REQUEST FOR A CONDITIONAL LETTER OF MAP REVISION (CLOMR) FOR A PORTION OF OTAY RIVER LOCATED WITHIN THE CITY OF SAN DIEGO, CALIFORNIA

Job Number 17414

August 27, 2015

RICK ENGINEERING COMPANY

RICK
ENGINEERING COMPANY

August 27, 2015

Ms. Elizabeth Chopp
City of Chula Vista
276 Fourth Avenue
Chula Vista, California 91910

SUBJECT: REQUEST FOR A CONDITIONAL LETTER OF MAP REVISION (CLOMR) FOR A PORTION OF OTAY RIVER LOCATED WITHIN THE CITY OF CHULA VISTA, CALIFORNIA
(RICK ENGINEERING COMPANY JOB NUMBER 17414)

Dear Ms. Chopp:

Rick Engineering is proposing to submit a Conditional Letter of Map Revision (CLOMR) for Otay River for the Shinohara II Contamination Remediation Project. This CLOMR proposes to revise the FIRMs to reflect the proposed grading for Shinohara II Contamination Remediation Project at the southern side of Otay River. The CLOMR also incorporates the existing improvements along the north side of Otay River, an existing culvert/Road Crossing upstream of 805-Freeway which were not reflected in the effective information. Study limits for the proposed updates to the floodplain within Otay River are from immediately upstream of 805-Freeway to about 4,800 feet upstream of 805 Freeway.

Please review the enclosed CLOMR package. Upon final review, please complete the following items for the CLOMR package to be submitted to FEMA:

1. Sign the form titled "Overview and Concurrence Form," (MT-2 Form 1, Page 2 of 3, Section D, Signature), located in Appendix 1.

2. Please provide a check in the amount of $6,750 payable to the National Flood Insurance Program and send it to the Rick Engineering Company to be included in FEMA submittal.

Once the above items are received, Rick Engineering Company will forward a copy of the CLOMR application and payment to FEMA directly.

As a portion of the floodplain covered in this CLOMR is in the City of San Diego, therefore a copy of this CLOMR is also sent to the City of San Diego.

If you have any questions regarding this package or need additional information about this project, please contact Jonathan Mack at (619) 908-3501 or jmack@rickengineering.com.

Sincerely,

RICK ENGINEERING COMPANY

Jayne Janda-Timba
R.C.E. #70649, Exp. 06/17
Associate

REGISTERED PROFESSIONAL ENGINEER
JAYNE MARIE JANDA-TIMBA
NO. 70649
EXP. 6/30/17
CIVIL
STATE OF CALIFORNIA

JJT:JM:vs:k/files/text/.001

Enclosures: 1 Copy of the CLOMR Submittal Package

cc: Mr. Steve Power, City of Chula Vista
Mr. Jamal Batta, City of San Diego

RICK
ENGINEERING COMPANY

November 2, 2015

Mr. Jamal Batta
City of San Diego
600 B Street, Suite 800
San Diego, California 92101

SUBJECT: REQUEST FOR A CONDITIONAL LETTER OF MAP REVISION (CLOMR) FOR A PORTION OF OTAY RIVER LOCATED WITHIN THE CITY OF SAN DIEGO, CALIFORNIA
(RICK ENGINEERING COMPANY JOB NUMBER 17414)

Dear Mr. Batta:

Rick Engineering is proposing to submit a Conditional Letter of Map Revision (CLOMR) for Otay River for the Shinohara II Contamination Remediation Project. This CLOMR proposes to revise the FIRMs to reflect the proposed grading for Shinohara II Contamination Remediation Project at the southern side of Otay River. The CLOMR also incorporates the existing improvements along the north side of Otay River, an existing culvert/Road Crossing upstream of 805-Freeway which were not reflected in the effective information. Study limits for the proposed updates to the floodplain within Otay River are from immediately upstream of 805-Freeway to about 4,800 feet upstream of 805 Freeway.

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As a portion of the floodplain covered in this CLOMR is in the City of Chula Vista, therefore a copy of this CLOMR is also sent to the City of Chula Vista.

If you have any questions regarding this package or need additional information about this project, please contact Jonathan Mack at (619) 908-3501 or jmack@rickengineering.com.

Sincerely,

RICK ENGINEERING COMPANY

REGISTERED PROFESSIONAL ENGINEER
JAYNE MARIE JANDA-TIMBA
NO. 70649
EXP. 6/30/17
CIVIL
STATE OF CALIFORNIA

Jayne Janda-Timba
R.C.E. #70649, Exp. 06/17
Associate

Enclosures: 1 Copy of the CLOMR Submittal Package

cc: Ms. Elizabeth Chopp, City of Chula Vista
Mr. Steve Power, City of Chula Vista

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INTRODUCTION

This CLOMR proposes to update the floodplains for a section of Otay River upstream of 805-Freeway, located within the City of Chula Vista, California to reflect:

- proposed grading & restoration for Shinohara II Contamination Remediation Project at the southern side of Otay River

The proposed improvements are associated with the contamination remediation of a historical burn dump deposit site (Shinohara II Contamination Remediation Project) at the City of Chula Vista. This project proposes to restore about 5.56 acre of impacted vegetation at a historical burn site which borders Otay River for a distance of about 850 feet. This CLOMR will impact Otay River, extending for a reach of about 4,800 feet upstream of 805-Freeway.

This CLOMR also incorporates existing condition information which is not reflected in the current effective model. These include:

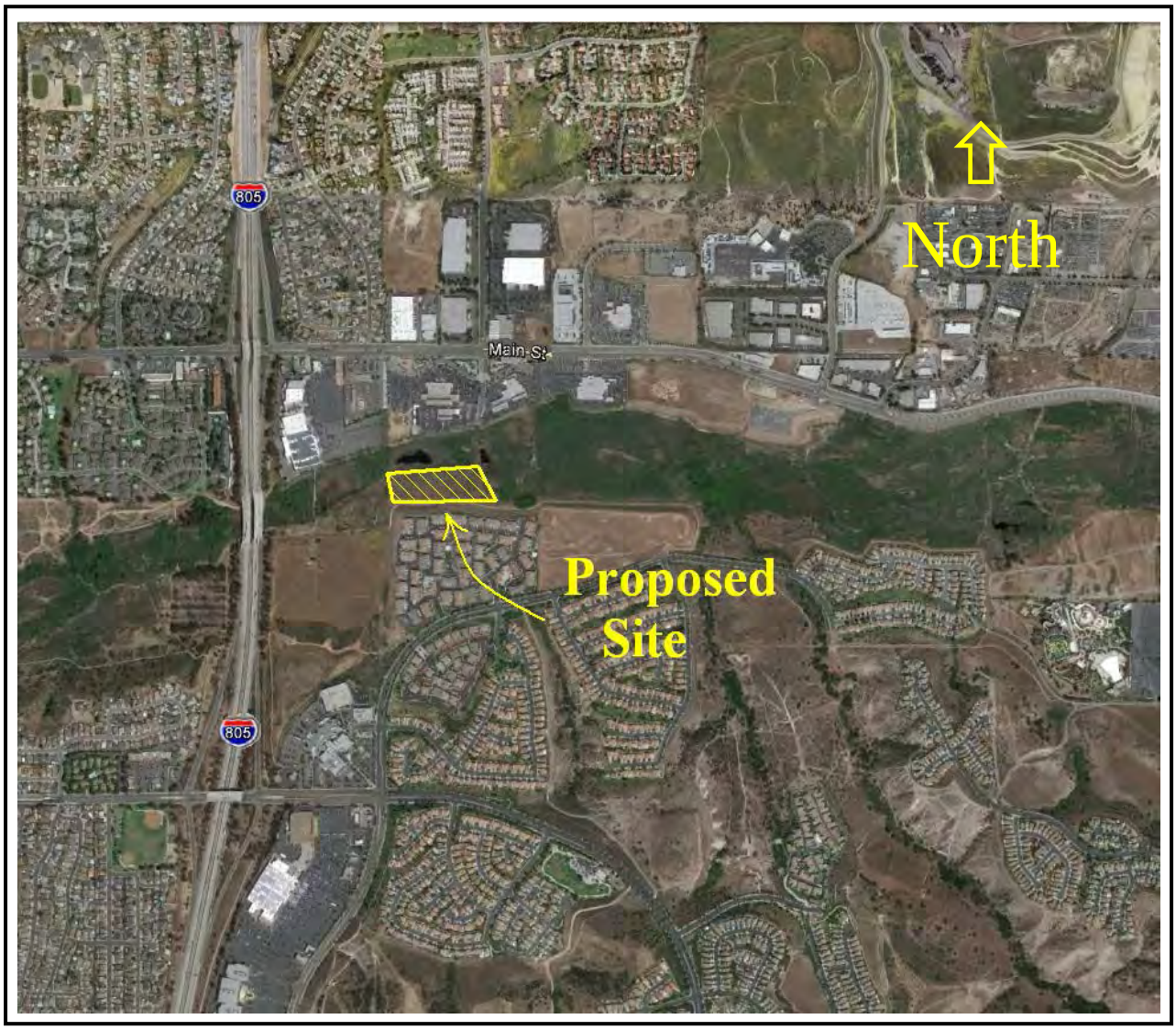
- change in topography along north & south side of Otay River,
- an existing culvert/road crossing at upstream of 805-Freeway,

The Federal Emergency Management Agency (FEMA) has designated this portion of Otay River as Zone AE, and Zone X. These zones are shown on Flood Insurance Panel Number 06073C2158G, dated May 16, 2012, and Panel Number 06073C2159G, dated May 16, 2012. Copies of the effective Flood Insurance Rate Maps (FIRMs) are included in Appendix 4. The purpose of this CLOMR, which will be followed by a request for a Letter of Map Revision (LOMR) when construction is complete, is to update the FEMA floodplain and floodway maps for this portion of Otay River.

All applicable FEMA MT-2 forms required for this CLOMR request are located in Appendix 1-3.

Vicinity Map

The proposed project location is shown on the following vicinity map:



TOPOGRAPHIC INFORMATION

Topographic information for Otay River is from 2-foot contour topography received from City of Chula Vista on April 2015. This topographic data is on NAVD 88 vertical datum. However; this topo does not reflect the grading for a portion of north side of Otay River. The as-built plans for this site were obtained from City of Chula Vista, and can be found in Appendix 14. This grading was incorporated into the existing and proposed models, at cross-sections 3182.152 & 2735.287.

The vertical datum for Auto Park Expansion plan drawings are NGVD 29. The effective FEMA Flood Profiles for this section of Otay River are in NAVD 88 vertical datum. In order to adjust the datum to NAVD 88, +2.2 foot was added to NGVD 29 elevations[1]. A copy of FEMA, Flood Insurance Study, Datum shift adjustment table is included in Appendix 4.

HYDROLOGIC INFORMATION

Current FEMA hydrology information from the San Diego County Flood Insurance Study dated 2012 was used for this CLOMR. Table 1 below summarizes the flow-rates used in the model. Appendix 4 contains a copy of the effective FEMA peak discharges.

Table 1: FEMA Effective Flow-Rates for Otay River

Cross-Section	Approximate Location	10-Year Flow Rate (cfs)	50-Year Flow Rate (cfs)	100- Year Flow Rate (cfs)	500- Year Flow Rate (cfs)
Effective X-Sec: 149.1 Proposed X-Sec: 4735.705	about 4,800 feet upstream of 805-Freeway	1,200	12,000	22,000	50,000

The proposed model in this CLOMR utilizes the same flow-rates as the effective FEMA HEC-2.

[1] Flood Insurance Study, San Diego County, California, and Incorporated Areas – Federal Emergency Management Agency, Flood Insurance Study Number: 06073CV001C, Revised May 16, 2012 – Table 12: Flooding Source Datum Shift Values - Otay River: +2.2 (feet NAVD above NGVD)

HYDRAULIC ANALYSES

The U.S. Army Corps of Engineers HEC-RAS version 4.1.0 was used to perform the hydraulic analyses to determine the impacts of the proposed grading. HEC-RAS is intended to calculate water surface elevations (WSELs) for steady gradually varied flow in natural or engineered channels. The effects of various obstructions such as bridges and culverts may be considered in the computations.

For the existing and proposed models, a new HEC-RAS model was created with the new topography used as base. Cross-section locations were based on the effective model with additional cross-sections added as necessary. The following table represents how the cross-sections correlate in different models:

Table 2: Cross-Section Correlation

Effective / Corrected Effective Cross-Section	Existing / Proposed Cross-Section
149.1	4735.705
149	4161.779
148	3182.152
147	2735.287
146	2263.575
—	1961.59
—	1648.554
145	1356.913
—	958.6605
—	536.4273
—	358.9326
143	45.4046

Reach Boundary Condition

The Reach Boundary Conditions for existing and proposed conditions were modeled as Known W.S (Known Water Surface Elevation), and were obtained from the effective HEC-2 model at cross-section 143. The WSELs were converted from NGVD 29 to NAVD 88 vertical datum. A Summary of the starting WSELs can be found below in Table 3:

Table 3: HEC-2 WSEL at Cross-Section 143

HEC-2 Profile	Q (cfs)	WSEL (NGVD)[1] (ft)	WSEL (NAVD)[2] (ft)
100-YR-FP	22,000	84.29	86.49
100-YR-FW	22,000	84.29	86.49
10-YR	1,200	76.04	78.24
50-YR	12,000	81.47	83.67
500-YR	50,000	90.22	92.42

[1] This WSEL was obtained from HEC-2 which is on NGVD datum
[2] The HEC-2 WSEL was converted to NAVD datum by adding 2.2 feet to it

Ineffective Flow Areas

Ineffective flow areas were added to the cross-sections as appropriate at areas of flow expansion or contraction in the proposed model. Locations of ineffective flows are based on aerial imagery and topographic information within the limits of the study. A contraction ratio of 1:1 and an expansion ratio of 4:1 were used in determining the locations of ineffective flows.

Manning's n-values

The Manning's roughness coefficient (n) values for existing and proposed models were determined in accordance with the San Diego County Hydraulic Design Manual (September 2014).

The existing condition model n values were selected from aerial imagery of the river reach and were field verified. Generally the channel has an n-value of 0.075 to reflect the light to medium brush; the banks have an n-value of 0.04-0.03 that reflect grass, weeds and light brush; and

overbanks have an n-value of 0.03-0.02 which represent the natural grass, weeds, little to no brush and graded soil.

The proposed condition model utilizes the existing n values except for the proposed vegetation restoration site. Pursuant to the restoration plan prepared by RECON Environmental Inc., the planned vegetation for the proposed site will consist of Diegan Coastal Sage Scrub, Southern Willow Scrub, and Freshwater Marsh. The n values of 0.05-0.065 are selected for the proposed vegetation which corresponds to heavy weeds, and light to medium brush. Appendix 5 contains Manning's n backup information.

Hydraulic Models

The following section provides a brief description of the hydraulic models that are included in this submittal. All digital copies of the submitted models are located on the CD in Appendix 16.

FEMA Effective Data

The input and output files for two HEC-2 models have been received from FEMA for this study.

- "OTAYCE-F.HEC" & "OTAYCE-F.OUT"
- "OTAYNBDE.HEC" & "OTAYNBDE.OUT"

After investigation of both models, it was discovered that the current effective model is "OTAYCE-F.HEC". The input and output files are based on NGVD 29 vertical datum.

FEMA Duplicate Effective Condition

The effective HEC-2 input file was re-executed to create this duplicate effective model. A copy of the Effective HEC-2 output is included in Appendix 6. The input and output files are based on NGVD 29 vertical datum.

HEC-2

Input: OTAYCE-F.HEC

Output: OTAYCE-F.OUT

FEMA Corrected Effective Condition

The effective model was used as base for corrected effective and the following modifications were made to it:

- The model was imported into HEC-RAS.
- The cross-section elevations, imported from current effective model, were adjusted for Datum Shift[2] to convert them from NGVD 29 to NAVD 88 vertical datum.
- An existing culvert/road crossing at approximately 480 feet upstream of 805-Freeway, between cross-sections 358.9326 and 536.4273 was added to the model. Google Earth historical imagery shows the historical images of this area since 1994. The images show that this road crossing has been present, at least since 1994. There are 4 headwalls in the culvert/road crossing, and each headwall contains three 5-feet diameter barrels. For HEC-RAS modeling, each headwall is modeled as one "culvert type", and the average barrel invert elevation at upstream and downstream, respectively, is used for all the three barrels in that headwall type.

HEC-RAS

Project:	17414_CE.prj
Plan:	17414_CE.p01
Geometry:	17414_CE.g01
Flow:	17414_CE.f01

A copy of Corrected Effective HEC-RAS Analysis can be found at Appendix 7.

[2] Flood Insurance Study, San Diego County, California, and Incorporated Areas – Federal Emergency Management Agency, Flood Insurance Study Number: 06073CV001C, Revised May 16, 2012 – Table 12: Flooding Source Datum Shift Values - Otay River: +2.2 (feet NAVD above NGVD)

Existing Condition

A new model was created in HEC-RAS, and the locations of the cross-sections were based on the effective model cross-sections. The vertical datum for this model is NAVD 88. The existing condition model includes the culvert/ road crossing which was incorporated in the corrected effective model, and has the following improvements:

- Using the updated topographic data obtained from City of Chula Vista, the cross-section elevations have been updated for almost all cross-sections with the exception of the two most upstream (4735.705, 4161.779), and the one most downstream (45.4046) cross-sections. The geometric data for cross-sections 4735.705, 4161.779, and 45.4046 are brought in from the Effective model.
- In order to incorporate the existing grading at the north side of the Otay River, the elevations for the right side of cross-sections 3182.152 & 2735.287 have been manually brought in from the grading drawings submitted to the City of Chula Vista, and then adjusted for datum shift.
- Cross-sections 1961.59, 1648.554, 958.6605, 536.4273, 358.9326 were added to the model
- Manning's roughness coefficient values were updated for all cross-sections to represent the existing conditions except for the two most upstream and one most downstream cross-sections, which are consistent with the Effective Model.

HEC-RAS

Project:	17414.prj
Plan:	17414.p01
Geometry:	17414.g01
Flow:	17414.f01

The HEC-RAS Existing Condition multiple profile model results are provided in Appendix 8 and the Existing Condition HEC-RAS workmaps are located in Appendix 11.

Proposed Condition

Utilizing the Existing Condition model as a base, the Proposed Condition model was prepared to reflect the proposed grading and vegetation. This model is based in NAVD 88 vertical datum, and includes the following updates compared to the existing model:

- The proposed grading and vegetation for the restoration of the historical burn site has been incorporated into the model by updating cross-sections 1961.59, 1648.554, 1356.913
- Manning's roughness coefficient values were updated to represent the proposed sites ultimate vegetation.

HEC-RAS

	Multiple Profile	Floodplain & Floodway (100-year)
Project:	17414.prj	17414.prj
Plan:	17414.p02	17414.p03
Geometry:	17414.g02	17414.g02
Flow:	17414.f01	17414.f02

The HEC-RAS Proposed Condition multiple profile model results are provided in Appendix 9 and the Proposed Condition HEC-RAS workmaps are located in Appendix 12. The proposed grading plans are located in Appendix 15. The HEC-RAS results for Proposed Condition Floodway analysis (100-year Floodplain & Floodway) are located in Appendix 10.

Floodplain Delineation

The proposed condition floodway is based on the computed WSELs from the HEC-RAS analysis, proposed condition grading, and floodplain limits. All WSELs are on NAVD88. Floodway widths are based on equal conveyance reduction and revised as necessary based on ineffective flow areas, to smooth the alignment along the stream centerline, and for floodway rise to be within 0 to 1-foot of WSEL.

Tie in locations to the Otay River are noted on the HEC-RAS workmaps. The revised FIRMettes reflecting the Proposed Condition modeling is included in Appendix 13.

The National Flood Insurance Program Regulation 44 Code of Federal Regulations Ch.1, Section §65.7 (b) (1) requires that the community distribute a public notice stating the community's intent to revise the floodway. A copy of the Public Notification for the CLOMR Floodway Revision issued by the City of Chula Vista is included in Appendix 3.

Sediment Transport Effects

The effects of sediment transport are not included in the effective mapping and are not anticipated to significantly impact this area. Therefore the effects of sediment transport have not been incorporated into the hydraulic modeling of this portion of Otay River.

HYDRAULIC RESULTS

Proposed Condition vs. Existing Condition

The Proposed Condition HEC-RAS analysis of this portion of Otay River reflects the proposed grading and vegetation restoration associated with the contamination remediation of a historical burn dump deposit site (Shinohara II Contamination Remediation Project). This model is compared to the Existing Condition HEC-RAS model to determine the impact of the proposed improvements on the existing condition of the creek. Table 4 on the following page shows the WSELs for the Existing and Proposed (CLOMR) conditions for 100 year flood.

Table 4: Existing and Proposed WSEL Comparison

Existing / Proposed Cross-Section	Effective / Corrected Effective Cross-Section	Q (cfs)	Effective WSEL [1] (ft)	Existing Condition WSEL (ft)	Proposed Condition WSEL (ft)	*C*WSEL (Proposed - Effective) (ft)	*C*WSEL (Proposed - Existing) (ft)
4735.705	149.1	22,000	114.86	114.82	114.81	-0.05	-0.01
4161.779	149	22,000	110.69	111.03	111.06	0.37	0.03
3182.152	148	22,000	107.64	105.90	105.82	-1.82	-0.08
2735.287	147	22,000	107.54	105.68	105.58	-1.96	-0.10
2263.575	146	22,000	104.10	105.46	105.36	1.26	-0.10
1961.59	—	22,000	—	104.89	104.75	—	-0.14
1648.554	—	22,000	—	104.17	104.14	—	-0.03
1356.913	145	22,000	96.22	103.68	103.69	7.47	0.01
958.6605	—	22,000	—	102.84	102.83	—	-0.01
536.4273	—	22,000	—	102.73	102.73	—	0.00
Culvert / Road Crossing							
358.9326	—	22,000	—	90.75	90.75	—	0.00
45.4046	143	22,000	86.49	86.49	86.49	0.00	0.00

WSEL elevations in table are in NAVD datum.

[1] Effective WSELs are from HEC-2 output provided by FEMA which is in NGVD datum. HEC-2 output WSELs are converted to NAVD datum by adding +2.2 feet to HEC-2 computed WSELs.

The result shows that the proposed project will generally decrease the 100 yr WESEL except at 2 cross-sections. These cross-sections are

- At cross-section 1356.913, the increase in WSEL is of 0.01 feet,
- At cross-section 4161.779, the increase in WSEL is of 0.03 feet.

Increases are considered minor in nature and do not negatively impact any insurable structures.

There are significant increases in WSEL between the effective and existing/proposed models. These increases are the result of a previously unmapped culvert/road crossing that was not considered in the effective mode. However; it should be noted that historical investigation show that the culvert/road crossing was in existence prior to the last effective model update. Therefore, the model has been updated to reflect this culvert/road crossing. This existing culvert/road crossing does not negatively impact any insurable structures when compared with the effective model.

Cumulative Impacts to the 100-Year Floodway

A summary of the floodway analysis is located in Table 5. The floodway analysis did not yield any negative surcharges.

Table 5: 100-Year Proposed Floodplain & Floodway WSEL Comparison

Cross-Section	100-YR Floodplain		100-YR Floodway			Surcharge (Floodway - Floodplain) (ft)
	Q (cfs)	WSEL (ft)	Q (cfs)	WSEL (ft)	Top Width (ft)	
4735.705	22000	114.81	22000	115.12	701.11	0.31
4161.779	22000	111.06	22000	111.07	650.00	0.01
3182.152	22000	105.82	22000	106.10	713.00	0.28
2735.287	22000	105.58	22000	105.82	767.00	0.24
2263.575	22000	105.36	22000	105.61	647.00	0.25
1961.59	22000	104.75	22000	105.05	370.00	0.30
1648.554	22000	104.14	22000	104.48	288.48	0.34
1356.913	22000	103.69	22000	104.07	284.68	0.38
958.6605	22000	102.83	22000	103.34	463.76	0.51
536.4273	22000	102.73	22000	103.21	458.93	0.48
Culvert/Road Crossing						
358.9326	22000	90.75	22000	90.75	371.90	0.00
45.4046	22000	86.49	22000	86.49	329.08	0.00

All WSELs are in NAVD 88 Datum.

DIGITAL DATA

The CAD/GIS files submitted with this CLOMR are on NAD 83, California State Plane Zone VI (feet). These files can be found on the CD in Appendix 16.

Appendix 1

FEMA MT-2 Forms for a Portion of Otay River & ESA Compliance Documentation

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

OVERVIEW & CONCURRENCE FORM

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

PAPERWORK BURDEN DISCLOSURE NOTICE

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

PRIVACY ACT STATEMENT

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

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

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

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

A. REQUESTED RESPONSE FROM DHS-FEMA

This request is for a (check one):

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

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

B. OVERVIEW

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

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Example: 480301 480287	City of Katy Harris County	TX TX	48473C 48201C	0005D 0220G	02/08/83 09/28/90
065021	San Diego County, California And Incorporated Areas	CA	06073C	2158G	05/16/12
060295	San Diego County, California And Incorporated Areas	CA	06073C	2159G	05/16/12

2. a. Flooding Source: Otay River

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

3. Project Name/Identifier: Shinohara II Contamination Remediation/Otay River

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

5. Basis for Request and Type of Revision:

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

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

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

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

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

☐ Dam ☐ Fill ☐ Other (Attach Description)

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

See Attached Response.

C. REVIEW FEE

Has the review fee for the appropriate request category been included? ☒ Yes Fee amount: $6750

☐ No, Attach Explanation

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

D. SIGNATURE

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

Name: Jayne M Janda Tibbe	Company: Rick Engineering Company	
Mailing Address: 5620 Friars Road San Diego, CA 92110	Daytime Telephone No.: 619-291-0707	Fax No.: 619-291-4165
	E-Mail Address:	
Signature of Requester (required): Jayne M Janda Tibbe	Date: 9/10/15	

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

Community Official's Name and Title:	Community Name:	
Mailing Address:	Daytime Telephone No.:	Fax No.:
	E-Mail Address:	
Community Official's Signature (required):	Date:	

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

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

Certifier's Name: Jayne Janda-Tibbe	License No.: 70649	Expiration Date: 6/30/17	
Company Name: Rick Engineering Comp	Telephone No.: 6196881449	Fax No.: 6192914165	
Signature: Jayne M Janda Tibbe	Date: 9/10/15	E-Mail Address: jjanda-tibbe@rickengineering.com	

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

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

Seal (Optional)

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

RIVERINE HYDROLOGY & HYDRAULICS FORM

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

PAPERWORK BURDEN DISCLOSURE NOTICE

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

PRIVACY ACT STATEMENT

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

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

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

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

Flooding Source: Otay River

Note: Fill out one form for each flooding source studied

A. HYDROLOGY

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

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

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

Location	Drainage Area (Sq. Mi.)	Effective/FIS (cfs)	Revised (cfs)

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

☐ Statistical Analysis of Gage Records ☐ Precipitation/Runoff Model → Specify Model: _____
☐ Regional Regression Equations ☐ Other (please attach description)

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

4. Review/Approval of Analysis

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

5. Impacts of Sediment Transport on Hydrology

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

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

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit*	Effective Xsec 143	45.4046	86.49 (NAVD 88)	86.49 (NAVD 88)
Upstream Limit*	Effective Xsec 149.1	4735.705	114.86 (NAVD 88)	114.81 (NAVD 88)

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

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

3. Pre-Submittal Review of Hydraulic Models*

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

4.

Models Submitted	Natural Run		Floodway Run		Datum
Duplicate Effective Model*	File Name: OTAYCE-F.HEC	Plan Name:	File Name: OTAYCE-F.HEC	Plan Name:	NGVD29
Corrected Effective Model*	File Name: 17414_CE.prj	Plan Name: 17414_CE.p01	File Name: 17414_CE.prj	Plan Name: 17414_CE.p01	NAVD88
Existing or Pre-Project Conditions Model	File Name: 17414.prj	Plan Name: 17414.p01	File Name:	Plan Name:	NAVD88
Revised or Post-Project Conditions Model	File Name: 17414.prj	Plan Name: 17414.p02	File Name: 17414.prj	Plan Name: 17414.p03	NAVD88
Other - (attach description)	File Name:	Plan Name:	File Name:	Plan Name:	

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

☒ Digital Models Submitted? (Required)

C. MAPPING REQUIREMENTS

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

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

Topographic Information: Photogrammetric methods based on aerial imagery

Source: City of Chula Vista Survey Date: October 1994

Accuracy: 2-foot contour

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

☒ Annotated FIRM and/or FBFM (Required)

D. COMMON REGULATORY REQUIREMENTS*

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

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

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

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

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

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

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

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

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

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

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

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

DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

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

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 7 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20598-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

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

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

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

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

Flooding Source: Otay River

Note**:** Fill out one form for each flooding source studied.

A. GENERAL

Complete the appropriate section(s) for each Structure listed below:

Channelization.....complete Section B
Bridge/Culvert.....complete Section C
Dam.....complete Section D
Levee/Floodwall.....complete Section E
Sediment Transport.....complete Section F (if required)

Description Of Modeled Structure

1. Name of Structure: _____

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

Location of Structure: _____

Downstream Limit/Cross Section: _____

Upstream Limit/Cross Section: _____

2. Name of Structure: Unnamed Culvert/Road Crossing

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

Location of Structure: Approximately 480 ft upstream of 805-Freeway

Downstream Limit/Cross Section: 358.9326

Upstream Limit/Cross Section: 536.4273

3. Name of Structure: _____

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

Location of Structure: _____

Downstream Limit/Cross Section: _____

Upstream Limit/Cross Section: _____

NOTE: FOR MORE STRUCTURES, ATTACH ADDITIONAL PAGES AS NEEDED.

B. CHANNELIZATION

Flooding Source: _____

Name of Structure: _____

1. Hydraulic Considerations

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

The design elevation in the channel is based on (check one):

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

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

☐ Inlet to channel ☐ Outlet of channel ☐ At Drop Structures ☐ At Transitions

☐ Other locations (specify): _____

2. Channel Design Plans

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

3. Accessory Structures

The channelization includes (check one):

☐ Levees [Attach Section E (Levee/Floodwall)] ☐ Drop structures ☐ Superelevated sections

☐ Transitions in cross sectional geometry ☐ Debris basin/detention basin [Attach Section D (Dam/Basin)] ☐ Energy dissipator

☐ Weir ☐ Other (Describe):

4. Sediment Transport Considerations

Are the hydraulics of the channel affected by sediment transport? ☐ Yes ☐ No

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

C. BRIDGE/CULVERT

Flooding Source: Otay River

Name of Structure: Unnamed Road Crossing/Culvert

1. This revision reflects (check one):

☒ Bridge/culvert not modeled in the FIS

☐ Modified bridge/culvert previously modeled in the FIS

☐ Revised analysis of bridge/culvert previously modeled in the FIS

2. Hydraulic model used to analyze the structure (e.g., HEC-2 with special bridge routine, WSPRO, HY8): HEC-RAS, bridge/culvert
If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structures. Attach justification.

3. Attach plans of the structures certified by a registered professional engineer. The plan detail and information should include the following (check the information that has been provided):

☐ Dimensions (height, width, span, radius, length)

☒ Shape (culverts only)

☐ Material

☐ Beveling or Rounding

☐ Wing Wall Angle

☐ Skew Angle

☐ Distances Between Cross Sections

☐ Erosion Protection

☒ Low Chord Elevations – Upstream and Downstream

☒ Top of Road Elevations – Upstream and Downstream

☒ Structure Invert Elevations – Upstream and Downstream

☐ Stream Invert Elevations – Upstream and Downstream

☐ Cross-Section Locations

4. Sediment Transport Considerations

Are the hydraulics of the structure affected by sediment transport? ☐ Yes ☒ No

If Yes, then fill out Section F (Sediment Transport) of Form 3. If no, then attach an explanation.

Responses to FEMA MT-2 Forms

Response to FEMA MT-2 Form 1:

Section B. Overview

1. The ESA Compliance Documentation can be found in the following pages, in Appendix 1 of the CLOMR report.

Response to FEMA MT-2 Form 2:

Section D. Common Regulatory Requirement

2. The proposed project would result in WSEL differences of -0.14 feet to +0.03 feet between existing and proposed conditions within the study reach of Otay River, cross-sections 45.4046 to 4735.705 (Table 4 of CLOMR Report). However, the increases don't impact any insurable structures.

Response to FEMA MT-2 Form 3:

Section C. Bridge/Culvert

3. Plans of structure

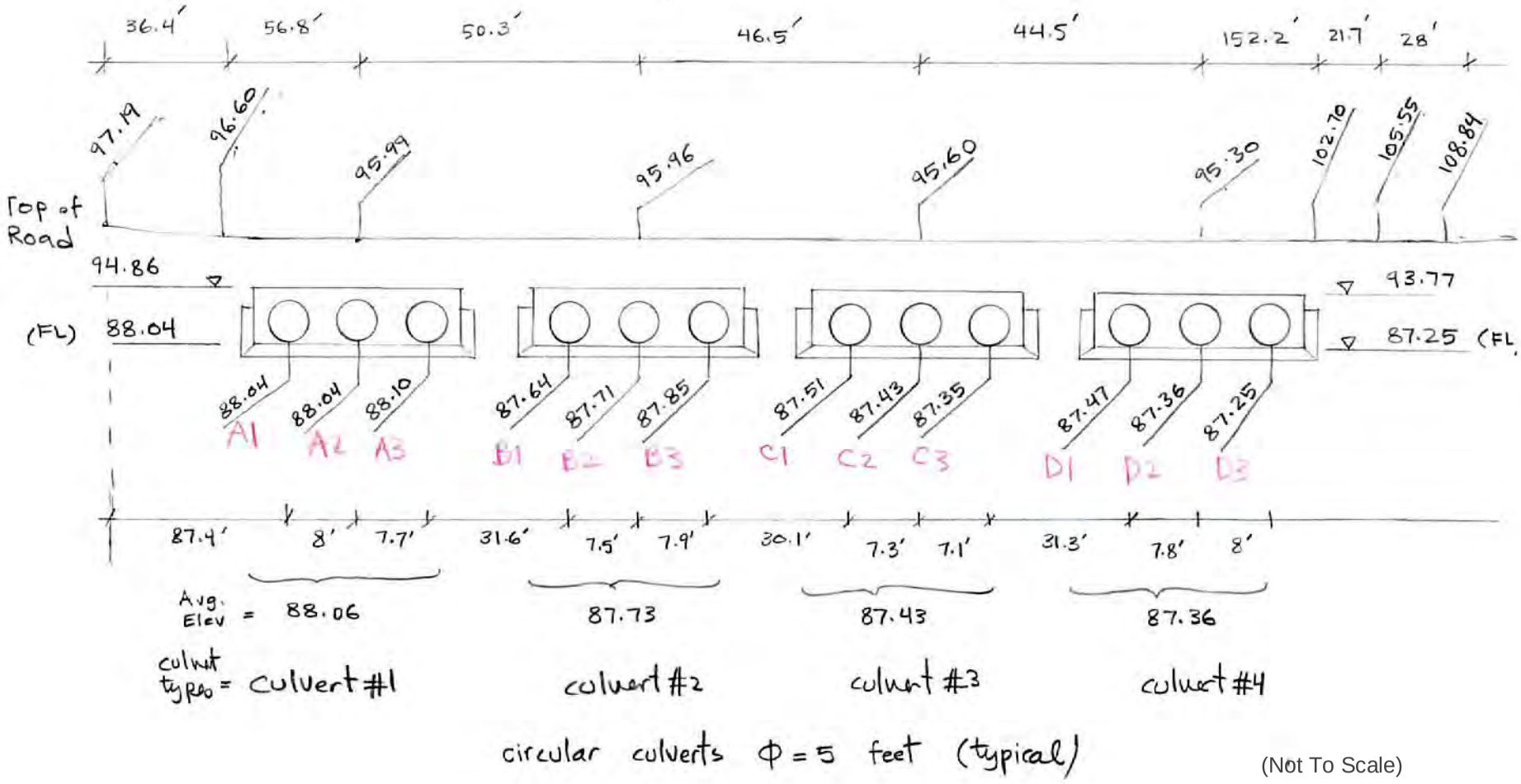
A culvert/road crossing exists between cross-sections 358.9326 and 536.4273. This culvert has been in existence since before the last LOMR. No engineering plans can be found for it. A survey has been performed for this road crossing/culvert and the schematic drawing of this culvert can be found on the next two pages.

4. Sediment Transport Considerations

The effective information does not show any historic sedimentation issues along this portion of Otay River, therefore sediment transport was not considered in this hydraulic analysis.

Culvert Survey Summary - Upstream (NAVD)

(looking DS)

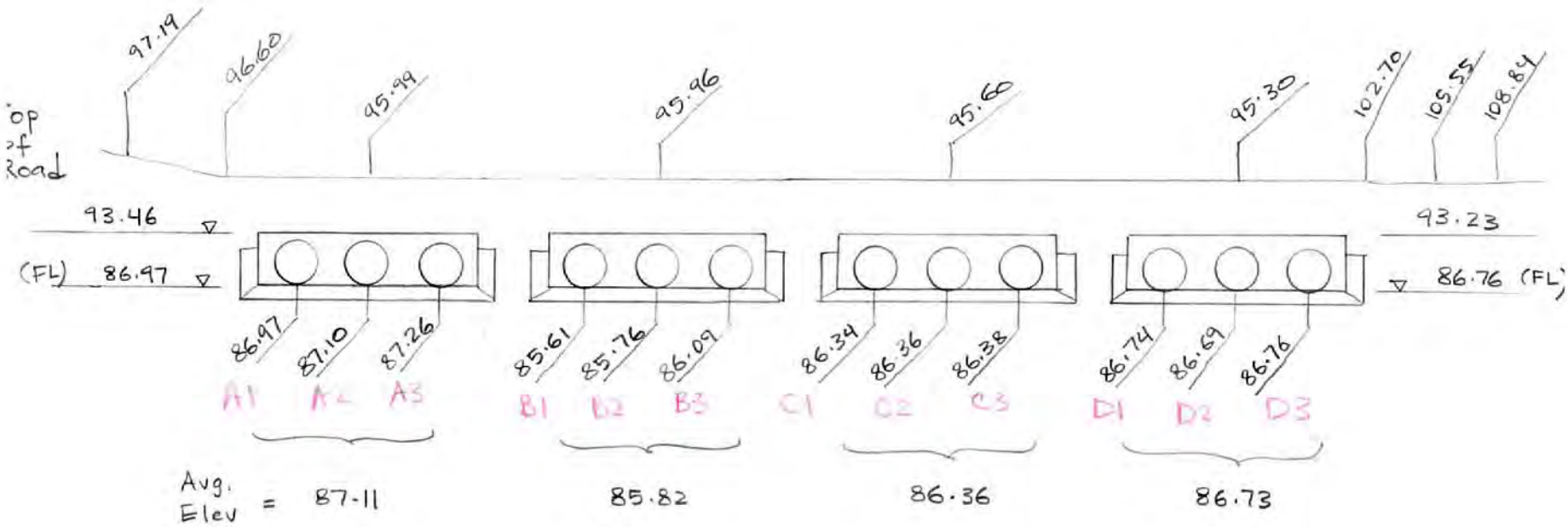


circular culverts $\phi = 5$ feet (typical)

(Not To Scale)

Culvert Survey Summary - Downstream (NAVD)

(looking DS)



(Not To Scale)

RECON

An Employee-Owned Company

August 27, 2015

Mr. Steve Power
City of Chula Vista
276 Fourth Avenue
Chula Vista, CA 91910

Reference: FEMA Letter for Shinohara II Contamination Remediation/Restoration Project; Required Background Information for Issuance of CLOMR-F (RECON Number 7014-1)

Dear Mr. Power:

This letter provides the background information needed to prepare a "no take" letter as required by Federal Emergency Management Agency (FEMA) for addressing the Conditional Letter of Map Revision (CLOMR-F) for the Shinohara II Remediation/Restoration Project. The project site occurs along the Otay River and includes an area of the 100-year inundation mapped on-site by FEMA maps. The project applicant is proposing to move contaminated soils from the slopes surrounding the project site and containing and capping the material under clean soil. Information contained in this letter demonstrates how the project would not affect any listed species covered under the federal Endangered Species Act (ESA).

The Shinohara II Contamination Remediation/Restoration Project lies on the south bank of the Otay River in Chula Vista, California, and is part of a larger property made up of two parcels. The City owns approximately 1 acre of the site, and the remainder is owned by the Shinohara Family Trust. The site is known to have historically received waste from a burn dump and is recorded as a known burn site, and has an active case (Solid Waste Information System number 37-CR-0075) with the County of San Diego Solid Waste Local Enforcement Agency. Based on regulatory records review, the site was never operated as a burn dump; however, burn ash was brought to the site as fill material in the late 1970s, when the owner of the Shinohara parcel reportedly allowed fill to be imported from various sources to create a level surface. It was reported that fill materials imported to the site included burn ash from the former South Bay Burn Site (formerly located approximately 0.25 mile southwest of the site at Interstate 805 and Palm Avenue) during the construction of Interstate 805.

No discretionary actions are required for project approval. The project does require a grading permit and CLOMR. The project proposes regrading the slopes along the Otay River to remediate the contaminated soil within the existing 100-year floodplain as delineated in the current effective Flood Insurance Rate Map (FIRM) panel numbers 06073C2158G and 06073C2159G, effective May 16, 2012. The project is located primarily within open space designated as part of the City of Chula Vista's (City) Multiple Species Conservation Program (MSCP) Subarea Plan. The City is undertaking this project to facilitate its reuse as part of the Otay Valley Regional Park (OVRP). Eventually, it is envisioned that the entire 13-mile stretch of OVRP will be developed with trails, and that the project site will be redeveloped with trails as part of that effort.

The post-project 100-year water surface elevations of Otay River throughout the project site would not exceed 1 foot when compared to the existing condition. Changes in Base Flood Elevation (BFE) due to the project are reflected in the CLOMR for the project (August 2015) and any increases in BFE will not negatively impact any insurable structures.

BIOLOGICAL RESOURCE EVALUATION METHODS

RECON Environmental, Inc. biologists conducted a general biological survey and delineation of jurisdictional waters for the project site in 2013 and 2014. Additional focused species surveys were conducted during 2013. The following vegetation communities/land cover types were mapped within the survey area: Diegan coastal sage scrub (includes disturbed and revegetated), southern willow scrub, non-native grassland, coast and valley freshwater marsh, ornamental/landscaped vegetation, disturbed habitat, and disturbed wetland. Open water and urban/developed land are also present within the survey area. Two federal listed wildlife species were observed within or adjacent to the project site: coastal California gnatcatcher and least Bell's vireo. No direct or indirect impacts to these species are anticipated from the project based on avoidance measures incorporated into the project design. There is no critical habitat for any federal listed species designated on the project site.

Federal listed species with the potential to occur on-site were evaluated based on habitat present on the project site and on focused protocol surveys conducted for specific species. The information provided on habitat and surveys was used to make determinations on the likelihood of any federal listed species to be directly or indirectly affected by the project. A search of the California Natural Diversity Data Base was conducted to find known observations of federal listed species either on the project site or in its vicinity. The potential for these listed species to occur on the project site was then further evaluated using the information on habitat preferences and ecological conditions preferred by each species. Focused protocol surveys were conducted for those federal listed species with a moderate to high potential for occurrence on the project site.

SURVEY RESULTS FOR FEDERAL LISTED SPECIES

The results of the general and focused surveys for listed plants and wildlife with the potential to occur on the site are presented below.

Federal Listed Plant Species

While one listed plant species is known to occur in the general vicinity of the project site, Otay tarplant, this species was not observed during general surveys and it was determined that the potential to occur was low based on the lack of suitable native clay soils within the survey area and the fact that substantial fill material was historically placed on native soils further undermining suitability for the species. The results of the surveys and assessment revealed that no federal listed plant species with potential to occur on-site were present (RECON 2015). In general, the project site either lacked suitable habitat for these listed species or the species would have been easily observed during the surveys had they been present.

Federal Listed Wildlife Species

Focused protocol surveys were conducted for one federal listed species with moderate potential to occur on the project site. Surveys for the coastal California gnatcatcher were conducted according to U.S. Fish and Wildlife survey protocol comprising three surveys conducted in the summer of 2013 (RECON 2015). Three gnatcatcher territories were identified within a survey area surrounding the project site. One of the three territories included a small portion of the southern boundary of the project site itself, which supports a small strip of disturbed coastal sage scrub. This species was primarily found on the manufactured slopes located on an adjacent parcel to the south of the project area. Focused surveys were not conducted for the least Bell's vireo as one male was repeatedly heard singing in the riparian habitat located to the east of the project site. While no vireo was detected within the riparian vegetation in the project site, there is suitable habitat present to support nesting vireos.

EFFECTS ON FEDERAL LISTED SPECIES

Federal listed plant and wildlife species with the potential for occurrence on the project site were evaluated for presence/absence and for any anticipated direct or indirect impacts on these species. The project site lacks suitable habitat for the listed plant species with the potential for occurrence on-site. Focused and general surveys did detect two federal listed bird species within or near the project site. The remediation/restoration project will be conducted outside of the breeding season for both species, which will avoid any effect on the least Bell's vireo, which is a migratory bird and not present during the non-breeding season. Breeding season restrictions will also protect any effect on nesting gnatcatchers. In addition, a biological monitor will be present during any alteration of the coastal sage scrub habitat to further ensure that the project will result in no effect to this species. Lastly, as a restoration project, the lower slopes of the site will be revegetated with riparian habitat and the upland portion of the site will be converted from non-native grassland to coastal sage scrub which is expected to provide additional suitable habitat for the gnatcatcher. Therefore, based on project design and seasonal restrictions, no direct or indirect impacts to any federal listed species are anticipated from the proposed project.

Sincerely,

Wendy Loeffler
Senior Project Manager

WEL:sh

Reference Cited

RECON
2015 Biological Technical Report for the Shinohara II Contamination Remediation Project, Chula Vista, California. Prepared for City of Chula Vista. July 9.

Appendix 2

Payment Form

FEDERAL EMERGENCY MANAGEMENT AGENCY

PAYMENT INFORMATION FORM

Community Name: City of Chula Vista

Project Identifier: Shinohara II Contamination Remediation/Restoration Project

THIS FORM MUST BE MAILED, ALONG WITH THE APPROPRIATE FEE, TO THE ADDRESS BELOW OR FAXED TO THE FAX NUMBER BELOW.

Please make check or money order payable to the National Flood Insurance Program.

Type of Request:

☐ MT-1 application
☒ MT-2 application

LOMC Clearinghouse
847 South Pickett Street
Alexandria, VA 22304-4605
Attn.: LOMC Manager

☐ EDR application

FEMA Project Library
847 South Pickett Street
Alexandria, VA 22304-4605
FAX (703) 212-4090

Request No. (if known): _____ **Check No.:** _____ **Amount:** $6,750

☐ INITIAL FEE* ☒ FINAL FEE ☐ FEE BALANCE** ☐ MASTER CARD ☐ VISA ☐ CHECK ☐ MONEY ORDER

*Note: Check only for EDR and/or Alluvial Fan requests (as appropriate).

****Note: Check only if submitting a corrected fee for an ongoing request.**

COMPLETE THIS SECTION *ONLY* IF PAYING BY CREDIT CARD

CARD NUMBER EXP. DATE

				–					–					–					–		
1	2	3	4		5	6	7	8		9	10	11	12		13	14	15	16		Month	Year

_____ _____

Date Signature

NAME *(AS IT APPEARS ON CARD)*: _____
(please print or type)

ADDRESS: _____
(*for your credit card receipt-please print or type*) _____

DAYTIME PHONE: _____

Appendix 3

Public Notification for CLOMR Floodway Revision

RECON

An Employee-Owned Company

August 27, 2015

Mr. Steve Power
City of Chula Vista
276 Fourth Avenue
Chula Vista, CA 91910

Reference: FEMA Letter for Shinohara II Contamination Remediation/Restoration Project; Required Background Information for Issuance of CLOMR-F (RECON Number 7014-1)

Dear Mr. Power:

This letter provides the background information needed to prepare a "no take" letter as required by Federal Emergency Management Agency (FEMA) for addressing the Conditional Letter of Map Revision (CLOMR-F) for the Shinohara II Remediation/Restoration Project. The project site occurs along the Otay River and includes an area of the 100-year inundation mapped on-site by FEMA maps. The project applicant is proposing to move contaminated soils from the slopes surrounding the project site and containing and capping the material under clean soil. Information contained in this letter demonstrates how the project would not affect any listed species covered under the federal Endangered Species Act (ESA).

The Shinohara II Contamination Remediation/Restoration Project lies on the south bank of the Otay River in Chula Vista, California, and is part of a larger property made up of two parcels. The City owns approximately 1 acre of the site, and the remainder is owned by the Shinohara Family Trust. The site is known to have historically received waste from a burn dump and is recorded as a known burn site, and has an active case (Solid Waste Information System number 37-CR-0075) with the County of San Diego Solid Waste Local Enforcement Agency. Based on regulatory records review, the site was never operated as a burn dump; however, burn ash was brought to the site as fill material in the late 1970s, when the owner of the Shinohara parcel reportedly allowed fill to be imported from various sources to create a level surface. It was reported that fill materials imported to the site included burn ash from the former South Bay Burn Site (formerly located approximately 0.25 mile southwest of the site at Interstate 805 and Palm Avenue) during the construction of Interstate 805.

No discretionary actions are required for project approval. The project does require a grading permit and CLOMR. The project proposes regrading the slopes along the Otay River to remediate the contaminated soil within the existing 100-year floodplain as delineated in the current effective Flood Insurance Rate Map (FIRM) panel numbers 06073C2158G and 06073C2159G, effective May 16, 2012. The project is located primarily within open space designated as part of the City of Chula Vista's (City) Multiple Species Conservation Program (MSCP) Subarea Plan. The City is undertaking this project to facilitate its reuse as part of the Otay Valley Regional Park (OVRP). Eventually, it is envisioned that the entire 13-mile stretch of OVRP will be developed with trails, and that the project site will be redeveloped with trails as part of that effort.

The post-project 100-year water surface elevations of Otay River throughout the project site would not exceed 1 foot when compared to the existing condition. Changes in Base Flood Elevation (BFE) due to the project are reflected in the CLOMR for the project (August 2015) and any increases in BFE will not negatively impact any insurable structures.

BIOLOGICAL RESOURCE EVALUATION METHODS

RECON Environmental, Inc. biologists conducted a general biological survey and delineation of jurisdictional waters for the project site in 2013 and 2014. Additional focused species surveys were conducted during 2013. The following vegetation communities/land cover types were mapped within the survey area: Diegan coastal sage scrub (includes disturbed and revegetated), southern willow scrub, non-native grassland, coast and valley freshwater marsh, ornamental/landscaped vegetation, disturbed habitat, and disturbed wetland. Open water and urban/developed land are also present within the survey area. Two federal listed wildlife species were observed within or adjacent to the project site: coastal California gnatcatcher and least Bell's vireo. No direct or indirect impacts to these species are anticipated from the project based on avoidance measures incorporated into the project design. There is no critical habitat for any federal listed species designated on the project site.

Federal listed species with the potential to occur on-site were evaluated based on habitat present on the project site and on focused protocol surveys conducted for specific species. The information provided on habitat and surveys was used to make determinations on the likelihood of any federal listed species to be directly or indirectly affected by the project. A search of the California Natural Diversity Data Base was conducted to find known observations of federal listed species either on the project site or in its vicinity. The potential for these listed species to occur on the project site was then further evaluated using the information on habitat preferences and ecological conditions preferred by each species. Focused protocol surveys were conducted for those federal listed species with a moderate to high potential for occurrence on the project site.

SURVEY RESULTS FOR FEDERAL LISTED SPECIES

The results of the general and focused surveys for listed plants and wildlife with the potential to occur on the site are presented below.

Federal Listed Plant Species

While one listed plant species is known to occur in the general vicinity of the project site, Otay tarplant, this species was not observed during general surveys and it was determined that the potential to occur was low based on the lack of suitable native clay soils within the survey area and the fact that substantial fill material was historically placed on native soils further undermining suitability for the species. The results of the surveys and assessment revealed that no federal listed plant species with potential to occur on-site were present (RECON 2015). In general, the project site either lacked suitable habitat for these listed species or the species would have been easily observed during the surveys had they been present.

Federal Listed Wildlife Species

Focused protocol surveys were conducted for one federal listed species with moderate potential to occur on the project site. Surveys for the coastal California gnatcatcher were conducted according to U.S. Fish and Wildlife survey protocol comprising three surveys conducted in the summer of 2013 (RECON 2015). Three gnatcatcher territories were identified within a survey area surrounding the project site. One of the three territories included a small portion of the southern boundary of the project site itself, which supports a small strip of disturbed coastal sage scrub. This species was primarily found on the manufactured slopes located on an adjacent parcel to the south of the project area. Focused surveys were not conducted for the least Bell's vireo as one male was repeatedly heard singing in the riparian habitat located to the east of the project site. While no vireo was detected within the riparian vegetation in the project site, there is suitable habitat present to support nesting vireos.

EFFECTS ON FEDERAL LISTED SPECIES

Federal listed plant and wildlife species with the potential for occurrence on the project site were evaluated for presence/absence and for any anticipated direct or indirect impacts on these species. The project site lacks suitable habitat for the listed plant species with the potential for occurrence on-site. Focused and general surveys did detect two federal listed bird species within or near the project site. The remediation/restoration project will be conducted outside of the breeding season for both species, which will avoid any effect on the least Bell's vireo, which is a migratory bird and not present during the non-breeding season. Breeding season restrictions will also protect any effect on nesting gnatcatchers. In addition, a biological monitor will be present during any alteration of the coastal sage scrub habitat to further ensure that the project will result in no effect to this species. Lastly, as a restoration project, the lower slopes of the site will be revegetated with riparian habitat and the upland portion of the site will be converted from non-native grassland to coastal sage scrub which is expected to provide additional suitable habitat for the gnatcatcher. Therefore, based on project design and seasonal restrictions, no direct or indirect impacts to any federal listed species are anticipated from the proposed project.

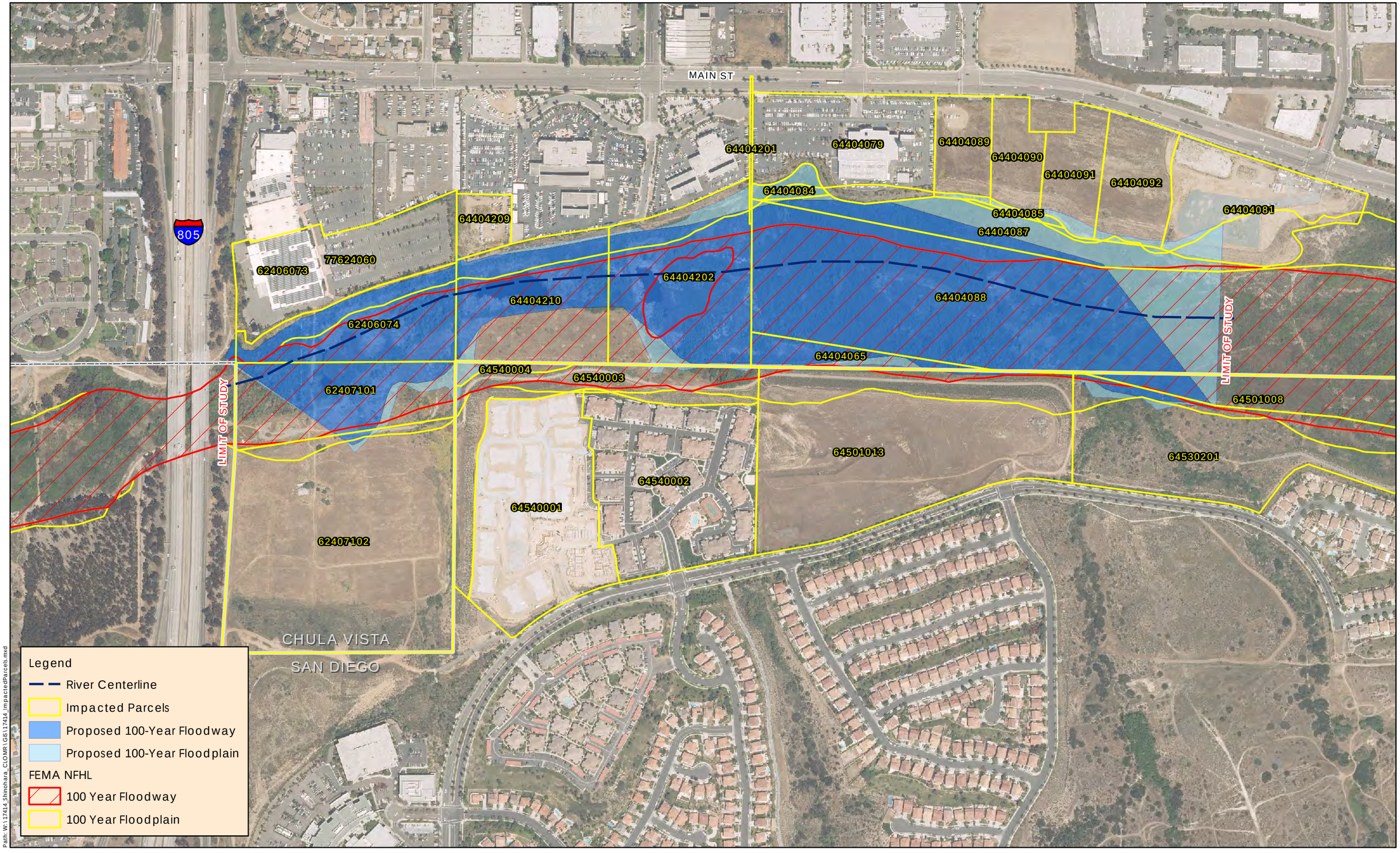
Sincerely,

Wendy Loeffler
Senior Project Manager

WEL:sh

Reference Cited

RECON
2015 Biological Technical Report for the Shinohara II Contamination Remediation Project, Chula Vista, California. Prepared for City of Chula Vista. July 9.



Path: W:\17414_Shinohara_CLOMR\GIS\17414_ImpactedParcels.mxd

RICK ENGINEERING COMPANY

Scale in Feet
0 400 800
North

Date of Exhibit: 08.31.2015
Eagle Aerial Image: 04.2013

Shinohara

Parcels Impacted by 100 Year Floodplain

J-17414

Appendix 4

Copies of Effective FEMA FIRMett & Effective Flood Insurance Study Excerpts

TABLE 8: SUMMARY OF PEAK DISCHARGES

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cubic feet per second) 10% Annual-Chance	2% Annual-Chance	1% Annual-Chance	0.2% Annual-Chance
Otay River					
At Otay Valley Road	122.7	1,200	12,000	22,000	50,000
Pala Mesa Creek					
Approximately 265 Feet Upstream of Interstate Highway 15	2.1	--	--	1,700	--
Paradise Creek – Valley Road Branch					
At Confluence with Paradise Creek	0.68	--	--	468	--
Pauma Creek					
At Apex of Alluvial Fan	14.7	1,550	6,270	10,480	30,460
Pilgrim Creek					
Upstream End of Oceanside Golf Course	14.0	--	--	5,775	--
Downstream End of Oceanside Golf Course	14.0	--	--	1,244	--
Just Upstream of the Confluence with Windmill Creek	15.8	--	--	1,888	--
At Mouth	19.0	--	--	1,925	--

-- Data Not Available

TABLE 12: FLOODING SOURCE DATUM SHIFT VALUES

Stream Name	Elevation (feet NAVD above NGVD)
Moosa Creek (North Branch)	+2.3
Moosa Creek (South Branch)	+2.3
Murphy Canyon Creek	+2.1
Murray Canyon Creek	+2.1
Nestor Creek	+2.1
North Avenue Tributary	+2.3
North Branch Poway Creek	+2.1
North Tributary to Santa Maria Creek	+2.2
Olive Creek	+2.4
Otay River	+2.2
Pala Mesa Creek	+2.2
Paradise Creek	+2.1
Paradise Creek – Valley Road Branch	+2.1
Pilgrim Creek	+2.3
Poggi Canyon Creek	+2.2
Pomerado Creek	+2.1
Poway Creek	+2.1
Rainbow Creek (Main Branch)	+2.3
Rainbow Creek (West Branch)	+2.3
Rattlesnake Creek	+2.1
Rattlesnake Creek Split Flow at Heritage Hills	+2.1
Rattlesnake Creek Split Flow at Midland Road	+2.1
Reidy Creek	+2.3
Reidy Creek Split Flow	+2.3
Rice Canyon Creek	+2.1
Rincon Avenue Tributary	+2.3
Rose Canyon Creek	+2.1
Samagutuma Creek	+2.4
San Clemente Canyon Creek	+2.1
San Diego Bay	+2.2
San Diego River	+2.1
San Dieguito River	+2.1
San Elijo Creek	+2.2
San Luis Rey River	+2.3
San Marcos Creek	+2.3
San Marcos Creek (Below Lake San Marcos)	+2.3
San Marcos Creek Highway 78 Split Flow	+2.3

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Otay River								
A	0	2,533	4,688	4.7	13.2	13.2	13.2	0.0
B	1,390	2,110	9,474	2.3	15.2	15.2	16.1	0.9
C	2,490	2,300	4,084	5.4	16.3	16.3	16.8	0.5
D	3,720	1,662	7,917	2.8	18.2	18.2	18.9	0.7
E	4,040	642	1,928	11.4	19.3	19.3	19.4	0.1
F	4,270	722	3,819	5.8	20.6	20.6	20.6	0.0
G	5,100	641	2,883	7.6	24.0	24.0	24.0	0.0
H	5,350	360	1,767	12.4	25.7	25.7	25.7	0.0
I	5,390	320	2,711	8.1	28.0	28.0	28.0	0.0
J	5,500	304	2,359	9.3	28.9	28.9	28.9	0.0
K	5,600	440	4,010	5.5	30.8	30.8	30.8	0.0
L	5,880	740	4,511	4.9	30.8	30.8	30.9	0.1
M	6,280	1,020	7,451	2.9	30.9	30.9	31.5	0.6
N	6,610	1,225	7,933	2.8	30.9	30.9	31.7	0.8
O	7,012	1,243	4,824	4.6	32.8	32.8	32.9	0.1
P	7,330	1,035	3,833	5.7	33.3	33.3	33.8	0.5
Q	7,670	1,204	6,208	3.5	34.3	34.3	35.3	1.0
R	8,780	451	3,132	7.0	36.4	36.4	37.3	0.9
S	8,875	432	2,553	8.6	36.6	36.6	37.6	1.0
T	9,525	1,060	7,231	3.0	39.7	39.7	39.9	0.2
U	10,375	1,110	9,424	2.3	40.1	40.1	40.3	0.2
V	11,275	935	8,841	2.5	40.3	40.3	40.5	0.2
W	11,825	917	8,300	2.6	40.3	40.3	40.6	0.3
X	12,085	670	6,494	3.4	40.4	40.4	40.7	0.3
Y	12,395	403	1,798	12.2	42.9	42.9	42.9	0.0
Z	12,579	476	3,279	6.8	45.4	45.4	45.4	0.0

[1] Feet above Cross Section A

TABLE 13

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN DIEGO COUNTY, CA

AND INCORPORATED AREAS

FLOODWAY DATA

OTAY RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Otay River (cont'd)								
AA	12,959	540	4,145	5.3	45.7	45.7	46.0	0.3
AB	13,789	503	3,304	6.7	46.2	46.2	47.2	1.0
AC	14,839	575	4,992	4.4	48.4	48.4	49.0	0.6
AD	15,349	455	1,940	11.3	49.0	49.0	49.0	0.0
AE	16,049	455	2,241	9.8	54.9	54.9	55.6	0.7
AF	16,249	462	3,144	7.0	57.3	57.3	57.3	0.0
AG	16,529	447	3,490	6.3	57.9	57.9	58.0	0.1
AH	16,769	446	2,434	9.0	58.2	58.2	58.3	0.1
AI	16,979	415	2,063	10.7	59.1	59.1	59.3	0.2
AJ	17,149	382	2,053	10.7	61.2	61.2	61.2	0.0
AK	17,669	442	2,432	9.0	63.8	63.8	64.8	1.0
AL	18,109	430	1,969	11.2	68.2	68.2	68.8	0.6
AM	18,969	595	2,383	9.2	76.6	76.6	77.4	0.8
AN	19,039	586	3,840	5.7	77.6	77.6	78.5	0.9
AO	19,259	610	3,518	6.2	78.2	78.2	78.8	0.6
AP	19,349	572	2,298	9.6	78.2	78.2	78.8	0.6
AQ	19,704	442	2,695	8.2	81.4	81.4	81.4	0.0
AR	20,174	448	3,705	6.1	83.2	83.2	83.2	0.0
AS	20,674	316	2,938	7.2	84.2	84.2	84.2	0.0
AT	21,120	329	2,938	7.3	86.5	86.5	86.5	0.0
AU	21,465	415	1,832	12.2	91.3	91.3	91.3	0.0
AV	22,420	470	4,374	5.3	96.2	96.2	96.2	0.0
AW	23,330	379	1,744	12.7	104.1	104.1	104.1	0.0
AX	23,875	635	6,948	3.4	107.5	107.5	107.6	0.1
AY	24,245	600	5,399	4.4	107.6	107.6	107.7	0.1
AZ	25,225	514	2,049	12.3	110.7	110.7	111.2	0.5

[1] Feet Above Cross Section A

TABLE 13

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN DIEGO COUNTY, CA

AND INCORPORATED AREAS

FLOODWAY DATA

OTAY RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Otay River (cont'd)								
BA	25,919	635	3,380	6.5	114.8	114.8	115.5	0.7
BB	26,489	665	4,846	4.5	116.2	116.2	116.9	0.7
BC	27,534	713	2,379	9.2	117.7	117.7	118.7	1.0
BD	28,094	571	3,241	6.8	123.3	123.3	124.2	0.9
BE	28,284	590	1,599	13.8	125.3	125.3	125.3	0.0
BF	28,629	564	4,085	5.4	128.9	128.9	129.2	0.3
BG	28,959	574	3,466	6.3	129.1	129.1	129.6	0.5
BH	29,259	580	5,340	4.1	129.4	129.4	130.4	1.0
BI	29,429	600	2,128	10.3	131.8	131.8	131.8	0.0
BJ	29,619	630	4,329	5.1	133.4	133.4	133.8	0.4
BK	29,829	637	4,332	5.1	133.6	133.6	134.0	0.4
BL	30,404	650	5,548	4.0	134.0	134.0	134.7	0.7
BM	30,884	685	1,941	11.3	143.6	143.6	143.6	0.0
BN	30,964	833	6,336	3.5	145.1	145.1	145.8	0.7
BO	32,114	808	8,694	2.5	145.6	145.6	146.3	0.7
BP	33,074	520	3,145	7.0	145.7	145.7	146.3	0.6
BQ	33,824	523	3,240	6.8	148.0	148.0	148.6	0.6
BR	34,664	515	2,703	8.1	151.4	151.4	151.6	0.2
BS	35,779	446	1,892	11.6	160.5	160.5	160.5	0.0
BT	36,599	520	3,324	6.6	166.0	166.0	166.1	0.1
BU	37,049	406	3,069	7.2	167.1	167.1	167.2	0.1
BV	37,549	268	1,600	13.7	169.9	169.9	169.9	0.0
BW	37,749	280	2,171	10.1	172.9	172.9	172.9	0.0
BX	38,239	315	1,872	11.7	175.3	175.3	175.3	0.0
BY	38,479	380	2,002	11.0	177.8	177.8	177.8	0.0
BZ	38,829	462	2,865	7.7	180.4	180.4	180.6	0.2

[1] Feet Above Cross Section A

TABLE 13

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN DIEGO COUNTY, CA

AND INCORPORATED AREAS

FLOODWAY DATA

OTAY RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Otay River (cont'd)								
CA	39,629	762	5,569	3.9	181.5	181.5	182.5	1.0
CB	41,309	741	3,587	6.1	184.3	184.3	184.5	0.2
CC	42,409	501	2,035	10.8	192.3	192.3	192.6	0.3
CD	43,509	873	4,270	5.2	197.9	197.9	198.1	0.2
CE	44,789	1,110	3,708	5.9	201.9	201.9	201.9	0.0
CF	45,989	579	2,484	8.9	208.3	208.3	208.3	0.0
CG	46,789	794	5,009	4.4	211.2	211.2	211.4	0.2
CH	47,989	828	2,393	9.2	216.9	216.9	216.9	0.0
CI	48,989	1,155	2,657	8.3	231.4	231.4	231.4	0.0
CJ	49,889	775	3,154	7.0	238.3	238.3	238.6	0.3
CK	50,189	615	2,112	10.4	240.1	240.1	240.4	0.3
CL	50,559	619	2,878	7.6	243.5	243.5	244.2	0.7
CM	50,909	415	2,577	8.5	245.2	245.2	245.8	0.6
CN	51,569	368	1,824	12.1	250.2	250.2	250.2	0.0
CO	52,049	390	2,923	7.5	254.6	254.6	255.2	0.6
CP	53,329	437	1,893	11.6	262.1	262.1	262.1	0.0
CQ	53,499	454	1,919	11.5	264.0	264.0	264.0	0.0
CR	53,844	583	4,261	5.2	266.5	266.5	267.3	0.8
CS	54,234	659	5,891	3.7	266.8	266.8	267.8	1.0
CT	54,694	518	4,336	5.1	267.1	267.1	268.0	0.9
CU	54,974	370	3,002	7.3	267.2	267.2	268.1	0.9
CV	55,074	321	2,174	10.1	267.2	267.2	268.1	0.9
CW	55,154	297	1,777	12.4	267.4	267.4	268.1	0.7
CX	55,254	295	2,419	9.1	269.7	269.7	269.7	0.0
CY	55,524	203	1,668	13.2	269.9	269.9	270.0	0.1
CZ	55,604	165	1,361	16.2	271.2	271.2	271.2	0.0

[1] Feet Above Cross Section A

TABLE 13

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN DIEGO COUNTY, CA

AND INCORPORATED AREAS

FLOODWAY DATA

OTAY RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Otay River (cont'd)								
DA	55,774	119	1,212	18.1	272.6	272.6	272.6	0.0
DB	55,934	76	1,041	21.1	281.1	281.1	281.1	0.0
DC	56,144	145	1,291	17.0	288.6	288.6	288.6	0.0
DD	56,314	103	1,155	19.0	295.9	295.9	295.9	0.0
DE	56,564	109	1,425	15.4	299.9	299.9	299.9	0.0
DF	56,754	94	1,126	19.5	300.3	300.3	300.3	0.0
DG	56,914	89	1,111	19.8	306.1	306.1	306.1	0.0
DH	57,124	114	1,186	18.5	313.4	313.4	313.4	0.0
DI	57,304	128	1,247	17.6	318.4	318.4	318.4	0.0
DJ	57,884	104	1,145	19.2	332.2	332.2	332.2	0.0
DK	58,364	164	1,341	16.4	342.1	342.1	342.1	0.0
DL	58,724	150	1,311	16.8	347.4	347.4	347.4	0.0
DM	59,494	229	2,900	7.6	355.2	355.2	355.2	0.0
DN	59,914	141	1,328	16.6	356.0	356.0	356.0	0.0
DO	60,034	165	2,114	10.4	359.8	359.8	359.8	0.0
DP	60,314	161	1,360	16.2	359.8	359.8	359.8	0.0
DQ	60,564	240	1,515	14.5	365.3	365.3	365.3	0.0
DR	60,934	196	1,427	15.4	373.7	373.7	373.7	0.0
DS	61,114	161	1,361	16.2	375.4	375.4	375.4	0.0
DT	62,014	301	4,226	5.2	381.3	381.3	381.3	0.0

[1] Feet Above Cross Section A

TABLE 13

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN DIEGO COUNTY, CA

AND INCORPORATED AREAS

FLOODWAY DATA

OTAY RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NGVD[2])			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Otay River								
A	0	2,533	4,688	4.7	11.0	11.0	11.0	0.0
B	1,390	2,110	9,474	2.3	13.0	13.0	13.9	0.9
C	2,490	2,300	4,084	5.4	14.1	14.1	14.6	0.5
D	3,720	1,662	7,917	2.8	16.0	16.0	16.7	0.7
E	4,040	642	1,928	11.4	17.1	17.1	17.2	0.1
F	4,270	722	3,819	5.8	18.4	18.4	18.4	0.0
G	5,100	641	2,883	7.6	21.8	21.8	21.8	0.0
H	5,350	360	1,767	12.4	23.5	23.5	23.5	0.0
I	5,390	320	2,711	8.1	25.8	25.8	25.8	0.0
J	5,500	304	2,359	9.3	26.7	26.7	26.7	0.0
K	5,600	440	4,010	5.5	28.6	28.6	28.6	0.0
L	5,880	740	4,511	4.9	28.6	28.6	28.7	0.1
M	6,280	1,020	7,451	2.9	28.7	28.7	29.3	0.6
N	6,610	1,225	7,933	2.8	28.7	28.7	29.5	0.8
O	7,012	1,243	4,824	4.6	30.6	30.6	30.7	0.1
P	7,330	1,035	3,833	5.7	31.1	31.1	31.6	0.5
Q	7,670	1,204	6,208	3.5	32.1	32.1	33.1	1.0

[1] Feet above Cross Section A

[2] This additional table was added for Otay River to account for the portion of the floodway printed on a DFIRM with a different datum.

TABLE 13

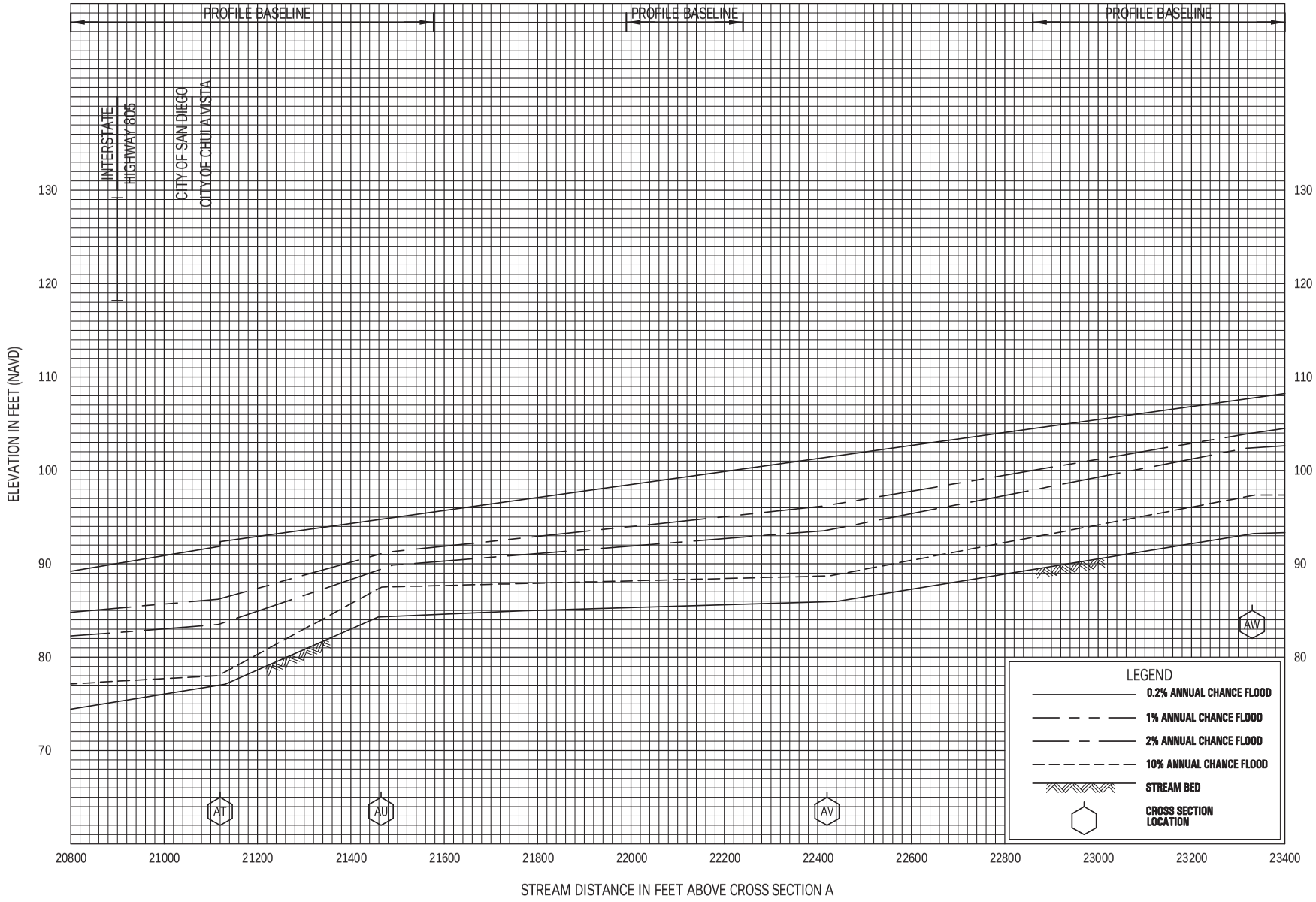
FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN DIEGO COUNTY, CA

AND INCORPORATED AREAS

FLOODWAY DATA

OTAY RIVER



FLOOD PROFILES

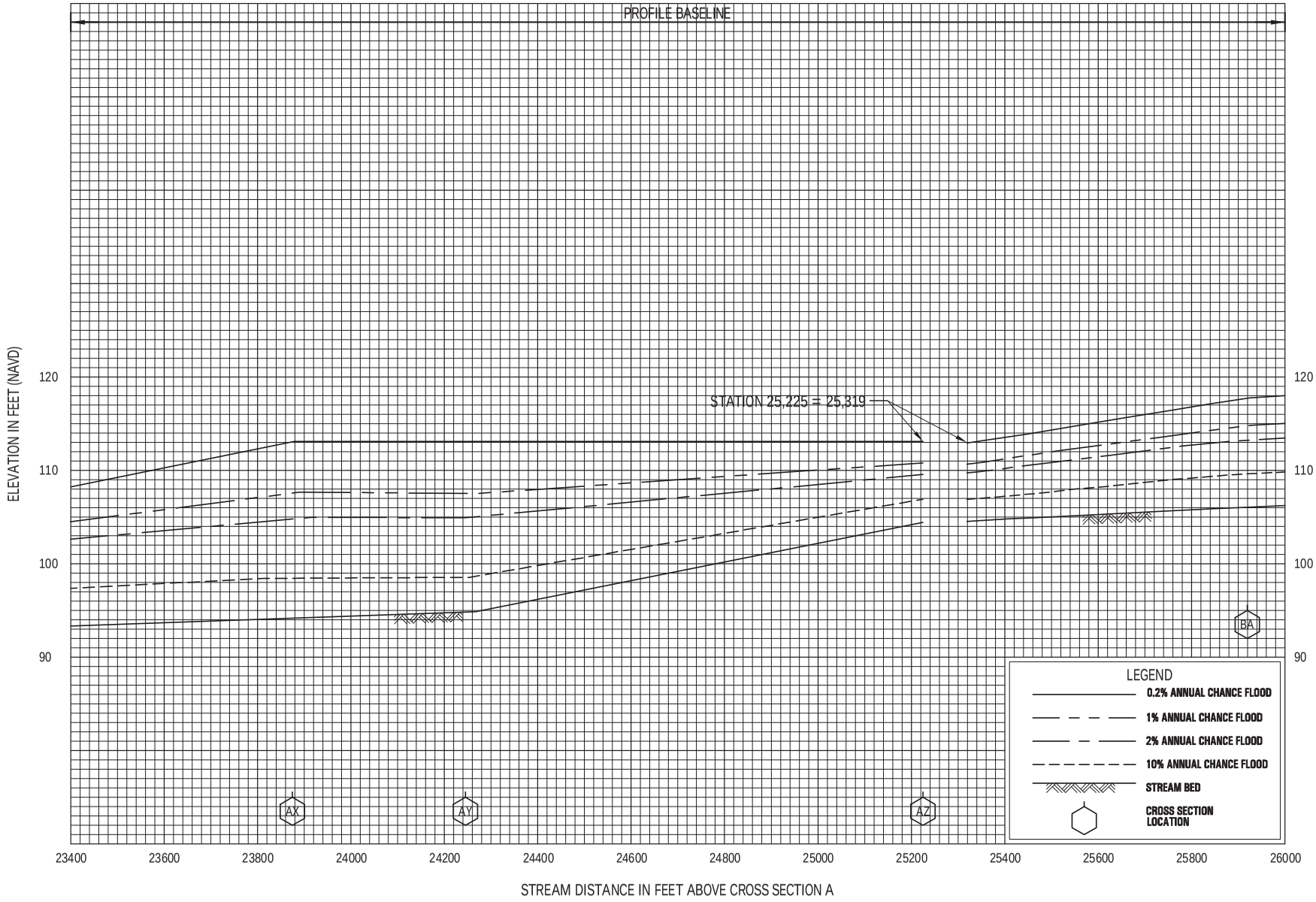
OTAY RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN DIEGO COUNTY, CA

(AND INCORPORATED AREAS)

266P



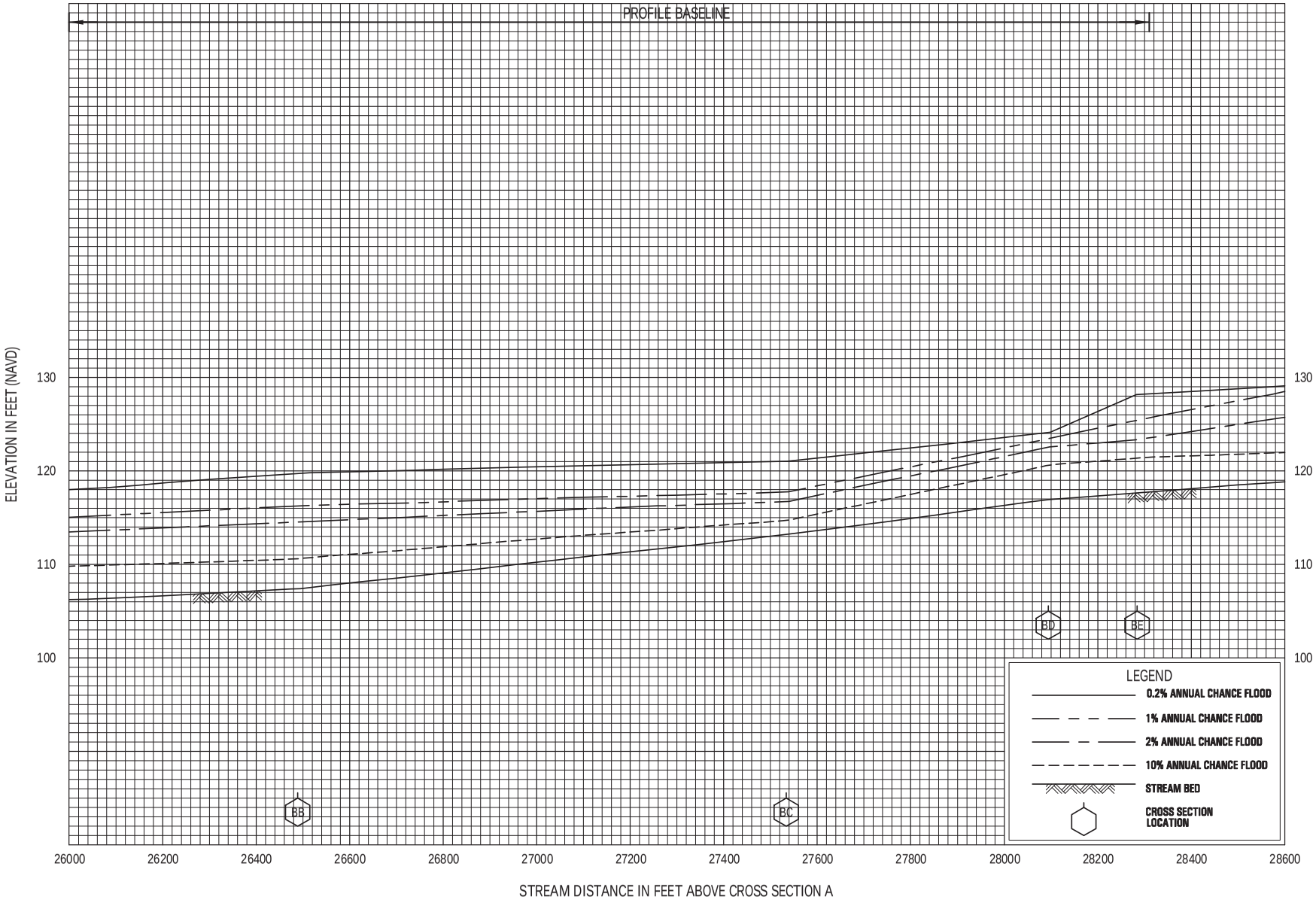
FLOOD PROFILES

OTAY RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN DIEGO COUNTY, CA

(AND INCORPORATED AREAS)



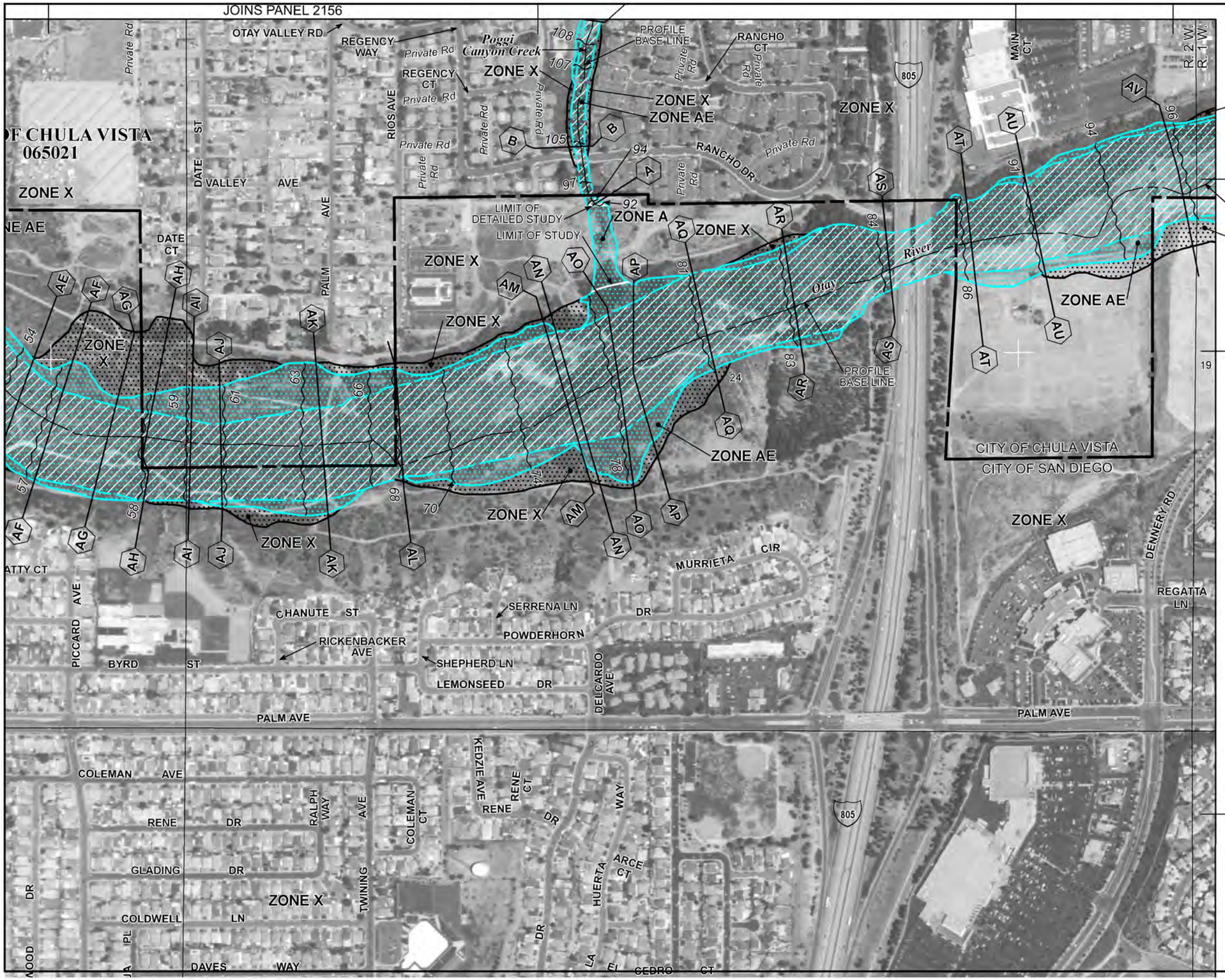
FLOOD PROFILES

OTAY RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN DIEGO COUNTY, CA

(AND INCORPORATED AREAS)



ance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

0 250 500 750 1,000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2158G

FIRM

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA

AND INCORPORATED AREAS

PANEL 2158 OF 2375

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CHULA VISTA, CITY OF	065021	2158	G
SAN DIEGO, CITY OF	060295	2158	G

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

MAP NUMBER
06073C2158G

MAP REVISED
MAY 16, 2012

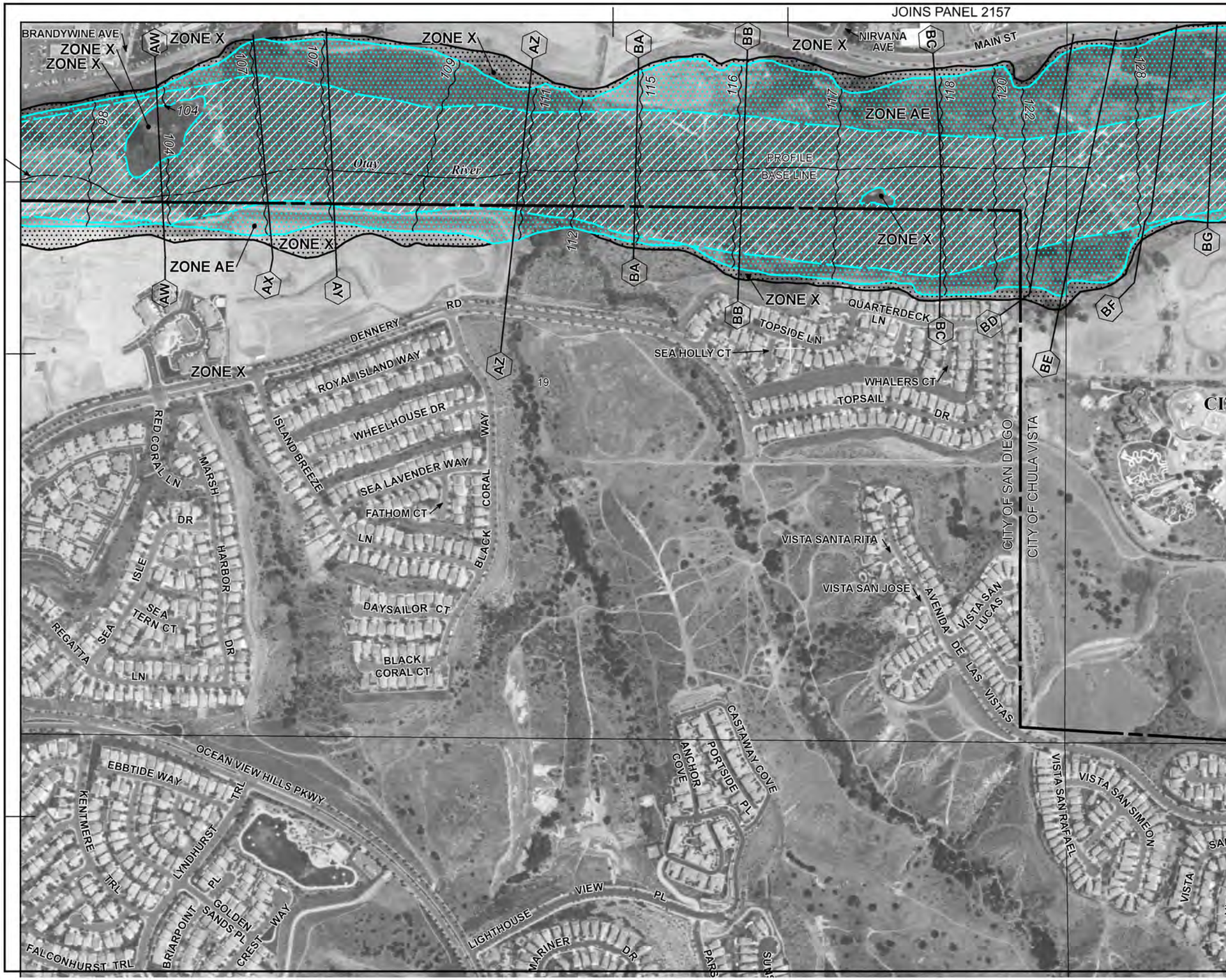
Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

ance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

0 250 500 750 1,000 FEET



NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2159G

FIRM

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA

AND INCORPORATED AREAS

PANEL 2159 OF 2375

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CHULA VISTA, CITY OF	065021	2159	G
SAN DIEGO, CITY OF	060295	2159	G

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

MAP NUMBER
06073C2159G

MAP REVISED
MAY 16, 2012

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Appendix 5

Manning's n Values backup Information

Table A-5

Table A-5 Average Manning Roughness Coefficients for Natural Channels

Minor Streams (Surface Width at Flood Stage < 100 ft)

Fairly Regular Section

(A) Some Grass and Weeds, Little or No Brush 0.030

(B) Dense Growth of Weeds, Depth of Flow Materially Greater Than Weed Height 0.040

(C) Some Weeds, Light Brush on Banks 0.040

(D) Some Weeds, Heavy Brush on Banks 0.060

(E) For Trees within Channel with Branches Submerged at High Stage, Increase All Above Values By 0.015

Irregular Section, with Pools, Slight Channel Meander

Channels (A) to (E) Above, Increase All Values By 0.015

Mountain Streams; No Vegetation in Channel, Banks Usually Steep, Trees and Brush along Banks Submerged at High Stage

(A) Bottom, Gravel, Cobbles and Few Boulders 0.050

(B) Bottom, Cobbles with Large Boulders 0.060

Flood Plains (Adjacent To Natural Streams)

Pasture, No Brush

(A) Short Grass 0.030

(B) High Grass 0.040

Cultivated Areas

(A) No Crop 0.040

(B) Mature Row Crops 0.040

(C) Mature Field Crops 0.050

Heavy Weeds, Scattered Brush 0.050

Light Brush and Trees 0.060

Medium To Dense Brush 0.090

Dense Willows 0.170

Cleared Land with Tree Stumps, 100-150 Per Acre 0.060

Heavy Stand of Timber, Little Undergrowth

(A) Flood Depth below Branches 0.110

(B) Flood Depth Reaches Branches 0.140

Image source: SanGIS (flown May 2012)

