       .       .
        11550.  .       .       .   IEL  .       .       .       .       .       .       .       .
        11600.  .       .       .   IWE  .       .       .       .       .       .       .       .
        11650.  .       .       .   IWE  .       .       .       .       .       .       .       .
        11700.  .       .       .   I E  .       .       .       .       .       .       .       .
        11750.  .       .       .    IE  .       .       .       .       .       .       .       .
        11800.  .       .       .    IE  .       .       .       .       .       .       .       .
        11850.  .       .       .    IE  .       .       .       .       .       .       .       .
        11900.  .       .       .   IWE. .       .       .       .       .       .       .       .
        11950.  .       .       .   IWE. .       .       .       .       .       .       .       .
        12000.  .       .       .   IWE. .       .       .       .       .       .       .       .
   2.28 12050.  .       .       .   I E. .       .       .       .       .       .       .       .
        12100.  .   C   .       .   I E. .       .       .       .       .       .       .       .
        12150.  C       .       .   I E. .       .       .       .       .       .       .       .
        12200.  C       .       .   I E. .       .       .       .       .       .       .       .
        12250.  C       .       .   I E. .       .       .       .       .       .       .       .
        12300.  C       .       .    IWE .       .       .       .       .       .       .       .
        12350.  C       .       .    IWE .       .       .       .       .       .       .       .

        12400.  C       .       .    IWE .       .       .       .       .       .       .       .
        12450.  C       .       .    IWE .       .       .       .       .       .       .       .
        12500.  C       .       .    IWE .       .       .       .       .       .       .       .
   2.37 12550.  C       .       .    ILE .       .       .       .       .       .       .       .
        12600.  C       .       .    ILE .       .       .       .       .       .       .       .
        12650.  C       .       .    ILE .       .       .       .       .       .       .       .
        12700.  C       .       .    ILE .       .       .       .       .       .       .       .
        12750.  C       .       .    ILE .       .       .       .       .       .       .       .
        12800.  C       .       .    ILE .       .       .       .       .       .       .       .
        12850.  C       .       .    ILE .       .       .       .       .       .       .       .
        12900.  C       .       .     IE .       .       .       .       .       .       .       .
        12950.  C       .       .    IWE .       .       .       .       .       .       .       .
        13000.  .   C   .       .    IWE .       .       .       .       .       .       .       .
   2.47 13050.  .       .       .    IWE .       .       .       .       .       .       .       .
        13100.  .       .       .    I.E .       .       .       .       .       .       .       .
        13150.  .       .       .    ILE .       .       .       .       .       .       .       .
        13200.  .       .       .    ILE .       .       .       .       .       .       .       .
        13250.  .       .       .    ILE .       .       .       .       .       .       .       .
        13300.  .       .       .    ILE .       .       .       .       .       .       .       .
        13350.  .       .       .    ILE .       .       .       .       .       .       .       .
        13400.  .       .       .     IWE .      .       .       .       .       .       .       .
        13450.  .       .       .     IWE .      .       .       .       .       .       .       .
        13500.  .       .       .     IWE .      .       .       .       .       .       .       .
   2.56 13550.  .       .       .     I E .      .       .       .       .       .       .       .
        13600.  .       .       .     I E .      .       .       .       .       .       .       .
        13650.  .       .       .     I E .      .       .       .       .       .       .       .
        13700.  .       .       .     ILE .      .       .       .       .       .       .       .
        13750.  .       .       .     ILE .      .       .       .       .       .       .       .
        13800.  .       .       .     ILE .      .       .       .       .       .       .       .
        13850.  .       .       .     ILE .      .       .       .       .       .       .       .
        13900.  .       .       .     ILE .      .       .       .       .       .       .       .
        13950.  .       .       .     ILE .      .       .       .       .       .       .       .
        14000.  .       .       .     ILE .      .       .       .       .       .       .       .
   2.66 14050.  .       .       .     .IWE .     .       .       .       .       .       .       .
        14100.  .       .       .     .IWE .     .       .       .       .       .       .       .
        14150.  .       .       .     .IWE .     .       .       .       .       .       .       .
        14200.  .       .       .     .IWE .     .       .       .       .       .       .       .
        14250.  .       .       .     .IWE .     .       .       .       .       .       .       .
        14300.  .       .       .     .ICE .     .       .       .       .       .       .       .
        14350.  .       .       .     .ILE .     .       .       .       .       .       .       .
        14400.  .       .       .     .ILE .     .       .       .       .       .       .       .
        14450.  .       .       .     .ILE .     .       .       .       .       .       .       .
        14500.  .       .       .     .ILE .     .       .       .       .       .       .       .
   2.75 14550.  .       .       .     .I E .     .       .       .       .       .       .       .
        14600.  .       .       .     . IEM .    .       .       .       .       .       .       .
        14650.  .       .       .     . IEM .    .       .       .       .       .       .       .
        14700.  .       .       .     . IEM .    .       .       .       .       .       .       .
        14750.  .       .       .     . IEM .    .       .       .       .       .       .       .
        14800.  .       .       .     . IEM .    .       .       .       .       .       .       .
        14850.  .       .       .     . IWE .    .       .       .       .       .       .       .
        14900.  .       .       .     . IWE .    .       .       .       .       .       .       .
        14950.  .       .       .     . IWE .    .       .       .       .       .       .       .
        15000.  .       .       .     . IWE .    .       .       .       .       .       .       .
   2.85 15050.  .       .       .     . IWE .    .       .       .       .       .       .       .
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      15100.  .       C.      .       . ILE     .  .  .  .  .  .  .  .
      15150.  C       .       .       . ILE     .  .  .  .  .  .  .  .
      15200.  C       .       .       . IRE     .  .  .  .  .  .  .  .
      15250.  C       .       .       . IRE     .  .  .  .  .  .  .  .
      15300.  C       .       .       . IREM    .  .  .  .  .  .  .  .
      15350.  C       .       .       . IREM    .  .  .  .  .  .  .  .
      15400.  C       .       .       . IREM    .  .  .  .  .  .  .  .
      15450.  C       .       .       . IREM    .  .  .  .  .  .  .  .
      15500.  C       .       .       .  IEL    .  .  .  .  .  .  .  .
 2.94 15550.  C       .       .       .  IEL    .  .  .  .  .  .  .  .
      15600.  C       .       .       .  IEL    .  .  .  .  .  .  .  .
      15650.  C       .       .       .  IEL    .  .  .  .  .  .  .  .
      15700.  C       .       .       .  IEL    .  .  .  .  .  .  .  .
      15750.  C       .       .       .  IWE    .  .  .  .  .  .  .  .
      15800.  C       .       .       .  IWE    .  .  .  .  .  .  .  .
      15850.  C       .       .       .  IWE    .  .  .  .  .  .  .  .
      15900.  C       .       .       .  IWE    .  .  .  .  .  .  .  .
      15950.  C       .       .       .  IWE    .  .  .  .  .  .  .  .
      16000.  .   C   .       .       .  ILE    .  .  .  .  .  .  .  .
 3.06 16050.  .       .       .       .  ILE    .  .  .  .  .  .  .  .
      16100.  .       .   C   .       .  ILEM   .  .  .  .  .  .  .  .
      16150.  C       .       .       .  ILEM   .  .  .  .  .  .  .  .
      16200.  C       .       .       .  ILEM   .  .  .  .  .  .  .  .
      16250.  C       .       .       .  ILEM   .  .  .  .  .  .  .  .
      16300.  C       .       .       .  ILEM   .  .  .  .  .  .  .  .
      16350.  C       .       .       .  IREM   .  .  .  .  .  .  .  .
      16400.  C       .       .       .  IREM   .  .  .  .  .  .  .  .
      16450.  C       .       .       .  IREM   .  .  .  .  .  .  .  .
      16500.  C       .       .       .  IREM   .  .  .  .  .  .  .  .
      16550.  C       .       .       .  IREM   .  .  .  .  .  .  .  .
      16600.  C       .       .       .  I EM   .  .  .  .  .  .  .  .
 3.15 16650.  C       .       .       .  I EM   .  .  .  .  .  .  .  .
      16700.  C       .       .       .   IEM   .  .  .  .  .  .  .  .
      16750.  C       .       .       .   IWE   .  .  .  .  .  .  .  .
      16800.  C       .       .       .   IWEM  .  .  .  .  .  .  .  .
      16850.  C       .       .       .   IREM  .  .  .  .  .  .  .  .
      16900.  C       .       .       .   IREM  .  .  .  .  .  .  .  .
      16950.  C       .       .       .    IEM  .  .  .  .  .  .  .  .
      17000.  C       .       .       .    IEM  .  .  .  .  .  .  .  .
      17050.  C       .       .       .    IEM  .  .  .  .  .  .  .  .
      17100.  C       .       .       .    IEM  .  .  .  .  .  .  .  .
      17150.  .       .       .   C   .    IEM  .  .  .  .  .  .  .  .
 3.25 17200.  .       .       .       .     EM  .  .  .  .  .  .  .  .
      17250.  .       .   C   .       .     EM  .  .  .  .  .  .  .  .
      17300.  C       .       .       .     EM  .  .  .  .  .  .  .  .
      17350.  C       .       .       .     EM  .  .  .  .  .  .  .  .
      17400.  C       .       .       .     WE  .  .  .  .  .  .  .  .
      17450.  C       .       .       .     WE  .  .  .  .  .  .  .  .
      17500.  C       .       .       .     WE  .  .  .  .  .  .  .  .
      17550.  C       .       .       .     IE  .  .  .  .  .  .  .  .
      17600.  C       .       .       .     IE  .  .  .  .  .  .  .  .
      17650.  C       .       .       .     IE  .  .  .  .  .  .  .  .
 3.34 17700.  C       .       .       .     IE  .  .  .  .  .  .  .  .
      17750.  C       .       .       .     IE  .  .  .  .  .  .  .  .
      17800.  C       .       .       .     IE  .  .  .  .  .  .  .  .
      17850.  C       .       .       .    IEM  .  .  .  .  .  .  .  .
      17900.  C       .       .       .    IEM  .  .  .  .  .  .  .  .
      17950.  C       .       .       .    IEM  .  .  .  .  .  .  .  .
      18000.  C       .       .       .    IEM  .  .  .  .  .  .  .  .
      18050.  C       .       .       .    IEM  .  .  .  .  .  .  .  .
      18100.  C       .       .       .    IEM  .  .  .  .  .  .  .  .
      18150.  C       .       .       .    IEM  .  .  .  .  .  .  .  .
 3.44 18200.  C       .       .       .    IEM  .  .  .  .  .  .  .  .
      18250.  C       .       .       .    IEM  .  .  .  .  .  .  .  .
      18300.  C       .       .       .    IEM  .  .  .  .  .  .  .  .
      18350.  C       .       .       .    IEM  .  .  .  .  .  .  .  .
      18400.  C       .       .       .    IEM  .  .  .  .  .  .  .  .
      18450.  C       .       .       .    IEM  .  .  .  .  .  .  .  .
      18500.  C       .       .       .   IE M.  .  .  .  .  .  .  .
      18550.  C       .       .       .   IE M.  .  .  .  .  .  .  .
      18600.  C       .       .       .   IE M.  .  .  .  .  .  .  .
      18650.  .       C       .       .   IE M.  .  .  .  .  .  .  .
 3.54 18700.  .       .       .       .   IE M.  .  .  .  .  .  .  .
      18750.  .       .       .       .   IE M.  .  .  .  .  .  .  .

      18800.  .       .       .       .   IE M.  .  .  .  .  .  .  .
      18850.  .       .       .       .    E M.  .  .  .  .  .  .  .
      18900.  .       .       .       .    E M.  .  .  .  .  .  .  .
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      18950.                    WEM.
      19000.                    WEM.
      19050.                    IEM.
      19100.                    IEM.
      19150.                    IEM.
3.63  19200.                    IEM.
      19250.                    IEM.
      19300.                    IEM.
      19350.                     WE.
      19400.                     IE.
      19450.                     IE.
      19500.                     IE.
      19550.                     IE.
      19600.                    IEM
      19650.                     WE
3.72  19700.                     WE
      19750.                     IE
      19800.                     IE
      19850.                     IE
      19900.                     IE
      19950.                    IEM
      20000.                    IEM
      20050.                     EM
      20100.                     WE
      20150.                     IE
3.82  20200.                     IE
      20250.                    IEM
      20300.                    IEM
      20350.                    IEM
      20400.                    IEM
      20450.                    .WE
      20500.                    .WE
      20550.                    .IEM
      20600.                    .IEM
3.91  20650.                    .IEM
      20700.                    .IEM
      20750.                    .IWE
      20800.                    . WE
      20850.                    . IEM
      20900.                    . IEM
      20950.                    . IEM
      21000.                    . IEM
      21050.                    . IEM
      21100.                    . IEM
4.01  21150.                    . WE
      21200.                    . WE
      21250.                    . IEM
      21300.                    . IEM
      21350.                    . IEM
      21400.                    .  EM
      21450.                    .  EM
      21500.                    .  WE
      21550.                    .  IEM
      21600.                    .  IEM
4.10  21650.                    .  EM
      21700.                    .  EM
      21750.                    .  EM
      21800.                    .  EM
      21850.                    .  WE
      21900.                    .  WE
      21950.                    .  IE
      22000.                    .  IE
      22050.                    .  IE
      22100.                    .  IE
4.20  22150.                    .  IE
      22200.                    .  EM
      22250.                    .  EM
      22300.                    .  WE
      22350.                    .  IE
      22400.                    .  IE
      22450.                    .  IE
      22500.                    .  IEM
      22550.                    .  EM
      22600.                    .  EM
4.29  22650.                    .  WE
      22700.              C.    .  IE
      22750.  C                 .  IE
      22800.  C                 .  IE
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        22850.  C                                    IE .
        22900.  C                                    IE .
        22950.  C                                    IEM.
        23000.  C                                     EM.
        23050.  C                                     EM.
  4.38  23100.  C                                     EM.
        23150.  C                                     WE.
        23200.  C                                     WE.
        23250.  C                                     WE.
        23300.  C                                     IE.
        23350.  C                                     IE.
        23400.  C                                     IE.
        23450.  C                                     IE.
        23500.  C                                     IE.
        23550.  C                                     IEM
  4.47  23600.  C                                     IEM
        23650.  C                                     IEM
        23700.  C                                      EM
        23750.  C                                      EM
        23800.  C                                      EM
        23850.  C                                      WE
        23900.  C                                      WE
        23950.  C                                      IE
        24000.  .C                                     IE
        24050.  .                 C                    IE
  4.56  24100.  .                                      IE
        24150.  .              C                       IE
        24200.  C                                      IE
        24250.  C                                      IE
        24300.  C                                      IE
        24350.  C                                      IE
        24400.  C                                      IE
        24450.  C                                      IE
        24500.  C                                      IE
        24550.  C                                      IEM
  4.65  24600.  C                                      IEM
        24650.  C                                      IEM
        24700.  C                                       EM
        24750.  C                                       EM
        24800.  C                                       EM
        24850.  C                                       EM
        24900.  C                                       WE
  4.72  24950.  .                                       WE
1
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 T1      WHITE TANKS/AGUA FRIA AREA DRAINAGE MASTER STUDY
 T2      100-YEAR STORM EVENT          FLOODWAY RUN
 T3      TUTHILL DIKE WASH - WASH "5"

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                 3                                                          1039.06

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      15                 -1


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     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA

     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

 *PROF 2


CCHV=      .100 CEHV=      .300
*SECNO   .000
```

```
3470 ENCROACHMENT STATIONS=     9945.5   10068.7  TYPE=      1  TARGET=      123.250

          Q @ X1 = 0.000 TO X1  = 1.012 EQUALS Q AT I6CWT4
          Q = 4057 CFS

          MATCH FLOODPLAIN INTO 100-YEAR PONDING WSEL BEHIND WHITE TANKS
          STRUCTURE # 4

      .000      6.06   1039.06       .00   1039.06   1040.11      1.05       .00       .00 100000.00
   4057.0        .0    4057.0        .0        .0     493.6        .0        .0        .0 100000.00
      .00       .00      8.22       .00      .000      .030      .000      .000   1033.00   9945.48
  .004367        0.        0.        0.         0         0         0       .00    123.25  10068.73


*SECNO  .075

3470 ENCROACHMENT STATIONS=     9910.0   10073.4  TYPE=      1  TARGET=      163.380
      .075      5.84   1040.84       .00   1040.84   1041.53       .70      1.39       .04   1036.00
   4057.0     740.7    3314.8       1.5     142.0     474.8       1.4       5.1       1.3   1040.00
      .02      5.22      6.98      1.09      .030      .030      .040      .000   1035.00   9910.00
  .002833      400.      400.      400.         2         0         0       .00    163.36  10073.36


*SECNO  .186

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9950.0   10068.5  TYPE=      1  TARGET=      118.550
      .186      4.75   1043.25   1043.25   1043.71   1045.10      1.85      2.52       .35   1040.00
   4057.0     155.1    3785.6     116.3      26.5     337.7      26.5      11.8       3.2   1040.00
      .03      5.86     11.21      4.40      .030      .030      .040      .000   1038.50   9953.74
  .007516      580.      580.      580.         3        15         0       .00    112.53  10066.26


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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

*SECNO  .314

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=     9925.0   10080.0  TYPE=      1  TARGET=      155.000
      .314      5.56   1048.06       .00   1047.99   1049.09      1.03      3.91       .08   1048.00
   4057.0        .0    4057.0        .0        .1     497.5        .0      18.7       5.0 100000.00
      .05       .31      8.16       .00      .030      .030      .000      .000   1042.50   9945.41
  .004566      500.      680.      720.         2         0         0       .00    134.59  10080.00


*SECNO  .415
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9940.0   10175.0  TYPE=      1  TARGET=      235.000
      .415      4.68   1051.88   1051.88   1051.93   1053.02      1.14      3.23       .03   1050.00
   4057.0        .0    3407.4     649.6        .0     371.1     159.6      25.5       7.6   1050.00
      .07       .00      9.18      4.07      .000      .030      .040      .000   1047.20   9940.00
  .007795      300.      530.      800.         2        15         0       .00    235.00  10175.00


*SECNO  .540
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9911.8   10110.0  TYPE=      1  TARGET=      198.250
```

.540	4.46	1057.46	1057.46	1057.55	1058.73	1.28	4.95	.04	1056.00
4057.0	42.5	3580.1	434.4	12.5	375.2	104.9	33.2	10.9	1056.00
.09	3.41	9.54	4.14	.030	.030	.040	.000	1053.00	9912.87
.007254	660.	660.	650.	3	11	0	.00	197.13	10110.00

*SECNO .634
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9951.0 10105.0 TYPE= 1 TARGET= 154.020

.634	4.99	1061.79	1061.79	1061.80	1063.28	1.49	3.37	.06	1058.00
4057.0	215.0	3265.2	576.9	35.9	307.1	123.7	38.6	12.9	1058.00
.11	6.00	10.63	4.67	.030	.030	.040	.000	1056.80	9951.07
.006421	495.	495.	495.	2	8	0	.00	153.93	10105.00

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO .729

3470 ENCROACHMENT STATIONS= 9953.5 10085.0 TYPE= 1 TARGET= 131.480

.729	4.64	1065.34	.00	1065.30	1066.77	1.43	3.48	.01	1064.00
4057.0	15.0	4042.0	.0	4.5	420.8	.0	43.8	14.5	100000.00
.12	3.33	9.60	.00	.030	.030	.000	.000	1060.70	9953.52
.007584	500.	500.	500.	1	0	0	.00	131.48	10085.00

*SECNO .823

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9952.7 10045.3 TYPE= 1 TARGET= 92.560

.823	6.44	1070.94	1070.94	1070.92	1073.07	2.13	3.74	.21	1070.00
4057.0	2.8	4039.6	14.6	1.1	344.3	7.4	48.2	15.8	1070.00
.13	2.50	11.73	1.98	.030	.030	.040	.000	1064.50	9952.71
.007523	495.	495.	495.	9	11	0	.00	92.56	10045.27

*SECNO .917

3470 ENCROACHMENT STATIONS= 9956.3 10050.0 TYPE= 1 TARGET= 93.700

.917	5.41	1074.71	1074.62	1074.73	1076.72	2.01	3.64	.01	1072.00
4057.0	50.5	3993.9	12.6	9.7	348.7	5.9	52.3	16.9	1074.00
.15	5.18	11.46	2.13	.030	.030	.040	.000	1069.30	9956.49
.007036	500.	500.	500.	0	15	0	.00	93.51	10050.00

*SECNO 1.012
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9936.4 10028.6 TYPE= 1 TARGET= 92.199

1.012	5.05	1080.75	1080.75	1080.73	1082.83	2.09	3.73	.02	1080.00
4057.0	3.2	4048.1	5.7	1.4	348.7	3.3	56.4	17.9	1080.00
.16	2.28	11.61	1.74	.030	.030	.040	.000	1075.70	9936.36
.007912	500.	500.	500.	5	11	0	.00	92.20	10028.56

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

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CCHV=      .300 CEHV=      .500
*SECNO 1.067

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9977.7   10022.0  TYPE=       1  TARGET=       44.300

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1088.00 ELREA=      1088.00


           Q @ X1 = 1.067 TO X1 = 1.110 EQUALS Q AT CP43 (AFTER DIVERT)
           Q = 4061 CFS
           FLOW LEFT OVER AFTER WEIR FLOW OVER DIKE UPSTREAM OF CULVERT

           4 - 10ft x 8ft x 227ft BC AT INTERSTATE 10

     1.067       6.37   1085.01   1085.01   1085.01   1088.23      3.22      1.18       .57   1078.64
    4061.0         .0    4061.0        .0        .0     282.0        .0      58.5      18.4 100000.00
       .16        .00     14.40       .00      .000      .016      .000      .000   1078.64   9977.70
   .002423      293.      293.      293.        20        11         0       .00     44.30  10022.00


SPECIAL CULVERT

SC  CUNO       CUNV       ENTLC      COFQ       RDLEN      RISE       SPAN       CULVLN     CHRT       SCL        ELCHU      ELCHD
     4          .016        .50       2.60        .00       8.00      10.00      227.00      8          1       1081.16    1078.64

CHART  8 - BOX CULVERT WITH FLARED WINGWALLS; NO INLET TOP EDGE BEVEL
SCALE  1 - WINGWALLS FLARED 30 TO 75 DEGREES

*SECNO 1.110
BTCARD, BRIDGE STENCL=     9950.00   STENCR=   10022.00

SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG =   1093.68

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.37

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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

SPECIAL CULVERT

     EGIC       EGOC        H4       QWEIR      QCULV       VCH       ACULV      ELTRD     WEIRLN
   1093.80    1093.13      5.46        14.      4024.     6.084       320.0    1092.00         7.


3470 ENCROACHMENT STATIONS=     9950.0   10022.0  TYPE=       1  TARGET=       72.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1092.00 ELREA=      1099.00


           PORTION OF FLOW FOR THE NEXT FOUR CROSS SECTIONS UPSTREAM
           IS LOST AS WEIR FLOW OVER THE DIKE TO THE EAST
           APPROXIMATELY 1440 CFS FLOWS EAST OVER DIKE

           EFFECTIVE FLOW OPTION IS INCORPORATED FOR THE NEXT 5 UPSTREAM CROSS
           SECTIONS AS A RESULT OF PONDING AND UPSTREAM AND DOWNSTREAM EXPANSION
           AND CONTRATION FLOW SITUATIONS.

           ACTUAL MAPPED LIMITS CORRESPOND TO WATER SURFACE ELEVATIONS AND ARE
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          SHOWN CORRECTLY ON THE FLOODPLAIN WORK MAP.

     1.110     12.06   1093.16       .00   1093.14   1093.68       .52      5.46       .00   1081.16
    4061.0     809.1    3251.9        .0     182.4     534.5        .0      61.1      18.7 100000.00
       .18      4.44      6.08       .00      .016      .016      .000      .000   1081.10   9950.00
   .000214      227.      227.       227.         2         0         0       .00     72.00  10022.00


 *SECNO 1.118

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.53


 3470 ENCROACHMENT STATIONS=     9920.0   10100.0  TYPE=       1  TARGET=      180.000

          Q @ X1 = 1.118 TO X1  = 1.198 EQUALS STORAGE ROUTED Q AT CP43
          Q = 5503 CFS

     1.118     12.14   1093.64       .00   1093.65   1093.80       .16       .00       .11   1091.50
    5503.0       .0    2897.5    2605.5        .0     959.0     786.2      62.3      18.8   1082.00
       .18       .00      3.02      3.31       .000      .016      .016      .000   1081.50   9920.00
   .000061      40.       40.       40.         2         0         0       .00    180.00  10100.00


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     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


 CCHV=      .100 CEHV=      .300
 *SECNO 1.152

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .35


 3470 ENCROACHMENT STATIONS=     9930.0   10150.0  TYPE=       1  TARGET=      220.000
     1.152     11.61   1093.61       .00   1093.62   1093.84       .23       .02       .02   1143.00
    5503.0       .0    3765.2    1737.8        .0     880.7     639.7      69.0      19.6   1086.00
       .19       .00      4.28      2.72       .000      .030      .040      .000   1082.00   9930.00
   .000508      180.      180.      180.         2         0         0       .00    220.00  10150.00


 *SECNO 1.198

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .58


 3470 ENCROACHMENT STATIONS=     9925.0   10200.0  TYPE=       1  TARGET=      275.000
     1.198      8.29   1093.59       .00   1093.60   1094.13       .54       .19       .09   1090.00
    5503.0      50.0    3830.3    1622.6      16.1     564.2     530.5      76.2      21.0   1090.00
       .20      3.10      6.79      3.06       .030      .030      .040      .000   1085.30   9936.02
   .001526      235.      240.      235.         2         0         0       .00    263.98  10200.00


 CCHV=      .300 CEHV=      .500
 *SECNO 1.260

 3301 HV CHANGED MORE THAN HVINS

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9945.0   10200.0  TYPE=       1  TARGET=      255.000

          Q @ X1 = 1.260 TO X1 = 1.322 EQUALS ROUTED Q AT CP42
          Q = 6601 CFS

          UPSTREAM OF MCDOWELL ROAD

     1.260      5.53   1097.03   1097.03   1097.03   1098.55      1.52      1.00       .49   1094.00
    6601.0     138.7    3925.4    2537.0      21.7     332.3     419.0      83.2      22.8   1094.00
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```
      .21      6.40     11.81      6.05      .030      .030      .040      .000   1091.50   9962.42
  .007196       340.      330.      315.        20        23         0       .00    237.58  10200.00

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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

 *SECNO 1.287
 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9974.0   10145.0  TYPE=       1  TARGET=      171.040
      1.287      5.21   1099.21   1099.21   1099.25   1101.05      1.84      1.07       .16   1098.00
     6601.0      12.1    6588.9        .0       3.7     605.4        .0      85.3      23.4 100000.00
        .22      3.27     10.88       .00       .030      .030      .000      .000   1094.00   9973.96
  .008645       160.      140.      120.        20        11         0       .00    171.04  10145.00

 *SECNO 1.313
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9920.1   10080.0  TYPE=       1  TARGET=      159.860

          THE NEXT THREE UPSTREAM CROSS SECTIONS FLOW THROUGH A DETENTIION
          BASIN AND EFFECTIVE FLOW LIMITS ARE IMPOSED TO MODEL THIS SITUATION
          CORRECTLY.  MAPPED LIMITS ARE SMOWN ON THE FLOODPLAIN MAP TO
          CORRECTLY DEPICT THE ACTUAL PONDING AREA.

          CONFLUENCE OF BULLDOZER WASH

     1.313      5.98   1100.98   1100.98   1100.98   1102.96      1.99      1.03       .08   1096.00
    6601.0     611.0    5056.6     933.4      76.8     410.8     143.7      87.3      24.0   1096.00
       .22      7.96     12.31      6.49      .030      .030      .040      .000   1095.00   9920.14
  .006401       145.      140.      135.         3         8         0       .00    159.63  10079.77

 *SECNO 1.322

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.54


 3470 ENCROACHMENT STATIONS=     9875.9   10110.0  TYPE=       1  TARGET=      234.100
      1.322      8.29   1103.29       .00   1103.29   1103.56       .27       .08       .51   1096.00
     6601.0     594.1    6006.9        .0     196.1    1401.6        .0      89.1      24.3 100000.00
        .22      3.03      4.29       .00       .030      .030      .000      .000   1095.00   9877.18
   .000511       150.       50.      150.         3         0         0       .00    232.82  10110.00

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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV

    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

CCHV=      .100 CEHV=      .300
*SECNO 1.362


302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.54
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3470 ENCROACHMENT STATIONS=     9877.2   10100.0  TYPE=       1  TARGET=      222.760

        Q AT X1 = 1.362 TO X1 = 1.614 EQUALS (Q AT CP39 + 1/5 HYDROGRAPH AT 42)
        Q = 6018 + 1/5(1029) = 6225 CFS

     1.362     21.50   1103.50       .00   1103.50   1103.61       .10       .03       .02   1090.00
    6225.0     550.3    4859.7     815.0     332.5    1717.9     582.7      99.5      25.4   1090.00
       .25      1.66      2.83      1.40      .030      .030      .040      .000   1082.00   9878.68
   .000070      150.      210.      300.         2         0         0       .00    221.32  10100.00


*SECNO 1.422

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9949.0   10045.0  TYPE=       1  TARGET=       96.010
     1.422      7.90   1106.40   1106.40   1106.40   1109.05      2.65       .07       .76 100000.00
    6225.0        .0    6225.0        .0        .0     476.5        .0     110.7      26.5 100000.00
       .25       .00     13.06       .00      .000      .030      .000      .000   1098.50   9949.00
   .007981      315.      315.      315.        20        22         0       .00     92.01  10041.00


*SECNO 1.518
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9969.4   10090.0  TYPE=       1  TARGET=      120.600
     1.518      7.36   1114.26   1114.26   1113.73   1116.97      2.71      3.79       .02   1110.00
    6225.0      62.9    6125.6      36.5      13.4     460.3      13.2     116.3      27.6   1112.00
       .26      4.70     13.31      2.76      .040      .030      .050      .000   1106.90   9969.40
   .007069      495.      505.      495.        20        11         0       .00    100.54  10069.94


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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO 1.614
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9967.7   10110.0  TYPE=       1  TARGET=      142.280
     1.614      9.45   1123.35   1123.35   1123.45   1125.76      2.41      3.34       .03   1122.00
    6225.0      10.0    6088.9     126.1       4.5     483.6      54.9     122.3      29.1   1122.00
       .28      2.20     12.59      2.30      .040      .030      .050      .000   1113.90   9968.26
   .006091      510.      510.      505.        20        11         0       .00    141.74  10110.00


*SECNO 1.710
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9965.0   10070.0  TYPE=       1  TARGET=      105.000

          Q @ X1 = 1.710 TO 2.088 EQUALS (Q AT 1.299 + Q AT CP39)/2
          Q = (6225 + 6110)/2 = 6168 CFS

     1.710     10.94   1130.94   1130.94   1130.93   1133.59      2.65      3.49       .07   1132.00
    6168.0        .0    6168.0        .0        .0     472.5        .0     128.2      30.4 100000.00
       .29       .00     13.05       .00      .000      .030      .000      .000   1120.00   9967.64
   .007914      505.      505.      510.        20         8         0       .00     89.16  10056.80


*SECNO 1.805
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
```

```
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9969.8   10050.0  TYPE=      1  TARGET=       80.250
      1.805     10.50   1138.10   1138.10   1138.10   1141.02      2.92       4.00        .08   1138.00
     6168.0        .0    6168.0        .0        .0     449.9        .0      133.5       31.4 100000.00
        .30        .03     13.71        .00       .040      .030      .000       .000   1127.60   9969.75
     .008074      500.      500.      500.        20        11         0        .00     80.25  10050.00


 *SECNO 1.898
 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
1
    18JAN02      15:45:38                                                                    PAGE   38

     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9972.1   10070.0  TYPE=      1  TARGET=       97.930
      1.898      7.90   1145.20   1145.20   1145.29   1147.98      2.78       3.85        .01   1140.00
     6168.0     108.9    4230.9    1828.1      20.2      274.8     249.3      139.2       32.4   1140.00
        .31       5.38      15.39       7.33       .040       .030       .050       .000   1137.30   9972.21
     .007502      495.      495.      495.        20        19         0        .00     97.79  10070.00


 *SECNO 1.994
 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9969.1   10092.8  TYPE=      1  TARGET=      123.750
      1.994      8.90   1152.40   1152.40   1152.38   1154.89      2.49       3.42        .03   1150.00
     6168.0      22.6    5982.2     163.3       7.2      465.3      56.5      145.4       33.7   1150.00
        .32       3.14      12.86       2.89       .040       .030       .050       .000   1143.50   9969.06
     .006160      505.      505.      505.        20         8         0        .00     123.75  10092.81


 *SECNO 2.088
 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9971.5   10055.0  TYPE=      1  TARGET=       83.550
      2.088      9.18   1159.28   1159.28   1159.36   1162.15      2.87       3.42        .11   1158.00
     6168.0       4.7    6163.3        .0       2.0      453.1        .0      151.0       34.8 100000.00
        .33       2.32      13.60        .00       .040       .030       .000       .000   1150.10   9971.81
     .007822      495.      495.      495.        20         8         0        .00      83.19  10055.00


 *SECNO 2.170

 3301 HV CHANGED MORE THAN HVINS

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9964.3   10128.9  TYPE=      1  TARGET=      164.590

1
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          Q @ X1 = 2.170 TO X1  = 2.659 EQUALS Q AT CP39
          Q = 6110 CFS

      2.170      4.79   1167.39   1167.39   1167.39   1169.16      1.77       3.63        .11 100000.00
     6110.0        .0    6110.0        .0        .0      571.6        .0      156.1       36.1 100000.00
        .34        .00      10.69        .00       .000       .030       .000       .000   1162.60   9964.35
     .008945      430.      435.      445.        20        11         0        .00     164.54  10128.89
```

*SECNO 2.279

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9945.9 10039.9 TYPE= 1 TARGET= 94.030

UPSTREAM OF THOMAS ROAD EXTENDED

2.279	7.30	1176.60	1176.60	1176.61	1179.18	2.58	4.89	.24	100000.00
6110.0	.0	6110.0	.0	.0	474.2	.0	163.0	37.8	100000.00
.35	.00	12.88	.00	.000	.030	.000	.000	1169.30	9945.93
.008103	580.	575.	570.	20	14	0	.00	93.96	10039.90

*SECNO 2.373

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 9950.0 10080.0 TYPE= 1 TARGET= 129.960

2.373	8.37	1180.37	.00	1180.51	1182.27	1.90	3.02	.07	1180.00
6110.0	1.1	4892.5	1216.3	1.3	405.5	231.7	169.3	39.0	1174.00
.37	.84	12.07	5.25	.040	.030	.050	.000	1172.00	9952.76
.004766	495.	495.	495.	2	0	0	.00	127.24	10080.00

*SECNO 2.468
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9941.0 10080.0 TYPE= 1 TARGET= 138.970

2.468	7.57	1184.87	1184.87	1184.94	1187.08	2.22	2.83	.10	1180.00
6110.0	443.6	3822.8	1843.6	81.4	268.4	274.8	176.7	40.6	1180.00
.38	5.45	14.24	6.71	.040	.030	.050	.000	1177.30	9941.55
.006670	505.	505.	505.	20	11	0	.00	138.45	10080.00

1
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 2.563
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9944.8 10100.0 TYPE= 1 TARGET= 155.190

CONFLUENCE OF CATERPILLAR WASH

2.563	8.62	1190.92	1190.92	1191.10	1193.20	2.28	2.83	.02	1184.00
6110.0	372.7	4728.3	1008.9	66.7	349.8	218.9	183.9	42.3	1184.00
.39	5.59	13.52	4.61	.040	.030	.050	.000	1182.30	9948.00
.004855	500.	500.	500.	20	8	0	.00	152.00	10100.00

*SECNO 2.659
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9968.5 10100.0 TYPE= 1 TARGET= 131.450

2.659	8.00	1193.80	1193.80	1193.87	1196.15	2.35	2.76	.02	1190.00
6110.0	48.6	4637.1	1424.3	12.0	336.3	261.4	191.1	43.9	1188.00

```
      .40       4.05      13.79       5.45       .040       .030       .050       .000    1185.80    9968.67
   .006218       505.       505.       505.          2         11          0        .00     131.32   10100.00

*SECNO 2.753

3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=     9917.7   10110.0  TYPE=       1  TARGET=      192.330

          Q @ X1=3.753 TO X1=3.250 EQUALS Q @ CP27
          Q = 3011 CFS

     2.753       7.66    1197.96        .00    1197.53    1198.64        .68       2.33        .17    1196.00
    3011.0      167.1     2762.6       81.3       72.1      401.4       46.4      197.6       45.7    1196.00
       .42       2.32       6.88       1.75       .040       .030       .050       .000    1190.30    9917.67
   .002894       495.       500.       495.          3          0          0        .00     192.33   10110.00


1
   18JAN02      15:45:38                                                                                PAGE   41

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

*SECNO 2.848

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9964.0   10080.0  TYPE=       1  TARGET=      116.000
     2.848       7.00    1200.20    1200.20    1200.23    1201.89       1.69       2.02        .30    1198.00
    3011.0       58.4     2568.5      384.1       18.1      229.5       96.9      202.5       47.5    1197.90
       .44       3.23      11.19       3.96       .040       .030       .050       .000    1193.20    9964.27
   .006048       495.       500.       495.         20         11          0        .00     115.22   10079.49

*SECNO 2.943

3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=     9960.5   10067.9  TYPE=       1  TARGET=      107.400
     2.943       7.66    1203.46        .00    1203.43    1204.63       1.17       2.68        .05  100000.00
    3011.0         .0     2527.4      483.6         .0      271.8      112.7      206.7       48.8    1200.50
       .45        .00       9.30       4.29       .000       .030       .050       .000    1195.80    9960.50
   .004797       500.       500.       500.          2          0          0        .00     107.40   10067.90

*SECNO 3.057

3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=     9975.0   10075.0  TYPE=       1  TARGET=      100.000
     3.057       6.39    1205.79        .00    1205.87    1207.47       1.67       2.69        .15    1202.00
    3011.0       74.4     2264.9      671.7       18.0      193.9      146.6      211.1       50.0    1202.00
       .47       4.13       11.68       4.58       .040       .030       .050       .000    1199.40    9975.51
   .005813       505.       510.       510.          2          0          0        .00      99.49   10075.00

*SECNO 3.148

3301 HV CHANGED MORE THAN HVINS

1
   18JAN02      15:45:38                                                                                PAGE   42

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
```

Appendix A2
HEC-2 Output for Regulatory FIRM Conditions
Duplicate Effective Model (Tractor Wash)

```
1*****************************************
*  HEC-2 WATER SURFACE PROFILES           *
*                                         *
*  Version   4.6.2;  May 1991             *
*                                         *
*  RUN DATE    13AUG01    TIME   07:23:58  *
*****************************************
```

```
*************************************
*  U.S. ARMY CORPS OF ENGINEERS     *
*  HYDROLOGIC ENGINEERING CENTER    *
*  609 SECOND STREET, SUITE D       *
*  DAVIS, CALIFORNIA 95616-4687     *
*           (916) 756-1104          *
*************************************
```

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

1

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THIS RUN EXECUTED 13AUG01 07:23:58

```
************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
************************************
```

```
T1      WHITE TANKS / AGUA FRIA AREA DRAINAGE MASTER STUDY
T2      100 - YEAR STORM EVENT     FLOODPLAIN RUN     FILE: 5C.H2I
 3      TRACTOR WASH - WASH "5C" - TRIBUTARY TO TUTHILL DIKE WASH

J1 -ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0         2         0         0         0         0         0         0   1213.72         0

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      1         0         0         0         0         0         0         0         0         0


J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38        43         1        53        21        22        54        51         4         8
     42         5        26         0       110         0       200

NC      .04       .05       .03        .3        .5
QT        2      3011      3011
ET                         9.1                                                          9940      10150

          STARTING WSEL IS FROM X-SECTION 3.250 ON WASH "5" - TUTHILL DIKE
           WASH

          CONFLUENCE WITH TUTHILL DIKE WASH

          Q AT X1 = 0.000 EQUALS 3011 CFS.   (TAKEN FROM X1= 3.250 ON WASH "5"-
          TUTHILL DIKE WASH.

X1    0.000        12      9970     10120         0         0         0
GR   1220.4      9830      1220      9840      1218      9845      1216      9900      1214      9935
GR     1212      9970    1210.9     10000      1212     10120      1214     10195      1216     10375
GR     1218     10480      1220     10580

NC      .07       .07      .035        .1        .3
QT        2      1648      1648
ET                         9.1                                                          9950      10098

          Q @ X1 = 0.037 TO X1 = 0.629 EQUALS Q AT I1CP27
```

1

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```
          Q = 1648 CFS

          INDIAN SCHOOL ROAD EXTENDED

          IGNORE EXTENDED CROSS SECTION WHICH TIES INTO TUTHILL DIKE WASH
```

FLOODPLAIN

X1	0.037	10	9955	10060	245	155	195			
GR	1215.5	9780	1214	9830	1213.5	9905	1214	9955	1212	9980
GR	1210	10000	1212	10025	1214	10060	1216	10115	1218	10190
ET			9.1						9959	10068
X1	0.095	13	9970	10050	300	310	305			
GR	1229	9915	1228	9930	1220	9950	1210	9970	1204	9985
GR	1203.5	10000	1204	10020	1206	10030	1210	10050	1216	10070
GR	1218	10090	1220	10200	1222.2	10220				
ET			9.1						9949	10059
X1	0.188	19	9960	10045	490	490	495			
GR	1246.6	9870	1246	9880	1240	9890	1230	9905	1220	9940
GR	1210	9960	1206	9975	1205.8	10000	1206	10020	1208	10030
GR	1210	10045	1220	10070	1224	10080	1226	10095	1226.3	10120
GR	1226	10130	1225.7	10220	1226	10290	1228	10355		
ET			9.1						9970	10050
X1	0.251	15	9975	10030	310	360	330			
GR	1249.7	9890	1240	9920	1230	9940	1222	9975	1220	9990
GR	1219.3	10000	1220	10020	1222	10030	1224	10060	1226	10095
GR	1228	10110	1230	10120	1240	10130	1242	10140	1243	10220
ET		5.1	9.1		9951.5	10100			9952	10060

PONDING AREA TO RIGHT OF STATION 10100 IS INEFFECTIVE FLOW AS DEFINED BY EXPANSION CRITERIA.

X1	0.305	21	9970	10030	275	295	285			
GR	1250	9790	1248	9815	1247.4	9845	1248	9885	1246	9895
GR	1240	9910	1230	9930	1228	9940	1226	9950	1224	9960
GR	1222	9970	1221.1	10000	1221.8	10030	1222	10380	1224	10390
GR	1226	10400	1228	10415	1230	10430	1240	10460	1242	10480
GR	1244	10490								
ET			9.1						9955	10020
X1	0.347	15	9960	10015	200	210	220			
GR	1249	9815	1248	9830	1240	9840	1236	9850	1234	9860
GR	1232	9885	1230	9920	1228	9960	1226	9980	1224	9990
GR	1222.7	10000	1224	10005	1226	10015	1230	10025	1232	10035
ET			9.1						9978	10030
X1	0.389	10	9980	10020	215	215	225			
GR	1250.1	9935	1250	9940	1240	9955	1230	9980	1228	9990
GR	1226	9995	1225.3	10000	1226	10010	1230	10020	1232	10040

ET			9.1						9879	10017
X1	0.455	9	9965	10005	400	235	345			
GR	1242	9830	1240	9850	1238	9860	1236	9870	1234	9885
GR	1232	9965	1230	10000	1232	10005	1240	10040		
ET			9.1						9976	10069
X1	0.504	14	9980	10055	180	270	260			
GR	1243.4	9920	1243.6	9940	1242	9950	1240	9965	1236	9980
GR	1234	9990	1233.6	10000	1234	10010	1236	10055	1238	10080
GR	1240	10095	1242	10110	1244	10140	1244.2	10160		
ET			9.1						9921	10055
X1	0.549	14	9975	10030	250	160	240			
GR	1248	9775	1246	9865	1244	9880	1242	9895	1240	9910
GR	1238	9975	1236	9985	1235.4	10000	1236	10015	1238	10030
GR	1240	10060	1242	10090	1244	10110	1244.5	10125		
ET			9.1						9970	10046
X1	0.629	13	9955	10045	290	480	420			
GR	1251.5	9830	1250.6	9885	1250	9945	1248	9955	1242	9980
GR	1241.1	10000	1242	10030	1244	10045	1250	10060	1252	10070
GR	1252.7	10130	1252.4	10210	1253.5	10230				
QT	2	1295	1295							
ET			9.1						9955	10038

Q @ X1 = 0.720 TO X1 = 1.137 EQUALS (Q AT I1CP27 + Q AT SUB26)/2
Q = (1648 + 943)/2 = 1295 CFS

X1	0.720	18	9980	10025	465	470	480			
GR	1257.2	9790	1257.5	9835	1256	9870	1254	9875	1250	9885
GR	1246	9900	1245.6	9910	1246	9920	1248	9935	1248.8	9955

```
GR     1248       9980      1246.6      10000       1248       10025       1250       10040       1252       10045
GR     1254      10055        1256      10065       1258       10130

ET                              9.1                                                                 9974       10038
X1    0.786          6        9985      10025        350         360        350
GR     1257       9960        1254       9985       1252       10000       1252       10025       1254       10035
GR     1260      10050

ET                              9.1                                                                 9969       10028
X1    0.828          5        9980      10020        230         190        220
GR     1270       9915        1260       9980       1257       10000       1260       10020       1270       10070

ET                              9.1                                                                 9978       10042
X1    0.894          7        9980      10020        350         350        350
GR     1277       9875        1274       9970       1268        9980       1264       10000       1268       10020
GR     1270      10055        1278      10125
1
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NC      .07        .07        .035         .1         .3
ET                              9.1                                                                 9976       10020
X1    0.955          5        9965      10030        320         320        320
GR     1285       9875        1280       9965     1271.5       10000       1280       10030       1284       10115

ET                              9.1                                                                 9987       10022
X1    1.017          6        9980      10020        330         340        330
GR     1292       9940        1290       9980       1280       10000       1286       10020       1290       10035
GR     1293      10150

ET                              9.1                                                                 9986       10033
X1    1.085          6        9985      10035        355         355        355
GR     1301       9955        1300       9985       1294       10000       1300       10035       1302       10085
GR     1303      10190

ET                              9.1                                                                 9962       10026
X1    1.137          7        9985      10015        275         275        275
GR     1309       9885        1308       9955       1304        9985       1303       10000       1304       10015
GR     1308      10030        1312      10235

NC      .035       .035       .035         .3         .5
QT         2        943         943
ET                              9.1                                                                 9957       10059

          Q @ X1 = 1.196 TO X1 = 2.047 EQUALS Q AT SUB26
          Q = 943 CFS

X1    1.196          7        9965      10075        330         300        310
GR   1321.5       9890        1320       9940       1316        9965       1315       10000       1316       10020
GR     1318      10075        1320      10200

ET                              9.1                                                                 9995       10297

          RECENT FLOODING EVIDENCE INDICATES THAT THE ROAD WILL WASH OUT IN
          THIS AREA AND FLOW WILL CONTINUE TO THE EAST, THUS THE REASON FOR
          TAKING THE ENTIRE FLOW TO THE EAST AT THIS CROSS SECTION.

X1    1.210          8        9880      10240         75          75         75
GR     1330       9250        1328       9550       1326        9880       1325       10000       1324       10160
GR     1324      10240        1326      10350       1328       10375

NC      .075       .075        .05         .3         .5
ET                              9.1                                                                 9725       10195
X1    1.298         12        9970      10065        100         250        465
GR     1330       9610        1324       9765       1324        9890       1320        9970       1314       10000
GR     1320      10045        1322      10065       1322       10160       1324       10180       1326       10200
GR     1328      10360        1329      10385
1
    13AUG01      07:23:58                                                                                    PAGE    5


NC      .075       .075        .05         .1         .3
ET                              9.1                                                                 9895       10022
X1    1.364         11        9955      10035         75         500        350
GR     1330       9840        1326       9900     1324.5        9925       1327        9955       1324        9990
GR   1322.5      10000        1326      10020       1328       10035       1330       10110       1328       10150
GR     1334      10250

                                9.1                                                                 9902       10102
X1    1.416         10        9905      10020        275         275        275
GR   1332.5       9895        1326       9905     1325.5        9920       1326        9935       1326        9975
GR     1324      10000        1326      10020       1328       10080       1330       10200       1334       10275
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```
NC     .075      .075      .035       .3        .5
ET                         9.1                                                  9958      10168
X1    1.478        10      9960     10165       325       325       325
GR     1336      9450      1334      9500      1332      9915      1330      9960      1328     10000
GR     1330     10120      1330     10165      1332     10230      1334     10300      1336     10400

ET                         9.1                                                  9863      10203

          DETENTION BASIN

X1    1.580        23      9885     10090       200       470       540
GR     1350      9750      1340      9770      1334      9795    1333.6      9810      1334      9820
GR     1334      9850      1330      9865      1320      9885      1316      9920    1316.2      9965
GR     1316     10000    1314.8     10060      1316     10075      1318     10090      1320     10100
GR     1322     10110      1324     10125      1326     10135      1328     10150      1330     10190
GR     1332     10230      1340     10245      1341     10260

NC     .075      .075       .05        .1        .3
ET                         9.1                                                  9929      10113
X1    1.669        19      9970     10025       475       410       470
GR   1340.9      9900      1340      9910      1330      9930      1328      9950      1326      9960
GR     1324      9970      1322      9980    1321.5     10000      1322     10015      1324     10025
GR     1326     10040      1327     10055      1326     10070      1325     10085      1326     10090
GR     1328     10100      1330     10110      1332     10120      1333     10135

ET                         9.1                                                  9968      10027
X1    1.769        16      9975     10025       505       475       525
GR     1340      9815      1338      9835      1336      9865      1334      9945      1332      9975
GR     1330      9990      1329     10000      1330     10015      1332     10025      1338     10050
GR     1340     10065      1338     10105      1340     10135      1342     10150      1344     10170
GR     1345     10210

ET                         9.1                                                  9977      10050
X1    1.862        15      9975     10050       375       545       490
GR   1358.7      9920      1358      9935      1350      9955      1344      9970      1342      9975
GR     1340      9985      1339     10000    1340.5     10050    1339.6     10090      1340     10105
GR     1342     10115      1344     10130      1346     10155      1348     10190      1350     10235
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ET                         9.1                                                  9977      10042
X1    1.930        14      9975     10045       440       225       360
GR     1357      9835      1356      9860      1354      9895      1352      9920      1350      9960
GR     1348      9975      1346      9985    1344.7     10000      1346     10030      1348     10045
GR     1350     10055      1352     10075      1354     10155      1356     10190

ET                         9.1                                                  9973      10040
X1    1.985        13      9980     10040       140       320       290
GR     1370      9870      1362      9905      1360      9910      1358      9930      1356      9960
GR     1354      9970      1352      9980    1350.1     10000      1352     10040      1354     10130
GR     1356     10165      1358     10190      1360     10215

ET                         9.1                                                  9970      10046
X1    2.047        13      9990     10020       370       300       330
GR     1370      9880      1368      9890      1366      9920      1364      9930      1366      9935
GR     1364      9950      1360      9990      1358     10000      1360     10020      1362     10045
GR     1364     10070      1366     10120      1368     10240

QT        2       472       472
ET                         9.1                                                  9954      10013

          CAMELBACK RD. "EXTENDED"

          Q @ X1 = 2.092 TO X1 = 2.731 EQUALS Q AT SUB26/2
          Q = 943/2 = 472 CFS

X1    2.092        12      9970     10015       240       225       235
GR     1380      9850      1370      9900      1368      9910      1366      9940      1364      9955
GR     1362      9970      1360      9985      1359     10000      1360     10010      1366     10015
GR     1368     10025    1369.3     10065

ET                         9.1                                                  9989      10032
X1    2.144        15      9990     10025       175       320       275
GR     1380      9865      1378      9880      1376      9910      1374      9940      1372      9960
GR     1370      9980      1364      9990    1362.4     10000      1364     10025      1366     10040
GR     1368     10050      1370     10060      1372     10075      1374     10085      1376     10120

                           9.1                                                  9934      10008
X1    2.186        17      9920     10010       260       160       225
GR     1380      9835      1376      9845      1374      9855      1372      9865      1370      9880
GR   1369.5      9900      1370      9920      1368      9960    1366.3     10000      1370     10010
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GR     1374      10020      1378      10030      1378.7     10045      1378      10075      1380      10110
GR     1382      10120      1383      10140

ET                          9.1                                                              9970      10021
X1    2.238         15      9970      10020         205        340       275
GR     1382       9865      1380       9875        1379       9910      1380       9950      1378       9965
GR     1372       9970      1370       9980      1369.6      10000      1370      10010      1372      10020
GR     1374      10035      1376      10060        1378      10080      1380      10105      1382      10125
1
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ET                          9.1                                                              9993      10046
X1    2.288         15      9990      10055         270        250       260
GR     1390       9910      1388       9920        1386       9935      1384       9960      1382       9970
GR     1380       9980      1378       9990      1375.2      10000      1376      10030      1378      10055
GR     1380      10080      1382      10105        1384      10150      1386      10170      1388      10185

ET                          9.1                                                              9964      10016
X1    2.341         12      9970      10010         295        195       280
GR     1391       9885      1390       9930        1386       9950      1382       9970    1380.5      10000
GR     1382      10010      1384      10020        1386      10030      1390      10035      1392      10045
GR     1394      10070    1395.5      10120

ET                          9.1                                                              9980      10015
X1    2.387         15      9970      10020         200        225       245
GR     1395       9910      1394       9935        1392       9950      1390       9970      1388       9980
GR     1386       9990    1385.8      10000        1386      10010      1390      10020      1400      10045
GR   1400.8      10060      1400      10075        1402      10105      1404      10135      1406      10165

ET                          9.1                                                              9964      10020
X1    2.442         15      9965      10020         255        300       290
GR     1408       9785      1406       9805        1404       9830      1402       9900      1400       9940
GR     1394       9965      1392       9990      1391.7      10000      1392      10005      1394      10020
GR.    1400      10025      1404      10035        1406      10050      1408      10065      1410      10125

 T                          9.1                                                              9985      10015
.     2.540          7      9985      10015         460        520       515
R     1416       9945      1414       9970        1410       9985    1406.4      10000      1410      10015
ER    1414      10025      1416      10045

ET                          9.1                                                              9974      10008
X1    2.635         12      9970      10010         440        500       505
GR     1440       9885      1438       9905        1436       9920      1434       9940      1432       9950
GR     1430       9970      1428       9980        1426      10000      1430      10010      1432      10020
GR     1434      10035    1434.7      10065

ET                          9.1                                                              9988      10012
X1    2.731          7      9990      10010         455        470       505
GR     1470       9935      1460       9975        1450       9990    1448.7      10000      1450      10010
GR     1460      10025      1464      10050
1
   13AUG01      07:23:58                                                                                PAGE    8

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 *PROF 1
0

 CCHV=      .300 CEHV=      .500
 *SECNO  .000
 3720 CRITICAL DEPTH ASSUMED

            STARTING WSEL IS FROM X-SECTION 3.250 ON WASH "5" - TUTHILL DIKE
             WASH

            CONFLUENCE WITH TUTHILL DIKE WASH

            Q AT X1 = 0.000 EQUALS 3011 CFS.   (TAKEN FROM X1= 3.250 ON WASH "5"-
            TUTHILL DIKE WASH.

      .000       2.83    1213.73    1213.73    1213.72    1214.69        .96        .00        .00    1212.00
    3011.0       83.6     2783.9      143.5       26.2       341.8       56.0         .0         .0    1212.00
       .00       3.20       8.14       2.56       .040        .030       .050       .000    1210.90    9939.75
   .009017         0.         0.         0.          0          4          0        .00     245.08   10184.83


 CCHV=      .100 CEHV=      .300
```

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*SECNO  .037

3301 HV CHANGED MORE THAN HVINS


          Q @ X1 = 0.037 TO X1 = 0.629 EQUALS Q AT I1CP27
          Q = 1648 CFS

          INDIAN SCHOOL ROAD EXTENDED

          IGNORE EXTENDED CROSS SECTION WHICH TIES INTO TUTHILL DIKE WASH
          FLOODPLAIN

      .037      5.42   1215.42       .00       .00   1215.62       .20       .85       .08   1214.00
   1648.0     284.5    1343.9      19.6     242.6     344.2      27.8       2.4       1.3   1214.00
      .02      1.17      3.90       .71      .070      .035      .070      .000   1210.00   9782.62
  .001743      245.      195.      155.         2         0         0       .00    316.47  10099.09


*SECNO  .095
1
   13AUG01      07:23:58                                                                        PAGE    9

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  4.07

      .095     12.15   1215.65       .00       .00   1215.71       .06       .08       .01   1210.00
   1648.0      12.9    1612.6      22.5      31.9     805.9      53.3       7.7       2.8   1210.00
      .06       .40      2.00       .42      .070      .035      .070      .000   1203.50   9958.70
  .000105      300.      305.      310.         2         0         0       .00    110.15  10068.84


*SECNO  .188
      .188      9.91   1215.71       .00       .00   1215.78       .07       .06       .00   1210.00
   1648.0      15.6    1612.4      20.0      32.6     744.6      40.7      17.4       4.1   1210.00
      .12       .48      2.17       .49      .070      .035      .070      .000   1205.80   9948.59
  .000146      490.      495.      490.         2         0         0       .00    110.68  10059.27


*SECNO  .251

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      .251      4.06   1223.36   1223.36       .00   1224.73      1.38       .16       .39   1222.00
   1648.0       6.9    1617.3      23.9       4.0     170.0      13.8      21.2       4.8   1222.00
      .13      1.71      9.51       1.73      .070      .035      .070      .000   1219.30   9969.07
  .011240      310.      330.      360.        20        19         0       .00     81.26  10050.33


*SECNO  .305

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.65


3470 ENCROACHMENT STATIONS=     9951.5   10100.0  TYPE=       1  TARGET=      148.500

          PONDING AREA TO RIGHT OF STATION 10100 IS INEFFECTIVE FLOW AS DEFINED
          BY EXPANSION CRITERIA.

      .305      4.51   1225.61       .00       .00   1225.82       .21       .97       .12   1222.00
   1648.0      46.1    1073.5     528.4      32.5     246.4     265.1      23.6       5.6   1221.80
      .16      1.42      4.36       1.99      .070      .035      .070      .000   1221.10   9951.96
  .001601      275.      285.      295.         3         0         0       .00    148.04  10100.00


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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
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    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

*SECNO  .347

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      .347      5.58   1228.28   1228.28       .00   1229.78      1.50       .76       .39   1228.00
    1648.0        .5    1631.3      16.2        .8     165.1       6.5      25.4       6.1   1226.00
       .16       .64      9.88      2.49      .070      .035      .070      .000   1222.70   9954.40
   .012724      200.      220.      210.        20        11         0       .00     66.29  10020.70


*SECNO  .389
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      .389      5.73   1231.03   1231.03       .00   1232.84      1.81      2.72       .09   1230.00
    1648.0       1.8    1638.4       7.7       1.3     151.4       5.3      26.3       6.4   1230.00
       .17      1.39     10.82      1.46      .070      .035      .070      .000   1225.30   9977.43
   .011541      215.      225.      215.         2         8         0       .00     52.86  10030.29

*SECNO  .455

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.44

      .455      4.92   1234.92       .00       .00   1235.65       .73      2.71       .11   1232.00
    1648.0     381.5    1228.8      37.7     157.7     157.2      18.8      28.3       7.2   1232.00
       .18      2.42      7.82      2.00      .070      .035      .070      .000   1230.00   9878.02
   .005542      400.      345.      235.         1         0         0       .00     139.80  10017.82


*SECNO  .504
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      .504      3.55   1237.15   1237.15       .00   1238.34      1.19      2.03       .14   1236.00
    1648.0       4.1    1630.1      13.8       2.5     185.5       8.3      29.7       7.8   1236.00
       .19      1.63      8.79      1.66      .070      .035      .070      .000   1233.60   9975.68
   .012868      180.      260.      270.         2        19         0       .00     93.74  10069.42


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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO  .549
      .549      4.28   1239.68   1239.44       .00   1240.67       .99      2.31       .02   1238.00
    1648.0      74.6    1539.0      34.4      45.6     186.1      21.0      30.9       8.4   1238.00
       .20      1.64      8.27      1.63      .070      .035      .070      .000   1235.40   9920.56
   .007528      250.      240.      160.         4         8         0       .00     134.57  10055.13


*SECNO  .629
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      .629      3.42   1244.52   1244.52       .00   1245.76      1.24      4.14       .07   1248.00
    1648.0        .0    1647.7        .3        .0     184.3        .3      33.0       9.3   1244.00
       .21       .00      8.94       .96      .000      .035      .070      .000   1241.10   9969.52
   .013608      290.      420.      480.         3        15         0       .00     76.78  10046.29


*SECNO  .720

3301 HV CHANGED MORE THAN HVINS

          Q @ X1 = 0.720 TO X1 = 1.137 EQUALS (Q AT I1CP27 + Q AT SUB26)/2
          Q = (1648 + 943)/2 = 1295 CFS

      .720      4.16   1249.76       .00       .00   1250.09       .34      4.24       .09   1248.00
    1295.0     631.7     646.4      16.9     207.6     110.4      11.5      35.8      10.6   1248.00
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      .24      3.04      5.86      1.47      .070      .035      .070      .000   1245.60   9885.93
  .005770      465.      480.      470.         4         0         0       .00    152.21  10038.14


*SECNO  .786

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      .786      3.40   1255.40   1255.40       .00   1256.75      1.35      2.82       .31   1254.00
    1295.0      14.9    1176.8     103.2        8.2     121.0      26.5      37.7      11.5   1252.00
       .25      1.83      9.72      3.90      .070      .035      .070      .000   1252.00   9973.33
  .012042      350.      350.      360.         20        15         0       .00     65.17  10038.50


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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO  .828
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      .828      4.74   1261.74   1261.74       .00   1263.17      1.43      2.53       .02   1260.00
    1295.0      19.9    1259.9      15.2        9.8     129.5       7.6      38.5      11.8   1260.00
       .26      2.02      9.73      2.01      .070      .035      .070      .000   1257.00   9958.70
  .011115      230.      220.      190.         20        11         0       .00     59.99  10028.69


SECNO  .894
385 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      .894      5.27   1269.27   1269.27       .00   1270.71      1.44      3.89       .00   1268.00
    1295.0       2.0    1269.9      23.2        1.3     130.7      14.1      39.7      12.3   1268.00
       .27      1.49      9.72      1.65      .070      .035      .070      .000   1264.00   9977.89
  .011087      350.      350.      350.         20         8         0       .00     64.29  10042.18


CCHV=      .100 CEHV=      .300
*SECNO  .955
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      .955      5.88   1277.38   1277.38       .00   1278.87      1.49      3.86       .02   1280.00
    1295.0        .0    1295.0        .0        .0     132.2        .0      40.7      12.7   1280.00
       .28       .00      9.79       .00      .000      .035      .000      .000   1271.50   9975.79
  .013202      320.      320.      320.         20         8         0       .00     44.97  10020.76


*SECNO 1.017
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     1.017      6.76   1286.76   1286.76       .00   1288.54      1.77      4.25       .09   1290.00
    1295.0        .0    1293.7       1.3        .0     121.0       1.1      41.7      13.0   1286.00
       .29       .00     10.69      1.22      .000      .035      .070      .000   1280.00   9986.47
  .012593      330.      330.      340.         20         8         0       .00     36.39  10022.86


*SECNO 1.085
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
1
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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


,93 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     1.085      5.67   1299.67   1299.67       .00   1301.12      1.45      4.63       .03   1300.00
    1295.0        .0    1295.0        .0        .0     133.8        .0      42.7      13.3   1300.00
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      .30       .00      9.68       .00      .000      .035      .000      .000   1294.00   9985.83
  .013527      355.      355.      355.       20        15         0       .00     47.23  10033.06


*SECNO 1.137
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     1.137      4.16   1307.16   1307.16       .00   1308.62      1.46      3.26       .00   1304.00
    1295.0     109.8    1131.3      54.0      37.5     109.8      18.7      43.6      13.7   1304.00
       .31       2.93     10.30      2.88      .070      .035      .070      .000   1303.00   9961.29
  .010455      275.      275.      275.       20        13         0       .00     65.57  10026.86


CCHV=      .300 CEHV=      .500
*SECNO 1.196

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

          Q @ X1 = 1.196 TO X1 = 2.047 EQUALS Q AT SUB26
          Q = 943 CFS

     1.196      2.44   1317.44   1317.44       .00   1318.14       .70      3.83       .23   1316.00
     943.0      27.5     915.5        .0       6.5     135.1        .0      44.8      14.3   1318.00
       .32       4.26      6.78       .00      .035      .035      .000      .000   1315.00   9956.01
  .015849      330.      310.      300.       20        14         0       .00    103.56  10059.56


*SECNO 1.210
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

          RECENT FLOODING EVIDENCE INDICATES THAT THE ROAD WILL WASH OUT IN
          THIS AREA AND FLOW WILL CONTINUE TO THE EAST, THUS THE REASON FOR

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          TAKING THE ENTIRE FLOW TO THE EAST AT THIS CROSS SECTION.

     1.210      1.05   1325.05   1325.05       .00   1325.39       .34      1.34       .11   1326.00
     943.0        .0     823.3     119.7        .0     172.1      30.3      45.0      14.6   1324.00
       .32       .00      4.78      3.95      .000      .035      .035      .000   1324.00   9994.01
  .020429       75.       75.       75.       20        18         0       .00    303.74  10297.75


CCHV=      .300 CEHV=      .500
*SECNO 1.298

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO = 18.41

     1.298     11.57   1325.57       .00       .00   1325.58       .01       .09       .10   1320.00
     943.0     147.5     657.2     138.3     513.9     734.2     403.0      51.7      17.3   1322.00
       .48       .29       .90       .34      .075      .050      .075      .000   1314.00   9724.42
  .000060      100.      465.      250.         3         0         0       .00    471.28  10195.71


CCHV=      .100 CEHV=      .300
*SECNO 1.364

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     1.364      3.86   1326.36   1326.36       .00   1327.07       .71       .07       .21   1327.00
     943.0     167.3     775.7        .0      49.7     106.5        .0      57.9      18.9   1328.00
       .49       3.37      7.28       .00      .075      .050      .000      .000   1322.50   9894.54
  .028471       75.      350.      500.       20        26         0       .00    113.13  10022.73


ECNO 1.416

3301 HV CHANGED MORE THAN HVINS
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3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.85

     1.416      4.37   1328.37       .00       .00   1328.47       .10      1.33       .06   1326.00
     943.0       3.8     849.2      90.0       4.3     325.8      86.9      59.7      19.9   1326.00
       .52       .87      2.61      1.04      .075      .050      .075      .000   1324.00   9901.34
   .001922      275.      275.      275.         6         0         0       .00    201.27  10102.62


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


CCHV=      .300 CEHV=      .500
*SECNO 1.478
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     1.478      2.10   1330.10   1330.10       .00   1330.52       .42      1.41       .16   1330.00
     943.0        .0     942.9        .1        .1     181.2        .2      61.9      21.4   1330.00
       .54       .37      5.20       .37      .075      .035      .075      .000   1328.00   9957.67
   .017717      325.      325.      325.        20        13         0       .00    210.69  10168.36


*SECNO 1.580

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO = *****


           DETENTION BASIN

     1.580     15.85   1330.65       .00       .00   1330.65       .00       .00       .13   1320.00
     943.0       7.9     890.7      44.4     113.8    2955.4     509.3      84.4      24.7   1318.00
      1.06       .07       .30       .09      .075      .035      .075      .000   1314.80   9862.56
  .000001      200.      540.      470.         2         0         0       .00    340.45  10203.01


CCHV=      .100 CEHV=      .300
*SECNO 1.669

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .11

     1.669      9.14   1330.64       .00       .00   1330.66       .02       .00       .01   1324.00
     943.0      69.4     647.9     225.7     126.1     464.1     365.7     108.3      27.4   1324.00
      1.17       .55      1.40       .62      .075      .050      .075      .000   1321.50   9928.71
   .000130      475.      470.      410.         2         0         0       .00    184.50  10113.21


*SECNO 1.769

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     1.769      3.49   1332.49   1332.49       .00   1333.58      1.09       .24       .32   1332.00
     943.0       2.3     940.0        .6       1.8     112.1        .5     114.5      28.8   1332.00
      1.19      1.29      8.38      1.26      .075      .050      .075      .000   1329.00   9967.61
   .027411      505.      525.      475.        20        18         0       .00     59.44  10027.05


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 1.862

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.56

     1.862      2.69   1341.69       .00       .00   1341.97       .28      8.31       .08   1342.00
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     943.0        .0      649.0      294.0        .0      136.7      100.8      116.5       29.9    1340.50
      1.22        .00      4.75       2.92       .000       .050       .075       .000    1339.00    9976.57
   .011193      375.       490.       545.          7          0          0        .00     136.86   10113.43


*SECNO 1.930

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     1.930       2.96    1347.66    1347.66        .00    1348.60        .94       5.87        .20    1348.00
     943.0         .0      943.0         .0         .0      121.5         .0      117.8       30.7    1348.00
      1.23        .00       7.76        .00       .000       .050       .000       .000    1344.70    9976.68
   .030339      440.       360.       225.          3          8          0        .00      65.81   10042.49


*SECNO 1.985

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.58

     1.985       3.36    1353.46        .00        .00    1353.95        .49       5.30        .04    1352.00
     943.0         9.3      849.2       84.6        5.3      144.5       47.8      118.9       31.3    1352.00
      1.25        1.75       5.88       1.77       .075       .050       .075       .000    1350.10    9972.71
   .012161      140.       290.       320.          6          0          0        .00     132.88   10105.59


*SECNO 2.047

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     2.047       4.09    1362.09    1362.09        .00    1363.10       1.01       4.96        .16    1360.00
     943.0        61.3      802.9       78.8       21.8       92.6       27.3      120.2       32.1    1360.00
      1.26        2.81       8.67       2.89       .075       .050       .075       .000    1358.00    9969.12
   .019158      370.       330.       300.         20         11          0        .00      76.98   10046.10


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 2.092

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.94

          CAMELBACK RD. "EXTENDED"

          Q @ X1 = 2.092 TO X1 = 2.731 EQUALS Q AT SUB26/2
          Q = 943/2 = 472 CFS

     2.092       5.26    1364.26        .00        .00    1364.36        .10       1.17        .09    1362.00
     472.0       15.6      456.4         .0       19.2      175.5         .0      121.1       32.5    1366.00
      1.28         .81       2.60        .00       .075       .050       .000       .000    1359.00    9953.04
   .001275      240.       235.       225.          4          0          0        .00      60.51   10013.55


*SECNO 2.144

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     2.144       2.57    1364.97    1364.97        .00    1365.82        .85        .96        .22    1364.00
     472.0        1.5      463.1         7.4        .8        62.0        3.5      121.9       32.8    1364.00
      1.29        1.90       7.47       2.10       .075       .050       .075       .000    1362.40    9988.38
   .029646      175.       275.       320.         20          8          0        .00      43.91   10032.29


*SECNO 2.186
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3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.69

2.186	3.01	1369.31	.00	.00	1369.57	.26	3.69	.06	1370.00
472.0	.0	472.0	.0	.0	116.3	.0	122.4	33.1	1370.00
1.31	.00	4.06	.00	.000	.050	.000	.000	1366.30	9933.68
.010416	260.	225.	160.	5	0	0	.00	74.47	10008.15

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 2.238

2.238	2.61	1372.21	.00	.00	1372.58	.37	2.98	.03	1372.00
472.0	.0	471.9	.1	.0	96.8	.2	123.0	33.5	1372.00
1.33	.02	4.88	.47	.075	.050	.075	.000	1369.60	9969.82
.011283	205.	275.	340.	4	0	0	.00	51.80	10021.62

*SECNO 2.288
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2.288	2.14	1377.34	1377.34	.00	1378.01	.67	4.74	.09	1378.00
472.0	.0	472.0	.0	.0	71.7	.0	123.5	33.8	1378.00
1.34	.00	6.58	.00	.000	.050	.000	.000	1375.20	9992.35
.034242	270.	260.	250.	3	15	0	.00	54.43	10046.78

SECNO 2.341

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.58

2.341	2.80	1383.30	.00	.00	1383.77	.47	5.73	.02	1382.00
472.0	7.2	457.6	7.2	4.2	81.9	4.2	124.1	34.1	1382.00
1.35	1.71	5.59	1.71	.075	.050	.075	.000	1380.50	9963.51
.013649	295.	280.	195.	3	0	0	.00	52.98	10016.49

*SECNO 2.387
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2.387	2.36	1388.16	1388.16	.00	1389.04	.88	4.86	.12	1390.00
472.0	.0	472.0	.0	.0	62.7	.0	124.5	34.4	1390.00
1.36	.00	7.53	.00	.000	.050	.000	.000	1385.80	9979.20
.031559	200.	245.	225.	3	15	0	.00	36.20	10015.40

*SECNO 2.442

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.53

2.442	2.72	1394.42	.00	.00	1394.80	.38	5.71	.05	1394.00
472.0	.3	471.7	.0	.4	95.2	.1	125.0	34.7	1394.00
1.38	.79	4.95	.02	.075	.050	.075	.000	1391.70	9963.26
.013442	255.	290.	300.	4	0	0	.00	57.09	10020.35

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 2.540

3301 HV CHANGED MORE THAN HVINS

.85 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2.540	3.77	1410.17	1410.17	.00	1411.16	.99	9.97	.18	1410.00
472.0	.0	472.0	.0	.1	59.2	.0	125.9	35.2	1410.00

