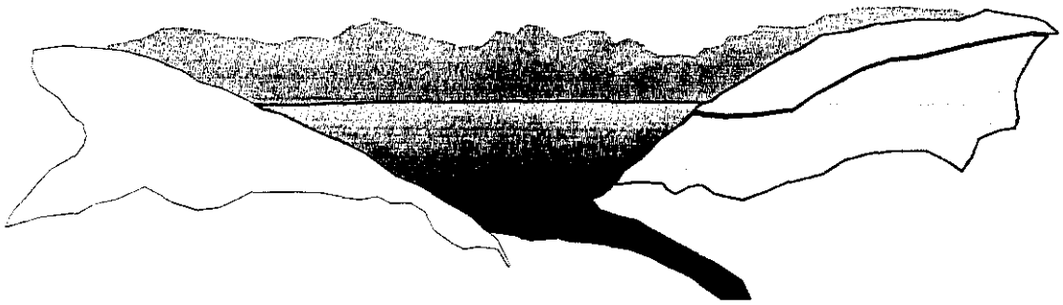
C L A R K C O U N T Y
REGIONAL FLOOD CONTROL DISTRICT



DRAFT
ABBOTT AND PULSIPHER WASHES FIS RESTUDY

SUPPLEMENT
Volume I of I

Mesquite, Clark County, Nevada

Submitted by: Clark County Regional Flood Control District

Study Contractor: G. C. Wallace, Inc.

Date Submitted: November 2000

G. C. WALLACE, INC.
Engineers/Planners/Surveyors

DRAFT

ABBOTT AND PULSIPHER WASHES FIS RESTUDY

SUPPLEMENT

NOVEMBER 2000

MESQUITE, CLARK COUNTY, NEVADA

G. C. WALLACE, INC.
Engineers/Planners/Surveyors

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
CERTIFICATION

This is to certify that all work accomplished in the conduct of this FIS was done in accordance with the Statement of Work and General Provisions of Contract 550.0351, and all amendments thereto, together with all such modifications, either written or oral, as the Regional PO and/or the Contracting Officer or their representatives have directed, such as modifications affect this contract, and that all such work has been accomplished in accordance with sound and accepted engineering practice within the contract provisions for respective phases of work.

Jerry E. Pruitt, P.E. - Vice President
G. C. Wallace, Inc.

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1.0 INTRODUCTION

1.1 Purpose of Study

The purpose of this study is to perform detailed hydraulic analyses of the Pulsipher Wash. The Pulsipher Wash was previously analyzed by approximate methods in the Abbott and Pulsipher Washes FIS Restudy (Reference 1) which was submitted to Michael Baker Jr., Inc. (MBJ) in October 1998. Subsequent analyses were submitted by G. C. WALLACE, INC. (GCW) in October 1999 and February 2000 in response to comments from Federal Emergency Management Agency (FEMA) and Michael Baker Jr. (MBJ). The proposed mapping revisions for the Abbott Wash were approved by FEMA on May 15, 2000. However, the effective Flood Insurance Rate Map (FIRM) of the Pulsipher Wash was determined using detailed methods. Therefore, the study members concluded that a detailed study would be required in order to revise the current mapping of the Pulsipher Wash. The information presented in this report is intended to supplement the previous analyses of the Pulsipher Wash which was included in the Abbott and Pulsipher Washes FIS Restudy.

The results of this detailed study will be used to update the FIRM for Clark County (Unincorporated Areas). The FIRM panel impacted by this detailed study will be Panel 32003C0386 D dated August 16, 1995. The FIRMs are distributed by the FEMA to aid in the administration of the National Flood Insurance Program (NFIP). This program was established with the passage of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973 to enable property owners to purchase insurance protection against losses from flooding.

1.2. Authority For Study

GCW was authorized by the Clark County Regional Flood Control District (CCRFCD) to perform this detailed study for these unincorporated areas of Clark County under contract, *Request for Supplemental Services Pulsipher Wash Detailed Hydraulic Analyses*, dated August 18, 2000.

Topographic data south of I-15 was generated specifically for the Abbott and Pulsipher Washes FIS Restudy by Nevada Aerial Mapping dated January 14, 1998 (Reference 2). Topographic data north of I-15 was generated for a separate project by Olympus Aerial Surveys, Inc. dated July 14, 1997, and August 26, 1997 (Reference 3). An additional survey was conducted by Pentacore, Inc. to determine the physical dimensions of the culverts at I-15 and Hafen Lane.

1.3 Community Coordination and Acknowledgment

The area of detailed study and project scope was outlined and agreed upon in correspondence between CCRFCD, MBJ, and FEMA. Study members from FEMA, MBJ, City of Mesquite (COM), and GCW were sent copies of this correspondence from CCRFCD, dated July 31, 2000, and August 4, 2000. Copies of these messages are attached.

1.4 Community Concurrence

The study members of GCW have maintained contact with CCRFCD and COM throughout the project. Both CCRFCD and COM have had the opportunity to provide input regarding the results of this detailed study through continued meetings and review submittals. At the time of submittal, both CCRFCD and COM concur with the results of this detailed study.

2.0 AREAS STUDIED

2.1 Scope of Study

This detailed study will include investigations necessary to delineate Base Flood Elevations (BFEs) and a floodway by detailed methods for approximately 4,200 feet of the Pulsipher Wash from 500 feet north of I-15 to the Virgin River. In addition to the main channel, a detailed study will be completed for the breakout flow along the north side of I-15. The I-15 Breakout model will extend west approximately 3,100 feet from the I-15 culvert to the limit of the topographic mapping. As previously stated, the Pulsipher Wash was analyzed by approximate methods in the Abbott and Pulsipher Washes FIS Restudy (Reference 1). The entire study length of the Pulsipher Wash lies within the

unincorporated areas of Clark County, Nevada. See Figures 1 and 2 for the location of the detailed study area.

2.2 Community Description

The study area is located in the City of Mesquite, Clark County, Nevada. The City of Mesquite is located at the northeast corner of Clark County, near the Arizona border. The city is adjacent to and north of the Virgin River. See Figures 1 and 2 for the location of the detailed study area.

2.3 Principal Flood Problems

The Pulsipher Wash does not have significant flood problems north of I-15. However, the I-15 culvert (12-foot wide by 10-foot high reinforced concrete box) does not have the capacity to pass the total flow of 3,478 cfs in the Pulsipher Wash during the 100-year storm event. This will result in a backwater affect several hundred feet upstream of the culvert. A breakout of 1,340 cfs will occur at the left bank of the I-15 culvert, leaving 2,138 cfs in the main channel south of I-15. The Pulsipher Wash is perched south of I-15, making the channel susceptible to breakouts at several locations. Additionally, the culvert at Hafen Lane (3-12.1 foot wide by 4.1 foot high reinforced concrete boxes) does not have the capacity to pass the total flow in the Pulsipher Wash, which will result in overtopping of Hafen Lane.

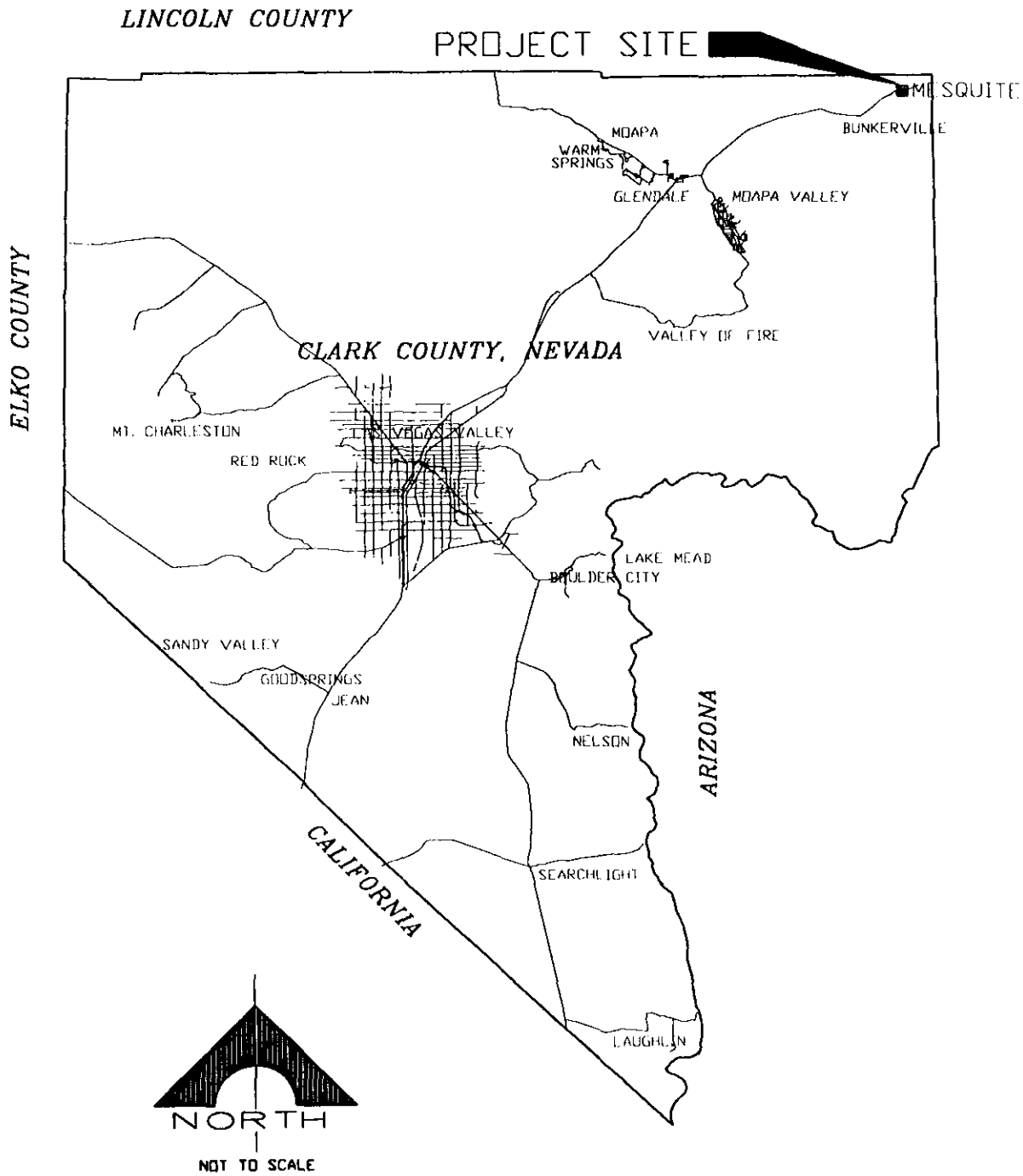
2.4 Flood Protection Measures

No new construction is associated with this project. Maintenance of the existing facilities is provided by COM and funded by the CCRFCD.

3.0 ENGINEERING METHODS

3.1 Hydrologic Analysis

The HEC-1 model presented in the Abbott and Pulsipher Washes FIS Restudy (Reference 1) is a modified version of the HEC-1 model from the 1995 MPU (Reference 4). See Section 3.1.2 and 3.1.3 of the FIS Restudy for a detailed explanation of the hydrologic modeling. The existing condition hydrologic map is



ABBOTT AND PULSIPHER WASHES

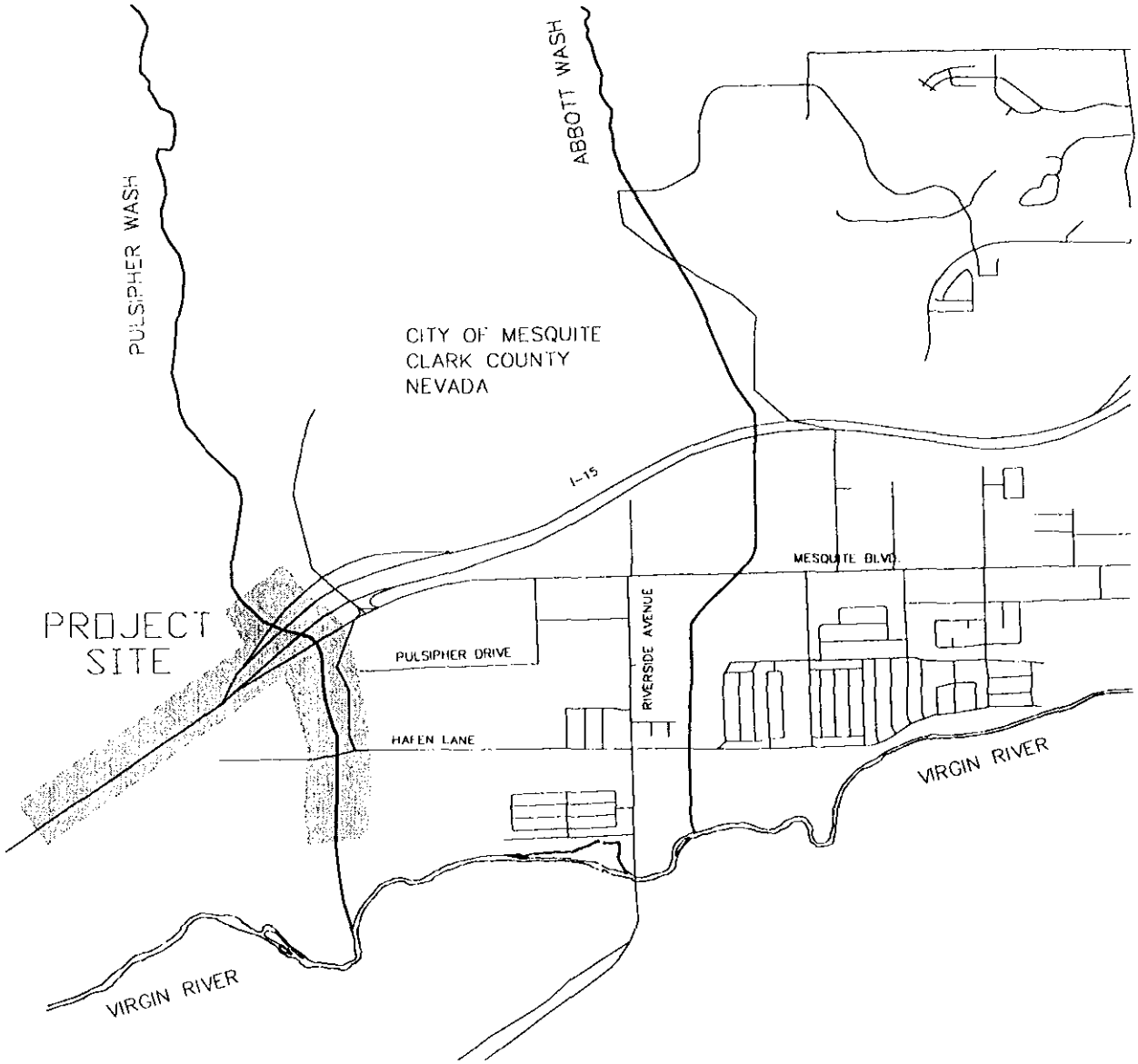
FIS RESTUDY

FIGURE 1

VICINITY MAP

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

F:\550-035\cd\fis\figures\figure1.dwg 11-10-00 08:52:53 mludwig



NORTH

NOT TO SCALE

ABBOTT AND PULSIPHER WASHES

FIS RESTUDY

FIGURE 2

LOCATION MAP

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

F:\550-0351\dwg\fig\figure2.dwg 11-10-00 09:11:07 mludwig

attached as Figure 3. The results of the hydrologic modeling used in the FIS Restudy are summarized in Table 1.

TABLE 1
SUMMARY OF RESULTS FOR THE PULSIPHER WASH WATERSHED DURING THE 100-YEAR STORM EVENT

Concentration Point*	Description	Overall Storm			*Adopted* Discharge (cfs)
		Area (sq mi)	DARF	Peak Q (cfs)	
10	Pulsipher Wash 10,300 feet north of I-15	1.35	0.96	2,078	2,078
20	Pulsipher Wash 6,100 feet north of I-15	2.06	0.93	2,318	2,318
30	Pulsipher Wash 1,500 feet north of I-15	4.36	0.91	3,474	3,474
50	Pulsipher Wash at I-15	4.70	0.91	3,478	3,478
60	Pulsipher Wash at Virgin River	4.85	0.91	3,549	3,549

* See Figure 3

3.2 Hydraulic Analysis Methodology

3.2.1 General

The general methodology used in this detailed study is the same as the methodology used in the original submittal (Reference 1). See Sections 3.2.1 through 3.2.4 of the FIS Restudy for detailed information concerning bridge modeling, generating channel cross sections, channel roughness, and expansion/contraction coefficients. Floodplain and floodway boundaries for the 100-year storm event were determined using the U.S. Army Corps of Engineers (USACOE) HEC-2 Water Surface Profiles computer program (Reference 6) which runs inside BOSS International's BOSS RMS for AutoCAD software (Reference 7). Water surface elevations were computed using the subcritical flow regime within the BOSS RMS software. Starting water surface elevations were set at critical depth.

The floodway analysis was predicated on a maximum surcharge of 1 foot. Floodways were initially estimated using equal conveyance loss for both banks of the watercourse. This initial estimation was done using Encroachment Method 4 within the BOSS RMS program. Floodway limits were refined when needed using Encroachment Method 1. In certain situations, reasonable results could not be obtained using Encroachment Method 4. In these situations, GCW coordinated with CCRFCD to determine the most appropriate encroachment method.

3.2.2 Main Channel Model

The HEC-2 model for the detailed study of the main channel is PULS2D2.OUT. This model is based from the HEC-2 model, PULSREV7.OUT (1/13/00), which was submitted in a second response to comments for the Abbott and Pulsipher Washes FIS Restudy dated February 2000. The HEC-2 model used in this detailed study of the main channel, PULS2D2.OUT, is identical to the HEC-2 model submitted with the second response, PULSREV7.OUT (1/13/00), with two (2) exceptions. All sections upstream of Section 2300 were removed from the HEC-2 model, PULS2D2.OUT. Section 2300 is approximately located at the upstream limit of the detailed mapping shown on the Effective FIRM. See Figure 4 for the Effective FIRM. The other exception is that the split flow options were removed from the HEC-2 model, PULS2D2.OUT. Split flow options were removed in order to utilize the HEC-2 encroachment routines. The HEC-2 encroachment routines cannot be used in conjunction with the split flow routines. Therefore, flows were adjusted at individual sections of the HEC-2 model, PULS2D2.OUT, to match the total 100-year flow remaining in the main channel after breakouts, as shown in the attached HEC-2 model of the second response, PULSREV7.OUT. See Table 2 in the Modeling Results Section for a summary of the 100-year flows used in the detailed study Main Channel model, PULS2D2.OUT.

3.2.3 I-15 Breakout Model

The breakout along I-15 was not previously analyzed in the original submittal (Reference 1). The HEC-2 model for the detailed study of the I-15 breakout is I15BRK4.OUT. This model runs west from the I-15 culvert to the limit of the topographic mapping, extending across I-15 to include the north ditch, median ditch, and south ditch. The 100-year flow used in this model of 1,340 cfs was referenced from the Main Channel model, PULSREV7.OUT (1/13/00). Channel roughness values were determined using the same methodology as was used in the original submittal. These values are 0.030 for channel and overbank areas. Channel roughness values for the I-15 Breakout model are attached.

3.3 Hydraulic Modeling Results

3.3.1 Main Channel Model

The floodway analysis of the main channel was completed with a combination of Encroachment Methods 1 and 4. The majority of sections used Encroachment Method 1 because, in this situation, Encroachment Method 4 often failed to produce reasonable results. An iterative process was applied with Encroachment Method 1 using engineering judgement to determine the locations of the encroachment stations in order to approximate equal conveyance loss for both banks of the watercourse. The 100-year floodway, floodplain, and BFEs are shown on the attached workmaps. See Table 2 for a summary of floodway results for the Main Channel model, and a comparison to the Effective BFEs. The Effective BFEs were referenced from the FIS Study for the City of Mesquite (Reference 5).

In addition to the floodway mapping, the Left Breakout area is now delineated as Shaded Zone X. The Left Breakout HEC-2 model from the second response is attached. The limit of study has been moved to accommodate this mapping change. The request for this mapping revision was outlined and agreed upon in correspondence dated August 4, 2000, between CCRFCD, MBJ, and FEMA. A copy of this message is attached.

HEC-2 Run			Floodway			Base Flood Water Surface Elevation			
Cross-Section	Flow Rate (cfs)	Hydraulic Base Line Distance (1,000 feet)	Width (ft)	Section Area (sq ft)	Mean Velocity (fps)	Regulatory (ft NGVD)	w/ Floodway (ft NGVD)	w/o Floodway (ft NGVD)	Increase (ft)
PULS2D2.OUT									
200	669	0.0	40	82	8.1	1554.3	1556.7	1555.7	1.0
300	669	0.4	23	68	9.8	1561.4	1561.6	1560.6	1.0
400	669	0.5	19	64	10.5	1564.1	1564.2	1563.2	1.0
500	669	0.6	38	80	8.3	1565.4	1567.1	1567.1	-0.0
600	669	0.7	38	100	6.7	1568.0	1568.7	1568.7	0.0
700	669	0.8	29	74	9.0	1570.1	1574.3	1573.9	0.4
800	676	1.0	30	88	7.6	1574.1	1576.0	1575.4	0.6
900	798	1.1	30	104	7.6	1574.8	1576.6	1576.0	0.6
1000	966	1.2	35	99	9.8	1575.5	1577.5	1577.0	0.5
1100	1232	1.3	40	158	7.8	1576.2	1578.9	1578.1	0.8
1200	1889	1.4	50	240	7.9	1576.9	1579.3	1578.5	0.8
1300	2101	1.6	80	209	10.0	1578.0	1580.4	1579.5	0.9
1400	2101	1.7	40	175	12.0	1579.1	1584.0	1584.2	-0.2
1500	2209	1.8	50	225	9.8	1580.0	1585.4	1585.5	-0.1
1600	2209	2.0	50	265	8.3	1582.4	1586.5	1585.7	0.8
1650	2209	2.2	65	225	9.8	1584.6	1587.7	1587.3	0.4
1700	2209	2.4	65	264	8.4	1586.6	1589.2	1588.2	1.0
1750	2209	2.5	39	179	12.3	1589.0	1589.4	1589.2	0.2
1800	2209	2.7	30	164	13.4	1592.0	1590.6	1590.5	0.1
1900	2138	2.8	12	119	18.0	1593.0	1592.7	1592.7	0.0
2000	2138	3.1	14	120	17.8	1598.8	1599.5	1599.5	0.0
2100	3478	3.1	154	1697	2.0	1599.8	1605.8	1605.8	-0.0
2200	3478	3.5	208	1850	1.9	LIMIT	1605.9	1605.9	-0.1
2300	3478	3.8	224	1482	2.3	LIMIT	1605.8	1605.8	-0.0

FEDERAL EMERGENCY MANAGEMENT AGENCY
UNINCORPORATED CLARK COUNTY/
NEVADA

TABLE 2
FLOODWAY DATA - MAIN CHANNEL
PULSIPHER WASH

3.3.2 I-15 Breakout Model

The floodway analysis of I-15 was completed solely using Encroachment Method 4. A review of the floodway results showed that additional refinements of the floodway limits would not be necessary. The modeling results also indicated that a breakout will occur between Sections 45 and 50 (i.e., 127 cfs) during the 100-year storm event. See the hand calculation on page 14 of the attached HEC-2 model. This breakout will flow south through the existing golf course and will not return to the ditches along I-15. This breakout is considered outside the limit of this detailed study. However, for modeling purposes, the breakout flow is immediately returned in order to produce a more conservative floodplain and floodway. The 100-year floodway, floodplain, and BFEs are shown on the attached work maps. See Table 3 for a summary of floodway results for the I-15 Breakout model.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

4.1 Floodplain Boundaries

Floodplain boundaries for the detailed and approximate method areas were delineated on topographic maps with a scale of 1" = 400' and contour intervals of 1-foot north of I-15 and 2-feet south of I-15. Spot elevations were plotted and used in areas requiring greater definition. The boundaries of the 100-year flood were delineated using elevations computed at each section by the HEC-2 models. The delineations were interpolated between sections using engineering judgment in conjunction with the BOSS RMS software capabilities. The 500-year floodplain was not determined in this study. The 100-year floodplain boundary has not changed from the boundary shown in the approximate study.

4.2 Floodways

Floodways are typically defined as the main channel of a watercourse and the adjacent land width that must remain free of encroachments so as not to raise the 100-year water surface elevation more than a specified amount. This study complies with the maximum allowable rise of 1 foot which was established by FEMA.

HEC-2 Run			Floodway			Base Flood Water Surface Elevation			
Cross-Section	Flow Rate (cfs)	Hydraulic Base Line Distance (1,000 feet)	Width (ft)	Section Area (sq ft)	Mean Velocity (fps)	Regulatory (ft NGVD)	w/ Floodway (ft NGVD)	w/o Floodway (ft NGVD)	Increase (ft)
PULS2D2.OUT									
10	1340	0.0	73	159	8.4	--	1577.1	1577.1	0.0
15	1340	0.2	214	578	2.3	--	1578.3	1578.3	0.0
20	1340	0.4	232	394	3.4	--	1578.3	1578.3	0.0
25	1340	0.6	234	217	6.2	--	1578.5	1578.4	0.1
30	1340	0.8	239	377	3.6	--	1579.3	1578.7	0.6
35	1340	1.0	190	177	7.6	--	1582.0	1581.1	0.9
40	1340	1.2	98	239	5.6	--	1583.8	1582.9	0.9
45	1340	1.4	252	1020	1.3	--	1584.3	1584.0	0.3
50	1340	1.5	219	229	5.8	--	1583.9	1583.9	0.0
55	1340	1.7	287	189	7.1	--	1586.8	1585.8	1.0
60	1340	1.9	108	179	7.5	--	1589.8	1589.0	0.8
65	1340	2.1	137	275	4.9	--	1591.5	1590.8	0.7
70	1340	2.3	132	292	4.6	--	1592.2	1591.9	0.3
75	1340	2.6	107	199	6.7	--	1593.0	1592.5	0.5
80	1340	2.7	73	159	8.4	--	1594.4	1594.2	0.2
85	1340	3.0	118	194	6.9	--	1599.0	1598.2	0.8
FEDERAL EMERGENCY MANAGEMENT AGENCY UNINCORPORATED CLARK COUNTY/ NEVADA						TABLE 3 FLOODWAY DATA - I-15 BREAKOUT BREAKOUT FROM PULSIPHER WASH ALONG I-15			

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance rate zones are designated based on the results of the engineering analyses. The FEMA flood insurance rate zones are defined as follows:

Zone A

Zone A is the Flood Insurance Rate Zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no BFEs or depths are shown within this zone.

Zone AE

Zone AE is the Flood Insurance Rate Zone that corresponds to the 100-year floodplains that are determined in the FIS by detailed methods. In most instances, whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the Flood Insurance Rate Zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from the detailed hydraulic analyses are shown within this zone.

Zone AO

Zone AO is the Flood Insurance Rate Zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

Zone X

Zone X is the Flood Insurance Rate Zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less that 1 square mile, and areas protected by levees from the 100-year flood. No BFEs or depths are shown within this zone.

6.0 REFERENCES

1. G. C. Wallace, Inc., *Abbott and Pulsipher Washes FIS Restudy,* October 1998, November 1999, February 2000.

2. Nevada Aerial Mapping, *Topographical Mapping for the Abbott and Pulsipher Washes FIS Restudy*, 1" = 400', 2-foot contour interval, flown January 14, 1998.

3. Olympus Aerial Surveys, Inc., *Topographical Mapping for Mesquite Ranches and Mesquite Vistas*, 1" = 400', 1-foot contour interval, flown July 14, 1997 and August 26, 1997.

4. Clark County Regional Flood Control District, *Technical Appendix for the City of Mesquite Flood Control Master Plan Update,* September 1995.

5. Federal Emergency Management Agency, *Flood Insurance Study for City of Mesquite, Nevada, Clark County,* September 28, 1990.

6. U. S. Army Corps of Engineers, *Hydrologic Engineering Center, HEC-2 Water Surface Profiles User's Manual Version 4.6.2,* September 1990.

7. BOSS International, *BOSS RMS for AutoCAD,* Version 4.0 for Windows, September 13, 2000.

Federal Emergency Management Agency

Washington, D.C. 20472

MAY 24 2000

Mr. Kevin L. Eubanks, P.E.
Assistant General Manager
Clark County Regional Flood Control District
600 South Grand Central Parkway
Las Vegas, NV 89106-4511

Dear Mr. Eubanks:

This follows up on our letter dated May 15, 2000, to the Honorable Charles Horne, Mayor, City of Mesquite, in response to your February 4, 1999, request for a revision to the effective Flood Insurance Rate Map (FIRM) and Flood Insurance Study report for Clark County, Nevada and Incorporated Areas. In our May 15 letter, we stated that we had sufficient information to revise the flood data along Abbott Wash shown on the effective FIRM but could not revise the flood data along Pulsipher Wash as requested until additional concerns regarding the submitted hydraulic analyses for that wash were resolved. These concerns are explained in the following paragraphs.

The hydraulic analyses of the base (1-percent-annual-chance) flood along Pulsipher Wash submitted in support of your February 4 request did not include a revised analysis of the regulatory floodway. In your letter to us dated October 6, 1999, you indicated that the City of Mesquite and the Clark County Regional Flood Control District had decided to eliminate the effective floodway designation along Pulsipher Wash and to represent the flood hazard information for the wash with a Special Flood Hazard Area designated Zone A, an area subject to inundation by the base flood for which base flood elevations have not been determined.

In our letter of November 7, 1996, to Mr. Allen Bell, P.E., Director of Public Works, City of Mesquite, we discussed several issues regarding a previously proposed delineation for the Pulsipher Wash floodway. Specifically, we expressed our concern that the floodway analysis submitted by Mr. Bell reflected reductions in the base flood discharge values as a result of split flow from the main channel of Pulsipher Wash into the overbanks. We stated that, unless a split floodway were developed, the floodway must be defined using the full base flood discharge values and without the reductions resulting from the split flow. The hydraulic analysis of the base flood along Pulsipher Wash submitted with your request also reflects split flow from the main channel of Pulsipher Wash into the overbanks and computes significant amounts of flow leaving the study area during the base flood, most notably upstream of Interstate Highway 15 and upstream of Hafen Lane.

Because the flood hazard presented by the split flows leaving the wash is unclear, we do not believe it would be consistent with the floodplain management objectives of the National Flood Insurance Program to adopt less stringent floodplain management requirements than those currently in place for Pulsipher Wash. For this reason we do not agree that it would be appropriate to replace the detailed flood hazard information shown on the FIRM with approximate flood hazard information. We further affirm, as stated in our November 7 letter, that unless a split floodway is designated along Pulsipher Wash, a revised floodway for the wash must be analyzed without allowing flow to split outside of the floodway.

We appreciate your efforts in helping us maintain an accurate FIRM for Clark County, Nevada and Incorporated Areas. If you have any questions regarding this matter, please contact Mr. Max Yuan of my staff in Washington, DC, either by telephone at (202) 646-3843 or by facsimile at (202) 646-4596.

Sincerely,

Matthew B. Miller

Matthew B. Miller, P.E., Chief
Hazards Study Branch
Mitigation Directorate

Enclosure

cc: Mr. Allen Bell, P.E.
Director of Public Works
City of Mesquite

MAPPING

Study Contractor: G.C. Wallace, Inc.

MAPPING INFORMATION
WORK MAP DELINEATION SUMMARY

MESQUITE, CLARK COUNTY, NEVADA

FLOOD INSURANCE STUDY

The floodplain boundaries were interpolated between cross sections using 1" = 400' scale topographic maps. The contour interval on topographic maps north of I-15 is 1-foot. These maps were created for a separate project. The contour interval on topographic maps south of I-15 is 2-feet. These maps were created specifically for this study.

For the Pulsipher Wash, an approximate 100-year floodplain was delineated from 500 feet north of I-15 to the north boundary of the Mesquite, NV city limits. A detailed 100-year floodplain was delineated from 500 feet north of I-15 to the Virgin River. A detailed 100-year floodplain was also delineated from the I-15 culvert to 3100 feet west along I-15 to the extent of the topographic mapping. Base Flood Elevations were determined for the areas of detailed study.

FEMA FORMS

FEDERAL EMERGENCY MANAGEMENT AGENCY
REVISION REQUESTOR AND COMMUNITY OFFICIAL FORM

FEMA USE ONLY

O.M.B. Burden No. 3067-0148
Expires July 31, 1997

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.13 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

1. OVERVIEW

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

- ☐ Physical change
  - ☐ Existing
  - ☐ Proposed
- ■ Improved methodology
- ■ Improved data
- ■ Floodway revision

Other _____

Explain _____

2. Flooding Source: Pulsipher Wash
3. Project Name/Identifier: Abbott and Pulsipher Washes FIS Restudy
4. FEMA zone designations affected: A, AE, AO, X

(example: A, AH, AO, A1-A30, A99, AE, V, V1-30, VE, B, C, D, X)

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

	Community No.	Community Name	County	State	Map No.	Panel No.	Effective Date
EX:	480301	Katy, City	Harris, Fort Bend	TX	480301	0005D	02/08/83
	480287	Harris County	Harris	TX	48201C	0220G	09/28/90
	32003	Mesquite	Clark County	NV	32003C	0386D	8/16/95

6. The area of revision encompasses the following types of flooding, structures, and associated disciplines: *(check all that apply)*

Types of Flooding	Structures	Disciplines*
■ Riverine	☐ Channelization	■ Water Resources
☐ Coastal	☐ Levee/Floodwall	■ Hydrology
☐ Alluvial Fan	■ Bridge/Culvert	■ Hydraulics
☐ Shallow Flooding *(e.g. Zones AO and AH)*	☐ Dam	☐ Sediment Transport
☐ Lakes	☐ Coastal	☐ Interior Drainage
	☐ Fill	☐ Structural
Affected by wind/wave action	☐ Pump Station	☐ Geotechnical
☐ Yes	☐ None	■ Land Surveying
■ No	☐ Channel Relocation	☐ Other *(describe)*
	☐ Excavation	
	☐ Other *(describe)*	
☐ Other *(describe)* _____	_____	_____

* **Attach completed "Certification by Registered Professional Engineer and/or Land Surveyor" Form for each discipline checked. (Form 2)**

2. FLOODWAY INFORMATION

7. Does the affected flooding source have a floodway designated on the effective FIRM or FBFM? ■ Yes ☐ No
8. Does the revised floodway delineation differ from that shown on the effective FIRM or FBFM? ■ Yes ☐ No

If Yes, give reason: Floodway revision

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

Attach copy of either a public notice distributed by the community stating the community's intent to revise the floodway or a statement by the community that it has notified all affected property owners and affected adjacent jurisdictions.

9. Does the State have jurisdiction over the floodway or its adoption by communities participating in the NFIP?

☐Yes ■No

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

3. PROPOSED ENCROACHMENTS N/A

10. With floodways:

a. Does the revision request involve fill, new construction, substantial improvement, or other development in the floodway? ☐ Yes ☐ No

b. If yes, does the development cause the 100-year water surface elevation to increase at any location by more than 0.000 feet? ☐ Yes ☐ No

11. Without floodways:

a. Does the revision request involve fill, new construction, substantial improvement, or other development in the 100-year floodplain? ☐ Yes ☐ No

b. If yes, does the cumulative effect of all development that has occurred since the effective SFHA was originally identified cause the 100-year water surface elevation to increase at any location by more than one foot *(or other surcharge limit if community or state has adopted more stringent criteria)*? ☐ Yes ☐ No

If the answer to either Items 10b or 11b is yes, please provide documentation that all requirements of Section 65.12 of the NFIP regulations have been met, regarding evaluation of alternatives, notice to individual legal property owners, concurrence of CEO, and certification that no insurable structures are impacted.

4. REVISION REQUESTOR ACKNOWLEDGMENT

12. Having read NFIP Regulations, 44 CFR Ch. I, parts 59, 60, 61, and 72, I believe that the proposed revision ■ is ☐ is not in compliance with the requirements of the aforementioned NFIP Regulations.

5. COMMUNITY OFFICIAL ACKNOWLEDGMENT

13. Was this revision request reviewed by the community for compliance with the community's adopted floodplain management ordinances? ■ Yes ☐ No

14. Does this revision request have the endorsement of the community? ■ Yes ☐ No

If no to either of the above questions, please explain: _____

Please note that community acknowledgment and/or notification is required for all requests as outlined in Section 65.4(b) of the NFIP Regulations.

6. OPERATION AND MAINTENANCE N/A

15. Does the physical change involve a flood control structure (e.g. levees, floodwalls, channelization, basins, dams)? ☐ Yes ☐ No

If yes, please provide the following information for each of the new flood control structures:

A. Inspection of the flood control project will be conducted periodically by _____ (entity)

_____ with a maximum interval of _____ months between inspections.

B. Based on the results of scheduled periodic inspections, appropriate maintenance of the flood control facilities will be conducted by _____ (entity)

to ensure the integrity and degree of flood protection of the structure.

C. A formal plan of operation, including documentation of the flood warning system, specific actions and assignments of responsibility by individual name or title, and provisions for testing the plan at intervals not less than one year, ☐ has ☐ has not been prepared for the flood control structure.

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

Attach operation and maintenance plans

7. REQUESTED RESPONSE FROM FEMA

16. After examining the pertinent NFIP regulations and reviewing the document entitled "Appeals, Revisions, and Amendments to Flood Insurance Maps: A Guide for Community Officials," dated January 1990, this request is for a:

____a. CLOMR — A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision *(LOMR or PMR)*, or proposed hydrology changes *(see 44 CFR Ch. I, Parts 60, 65, and 72)*.

____b. LOMR — A letter from FEMA officially revising the current NFIP map to show changes to floodplains, floodways, or flood elevations. LOMRs typically depict decreased flood hazards. *(See 44 CFR Ch. 1, Parts 60 and 65.)*

_X_c. PMR — A reprinted NFIP map incorporating changes to floodplains, floodways, or flood elevations. Because of the time and cost involved to change, reprint, and redistribute an NFIP map, a PMR is usually processed when a revision reflects increased flood hazards or large-scope changes. *(See 44 CFR Ch. 1, Parts 60 and 65.)*

____d. Other: Describe _____

8. FORMS INCLUDED

Form 2 entitled "Certification by Registered Professional Engineer And/Or Land Surveyor" must be submitted.

The following forms should be included with this request if (check the included forms):

• Hydrologic analysis for flooding source differs from that used to develop FIRM	■	Hydrologic Analysis Form (Form 3)
• Hydraulic analysis for riverine flooding differs from that used to develop FIRM	■	Riverine Hydraulic Analysis Form (Form 4)
• The request is based on updated topographic information or a revised floodplain or floodway delineation is requested	■	Riverine/Coastal Mapping Form (Form 5)
• The request involves any type of channel modification	☐	Channelization Form (Form 6)
• The request involves new bridge or culvert or revised analysis of an existing bridge or culvert	■	Bridge/Culvert Form (Form 7) - **See Attachment**
• The request involves a new revised levee/floodwall system	☐	Levee/Floodwall System Analysis Form (Form 8)
• The request involves analysis of coastal flooding	☐	Coastal Analysis Form (Form 9)
• The request involves coastal structures credited as providing protection from the 100-year flood	☐	Coastal Structures (Form 10)
• The request involves an existing, proposed, or modified dam	☐	Dam Form (Form 11)
• The request involves structures credited as providing protection from the 100-year flood on an alluvial fan	☐	Alluvial Fan Flooding Form (Form 12)

9. INITIAL REVIEW FEE

18. The minimum initial review fee for the appropriate request category has been included. ☐ Yes ■ No

Initial fee amount: $ ____

Check or money order only. Make check or money order payable to: National Flood Insurance Program. If paying by Visa or MasterCard please refer to the credit card information form which follows this form.

or

19. *Is this request for a project that is for public benefit and is primarily intended for flood loss reduction to insurable structures in identified flood hazard areas which were in existence prior to the commencement of construction of the flood control project?* ☐ Yes ■ No

or

20. Is this request to correct map errors, to include the effects of natural changes within the areas of special flood hazard, or solely to provide more detailed data? ■ Yes ☐ No

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

Jerry E. Pruitt

Signature of Revision Requestor

Jerry E. Pruitt, P.E., Vice President

Printed Name and Title of Revision Requestor

G. C. Wallace, Inc.

Company Name

(702) 804-2000 11/20/00

Telephone No. Date

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

Signature of Community Official

J. Allen Bell, P.E., City Engineer

Printed Name and Title of Community Official

Mesquite, Clark County, Nevada

Community Name

Date

Does this request impact any other communities? ☐ Yes ■ No

If yes, attach letters from all affected jurisdictions acknowledging revision request and approving changes to floodway, if applicable.

Note: Although a photograph of physical changes is not required, it may be helpful for FEMA's review.

ATTACHMENT TO FEMA FORM 1

17. **Bridge/Culvert Form (Form 7)**

The information normally shown on the Bridge/Culvert Form (Form 7) is located in the HEC-2 models and is not reproduced on the form in an effort to save the community time and money.

FEDERAL EMERGENCY MANAGEMENT AGENCY CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR FORM	*FEMA USE ONLY*	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1997*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472.

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

1. This certification is in accordance with 44 CFR Ch. I, Section 65.2.
2. I am licensed with an expertise in Hydrology and Hydraulics
   [example: water resources *(hydrology, hydraulics, sediment transport, interior drainage)**, structural, geotechnical, land surveying.]
3. I have 10 years experience in the expertise listed above.
4. I have ☐ prepared ■ reviewed the attached supporting data and analyses related to my expertise.
5. I ■ have ☐ have not visited and physically viewed the project.
6. In my opinion, the following analyses and/or designs, is/are being certified:
   N/A
7. Based upon the following review, the modifications in place have been constructed in general accordance with plans and specifications.

   Basis for above statement: (check all that apply)

   a.☐ Viewed all phases of actual construction.
   b.☐ Compared plans and specifications with as-built survey information.
   c.☐ Examined plans and specifications and compared with completed projects.
   d.■ Other Analyses only, no construction involved.
8. All information submitted in support of this request is 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: Jerry E. Pruitt, P.E.
(please print or type)

Title: Vice President
(please print or type)

Registration No. 11902 Expiration Date: 12/31/01

State Nevada

Type of License Civil

Jerry E Pruitt
Signature

11/22/00
Date

Seal
(Optional)

*Specify Subdiscipline

Note: Insert not applicable (N/A) when statement does not apply.

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDRAULIC ANALYSIS FORM**	*FEMA USE ONLY*	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1997*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 3.67 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management Agency, 500 C Street, S.W., Washington, DC 20472.

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

Community Name: Mesquite, Clark County, Nevada

Flooding Source: Pulsipher Wash
(One form for each flooding source)

Project Name/Identifier: Abbott and Pulsipher Washes FIS Restudy

1. HYDROLOGIC ANALYSIS IN FIS

■ Approximate study stream (Zone A)

☐ Detailed study stream (briefly explain methodology) _____

2. REASON FOR NEW HYDROLOGIC ANALYSIS

☐ No existing analysis

■ Improved data *(see data revision on page 3)*

☐ Changed physical conditions of watershed *(explain)* _____

■ Alternative methodology *(justify why the revised model is better than model used in the effective FIS)*
The SCS TR-20 Method is somewhat outdated. The revised model employs the USACOE HEC-1 software. Also, a 6-hour storm duration is now considered more appropriate than the 3-hour.

☐ Evaluation of proposed conditions (CLOMRs only) (explain) _____

☐ Other _____

If a computer program/model was used in revising the hydrologic analysis, please provide a diskette with the input files for the 10-, 50-, 100- and 500-year recurrence intervals.

Only the 100-year recurrence interval need be included for SFHAs designated as Zone A.

3. APPROVAL OF ANALYSIS

■ Approval of the hydrologic analysis, including the resulting peak discharge value(s) has been provided by the appropriate local, state, or Federal Agency. (i.e., Clark County Regional Flood Control District, City of Mesquite Public Works)
Attach evidence of approval.

☐ Approval of the hydrologic analysis is not required by any local, State or Federal Agency.

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

4. REVIEW OF RESULTS

Stream: Pulsipher Wash

Comparison of 100-year Discharges

Location:	Drainage area (Sq. mi.)	FIS (cfs):	Revised (cfs):
At I-15	4.9/4.7	2,070	3,478

Note: When revised discharges are not significantly different than FIS discharges, FEMA may require a confidence limits analysis on attachment D at a later date to complete the review.

As is often the case with revision requests, only a portion of a stream may actually be revised or be affected by a revision. Therefore, transition to the unrevised portion is important to maintain the continuity of the study. NFIP regulations stipulate that such a transition must be assured. What is the transition from the proposed discharges to the effective discharges? Please explain how the transition was made *(attach separate sheet if necessary)*.

The analysis incorporates the entire reach of the Pulsipher Wash from the north boundary of Mesquite city limits to the Virgin River.

ATTACH A COMPLETED "REVIEW OF RESULTS" PAGE FOR EACH FLOODING SOURCE.

Is the new hydrologic analysis being developed solely to revise the flow values presented in the FIS *(i.e. no changed hydraulic conditions)?* ☐ Yes ■ No

If yes, does the 100-year water surface elevation change by 1.0 foot or more? ☐ Yes ☐ No

Note: FEMA does not normally revise NFIP maps solely due to flow changes when changes in 100-year water surface elevation are less than 1.0 foot.

5. HISTORICAL FLOODING INFORMATION

Is historical data available for the flooding source? ☐ Yes ■ No

If yes, provide the following:

Location along flooding source: _____

Maximum peak discharge: _____ cfs

Second highest peak discharge: _____ cfs

Source of information: _____

6. GAGE RECORD INFORMATION - N/A

Location of nearest gage to project site *(along flooding source or similar watershed; specify)*

_____

Gaging Station: _____

Drainage area at gage: _____ mi^2

Number of years of data: _____

7. DATA REVISION

Please use the following table to list all the data and/or parameters affected by this request and identify them as new data *(New)* or as revising existing data *(Revised)*. *(If necessary, attach a separate sheet.)*

Data Parameter	New	Revised	Data Source
Land Use	■	☐	City of Mesquite MPU, 1995
Rainfall Loss	■	☐	City of Mesquite MPU, 1995
Drainage Facilities	■	☐	Field Survey - Pentacore
Topography	■	☐	Field Survey - Pentacore
Storm Duration	■	☐	CCRFCD Manual 1990

- The data source can be a Federal, State, or local government agency, or a private source. Some State and local governments may have less strict data requirements than Federal agencies, in which case the hydrologic data may not be accepted by FEMA unless it is demonstrated that the data give a better estimate of the flood discharge.
- Attach documentation corroborating each data source *(i.e., certified statement, report, bibliographical reference to a published document)*. In the case of a published document or a government report, providing copies of the cover and pertinent pages may be helpful.