Project Area/Limit of Work
Otay Valley Regional Park

Planting Area

Diegan Coastal Sage Scrub
Southern Willow Scrub and Freshwater Marsh

0 Feet 100

FIGURE 5

Estimated Final Planting Areas

RECON

M:\JOBS4\7014\common_gis\fig5_resto.mxd 6/13/2014 fmm

Appendix 6

Duplicate Effective HEC-2 Output

```
1*****************************************                                                    ***************************************
 *  HEC-2 WATER SURFACE PROFILES           *                                                    *  U.S. ARMY CORPS OF ENGINEERS       *
 *                                         *                                                    *  HYDROLOGIC ENGINEERING CENTER      *
 *  Version   4.6.2;  May 1991             *                                                    *  609 SECOND STREET, SUITE D         *
 *                                         *                                                    *  DAVIS, CALIFORNIA 95616-4687       *
 *  RUN DATE    04MAY15    TIME   14:47:15 *                                                    *          (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
   04MAY15      14:47:15                                                                                                    PAGE    1


                                                                                                  THIS RUN EXECUTED 04MAY15    14:47:15
 ************************************
  HEC-2 WATER SURFACE PROFILES

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


 THIS IS AN ARCHIVAL RUN ALL DATA AND RESULTS ARE SAVED ON UNIT   96

 AC  THIS MODEL IS THE CORRECTED EFFECTIVE MODEL, REVISED 6/15/04
 AC  REVISIONS INCLUDE: CHANGES TO X-SECTIONS 142-143, REGARDING
 AC  X1 CARDS AND ET CARDS FOR THE EXPANSION AND CONTRACTION.
 AC  ALSO, WE REMOVED THE X3 CARDS.
 AC  n-VALUES FOR THE CHANNEL REFLECT UP-TO-DATE VEGETATIO
 T1      OTAY RIVER - J-14624    -CORRECTED EFFECTIVE-
 T2      100-YR. FLOODPLAIN  Q=22,000 CFS
 T3      JUNE 15, 2004

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                  2                                                                  55.75

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       1                 -10


 J3  VARIABLE CODES FOR SUMMARY PRINTOUT

      38         1         34         3         4         27         28         9       150         200

 NC      .04       .04       .04        .1        .3
 QT        2     22000     22000                                  1200      12000      50000
 ET    133.2                 4.1        46       493
          SECTIONS FROM LEFT TO RIGHT LOOKING DOWNSTREAM
 X1    133.2        34       354       425       280       260       280
 GR   0075.0     00000    0053.7     00023    0046.5     00070    0045.0     00117    0048.5     00143
 GR   0050.3     00170    0050.4     00233    0047.0     00255    0047.0     00270    0047.5     00300
 GR     49.2       354     42.7       376     42.7       413     49.2       425     53.2       463
 GR   0049.8     00490    0054.0     00515    0060.3     00575    0057.0     00622    0060.0     00695
 GR   0060.5     00760    0060.8     00780    0060.8     00800    0059.5     00850    0061.8     00920
 GR   0067.0     00960    0062.7     00990    0067.7     01045    0073.0     01105    0072.4     01140
 GR   0072.4     01155    0073.8     01210    0076.5     01250    0077.0     01305

 ET      134                 4.1        44       490
 X1      134        25       274       471       250       230       240
 GR   0080.0     00000    0049.8     00045    0049.3     00081    0051.9     00106    0051.4     00209
 GR   0046.7     00230    0054.6     00274    0050.3     00301    0048.7     00352    0042.8     00369
 GR   0047.8     00407    0059.2     00471    0059.2     00489    0051.6     00533    0058.4     00591
 GR   0059.0     00703    0061.4     00813    0061.9     00840     059.3     00860    0059.1     00951
 GR   0075.5     01014    0074.8     01123    0076.5     01305    0077.0     01347    0080.0     01365
1
   04MAY15      14:47:15                                                                                                    PAGE    2


 ET    134.1                 4.1        30       445
 X1    134.1        29       320       375       220       200       210
 GR   0061.4     00000    0058.5     00023    0054.0     00047    0051.2     00115    0050.3     00162
 GR   0053.0     00222    0051.5     00280    0050.0     00320    0047.2     00345    0052.6     00375
 GR   0056.8     00435    0059.0     00520    0056.0     00570    0059.5     00600    0058.7     00648
 GR   0058.7     00665    0062.0     00700    0062.4     00765    0063.5     00790    0063.5     00815
 GR   0063.5     00875    0065.0     00922    0063.7     00964    0068.6     00990    0074.0     01010
 GR   0075.5     01057    0076.6     01148    0078.0     01190    0078.2     01305

 ET      135                 4.1       113       495
 X1      135        20       154       239       180       160       170
 GR   0085.0     00000    0055.8     00102    0047.7     00154    0047.9     00191    0055.9     00239
 GR   0053.7     00337    0050.4     00388    0057.9     00461    0052.6     00544    0059.0     00609
 GR   0059.6     00710    0064.3     00762    0062.1     00802    0064.1     00862    0064.5     00888
 GR   0064.1     00963    0075.3     00996    0076.5     01125    0078.0     01327    0080.0     01399
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ET      136                 4.1       213       655
X1      136        22       213       281       530       510       520
GR   0100.0     00000    0086.1     00068    0062.7     00131    0060.3     00166    0059.9     00213
GR   0049.6     00242    0059.9     00281    0054.2     00305    0058.4     00336    0053.7     00359
GR   0057.0     00393    0056.4     00467    0060.0     00495    0058.1     00576    0058.4     00648
GR   0056.4     00721    0064.3     00784    0061.3     00878    0072.1     00912    0072.5     00952
GR   0076.4     01036    0080.0     01094

ET      137                 4.1       300       730
X1      137        19       536       663       410       390       440
GR   0100.0     00000    0078.2     00100    0072.2     00146    0072.6     00174    0071.6     00228
GR   0071.0     00281    0063.7     00312    0060.5     00366    0064.1     00473    0065.0     00536
GR   0057.8     00583    0057.8     00631    0063.4     00663    0060.8     00785    0065.0     00836
GR   0070.9     00885    0070.9     00904    0073.1     00956    0090.0     01017

ET      138                 4.1       400       995
X1      138        26       435       757       920       820       860
GR   0100.0     00000    0095.4     00060    0091.6     00130    0080.4     00160    0077.3     00212
GR   0075.2     00308    0074.8     00390    0074.0     00435    0071.2     00461    0066.1     00492
GR   0067.2     00501    0070.0     00535    0067.2     00598    0067.0     00626    0068.8     00645
GR   0074.5     00757    0073.5     00839    0072.7     00941    0065.3     00964    0072.4     00977
GR   0062.4     01024    0081.0     01075    0093.3     01152    0093.6     01173    0097.6     01196
GR   0100.0     01396

ET    138.1                 4.1       418      1004
X1    138.1        37       493       684        60        80        70
GR   0105.0     00000    0100.0     00020    0096.3     00050    0092.6     00074    0091.0     00105
GR   0091.0     00120    0087.3     00150    0081.5     00178    0076.0     00250    0074.5     00275
GR   0077.6     00305    0072.8     00337    0070.3     00368    0071.7     00420    0071.6     00442
GR   0070.5     00493    0068.0     00522    0064.5     00560    0064.5     00632    0066.0     00658
GR   0068.5     00684    0072.3     00738    0072.8     00850    0073.0     00923    0067.0     00950
GR   0067.0     00970    0077.0     01008    0080.0     01032    0081.0     01060    0081.0     01070
GR   0076.3     01110    0080.5     01140    0094.7     01163    0096.8     01213    0098.3     01295
GR   0099.0     01390    0100.0     01470
1
   04MAY15      14:47:15                                                                          PAGE    3


ET    138.3                 4.1       410      1020
X1    138.3        35       550       700       200       250       220
GR   0101.6     00000    0092.4     00063    0097.3     00090    0087.3     00105    0085.5     00128
GR   0073.0     00145    0073.0     00155    0078.2     00172    0081.7     00218    0080.0     00260
GR   0077.0     00300    0071.0     00332    0070.0     00350    0072.5     00388    0073.3     00460
GR   0070.3     00500    0070.8     00550    0066.0     00595    0066.5     00672    0069.8     00700
GR   0071.2     00750    0073.5     00857    0072.2     00920    0072.2     00930    0072.0     00960
GR   0073.0     01015    0072.6     01070    0074.0     01137    0079.0     01175    0090.4     01208
GR   0089.4     01260    0089.2     01295    0091.3     01340    0095.6     01388    0102.0     01432

ET      139                 4.1       480      1070
X1      139        30       601      1013       130       100        90
GR   0100.0     00000    0090.9     00071    0088.9     00117    0089.9     00155    0081.0     00175
GR   0079.3     00238    0077.6     00329    0073.5     00405    0073.1     00459    0073.2     00527
GR   0073.0     00601    0070.3     00645    0067.5     00679    0071.2     00708    0073.0     00833
GR   0073.6     00881    0073.8     00936    0075.7     00983    0070.0     01013    0079.1     01067
GR   0076.3     01107    0079.8     01129    0079.8     01181    0085.0     01201    0084.6     01241
GR   0100.0     01257    0100.7     01302    0093.5     01348    0094.3     01483    0100.0     01500

ET      140                 4.1       648      1090
X1      140        24       948      1055       420       400       355
GR   0100.0     00000    0096.2     00035    0094.9     00078    0094.3     00138    0091.6     00195
GR   0082.7     00278    0084.4     00351    0081.6     00445    0082.0     00494    0080.2     00550
GR   0079.2     00603    0076.8     00663    0073.6     00717    0073.8     00814    0073.1     00859
GR   0071.8     00901    0077.2     00948    0072.0     00961    0069.1     00983    0069.1     01055
GR   0081.0     01098    0082.0     01126    0097.2     01144    0100.0     01288

NC      .04       .04       .04        .3        .5
ET      141       9.1       4.1       582      1030                                          530      1010
X1      141        23       585       944       450       480       470
GR   0105.0     00000    0102.9     00037    0101.2     00120    0101.8     00219    0099.6     00288
GR   0097.5     00346    0095.4     00442    0092.5     00526    0081.0     00551    0080.7     00563
GR   0074.1     00585    0073.2     00691    0072.6     00768    0070.7     00842    0071.4     00911
GR   0073.1     00944    0072.9     00994    0080.0     01052    0083.4     01102    0088.8     01135
GR   0095.7     01169    0098.1     01240    0105.0     01430

NH        6      .030       106       .03       870      .030       930      .060      1160      .030
NH     1250       .03      1978
ET      142       9.1       4.1    895.67   1211.45                                          710      1465
X1      142        22       930      1160       430       510       500
GR   0150.0     00000    0137.4     00011    0135.5     00029    0120.9     00068    0114.3     00106
GR   0112.8     00206    0111.7     00262    0106.8     00368    0103.4     00476    0100.6     00544
GR     96.4       662        90       680        90       870      71.2       930      71.2      1160
GR       90      1250        90      1460      91.8      1473      95.9      1539       102      1618
GR    104.9      1692       110      1978

NH        6      .030       106       .03       870      .030       930      .060      1160      .030
NH     1250       .03      1978
ET                9.1       4.1       895   1221.71                                          710      1465
1
   04MAY15      14:47:15                                                                          PAGE    4


X1    142.1        45       930      1160         1         1         1
GR   0150.0     00000    0137.4     00011    0135.5     00029    0120.9     00068    0114.3     00106
GR   0112.8     00206    0111.7     00262    0106.8     00368    0103.4     00476    0100.6     00544
GR   0096.4     00662    0090.0     00680    0090.0     00870    0090.0     00880    0116.0     00880
GR   0116.0     00886    0088.0     00886    0084.0     00897    0116.0     00897    0116.0     00903
GR   0080.0     00903    0071.2     00930    0071.2     01028    0116.0     01028    0116.0     01034
GR   0071.2     01034    0071.2     01045    0116.0     01045    0116.0     01051    0071.2     01051
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GR   0071.2      01160      0083.0      01228      0116.0      01228      0116.0      01234      0087.0      01234
GR   0089.0      01244      0116.0      01244      0116.0      01250      0090.0      01250      0090.0      01460
GR   0091.8      01473      0095.9      01539      0102.0      01618      0104.9      01692      0110.0      01978

NH        6       .030        300        .03        629       .030        650       .060        940       .030
NH      976        .03       1032
ET               9.1        4.1        630        960                                           630        960
X1    142.9         48        650        940        399        409        444
GR   0110.0      00000      0105.0      00155      0100.0      00240      0095.0      00300      0090.0      00440
GR   0085.0      00622      0116.0      00622      0116.0      00628      0085.0      00628      0085.0      00629
GR   0080.0      00639      0116.0      00639      0116.0      00644      0077.5      00644      0075.0      00650
GR   0074.9      00778      0116.0      00778      0116.0      00784      0074.9      00784      0074.8      00795
GR   0116.0      00795      0116.0      00801      0074.8      00801      0074.8      00850      0075.0      00940
GR   0078.0      00950      0080.0      00956      0082.0      00959      0116.0      00959      0116.0      00965
GR   0086.0      00965      0086.0      00968      0088.0      00972      0089.6      00976      0116.0      00976
GR   0116.0      00982      0090.5      00982      0090.0      00990      0092.0      00995      0094.0      01000
GR   0096.0      01005      0098.0      01009      0100.0      01012      0102.0      01015      0104.0      01020
GR   0106.0      01022      0108.0      01028      0110.0      01032

NH        6       .030        300        .03        629       .030        650       .060        940       .030
NH      977        .03       1032
ET      143        9.1        4.1        630      959.5                                           630        960
X1      143         29        650        940          1          1          1
GR   0110.0      00000      0105.0      00155      0100.0      00240      0095.0      00300      0090.0      00440
GR   0085.0      00629      0080.0      00639      0075.0      00650      0074.8      00850      0075.0      00940
GR   0078.0      00950      0080.0      00956      0082.0      00960      0084.0      00963      0086.0      00968
GR   0088.0      00972      0090.0      00977      0090.0      00980      0090.0      00990      0092.0      00995
GR   0094.0      01000      0096.0      01005      0098.0      01009      0100.0      01012      0102.0      01015
GR   0104.0      01020      0106.0      01022      0108.0      01028      0110.0      01032

NH        4       .030        540        .04        800        .10       1190      0.045       1245
ET      144        9.1        4.1        800       1235                                           470       1245
X1      144         24        840       1215        390        360        345
GR   0115.0      00000      0110.0      00190      0105.0      00400      0100.0      00540      0095.0      00680
GR   0090.0      00800      0085.0      00840      0085.0      00920      0084.5      00970      0085.0      01000
GR   0086.0      01050      0085.0      01070      0084.5      01100      0082.3      01150      0083.0      01190
GR   0084.0      01210      0085.0      01215      0088.0      01220      0090.0      01224      0092.0      01229
GR   0094.0      01233      0096.0      01235      0098.0      01240      0100.0      01245

NH        3        .05        655       .075        985        .05       1075
NC                                        .1         .3
ET      145                   4.1        560       1030
X1      145         20        648        985        960        960        955
GR   0120.0      00000      0112.4      00177      0104.9      00312      0100.4      00402      0098.2      00458
GR   0098.3      00513      0098.5      00548      0086.2      00560      0087.0      00621      0086.5      00648
GR   0083.7      00655      0084.0      00985      0086.0      01000      0088.0      01015      0090.0      01023
GR   0095.0      01032      0100.0      01040      0105.0      01048      0110.0      01054      0115.0      01075
1
   04MAY15      14:47:15                                                                                    PAGE    5


NH        3        .03        395       .040       1110       .045       1190
NC                                        .3         .5
ET      146                   4.1        412       1100
X1      146         20        418        770        880        935        910
GR   0125.0      00000      0119.8      00130      0113.0      00261      0108.2      00356      0106.9      00395
GR    101.1      00418      0091.0      00489      0097.0      00559      0098.0      00653      0100.0      00770
GR   0102.8      00806      0127.4      00839      0126.8      00873      0120.0      00916      0111.5      00941
GR   0115.3      01017      0117.9      01074      0115.8      01090      0102.0      01110      0121.5      01190

NC      .04        .04        .04
ET      147        9.1        4.1        645       1280                                           102       1435
X1      147         20       1081       1174        460        460        545
GR   0125.0      00000      0119.1      00102      0113.5      00310      0105.1      00519      0102.9      00609
GR   0101.7      00712      0094.3      00730      0093.6      00873      0093.5      00955      0093.0      01008
GR   0095.0      01081      0092.1      01111      0092.2      01149      0093.7      01174      0092.2      01234
GR   0094.1      01362      0107.8      01455      0112.3      01494      0119.0      01604      0125.0      01734

NC                                        .1         .3
ET      148                   4.1        620       1220
X1      148         27        997       1159        450        470        370
X3       10
GR   0130.0      00000      0127.1      00039      0119.0      00312      0114.6      00437      0104.5      00549
GR   0096.8      00595      0095.5      00675      0095.5      00746      0097.9      00865      0098.9      00966
GR   0099.1      00997      0095.7      01014      0095.1      01159      0096.7      01225      0092.6      01285
GR   0096.1      01328      0101.5      01411      0098.0      01436      0102.1      01464      0104.9      01502
GR   0120.4      01537      0125.5      01719      0129.1      01883      0130.8      01892      0130.2      01919
GR   0129.2      01927      0130.0      01937

ET      149                   4.1        208        722
X1      149         16        274        505        900       1020        980
X3       10
GR   0135.0      00000      0134.2      00009      0108.4      00067      0107.0      00146      0104.4      00274
GR   0103.0      00384      0104.6      00438      0102.2      00468      0107.0      00505      0106.0      00620
GR   0106.0      00761      0104.7      00848      0116.4      00890      0119.5      01016      0130.7      01171
GR   0135.0      01289

ET    149.1                   4.1      170.0      900.0
X1    149.1         29        430        567        610        560        600
GR   0127.0      00000      0125.0      00040      0115.8      00090      0117.3      00112      0111.4      00170
GR   0111.4      00195      0107.7      00240      0106.0      00282      0106.0      00370      0110.0      00390
GR    111.6        405        110        418        108        430      103.8        490      103.8        540
GR   0107.3      00567      0107.5      00650      0110.0      00665      0111.6      00728      0111.4      00777
GR   0109.0      00823      0110.8      00862      0115.0      00880      0115.0      00910      0111.8      00937
GR   0107.0      00970      0110.4      01017      0119.0      01042      0129.0      01080

ET    150.0                   4.1      500.0     1225.0
X1      150         28        861       1152        560        600        570
X3       10
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GR   0135.0      00000      0131.5      00009      0128.5      00156      0124.8      00254      0119.3      00293
GR   0116.6      00391      0113.7      00427      0115.0      00485      0105.2      00512      0110.0      00542
GR   0108.8      00620      0106.1      00709      0106.6      00837      0111.3      00861      0105.9      00884
GR   0106.7      01003      0107.9      01152      0115.2      01177      0117.5      01202      0108.9      01224
GR   0106.1      01239      0106.1      01285      0107.4      01312      0107.5      01401      0117.4      01432
1
   04MAY15      14:47:15                                                                                      PAGE    6

GR   0118.3      01485      0129.8      01538      0135.0      01592

ET    151.0                  4.1       220.0      1060.0
X1      151         23        627        1000        1030        1000        1045
GR   0140.0      00000      0121.7      00040      0123.0      00162      0116.5      00181      0113.4      00239
GR   0112.0      00338      0113.4      00460      0113.1      00590      0116.0      00627      0112.3      00652
GR   0112.8      00802      0113.7      00883      0113.7      00974      0116.7      01000      0111.5      01031
GR   0111.8      01112      0111.0      01250      0114.7      01258      0118.5      01297      0118.5      01314
GR   0127.9      01331      0127.3      01360      0135.0      01369

ET      152                  4.1        505        1095
X1      152         25        833        932         540         590         560
X3       10
GR   0150.0      00000      0146.0      00071      0127.3      00135      0127.2      00311      0125.8      00384
GR    114.7        413       114.3        468       114.2        642       115.2        788       122.7        813
GR   0121.9      00833      0114.8      00853      0114.8      00895      0120.0      00932      0118.8      01040
GR   0117.8      01191      0116.0      01313      0116.1      01369      0116.9      01405      0117.3      01494
GR   0123.4      01517      0124.7      01550      0129.2      01575      0129.6      01623      0150.0      01664

ET      153                  4.1        660        1250
X1      153         30        705       1096         180         190         190
X3       10
GR   0150.0      00000      0141.5      00137      0135.5      00185      0144.0      00222      0125.9      00272
GR    124.5        350       115.3        376       115.3        413         123        445       115.3        468
GR    115.3        582       120.3        622       115.7        641       116.9        682       125.9        705
GR      116        725       115.9        771       116.4        845       119.9        882       115.3        945
GR   0124.4      00993      0124.6      01096      0123.0      01236      0124.2      01358      0124.0      01501
GR   0117.6      01592      0122.7      01647      0129.9      01707      0129.7      01766      0150.0      01795

ET                           4.1        555        1145
X1      154         26        599        943         350         330         345
X3       10
GR   0150.0      00000      0144.1      00094      0138.8      00204      0129.9      00279      0129.0      00425
GR   0123.3      00503      0116.9      00541      0116.9      00575      0125.2      00599      0117.8      00617
GR   0119.4      00702      0119.7      00771      0117.9      00867      0118.3      00943      0121.9      01065
GR   0128.6      01113      0121.8      01175      0122.1      01219      0129.4      01242      0124.5      01287
GR   0119.0      01305      0118.5      01464      0121.5      01541      0134.2      01575      0133.7      01634
GR   0150.0      01663

ET      155                  4.1        588        1162
X1      155         26        707        968         350         290         330
GR   0150.0      00000      0140.9      00272      0135.7      00448      0133.8      00513      0124.9      00551
GR   0120.6      00707      0118.7      00855      0118.7      00952      0122.8      00968      0122.5      01031
GR   0124.4      01053      0122.6      01121      0125.9      01135      0124.7      01235      0118.1      01253
GR   0118.1      01274      0121.5      01289      0120.7      01396      0118.1      01406      0118.1      01430
GR   0121.0      01465      0118.8      01480      0118.9      01506      0137.0      01538      0136.9      01598
GR   0150.0      01624

ET      156                  4.1        655        1235
X1      156         17        696       1183         230         250         300
GR   0150.0      00000      0143.7      00169      0138.0      00413      0135.8      00534      0127.4      00573
GR   0123.4      00696      0118.1      00740      0118.1      01051      0119.2      01183      0121.5      01278
GR   0121.0      01349      0128.3      01378      0127.2      01443      0128.8      01510      0135.2      01531
GR   0134.4      01581      0150.0      01622
1
   04MAY15      14:47:15                                                                                      PAGE    7

ET      157                  4.1        660        1260
X1      157         20       1123       1213         150         170         170
GR   0150.0      00000      0142.0      00335      0139.1      00447      0133.4      00537      0129.3      00617
GR   0123.2      00766      0122.8      00882      0129.0      00911      0128.3      01035      0127.2      01123
GR    121.1       1144       124.8       1181       128.3       1213         128       1313         128       1348
GR      128       1470       133.9       1484       135.8       1525       134.5       1564         150       1592

ET    157.1                  4.1        682        1312
X1    157.1         33       1062       1160         190         190         190
GR   0152.0      00000      0149.3      00118      0146.5      00210      0144.4      00300      0143.7      00370
GR   0141.8      00440      0139.2      00458      0138.7      00490      0135.2      00557      0133.8      00570
GR   0136.2      00619      0133.8      00641      0128.6      00664      0125.5      00690      0125.0      00777
GR   0123.5      00800      0123.5      01008      0125.0      01018      0126.0      01062      0123.5      01090
GR   0123.5      01150      0125.4      01160      0125.6      01216      0128.0      01245      0128.0      01260
GR    126.2       1290       126.2       1305        125       1316         125       1496       130.2       1500
GR   0135.4      01528      0135.4      01552      0150.0      01587

ET      158                  4.1        635        1272
X1      158         21        822       1111         210         200         210
GR   0150.0      00000      0141.7      00275      0136.5      00514      0133.0      00532      0124.5      00628
GR   0124.7      00685      0129.7      00733      0121.5      00822      0121.7      00962      0122.8      01024
GR   0122.6      01073      0130.8      01111      0130.5      01217      0123.3      01241      0123.1      01264
GR    121.5       1290       121.5       1346       124.7       1400       137.7       1425       137.2       1475
GR   0150.0      01491
1
   04MAY15      14:47:15                                                                                      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
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 *PROF 1
0

 CCHV=     .100 CEHV=     .300
 *SECNO 133.200
        SECTIONS FROM LEFT TO RIGHT LOOKING DOWNSTREAM
    133.200     13.05     55.75       .00     55.75     56.37       .62       .00       .00     49.20
    22000.0   14262.8    6183.1    1554.1    2424.4     816.0     398.5        .0        .0     49.20
        .00      5.88      7.58      3.90      .040      .040      .040      .000     42.70     20.79
    .001682      280.      280.      260.         0         0         0       .00    510.88    531.67


 *SECNO 134.000

 3265 DIVIDED FLOW


 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .57

    134.000     13.22     56.02       .00       .00     57.21      1.20       .67       .17     54.60
    22000.0   10004.6   11363.1     632.3    1229.0    1199.8     139.6      17.5       2.8     59.20
        .01      8.14      9.47      4.53      .040      .040      .040      .000     42.80     35.74
    .005240      250.      240.      230.         2         0         0       .00    480.62    570.66


 *SECNO 134.100

 3265 DIVIDED FLOW


 3301 HV CHANGED MORE THAN HVINS

    134.100      9.69     56.89       .00       .00     58.95      2.05      1.48       .26     50.00
    22000.0   15432.5    5747.7     819.8    1433.1     417.2     142.0      28.7       5.0     52.60
        .01     10.77     13.78      5.77      .040      .040      .040      .000     47.20     31.56
    .009367      220.      210.      200.         2         0         0       .00    429.70    577.67


 *SECNO 135.000
1
    04MAY15      14:47:15                                                                                                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


 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.50

    135.000     11.28     58.98       .00       .00     60.07      1.09      1.03       .10     47.70
    22000.0    3402.7    7705.6   10891.7     393.5     753.4    1631.3      38.0       6.9     55.90
        .02      8.65     10.23      6.68      .040      .040      .040      .000     47.70     90.90
    .004175      180.      170.      160.         3         0         0       .00    517.88    608.78


 *SECNO 136.000

 3265 DIVIDED FLOW

    136.000     12.04     61.64       .00       .00     62.92      1.29      2.79       .06     59.90
    22000.0     337.7    5233.9   16428.4      85.3     468.3    1953.5      69.2      13.6     59.90
        .03      3.96     11.18      8.41      .040      .040      .040      .000     49.60    146.50
    .007330      530.      520.      510.         3         0         0       .00    627.89    879.06


 *SECNO 137.000

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
    137.000      8.20     66.00     66.00       .00     67.83      1.83      3.60       .16     65.00
    22000.0    6131.3   10045.8    5822.9     709.0     782.5     638.0      90.9      19.0     63.40
        .05      8.65     12.84      9.13      .040      .040      .040      .000     57.80    302.24
    .010685      410.      440.      390.         2        20         0       .00    542.07    844.30


 *SECNO 138.000

 3265 DIVIDED FLOW

    138.000     11.96     74.36       .00       .00     75.71      1.35      7.83       .05     74.00
    22000.0       3.9   13608.7    8387.3       3.7    1481.7     877.9     135.0      30.5     74.50
        .07      1.06      9.18      9.55      .040      .040      .040      .000     62.40    414.56
    .007931      920.      860.      820.         3         0         0       .00    628.35   1056.80


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    04MAY15      14:47:15                                                                                                PAGE   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 138.100

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.93

   138.100     10.88     75.38       .00       .00     76.05       .67       .27       .07     70.50
   22000.0    2946.2   13528.3    5525.6     683.3    1784.3    1215.7     140.1      31.7     68.50
       .07      4.31      7.58      4.55      .040      .040      .040      .000     64.50    260.20
   .002123       60.       70.       80.         2         0         0       .00    705.51   1001.87

*SECNO 138.300

3265 DIVIDED FLOW

   138.300      9.96     75.96       .00       .00     76.57       .60       .51       .01     70.80
   22000.0    5033.6   10138.2    6828.3    1050.9    1307.1    1567.2     159.8      35.8     69.80
       .08      4.79      7.76      4.36      .040      .040      .040      .000     66.00    140.97
   .002440      200.      220.      250.         3         0         0       .00    870.12   1151.92

*SECNO 139.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   139.000      8.35     75.85     75.85       .00     77.54      1.68       .51       .32     73.00
   22000.0    5045.2   15984.9     969.9     577.0    1462.4     101.7     167.0      37.7     70.00
       .09      8.74     10.93      9.54      .040      .040      .040      .000     67.50    361.36
   .016041      130.       90.      100.        20         9         0       .00    686.38   1047.74

*SECNO 140.000

3301 HV CHANGED MORE THAN HVINS

1
   04MAY15      14:47:15                                                                                    PAGE   11

     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 =  2.02

   140.000     10.06     79.16       .00       .00     80.28      1.12      2.68       .06     77.20
   22000.0   10950.3    9826.1    1223.5    1572.7     973.6     183.0     188.6      42.9     69.10
       .10      6.96     10.09      6.68      .040      .040      .040      .000     69.10    603.87
   .003943      420.      355.      400.         3         0         0       .00    487.50   1091.37

CCHV=     .300 CEHV=     .500
*SECNO 141.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.58


3470 ENCROACHMENT STATIONS=      530.0    1010.0  TYPE=      1  TARGET=      480.000
   141.000     10.28     80.98       .00       .00     81.55       .57      1.11       .16     74.10
   22000.0     264.8   18884.4    2850.7      80.2    3061.4     512.3     222.8      48.0     73.10
       .12      3.30      6.17      5.56      .040      .040      .040      .000     70.70    551.96
   .001583      450.      470.      480.         3         0         0       .00    458.04   1010.00

1490 NH CARD USED
*SECNO 142.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .66


3470 ENCROACHMENT STATIONS=      710.0    1465.0  TYPE=      1  TARGET=      755.000
   142.000     10.76     81.96       .00       .00     82.85       .89      1.14       .16     71.20
   22000.0    1629.7   17884.0    2486.4     184.6    2473.7     276.9     260.5      52.4     71.20
       .14      8.83      7.23      8.98      .030      .060      .030      .000     71.20    895.67
   .003589      430.      500.      510.         2         0         0       .00    315.81   1211.49


1490 NH CARD USED
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*SECNO 142.100

3265 DIVIDED FLOW

1
   04MAY15      14:47:15                                                                                                                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


3470 ENCROACHMENT STATIONS=      710.0    1465.0  TYPE=      1  TARGET=      755.000
   142.100     10.71     81.91       .00       .00     82.90       .99       .00       .05     71.20
   22000.0    1762.2   16960.6    3277.1     170.3    2334.4     330.4     260.5      52.4     71.20
       .14     10.35      7.27      9.92      .030      .058      .030      .000     71.20    903.00
   .004366        1.        1.        1.         2         0         0       .00    306.71   1221.71


1490 NH CARD USED
*SECNO 142.900

3265 DIVIDED FLOW


3470 ENCROACHMENT STATIONS=      630.0     960.0  TYPE=      1  TARGET=      330.000
   142.900      9.29     84.09       .00       .00     85.15      1.06      2.21       .03     75.00
   22000.0     495.0   20038.6    1466.4      63.7    2553.2     115.7     288.6      55.5     75.00
       .15      7.77      7.85     12.68      .030      .059      .030      .000     74.80    630.82
   .005922      399.      444.      409.         2         0         0       .00    311.18    959.00


1490 NH CARD USED
*SECNO 143.000

3470 ENCROACHMENT STATIONS=      630.0     960.0  TYPE=      1  TARGET=      330.000
   143.000      9.49     84.29       .00       .00     85.20       .91       .01       .05     75.00
   22000.0     912.6   19747.9    1339.5      93.1    2723.8     122.8     288.7      55.5     75.00
       .15      9.80      7.25     10.90      .030      .060      .030      .000     74.80    630.42
   .004324        1.        1.        1.         2         0         0       .00    329.58    960.00


1490 NH CARD USED
*SECNO 144.000

3301 HV CHANGED MORE THAN HVINS

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

3470 ENCROACHMENT STATIONS=      470.0    1245.0  TYPE=      1  TARGET=      775.000
   144.000      6.83     89.13     89.13       .00     91.42      2.29      3.86       .69     85.00
   22000.0     436.6   21356.8     206.5      68.4    1749.3      14.5     307.7      58.5     85.00
       .16      6.39     12.21     14.29      .100      .090      .045      .000     82.30    806.93
   .070869      390.      345.      360.        20        19         0       .00    415.34   1222.27


1
   04MAY15      14:47:15                                                                                                                PAGE   13

    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


1490 NH CARD USED
CCHV=     .100 CEHV=     .300
*SECNO 145.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  8.82

   145.000     10.32     94.02       .00       .00     94.42       .40      2.81       .19     86.50
   22000.0    2821.9   17941.1    1237.0     678.9    3419.3     295.4     376.0      68.3     84.00
       .22      4.16      5.25      4.19      .040      .040      .040      .000     83.70    552.37
   .000910      960.      955.      960.         5         0         0       .00    477.87   1030.24


1490 NH CARD USED
CCHV=     .300 CEHV=     .500
*SECNO 146.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   146.000     10.90    101.90    101.90       .00    104.40      2.51      2.11      1.05    101.10
   22000.0       3.0   21898.3      98.7       1.3    1720.3      23.1     439.9      77.2    100.00
       .23      2.35     12.73      4.27      .040      .040      .040      .000     91.00    414.84
   .014209      880.      910.      935.        20         8         0       .00    379.55    794.39
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*SECNO 147.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  8.45


3470 ENCROACHMENT STATIONS=      102.0    1435.0  TYPE=      1  TARGET=     1333.000
   147.000     13.24    105.34       .00       .00    105.45       .10       .32       .72     95.00
   22000.0   11574.8    3287.3    7138.0    4632.8    1165.0    2732.7     497.0      84.5     93.70
       .29      2.50      2.82      2.61      .040      .040      .040      .000     92.10    512.94
   .000199      460.      545.      460.         3         0         0       .00    922.06   1435.00


1
   04MAY15      14:47:15                                                                                                    PAGE   14

    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 148.000
   148.000     12.84    105.44       .00       .00    105.56       .12       .11       .01     99.10
   22000.0    9773.4    4791.3    7435.3    3625.4    1592.7    2672.6     580.5      94.2     95.10
       .33      2.70      3.01      2.78      .040      .040      .040      .000     92.60    538.56
   .000312      450.      370.      470.         2         0         0       .00    964.66   1503.22


*SECNO 149.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   149.000      6.29    108.49    108.49       .00    110.00      1.51       .90       .42    104.40
   22000.0    3103.9   12242.4    6653.7     419.4    1076.7     878.7     693.9     113.7    107.00
       .36      7.40     11.37      7.57      .040      .040      .040      .000    102.20     66.80
   .012062      900.      980.     1020.        20         8         0       .00    794.80    861.60


*SECNO 149.100

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.94

   149.100      8.86    112.66       .00       .00    113.37       .71      3.29       .08    108.00
   22000.0    7634.1    8418.5    5947.4    1197.3    1039.9    1199.9     733.2     124.4    107.30
       .39      6.38      8.10      4.96      .040      .040      .040      .000    103.80    157.66
   .003194      610.      600.      560.         4         0         0       .00    806.07   1023.56


*SECNO 150.000

3265 DIVIDED FLOW

1
   04MAY15      14:47:15                                                                                                    PAGE   15

    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 =  1.97

   150.000      8.83    114.03       .00       .00    114.25       .22       .83       .05    111.30
   22000.0    8734.4    8015.4    5250.2    2354.8    2047.3    1409.5     794.2     135.8    107.90
       .43      3.71      3.92      3.72      .040      .040      .040      .000    105.20    422.91
   .000826      560.      570.      600.         3         0         0       .00    914.66   1421.44


*SECNO 151.000

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .28

   151.000      4.54    115.54       .00       .00    116.55      1.01      2.07       .24    116.00
   22000.0    7139.5    5789.4    9071.1    1008.0     853.1     961.3     896.0     158.9    116.70
       .46      7.08      6.79      9.44      .040      .040      .040      .000    111.00    198.88
   .010572     1030.     1045.     1000.         3         0         0       .00   1041.98   1266.66
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*SECNO 152.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       121.90 ELREA=       120.00

   152.000      6.34    121.14       .00       .00    122.43      1.28      5.79       .08    121.90
   22000.0        .0    4707.8   17292.2        .0     461.2    1973.0     930.5     170.1    120.00
       .48       .00     10.21      8.76      .000      .040      .040      .000    114.80    835.14
   .009613      540.      560.      590.         9         0         0       .00    673.33   1508.48


*SECNO 153.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
1
   04MAY15      14:47:15                                                                                                                                PAGE   16

    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


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       125.90 ELREA=       124.60

   153.000      7.84    123.14    123.14       .00    126.09      2.95      2.14       .50    125.90
   22000.0        .0   22000.0        .0        .0    1596.6        .0     939.3     172.2    124.60
       .49       .00     13.78       .00      .000      .040      .000      .000    115.30    710.57
   .013411      180.      190.      190.        20        11         0       .00    275.81    986.38


*SECNO 154.000

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  4.84

   154.000      9.84    126.74       .00       .00    126.91       .17       .54       .28    125.20
   22000.0    2627.4    9462.3    9910.4     804.4    2701.2    3189.0     971.7     177.3    118.30
       .51      3.27      3.50      3.11      .040      .040      .040      .000    116.90    455.93
   .000573      350.      345.      330.         3         0         0       .00   1036.01   1555.03


*SECNO 155.000
   155.000      8.81    126.91       .00       .00    127.18       .28       .24       .03    120.60
   22000.0    2067.1    9279.0   10653.9     657.0    1968.5    2700.7    1014.8     184.5    122.80
       .53      3.15      4.71      3.94      .040      .040      .040      .000    118.10    542.43
   .001091      350.      330.      290.         2         0         0       .00    977.72   1520.16


*SECNO 156.000
   156.000      9.08    127.18       .00       .00    127.43       .25       .25       .00    123.40
   22000.0     333.7   17811.2    3855.2     219.3    4231.0    1145.0    1049.5     189.9    119.20
       .55      1.52      4.21      3.37      .040      .040      .040      .000    118.10    579.88
   .000720      230.      300.      250.         2         0         0       .00    793.66   1373.54


*SECNO 157.000

3301 HV CHANGED MORE THAN HVINS

1
   04MAY15      14:47:15                                                                                                                                PAGE   17

    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


3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   157.000      8.50    129.60    129.60       .00    130.93      1.33       .28       .32    127.20
   22000.0   15449.7    4691.5    1858.9    1654.0     458.2     399.5    1064.9     193.0    128.30
       .56      9.34     10.24      4.65      .040      .040      .040      .000    121.10    611.13
   .008834      150.      170.      170.        20        10         0       .00    862.67   1473.80


*SECNO 157.100

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.94

   157.100      7.70    131.20       .00       .00    131.47       .27       .43       .11    126.00
   22000.0   11733.9    3154.2    7111.9    2721.3     709.9    1886.7    1082.0     196.7    125.40
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       .57      4.31      4.44      3.77      .040      .040      .040      .000    123.50    652.51
   .001025      190.      190.      190.         2         0         0       .00    852.86   1505.37


 *SECNO 158.000
   158.000      9.90    131.40       .00       .00    131.65       .25       .18       .00    121.50
   22000.0    4257.2   11004.2    6738.7    1374.2    2544.2    1658.4    1107.8     200.8    130.80
       .59      3.10      4.33      4.06      .040      .040      .040      .000    121.50    550.07
   .000749      210.      210.      200.         2         0         0       .00    862.81   1412.88


 T1      OTAY RIVER NATURAL BACKWATER     SECTIONS 133.2 TO 158.0
 T2      FLOODWAY    Q#22,000 CFS
 T3      JUNE 15, 2004

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                 3                                                                   55.82

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       2                 -10                                                                     15

1
   04MAY15      14:47:15                                                                                                PAGE   18


     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=     .100 CEHV=     .300
 *SECNO 133.200

 3470 ENCROACHMENT STATIONS=       46.0     493.0  TYPE=      1  TARGET=      447.000
         SECTIONS FROM LEFT TO RIGHT LOOKING DOWNSTREAM
   133.200     13.12     55.82       .00     55.75     56.48       .66       .00       .00     49.20
   22000.0   14358.0    6367.4    1274.6    2356.0     821.0     309.5        .0        .0     49.20
       .00      6.09      7.76      4.12      .040      .040      .040      .000     42.70     46.00
   .001748      280.      280.      260.         0         0         0       .00    447.00    493.00


 FLOW DISTRIBUTION FOR SECNO=    133.20          CWSEL=     55.82

 STA=      46.      70.     117.     143.     170.     233.     255.     270.     300.     354.     425.     463.     493.
   PER Q=      4.2      15.6       7.2       4.2       7.6       4.1       4.0       7.6      10.9      28.9       3.4       2.4
    AREA=    179.6     473.3     235.8     173.3     344.6     156.6     132.3     257.1     403.4     821.0     175.6     133.9
     VEL=      5.1       7.2       6.7       5.4       4.8       5.7       6.6       6.5       5.9       7.8       4.3       3.9
   DEPTH=      7.5      10.1       9.1       6.4       5.5       7.1       8.8       8.6       7.5      11.6       4.6       4.5

 *SECNO 134.000

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .57


 3470 ENCROACHMENT STATIONS=       44.0     490.0  TYPE=      1  TARGET=      446.000
   134.000     13.28     56.08       .00     56.02     57.37      1.29       .70       .19     54.60
   22000.0   10257.2   11742.8        .0    1220.8    1211.2        .0      16.7       2.4     59.20
       .01      8.40      9.70       .00      .040      .040      .000      .000     42.80     44.00
   .005436      250.      240.      230.         2         0         0       .00    409.48    453.48


 FLOW DISTRIBUTION FOR SECNO=    134.00          CWSEL=     56.08

 STA=      44.      45.      81.     106.     209.     230.     274.     471.
   PER Q=       .1      10.2       5.3      15.3       6.6       9.1      53.4
    AREA=      5.9     235.1     137.0     456.2     147.6     238.9    1211.2
     VEL=      2.5       9.6       8.5       7.4       9.9       8.4       9.7
   DEPTH=      5.9       6.5       5.5       4.4       7.0       5.4       6.7

1
   04MAY15      14:47:15                                                                                                PAGE   19


     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 134.100

 3301 HV CHANGED MORE THAN HVINS


 3470 ENCROACHMENT STATIONS=       30.0     445.0  TYPE=      1  TARGET=      415.000
   134.100      9.89     57.09       .00     56.89     58.98      1.90      1.43       .18     50.00
   22000.0   15477.6    5652.0     870.4    1490.4     428.1     145.2      27.8       4.5     52.60
       .01     10.38     13.20      5.99      .040      .040      .040      .000     47.20     30.50
   .008311      220.      210.      200.         2         0         0       .00    414.50    445.00
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FLOW DISTRIBUTION FOR SECNO=    134.10          CWSEL=     57.09

STA=      31.      47.     115.     162.     222.     280.     320.     375.     435.     445.
  PER Q=       .5     12.8     15.7     15.5     12.4     13.4     25.7      3.9       .0
   AREA=     25.5    305.5    298.1    326.6    280.9    253.7    428.1    143.6      1.6
    VEL=      4.5      9.2     11.6     10.5      9.7     11.6     13.2      6.1      1.0
  DEPTH=      1.5      4.5      6.3      5.4      4.8      6.3      7.8      2.4       .2

*SECNO 135.000

3470 ENCROACHMENT STATIONS=      113.0     495.0  TYPE=      1  TARGET=      382.000
   135.000     10.70     58.40       .00     58.98     60.38      1.98      1.37       .02     47.70
   22000.0    3554.6    9303.8    9141.6     307.8     704.2    1040.8      35.9       6.0     55.90
       .02     11.55     13.21      8.78      .040      .040      .040      .000     47.70    113.00
   .007622      180.      170.      160.         2         0         0       .00    382.00    495.00


FLOW DISTRIBUTION FOR SECNO=    135.00          CWSEL=     58.40

STA=     113.     154.     239.     337.     388.     461.     495.
  PER Q=     16.2     42.3     12.2     16.4     12.0      1.0
   AREA=    307.8    704.2    352.8    323.9    310.3     53.9
    VEL=     11.5     13.2      7.6     11.1      8.5      4.2
  DEPTH=      7.5      8.3      3.6      6.4      4.3      1.6

*SECNO 136.000

3301 HV CHANGED MORE THAN HVINS

1
   04MAY15      14:47:15                                                                                                                PAGE   20


    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=      213.0     655.0  TYPE=      1  TARGET=      442.000
   136.000     12.97     62.57       .00     61.64     63.87      1.30      3.43       .07     59.90
   22000.0        .0    5631.3   16368.7        .0     531.1    1901.2      62.4      10.9     59.90
       .03       .00     10.60      8.61      .000      .040      .040      .000     49.60    213.00
   .005861      530.      520.      510.         1         0         0       .00    442.00    655.00


FLOW DISTRIBUTION FOR SECNO=    136.00          CWSEL=     62.57

STA=     213.     281.     305.     336.     359.     393.     467.     495.     576.     648.     655.
  PER Q=     25.6      5.2      8.5      6.7     11.8     18.2      4.2      8.5     10.6       .7
   AREA=    531.1    132.2    194.0    149.7    245.1    433.6    122.1    284.3    310.3     29.8
    VEL=     10.6      8.7      9.6      9.8     10.6      9.2      7.5      6.6      7.5      5.4
  DEPTH=      7.8      5.5      6.3      6.5      7.2      5.9      4.4      3.5      4.3      4.3

*SECNO 137.000

3301 HV CHANGED MORE THAN HVINS

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

3470 ENCROACHMENT STATIONS=      300.0     730.0  TYPE=      1  TARGET=      430.000
   137.000      8.80     66.60     66.60     66.00     68.74      2.14      3.17       .25     65.00
   22000.0    8015.1   11617.7    2367.2     849.1     858.3     262.0      83.1      14.9     63.40
       .04      9.44     13.54      9.04      .040      .040      .040      .000     57.80    300.00
   .010502      410.      440.      390.        20        20         0       .00    430.00    730.00


FLOW DISTRIBUTION FOR SECNO=    137.00          CWSEL=     66.60

STA=     300.     312.     366.     473.     536.     663.     730.
  PER Q=       .4     11.4     21.0      3.6     52.8     10.8
   AREA=     17.8    242.8    459.7    128.9    858.3    262.0
    VEL=      4.8     10.4     10.1      6.1     13.5      9.0
  DEPTH=      1.5      4.5      4.3      2.0      6.8      3.9

*SECNO 138.000
1
   04MAY15      14:47:15                                                                                                                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


3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=      400.0     995.0  TYPE=      1  TARGET=      595.000
   138.000     12.76     75.16       .00     74.36     76.57      1.41      7.76       .07     74.00
   22000.0      86.9   17481.6    4431.4      29.9    1739.3     614.1     126.2      25.1     74.50
       .07      2.91     10.05      7.22      .040      .040      .040      .000     62.40    400.00
   .007755      920.      860.      820.         3         0         0       .00    595.00    995.00
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FLOW DISTRIBUTION FOR SECNO=    138.00          CWSEL=     75.16

STA=     400.     435.     757.     839.     941.     964.     977.     995.
  PER Q=       .4      79.5       1.6       5.1       6.9       3.8       2.8
   AREA=     29.9    1739.3      95.5     210.5     141.8      82.1      84.2
    VEL=      2.9      10.1       3.6       5.3      10.6      10.2       7.4
  DEPTH=       .9       5.4       1.2       2.1       6.2       6.3       4.7

*SECNO 138.100

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.20


3470 ENCROACHMENT STATIONS=      418.0    1004.0  TYPE=      1  TARGET=      586.000
   138.100     11.78     76.28       .00     75.38     76.87       .59       .22       .08     70.50
   22000.0    1641.4   13731.3    6627.3     378.6    1956.7    1503.8     131.4      26.1     68.50
       .07      4.34      7.02      4.41      .040      .040      .040      .000     64.50    418.00
   .001608       60.       70.       80.         2         0         0       .00    586.00   1004.00


FLOW DISTRIBUTION FOR SECNO=    138.10          CWSEL=     76.28

STA=     418.     420.     442.     493.     684.     738.     850.     923.     950.     970.    1004.
  PER Q=       .1       1.9       5.5      62.4       7.0       6.8       3.8       3.9       5.6       3.1
   AREA=      9.2     102.1     267.2    1956.7     318.1     418.9     247.5     169.8     185.8     163.8
    VEL=      1.9       4.1       4.5       7.0       4.9       3.6       3.4       5.0       6.6       4.1
  DEPTH=      4.6       4.6       5.2      10.2       5.9       3.7       3.4       6.3       9.3       4.8
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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 138.300

3470 ENCROACHMENT STATIONS=      410.0    1020.0  TYPE=      1  TARGET=      610.000
   138.300     10.64     76.64       .00     75.96     77.35       .71       .44       .04     70.80
   22000.0    3567.6   11329.2    7103.3     677.4    1406.8    1427.7     150.8      29.3     69.80
       .08      5.27      8.05      4.98      .040      .040      .040      .000     66.00    410.00
   .002385      200.      220.      250.         2         0         0       .00    610.00   1020.00


FLOW DISTRIBUTION FOR SECNO=    138.30          CWSEL=     76.64

STA=     410.     460.     500.     550.     700.     750.     857.     920.     930.     960.    1015.    1020.
  PER Q=       3.3       4.5       8.3      51.5       8.5       9.9       4.8       1.0       3.1       4.8        .2
   AREA=     180.3     193.1     303.9    1406.8     306.4     457.8     238.0      44.3     135.9     227.1      18.2
    VEL=      4.1       5.2       6.0       8.1       6.1       4.8       4.4       4.9       5.0       4.7       3.0
  DEPTH=      3.6       4.8       6.1       9.4       6.1       4.3       3.8       4.4       4.5       4.1       3.6

*SECNO 139.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .48


3470 ENCROACHMENT STATIONS=      480.0    1070.0  TYPE=      1  TARGET=      590.000
   139.000      9.06     76.56       .00     75.85     78.00      1.44       .43       .22     73.00
   22000.0    3524.2   17417.5    1058.3     416.2    1755.5     127.9     157.5      30.7     70.00
       .08      8.47      9.92      8.27      .040      .040      .040      .000     67.50    480.00
   .010359      130.       90.      100.         2         0         0       .00    571.96   1051.96


FLOW DISTRIBUTION FOR SECNO=    139.00          CWSEL=     76.56

STA=     480.     527.     601.    1013.    1052.
  PER Q=       5.9      10.1      79.2       4.8
   AREA=     159.8     256.4    1755.5     127.9
    VEL=      8.2       8.7       9.9       8.3
  DEPTH=      3.4       3.5       4.3       3.3
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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 140.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.62


3470 ENCROACHMENT STATIONS=      648.0    1090.0  TYPE=      1  TARGET=      442.000
   140.000     10.07     79.17       .00     79.16     80.31      1.14      2.28       .03     77.20
   22000.0   10909.0    9843.8    1247.1    1536.4     974.5     183.1     179.4      35.1     69.10
       .10      7.10     10.10      6.81      .040      .040      .040      .000     69.10    648.00
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   .003944      420.      355.      400.         2         0         0       .00    442.00   1090.00


 FLOW DISTRIBUTION FOR SECNO=    140.00          CWSEL=     79.17

 STA=     648.     663.     717.     814.     859.     901.     948.    1055.    1090.
   PER Q=       .5      5.7     17.5      8.7     10.7      6.5     44.7      5.7
    AREA=     31.1    214.6    531.0    257.6    282.4    219.7    974.5    183.1
     VEL=      3.5      5.8      7.2      7.5      8.3      6.5     10.1      6.8
   DEPTH=      2.1      4.0      5.5      5.7      6.7      4.7      9.1      5.2

 CCHV=     .300 CEHV=     .500
 *SECNO 141.000

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.61


 3470 ENCROACHMENT STATIONS=      582.0    1030.0  TYPE=      1  TARGET=      448.000
    141.000     10.32     81.02       .00     80.98     81.57       .55      1.08       .18     74.10
    22000.0      46.5   18683.3    3270.2      19.4    3073.2     613.0     213.7      39.9     73.10
        .12      2.40      6.08      5.33      .040      .040      .040      .000     70.70    582.00
    .001530      450.      470.      480.         2         0         0       .00    448.00   1030.00


 FLOW DISTRIBUTION FOR SECNO=    141.00          CWSEL=     81.02

 STA=     582.     585.     944.     994.    1030.
   PER Q=       .2     84.9     10.6      4.3
    AREA=     19.4   3073.2    400.4    212.6
     VEL=      2.4      6.1      5.8      4.4
   DEPTH=      6.5      8.6      8.0      5.9

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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


 1490 NH CARD USED
 *SECNO 142.000

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .65


 3470 ENCROACHMENT STATIONS=      895.7    1211.4  TYPE=      1  TARGET=      315.780
    142.000     10.76     81.96       .00     81.96     82.85       .89      1.12       .17     71.20
    22000.0    1631.1   17879.0    2489.8     184.9    2475.8     277.3     251.8      44.3     71.20
        .14      8.82      7.22      8.98      .030      .060      .030      .000     71.20    895.67
    .003577      430.      500.      510.         2         0         0       .00    315.78   1211.45


 FLOW DISTRIBUTION FOR SECNO=    142.00          CWSEL=     81.96

 STA=     896.     930.    1160.    1211.
   PER Q=      7.4     81.3     11.3
    AREA=    184.9   2475.8    277.3
     VEL=      8.8      7.2      9.0
   DEPTH=      5.4     10.8      5.4

 1490 NH CARD USED
 *SECNO 142.100

 3265 DIVIDED FLOW


 3470 ENCROACHMENT STATIONS=      895.0    1221.7  TYPE=      1  TARGET=      326.710
    142.100     10.72     81.92       .00     81.91     82.91       .99       .00       .05     71.20
    22000.0    1763.3   16956.0    3280.8     170.6    2336.4     331.0     251.8      44.3     71.20
        .14     10.34      7.26      9.91      .030      .058      .030      .000     71.20    903.00
    .004352        1.        1.        1.         2         0         0       .00    306.71   1221.71


 FLOW DISTRIBUTION FOR SECNO=    142.10          CWSEL=     81.92

 STA=     903.     930.    1034.    1051.    1160.    1222.
   PER Q=      8.0     35.4      2.1     39.6     14.9
    AREA=    170.6   1050.3    117.9   1168.2    331.0
     VEL=     10.3      7.4      3.9      7.5      9.9
   DEPTH=      6.3     10.7     10.7     10.7      5.4

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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


 1490 NH CARD USED
 *SECNO 142.900
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3265 DIVIDED FLOW


3470 ENCROACHMENT STATIONS=      630.0     960.0  TYPE=      1  TARGET=      330.000
   142.900      9.29     84.09       .00     84.09     85.15      1.06      2.21       .03     75.00
   22000.0     495.1   20038.2    1466.8      63.8    2554.2     115.7     279.9      47.4     75.00
       .15      7.76      7.85     12.67      .030      .059      .030      .000     74.80    630.82
   .005914      399.      444.      409.         2         0         0       .00    311.18    959.00


FLOW DISTRIBUTION FOR SECNO=    142.90          CWSEL=     84.09

STA=     631.      650.      784.      801.      940.      950.      959.
  PER Q=      2.3      42.3       2.0      46.8       4.9       1.7
   AREA=     63.8    1170.1     101.7    1282.5      75.9      39.8
    VEL=      7.8       8.0       4.3       8.0      14.3       9.6
  DEPTH=      3.3       9.1       9.2       9.2       7.6       4.4

1490 NH CARD USED
*SECNO 143.000

3470 ENCROACHMENT STATIONS=      630.0     959.5  TYPE=      1  TARGET=      329.500
   143.000      9.49     84.29       .00     84.29     85.20       .91       .01       .04     75.00
   22000.0     913.0   19755.0    1332.0      93.2    2724.2     121.7     280.0      47.4     75.00
       .15      9.80      7.25     10.95      .030      .060      .030      .000     74.80    630.41
   .004325        1.        1.        1.         2         0         0       .00    329.09    959.50


FLOW DISTRIBUTION FOR SECNO=    143.00          CWSEL=     84.29

STA=     630.      639.      650.      940.      950.      956.      959.
  PER Q=       .4       3.7      89.8       4.4       1.4        .3
   AREA=     18.4      74.7    2724.2      77.9      31.8      12.0
    VEL=      5.0      11.0       7.3      12.4       9.6       4.9
  DEPTH=      2.1       6.8       9.4       7.8       5.3       3.4

1490 NH CARD USED
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   04MAY15      14:47:15                                                                                                                                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


*SECNO 144.000

3301 HV CHANGED MORE THAN HVINS

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

3470 ENCROACHMENT STATIONS=      800.0    1235.0  TYPE=      1  TARGET=      435.000
   144.000      6.83     89.13      89.13     89.13     91.42      2.29      3.86       .69     85.00
   22000.0     436.6   21356.8     206.5      68.4    1749.4      14.5     299.0      50.4     85.00
       .16      6.39     12.21     14.29      .100      .090      .045      .000     82.30    806.93
   .070865      390.      345.      360.        20        19         0       .00    415.34   1222.27


FLOW DISTRIBUTION FOR SECNO=    144.00          CWSEL=     89.13

STA=     807.      840.     1190.     1215.     1222.
  PER Q=      2.0      80.4      16.7        .9
   AREA=     68.4    1613.5     135.9      14.5
    VEL=      6.4      11.0      27.1      14.3
  DEPTH=      2.1       4.6       5.4       2.0

1490 NH CARD USED
CCHV=     .100 CEHV=     .300
*SECNO 145.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  8.77


3470 ENCROACHMENT STATIONS=      560.0    1030.0  TYPE=      1  TARGET=      470.000
   145.000     10.34     94.04       .00     94.02     94.45       .40      2.83       .19     86.50
   22000.0    2635.8   18113.2    1251.0     651.2    3427.3     296.5     367.1      60.1     84.00
       .21      4.05      5.29      4.22      .040      .040      .040      .000     83.70    560.00
   .000920      960.      955.      960.         5         0         0       .00    470.00   1030.00


FLOW DISTRIBUTION FOR SECNO=    145.00          CWSEL=     94.04

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   04MAY15      14:47:15                                                                                                                                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


STA=     560.      621.      648.      985.     1000.     1015.     1023.     1030.
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   PER Q=      8.2      3.8     82.3      3.0      2.0       .6       .1
    AREA=    454.2    197.0   3427.3    135.7    105.7     40.4     14.7
     VEL=      4.0      4.2      5.3      4.9      4.1      3.2      1.7
   DEPTH=      7.4      7.3     10.2      9.0      7.0      5.0      2.1

 1490 NH CARD USED
 CCHV=     .300 CEHV=     .500
 *SECNO 146.000

 3301 HV CHANGED MORE THAN HVINS

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

 3470 ENCROACHMENT STATIONS=      412.0    1100.0  TYPE=      1  TARGET=      688.000
    146.000     10.90    101.90    101.90    101.90    104.40      2.51      2.13      1.05    101.10
    22000.0       2.9   21898.5      98.6       1.3    1719.8      23.1     430.9      68.9    100.00
        .23      2.35     12.73      4.27      .040      .040      .040      .000     91.00    414.84
    .014222      880.      910.      935.        20         8         0       .00    379.53    794.38


 FLOW DISTRIBUTION FOR SECNO=    146.00          CWSEL=    101.90

 STA=     415.     418.     770.     794.
   PER Q=       .0     99.5       .4
    AREA=      1.3   1719.8     23.1
     VEL=      2.3     12.7      4.3
   DEPTH=       .4      4.9       .9

 *SECNO 147.000

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  7.06


 3470 ENCROACHMENT STATIONS=      645.0    1280.0  TYPE=      1  TARGET=      635.000
    147.000     13.30    105.40       .00    105.34    105.56       .16       .45       .71     95.00
    22000.0   13776.4    3969.3    4254.4    4440.1    1170.2    1338.5     479.6      74.7     93.70
        .28      3.10      3.39      3.18      .040      .040      .040      .000     92.10    645.00
    .000286      460.      545.      460.         3         0         0       .00    635.00   1280.00


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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

 FLOW DISTRIBUTION FOR SECNO=    147.00          CWSEL=    105.40

 STA=     645.     712.     730.     873.     955.    1008.    1081.    1174.    1234.    1280.
   PER Q=      1.4      1.4     23.7     14.4      9.7     12.0     18.0     11.4      7.9
    AREA=    221.7    133.2   1637.3    971.7    643.9    832.2   1170.2    747.0    591.5
     VEL=      1.4      2.3      3.2      3.3      3.3      3.2      3.4      3.4      2.9
   DEPTH=      3.3      7.4     11.4     11.8     12.1     11.4     12.6     12.4     12.9

 CCHV=     .100 CEHV=     .300
 *SECNO 148.000

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .66


 3470 ENCROACHMENT STATIONS=      620.0    1220.0  TYPE=      1  TARGET=      600.000
    148.000     12.91    105.51       .00    105.44    105.77       .26       .18       .03     99.10
    22000.0   12639.4    7032.9    2327.7    3205.8    1604.2     590.0     541.3      80.9     95.10
        .31      3.94      4.38      3.95      .040      .040      .040      .000     92.60    620.00
    .000657      450.      370.      470.         2         0         0       .00    600.00   1220.00


 FLOW DISTRIBUTION FOR SECNO=    148.00          CWSEL=    105.51

 STA=     620.     675.     746.     865.     966.     997.    1159.    1220.
   PER Q=      9.3     14.3     19.4     11.5      3.0     32.0     10.6
    AREA=    526.1    710.9   1048.6    718.3    201.9   1604.2    590.0
     VEL=      3.9      4.4      4.1      3.5      3.3      4.4      3.9
   DEPTH=      9.6     10.0      8.8      7.1      6.5      9.9      9.7

 *SECNO 149.000

 3301 HV CHANGED MORE THAN HVINS

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

 3470 ENCROACHMENT STATIONS=      208.0     722.0  TYPE=      1  TARGET=      514.000
    149.000      6.80    109.00    109.00    108.49    110.96      1.95      1.66       .51    104.40
    22000.0    2573.2   14674.8    4752.1     259.7    1195.7     594.5     622.4      93.2    107.00
        .33      9.91     12.27      7.99      .040      .040      .040      .000    102.20    208.00
    .012219      900.      980.     1020.        20        11         0       .00    514.00    722.00


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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

FLOW DISTRIBUTION FOR SECNO=    149.00          CWSEL=    109.00

STA=     208.     274.     505.     620.     722.
  PER Q=     11.7      66.7       9.9      11.7
   AREA=    259.7    1195.7     288.0     306.5
    VEL=      9.9      12.3       7.6       8.4
  DEPTH=      3.9       5.2       2.5       3.0

*SECNO 149.100

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.20

3470 ENCROACHMENT STATIONS=      170.0     900.0  TYPE=      1  TARGET=      730.000
   149.100      9.48    113.28       .00    112.66    113.93       .65      2.84       .13    108.00
   22000.0    8207.0    8556.1    5236.9    1351.9    1125.5    1086.1     660.5     101.3    107.30
       .36      6.07      7.60      4.82      .040      .040      .040      .000    103.80    170.00
   .002535      610.      600.      560.         4         0         0       .00    702.63    872.63

FLOW DISTRIBUTION FOR SECNO=    149.10          CWSEL=    113.28

STA=     170.     240.     282.     370.     405.     430.     567.     650.     728.     823.     873.
  PER Q=      4.0       7.9      20.5       3.3       1.6      38.9      13.5       4.0       3.6       2.6
   AREA=    214.8     270.1     640.6     142.8      83.6    1125.5     488.0     224.2     228.9     145.0
    VEL=      4.1       6.5       7.0       5.0       4.3       7.6       6.1       3.9       3.5       4.0
  DEPTH=      3.1       6.4       7.3       4.1       3.3       8.2       5.9       2.9       2.4       2.9

*SECNO 150.000

3265 DIVIDED FLOW

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.52

3470 ENCROACHMENT STATIONS=      500.0    1225.0  TYPE=      1  TARGET=      725.000
   150.000      9.34    114.54       .00    114.03    114.87       .33       .91       .03    111.30
   22000.0   11316.2   10380.9     302.9    2509.4    2196.7     122.0     715.4     110.5    107.90
       .39      4.51      4.73      2.48      .040      .040      .040      .000    105.20    500.00
   .001096      560.      570.      600.         3         0         0       .00    690.18   1225.00
```



```
    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

FLOW DISTRIBUTION FOR SECNO=    150.00          CWSEL=    114.54

STA=     500.     512.     542.     620.     709.     837.     861.    1152.    1175.    1224.    1225.
  PER Q=      1.4       4.2       6.7      13.0      23.8       2.3      47.2        .9        .4        .0
   AREA=     86.0     208.3     401.1     631.2    1048.6     134.2    2196.7      75.6      40.7       5.7
    VEL=      3.5       4.4       3.7       4.5       5.0       3.8       4.7       2.7       2.3       1.1
  DEPTH=      7.2       6.9       5.1       7.1       8.2       5.6       7.5       3.3        .8       5.7

*SECNO 151.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .36

3470 ENCROACHMENT STATIONS=      220.0    1060.0  TYPE=      1  TARGET=      840.000
   151.000      5.56    116.56       .00    115.54    117.48       .92      2.44       .18    116.00
   22000.0   11046.6    9184.2    1769.2    1410.4    1227.6     221.8     806.7     128.6    116.70
       .43      7.83      7.48      7.98      .040      .040      .040      .000    111.00    220.00
   .008261     1030.     1045.     1000.         2         0         0       .00    838.03   1060.00

FLOW DISTRIBUTION FOR SECNO=    151.00          CWSEL=    116.56

STA=     220.     239.     338.     460.     590.     627.    1000.    1031.    1060.
  PER Q=      1.4      14.5      17.8      14.7       1.8      41.7       2.2       5.9
   AREA=     50.5     382.7     471.6     431.0      74.6    1227.6      76.5     145.3
    VEL=      6.0       8.3       8.3       7.5       5.4       7.5       6.2       8.9
  DEPTH=      2.7       3.9       3.9       3.3       2.0       3.3       2.5       5.0

*SECNO 152.000
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 3265 DIVIDED FLOW

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
1
    04MAY15      14:47:15                                                                                                    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


 3470 ENCROACHMENT STATIONS=      505.0    1095.0  TYPE=      1  TARGET=      590.000
    152.000      7.12    121.92    121.92    121.14    122.73       .81      2.64       .01    121.90
    22000.0   16734.4    3415.7    1849.9    2181.3     537.6     453.6     844.9     137.6    120.00
        .45      7.67      6.35      4.08      .040      .040      .040      .000    114.80    505.00
    .003131      540.      560.      590.        20        22         0       .00    567.87   1095.00


 FLOW DISTRIBUTION FOR SECNO=    152.00          CWSEL=    121.92

 STA=     505.     642.     788.     810.     932.    1040.    1095.
   PER Q=     37.3     37.2      1.5     15.5      4.8      3.7
    AREA=   1052.1   1053.9     75.2    537.6    272.0    181.5
     VEL=      7.8      7.8      4.5      6.4      3.8      4.4
   DEPTH=      7.7      7.2      3.4      5.4      2.5      3.3

 *SECNO 153.000

 3301 HV CHANGED MORE THAN HVINS

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

 3470 ENCROACHMENT STATIONS=      660.0    1250.0  TYPE=      1  TARGET=      590.000

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       125.90 ELREA=       124.60

    153.000      7.86    123.16    123.16    123.14    126.09      2.93      1.06       .64    125.90
    22000.0        .0   22000.0        .0        .0    1600.4        .0     855.1     139.4    124.60
        .45       .00     13.75       .00      .000      .040      .000      .000    115.30    710.54
    .013310      180.      190.      190.        20         8         0       .00    275.92    986.45


 FLOW DISTRIBUTION FOR SECNO=    153.00          CWSEL=    123.16

 STA=     711.    1096.
   PER Q=    100.0
    AREA=   1600.4
     VEL=     13.7
   DEPTH=      5.8

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    04MAY15      14:47:15                                                                                                    PAGE   32


     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 154.000

 3265 DIVIDED FLOW


 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.04


 3470 ENCROACHMENT STATIONS=      555.0    1145.0  TYPE=      1  TARGET=      590.000
    154.000     10.10    127.00       .00    126.74    127.46       .46      1.12       .25    125.20
    22000.0    1646.1   15801.5    4552.4     344.5    2788.3     950.4     877.4     142.7    118.30
        .47      4.78      5.67      4.79      .040      .040      .040      .000    116.90    555.00
    .001437      350.      345.      330.         2         0         0       .00    563.84   1145.00


 FLOW DISTRIBUTION FOR SECNO=    154.00          CWSEL=    127.00

 STA=     555.     575.     599.     943.    1065.    1101.    1145.
   PER Q=      4.6      2.9     71.8     19.5      1.1       .1
    AREA=    201.9    142.6   2788.3    841.0     92.9     16.5
     VEL=      5.0      4.5      5.7      5.1      2.6      1.3
   DEPTH=     10.1      5.9      8.1      6.9      2.5       .4

 *SECNO 155.000

 3470 ENCROACHMENT STATIONS=      588.0    1162.0  TYPE=      1  TARGET=      574.000
    155.000      9.33    127.43       .00    126.91    128.12       .69       .59       .07    120.60
    22000.0    3280.5   15295.3    3424.2     616.7    2103.2     744.7     905.5     146.9    122.80
        .48      5.32      7.27      4.60      .040      .040      .040      .000    118.10    588.00
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   .002378      350.      330.      290.         2         0         0       .00    574.00   1162.00


 FLOW DISTRIBUTION FOR SECNO=    155.00          CWSEL=    127.43

 STA=     588.     707.     968.    1031.    1053.    1121.    1135.    1162.
   PER Q=     14.9     69.5      7.0      1.8      5.5       .8       .5
    AREA=    616.7   2103.2    300.7     87.4    266.7     44.4     45.5
     VEL=      5.3      7.3      5.1      4.5      4.5      3.8      2.5
   DEPTH=      5.2      8.1      4.8      4.0      3.9      3.2      1.7

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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 156.000

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.94


 3470 ENCROACHMENT STATIONS=      655.0    1235.0  TYPE=      1  TARGET=      580.000
    156.000     10.11    128.21       .00    127.18    128.48       .27       .32       .04    123.40
    22000.0     386.5   20086.6    1526.9     169.8    4733.6     435.7     934.5     150.6    119.20
        .50      2.28      4.24      3.50      .040      .040      .040      .000    118.10    655.00
   .000629      230.      300.      250.         2         0         0       .00    580.00   1235.00


 FLOW DISTRIBUTION FOR SECNO=    156.00          CWSEL=    128.21

 STA=     655.     696.    1183.    1235.
   PER Q=      1.8     91.3      6.9
    AREA=    169.8   4733.6    435.7
     VEL=      2.3      4.2      3.5
   DEPTH=      4.1      9.7      8.4

 *SECNO 157.000

 3301 HV CHANGED MORE THAN HVINS

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

 3470 ENCROACHMENT STATIONS=      660.0    1260.0  TYPE=      1  TARGET=      600.000
    157.000      8.50    129.60    129.60    129.60    131.31      1.70       .26       .43    127.20
    22000.0   16686.8    5020.9     292.3    1604.0     458.5      64.6     948.6     152.8    128.30
        .51     10.40     10.95      4.52      .040      .040      .040      .000    121.10    660.00
   .010093      150.      170.      170.        20        10         0       .00    600.00   1260.00


 FLOW DISTRIBUTION FOR SECNO=    157.00          CWSEL=    129.60

 STA=     660.     766.     882.     911.    1035.    1123.    1213.    1260.
   PER Q=     19.7     45.8      4.3      1.9      4.2     22.8      1.3
    AREA=    448.9    766.1    107.4    118.4    163.2    458.5     64.6
     VEL=      9.6     13.1      8.8      3.6      5.6     11.0      4.5
   DEPTH=      4.2      6.6      3.7      1.0      1.9      5.1      1.4

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   04MAY15      14:47:15                                                                                                    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


 *SECNO 157.100

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.69


 3470 ENCROACHMENT STATIONS=      682.0    1312.0  TYPE=      1  TARGET=      630.000
    157.100      8.09    131.59       .00    131.20    132.00       .41       .56       .13    126.00
    22000.0   14699.2    4024.4    3276.4    2790.2     748.5     790.1     962.7     155.4    125.40
        .52      5.27      5.38      4.15      .040      .040      .040      .000    123.50    682.00
   .001398      190.      190.      190.         2         0         0       .00    630.00   1312.00


 FLOW DISTRIBUTION FOR SECNO=    157.10          CWSEL=    131.59

 STA=     682.     777.     800.    1008.    1062.    1160.    1216.    1260.    1305.    1312.
   PER Q=     12.6      4.0     42.8      7.4     18.3      7.2      3.3      3.9       .5
    AREA=    596.7    168.9   1683.2    341.5    748.5    341.2    192.9    215.6     40.4
     VEL=      4.6      5.2      5.6      4.8      5.4      4.6      3.7      4.0      2.9
   DEPTH=      6.3      7.3      8.1      6.3      7.6      6.1      4.4      4.8      5.8

 *SECNO 158.000

 3470 ENCROACHMENT STATIONS=      635.0    1272.0  TYPE=      1  TARGET=      637.000
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```
   158.000     10.35    131.85       .00    131.40    132.28       .43       .27       .01    121.50
   22000.0    4835.9   15218.7    1945.5    1141.4    2674.3     517.0     983.5     158.5    130.80
       .53      4.24      5.69      3.76      .040      .040      .040      .000    121.50    635.00
   .001212      210.      210.      200.         2         0         0       .00    637.00   1272.00


 FLOW DISTRIBUTION FOR SECNO=    158.00          CWSEL=    131.85

 STA=     635.     685.     733.     822.    1111.    1217.    1241.    1264.    1272.
   PER Q=      7.3      3.6     11.1     69.2       .8      2.0      4.9      1.1
    AREA=    361.9    223.2    556.3   2674.3    127.2    118.8    199.0     72.0
     VEL=      4.4      3.6      4.4      5.7      1.5      3.7      5.5      3.4
   DEPTH=      7.2      4.7      6.3      9.3      1.2      5.0      8.7      9.0

 T1      OTAY RIVER NATURAL BACKWATER    SECTIONS 133.2 TO 158.0
 T2      10-YR. STORM EVENT   Q#1,200 CFS
 T3      JUNE 15, 2004

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    04MAY15      14:47:15                                                                                                    PAGE   35


 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                  6                                                                    50.19

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       3                 -10                                                                      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 3
0

 CCHV=     .100 CEHV=     .300
 *SECNO 133.200

 3265 DIVIDED FLOW

         SECTIONS FROM LEFT TO RIGHT LOOKING DOWNSTREAM
   133.200      7.49     50.19       .00     50.19     50.21       .02       .00       .00     49.20
    1200.0     595.2     603.4       1.5     632.3     421.3       5.7        .0        .0     49.20
       .00       .94      1.43       .26      .040      .040      .040      .000     42.70     45.91
   .000145      280.      280.      260.         0         0         0       .00    327.90    492.32


 FLOW DISTRIBUTION FOR SECNO=    133.20          CWSEL=     50.19

 STA=      46.      70.     117.     143.     168.     255.     270.     300.     354.     425.     434.     492.
   PER Q=      2.5     21.0      7.6       .7      1.7      3.9      6.7      5.6     50.3       .1       .0
    AREA=     44.4    208.7     89.4     21.4     32.9     47.8     88.2     99.4    421.3      4.7      1.1
     VEL=       .7      1.2      1.0       .4       .6      1.0       .9       .7      1.4       .3       .1
   DEPTH=      1.8      4.4      3.4       .8       .4      3.2      2.9      1.8      5.9       .5       .0

 *SECNO 134.000

 3265 DIVIDED FLOW


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .26

   134.000      7.39     50.19       .00       .00     50.34       .15       .09       .04     54.60
    1200.0     181.1    1018.9        .0      88.0     312.7        .0       4.1       1.5     59.20
       .02      2.06      3.26       .00      .040      .040      .000      .000     42.80     44.42
   .002086      250.      240.      230.         2         0         0       .00    196.05    420.41


 FLOW DISTRIBUTION FOR SECNO=    134.00          CWSEL=     50.19

 STA=      44.      81.      90.     230.     249.     471.
   PER Q=      2.4       .3      5.5      6.9     84.9
    AREA=     23.1      3.8     27.2     33.9    312.7
     VEL=      1.3      1.0      2.4      2.4      3.3
   DEPTH=       .6       .4       .2      1.7      2.7

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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 134.100

 3265 DIVIDED FLOW

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
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3720 CRITICAL DEPTH ASSUMED
   134.100      4.37     51.57     51.57       .00     52.21       .63       .85       .15     50.00
    1200.0     292.5     907.5        .0      91.5     127.5        .0       5.6       2.4     52.60
       .03      3.20      7.12       .00      .040      .040      .000      .000     47.20    105.92
   .010498      220.      210.      200.        20        14         0       .00    176.53    369.30


FLOW DISTRIBUTION FOR SECNO=    134.10          CWSEL=     51.57

STA=     106.     115.     162.     190.     320.     375.
  PER Q=       .2     10.8      4.2      9.2     75.6
   AREA=      1.7     38.7     18.0     33.1    127.5
    VEL=      1.2      3.3      2.8      3.3      7.1
  DEPTH=       .2       .8       .6       .3      2.6

*SECNO 135.000

3265 DIVIDED FLOW


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.56

   135.000      4.95     52.65       .00       .00     52.82       .17       .57       .05     47.70
    1200.0     212.0     885.8     102.2      78.7     247.2      63.8       6.8       3.1     55.90
       .05      2.69      3.58      1.60      .040      .040      .040      .000     47.70    122.22
   .001596      180.      170.      160.         3         0         0       .00    155.30    544.52


FLOW DISTRIBUTION FOR SECNO=    135.00          CWSEL=     52.65

STA=     122.     154.     239.     388.     410.
  PER Q=     17.7     73.8      5.2      3.3
   AREA=     78.7    247.2     39.1     24.7
    VEL=      2.7      3.6      1.6      1.6
  DEPTH=      2.5      3.8       .3      1.1

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 136.000

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   136.000      6.06     55.66     55.66       .00     56.68      1.01      1.81       .25     59.90
    1200.0        .0    1037.4     162.6        .0     121.3      41.7      10.1       4.5     59.90
       .06       .00      8.55      3.90      .000      .040      .040      .000     49.60    224.93
   .012820      530.      520.      510.        20        11         0       .00     86.79    379.22


FLOW DISTRIBUTION FOR SECNO=    136.00          CWSEL=     55.66

STA=     225.     281.     305.     316.     359.     379.
  PER Q=     86.5      1.3      2.2      3.2      6.8
   AREA=    121.3      4.5      7.9      9.4     19.8
    VEL=      8.6      3.4      3.4      4.1      4.1
  DEPTH=      3.0       .2       .7       .2      1.0

*SECNO 137.000

3265 DIVIDED FLOW

   137.000      2.96     60.76       .00       .00     61.34       .58      4.62       .04     65.00
    1200.0       1.4    1198.6        .0       1.6     195.8        .0      11.9       5.4     63.40
       .08       .90      6.12       .00      .040      .040      .000      .000     57.80    361.60
   .008891      410.      440.      390.         3         0         0       .00     96.39    647.92


FLOW DISTRIBUTION FOR SECNO=    137.00          CWSEL=     60.76

STA=     362.     366.     374.     663.
  PER Q=       .0       .1     99.9
   AREA=       .6      1.0    195.8
    VEL=       .9       .9      6.1
  DEPTH=       .1       .1      2.3

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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 138.000
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3265 DIVIDED FLOW

   138.000      5.80     68.20       .00       .00     68.74       .54      7.39       .00     74.00
    1200.0        .0     256.9     943.1        .0      82.9     145.8      16.0       7.8     74.50
       .13       .00      3.10      6.47      .000      .040      .040      .000     62.40    479.25
   .008625      920.      860.      820.         4         0         0       .00    154.44   1039.90


FLOW DISTRIBUTION FOR SECNO=    138.00          CWSEL=     68.20

STA=     479.     757.     964.     969.    1024.    1040.
  PER Q=     21.4      4.6      2.6     45.5     25.8
   AREA=     82.9     13.1      7.7     79.0     46.1
    VEL=      3.1      4.3      4.0      6.9      6.7
  DEPTH=       .9       .1      1.4      1.4      2.9

*SECNO 138.100

3265 DIVIDED FLOW


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.63

   138.100      4.34     68.84       .00       .00     68.91       .06       .12       .05     70.50
    1200.0        .0    1134.7      65.3        .0     550.0      51.7      16.7       8.2     68.50
       .14       .00      2.06      1.26      .000      .040      .040      .000     64.50    512.23
   .000655       60.       70.       80.         2         0         0       .00    211.91    977.00


FLOW DISTRIBUTION FOR SECNO=    138.10          CWSEL=     68.84

STA=     512.     684.     689.     950.     970.     977.
  PER Q=     94.6       .0       .6      4.4       .5
   AREA=    550.0       .8      7.6     36.8      6.4
    VEL=      2.1       .3       .9      1.4       .9
  DEPTH=      3.2       .2       .0      1.8       .9

*SECNO 138.300
1
   04MAY15      14:47:15                                                                                                    PAGE   40


    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 =   .38

   138.300      2.99     68.99       .00       .00     69.28       .29       .31       .07     70.80
    1200.0        .0    1200.0        .0        .0     279.5        .0      19.0       9.0     69.80
       .15       .00      4.29       .00      .000      .040      .000      .000     66.00    566.94
   .004640      200.      220.      250.         3         0         0       .00    126.21    693.15


FLOW DISTRIBUTION FOR SECNO=    138.30          CWSEL=     68.99

STA=     567.     700.
  PER Q=    100.0
   AREA=    279.5
    VEL=      4.3
  DEPTH=      2.2

*SECNO 139.000

3265 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   139.000      3.97     71.47     71.47       .00     72.21       .74       .76       .14     73.00
    1200.0        .0    1173.0      27.0        .0     168.2       6.4      19.5       9.3     70.00
       .15       .00      6.98      4.21      .000      .040      .040      .000     67.50    625.95
   .019783      130.       90.      100.        20        11         0       .00    117.21   1021.72


FLOW DISTRIBUTION FOR SECNO=    139.00          CWSEL=     71.47

STA=     626.    1013.    1022.
  PER Q=     97.8      2.2
   AREA=    168.2      6.4
    VEL=      7.0      4.2
  DEPTH=      1.5       .7

*SECNO 140.000
1
   04MAY15      14:47:15                                                                                                    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


3265 DIVIDED FLOW
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 3301 HV CHANGED MORE THAN HVINS

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  4.08

    140.000      4.14     73.24       .00       .00     73.37       .14      1.10       .06     77.20
     1200.0      44.9    1092.6      62.5      42.3     358.4      30.9      22.0      10.5     69.10
        .19      1.06      3.05      2.03      .040      .040      .040      .000     69.10    850.50
    .001187      420.      355.      400.         5         0         0       .00    174.98   1069.93

 FLOW DISTRIBUTION FOR SECNO=    140.00          CWSEL=     73.24

 STA=      850.      901.      913.     1055.     1070.
   PER Q=      3.0        .8      91.1       5.2
    AREA=     33.4       8.9     358.4      30.9
     VEL=      1.1       1.0       3.0       2.0
   DEPTH=       .7        .7       3.7       2.1

 CCHV=     .300 CEHV=     .500
 *SECNO 141.000
    141.000      3.28     73.98       .00       .00     74.04       .06       .65       .02     74.10
     1200.0        .0    1123.2      76.8        .0     550.3      53.7      27.6      13.6     73.10
        .25       .00      2.04      1.43      .000      .040      .040      .000     70.70    599.27
    .001619      450.      470.      480.         4         0         0       .00    403.54   1002.81

 FLOW DISTRIBUTION FOR SECNO=    141.00          CWSEL=     73.98

 STA=      599.      944.      994.     1003.
   PER Q=     93.6       6.0        .4
    AREA=    550.3      48.9       4.8
     VEL=      2.0       1.5       1.0
   DEPTH=      1.6       1.0        .5

 1490 NH CARD USED
1
    04MAY15      14:47:15                                                                                            PAGE  42

      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 142.000

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.52

    142.000      3.33     74.53       .00       .00     74.56       .03       .51       .01     71.20
     1200.0      31.6    1120.3      48.2      17.6     764.8      26.5      35.7      17.4     71.20
        .35      1.79      1.46      1.82      .030      .060      .030      .000     71.20    919.39
    .000705      430.      500.      510.         2         0         0       .00    256.53   1175.92

 FLOW DISTRIBUTION FOR SECNO=    142.00          CWSEL=     74.53

 STA=      919.      930.     1160.     1176.
   PER Q=      2.6      93.4       4.0
    AREA=     17.6     764.8      26.5
     VEL=      1.8       1.5       1.8
   DEPTH=      1.7       3.3       1.7

 1490 NH CARD USED
 *SECNO 142.100

 3265 DIVIDED FLOW

    142.100      3.33     74.53       .00       .00     74.56       .04       .00       .00     71.20
     1200.0      32.6    1104.7      62.7      17.0     725.3      31.9      35.7      17.4     71.20
        .35      1.92      1.52      1.97      .030      .060      .030      .000     71.20    919.79
    .000815        1.        1.        1.         0         0         0       .00    247.38   1179.17

 FLOW DISTRIBUTION FOR SECNO=    142.10          CWSEL=     74.53

 STA=      920.      930.     1034.     1051.     1160.     1179.
   PER Q=      2.7      41.9       3.5      46.7       5.2
    AREA=     17.0     326.1      36.6     362.7      31.9
     VEL=      1.9       1.5       1.1       1.5       2.0
   DEPTH=      1.7       3.3       3.3       3.3       1.7

 1490 NH CARD USED
 *SECNO 142.900
1
    04MAY15      14:47:15                                                                                            PAGE  43

      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


 3265 DIVIDED FLOW

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
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3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   142.900       .93     75.73     75.73       .00     76.15       .41      1.15       .19     75.00
    1200.0       3.7    1191.1       5.3        .6     230.7        .9      40.8      20.1     75.00
       .37      5.72      5.16      5.86      .030      .060      .030      .000     74.80    648.24
   .056464      399.      444.      409.        20        14         0       .00    282.20    942.44


FLOW DISTRIBUTION FOR SECNO=    142.90          CWSEL=     75.73

STA=     648.     650.     784.     801.     940.     942.
  PER Q=       .3     41.6      4.0     53.7       .4
   AREA=       .6    100.3      9.7    120.7       .9
    VEL=      5.7      5.0      4.9      5.3      5.9
  DEPTH=       .4       .8       .9       .9       .4

1490 NH CARD USED
*SECNO 143.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.77

   143.000      1.24     76.04       .00       .00     76.24       .20       .03       .06     75.00
    1200.0       4.7    1187.9       7.4       1.2     328.2       1.8      40.8      20.1     75.00
       .37      4.03      3.62      4.17      .030      .060      .030      .000     74.80    647.73
   .018117        1.        1.        1.         4         0         0       .00    295.71    943.44


FLOW DISTRIBUTION FOR SECNO=    143.00          CWSEL=     76.04

STA=     648.     650.     940.     943.
  PER Q=       .4     99.0       .6
   AREA=      1.2    328.2      1.8
    VEL=      4.0      3.6      4.2
  DEPTH=       .5      1.1       .5

1490 NH CARD USED
1
   04MAY15      14:47:15                                                                                          PAGE   44


    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 144.000

3265 DIVIDED FLOW


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .64

   144.000      2.97     85.27       .00       .00     85.49       .22      9.24       .01     85.00
    1200.0        .2    1199.7        .0        .3     320.0        .1      43.4      22.6     85.00
       .40       .82      3.75       .07      .100      .082      .045      .000     82.30    837.81
   .043555      390.      345.      360.         7         0         0       .00    326.79   1215.46


FLOW DISTRIBUTION FOR SECNO=    144.00          CWSEL=     85.27

STA=     838.     840.    1190.    1215.    1215.
  PER Q=       .0     69.5     30.5       .0
   AREA=       .3    280.7     39.3       .1
    VEL=       .8      3.0      9.3       .1
  DEPTH=       .1       .9      1.6       .1

1490 NH CARD USED
CCHV=     .100 CEHV=     .300
*SECNO 145.000

3265 DIVIDED FLOW


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO = 11.46

   145.000      2.86     86.56       .00       .00     86.58       .03      1.07       .02     86.50
    1200.0       1.0    1177.6      21.4       5.0     903.2      24.5      57.1      30.4     84.00
       .60       .21      1.30       .87      .040      .040      .040      .000     83.70    559.65
   .000331      960.      955.      960.         8         0         0       .00    386.70   1004.17


FLOW DISTRIBUTION FOR SECNO=    145.00          CWSEL=     86.56

STA=     560.     587.     985.    1000.    1004.
  PER Q=       .1     98.1      1.8       .0
   AREA=      4.8    903.2     23.3      1.2
    VEL=       .2      1.3       .9       .3
  DEPTH=       .2      2.7      1.6       .3

1
   04MAY15      14:47:15                                                                                          PAGE   45


    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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1490 NH CARD USED
CCHV=     .300 CEHV=     .500
*SECNO 146.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   146.000      4.00     95.00     95.00       .00     96.00      1.00       .94       .49    101.10
    1200.0        .0    1200.0        .0        .0     149.6        .0      68.4      35.2    100.00
       .63       .00      8.02       .00      .000      .040      .000      .000     91.00    460.88
   .018656      880.      910.      935.        20        11         0       .00     74.79    535.67


FLOW DISTRIBUTION FOR SECNO=    146.00          CWSEL=     95.00

STA=     461.     770.
  PER Q=    100.0
   AREA=    149.6
    VEL=      8.0
  DEPTH=      2.0

*SECNO 147.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO = 16.88

   147.000      4.31     96.41       .00       .00     96.42       .01       .12       .30     95.00
    1200.0     540.0     235.4     424.6     935.3     334.2     643.1      79.8      39.2     93.70
       .86       .58       .70       .66      .040      .040      .040      .000     92.10    724.87
   .000065      460.      545.      460.         4         0         0       .00    652.82   1377.68


FLOW DISTRIBUTION FOR SECNO=    147.00          CWSEL=     96.41

STA=     725.     730.     873.     955.    1008.    1081.    1174.    1234.    1362.    1378.
  PER Q=       .1     16.1     11.8      9.0      7.9     19.6     11.9     23.0       .5
   AREA=      5.4    351.9    234.6    167.5    176.0    334.2    207.6    417.3     18.1
    VEL=       .3       .5       .6       .6       .5       .7       .7       .7       .3
  DEPTH=      1.1      2.5      2.9      3.2      2.4      3.6      3.5      3.3      1.2
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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 148.000

3265 DIVIDED FLOW


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .12


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=        99.10 ELREA=        95.10

   148.000      1.28     96.38       .00       .00     96.56       .18       .09       .05     99.10
    1200.0        .0     362.2     837.8        .0     143.7     226.7      91.3      44.0     95.10
       .89       .00      2.52      3.70      .000      .040      .040      .000     95.10   1010.58
   .004805      450.      370.      470.         4         0         0       .00    304.06   1332.35


FLOW DISTRIBUTION FOR SECNO=    148.00          CWSEL=     96.38

STA=    1011.    1159.    1212.    1285.    1328.    1332.
  PER Q=     30.2      5.4     34.3     30.0       .0
   AREA=    143.7     34.0    104.7     87.4       .6
    VEL=      2.5      1.9      3.9      4.1       .7
  DEPTH=      1.0       .6      1.4      2.0       .1

*SECNO 149.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .50


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       104.40 ELREA=       107.00

   149.000      2.52    104.72    104.64       .00    105.16       .44      8.52       .08    104.40
    1200.0       3.5    1196.4        .0       2.4     223.9        .0      98.2      50.1    107.00
       .94      1.50      5.34       .00      .040      .040      .000      .000    102.20    258.71
   .019426      900.      980.     1020.        15        20         0       .00    228.64    487.35


FLOW DISTRIBUTION FOR SECNO=    149.00          CWSEL=    104.72

STA=     259.     274.     505.
  PER Q=       .3     99.7
   AREA=      2.4    223.9
    VEL=      1.5      5.3
  DEPTH=       .2      1.0
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1
   04MAY15      14:47:15                                                                                                     PAGE   47

     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 149.100

 3265 DIVIDED FLOW


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.45

    149.100      3.65    107.45       .00       .00    107.55       .10      2.36       .03    108.00
     1200.0     281.3     916.4       2.3     158.2     328.4       6.4     103.1      53.9    107.30
       1.01      1.78      2.79       .35      .040      .040      .040      .000    103.80    246.29
    .001631      610.      600.      560.         5         0         0       .00    329.53    976.16


 FLOW DISTRIBUTION FOR SECNO=    149.10          CWSEL=    107.45

 STA=     246.     282.     370.     377.     567.     627.     970.     976.
   PER Q=      2.6     20.3       .5     76.4       .1       .0       .1
    AREA=     25.8    127.2      5.2    328.4      4.4       .7      1.4
     VEL=      1.2      1.9      1.2      2.8       .3       .5       .6
   DEPTH=       .7      1.4       .7      2.5       .1       .0       .2

 *SECNO 150.000

 3265 DIVIDED FLOW


 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       111.30 ELREA=       107.90

    150.000      2.46    108.36       .00       .00    108.41       .05       .86       .01    111.30
     1200.0        .0     746.3     453.7        .0     416.3     243.8     110.7      59.1    107.90
       1.10       .00      1.79      1.86      .000      .040      .040      .000    105.90    873.52
    .001365      560.      570.      600.         6         0         0       .00    456.87   1403.70


 FLOW DISTRIBUTION FOR SECNO=    150.00          CWSEL=    108.36

 STA=     874.    1152.    1154.    1239.    1285.    1312.    1401.    1404.
   PER Q=     62.2       .0      1.7     20.5      6.8      8.7       .1
    AREA=    416.3       .4     13.7    104.0     43.5     81.1      1.2
     VEL=      1.8       .5      1.5      2.4      1.9      1.3       .8
   DEPTH=      1.5       .2       .2      2.3      1.6       .9       .4
1
   04MAY15      14:47:15                                                                                                     PAGE   48

     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 151.000

 3265 DIVIDED FLOW

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
    151.000      1.49    112.49    112.49       .00    112.89       .40      3.45       .10    116.00
     1200.0      38.7       6.1    1155.2      19.1       5.7     224.3     121.4      68.8    116.70
       1.15      2.02      1.08      5.15      .040      .040      .040      .000    111.00    303.19
    .019208     1030.     1045.     1000.        20        14         0       .00    364.80   1253.23


 FLOW DISTRIBUTION FOR SECNO=    151.00          CWSEL=    112.49

 STA=     303.     338.     381.    1000.    1031.    1112.    1250.    1253.
   PER Q=      1.4      1.8       .5       .8     26.1     68.6       .8
    AREA=      8.6     10.6      5.7      2.9     68.2    150.7      2.4
     VEL=      2.0      2.0      1.1      3.2      4.6      5.5      4.0
   DEPTH=       .2       .2       .1       .1       .8      1.1       .7

 *SECNO 152.000

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.73


 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       121.90 ELREA=       120.00

    152.000      3.52    118.32       .00       .00    118.83       .51      5.90       .03    121.90
     1200.0        .0    1200.0        .0        .0     209.0        .0     124.4      71.7    120.00
       1.18       .00      5.74       .00      .000      .040      .000      .000    114.80    843.10
    .006391      540.      560.      590.         5         0         0       .00     76.91    920.01


 FLOW DISTRIBUTION FOR SECNO=    152.00          CWSEL=    118.32

 STA=     843.     932.
   PER Q=    100.0
```

```
   AREA=    209.0
    VEL=      5.7
  DEPTH=      2.7

1
   04MAY15      14:47:15                                                                                                    PAGE   49

    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 153.000

 3265 DIVIDED FLOW

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.57

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       125.90 ELREA=       124.60

   153.000      3.89    119.19       .00       .00    119.25       .07       .38       .04    125.90
    1200.0        .0    1200.0        .0        .0     568.6        .0     126.1      72.3    124.60
      1.21       .00      2.11       .00      .000      .040      .000      .000    115.30    718.56
   .000971      180.      190.      190.         3         0         0       .00    229.69    965.51

 FLOW DISTRIBUTION FOR SECNO=    153.00          CWSEL=    119.19

 STA=     719.    1096.
   PER Q=    100.0
    AREA=    568.6
     VEL=      2.1
   DEPTH=      2.5

 *SECNO 154.000

 3265 DIVIDED FLOW

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .52

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       125.20 ELREA=       118.30

   154.000      1.95    119.75       .00       .00    119.83       .07       .57       .00    125.20
    1200.0        .0     746.3     453.7        .0     334.9     217.2     130.5      75.5    118.30
      1.25       .00      2.23      2.09      .000      .040      .040      .000    117.80    612.24
   .003545      350.      345.      330.         3         0         0       .00    573.84   1496.25

 FLOW DISTRIBUTION FOR SECNO=    154.00          CWSEL=    119.75

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   04MAY15      14:47:15                                                                                                    PAGE   50

    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

 STA=     612.     943.     992.    1305.    1464.    1496.
   PER Q=     62.2      5.4       .1     29.6      2.7
    AREA=    334.9     35.9       .9    160.0     20.3
     VEL=      2.2      1.8      1.1      2.2      1.6
   DEPTH=      1.0       .7       .0      1.0       .6

 *SECNO 155.000

 3265 DIVIDED FLOW

   155.000      2.46    120.56       .00       .00    120.63       .08       .81       .00    120.60
    1200.0        .0     620.2     579.8        .0     319.3     236.4     134.5      79.0    122.80
      1.29       .00      1.94      2.45      .000      .040      .040      .000    118.10    710.94
   .001957      350.      330.      290.         1         0         0       .00    390.60   1508.92

 FLOW DISTRIBUTION FOR SECNO=    155.00          CWSEL=    120.56

 STA=     711.     968.    1253.    1274.    1285.    1406.    1430.    1460.    1480.    1506.    1509.
   PER Q=     51.7      1.2     12.8      2.0      1.8     14.6      5.7      1.3      8.6       .3
    AREA=    319.3      8.2     51.4     13.2     11.5     58.8     36.2     10.4     44.2      2.4
     VEL=      1.9      1.8      3.0      1.9      1.8      3.0      1.9      1.5      2.3      1.3
   DEPTH=      1.3       .0      2.4      1.2       .1      2.4      1.2       .5      1.7       .8

 *SECNO 156.000

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.89

   156.000      2.67    120.77       .00       .00    120.79       .02       .15       .01    123.40
    1200.0        .0    1175.5      24.5        .0    1138.0      50.7     140.3      82.0    119.20
      1.37       .00      1.03       .48      .000      .040      .040      .000    118.10    717.87
   .000235      230.      300.      250.         2         0         0       .00    529.82   1247.69
```

```
FLOW DISTRIBUTION FOR SECNO=    156.00          CWSEL=    120.77

STA=     718.    1183.    1248.
  PER Q=     98.0      2.0
   AREA=   1138.0     50.7
    VEL=      1.0       .5
  DEPTH=      2.4       .8

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   04MAY15      14:47:15                                                                                                    PAGE   51

    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 157.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   157.000      3.01    124.11    124.11       .00    124.67       .56       .13       .16    127.20
    1200.0     779.4     420.6        .0     142.6      60.8        .0     143.0      83.4    128.30
      1.38      5.47      6.92       .00      .040      .040      .000      .000    121.10    743.83
   .020508      150.      170.      170.        20        11         0       .00    184.72   1174.08

FLOW DISTRIBUTION FOR SECNO=    157.00          CWSEL=    124.11

STA=     744.     766.     882.     888.    1213.
  PER Q=      2.6      61.0       1.3      35.1
   AREA=     10.1     128.5       4.0      60.8
    VEL=      3.1       5.7       3.9       6.9
  DEPTH=       .5       1.1        .7       1.5

*SECNO 157.100

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.73

   157.100      1.86    125.36       .00       .00    125.42       .06       .70       .05    126.00
    1200.0     890.2     264.7      45.2     434.8     139.3      63.8     144.9      85.1    125.40
      1.40      2.05      1.90       .71      .040      .040      .040      .000    123.50    715.92
   .001478      190.      190.      190.         5         0         0       .00    591.49   1496.27

FLOW DISTRIBUTION FOR SECNO=    157.10          CWSEL=    125.36

1
   04MAY15      14:47:15                                                                                                    PAGE   52

    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

STA=     716.     777.     800.    1008.    1018.    1033.    1160.    1316.    1496.
  PER Q=       .4       3.2      69.1       1.4       .1      22.1       .0       3.7
   AREA=     10.7      25.3     385.0      11.0      2.7     139.3       .6      63.2
    VEL=       .4       1.5       2.2       1.5       .4       1.9       .4        .7
  DEPTH=       .2       1.1       1.9       1.1       .2       1.5       .0        .4

*SECNO 158.000

3265 DIVIDED FLOW

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.88

   158.000      3.96    125.46       .00       .00    125.47       .01       .05       .01    121.50
    1200.0      67.7     742.7     389.6     142.7     894.9     492.5     150.0      87.8    130.80
      1.48       .47       .83       .79      .040      .040      .040      .000    121.50    617.10
   .000098      210.      210.      200.         3         0         0       .00    550.24   1401.47

FLOW DISTRIBUTION FOR SECNO=    158.00          CWSEL=    125.46

STA=     617.     628.     685.     692.     822.    1111.    1241.    1264.    1290.    1346.    1400.    1401.
  PER Q=       .1       1.4       .0       4.1      61.9       .2       2.8       5.4      17.1       6.9       .0
   AREA=      5.3      49.3      2.8      85.3     894.9      7.8      52.1      82.3     222.0     127.7       .6
    VEL=       .2        .3       .2        .6        .8       .4        .6        .8        .9        .7       .2
  DEPTH=       .5        .9       .4        .7       3.4       .1       2.3       3.2       4.0       2.4       .4

T1      OTAY RIVER NATURAL BACKWATER    SECTIONS 133.2 TO 158.0
T2      50-YR. STORM EVENT   Q#12,000 CFS
T3      JUNE 15, 2004
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 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                 7                                                                   53.60

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       4                -10                                                                      15

1
    04MAY15      14:47:15                                                                                                    PAGE   53


     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 4
0

 CCHV=     .100 CEHV=     .300
 *SECNO 133.200
         SECTIONS FROM LEFT TO RIGHT LOOKING DOWNSTREAM
    133.200     10.90     53.60       .00     53.60     53.98       .38       .00       .00     49.20
    12000.0    7532.3    4019.2     448.5    1710.5     663.4     190.9        .0        .0     49.20
        .00      4.40      6.06      2.35      .040      .040      .040      .000     42.70     23.65
    .001417      280.      280.      260.         0         0         0       .00    488.97    512.62


 FLOW DISTRIBUTION FOR SECNO=    133.20          CWSEL=     53.60

 STA=      24.      70.     117.     143.     170.     233.     255.     270.     300.     354.     425.     513.
   PER Q=      4.4     17.0      7.4      3.4      5.2      3.6      4.1      7.6     10.0     33.5      3.7
    AREA=    164.5    368.9    178.1    113.4    204.7    107.8     99.0    190.5    283.5    663.4    190.9
     VEL=      3.2      5.5      5.0      3.6      3.1      4.0      4.9      4.8      4.2      6.1      2.3
   DEPTH=      3.5      7.8      6.8      4.2      3.2      4.9      6.6      6.3      5.2      9.3      2.2

 *SECNO 134.000

 3265 DIVIDED FLOW


 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .47

    134.000     11.03     53.83       .00       .00     54.80       .97       .64       .18     54.60
    12000.0    4710.3    7176.5     113.2     713.6     823.6      35.6      11.7       2.6     59.20
        .01      6.60      8.71      3.18      .040      .040      .040      .000     42.80     38.99
    .006405      250.      240.      230.         2         0         0       .00    424.69    552.03


 FLOW DISTRIBUTION FOR SECNO=    134.00          CWSEL=     53.83

 STA=      39.      45.      81.     106.     209.     230.     270.     471.     533.     552.
   PER Q=       .4     10.1      4.4      9.4      6.9      8.1     59.8       .4       .6
    AREA=     12.1    154.1     80.8    224.6    100.4    141.6    823.6     14.4     21.2
     VEL=      4.2      7.8      6.5      5.0      8.3      6.9      8.7      3.2      3.2
   DEPTH=      2.0      4.3      3.2      2.2      4.8      3.6      5.1       .2      1.1

1
    04MAY15      14:47:15                                                                                                    PAGE   54


     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 134.100
    134.100      7.98     55.18       .00       .00     56.60      1.42      1.66       .13     50.00
    12000.0    8014.4    3781.7     203.9     946.1     322.9      47.5      18.8       4.5     52.60
        .02      8.47     11.71      4.29      .040      .040      .040      .000     47.20     40.71
    .009533      220.      210.      200.         3         0         0       .00    371.14    411.85


 FLOW DISTRIBUTION FOR SECNO=    134.10          CWSEL=     55.18

 STA=      41.      47.     115.     162.     222.     280.     320.     375.     412.
   PER Q=       .1     10.0     17.0     14.8     10.5     14.4     31.5      1.7
    AREA=      3.7    175.4    208.2    211.8    169.9    177.2    322.9     47.5
     VEL=      2.5      6.8      9.8      8.4      7.4      9.8     11.7      4.3
   DEPTH=       .6      2.6      4.4      3.5      2.9      4.4      5.9      1.3

 *SECNO 135.000

 3265 DIVIDED FLOW


 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.44

    135.000      9.20     56.90       .00       .00     57.76       .87      1.11       .06     47.70
    12000.0    2008.4    5201.0    4790.6     270.2     577.1     899.1      24.8       6.2     55.90
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       .02      7.43      9.01      5.33      .040      .040      .040      .000     47.70     98.14
   .004623      180.      170.      160.         2         0         0       .00    464.32    587.73

 FLOW DISTRIBUTION FOR SECNO=    135.00          CWSEL=     56.90

 STA=      98.     102.     154.     239.     337.     388.     451.     544.     588.
   PER Q=       .0      16.7     43.3      7.1     14.9      9.5      5.1      3.3
    AREA=      2.1     268.1    577.1    206.3    247.6    205.9    145.1     94.1
     VEL=      1.7       7.5      9.0      4.1      7.2      5.5      4.2      4.2
   DEPTH=       .6       5.2      6.8      2.1      4.9      3.3      1.6      2.2

 *SECNO 136.000
1
    04MAY15      14:47:15                                                                                                PAGE   55

     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


 3265 DIVIDED FLOW

    136.000     10.39     59.99       .00       .00     61.04      1.05      3.22       .05     59.90
    12000.0       .2    3664.1    8335.6        .5     356.4    1169.4      44.1      12.1     59.90
        .04       .45     10.28      7.13      .040      .040      .040      .000     49.60    202.28
   .008928      530.      520.      510.         3         0         0       .00    546.92    749.64

 FLOW DISTRIBUTION FOR SECNO=    136.00          CWSEL=     59.99

 STA=     202.     213.     281.     305.     336.     359.     393.     467.     495.     576.     648.     721.     750.
   PER Q=       .0      30.5      4.2      7.9      6.5     12.8     15.8      2.2      2.1      5.3     10.4      2.2
    AREA=       .5     356.4     70.6    114.4     90.6    157.8    243.6     50.2     76.2    125.4    189.2     51.4
     VEL=       .4      10.3      7.1      8.3      8.6      9.7      7.8      5.2      3.4      5.1      6.6      5.2
   DEPTH=       .0       5.2      2.9      3.7      3.9      4.6      3.3      1.8       .9      1.7      2.6      1.8

 *SECNO 137.000

 3265 DIVIDED FLOW

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
    137.000      6.88     64.68     64.68       .00     65.97      1.29      3.91       .07     65.00
    12000.0    2681.8    6591.6    2726.6     407.0     614.8     405.5      58.0      17.0     63.40
        .05      6.59     10.72      6.72      .040      .040      .040      .000     57.80    307.85
   .010051      410.      440.      390.         8        20         0       .00    499.44    832.07

 FLOW DISTRIBUTION FOR SECNO=    137.00          CWSEL=     64.68

 STA=     308.     312.     366.     473.     513.     663.     785.     832.
   PER Q=       .0       8.1     14.0       .2     54.9     18.3      4.4
    AREA=      2.0     139.1    254.3     11.6    614.8    314.3     91.2
     VEL=      2.3       7.0      6.6      1.6     10.7      7.0      5.8
   DEPTH=       .5       2.6      2.4       .3      4.9      2.6      1.9

 *SECNO 138.000

 3265 DIVIDED FLOW

1
    04MAY15      14:47:15                                                                                                PAGE   56

     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


    138.000     10.17     72.57       .00       .00     73.63      1.06      7.64       .02     74.00
    12000.0        .0    7294.9    4705.1        .0     951.5     515.9      86.4      25.7     74.50
        .08       .00      7.67      9.12      .000      .040      .040      .000     62.40    448.23
   .008013      920.      860.      820.         3         0         0       .00    381.46   1051.90

 FLOW DISTRIBUTION FOR SECNO=    138.00          CWSEL=     72.57

 STA=     448.     757.     964.     977.    1024.    1052.
   PER Q=     60.8      5.2      3.0     19.9     11.2
    AREA=    951.5     82.3     48.4    243.2    141.9
     VEL=      7.7      7.6      7.3      9.8      9.4
   DEPTH=      3.5       .4      3.7      5.2      5.1

 *SECNO 138.100

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.01

    138.100      8.95     73.45       .00       .00     73.94       .50       .26       .06     70.50
    12000.0     993.5    8869.2    2137.2     350.0    1414.6     607.5      89.6      26.5     68.50
        .08      2.84      6.27      3.52      .040      .040      .040      .000     64.50    332.65
   .001979       60.       70.       80.         2         0         0       .00    661.87    994.52
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FLOW DISTRIBUTION FOR SECNO=    138.10          CWSEL=     73.45

STA=     333.     368.     420.     442.     493.     684.     738.     850.     923.     950.     970.     995.
  PER Q=      1.3      3.2       .8      3.0     73.9      4.8      1.3       .4      2.9      6.2      2.3
   AREA=     60.4    127.5     39.6    122.5   1414.6    164.8    101.0     40.3     93.2    129.0     79.1
    VEL=      2.5      3.0      2.4      3.0      6.3      3.5      1.5      1.1      3.7      5.7      3.5
  DEPTH=      1.7      2.5      1.8      2.4      7.4      3.1       .9       .6      3.5      6.5      3.2

*SECNO 138.300

3265 DIVIDED FLOW

   138.300      7.89     73.89       .00       .00     74.58       .69       .58       .06     70.80
   12000.0    2097.0    7773.4    2129.6     516.7     996.3     647.4     101.3      30.5     69.80
       .09      4.06      7.80      3.29      .040      .040      .040      .000     66.00    143.79
   .003546      200.      220.      250.         3         0         0       .00    829.38   1131.82
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04MAY15 14:47:15 PAGE 57

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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

FLOW DISTRIBUTION FOR SECNO=    138.30          CWSEL=     73.89

STA=     144.     350.     388.     500.     550.     700.     750.     857.     960.    1132.
  PER Q=      3.2      3.5      3.8      6.9     64.8      7.1      4.1      3.1      3.5
   AREA=     94.1    100.4    155.1    167.1    996.3    169.6    165.0    136.3    176.5
    VEL=      4.1      4.2      3.0      4.9      7.8      5.0      3.0      2.8      2.4
  DEPTH=       .5      2.6      1.4      3.3      6.6      3.4      1.5      1.3      1.0

*SECNO 139.000

3265 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   139.000      7.36     74.86     74.86       .00     75.93      1.07       .62       .11     73.00
   12000.0    2153.2    9287.4     559.4     348.3    1064.1      70.1     105.5      32.2     70.00
       .10      6.18      8.73      7.98      .040      .040      .040      .000     67.50    379.76
   .014367      130.       90.      100.        20        10         0       .00    636.95   1041.85

FLOW DISTRIBUTION FOR SECNO=    139.00          CWSEL=     74.86

STA=     380.     405.     459.     527.     601.    1013.    1042.
  PER Q=       .5      4.2      6.2      7.1     77.4      4.7
   AREA=     17.2     84.3    116.4    130.4   1064.1     70.1
    VEL=      3.4      6.0      6.4      6.5      8.7      8.0
  DEPTH=       .7      1.6      1.7      1.8      2.8      2.4

*SECNO 140.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.15

   140.000      8.38     77.48       .00       .00     78.16       .68      2.19       .04     77.20
   12000.0    5125.0    6208.0     666.9    1027.2     792.9     126.8     120.6      37.1     69.10
       .11      4.99      7.83      5.26      .040      .040      .040      .000     69.10    646.09
   .003120      420.      355.      400.         4         0         0       .00    439.18   1085.27

FLOW DISTRIBUTION FOR SECNO=    140.00          CWSEL=     77.48
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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

STA=     646.     663.     717.     814.     859.     901.     948.    1055.    1085.
  PER Q=       .0      3.7     15.4      7.9     10.7      5.0     51.7      5.6
   AREA=       5.7    122.9    366.3    181.2    211.1    139.9    792.9    126.8
    VEL=      1.0      3.6      5.0      5.3      6.1      4.3      7.8      5.3
  DEPTH=       .3      2.3      3.8      4.0      5.0      3.0      7.4      4.2

CCHV=     .300 CEHV=     .500
*SECNO 141.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.59

   141.000      8.14     78.84       .00       .00     79.14       .30       .87       .12     74.10
   12000.0      84.3   10295.5    1620.2      37.5    2295.5     436.4     145.9      41.9     73.10
       .14      2.25      4.49      3.71      .040      .040      .040      .000     70.70    569.19
   .001228      450.      470.      480.         3         0         0       .00    473.35   1042.54

FLOW DISTRIBUTION FOR SECNO=    141.00          CWSEL=     78.84

STA=     569.     585.     944.     994.    1043.
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```
  PER Q=       .7     85.8     10.3      3.2
   AREA=     37.5   2295.5    292.1    144.2
    VEL=      2.2      4.5      4.2      2.7
  DEPTH=      2.4      6.4      5.8      3.0

1490 NH CARD USED
*SECNO 142.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .68

   142.000      8.42     79.62       .00       .00     80.08       .46       .86       .08     71.20
   12000.0     725.5   10167.5    1106.9     113.2    1937.1     169.8     174.5      46.3     71.20
       .17      6.41      5.25      6.52      .030      .060      .030      .000     71.20    903.12
   .002621      430.      500.      510.         2         0         0       .00    297.20   1200.32


FLOW DISTRIBUTION FOR SECNO=    142.00          CWSEL=     79.62

STA=     903.     930.    1160.    1200.
  PER Q=      6.0     84.7      9.2
   AREA=    113.2   1937.1    169.8
    VEL=      6.4      5.2      6.5
  DEPTH=      4.2      8.4      4.2
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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


1490 NH CARD USED
*SECNO 142.100

3265 DIVIDED FLOW

   142.100      8.40     79.60       .00       .00     80.11       .51       .00       .02     71.20
   12000.0     758.8    9781.7    1459.5     108.3    1831.9     203.5     174.5      46.3     71.20
       .17      7.01      5.34      7.17      .030      .059      .030      .000     71.20    904.22
   .003155        1.        1.        1.         2         0         0       .00    292.21   1208.42


FLOW DISTRIBUTION FOR SECNO=    142.10          CWSEL=     79.60

STA=     904.     930.    1034.    1051.    1160.    1208.
  PER Q=      6.3     37.4      2.4     41.8     12.2
   AREA=    108.3    823.5     92.4    915.9    203.5
    VEL=      7.0      5.4      3.1      5.5      7.2
  DEPTH=      4.2      8.4      8.4      8.4      4.2

1490 NH CARD USED
*SECNO 142.900

3265 DIVIDED FLOW

   142.900      6.56     81.36       .00       .00     82.01       .64      1.83       .07     75.00
   12000.0     241.4   11154.6     604.0      32.5    1795.3      64.2     194.9      49.3     75.00
       .19      7.42      6.21      9.41      .030      .059      .030      .000     74.80    636.28
   .005752      399.      444.      409.         2         0         0       .00    304.76    958.04


FLOW DISTRIBUTION FOR SECNO=    142.90          CWSEL=     81.36

STA=     636.     650.     784.     801.     940.     950.     958.
  PER Q=      2.0     42.9      2.3     47.7      4.2       .8
   AREA=     32.5    820.7     71.6    903.0     48.6     15.6
    VEL=      7.4      6.3      3.9      6.3     10.5      6.1
  DEPTH=      2.4      6.4      6.5      6.5      4.9      1.9

1490 NH CARD USED
*SECNO 143.000
   143.000      6.67     81.47       .00       .00     82.04       .56       .01       .02     75.00
   12000.0     347.1   11093.4     559.5      45.9    1906.6      66.8     195.0      49.3     75.00
       .19      7.56      5.82      8.38      .030      .060      .030      .000     74.80    636.05
   .004481        1.        1.        1.         2         0         0       .00    322.90    958.95
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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


FLOW DISTRIBUTION FOR SECNO=    143.00          CWSEL=     81.47

STA=     636.     639.     650.     940.     950.     956.     959.
  PER Q=       .0      2.8     92.4      3.9       .7       .0
   AREA=      2.2     43.7   1906.6     49.7     14.8      2.2
    VEL=      2.5      7.8      5.8      9.4      5.9      2.5
  DEPTH=       .7      4.0      6.6      5.0      2.5       .7

1490 NH CARD USED
*SECNO 144.000
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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
   144.000      5.29     87.59     87.59       .00     89.16      1.57      4.07       .50     85.00
   12000.0     134.0   11809.8      56.3      26.8    1170.4       5.6     207.8      52.2     85.00
       .20      4.99     10.09     10.06      .100      .089      .045      .000     82.30    819.28
   .080699      390.      345.      360.        20        15         0       .00    400.04   1219.32


FLOW DISTRIBUTION FOR SECNO=    144.00          CWSEL=     87.59

STA=     819.     840.    1190.    1215.    1219.
  PER Q=      1.1     79.7     18.7       .5
   AREA=     26.8   1073.2     97.3      5.6
    VEL=      5.0      8.9     23.1     10.1
  DEPTH=      1.3      3.1      3.9      1.3

1490 NH CARD USED
CCHV=     .100 CEHV=     .300
*SECNO 145.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO = 10.29

   145.000      7.78     91.48       .00       .00     91.71       .23      2.42       .13     86.50
   12000.0    1270.0   10160.5     569.4     439.4    2563.9     186.4     256.0      61.8     84.00
       .27      2.89      3.96      3.06      .040      .040      .040      .000     83.70    554.84
   .000762      960.      955.      960.         8         0         0       .00    470.83   1025.67


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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


FLOW DISTRIBUTION FOR SECNO=    145.00          CWSEL=     91.48

STA=     555.     560.     621.     648.     985.    1000.    1015.    1023.    1026.
  PER Q=       .2      7.3      3.1     84.7      2.9      1.6       .3       .0
   AREA=     13.6    297.9    127.8   2563.9     97.3     67.3     19.9      2.0
    VEL=      1.5      3.0      2.9      4.0      3.5      2.8      1.8       .8
  DEPTH=      2.6      4.9      4.7      7.6      6.5      4.5      2.5       .7

1490 NH CARD USED
CCHV=     .300 CEHV=     .500
*SECNO 146.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   146.000      9.18    100.18    100.18       .00    101.97      1.78      1.89       .78    101.10
   12000.0        .0   11999.8        .2        .0    1120.5        .2     300.9      70.3    100.00
       .29       .00     10.71      1.00      .000      .040      .040      .000     91.00    424.43
   .017376      880.      910.      935.        20        11         0       .00    347.95    772.38


FLOW DISTRIBUTION FOR SECNO=    146.00          CWSEL=    100.18

STA=     424.     770.     772.
  PER Q=    100.0       .0
   AREA=   1120.5       .2
    VEL=     10.7      1.0
  DEPTH=      3.2       .1

*SECNO 147.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO = 10.90

   147.000     10.57    102.67       .00       .00    102.73       .06       .25       .52     95.00
   12000.0    6158.7   1891.6    3949.7    3254.5     917.0    2052.7     341.7      76.8     93.70
       .36      1.89      2.06      1.92      .040      .040      .040      .000     92.10    628.15
   .000146      460.      545.      460.         3         0         0       .00    792.07   1420.22


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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


FLOW DISTRIBUTION FOR SECNO=    147.00          CWSEL=    102.67
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STA=     628.     712.     730.     873.     955.    1008.    1081.    1174.    1234.    1362.    1420.
  PER Q=       .1       .8     19.8     12.2      8.3     10.0     15.8     10.0     20.5      2.4
   AREA=     41.0     84.2   1247.9    748.4    499.6    633.4    917.0    583.6   1219.4    249.7
    VEL=       .3      1.2      1.9      2.0      2.0      1.9      2.1      2.0      2.0      1.2
  DEPTH=       .5      4.7      8.7      9.1      9.4      8.7      9.9      9.7      9.5      4.3

CCHV=     .100 CEHV=     .300
*SECNO 148.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .69

   148.000     10.15    102.75       .00       .00    102.83       .08       .09       .01     99.10
   12000.0    5137.1    2804.8    4058.1    2424.8    1157.0    1781.2     400.5      85.5     95.10
       .42      2.12      2.42      2.28      .040      .040      .040      .000     92.60    559.44
   .000310      450.      370.      470.         2         0         0       .00    913.40   1472.85


FLOW DISTRIBUTION FOR SECNO=    148.00          CWSEL=    102.75

STA=     559.     675.     746.     865.     966.     997.    1159.    1225.    1285.    1328.    1411.    1473.
  PER Q=     11.3     10.5     13.0      6.4      1.5     23.4      8.9     10.7      8.1      4.5      1.6
   AREA=    634.0    514.9    720.2    439.5    116.3   1157.0    452.2    486.1    361.3    328.0    153.6
    VEL=      2.1      2.5      2.2      1.7      1.6      2.4      2.4      2.6      2.7      1.6      1.3
  DEPTH=      5.5      7.3      6.1      4.4      3.8      7.1      6.9      8.1      8.4      4.0      2.5

*SECNO 149.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   149.000      5.26    107.46    107.46       .00    108.53      1.07       .89       .30    104.40
   12000.0    1323.7    7908.8    2767.4     231.9     839.8     515.0     477.3     103.8    107.00
       .45      5.71      9.42      5.37      .040      .040      .040      .000    102.20    119.81
   .011523      900.      980.     1020.        20        11         0       .00    738.11    857.92


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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

FLOW DISTRIBUTION FOR SECNO=    149.00          CWSEL=    107.46

STA=     120.     146.     274.     505.     620.     761.     848.     858.
  PER Q=       .1     11.0     65.9      3.6      8.8     10.1       .6
   AREA=      6.1    225.8    839.8    110.9    206.4    183.9     13.7
    VEL=      1.5      5.8      9.4      3.9      5.1      6.6      4.8
  DEPTH=       .2      1.8      3.6      1.0      1.5      2.1      1.4

*SECNO 149.100

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.01

   149.100      7.31    111.11       .00       .00    111.61       .49      3.02       .06    108.00
   12000.0    4141.5    5449.3    2409.2     798.6     828.8     631.1     503.4     113.2    107.30
       .48      5.19      6.57      3.82      .040      .040      .040      .000    103.80    198.47
   .002851      610.      600.      560.         4         0         0       .00    660.15   1019.08

FLOW DISTRIBUTION FOR SECNO=    149.10          CWSEL=    111.11

STA=     198.     282.     370.     430.     567.     650.     970.    1017.    1019.
  PER Q=      9.5     22.1      3.0     45.4     12.2      4.5      3.4       .0
   AREA=    250.0    450.1     98.5    828.8    308.3    208.5    113.5       .7
    VEL=      4.5      5.9      3.6      6.6      4.8      2.6      3.6      1.0
  DEPTH=      3.0      5.1      1.6      6.0      3.7       .7      2.4       .4

*SECNO 150.000

3265 DIVIDED FLOW


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.04

   150.000      7.03    112.23       .00       .00    112.35       .13       .71       .04    111.30
   12000.0    4675.7    4463.6    2860.7    1685.9    1524.8    1008.4     546.0     123.3    107.90
       .54      2.77      2.93      2.84      .040      .040      .040      .000    105.20    492.62
   .000684      560.      570.      600.         3         0         0       .00    874.57   1415.82


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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


FLOW DISTRIBUTION FOR SECNO=    150.00          CWSEL=    112.23

STA=     493.     542.     620.     709.     837.     861.    1152.    1285.    1312.    1401.    1416.
  PER Q=      4.3      3.6      9.8     19.9      1.4     37.2      9.8      3.7      9.8       .5
   AREA=    207.2    221.0    425.7    753.1     78.8   1524.8    399.5    148.1    425.7     35.1
    VEL=      2.5      1.9      2.8      3.2      2.1      2.9      3.0      3.0      2.8      1.7
  DEPTH=      4.2      2.8      4.8      5.9      3.3      5.2      3.0      5.5      4.8      2.4

*SECNO 151.000

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   151.000      3.48    114.48    114.48       .00    115.33       .85      1.87       .22    116.00
   12000.0    3349.2    2570.2    6080.6     575.2     477.8     693.1     616.3     145.2    116.70
       .58      5.82      5.38      8.77      .040      .040      .040      .000    111.00    218.85
   .013514     1030.     1045.     1000.        20         8         0       .00    976.43   1257.52


FLOW DISTRIBUTION FOR SECNO=    151.00          CWSEL=    114.48

STA=     219.     239.     338.     460.     590.     608.    1000.    1031.    1112.    1250.    1258.
  PER Q=       .3      9.3     11.4      6.6       .3     21.4      1.2     16.5     32.3       .6
   AREA=     10.9    175.9    216.8    159.5     12.1    477.8     26.4    229.0    424.6     13.1
    VEL=      2.9      6.3      6.3      4.9      3.4      5.4      5.6      8.6      9.1      5.9
  DEPTH=       .5      1.8      1.8      1.2       .7      1.4       .9      2.8      3.1      1.7

*SECNO 152.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      121.90 ELREA=      120.00

   152.000      5.37    120.17    120.03       .00    120.89       .71      5.55       .01    121.90
   12000.0        .0    2871.7    9128.3        .0     369.4    1420.7     639.6     155.9    120.00
       .60       .00      7.77      6.43      .000      .040      .040      .000    114.80    837.85
   .007205      540.      560.      590.        14        18         0       .00    667.00   1504.85


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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

FLOW DISTRIBUTION FOR SECNO=    152.00          CWSEL=    120.17

STA=     838.     932.    1040.    1191.    1313.    1369.    1405.    1494.    1505.
  PER Q=     23.9      1.9     11.3     23.2     15.6      8.3     15.2       .5
   AREA=    369.4     84.0    283.6    399.9    231.2    132.4    273.9     15.6
    VEL=      7.8      2.7      4.8      7.0      8.1      7.5      6.7      3.9
  DEPTH=      3.9       .8      1.9      3.3      4.1      3.7      3.1      1.4

*SECNO 153.000

3301 HV CHANGED MORE THAN HVINS


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      125.90 ELREA=      124.60

   153.000      5.87    121.17    121.09       .00    123.14      1.97      1.87       .38    125.90
   12000.0        .0   12000.0        .0        .0    1065.4        .0     645.8     157.9    124.60
       .61       .00     11.26       .00      .000      .040      .000      .000    115.30    714.56
   .014268      180.      190.      190.         6         8         0       .00    261.39    975.95


FLOW DISTRIBUTION FOR SECNO=    153.00          CWSEL=    121.17

STA=     715.    1096.
  PER Q=    100.0
   AREA=   1065.4
    VEL=     11.3
  DEPTH=      4.1

*SECNO 154.000

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.72

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   04MAY15     14:47:15                                                                                                PAGE   66


    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


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       125.20 ELREA=       118.30

   154.000      6.21    124.01       .00       .00    124.19       .18       .88       .18    125.20
   12000.0        .0    6294.5    5705.5        .0    1765.5    1808.6     663.9     162.1    118.30
       .63       .00      3.57      3.15      .000      .040      .040      .000    117.80    601.88
   .001034      350.      345.      330.         3         0         0       .00    807.65   1547.73


FLOW DISTRIBUTION FOR SECNO=    154.00          CWSEL=    124.01

STA=     602.     943.    1065.    1080.    1175.    1219.    1225.    1305.    1464.    1541.    1548.
  PER Q=      52.5     11.8       .2       .2      1.5       .1       .7     25.2      7.8       .1
   AREA=   1765.5    477.6     16.0     22.4     90.9      5.8     41.2    837.1    309.2      8.5
    VEL=      3.6      3.0      1.2      1.3      1.9      1.1      2.1      3.6      3.0      1.3
  DEPTH=      5.2      3.9      1.1       .2      2.1      1.0       .5      5.3      4.0      1.3

*SECNO 155.000

3265 DIVIDED FLOW

   155.000      6.26    124.36       .00       .00    124.63       .27       .41       .03    120.60
   12000.0     605.5    5899.1    5495.4     256.5    1304.0    1399.8     687.2     167.9    122.80
       .65      2.36      4.52      3.93      .040      .040      .040      .000    118.10    570.58
   .001741      350.      330.      290.         3         0         0       .00    835.66   1515.65


FLOW DISTRIBUTION FOR SECNO=    155.00          CWSEL=    124.36

STA=     571.     707.     968.    1128.    1274.    1396.    1430.    1465.    1506.    1516.
  PER Q=       5.0     49.2      3.0      7.2     12.3      8.4      6.2      8.1       .6
   AREA=     256.5   1304.0    192.9    184.9    417.3    199.9    168.4    210.2     26.4
    VEL=       2.4      4.5      1.9      4.7      3.5      5.1      4.4      4.6      2.8
  DEPTH=       1.9      5.0      1.2      1.3      3.4      5.9      4.8      5.1      2.7

*SECNO 156.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.58

   156.000      6.68    124.78       .00       .00    124.94       .16       .30       .01    123.40
   12000.0      22.3   10251.6    1726.1      29.1    3062.0     699.1     709.1     172.8    119.20
       .68       .77      3.35      2.47      .040      .040      .040      .000    118.10    653.69
   .000700      230.      300.      250.         2         0         0       .00    710.31   1364.00


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   04MAY15      14:47:15                                                                                                PAGE   67

     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


FLOW DISTRIBUTION FOR SECNO=    156.00          CWSEL=    124.78

STA=     654.     696.    1183.    1278.    1349.    1364.
  PER Q=       .2     85.4      9.3      4.8       .3
   AREA=     29.1   3062.0    420.5    250.3     28.3
    VEL=       .8      3.3      2.6      2.3      1.5
  DEPTH=       .7      6.3      4.4      3.5      1.9

*SECNO 157.000

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   157.000      6.70    127.80    127.80       .00    129.39      1.60       .30       .43    127.20
   12000.0    9126.0    2874.0        .0     888.0     297.2        .0     718.6     174.8    128.30
       .68     10.28      9.67       .00      .040      .040      .000      .000    121.10    653.65
   .013096      150.      170.      170.        20         5         0       .00    385.12   1208.42


FLOW DISTRIBUTION FOR SECNO=    157.00          CWSEL=    127.80

STA=     654.     766.     882.     905.    1123.    1213.
  PER Q=      15.9     56.1      3.8       .2     23.9
   AREA=     258.4    556.7     58.5     14.4    297.2
    VEL=       7.4     12.1      7.7      1.9      9.7
  DEPTH=       2.3      4.8      2.5       .1      3.5

*SECNO 157.100

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  4.31

   157.100      6.26    129.76       .00       .00    129.89       .14       .35       .15    126.00
```

```
   12000.0    6582.9    1805.2    3611.9    2134.3     568.3    1392.8     730.1     177.5    125.40
       .70      3.08      3.18      2.59      .040      .040      .040      .000    123.50    658.90
  .000705      190.      190.      190.         2         0         0       .00    840.75   1499.66


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   04MAY15      14:47:15                                                                                                    PAGE   68

    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

 FLOW DISTRIBUTION FOR SECNO=    157.10          CWSEL=    129.76

 STA=     659.      777.      800.     1008.     1062.     1160.     1216.     1290.     1496.     1500.
   PER Q=      9.9       3.2      36.3       5.4      15.0       5.1       3.0      21.9        .1
    AREA=    465.0     126.6    1300.6     242.2     568.3     238.2     191.5     954.5       8.7
     VEL=      2.6       3.1       3.3       2.7       3.2       2.6       1.9       2.7       1.3
   DEPTH=      3.9       5.5       6.3       4.5       5.8       4.3       2.6       4.6       2.4

 *SECNO 158.000

 3265 DIVIDED FLOW

   158.000      8.39    129.89       .00       .00    130.01       .12       .11       .00    121.50
   12000.0    1955.6    6297.6    3746.8     975.8    2108.9    1285.5     750.2     181.2    130.80
       .72      2.00      2.99      2.91      .040      .040      .040      .000    121.50    567.16
  .000449      210.      210.      200.         2         0         0       .00    730.55   1409.98


 FLOW DISTRIBUTION FOR SECNO=    158.00          CWSEL=    129.89

 STA=     567.      628.      685.      733.      822.     1111.     1241.     1264.     1290.     1346.     1400.     1410.
   PER Q=      2.1       6.0       1.6       6.6      52.5       1.0       3.6       5.0      12.7       8.6        .3
    AREA=    163.9     301.4     129.0     381.6    2108.9      72.3     153.8     197.3     469.7     366.5      25.9
     VEL=      1.5       2.4       1.5       2.1       3.0       1.7       2.8       3.0       3.3       2.8       1.4
   DEPTH=      2.7       5.3       2.7       4.3       7.4        .6       6.7       7.6       8.4       6.8       2.6

 T1      OTAY RIVER NATURAL BACKWATER    SECTIONS 133.2 TO 158.0
 T2      500-YR. STORM EVENT  Q#50,000 CFS
 T3      JUNE 15, 2004

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                 8                                                                   59.75

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       5                 -10                                                                      15



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   04MAY15      14:47:15                                                                                                    PAGE   69

    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 5
0

 CCHV=     .100 CEHV=     .300
 *SECNO 133.200

 3265 DIVIDED FLOW

         SECTIONS FROM LEFT TO RIGHT LOOKING DOWNSTREAM
   133.200     17.05     59.75       .00     59.75     60.95      1.20       .00       .00     49.20
   50000.0   32589.5   11395.0    6015.5    3765.9    1100.0    1049.4        .0        .0     49.20
       .00      8.65     10.36      5.73      .040      .040      .040      .000     42.70     16.47
  .002111      280.      280.      260.         0         0         0       .00    676.60    857.61


 FLOW DISTRIBUTION FOR SECNO=    133.20          CWSEL=     59.75

 STA=      16.       70.      117.      143.      170.      233.      255.      270.      300.      354.      425.      463.      490.
   PER Q=      7.1      13.0       6.3       4.5       9.0       4.1       3.6       6.9      10.6      22.8       4.6       3.1
    AREA=    473.3     658.0     338.0     279.5     592.2     243.1     191.3     375.0     615.6    1100.0     324.9     222.8
     VEL=      7.5       9.9       9.4       8.1       7.6       8.4       9.3       9.2       8.6      10.4       7.1       6.9
   DEPTH=      8.8      14.0      13.0      10.4       9.4      11.0      12.8      12.5      11.4      15.5       8.5       8.3

 STA=     490.      570.      858.
   PER Q=      3.7        .6
    AREA=    353.7     148.0
     VEL=      5.2       2.1
   DEPTH=      4.4        .5

 *SECNO 134.000

 3265 DIVIDED FLOW
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3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .70

   134.000     17.29     60.09       .00       .00     61.83      1.74       .72       .16     54.60
   50000.0   23566.8   22177.5    4255.8    2211.5    1973.4     784.8      30.5       4.1     59.20
       .01     10.66     11.24      5.42      .040      .040      .040      .000     42.80     29.67
   .004315      250.      240.      230.         2         0         0       .00    824.02    954.79


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   04MAY15      14:47:15                                                                                                    PAGE   70

    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

FLOW DISTRIBUTION FOR SECNO=    134.00          CWSEL=     60.09

STA=      30.      81.     106.     209.     230.     274.     471.     591.     955.
  PER Q=      9.9       5.2      17.6       5.5       9.0      44.4       7.1       1.4
   AREA=    458.2     237.2     869.0     231.8     415.2    1973.4     517.3     267.5
    VEL=     10.8      10.9      10.1      11.9      10.8      11.2       6.9       2.6
  DEPTH=      8.9       9.5       8.4      11.0       9.4      10.0       4.3        .7

*SECNO 134.100

3301 HV CHANGED MORE THAN HVINS

   134.100     13.46     60.66       .00       .00     63.22      2.57      1.15       .25     50.00
   50000.0   33262.3    9606.9    7130.8    2561.9     624.1     965.0      52.8       7.7     52.60
       .01     12.98     15.39      7.39      .040      .040      .040      .000     47.20      5.90
   .006836      220.      210.      200.         2         0         0       .00    679.86    685.75


FLOW DISTRIBUTION FOR SECNO=    134.10          CWSEL=     60.66

STA=       6.     115.     162.     222.     280.     320.     375.     435.     570.     686.
  PER Q=     15.4      13.2      14.4      12.4      11.2      19.2       7.2       4.9       2.1
   AREA=    672.1     465.6     540.4     487.6     396.3     624.1     357.4     392.2     215.5
    VEL=     11.4      14.2      13.3      12.7      14.2      15.4      10.1       6.3       5.0
  DEPTH=      6.2       9.9       9.0       8.4       9.9      11.3       6.0       2.9       1.9

*SECNO 135.000

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS

   135.000     14.86     62.56       .00       .00     64.20      1.64       .88       .09     47.70
   50000.0    6822.7   13293.3   29884.0     641.3    1057.0    3334.7      70.6      10.3     55.90
       .02     10.64     12.58      8.96      .040      .040      .040      .000     47.70     78.42
   .004018      180.      170.      160.         3         0         0       .00    685.96    815.53


FLOW DISTRIBUTION FOR SECNO=    135.00          CWSEL=     62.56

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   04MAY15      14:47:15                                                                                                    PAGE   71

    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


STA=      78.     102.     154.     239.     337.     388.     461.     544.     609.     710.     743.     816.
  PER Q=       .8      12.8      26.6      14.0      12.1      11.9      10.7       7.4       3.4        .3        .0
   AREA=     79.6     561.7    1057.0     759.6     535.6     613.3     606.0     438.8     328.4      48.2       4.9
    VEL=      5.2      11.4      12.6       9.2      11.3       9.7       8.9       8.4       5.2       3.0        .9
  DEPTH=      3.4      10.8      12.4       7.8      10.5       8.4       7.3       6.8       3.3       1.5        .1

*SECNO 136.000
   136.000     15.33     64.93       .00       .00     66.65      1.72      2.43       .03     59.90
   50000.0    2585.8    8798.4   38615.8     353.5     692.0    3798.8     128.8      18.9     59.90
       .03      7.31     12.71     10.17      .040      .040      .040      .000     49.60    125.00
   .005636      530.      520.      510.         3         0         0       .00    764.42    889.42


FLOW DISTRIBUTION FOR SECNO=    136.00          CWSEL=     64.93

STA=     125.     213.     281.     305.     336.     359.     393.     467.     495.     576.     648.     721.     784.
  PER Q=      5.2      17.6       4.1       6.2       4.8       8.2      13.8       3.7       8.6       9.5      11.8       4.4
   AREA=    353.5     692.0     189.1     267.4     204.2     325.6     608.8     188.4     476.1     480.8     549.5     288.4
    VEL=      7.3      12.7      10.8      11.7      11.8      12.5      11.4       9.9       9.1       9.9      10.7       7.6
  DEPTH=      4.0      10.2       7.9       8.6       8.9       9.6       8.2       6.7       5.9       6.7       7.5       4.6

STA=     784.     889.
  PER Q=      2.0
   AREA=    220.7
    VEL=      4.6
  DEPTH=      2.1

*SECNO 137.000
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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
   137.000     10.90     68.70     68.70       .00     71.78      3.08      3.08       .41     65.00
   50000.0   16797.7   18369.6   14832.8    1355.9    1125.6    1158.0     168.3      25.1     63.40
       .04     12.39     16.32     12.81      .040      .040      .040      .000     57.80    290.76
   .010634      410.      440.      390.        20        16         0       .00    575.97    866.74


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   04MAY15      14:47:15                                                                                                    PAGE   72

    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

FLOW DISTRIBUTION FOR SECNO=    137.00          CWSEL=     68.70

STA=     291.     312.     366.     473.     536.     663.     785.     836.     867.
  PER Q=       .7       9.6     18.1       5.2     36.7     21.7       7.3       .7
   AREA=     53.1    356.4    805.9    261.5   1125.6    805.3    295.8     56.9
    VEL=      6.9     13.5     13.2       9.9     16.3     13.5     12.3      5.7
  DEPTH=      2.5      6.6      6.4       4.2      8.9      6.6      5.8      1.9

*SECNO 138.000

3301 HV CHANGED MORE THAN HVINS

   138.000     14.86     77.26       .00       .00     79.25      1.98      7.36       .11     74.00
   50000.0    2131.8   28897.9   18970.3     413.1    2417.3    1760.0     249.4      39.3     74.50
       .06      5.16     11.95     10.78      .040      .040      .040      .000     62.40    213.39
   .007074      920.      860.      820.         2         0         0       .00    851.38   1064.77

FLOW DISTRIBUTION FOR SECNO=    138.00          CWSEL=     77.26

STA=     213.     308.     390.     435.     757.     839.     941.     964.     977.    1024.    1065.
  PER Q=       .6       2.0      1.6     57.8      3.7      6.9      4.7      2.6     13.1      6.9
   AREA=     97.9    186.1    129.1   2417.3    268.1    425.3    190.2    109.5    463.9    303.1
    VEL=      3.2      5.4      6.3     12.0      6.9      8.1     12.4     11.9     14.2     11.4
  DEPTH=      1.0      2.3      2.9      7.5      3.3      4.2      8.3      8.4      9.9      7.4

*SECNO 138.100

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.59

   138.100     13.90     78.40       .00       .00     79.63      1.23       .31       .08     70.50
   50000.0    9324.3   24819.6   15856.1    1410.5    2360.1    2230.0     258.1      40.6     68.50
       .06      6.61     10.52      7.11      .040      .040      .040      .000     64.50    218.55
   .002813       60.       70.       80.         3         0         0       .00    833.58   1125.02


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   04MAY15      14:47:15                                                                                                    PAGE   73

    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

FLOW DISTRIBUTION FOR SECNO=    138.10          CWSEL=     78.40

STA=     219.     368.     420.     493.     684.     738.     850.     923.     950.     970.    1008.    1125.
  PER Q=       5.2      5.8      7.7     49.6      6.8      8.4      4.9      3.6      4.6      3.2       .2
   AREA=    502.1    384.9    523.5   2360.1    432.1    655.5    401.7    226.9    228.1    243.3     42.5
    VEL=      5.2      7.5      7.3     10.5      7.9      6.4      6.1      8.0     10.0      6.6      1.9
  DEPTH=      3.4      7.4      7.2     12.4      8.0      5.9      5.5      8.4     11.4      6.4       .4

*SECNO 138.300

3265 DIVIDED FLOW

   138.300     13.37     79.37       .00       .00     80.23       .87       .56       .04     70.80
   50000.0   13287.4   16779.9   19932.7    2050.4    1817.5    3148.7     292.1      45.3     69.80
       .07      6.48      9.23      6.33      .040      .040      .040      .000     66.00    136.34
   .002228      200.      220.      250.         2         0         0       .00    958.61   1176.06

FLOW DISTRIBUTION FOR SECNO=    138.30          CWSEL=     79.37

STA=     136.     332.     388.     460.     500.     550.     700.     750.     857.     920.     960.    1015.    1070.
  PER Q=       3.5      6.8      5.7      4.1      6.6     33.6      6.7      9.6      5.0      3.8      4.8      4.4
   AREA=    373.3    468.0    465.6    302.7    440.8   1817.5    443.3    750.8    410.5    289.7    377.7    361.2
    VEL=      4.6      7.2      6.1      6.7      7.5      9.2      7.5      6.4      6.1      6.6      6.3      6.1
  DEPTH=      1.9      8.4      6.5      7.6      8.8     12.1      8.9      7.0      6.5      7.2      6.9      6.6
```

```
 STA=    1070.    1137.    1176.
   PER Q=      4.7       .8
    AREA=    406.5    109.1
     VEL=      5.8      3.5
   DEPTH=      6.1      2.8

 *SECNO 139.000

 3265 DIVIDED FLOW


 3301 HV CHANGED MORE THAN HVINS

1
    04MAY15      14:47:15                                                                                                                        PAGE  74

     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 =   .52

    139.000     11.50     79.00       .00       .00     80.96      1.96       .40       .33     73.00
    50000.0   14597.6   32911.7    2490.7    1457.4    2759.1     315.5     306.0      47.6     70.00
        .07     10.02     11.93      7.90      .040      .040      .040      .000     67.50    253.98
    .008193      130.       90.      100.         3         0         0       .00    868.01   1123.98


 FLOW DISTRIBUTION FOR SECNO=    139.00          CWSEL=     79.00

 STA=     254.     329.     405.     459.     527.     601.    1013.    1066.    1107.    1124.
   PER Q=       .3      4.0      6.6      8.7      9.6     65.8      4.4       .4       .2
    AREA=     52.6    262.3    307.9    397.9    436.7   2759.1    240.4     52.1     22.9
     VEL=      2.7      7.7     10.7     10.9     11.0     11.9      9.1      4.1      4.1
   DEPTH=       .7      3.5      5.7      5.9      5.9      6.7      4.5      1.3      1.4

 *SECNO 140.000

 3301 HV CHANGED MORE THAN HVINS

    140.000     12.33     81.43       .00       .00     84.11      2.68      2.94       .22     77.20
    50000.0   27989.6   19120.5    2889.9    2470.6    1216.3     277.1     343.9      54.2     69.10
        .08     11.33     15.72     10.43      .040      .040      .040      .000     69.10    511.63
    .007110      420.      355.      400.         2         0         0       .00    598.50   1110.13


 FLOW DISTRIBUTION FOR SECNO=    140.00          CWSEL=     81.43

 STA=     512.     550.     603.     663.     717.     814.     859.     901.     948.    1055.    1098.    1110.
   PER Q=       .1       .8      2.9      7.1     18.4      9.0     10.2      7.4     38.2      5.8       .0
    AREA=     23.7     91.9    206.0    336.6    750.1    359.2    377.3    325.9   1216.3    274.5      2.6
     VEL=      2.3      4.5      7.1     10.6     12.3     12.5     13.5     11.3     15.7     10.5      1.1
   DEPTH=       .6      1.7      3.4      6.2      7.7      8.0      9.0      6.9     11.4      6.4       .2

 CCHV=     .300 CEHV=     .500
 *SECNO 141.000

 3301 HV CHANGED MORE THAN HVINS

1
    04MAY15      14:47:15                                                                                                                        PAGE  75

     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 =  1.93

    141.000     14.32     85.02       .00       .00     86.13      1.10      1.54       .47     74.10
    50000.0    1277.7   39625.7    9096.6     235.3    4513.4    1272.2     397.3      60.4     73.10
        .10      5.43      8.78      7.15      .040      .040      .040      .000     70.70    542.26
    .001911      450.      470.      480.         2         0         0       .00    569.64   1111.90


 FLOW DISTRIBUTION FOR SECNO=    141.00          CWSEL=     85.02

 STA=     542.     551.     563.     585.     944.     994.    1052.    1102.    1112.
   PER Q=       .1       .4      2.0     79.3     10.2      6.7      1.2       .0
    AREA=     17.6     50.0    167.7   4513.4    601.0    497.1    166.0      8.0
     VEL=      2.4      4.2      6.1      8.8      8.5      6.8      3.6      1.4
   DEPTH=      2.0      4.2      7.6     12.6     12.0      8.6      3.3       .8

 1490 NH CARD USED
 *SECNO 142.000

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .59

    142.000     14.80     86.00       .00       .00     88.17      2.17      1.51       .53     71.20
    50000.0    4763.2   37969.7    7267.1     349.8    3405.5     524.8     456.1      65.7     71.20
```

```
       .11     13.62     11.15     13.85      .030      .060      .030      .000     71.20    882.75
   .005573      430.      500.      510.         2         0         0       .00    348.14   1230.88


 FLOW DISTRIBUTION FOR SECNO=    142.00          CWSEL=     86.00

 STA=     883.     930.    1160.    1231.
   PER Q=      9.5      75.9      14.5
    AREA=    349.8    3405.5     524.8
     VEL=     13.6      11.1      13.8
   DEPTH=      7.4      14.8       7.4

 1490 NH CARD USED
1
    04MAY15      14:47:15                                                                                                PAGE   76


     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 142.100

 3265 DIVIDED FLOW

   142.100     14.56     85.76       .00       .00     88.42      2.66       .01       .24     71.20
   50000.0    4623.3   35337.1   10039.6     278.6    3174.4     589.0     456.2      65.7     71.20
       .11     16.59     11.13     17.05      .030      .058      .030      .000     71.20    892.16
   .007154        1.        1.        1.         2         0         0       .00    317.84   1228.00


 FLOW DISTRIBUTION FOR SECNO=    142.10          CWSEL=     85.76

 STA=     892.     897.     930.    1034.    1051.    1160.    1228.
   PER Q=       .0       9.2      32.5       1.7      36.5      20.1
    AREA=      4.3     274.4    1427.0     160.2    1587.2     589.0
     VEL=      3.0      16.8      11.4       5.3      11.5      17.0
   DEPTH=       .9       8.3      14.6      14.6      14.6       8.7

 1490 NH CARD USED
 *SECNO 142.900

 3265 DIVIDED FLOW


 3301 HV CHANGED MORE THAN HVINS

   142.900     14.88     89.68       .00       .00     91.44      1.77      2.75       .27     75.00
   50000.0    3979.2   41938.8    4082.0     555.0    4106.9     247.1     501.1      69.7     75.00
       .12      7.17     10.21     16.52      .030      .058      .030      .000     74.80    451.78
   .005641      399.      444.      409.         3         0         0       .00    495.22    976.00


 FLOW DISTRIBUTION FOR SECNO=    142.90          CWSEL=     89.68

 STA=     452.     622.     650.     784.     801.     940.     950.     976.
   PER Q=      5.1       2.8      39.2       1.5      43.2       5.3       2.8
    AREA=    398.0     157.0    1885.0     163.1    2058.8     131.8     115.3
     VEL=      6.4       9.0      10.4       4.7      10.5      20.2      12.4
   DEPTH=      2.3       5.6      14.7      14.8      14.8      13.2       4.4

1
    04MAY15      14:47:15                                                                                                PAGE   77


     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


 1490 NH CARD USED
 *SECNO 143.000
   143.000     15.42     90.22       .00       .00     91.57      1.35       .00       .12     75.00
   50000.0    5838.4   40013.2    4148.5     732.5    4443.7     311.2     501.2      69.7     75.00
       .12      7.97      9.00     13.33      .030      .060      .030      .000     74.80    433.75
   .003473        1.        1.        1.         2         0         0       .00    556.80    990.56


 FLOW DISTRIBUTION FOR SECNO=    143.00          CWSEL=     90.22

 STA=     434.     629.     650.     940.     950.     963.     991.
   PER Q=      5.9       5.8      80.0       4.5       3.2        .6
    AREA=    515.4     217.2    4443.7     137.2     125.9      48.1
     VEL=      5.7      13.4       9.0      16.3      12.7       6.6
   DEPTH=      2.6      10.3      15.3      13.7       9.7       1.7

 1490 NH CARD USED
 *SECNO 144.000

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
   144.000     10.32     92.62     92.62       .00     96.08      3.46      3.07      1.05     85.00
   50000.0    2897.1   46083.1    1019.8     287.2    3056.5      53.6     537.0      74.0     85.00
       .13     10.09     15.08     19.04      .083      .091      .045      .000     82.30    737.12
   .052400      390.      345.      360.         2        14         0       .00    493.12   1230.24
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 FLOW DISTRIBUTION FOR SECNO=    144.00          CWSEL=     92.62

 STA=     737.     840.    1190.    1215.    1230.
   PER Q=      5.8     77.7     14.5      2.0
    AREA=    287.2   2833.5    223.0     53.6
     VEL=     10.1     13.7     32.4     19.0
   DEPTH=      2.8      8.1      8.9      3.5

 1490 NH CARD USED
 CCHV=     .100 CEHV=     .300
 *SECNO 145.000
1
    04MAY15      14:47:15                                                                                                  PAGE   78

     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


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  6.69

    145.000     15.17     98.87       .00       .00     99.73       .86      3.39       .26     86.50
    50000.0    7580.5   39026.7    3392.9    1211.2    5054.6     534.6     648.9      86.0     84.00
        .16      6.26      7.72      6.35      .040      .040      .040      .000     83.70    440.83
    .001170      960.      955.      960.         5         0         0       .00    597.37   1038.20


 FLOW DISTRIBUTION FOR SECNO=    145.00          CWSEL=     98.87

 STA=     441.     513.     548.     560.     621.     648.     985.    1000.    1015.    1023.    1032.    1038.
   PER Q=       .1       .0       .5     10.1      4.4     78.1      3.0      2.3       .9       .5       .0
    AREA=     40.2     16.6     78.3    748.8    327.4   5054.6    208.1    178.1     79.0     57.4     12.0
     VEL=       .9       .8      3.5      6.8      6.7      7.7      7.3      6.6      5.7      4.0      1.8
   DEPTH=       .6       .5      6.5     12.3     12.1     15.0     13.9     11.9      9.9      6.4      1.9

 1490 NH CARD USED
 CCHV=     .300 CEHV=     .500
 *SECNO 146.000

 3265 DIVIDED FLOW


 3301 HV CHANGED MORE THAN HVINS

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
    146.000     14.47    105.47    105.47       .00    109.41      3.94      2.42      1.54    101.10
    50000.0     243.7   48103.4    1653.0      37.9    2978.7     184.9     753.1      96.7    100.00
        .18      6.43     16.15      8.94      .040      .040      .040      .000     91.00    400.66
    .010997      880.      910.      935.        20        11         0       .00    428.20   1124.25


 FLOW DISTRIBUTION FOR SECNO=    146.00          CWSEL=    105.47

 STA=     401.     418.     770.     806.     810.    1110.    1124.
   PER Q=       .5     96.2      2.9       .0       .1       .3
    AREA=     37.9   2978.7    146.6      4.8      8.7     24.7
     VEL=      6.4     16.1      9.9      4.1      4.9      5.5
   DEPTH=      2.2      8.5      4.1      1.3       .0      1.7

1
    04MAY15      14:47:15                                                                                                  PAGE   79

     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 147.000

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  6.62

    147.000     18.62    110.72       .00       .00    110.92       .20       .38      1.12     95.00
    50000.0   27645.0    6693.5   15661.5    8044.4    1664.7    4259.8     848.3     105.2     93.70
        .22      3.44      4.02      3.68      .040      .040      .040      .000     92.10    379.24
    .000251      460.      545.      460.         2         0         0       .00   1101.04   1480.28


 FLOW DISTRIBUTION FOR SECNO=    147.00          CWSEL=    110.72

 STA=     379.     609.     712.     873.     955.    1008.    1081.    1174.    1234.    1362.    1455.    1480.
   PER Q=      3.5      4.2     19.9     11.0      7.3      9.4     13.4      8.5     17.9      4.8       .1
    AREA=    997.0    867.0   2626.6   1407.7    925.8   1220.3   1664.7   1066.0   2248.6    908.3     36.9
     VEL=      1.7      2.4      3.8      3.9      4.0      3.8      4.0      4.0      4.0      2.7       .8
   DEPTH=      4.3      8.4     16.3     17.2     17.5     16.7     17.9     17.8     17.6      9.8      1.5
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CCHV=     .100 CEHV=     .300
*SECNO 148.000
   148.000     18.23    110.83       .00       .00    111.05       .22       .12       .01     99.10
   50000.0   22963.2    9956.2   17080.6    6254.4    2464.9    4558.6     987.3     116.1     95.10
       .25      3.67      4.04      3.75      .040      .040      .040      .000     92.60    478.86
   .000314      450.      370.      470.         2         0         0       .00   1036.52   1515.38


FLOW DISTRIBUTION FOR SECNO=    148.00          CWSEL=    110.83

STA=     479.     595.     675.     746.     865.     966.     997.    1159.    1225.    1285.    1328.    1411.    1464.
  PER Q=      3.5      9.3      8.8     12.9      8.9      2.5     19.9      7.9      8.2      6.0      6.9      3.7
   AREA=    689.9   1174.0   1088.1   1680.9   1254.9    366.6   2464.9    985.1    970.5    708.4    998.1    578.6
    VEL=      2.5      3.9      4.1      3.8      3.5      3.4      4.0      4.0      4.2      4.3      3.5      3.2
  DEPTH=      5.9     14.7     15.3     14.1     12.4     11.8     15.2     14.9     16.2     16.5     12.0     10.9

STA=    1464.    1515.
  PER Q=      1.5
   AREA=    318.0
    VEL=      2.3
  DEPTH=      6.2
```



```
    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 149.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   149.000      8.40    110.60    110.60       .00    113.09      2.49       .90       .68    104.40
   50000.0    9209.6   22588.9   18201.5     861.3    1563.7    1638.5    1178.7     136.5    107.00
       .27     10.69     14.45     11.11      .040      .040      .040      .000    102.20     62.06
   .011837      900.      980.     1020.        20        14         0       .00    807.11    869.17


FLOW DISTRIBUTION FOR SECNO=    149.00          CWSEL=    110.60

STA=      62.      67.     146.     274.     505.     620.     761.     848.     869.
  PER Q=       .0      3.8     14.6     45.2      9.8     14.5     11.1      1.0
   AREA=      5.4    228.9    626.9   1563.7    471.2    648.3    456.6     62.4
    VEL=      4.1      8.2     11.7     14.4     10.4     11.2     12.2      8.1
  DEPTH=      1.1      2.9      4.9      6.8      4.1      4.6      5.2      2.9

*SECNO 149.100

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.82

   149.100     11.71    115.51       .00       .00    116.72      1.21      3.50       .13    108.00
   50000.0   17264.4   15160.8   17574.9    2014.1    1430.7    2408.6    1245.4     148.0    107.30
       .29      8.57     10.60      7.30      .040      .040      .040      .000    103.80    129.62
   .003577      610.      600.      560.         3         0         0       .00    902.23   1031.85


FLOW DISTRIBUTION FOR SECNO=    149.10          CWSEL=    115.51
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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


STA=     130.     240.     282.     370.     405.     430.     567.     650.     728.     823.     862.     970.    1017.
  PER Q=      5.7      6.8     16.7      3.4      2.0     30.3     12.1      5.3      5.5      3.1      3.8      5.1
   AREA=    453.7    363.6    836.7    220.8    139.3   1430.7    672.9    397.9    440.5    218.7    320.6    320.0
    VEL=      6.2      9.4     10.0      7.7      7.0     10.6      9.0      6.7      6.2      7.0      6.0      8.0
  DEPTH=      4.1      8.7      9.5      6.3      5.6     10.4      8.1      5.1      4.6      5.6      3.0      6.8

STA=    1017.    1032.
  PER Q=       .3
   AREA=     37.9
    VEL=      4.0
  DEPTH=      2.6

*SECNO 150.000

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.82
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   150.000     12.16    117.36       .00       .00    117.83       .47      1.03       .07    111.30
   50000.0   20550.2   17438.3   12011.5    3866.2    3015.8    2248.0    1344.4     161.0    107.90
       .32      5.32      5.78      5.34      .040      .040      .040      .000    105.20    363.50
   .001075      560.      570.      600.         3         0         0       .00   1066.45   1431.87


 FLOW DISTRIBUTION FOR SECNO=    150.00          CWSEL=    117.36

 STA=     364.      542.      620.      709.      837.      861.     1152.     1239.     1285.     1312.     1401.     1432.
   PER Q=      6.2       6.0       9.9      17.0       2.0      34.9       3.4       6.3       3.4       9.9       1.0
    AREA=    753.0     620.7     881.8    1409.0     201.8    3015.8     409.8     517.8     286.4     881.8     152.1
     VEL=      4.1       4.9       5.6       6.0       5.0       5.8       4.1       6.1       5.9       5.6       3.4
   DEPTH=      4.2       8.0       9.9      11.0       8.4      10.4       4.7      11.3      10.6       9.9       4.9

 *SECNO 151.000

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .53

   151.000      7.93    118.93       .00       .00    119.85       .91      1.89       .13    116.00
   50000.0   18538.2   15439.5   16022.3    2520.8    2112.8    1928.4    1529.4     187.0    116.70
       .36      7.35      7.31      8.31      .040      .040      .040      .000    111.00    173.87
   .003838     1030.     1045.     1000.         2         0         0       .00   1140.92   1314.79


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   04MAY15      14:47:15                                                                                                  PAGE   82

    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


 FLOW DISTRIBUTION FOR SECNO=    151.00          CWSEL=    118.93

 STA=     174.      338.      460.      590.      627.     1000.     1112.     1250.     1315.
   PER Q=     12.4      11.9      10.8       2.0      30.9      12.2      18.4       1.5
    AREA=    857.7     761.2     739.6     162.4    2112.8     740.4    1040.4     147.6
     VEL=      7.2       7.8       7.3       6.2       7.3       8.2       8.8       4.9
   DEPTH=      5.2       6.2       5.7       4.4       5.7       6.6       7.5       2.3

 *SECNO 152.000

 3265 DIVIDED FLOW

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
   152.000      7.15    121.95    121.95       .00    123.13      1.18      2.40       .08    121.90
   50000.0   28593.7    4285.0   17121.3    2954.2     541.0    2443.8    1610.0     201.5    120.00
       .37      9.68      7.92      7.01      .040      .040      .040      .000    114.80    394.05
   .004823      540.      560.      590.        20        18         0       .00   1096.35   1511.55


 FLOW DISTRIBUTION FOR SECNO=    152.00          CWSEL=    121.95

 STA=     394.      468.      642.      788.      833.      932.     1191.     1313.     1369.     1405.     1494.     1512.
   PER Q=      8.9      27.0      20.5        .9       8.6       9.4       9.4       5.6       3.1       6.4        .4
    AREA=    478.7    1340.4    1059.0      76.1     541.0     827.5     616.5     330.6     196.3     432.0      40.8
     VEL=      9.3      10.1       9.7       5.6       7.9       5.7       7.6       8.4       8.0       7.4       4.4
   DEPTH=      6.5       7.7       7.3       1.7       5.5       3.2       5.1       5.9       5.5       4.9       2.3

 *SECNO 153.000
 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
   153.000     10.69    125.99    125.99       .00    126.78       .79       .63       .04    125.90
   50000.0   25814.7   16730.4    7454.9    3191.0    2556.1    1704.8    1638.5     206.9    124.60
       .38      8.09      6.55      4.37      .040      .040      .040      .000    115.30    271.76
   .002569      180.      190.      190.        20        23         0       .00   1402.62   1674.38


 FLOW DISTRIBUTION FOR SECNO=    153.00          CWSEL=    125.99

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   04MAY15      14:47:15                                                                                                  PAGE   83

    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


 STA=     272.      413.      468.      582.      622.      682.      705.     1096.     1358.     1592.     1647.     1674.
   PER Q=      9.3       5.0      22.3       5.0       9.0       1.0      33.5       3.9       6.9       3.9        .2
    AREA=    615.0     376.0    1218.2     327.4     548.9     105.5    2556.1     597.2     741.7     321.0      45.0
     VEL=      7.6       6.6       9.1       7.6       8.2       5.0       6.5       3.3       4.6       6.1       2.6
   DEPTH=      4.4       6.8      10.7       8.2       9.1       4.6       6.5       2.3       3.2       5.8       1.6

 *SECNO 154.000

 3265 DIVIDED FLOW

   154.000      9.97    126.87       .00       .00    127.71       .84       .92       .02    125.20
   50000.0    5972.9   21449.5   22577.6     822.2    2743.9    3257.2    1694.4     216.4    118.30
       .39      7.26      7.82      6.93      .040      .040      .040      .000    116.90    454.23
   .002794      350.      345.      330.         0         0         0       .00   1041.58   1555.36
```