```
     1.39       .03      7.98       .03      .075      .050      .075      .000   1406.40   9984.35
  .030243      460.      515.      520.        14        11         0       .00     31.08  10015.43


*SECNO 2.635
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     2.635      3.23   1429.23   1429.23       .00   1430.15       .92     15.65       .01   1430.00
     472.0        .0     472.0        .0        .0      61.3        .0     126.6      35.6   1430.00
      1.41       .00      7.69       .00      .000      .050      .000      .000   1426.00   9973.86
  .031785      440.      505.      500.         9        15         0       .00     34.21  10008.07


*SECNO 2.731
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     2.731      3.21   1451.91   1451.91       .00   1453.11      1.20     14.44       .08   1450.00
     472.0       7.5     457.0       7.5       2.7      51.3       2.7     127.3      35.9   1450.00
      1.43      2.74      8.91      2.74      .075      .050      .075      .000   1448.70   9987.13
  .025921      455.      505.      470.         9         5         0       .00     25.74  10012.87


1
 PROFILE FOR STREAM  TRACTOR WASH - WASH "5C"


 PLOTTED POINTS (BY PRIORITY) E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA


 ELEVATION  1204.     1254.     1304.     1354.     1404.     1454.     1504.     1554.     1604.     1654.
     SECNO   CUMDIS

       .00      0.  .IEM       .         .         .         .         .         .         .         .         .
               50.  CIEM       .         .         .         .         .         .         .         .         .
              100.  CIEM       .         .         .         .         .         .         .         .         .
              150.  CIEM       .         .         .         .         .         .         .         .         .
       .04    200.  CIE        .         .         .         .         .         .         .         .         .
              250.  CIEM       .         .         .         .         .         .         .         .         .
              300.  CIEM       .         .         .         .         .         .         .         .         .
              350.  CIEM       .         .         .         .         .         .         .         .         .
              400.  I EM       .         .         .         .         .         .         .         .         .
              450.  ILEM       .         .         .         .         .         .         .         .         .
       .09    500.  ILE M      .         .         .         .         .         .         .         .         .
              550.  ILE M      .         .         .         .         .         .         .         .         .
              600.  ILE M      .         .         .         .         .         .         .         .         .
              650.  ILE M      .         .         .         .         .         .         .         .         .
              700.  ILE M      .         .         .         .         .         .         .         .         .
              750.  ILE M      .         .         .         .         .         .         .         .         .
              800.  ILE M      .         .         .         .         .         .         .         .         .
              850.  ILE  M     .         .         .         .         .         .         .         .         .
              900.  ILE  M     .         .         .         .         .         .         .         .         .
              950.  ILE  M     .         .         .         .         .         .         .         .         .
       .19   1000.  ILE  M     .         .         .         .         .         .         .         .         .
             1050.  CILE M      .         .         .         .         .         .         .         .         .
             1100.  CILE  M     .         .         .         .         .         .         .         .         .
             1150.  C IE  M     .         .         .         .         .         .         .         .         .
             1200.  C IWE  M    .         .         .         .         .         .         .         .         .
             1250.  C  IE  M    .         .         .         .         .         .         .         .         .
             1300.  C  IE   M   .         .         .         .         .         .         .         .         .
       .25   1350.  .  IE   M   .         .         .         .         .         .         .         .         .
             1400.  C  IE   M   .         .         .         .         .         .         .         .         .
             1450.  C  IE   M   .         .         .         .         .         .         .         .         .
             1500.  C  IE   M   .         .         .         .         .         .         .         .         .
             1550.  C  IE   M   .         .         .         .         .         .         .         .         .
             1600.  C  IE   M   .         .         .         .         .         .         .         .         .
       .31   1650.  C   E   M   .         .         .         .         .         .         .         .         .
             1700.  C   IE  M   .         .         .         .         .         .         .         .         .
             1750.  C   IE M    .         .         .         .         .         .         .         .         .
             1800.  C   IEM     .         .         .         .         .         .         .         .         .
       .35   1850.  .   IEM     .         .         .         .         .         .         .         .         .
             1900.  .   IEM     .         .         .         .         .         .         .         .         .
             1950.  .   IWE     .         .         .         .         .         .         .         .         .
             2000.  .   IWE     .         .         .         .         .         .         .         .         .
             2050.  .   IWE     .         .         .         .         .         .         .         .         .
       .39   2100.  .   ILE     .         .         .         .         .         .         .         .         .
             2150.  C   ILE     .         .         .         .         .         .         .         .         .
             2200.  C    IE     .         .         .         .         .         .         .         .         .
             2250.  C    IE     .         .         .         .         .         .         .         .         .
             2300.  C    IEM    .         .         .         .         .         .         .         .         .
             2350.  C    IEM    .         .         .         .         .         .         .         .         .
       .46   2400.  C    IEM    .         .         .         .         .         .         .         .         .
             2450.  C    IWE    .         .         .         .         .         .         .         .         .
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        2500.  C     WEM .
        2550.  C     IEM .
        2600.  C     IEM .
        2650.  C     IEM .
  .50   2700.  .     IEM .
        2750.  .     IEM .
        2800.  .     IEM .
        2850.  .     IEM .
  .55   2900.  .     IEM .
        2950.  .      WE .
        3000.  .      WEM.
        3050.  .      IEM.
        3100.  .      IEM.
        3150.  .      IEM.
        3200.  .      IEM.
        3250.  .      IEL.
        3300.  .      IELM
  .63   3350.  .       ELM
        3400.  C      WEM
        3450.  C      WEM
        3500.  C      IEM
        3550.  C      IEM
        3600.  C      IEM
        3650.  C      IEM
        3700.  C      IEM
        3750.  C      IE.M
  .72   3800.  C      IE.M
        3850.  C       WEM
        3900.  C       IEM
        3950.  C       IEM
        4000.  C       IEM
        4050.  C       IEM
        4100.  C        EM
  .79   4150.  .        WE
        4200.  .        IE
        4250.  .        IEM
        4300.  .        IWE
        4350.  .        .IEM
  .83   4400.  .        .IEM
        4450.  .        .IE M
        4500.  .        .IE M
        4550.  .        .IWEM
        4600.  .        . IEM
        4650.  .        . IEM
        4700.  .        . IE M
  .89   4750.  .        . IE M
        4800.  .        . IWEM
        4850.  .        .  IEM
        4900.  .        .  IEM
        4950.  .        .  IE M
        5000.  .        .  IWEM
  .95   5050.  .        .   IEM
        5100.  .        .   IEL
        5150.  .        .   IWEM
        5200.  .        .   I EM
        5250.  .        .    IEL
        5300.  .        .    IWE
        5350.  .        .    IWEM
 1.02   5400.  .        .    I EM
        5450.  .        .     IEL
        5500.  .        .     IWE
        5550.  .        .     I E
        5600.  .        .      IEM.
        5650.  .        .      IWE.
        5700.  .        .       IE.
 1.09   5750.  .        .       IWE
        5800.  .        .       ILE
        5850.  .        .        IE
        5900.  .        .        IE
        5950.  .        .        IWE
 1.14   6000.  .        .         IE
        6050.  .        .         IE
        6100.  .        .         .WE
        6150.  .        .         .IE
        6200.  .        .         .IEM
        6250.  .        .         . WE
        6300.  .        .         . IE
 1.20   6350.  .        .         . IE
 1.21   6400.  .        .         .   EL
        6450.  C        .         .   EM
        6500.  C        .         .   EM
        6550.  C        .         . IEM
        6600.  C        .         . IEM
        6650.  C        .         . IEM
```

```
      6700.  C          .         .  IEM    .          .         .          .         .          .          .         .
      6750.  C          .         .  IEM    .          .         .          .         .          .          .         .
      6800.  C          .         . ILEM    .          .         .          .         .          .          .         .
1.30  6850.  C          .         . ILEM    .          .         .          .         .          .          .         .
      6900.  C          .         . I EM    .          .         .          .         .          .          .         .
      6950.  C          .         .  IWE    .          .         .          .         .          .          .         .
      7000.  C          .         .  IWE    .          .         .          .         .          .          .         .
      7050.  C          .         .  ILE    .          .         .          .         .          .          .         .
      7100.  C          .         .  ILE    .          .         .          .         .          .          .         .
      7150.  C          .         .   IE    .          .         .          .         .          .          .         .
1.36  7200.  .          .         .   IE    .          .         .          .         .          .          .         .
      7250.  C          .         .   IE    .          .         .          .         .          .          .         .
      7300.  C          .         .   IE    .          .         .          .         .          .          .         .
      7350.  C          .         .   IEM   .          .         .          .         .          .          .         .
      7400.  C          .         .   IEM   .          .         .          .         .          .          .         .
      7450.  C          .         .   IEM   .          .         .          .         .          .          .         .
1.42  7500.  C          .         .   IEM   .          .         .          .         .          .          .         .
      7550.  C          .         .   IEM   .          .         .          .         .          .          .         .
      7600.  C          .         .   IEM   .          .         .          .         .          .          .         .
      7650.  C          .         .   IEM   .          .         .          .         .          .          .         .
      7700.  C          .         .    EM   .          .         .          .         .          .          .         .
      7750.  C          .         .    EM   .          .         .          .         .          .          .         .
1.48  7800.  .          .         .    E M  .          .         .          .         .          .          .         .
      7850.  .C         .         .    E M  .          .         .          .         .          .          .         .
      7900.  C          .         .   IE M  .          .         .          .         .          .          .         .
      7950.  C          .         .   IE M  .          .         .          .         .          .          .         .
      8000.  C          .         .   IE M  .          .         .          .         .          .          .         .
      8050.  C          .         .   IE M  .          .         .          .         .          .          .         .
      8100.  C          .         .  ILE M  .          .         .          .         .          .          .         .
      8150.  C          .         .  ILE M  .          .         .          .         .          .          .         .
      8200.  C          .         .  ILE M  .          .         .          .         .          .          .         .
      8250.  C          .         .  ILE M  .          .         .          .         .          .          .         .
      8300.  C          .         . IL E M  .          .         .          .         .          .          .         .
1.58  8350.  C          .         . IL E  M .          .         .          .         .          .          .         .
      8400.  C          .         . IL E M  .          .         .          .         .          .          .         .
      8450.  C          .         .  I E M  .          .         .          .         .          .          .         .
      8500.  C          .         .  ILE M  .          .         .          .         .          .          .         .
      8550.  C          .         .  ILE M  .          .         .          .         .          .          .         .
      8600.  C          .         .  ILE M  .          .         .          .         .          .          .         .
      8650.  C          .         .  ILEM   .          .         .          .         .          .          .         .
      8700.  C          .         .  ILEM   .          .         .          .         .          .          .         .
      8750.  C          .         .  ILEM   .          .         .          .         .          .          .         .
      8800.  C          .         .   IEM   .          .         .          .         .          .          .         .
1.67  8850.  C          .         .   IEM   .          .         .          .         .          .          .         .
      8900.  C          .         .   IEM   .          .         .          .         .          .          .         .
      8950.  C          .         .   IWE   .          .         .          .         .          .          .         .
      9000.  C          .         .   ILE   .          .         .          .         .          .          .         .
      9050.  C          .         .   ILE   .          .         .          .         .          .          .         .
      9100.  C          .         .   ILEM  .          .         .          .         .          .          .         .
      9150.  C          .         .   ILEM  .          .         .          .         .          .          .         .
      9200.  C          .         .    IEM  .          .         .          .         .          .          .         .
      9250.  C          .         .    IEM  .          .         .          .         .          .          .         .
      9300.  C          .         .    IEM  .          .         .          .         .          .          .         .
1.77  9350.  .          .         .    IEM  .          .         .          .         .          .          .         .
      9400.  C          .         .    IE M .          .         .          .         .          .          .         .
      9450.  C          .         .     E M .          .         .          .         .          .          .         .
      9500.  C          .         .     WEM .          .         .          .         .          .          .         .
      9550.  C          .         .     IEM .          .         .          .         .          .          .         .
      9600.  C          .         .     IEM .          .         .          .         .          .          .         .
      9650.  C          .         .     IE M.          .         .          .         .          .          .         .
      9700.  C          .         .      E M.          .         .          .         .          .          .         .
      9750.  C          .         .      E M.          .         .          .         .          .          .         .
      9800.  C          .         .      WEM.          .         .          .         .          .          .         .
1.86  9850.  C          .         .      IEM.          .         .          .         .          .          .         .
      9900.  C          .         .      IEM.          .         .          .         .          .          .         .
      9950.  C          .         .      IE M          .         .          .         .          .          .         .
     10000.  C          .         .       E M          .         .          .         .          .          .         .
     10050.  C          .         .       E M          .         .          .         .          .          .         .
     10100.  C          .         .       WEM          .         .          .         .          .          .         .
     10150.  C          .         .       IEM          .         .          .         .          .          .         .
1.93 10200.  .          .         .       IE.M         .         .          .         .          .          .         .
     10250.  C          .         .       IE.M         .         .          .         .          .          .         .
     10300.  C          .         .        E.M         .         .          .         .          .          .         .
     10350.  C          .         .        WEM         .         .          .         .          .          .         .
     10400.  C          .         .        IEM         .         .          .         .          .          .         .
     10450.  C          .         .        IEM         .         .          .         .          .          .         .
1.99 10500.  C          .         .        IEM         .         .          .         .          .          .         .
     10550.  C          .         .         E M        .         .          .         .          .          .         .
     10600.  C          .         .         IEM        .         .          .         .          .          .         .
     10650.  C          .         .         IEM        .         .          .         .          .          .         .
     10700.  C          .         .         IEM        .         .          .         .          .          .         .
     10750.  C          .         .         .E M       .         .          .         .          .          .         .
     10800.  .       C  .         .         .IEM       .         .          .         .          .          .         .
2.05 10850.  .          .         .         .IEM       .         .          .         .          .          .         .
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        10900.  C          .         .        .IEM       .         .         .         .         .         .
        10950.  C          .         .        .IEM       .         .         .         .         .         .
        11000.  C          .         .        .IEM       .         .         .         .         .         .
   2.09 11050.  C          .         .        .IER       .         .         .         .         .         .
        11100.  C          .         .        .IEM       .         .         .         .         .         .
        11150.  C          .         .        .IE M      .         .         .         .         .         .
        11200.  C          .         .        .IE M      .         .         .         .         .         .
        11250.  C          .         .        . E M      .         .         .         .         .         .
        11300.  .      C   .         .        . E M      .         .         .         .         .         .
   2.14 11350.  .          .         .        . E  M     .         .         .         .         .         .
        11400.  C          .         .        . WE M     .         .         .         .         .         .
        11450.  C          .         .        . IE M     .         .         .         .         .         .
        11500.  C          .         .        . IE M     .         .         .         .         .         .
   2.19 11550.  C          .         .        .  E M     .         .         .         .         .         .
        11600.  C          .         .        .  E M     .         .         .         .         .         .
        11650.  C          .         .        .  E M     .         .         .         .         .         .
        11700.  C          .         .        .  WE M    .         .         .         .         .         .
        11750.  C          .         .        .  IE M    .         .         .         .         .         .
        11800.  C          .         .        .  IE M    .         .         .         .         .         .
   2.24 11850.  C          .         .        .  IE M    .         .         .         .         .         .
        11900.  C          .         .        .  IE M    .         .         .         .         .         .
        11950.  C          .         .        .   E M    .         .         .         .         .         .
        12000.  C          .         .        .   E M    .         .         .         .         .         .
        12050.  C          .         .        .   IE M   .         .         .         .         .         .
   2.29 12100.  .          .         .        .   IE M   .         .         .         .         .         .
        12150.  C          .         .        .    E M   .         .         .         .         .         .
        12200.  C          .         .        .    E M   .         .         .         .         .         .
        12250.  C          .         .        .    WEM   .         .         .         .         .         .
        12300.  C          .         .        .    IEM   .         .         .         .         .         .
        12350.  C          .         .        .    IEM   .         .         .         .         .         .
   2.34 12400.  C          .         .        .    IE M  .         .         .         .         .         .
        12450.  C          .         .        .     E M  .         .         .         .         .         .
        12500.  C          .         .        .     E M  .         .         .         .         .         .
        12550.  C          .         .        .     IEM  .         .         .         .         .         .
   2.39 12600.  .          .         .        .     IEM  .         .         .         .         .         .
        12650.  C          .         .        .      E M.         .         .         .         .         .
        12700.  C          .         .        .      WEM.         .         .         .         .         .
        12750.  C          .         .        .      IE M         .         .         .         .         .
        12800.  C          .         .        .      IE M         .         .         .         .         .
        12850.  C          .         .        .      IE .M        .         .         .         .         .
   2.44 12900.  C          .         .        .       E .M        .         .         .         .         .
        12950.  C          .         .        .      WE.M         .         .         .         .         .
        13000.  C          .         .        .      IE.M         .         .         .         .         .
        13050.  C          .         .        .      IE.M         .         .         .         .         .
        13100.  C          .         .        .       WE M        .         .         .         .         .
        13150.  C          .         .        .       IE M        .         .         .         .         .
        13200.  C          .         .        .       IE M        .         .         .         .         .
        13250.  C          .         .        .        E M        .         .         .         .         .
        13300.  C          .         .        .        IEM        .         .         .         .         .
        13350.  .      C   .         .        .        IEM        .         .         .         .         .
        13400.  .          .         .        .  C     IEM        .         .         .         .         .
   2.54 13450.  .          .         .        .       .WEM        .         .         .         .         .
        13500.  .          .         .        .       .IEM        .         .         .         .         .
        13550.  .          .         .        .       .IEM        .         .         .         .         .
        13600.  .          .         .        .       . WEM       .         .         .         .         .
        13650.  .          .         .        .       . IEM       .         .         .         .         .
        13700.  .          .         .        .       .  EM       .         .         .         .         .
        13750.  .          .         .        .       .  IEM      .         .         .         .         .
        13800.  .          .         .        .       .  IEM      .         .         .         .         .
        13850.  .          .         .        .       .   WE      .         .         .         .         .
        13900.  .          .         .        .       .   IEM     .         .         .         .         .
   2.63 13950.  .          .         .        .       .    EM     .         .         .         .         .
        14000.  .          .         .        .       .    IEM    .         .         .         .         .
        14050.  .          .         .        .       .    IEM    .         .         .         .         .
        14100.  .          .         .        .       .     WEM   .         .         .         .         .
        14150.  .          .         .        .       .     IE M. .         .         .         .         .
        14200.  .          .         .        .       .      WEM. .         .         .         .         .
        14250.  .          .         .        .       .      IE M .         .         .         .         .
        14300.  .          .         .        .       .       WEM  .         .         .         .         .
        14350.  .          .         .        .       .       IE.M .         .         .         .         .
        14400.  .          .         .        .       .        E.M .         .         .         .         .
   2.73 14450.  .          .         .        .       .        IE M .        .         .         .         .
1
    13AUG01      07:23:58                                                                  PAGE   20

 T1      WHITE TANKS / AGUA FRIA AREA DRAINAGE MASTER STUDY
 T2      100 - YEAR STORM EVENT     FLOODWAY RUN     FILE: 5C.H2I
 T3      TRACTOR WASH - WASH "5C" - TRIBUTARY TO TUTHILL DIKE WASH

   ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

     0         3         0         0         0         0         0         0    1213.72         0
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J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
     15         0        -1         0         0         0         0         0         0         0

1
    13AUG01      07:23:58                                                                          PAGE   21

     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


 *PROF 2
0

 CCHV=     .300 CEHV=     .500
 *SECNO  .000

 3470 ENCROACHMENT STATIONS=     9940.0   10150.0  TYPE=      1  TARGET=      210.000

            STARTING WSEL IS FROM X-SECTION 3.250 ON WASH "5" - TUTHILL DIKE
             WASH

            CONFLUENCE WITH TUTHILL DIKE WASH

            Q AT X1 = 0.000 EQUALS 3011 CFS.   (TAKEN FROM X1= 3.250 ON WASH "5"-
            TUTHILL DIKE WASH.

       .000      2.82   1213.72   1213.72   1213.73   1214.70       .98       .00       .00   1212.00
    3011.0      83.5    2794.4     133.1      25.9     340.5      39.6        .0        .0   1212.00
       .00      3.23      8.21      3.36      .040      .030      .050      .000   1210.90   9940.00
   .009203        0.        0.        0.         0         4         0       .00    210.00  10150.00


 CCHV=     .100 CEHV=     .300
 *SECNO  .037

 3301 HV CHANGED MORE THAN HVINS

 3470 ENCROACHMENT STATIONS=     9950.0   10098.0  TYPE=      1  TARGET=      148.000

            Q @ X1 = 0.037 TO X1 = 0.629 EQUALS Q AT I1CP27
            Q = 1648 CFS

            INDIAN SCHOOL ROAD EXTENDED

            IGNORE EXTENDED CROSS SECTION WHICH TIES INTO TUTHILL DIKE WASH
            FLOODPLAIN

       .037      5.45   1215.45       .00   1215.42   1215.78       .33      1.01       .07   1214.00
    1648.0       8.4    1614.5      25.1        7.4     347.0      28.8       1.8        .8   1214.00
       .01      1.14      4.65       .87       .070      .035       .070      .000   1210.00   9950.00
   .002449       245.      195.      155.          2         0          0       .00    148.00  10098.00


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    13AUG01      07:23:58                                                                          PAGE   22

     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


 *SECNO  .095

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  4.98


 3470 ENCROACHMENT STATIONS=     9959.0   10068.0  TYPE=      1  TARGET=      109.000
       .095     12.33   1215.83       .00   1215.65   1215.89       .06       .08       .03   1210.00
    1648.0      13.8    1609.9      24.3        33.9     820.0      56.3       6.3       1.7   1210.00
       .06       .41      1.96       .43       .070      .035       .070      .000   1203.50   9959.00
   .000099       300.      305.      310.          2         0          0       .00    109.00  10068.00


 ECNO  .188

 3470 ENCROACHMENT STATIONS=     9949.0   10059.0  TYPE=      1  TARGET=      110.000
       .188     10.08   1215.88       .00   1215.71   1215.95       .07       .06       .00   1210.00
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   1648.0      16.6    1610.1      21.3      34.4     759.3      43.1      16.2       2.9   1210.00
      .12       .48      2.12       .49      .070      .035      .070      .000   1205.80   9949.00
  .000136      490.      495.      490.         2         0         0       .00    110.00  10059.00


*SECNO  .251

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9970.0   10050.0  TYPE=      1  TARGET=       80.000
      .251      4.06    1223.36    1223.36    1223.36    1224.73      1.37       .15       .39   1222.00
   1648.0       7.3    1616.2       24.5        4.0      170.5      13.9      20.1       3.7   1222.00
      .13      1.83       9.48       1.76       .070       .035      .070      .000   1219.30   9970.00
  .011120       310.      330.       360.         20         18         0       .00     80.00  10050.00


*SECNO  .305

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.22

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   13AUG01      07:23:58                                                                    PAGE   23

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


'70 ENCROACHMENT STATIONS=     9952.0   10060.0  TYPE=      1  TARGET=      108.000

         PONDING AREA TO RIGHT OF STATION 10100 IS INEFFECTIVE FLOW AS DEFINED
         BY EXPANSION CRITERIA.

      .305      4.60    1225.70       .00    1225.61    1226.06       .36      1.22       .10   1222.00
   1648.0       58.7    1321.1      268.2       34.2       252.1     116.8      22.0       4.3   1221.80
      .15       1.71       5.24       2.30       .070       .035      .070      .000   1221.10   9952.00
  .002249       275.      285.       295.         3         0         0       .00    108.00  10060.00


*SECNO  .347

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9955.0   10020.0  TYPE=      1  TARGET=       65.000
      .347      5.58    1228.28    1228.28    1228.28    1229.78      1.50       .97       .34   1228.00
   1648.0         .5    1630.8       16.6         .8       165.3       6.4      23.5       4.7   1226.00
      .15       .69       9.87       2.60       .070       .035      .070      .000   1222.70   9955.00
  .012676       200.      220.       210.         20         11         0       .00     65.00  10020.00


*SECNO  .389
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9978.0   10030.0  TYPE=      1  TARGET=       52.000
      .389      5.74    1231.04    1231.04    1231.03    1232.84      1.79      2.70       .09   1230.00
   1648.0         1.9    1637.9       8.2         1.3       152.0       5.4      24.3       5.0   1230.00
      .16      1.50      10.77       1.50       .070       .035      .070      .000   1225.30   9978.00
  .011374       215.      225.       215.         2         8         0       .00     52.00  10030.00


*SECNO  .455

3301 HV CHANGED MORE THAN HVINS

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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
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    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.42


3470 ENCROACHMENT STATIONS=     9879.0   10017.0  TYPE=      1  TARGET=      138.000
       .455      4.92   1234.92       .00   1234.92   1235.65       .74      2.71       .11   1232.00
    1648.0     379.5    1230.0      38.4     156.4     156.7      18.5      26.3       5.8   1232.00
       .18      2.43      7.85      2.07      .070      .035      .070      .000   1230.00   9879.00
   .005621      400.      345.      235.         2         0         0       .00    138.00  10017.00


*SECNO  .504
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9976.0   10069.0  TYPE=      1  TARGET=       93.000
       .504      3.56   1237.16   1237.16   1237.15   1238.34      1.17      2.03       .13   1236.00
    1648.0       4.3    1629.3      14.4       2.5     186.4       8.5      27.8       6.4   1236.00
       .18      1.69      8.74      1.70      .070      .035      .070      .000   1233.60   9976.00
   .012657      180.      260.      270.         2        19         0       .00     93.00  10069.00


*SECNO  .549

3470 ENCROACHMENT STATIONS=     9921.0   10055.0  TYPE=      1  TARGET=      134.000
       .549      4.26   1239.66   1239.42   1239.68   1240.67      1.00      2.31       .02   1238.00
    1648.0      73.8    1540.2      34.0      45.0     185.5      20.8      29.0       7.0   1238.00
       .19      1.64      8.30      1.64      .070      .035      .070      .000   1235.40   9921.00
   .007627      250.      240.      160.         4         8         0       .00    133.95  10054.95


*SECNO  .629
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9970.0   10046.0  TYPE=      1  TARGET=       76.000
       .629      3.41   1244.51   1244.51   1244.52   1245.76      1.25      4.17       .07 100000.00
    1648.0        .0    1647.7        .3        .0     183.7        .3      31.0       7.9   1244.00
       .21       .00      8.97      1.01      .000      .035      .070      .000   1241.10   9970.00
   .013648      290.      420.      480.         3        15         0       .00     76.00  10046.00


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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO  .720

3470 ENCROACHMENT STATIONS=     9955.0   10038.0  TYPE=      1  TARGET=       83.000

          Q @ X1 = 0.720 TO X1 = 1.137 EQUALS (Q AT I1CP27 + Q AT SUB26)/2
          Q = (1648 + 943)/2 = 1295 CFS

       .720      4.65   1250.25       .00   1249.76   1251.20       .95      5.41       .03   1248.00
    1295.0     137.5    1113.0      44.5      46.6     133.4      18.2      33.1       8.8   1248.00
       .22      2.95      8.34      2.45      .070      .035      .070      .000   1245.60   9955.00
   .009095      465.      480.      470.         3         0         0       .00     83.00  10038.00


*SECNO  .786
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9974.0   10038.0  TYPE=      1  TARGET=       64.000
       .786      3.42   1255.42   1255.42   1255.40   1256.75      1.33      3.60       .11   1254.00
    1295.0      16.0    1175.3     103.7       8.4     122.0      26.7      34.6       9.4   1252.00
       .23      1.90      9.63      3.88      .070      .035      .070      .000   1252.00   9974.00
   .011693      350.      350.      360.         3        15         0       .00     64.00  10038.00


 SECNO  .828
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
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3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9969.0   10028.0  TYPE=      1  TARGET=       59.000
      .828      4.76   1261.76   1261.76   1261.74   1263.17      1.41      2.46       .02   1260.00
    1295.0      20.7    1258.2      16.1      10.1      130.4       7.7      35.3       9.7   1260.00
       .24      2.06      9.65      2.10      .070       .035      .070      .000   1257.00   9969.00
   .010831      230.      220.      190.        20         11         0       .00     59.00  10028.00


*SECNO  .894
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9978.0   10042.0  TYPE=      1  TARGET=       64.000
      .894      5.31   1269.31   1269.31   1269.27   1270.70      1.40      3.75       .00   1268.00
    1295.0       2.1    1267.7      25.1       1.4      132.3      14.9      36.5      10.2   1268.00
       .25      1.52      9.59      1.68      .070       .035      .070      .000   1264.00   9978.00
   .010620      350.      350.      350.        20          8         0       .00     64.00  10042.00


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    13AUG01      07:23:58                                                                    PAGE   26

   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


CCHV=     .100 CEHV=     .300
*SECNO  .955
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9976.0   10020.0  TYPE=      1  TARGET=       44.000
      .955      5.84   1277.34   1277.34   1277.38   1278.87      1.53      3.81       .04 100000.00
    1295.0        .0    1295.0        .0        .0      130.5        .0      37.5      10.6 100000.00
       .26       .00      9.92       .00      .000       .035      .000      .000   1271.50   9976.00
   .013464      320.      320.      320.        20          8         0       .00     44.00  10020.00


*SECNO 1.017
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9987.0   10022.0  TYPE=      1  TARGET=       35.000
     1.017      6.74   1286.74   1286.74   1286.76   1288.54      1.80      4.31       .08 100000.00
    1295.0        .0    1293.7       1.3        .0      120.3       1.0      38.5      10.9   1286.00
       .27       .00     10.76      1.34      .000       .035      .070      .000   1280.00   9987.00
   .012692      330.      330.      340.        20          8         0       .00     35.00  10022.00


*SECNO 1.085
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9986.0   10033.0  TYPE=      1  TARGET=       47.000
     1.085      5.65   1299.65   1299.65   1299.67   1301.12      1.47      4.69       .03 100000.00
    1295.0        .0    1295.0        .0        .0      132.9        .0      39.5      11.2 100000.00
       .28       .00      9.74       .00      .000       .035      .000      .000   1294.00   9986.00
   .013756      355.      355.      355.        20         15         0       .00     46.94  10032.94


*SECNO 1.137
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9962.0   10026.0  TYPE=      1  TARGET=       64.000
1
    13AUG01      07:23:58                                                                    PAGE   27

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST
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    1.137      4.20   1307.20   1307.20   1307.16   1308.61      1.41      3.21       .01   1304.00
   1295.0     113.0     1125.9      56.1      38.2      110.9      19.0      40.5      11.6   1304.00
      .29      2.96      10.16      2.95      .070       .035      .070      .000   1303.00   9952.00
  .010043      275.      275.       275.        20         19         0       .00     64.00  10026.00


CCHV=     .300 CEHV=     .500
*SECNO 1.196

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9957.0   10059.0  TYPE=      1  TARGET=      102.000

          Q @ X1 = 1.196 TO X1 = 2.047 EQUALS Q AT SUB26
          Q = 943 CFS

    1.196      2.45   1317.45   1317.45   1317.44   1318.14       .69      3.70       .22   1316.00
    943.0      28.8      914.2        .0       6.4      135.7        .0      41.6      12.2 100000.00
      .30      4.47       6.74       .00      .035       .035      .000      .000   1315.00   9957.00
  .015442      330.       310.       300.        20         11         0       .00     102.00  10059.00


*SECNO 1.210
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9995.0   10297.0  TYPE=      1  TARGET=      302.000

          RECENT FLOODING EVIDENCE INDICATES THAT THE ROAD WILL WASH OUT IN
          THIS AREA AND FLOW WILL CONTINUE TO THE EAST, THUS THE REASON FOR
          TAKING THE ENTIRE FLOW TO THE EAST AT THIS CROSS SECTION.

    1.210      1.05   1325.05   1325.05   1325.05   1325.39       .34      1.32       .11 100000.00
    943.0        .0     822.7     120.3        .0     172.0      30.3      41.9      12.5   1324.00
      .30        .00      4.78      3.97      .000       .035      .035      .000   1324.00   9995.00
  .020330       75.       75.       75.        20         18         0       .00     302.00  10297.00


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


CCHV=     .300 CEHV=     .500
*SECNO 1.298

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO = 18.37


3470 ENCROACHMENT STATIONS=     9725.0   10195.0  TYPE=      1  TARGET=      470.000
    1.298      11.57   1325.57       .00   1325.57   1325.58       .01       .09       .10   1320.00
    943.0      147.6     657.1      138.3     513.8     734.2     402.9      48.6      15.2   1322.00
      .46        .29       .89        .34      .075       .050      .075      .000   1314.00   9725.00
  .000060      100.       465.       250.         3          0         0       .00     470.00  10195.00


CCHV=     .100 CEHV=     .300
*SECNO 1.364

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9895.0   10022.0  TYPE=      1  TARGET=      127.000
    1.364      3.92   1326.42   1326.42   1326.36   1327.08       .65       .07       .19   1327.00
    943.0     172.4     770.6        .0      52.9      110.1        .0      54.8      16.8 100000.00
      .47      3.26       7.00       .00      .075       .050      .000      .000   1322.50   9895.00
  .025204       75.       350.       500.        20         21         0       .00     113.39  10022.00
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*SECNO 1.416

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.58


3470 ENCROACHMENT STATIONS=     9902.0   10102.0  TYPE=      1  TARGET=      200.000
     1.416      4.36   1328.36       .00   1328.37   1328.45       .10      1.32       .06   1326.00
     943.0       3.7     850.3      89.0       4.2     323.7       85.4      56.6      17.8   1326.00
       .51       .90      2.63      1.04       .075      .050      .075      .000   1324.00   9902.00
   .001969      275.      275.      275.          6         0         0       .00    199.51  10101.51


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    13AUG01      07:23:58                                                                          PAGE   29

     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

CCHV=      .300 CEHV=      .500
*SECNO 1.478
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9958.0   10168.0  TYPE=      1  TARGET=      210.000
     1.478      2.13   1330.13   1330.13   1330.10   1330.53       .40      1.41       .15   1330.00
     943.0        .1     942.8        .1        .2     185.7        .2      58.8      19.3   1330.00
       .52       .47      5.08       .46       .075      .035      .075      .000   1328.00   9958.00
   .016322      325.      325.      325.          4         9         0       .00    210.00  10168.00


 SECNO 1.580

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO = *****

3470 ENCROACHMENT STATIONS=     9863.0   10203.0  TYPE=      1  TARGET=      340.000

           DETENTION BASIN

     1.580     15.85   1330.65       .00   1330.65   1330.65       .00       .00       .12   1320.00
     943.0       7.9     890.7      44.3      113.7    2954.5     508.8      81.3      22.5   1318.00
      1.04       .07        .3       .09       .075      .035      .075      .000   1314.80   9863.00
   .000001      200.      540.      470.          2         0         0       .00    339.93  10202.93


CCHV=      .100 CEHV=      .300
*SECNO 1.669

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .11


3470 ENCROACHMENT STATIONS=     9929.0   10113.0  TYPE=      1  TARGET=      184.000
     1.669      9.13   1330.63       .00   1330.64   1330.66       .02       .00       .01   1324.00
     943.0      69.3     648.1     225.6      125.9     463.9     365.3     105.1      25.2   1324.00
      1.15       .55      1.40       .62       .075      .050      .075      .000   1321.50   9929.00
   .000130      475.      470.      410.          2         0         0       .00    184.00  10113.00


*SECNO 1.769
1
    13AUG01      07:23:58                                                                          PAGE   30

     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


3301 HV CHANGED MORE THAN HVINS

 85 20 TRIALS ATTEMPTED WSEL,CWSEL
,93 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
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*SECNO 1.416

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.58


3470 ENCROACHMENT STATIONS=     9902.0   10102.0  TYPE=      1  TARGET=      200.000
     1.416      4.36   1328.36       .00   1328.37   1328.45       .10      1.32       .06   1326.00
     943.0       3.7     850.3      89.0       4.2     323.7       85.4      56.6      17.8   1326.00
       .51       .90      2.63      1.04      .075      .050      .075      .000   1324.00   9902.00
   .001969      275.      275.      275.         6         0         0       .00    199.51  10101.51


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   13AUG01      07:23:58                                                                          PAGE   29

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

CCHV=      .300 CEHV=      .500
*SECNO 1.478
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9958.0   10168.0  TYPE=      1  TARGET=      210.000
     1.478      2.13   1330.13   1330.13   1330.10   1330.53       .40      1.41       .15   1330.00
     943.0        .1     942.8        .1        .2     185.7        .2      58.8      19.3   1330.00
       .52       .47      5.08       .46      .075      .035      .075      .000   1328.00   9958.00
   .016322      325.      325.      325.         4         9         0       .00    210.00  10168.00


 SECNO 1.580

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO = *****

3470 ENCROACHMENT STATIONS=     9863.0   10203.0  TYPE=      1  TARGET=      340.000

           DETENTION BASIN

     1.580     15.85   1330.65       .00   1330.65   1330.65       .00       .00       .12   1320.00
     943.0       7.9     890.7      44.3      113.7    2954.5     508.8      81.3      22.5   1318.00
      1.04       .07       .30       .09      .075      .035      .075      .000   1314.80   9863.00
   .000001      200.      540.      470.         2         0         0       .00    339.93  10202.93


CCHV=      .100 CEHV=      .300
*SECNO 1.669

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .11


3470 ENCROACHMENT STATIONS=     9929.0   10113.0  TYPE=      1  TARGET=      184.000
     1.669      9.13   1330.63       .00   1330.64   1330.66       .02       .00       .01   1324.00
     943.0      69.3     648.1     225.6     125.9     463.9     365.3     105.1      25.2   1324.00
      1.15       .55      1.40       .62      .075      .050      .075      .000   1321.50   9929.00
   .000130      475.      470.      410.         2         0         0       .00    184.00  10113.00


*SECNO 1.769
1
   13AUG01      07:23:58                                                                          PAGE   30

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


3301 HV CHANGED MORE THAN HVINS

  85 20 TRIALS ATTEMPTED WSEL,CWSEL
 .93 PROBABLE MINIMUM SPECIFIC ENERGY
720 CRITICAL DEPTH ASSUMED
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3470 ENCROACHMENT STATIONS=     9968.0   10027.0  TYPE=      1  TARGET=       59.000
     1.769      3.50   1332.50   1332.50   1332.49   1333.58      1.08       .24       .32   1332.00
     943.0       2.5     939.8        .7       1.9     112.5        .5     111.3     26.6    1332.00
      1.17      1.35      8.35      1.30      .075      .050      .075      .000   1329.00   9968.00
   .027063      505.      525.      475.        20        18         0       .00     59.00  10027.00


*SECNO 1.862

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.44


3470 ENCROACHMENT STATIONS=     9977.0   10050.0  TYPE=      1  TARGET=       73.000
     1.862      3.06   1342.06       .00   1341.69   1342.57       .51      8.93       .06 100000.00
     943.0        .0     943.0        .0        .0     164.5        .0     112.9     27.4 100000.00
      1.19       .00      5.73       .00      .000      .050      .000      .000   1339.00   9977.00
   .013110      375.      490.      545.         3         0         0       .00     73.00  10050.00


*SECNO 1.930

3470 ENCROACHMENT STATIONS=     9977.0   10042.0  TYPE=      1  TARGET=       65.000
     1.930      3.16   1347.86       .00   1347.66   1348.63       .77      5.98       .08 100000.00
     943.0        .0     943.0        .0        .0     134.0        .0     114.2     27.9 100000.00
      1.21       .00      7.04       .00      .000      .050      .000      .000   1344.70   9977.00
   .021753      440.      360.      225.         4         0         0       .00     65.00  10042.00


*SECNO 1.985

3470 ENCROACHMENT STATIONS=     9973.0   10040.0  TYPE=      1  TARGET=       67.000
     1.985      3.31   1353.41       .00   1353.46   1354.08       .67      5.44       .01   1352.00
     943.0       9.7     933.3        .0       4.9     140.9        .0     115.1     28.4 100000.00
      1.22      1.98      6.62       .00      .075      .050      .000      .000   1350.10   9973.00
   .016440      140.      290.      320.         3         0         0       .00     67.00  10040.00


   13AUG01      07:23:58                                                                    PAGE   31

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 2.047
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9970.0   10046.0  TYPE=      1  TARGET=       76.000
     2.047      4.11   1362.11   1362.11   1362.09   1363.10       .99      5.76       .09   1360.00
     943.0      63.7     799.3      80.0      22.2      93.3      27.8     116.2     28.9    1360.00
      1.23      2.87      8.57      2.88      .075      .050      .075      .000   1358.00   9970.00
   .018563      370.      330.      300.         9        11         0       .00     76.00  10046.00


*SECNO 2.092

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.90


3470 ENCROACHMENT STATIONS=     9954.0   10013.0  TYPE=      1  TARGET=       59.000

          CAMELBACK RD. "EXTENDED"

          Q @ X1 = 2.092 TO X1 = 2.731 EQUALS Q AT SUB26/2
          Q = 943/2 = 472 CFS

     2.092      5.25   1364.25       .00   1364.26   1364.35       .10      1.17       .09   1362.00
     472.0      15.4     456.6        .0      18.9     174.7        .0     117.1     29.3 100000.00
      1.26       .81      2.61       .00      .075      .050      .000      .000   1359.00   9954.00
   .001287      240.      235.      225.         4         0         0       .00     59.00  10013.00


*SECNO 2.144
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3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9989.0 10032.0 TYPE= 1 TARGET= 43.000

2.144	2.58	1364.98	1364.98	1364.97	1365.82	.84	.96	.22	1364.00
472.0	1.3	462.9	7.7	.7	62.3	3.6	117.9	29.6	1364.00
1.27	1.96	7.43	2.15	.075	.050	.075	.000	1362.40	9989.00
.029109	175.	275.	320.	20	8	0	.00	43.00	10032.00

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 2.186

3304 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.66

3470 ENCROACHMENT STATIONS= 9934.0 10008.0 TYPE= 1 TARGET= 74.000

2.186	3.01	1369.31	.00	1369.31	1369.57	.25	3.69	.06	100000.00
472.0	.0	472.0	.0	.0	115.6	.0	118.3	29.9	100000.00
1.28	.00	4.08	.00	.000	.050	.000	.000	1366.30	9934.00
.010532	260.	225.	160.	5	0	0	.00	74.00	10008.00

SECNO 2.238

3470 ENCROACHMENT STATIONS= 9970.0 10021.0 TYPE= 1 TARGET= 51.000

2.238	2.62	1372.22	.00	1372.21	1372.59	.37	2.99	.03	1372.00
472.0	.0	471.9	.1	.0	97.1	.2	119.0	30.3	1372.00
1.30	.00	4.86	.57	.000	.050	.075	.000	1369.60	9970.00
.011214	205.	275.	340.	4	0	0	.00	51.00	10021.00

*SECNO 2.288
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9993.0 10046.0 TYPE= 1 TARGET= 53.000

2.288	2.13	1377.33	1377.33	1377.34	1378.02	.69	4.73	.10	100000.00
472.0	.0	472.0	.0	.0	70.9	.0	119.5	30.6	100000.00
1.31	.00	6.66	.00	.000	.050	.000	.000	1375.20	9993.00
.034524	270.	260.	250.	2	15	0	.00	53.00	10046.00

*SECNO 2.341

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.60

3470 ENCROACHMENT STATIONS= 9964.0 10016.0 TYPE= 1 TARGET= 52.000

2.341	2.79	1383.29	.00	1383.30	1383.76	.47	5.72	.02	1382.00
472.0	7.5	457.0	7.5	4.2	82.1	4.2	120.0	30.9	1382.00
1.32	1.78	5.57	1.78	.075	.050	.075	.000	1380.50	9964.00
.013536	295.	280.	195.	3	0	0	.00	52.00	10016.00

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

SECNO 2.387
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

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3470 ENCROACHMENT STATIONS=     9980.0   10015.0  TYPE=      1  TARGET=       35.000
     2.387      2.34   1388.14   1388.14   1388.16   1389.04       .90      4.85       .13 100000.00
     472.0        .0     472.0        .0        .0      61.9        .0     120.5      31.1 100000.00
      1.33       .00      7.63       .00      .000      .050      .000      .000   1385.80   9980.00
   .031813      200.      245.      225.         3        15         0       .00     35.00  10015.00


*SECNO 2.442

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.54


3470 ENCROACHMENT STATIONS=     9964.0   10020.0  TYPE=      1  TARGET=       56.000
     2.442      2.72   1394.42       .00   1394.42   1394.80       .38      5.70       .05   1394.00
     472.0        .3     471.7        .0        .3      95.7        .0     121.0      31.4 100000.00
      1.35       .91      4.93       .00      .075      .050      .000      .000   1391.70   9964.00
   .013354      255.      290.      300.         3         0         0       .00     56.00  10020.00


*SECNO 2.540

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9985.0   10015.0  TYPE=      1  TARGET=       30.000
     2.540      3.77   1410.17   1410.17   1410.17   1411.16       .99     10.03       .19   1410.00
     472.0        .0     472.0        .0        .0      59.0        .0     121.9      32.0 100000.00
      1.36       .00      8.00       .00      .000      .050      .000      .000   1406.40   9985.00
   .030987      460.      515.      520.        14        11         0       .00     30.00  10015.00


*SECNO 2.635
7185 MINIMUM SPECIFIC ENERGY
 720 CRITICAL DEPTH ASSUMED

  13AUG01      07:23:58                                                                          PAGE   34

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


3470 ENCROACHMENT STATIONS=     9974.0   10008.0  TYPE=      1  TARGET=       34.000
     2.635      3.22   1429.22   1429.22   1429.23   1430.15       .93     15.93       .01 100000.00
     472.0        .0     472.0        .0        .0      61.0        .0     122.6      32.3 100000.00
      1.38       .00      7.74       .00      .000      .050      .000      .000   1426.00   9974.00
   .032137      440.      505.      500.         9        15         0       .00     34.00  10008.00


*SECNO 2.731
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9988.0   10012.0  TYPE=      1  TARGET=       24.000
     2.731      3.18   1451.88   1451.88   1451.91   1453.12      1.23     14.84       .09   1450.00
     472.0       7.0     458.0       7.0       2.4      50.7       2.4     123.3      32.7   1450.00
      1.40      2.86      9.04      2.86      .075      .050      .075      .000   1448.70   9988.00
   .027040      455.      505.      470.         9         5         0       .00     24.00  10012.00


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  13AUG01      07:23:58                                                                          PAGE   35


                                                                        THIS RUN EXECUTED 13AUG01    07:23:59

 ************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
 ************************************


NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST
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TRACTOR WASH - WASH "5C"

SUMMARY PRINTOUT

	SECNO	Q	CWSEL	SSTA	STCHL	STCHR	ENDST	DIFWSX	TOPWID	DEPTH	ELMIN	10*KS	VCH
*	.000	3011.00	1213.73	9939.75	9970.00	10120.00	10184.83	.00	245.08	2.83	1210.90	90.17	8.14
	.000	3011.00	1213.72	9940.00	9970.00	10120.00	10150.00	.00	210.00	2.82	1210.90	92.03	8.21
	.037	1648.00	1215.42	9782.62	9955.00	10060.00	10099.09	1.69	316.47	5.42	1210.00	17.43	3.90
	.037	1648.00	1215.45	9950.00	9955.00	10060.00	10098.00	1.73	148.00	5.45	1210.00	24.49	4.65
*	.095	1648.00	1215.65	9958.70	9970.00	10050.00	10068.84	.23	110.15	12.15	1203.50	1.05	2.00
*	.095	1648.00	1215.83	9959.00	9970.00	10050.00	10068.00	.38	109.00	12.33	1203.50	.99	1.96
	.188	1648.00	1215.71	9948.59	9960.00	10045.00	10059.27	.05	110.68	9.91	1205.80	1.46	2.17
	.188	1648.00	1215.88	9949.00	9960.00	10045.00	10059.00	.05	110.00	10.08	1205.80	1.36	2.12
*	.251	1648.00	1223.36	9969.07	9975.00	10030.00	10050.33	7.65	81.26	4.06	1219.30	112.40	9.51
*	.251	1648.00	1223.36	9970.00	9975.00	10030.00	10050.00	7.48	80.00	4.06	1219.30	111.20	9.48
*	.305	1648.00	1225.61	9951.96	9970.00	10030.00	10100.00	2.25	148.04	4.51	1221.10	16.01	4.36
*	.305	1648.00	1225.70	9952.00	9970.00	10030.00	10060.00	2.34	108.00	4.60	1221.10	22.49	5.24
*	.347	1648.00	1228.28	9954.40	9960.00	10015.00	10020.70	2.67	66.29	5.58	1222.70	127.24	9.88
*	.347	1648.00	1228.28	9955.00	9960.00	10015.00	10020.00	2.58	65.00	5.58	1222.70	126.76	9.87
*	.389	1648.00	1231.03	9977.43	9980.00	10020.00	10030.29	2.75	52.86	5.73	1225.30	115.41	10.82
*	.389	1648.00	1231.04	9978.00	9980.00	10020.00	10030.00	2.76	52.00	5.74	1225.30	113.74	10.77
*	.455	1648.00	1234.92	9878.02	9965.00	10005.00	10017.82	3.89	139.80	4.92	1230.00	55.42	7.82
*	.455	1648.00	1234.92	9879.00	9965.00	10005.00	10017.00	3.87	138.00	4.92	1230.00	56.21	7.85
*	.504	1648.00	1237.15	9975.68	9980.00	10055.00	10069.42	2.23	93.74	3.55	1233.60	128.68	8.79
*	.504	1648.00	1237.16	9976.00	9980.00	10055.00	10069.00	2.25	93.00	3.56	1233.60	126.57	8.74
	.549	1648.00	1239.68	9920.56	9975.00	10030.00	10055.13	2.52	134.57	4.28	1235.40	75.28	8.27
	.549	1648.00	1239.66	9921.00	9975.00	10030.00	10054.95	2.50	133.95	4.26	1235.40	76.27	8.30

	SECNO	Q	CWSEL	SSTA	STCHL	STCHR	ENDST	DIFWSX	TOPWID	DEPTH	ELMIN	10*KS	VCH
*	.629	1648.00	1244.52	9969.52	9955.00	10045.00	10046.29	4.84	76.78	3.42	1241.10	136.08	8.94
*	.629	1648.00	1244.51	9970.00	9955.00	10045.00	10046.00	4.85	76.00	3.41	1241.10	136.48	8.97
	.720	1295.00	1249.76	9885.93	9980.00	10025.00	10038.14	5.24	152.21	4.16	1245.60	57.70	5.86
	.720	1295.00	1250.25	9955.00	9980.00	10025.00	10038.00	5.74	83.00	4.65	1245.60	90.95	8.34
*	.786	1295.00	1255.40	9973.33	9985.00	10025.00	10038.50	5.64	65.17	3.40	1252.00	120.42	9.72
*	.786	1295.00	1255.42	9974.00	9985.00	10025.00	10038.00	5.17	64.00	3.42	1252.00	116.93	9.63
*	.828	1295.00	1261.74	9968.70	9980.00	10020.00	10028.69	6.34	59.99	4.74	1257.00	111.15	9.73
*	.828	1295.00	1261.76	9969.00	9980.00	10020.00	10028.00	6.34	59.00	4.76	1257.00	108.31	9.65
*	.894	1295.00	1269.27	9977.89	9980.00	10020.00	10042.18	7.53	64.29	5.27	1264.00	110.87	9.72
*	.894	1295.00	1269.31	9978.00	9980.00	10020.00	10042.00	7.55	64.00	5.31	1264.00	106.20	9.59
*	.955	1295.00	1277.38	9975.79	9965.00	10030.00	10020.76	8.11	44.97	5.88	1271.50	132.02	9.79
*	.955	1295.00	1277.34	9976.00	9965.00	10030.00	10020.00	8.04	44.00	5.84	1271.50	134.64	9.92
*	1.017	1295.00	1286.76	9986.47	9980.00	10020.00	10022.86	9.38	36.39	6.76	1280.00	125.93	10.69
*	1.017	1295.00	1286.74	9987.00	9980.00	10020.00	10022.00	9.40	35.00	6.74	1280.00	126.92	10.76
*	1.085	1295.00	1299.67	9985.83	9985.00	10035.00	10033.06	12.90	47.23	5.67	1294.00	135.27	9.68
*	1.085	1295.00	1299.65	9986.00	9985.00	10035.00	10032.94	12.90	46.94	5.65	1294.00	137.56	9.74
*	1.137	1295.00	1307.16	9961.29	9985.00	10015.00	10026.86	7.49	65.57	4.16	1303.00	104.55	10.30
*	1.137	1295.00	1307.20	9962.00	9985.00	10015.00	10026.00	7.55	64.00	4.20	1303.00	100.43	10.16
*	1.196	943.00	1317.44	9956.01	9965.00	10075.00	10059.56	10.28	103.56	2.44	1315.00	158.49	6.78
*	1.196	943.00	1317.45	9957.00	9965.00	10075.00	10059.00	10.25	102.00	2.45	1315.00	154.42	6.74
*	1.210	943.00	1325.05	9994.01	9880.00	10240.00	10297.75	7.61	303.74	1.05	1324.00	204.29	4.78
*	1.210	943.00	1325.05	9995.00	9880.00	10240.00	10297.00	7.60	302.00	1.05	1324.00	203.30	4.78
	1.298	943.00	1325.57	9724.42	9970.00	10065.00	10195.71	.52	471.28	11.57	1314.00	.60	.90
	1.298	943.00	1325.57	9725.00	9970.00	10065.00	10195.00	.52	470.00	11.57	1314.00	.60	.89
*	1.364	943.00	1326.36	9894.54	9955.00	10035.00	10022.73	.79	113.13	3.86	1322.50	284.71	7.28

*	1.364	943.00	1326.42	9895.00	9955.00	10035.00	10022.00	.86	113.39	3.92	1322.50	252.04	7.00
*	1.416	943.00	1328.37	9901.34	9905.00	10020.00	10102.62	2.01	201.27	4.37	1324.00	19.22	2.61
*	1.416	943.00	1328.36	9902.00	9905.00	10020.00	10101.51	1.93	199.51	4.36	1324.00	19.69	2.63
*	1.478	943.00	1330.10	9957.67	9960.00	10165.00	10168.36	1.73	210.69	2.10	1328.00	177.17	5.20
*	1.478	943.00	1330.13	9958.00	9960.00	10165.00	10168.00	1.77	210.00	2.13	1328.00	163.22	5.08
*	1.580	943.00	1330.65	9862.56	9885.00	10090.00	10203.01	.55	340.45	15.85	1314.80	.01	.30
*	1.580	943.00	1330.65	9863.00	9885.00	10090.00	10202.93	.52	339.93	15.85	1314.80	.01	.30
*	1.669	943.00	1330.64	9928.71	9970.00	10025.00	10113.21	-.01	184.50	9.14	1321.50	1.30	1.40
*	1.669	943.00	1330.63	9929.00	9970.00	10025.00	10113.00	-.01	184.00	9.13	1321.50	1.30	1.40

	SECNO	Q	CWSEL	SSTA	STCHL	STCHR	ENDST	DIFWSX	TOPWID	DEPTH	ELMIN	10*KS	VCH
*	1.769	943.00	1332.49	9967.61	9975.00	10025.00	10027.05	1.85	59.44	3.49	1329.00	274.11	8.38
*	1.769	943.00	1332.50	9968.00	9975.00	10025.00	10027.00	1.87	59.00	3.50	1329.00	270.63	8.35
*	1.862	943.00	1341.69	9976.57	9975.00	10050.00	10113.43	9.19	136.86	2.69	1339.00	111.93	4.75
*	1.862	943.00	1342.06	9977.00	9975.00	10050.00	10050.00	9.56	73.00	3.06	1339.00	131.10	5.73
*	1.930	943.00	1347.66	9976.68	9975.00	10045.00	10042.49	5.98	65.81	2.96	1344.70	303.39	7.76
	1.930	943.00	1347.86	9977.00	9975.00	10045.00	10042.00	5.80	65.00	3.16	1344.70	217.53	7.04
*	1.985	943.00	1353.46	9972.71	9980.00	10040.00	10105.59	5.79	132.88	3.36	1350.10	121.61	5.88
	1.985	943.00	1353.41	9973.00	9980.00	10040.00	10040.00	5.55	67.00	3.31	1350.10	164.40	6.62
*	2.047	943.00	1362.09	9969.12	9990.00	10020.00	10046.10	8.63	76.98	4.09	1358.00	191.58	8.57
*	2.047	943.00	1362.11	9970.00	9990.00	10020.00	10046.00	8.70	76.00	4.11	1358.00	185.63	8.57
*	2.092	472.00	1364.26	9953.04	9970.00	10015.00	10013.55	2.17	60.51	5.26	1359.00	12.75	2.60
*	2.092	472.00	1364.25	9954.00	9970.00	10015.00	10013.00	2.14	59.00	5.25	1359.00	12.87	2.61
	2.144	472.00	1364.97	9988.38	9990.00	10025.00	10032.29	.71	43.91	2.57	1362.40	296.46	7.47
	2.144	472.00	1364.98	9989.00	9990.00	10025.00	10032.00	.73	43.00	2.58	1362.40	291.09	7.43
	2.186	472.00	1369.31	9933.68	9920.00	10010.00	10008.15	4.34	74.47	3.01	1366.30	104.16	4.06
*	2.186	472.00	1369.31	9934.00	9920.00	10010.00	10008.00	4.33	74.00	3.01	1366.30	105.32	4.08
	2.238	472.00	1372.21	9969.82	9970.00	10020.00	10021.62	2.90	51.80	2.61	1369.60	112.83	4.88
	2.238	472.00	1372.22	9970.00	9970.00	10020.00	10021.00	2.91	51.00	2.62	1369.60	112.14	4.86
*	2.288	472.00	1377.34	9992.35	9990.00	10055.00	10046.78	5.13	54.43	2.14	1375.20	342.42	6.58
*	2.288	472.00	1377.33	9993.00	9990.00	10055.00	10046.00	5.11	53.00	2.13	1375.20	345.24	6.66
*	2.341	472.00	1383.30	9963.51	9970.00	10010.00	10016.49	5.95	52.98	2.80	1380.50	136.49	5.59
*	2.341	472.00	1383.29	9964.00	9970.00	10010.00	10016.00	5.96	52.00	2.79	1380.50	135.36	5.57
*	2.387	472.00	1388.16	9979.20	9970.00	10020.00	10015.40	4.86	36.20	2.36	1385.80	315.59	7.53
*	2.387	472.00	1388.14	9980.00	9970.00	10020.00	10015.00	4.85	35.00	2.34	1385.80	318.13	7.63
*	2.442	472.00	1394.42	9963.26	9965.00	10020.00	10020.35	6.26	57.09	2.72	1391.70	134.42	4.95
*	2.442	472.00	1394.42	9964.00	9965.00	10020.00	10020.00	6.28	56.00	2.72	1391.70	133.54	4.93
*	2.540	472.00	1410.17	9984.35	9985.00	10015.00	10015.43	15.75	31.08	3.77	1406.40	302.43	7.98
*	2.540	472.00	1410.17	9985.00	9985.00	10015.00	10015.00	15.74	30.00	3.77	1406.40	309.87	8.00
*	2.635	472.00	1429.23	9973.86	9970.00	10010.00	10008.07	19.06	34.21	3.23	1426.00	317.85	7.69
*	2.635	472.00	1429.22	9974.00	9970.00	10010.00	10008.00	19.05	34.00	3.22	1426.00	321.37	7.74
*	2.731	472.00	1451.91	9987.13	9990.00	10010.00	10012.87	22.69	25.74	3.21	1448.70	259.21	8.91
*	2.731	472.00	1451.88	9988.00	9990.00	10010.00	10012.00	22.67	24.00	3.18	1448.70	270.40	9.04

TRACTOR WASH - WASH "5C"

SUMMARY PRINTOUT TABLE 110

SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
.000	1213.73	.01	1214.69	245.08	83.62	2783.91	143.47	.00	.00	9970.00	10120.00	.00
.000	1213.72	-.01	1214.70	210.00	83.51	2794.38	133.11	210.00	9940.00	9970.00	10120.00	10150.00
.037	1215.42	.00	1215.62	316.47	284.51	1343.89	19.60	.00	.00	9955.00	10060.00	.00
.037	1215.45	.03	1215.78	148.00	8.41	1614.54	25.05	148.00	9950.00	9955.00	10060.00	10098.00

*	.095	1215.65	.00	1215.71	110.15	12.90	1612.59	22.51	.00	.00	9970.00	10050.00	.00
*	.095	1215.83	.18	1215.89	109.00	13.80	1609.87	24.33	109.00	9959.00	9970.00	10050.00	10068.00
	.188	1215.71	.00	1215.78	110.68	15.60	1612.40	19.99	.00	.00	9960.00	10045.00	.00
	.188	1215.88	.17	1215.95	110.00	16.62	1610.11	21.28	110.00	9949.00	9960.00	10045.00	10059.00
*	.251	1223.36	.00	1224.73	81.26	6.86	1617.25	23.89	.00	.00	9975.00	10030.00	.00
*	.251	1223.36	.01	1224.73	80.00	7.26	1616.24	24.50	80.00	9970.00	9975.00	10030.00	10050.00
*	.305	1225.61	.00	1225.82	148.04	46.09	1073.54	528.36	148.50	9951.50	9970.00	10030.00	10100.00
*	.305	1225.70	.09	1226.06	108.00	58.68	1321.10	268.22	108.00	9952.00	9970.00	10030.00	10060.00
*	.347	1228.28	.00	1229.78	66.29	.50	1631.34	16.16	.00	.00	9960.00	10015.00	.00
*	.347	1228.28	.00	1229.78	65.00	.55	1630.81	16.64	65.00	9955.00	9960.00	10015.00	10020.00
*	.389	1231.03	.00	1232.84	52.86	1.84	1638.44	7.72	.00	.00	9980.00	10020.00	.00
*	.389	1231.04	.02	1232.84	52.00	1.93	1637.90	8.17	52.00	9978.00	9980.00	10020.00	10030.00
*	.455	1234.92	.00	1235.65	139.80	381.51	1228.83	37.67	.00	.00	9965.00	10005.00	.00
*	.455	1234.92	-.01	1235.65	138.00	379.55	1230.04	38.41	138.00	9879.00	9965.00	10005.00	10017.00
*	.504	1237.15	.00	1238.34	93.74	4.07	1630.10	13.84	.00	.00	9980.00	10055.00	.00
*	.504	1237.16	.01	1238.34	93.00	4.27	1629.33	14.40	93.00	9976.00	9980.00	10055.00	10069.00
	.549	1239.68	.00	1240.67	134.57	74.61	1539.00	34.39	.00	.00	9975.00	10030.00	.00
	.549	1239.66	-.01	1240.67	133.95	73.78	1540.24	33.98	134.00	9921.00	9975.00	10030.00	10055.00
*	.629	1244.52	.00	1245.76	76.78	.00	1647.68	.32	.00	.00	9955.00	10045.00	.00
*	.629	1244.51	-.01	1245.76	76.00	.00	1647.69	.31	76.00	9970.00	9955.00	10045.00	10046.00
	.720	1249.76	.00	1250.09	152.21	631.71	646.39	16.90	.00	.00	9980.00	10025.00	.00
	.720	1250.25	.50	1251.20	83.00	137.53	1112.97	44.50	83.00	9955.00	9980.00	10025.00	10038.00
*	.786	1255.40	.00	1256.75	65.17	14.94	1176.83	103.23	.00	.00	9985.00	10025.00	.00
*	.786	1255.42	.02	1256.75	64.00	15.97	1175.32	103.71	64.00	9974.00	9985.00	10025.00	10038.00
*	.828	1261.74	.00	1263.17	59.99	19.87	1259.93	15.20	.00	.00	9980.00	10020.00	.00
	.828	1261.76	.02	1263.17	59.00	20.71	1258.18	16.12	59.00	9969.00	9980.00	10020.00	10028.00
	.894	1269.27	.00	1270.71	64.29	1.99	1269.86	23.15	.00	.00	9980.00	10020.00	.00
*	.894	1269.31	.04	1270.70	64.00	2.15	1267.74	25.11	64.00	9978.00	9980.00	10020.00	10042.00

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	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	.955	1277.38	.00	1278.87	44.97	.00	1295.00	.00	.00	.00	9965.00	10030.00	.00
*	.955	1277.34	-.04	1278.87	44.00	.00	1295.00	.00	44.00	9976.00	9965.00	10030.00	10020.00
*	1.017	1286.76	.00	1288.54	36.39	.00	1293.66	1.34	.00	.00	9980.00	10020.00	.00
*	1.017	1286.74	-.02	1288.54	35.00	.00	1293.73	1.27	35.00	9987.00	9980.00	10020.00	10022.00
*	1.085	1299.67	.00	1301.12	47.23	.00	1295.00	.00	.00	.00	9985.00	10035.00	.00
*	1.085	1299.65	-.02	1301.12	46.94	.00	1295.00	.00	47.00	9986.00	9985.00	10035.00	10033.00
*	1.137	1307.16	.00	1308.62	65.57	109.77	1131.27	53.96	.00	.00	9985.00	10015.00	.00
*	1.137	1307.20	.03	1308.61	64.00	113.03	1125.88	56.09	64.00	9962.00	9985.00	10015.00	10026.00
*	1.196	1317.44	.00	1318.14	103.56	27.53	915.47	.00	.00	.00	9965.00	10075.00	.00
*	1.196	1317.45	.01	1318.14	102.00	28.80	914.20	.00	102.00	9957.00	9965.00	10075.00	10059.00
*	1.210	1325.05	.00	1325.39	303.74	.00	823.30	119.70	.00	.00	9880.00	10240.00	.00
*	1.210	1325.05	.00	1325.39	302.00	.00	822.75	120.25	302.00	9995.00	9880.00	10240.00	10297.00
*	1.298	1325.57	.00	1325.58	471.28	147.53	657.17	138.29	.00	.00	9970.00	10065.00	.00
*	1.298	1325.57	.00	1325.58	470.00	147.56	657.12	138.32	470.00	9725.00	9970.00	10065.00	10195.00
*	1.364	1326.36	.00	1327.07	113.13	167.29	775.71	.00	.00	.00	9955.00	10035.00	.00
*	1.364	1326.42	.06	1327.08	113.39	172.39	770.61	.00	127.00	9895.00	9955.00	10035.00	10022.00
*	1.416	1328.37	.00	1328.47	201.27	3.77	849.22	90.01	.00	.00	9905.00	10020.00	.00
*	1.416	1328.36	-.01	1328.45	199.51	3.75	850.29	88.96	200.00	9902.00	9905.00	10020.00	10102.00
*	1.478	1330.10	.00	1330.52	210.69	.04	942.89	.06	.00	.00	9960.00	10165.00	.00
*	1.478	1330.13	.02	1330.53	210.00	.08	942.81	.11	210.00	9958.00	9960.00	10165.00	10168.00
	1.580	1330.65	.00	1330.65	340.45	7.92	890.72	44.36	.00	.00	9885.00	10090.00	.00
	1.580	1330.65	.00	1330.65	339.93	7.92	890.74	44.34	340.00	9863.00	9885.00	10090.00	10203.00
*	1.669	1330.64	.00	1330.66	184.50	69.38	647.92	225.70	.00	.00	9970.00	10025.00	.00
*	1.669	1330.63	.00	1330.66	184.00	69.31	648.11	225.58	184.00	9929.00	9970.00	10025.00	10113.00