8. METHODOLOGY FOR NEW ANALYSIS

☐ Statistical Analysis of Gage Records *(use Attachment A)*

☐ Regional Regression Equations *(use Attachment B)*

■ Precipitation/Runoff Model *(use Attachment C)*

☐ Other *(specify; attach backup computations and supporting data)* _____

_____

ATTACHMENT A: STATISTICAL ANALYSIS OF GAGE RECORDS

aging Station: _____

ap[illegible]ocation (latitude and longitude): _____

		FIS:	Revised:
1.	Number of years of data		
	Systematic		
	Historical		
2.	Homogeneous data	☐ Yes ☐ No	☐ Yes ☐ No
3.	Data adjustments	☐ Yes ☐ No	☐ Yes ☐ No
4.	Number of high outliers		
	Low outliers		
	Zero events		
5.	Generalized skew		
6.	Station skew		
7.	Adopted skew		
	Probability distribution used (justify if log-Pearson III was not used)		
9.	Transfer equations to ungaged sites. If yes, specify method		☐ Yes ☐ No
10.	Expected probability*		☐ Yes ☐ No
11.	Comparison of results with other analyses. If yes, describe comparison		☐ Yes ☐ No

* FEMA does not accept expected probability analyses for the purpose of reflecting flood hazard information in a FIS.

If any data is not available, indicate with "N/A".

Attach analysis including plot of flood frequency curve.

ATTACHMENT B: REGIONAL REGRESSION EQUATIONS

1. Bibliographical Reference:

_____

_____

_____

(Attach a copy of title page, table of contents, and pertinent pages including equations.)

2. Gaged or ungaged stream: _____

3. Hydrologic region(s): _____
Attach backup map.

4. Provide parameters, values, and source of data used to define parameters.

_____

_____

_____

		FIS:	Revised:
5.	Urbanized conditions calculations	☐ Yes ☐ No	☐ Yes ☐ No
6.	Percent of watershed urbanization	_____	_____
7.	Is the watershed controlled?	☐ Yes ☐ No	☐ Yes ☐ No
8.	Comparison with other analyses	☐ Yes ☐ No	☐ Yes ☐ No

If the answer to 5, 7, or 8 is yes, explain methodology in Comments.

If data is not available, indicate by N/A.

Comments

_____

_____

_____

_____

_____

Attach computation and supporting maps, delineating the watershed boundary and drainage area divides.

		FIS:	Revised:
	Method or model used:	TR-20	HEC-1
	Version:	N/A	4.0
	Date:	1982	September 1995
2.	Source of rainfall depth:	NOAA	NOAA
3.	Source of rainfall distribution:	N/A	USACOE
4.	Rainfall duration:	3-hour	6-hour
5.	Areal adjustment to precipitation (%):	0.96	0.91
6.	Maximum overland flow length:	N/A	500 feet
7.	Hydrograph development method:	SCS Unit Hydrograph	SCS Unit Hydrograph
8.	Loss rate method:	SCS Curve Numbers	Green-Ampt
	Source of soils information:	SCS	SCS
	Source of land use information:	N/A	Mesquite MPU
9.	Channel routing method:	N/A	Muskingum
10.	Reservoir routing:	☐ Yes ■ No	☐ Yes ■ No
11.	Baseflow considerations:	☐ Yes ■ No	☐ Yes ■ No

If yes, explain how baseflow was determined:

12.	Snowmelt considerations?	☐ Yes ■ No	☐ Yes ■ No
13.	Model calibration?	☐ Yes ■ No	☐ Yes ■ No

If yes, explain how calibration was performed

14.	Future land use conditions?		☐ Yes ■ No

If yes, explain why:

Note: FEMA policy is to base flooding on existing conditions.

If data is not available, indicate by "N/A".

Attach precipitation/runoff model, hydrologic model schematic, curve number calculations, time of concentration calculations, and supporting maps, delineating the watershed boundary and drainage area divides.

ATTACHMENT D: CONFIDENCE LIMITS EVALUATION

Stream: _____

Select location for Confidence Limits Evaluation *(describe location):* _____

_____

Discharges for selected location:

Exceedance Probability	FIS		Revised	
10% (10-year)	_____	cfs	_____	cfs
2% (50-year)	_____	cfs	_____	cfs
1% (100-year)	_____	cfs	_____	cfs
0.2% (500-year)	_____	cfs	_____	cfs

1% (100-year) Flood Confidence Intervals

90% Confidence Interval: 5% limit _____ cfs; 95% limit _____ cfs

50% Confidence Interval: 25% limit _____ cfs; 75% limit _____ cfs

If the value of the 100-year frequency flood in the FIS is beyond the 50% confidence interval but within the 90% confidence interval, does the 100-year water surface elevation change by 1.0 foot or more?

☐ Yes ☐ No

Note: An example of confidence limits analysis can be found in Appendix 9 of Bulletin 17B.

h Confidence Limits Analysis.

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDRAULIC ANALYSIS FORM**	*FEMA USE ONLY*	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1997*

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

Community Name: Mesquite, Clark County, Nevada

Flooding Source: Pulsipher Wash
(One form for each flooding source)

Project Name/Identifier: Abbott and Pulsipher Washes FIS Restudy

1. REACH TO BE REVISED

Downstream limit: Virgin river

Upstream Limit: Northern boundary of Mesquite city limits

2. EFFECTIVE FIS

☐ *Not studied*

■ Studied by approximate methods

Downstream limit of study 500 feet north of I-15

Upstream limit of study Northern boundary of Mesquite city limits

■ Studied by detailed methods

Downstream limit of detailed study Virgin River

Upstream limit of detailed study 500 feet north of I-15

■ Floodway delineated

Downstream limit of Floodway Virgin River

Upstream limit of Floodway 500 feet north of I-15

3. HYDRAULIC ANALYSIS

Why is the hydraulic analysis different from that used to develop the FIRM? *(Check all that apply)*

☐ Not studied in FIS

■ Improved hydrologic data/analysis. Explain: The revised hydrologic analysis by the City of Mesquite MPU includes more detailed drainage basin delineations. Also, the HEC-1 computer model uses the Green-Ampt method for rainfall loss rate and a 6-hour storm duration.

■ Improved hydraulic analysis. Explain: Updated topographic information (i.e., 1-foot and 2-foot contour intervals). Utilizes BOSS RMS software capabilities.

☐ Flood control structure. Explain:

☐ Other. Explain:

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

4. Models Submitted

areas which have detailed flooding:

Full input and output listings along with files on diskette (if available) for each of the models listed below (items 1, 2, 3, 4, and 5) and summary of the source of input parameters used in the models must be provided. The summary must include a complete description of any changes made from model to model (e.g. duplicate effective model to corrected effective model). At a minimum, the Duplicate Effective (item 1) and the Revised or Post-Project Conditions (item 4) models must be submitted. See instructions for directions on when other models may be required.

For areas which do not have detailed flooding:

Only the 100-year flood profile is required. A hydraulic model is not required for areas which do not have detailed flooding; however, BFEs may not be added to the revised FIRM. If a hydraulic model is developed for the area, items 3 and 4 described below must be submitted.

If hydraulic models are not developed, hydraulic analyses for existing or pre-project conditions and revised or post-project conditions must be submitted. All calculations must be submitted for these analyses. (See Item 6 below.)

1. Duplicate Effective Model — Natural ☐ Floodway ☐

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

2. Corrected Effective Model — Natural ☐ Floodway ☐

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

3. Existing or Pre-Project Conditions Model — Natural ☐ Floodway ☐

The duplicate effective or corrected model is modified to produce the existing or pre-project conditions model to reflect any modifications that have occurred within the floodplain since the date of the effective model but prior to the construction of the project for which the revision is being requested. If no modification has occurred since the date of the effective model, then this model would be identical to the corrected effective or duplicate effective model.

4. Revised or Post-Project Conditions Model — Natural ☐ Floodway ☐

The existing or pre-project conditions model *(or duplicate effective or corrected effective model, as appropriate)* is revised to reflect revised or post-project conditions. This model must incorporate any physical changes to the floodplain since the effective model was produced as well as the effects of the project. When the request is for proposed project this Model should reflect proposed conditions.

5. Other: Please attach a sheet describing all other models or calculations submitted. Existing Conditions Model. — Natural ■ Floodway ■

6. Hydraulic Analyses (Only if Hydraulic Models are not developed) — Natural ☐ Floodway ☐

Attach all calculations for the existing or pre-project conditions and the revised or post-project conditions. Proceed to Form 5, "Riverine/Coastal Mapping Form".

5. MODEL PARAMETERS (from model used to revise 100-year water surface elevation)

1. Discharges:

	Upstream Limit	Downstream Limit
10-year	N/A	N/A
50-year	N/A	N/A
100-year	2,318 cfs	3,549 cfs
500-year	N/A	N/A

Attach diagram showing changes in 100-year discharge

2. Explain how the starting water surface elevations were determined Critical depth was assumed.

3. *Give range of friction loss coefficients (Manning's "N")* Channel . . . . . 0.015 - 0.030

Overbanks . . . 0.015 - 0.040

If friction loss coefficients are different anywhere along the revised reach from those used to develop the FIRM, give location, value used in the effective FIS, and revised values and an explanation as to how the revised values were determined.

Location	FIS	Revised
N/A		

Explain:

4. Describe how the cross section geometry data were determined *(e.g., field survey, topographic map, taken from previous study)* and list cross sections that were added.

Cross-section geometry data were determined by field survey and topographic maps developed specifically for this restudy.

5. Were natural channel banks selected as the location of the left and right channel banks in the model?

■Yes ☐ No If no, explain why not:

5. MODEL PARAMETERS (Cont'd)

6. Explain how reach lengths for channel and overbanks were determined:

The flow lengths between cross-sections were determined by measuring along expected flow paths using the natural topography, the river centerline, banks, and engineering judgement.

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

Do the results indicate:

a. Water surface elevations higher than end points of cross sections? ■ Yes ☐ No

b. Supercritical depth? ☐ Yes ■ No

c. Critical depth? ■ Yes ☐ No

d. Other unique situations? ☐ Yes ■ No

If yes to any of the above, attach an explanation that discusses the situation and how it is presented on the profiles, tables, and maps. Explanation attached.

What is the maximum change in energy gradient between cross-sections? 0.021

Specify location Between Sections 2000 and 1900 at I-15 Culvert (PULS2D2.OUT)

What is the distance between the cross-sections in 2 above? 320 feet

Specify location Between Sections 2000 and 1900 at I-15 Culvert (PULS2D2.OUT)

What is the maximum distance between cross-sections? 365 feet

Specify location Section 300 (PULS2D2.OUT)

Floodway determination

a. What is the maximum surcharge allowed by the community or State? 1 foot

b. What is the maximum surcharge for the revised conditions? 0.99 foot

Specify locations Section 200 (PULS2D2.OUT)

c. What is the maximum velocity? 18.0 fps

Specify location Section 1900 (PULS2D2.OUT)

d. Are there any negative surcharge values at any cross-section? ■ Yes ☐ No

If yes, the floodway may need to widen. If it is not widened, please explain and indicate the maximum negative surcharge.

Explain: Negative surcharges are shown at Sections 1400, 1500, 2100, 2200, and 2300. The maximum negative surcharge is -0.2 feet at Section 1400. Efforts to remove the negative surcharge at these sections produced adverse results upstream. Although these negative surcharges are undesirable, GCW believes the floodway widths at these sections effectively tie into the revised floodway at the adjacent sections.

6. RESULTS (Cont'd)

Is the discharge value used to determine the floodway anywhere different from that used to determine the natural 100-year flood elevations? . . . . . ☐Yes ■ No

If yes, explain:

Do 100-year water surface elevations increase at any location? . . . . . ☐ Yes ■ No

If yes, please attach a list of the locations where the increases occur, state whether or not the increases are located on the requestor's property, and provide an explanation of the reason for the increases. *(For example: State if the increase is due to fill placed within the floodway fringe or placed within the currently adopted floodway limits)*

Attach a completed comparison table entitled: *Water Surface Elevation Check (See page 6)*

7. REVISED FIRM/FBFM AND FLOOD PROFILES

The revised water surface elevations tie into those computed by the effective FIS Model *(10-, 50-, 100-, and 500-year)*, downstream of the project at cross-section 200 within 2.6 feet (*vertical*) and upstream of the project at cross section 2200 within 2.9 feet (*vertical*).

The revised floodway elevations tie into those computed by the effective FIS model, downstream of the project at cross section 200 within 1.2 feet (*vertical*) and upstream of the project at cross section 2200 within 2.4 feet (*vertical*).

Attach profiles, at the same vertical and horizontal scale as the profiles in the effective FIS report, showing stream bed and profiles of all floods studied (without encroachment). Also, label all cross sections, road crossings (including low chord and top-of-road data), culverts, tributaries, corporate limits, and study limits. If channel distance has changed, the stationing should be revised for all profile sheets. See Profile Exhibits attached.

Attach a Floodway Data Table showing data for each cross section listed in the published Floodway Data Table in the FIS report. See Table attached in report text.

Proceed to Riverine/Coastal Mapping Form (Form 5).

FEDERAL EMERGENCY M[illegible]GEMENT AGENCY

WATER SURFACE E[illegible]VATION CHECK

***See Tables 2 and 3 of report text.**

COMMUNITY NAME*	FLOODING SOURCE	PROJECT NAME/IDENTIFIER

	EFFECTIVE			DUPLICATE EFFECTIVE			CORRECTED EFFECTIVE			EXISTING/PRE-PROJECT			REVISED/PROJECT		
SECNO	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]

COMMENTS: *N/A, please see FEMA Floodway Data

1 - 100-year (natural) Water Surface Elevation 2 - Encroachment (floodway) Water Surface Elevation 3 - Surcharge Value

ATTACHMENT TO FEMA FORM 4

5. RESULTS

1a. HEC-2 model PULS2D2.OUT: Sections 2300, 2200, and 2100 are located immediately upstream of the I-15 culvert. A backwater affect is present at these sections. Sections 1100, 1000, and 900 are perched. All sections listed above were edited to remove ineffective flow areas. Artificially confining the flow at a section increases the water surface elevation, resulting in a more conservative floodplain.

1c. Water surface elevations were determined using the subcritical flow regime within BOSS International's RMS software.

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE/COASTAL MAPPING FORM**	*FEMA USE ONLY*	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1997*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

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

Community Name: Mesquite, Clark County, Nevada

Flooding Source: Pulsipher Wash

Project Name/Identifier: Abbott and Pulsipher Washes FIS Restudy

1. MAPPING CHANGES

1. A topographic work map of suitable scale, contour interval, and planimetric definition must be submitted showing *(indicate N/A when not applicable)*:

		Included
A.	Revised approximate 100-year floodplain boundaries (Zone A)	■ Yes ☐ No ☐ N/A
B.	Revised detailed 100- and 500-year floodplain boundaries **(100-year only)**	■ Yes ☐ No ☐ N/A
C.	Revised 100-year floodway boundaries	■ Yes ☐ No ☐ N/A
D.	Location and alignment of all cross sections used in the revised hydraulic model with stationing control indicated	■ Yes ☐ No ☐ N/A
E.	Stream alignments, road and dam alignments	■ Yes ☐ No ☐ N/A
F.	Current community boundaries	☐ Yes ■ No ☐ N/A
G.	Effective 100- and 500-year floodplain and 100-year floodway boundaries from the FIRM/FBFM reduced or enlarged to the scale of the topographic work map **100-Year Floodplain and Floodway only**	■ Yes ☐ No ☐ N/A
H.	Tie-ins between the effective and revised 100- and 500-year floodplains and 100-year floodway boundaries **100-Year Floodplain and Floodway only**	■ Yes ☐ No ☐ N/A
I.	The requestor's property boundaries and community easements	☐ Yes ■ No ☐ N/A
J.	The signed certification of a registered professional engineer	■ Yes ☐ No ☐ N/A
K.	Location and description of reference marks	■ Yes ☐ No ☐ N/A
L.	Vertical datum (example: NGVD, NAVD, etc.)	■ Yes ☐ No ☐ N/A
M.	Coastal zone designations tie into adjacent areas not being revised	☐ Yes ☐ No ■ N/A
N.	Location and alignment of all coastal transects used to revise the coastal analyses	☐ Yes ☐ No ■ N/A

If any of the items above are marked no or N/A, please explain: F., Clark County and City of Mesquite boundaries are beyond study area, I., same as F., M. and N., not a coastal zone.

2. What is the source and date of the updated topographic information *(example: orthophoto maps, July 1985; field survey, May 1979, beach profiles, June 1987, etc.)*? Aerial photography flown Jan. 1998, July and Aug. 1997, Field Survey, March 1998.

3. What is the scale and contour interval of the following work maps?
   a. Effective FIS 1" = 400' scale 4-foot Contour interval
   b. Revision Request 1"=400' scale 1-foot and 2-foot Contour interval

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

4. Attach an annotated FIRM and FBFM at the scale of the effective FIRM and FBFM showing the revised 100-year and 500-year floodplains and the 100-year floodway boundaries and how they tie into those shown on the effective FIRM and FBFM downstream and upstream of the revision or adjacent to the area of revision for coastal studies. Attached additional pages if needed.

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

5. Flood Boundaries and 100-year water surface elevations:

a. Has the 100-year floodplain been shifted or increased or the 100-year water surface elevation increased at any location on property other than the requestor's or community's? ☐Yes ■ No

If yes, please give the location of shift or increase and an explanation for the increase.

b. Have the affected property owners been notified of this shift or increase and the effect it will have on their property? . . . . . ☐Yes ☐ No N/A

If yes, please attach letters from these property owners stating they have no objections to the revised flood boundaries if a LOMR is being requested.

c. What is the number of insurable structures that will be impacted by this shift or increase? N/A

6. Have the floodway boundaries shifted or increased at any location compared to those shown on the effective FBFM or FIRM? . . . . . ■ Yes ☐ No

If yes, explain:

The revised floodway boundary is shifted from the effective floodway boundary at several locations. The revised floodway boundary follows the alignment of the natural wash as shown on the current topographic maps.

7. If a V-zone has been designated, has it been delineated to extend landward to the heel of the primary frontal dune? . . . . . ☐ Yes ☐ No N/A

If no, explain:

8. Manual or digital map submission:

☐ Manual
■ Digital

Digital map submissions may be used to update digital FIRMs (DFIRMs). For updating DFIRMs, these submissions must be coordinated with FEMA Headquarters as far in advance of submission as possible.

2. EARTH FILL PLACEMENT - N/A

1. The fill is: ☐ Existing ☐ Proposed

Has fill been/will be placed in the regulatory floodway? . . . . . ☐ Yes ☐ No

If yes, please attach completed Riverine Hydraulic Analysis Form.

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

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

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

If yes, justify steeper slopes _____

_____

b. Is adequate erosion protection provided for fill slopes exposed to moving flood waters? *(Slopes exposed to flows with velocities of up to 5 feet per second (fps) during the 100-year flood must, at a minimum, be protected by a cover of grass, vines, weeds, or similar vegetation; slopes exposed to flows with velocities greater than 5 fps during the 100-year flood must, at a minimum, be protected by stone or rock riprap.)* . . . . . ☐ Yes ☐ No

If no, describe erosion protection provided _____

_____

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

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

If yes, provide certification of fill compaction (item C. above) by the community's NFIP permit official, a registered professional engineer, or an accredited soils engineer.

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

If yes, is the fill protected from erosion by a flood control structure such as a revertment or revetment or seawall? . . . . . ☐ Yes ☐ No

If yes, attach the coastal structures form.

MAIN CHANNEL HEC-2 MODEL
PULS2D2.OUT

PULS2D2.OUT

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Version : 4.0

PROGRAM ORIGIN :

BOSS RiverCAD HEC-2 Analysis is an enhanced version of the U.S. Army Corps of Engineers Hydrologic Engineering Center HEC-2 program for water-surface profile computations. Program based upon the September 1990 version, updated on August 1991.

DISCLAIMER :

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PROJECT DESCRIPTION :

PROJECT TITLE : Abbott and Pulsipher Washes FIS Restudy
PROJECT NUMBER : 550-0351
DESCRIPTION : Pulsipher Wash Detailed Hydraulic Analys
ENGINEER : Jerry E. Pruitt, PE
DATE OF RUN : 11/13/2000
TIME OF RUN : 6:19 pm

T1 550-0351
T2 Abbott and Pulsipher Washes FIS Restudy
T3 Pulsipher Wash Detailed Hydraulic Analysis

JOB PARAMETERS :

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		2			-1			669	1555.1	
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1		-1				-2	-6		15

USER-DEFINED SUMMARY TABLES (J3) :

	150	100	200	110		200				
NC	0.03	0.03	0.025	0.1		0.3				
ET			7.1				2990	3030		
X1	200	15	2929.4	3113.93						
GR	1564	2778.75	1564	2874.16	1562	2912.73	1560	2929.4	1558	2941.08
GR	1556	2949.85	1554	2963.64	1554	2981.64	1554	3011.17	1554	3066.53
GR	1556	3081.56	1558	3096.65	1560	3113.93	1560	3148.31	1560	3396.06
ET			7.1				2970	2993		
X1	300	11	2926.48	3035.77	364.63	359.83	352.07			
GR	1566	2682.38	1564	2807.33	1562	2926.48	1560	2954.76	1558	2969.07
GR	1558	3000.86	1560	3018.26	1562	3035.77	1562	3082.96	1562	3156.53
GR	1564	3217.12								
NC	0.03	0.03	0.025	0.1		0.3				
ET			7.1				2339	2358		
X1	400	14	2281.55	2450.74	132.08	158.2	134.41			
GR	1566	2281.55	1566	2288.71	1564	2319.58	1562	2326.53	1560	2333.47
GR	1560	2352.21	1562	2362.78	1562	2368.59	1562	2429.18	1564	2450.74
GR	1566	2527.34	1566	2620.61	1566	2621.4	1568	2852.45		
NC	0.015	0.015	0.015	0.3	0.5					
X1	500	11	2332.84	2370.57	75.43	81.76	74.97			
X3	10							1572	1572	
GR	1572	1921.7	1572	2203.22	1572	2332.84	1568.47	2332.84	1564.37	2332.84

GR	1564.3	2370.57	1568.47	2370.57	1572	2370.57	1572	2514.64	1572	2562.6
GR	1572	2867.98								
NC	0.015	0.015	0.015	0.3	0.5					

SB	1.25	1.5	2.7	76	37.73	1.34	147.38	0	1565.46	1564.37
X1	600	6	2596.22	2633.95	122.03	131.14	133.46			
X2			1	1569.51	1572.66			2		
X3	10							1572.6	1572.6	
GR	1572.6	2596.22	1569.56	2596.22	1565.46	2596.22	1565.46	2633.95	1569.56	2633.95
GR	1572.6	2633.95								
NC	0.04	0.04	0.03	0.3	0.5					
ET			7.1				2121.76	2151.76		
X1	700	8	2121.76	2330.75	133.44	79.47	112.64			
GR	1573.8	2121.76	1572	2128.04	1570	2132.18	1569.5	2139.33	1570	2143.07
GR	1572	2144.69	1574	2297.02	1574.9	2330.75				
NC	0.04	0.04	0.03	0.1	0.3					
QT	2	676	676							
ET			7.1				1769.22	1799.22		
X1	800	11	1769.22	1903.89	134.63	139.86	144.94			
GR	1574.5	1769.22	1574	1778.29	1572	1784.62	1570	1788.23	1570.23	1793.02
GR	1570	1791.12	1572	1797.25	1574	1818.13	1574	1841.16	1574	1867.83
GR	1576	1903.89								
NC	0.04	0.04	0.03							
QT	2	798	798							
ET			7.1				1575.7	1605.7		
X1	900	8	1575.7	1686.84	102.08	108.33	103.62			
GR	1574.5	1575.7	1574	1579.92	1572	1592.09	1571	1597.2	1572	1604.66
GR	1574	1606.43	1575	1651.77	1577	1686.84				
QT	2	966	966							
ET			7.1				1472.42	1507.42		
X1	1000	9	1472.42	1568.37	116.93	121.55	118.27			
GR	1576	1472.42	1576	1484.88	1574	1489.57	1572	1494.01	1571.15	1496.75
GR	1572	1501.64	1574	1503.91	1576	1545.7	1577.2	1568.37		
QT	2	1232	1232							
ET			7.1				1328	1368		
X1	1100	7	1320.06	1417.67	102.45	103.7	103.7			
GR	1576	1320.06	1576	1334.53	1574	1339.91	1571.4	1347.79	1574	1349.58
GR	1576	1393.55	1577.4	1417.67						
QT	2	1889	1889							
ET			7.1				1184	1234		
X1	1200	7	1178.38	1272.58	111.55	110.23	110.23			
GR	1576	1178.38	1576	1179.17	1574	1190.7	1571.62	1204.49	1574	1209.35
GR	1576	1247.96	1577.5	1272.58						
NC			0.025							
QT	2	2101	2101							
ET			7.1				1079	1157		
X1	1300	18	1014.17	1207.18	198.91	153.42	176.37			
GR	1588	1000	1586	1004.58	1584	1009.31	1582	1014.17	1582	1065.78
GR	1582	1072.99	1580	1076.58	1574	1080.99	1572.69	1083.53	1574	1091.54

GR	1580	1106.55	1580	1121.82	1578	1125.36	1576	1170.24	1576	1178.38
GR	1578	1183.85	1578	1201.6	1579	1207.18				
ET			7.1				1140	1180		
X1	1400	18	1061	1186.25	122.02	190.42	161.58			
GR	1600	1000	1600	1027.47	1598	1035.26	1596	1040.7	1590	1046.91
GR	1588	1052.71	1586	1056.6	1584	1061	1582	1138.25	1580	1142.92
GR	1578	1145.8	1578	1160.96	1580	1173.97	1582	1180.16	1584	1186.25
GR	1584	1230.34	1584	1231.21	1584	1307.21				
QT	2	2209	2209							
ET			7.1				1172	1222		
X1	1500	22	1081.73	1230.57	76.07	119.69	108.07			
GR	1600	1000	1599	1069.96	1583	1081.73	1582	1182.35	1580	1186.84
GR	1578	1197.97	1578	1201.11	1580	1212.43	1582	1216.13	1583.8	1230.57
GR	1584	1294.4	1584	1308.23	1584	1356.62	1586	1626.22	1588	1674.02
GR	1590	1697.27	1592	1726.23	1594	1741.62	1596	1753.42	1598	1763.24
GR	1598	1801.09	1596	1808.99						
ET			7.1				1160	1210		
X1	1600	13	1094.37	1243.82	101.17	210.32	196.31			
GR	1602	1000	1600	1064.32	1594.01	1081.14	1584	1094.37	1582	1149.75
GR	1580.4	1170.49	1580.78	1218.11	1582	1229.76	1584	1243.82	1585	1327.67
GR	1586	1412.26	1588	1551.37	1590	1677.73				
ET			7.1				1135	1200		
X1	1650	23	1129.97	1180.64	190.68	185.82	175.97			
GR	1600	1000	1598	1005.05	1596	1011.4	1594	1026.96	1594	1094.89
GR	1594	1110.32	1592	1122.14	1590	1124.66	1588	1129.97	1586	1134.76
GR	1584	1139.66	1582	1148.86	1582	1161.14	1584	1172.84	1584.7	1180.64
GR	1585	1256.59	1586	1347.77	1588	1480.9	1590	1600.61	1592	1684.68
GR	1594	1697.13	1596	1700.86	1598	1704.54				
NC	0.04	0.04	0.025							
ET			7.1				1286.61	1351.61		
X1	1700	20	1286.61	1350.67	163.66	154.63	161.13			
GR	1602	1000	1604	1037.4	1605.9	1128.6	1605.81	1151.3	1604	1198.85
GR	1602	1246.99	1600	1248.58	1590	1277.69	1588	1282.43	1586	1286.61
GR	1584	1301.89	1582.05	1314.08	1584	1326.15	1586	1341.79	1586.5	1350.67
GR	1586	1360.4	1585.5	1416.24	1586	1475.83	1588	1602.02	1590	1708.11
NC	0.04	0.04	0.025							

```
ET                              7.1                                     1095.43     1135.43
X1      1750          21    1095.43     1152.29      171.49      179.87      169.33
GR      1610        1050    1608        1023.79      1606        1053.35     1604        1063.55     1602        1070.34
GR      1600      1076.66   1590        1095.43      1588        1097.81     1586        1103.58     1582.1      1112
GR    1587.1      1122.43   1586        1133.65      1587.5      1152.29     1587.1      1211.93     1588        1287.4
GR      1590      1362.75   1592        1371.76      1594        1376.44     1596        1380.58     1598        1384.75
GR      1600      1386.94

NC      0.04        0.04      0.025       0.1          0.3
ET                              7.1                                     1146        1176
```



```
X1      1800          19    1139.62     1221.1       173.79      148.02      170.93
GR      1606        1000    1606        1021.77      1604        1037.17     1602        1053.97     1600        1078.01
GR      1598      1135.85   1596        1139.62      1590        1145.75     1588        1148.51     1586        1151.34
GR    1581.1      1155.97   1582.1      1164.98      1586        1171.75     1588        1183.17     1590        1191.2
GR      1592      1221.1    1594        1234.56      1596        1243.62     1598        1254.32

NC      0.015       0.015     0.015       0.3          0.5
QT                2          2138        2138
X1      1900          14    1193.33     1205.33      66.92       60.81       58.98
GR      1606        1000    1604        1017.04      1602        1034.84     1600        1056.24     1598        1118.67
GR      1590      1176.6    1582.19     1193.33      1582.19     1193.33     1582.19     1205.33     1592.19     1205.33
GR      1594      1221.37   1596        1224.34      1598        1232.13     1600        1243.77

NC      0.015       0.015     0.015       0.3          0.5
SB                  1.5       2.7         114          12                   120         0           1588.88     1582.19
X1      2000          9     1044.29     1056.29      320.07      303.13      319.85
XT                            1           1598.88      1603.83
GR      1602        1000    1600        1026.41      1598.88     1044.29     1586.88     1044.29     1588.88     1056.29
GR    1598.6      1056.29   1600        1080.33      1602        1092.77     1604        1104.82

NC      0.04        0.04      0.025       0.3          0.5
QT                2          3478        3478
ET                            10.4
X1      2100          17    1093.94     1188.63      58.83       54.83       49.81
GR      1606        1000    1604        1009.57      1602        1013.54     1600        1020.41     1598        1037.57
GR      1596      1093.94   1594        1118.59      1592        1126.16     1590        1145.6      1590        1151.46
GR      1592      1174.19   1594        1184.61      1596        1188.63     1598        1204.5      1600        1224.72
GR      1602      1240.9    1604        1251.99

NC      0.04        0.04      0.025       0.1          0.3
ET                            55.4
X1      2200          16    142.43      318.37       383.01      273.85      328.57
GR      1606          0     1608        20.66        1606        28.27       1604        40.91       1603        53.3
GR      1602       71.43    1600        112.67       1598        142.43      1596        210.95      1593        217.68
GR      1598      316.37    1596        562.06       1596        571.04      1596        618.66      1596        624.51
GR      1598      691.73    1600        708.07       1602        779.64

NC                                      0.1          0.3
ET                            10.4
X1      2300          18    150.15      250.92       320.42      310.65      311.55
GR      1608          0     1608        15.33        1606        21.57       1604        27.19       1602        63.6
GR      1600      150.15    1599        164.23       1598        187.99      1596        192.33      1594        198.34
GR      1594      228.2     1596        235.23       1598        238.65      1600        244.41      1600        250.92
GR      1600      277.03    1600        398.64       1602        414.21
     STATUS: Analyzing profile 1.

     STATUS: Critical depth to be calculated at all cross-sections.

     STATUS: Allowable error for critical depth determination (ALLDC) is  2.000
             percent of the depth.
```



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  Contraction Coefficient (CCHV)                                        0.100

  Expansion Coefficient (CEHV)                                          0.300

     STATUS: Analyzing cross-section reach 200.000.