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 FLOW DISTRIBUTION FOR SECNO=    154.00          CWSEL=    126.87

 STA=     454.     541.     575.     599.     943.    1065.    1219.    1464.    1541.    1555.
   PER Q=      4.1      6.2      1.7     42.9     11.6      3.9     21.9      7.5       .3
    AREA=    343.9    338.8    139.5   2743.9    825.2    421.4   1443.6    528.5     38.5
     VEL=      5.9      9.1      6.1      7.8      7.0      4.7      7.6      7.1      3.6
   DEPTH=      4.0     10.0      5.8      8.0      6.8      2.7      5.9      6.9      2.7

 *SECNO 155.000
    155.000      9.61    127.71       .00       .00    128.79      1.08      1.01       .07    120.60
    50000.0    5140.4   20275.3   24584.2     789.8    2177.0    3142.5    1740.8     223.6    122.80
       .40      6.51      9.31      7.82      .040      .040      .040      .000    118.10    539.02
   .003725      350.      330.      290.         2         0         0       .00    982.55   1521.57


 FLOW DISTRIBUTION FOR SECNO=    155.00          CWSEL=    127.71

 STA=     539.     707.     968.    1031.    1121.    1253.    1274.    1396.    1430.    1465.    1506.    1522.
   PER Q=     10.3     40.6      4.3      4.5      4.1      4.1     13.4      6.2      5.2      6.5       .8
    AREA=    789.8   2177.0    318.5    379.6    402.4    201.7    825.4    313.6    285.4    347.3     68.5
     VEL=      6.5      9.3      6.7      5.9      5.1     10.2      8.1      9.9      9.2      9.4      5.6
   DEPTH=      4.7      8.3      5.1      4.2      3.0      9.6      6.8      9.2      8.2      8.5      4.4

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   04MAY15      14:47:15                                                                                                PAGE   84


    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 156.000
    156.000     10.59    128.69       .00       .00    129.55       .87       .75       .02    123.40
    50000.0    1500.3   39041.6    9458.1     408.5    4968.1    1545.3    1782.0     229.5    119.20
       .42      3.67      7.86      6.12      .040      .040      .040      .000    118.10    567.01
   .002024      230.      300.      250.         2         0         0       .00    938.38   1505.39


 FLOW DISTRIBUTION FOR SECNO=    156.00          CWSEL=    128.69

 STA=     567.     696.    1183.    1278.    1349.    1378.    1443.    1505.
   PER Q=      3.0     78.1     10.9      6.7      1.0       .2       .1
    AREA=    408.5   4968.1    792.3    528.2    117.2     61.1     46.5
     VEL=      3.7      7.9      6.9      6.4      4.2      1.6      1.4
   DEPTH=      3.2     10.2      8.3      7.4      4.0       .9       .7

 *SECNO 157.000

 3301 HV CHANGED MORE THAN HVINS

 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3693 PROBABLE MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
    157.000     10.35    131.45    131.45       .00    133.85      2.40       .65       .46    127.20
    50000.0   33234.7    8905.4    7859.9    2634.0     624.6     885.8    1802.9     232.9    128.30
       .42     12.62     14.26      8.87      .040      .040      .040      .000    121.10    575.04
   .011329      150.      170.      170.        20         5         0       .00    903.14   1478.19


 FLOW DISTRIBUTION FOR SECNO=    157.00          CWSEL=    131.45

 STA=     575.     617.     766.     882.     911.    1035.    1123.    1213.    1313.    1348.    1470.    1478.
   PER Q=       .4     18.4     32.2      3.9      5.5      6.2     17.8      5.8      2.2      7.6       .2
    AREA=     45.1    774.8    980.2    161.0    347.2    325.6    624.6    330.0    120.8    420.9     14.1
     VEL=      4.1     11.9     16.4     12.2      7.9      9.5     14.3      8.8      9.0      9.0      5.4
   DEPTH=      1.1      5.2      8.5      5.6      2.8      3.7      6.9      3.3      3.5      3.5      1.7

 *SECNO 157.100

 3265 DIVIDED FLOW

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   04MAY15      14:47:15                                                                                                PAGE   85


    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


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.68

    157.100     10.51    134.01       .00       .00    134.66       .65       .64       .17    126.00
    50000.0   25850.9    6754.4   17394.7    3890.0     985.2    2878.3    1828.9     236.8    125.40
       .43      6.65      6.86      6.04      .040      .040      .040      .000    123.50    568.07
   .001576      190.      190.      190.         2         0         0       .00    887.56   1520.50


 FLOW DISTRIBUTION FOR SECNO=    157.10          CWSEL=    134.01

 STA=     568.     777.     800.    1008.    1062.    1160.    1216.    1260.    1305.    1496.    1521.
   PER Q=     11.9      3.0     30.9      5.9     13.5      5.9      3.2      3.6     21.8       .4
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   AREA=   1008.2    224.4   2185.5    471.9    985.2    476.4    299.1    324.3   1713.8     64.7
    VEL=      5.9      6.7      7.1      6.3      6.9      6.1      5.3      5.5      6.4      2.8
  DEPTH=      4.8      9.8     10.5      8.7     10.1      8.5      6.8      7.2      9.0      2.6

*SECNO 158.000
   158.000     12.85    134.35       .00       .00    134.95       .60       .29       .01    121.50
   50000.0   11557.8   23004.4   15437.8    2223.2    3399.9    2560.7    1866.7     241.0    130.80
       .44      5.20      6.77      6.03      .040      .040      .040      .000    121.50    525.00
   .001245      210.      210.      200.         2         0         0       .00    893.58   1418.58


FLOW DISTRIBUTION FOR SECNO=    158.00          CWSEL=    134.35

STA=     525.     628.     685.     733.     822.    1111.    1241.    1264.    1290.    1346.    1400.    1419.
  PER Q=      4.5      6.7      3.3      8.7     46.0      4.2      3.4      4.3     10.4      8.0       .6
   AREA=    543.4    556.4    343.7    779.7   3399.9    572.4    256.7    313.6    720.2    608.1     89.7
    VEL=      4.1      6.0      4.9      5.6      6.8      3.7      6.5      6.9      7.2      6.6      3.5
  DEPTH=      5.3      9.8      7.2      8.8     11.8      4.4     11.2     12.1     12.9     11.3      4.8
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THIS RUN EXECUTED 04MAY15 14:47:15

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************************************
 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


JUNE 15, 2004

SUMMARY PRINTOUT
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	SECNO	CWSEL	.01K	EG	TOPWID	STENCL	STENCR	WSELK
	133.200	55.75	5364.60	56.37	510.88	.00	.00	55.75
	133.200	55.82	5262.29	56.48	447.00	46.00	493.00	55.75
	133.200	50.19	996.23	50.21	327.90	.00	.00	50.19
	133.200	53.60	3187.56	53.98	488.97	.00	.00	53.60
	133.200	59.75	10882.74	60.95	676.60	.00	.00	59.75
*	134.000	56.02	3039.25	57.21	480.62	.00	.00	.00
*	134.000	56.08	2983.89	57.37	409.48	44.00	490.00	56.02
*	134.000	50.19	262.76	50.34	196.05	.00	.00	.00
*	134.000	53.83	1499.37	54.80	424.69	.00	.00	.00
*	134.000	60.09	7612.06	61.83	824.02	.00	.00	.00
	134.100	56.89	2273.11	58.95	429.70	.00	.00	.00
	134.100	57.09	2413.18	58.98	414.50	30.00	445.00	56.89
*	134.100	51.57	117.12	52.21	176.53	.00	.00	.00
	134.100	55.18	1229.07	56.60	371.14	.00	.00	.00
	134.100	60.66	6047.48	63.22	679.86	.00	.00	.00
*	135.000	58.98	3404.68	60.07	517.88	.00	.00	.00
	135.000	58.40	2519.95	60.38	382.00	113.00	495.00	58.98
*	135.000	52.65	300.37	52.82	155.30	.00	.00	.00
*	135.000	56.90	1764.81	57.76	464.32	.00	.00	.00
	135.000	62.56	7887.81	64.20	685.96	.00	.00	.00
	136.000	61.64	2569.64	62.92	627.89	.00	.00	.00
	136.000	62.57	2873.74	63.87	442.00	213.00	655.00	61.64
*	136.000	55.66	105.98	56.68	86.79	.00	.00	.00
	136.000	59.99	1269.99	61.04	546.92	.00	.00	.00
	136.000	64.93	6660.26	66.65	764.42	.00	.00	.00

	SECNO	CWSEL	.01K	EG	TOPWID	STENCL	STENCR	WSELK
*	137.000	66.00	2128.34	67.83	542.07	.00	.00	.00
*	137.000	66.60	2146.80	68.74	430.00	300.00	730.00	66.00
	137.000	60.76	127.27	61.34	96.39	.00	.00	.00
*	137.000	64.68	1196.96	65.97	499.44	.00	.00	.00
*	137.000	68.70	4848.64	71.78	575.97	.00	.00	.00
	138.000	74.36	2470.36	75.71	628.35	.00	.00	.00
	138.000	75.16	2498.15	76.57	595.00	400.00	995.00	74.36
	138.000	68.20	129.21	68.74	154.44	.00	.00	.00
	138.000	72.57	1340.52	73.63	381.46	.00	.00	.00
	138.000	77.26	5944.73	79.25	851.38	.00	.00	.00
*	138.100	75.38	4774.75	76.05	705.51	.00	.00	.00
*	138.100	76.28	5485.61	76.87	586.00	418.00	1004.00	75.38
*	138.100	68.84	468.81	68.91	211.91	.00	.00	.00
*	138.100	73.45	2697.72	73.94	661.87	.00	.00	.00
*	138.100	78.40	9427.35	79.63	833.58	.00	.00	.00
	138.300	75.96	4453.53	76.57	870.12	.00	.00	.00
	138.300	76.64	4504.82	77.35	610.00	410.00	1020.00	75.96
*	138.300	68.99	176.17	69.28	126.21	.00	.00	.00

	138.300	73.89	2015.10	74.58	829.38	.00	.00	.00
	138.300	79.37	10593.80	80.23	958.61	.00	.00	.00
*	139.000	75.85	1737.04	77.54	686.38	.00	.00	.00
*	139.000	76.56	2161.49	78.00	571.96	480.00	1070.00	75.85
*	139.000	71.47	85.32	72.21	117.21	.00	.00	.00
*	139.000	74.86	1001.16	75.93	636.95	.00	.00	.00
*	139.000	79.00	5523.77	80.96	868.01	.00	.00	.00
*	140.000	79.16	3503.72	80.28	487.50	.00	.00	.00
*	140.000	79.17	3503.07	80.31	442.00	648.00	1090.00	79.16
*	140.000	73.24	348.34	73.37	174.98	.00	.00	.00
*	140.000	77.48	2148.36	78.16	439.18	.00	.00	.00
	140.000	81.43	5929.88	84.11	598.50	.00	.00	.00
*	141.000	80.98	5529.81	81.55	458.04	530.00	1010.00	.00
*	141.000	81.02	5625.25	81.57	448.00	582.00	1030.00	80.98
	141.000	73.98	298.26	74.04	403.54	.00	.00	.00
*	141.000	78.84	3423.79	79.14	473.35	.00	.00	.00
*	141.000	85.02	11438.38	86.13	569.64	.00	.00	.00
*	142.000	81.96	3672.46	82.85	315.81	710.00	1465.00	.00
*	142.000	81.96	3678.68	82.85	315.78	895.67	1211.45	81.96
*	142.000	74.53	452.08	74.56	256.53	.00	.00	.00
*	142.000	79.62	2344.14	80.08	297.20	.00	.00	.00
*	142.000	86.00	6697.59	88.17	348.14	.00	.00	.00

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	SECNO	CWSEL	.01K	EG	TOPWID	STENCL	STENCR	WSELK
	142.100	81.91	3329.43	82.90	306.71	710.00	1465.00	.00
	142.100	81.92	3334.97	82.91	306.71	895.00	1221.71	81.91
	142.100	74.53	420.35	74.56	247.38	.00	.00	.00
	142.100	79.60	2136.37	80.11	292.21	.00	.00	.00
	142.100	85.76	5911.46	88.42	317.84	.00	.00	.00
	142.900	84.09	2858.84	85.15	311.18	630.00	960.00	.00
	142.900	84.09	2860.70	85.15	311.18	630.00	960.00	84.09
*	142.900	75.73	50.50	76.15	282.20	.00	.00	.00
	142.900	81.36	1582.21	82.01	304.76	.00	.00	.00
	142.900	89.68	6657.37	91.44	495.22	.00	.00	.00
	143.000	84.29	3345.77	85.20	329.58	630.00	960.00	.00
	143.000	84.29	3345.29	85.20	329.09	630.00	959.50	84.29
*	143.000	76.04	89.15	76.24	295.71	.00	.00	.00
	143.000	81.47	1792.70	82.04	322.90	.00	.00	.00
	143.000	90.22	8484.91	91.57	556.80	.00	.00	.00
*	144.000	89.13	826.41	91.42	415.34	470.00	1245.00	.00
*	144.000	89.13	826.43	91.42	415.34	800.00	1235.00	89.13
*	144.000	85.27	57.50	85.49	326.79	.00	.00	.00
*	144.000	87.59	422.42	89.16	400.04	.00	.00	.00
*	144.000	92.62	2184.26	96.08	493.12	.00	.00	.00
*	145.000	94.02	7292.95	94.42	477.87	.00	.00	.00
*	145.000	94.04	7251.84	94.45	470.00	560.00	1030.00	94.02
*	145.000	86.56	659.09	86.58	386.70	.00	.00	.00
*	145.000	91.48	4347.28	91.71	470.83	.00	.00	.00
*	145.000	98.87	14617.24	99.73	597.37	.00	.00	.00
*	146.000	101.90	1845.64	104.40	379.55	.00	.00	.00
*	146.000	101.90	1844.80	104.40	379.53	412.00	1100.00	101.90
*	146.000	95.00	87.86	96.00	74.79	.00	.00	.00
*	146.000	100.18	910.33	101.97	347.95	.00	.00	.00
*	146.000	105.47	4767.88	109.41	428.20	.00	.00	.00
*	147.000	105.34	15604.02	105.45	922.06	102.00	1435.00	.00
*	147.000	105.40	13019.59	105.56	635.00	645.00	1280.00	105.34
*	147.000	96.41	1483.01	96.42	652.82	.00	.00	.00
*	147.000	102.67	9925.10	102.73	792.07	.00	.00	.00
*	147.000	110.72	31573.93	110.92	1101.04	.00	.00	.00
	148.000	105.44	12451.34	105.56	964.66	.00	.00	.00
*	148.000	105.51	8585.03	105.77	600.00	620.00	1220.00	105.44
*	148.000	96.38	173.12	96.56	304.06	.00	.00	.00
*	148.000	102.75	6810.89	102.83	913.40	.00	.00	.00
	148.000	110.83	28200.07	111.05	1036.52	.00	.00	.00

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	SECNO	CWSEL	.01K	EG	TOPWID	STENCL	STENCR	WSELK
*	149.000	108.49	2003.19	110.00	794.80	.00	.00	.00
*	149.000	109.00	1990.24	110.96	514.00	208.00	722.00	108.49
*	149.000	104.72	86.10	105.16	228.64	.00	.00	.00
*	149.000	107.46	1117.89	108.53	738.11	.00	.00	.00
*	149.000	110.60	4595.71	113.09	807.11	.00	.00	.00
*	149.100	112.66	3892.81	113.37	806.07	.00	.00	.00
*	149.100	113.28	4369.65	113.93	702.63	170.00	900.00	112.66
*	149.100	107.45	297.13	107.55	329.53	.00	.00	.00
*	149.100	111.11	2247.32	111.61	660.15	.00	.00	.00
*	149.100	115.51	8360.25	116.72	902.23	.00	.00	.00
*	150.000	114.03	7654.09	114.25	914.66	.00	.00	.00

*	150.000	114.54	6645.89	114.87	690.18	500.00	1225.00	114.03
	150.000	108.36	324.84	108.41	456.87	.00	.00	.00
*	150.000	112.23	4587.86	112.35	874.57	.00	.00	.00
*	150.000	117.36	15249.27	117.83	1066.45	.00	.00	.00
*	151.000	115.54	2139.70	116.55	1041.98	.00	.00	.00
*	151.000	116.56	2420.45	117.48	838.03	220.00	1060.00	115.54
*	151.000	112.49	86.59	112.89	364.80	.00	.00	.00
*	151.000	114.48	1032.25	115.33	976.43	.00	.00	.00
*	151.000	118.93	8071.26	119.85	1140.92	.00	.00	.00
	152.000	121.14	2243.79	122.43	673.33	.00	.00	.00
*	152.000	121.92	3931.97	122.73	567.87	505.00	1095.00	121.14
*	152.000	118.32	150.10	118.83	76.91	.00	.00	.00
	152.000	120.17	1413.73	120.89	667.00	.00	.00	.00
*	152.000	121.95	7199.73	123.13	1096.35	.00	.00	.00
*	153.000	123.14	1899.70	126.09	275.81	.00	.00	.00
*	153.000	123.16	1906.90	126.09	275.92	660.00	1250.00	123.14
*	153.000	119.19	385.06	119.25	229.69	.00	.00	.00
	153.000	121.17	1004.61	123.14	261.39	.00	.00	.00
*	153.000	125.99	9864.06	126.78	1402.62	.00	.00	.00
*	154.000	126.74	9191.58	126.91	1036.01	.00	.00	.00
*	154.000	127.00	5802.99	127.46	563.84	555.00	1145.00	126.74
*	154.000	119.75	201.56	119.83	573.84	.00	.00	.00
*	154.000	124.01	3732.42	124.19	807.65	.00	.00	.00
	154.000	126.87	9459.06	127.71	1041.58	.00	.00	.00
	155.000	126.91	6659.65	127.18	977.72	.00	.00	.00
	155.000	127.43	4511.27	128.12	574.00	588.00	1162.00	126.91
	155.000	120.56	271.24	120.63	390.60	.00	.00	.00
	155.000	124.36	2876.08	124.63	835.66	.00	.00	.00
	155.000	127.71	8192.47	128.79	982.55	.00	.00	.00

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	SECNO	CWSEL	.01K	EG	TOPWID	STENCL	STENCR	WSELK
	156.000	127.18	8201.76	127.43	793.66	.00	.00	.00
*	156.000	128.21	8769.07	128.48	580.00	655.00	1235.00	127.18
*	156.000	120.77	783.46	120.79	529.82	.00	.00	.00
*	156.000	124.78	4534.35	124.94	710.31	.00	.00	.00
	156.000	128.69	11114.08	129.55	938.38	.00	.00	.00
*	157.000	129.60	2340.73	130.93	862.67	.00	.00	.00
*	157.000	129.60	2189.85	131.31	600.00	660.00	1260.00	129.60
*	157.000	124.11	83.80	124.67	184.72	.00	.00	.00
*	157.000	127.80	1048.62	129.39	385.12	.00	.00	.00
*	157.000	131.45	4697.49	133.85	903.14	.00	.00	.00
*	157.100	131.20	6873.09	131.47	852.86	.00	.00	.00
*	157.100	131.59	5884.60	132.00	630.00	682.00	1312.00	131.20
*	157.100	125.36	312.14	125.42	591.49	.00	.00	.00
*	157.100	129.76	4520.92	129.89	840.75	.00	.00	.00
*	157.100	134.01	12596.65	134.66	887.56	.00	.00	.00
	158.000	131.40	8040.53	131.65	862.81	.00	.00	.00
	158.000	131.85	6318.05	132.28	637.00	635.00	1272.00	131.40
*	158.000	125.46	1210.38	125.47	550.24	.00	.00	.00
	158.000	129.89	5662.07	130.01	730.55	.00	.00	.00
	158.000	134.35	14172.37	134.95	893.58	.00	.00	.00

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SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	133.200	.00	.00	.00	42.70	22000.00	55.75	.00	56.37	16.82	7.58	3638.95	5364.60
	133.200	.00	.00	.00	42.70	22000.00	55.82	.00	56.48	17.48	7.76	3486.56	5262.29
	133.200	.00	.00	.00	42.70	1200.00	50.19	.00	50.21	1.45	1.43	1059.32	996.23
	133.200	.00	.00	.00	42.70	12000.00	53.60	.00	53.98	14.17	6.06	2564.81	3187.56
	133.200	.00	.00	.00	42.70	50000.00	59.75	.00	60.95	21.11	10.36	5915.32	10882.74
*	134.000	240.00	.00	.00	42.80	22000.00	56.02	.00	57.21	52.40	9.47	2568.38	3039.25
*	134.000	240.00	.00	.00	42.80	22000.00	56.08	.00	57.37	54.36	9.70	2431.98	2983.89
*	134.000	240.00	.00	.00	42.80	1200.00	50.19	.00	50.34	20.86	3.26	400.70	262.76
*	134.000	240.00	.00	.00	42.80	12000.00	53.83	.00	54.80	64.05	8.71	1572.82	1499.37
*	134.000	240.00	.00	.00	42.80	50000.00	60.09	.00	61.83	43.15	11.24	4969.65	7612.06
	134.100	210.00	.00	.00	47.20	22000.00	56.89	.00	58.95	93.67	13.78	1992.36	2273.11
	134.100	210.00	.00	.00	47.20	22000.00	57.09	.00	58.98	83.11	13.20	2063.80	2413.18
*	134.100	210.00	.00	.00	47.20	1200.00	51.57	51.57	52.21	104.98	7.12	218.96	117.12
	134.100	210.00	.00	.00	47.20	12000.00	55.18	.00	56.60	95.33	11.71	1316.46	1229.07
	134.100	210.00	.00	.00	47.20	50000.00	60.66	.00	63.22	68.36	15.39	4151.08	6047.48
*	135.000	170.00	.00	.00	47.70	22000.00	58.98	.00	60.07	41.75	10.23	2778.19	3404.68
	135.000	170.00	.00	.00	47.70	22000.00	58.40	.00	60.38	76.22	13.21	2052.83	2519.95
*	135.000	170.00	.00	.00	47.70	1200.00	52.65	.00	52.82	15.96	3.58	389.71	300.37
*	135.000	170.00	.00	.00	47.70	12000.00	56.90	.00	57.76	46.23	9.01	1746.48	1764.81
	135.000	170.00	.00	.00	47.70	50000.00	62.56	.00	64.20	40.18	12.58	5032.95	7887.81

	136.000	520.00	.00	.00	49.60	22000.00	61.64	.00	62.92	73.30	11.18	2507.09	2569.64
	136.000	520.00	.00	.00	49.60	22000.00	62.57	.00	63.87	58.61	10.60	2432.24	2873.74
*	136.000	520.00	.00	.00	49.60	1200.00	55.66	55.66	56.68	128.20	8.55	162.97	105.98
	136.000	520.00	.00	.00	49.60	12000.00	59.99	.00	61.04	89.28	10.28	1526.27	1269.99
	136.000	520.00	.00	.00	49.60	50000.00	64.93	.00	66.65	56.36	12.71	4844.35	6660.26
*	137.000	440.00	.00	.00	57.80	22000.00	66.00	66.00	67.83	106.85	12.84	2129.43	2128.34
*	137.000	440.00	.00	.00	57.80	22000.00	66.60	66.60	68.74	105.02	13.54	1969.39	2146.80
	137.000	440.00	.00	.00	57.80	1200.00	60.76	.00	61.34	88.91	6.12	197.35	127.27
*	137.000	440.00	.00	.00	57.80	12000.00	64.68	64.68	65.97	100.51	10.72	1427.37	1196.96
*	137.000	440.00	.00	.00	57.80	50000.00	68.70	68.70	71.78	106.34	16.32	3639.56	4848.64
	138.000	860.00	.00	.00	62.40	22000.00	74.36	.00	75.71	79.31	9.18	2363.35	2470.36
	138.000	860.00	.00	.00	62.40	22000.00	75.16	.00	76.57	77.55	10.05	2383.24	2498.15
	138.000	860.00	.00	.00	62.40	1200.00	68.20	.00	68.74	86.25	3.10	228.71	129.21
	138.000	860.00	.00	.00	62.40	12000.00	72.57	.00	73.63	80.13	7.67	1467.38	1340.52
	138.000	860.00	.00	.00	62.40	50000.00	77.26	.00	79.25	70.74	11.95	4590.45	5944.73
*	138.100	70.00	.00	.00	64.50	22000.00	75.38	.00	76.05	21.23	7.58	3683.31	4774.75
*	138.100	70.00	.00	.00	64.50	22000.00	76.28	.00	76.87	16.08	7.02	3839.08	5485.61
*	138.100	70.00	.00	.00	64.50	1200.00	68.84	.00	68.91	6.55	2.06	601.76	468.81
*	138.100	70.00	.00	.00	64.50	12000.00	73.45	.00	73.94	19.79	6.27	2372.14	2697.72
*	138.100	70.00	.00	.00	64.50	50000.00	78.40	.00	79.63	28.13	10.52	6000.66	9427.35

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	138.300	220.00	.00	.00	66.00	22000.00	75.96	.00	76.57	24.40	7.76	3925.22	4453.53
	138.300	220.00	.00	.00	66.00	22000.00	76.64	.00	77.35	23.85	8.05	3511.84	4504.82
*	138.300	220.00	.00	.00	66.00	1200.00	68.99	.00	69.28	46.40	4.29	279.53	176.17
	138.300	220.00	.00	.00	66.00	12000.00	73.89	.00	74.58	35.46	7.80	2160.44	2015.10
	138.300	220.00	.00	.00	66.00	50000.00	79.37	.00	80.23	22.28	9.23	7016.66	10593.80
*	139.000	90.00	.00	.00	67.50	22000.00	75.85	75.85	77.54	160.41	10.93	2141.04	1737.04
*	139.000	90.00	.00	.00	67.50	22000.00	76.56	.00	78.00	103.59	9.92	2299.61	2161.49
*	139.000	90.00	.00	.00	67.50	1200.00	71.47	71.47	72.21	197.83	6.98	174.56	85.32
*	139.000	90.00	.00	.00	67.50	12000.00	74.86	74.86	75.93	143.67	8.73	1482.52	1001.16
*	139.000	90.00	.00	.00	67.50	50000.00	79.00	.00	80.96	81.93	11.93	4531.94	5523.77
*	140.000	355.00	.00	.00	69.10	22000.00	79.16	.00	80.28	39.43	10.09	2729.34	3503.72
*	140.000	355.00	.00	.00	69.10	22000.00	79.17	.00	80.31	39.44	10.10	2694.02	3503.07
*	140.000	355.00	.00	.00	69.10	1200.00	73.24	.00	73.37	11.87	3.05	431.62	348.34
*	140.000	355.00	.00	.00	69.10	12000.00	77.48	.00	78.16	31.20	7.83	1946.84	2148.36
	140.000	355.00	.00	.00	69.10	50000.00	81.43	.00	84.11	71.10	15.72	3964.01	5929.88
*	141.000	470.00	.00	.00	70.70	22000.00	80.98	.00	81.55	15.83	6.17	3653.91	5529.81
*	141.000	470.00	.00	.00	70.70	22000.00	81.02	.00	81.57	15.30	6.08	3705.56	5625.25
	141.000	470.00	.00	.00	70.70	1200.00	73.98	.00	74.04	16.19	2.04	603.96	298.26
*	141.000	470.00	.00	.00	70.70	12000.00	78.84	.00	79.14	12.28	4.49	2769.30	3423.79
*	141.000	470.00	.00	.00	70.70	50000.00	85.02	.00	86.13	19.11	8.78	6020.81	11438.38
*	142.000	500.00	.00	.00	71.20	22000.00	81.96	.00	82.85	35.89	7.23	2935.19	3672.46
*	142.000	500.00	.00	.00	71.20	22000.00	81.96	.00	82.85	35.77	7.22	2938.07	3678.68
*	142.000	500.00	.00	.00	71.20	1200.00	74.53	.00	74.56	7.05	1.46	808.96	452.08
*	142.000	500.00	.00	.00	71.20	12000.00	79.62	.00	80.08	26.21	5.25	2220.14	2344.14
*	142.000	500.00	.00	.00	71.20	50000.00	86.00	.00	88.17	55.73	11.15	4280.07	6697.59
	142.100	1.00	.00	.00	71.20	22000.00	81.91	.00	82.90	43.66	7.27	2835.08	3329.43
	142.100	1.00	.00	.00	71.20	22000.00	81.92	.00	82.91	43.52	7.26	2837.94	3334.97
	142.100	1.00	.00	.00	71.20	1200.00	74.53	.00	74.56	8.15	1.52	774.19	420.35
	142.100	1.00	.00	.00	71.20	12000.00	79.60	.00	80.11	31.55	5.34	2143.65	2136.37
	142.100	1.00	.00	.00	71.20	50000.00	85.76	.00	88.42	71.54	11.13	4042.03	5911.46
	142.900	444.00	.00	.00	74.80	22000.00	84.09	.00	85.15	59.22	7.85	2732.62	2858.84
	142.900	444.00	.00	.00	74.80	22000.00	84.09	.00	85.15	59.14	7.85	2733.73	2860.70
*	142.900	444.00	.00	.00	74.80	1200.00	75.73	75.73	76.15	564.64	5.16	232.28	50.50
	142.900	444.00	.00	.00	74.80	12000.00	81.36	.00	82.01	57.52	6.21	1892.01	1582.21
	142.900	444.00	.00	.00	74.80	50000.00	89.68	.00	91.44	56.41	10.21	4909.02	6657.37
	143.000	1.00	.00	.00	74.80	22000.00	84.29	.00	85.20	43.24	7.25	2939.79	3345.77
	143.000	1.00	.00	.00	74.80	22000.00	84.29	.00	85.20	43.25	7.25	2938.98	3345.29
*	143.000	1.00	.00	.00	74.80	1200.00	76.04	.00	76.24	181.17	3.62	331.10	89.15
	143.000	1.00	.00	.00	74.80	12000.00	81.47	.00	82.04	44.81	5.82	2019.25	1792.70
	143.000	1.00	.00	.00	74.80	50000.00	90.22	.00	91.57	34.73	9.00	5487.43	8484.91

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	144.000	345.00	.00	.00	82.30	22000.00	89.13	89.13	91.42	708.69	12.21	1832.17	826.41
*	144.000	345.00	.00	.00	82.30	22000.00	89.13	89.13	91.42	708.65	12.21	1832.20	826.43
*	144.000	345.00	.00	.00	82.30	1200.00	85.27	.00	85.49	435.55	3.75	320.39	57.50
*	144.000	345.00	.00	.00	82.30	12000.00	87.59	87.59	89.16	806.99	10.09	1202.88	422.42
*	144.000	345.00	.00	.00	82.30	50000.00	92.62	92.62	96.08	524.00	15.08	3397.25	2184.26
*	145.000	955.00	.00	.00	83.70	22000.00	94.02	.00	94.42	9.10	5.25	4393.61	7292.95
*	145.000	955.00	.00	.00	83.70	22000.00	94.04	.00	94.45	9.20	5.29	4374.90	7251.84
*	145.000	955.00	.00	.00	83.70	1200.00	86.56	.00	86.58	3.31	1.30	932.70	659.09
*	145.000	955.00	.00	.00	83.70	12000.00	91.48	.00	91.71	7.62	3.96	3189.70	4347.28
*	145.000	955.00	.00	.00	83.70	50000.00	98.87	.00	99.73	11.70	7.72	6800.39	14617.24
*	146.000	910.00	.00	.00	91.00	22000.00	101.90	101.90	104.40	142.09	12.73	1744.68	1845.64
*	146.000	910.00	.00	.00	91.00	22000.00	101.90	101.90	104.40	142.22	12.73	1744.18	1844.80
*	146.000	910.00	.00	.00	91.00	1200.00	95.00	95.00	96.00	186.56	8.02	149.58	87.86
*	146.000	910.00	.00	.00	91.00	12000.00	100.18	100.18	101.97	173.76	10.71	1120.71	910.33

*	146.000	910.00	.00	.00	91.00	50000.00	105.47	105.47	109.41	109.97	16.15	3201.51	4767.88
*	147.000	545.00	.00	.00	92.10	22000.00	105.34	.00	105.45	1.99	2.82	8530.50	15604.02
*	147.000	545.00	.00	.00	92.10	22000.00	105.40	.00	105.56	2.86	3.39	6948.75	13019.59
*	147.000	545.00	.00	.00	92.10	1200.00	96.41	.00	96.42	.65	.70	1912.65	1483.01
*	147.000	545.00	.00	.00	92.10	12000.00	102.67	.00	102.73	1.46	2.06	6224.24	9925.10
*	147.000	545.00	.00	.00	92.10	50000.00	110.72	.00	110.92	2.51	4.02	13968.93	31573.93
	148.000	370.00	.00	.00	92.60	22000.00	105.44	.00	105.56	3.12	3.01	7890.70	12451.34
*	148.000	370.00	.00	.00	92.60	22000.00	105.51	.00	105.77	6.57	4.38	5399.93	8585.03
*	148.000	370.00	.00	.00	95.10	1200.00	96.38	.00	96.56	48.05	2.52	370.45	173.12
*	148.000	370.00	.00	.00	92.60	12000.00	102.75	.00	102.83	3.10	2.42	5362.97	6810.89
	148.000	370.00	.00	.00	92.60	50000.00	110.83	.00	111.05	3.14	4.04	13277.85	28200.07
*	149.000	980.00	.00	.00	102.20	22000.00	108.49	108.49	110.00	120.62	11.37	2374.84	2003.19
*	149.000	980.00	.00	.00	102.20	22000.00	109.00	109.00	110.96	122.19	12.27	2049.87	1990.24
*	149.000	980.00	.00	.00	102.20	1200.00	104.72	104.64	105.16	194.26	5.34	226.31	86.10
*	149.000	980.00	.00	.00	102.20	12000.00	107.46	107.46	108.53	115.23	9.42	1586.68	1117.89
*	149.000	980.00	.00	.00	102.20	50000.00	110.60	110.60	113.09	118.37	14.45	4063.46	4595.71
*	149.100	600.00	.00	.00	103.80	22000.00	112.66	.00	113.37	31.94	8.10	3437.18	3892.81
*	149.100	600.00	.00	.00	103.80	22000.00	113.28	.00	113.93	25.35	7.60	3563.55	4369.65
*	149.100	600.00	.00	.00	103.80	1200.00	107.45	.00	107.55	16.31	2.79	493.00	297.13
*	149.100	600.00	.00	.00	103.80	12000.00	111.11	.00	111.61	28.51	6.57	2258.49	2247.32
*	149.100	600.00	.00	.00	103.80	50000.00	115.51	.00	116.72	35.77	10.60	5853.36	8360.25
*	150.000	570.00	.00	.00	105.20	22000.00	114.03	.00	114.25	8.26	3.92	5811.60	7654.09
*	150.000	570.00	.00	.00	105.20	22000.00	114.54	.00	114.87	10.96	4.73	4828.10	6645.89
	150.000	570.00	.00	.00	105.90	1200.00	108.36	.00	108.41	13.65	1.79	660.07	324.84
*	150.000	570.00	.00	.00	105.20	12000.00	112.23	.00	112.35	6.84	2.93	4219.06	4587.86
*	150.000	570.00	.00	.00	105.20	50000.00	117.36	.00	117.83	10.75	5.78	9130.06	15249.27

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	151.000	1045.00	.00	.00	111.00	22000.00	115.54	.00	116.55	105.72	6.79	2822.36	2139.70
*	151.000	1045.00	.00	.00	111.00	22000.00	116.56	.00	117.48	82.61	7.48	2859.85	2420.45
*	151.000	1045.00	.00	.00	111.00	1200.00	112.49	112.49	112.89	192.08	1.08	249.08	86.59
*	151.000	1045.00	.00	.00	111.00	12000.00	114.48	114.48	115.33	135.14	5.38	1746.01	1032.25
*	151.000	1045.00	.00	.00	111.00	50000.00	118.93	.00	119.85	38.38	7.31	6562.02	8071.26
	152.000	560.00	.00	.00	114.80	22000.00	121.14	.00	122.43	96.13	10.21	2434.19	2243.79
*	152.000	560.00	.00	.00	114.80	22000.00	121.92	121.92	122.73	31.31	6.35	3172.42	3931.97
*	152.000	560.00	.00	.00	114.80	1200.00	118.32	.00	118.83	63.91	5.74	209.01	150.10
	152.000	560.00	.00	.00	114.80	12000.00	120.17	120.03	120.89	72.05	7.77	1790.09	1413.73
*	152.000	560.00	.00	.00	114.80	50000.00	121.95	121.95	123.13	48.23	7.92	5938.96	7199.73
*	153.000	190.00	.00	.00	115.30	22000.00	123.14	123.14	126.09	134.11	13.78	1596.56	1899.70
*	153.000	190.00	.00	.00	115.30	22000.00	123.16	123.16	126.09	133.10	13.75	1600.43	1906.90
*	153.000	190.00	.00	.00	115.30	1200.00	119.19	.00	119.25	9.71	2.11	568.64	385.06
	153.000	190.00	.00	.00	115.30	12000.00	121.17	121.09	123.14	142.68	11.26	1065.40	1004.61
*	153.000	190.00	.00	.00	115.30	50000.00	125.99	125.99	126.78	25.69	6.55	7451.95	9864.06
*	154.000	345.00	.00	.00	116.90	22000.00	126.74	.00	126.91	5.73	3.50	6694.59	9191.58
*	154.000	345.00	.00	.00	116.90	22000.00	127.00	.00	127.46	14.37	5.67	4083.20	5802.99
*	154.000	345.00	.00	.00	117.80	1200.00	119.75	.00	119.83	35.45	2.23	552.07	201.56
*	154.000	345.00	.00	.00	117.80	12000.00	124.01	.00	124.19	10.34	3.57	3574.13	3732.42
	154.000	345.00	.00	.00	116.90	50000.00	126.87	.00	127.71	27.94	7.82	6823.31	9459.06
	155.000	330.00	.00	.00	118.10	22000.00	126.91	.00	127.18	10.91	4.71	5326.23	6659.65
	155.000	330.00	.00	.00	118.10	22000.00	127.43	.00	128.12	23.78	7.27	3464.57	4511.27
	155.000	330.00	.00	.00	118.10	1200.00	120.56	.00	120.63	19.57	1.94	555.71	271.24
	155.000	330.00	.00	.00	118.10	12000.00	124.36	.00	124.63	17.41	4.52	2960.27	2876.08
	155.000	330.00	.00	.00	118.10	50000.00	127.71	.00	128.79	37.25	9.31	6109.33	8192.47
	156.000	300.00	.00	.00	118.10	22000.00	127.18	.00	127.43	7.20	4.21	5595.24	8201.76
*	156.000	300.00	.00	.00	118.10	22000.00	128.21	.00	128.48	6.29	4.24	5339.14	8769.07
*	156.000	300.00	.00	.00	118.10	1200.00	120.77	.00	120.79	2.35	1.03	1188.67	783.46
*	156.000	300.00	.00	.00	118.10	12000.00	124.78	.00	124.94	7.00	3.35	3790.29	4534.35
	156.000	300.00	.00	.00	118.10	50000.00	128.69	.00	129.55	20.24	7.86	6921.88	11114.08
*	157.000	170.00	.00	.00	121.10	22000.00	129.60	129.60	130.93	88.34	10.24	2511.61	2340.73
*	157.000	170.00	.00	.00	121.10	22000.00	129.60	129.60	131.31	100.93	10.95	2127.18	2189.85
*	157.000	170.00	.00	.00	121.10	1200.00	124.11	124.11	124.67	205.08	6.92	203.38	83.80
*	157.000	170.00	.00	.00	121.10	12000.00	127.80	127.80	129.39	130.96	9.67	1185.15	1048.62
*	157.000	170.00	.00	.00	121.10	50000.00	131.45	131.45	133.85	113.29	14.26	4144.45	4697.49
*	157.100	190.00	.00	.00	123.50	22000.00	131.20	.00	131.47	10.25	4.44	5317.87	6873.09
*	157.100	190.00	.00	.00	123.50	22000.00	131.59	.00	132.00	13.98	5.38	4328.81	5884.60
*	157.100	190.00	.00	.00	123.50	1200.00	125.36	.00	125.42	14.78	1.90	637.86	312.14
*	157.100	190.00	.00	.00	123.50	12000.00	129.76	.00	129.89	7.05	3.18	4095.36	4520.92
*	157.100	190.00	.00	.00	123.50	50000.00	134.01	.00	134.66	15.76	6.86	7753.57	12596.65

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	158.000	210.00	.00	.00	121.50	22000.00	131.40	.00	131.65	7.49	4.33	5576.85	8040.53
	158.000	210.00	.00	.00	121.50	22000.00	131.85	.00	132.28	12.12	5.69	4332.71	6318.05
*	158.000	210.00	.00	.00	121.50	1200.00	125.46	.00	125.47	.98	.83	1530.06	1210.38
	158.000	210.00	.00	.00	121.50	12000.00	129.89	.00	130.01	4.49	2.99	4370.22	5662.07
	158.000	210.00	.00	.00	121.50	50000.00	134.35	.00	134.95	12.45	6.77	8183.81	14172.37