*	1.769	1332.49	.00	1333.58	59.44	2.34	940.02	.64	.00	.00	9975.00	10025.00	.00
*	1.769	1332.50	.01	1333.58	59.00	2.52	939.80	.68	59.00	9968.00	9975.00	10025.00	10027.00
*	1.862	1341.69	.00	1341.97	136.86	.00	649.01	293.99	.00	.00	9975.00	10050.00	.00
*	1.862	1342.06	.37	1342.57	73.00	.00	943.00	.00	73.00	9977.00	9975.00	10050.00	10050.00
*	1.930	1347.66	.00	1348.60	65.81	.00	943.00	.00	.00	.00	9975.00	10045.00	.00
	1.930	1347.86	.19	1348.63	65.00	.00	943.00	.00	65.00	9977.00	9975.00	10045.00	10042.00
*	1.985	1353.46	.00	1353.95	132.88	9.27	849.17	84.55	.00	.00	9980.00	10040.00	.00
	1.985	1353.41	-.05	1354.08	67.00	9.67	933.33	.00	67.00	9973.00	9980.00	10040.00	10040.00
*	2.047	1362.09	.00	1363.10	76.98	61.33	802.91	78.75	.00	.00	9990.00	10020.00	.00
*	2.047	1362.11	.02	1363.10	76.00	63.71	799.27	80.02	76.00	9970.00	9990.00	10020.00	10046.00

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	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	2.092	1364.26	.00	1364.36	60.51	15.58	456.42	.00	.00	.00	9970.00	10015.00	.00
*	2.092	1364.25	-.01	1364.35	59.00	15.36	456.64	.00	59.00	9954.00	9970.00	10015.00	10013.00
*	2.144	1364.97	.00	1365.82	43.91	1.50	463.08	7.42	.00	.00	9990.00	10025.00	.00
*	2.144	1364.98	.01	1365.82	43.00	1.33	462.93	7.74	43.00	9989.00	9990.00	10025.00	10032.00
*	2.186	1369.31	.00	1369.57	74.47	.00	472.00	.00	.00	.00	9920.00	10010.00	.00
*	2.186	1369.31	.00	1369.57	74.00	.00	472.00	.00	74.00	9934.00	9920.00	10010.00	10008.00
	2.238	1372.21	.00	1372.58	51.80	.00	471.92	.08	.00	.00	9970.00	10020.00	.00
	2.238	1372.22	.01	1372.59	51.00	.00	471.91	.09	51.00	9970.00	9970.00	10020.00	10021.00
*	2.288	1377.34	.00	1378.01	54.43	.00	472.00	.00	.00	.00	9990.00	10055.00	.00
*	2.288	1377.33	-.01	1378.02	53.00	.00	472.00	.00	53.00	9993.00	9990.00	10055.00	10046.00
*	2.341	1383.30	.00	1383.77	52.98	7.21	457.57	7.21	.00	.00	9970.00	10010.00	.00
	2.341	1383.29	.00	1383.76	52.00	7.48	457.04	7.48	52.00	9964.00	9970.00	10010.00	10016.00
	2.387	1388.16	.00	1389.04	36.20	.00	472.00	.00	.00	.00	9970.00	10020.00	.00
	2.387	1388.14	-.02	1389.04	35.00	.00	472.00	.00	35.00	9980.00	9970.00	10020.00	10015.00
*	2.442	1394.42	.00	1394.80	57.09	.29	471.71	.00	.00	.00	9965.00	10020.00	.00
*	2.442	1394.42	.00	1394.80	56.00	.28	471.72	.00	56.00	9964.00	9965.00	10020.00	10020.00
*	2.540	1410.17	.00	1411.16	31.08	.00	472.00	.00	.00	.00	9985.00	10015.00	.00
*	2.540	1410.17	-.01	1411.16	30.00	.00	472.00	.00	30.00	9985.00	9985.00	10015.00	10015.00
*	2.635	1429.23	.00	1430.15	34.21	.00	472.00	.00	.00	.00	9970.00	10010.00	.00
*	2.635	1429.22	-.01	1430.15	34.00	.00	472.00	.00	34.00	9974.00	9970.00	10010.00	10008.00
*	2.731	1451.91	.00	1453.11	25.74	7.52	456.95	7.52	.00	.00	9990.00	10010.00	.00
*	2.731	1451.88	-.03	1453.12	24.00	6.98	458.05	6.97	24.00	9988.00	9990.00	10010.00	10012.00

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SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= .000 PROFILE= 1 CRITICAL DEPTH ASSUMED

WARNING SECNO= .095 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= .095 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= .251 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .251 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= .251 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= .251 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .251 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= .251 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= .305 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= .305 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= .347 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .347 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= .347 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= .347 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= .347 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY

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CAUTION SECNO=       .347  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=       .389  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .389  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .389  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .389  PROFILE=  2  MINIMUM SPECIFIC ENERGY

WARNING SECNO=       .455  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=       .455  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=       .504  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .504  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .504  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .504  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=       .629  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .629  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .629  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .629  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=       .786  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .786  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .786  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=       .786  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .786  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=       .828  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .828  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .828  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=       .828  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .828  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
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CAUTION SECNO=       .828  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=       .894  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .894  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .894  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=       .894  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .894  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .894  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=       .955  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .955  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .955  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=       .955  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .955  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .955  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=      1.017  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      1.017  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=      1.017  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=      1.017  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      1.017  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=      1.017  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=      1.085  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      1.085  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=      1.085  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=      1.085  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      1.085  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=      1.085  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=      1.137  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      1.137  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
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FLOODWAY DATA,   TRACTOR WASH - WASH "5C"
PROFILE NO.  2

                ------- FLOODWAY -------      WATER SURFACE ELEVATION
  STATION    WIDTH    SECTION     MEAN       WITH     WITHOUT  DIFFERENCE
                       AREA     VELOCITY  FLOODWAY  FLOODWAY

      .000    210.      406.      7.4     1213.7    1213.7        .0
      .037    148.      383.      4.3     1215.4    1215.4        .0
      .095    109.      910.      1.8     1215.9    1215.7        .2
      .188    110.      837.      2.0     1215.9    1215.7        .2
      .251     80.      188.      8.7     1223.4    1223.4        .0
      .305    108.      403.      4.1     1225.7    1225.6        .1
      .347     65.      172.      9.6     1228.3    1228.3        .0
      .389     52.      159.     10.4     1231.0    1231.0        .0
      .455    138.      332.      5.0     1234.9    1234.9        .0
      .504     93.      197.      8.4     1237.2    1237.2        .0
      .549    134.      251.      6.6     1239.7    1239.7        .0
      .629     76.      184.      9.0     1244.5    1244.5        .0
      .720     83.      198.      6.5     1250.3    1249.8        .5
      .786     64.      157.      8.2     1255.4    1255.4        .0
      .828     59.      148.      8.7     1261.7    1261.7        .0
      .894     64.      149.      8.7     1269.3    1269.3        .0
      .955     44.      131.      9.9     1277.4    1277.4        .0
     1.017     35.      121.     10.7     1286.8    1286.8        .0
     1.085     47.      133.      9.7     1299.7    1299.7        .0
     1.137     64.      168.      7.7     1307.2    1307.2        .0
     1.196    102.      142.      6.6     1317.4    1317.4        .0
     1.210    302.      202.      4.7     1325.0    1325.0        .0
     1.298    470.     1651.       .6     1325.6    1325.6        .0
     1.364    127.      163.      5.8     1326.5    1326.4        .1
     1.416    200.      413.      2.3     1328.4    1328.4        .0
     1.478    210.      186.      5.1     1330.1    1330.1        .0
     1.580    340.     3577.       .3     1330.7    1330.7        .0
     1.669    184.      955.      1.0     1330.6    1330.6        .0
     1.769     59.      115.      8.2     1332.5    1332.5        .0
     1.862     73.      165.      5.7     1342.1    1341.7        .4
     1.930     65.      134.      7.0     1347.9    1347.7        .2
     1.985     67.      146.      6.5     1353.4    1353.5       -.1
     2.047     76.      143.      6.6     1362.1    1362.1        .0
     2.092     59.      194.      2.4     1364.3    1364.3        .0
     2.144     43.       67.      7.1     1365.0    1365.0        .0
     2.186     74.      116.      4.1     1369.3    1369.3        .0
     2.238     51.       97.      4.9     1372.2    1372.2        .0
     2.288     53.       71.      6.7     1377.3    1377.3        .0
     2.341     52.       90.      5.2     1383.3    1383.3        .0
     2.387     35.       62.      7.6     1388.2    1388.2        .0
     2.442     56.       96.      4.9     1394.4    1394.4        .0
     2.540     30.       59.      8.0     1410.2    1410.2        .0
1
   13AUG01      07:23:58                                          PAGE   46