     WARNING: (3720) Critical depth has been assumed.
```

Cross Section Number SECNO	Left Overbank Manning n XNL	Channel Manning n XNCH	Right Overbank Manning n XNR	Flow Depth DEPTH (ft)	Water Surface Elevation CWSEL (ft MSL)	Critical W. S. Elevation CRIWS (ft MSL)	Known W. S. Elevation WSELK (ft MSL)
Energy Gradient SLOPE (ft/ft)	Left Overbank Length XLOBL (ft)	Channel Length XLCH (ft)	Right Overbank Length XLOBR (ft)	Energy Gradient Elevation EG (ft MSL)	Weighted Velocity Head HV (ft)	Friction Energy Loss HL (ft)	Other Energy Loss OLOSS (ft)
Cummul-ative Volume VOL (acre-ft)	Left Overbank Area ALOB (sq ft)	Channel Area ACH (sq ft)	Right Overbank Area AROB (sq ft)	Bridge Deck Area COAR (sq ft)	Left Bank Elevation LTBNK (ft MSL)	Right Bank Elevation RTBNK (ft MSL)	Number of Balance Trials ITRIAL
Total Flow Q (cfs)	Left Overbank Flow QLOB (cfs)	Channel Flow QCH (cfs)	Right Overbank Flow QROB (cfs)	Computed W. S. Top Width TOPWD (ft)	Left W. S. Station SSTA (ft)	Right W. S. Station ENDST (ft)	Number of Crit Dpth Trials IDC
Flow Travel Time TIME	Left Overbank Velocity VLOB	Channel Mean Velocity VCH	Right Overbank Velocity VROB	Length Weighted Manning n WTN	Cummul. Surface Area TWA	Minimum C. S. Elevation ELMIN	Number of Other Trials ICONT

(hrs)	(ft/s)	(ft/s)	(ft/s)		(acres)	(ft MSL)	
200.000	0.000	0.025	0.000	1.07	1555.07	1555.07	1555.10
0.009193	0	0	0	1555.57	0.50	0.00	0.00
0.00	0	117	0	0.00	1560.00	1560.00	0
669	0	669	0	118.7	2956.29	3074.54	7
0.00	0.00	5.68	0.00	0.000	0.0	1554.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 200.000
Total Discharge (cfs, Q) 669
Computed Water Surface Elevation (ft MSL, CWSEL) 1555.07

Station (ft) = 2956.3 3113.9
Flow (+) = 100.0
Area (sq ft) = 117.8
Vel (ft/s) = 5.68
Depth (ft) = 1.00

STATUS: Analyzing cross-section reach 300.000.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
300.000	0.000	0.025	0.000	2.01	1560.01	1560.01	0.00
0.008014	364	352	359	1560.77	0.75	3.02	0.08
0.86	0	95	0	0.00	1562.00	1562.00	0
669	0	669	0	63.7	2954.61	3018.35	14
0.01	0.00	6.97	0.00	0.000	0.7	1558.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 300.000
Total Discharge (cfs, Q) 669
Computed Water Surface Elevation (ft MSL, CWSEL) 1560.01

Station (ft) = 2954.6 3035.8
Flow (+) = 100.0
Area (sq ft) = 96.0
Vel (ft/s) = 6.97
Depth (ft) = 1.51

Contraction Coefficient (CCHV) 0.100

Expansion Coefficient (CEHV) 0.300

STATUS: Analyzing cross-section reach 400.000.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
400.000	0.000	0.025	0.000	2.56	1562.56	1562.56	0.00
0.009164	132	134	158	1563.09	0.53	1.15	0.02
1.19	0	114	0	0.00	1566.00	1564.00	0
669	0	669	0	110.7	2324.57	2435.25	11
0.02	0.00	5.82	0.00	0.000	1.0	1560.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 400.000
Total Discharge (cfs, Q) 669
Computed Water Surface Elevation (ft MSL, CWSEL) 1562.56

Station (ft) = 2324.6 2450.7
Flow (+) = 100.0
Area (sq ft) = 115.0
Vel (ft/s) = 5.82
Depth (ft) = 1.04

Contraction Coefficient (CCHV) 0.300

Expansion Coefficient (CEHV) 0.500

STATUS: Analyzing cross-section reach 500.000.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

STATUS: (3495) Overbank area assumed noneffective.

Left Overbank Elevation (ft, XLBEL)	1572.00
Right Overbank Elevation (ft, RBEL)	1572.00

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
500.000	*0.000*	*0.015*	*0.000*	2.13	1566.47	1566.47	0.00
0.002948	75	74	81	1567.54	1.07	0.36	0.27
1.36	0	80	0	0.00	1572.00	1572.00	0
669	0	669	0	37.7	2332.84	2370.57	11
0.02	0.00	8.30	0.00	0.000	1.1	1564.30	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	500.000
Total Discharge (cfs, Q)	669
Computed Water Surface Elevation (ft MSL, CWSEL)	1566.47

Station (ft) = 2332.8 2370.6
Flow (s) = 100.0
Area (sq ft) = 80.6
Vel (ft/s) = 8.30
Depth (ft) = 2.14

Contraction Coefficient (CCHV)	0.300
Expansion Coefficient (CEHV)	0.500

STATUS: Special bridge analysis being performed.

STATUS: (5227) Downstream elevation is 1566.21, not 1566.47, hydraulic jump occurs downstream (if low flow controls).

BRIDGE DESCRIPTION :

Bridge Total Loss Coefficient (XKOR)		1.50
Bridge Opening Total Area (sq ft, BAREA)		147.38
Bridge Opening Bottom Width (ft, BWC)		37.77
Bridge Opening Side Slope (SS)	1 :	0.00
Bridge Opening Upstream Invert (ft MSL, ELCHU)		1565.46
Bridge Opening Downstream Invert (ft MSL, ELCHD)		1564.37
Bridge Skew Factor (BSQ)		1.00
Roadway Length (ft, RDLEN)		76.00
Roadway Weir Flow Discharge Coefficient (COFQ)		2.70
Pier Width (ft, BWP)		1.34
Pier Loss Drag Coefficient (CMOM)		2.00
Pier Shape Coefficient (XK)		1.25

STATUS: Analyzing cross-section reach 600.000.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO)	1.41

STATUS: Class B low flow.

STATUS: (3420) Bridge computation results:

Bridge Water-Surface Elevation (ft MSL, WSBR)	1567.11
Bridge Flow Velocity (ft/s, VBR)	8.39
Calculated Channel Area (sq ft, TRAPER)	60.

BRIDGE ANALYSIS RESULTS :

Pressure Flow Energy Grade Line Elevation (ft MSL, EGPRS 0.00

Low Flow Energy Grade Line Elevation (ft MSL, EGLWC) 1568.69

Low Flow Water Surface Drop Through Bridge (ft, H3) 0.00

Total Weir Flow (cfs, QWEIR) 0.

Bridge Discharge as Orifice or Low Flow (cfs, QLOW) 669.

Actual Bridge Opening Area (sq ft, BAREA) 147.

Trapezoidal Approx. Opening Area less Pier Area (sq ft, TAREA 147.

Bridge Low Chord Elevation (ft MSL, ELLC) 1574.00

Top of Roadway Elevation (ft MSL, ELTFL) 1571.66

Roadway Weir Length (ft, WEIRLN) 0.0

STATUS: (3495) Overbank area assumed noneffective.

Left Overbank Elevation (ft, XLBEL: 1572.66
Right Overbank Elevation (ft, RBEL 1572.66

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
600.000	0.000	0.015	0.000	2.64	1568.10	0.00	0.00
0.001491	122	133	131	1568.80	0.00	1.24	0.00
1.63	0	99	0	0.00	1572.66	1572.66	0
669	0	669	0	37.7	2596.22	2633.95	0
0.03	0.00	6.70	0.00	0.000	1.0	1565.46	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 600.000
Total Discharge (cfs, Q) 669
Computed Water Surface Elevation (ft MSL, CWSEL) 1568.10

Station (ft) = 2596.2 2633.9
Flow (+) = 100.0
Area (sq ft) = 99.8
Vel (ft/s) = 6.70
Depth (ft) = 2.64

Contraction Coefficient (CCHV) 0.300

Expansion Coefficient (CEHV) 0.500

STATUS: Analyzing cross-section reach 700.000.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
700.000	0.000	0.030	0.000	3.79	1573.29	1573.29	0.00
0.013469	133	112	79	1573.79	0.50	0.38	0.06
1.92	0	118	0	0.00	1573.80	1574.80	0
669	0	668	0	119.6	2123.53	2243.13	5
0.03	0.00	5.66	0.00	0.000	1.5	1569.50	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 700.000
Total Discharge (cfs, Q) 669
Computed Water Surface Elevation (ft MSL, CWSEL) 1573.29

Station (ft) = 2123.5 2330.8
Flow (+) = 100.0
Area (sq ft) = 118.3
Vel (ft/s) = 5.66
Depth (ft) = 0.99

Contraction Coefficient (CCHV) 0.100

Expansion Coefficient (CEHV) 0.300

STATUS: Analyzing cross-section reach 800.000.

STATUS: (3280) For cross-section 800.00, ends have been extended vertically 0.26 feet in order to calculate the hydraulic cross-section properties.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 1.47

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
800.000	0.000	0.030	0.000	4.76	1574.76	1574.41	0.00
0.006364	134	144	139	1575.10	0.34	1.29	0.02
2.35	0	145	0	0.00	1574.50	1576.00	2
676	0	675	0	112.3	1769.22	1881.50	12
0.04	0.00	4.65	0.00	0.000	1.8	1570.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 800.000
Total Discharge (cfs, Q) 676
Computed Water Surface Elevation (ft MSL, CWSEL) 1574.76

Station (ft) = 1769.2 1903.9
Flow (%) = 100.0
Area (sq ft) = 145.4
Vel (ft/s) = 4.65
Depth (ft) = 1.29

STATUS: Analyzing cross-section reach 900.000.

STATUS: (3280) For cross-section 900.00, ends have been extended vertically 0.88 feet in order to calculate the hydraulic cross-section properties.

900.000	0.000	0.030	0.000	4.37	1575.37	1575.28	0.00
0.009274	102	103	108	1575.98	0.61	0.80	0.08
2.68	0	127	0	0.00	1574.50	1577.00	2
798	0	797	0	82.6	1575.70	1658.35	10
0.05	0.00	6.26	0.00	0.000	2.1	1571.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 900.000
Total Discharge (cfs, Q) 798
Computed Water Surface Elevation (ft MSL, CWSEL) 1575.37

Station (ft) = 1575.7 1686.8
Flow (%) = 100.0
Area (sq ft) = 127.5
Vel (ft/s) = 6.26
Depth (ft) = 1.54

STATUS: Analyzing cross-section reach 1000.000.

STATUS: (3280) For cross-section 1000.00, ends have been extended vertically 0.45 feet in order to calculate the hydraulic cross-section properties.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
1000.000	0.000	0.030	0.000	5.30	1576.45	1576.36	0.00
0.011051	116	118	121	1577.24	0.79	1.21	0.06
3.04	0	135	0	0.00	1576.00	1577.20	2
966	0	965	0	81.8	1472.42	1554.18	11
0.05	0.00	7.15	0.00	0.000	2.3	1571.15	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 1000.000
Total Discharge (cfs, Q) 966
Computed Water Surface Elevation (ft MSL, CWSEL) 1576.45

Station (ft) = 1472.4 1568.4
Flow (%) = 100.0
Area (sq ft) = 135.2
Vel (ft/s) = 7.15
Depth (ft) = 1.65

STATUS: Analyzing cross-section reach 1100.000.

STATUS: (3280) For cross-section 1100.00, ends have been extended vertically 1.47 feet in order to calculate the hydraulic cross-section properties.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 1.81

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
1100.000	0.000	0.030	0.000	6.07	1577.47	1576.93	0.00
0.005473	102	103	103	1578.02	0.54	0.75	0.02
3.44	0	208	0	0.00	1576.00	1577.40	2
1232	0	1231	0	97.6	1320.06	1417.67	8
0.06	0.00	5.92	0.00	0.000	2.5	1571.40	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 1100.000
Total Discharge (cfs, Q) 1232
Computed Water Surface Elevation (ft MSL, CWSEL) 1577.47

Station (ft) = 1320.1 1417.7
Flow (%) = 100.0
Area (sq ft) = 208.1
Vel (ft/s) = 5.92
Depth (ft) = 2.13

STATUS: Analyzing cross-section reach 1200.000.

STATUS: (3280) For cross-section 1200.00, ends have been extended vertically 1.90 feet in order to calculate the hydraulic cross-section properties.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 1.59

1200.000	0.000	0.030	0.000	6.28	1577.90	1577.33	0.00
0.005109	111	110	110	1578.66	0.76	0.58	0.06
4.05	0	270	0	0.00	1576.00	1577.50	2
1889	0	1888	0	94.2	1178.38	1272.58	12
0.06	0.00	6.99	0.00	0.000	2.7	1571.62	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 1200.000
Total Discharge (cfs, Q) 1889
Computed Water Surface Elevation (ft MSL, CWSEL) 1577.90

Station (ft) = 1178.4 1272.6
Flow (%) = 100.0
Area (sq ft) = 270.4
Vel (ft/s) = 6.99
Depth (ft) = 2.87

STATUS: Analyzing cross-section reach 1300.000.

STATUS: (3265) Divided flow.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
1300.000	0.000	0.025	0.000	6.23	1578.92	1578.92	0.00
0.007945	198	176	153	1580.10	1.18	1.12	0.13
5.09	0	241	0	0.00	1582.00	1579.00	0
2101	0	2100	0	103.6	1077.38	1206.71	5
0.07	0.00	8.72	0.00	0.000	3.2	1572.69	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 1300.000
Total Discharge (cfs, Q) 2101
Computed Water Surface Elevation (ft MSL, CWSEL) 1578.92

Station (ft) = 1077.4 1207.2
Flow (%) = 100.0
Area (sq ft) = 241.1
Vel (ft/s) = 8.72
Depth (ft) = 2.20

STATUS: Analyzing cross-section reach 1400.000.

WARNING: (7185) Critical depth has been crossed; therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	AREA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	ZWA	ELMIN	ICONT
1400.000	0.000	0.025	0.000	5.65	1584.63	1584.63	0.00
0.007512	122	161	190	1584.79	1.26	1.25	0.00
5.98	0	247	0	1.00	1584.00	1584.00	0
2101	0	2100	0	100.0	1175.28	1165.17	8
0.07	0.00	8.65	0.00	0.000	3.7	1578.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 1400.000
Total Discharge (cfs, Q) 2101
Computed Water Surface Elevation (ft MSL, CWSEL) 1584.63

Station (ft) =	1075.4	1186.3
Flow (-) =	100.0	
Area (sq ft) =	242.9	
Vel (ft/s) =	8.65	
Depth (ft) =	2.21	

STATUS: Analyzing cross-section reach 1500.000

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO): 2.53

1500.000	0.040	0.025	0.040	6.87	1584.87	1583.71	0.00
0.001302	76	108	115	1585.16	0.29	0.28	0.09
7.08	1	452	167	0.00	1583.00	1583.80	3
2209	1	2020	187	394.5	1281.35	1414.89	5
0.08	0.90	4.47	1.11	0.000	4.2	1578.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 1500.000
Total Discharge (cfs, Q) 2209
Computed Water Surface Elevation (ft MSL, CWSEL) 1584.87

Station (ft) =	1080.4	1081.7	1230.6	1294.4	1308.2	1356.6
Flow (-) =	0.1	91.5	7.5	0.7	2.3	
Area (sq ft) =	1.3	452.0	61.5	12.0	42.1	
Vel (ft/s) =	0.90	4.47	1.11	1.22	1.22	
Depth (ft) =	0.94	3.04	0.87	0.87	0.87	

Station (ft) =	1356.6	1474.8
Flow (-) =	1.8	
Area (sq ft) =	51.5	
Vel (ft/s) =	0.77	
Depth (ft) =	0.44	

STATUS: Analyzing cross-section reach 1600.000

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	AREA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	ZWA	ELMIN	ICONT
1600.000	0.040	0.025	0.040	4.70	1585.10	1583.69	0.00
0.001173	101	196	210	1585.40	0.30	0.24	0.01
9.72	0	485	51	0.00	1584.00	1584.00	2
2209	0	2162	46	243.5	1097.91	1336.46	11
0.09	0.74	4.46	0.90	0.000	5.7	1580.40	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 1600.000
Total Discharge (cfs, Q) 2209
Computed Water Surface Elevation (ft MSL, CWSEL) 1585.10

Station (ft) =	1092.9	1094.4	1243.8	1307.7	1356.4
Flow (-) =	0.0	97.9	2.1	0.0	
Area (sq ft) =	0.8	485.0	50.6	0.5	
Vel (ft/s) =	0.74	4.46	0.91	0.18	
Depth (ft) =	0.55	3.25	0.81	0.05	

STATUS: Analyzing cross-section reach 1650.000

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
1650.000	0.000	0.025	0.040	4.66	1586.66	1586.66	0.00
0.004414	192	175	185	1587.48	0.82	0.36	0.15
11.68	0	160	256	0.00	1586.00	1584.70	0
2209	0	1407	801	258.5	1133.18	1391.65	5
0.10	0.60	8.78	3.13	0.000	6.8	1582.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 1650.000
Total Discharge (cfs, Q) 2209
Computed Water Surface Elevation (ft MSL, CWSEL) 1586.66

Station (ft) =	1133.2	1180.6	1254.6	1347.6	1391.6
Flow (=) =	63.7	22.2	13.3	0.8	
Area (sq ft) =	160.4	133.8	108.0	14.5	
Vel (ft/s) =	8.78	3.66	2.72	1.18	
Depth (ft) =	3.38	1.81	1.16	0.33	

STATUS: Analyzing cross-section reach 1700.000.

1700.000	0.040	0.025	0.040	5.51	1587.56	1587.24	0.00
0.003048	163	161	154	1588.68	0.52	0.58	0.03
13.33	2	200	298	0.00	1586.00	1586.50	3
2209	4	1403	801	290.9	1283.35	1574.29	8
0.11	1.62	6.99	2.68	0.000	7.7	1582.05	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 1700.000
Total Discharge (cfs, Q) 2209
Computed Water Surface Elevation (ft MSL, CWSEL) 1587.56

Station (ft) =	1283.3	1286.6	1350.7	1360.4	1416.2	1475.8
Flow (=) =	0.2	63.5	1.4	13.9	14.9	
Area (sq ft) =	2.5	200.8	12.8	101.1	107.9	
Vel (ft/s) =	1.62	6.99	2.45	3.05	3.05	
Depth (ft) =	0.78	3.14	1.31	1.81	1.81	

Station (ft) =	1475.8	1574.3
Flow (=) =	6.0	
Area (sq ft) =	76.8	
Vel (ft/s) =	1.74	
Depth (ft) =	0.78	

STATUS: Analyzing cross-section reach 1750.000.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
1750.000	0.000	0.025	0.040	6.52	1588.62	1588.62	0.00
0.004062	171	169	179	1589.60	0.98	0.60	0.14
15.08	0	202	167	0.00	1590.00	1587.50	0
2209	0	1775	433	213.8	1097.07	1310.83	11
0.11	0.00	8.78	2.59	0.000	8.8	1582.10	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 1750.000
Total Discharge (cfs, Q) 2209
Computed Water Surface Elevation (ft MSL, CWSEL) 1588.62

Station (ft) =	1097.1	1152.3	1211.9	1287.4	1310.8
Flow (=) =	80.4	10.2	9.1	0.4	
Area (sq ft) =	202.3	78.8	80.9	7.3	
Vel (ft/s) =	8.78	2.85	2.48	1.09	
Depth (ft) =	3.66	1.32	1.07	0.31	

Contraction Coefficient (CCHV) 0.100

Expansion Coefficient (CEHV) 0.300

STATUS: Analyzing cross-section reach 1800.000.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	*ALOB*	*ACH*	*AROB*	*CORAR*	*LTBNK*	*RTBNK*	*ITRIAL*
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
1800.000	0.000	0.025	0.000	7.80	1589.90	1589.90	0.00
0.006514	173	170	148	1592.04	2.14	0.86	0.35
16.13	0	187	0	0.00	1596.00	1592.00	0
2209	0	2208	0	44.9	1145.89	1190.79	11
0.12	*0.00*	11.75	*0.00*	*0.000*	9.2	1582.10	*0*

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 1800.000
Total Discharge (cfs, Q) 2209
Computed Water Surface Elevation (ft MSL, CWSEL) 1589.90

Station (ft) = *1145.9* *1221.1*
Flow (s) = 100.0
Area (sq ft) = 188.0
Vel (ft/s) = 11.75
Depth (ft) = 4.19

Contraction Coefficient (CCHV) 0.300

Expansion Coefficient (CEHV) 0.500

STATUS: Analyzing cross-section reach 1900.000.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

1900.000	0.000	0.015	0.000	9.90	1592.09	1592.09	0.00
0.005698	66	58	60	1597.12	5.03	0.36	1.44
16.34	0	118	0	0.00	1592.19	1592.19	0
2138	0	2137	0	12.0	1193.33	1205.33	14
0.12	0.00	18.00	0.00	0.000	9.3	1582.19	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 1900.000
Total Discharge (cfs, Q) 2138
Computed Water Surface Elevation (ft MSL, CWSEL) 1592.09

Station (ft) = 1193.3 1205.3
Flow (s) = 100.0
Area (sq ft) = 118.8
Vel (ft/s) = 18.00
Depth (ft) = 9.90

Contraction Coefficient (CCHV) 0.300

Expansion Coefficient (CEHV) 0.500

STATUS: Special bridge analysis being performed.

BRIDGE DESCRIPTION :

Bridge Total Loss Coefficient (XKOR) 1.50

Bridge Opening Total Area (sq ft, BAREA) 120.00

Bridge Opening Bottom Width (ft, BWC) 12.00

Bridge Opening Side Slope (SS) 1 : 0.00

Bridge Opening Upstream Invert (ft MSL, ELCHU) 1588.88

Bridge Opening Downstream Invert (ft MSL, ELCHD) 1582.19

Bridge Skew Factor (BSQ) 1.00

Roadway Length (ft, RDLEN) 114.00

Roadway Weir Flow Discharge Coefficient (COFQ) 2.70

Pier Width (ft, BWP) 0.00

Pier Loss Drag Coefficient (CMOM) 2.00

Pier Shape Coefficient (XK) 0.00

STATUS: Analyzing cross-section reach 2000.000.

STATUS: (6070) Low flow computed by normal bridge method.

BRIDGE ANALYSIS RESULTS :

Pressure Flow Energy Grade Line Elevation (ft MSL, EGPRS)	1599.48
Low Flow Energy Grade Line Elevation (ft MSL, EGLWC)	1603.81
Bridge Low Chord Elevation (ft MSL, ELLC)	1598.88
Previous Computed Water Surface Elevation (ft MSL, PCWSE)	1592.09
Top of Roadway Elevation (ft MSL, ELTRD)	1603.83

STATUS: (4575) Critical depth assumed below bridge low chord. Results follow:

Bridge Low Chord Elevation (ft MSL, ELLC)	1598.88
Low Chord Depth EGL Elevation (ft MSL, EGLC)	1603.81
Critical Depth EGL Elevation (ft MSL, EGC)	1606.37
Estimated Water Surface Elevation (ft MSL, WSEL)	1605.14

STATUS: (4575) Critical depth assumed below bridge low chord. Results follow:

Bridge Low Chord Elevation (ft MSL, ELLC)	1598.88
Low Chord Depth EGL Elevation (ft MSL, EGLC)	1603.81
Critical Depth EGL Elevation (ft MSL, EGC)	1603.81
Estimated Water Surface Elevation (ft MSL, WSEL)	1598.74

STATUS: (3370) Normal bridge method specified for cross-section. Bridge deck information follows:

Number of Roadway Points (NRD)	0
Top of Roadway Elevation (ft MSL, ELTRD)	1603.83
Bridge Low Chord Elevation (ft MSL, ELLC)	1598.88

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
2000.000	0.000	0.015	0.015	10.00	1598.88	1598.88	0.00
0.008467	320	319	303	1603.81	4.93	2.20	0.03
17.22	0	120	0	0.00	1598.88	1598.80	0
2138	0	2137	0	13.6	1044.29	1057.89	18
0.12	0.00	17.82	0.09	0.000	9.4	1588.88	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)			2000.000
Total Discharge (cfs, Q)			2138
Computed Water Surface Elevation (ft MSL, CWSEL)			1598.88
Station (ft) =	1044.3	1056.3	1057.9
Flow (cfs) =	100.0	0.0	
Area (sq ft) =	120.0	0.1	
Vel (ft/s) =	17.82	0.09	
Depth (ft) =	10.00	0.04	
Contraction Coefficient (CCHV)			0.300
Expansion Coefficient (CEHV)			0.500

STATUS: Analyzing cross-section reach 2100.000.

STATUS: (3280) For cross-section 2100.00, ends have been extended vertically 1.22 feet in order to calculate the hydraulic cross-section properties.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 22.18

2100.000	0.040	0.025	0.040	15.22	1605.22	1595.96	0.00
0.000046	58	49	54	1605.28	0.06	0.01	1.46
18.60	611	1201	348	0.00	1596.00	1596.00	3
3478	585	2600	292	248.2	1003.75	1251.99	14
0.13	0.96	2.16	0.84	0.000	9.5	1590.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)						2100.000
Total Discharge (cfs, Q)						3478
Computed Water Surface Elevation (ft MSL, CWSEL)						1605.22
Station (ft) =	1003.8	1009.6	1013.5	1020.4	1037.6	1093.9
Flow (-) =	0.0	0.1	0.5	2.6	13.6	
Area (sq ft) =	3.5	8.8	29.0	106.7	463.1	
Vel (ft/s) =	0.18	0.40	0.64	0.84	1.02	
Depth (ft) =	0.61	2.22	4.22	6.22	8.22	
Station (ft) =	1093.9	1166.6	1204.5	1224.7	1240.9	1252.0
Flow (-) =	74.8	3.6	3.1	1.3	0.3	
Area (sq ft) =	1201.3	130.4	125.7	68.2	24.6	
Vel (ft/s) =	2.16	1.02	0.84	0.65	0.39	
Depth (ft) =	12.69	8.22	6.22	4.22	2.22	
Contraction Coefficient (CCHV)						0.100
Expansion Coefficient (CEHV)						0.300

STATUS: Analyzing cross-section reach 2200.000.

STATUS: (3280) For cross-section 2200.00, ends have been extended vertically 3.28 feet in order to calculate the hydraulic cross-section properties.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 1.94

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
2200.000	0.040	0.025	0.040	12.28	1605.28	1597.75	0.00
0.000012	383	328	273	1605.29	0.01	0.01	0.00
46.20	441	1624	3566	0.00	1598.00	1598.00	2
3478	159	1475	1842	746.8	32.82	779.64	17
0.26	0.36	0.91	0.52	0.000	13.1	1593.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)						2200.000
Total Discharge (cfs, Q)						3478
Computed Water Surface Elevation (ft MSL, CWSEL)						1605.28
Station (ft) =	32.8	142.4	318.4	562.1	618.7	693.7
Flow (-) =	4.6	42.4	30.7	8.6	9.6	
Area (sq ft) =	441.0	1624.6	2017.8	525.2	627.4	
Vel (ft/s) =	0.36	0.91	0.53	0.57	0.53	
Depth (ft) =	4.02	9.23	8.28	9.28	8.36	
Station (ft) =	693.7	779.6				
Flow (-) =	4.0					
Area (sq ft) =	396.4					
Vel (ft/s) =	0.36					
Depth (ft) =	4.61					
Contraction Coefficient (CCHV)						0.100
Expansion Coefficient (CEHV)						0.300

STATUS: Analyzing cross-section reach 2300.000.

STATUS: (3280) For cross-section 2300.00, ends have been extended vertically 3.25 feet in order to calculate the hydraulic cross-section properties.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 0.34

2300.000	0.040	0.025	0.040	11.25	1605.25	1600.56	0.00
0.000106	320	311	310	1605.31	0.07	0.01	0.02
74.03	451	844	840	0.00	1600.00	1600.00	2
3478	422	2103	951	390.4	23.68	414.11	11
0.31	0.94	2.49	1.13	0.000	17.2	1594.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	2300.000
Total Discharge (cfs, Q)	3478
Computed Water Surface Elevation (ft MSL, CWSEL)	1605.25

```
   Station (ft) =       23.7      27.2      63.6     150.1     250.9     277.0
        Flow (%)  =        0.0       1.5      10.6      60.5       4.5
        Area (sq ft) =     2.2      81.8     367.7     844.9     137.0
        Vel (ft/s)   =    0.27      0.65      1.00      2.49      1.15
        Depth (ft)   =    0.62      2.25      4.25      8.38      5.25

   Station (ft) =       277.0     398.6     414.1
        Flow (%)  =        21.2       1.7
        Area (sq ft) =   638.2      65.7
        Vel (ft/s)   =    1.15      0.88
        Depth (ft)   =    5.25      4.25

T1      550-0351
T2      Abbott and Pulsipher Washes FIS Restudy
T3      Pulsipher Wash Detailed Hydraulic Analysis

JOB PARAMETERS :
----------------

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
                3                             -1                            669     1556.1

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
     15                   -1                                      -2        -6                  15


      STATUS: Analyzing profile 2.

      STATUS: Critical depth to be calculated at all cross-sections.

      STATUS: Allowable error for critical depth determination (ALLDC) is  2.000
              percent of the depth.

   Contraction Coefficient (CCHV)                                          0.100

   Expansion Coefficient (CEHV)                                            0.300

      STATUS: Analyzing cross-section reach 200.000.

      WARNING: (3720) Critical depth has been assumed.

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  PROJECT TITLE  : Abbott and Pulsipher Washes FIS Restudy
  PROJECT NUMBER : 550-0351                                      11/13/2000
-------------------------------------------------------------------------------

      STATUS: (3470) Encroachment computation information follows:

              Left Encroachment Station (ft, STENCL)                  2990.00
              Right Encroachment Station (ft, STENCR)                 3030.00
              Encroachment Method (TYPE)                                    1
              Width or Percent Target                                  40.000

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

  200.000      0.000      0.025      0.000      2.05    1556.05    1556.05    1555.07
0.008209          0          0          0   1557.08       1.03       0.00       0.00
     0.00          0         82          0      0.00  100000.00  100000.00          0
      669          0        669          0      40.0    2990.00    3030.00          7
     0.00       0.00       8.15       0.00     0.000        0.0    1554.00          0

FLOW DISTRIBUTION :
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   Cross-Section Number (SECNO)                                          200.000
   Total Discharge (cfs, Q)                                                669
   Computed Water Surface Elevation (ft MSL, CWSEL)                      1556.05

   Station (ft) =     2990.0    3113.9
        Flow (%)  =      100.0
        Area (sq ft) =    82.1
        Vel (ft/s)   =    8.15
        Depth (ft)   =    2.05

      STATUS: Analyzing cross-section reach 300.000.

      WARNING: (7185) Critical depth has been crossed, therefore critical
               depth has been assumed for the current cross-section.

      WARNING: (3720) Critical depth has been assumed.

      STATUS: (3470) Encroachment computation information follows:

              Left Encroachment Station (ft, STENCL)                  2970.00
              Right Encroachment Station (ft, STENCR)                 2993.00
              Encroachment Method (TYPE)                                    1
              Width or Percent Target                                  23.000

BOSS RiverCAD  HEC-2 Analysis  version 4.0                          PAGE  29
  PROJECT TITLE  : Abbott and Pulsipher Washes FIS Restudy
  PROJECT NUMBER : 550-0351                                      11/13/2000
-------------------------------------------------------------------------------