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SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	133.200	22000.00	55.75	.00	.00	.00	510.88	.00
	133.200	22000.00	55.82	.07	.00	.07	447.00	.00
	133.200	1200.00	50.19	-5.63	.00	.00	327.90	.00
	133.200	12000.00	53.60	3.41	.00	.00	488.97	.00
	133.200	50000.00	59.75	6.15	.00	.00	676.60	.00
*	134.000	22000.00	56.02	.00	.27	.00	480.62	240.00
*	134.000	22000.00	56.08	.06	.26	.06	409.48	240.00
*	134.000	1200.00	50.19	-5.89	.00	.00	196.05	240.00
*	134.000	12000.00	53.83	3.64	.23	.00	424.69	240.00
*	134.000	50000.00	60.09	6.26	.34	.00	824.02	240.00
	134.100	22000.00	56.89	.00	.88	.00	429.70	210.00
	134.100	22000.00	57.09	.19	1.01	.19	414.50	210.00
*	134.100	1200.00	51.57	-5.51	1.38	.00	176.53	210.00
	134.100	12000.00	55.18	3.61	1.35	.00	371.14	210.00
	134.100	50000.00	60.66	5.48	.57	.00	679.86	210.00
*	135.000	22000.00	58.98	.00	2.09	.00	517.88	170.00
	135.000	22000.00	58.40	-.58	1.31	-.58	382.00	170.00
*	135.000	1200.00	52.65	-5.75	1.08	.00	155.30	170.00
*	135.000	12000.00	56.90	4.25	1.72	.00	464.32	170.00
	135.000	50000.00	62.56	5.66	1.90	.00	685.96	170.00
	136.000	22000.00	61.64	.00	2.66	.00	627.89	520.00
	136.000	22000.00	62.57	.93	4.17	.93	442.00	520.00
*	136.000	1200.00	55.66	-6.91	3.01	.00	86.79	520.00
	136.000	12000.00	59.99	4.33	3.09	.00	546.92	520.00
	136.000	50000.00	64.93	4.93	2.37	.00	764.42	520.00
*	137.000	22000.00	66.00	.00	4.36	.00	542.07	440.00
*	137.000	22000.00	66.60	.60	4.03	.60	430.00	440.00
	137.000	1200.00	60.76	-5.84	5.10	.00	96.39	440.00
*	137.000	12000.00	64.68	3.92	4.68	.00	499.44	440.00
*	137.000	50000.00	68.70	4.02	3.77	.00	575.97	440.00
	138.000	22000.00	74.36	.00	8.36	.00	628.35	860.00
	138.000	22000.00	75.16	.80	8.57	.80	595.00	860.00
	138.000	1200.00	68.20	-6.97	7.44	.00	154.44	860.00
	138.000	12000.00	72.57	4.37	7.89	.00	381.46	860.00
	138.000	50000.00	77.26	4.69	8.56	.00	851.38	860.00
*	138.100	22000.00	75.38	.00	1.02	.00	705.51	70.00
*	138.100	22000.00	76.28	.90	1.12	.90	586.00	70.00
*	138.100	1200.00	68.84	-7.44	.65	.00	211.91	70.00
*	138.100	12000.00	73.45	4.61	.88	.00	661.87	70.00
*	138.100	50000.00	78.40	4.95	1.14	.00	833.58	70.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	138.300	22000.00	75.96	.00	.58	.00	870.12	220.00
	138.300	22000.00	76.64	.67	.35	.67	610.00	220.00
*	138.300	1200.00	68.99	-7.65	.15	.00	126.21	220.00
	138.300	12000.00	73.89	4.90	.44	.00	829.38	220.00
	138.300	50000.00	79.37	5.47	.96	.00	958.61	220.00
*	139.000	22000.00	75.85	.00	-.11	.00	686.38	90.00
*	139.000	22000.00	76.56	.70	-.08	.70	571.96	90.00
*	139.000	1200.00	71.47	-5.09	2.48	.00	117.21	90.00
*	139.000	12000.00	74.86	3.39	.97	.00	636.95	90.00
*	139.000	50000.00	79.00	4.14	-.37	.00	868.01	90.00
*	140.000	22000.00	79.16	.00	3.30	.00	487.50	355.00
*	140.000	22000.00	79.17	.02	2.62	.02	442.00	355.00
*	140.000	1200.00	73.24	-5.94	1.77	.00	174.98	355.00
*	140.000	12000.00	77.48	4.24	2.61	.00	439.18	355.00
	140.000	50000.00	81.43	3.95	2.43	.00	598.50	355.00
*	141.000	22000.00	80.98	.00	1.82	.00	458.04	470.00
*	141.000	22000.00	81.02	.04	1.84	.04	448.00	470.00
	141.000	1200.00	73.98	-7.04	.74	.00	403.54	470.00
*	141.000	12000.00	78.84	4.86	1.36	.00	473.35	470.00
*	141.000	50000.00	85.02	6.18	3.59	.00	569.64	470.00
*	142.000	22000.00	81.96	.00	.98	.00	315.81	500.00
*	142.000	22000.00	81.96	.01	.95	.01	315.78	500.00
*	142.000	1200.00	74.53	-7.44	.55	.00	256.53	500.00
*	142.000	12000.00	79.62	5.10	.78	.00	297.20	500.00
*	142.000	50000.00	86.00	6.38	.98	.00	348.14	500.00
	142.100	22000.00	81.91	.00	-.05	.00	306.71	1.00
	142.100	22000.00	81.92	.01	-.05	.01	306.71	1.00
	142.100	1200.00	74.53	-7.39	.00	.00	247.38	1.00
	142.100	12000.00	79.60	5.08	-.02	.00	292.21	1.00
	142.100	50000.00	85.76	6.16	-.24	.00	317.84	1.00
	142.900	22000.00	84.09	.00	2.18	.00	311.18	444.00

	142.900	22000.00	84.09	.00	2.18	.00	311.18	444.00
*	142.900	1200.00	75.73	-8.36	1.21	.00	282.20	444.00
	142.900	12000.00	81.36	5.63	1.76	.00	304.76	444.00
	142.900	50000.00	89.68	8.31	3.92	.00	495.22	444.00
	143.000	22000.00	84.29	.00	.20	.00	329.58	1.00
	143.000	22000.00	84.29	.00	.20	.00	329.09	1.00
*	143.000	1200.00	76.04	-8.26	.30	.00	295.71	1.00
	143.000	12000.00	81.47	5.44	.11	.00	322.90	1.00
	143.000	50000.00	90.22	8.75	.55	.00	556.80	1.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	144.000	22000.00	89.13	.00	4.84	.00	415.34	345.00
*	144.000	22000.00	89.13	.00	4.84	.00	415.34	345.00
*	144.000	1200.00	85.27	-3.86	9.24	.00	326.79	345.00
*	144.000	12000.00	87.59	2.32	6.12	.00	400.04	345.00
*	144.000	50000.00	92.62	5.03	2.40	.00	493.12	345.00
*	145.000	22000.00	94.02	.00	4.89	.00	477.87	955.00
*	145.000	22000.00	94.04	.02	4.91	.02	470.00	955.00
*	145.000	1200.00	86.56	-7.49	1.28	.00	386.70	955.00
*	145.000	12000.00	91.48	4.93	3.89	.00	470.83	955.00
*	145.000	50000.00	98.87	7.38	6.25	.00	597.37	955.00
*	146.000	22000.00	101.90	.00	7.88	.00	379.55	910.00
*	146.000	22000.00	101.90	.00	7.85	.00	379.53	910.00
*	146.000	1200.00	95.00	-6.90	8.44	.00	74.79	910.00
*	146.000	12000.00	100.18	5.18	8.70	.00	347.95	910.00
*	146.000	50000.00	105.47	5.29	6.60	.00	428.20	910.00
*	147.000	22000.00	105.34	.00	3.45	.00	922.06	545.00
*	147.000	22000.00	105.40	.06	3.50	.06	635.00	545.00
*	147.000	1200.00	96.41	-8.99	1.41	.00	652.82	545.00
*	147.000	12000.00	102.67	6.26	2.49	.00	792.07	545.00
*	147.000	50000.00	110.72	8.04	5.24	.00	1101.04	545.00
	148.000	22000.00	105.44	.00	.10	.00	964.66	370.00
*	148.000	22000.00	105.51	.07	.11	.07	600.00	370.00
*	148.000	1200.00	96.38	-9.12	-.03	.00	304.06	370.00
*	148.000	12000.00	102.75	6.37	.08	.00	913.40	370.00
	148.000	50000.00	110.83	8.08	.11	.00	1036.52	370.00
*	149.000	22000.00	108.49	.00	3.05	.00	794.80	980.00
*	149.000	22000.00	109.00	.52	3.50	.52	514.00	980.00
*	149.000	1200.00	104.72	-4.29	8.33	.00	228.64	980.00
*	149.000	12000.00	107.46	2.75	4.71	.00	738.11	980.00
*	149.000	50000.00	110.60	3.13	-.23	.00	807.11	980.00
*	149.100	22000.00	112.66	.00	4.17	.00	806.07	600.00
*	149.100	22000.00	113.28	.62	4.27	.62	702.63	600.00
*	149.100	1200.00	107.45	-5.83	2.73	.00	329.53	600.00
*	149.100	12000.00	111.11	3.67	3.65	.00	660.15	600.00
*	149.100	50000.00	115.51	4.39	4.91	.00	902.23	600.00
*	150.000	22000.00	114.03	.00	1.37	.00	914.66	570.00
*	150.000	22000.00	114.54	.52	1.26	.52	690.18	570.00
	150.000	1200.00	108.36	-6.18	.91	.00	456.87	570.00
*	150.000	12000.00	112.23	3.86	1.11	.00	874.57	570.00
*	150.000	50000.00	117.36	5.13	1.85	.00	1066.45	570.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	151.000	22000.00	115.54	.00	1.52	.00	1041.98	1045.00
*	151.000	22000.00	116.56	1.02	2.02	1.02	838.03	1045.00
*	151.000	1200.00	112.49	-4.07	4.13	.00	364.80	1045.00
*	151.000	12000.00	114.48	1.98	2.25	.00	976.43	1045.00
*	151.000	50000.00	118.93	4.46	1.58	.00	1140.92	1045.00
	152.000	22000.00	121.14	.00	5.60	.00	673.33	560.00
*	152.000	22000.00	121.92	.78	5.35	.78	567.87	560.00
*	152.000	1200.00	118.32	-3.60	5.82	.00	76.91	560.00
	152.000	12000.00	120.17	1.86	5.70	.00	667.00	560.00
*	152.000	50000.00	121.95	1.78	3.02	.00	1096.35	560.00
*	153.000	22000.00	123.14	.00	2.00	.00	275.81	190.00
*	153.000	22000.00	123.16	.01	1.24	.01	275.92	190.00
*	153.000	1200.00	119.19	-3.97	.87	.00	229.69	190.00
	153.000	12000.00	121.17	1.98	.99	.00	261.39	190.00
*	153.000	50000.00	125.99	4.82	4.03	.00	1402.62	190.00
*	154.000	22000.00	126.74	.00	3.60	.00	1036.01	345.00
*	154.000	22000.00	127.00	.26	3.84	.26	563.84	345.00
*	154.000	1200.00	119.75	-7.25	.57	.00	573.84	345.00
*	154.000	12000.00	124.01	4.26	2.85	.00	807.65	345.00
	154.000	50000.00	126.87	2.85	.88	.00	1041.58	345.00
	155.000	22000.00	126.91	.00	.17	.00	977.72	330.00
	155.000	22000.00	127.43	.53	.43	.53	574.00	330.00
	155.000	1200.00	120.56	-6.87	.80	.00	390.60	330.00
	155.000	12000.00	124.36	3.80	.35	.00	835.66	330.00
	155.000	50000.00	127.71	3.34	.84	.00	982.55	330.00

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      156.000  22000.00    127.18       .00       .27       .00    793.66    300.00
 *    156.000  22000.00    128.21      1.03       .78      1.03    580.00    300.00
 *    156.000   1200.00    120.77     -7.44       .21       .00    529.82    300.00
 *    156.000  12000.00    124.78      4.00       .42       .00    710.31    300.00
      156.000  50000.00    128.69      3.91       .98       .00    938.38    300.00

 *    157.000  22000.00    129.60       .00      2.42       .00    862.67    170.00
 *    157.000  22000.00    129.60       .00      1.40       .00    600.00    170.00
 *    157.000   1200.00    124.11     -5.50      3.33       .00    184.72    170.00
 *    157.000  12000.00    127.80      3.69      3.02       .00    385.12    170.00
 *    157.000  50000.00    131.45      3.65      2.76       .00    903.14    170.00

 *    157.100  22000.00    131.20       .00      1.60       .00    852.86    190.00
 *    157.100  22000.00    131.59       .39      1.99       .39    630.00    190.00
 *    157.100   1200.00    125.36     -6.24      1.25       .00    591.49    190.00
 *    157.100  12000.00    129.76      4.40      1.96       .00    840.75    190.00
 *    157.100  50000.00    134.01      4.25      2.56       .00    887.56    190.00
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       SECNO       Q       CWSEL    DIFWSP    DIFWSX    DIFKWS    TOPWID     XLCH

      158.000  22000.00    131.40       .00       .20       .00    862.81    210.00
      158.000  22000.00    131.85       .45       .26       .45    637.00    210.00
 *    158.000   1200.00    125.46     -6.39       .11       .00    550.24    210.00
      158.000  12000.00    129.89      4.42       .13       .00    730.55    210.00
      158.000  50000.00    134.35      4.47       .35       .00    893.58    210.00
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SUMMARY OF ERRORS AND SPECIAL NOTES

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 WARNING SECNO=    134.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=    134.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=    134.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=    134.000  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=    134.000  PROFILE=  5  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=    134.100  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    134.100  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=    134.100  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=    135.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=    135.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=    135.000  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=    136.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    136.000  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=    136.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=    137.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    137.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=    137.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    137.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=    137.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=    137.000  PROFILE=  4  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    137.000  PROFILE=  4  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=    137.000  PROFILE=  5  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    137.000  PROFILE=  5  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=    137.000  PROFILE=  5  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=    138.100  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=    138.100  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=    138.100  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=    138.100  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=    138.100  PROFILE=  5  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=    138.300  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=    139.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    139.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=    139.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 WARNING SECNO=    139.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 CAUTION SECNO=    139.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    139.000  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=    139.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=    139.000  PROFILE=  4  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    139.000  PROFILE=  4  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=    139.000  PROFILE=  4  20 TRIALS ATTEMPTED TO BALANCE WSEL
 WARNING SECNO=    139.000  PROFILE=  5  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=    140.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=    140.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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 WARNING SECNO=    140.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=    140.000  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=    141.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=    141.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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WARNING SECNO=    141.000  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    141.000  PROFILE=  5  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    142.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    142.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    142.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    142.000  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    142.000  PROFILE=  5  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=    142.900  PROFILE=  3  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    142.900  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    142.900  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=    143.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=    144.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    144.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    144.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=    144.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    144.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    144.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
WARNING SECNO=    144.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO=    144.000  PROFILE=  4  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    144.000  PROFILE=  4  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    144.000  PROFILE=  4  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=    144.000  PROFILE=  5  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    144.000  PROFILE=  5  MINIMUM SPECIFIC ENERGY

WARNING SECNO=    145.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    145.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    145.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    145.000  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    145.000  PROFILE=  5  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=    146.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    146.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    146.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=    146.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    146.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    146.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=    146.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    146.000  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    146.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=    146.000  PROFILE=  4  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    146.000  PROFILE=  4  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    146.000  PROFILE=  4  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=    146.000  PROFILE=  5  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    146.000  PROFILE=  5  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    146.000  PROFILE=  5  20 TRIALS ATTEMPTED TO BALANCE WSEL
1
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WARNING SECNO=    147.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    147.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    147.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    147.000  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    147.000  PROFILE=  5  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    148.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    148.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    148.000  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=    149.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    149.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    149.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=    149.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    149.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    149.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
WARNING SECNO=    149.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO=    149.000  PROFILE=  4  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    149.000  PROFILE=  4  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    149.000  PROFILE=  4  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=    149.000  PROFILE=  5  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    149.000  PROFILE=  5  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    149.000  PROFILE=  5  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=    149.100  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    149.100  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    149.100  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    149.100  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    149.100  PROFILE=  5  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    150.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    150.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    150.000  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    150.000  PROFILE=  5  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    151.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    151.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO=    151.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    151.000  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    151.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=    151.000  PROFILE=  4  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    151.000  PROFILE=  4  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    151.000  PROFILE=  4  20 TRIALS ATTEMPTED TO BALANCE WSEL
WARNING SECNO=    151.000  PROFILE=  5  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=    152.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
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CAUTION SECNO=    152.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    152.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
WARNING SECNO=    152.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO=    152.000  PROFILE=  5  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    152.000  PROFILE=  5  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    152.000  PROFILE=  5  20 TRIALS ATTEMPTED TO BALANCE WSEL
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CAUTION SECNO=    153.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    153.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    153.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=    153.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    153.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    153.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
WARNING SECNO=    153.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO=    153.000  PROFILE=  5  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    153.000  PROFILE=  5  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    153.000  PROFILE=  5  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=    154.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    154.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    154.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    154.000  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    156.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    156.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    156.000  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=    157.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    157.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    157.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=    157.000  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    157.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    157.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=    157.000  PROFILE=  3  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    157.000  PROFILE=  3  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    157.000  PROFILE=  3  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=    157.000  PROFILE=  4  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    157.000  PROFILE=  4  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    157.000  PROFILE=  4  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=    157.000  PROFILE=  5  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    157.000  PROFILE=  5  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    157.000  PROFILE=  5  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=    157.100  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    157.100  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    157.100  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    157.100  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    157.100  PROFILE=  5  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    158.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

1
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FLOODWAY DATA,   JUNE 15, 2004
PROFILE NO.  2
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STATION	------- FLOODWAY ------- WIDTH	SECTION AREA	MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
133.200	447.	3487.	6.3	55.9	55.8	.1
134.000	409.	2432.	9.0	56.1	56.0	.1
134.100	414.	2064.	10.7	57.1	56.9	.2
135.000	382.	2053.	10.7	58.4	59.0	-.6
136.000	442.	2432.	9.0	62.5	61.6	.9
137.000	430.	1969.	11.2	66.6	66.0	.6
138.000	595.	2383.	9.2	75.2	74.4	.8
138.100	586.	3839.	5.7	76.3	75.4	.9
138.300	610.	3512.	6.3	76.7	76.0	.7
139.000	572.	2300.	9.6	76.6	75.9	.7
140.000	442.	2694.	8.2	79.2	79.2	.0
141.000	448.	3706.	5.9	81.0	81.0	.0
142.000	316.	2938.	7.5	82.0	82.0	.0
142.100	319.	2838.	7.8	81.9	81.9	.0
142.900	328.	2734.	8.0	84.1	84.1	.0
143.000	329.	2939.	7.5	84.3	84.3	.0
144.000	415.	1832.	12.0	89.1	89.1	.0
145.000	470.	4375.	5.0	94.0	94.0	.0
146.000	380.	1744.	12.6	101.9	101.9	.0
147.000	635.	6949.	3.2	105.4	105.3	.1
148.000	600.	5400.	4.1	105.5	105.4	.1
149.000	514.	2050.	10.7	109.0	108.5	.5
149.100	703.	3564.	6.2	113.3	112.7	.6
150.000	725.	4828.	4.6	114.5	114.0	.5
151.000	840.	2860.	7.7	116.5	115.5	1.0
152.000	590.	3172.	6.9	121.9	121.1	.8
153.000	276.	1600.	13.7	123.1	123.1	.0
154.000	590.	4083.	5.4	127.0	126.7	.3
155.000	574.	3465.	6.4	127.4	126.9	.5
156.000	580.	5339.	4.1	128.2	127.2	1.0
157.000	600.	2127.	10.3	129.6	129.6	.0

157.100	630.	4329.	5.1	131.6	131.2	.4
158.000	637.	4333.	5.1	131.9	131.4	.5

1

FLOODWAY DATA, JUNE 15, 2004
PROFILE NO. 3

STATION	WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
133.200	446.	1059.	1.1	50.2	55.8	-5.6
134.000	376.	401.	3.0	50.2	56.0	-5.8
134.100	263.	219.	5.5	51.6	56.9	-5.3
135.000	422.	390.	3.1	52.7	59.0	-6.3
136.000	154.	163.	7.4	55.7	61.6	-5.9
137.000	286.	197.	6.1	60.8	66.0	-5.2
138.000	561.	229.	5.2	68.2	74.4	-6.2
138.100	465.	602.	2.0	68.8	75.4	-6.6
138.300	126.	280.	4.3	69.0	76.0	-7.0
139.000	396.	175.	6.9	71.5	75.9	-4.4
140.000	219.	432.	2.8	73.2	79.2	-6.0
141.000	404.	604.	2.0	74.0	81.0	-7.0
142.000	257.	809.	1.5	74.5	82.0	-7.5
142.100	259.	774.	1.6	74.5	81.9	-7.4
142.900	294.	232.	5.2	75.7	84.1	-8.4
143.000	296.	331.	3.6	76.0	84.3	-8.3
144.000	378.	320.	3.7	85.3	89.1	-3.8
145.000	445.	933.	1.3	86.6	94.0	-7.4
146.000	75.	150.	8.0	95.0	101.9	-6.9
147.000	653.	1913.	.6	96.4	105.3	-8.9
148.000	322.	370.	3.2	96.4	105.4	-9.0
149.000	229.	226.	5.3	104.7	108.5	-3.8
149.100	730.	493.	2.4	107.4	112.7	-5.3
150.000	530.	660.	1.8	108.4	114.0	-5.6
151.000	950.	249.	4.8	112.5	115.5	-3.0
152.000	77.	209.	5.7	118.3	121.1	-2.8
153.000	247.	569.	2.1	119.2	123.1	-3.9
154.000	884.	552.	2.2	119.8	126.7	-6.9
155.000	798.	556.	2.2	120.6	126.9	-6.3
156.000	530.	1189.	1.0	120.8	127.2	-6.4
157.000	430.	203.	5.9	124.1	129.6	-5.5
157.100	780.	638.	1.9	125.4	131.2	-5.8
158.000	784.	1530.	.8	125.5	131.4	-5.9

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FLOODWAY DATA, JUNE 15, 2004
PROFILE NO. 4

STATION	WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
133.200	489.	2565.	4.7	53.6	55.8	-2.2
134.000	513.	1573.	7.6	53.8	56.0	-2.2
134.100	371.	1316.	9.1	55.2	56.9	-1.7
135.000	490.	1746.	6.9	56.9	59.0	-2.1
136.000	547.	1526.	7.9	60.0	61.6	-1.6
137.000	524.	1427.	8.4	64.7	66.0	-1.3
138.000	604.	1467.	8.2	72.6	74.4	-1.8
138.100	662.	2372.	5.1	73.4	75.4	-2.0
138.300	988.	2160.	5.6	73.9	76.0	-2.1
139.000	662.	1483.	8.1	74.9	75.9	-1.0
140.000	439.	1947.	6.2	77.5	79.2	-1.7
141.000	473.	2769.	4.3	78.8	81.0	-2.2
142.000	297.	2220.	5.4	79.6	82.0	-2.4
142.100	304.	2144.	5.6	79.6	81.9	-2.3
142.900	322.	1892.	6.3	81.4	84.1	-2.7
143.000	323.	2019.	5.9	81.5	84.3	-2.8
144.000	400.	1203.	10.0	87.6	89.1	-1.5
145.000	471.	3190.	3.8	91.5	94.0	-2.5
146.000	348.	1121.	10.7	100.2	101.9	-1.7
147.000	792.	6224.	1.9	102.7	105.3	-2.6
148.000	913.	5363.	2.2	102.8	105.4	-2.6
149.000	738.	1587.	7.6	107.5	108.5	-1.0
149.100	821.	2258.	5.3	111.1	112.7	-1.6
150.000	923.	4219.	2.8	112.2	114.0	-1.8
151.000	1039.	1746.	6.9	114.5	115.5	-1.0
152.000	667.	1790.	6.7	120.2	121.1	-.9
153.000	261.	1065.	11.3	121.2	123.1	-1.9
154.000	946.	3574.	3.4	124.0	126.7	-2.7
155.000	945.	2960.	4.1	124.4	126.9	-2.5
156.000	710.	3790.	3.2	124.8	127.2	-2.4
157.000	555.	1185.	10.1	127.8	129.6	-1.8
157.100	841.	4095.	2.9	129.8	131.2	-1.4
158.000	843.	4370.	2.7	129.9	131.4	-1.5

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FLOODWAY DATA, JUNE 15, 2004
PROFILE NO. 5

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WATER SURFACE ELEVATION WITHOUT FLOODWAY	DIFFERENCE
133.200	841.	5915.	8.5	59.8	55.8	4.0
134.000	925.	4970.	10.1	60.1	56.0	4.1
134.100	680.	4151.	12.0	60.7	56.9	3.8
135.000	737.	5033.	9.9	62.6	59.0	3.6
136.000	764.	4844.	10.3	64.9	61.6	3.3
137.000	576.	3640.	13.7	68.7	66.0	2.7
138.000	851.	4590.	10.9	77.3	74.4	2.9
138.100	906.	6001.	8.3	78.4	75.4	3.0
138.300	1040.	7017.	7.1	79.4	76.0	3.4
139.000	870.	4532.	11.0	79.0	75.9	3.1
140.000	598.	3964.	12.6	81.4	79.2	2.2
141.000	570.	6021.	8.3	85.0	81.0	4.0
142.000	348.	4280.	11.7	86.0	82.0	4.0
142.100	336.	4042.	12.4	85.8	81.9	3.9
142.900	524.	4909.	10.2	89.7	84.1	5.6
143.000	557.	5487.	9.1	90.2	84.3	5.9
144.000	493.	3397.	14.7	92.6	89.1	3.5
145.000	597.	6800.	7.4	98.9	94.0	4.9
146.000	724.	3202.	15.6	105.5	101.9	3.6
147.000	1101.	13969.	3.6	110.7	105.3	5.4
148.000	1037.	13278.	3.8	110.8	105.4	5.4
149.000	807.	4063.	12.3	110.6	108.5	2.1
149.100	902.	5853.	8.5	115.5	112.7	2.8
150.000	1068.	9130.	5.5	117.4	114.0	3.4
151.000	1141.	6562.	7.6	118.9	115.5	3.4
152.000	1117.	5939.	8.4	122.0	121.1	.9
153.000	1403.	7452.	6.7	126.0	123.1	2.9
154.000	1101.	6823.	7.3	126.9	126.7	.2
155.000	983.	6109.	8.2	127.7	126.9	.8
156.000	938.	6922.	7.2	128.7	127.2	1.5
157.000	903.	4144.	12.1	131.5	129.6	1.9
157.100	952.	7754.	6.4	134.0	131.2	2.8
158.000	894.	8184.	6.1	134.4	131.4	3.0

Appendix 7

Corrected Effective HEC-RAS Output

HEC-RAS Plan: CE-MP-FP-FW River: RIVER-1 Reach: Reach-1

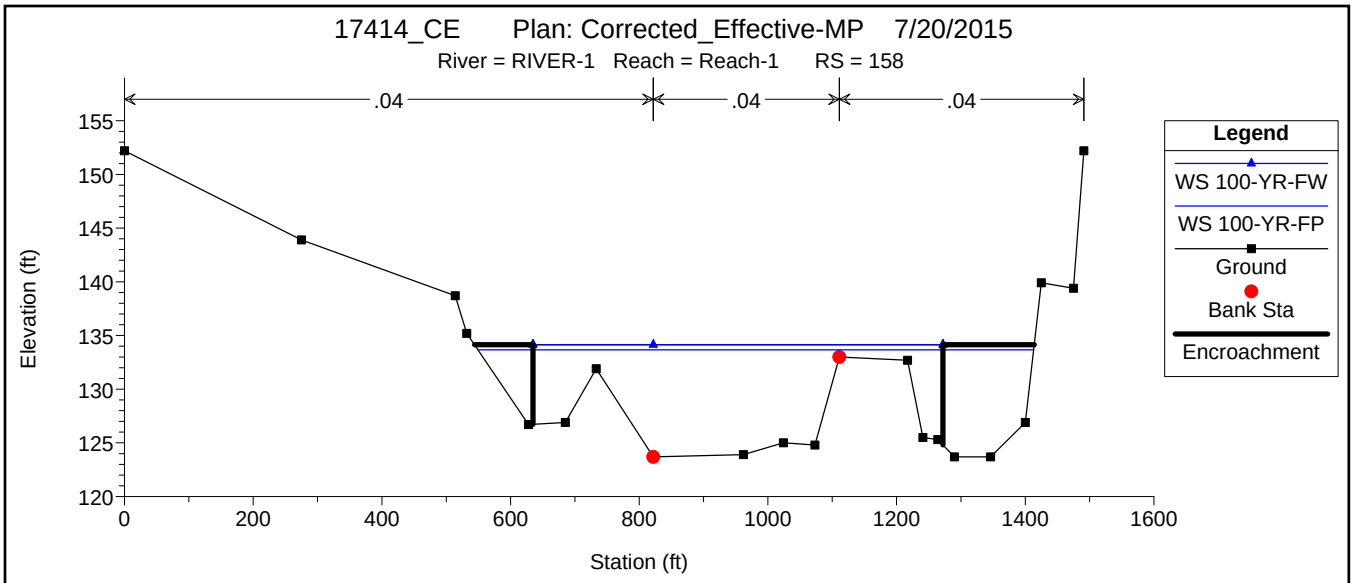
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	158	100-YR-FP	22000.00	123.70	133.67		133.93	0.000849	4.63	5636.78	863.73	0.27
Reach-1	158	100-YR-FW	22000.00	123.70	134.13		134.57	0.001233	5.77	4386.50	637.00	0.33
Reach-1	158	10-YR	1200.00	123.70	127.71		127.72	0.000097	0.83	1556.04	552.20	0.08
Reach-1	158	50-YR	12000.00	123.70	132.10		132.22	0.000465	3.04	4379.65	730.82	0.20
Reach-1	158	500-YR	50000.00	123.70	136.58		137.19	0.001355	7.06	8197.01	893.68	0.36
Reach-1	157.1	100-YR-FP	22000.00	125.70	133.47		133.73	0.001034	4.49	5378.57	853.56	0.29
Reach-1	157.1	100-YR-FW	22000.00	125.70	133.89		134.29	0.001367	5.36	4391.31	630.00	0.34
Reach-1	157.1	10-YR	1200.00	125.70	127.61		127.67	0.001637	2.04	673.78	609.17	0.29
Reach-1	157.1	50-YR	12000.00	125.70	131.97		132.10	0.000734	3.25	4108.72	840.84	0.24
Reach-1	157.1	500-YR	50000.00	125.70	136.22		136.87	0.001648	7.02	7767.97	888.28	0.39
Reach-1	157	100-YR-FP	22000.00	123.30	131.79	131.79	133.15	0.011832	11.83	2499.04	862.35	0.93
Reach-1	157	100-YR-FW	22000.00	123.30	131.84	131.84	133.56	0.013167	12.56	2148.06	600.00	0.98
Reach-1	157	10-YR	1200.00	123.30	126.34	126.34	126.88	0.019610	6.82	209.89	186.22	0.97
Reach-1	157	50-YR	12000.00	123.30	130.03	130.03	131.59	0.014184	10.10	1195.87	388.40	0.95
Reach-1	157	500-YR	50000.00	123.30	133.80	133.80	136.05	0.011923	14.84	4281.83	906.47	0.98
Reach-1	156	100-YR-FP	22000.00	120.30	129.44		129.69	0.000707	4.19	5643.58	799.50	0.25
Reach-1	156	100-YR-FW	22000.00	120.30	130.42		130.69	0.000626	4.24	5348.20	580.00	0.24
Reach-1	156	10-YR	1200.00	120.30	122.98		123.00	0.000229	1.03	1197.37	530.64	0.12
Reach-1	156	50-YR	12000.00	120.30	126.99		127.16	0.000698	3.35	3802.73	710.92	0.23
Reach-1	156	500-YR	50000.00	120.30	130.99		131.89	0.002129	8.11	7017.35	943.10	0.45
Reach-1	155	100-YR-FP	22000.00	120.90	129.15		129.43	0.001190	4.94	5369.52	977.99	0.32
Reach-1	155	100-YR-FW	22000.00	120.90	129.65		130.34	0.002381	7.29	3478.13	574.00	0.45
Reach-1	155	10-YR	1200.00	120.90	122.77		122.84	0.001984	1.97	565.07	393.31	0.30
Reach-1	155	50-YR	12000.00	120.90	126.57		126.84	0.001788	4.59	2972.24	837.01	0.36
Reach-1	155	500-YR	50000.00	120.90	130.03		131.09	0.003826	9.53	6228.65	983.28	0.58
Reach-1	154	100-YR-FP	22000.00	120.00	128.97	124.55	129.14	0.000618	3.64	6721.48	1037.18	0.23
Reach-1	154	100-YR-FW	22000.00	120.00	129.21	125.56	129.67	0.001462	5.72	4091.39	564.07	0.35
Reach-1	154	10-YR	1200.00	120.00	121.96	121.41	122.03	0.003583	2.24	552.02	633.05	0.39
Reach-1	154	50-YR	12000.00	120.00	126.22	123.39	126.39	0.001064	3.62	3574.55	910.03	0.28
Reach-1	154	500-YR	50000.00	120.00	129.13	126.76	129.97	0.002960	8.09	6893.99	1044.63	0.50
Reach-1	153	100-YR-FP	22000.00	117.50	125.39	125.39	128.29	0.013113	13.68	1608.22	794.35	1.00
Reach-1	153	100-YR-FW	22000.00	117.50	125.38	125.38	128.29	0.013136	13.69	1607.31	344.23	1.00
Reach-1	153	10-YR	1200.00	117.50	121.39	119.53	121.46	0.000971	2.11	568.78	551.59	0.24
Reach-1	153	50-YR	12000.00	117.50	123.49	123.32	125.35	0.012970	10.93	1097.97	676.55	0.94
Reach-1	153	500-YR	50000.00	117.50	128.10	128.10	128.91	0.003209	7.25	7331.17	1401.67	0.50
Reach-1	152	100-YR-FP	22000.00	117.00	123.37	123.01	124.65	0.010227	10.57	2456.42	1085.37	0.85
Reach-1	152	100-YR-FW	22000.00	117.00	124.10	124.10	124.92	0.003233	6.44	3161.74	567.33	0.49
Reach-1	152	10-YR	1200.00	117.00	120.53	119.63	121.03	0.006316	5.72	209.89	858.33	0.61
Reach-1	152	50-YR	12000.00	117.00	122.49	122.21	123.16	0.007420	8.02	1864.43	1074.30	0.70
Reach-1	152	500-YR	50000.00	117.00	124.10	124.10	125.31	0.005231	8.19	5880.24	1094.49	0.62
Reach-1	151	100-YR-FP	22000.00	114.50	117.86		118.78	0.009822	6.73	2943.52	1049.30	0.75
Reach-1	151	100-YR-FW	22000.00	114.50	118.82		119.71	0.008044	7.45	2903.66	838.80	0.72
Reach-1	151	10-YR	1200.00	114.50	114.69	114.69	115.09	0.019663	1.09	249.23	365.01	0.62
Reach-1	151	50-YR	12000.00	114.50	116.70	116.70	117.53	0.013412	5.42	1772.56	977.92	0.80
Reach-1	151	500-YR	50000.00	114.50	121.43		122.25	0.003473	7.19	6895.24	1142.30	0.52
Reach-1	150	100-YR-FP	22000.00	108.10	116.36	113.27	116.57	0.000805	3.91	5928.94	923.45	0.26
Reach-1	150	100-YR-FW	22000.00	108.10	116.85	113.50	117.17	0.001065	4.70	4900.84	690.81	0.30
Reach-1	150	10-YR	1200.00	108.10	110.58	109.84	110.63	0.001406	1.83	667.97	697.95	0.26
Reach-1	150	50-YR	12000.00	108.10	114.52	111.91	114.64	0.000678	2.94	4292.58	875.57	0.22
Reach-1	150	500-YR	50000.00	108.10	119.78	114.28	120.23	0.001155	6.08	9364.75	1086.76	0.33
Reach-1	149.1	100-YR-FP	22000.00	106.00	114.95	113.32	115.68	0.003488	8.53	3511.31	808.41	0.54
Reach-1	149.1	100-YR-FW	22000.00	106.00	115.55	113.38	116.21	0.002708	7.90	3615.94	702.95	0.48
Reach-1	149.1	10-YR	1200.00	106.00	109.65		109.75	0.001660	2.82	493.68	330.51	0.31
Reach-1	149.1	50-YR	12000.00	106.00	113.38	111.72	113.89	0.003010	6.81	2305.16	667.34	0.48
Reach-1	149.1	500-YR	50000.00	106.00	117.84	115.93	119.05	0.003814	11.03	5968.55	903.85	0.60
Reach-1	149	100-YR-FP	22000.00	104.40	110.83	110.83	112.23	0.010998	11.07	2483.65	795.60	0.89
Reach-1	149	100-YR-FW	22000.00	104.40	111.26	111.26	113.16	0.011720	12.10	2078.29	514.00	0.93
Reach-1	149	10-YR	1200.00	104.40	106.92	106.86	107.35	0.018860	5.29	228.46	230.58	0.91
Reach-1	149	50-YR	12000.00	104.40	109.74	109.74	110.76	0.010847	9.27	1644.49	742.80	0.85
Reach-1	149	500-YR	50000.00	104.40	112.88	112.88	115.31	0.011523	14.36	4125.90	807.56	0.97
Reach-1	148	100-YR-FP	22000.00	97.30	107.69	101.56	107.81	0.000333	3.12	7937.48	965.30	0.17
Reach-1	148	100-YR-FW	22000.00	97.30	107.71	102.28	107.97	0.000665	4.41	5399.31	600.00	0.25

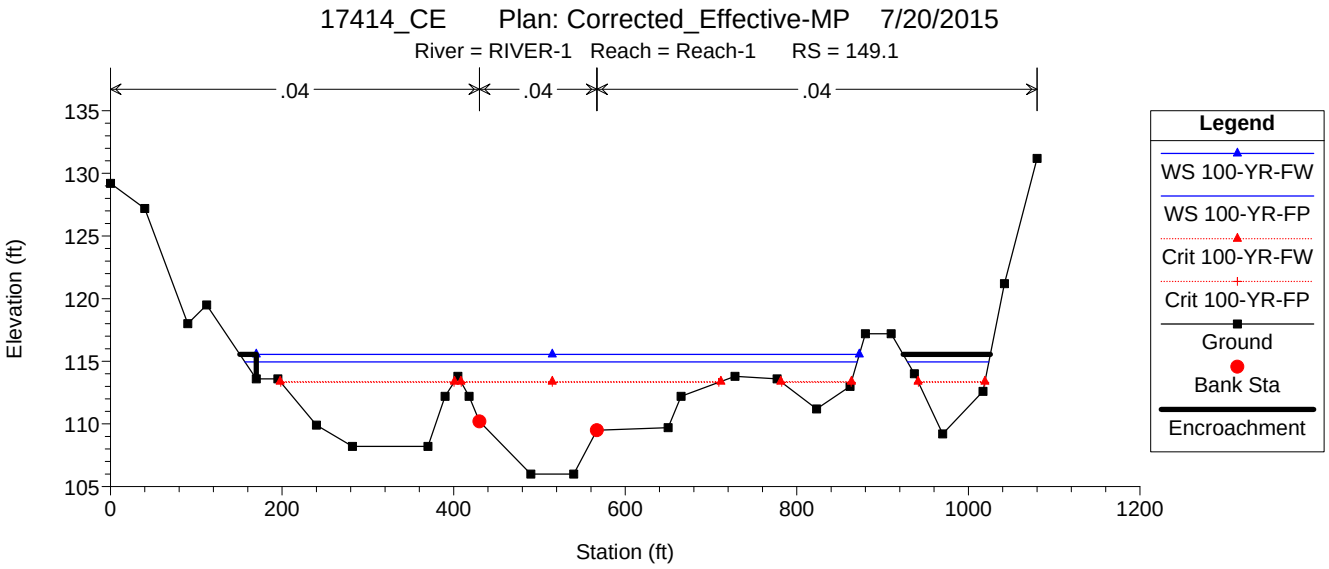
HEC-RAS Plan: CE-MP-FP-FW River: RIVER-1 Reach: Reach-1 (Continued)

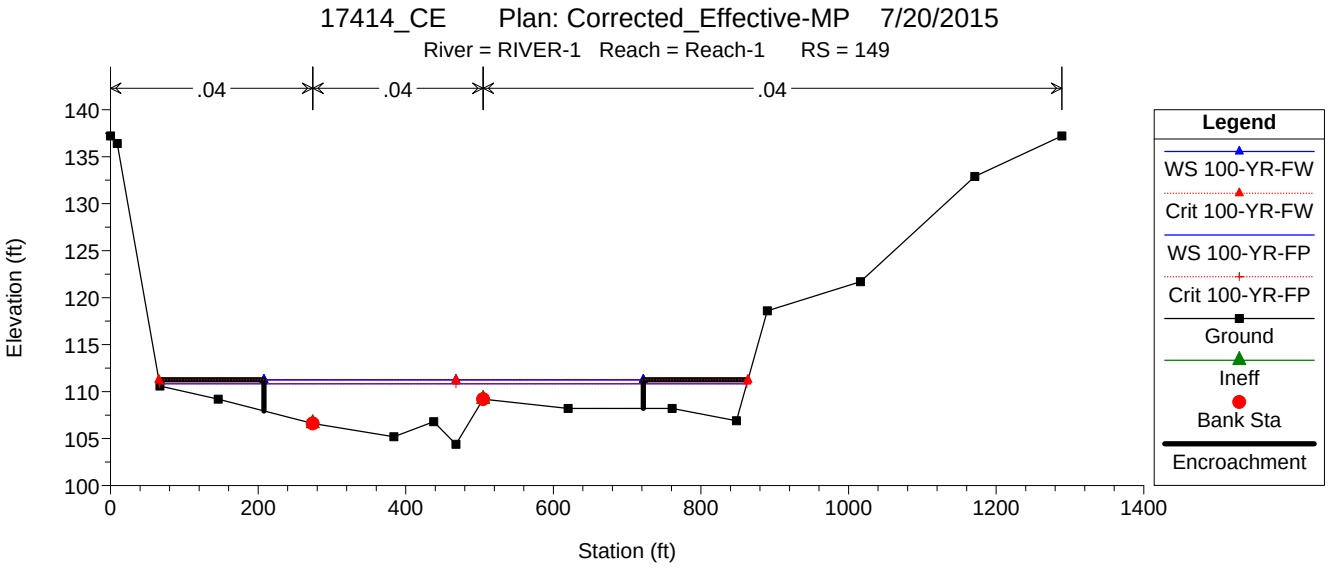
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	148	10-YR	1200.00	97.30	98.59	98.19	98.77	0.004870	2.55	373.06	474.81	0.45
Reach-1	148	50-YR	12000.00	97.30	104.96	100.96	105.04	0.000338	2.53	5371.86	913.59	0.17
Reach-1	148	500-YR	50000.00	97.30	113.10	103.60	113.32	0.000335	4.19	13357.80	1037.55	0.19
Reach-1	147	100-YR-FP	22000.00	94.30	107.58		107.68	0.000241	3.11	8560.76	926.40	0.15
Reach-1	147	100-YR-FW	22000.00	94.30	107.59		107.75	0.000308	3.52	6945.14	635.00	0.17
Reach-1	147	10-YR	1200.00	94.30	98.61		98.62	0.000067	0.71	1915.23	652.85	0.07
Reach-1	147	50-YR	12000.00	94.30	104.87		104.93	0.000171	2.23	6220.89	791.68	0.13
Reach-1	147	500-YR	50000.00	94.30	112.97		113.18	0.000304	4.43	14029.60	1102.89	0.18
Reach-1	146	100-YR-FP	22000.00	93.20	104.16	104.16	106.60	0.013580	12.56	1769.80	380.67	0.99
Reach-1	146	100-YR-FW	22000.00	93.20	104.18	104.18	106.60	0.013392	12.50	1777.57	381.01	0.99
Reach-1	146	10-YR	1200.00	93.20	97.20	97.20	98.20	0.018784	8.04	149.20	74.69	1.00
Reach-1	146	50-YR	12000.00	93.20	102.49	102.49	104.16	0.015738	10.39	1155.79	349.94	1.00
Reach-1	146	500-YR	50000.00	93.20	107.73	107.73	111.62	0.010752	16.04	3227.46	428.86	0.97
Reach-1	145	100-YR-FP	22000.00	85.90	102.84	91.03	102.98	0.000169	3.16	7899.55	643.91	0.14
Reach-1	145	100-YR-FW	22000.00	85.90	103.16	91.02	103.29	0.000153	3.04	7622.97	470.00	0.13
Reach-1	145	10-YR	1200.00	85.90	92.23	86.79	92.24	0.000017	0.51	2509.27	466.80	0.04
Reach-1	145	50-YR	12000.00	85.90	100.52	89.54	100.57	0.000079	1.96	6473.31	549.69	0.09
Reach-1	145	500-YR	50000.00	85.90	106.88	94.06	107.27	0.000378	5.46	10670.90	730.99	0.21
Reach-1	144.1		Culvert									
Reach-1	144	100-YR-FP	22000.00	84.50	91.37	91.37	93.62	0.069375	12.13	1845.84	415.67	0.99
Reach-1	144	100-YR-FW	22000.00	84.50	91.37	91.37	93.62	0.069375	12.13	1845.84	415.67	0.99
Reach-1	144	10-YR	1200.00	84.50	87.46		87.68	0.045214	3.80	316.21	325.77	0.68
Reach-1	144	50-YR	12000.00	84.50	89.82	89.82	91.36	0.077946	9.98	1216.13	400.36	0.99
Reach-1	144	500-YR	50000.00	84.50	94.85	94.85	98.27	0.052126	15.07	3409.96	493.79	0.93
Reach-1	143	100-YR-FP	22000.00	77.00	86.61		87.47	0.004234	7.23	2983.75	333.86	0.41
Reach-1	143	100-YR-FW	22000.00	77.00	86.59		87.46	0.004269	7.25	2971.09	329.28	0.41
Reach-1	143	10-YR	1200.00	77.00	78.24	77.91	78.44	0.017663	3.59	333.65	295.76	0.59
Reach-1	143	50-YR	12000.00	77.00	83.74		84.28	0.004394	5.80	2041.50	323.17	0.40
Reach-1	143	500-YR	50000.00	77.00	92.74		93.98	0.003272	8.86	5667.63	566.59	0.39
Reach-1	142.9	100-YR-FP	22000.00	77.00	86.41		87.42	0.005971	7.78	2770.02	311.42	0.45
Reach-1	142.9	100-YR-FW	22000.00	77.00	86.40		87.41	0.005993	7.79	2766.91	311.40	0.45
Reach-1	142.9	10-YR	1200.00	77.00	77.93	77.93	78.35	0.057077	5.17	231.74	282.19	1.00
Reach-1	142.9	50-YR	12000.00	77.00	83.64		84.26	0.005728	6.17	1914.93	305.03	0.43
Reach-1	142.9	500-YR	50000.00	77.00	92.34		93.88	0.005459	9.85	5140.49	513.32	0.44
Reach-1	142.1	100-YR-FP	22000.00	73.40	84.16		85.15	0.004490	7.17	2850.98	307.01	0.39
Reach-1	142.1	100-YR-FW	22000.00	73.40	84.13		85.13	0.004534	7.20	2841.79	306.71	0.39
Reach-1	142.1	10-YR	1200.00	73.40	76.73		76.76	0.000824	1.52	774.04	247.38	0.15
Reach-1	142.1	50-YR	12000.00	73.40	81.86		82.36	0.003195	5.28	2159.26	292.68	0.32
Reach-1	142.1	500-YR	50000.00	73.40	88.19		90.84	0.007171	10.77	4116.00	318.48	0.49
Reach-1	142	100-YR-FP	22000.00	73.40	84.21		85.09	0.003519	7.18	2953.53	316.28	0.38
Reach-1	142	100-YR-FW	22000.00	73.40	84.18		85.07	0.003553	7.20	2944.13	315.78	0.39
Reach-1	142	10-YR	1200.00	73.40	76.73		76.76	0.000703	1.46	809.48	256.55	0.14
Reach-1	142	50-YR	12000.00	73.40	81.88		82.33	0.002561	5.21	2236.32	297.63	0.32
Reach-1	142	500-YR	50000.00	73.40	88.47		90.55	0.005213	10.91	4371.66	350.23	0.50
Reach-1	141	100-YR-FP	22000.00	72.90	83.30		83.83	0.001483	6.03	3876.03	517.46	0.36
Reach-1	141	100-YR-FW	22000.00	72.90	83.24		83.79	0.001518	6.07	3721.64	448.00	0.36
Reach-1	141	10-YR	1200.00	72.90	76.18		76.24	0.001618	2.04	604.57	403.73	0.28
Reach-1	141	50-YR	12000.00	72.90	81.11		81.41	0.001200	4.47	2803.41	474.18	0.31
Reach-1	141	500-YR	50000.00	72.90	87.53		88.61	0.001838	8.75	6200.07	572.24	0.43
Reach-1	140	100-YR-FP	22000.00	71.30	81.39	79.85	82.55	0.004227	10.46	2739.10	488.08	0.61
Reach-1	140	100-YR-FW	22000.00	71.30	81.35		82.52	0.004100	10.28	2685.30	442.00	0.60
Reach-1	140	10-YR	1200.00	71.30	75.44		75.57	0.001189	3.05	432.33	175.30	0.28
Reach-1	140	50-YR	12000.00	71.30	79.75		80.43	0.003134	7.90	1980.10	441.34	0.51
Reach-1	140	500-YR	50000.00	71.30	83.86	83.27	86.58	0.007632	16.50	4103.23	621.86	0.85
Reach-1	139	100-YR-FP	22000.00	69.70	78.12	78.12	79.74	0.015201	10.78	2188.55	688.07	1.00
Reach-1	139	100-YR-FW	22000.00	69.70	78.89		80.24	0.009413	9.63	2368.51	572.67	0.81
Reach-1	139	10-YR	1200.00	69.70	73.67	73.67	74.41	0.019778	6.97	174.60	117.24	0.99
Reach-1	139	50-YR	12000.00	69.70	77.00	77.00	78.14	0.015674	9.01	1443.86	633.63	0.97
Reach-1	139	500-YR	50000.00	69.70	81.32	80.54	83.28	0.008405	12.22	4637.02	877.20	0.83
Reach-1	138.3	100-YR-FP	22000.00	68.20	78.32		78.89	0.002299	7.62	4061.51	872.86	0.45
Reach-1	138.3	100-YR-FW	22000.00	68.20	78.94		79.64	0.002297	7.97	3582.68	610.00	0.46

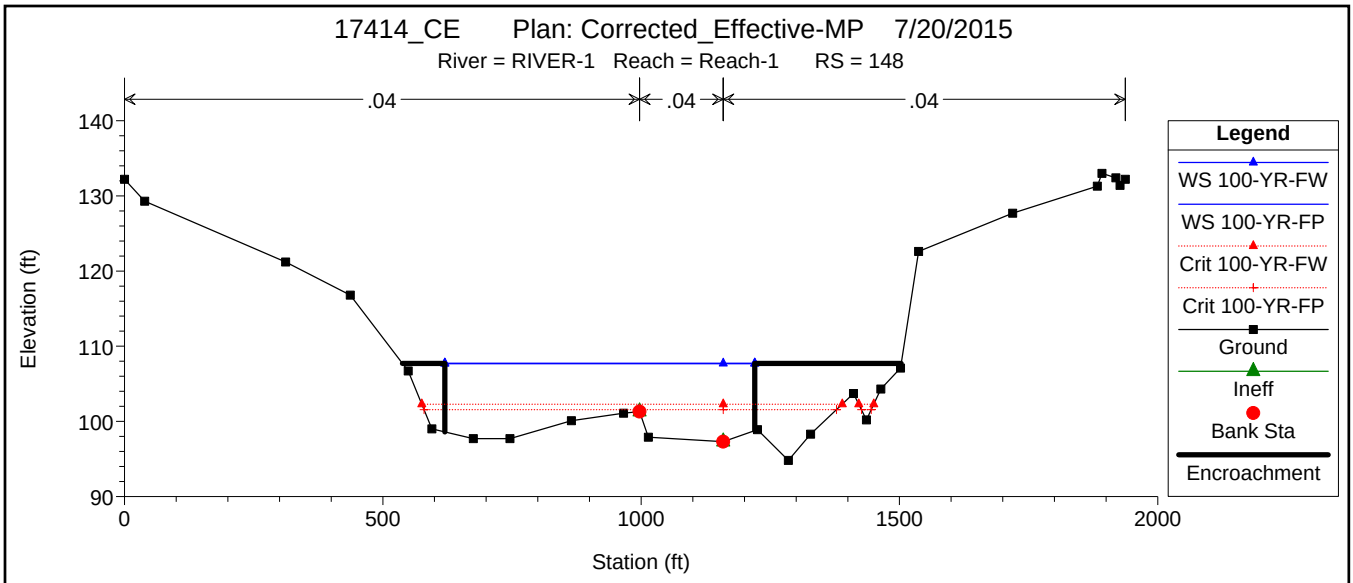
HEC-RAS Plan: CE-MP-FP-FW River: RIVER-1 Reach: Reach-1 (Continued)

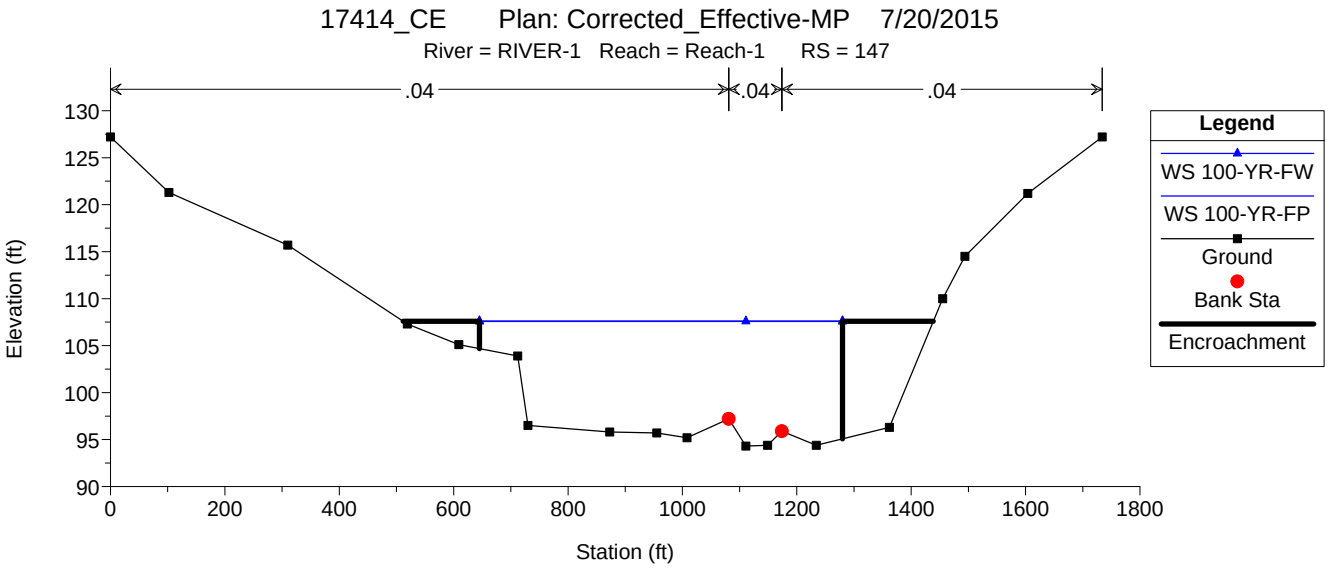
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	138.3	10-YR	1200.00	68.20	71.20		71.48	0.004619	4.29	279.99	126.27	0.51
Reach-1	138.3	50-YR	12000.00	68.20	76.15		76.86	0.003627	7.94	2210.64	832.87	0.54
Reach-1	138.3	500-YR	50000.00	68.20	81.69		82.55	0.002245	9.33	7137.92	962.49	0.47
Reach-1	138.1	100-YR-FP	22000.00	66.70	77.75		78.40	0.002054	7.54	3795.19	711.33	0.43
Reach-1	138.1	100-YR-FW	22000.00	66.70	78.59		79.17	0.001601	7.04	3894.83	586.00	0.39
Reach-1	138.1	10-YR	1200.00	66.70	71.04		71.11	0.000657	2.07	602.39	212.02	0.20
Reach-1	138.1	50-YR	12000.00	66.70	75.64		76.20	0.002209	6.62	2364.24	661.74	0.43
Reach-1	138.1	500-YR	50000.00	66.70	80.66		81.93	0.002961	10.82	6045.60	835.56	0.54
Reach-1	138	100-YR-FP	22000.00	68.30	76.85	75.89	78.08	0.008046	9.58	2551.07	659.34	0.76
Reach-1	138	100-YR-FW	22000.00	68.30	77.43	77.03	78.87	0.007893	10.23	2425.31	595.00	0.77
Reach-1	138	10-YR	1200.00	68.30	70.41	70.21	70.94	0.008528	3.09	229.95	154.95	0.59
Reach-1	138	50-YR	12000.00	68.30	74.88		75.88	0.007486	7.51	1509.40	385.27	0.70
Reach-1	138	500-YR	50000.00	68.30	79.64	78.84	81.55	0.006969	12.04	4732.88	855.52	0.77
Reach-1	137	100-YR-FP	22000.00	60.00	68.26	68.26	70.09	0.010741	12.96	2164.53	542.88	0.92
Reach-1	137	100-YR-FW	22000.00	60.00	68.87	68.87	70.99	0.010432	13.58	1999.24	430.00	0.92
Reach-1	137	10-YR	1200.00	60.00	62.95		63.54	0.008999	6.15	196.44	95.84	0.71
Reach-1	137	50-YR	12000.00	60.00	66.85	66.85	68.22	0.010848	11.11	1414.55	497.05	0.88
Reach-1	137	500-YR	50000.00	60.00	70.96	70.96	74.03	0.010913	16.60	3671.96	576.68	0.98
Reach-1	136	100-YR-FP	22000.00	51.80	63.96		65.19	0.007157	11.17	2584.55	634.89	0.74
Reach-1	136	100-YR-FW	22000.00	51.80	64.90		66.15	0.005695	10.56	2493.18	442.00	0.66
Reach-1	136	10-YR	1200.00	51.80	57.88	57.88	58.88	0.012621	8.50	164.15	87.25	0.86
Reach-1	136	50-YR	12000.00	51.80	62.35		63.33	0.008701	10.35	1612.23	566.72	0.78
Reach-1	136	500-YR	50000.00	51.80	67.43		69.02	0.005487	12.79	5072.49	766.16	0.70
Reach-1	135	100-YR-FP	22000.00	49.90	61.23		62.33	0.004324	10.45	2807.60	524.17	0.62
Reach-1	135	100-YR-FW	22000.00	49.90	60.66		62.66	0.007806	13.43	2075.09	382.00	0.82
Reach-1	135	10-YR	1200.00	49.90	54.86		55.03	0.001578	3.57	391.64	156.08	0.32
Reach-1	135	50-YR	12000.00	49.90	59.08		59.99	0.004965	9.31	1735.10	463.37	0.63
Reach-1	135	500-YR	50000.00	49.90	65.02		66.59	0.004080	12.85	5219.08	702.78	0.64
Reach-1	134.1	100-YR-FP	22000.00	49.40	59.17	58.79	61.18	0.009374	13.87	2023.32	434.66	0.88
Reach-1	134.1	100-YR-FW	22000.00	49.40	59.36	58.78	61.23	0.008360	13.32	2092.43	414.87	0.84
Reach-1	134.1	10-YR	1200.00	49.40	53.79	53.79	54.42	0.010501	7.13	221.12	177.63	0.78
Reach-1	134.1	50-YR	12000.00	49.40	57.65		58.89	0.007982	11.05	1418.21	376.48	0.79
Reach-1	134.1	500-YR	50000.00	49.40	62.66	62.66	65.51	0.008197	16.66	4016.53	676.18	0.88
Reach-1	134	100-YR-FP	22000.00	45.00	57.12	56.91	59.02	0.010438	12.17	2054.18	457.12	0.89
Reach-1	134	100-YR-FW	22000.00	45.00	57.11	56.91	59.15	0.011055	12.52	1956.96	402.92	0.91
Reach-1	134	10-YR	1200.00	45.00	50.29	50.07	51.25	0.012835	7.98	156.11	68.78	0.86
Reach-1	134	50-YR	12000.00	45.00	55.41	55.37	56.87	0.010938	10.79	1317.09	404.16	0.88
Reach-1	134	500-YR	50000.00	45.00	60.68	60.04	63.50	0.008606	14.33	3817.14	547.23	0.86
Reach-1	133.2	100-YR-FP	22000.00	44.90	55.75	54.77	57.10	0.005236	11.60	2540.38	488.34	0.67
Reach-1	133.2	100-YR-FW	22000.00	44.90	55.82	54.67	57.18	0.005084	11.49	2503.16	447.00	0.66
Reach-1	133.2	10-YR	1200.00	44.90	50.19	48.01	50.32	0.001200	3.26	458.69	210.58	0.28
Reach-1	133.2	50-YR	12000.00	44.90	53.60	53.24	54.77	0.006438	10.79	1547.54	430.12	0.71
Reach-1	133.2	500-YR	50000.00	44.90	59.75	57.82	61.76	0.004546	13.72	4581.55	551.18	0.66

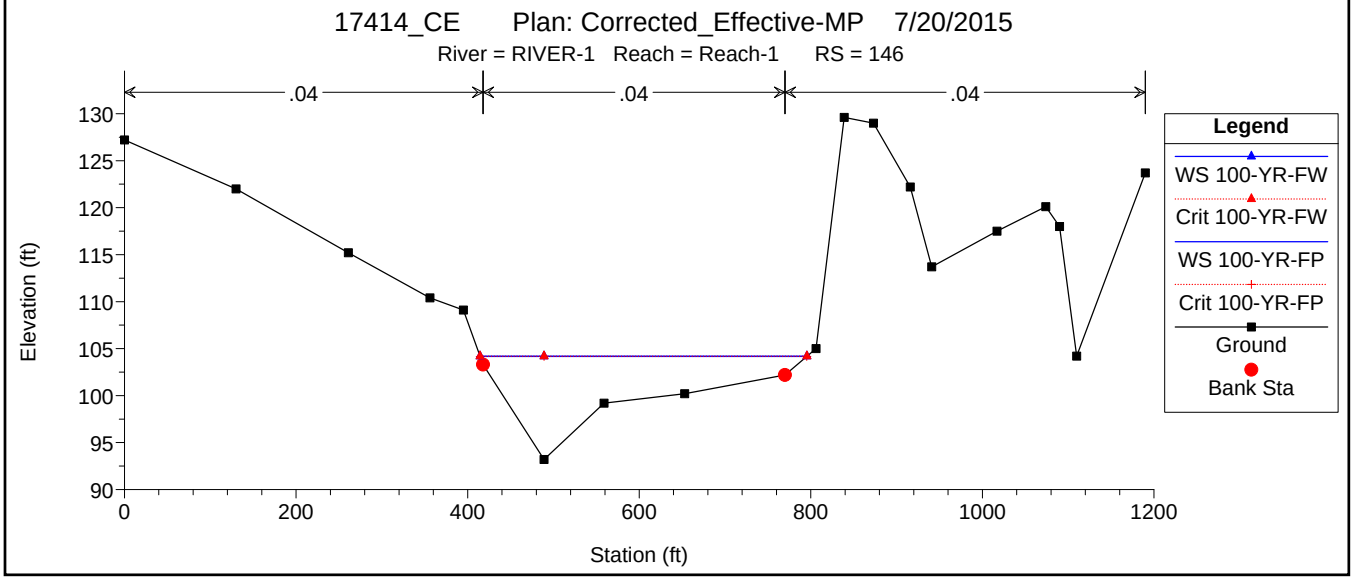

17414_CE Plan: Corrected_Effective-MP 7/20/2015
River = RIVER-1 Reach = Reach-1 RS = 158
.04
.04
.04
Elevation (ft)
Station (ft)
Legend
WS 100-YR-FW
WS 100-YR-FP
Ground
Bank Sta
Encroachment


17414_CE Plan: Corrected_Effective-MP 7/20/2015
River = RIVER-1 Reach = Reach-1 RS = 149.1
.04
.04
.04
Elevation (ft)
Station (ft)
Legend
WS 100-YR-FW
WS 100-YR-FP
Crit 100-YR-FW
Crit 100-YR-FP
Ground
Bank Sta
Encroachment


17414_CE Plan: Corrected_Effective-MP 7/20/2015
River = RIVER-1 Reach = Reach-1 RS = 149
.04
.04
.04
Elevation (ft)
Station (ft)
Legend
WS 100-YR-FW
Crit 100-YR-FW
WS 100-YR-FP
Crit 100-YR-FP
Ground
Ineff
Bank Sta
Encroachment


17414_CE Plan: Corrected_Effective-MP 7/20/2015
River = RIVER-1 Reach = Reach-1 RS = 148
.04
.04
.04
Elevation (ft)
Station (ft)
Legend
WS 100-YR-FW
WS 100-YR-FP
Crit 100-YR-FW
Crit 100-YR-FP
Ground
Ineff
Bank Sta
Encroachment


17414_CE Plan: Corrected_Effective-MP 7/20/2015
River = RIVER-1 Reach = Reach-1 RS = 147
.04
.04
.04
Elevation (ft)
Station (ft)
Legend
WS 100-YR-FW
WS 100-YR-FP
Ground
Bank Sta
Encroachment


17414_CE Plan: Corrected_Effective-MP 7/20/2015
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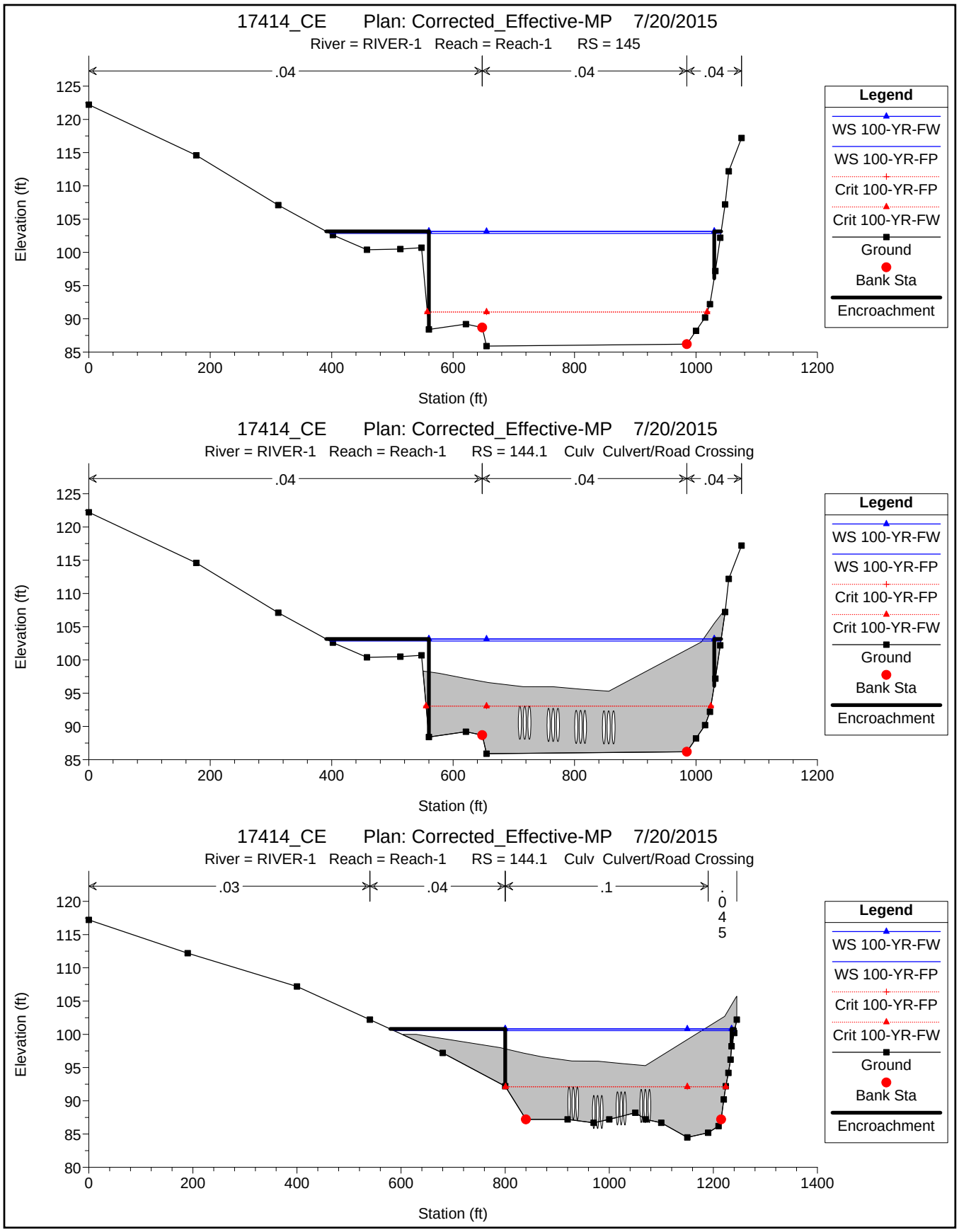
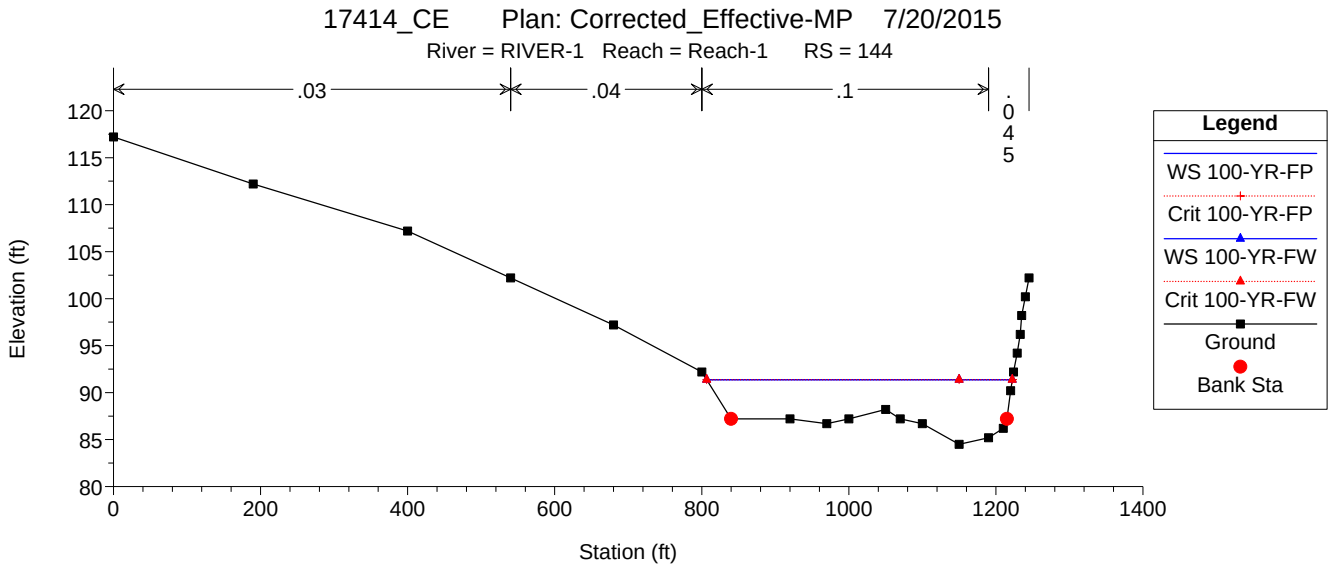
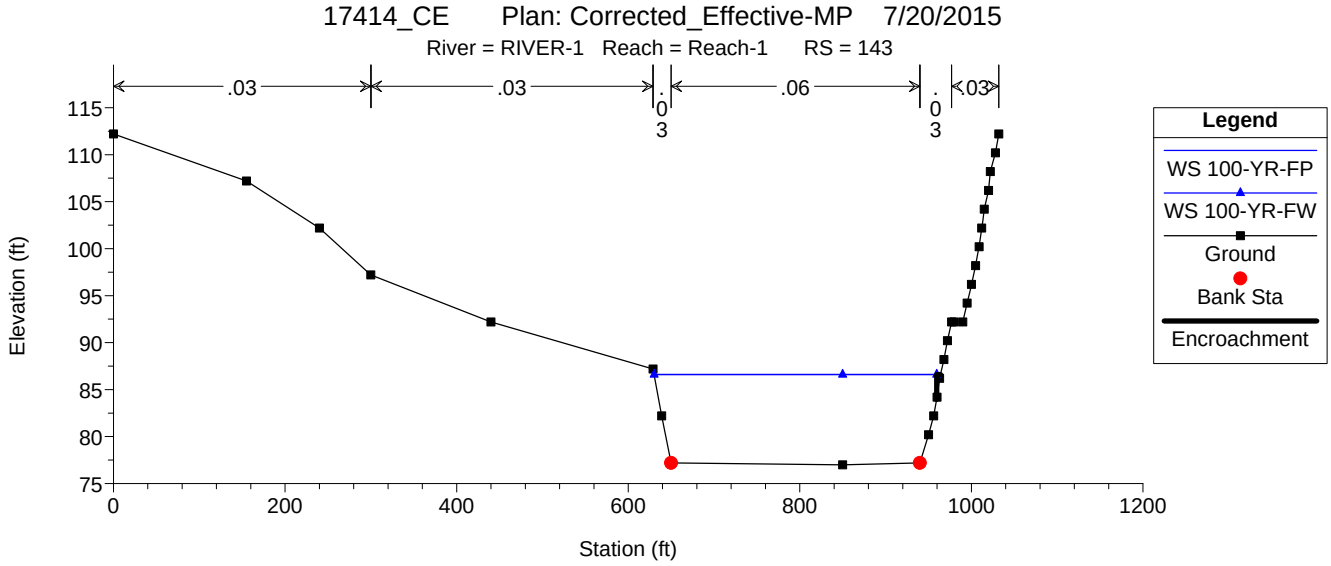
.04
.04
.04
Elevation (ft)
Station (ft)
Legend
WS 100-YR-FW
Crit 100-YR-FW
WS 100-YR-FP
Crit 100-YR-FP
Ground
Bank Sta


17414_CE Plan: Corrected_Effective-MP 7/20/2015
River = RIVER-1 Reach = Reach-1 RS = 145
.04
.04
.04
Elevation (ft)
Station (ft)
Legend
WS 100-YR-FW
WS 100-YR-FP
Crit 100-YR-FP
Crit 100-YR-FW
Ground
Bank Sta
Encroachment
17414_CE Plan: Corrected_Effective-MP 7/20/2015
River = RIVER-1 Reach = Reach-1 RS = 144.1 Culv Culvert/Road Crossing
.04
.04
.04
Elevation (ft)
Station (ft)
Legend
WS 100-YR-FW
WS 100-YR-FP
Crit 100-YR-FP
Crit 100-YR-FW
Ground
Bank Sta
Encroachment
17414_CE Plan: Corrected_Effective-MP 7/20/2015
River = RIVER-1 Reach = Reach-1 RS = 144.1 Culv Culvert/Road Crossing
.03
.04
.1
.045
Elevation (ft)
Station (ft)
Legend
WS 100-YR-FW
WS 100-YR-FP
Crit 100-YR-FP
Crit 100-YR-FW
Ground
Bank Sta
Encroachment


17414_CE Plan: Corrected_Effective-MP 7/20/2015
River = RIVER-1 Reach = Reach-1 RS = 144
.03
.04
.1
.045
Elevation (ft)
Station (ft)
Legend
WS 100-YR-FP
Crit 100-YR-FP
WS 100-YR-FW
Crit 100-YR-FW
Ground
Bank Sta


17414_CE Plan: Corrected_Effective-MP 7/20/2015
River = RIVER-1 Reach = Reach-1 RS = 143
.03
.03
.03
.06
.03
.03
Elevation (ft)
Station (ft)
Legend
WS 100-YR-FP
WS 100-YR-FW
Ground
Bank Sta
Encroachment

```
HEC-RAS Version 4.1.0 Jan 2010
 U.S. Army Corps of Engineers
Hydrologic Engineering Center
      609 Second Street
      Davis, California

X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
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PROJECT DATA
Project Title: 17414_CE
Project File : 17414_CE.prj
Run Date and Time: 7/20/2015 3:11:15 PM

Project in English units

Project Description:
OTAY RIVER - J-14624   -CORRECTED EFFECTIVE-
      100-YR. FLOODPLAIN
Q=22,000 CFS
      JUNE 15, 2004

PLAN DATA

Plan Title: Corrected_Effective-MP
Plan File :
w:\17414_Shinohara_CLOMR\WaterResources\Hydraulics\HecRas\CE\17414_CE.p01

Geometry Title: Corrected_Effective
Geometry File :
w:\17414_Shinohara_CLOMR\WaterResources\Hydraulics\HecRas\CE\17414_CE.g01

Flow Title   : Corrected_Effective
Flow File   :
w:\17414_Shinohara_CLOMR\WaterResources\Hydraulics\HecRas\CE\17414_CE.f01

Plan Summary Information:
Number of: Cross Sections =   33   Multiple Openings =   0
            Culverts   =   1   Inline Structures =   0
            Bridges   =   0   Lateral Structures =   0

Computational Information
    Water surface calculation tolerance = 0.01
    Critical depth calculation tolerance = 0.01
    Maximum number of iterations   = 20
    Maximum difference tolerance   = 0.3
    Flow tolerance factor   = 0.001

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

Encroachment Data
   Equal Conveyance = True
   Left Offset   =   0
   Right Offset   =   0

River = RIVER-1   Reach = Reach-1

RS	Profile	Method	Value1	Value2
133.2	100-YR-FW	1	46	493
134	100-YR-FW	1	44	490
134.1	100-YR-FW	1	30	445
135	100-YR-FW	1	113	495
136	100-YR-FW	1	213	655
137	100-YR-FW	1	300	730
138	100-YR-FW	1	400	995
138.1	100-YR-FW	1	418	1004
138.3	100-YR-FW	1	410	1020
139	100-YR-FW	1	480	1070
140	100-YR-FW	1	648	1090
141	100-YR-FW	1	582	1030
142	100-YR-FW	1	895.67	1211.45
142.1	100-YR-FW	1	895	1221.71
142.9	100-YR-FW	1	630	960
143	100-YR-FW	1	630	959.5
144	100-YR-FW	1	800	1235
145	100-YR-FW	1	560	1030
146	100-YR-FW	1	412	1100
147	100-YR-FW	1	645	1280
148	100-YR-FW	1	620	1220
149	100-YR-FW	1	208	722
149.1	100-YR-FW	1	170	900
150	100-YR-FW	1	500	1225
151	100-YR-FW	1	220	1060
152	100-YR-FW	1	505	1095
153	100-YR-FW	1	660	1250
154	100-YR-FW	1	555	1145
155	100-YR-FW	1	588	1162
156	100-YR-FW	1	655	1235
157	100-YR-FW	1	660	1260
157.1	100-YR-FW	1	682	1312
158	100-YR-FW	1	635	1272

River = RIVER-1   Reach = Reach-1

RS	Profile	Method	Value1	Value2
133.2	10-YR	0	0	0
134	10-YR	0	0	0
134.1	10-YR	0	0	0
135	10-YR	0	0	0
136	10-YR	0	0	0
137	10-YR	0	0	0
138	10-YR	0	0	0
138.1	10-YR	0	0	0
138.3	10-YR	0	0	0
139	10-YR	0	0	0
140	10-YR	0	0	0
141	10-YR	0	0	0
142	10-YR	0	0	0
142.1	10-YR	0	0	0
142.9	10-YR	0	0	0

143	10-YR	0	0	0
144	10-YR	0	0	0
145	10-YR	0	0	0
146	10-YR	0	0	0
147	10-YR	0	0	0
148	10-YR	0	0	0
149	10-YR	0	0	0
149.1	10-YR	0	0	0
150	10-YR	0	0	0
151	10-YR	0	0	0
152	10-YR	0	0	0
153	10-YR	0	0	0
154	10-YR	0	0	0
155	10-YR	0	0	0
156	10-YR	0	0	0
157	10-YR	0	0	0
157.1	10-YR	0	0	0
158	10-YR	0	0	0

River = RIVER-1 Reach = Reach-1

RS	Profile	Method	Value1	Value2
133.2	50-YR	0	0	0
134	50-YR	0	0	0
134.1	50-YR	0	0	0
135	50-YR	0	0	0
136	50-YR	0	0	0
137	50-YR	0	0	0
138	50-YR	0	0	0
138.1	50-YR	0	0	0
138.3	50-YR	0	0	0
139	50-YR	0	0	0
140	50-YR	0	0	0
141	50-YR	0	0	0
142	50-YR	0	0	0
142.1	50-YR	0	0	0
142.9	50-YR	0	0	0
143	50-YR	0	0	0
144	50-YR	0	0	0
145	50-YR	0	0	0
146	50-YR	0	0	0
147	50-YR	0	0	0
148	50-YR	0	0	0
149	50-YR	0	0	0
149.1	50-YR	0	0	0
150	50-YR	0	0	0
151	50-YR	0	0	0
152	50-YR	0	0	0
153	50-YR	0	0	0
154	50-YR	0	0	0
155	50-YR	0	0	0
156	50-YR	0	0	0
157	50-YR	0	0	0
157.1	50-YR	0	0	0
158	50-YR	0	0	0

River = RIVER-1 Reach = Reach-1

RS	Profile	Method	Value1	Value2
133.2	500-YR	0	0	0
134	500-YR	0	0	0
134.1	500-YR	0	0	0
135	500-YR	0	0	0
136	500-YR	0	0	0
137	500-YR	0	0	0

138	500-YR	0	0	0
138.1	500-YR	0	0	0
138.3	500-YR	0	0	0
139	500-YR	0	0	0
140	500-YR	0	0	0
141	500-YR	0	0	0
142	500-YR	0	0	0
142.1	500-YR	0	0	0
142.9	500-YR	0	0	0
143	500-YR	0	0	0
144	500-YR	0	0	0
145	500-YR	0	0	0
146	500-YR	0	0	0
147	500-YR	0	0	0
148	500-YR	0	0	0
149	500-YR	0	0	0
149.1	500-YR	0	0	0
150	500-YR	0	0	0
151	500-YR	0	0	0
152	500-YR	0	0	0
153	500-YR	0	0	0
154	500-YR	0	0	0
155	500-YR	0	0	0
156	500-YR	0	0	0
157	500-YR	0	0	0
157.1	500-YR	0	0	0
158	500-YR	0	0	0

FLOW DATA

Flow Title: Corrected_Effective
Flow File :
w:\17414_Shinohara_CLOMR\WaterResources\Hydraulics\HecRas\CE\17414_CE.f01

Flow Data (cfs)

River	Reach	RS	100-YR-FP	100-YR-FW	10-YR	50-YR	500-YR
RIVER-1	Reach-1	158	22000	22000	1200	12000	50000

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
RIVER-1	Reach-1	100-YR-FP		
Known WS = 55.75				
RIVER-1	Reach-1	100-YR-FW		
Known WS = 55.82				
RIVER-1	Reach-1	10-YR		
Known WS = 50.19				
RIVER-1	Reach-1	50-YR		
Known WS = 53.6				
RIVER-1	Reach-1	500-YR		

Known WS = 59.75

GEOMETRY DATA

Geometry Title: Corrected_Effective
Geometry File :
w:\17414_Shinohara_CLOMR\WaterResources\Hydraulics\HecRas\CE\17414_CE.g01

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 158

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	152.2	275	143.9	514	138.7	532	135.2	628	126.7
685	126.9	733	131.9	822	123.7	962	123.9	1024	125
1073	124.8	1111	133	1217	132.7	1241	125.5	1264	125.3
1290	123.7	1346	123.7	1400	126.9	1425	139.9	1475	139.4
1491	152.2								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	822	.04	1111	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
822	1111	210	210	200	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 157.1

INPUT
Description:
Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	154.2	118	151.5	210	148.7	300	146.6	370	145.9
440	144	458	141.4	490	140.9	557	137.4	570	136
619	138.4	641	136	664	130.8	690	127.7	777	127.2
800	125.7	1008	125.7	1018	127.2	1062	128.2	1090	125.7
1150	125.7	1160	127.6	1216	127.8	1245	130.2	1260	130.2
1290	128.4	1305	128.4	1316	127.2	1496	127.2	1500	132.4
1528	137.6	1552	137.6	1587	152.2				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	1062	.04	1160	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1062	1160	190	190	190	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 157

INPUT
Description:
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	152.2	335	144.2	447	141.3	537	135.6	617	131.5
766	125.4	882	125	911	131.2	1035	130.5	1123	129.4
1144	123.3	1181	127	1213	130.5	1313	130.2	1348	130.2
1470	130.2	1484	136.1	1525	138	1564	136.7	1592	152.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	1123	.04	1213	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1123	1213	150	170	170	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 156

INPUT
Description:
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	152.2	169	145.9	413	140.2	534	138	573	129.6
696	125.6	740	120.3	1051	120.3	1183	121.4	1278	123.7
1349	123.2	1378	130.5	1443	129.4	1510	131	1531	137.4
1581	136.6	1622	152.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	696	.04	1183	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
696	1183	230	300	250	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 155

INPUT
Description:
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	152.2	272	143.1	448	137.9	513	136	551	127.1
707	122.8	855	120.9	952	120.9	968	125	1031	124.7
1053	126.6	1121	124.8	1135	128.1	1235	126.9	1253	120.3
1274	120.3	1289	123.7	1396	122.9	1406	120.3	1430	120.3
1465	123.2	1480	121	1506	121.1	1538	139.2	1598	139.1
1624	152.2								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	707	.04	968	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

```
          707     968              350     330     290             .1       .3

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 154

INPUT
Description:
Station Elevation Data    num=      26
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   152.2      94   146.3     204     141     279   132.1     425   131.2
     503   125.5     541   119.1     575   119.1     599   127.4     617     120
     702   121.6     771   121.9     867   120.1     943   120.5    1065   124.1
    1113   130.8    1175     124    1219   124.3    1242   131.6    1287   126.7
    1305   121.2    1464   120.7    1541   123.7    1575   136.4    1634   135.9
    1663   152.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .04     599     .04     943     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          599     943              350     345     330             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     599   127.4       F
     943    1663   120.5       F

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 153

INPUT
Description:
Station Elevation Data    num=      30
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   152.2     137   143.7     185   137.7     222   146.2     272   128.1
     350   126.7     376   117.5     413   117.5     445   125.2     468   117.5
     582   117.5     622   122.5     641   117.9     682   119.1     705   128.1
     725   118.2     771   118.1     845   118.6     882   122.1     945   117.5
     993   126.6    1096   126.8    1236   125.2    1358   126.4    1501   126.2
    1592   119.8    1647   124.9    1707   132.1    1766   131.9    1795   152.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .04     705     .04    1096     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          705    1096              180     190     190             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     705   128.1       F
    1096    1795   126.8       F

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 152
```



```
INPUT
Description:
Station Elevation Data    num=      25
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   152.2      71   148.2     135   129.5     311   129.4     384     128
     413   116.9     468   116.5     642   116.4     788   117.4     813   124.9
     833   124.1     853     117     895     117     932   122.2    1040     121
    1191     120    1313   118.2    1369   118.3    1405   119.1    1494   119.5
    1517   125.6    1550   126.9    1575   131.4    1623   131.8    1664   152.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .04     833     .04     932     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          833     932              540     560     590             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     833   124.1       F
     932    1664   122.2       F

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 151

INPUT
Description:
Station Elevation Data    num=      23
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   142.2      40   123.9     162   125.2     181   118.7     239   115.6
     338   114.2     460   115.6     590   115.3     627   118.2     652   114.5
     802     115     883   115.9     974   115.9    1000   118.9    1031   113.7
    1112     114    1250   113.2    1258   116.9    1297   120.7    1314   120.7
    1331   130.1    1360   129.5    1369   137.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .04     627     .04    1000     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          627    1000             1030    1045    1000             .1       .3

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 150

INPUT
Description:
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   137.2       9   133.7     156   130.7     254     127     293   121.5
     391   118.8     427   115.9     485   117.2     512   107.4     542   112.2
     620     111     709   108.3     837   108.8     861   113.5     884   108.1
    1003   108.9    1152   110.1    1177   117.4    1202   119.7    1224   111.1
    1239   108.3    1285   108.3    1312   109.6    1401   109.7    1432   119.6
    1485   120.5    1538     132    1592   137.2

Manning's n Values        num=       3
```

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	861	.04	1152	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
861 1152 560 570 600 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	861	113.5	F
1152	1592	110.1	F

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 149.1

INPUT
Description:
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	129.2	40	127.2	90	118	112	119.5	170	113.6
195	113.6	240	109.9	282	108.2	370	108.2	390	112.2
405	113.8	418	112.2	430	110.2	490	106	540	106
567	109.5	650	109.7	665	112.2	728	113.8	777	113.6
823	111.2	862	113	880	117.2	910	117.2	937	114
970	109.2	1017	112.6	1042	121.2	1080	131.2		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	430	.04	567	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
430 567 610 600 560 .1 .3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 149

INPUT
Description:
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	137.2	9	136.4	67	110.6	146	109.2	274	106.6
384	105.2	438	106.8	468	104.4	505	109.2	620	108.2
761	108.2	848	106.9	890	118.6	1016	121.7	1171	132.9
1289	137.2								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	274	.04	505	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
274 505 900 980 1020 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	274	106.6	F
505	1289	109.2	F

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 148

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	132.2	39	129.3	312	121.2	437	116.8	549	106.7
595	99	675	97.7	746	97.7	865	100.1	966	101.1
997	101.3	1014	97.9	1159	97.3	1225	98.9	1285	94.8
1328	98.3	1411	103.7	1436	100.2	1464	104.3	1502	107.1
1537	122.6	1719	127.7	1883	131.3	1892	133	1919	132.4
1927	131.4	1937	132.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	997	.04	1159	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
997 1159 450 370 470 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	997	101.3	F
1159	1937	97.3	F

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 147

INPUT
Description:
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	127.2	102	121.3	310	115.7	519	107.3	609	105.1
712	103.9	730	96.5	873	95.8	955	95.7	1008	95.2
1081	97.2	1111	94.3	1149	94.4	1174	95.9	1234	94.4
1362	96.3	1455	110	1494	114.5	1604	121.2	1734	127.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	1081	.04	1174	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1081 1174 460 545 460 .3 .5

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 146

INPUT
Description:
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	127.2	130	122	261	115.2	356	110.4	395	109.1
418	103.3	489	93.2	559	99.2	653	100.2	770	102.2
806	105	839	129.6	873	129	916	122.2	941	113.7
1017	117.5	1074	120.1	1090	118	1110	104.2	1190	123.7

Manning's n Values num= 3

```
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .04     418     .04     770     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           418     770              880     910     935             .3       .5

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 145

INPUT
Description:
Station Elevation Data    num=      20
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   122.2     177   114.6     312   107.1     402   102.6     458   100.4
     513   100.5     548   100.7     560    88.4     621    89.2     648    88.7
     655    85.9     985    86.2    1000    88.2    1015    90.2    1023    92.2
    1032    97.2    1040   102.2    1048   107.2    1054   112.2    1075   117.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .04     648     .04     985     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           648     985              960     955     960             .1       .3

CULVERT


RIVER: RIVER-1
REACH: Reach-1            RS: 144.1

INPUT
Description: Culvert/Road Crossing
Distance from Upstream XS =     884
Deck/Roadway Width        =      40
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=      11
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     416     100      80     577      98      80     622   97.19      80
   658.4    96.6      80   715.2   95.99      80   765.5   95.96      80
     812    95.6      80   856.5    95.3      80  1008.7   102.7      80
  1030.4  105.55      80  1058.4  108.84      80

Upstream Bridge Cross Section Data
Station Elevation Data    num=      20
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   122.2     177   114.6     312   107.1     402   102.6     458   100.4
     513   100.5     548   100.7     560    88.4     621    89.2     648    88.7
     655    85.9     985    86.2    1000    88.2    1015    90.2    1023    92.2
    1032    97.2    1040   102.2    1048   107.2    1054   112.2    1075   117.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .04     648     .04     985     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
           648     985             .1       .3

Downstream  Deck/Roadway Coordinates
```



```
    num=      12
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     604     100      80     629     100      80     790      98      80
     835   97.19      80   871.4    96.6      80   928.2   95.99      80
   978.5   95.96      80    1025    95.6      80  1069.5    95.3      80
  1221.7   102.7      80  1243.4  105.55      80  1271.4  108.84      80

Downstream Bridge Cross Section Data
Station Elevation Data    num=      24
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   117.2     190   112.2     400   107.2     540   102.2     680    97.2
     800    92.2     840    87.2     920    87.2     970    86.7    1000    87.2
    1050    88.2    1070    87.2    1100    86.7    1150    84.5    1190    85.2
    1210    86.2    1215    87.2    1220    90.2    1224    92.2    1229    94.2
    1233    96.2    1235    98.2    1240   100.2    1245   102.2

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .03     540     .04     800      .1    1190    .045

Bank Sta: Left   Right    Coeff Contr.   Expan.
           840    1215             .3       .5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  4

Culvert Name     Shape      Rise    Span
Culvert #1      Circular       5
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
               875      40     .024     .024        0                    .5
      1
Number of Barrels =  3
Upstream   Elevation =  88.06
Centerline Stations
    Sta.    Sta.    Sta.
   709.9   717.9   725.6
Downstream Elevation =  87.11
Centerline Stations
    Sta.    Sta.    Sta.
   922.9   930.9   938.6

Culvert Name     Shape      Rise    Span
Culvert #2      Circular       5
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
               877      40     .024     .024        0                    .5
      1
Number of Barrels =  3
Upstream   Elevation =  87.73
```

```
Centerline Stations
    Sta.    Sta.    Sta.
   757.2   764.7   772.6
Downstream Elevation =  85.82
Centerline Stations
    Sta.    Sta.    Sta.
   970.2   977.7   985.6

Culvert Name     Shape      Rise    Span
Culvert #3      Circular       5
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                880      40     .024     .024        0                    .5
      1
Number of Barrels =  3
Upstream   Elevation =  87.43
Centerline Stations
    Sta.    Sta.    Sta.
   802.7     810   817.1
Downstream Elevation =  86.36
Centerline Stations
    Sta.    Sta.    Sta.
  1015.7    1023  1030.1

Culvert Name     Shape      Rise    Span
Culvert #4      Circular       5
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                884      40     .024     .024        0                    .5
      1
Number of Barrels =  3
Upstream   Elevation =  87.36
Centerline Stations
    Sta.    Sta.    Sta.
   848.4   856.2   864.2
Downstream Elevation =  86.73
Centerline Stations
    Sta.    Sta.    Sta.
  1061.4  1069.2  1077.2

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 144

INPUT
Description:
Station Elevation Data    num=      24
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   117.2     190   112.2     400   107.2     540   102.2     680    97.2
     800    92.2     840    87.2     920    87.2     970    86.7    1000    87.2
    1050    88.2    1070    87.2    1100    86.7    1150    84.5    1190    85.2
    1210    86.2    1215    87.2    1220    90.2    1224    92.2    1229    94.2
    1233    96.2    1235    98.2    1240   100.2    1245   102.2

Manning's n Values        num=       4
```



```
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .03     540     .04     800      .1    1190    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           840    1215              390     345     360              .3       .5

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 143

INPUT
Description:
Station Elevation Data    num=      29
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   112.2     155   107.2     240   102.2     300    97.2     440    92.2
     629    87.2     639    82.2     650    77.2     850      77     940    77.2
     950    80.2     956    82.2     960    84.2     963    86.2     968    88.2
     972    90.2     977    92.2     980    92.2     990    92.2     995    94.2
    1000    96.2    1005    98.2    1009   100.2    1012   102.2    1015   104.2
    1020   106.2    1022   108.2    1028   110.2    1032   112.2

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .03     300     .03     629     .03     650     .06     940     .03
     977     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           650     940                1       1       1              .3       .5

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 142.9

INPUT
Description:
Station Elevation Data    num=      48
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   112.2     155   107.2     240   102.2     300    97.2     440    92.2
     622    87.2     622   118.2     628   118.2     628    87.2     629    87.2
     639    82.2     639   118.2     644   118.2     644    79.7     650    77.2
     778    77.1     778   118.2     784   118.2     784    77.1     795      77
     795   118.2     801   118.2     801      77     850      77     940    77.2
     950    80.2     956    82.2     959    84.2     959   118.2     965   118.2
     965    88.2     968    88.2     972    90.2     976    91.8     976   118.2
     982   118.2     982    92.7     990    92.2     995    94.2    1000    96.2
    1005    98.2    1009   100.2    1012   102.2    1015   104.2    1020   106.2
    1022   108.2    1028   110.2    1032   112.2

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .03     300     .03     629     .03     650     .06     940     .03
     976     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           650     940              399     444     409              .3       .5

CROSS SECTION
```

RIVER: RIVER-1
REACH: Reach-1 RS: 142.1

INPUT
Description:
Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	152.2	11	139.6	29	137.7	68	123.1	106	116.5
206	115	262	113.9	368	109	476	105.6	544	102.8
662	98.6	680	92.2	870	92.2	880	92.2	880	118.2
886	118.2	886	90.2	897	86.2	897	118.2	903	118.2
903	82.2	930	73.4	1028	73.4	1028	118.2	1034	118.2
1034	73.4	1045	73.4	1045	118.2	1051	118.2	1051	73.4
1160	73.4	1228	85.2	1228	118.2	1234	118.2	1234	89.2
1244	91.2	1244	118.2	1250	118.2	1250	92.2	1460	92.2
1473	94	1539	98.1	1618	104.2	1692	107.1	1978	112.2

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	106	.03	870	.03	930	.06	1160	.03
1250	.03								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
930	1160	1	1	1	.3	.5

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 142

INPUT
Description:
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	152.2	11	139.6	29	137.7	68	123.1	106	116.5
206	115	262	113.9	368	109	476	105.6	544	102.8
662	98.6	680	92.2	870	92.2	930	73.4	1160	73.4
1250	92.2	1460	92.2	1473	94	1539	98.1	1618	104.2
1692	107.1	1978	112.2						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	106	.03	870	.03	930	.06	1160	.03
1250	.03								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
930	1160	430	500	510	.3	.5

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 141

INPUT
Description:
Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	107.2	37	105.1	120	103.4	219	104	288	101.8
346	99.7	442	97.6	526	94.7	551	83.2	563	82.9
585	76.3	691	75.4	768	74.8	842	72.9	911	73.6
944	75.3	994	75.1	1052	82.2	1102	85.6	1135	91

1169	97.9	1240	100.3	1430	107.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	585	.04	944	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
585	944	450	470	480	.3	.5

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 140

INPUT
Description:
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	102.2	35	98.4	78	97.1	138	96.5	195	93.8
278	84.9	351	86.6	445	83.8	494	84.2	550	82.4
603	81.4	663	79	717	75.8	814	76	859	75.3
901	74	948	79.4	961	74.2	983	71.3	1055	71.3
1098	83.2	1126	84.2	1144	99.4	1288	102.2		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	948	.04	1055	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
948	1055	420	355	400	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 139

INPUT
Description:
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	102.2	71	93.1	117	91.1	155	92.1	175	83.2
238	81.5	329	79.8	405	75.7	459	75.3	527	75.4
601	75.2	645	72.5	679	69.7	708	73.4	833	75.2
881	75.8	936	76	983	77.9	1013	72.2	1067	81.3
1107	78.5	1129	82	1181	82	1201	87.2	1241	86.8
1257	102.2	1302	102.9	1348	95.7	1483	96.5	1500	102.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	601	.04	1013	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
601	1013	130	90	100	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 138.3

INPUT

```
Description:
Station Elevation Data    num=      35
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   103.8      63    94.6      90    99.5     105    89.5     128    87.7
     145    75.2     155    75.2     172    80.4     218    83.9     260    82.2
     300    79.2     332    73.2     350    72.2     388    74.7     460    75.5
     500    72.5     550      73     595    68.2     672    68.7     700      72
     750    73.4     857    75.7     920    74.4     930    74.4     960    74.2
    1015    75.2    1070    74.8    1137    76.2    1175    81.2    1208    92.6
    1260    91.6    1295    91.4    1340    93.5    1388    97.8    1432   104.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .04     550     .04     700     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           550     700              200     220     250             .1       .3

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 138.1

INPUT
Description:
Station Elevation Data    num=      37
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   107.2      20   102.2      50    98.5      74    94.8     105    93.2
     120    93.2     150    89.5     178    83.7     250    78.2     275    76.7
     305    79.8     337      75     368    72.5     420    73.9     442    73.8
     493    72.7     522    70.2     560    66.7     632    66.7     658    68.2
     684    70.7     738    74.5     850      75     923    75.2     950    69.2
     970    69.2    1008    79.2    1032    82.2    1060    83.2    1070    83.2
    1110    78.5    1140    82.7    1163    96.9    1213      99    1295   100.5
    1390   101.2    1470   102.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .04     493     .04     684     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           493     684               60      70      80             .1       .3

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 138

INPUT
Description:
Station Elevation Data    num=      26
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   102.2      60    97.6     130    93.8     160    82.6     212    79.5
     308    77.4     390      77     435    76.2     461    73.4     492    68.3
     501    69.4     535    72.2     598    69.4     626    69.2     645      71
     757    76.7     839    75.7     941    74.9     964    67.5     977    74.6
    1024    64.6    1075    83.2    1152    95.5    1173    95.8    1196    99.8
    1396   102.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
```



```
       0     .04     435     .04     757     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           435     757              920     860     820             .1       .3

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 137

INPUT
Description:
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   102.2     100    80.4     146    74.4     174    74.8     228    73.8
     281    73.2     312    65.9     366    62.7     473    66.3     536    67.2
     583      60     631      60     663    65.6     785      63     836    67.2
     885    73.1     904    73.1     956    75.3    1017    92.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .04     536     .04     663     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           536     663              410     440     390             .1       .3

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 136

INPUT
Description:
Station Elevation Data    num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   102.2      68    88.3     131    64.9     166    62.5     213    62.1
     242    51.8     281    62.1     305    56.4     336    60.6     359    55.9
     393    59.2     467    58.6     495    62.2     576    60.3     648    60.6
     721    58.6     784    66.5     878    63.5     912    74.3     952    74.7
    1036    78.6    1094    82.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .04     213     .04     281     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           213     281              530     520     510             .1       .3