FLOODWAY DATA,   TRACTOR WASH - WASH "5C"
PROFILE NO.  2

                ------- FLOODWAY -------      WATER SURFACE ELEVATION
  STATION    WIDTH    SECTION     MEAN       WITH     WITHOUT  DIFFERENCE
                       AREA     VELOCITY  FLOODWAY  FLOODWAY
```

2.635	34.	61.	7.7	1429.2	1429.2	.0
2.731	24.	56.	8.5	1451.9	1451.9	.0

Appendix B
General Documentation & Correspondence

FLOOD INSURANCE STUDY

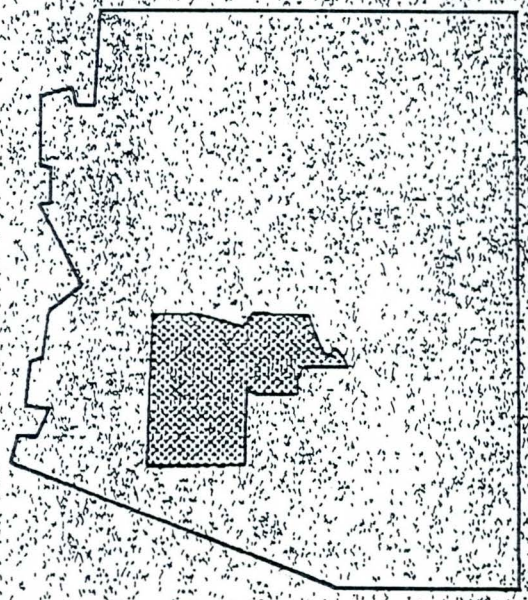
MARICOPA COUNTY, ARIZONA

AND INCORPORATED AREAS

VOLUME 1 OF 16

040013CV001

COMMUNITY NAME	COMMUNITY NUMBER
AVONDALE, CITY OF	040038
BUCKEYE, TOWN OF	040039
CAREFREE, TOWN OF	040125
CAVE CREEK, TOWN OF	040129
CHANDLER, CITY OF	040040
EL MIRAGE, CITY OF	040041
FOUNTAIN HILLS, TOWN OF	040135
GILA BEND, TOWN OF	040043
GILBERT, TOWN OF	040044
GLENDALE, CITY OF	040045
GOODYEAR, CITY OF	040046
GUADALUPE, TOWN OF	040111
LITCHFIELD PARK, CITY OF	040128
MARICOPA COUNTY, UNINCORPORATED AREAS	040037
MESA, CITY OF	040048
PARADISE VALLEY, TOWN OF	040049
PEORIA, CITY OF	040050
PHOENIX, CITY OF	040051
QUEEN CREEK, TOWN OF	040132
SCOTTSDALE, CITY OF	045012
SURPRISE, CITY OF	045053 → 040053
TEMPE, CITY OF	040054
TOLLESON, CITY OF	040055
WICKENBURG, TOWN OF	040056
YOUNGTOWN, TOWN OF	040057



REVISED: JULY 19, 2001

Federal Emergency Management Agency

Table 3. Summary of Discharges (Cont'd)

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
North Fork Cholla Wash					
Upstream of the confluence with Cholla Wash	0.81	--[1]	--[1]	704	--[1]
Waterfall Wash					
At the confluence with Beardsley Canal Wash	4.86	--[1]	--[1]	2,245	--[1]
White Tanks #3 Wash					
At White Tanks Structure #3	2.86	--[1]	--[1]	1,743	--[1]
Bedrock Wash					
At White Tanks Structure #3	4.93	--[1]	--[1]	1,738	--[1]
At the confluence with North Fork Bedrock Wash	3.86	--[1]	--[1]	1,920	--[1]
North Fork Bedrock Wash					
At 0.15 miles upstream of the confluence with Bedrock Wash	2.1	--[1]	--[1]	1,560	--[1]
Jackrabbit Trail Wash					
At Interstate 10	17.43	--[1]	--[1]	1,186	--[1]
At McDowell Road Culverts	17.43	--[1]	--[1]	1,186	--[1]
At Thomas Road	2.07	--[1]	--[1]	1,105	--[1]
At At Indian School Road	1.36	--[1]	--[1]	726	--[1]
At Camelback Road	0.43	--[1]	--[1]	221	--[1]
At Medlock Drive	0.22	--[1]	--[1]	187	--[1]
Tuthill Dike Wash					
Downstream of Interstate 10	13.90	--[1]	--[1]	4,061	--[1]
Upstream of Interstate 10	13.90	--[1]	--[1]	5,503	--[1]
At McDowell Road and the confluence with Bulldozer Wash	14.56	--[1]	--[1]	6,601	--[1]

[1]Not Computed

Table 3. Summary of [redacted]arges (Cont'd)

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
Tuthill Dike Wash (Cont'd)					
At Thomas Road and the confluence with Caterpillar Wash	12.86	--[1]	--[1]	6,110	--[1]
At Indian School Road and the confluence with Tractor Wash	7.45	--[1]	--[1]	3,011	--[1]
Downstream of Camelback Road	4.99	--[1]	--[1]	1,261	--[1]
At the confluence with Caterpillar Dike Wash	4.69	--[1]	--[1]	1,108	--[1]
Bulldozer Wash					
At 0.2 miles upstream of the confluence with Tuthill Dike Wash	1.46	--[1]	--[1]	1,250	--[1]
At Caterpillar Proving Grounds Road	0.52	--[1]	--[1]	525	--[1]
Osborn Road Wash					
Just upstream of the confluence with Tuthill Dike Wash	5.02	--[1]	--[1]	3,412	--[1]
At Caterpillar Proving Grounds Road	4.64	--[1]	--[1]	3,253	--[1]
Tractor Wash					
Just upstream of the confluence with Tuthill Dike Wash	2.16	--[1]	--[1]	1,648	--[1]
At Caterpillar Proving Grounds Road	0.58[2]	--[1]	--[1]	472	--[1]
Diversion Dike Wash					
At 0.3 miles upstream of the confluence with Tuthill Dike Wash	0.25	--[1]	--[1]	382	--[1]

[1]Not Computed
[2]Interpolated Discharge from White Tanks/Agua Fria ADMS HEC-1 Run

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE (FEET)
					FLOODING SOURCE			
Tuthill Dike Wash								
A	0.186	113	391	10.4	1,043.7	1,043.7	1,043.2	-0.5
B	0.314	135	498	8.2	1,048.0	1,048.0	1,048.1	0.1
C	0.729	131	425	9.5	1,065.3	1,065.3	1,065.3	0.0
D	1.067	44	282	14.4	1,085.0	1,085.0	1,085.0	0.0
E	1.260	238	772	8.5	1,097.0	1,097.0	1,097.0	0.0
F	1.710	89	472	13.1	1,130.9	1,130.9	1,130.9	0.0
G	2.088	83	455	13.6	1,159.4	1,159.4	1,159.3	-0.1
H	2.563	152	635	9.6	1,191.1	1,191.1	1,190.9	-0.2
I	2.943	107	385	7.8	1,203.4	1,203.4	1,203.4	0.0
J	3.250	210	405	7.4	1,213.7	1,213.7	1,213.7	0.0
K	3.631	55	151	9.4	1,222.2	1,222.2	1,222.2	0.0
L	4.006	61	143	8.8	1,249.7	1,249.7	1,249.7	0.0
M	4.375	98	215	5.9	1,274.3	1,274.3	1,274.5	0.2
N	4.725	100	163	6.8	1,285.3	1,285.3	1,285.3	0.0

[1]Miles Above White Tanks Structure #4

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

FLOODWAY DATA

TUTHILL DIKE WASH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE (FEET)
					FLOODING SOURCE			
Tractor Wash								
A	0.095	109	910	1.8	1,215.7	1,215.7	1,215.9	0.2
B	0.389	52	159	10.4	1,231.0	1,231.0	1,231.0	0.0
C	0.786	64	157	8.2	1,255.4	1,255.4	1,255.4	0.0
D	1.137	64	168	7.7	1,307.2	1,307.2	1,307.2	0.0
E	1.478	210	186	5.1	1,330.1	1,330.1	1,330.1	0.0
F	1.769	59	115	8.2	1,332.5	1,332.5	1,332.5	0.0
G	2.186	74	116	4.1	1,369.3	1,369.3	1,369.3	0.0
H	2.442	56	96	4.9	1,394.4	1,394.4	1,394.4	0.0
I	2.731	24	56	8.5	1,451.9	1,451.9	1,451.9	0.0

[1]Miles Above Confluence With Tuthill Dike Wash

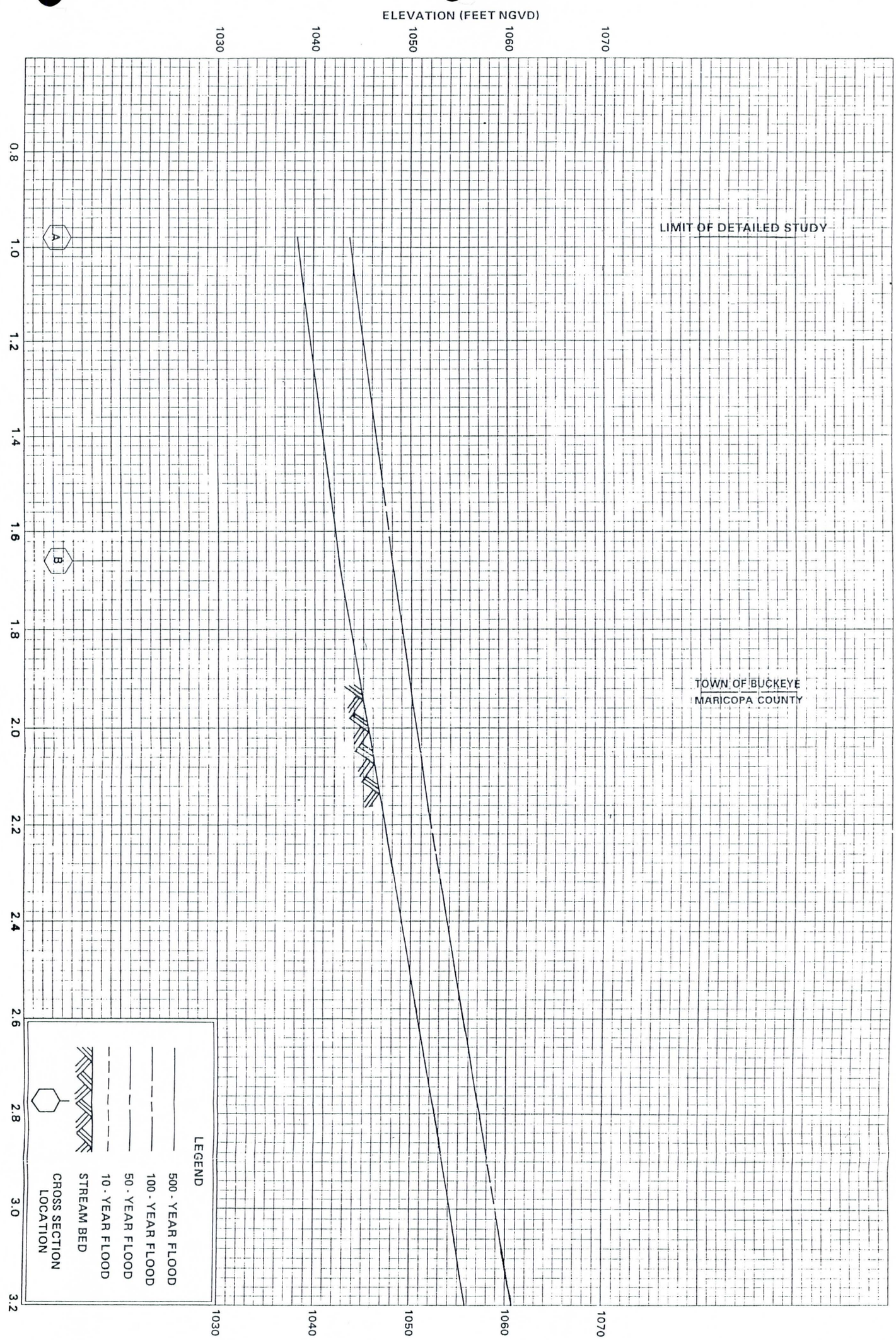
TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

FLOODWAY DATA

TRACTOR WASH



FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ AND INCORPORATED AREAS

FLOOD PROFILES

TUTHILL DIKE WASH

8002P

MARICOPA COUNTY
TOWN OF BUCKEYE

INTERSTATE 10

ELEVATION (FEET NGVD)

1100
1090
1080
1070
1060
1050

3.2 3.4 3.6 3.8 4.0 4.2 4.4 4.6 4.8 5.0 5.2 5.4 5.6 5.8

STREAM DISTANCE IN THOUSANDS OF FEET ABOVE WHITE TANKS STRUCTURE #4

C

D

LEGEND

- 500 - YEAR FLOOD
- 100 - YEAR FLOOD
- 50 - YEAR FLOOD
- 10 - YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION

FLOOD PROFILES

TUTHILL DIKE WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ AND INCORPORATED AREAS

803P

MARICOPA COUNTY
TOWN OF BUCKEYE

INTERSTATE 10

ELEVATION (FEET NGVD)

1100
1090
1080
1070
1060
1050

3.2 3.4 3.6 3.8 4.0 4.2 4.4 4.6 4.8 5.0 5.2 5.4 5.6 5.8

STREAM DISTANCE IN THOUSANDS OF FEET ABOVE WHITE TANKS STRUCTURE #4

C

D

LEGEND

- 500 - YEAR FLOOD
- 100 - YEAR FLOOD
- 50 - YEAR FLOOD
- 10 - YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION

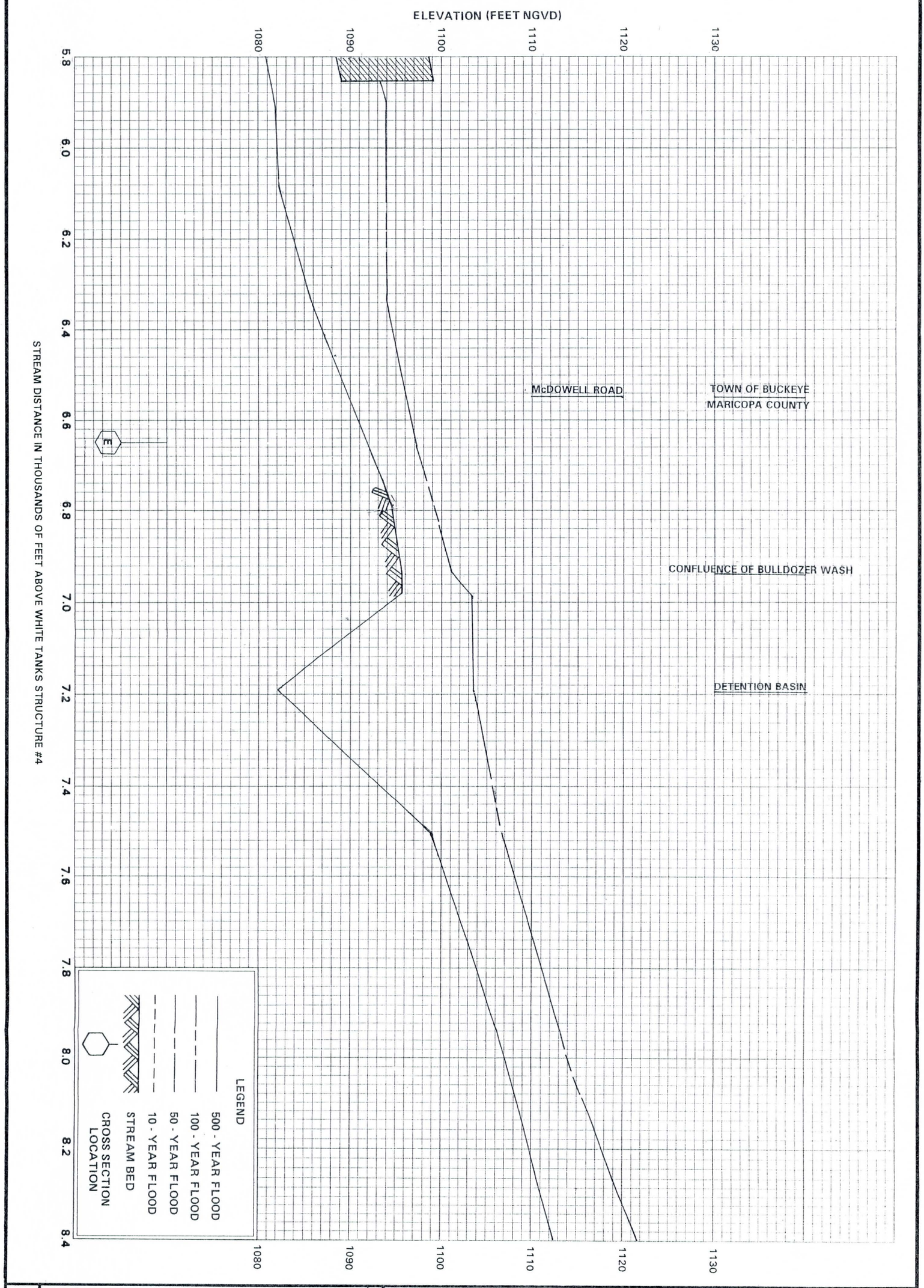
FLOOD PROFILES

TUTHILL DIKE WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

803P



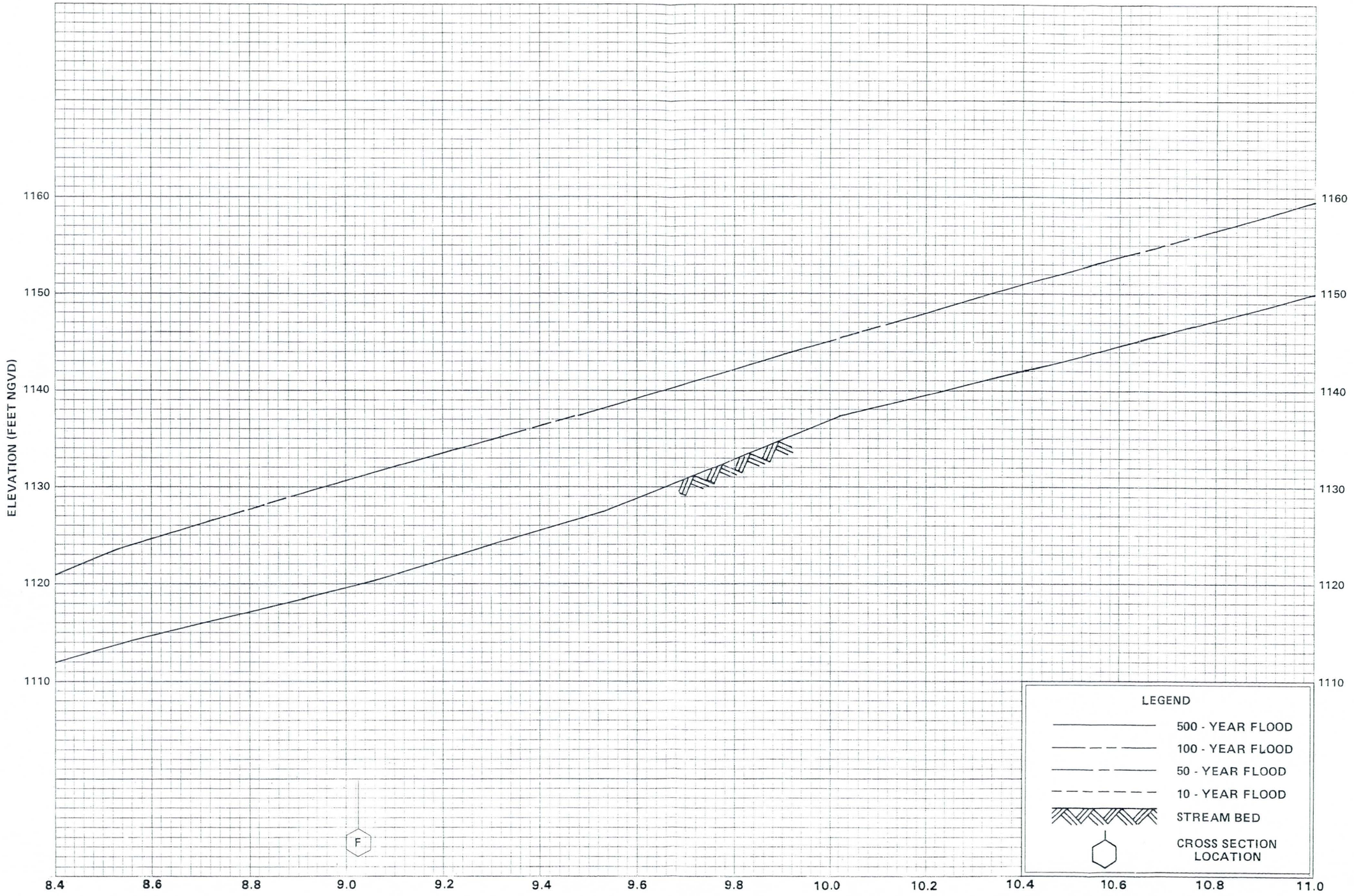
804P

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ AND INCORPORATED AREAS

FLOOD PROFILES

TUTHILL DIKE WASH



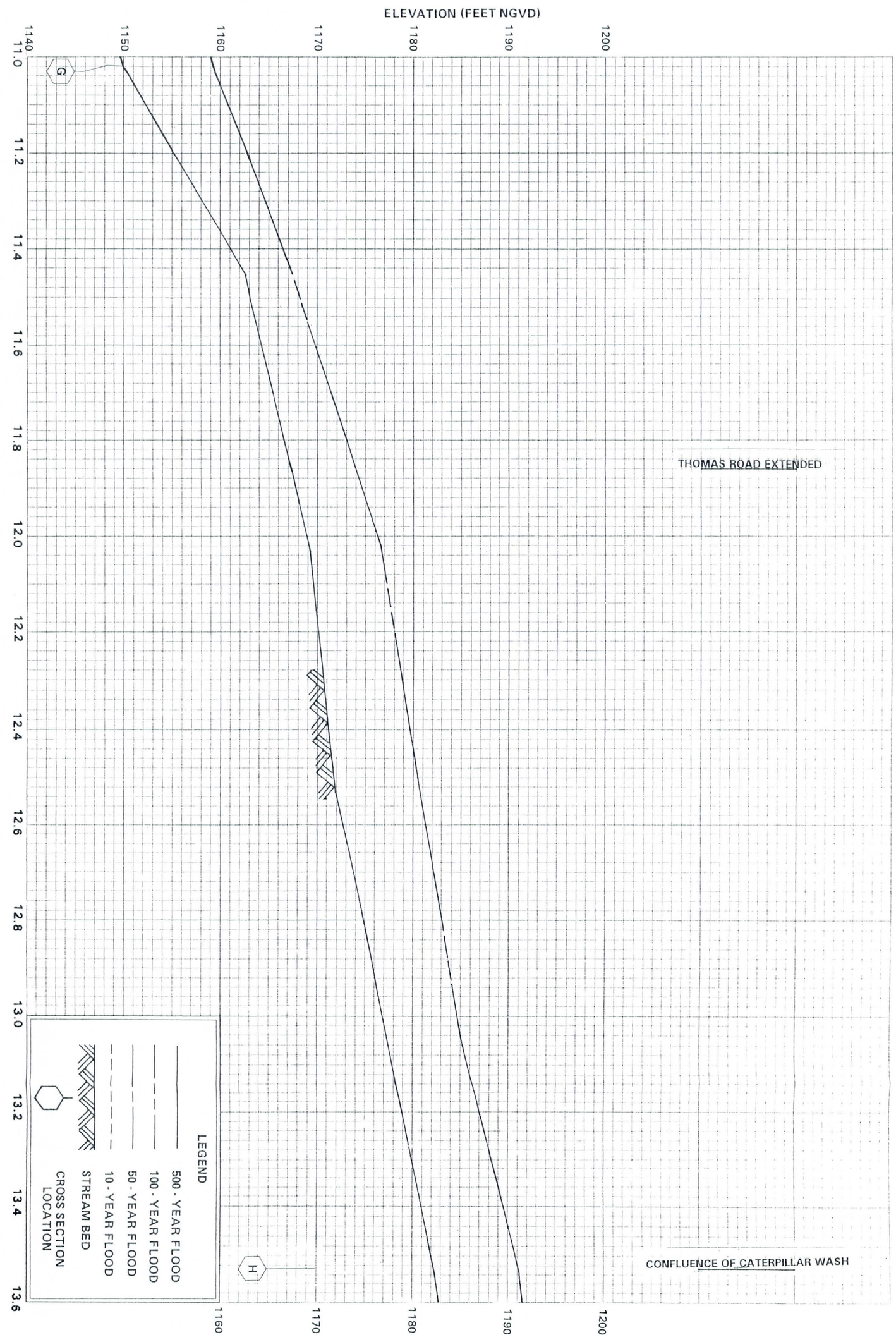
FLOOD PROFILES

TUTHILL DIKE WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ AND INCORPORATED AREAS

805P



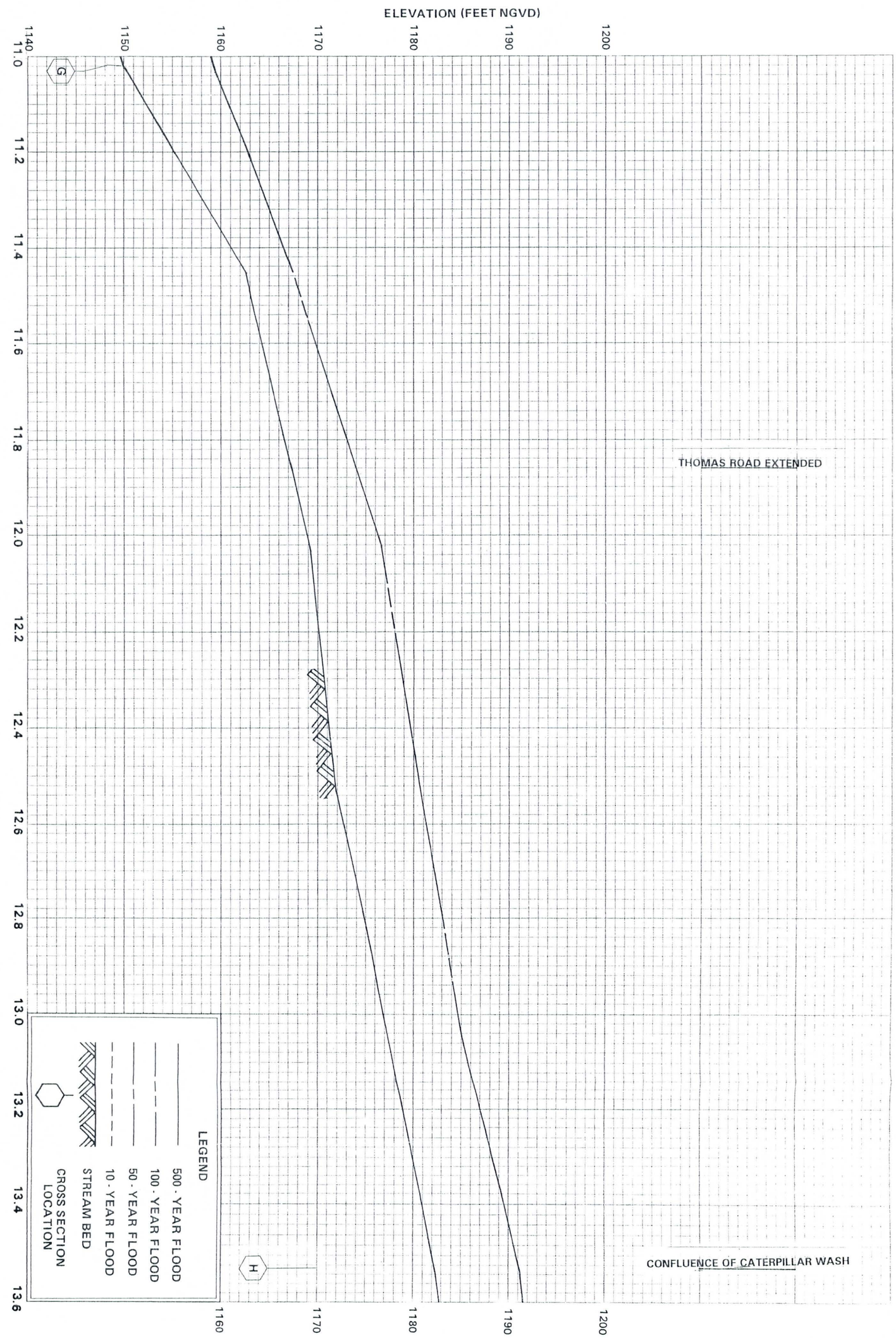
FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ AND INCORPORATED AREAS

FLOOD PROFILES

TUTHILL DIKE WASH

806P



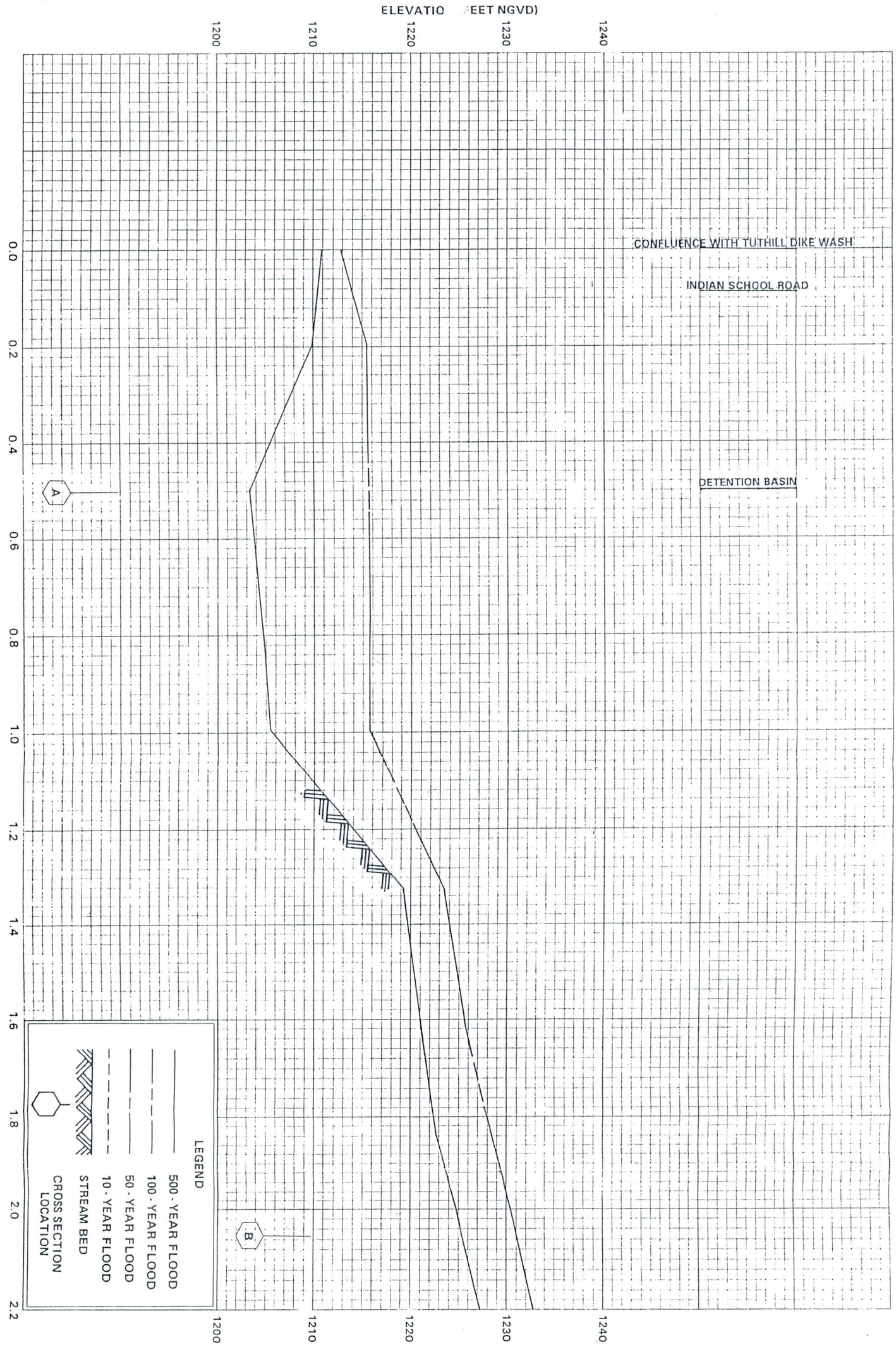
806P

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ AND INCORPORATED AREAS

FLOOD PROFILES

TUTHILL DIKE WASH



FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

FLOOD PROFILES

TRACTOR WASH

796P

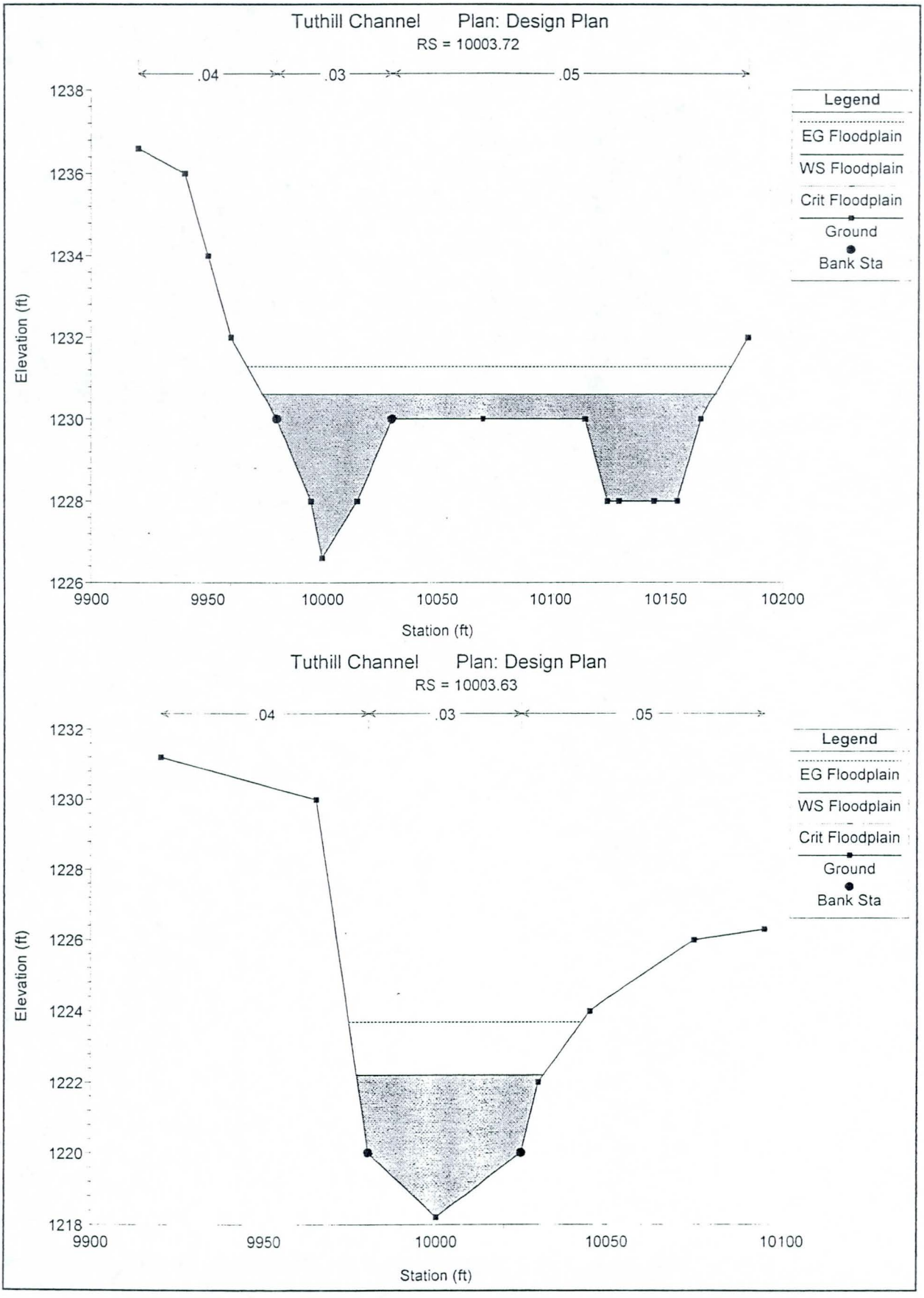
Appendix C
Hydraulic Analysis and Supporting Documentation

Appendix C1
Proposed Channel Cross Section Plots

Appendix C2
Cross Section Stations Relationships between Effective FIS Models and Post-Project Models

Appendix C1
Proposed Channel Cross Section Plots

Tuthill Dike Wash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.03
.05
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
1238
1236
1234
1232
1230
1228
1226
9900
9950
10000
10050
10100
10150
10200
Station (ft)
Tuthill Channel Plan: Design Plan
RS = 10003.63
.04
.03
.05
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
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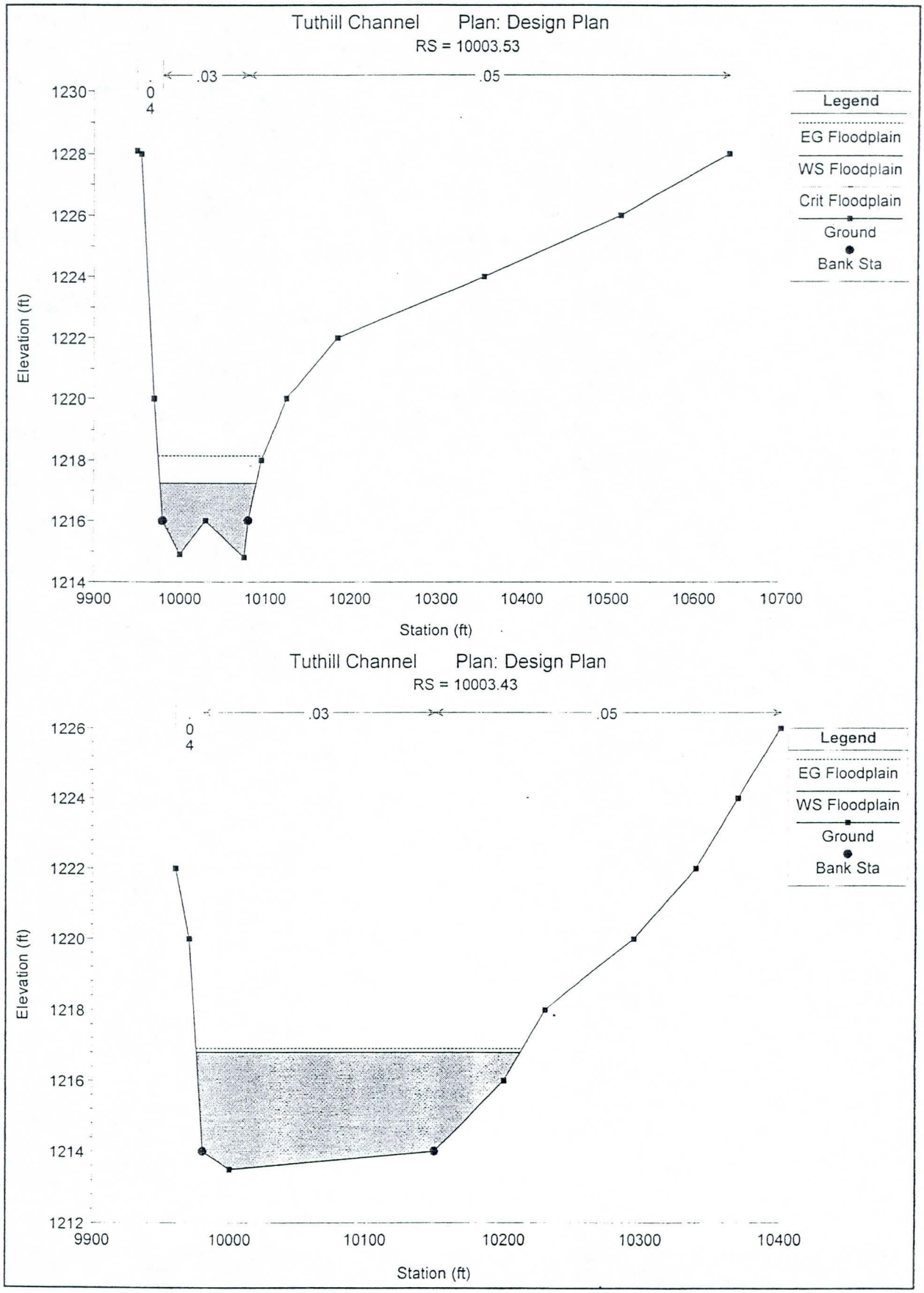
1230
1228
1226
1224
1222
1220
1218
9900
9950
10000
10050
10100
Station (ft)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WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
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1228
1226
1224
1222
1220
1218
1216
1214
9900
10000
10100
10200
10300
10400
10500
10600
10700
Station (ft)
Tuthill Channel Plan: Design Plan
RS = 10003.43
.03
.05
0
4
Legend
EG Floodplain
WS Floodplain
Ground
Bank Sta
Elevation (ft)
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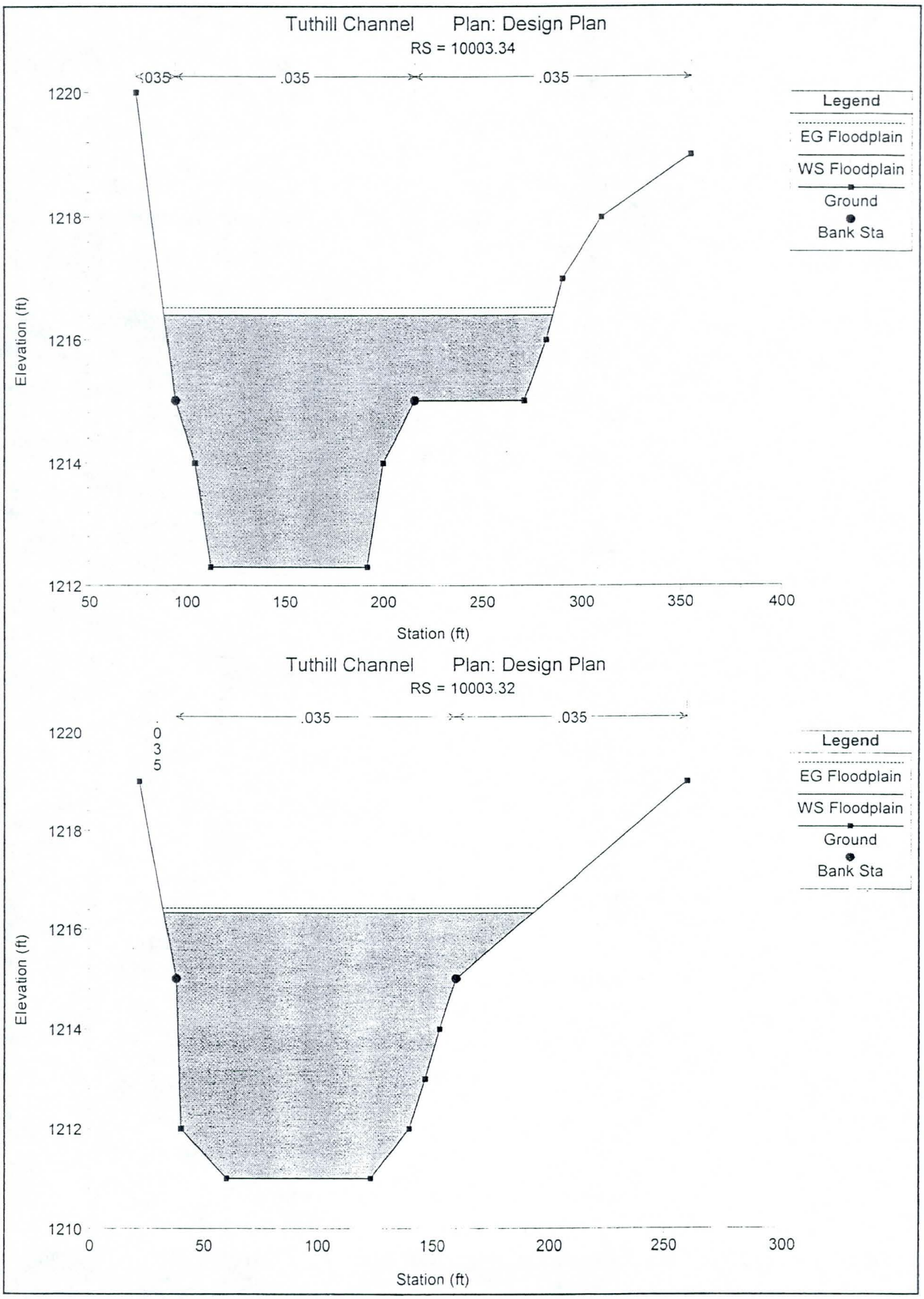
1220
1218
1216
1214
1212
9900
10000
10100
10200
10300
10400
Station (ft)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WS Floodplain
Ground
Bank Sta
Elevation (ft)
1220
1218
1216
1214
1212
50
100
150
200
250
300
350
400
Station (ft)
Tuthill Channel Plan: Design Plan
RS = 10003.32
.035
.035
0
3
5
Legend
EG Floodplain
WS Floodplain
Ground
Bank Sta
Elevation (ft)
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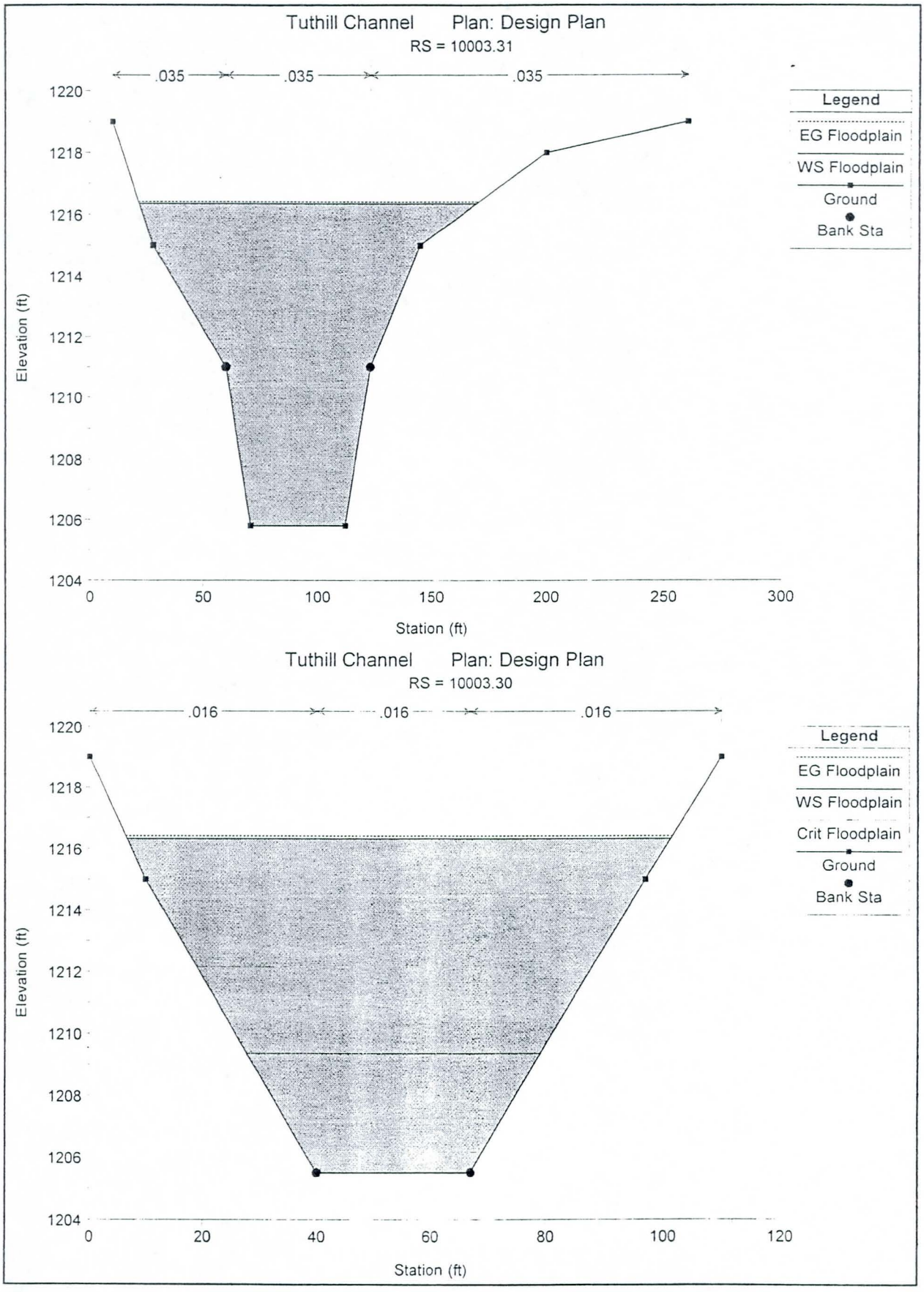
1216
1214
1212
1210
0
50
100
150
200
250
300
Station (ft)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EG Floodplain
WS Floodplain
Ground
Bank Sta
Elevation (ft)
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1218
1216
1214
1212
1210
1208
1206
1204
0
50
100
150
200
250
300
Station (ft)
Tuthill Channel Plan: Design Plan
RS = 10003.30
.016
.016
.016
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
1220
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1210
1208
1206
1204
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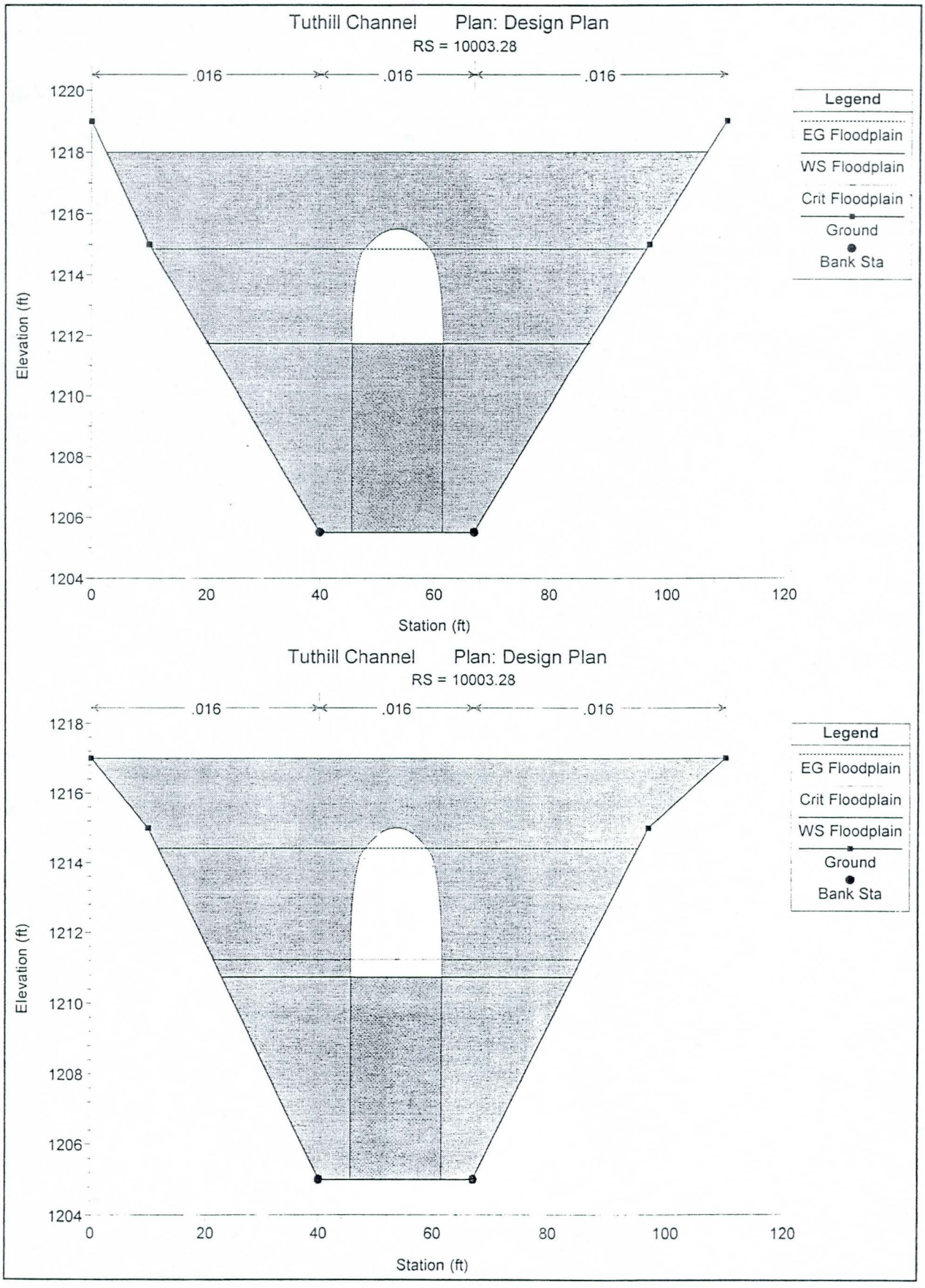
20
40
60
80
100
120
Station (ft)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.016
.016
1220
1218
1216
1214
1212
1210
1208
1206
1204
Elevation (ft)
0
20
40
60
80
100
120
Station (ft)
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Tuthill Channel Plan: Design Plan
RS = 10003.28
.016
.016
.016
1218
1216
1214
1212
1210
1208
1206
1204
Elevation (ft)
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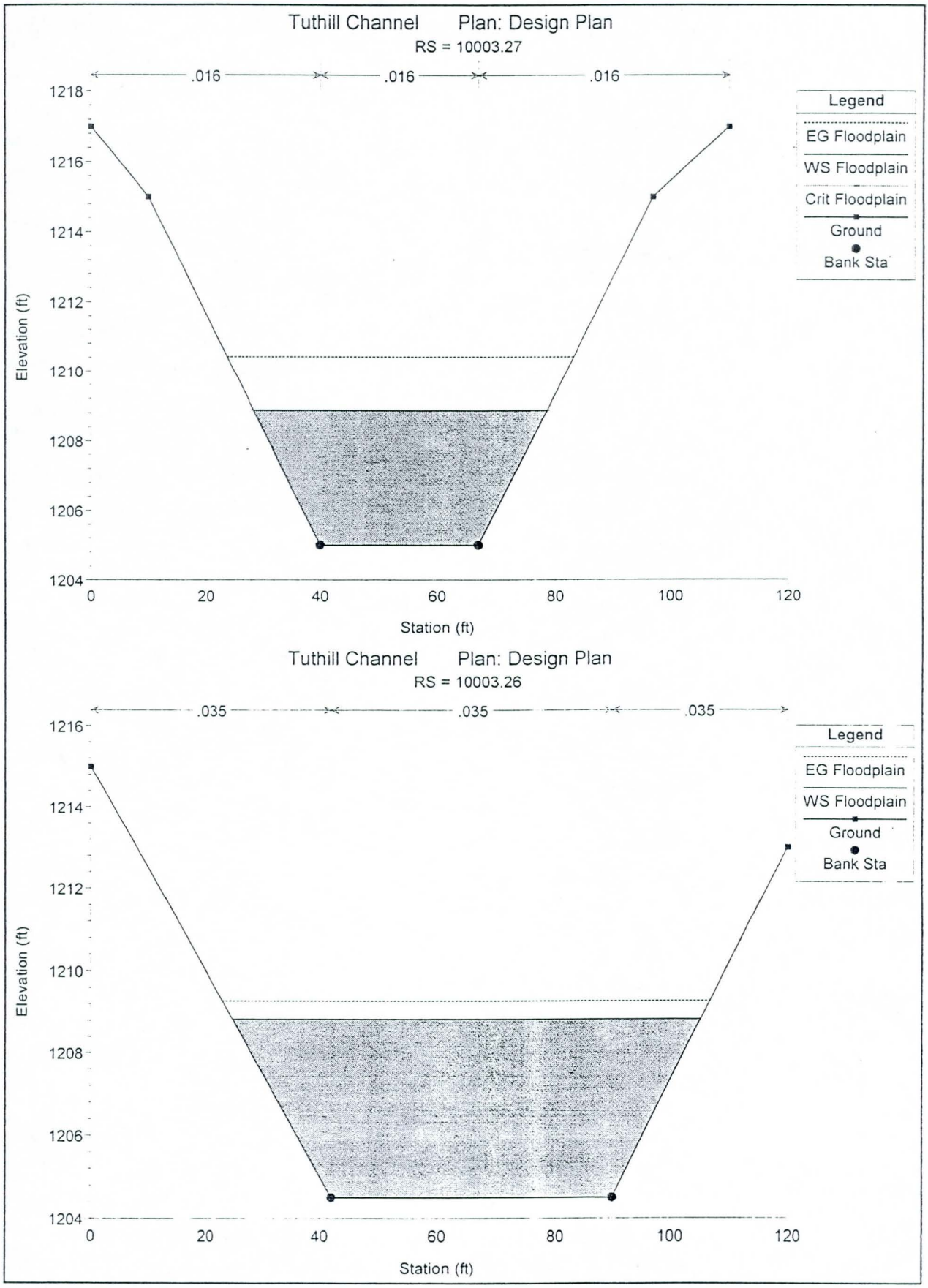
20
40
60
80
100
120
Station (ft)
Legend
EG Floodplain
Crit Floodplain
WS Floodplain
Ground
Bank Sta


Tuthill Channel Plan: Design Plan
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.016
.016
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
1218
1216
1214
1212
1210
1208
1206
1204
0
20
40
60
80
100
120
Station (ft)
Tuthill Channel Plan: Design Plan
RS = 10003.26
.035
.035
.035
Legend
EG Floodplain
WS Floodplain
Ground
Bank Sta
Elevation (ft)
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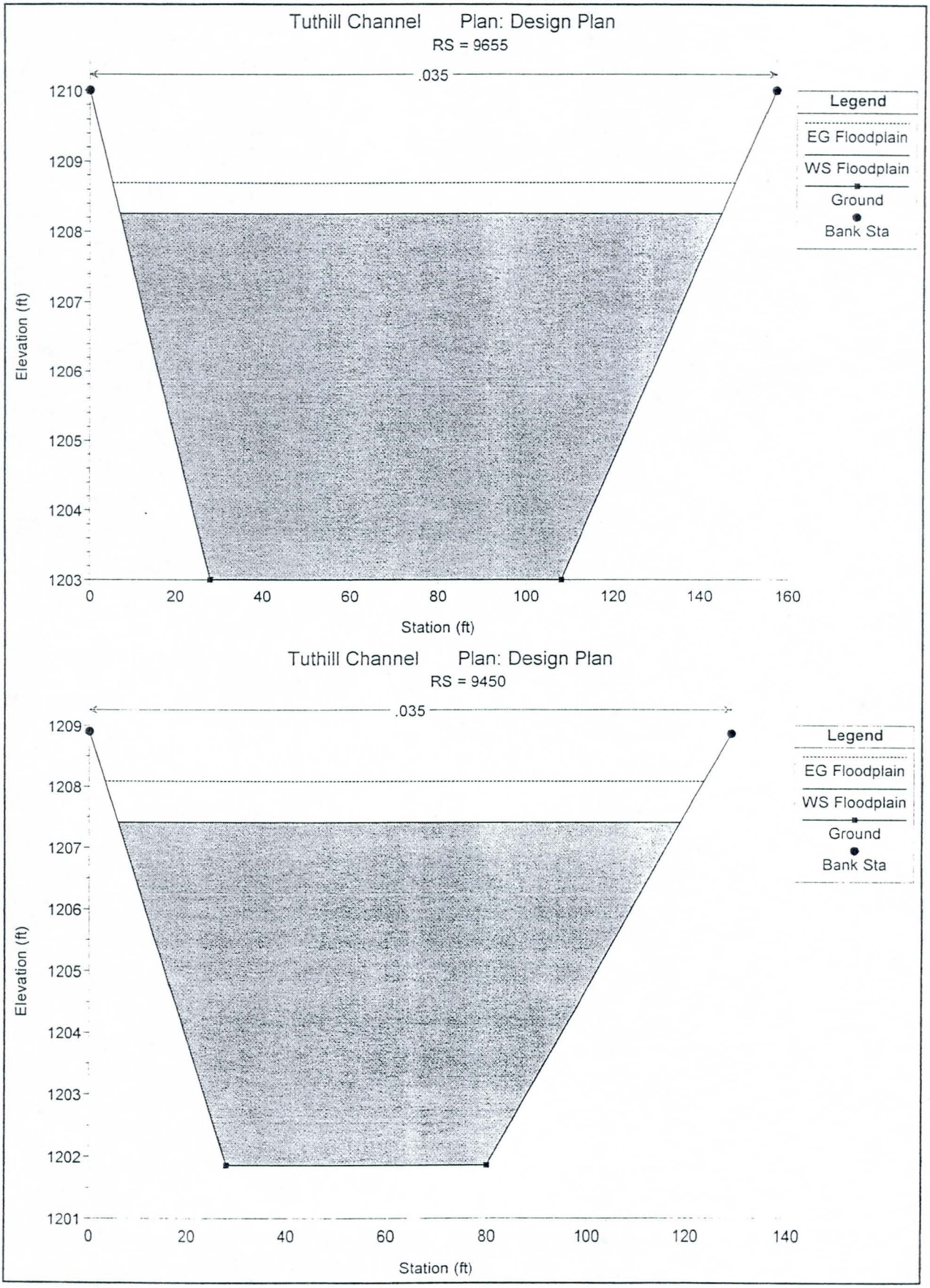
1212
1210
1208
1206
1204
0
20
40
60
80
100
120
Station (ft)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WS Floodplain
Ground
Bank Sta
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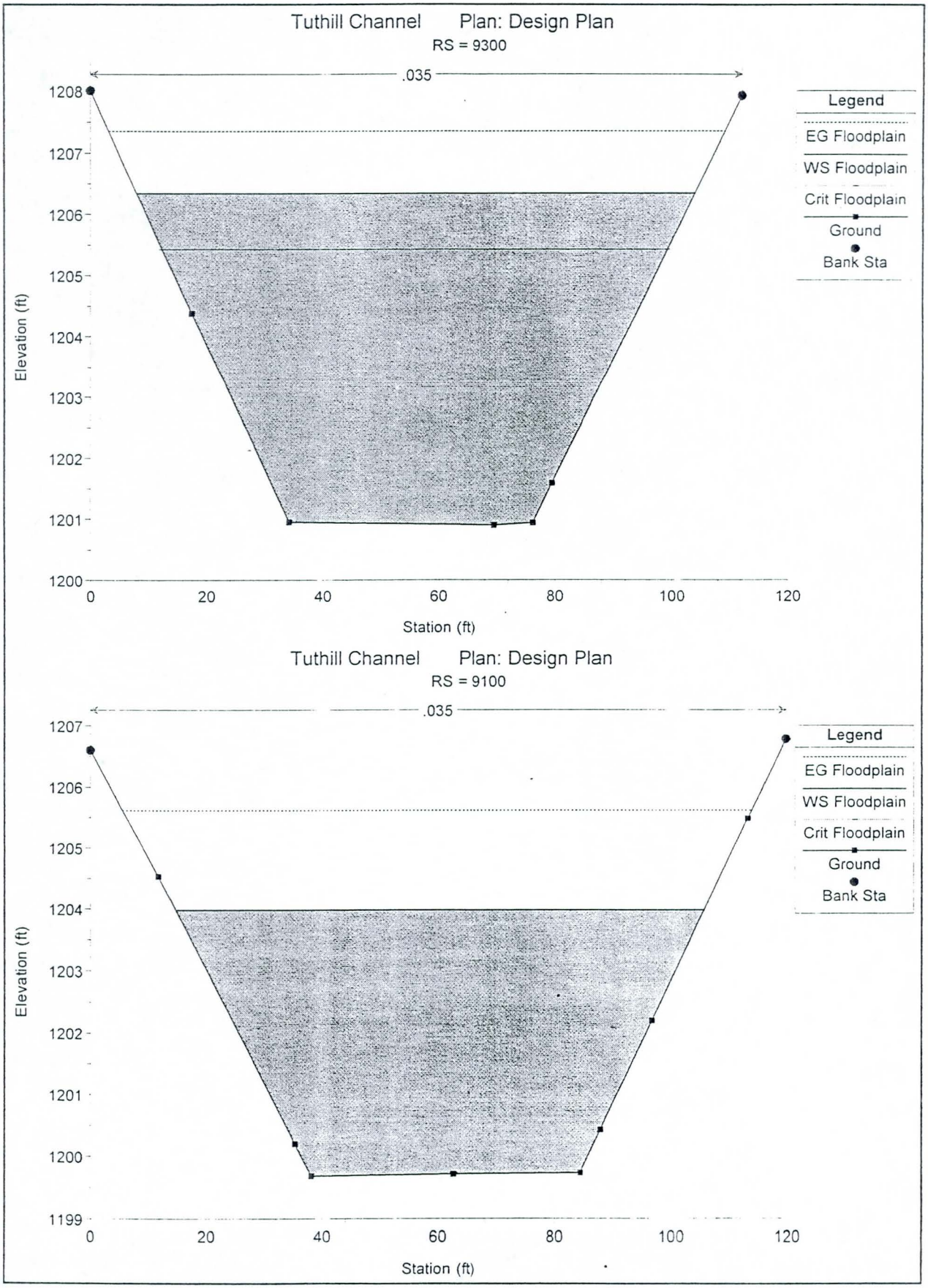
1208
1207
1206
1205
1204
1203
0
20
40
60
80
100
120
140
160
Station (ft)
Tuthill Channel Plan: Design Plan
RS = 9450
.035
Legend
EG Floodplain
WS Floodplain
Ground
Bank Sta
Elevation (ft)
1209
1208
1207
1206
1205
1204
1203
1202
1201
0
20
40
60
80
100
120
140
Station (ft)


Tuthill Channel Plan: Design Plan
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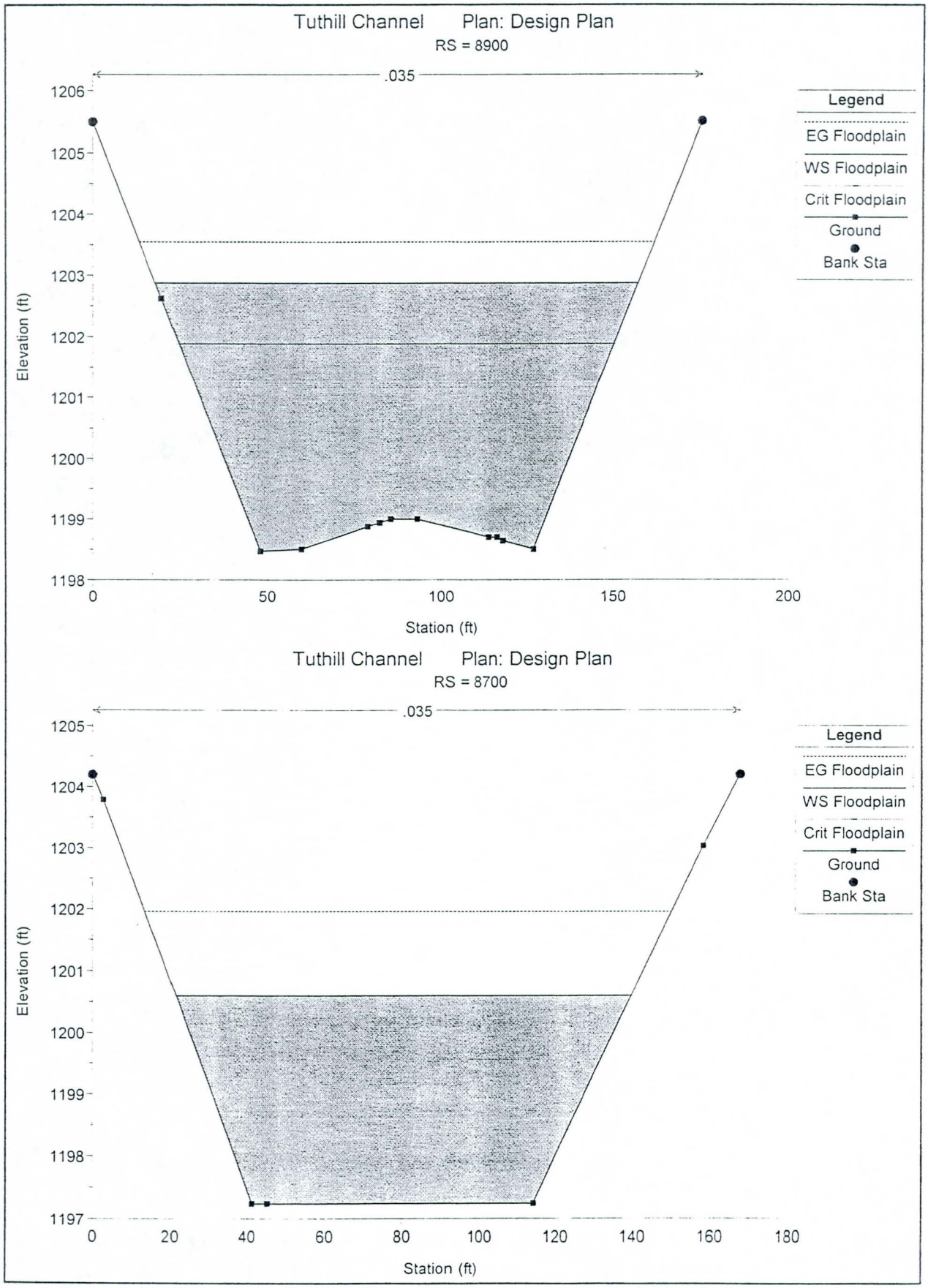
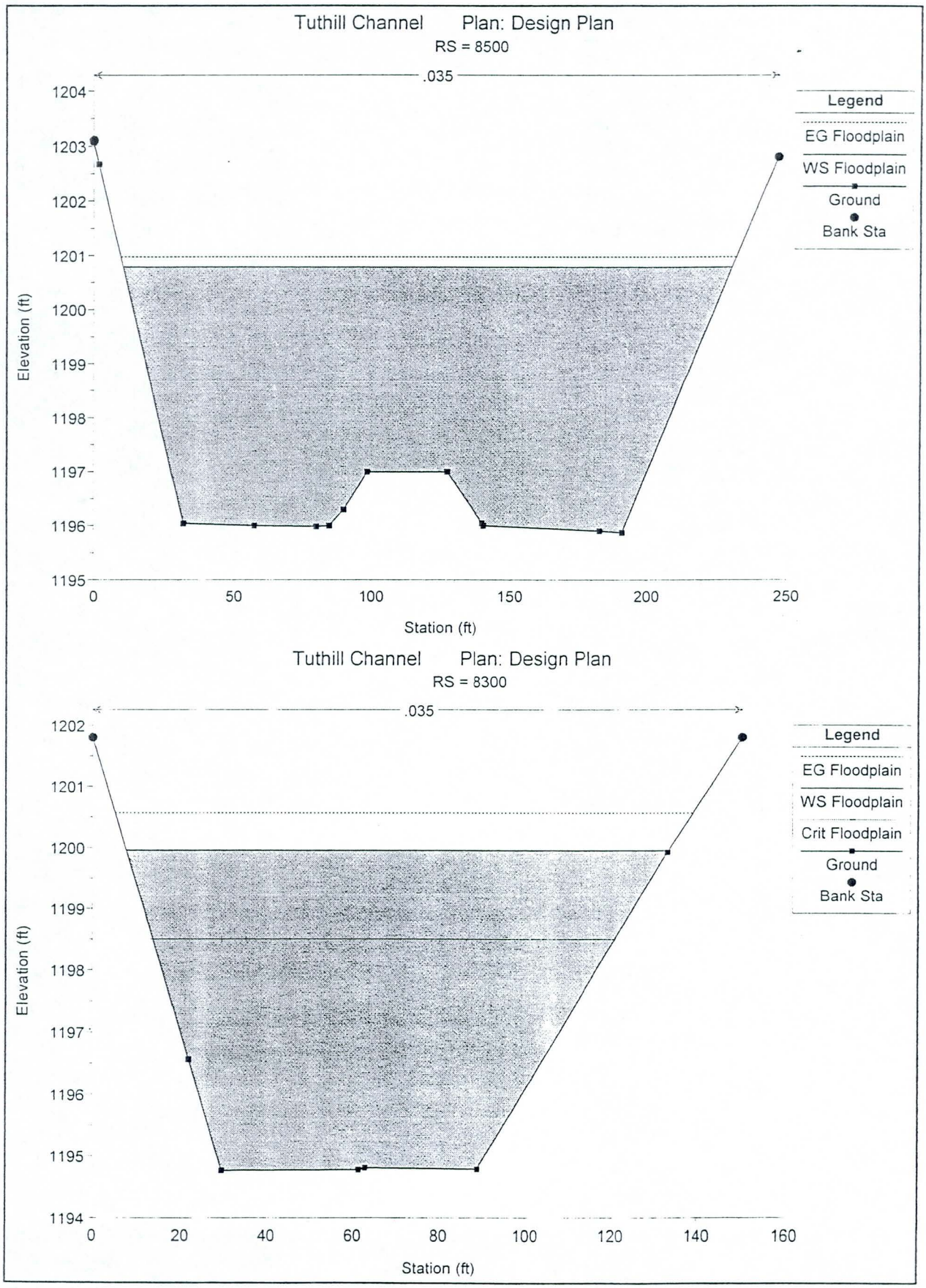
.035
1208
1207
1206
1205
1204
1203
1202
1201
1200
Elevation (ft)
0
20
40
60
80
100
120
Station (ft)
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Tuthill Channel Plan: Design Plan
RS = 9100
.035
1207
1206
1205
1204
1203
1202
1201
1200
1199
Elevation (ft)
0
20
40
60
80
100
120
Station (ft)
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta


Tuthill Channel Plan: Design Plan
RS = 8900
.035
1206
1205
1204
1203
1202
1201
1200
1199
1198
Elevation (ft)
0
50
100
150
200
Station (ft)
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Tuthill Channel Plan: Design Plan
RS = 8700
.035
1205
1204
1203
1202
1201
1200
1199
1198
1197
Elevation (ft)
0
20
40
60
80
100
120
140
160
180
Station (ft)
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta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Legend
EG Floodplain
WS Floodplain
Ground
Bank Sta
Elevation (ft)
Station (ft)
Tuthill Channel Plan: Design Plan
RS = 8300
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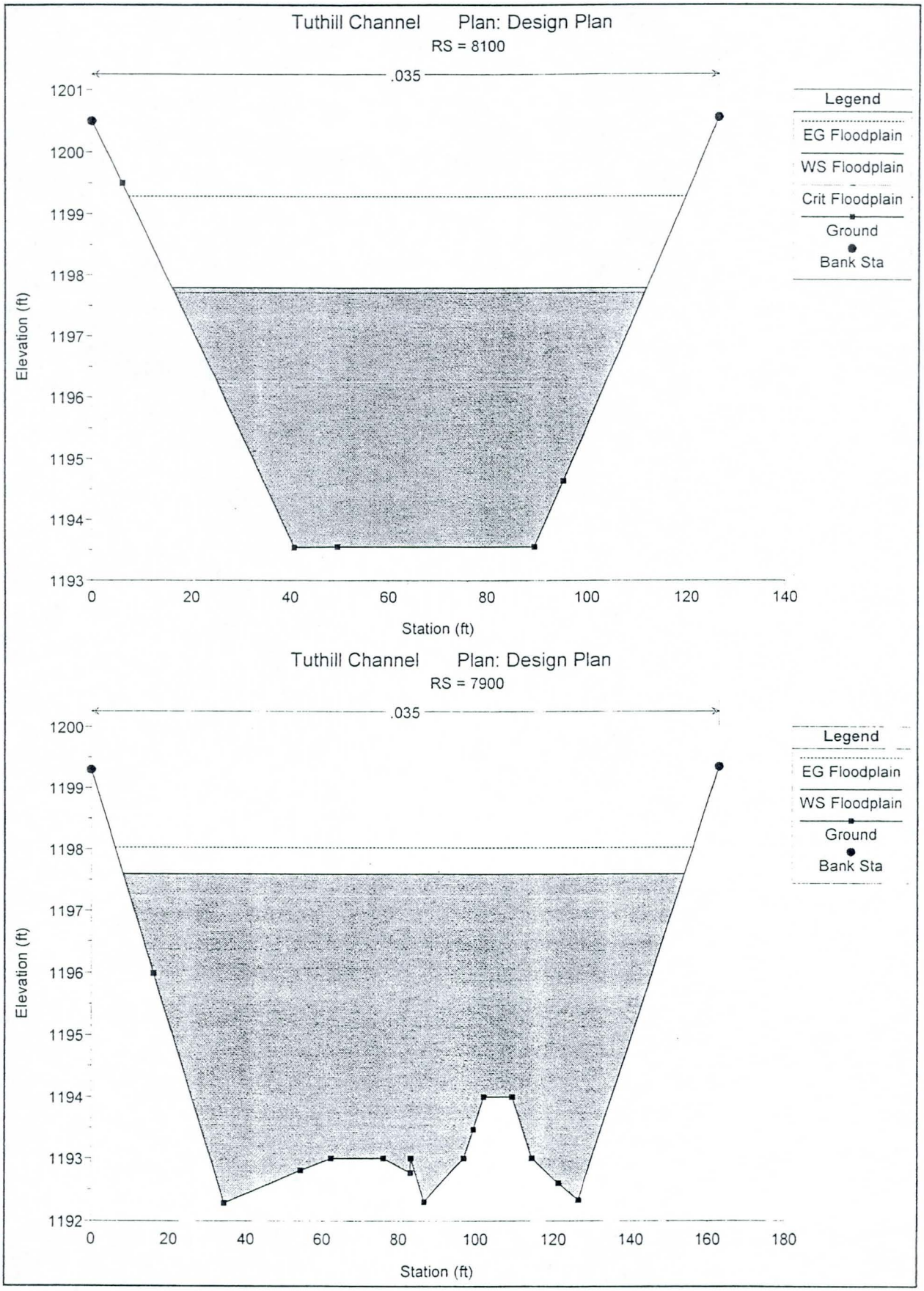
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
Station (ft)


Tuthill Channel Plan: Design Plan
RS = 8100
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Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
1201
1200
1199
1198
1197
1196
1195
1194
1193
0
20
40
60
80
100
120
140
Station (ft)
Tuthill Channel Plan: Design Plan
RS = 7900
.035
Legend
EG Floodplain
WS Floodplain
Ground
Bank Sta
Elevation (ft)
1200
1199
1198
1197
1196
1195
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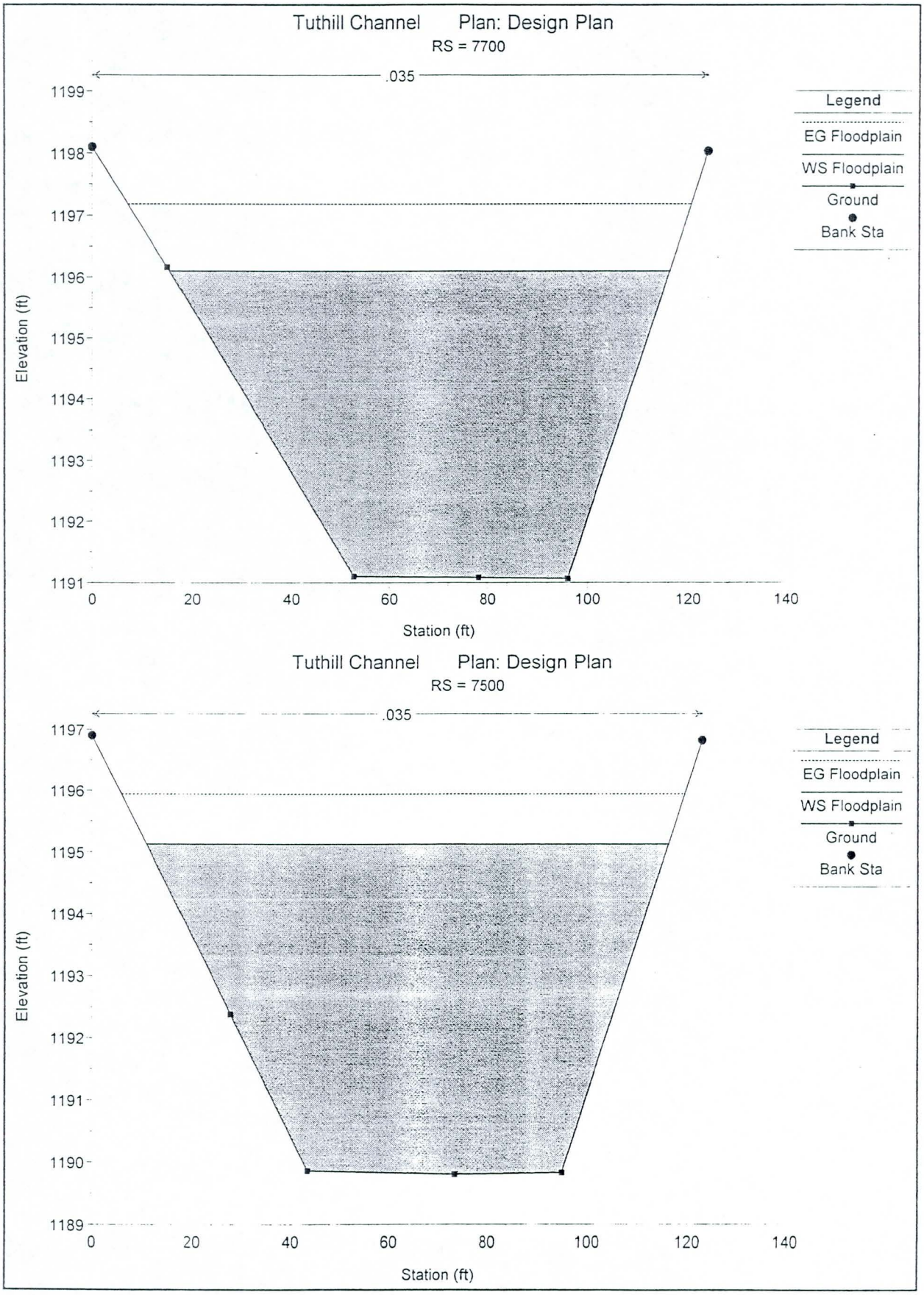
60
80
100
120
140
160
180
Station (ft)


Tuthill Channel Plan: Design Plan
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EG Floodplain
WS Floodplain
Ground
Bank Sta
Elevation (ft)
1199
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1197
1196
1195
1194
1193
1192
1191
0
20
40
60
80
100
120
140
Station (ft)
Tuthill Channel Plan: Design Plan
RS = 7500
.035
Legend
EG Floodplain
WS Floodplain
Ground
Bank Sta
Elevation (ft)
1197
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1194
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120
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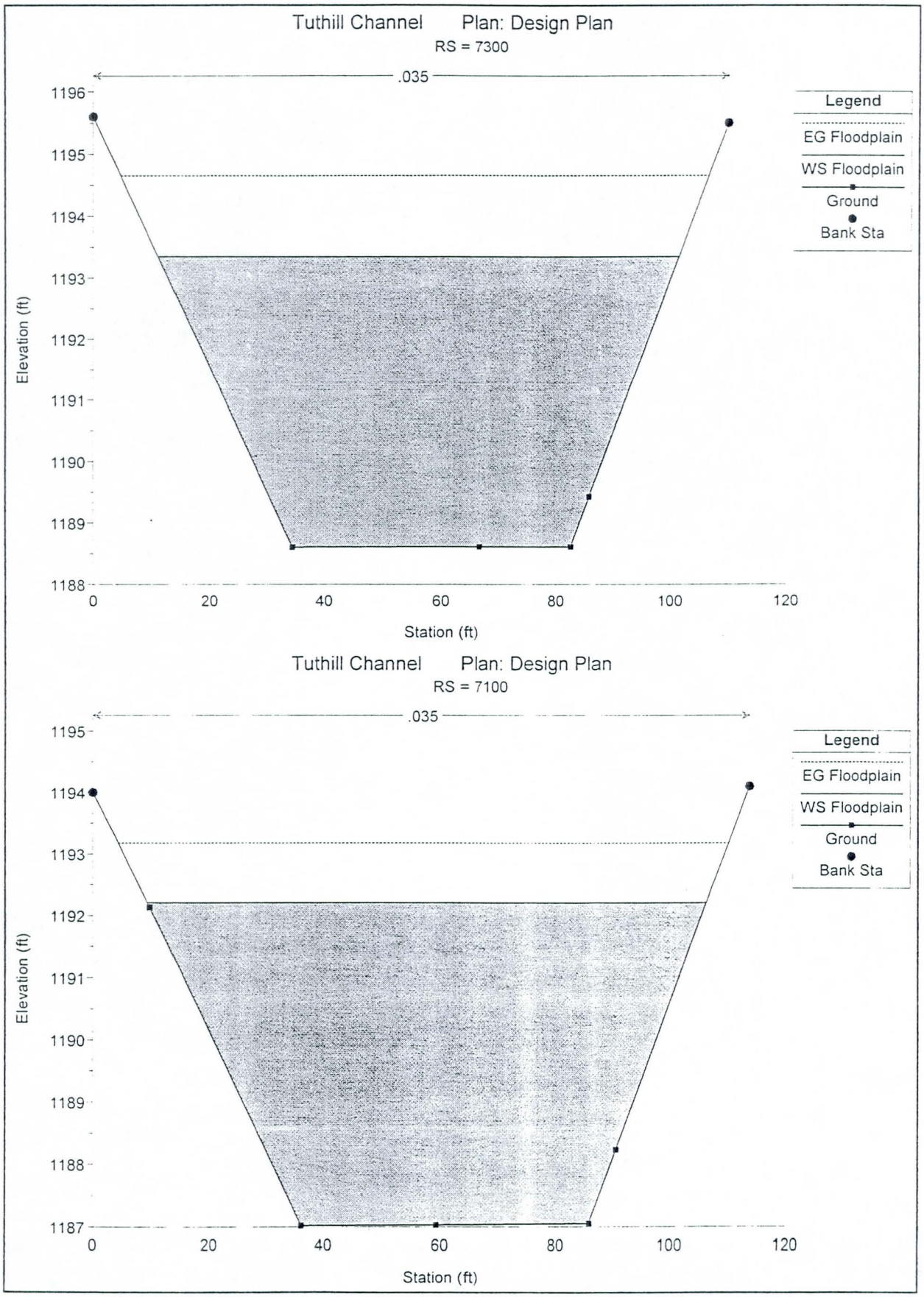
Station (ft)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WS Floodplain
Ground
Bank Sta
Elevation (ft)
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1195
1194
1193
1192
1191
1190
1189
1188
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20
40
60
80
100
120
Station (ft)
Tuthill Channel Plan: Design Plan
RS = 7100
.035
Legend
EG Floodplain
WS Floodplain
Ground
Bank Sta
Elevation (ft)
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1190
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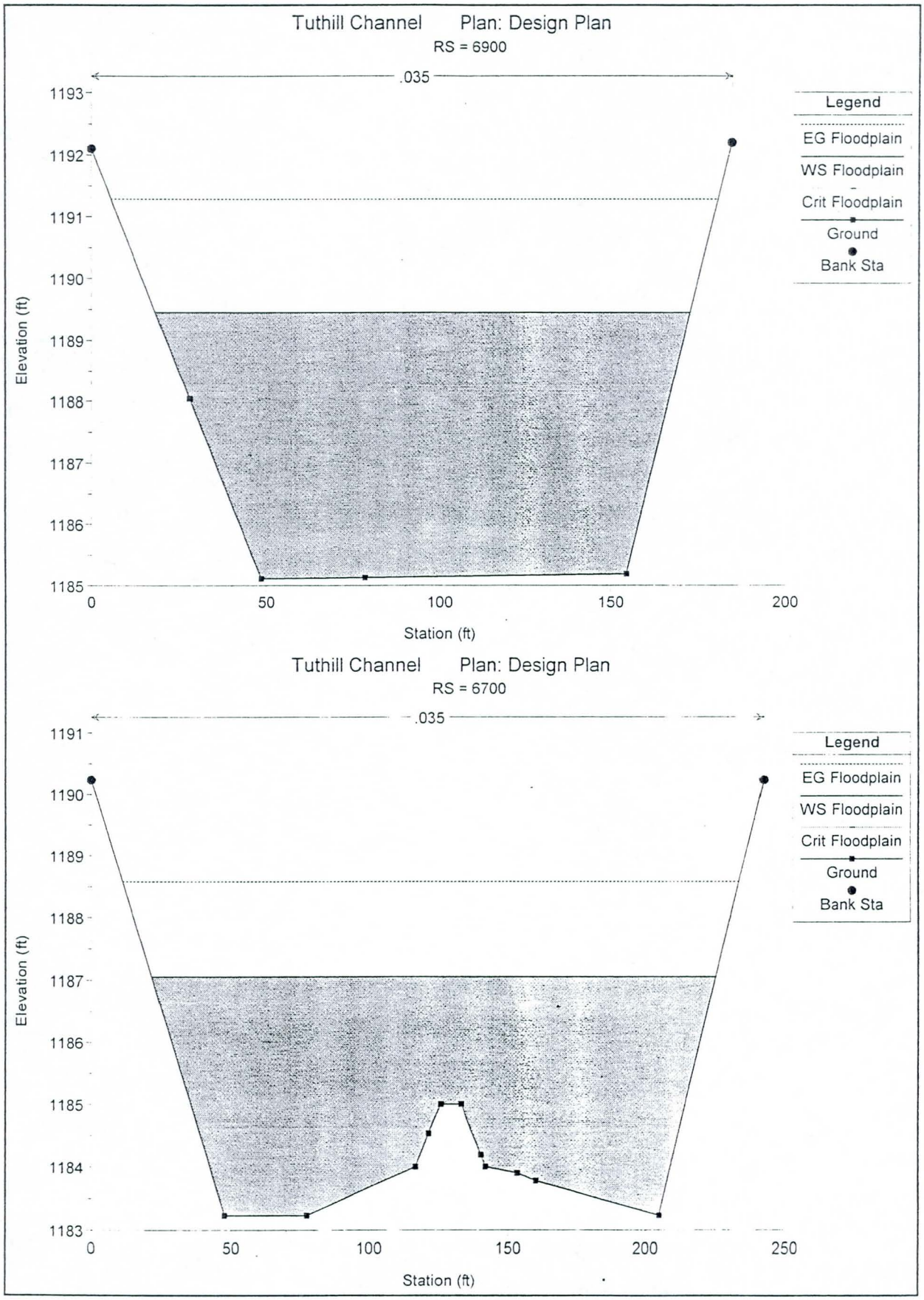
100
120
Station (ft)


Tuthill Channel Plan: Design Plan
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WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
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1192
1191
1190
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1187
1186
1185
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150
200
Station (ft)
Tuthill Channel Plan: Design Plan
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Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
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1187
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0
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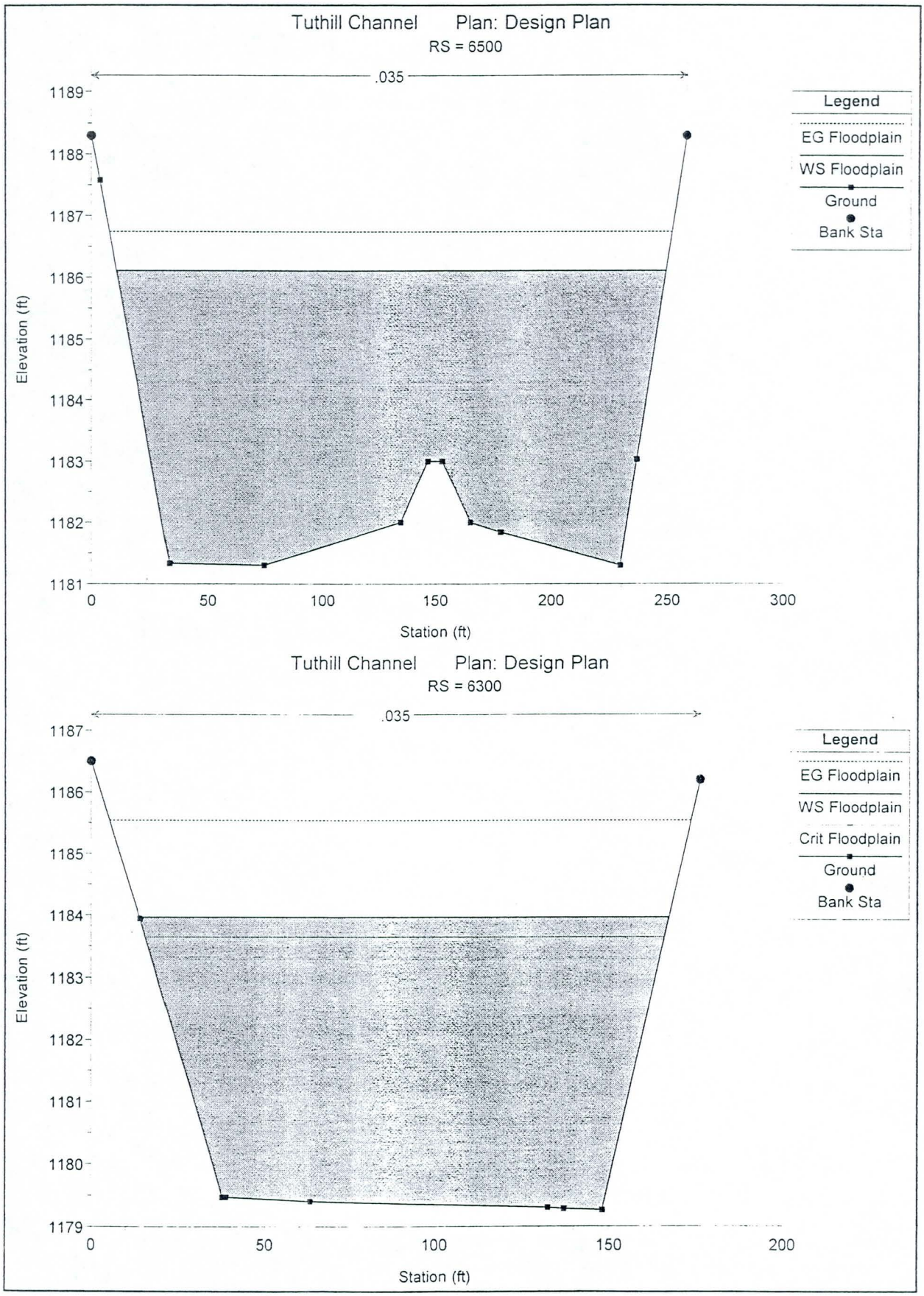
150
200
250
Station (ft)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WS Floodplain
Ground
Bank Sta
Elevation (ft)
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1186
1185
1184
1183
1182
1181
0
50
100
150
200
250
300
Station (ft)
Tuthill Channel Plan: Design Plan
RS = 6300
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Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
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1184
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1182
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1179
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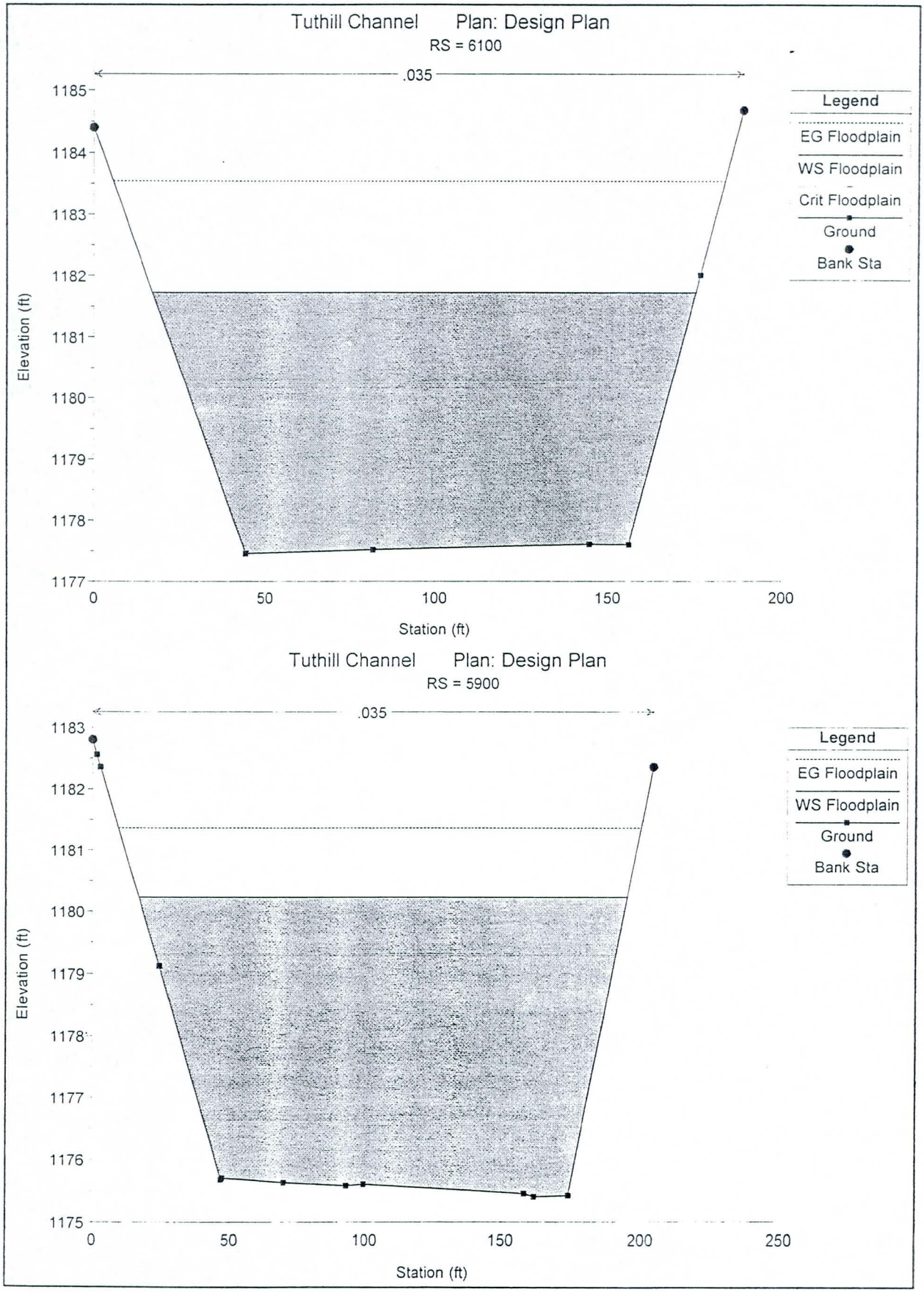
150
200
Station (ft)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WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
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1184
1183
1182
1181
1180
1179
1178
1177
0
50
100
150
200
Station (ft)
Tuthill Channel Plan: Design Plan
RS = 5900
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Legend
EG Floodplain
WS Floodplain
Ground
Bank Sta
Elevation (ft)
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1175
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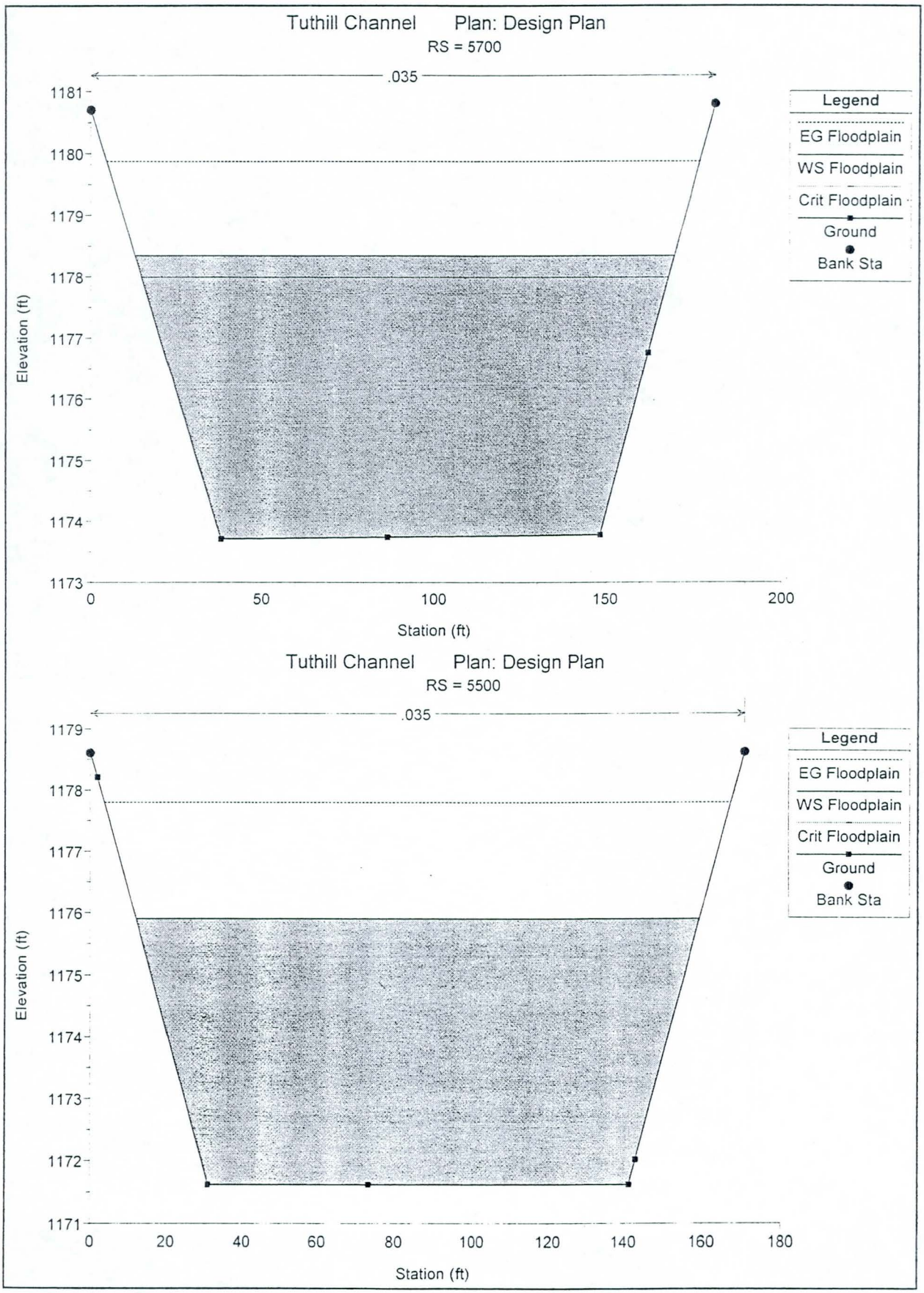
150
200
250
Station (ft)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1178
1177
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1174
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Elevation (ft)
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50
100
150
200
Station (ft)
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Tuthill Channel Plan: Design Plan
RS = 5500
.035
1179
1178
1177
1176
1175
1174
1173
1172
1171
Elevation (ft)
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120
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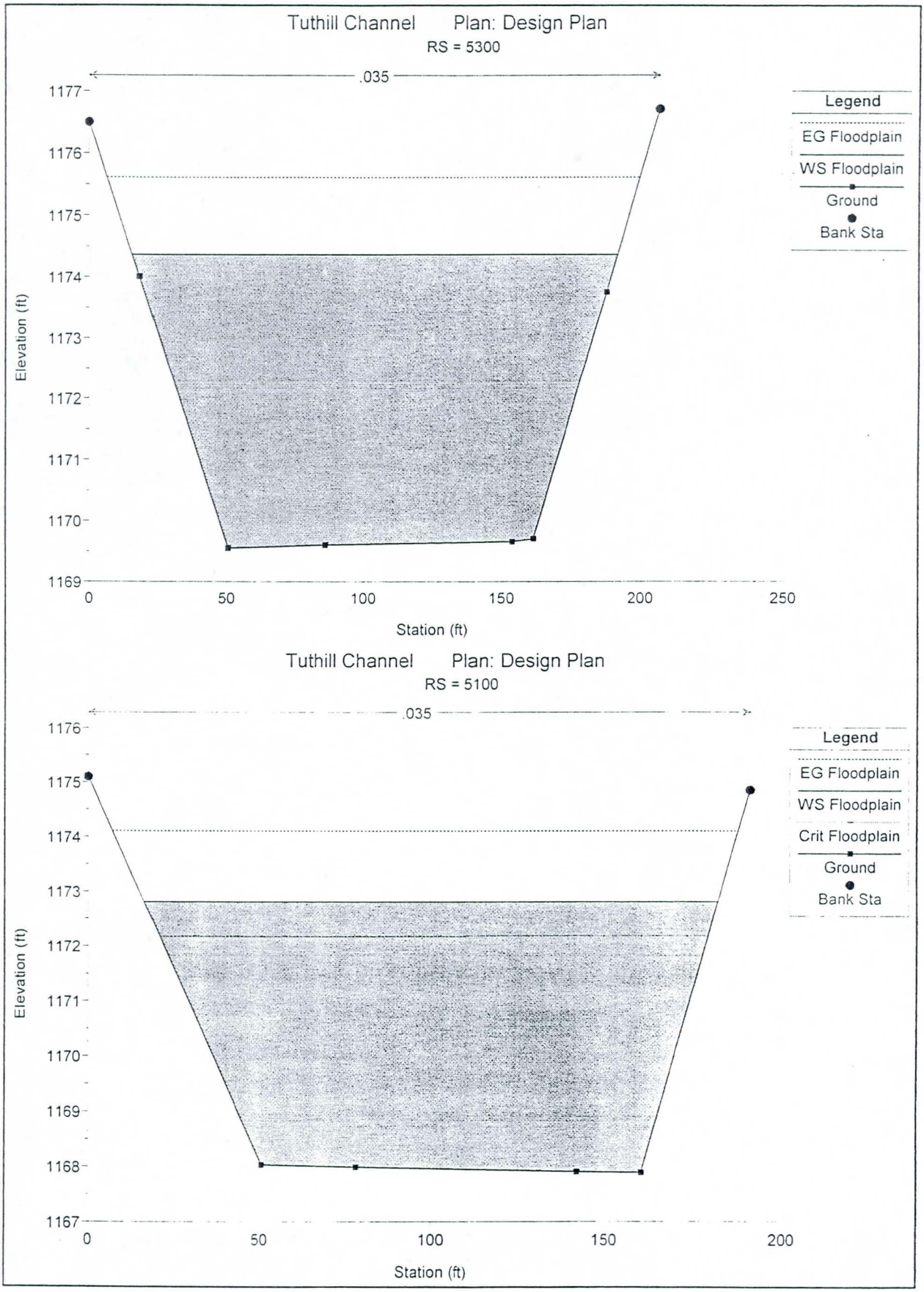
180
Station (ft)
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta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1176
1175
1174
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1171
1170
1169
Elevation (ft)
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100
150
200
250
Station (ft)
Legend
EG Floodplain
WS Floodplain
Ground
Bank Sta
Tuthill Channel Plan: Design Plan
RS = 5100
.035
1176
1175
1174
1173
1172
1171
1170
1169
1168
1167
Elevation (ft)
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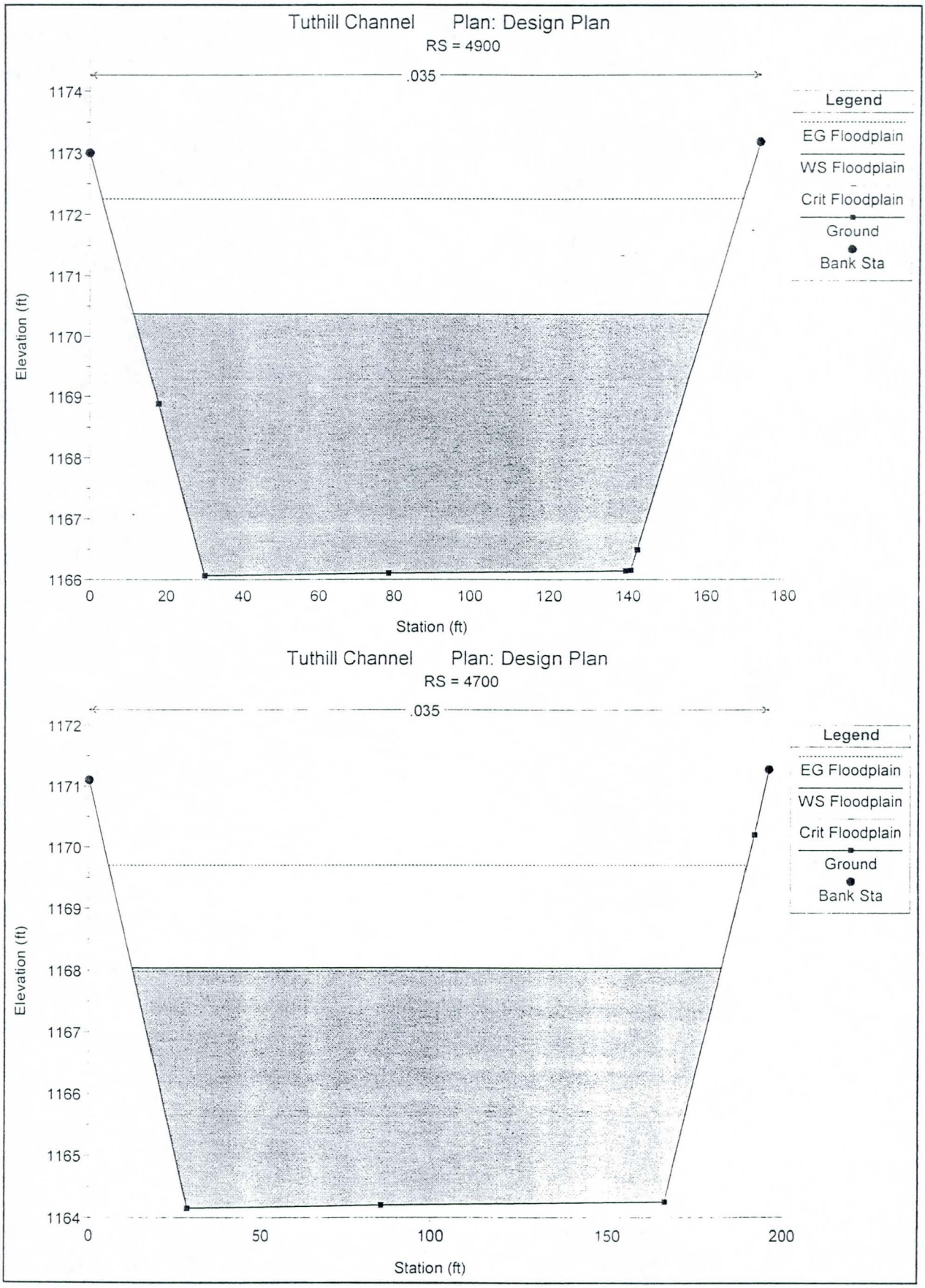
150
200
Station (ft)
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta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WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
Station (ft)
1174
1173
1172
1171
1170
1169
1168
1167
1166
0
20
40
60
80
100
120
140
160
180
Tuthill Channel Plan: Design Plan
RS = 4700
.035
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
Station (ft)
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1170
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1165
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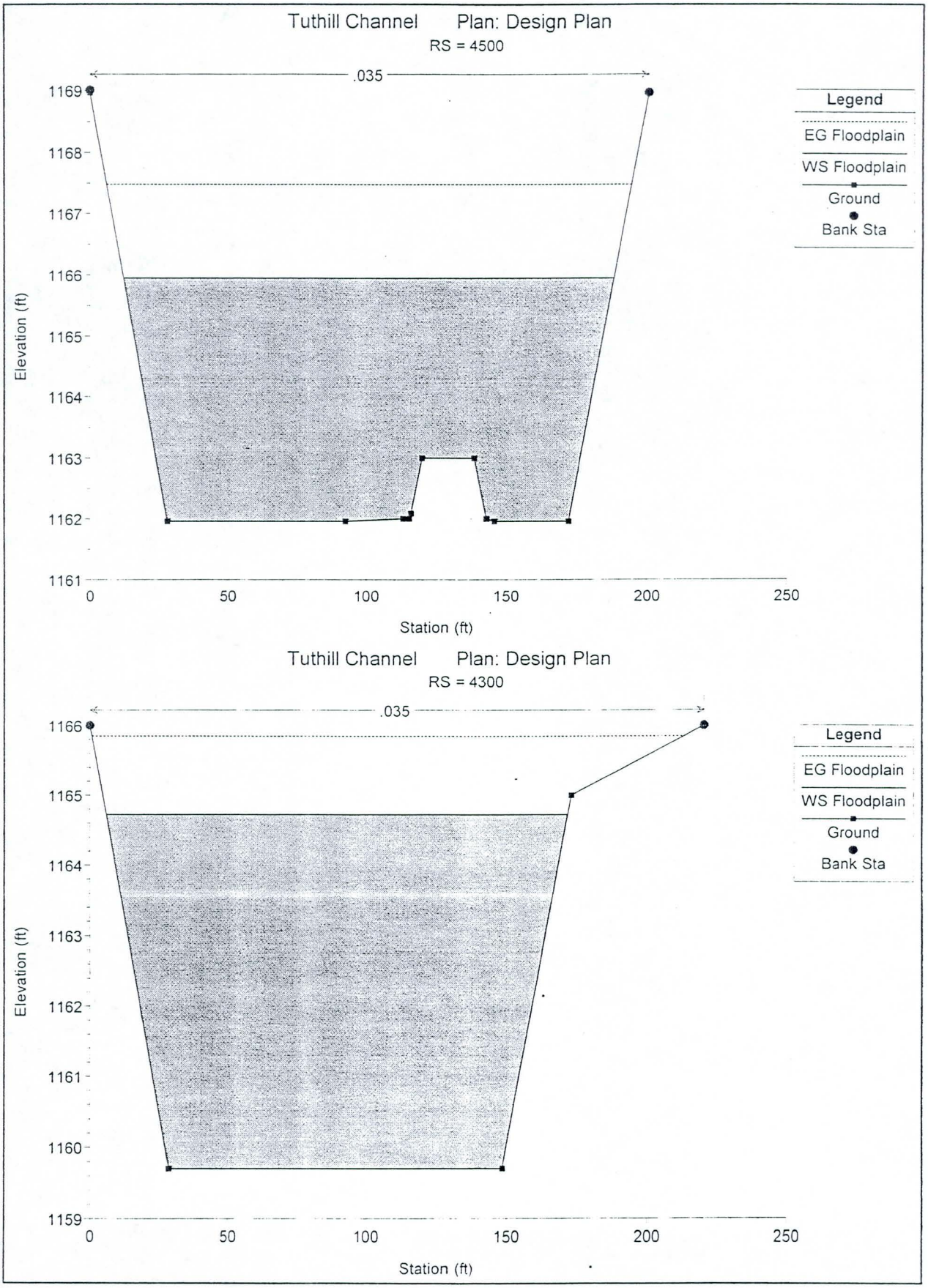
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100
150
200
250
Station (ft)
Legend
EG Floodplain
WS Floodplain
Ground
Bank Sta
Tuthill Channel Plan: Design Plan
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.035
1166
1165
1164
1163
1162
1161
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Elevation (ft)
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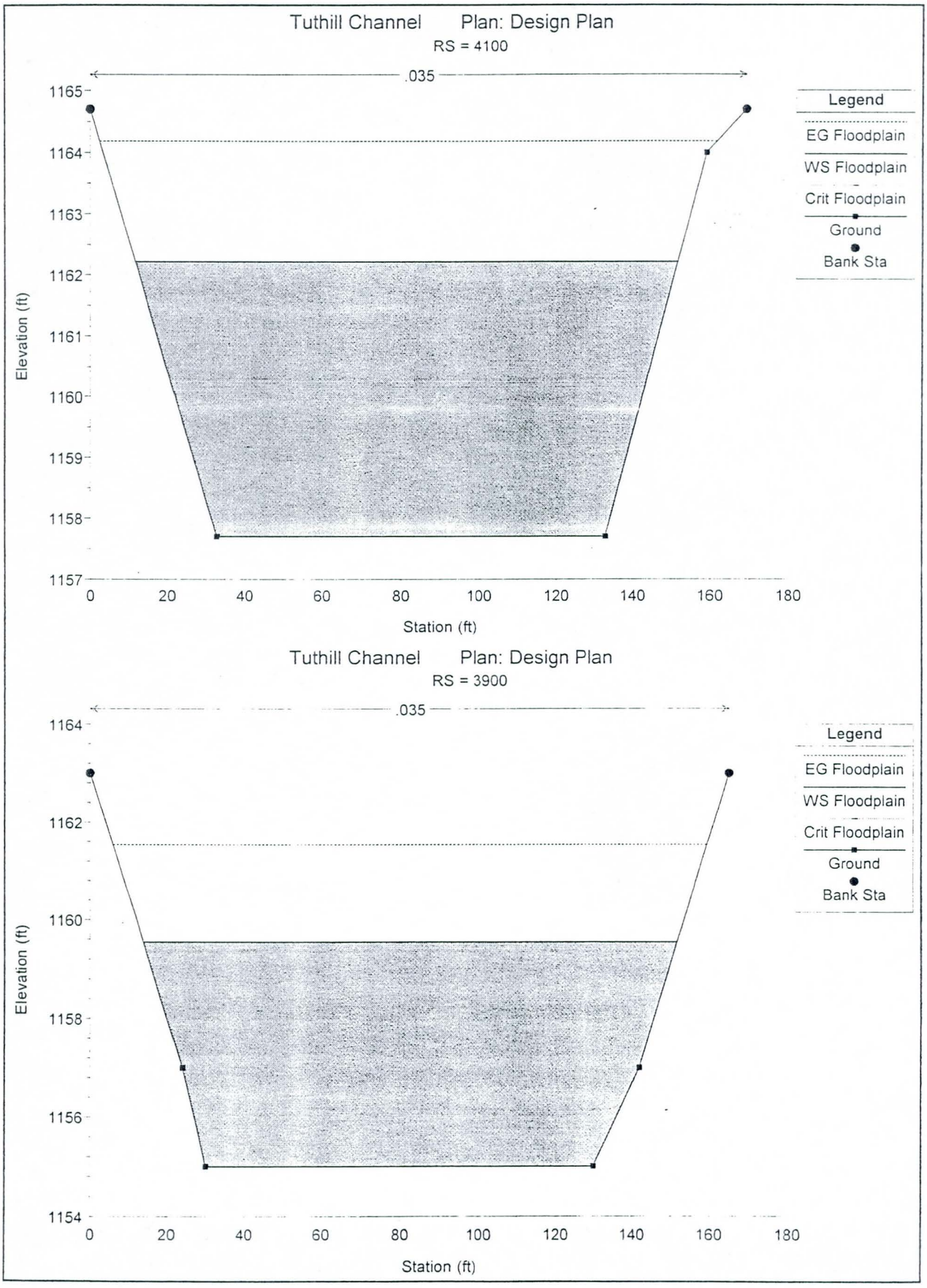
200
250
Station (ft)
Legend
EG Floodplain
WS Floodplain
Ground
Bank Sta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WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
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1164
1163
1162
1161
1160
1159
1158
1157
0
20
40
60
80
100
120
140
160
180
Station (ft)
Tuthill Channel Plan: Design Plan
RS = 3900
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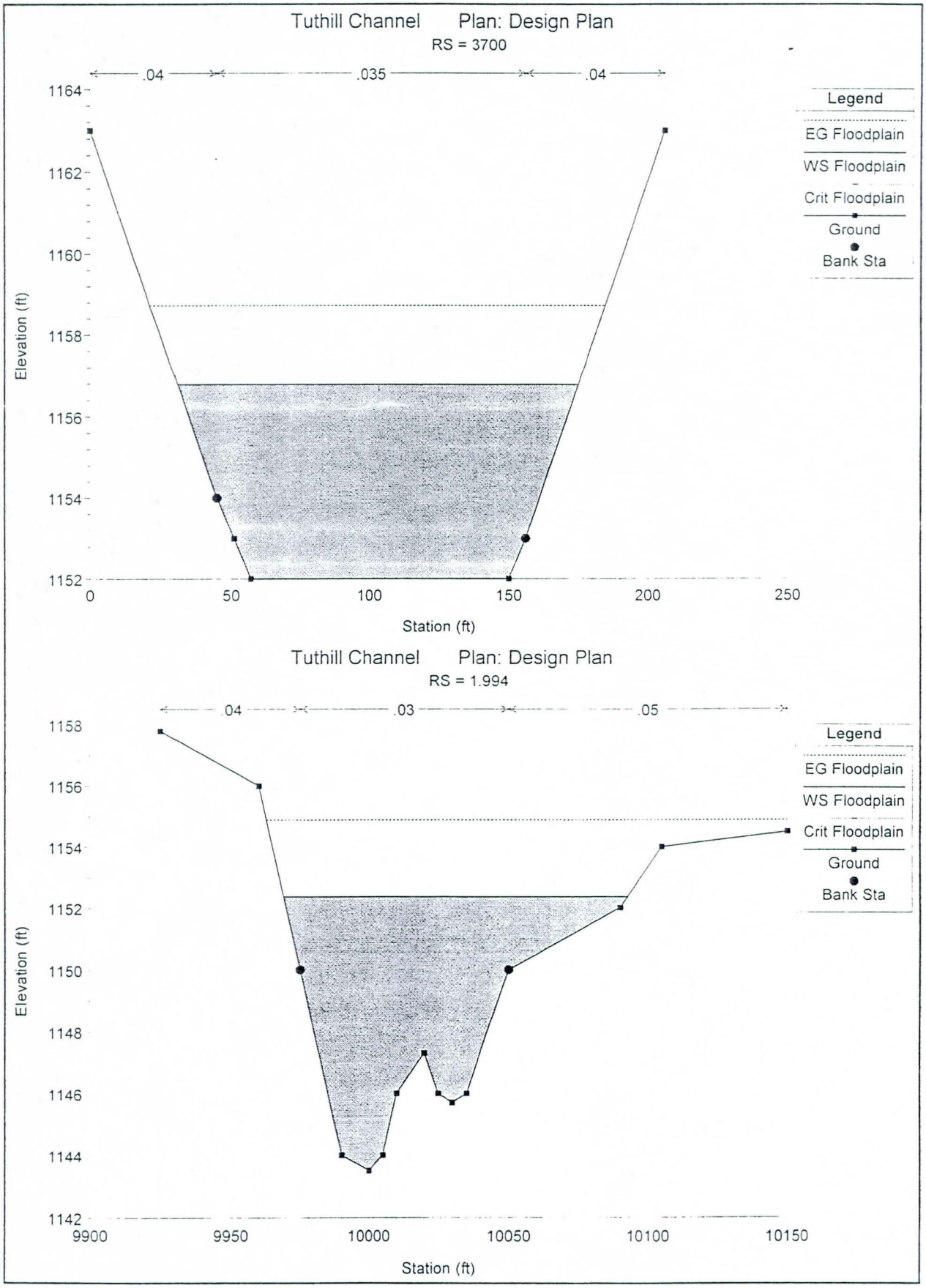
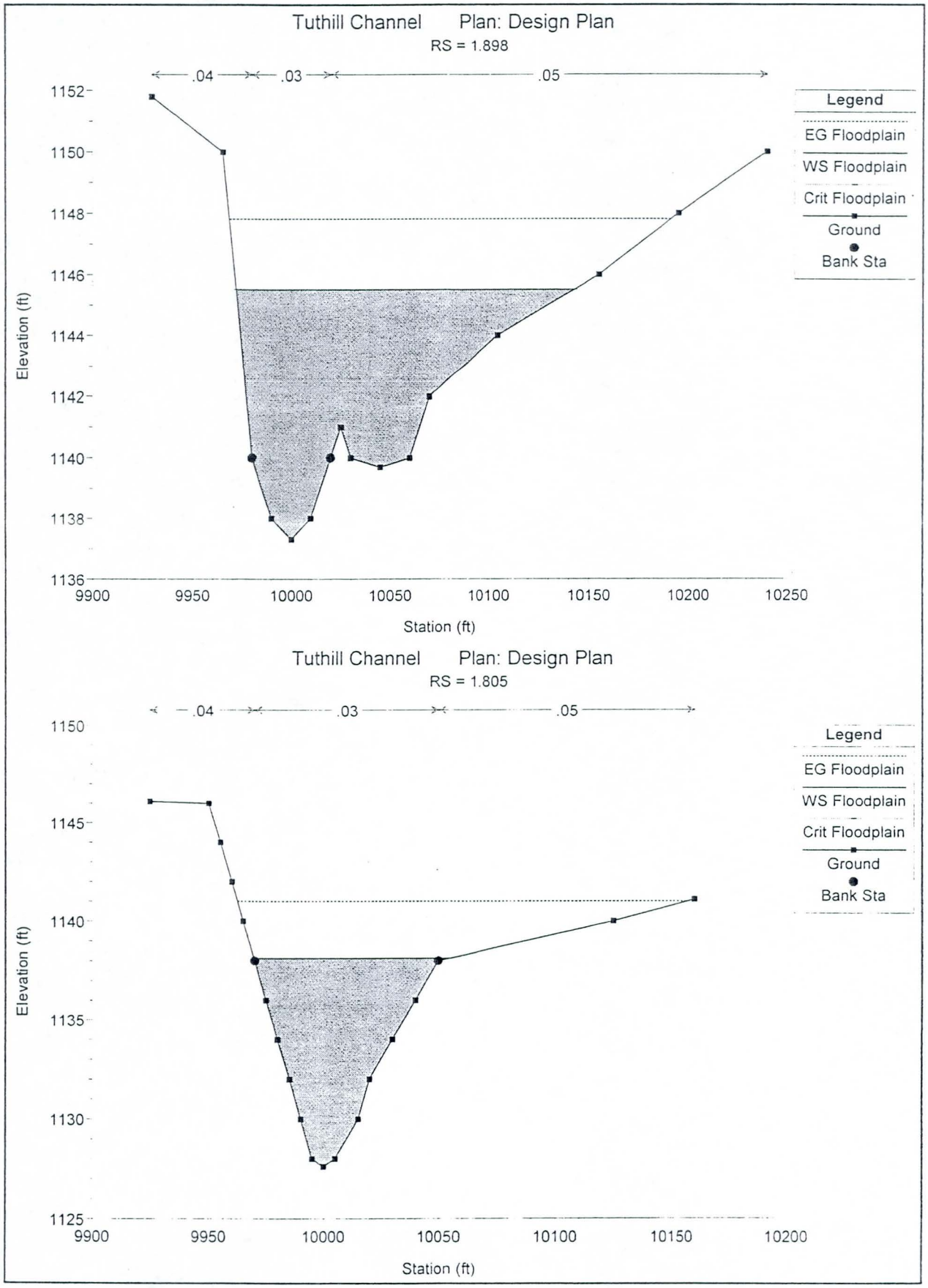
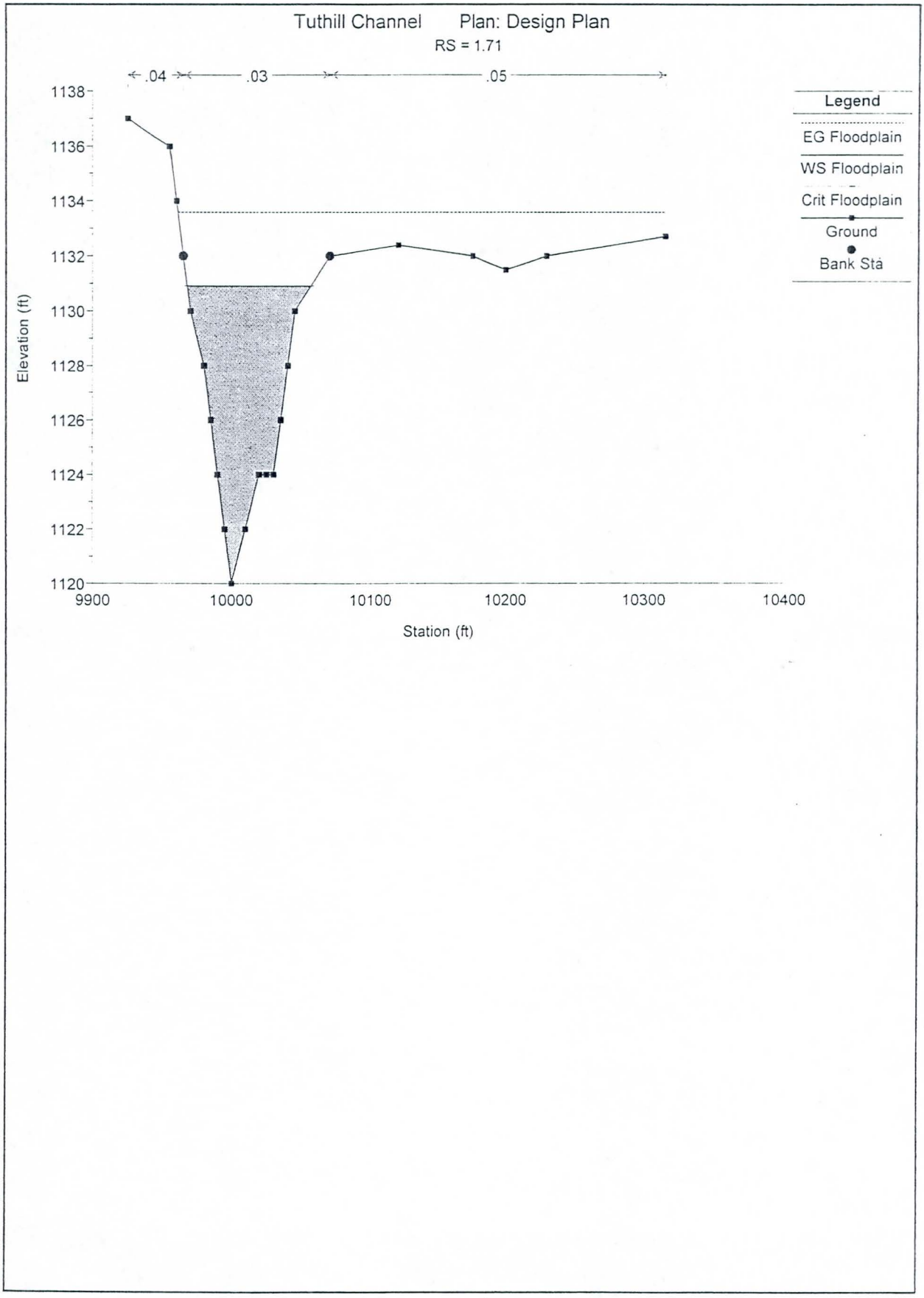
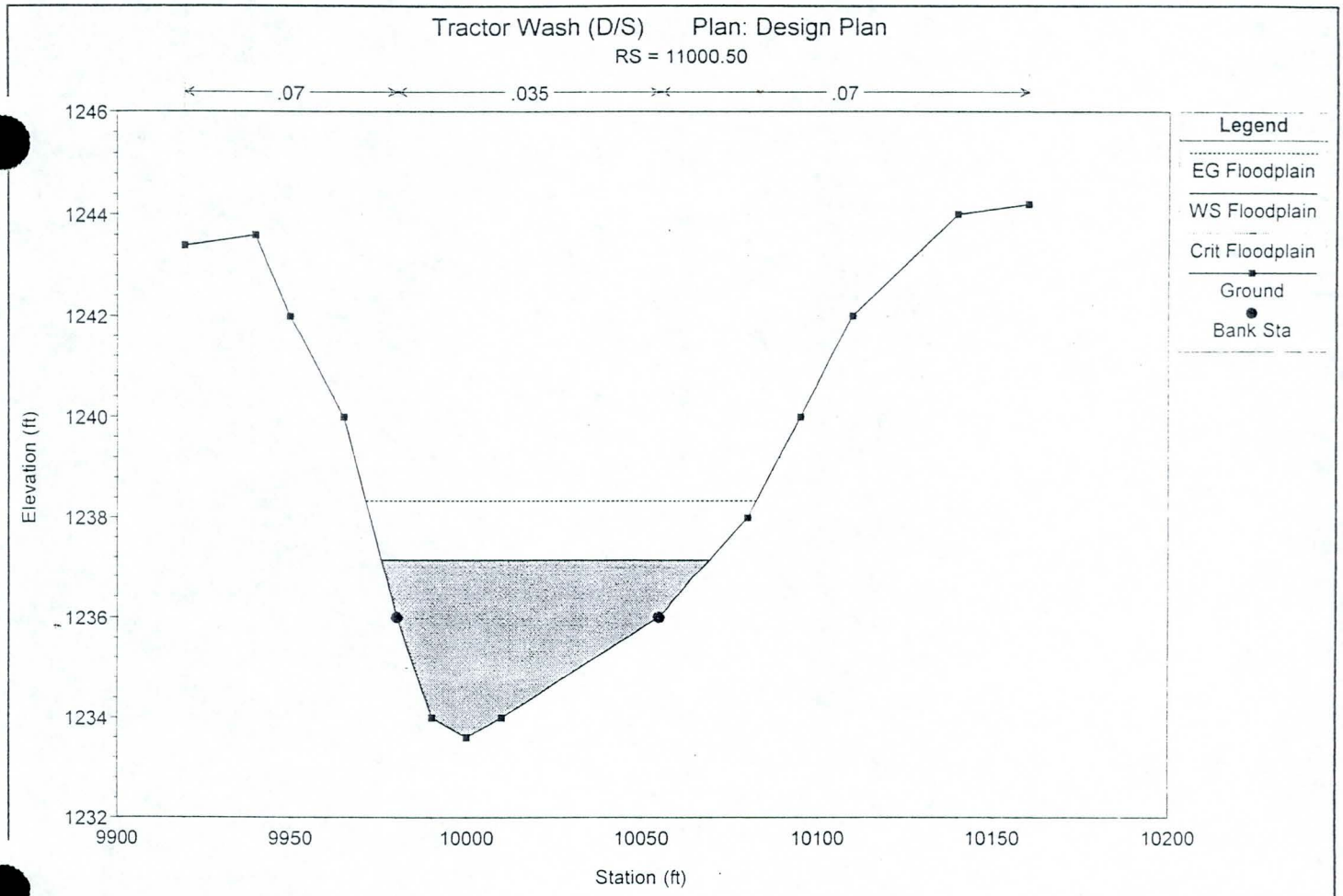
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
1164
1162
1160
1158
1156
1154
0
20
40
60
80
100
120
140
160
180
Station (ft)

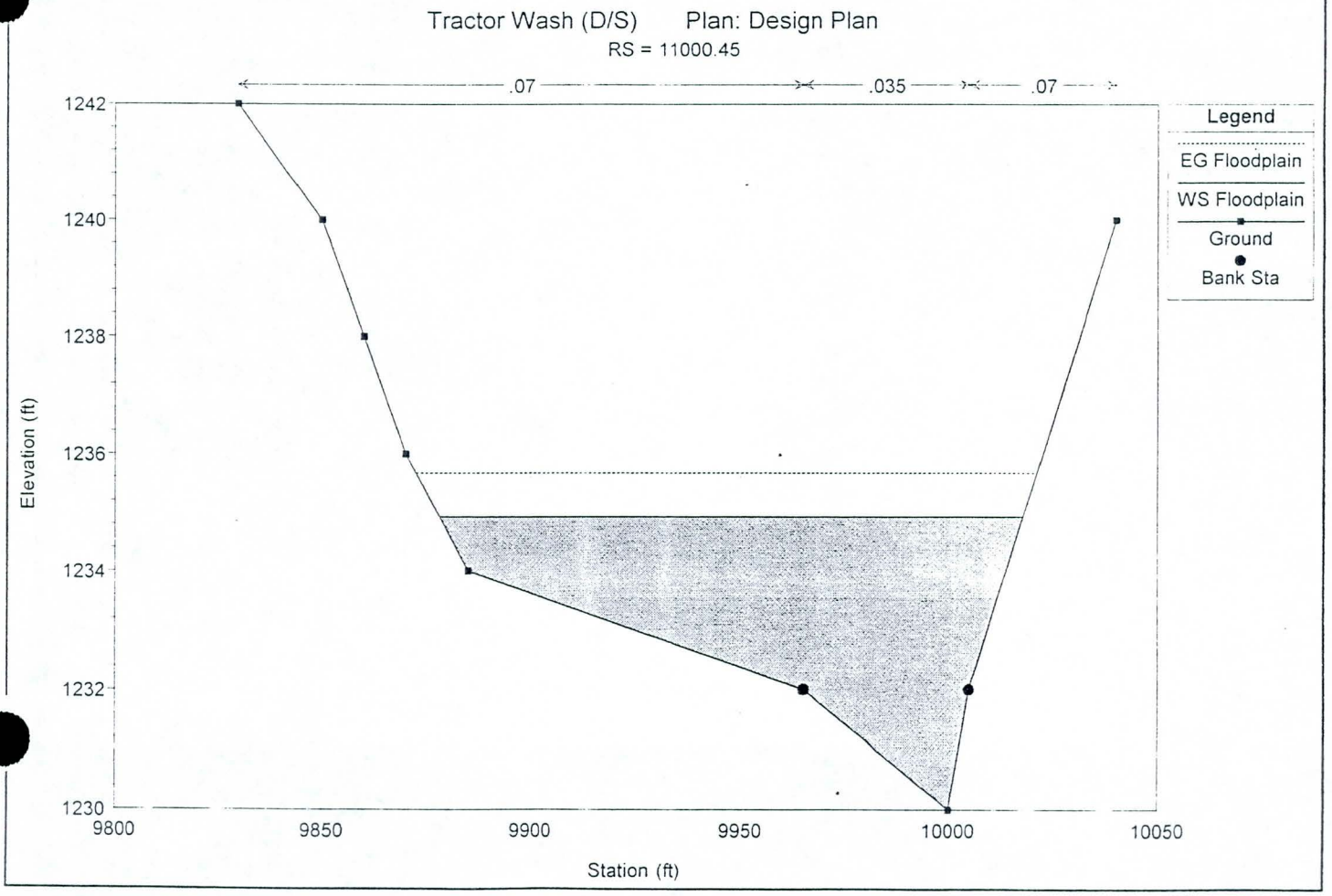

Tuthill Channel Plan: Design Plan
RS = 3700
.04
.035
.04
1164
1162
1160
1158
1156
1154
1152
Elevation (ft)
0
50
100
150
200
250
Station (ft)
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Tuthill Channel Plan: Design Plan
RS = 1.994
.04
.03
.05
1158
1156
1154
1152
1150
1148
1146
1144
1142
Elevation (ft)
9900
9950
10000
10050
10100
10150
Station (ft)
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta

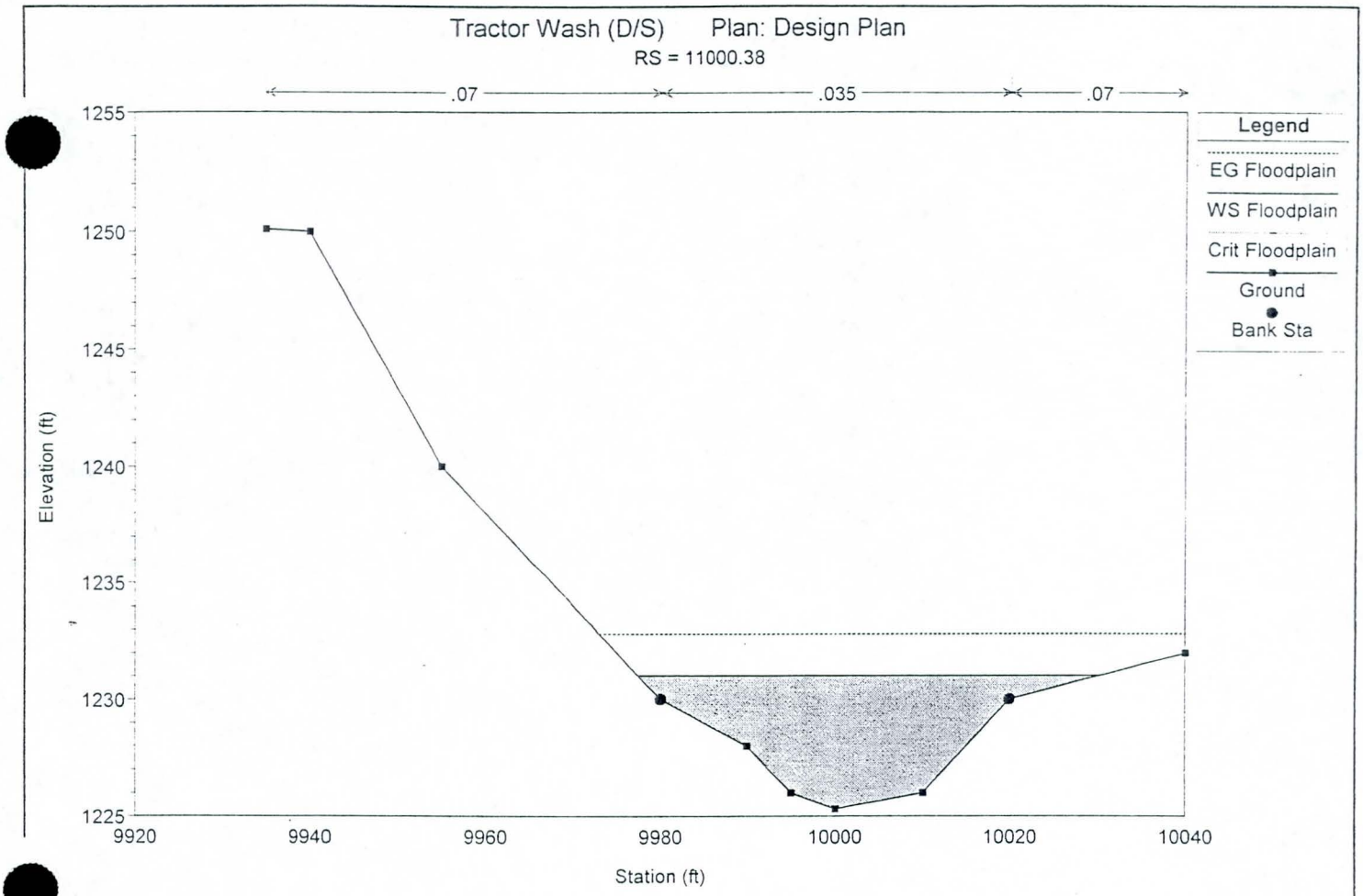

Tuthill Channel Plan: Design Plan
RS = 1.898
.04
.03
.05
1152
1150
1148
1146
1144
1142
1140
1138
1136
Elevation (ft)
9900
9950
10000
10050
10100
10150
10200
10250
Station (ft)
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Tuthill Channel Plan: Design Plan
RS = 1.805
.04
.03
.05
1150
1145
1140
1135
1130
1125
Elevation (ft)
9900
9950
10000
10050
10100
10150
10200
Station (ft)
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta

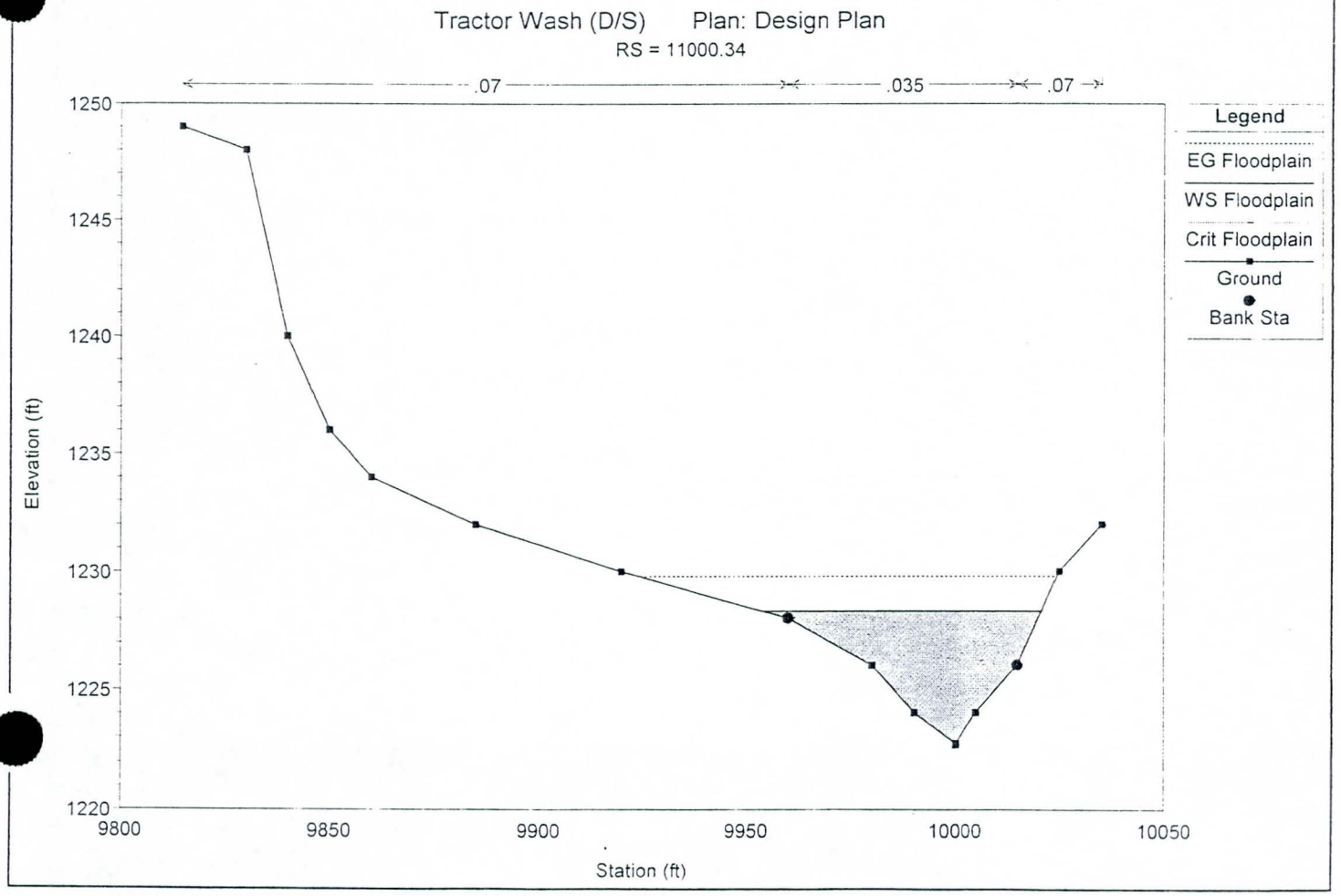

Tuthill Channel Plan: Design Plan
RS = 1.71
.04
.03
.05
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
1138
1136
1134
1132
1130
1128
1126
1124
1122
1120
9900
10000
10100
10200
10300
10400
Station (ft)

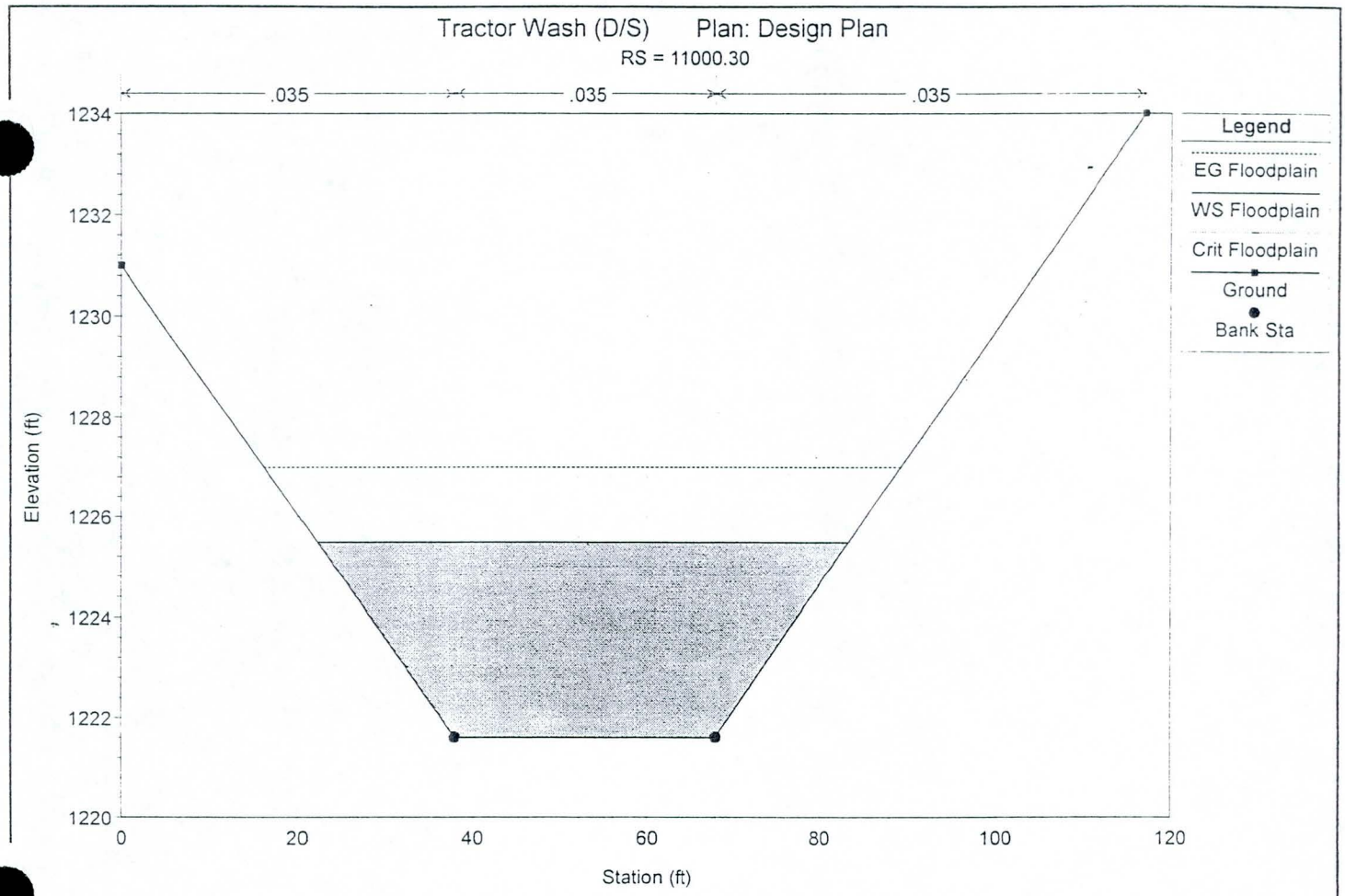
Tractor Wash

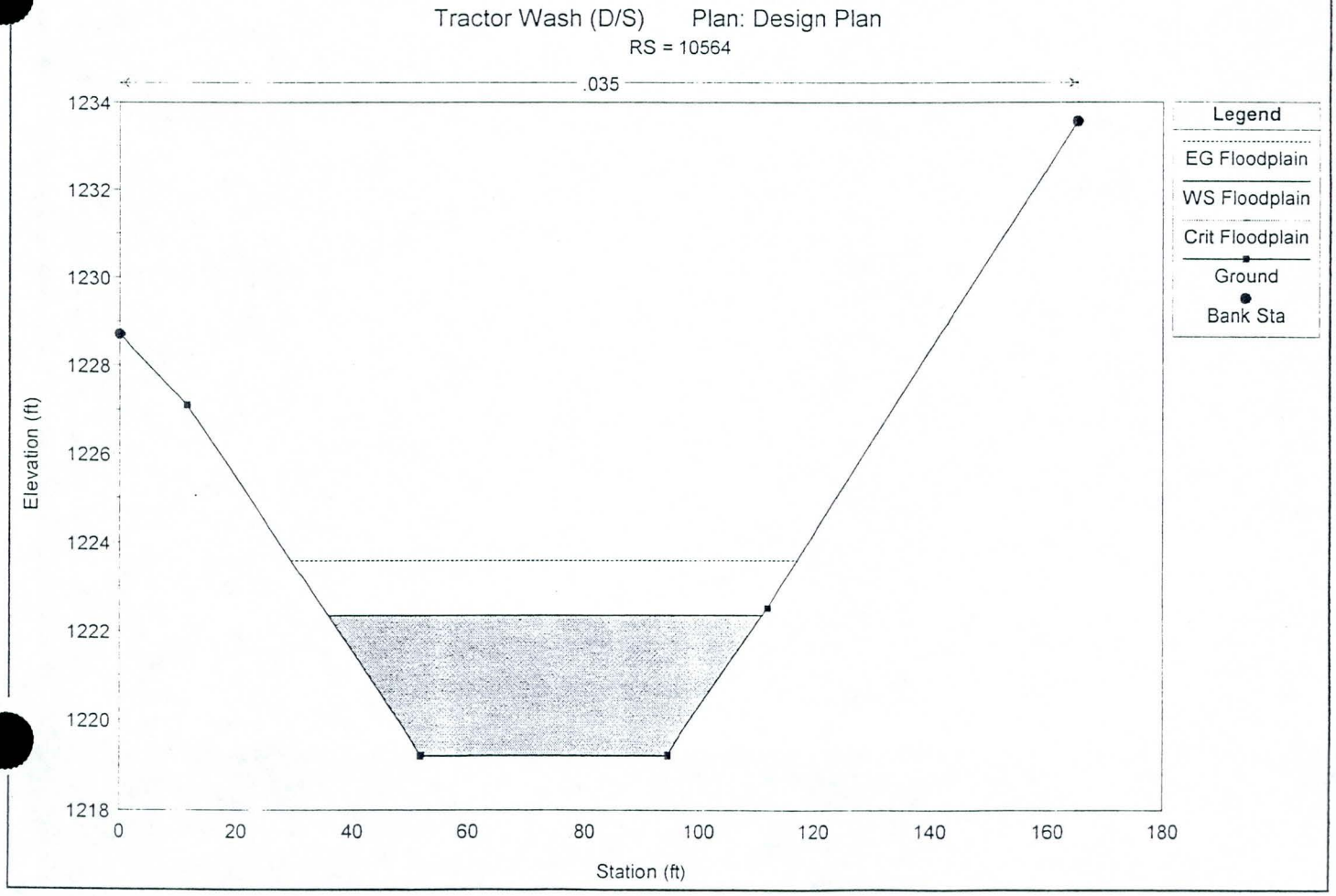

Tractor Wash (D/S) Plan: Design Plan
RS = 11000.50
.07
.035
.07
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
1246
1244
1242
1240
1238
1236
1234
1232
9900
9950
10000
10050
10100
10150
10200
Station (ft)

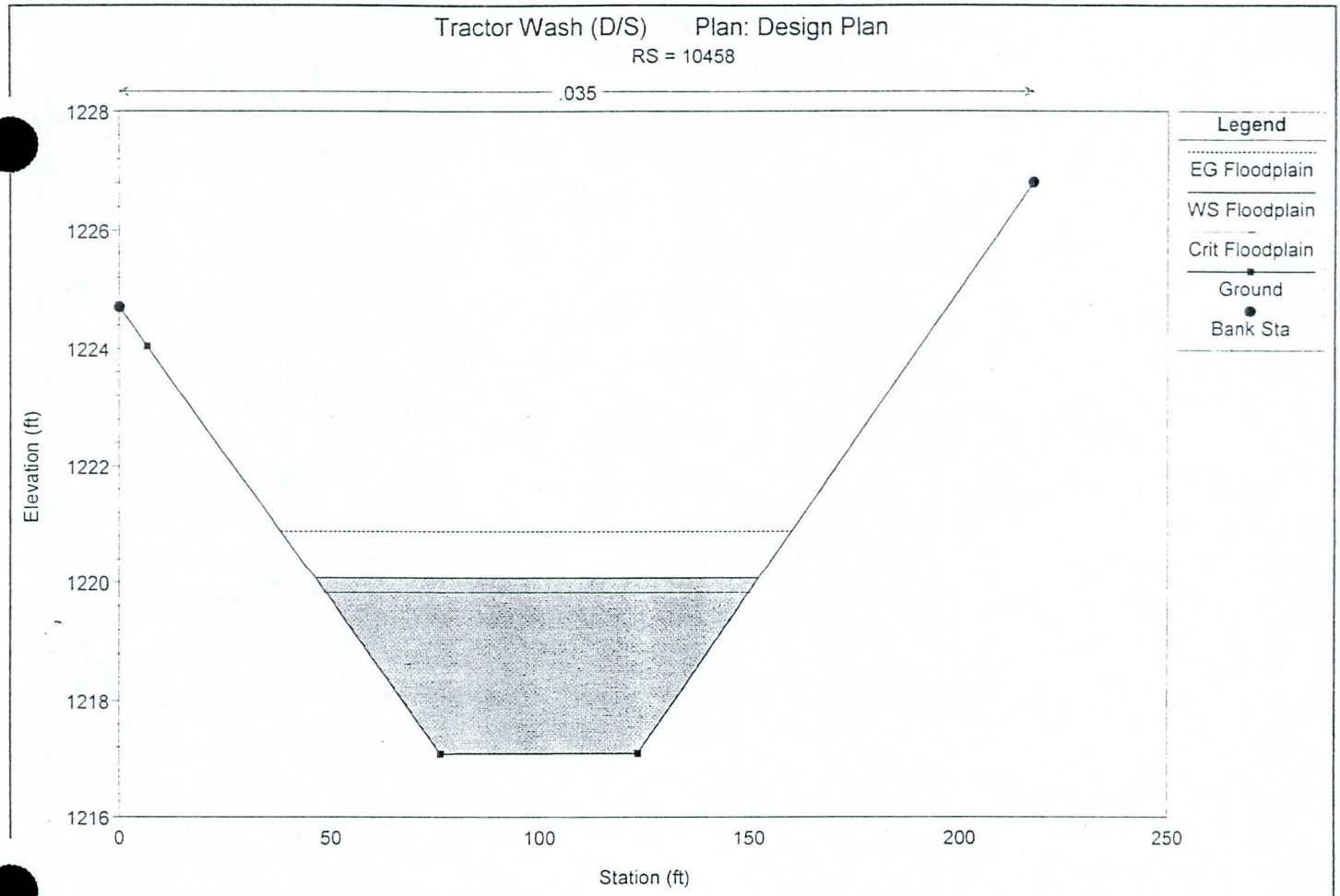

Tractor Wash (D/S) Plan: Design Plan
RS = 11000.45
.07
.035
.07
Legend
EG Floodplain
WS Floodplain
Ground
Bank Sta
Elevation (ft)
1242
1240
1238
1236
1234
1232
1230
9800
9850
9900
9950
10000
10050
Station (ft)

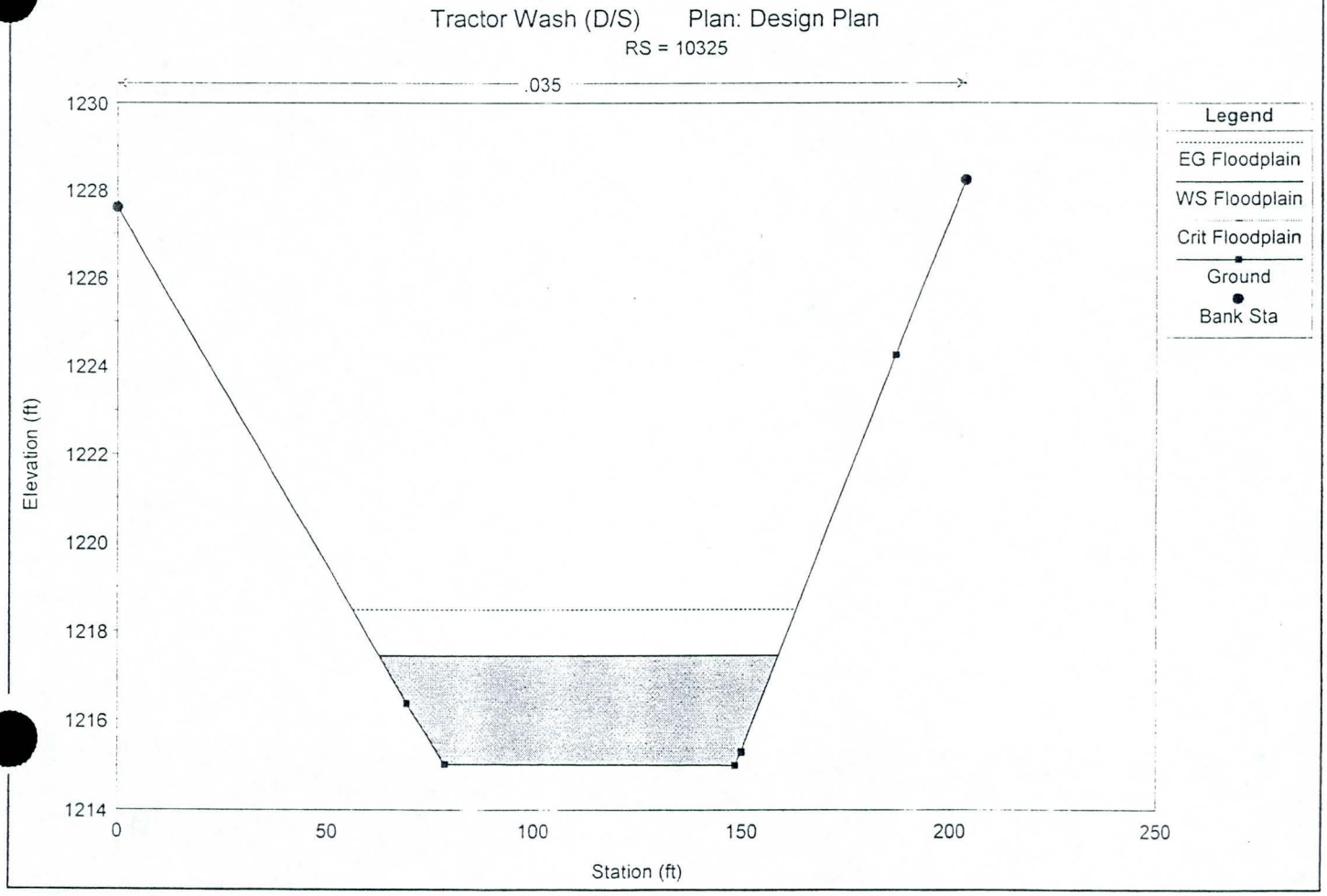

Tractor Wash (D/S) Plan: Design Plan
RS = 11000.38
.07
.035
.07
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
1255
1250
1245
1240
1235
1230
1225
9920
9940
9960
9980
10000
10020
10040
Station (ft)

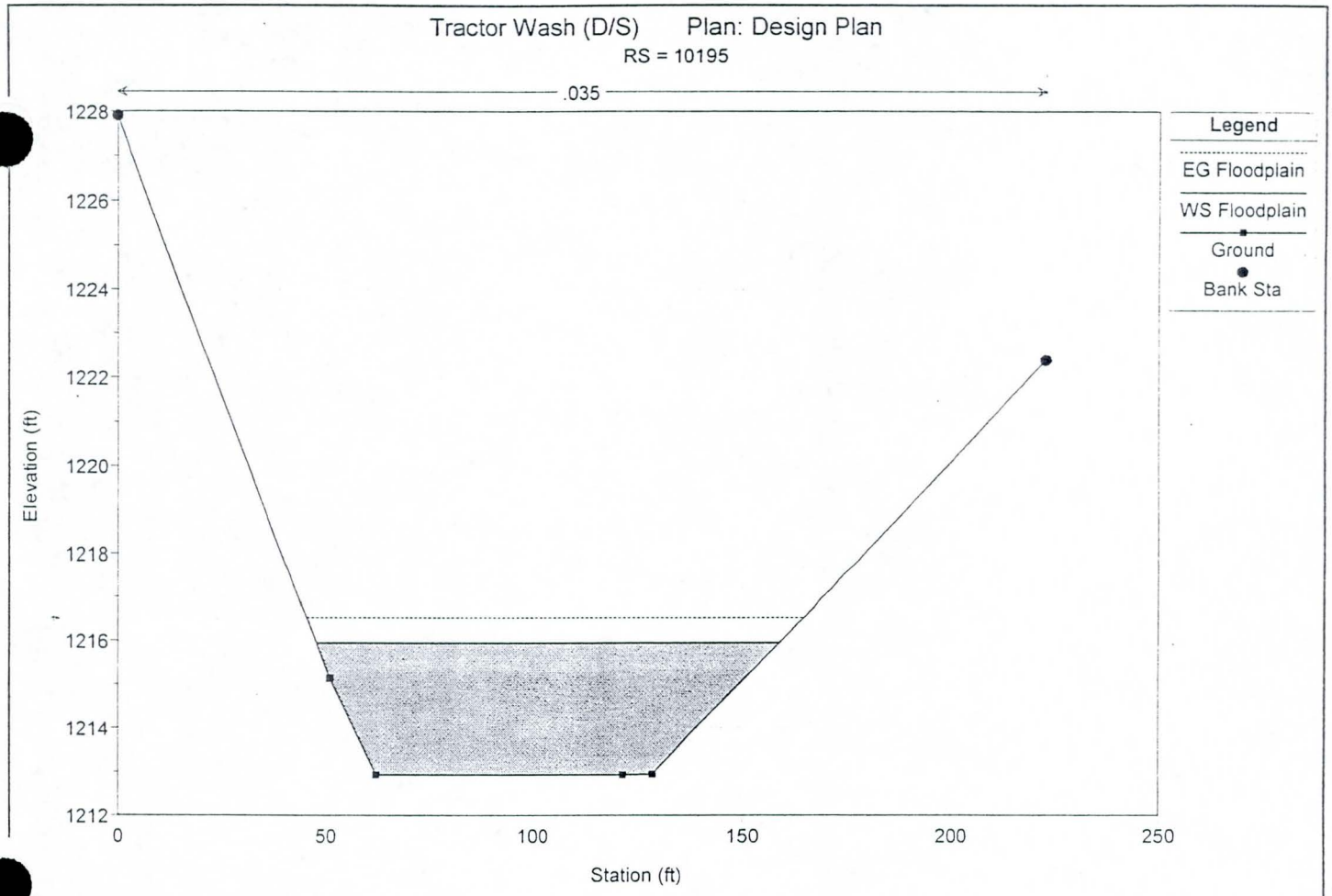

Tractor Wash (D/S) Plan: Design Plan
RS = 11000.34
.07
.035
.07
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
1250
1245
1240
1235
1230
1225
1220
9800
9850
9900
9950
10000
10050
Station (ft)

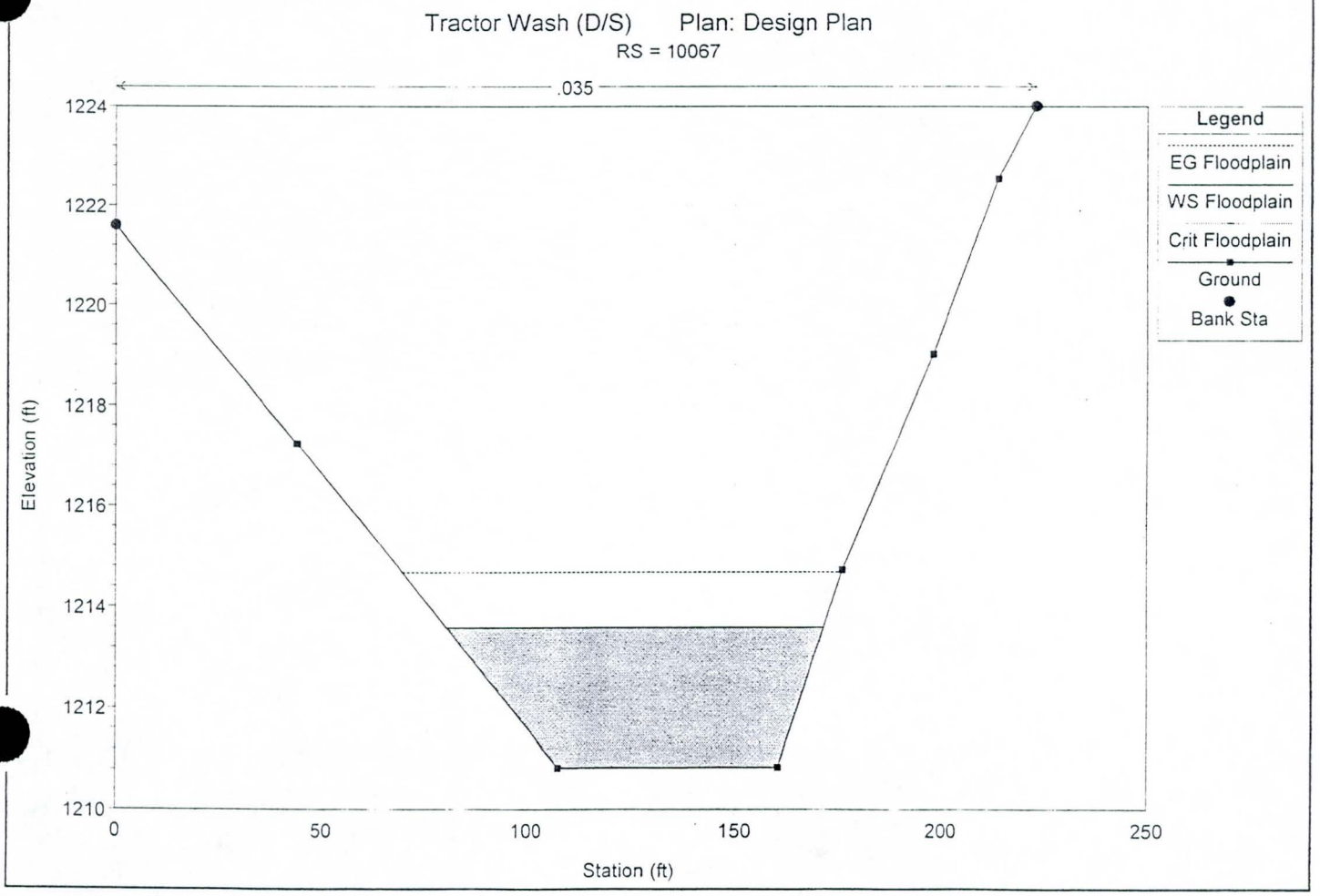

Tractor Wash (D/S) Plan: Design Plan
RS = 11000.30
.035
.035
.035
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
1234
1232
1230
1228
1226
1224
1222
1220
0
20
40
60
80
100
120
Station (ft)

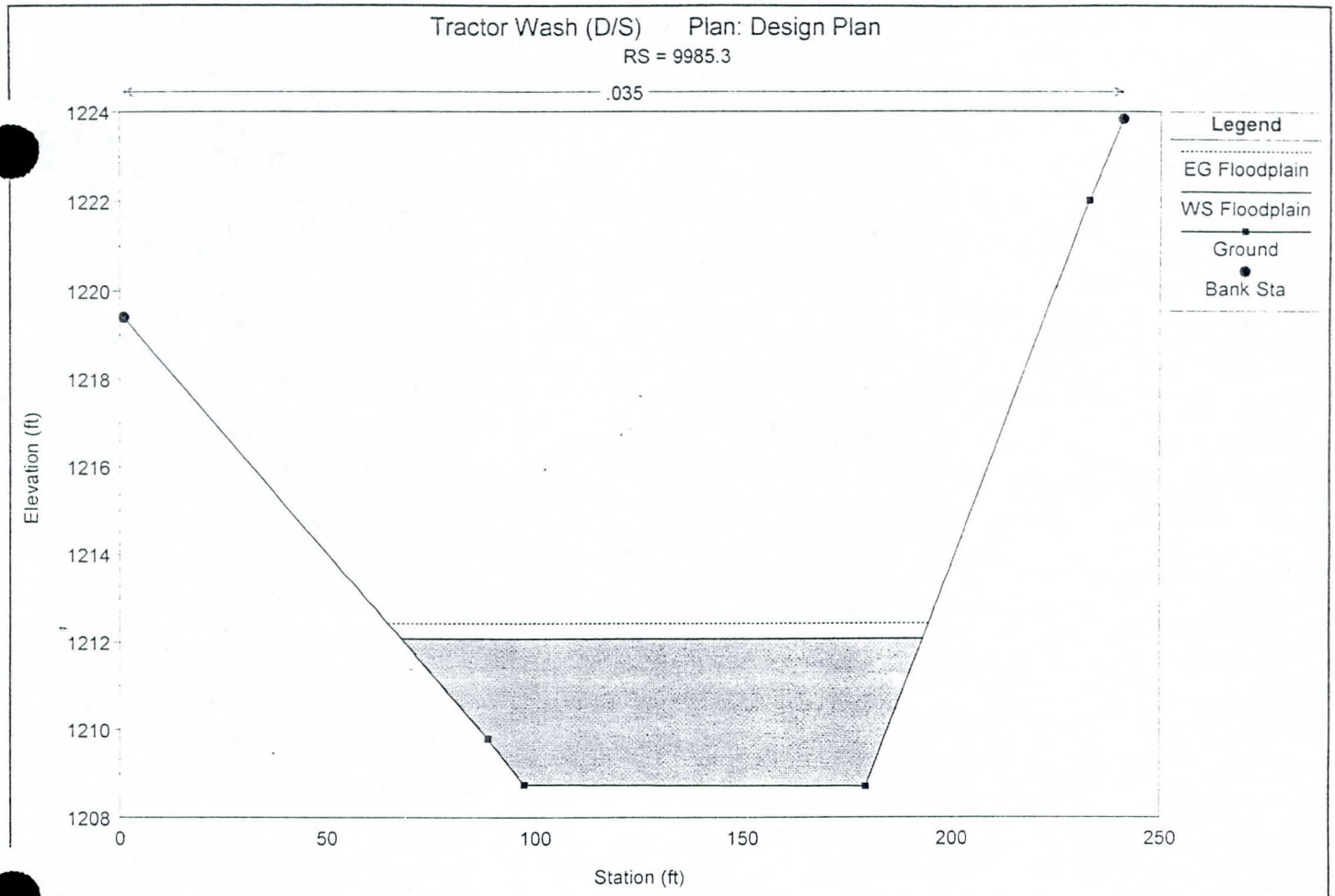

Tractor Wash (D/S) Plan: Design Plan
RS = 10564
.035
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
1234
1232
1230
1228
1226
1224
1222
1220
1218
0
20
40
60
80
100
120
140
160
180
Station (ft)

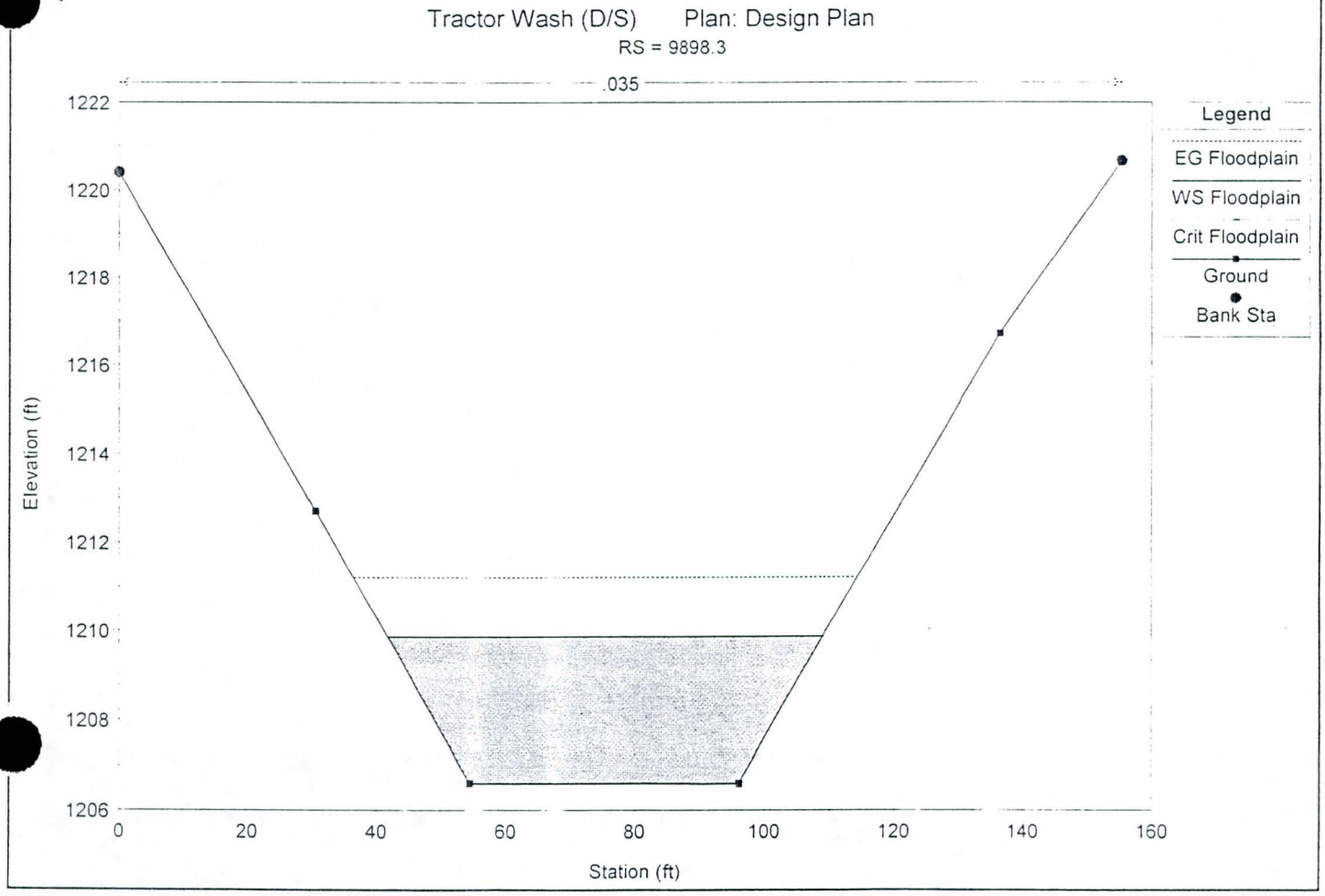

Tractor Wash (D/S) Plan: Design Plan
RS = 10458
.035
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
1228
1226
1224
1222
1220
1218
1216
0
50
100
150
200
250
Station (ft)

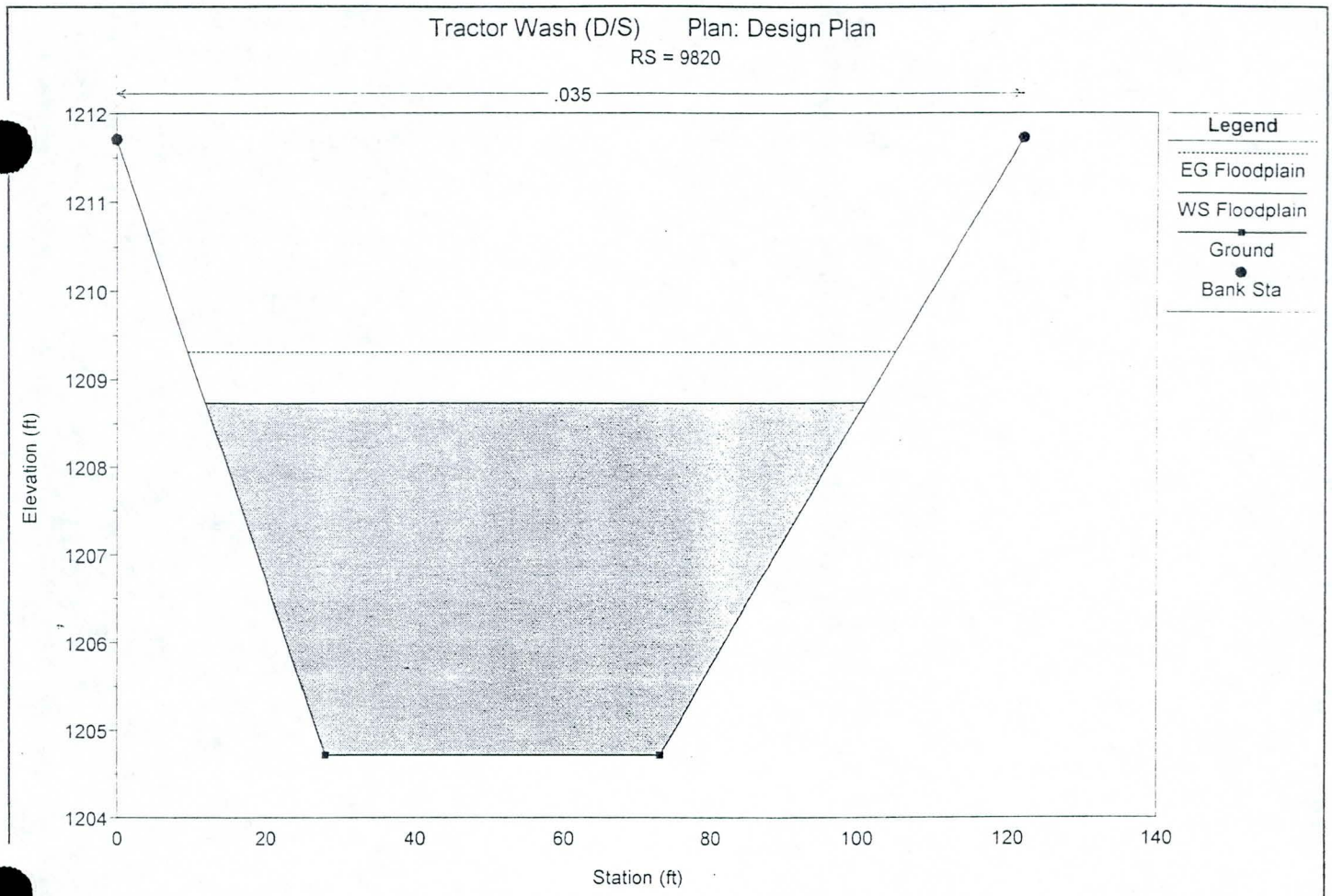

Tractor Wash (D/S) Plan: Design Plan
RS = 10325
.035
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
1230
1228
1226
1224
1222
1220
1218
1216
1214
0
50
100
150
200
250
Station (ft)

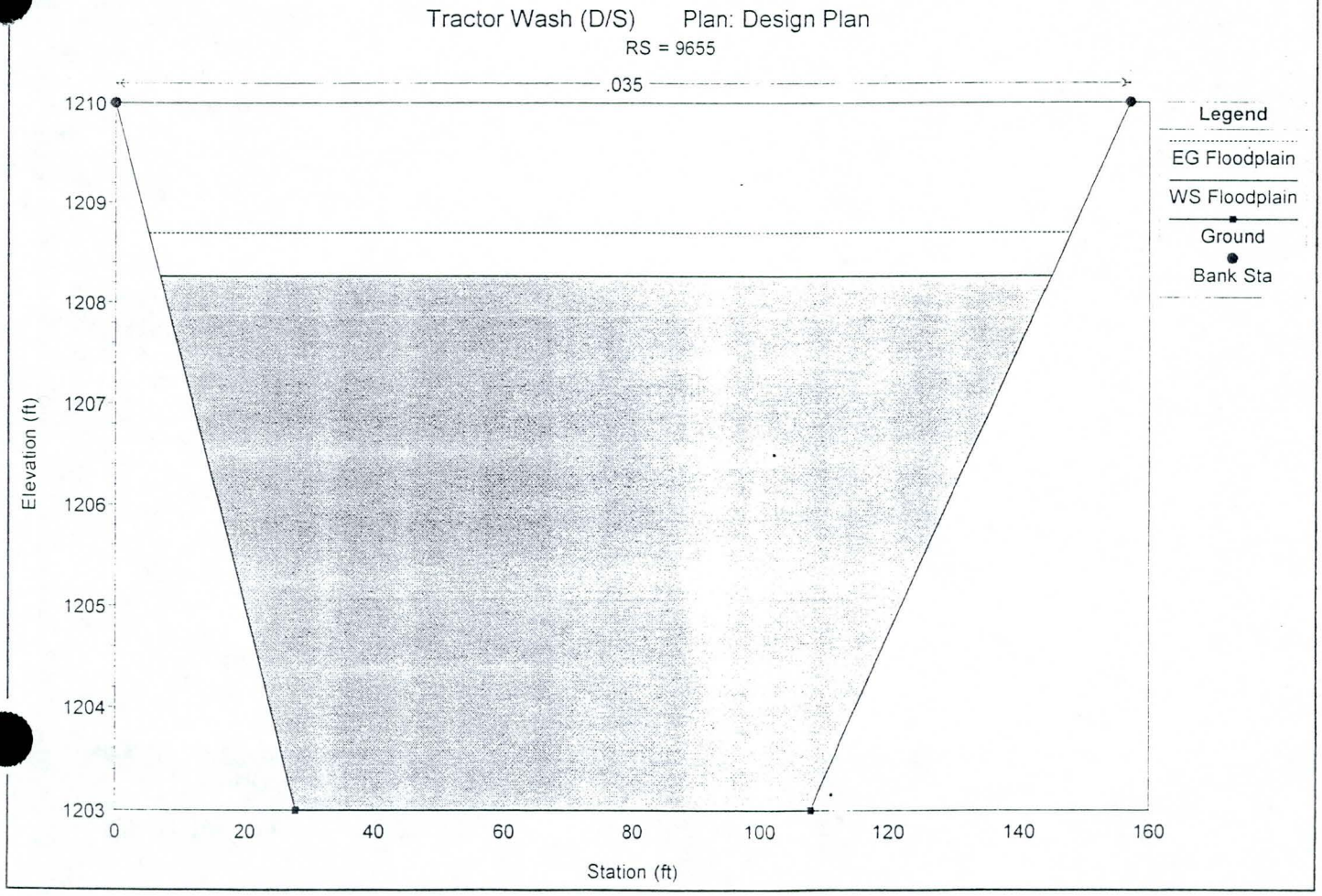

Tractor Wash (D/S) Plan: Design Plan
RS = 10195
.035
Legend
EG Floodplain
WS Floodplain
Ground
Bank Sta
Elevation (ft)
1228
1226
1224
1222
1220
1218
1216
1214
1212
0
50
100
150
200
250
Station (ft)

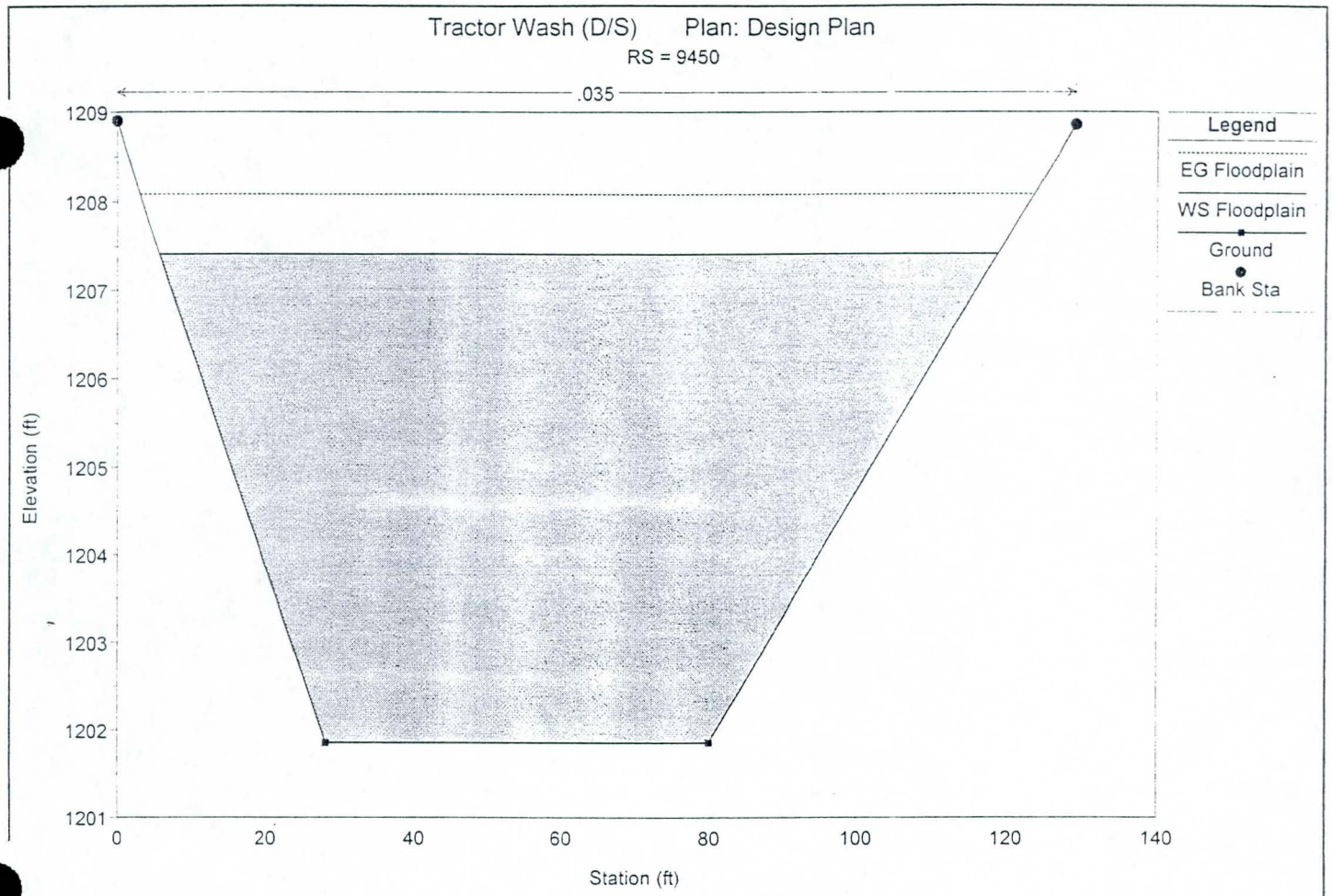

Tractor Wash (D/S) Plan: Design Plan
RS = 10067
.035
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
1224
1222
1220
1218
1216
1214
1212
1210
0
50
100
150
200
250
Station (ft)

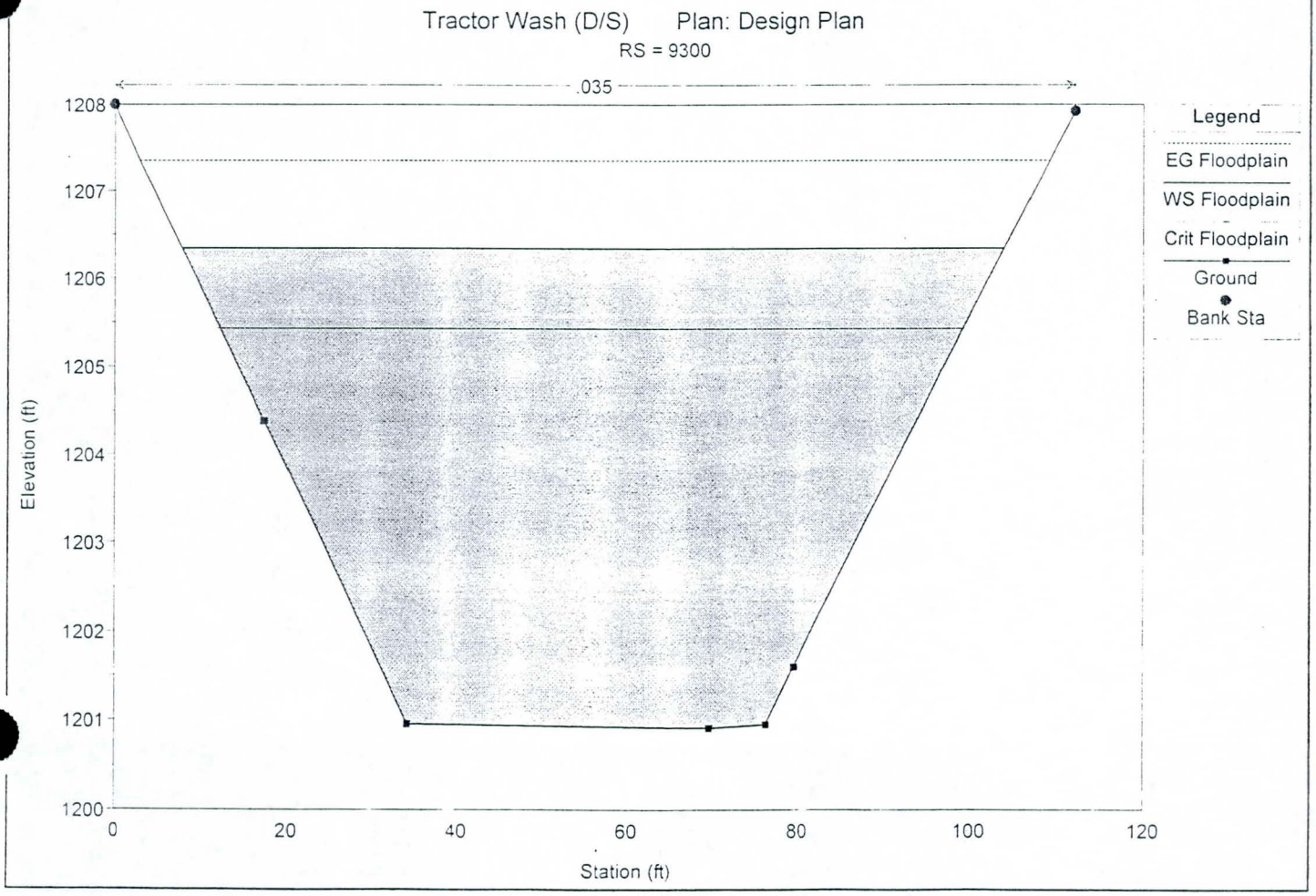

Tractor Wash (D/S) Plan: Design Plan
RS = 9985.3
.035
Legend
EG Floodplain
WS Floodplain
Ground
Bank Sta
Elevation (ft)
Station (ft)
1224
1222
1220
1218
1216
1214
1212
1210
1208
0
50
100
150
200
250

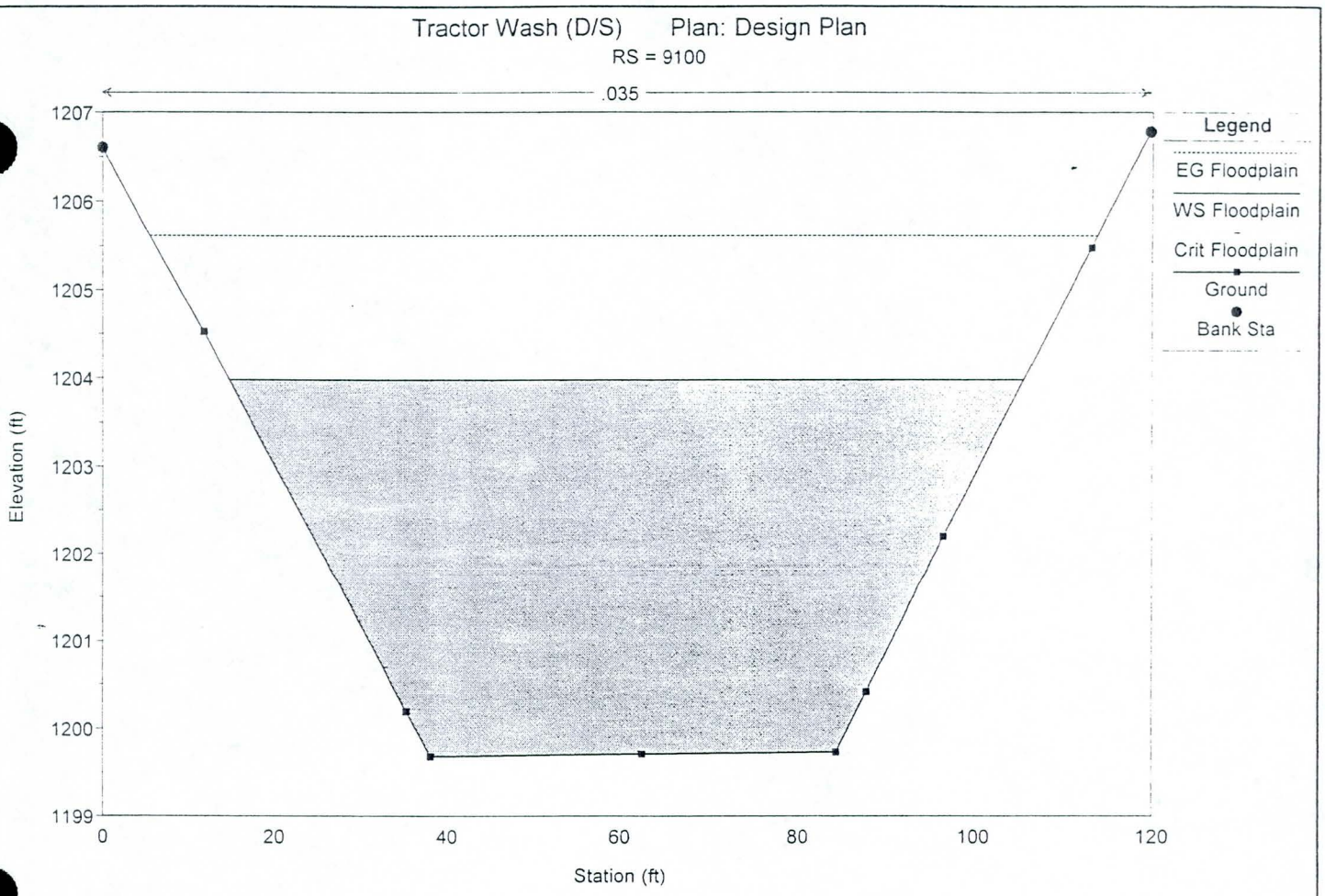

Tractor Wash (D/S) Plan: Design Plan
RS = 9898.3
.035
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
Station (ft)
1222
1220
1218
1216
1214
1212
1210
1208
1206
0
20
40
60
80
100
120
140
160


Tractor Wash (D/S) Plan: Design Plan
RS = 9820
.035
Legend
EG Floodplain
WS Floodplain
Ground
Bank Sta
Elevation (ft)
Station (ft)
1212
1211
1210
1209
1208
1207
1206
1205
1204
0
20
40
60
80
100
120
140


Tractor Wash (D/S) Plan: Design Plan
RS = 9655
.035
Legend
EG Floodplain
WS Floodplain
Ground
Bank Sta
Elevation (ft)
Station (ft)
1210
1209
1208
1207
1206
1205
1204
1203
0
20
40
60