SECNO      XNL        XNCH       XNR        DEPTH      CWSEL      CRIWS      WSELK
SLOPE      XLOBL      XLCH       XLOBR      EG         HV         HL         OLOSS
VOL        ALOB       ACH        AROB       CORAR      LTBNK      RTBNK      ITRIAL
Q          QLOB       QCH        QROB       TOPWD      SSTA       ENDST      IDC
TIME       VLOB       VCH        VROB       WTN        TWA        ELMIN      ICONT
```

300.000	0.000	0.025	0.000	2.97	1560.97	1560.97	1560.01
0.008648	364	352	359	1562.46	1.49	2.97	0.14
0.61	0	68	0	0.00	100000.00	100000.00	0
669	0	669	0	23.0	2970.00	2993.00	11
0.01	0.00	9.80	0.00	0.000	0.3	1558.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 300.000
Total Discharge (cfs, Q) 669
Computed Water Surface Elevation (ft MSL, CWSEL) 1560.97

Station (ft) = 2970.0 3035.8
Flow (+) = 100.0
Area (sq ft) = 68.3
Vel (ft/s) = 9.80
Depth (ft) = 2.97

Contraction Coefficient (CCHV) 0.100

Expansion Coefficient (CEHV) 0.300

STATUS: Analyzing cross-section reach 400.000.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL) 2339.00
Right Encroachment Station (ft, STENCR) 2358.00
Encroachment Method (TYPE) 1
Width or Percent Target 19.000

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
400.000	0.000	0.025	0.000	3.53	1563.53	1563.53	1562.56
0.008911	132	134	158	1565.23	1.70	1.18	0.06
0.81	0	63	0	0.00	100000.00	100000.00	0
669	0	669	0	19.0	2339.00	2358.00	11
0.01	0.00	10.47	0.00	0.000	0.3	1560.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 400.000
Total Discharge (cfs, Q) 669
Computed Water Surface Elevation (ft MSL, CWSEL) 1563.53

Station (ft) = 2339.0 2450.7
Flow (+) = 100.0
Area (sq ft) = 63.9
Vel (ft/s) = 10.47
Depth (ft) = 3.36

Contraction Coefficient (CCHV) 0.300

Expansion Coefficient (CEHV) 0.500

STATUS: Analyzing cross-section reach 500.000.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

STATUS: (3495) Overbank area assumed noneffective.

Left Overbank Elevation (ft, XLBEL) 1572.00
Right Overbank Elevation (ft, RBEL) 1572.00

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
500.000	0.000	0.015	0.000	2.16	1566.46	1566.46	1566.47
0.002978	75	74	81	1567.54	1.08	0.36	0.19
0.94	0	80	0	0.00	1572.00	1572.00	0
669	0	669	0	37.7	2332.84	2370.57	14
0.02	0.00	8.33	0.00	0.000	0.4	1564.30	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 500.000
Total Discharge (cfs, Q) 669
Computed Water Surface Elevation (ft MSL, CWSEL) 1566.46

Station (ft) = 2352.6 2370.6
Flow (cfs) = 100.0
Area (sq ft) = 60.3
Vel (ft/s) = 8.33
Depth (ft) = 2.13

Contraction Coefficient (CCHV) 0.300

Expansion Coefficient (CEHV) 0.500

STATUS: Special Bridge analysis being performed.

STATUS: (5127) Downstream elevation is 1566.21, not 1566.46,
hydraulic jump occurs downstream (if low flow controls).

BRIDGE DESCRIPTION :

Bridge Total Loss Coefficient (XKTB) 1.50

Bridge Opening Total Area (sq ft, BAREA) 147.38

Bridge Opening bottom Width (ft, BWC) 37.73

Bridge Opening Side Slope (SS) 1 : 0.00

Bridge Opening Upstream Invert (ft MSL, ELCHU) 1565.46

Bridge Opening Downstream Invert (ft MSL, ELCHD) 1564.37

Bridge Skew Factor (BSQ) 1.00

Roadway Length (ft, RDLEN) 76.00

Roadway Weir Flow Discharge Coefficient (COFQ) 2.70

Pier Width (ft, BWP) 1.34

Pier Loss Drag Coefficient (CMOM) 2.00

Pier Shape Coefficient (XK) 1.25

STATUS: Analyzing cross-section reach 600.000.

WARNING: (3502) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 1.41

STATUS: Class B low flow.

STATUS: (3407) Bridge computation results:

Bridge Water-Surface Elevation (ft MSL, WSBR) 1567.11
Bridge Flow Velocity (ft/s, VBR) 8.39
Calculated Channel Area (sq ft, TRAPER) 60.

BRIDGE ANALYSIS RESULTS :

Pressure Flow Energy Grade Line Elevation (ft MSL, EGPRS) 0.00

Low Flow Energy Grade Line Elevation (ft MSL, EGLWC) 1568.80

Low Flow Water Surface Drop Through Bridge (ft, H3) 0.00

Total Weir Flow (cfs, QWEIR) 0.

Bridge Discharge as Orifice or Low Flow (cfs, QLOW) 669.

Actual Bridge Opening Area (sq ft, BAREA) 147.

Trapezoidal Approx. Opening Area less Pier Area (sq ft, TAREA) 147.

Bridge Low Chord Elevation (ft MSL, ELLC) 1569.51

Top of Roadway Elevation (ft MSL, ELTRD) 1572.66

Roadway Weir Length (ft, WEIRLN) 0.0

STATUS: (3495) Overbank area assumed noneffective.

Left Overbank Elevation (ft, XLBEL) 1572.60
Right Overbank Elevation (ft, RBEL) 1572.60

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
600.000	0.035	0.015	0.035	2.64	1568.10	0.00	1568.10

0.001491	122	133	131	1568.80	0.70	1.26	0.00
1.21	0	99	0	0.00	1572.60	1572.60	0
669	0	669	0	37.7	2596.22	2633.95	0
0.02	0.00	6.70	0.00	0.000	0.5	1565.46	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	600.000
Total Discharge (cfs, Q)	669
Computed Water Surface Elevation (ft MSL, CWSEL)	1568.10

Station (ft) = 2596.2 2633.9
Flow (*) = 100.0
Area (sq ft) = 99.8
Vel (ft/s) = 6.70
Depth (ft) = 2.64

Contraction Coefficient (CCHV) 0.300

Expansion Coefficient (CEHV) 0.500

STATUS: Analyzing cross-section reach 700.000.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	2121.76
Right Encroachment Station (ft, STENCR)	2151.76
Encroachment Method (TYPE)	1
Width or Percent Target	30.000

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	*XLOBL*	*XLCH*	*XLOBR*	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
700.000	0.000	0.030	0.000	4.16	1573.66	1573.66	1573.29
0.011249	133	112	79	1574.93	1.27	0.36	0.29
1.44	0	73	0	0.00	1623.80	100000.00	0
669	0	668	0	29.5	2122.27	2151.76	14
0.03	0.00	9.04	0.00	0.000	0.6	1569.50	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	700.000
Total Discharge (cfs, Q)	669
Computed Water Surface Elevation (ft MSL, CWSEL)	1573.66

Station (ft) = 2122.3 2330.8
Flow (*) = 100.0
Area (sq ft) = 74.0
Vel (ft/s) = 9.04
Depth (ft) = 2.51

Contraction Coefficient (CCHV) 0.100

Expansion Coefficient (CEHV) 0.300

STATUS: Analyzing cross-section reach 800.000.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1769.22
Right Encroachment Station (ft, STENCR)	1799.22
Encroachment Method (TYPE)	1
Width or Percent Target	30.000

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
800.000	0.000	0.030	0.000	5.34	1575.34	1574.89	1574.76
0.007179	134	144	139	1576.25	0.91	1.28	0.04
1.71	0	88	0	0.00	1624.50	100000.00	2
676	0	675	0	30.0	1769.22	1799.22	11
0.03	0.00	7.64	0.00	0.000	0.7	1570.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	800.000
Total Discharge (cfs, Q)	676
Computed Water Surface Elevation (ft MSL, CWSEL)	1575.34

Station (ft) = 1769.2 1903.9
Flow (t) = 100.0
Area (sq ft) = 88.5
Vel (ft/s) = 7.64
Depth (ft) = 2.95

STATUS: Analyzing cross-section reach 900.000.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1575.70
Right Encroachment Station (ft, STENCR)	1605.70
Encroachment Method (TYPE)	1
Width or Percent Target	30.000

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	CLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
900.000	0.000	0.030	0.000	5.01	1576.01	1575.31	1571.37
0.005915	102	103	108	1576.91	0.91	0.67	0.00
1.94	0	104	0	0.00	1624.50	100000.00	2
798	0	797	0	30.0	1575.70	1605.70	15
0.03	0.00	7.64	0.00	0.000	0.7	1571.00	3

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	900.000
Total Discharge (cfs, Q)	798
Computed Water Surface Elevation (ft MSL, CWSEL)	1576.01

Station (ft) = 1575.7 1686.8
Flow (t) = 100.0
Area (sq ft) = 104.4
Vel (ft/s) = 7.64
Depth (ft) = 3.48

STATUS: Analyzing cross-section reach 1000.000.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1472.42
Right Encroachment Station (ft, STENCR)	1507.42
Encroachment Method (TYPE)	1
Width or Percent Target	35.000

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	CLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
1000.000	0.000	0.030	0.000	5.01	1576.96	1576.96	1576.45
0.012256	116	118	121	1578.44	1.48	1.01	0.17
2.21	0	98	0	0.00	1626.00	100000.00	0
966	0	965	0	35.0	1472.42	1507.42	11
0.04	0.00	9.78	0.00	0.000	0.8	1571.15	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	1000.000
Total Discharge (cfs, Q)	966
Computed Water Surface Elevation (ft MSL, CWSEL)	1576.96

Station (ft) = 1472.4 1568.4
Flow (t) = 100.0
Area (sq ft) = 98.8
Vel (ft/s) = 9.78
Depth (ft) = 2.82

STATUS: Analyzing cross-section reach 1100.000.

STATUS: (3280) For cross-section 1100.00, ends have been extended vertically 0.89 feet in order to calculate the hydraulic cross-section properties.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 1.99

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)
Right Encroachment Station (ft, STENCR)
Encroachment Method (TYPE)
Width or Percent Target

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	ELOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	STRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IRC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
1100.000	0.000	0.030	0.000	6.89	1579.29	1579.48	1577.49
0.005051	102	103	103	1579.23	0.97	0.74	0.05
2.52	0	157	0	0.07	100000.00	100000.00	1
1232	0	1231	0	40.0	1416.	1396.	5
0.04	0.00	7.80	0.00	0.000	0.9	1571.47	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)
Total Discharge (cfs, Q)
Computed Water Surface Elevation (ft MSL, CWSEL)

Station (ft) = 1328.0 1417.7
Flow (*) = 100.0
Area (sq ft) = 158.6
Vel (ft/s) = 7.80
Depth (ft) = 3.95

STATUS: Analyzing cross-section reach 1200.000.

STATUS: (3280) For cross-section 1200.00, ends have been extended vertically 1.24 feet in order to calculate the hydraulic cross-section properties.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO)

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)
Right Encroachment Station (ft, STENCR)
Encroachment Method (TYPE)
Width or Percent Target

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	ELOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	STRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IRC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
1200.000	0.000	0.030	0.000	7.11	1576.74	1577.45	1577.90
0.003605	111	110	110	1579.71	0.98	0.47	0.01
3.02	0	239	0	0.00	100000.00	100000.00	1
1889	0	1888	0	50.0	1184.00	1284.	15
0.05	0.00	7.88	0.00	0.000	1.0	1571.61	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 1200.000
Total Discharge (cfs, Q) 1859
Computed Water Surface Elevation (ft MSL, CWSEL) 1576.74

Station (ft) = 1184.0 1272.6
Flow (*) = 100.0
Area (sq ft) = 239.8
Vel (ft/s) = 7.88
Depth (ft) = 4.80

STATUS: Analyzing cross-section reach 1300.000.

STATUS: (3265) Divided flow.

STATUS: (3280) For cross-section 1300.00, ends have been extended vertically 0.82 feet in order to calculate the hydraulic cross-section properties.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed *for the current* cross-section.

WARNING: (3720) Critical depth has been assumed.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1077.00
Right Encroachment Station (ft, STENCR)	1157.00
Encroachment Method (TYPE)	1
Width or Percent Target	80.000

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
1300.000	0.000	0.025	0.000	7.13	1579.82	1579.82	1578.92
0.006929	196	176	153	1581.38	1.56	0.90	0.18
3.93	0	209	0	0.00	100000.00	100000.00	0
2101	0	2100	0	64.0	1077.00	1157.00	5
0.05	0.00	10.04	0.00	0.000	1.3	1572.69	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	1300.000
Total Discharge (cfs, Q)	2101
Computed Water Surface Elevation (ft MSL, CWSEL)	1579.82

Station (ft)	=	1077.0 1207.2
Flow (%)	=	100.0
Area (sq ft)	=	209.3
Vel (ft/s)	=	10.04
Depth (ft)	=	3.27

STATUS: Analyzing cross-section reach 1400.000.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1140.00
Right Encroachment Station (ft, STENCR)	1180.00
Encroachment Method (TYPE)	1
Width or Percent Target	40.000

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
1400.000	0.000	0.025	0.000	5.42	1583.42	1583.42	1583.63
0.006615	122	161	190	1585.65	2.23	1.09	0.20
4.64	0	175	0	0.00	100000.00	100000.00	0
2101	0	2100	0	40.0	1140.00	1180.00	15
0.05	0.00	11.98	0.00	0.000	1.5	1578.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	1400.000
Total Discharge (cfs, Q)	2101
Computed Water Surface Elevation (ft MSL, CWSEL)	1583.42

Station (ft)	=	1140.0 1186.3
Flow (%)	=	100.0
Area (sq ft)	=	175.4
Vel (ft/s)	=	11.98
Depth (ft)	=	4.39

STATUS: Analyzing cross-section reach 1500.000.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1172.00
Right Encroachment Station (ft, STENCR)	1222.00
Encroachment Method (TYPE)	1
Width or Percent Target	50.000

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
1500.000	0.000	0.025	0.000	6.79	1584.79	1584.22	1584.87
0.004287	76	108	119	1586.29	1.50	0.57	0.07
5.14	0	224	0	0.00	100000.00	100000.00	4
2209	0	2208	0	50.0	1172.00	1222.00	8
0.06	0.00	9.82	0.00	0.000	1.6	1578.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	1500.000
Total Discharge (cfs, Q)	2209
Computed Water Surface Elevation (ft MSL, CWSEL)	1584.79

Station (ft) =	1172.0	1230.6
Flow (*) =	100.0	
Area (sq ft) =	224.9	
Vel (ft/s) =	9.82	
Depth (ft) =	4.50	

STATUS: Analyzing cross-section reach 1600.000.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1160.00
Right Encroachment Station (ft, STENCR)	1210.00
Encroachment Method (TYPE)	1
Width or Percent Target	50.000

1600.000	0.000	0.025	0.000	5.51	1585.91	1584.52	1585.10
0.002699	101	196	210	1586.99	1.08	0.66	0.04
6.24	0	265	0	0.00	100000.00	100000.00	2
2209	0	2208	0	50.0	1160.00	1210.00	14
0.06	0.00	8.33	0.00	0.000	1.8	1580.40	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	1600.000
Total Discharge (cfs, Q)	2209
Computed Water Surface Elevation (ft MSL, CWSEL)	1585.91

Station (ft) =	1160.0	1243.8
Flow (*) =	100.0	
Area (sq ft) =	265.3	
Vel (ft/s) =	8.33	
Depth (ft) =	5.31	

STATUS: Analyzing cross-section reach 1650.000.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1135.00
Right Encroachment Station (ft, STENCR)	1200.00
Encroachment Method (TYPE)	1
Width or Percent Target	65.000

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
1650.000	0.000	0.025	0.040	5.09	1587.09	1587.09	1586.66
0.005992	190	175	185	1588.86	1.77	0.68	0.21
7.24	0	179	45	0.00	100000.00	1584.70	0
2209	0	1994	214	65.0	1135.00	1200.00	11
0.07	0.00	11.13	4.71	0.000	2.0	1582.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	1650.000
Total Discharge (cfs, Q)	2209
Computed Water Surface Elevation (ft MSL, CWSEL)	1587.09

Station (ft) =	1135.0	1180.6	1200.0
Flow (*) =	90.3	9.7	
Area (sq ft) =	179.2	45.5	
Vel (ft/s) =	11.13	4.71	
Depth (ft) =	3.93	2.35	

STATUS: Analyzing cross-section reach 1700.000.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL) 1286.61
Right Encroachment Station (ft, STENCR) 1351.61
Encroachment Method (TYPE) 1
Width or Percent Target 65.000

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
1700.000	0.000	0.025	0.000	6.41	1568.51	1568.52	1568.56
0.003253	163	161	154	1569.02	0.01	0.00	0.10
8.14	0	262	1	0.00	1568.41	1568.41	1
2209	0	2205	3	6.41	1568.41	1568.41	0
0.07	0.00	8.41	1.57	0.000	0.00	1568.52	1

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 1700.000
Total Discharge (cfs, Q) 2209
Computed Water Surface Elevation (ft MSL, CWSEL) 1568.52

Station (ft) =	1286.6	1350.7	1351.6
Flow (*) =	99.9	0.1	
Area (sq ft) =	262.3	1.9	
Vel (ft/s) =	8.41	1.57	
Depth (ft) =	4.10	2.04	

STATUS: Analyzing cross-section reach 1750.000.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL) 1095.49
Right Encroachment Station (ft, STENCR) 1135.49
Encroachment Method (TYPE) 1
Width or Percent Target 40.000

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
1750.000	0.000	0.025	0.000	6.70	1588.60	1588.80	1588.82
0.006529	171	169	179	1591.17	2.37	0.76	0.38
9.00	0	178	0	0.00	1590.10	100000.00	0
2209	0	2208	0	38.6	1096.86	1135.43	8
0.08	0.00	12.35	0.00	0.000	2.5	1582.10	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 1750.000
Total Discharge (cfs, Q) 2209
Computed Water Surface Elevation (ft MSL, CWSEL) 1588.60

Station (ft) =	1096.9	1152.3
Flow (*) =	100.0	
Area (sq ft) =	178.9	
Vel (ft/s) =	12.35	
Depth (ft) =	4.64	

Contraction Coefficient (CCHV) 0.100

Expansion Coefficient (CEHV) 0.300

STATUS: Analyzing cross-section reach 1800.000.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1146.00
Right Encroachment Station (ft, STENCR)	1176.00
Encroachment Method (TYPE)	1
Width or Percent Target	30.000

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	AREA	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
1800.000	0.000	0.025	0.000	7.86	1589.96	1589.96	1589.90
0.007210	173	170	146	1592.76	2.80	1.16	0.13
9.87	0	164	0	0.00	100000.00	100000.00	0
2209	0	1268	0	30.0	1146.00	1176.00	11
0.08	0.00	13.43	0.00	0.000	2.6	1562.10	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	1800.000
Total Discharge (cfs, Q)	2209
Computed Water Surface Elevation (ft MSL, CWSEL)	1589.96

Station (ft) =	1146.0	1221.1
Flow (-) =	100.0	
Area (sq ft) =	164.5	
Vel (ft/s) =	13.43	
Depth (ft) =	5.48	

Contraction Coefficient (CCHV)	0.300
Expansion Coefficient (CEHV)	0.500

STATUS: Analyzing cross-section reach 1900.000.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (3185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3320) Critical depth has been assumed.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	AREA	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
1900.000	0.000	0.015	0.000	9.91	1592.10	1592.10	1592.09
0.005672	66	58	60	1597.12	5.01	0.37	1.11
9.87	0	118	0	0.00	1592.19	1592.19	0
2138	0	2137	0	12.0	1193.33	1205.33	14
0.08	0.00	17.97	0.00	0.000	2.6	1582.19	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	1900.000
Total Discharge (cfs, Q)	2138
Computed Water Surface Elevation (ft MSL, CWSEL)	1592.10

Station (ft) =	1193.3	1205.3
Flow (-) =	100.0	
Area (sq ft) =	119.0	
Vel (ft/s) =	17.97	
Depth (ft) =	9.91	

Contraction Coefficient (CCHV)	0.300
Expansion Coefficient (CEHV)	0.500

STATUS: Special bridge analysis being performed.

BRIDGE DESCRIPTION :

Bridge Total Loss Coefficient (XKOR)		1.50
Bridge Opening Total Area (sq ft, BAREA)		120.00
Bridge Opening Bottom Width (ft, BWC)		12.00
Bridge Opening Side Slope (SS)	1 :	0.00
Bridge Opening Upstream Invert (ft MSL, ELCHU)		1588.88

Bridge Opening Downstream Invert (ft MSL, ELCHD) 1582.19

Bridge Skew Factor (BSQ) 1.00

Roadway Length (ft, RDLEN) 114.00

Roadway Weir Flow Discharge Coefficient (COFQ) 2.70

Pier Width (ft, BWP) 0.00

Pier Loss Drag Coefficient (CMOM) 2.00

Pier Shape Coefficient (XK) 0.00

STATUS: Analyzing cross-section reach 2000.000.

STATUS: (6070) Low flow computed by normal bridge method.

BRIDGE ANALYSIS RESULTS :

Pressure Flow Energy Grade Line Elevation (ft MSL, EGPRS) 1599.50

Low Flow Energy Grade Line Elevation (ft MSL, EGLWC) 1603.81

Bridge Low Chord Elevation (ft MSL, ELLC) 1598.88

Previous Computed Water Surface Elevation (ft MSL, PCWSE) 1592.10

Top of Roadway Elevation (ft MSL, ELTRD) 1603.83

STATUS: (4575) Critical depth assumed below bridge low chord.
Results follow:

Bridge Low Chord Elevation (ft MSL, ELLC)	1598.88
Low Chord Depth EGL Elevation (ft MSL, EGLC)	1603.81
Critical Depth EGL Elevation (ft MSL, EGC)	1606.37
Estimated Water Surface Elevation (ft MSL, WSEL)	1605.14

STATUS: (4575) Critical depth assumed below bridge low chord.
Results follow:

Bridge Low Chord Elevation (ft MSL, ELLC)	1598.88
Low Chord Depth EGL Elevation (ft MSL, EGLC)	1603.81
Critical Depth EGL Elevation (ft MSL, EGC)	1603.81
Estimated Water Surface Elevation (ft MSL, WSEL)	1598.74

STATUS: (3370) Normal bridge method specified for cross-section. Bridge deck information follows:

Number of Roadway Points (NRD)	0
Top of Roadway Elevation (ft MSL, ELTRD)	1603.83
Bridge Low Chord Elevation (ft MSL, ELLC)	1598.88

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
2000.000	0.000	0.015	0.015	10.00	1598.88	1598.88	1598.88
0.008467	320	319	303	1603.81	4.93	2.19	0.03
10.74	0	120	0	0.00	1598.88	1598.80	0
2138	0	2137	0	13.6	1044.29	1057.89	18
0.09	0.00	17.82	0.09	0.000	2.7	1588.88	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	2000.000
Total Discharge (cfs, Q)	2138
Computed Water Surface Elevation (ft MSL, CWSEL)	1598.88

Station (ft) =	1044.3	1056.3	1057.9
Flow (cfs) =	100.0	0.0	
Area (sq ft) =	120.0	0.1	
Vel (ft/s) =	17.82	0.09	
Depth (ft) =	10.00	0.04	

Contraction Coefficient (CCHV) 0.300

Expansion Coefficient (CEHV) 0.500

STATUS: Analyzing cross-section reach 2100.000.

STATUS: (2800) Special encroachment note.

Natural Flow (cfs, NAT Q1)	5152.85
Natural Water Surface Elevation (ft MSL, WSEL)	1605.22
Encroached Flow (cfs, ENC Q1)	5152.85
Encroached Water Surface Elevation (ft MSL, WSEL)	1606.22
Interpolation Distance Ratio (RATIO)	0.0000

Flow (cfs, NAT Q1) 6004.52
Left Overbank Ratio (LOB RATIO) 0.1787
Channel Ratio (CH RATIO) 0.7282
Right Overbank Ratio (ROB RATIO) 0.0931

STATUS: (3280) For cross-section 2100.00, ends have been extended vertically 1.18 feet in order to calculate the hydraulic cross-section properties.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 19.36

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL) 1046.71
Right Encroachment Station (ft, STENCR) 1201.07
Encroachment Method (TYPE) 4
Width or Percent Target 0.142

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
2100.000	0.040	0.025	0.040	15.19	1605.19	1595.96	1605.22
0.000060	58	49	54	1605.27	0.08	0.01	1.45
11.83	394	1198	104	0.00	1596.00	1596.00	3
3478	422	2966	89	154.4	1046.71	1201.07	14
0.09	1.07	2.48	0.86	0.000	2.8	1590.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 2100.000
Total Discharge (cfs, Q) 3478
Computed Water Surface Elevation (ft MSL, CWSEL) 1605.19

Station (ft) =	1046.7	1093.9	1188.6	1201.1
Flow (+) =	12.1	85.3	2.6	
Area (sq ft) =	394.1	1198.2	104.5	
Vel (ft/s) =	1.07	2.48	0.86	
Depth (ft) =	8.35	12.65	8.40	

Contraction Coefficient (CCHV) 0.100

Expansion Coefficient (CEHV) 0.300

STATUS: Analyzing cross-section reach 2200.000.

STATUS: (2800) Special encroachment note.

Natural Flow (cfs, NAT Q1) 9991.66
Natural Water Surface Elevation (ft MSL, WSEL) 1605.28
Encroached Flow (cfs, ENC Q1) 9991.66
Encroached Water Surface Elevation (ft MSL, WSEL) 1610.78
Interpolation Distance Ratio (RATIO) 0.0000
Flow (cfs, NAT Q1) 23792.75
Left Overbank Ratio (LOB RATIO) 0.0783
Channel Ratio (CH RATIO) 0.3881
Right Overbank Ratio (ROB RATIO) 0.5336

STATUS: (3280) For cross-section 2200.00, ends have been extended vertically 3.23 feet in order to calculate the hydraulic cross-section properties.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL) 142.43
Right Encroachment Station (ft, STENCR) 350.09
Encroachment Method (TYPE) 4
Width or Percent Target 0.580

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
2200.000	0.000	0.025	0.040	12.23	1605.23	1598.42	1605.28
0.000063	383	328	273	1605.29	0.06	0.02	0.00
25.24	0	1616	233	0.00	1598.00	1598.00	2
3478	0	3251	226	207.7	142.43	350.09	17
0.14	0.00	2.01	0.97	0.000	4.2	1593.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 2200.000
Total Discharge (cfs, Q) 3478
Computed Water Surface Elevation (ft MSL, CWSEL) 1605.23

Station (ft) =	142.4	318.4	350.1
Flow (*) =	93.5	6.5	
Area (sq ft) =	1616.3	233.6	
Vel (ft/s) =	2.01	0.97	
Depth (ft) =	9.19	7.36	

Contraction Coefficient (CCHV) 0.100

Expansion Coefficient (CEHV) 0.300

STATUS: Analyzing cross-section reach 2300.000.

STATUS: (2800) Special encroachment note.

Natural Flow (cfs, NAT Q1)	3383.01
Natural Water Surface Elevation (ft MSL, WSEL)	1605.25
Encroached Flow (cfs, ENC Q1)	3383.01
Encroached Water Surface Elevation (ft MSL, WSEL)	1606.25
Interpolation Distance Ratio (RATIO)	0.0000
Flow (cfs, NAT Q1)	4318.17
Left Overbank Ratio (LOB RATIO)	0.1410
Channel Ratio (CH RATIO)	0.5718
Right Overbank Ratio (ROB RATIO)	0.2873

STATUS: *(3280) For cross-section 2300.00, ends have been extended* vertically 3.22 feet in order to calculate the hydraulic cross-section properties.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 3.62

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	129.02
Right Encroachment Station (ft, STENCR)	353.29
Encroachment Method (TYPE)	4
Width or Percent Target	0.217

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	GLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
2300.000	0.040	0.025	0.040	11.22	1605.22	1600.48	1605.25
0.000164	320	311	310	1605.34	0.12	0.03	0.02
37.16	105	842	534	0.00	1600.00	1600.00	2
3478	127	2608	741	224.3	129.02	353.29	11
0.17	1.21	3.10	1.39	0.000	5.7	1594.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	2300.000
Total Discharge (cfs, Q)	3478
Computed Water Surface Elevation (ft MSL, CWSEL)	1605.22

Station (ft) =	129.0	150.1	250.9	277.0	353.3
Flow (*) =	3.7	75.0	5.6	15.7	
Area (sq ft) =	105.2	842.2	136.3	398.2	
Vel (ft/s) =	1.21	3.10	1.43	1.37	
Depth (ft) =	4.98	8.36	5.22	5.22	

SPECIAL NOTE :

An asterisk (*) to the left of the cross-section number indicates a special note is present in the SUMMARY OF WARNING AND STATUS MESSAGES section.

SUMMARY PRINTOUT TABLE 100 : Abbott and Pulsipher Washes FIS Restudy
Pulsipher Wash Detailed Hydraulic Analys
550-0351

	Cross-Section Number SECNO	Low Flow Energy Elevation (ft MSL) EGLWC	Max. Low Chord Elevation (ft MSL) ELLC	Prs. Flow Energy Elevation (ft MSL) EGPRS	Top of Roadway Elevation (ft MSL) ELTRD	Pressure and/or Low Flow (cfs) QPR	Total Bridge Weir Flow (cfs) QWEIR	Bridge Flow Class CLASS	Yarnell W.S. Elev Change (ft) H3	Flow Depth (ft) DEPTH	Computed W. S. Elevation (ft MSL) CWSEL	Channel Mean Flow Velocity (ft/s) VCH	Energy Gradient Elevation (ft MSL) EG
*	600.000	1568.80	1569.51	0.00	1572.66	669.00	0.00	2.00	0.00	2.64	1568.10	6.70	1568.80
*	600.000	1568.80	1569.51	0.00	1572.66	669.00	0.00	2.00	0.00	2.64	1568.10	6.70	1568.80
*	2000.000	1603.81	1598.88	1599.48	1603.83	2138.00	0.00	59.00	0.00	10.00	1598.88	17.82	1603.81
*	2000.000	1603.81	1598.88	1599.50	1603.83	2138.00	0.00	59.00	0.00	10.00	1598.88	17.82	1603.81

SUMMARY PRINTOUT TABLE 110 : Abbott and Pulsipher Washes FIS Restudy
Pulsipher Wash Detailed Hydraulic Analys
550-0351

Cross-Section Number	Computed W. S. Elevation (ft MSL)	W.S. Elev Diff per Know/Comp (ft)	Energy Gradient Elevation (ft MSL)	Water Surface Top Width (ft)	Left Overbank Flow (cfs)	Channel Flow (cfs)	Right Overbank Flow (cfs)	Encroach. Target Requested	Left Encroach. Station (ft)	Left Bank Station (ft)	Right Bank Station (ft)	Right Encroach. Station (ft)

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	200.000	1555.07	-0.03	1555.57	118.24	0.00	669.00	0.00	0.00	0.00	2929.40	3113.93	0.00
*	200.000	1556.05	0.99	1557.08	40.00	0.00	669.00	0.00	40.00	2990.00	2929.40	3113.93	3030.00
*	300.000	1560.01	0.00	1560.77	63.74	0.00	669.00	0.00	0.00	0.00	2926.48	3035.77	0.00
*	300.000	1560.97	0.96	1562.46	23.00	0.00	669.00	0.00	23.00	2970.00	2926.48	3035.77	2993.00
*	400.000	1562.56	0.00	1563.09	110.67	0.00	669.00	0.00	0.00	0.00	2281.55	2450.74	0.00
*	400.000	1563.53	0.97	1565.23	19.00	0.00	669.00	0.00	19.00	2339.00	2281.55	2450.74	2358.00
*	500.000	1566.47	0.00	1567.54	37.73	0.00	669.00	0.00	0.00	0.00	2332.84	2370.57	0.00
*	500.000	1566.46	-0.01	1567.54	37.73	0.00	669.00	0.00	0.00	0.00	2332.84	2370.57	0.00

	Cross-Section Number SECNO	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Energy Gradient Elevation (ft MSL) EG	Water Surface Top Width (ft) TOPWID	Left Overbank Flow (cfs) QLOB	Channel Flow (cfs) QCH	Right Overbank Flow (cfs) QROB	Encroach. Target Requested PERENC	Left Encroach. Station (ft) STENCL	Left Bank Station (ft) STCHL	Right Bank Station (ft) STCHR	Right Encroach. Station (ft) STENCR
*	600.000	1568.10	0.00	1568.80	37.73	0.00	669.00	0.00	0.00	0.00	2596.22	2633.95	0.00
*	600.000	1568.10	0.00	1568.80	37.73	0.00	669.00	0.00	0.00	0.00	2596.22	2633.95	0.00
*	700.000	1573.29	0.00	1573.79	119.59	0.00	669.00	0.00	0.00	0.00	2121.76	2330.75	0.00
*	700.000	1573.66	0.36	1574.93	29.49	0.00	669.00	0.00	30.00	2121.76	2121.76	2330.75	2151.76
*	800.000	1574.76	0.00	1575.10	112.28	0.00	676.00	0.00	0.00	0.00	1769.22	1903.89	0.00
	800.000	1575.34	0.58	1576.25	30.00	0.00	676.00	0.00	30.00	1769.22	1769.22	1903.89	1799.22
	900.000	1575.37	0.00	1575.98	82.65	0.00	798.00	0.00	0.00	0.00	1575.70	1686.84	0.00
	900.000	1576.01	0.64	1576.91	30.00	0.00	798.00	0.00	30.00	1575.70	1575.70	1686.84	1605.70
	1000.000	1576.45	0.00	1577.24	81.76	0.00	966.00	0.00	0.00	0.00	1472.42	1568.37	0.00
*	1000.000	1576.96	0.51	1578.44	35.00	0.00	966.00	0.00	35.00	1472.42	1472.42	1568.37	1507.42
*	1100.000	1577.47	0.00	1578.02	97.61	0.00	1232.00	0.00	0.00	0.00	1320.06	1417.67	0.00
*	1100.000	1578.29	0.82	1579.23	40.00	0.00	1232.00	0.00	40.00	1328.00	1320.06	1417.67	1368.00
*	1200.000	1577.90	0.00	1578.66	94.20	0.00	1889.00	0.00	0.00	0.00	1178.38	1272.58	0.00
*	1200.000	1578.74	0.84	1579.71	50.00	0.00	1889.00	0.00	50.00	1184.00	1178.38	1272.58	1234.00
*	1300.000	1578.92	0.00	1580.10	109.62	0.00	2101.00	0.00	0.00	0.00	1014.17	1207.18	0.00
*	1300.000	1579.82	0.90	1581.38	63.98	0.00	2101.00	0.00	60.00	1077.00	1014.17	1207.18	1157.00
*	1400.000	1583.63	0.00	1584.79	109.85	0.00	2101.00	0.00	0.00	0.00	1061.00	1186.25	0.00
*	1400.000	1583.42	-0.21	1585.65	40.00	0.00	2101.00	0.00	40.00	1140.00	1061.00	1186.25	1180.00
*	1500.000	1584.87	0.00	1585.16	394.48	1.16	2020.65	187.19	0.00	0.00	1081.73	1230.57	0.00
	1500.000	1584.79	-0.08	1586.29	50.00	0.00	2209.00	0.00	50.00	1172.00	1081.73	1230.57	1222.00
	1600.000	1585.10	0.00	1585.40	243.48	0.59	2162.40	46.01	0.00	0.00	1094.37	1243.82	0.00
	1600.000	1585.91	0.81	1586.99	50.00	0.00	2209.00	0.00	50.00	1160.00	1094.37	1243.82	1210.00
*	1650.000	1586.66	0.00	1587.48	258.47	0.00	1407.46	801.54	0.00	0.00	1129.97	1180.64	0.00
*	1650.000	1587.09	0.43	1588.86	65.00	0.00	1994.02	214.17	65.00	1135.00	1129.97	1180.64	1200.00
	1700.000	1587.56	0.00	1588.08	290.94	4.13	1403.36	801.51	0.00	0.00	1286.61	1350.67	0.00
	1700.000	1588.52	0.96	1589.62	65.00	0.00	2205.98	3.01	65.00	1286.61	1286.61	1350.67	1351.61
*	1750.000	1588.62	0.00	1589.60	213.76	0.00	1775.68	433.32	0.00	0.00	1095.43	1152.29	0.00
*	1750.000	1588.80	0.18	1591.17	38.57	0.00	2209.00	0.00	40.00	1095.43	1095.43	1152.29	1135.43
*	1800.000	1589.90	0.00	1592.04	44.90	0.00	2209.00	0.00	0.00	0.00	1139.62	1221.10	0.00
*	1800.000	1589.96	0.06	1592.76	30.00	0.00	2209.00	0.00	30.00	1146.00	1139.62	1221.10	1176.00

	Cross-Section Number SECNO	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Energy Gradient Elevation (ft MSL) EG	Water Surface Top Width (ft) TOPWID	Left Overbank Flow (cfs) QLOB	Channel Flow (cfs) QCH	Right Overbank Flow (cfs) QROB	Encroach. Target Requested PERENC	Left Encroach. Station (ft) STENCL	Left Bank Station (ft) STCHL	Right Bank Station (ft) STCHR	Right Encroach. Station (ft) STENCR
*	1900.000	1592.09	0.00	1597.12	12.00	0.00	2138.00	0.00	0.00	0.00	1193.33	1205.33	0.00
*	1900.000	1592.10	0.02	1597.12	12.00	0.00	2138.00	0.00	0.00	0.00	1193.33	1205.33	0.00
*	2000.000	1598.88	0.00	1603.81	13.60	0.00	2137.99	0.01	0.00	0.00	1044.29	1056.29	0.00
*	2000.000	1598.88	0.00	1603.81	13.60	0.00	2137.99	0.01	0.00	0.00	1044.29	1056.29	0.00
*	2100.000	1605.22	0.00	1605.28	248.24	585.22	2600.07	292.71	0.00	0.00	1093.94	1188.63	0.00
*	2100.000	1605.19	-0.03	1605.27	154.36	422.07	2966.01	89.92	0.14	1046.71	1093.94	1188.63	1201.07
*	2200.000	1605.28	0.00	1605.29	746.82	159.82	1475.23	1842.95	0.00	0.00	142.43	318.37	0.00
	2200.000	1605.23	-0.05	1605.29	207.66	0.00	3251.41	226.59	0.58	142.43	142.43	318.37	350.09
*	2300.000	1605.25	0.00	1605.31	390.43	422.44	2103.66	951.90	0.00	0.00	150.15	250.92	0.00
*	2300.000	1605.22	-0.03	1605.34	224.28	127.60	2608.98	741.43	0.22	129.02	150.15	250.92	353.29

SUMMARY PRINTOUT TABLE 150 : Abbott and Pulsipher Washes FIS Restudy
---------- Pulsipher Wash Detailed Hydraulic Analys
550-0351

Cross-Section Number	Channel Reach Length (ft)	Top of Roadway Elevation (ft MSL)	Max. Low Chord Elevation (ft MSL)	Minimum C. S. Elevation (ft MSL)	Discharge Flow (cfs)	Computed W. S. Elevation (ft MSL)	Critical W. S. Elevation (ft MSL)	Energy Gradient Elevation (ft MSL)	Energy Gradient Slope * 10,000	Channel Mean Flow Velocity (ft/s)	Cross-Section Area (sq ft)	Index Q (0.01 * Convey.)

SECNO	XLCH	ELTRD	ELLC	ELMIN		W.S.	CWSEL	K	10K*S	VCH	AREA	.01K
* 200.000	0.00	0.00	0.00	1564.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	91.93	5.68	117.79	69.77
* 200.000	0.00	0.00	0.00	1564.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	82.69	6.15	82.09	73.84
* 300.000	352.67	0.00	0.00	1558.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	60.14	6.97	95.97	74.73
* 300.000	352.67	0.00	0.00	1558.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	86.48	9.80	68.28	71.94
* 400.000	134.41	0.00	0.00	1556.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	91.64	5.82	115.00	69.88
* 400.000	134.41	0.00	0.00	1556.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	89.11	10.47	63.89	70.87
* 500.000	74.97	0.00	0.00	1564.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	79.48	8.30	80.57	123.22
* 500.000	74.97	0.00	0.00	1564.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	79.78	8.33	80.31	122.60
* 600.000	133.46	1572.66	1569.51	1561.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	14.91	6.70	99.79	173.24
* 600.000	133.46	1572.66	1569.51	1561.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	14.91	6.70	99.79	173.24

Cross-Section Number / SECNO	Channel Reach Length (ft) / XLCH	Top of Roadway Elevation (ft MSL) / ELTRD	Max. Low Chord Elevation (ft MSL) / ELLC	Minimum C. S. Elevation (ft MSL) / ELMIN	Discharge Flow (cfs) / Q	Computed W. S. Elevation (ft MSL) / CWSEL	Critical W. S. Elevation (ft MSL) / CRIWS	Energy Gradient Elevation (ft MSL) / EG	Energy Gradient Slope * 10,000 / 10K*S	Channel Mean Flow Velocity (ft/s) / VCH	Cross-Section Area (sq ft) / AREA	Index Q (0.01 * Convey.) / .01K
* 700.000	112.64	0.00	0.00	1564.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	144.69	5.66	116.30	57.64
* 700.000	112.64	0.00	0.00	1564.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	131.49	9.04	73.97	63.08
* 800.000	144.94	0.00	0.00	1559.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	64.64	4.65	145.36	84.74
800.000	144.94	0.00	0.00	1559.00	900.00	1564.41	1564.84	1565.25	71.79	7.64	88.49	79.78
900.000	103.62	0.00	0.00	1572.00	900.00	1575.37	1575.28	1575.98	92.74	6.26	127.48	82.86
900.000	103.62	0.00	0.00	1571.00	900.00	1575.31	1575.31	1575.92	59.15	7.64	104.42	103.76
1000.000	118.27	0.00	0.00	1571.15	900.00	1576.45	1576.36	1577.24	110.51	7.15	135.17	91.89
* 1000.000	118.27	0.00	0.00	1571.15	900.00	1576.96	1576.96	1578.44	122.56	9.78	98.80	87.26
* 1100.000	103.70	0.00	0.00	1571.40	1,432.00	1577.47	1576.93	1578.02	54.73	5.92	208.13	166.53
* 1200.000	103.70	0.00	0.00	1571.40	1,432.00	1578.29	1577.38	1579.13	50.51	7.80	157.96	173.35
* 1200.000	110.23	0.00	0.00	1571.62	1889.00	1577.42	1577.33	1578.66	51.09	6.99	270.37	264.29
* 1200.000	110.23	0.00	0.00	1571.62	1889.00	1578.74	1577.45	1579.91	38.05	7.88	239.80	306.22
* 1300.000	176.37	0.00	0.00	1572.49	2,231.00	1578.92	1578.92	1581.14	79.45	8.72	241.06	235.72
* 1300.000	176.37	0.00	0.00	1572.49	2,231.00	1579.82	1579.82	1581.48	69.29	10.04	209.32	252.40
* 1400.000	161.58	0.00	0.00	1578.00	2,231.00	1583.69	1583.69	1584.79	75.12	8.65	242.88	242.41
* 1400.000	161.58	0.00	0.00	1578.00	2,231.00	1583.84	1583.84	1585.65	66.15	11.98	175.42	258.33
* 1500.000	108.07	0.00	0.00	1578.00	2,231.00	1584.67	1584.71	1585.26	13.02	4.47	620.88	612.20
1500.000	108.07	0.00	0.00	1578.00	2,231.00	1584.79	1584.22	1586.29	42.87	9.82	224.66	337.38
1600.000	196.31	0.00	0.00	1580.40	2,231.00	1585.10	1584.69	1585.40	11.73	4.46	536.99	645.04
1600.000	196.31	0.00	0.00	1580.40	2,231.00	1585.91	1584.52	1586.99	26.99	8.33	265.32	425.19
* 1650.000	175.57	0.00	0.00	1581.00	2,231.00	1586.66	1586.66	1587.48	44.14	8.78	416.62	332.48
* 1650.000	175.57	0.00	0.00	1581.00	2,231.00	1587.09	1587.09	1588.61	59.92	11.13	224.64	285.38
1700.000	161.13	0.00	0.00	1581.05	2,231.00	1587.56	1587.24	1588.08	30.48	6.99	501.92	400.10
1700.000	161.13	0.00	0.00	1581.05	2,231.00	1588.52	1587.74	1589.62	32.53	8.41	264.26	387.29
* 1750.000	169.33	0.00	0.00	1581.10	2,231.00	1588.62	1588.62	1589.62	40.62	8.78	369.30	346.59
* 1750.000	169.33	0.00	0.00	1581.10	2,231.00	1588.80	1588.80	1591.17	65.29	12.35	178.87	273.39
* 1800.000	170.93	0.00	0.00	1582.10	2,231.00	1589.90	1589.90	1592.04	65.14	11.75	187.96	273.69
* 1800.000	170.93	0.00	0.00	1582.10	2,231.00	1589.96	1589.96	1592.76	70.10	13.43	164.50	263.83
* 1900.000	58.98	0.00	0.00	1582.19	2138.00	1592.09	1592.09	1597.12	56.98	18.00	118.75	283.23
* 1900.000	58.98	0.00	0.00	1582.19	2138.00	1592.10	1592.10	1597.12	56.72	17.97	118.97	283.88

Cross-Section Number / SECNO	Channel Reach Length (ft) / XLCH	Top of Roadway Elevation (ft MSL) / ELTRD	Max. Low Chord Elevation (ft MSL) / ELLC	Minimum C. S. Elevation (ft MSL) / ELMIN	Discharge Flow (cfs) / Q	Computed W. S. Elevation (ft MSL) / CWSEL	Critical W. S. Elevation (ft MSL) / CRIWS	Energy Gradient Elevation (ft MSL) / EG	Energy Gradient Slope * 10,000 / 10K*S	Channel Mean Flow Velocity (ft/s) / VCH	Cross-Section Area (sq ft) / AREA	Index Q (0.01 * Convey.) / .01K
* 2000.000	319.85	1603.83	1598.88	1588.88	2138.00	1592.68	1592.88	1603.81	84.67	17.82	120.06	232.35
* 2000.000	319.85	1603.83	1598.88	1588.88	2138.00	1592.88	1592.88	1603.81	84.67	17.82	120.06	232.35
* 2100.000	49.81	0.00	0.00	1590.00	3478.00	1605.22	1595.96	1605.28	0.46	2.16	2161.21	5152.85
* 2100.000	49.81	0.00	0.00	1590.00	3478.00	1605.19	1595.96	1605.27	0.60	2.48	1696.89	4498.07
* 2200.000	328.57	0.00	0.00	1593.00	3478.00	1605.28	1597.05	1605.29	0.12	0.91	5632.50	9991.66
2200.000	328.57	0.00	0.00	1593.00	3478.00	1605.23	1598.42	1605.29	0.63	2.01	1849.89	4376.21
* 2300.000	311.55	0.00	0.00	1594.00	3478.00	1605.25	1600.56	1605.31	1.06	2.49	2137.54	3383.01
* 2300.000	311.55	0.00	0.00	1594.00	3478.00	1605.22	1600.48	1605.34	1.64	3.10	1481.88	2713.23

SUMMARY PRINTOUT TABLE 150 : Abbott and Pulsipher Washes FIS Restudy
Pulsipher Wash Detailed Hydraulic Analys
55C-0351

Cross-Section Number	Discharge Flow (cfs)	Computed W. S. Elevation (ft MSL)	W.S. Elev Diff per Fictile (ft)	W.S. Elev Diff per Section (ft)	W.S. Elev Diff per Known Comp (ft)	Water Surface Top Width (ft)	Channel Reach Length (ft)

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	200.000	669.00	1555.07	0.00	0.00	-0.03	118.24	0.00
*	200.000	669.00	1556.05	0.99	0.00	0.99	40.00	0.00
*	300.000	669.00	1560.01	0.00	4.95	0.00	63.74	352.07
*	300.000	669.00	1560.97	0.96	4.92	0.96	23.00	352.07
*	400.000	669.00	1562.56	0.00	2.55	0.00	110.67	134.41
*	400.000	669.00	1563.53	0.97	2.56	0.97	19.00	134.41
*	500.000	669.00	1566.47	0.00	3.91	0.00	37.73	74.97
*	500.000	669.00	1566.46	-0.01	2.93	-0.01	37.73	74.97
*	600.000	669.00	1568.10	0.00	1.63	0.00	37.73	133.46
*	600.000	669.00	1568.10	0.00	1.64	0.00	37.73	133.46
*	700.000	669.00	1573.29	0.00	5.19	0.00	119.59	112.64
*	700.000	669.00	1573.66	0.36	5.55	0.36	29.49	112.64

	Cross-Section Number SECNO	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Profile (ft) DIFWSP	W.S. Elev Diff per Section (ft) DIFWSX	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Water Surface Top Width (ft) TOPWID	Channel Reach Length (ft) XLCH
*	800.000	676.00	1574.76	0.00	1.47	0.00	112.28	144.94
	800.000	676.00	1575.34	0.58	1.69	0.58	30.00	144.94
	900.000	798.00	1575.37	0.00	0.61	0.00	82.65	103.62
	900.000	798.00	1576.01	0.64	0.67	0.64	30.00	103.62
	1000.000	966.00	1576.45	0.00	1.08	0.00	81.76	118.27
*	1000.000	966.00	1576.96	0.51	0.95	0.51	35.00	118.27
*	1100.000	1232.00	1577.47	0.00	1.02	0.00	97.61	103.70
*	1100.000	1232.00	1578.29	0.82	1.33	0.82	40.00	103.70
*	1200.000	1889.00	1577.90	0.00	0.43	0.00	94.20	110.23
*	1200.000	1889.00	1578.74	0.84	0.45	0.84	50.00	110.23
*	1300.000	2101.00	1578.92	0.00	1.02	0.00	109.62	176.37
*	1300.000	2101.00	1579.82	0.90	1.07	0.90	63.98	176.37
*	1400.000	2101.00	1583.63	0.00	4.71	0.00	109.85	161.58
*	1400.000	2101.00	1583.42	-0.21	3.61	-0.21	40.00	161.58
*	1500.000	2209.00	1584.87	0.00	1.24	0.00	394.48	108.07
	1500.000	2209.00	1584.79	-0.08	1.37	-0.08	50.00	108.07
	1600.000	2209.00	1585.10	0.00	0.23	0.00	243.48	196.31
	1600.000	2209.00	1585.91	0.81	1.12	0.81	50.00	196.31
*	1650.000	2209.00	1586.66	0.00	1.56	0.00	258.47	175.57
*	1650.000	2209.00	1587.09	0.43	1.17	0.43	65.00	175.57
	1700.000	2209.00	1587.56	0.00	0.90	0.00	290.94	161.13
	1700.000	2209.00	1588.52	0.96	1.44	0.96	65.00	161.13
*	1750.000	2209.00	1588.62	0.00	1.06	0.00	213.76	169.33
*	1750.000	2209.00	1588.80	0.18	0.28	0.18	38.57	169.33
*	1800.000	2209.00	1589.90	0.00	1.28	0.00	44.90	170.93
*	1800.000	2209.00	1589.96	0.06	1.16	0.06	30.00	170.93
*	1900.000	2138.00	1592.09	0.00	2.19	0.00	12.00	58.98
*	1900.000	2138.00	1592.10	0.02	2.14	0.02	12.00	58.98
*	2000.000	2138.00	1598.88	0.00	6.79	0.00	13.60	319.85
*	2000.000	2138.00	1598.88	0.00	6.78	0.00	13.60	319.85

	Cross-Section Number SECNO	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Profile (ft) DIFWSP	W.S. Elev Diff per Section (ft) DIFWSX	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Water Surface Top Width (ft) TOPWID	Channel Reach Length (ft) XLCH
*	2100.000	3478.00	1605.22	0.00	6.34	0.00	248.24	49.81
*	2100.000	3478.00	1605.19	-0.03	6.31	-0.03	154.36	49.81
*	2200.000	3478.00	1605.28	0.00	0.06	0.00	746.82	328.57
	2200.000	3478.00	1605.23	-0.05	0.05	-0.05	207.66	328.57
*	2300.000	3478.00	1605.25	0.00	-0.03	0.00	390.43	311.55
*	2300.000	3478.00	1605.22	-0.03	-0.01	-0.03	224.28	311.55

SUMMARY OF WARNING AND STATUS MESSAGES :