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 135

INPUT
Description:
Station Elevation Data    num=      20
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    87.2     102      58     154    49.9     191    50.1     239    58.1
     337    55.9     388    52.6     461    60.1     544    54.8     609    61.2
     710    61.8     762    66.5     802    64.3     862    66.3     888    66.7
```

963	66.3	996	77.5	1125	78.7	1327	80.2	1399	82.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	154	.04	239	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
154	239	180	170	160	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 134.1

INPUT
Description:
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	63.6	23	60.7	47	56.2	115	53.4	162	52.5
222	55.2	280	53.7	320	52.2	345	49.4	375	54.8
435	59	520	61.2	570	58.2	600	61.7	648	60.9
665	60.9	700	64.2	765	64.6	790	65.7	815	65.7
875	65.7	922	67.2	964	65.9	990	70.8	1010	76.2
1057	77.7	1148	78.8	1190	80.2	1305	80.4		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	320	.04	375	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
320	375	220	210	200	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 134

INPUT
Description:
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.2	45	52	81	51.5	106	54.1	209	53.6
230	48.9	274	56.8	301	52.5	352	50.9	369	45
407	50	471	61.4	489	61.4	533	53.8	591	60.6
703	61.2	813	63.6	840	64.1	860	61.5	951	61.3
1014	77.7	1123	77	1305	78.7	1347	79.2	1365	82.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	274	.04	471	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
274	471	250	240	230	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 133.2

INPUT

Description: SECTIONS FROM LEFT TO RIGHT LOOKING DOWNSTREAM

Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	77.2	23	55.9	70	48.7	117	47.2	143	50.7
170	52.5	233	52.6	255	49.2	270	49.2	300	49.7
354	51.4	376	44.9	413	44.9	425	51.4	463	55.4
490	52	515	56.2	575	62.5	622	59.2	695	62.2
760	62.7	780	63	800	63	850	61.7	920	64
960	69.2	990	64.9	1045	69.9	1105	75.2	1140	74.6
1155	74.6	1210	76	1250	78.7	1305	79.2		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	354	.04	425	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
354	425	280	280	260	.1	.3

SUMMARY OF MANNING'S N VALUES

River:RIVER-1

Reach	River Sta.	n1	n2	n3	n4	n5	n6
Reach-1	158	.04	.04	.04			
Reach-1	157.1	.04	.04	.04			
Reach-1	157	.04	.04	.04			
Reach-1	156	.04	.04	.04			
Reach-1	155	.04	.04	.04			
Reach-1	154	.04	.04	.04			
Reach-1	153	.04	.04	.04			
Reach-1	152	.04	.04	.04			
Reach-1	151	.04	.04	.04			
Reach-1	150	.04	.04	.04			
Reach-1	149.1	.04	.04	.04			
Reach-1	149	.04	.04	.04			
Reach-1	148	.04	.04	.04			
Reach-1	147	.04	.04	.04			
Reach-1	146	.04	.04	.04			
Reach-1	145	.04	.04	.04			
Reach-1	144.1	Culvert					

Reach-1	144	.03	.04	.1	.045	
Reach-1	143	.03	.03	.03	.06	.03
.03						
Reach-1	142.9	.03	.03	.03	.06	.03
.03						
Reach-1	142.1	.03	.03	.03	.06	.03
.03						
Reach-1	142	.03	.03	.03	.06	.03
.03						
Reach-1	141	.04	.04	.04		
Reach-1	140	.04	.04	.04		
Reach-1	139	.04	.04	.04		
Reach-1	138.3	.04	.04	.04		
Reach-1	138.1	.04	.04	.04		
Reach-1	138	.04	.04	.04		
Reach-1	137	.04	.04	.04		
Reach-1	136	.04	.04	.04		
Reach-1	135	.04	.04	.04		
Reach-1	134.1	.04	.04	.04		
Reach-1	134	.04	.04	.04		
Reach-1	133.2	.04	.04	.04		

SUMMARY OF REACH LENGTHS

River: RIVER-1

Reach	River Sta.	Left	Channel	Right
Reach-1	158	210	210	200
Reach-1	157.1	190	190	190
Reach-1	157	150	170	170
Reach-1	156	230	300	250
Reach-1	155	350	330	290
Reach-1	154	350	345	330
Reach-1	153	180	190	190
Reach-1	152	540	560	590
Reach-1	151	1030	1045	1000
Reach-1	150	560	570	600
Reach-1	149.1	610	600	560
Reach-1	149	900	980	1020
Reach-1	148	450	370	470
Reach-1	147	460	545	460
Reach-1	146	880	910	935
Reach-1	145	960	955	960
Reach-1	144.1	Culvert		

Reach-1	144	390	345	360
Reach-1	143	1	1	1
Reach-1	142.9	399	444	409
Reach-1	142.1	1	1	1
Reach-1	142	430	500	510
Reach-1	141	450	470	480
Reach-1	140	420	355	400
Reach-1	139	130	90	100
Reach-1	138.3	200	220	250
Reach-1	138.1	60	70	80
Reach-1	138	920	860	820
Reach-1	137	410	440	390
Reach-1	136	530	520	510
Reach-1	135	180	170	160
Reach-1	134.1	220	210	200
Reach-1	134	250	240	230
Reach-1	133.2	280	280	260

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RIVER-1

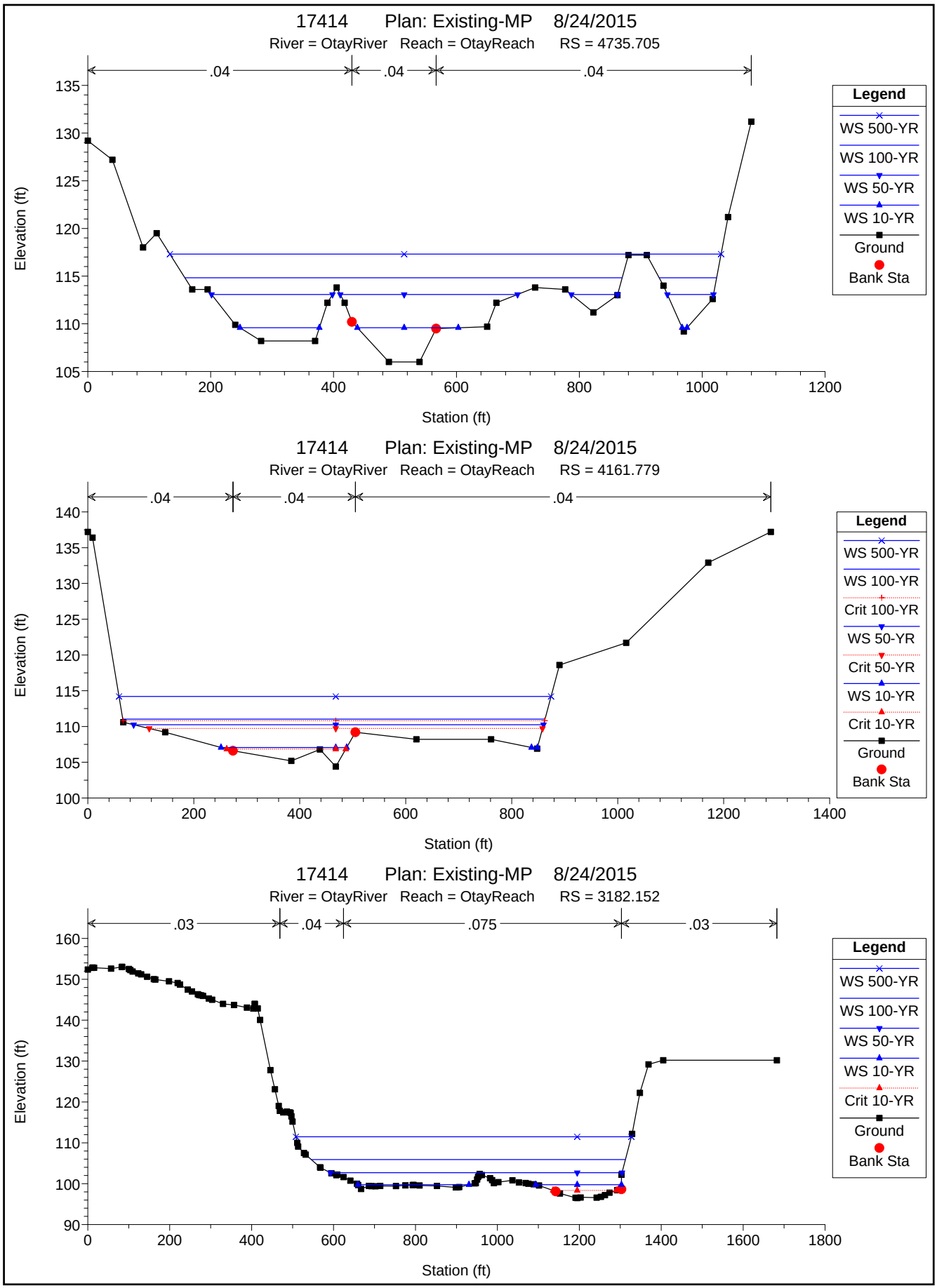
Reach	River Sta.	Contr.	Expan.
Reach-1	158	.1	.3
Reach-1	157.1	.1	.3
Reach-1	157	.1	.3
Reach-1	156	.1	.3
Reach-1	155	.1	.3
Reach-1	154	.1	.3
Reach-1	153	.1	.3
Reach-1	152	.1	.3
Reach-1	151	.1	.3
Reach-1	150	.1	.3
Reach-1	149.1	.1	.3
Reach-1	149	.1	.3
Reach-1	148	.1	.3
Reach-1	147	.3	.5
Reach-1	146	.3	.5
Reach-1	145	.1	.3
Reach-1	144.1	Culvert	
Reach-1	144	.3	.5
Reach-1	143	.3	.5
Reach-1	142.9	.3	.5
Reach-1	142.1	.3	.5
Reach-1	142	.3	.5
Reach-1	141	.3	.5
Reach-1	140	.1	.3
Reach-1	139	.1	.3
Reach-1	138.3	.1	.3
Reach-1	138.1	.1	.3
Reach-1	138	.1	.3
Reach-1	137	.1	.3
Reach-1	136	.1	.3
Reach-1	135	.1	.3
Reach-1	134.1	.1	.3
Reach-1	134	.1	.3
Reach-1	133.2	.1	.3

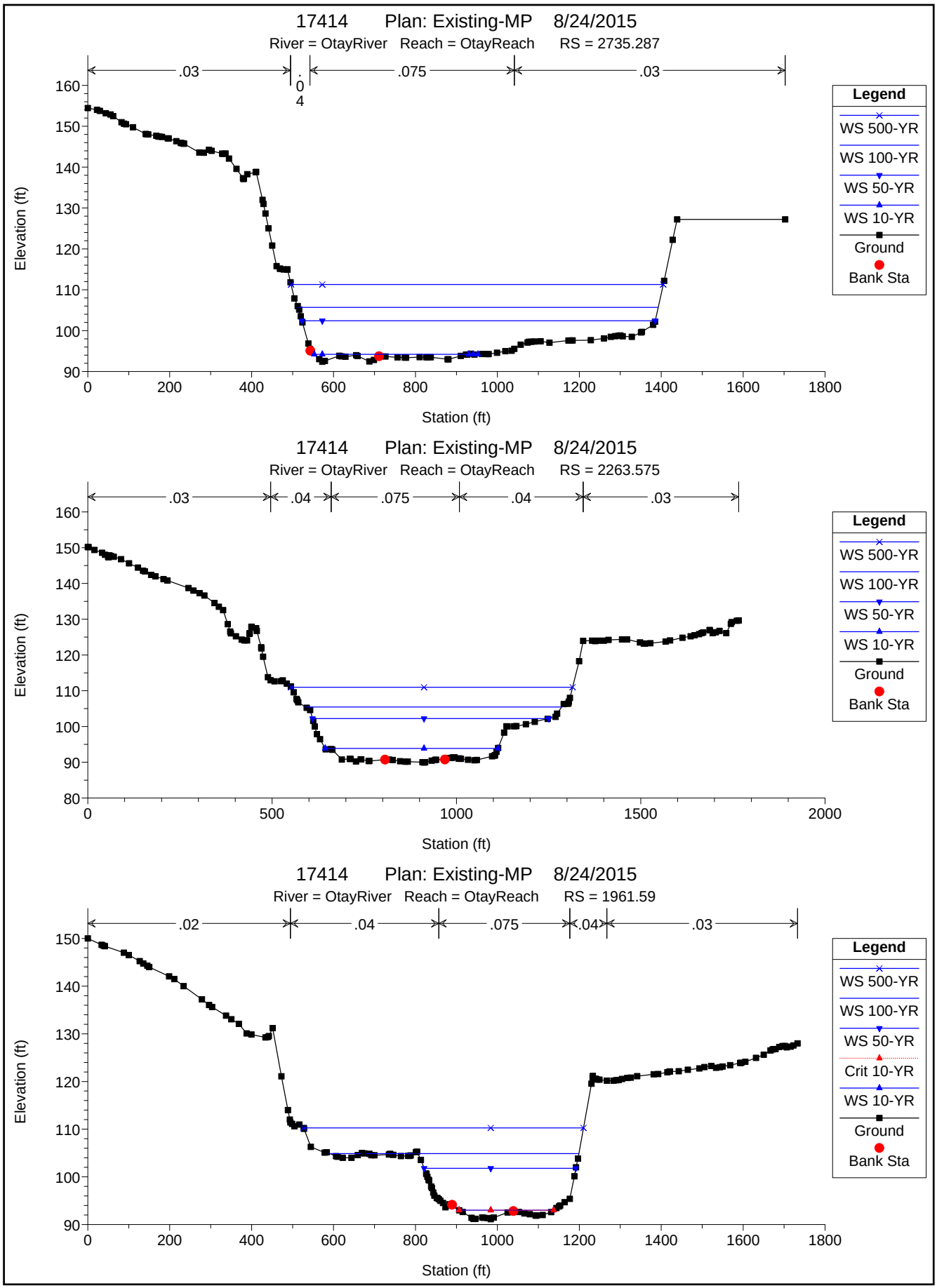
Appendix 8

Existing Condition HEC-RAS Output
(Multiple Profile)

HEC-RAS Plan: Existing River: OtayRiver Reach: OtayReach

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
OtayReach	4735.705	100-YR	22000.00	106.00	114.82		115.60	0.003794	8.80	3411.74	805.26	0.56
OtayReach	4735.705	10-YR	1200.00	106.00	109.59		109.70	0.001819	2.91	474.50	301.39	0.32
OtayReach	4735.705	50-YR	12000.00	106.00	113.08		113.68	0.003782	7.37	2105.26	635.97	0.54
OtayReach	4735.705	500-YR	50000.00	106.00	117.31		118.76	0.004919	12.10	5491.44	897.10	0.67
OtayReach	4161.779	100-YR	22000.00	104.40	111.03	110.81	112.25	0.009068	10.33	2644.11	796.78	0.81
OtayReach	4161.779	10-YR	1200.00	104.40	107.06	106.84	107.39	0.012435	4.66	262.00	248.42	0.75
OtayReach	4161.779	50-YR	12000.00	104.40	110.25	109.73	110.90	0.005922	7.46	2032.39	773.51	0.64
OtayReach	4161.779	500-YR	50000.00	104.40	114.20		115.70	0.005496	11.16	5198.07	815.28	0.69
OtayReach	3182.152	100-YR	22000.00	96.49	105.90		106.25	0.004183	5.43	4767.07	767.22	0.32
OtayReach	3182.152	10-YR	1200.00	96.49	99.74	98.34	99.84	0.005174	2.66	538.38	480.59	0.29
OtayReach	3182.152	50-YR	12000.00	96.49	102.68		103.14	0.011178	6.52	2374.87	712.09	0.49
OtayReach	3182.152	500-YR	50000.00	96.49	111.47		111.93	0.002509	5.84	9217.00	818.95	0.27
OtayReach	2735.287	100-YR	22000.00	92.38	105.68		105.78	0.000374	2.04	8770.81	878.81	0.10
OtayReach	2735.287	10-YR	1200.00	92.38	94.21		94.46	0.052208	4.26	304.36	388.70	0.79
OtayReach	2735.287	50-YR	12000.00	92.38	102.41		102.47	0.000443	1.81	5924.60	862.50	0.11
OtayReach	2735.287	500-YR	50000.00	92.38	111.28		111.49	0.000407	2.73	13781.66	908.70	0.11
OtayReach	2263.575	100-YR	22000.00	89.91	105.46		105.58	0.000461	2.60	7916.21	695.18	0.12
OtayReach	2263.575	10-YR	1200.00	89.91	93.86		93.88	0.000314	0.81	1386.62	468.53	0.08
OtayReach	2263.575	50-YR	12000.00	89.91	102.21		102.28	0.000382	2.01	5738.26	641.32	0.10
OtayReach	2263.575	500-YR	50000.00	89.91	110.96		111.25	0.000626	3.73	11992.00	763.22	0.14
OtayReach	1961.59	100-YR	22000.00	91.13	104.89		105.28	0.002328	5.24	4377.69	583.86	0.26
OtayReach	1961.59	10-YR	1200.00	91.13	93.01	93.01	93.49	0.073700	5.93	222.10	230.80	0.97
OtayReach	1961.59	50-YR	12000.00	91.13	101.80		102.03	0.001951	3.99	3120.92	370.31	0.23
OtayReach	1961.59	500-YR	50000.00	91.13	110.26		110.88	0.002290	6.56	7928.53	683.46	0.27
OtayReach	1648.554	100-YR	22000.00	86.75	104.17		104.61	0.001912	5.69	4129.55	301.18	0.24
OtayReach	1648.554	10-YR	1200.00	86.75	92.48		92.51	0.000604	1.45	925.00	232.49	0.11
OtayReach	1648.554	50-YR	12000.00	86.75	101.35		101.56	0.001162	3.93	3299.86	288.46	0.18
OtayReach	1648.554	500-YR	50000.00	86.75	109.16		110.05	0.002932	8.38	6698.01	590.68	0.32
OtayReach	1356.913	100-YR	22000.00	85.16	103.68		104.10	0.001584	5.48	4244.39	496.20	0.23
OtayReach	1356.913	10-YR	1200.00	85.16	92.40		92.41	0.000198	1.02	1246.81	218.32	0.07
OtayReach	1356.913	50-YR	12000.00	85.16	101.07		101.27	0.000875	3.67	3358.98	268.60	0.16
OtayReach	1356.913	500-YR	50000.00	85.16	108.47		109.28	0.002231	7.58	6949.74	596.94	0.28
OtayReach	958.6605	100-YR	22000.00	87.85	102.84		103.34	0.002330	5.76	3926.90	524.40	0.26
OtayReach	958.6605	10-YR	1200.00	87.85	92.25		92.28	0.000643	1.31	938.49	242.04	0.11
OtayReach	958.6605	50-YR	12000.00	87.85	100.62		100.85	0.001235	3.76	3111.48	277.27	0.19
OtayReach	958.6605	500-YR	50000.00	87.85	107.06		108.19	0.003253	8.05	5898.08	700.83	0.33
OtayReach	536.4273	100-YR	22000.00	84.28	102.73	90.52	102.90	0.000401	3.44	6715.57	662.88	0.14
OtayReach	536.4273	10-YR	1200.00	84.28	92.23	85.40	92.24	0.000032	0.55	2250.54	325.85	0.03
OtayReach	536.4273	50-YR	12000.00	84.28	100.55	88.70	100.62	0.000219	2.34	5430.47	571.08	0.10
OtayReach	536.4273	500-YR	50000.00	84.28	106.95	94.49	107.40	0.000754	5.42	9253.16	832.34	0.20
OtayReach	464.0616		Culvert									
OtayReach	358.9326	100-YR	22000.00	84.96	90.75	90.75	93.13	0.039751	12.65	1806.27	371.89	0.95
OtayReach	358.9326	10-YR	1200.00	84.96	86.47		86.67	0.024518	3.58	336.84	289.98	0.58
OtayReach	358.9326	50-YR	12000.00	84.96	89.09	89.09	90.74	0.044357	10.50	1195.27	362.86	0.95
OtayReach	358.9326	500-YR	50000.00	84.96	94.45	94.24	98.25	0.031033	15.78	3214.77	389.11	0.92
OtayReach	45.40464	100-YR	22000.00	77.00	86.49	82.63	87.36	0.007514	7.50	2942.97	333.31	0.44
OtayReach	45.40464	10-YR	1200.00	77.00	78.24	77.91	78.44	0.028125	3.60	333.59	295.75	0.60
OtayReach	45.40464	50-YR	12000.00	77.00	83.67	80.81	84.22	0.007736	5.95	2017.81	322.88	0.42
OtayReach	45.40464	500-YR	50000.00	77.00	92.42	86.55	93.76	0.006253	9.53	5485.74	556.71	0.43


17414 Plan: Existing-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 4735.705
.04
.04
.04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta
17414 Plan: Existing-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 4161.779
.04
.04
.04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
Crit 100-YR
WS 50-YR
Crit 50-YR
WS 10-YR
Crit 10-YR
Ground
Bank Sta
17414 Plan: Existing-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 3182.152
.03
.04
.075
.03
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Crit 10-YR
Ground
Bank Sta


17414 Plan: Existing-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 2735.287
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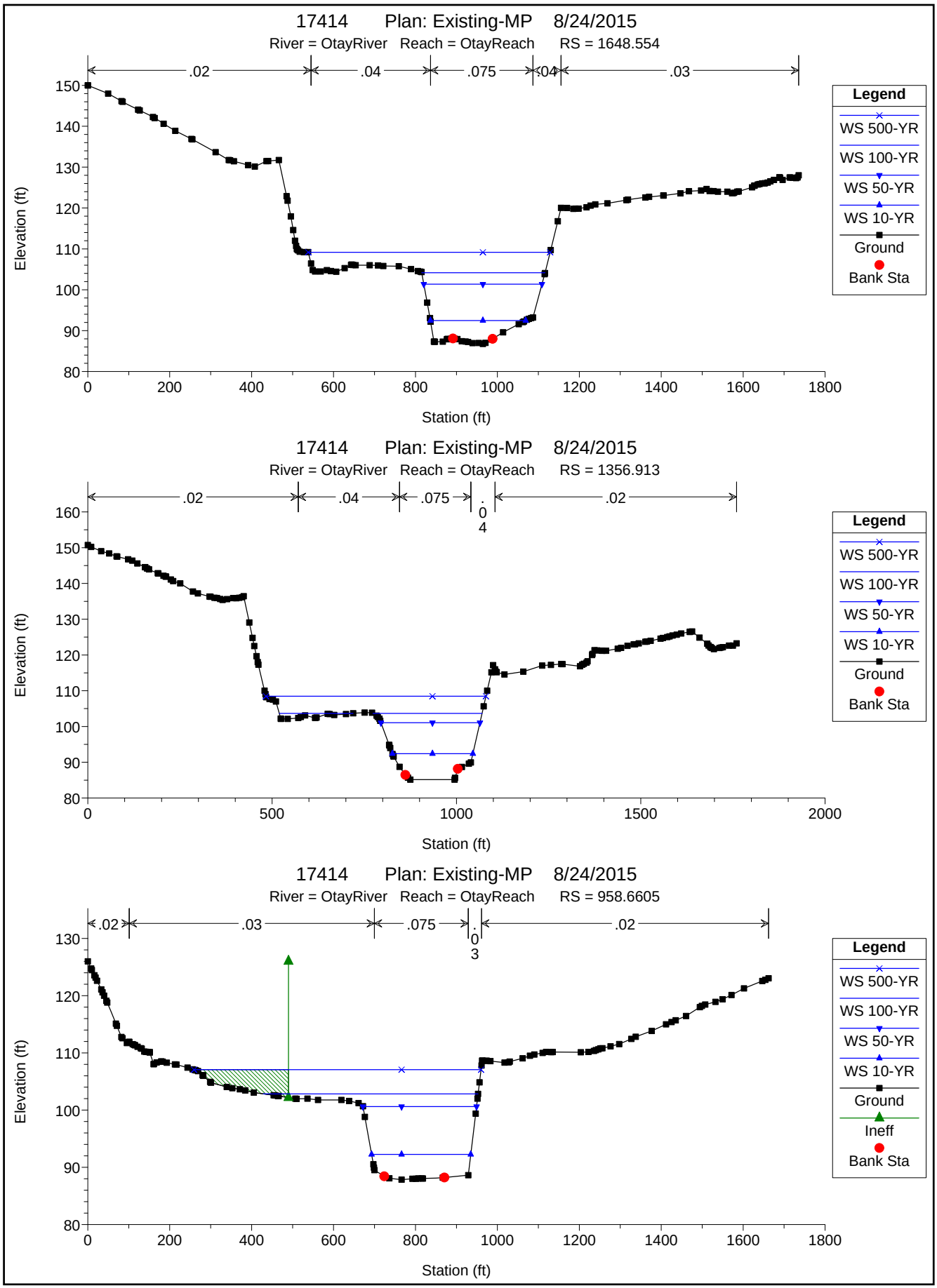
.04
.075
.03
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta
17414 Plan: Existing-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 2263.575
.03
.04
.075
.04
.03
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta
17414 Plan: Existing-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 1961.59
.02
.04
.075
.04
.03
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
Crit 10-YR
WS 10-YR
Ground
Bank Sta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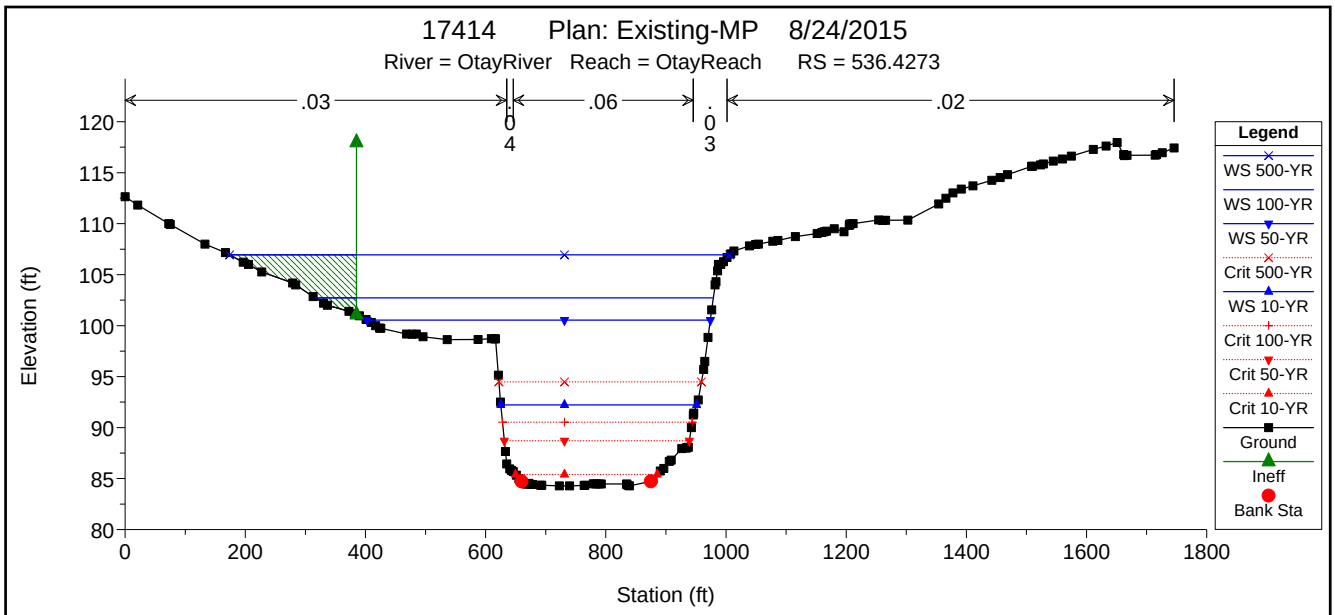
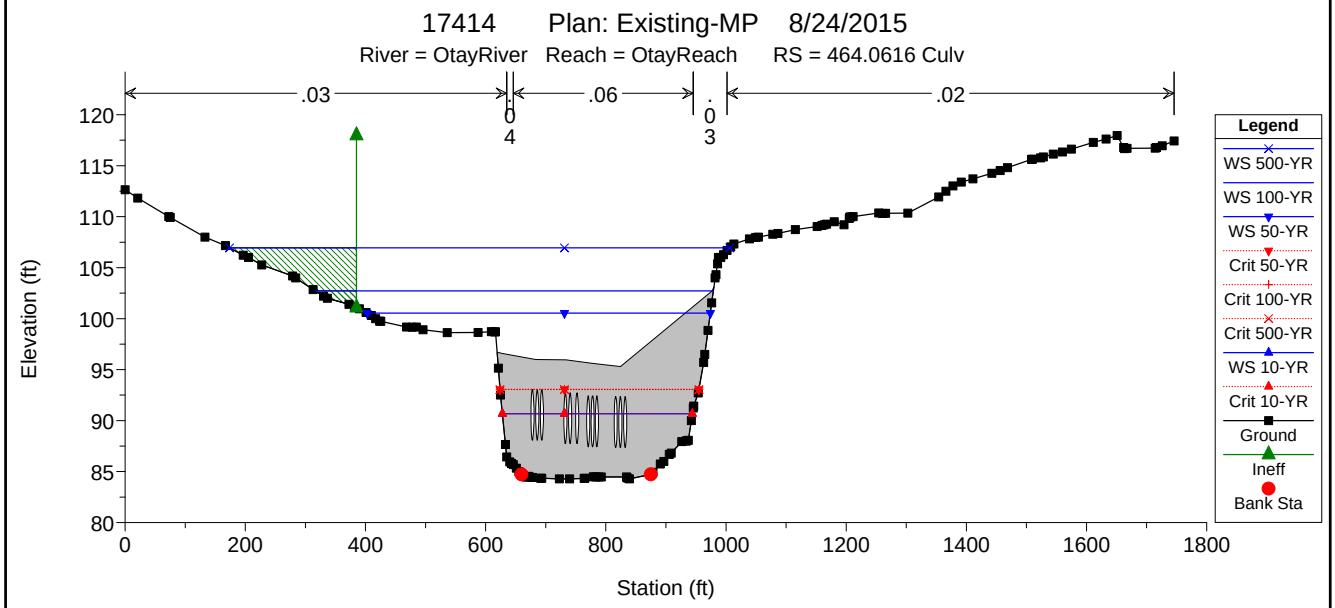
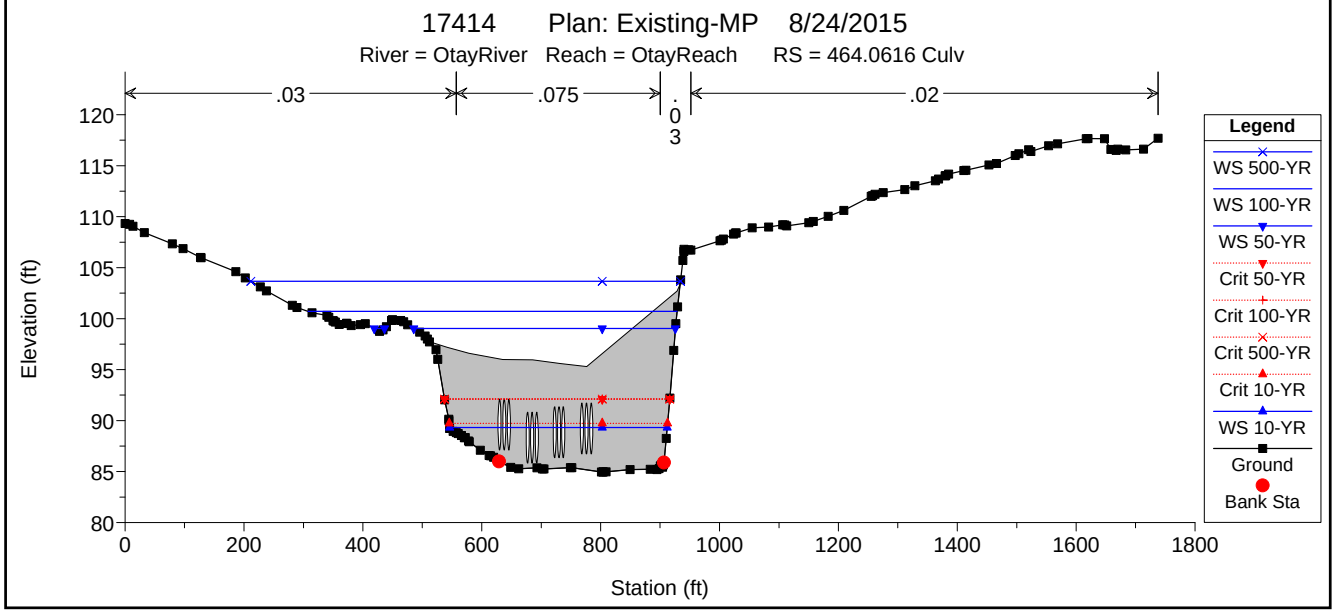
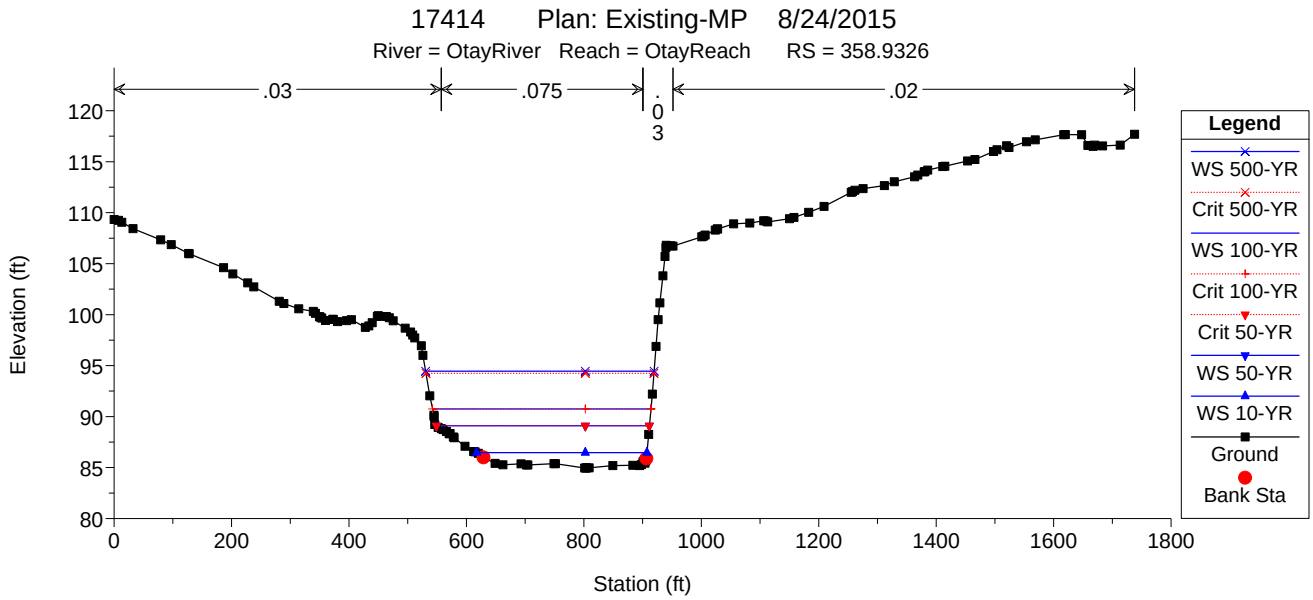
.04
.075
.04
.03
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta
17414 Plan: Existing-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 1356.913
.02
.04
.075
.04
.02
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta
17414 Plan: Existing-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 958.6605
.02
.03
.075
.03
.02
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta


17414 Plan: Existing-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 536.4273
.03
.04
.06
.03
.02
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
Crit 500-YR
WS 10-YR
Crit 100-YR
Crit 50-YR
Crit 10-YR
Ground
Ineff
Bank Sta


17414 Plan: Existing-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 464.0616 Culv
.03
.04
.06
.03
.02
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
Crit 50-YR
Crit 100-YR
Crit 500-YR
WS 10-YR
Crit 10-YR
Ground
Ineff
Bank Sta


17414 Plan: Existing-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 464.0616 Culv
.03
.075
.03
.02
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
Crit 50-YR
Crit 100-YR
Crit 500-YR
Crit 10-YR
WS 10-YR
Ground
Bank Sta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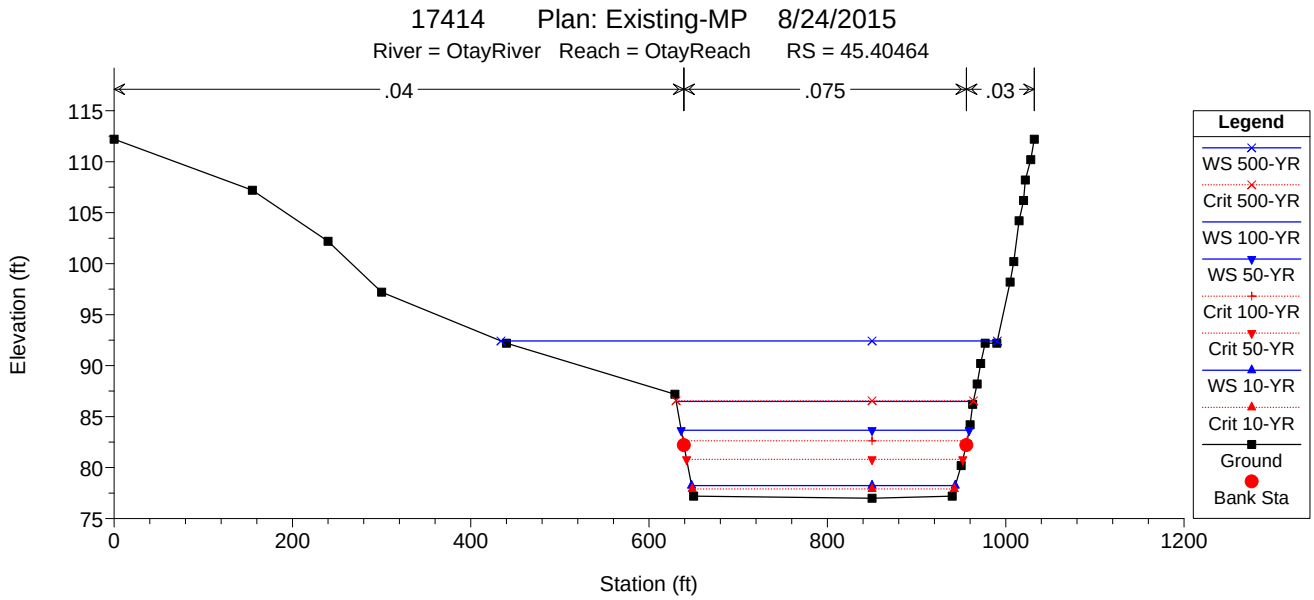
River = OtayRiver Reach = OtayReach RS = 358.9326
.03
.075
.03
.02
Elevation (ft)
Station (ft)
Legend
WS 500-YR
Crit 500-YR
WS 100-YR
Crit 100-YR
Crit 50-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta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.075
.03
Elevation (ft)
Station (ft)
Legend
WS 500-YR
Crit 500-YR
WS 100-YR
WS 50-YR
Crit 100-YR
Crit 50-YR
WS 10-YR
Crit 10-YR
Ground
Bank Sta

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
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PROJECT DATA
Project Title: 17414
Project File : 17414.prj
Run Date and Time: 8/24/2015 4:57:17 PM

Project in English units

PLAN DATA

Plan Title: Existing-MP
Plan File :
w:\17414_Shinohara_CLOMR\WaterResources\Hydraulics\HecRas\CLOMR\17414.p01

Geometry Title: Existing-MP
Geometry File :
w:\17414_Shinohara_CLOMR\WaterResources\Hydraulics\HecRas\CLOMR\17414.g01

Flow Title : MP
Flow File :
w:\17414_Shinohara_CLOMR\WaterResources\Hydraulics\HecRas\CLOMR\17414.f01

Plan Summary Information:
Number of: Cross Sections = 12 Multiple Openings = 0
Culverts = 1 Inline Structures = 0
Bridges = 0 Lateral Structures = 0

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: MP
Flow File :
w:\17414_Shinohara_CLOMR\WaterResources\Hydraulics\HecRas\CLOMR\17414.f01

Flow Data (cfs)

River	Reach	RS	100-YR	10-YR	50-YR	500-YR
OtayRiver	OtayReach	4735.705	22000	1200	12000	50000

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
OtayRiver	OtayReach	100-YR	Known WS = 86.49	
OtayRiver	OtayReach	10-YR	Known WS = 78.24	
OtayRiver	OtayReach	50-YR	Known WS = 83.67	
OtayRiver	OtayReach	500-YR	Known WS = 92.42	

GEOMETRY DATA

Geometry Title: Existing-MP
Geometry File :
w:\17414_Shinohara_CLOMR\WaterResources\Hydraulics\HecRas\CLOMR\17414.g01

CROSS SECTION

RIVER: OtayRiver
REACH: OtayReach RS: 4735.705

INPUT
Description:
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	129.2	40	127.2	90	118	112	119.5	170	113.6
195	113.6	240	109.9	282	108.2	370	108.2	390	112.2
405	113.8	418	112.2	430	110.2	490	106	540	106
567	109.5	650	109.7	665	112.2	728	113.8	777	113.6
823	111.2	862	113	880	117.2	910	117.2	937	114
970	109.2	1017	112.6	1042	121.2	1080	131.2		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	430	.04	567	.04

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           430     567              610     600     560             .1       .3

CROSS SECTION


RIVER: OtayRiver
REACH: OtayReach          RS: 4161.779

INPUT
Description:
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   137.2       9   136.4      67   110.6     146   109.2     274   106.6
     384   105.2     438   106.8     468   104.4     505   109.2     620   108.2
     761   108.2     848   106.9     890   118.6    1016   121.7    1171   132.9
    1289   137.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .04     274     .04     505     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           274     505           933.16     980    1020             .1       .3

CROSS SECTION


RIVER: OtayRiver
REACH: OtayReach          RS: 3182.152

INPUT
Description:
Station Elevation Data    num=     105
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   152.4   10.93   152.8      12  152.88   15.35  152.83   56.68  152.62
   82.84  153.02   84.01  153.06  100.36  152.52  103.83  152.26  109.45   151.9
  123.12  151.46  130.14  151.22  144.77  150.64  161.29  150.03  164.68  149.96
  198.16  149.51  219.37   149.1  225.01  148.72  244.06  147.47   254.3  147.04
  268.67  146.34  271.95  146.15  276.57  146.09  281.41  145.93  295.16   145.3
  303.42  145.01  330.18  143.99  356.93  143.72  388.62  143.09  404.08  142.83
  407.32  143.98  407.59  143.96  414.75  142.87  420.66  140.06  445.83  127.79
  456.66  123.08  465.99  119.04  468.78  117.81  476.99  117.44  486.25  117.63
   492.5  117.43  495.27  117.34  497.02  116.46  499.92  115.17  511.45     110
  513.59  109.08  527.78   107.5  531.79   107.1  567.07     104  568.16  103.91
  594.57  102.56  606.71  102.07  608.84  102.21  624.27  101.63  641.15  100.75
  657.32     100  659.91   99.67  667.15   98.71  686.33   99.44  692.21    99.4
  702.39   99.37  713.85   99.44  752.43   99.43  775.38   99.59   793.1   99.66
  795.34    99.7  810.04   99.56  852.51   99.45  898.56   99.09  902.55   99.11
  906.65   99.18  944.58  100.07  947.42  100.13  950.49  101.03   952.9  101.64
     955     102   956.5  102.38  962.23  102.11  982.17  101.35  986.98  100.87
  991.45  100.14 1002.36  100.38 1036.71  100.82 1052.67   100.3  1069.1  100.16
 1075.48     100 1088.61   99.85 1101.76   99.56 1142.54   98.11 1152.76    97.6
 1190.88   96.56 1195.01   96.49 1203.09   96.63  1242.4   96.58 1252.84   96.77
 1262.62    97.2  1273.5    97.8 1292.43   98.41 1302.88   98.62    1303   102.2
    1329   112.2    1348   122.2    1369   129.2    1405   130.2 1682.42   130.2

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .03  468.78     .04  624.27    .075    1303     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1142.54 1302.88              440  446.86  453.75             .1       .3
```



```
CROSS SECTION


RIVER: OtayRiver
REACH: OtayReach          RS: 2735.287

INPUT
Description:
Station Elevation Data    num=     118
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  154.44   22.53     154    29.3  153.77   43.85   153.2   55.27  152.89
   61.97  152.48   82.12  150.98   88.19  150.64   93.31  150.49  110.35  149.75
  141.12  148.11  143.81  148.05  147.62     148  167.29  147.66   172.2  147.51
  175.13  147.45  181.12  147.39  195.29  147.04  197.32     147  216.01  146.34
   227.1   145.9  230.68  145.86  233.47   145.8  234.98  145.72  272.36  143.58
  283.24  143.52   295.8  144.23  302.26     144  328.01   143.3  329.57  143.25
  336.24  143.32  344.56  142.09  363.06  139.58  378.93  137.29  380.14  137.11
  381.06   137.2  389.35  138.29  409.91  138.77  410.97  138.82  426.67     132
  428.95  130.99  433.77  128.67  441.13  125.05  450.27  120.81  460.97  115.79
  469.11  115.16  469.97  115.13  478.07  114.95  487.33  114.96  487.61  114.97
  494.99  111.82  504.18  107.88  512.47     106  516.03  105.16  519.91   103.5
  524.09     102   538.5   96.85  542.24   95.52  543.53   95.09  565.01   93.03
  572.48   92.38  578.75   92.58  613.83   93.85  619.17   93.72  628.94   93.63
  655.32   93.97  658.48   93.79  687.36   92.46  698.65   92.82  711.17   93.73
  726.48   93.69  756.12   93.45  773.43   93.42  776.63   93.38  810.18   93.51
  826.56   93.49  830.26   93.46  837.32    93.5  878.57   92.99  880.47   92.96
  910.56   93.82  923.55   94.14  926.14   94.11  934.98   94.34  944.11   94.16
  962.76   94.28  973.66   94.28  978.42   94.27  999.03   94.59 1019.45   94.97
 1034.83   95.08 1041.44   95.54 1056.88   96.55 1073.67   97.09 1076.41   97.27
 1082.87   97.28 1090.41   97.33  1105.6   97.39 1127.09   97.05 1173.45   97.58
  1179.2   97.58 1183.61    97.6 1227.95   97.67 1260.01    98.1 1276.88   98.48
 1287.79   98.65 1295.45   98.74 1300.26   98.81 1305.88   98.62 1328.25   98.49
 1350.63   99.57 1352.83   99.69 1380.26  101.43    1385   102.2    1407   112.2
    1428   122.2    1439   127.2  1702.7   127.2

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .03  494.99     .04  542.24    .075 1041.44     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        543.53  711.17            482.72  471.71   471.4             .1       .3

CROSS SECTION


RIVER: OtayRiver
REACH: OtayReach          RS: 2263.575

INPUT
Description:
Station Elevation Data    num=     145
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  150.19    2.02  150.15   17.83  149.37   38.57  148.57   46.81     148
      55  147.45   55.93  147.33   58.23  147.86    62.7  147.69   70.38  147.46
   90.06   146.8   111.9  145.64  135.79  144.42  149.81  143.57  154.62  143.36
  171.74  142.39  183.41     142  205.23  141.19  216.14  140.83  273.11  138.71
  286.74     138  303.14  137.29  316.26  136.61  343.76   134.5  355.67  133.47
  367.16  132.54  379.72  128.63  386.37  126.53     388  126.04  401.76  125.23
  417.36  124.28  424.68  124.06  431.87  124.08  438.34  125.87  439.24   126.1
  443.74  127.87  444.24  127.88  456.74  127.48  458.57  126.73   470.3  122.15
  471.07  121.83  475.45   119.5  488.56  113.79  496.01  112.93  506.68  112.65
  524.73  112.67  529.01   112.9  539.77  111.98  550.75   111.2  558.37  109.56
```

565.9	107.71	568.34	107.35	570.89	106.78	593.83	105.23	603.12	104.6
611.39	101.55	615.55	100	621.4	97.86	630.08	96.45	645.32	93.63
660.25	93.68	663.64	93.5	689.21	90.77	710.83	90.95	712.78	90.93
727.47	90.23	740.25	90.82	741.95	90.79	761.96	90.35	763.78	90.37
806.47	90.73	817.26	90.72	826.97	90.64	847.27	90.3	861.38	90.16
868.06	90.16	907.75	90	912.13	89.91	915.05	90	932.84	90.44
942.39	90.66	944.93	90.69	968.84	90.78	970.43	90.82	981.13	91.19
987.02	91.24	991.77	91.38	995.08	91.37	1005.9	91.01	1008.03	91.08
1012.26	90.95	1031.62	90.71	1048.88	90.56	1055.31	90.63	1096.71	91.69
1103.05	91.83	1104.54	92	1108.59	92.91	1113.15	94	1129.36	98.3
1135.67	100.04	1138.67	100.01	1156.84	100.05	1162.42	100.12	1188.5	100.65
1212.48	101.32	1247.6	102.12	1268.72	102.68	1273.19	103.6	1291.16	106.28
1301.57	106.37	1303.76	106.47	1304.9	106.95	1307.78	108	1332.97	118.25
1343.8	123.94	1368.06	124	1376.28	123.87	1384.4	124	1399.77	124
1412.72	124.21	1449.29	124.34	1462.77	124.35	1497.97	123.49	1508.25	123.2
1511.21	123.17	1526.03	123.27	1567.27	123.75	1579.71	124.07	1612.95	124.81
1635.35	125.22	1645.92	125.52	1658.3	125.81	1665.16	126.12	1669.53	126.28
1686.91	126.95	1687.22	126.95	1695.14	126.11	1703.73	126.35	1713.62	126.74
1731.92	126.1	1744.46	128.72	1746.79	129.18	1760.69	129.57	1765.67	129.64

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	496.01	.04	660.25	.075	1008.03	.04	1343.8	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
806.47	968.84	301.87	301.98	315.82	.1	.3

CROSS SECTION

RIVER: OtayRiver
REACH: OtayReach RS: 1961.59

INPUT
Description:
Station Elevation Data num= 148

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	150	33.68	148.67	37.71	148.49	41.6	148.37	88.06	147
100.03	146.52	126.64	145.24	135.46	144.76	145.36	144.27	150.05	144
198.62	142.04	211.06	141.48	233.89	140	278.53	137.22	295.99	136.05
303.54	135.62	337.58	133.81	350.49	133.05	368.86	132.08	387.71	130.09
399.56	129.85	433.7	129.23	439.41	129.33	442.02	129.51	451.34	131.19
472.8	121.1	488.68	114	493.23	112	494.68	111.43	498.84	111.11
504.63	110.62	516.17	110.98	527.15	110.24	527.83	110.07	544.53	106.29
578.38	105.09	583.2	105.16	606.14	104.34	609.96	104.22	622.33	104
643.88	104	659.04	104.57	669.4	105	675.13	104.93	687.49	104.82
692.39	104.54	699.74	104.53	734.97	104.68	738.24	104.83	745.89	104.61
764.32	104.37	782.16	104.4	785.87	104.4	788.4	104.51	801.16	105.21
804.03	105.28	813.22	103.56	826.01	100.7	826.95	100.59	829.12	100
831.84	99.39	833.12	99.25	838.14	97.98	839.96	97.67	843.25	96.7
846.13	96.07	851.97	95.57	854.2	95.54	857.2	95.289	861	94.97
867.14	94.51	873.25	93.62	883.06	94.24	884.33	94.16	886.35	94
889.35	94.14	892.31	94	906.71	93	915.25	92.63	936.85	91.41
941.77	91.18	946.54	91.21	962.85	91.48	966.69	91.41	976.66	91.36
983.78	91.13	991.05	91.45	1024.85	92.54	1039.04	92.83	1052.52	92.63
1066.06	92.33	1079.21	92.17	1093.35	91.89	1095.69	91.89	1110.3	92
1131.31	92.61	1144.14	93.45	1150.66	93.8	1153.29	94	1164.24	94.69
1176.79	95.38	1188.12	100.11	1191.76	102	1196.83	103.84	1229.76	119.55
1232.33	120.81	1233.06	121.17	1240.21	120.58	1243.45	120.41	1249.13	120.38
1267.18	120.18	1283.52	120.17	1290.29	120.27	1296.02	120.29	1304.24	120.52
1317.04	120.73	1325.53	120.81	1341.39	121.11	1381.59	121.53	1392.47	121.56
1415.05	121.95	1420.29	122.1	1421.13	122.09	1442.83	122.15	1464.97	122.45
1493.19	122.74	1505.49	123.03	1522.15	123.26	1534.05	122.88	1543.54	123.01

1549.94	123.14	1568.42	123.42	1592.7	123.9	1595.33	123.92	1605.21	124.12
1631.28	124.96	1650.41	125.61	1666.65	126.51	1672.03	126.73	1675.27	126.8
1679.16	126.79	1688.03	127.23	1696.18	127.42	1701.74	127.46	1706.34	127.16
1716.09	127.3	1722.88	127.57	1732.79	128				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	494.68	.04	857.2	.075	1176.79	.04	1267.18	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
889.35	1039.04	310.97	313.04	317.06	.1	.3

CROSS SECTION

RIVER: OtayRiver
REACH: OtayReach RS: 1648.554

INPUT
Description:
Station Elevation Data num= 138

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	150	.34	149.99	49.56	148	82.37	146.15	84.97	146
122.97	144.06	126.66	143.88	159.15	142.25	163.21	142	184.99	140.62
213.56	138.87	253.05	136.91	255.39	136.79	311.92	133.67	344.2	131.73
347.52	131.69	356.77	131.43	391.31	130.51	407.7	130.15	436.16	131.45
440.26	131.5	466.3	131.75	485.36	122.89	487.65	121.8	495.81	117.95
501.39	114.59	505.84	112	508.66	110.73	510.39	110	510.87	109.89
513.5	109.63	517.36	109.29	527.45	109.18	529.05	109.21	537.95	109.23
545.02	106.42	549	104.82	554.95	104.46	568.57	104.48	583.64	104.79
593.58	104.57	606.51	104.4	627.01	105.28	642.71	106.1	644.35	106.18
647.84	106.07	654.02	106	688.07	106	708.37	105.96	721.44	105.82
759.3	105.76	788.96	105.04	805.9	104.59	811.95	104.43	814.79	104.33
828.49	96.87	835.47	93.08	836.92	92.204	845.02	87.31	845.53	87.301
847.36	87.27	866.63	87.31	876.61	87.88	878.52	88	886.81	88
891.67	88.07	895.13	88.03	902.42	87.93	913.07	87.41	922.32	87.34
928.39	87.23	939.44	86.95	954.34	86.97	964.51	86.75	970.84	86.99
985.93	87.84	988.55	88	1013.94	89.58	1051.95	91.58	1062.27	92.09
1064.87	92.26	1072.14	92.65	1076.8	92.88	1082.43	93.08	1086.76	93.22
1115.37	103.82	1116.07	104.09	1130.21	109.71	1147.49	116.78	1155.48	120.05
1170.21	120	1185.53	119.78	1190.86	119.84	1198.1	119.84	1217.66	120.18
1227.44	120.59	1239.01	120.89	1268.59	121.13	1314.93	121.94	1318.77	122.04
1361.44	122.57	1370.44	122.73	1405.15	123.05	1405.73	123.05	1446.77	123.59
1467.57	124.1	1497.26	124.28	1510.71	124.64	1518.17	124.17	1527.61	124.12
1538.5	124	1561.41	124	1572.94	123.61	1574.63	123.61	1577.92	123.72
1585.26	124	1589.03	124.06	1621.73	125.07	1627.18	125.45	1627.95	125.49
1635.9	125.76	1639.88	125.87	1646.15	126	1651.37	126	1653.23	126.08
1659.94	126.22	1666.58	126.53	1675.23	126.87	1688.57	127.49	1688.77	127.52
1690.22	127.39	1696.44	126.87	1713.53	127.47	1715.44	127.46	1721.09	127.4
1729.39	127.33	1732.91	127.49	1735.57	128				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	545.02	.04	836.92	.075	1086.76	.04	1155.48	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
891.67	988.55	292.04	291.64	293.2	.1	.3

CROSS SECTION

RIVER: OtayRiver
REACH: OtayReach RS: 1356.913

INPUT
Description:
Station Elevation Data num= 140

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	150.74	9.27	150.21	36.34	149.02	57.94	148.4	78.09	147.56
79.85	147.52	109.23	146.75	120.7	146.38	134.2	145.6	155.1	144.56
156.12	144.52	160.77	144.18	165.95	143.93	189.77	142.85	191.29	142.77
205.23	142.13	211.03	141.95	212.23	141.9	225.18	141.11	231.52	140.68
250.79	140	285.12	137.75	298.55	137.2	330.3	136.34	333.12	136.26
343.7	136	350.47	135.94	359.27	135.64	365.68	135.38	377.63	135.62
394.11	135.89	402.8	135.88	410.72	136	418.63	136.15	422.92	136.43
437.98	129.08	446.88	124.8	451.63	122.5	457.51	119.67	461.07	118
462.7	117.28	479.37	110	481.84	109.03	483.77	108.18	492.96	107.69
502.17	107.53	510.31	106.99	523.34	102.21	524.07	102.14	542.14	102.13
570.84	102.37	577.99	102.67	589.42	103.1	616.54	102.41	617.19	102.4
620.54	102.51	650.79	103.55	655.76	103.47	668.48	103.22	700.24	103.48
719.77	103.68	750.88	103.87	771.06	103.84	783.1	103.03	786.57	102.66
791.04	102.19	793.35	101.58	817.23	94.877	817.93	94.68	820.37	94
826.6	92.31	828.49	91.81	829.61	91.6	845.55	88.74	861.67	86.46
868.4	85.69	875.09	85.16	994.83	85.16	996.27	85.66	1003.67	88.15
1014.76	88.7	1033.72	89.61	1039.18	89.94	1073.88	105.64	1083.4	110
1094.92	115.14	1099.46	117.17	1104.53	116	1107.25	115.31	1109.13	115.18
1130.09	114.57	1181.38	115.33	1232.67	117.03	1256.47	117.21	1284.29	117.48
1287.8	117.43	1335.26	116.84	1341.1	117.27	1345.69	117.53	1352.95	117.86
1355.53	118.22	1368.01	120	1369.08	120.29	1374.71	121.33	1381.87	121.28
1393.87	121.22	1395.75	121.19	1405.94	121.19	1437.49	121.74	1446.74	122
1464.14	122.55	1480.77	122.97	1484.46	123	1494.46	123.26	1512.67	123.68
1516.83	123.77	1526.81	123.96	1553.56	124.56	1560.02	124.74	1572.04	125.02
1578.15	125.19	1586.16	125.43	1597.68	125.68	1609.76	126	1632.99	126.46
1633.91	126.49	1639.37	126.59	1659.4	124.85	1680.57	123.14	1683.75	122.64
1688.77	122.25	1689.51	122.15	1692.75	121.96	1698.48	121.65	1713.57	121.96
1718.33	122.08	1722.73	122.17	1739.48	122.63	1749.8	122.62	1759.9	123.24

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	570.84	.04	845.55	.075	1039.18	.04	1104.53	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
861.67 1003.67 394.53 398.25 400.56 .1 .3

CROSS SECTION

RIVER: OtayRiver
REACH: OtayReach RS: 958.6605

INPUT
Description:
Station Elevation Data num= 126

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	126	8.13	124.74	9.99	124.46	16.01	123.57	18.89	123.15
22.57	122.6	32.8	121.09	36.05	120.59	39.83	120	45.36	119.12
47.38	118.79	68.54	115.12	70.9	114.73	82.09	112.77	84.77	112.56
95.32	111.71	100.17	111.86	100.84	111.93	101.16	111.92	109.68	111.52
113.18	111.41	115.45	111.33	121.47	111.08	129.53	110.82	131.52	110.74
137.82	110.22	141.99	110.19	144.01	110.17	147.56	110.15	151.33	110.12
151.48	110.08	160.66	108.04	161.09	108.06	167.95	108.32	179.26	108.53
182.96	108.47	192.69	108.29	212.67	108	216.45	107.95	243.38	107.42
255.73	107.13	261.3	107.02	263.83	106.95	268.9	106.82	280.14	106.11
281.79	106	298.52	104.93	300.73	104.8	339.15	104.04	352.98	103.83
371.17	103.63	384.43	103.45	405.23	103.06	453.86	102.59	457.48	102.55
464.28	102.46	465.79	102.45	506.56	102	509.73	101.97	536.31	102

561.98	101.77	619.02	101.77	638.03	101.6	661.09	101.23	671.76	100.67
676.44	98.81	697.23	90.53	698.73	89.94	699.74	89.52	723.97	88.44
736.17	88.09	765.94	87.85	792.53	88	801.24	88	806.79	88.06
815.45	88.06	818.19	88.05	866.66	88.19	870.75	88.21	928.81	88.64
947.05	99.38	951.48	102	952.9	102.83	956.33	104.86	961.31	107.79
962.75	108.64	963.41	108.65	972.63	108.61	974.41	108.61	982.98	108.57
1017.57	108.31	1027.38	108.34	1030.15	108.49	1061.52	109.05	1079.44	109.5
1090.15	109.71	1110.48	110	1119.01	110.17	1131.25	110.12	1135.15	110.14
1203.68	110.11	1222.2	110.16	1235.68	110.34	1240.41	110.48	1246.47	110.62
1251.49	110.78	1256.42	110.81	1276.31	111.14	1297.42	111.55	1327	112.45
1337.82	112.81	1376.78	113.84	1411.64	115	1425.29	115.38	1435.31	115.7
1460.54	116.44	1494.33	118	1499.35	118.21	1507.47	118.44	1532.34	118.92
1549.69	119.36	1571.66	120.11	1601.94	121.27	1646.66	122.56	1654.19	122.76
1662.02	123.04								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	101.16	.03	699.74	.075	928.81	.03	961.31	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
723.97 870.75 430.81 422.23 416.67 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	490		F

CROSS SECTION

RIVER: OtayRiver
REACH: OtayReach RS: 536.4273

INPUT
Description:
Station Elevation Data num= 135

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	112.64	20.98	111.83	72.65	110	75.18	109.92	132.79	108
166.85	107.17	196.5	106.22	205.36	106	227.34	105.26	278.78	104.18
283.78	104	312.8	102.85	330.22	102.2	336.6	102	372.51	101.4
381.66	101.15	389.78	100.97	401.07	100.61	409.82	100.3	417	100
423.38	99.76	425.6	99.74	468.49	99.17	477.7	99.16	484.55	99.17
495.75	98.91	535.99	98.63	587.43	98.65	609.48	98.72	614.82	98.71
616.36	98.7	621.14	95.15	624.68	92.51	632.87	87.66	635.1	86.43
640.13	85.94	643.16	85.79	646.05	85.68	650.92	85.33	655.31	85
659.81	84.72	662.12	84.59	663.66	84.53	666.89	84.48	668.47	84.48
671.36	84.53	673.37	84.45	677.9	84.43	691.6	84.35	693.24	84.35
722.53	84.28	739.72	84.28	764.04	84.33	764.9	84.35	779.17	84.49
783.36	84.48	788.38	84.48	792.33	84.47	834.39	84.47	834.89	84.43
836.76	84.35	839.3	84.29	875.07	84.73	876.23	84.75	878.41	84.92
890.66	85.75	896.42	86	905.7	86.69	908.83	86.81	926.25	87.94
933.45	88	934.18	88	937.24	88.06	942.23	90	945.44	91.24
946.46	91.43	953.71	92.71	962.83	95.71	964.61	96.49	970.04	98.85
976.22	101.55	981.85	104	983.34	104.31	986.09	105.38	987.45	106
991.23	106.01	995.73	106.27	1001.71	106.69	1007.81	107.04	1013.22	107.32
1039.1	107.83	1049.51	107.96	1053.81	108	1077.95	108.27	1086.31	108.35
1115.51	108.74	1151.73	109.03	1159.65	109.14	1163.28	109.21	1167.39	109.27
1180.21	109.5	1196.28	109.21	1205.24	109.83	1206.02	109.95	1207.32	109.97
1211.47	110.01	1254.2	110.37	1260.55	110.31	1265.5	110.34	1302.63	110.35
1354.07	111.94	1365.87	112.5	1377.74	113.02	1391.5	113.39	1410.97	113.7
1442.43	114.26	1456.33	114.53	1468.49	114.81	1508.4	115.62	1510.15	115.64
1523.3	115.77	1528.25	115.85	1544.57	116.14	1559.84	116.34	1574.68	116.63
1611.28	117.29	1632.49	117.62	1650.97	117.96	1661.82	116.79	1663.18	116.67
1667.4	116.7	1714.16	116.72	1716.47	116.79	1726.04	116.96	1745.56	117.43

```
Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .03   635.1     .04  646.05     .06  945.44     .03 1001.71     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        659.81  875.07          180.21  177.49  177.46              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0     385                F

CULVERT


RIVER: OtayRiver
REACH: OtayReach          RS: 464.0616

INPUT
Description:
Distance from Upstream XS =      67
Deck/Roadway Width        =      40
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       8
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     590   97.19      80   626.4    96.6      80   683.2   95.99      80
   733.5   95.96      80     780    95.6      80   824.5    95.3      80
   976.7   102.7      80   998.4  105.55      80

Upstream Bridge Cross Section Data
Station Elevation Data    num=     135
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  112.64   20.98  111.83   72.65     110   75.18  109.92  132.79     108
  166.85  107.17   196.5  106.22  205.36     106  227.34  105.26  278.78  104.18
  283.78     104   312.8  102.85  330.22   102.2   336.6     102  372.51   101.4
  381.66  101.15  389.78  100.97  401.07  100.61  409.82   100.3     417     100
  423.38   99.76   425.6   99.74  468.49   99.17   477.7   99.16  484.55   99.17
  495.75   98.91  535.99   98.63  587.43   98.65  609.48   98.72  614.82   98.71
  616.36    98.7  621.14   95.15  624.68   92.51  632.87   87.66   635.1   86.43
  640.13   85.94  643.16   85.79  646.05   85.68  650.92   85.33  655.31      85
  659.81   84.72  662.12   84.59  663.66   84.53  666.89   84.48  668.47   84.48
  671.36   84.53  673.37   84.45   677.9   84.43   691.6   84.35  693.24   84.35
  722.53   84.28  739.72   84.28  764.04   84.33   764.9   84.35  779.17   84.49
  783.36   84.48  788.38   84.48  792.33   84.47  834.39   84.47  834.89   84.43
  836.76   84.35   839.3   84.29  875.07   84.73  876.23   84.75  878.41   84.92
  890.66   85.75  896.42      86   905.7   86.69  908.83   86.81  926.25   87.94
  933.45      88  934.18      88  937.24   88.06  942.23      90  945.44   91.24
  946.46   91.43  953.71   92.71  962.83   95.71  964.61   96.49  970.04   98.85
  976.22  101.55  981.85     104  983.34  104.31  986.09  105.38  987.45     106
  991.23  106.01  995.73  106.27 1001.71  106.69 1007.81  107.04 1013.22  107.32
  1039.1  107.83 1049.51  107.96 1053.81     108 1077.95  108.27 1086.31  108.35
 1115.51  108.74 1151.73  109.03 1159.65  109.14 1163.28  109.21 1167.39  109.27
 1180.21   109.5 1196.28  109.21 1205.24  109.83 1206.02  109.95 1207.32  109.97
 1211.47  110.01  1254.2  110.37 1260.55  110.31  1265.5  110.34 1302.63  110.35
 1354.07  111.94 1365.87   112.5 1377.74  113.02  1391.5  113.39 1410.97   113.7
 1442.43  114.26 1456.33  114.53 1468.49  114.81  1508.4  115.62 1510.15  115.64
  1523.3  115.77 1528.25  115.85 1544.57  116.14 1559.84  116.34 1574.68  116.63
 1611.28  117.29 1632.49  117.62 1650.97  117.96 1661.82  116.79 1663.18  116.67
  1667.4   116.7 1714.16  116.72 1716.47  116.79 1726.04  116.96 1745.56  117.43

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .03   635.1     .04  646.05     .06  945.44     .03 1001.71     .02
```



```
Bank Sta: Left   Right    Coeff Contr.   Expan.
        659.81  875.07             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0     385                F

Downstream  Deck/Roadway Coordinates
    num=       9
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     498      98      80     542   97.19      80   578.4    96.6      80
   635.2   95.99      80   685.5   95.96      80     732    95.6      80
   776.5    95.3      80   928.7   102.7      80   950.4  105.55      80

Downstream Bridge Cross Section Data
Station Elevation Data    num=     133
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  109.33    7.49  109.25   13.18  109.07   32.25  108.43   79.38  107.34
   97.34  106.87  126.87     106  127.81  105.97   186.4  104.61  202.07     104
  227.55  103.11  237.78  102.72  281.32  101.31  289.16  101.09  314.45  100.58
  339.34  100.32  342.79  100.14  349.66    99.8  350.88   99.75  353.73   99.67
  360.04   99.42  372.41   99.56  373.34   99.52  380.32   99.32  395.94   99.41
  404.06    99.5  427.91   98.76   433.9   98.89  439.54   99.21  448.19   99.82
  449.87    99.9  463.43   99.82  468.66   99.69  475.24    99.4  495.51   98.68
  504.83   98.29  508.36      98  511.86   97.72  523.07   96.95  525.87      96
  537.62   92.03  544.59   90.13   544.9      90  545.98   89.23  551.83   88.94
   557.2   88.82  560.31   88.72  565.85   88.53  570.61   88.32  572.18   88.34
  577.64      88  579.09   87.93  597.45    87.1  612.31   86.58  614.82   86.54
  620.05    86.4  629.09      86  648.83   85.41  662.24   85.28  692.82   85.36
   702.1   85.26   704.7   85.26  749.07   85.38  751.59   85.39  801.24   84.96
  803.91   84.96  804.36   84.97  809.07   84.98   849.4   85.19  883.49   85.22
   894.8   85.19   898.2   85.29  900.42   85.55  902.08   85.65  904.12   85.43
  905.45   85.65   906.5   85.88  910.24   88.25  916.49   92.21   922.9   96.89
  926.46    99.5  929.39  101.16  934.54  103.81  938.25  105.71  939.88  106.59
   940.3   106.8   947.8  106.75   951.9  106.73 1000.69  107.64 1003.54  107.69
 1006.44   107.8  1023.6   108.3 1026.84   108.4  1027.9  108.41 1054.92   108.9
 1082.57  108.98  1106.3  109.21 1109.82  109.19 1113.12   109.1 1150.07   109.4
 1157.78  109.54 1182.85  110.03 1209.07  110.62 1255.27     112 1257.56  112.06
  1261.7   112.2 1275.41  112.36 1311.83  112.66 1328.69  113.03 1363.21  113.52
 1368.53  113.69 1379.64     114 1380.53  114.02 1385.53  114.18 1411.11  114.52
 1414.59  114.56 1453.34  115.07 1465.97  115.21 1497.51     116 1503.52  116.17
 1519.97  116.57 1523.87  116.39 1553.67  116.95 1568.74  117.15 1617.05  117.64
    1620  117.66 1647.77  117.65 1658.34   116.6 1667.39   116.5 1669.88  116.63
 1683.36  116.55 1713.34  116.63 1737.82  117.69

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .03   557.2    .075  900.42     .03   951.9     .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
        629.09   906.5             .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  4

Culvert Name     Shape      Rise    Span
Culvert #1      Circular       5
```

```
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                 90      40     .024     .024        0                    .5
      1
Number of Barrels =  3
Upstream   Elevation =  88.06
Centerline Stations
    Sta.    Sta.    Sta.
   677.9   685.9   693.6
Downstream Elevation =  87.11
Centerline Stations
    Sta.    Sta.    Sta.
   629.9   637.9   645.6

Culvert Name     Shape      Rise    Span
Culvert #2      Circular       5
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                 77      40     .024     .024        0                    .5
      1
Number of Barrels =  3
Upstream   Elevation =  87.73
Centerline Stations
    Sta.    Sta.    Sta.
   732.7   740.6   752.2
Downstream Elevation =  85.82
Centerline Stations
    Sta.    Sta.    Sta.
   677.2   684.7   692.6

Culvert Name     Shape      Rise    Span
Culvert #3      Circular       5
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                 66      40     .024     .024        0                    .5
      1
Number of Barrels =  3
Upstream   Elevation =  87.43
Centerline Stations
    Sta.    Sta.    Sta.
   770.7     778   785.1
Downstream Elevation =  86.36
Centerline Stations
    Sta.    Sta.    Sta.
   722.7     730   737.1

Culvert Name     Shape      Rise    Span
Culvert #4      Circular       5
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                 53      40     .024     .024        0                    .5
```



```
      1
Number of Barrels =  3
Upstream   Elevation =  87.36
Centerline Stations
    Sta.    Sta.    Sta.
   816.4   824.2   832.2
Downstream Elevation =  86.73
Centerline Stations
    Sta.    Sta.    Sta.
   768.4   776.2   784.2

CROSS SECTION


RIVER: OtayRiver
REACH: OtayReach          RS: 358.9326

INPUT
Description:
Station Elevation Data    num=     133
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  109.33    7.49  109.25   13.18  109.07   32.25  108.43   79.38  107.34
   97.34  106.87  126.87     106  127.81  105.97   186.4  104.61  202.07     104
  227.55  103.11  237.78  102.72  281.32  101.31  289.16  101.09  314.45  100.58
  339.34  100.32  342.79  100.14  349.66    99.8  350.88   99.75  353.73   99.67
  360.04   99.42  372.41   99.56  373.34   99.52  380.32   99.32  395.94   99.41
  404.06    99.5  427.91   98.76   433.9   98.89  439.54   99.21  448.19   99.82
  449.87    99.9  463.43   99.82  468.66   99.69  475.24    99.4  495.51   98.68
  504.83   98.29  508.36      98  511.86   97.72  523.07   96.95  525.87      96
  537.62   92.03  544.59   90.13   544.9      90  545.98   89.23  551.83   88.94
   557.2   88.82  560.31   88.72  565.85   88.53  570.61   88.32  572.18   88.34
  577.64      88  579.09   87.93  597.45    87.1  612.31   86.58  614.82   86.54
  620.05    86.4  629.09      86  648.83   85.41  662.24   85.28  692.82   85.36
   702.1   85.26   704.7   85.26  749.07   85.38  751.59   85.39  801.24   84.96
  803.91   84.96  804.36   84.97  809.07   84.98   849.4   85.19  883.49   85.22
   894.8   85.19   898.2   85.29  900.42   85.55  902.08   85.65  904.12   85.43
  905.45   85.65   906.5   85.88  910.24   88.25  916.49   92.21   922.9   96.89
  926.46    99.5  929.39  101.16  934.54  103.81  938.25  105.71  939.88  106.59
   940.3   106.8   947.8  106.75   951.9  106.73 1000.69  107.64 1003.54  107.69
 1006.44   107.8  1023.6   108.3 1026.84   108.4  1027.9  108.41 1054.92   108.9
 1082.57  108.98  1106.3  109.21 1109.82  109.19 1113.12   109.1 1150.07   109.4
 1157.78  109.54 1182.85  110.03 1209.07  110.62 1255.27     112 1257.56  112.06
  1261.7   112.2 1275.41  112.36 1311.83  112.66 1328.69  113.03 1363.21  113.52
 1368.53  113.69 1379.64     114 1380.53  114.02 1385.53  114.18 1411.11  114.52
 1414.59  114.56 1453.34  115.07 1465.97  115.21 1497.51     116 1503.52  116.17
 1519.97  116.57 1523.87  116.39 1553.67  116.95 1568.74  117.15 1617.05  117.64
    1620  117.66 1647.77  117.65 1658.34   116.6 1667.39   116.5 1669.88  116.63
 1683.36  116.55 1713.34  116.63 1737.82  117.69

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .03   557.2    .075  900.42     .03   951.9     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        629.09   906.5           329.45  313.53   289.4             .1       .3

CROSS SECTION


RIVER: OtayRiver
REACH: OtayReach          RS: 45.40464

INPUT
```

Description:

Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	112.2	155	107.2	240	102.2	300	97.2	440	92.2
629	87.2	639	82.2	650	77.2	850	77	940	77.2
950	80.2	956	82.2	960	84.2	963	86.2	968	88.2
972	90.2	977	92.2	990	92.2	1005	98.2	1009	100.2
1015	104.2	1020	106.2	1022	108.2	1028	110.2	1032	112.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	639	.075	956	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
639	956	1	1	1	.3	.5

SUMMARY OF MANNING'S N VALUES

River:OtayRiver

Reach	River Sta.	n1	n2	n3	n4	n5
OtayReach	4735.705	.04	.04	.04		
OtayReach	4161.779	.04	.04	.04		
OtayReach	3182.152	.03	.04	.075	.03	
OtayReach	2735.287	.03	.04	.075	.03	
OtayReach	2263.575	.03	.04	.075	.04	.03
OtayReach	1961.59	.02	.04	.075	.04	.03
OtayReach	1648.554	.02	.04	.075	.04	.03
OtayReach	1356.913	.02	.04	.075	.04	.02
OtayReach	958.6605	.02	.03	.075	.03	.02
OtayReach	536.4273	.03	.04	.06	.03	.02
OtayReach	464.0616	Culvert				
OtayReach	358.9326	.03	.075	.03	.02	
OtayReach	45.40464	.04	.075	.03		

SUMMARY OF REACH LENGTHS

River: OtayRiver

Reach	River Sta.	Left	Channel	Right

OtayReach	4735.705	610	600	560
OtayReach	4161.779	933.16	980	1020
OtayReach	3182.152	440	446.86	453.75
OtayReach	2735.287	482.72	471.71	471.4
OtayReach	2263.575	301.87	301.98	315.82
OtayReach	1961.59	310.97	313.04	317.06
OtayReach	1648.554	292.04	291.64	293.2
OtayReach	1356.913	394.53	398.25	400.56
OtayReach	958.6605	430.81	422.23	416.67
OtayReach	536.4273	180.21	177.49	177.46
OtayReach	464.0616	Culvert		
OtayReach	358.9326	329.45	313.53	289.4
OtayReach	45.40464	1	1	1

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: OtayRiver

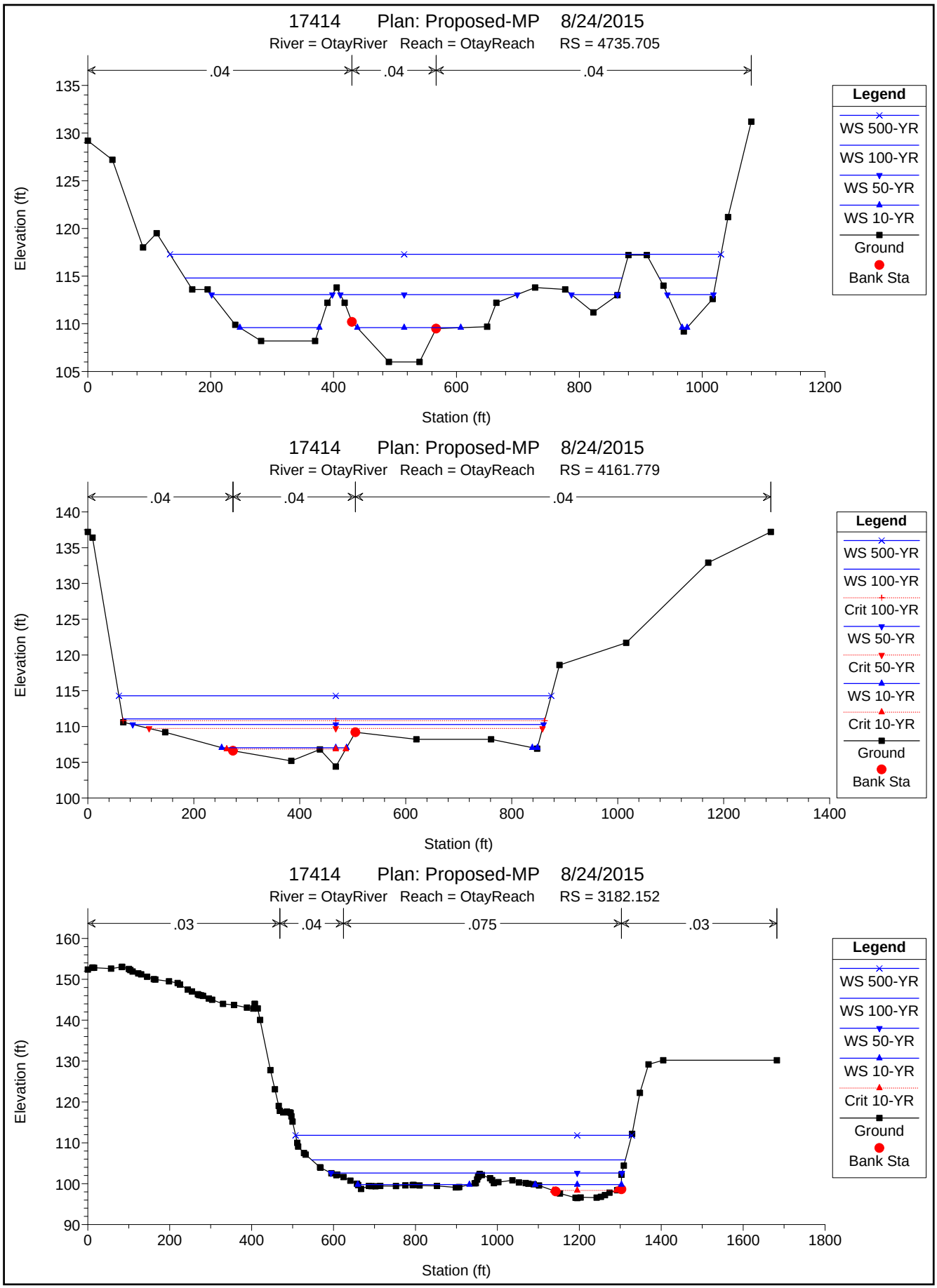
Reach	River Sta.	Contr.	Expan.
OtayReach	4735.705	.1	.3
OtayReach	4161.779	.1	.3
OtayReach	3182.152	.1	.3
OtayReach	2735.287	.1	.3
OtayReach	2263.575	.1	.3
OtayReach	1961.59	.1	.3
OtayReach	1648.554	.1	.3
OtayReach	1356.913	.1	.3
OtayReach	958.6605	.1	.3
OtayReach	536.4273	.1	.3
OtayReach	464.0616	Culvert	
OtayReach	358.9326	.1	.3
OtayReach	45.40464	.3	.5

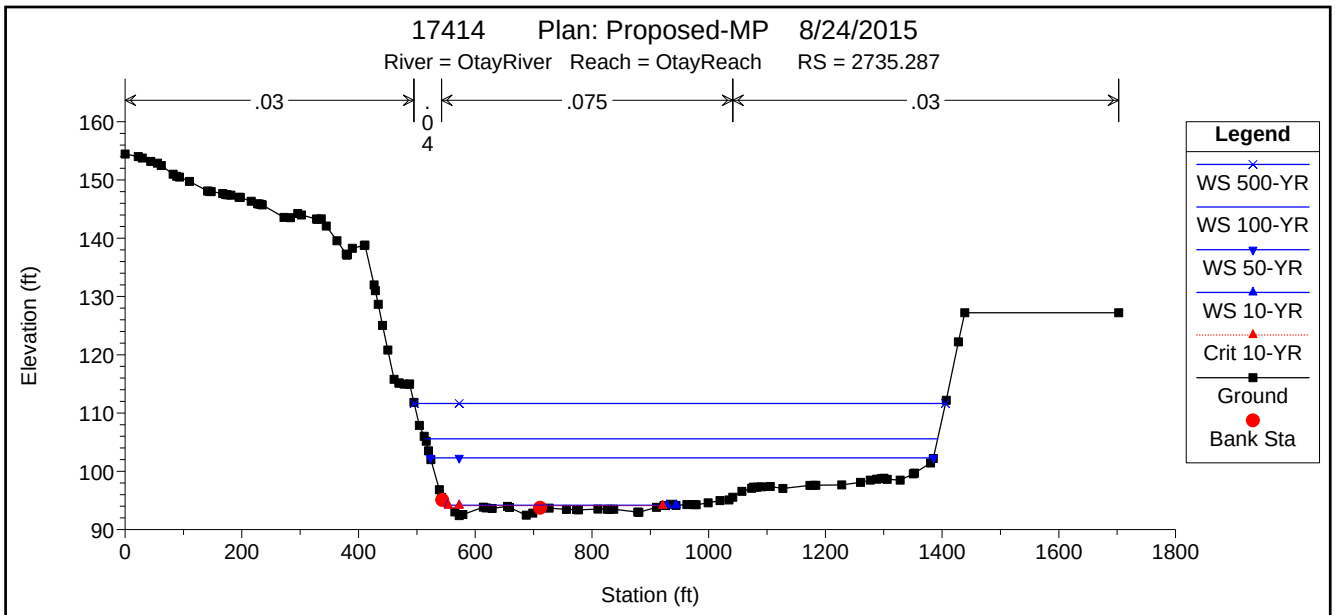
Appendix 9

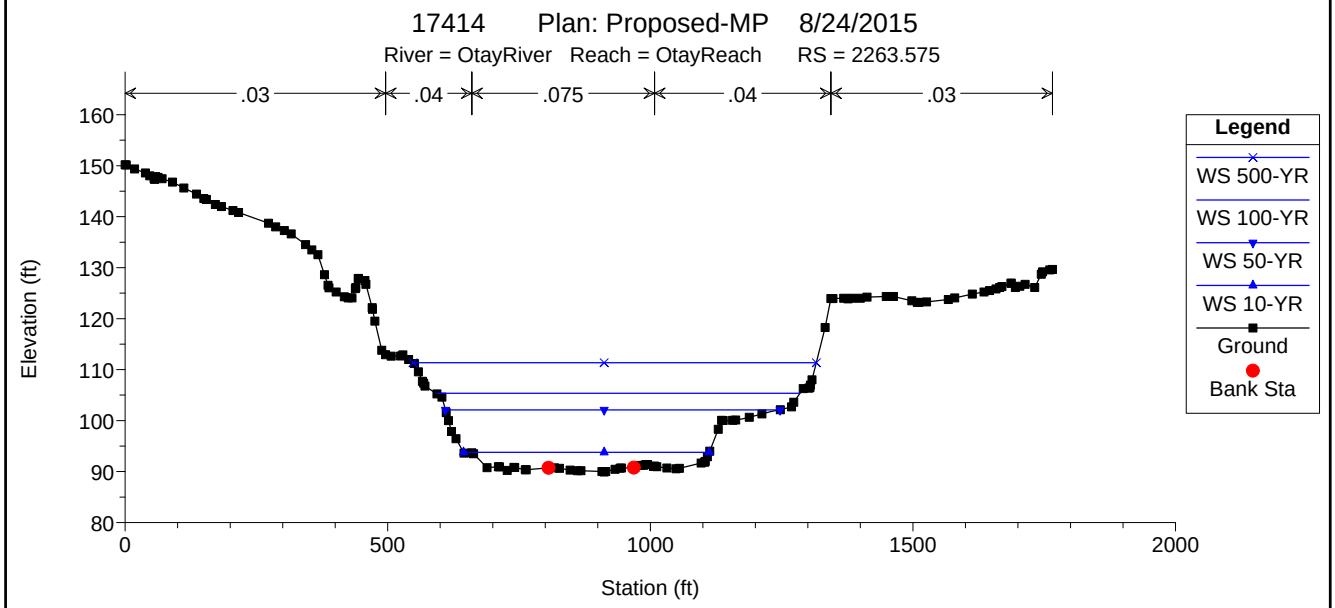
Proposed Condition HEC-RAS Output
(Multiple Profile)

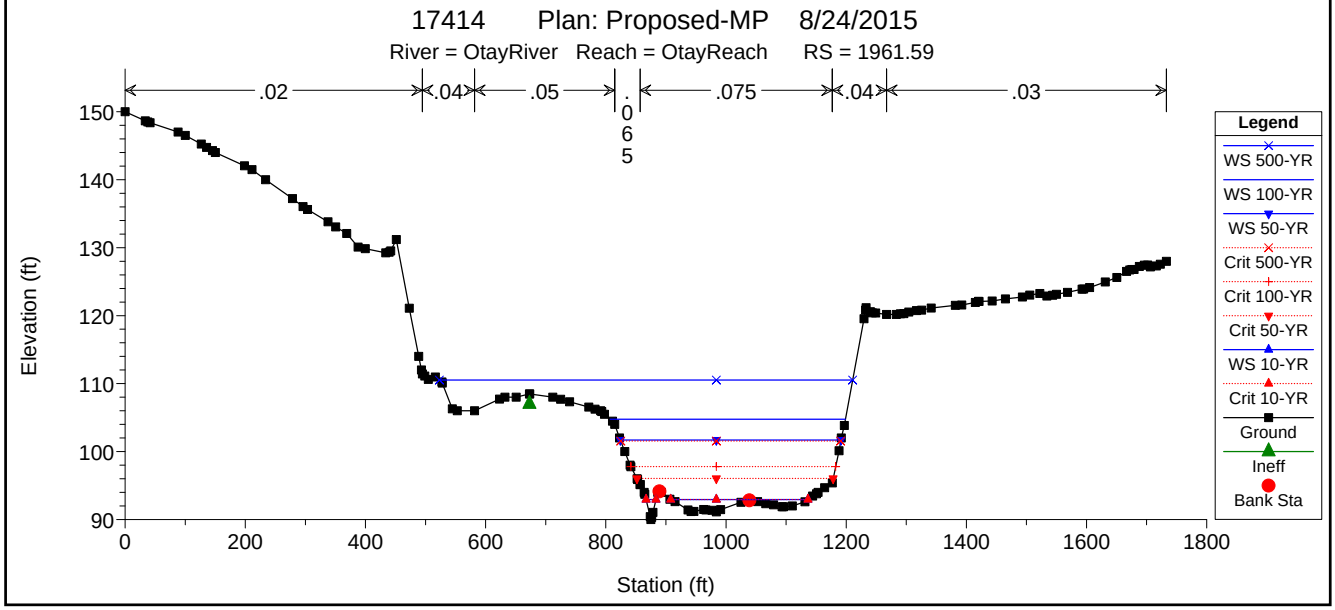
HEC-RAS Plan: Proposed River: OtayRiver Reach: OtayReach

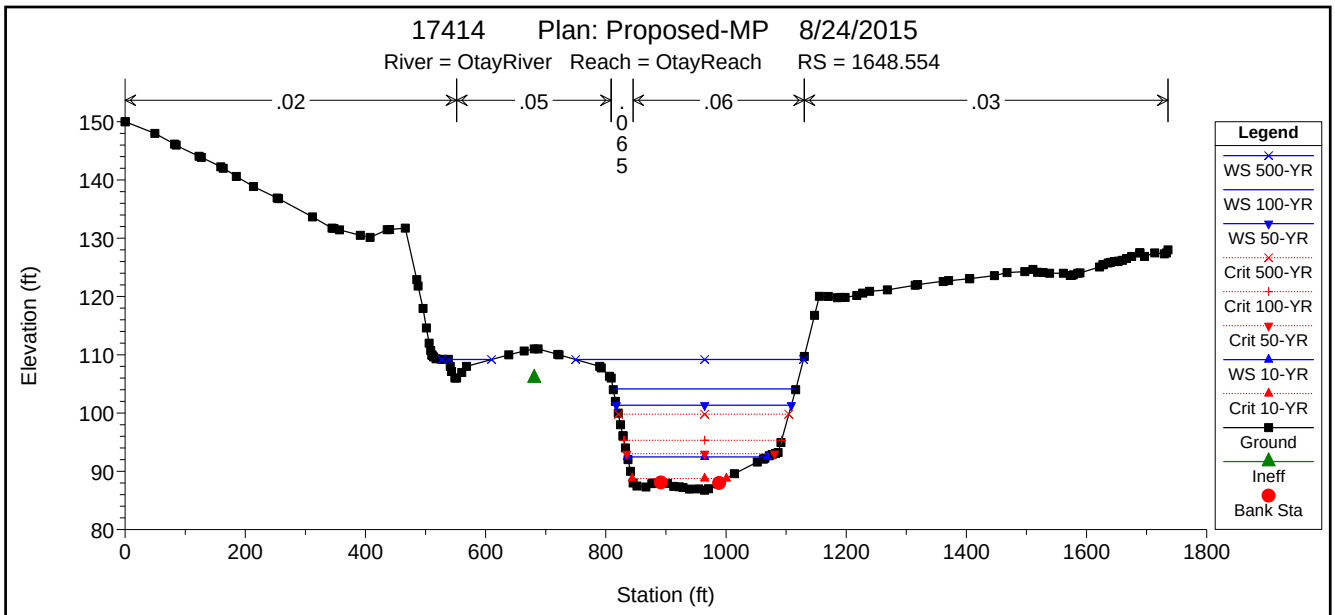
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
OtayReach	4735.705	100-YR	22000.00	106.00	114.81		115.59	0.003832	8.83	3399.88	804.89	0.57
OtayReach	4735.705	10-YR	1200.00	106.00	109.60		109.71	0.001792	2.90	477.53	306.19	0.32
OtayReach	4735.705	50-YR	12000.00	106.00	113.06		113.67	0.003829	7.41	2094.91	634.30	0.54
OtayReach	4735.705	500-YR	50000.00	106.00	117.29		118.75	0.004969	12.15	5473.37	896.85	0.68
OtayReach	4161.779	100-YR	22000.00	104.40	111.06	110.81	112.26	0.008836	10.23	2666.36	796.94	0.80
OtayReach	4161.779	10-YR	1200.00	104.40	107.04	106.84	107.38	0.013321	4.76	256.03	245.34	0.77
OtayReach	4161.779	50-YR	12000.00	104.40	110.28	109.74	110.92	0.005724	7.37	2056.44	775.37	0.63
OtayReach	4161.779	500-YR	50000.00	104.40	114.30		115.75	0.005230	10.97	5279.19	815.86	0.67
OtayReach	3182.152	100-YR	22000.00	96.49	105.82		106.17	0.004374	5.51	4701.31	766.02	0.33
OtayReach	3182.152	10-YR	1200.00	96.49	99.77	98.34	99.87	0.004914	2.62	552.15	483.32	0.29
OtayReach	3182.152	50-YR	12000.00	96.49	102.60		103.09	0.012022	6.70	2318.95	710.35	0.51
OtayReach	3182.152	500-YR	50000.00	96.49	111.83		112.26	0.002262	5.64	9509.61	820.67	0.26
OtayReach	2735.287	100-YR	22000.00	92.38	105.58		105.69	0.000386	2.06	8687.82	878.20	0.10
OtayReach	2735.287	10-YR	1200.00	92.38	94.17	94.08	94.44	0.063786	4.55	285.50	376.13	0.86
OtayReach	2735.287	50-YR	12000.00	92.38	102.32		102.38	0.000464	1.84	5845.66	862.04	0.11
OtayReach	2735.287	500-YR	50000.00	92.38	111.65		111.86	0.000374	2.66	14123.60	910.41	0.11
OtayReach	2263.575	100-YR	22000.00	89.91	105.36		105.48	0.000474	2.62	7846.25	693.01	0.12
OtayReach	2263.575	10-YR	1200.00	89.91	93.79		93.80	0.000342	0.83	1350.55	467.79	0.08
OtayReach	2263.575	50-YR	12000.00	89.91	102.11		102.18	0.000394	2.03	5674.82	637.24	0.10
OtayReach	2263.575	500-YR	50000.00	89.91	111.36		111.63	0.000578	3.62	12296.48	767.58	0.14
OtayReach	1961.59	100-YR	22000.00	91.13	104.75	97.80	105.17	0.002503	5.39	4266.75	391.34	0.27
OtayReach	1961.59	10-YR	1200.00	91.13	92.95	92.95	93.39	0.066756	5.49	233.47	245.09	0.92
OtayReach	1961.59	50-YR	12000.00	91.13	101.70	96.05	101.93	0.002031	4.04	3113.13	366.97	0.23
OtayReach	1961.59	500-YR	50000.00	91.13	110.52	101.55	111.25	0.002812	7.34	7486.76	687.82	0.30
OtayReach	1648.554	100-YR	22000.00	86.75	104.14	95.32	104.60	0.001369	6.02	4136.39	304.08	0.26
OtayReach	1648.554	10-YR	1200.00	86.75	92.46	88.75	92.49	0.000397	1.47	913.02	232.65	0.11
OtayReach	1648.554	50-YR	12000.00	86.75	101.33	93.02	101.54	0.000812	4.10	3298.71	291.12	0.19
OtayReach	1648.554	500-YR	50000.00	86.75	109.18	99.79	110.36	0.002587	9.85	5871.21	451.47	0.37
OtayReach	1356.913	100-YR	22000.00	85.16	103.69	93.55	104.14	0.001760	5.78	4208.67	305.63	0.24
OtayReach	1356.913	10-YR	1200.00	85.16	92.39	86.57	92.41	0.000191	1.01	1308.75	232.52	0.07
OtayReach	1356.913	50-YR	12000.00	85.16	101.09	91.26	101.28	0.000927	3.79	3490.08	270.10	0.17
OtayReach	1356.913	500-YR	50000.00	85.16	108.43	98.38	109.48	0.003222	9.10	6307.74	596.78	0.33
OtayReach	958.6605	100-YR	22000.00	87.85	102.83	94.76	103.33	0.002330	5.76	3926.80	524.37	0.26
OtayReach	958.6605	10-YR	1200.00	87.85	92.25	89.19	92.28	0.000643	1.31	938.49	242.04	0.11
OtayReach	958.6605	50-YR	12000.00	87.85	100.62	92.64	100.85	0.001235	3.76	3111.48	277.27	0.19
OtayReach	958.6605	500-YR	50000.00	87.85	107.06	99.34	108.18	0.003255	8.05	5896.93	700.70	0.33
OtayReach	536.4273	100-YR	22000.00	84.28	102.73	90.52	102.90	0.000401	3.44	6715.43	662.87	0.14
OtayReach	536.4273	10-YR	1200.00	84.28	92.23	85.40	92.24	0.000032	0.55	2250.54	325.85	0.03
OtayReach	536.4273	50-YR	12000.00	84.28	100.55	88.70	100.62	0.000219	2.34	5430.47	571.08	0.10
OtayReach	536.4273	500-YR	50000.00	84.28	106.94	94.49	107.40	0.000754	5.43	9251.53	832.21	0.20
OtayReach	464.0616		Culvert									
OtayReach	358.9326	100-YR	22000.00	84.96	90.75	90.75	93.13	0.039751	12.65	1806.28	371.90	0.95
OtayReach	358.9326	10-YR	1200.00	84.96	86.47		86.67	0.024518	3.58	336.84	289.98	0.58
OtayReach	358.9326	50-YR	12000.00	84.96	89.09	89.09	90.74	0.044359	10.50	1195.25	362.86	0.95
OtayReach	358.9326	500-YR	50000.00	84.96	94.45	94.24	98.25	0.031032	15.78	3214.78	389.11	0.92
OtayReach	45.40464	100-YR	22000.00	77.00	86.49	82.63	87.36	0.007514	7.50	2942.97	333.31	0.44
OtayReach	45.40464	10-YR	1200.00	77.00	78.24	77.91	78.44	0.028125	3.60	333.59	295.75	0.60
OtayReach	45.40464	50-YR	12000.00	77.00	83.67	80.81	84.22	0.007736	5.95	2017.81	322.88	0.42
OtayReach	45.40464	500-YR	50000.00	77.00	92.42	86.55	93.76	0.006253	9.53	5485.74	556.71	0.43

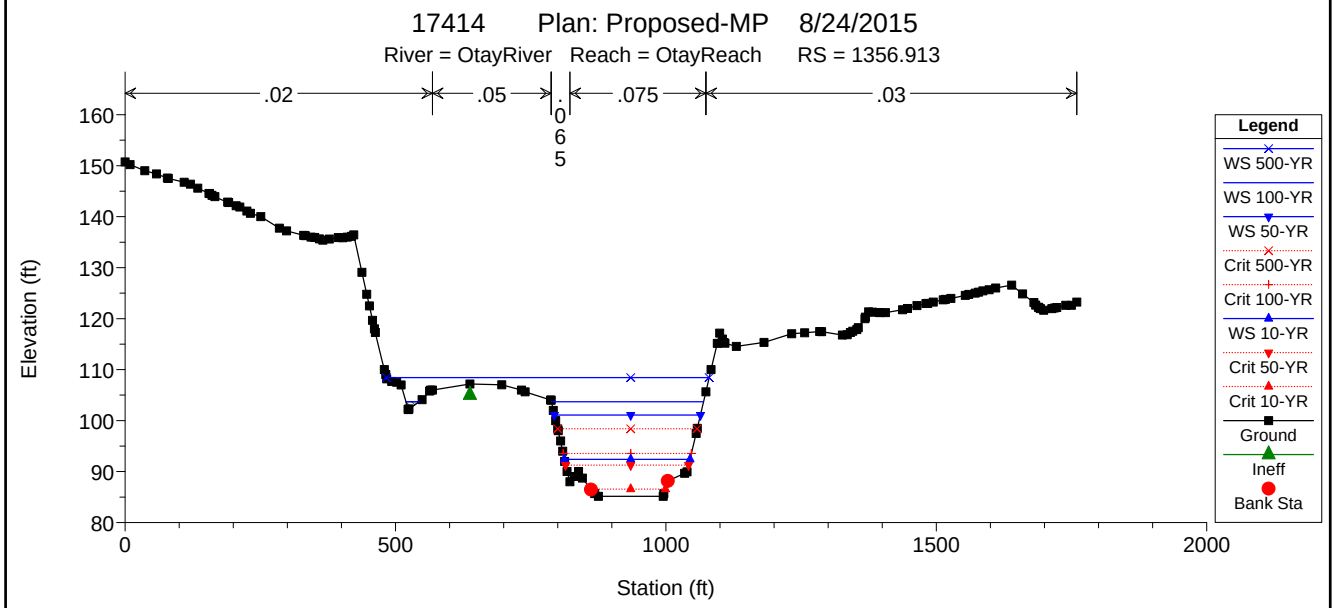

17414 Plan: Proposed-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 4735.705
.04
.04
.04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta
17414 Plan: Proposed-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 4161.779
.04
.04
.04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
Crit 100-YR
WS 50-YR
Crit 50-YR
WS 10-YR
Crit 10-YR
Ground
Bank Sta
17414 Plan: Proposed-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 3182.152
.03
.04
.075
.03
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Crit 10-YR
Ground
Bank Sta