80
100
120
140
160


Tractor Wash (D/S) Plan: Design Plan
RS = 9450
.035
Legend
EG Floodplain
WS Floodplain
Ground
Bank Sta
Elevation (ft)
1209
1208
1207
1206
1205
1204
1203
1202
1201
0
20
40
60
80
100
120
140
Station (ft)


Tractor Wash (D/S) Plan: Design Plan
RS = 9300
.035
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
1208
1207
1206
1205
1204
1203
1202
1201
1200
0
20
40
60
80
100
120
Station (ft)


Tractor Wash (D/S) Plan: Design Plan
RS = 9100
.035
Legend
EG Floodplain
WS Floodplain
Crit Floodplain
Ground
Bank Sta
Elevation (ft)
1207
1206
1205
1204
1203
1202
1201
1200
1199
0
20
40
60
80
100
120
Station (ft)

Appendix C2
Cross Section Stations Relationships between Effective FIS Models and Post-Project Models

Cross Section Stations Relationships between Effective FIS Models and Post-Project Models

Wash Name	Post-Project Model Station	Effective FIS Model Station
Tuthill Dike Wash	1.710	1.710
	1.805	1.805
	1.898	1.898
	1.994	1.994
	3700	2.089
	3900	2.126
	4100	2.164
	4300	2.202
	4500	2.240
	4700	2.278
	4900	2.316
	5100	2.353
	5300	2.392
	5500	2.430
	5700	2.468
	5900	2.504
	6100	2.544
	6300	2.581
	6500	2.620
	6700	2.658
	6900	2.696
	7100	2.734
	7300	2.771
	7500	2.809
	7700	2.848
	7900	2.885
	8100	2.924
	8300	2.962
	8500	3.000
	8700	3.038
	8900	3.076
	9100	3.114
	9300	3.153
	9450	3.181
	9655	3.219
	10003.26	3.265
	10003.27	3.284
	10003.30	3.306
	10003.31	3.311
	10003.32	3.313
	10003.34	3.344
	10003.43	3.439
	10003.53	3.535
	10003.63	3.631
	10003.72	3.724

Cross Section Stations Relationships between Effective FIS Models and Post-Project Models

Wash Name	Post-Project Model Station	Effective FIS Model Station
Tractor Wash (D/S)	9100	N/A
	9300	N/A
	9450	N/A
	9655	N/A
	9820	0.003
	9898.30	0.041
	9985.30	0.075
	10067	0.113
	10195	0.151
	10325	0.189
	10458	0.227
	10564	0.265
	11000.30	0.303
	11000.34	0.347
	11000.38	0.389
	11000.45	0.455
	11000.50	0.504

Appendix D
Erosion and Sediment Transport Computation Sheets

Appendix D1
Equilibrium Slope Computations

Appendix D2
Bend Scour Computations

Appendix D3
Sill Scour Computations

Appendix D4
Bed-Form Troughs Estimation

Appendix D1
Equilibrium Slope Computations

Equilibrium Slope Computation Sheet

Reference: ADWR, Design Manual for Engineering Analysis of Fluvial Systems, 1985. -

Calculation: Total Bed-Material Discharge. **Application:** Sand-Bed Channels.

Project Name: Whitestone - Tuthill Wash **Section Name:** 100 - 4300

Sediment Transport Equation

Zeller and Fullerton (1983) developed the following equation based on the Empirical Power Relationship $qs = aY_h^b V^c$ by Simons, Li, and Fullerton (1981):

$$qs = \frac{0.0064\, n^{1.77} V^{4.32} G^{0.45}}{Y_h^{0.30} D_{50}^{0.61}}$$

Where: q_s = bed-material discharge in cfs per unit width;
n = Manning's roughness coefficient;
V = mean velocity (ft/s);
G = gradation coefficient = $0.5(D_{84}/D_{50}+D_{50}/D_{16})$;
Y_h = hydraulic depth (ft);
D_{50} = median diameter (mm).

Input Data - 10-year Flow

Q =	2320	(cfs)	D_{50} =	0.6	(mm)
n =	0.035		D_{84} =	6	(mm)
Y_h =	2.34	(ft)	D_{16} =	0.08	(mm)
V =	6.21	(ft/s)	G =	8.75	
B =	149.98	(ft)	r_s =	165.4	(lb/ft^3)

Computed Sediment Discharge

q_s =	**0.12672**	**(cfs/ft)**
Q_s =	**19.01**	**(cfs)**
c =	**21253**	**(ppm by weight)**
Se =	**0.00691**	**(Equilibrium slope)**

Equilibrium Slope Computation Sheet

Reference: ADWR, Design Manual for Engineering Analysis of Fluvial Systems, 1985.

Calculation: Total Bed-Material Discharge. **Application:** Sand-Bed Channels.

Project Name: Whitestone - Tuthill Wash **Section Name:** 4300 - 6900

Sediment Transport Equation

Zeller and Fullerton (1983) developed the following equation based on the Empirical Power Relationship $qs = aY_h^b V^c$ by Simons, Li, and Fullerton (1981):

$$qs = \frac{0.0064\, n^{1.77} V^{4.32} G^{0.45}}{Y_h^{0.30} D_{50}^{0.61}}$$

Where: q_s = bed-material discharge in cfs per unit width;
n = Manning's roughness coefficient;
V = mean velocity (ft/s);
G = gradation coefficient = $0.5(D_{84}/D_{50}+D_{50}/D_{16})$;
Y_h = hydraulic depth (ft);
D_{50} = median diameter (mm).

Input Data - 10-year Flow

Q =	2320	(cfs)	D_{50} =	0.6	(mm)
n =	0.035		D_{84} =	6	(mm)
Y_h =	2.80	(ft)	D_{16} =	0.08	(mm)
V =	6.16	(ft/s)	G =	8.75	
B =	122.32	(ft)	r_s =	165.4	(lb/ft^3)

Computed Sediment Discharge

q_s =	**0.11647**	**(cfs/ft)**
Q_s =	**14.25**	**(cfs)**
c =	**16016**	**(ppm by weight)**
Se =	**0.00538**	**(Equilibrium slope)**

Equilibrium Slope Computation Sheet

Reference: ADWR, Design Manual for Engineering Analysis of Fluvial Systems, 1985.

Calculation: Total Bed-Material Discharge. **Application:** Sand-Bed Channels.

Project Name: Whitestone - Tuthill Wash **Section Name:** 6900 - 9655

Sediment Transport Equation

Zeller and Fullerton (1983) developed the following equation based on the Empirical Power Relationship $qs = aY_h^b V^c$ by Simons, Li, and Fullerton (1981):

$$qs = \frac{0.0064\, n^{1.77} V^{4.32} G^{0.45}}{Y_h^{0.30} D_{50}^{0.61}}$$

Where: q_s = bed-material discharge in cfs per unit width;
n = Manning's roughness coefficient;
V = mean velocity (ft/s);
G = gradation coefficient = $0.5(D_{84}/D_{50}+D_{50}/D_{16})$;
Y_h = hydraulic depth (ft);
D_{50} = median diameter (mm).

Input Data - 10-year Flow

Q =	1130	(cfs)	D_{50} =	0.6	(mm)
n =	0.035		D_{84} =	6	(mm)
Y_h =	2.60	(ft)	D_{16} =	0.08	(mm)
V =	5.77	(ft/s)	G =	8.75	
B =	62.50	(ft)	r_s =	165.4	(lb/ft^3)

Computed Sediment Discharge

q_s =	0.08951	(cfs/ft)
Q_s =	5.59	(cfs)
c =	12954	(ppm by weight)
Se =	0.00522	(Equilibrium slope)

Equilibrium Slope Computation Sheet

Reference: ADWR, Design Manual for Engineering Analysis of Fluvial Systems, 1985.

Calculation: Total Bed-Material Discharge. **Application:** Sand-Bed Channels.

Project Name: Whitestone - Tuthill Wash **Section Name:** 9655 - 10900

Sediment Transport Equation

Zeller and Fullerton (1983) developed the following equation based on the Empirical Power Relationship $qs = aY_h^b V^c$ by Simons, Li, and Fullerton (1981):

$$qs = \frac{0.0064\, n^{1.77} V^{4.32} G^{0.45}}{Y_h^{0.30} D_{50}^{0.61}}$$

Where: q_s = bed-material discharge in cfs per unit width;
n = Manning's roughness coefficient;
V = mean velocity (ft/s);
G = gradation coefficient = $0.5(D_{84}/D_{50}+D_{50}/D_{16})$;
Y_h = hydraulic depth (ft);
D_{50} = median diameter (mm).

Input Data - 10-year Flow

Q =	610	(cfs)	D_{50} =	0.6	(mm)
n =	0.035		D_{84} =	6	(mm)
Y_h =	1.74	(ft)	D_{16} =	0.08	(mm)
V =	5.81	(ft/s)	G =	8.75	
B =	53.00	(ft)	r_s =	165.4	(lb/ft^3)

Computed Sediment Discharge

q_s =	**0.10435**	**(cfs/ft)**
Q_s =	**5.53**	**(cfs)**
c =	**23468**	**(ppm by weight)**
Se =	**0.0185**	**(Equilibrium slope)**

Appendix D2
Bend Scour Computations

Bend Scour Calculation Sheet

Reference: ADWR, Design Manual for Engineering Analysis of Fluvial Systems, 1985. p5.105-5.110

Project Name: Whitestone - Tractor Wash Section Name: 98+20

Scour Depth Equation:

$Zbs = (0.0685*Y*V^{0.8})[2.1*(\sin^2(a/2)/\cos(a))^{0.2}-1]/(Yh^{0.4}*Se^{0.3})$

Where Zbs = bend scour component of total scour depth (ft)
V = mean velocity of upstream flow (fps)
Y = maximum depth of upstream flow (ft)
Yh = hydraulic depth of upstream flow (ft)
Se = upstream energy slope (bed slope for uniform flow conditions, ft/ft)
a = angle formed by the projection of the channel centerline from the point of curvature to a point which meets a line tangent to the outer bank of the channel (degrees)

Scour Length Equation

$X = 2.3*(C/g^{0.5})*Y$

Where X = distance from the end of channel curvature (point of tangency, P.T.) to the downstream point at which secondary currents have dissipated (ft)
C = Chezy coefficient = $1.486*R^{(1/6)}/n$
g = gravitational acceleration (32.2 ft/s²)
Y = depth of flow (to be conservative, use maximum depth of flow, exclusive of scour, within the bend) (ft)

Input Data

V =	6.11	(ft/s)	n =	0.035	
Y =	4.02	(ft)	A =	269.68	(ft²)
Yh =	3.02	(ft)	P =	90.02	(ft)
Se =	0.0048		R =	3.00	(ft)
a =	40	(degree)	C =	50.98	
			Stable bank side slope =	4	(H:V)

Computed Scour Values

Scour Depth:		Scour Length:		Scour Width:	
Zbs =	1.65 (ft)	**X =**	83 (ft)	**W =**	6.6 (ft)

Appendix D3
Sill Scour Computations

Local Scour Computation Sheet

Reference: US Department of the Interior Bureau of Reclamation, January 1984 Computing Degradation and Local Scour.

Application: Natural channel for restrictions and bends (Type A) and bankline structures (Type B). Examples - siphon crossing or any buried pipeline, stability study of a natural bank, waterway for one-span bridge, abutments to bridge, bank slope protection such as riprap, spur dikes, groins, pumping plants, and canal headworks.

Equations:

1. USBR (Abbott, 1963): Ds = K*(Q/B)^0.24 (0.5 mm <D50<0.7 mm)
2. Neill (1973): Ds = Z1*Df = Z1*Di*(Qf/Qi)^m
3. Lacey (1930): Ds = Z2*Dm = Z2*0.47*(Q/f)^(1/3)
4. Blench (1969): Ds = Z3*Dfo = Z3*Qf^(2/3)/Fbo^(1/3)
5. Competent Vel: Ds = Dm*(Vm/Vc - 1)

Where: K = 2.45; Q = design flow (cfs); B = channel width (ft);
Z1 = Neill Eq. factor; Z2 = Lacey Eq. factor;
Z3 = Blench Eq. factor, Z1, Z2, and Z3 from Table 7 (p.36);
Di = average depth at bankfull flow (Qb) (ft);
Qf = Q/B (cfs/ft); Qi = Qb/B (cfs/ft);
m = 0.67 for sand to 0.85 for coarse gravel;
f = 1.76*D50^0.5, D50 (mm);
Fbo = zero bed factor from Figure 9 (p.35);
Dm = mean flow depth (ft), Vm = mean velocity (fps);
Vc = competent mean velocity (fps) from Table 8 (p.38).

Project Name: Whitestone - Tuthill Wash **Location:** 100 - 4300

Input Data:

Q =	6250	cfs	B =	181.1	ft
Z1 =	0.6		Z2 =	0.5	
Z3 =	0.6		Di =	1.86	ft
Qb =	2320	cfs	D50 =	0.6	mm
Dm =	3.25	ft	Vm =	10.4	fps
Vc =	3	fps	Fbo =	3	
m =	0.67		D85 =	6	mm

Results:

1. USBR (Abbott, 1963):	Ds =	5.73	ft
2. Neill (1973):	Ds =	2.17	ft
3. Lacey (1930):	Ds =	3.90	ft
4. Blench (1969):	Ds =	4.41	ft
5. Competent Vel:	Ds =	8.02	ft
Average Scour Depth	=	4.85	ft
Recommended Scour Depth =		**5.00**	**ft**

Local Scour Computation Sheet

Reference: US Department of the Interior Bureau of Reclamation, January 1984 Computing Degradation and Local Scour.

Application: Natural channel for restrictions and bends (Type A) and bankline structures (Type B). Examples - siphon crossing or any buried pipeline, stability study of a natural bank, waterway for one-span bridge, abutments to bridge, bank slope protection such as riprap, spur dikes, groins, pumping plants, and canal headworks.

Equations:

1. USBR (Abbott, 1963): Ds = K*(Q/B)^0.24 (0.5 mm <D50<0.7 mm)
2. Neill (1973): Ds = Z1*Df = Z1*Di*(Qf/Qi)^m
3. Lacey (1930): Ds = Z2*Dm = Z2*0.47*(Q/f)^(1/3)
4. Blench (1969): Ds = Z3*Dfo = Z3*Qf^(2/3)/Fbo^(1/3)
5. Competent Vel: Ds = Dm*(Vm/Vc - 1)

Where: K = 2.45; Q = design flow (cfs); B = channel width (ft);
Z1 = Neill Eq. factor; Z2 = Lacey Eq. factor;
Z3 = Blench Eq. factor, Z1, Z2, and Z3 from Table 7 (p.36);
Di = average depth at bankfull flow (Qb) (ft);
Qf = Q/B (cfs/ft); Qi = Qb/B (cfs/ft);
m = 0.67 for sand to 0.85 for coarse gravel;
f = 1.76*D50^0.5, D50 (mm);
Fbo = zero bed factor from Figure 9 (p.35);
Dm = mean flow depth (ft), Vm = mean velocity (fps);
Vc = competent mean velocity (fps) from Table 8 (p.38).

Project Name: Whitestone - Tuthill Wash **Location:** 4300 - 6900

Input Data:

Q =	6250	cfs	B =	149.8	ft
Z1 =	0.6		Z2 =	0.5	
Z3 =	0.6		Di =	2.15	ft
Qb =	2320	cfs	D50 =	0.6	mm
Dm =	3.25	ft	Vm =	11.1	fps
Vc =	3	fps	Fbo =	3	
m =	0.67		D85 =	6	mm

Results:

1. USBR (Abbott, 1963):	Ds =	6.00	ft
2. Neill (1973):	Ds =	2.51	ft
3. Lacey (1930):	Ds =	3.90	ft
4. Blench (1969):	Ds =	5.01	ft
5. Competent Vel:	Ds =	8.78	ft
Average Scour Depth	=	5.24	ft
Recommended Scour Depth =		**5.50**	**ft**

Local Scour Computation Sheet

Reference: US Department of the Interior Bureau of Reclamation, January 1984 Computing Degradation and Local Scour.

Application: Natural channel for restrictions and bends (Type A) and bankline structures (Type B). Examples - siphon crossing or any buried pipeline, stability study of a natural bank, waterway for one-span bridge, abutments to bridge, bank slope protection such as riprap, spur dikes, groins, pumping plants, and canal headworks.

Equations:

1. USBR (Abbott, 1963): Ds = K*(Q/B)^0.24 (0.5 mm <D50<0.7 mm)
2. Neill (1973): Ds = Z1*Df = Z1*Di*(Qf/Qi)^m
3. Lacey (1930): Ds = Z2*Dm = Z2*0.47*(Q/f)^(1/3)
4. Blench (1969): Ds = Z3*Dfo = Z3*Qf^(2/3)/Fbo^(1/3)
5. Competent Vel: Ds = Dm*(Vm/Vc - 1)

Where: K = 2.45; Q = design flow (cfs); B = channel width (ft);
Z1 = Neill Eq. factor; Z2 = Lacey Eq. factor;
Z3 = Blench Eq. factor, Z1, Z2, and Z3 from Table 7 (p.36);
Di = average depth at bankfull flow (Qb) (ft);
Qf = Q/B (cfs/ft); Qi = Qb/B (cfs/ft);
m = 0.67 for sand to 0.85 for coarse gravel;
f = 1.76*D50^0.5, D50 (mm);
Fbo = zero bed factor from Figure 9 (p.35);
Dm = mean flow depth (ft), Vm = mean velocity (fps);
Vc = competent mean velocity (fps) from Table 8 (p.38).

Project Name: Whitestone - Tuthill Wash **Location:** 6900 - 10900

Input Data:

Q =	3050	cfs	B =	105.7	ft
Z1 =	0.6		Z2 =	0.5	
Z3 =	0.6		Di =	2.49	ft
Qb =	1130	cfs	D50 =	0.6	mm
Dm =	3.25	ft	Vm =	7.3	fps
Vc =	3	fps	Fbo =	3	
m =	0.67		D85 =	6	mm

Results:

1. USBR (Abbott, 1963):	Ds =	5.49	ft
2. Neill (1973):	Ds =	2.91	ft
3. Lacey (1930):	Ds =	3.07	ft
4. Blench (1969):	Ds =	3.92	ft
5. Competent Vel:	Ds =	4.66	ft
Average Scour Depth	=	4.01	ft
Recommended Scour Depth =		**4.00**	**ft**

Appendix D4
Bed-Form Troughs Estimation

Bed-Form Trough Computation Sheet

Reference: ADWR, Design Manual for Engineering Analysis of Fluvial Systems, 1985.

Project Name: Whitestone - Tuthill **Section Name:** 100 - 4300

Depth of Antidune Troughs

Kennedy (1963) developed the following equation based on laboratory flume studies to estimate the maximum depth of antidune troughs (below the existing channel bed)

$$Da = 0.0135v^2$$

Where: Da = depth of antidune trough (ft);
v = mean velocity of the channel (ft/s).

Depth of Dune Height

Simons and Senturk (1977) developed the following relationship to estimate the depth of dune height.

$$\log(Yh) = 0.8271\log(Hd) + 0.8901$$

Where: Hd = depth of dune height (m);
Yh = hydraulic depth (m).

Input Data - 100-year Flow

Q =	6250	(cfs)	v =	10.36 (ft/s)
Yh =	3.33	(ft)		

Computed Depths

Da =	1.45	(ft)
Dd=Hd/2 =	0.14	(ft)

Recomended Value = 1.45 (ft) (greater of Da and Dd)

Bed-Form Trough Computation Sheet

Reference: ADWR, Design Manual for Engineering Analysis of Fluvial Systems, 1985.

Project Name: Whitestone - Tuthill **Section Name:** 4300 - 6900

Depth of Antidune Troughs

Kennedy (1963) developed the following equation based on laboratory flume studies to estimate the maximum depth of antidune troughs (below the existing channel bed)

$$Da = 0.0135v^2$$

Where: Da = depth of antidune trough (ft);
v = mean velocity of the channel (ft/s).

Depth of Dune Height

Simons and Senturk (1977) developed the following relationship to estimate the depth of dune height.

$$\log(Yh) = 0.8271\log(Hd) + 0.8901$$

Where: Hd = depth of dune height (m);
Yh = hydraulic depth (m).

Input Data - 100-year Flow

Q =	6250	(cfs)	v =	11.07 (ft/s)
Yh =	3.77	(ft)		

Computed Depths

Da =	1.65	(ft)
Dd=Hd/2 =	0.16	(ft)

Recomended Value = 1.65 (ft) (greater of Da and Dd)

Bed-Form Trough Computation Sheet

Reference: ADWR. Design Manual for Engineering Analysis of Fluvial Systems. 1985.

Project Name: Whitestone - Tuthill **Section Name:** 6900 - 9655

Depth of Antidune Troughs

Kennedy (1963) developed the following equation based on laboratory flume studies to estimate the maximum depth of antidune troughs (below the existing channel bed)

$$Da = 0.0135v^2$$

Where: Da = depth of antidune trough (ft);
v = mean velocity of the channel (ft/s).

Depth of Dune Height

Simons and Senturk (1977) developed the following relationship to estimate the depth of dune height.

$$\log(Yh) = 0.8271\log(Hd) + 0.8901$$

Where: Hd = depth of dune height (m);
Yh = hydraulic depth (m).

Input Data - 100-year Flow

Q =	3050	(cfs)	v =	7.27	(ft/s)
Yh =	3.97	(ft)			

Computed Depths

Da =	0.71	(ft)
Dd=Hd/2 =	0.17	(ft)

Recomended Value = 0.71 (ft) (greater of Da and Dd)

Bed-Form Trough Computation Sheet

Reference: ADWR. Design Manual for Engineering Analysis of Fluvial Systems, 1985.

Project Name: Whitestone - Tuthill **Section Name:** 9655 - 10900

Depth of Antidune Troughs

Kennedy (1963) developed the following equation based on laboratory flume studies to estimate the maximum depth of antidune troughs (below the existing channel bed)

$$Da = 0.0135v^2$$

Where: Da = depth of antidune trough (ft);
v = mean velocity of the channel (ft/s).

Depth of Dune Height

Simons and Senturk (1977) developed the following relationship to estimate the depth of dune height.

$$\log(Yh) = 0.8271\log(Hd) + 0.8901$$

Where: Hd = depth of dune height (m);
Yh = hydraulic depth (m).

Input Data - 100-year Flow

Q =	1650	(cfs)	v =	8.17 (ft/s)
Yh =	2.10	(ft)		

Computed Depths

Da =	0.90	(ft)
Dd=Hd/2 =	0.08	(ft)

Recomended Value = 0.90 (ft) (greater of Da and Dd)

EXHIBITS

Exhibit A Existing Floodplain Maps

Exhibit B Proposed Construction Plans

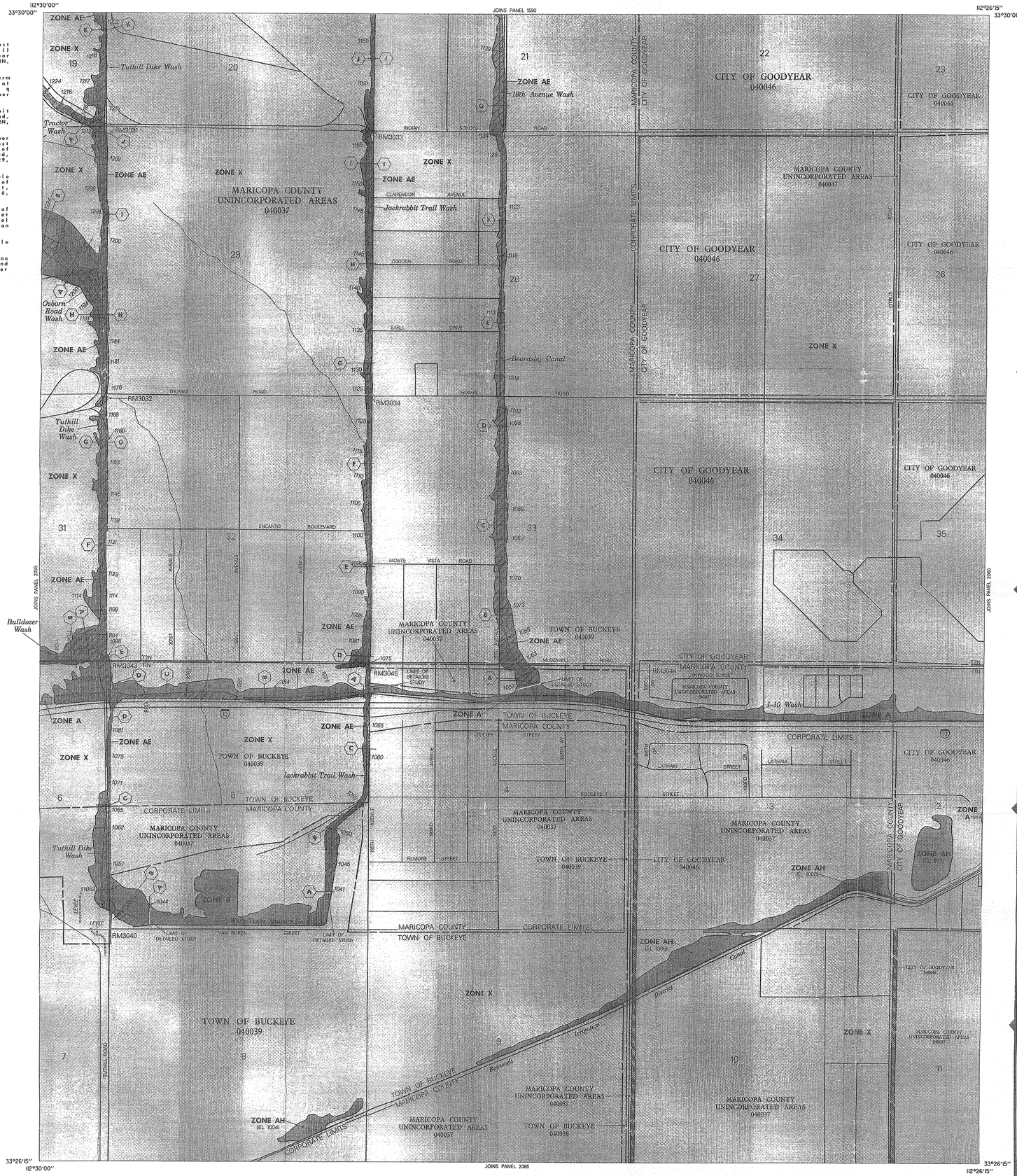
Exhibit C Study Work Maps

Exhibit D Annotated FIRM Panels

Exhibit A Existing Floodplain Maps

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
RM3031	1218.28	3-inch aluminum cap at southeast corner of intersection of Tuthill and Indian School Roads, near southwest corner section 20, T2N, R2W.
RM3032	1176.94	3-inch aluminum cap in top of berm on west side of Tuthill Road at intersection of road to southwest a 200 feet south of northwest corner section 32, T2N, R2W.
RM3033	1160.26	Brass cap in handhole, Jackrabbit Trail and Indian School Road, southeast corner section 20, T2N, R2W.
RM3034	1125.07	40d nail in southwest face of power pole (PS 177171) at northeast corner of intersection of Jackrabbit Trail and Thomas Road, near southeast corner section 29, T2N, R2W.
RM3040	1044.61	Cotton picker spindle in power pole southeast corner of intersection of Tuthill Road and Van Buren Street, near southeast corner section 6, T1N, R2W.
RM3043	1100.43	3-inch iron pipe at center of pavement on McDowell Road a 25 feet east of barricade at flood control channel, southwest corner section 31, T2N, R2W.
RM3044	1051.34	Brass cap in handhole, Perryville and McDowell Roads.
RM3045	1079.43	Brass cap in handhole at centerline intersection of McDowell Road and Jackrabbit Trail, southwest corner section 33, T2N, R2W.



LEGEND

To obtain more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations and therefore may not exactly reflect the flood elevation data presented in the FIS. BFEs shown on the FIRM are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

ERM elevations listed on this map were obtained and/or developed to establish vertical control for determination of flood elevations and floodplain boundaries portrayed on this map. Users should be aware that these ERM elevations may have changed since the publication of this map. To obtain up-to-date elevation information on National Geodetic Survey (NGS) ERMs shown on this map, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their website at www.ngs.noaa.gov. Map users should seek verification of non-NGS ERM monument elevations when using these elevations for construction or floodplain management purposes.

Coastal BFE's shown on this map may apply only landward of 0.0' NGVD. Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this community. Elevations shown in the Summary of Stillwater Elevations table should be used for construction, and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

ZONE A No base flood elevations determined.

ZONE AE Base flood elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE A99 To be protected from 100-year flood by Federal flood protection system under construction; no base flood elevations determined.

ZONE V Coastal flood with velocity hazard (wave action); no base flood elevations determined.

ZONE VE Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

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

OTHER AREAS

ZONE X Areas determined to be outside 500-year floodplain.

ZONE D Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS

Identified 1983 | Identified 1990 | Otherwise Protected Areas

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

Floodplain Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.

513 — Base Flood Elevation Line; Elevation in Feet. See Map Index for Elevation Datum.

D D — Cross Section Line

(EL 987) — Base Flood Elevation in Feet Where Uniform Within Zone. See Map Index for Elevation Datum.

RM7 — Elevation Reference Mark

M2 — River Mile

97°07'30", 32°22'30" — Horizontal Coordinates Based on North American Datum of 1927 (NAD 27) Projection.

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for more detailed data on BFE's, and for any information on floodway delineations, prior to use of this map for property purchase or construction purposes.

Areas of Special Flood Hazard (100-year flood) include Zones A, AE, AH, AO, AH, AO, A99, V, VE and V1-V30.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

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

Floodway widths in some areas may be too narrow to show to scale. Refer to Floodway Data Table where floodway width is shown at 1/20 inch.

Corporate limits shown are current as of the date of this map. The user should contact appropriate community officials to determine if corporate limits have changed subsequent to the issuance of this map.

This map may incorporate approximate boundaries of Coastal Barrier Resource System Units and/or Otherwise Protected Areas established under the Coastal Barrier Improvement Act of 1990 (PL 101-591).

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

For adjoining map panels and base map source see separately printed Map Index.

MAP REPOSITORY
Refer to Repository Listing on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP:
APRIL 15, 1988

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL:
SEPTEMBER 30, 1996

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

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

APPROXIMATE SCALE IN FEET
1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 2055 OF 4350
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
BUCKEYE, TOWN OF	040039	2055	F
GOODYEAR, CITY OF	040046	2055	F
MARICOPA COUNTY, UNINCORPORATED AREAS	040037	2055	F

EXHIBIT A
EXISTING
FLOODPLAIN MAP

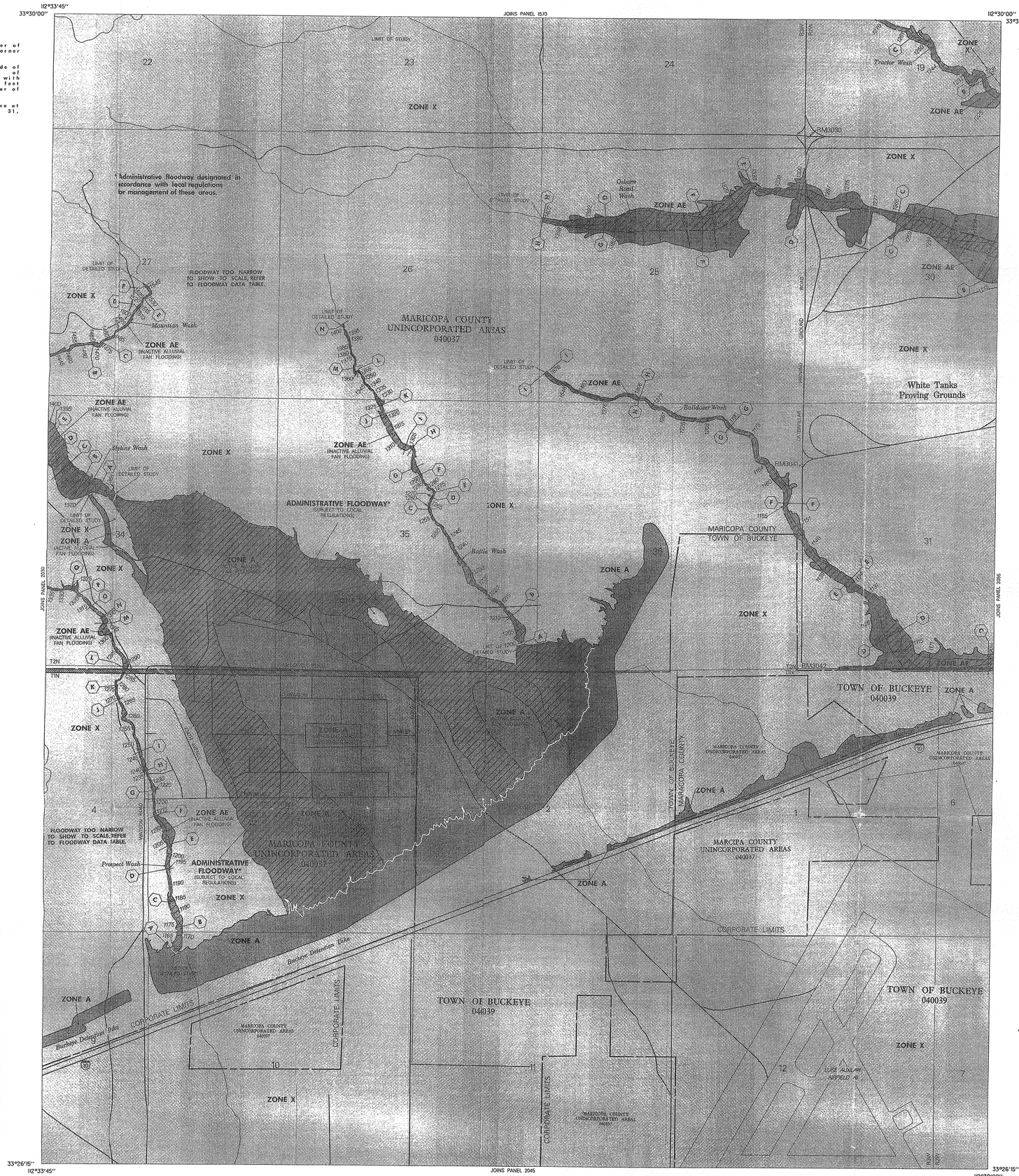
MAP NUMBER
04013C2055 F

MAP REVISED:
JULY 19, 2001

Federal Emergency Management Agency

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
RM3030	1308.77	Brass cap at southwest corner of section 19, southwest corner section 17, T2N, R2W.
RM3041	1184.64	3-inch aluminum cap at west side of dirt road along west side of section 31, at intersection with dirt road to northeast a 1200 feet south of the northwest corner of section 31, T2N, R2W.
RM3042	1114.76	Steel pin 0.8 foot below surface at southwest corner of section 31, T2N, R2W.



LEGEND