Section 200, profile 1, critical depth assumed.

Section 200, profile 2, critical depth assumed.

Section 300, profile 1, critical depth assumed.

Section 300, profile 1, minimum specific energy.

Section 300, profile 2, critical depth assumed.

Section 300, profile 2, minimum specific energy.

Section 400, profile 1, critical depth assumed.

Section 400, profile 1, minimum specific energy.

Section 400, profile 2, critical depth assumed.

Section 400, profile 2, minimum specific energy.

Section 500, profile 1, critical depth assumed.

Section 500, profile 1, minimum specific energy.

Section 500, profile 2, critical depth assumed.

Section 500, profile 2, minimum specific energy.

Section 600, profile 1, hydraulic jump downstream.

Section 600, profile 1, conveyance change outside acceptable range.

Section 600, profile 2, hydraulic jump downstream.

Section 600, profile 2, conveyance change outside acceptable range.

Section 700, profile 1, critical depth assumed.

Section 700, profile 1, minimum specific energy.

Section 700, profile 2, critical depth assumed.

Section 700, profile 2, minimum specific energy.

Section 800, profile 1, conveyance change outside acceptable range.

Section 1000, profile 2, critical depth assumed.

Section 1000, profile 2, minimum specific energy.

Section 1100, profile 1, conveyance change outside acceptable range.

Section 1100, profile 2, conveyance change outside acceptable range.

Section 1200, profile 1, conveyance change outside acceptable range.

Section 1200, profile 2, conveyance change outside acceptable range.

Section 1300, profile 1, critical depth assumed.

Section 1300, profile 1, minimum specific energy.

Section 1300, profile 2, critical depth assumed.

Section 1300, profile 2, minimum specific energy.

Section 1400, profile 1, critical depth assumed.

Section 1400, profile 1, minimum specific energy.

Section 1400, profile 2, critical depth assumed.

Section 1400, profile 2, minimum specific energy.

Section 1500, profile 1, conveyance change outside acceptable range.

Section 1650, profile 1, critical depth assumed.

Section 1650, profile 1, minimum specific energy.

Section 1650, profile 2, critical depth assumed.

Section 1650, profile 2, minimum specific energy.

Section 1750, profile 1, critical depth assumed.

Section 1750, profile 1, minimum specific energy.

Section 1750, profile 2, critical depth assumed.

Section 1750, profile 2, minimum specific energy.

Section 1800, profile 1, critical depth assumed.

Section 1800, profile 1, minimum specific energy.

Section 1800, profile 2, critical depth assumed.

Section 1800, profile 2, minimum specific energy.

Section 1900, profile 1, critical depth assumed.

Section 1900, profile 1, minimum specific energy.

Section 1900, profile 2, critical depth assumed.

Section 1900, profile 2, minimum specific energy.

Section 2000, profile 1, critical depth assumed.

Section 2000, profile 1, minimum specific energy.

Section 2000, profile 2, critical depth assumed.

Section 2000, profile 2, minimum specific energy.

Section 2100, profile 1, conveyance change outside acceptable range.

Section 2100, profile 2, conveyance change outside acceptable range.

Section 2200, profile 1, conveyance change outside acceptable range.

Section 2300, profile 1, conveyance change outside acceptable range.

Section 2300, profile 2, conveyance change outside acceptable range.

63 Warning and status messages generated.

SUMMARY PRINTOUT TABLE 700 : Abbott and Pulsipher Washes FIS Restudy
Pulsipher Wash Detailed Hydraulic Analys
550-0351

Profile Number 2

Cross-Section Number	Floodway Width (ft)	Floodway Section Area (sq ft)	Floodway Mean Velocity (ft/s)	W. S. Elevation with Floodway (ft MSL)	W. S. Elevation without Floodway (ft MSL)	W. S. Elevation Difference (ft)
200.000	40.	87.	6.1	1556.1	1555.1	1.0
300.000	23.	68.	9.6	1561.0	1560.0	1.0
400.000	19.	64.	10.5	1567.6	1566.6	1.0
500.000	38.	80.	8.3	1569.5	1568.5	1.0
600.000	38.	100.	6.7	1568.1	1568.1	0.0
700.000	29.	74.	9.0	1573.9	1573.5	0.4
800.000	30.	86.	7.8	1574.4	1574.0	0.4
900.000	30.	104.	7.4	1575.4	1574.8	0.6
1000.000	35.	99.	6.8	1576.9	1576.4	0.5
1100.000	40.	158.	7.8	1578.3	1577.5	0.8
1200.000	50.	240.	7.9	1578.7	1577.9	0.8
1300.000	80.	269.	11.1	1579.6	1578.7	0.9
1400.000	40.	175.	11.0	1584.6	1584.8	-0.2
1500.000	50.	225.	9.8	1584.8	1584.9	-0.1
1600.000	50.	265.	8.3	1585.9	1585.1	0.8
1650.000	65.	225.	9.8	1587.1	1586.7	0.4
1700.000	65.	244.	8.8	1588.6	1587.6	1.0
1750.000	39.	179.	11.3	1588.8	1588.6	0.2
1800.000	30.	164.	11.4	1589.0	1588.9	0.1
1900.000	12.	119.	15.0	1592.1	1592.1	0.0
2000.000	14.	120.	17.8	1596.9	1596.9	0.0
2100.000	154.	1697.	2.0	1605.2	1605.2	0.0
2200.000	208.	1850.	1.9	1605.3	1605.3	0.0
2300.000	224.	1462.	2.3	1605.2	1605.2	0.0

END OF OUTPUT

CROSS SECTION LABELING FORM
MAIN CHANNEL HEC-2 MODEL

KEY TO CROSS-SECTION (XS) LABELING

PREPARED BY:
SC: G.C. WALLACE, INC.
TEC: _____

DATE PREPARED:
SC: 11/13/00
TEC: _____

COMMUNITY NAME MESQUITE, CLARK CO.
STATE NEVADA
FEMA CID NO. _____

STREAM NAME PULSIPHER WASH
RUN DATE 11/9/00

STUDY CONTRACTOR			TECHNICAL EVALUATION CONTRACTOR	
FIELD SURVEY SECTION NO.	XS LETTER DRAFT FIS	COMPUTER STATIONING	EPA REACH FILE NO.	XS LETTER FINAL FIS
	200	200		
	300	300		
	400	400		
500	500	500		
600	600	600		
	700	700		
	800	800		
	900	900		
	1000	1000		
	1100	1100		
	1200	1200		
	1300	1300		
	1400	1400		
	1500	1500		
	1600	1600		

KEY TO CROSS-SECTION (XS) LABELING

PREPARED BY:
SC: G.C. WALLACE, INC.
TEC: _____

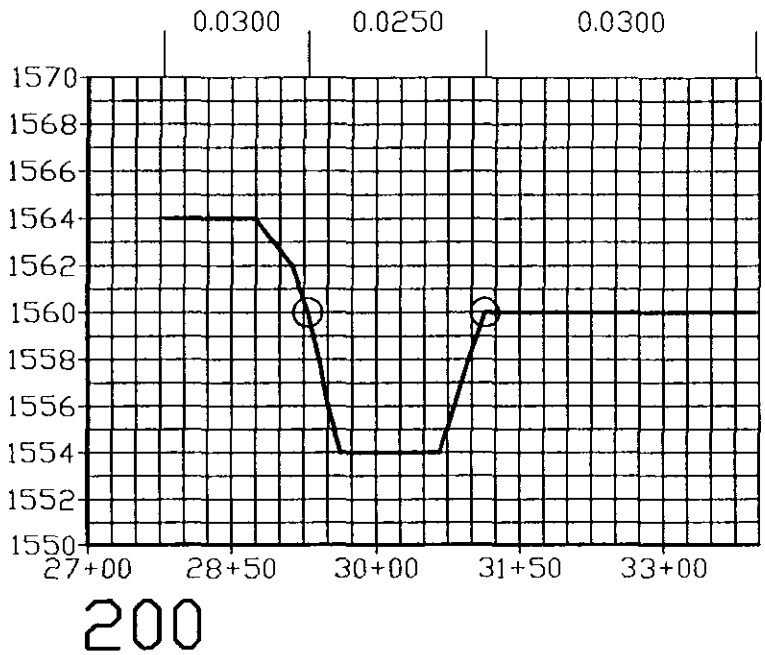
DATE PREPARED:
SC: 11/13/00
TEC: _____

COMMUNITY NAME MESQUITE, CLARK CO.
STATE NEVADA
FEMA CID NO. _____

STREAM NAME PULSIPHER WASH
RUN DATE 11/9/00

STUDY CONTRACTOR			TECHNICAL EVALUATION CONTRACTOR	
FIELD SURVEY SECTION NO.	XS LETTER DRAFT FIS	COMPUTER STATIONING	EPA REACH FILE NO.	XS LETTER FINAL FIS
	1650	1650		
	1700	1700		
	1750	1750		
	1800	1800		
1900	1900	1900		
2000	2000	2000		
	2100	2100		
	2200	2200		
	2300	2300		

INDIVIDUAL CROSS SECTION EXHIBITS
MAIN CHANNEL HEC-2 MODEL



200

NOTE: NOT TO SCALE
LOOKING UPSTREAM

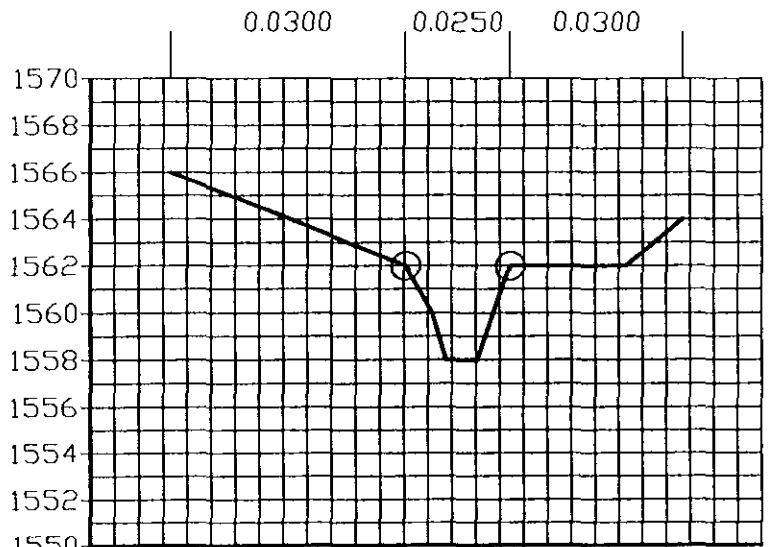
ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 200

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

11-10-00 09:[illegible] mludwig

F:\550-033\dwg\fig\mainxs.dwg



300

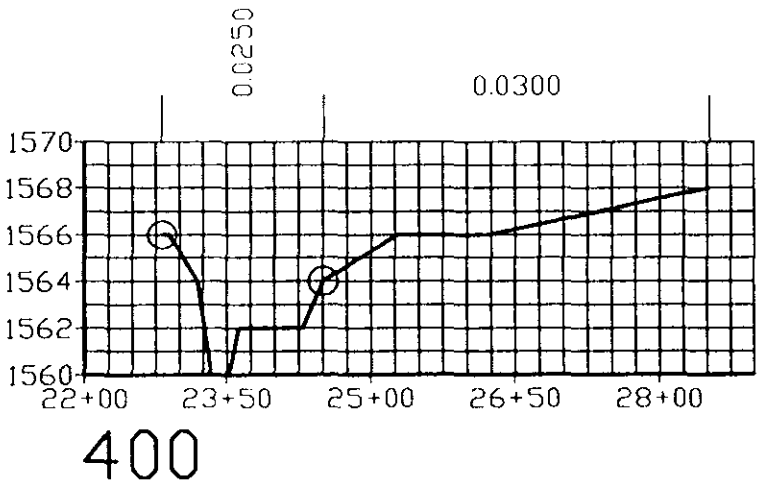
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LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 300

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

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400

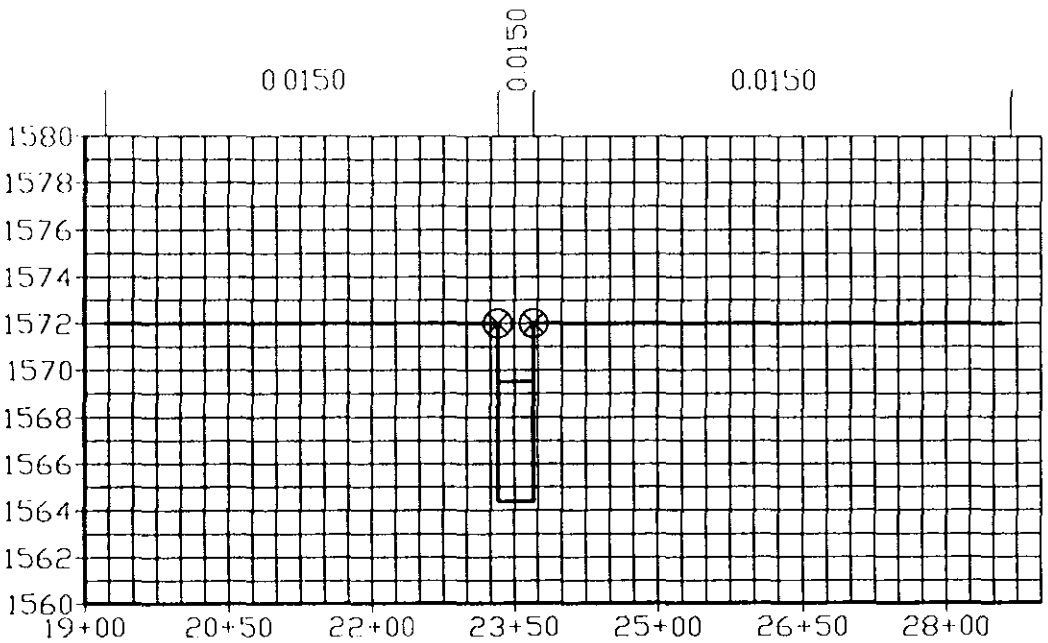
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LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 400

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

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500

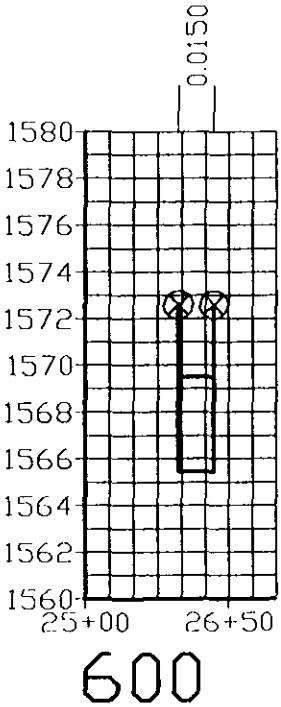
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 500

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

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NOTE: NOT TO SCALE
LOOKING UPSTREAM

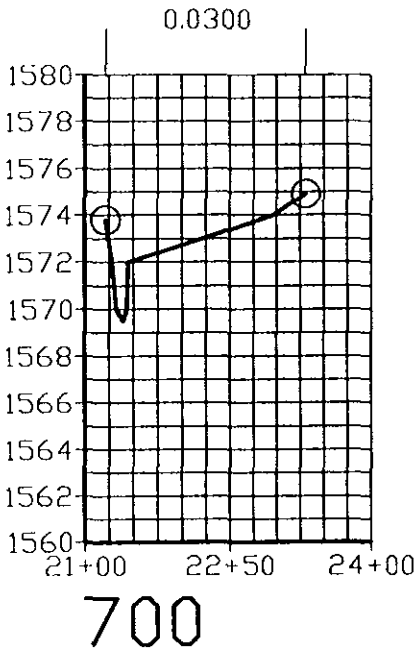
ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 600

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD, LAS VEGAS, NEVADA 89146

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700

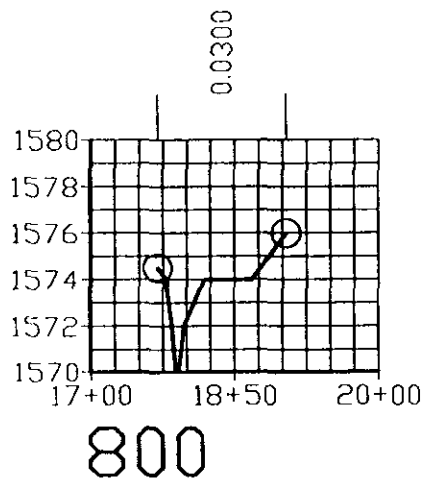
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 700

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD.,LAS VEGAS, NEVADA 89146

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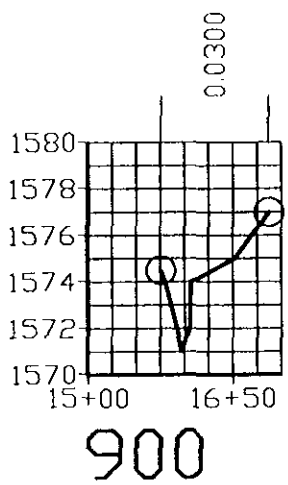
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 800

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

F:\550-0337\dwg\fig\mainxs.dwg 11-10-00 10:46:01 mludwig



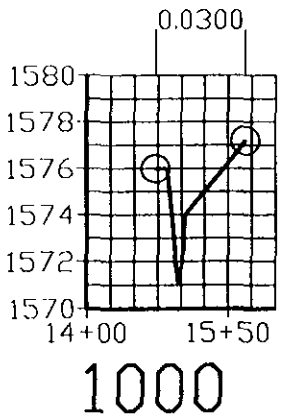
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 900

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

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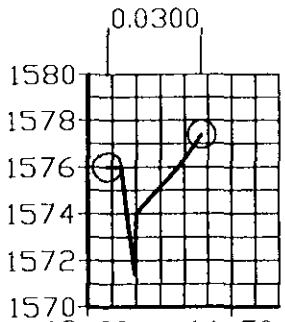
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 1000

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

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1100

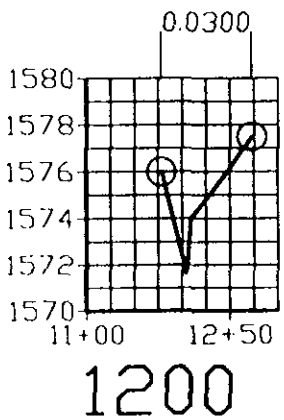
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LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 1100

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

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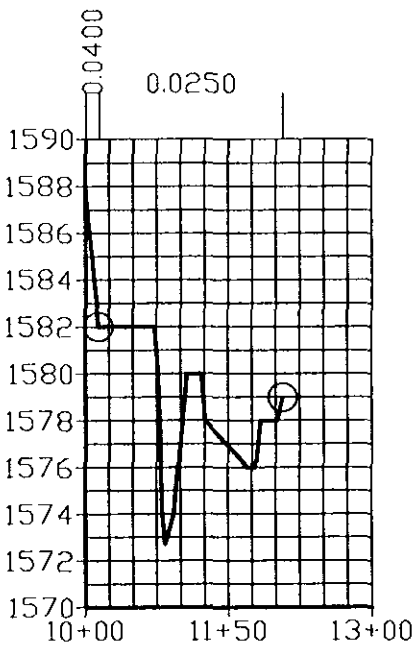
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LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 1200

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

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1300

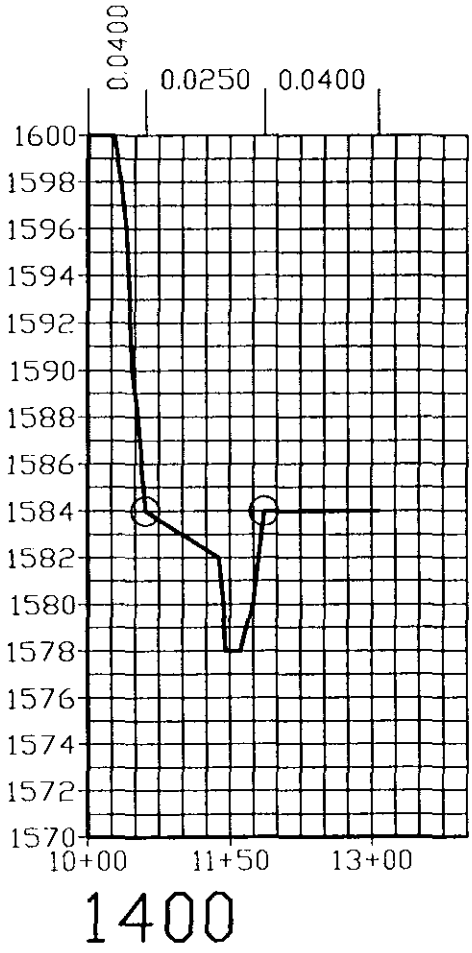
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LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 1300

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

11-10-00 11:2[illegible]6 mludwig
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1400

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LOOKING UPSTREAM

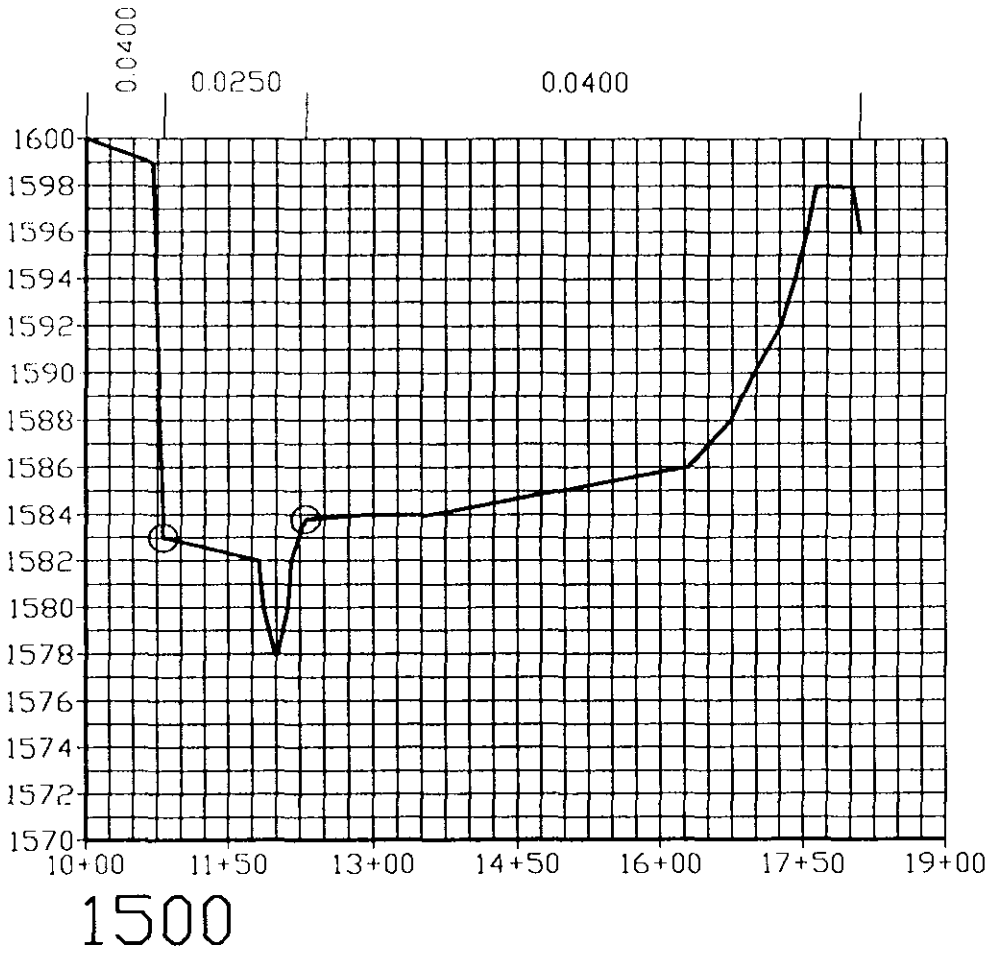
ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 1400

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

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1500

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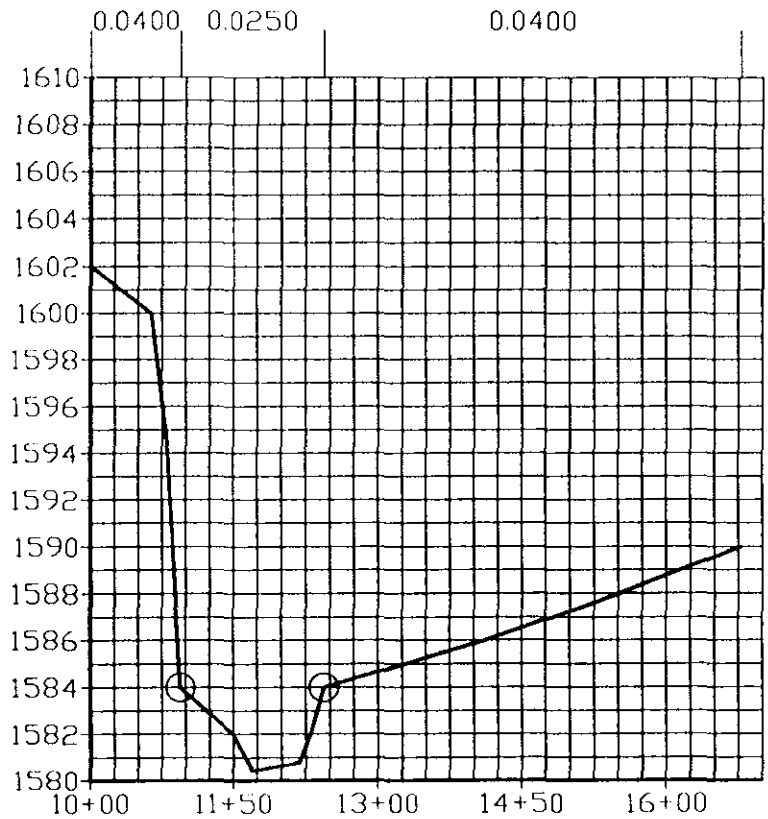
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FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 1500

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD, LAS VEGAS, NEVADA 89146

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1600

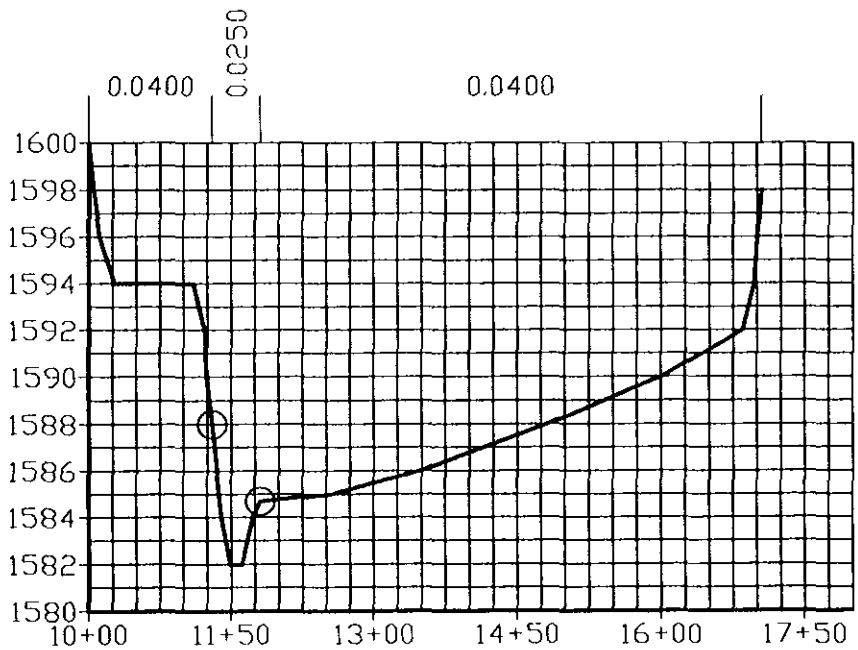
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LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 1600

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

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1650

NOTE: NOT TO SCALE
LOOKING UPSTREAM

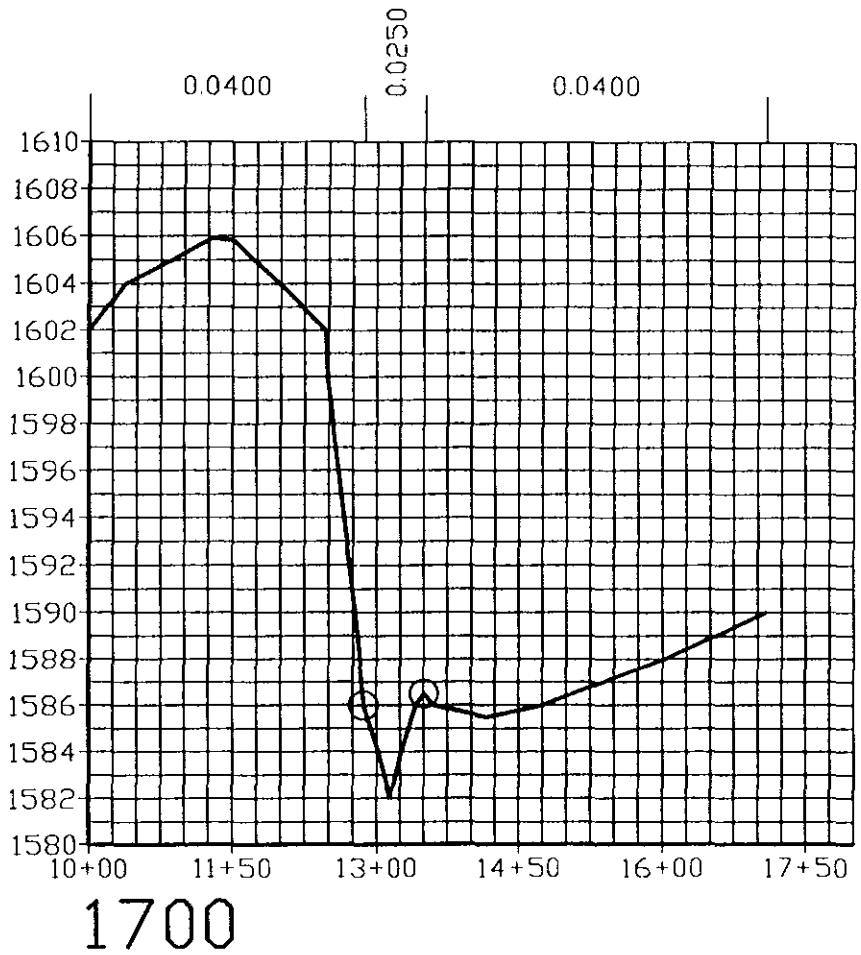
ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 1650

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

11-10-00 11:2?:26 miudwig

F:\550-033?\dwg\fig\mainxs.dwg



1700

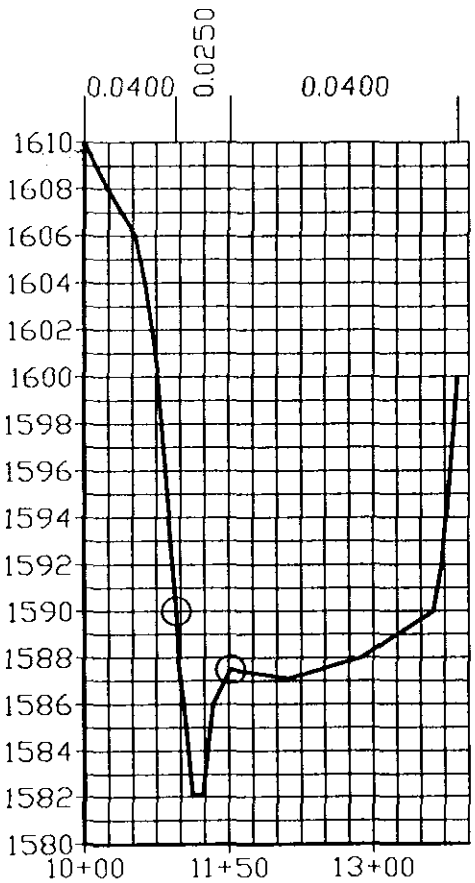
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 1700

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

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1750

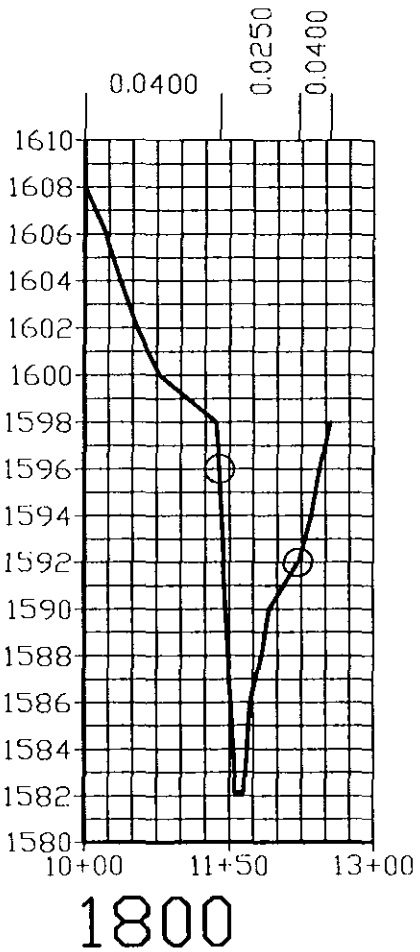
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 1750

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

F:\550-035T\dwg\fig\mainxs.dwg 11-10-00 10:40:01 mludwig



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LOOKING UPSTREAM

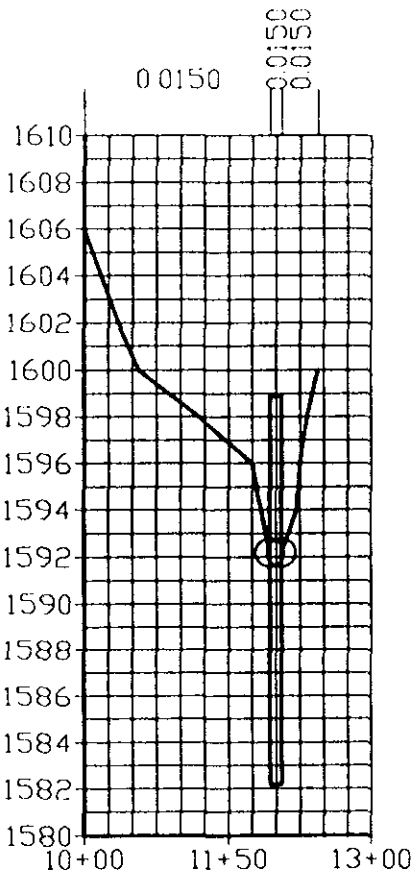
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FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 1800

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

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1900

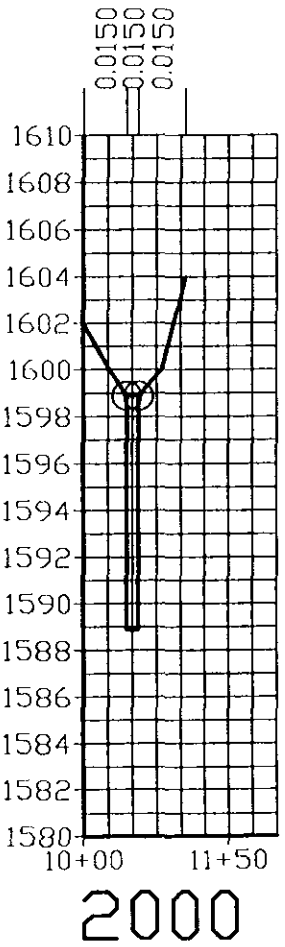
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FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 1900

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD, LAS VEGAS, NEVADA 89146

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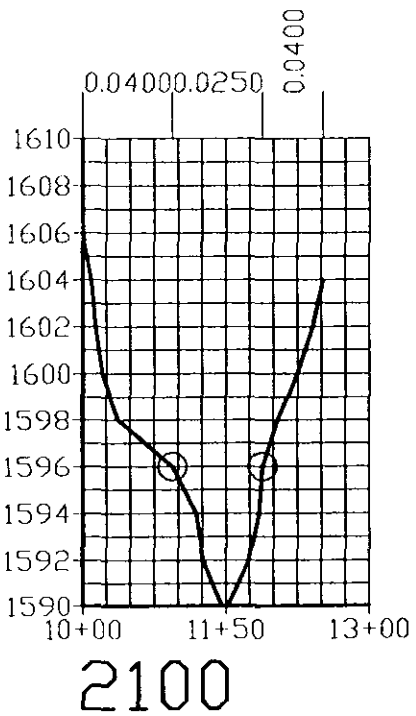
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 2000

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

F:\550-035\dwg\fig\mainxs.dwg 11-10-00 10:4[illegible] mludwig



2100

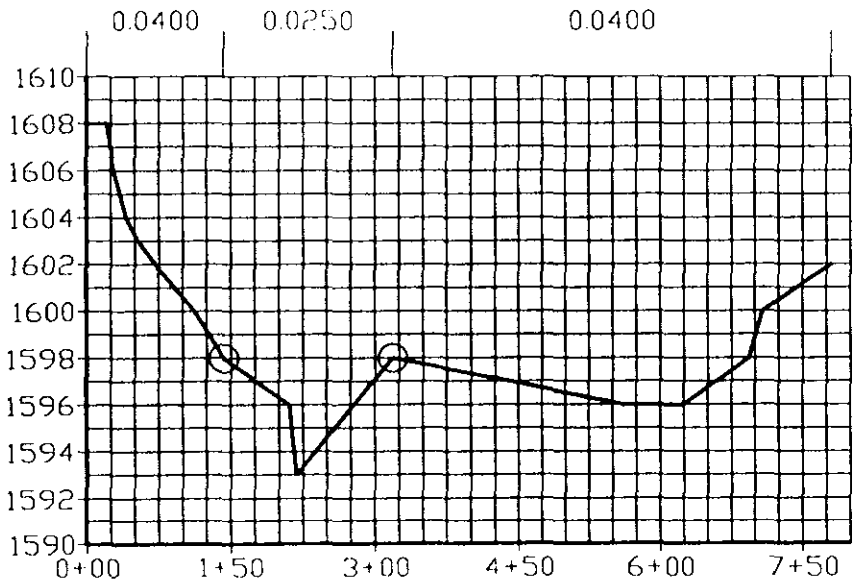
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 2100

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD, LAS VEGAS, NEVADA 89146

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2200

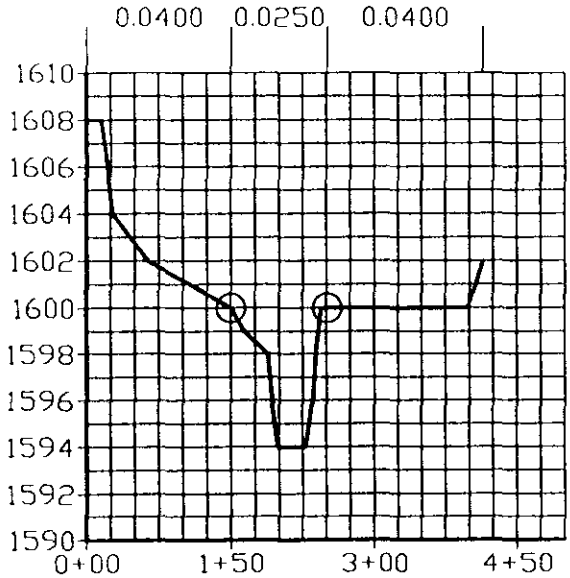
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 2200

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

F:\550-035\dwg\fig\mainxs.dwg 11-10-00 10:40:01 mludwig



2300

NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 2300

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

mludwig
11-10-00 10:4
F:\550-033\dwg\fig\mainxs.dwg

I-15 BREAKOUT HEC-2 MODEL
I15BRK4.OUT

BOSS RiverCAD (tm)

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Version : 4.0

PROGRAM ORIGIN :

BOSS RiverCAD HEC-2 Analysis is an enhanced version of the U.S. Army Corps of Engineers Hydrologic Engineering Center HEC-2 program for water-surface profile computations. Program based upon the September 1990 version, updated on *August 1991*.

DISCLAIMER :

BOSS RiverCAD is a complex program which requires engineering expertise to use correctly. BOSS International assumes absolutely no responsibility for the correct use of this program. All results obtained should be carefully examined by an experienced professional engineer to determine if they are reasonable and accurate.

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PROJECT DESCRIPTION :

PROJECT TITLE : Abbott and Pulsipher Washes FIS Restudy
PROJECT NUMBER : 550-0351
DESCRIPTION : Pulsipher Wash Detailed Hydraulic Analys
ENGINEER : Jerry E. Pruitt, P.E.
DATE OF RUN : 11/13/2000
TIME OF RUN : 6:31 pm

T1 550-0351
T2 Abbott and Pulsipher Washes FIS Restudy
T3 Pulsipher Wash Detailed Hydraulic Analysis

JOB PARAMETERS :

	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
J1		2			-1			1340	1575.7	

	NPROF	IPLOT	PRTVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
J2	1		-1				-1	-6		15

USER-DEFINED SUMMARY TABLES (J3) :

	150	100	110	200						
NC	0.03	0.03	0.03	0.1	0.3					
ET			10.4							
X1	10	26	1124.84	1331.55						
GR	1590	1000	1590	1000.07	1588	1010.03	1588	1010.08	1586	1024.01
GR	1584	1038.47	1584	1063.77	1584	1078.45	1582	1091.15	1580	1096.95
GR	1578	1102.16	1578	1109.37	1580	1115.4	1582	1124.84	1582	1150.98
GR	1580	1157.58	1580	1168.35	1580.8	1193.79	1578	1224.12	1576	1229.58
GR	1574	1233.75	1572	1242.42	1572	1250.45	1574	1265.84	1576	1285.82
GR	1577.4	1331.55								
NC	0.03	0.03	0.03							
ET			10.4							
X1	15	25	1225.79	1362.44	182.05	179.72	196.3			
GR	1584	1000	1582	1025.96	1580	1034.54	1578	1044.03	1576	1053.43
GR	1574	1063.32	1574	1072.58	1574	1111.59	1572	1126.77	1570	1149.13
GR	1570	1169.97	1572	1177.3	1574	1181.96	1576	1187.98	1578	1194.05
GR	1580	1203.07	1581.6	1225.79	1580	1252.31	1578	1259.22	1576	1265.46
GR	1575	1269.57	1575	1285.94	1576	1307.71	1578	1335.49	1578.2	1362.44
NC	0.03	0.03	0.03							
ET			10.4							
X1	20	21	1252.17	1412.76	209.01	198.21	198.41			
GR	1584	1000	1582	1015.21	1582	1015.31	1580	1024.72	1578	1034.87
GR	1576	1056.33	1574	1077.79	1574	1201.1	1576	1206.59	1578	1214.48

GR	1581	1275.69	1582	1231.8	1582.4	1252.17	1582	1274.77	1580	1280.23
GR	1578	1296.56	1578	1290.9	1576	1313.5	1576	1329.87	1578	1351.22
GR	1578	1412.76								

NC	0.03	0.03	0.03							
ET			10.4							
XI	45	24	1288.25	1349.59	190.68	193.34	202			
GR	1584	1000	1582	1005.13	1580	1010.33	1578	1017.39	1576	1023.98
GR	1574	1041.47	1574	1072.79	1576	1081.17	1578	1092.33	1578	1116.26
GR	1576	1127.75	1576	1140.83	1578	1146.51	1580	1151.1	1582	1162.18
GR	1584.5	1188.26	1582	1216.2	1578	1239.75	1576	1253.99	1576	1262.97
GR	1576	1278.17	1576	1280.92	1578	1293.97	1578	1349.59		
NC	0.03	0.03	0.03							
ET			10.4							
XI	45	24	1305.53	1441.25	229.68	184.64	193.85			
GR	1584	1000	1582	1030.5	1582	1030.56	1580	1060.17	1578	1094.77
GR	1574	1116.13	1574	1170.73	1574	1196.64	1576	1209.82	1576	1209.86
GR	1576	1215.5	1580	1222.87	1582	1230.45	1582	1252.02	1582	1275.42
GR	1584	1288.31	1584.5	1305.53	1584	1325.89	1582	1337.91	1580	1349.81
GR	1578	1361.07	1576	1369.37	1574	1380.61	1572	1388.91	1572	1393.98
GR	1578	1398.53	1576	1402.19	1578	1405.46	1580	1409.71	1581	1441.25
NC	0.03	0.03	0.03							
ET			10.4							
XI	45	24	1187.21	1345.45	227.49	180.63	181.78			
GR	1582	1000	1582	1009.89	1586	1021.97	1584	1037.77	1582	1052.46
GR	1578	1087.54	1578	1100.48	1578	1126.04	1580	1140.3	1582	1167.8
GR	1584	1187.21	1584	1233.94	1584	1233.95	1582	1244.88	1580	1265.23
GR	1578	1281.05	1576	1294.63	1580	1306.19	1582	1321.59	1582.5	1345.45
NC	0.03	0.03	0.03							
ET			10.4							
XI	40	19	1145.56	1285.48	162	213.49	207.85			
GR	1600	1000	1590	1041.71	1588	1058.92	1586	1069.37	1584	1084.77
GR	1582	1090.23	1582	1105.72	1584	1113.25	1586	1124.33	1586.6	1145.56
GR	1586	1167.36	1584	1174.62	1582	1184.47	1580	1195.41	1578.5	1209.03
GR	1576.5	1224.27	1580	1234.83	1582	1249.93	1583.5	1265.48		
NC	0.03	0.03	0.03							
ET			10.4							
XI	45	25	1367.87	1506.99	201.96	208.58	193.28			
GR	1586	1000	1584	1068.4	1582	1121.98	1580	1184.23	1578	1235.85
GR	1576	1264.17	1576	1302.35	1578	1312.37	1580	1319.36	1582	1326.1
GR	1584	1333.96	1586	1343.43	1587.7	1367.87	1586	1397.07	1584	1406.06
GR	1582	1412.62	1580	1420.87	1578	1427.66	1576	1454.89	1576	1464.6
GR	1578	1468.56	1580	1473.32	1582	1476.57	1584	1481.71	1585	1506.99
NC	0.03	0.03	0.03							
ET			10.4							
XI	50	23	1247.4	1410.35	192.96	212.44	181.28			
GR	1588	1000	1586	1026.26	1584	1069.31	1582	1100.23	1580	1150.94
GR	1580	1199.77	1582	1218.55	1584	1228.89	1586	1239.79	1588	1247.4
GR	1588	1300.65	1586	1317.55	1584	1332.09	1582	1353.43	1582	1354.62
GR	1584	1379.79	1586	1386.81	1586.8	1410.35	1586	1433.09	1584	1445.61
GR	1582	1460.24	1582	1498.62	1584	1514.42				

NC	0.03	0.03	0.03							
ET			10.4							
XI	55	33	1267.85	1398.14	167.87	174.05	201.18			
GR	1594	1000	1592	1042.73	1590	1070.53	1588	1087.3	1586	1094.31
GR	1584	1099.94	1584	1106.39	1586	1111.46	1588	1117.57	1588	1117.6
GR	1588	1119.35	1586	1130.89	1584	1142.22	1583	1173.42	1584	1198.52
GR	1586	1218.03	1588	1233.34	1589.5	1267.85	1586	1295.71	1586	1316.12
GR	1584	1337.66	1584	1345.62	1586	1356.25	1588	1376.27	1588.1	1398.14
GR	1588	1421.88	1586	1435.95	1584	1451.35	1582	1471.53	1582	1473.76
GR	1584	1479.06	1586	1485.36	1588	1491.85				
NC	0.03	0.03	0.03							
ET			10.4							
XI	60	22	1273.16	1406.74	208.92	195.87	192.87			
GR	1594	1074.99	1592	1100	1592	1118.72	1592	1137.43	1590	1175.28
GR	1588	1222.98	1587	1230.07	1588	1237.08	1590	1243.4	1590.3	1273.16
GR	1590	1291.08	1588	1310.07	1586	1338.18	1586	1351.82	1588	1374.67
GR	1589	1406.74	1588	1436.27	1586	1453.11	1586	1477.62	1588	1487.44
GR	1590	1494.64	1592	1502.28						
NC	0.03	0.03	0.03							
ET			10.4							
XI	65	20	1128.47	1265.23	202.2	235.71	194.95			
GR	1598	1048.94	1596	1063.32	1594	1068.74	1592	1076.51	1590	1083.95
GR	1590	1096.56	1590.9	1128.47	1590	1159.82	1588	1178.33	1586.2	1206.44
GR	1588	1222.89	1590	1242.88	1590.1	1265.23	1590	1294.9	1588	1311.2
GR	1588	1319.93	1590	1328.74	1592	1344.43	1594	1360.92	1596	1382.36
NC	0.03	0.03	0.03							
ET			10.4							
XI	70	16	1112.76	1245.74	194.82	216.13	213.24			
GR	1600	1025.99	1590	1062.13	1589	1067.23	1590	1072.63	1591.7	1112.76
GR	1590	1145.19	1588	1166.93	1588	1197.16	1590	1213.43	1590.1	1245.74
GR	1590	1280.24	1590	1298.98	1592	1318.26	1594	1333.22	1596	1346.68
GR	1598	1367.12								
NC	0.03	0.03	0.03							
ET			10.4							
XI	75	23	1107.02	1248.2	191.38	167.91	207.11			
GR	1600	1037.27	1598	1042.44	1596	1048.71	1594	1054.69	1592	1059.33
GR	1590	1063.68	1590	1067.68	1592	1081.15	1593	1107.02	1592	1144.32

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GR     1590     1170.98        1588     1187.22        1588     1194.9         1590     1208.87        1592     1224.33
GR   1592.7      1248.2        1592     1275.24        1590     1293.29        1590      1303.8        1592     1310.12
GR     1594     1325.89        1596     1336.45        1598     1344.26

NC     0.03        0.03        0.03
ET                                10.4
X1       80          22     1114.61     1256.15      186.64      176.78      188.97
GR     1600     1041.24        1598     1047.24        1596     1052.94        1594     1059.29        1592.2     1066.47
GR     1594     1074.96      1595.6     1114.61        1594     1146.8         1592     1163.44          1590     1180.22
GR     1590     1193.92        1592     1208.08        1592     1208.09        1594     1222.36        1594.3     1256.15
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GR     1594     1291.07        1592     1301.13        1592     1315.62        1594     1324.79        1596     1335.8
GR     1598     1343.07        1600     1349.77

NC     0.03        0.03        0.03
ET                                10.4
X1       85          18     1108.61     1280.98      215.99      271.15      240.98
GR     1610     1034.47        1600     1058.45        1600     1058.48        1598     1069.23        1598     1083.13
GR     1600     1108.61        1600     1125.96        1598     1170.31        1596     1187.16        1594     1199.72
GR     1594     1214.06        1596     1222.08        1598     1244.09        1598     1280.98        1596     1329.74
GR     1596     1357.16        1598     1364.96        1600     1372.91
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STATUS: Analyzing profile 1.

STATUS: Critical depth to be calculated at all cross-sections.

Contraction Coefficient (CCHV) 0.100

Expansion Coefficient (CEHV) 0.300

STATUS: Analyzing cross-section reach 10.000.

WARNING: (3720) Critical depth has been assumed.

Cross Section Number SECNO	Left Overbank Manning n XNL	Channel Manning n XNCH	Right Overbank Manning n XNR	Flow Depth DEPTH (ft)	Water Surface Elevation CWSEL (ft MSL)	Critical W. S. Elevation CRIWS (ft MSL)	Known W. S. Elevation WSELK (ft MSL)
Energy Gradient SLOPE (ft/ft)	Left Overbank Length XLOBL (ft)	Channel Length XLCH (ft)	Right Overbank Length XLOBR (ft)	Energy Gradient Elevation EG (ft MSL)	Weighted Velocity Head HV (ft)	Friction Energy Loss HL (ft)	Other Energy Loss OLOSS (ft)
Cummul-ative Volume VOL (acre-ft)	Left Overbank Area ALOB (sq ft)	Channel Area ACH (sq ft)	Right Overbank Area AROB (sq ft)	Bridge Deck Area CORAR (sq ft)	Left Bank Elevation LTBNK (ft MSL)	Right Bank Elevation RTBNK (ft MSL)	Number of Balance Trials ITRIAL
Total Flow Q (cfs)	Left Overbank Flow QLOB (cfs)	Channel Flow QCH (cfs)	Right Overbank Flow QROB (cfs)	Computed W. S. Top Width TOPWD (ft)	Left W. S. Station SSTA (ft)	Right W. S. Station ENDST (ft)	Number of Crit Dpth Trials IDC
Flow Travel Time TIME (hrs)	Left Overbank Velocity VLOB (ft/s)	Channel Mean Velocity VCH (ft/s)	Right Overbank Velocity VROB (ft/s)	Length Weighted Manning n WTN	Cummul. Surface Area TWA (acres)	Minimum C. S. Elevation ELMIN (ft MSL)	Number of Other Trials ICONT
10.000	0.000	0.030	0.000	4.47	1576.47	1576.47	1575.70
0.010432	0	0	0	1577.58	1.10	0.00	0.00
0.00	0	159	0	0.00	1582.00	1577.40	0
1340	0	1339	0	74.0	1228.29	1301.28	10
0.00	0.00	8.43	0.00	0.000	0.0	1572.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 10.000
Total Discharge (cfs, Q) 1340
Computed Water Surface Elevation (ft MSL, CWSEL) 1576.47

Station (ft) = 1228.3 1331.6
Flow (%) = 100.0
Area (sq ft) = 159.0
Vel (ft/s) = 8.43
Depth (ft) = 2.18

STATUS: Analyzing cross-section reach 15.000.

STATUS: (3265) Divided flow.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 8.68

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
15.000	0.030	0.030	0.000	7.72	1577.72	1573.41	0.00
0.000138	182	196	179	1577.77	0.05	0.08	0.11
2.08	687	126	0	0.00	1581.60	1578.20	2
1340	1231	108	0	219.3	1045.36	1331.56	11
0.03	1.79	0.85	0.00	0.000	0.6	1570.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 15.000
Total Discharge (cfs, Q) 1340
Computed Water Surface Elevation (ft MSL, CWSEL) 1577.72

Station (ft)	1045.4	1053.4	1063.3	1072.6	1111.6	1126.8
Flow (+)	0.3	2.2	3.6	15.1	8.7	
Area (sq ft)	6.9	26.9	34.4	145.0	71.6	
Vel (ft/s)	0.52	1.12	1.40	1.40	1.63	
Depth (ft)	0.86	2.72	3.72	3.72	4.72	

Station (ft)	1126.8	1149.1	1170.0	1177.3	1182.0	1188.0
Flow (+)	23.2	27.3	7.4	2.5	1.3	
Area (sq ft)	150.2	160.8	49.2	22.0	16.4	
Vel (ft/s)	2.07	2.28	2.03	1.55	1.10	
Depth (ft)	6.72	7.72	6.72	4.72	2.72	

Station (ft)	1188.0	1193.2	1362.4
Flow (+)	0.2	8.1	
Area (sq ft)	4.5	126.9	
Vel (ft/s)	0.51	0.85	
Depth (ft)	0.86	1.78	

STATUS: Analyzing cross-section reach 20.000.

STATUS: (3265) Divided flow.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 0.58

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
20.000	0.030	0.030	0.000	3.74	1577.74	1575.49	0.00
0.000409	209	188	198	1577.82	0.08	0.05	0.01
5.47	557	55	0	0.00	1582.40	1578.00	2
1340	1278	61	0	223.5	1037.64	1348.47	21
0.06	2.29	1.11	0.00	0.000	1.7	1574.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 20.000
Total Discharge (cfs, Q) 1340
Computed Water Surface Elevation (ft MSL, CWSEL) 1577.74

Station (ft)	1037.6	1056.3	1077.8	1201.1	1206.6	1213.5
Flow (+)	1.1	8.6	83.2	2.1	0.4	
Area (sq ft)	16.3	58.8	461.4	15.1	6.0	
Vel (ft/s)	0.91	1.96	2.41	1.88	0.90	
Depth (ft)	0.87	2.74	3.74	2.74	0.87	

Station (ft)	1213.5	1412.8
Flow (+)	4.6	
Area (sq ft)	55.8	
Vel (ft/s)	1.11	
Depth (ft)	1.17	

STATUS: Analyzing cross-section reach 25.000.

STATUS: (3265) Divided flow.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 0.48

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
25.000	0.030	0.030	0.000	3.76	1577.76	1576.72	0.00
0.001793	190	202	193	1578.02	0.26	0.14	0.06
7.56	248	86	0	0.00	1583.50	1578.00	2

1340	1083	256	0	151.8	1018.19	1292.38	11
0.07	4.36	2.97	0.00	0.000	2.5	1574.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 25.000
Total Discharge (cfs, Q) 1340
Computed Water Surface Elevation (ft MSL, CWSEL) 1577.76

Station (ft) =	1018.2	1024.0	1031.7	1072.8	1081.2	1091.0
Flow (*) =	0.7	6.4	58.4	7.0	1.2	
Area (sq ft) =	5.1	21.2	154.5	23.1	8.6	
Vel (ft/s) =	1.87	4.03	5.07	4.05	1.90	
Depth (ft) =	0.88	2.76	3.76	2.76	0.88	

Station (ft) =	1091.0	1127.8	1140.8	1145.8	1349.6
Flow (*) =	1.3	5.2	0.6	19.2	
Area (sq ft) =	8.9	23.0	4.4	86.4	
Vel (ft/s) =	1.90	3.05	1.85	2.97	
Depth (ft) =	0.24	1.76	0.88	1.70	

STATUS: Analyzing cross-section reach 30.000.

STATUS: (3265) Divided flow.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 1.64

30.000	0.030	0.030	0.000	6.14	1578.14	1576.08	0.00
0.000664	229	193	184	1578.26	0.12	0.23	0.01
9.62	377	157	0	0.00	1584.50	1581.00	2
1340	894	445	0	169.0	1092.29	1405.76	8
0.09	2.73	2.83	0.00	0.000	3.3	1572.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 30.000
Total Discharge (cfs, Q) 1340
Computed Water Surface Elevation (ft MSL, CWSEL) 1578.14

Station (ft) =	1092.3	1128.1	1170.7	1196.6	1209.8	1215.5
Flow (*) =	4.0	27.4	26.4	8.4	0.6	
Area (sq ft) =	38.3	133.9	107.3	41.4	6.4	
Vel (ft/s) =	1.39	2.74	3.29	2.72	1.34	
Depth (ft) =	1.07	3.14	4.14	3.14	1.14	

Station (ft) =	1215.5	1441.3
Flow (*) =	33.2	
Area (sq ft) =	157.2	
Vel (ft/s) =	2.83	
Depth (ft) =	3.47	

STATUS: Analyzing cross-section reach 35.000.

STATUS: (3265) Divided flow.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
35.000	0.030	0.030	0.000	2.52	1580.52	1580.52	0.00
0.009334	227	181	180	1581.32	0.80	0.35	0.21
11.26	109	78	0	0.00	1584.00	1582.50	0
1340	838	501	0	119.3	1078.42	1310.20	16
0.10	7.63	6.40	0.00	0.000	4.0	1578.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 35.000
Total Discharge (cfs, Q) 1340
Computed Water Surface Elevation (ft MSL, CWSEL) 1580.52

Station (ft) =	1078.4	1087.5	1100.5	1126.0	1140.3	1147.5
Flow (*) =	0.3	9.2	42.6	10.2	0.3	
Area (sq ft) =	2.4	19.7	64.4	21.7	1.9	
Vel (ft/s) =	1.95	6.28	8.86	6.29	1.95	
Depth (ft) =	0.26	1.52	2.52	1.52	0.26	

Station (ft) =	1147.5	1345.4
Flow (*) =	37.4	
Area (sq ft) =	78.3	
Vel (ft/s) =	6.40	
Depth (ft) =	1.56	

STATUS: Analyzing cross-section reach 4 ...

STATUS: (3065) Divided flow

WARNING: (3185) Critical depth has been [illegible] reach. Trial to find a depth has been attempted [illegible]

WARNING: (3720) Critical depth has been attempted

SECNO	XNL	XNCH	ANF	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLOCH	XLOBF	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AFOB	CFAF	LTRNK	RTRNK	ITRIAL
Q	QLOB	QCH	QFOB	TOPW	VINA	ENDST	IPC
TIME	VLOB	VCH	VFOB	WTN	TWA	ELMIN	ICONT
45.000	0.030	0.030	[illegible]	[illegible]	[illegible]	[illegible]	0.00
0.000604	.03	194	[illegible]	[illegible]	[illegible]	[illegible]	0.00
15.49	98	355	[illegible]	[illegible]	[illegible]	[illegible]	2
1340	996	343	[illegible]	[illegible]	[illegible]	[illegible]	11
0.16	1.04	0.97	[illegible]	[illegible]	[illegible]	[illegible]	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO):					45.000
Total Discharge (cfs, Q):					1340
Computed Water Surface Elevation (ft MSL, WSEL):					1583.40
Station (ft) =	1084.6	1122.0	1184.2	1235.8	1264.2	1302.3
Flow (+) =	0.5	4.8	15.5	15.9	27.3	
Area (sq ft) =	26.0	149.0	[illegible]	161.1	262.3	
Vel (ft/s) =	0.17	0.61	0.94	1.17	1.30	
Depth (ft) =	0.70	2.39	4.39	4.39	7.39	
Station (ft) =	1322.1	1352.4	1374.4	1414.3	1441.6	1503.0
Flow (+) =	4.6	[illegible]	[illegible]	[illegible]	4.6	
Area (sq ft) =	64.1	92.7	18.1	4.8	155.2	
Vel (ft/s) =	1.04	0.84	0.59	0.84	0.93	
Depth (ft) =	6.39	4.04	0.39	0.70	4.93	

STATUS: Analyzing cross-section reach 5 ...

STATUS: (3065) Divided flow

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO): 0.19

SECNO	XNL	XNCH	XNF	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLOCH	XLOBF	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AFOB	CFAF	LTRNK	RTRNK	ITRIAL
Q	QLOB	QCH	QFOB	TOPW	VINA	ENDST	IPC
TIME	VLOB	VCH	VFOB	WTN	TWA	ELMIN	ICONT
50.000	0.030	0.030	[illegible]	[illegible]	[illegible]	[illegible]	0.00
0.001436	190	181	[illegible]	[illegible]	[illegible]	[illegible]	0.05
19.35	340	21	[illegible]	[illegible]	[illegible]	[illegible]	3
1340	1182	30	[illegible]	[illegible]	[illegible]	[illegible]	17

0.18	3.48	1.40	2.00	0.000	6.6	1580.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 50.000
Total Discharge (cfs, Q) 1340
Computed Water Surface Elevation (ft MSL, CWSEL) 1583.31

Station (ft) =	1079.9	1100.2	1150.9	1199.8	1218.6	1225.3
Flow (+) =	1.4	27.7	48.6	10.2	0.4	
Area (sq ft) =	13.3	117.2	161.7	43.4	4.5	
Vel (ft/s) =	1.37	3.16	4.02	3.15	1.35	
Depth (ft) =	0.66	2.31	3.31	2.31	0.66	

Station (ft) =	1225.3	1410.3	1460.2	1498.6	1509.0
Flow (+) =	2.3	0.6	8.2	0.7	
Area (sq ft) =	21.6	6.3	50.4	6.8	
Vel (ft/s) =	1.40	1.36	2.17	1.36	
Depth (ft) =	0.68	0.13	1.31	0.66	

STATUS: Analyzing cross-section reach 55.000.

STATUS: (3265) Divided flow.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

55.000	0.030	0.030	0.030	3.19	1585.19	1585.19	0.00
0.008995	167	201	174	1585.88	0.69	0.48	0.15
20.60	117	20	70	0.00	1589.50	1588.10	0
1340	723	82	534	155.2	1096.59	1482.81	11
0.18	6.15	3.93	7.57	0.000	7.4	1582.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 55.000
Total Discharge (cfs, Q) 1340
Computed Water Surface Elevation (ft MSL, CWSEL) 1585.19

Station (ft) =	1096.6	1099.9	1106.4	1109.4	1142.2	1173.4
Flow (+) =	0.5	3.0	0.4	1.0	26.2	
Area (sq ft) =	2.0	7.7	1.8	4.0	52.7	
Vel (ft/s) =	3.20	5.28	3.17	3.29	6.66	
Depth (ft) =	0.60	1.19	0.60	0.12	1.69	

Station (ft) =	1173.4	1198.5	1210.1	1398.1	1451.3	1471.5
Flow (+) =	21.1	1.7	6.1	1.3	26.1	
Area (sq ft) =	42.4	6.9	20.9	5.5	44.2	
Vel (ft/s) =	6.66	3.31	3.93	3.31	7.90	
Depth (ft) =	1.69	0.60	0.77	0.10	2.19	

Station (ft) =	1471.5	1473.8	1479.1	1482.8
Flow (+) =	5.4	6.6	0.5	
Area (sq ft) =	7.1	11.6	2.2	
Vel (ft/s) =	10.18	7.58	3.22	
Depth (ft) =	3.19	2.19	0.60	

STATUS: Analyzing cross-section reach 60.000.

STATUS: (3265) Divided flow.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
60.000	0.030	0.030	0.030	2.35	1588.35	1588.35	0.00
0.009276	208	192	195	1589.01	0.66	1.82	0.00
21.56	13	103	95	0.00	1590.30	1589.00	0
1340	53	589	697	165.6	1214.61	1488.70	15
0.19	3.92	5.69	7.29	0.000	8.1	1586.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 60.000
Total Discharge (cfs, Q) 1340
Computed Water Surface Elevation (ft MSL, CWSEL) 1588.35

Station (ft) =	1214.6	1223.0	1230.1	1237.1	1238.2	1406.7
Flow (+) =	0.2	1.9	1.9	0.0	44.0	
Area (sq ft) =	1.5	6.0	6.0	0.2	103.5	
Vel (ft/s) =	1.49	4.26	4.26	1.45	5.69	
Depth (ft) =	0.18	0.85	0.85	0.18	1.31	

FLOW BREAKOUT BETWEEN SECTIONS 45 AND 50.

FROM TABLE AT LEFT

0.6 %
8.2 %
0.7 %
9.5 % OF TOTAL FLOW (1340)

~ 9.5% (1340 CFS)

= 127 CFS

Station (ft) =	1406.7	1436.3	1453.1	1477.6	1487.4	1488.7
Flow (+) =	0.2	9.9	36.3	5.7	0.0	
Area (sq ft) =	1.8	22.7	57.6	13.3	0.2	
Vel (ft/s) =	1.49	5.80	8.43	5.75	1.46	
Depth (ft) =	0.06	1.35	2.35	1.35	0.18	

STATUS: Analyzing cross-section reach 65.000.

STATUS: (3265) Divided flow.

65.000	0.030	0.030	0.030	3.99	1590.19	1589.74	0.00
0.006689	202	194	235	1590.67	0.48	1.64	0.02
22.65	3	187	53	0.00	1590.90	1590.10	2
1340	3	1066	269	197.1	1083.24	1330.23	17
0.20	1.21	5.69	5.07	0.000	9.0	1586.20	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	65.000
Total Discharge (cfs, Q)	1340
Computed Water Surface Elevation (ft MSL, CWSEL)	1590.19

Station (ft) =	1083.2	1096.6	1103.3	1265.2	1294.9	1311.2
Flow (+) =	0.2	0.0	79.6	0.3	6.6	
Area (sq ft) =	2.5	0.6	187.3	4.2	19.4	
Vel (ft/s) =	1.30	0.84	5.69	1.09	4.53	
Depth (ft) =	0.19	0.10	1.67	0.14	1.19	

Station (ft) =	1311.2	1319.9	1328.7	1330.2
Flow (+) =	9.7	3.5	0.0	
Area (sq ft) =	19.1	10.5	0.1	
Vel (ft/s) =	6.83	4.47	0.84	
Depth (ft) =	2.19	1.19	0.10	

STATUS: Analyzing cross-section reach 70.000.

STATUS: (3265) Divided flow.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 1.58

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
70.000	0.030	0.030	0.030	3.33	1591.33	1590.73	0.00
0.002664	194	213	216	1591.55	0.22	0.85	0.03
24.15	43	247	77	0.00	1591.70	1590.10	3
1340	119	992	227	238.8	1057.32	1311.82	20
0.22	2.76	4.01	2.92	0.000	10.1	1588.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	70.000
Total Discharge (cfs, Q)	1340
Computed Water Surface Elevation (ft MSL, CWSEL)	1591.33

Station (ft) =	1057.3	1062.1	1067.2	1072.6	1104.1	1245.7
Flow (+) =	0.5	2.6	2.8	3.0	74.1	
Area (sq ft) =	3.2	9.3	9.9	21.0	247.7	
Vel (ft/s) =	1.90	3.78	3.79	1.95	4.01	
Depth (ft) =	0.67	1.83	1.83	0.67	1.97	

Station (ft) =	1245.7	1280.2	1299.0	1311.8
Flow (+) =	10.0	5.8	1.2	
Area (sq ft) =	44.2	25.0	8.6	
Vel (ft/s) =	3.02	3.10	1.94	
Depth (ft) =	1.28	1.33	0.67	

STATUS: Analyzing cross-section reach 75.000.

STATUS: (3265) Divided flow.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 0.61

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
75.000	0.030	0.030	0.030	3.88	1591.88	1591.68	0.00
0.007221	191	207	167	1592.49	0.61	0.82	0.12
25.48	23	153	41	0.00	1593.00	1592.70	2
1340	109	1018	211	131.5	1059.60	1309.73	8
0.23	4.74	6.62	5.15	0.000	10.9	1588.00	0

FLOW DISTRIBUTION :

Cross-Section Number (ft) = 80.000
Total Discharge (cfs) = 1340
Computed Water Surface Elevation (ft MSL, CWSEL) = 1591.59

Station (ft)						
Flow (cfs)						4.8
Area (sq ft)				11.9	15.1	15.9
Vel (ft/s)						4.02
Depth (ft)						0.35

Station (ft)			
Flow (cfs)			
Area (sq ft)			
Vel (ft/s)			
Depth (ft)			

STATUS: Analyzing [illegible]

STATUS: [illegible]

WARNING: (25) Critical depth has been assumed, therefore critical depth has been assumed for the current cross-section.

WARNING: (73) Critical depth has been assumed.

BOSS RiverCAD HEC-2 Analysis Version 4.0 PAGE 18
PROJECT TITLE : Abbott and Pulsipher Wastes EIS Restudy
PROJECT NUMBER : 550-0351 11/13/2000

SECNO	XNL	ZONE	PMP	DEPTH	AREA	VIEWS	WSELK
SLOPE	NLOB	XLOB	XR BR	FR	HO	HI	CLOSS
VOL	ALOB	ACH	AR 5	.. PAP	LOSS	HIDNR	ITRIAL
Q	SLOB	QCH	.PCH	T EW	SUTA	ERROR	IHC
TIME	VLOB	VCH	VR R	WTN	TWA	ELMIN	ICONT
80.000	0.000	[illegible]	[illegible]	5.61	1591.71	1591.61	0.00
0.009504	100	100	17	1594.64	0.05	1.54	0.07
26.34	0	34	0	[illegible]	1595.46	1594.30	0
1340	0	[illegible]	[illegible]	[illegible]	[illegible]	1323.00	12
0.25	0.00	[illegible]	[illegible]	[illegible]	11.3	1590.00	0

FLOW DISTRIBUTION :

Cross-Section Number (ft) = 80.000
Total Discharge (cfs) = 1340
Computed Water Surface Elevation (ft MSL, CWSEL) = 1593.61

Station (ft)						
Flow (cfs)					.0	11.5
Area (sq ft)					6.5	23.3
Vel (ft/s)					4.11	6.63
Depth (ft)					0.24	1.01

Station (ft)			
Flow (cfs)			
Area (sq ft)			
Vel (ft/s)			
Depth (ft)			

STATUS: Analyzing [illegible] reach 85.000.

STATUS: Divided flow.

WARNING: (25) Critical depth has been assumed, therefore critical depth has been assumed for the current cross-section.

WARNING: (73) Critical depth has been assumed.

85.000	0.000	0.000	0.000	3.5%	1597.55	1597.55	0.00
0.009177	215	240	275	1598.27	0.32	2.31	0.01
27.46	0	126	56	0.60	1600.00	1598.00	0
1340	0	999	465	136.4	1114.09	1363.21	8
0.25	0.00	0.54	5.21	0.00	11.1	1594.00	0

BOSS RiverCAD HEC-2 Analysis Version 4.0 PAGE 19
PROJECT TITLE : Abbott and Pulsipher Wastes EIS Restudy
PROJECT NUMBER : 550-0351 11/13/2000

FLOW DISTRIBUTION :

Cross-Section Number (ft) = 85.000
Total Discharge (cfs) = 1340
Computed Water Surface Elevation (ft MSL, CWSEL) = 1597.55

Station (ft)					
Flow (cfs)		69.7	8.8	25.1	1.4
Area (sq ft)		116.8	19.9	4.15	4.7
Vel (ft/s)		7.36	4.00	4.36	3.92
Depth (ft)		1.95	0.60	1.55	0.78

T1 550-0351
T2 Abbott and Pulsipher Wastes EIS Restudy
T3 Pulsipher Wash Detailed Hydraulic Analysis

JOB PARAMETERS :

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		3			-1			1340	1576.7	

*.	BPRINT	IPLOT	PFPVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1*		-1				-1	-6		15

STATUS: Analyzing profile 2.

STATUS: Critical depth to be calculated at all cross-sections.

Contraction Coefficient (CCHV) 0.100

Expansion Coefficient (CEHV) 0.300

STATUS: Analyzing cross-section reach 15.000.

STATUS: (2800) Special encroachment note.

Natural Flow (cfs, NAT Q1)	131.19
Natural Water Surface Elevation (ft MSL, WSEL)	1576.47
Encroached Flow (cfs, ENC Q1)	217.16
Encroached Water Surface Elevation (ft MSL, WSEL)	1577.47
Interpolation Distance Ratio (RATIO)	-0.6553
Flow (cfs, NAT Q1)	217.16
Left Overbank Ratio (LOB RATIO)	0.0000
Channel Ratio (CH RATIO)	1.0000
Right Overbank Ratio (ROB RATIO)	0.0000

WARNING: (3710) Critical depth has been assumed.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1124.84
Right Encroachment Station (ft, STENCR)	1331.55
Encroachment Method (TYPE)	4
Width or Percent Target	0.000

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
*	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
ICONT	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
10.000	0.000	0.030	0.000	4.48	1576.48	1576.48	1576.47
.001413	0	0	0	1577.58	1.10	0.00	0.00
1.00	0	159	0	0.00	1582.00	1577.40	0
134.	0	1339	0	73.1	1228.28	1301.35	4
.00	0.00	8.42	0.00	0.000	0.0	1572.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	10.000
Total Discharge (cfs, Q)	1340
Computed Water Surface Elevation (ft MSL, CWSEL)	1576.48

Station (ft)	=	1228.3 1331.6
Flow (%)	=	100.0
Area (sq ft)	=	159.2
Vel (ft/s)	=	8.42
Depth (ft)	=	2.18

STATUS: Analyzing cross-section reach 15.000.

STATUS: (2800) Special encroachment note.

Natural Flow (cfs, NAT Q1)	1139.16
Natural Water Surface Elevation (ft MSL, WSEL)	1577.72
Encroached Flow (cfs, ENC Q1)	1139.16
Encroached Water Surface Elevation (ft MSL, WSEL)	1578.72
Interpolation Distance Ratio (RATIO)	0.0000
Flow (cfs, NAT Q1)	1579.97
Left Overbank Ratio (LOB RATIO)	0.8882
Channel Ratio (CH RATIO)	0.1118
Right Overbank Ratio (ROB RATIO)	0.0000

STATUS: (3265) Divided flow.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 6.49

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1117.35
Right Encroachment Station (ft, STENCR)	1362.44
Encroachment Method (TYPE)	4
Width or Percent Target	0.279

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL

Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
15.000	0.030	0.030	0.000	7.72	1577.72	1573.39	1577.72
0.000247	182	196	179	1577.82	0.10	0.14	0.10
1.59	451	126	0	0.00	1581.60	1578.20	2
1340	1195	144	0	147.3	1117.35	1331.56	15
0.02	2.65	1.14	0.00	0.000	0.5	1570.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 15.000
Total Discharge (cfs, Q) 1340
Computed Water Surface Elevation (ft MSL, CWSEL) 1577.72

Station (ft) =	1117.3	1126.8	1149.1	1170.0	1177.3	1182.0
Flow (=) =	6.4	31.0	36.5	9.9	3.4	
Area (sq ft) =	48.0	150.2	160.8	49.2	22.0	
Vel (ft/s) =	1.77	2.77	3.04	2.71	2.07	
Depth (ft) =	5.10	6.72	7.72	6.72	4.72	

Station (ft) =	1182.0	1188.0	1193.2	1362.4
Flow (=) =	1.8	0.2	10.8	
Area (sq ft) =	16.4	4.5	126.9	
Vel (ft/s) =	1.46	0.68	1.14	
Depth (ft) =	2.72	0.86	1.78	

STATUS: Analyzing cross-section reach 20.000.

STATUS: (2800) Special encroachment note.

Natural Flow (cfs, NAT Q1) 662.52
Natural Water Surface Elevation (ft MSL, WSEL) 1577.74
Encroached Flow (cfs, ENC Q1) 662.52
Encroached Water Surface Elevation (ft MSL, WSEL) 1578.74
Interpolation Distance Ratio (RATIO) 0.0000
Flow (cfs, NAT Q1) 1064.99
Left Overbank Ratio (LOB RATIO) 0.9146
Channel Ratio (CH RATIO) 0.0854
Right Overbank Ratio (ROB RATIO) 0.0000

STATUS: (3265) Divided flow.

WARNING: (3302) Conveyance Change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 0.49

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL) 1116.63
Right Encroachment Station (ft, STENCR) 1412.76
Encroachment Method (TYPE) 4
Width or Percent Target 0.378

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
20.000	0.030	0.030	0.000	3.74	1577.74	1575.96	1577.74
0.001040	209	188	198	1577.94	0.20	0.09	0.03
3.88	337	56	0	0.00	1582.40	1578.00	1
1340	1240	99	0	144.7	1116.63	1348.55	11
0.04	3.67	1.77	0.00	0.000	1.2	1574.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 20.000
Total Discharge (cfs, Q) 1340
Computed Water Surface Elevation (ft MSL, CWSEL) 1577.74

Station (ft) =	1116.6	1201.1	1206.6	1213.5	1412.8
Flow (=) =	88.5	3.4	0.6	7.4	
Area (sq ft) =	316.7	15.1	6.0	56.2	