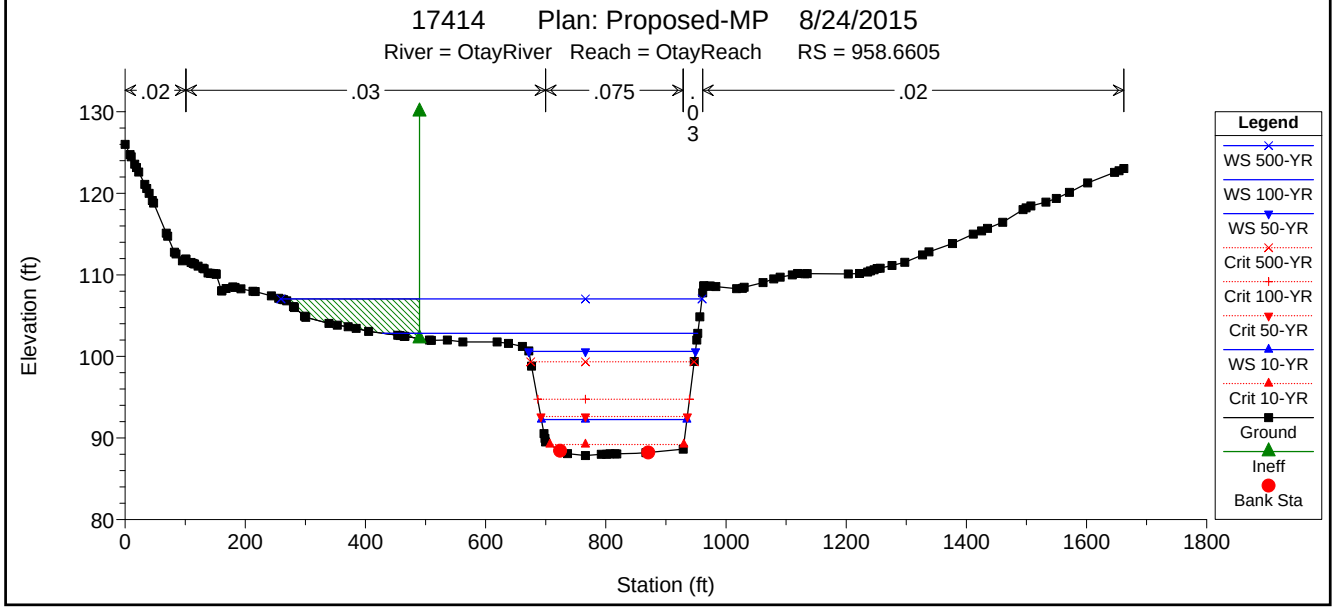

17414 Plan: Proposed-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 2735.287
.03
.04
.075
.03
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Crit 10-YR
Ground
Bank Sta

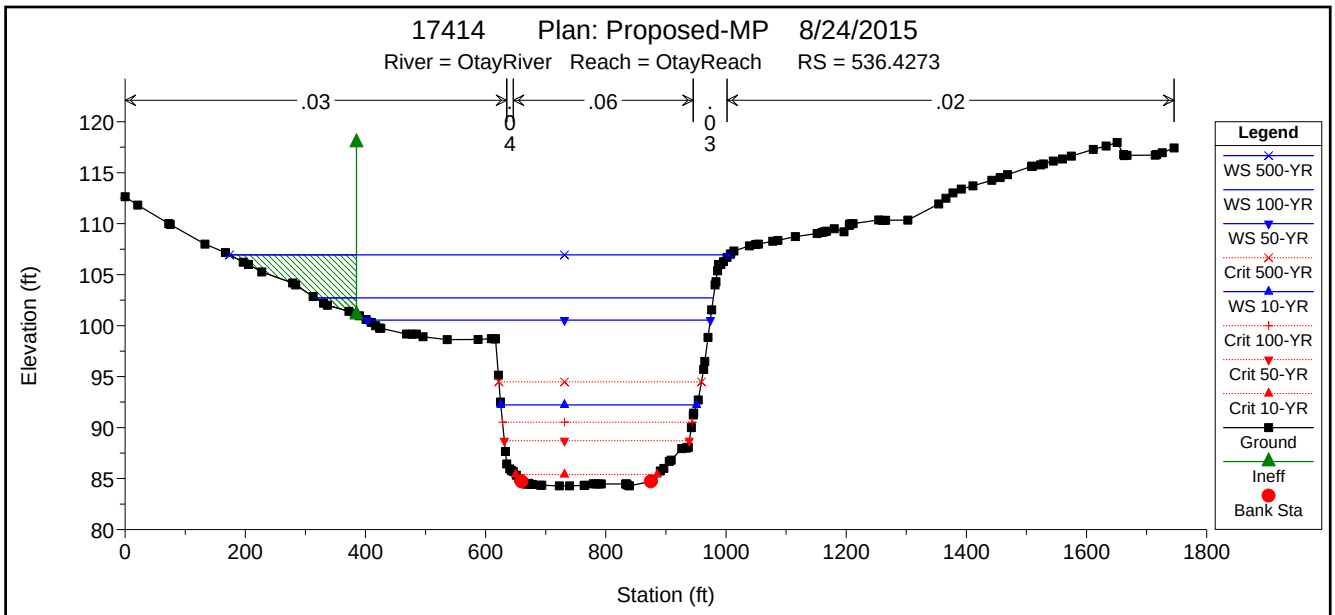

17414 Plan: Proposed-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 2263.575
.03
.04
.075
.04
.03
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta

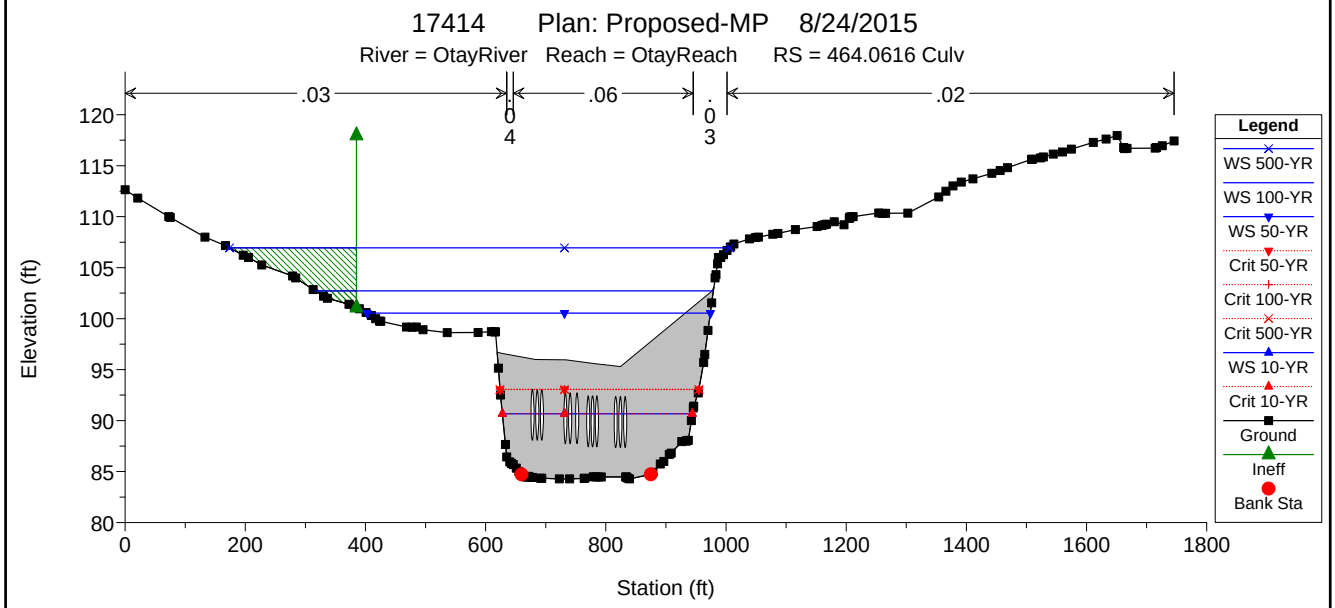

17414 Plan: Proposed-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 1961.59
.02
.04
.05
.065
.075
.04
.03
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
Crit 500-YR
Crit 100-YR
Crit 50-YR
WS 10-YR
Crit 10-YR
Ground
Ineff
Bank Sta

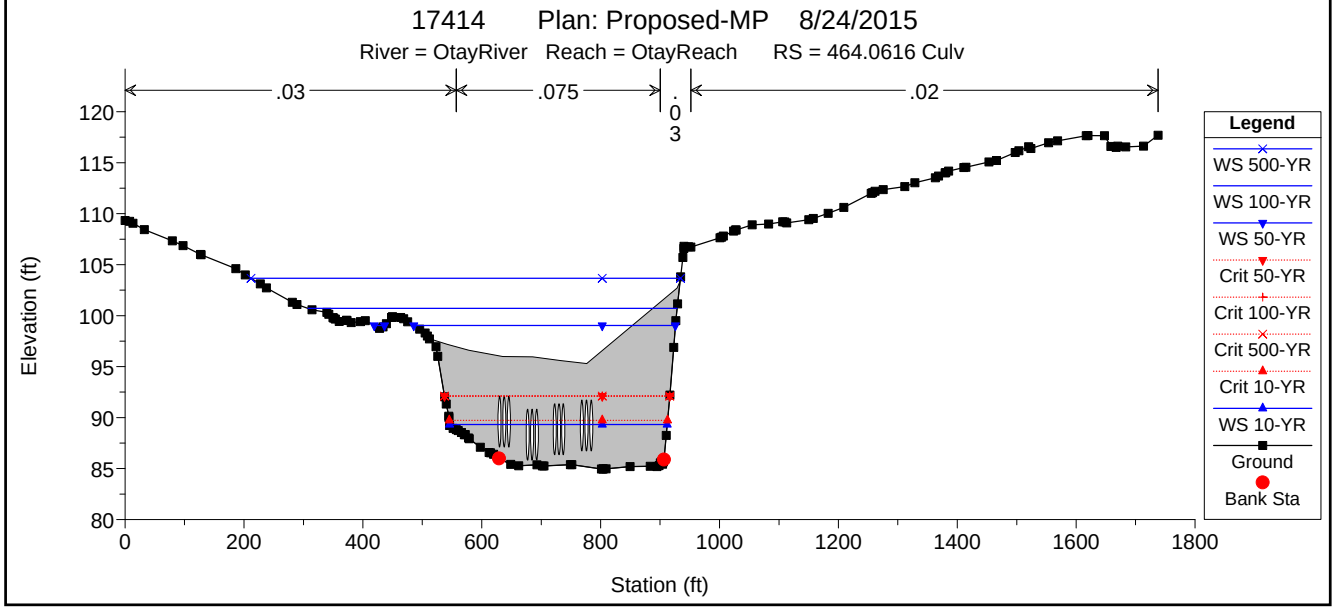

17414 Plan: Proposed-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 1648.554
.02
.05
.065
.06
.03
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
Crit 500-YR
Crit 100-YR
Crit 50-YR
WS 10-YR
Crit 10-YR
Ground
Ineff
Bank Sta

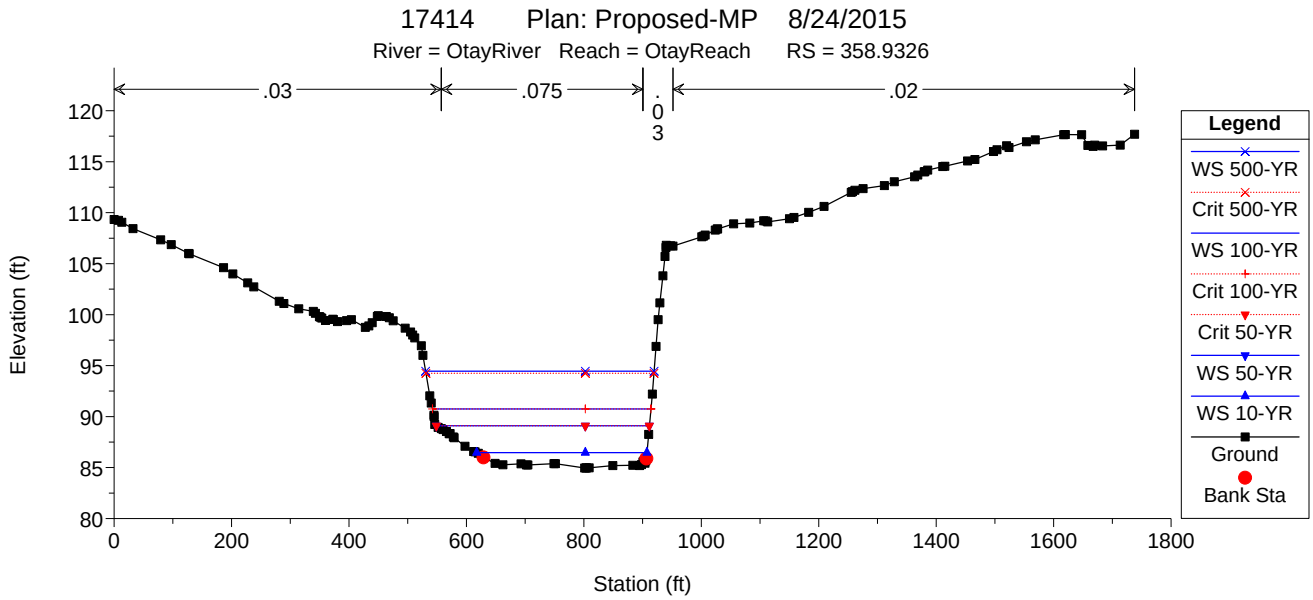

17414 Plan: Proposed-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 1356.913
.02
.05
.065
.075
.03
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
Crit 500-YR
Crit 100-YR
WS 10-YR
Crit 50-YR
Crit 10-YR
Ground
Ineff
Bank Sta

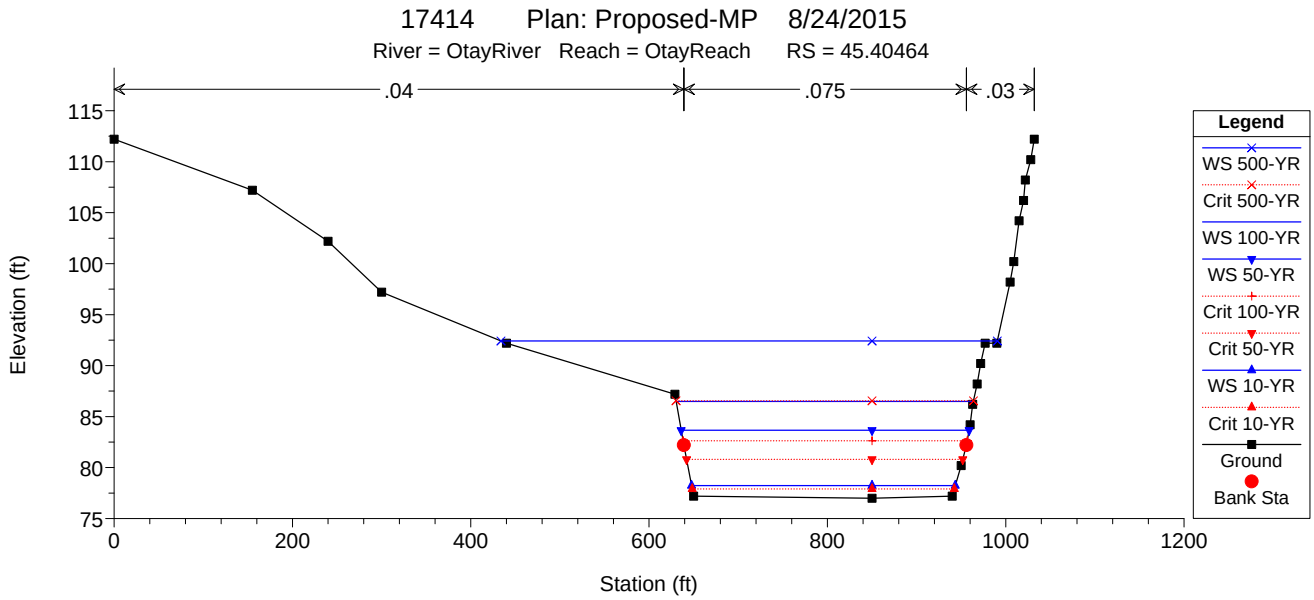

17414 Plan: Proposed-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 958.6605
.02
.03
.075
.03
.02
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
Crit 500-YR
Crit 100-YR
Crit 50-YR
WS 10-YR
Crit 10-YR
Ground
Ineff
Bank Sta


17414 Plan: Proposed-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 536.4273
.03
.04
.06
.03
.02
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
Crit 500-YR
WS 10-YR
Crit 100-YR
Crit 50-YR
Crit 10-YR
Ground
Ineff
Bank Sta


17414 Plan: Proposed-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 464.0616 Culv
.03
.04
.06
.03
.02
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
Crit 50-YR
Crit 100-YR
Crit 500-YR
WS 10-YR
Crit 10-YR
Ground
Ineff
Bank Sta


17414 Plan: Proposed-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 464.0616 Culv
.03
.075
.03
.02
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
Crit 50-YR
Crit 100-YR
Crit 500-YR
Crit 10-YR
WS 10-YR
Ground
Bank Sta


17414 Plan: Proposed-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 358.9326
.03
.075
.03
.02
Elevation (ft)
Station (ft)
Legend
WS 500-YR
Crit 500-YR
WS 100-YR
Crit 100-YR
Crit 50-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta


17414 Plan: Proposed-MP 8/24/2015
River = OtayRiver Reach = OtayReach RS = 45.40464
.04
.075
.03
Elevation (ft)
Station (ft)
Legend
WS 500-YR
Crit 500-YR
WS 100-YR
WS 50-YR
Crit 100-YR
Crit 50-YR
WS 10-YR
Crit 10-YR
Ground
Bank Sta

```
HEC-RAS Version 4.1.0 Jan 2010
 U.S. Army Corps of Engineers
Hydrologic Engineering Center
      609 Second Street
      Davis, California

X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
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PROJECT DATA
Project Title: 17414
Project File : 17414.prj
Run Date and Time: 8/24/2015 4:57:28 PM

Project in English units

PLAN DATA

Plan Title: Proposed-MP
Plan File :
w:\17414_Shinohara_CLOMR\WaterResources\Hydraulics\HecRas\CLOMR\17414.p02

Geometry Title: Proposed-MP
Geometry File :
w:\17414_Shinohara_CLOMR\WaterResources\Hydraulics\HecRas\CLOMR\17414.g02

Flow Title : MP
Flow File :
w:\17414_Shinohara_CLOMR\WaterResources\Hydraulics\HecRas\CLOMR\17414.f01

Plan Summary Information:
Number of: Cross Sections = 12 Multiple Openings = 0
Culverts = 1 Inline Structures = 0
Bridges = 0 Lateral Structures = 0

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: MP
Flow File :
w:\17414_Shinohara_CLOMR\WaterResources\Hydraulics\HecRas\CLOMR\17414.f01

Flow Data (cfs)

River	Reach	RS	100-YR	10-YR	50-YR	500-YR
OtayRiver	OtayReach	4735.705	22000	1200	12000	50000

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
OtayRiver	OtayReach	100-YR	Known WS = 86.49	
OtayRiver	OtayReach	10-YR	Known WS = 78.24	
OtayRiver	OtayReach	50-YR	Known WS = 83.67	
OtayRiver	OtayReach	500-YR	Known WS = 92.42	

GEOMETRY DATA

Geometry Title: Proposed-MP
Geometry File :
w:\17414_Shinohara_CLOMR\WaterResources\Hydraulics\HecRas\CLOMR\17414.g02

CROSS SECTION

RIVER: OtayRiver
REACH: OtayReach RS: 4735.705

INPUT
Description:
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	129.2	40	127.2	90	118	112	119.5	170	113.6
195	113.6	240	109.9	282	108.2	370	108.2	390	112.2
405	113.8	418	112.2	430	110.2	490	106	540	106
567	109.5	650	109.7	665	112.2	728	113.8	777	113.6
823	111.2	862	113	880	117.2	910	117.2	937	114
970	109.2	1017	112.6	1042	121.2	1080	131.2		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	430	.04	567	.04

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           430     567               610     600     560             .1       .3

CROSS SECTION


RIVER: OtayRiver
REACH: OtayReach          RS: 4161.779

INPUT
Description:
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   137.2       9   136.4      67   110.6     146   109.2     274   106.6
     384   105.2     438   106.8     468   104.4     505   109.2     620   108.2
     761   108.2     848   106.9     890   118.6    1016   121.7    1171   132.9
    1289   137.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .04     274     .04     505     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           274     505           933.16     980    1020             .1       .3

CROSS SECTION


RIVER: OtayRiver
REACH: OtayReach          RS: 3182.152

INPUT
Description:
Station Elevation Data    num=     106
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   152.4   10.93   152.8      12  152.88   15.35  152.83   56.68  152.62
   82.84  153.02   84.01  153.06  100.36  152.52  103.83  152.26  109.45   151.9
  123.12  151.46  130.14  151.22  144.77  150.64  161.29  150.03  164.68  149.96
  198.16  149.51  219.37   149.1  225.01  148.72  244.06  147.47   254.3  147.04
  268.67  146.34  271.95  146.15  276.57  146.09  281.41  145.93  295.16   145.3
  303.42  145.01  330.18  143.99  356.93  143.72  388.62  143.09  404.08  142.83
  407.32  143.98  407.59  143.96  414.75  142.87  420.66  140.06  445.83  127.79
  456.66  123.08  465.99  119.04  468.78  117.81  476.99  117.44  486.25  117.63
   492.5  117.43  495.27  117.34  497.02  116.46  499.92  115.17  511.45     110
  513.59  109.08  527.78   107.5  531.79   107.1  567.07     104  568.16  103.91
  594.57  102.56  606.71  102.07  608.84  102.21  624.27  101.63  641.15  100.75
  657.32     100  659.91   99.67  667.15   98.71  686.33   99.44  692.21    99.4
  702.39   99.37  713.85   99.44  752.43   99.43  775.38   99.59   793.1   99.66
  795.34    99.7  810.04   99.56  852.51   99.45  898.56   99.09  902.55   99.11
  906.65   99.18  944.58  100.07  947.42  100.13  950.49  101.03   952.9  101.64
     955     102   956.5  102.38  962.23  102.11  982.17  101.35  986.98  100.87
  991.45  100.14 1002.36  100.38 1036.71  100.82 1052.67   100.3  1069.1  100.16
 1075.48     100 1088.61   99.85 1101.76   99.56 1142.54   98.11 1152.76    97.6
 1190.88   96.56 1195.01   96.49 1203.09   96.63  1242.4   96.58 1252.84   96.77
 1262.62    97.2  1273.5    97.8 1292.43   98.41 1302.88   98.62    1303   102.2
  1308.8 104.431    1329   112.2    1348   122.2    1369   129.2    1405   130.2
 1682.42   130.2

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .03  468.78     .04  624.27    .075    1303     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
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        1142.54 1302.88              440  446.86  453.75             .1       .3

CROSS SECTION


RIVER: OtayRiver
REACH: OtayReach          RS: 2735.287

INPUT
Description:
Station Elevation Data    num=     118
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  154.44   22.53     154    29.3  153.77   43.85   153.2   55.27  152.89
   61.97  152.48   82.12  150.98   88.19  150.64   93.31  150.49  110.35  149.75
  141.12  148.11  143.81  148.05  147.62     148  167.29  147.66   172.2  147.51
  175.13  147.45  181.12  147.39  195.29  147.04  197.32     147  216.01  146.34
   227.1   145.9  230.68  145.86  233.47   145.8  234.98  145.72  272.36  143.58
  283.24  143.52   295.8  144.23  302.26     144  328.01   143.3  329.57  143.25
  336.24  143.32  344.56  142.09  363.06  139.58  378.93  137.29  380.14  137.11
  381.06   137.2  389.35  138.29  409.91  138.77  410.97  138.82  426.67     132
  428.95  130.99  433.77  128.67  441.13  125.05  450.27  120.81  460.97  115.79
  469.11  115.16  469.97  115.13  478.07  114.95  487.33  114.96  487.61  114.97
  494.99  111.82  504.18  107.88  512.47     106  516.03  105.16  519.91   103.5
  524.09     102   538.5   96.85  542.24   95.52  543.53   95.09  565.01   93.03
  572.48   92.38  578.75   92.58  613.83   93.85  619.17   93.72  628.94   93.63
  655.32   93.97  658.48   93.79  687.36   92.46  698.65   92.82  711.17   93.73
  726.48   93.69  756.12   93.45  773.43   93.42  776.63   93.38  810.18   93.51
  826.56   93.49  830.26   93.46  837.32    93.5  878.57   92.99  880.47   92.96
  910.56   93.82  923.55   94.14  926.14   94.11  934.98   94.34  944.11   94.16
  962.76   94.28  973.66   94.28  978.42   94.27  999.03   94.59 1019.45   94.97
 1034.83   95.08 1041.44   95.54 1056.88   96.55 1073.67   97.09 1076.41   97.27
 1082.87   97.28 1090.41   97.33  1105.6   97.39 1127.09   97.05 1173.45   97.58
  1179.2   97.58 1183.61    97.6 1227.95   97.67 1260.01    98.1 1276.88   98.48
 1287.79   98.65 1295.45   98.74 1300.26   98.81 1305.88   98.62 1328.25   98.49
 1350.63   99.57 1352.83   99.69 1380.26  101.43    1385   102.2    1407   112.2
    1428   122.2    1439   127.2  1702.7   127.2

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .03  494.99     .04  542.24    .075 1041.44     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        543.53  711.17           482.72  471.71   471.4             .1       .3

CROSS SECTION


RIVER: OtayRiver
REACH: OtayReach          RS: 2263.575

INPUT
Description:
Station Elevation Data    num=     146
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  150.19    2.02  150.15   17.83  149.37   38.57  148.57   46.81     148
      55  147.45   55.93  147.33   58.23  147.86    62.7  147.69   70.38  147.46
   90.06   146.8   111.9  145.64  135.79  144.42  149.81  143.57  154.62  143.36
  171.74  142.39  183.41     142  205.23  141.19  216.14  140.83  273.11  138.71
  286.74     138  303.14  137.29  316.26  136.61  343.76   134.5  355.67  133.47
  367.16  132.54  379.72  128.63  386.37  126.53     388  126.04  401.76  125.23
  417.36  124.28  424.68  124.06  431.87  124.08  438.34  125.87  439.24   126.1
  443.74  127.87  444.24  127.88  456.74  127.48  458.57  126.73   470.3  122.15
  471.07  121.83  475.45   119.5  488.56  113.79  496.01  112.93  506.68  112.65
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524.73	112.67	529.01	112.9	539.77	111.98	550.75	111.2	558.37	109.56
565.9	107.71	568.34	107.35	570.89	106.78	593.83	105.23	603.12	104.6
611.39	101.55	615.55	100	621.4	97.86	630.08	96.45	645.32	93.63
660.25	93.68	663.64	93.5	689.21	90.77	710.83	90.95	712.78	90.93
727.47	90.23	740.25	90.82	741.95	90.79	761.96	90.35	763.78	90.37
806.47	90.73	817.26	90.72	826.97	90.64	847.27	90.3	861.38	90.16
868.06	90.16	907.75	90	912.13	89.91	915.05	90	932.84	90.44
942.39	90.66	944.93	90.69	968.84	90.78	970.43	90.82	981.13	91.19
987.02	91.24	991.77	91.38	995.08	91.37	1005.9	91.01	1008.03	91.08
1012.26	90.95	1031.62	90.71	1048.88	90.56	1055.31	90.63	1096.71	91.69
1103.05	91.83	1104.54	92	1108.59	92.91	1113.15	94	1129.36	98.3
1135.67	100.04	1138.67	100.01	1156.84	100.05	1162.42	100.12	1188.5	100.65
1212.48	101.32	1247.6	102.12	1268.72	102.68	1273.19	103.6	1291.16	106.28
1301.57	106.37	1303.76	106.47	1304.9	106.95	1307.78	108	1332.97	118.25
1343.8	123.94	1347.81	123.95	1368.06	124	1376.28	123.87	1384.4	124
1399.77	124	1412.72	124.21	1449.29	124.34	1462.77	124.35	1497.97	123.49
1508.25	123.2	1511.21	123.17	1526.03	123.27	1567.27	123.75	1579.71	124.07
1612.95	124.81	1635.35	125.22	1645.92	125.52	1658.3	125.81	1665.16	126.12
1669.53	126.28	1686.91	126.95	1687.22	126.95	1695.14	126.11	1703.73	126.35
1713.62	126.74	1731.92	126.1	1744.46	128.72	1746.79	129.18	1760.69	129.57
1765.67	129.64								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	496.01	.04	660.25	.075	1008.03	.04	1343.8	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
806.47	968.84	301.87	301.98	315.82	.1	.3

CROSS SECTION

RIVER: OtayRiver
REACH: OtayReach RS: 1961.59

INPUT
Description:
Station Elevation Data num= 140

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	150	33.68	148.67	37.71	148.49	41.6	148.37	88.06	147
100.03	146.52	126.64	145.24	135.46	144.76	145.36	144.27	150.05	144
198.62	142.04	211.06	141.48	233.89	140	278.53	137.22	295.99	136.05
303.54	135.62	337.58	133.81	350.49	133.05	368.86	132.08	387.71	130.09
399.56	129.85	433.7	129.23	439.41	129.33	442.02	129.51	451.34	131.19
472.8	121.1	488.68	114	493.23	112	494.68	111.43	498.84	111.11
504.63	110.62	516.17	110.98	527.15	110.24	527.83	110.07	544.53	106.29
552.71	106	581.47	106	623.18	107.73	632.22	108	650.84	108
672.76	108.48	673.48	108.48	711.77	108	724.91	107.7	739.59	107.32
771.62	106.54	782.16	106.25	791.37	106	793.26	105.9	797.78	105.5
811.03	104.47	814.77	104	822.9	102	831.5	100	840.4	98
841.75	97.771	852.19	96	852.99	95.89	857	95.166	857.2	95.13
863.78	94	864.95	93.72	873.88	90.42	874.94	90	876.17	90.34
878.3	91.06	886.35	94	889.35	94.14	892.31	94	906.71	93
915.25	92.63	936.85	91.41	941.77	91.18	946.54	91.21	962.85	91.48
966.69	91.41	976.66	91.36	983.78	91.13	991.05	91.45	1024.85	92.54
1039.04	92.83	1052.52	92.63	1066.06	92.33	1079.21	92.17	1093.35	91.89
1095.69	91.89	1110.3	92	1131.31	92.61	1144.14	93.45	1150.66	93.8
1153.29	94	1164.24	94.69	1176.79	95.38	1188.12	100.11	1191.76	102
1196.83	103.84	1229.76	119.55	1232.33	120.81	1233.06	121.17	1240.21	120.58
1243.45	120.41	1249.13	120.38	1267.18	120.18	1283.52	120.17	1290.29	120.27
1296.02	120.29	1304.24	120.52	1317.04	120.73	1325.53	120.81	1341.39	121.11
1381.59	121.53	1392.47	121.56	1415.05	121.95	1420.29	122.1	1421.13	122.09
1442.83	122.15	1464.97	122.45	1493.19	122.74	1505.49	123.03	1522.15	123.26

1534.05	122.88	1543.54	123.01	1549.94	123.14	1568.42	123.42	1592.7	123.9
1595.33	123.92	1605.21	124.12	1631.28	124.96	1650.41	125.61	1666.65	126.51
1672.03	126.73	1675.27	126.8	1679.16	126.79	1688.03	127.23	1696.18	127.42
1701.74	127.46	1706.34	127.16	1716.09	127.3	1722.88	127.57	1732.79	128

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	494.68	.04	581.47	.05	814.77	.065	857.2	.075
1176.79	.04	1267.18	.03						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
889.35	1039.04	310.97	313.04	317.06	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	672.76	107	F

CROSS SECTION

RIVER: OtayRiver
REACH: OtayReach RS: 1648.554

INPUT
Description:
Station Elevation Data num= 135

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	150	.34	149.99	49.56	148	82.37	146.15	84.97	146
122.97	144.06	126.66	143.88	159.15	142.25	163.21	142	184.99	140.62
213.56	138.87	253.05	136.91	255.39	136.79	311.92	133.67	344.2	131.73
347.52	131.69	356.77	131.43	391.31	130.51	407.7	130.15	436.16	131.45
440.26	131.5	466.3	131.75	485.36	122.89	487.65	121.8	495.81	117.95
501.39	114.59	505.84	112	508.66	110.73	510.39	110	510.87	109.89
513.5	109.63	517.36	109.29	527.45	109.18	529.05	109.21	537.95	109.23
541.04	108	543.14	107.13	548.66	106	551.77	106	560.26	106.98
568.26	108	638.45	110	664.1	110.66	680.85	111	687.36	111
719.92	110.07	722.13	110	789.72	108	792.45	107.75	805.9	106.31
808.82	106	812.37	104	815.99	102	820.52	100	824.45	98
828.52	96.111	828.76	96	832.73	94	836.92	92	841.27	90
845.53	88	851.79	87.48	866.63	87.31	876.61	87.88	878.52	88
886.81	88	891.67	88.07	902.42	87.93	913.07	87.41	922.32	87.34
928.39	87.23	939.44	86.95	954.34	86.97	964.51	86.75	970.84	86.99
985.93	87.84	988.55	88	1013.94	89.58	1051.95	91.58	1062.27	92.09
1064.87	92.26	1072.14	92.65	1076.8	92.88	1082.43	93.08	1086.76	93.22
1091.36	94.93	1115.85	104	1130.21	109.71	1147.49	116.78	1155.48	120.05
1170.21	120	1185.53	119.78	1190.86	119.84	1198.1	119.84	1217.66	120.18
1227.44	120.59	1239.01	120.89	1268.59	121.13	1314.93	121.94	1318.77	122.04
1361.44	122.57	1370.44	122.73	1405.15	123.05	1405.73	123.05	1446.77	123.59
1467.57	124.1	1497.26	124.28	1510.71	124.64	1518.17	124.17	1527.61	124.12
1538.5	124	1561.4	124	1572.94	123.61	1574.63	123.61	1577.92	123.72
1585.26	124	1589.03	124.06	1621.73	125.07	1627.18	125.45	1627.95	125.49
1635.9	125.76	1639.88	125.87	1646.15	126	1651.37	126	1653.23	126.08
1659.94	126.22	1666.58	126.53	1675.23	126.87	1688.57	127.49	1688.77	127.52
1696.44	126.87	1713.53	127.47	1729.39	127.33	1732.91	127.49	1735.57	128

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	551.77	.05	808.82	.065	845.53	.06	1130.21	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
891.67	988.55	292.04	291.64	293.2	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	680.85	106	F

CROSS SECTION

RIVER: OtayRiver
REACH: OtayReach RS: 1356.913

INPUT
Description:
Station Elevation Data num= 137

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	150.74	9.27	150.21	36.34	149.02	57.94	148.4	78.09	147.56
79.85	147.52	109.23	146.75	120.7	146.38	134.2	145.6	155.1	144.56
156.12	144.52	160.77	144.18	165.95	143.93	189.77	142.85	191.29	142.77
205.23	142.13	212.23	141.9	225.18	141.11	231.52	140.68	250.79	140
285.12	137.75	298.55	137.2	330.3	136.34	333.12	136.26	343.7	136
350.47	135.94	359.27	135.64	365.68	135.38	377.63	135.62	394.11	135.89
402.8	135.88	410.72	136	418.63	136.15	422.92	136.43	437.98	129.08
446.88	124.8	451.63	122.5	457.51	119.67	461.07	118	462.7	117.28
479.37	110	481.84	109.03	483.77	108.18	492.96	107.69	502.17	107.53
510.31	106.99	523.34	102.21	523.53	102.15	524.95	102.27	549.18	104.1
563.08	105.81	564.67	106	568.46	106	637.56	107.17	696.56	107.01
732.94	106	739.7	105.64	786.57	104.04	787.88	104	791.77	102
796.04	100	800	98.353	800.85	98	805.22	96	809.18	94
812.78	92	817.23	90	822.43	88	830.14	89.04	838.54	90
845.55	88.74	861.67	86.46	868.4	85.69	875.09	85.16	994.83	85.16
996.27	85.66	1003.67	88.15	1034.59	89.66	1039.18	89.94	1055.85	97.49
1058.08	98.49	1073.88	105.64	1083.4	110	1094.92	115.14	1099.46	117.17
1104.53	116	1107.25	115.31	1109.13	115.18	1130.09	114.57	1181.38	115.33
1232.67	117.03	1256.47	117.21	1284.29	117.48	1287.8	117.43	1326.42	116.79
1335.26	116.84	1341.1	117.27	1345.69	117.53	1352.95	117.86	1355.53	118.22
1368.01	120	1369.08	120.29	1374.71	121.33	1381.87	121.28	1393.87	121.22
1395.75	121.19	1405.94	121.19	1437.49	121.74	1446.74	122	1464.14	122.55
1480.77	122.97	1484.46	123	1494.46	123.26	1512.67	123.68	1516.83	123.77
1526.81	123.96	1553.56	124.56	1560.02	124.74	1572.04	125.02	1578.15	125.19
1586.16	125.43	1597.68	125.68	1609.76	126	1639.37	126.59	1659.4	124.85
1680.57	123.14	1683.75	122.64	1688.77	122.25	1689.51	122.15	1692.75	121.96
1698.48	121.65	1713.57	121.96	1718.33	122.08	1722.73	122.17	1739.48	122.63
1749.8	122.62	1759.9	123.24						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	568.46	.05	787.88	.065	822.43	.075	1073.88	.03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
861.67 1003.67 394.53 398.25 400.56 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	637.56	105	F

CROSS SECTION

RIVER: OtayRiver
REACH: OtayReach RS: 958.6605

INPUT
Description:
Station Elevation Data num= 126

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	126	8.13	124.74	9.99	124.46	16.01	123.57	18.89	123.15
22.57	122.6	32.8	121.09	36.05	120.59	39.83	120	45.36	119.12
47.38	118.79	68.54	115.12	70.9	114.73	82.09	112.77	84.77	112.56

95.32	111.71	100.17	111.86	100.84	111.93	101.16	111.92	109.68	111.52
113.18	111.41	115.45	111.33	121.47	111.08	129.53	110.82	131.52	110.74
137.82	110.22	141.99	110.19	144.01	110.17	147.56	110.15	151.33	110.12
151.48	110.08	160.66	108.04	161.09	108.06	167.95	108.32	179.26	108.53
182.96	108.47	192.69	108.29	212.67	108	216.45	107.95	243.38	107.42
255.73	107.13	261.3	107.02	263.83	106.95	268.9	106.82	280.14	106.11
281.79	106	298.52	104.93	300.73	104.8	339.15	104.04	352.98	103.83
371.17	103.63	384.43	103.45	405.23	103.06	453.86	102.59	457.48	102.55
464.28	102.46	465.79	102.45	506.56	102	509.73	101.97	536.31	102
561.98	101.77	619.02	101.77	638.03	101.6	661.09	101.23	671.76	100.67
676.44	98.81	697.23	90.53	698.73	89.94	699.74	89.52	723.97	88.44
736.17	88.09	765.94	87.85	792.53	88	801.24	88	806.79	88.06
815.45	88.06	818.19	88.05	866.66	88.19	870.75	88.21	928.81	88.64
947.05	99.38	951.48	102	952.9	102.83	956.33	104.86	961.31	107.79
962.75	108.64	963.41	108.65	972.63	108.61	974.41	108.61	982.98	108.57
1017.57	108.31	1027.38	108.34	1030.15	108.49	1061.52	109.05	1079.44	109.5
1090.15	109.71	1110.48	110	1119.01	110.17	1131.25	110.12	1135.15	110.14
1203.68	110.11	1222.2	110.16	1235.68	110.34	1240.41	110.48	1246.47	110.62
1251.49	110.78	1256.42	110.81	1276.31	111.14	1297.42	111.55	1327	112.45
1337.82	112.81	1376.78	113.84	1411.64	115	1425.29	115.38	1435.31	115.7
1460.54	116.44	1494.33	118	1499.35	118.21	1507.47	118.44	1532.34	118.92
1549.69	119.36	1571.66	120.11	1601.94	121.27	1646.66	122.56	1654.19	122.76
1662.02	123.04								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	101.16	.03	699.74	.075	928.81	.03	961.31	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
723.97 870.75 430.81 422.23 416.67 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	490	130	F

CROSS SECTION

RIVER: OtayRiver
REACH: OtayReach RS: 536.4273

INPUT
Description:
Station Elevation Data num= 136

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	112.64	20.98	111.83	72.65	110	75.18	109.92	132.79	108
166.85	107.17	196.5	106.22	205.36	106	227.34	105.26	278.78	104.18
283.78	104	312.8	102.85	330.22	102.2	336.6	102	372.51	101.4
381.66	101.15	389.78	100.97	401.07	100.61	409.82	100.3	417	100
423.38	99.76	425.6	99.74	468.49	99.17	477.7	99.16	484.55	99.17
495.75	98.91	535.99	98.63	587.43	98.65	609.48	98.72	614.82	98.71
616.36	98.7	621.14	95.15	624.68	92.51	632.87	87.66	635.1	86.43
640.13	85.94	643.16	85.79	646.05	85.68	650.92	85.33	655.31	85
659.81	84.72	662.12	84.59	663.66	84.53	666.89	84.48	668.47	84.48
671.36	84.53	673.37	84.45	677.9	84.43	691.6	84.35	693.24	84.35
722.53	84.28	739.72	84.28	764.04	84.33	764.9	84.35	779.17	84.49
783.36	84.48	788.38	84.48	792.33	84.47	832.87	84.47	834.39	84.47
834.89	84.43	836.76	84.35	839.3	84.29	875.07	84.73	876.23	84.75
878.41	84.92	890.66	85.75	896.42	86	905.7	86.69	908.83	86.81
926.25	87.94	933.45	88	934.18	88	937.24	88.06	942.23	90
945.44	91.24	946.46	91.43	953.71	92.71	962.83	95.71	964.61	96.49
970.04	98.85	976.22	101.55	981.85	104	983.34	104.31	986.09	105.38
987.45	106	991.23	106.01	995.73	106.27	1001.71	106.69	1007.81	107.04
1013.22	107.32	1039.1	107.83	1049.51	107.96	1053.81	108	1077.95	108.27

```
 1086.31  108.35 1115.51  108.74 1151.73  109.03 1159.65  109.14 1163.28  109.21
 1167.39  109.27 1180.21   109.5 1196.28  109.21 1205.24  109.83 1206.02  109.95
 1207.32  109.97 1211.47  110.01  1254.2  110.37 1260.55  110.31  1265.5  110.34
 1302.63  110.35 1354.07  111.94 1365.87   112.5 1377.74  113.02  1391.5  113.39
 1410.97   113.7 1442.43  114.26 1456.33  114.53 1468.49  114.81  1508.4  115.62
 1510.15  115.64  1523.3  115.77 1528.25  115.85 1544.57  116.14 1559.84  116.34
 1574.68  116.63 1611.28  117.29 1632.49  117.62 1650.97  117.96 1661.82  116.79
 1663.18  116.67  1667.4   116.7 1714.16  116.72 1716.47  116.79 1726.04  116.96
 1745.56  117.43

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .03   635.1     .04  646.05     .06  945.44     .03 1001.71     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        659.81  875.07           180.21  177.49  177.46              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0     385                F

CULVERT


RIVER: OtayRiver
REACH: OtayReach          RS: 464.0616

INPUT
Description:
Distance from Upstream XS =      67
Deck/Roadway Width        =      40
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       8
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     590   97.19      80   626.4    96.6      80   683.2   95.99      80
   733.5   95.96      80     780    95.6      80   824.5    95.3      80
   976.7   102.7      80   998.4  105.55      80

Upstream Bridge Cross Section Data
Station Elevation Data    num=     136
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  112.64   20.98  111.83   72.65     110   75.18  109.92  132.79     108
  166.85  107.17   196.5  106.22  205.36     106  227.34  105.26  278.78  104.18
  283.78     104   312.8  102.85  330.22   102.2   336.6     102  372.51   101.4
  381.66  101.15  389.78  100.97  401.07  100.61  409.82   100.3     417     100
  423.38   99.76   425.6   99.74  468.49   99.17   477.7   99.16  484.55   99.17
  495.75   98.91  535.99   98.63  587.43   98.65  609.48   98.72  614.82   98.71
  616.36    98.7  621.14   95.15  624.68   92.51  632.87   87.66   635.1   86.43
  640.13   85.94  643.16   85.79  646.05   85.68  650.92   85.33  655.31      85
  659.81   84.72  662.12   84.59  663.66   84.53  666.89   84.48  668.47   84.48
  671.36   84.53  673.37   84.45   677.9   84.43   691.6   84.35  693.24   84.35
  722.53   84.28  739.72   84.28  764.04   84.33   764.9   84.35  779.17   84.49
  783.36   84.48  788.38   84.48  792.33   84.47  832.87   84.47  834.39   84.47
  834.89   84.43  836.76   84.35   839.3   84.29  875.07   84.73  876.23   84.75
  878.41   84.92  890.66   85.75  896.42      86   905.7   86.69  908.83   86.81
  926.25   87.94  933.45      88  934.18      88  937.24   88.06  942.23      90
  945.44   91.24  946.46   91.43  953.71   92.71  962.83   95.71  964.61   96.49
  970.04   98.85  976.22  101.55  981.85     104  983.34  104.31  986.09  105.38
  987.45     106  991.23  106.01  995.73  106.27 1001.71  106.69 1007.81  107.04
 1013.22  107.32  1039.1  107.83 1049.51  107.96 1053.81     108 1077.95  108.27
 1086.31  108.35 1115.51  108.74 1151.73  109.03 1159.65  109.14 1163.28  109.21
 1167.39  109.27 1180.21   109.5 1196.28  109.21 1205.24  109.83 1206.02  109.95
 1207.32  109.97 1211.47  110.01  1254.2  110.37 1260.55  110.31  1265.5  110.34
```



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 1302.63  110.35 1354.07  111.94 1365.87   112.5 1377.74  113.02  1391.5  113.39
 1410.97   113.7 1442.43  114.26 1456.33  114.53 1468.49  114.81  1508.4  115.62
 1510.15  115.64  1523.3  115.77 1528.25  115.85 1544.57  116.14 1559.84  116.34
 1574.68  116.63 1611.28  117.29 1632.49  117.62 1650.97  117.96 1661.82  116.79
 1663.18  116.67  1667.4   116.7 1714.16  116.72 1716.47  116.79 1726.04  116.96
 1745.56  117.43

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .03   635.1     .04  646.05     .06  945.44     .03 1001.71     .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
        659.81  875.07             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0     385                F

Downstream  Deck/Roadway Coordinates
    num=       9
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     498      98      80     542   97.19      80   578.4    96.6      80
   635.2   95.99      80   685.5   95.96      80     732    95.6      80
   776.5    95.3      80   928.7   102.7      80   950.4  105.55      80

Downstream Bridge Cross Section Data
Station Elevation Data    num=     134
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  109.33    7.49  109.25   13.18  109.07   32.25  108.43   79.38  107.34
   97.34  106.87  126.87     106  127.81  105.97   186.4  104.61  202.07     104
  227.55  103.11  237.78  102.72  281.32  101.31  289.16  101.09  314.45  100.58
  339.34  100.32  342.79  100.14  349.66    99.8  350.88   99.75  353.73   99.67
  360.04   99.42  372.41   99.56  373.34   99.52  380.32   99.32  395.94   99.41
  404.06    99.5  427.91   98.76   433.9   98.89  439.54   99.21  448.19   99.82
  449.87    99.9  463.43   99.82  468.66   99.69  475.24    99.4  495.51   98.68
  504.83   98.29  508.36      98  511.86   97.72  523.07   96.95  525.87      96
  537.62   92.03  540.18   91.33  544.59   90.13   544.9      90  545.98   89.23
  551.83   88.94   557.2   88.82  560.31   88.72  565.85   88.53  570.61   88.32
  572.18   88.34  577.64      88  579.09   87.93  597.45    87.1  612.31   86.58
  614.82   86.54  620.05    86.4  629.09      86  648.83   85.41  662.24   85.28
  692.82   85.36   702.1   85.26   704.7   85.26  749.07   85.38  751.59   85.39
  801.24   84.96  803.91   84.96  804.36   84.97  809.07   84.98   849.4   85.19
  883.49   85.22   894.8   85.19   898.2   85.29  900.42   85.55  902.08   85.65
  904.12   85.43  905.45   85.65   906.5   85.88  910.24   88.25  916.49   92.21
   922.9   96.89  926.46    99.5  929.39  101.16  934.54  103.81  938.25  105.71
  939.88  106.59   940.3   106.8   947.8  106.75   951.9  106.73 1000.69  107.64
 1003.54  107.69 1006.44   107.8  1023.6   108.3 1026.84   108.4  1027.9  108.41
 1054.92   108.9 1082.57  108.98 1106.3  109.21 1109.82  109.19 1113.12   109.1
 1150.07   109.4 1157.78  109.54 1182.85  110.03 1209.07  110.62 1255.27     112
 1257.56  112.06  1261.7   112.2 1275.41  112.36 1311.83  112.66 1328.69  113.03
 1363.21  113.52 1368.53  113.69 1379.64     114 1380.53  114.02 1385.53  114.18
 1411.11  114.52 1414.59  114.56 1453.34  115.07 1465.97  115.21 1497.51     116
 1503.52  116.17 1519.97  116.57 1523.87  116.39 1553.67  116.95 1568.74  117.15
 1617.05  117.64    1620  117.66 1647.77  117.65 1658.34   116.6 1667.39   116.5
 1669.88  116.63 1683.36  116.55 1713.34  116.63 1737.82  117.69

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .03   557.2    .075  900.42     .03   951.9     .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
        629.09   906.5             .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
```

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Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  4

Culvert Name     Shape      Rise    Span
Culvert #1      Circular       5
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                90      40     .024     .024        0                   .5
      1
Number of Barrels =  3
Upstream   Elevation =  88.06
Centerline Stations
    Sta.    Sta.    Sta.
   677.9   685.9   693.6
Downstream Elevation =  87.11
Centerline Stations
    Sta.    Sta.    Sta.
   629.9   637.9   645.6

Culvert Name     Shape      Rise    Span
Culvert #2      Circular       5
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                77      40     .024     .024        0                   .5
      1
Number of Barrels =  3
Upstream   Elevation =  87.73
Centerline Stations
    Sta.    Sta.    Sta.
   732.7   740.6   752.2
Downstream Elevation =  85.82
Centerline Stations
    Sta.    Sta.    Sta.
   677.2   684.7   692.6

Culvert Name     Shape      Rise    Span
Culvert #3      Circular       5
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                66      40     .024     .024        0                   .5
      1
Number of Barrels =  3
Upstream   Elevation =  87.43
Centerline Stations
    Sta.    Sta.    Sta.
   770.7     778   785.1
Downstream Elevation =  86.36
Centerline Stations
```



```
    Sta.    Sta.    Sta.
   722.7     730   737.1

Culvert Name     Shape      Rise    Span
Culvert #4      Circular       5
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                53      40     .024     .024        0                   .5
      1
Number of Barrels =  3
Upstream   Elevation =  87.36
Centerline Stations
    Sta.    Sta.    Sta.
   816.4   824.2   832.2
Downstream Elevation =  86.73
Centerline Stations
    Sta.    Sta.    Sta.
   768.4   776.2   784.2

CROSS SECTION


RIVER: OtayRiver
REACH: OtayReach          RS: 358.9326

INPUT
Description:
Station Elevation Data    num=     134
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  109.33    7.49  109.25   13.18  109.07   32.25  108.43   79.38  107.34
   97.34  106.87  126.87     106  127.81  105.97   186.4  104.61  202.07     104
  227.55  103.11  237.78  102.72  281.32  101.31  289.16  101.09  314.45  100.58
  339.34  100.32  342.79  100.14  349.66    99.8  350.88   99.75  353.73   99.67
  360.04   99.42  372.41   99.56  373.34   99.52  380.32   99.32  395.94   99.41
  404.06    99.5  427.91   98.76   433.9   98.89  439.54   99.21  448.19   99.82
  449.87    99.9  463.43   99.82  468.66   99.69  475.24    99.4  495.51   98.68
  504.83   98.29  508.36      98  511.86   97.72  523.07   96.95  525.87      96
  537.62   92.03  540.18   91.33  544.59   90.13   544.9      90  545.98   89.23
  551.83   88.94   557.2   88.82  560.31   88.72  565.85   88.53  570.61   88.32
  572.18   88.34  577.64      88  579.09   87.93  597.45    87.1  612.31   86.58
  614.82   86.54  620.05    86.4  629.09      86  648.83   85.41  662.24   85.28
  692.82   85.36   702.1   85.26   704.7   85.26  749.07   85.38  751.59   85.39
  801.24   84.96  803.91   84.96  804.36   84.97  809.07   84.98   849.4   85.19
  883.49   85.22   894.8   85.19   898.2   85.29  900.42   85.55  902.08   85.65
  904.12   85.43  905.45   85.65   906.5   85.88  910.24   88.25  916.49   92.21
   922.9   96.89  926.46    99.5  929.39  101.16  934.54  103.81  938.25  105.71
  939.88  106.59   940.3   106.8   947.8  106.75   951.9  106.73 1000.69  107.64
 1003.54  107.69 1006.44   107.8  1023.6   108.3 1026.84   108.4  1027.9  108.41
 1054.92   108.9 1082.57  108.98 1106.3  109.21 1109.82  109.19 1113.12   109.1
 1150.07   109.4 1157.78  109.54 1182.85  110.03 1209.07  110.62 1255.27     112
 1257.56  112.06  1261.7   112.2 1275.41  112.36 1311.83  112.66 1328.69  113.03
 1363.21  113.52 1368.53  113.69 1379.64     114 1380.53  114.02 1385.53  114.18
 1411.11  114.52 1414.59  114.56 1453.34  115.07 1465.97  115.21 1497.51     116
 1503.52  116.17 1519.97  116.57 1523.87  116.39 1553.67  116.95 1568.74  117.15
 1617.05  117.64    1620  117.66 1647.77  117.65 1658.34   116.6 1667.39   116.5
 1669.88  116.63 1683.36  116.55 1713.34  116.63 1737.82  117.69

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .03   557.2    .075  900.42     .03   951.9     .02
```

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
629.09	906.5	329.45	313.53	289.4	.1	.3

CROSS SECTION

RIVER: OtayRiver
REACH: OtayReach RS: 45.40464

INPUT
Description:
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	112.2	155	107.2	240	102.2	300	97.2	440	92.2
629	87.2	639	82.2	650	77.2	850	77	940	77.2
950	80.2	956	82.2	960	84.2	963	86.2	968	88.2
972	90.2	977	92.2	990	92.2	1005	98.2	1009	100.2
1015	104.2	1020	106.2	1022	108.2	1028	110.2	1032	112.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	639	.075	956	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
639	956	1	1	1	.3	.5

SUMMARY OF MANNING'S N VALUES

River:OtayRiver

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7
OtayReach	4735.705	.04	.04	.04				
OtayReach	4161.779	.04	.04	.04				
OtayReach	3182.152	.03	.04	.075	.03			
OtayReach	2735.287	.03	.04	.075	.03			
OtayReach	2263.575	.03	.04	.075	.04	.03		
OtayReach	1961.59	.02	.04	.05	.065	.075	.04	.03
OtayReach	1648.554	.02	.05	.065	.06	.03		
OtayReach	1356.913	.02	.05	.065	.075	.03		
OtayReach	958.6605	.02	.03	.075	.03	.02		
OtayReach	536.4273	.03	.04	.06	.03	.02		
OtayReach	464.0616	Culvert						
OtayReach	358.9326	.03	.075	.03	.02			
OtayReach	45.40464	.04	.075	.03				

SUMMARY OF REACH LENGTHS

River: OtayRiver

Reach	River Sta.	Left	Channel	Right
OtayReach	4735.705	610	600	560
OtayReach	4161.779	933.16	980	1020
OtayReach	3182.152	440	446.86	453.75
OtayReach	2735.287	482.72	471.71	471.4
OtayReach	2263.575	301.87	301.98	315.82
OtayReach	1961.59	310.97	313.04	317.06
OtayReach	1648.554	292.04	291.64	293.2
OtayReach	1356.913	394.53	398.25	400.56
OtayReach	958.6605	430.81	422.23	416.67
OtayReach	536.4273	180.21	177.49	177.46
OtayReach	464.0616	Culvert		
OtayReach	358.9326	329.45	313.53	289.4
OtayReach	45.40464	1	1	1

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: OtayRiver

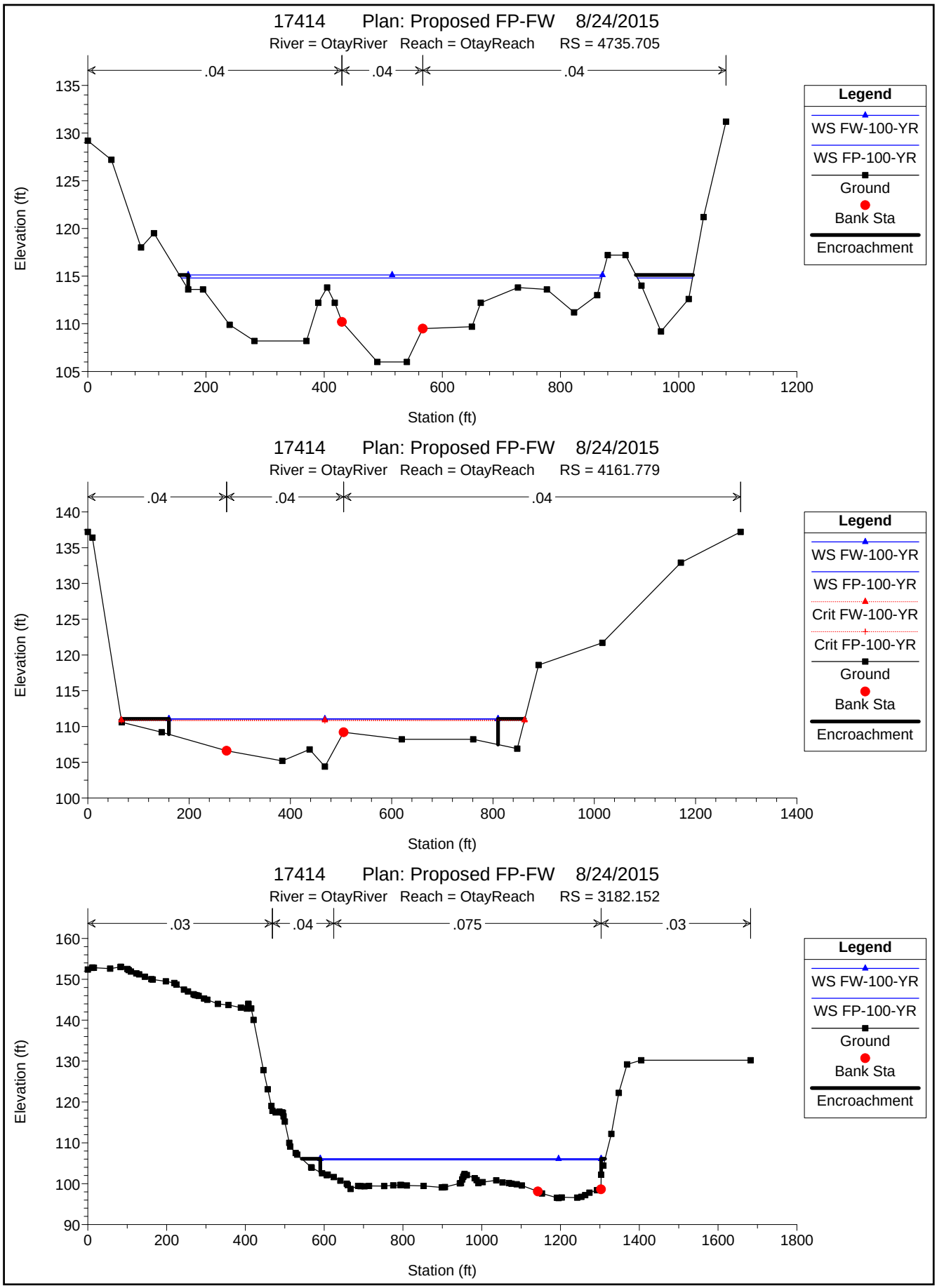
Reach	River Sta.	Contr.	Expan.
OtayReach	4735.705	.1	.3
OtayReach	4161.779	.1	.3
OtayReach	3182.152	.1	.3
OtayReach	2735.287	.1	.3
OtayReach	2263.575	.1	.3
OtayReach	1961.59	.1	.3
OtayReach	1648.554	.1	.3
OtayReach	1356.913	.1	.3
OtayReach	958.6605	.1	.3
OtayReach	536.4273	.1	.3
OtayReach	464.0616	Culvert	
OtayReach	358.9326	.1	.3
OtayReach	45.40464	.3	.5

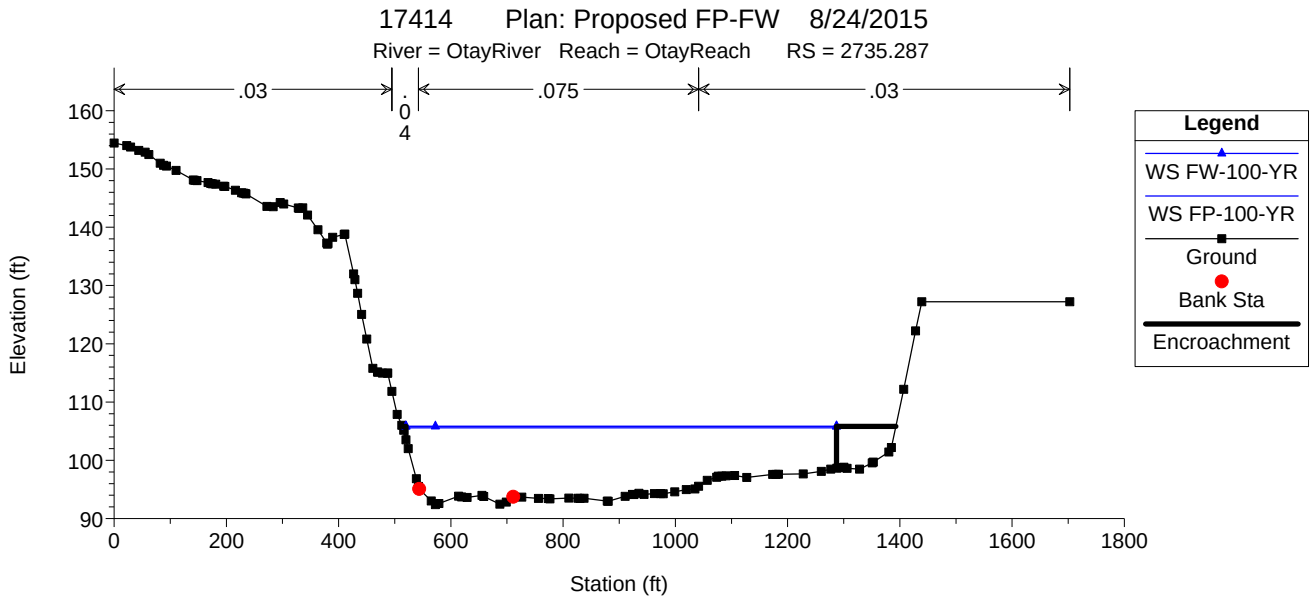
Appendix 10

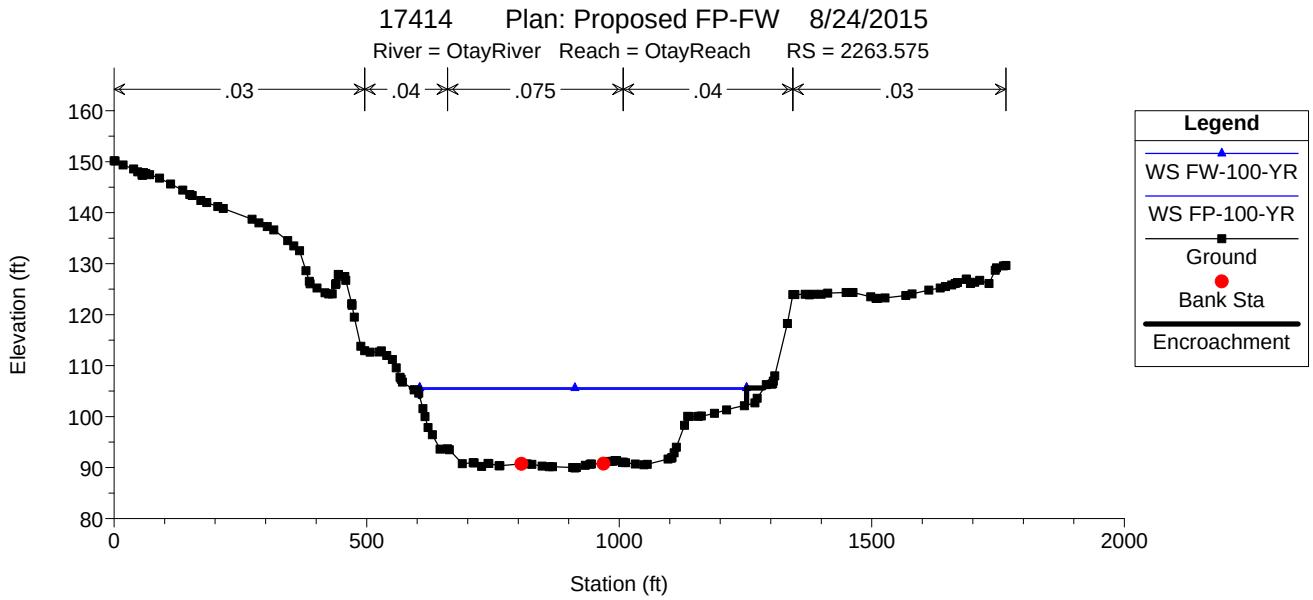
Proposed Condition HEC-RAS Output
(100-year Floodplain & Floodway)

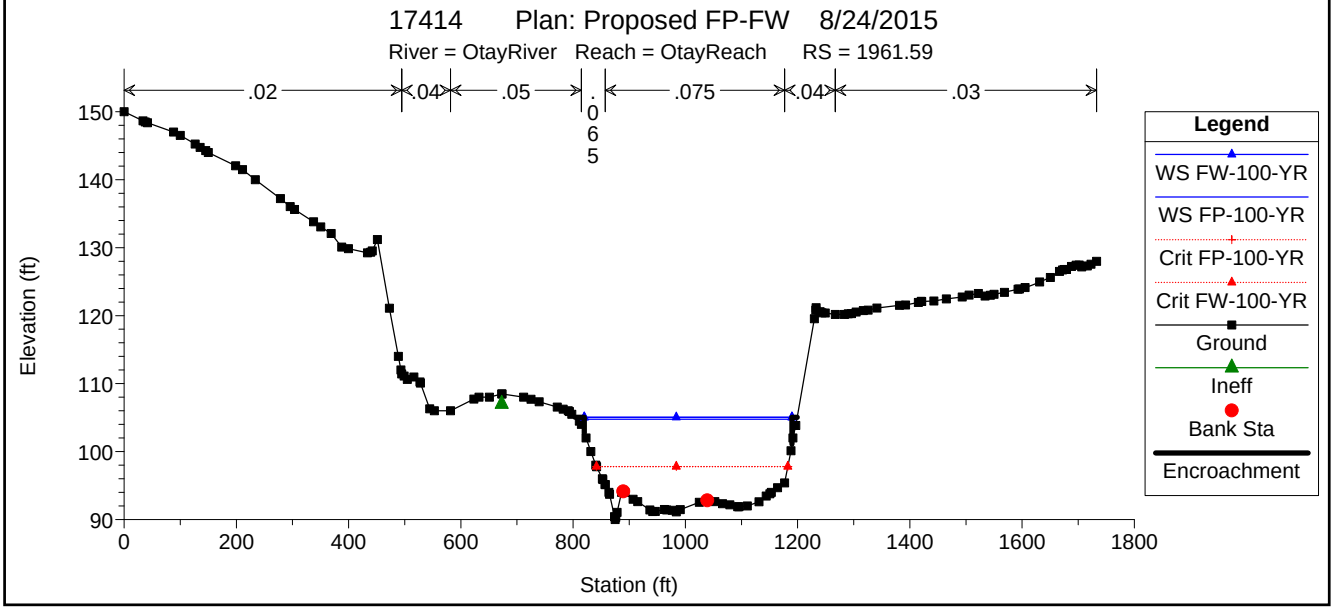
HEC-RAS Plan: Proposed FP- River: OtayRiver Reach: OtayReach

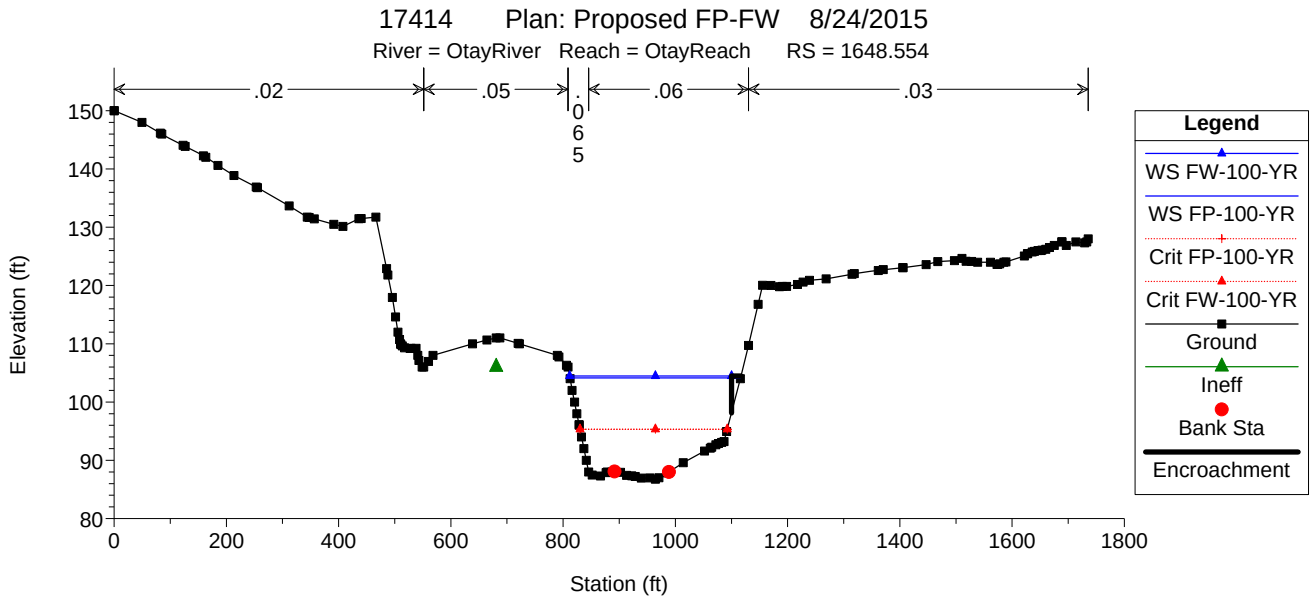
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
OtayReach	4735.705	FP-100-YR	22000.00	106.00	114.81		115.59	0.003832	8.83	3399.88	804.89	0.57
OtayReach	4735.705	FW-100-YR	22000.00	106.00	115.12		115.93	0.003535	8.72	3314.32	701.11	0.55
OtayReach	4161.779	FP-100-YR	22000.00	104.40	111.06	110.81	112.26	0.008836	10.23	2666.36	796.94	0.80
OtayReach	4161.779	FW-100-YR	22000.00	104.40	111.07	110.90	112.54	0.010180	11.00	2377.35	650.00	0.86
OtayReach	3182.152	FP-100-YR	22000.00	96.49	105.82		106.17	0.004374	5.51	4701.31	766.02	0.33
OtayReach	3182.152	FW-100-YR	22000.00	96.49	106.10		106.44	0.003907	5.32	4812.21	713.00	0.31
OtayReach	2735.287	FP-100-YR	22000.00	92.38	105.58		105.69	0.000386	2.06	8687.82	878.20	0.10
OtayReach	2735.287	FW-100-YR	22000.00	92.38	105.82		105.94	0.000430	2.20	8252.76	767.00	0.11
OtayReach	2263.575	FP-100-YR	22000.00	89.91	105.36		105.48	0.000474	2.62	7846.25	693.01	0.12
OtayReach	2263.575	FW-100-YR	22000.00	89.91	105.61		105.73	0.000428	2.52	7935.49	647.00	0.11
OtayReach	1961.59	FP-100-YR	22000.00	91.13	104.75	97.80	105.17	0.002503	5.39	4266.75	391.34	0.27
OtayReach	1961.59	FW-100-YR	22000.00	91.13	105.05	97.80	105.45	0.002313	5.26	4350.80	370.00	0.26
OtayReach	1648.554	FP-100-YR	22000.00	86.75	104.14	95.32	104.60	0.001369	6.02	4136.39	304.08	0.26
OtayReach	1648.554	FW-100-YR	22000.00	86.75	104.48	95.32	104.92	0.001269	5.87	4184.51	288.48	0.25
OtayReach	1356.913	FP-100-YR	22000.00	85.16	103.69	93.55	104.14	0.001760	5.78	4208.67	305.63	0.24
OtayReach	1356.913	FW-100-YR	22000.00	85.16	104.07	93.55	104.49	0.001632	5.64	4314.18	284.68	0.23
OtayReach	958.6605	FP-100-YR	22000.00	87.85	102.83	94.76	103.33	0.002330	5.76	3926.80	524.37	0.26
OtayReach	958.6605	FW-100-YR	22000.00	87.85	103.34	94.76	103.78	0.001967	5.41	4160.24	463.76	0.24
OtayReach	536.4273	FP-100-YR	22000.00	84.28	102.73	90.52	102.90	0.000401	3.44	6715.43	662.87	0.14
OtayReach	536.4273	FW-100-YR	22000.00	84.28	103.21	90.53	103.39	0.000389	3.45	6509.29	458.93	0.14
OtayReach	464.0616		Culvert									
OtayReach	358.9326	FP-100-YR	22000.00	84.96	90.75	90.75	93.13	0.039751	12.65	1806.28	371.90	0.95
OtayReach	358.9326	FW-100-YR	22000.00	84.96	90.75	90.75	93.13	0.039751	12.65	1806.28	371.90	0.95
OtayReach	45.40464	FP-100-YR	22000.00	77.00	86.49	82.63	87.36	0.007514	7.50	2942.97	333.31	0.44
OtayReach	45.40464	FW-100-YR	22000.00	77.00	86.49	82.63	87.36	0.007540	7.51	2937.79	329.08	0.44

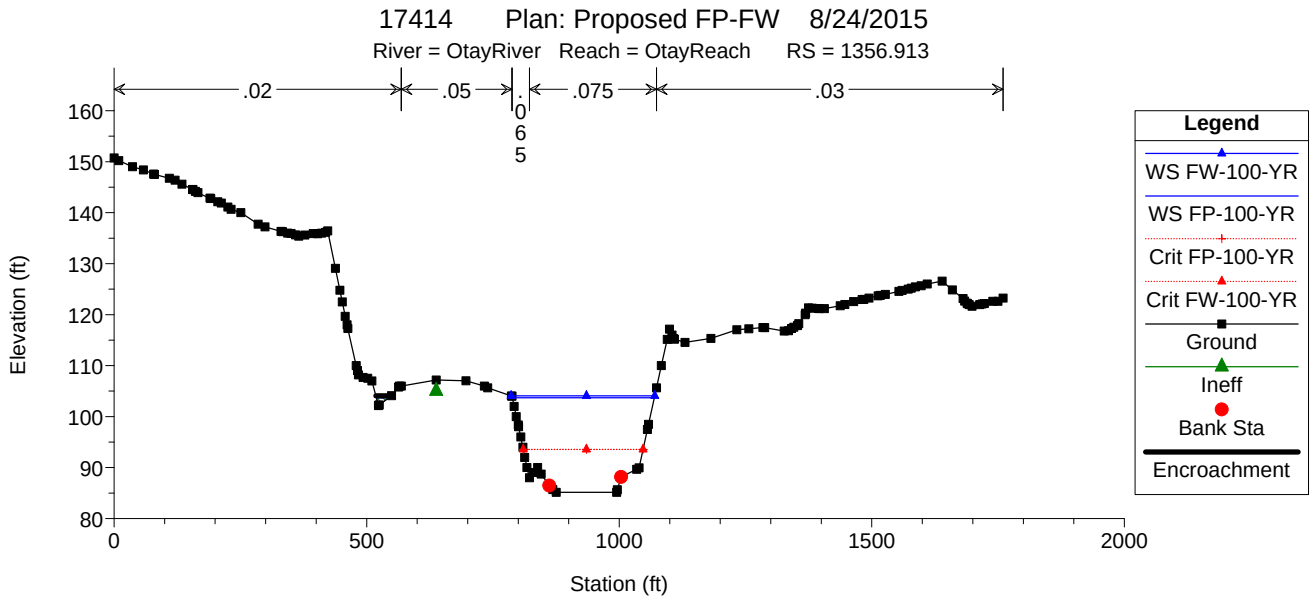

17414 Plan: Proposed FP-FW 8/24/2015
River = OtayRiver Reach = OtayReach RS = 4735.705
.04
.04
.04
Elevation (ft)
Station (ft)
Legend
WS FW-100-YR
WS FP-100-YR
Ground
Bank Sta
Encroachment
17414 Plan: Proposed FP-FW 8/24/2015
River = OtayRiver Reach = OtayReach RS = 4161.779
.04
.04
.04
Elevation (ft)
Station (ft)
Legend
WS FW-100-YR
WS FP-100-YR
Crit FW-100-YR
Crit FP-100-YR
Ground
Bank Sta
Encroachment
17414 Plan: Proposed FP-FW 8/24/2015
River = OtayRiver Reach = OtayReach RS = 3182.152
.03
.04
.075
.03
Elevation (ft)
Station (ft)
Legend
WS FW-100-YR
WS FP-100-YR
Ground
Bank Sta
Encroachment

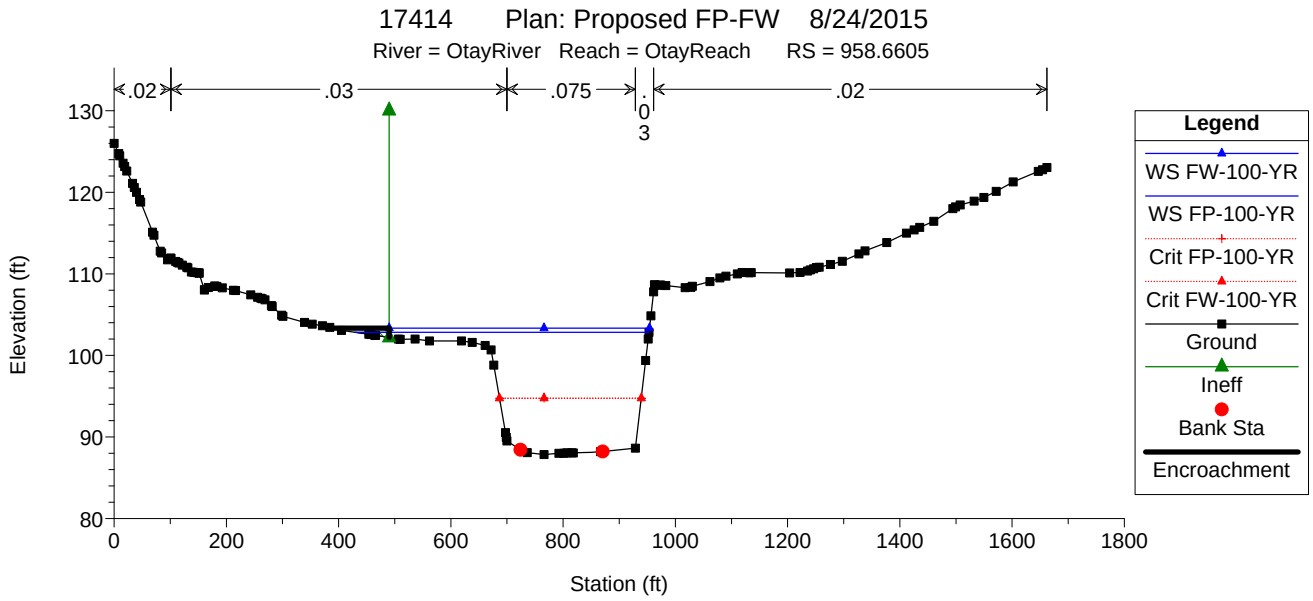

17414 Plan: Proposed FP-FW 8/24/2015
River = OtayRiver Reach = OtayReach RS = 2735.287
.03
.04
.075
.03
Elevation (ft)
Station (ft)
Legend
WS FW-100-YR
WS FP-100-YR
Ground
Bank Sta
Encroachment

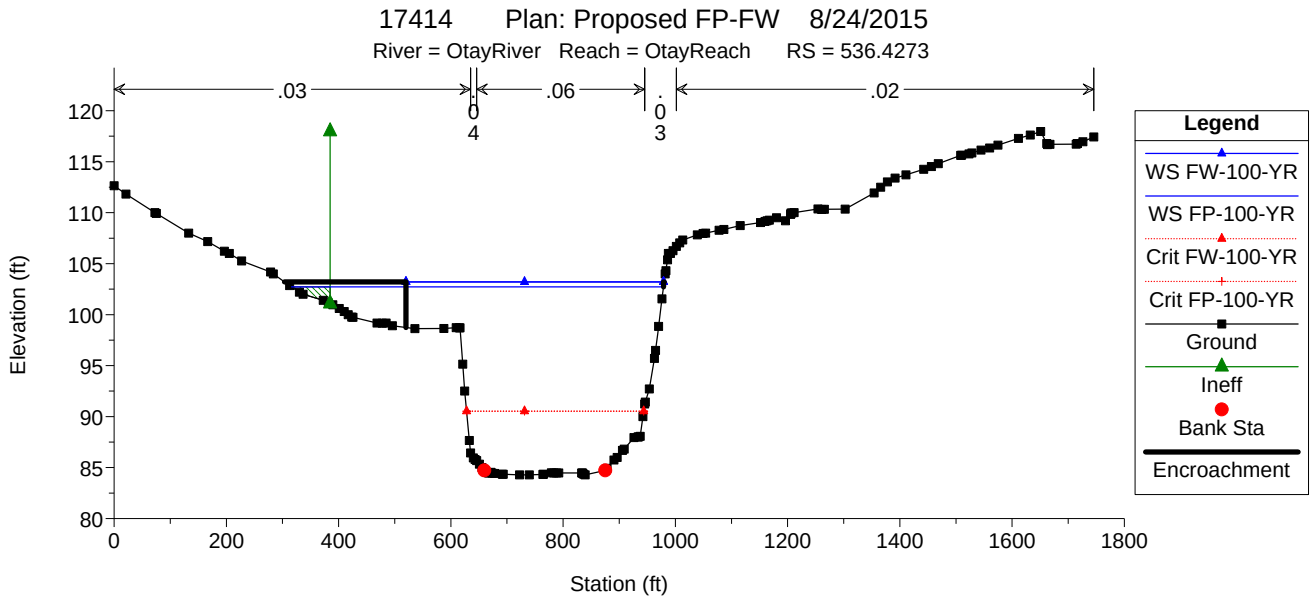

17414 Plan: Proposed FP-FW 8/24/2015
River = OtayRiver Reach = OtayReach RS = 2263.575
.03
.04
.075
.04
.03
Elevation (ft)
Station (ft)
Legend
WS FW-100-YR
WS FP-100-YR
Ground
Bank Sta
Encroachment

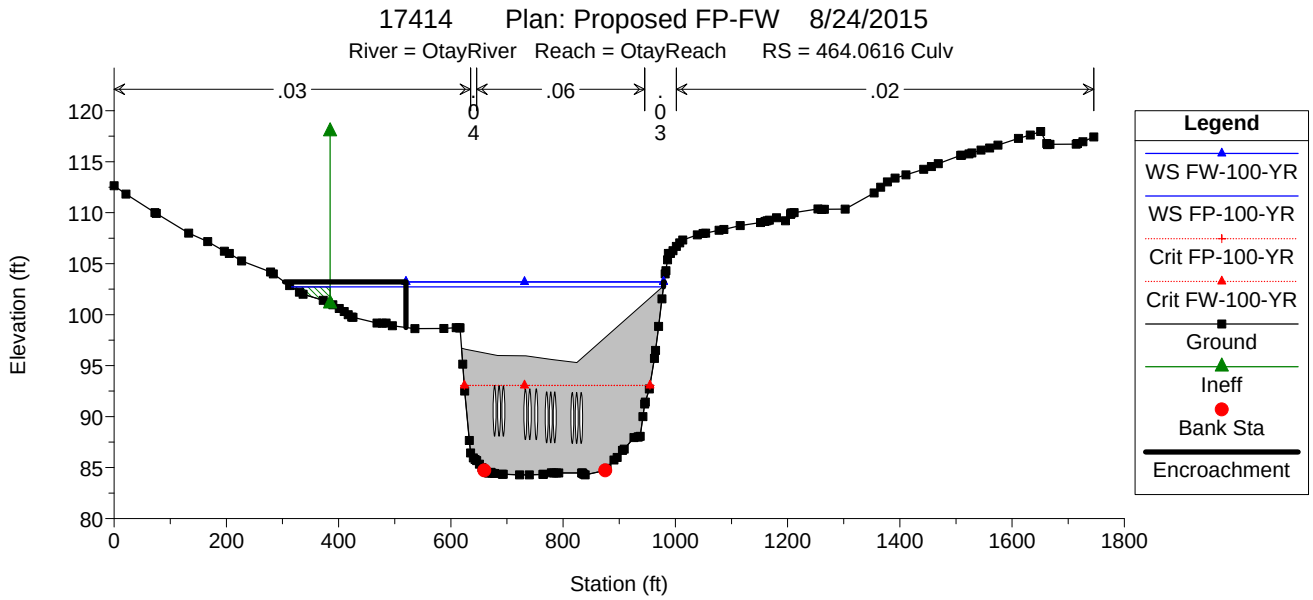

17414 Plan: Proposed FP-FW 8/24/2015
River = OtayRiver Reach = OtayReach RS = 1961.59
.02
.04
.05
.065
.075
.04
.03
Elevation (ft)
Station (ft)
Legend
WS FW-100-YR
WS FP-100-YR
Crit FP-100-YR
Crit FW-100-YR
Ground
Ineff
Bank Sta
Encroachment

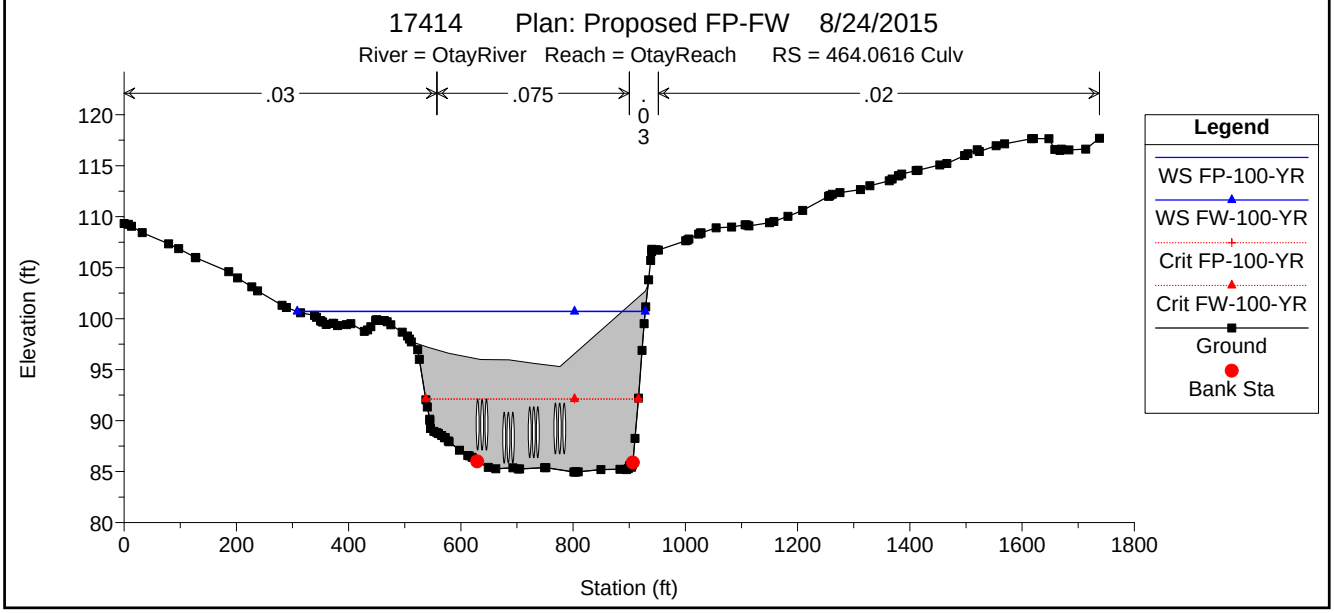

17414 Plan: Proposed FP-FW 8/24/2015
River = OtayRiver Reach = OtayReach RS = 1648.554
.02
.05
.065
.06
.03
Elevation (ft)
Station (ft)
Legend
WS FW-100-YR
WS FP-100-YR
Crit FP-100-YR
Crit FW-100-YR
Ground
Ineff
Bank Sta
Encroachment

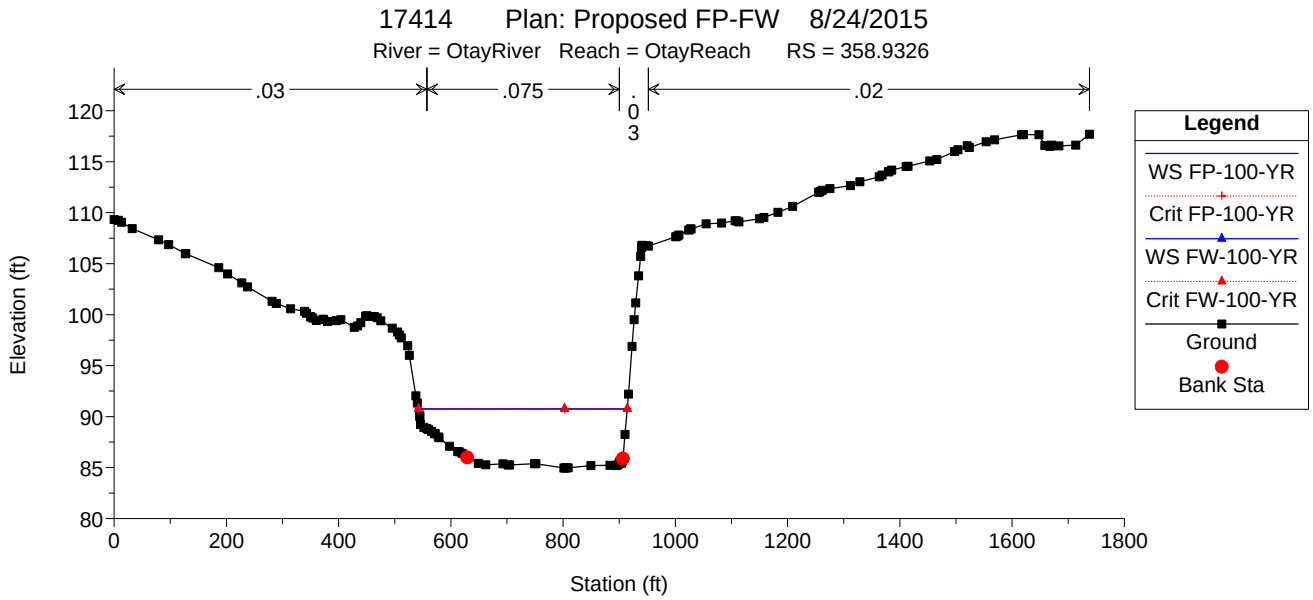

17414 Plan: Proposed FP-FW 8/24/2015
River = OtayRiver Reach = OtayReach RS = 1356.913
.02
.05
.065
.075
.03
Elevation (ft)
Station (ft)
Legend
WS FW-100-YR
WS FP-100-YR
Crit FP-100-YR
Crit FW-100-YR
Ground
Ineff
Bank Sta
Encroachment

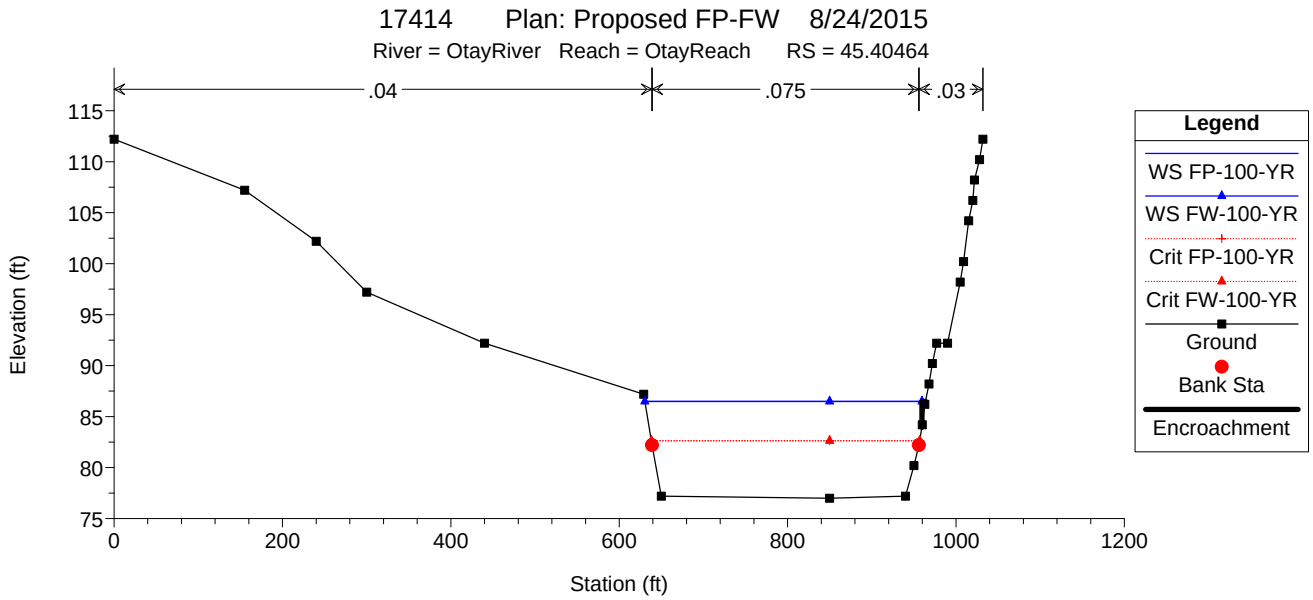

17414 Plan: Proposed FP-FW 8/24/2015
River = OtayRiver Reach = OtayReach RS = 958.6605
.02
.03
.075
.03
.02
Elevation (ft)
Station (ft)
Legend
WS FW-100-YR
WS FP-100-YR
Crit FP-100-YR
Crit FW-100-YR
Ground
Ineff
Bank Sta
Encroachment


17414 Plan: Proposed FP-FW 8/24/2015
River = OtayRiver Reach = OtayReach RS = 536.4273
.03
.06
.02
Elevation (ft)
Station (ft)
Legend
WS FW-100-YR
WS FP-100-YR
Crit FW-100-YR
Crit FP-100-YR
Ground
Ineff
Bank Sta
Encroachment


17414 Plan: Proposed FP-FW 8/24/2015
River = OtayRiver Reach = OtayReach RS = 464.0616 Culv
.03
.06
.02
Elevation (ft)
Station (ft)
Legend
WS FW-100-YR
WS FP-100-YR
Crit FP-100-YR
Crit FW-100-YR
Ground
Ineff
Bank Sta
Encroachment


17414 Plan: Proposed FP-FW 8/24/2015
River = OtayRiver Reach = OtayReach RS = 464.0616 Culv
.03
.075
.02
Elevation (ft)
Station (ft)
Legend
WS FP-100-YR
WS FW-100-YR
Crit FP-100-YR
Crit FW-100-YR
Ground
Bank Sta


17414 Plan: Proposed FP-FW 8/24/2015
River = OtayRiver Reach = OtayReach RS = 358.9326
.03
.075
.03
.02
Elevation (ft)
Station (ft)
Legend
WS FP-100-YR
Crit FP-100-YR
WS FW-100-YR
Crit FW-100-YR
Ground
Bank Sta


17414 Plan: Proposed FP-FW 8/24/2015
River = OtayRiver Reach = OtayReach RS = 45.40464
.04
.075
.03
Elevation (ft)
Station (ft)
Legend
WS FP-100-YR
WS FW-100-YR
Crit FP-100-YR
Crit FW-100-YR
Ground
Bank Sta
Encroachment

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
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PROJECT DATA
Project Title: 17414
Project File : 17414.prj
Run Date and Time: 8/24/2015 4:57:39 PM

Project in English units

PLAN DATA

Plan Title: Proposed FP-FW
Plan File :
w:\17414_Shinohara_CLOMR\WaterResources\Hydraulics\HecRas\CLOMR\17414.p03

Geometry Title: Proposed-MP
Geometry File :
w:\17414_Shinohara_CLOMR\WaterResources\Hydraulics\HecRas\CLOMR\17414.g02

Flow Title : FP-FW
Flow File :
w:\17414_Shinohara_CLOMR\WaterResources\Hydraulics\HecRas\CLOMR\17414.f02

Plan Summary Information:
Number of: Cross Sections = 12 Multiple Openings = 0
Culverts = 1 Inline Structures = 0
Bridges = 0 Lateral Structures = 0

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

Encroachment Data
Equal Conveyance = False
Left Offset = 0

Right Offset = 0

River = OtayRiver Reach = OtayReach

RS	Profile	Method	Value1	Value2
4735.705	FW-100-YR	1	170	900
4161.779	FW-100-YR	1	160	810
3182.152	FW-100-YR	1	590	1303
2735.287	FW-100-YR	1	520	1287
2263.575	FW-100-YR	1	605	1252
1961.59	FW-100-YR	1	820	1190
1648.554	FW-100-YR	1	800	1100
1356.913	FW-100-YR	1	785	1075
958.6605	FW-100-YR	1	490	1800
536.4273	FW-100-YR	1	520	978.93
358.9326	FW-100-YR	1	0	1000
45.40464	FW-100-YR	1	630	959.5

FLOW DATA

Flow Title: FP-FW
Flow File :
w:\17414_Shinohara_CLOMR\WaterResources\Hydraulics\HecRas\CLOMR\17414.f02

Flow Data (cfs)

River	Reach	RS	FP-100-YR	FW-100-YR
OtayRiver	OtayReach	4735.705	22000	22000

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
OtayRiver	OtayReach	FP-100-YR	Known WS = 86.49	
OtayRiver	OtayReach	FW-100-YR	Known WS = 86.49	

GEOMETRY DATA

Geometry Title: Proposed-MP
Geometry File :
w:\17414_Shinohara_CLOMR\WaterResources\Hydraulics\HecRas\CLOMR\17414.g02

CROSS SECTION

RIVER: OtayRiver
REACH: OtayReach RS: 4735.705

INPUT
Description:
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	129.2	40	127.2	90	118	112	119.5	170	113.6
195	113.6	240	109.9	282	108.2	370	108.2	390	112.2
405	113.8	418	112.2	430	110.2	490	106	540	106
567	109.5	650	109.7	665	112.2	728	113.8	777	113.6
823	111.2	862	113	880	117.2	910	117.2	937	114
970	109.2	1017	112.6	1042	121.2	1080	131.2		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	430	.04	567	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
430	567	610	600	560	.1	.3

CROSS SECTION

RIVER: OtayRiver
REACH: OtayReach RS: 4161.779

INPUT
Description:
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	137.2	9	136.4	67	110.6	146	109.2	274	106.6
384	105.2	438	106.8	468	104.4	505	109.2	620	108.2
761	108.2	848	106.9	890	118.6	1016	121.7	1171	132.9
1289	137.2								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	274	.04	505	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
274	505	933.16	980	1020	.1	.3

CROSS SECTION

RIVER: OtayRiver
REACH: OtayReach RS: 3182.152

INPUT
Description:
Station Elevation Data num= 106

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	152.4	10.93	152.8	12	152.88	15.35	152.83	56.68	152.62
82.84	153.02	84.01	153.06	100.36	152.52	103.83	152.26	109.45	151.9
123.12	151.46	130.14	151.22	144.77	150.64	161.29	150.03	164.68	149.96
198.16	149.51	219.37	149.1	225.01	148.72	244.06	147.47	254.3	147.04
268.67	146.34	271.95	146.15	276.57	146.09	281.41	145.93	295.16	145.3
303.42	145.01	330.18	143.99	356.93	143.72	388.62	143.09	404.08	142.83
407.32	143.98	407.59	143.96	414.75	142.87	420.66	140.06	445.83	127.79
456.66	123.08	465.99	119.04	468.78	117.81	476.99	117.44	486.25	117.63
492.5	117.43	495.27	117.34	497.02	116.46	499.92	115.17	511.45	110
513.59	109.08	527.78	107.5	531.79	107.1	567.07	104	568.16	103.91
594.57	102.56	606.71	102.07	608.84	102.21	624.27	101.63	641.15	100.75
657.32	100	659.91	99.67	667.15	98.71	686.33	99.44	692.21	99.4
702.39	99.37	713.85	99.44	752.43	99.43	775.38	99.59	793.1	99.66
795.34	99.7	810.04	99.56	852.51	99.45	898.56	99.09	902.55	99.11
906.65	99.18	944.58	100.07	947.42	100.13	950.49	101.03	952.9	101.64
955	102	956.5	102.38	962.23	102.11	982.17	101.35	986.98	100.87

991.45	100.14	1002.36	100.38	1036.71	100.82	1052.67	100.3	1069.1	100.16
1075.48	100	1088.61	99.85	1101.76	99.56	1142.54	98.11	1152.76	97.6
1190.88	96.56	1195.01	96.49	1203.09	96.63	1242.4	96.58	1252.84	96.77
1262.62	97.2	1273.5	97.8	1292.43	98.41	1302.88	98.62	1303	102.2
1308.8	104.431	1329	112.2	1348	122.2	1369	129.2	1405	130.2
1682.42	130.2								

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	468.78	.04	624.27	.075	1303	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1142.54	1302.88	440	446.86	453.75	.1	.3

CROSS SECTION

RIVER: OtayRiver
REACH: OtayReach RS: 2735.287

INPUT
Description:
Station Elevation Data num= 118

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	154.44	22.53	154	29.3	153.77	43.85	153.2	55.27	152.89
61.97	152.48	82.12	150.98	88.19	150.64	93.31	150.49	110.35	149.75
141.12	148.11	143.81	148.05	147.62	148	167.29	147.66	172.2	147.51
175.13	147.45	181.12	147.39	195.29	147.04	197.32	147	216.01	146.34
227.1	145.9	230.68	145.86	233.47	145.8	234.98	145.72	272.36	143.58
283.24	143.52	295.8	144.23	302.26	144	328.01	143.3	329.57	143.25
336.24	143.32	344.56	142.09	363.06	139.58	378.93	137.29	380.14	137.11
381.06	137.2	389.35	138.29	409.91	138.77	410.97	138.82	426.67	132
428.95	130.99	433.77	128.67	441.13	125.05	450.27	120.81	460.97	115.79
469.11	115.16	469.97	115.13	478.07	114.95	487.33	114.96	487.61	114.97
494.99	111.82	504.18	107.88	512.47	106	516.03	105.16	519.91	103.5
524.09	102	538.5	96.85	542.24	95.52	543.53	95.09	565.01	93.03
572.48	92.38	578.75	92.58	613.83	93.85	619.17	93.72	628.94	93.63
655.32	93.97	658.48	93.79	687.36	92.46	698.65	92.82	711.17	93.73
726.48	93.69	756.12	93.45	773.43	93.42	776.63	93.38	810.18	93.51
826.56	93.49	830.26	93.46	837.32	93.5	878.57	92.99	880.47	92.96
910.56	93.82	923.55	94.14	926.14	94.11	934.98	94.34	944.11	94.16
962.76	94.28	973.66	94.28	978.42	94.27	999.03	94.59	1019.45	94.97
1034.83	95.08	1041.44	95.54	1056.88	96.55	1073.67	97.09	1076.41	97.27
1082.87	97.28	1090.41	97.33	1105.6	97.39	1127.09	97.05	1173.45	97.58
1179.2	97.58	1183.61	97.6	1227.95	97.67	1260.01	98.1	1276.88	98.48
1287.79	98.65	1295.45	98.74	1300.26	98.81	1305.88	98.62	1328.25	98.49
1350.63	99.57	1352.83	99.69	1380.26	101.43	1385	102.2	1407	112.2
1428	122.2	1439	127.2	1702.7	127.2				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	494.99	.04	542.24	.075	1041.44	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
543.53	711.17	482.72	471.71	471.4	.1	.3

CROSS SECTION

RIVER: OtayRiver
REACH: OtayReach RS: 2263.575

INPUT

Description:
Station Elevation Data num= 146

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	150.19	2.02	150.15	17.83	149.37	38.57	148.57	46.81	148
55	147.45	55.93	147.33	58.23	147.86	62.7	147.69	70.38	147.46
90.06	146.8	111.9	145.64	135.79	144.42	149.81	143.57	154.62	143.36
171.74	142.39	183.41	142	205.23	141.19	216.14	140.83	273.11	138.71
286.74	138	303.14	137.29	316.26	136.61	343.76	134.5	355.67	133.47
367.16	132.54	379.72	128.63	386.37	126.53	388	126.04	401.76	125.23
417.36	124.28	424.68	124.06	431.87	124.08	438.34	125.87	439.24	126.1
443.74	127.87	444.24	127.88	456.74	127.48	458.57	126.73	470.3	122.15
471.07	121.83	475.45	119.5	488.56	113.79	496.01	112.93	506.68	112.65
524.73	112.67	529.01	112.9	539.77	111.98	550.75	111.2	558.37	109.56
565.9	107.71	568.34	107.35	570.89	106.78	593.83	105.23	603.12	104.6
611.39	101.55	615.55	100	621.4	97.86	630.08	96.45	645.32	93.63
660.25	93.68	663.64	93.5	689.21	90.77	710.83	90.95	712.78	90.93
727.47	90.23	740.25	90.82	741.95	90.79	761.96	90.35	763.78	90.37
806.47	90.73	817.26	90.72	826.97	90.64	847.27	90.3	861.38	90.16
868.06	90.16	907.75	90	912.13	89.91	915.05	90	932.84	90.44
942.39	90.66	944.93	90.69	968.84	90.78	970.43	90.82	981.13	91.19
987.02	91.24	991.77	91.38	995.08	91.37	1005.9	91.01	1008.03	91.08
1012.26	90.95	1031.62	90.71	1048.88	90.56	1055.31	90.63	1096.71	91.69
1103.05	91.83	1104.54	92	1108.59	92.91	1113.15	94	1129.36	98.3
1135.67	100.04	1138.67	100.01	1156.84	100.05	1162.42	100.12	1188.5	100.65
1212.48	101.32	1247.6	102.12	1268.72	102.68	1273.19	103.6	1291.16	106.28
1301.57	106.37	1303.76	106.47	1304.9	106.95	1307.78	108	1332.97	118.25
1343.8	123.94	1347.81	123.95	1368.06	124	1376.28	123.87	1384.4	124
1399.77	124	1412.72	124.21	1449.29	124.34	1462.77	124.35	1497.97	123.49
1508.25	123.2	1511.21	123.17	1526.03	123.27	1567.27	123.75	1579.71	124.07
1612.95	124.81	1635.35	125.22	1645.92	125.52	1658.3	125.81	1665.16	126.12
1669.53	126.28	1686.91	126.95	1687.22	126.95	1695.14	126.11	1703.73	126.35
1713.62	126.74	1731.92	126.1	1744.46	128.72	1746.79	129.18	1760.69	129.57
1765.67	129.64								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	496.01	.04	660.25	.075	1008.03	.04	1343.8	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
806.47	968.84	301.87	301.98	315.82	.1	.3

CROSS SECTION

RIVER: OtayRiver
REACH: OtayReach RS: 1961.59

INPUT
Description:
Station Elevation Data num= 140

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	150	33.68	148.67	37.71	148.49	41.6	148.37	88.06	147
100.03	146.52	126.64	145.24	135.46	144.76	145.36	144.27	150.05	144
198.62	142.04	211.06	141.48	233.89	140	278.53	137.22	295.99	136.05
303.54	135.62	337.58	133.81	350.49	133.05	368.86	132.08	387.71	130.09
399.56	129.85	433.7	129.23	439.41	129.33	442.02	129.51	451.34	131.19
472.8	121.1	488.68	114	493.23	112	494.68	111.43	498.84	111.11
504.63	110.62	516.17	110.98	527.15	110.24	527.83	110.07	544.53	106.29
552.71	106	581.47	106	623.18	107.73	632.22	108	650.84	108
672.76	108.48	673.48	108.48	711.77	108	724.91	107.7	739.59	107.32
771.62	106.54	782.16	106.25	791.37	106	793.26	105.9	797.78	105.5
811.03	104.47	814.77	104	822.9	102	831.5	100	840.4	98
841.75	97.771	852.19	96	852.99	95.89	857	95.166	857.2	95.13

863.78	94	864.95	93.72	873.88	90.42	874.94	90	876.17	90.34
878.3	91.06	886.35	94	889.35	94.14	892.31	94	906.71	93
915.25	92.63	936.85	91.41	941.77	91.18	946.54	91.21	962.85	91.48
966.69	91.41	976.66	91.36	983.78	91.13	991.05	91.45	1024.85	92.54
1039.04	92.83	1052.52	92.63	1066.06	92.33	1079.21	92.17	1093.35	91.89
1095.69	91.89	1110.3	92	1131.31	92.61	1144.14	93.45	1150.66	93.8
1153.29	94	1164.24	94.69	1176.79	95.38	1188.12	100.11	1191.76	102
1196.83	103.84	1229.76	119.55	1232.33	120.81	1233.06	121.17	1240.21	120.58
1243.45	120.41	1249.13	120.38	1267.18	120.18	1283.52	120.17	1290.29	120.27
1296.02	120.29	1304.24	120.52	1317.04	120.73	1325.53	120.81	1341.39	121.11
1381.59	121.53	1392.47	121.56	1415.05	121.95	1420.29	122.1	1421.13	122.09
1442.83	122.15	1464.97	122.45	1493.19	122.74	1505.49	123.03	1522.15	123.26
1534.05	122.88	1543.54	123.01	1549.94	123.14	1568.42	123.42	1592.7	123.9
1595.33	123.92	1605.21	124.12	1631.28	124.96	1650.41	125.61	1666.65	126.51
1672.03	126.73	1675.27	126.8	1679.16	126.79	1688.03	127.23	1696.18	127.42
1701.74	127.46	1706.34	127.16	1716.09	127.3	1722.88	127.57	1732.79	128

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	494.68	.04	581.47	.05	814.77	.065	857.2	.075
1176.79	.04	1267.18	.03						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
889.35	1039.04	310.97	313.04	317.06	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	672.76	107	F

CROSS SECTION

RIVER: OtayRiver
REACH: OtayReach RS: 1648.554

INPUT
Description:
Station Elevation Data num= 135

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	150	.34	149.99	49.56	148	82.37	146.15	84.97	146
122.97	144.06	126.66	143.88	159.15	142.25	163.21	142	184.99	140.62
213.56	138.87	253.05	136.91	255.39	136.79	311.92	133.67	344.2	131.73
347.52	131.69	356.77	131.43	391.31	130.51	407.7	130.15	436.16	131.45
440.26	131.5	466.3	131.75	485.36	122.89	487.65	121.8	495.81	117.95
501.39	114.59	505.84	112	508.66	110.73	510.39	110	510.87	109.89
513.5	109.63	517.36	109.29	527.45	109.18	529.05	109.21	537.95	109.23
541.04	108	543.14	107.13	548.66	106	551.77	106	560.26	106.98
568.26	108	638.45	110	664.1	110.66	680.85	111	687.36	111
719.92	110.07	722.13	110	789.72	108	792.45	107.75	805.9	106.31
808.82	106	812.37	104	815.99	102	820.52	100	824.45	98
828.52	96.111	828.76	96	832.73	94	836.92	92	841.27	90
845.53	88	851.79	87.48	866.63	87.31	876.61	87.88	878.52	88
886.81	88	891.67	88.07	902.42	87.93	913.07	87.41	922.32	87.34
928.39	87.23	939.44	86.95	954.34	86.97	964.51	86.75	970.84	86.99
985.93	87.84	988.55	88	1013.94	89.58	1051.95	91.58	1062.27	92.09
1064.87	92.26	1072.14	92.65	1076.8	92.88	1082.43	93.08	1086.76	93.22
1091.36	94.93	1115.85	104	1130.21	109.71	1147.49	116.78	1155.48	120.05
1170.21	120	1185.53	119.78	1190.86	119.84	1198.1	119.84	1217.66	120.18
1227.44	120.59	1239.01	120.89	1268.59	121.13	1314.93	121.94	1318.77	122.04
1361.44	122.57	1370.44	122.73	1405.15	123.05	1405.73	123.05	1446.77	123.59
1467.57	124.1	1497.26	124.28	1510.71	124.64	1518.17	124.17	1527.61	124.12
1538.5	124	1561.4	124	1572.94	123.61	1574.63	123.61	1577.92	123.72
1585.26	124	1589.03	124.06	1621.73	125.07	1627.18	125.45	1627.95	125.49
1635.9	125.76	1639.88	125.87	1646.15	126	1651.37	126	1653.23	126.08

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 1659.94  126.22 1666.58  126.53 1675.23  126.87 1688.57  127.49 1688.77  127.52
 1696.44  126.87 1713.53  127.47 1729.39  127.33 1732.91  127.49 1735.57     128

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .02  551.77     .05  808.82    .065  845.53     .06 1130.21     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        891.67  988.55           292.04  291.64   293.2              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  680.85     106       F

CROSS SECTION


RIVER: OtayRiver
REACH: OtayReach          RS: 1356.913

INPUT
Description:
Station Elevation Data    num=     137
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  150.74    9.27  150.21   36.34  149.02   57.94   148.4   78.09  147.56
   79.85  147.52  109.23  146.75   120.7  146.38   134.2   145.6   155.1  144.56
  156.12  144.52  160.77  144.18  165.95  143.93  189.77  142.85  191.29  142.77
  205.23  142.13  212.23   141.9  225.18  141.11  231.52  140.68  250.79     140
  285.12  137.75  298.55   137.2   330.3  136.34  333.12  136.26   343.7     136
  350.47  135.94  359.27  135.64  365.68  135.38  377.63  135.62  394.11  135.89
   402.8  135.88  410.72     136  418.63  136.15  422.92  136.43  437.98  129.08
  446.88   124.8  451.63   122.5  457.51  119.67  461.07     118   462.7  117.28
  479.37     110  481.84  109.03  483.77  108.18  492.96  107.69  502.17  107.53
  510.31  106.99  523.34  102.21  523.53  102.15  524.95  102.27  549.18   104.1
  563.08  105.81  564.67     106  568.46     106  637.56  107.17  696.56  107.01
  732.94     106   739.7  105.64  786.57  104.04  787.88     104  791.77     102
  796.04     100     800  98.353  800.85      98  805.22      96  809.18      94
  812.78      92  817.23      90  822.43      88  830.14   89.04  838.54      90
  845.55   88.74  861.67   86.46   868.4   85.69  875.09   85.16  994.83   85.16
  996.27   85.66 1003.67   88.15 1034.59   89.66 1039.18   89.94 1055.85   97.49
 1058.08   98.49 1073.88  105.64  1083.4     110 1094.92  115.14 1099.46  117.17
 1104.53     116 1107.25  115.31 1109.13  115.18 1130.09  114.57 1181.38  115.33
 1232.67  117.03 1256.47  117.21 1284.29  117.48  1287.8  117.43 1326.42  116.79
 1335.26  116.84  1341.1  117.27 1345.69  117.53 1352.95  117.86 1355.53  118.22
 1368.01     120 1369.08  120.29 1374.71  121.33 1381.87  121.28 1393.87  121.22
 1395.75  121.19 1405.94  121.19 1437.49  121.74 1446.74     122 1464.14  122.55
 1480.77  122.97 1484.46     123 1494.46  123.26 1512.67  123.68 1516.83  123.77
 1526.81  123.96 1553.56  124.56 1560.02  124.74 1572.04  125.02 1578.15  125.19
 1586.16  125.43 1597.68  125.68 1609.76     126 1639.37  126.59  1659.4  124.85
 1680.57  123.14 1683.75  122.64 1688.77  122.25 1689.51  122.15 1692.75  121.96
 1698.48  121.65 1713.57  121.96 1718.33  122.08 1722.73  122.17 1739.48  122.63
  1749.8  122.62  1759.9  123.24

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .02  568.46     .05  787.88    .065  822.43    .075 1073.88     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        861.67 1003.67           394.53  398.25  400.56              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  637.56     105       F

CROSS SECTION
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RIVER: OtayRiver
REACH: OtayReach          RS: 958.6605

INPUT
Description:
Station Elevation Data    num=     126
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     126    8.13  124.74    9.99  124.46   16.01  123.57   18.89  123.15
   22.57   122.6    32.8  121.09   36.05  120.59   39.83     120   45.36  119.12
   47.38  118.79   68.54  115.12    70.9  114.73   82.09  112.77   84.77  112.56
   95.32  111.71  100.17  111.86  100.84  111.93  101.16  111.92  109.68  111.52
  113.18  111.41  115.45  111.33  121.47  111.08  129.53  110.82  131.52  110.74
  137.82  110.22  141.99  110.19  144.01  110.17  147.56  110.15  151.33  110.12
  151.48  110.08  160.66  108.04  161.09  108.06  167.95  108.32  179.26  108.53
  182.96  108.47  192.69  108.29  212.67     108  216.45  107.95  243.38  107.42
  255.73  107.13   261.3  107.02  263.83  106.95   268.9  106.82  280.14  106.11
  281.79     106  298.52  104.93  300.73   104.8  339.15  104.04  352.98  103.83
  371.17  103.63  384.43  103.45  405.23  103.06  453.86  102.59  457.48  102.55
  464.28  102.46  465.79  102.45  506.56     102  509.73  101.97  536.31     102
  561.98  101.77  619.02  101.77  638.03   101.6  661.09  101.23  671.76  100.67
  676.44   98.81  697.23   90.53  698.73   89.94  699.74   89.52  723.97   88.44
  736.17   88.09  765.94   87.85  792.53      88  801.24      88  806.79   88.06
  815.45   88.06  818.19   88.05  866.66   88.19  870.75   88.21  928.81   88.64
  947.05   99.38  951.48     102   952.9  102.83  956.33  104.86  961.31  107.79
  962.75  108.64  963.41  108.65  972.63  108.61  974.41  108.61  982.98  108.57
 1017.57  108.31 1027.38  108.34 1030.15  108.49 1061.52  109.05 1079.44   109.5
 1090.15  109.71 1110.48     110 1119.01  110.17 1131.25  110.12 1135.15  110.14
 1203.68  110.11  1222.2  110.16 1235.68  110.34 1240.41  110.48 1246.47  110.62
 1251.49  110.78 1256.42  110.81 1276.31  111.14 1297.42  111.55    1327  112.45
 1337.82  112.81 1376.78  113.84 1411.64     115 1425.29  115.38 1435.31   115.7
 1460.54  116.44 1494.33     118 1499.35  118.21 1507.47  118.44 1532.34  118.92
 1549.69  119.36 1571.66  120.11 1601.94  121.27 1646.66  122.56 1654.19  122.76
 1662.02  123.04

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .02  101.16     .03  699.74    .075  928.81     .03  961.31     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        723.97  870.75           430.81  422.23  416.67              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0     490     130       F

CROSS SECTION


RIVER: OtayRiver
REACH: OtayReach          RS: 536.4273

INPUT
Description:
Station Elevation Data    num=     136
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  112.64   20.98  111.83   72.65     110   75.18  109.92  132.79     108
  166.85  107.17   196.5  106.22  205.36     106  227.34  105.26  278.78  104.18
  283.78     104   312.8  102.85  330.22   102.2   336.6     102  372.51   101.4
  381.66  101.15  389.78  100.97  401.07  100.61  409.82   100.3     417     100
  423.38   99.76   425.6   99.74  468.49   99.17   477.7   99.16  484.55   99.17
  495.75   98.91  535.99   98.63  587.43   98.65  609.48   98.72  614.82   98.71
  616.36    98.7  621.14   95.15  624.68   92.51  632.87   87.66   635.1   86.43
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640.13	85.94	643.16	85.79	646.05	85.68	650.92	85.33	655.31	85
659.81	84.72	662.12	84.59	663.66	84.53	666.89	84.48	668.47	84.48
671.36	84.53	673.37	84.45	677.9	84.43	691.6	84.35	693.24	84.35
722.53	84.28	739.72	84.28	764.04	84.33	764.9	84.35	779.17	84.49
783.36	84.48	788.38	84.48	792.33	84.47	832.87	84.47	834.39	84.47
834.89	84.43	836.76	84.35	839.3	84.29	875.07	84.73	876.23	84.75
878.41	84.92	890.66	85.75	896.42	86	905.7	86.69	908.83	86.81
926.25	87.94	933.45	88	934.18	88	937.24	88.06	942.23	90
945.44	91.24	946.46	91.43	953.71	92.71	962.83	95.71	964.61	96.49
970.04	98.85	976.22	101.55	981.85	104	983.34	104.31	986.09	105.38
987.45	106	991.23	106.01	995.73	106.27	1001.71	106.69	1007.81	107.04
1013.22	107.32	1039.1	107.83	1049.51	107.96	1053.81	108	1077.95	108.27
1086.31	108.35	1115.51	108.74	1151.73	109.03	1159.65	109.14	1163.28	109.21
1167.39	109.27	1180.21	109.5	1196.28	109.21	1205.24	109.83	1206.02	109.95
1207.32	109.97	1211.47	110.01	1254.2	110.37	1260.55	110.31	1265.5	110.34
1302.63	110.35	1354.07	111.94	1365.87	112.5	1377.74	113.02	1391.5	113.39
1410.97	113.7	1442.43	114.26	1456.33	114.53	1468.49	114.81	1508.4	115.62
1510.15	115.64	1523.3	115.77	1528.25	115.85	1544.57	116.14	1559.84	116.34
1574.68	116.63	1611.28	117.29	1632.49	117.62	1650.97	117.96	1661.82	116.79
1663.18	116.67	1667.4	116.7	1714.16	116.72	1716.47	116.79	1726.04	116.96
1745.56	117.43								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	635.1	.04	646.05	.06	945.44	.03	1001.71	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

659.81	875.07	180.21	177.49	177.46	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	385		F

CULVERT

RIVER: OtayRiver
REACH: OtayReach RS: 464.0616

INPUT
Description:
Distance from Upstream XS = 67
Deck/Roadway Width = 40
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 8

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
590	97.19	80	626.4	96.6	80	683.2	95.99	80
733.5	95.96	80	780	95.6	80	824.5	95.3	80
976.7	102.7	80	998.4	105.55	80			

Upstream Bridge Cross Section Data
Station Elevation Data num= 136

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	112.64	20.98	111.83	72.65	110	75.18	109.92	132.79	108
166.85	107.17	196.5	106.22	205.36	106	227.34	105.26	278.78	104.18
283.78	104	312.8	102.85	330.22	102.2	336.6	102	372.51	101.4
381.66	101.15	389.78	100.97	401.07	100.61	409.82	100.3	417	100
423.38	99.76	425.6	99.74	468.49	99.17	477.7	99.16	484.55	99.17
495.75	98.91	535.99	98.63	587.43	98.65	609.48	98.72	614.82	98.71
616.36	98.7	621.14	95.15	624.68	92.51	632.87	87.66	635.1	86.43
640.13	85.94	643.16	85.79	646.05	85.68	650.92	85.33	655.31	85
659.81	84.72	662.12	84.59	663.66	84.53	666.89	84.48	668.47	84.48
671.36	84.53	673.37	84.45	677.9	84.43	691.6	84.35	693.24	84.35

722.53	84.28	739.72	84.28	764.04	84.33	764.9	84.35	779.17	84.49
783.36	84.48	788.38	84.48	792.33	84.47	832.87	84.47	834.39	84.47
834.89	84.43	836.76	84.35	839.3	84.29	875.07	84.73	876.23	84.75
878.41	84.92	890.66	85.75	896.42	86	905.7	86.69	908.83	86.81
926.25	87.94	933.45	88	934.18	88	937.24	88.06	942.23	90
945.44	91.24	946.46	91.43	953.71	92.71	962.83	95.71	964.61	96.49
970.04	98.85	976.22	101.55	981.85	104	983.34	104.31	986.09	105.38
987.45	106	991.23	106.01	995.73	106.27	1001.71	106.69	1007.81	107.04
1013.22	107.32	1039.1	107.83	1049.51	107.96	1053.81	108	1077.95	108.27
1086.31	108.35	1115.51	108.74	1151.73	109.03	1159.65	109.14	1163.28	109.21
1167.39	109.27	1180.21	109.5	1196.28	109.21	1205.24	109.83	1206.02	109.95
1207.32	109.97	1211.47	110.01	1254.2	110.37	1260.55	110.31	1265.5	110.34
1302.63	110.35	1354.07	111.94	1365.87	112.5	1377.74	113.02	1391.5	113.39
1410.97	113.7	1442.43	114.26	1456.33	114.53	1468.49	114.81	1508.4	115.62
1510.15	115.64	1523.3	115.77	1528.25	115.85	1544.57	116.14	1559.84	116.34
1574.68	116.63	1611.28	117.29	1632.49	117.62	1650.97	117.96	1661.82	116.79
1663.18	116.67	1667.4	116.7	1714.16	116.72	1716.47	116.79	1726.04	116.96
1745.56	117.43								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	635.1	.04	646.05	.06	945.44	.03	1001.71	.02

Bank Sta: Left Right Coeff Contr. Expan.

659.81	875.07	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	385		F

Downstream Deck/Roadway Coordinates
num= 9

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
498	98	80	542	97.19	80	578.4	96.6	80
635.2	95.99	80	685.5	95.96	80	732	95.6	80
776.5	95.3	80	928.7	102.7	80	950.4	105.55	80

Downstream Bridge Cross Section Data
Station Elevation Data num= 134

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	109.33	7.49	109.25	13.18	109.07	32.25	108.43	79.38	107.34
97.34	106.87	126.87	106	127.81	105.97	186.4	104.61	202.07	104
227.55	103.11	237.78	102.72	281.32	101.31	289.16	101.09	314.45	100.58
339.34	100.32	342.79	100.14	349.66	99.8	350.88	99.75	353.73	99.67
360.04	99.42	372.41	99.56	373.34	99.52	380.32	99.32	395.94	99.41
404.06	99.5	427.91	98.76	433.9	98.89	439.54	99.21	448.19	99.82
449.87	99.9	463.43	99.82	468.66	99.69	475.24	99.4	495.51	98.68
504.83	98.29	508.36	98	511.86	97.72	523.07	96.95	525.87	96
537.62	92.03	540.18	91.33	544.59	90.13	544.9	90	545.98	89.23
551.83	88.94	557.2	88.82	560.31	88.72	565.85	88.53	570.61	88.32
572.18	88.34	577.64	88	579.09	87.93	597.45	87.1	612.31	86.58
614.82	86.54	620.05	86.4	629.09	86	648.83	85.41	662.24	85.28
692.82	85.36	702.1	85.26	704.7	85.26	749.07	85.38	751.59	85.39
801.24	84.96	803.91	84.96	804.36	84.97	809.07	84.98	849.4	85.19
883.49	85.22	894.8	85.19	898.2	85.29	900.42	85.55	902.08	85.65
904.12	85.43	905.45	85.65	906.5	85.88	910.24	88.25	916.49	92.21
922.9	96.89	926.46	99.5	929.39	101.16	934.54	103.81	938.25	105.71
939.88	106.59	940.3	106.8	947.8	106.75	951.9	106.73	1000.69	107.64
1003.54	107.69	1006.44	107.8	1023.6	108.3	1026.84	108.4	1027.9	108.41
1054.92	108.9	1082.57	108.98	1106.3	109.21	1109.82	109.19	1113.12	109.1
1150.07	109.4	1157.78	109.54	1182.85	110.03	1209.07	110.62	1255.27	112
1257.56	112.06	1261.7	112.2	1275.41	112.36	1311.83	112.66	1328.69	113.03
1363.21	113.52	1368.53	113.69	1379.64	114	1380.53	114.02	1385.53	114.18
1411.11	114.52	1414.59	114.56	1453.34	115.07	1465.97	115.21	1497.51	116