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ERM elevations listed on this map were obtained and/or developed to establish vertical control for determination of flood elevations and floodplain boundaries portrayed on this map. Users should be aware that these ERM elevations may have changed since the publication of this map. To obtain up-to-date elevation information on National Geodetic Survey (NGS) ERMs shown on this map, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their website at www.ngs.noaa.gov. Map users should seek verification of non-NGS ERM monument elevations when using these elevations for construction or floodplain management purposes.

Coastal BFE's shown on this map may apply only landward of 0.0' NGVD. Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this community. Elevations shown in the Summary of Stillwater Elevations table should be used for construction, and /or floodplain management purposes when they are higher than the elevations shown on this FIRM.

LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

ZONE A No base flood elevation determined.

ZONE AE Base flood elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE A99 To be protected from 100-year flood by Federal flood protection system under construction ; no base flood elevations determined.

ZONE V Coastal flood with velocity hazard (wave action); no base flood elevations determined.

ZONE VE Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

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

OTHER AREAS

ZONE X Areas determined to be outside 500-year floodplain.

ZONE D Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS

Identified 1983 | Identified 1990 | Otherwise Protected Areas

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

Floodplain Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.

513 — Base Flood Elevation Line; Elevation in Feet. See Map Index for Elevation Datum.

(EL 987) — Base Flood Elevation in Feet Where Uniform Within Zone. See Map Index for Elevation Datum.

Cross Section Line

RM7 — Elevation Reference Mark.

M2 — River Mile

97°07'30", 32°22'30" — Horizontal Coordinates Based on North American Datum of 1927 (NAD 27) Projection.

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for more detailed data on BFEs, and for any information on floodway delineations, prior to use of this map for property purchase or construction purposes.

Areas of Special Flood Hazard (100-year flood) include Zones A, AE, A1-A30, AH, AO, A99, V, VE and V1-V30.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

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

Floodway widths in some areas may be too narrow to show to scale. Refer to Floodway Data Table where floodway width is shown at 120 inch.

Corporate limits shown are current as of the date of this map. The user should contact appropriate community officials to determine if corporate limits have changed subsequent to the issuance of this map.

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

For adjoining map panels and base map source see separately printed Map Index.

MAP REPOSITORY
Refer to Repository Listing on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP:
APRIL 15, 1988

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL:
SEPTEMBER 4, 1991, SEPTEMBER 30, 1996

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

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APPROXIMATE SCALE IN FEET
1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 2035 OF 4350
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
BUCKEYE, TOWN OF	040039	2035	G
MARICOPA COUNTY UNINCORPORATED AREAS	040037	2035	G

EXHIBIT A
EXISTING
FLOODPLAIN MAP

MAP NUMBER
04013C2035 G

MAP REVISED:
JULY 19, 2001

Federal Emergency Management Agency

Exhibit B Proposed Construction Plans

VERRADO

TUTHILL DIKE WASH & TRACTOR WASH - PHASE I
A PORTION OF SECTIONS 19, 30 & 31 T.3N., R.1W. OF THE GILA & SALT RIVER, BASE AND MERIDIAN
MARICOPA COUNTY, ARIZONA

ENGINEERS NOTES

1. A THOROUGH ATTEMPT HAS BEEN MADE TO SHOW THE LOCATIONS OF ALL UNDERGROUND OBSTRUCTIONS AND UTILITY LINES IN THE WORK AREA. HOWEVER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO OBSTRUCTIONS AND UTILITY LINES ENCOUNTERED DURING CONSTRUCTION AND SHALL DETERMINE THE EXACT LOCATION OF UTILITIES IN ADVANCE OF TRENCHING. THE ENGINEER AND/ OR DEVELOPER WILL NOT GUARANTEE ANY ELEVATIONS OR LOCATIONS OF ING UNDERGROUND UTILITIES SHOWN ON THESE PLANS.

 TO BIDDING THE WORK, THE CONTRACTOR SHALL THOROUGHLY SATISFY ELF AS TO THE ACTUAL CONDITIONS, REQUIREMENTS OF THE WORK AND EXCESS OR DEFICIENCY IN QUANTITIES, IF ANY. NO CLAIMS SHALL BE MADE AGAINST THE OWNER/DEVELOPER OR ENGINEER FOR ANY EXCESS OR DEFICIENCY THEREIN, ACTUAL OF RELATIVE.

3. THE ENGINEER WILL NOT BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, PROCEDURES OR SAFETY PRECAUTIONS OR PROGRAMS UTILIZED IN CONNECTION WITH THE WORK, AND WILL NOT BE RESPONSIBLE FOR THE CONTRACTOR'S FAILURE TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

4. ANY QUANTITIES SHOWN ARE THE BEST ESTIMATE OF THE ENGINEER. THE SUBCONTRACTOR SHALL MAKE HIS OWN INDEPENDENT ESTIMATE ON QUANTITIES AND BASE HIS BID THEREON.

5. THE ENGINEER SHALL NOT BE RESPONSIBLE FOR COORDINATING THE RELOCATION OF UTILITIES, POWER POLES, ETC.

6. THE CONTRACTOR SHALL MAKE NO CLAIM AGAINST THE OWNER OR THE ENGINEER REGARDING ALLEGED INACCURACY OF CONSTRUCTION STAKES SET BY THE ENGINEER UNLESS ALL SURVEY STAKES SET BY THE ENGINEER ARE MAINTAINED INTACT AND CAN BE VERIFIED AS TO THEIR ORIGIN. IF, IN THE OPINION OF THE ENGINEER, THE STAKES ARE NOT MAINTAINED INTACT AND CANNOT BE VERIFIED AS TO THEIR ORIGIN, ANY REMEDIAL WORK REQUIRED TO CORRECT ANY ITEM OF IMPROPER CONSTRUCTION WORK SHALL BE PERFORMED AT THE SOLE EXPENSE OF THE RESPONSIBLE CONTRACTOR OR SUBCONTRACTOR.

7. NOTHING CONTAINED IN THE CONTRACT DOCUMENTS SHALL CREATE, NOR SHALL BE CONSTRUED TO CREATE, ANY CONTRACTUAL RELATIONSHIP BETWEEN THE ENGINEER AND THE CONTRACTOR OR ANY SUBCONTRACTOR.

8. THE ENGINEER WILL MAKE FIELD AS-BUILT MEASUREMENTS OF THE WORK UPON NOTIFICATION BY THE CLIENT OR HIS REPRESENTATIVE THAT THE PIPE WORK IS COMPLETE AND READY FOR AS-BUILT SURVEY. THE OWNER OR HIS REPRESENTATIVE IS RESPONSIBLE FOR LEAVING TRENCHES OPEN SO THAT ACCURATE AS-BUILTS CAN BE PERFORMED TO COMPLY WITH THE TOWN REQUIREMENTS. IF THE TRENCHES ARE BACKFILLED AND OBSCURED TO THE POINT THAT AS-BUILT MEASUREMENTS CANNOT BE PERFORMED, IT IS THE RESPONSIBILITY OF THE CLIENT OR HIS REPRESENTATIVE TO POT HOLE UTILITY TRENCHES AS NECESSARY TO COMPLETE AS-BUILT SURVEY.

9. AS-BUILT SURVEYS AND SUBMITTALS WILL NOT BE PERFORMED UNTIL ORDERED BY THE CLIENT OR HIS REPRESENTATIVE.

10. ELEVATIONS REFERRED TO HEREIN ARE DESIGN ELEVATIONS ONLY. ANY FIELD DESIGN CHANGES MADE BY THE CLIENT OR HIS REPRESENTATIVE WILL ONLY BE STAKED AFTER RECEIVING A WRITTEN AND SIGNED CHANGE ORDER.

11. THE CONTRACTOR IS TO VERIFY THE LOCATION, ELEVATION, CONDITION, AND PAVEMENT CROSS-SLOPE OF ALL EXISTING SURFACES AT POINTS OF TIE-IN ND MATCHING, PRIOR TO COMMENCEMENT OF GRADING, PAVING, CURB AND JTTER, OR OTHER SURFACE CONSTRUCTION. SHOULD EXISTING LOCATIONS, LEVATIONS, CONDITION, OR PAVEMENT CROSS-SLOPE DIFFER FROM THAT SHOWN ON THESE PLANS, RESULTING IN THE DESIGN INTENT REFLECTED ON THE PLANS NOT ABLE TO BE CONSTRUCTED, THE CONTRACTOR SHALL NOTIFY THE OWNER'S AGENT IMMEDIATELY FOR DIRECTION ON HOW TO PROCEED PRIOR TO COMMENCEMENT OF CONSTRUCTION. THE CONTRACTOR ACCEPTS RESPONSIBILITY FOR ALL COSTS ASSOCIATED WITH CORRECTIVE ACTION IF THESE PROCEDURES ARE NOT FOLLOWED.

12. MARICOPA ASSOCIATION OF GOVERNMENTS (MAG) UNIFORM STANDARD SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS CONSTRUCTION (LATEST EDITION INCLUDING LATEST REVISION AND CURRENT SUPPLEMENTALS THEREOF PER THE TOWN OF BUCKEYE AND ARIZONA-AMERICAN WATER COMPANY ARE INCORPORATED INTO THESE PLANS IN THEIR ENTIRETY.

13. ALL WORK REQUIRED TO COMPLETE THE CONSTRUCTION COVERED BY THESE PLANS SHALL BE IN ACCORDANCE WITH THE MAG STANDARD SPECIFICATIONS AND DETAILS AND CURRENT SUPPLEMENTS THEREOF PER THE TOWN OF BUCKEYE AND ARIZONA-AMERICAN WATER COMPANY UNLESS SPECIFIED OTHERWISE IN THESE PLANS OR ELSEWHERE IN THE CONTRACT DOCUMENTS. CONTRACTORS SHALL FAMILIARIZE THEMSELVES WITH ALL REQUIRED STANDARD SPECIFICATIONS, DETAILS AND SUPPLEMENTS PRIOR TO BIDDING THE WORK FOR THE CONSTRUCTION COVERED BY THESE PLANS.

14. THE CONTRACTOR IS RESPONSIBLE FOR ALL METHODS, SEQUENCING, AND SAFETY USED DURING CONSTRUCTION UNLESS SPECIFICALLY ADDRESSED OTHERWISE IN THESE PLANS OR ELSEWHERE IN THE CONTRACT DOCUMENTS.

15. THE CONTRACTOR IS TO COMPLY WITH ALL LOCAL, STATE, AND FEDERAL LAWS AND REGULATIONS APPLICABLE TO THE CONSTRUCTION COVERED BY THESE PLANS.

16. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND COMPLYING WITH ALL PERMITS REQUIRED TO COMPLETE ALL WORK COVERED BY THESE PLANS.

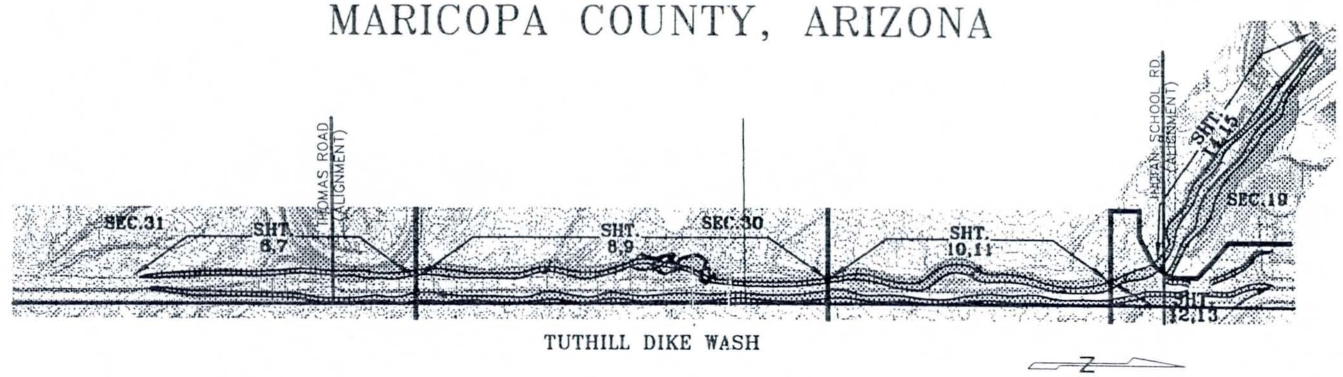
17. THE QUANTITIES AND SITE CONDITIONS DEPICTED IN THESE PLANS ARE FOR INFORMATIONAL PURPOSES ONLY AND ARE SUBJECT TO ERROR AND OMISSION. CONTRACTORS SHALL SATISFY THEMSELVES AS TO ACTUAL QUANTITIES AND SITE CONDITIONS PRIOR TO BIDDING THE WORK FOR THE CONSTRUCTION COVERED BY THESE PLANS.

18. A REASONABLE EFFORT HAS BEEN MADE TO SHOW THE LOCATIONS OF EXISTING UNDERGROUND FACILITIES AND UTILITIES IN THE CONSTRUCTION AREA. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO UTILITIES AND/OR FACILITIES CAUSED DURING THEIR CONSTRUCTION OPERATIONS. THE CONTRACTOR SHALL CALL 48 HOURS IN ADVANCE FOR BLUE STAKE (602-263-1100) PRIOR TO ANY EXCAVATION.

19. THE CONTRACTOR IS RESPONSIBLE FOR ALL COORDINATION OF CONSTRUCTION AFFECTING UTILITIES AND THE COORDINATION OF ANY NECESSARY UTILITY RELOCATION WORK.

LL PAVING, GRADING, EXCAVATION, TRENCHING, PIPE BEDDING, CUT, ILL AND BACKFILL SHALL COMPLY WITH THE RECOMMENDATIONS SET FORTH IN THE SOILS (GEOTECHNICAL) REPORT FOR THIS PROJECT IN ADDITION TO THE REFERENCED REQUIRED SPECIFICATIONS AND DETAILS.

21. THE CONTRACTOR IS TO VERIFY THE LOCATION AND THE ELEVATIONS OF ALL EXISTING UTILITIES AT POINTS OF TIE-IN PRIOR TO COMMENCING ANY NEW CONSTRUCTION. SHOULD ANY LOCATION OR ELEVATION DIFFER FROM THAT SHOWN ON THESE PLANS, THE CONTRACTOR SHALL CONTACT THE OWNER'S AGENT.



PROJECT SITE & INDEX MAP
N.T.S.

SHEET INDEX

1	COVER SHEET
2,3	DETAIL SHEET
4-6	ALIGNMENT & CONTROL SHEETS
7,9,11,13	TUTHILL WASH CHANNEL PLAN
8,10,12,14	TUTHILL WASH CHANNEL PROFILE PLAN
15	TRACTOR WASH CHANNEL PLAN
16	TRACTOR WASH CHANNEL PROFILE PLAN
17	TUTHILL WASH CONFLUENCE PLAN

EARTHWORK QUANTITIES

FILL (RAW) 49,643 C.Y.
CUT (RAW) 431,560 C.Y.

ENGINEERS NOTES

22. THE CONTRACTOR IS RESPONSIBLE TO COORDINATE WORK WITH WEATHER CONDITIONS, THE PROJECT SITE IS LOCATED IN A FLOOD PRONE AREA AND SUBJECT TO FLOODING AND ITS ASSOCIATED HAZARD.

23. COORDINATION BETWEEN ALL PARTIES IS ESSENTIAL PART OF CONTRACT.

24. CONTRACTOR IS RESPONSIBLE TO COORDINATE UTILITY CROSSINGS AT CULVERT CROSSINGS BEFORE STARTING WORK ON CULVERTS. COORDINATE WITH OWNER REPRESENTATIVE. VERIFY UTILITY LINES AND/ OR CONDUITS ARE IN PLACE BEFORE STARTING CULVERT WORK.

UTILITY NOTES

THESE PLANS HAVE BEEN SUBMITTED TO THE FOLLOWING UTILITY COMPANIES AND THE WORK CONTAINED IN THESE PLANS HAS BEEN APPROVED BY THESE COMPANIES WITHIN THEIR AREA OF INTEREST. THE SIZE AND LOCATIONS, AS SHOWN, OF THE GAS, TELEPHONE AND POWER LINES, AND CONNECTIONS AGREE WITH THE INFORMATION CONTAINED IN THE UTILITY COMPANY RECORDS. WHERE THE WORK TO BE DONE CONFLICTS WITH ANY OF THESE UTILITIES, THE CONFLICTS SHALL BE RESOLVED AS SPECIFIED. CONFLICTS ARISING DURING THE COURSE OF CONSTRUCTION FROM UNFORESEEN CIRCUMSTANCES SHALL BE REPORTED TO THE INTERESTED UTILITY COMPANY AND BE RESOLVED BY THEM AND THE DESIGN ENGINEER.

IN ACCORDANCE WITH AAC R18-4-119, ALL MATERIALS ADDED AFTER JANUARY 1, 1993 WHICH MAY COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NATIONAL SANITATION FOUNDATION STANDARDS 60 AND 61.

RELATED PROJECTS FOR REFERENCE

- OSBORN WASH CHANNELIZATION PLANS W/P PLN# 011416
- INDIAN SCHOOL IMPROVEMENT PLANS W/P PLN# 011446

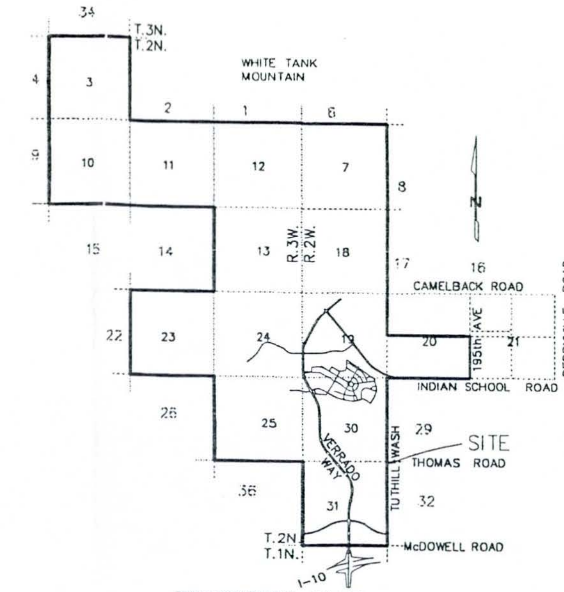
ARIZONA PUBLIC SERVICE	BARBARA HEIMER COMPANY REPRESENTATIVE CONTACTED	DATE
QWEST COMMUNICATIONS	JOHN O'DELL COMPANY REPRESENTATIVE CONTACTED	DATE
SOUTHWEST GAS COMPANY	MARK WATANEBE COMPANY REPRESENTATIVE CONTACTED	DATE
COX COMMUNICATIONS	WALT COOMBS COMPANY REPRESENTATIVE CONTACTED	DATE

TOWN OF BUCKEYE APPROVAL:

THE TOWN OF BUCKEYE APPROVES THESE PLANS FOR CONCEPT ONLY AND ACCEPTS NO LIABILITY FOR ERRORS OR OMISSIONS.

TOWN ENGINEERING/PUBLIC WORKS ________ DATE ________

APPROVED BY ________ DATE ________



VICINITY MAP
N.T.S.

OWNER / DEVELOPER
DMB WHITE TANK, LLC
7600 E. DOUBLETREE RANCH RD.
SUITE 300
SCOTTSDALE, AZ. 85258
CONTACT: MR. ROBERT F. KAMMERLE
TEL.: (480) 367-7000
FAX (480) 367-9788

ENGINEER
WOOD, PATEL & ASSOCIATES INC.
2051 WEST NORTHERN, SUITE 100
PHOENIX, ARIZONA 85021
CONTACT: ASHOK C. PATEL, PE
TEL.: (602) 335-8500
FAX (602) 335-8580

PUBLIC UTILITIES

WATER	ARIZONA-AMERICAN WATER COMPANY
SEWER	ARIZONA-AMERICAN WATER COMPANY
FIRE	TOWN OF BUCKEYE
ELECTRIC	ARIZONA PUBLIC SERVICE
TELEPHONE/FIBER	COX/QWEST COMMUNICATIONS
GAS	SOUTHWEST GAS
CABLE	COX COMMUNICATIONS
WASTE DISPOSAL	TOWN OF BUCKEYE

BENCHMARK
BRASS CAP IN HANDHOLE AT THE INTERSECTION OF JACKRABBIT TRAIL AND McDOWELL ROAD, SOUTHWEST CORNER OF SECTION 33, TOWNSHIP 2 NORTH, RANGE 2 WEST, GILA AND SALT RIVER MERIDIAN.
ELEV.= 1079.43
DATUM NGVD '29
SOURCE:
REFERENCE MARK 3045 AS SHOWN ON FLOOD INSURANCE RATE MAP NO. 04013C2055 F, REVISED JULY 19 2001.

"AS-BUILT" CERTIFICATION
I HEREBY CERTIFY THAT THE "AS-BUILT" MEASUREMENTS AS SHOWN OR NOTED HEREON WERE MADE UNDER MY SUPERVISION OR AS NOTED, AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. ADDITIONALLY, I HEREBY CERTIFY THAT MAINS AND SERVICES HAVE BEEN INSTALLED AT THE AS-BUILT LOCATION NOTED HEREON.

SEAL

Two working days before you dig, CALL FOR THE BLUE STAKES
263-1100
Blue Stake Center CALL COLLECT

DMB

WOOD/PATEL
Civil Engineers
Hydrologists
Land Surveyors
Construction Managers
(602) 335-8500

VERRADO
BUCKEYE, AZ.
TUTHILL DIKE WASH & TRACTOR WASH - PHASE I
COVER

PRELIMINARY
NOT
FOR
CONSTRUCTION
OR RECORDING

Registered Professional Engineer Civil
CERTIFICATE NO. 10512
ASHOK C. PATEL
Date Signed
ARIZONA, U.S.A.

DESIGNER	J. Taillon / J. McCarty
DRAWN	J. Castaneda
CHECKED	A. Patel
DATE	May 8, 2002
SCALE	N/A
JOB NO.	011416.02
SHEET	1 OF 18

DRAWINGS SPECIFICATIONS AS INSTRUMENTS OF SERVICE ARE THE PROPERTY OF WHITE TANK, LLC AND MAY NOT BE REPRODUCED WITHOUT THE WRITTEN PERMISSION OF WHITE TANK, LLC.

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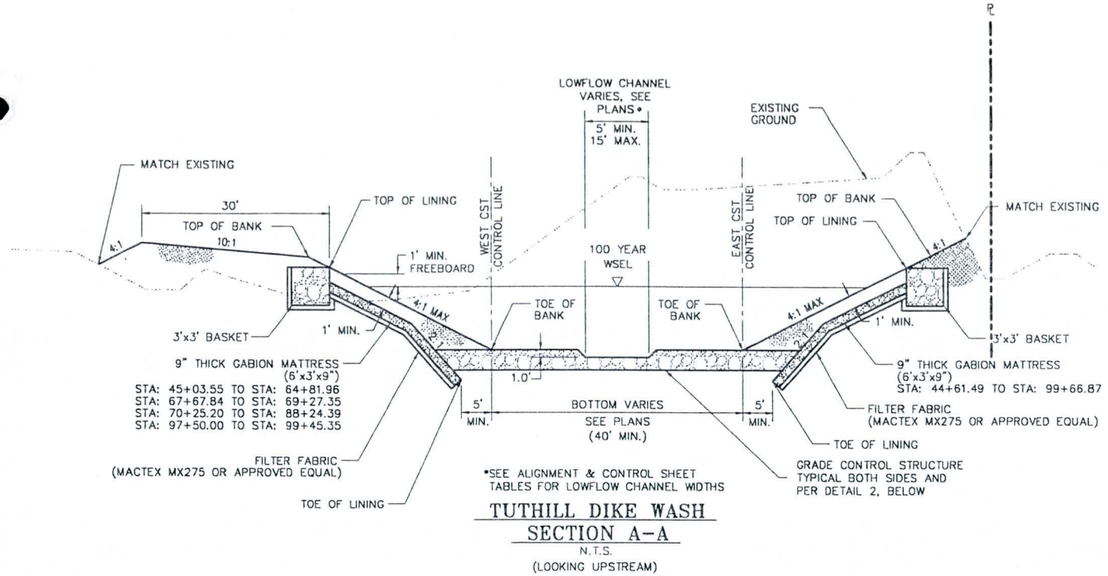
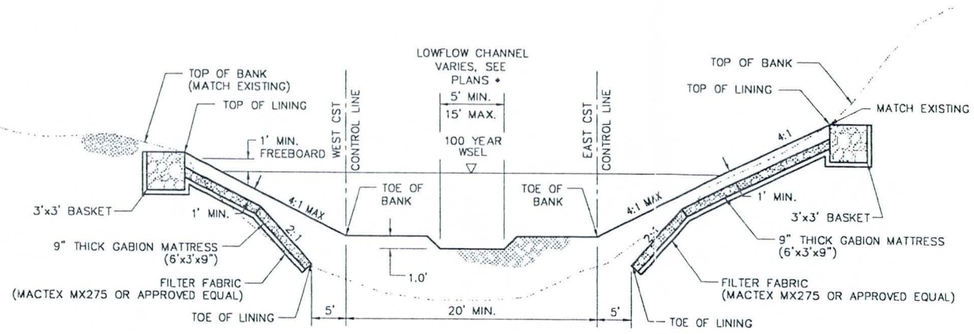


*SEE ALIGNMENT & CONTROL SHEET TABLES FOR LOWFLOW CHANNEL WIDTHS

TUTHILL DIKE WASH SECTION A-A

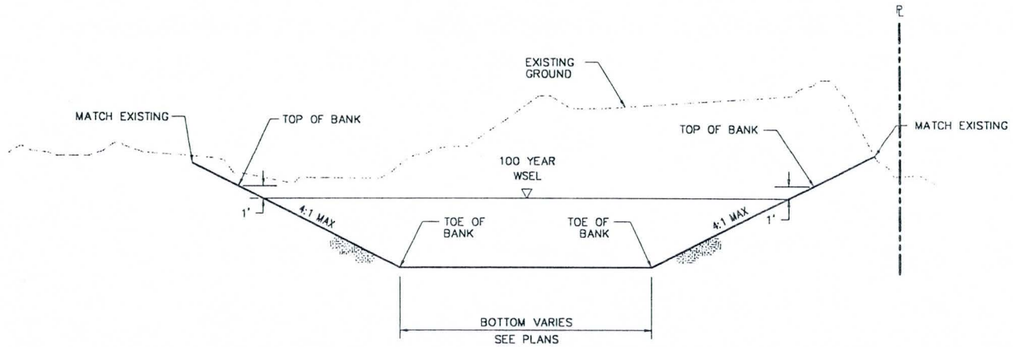
N.T.S.
(LOOKING UPSTREAM)



*SEE ALIGNMENT & CONTROL SHEET TABLES FOR LOWFLOW CHANNEL WIDTHS

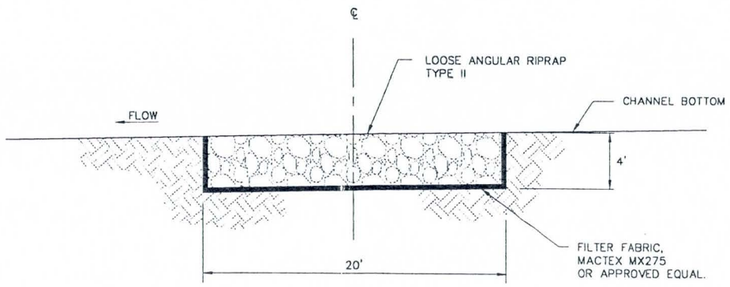
TRACTOR WASH SECTION B-B

N.T.S.
(LOOKING UPSTREAM)



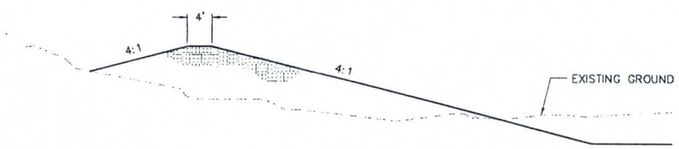
TUTHILL DIKE WASH SECTION I-I

N.T.S.
INTERIM CHANNEL, LOOKING UPSTREAM
(STA: 33+56.50 TO STA:45+03.55)



DETAIL 2 GRADE CONTROL STRUCTURE

N.T.S.



TUTHILL DIKE WASH SECTION J-J

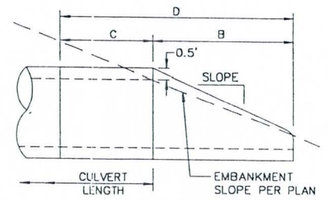
(NORTH OF INDIAN SCHOOL ROAD)
N.T.S.
INTERIM CHANNEL
(STA: 9+49.05 TO STA:13+42.89 WEST SIDE
STA: 9+74.55 TO STA:13+58.97 EAST SIDE)

LOOSE RIPRAP GRADATION TABLE

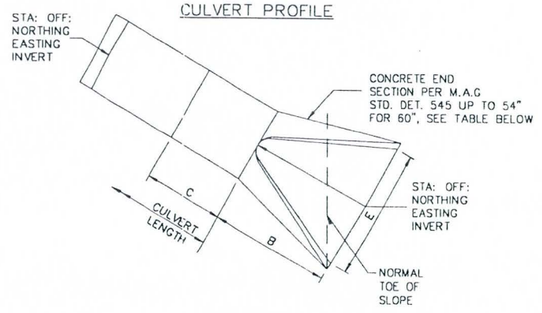
PERCENT FINER BY WEIGHT	SIEVE SIZE		
	TYPE I	TYPE II	
15	6"	8"	
50	12"	18"	
85	18"	27"	
100	24"	36"	
INSTALL LOOSE RIPRAP PER M.A.G. SPEC. 200.			

NOTES

1. DESIGN OF END SECTION SHALL CONFORM TO STANDARD FOR REINFORCED CONCRETE PIPE.
2. END SECTION JOINT CONFORMATION SHALL MATCH THE PIPE JOINTS.
3. EMBANKMENT SLOPE SHALL BE WARPED TO MATCH SLOPE OF END SECTION.
4. CULVERT LENGTH IS AS SHOWN ON PLANS.



CULVERT PROFILE



CULVERT PLAN

PIPE DIA.	WALL THICKNESS	SLOPE	B	C	D	E
60"	6"	2	60"	39"	99"	96"

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Civil Engineers
Hydrologists
Water Resources
Construction Managers
(602) 335-0500

VERRADO

BUCKEYE, AZ.

TUTHILL DIKE WASH & TRACTOR WASH - PHASE I

DETAIL SHEET

PRELIMINARY
NOT
FOR
CONSTRUCTION
OR RECORDING

Registered Professional Engineer (Civil) CERTIFICATE NO. 10512 ASHOK C. PATEL Date Signed ARIZONA, U.S.A.

DESIGNER	J. Taillon / J. McCarty
DRAWN	J. Castaneda
CHECKED	A. Patel
DATE	May 8, 2002
SCALE	N/A
JOB NO.	011416.02
SHEET	2 OF 18

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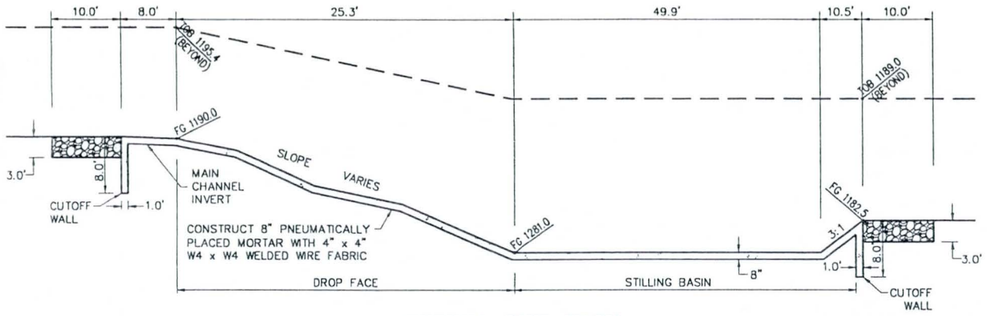
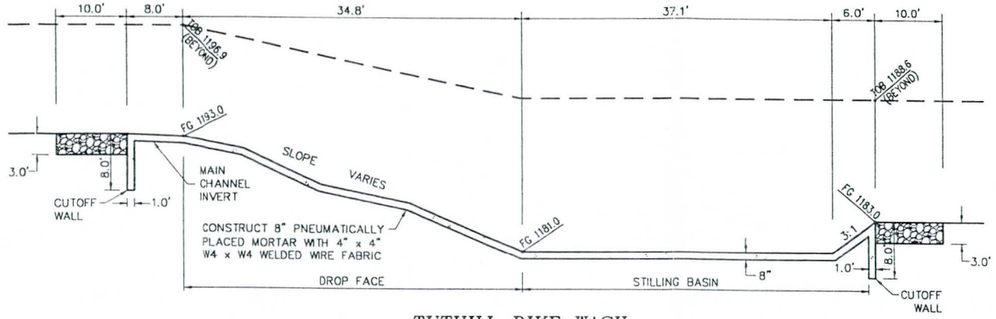
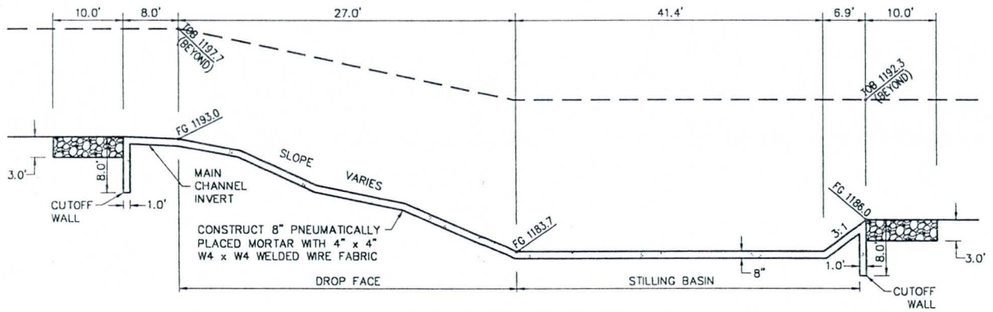


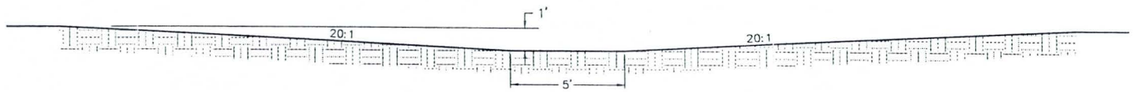
TUTHILL DIKE WASH
SECTION C-C
N.T.S.



TUTHILL DIKE WASH
SECTION D-D
N.T.S.

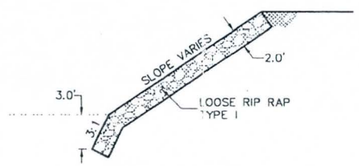


TUTHILL DIKE WASH
SECTION E-E
N.T.S.

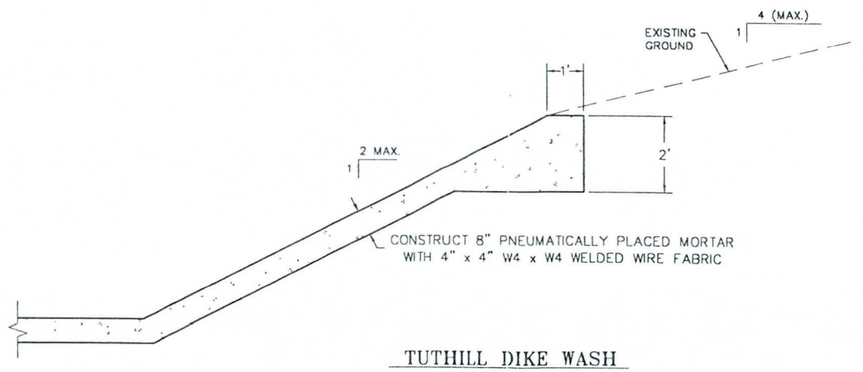


SECTION F-F
STA:59+50WEST
N.T.S.

QUANTITIES (ESTIMATED)		
GABION BASKETS	4,600	CY
GABION MATTRESS	9,500	CY
PNEUMATICALLY PLACED MORTAR DROP STRUCTURE (8")	2,452	SY
RIP RAP (TYPE I)	1,193	CY
RIP RAP (TYPE II)	3,993	CY
12" HDPE STORM DRAIN PIPE	347	LF
18" HDPE STORM DRAIN PIPE	265	LF
24" CLASS III R.G.R.C.P. STORM DRAIN PIPE	96	LF
30" CLASS III R.G.R.C.P. STORM DRAIN PIPE	70	LF
36" CLASS III R.G.R.C.P. STORM DRAIN PIPE	123	LF
60" CLASS III R.G.R.C.P. STORM DRAIN PIPE	22	LF
END SECTION (24")	2	EA
END SECTION (30")	1	EA
END SECTION (36")	2	EA
END SECTION (60")	1	EA
PIPE PLUG (24")	2	EA
PIPE PLUG (30")	1	EA
PIPE PLUG (36")	2	EA
PIPE PLUG (60")	1	EA
CONCRETE CUTOFF WALL	121	CY



SECTION H-H
(SLOPE PROTECTION BETWEEN DROP STRUCTURES)
N.T.S.



TUTHILL DIKE WASH
SECTION G-G
N.T.S.

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VERRADO
BUCKEYE, AZ.
TUTHILL DIKE WASH & TRACTOR WASH - PHASE I
DETAIL SHEET

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Registered Professional Engineer
CERTIFICATE NO.
10517
ASHOK C. PATEL
Date Signed
ARIZONA, U.S.A.

DESIGNER J. Taillon / J. McCarty
DRAWN J. Castaneda
CHECKED A. Patel
DATE May 8, 2002
SCALE N/A
JOB NO. 011416.02
SHEET 13 OF 18

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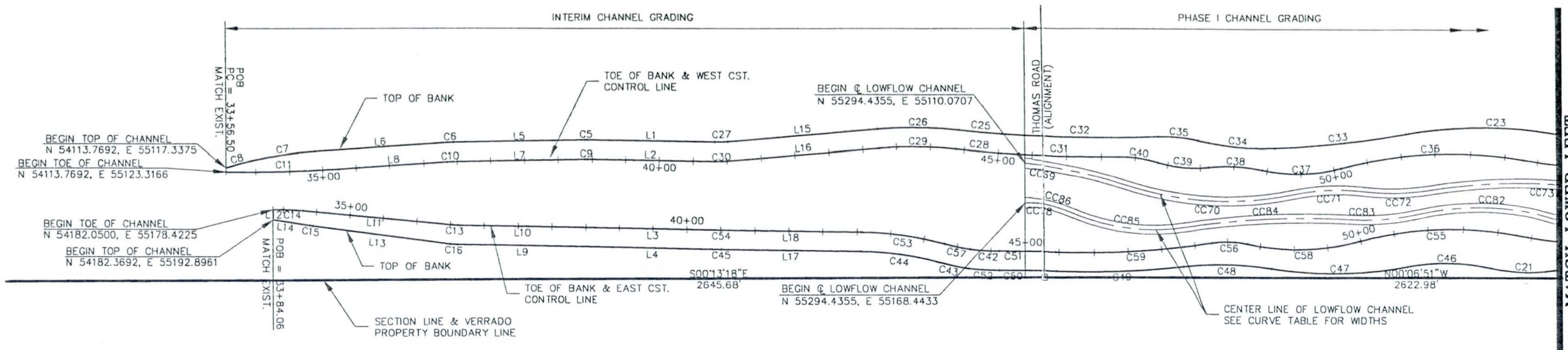
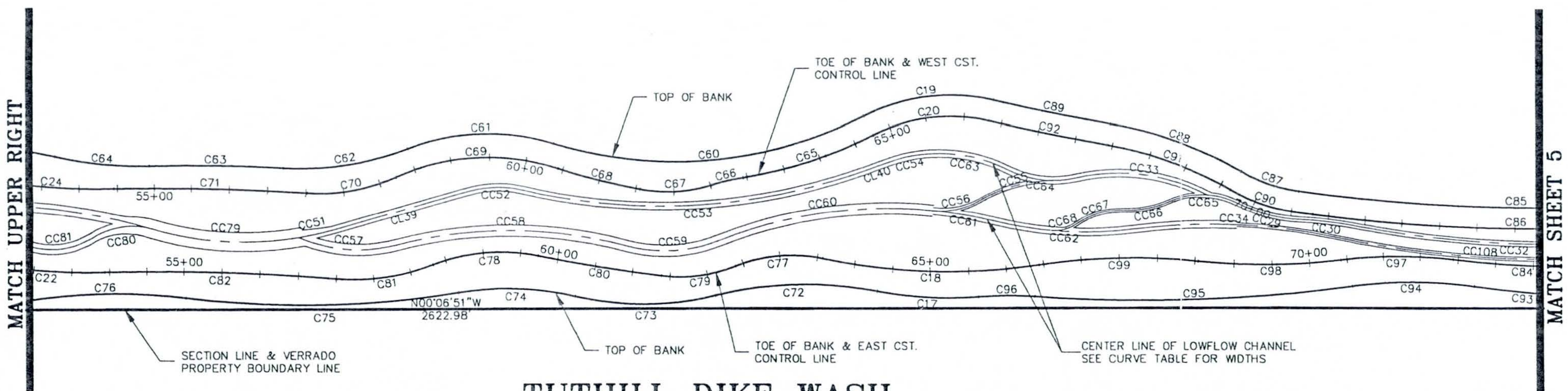
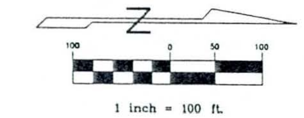


TUTHILL DIKE WASH



TUTHILL DIKE WASH



LOWFLOW CHANNEL CENTERLINE LINE TABLE			
LINE	BEARING	DISTANCE	WIDTH
CL39	S15°39'47"E	190.50'	10.00'
CL40	S20°15'33"E	23.56'	10.00'

TOE & TOP OF BANK CURVE TABLE					
CURVE	DELTA	RADIUS	ARC	TANGENT	CHORD
C5	01°58'24"	100.00'	3.44'	1.72'	3.44'
C6	02°36'38"	200.00'	9.11'	4.56'	9.11'
C7	09°07'28"	600.00'	95.55'	47.88'	95.45'
C8	06°05'14"	363.49'	38.62'	19.33'	38.60'
C9	02°03'05"	100.00'	3.58'	1.79'	3.58'
C10	02°33'09"	200.00'	8.91'	4.46'	8.91'
C11	04°12'25"	2277.00'	167.19'	83.63'	167.15'
C13	04°24'40"	100.00'	7.70'	3.85'	7.70'
C14	05°11'24"	350.00'	31.70'	15.86'	31.69'
C15	01°29'23"	200.00'	5.20'	2.60'	5.20'
C16	04°24'40"	128.00'	9.85'	4.93'	9.85'
C17	15°20'17"	500.00'	133.85'	67.33'	133.45'
C18	20°30'05"	800.00'	286.25'	144.67'	284.73'
C19	40°14'29"	250.00'	175.59'	91.59'	172.00'
C20	40°14'29"	222.00'	155.92'	81.33'	152.74'
C21	21°41'30"	250.00'	94.65'	47.90'	94.08'
C22	11°54'27"	799.50'	166.16'	83.38'	165.86'
C23	22°55'26"	650.00'	260.06'	131.79'	258.33'
C24	10°41'33"	900.00'	167.96'	84.22'	167.71'
C25	01°51'59"	1972.00'	64.23'	32.12'	64.23'
C26	10°53'13"	628.00'	119.33'	59.84'	119.15'
C27	05°43'47"	200.00'	20.00'	10.01'	19.99'
C28	01°51'59"	2000.00'	65.15'	32.58'	65.14'
C29	10°53'13"	600.00'	114.01'	57.18'	113.84'
C30	05°46'48"	200.00'	20.18'	10.10'	20.17'
C31	04°54'57"	2000.00'	171.59'	85.85'	171.54'
C32	06°37'48"	1972.00'	228.19'	114.22'	228.06'
C33	07°42'12"	1450.00'	194.95'	97.62'	194.80'
C34	15°19'19"	430.00'	114.99'	57.84'	114.65'
C35	15°22'36"	230.00'	61.73'	31.05'	61.54'
C36	24°22'14"	630.00'	267.97'	136.04'	265.95'
C37	26°43'57"	250.00'	116.64'	59.40'	115.59'
C38	17°55'27"	260.25'	81.42'	41.04'	81.08'
C39	22°16'12"	200.00'	77.74'	39.37'	77.25'
C40	16°49'00"	200.00'	58.70'	29.56'	58.49'
C42	08°00'38"	300.00'	41.94'	21.01'	41.91'
C43	07°21'26"	328.00'	42.12'	21.09'	42.09'
C44	14°24'07"	472.00'	118.64'	59.64'	118.33'
C45	00°14'58"	100.00'	0.44'	0.22'	0.44'

TOE & TOP OF BANK CURVE TABLE					
C46	23°05'04"	300.00'	120.87'	61.27'	120.05'
C47	19°15'56"	600.00'	201.75'	101.83'	200.80'
C48	15°11'21"	500.00'	132.55'	66.67'	132.16'
C49	08°40'08"	1230.00'	186.10'	93.23'	185.92'
C50	02°28'51"	1972.00'	85.39'	42.70'	85.38'
C51	02°23'54"	2000.00'	83.71'	41.86'	83.71'
C52	06°24'37"	401.75'	44.95'	22.50'	44.92'
C53	14°14'40"	500.00'	124.31'	62.48'	123.99'
C54	00°14'58"	100.00'	0.44'	0.22'	0.44'
C55	25°26'17"	520.00'	230.87'	117.37'	228.98'
C56	20°58'41"	150.00'	54.92'	27.77'	54.61'
C57	07°25'12"	300.00'	38.85'	19.45'	38.82'
C58	27°06'13"	350.00'	165.57'	84.36'	164.03'
C59	11°01'54"	1200.00'	231.05'	115.88'	230.69'
C60	44°03'02"	550.00'	422.86'	222.50'	412.52'
C61	37°44'15"	300.00'	197.59'	102.53'	194.04'
C62	24°04'09"	400.00'	168.04'	85.28'	166.80'
C63	04°57'18"	2048.00'	177.11'	88.61'	177.05'
C64	14°32'48"	500.00'	126.94'	63.81'	126.60'
C65	18°01'35"	578.00'	181.85'	91.68'	181.10'
C66	08°14'08"	300.00'	43.12'	21.60'	43.08'
C67	27°26'37"	200.00'	95.80'	48.84'	94.88'
C68	08°02'12"	800.00'	112.21'	56.20'	112.12'
C69	42°10'20"	300.00'	220.81'	115.68'	215.86'
C70	27°46'14"	250.00'	121.17'	61.80'	119.99'
C71	05°02'24"	2910.50'	256.02'	128.09'	255.93'
C72	24°42'18"	500.00'	215.59'	109.50'	213.93'
C73	26°55'27"	400.00'	187.97'	95.75'	186.24'
C74	22°09'24"	400.00'	154.68'	78.32'	153.72'
C75	15°56'37"	1300.00'	361.75'	182.05'	360.58'
C76	16°02'00"	780.00'	218.27'	109.85'	217.56'
C77	33°51'25"	200.00'	118.18'	60.87'	116.47'
C78	32°26'50"	250.00'	141.58'	72.74'	139.69'
C79	28°48'35"	200.00'	100.57'	51.37'	99.51'
C80	04°43'17"	2000.00'	164.81'	82.45'	164.76'
C81	25°30'45"	300.00'	133.58'	67.92'	132.48'
C82	06°14'26"	2800.00'	304.97'	152.63'	304.82'
C84	18°20'33"	1475.00'	472.20'	238.14'	470.19'
C85	18°54'58"	2501.00'	825.70'	416.64'	821.95'
C86	17°39'57"	2529.00'	779.76'	393.00'	776.67'

TOE & TOP OF BANK CURVE TABLE					
C87	23°11'32"	200.00'	80.96'	41.04'	80.40'
C88	20°45'52"	500.00'	181.20'	91.61'	180.21'
C89	03°21'22"	2710.00'	158.74'	79.39'	158.72'
C90	23°11'32"	228.00'	92.29'	46.79'	91.66'
C91	20°45'52"	472.00'	171.06'	86.48'	170.12'
C92	03°21'22"	2738.00'	160.38'	80.21'	160.36'
C93	16°38'18"	1500.00'	435.59'	219.34'	434.06'
C94	15°43'05"	600.00'	164.60'	82.82'	164.08'
C95	12°00'08"	2000.00'	418.96'	210.25'	418.20'
C96	08°34'41"	500.00'	74.86'	37.50'	74.79'
C97	13°43'38"	632.00'	151.42'	76.07'	151.05'
C98	13°07'30"	820.00'	187.84'	94.33'	187.43'
C99	14°26'59"	835.00'	210.58'	105.85'	210.02'

TOE & TOP OF BANK LINE TABLE		
LINE	BEARING	DISTANCE
L1	N00°56'02"E	189.11'
L2	N00°59'03"E	188.25'
L3	N01°05'15"E	199.17'
L4	N01°05'15"E	199.25'
L5	N01°02'22"W	194.02'
L6	N03°39'00"W	197.73'
L7	N01°04'02"W	194.53'
L8	N03°37'11"W	162.02'
L9	N00°57'58"E	191.14'
L10	N00°57'58"E	191.22'
L11	N05°22'38"E	223.38'
L12	N00°11'13"E	13.59'
L13	N07°24'12"E	206.39'
L14	N08°53'35"E	55.55'
L15	N04°47'45"W	220.50'
L16	N04°47'45"W	223.23'
L17	N00°50'18"E	205.20'
L18	N00°50'18"E	205.14'

LOWFLOW CHANNEL CENTERLINE CURVE TABLE						
CURVE	DELTA	RADIUS	ARC	TANGENT	CHORD	WIDTH
CC29	25°00'33"	200.00'	87.30'	44.36'	86.61'	7.00'
CC30	08°20'03"	500.00'	72.73'	36.43'	72.66'	7.00'
CC32	22°19'08"	1480.00'	576.52'	291.96'	572.88'	7.00'
CC33	40°41'07"	250.00'	177.52'	92.69'	173.82'	10.00'