Vel (ft/s) =	3.75	3.01	1.43	1.77	
Depth (ft) =	3.75	2.75	0.87	1.17	

STATUS: Analyzing cross-section reach 25.000.

STATUS: (2800) Special encroachment note.

Natural Flow (cfs, NAT Q1) 316.46
Natural Water Surface Elevation (ft MSL, WSEL) 1577.76
Encroached Flow (cfs, ENC Q1) 316.46
Encroached Water Surface Elevation (ft MSL, WSEL) 1578.76
Interpolation Distance Ratio (RATIO) 0.0000
Flow (cfs, NAT Q1) 555.53
Left Overbank Ratio (LOB RATIO) 0.7763
Channel Ratio (CH RATIO) 0.2237
Right Overbank Ratio (ROB RATIO) 0.0000

STATUS: (3265) Divided flow.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 0.42

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL) 1578.16
Right Encroachment Station (ft, STENCR) 1441.25
Encroachment Method (TYPE) 4
Width or Percent Target 0.836

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	EGLOB
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
25.000	0.030	0.030	0.000	3.86	1577.86	1577.68	1
0.006023	190	202	193	1578.46	0.61	0.44	0
5.23	125	91	0	0.00	1583.50	1578.50	1
1340	830	509	0	113.6	1059.16	1744.04	5
0.05	6.64	5.56	0.00	0.000	1.7	1574.00	1

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 25.0
Total Discharge (cfs, Q) 134.
Computed Water Surface Elevation (ft MSL, CWSEL) 1577.86

Station (ft) =	1059.2	1072.8	1081.2	1091.5	1127.8	1140.8
Flow (*) =	31.4	13.6	2.6	2.7	10.5	
Area (sq ft) =	52.5	23.9	9.6	9.9	24.3	
Vel (ft/s) =	8.01	7.60	3.62	3.62	5.61	
Depth (ft) =	3.86	2.86	0.93	0.27	1.56	

Station (ft) =	1140.8	1146.1	1349.6
Flow (*) =	1.3	38.0	
Area (sq ft) =	4.9	91.6	
Vel (ft/s) =	3.52	5.56	
Depth (ft) =	0.93	1.75	

STATUS: Analyzing cross-section reach 30.000.

STATUS: (2800) Special encroachment note.

Natural Flow (cfs, NAT Q1) 519.95
Natural Water Surface Elevation (ft MSL, WSEL) 1578.14
Encroached Flow (cfs, ENC Q1) 519.95
Encroached Water Surface Elevation (ft MSL, WSEL) 1578.14
Interpolation Distance Ratio (RATIO) 0.0000
Flow (cfs, NAT Q1) 80.91
Left Overbank Ratio (LOB RATIO) 0.1574
Channel Ratio (CH RATIO) 0.3524
Right Overbank Ratio (ROB RATIO) 0.4902

STATUS: (3265) Divided flow.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 1.61

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL) 1568.16
Right Encroachment Station (ft, STENCR) 1441.25
Encroachment Method (TYPE) 4
Width or Percent Target 0.836

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	EGLOB
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
30.000	0.030	0.030	0.000	6.70	1576.70	1576.55	1576.14
0.000877	229	193	184	1578.90	0.20	0.39	0.04
6.66	193	183	0	0.00	1584.50	1561.00	1
1340	715	624	0	99.6	1168.16	1406.95	8
0.06	3.71	3.40	0.00	0.000	2.3	1572.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 30.00
Total Discharge (cfs, Q) 134
Computed Water Surface Elevation (ft MSL, CWSEL) 1578.70

Station (ft) =	1168.2	1170.7	1196.6	1209.8	1209.9	1215.5
Flow (*) =	1.8	37.4	12.7	0.0	1.4	
Area (sq ft) =	11.9	121.8	48.8	0.1	9.5	
Vel (ft/s) =	2.06	4.12	3.48	2.64	2.61	
Depth (ft) =	4.64	4.70	3.70	2.70	1.70	

Station (ft) =	1215.5	1218.1	1441.3
Flow (*) =	0.0	46.6	

Area (sq ft)	=	0.9	1-9.6
Vel (ft/s)	=	0.71	3.40
Depth (ft)	=	0.35	1.70

STATUS: Analyzing cross-section reach 35.000.

STATUS: (2800) Special encroachment note.

Natural Flow (cfs, NAT Q1)	138.70
Natural Water Surface Elevation (ft MSL, WSEL)	1580.52
Encroached Flow (cfs, ENC Q1)	138.70
Encroached Water Surface Elevation (ft MSL, WSEL)	1581.52
Interpolation Distance Ratio (RATIO	0.0000
Flow (cfs, NAT Q1)	288.72
Left Overbank Ratio (LOB RATIO)	0.6250
Channel Ratio (CH RATIO	0.3750
Right Overbank Ratio (ROB RATIO)	0.0000

STATUS: (3605) Divided flow.

STATUS: (3401) The velocity head difference for current and previous cross sections exceeded the allowable specified by HVINS.

WARNING: (3725) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1127.41
Right Encroachment Station (ft, STENCR)	1345.45
Encroachment Method (TYPE)	4
Width or Percent Target	0.520

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
K.L	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	*ELMIN*	*ICONT*
35.000	0.030	0.030	0.030	3.44	1581.44	1581.44	1580.52
0.010478	127	181	180	1582.35	0.91	0.42	0.21
7.96	44	132	0	0.00	1584.00	1582.50	0
1340	289	1050	1	99.6	1127.41	1317.30	11
0.07	6.50	7.94	0.00	0.000	2.7	1578.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	35.000
Total Discharge (cfs, Q)	1340
Computed Water Surface Elevation (ft MSL, CWSEL)	1581.44

Station (ft)	=	1127.4	1140.2	1160.1	1345.4
Flow (cfs)	=	17.3	4.3	78.4	
Area (sq ft)	=	30.3	14.3	142.3	
Vel (ft/s)	=	1.65	4.06	7.94	
Depth (ft)	=	2.35	0.72	1.98	

STATUS: Analyzing cross-section reach 40.000.

STATUS: (2800) Special encroachment note.

Natural Flow (cfs, NAT Q1)	140.42
Natural Water Surface Elevation (ft MSL, WSEL)	1582.27
Encroached Flow (cfs, ENC Q1)	228.02
Encroached Water Surface Elevation (ft MSL, WSEL)	1583.27
Interpolation Distance Ratio (RATIO)	-0.6238
Flow (cfs, NAT Q1)	241.37
Left Overbank Ratio (LOB RATIO)	0.0553
Channel Ratio (CH RATIO	0.9447
Right Overbank Ratio (ROB RATIO)	0.0000

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO)	1.63

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1145.56
Right Encroachment Station (ft, STENCR)	1285.48
Encroachment Method (TYPE)	4
Width or Percent Target	0.055

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
40.000	0.000	0.030	0.000	4.63	1583.13	1582.16	1582.27
0.003944	162	207	213	1583.62	0.49	1.23	0.04
8.93	0	238	0	0.00	1586.60	1583.50	2
1340	0	1340	0	98.0	1178.85	1276.88	8
0.08	0.00	5.61	0.00	0.000	3.2	1578.50	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	40.000
Total Discharge (cfs, Q)	1340
Computed Water Surface Elevation (ft MSL, CWSEL)	1583.13

Station (ft) =	1178.8	1285.5
Flow (*) =	100.0	
Area (sq ft) =	238.9	
Vel (ft/s) =	5.61	
Depth (ft) =	2.44	

STATUS: Analyzing cross-section reach 45.000.

STATUS: (2800) Special encroachment note.

Natural Flow (cfs, NAT Q1)	1943.72
Natural Water Surface Elevation (ft MSL, WSEL)	1583.40
Encroached Flow (cfs, ENC Q1)	1943.72
Encroached Water Surface Elevation (ft MSL, WSEL)	1584.40
Interpolation Distance Ratio (RATIO)	0.0000
Flow (cfs, NAT Q1)	2589.83
Left Overbank Ratio (LOB RATIO)	0.7650
Channel Ratio (CH RATIO)	0.2350
Right Overbank Ratio (ROB RATIO)	0.0000

STATUS: (3265) Divided flow.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO)	7.76

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1228.94
Right Encroachment Station (ft, STENCR)	1506.99
Encroachment Method (TYPE)	4
Width or Percent Target	0.249

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
45.000	0.030	0.030	0.000	7.68	1583.68	1578.23	1583.40
0.000065	201	193	208	1583.71	0.03	0.04	0.05
11.79	644	376	0	0.00	1587.70	1585.00	2
1340	903	436	0	177.6	1228.94	1480.89	11
0.12	1.40	1.16	0.00	0.000	3.8	1576.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	45.000
Total Discharge (cfs, Q)	1340
Computed Water Surface Elevation (ft MSL, CWSEL)	1583.68

Station (ft) =	1228.9	1235.8	1264.2	1302.3	1312.4	1319.4
Flow (*) =	2.4	20.0	34.1	7.0	2.7	
Area (sq ft) =	38.3	189.2	293.2	66.9	32.7	
Vel (ft/s) =	0.85	1.42	1.56	1.40	1.09	
Depth (ft) =	5.55	6.68	7.68	6.68	4.68	

Station (ft) =	1319.4	1326.1	1332.7	1507.0
Flow (*) =	1.0	0.1	32.5	
Area (sq ft) =	18.1	5.6	376.1	
Vel (ft/s) =	0.75	0.39	1.16	
Depth (ft) =	2.68	0.84	5.10	

STATUS: Analyzing cross-section reach 50.000.

STATUS: (2800) Special encroachment note.

Natural Flow (cfs, NAT Q1)	366.61
Natural Water Surface Elevation (ft MSL, WSEL)	1583.31
Encroached Flow (cfs, ENC Q1)	366.61
Encroached Water Surface Elevation (ft MSL, WSEL)	1584.31
Interpolation Distance Ratio (RATIO)	0.0000
Flow (cfs, NAT Q1)	698.55
Left Overbank Ratio (LOB RATIO)	0.8035
Channel Ratio (CH RATIO)	0.0530
Right Overbank Ratio (ROB RATIO)	0.1435

STATUS: (3265) Divided flow.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO)

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)
Right Encroachment Station (ft, STENCR)
Encroachment Method (TYPE)
Width or Percent Target

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	
TIME	*VLOB*	*VCH*	*VROB*	*WTN*	*TWA*	*ELMIN*	
50.000	0.030	0.030	0.000	3.33	1583.33		
0.003859	192	181	212	1583.91	0.58		
14.50	206	22	0	0.00	1586.00		
1340	1286	53	0	105.4	1152.24		
0.13	6.22	2.40	0.00	0.000	4.4		

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)
Total Discharge (cfs, Q)
Computed Water Surface Elevation (ft MSL, CWSEL) 1583.33

Station (ft) =	1152.2	1199.8	1218.6	1225.4	1410.3
Flow (s) =	77.6	17.6	0.8	4.0	
Area (sq ft) =	158.4	43.8	4.6	22.3	
Vel (ft/s) =	6.56	5.39	2.32	2.40	
Depth (ft) =	3.33	2.33	0.67	0.69	

STATUS: Analyzing cross-section reach 55.000.

STATUS: (2800) Special encroachment note.

Natural Flow (cfs, NAT Q1)
Natural Water Surface Elevation (ft MSL, WSEL)
Encroached Flow (cfs, ENC Q1)
Encroached Water Surface Elevation (ft MSL, WSEL)
Interpolation Distance Ratio (RATIO)
Flow (cfs, NAT Q1)
Left Overbank Ratio (LOB RATIO)
Channel Ratio (CH RATIO)
Right Overbank Ratio (ROB RATIO)

STATUS: (3265) Divided flow.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)
Right Encroachment Station (ft, STENCR)
Encroachment Method (TYPE)
Width or Percent Target

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
55.000	0.030	0.030	0.030	4.17	1586.17		
0.009612	167	201	174	1587.02	0.85		
15.34	103	55	30	0.00	1589.50		
1340	850	313	176	115.6	1169.01		
0.14	8.19	5.67	5.83	0.000	4.9		

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)
Total Discharge (cfs, Q)
Computed Water Surface Elevation (ft MSL, CWSEL)

Station (ft) = 1144.2 1194.4 1245.1 1295.8 1345.1
Flow (cfs) = 7.4 0.0 0.0 0.0 29.6
Area (sq ft) = 22.7 0.0 0.0 0.0 45.3
Vel (ft/s) = 0.33 0.00 0.00 0.00 0.67
Depth (ft) = 0.51 0.00 0.00 0.00 1.07

Station (ft) = 1394.1 1441.4 1491.4
Flow (cfs) = 0.0 0.0
Area (sq ft) = 16.1 11.1
Vel (ft/s) = 0.00 0.00
Depth (ft) = 0.45 0.45

STATUS: Analyzing cross-section reach 65.000.

STATUS: (2800) Special encroachment note:

Natural Flow (cfs, NAT Q) 169.65
Natural Water Surface Elevation (ft MSL, WSEL) 1590.19
Encroached Flow (cfs, ENCQ) 140.31
Encroached Water Surface Elevation (ft MSL, WSEL) 1589.00
Interpolation Distance Ratio (RATI) 0.1740
Flow (cfs, NAT Q) 29.34
Left Overbank Ratio (LOB RATI) 0.0000
Channel Ratio (CH RATI) 0.0000
Right Overbank Ratio (ROB RATI) 1.0000

WARNING: (2185) Critical depth has been assumed, therefore critical depth has been assumed if the current is supercritical.

WARNING: (3760) Critical depth has been assumed.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL) 1372.16
Right Encroachment Station (ft, STENCR) 1406.74
Encroachment Method (ITYE) 4
Width or Percent Target 0.555

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CWSNO	WSELK
SLOPE	XLOBL	XLOBR	E	HO	HL	CLASS	
VOL	ALOB	AOH	AROB	CCHAR	STBNK	FTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWI	VSTA	ENDST	ICONT
TIME	VLOB	VCH	VROB	WTH	TWA	ELMIN	ICOUNT
60.000	0.000	0.030	0.000	3.15	1594.15	1589.15	1588.35
0.011544	708	192	194	1590.00	2.87	2.06	0.21
16.18	0	179	0	0.00	1591.30	1589.00	0
1340	0	1340	0	1.00	1.47.17	140.74	19
0.14	0.60	0.40	0.0	0.00	0.14	1.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 60.000
Total Discharge (cfs, Q) 1340
Computed Water Surface Elevation (ft MSL, CWSEL) 1589.15

Station (ft) = 1299.2 1460.7
Flow (cfs) = 100.0
Area (sq ft) = 179.4
Vel (ft/s) = 2.47
Depth (ft) = 1.07

STATUS: Analyzing cross-section reach 65.000.

STATUS: (2800) Special encroachment note:

Natural Flow (cfs, NAT Q) 169.65
Natural Water Surface Elevation (ft MSL, WSEL) 1590.19
Encroached Flow (cfs, ENCQ) 271.96
Encroached Water Surface Elevation (ft MSL, WSEL) 1591.19
Interpolation Distance Ratio (RATI) -0.6590
Flow (cfs, NAT Q) 306.36
Left Overbank Ratio (LOB RATI) 0.0487
Channel Ratio (CH RATI) 0.7039
Right Overbank Ratio (ROB RATI) 0.2475

WARNING: (3362) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (ERATIO) 1.73

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL) 1126.47
Right Encroachment Station (ft, STENCR) 1265.23
Encroachment Method (ITYE) 4
Width or Percent Target 0.296

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
65.000	0.000	0.030	0.000	4.70	1590.90	1590.15	1590.19
0.003844	202	194	235	1591.27	0.37	1.21	0.05
17.19	0	275	0	0.00	1590.90	1590.10	2
1340	0	1340	0	136.7	1128.58	1265.23	14
0.16	0.00	4.87	0.00	0.000	5.9	1586.20	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 65.000
Total Discharge (cfs, Q) 1340
Computed Water Surface Elevation (ft MSL, CWSEL) 1590.90

Station (ft) = 1128.6 1265.2
Flow (=) = 100.0
Area (sq ft) = 275.2
Vel (ft/s) = 4.87
Depth (ft) = 2.01

STATUS: Analyzing cross-section reach 70.000.

STATUS: (2800) Special encroachment note.

Natural Flow (cfs, NAT Q1) 259.64
Natural Water Surface Elevation (ft MSL, WSEL) 1591.33
Encroached Flow (cfs, ENC Q1) 377.51
Encroached Water Surface Elevation (ft MSL, WSEL) 1592.33
Interpolation Distance Ratio (RATIO) -0.4540
Flow (cfs, NAT Q1) 571.22
Left Overbank Ratio (LOB RATIO) 0.1272
Channel Ratio (CH RATIO) 0.6609
Right Overbank Ratio (ROB RATIO) 0.2119

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL) 1112.76
Right Encroachment Station (ft, STENCR) 1245.74
Encroachment Method (TYPE) 4
Width or Percent Target 0.339

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
70.000	0.000	0.030	0.000	3.67	1591.67	1590.81	1591.33
0.003052	194	213	216	1592.00	0.33	0.73	0.00
18.58	0	291	0	0.00	1591.70	1590.10	3
1340	0	1340	0	132.5	1113.26	1245.74	14
0.17	0.00	4.59	0.00	0.000	6.6	1588.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO) 70.000
Total Discharge (cfs, Q) 1340
Computed Water Surface Elevation (ft MSL, CWSEL) 1591.67

Station (ft) = 1113.3 1245.7
Flow (=) = 100.0
Area (sq ft) = 291.9
Vel (ft/s) = 4.59
Depth (ft) = 2.20

STATUS: Analyzing cross-section reach 75.000.

STATUS: (2800) Special encroachment note.

Natural Flow (cfs, NAT Q1) 157.69
Natural Water Surface Elevation (ft MSL, WSEL) 1591.88
Encroached Flow (cfs, ENC Q1) 198.24
Encroached Water Surface Elevation (ft MSL, WSEL) 1592.88
Interpolation Distance Ratio (RATIO) -0.2572
Flow (cfs, NAT Q1) 307.56
Left Overbank Ratio (LOB RATIO) 0.1280
Channel Ratio (CH RATIO) 0.6446
Right Overbank Ratio (ROB RATIO) 0.2274

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 0.61

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1107.02
Right Encroachment Station (ft, STENCR)	1248.20
Encroachment Method (TYPE)	4
Width or Percent Target	0.355

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
75.000	0.000	0.030	0.000	4.38	1592.38	1592.04	1591.88
0.008131	191	207	167	1593.09	0.70	0.97	0.11
19.75	0	199	0	0.00	1593.00	1592.70	3
1340	0	1339	0	107.2	1130.11	1237.32	8
0.18	0.00	6.73	0.00	0.000	7.1	1588.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	75.000
Total Discharge (cfs, Q)	1340
Computed Water Surface Elevation (ft MSL, CWSEL)	1592.38

Station (ft)	=	1130.1 1248.2
Flow (s)	=	100.0
Area (sq ft)	=	199.1
Vel (ft/s)	=	6.73
Depth (ft)	=	1.86

STATUS: Analyzing cross-section reach 80.000.

STATUS: (2800) Special encroachment note.

Natural Flow (cfs, NAT Q1)	137.46
Natural Water Surface Elevation (ft MSL, WSEL)	1593.61
Encroached Flow (cfs, ENC Q1)	181.13
Encroached Water Surface Elevation (ft MSL, WSEL)	1594.61
Interpolation Distance Ratio (RATIO)	-0.3177
Flow (cfs, NAT Q1)	258.61
Left Overbank Ratio (LOB RATIO)	0.0630
Channel Ratio (CH RATIO)	0.7004
Right Overbank Ratio (ROB RATIO)	0.2366

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1114.61
Right Encroachment Station (ft, STENCR)	1256.15
Encroachment Method (TYPE)	4
Width or Percent Target	0.300

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
80.000	0.000	0.030	0.000	3.83	1593.83	1593.82	1593.61
0.010411	186	188	176	1594.94	1.11	1.73	0.12
20.53	0	158	0	0.00	1595.60	1594.30	1
1340	0	1339	0	73.1	1148.12	1221.23	12
0.18	0.00	8.44	0.00	0.000	7.5	1590.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	80.000
Total Discharge (cfs, Q)	1340
Computed Water Surface Elevation (ft MSL, CWSEL)	1593.83

Station (ft)	=	1148.1 1256.2
Flow (s)	=	100.0
Area (sq ft)	=	158.8
Vel (ft/s)	=	8.44
Depth (ft)	=	2.17

STATUS: Analyzing cross-section reach 85.000.

STATUS: (2800) Special encroachment note.

Natural Flow (cfs, NAT Q1)	139.88
Natural Water Surface Elevation (ft MSL, WSEL)	1597.55
Encroached Flow (cfs, ENC Q1)	162.99
Encroached Water Surface Elevation (ft MSL, WSEL)	1598.55
Interpolation *Distance Ratio (RATIO)*	-0.1652
Flow (cfs, NAT Q1)	288.99
Left Overbank Ratio (LOB RATIO)	0.0108
Channel Ratio (CH RATIO)	0.5640
Right Overbank Ratio (ROB RATIO)	0.4252

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: Supercritical Depth has been assumed.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1105.61
Right Encroachment Station (ft, STENCR)	1261.99
Encroachment Method (TYPE)	4
Width or Percent Target	0.436

SECNO	XNL	XN(3)	XRP	DEPTH	CWSEL	CRIWS	WSELP
SLOPE	XLOBL	XC(3)	XLOBR	ES	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	ITENF	KTRNK	ITRIAL
Q	QLOB	QCH	QROB	STRAC	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WIN	TWA	ELMIN	ICONT
85.000	0.000	0.000	0.000	4.40	1596.30	1598.40	1597.05
0.010098	.035	.040	.071	1544.56	3.74	2.47	3.64
22.50	0	193	0	0.00	1671.00	1596.00	0
1340	0	1339	0	117.9	1161.30	1161.96	10
0.19	0.00	6.91	0.00	0.010	6.1	1596.00	0

FLOW DISTRIBUTION :

Cross-Section Number (SECNO)	85.000
Total Discharge (cfs, Q	1347
Computed Water Surface Elevation (ft MSL, WSEL	1596.3

Station (ft) =	1163.8	1261.0
Flow (*) =	100.0	
Area (sq ft) =	193.9	
Vel (ft/s) =	6.91	
Depth (ft) =	1.65	

SPECIAL NOTE :

An asterisk (*) to the left of the cross-section number indicates a special note is present in the SUMMARY OF WARNING AND STATUS MESSAGES section.

SUMMARY PRINTOUT TABLE 150 : Abbott and Pulsipher Washes FIS Restudy
Pulsipher Wash Detailed Hydraulic Analys
550-0351

Cross-Section Number SECNO	Low Flow Energy Elevation (ft MSL) EGLWC	Max. Low Chnl Elevation (ft MSL) ELLOC	Prs. Flow Energy Elevation (ft MSL) EGPRS	Top of Roadway Elevation (ft MSL) ELTRD	Pressure and/or Low Flow (cfs) QPR	Total Bridge Weir Flow (cfs) QWEIR	Bridge Class CLASS	Yarnell W.S. Elev Change (ft) H3	Flow Depth (ft) DEPTH	Computed W. S. Elevation (ft MSL) CWSEL	Channel Mean Flow Velocity (ft/s) VCH	Energy Gradient Elevation (ft MSL) EG

SUMMARY PRINTOUT TABLE 110 : Abbott and Pulsipher Washes FIS Restudy
Pulsipher Wash Detailed Hydraulic Analys
550-0351

	Cross-Section Number SECNO	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Energy Gradient Elevation (ft MSL) EG	Water Surface Top Width (ft) TOPWID	Left Overbank Flow (cfs) QLOB	Channel Flow (cfs) QCH	Right Overbank Flow (cfs) QROB	Encroach. Target Requested PERENC	Left Encroach. Station (ft) STENCL	Left Bank Station (ft) STCHL	Right Bank Station (ft) STCHR	Right Encroach. Station (ft) STENCR
*	10.000	1576.47	0.77	1577.58	72.99	0.00	1340.00	0.00	0.00	0.00	1124.84	1331.55	0.00
*	10.000	1576.48	0.00	1577.58	73.06	0.00	1340.00	0.00	0.00	1124.84	1124.84	1331.55	1331.55
*	15.000	1577.77	0.00	1577.77	219.29	1237.98	108.02	0.00	0.00	0.00	1225.79	1362.44	0.00
*	15.000	1577.78	0.00	1577.82	247.30	1195.63	144.37	0.00	0.28	1117.35	1225.79	1362.44	1362.44
*	20.000	1577.74	0.00	1577.82	223.51	1178.10	61.90	0.00	0.00	0.00	1252.17	1412.76	0.00
*	20.000	1577.74	0.00	1577.94	144.68	1240.42	99.58	0.00	0.38	1116.63	1252.17	1412.76	1412.76
*	25.000	1577.76	0.00	1578.02	151.85	1043.20	256.80	0.00	0.00	0.00	1188.25	1349.59	0.00
*	25.000	1577.86	0.10	1578.46	113.63	840.89	509.11	0.00	0.43	1059.18	1188.25	1349.59	1349.59
*	30.000	1578.14	0.69	1578.26	269.03	894.47	445.53	0.00	0.00	0.00	1305.53	1441.25	0.00
*	30.000	1578.70	0.56	1578.90	99.60	715.88	624.12	0.00	0.36	1168.16	1305.53	1441.25	1441.25
*	35.000	1580.52	0.00	1581.37	119.29	838.86	501.14	0.00	0.00	0.00	1187.21	1345.45	0.00
*	35.000	1581.44	0.92	1582.35	99.47	289.49	1050.51	0.00	0.52	1127.41	1187.21	1345.45	1345.45

	Cross-Section Number SECNO	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Energy Gradient Elevation (ft MSL) EG	Water Surface Top Width (ft) TOPWID	Left Overbank Flow (cfs) QLOB	Channel Flow (cfs) QCH	Right Overbank Flow (cfs) QROB	Encroach. Target Requested PERENC	Left Encroach. Station (ft) STENCL	Left Bank Station (ft) STCHL	Right Bank Station (ft) STCHR	Right Encroach. Station (ft) STENCR
*	40.000	1582.27	0.00	1583.28	90.56	8.71	1331.29	0.00	0.00	0.00	1145.56	1285.48	0.00
*	40.000	1583.13	0.86	1583.62	58.03	0.00	1340.00	0.00	0.06	1145.56	1145.56	1285.48	1285.48

*	45.000	1584.40	0.00	1583.41	319.05	996.75	343.25	0.00	0.00	0.00	1367.87	1506.99	0.00
*	45.000	1583.68	0.29	1583.71	177.55	903.85	436.15	0.00	0.25	1228.94	1367.87	1506.99	1506.99
*	50.000	1585.31	0.00	1583.48	235.44	1182.76	30.16	127.08	0.00	0.00	1247.40	1410.35	0.00
*	50.000	1583.33	0.02	1583.91	105.39	1286.61	53.39	0.00	0.48	1152.24	1247.40	1410.35	1410.35
*	55.000	1585.19	0.00	1585.88	155.22	723.06	82.08	534.86	0.00	0.00	1267.85	1398.14	0.00
*	55.000	1586.17	0.98	1587.02	115.57	850.36	313.57	176.07	0.57	1169.01	1267.85	1398.14	1456.32
*	60.000	1588.35	0.00	1589.01	165.56	53.54	589.07	697.39	0.00	0.00	1273.16	1406.74	0.00
*	60.000	1589.15	0.80	1590.01	107.57	0.00	1340.00	0.00	0.56	1273.16	1273.16	1406.74	1406.74
	65.000	1590.19	0.00	1590.67	197.09	3.75	1066.25	270.00	0.00	0.00	1128.47	1265.23	0.00
*	65.000	1590.90	0.71	1591.27	136.65	0.00	1340.00	0.00	0.30	1128.47	1128.47	1265.23	1265.23
*	70.000	1591.33	0.00	1591.55	238.81	119.70	992.91	227.39	0.00	0.00	1112.76	1245.74	0.00
	70.000	1591.67	0.34	1592.00	132.48	0.00	1340.00	0.00	0.34	1112.76	1112.76	1245.74	1245.74
*	75.000	1591.88	0.00	1592.49	131.48	109.98	1018.26	211.76	0.00	0.00	1107.02	1248.20	0.00
*	75.000	1592.38	0.50	1593.09	107.21	0.00	1340.00	0.00	0.36	1107.02	1107.02	1248.20	1248.20
*	80.000	1593.61	0.00	1594.46	111.74	32.47	1101.72	205.81	0.00	0.00	1114.61	1256.15	0.00
	80.000	1593.83	0.22	1594.94	93.11	0.00	1340.00	0.00	0.30	1114.61	1114.61	1256.15	1256.15
*	85.000	1597.55	0.00	1598.27	136.36	0.00	933.60	406.40	0.00	0.00	1108.61	1280.98	0.00
*	85.000	1598.32	0.76	1599.06	117.66	0.00	1340.00	0.00	0.44	1108.61	1108.61	1280.98	1280.98

SUMMARY PRINTOUT TABLE 150 : Abbott and Pulsipher Washes FIS Restudy
---------- Pulsipher Wash Detailed Hydraulic Analys
550-0351

	Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Top of Roadway Elevation (ft MSL) ELTRD	Max. Low Chord Elevation (ft MSL) ELLC	Minimum C. S. Elevation (ft MSL) ELMIN	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	Critical W. S. Elevation (ft MSL) CRIWS	Energy Gradient Elevation (ft MSL) EG	Energy Gradient Slope * 10,000 10K*S	Channel Mean Flow Velocity (ft/s) VCH	Cross-Section Area (sq ft) AREA	Index Q (0.01 * Convey.) .01K
*	10.000	0.00	0.00	0.00	1572.00	1340.00	1576.47	1576.47	1577.58	104.32	8.43	159.03	131.19
*	10.000	0.00	0.00	0.00	1572.00	1340.00	1576.48	1576.48	1577.58	104.13	8.42	159.18	131.31
*	15.000	196.30	0.00	0.00	1570.00	1340.00	1577.72	1573.41	1577.77	1.38	0.85	814.87	1139.16
*	15.000	196.30	0.00	0.00	1570.00	1340.00	1577.72	1573.39	1577.82	2.47	1.14	577.99	852.09
*	20.000	188.41	0.00	0.00	1574.00	1340.00	1577.74	1575.49	1577.82	4.09	1.11	613.42	662.52
*	20.000	188.41	0.00	0.00	1574.00	1340.00	1577.74	1575.96	1577.94	10.40	1.77	394.04	415.53
*	25.000	202.00	0.00	0.00	1574.00	1340.00	1577.76	1576.72	1578.02	17.93	2.97	335.14	316.46
*	25.000	202.00	0.00	0.00	1574.00	1340.00	1577.86	1577.68	1578.46	60.23	5.56	216.68	172.66
*	30.000	193.85	0.00	0.00	1572.00	1340.00	1578.14	1576.08	1578.26	6.64	2.83	484.71	519.95
*	30.000	193.85	0.00	0.00	1572.00	1340.00	1578.70	1576.25	1578.90	8.77	3.40	376.70	452.54
*	35.000	181.78	0.00	0.00	1578.00	1340.00	1580.52	1580.52	1581.32	93.34	6.40	188.29	138.70
*	35.000	181.78	0.00	0.00	1578.00	1340.00	1581.44	1581.44	1582.35	104.28	7.94	176.81	131.22
*	40.000	207.85	0.00	0.00	1578.50	1340.00	1582.27	1582.27	1583.28	91.06	8.07	169.35	140.42
*	40.000	207.85	0.00	0.00	1578.50	1340.00	1583.13	1582.16	1583.62	39.44	5.61	238.90	213.38
*	45.000	193.28	0.00	0.00	1576.00	1340.00	1583.40	1578.23	1583.41	0.48	0.97	1335.23	1943.72
*	45.000	193.28	0.00	0.00	1576.00	1340.00	1583.68	1578.23	1583.71	0.65	1.16	1020.17	1656.49
*	50.000	181.28	0.00	0.00	1580.00	1340.00	1583.31	1582.26	1583.48	13.36	1.40	425.20	366.61
*	50.000	181.28	0.00	0.00	1580.00	1340.00	1583.33	1582.69	1583.91	38.59	2.40	229.09	215.72
*	55.000	201.18	0.00	0.00	1582.00	1340.00	1585.19	1585.19	1585.88	89.95	3.93	209.09	141.29
*	55.000	201.18	0.00	0.00	1582.00	1340.00	1586.17	1586.17	1587.02	96.12	5.67	189.33	136.68
*	60.000	192.87	0.00	0.00	1586.00	1340.00	1588.35	1588.35	1589.01	92.76	5.69	212.81	139.13
*	60.000	192.87	0.00	0.00	1586.00	1340.00	1589.15	1589.15	1590.01	115.44	7.47	179.43	124.72
	65.000	194.95	0.00	0.00	1586.20	1340.00	1590.19	1589.74	1590.67	66.89	5.69	243.68	163.85
*	65.000	194.95	0.00	0.00	1586.20	1340.00	1590.90	1590.15	1591.27	38.44	4.87	275.17	216.12
*	70.000	213.24	0.00	0.00	1588.00	1340.00	1591.33	1591.73	1591.55	26.64	4.01	368.90	259.64

	Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Top of Roadway Elevation (ft MSL) ELTRD	Max. Low Chord Elevation (ft MSL) ELLC	Minimum C. S. Elevation (ft MSL) ELMIN	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	Critical W. S. Elevation (ft MSL) CRIWS	Energy Gradient Elevation (ft MSL) EG	Energy Gradient Slope * 10,000 10K*S	Channel Mean Flow Velocity (ft/s) VCH	Cross-Section Area (sq ft) AREA	Index Q (0.01 * Convey.) .01K
	70.000	213.24	0.00	0.00	1588.00	1340.00	1591.67	1591.81	1592.00	30.52	4.59	291.88	242.57
*	75.000	207.11	0.00	0.00	1588.00	1340.00	1591.88	1591.68	1592.49	72.21	6.62	218.05	157.69
*	75.000	207.11	0.00	0.00	1588.00	1340.00	1592.38	1592.04	1593.09	81.31	6.73	199.13	148.60
*	80.000	188.97	0.00	0.00	1590.00	1340.00	1593.61	1593.61	1594.46	95.03	7.75	186.58	137.46
	80.000	188.97	0.00	0.00	1590.00	1340.00	1593.83	1593.82	1594.94	104.11	8.44	158.76	131.33
*	85.000	240.98	0.00	0.00	1594.00	1340.00	1597.55	1597.55	1598.27	91.77	7.36	203.39	139.88
*	85.000	240.98	0.00	0.00	1594.00	1340.00	1598.32	1598.32	1599.06	100.98	6.91	193.94	133.35

	Cross-Section Number	Discharge Flow (cfs)	Computed W. S. Elevation (ft MSL)	W.S. Elev Diff per Profile (ft)	W.S. Elev Diff per Section (ft)	W.S. Elev Diff per Know/Comp (ft)	Water Surface Top Width (ft)	Channel Reach Length (ft)
	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	10.000	1340.00	1576.47	0.00	0.00	0.00	72.99	0.00
*	10.000	1340.00	1576.48	0.00	0.00	0.00	73.06	0.00
*	15.000	1340.00	1577.72	0.00	1.25	0.00	219.29	196.30
*	15.000	1340.00	1577.72	0.00	1.24	0.00	147.30	196.30
*	20.000	1340.00	1577.74	0.00	0.02	0.00	223.51	188.41
*	20.000	1340.00	1577.74	0.00	0.02	0.00	144.68	188.41
*	25.000	1340.00	1577.76	0.00	0.01	0.00	151.85	202.00
*	25.000	1340.00	1577.86	0.10	0.11	0.10	113.63	202.00
*	30.000	1340.00	1578.14	0.00	0.39	0.00	169.03	193.85
*	30.000	1340.00	1578.70	0.56	0.84	0.56	99.60	193.85
*	35.000	1340.00	1580.52	0.00	2.38	0.00	119.29	181.78
*	35.000	1340.00	1581.44	0.92	2.74	0.92	99.47	181.78
*	40.000	1340.00	1582.27	0.00	1.75	0.00	90.58	207.85

	Cross-Section Number	Discharge Flow (cfs)	Computed W. S. Elevation (ft MSL)	W.S. Elev Diff per Profile (ft)	W.S. Elev Diff per Section (ft)	W.S. Elev Diff per Know/Comp (ft)	Water Surface Top Width (ft)	Channel Reach Length (ft)
	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	40.000	1340.00	1583.13	0.86	1.69	0.86	98.03	207.85
*	45.000	1340.00	1583.40	0.00	1.12	0.00	319.05	193.28
*	45.000	1340.00	1583.68	0.29	0.55	0.29	177.55	193.28
*	50.000	1340.00	1583.31	0.00	-0.08	0.00	235.44	181.28
*	50.000	1340.00	1583.33	0.02	-0.35	0.02	105.39	181.28
*	55.000	1340.00	1585.19	0.00	1.88	0.00	155.22	201.18
*	55.000	1340.00	1586.17	0.98	2.84	0.98	115.57	201.18
*	60.000	1340.00	1588.35	0.00	3.16	0.00	165.56	192.87
*	60.000	1340.00	1589.15	0.80	2.97	0.80	107.57	192.87
	65.000	1340.00	1590.19	0.00	1.84	0.00	197.09	194.95
*	65.000	1340.00	1590.90	0.71	1.75	0.71	136.65	194.95
*	70.000	1340.00	1591.33	0.00	1.14	0.00	238.81	213.24
	70.000	1340.00	1591.67	0.34	0.77	0.34	132.48	213.24
*	75.000	1340.00	1591.88	0.00	0.55	0.00	131.48	207.11
*	75.000	1340.00	1592.38	0.50	0.71	0.50	107.21	207.11
*	80.000	1340.00	1593.61	0.00	1.73	0.00	111.74	188.97
	80.000	1340.00	1593.83	0.22	1.45	0.22	73.11	188.97
*	85.000	1340.00	1597.55	0.00	3.94	0.00	136.36	240.98
*	85.000	1340.00	1598.32	0.76	4.48	0.76	117.66	240.98

SUMMARY OF WARNING AND STATUS MESSAGES :

Section 10, profile 1, critical depth assumed.

Section 10, profile 2, critical depth assumed.

Section 15, profile 1, conveyance change outside acceptable range.

Section 15, profile 2, conveyance change outside acceptable range.

Section 20, profile 1, conveyance change outside acceptable range.

Section 20, profile 2, conveyance change outside acceptable range.

Section 25, profile 1, conveyance change outside acceptable range.

Section 25, profile 2, conveyance change outside acceptable range.

Section 30, profile 1, conveyance change outside acceptable range.

Section 30, profile 2, conveyance change outside acceptable range.

Section 35, profile 1, critical depth assumed.

Section 35, profile 1, minimum specific energy.

Section 35, profile 2, critical depth assumed.

Section 35, profile 2, minimum specific energy.

Section 40, profile 1, critical depth assumed.

Section 40, profile 1, minimum specific energy.

Section 40, profile 2, conveyance change outside acceptable range.

Section 45, profile 1, conveyance change outside acceptable range.

Section 45, profile 2, conveyance change outside acceptable range.

Section 50, profile 1, conveyance change outside acceptable range.

Section 50, profile 2, conveyance change outside acceptable range.

Section 55, profile 1, critical depth assumed.

Section 55, profile 1, minimum specific energy.

Section 55, profile 2, critical depth assumed.

Section 55, profile 2, minimum specific energy.

Section 60, profile 1, critical depth assumed.

Section 60, profile 1, minimum specific energy.

Section 60, profile 2, critical depth assumed.

Section 60, profile 2, minimum specific energy.

Section 65, profile 2, conveyance change outside acceptable range.

Section 70, profile 1, conveyance change outside acceptable range.

Section 75, profile 1, conveyance change outside acceptable range.

Section 75, profile 2, conveyance change outside acceptable range.

Section 80, profile 1, critical depth assumed.

Section 80, profile 1, minimum specific energy.

Section 85, profile 1, critical depth assumed.

Section 85, profile 1, minimum specific energy.

Section 85, profile 2, critical depth assumed.

Section 85, profile 2, minimum specific energy.

39 Warning and status message(s) generated

SUMMARY PRINTOUT TABLE 200 : Abbott and Pulsipher Washes FIS Restudy
Pulsipher Wash Detailed Hydraulic Analys
550-0351

Profile Number 2

Cross-Section Number	Floodway Width (ft)	Floodway Section Area (sq ft)	Floodway Mean Velocity (ft/s)	W. S. Elevation with Floodway (ft MSL)	W. S. Elevation without Floodway (ft MSL)	W. S. Elevation Diffrence (ft)
10.000	73.	159.	8.4	1576.5	1576.5	0.0
15.000	214.	578.	2.3	1577.7	1577.7	0.0
20.000	232.	394.	3.4	1577.7	1577.7	0.0
25.000	234.	217.	6.2	1577.9	1577.8	0.1
30.000	239.	377.	3.6	1578.7	1578.1	0.6
35.000	190.	177.	7.6	1581.4	1580.5	0.9
40.000	98.	239.	5.6	1583.2	1582.3	0.9
45.000	252.	1020.	1.3	1583.7	1583.4	0.3
50.000	219.	229.	5.8	1583.3	1583.3	0.0
55.000	287.	189.	7.1	1586.2	1585.2	1.0
60.000	108.	179.	7.5	1589.2	1588.4	0.8
65.000	137.	275.	4.9	1590.9	1590.2	0.7
70.000	132.	292.	4.6	1591.6	1591.3	0.3
75.000	107.	199.	6.7	1592.4	1591.9	0.5
80.000	73.	159.	8.4	1593.8	1593.6	0.2
85.000	118.	194.	6.9	1598.4	1597.6	0.8

END OF OUTPUT

CROSS SECTION LABELING FORM
I-15 BREAKOUT HEC-2 MODEL

KEY TO CROSS-SECTION (XS) LABELING

PREPARED BY:
SC: G.C. WALLACE, INC.
TEC:

DATE PREPARED:
SC: 11/13/00
TEC:

COMMUNITY NAME MESQUITE, CLARK CO.
STATE NEVADA
FEMA CID NO.

STREAM NAME PULSIPHER WASH
RUN DATE 11/9/00

STUDY CONTRACTOR			TECHNICAL EVALUATION CONTRACTOR	
FIELD SURVEY SECTION NO.	XS LETTER DRAFT FIS	COMPUTER STATIONING	EPA REACH FILE NO.	XS LETTER FINAL FIS
	10	10		
	15	15		
	20	20		
	25	25		
	30	30		
	35	35		
	40	40		
	45	45		
	50	50		
	55	55		
	60	60		
	65	65		
	70	70		
	75	75		
	80	80		
	85	85		

CHANNEL ROUGHNESS CALCULATIONS
I-15 BREAKOUT HEC-2 MODEL

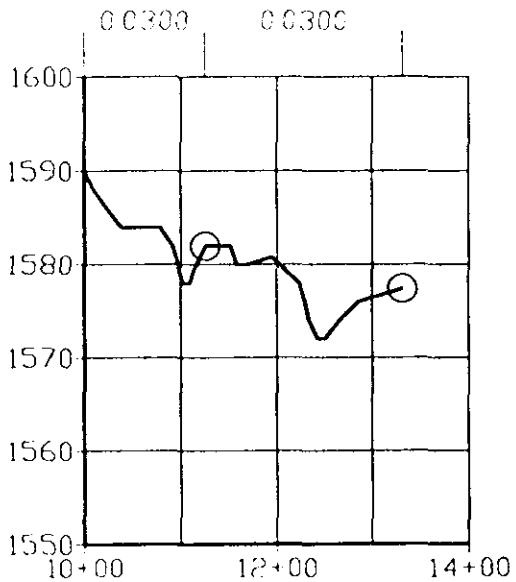
ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH - I-15 BREAKOUT MODEL
MANNINGS "n" CALCULATIONS - CHANNEL AND OVERBANKS

SECTION	n0	n1	n2	n3	n4	m5	n
10	0.020	0.005	0.000	0.000	0.005	1.000	0.030
15	0.020	0.005	0.000	0.000	0.005	1.000	0.030
20	0.020	0.005	0.000	0.000	0.005	1.000	0.030
25	0.020	0.005	0.000	0.000	0.005	1.000	0.030
30	0.020	0.005	0.000	0.000	0.005	1.000	0.030
35	0.020	0.005	0.000	0.000	0.005	1.000	0.030
40	0.020	0.005	0.000	0.000	0.005	1.000	0.030
45	0.020	0.005	0.000	0.000	0.005	1.000	0.030
50	0.020	0.005	0.000	0.000	0.005	1.000	0.030
55	0.020	0.005	0.000	0.000	0.005	1.000	0.030
60	0.020	0.005	0.000	0.000	0.005	1.000	0.030
65	0.020	0.005	0.000	0.000	0.005	1.000	0.030
70	0.020	0.005	0.000	0.000	0.005	1.000	0.030
75	0.020	0.005	0.000	0.000	0.005	1.000	0.030
80	0.020	0.005	0.000	0.000	0.005	1.000	0.030
85	0.020	0.005	0.000	0.000	0.005	1.000	0.030

REFERENCED FROM "OPEN-CHANNEL HYDRAULICS", VEN TE CHOW, McGRAW-HILL, INC., 1959. SEE VOLUME III, SECTION 5.3.

n0 = MATERIAL
n1 = IRREGULARITY
n2 = CROSS SECTION VARIATIONS
n3 = OBSTRUCTIONS
n4 = VEGETATION
m5 = MEANDERING

INDIVIDUAL CROSS SECTION EXHIBITS
I-15 BREAKOUT HEC-2 MODEL



10

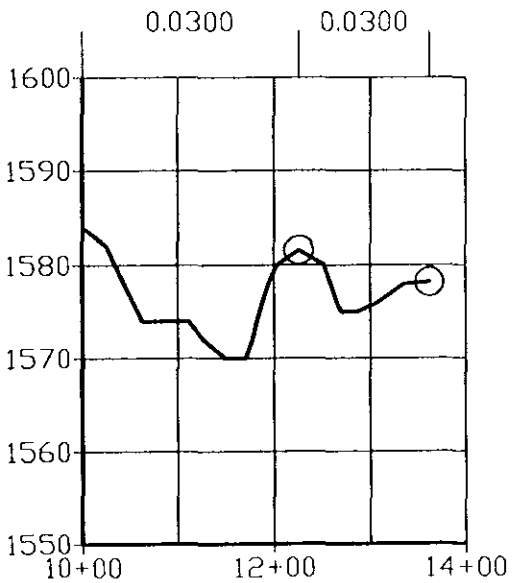
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
1-15 BREAKOUT MODEL
CROSS SECTION 10

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

mludwig
11-10-00
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15

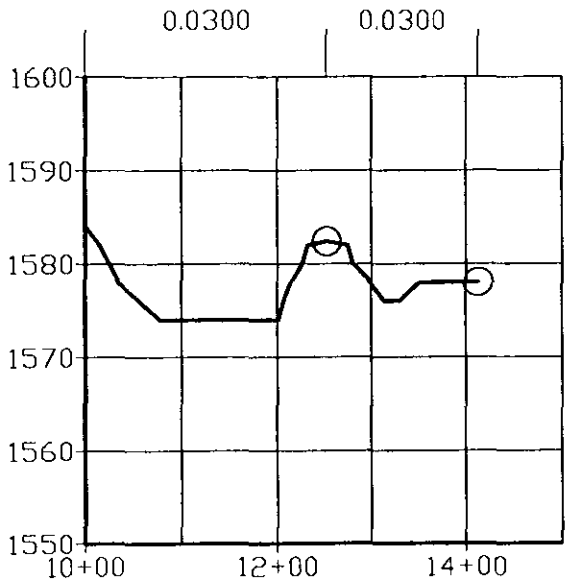
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
I-15 BREAKOUT MODEL
CROSS SECTION 15

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

F:\550-035\dwg\fig\i15xs.dwg 11-10-00 11:5[illegible] mludwig



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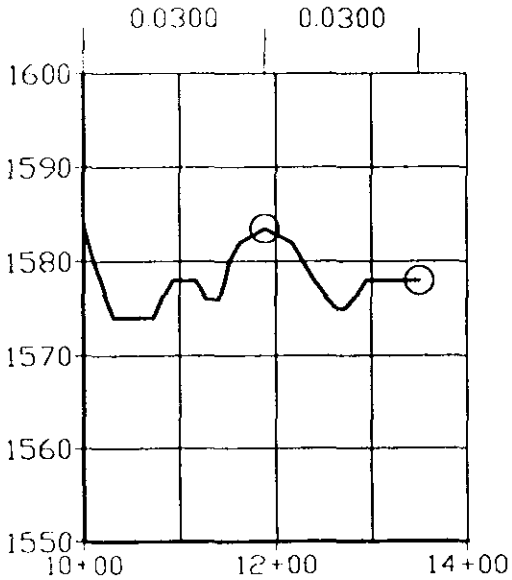
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
I-15 BREAKOUT MODEL
CROSS SECTION 20

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

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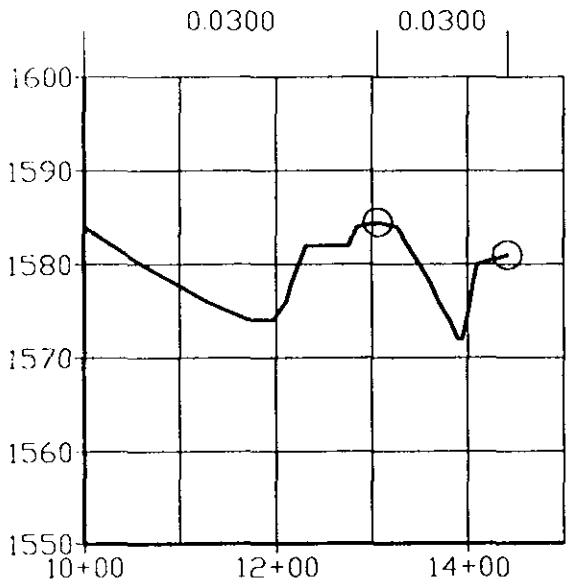
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
I-15 BREAKOUT MODEL
CROSS SECTION 25

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

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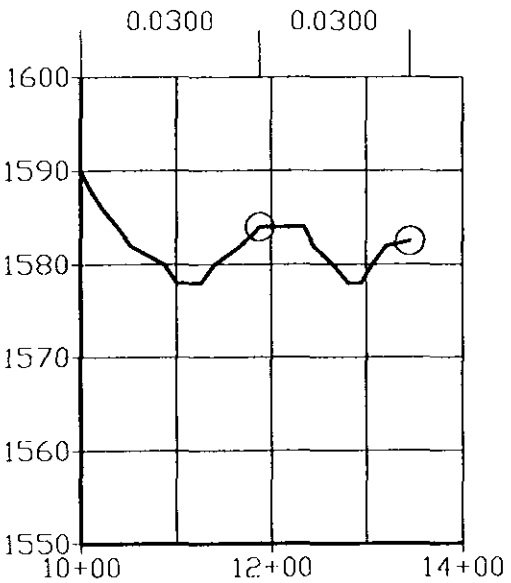
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LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
I-15 BREAKOUT MODEL
CROSS SECTION 30

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

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35

NOTE: NOT TO SCALE
LOOKING UPSTREAM

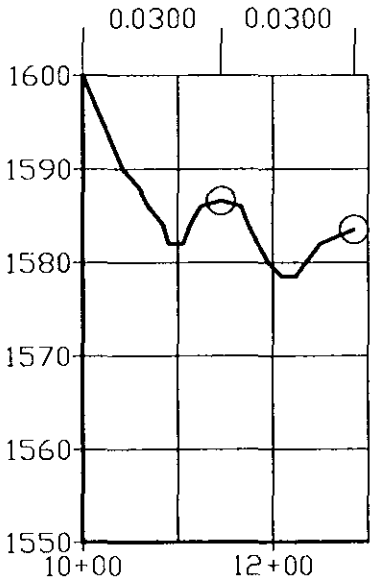
ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
I-15 BREAKOUT MODEL
CROSS SECTION 35

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

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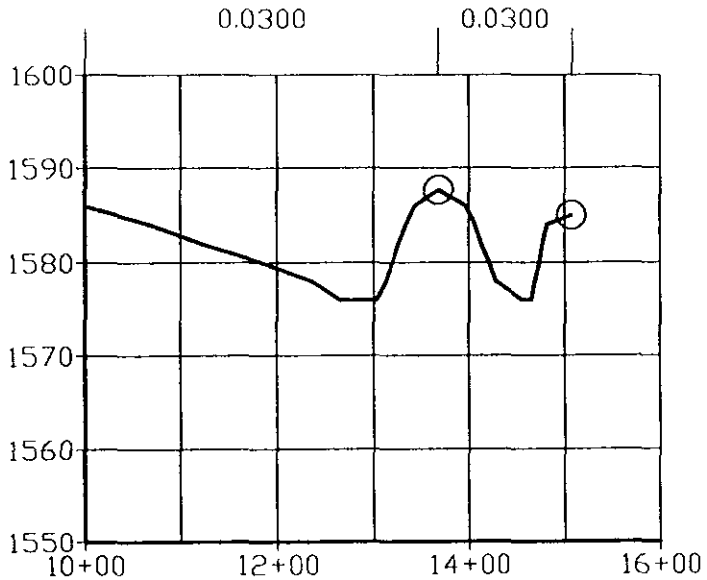
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
I-15 BREAKOUT MODEL
CROSS SECTION 40

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

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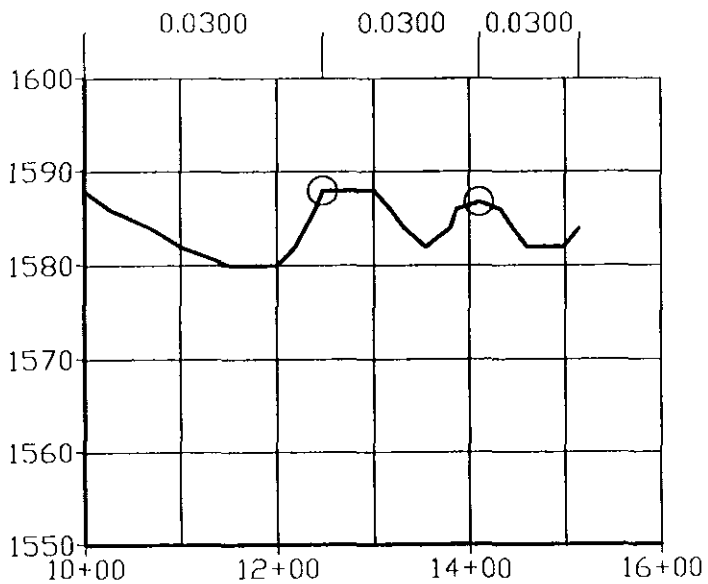
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LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
I-15 BREAKOUT MODEL
CROSS SECTION 45

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

mludwig
11-10-00
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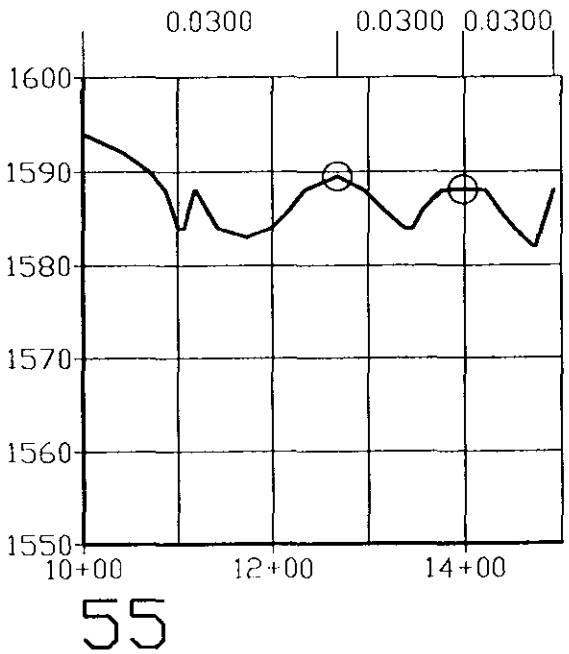
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
I-15 BREAKOUT MODEL
CROSS SECTION 50

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

mludwig
11-10-00
F:\550-035\dwg\fig\15xs.dwg



55

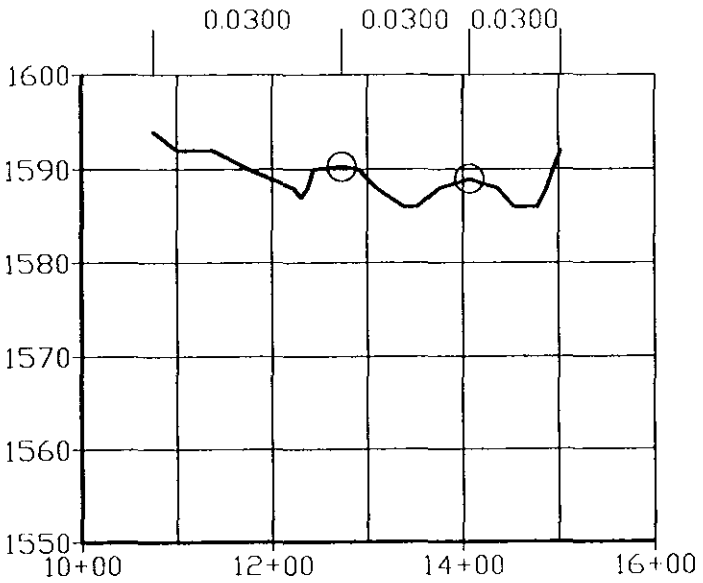
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ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
I-15 BREAKOUT MODEL
CROSS SECTION 55

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

mludwig 11-10-00 11:[illegible]2 F:\550-03[illegible]\dwg\fig\i15xs.dwg



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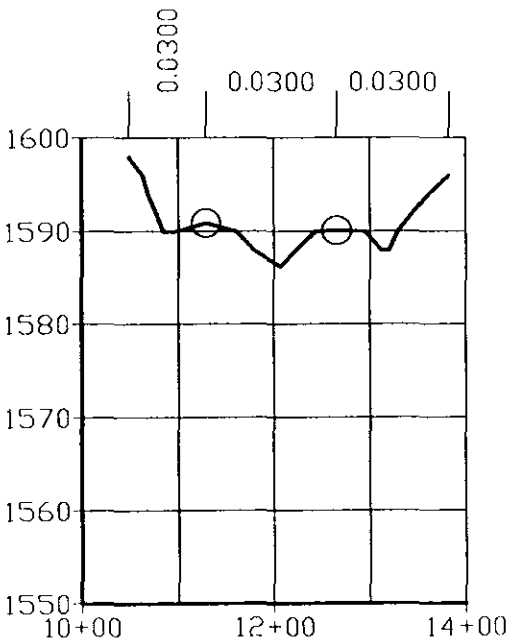
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LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
I-15 BREAKOUT MODEL
CROSS SECTION 60

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

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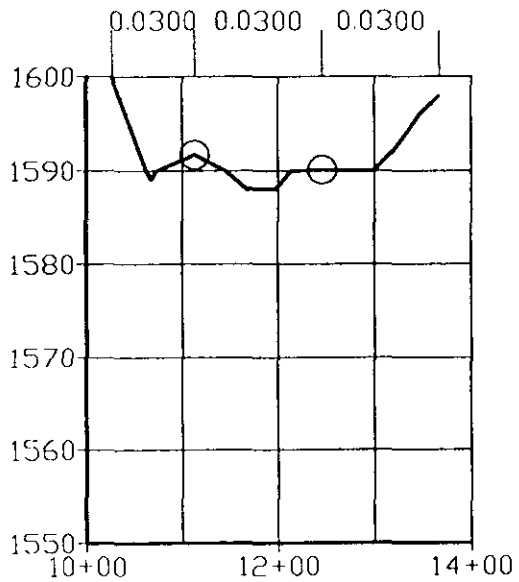
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
I-15 BREAKOUT MODEL
CROSS SECTION 65

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

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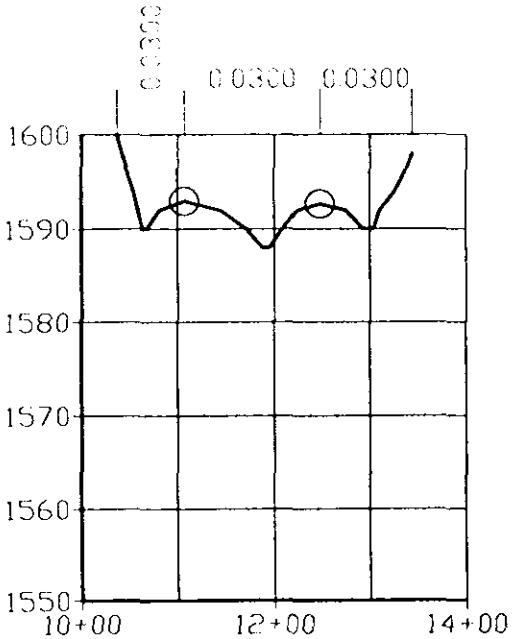
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
I-15 BREAKOUT MODEL
CROSS SECTION 70

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD, LAS VEGAS, NEVADA 89146

mludwig
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75

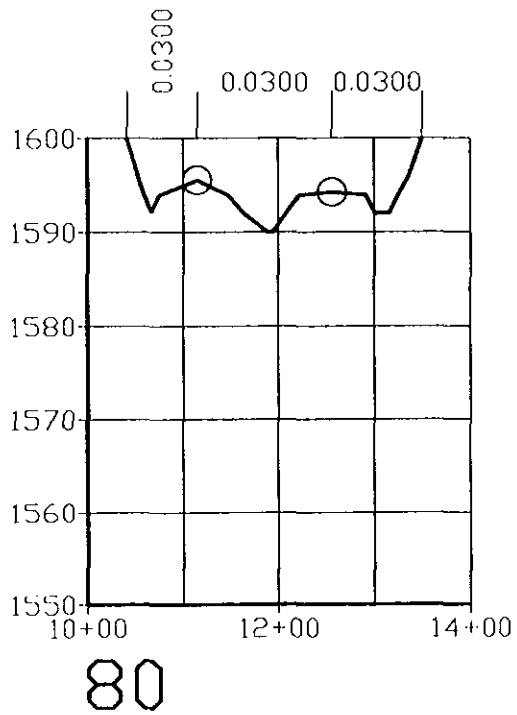
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LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
I-15 BREAKOUT MODEL
CROSS SECTION 75

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

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80

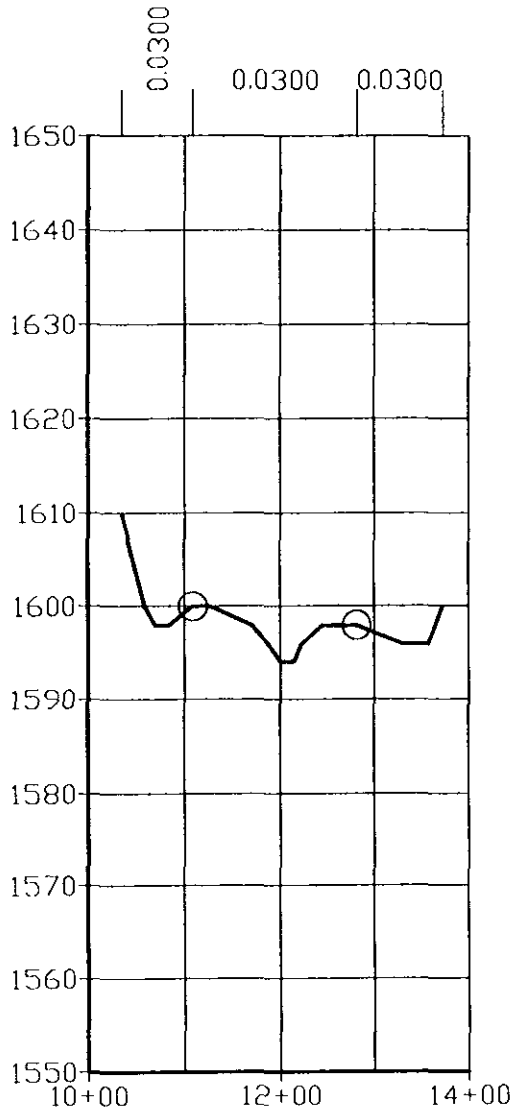
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LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
I-15 BREAKOUT MODEL
CROSS SECTION 80

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

F:\550-033\dwg\fig\i15xs.dwg 11-10-00 11:5[illegible]2 mludwig



85

NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
I-15 BREAKOUT MODEL
CROSS SECTION 85

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

F:\550-03\dwg\fig\mainxs.dwg 11-10-00 11:26 mludwig

MISCELLANEOUS REFERENCES

Study Contractor: G.C. Wallace, Inc.

MISCELLANEOUS REFERENCE MATERIALS INDEX

MESQUITE, CLARK COUNTY, NEVADA

FLOOD INSURANCE STUDY

INFORMATION TYPE	ITEM DATE	EXHIBIT NO.
Compact Disc	11/14/00	-
Hard copy correspondence	07/31/00	-
Hard copy correspondence	08/04/00	-
HEC-2 model PULSREV7.OUT	01/13/00	-
HEC-2 model PULSOUT10.OUT	01/18/00	-

CORRESPONDENCE

Subject: Pulsipher Wash
Date: Fri, 04 Aug 2000 11:26:04 -0700
From: Kevin Eubanks <kevinrfc@co.clark.nv.us>
To: cblack@gcwallace.com, jpruitt@gcwallace.com
CC: abell@ci.mesquite.nv.us, Max.Yuan@fema.gov, Michael.Grimm@fema.gov, jeisenberg@mbakercorp.com, pbuch-pedersen@mbakercorp.com

Calvin/Jerry,

Jame Eisenberg talked with Max Yuan and Max agreed to:
1) delineate the floodway N. of I-15 to the extent of topo.
2)Show a limit of floodway note along the Hafen breakout length. Show the breakout path as shaded Zone X down to x-sec 1000. Add a note within the Shaded Zone X that the area is to maintain a certain amount of conveyance. Exact note language to be settled later.

Let me know if you need more clarification to prepare your written request for supplemental services. Once I get the request, we can get to work.

Giddyup!

Thanks!

Kevin Eubanks, P.E.
Assistant General Manager
Clark County Regional Flood Control District
600 Grand Central Parkway, Suite 300
Las Vegas, NV 89106-4511
Kevinrfc@co.clark.nv.us

Subject: **[Fwd: Pulsipher Wash]**
Date: Mon, 31 Jul 2000 09:09:11 -0700
From: Jerry Pruitt <JPruitt@GCWallace.Com>
Organization: G.C. Wallace Inc.
To: Mike Ludwig <MLudwig@GCWallace.Com>

Subject: ***Pulsipher Wash***
Date: Mon, 31 Jul 2000 08:37:10 -0700
From: Kevin Eubanks <kevinrfc@co.clark.nv.us>
To: Max.Yuan@fema.gov, pbuch-pedersen@mbakercorp.com
CC: cblack@gcwallace.com, jpruitt@gcwallace.com

Max/Pernille,

The attached Excel spreadsheet shows a summary of HEC-2 results. These results are preliminary subject to refinement. They indicate that stopping either break out at I-15 or Hafen Lane will cause a greater than 1' increase downstream.

We had agreed over the phone that we would map the I-15 break-out with a floodway to a point downstream. The point was determined by available topography and the ability of the map to regulate development of the breakout area (ie. preserve the breakout path).

The Hafen breakout is more difficult. Once it breaks out it creates flow of less than one foot. We don't have any more topo that you have received. This is a Zone X now. You had offered the possibility of a note on the map that was used at Tropicana Wash and the UPRR (32003C panel 2552), "Breakout Area - 100 Year Flow Conveyance Must Be Maintained". We would like to proceed by defining the floodway downstream of I-15 and adding this note in the Hafen Breakout area. What say you?

Our objective is to end up with a more accurate map. But we have to weigh the improvement to the map with the cost to get there.

Thanks!

Kevin Eubanks, P.E.
Assistant General Manager
Clark County Regional Flood Control District
600 Grand Central Parkway, Suite 300
Las Vegas, NV 89106-4511
Kevinrfc@co.clark.nv.us

---

fway-xcl.xls	**Name:** fway-xcl.xls **Type:** Microsoft Excel Worksheet (application/vnd.ms-excel) **Encoding:** base64

MAIN CHANNEL HEC-2 MODEL FROM SECOND RESPONSE
PULSREV7.OUT (1/13/00)

PULSREV7.OUT