```
 1503.52  116.17 1519.97  116.57 1523.87  116.39 1553.67  116.95 1568.74  117.15
 1617.05  117.64    1620  117.66 1647.77  117.65 1658.34   116.6 1667.39   116.5
 1669.88  116.63 1683.36  116.55 1713.34  116.63 1737.82  117.69

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .03   557.2    .075  900.42     .03   951.9     .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
        629.09   906.5             .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  4

Culvert Name     Shape      Rise    Span
Culvert #1      Circular       5
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                 90      40     .024     .024        0                   .5
      1
Number of Barrels =  3
Upstream   Elevation =  88.06
Centerline Stations
    Sta.    Sta.    Sta.
   677.9   685.9   693.6
Downstream Elevation =  87.11
Centerline Stations
    Sta.    Sta.    Sta.
   629.9   637.9   645.6

Culvert Name     Shape      Rise    Span
Culvert #2      Circular       5
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                 77      40     .024     .024        0                   .5
      1
Number of Barrels =  3
Upstream   Elevation =  87.73
Centerline Stations
    Sta.    Sta.    Sta.
   732.7   740.6   752.2
Downstream Elevation =  85.82
Centerline Stations
    Sta.    Sta.    Sta.
   677.2   684.7   692.6

Culvert Name     Shape      Rise    Span
Culvert #3      Circular       5
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
```



```
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                 66      40     .024     .024        0                   .5
      1
Number of Barrels =  3
Upstream   Elevation =  87.43
Centerline Stations
    Sta.    Sta.    Sta.
   770.7     778   785.1
Downstream Elevation =  86.36
Centerline Stations
    Sta.    Sta.    Sta.
   722.7     730   737.1

Culvert Name     Shape      Rise    Span
Culvert #4      Circular       5
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                 53      40     .024     .024        0                   .5
      1
Number of Barrels =  3
Upstream   Elevation =  87.36
Centerline Stations
    Sta.    Sta.    Sta.
   816.4   824.2   832.2
Downstream Elevation =  86.73
Centerline Stations
    Sta.    Sta.    Sta.
   768.4   776.2   784.2