CC34	18°42'10"	800.00'	261.14'	131.74'	259.98'	10.00'
CC51	06°00'32"	430.00'	45.10'	22.57'	45.07'	10.00'
CC52	28°55'29"	140.00'	70.68'	36.11'	69.93'	10.00'
CC53	33°31'15"	800.00'	468.04'	240.93'	461.39'	10.00'
CC54	16°36'11"	200.00'	57.96'	29.18'	57.75'	10.00'
CC55	29°46'41"	200.00'	103.95'	53.18'	102.78'	5.00'
CC56	35°54'03"	100.00'	62.66'	32.40'	61.64'	5.00'
CC57	37°49'51"	200.00'	132.05'	68.54'	129.67'	15.00'
CC58	29°22'39"	600.00'	307.64'	157.28'	304.28'	15.00'
CC59	36°37'54"	200.00'	127.87'	66.20'	125.70'	15.00'
CC60	27°28'36"	600.00'	287.73'	146.69'	284.98'	15.00'
CC61	07°57'54"	600.00'	83.41'	41.77'	83.34'	10.00'
CC62	21°02'17"	500.00'	183.59'	92.84'	182.56'	10.00'
CC63	30°22'42"	200.00'	106.04'	54.30'	104.80'	10.00'
CC64	39°38'13"	135.00'	93.39'	48.65'	91.54'	10.00'
CC65	50°42'34"	100.00'	88.50'	47.39'	85.64'	7.00'
CC66	25°21'49"	150.00'	66.40'	33.75'	65.86'	5.00'
CC67	36°29'08"	100.00'	63.68'	32.96'	62.61'	5.00'
CC68	40°00'42"	50.00'	34.92'	18.20'	34.21'	5.00'
CC69	24°59'40"	800.00'	348.99'	177.31'	346.23'	15.00'
CC70	29°17'30"	500.00'	255.62'	130.67'	252.84'	13.00'
CC71	18°18'23"	330.00'	105.44'	53.17'	104.99'	13.00'
CC72	16°06'25"	350.00'	98.39'	49.52'	98.07'	13.00'
CC73	25°33'28"	800.00'	356.86'	181.45'	353.90'	13.00'
CC78	11°20'12"	150.00'	29.68'	14.89'	29.63'	13.00'
CC79	25°47'52"	430.00'	193.61'	98.47'	191.98'	25.00'
CC80	48°30'35"	100.00'	84.67'	45.06'	82.16'	13.00'
CC81	49°41'02"	100.00'	86.71'	46.30'	84.02'	13.00'
CC82	29°50'59"	400.00'	208.39'	106.62'	206.04'	13.00'
CC83	15°39'19"	370.00'	101.10'	50.87'	100.78'	13.00'
CC84	11°57'09"	1200.00'	250.33'	125.62'	249.88'	13.00'
CC85	32°50'19"	300.00'	171.94'	88.40'	169.60'	13.00'
CC86	14°51'32"	150.00'	38.90'	19.56'	38.79'	13.00'
CC108	24°19'35"	1500.00'	636.86'	323.30'	632.09'	5.00'

DMB

WOOD/PATEL
Civil Engineers
Hydrologists
Land Surveyors
Construction Managers
(602) 335-8500

VERRADO
BUCKEYE, AZ.
TUTHILL DIKE WASH & TRACTOR WASH – PHASE I
ALIGNMENT & CONTROL SHEET

PRELIMINARY
NOT
FOR
CONSTRUCTION
OR RECORDING

Registered Professional Engineer (Civil) – Certificate No. 10512 – ASHOK C. PATEL – ARIZONA, U.S.A.

DESIGNER: J. Taillon / J. McCarty
DRAWN: J. Castaneda
CHECKED: A. Patel
DATE: May 8, 2002
SCALE: 1" = 100'
JOB NO: 011416.02
SHEET: 4 OF 18

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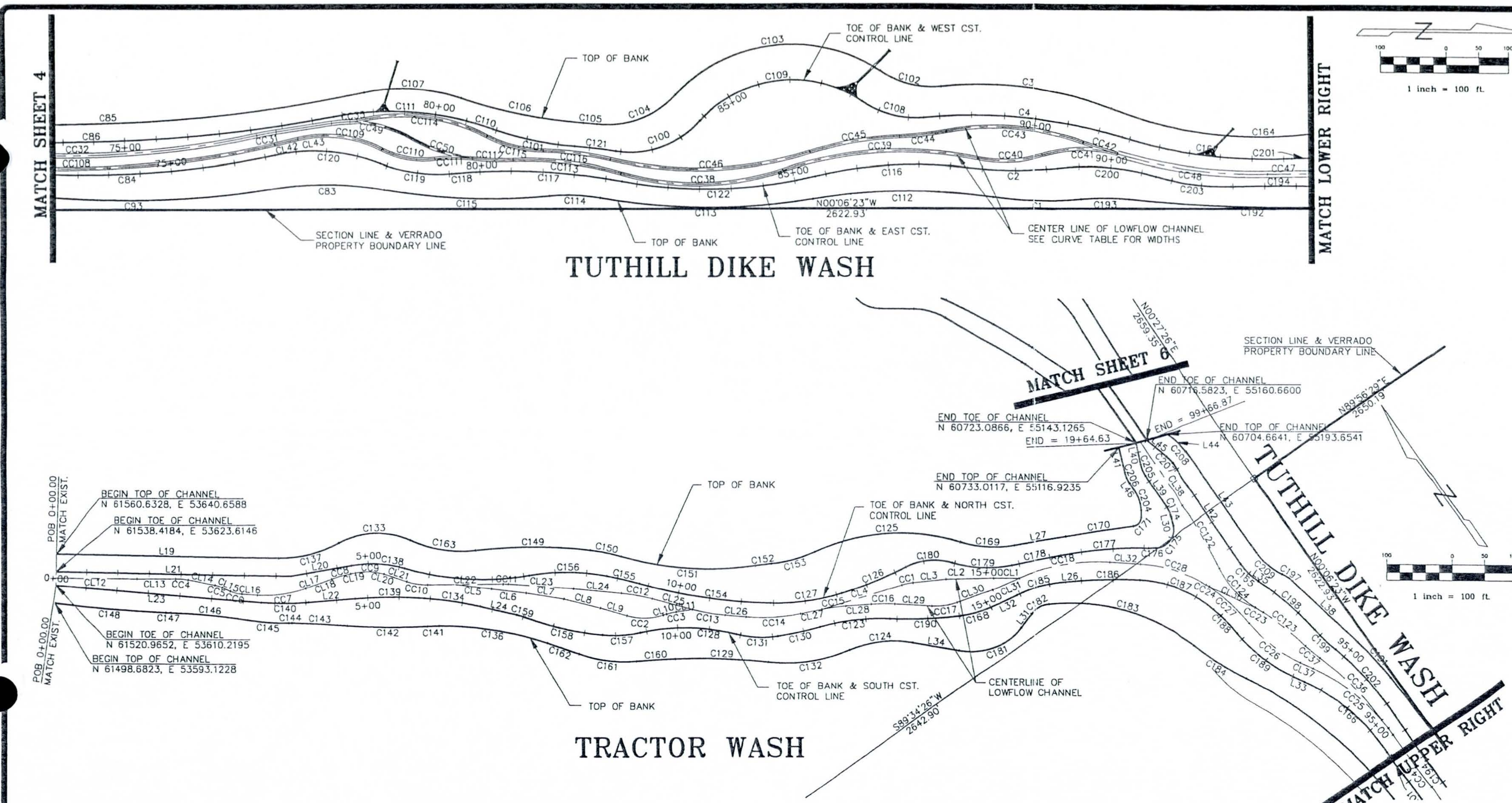

LOWFLOW CHANNEL CENTERLINE CURVE TABLE						
CURVE	DELTA	RADIUS	ARC	TANGENT	CHORD	WIDTH
CC1	10°45'46"	100.00'	18.78'	9.42'	18.76'	5.00'
CC2	33°37'18"	100.00'	58.68'	30.21'	57.84'	5.00'
CC3	09°09'04"	100.00'	15.97'	8.00'	15.95'	5.00'
CC4	11°31'12"	100.00'	20.11'	10.09'	20.07'	10.00'
CC5	13°49'24"	50.00'	12.06'	6.06'	12.03'	10.00'
CC6	21°09'58"	50.00'	18.47'	9.34'	18.37'	10.00'
CC7	22°32'25"	200.00'	78.68'	39.86'	78.17'	10.00'
CC8	09°04'16"	200.00'	31.66'	15.86'	31.63'	10.00'
CC9	26°32'38"	100.00'	46.33'	23.59'	45.91'	10.00'
CC10	19°20'48"	100.00'	33.77'	17.05'	33.61'	10.00'
CC11	04°48'00"	100.00'	8.38'	4.19'	8.38'	5.00'
CC12	09°30'04"	300.00'	49.75'	24.93'	49.69'	5.00'
CC13	10°01'09"	300.00'	52.46'	26.30'	52.39'	10.00'
CC14	16°22'22"	300.00'	85.73'	43.16'	85.44'	10.00'
CC15	07°15'01"	300.00'	37.96'	19.01'	37.94'	10.00'
CC16	07°14'02"	300.00'	37.88'	18.96'	37.85'	5.00'
CC17	23°13'01"	100.00'	40.52'	20.54'	40.24'	5.00'
CC18	27°55'14"	300.00'	146.19'	74.58'	144.75'	10.00'
CC23	08°23'24"	100.00'	14.64'	7.33'	14.63'	5.00'
CC24	06°16'25"	50.00'	5.47'	2.74'	5.47'	10.00'
CC25	31°24'34"	300.01'	164.47'	84.36'	162.41'	5.00'
CC26	26°45'30"	220.00'	102.74'	52.33'	101.81'	5.00'
CC27	16°26'34"	300.00'	86.09'	43.34'	85.80'	5.00'
CC28	28°32'55"	225.00'	112.11'	57.24'	110.95'	10.00'
CC31	03°36'18"	500.00'	31.46'	15.74'	31.46'	7.00'
CC32	22°19'08"	1480.00'	576.52'	291.96'	572.88'	7.00'
CC35	13°47'38"	50.00'	12.04'	6.05'	12.01'	5.00'
CC36	17°38'27"	450.00'	138.55'	69.83'	138.00'	5.00'
CC37	06°50'25"	250.00'	29.85'	14.94'	29.83'	5.00'
CC38	34°36'16"	430.00'	259.70'	133.95'	255.78'	5.00'
CC39	29°50'11"	600.00'	312.45'	159.85'	308.93'	5.00'
CC40	29°21'26"	200.00'	102.48'	52.39'	101.36'	5.00'
CC41	33°57'04"	200.00'	118.51'	61.05'	116.79'	5.00'
CC42	04°03'34"	800.00'	56.68'	28.35'	56.67'	5.00'
CC43	30°56'41"	400.00'	216.04'	110.72'	213.42'	5.00'
CC44	08°40'00"	500.00'	75.63'	37.89'	75.56'	5.00'
CC45	15°02'59"	550.00'	144.47'	72.65'	144.05'	5.00'
CC46	30°27'34"	600.00'	318.97'	163.35'	315.23'	5.00'
CC47	02°05'44"	3095.00'	113.20'	56.60'	113.19'	10.00'
CC48	17°24'59"	800.00'	243.18'	122.53'	242.24'	10.00'
CC49	38°04'01"	200.00'	132.88'	69.00'	130.45'	4.00'
CC50	23°28'32"	250.00'	102.43'	51.94'	101.72'	4.00'
CC108	24°19'35"	1500.00'	636.86'	323.30'	632.09'	5.00'
CC109	40°01'57"	200.00'	139.74'	72.86'	136.91'	5.00'
CC110	34°20'36"	145.00'	86.91'	44.81'	85.62'	5.00'
CC111	13°27'30"	255.00'	59.90'	30.09'	59.76'	5.00'
CC112	08°40'34"	430.00'	65.11'	32.62'	65.05'	5.00'
CC113	18°39'12"	530.00'	172.55'	87.04'	171.79'	5.00'
CC114	40°48'55"	300.00'	213.71'	111.61'	209.22'	5.00'
CC115	26°14'24"	200.00'	91.60'	46.62'	90.80'	5.00'
CC116	12°20'02"	500.00'	107.63'	54.03'	107.43'	5.00'
CC122	08°13'42"	800.00'	114.89'	57.54'	114.79'	5.00'
CC123	11°34'49"	500.00'	101.06'	50.70'	100.88'	5.00'
CC124	32°06'43"	150.00'	84.07'	43.17'	82.97'	5.00'

TOE & TOP OF BANK CURVE TABLE					
CURVE	DELTA	RADIUS	ARC	TANGENT	CHORD
C1	13°13'20"	600.00'	138.46'	69.54'	138.16'
C2	13°21'33"	600.00'	139.90'	70.27'	139.58'
C3	27°06'59"	570.00'	269.76'	137.46'	267.25'
C4	22°26'03"	800.00'	313.24'	158.65'	311.24'
C83	18°31'33"	570.00'	184.30'	92.96'	183.50'
C84	18°20'33"	1475.00'	472.20'	238.14'	470.19'
C85	18°54'58"	2501.00'	825.70'	416.64'	821.95'
C86	17°39'57"	2529.00'	779.76'	393.00'	776.67'
C93	16°38'18"	1500.00'	435.59'	219.34'	434.06'
C100	56°48'18"	150.00'	148.72'	81.11'	142.70'
C101	15°09'51"	500.00'	132.33'	66.56'	131.95'
C102	39°39'09"	150.00'	103.81'	54.08'	101.75'
C103	80°27'14"	250.00'	351.05'	211.47'	322.91'
C104	53°05'45"	150.00'	139.00'	74.94'	134.08'
C105	02°03'06"	600.00'	21.49'	10.74'	21.48'
C106	14°14'15"	800.00'	198.79'	99.91'	198.28'
C107	29°55'46"	300.00'	156.71'	80.19'	154.93'
C108	40°03'56"	150.00'	104.89'	54.69'	102.77'
C109	82°21'23"	194.00'	278.85'	169.70'	255.46'
C110	03°25'05"	500.00'	29.83'	14.92'	29.82'
C111	26°10'33"	500.00'	228.43'	116.24'	226.44'
C112	17°12'18"	950.00'	285.27'	143.72'	284.20'
C113	19°08'27"	1010.00'	337.41'	170.29'	335.85'
C114	15°19'05"	300.00'	80.21'	40.34'	79.97'
C115	15°08'50"	1000.00'	264.37'	132.96'	263.60'
C116	19°57'04"	700.00'	243.75'	123.12'	242.52'
C117	13°18'40"	1000.00'	232.32'	116.69'	231.80'
C118	02°15'50"	1000.00'	39.51'	19.76'	39.51'
C119	26°27'25"	250.00'	115.44'	58.77'	114.42'
C120	33°00'35"	300.00'	172.84'	88.89'	170.46'
C121	04°41'01"	800.00'	65.39'	32.72'	65.38'
C122	23°28'39"	750.00'	307.32'	155.85'	305.17'
C123	18°22'41"	350.00'	112.27'	56.62'	111.78'
C124	32°51'25"	180.00'	103.22'	53.07'	101.81'
C125	41°52'22"	324.76'	237.34'	124.25'	232.09'
C126	09°53'32"	643.31'	111.07'	55.67'	110.93'
C127	18°31'02"	352.00'	113.76'	57.38'	113.27'
C128	26°44'37"	330.27'	154.16'	78.51'	152.76'

TOE & TOP OF BANK CURVE TABLE					
CURVE	DELTA	RADIUS	ARC	TANGENT	CHORD
C129	08°22'37"	1000.00'	146.21'	73.23'	146.08'
C130	06°59'14"	556.09'	67.81'	33.95'	67.77'
C131	23°13'04"	160.00'	64.84'	32.87'	64.39'
C132	29°18'29"	255.24'	130.56'	66.74'	129.14'
C133	52°39'51"	128.50'	118.11'	63.60'	114.00'
C134	08°54'07"	575.84'	89.47'	44.82'	89.38'
C136	19°08'57"	520.00'	173.79'	87.71'	172.98'
C137	29°15'57"	200.00'	102.16'	52.22'	101.05'
C138	25°49'58"	190.00'	85.66'	43.57'	84.94'
C139	08°19'42"	760.00'	110.47'	55.33'	110.37'
C140	09°00'54"	480.00'	75.52'	37.84'	75.45'
C141	02°38'21"	394.76'	18.18'	9.09'	18.18'
C142	07°22'38"	1000.00'	128.76'	64.47'	128.67'
C143	02°28'59"	2061.35'	89.34'	44.67'	89.33'
C144	03°02'30"	100.00'	5.31'	2.66'	5.31'
C145	10°45'39"	350.00'	65.73'	32.96'	65.64'
C146	07°59'24"	867.50'	120.98'	60.59'	120.88'
C147	00°53'52"	500.00'	7.83'	3.92'	7.83'
C148	04°43'44"	2172.53'	179.31'	89.70'	179.25'
C149	13°23'22"	779.51'	182.16'	91.50'	181.75'
C150	09°37'42"	300.00'	50.41'	25.27'	50.35'
C151	24°33'34"	499.64'	214.17'	108.75'	212.53'
C152	02°55'40"	500.00'	25.55'	12.78'	25.55'
C153	19°20'00"	210.00'	70.86'	35.77'	70.52'
C154	14°18'11"	839.76'	209.63'	105.36'	209.09'
C155	05°08'06"	595.00'	53.33'	26.68'	53.31'
C156	20°21'41"	346.32'	123.07'	62.19'	122.43'
C157	17°19'41"	200.00'	60.49'	30.48'	60.26'
C158	15°45'57"	457.88'	125.99'	63.40'	125.60'
C159	07°55'00"	100.00'	13.82'	6.92'	13.81'
C160	02°50'34"	1255.35'	62.29'	31.15'	62.28'
C161	24°13'46"	220.00'	93.03'	47.22'	92.34'
C162	00°39'53"	4554.46'	52.84'	26.42'	52.84'
C163	31°12'47"	195.00'	106.23'	54.47'	104.92'
C164	49°48'15"	660.00'	573.70'	306.39'	555.81'
C165	21°29'18"	100.00'	37.50'	18.98'	37.28'
C166	32°54'03"	300.00'	172.27'	88.58'	169.91'
C167	19°42'00"	800.00'	275.07'	138.90'	273.71'

TOE & TOP OF BANK CURVE TABLE					
CURVE	DELTA	RADIUS	ARC	TANGENT	CHORD
C168	18°06'17"	150.00'	47.40'	23.90'	47.20'
C169	27°13'41"	175.00'	83.16'	42.38'	82.38'
C170	02°28'48"	2500.00'	108.21'	54.12'	108.20'
C171	77°01'50"	15.00'	20.17'	11.94'	18.68'
C174	22°04'52"	48.00'	18.50'	9.37'	18.38'
C175	101°28'54"	29.00'	51.36'	35.48'	44.91'
C176	02°38'59"	250.00'	11.56'	5.78'	11.56'
C177	12°22'04"	649.15'	140.12'	70.33'	139.85'
C178	00°55'33"	4866.00'	78.63'	39.32'	78.63'
C179	28°37'05"	185.01'	92.41'	47.19'	91.45'
C180	43°33'04"	100.00'	76.01'	39.95'	74.19'
C181	62°05'31"	100.00'	108.37'	60.20'	103.15'
C182	46°07'11"	40.00'	32.20'	17.03'	31.34'
C183	43°46'09"	320.00'	244.45'	128.54'	238.55'
C184	11°23'17"	500.00'	99.38'	49.85'	99.22'
C185	20°40'11"	220.00'	79.37'	40.12'	78.94'
C186	07°43'47"	760.72'	102.63'	51.39'	102.55'
C187	37°07'08"	200.00'	129.57'	67.15'	127.31'
C188	11°08'24"	275.00'	53.47'	26.82'	53.38'
C189	26°45'30"	245.00'	114.42'	58.27'	113.38'
C190	10°09'31"	640.53'	113.57'	56.93'	113.42'
C191	08°45'24"	500.00'	76.42'	38.28'	76.34'
C192	08°28'12"	2700.00'	399.14'	199.93'	398.77'
C193	10°46'04"	400.00'	75.17'	37.70'	75.06'
C194	03°27'42"	3000.00'	181.25'	90.65'	181.22'
C197	19°01'01"	60.00'	19.91'	10.05'	19.82'
C198	13°24'42"	500.00'	117.04'	58.79'	116.77'
C199	07°36'33"	340.00'	45.15'	22.61'	45.12'
C200	22°32'19"	400.00'	157.35'	79.71'	156.34'
C201	05°04'07"	500.00'	44.23'	22.13'	44.22'
C202	16°58'20"	470.00'	139.22'	70.13'	138.72'
C203	17°37'33"	400.00'	123.05'	62.02'	122.57'
C204	30°18'07"	67.00'	35.43'	18.14'	35.02'
C205	22°28'22"	50.00'	19.61'	9.93'	19.49'
C206	22°05'23"	50.00'	19.28'	9.76'	19.16'
C207	16°34'25"	50.00'	14.46'	7.28'	14.41'
C208	16°05'50"	50.00'	14.05'	7.07'	14.00'
C209	30°53'11"	100.00'	53.91'	27.63'	53.26'

TOE & TOP OF BANK LINE TABLE		
LINE	BEARING	DISTANCE
L19	N54°01'50"W	352.41'
L20	S64°42'03"E	99.54'
L21	S53°58'15"E	373.82'
L22	S59°25'03"E	75.51'
L23	S50°24'09"E	328.67'
L24	S42°11'15"E	59.46'
L26	N60°02'30"W	15.67'
L27	N65°08'52"W	82.10'
L30	N22°04'52"E	14.12'
L31	S72°41'56"W	27.30'
L32	N80°42'41"W	45.63'
L33	N30°48'41"W	18.69'
L34	S45°12'33"E	74.97'
L35	N21°01'32"W	1.54'
L38	N11°47'40"W	140.24'
L39	S00°00'00"W	57.89'
L40	S22°28'22"W	34.50'
L41	S22°05'23"W	40.24'
L42	N00°27'47"E	193.49'
L43	N00°04'31"E	194.02'
L44	S16°01'20"E	26.16'
L45	S16°06'39"E	39.98'
L46	N00°00'00"E	11.57'

LOWFLOW CHANNEL CENTERLINE LINE TABLE			
LINE	BEARING	DISTANCE	WIDTH
CL1	S55°08'24"E	40.36'	5.00'
CL2	S56°29'32"E	72.80'	5.00'
CL3	S61°10'00"E	52.68'	5.00'
CL4	S71°55'46"E	132.94'	5.00'
CL5	N48°21'37"W	58.41'	5.00'
CL6	N48°16'06"W	55.37'	5.00'
CL7	N45°51'59"W	60.23'	5.00'
CL8	N41°01'35"W	59.59'	5.00'
CL9	N38°58'01"W	44.13'	5.00'
CL10	N72°35'18"W	5.62'	5.00'
CL11	N63°26'15"W	25.92'	5.00'
CL12	N54°29'39"W	133.56'	10.00'
CL13	N55°28'00"W	61.34'	10.00'
CL14	N43°56'48"W	42.74'	10.00'
CL15	N30°07'24"W	14.27'	10.00'
CL16	N51°17'22"W	24.89'	10.00'
CL17	N73°49'47"W	18.30'	10.00'
CL18	N74°51'06"W	26.54'	10.00'
CL19	N65°46'50"W	7.30'	10.00'
CL20	N39°14'12"W	3.38'	10.00'
CL21	N36°24'53"W	35.05'	10.00'
CL22	N55°45'41"W	119.92'	10.00'
CL23	N50°57'41"W	103.19'	5.00'
CL24	N49°35'06"W	76.28'	5.00'
CL25	N40°05'02"W	66.23'	5.00'
CL26	N50°06'11"W	32.85'	10.00'
CL27	N66°28'33"W	34.33'	10.00'
CL28	N59°13'32"W	40.09'	5.00'
CL29	N51°59'31"W	60.11'	5.00'
CL30	N75°12'32"W	57.68'	5.00'
CL31	N79°15'32"W	45.73'	5.00'
CL32	N51°20'18"W	49.11'	10.00'
CL36	S30°02'13"E	80.18'	5.00'
CL37	N30°48'41"W	22.51'	5.00'
CL38	N00°27'47"E	121.35'	5.00'
CL42	S12°55'50"E	38.81'	5.00'
CL43	S08°22'27"E	91.31'	7.00'

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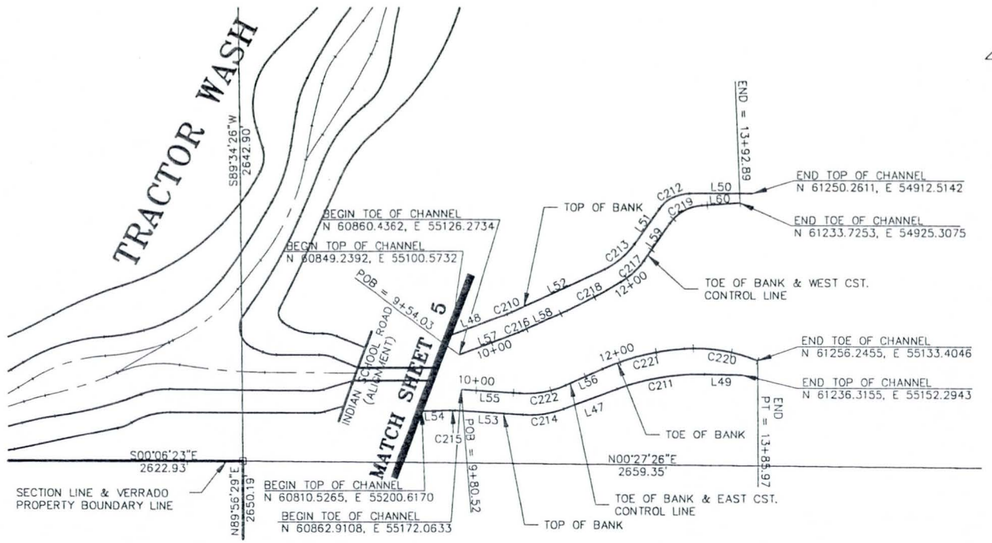
VERRADO
BUCKEYE, AZ.
TUTHILL DIKE WASH & TRACTOR WASH – PHASE I
ALIGNMENT & CONTROL SHEET

PRELIMINARY
NOT
FOR
CONSTRUCTION
OR RECORDING

Registered Professional Engineer — Certificate No. 10512 — ASHOK C. PATEL — ARIZONA, U.S.A.

DESIGNER: J. Taillon / J. McCarty
DRAWN: J. Castaneda
CHECKED: A. Patel
DATE: May 8, 2002
SCALE: 1" = 100'
JOB NO.: 011416.02
SHEET: 5 OF 18

DRAWINGS, SPECIFICATIONS AS INSTRUMENTS OF SERVICE ARE THE PROPERTY OF WHITE TANK, LLC. AND MAY NOT BE REPRODUCED WITHOUT THE WRITTEN PERMISSION OF WHITE TANK, LLC.



TUTHILL DIKE WASH

1 inch = 100 ft.

TOE & TOP OF BANK CURVE TABLE					
CURVE	DELTA	RADIUS	ARC	TANGENT	CHORD
C210	03°55'02"	100.00'	6.84'	3.42'	6.84'
C211	21°17'35"	317.65'	118.05'	59.71'	117.37'
C212	54°26'10"	50.00'	47.50'	25.72'	45.74'
C213	29°43'35"	100.00'	51.88'	26.54'	51.30'
C214	23°38'46"	133.00'	54.89'	27.84'	54.50'
C215	05°10'03"	76.00'	6.85'	3.43'	6.85'
C216	03°43'23"	100.00'	6.50'	3.25'	6.50'
C217	23°51'59"	100.00'	41.65'	21.13'	41.35'
C218	06°15'35"	750.00'	81.94'	41.01'	81.90'
C219	50°53'50"	56.87'	50.52'	27.06'	48.87'
C220	26°20'25"	213.35'	98.08'	49.92'	97.22'
C221	19°47'51"	328.00'	113.33'	57.24'	112.77'
C222	27°05'45"	133.00'	62.90'	32.05'	62.31'

TOE & TOP OF BANK LINE TABLE		
LINE	BEARING	DISTANCE
L47	N20°10'48"W	76.77'
L48	N20°47'34"W	80.08'
L49	N01°13'53"E	50.00'
L50	N00°00'00"E	82.47'
L51	N54°26'10"W	56.92'
L52	N24°42'35"W	136.56'
L53	N03°27'58"E	90.10'
L54	N01°42'04"W	37.30'
L55	N03°28'17"E	77.54'
L56	N23°37'28"W	53.59'
L57	N20°47'37"W	84.04'
L58	N24°30'59"W	64.49'
L59	N54°38'33"W	59.73'
L60	N03°44'44"W	50.00'

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BUCKEYE, AZ.

TUTHILL DIKE WASH & TRACTOR WASH – PHASE I
ALIGNMENT & CONTROL SHEET

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CONSTRUCTION
OR RECORDING

Registered Professional Engineer (Civil)
CERTIFICATE NO.
10512
ASHOK C.
PATEL
Date Signed
ARIZONA, U.S.A.

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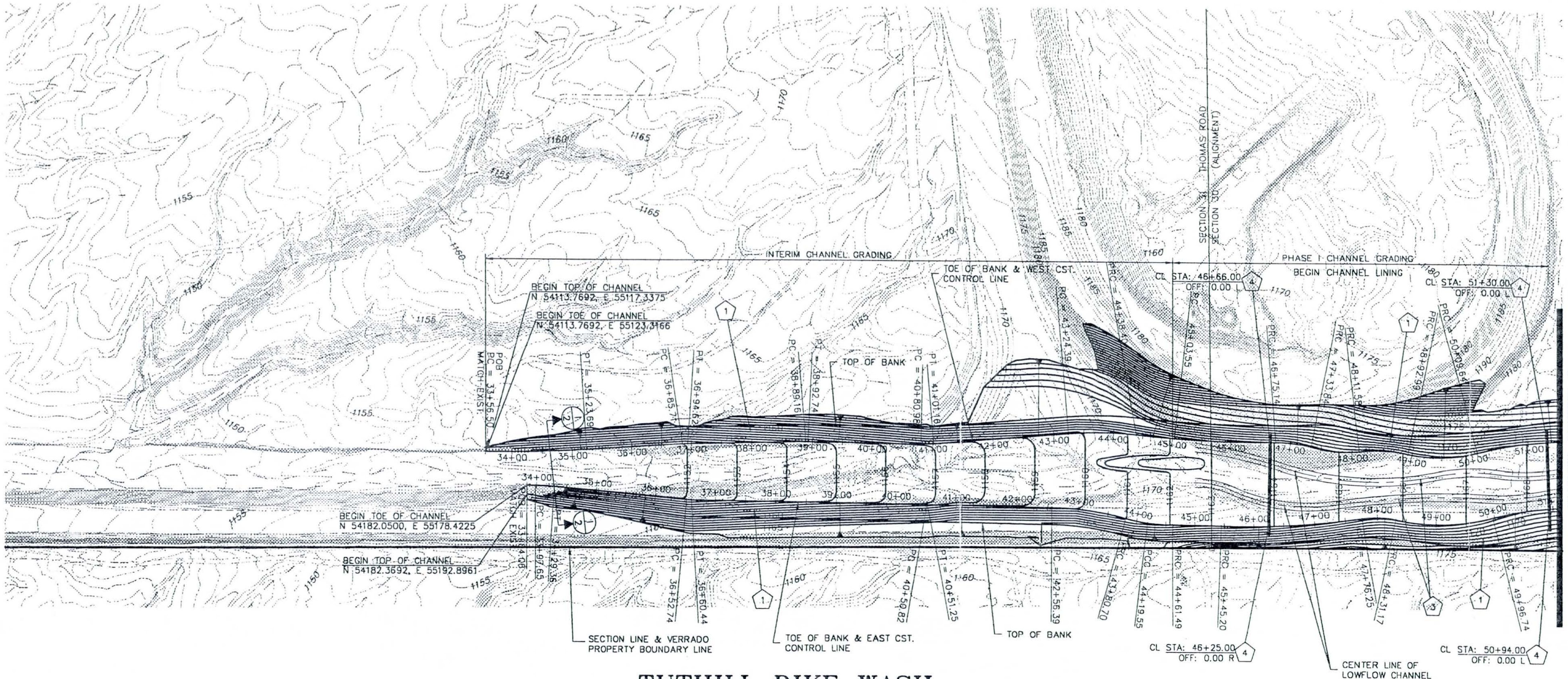
DESIGNER	J. Taillon / J. McCarty
DRAWN	J. Castaneda
CHECKED	A. Patel
DATE	May 8, 2002
SCALE	1" = 100'
JOB NO.	011416.02
SHEET	6 OF 18



TUTHILL DIKE WASH

CONSTRUCTION NOTES

1. CONSTRUCT EARTHEN CHANNEL PER TYPICAL SECTION A-A ON SHEET 2.
3. CONSTRUCT LOW-FLOW CHANNEL PER ALIGNMENT & CONTROL, SHEETS 3-5.
4. CONSTRUCT GRADE CONTROL STRUCTURE WITH LOOSE RIP-RAP PER TYPICAL DETAIL 2 AND GRADATION TABLE, SHEET 2.

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TUTHILL DIKE WASH & TRACTOR WASH - PHASE I
CHANNELIZATION PLAN

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OR RECORDING

Registered Professional Engineer (Civil) — Certificate No. 10512 — ASHOK C. PATEL — ARIZONA, U.S.A.

DESIGNER	J. Taillon / J. McCarty
DRAWN	J. Castaneda
CHECKED	A. Patel
DATE	May 8, 2002
SCALE	1" = 100'
JOB NO.	011416.02
SHEET	7 OF 18

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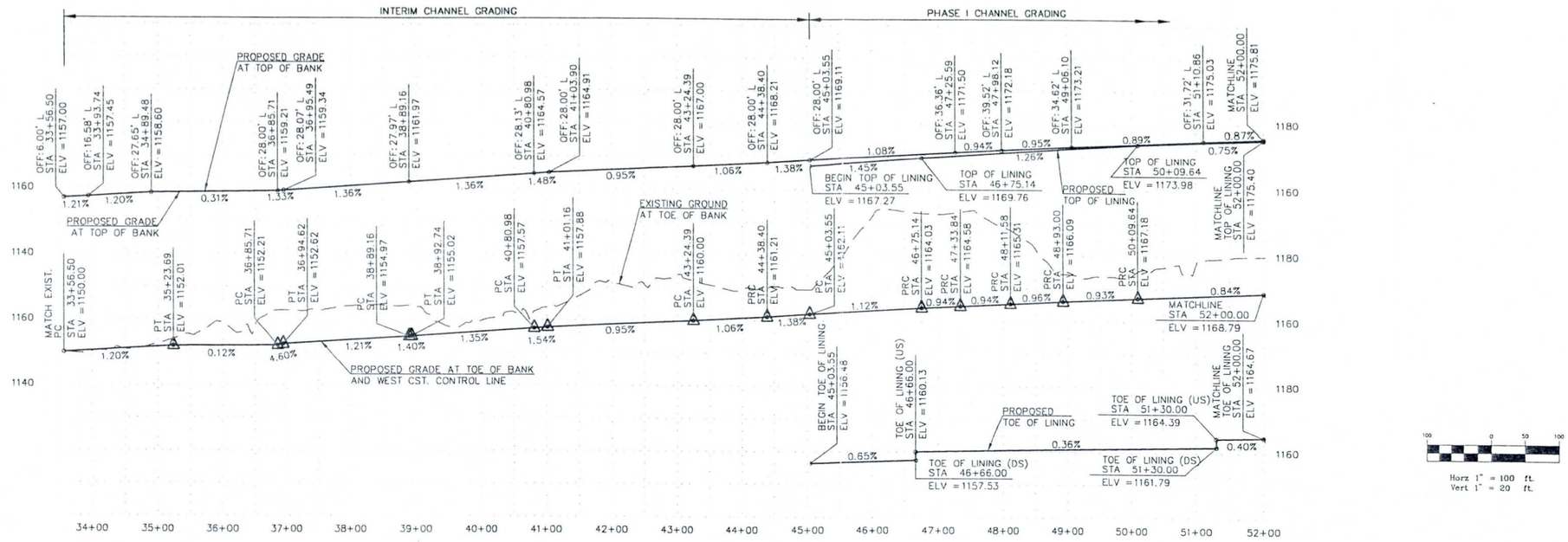
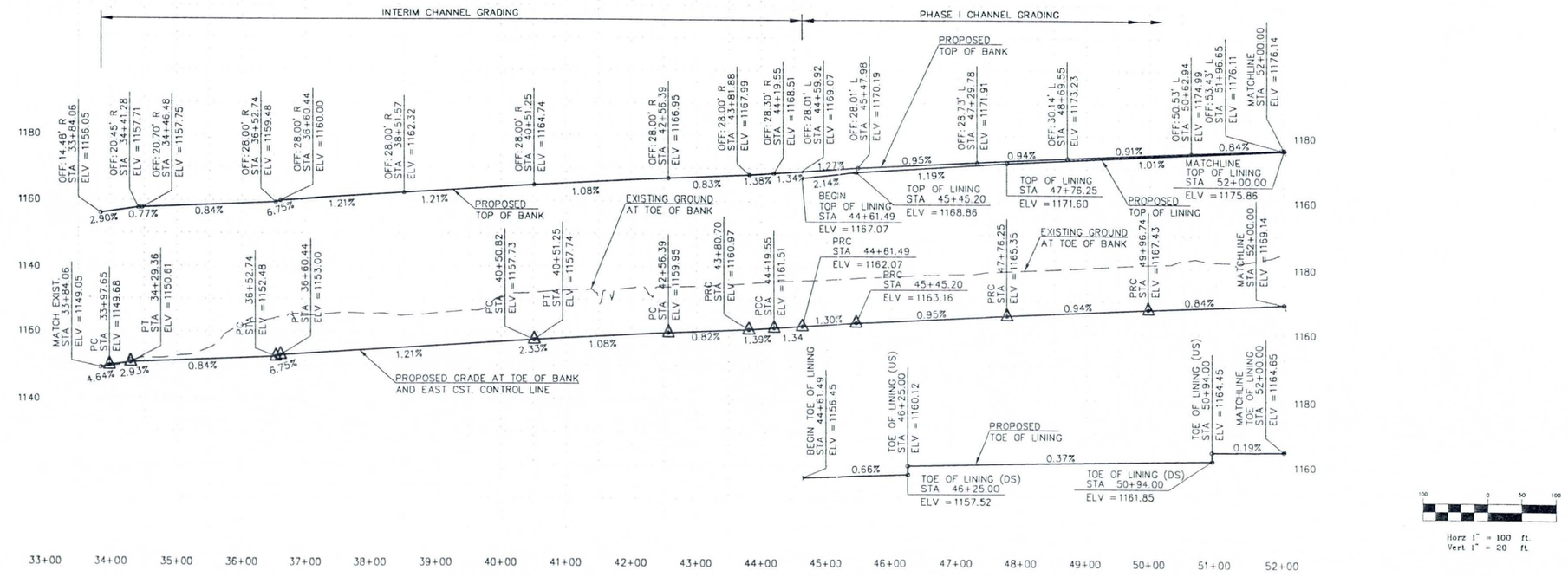


TUTHILL DIKE WASH WEST SIDE



TUTHILL DIKE WASH EAST SIDE

Horz 1" = 100 ft.
Vert 1" = 20 ft.

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TUTHILL DIKE WASH & TRACTOR WASH - PHASE I
PROFILE PLAN

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OR RECORDING

Registered Professional Engineer
CERTIFICATE NO.
10512
ASHOK C. PATEL
Date Signed
ARIZONA, U.S.A.

DESIGNER J. Taillon / J. McCarty
DRAWN J. Castaneda
CHECKED A. Patel
DATE May 8, 2002
SCALE 1" = 100'
JOB NO. 011416.02
SHEET 8 OF 18

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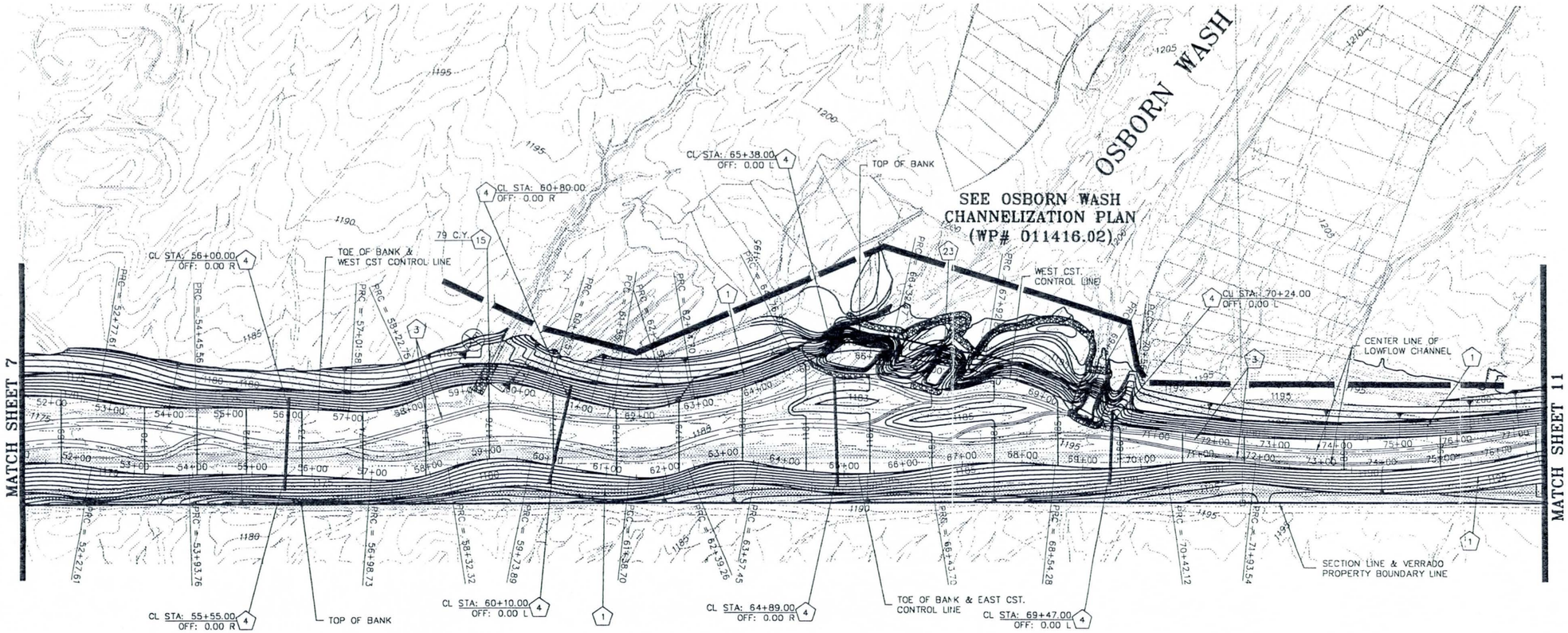

1 inch = 100 ft.

TUTHILL DIKE WASH

CONSTRUCTION NOTES

1. CONSTRUCT EARTHEN CHANNEL PER TYPICAL SECTION A-A ON SHEET 2.
3. CONSTRUCT LOW-FLOW CHANNEL PER ALIGNMENT & CONTROL, SHEETS 3-5.
4. CONSTRUCT GRADE CONTROL STRUCTURE WITH LOOSE RIP-RAP PER TYPICAL DETAIL 2 AND GRADATION TABLE, SHEET 2.
15. STA: 59+50.00 CONSTRUCT SWALE PER SECTION F-F, SHEET 3. INSTALL LOOSE RIP-RAP (TYPE I).
23. SEE SHEET 17 FOR DROP STRUCTURE DETAILS.

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TUTHILL DIKE WASH & TRACTOR WASH - PHASE I
CHANNELIZATION PLAN

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OR RECORDING

Registered Professional Engineer
CERTIFICATE NO.
10517
ASHOK C. PATEL
Date Signed
ARIZONA, U.S.A.

DESIGNER J. Taillon / J. McCarty
DRAWN J. Castaneda
CHECKED A. Patel
DATE May 8, 2002
SCALE 1" = 100'
JOB NO 011416.02
SHEET 9 OF 18

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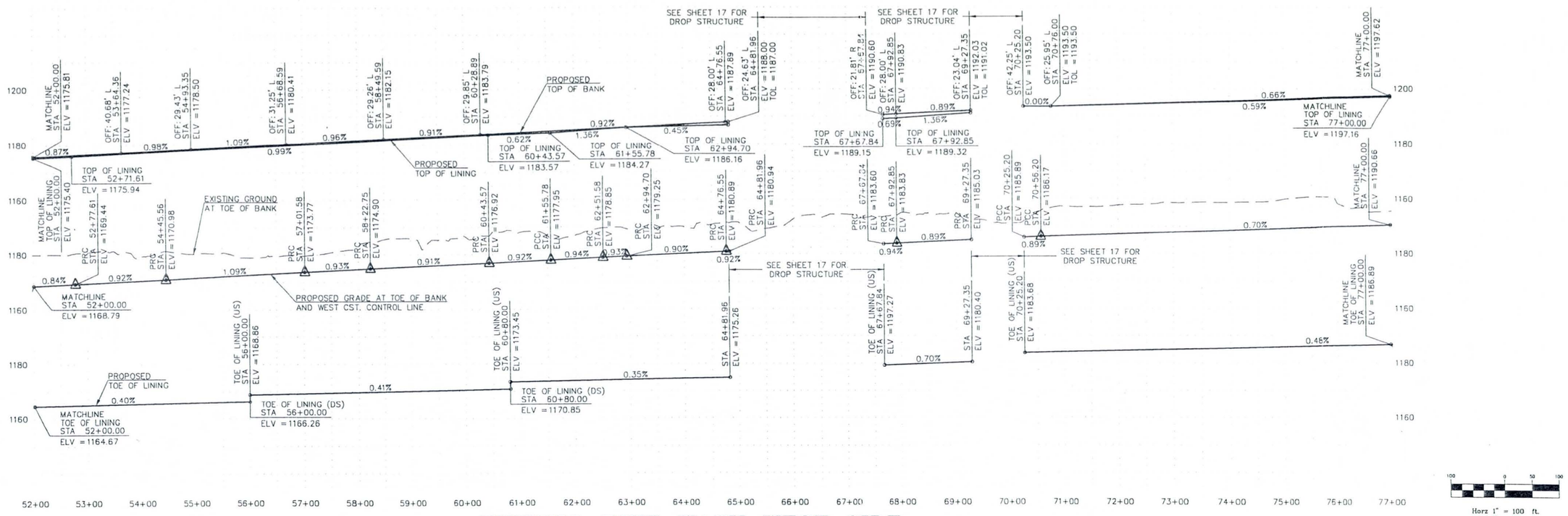
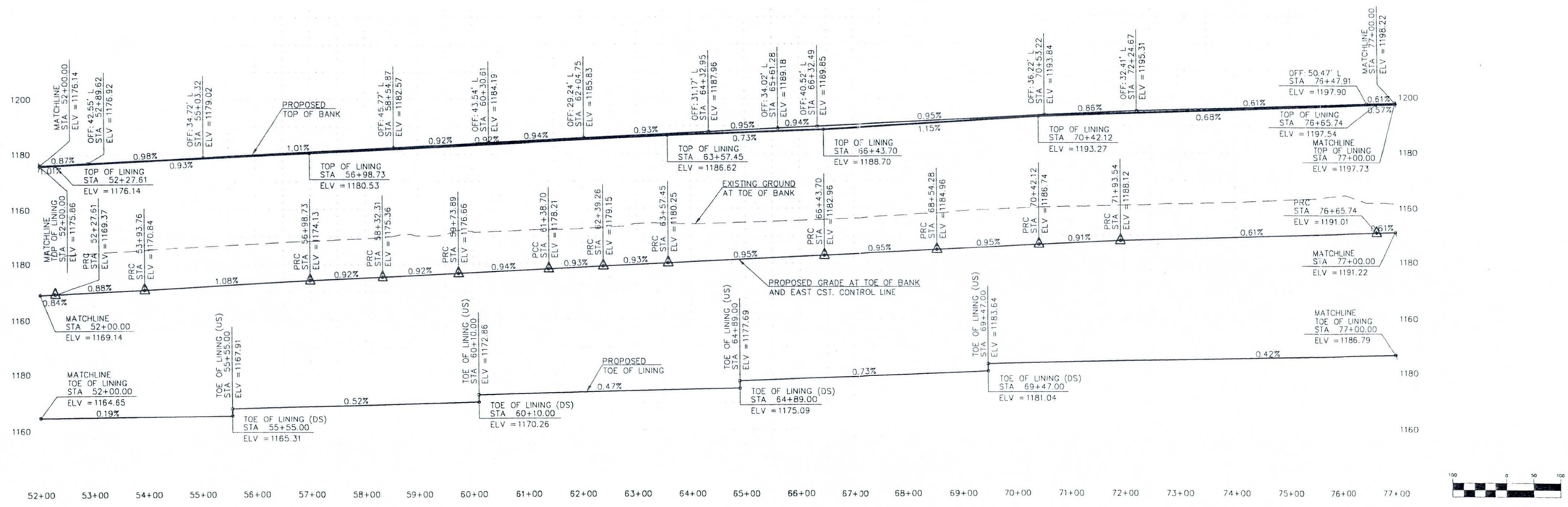


TUTHILL DIKE WASH WEST SIDE



TUTHILL DIKE WASH EAST SIDE

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TUTHILL DIKE WASH & TRACTOR WASH - PHASE I
PROFILE PLAN

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OR RECORDING

Registered Professional Engineer
10517
ASHOK C. PATEL
Date Signed
ARIZONA, U.S.A.

DESIGNER	J. Taillon / J. McCarty
DRAWN	J. Castanedo
CHECKED	A. Patel
DATE	May 8, 2002
SCALE	1" = 100'
JOB NO.	011416.02
SHEET	10 OF 18

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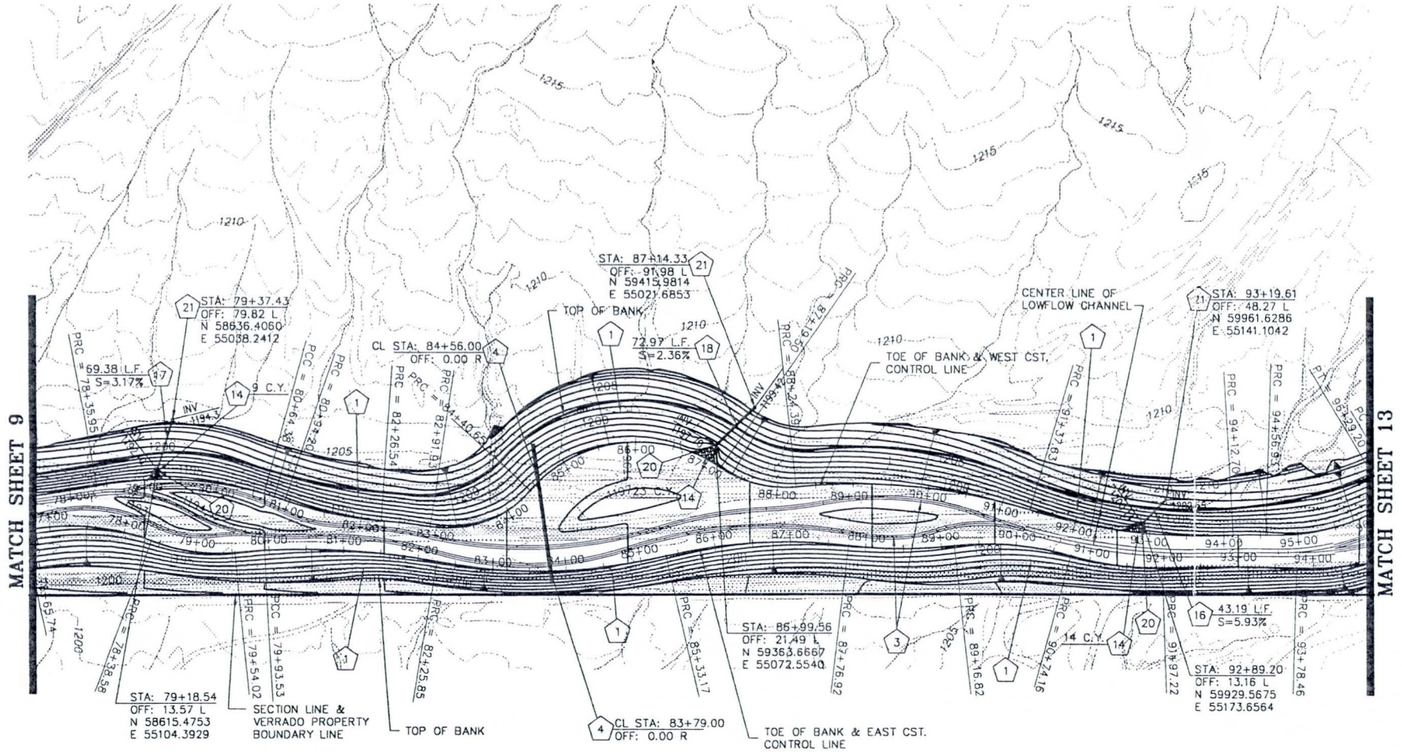

1 inch = 100 ft.

CONSTRUCTION NOTES

1. CONSTRUCT EARTHEN CHANNEL PER TYPICAL SECTION A-A ON SHEET 2.
3. CONSTRUCT LOW-FLOW CHANNEL PER ALIGNMENT & CONTROL, SHEETS 3-5.
4. CONSTRUCT GRADE CONTROL STRUCTURE WITH LOOSE RIP-RAP PER TYPICAL DETAIL 2 AND GRADATION TABLE, SHEET 2.
14. INSTALL LOOSE RIP-RAP (TYPE I) 2.0' DEEP.
16. INSTALL 24" CLASS III R.G.R.C.P. PIPE.
17. INSTALL 30" CLASS III R.G.R.C.P. PIPE.
18. INSTALL 36" CLASS III R.G.R.C.P. PIPE.
20. CONSTRUCT END SECTION PER DETAIL ON SHEET 2.
21. INSTALL PIPE PLUG PER M.A.G. STD. DTL. 427.

TUTHILL DIKE WASH

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TUTHILL DIKE WASH & TRACTOR WASH - PHASE I
CHANNELIZATION PLAN

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Registered Professional Engineer
CERTIFICATE NO.
10517
ASHOK C. PATEL
Date Signed
ARIZONA, U.S.A.

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DESIGNER	J. Taillon / J. McCarty
DRAWN	J. Castaneda
CHECKED	A. Patel
DATE	May 8, 2002
SCALE	1" = 100'
JOB NO	011416.02
SHEET	11 OF 18

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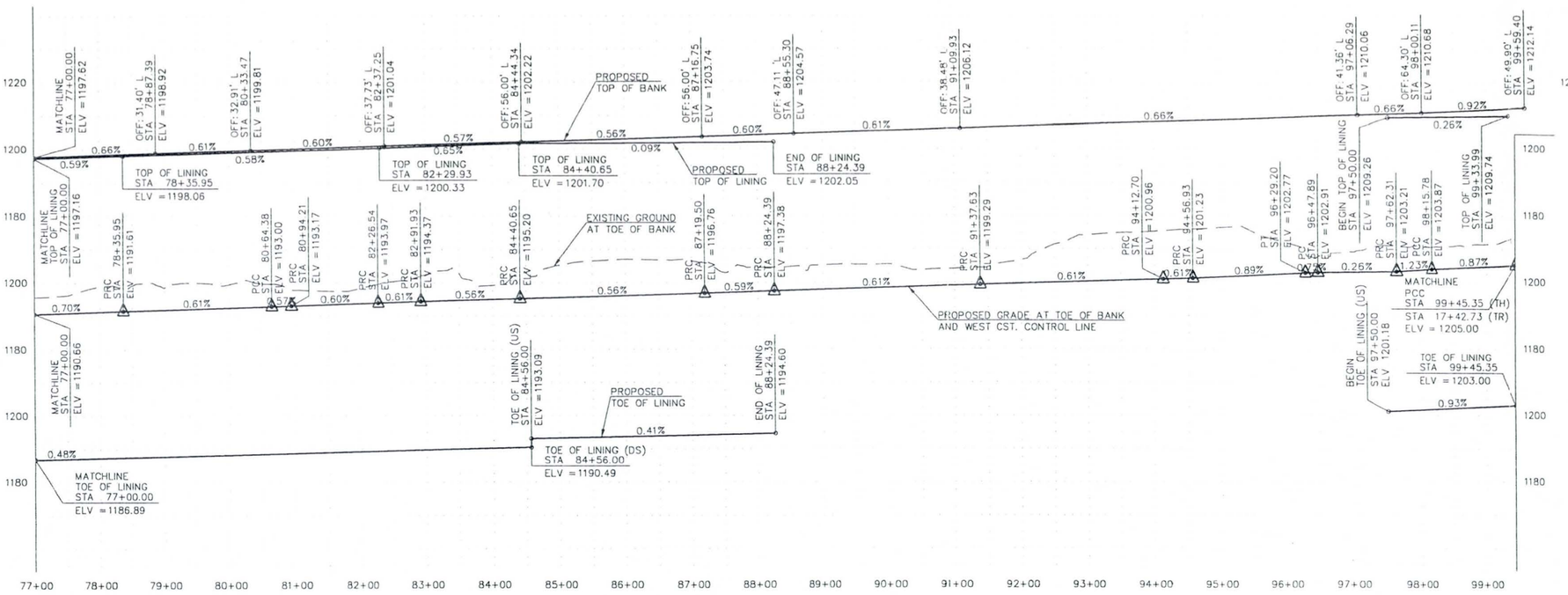
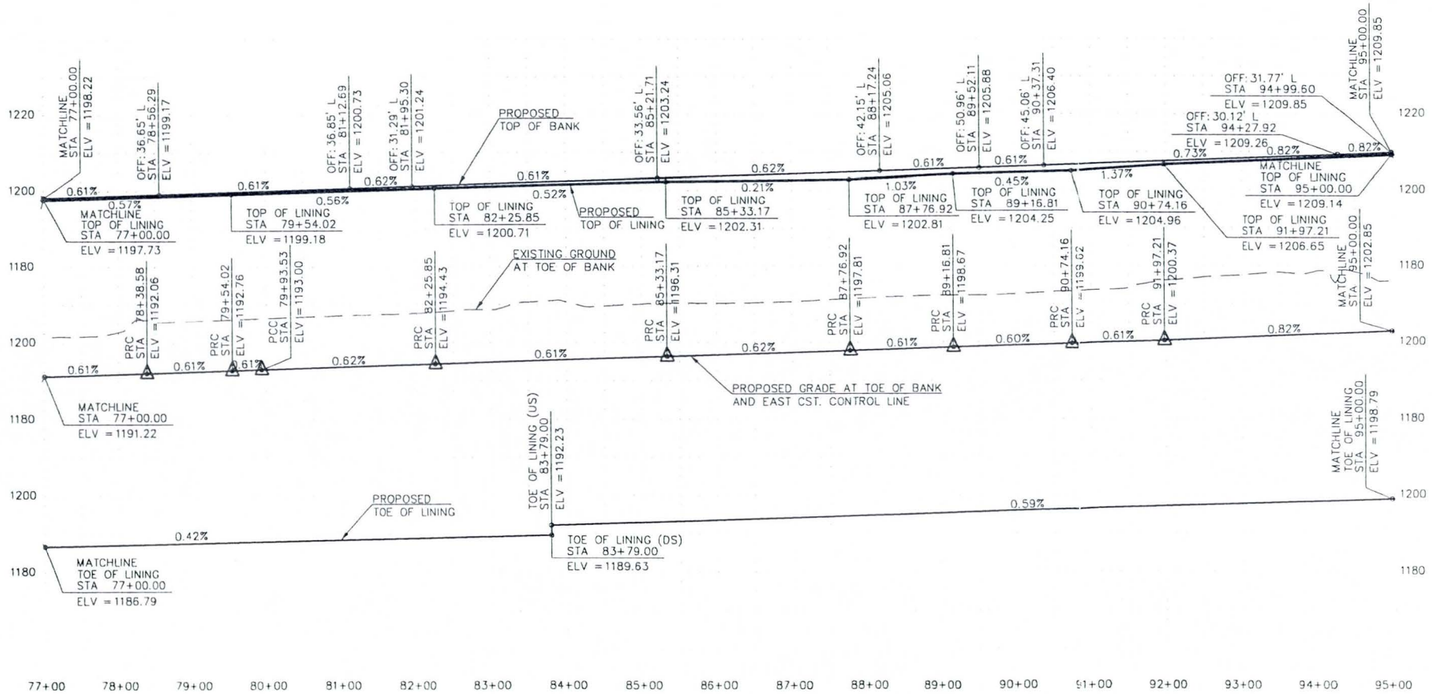


TUTHILL DIKE WASH WEST SIDE

Horz 1" = 100 ft.
Vert 1" = 20 ft.



TUTHILL DIKE WASH EAST SIDE

Horz 1" = 100 ft.
Vert 1" = 20 ft.

DMB

WOOD/PATEL
Civil Engineers
Hydrologists
Water Resources
Construction Managers
(602) 335-8500

VERRADO

BUCKEYE, AZ.

TUTHILL DIKE WASH & TRACTOR WASH - PHASE I
PROFILE PLAN

PRELIMINARY
NOT
FOR
CONSTRUCTION
OR RECORDING

Registered Professional Engineer
10517
ASHOK C. PATEL
Date Signed
ARIZONA, U.S.A.

DESIGNER J. Taillon / J. McCarty
DRAWN J. Castaneda
CHECKED A. Patel
DATE May 8, 2002
SCALE 1" = 100'
JOB NO. 011416.02
SHEET 12 OF 18

J:\2001\011416\TUTHILL-WASH\PHASE1\3447PRO12.dwg

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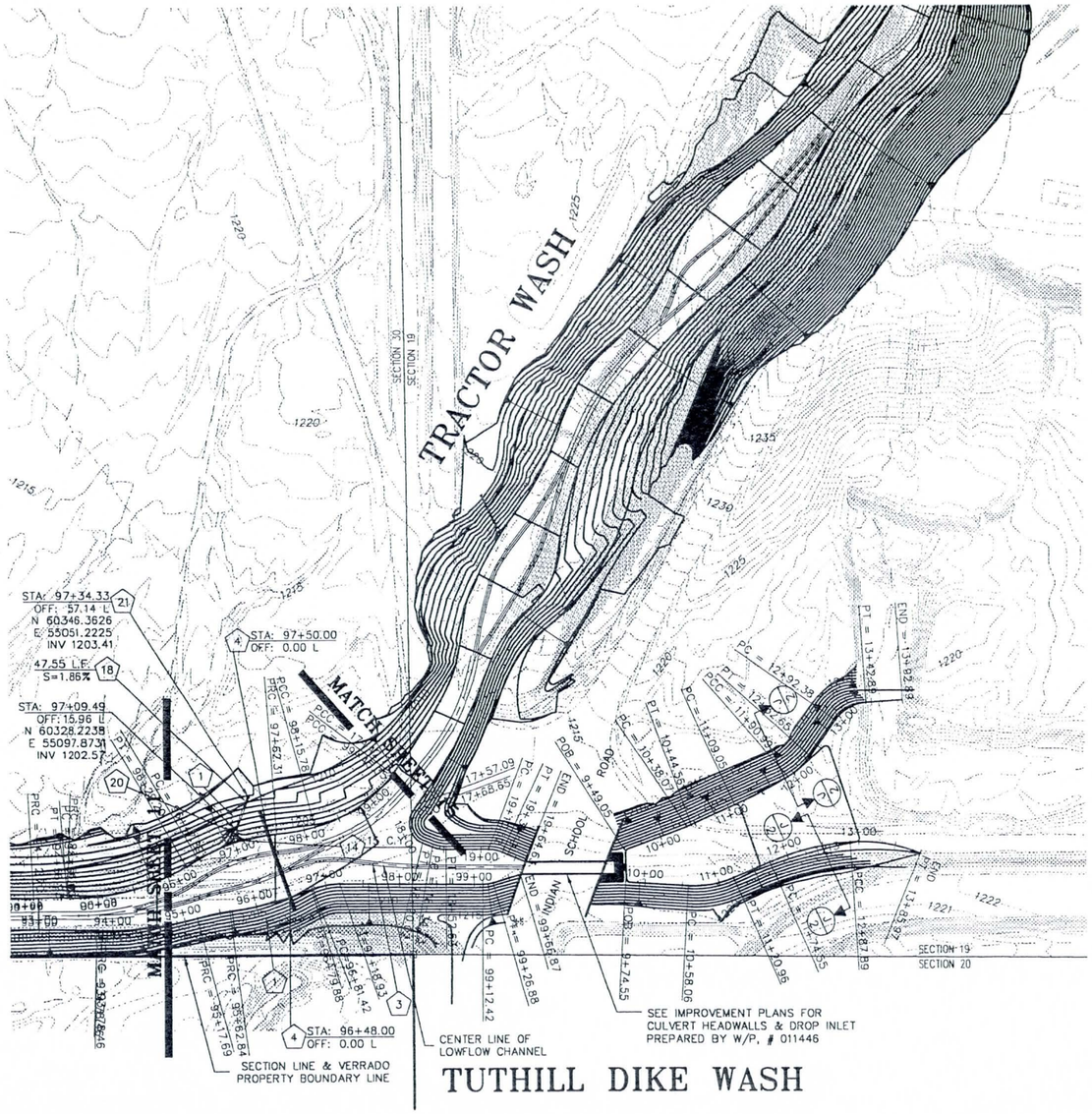

TUTHILL DIKE WASH

1 inch = 100 ft

CONSTRUCTION NOTES

1. CONSTRUCT EARTHEN CHANNEL PER TYPICAL SECTION A–A ON SHEET 2.
3. CONSTRUCT LOW–FLOW CHANNEL PER ALIGNMENT & CONTROL, SHEETS 3–5.
4. CONSTRUCT GRADE CONTROL STRUCTURE WITH LOOSE RIP–RAP PER TYPICAL DETAIL 2 AND GRADATION TABLE, SHEET 2.
14. INSTALL LOOSE RIP–RAP (TYPE I) 2.0' DEEP.
18. INSTALL 36" CLASS III R.C.R.C.P. PIPE.
20. CONSTRUCT END SECTION PER DETAIL ON SHEET 2.
21. INSTALL PIPE PLUG PER M.A.G. STD. DTL. 427.

DMB

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Land Surveyors
Construction Managers
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VERRADO
BUCKEYE, AZ.

TUTHILL DIKE WASH & TRACTOR WASH – PHASE I
CHANNELIZATION PLAN

PRELIMINARY
NOT
FOR
CONSTRUCTION
OR RECORDING

Registered Professional Engineer (Civil)
CERTIFICATE NO.
10512
ASHOK C. PATEL
Date Signed
ARIZONA, U.S.A.

DESIGNER: J. Taillon / J. McCarty
DRAWN: J. Castaneda
CHECKED: A. Patel
DATE: May 8, 2002
SCALE: 1" = 100'
JOB NO.: 011416.02
SHEET: 13 OF 18

V:\2001\011416\MP\TUTHILL-MASAPHASE1\11416PP013.dwg

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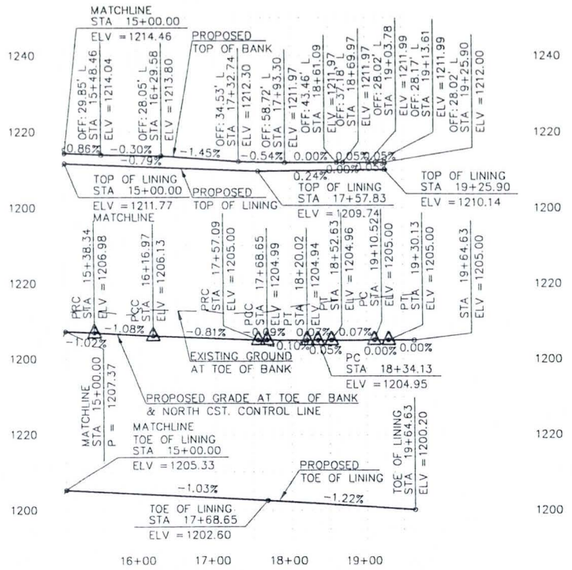
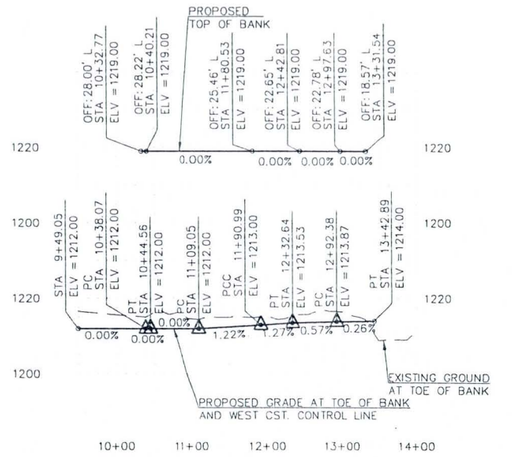
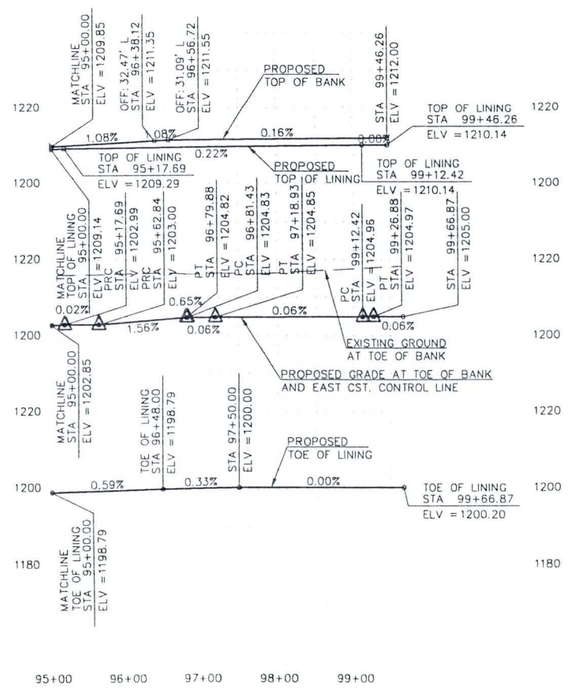


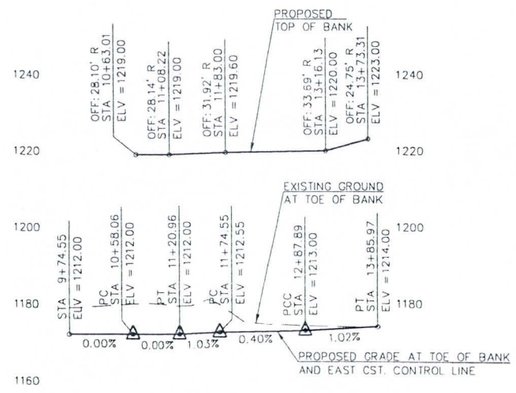
TUTHILL DIKE WASH WEST SIDE



TUTHILL DIKE WASH WEST SIDE (NORTH OF IND. SCHOOL)



TUTHILL DIKE WASH EAST SIDE



TUTHILL DIKE WASH EAST SIDE (NORTH OF IND. SCHOOL)

Horz 1" = 100 ft.
Vert 1" = 20 ft.

DMB
WOOD/PATEL
Civil Engineers
Hydrologists
Land Surveyors
Construction Managers
(602) 335-8500

VERRADO
BUCKEYE, AZ.
TUTHILL DIKE WASH & TRACTOR WASH - PHASE I
PROFILE PLAN

PRELIMINARY
NOT
FOR
CONSTRUCTION
OR RECORDING

Registered Professional Engineer (Civil) CERTIFICATE NO. 10517 ASHOK C. PATEL Date Signed ARIZONA, U.S.A.

DESIGNER	J. Taillon / J. McCarty
DRAWN	J. Castaneda
CHECKED	A. Patel
DATE	May 8, 2002
SCALE	1" = 100'
JOB NO.	011416.02
SHEET	14 OF 18

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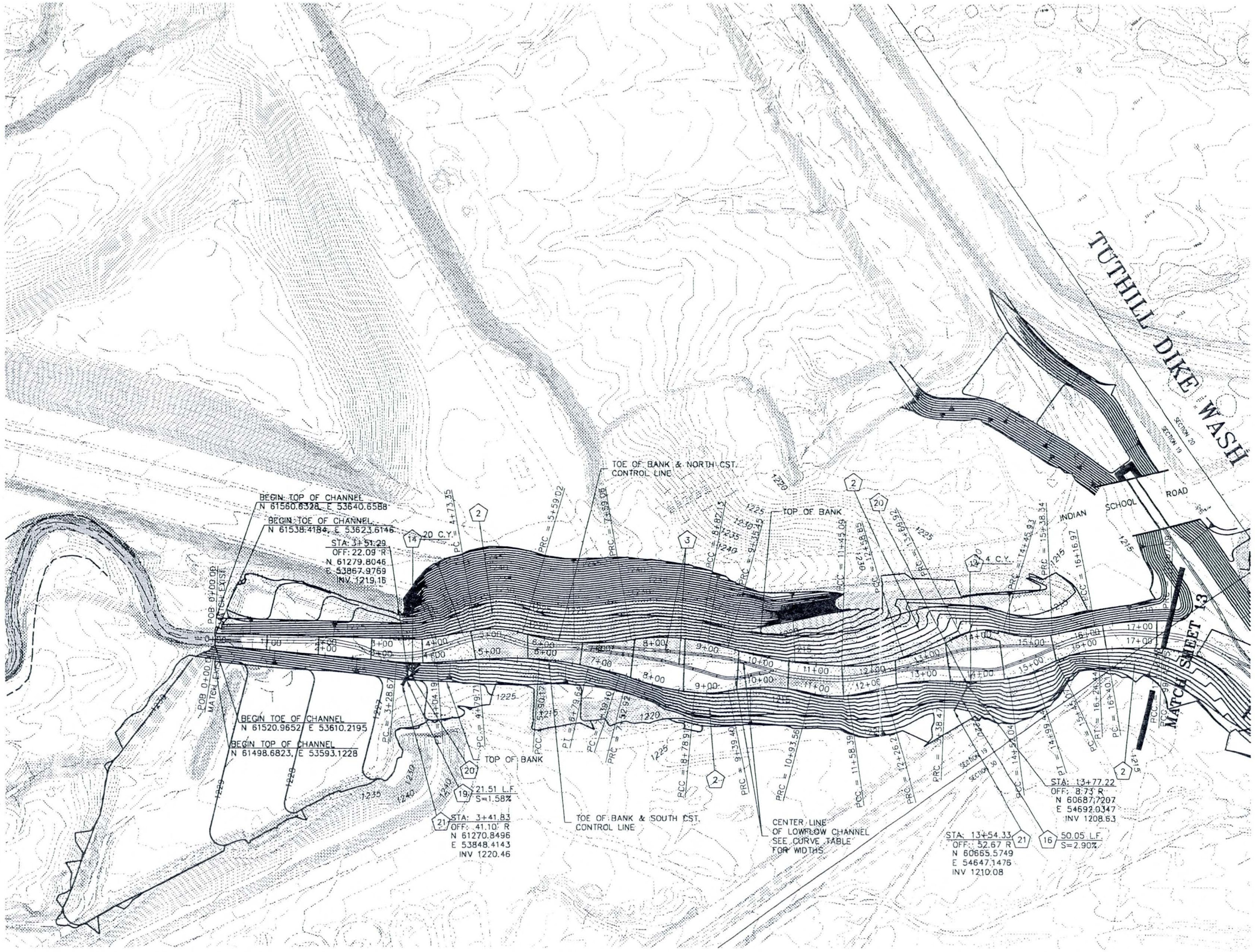

TRACTOR WASH

1 inch = 100 ft.

CONSTRUCTION NOTES

(2) CONSTRUCT EARTHEN CHANNEL PER TYPICAL SECTION B-B ON SHEET 2.

(3) CONSTRUCT LOW-FLOW CHANNEL PER ALIGNMENT & CONTROL, SHEETS 3-5.

(14) INSTALL LOOSE RIP-RAP (TYPE I) 2.0' DEEP.

(16) INSTALL 24" CLASS III R.G.R.C.P. PIPE.

(19) INSTALL 60" CLASS III R.G.R.C.P. PIPE.

(20) CONSTRUCT END SECTION PER DETAIL ON SHEET 2.

(21) INSTALL PIPE PLUG PER M.A.G. STD. DTL. 427.

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VERRADO
BUCKEYE, AZ.
TUTHILL DIKE WASH & TRACTOR WASH - PHASE I
CHANNELIZATION PLAN

PRELIMINARY
NOT
FOR
CONSTRUCTION
OR RECORDING

Registered Professional Engineer — Certificate No. 10512 — ASHOK C. PATEL — ARIZONA, U.S.A.

DESIGNER	J. Taillon / J. McCarty
DRAWN	J. Castaneda
CHECKED	A. Patel
DATE	May 8, 2002
SCALE	1" = 100'
JOB NO.	011416.02
SHEET	15 OF 18

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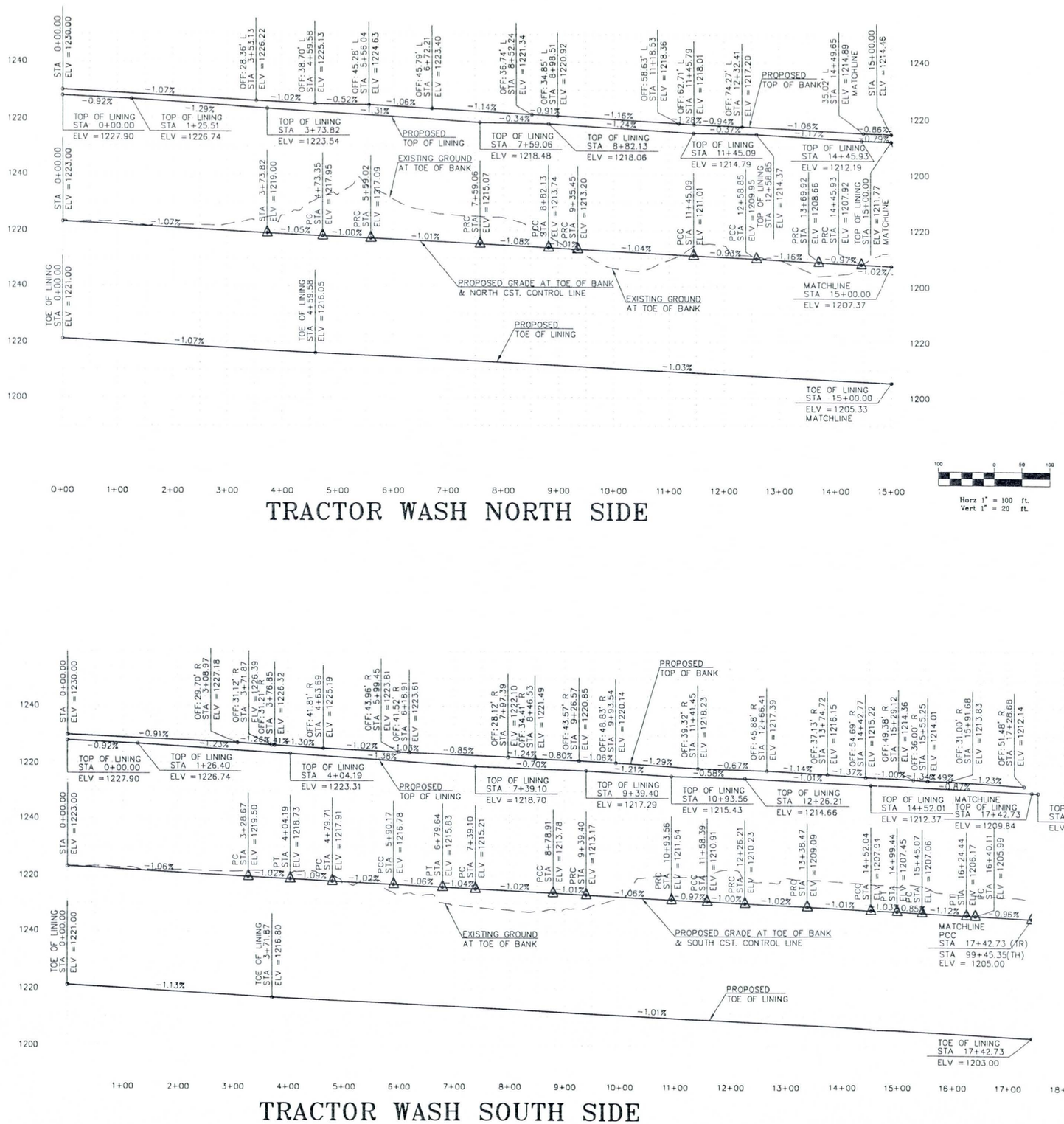
DRAWING AND SPECIFICATIONS AS INSTRUMENTS OF SERVICE ARE THE PROPERTY OF WHITE TANK, L.L.C. AND MAY NOT BE REPRODUCED WITHOUT THE WRITTEN PERMISSION OF WHITE TANK, L.L.C.



TRACTOR WASH NORTH SIDE

TRACTOR WASH SOUTH SIDE

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VERRADO

BUCKEYE, AZ.

TUTHILL DIKE WASH & TRACTOR WASH - PHASE I
PROFILE PLAN

PRELIMINARY
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OR RECORDING

Registered Professional Engineer
10517
ASHOK C. PATEL
Date Signed
ARIZONA, U.S.A.

DESIGNER J. Taillon / J. McCarty
DRAWN J. Castaneda
CHECKED A. Patel
DATE May 8, 2002
SCALE 1" = 100'
JOB NO. 011416.02
SHEET 16 OF 18

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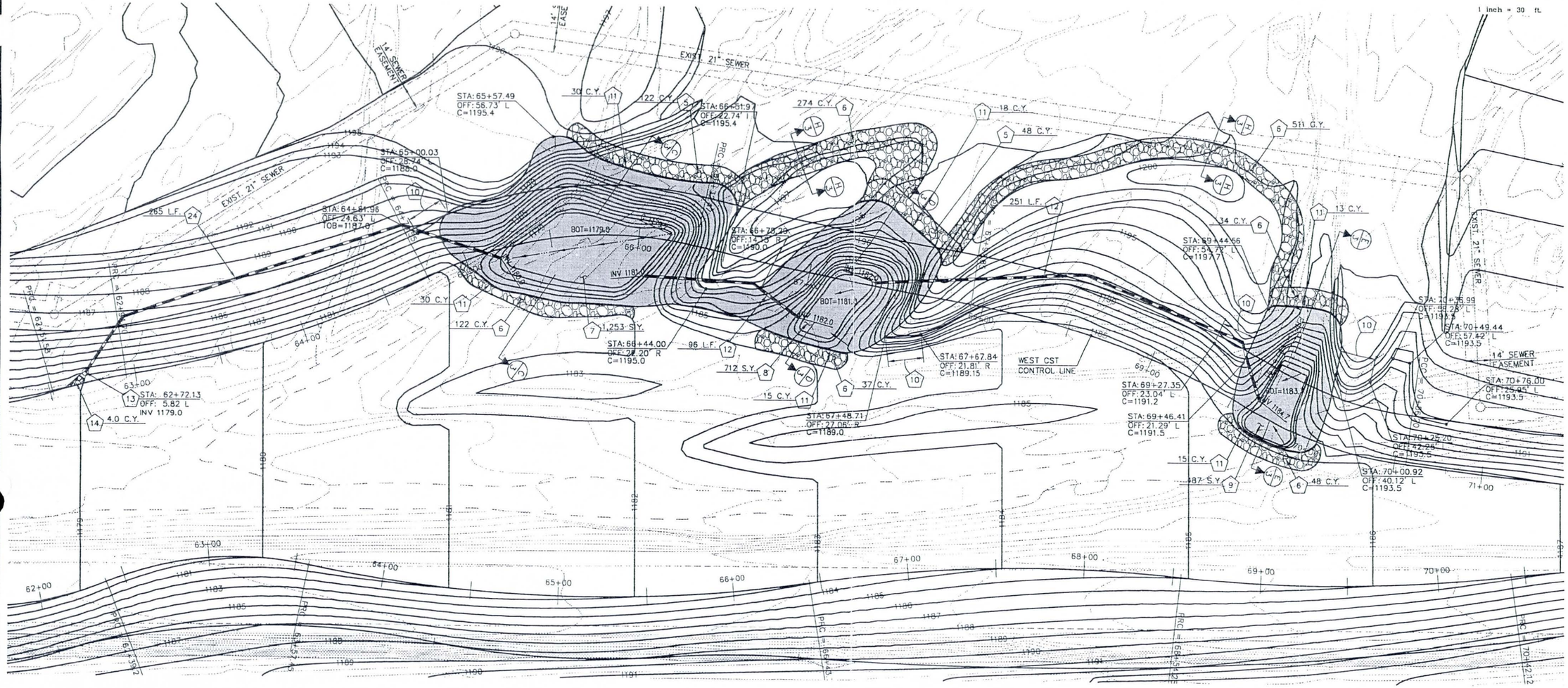

CONSTRUCTION NOTES

(5) INSTALL LOOSE RIP-RAP (TYPE II) 3.0' DEEP.