```
1*****************************************
*  HEC-2 WATER SURFACE PROFILES           *
*                                         *
*  Version   4.6.2;  May 1991             *
*                                         *
*  RUN DATE    13JAN00    TIME   11:47:40  *
*****************************************
```

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

```
X      X  XXXXXXX   XXXXX              XXXXX
X      X  X         X     X           X     X
X      X  X         X                 X     X
XXXXXXX   XXXX      X           XXXXX     XXXXX
X      X  X         X                 X
X      X  X         X     X           X
X      X  XXXXXXX   XXXXX             XXXXXXX
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1

13JAN00 11:47:40 PAGE 1

THIS RUN EXECUTED 13JAN00 11:47:40

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

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

```
SPLIT FLOW BEING PERFORMED

SF


JC
JP      0       0      40       0       0

TWSPLIT FLOW AT PULSIPHER/I-15 CULVERT
WS      9    2000    2100                3
WC      0    1603      16    1602    38.3    1600      66    1599    92.5    1599
WC 186.3    1600   113.9    1602   119.9    1604   130.5    1606

TWSTATION 1400 - SPLIT FLOW OVER RIGHT BANK
WS      2    1400    1500                2.7
WC      0    1584     120  1583.8

TWSTATION 1300 - SPLIT FLOW OVER RIGHT BANK
WS      2    1300    1400                2.7
WC      0    1579     190    1584

TWSTATION 1200 - SPLIT FLOW OVER LEFT BANK
WS      2    1200    1300                2.7
WC      0    1576     199    1582

TWSTATION 1100 - SPLIT FLOW OVER LEFT OVERBANK
WS      2    1100    1200                2.7
WC      0    1576     112    1576

TWSTATION 1000 - SPLIT FLOW OVER LEFT BANK
WS      2    1000    1100                2.7
WC      0    1576     102    1576

TWSTATION 900 - SPLIT FLOW OVER LEFT BANK
WS      2     900    1000                2.7
WC      0  1574.5     117    1576

TWSTATION 800 - SPLIT FLOW OVER LEFT BANK
WS      2     800     900                2.7
WC      0  1574.5     102  1574.5
1
   13JAN00      11:47:40                                        PAGE    2


TWSTATION 700 - SPLIT FLOW OVER LEFT BANK
WS      2     700     800                2.7
WC      0  1573.8     135  1574.5
1
   13JAN00      11:47:40                                        PAGE    3


T1      550-035
T2      Mequite Wash FIS Restudy
T3      Pulsipher Wash
```

J1 ICHECK INQ NINV IDIR STRT METRIC HVINS Q WSEL FQ

2 -1 3549 1556.95

J5 **********ASSUMED DISCHARGES FOR SPLIT FLOW**********

0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0
0 500

J2 NPROF IPLOT PRFVS XSECV XSECH FN ALLDC IBW CHNIM ITRACE

-1 -2 -1 -6

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

100 150

NC	0.01	0.01	0.025	0.1	0.3					
X1	200	15	2929.4	3113.93						
X3	10									
GR	1564	2778.75	1564	2874.16	1562	2912.73	1560	2929.4	1558	2941.08
GR	1556	2949.85	1554	2963.64	1554	2981.64	1554	3011.17	1554	3066.53
GR	1556	3081.56	1558	3096.65	1560	3113.93	1560	3148.31	1560	3396.06
X1	300	11	2926.48	3035.77	364.63	359.83	352.07			
X3	10									
GR	1566	2682.38	1564	2807.33	1562	2926.48	1560	2954.76	1558	2969.07
GR	1558	3000.86	1560	3018.26	1562	3035.77	1562	3082.96	1562	3156.53
GR	1564	3217.12								
NC	0.01	0.01	0.025	0.1	0.3					
X1	400	22	2281.55	2450.74	132.08	158.2	134.41			
X3	10							1566		
GR	1570	2126.23	1572	2143.31	1572	2183.04	1570	2191.36	1562	2217.92
GR	1560	2238.83	1560	2252.16	1564	2262.45	1566	2281.55	1566	2288.71
GR	1564	2319.58	1562	2326.53	1560	2333.47	1560	2352.21	1562	2362.78
GR	1562	2368.59	1562	2429.18	1564	2450.74	1566	2527.34	1566	2620.61
GR	1566	2621.4	1568	2852.45						
NC	0.015	0.015	0.015	0.3	0.5					
X1	500	11	2332.84	2370.57	75.43	81.76	74.97			
X3	10							1572	1572	
GR	1572	1921.7	1572	2203.22	1572	2332.84	1568.47	2332.84	1564.37	2332.84
GR	1564.3	2370.57	1568.47	2370.57	1572	2370.57	1572	2514.64	1572	2582.6
GR	1572	2867.98								

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NC	0.015	0.015	0.015	0.3	0.5					
SB	1.25	1.5	2.7	76	37.73	1.34	147.38	0	1565.46	1564.37
X1	600	12	2596.22	2633.95	122.03	131.14	133.46			
X2			1	1569.51	1572.66			2		
X3	10							1572.6	1572.6	
GR	1574	2232.97	1572.6	2260	1572.6	2596.22	1569.56	2596.22	1565.46	2596.22
GR	1565.4	2633.95	1569.56	2633.95	1572.6	2633.95	1572.6	2866.27	1572.6	2963.4
GR	1572.6	3102.68	1573.7	3146.68						
NC	0.04	0.04	0.03	0.3	0.5					
XJ	700	18	2121.76	2330.75	133.44	79.47	112.64			
X3	10			2121.76	1578	2330.75	1578	1573.8	1574.9	
GR	1574	1799.95	1572.2	1877	1572.2	1954	1572.2	2031	1573.8	2121.76
GR	1572	2128.04	1570	2132.18	1569.5	2139.33	1570	2143.07	1572	2144.69
GR	1574	2297.02	1574.9	2330.75	1574.5	2366.44	1574	2409.4	1572.7	2453.34
GR	1572.7	2564.87	1572.7	2717.29	1574	2748.19				
NC	0.04	0.04	0.03	0.1	0.3					
X1	800	22	1769.22	1903.89	134.63	139.86	144.94			
X3	10			1769.22	1578	1903.89	1578	1574.5	1576	
GR	1574	1427.88	1572.5	1510	1572.5	1592	1572.5	1674	1574	1759.85
GR	1574.5	1769.22	1574	1778.29	1572	1784.62	1570	1788.23	1570.23	1790.02
GR	1570	1791.12	1572	1797.25	1574	1818.13	1574	1841.16	1574	1867.83
GR	1576	1903.89	1574	1968.96	1573.2	2017.28	1573.2	2207.8	1573.2	2144.84
GR	1574	2392.94	1574	2407.17						
NC	0.04	0.04	0.03							
X1	900	21	1575.7	1686.84	102.08	108.33	103.62			
X3	10			1575.7	1578	1686.84	1578	1574.5	1577	
GR	1574	1219.54	1572.9	1309.5	1572.9	1399	1572.9	1489.5	1574	1572.39
GR	1574.5	1575.7	1574	1579.92	1572	1592.09	1571	1597.2	1572	1604.66
GR	1574	1606.43	1575	1651.77	1577	1686.84	1575.8	1705.75	1574	1749.48
GR	1573.7	1798.67	1573.7	1915.16	1573.7	2060.43	1573.7	2160.73	1574	2209.7
GR	1574	2230.82								
X1	1000	20	1472.42	1568.37	116.93	121.55	118.27			
X3	10			1472.42	1579	1568.37	1579	1576	1577.2	
GR	1574	1096.67	1573.3	1190	1573.3	1283	1573.3	1376	1576	1472.42
GR	1576	1484.88	1574	1489.57	1572	1494.01	1571.15	1496.75	1572	1501.64
GR	1574	1503.91	1576	1545.7	1577.2	1568.37	1576.5	1597.74	1576	1625.79
GR	1575.5	1648.15	1574.3	1710.01	1574.3	1879.49	1574.3	2080.17	1575.3	2121.11
X1	1100	17	1320.06	1417.67	102.45	103.7	103.7			
X3	10			1320.06	1579	1417.67	1579	1576	1577.4	
GR	1574	924.71	1573.5	1024	1573.5	1124	1573.5	1224	1576	1320.06
GR	1576	1334.53	1574	1339.91	1571.4	1347.79	1574	1349.58	1576	1393.55

GR	1577.4	1417.67	1576.5	1447.13	1576	1476.62	1574.7	1519.36	1574.7	1720.11
GR	1574.7	1929.89	1575.7	1982.94						

X1	1200	22	1178.38	1272.58	111.55	110.23	110.23			
X3	10			1178.38	1582	1272.58	1581	1576	1577.5	
GR	1588	1000	1586	1003.72	1584	1007.45	1582	1011.19	1580	1030.36
GR	1578	1045.48	1576	1078.58	1575	1158.89	1576	1178.38	1576	1179.17
GR	1574	1190.7	1571.62	1204.49	1574	1209.35	1576	1247.96	1577.5	1272.58
GR	1576.5	1301.79	1576	1333.43	1575.1	1378.11	1575.1	1575.34	1575.1	1770.67
GR	1576	1817.16	1576.5	1831.23						
NC			0.025							
X1	1300	27	1014.17	1207.18	198.91	153.42	176.37			
X3	10					1207.18	1583	1582	1579	
GR	1588	1000	1586	1004.58	1584	1009.31	1582	1014.17	1582	1065.78
GR	1582	1072.99	1580	1076.58	1574	1080.99	1572.69	1081.51	1574	1092.54
GR	1580	1106.55	1580	1121.82	1578	1125.36	1576	1170.24	1576	1178.38
GR	1578	1183.85	1578	1201.6	1579	1207.18	1578	1236.12	1578	1241.05
GR	1578	1260.24	1576	1268.87	1575.6	1313.34	1575.6	1502.88	1575.6	1676.59
GR	1576	1718.52	1577	1735.14						
X1	1400	18	1061	1186.25	122.02	190.42	161.58			
X3	10					1186.25	1587	1584	1584	
GR	1600	1000	1600	1027.47	1598	1035.26	1596	1040.7	1590	1046.91
GR	1588	1052.71	1586	1056.6	1584	1061	1582	1138.25	1580	1142.92
GR	1578	1145.8	1578	1160.96	1580	1173.97	1582	1180.16	1584	1186.25
GR	1584	1230.14	1584	1231.21	1584	1307.21				
X1	1500	22	1081.73	1230.57	76.07	119.69	108.07			
X3	10									
GR	1600	1000	1599	1069.96	1583	1081.73	1582	1182.35	1580	1186.84
GR	1578	1197.97	1578	1201.11	1580	1212.43	1582	1216.13	1583.8	1230.57
GR	1584	1294.4	1584	1308.23	1584	1356.62	1586	1628.22	1588	1674.02
GR	1590	1697.27	1592	1726.23	1594	1741.62	1596	1753.42	1598	1763.24
GR	1598	1801.09	1596	1808.99						
X1	1600	13	1094.37	1243.82	101.17	210.32	196.31			
GR	1602	1000	1600	1064.32	1594.01	1081.14	1584	1094.37	1582	1149.75
GR	1580.4	1170.49	1580.78	1218.11	1582	1229.76	1584	1243.82	1585	1327.67
GR	1586	1412.26	1588	1551.37	1590	1677.73				
X1	1650	23	1129.97	1180.64	190.68	185.82	175.57			
X3	10									
GR	1600	1000	1598	1005.05	1596	1011.4	1594	1026.96	1594	1094.89
GR	1594	1110.32	1592	1122.14	1590	1124.66	1588	1129.97	1586	1134.76
GR	1584	1139.66	1582	1148.86	1582	1161.14	1584	1172.84	1584.7	1180.64
GR	1585	1254.59	1586	1347.77	1588	1480.9	1590	1600.61	1592	1684.68
GR	1594	1697.13	1596	1700.86	1598	1704.54				
NC	0.04	0.04	0.025							
X1	1700	20	1286.61	1350.67	163.66	154.63	161.13			
GR	1602	1000	1604	1037.4	1605.9	1128.6	1605.81	1151.3	1604	1198.85
GR	1602	1246.99	1600	1248.58	1590	1277.69	1588	1282.43	1586	1286.61
GR	1584	1301.89	1582.05	1314.08	1584	1326.15	1586	1341.79	1586.5	1350.67
GR	1586	1360.4	1585.5	1416.24	1586	1475.83	1588	1602.02	1590	1708.11

NC	0.04	0.04	0.025							
X1	1750	21	1095.43	1152.29	171.49	179.87	169.33			
GR	1610	1000	1608	1023.79	1606	1053.35	1604	1063.55	1602	1070.34
GR	1600	1076.66	1590	1095.43	1588	1097.81	1586	1103.58	1582.1	1112
GR	1582.1	1122.43	1586	1133.65	1587.5	1152.29	1587.1	1211.93	1588	1287.4
GR	1590	1362.75	1592	1371.76	1594	1376.44	1596	1380.58	1598	1384.75
GR	1600	1386.94								
NC	0.04	0.04	0.025	0.1	0.3					
X1	1800	19	1139.62	1221.1	173.79	148.02	170.93			
GR	1608	1000	1606	1021.77	1604	1037.17	1602	1053.97	1600	1078.01
GR	1598	1135.85	1596	1139.62	1590	1145.75	1588	1148.51	1586	1151.34
GR	1582.1	1155.97	1582.1	1164.98	1586	1171.75	1588	1183.17	1590	1191.2
GR	1592	1221.1	1594	1234.56	1596	1243.62	1598	1254.32		
NC	0.015	0.015	0.015	0.3	0.5					
QT	1	3478								
X1	1900	14	1193.33	1205.33	66.92	60.81	58.98			
GR	1606	1000	1604	1017.04	1602	1034.84	1600	1056.24	1598	1118.67
GR	1596	1174.32	1592.19	1193.33	1582.19	1193.33	1582.19	1205.33	1592.19	1205.33
GR	1594	1221.37	1596	1224.34	1598	1232.13	1600	1243.77		
NC	0.015	0.015	0.015	0.3	0.5					
SB		1.5	2.7	114	12		120	0	1588.88	1582.19
X1	2000	9	1044.29	1056.29	320.07	303.13	319.85			
X2			1	1598.88	1603.83					
GR	1602	1000	1600	1026.41	1598.88	1044.29	1588.88	1044.29	1588.88	1056.29
GR	1598.8	1056.29	1600	1080.33	1602	1092.77	1604	1104.82		
NC	0.04	0.04	0.025	0.3	0.5					
X1	2100	17	1093.94	1188.63	58.83	54.83	49.81			
GR	1606	1000	1604	1009.57	1602	1013.54	1600	1020.41	1598	1037.57
GR	1596	1093.94	1594	1118.59	1592	1126.16	1590	1145.6	1590	1151.46
GR	1592	1174.19	1594	1184.61	1596	1188.63	1598	1204.5	1600	1224.72