CROSS SECTION


RIVER: OtayRiver
REACH: OtayReach          RS: 358.9326

INPUT
Description:
Station Elevation Data    num=     134
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  109.33    7.49  109.25   13.18  109.07   32.25  108.43   79.38  107.34
   97.34  106.87  126.87     106  127.81  105.97   186.4  104.61  202.07     104
  227.55  103.11  237.78  102.72  281.32  101.31  289.16  101.09  314.45  100.58
  339.34  100.32  342.79  100.14  349.66    99.8  350.88   99.75  353.73   99.67
  360.04   99.42  372.41   99.56  373.34   99.52  380.32   99.32  395.94   99.41
  404.06    99.5  427.91   98.76   433.9   98.89  439.54   99.21  448.19   99.82
  449.87    99.9  463.43   99.82  468.66   99.69  475.24    99.4  495.51   98.68
  504.83   98.29  508.36      98  511.86   97.72  523.07   96.95  525.87      96
  537.62   92.03  540.18   91.33  544.59   90.13   544.9      90  545.98   89.23
  551.83   88.94   557.2   88.82  560.31   88.72  565.85   88.53  570.61   88.32
  572.18   88.34  577.64      88  579.09   87.93  597.45    87.1  612.31   86.58
  614.82   86.54  620.05    86.4  629.09      86  648.83   85.41  662.24   85.28
  692.82   85.36   702.1   85.26   704.7   85.26  749.07   85.38  751.59   85.39
  801.24   84.96  803.91   84.96  804.36   84.97  809.07   84.98   849.4   85.19
  883.49   85.22   894.8   85.19   898.2   85.29  900.42   85.55  902.08   85.65
  904.12   85.43  905.45   85.65   906.5   85.88  910.24   88.25  916.49   92.21
   922.9   96.89  926.46    99.5  929.39  101.16  934.54  103.81  938.25  105.71
  939.88  106.59   940.3   106.8   947.8  106.75   951.9  106.73 1000.69  107.64
 1003.54  107.69 1006.44   107.8  1023.6   108.3 1026.84   108.4  1027.9  108.41
```

1054.92	108.9	1082.57	108.98	1106.3	109.21	1109.82	109.19	1113.12	109.1
1150.07	109.4	1157.78	109.54	1182.85	110.03	1209.07	110.62	1255.27	112
1257.56	112.06	1261.7	112.2	1275.41	112.36	1311.83	112.66	1328.69	113.03
1363.21	113.52	1368.53	113.69	1379.64	114	1380.53	114.02	1385.53	114.18
1411.11	114.52	1414.59	114.56	1453.34	115.07	1465.97	115.21	1497.51	116
1503.52	116.17	1519.97	116.57	1523.87	116.39	1553.67	116.95	1568.74	117.15
1617.05	117.64	1620	117.66	1647.77	117.65	1658.34	116.6	1667.39	116.5
1669.88	116.63	1683.36	116.55	1713.34	116.63	1737.82	117.69		

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	557.2	.075	900.42	.03	951.9	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
629.09	906.5	329.45	313.53	289.4	.1	.3

CROSS SECTION

RIVER: OtayRiver
REACH: OtayReach RS: 45.40464

INPUT
Description:
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	112.2	155	107.2	240	102.2	300	97.2	440	92.2
629	87.2	639	82.2	650	77.2	850	77	940	77.2
950	80.2	956	82.2	960	84.2	963	86.2	968	88.2
972	90.2	977	92.2	990	92.2	1005	98.2	1009	100.2
1015	104.2	1020	106.2	1022	108.2	1028	110.2	1032	112.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	639	.075	956	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
639	956	1	1	1	.3	.5

SUMMARY OF MANNING'S N VALUES

River:OtayRiver

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7
OtayReach	4735.705	.04	.04	.04				
OtayReach	4161.779	.04	.04	.04				
OtayReach	3182.152	.03	.04	.075	.03			
OtayReach	2735.287	.03	.04	.075	.03			
OtayReach	2263.575	.03	.04	.075	.04	.03		
OtayReach	1961.59	.02	.04	.05	.065	.075	.04	.03
OtayReach	1648.554	.02	.05	.065	.06	.03		

OtayReach	1356.913	.02	.05	.065	.075	.03
OtayReach	958.6605	.02	.03	.075	.03	.02
OtayReach	536.4273	.03	.04	.06	.03	.02
OtayReach	464.0616	Culvert				
OtayReach	358.9326	.03	.075	.03	.02	
OtayReach	45.40464	.04	.075	.03		

SUMMARY OF REACH LENGTHS

River: OtayRiver

Reach	River Sta.	Left	Channel	Right
OtayReach	4735.705	610	600	560
OtayReach	4161.779	933.16	980	1020
OtayReach	3182.152	440	446.86	453.75
OtayReach	2735.287	482.72	471.71	471.4
OtayReach	2263.575	301.87	301.98	315.82
OtayReach	1961.59	310.97	313.04	317.06
OtayReach	1648.554	292.04	291.64	293.2
OtayReach	1356.913	394.53	398.25	400.56
OtayReach	958.6605	430.81	422.23	416.67
OtayReach	536.4273	180.21	177.49	177.46
OtayReach	464.0616	Culvert		
OtayReach	358.9326	329.45	313.53	289.4
OtayReach	45.40464	1	1	1

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: OtayRiver

Reach	River Sta.	Contr.	Expan.
OtayReach	4735.705	.1	.3
OtayReach	4161.779	.1	.3
OtayReach	3182.152	.1	.3
OtayReach	2735.287	.1	.3
OtayReach	2263.575	.1	.3
OtayReach	1961.59	.1	.3
OtayReach	1648.554	.1	.3
OtayReach	1356.913	.1	.3
OtayReach	958.6605	.1	.3
OtayReach	536.4273	.1	.3
OtayReach	464.0616	Culvert	
OtayReach	358.9326	.1	.3
OtayReach	45.40464	.3	.5

Appendix 11

Existing Condition HEC-RAS Workmaps

MAIN ST

805

LIMIT OF STUDY

LIMIT OF STUDY

45.4046

358.9326

536.4273

958.6605

1356.913

1648.554

1961.59

2263.575

2735.287

3182.152

4161.779

4735.705

CHULA VISTA

SAN DIEGO

Legend

- Cross Sections
- River Centerline
- Existing Contours
- Existing 100-Year
- Existing 500-Year

FEMA NFHL

- 100-YR Floodplain
- 500-YR Floodplain

I hereby certify that the revisions to the 100-year floodplain boundaries are accurately plotted on this Floodplain Workmap

Jayne M. Janda-Timba, P.E. #70649 Exp. 6/30/17

REGISTERED PROFESSIONAL ENGINEER
JAYNE M. JANDA-TIMBA
NO. 70649
STATE OF CALIFORNIA

Path: W:\17414_Shinohara_CLOMR\GIS\17414_Workmap_Existing.mxd

RICK ENGINEERING COMPANY

Scale in Feet

0 400 800

North

Date of Exhibit: 08.31.2015
Eagle Aerial Image: 04.2013

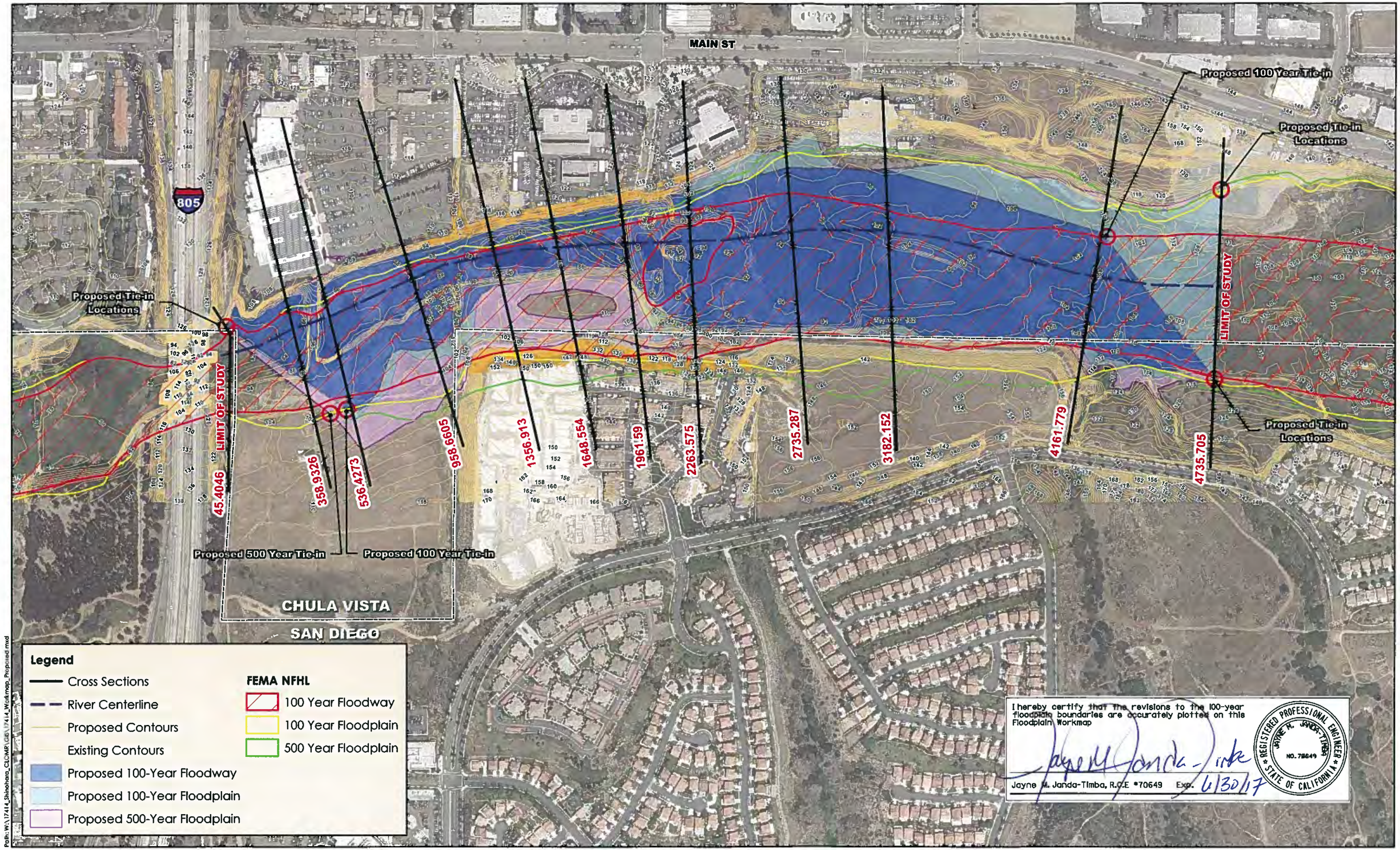
Shinohara

Floodplain Workmap - Existing Conditions

J-17414

Appendix 12

Proposed Condition HEC-RAS Workmaps



RICK ENGINEERING COMPANY

Scale in Feet: 0 400 800

North

Date of Exhibit: 08.31.2015
Eagle Aerial Image: 04.2013

Shinohara

Floodplain Workmap - Proposed Conditions

J-17414

Appendix 13

Revised FIRMette

JOINS PANEL 2156

OF CHULA VISTA
065021

ZONE X
ZONE AE
ZONE A
LIMIT OF DETAILED STUDY
LIMIT OF STUDY
PROFILE BASELINE
Pogi Canyon Creek
OTAY VALLEY RD
REGENCY WAY
REGENCY CT
RANCHO DR
MARIA CT
DATE ST
DATE CT
VALLEY AVE
PALM AVE
RIDGE AVE
PICCARD AVE
BYRD ST
CHANUTE ST
RICKENBACKER AVE
SERRENA LN
POWDERHORN DR
SHEPHERD LN
LEMONSEED DR
BELGARDO AVE
MURRIETA CIR
DENNERY RD
REGATTA LN
COLEMAN AVE
RENE DR
RALPH WAY
KEEZE AVE
RENE CT
HUERTA WAY
ARCE CT
DAVES WAY
LA FLORIDA CT
805
River
CITY OF CHULA VISTA
CITY OF SAN DIEGO

I hereby certify that the revisions to the 100-year floodplain boundaries are accurately plotted on this Floodplain Workmap

Jayne M. Janda-Timba, R.C.E #70649 Exp. 6/30/17

REGISTERED PROFESSIONAL ENGINEER
JAYNE M. JANDA-TIMBA
NO. 70649
STATE OF CALIFORNIA

ance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

0 250 500 750 1,000 FEET

Revised Floodplains

- 100 Year Floodway
- 100 Year Floodplain
- 500 Year Floodplain

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2158G

FIRM REVISED

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA

AND INCORPORATED AREAS

PANEL 2158 OF 2375

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CHULA VISTA, CITY OF	065021	2158	G
SAN DIEGO, CITY OF	060295	2158	G

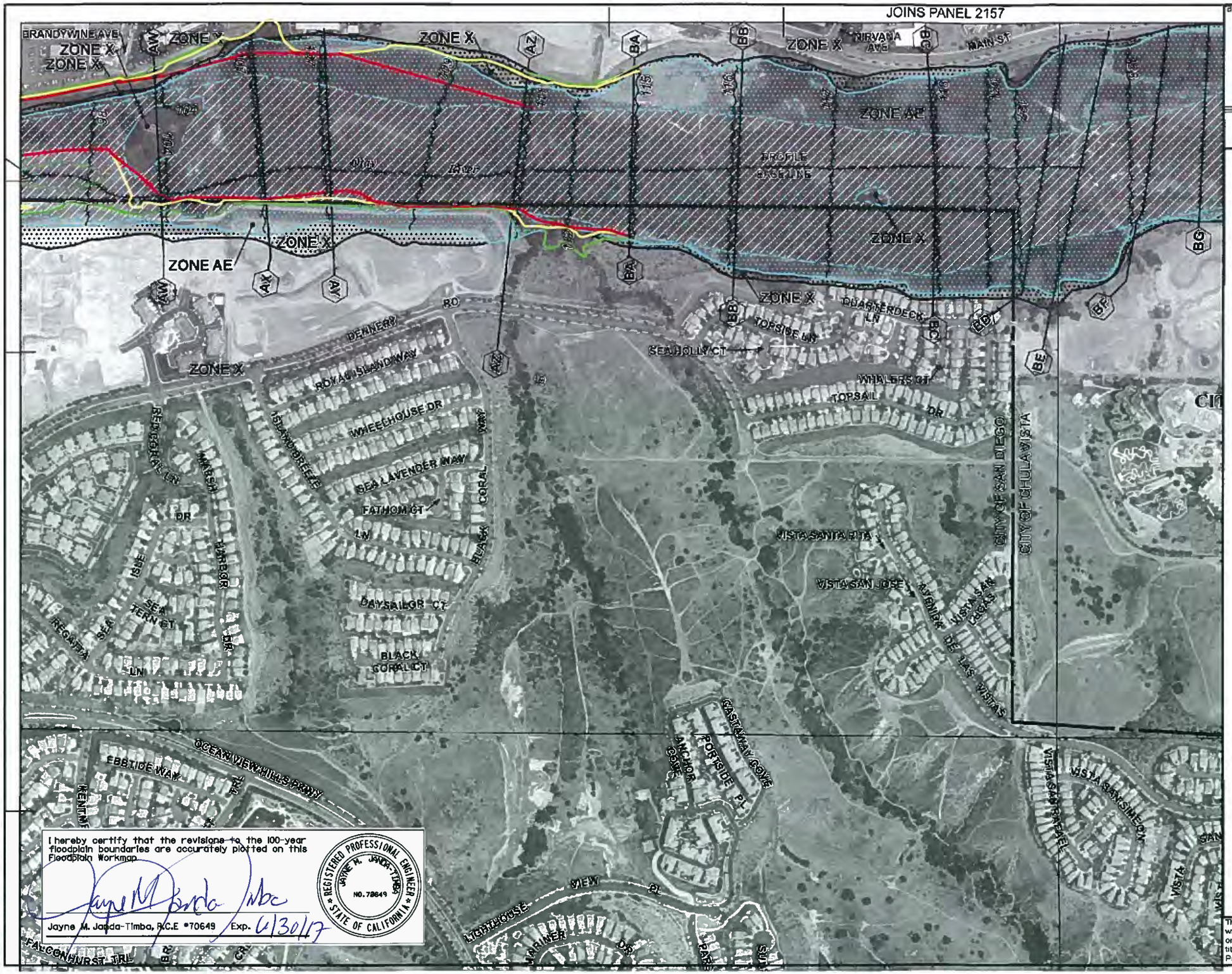
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
06073C2158G

MAP REVISED
MAY 16, 2012

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



I hereby certify that the revisions to the 100-year floodplain boundaries are accurately plotted on this Floodplain Workmap

Jayne M. Jacda-Timba, R.C.E #70649 Exp. 6/30/17

REGISTERED PROFESSIONAL ENGINEER JAYNE M. JACDA-TIMBA NO. 70649 STATE OF CALIFORNIA

ance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

0 250 500 750 1,000 FEET

Revised Floodplains

- 100 Year Floodway
- 100 Year Floodplain
- 500 Year Floodplain

NFIP

NATIONAL FLOOD-INSURANCE-PROGRAM

PANEL 2159G

FIRM REVISED

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA

AND INCORPORATED AREAS

PANEL 2159 OF 2375

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CHULA VISTA, CITY OF	060021	2159	G
SAN DIEGO, CITY OF	060295	2159	G

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

MAP NUMBER 06073C2159G

MAP REVISED MAY 16, 2012

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Appendix 14

Existing Grading Plan & Culvert Survey Information

GRADING PLAN
FOR 650 MAIN STREET, AUTO PARK EXPANSION

PRECONSTRUCTION CONFERENCE:

THE CONTRACTOR SHALL NOT BEGIN ANY WORK ON THIS PROJECT UNTIL A PRECONSTRUCTION CONFERENCE IS HELD WITH THE ENGINEER OF WORK, THE SOILS ENGINEER, ENGINEERING GEOLOGIST, A QUALIFIED PALEONTOLOGICAL MONITOR, A BOTANIST, THE DEVELOPER, THE CITY, AND OTAY WATER DISTRICT.

PRIVATE STORM DRAIN NOTES:

THE STORM DRAIN SYSTEM SHOWN ON THESE PLANS IS PRIVATE, UNLESS SHOWN OTHERWISE AND SHALL BE INSPECTED BY THE OFFICE OF THE CITY ENGINEER FOR COMPLIANCE WITH THE CITY AND REGIONAL STANDARDS. THE OWNER SHALL PROVIDE THE REQUIRED FEE DEPOSIT FOR SAID INSPECTION.

DIG ALERT NOTICE:

SECTION 4216-4217 OF THE GOVERNMENT CODE REQUIRES THAT DIG ALERT IDENTIFICATION NUMBER BE ISSUED BEFORE A "PERMIT TO EXCAVATE" WILL BE VALID. FOR YOUR DIG ALERT I.D. NUMBER, CALL UNDERGROUND SERVICE ALERT TOLL FREE 1-800-422-4133 AT LEAST TWO WORKING DAYS BEFORE YOU DIG.

GENERAL NOTES:

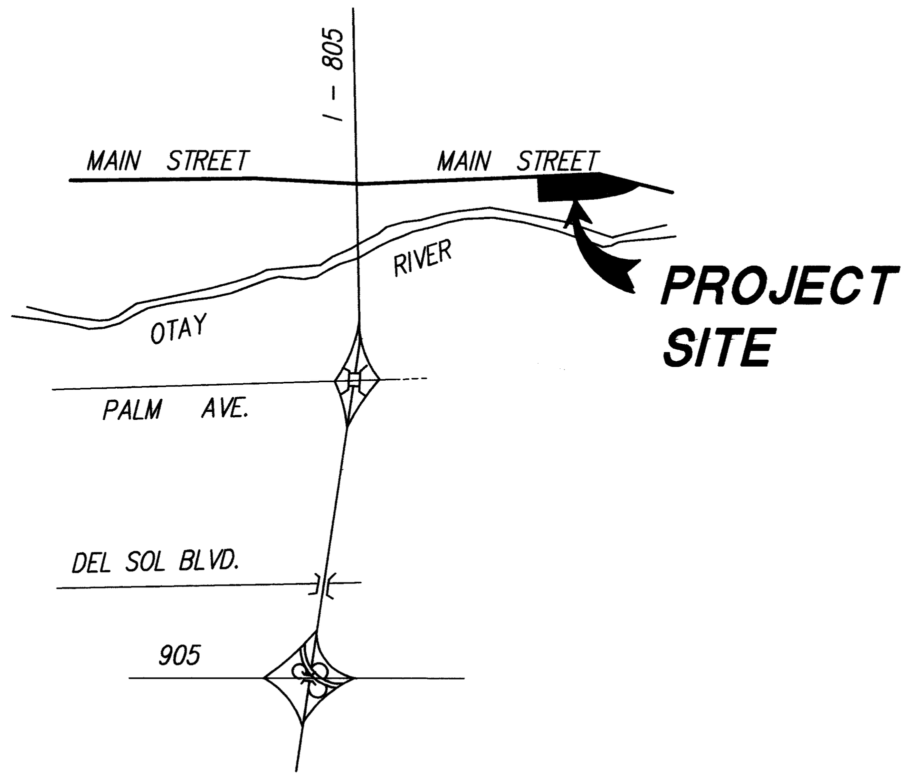
1. THE SOILS REPORT TITLED "GEOTECHNICAL INVESTIGATION, JAGINCO, L.P., CHULA VISTA" ORIGINALLY DATED 1-4-95, PREPARED BY GEOTECHNICS IN-CORPORATED, AND UPDATED BY LETTER 8-29-00 SHALL BE CONSIDERED TO BE PART OFTHIS GRADING PLAN. ALL GRADING SHALL BE DONE IN ACCORDANCE WITH THE RECOMMENDATIONS AND SPECIFICATIONS CONTAINED IN SAID REPORT.
2. WRITTEN PERMISSION SHALL BE OBTAINED FOR ANY OFF SITE GRADING PRIOR TO THE START OF WORK.
3. CONTRACTOR SHALL TAKE ANY NECESSARY PRECAUTIONS REQUIRED TO PROTECT ADJACENT PROPERTIES DURING GRADING OPERATIONS. ANYTHING DAMAGED OR DESTROYED SHALL BE REPLACED OR REPAIRED TO CONDITION EXISTING PRIOR TO GRADING.
4. THE DEVELOPER SHALL BE RESPONSIBLE THAT ANY MONUMENT OR BENCH MARK WHICH IS DISTURBED OR DESTROYED THROUGH GRADING OPERATIONS SHALL BE REESTABLISHED AND REPLACED BY A REGISTERED CIVIL ENGINEER WHO IS ALLOWED TO PRACTICE LAND SURVEYING, OR A LICENSED LAND SURVEYOR, AND A CORNER RECORD, RECORD OF SURVEY, OR CERTIFICATE OF CORRECTION FILED AS REQUIRED BY THE LAND SURVEYORS ACT.
5. THE CONTRACTOR SHALL DESIGN, CONSTRUCT, AND MAINTAIN ALL SAFETY DEVICES, INCLUDING SHORING, AND SHALL BE RESPONSIBLE FOR CONFORMING TO ALL LOCAL, STATE, AND FEDERAL SAFETY AND HEALTH STANDARDS, LAWS, AND REGULATIONS.

GENERAL NOTES CONT'D:

6. ALL FLOWS SHOWN ARE FOR 100-YEAR STORM.
7. ALL SEDIMENTATION BASINS, OUTLET PIPES AND DITCHES ARE PRIVATE UNLESS OTHERWISE NOTED AND HAVE NOT BEEN REVIEWED FOR ADEQUACY BY THE CITY ENGINEERING DEPARTMENT.
8. THE OWNER MUST OBTAIN AN EXCAVATION PERMIT FORM THE DIVISION OF OCCUPATIONAL SAFETY AND HEALTH (D.O.S.H.) FOR CONSTRUCTION OF THE TRENCHES OR EXCAVATIONS WHICH ARE FIVE FEET OR DEEPER INTO WHICH A PERSON IS REQUIRED TO DESCEND. SAID PERMIT IS REQUIRED PRIOR TO ISSUANCE OF A GRADING PERMIT BY THE CITY OF CHULA VISTA.
9. GRADING EQUIPMENT SHALL NOT USE OR BLOCK TRAFFIC LANES DURING GRADING ACTIVITY, TRUCK OPERATIONS IN AND OUT OF CONSTRUCTION AND STAGING AREAS SHALL BE CONTROLLED AS REQUIRED BY THE CITY. TRUCK AND EQUIPMENT ROUTES IN AND OUT OF THE SITE SHALL BE APPROVED BY THE CITY PRIOR TO START OF WORK. AT THE END OF THE WORKING DAY, STREETS SHALL BE CLEANED OF DIRT AND CONSTRUCTION DEBRIS TO THE SATISFACTION OF THE CITY INSPECTOR AND MITIGATION MONITOR.
10. DUST GENERATED BY CONSTRUCTION ACTIVITIES SHALL COMPLY WITH LOCAL DUST CONTROL, ANY REQUIREMENTS OF ANY MITIGATION MONITORING PROGRAMS AND UNIFORM BUILDING CODE (UBC) REQUIREMENTS WHICH INCLUDE DUST CONTROL MEASURES FOR CONSTRUCTION SITES. DUST REDUCING MEASURES SHALL INCLUDE , BUT NOT LIMITED TO, REGULAR WATERING OF GRADED SURFACES AND RESTRICTION OF ALL CONSTRUCTION VEHICLES AND EQUIPMENT TO TRAVEL ALONG ESTABLISHED AND REGULARLY WATERED ROADWAYS AT SPECIFIED SPEEDS.

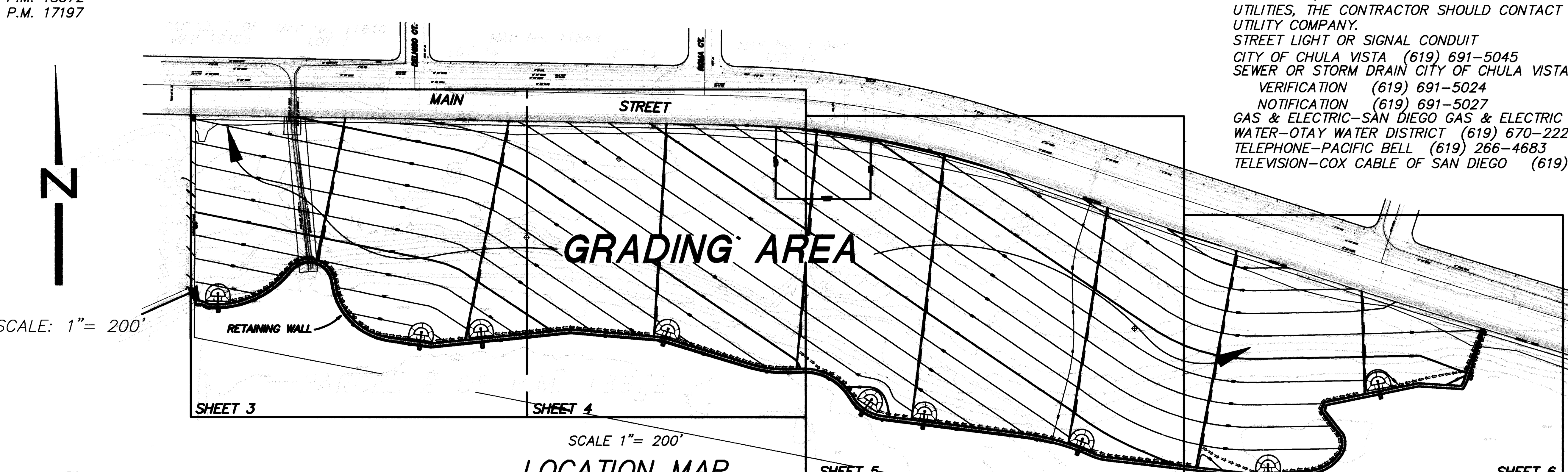
REFERENCE DRAWINGS:

92-175	OTAY VALLEY ROAD WIDENING
92-176	OTAY VALLEY ROAD WIDENING
92-177	OTAY VALLEY ROAD WIDENING
92-177A	OTAY VALLEY ROAD WIDENING
92-137	OTAY VALLEY ROAD WIDENING
92-138	OTAY VALLEY ROAD WIDENING
92-159	OTAY VALLEY ROAD WIDENING
91-651	IMPROVEMENT PLANS FOR OTAY VALLEY ROAD
91-652	IMPROVEMENT PLANS FOR OTAY VALLEY ROAD
91-653	IMPROVEMENT PLANS FOR OTAY VALLEY ROAD
91-654	IMPROVEMENT PLANS FOR OTAY VALLEY ROAD
75-110D	IMPROVEMENT OF 10" PCV SEWER IN OTAY VALLEY ROAD FOR OTAY INDUSTRIAL PARK
75-111D	IMPROVEMENT OF 10" PCV SEWER IN OTAY VALLEY ROAD FOR OTAY INDUSTRIAL PARK
P.M. 18372	
P.M. 17197	



VICINITY MAP

NOT TO SCALE



SCALE: 1"= 200'

SCALE 1"= 200'

LOCATION MAP

SPECIAL NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE QUANTITIES SHOWN HEREON AND BALANCING THE EARTHWORK ONSITE. IF DISCREPANCIES ARISE, THE ENGINEER OF WORK SHALL PROVIDE AREAS OF ADJUSTMENT TO THE CONTRACTOR. WHERE TRENCHES ARE WITHIN EASEMENTS, STREETS, OR 10' OF ANY BUILDING, SOILS REPORTS SHALL BE SUBMITTED TO THE ENGINEER OF WORK BY A QUALIFIED SOILS ENGINEER WHICH INDICATE THAT THE TRENCH BACKFILL WAS COMPACTED UNDER THE OBSERVATION OF THE SOILS ENGINEER AND IN ACCORDANCE WITH THE EARTHWORK SPECIFICATIONS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE TO INSURE THAT ALL SLOPES ARE BUILT IN ACCORDANCE WITH THESE PLANS. IF THERE IS ANY QUESTION REGARDING THESE PLANS OR FIELD STAKES, THE CONTRACTOR SHALL REQUEST AN INTERPRETATION BEFORE DOING ANY WORK BY CALLING THE ENGINEER AT 858-385-0500.
3. THE CONTRACTOR SHALL UNCOVER ALL UTILITIES THAT MAY BE JOINED, CROSSED, OR PARALLELED TO VERIFY BOTH HORIZONTAL AND VERTICAL LOCATION PRIOR TO ANY CONSTRUCTION. ANY CONFLICT OR DISCREPANCY SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION PRIOR TO CONSTRUCTION. OTHERWISE THE CONTRACTOR ACCEPTS FULL RESPONSIBILITY FOR ANY ADDITIONAL CONSTRUCTION OR RELOCATION COSTS.
4. ALL FILL AREAS WHICH ARE FENCED SHALL REMAIN FENCED. TEMPORARY AND/OR FINAL FENCING SHALL BE PROVIDED AS SHOWN ON THE PLANS.
5. ALL APPROVED GEOTEXTILE ENGINEERING FABRIC SHALL BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS.
6. A 6" MINIMUM THICKNESS BEDDING BLANKET UNDERLAIN BY A LAYER OF GEOTEXTILE (MIRAFI 700X OR EQUIVALENT) SHALL BE CONSTRUCTED BENEATH ALL RIP RAP. THE BEDDING BLANKET SHALL MEET THE FOLLOWING SPECIFICATIONS:

   A. FRACTION PASSING THE NO. 3/8 IN. STANDARD SIEVE SHALL BE 100% BY WEIGHT.

   B. ANY SOURCE OF ON-SITE MATERIAL DEEMED SUITABLE BY THE SOILS ENGINEER.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING, MAINTAINING, RELOCATING, AND REMOVAL OF EXISTING UTILITIES.
8. THE CONTRACTOR SHALL REPLACE ALL DESTROYED OR DAMAGED SURFACE IMPROVEMENTS WITH IMPROVEMENTS EQUAL OR SUPERIOR.
9. ALL CONTOURS AND ELEVATIONS SHOWN HEREON REPRESENT FINISH GRADE. CONTRACTOR SHALL MAKE THE APPROPRIATE ALLOWANCES FOR PAVEMENT SUBGRADE, PAD UNDERCUT, AND UTILITY TRENCHING.
10. THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL PROPOSED CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS AND THE CITY OF CHULA VISTA.

NOTIFICATIONS:

1. THE EXISTENCE AND LOCATION OF UNDERGROUND UTILITY PIPES AND STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF AVAILABLE RECORD, TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN HEREON, HOWEVER, THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT ANY EXISTING UTILITIES OR STRUCTURES LOCATED AT THE WORK SITE. IT IS THE CONTRACTORS RESPONSIBILITY TO CONTACT UNDERGROUND SERVICE ALERT (PHONE 1-800-422-4133) TWO (2) WORKING DAYS IN ADVANCE OF ANY EXCAVATION FOR THE MARK OUT OF THE LOCATION UTILITIES AND NOTIFICATION OF COMMENCEMENT OF WORK.
2. FOR ANY QUESTION REGARDING THE MARK OUT OF UNDERGROUND UTILITIES, THE CONTRACTOR SHOULD CONTACT THE RESPECTIVE UTILITY COMPANY.
   STREET LIGHT OR SIGNAL CONDUIT
   CITY OF CHULA VISTA (619) 691-5045
   SEWER OR STORM DRAIN CITY OF CHULA VISTA
   VERIFICATION (619) 691-5024
   NOTIFICATION (619) 691-5027
   GAS & ELECTRIC-SAN DIEGO GAS & ELECTRIC 1-800-227-2600
   WATER-OTAY WATER DISTRICT (619) 670-2222
   TELEPHONE-PACIFIC BELL (619) 266-4683
   TELEVISION-COX CABLE OF SAN DIEGO (619) 263-9251/266-5597)

NOTIFICATIONS CONT'D:

3. THE CONTRACTOR SHALL NOTIFY THE CITY ENGINEER'S OFFICE (PHONE:619-585-5737) AND THE MITIGATION MONITOR AT THE PLANNING DIVISION (PHONE:619-476-2329) 48 HOURS (2 WORKING DAYS) PRIOR TO BEGINNING ANY WORK ON THIS PROJECT.
4. THE CONTRACTOR SHALL GIVE 24 HOURS (ONE WORKING DAY) NOTICE ON CALLS FOR INSPECTION. PHONE (619) 585-5737.
5. ALL WORK PERFORMED WITHOUT BENEFIT OF INSPECTION SHALL BE SUBJECT TO REJECTION AND REMOVAL AT CONTRACTOR'S EXPENSE.

GRADING NOTES:

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THESE APPROVED PLANS AND APPROVED REVISIONS. ANY CHANGES OR REVISIONS THEREFROM SHALL BE APPROVED BY THE CITY ENGINEER AND MITIGATION MONITOR PRIOR TO ANY REQUEST FOR INSPECTION.
2. ALL GRADING SHALL BE OBSERVED AND TESTED BY OR UNDER THE DIRECTION OF A QUALIFIED SOILS ENGINEER. THE SOILS ENGINEER SHALL OBSERVE THE EXCAVATION AND SHALL OBSERVE AND TEST THE PLACEMENT AND COMPACTION OF FILL AND BACKFILL AND COMPACTION OF TRENCHES SUBMIT GEOTECHNICAL OR SOILS REPORTS AS REQUIRED AND DETERMINE THE SUITABILITY OF ANY FILL MATERIAL UPON COMPLETION OF GRADING OPERATIONS. THE SOILS ENGINEER SHALL STATE THAT OBSERVATIONS AND TESTS WERE MADE BY OR UNDER DIRECTION OF THE SOILS ENGINEER AND THAT EMBANKMENTS AND EXCAVATIONS WERE CONSTRUCTED IN ACCORDANCE WITH THE GEOTECHNICAL ASPECTS OF THE APPROVED GRADING PLANS, ANY APPROVED REVISIONS THERETO, SUBJECT LAND DEVELOPMENT PERMIT AND ORDINANCE NO. 1797 AS AMENDED, AND THAT ALL EMBANKMENTS AND EXCAVATIONS ARE ACCEPTABLE FOR THEIR INTENDED USE.
3. THE CONTRACTOR SHALL PROPERLY GRADE ALL EXCAVATED SURFACES TO PROVIDE POSITIVE DRAINAGE AND PREVENT PONDING OF WATER. CONTRACTOR SHALL CONTROL SURFACE WATER TO AVOID DAMAGE TO ADJOINING PROPERTIES OR TO FINISHED WORK ON THE SITE AND SHALL TAKE REMEDIAL MEASURES TO PREVENT EROSION OF FRESHLY GRADED AREAS UNTIL SUCH TIME AS PERMANENT DRAINAGE AND EROSION CONTROL MEASURES HAVE BEEN INSTALLED TO THE SATISFACTION OF CITY ENGINEER AND THE MITIGATION MONITOR.
4. ALL AREAS TO BE FILLED SHALL BE PREPARED PRIOR TO FILLING AND FILL SHALL BE PLACED IN ACCORDANCE WITH STANDARD SPECIFICATIONS AND THE RECOMMENDATIONS AND SPECIFICATIONS CONTAINED IN THE SOILS REPORT, ALL VEGETABLE MATTER AND OTHER OBJECTIONABLE MATERIALS SHALL BE REMOVED BY THE CONTRACTOR FROM THE SURFACE UPON WHICH THE FILL IS TO BE PLACED. LOOSE FILL AND UNSUITABLE SOILS SHALL BE REMOVED TO SUITABLE FIRM NATURAL GROUND. THE EXPOSED SOILS SHALL BE SCARIFIED IN ACCORDANCE WITH THE GEOTECHNICAL REPORT AND THEN COMPACTED TO A MINIMUM OF 90% OF ASTM-D1557. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PLACE, SPREAD, WATER AND COMPACT FILL IN STRICT ACCORDANCE WITH THE SPECIFICATIONS.
5. CUT AND FILL SLOPES SHALL BE CUT AND TRIMMED TO THE FINISHED GRADE TO PRODUCE SMOOTH SURFACES AND UNIFORM CROSS SECTIONS. THE SLOPES OF EXCAVATIONS AND EMBANKMENTS SHALL BE SHAPED, TRIMMED AND PLANTED IN ACCORDANCE WITH THE PLANTING NOTES AND AS DIRECTED BY THE ENGINEER OF WORK, AND LEFT IN A NEAT AND ORDERLY CONDITION. ALL STONES, ROOTS AND OTHER WASTE MATERIALS EXPOSED ON THE EXCAVATION OR EMBANKMENT SLOPES WHICH ARE LIABLE TO BECOME LOOSENED, SHALL BE REMOVED AND DISPOSED OF. THE TOE AND TOP OF ALL SLOPES SHALL BE ROUNDED IN ACCORDANCE WITH ORDINANCE NO. 1797, THESE GRADING PLANS AND THE STANDARD DRAWINGS CVDS 26 AND 27 SLOPE SETBACKS AND GRADES SHALL CONFORM TO CVDS 25.
6. IF THERE ARE EROSION SCARS ON EXISTING SLOPES WHICH OTHERWISE WOULD NOT BE ELIMINATED BY THE PROPOSED GRADING. THESE SCARS ARE TO BE ELIMINATED BY TRIMMING, FINE GRADING AND PLANTING. IF THE SCARS ARE IN AREAS OF NATIVE VEGETATION, THE REPAIRS SHOULD BE PERFORMED WITH AN EFFORT TO AVOID OR MINIMIZE IMPACTS TO NATIVE VEGETATION. ALL SUCH REPAIRS IN AREAS OF NATIVE VEGETATION SHALL BE REVIEWED AND APPROVED BY THE CITY'S MITIGATION MONITORING COORDINATOR PRIOR TO THE BEGINNING OF THE REPAIR WORK.
7. ALL TREES, BRUSH, GRASS AND OTHER OBJECTIONABLE MATERIAL SHALL BE COLLECTED, PILED OR OTHERWISE DISPOSED OF OFF THE SITE BY THE CONTRACTOR SO AS TO LEAVE THE AREAS THAT HAVE BEEN CLEARED WITH A NEAT AND FINISHED APPEARANCE FREE FROM UNSIGHTLY DEBRIS. APPROVAL OF LOCATIONS FOR DEBRIS FILL SHALL BE OBTAINED FROM THE SOILS ENGINEER PRIOR TO THE DISPOSAL OF SUCH MATERIAL.
8. SUBDRAIN LOCATIONS SHOWN ARE APPROXIMATE AND ARE RECOMMENDED FOR ALL SIGNIFICANT FILL CANYONS. THE ACTUAL LOCATION AND EXTENT OF SUBDRAINS SHALL BE DETERMINED BY THE GEOTECHNICAL CONSULTANT AT THE TIME OF CONSTRUCTION.

TOPOGRAPHY SOURCE:

AERIAL TOPOGRAPHY BY
SAN-LO AERIAL SURVEY, FLOWN 6-13-00
(DOES NOT SHOW STOCKPILE GRADING
PERFORMED SUBSEQUENT TO 6-13-00)

EARTHWORK:

CUT: 45,100 CY
FILL: 293,200 CY
IMPORT: 247,500 CY

NOTE: GRADING QUANTITIES ARE ESTIMATED FOR BONDING PURPOSES ONLY AND ARE NOT TO BE USED FOR FINAL PAY QUANTITIES. EARTHWORK VALUES SHOWN HAVE BEEN CALCULATED BY USING AERIAL TOPOGRAPHY FLOWN 6-13-00.

GRADING NOTES CONT'D:

9. CONTRACTOR SHALL VERIFY LOCATIONS OF ALL EXISTING UNDERGROUND UTILITIES. LOCATIONS SHOWN ON THESE PLANS ARE APPROXIMATE AND SHOWN FOR GENERAL INFORMATION ONLY.
10. WHERE GRADING DOES NOT OCCUR, ALL EXISTING PLANT MATERIAL IS TO BE PROTECTED IN PLACE. NO CONSTRUCTION EQUIPMENT WILL BE ALLOWED TO TRAVEL THROUGH AND DAMAGE ANY OF THESE AREAS. ALL AREAS OF NATURAL MATERIAL SHALL BE FENCED UNDER THE DIRECTION OF THE PROJECT BIOLOGIST. CONTRACTOR WILL BE RESPONSIBLE TO REPAIR ANY AND ALL DAMAGE/IMPACTS TO THESE AREAS.
11. THE CONTRACTOR SHALL FURNISH TO THE ENGINEER OF WORK AS-BUILT PLANS FOR ALL NEW IMPROVEMENTS AND GRADING SHOWN ON THESE PLANS FOR SUBMITTAL TO THE CITY ENGINEER FOR APPROVAL IN ACCORDANCE WITH SECTION 15.04.140 OF THE CHULA VISTA MUNICIPAL CODE.
12. IN THE CASE OF CONFLICTS. THE REQUIREMENTS OF THE EARTHWORK, SPECIFICATIONS PREPARED FOR THE PROJECT BY THE SOILS ENGINEER SHALL GOVERN THE REQUIREMENTS OF THIS PLAN AND THESE NOTES AND THESE PLANS SHALL BE REVISED ACCORDINGLY.

LEGAL DESCRIPTION:

APN 644-040-66

PARCEL 1 AS SHOWN ON PARCEL MAP NO. 18372, PARCEL "A" OF CITY OF CHULA VISTA ADJUSTMENT PLAT NO. 02-10, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 12, 2004, AS FILE NO. 2004-020 55 47, OF OFFICIAL RECORDS

OWNER'S CERTIFICATE

IT IS AGREED THAT FIELD CONDITIONS MAY REQUIRE CHANGES TO THESE PLANS. IT IS FURTHER AGREED THAT THE OWNER (DEVELOPER) SHALL HAVE THE ENGINEER OF WORK MAKE SUCH CHANGES, ALTERATIONS OR ADDITIONS TO THESE PLANS WHICH THE ENGINEER OF WORK DETERMINES ARE NECESSARY AND DESIRABLE FOR THE PROPER COMPLETION OF THE GRADING. ALL PLAN CHANGES SHALL BE APPROVED BY THE CITY ENGINEER PRIOR TO CONSTRUCTION.

I FURTHER AGREE TO COMMENCE WORK ON ANY IMPROVEMENTS SHOWN ON THESE PLANS WITHIN THE EXISTING CITY RIGHT-OF-WAY WITHIN 60 DAYS AFTER THE ISSUANCE OF THE GRADING PERMIT AND TO PURSUE SUCH WORK ACTIVELY ON EVERY NORMAL WORKING DAY UNTIL COMPLETED, IRRESPECTIVE AND INDEPENDENT OF ANY OTHER WORK ASSOCIATED WITH THIS PROJECT UNDER MY CONTROL.

FREDERICK BORST AND RUTH ANN BORST, AS TO A 20% INTEREST.
C/O FRED BORST — SUNROAD ENTERPRISES
P.O. BOX 2008 — 4445 EASTGATE MALL, SUITE 400
EL CAJON, CA. 92021 — SAN DIEGO, CA. 92121
(619) 447-9120 — (858) 362-8500

________ DATE: ________
OWNER, AS TO EASTERLY 8(±) A..
________ DATE: Aug 24-2004
OWNER, AS TO WESTERLY 21.66 AC..

SOILS ENGINEER'S STATEMENT:

I, ANTHONY F. BELFAST A REGISTERED CIVIL ENGINEER OF THE STATE OF CALIFORNIA, PRINCIPALLY DOING BUSINESS IN THE FIELD OF APPLIED SOIL MECHANICS, HEREBY VERIFY THAT A SAMPLING AND STUDY OF THE SOIL CONDITIONS PREVALENT WITHIN THIS SITE WAS MADE BY ME OR UNDER MY DIRECTION BETWEEN THE DATES OF 11-30-94 AND 1-4-95. TWO COPIES OF THE SOILS REPORT COMPILED FROM THIS STUDY, WITH MY RECOMMENDATIONS, HAS BEEN SUBMITTED TO THE OFFICE OF THE CITY ENGINEER.

THESE GRADING PLANS HAVE BEEN REVIEWED BY ME OR UNDER MY DIRECTION AND CONFORM TO THE RECOMMENDATIONS MADE IN THE SOILS REPORT MENTIONED ABOVE.

SIGNED: ________ DATE: 8-24-04
R.C.E. NO: 40333 EXPIRATION DATE: 3-31-07

SIGNED: Kenneth W. Shaw DATE: 8-24-04
C.E.G. NO: 1251 EXPIRATION DATE: 4-30-05

DECLARATION OF RESPONSIBLE CHARGE:

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS.
I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE CITY OF CHULA VISTA IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR THE PROJECT DESIGN.

________ 8-17-04
JAMES R. HETTINGER R.C.E. 31756 DATE

ENGINEER OF WORK CERTIFICATE:

I HEREBY CERTIFY THAT IN MY PROFESSIONAL OPINION ALL WORK INCORPORATED IN THE GRADING PLANS SHEET 1 THROUGH SHEET 10 AND AUTHORIZED UNDER GRADING PERMIT NO. PG-651 HAS BEEN CONSTRUCTED TO THE LINE AND GRADES IN SUBSTANTIAL CONFORMANCE WITH SAID PLANS AND ANY APPROVED REVISIONS.

SIGNED: ________ DATE 5/21/08
PRINTED NAME: JOSEPH G. CRESTO P.E. # 45601
DISCIPLINE: CIVIL REGISTRATION EXPIRES 12/31/08

REGISTERED PROFESSIONAL ENGINEER SOHAIB AL-AGHA No. 45440 Exp. 12/31/06 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER JAMES R. HETTINGER No. 31756 EXP. 12-31-04 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER ANTHONY F. BELFAST C040333 Exp. 3-31-07 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER JOSEPH G. CRESTO No.45601 Exp.12/31/08 CIVIL STATE OF CALIFORNIA

REGISTERED GEOLOGIST KENNETH SHAW No. 1251 CERTIFIED ENGINEERING GEOLOGIST STATE OF CALIFORNIA

6/30/07

PG-651

DIGALERT
DIAL TOLL FREE
1-800-422-4133
AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

Construction contractor agrees that in accordance with generally accepted construction practices construction contractor will be required to assume sole and complete responsibility for job site conditions during the course of construction of the project including safety of all persons and property that this requirement shall be made to apply continuously and not be limited to normal working hours and construction contractor further agrees to defend, indemnify and hold design professional harmless from any and all liability, real or alleged, in connection with the performance of work on this project excepting liability arising from the sole negligence of design professional.

California Council of Civil Engineers & Land Surveyors

NOLTE
BEYOND ENGINEERING
15090 AVENUE OF SCIENCE, SUITE 101 SAN DIEGO, CA. 92128
858.385.0500 TEL 858.385.0400 FAX WWW.NOLTE.COM

CONSTRUCTION RECORD	REFERENCES	By	REVISIONS	Date	App'd	BENCHMARK	SCALE	
Contractor ERRECA'S INC.			(A) REVISE EARTHWORK QUANTITIES	9/17/04		CITY OF CHULA VISTA BM # 1695 1 1/2" BRASS DISK AT SOUTH END OF INLET, EAST SIDE OF ROMA COURT, 1580'(±) WEST OF MAXWELL ROAD, ELEV. = 139.19 NAVD '88.	Horizontal AS NOTED	Office
Inspector MIKE SCHEDINE TDS		SCE	AS-BUILT "CITY"	6/17/08	JRB		Vertical N/A	Field
Date completed 3/17/08								Traffic

Designed By	Drawn By	Checked By
JAR	JAR	--

Plans Prepared Under Supervision Of: James R. Hettinger, P.E.
Date 8-24-04
R.C.E. No. 31756

Submitted 8/26/04
By ________
Office

Approved 8/30/04
By ________
City Engineer

CITY OF CHULA VISTA PUBLIC WORKS DEPARTMENT
PLANS FOR THE GRADING OF:
650 MAIN STREET
AUTO PARK EXPANSION

Drawing No. 01027-01
Sheet 1 of 10

AS-BUILT

JOB NO. SD0460

GP1.DWG 10:37 a.m. N:\sd0460\CADD\RG\ 08/17/04

EXUT, EXMA, EXPN, exto, PRCN_RG, PRPN_RG, PRUT_RG, TBRG, PRMA

GRADING PLAN
FOR 650 MAIN STREET, AUTO PARK EXPANSION

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STATEMENT

(FOR PROJECTS SUBJECT TO NPDES GENERAL PERMIT FOR STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITIES)

DEVELOPMENT OF THIS PROJECT SHALL COMPLY WITH ALL REQUIREMENTS OF STATE WATER RESOURCES CONTROL BOARD (SWRCB) (NPDES GENERAL PERMIT # CAS000002, WASTE DISCHARGE REQUIREMENTS FOR DISCHARGE OF STORM DRAIN WATER RUNOFF ASSOCIATED WITH CONSTRUCTION ACTIVITY. IN ACCORDANCE WITH SAID PERMIT, A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND A MONITORING PROGRAM PLAN SHALL BE DEVELOPED AND IMPLEMENTED CONCURRENT WITH THE COMMENCEMENT OF GRADING ACTIVITIES. THE SWPPP SHALL SPECIFY BOTH CONSTRUCTION AND POST CONSTRUCTION AND NON-STRUCTURAL POLLUTION PREVENTION MEASURES. THE SWPPP SHALL ALSO ADDRESS OPERATION AND MAINTENANCE OF POST-CONSTRUCTION POLLUTION PREVENTION MEASURES, INCLUDING SHORT TERM AND LONG-TERM FUNDING SOURCES AND THE PARTY OR PARTIES THAT WILL BE RESPONSIBLE FOR THE IMPLEMENTATION OF SAID MEASURES.

A COMPLETE AND ACCURATE NOTICE-OF-INTENT (NOI) WILL BE FILED WITH THE SWRCB. A COPY OF THE ACKNOWLEDGEMENT FROM THE SWRCB THAT A NOI HAS BEEN RECEIVED FOR THIS PROJECT SHALL BE FILED WITH THE CITY OF CHULA VISTA WHEN RECEIVED; FURTHER, A COPY OF THE COMPLETED NOI FROM THE SWRCB SHOWING THE PERMIT NUMBER FOR THIS PROJECT SHALL BE FILED WITH THE CITY OF CHULA VISTA WHEN RECEIVED.

IN ADDITION, THE UNDERSIGNED AND SUBSEQUENT OWNER(S) OF ANY PORTION OF THE PROPERTY COVERED BY THIS GRADING PERMIT NO. PG-651 SHALL COMPLY WITH SPECIAL PROVISIONS REGARDING THE REVOCATION OR CANCELLATION OF NPDES GENERAL PERMIT COVERAGE, AS SET FORTH IN SWRCB ORDER NO. CAS000002, AND MAY SUBSEQUENT AMENDMENTS THERETO AND REISSUEANCE THEREOF.

FREDERICK BORST AND RUTH ANN BORST
C/O FRED BORST
P.O. BOX 2008
EL CAJON, CALIFORNIA 92021 PH. (619) 447-9120

[signature]
OWNER OF LAND

FREDERICK BORST
PRINTED NAME OF ABOVE PERSON DATE: AUG 17 2004

PERMIT IDENTIFICATION NUMBER

LANDSCAPING NOTES:

1. ALL SLOPES SHALL BE PLANTED AND IRRIGATED IN ACCORDANCE WITH PLANS APPROVED BY THE CITY OF CHULA VISTA DIRECTOR OF PLANNING AND BUILDING AND CITY ENGINEER. PLANS SHALL CONFORM TO THE CITY OF CHULA VISTA LANDSCAPE MANUAL AND ORDINANCE NO. 1797, BOTH AS AMENDED.
2. FINISH GRADING AND PLANTING SHALL BE ACCOMPLISHED ON ALL SLOPES PRIOR TO OCTOBER 1 OR IMMEDIATELY UPON COMPLETION OF ANY SLOPES GRADED BETWEEN OCTOBER 1 AND APRIL 1, PADS OR OTHER RELATIVELY LEVEL AREAS SHALL BE PLANTED AS DIRECTED BY THE CITY'S DIRECTOR OF PLANNING AND BUILDING.
3. PRIOR TO GRADING, CONTRACTOR SHALL FIELD VERIFY EXISTING IRRIGATION SYSTEMS TO DETERMINE WHICH ARE OPERABLE. UNLESS OTHERWISE NOTED ON THESE PLANS, ALL EXISTING IRRIGATION SYSTEMS ARE TO BE PROTECTED IN PLACE AND REMAIN OPERABLE. CONTACT THE PUBLIC WORKS OPERATION'S DEPARTMENT (JERRY FONCERRADA 691-5027)

ABBREVIATIONS

E/C	ELECTRICAL CONDUIT	PCC	PORTLAND CEMENT CONCRETE
EP	EDGE OF PAVEMENT	TYP	TYPICAL
FS	FINISH SURFACE	MAX	MAXIMUM
FG	FINISH GRADE	MIN	MINIMUM
TG	TOP OF GRATE	R/W	RIGHT-OF-WAY
P/L	PROPERTY LINE	EXIST	EXISTING
FL	FLOWLINE	S	SEWER
GB	GRADE BREAK	CO	CLEANOUT
HP	HIGH POINT	W	WATER
IE	INVERT ELEVATION	R	RADIUS
AC	ASPHALT CONCRETE	SHT.	SHEET
RSD	REGIONAL STANDARD DRAWINGS		

EROSION CONTROL NOTES:

PRIOR TO COMPLETION OF FINAL IMPROVEMENTS, TEMPORARY EROSION CONTROL SHALL BE PERFORMED BY THE CONTRACTOR AS INDICATED BELOW.

1. THE EROSION CONTROL CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSPECTION AND MODIFICATION OF THE EROSION CONTROL DEVICES DURING THE RAINY SEASON. THE CONTRACTOR, PERMITEE OR OWNER SHALL BE RESPONSIBLE FOR THE CONTINUAL MAINTENANCE OF THE EROSION CONTROL DEVICES DURING THE RAINY SEASON. IN THE EVENT OF FAILURE OR REFUSAL TO PROPERLY MAINTAIN SAID DEVICES, THE CITY ENGINEER OR MITIGATION MONITOR MAY CAUSE EMERGENCY MAINTENANCE WORK TO BE DONE TO PROTECT ADJACENT PRIVATE AND PUBLIC PROPERTY, THE COST (INCLUDING AN INITIAL MOBILIZATION AMOUNT) OF WHICH SHALL BE CHARGED TO THE OWNER.
2. SEDIMENTATION BASINS MAY NOT BE REMOVED OR MADE INOPERATIVE WITHOUT PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER AND MITIGATION MONITOR.
3. TEMPORARY EROSION CONTROL DEVICES, WHICH INTERFERE WITH THE WORK, SHALL BE RELOCATED OR MODIFIED AS THE WORK PROGRESSES, AS RECOMMENDED BY THE ENGINEER OF WORK AND AS APPROVED BY THE CITY ENGINEER AND MITIGATION MONITOR.
4. ALL REMOVABLE PROTECTION DEVICES SHOWN SHALL BE IN PLACE AT THE END OF EACH WORKING DAY WHEN THE 5-DAY RAIN PROBABILITY FORECAST EXCEEDS 40 PERCENT. AFTER EACH RAINSTORM EXCEEDING 1/4" IN A 12-HOUR PERIOD, SILT AND DEBRIS SHALL BE REMOVED FORM CHECK DAMS AND DESILTING BASINS AND BASINS SHALL BE PUMPED DRY AS DEEMED NECESSARY BY THE CITY ENGINEER AND MITIGATION MONITOR.
5. EFFECTIVE PLANTING SHALL BE INSTALLED, FULLY GERMINATED AND SHALL EFFECTIVELY COVER THE REQUIRED SLOPES PRIOR TO FINAL APPROVAL. THE PLANTING MIX SHALL BE APPROVED BY THE DIRECTOR OF PLANNING & BUILDING PRIOR TO INSTALLATION. SPRINKLER SYSTEMS ARE REQUIRED ON ALL SLOPES OVER FIVE FEET IN HEIGHT.
6. A 12 INCH HIGH BY THREE FEET WIDE BERM SHALL BE MAINTAINED ALONG THE TOP OF THE SLOPE OF THOSE FILLS ON WHICH GRADING IS NOT IN PROGRESS. CONCENTRATED WATER SHALL NOT BE CARRIED CLOSER THAN 10 FEET FROM THE TOP OF SLOPES.
7. SILT BASINS, TRAPS, OR SANDBAGS SHALL BE PROVIDED AT EVERY STORM DRAIN INLET TO PREVENT SEDIMENT FROM ENTERING THE STORM DRAIN SYSTEM.
8. FOR INLETS LOCATED AT SUMPS ADJACENT TO TOP OF SLOPE, THE CONTRACTOR SHALL INSURE THAT WATER DRAINING TO THE SUMPS IS DIRECTED INTO THE INLET, AND THAT A MINIMUM OF 1.00' FREEBOARD EXISTS AND IS MAINTAINED ABOVE THE TOP OF THE INLET. IF FREEBOARD IS NOT PROVIDED BY GRADING SHOWN ON THE PLANS, THE CONTRACTOR SHALL PROVIDE IT VIA TEMPORARY MEASURES, I.E. SANDBAGS OR DIKES.
9. THE GRADING CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANUP OF SILT AND MUD ON THE ADJACENT STREETS DUE TO CONSTRUCTION ACTIVITY.
10. THE CONTRACTOR SHALL CHECK AND MAINTAIN LINED AND UNLINED DITCHES AFTER EACH RAINFALL.
11. THE CONTRACTOR SHALL REMOVE SILT AND DEBRIS AFTER EACH RAINFALL EXCEEDING 1/4" IN A 12-HOUR PERIOD AND WHEN SILT REACHES DEPTH OF 1.0'.
12. EQUIPMENT AND WORKERS FOR EMERGENCY WORK SHALL BE MADE AVAILABLE ALL TIMES DURING THE RAINY SEASON. ALL NECESSARY MATERIALS SHALL BE STOCK PILED ON SITE AT CONVENIENT LOCATIONS TO FACILITATE RAPID CONSTRUCTION OF TEMPORARY DEVICES WHEN RAIN IS IMMINENT.
13. DEVICES SHOWN ON THESE PLANS SHALL NOT BE MOVED OR MODIFIED WITHOUT THE APPROVAL OF THE PUBLIC WORKS INSPECTOR AND MITIGATION MONITOR.
14. THE CONTRACTOR SHALL RESTORE ALL EROSION CONTROL DEVICES TO WORKING ORDER TO THE SATISFACTION OF THE CITY ENGINEER AND MITIGATION MONITOR AFTER EACH RAINFALL WHICH PRODUCES RUNOFF.
15. THE CONTRACTOR SHALL INSTALL ADDITIONAL EROSION CONTROL MEASURES AS MAY BE REQUIRED BY THE CITY ENGINEER AND MITIGATION MONITOR DUE TO INCOMPLETE GRADING OPERATIONS OR UNFORESEEN CIRCUMSTANCES WHICH MAY ARISE.
16. THE CONTRACTOR SHALL BE RESPONSIBLE AND SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT PUBLIC TRESPASS ONTO AREAS WHERE IMPOUNDED WATERS CREATE A HAZARDOUS CONDITION.
17. ALL EROSION CONTROL MEASURES PROVIDED PER THE APPROVED GRADING PLAN SHALL BE INCORPORATED HEREON.
18. GRADED AREA AROUND THE PROJECT PERIMETER MUST DRAIN AWAY FROM THE FACE OF SLOPES AT THE CONCLUSION OF EACH WORKING DAY.
19. IN CASE EMERGENCY WORK IS REQUIRED, CONTACT

FRED BORST (619) 447-9120.
(DEVELOPER'S NAME & PHONE#)

20. THE CONTRACTOR SHALL TAKE THE NECESSARY STEPS TO PROTECT THE PROJECT AND ADJACENT PROPERTY FROM ANY EROSION AND SILTATION THAT MAY RESULT FROM GRADING OPERATIONS BY APPROPRIATE MEANS (SANDBAGS, HAY BALES, TEMPORARY DESILTING BASINS, SILT FENCES, DIKES, SHORING, ETC.) UNTIL SUCH TIME THAT THE TOTAL PROJECT IS COMPLETED AND ACCEPTED FOR MAINTENANCE BY OWNER.

MITIGATION MONITORING GRADING NOTES: A

1. ALL GRADING SHALL BE CONDUCTED IN ACCORDANCE WITH THE REQUIRED MITIGATION MEASURES OUTLINED IN MITIGATED NEGATIVE DECLARATION IS-02-010 AND ADOPTED MITIGATION MONITORING AND REPORTING PROGRAM FOR THE SUBJECT PROJECT. ALL GRADING SHALL BE CONDUCTED IN ACCORADANCE WITH THE RECCOMENDATIONS PROVIDED IN THE GEOTECHNICAL INVESTIGATION-CHULA VISTA AUTO CENTER, DATED APRIL 20, 2001 FOR THE SUBJECT PROJECT
2. A PALEONTOLOGICAL MONITOR SHALL BE ON-SITE AT ALL TIMES DURING THE ORIGINAL CUTTING OF PREVIOUSLY UNDISTURBED SEDIMENTS OF HIGHLY SENTITIVE GEOLOGIC FORMATIONS (OTAY AND SAN DIEGO FORMATIONS) TO INSPECT CUTS FOR CONTAINED FOSSILS. THE PALEONTOLOGICAL MONITOR SHALL WORK UNDER THE DIRECTION OF A QUALIFIED PALEONTOLOGIST. THE MONITOR SHALL PERIODICALLY (EVERY SEVERAL WEEKS) INSPECT ORIGINAL CUTS IN DEPOSITS WITH AN UNKNOWN RESOURCE SENSITIVITY (QUATERNARY ALLUVIUM). (A PALEONTOLOGICAL MONITOR IS DEFINED AS AN INDIVIDUAL WHO HAS EXPERIENCE IN THE COLLECTION AND SALVAGE OF FOSSIL MATERIALS). IN THE EVENT THAT FOSSILS ARE DISCOVERED IN UNKOWN SENSITIVE FORMATIONS, IT MAY BE NECESSARY TO INCREASE THE PER-DAY FIELD MONITORING TIME. CONVERSELY, IF FOSSILS ARE NOT DISCOVERED, THE MONITORING EFFORT MAY BE REDUCED. WHEN FOSSILS ARE DISCOVERED, THE PALEONTOLOGIST (OR PALEONTOLOGICAL MONITOR) SHALL RECOVER THEM. IN INSTANCES WHERE RECOVERY REQUIRES AN EXTENDED SALVAGE TIME, THE PALEONTOLOGIST (OR PALEONTOLOGICAL MONITOR) SHALL BE ALLOWED TO DIRECT, DIVERT, OR HALT GRADING TO ALLOW RECOVERY OF FOSSIL REMAINS. WHERE DEEMED APPROPRIATE BY THE PALEONTOLOGIST (OR PALEONTOLOGICAL MONITOR), A SCREEN WASHING OPERATION FOR SMALL FOSSIL REMAINS SHALL BE SET UP. PREPARED FOSSILS, ALONG WITH COPIES OF ALL PERTINENT FIELD NOTES, PHOTOGRAPHS AND MAPS, SHALL BE DEPOSITED IN A SCIENTIFIC INSTITUTION WITH PALEONTOLOGICAL COLLECTIONS SUCH AS THE SAN DIEGO NATURAL HISTORY MUSEUM. A FINAL SUMMARY REPORT SHALL BE COMPLETED WHICH OUTLES THE RESULTS OF THE MITIGATION PROGRAM. THIS REPORT SHALL INCLUDE DISCUSSION OF THE METHODS USED, STRATIGRAPHY EXPOSED FOSSILS COLLECTED, AND SIGNIFICANCE OF RECOVERED FOSSILS.
3. AN ARCHAEOLOGICAL MONITOR SHALL BE ONSITE DURING ALL EXCAVAION ACTIVITIES. IN THE EVENT THAT CULTURAL RESOURCES ARE IDENTIFIED, THE ARCHAEOLOGIST SHALL BE AUTHORIZED TO DIVERT THE CONSTRUCTION ACTIVITIES, INVESTIGATE THE CULTURAL RESOURCES, AND SALVAGE MATERIAL TO ASCERTAIN THE SIGNIFICANCE OF ANY SITE.
4. IN ARRORDANCE WITH THE MITIGATION MONITORING AND REPORTING PROGRAM (MMRP) FOR THE SUBJECT PROJECT, THE FOLLOWING MEASURES SHALL BE REQUIREMENTS OF CONSTRUCTION OPERATIONS:
   - A) USE LOW POLLUTANT-EMITTING CONSTRUCTION EQUIPMENT.
   - B) USE ELECTRICAL CONSTRUCTION EQUIPMENT AS SETERMINED BY THE CITY ENGINEER.
   - C) USE CATALYTIC REDUCTION FOR GASOLINE-POWERED EQUIPMENT.
   - D) USE INJECTION TIMING RETARD FOR DIESEL-POWERED EQUIPMENT.
   - E) WATER THE CONSTRUCTION AREA TWICE DAILY TO MINIMIZE FUGITIVE DUST.
   - F) STABALIZE (HYDROSEED, FOR EXAMPLE) GRADED AREAS AS QUICKLY AS POSSIBLE TO MINIMIZE FUGITIVE DUST.
   - G) PAVE PERMANENT ROADS AS QUICKLY AS POSSIBLE TO MINIMIZE DUST.
   - H) USE ELECTRICITY FROM POWER POLES INSTEAD OF TEMPORARY GENERATORS DURING BUILDING CONSTRUCTION.
   - I) IMPLIMENT TRACK-OUT CONTROL AS FOLLOWS:
     - a) APPLY CHEMICAL STABALIZER OR PAVE THE LAST 100 FEET OF INTERNAL TRAVEL WITHIN A CONSTRUCTION SITE PRIOR TO PUBLIC ROAD ENTRY.
     - b) INSTALL WHEEL WASHERS ADJACENT TO A PAVED APRON PRIOR TO VEHICLE ENTRY ON PUBLIC ROADS.
     - c) REMOVE ANY VISIBLE TRACK-OUT INTO TRAVELED PUBLIC STREETS WITHIN 30 MINUTES OF OCCURENCE.
     - d) WET WASH THE CONSTRUCTION ACCESS POINT AT THE END OF EACH WORKDAY IF ANY VEHICLE TRAVEL ON UNPAVED SURFACES HAS OCCURED.
     - e) PROVIDE SUFFICIENT PERIMETER EROSION CONTROL TO PREVENT WASHOUT OF SILTY MATERIAL ONTO PUBLIC ROADS.
   - J) COVER HAUL TRUCKS OR MAINTAIN AT LEAST 12 INCHES OF FREEBOARD TO REDUCE BLOWOFF DURING HAULING.
   - K) SUSPEND ALL SOIL DISTURBANCE AND TRAVEL ON UNPAVED SURFACES IF WINDS EXCEED 25 MPH.
4. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THESE APPROVED PLANCS AND APPROVED REVISIONS. ANY CHANGES OR REVISIONS THEREFROM SHALL BE APPROVED BY THE CITY ENGINEER AND ENVIRONMENTAL MITIGATION MONITOR (MM) PRIOR TO ANY REQUEST FOR INSPECTION.
5. ALL GRADING SHALL ADHERE TO AND IMPLIMENT THE MITIGATION MONITORING AND REPORTING PROGRAM, TO THE SATISFACTION OF THE CITY ENVIRONMENTAL MITIGATION MONITOR.
6. THE CITY ENVIRONMENTAL MITIGATION MONITOR SHALL BE NOTIFIED A MINIMUM OF 48 HOURS PRIOR TO THE PRE-CONSTRUCION MEETING.
7. A QUALIFIED BIOLOGIST SHALL BE PRESENT ONSITE DURING PROJECT CONSTRUCTION GRADING ACTIVITIES ADJACENT TO ANY SENSITIVE ENVIRONMENTAL RESOURCES. THESE ACTIVITIES SHALL BE MONITORED BY THE BIOLOGIST AT ALL TIMES.

SHEET INDEX:

SHEET 1	TITLE SHEET, GENERAL NOTES
SHEET 2	GENERAL NOTES CONT'D
SHEET 3	GRADING PLAN
SHEET 4	GRADING PLAN
SHEET 5	GRADING PLAN
SHEET 6	GRADING PLAN
SHEET 7	EROSION CONTROL
SHEET 8	EROSION CONTROL
SHEET 9	EROSION CONTROL
SHEET 10	PROFILES, SECTIONS AND DETAILS

WORK TO BE DONE:

THE WORK TO BE DONE CONSISTS OF THE ITEMS INDICTED UNDER THE "LEGEND" SHOWN BELOW, AND IT IS TO BE DONE IN ACCORDANCE WITH THESE PLANS AND THE FOLLOWING LIST OR PRINTED MATERIALS AS CURRENTLY ADOPTED BY THE CHULA VISTA CITY COUNCIL:

1. STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION ("GREENBOOK") AND SUPPLEMENTAL AMENDMENTS THERETO:
2. SAN DIEGO AREA REGIONAL STANDARD DRAWINGS.
3. CITY OF CHULA VISTA STANDARD SPECIAL PROVISIONS (TO THE GREENBOOK).
4. DESIGN AND CONSTRUCTION STANDARDS OF THE CITY OF CHULA VISTA.
5. STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION STANDARD PLANS.
6. STANDARD SPECIFICATIONS, STATE OF CALIFORNIA "MANUAL OF TRAFFIC CONTROLS".

ALL REFERENCES ARE TO BE MADE PART OF THESE PLANS. ANY CHANGES OR REVISIONS THEREFROM SHALL BE APPROVED BY THE CITY ENGINEER OR HIS DESIGNEE PRIOR TO ANY REQUEST FOR INSPECTION.

LEGEND:

ITEM	STD. DWG. NO.	SYMBOL
EXISTING CONTOUR		
FINISH GRADE CONTOUR		447
SPOT ELEVATION		47.50
CUT SLOPE SYMBOL (2:1 MAX)		
FILL SLOPE SYMBOL (2:1 MAX)		
TOP OF SLOPE BERM		
CUT/FILL CONTOUR		
DAYLIGHT LINE		
PCC DRAINAGE DITCH	RSD D-75	
DRAINAGE SWALE		
TOP OF GRATE/ FL. ELEVATION		47.50 TG / 42.50 FL
RIP-RAP ENERGY DISSIPATOR	RSD D-40	
STRAIGHT HEADWALL TYPE 'A'	RSD D-30	
STORM DRAIN (SIZE AS NOTED)	RSD D-60	24"SD
DESILTATION BASIN	DETAIL 3, SHT. 10	
STANDPIPE DETAIL	SEE SHEET 10	
FIBER ROLL LOCATION	SHT.'S 7, 8, & 9	
SECTION CALLOUT		A / 3 — SECTION / SHEET NUMBER
DETAIL REFERENCE		3 / 10 — REFERNCE STRUCTURE / SHEET NUMBER
BIO FENCING, ORANGE		
LIMITS OF ENVIRONMENTALLY PROTECTED AREA		
THE EROSION CONTROL LEGEND CAN BE FOUND ON SHEETS 7-9		
EXISTING UTILITIES AS SHOWN		

DIGALERT
DIAL TOLL FREE 1-800-422-4133
AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

NOLTE
BEYOND ENGINEERING
15090 AVENUE OF SCIENCE, SUITE 101 SAN DIEGO, CA 92128
858.385.0500 TEL 858.385.0400 FAX WWW.NOLTE.COM

Construction contractor agrees that in accordance with generally accepted construction practices construction contractor will be required to assume sole and complete responsibility for job site conditions during the course of construction of the project including safety of all persons and property that this requirement shall be made to apply continuously and not be limited to normal working hours and construction contractor further agrees to defend, indemnify and hold design professional harmless from any and all liability, real or alleged, in connection with the performance of work on this project excepting liability arising from the sole negligence of design professional.

California Council of Civil Engineers & Land Surveyors

REGISTERED PROFESSIONAL ENGINEER — JAMES R. HETTINGER — No. 31756 — EXP. 12-31-04 — CIVIL — STATE OF CALIFORNIA

"AS-BUILT"
[signature] DATE 5/21/08
(SIGNATURE)
JOSEPH G. CRESTO P.E. NO. 45601
(PRINTED NAME)
MY REGISTRATION EXPIRES: 12/31/08 DISCIPLINE: CIVIL

REGISTERED PROFESSIONAL ENGINEER — JOSEPH G. CRESTO — No. 45601 — Exp. 12/31/08 — CIVIL — STATE OF CALIFORNIA

PG-651

CONSTRUCTION RECORD	REFERENCES	By	REVISIONS	Date	App'd
Contractor EKRECA'S INC.		A	REVISE NOTES	9/1/04	
Inspector MIKE SCHEDINE		SCE	AS-BUILT "CITY"	6/1/08	
Date completed 3/17/08					

BENCHMARK: CITY OF CHULA VISTA BM # 1695, 1 1/2" BRASS DISK AT SOUTH END OF INLET, EAST SIDE OF ROMA COURT, 1580'(±) WEST OF MAXWELL ROAD, ELEV. = 139.19 NAVD '88.

SCALE: Horizontal AS NOTED; Vertical N/A

Office / Field / Traffic

Designed By	Drawn By	Checked By
JAR	JAR	---

Plans Prepared Under Supervision Of: James R. Hettinger, P.E. Date 8-24-04 R.C.E. No. 31756

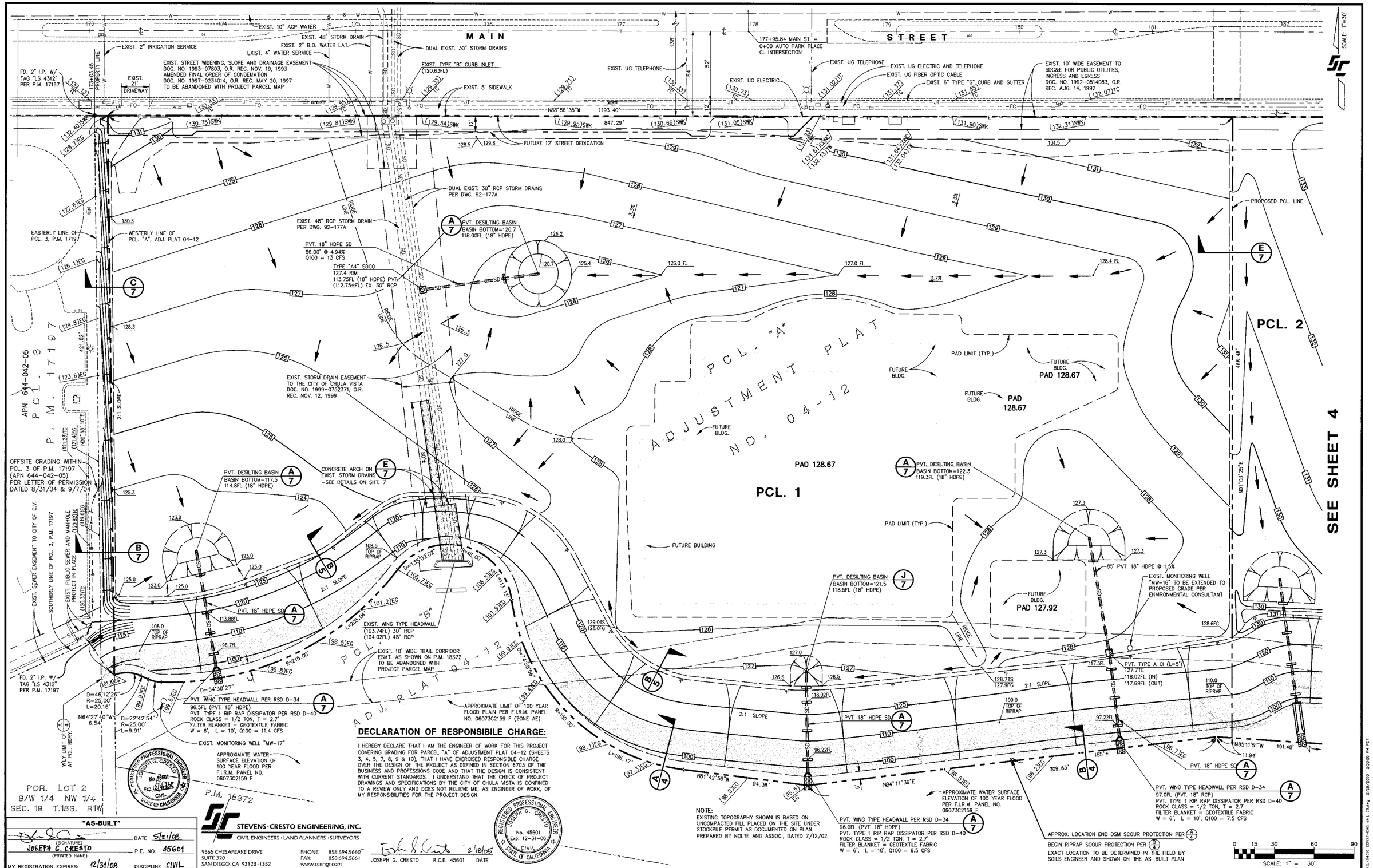
Submitted 8/26/04 By [signature] Office

Approved 8/30/04 By [signature] City Engineer

CITY OF CHULA VISTA PUBLIC WORKS DEPARTMENT
PLANS FOR THE GRADING OF: 650 MAIN STREET AUTO PARK EXPANSION

Drawing No. 01027-02
Sheet 2 of 10
JOB NO. SD0460

AS-BUILT



DECLARATION OF RESPONSIBILE CHARGE:

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT COVERING GRADING FOR PARCEL "A" OF ADJUSTMENT PLAT 04-12 (SHEETS 3, 4, 5, 7, 8, 9 & 10), THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS. I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE CITY OF CHULA VISTA IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR THE PROJECT DESIGN.

REGISTERED PROFESSIONAL ENGINEER JOSEPH G. CRESTO No. 45601 Exp. 12-31-06 CIVIL STATE OF CALIFORNIA

2/18/05
JOSEPH G. CRESTO R.C.E. 45601 DATE

NOTE:
EXISTING TOPOGRAPHY SHOWN IS BASED ON UNCOMPACTED FILL PLACED ON THE SITE UNDER STOCKPILE PERMIT AS DOCUMENTED ON PLAN PREPARED BY NOLTE AND ASSOC., DATED 7/12/02

REGISTERED PROFESSIONAL ENGINEER JOSEPH G. CRESTO No. 45601 Exp. 12/31/08 CIVIL STATE OF CALIFORNIA

"AS-BUILT"
(SIGNATURE) DATE 5/21/08
JOSEPH G. CRESTO (PRINTED NAME) P.E. NO. 45601
MY REGISTRATION EXPIRES: 12/31/08 DISCIPLINE CIVIL

STEVENS·CRESTO ENGINEERING, INC.
CIVIL ENGINEERS • LAND PLANNERS • SURVEYORS
9665 CHESAPEAKE DRIVE SUITE 320 SAN DIEGO, CA 92123-1352
PHONE: 858.694.5660 FAX: 858.694.5661 www.scengr.com

CONSTRUCTION RECORD	REFERENCES	By	REVISIONS	Date	App'd
Contractor ERREGA'S INC	03090, 01027, 86-430, 86-431	SCE	REPLACEMENT SHEET FOR TOYOTA	3/8/05	
Inspector MIKE SCHEDINE	92-159, 92-163, 92-164		DEVELOPMENT PAD GRADING.		
Date Completed 3/17/08	92-177, 92-177A	SCE	AS-BUILT "CITY"	5/21/08	

BENCH MARK
C.V. VERT. CTL. BENCH MARK, NO. 1046
DESCRIPTION: BRASS DISK AT EAST END OF DRAINAGE INLET, NORTH SIDE OTAY VALLEY ROAD, 150'± E/O OLEANDER AVENUE.
ELEVATION: 126.842 NGVD '29

SCALE
Horizontal AS NOTED
Vertical N/A

Office ____ Field ____ Traffic ____

Designed By	Drawn By	Checked By
JGC	BEM	JGC

Plans Prepared Under Supervision Of: JOSEPH G. CRESTO Date 2/18/05 R.C.E. No. 45601

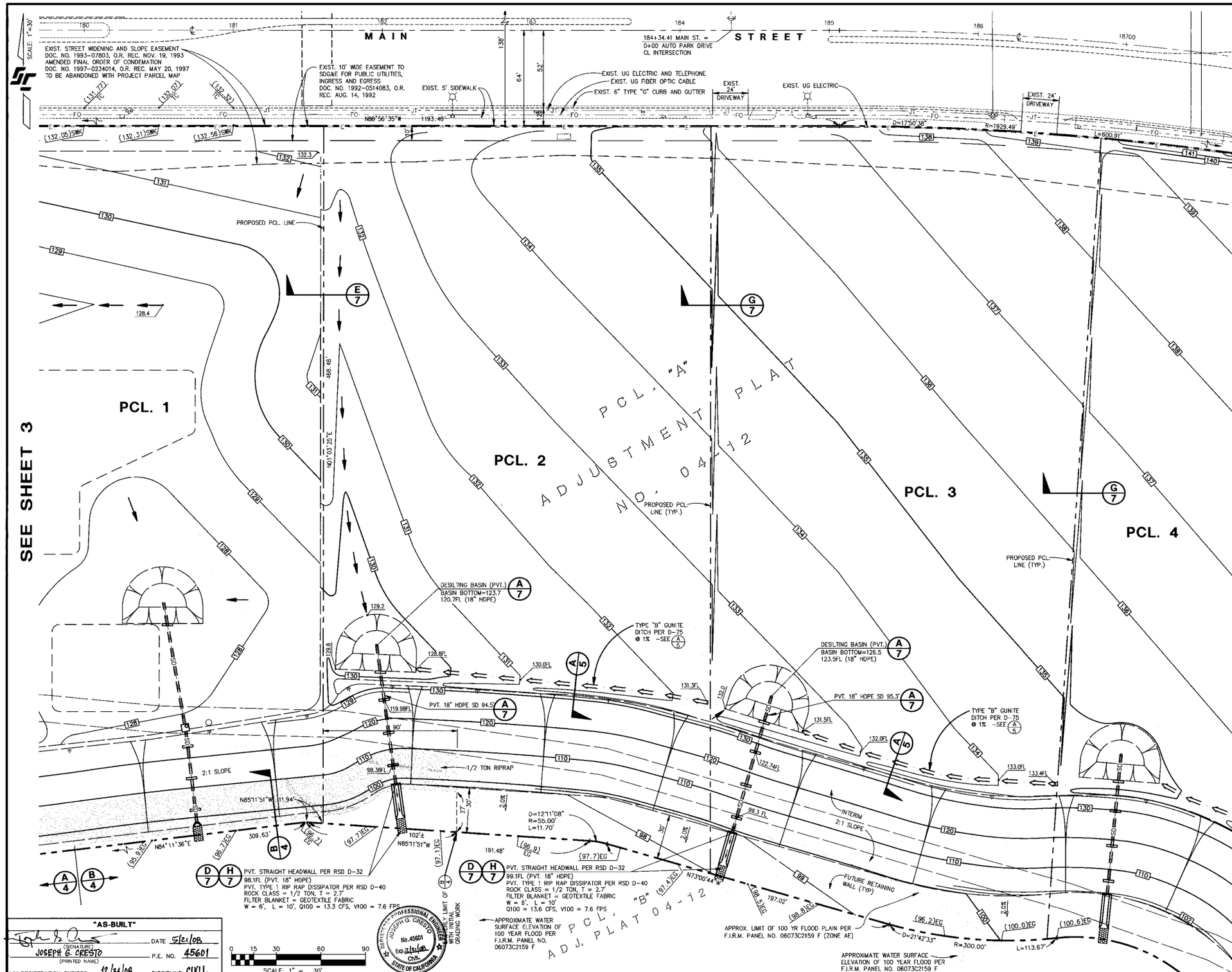
Submitted 3/8/05 By
Approved March 8, 2005 By Francisco X. Rivera, Deputy City Engineer

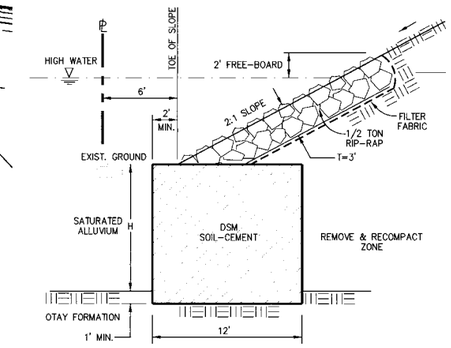
CITY OF CHULA VISTA — PUBLIC WORKS DEPARTMENT
GRADING AND DRAINAGE PLAN FOR:
650 MAIN STREET
PARCEL "A" OF ADJUSTMENT PLAT NO. 04-12

Drawing No. 01027-03
W.O. No. PG-651

NEW SHEET

AS-BUILT



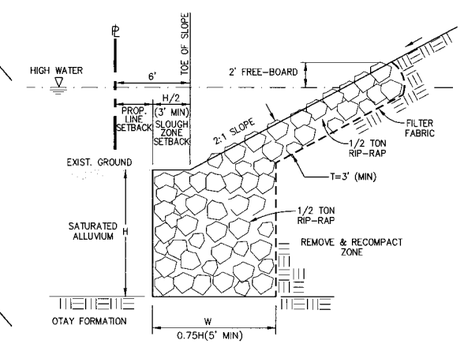


1. RIP-RAP TO CONSIST OF ONE-HALF TON MATERIAL, EQUIVALENT SPHERICAL DIAMETER EQUAL TO 24 INCHES. FILL VOIDS BETWEEN ROCK WITH SOIL FOR PLANTING.
2. DEEP SOIL MIXING (DSM) SOIL-CEMENT EXTENDED AT LEAST 1 FOOT INTO OTAY FORMATION, AND UP TO ELEVATION OF PROPOSED TOE OF SLOPE.
3. FILTER FABRIC AT RIP-RAP/SOIL INTERFACE. MIRAFI 700X OR SIMILAR.

*- PER GEOTECHICAL ENGINEER.

SCOUR/SLOPE PROTECTION SOIL-CEMENT COLUMNS BY DEEP SOIL-MIXING & RIP RAP* (A/4)

NO SCALE



1. RIP-RAP TO CONSIST OF ONE-HALF TON MATERIAL, EQUIVALENT SPHERICAL DIAMETER EQUAL TO 24 INCHES. RIP-RAP WIDTH, W, EQUAL TO 0.75H; FIVE FEET MINIMUM. FILL VOIDS BETWEEN ROCK WITH SOIL FOR PLANTING.
2. FILTER FABRIC AT RIP-RAP/SOIL INTERFACE. MIRAFI 700X OR SIMILAR.

*- PER GEOTECHICAL ENGINEER.

SCOUR/SLOPE PROTECTION RIP RAP* (B/4)

NO SCALE

"AS-BUILT"
(SIGNATURE) DATE 5/21/08
JOSEPH G. CRESTO (PRINTED NAME) P.E. NO. 45601
MY REGISTRATION EXPIRES: 12/31/08 DISCIPLINE CIVIL

REGISTERED PROFESSIONAL ENGINEER JOSEPH G. CRESTO No. 45601 Exp. 12-31-06 CIVIL STATE OF CALIFORNIA

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CONSTRUCTION RECORD	REFERENCES	By	REVISIONS	Date	App'd
Contractor EKRECA'S INC.	03090, 01027, 86-430, 86-431	SCE	REPLACEMENT SHT. FOR REVISED GRADING	3/8/05	
Inspector MIKE SCHEDINE	92-159, 92-163, 92-164	SCE	AS-BUILT "CITY"	4/17/08	
Date Completed 3/17/08	92-177, 92-177A				

BENCH MARK: C.V. VERT. CTL. BENCH MARK, NO. 1046 DESCRIPTION: BRASS DISK AT EAST END OF DRAINAGE INLET, NORTH SIDE OTAY VALLEY ROAD, 150'± E/O OLEANDER AVENUE. ELEVATION: 126.842 NGVD '29

SCALE: Horizontal / Vertical

Office / Field / Traffic

Designed By JGC — Drawn By BEM — Checked By JGC

Plans Prepared Under Supervision Of: JOSEPH G. CRESTO Date 2/18/05 R.C.E. No. 45601

Submitted 3/8/05 By Francisco X. Rivera, Deputy City Engineer — Approved March 8, 2005

CITY OF CHULA VISTA — PUBLIC WORKS DEPARTMENT

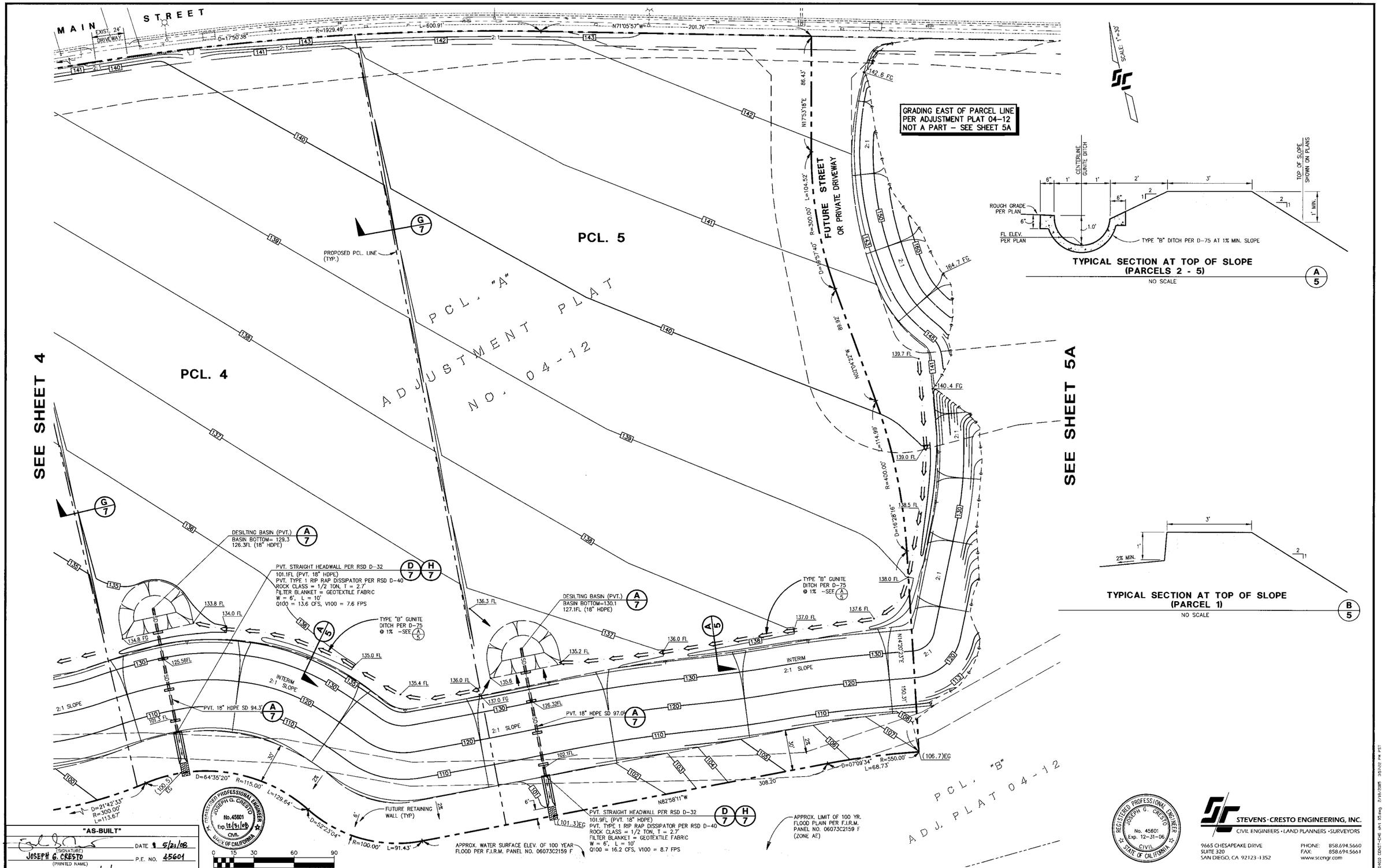
GRADING AND DRAINAGE PLAN FOR: 650 MAIN STREET, PARCEL "A" OF ADJUSTMENT PLAT NO. 04-12

Drawing No. 01027-04 — W.O. No. PG-651

NEW SHEET

AS-BUILT

X:\DWG\JOB\45601\CIVIL\45601 CONST-GRE.prt 24-aug 2/18/2005 3:44:53 PM PST



"AS-BUILT"

(SIGNATURE) DATE 5/21/08

JOSEPH G. CRESTO (PRINTED NAME) P.E. NO. 45601

MY REGISTRATION EXPIRES: 12/31/08 DISCIPLINE CIVIL

REGISTERED PROFESSIONAL ENGINEER JOSEPH G. CRESTO No. 45601 Exp. 12-31-06 CIVIL STATE OF CALIFORNIA

STEVENS·CRESTO ENGINEERING, INC.
CIVIL ENGINEERS · LAND PLANNERS · SURVEYORS
9665 CHESAPEAKE DRIVE
SUITE 320
SAN DIEGO, CA 92123-1352
PHONE: 858.694.5660
FAX: 858.694.5661
www.scengr.com

CONSTRUCTION RECORD	REFERENCES	By	REVISIONS	Date	App'd
Contractor EKRECA'S INC.	03090, 01027, 86-430, 86-431	SCE	REPLACEMENT SHT. FOR REVISED GRADING	3/8/05	
Inspector MIKE SCHEDINE	92-159, 92-163, 92-164	SCE	AS-BUILT "CITY"	5/17/08	JTB
Date Completed 3/17/08	92-177, 92-177A				

BENCH MARK
C.V. VERT. CTL. BENCH MARK, NO. 1046
DESCRIPTION: BRASS DISK AT EAST END OF DRAINAGE INLET, NORTH SIDE OTAY VALLEY ROAD, 150'± E/O OLEANDER AVENUE.
ELEVATION: 126.842 NGVD '29

SCALE: Horizontal AS NOTED; Vertical N/A

Office ____ Field ____ Traffic ____

Designed By JGC | Drawn By BEM | Checked By JGC

Plans Prepared Under Supervision Of: JOSEPH G. CRESTO Date 2/18/05 R.C.E. No. 45601

Submitted 3/8/05 By Edward Fretas

Approved March 8, 2005 By Francisco X. Rivera, Deputy City Engineer

CITY OF CHULA VISTA — PUBLIC WORKS DEPARTMENT

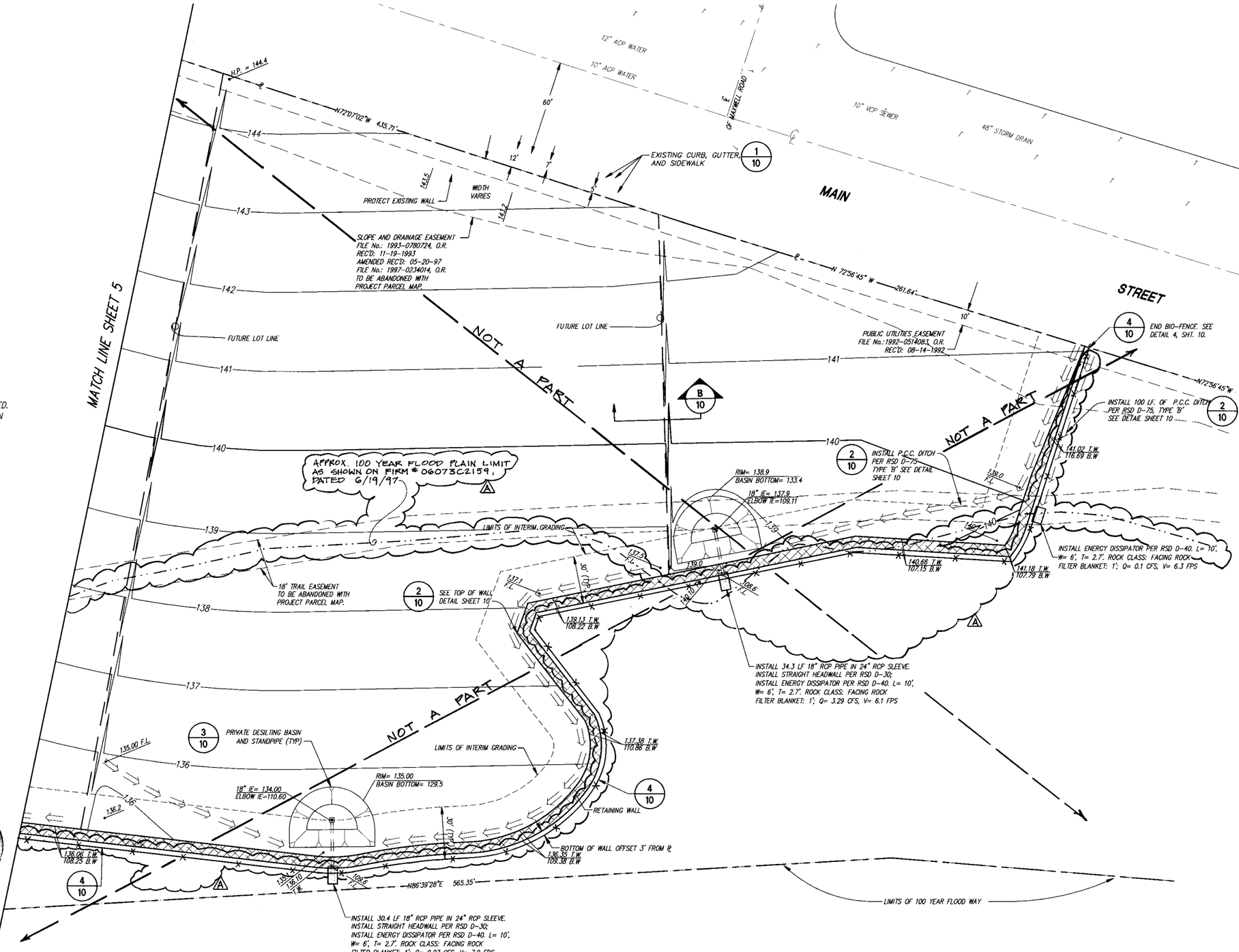
GRADING AND DRAINAGE PLAN FOR: 650 MAIN STREET
PARCEL "A" OF ADJUSTMENT PLAT NO. 04-12

Drawing No. 01027-05
W.O. No. PC-651

NEW SHEET

AS-BUILT

X:\SWD\Jobs\94387\CIVIL\04012 CDCT-CHE sht 05.dwg 2/18/2005 3:52:02 PM PST



N

GRAPHIC SCALE
0' 15' 30' 45' 60' 90' 120'
SCALE 1"= 30'

CONSTRUCTION NOTES:

1. ALL STORM DRAIN JOINTS SHALL BE WATER TIGHT.
2. GRADING IN THE VICINITY OF RETAINING WALL IS PROHIBITED UNTIL RETAINING WALL PERMIT IS GRANTED.
3. TOP OF WALL AND BOTTOM OF WALL ELEVATIONS SHOWN ARE TO BE VERIFIED WITH A RETAINING WALL DESIGN

CURVE TABLE

CURVE	LENGTH	RADIUS	Δ DELTA
C18	31.22'	100.00'	17°53'14"
C19	66.19'	390.00'	9°43'26"
C20	91.98'	100.00'	52°42'05"
C21	53.08'	50.00'	60°49'37"
C22	123.80'	51.00'	138°51'46"
C23	25.28'	50.00'	28°58'14"
C24	132.93'	151.00'	50°28'21"
C25	14.26'	50.00'	16°20'33"

DIGALERT
DIAL TOLL FREE
1-800-422-4133
AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER JOSEPH G. CRESTO No 45601 Exp. 12/31/08 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER JAMES R. HETTINGER No. 31756 EXP. 12-31-04 CIVIL STATE OF CALIFORNIA

"AS-BUILT"
(SIGNATURE) DATE 5/21/08
JOSEPH G. CRESTO P.E. NO. 45601
(PRINTED NAME)
MY REGISTRATION EXPIRES: 12/31/08 DISCIPLINE: CIVIL

NOLTE
BEYOND ENGINEERING
15090 AVENUE OF SCIENCE, SUITE 101 SAN DIEGO, CA. 92128
858.385.0500 TEL 858.385.9402 FAX WWW.NOLTE.COM

Construction contractor agrees that in accordance with generally accepted construction practices construction contractor will be required to assume sole and complete responsibility for job site conditions during the course of construction of the project including safety of all persons and property that this requirement shall be made to apply continuously and not be limited to normal working hours and construction contractor further agrees to defend, indemnify and hold design professional harmless from any and all liability, real or alleged, in connection with the performance of work on this project excepting liability arising from the sole negligence of design professional.

California Council of **Civil Engineers & Land Surveyors**

PG-651

CONSTRUCTION RECORD	REFERENCES	By	REVISIONS	Date	App'd
Contractor ERREGA'S INC.			A REMOVE PARCEL LINE, ADD BIO-FENCE, ADD FLOOD PLAIN LINE, ADD "NOT A PART"	9/1/04	Hy
Inspector MIKE SCHEDINE					
Date completed 3/17/08		SCE	AS-BUILT "CITY"	5/21/08	JDD

BENCHMARK
CITY OF CHULA VISTA BM # 1695
1 1/2" BRASS DISK AT SOUTH END OF INLET, EAST SIDE OF ROMA COURT, 1580'(±) WEST OF MAXWELL ROAD, ELEV. = 139.19 NAVD '88.

SCALE: Horizontal AS NOTED; Vertical N/A
Office ____ Field ____ Traffic ____

Designed By JAR | Drawn By JAR | Checked By --
Plans Prepared Under Supervision Of: James R. Hettinger, P.E.
Date 8-24-04 R.C.E. No. 31756

Submitted 8/26/04 By ____ Office
Approved 8/30/04 By ____ City Engineer

CITY OF CHULA VISTA PUBLIC WORKS DEPARTMENT
PLANS FOR THE GRADING OF:
650 MAIN STREET
AUTO PARK EXPANSION

Drawing No. 01027-06
Sheet 6 of 10
JOB NO. SD0460

AS-BUILT

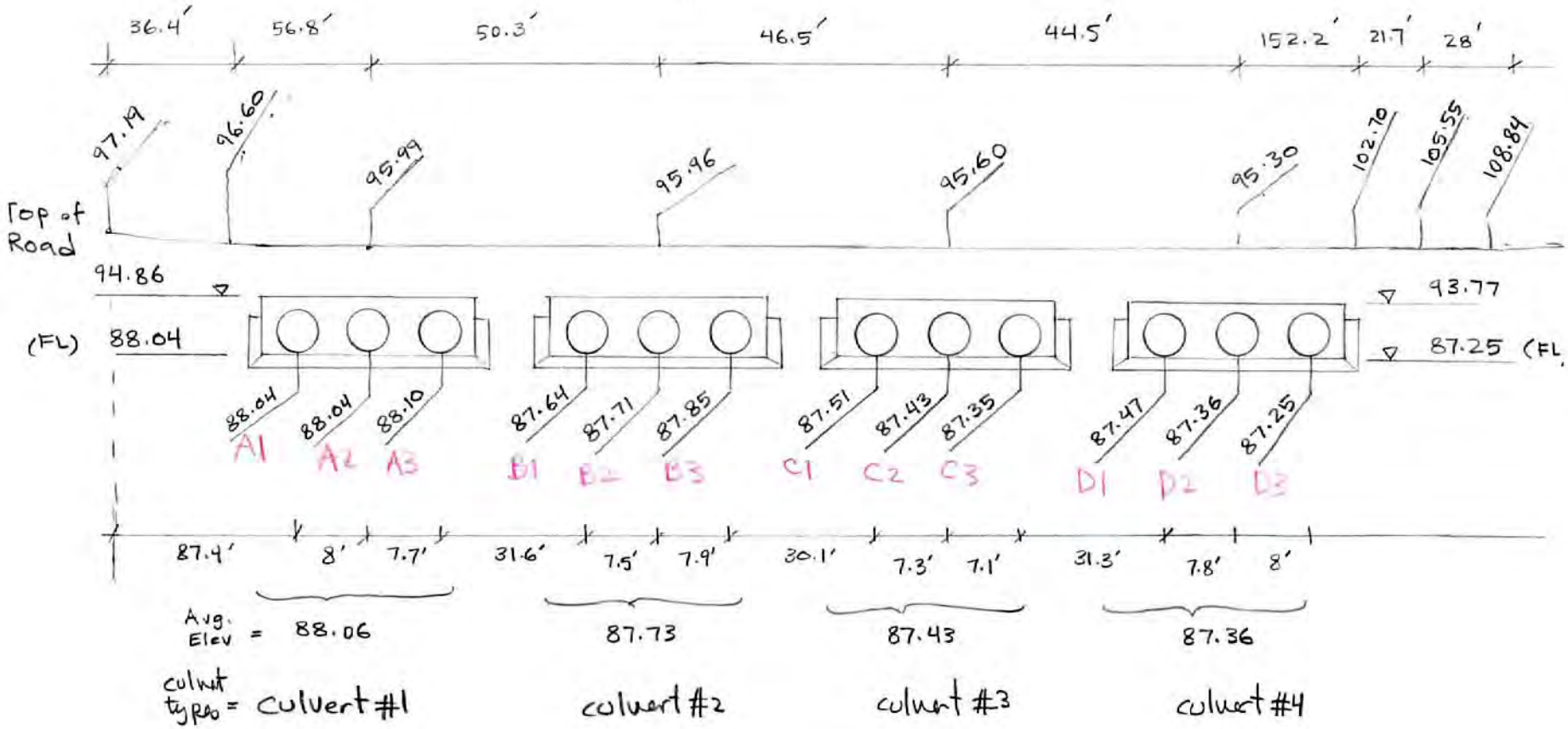
EMMA, EYTD, PRPN, RC, PRUT, RC, PRCN, RC, TBRC, PRUA, wetland_edge_051304, EXUT, EXPN
08/24/04 12:59 p:\Nt_\SD0460\CADD\R0200A\ GPS.DWG

Existing Culvert / Road Crossing

A survey was performed in May of 2015 for an existing culvert/road crossing which is located approximately 480 feet upstream of 805-Freeway. This culvert/road crossing doesn’t exist in the current Effective model. The schematic drawing of this culvert/road crossing can be found on the following pages.

Culvert Survey Summary - Upstream (NAVD)

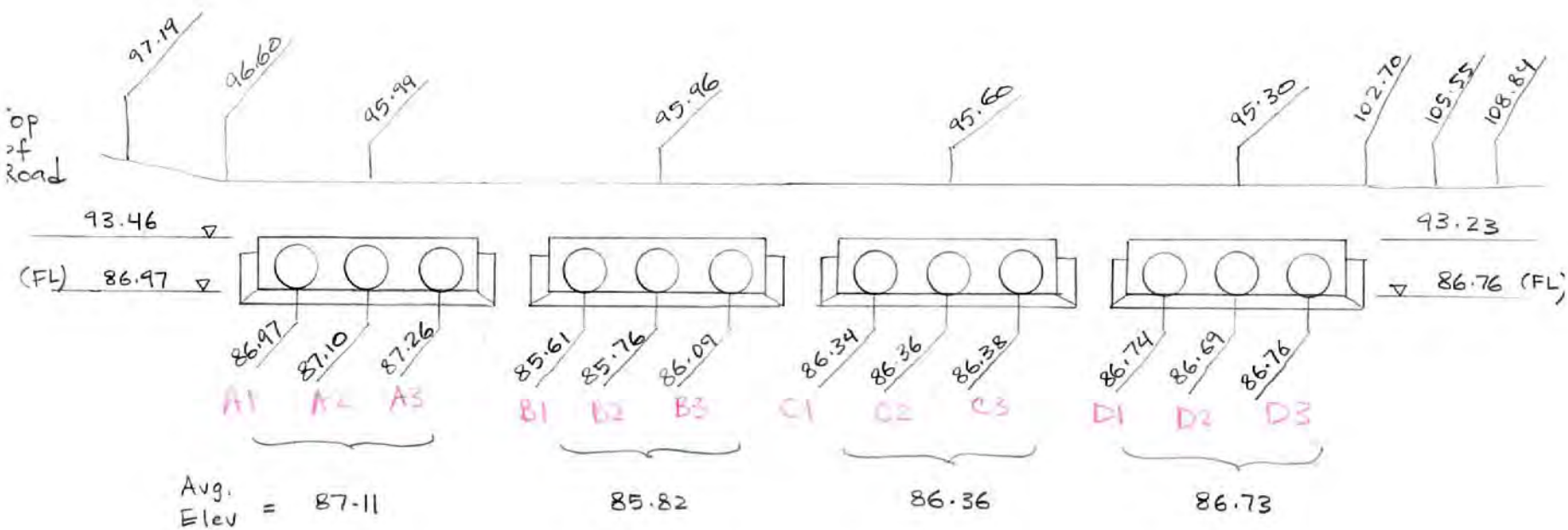
(looking DS)



circular culverts $\phi = 5$ feet (typical)

Culvert Survey Summary - Downstream (NAVD)

(looking DS)



Appendix 15

Proposed Grading Plans

SHINOHARA II BURN SITE

IMPROVEMENTS 2015

IN THE CITY OF CHULA VISTA, CALIFORNIA

DRAWING IS APPROXIMATELY HALF-SIZE AT 11x17

ISSUED FOR CONSTRUCTION

GRADING NOTES

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THESE APPROVED PLANS AND APPROVED REVISIONS. ANY CHANGES OR REVISIONS THEREFROM SHALL BE APPROVED BY THE CITY ENGINEER AND MITIGATION MONITOR PRIOR TO ANY REQUEST FOR INSPECTION.

2. ALL GRADING SHALL BE INSPECTED AND TESTED BY OR UNDER THE DIRECTION OF A QUALIFIED SOILS ENGINEER. THE SOILS ENGINEER SHALL: INSPECT THE EXCAVATION, AND SHALL OBSERVE AND TEST THE PLACEMENT, AND COMPACTION OF FILL AND BACKFILL AND COMPACTION OF TRENCHES; SUBMIT GEOTECHNICAL OR SOILS REPORTS AS REQUIRED AND DETERMINE THE SUITABILITY OF ANY FILL MATERIAL UPON COMPLETION OF GRADING OPERATIONS. THE SOILS ENGINEER SHALL STATE THAT OBSERVATIONS AND TESTS WERE MADE BY, OR UNDER DIRECTION OF THE SOILS ENGINEER, AND THAT EMBANKMENTS AND EXCAVATIONS WERE CONSTRUCTED IN ACCORDANCE WITH THE GEOTECHNICAL ASPECTS OF THE APPROVED GRADING PLANS, ANY APPROVED REVISIONS THERETO, SUBJECT LAND DEVELOPMENT PERMIT AND ORDINANCE NO. 1797 AS AMENDED, AND THAT ALL EMBANKMENTS AND EXCAVATIONS ARE ACCEPTABLE FOR THEIR INTENDED USE.

3. THE CONTRACTOR SHALL PROPERLY GRADE ALL EXCAVATED SURFACES TO PROVIDE POSITIVE DRAINAGE AND PREVENT PONDING OF WATER. CONTRACTOR SHALL CONTROL SURFACE WATER TO AVOID DAMAGE TO ADJOINING PROPERTIES OR TO FINISHED WORK ON THE SITE, AND SHALL TAKE REMEDIAL MEASURES TO PREVENT EROSION OF FRESHLY GRADED AREAS UNTIL SUCH TIME AS PERMANENT DRAINAGE AND EROSION CONTROL MEASURES HAVE BEEN INSTALLED TO THE SATISFACTION OF THE CITY ENGINEER AND THE MITIGATION MONITOR.

4. ALL AREAS TO BE FILLED SHALL BE PREPARED PRIOR TO FILLING, AND FILL SHALL BE PLACED IN ACCORDANCE WITH STANDARD SPECIFICATIONS AND THE RECOMMENDATIONS AND SPECIFICATIONS CONTAINED IN THE SOILS REPORT. ALL VEGETABLE MATTER AND OTHER OBJECTIONABLE MATERIALS SHALL BE REMOVED, BY THE CONTRACTOR, FROM THE SURFACE UPON WHICH THE FILL IS TO BE PLACED. LOOSE FILL AND UNSUITABLE SOILS SHALL BE REMOVED TO SUITABLE FIRM NATURAL GROUND. THE EXPOSED SOILS SHALL BE SCARIFIED IN ACCORDANCE WITH THE GEOTECHNICAL REPORT AND THEN COMPACTED TO A MINIMUM OF 90% OF ASTM-D1557. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PLACE, SPREAD, WATER AND COMPACT THE FILL IN STRICT ACCORDANCE WITH THE SPECIFICATIONS.

5. CUT AND FILL SLOPES SHALL BE CUT AND TRIMMED TO THE FINISHED GRADE TO PRODUCE SMOOTH SURFACES AND UNIFORM CROSS SECTIONS. THE SLOPES OF EXCAVATIONS AND EMBANKMENTS SHALL BE SHAPED, TRIMMED, AND PLANTED IN ACCORDANCE WITH THE PLANTING NOTES AND AS DIRECTED BY THE ENGINEER OF WORK, AND LEFT IN A NEAT AND ORDERLY CONDITION. ALL STONES, ROOTS AND OTHER WASTE MATERIALS EXPOSED ON THE EXCAVATION OR EMBANKMENT SLOPES WHICH ARE LIABLE TO BECOME LOOSENED, SHALL BE REMOVED AND DISPOSED OF. THE TOE AND TOP OF ALL SLOPES SHALL BE ROUNDED IN ACCORDANCE WITH ORDINANCE NO. 1797, THESE GRADING PLANS, AND THE STANDARD DRAWINGS CVDS 26 AND 27. SLOPE SETBACKS AND GRADES SHALL CONFORM TO CVDS 25.

6. IF THERE ARE EROSION SCARS ON EXISTING SLOPES WHICH OTHERWISE WOULD NOT BE ELIMINATED BY THE PROPOSED GRADING, THESE SCARS ARE TO BE ELIMINATED BY TRIMMING, FINE GRADING AND PLANTING. IF THE SCARS ARE IN AREAS OF NATIVE VEGETATION, THE REPAIRS SHOULD BE PERFORMED WITH AN EFFORT TO AVOID OR MINIMIZE IMPACTS TO NATIVE VEGETATION. ALL SUCH REPAIRS IN AREAS OF NATIVE VEGETATION SHALL BE REVIEWED AND APPROVED BY THE CITY'S MITIGATION MONITORING COORDINATOR PRIOR TO THE BEGINNING OF THE REPAIR WORK.

7. ALL TREES, BRUSH, GRASS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE COLLECTED, PILED OR OTHERWISE DISPOSED OF OFF THE SITE BY THE CONTRACTOR SO AS TO LEAVE THE AREAS THAT HAVE BEEN CLEARED WITH A NEAT AND FINISHED APPEARANCE FREE FROM UNSIGHTLY DEBRIS. APPROVAL OF LOCATIONS FOR DEBRIS FILL SHALL BE OBTAINED FROM THE SOILS ENGINEER PRIOR TO THE DISPOSAL OF ANY SUCH MATERIAL.

8. SUBDRAIN LOCATIONS SHOWN ARE APPROXIMATE AND ARE RECOMMENDED FOR ALL SIGNIFICANT FILL CANYONS. THE ACTUAL LOCATION AND EXTENT OF SUBDRAINS SHALL BE DETERMINED BY THE GEOTECHNICAL CONSULTANT AT THE TIME OF CONSTRUCTION.

9. BY REFERENCE HERE, THE REPORT (TITLE OF GEOTECHNICAL REPORT) ---------- PREPARED BY (GEOTECHNICAL CONSULTANT)---------- ON (DATE)---------- IS INCLUDED AS PART OF THESE PLANS.

10. CONTRACTOR SHALL VERIFY LOCATIONS OF ALL EXISTING UNDERGROUND UTILITIES. LOCATIONS SHOWN ON THESE PLANS ARE APPROXIMATE AND SHOWN FOR GENERAL INFORMATION ONLY.

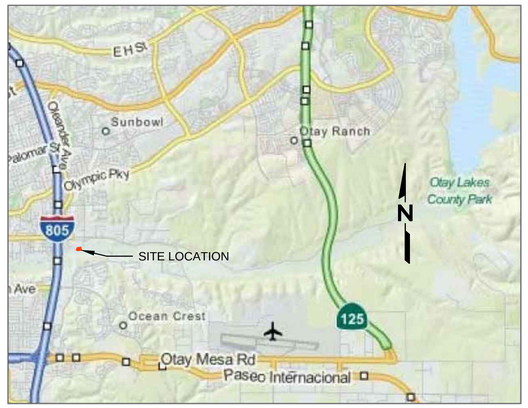
11. WHERE GRADING DOES NOT OCCUR, ALL EXISTING PLANT MATERIAL IS TO BE PROTECTED IN PLACE. NO CONSTRUCTION EQUIPMENT WILL BE ALLOWED TO TRAVEL THROUGH AND DAMAGE ANY OF THESE AREAS. ALL AREAS TO BE RETAINED IN A NATURAL CONDITION SHALL BE FENCED UNDER THE DIRECTION OF THE PROJECT BIOLOGIST. CONTRACTOR WILL BE RESPONSIBLE TO REPAIR ANY AND ALL DAMAGE/IMPACTS TO THESE AREAS.

12. THE CONTRACTOR SHALL FURNISH TO THE ENGINEER OF WORK AS-BUILT PLANS FOR ALL NEW IMPROVEMENTS AND GRADING SHOWN ON THESE PLANS FOR SUBMITTAL TO THE CITY ENGINEER FOR APPROVAL IN ACCORDANCE WITH SECTION 15.04.140 OF THE CHULA VISTA MUNICIPAL CODE.

13. IN THE CASE OF CONFLICTS, THE REQUIREMENTS OF THE EARTHWORK, SPECIFICATIONS PREPARED FOR THE PROJECT BY THE SOILS ENGINEER SHALL GOVERN THE REQUIREMENTS OF THIS PLAN AND THESE NOTES AND THESE PLANS SHALL BE REVISED ACCORDINGLY.

VICINITY MAP

N.T.S.



LOCATION MAP

N.T.S.

SHEET NO.	DESCRIPTION
1	TITLE SHEET – LOCATION MAP – GENERAL NOTES
2	SITE TOPOGRAPHIC MAP & SURVEY CONTROL
3	FOUNDATION GRADING PLAN
4	FOUNDATION GRADING SECTIONS
5	FINAL GRADING & DRAINAGE PLAN
6	FINAL GRADING SECTIONS & DETAILS
7	DRAINAGE SECTIONS & DETAILS

ASSESSOR'S PARCEL NUMBERS

644-042-10-00

644-042-02-00

EARTHWORK QUANTITIES

CUT: 2,800 CY

FILL: 33,900 CY

IMPORT: 31,100 CY

GENERAL NOTES

1. THE SOILS REPORT TITLED_____ FROM _____ (AS APPLICABLE) SHALL BE CONSIDERED TO BE PART OF THIS GRADING PLAN. ALL GRADING SHALL BE DONE IN ACCORDANCE WITH THE RECOMMENDATIONS AND SPECIFICATIONS CONTAINED IN SAID REPORT.

2. STORM DRAINS ARE SHOWN FOR INFORMATIONAL PURPOSES ONLY. APPROVAL OF THIS PLAN DOES NOT CONSTITUTE APPROVAL OF SIZES, LOCATIONS, AND TYPE OF SEWER AND DRAINAGE FACILITIES, OR ANY SURFACE IMPROVEMENTS WITHIN FUTURE STREET RIGHTS-OF-WAY SHOWN ON THESE PLANS. SEPARATE APPROVALS AND PERMITS FOR THESE SHALL BE REQUIRED IN CONJUNCTION WITH IMPROVEMENT PLANS.

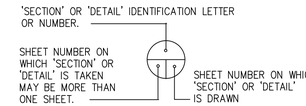
3. WRITTEN PERMISSION SHALL BE OBTAINED FOR ANY OFF-SITE GRADING.

4. CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS REQUIRED TO PROTECT ADJACENT PROPERTIES DURING GRADING OPERATIONS. ANYTHING DAMAGED OR DESTROYED SHALL BE REPLACED OR REPAIRED TO CONDITION EXISTING PRIOR TO GRADING.

5. THE DEVELOPER/CONTRACTOR SHALL BE RESPONSIBLE FOR SURVEY MOUNUMENTS AND/OR VERTICAL CONTROL BENCHMARKS WHICH ARE DISTRUBED OR DESTROYED BY CONSTRUCTION. A LAND SURVEYOR MUST FIELD LOCATE, REFERENCE, AND/OR PRESERVE ALL HISTORICAL PROPOSED IMPROVEMENTS; AND IF DESTROYED, A LANDSURVEYOR, OR A CIVIL ENGINEER AUTHORIZED TO PRACTICE LAND SURVEYING SHALL REPLACE SUCH MONUMENTS WITH THE APPROPRIATE MONUMENTS. A CORNER RECORD OR RECORD OF SURVEY, AS APPROPRIATE, SHALL BE FILED AS REQUIRED BY THE PROFESSIONAL LANDS SURVEYORS ACT. IF ANY VERTICAL CONTROL IS TO BE DISTURBED OR DESTROYED, THE CITY OF CHULA VISTA SURVEY SECTION MUST BE NOTIFIED, IN WRITING, AT LEAST THREE (3) DAYS PRIOR TO THE CONSTRUCTION. THE DEVELOPER/CONTRACTOR WILL BE RESPONSIBLE FOR THE COST OF REPLACING ANY VERTICAL CONTROL BENCHMARKS DESTROYED BY THE CONSTRUCTION.

SECTION AND DETAIL CROSS REFERENCING CONVENTION:

1. EXPLANATION OF 'SECTION' OR 'DETAIL' SYMBOL.



GENERAL NOTES (CONTINUED)

6. THE CONTRACTOR SHALL DESIGN, CONSTRUCT, AND MAINTAIN ALL SAFETY DEVICES, INCLUDING SHORING, AND SHALL BE RESPONSIBLE FOR CONFORMING TO ALL LOCAL, STATE, AND FEDERAL SAFETY AND HEALTH STANDARDS, LAWS, AND REGULATIONS.

7. ALL FLOWS SHOWN ARE FOR 100-YEAR STORM.

8. ALL SEDIMENTATION BASINS, OUTLET PIPES AND DITCHES ARE PRIVATE UNLESS OTHERWISE NOTED AND HAVE NOT BEEN REVIEWED FOR ADEQUACY BY THE CITY ENGINEERING DEPARTMENT.

9. THE OWNER MUST OBTAIN AN EXCAVATION PERMIT FROM THE DIVISION OF OCCUPATIONAL SAFETY AND HEALTH (D.O.S.H.) FOR CONSTRUCTION OF TRENCHES OR EXCAVATIONS WHICH ARE FIVE FEET OR DEEPER INTO WHICH A PERSON IS REQUIRED TO DESCEND. SAID PERMIT IS REQUIRED PRIOR TO ISSUANCE OF A GRADING PERMIT BY THE CITY OF CHULA VISTA.

10. GRADING EQUIPMENT SHALL NOT USE OR BLOCK TRAFFIC LANES DURING GRADING ACTIVITY, TRUCK OPERATIONS IN AND OUT OF CONSTRUCTION AND STAGING AREAS SHALL BE CONTROLLED AS REQUIRED BY THE CITY. TRUCK AND EQUIPMENT ROUTES IN AND OUT OF THE SITE, SHALL BE APPROVED BY THE CITY PRIOR TO START OF WORK. AT THE END OF THE WORKING DAY, STREETS SHALL BE CLEANED OF DIRT AND CONSTRUCTION DEBRIS TO THE SATISFACTION OF THE CITY INSPECTOR AND THE MITIGATION MONITOR.

11. DUST GENERATED BY CONSTRUCTION ACTIVITIES SHALL COMPLY WITH LOCAL DUST CONTROL, ANY REQUIREMENTS OF ANY MITIGATION MONITORING PROGRAMS, AND UNIFORM BUILDING CODE (UBC) REQUIREMENTS, WHICH INCLUDE DUST CONTROL MEASURES FOR CONSTRUCTION SITES. DUST REDUCING MEASURES SHALL INCLUDE, BUT NOT LIMITED TO, REGULAR WATERING OF GRADED SURFACES AND RESTRICTION OF ALL CONSTRUCTION VEHICLES AND EQUIPMENT TO TRAVEL ALONG ESTABLISHED AND REGULARLY

CERTIFICATES

OWNERS CERTIFICATE

IT IS AGREED THAT FIELD CONDITIONS MAY REQUIRE CHANGES TO THESE PLANS. IT IS FURTHER AGREED THAT THE OWNER (DEVELOPER) SHALL HAVE THE ENGINEER OF WORK MAKE SUCH CHANGES, ALTERATIONS OR ADDITIONS TO THESE PLANS WHICH THE ENGINEER OF WORK DETERMINES ARE NECESSARY AND DESIRABLE FOR THE PROPER COMPLETION OF THE IMPROVEMENTS. ALL PLAN CHANGES SHALL BE APPROVED BY THE CITY ENGINEER PRIOR TO CONSTRUCTION.

I FURTHER AGREE TO COMMENCE WORK ON ANY IMPROVEMENTS SHOWN ON THESE PLANS WITHIN EXISTING CITY RIGHT-OF-WAY WITHIN 60 DAYS AFTER ISSUANCE OF THE CONSTRUCTION PERMIT AND TO PURSUE SUCH WORK ACTIVELY ON EVERY NORMAL WORKING DAY UNTIL COMPLETED, IRRESPECTIVE AND INDEPENDENT OF ANY OTHER WORK ASSOCIATED WITH THIS PROJECT OR UNDER MY CONTROL.

NAME:

ADDRESS:

PHONE:

BY: _____ DATE: _____

DECLARATION OF RESPONSIBLE CHARGE

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXECISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS. I UNDERSTAND THAT THE CHECK OF THE PROJECT DRAWINGS AND SPECIFICATIONS BY THE CITY OF CHULA VISTA AND WATER DISTRICT IS CONFINED TO REVIEW ONLY AND DOES NOT RELIEVE ME AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR THE PROJECT DESIGN.

SCS ENGINEERS
9383 CHARLES SMITH AVENUE
RANCHO CUCAMONGA, CA 91730

BY: _____ RCE No. 25390 DATE 5/1/15

NOTIFICATIONS

1. THE EXISTENCE AND LOCATION OF UNDERGROUND UTILITY PIPES AND STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF AVAILABLE RECORD, TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN HEREON, HOWEVER, THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT ANY EXISTING UTILITIES OR STRUCTURES LOCATED AT THE WORK SITE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT UNDERGROUND SERVICE ALERT (PHONE 1-800-422-4133) TWO (2) WORKING DAYS IN ADVANCE OF ANY EXCAVATION FOR THE MARK OUT OF THE LOCATION OF UTILITIES AND NOTIFICATION OF COMMENCEMENT OF WORK.

FOR ANY QUESTIONS REGARDING THE MARK OUT OF UNDERGROUND UTILITIES, THE CONTRACTOR SHOULD CONTACT THE RESPECTIVE UTILITY COMPANY:

STREET LIGHT OR SIGNAL LIGHT CONDUIT CITY OF CHULA VISTA (619) 397-6163
SEWER OR STORM DRAIN CITY OF CHULA VISTA
VERIFICATION (619) 691-5024
NOTIFICATION (619) 397-6000
GAS & ELECTRIC SAN DIEGO GAS & ELECTRIC CO. 1-800-227-2600
(619) 230-7800
WATER OTAY WATER DISTRICT (619) 670-2222
SWEETWATER AUTHORITY (619) 420-1413
TELEPHONE PACIFIC BELL (619) 266-4683
TELEVISION COX CABLE OF SAN DIEGO/CHULA VISTA CABLE (619) 263-9251 (619) 476-0177
ULTRONICS & WORLDWIDE SATELLITE (619) 422-0776

2. CONTRACTOR SHALL NOTIFY THE CITY ENGINEER'S OFFICE (PHONE 619- 585-5737) AND THE MITIGATION MONITOR AT THE PLANNING DIVISION (PHONE 619- 691-5101) 48 HOURS (2 WORKING DAYS) PRIOR TO BEGINNING ANY WORK ON THIS PROJECT.

3. THE CONTRACTOR SHALL GIVE 24 HOURS (ONE WORKING DAY) NOTICE ON CALLS FOR INSPECTION. PHONE: (619) 397-6128.

4. ALL WORK PERFORMED WITHOUT BENEFIT OF INSPECTION SHALL BE SUBJECT TO REJECTION AND REMOVAL AT CONTRACTOR'S EXPENSE.

LANDSCAPING NOTES

1. ALL SLOPES SHALL BE PLANTED AND IRRIGATED IN ACCORDANCE WITH PLANS APPROVED BY THE CITY OF CHULA VISTA DIRECTOR OF PARKS AND RECREATION AND CITY ENGINEER. PLANS SHALL CONFORM TO THE CITY OF CHULA VISTA LANDSCAPE MANUAL AND ORDINANCE NO. 1797, BOTH AS AMENDED.

2. FINISH GRADING AND PLANTING SHALL BE ACCOMPLISHED ON ALL SLOPES PRIOR TO OCTOBER 1 OR IMMEDIATELY UPON COMPLETION OF ANY SLOPES GRADED BETWEEN OCTOBER 1 AND APRIL 1. PADS OR OTHER RELATIVELY LEVEL AREAS SHALL BE PLANTED AS DIRECTED BY THE CITY'S DIRECTOR OF PARKS AND RECREATION.

3. PRIOR TO GRADING, CONTRACTOR SHALL FIELD VERIFY EXISTING IRRIGATION SYSTEMS TO DETERMINE WHICH ARE OPERABLE. UNLESS OTHERWISE NOTED ON THESE PLANS, ALL EXISTING IRRIGATION SYSTEMS ARE TO BE PROTECTED IN PLACE AND REMAIN OPERABLE, PARKS AND RECREATION DEPARTMENT (LANDSCAPING COORDINATION NAME AND PHONE NO., PER SEC. 5-300).

BOND INFORMATION

Bond Company _____

Bond No. _____ Bond Amount _____

AS BUILT

_____ DATE _____
SIGNATURE

_____ P.E. No. _____
Printed Name
My Registration Expires _____ Discipline _____

UTILITY NOTE

ALL EXISTING UTILITIES SHOWN ON THESE PLANS ARE PLOTTED FROM RECORD DATA AT THEIR APPROXIMATE LOCATIONS. UNDERGROUND FACILITIES MAY EXIST WHICH HAVE NOT BEEN REPORTED OR ARE NOT OF RECORD. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL PERTINENT UTILITIES IN THE FIELD PRIOR TO THE START OF CONSTRUCTION.

"ENGINEER OF WORK CERTIFICATE"

I HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF, THE IMPROVEMENTS SHOWN ON THIS SET OF PLANS (SHEET 1 THROUGH SHEETS 7) HAVE BEEN INSTALLED AND CONSTRUCTED IN SUBSTANTIAL CONFORMANCE WITH THE SAID PLANS, ALL APPROPRIATE STANDARDS AND ANY DISCRETIONARY APPROVAL(S) FOR THE PROJECT.

SIGNED: _____ DATE: _____

PRINTED NAME: _____ P.E. No._____

DISCIPLINE: _____ MY REGISTRATION EXPIRES: _____

CONSTRUCTION RECORD	REFERENCES	By	REVISIONS	Date	App'd
CONTRACTOR:					
INSPECTOR:					
DATE COMPLETED:					

DATUM	SCALE
VERTICAL DATUM: NAVD88	HORIZONTAL
HORIZONTAL DATUM: NAD83	AS SHOWN
	VERTICAL

Designed By: | Drawn By: | Checked By:

Plans Prepared Under Supervision Of: Date:

_____ R.C.E. No._____

Submitted: _____
By: _____
Planning: | Landscape:

Approved: _____
By: For the City Engineer

TITLE SHEET – LOCATION MAP – GENERAL NOTES

CITY OF CHULA VISTA DEVELOPMENT SERVICES DEPARTMENT

SHINOHARA II BURN SITE

IMPROVEMENTS 2015

DRAWING NO. 1 of 7

W.O. No.

N

GRAPHIC SCALE
0 50 100
SCALE IN FEET

DRAWING IS HALF-SIZE AT 11x17

REGISTERED PROFESSIONAL ENGINEER
AMIR ROOK-LAYTON MCCANDLESS
25390
EXP 12-31-15
CIVIL
STATE OF CALIFORNIA

LEGEND

90	EXISTING MAJOR GRADES
	EXISTING MINOR GRADES
	APPROXIMATE REFUSE DISPOSAL LIMIT

HORIZONTAL & VERTICAL CONTROL

THE BASIS OF HORIZONTAL CONTROL FOR THIS SURVEY IS THE NORTH AMERICAN DATUM OF 1983. PLANE COORDINATES SHOWN HEREON ARE IN TERMS OF THE CALIFORNIA STATE PLANE COORDINATE SYSTEM OF 1983, ZONE 6 BASED LOCALLY ON CITY OF CHULA VISTA POINTS 1355 & 1356.

1355	1,798,506.190	6,321,589.860	191.640
1356	1,798,384.884	6,325,239.590	242.385

THE BASIS OF VERTICAL CONTROL FOR THIS SURVEY IS THE CITY OF CHULA VISTA VERTICAL CONTROL NETWORK BASED LOCALLY ON NAVD 88 AT POINT No. 1356 ELEVATION 242.385.

DATE OF SURVEY: 10/30/2012

TOPOGRAPHIC SURVEY WAS PERFORMED BY
ALYSON CONSULTING OF SAN DIEGO, CA 92110
(619) 851-3331, (619) 333-9735
ALYSONCONSULTING.COM

ISSUED FOR CONSTRUCTION

AS BUILT	UTILITY NOTE
SIGNATURE _____ DATE _____	ALL EXISTING UTILITIES SHOWN ON THESE PLANS ARE PLOTTED FROM RECORD DATA AT THEIR APPROXIMATE LOCATIONS. UNDERGROUND FACILITIES MAY EXIST WHICH HAVE NOT BEEN REPORTED OR ARE NOT OF RECORD. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL PERTINENT UTILITIES IN THE FIELD PRIOR TO THE START OF CONSTRUCTION.
Printed Name _____ P.E. No. _____	
My Registration Expires _____ Discipline _____	

CONSTRUCTION RECORD	REFERENCES	By	REVISIONS	Date	App'd
CONTRACTOR:					
INSPECTOR:					
DATE COMPLETED:					

DATUM	SCALE	Designed By:	Drawn By:	Checked By:
VERTICAL DATUM: NAVD88	HORIZONTAL			
HORIZONTAL DATUM: NAD83	AS SHOWN	Plans Prepared Under Supervision Of:	Date:	
	VERTICAL	R.C.E. No.		

Submitted: _____ By: _____ Planning: Landscape:

Approved: _____ By: For the City Engineer

SITE TOPOGRAPHIC MAP & SURVEY CONTROL

CITY OF CHULA VISTA DEVELOPMENT SERVICES DEPARTMENT

SHINOHARA II BURN SITE

IMPROVEMENTS 2015

DRAWING NO. 2 of 7

W.O. No.

ISSUED FOR CONSTRUCTION

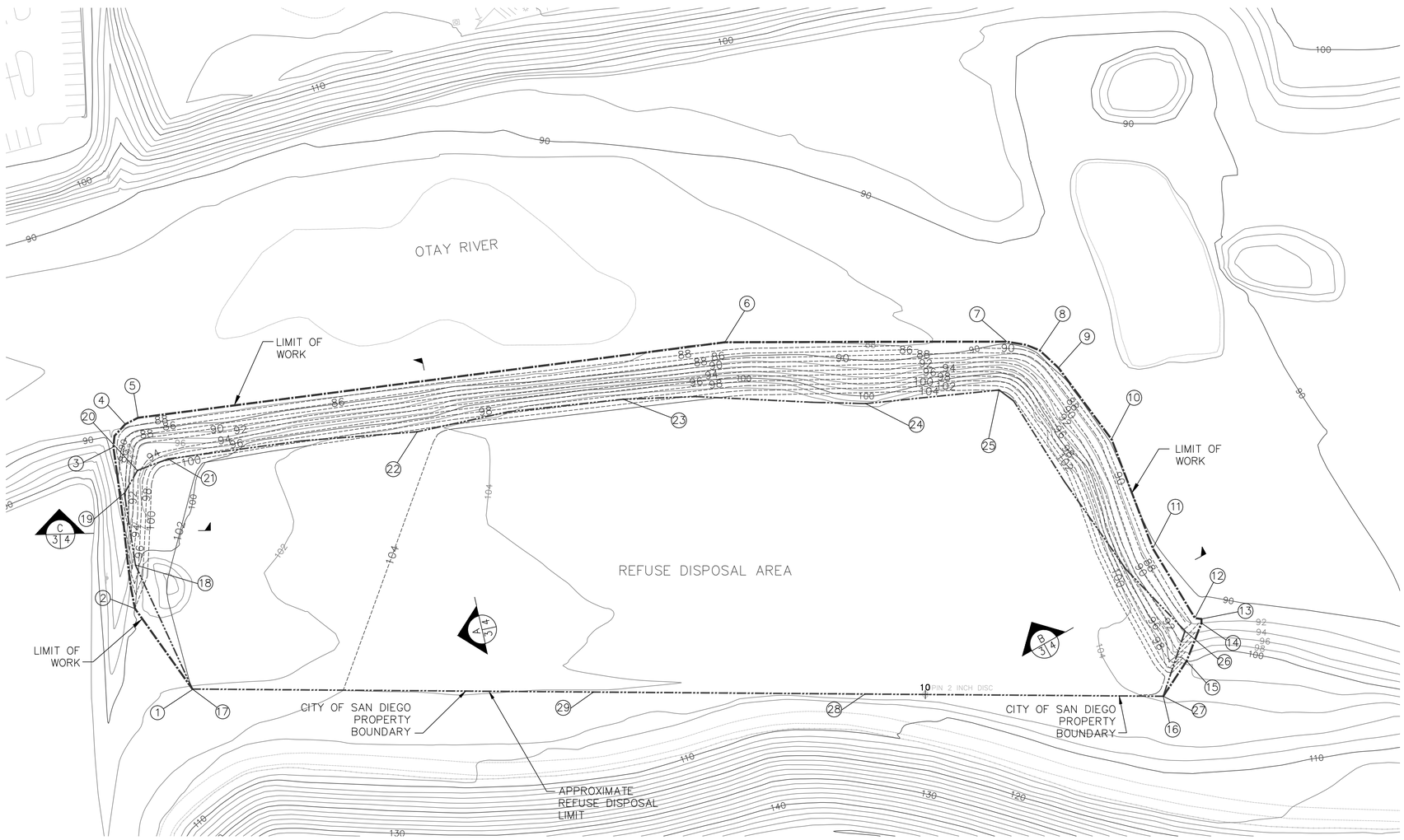
DRAWING IS APPROXIMATELY HALF-SIZE AT 11x17

N

GRAPHIC SCALE
0 50 100
SCALE IN FEET

LEGEND

- 102 — EXISTING MINOR GRADES
- 110 — EXISTING MAJOR GRADES
- 104 — FINAL FOUNDATION FILL GRADES
- 92 — FINAL FOUNDATION EXCAVATION GRADES
- LIMIT OF WORK
- APPROXIMATE REFUSE DISPOSAL LIMIT



WORK LIMIT BOUNDARY TABLE

NO.	X	Y
1	6320774.92	1795790.45
2	6320725.52	1795859.67
3	6320706.97	1795998.49
4	6320717.21	1796018.27
5	6320728.14	1796023.77
6	6321232.49	1796088.71
7	6321474.89	1796089.24
8	6321503.21	1796081.73
9	6321519.27	1796066.75
10	6321565.04	1796005.07
11	6321600.48	1795911.29
12	6321636.59	1795851.52
13	6321642.23	1795850.72
14	6321642.19	1795847.19
15	6321629.45	1795814.56
16	6321609.36	1795784.28

REFUSE LIMIT BOUNDARY TABLE

NO.	X	Y
17	6320774.92	1795790.45
18	6320725.96	1795897.17
19	6320716.37	1795959.04
20	6320727.63	1795978.46
21	6320754.07	1795988.97
22	6320968.36	1796012.31
23	6321145.09	1796049.82
24	6321353.50	1796035.98
25	6321468.26	1796047.66
26	6321628.07	1795840.39
27	6321609.36	1795784.28
28	6321353.05	1795792.21
29	6321119.68	1795787.91

HORIZONTAL & VERTICAL CONTROL

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1355 1,798,506.190 6,321,589.860 191.640
1356 1,798,384.884 6,325,239.590 242.385

THE BASIS OF VERTICAL CONTROL FOR THIS SURVEY IS THE CITY OF CHULA VISTA VERTICAL CONTROL NETWORK BASED LOCALLY ON NAVD 88 AT POINT No. 1356 ELEVATION 242.385.

DATE OF SURVEY: 10/30/2012

TOPOGRAPHIC SURVEY WAS PERFORMED BY ALYSON CONSULTING OF SAN DIEGO, CA 92110 (619) 851-3331, (619) 333-9735 ALYSONCONSULTING.COM

AS BUILT	UTILITY NOTE
SIGNATURE ____ DATE ____ P.E. No. ____ Printed Name ____ My Registration Expires ____ Discipline ____	ALL EXISTING UTILITIES SHOWN ON THESE PLANS ARE PLOTTED FROM RECORD DATA AT THEIR APPROXIMATE LOCATIONS. UNDERGROUND FACILITIES MAY EXIST WHICH HAVE NOT BEEN REPORTED OR ARE NOT OF RECORD. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL PERTINENT UTILITIES IN THE FIELD PRIOR TO THE START OF CONSTRUCTION.

FOUNDATION GRADING PLAN

CONSTRUCTION RECORD	REFERENCES	By	REVISIONS	Date	App'd
CONTRACTOR:					
INSPECTOR:					
DATE COMPLETED:					

DATUM: VERTICAL DATUM: NAVD88 HORIZONTAL DATUM: NAD83

SCALE: HORIZONTAL / AS SHOWN / VERTICAL

Designed By: ____ Drawn By: ____ Checked By: ____

Plans Prepared Under Supervision Of: ____ Date: ____ R.C.E. No. ____

Submitted: ____ By: ____ Planning: ____ Landscape: ____

Approved: ____ By: ____ For the City Engineer

CITY OF CHULA VISTA DEVELOPMENT SERVICES DEPARTMENT

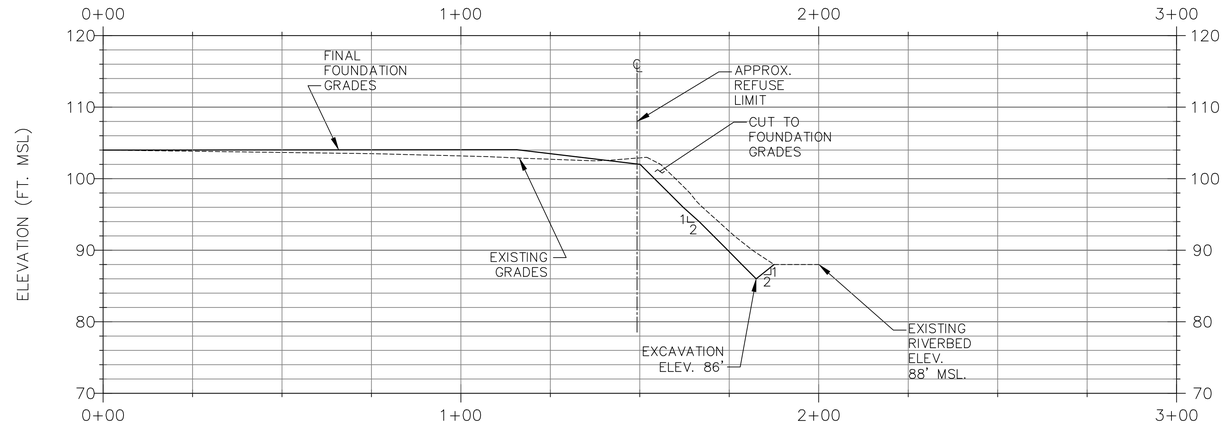
SHINOHARA II BURN SITE

IMPROVEMENTS 2015

DRAWING NO. 3 of 7

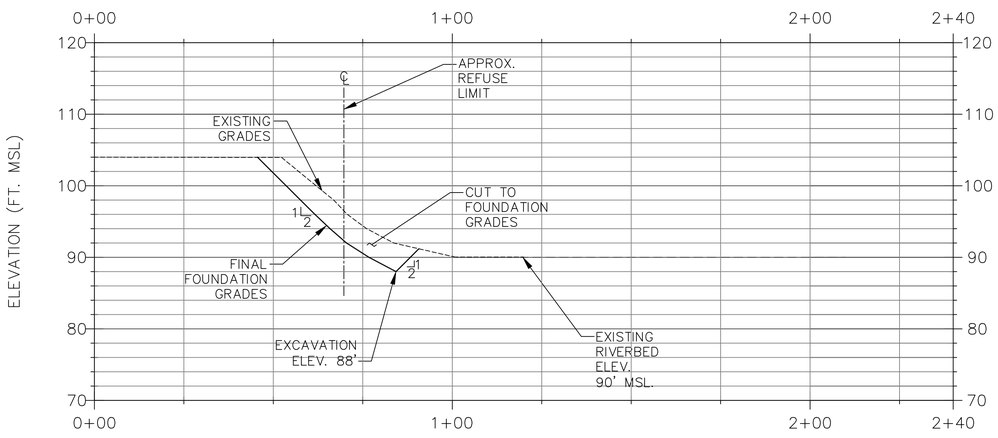
W.O. No.

DRAWING IS APPROXIMATELY HALF-SIZE AT 11x17



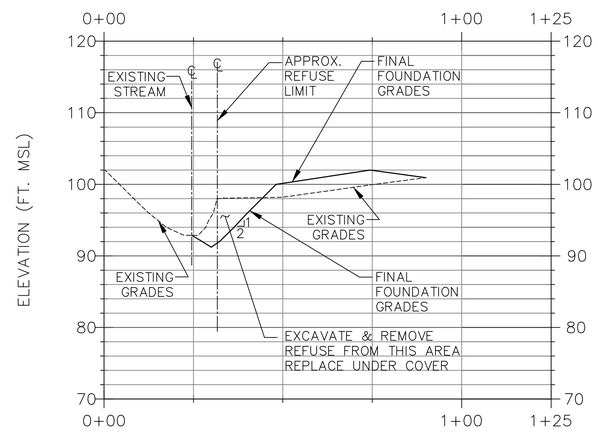
SECTION -- FINAL FOUNDATION GRADES NORTH TO SOUTH (A / 3 | 4)

SCALE: H: 1"=20'
V: 1"=10'



SECTION -- FINAL FOUNDATION GRADES EASTERN SLOPE (B / 3 | 4)

SCALE: H: 1"=20'
V: 1"=10'



SECTION -- FINAL FOUNDATION GRADES IN STREAM AREA (C / 3 | 4)

SCALE: H: 1"=20'
V: 1"=10'

ISSUED FOR CONSTRUCTION

AS BUILT	UTILITY NOTE
SIGNATURE _____ DATE _____ Printed Name _____ P.E. No. _____ My Registration Expires _____ Discipline _____	ALL EXISTING UTILITIES SHOWN ON THESE PLANS ARE PLOTTED FROM RECORD DATA AT THEIR APPROXIMATE LOCATIONS. UNDERGROUND FACILITIES MAY EXIST WHICH HAVE NOT BEEN REPORTED OR ARE NOT OF RECORD. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL PERTINENT UTILITIES IN THE FIELD PRIOR TO THE START OF CONSTRUCTION.

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CONTRACTOR:					
INSPECTOR:					
DATE COMPLETED:					

DATUM: VERTICAL DATUM: NAVD88; HORIZONTAL DATUM: NAD83

SCALE: HORIZONTAL / AS SHOWN / VERTICAL

Designed By: | Drawn By: | Checked By:

Plans Prepared Under Supervision Of: _____ Date: _____ R.C.E. No. _____

Submitted: _____ By: _____ Planning: | Landscape:

Approved: _____ By: For the City Engineer

FOUNDATION GRADING SECTIONS

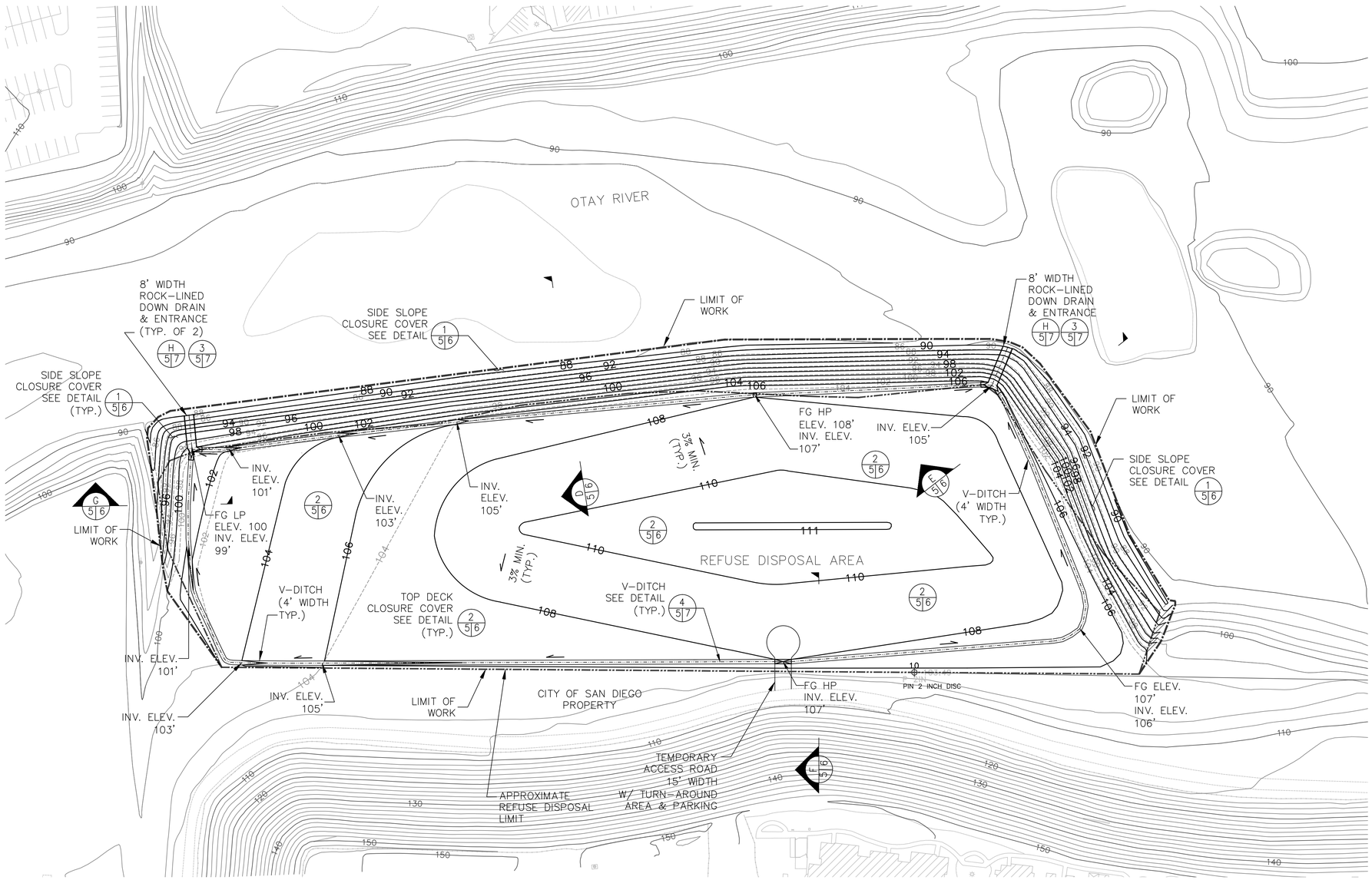
CITY OF CHULA VISTA DEVELOPMENT SERVICES DEPARTMENT

SHINOHARA II BURN SITE

IMPROVEMENTS 2015

DRAWING NO. 4 of 7

W.O. No.



N

GRAPHIC SCALE
0 50 100
SCALE IN FEET

DRAWING IS APPROXIMATELY HALF-SIZE AT 11x17

LEGEND

- 108 — FINAL GRADING CONTOURS
- 110 — EXISTING MAJOR GRADES
- 104 — FINAL FOUNDATION FILL GRADES
- 88 — FINAL FILL EXCAVATION CONTOURS
- LIMIT OF WORK
- V-DITCH
- DRAINAGE DIRECTION
- APPROXIMATE REFUSE DISPOSAL LIMIT

HORIZONTAL & VERTICAL CONTROL

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DATE OF SURVEY: 10/30/2012

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REGISTERED PROFESSIONAL ENGINEER ANDRONE LAYTON McCANDLY 25390 EXP. 12-31-15 CIVIL STATE OF CALIFORNIA

ISSUED FOR CONSTRUCTION

AS BUILT	UTILITY NOTE
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P.E. No. ____	
Printed Name ____ My Registration Expires ____ Discipline ____	

CONSTRUCTION RECORD	REFERENCES	By	REVISIONS	Date	App'd
CONTRACTOR:					
INSPECTOR:					
DATE COMPLETED:					

DATUM: VERTICAL DATUM: NAVD88; HORIZONTAL DATUM: NAD83

SCALE: HORIZONTAL AS SHOWN; VERTICAL

Designed By: | Drawn By: | Checked By:

Plans Prepared Under Supervision Of: ____ Date: ____ R.C.E. No. ____

Submitted: ____ By: ____ Planning: ____ Landscape: ____

Approved: ____ By: ____ For the City Engineer

FINAL GRADING & DRAINAGE PLAN

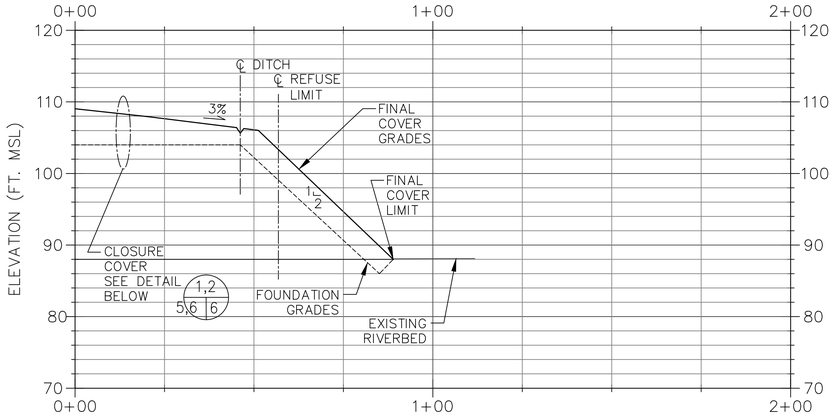
CITY OF CHULA VISTA DEVELOPMENT SERVICES DEPARTMENT

SHINOHARA II BURN SITE

IMPROVEMENTS 2015

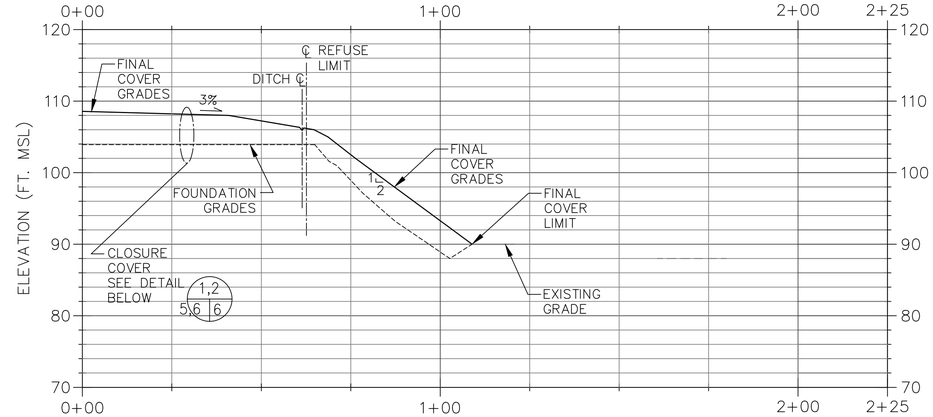
DRAWING NO. 5 of 7

W.O. No.



SECTION -- FINAL GRADING SOUTH TO NORTH (D / 5 6)

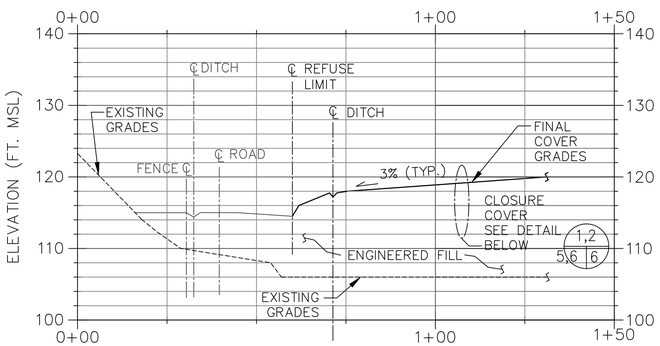
SCALE: H: 1"=20'
V: 1"=10'



SECTION -- FINAL GRADING EASTERN SLOPE (E / 5 6)

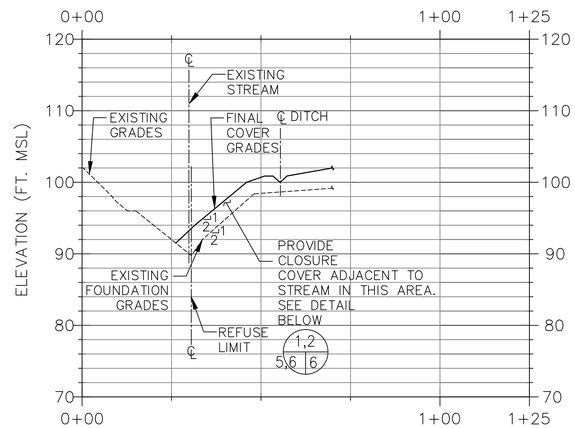
SCALE: H: 1"=20'
V: 1"=10'

DRAWING IS APPROXIMATELY HALF-SIZE AT 11x17



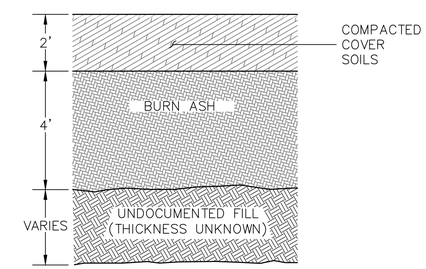
SECTION -- FINAL GRADING SOUTHERN SLOPE (F / 5 6)

SCALE: H: 1"=20'
V: 1"=10'



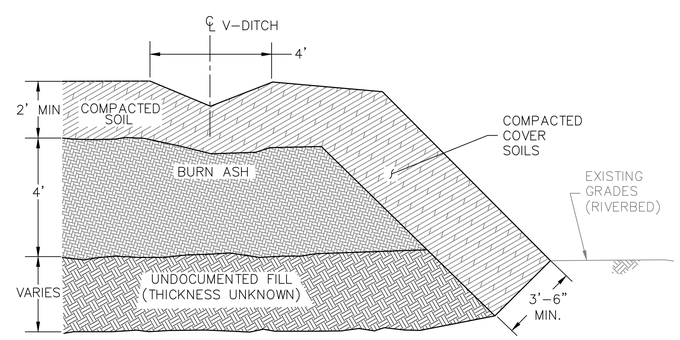
SECTION -- FINAL GRADING WESTERN SLOPE (G / 5 6)

SCALE: H: 1"=20'
V: 1"=10'



DETAIL -- TOP DECK CLOSURE COVER (2 / 5,6 6)

NTS



DETAIL -- SIDE-SLOPE CLOSURE COVER (1 / 5,6 6)

NTS

ISSUED FOR CONSTRUCTION

AS BUILT	UTILITY NOTE
SIGNATURE ____ DATE ____ Printed Name ____ P.E. No. ____ My Registration Expires ____ Discipline ____	ALL EXISTING UTILITIES SHOWN ON THESE PLANS ARE PLOTTED FROM RECORD DATA AT THEIR APPROXIMATE LOCATIONS. UNDERGROUND FACILITIES MAY EXIST WHICH HAVE NOT BEEN REPORTED OR ARE NOT OF RECORD. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL PERTINENT UTILITIES IN THE FIELD PRIOR TO THE START OF CONSTRUCTION.

CONSTRUCTION RECORD	REFERENCES	By	REVISIONS	Date	App'd
CONTRACTOR:					
INSPECTOR:					
DATE COMPLETED:					

DATUM: VERTICAL DATUM: NAVD88; HORIZONTAL DATUM: NAD83

SCALE: HORIZONTAL / AS SHOWN / VERTICAL

Designed By: | Drawn By: | Checked By:

Plans Prepared Under Supervision Of: ____ Date: ____ R.C.E. No. ____

Submitted: ____ By: ____ Planning: ____ Landscape: ____

Approved: ____ By: For the City Engineer

FINAL GRADING SECTIONS & DETAILS

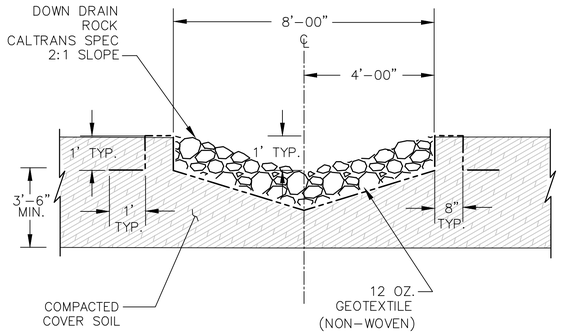
CITY OF CHULA VISTA DEVELOPMENT SERVICES DEPARTMENT

SHINOHARA II BURN SITE

IMPROVEMENTS 2015

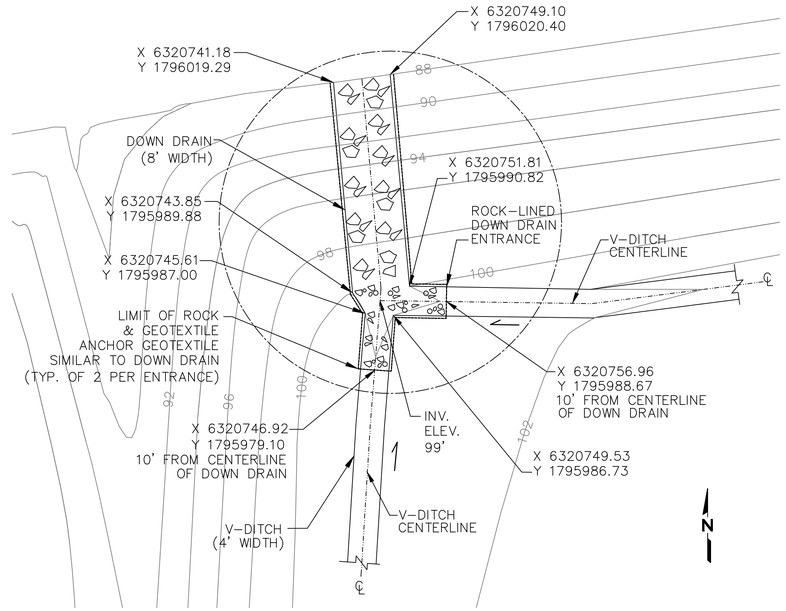
DRAWING NO. 6 of 7

W.O. No.

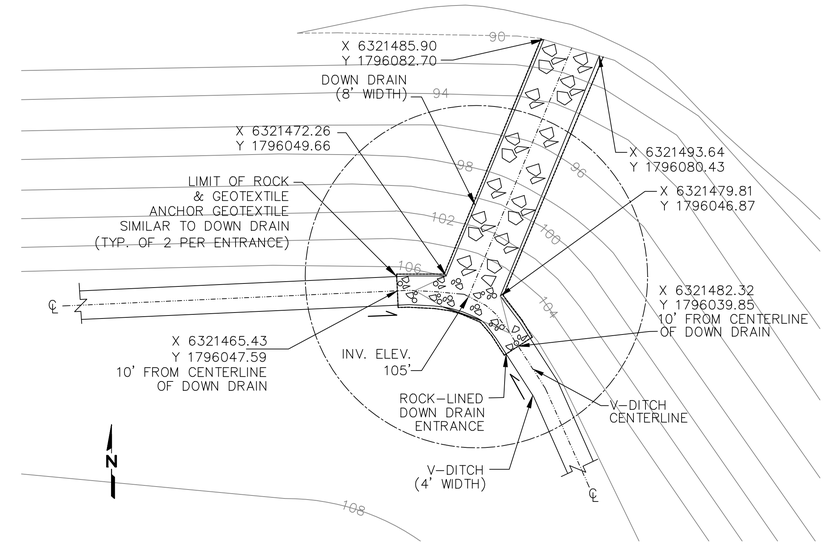


SECTION -- DOWN DRAIN (H 5|7)

NTS



NORTHWEST DOWN DRAIN



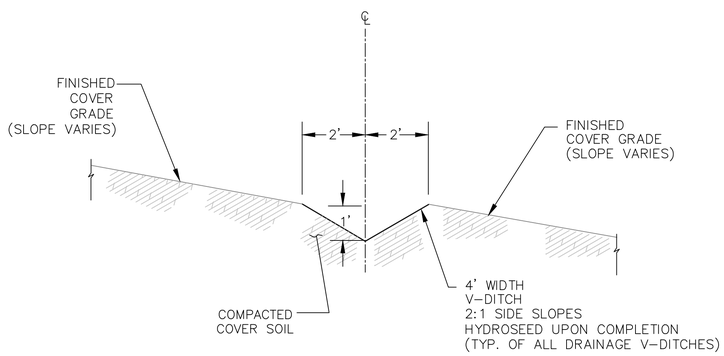
NORTHEAST DOWN DRAIN

CONSTRUCTION NOTES:

1. DOWN DRAIN ENTRANCES SHALL BE DITCH WIDTH BY 10' LENGTH (MIN.).
2. LENGTH SHALL BE MEASURED ALONG DITCH CENTERLINE.
3. DRAINAGE V-DITCH ENTRANCES TO DOWN DRAIN SHALL BE LINED WITH 12 OZ. NON-WOVEN GEOTEXTILE.
4. ANY V-DITCH ENTRANCE SHALL BE ROCK-LINED USING CALTRANS SPECIFIED MATERIAL FOR 5% MIN SLOPE.

DETAIL -- DOWN DRAIN & ENTRANCE (3 5|7)

1"=10'



DETAIL -- UNLINED V-DITCH (4 5|7)

NTS

GENERAL NOTES:

1. REMOVE SHRUBS AND TREES FROM SURFACE OF REFUSE DISPOSAL AREA TOP DECK AND SIDE SLOPES.
2. DISK AND COMPACT THE SURFACE OF THE REFUSE DISPOSAL AREA AND 10 FEET BEYOND. COMPACT TO MINIMUM 95 PERCENT OF MAXIMUM DRY DENSITY BY ASTM D698.
3. IMPORT, PLACE AND COMPACT TWO FEET OF SOIL OVER TOP DECK AND 3.5 FEET OVER SIDE SLOPE TO MINIMUM 95 PERCENT OF MAXIMUM DRY DENSITY BY ASTM D698.
4. IMPORT SOIL SHALL BE SILTY SAND (SM) OR SANDY CLAY (SC) WITH MINIMUM OF 30 PERCENT PASSING 200 SIEVE.
5. ROCK SHALL BE CALTRANS SPEC FOR DOWN DRAINS AND DOWN DRAIN ENTRANCES.

REGISTERED PROFESSIONAL ENGINEER
MICHAEL ANTHONY MCCARDLE
25390
EXP 12-31-15
CIVIL
STATE OF CALIFORNIA

DRAWING IS APPROXIMATELY HALF-SIZE AT 11x17

ISSUED FOR CONSTRUCTION

AS BUILT	UTILITY NOTE
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Printed Name ____ P.E. No. ____	
My Registration Expires ____ Discipline ____	

CONSTRUCTION RECORD	REFERENCES	By	REVISIONS	Date	App'd	DATUM	SCALE	Designed By:	Drawn By:	Checked By:	Submitted:	Approved:	CITY OF CHULA VISTA DEVELOPMENT SERVICES DEPARTMENT	DRAWING NO.
CONTRACTOR:						VERTICAL DATUM: NAVD88	HORIZONTAL				By:	For the City Engineer	DRAINAGE SECTIONS & DETAILS	
INSPECTOR:						HORIZONTAL DATUM: NAD83	AS SHOWN	Plans Prepared Under Supervision Of:		Date:			SHINOHARA II BURN SITE	7 of 7
DATE COMPLETED:							VERTICAL				Planning:	Landscape:	IMPROVEMENTS 2015	W.O. No.
								R.C.E. No.						

Appendix 16

CD of Digital HEC-RAS Models and GIS Drawings