(6) INSTALL LOOSE RIP-RAP (TYPE I) 2.0' DEEP.

(7) CONSTRUCT PNUEMATICALLY PLACED MORTAR LINING PER SECTION C-C, SHEET 3.

(8) CONSTRUCT PNUEMATICALLY PLACED MORTAR LINING PER SECTION D-D, SHEET 3.

(9) CONSTRUCT PNUEMATICALLY PLACED MORTAR LINING PER SECTION E-E, SHEET 3.

(10) TRANSITION CHANNEL BANK PROTECTION TO DROP STRUCTURE LINING.

(11) CONSTRUCT CONCRETE CUTOFF WALL PER SECTIONS, C-C, D-D & E-E, SHEET 3.

(12) INSTALL 12" HDPE STORM DRAIN PIPE. MITERED END TO MATCH SLOPE. INSTALL DEBRIS SCREEN AT MITERED PIPE ENDS.

(13) INSTALL END SECTION PER M.A.G. STD. DET. 545.

(14) INSTALL LOOSE RIP-RAP (TYPE I) 2.0' DEEP.

(24) INSTALL 18" HDPE STORM DRAIN PIPE. INSTALL MITERED END SECTION WITH TRASH RACK MATCHING SLOPE AT INLET SIDE OF STORM DRAIN.

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TUTHILL DIKE WASH & TRACTOR WASH - PHASE I
CHANNELIZATION PLAN

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OR RECORDING

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DESIGNED	J. Taillon / J. McCarty
DRAWN	J. Castaneda
CHECKED	A. Patel
DATE	May 8, 2002
SCALE	1" = 100'
JOB NO.	011416.02
SHEET	17 OF 18

DRAWINGS, SPECIFICATIONS AS INSTRUMENTS OF SERVICE ARE THE PROPERTY OF WHITE TANK, LLC. AND MAY NOT BE REPRODUCED WITHOUT THE WRITTEN PERMISSION OF WHITE TANK, LLC.

SUPPLEMENTAL
EROSION CONTROL SPECIFICATIONS

WORK DESCRIPTION

This work shall consist of furnishing and installing erosion control geotextiles, gabions or other erosion protection material in accordance with the lines, grade, design and dimensions shown in the drawings and as specified here.

Geotextile: The geotextile shall be Maccaferri MacTex MX 275 or approved equal. The geotextile shall be composed of synthetic fibers formed into nonwoven fabric. Fibers used in manufacture of the geotextile shall be composed of long chain polymeric filaments. They shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other , including selvages. These materials shall conform to the requirements of Table "A". The geotextile shall contain stabilizers and/or inhibitors to make the fibers resistant to deterioration resulting from exposure to sunlight or heat. The geotextile shall be free of defects or flaws which significantly affect its physical and/or filtering properties.

TABLE "A"
PHYSICAL REQUIREMENTS–EROSION CONTROL
NONWOVEN GEOTEXTILE

Property	Units	Numeric Value	Test Method
Grab Tensile Strength	lb	200	ASTM D 4632
Grab Elongation	%	50	ASTM D 4632
Seam Strength	lb	200	ASTM D 4632
Puncture Strength	lb	130	ASTM D 4833
Mullen Burst Strength	lb/in^2	400	ASTM D 3786
Trapezoid Tear	lb	80	ASTM D 4533
Permittivity	Sec^{-1}	1.4	ASTM D 4491
Ultraviolet Stability %	%	70/500 Hrs	ASTM D 4355
Apparent Opening Size	U.S. Standard Sieve	80	ASTM D 4751

All numerical values represent minimum average roll values (i.e., average of test results from any sampled roll in a lot shall meet or exceed the minimum values) in a weaker principal direction. Lot sampled according to ASTM 4354 "Practice for Sampling of Geosynthetics for Testing".

Conformance of geotextiles to specification property requirements shall be based on ASTM D 4759, "Practice for Determining the Specification Conformance of Geosynthetics". Owner will require a letter from the manufacturer certifying that the geotextiles furnished meet specification requirements.

If field seams are required by owner, values apply to both field and factory.

Geotextile Shipment and Storage: The geotextile shall be kept dry and wrapped such that it is protected from the elements during shipping and storage. At no time shall the geotextile be exposed to ultraviolet light for period exceeding fourteen days. The geotextile shall be labeled as per ASTM D4873. "Guide for Identification, Storage, and Handling of Geotextiles". Rolls shall be stored in a manner which protects them from the elements. If stored outdoors, they shall be elevated and protected with a waterproof cover.

Geotextile Placement: The geotextile shall be placed on a smooth graded surface approved by the owner. The geotextile shall be placed in such a manner that will not excessively stretch or tear upon placement of the overlying materials. Care should be taken to place the geotextile in intimate contact with the soil such that no void spaces exist between the underlying soil and the geotextile. Anchoring of the geotextile shall be accomplished through the use of key trenches of aprons at the crest and toe of slope.

Geotextile sheets shall be joined by either seaming or overlapping. All overlaps and seams shall be subject to the approval of the owner. Overlapped sheets shall have a minimum overlap of 3 feet. Overlaps shall be constructed with the upstream sheet placed over the downstream sheet or the upslope sheet placed over the downslope sheet. All overlaps shall be pined on 3-foot centers to hold the overlap in place during Gabion/Mattress placement. Pins are to be 3/16-in. diameter, 18-inches long, steel pins pointed at one end and fitted with a 1.5 inch diameter washer at the other.

Care shall be taken during construction to avoid contamination of the geotextile during construction. Contaminated geotextile shall be removed and replaced at the contractor's expense. Damaged geotextile shall be removed or repaired as directed by the owner. The patch shall extend 3 feet beyond the perimeter of the tear or damage and be pinned on 3-foot centers.

In the event that installation of the Gabion/Mattress and /or Stone demonstrates excessive damage/puncture to the geotextile, in the opinion of the owner. The contractor shall install a two inch gravel blanket between the geotextile and the Gabion/Mattress at the contractor's sole expense.

Granular bedding may be used in lieu of geotextile. Granular bedding shall be 4" thick, 3" minus graded gravel.

Gabion/Mattress Stone: Stone placement shall begin at the Gabion/Mattress toe and proceed up the slope. Stone shall not be dropped onto the geotextile from a height of more than 1 foot unless field trials demonstrate, to the approval of the inspector, that greater drop heights will not damage/puncture the geotextile. Any geotextile damaged during placement of stone shall be replaced as directed by the owner at the contractor's expense. Concrete rubble shall not be allowed as an acceptable substitution for stone. Stone shall conform to Table "B".

TABLE "B"

BOX GABION STONE	GABION MATTRESS STONE
D_{min} = 4"	D_{min} = 3"
D_{50} = 6"	D_{50} = 4.5"
D_{max} = 8"	D_{max} = 6"

Box Gabion/Gabion Mattress: Gabions and mattresses shall be fabricated in such a manner that the sides, ends, lid and diaphragms can be assembled at the construction site into rectangular units of the specified sizes. Gabions and mattresses are to be single unit construction, the base, ends and sides either to be woven into a single unit or one edge of these members connected to the base section of the unit in such a manner that strength and flexibility at the point of connection is at least equal to that of the mesh.

Where the length of the gabion or mattress exceeds its horizontal width, the gabion or mattress is to be equally divided by diaphragms, of the same mesh and diameter as the body of the gabions or mattresses, into cells whose length does not exceed the horizontal width. The gabions and mattresses shall be furnished with necessary diaphragms secured in proper position on the base section in such a manner that no additional tying at this juncture will be necessary.

All perimeter edges of gabions and mattresses are to be securely selvedged or bound so that the joints formed by tying the selvages have at least the same length as the body of the mesh.

Gabions and mattress shall conform with the project plan details. Stone shall be placed in close contact in the unit so that maximum fill is obtained. The units may be filled by machine with sufficient hand work to accomplish requirements of this specification.

Three foot high cells shall be filled in three lifts. Two connecting tie wires shall be placed between each lift in each cell. Care shall be taken to protect the vertical panels and diaphragms from being bent during filling operations.

The last lift of stone in each cell shall be level with the top of the gabion or mattress in order to properly close the lid and provide an even surface.

All gabion and mattress units shall be periodically tied or continuously laced together using selvedge wire, each to its neighbor, along all contacting edges, at 6-inch maximum spacing between ties, in order to form continuous connection structure.

Box gabions shall be fabricated from zinc coated 8x10 mesh steel wire meeting:

Mesh Opening: Hex Nom 3-1/4" x 4-1/2"
Mesh Wire: 0.120" Nom.Diam., ./sq.ft zinc coating
Selvedge Wire: 0.1535" Nom. Diam., 0.90 ozs./sq.ft. zinc coating
Lacing Wire: 0.0866" Nom. Diam., 0.70 ozs./sq.ft. zinc coating

Box gabions shall be MACCAFERRI gabions or approved equal.

Gabion Mattresses shall be fabricated from zinc coated 8x10 mesh steel wire meeting:

Mesh Opening: Hex Nom 3-1/4" x 4-1/2"
Mesh Wire: 0.120" Nom.Diam., ./sq.ft zinc coating
Selvedge Wire: 0.1535" Nom. Diam., 0.90 ozs./sq.ft. zinc coating
Lacing Wire: 0.0866" Nom. Diam., 0.70 ozs./sq.ft. zinc coating

Gabion mattresses shall be MACCAFERRI Reno Mattresses or approved equal.

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VERRADO
BUCKEYE, AZ.
TUTHILL DIKE WASH & TRACTOR WASH – PHASE I
CHANNELIZATION PLAN

PRELIMINARY
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OR RECORDING

Registered Professional Engineer (Civil)
CERTIFICATE NO.
10512
ASHOK C.
PATEL
Date Signed
ARIZONA, U.S.A.

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DESIGNER J. Taillon / J. McCarty
DRAWN J. Castaneda
CHECKED A. Patel
DATE May 8, 2002
SCALE 1" = 100'
JOB NO. 011416.02
SHEET 18 OF 18

Exhibit C Study Work Maps

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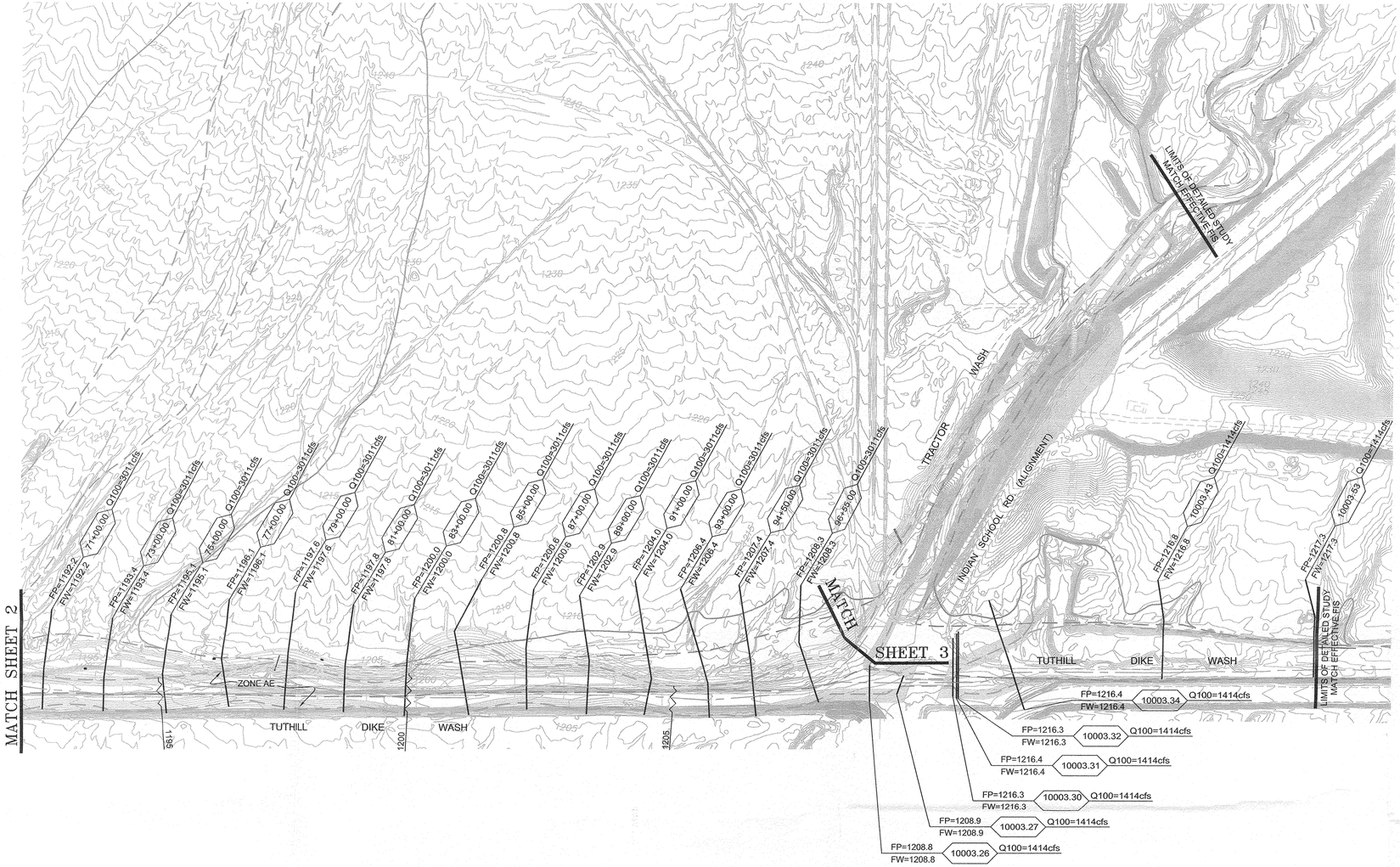

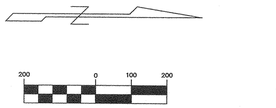

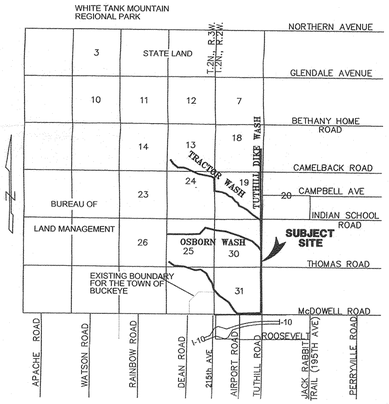

VICINITY MAP
N.T.S.

REFERENCE MARK RM:

BRASS CAP IN HANDHOLE AT THE INTERSECTION OF JACKRABBIT TRAIL AND McDOWELL ROAD.
ELEV. = 1079.43
RM 3045 FROM FIRM MAP# 0413C2055 F

LEGEND:

1.01	CROSS SECTION NUMBER
FP=1154.4	FLOODPLAIN WATER SURFACE ELEVATION = 1154.4
FW=1154.4	FLOODWAY WATER SURFACE ELEVATION = 1154.4
Q100=943cfs	100-YEAR PEAK DISCHARGE = 943 CUBIC FEET PER SEC.
1252	BASE FLOOD ELEVATION
	STREAM CENTERLINE
	POST PROJECT CONDITION FLOODWAY BOUNDARY
	POST PROJECT CONDITION FLOODPLAIN BOUNDARY
	EFFECTIVE FLOODWAY BOUNDARY
	EFFECTIVE FLOODPLAIN BOUNDARY
ZONE AE	FLOOD INSURANCE RATE ZONE

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Construction Managers
(602) 335-8500

TUTHILL DIKE WASH
BUCKEYE, AZ.

PRELIMINARY
NOT
FOR
CONSTRUCTION
OR RECORDING

Registered Professional Engineer (Civil)
CERTIFICATE NO.
10512
ASHOK C. PATEL
Date Signed
ARIZONA, U.S.A.

DESIGNER	TAILLON, CAMPBELL
DRAWN	J. CASTANEDA
CHECKED	A.PATEL
DATE	02/04/04
SCALE	1" = 200'
JOB NO.	011416.02
SHEET	1A OF 3

M:\2001\1941\P\TUTHILL\CLOMAR\POST\1941FIX-01.DWG

EXHIBIT C
STUDY WORK MAP

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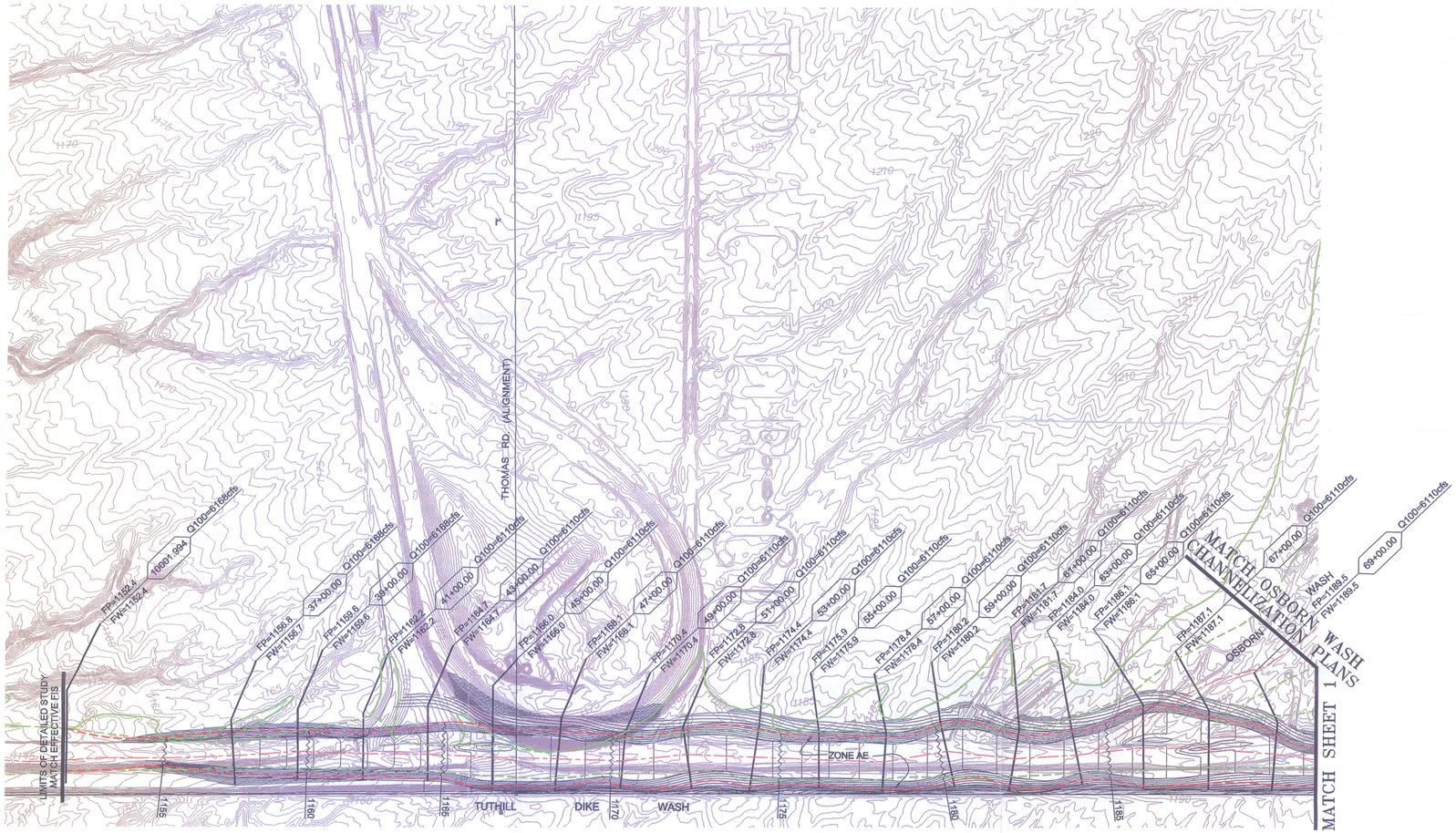
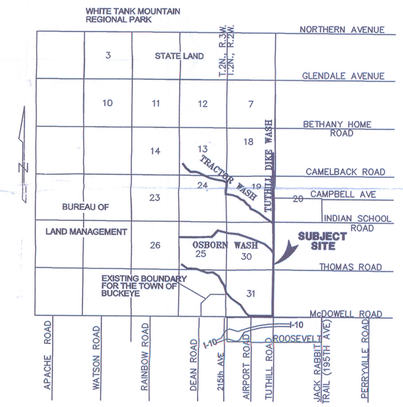


1 inch = 200 ft.



VICINITY MAP
N.T.S.

REFERENCE MARK RM:

BRASS CAP IN HANDHOLE AT THE INTERSECTION OF JACKRABBIT TRAIL AND McDOWELL ROAD.
ELEV. = 1079.43
RM 3045 FROM FIRM MAP# 0413C2055 F

LEGEND:

1.01	CROSS SECTION NUMBER
FP=1154.4	FLOODPLAIN WATER SURFACE ELEVATION = 1154.4
FW=1154.4	FLOODWAY WATER SURFACE ELEVATION = 1154.4
Q100=943cfs	100-YEAR PEAK DISCHARGE = 943 CUBIC FEET PER SEC.
1252	BASE FLOOD ELEVATION
	STREAM CENTERLINE
	POST PROJECT CONDITION FLOODWAY BOUNDARY
	POST PROJECT CONDITION FLOODPLAIN BOUNDARY
	EFFECTIVE FLOODWAY BOUNDARY
	EFFECTIVE FLOODPLAIN BOUNDARY
ZONE AE	FLOOD INSURANCE RATE ZONE

DMB

WOOD/PATEL
Civil Engineers
Hydrologists
Land Surveyors
Construction Managers
(602) 335-8500

TUTHILL DIKE WASH
BUCKEYE, AZ.

PRELIMINARY
NOT
FOR
CONSTRUCTION
OR RECORDING

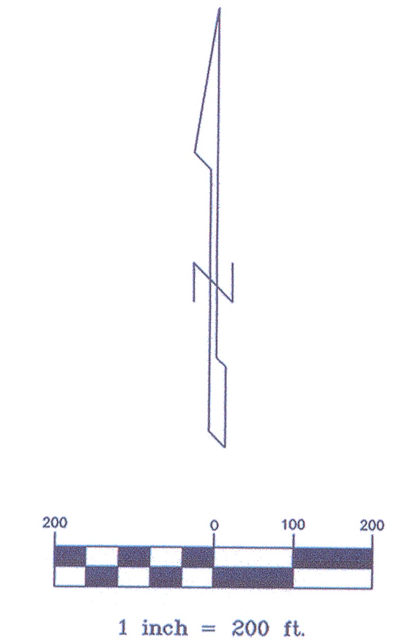
Registered Professional Engineer (Civil)
CERTIFICATE NO.
10512
ASHOK C. PATEL
Date Signed
ARIZONA, U.S.A.

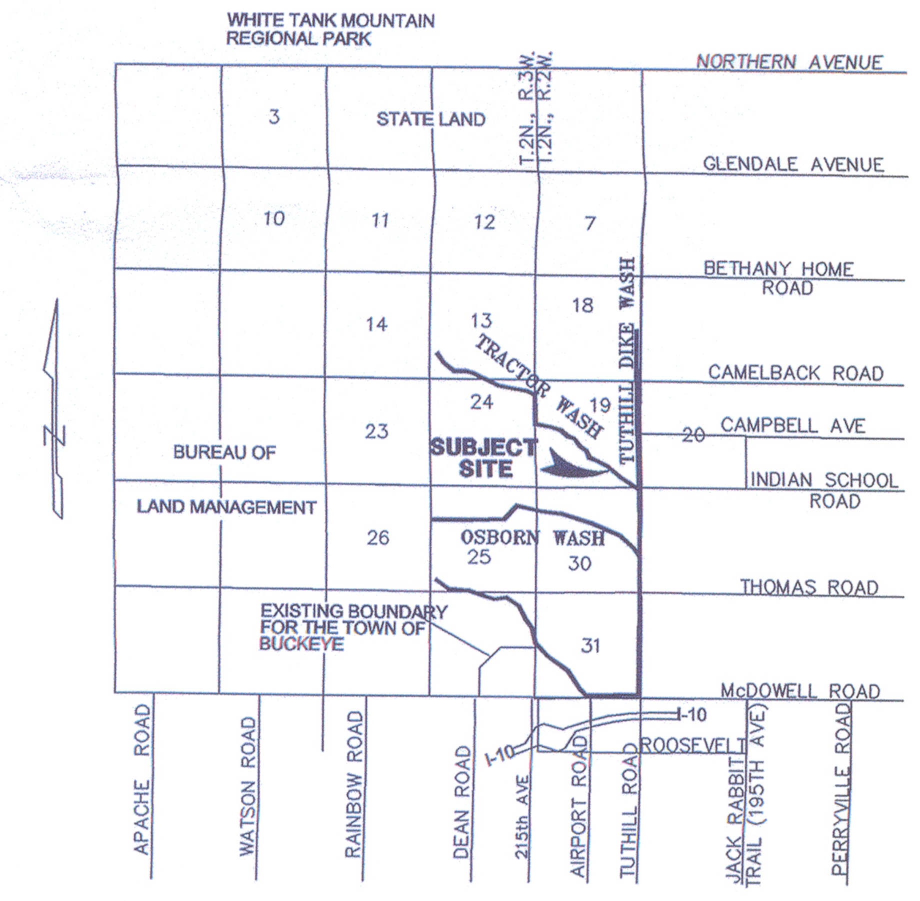
M:\2001\B4RUN\TUTHILL\CLOMAR\POST\B4RFH-02.DWG

DESIGNER	TAILLON, CAMPBELL
DRAWN	J. CASTANEDA
CHECKED	A.PATEL
DATE	03/18/02
SCALE	1" = 200'
JOB NO.	011416.02
SHEET	2 OF 3

EXHIBIT C
STUDY WORK MAP

DRAWINGS AND SPECIFICATIONS AS INSTRUMENTS OF SERVICE ARE THE PROPERTY OF WHITE TANK, LLC. AND MAY NOT BE REPRODUCED WITHOUT THE WRITTEN PERMISSION OF DMB WHITE TANK, LLC.





VICINITY MAP
N.T.S.

REFERENCE MARK RM:

BRASS CAP IN HANDHOLE AT THE INTERSECTION OF JACKRABBIT TRAIL AND McDOWELL ROAD.
ELEV. = 1079.43
RM 3045 FROM FIRM MAP# 0413C2055 F

LEGEND:

1.01	CROSS SECTION NUMBER
FP=1154.4	FLOODPLAIN WATER SURFACE ELEVATION = 1154.4
FW=1154.4	FLOODWAY WATER SURFACE ELEVATION = 1154.4
Q100=943cfs	100-YEAR PEAK DISCHARGE = 943 CUBIC FEET PER SEC.
1252	BASE FLOOD ELEVATION
	STREAM CENTERLINE
	POST PROJECT CONDITION FLOODWAY BOUNDARY
	POST PROJECT CONDITION FLOODPLAIN BOUNDARY
	EFFECTIVE FLOODWAY BOUNDARY
	EFFECTIVE FLOODPLAIN BOUNDARY
ZONE AE	FLOOD INSURANCE RATE ZONE

DMB

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Construction Managers
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TRACTOR WASH
BUCKEYE, AZ.

PRELIMINARY
NOT
FOR
CONSTRUCTION
OR RECORDING

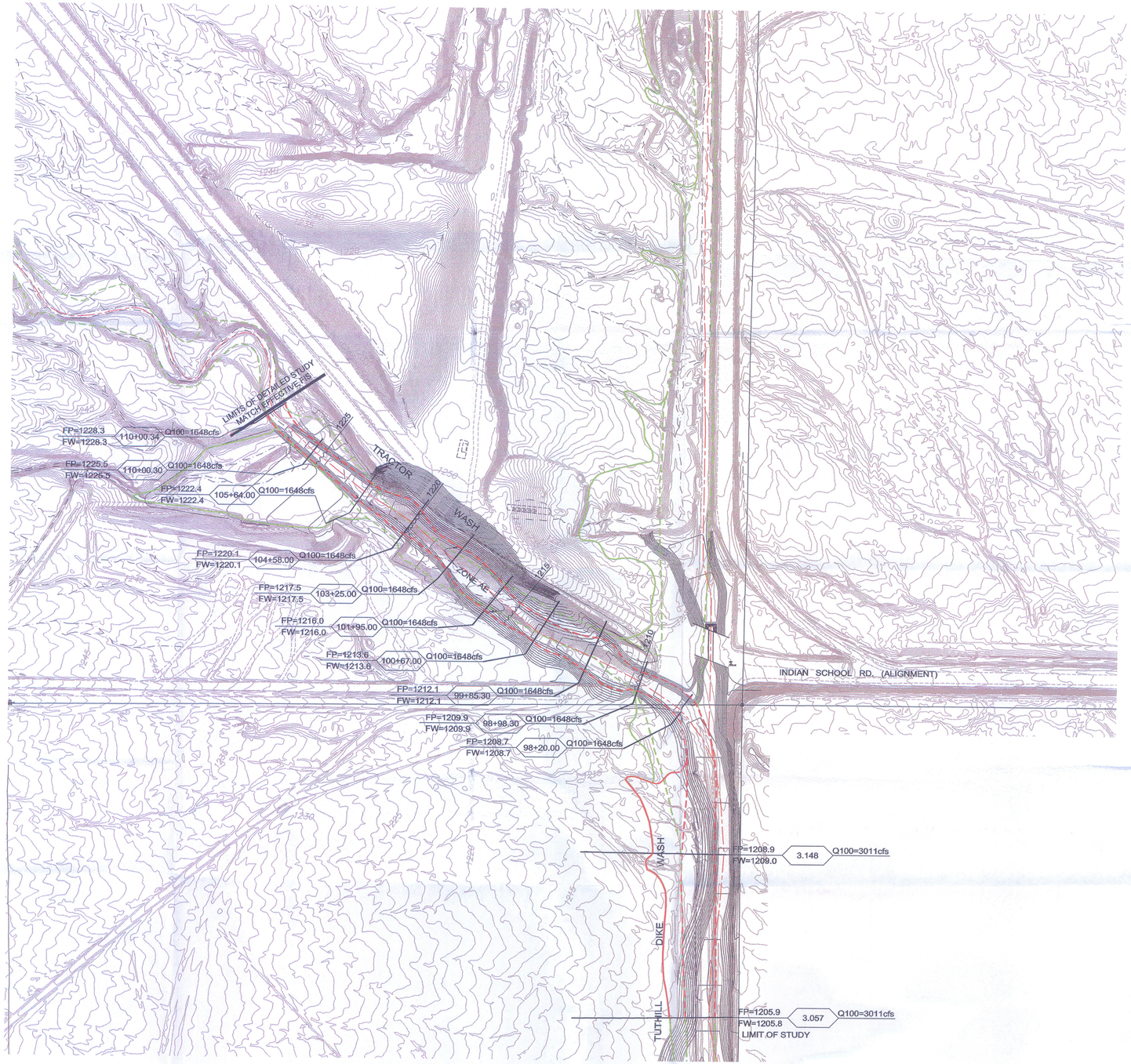
Registered Professional Engineer (Civil)
CERTIFICATE NO. 10512
ASHOK C. PATEL
Date Signed
ARIZONA, U.S.A.

M:\2001\1399\MP\TRACTOR\CLOMAR\POST\1399TWFW-01.DWG

DESIGNER	TAILLON, CAMPBELL
DRAWN	J. CASTANEDA
CHECKED	A.PATEL
DATE	APRIL 17, 2002
SCALE	1" = 200'
JOB NO.	011416.02
SHEET	3 OF 3

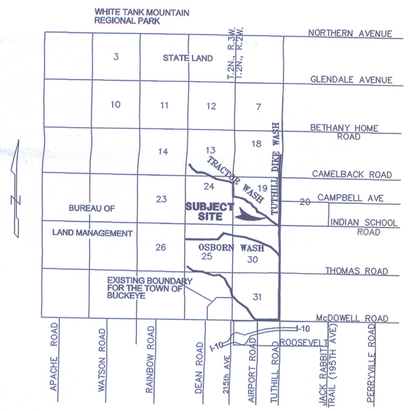
EXHIBIT C
STUDY WORK MAP

DRAWINGS AND SPECIFICATIONS AS INSTRUMENTS OF SERVICE ARE THE PROPERTY OF WHITE TANK, LLC. AND MAY NOT BE REPRODUCED WITHOUT THE WRITTEN PERMISSION OF DMB WHITE TANK, LLC.



200 0 100 200

1 inch = 200 ft.



VICINITY MAP
N.T.S.

REFERENCE MARK RM:

BRASS CAP IN HANDHOLE AT THE INTERSECTION OF JACKRABBIT TRAIL AND McDOWELL ROAD.
ELEV. = 1079.43
RM 3045 FROM FIRM MAP# 0413C2055 F

LEGEND:

1.01	CROSS SECTION NUMBER
FP=1154.4	FLOODPLAIN WATER SURFACE ELEVATION = 1154.4
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1252	BASE FLOOD ELEVATION
	STREAM CENTERLINE
	POST PROJECT CONDITION FLOODWAY BOUNDARY
	POST PROJECT CONDITION FLOODPLAIN BOUNDARY
	EFFECTIVE FLOODWAY BOUNDARY
	EFFECTIVE FLOODPLAIN BOUNDARY
ZONE AE	FLOOD INSURANCE RATE ZONE

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TRACTOR WASH
BUCKEYE, AZ.

PRELIMINARY
NOT
FOR
CONSTRUCTION
OR RECORDING

Registered Professional Engineer (Civil) CERTIFICATE NO. 10512 ASHOK C. PATEL Date Signed ARIZONA, U.S.A.

DESIGNER	TAILLON, CAMPBELL
DRAWN	J. CASTANEDA
CHECKED	A.PATEL
DATE	APRIL 17, 2002
SCALE	1" = 200'
JOB NO.	011416.02
SHEET	3A OF 3

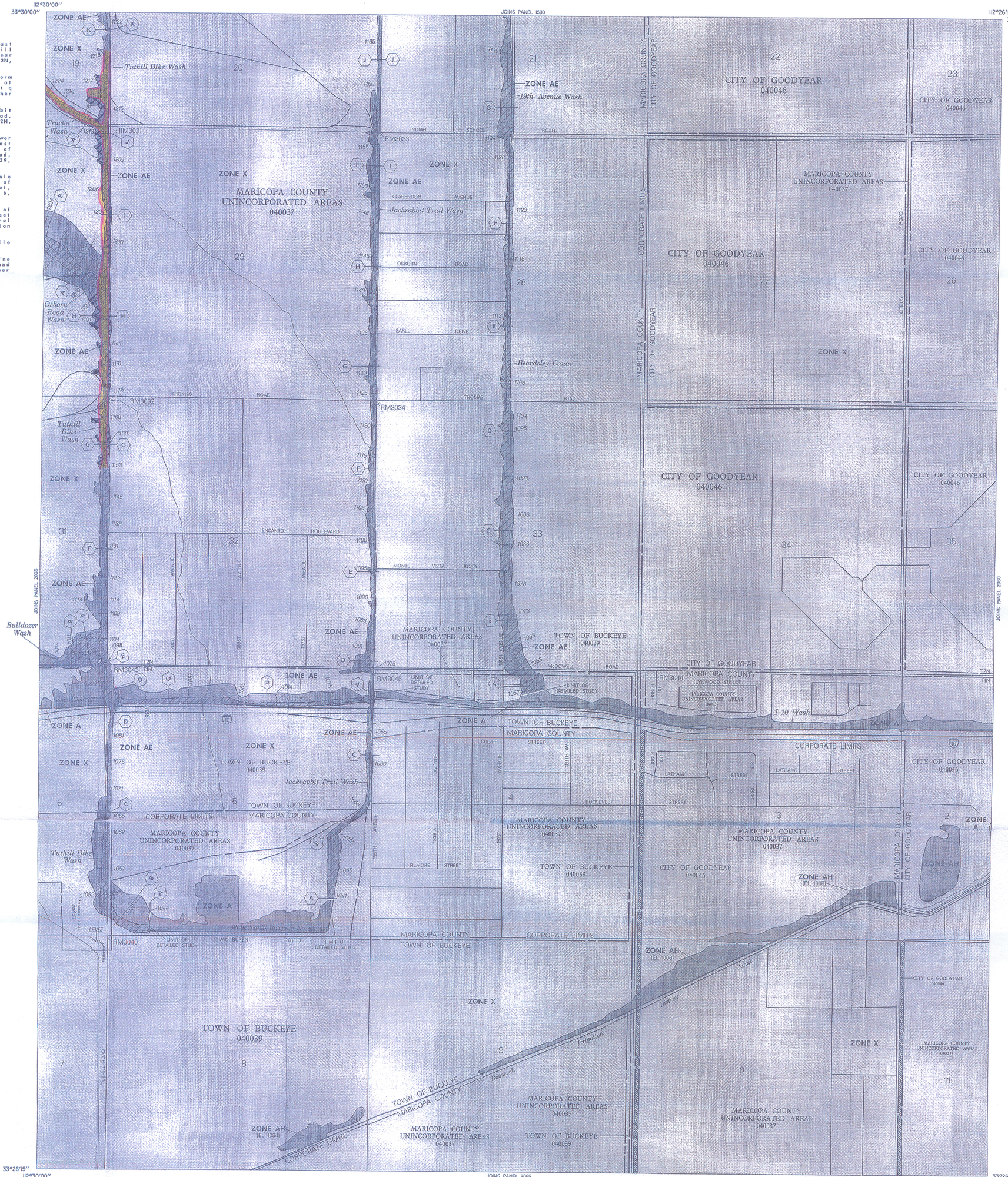
H:\JOB\01\1416\HPTRACTOR\CLOMAR\PDS\TUB4THFH-01.DWG

EXHIBIT C
STUDY WORK MAP

Exhibit D Annotated FIRM Panels

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
RM3031	1218.28	3-inch aluminum cap at southeast corner of intersection of Tuthill and Indian School Roads, near southwest corner section 20, T2N, R2W.
RM3032	1176.94	3-inch aluminum cap in top of borm on west side of Tuthill Road at intersection of road to southwest q 200 feet south of northwest corner section 32, T2N, R2W.
RM3033	1160.26	Brass cap in handhole, Jackrabbit Trail and Indian School Road, southeast corner section 20, T2N, R2W.
RM3034	1125.07	40d nail in southwest face of power pole (PS 177171) at northeast corner of intersection of Jackrabbit Trail and Thomas Road, near southeast corner section 29, T2N, R2W.
RM3040	1044.61	Cotton picker spindle in power pole southeast corner of intersection of Tuthill Road and Van Buren Street, near southeast corner section 6, T1N, R2W.
RM3043	1100.43	3-inch iron pipe at center of pavement on McDowell Road q 25 feet east of barricade at flood control channel, southwest corner section 31, T2N, R2W.
RM3044	1051.34	Brass cap in handhole, Perryville and McDowell Roads.
RM3045	1079.43	Brass cap in handhole at centerline intersection of McDowell Road and Jackrabbit Trail, southwest corner section 33, T2N, R2W.



LEGEND

To obtain more detailed information in areas where Base Flood Elevations (BFEs)and /or floodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations and therefore may not exactly reflect the flood elevation data presented in the FIS. BFEs shown on the FIRM are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS should be utilized in conjunction with the FIRM for purposes of construction and /or floodplain management.

ERM elevations listed on this map were obtained and/or developed to establish vertical control for determination of flood elevations and floodplain boundaries portrayed on this map. Users should be aware that these ERM elevations may have changed since the publication of this map. To obtain up-to-date elevation information on National Geodetic Survey (NGS) ERMs shown on this map, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their website at www.ngs.noaa.gov. Map users should seek verification of non-NGS ERM monument elevations when using these elevations for construction or floodplain management purposes.

Coastal BFE's shown on this map may apply only landward of 0.0' NGVD. Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this community. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and /or floodplain management purposes when they are higher than the elevations shown on this FIRM.

LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

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

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

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

OTHER AREAS

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

UNDEVELOPED COASTAL BARRIERS

Identified 1983 | Identified 1990 | Otherwise Protected Areas

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

- Floodplain Boundary
- Floodway Boundary
- Zone D Boundary
- Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.
- 513 — Base Flood Elevation Line; Elevation in Feet. See Map Index for Elevation Datum.
- D — D — Cross Section Line
- (EL 987) — Base Flood Elevation in Feet Where Uniform Within Zone. See Map Index for Elevation Datum.
- RM7 — Elevation Reference Mark
- M2 — River Mile
- 97°07'30", 32°22'30" — Horizontal Coordinates Based on North American Datum of 1927 (NAD 27) Projection.

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for more detailed data on BFE's, and for any information on floodway delineations, prior to use of this map for property purchases or construction purposes.

Areas of Special Flood Hazard (100-year flood) include Zones A, AE, A1-A30, AH, AO, A99, V, VE and V1-V30.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

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

Floodway widths in some areas may be too narrow to show to scale. Refer to Floodway Data Table where floodway width is shown at 1/20 inch.

Corporate limits shown are current as of the date of this map. The user should contact appropriate community officials to determine if corporate limits have changed subsequent to the issuance of this map.

This map may incorporate approximate boundaries of Coastal Barrier Resource System Units and /or Otherwise Protected Areas established under the Coastal Barrier Improvement Act of 1990 (PL 101-591).

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

For adjoining map panels and base map source see separately printed Map Index.

MAP REPOSITORY
Refer to Repository Listing on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP:
APRIL 15, 1988

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL:
SEPTEMBER 30, 1995

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

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

APPROXIMATE SCALE IN FEET
1000 0 1000

AREA TO BE REMOVED FROM ZONE AE

NEW FLOOD PLAIN ZONE AE

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 2055 OF 4350
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
BUCKEYE, TOWN OF	040039	2055	F
GOODYEAR, CITY OF	040046	2055	F
MARICOPA COUNTY, UNINCORPORATED AREAS	040037	2055	F

EXHIBIT D
ANNOTATED
FIRM PANEL

MAP NUMBER
04013C2055 F

MAP REVISED:
JULY 19, 2001

Federal Emergency Management Agency

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
RM3030	1308.77	Brass cap at southwest corner of section 19, southwest corner section 17, T2N, R2W.
RM3041	1184.64	3-inch aluminum cap at west side of dirt road along west side of section 31, at intersection with dirt road to northeast q 1200 feet south of the northwest corner of section 31, T2N, R2W.
RM3042	1114.76	Steel pin 0.8 foot below surface at southwest corner of section 31, T2N, R2W.

LEGEND

To obtain more detailed information in areas where Base Flood Elevations (BFEs)and /or floodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations and therefore may not exactly reflect the flood elevation data presented in the FIS. BFEs shown on the FIRM are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS should be utilized in conjunction with the FIRM for purposes of construction and /or floodplain management.

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LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

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

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

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

OTHER AREAS

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

UNDEVELOPED COASTAL BARRIERS

Identified 1983 | Identified 1990 | Otherwise Protected Areas

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

- Floodplain Boundary
- Floodway Boundary
- Zone D Boundary
- Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.
- 513 — Base Flood Elevation Line; Elevation in Feet. See Map Index for Elevation Datum.
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- RM7 — Elevation Reference Mark
- M2 — River Mile
- 97°07'30", 32°22'30" — Horizontal Coordinates Based on North American Datum of 1927 (NAD 27) Projection.

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for more detailed data on BFE's, and for any information on floodway delineations, prior to use of this map for property purchase or construction purposes.

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

For adjoining map panels and base map source see separately printed Map Index.

MAP REPOSITORY
Refer to Repository Listing on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP:
APRIL 15, 1988

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL:
SEPTEMBER 4, 1991, SEPTEMBER 30, 1995

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

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

APPROXIMATE SCALE IN FEET
1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 2035 OF 4350
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
BUCKEYE, TOWN OF	040039	2035	G
MARICOPA COUNTY, UNINCORPORATED AREAS	040037	2035	G

EXHIBIT D
ANNOTATED
FIRM PANEL

MAP NUMBER
04013C2035 G

MAP REVISED:
JULY 19, 2001

Federal Emergency Management Agency