GR	1602	1240.9	1604	1251.99						
NC	0.04	0.04	0.025	0.1	0.3					
XI	2200	18	142.43	318.37	383.01	273.85	328.57			
X3	10							1598	1598	
GR	1608	0	1608	20.66	1606	28.27	1604	40.91	1603	53.3
GR	1602	71.43	1600	112.67	1598	142.43	1596	210.95	1593	217.68
GR	1598	318.37	1596	562.06	1596	571.04	1596	618.66	1596	624.51
GR	1598	693.73	1600	708.07	1602	779.64				
NC				0.1	0.3					
X1	2300	25	150.15	250.92	320.42	320.65	321.55			
X3	0					453.09	1602			
GR	1608	0	1608	15.33	1606	21.57	1604	27.19	1602	61.6
GR	1600	150.15	1599	164.23	1598	187.99	1596	192.33	1594	198.34
GR	1594	228.2	1596	235.23	1598	238.65	1600	244.41	1600	250.92
GR	1600	277.03	1600	398.64	1602	414.11	1602	452.77	1600	463.12
GR	1600	475.52	1602	492.74	1604	507.6	1606	537.25	1608	543.16

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X1	2330	16	1156	1288	215	222	240			
X3	0									
GR	1608	1000	1606	1008	1604	1028	1602	1122	1601	1156
GR	1600	1203	1598	1205	1596	1209	1596	1238	1598	1243
GR	1600	1247	1601.6	1288	1602	1327	1604	1437	1606	1483
GR	1608	1508								
X1	2350	11	1025	1385	151	123	63			
X3	0									
GR	1608	1000	1606	1010	1604	1025	1603	1087	1603.5	1174
GR	1603.8	1227	1602	1271	1602	1339	1604	1385	1606	1445
GR	1608	1498								
X1	2400	21	555.74	605.96	178	109	71			
GR	1612	93.82	1610	232.8	1608.3	316.57	1608	336.99	1606	384.81
GR	1605.7	394.82	1604	447.58	1602	555.74	1600	564.71	1598	569.83
GR	1598	597.61	1600	601.64	1602	605.96	1604	666.82	1606	687.05
GR	1606	721.82	1605.3	750.29	1606	764.11	1608	799.73	1610	848.51
GR	1612	930.78								
X1	2500	15	173.41	241.04	186.68	182.96	179.72			
GR	1612	41.78	1610	45.58	1608	56.33	1607.4	69.14	1606	97.11
GR	1604	119.54	1604	161.89	1604	173.41	1602	209.67	1602	238.99
GR	1604	243.04	1606	249.45	1608	260.55	1610	291.23	1612	303.53
QT	1	3474								
X1	2600	28	774.94	927.94	320.81	390.78	373.36			
GR	1622	170.68	1620	198.85	1618	205.29	1616	210.56	1618	237.93
GR	1616	243.57	1616	474.86	1616	499.71	1614	504.57	1612	510.3
GR	1612	752.1	1612	762.71	1612	774.94	1610	779.75	1608	784.94
GR	1608	807.9	1608	855.3	1606	872.52	1606	907.23	1608	914.3
GR	1610	919.14	1612	927.94	1613.2	946.75	1614	960.44	1616	971.24
GR	1618	997.96	1620	1011.4	1622	1026.58				
X1	2700	29	605.11	832.94	249.65	237.3	246.94			
GR	1626	35.68	1624	43.5	1622	53.17	1620	65.17	1618	101.3
GR	1618	115.11	1618	141.58	1616	147.73	1616	265.04	1616	364.54
GR	1618	369.57	1618	394.68	1616	400.49	1614	408.58	1614	590.98
GR	1614	582.3	1614	605.11	1612	667.05	1610	699.84	1608	724.01
GR	1608	753.82	1610	771.97	1610.7	781.65	1612	801.7	1614	832.94
GR	1616	894.96	1618	898.43	1620	904.23	1630	923.69		
X1	2800	16	263.07	429.47	262.99	389.6	376.77			
X3	0			263.2	1616					
GR	1616	0	1616	39.55	1616	96.03	1616	121.37	1612	359.52
GR	1614	182.66	1614.7	197.49	1616	263.07	1610	302.64	1612	344.5
GR	1613.6	372.11	1614	379.65	1616	429.47	1620	489.99	1621.6	503.61
GR	1622	509.82								

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X1	2900	30	475.4	801.12	292.71	273.86	292.09			
X3	0			392.8	1620.51					
GR	1630	53.46	1628	61.93	1626	69.99	1624	77.51	1622	93.13
GR	1620	124.83	1618	331.67	1618	366.34	1620	373	1620.5	393.02
GR	1620	475.4	1618	525.34	1618	550.41	1618	631.71	1618	676.78
GR	1618	700.32	1616	722.78	1614	731.76	1612	736.6	1612	763
GR	1614	767.87	1616	772.71	1616.98	781.98	1618	790.94	1620	801.12
GR	1622	816.77	1624	832.8	1626	858.03	1628	874	1630	890.38
X1	3000	23	339.8	443.93	405.73	342.04	349.71			
GR	1630	70.06	1628	82.14	1626	94.71	1624	106.08	1623.2	152.05
GR	1622	224.19	1620	237.42	1620	274.5	1620	298.77	1620	312.51
GR	1620	339.8	1618	361.48	1616	368.38	1614	378.05	1614	399.19
GR	1616	402.54	1618	411.58	1620	443.93	1622	477.92	1624	497.81
GR	1626	542.69	1628	577.88	1628.8	598.92				
X1	3100	21	128.03	404.52	382.96	294.37	302.1			
GR	1640	88.37	1630	113.59	1628	118.26	1626	128.03	1624	297.39
GR	1622	300.14	1620	302.9	1618	305.76	1618	319.74	1618	333.19
GR	1620	337.19	1622	360.91	1624	384.72	1626	404.52	1628	466.46
GR	1630	524.54	1632	559.37	1634	582.77	1636	608.27	1638	629.41
GR	1640	646.16								

X1	3200		14	247.42	403.91	426.92	395.6	390.01			
GR	1619.7	227.47	1630	247.42	1628	253.14	1626	258.7	1624	267.64	
GR	1622	275.55	1622	310.81	1624	315.91	1626	321.83	1628	327.9	
GR	1630	403.91	1632	489.33	1634	564.85	1636	598.59			
X1	3300		35	36.55	575.86	462.6	416.49	482.8			
GR	1644		0	1642	12.73	1640	25.07	1638	31.27	1636	36.55
GR	1634		43.64	1632	47.01	1630	50.82	1628	55.39	1628	67.9
GR	1630		72.59	1632	76.9	1634	79.06	1636	137.59	1636	212.17
GR	1636	336.67	1634	350.97	1634	363.87	1634	407.22	1632	411.39	
GR	1630	414.76	1628	421.9	1628	494.95	1630	503.75	1632	508.15	
GR	1632	523.76	1630	526.02	1630	532.3	1632	537.02	1634	540.95	
GR	1636	575.86	1638	594.33	1640	601.98	1642	617.87	1644	633.83	
X1	3400		18	84.27	600.88	467.16	325.83	402.24			
GR	1650	59.27	1640	84.27	1638	109.44	1636	126.6	1634	131.99	
GR	1634	140.44	1636	146.48	1638	193.98	1638	219.41	1638	270.82	
GR	1636	278.83	1638	384.4	1640	600.88	1642	643.45	1644	683.24	
GR	1646	705.45	1648	714.67	1650	724.58					
X1	3500		12	1139.19	1820.67	445.73	364.17	403.18			
GR	1650	1117.94	1648	1129.92	1646	1139.19	1644	1154.95	1642	1166.11	
GR	1640	1198.2	1640	1311.56	1642	1661.86	1644	1780.13	1646	1820.67	
GR	1648	1954.48	1650	1976.19							

X1	3600		21	149.25	618.21	166.01	356.91	158.51			
GR	1660	75.43	1658	80.52	1656	91.22	1654	99.08	1652	110.5	
GR	1650	129.6	1648	149.25	1646	271.37	1646	283.71	1646	312.95	
GR	1646	327.9	1646	360.07	1646	420.55	1646	607.71	1648	618.21	
GR	1650	627.24	1652	634.08	1654	648.02	1656	659.58	1658	673.87	
GR	1660	681.36									
X1	3700		23	99.81	528.5	397.89	401.06	409.82			
GR	1660	58.71	1658	62.54	1656	71.6	1654	83.19	1652	99.81	
GR	1650	116.08	1648	222.35	1648	252.85	1648	259.17	1648	278.23	
GR	1648	293.98	1648	305.86	1648	314.35	1648	360.03	1648	368.2	
GR	1648	450.38	1650	484.45	1650.36	490.19	1652	528.5	1654	546.14	
GR	1656	553.69	1658	561.37	1660	571.08					
X1	3800		16	42.37	417.01	480	713	666			
GR	1670	24.23	1660	42.37	1658	44.95	1656	48.64	1654	62.46	
GR	1654	248.3	1656	288.05	1656	307.66	1656	426.77	1658	437.01	
GR	1660	446.89	1662	454.29	1664	464.34	1666	469.29	1668	473.37	
GR	1670	483.32									
QT	1	2318									
X1	3900		21	76.48	332.44	468.3	238.03	320.4			
GR	1670	68.89	1660	76.48	1658	109.91	1658	128.97	1658	143.72	
GR	1658	147.93	1656	228.75	1656	263.43	1658	286.12	1658.3	289.26	
GR	1660	301.71	1662	332.44	1662	354.48	1660	365.24	1658.8	388.81	
GR	1660	416.11	1662	428.9	1664	448.42	1666	460.82	1668	489.05	
GR	1670	546.72									
X1	4000		11	62.12	249.41	444.57	477.86	465.67			
GR	1670	57.92	1668	60.45	1666	62.12	1664	69.1	1662	80.78	
GR	1660	85.35	1660	112.66	1662	121.12	1664	164.38	1666	239.26	
GR	1666.3	249.41									
X1	4100		18	201.4	408.03	535	356	497			
GR	1680	148.32	1678	157.13	1676	173.19	1674	188.76	1672	201.4	
GR	1670	217.1	1670	223.19	1670	244.9	1668	248.78	1666	254.13	
GR	1666	279.97	1668	296.89	1670	368.21	1672	395.34	1674	408.03	
GR	1676	416.54	1678	422.71	1680	431.82					
X1	4200		21	72.87	318.01	285	297	402			
GR	1690		0	1688	8.75	1686	20.32	1684	34.98	1682	44.12
GR	1680	52.74	1678	72.87	1676	109.44	1674	148.79	1673.3	161.05	
GR	1674	174.44	1674	221.93	1672	228.81	1670	242.3	1670	245.6	
GR	1672	268.66	1674	290.23	1676	304.27	1678	311.41	1680	318.01	
GR	1690	331.29									
X1	4300		19	168.17	349.29	317.35	407.28	383.62			
GR	1700	89.17	1690	105.7	1680	168.17	1678	195.5	1677.6	203.3	
GR	1676	233.39	1676	271.26	1678	296.29	1680	349.29	1682	374.61	
GR	1684	411.28	1686	454.41	1688	473.84	1690	495.02	1692	512.03	
GR	1694	521.72	1696	534.23	1698	545.99	1700	552.12			

X1	4400		20	1152.32	1302.67	432	439	476			
GR	1698	1047.48	1696	1072.5	1694	1113.06	1692	1129.03	1690	1144.19	
GR	1688	1152.32	1686	1159.38	1684	1171.95	1682	1198.73	1680	1240.97	
GR	1680	1261.36	1682	1265.11	1684	1271.18	1686	1281.25	1688	1302.67	
GR	1690	1310.07	1692	1316.26	1694	1322.58	1696	1328.05	1698	1379.32	
X1	4500		22	91.69	375.6	416.91	575.19	533.38			
GR	1720	75.46	1710	91.69	1700	117.4	1699.3	120.73	1698	126.14	
GR	1696	135.93	1694	144.81	1692	170.97	1690	176.15	1688	181.18	
GR	1686	188.65	1686	207.59	1688	225.29	1690	276.16	1690.6	289.36	
GR	1692	317.67	1694	325.19	1696	332.17	1698	337.97	1700	152.73	
GR	1710	375.6	1712	416.61							

X1	4600	21	134.65	333.42	488	278	442			
GR	1710	16.97	1708	22.09	1706	26.16	1704	32.81	1702	52.97
GR	1700	69.79	1700	71.45	1701.4	100.97	1700	134.65	1698	178.33
GR	1696	199.43	1694	245.08	1692	251.89	1692	277.07	1692	285.45
GR	1692	294.37	1694	299.32	1696	317.63	1698	322.08	1700	333.42
GR	1710	339.21								
X1	4700	29	373.98	442.2	272.78	275.83	260.86			
X3	0					442.2	1700			
GR	1716	0	1714	8.97	1712	19.28	1710	50.93	1708	76.41
GR	1708	85.71	1710	111.4	1710	149.36	1710	171.04	1710.6	220.24
GR	1710	255.18	1710	257.77	1710	275.64	1708	298.45	1706	313.76
GR	1704	334.45	1702	364.57	1700	373.98	1698	382.11	1696	387.57
GR	1696	418.98	1698	430.84	1700	442.2	1700	475.32	1698	485.47
GR	1698	491.37	1700	503.73	1710	533.35	1712.7	554.54		
X1	4800	22	199.39	286.05	187.19	241.84	227.74			
GR	1720	0	1720	34.45	1719.1	47.68	1718	67.95	1716	81.26
GR	1714	99.11	1714	138.55	1714.5	152.91	1714	167.56	1712	188.86
GR	1710	199.39	1708	204.07	1706	211.95	1704	220.53	1702	222.94
GR	1700	229.54	1698	234.6	1698	259.35	1700	266.03	1710	286.05
GR	1720	306.75	1720	307.66						
NC	0.04	0.04	0.025	0.1	0.3					
X1	4900	14	118.6	259.71	374.55	218.45	151.24			
GR	1720	101.08	1710	118.6	1708	126.87	1706	136.18	1704	139.34
GR	1702	144.61	1702	157.05	1702	171.77	1702	187.75	1704	198.82
GR	1706	207.55	1708	232.01	1710	259.71	1720	290.56		

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

*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

CCHV= .100 CEHV= .300
*SECNO 200.000
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1560.00 ELREA= 1560.00

200.000	1.07	1555.07	1555.07	1556.95	1555.57	.50	.00	.00	1560.00
668.7	.0	668.7	.0	.0	117.8	.0	.0	.0	1560.00
.00	.00	5.68	.00	.000	.025	.000	.000	1554.00	2956.30
.009193	0.	0.	0.	0	17	0	.00	118.24	3074.53

*SECNO 300.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1562.00 ELREA= 1562.00

300.000	2.01	1560.01	1560.01	.00	1560.76	.76	1.02	.08	1562.00
668.7	.0	668.7	.0	.0	95.9	.0	.9	.7	1562.00
.01	.00	6.98	.00	.000	.025	.000	.000	1558.00	2954.63
.008030	365.	352.	360.	0	14	0	.00	63.71	3018.34

CCHV= .100 CEHV= .300
*SECNO 400.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1566.00 ELREA= 1564.00

400.000	2.56	1562.56	1562.56	.00	1563.09	.53	1.15	.02	1566.00
668.7	.0	668.7	.0	.0	115.0	.0	1.2	1.0	1564.00
.02	.00	5.82	.00	.000	.025	.000	.000	1560.00	2324.58
.009164	132.	134.	158.	0	11	0	.00	110.67	2435.24

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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= .500
*SECNO 500.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1572.00 ELREA= 1572.00

500.000	2.17	1566.47	1566.47	.00	1567.54	1.07	.36	.27	1572.00
668.7	.0	668.7	.0	.0	80.6	.0	1.4	1.1	1572.00
.02	.00	8.30	.00	.000	.015	.000	.000	1564.30	2332.84
.002945	75.	75.	82.	0	11	0	.00	37.73	2370.57

CCHV= .100 CEHV= .500

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 1566.21 , NOT 1566.47 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XK	XKOR	COPQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.25	1.50	2.70	76.00	37.73	1.34	147.38	.00	1565.46	1564.37

*SECNO 600.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.43

CLASS B LOW FLOW

3420 BRIDGE W.S.= 1567.10 BRIDGE VELOCITY= 8.39 CALCULATED CHANNEL AREA= 60.

EGPRS	EGLWC	H3	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
.00	1568.79	.00	0.	669.	147.	147.	1569.51	1572.66	0.

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1572.60 ELREA= 1572.60

600.000	2.70	1568.10	.00	.00	1568.79	.68	1.25	.00	1572.60
668.7	.0	668.7	.0	.0	100.9	.0	1.6	1.2	1572.60
.03	.00	6.63	.00	.000	.015	.000	.000	1565.40	2596.22
.001439	122.	133.	111.	0	0	0	.00	37.73	2633.95

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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

CCHV= .300 CEHV= .500
*SECNO 700.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 2121.8 2330.8 TYPE= 1 TARGET= 208.990
ELENCL= 1578.00 ELENCR= 1578.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1573.80 ELREA= 1574.90

700.000	3.76	1573.26	1573.26	.00	1573.79	.53	.37	.05	1573.80
668.7	.0	668.7	.0	.0	114.8	.0	1.9	1.4	1578.00
.03	.00	5.83	.00	.000	.030	.000	.000	1569.50	2123.63
.014490	133.	113.	79.	0	11	0	.00	117.24	2240.87

CCHV= .100 CEHV= .300
*SECNO 800.000
3280 CROSS SECTION 800.00 EXTENDED .78 FEET

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.56

3470 ENCROACHMENT STATIONS= 1769.2 1903.9 TYPE= 1 TARGET= 134.670
ELENCL= 1578.00 ELENCR= 1578.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1574.50 ELREA= 1576.00

800.000	4.78	1574.78	1574.40	.00	1575.10	.33	1.29	.02	1574.50
676.1	.0	676.1	.0	.0	147.4	.0	2.3	1.8	1578.00
.04	.00	4.59	.00	.000	.030	.000	.000	1570.00	1769.22
.006077	135.	145.	140.	3	16	0	.00	112.62	1881.84

*SECNO 900.000
3280 CROSS SECTION 900.00 EXTENDED 1.36 FEET

3470 ENCROACHMENT STATIONS= 1575.7 1686.8 TYPE= 1 TARGET= 111.140
ELENCL= 1578.00 ELENCR= 1578.00

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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


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1574.50 ELREA=       1577.00

   900.000       4.36    1575.36    1575.28        .00    1575.98        .62        .79        .09    1574.50
     798.1         .0      798.1         .0         .0      126.5         .0        2.7        2.1    1578.00
       .05         .00        6.31       .00        .000       .030       .000       .000    1571.00    1575.70
   .009353       102.       104.       108.          2         10          0        .00      82.44    1658.14


*SECNO 1000.000
3280 CROSS SECTION    1000.00 EXTENDED       1.14 FEET


3470 ENCROACHMENT STATIONS=       1472.4     1568.4  TYPE=        1  TARGET=        95.950
 ELENCL=    1579.00  ELENCR=    1579.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1576.00 ELREA=       1577.20

  1000.000       5.29    1576.44    1576.36        .00    1577.24        .80       1.21        .05    1576.00
     966.6         .0      966.6         .0         .0      134.8         .0        3.0        2.3    1579.00
       .05         .00        7.17       .00        000       .030       .000       .000    1571.15    1472.42
   .011061       117.       118.       122.          2         11          0        .00      81.68    1554.10


*SECNO 1100.000
3280 CROSS SECTION    1100.00 EXTENDED       1.77 FEET


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


3470 ENCROACHMENT STATIONS=       1320.1     1417.7  TYPE=        1  TARGET=        97.610
 ELENCL=    1579.00  ELENCR=    1579.00
  1100.000       6.07    1577.47    1576.93        .00    1578.01        .55        .75        .03    1576.00
    1232.5         .0      1232.5         .0         .0      207.5         .0        3.4        2.5    1579.00
       .06         .00        5.94       .00        .000       .030       .000       .000    1571.40    1320.06
   .005421       102        104.       104.          3          8          0        .00      97.61    1417.67


*SECNO 1200.000
3280 CROSS SECTION    1200.00 EXTENDED       1.39 FEET

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


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


3470 ENCROACHMENT STATIONS=       1178.4     1272.6  TYPE=        1  TARGET=        94.200
 ELENCL=    1582.00  ELENCR=    1581.00
  1200.000       6.27    1577.89    1577.33        .00    1578.65        .77        .57        .07    1576.00
    1889.4         .0      1889.4         .0         .0      268.9         .0        4.0        2.7    1581.00
       .06         .00        7.03       .00        .000       .030       .000       .000    1571.62    1178.38
   .005067       112.       110.       110.          2         12          0        .00      94.20    1272.58


*SECNO 1300.000

3265 DIVIDED FLOW

3280 CROSS SECTION    1300.00 EXTENDED       1.93 FEET

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=          .0     1207.2  TYPE=        1  TARGET=       1207.179

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1582.00 ELREA=       1579.00

  1300.000       6.24    1578.93    1578.93        .00    1580.10       1.17       1.11        .12    1582.00
    2100.8         .0      2100.8         .0         .0      242.0         .0        5.1        3.2    1583.00
       .07         .00        8.68       .00        .000       .025       .000       .000    1572.69    1077.37
   .007850       199.       176.       153.          0          5          0        .00      109.71    1206.76


*SECNO 1400.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=          .0     1186.3  TYPE=        1  TARGET=       1186.249

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1584.00 ELREA=       1584.00

  1400.000       5.68    1583.68    1583.68        .00    1584.79       1.11       1.21        .01    1584.00
    2100.8         .0      2100.8         .0         .0      248.0         .0        6.0        3.6    1587.00
```

07	.00	8.47	.00	.000	.025	.000	.000	1578.00	1071.49
.007168	122.	162.	190.	0	12	0	.00	111.77	1185.26

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

*SECNO 1500.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.45

1500.000	6.86	1584.86	1583.66	.00	1585.15	.29	.28	.08	1583.00
2209.1	1.2	2023.5	184.4	1.3	450.5	165.0	7.3	4.2	1583.80
.08	.91	4.49	1.12	.040	.025	.040	.000	1578.00	1080.36
.001121	76.	108.	120.	4	5	0	.00	391.03	1473.39

*SECNO 1600.000

1600.000	4.70	1585.10	1583.69	.00	1585.40	.30	.25	.00	1584.00
2209.1	.6	2163.5	45.0	.8	483.7	50.1	9.7	5.7	1584.00
.09	.74	4.47	.90	.040	.025	.040	.000	1580.40	1092.92
.001186	101.	196.	210.	3	11	0	.00	242.66	1335.58

*SECNO 1650.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1588.00 ELREA= 1584.70

1650.000	4.66	1586.66	1586.66	.00	1587.48	.81	.36	.15	1588.00
2209.1	.0	1406.3	802.8	.0	160.5	257.0	11.7	6.8	1584.70
.10	.00	8.76	3.12	.000	.025	.040	.000	1582.00	1133.17
.004194	191.	176.	186.	0	5	0	.00	258.69	1391.87

*SECNO 1700.000

1700.000	5.51	1587.56	1587.24	.00	1588.08	.53	.58	.03	1586.00
2209.1	4.1	1404.7	800.3	2.5	200.5	297.5	13.3	7.7	1586.50
.11	1.63	7.01	2.69	.040	.025	.040	.000	1582.05	1283.36
.003070	164.	161.	155.	3	8	0	.00	290.63	1573.98

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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 1750.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1750.000	6.59	1588.69	1588.69	.00	1589.60	.91	.58	.12	1590.00
2209.1	.0	1751.8	457.3	.0	206.1	178.0	15.1	8.8	1587.50
.11	.00	8.50	2.57	.000	.025	.040	.000	1582.10	1096.99
.003725	171.	169.	180.	0	8	0	.00	216.43	1313.42

CCHV= .100 CEHV= .300
*SECNO 1800.000

1301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1800.000	7.80	1589.90	1589.90	.00	1592.04	2.14	.81	.37	1596.00
2209.1	.0	2209.1	.0	.0	188.1	.0	16.2	9.2	1592.00
.12	.00	11.74	.00	.000	.025	.000	.000	1582.10	1145.89
.006502	174.	171.	148.	0	11	0	.00	44.92	1190.80

CCHV= .300 CEHV= .500
*SECNO 1900.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1900.000	9.90	1592.09	1592.09	.00	1597.12	5.03	.36	1.45	1592.19
2138.1	.0	2138.1	.0	.0	118.8	.0	16.4	9.3	1592.19
.12	.00	18.00	.00	.000	.015	.000	.000	1582.19	1193.33

.005698	67.	59.	61.	0	14	0	.00	12.00	1205.33

CCHV= .300 CEHV= .500

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	.00	1.50	2.70	114.00	12.00	.00	120.00	.00	1588.88	1582.19

*SECNO 2000.000

1

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

6070,LOW FLOW BY NORMAL BRIDGE

EGPRS= 1599.481 EGLWC= 1603.810 ELLC= 1598.880 PCWSE= 1592.086 ELTRD= 1603.830

4575 CRITICAL DEPTH ASSUMED BELOW ELLC OF 1598.880 EGLC= 1603.810 EGC= 1606.367 WSEL= 1605.140

4575 CRITICAL DEPTH ASSUMED BELOW ELLC OF 1598.880 EGLC= 1603.810 EGC= 1603.810 WSEL= 1598.745

3370 NORMAL BRIDGE, NRD= 0 MIN ELTRD= 1603.83 MAX ELLC= 1598.88

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2000.000	10.00	1598.88	1598.88	.00	1603.81	4.93	2.20	.03	1598.88
2138.1	.0	2138.1	.0	.0	120.0	.1	17.3	9.4	1598.80
.12	.00	17.82	.09	.000	.015	.015	.000	1588.88	1044.29
.008468	320.	320.	303.	0	18	0	.00	13.60	1057.89

CCHV= .300 CEHV= .500
*SECNO 2100.000
3280 CROSS SECTION 2100.00 EXTENDED 1.22 FEET

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 22.18

2100.000	15.22	1605.22	1595.96	.00	1605.28	.06	.01	1.46	1596.00
3478.0	585.3	2599.9	292.8	611.3	1201.5	349.0	18.6	9.5	1596.00
.13	.96	2.16	.84	.040	.025	.040	.000	1590.00	1003.74
.000046	59.	50.	55.	3	14	0	.00	248.25	1251.99

CCHV= .100 CEHV= .300
*SECNO 2200.000
3280 CROSS SECTION 2200.00 EXTENDED 3.28 FEET

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

2200.000	12.28	1605.28	1598.04	.00	1605.29	.01	.01	.00	1598.00
3478.0	159.8	1475.2	1843.0	441.1	1624.8	3567.2	46.2	13.1	1598.00
.26	.36	.91	.52	.040	.025	.040	.000	1593.00	32.82
.000012	383.	329.	274.	2	28	0	.00	746.82	779.64

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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 2300.000

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

3470 ENCROACHMENT STATIONS= .0 453.1 TYPE= 1 TARGET= 453.089

2300.000	11.26	1605.26	1600.56	.00	1605.31	.05	.01	.01	1600.00
3478.0	395.1	1962.7	1120.2	453.0	846.0	1144.2	75.2	17.6	1600.00
.31	.87	2.32	.98	.040	.025	.040	.000	1594.00	23.65
.000092	320.	312.	311.	2	11	0	.00	502.60	526.26

*SECNO 2310.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .56

2310.000	9.24	1605.24	1602.20	.00	1605.37	.13	.04	.02	1601.00
3478.0	426.1	2582.7	469.2	345.1	784.1	397.9	85.7	20.1	1601.60

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        .34      1.21      3.29      1.18       040       025       040       000   1596.00   1015.62
    .000292       235.       240       222         1        11         0        00    449.86   1465.48


*SECNO 2350.000

3302 WARNING   CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE   FRATIO =   .37

  2350.000      1.15   1605.15   1604.44        00   1605.47        .32       .05       .06   1604.00
    3478.0       5.9    3448.3      21.8       5.0     760.5      20.0      88.0      21.8   1604.00
       .34      1.19      4.51      1.19       040       025       040       000   1602.00   1016.35
    .002147       151        63       121         4        14         0        00    401.26   1419.61


*SECNO 2400.000

3301 HV CHANGED MORE THAN HVINS

  2400.000      6.90   1604.90   1604.56        00   1605.83        .93       .17       .19   1602.00
    3478.0     550.8    2620.1     306.5     217.2     297.2     119.1      89.5      21.8   1602.00
       .34      2.54      8.82      2.57       040       025       040       000   1598.00    419.86
    .002139       178        71       109         1        17         0        00    256.00    675.86


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     SECNO      DEPTH      CWSEL      CRITWS     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 2500.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2500.000      4.37   1606.37   1606.37        00   1607.75      1.38        .58       .14   1604.00
    3478.0     710.0    2719.6      28.4     159.4      63.7       9.1      91.8      22.6   1604.00
       .35      4.45     10.35      3.11       040       025       040       000   1602.00     89.80
    .005228       187       180       183         0        14         0        00    161.68    251.48


*SECNO 2600.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2600.000      4.06   1610.06   1610.06        00   1611.42      1.36      2.19       .00   1612.00
    3474.0        .0    3474.0         0         0     171.4         0      95.1      23.9   1612.00
       .36       .00      9.35        00       000       025       000       000   1606.00    779.60
    .006810       321.       173       292         0        11         0        00    139.82    919.42


*SECNO 2700.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2700.000      4.56   1612.56   1612.56        00   1611.79      1.23      1.69       .01   1614.00
    3474.0        .0    3474.0         0         0     390.8        .0      97.3      24.7   1614.00
       .37       .00      8.89        00       000       025       000       000   1608.00    649.69
    .006864       250.       247       237         0         8         0        00    160.76    810.45


*SECNO 2800.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=      263.2      507.8  TYPE=       1  TARGET=     -261.200
 ELENCL=   1616.00  ELENCR= 100000.00
  2800.000      5.31   1615.31   1615.31        00   1616.64      1.33      2.58       .03   1616.00
    3474.0        .0    3474.0         0         0     375.1         0     100.6      26.1   1616.00
       .38       .00      9.26        00       000       025       000       000   1610.00    267.64
    .006844       263.       377       390         0        11         0        00    144.58    412.22


*SECNO 2900.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
1
   13JAN00      11:47:40                                                                        PAGE   21

     SECNO      DEPTH      CWSEL      CRITWS     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=      392.8      890.2  TYPE=       1  TARGET=     -392.800
 ELENCL=   1620.51  ELENCR= 100000.00
  2900.000      6.57   1618.57   1618.57        00   1619.51       .94      2.33       .04   1620.00
    3474.0        .0    3474.0         0         0     446.7         0     101.3      27.5   1620.00
       .39       .00      7.78        00       000       025       000       000   1612.00    511.02
    .009181       293.       292       274         0        11         0        00    282.84    793.86


*SECNO 3000.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
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  3000.000      6.69    1620.69    1620.69      .00    1621.91     1.21      2.19       .09    1620.00
    3474.0       119.6     3329.4       5.0      72.5      365.9       4.1      107.0      29.6    1620.00
        .40        1.93       9.10       1.22      .040      .025      .040      .000    1614.00     232.84
  .004467         406.       350.       342.         0         5         0       .00     222.85     455.69


*SECNO 3100.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  3100.000      6.66    1624.66    1624.66      .00    1625.94     1.28      1.66       .01    1626.00
    3474.0          0     3474.0         .0       .0      382.6         .0      109.9      31.0    1626.00
        .41        .00       9.08       .00      .000      .025      .000      .000    1618.00     241.79
  .006816         381.       302.       294.         0         5         0       .00     149.43     391.22


*SECNO 3200.000

3101 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  3200.000      5.52    1627.52    1627.52      .00    1629.64     2.11      2.49       .25    1630.00
    3474.0          0     3474.0         .0       .0      297.8         .0      112.9      32.0    1630.00
        .42        .00      11.67       .00      .000      .025      .000      .000    1622.00     254.47
  .005481         4.7         390        396         0        11         0       .00      71.99     326.45


*SECNO 3300.000

3265 DIVIDED FLOW

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   11JAN00      11.47.40                                                                          PAGE    22

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


3301 HV CHANGED MORE THAN HVINS

  3300.000      1.38    1631.38    1631.36      .00    1632.76     1.38      1.05       .07    1636.00
    3474.0          0     3474.0         .0         0      368.4         .0      116.6      33.1    1636.00
        .43        .00       9.43       .00      .000      .025      .000      .000    1628.00      48.20
  .006676         461.       483.       416.         3        14         0       .00     132.80     535.55


*SECNO 3400.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  3400.000      5.11    1639.11    1639.11       .00    1639.82      .72      3.21       .07    1640.00
    3474.0          0     3474.0          0         0      511.1         .0      120.7      35.6    1640.00
        .45        .00       6.80       .00      .000      .025      .000      .000    1634.00      95.51
  .009731         467.       402.       326.         0        17         0       .00     408.71     504.21


*SECNO 3500.000

3102 WARNING   CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.41

  3500.000      2.15    1642.15    1641.90      .00    1642.55      .40      2.69       .03    1646.00
    3474.0          0     3474.0         .0         0      685.7         .0      126.2      39.8    1646.00
        .47        .00       5.07       .00      .000      .025      .000      .000    1640.00    1165.28
  .004861         446.       403.       364.         5        22         0       .00     507.21    1672.49


*SECNO 3600.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  3600.000      1.42    1647.42    1647.42      .00    1648.05      .64      2.26       .07    1648.00
    3474.0          0     3474.0         .0         0      542.3         .0      131.3      41.7    1648.00
        .49        .00       6.41       .00      .000      .025      .000      .000    1646.00     184.97
  .008531         366.       359.       357.         0        14         0       .00     430.17     615.14


*SECNO 3700.000
  3700.000      2.06    1650.06    1649.75      .00    1650.55      .49      2.48       .01    1652.00
    3474.0          0     3474.0         .0         0      617.2         .0      136.7      47.5    1652.00
        .51        .00       5.63       .00      .000      .025      .000      .000    1648.00     115.62
  .004510         398.       610.       401.         3        11         0       .00     369.76     485.38


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   11JAN00      11.47.40                                                                          PAGE    23

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

     1
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*SECNO 3800.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3800.000	2.25	1656.25	1656.25	.00	1656.94	.70	4.01	.06	1660.00
3474.0	.0	3474.0	.0	.0	518.7	.0	145.4	51.2	1658.00
.54	.00	6.70	.00	.000	.025	.000	.000	1654.00	48.18
.008386	480.	666.	713.	0	8	0	.00	379.85	428.03

*SECNO 3900.000

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

3900.000	2.79	1658.79	1658.78	.00	1659.61	.83	2.63	.04	1660.00
2318.0	.0	2318.0	.0	.0	317.6	.0	148.5	55.3	1662.00
.55	.00	7.30	.00	.000	.025	.000	.000	1656.00	96.78
.007964	468.	320.	238.	2	11	0	.00	196.62	293.40

*SECNO 4000.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4000.000	4.62	1664.62	1664.62	.00	1665.76	1.14	3.52	.09	1666.00
2318.0	.0	2318.0	.0	.0	270.2	.0	151.6	57.0	1666.30
.56	.00	8.58	.00	.000	.025	.000	.000	1660.00	66.94
.007186	445.	466.	478.	0	14	0	.00	120.65	187.58

*SECNO 4100.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4100.000	4.34	1670.34	1670.34	.00	1671.28	.94	3.63	.02	1672.00
2318.0	.0	2318.0	.0	.0	298.3	.0	154.9	58.6	1674.00
.58	.00	7.77	.00	.000	.025	.000	.000	1666.00	214.41
.007412	535.	497.	356.	0	12	0	.00	158.44	372.85

*SECNO 4200.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4200.000	4.93	1674.93	1674.93	.00	1675.84	.91	3.00	.00	1678.00
2318.0	.0	2318.0	.0	.0	302.8	.0	157.7	60.1	1680.00
.59	.00	7.65	.00	.000	.025	.000	.000	1670.00	130.55
.007494	285.	402.	297.	0	8	0	.00	166.18	296.74

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	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 4300.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4300.000	3.22	1679.22	1679.22	.00	1680.20	.99	2.86	.02	1680.00
2318.0	.0	2318.0	.0	.0	290.6	.0	160.3	63.5	1680.00
.61	.00	7.98	.00	.000	.025	.000	.000	1676.00	178.89
.007442	317.	384.	407.	0	14	0	.00	149.61	328.50

*SECNO 4400.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4400.000	4.01	1684.01	1684.01	.00	1685.31	1.30	3.41	.09	1688.00
2318.0	.0	2318.0	.0	.0	253.1	.0	163.2	62.8	1688.00
.62	.00	9.16	.00	.000	.025	.000	.000	1680.00	1171.90
.006904	432.	476.	439.	0	11	0	.00	99.31	1271.22

*SECNO 4500.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4500.000	4.55	1690.55	1690.55	.00	1691.73	1.18	3.70	.01	1710.00
2318.0	.0	2318.0	.0	.0	266.1	.0	166.4	64.1	1710.00
.64	.00	8.71	.00	.000	.025	.000	.000	1686.00	174.72
.006979	417.	533.	575.	0	8	0	.00	113.57	288.29

*SECNO 4600.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4600.000	3.99	1695.99	1695.99	.00	1697.15	1.16	3.13	.00	1700.00
2318.0	.0	2318.0	.0	.0	267.7	.0	169.1	65.3	1700.00
.65	.00	8.66	.00	.000	.025	.000	.000	1692.00	199.71
.007167	488.	442.	278.	0	15	0	.00	117.81	317.52

*SECNO 4700.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= .0 442.2 TYPE= 1 TARGET= 442.199

4700.000	4.65	1700.65	1700.65	.00	1701.94	1.30	1.48	.04	1700.00

2318.0	1.2	2241.0	75.8	1.0	241.2	40.4	170.8	66.1	1700.00
.66	1.17	9.29	1.88	.040	.025	.040	.000	1696.00	370.94
.004619	273.	261.	276.	0	11	0	.00	134.71	505.65

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 4800.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4800.000	5.20	1703.20	1703.20	.00	1705.21	2.01	1.21	.21	1710.00
2318.0	.0	2318.0	.0	.0	203.6	.0	172.1	66.6	1710.00
.67	.00	11.39	.00	.000	.025	.000	.000	1698.00	221.50
.006116	187.	228.	242.	0	8	0	.00	50.94	272.43

CCHV= .100 CEHV= .300
*SECNO 4900.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4900.000	3.90	1705.90	1705.90	.00	1707.53	1.63	2.21	.04	1710.00
2318.0	.0	2318.0	.0	.0	226.0	.0	173.8	67.1	1710.00
.68	.00	10.26	.00	.000	.025	.000	.000	1702.00	136.35
.006483	375.	351.	218.	0	15	0	.00	70.75	207.09

TWSPLIT FLOW AT PULSIPHER/I-15 CULVERT

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
1339.89	1339.89	.00	1339.89	1339.89	.00	11	1598.880	1605.219	2000.000	2100.000

TWSTATION 1400 - SPLIT FLOW OVER RIGHT BANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
108.35	108.34	.00	1448.23	1448.23	.00	11	1583.677	1584.860	1400.000	1500.000

TWSTATION 1300 - SPLIT FLOW OVER RIGHT BANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
.00	.00	.00	1448.23	1448.23	.00	11	1578.925	1583.677	1300.000	1400.000

TWSTATION 1200 - SPLIT FLOW OVER LEFT BANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
211.35	211.68	.16	1659.58	1659.91	.02	11	1577.886	1578.925	1200.000	1300.000

TWSTATION 1100 - SPLIT FLOW OVER LEFT OVERBANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
656.95	657.48	.08	2316.53	2317.39	.04	11	1577.466	1577.886	1100.000	1200.000

TWSTATION 1000 - SPLIT FLOW OVER LEFT BANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
265.90	266.46	.21	2582.43	2583.85	.05	11	1576.445	1577.466	1000.000	1100.000

TWSTATION 900 - SPLIT FLOW OVER LEFT BANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
168.48	168.63	.09	2750.91	2752.48	.06	11	1575.360	1576.445	900.000	1000.000

TWSTATION 800 - SPLIT FLOW OVER LEFT BANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
122.00	122.16	.13	2872.92	2874.64	.06	11	1574.778	1575.360	800.000	900.000

TWSTATION 700 - SPLIT FLOW OVER LEFT BANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
7.34	7.29	.72	2880.26	2881.93	.06	11	1573.263	1574.778	700.000	800.000

THIS RUN EXECUTED 13JAN00 11:47:41

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

Pulsipher Wash

SUMMARY PRINTOUT TABLE 100

	SECNO	EGLWC	ELLC	EGPRS	ELTRD	QPR	QWEIR	CLASS	H3	DEPTH	CWSEL	VCH	EG
*	600.000	1568.79	1569.51	.00	1572.66	668.74	.00	2.00	.00	2.70	1568.10	6.63	1568.79
*	2000.000	1601.81	1598.88	1599.48	1603.83	2138.11	00	59.00	.00	10.00	1598.88	17.82	1603.81

Pulsipher Wash

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	200.000	.00	.00	.00	1554.00	668.74	1555.07	1555.07	1555.57	91.93	5.68	117.76	69.75
*	300.000	352.07	.00	.00	1558.00	668.74	1560.01	1560.01	1560.76	80.30	6.98	95.86	74.63
*	400.000	134.41	00	.00	1560.00	668.74	1562.56	1562.56	1563.09	91.64	5.82	114.97	69.86
*	500.000	74.97	00	00	1564.30	668.74	1566.47	1566.47	1567.54	29.45	8.30	80.57	123.22
*	600.000	133.46	1572.66	1569.51	1565.40	668.74	1568.10	.00	1568.79	14.39	6.63	100.89	176.29
*	700.000	112.64	00	.00	1569.50	668.74	1573.26	1573.26	1573.79	144.90	5.83	114.80	55.55
*	800.000	144.94	00	.00	1570.00	676.08	1574.78	1574.40	1575.10	60.77	4.59	147.44	86.73
	900.000	103.62	00	.00	1571.00	798.09	1575.36	1575.28	1575.98	93.53	6.31	126.51	82.52
	1000.000	118.27	00	.00	1571.15	966.57	1576.44	1576.36	1577.24	110.61	7.17	134.84	91.90
*	1100.000	103.70	00	.00	1571.40	1232.47	1577.47	1576.93	1578.01	54.21	5.94	207.55	167.39
*	1200.000	110.23	.00	.00	1571.62	1889.42	1577.89	1577.33	1578.65	50.67	7.03	268.92	265.43
*	1300.000	176.37	00	.00	1572.69	2100.77	1578.93	1578.93	1580.10	78.50	8.68	242.00	237.11
*	1400.000	161.58	.00	.00	1578.00	2100.77	1583.68	1583.68	1584.79	71.68	8.47	248.01	248.14
*	1500.000	108.07	.00	.00	1578.00	2209.12	1584.86	1583.66	1585.15	13.21	4.49	616.70	607.80
	1600.000	196.31	.00	.00	1580.40	2209.12	1585.10	1583.69	1585.40	11.86	4.47	534.65	641.55
*	1650.000	175.57	.00	.00	1582.00	2209.12	1586.66	1586.66	1587.48	43.94	8.76	417.47	333.26
	1700.000	161.13	.00	.00	1582.05	2209.12	1587.56	1587.24	1588.08	30.70	7.01	500.54	398.71
*	1750.000	169.33	.00	.00	1582.10	2209.12	1588.69	1588.69	1589.60	37.25	8.50	384.09	361.95
*	1800.000	170.93	00	.00	1582.10	2209.12	1589.90	1589.90	1592.04	65.02	11.74	188.10	273.97
*	1900.000	58.98	00	.00	1582.19	2138.11	1592.09	1592.09	1597.12	56.98	18.00	118.76	283.25
*	2000.000	319.85	1603.83	1598.88	1588.88	2138.11	1598.88	1598.88	1603.81	84.68	17.82	120.06	232.35
*	2100.000	49.81	.00	.00	1590.00	3478.00	1605.22	1595.96	1605.28	.46	2.16	2161.69	5154.45
*	2200.000	328.57	00	.00	1593.00	3478.00	1605.28	1598.04	1605.29	.12	.91	5631.05	9993.15
*	2300.000	311.55	00	.00	1594.00	3478.00	1605.26	1600.56	1605.31	.92	2.32	2443.22	3633.66

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	2330.000	240.00	.00	.00	1596.00	3478.00	1605.24	1602.20	1605.37	2.92	3.29	1527.20	2036.33
*	2350.000	63.00	.00	00	1602.00	3478.00	1605.15	1604.46	1605.47	21.47	4.53	785.48	750.58
	2400.000	71.00	.00	.00	1598.00	3478.00	1604.90	1604.56	1605.83	21.39	8.82	633.59	752.08

*	2500.000	179.72	.00	.00	1602.00	3478.00	1606.37	1606.37	1607.75	52.28	10.39	432.21	481.01
*	2600.000	373.36	.00	.00	1606.00	3474.00	1610.06	1610.06	1611.42	68.10	9.35	371.36	420.97
*	2700.000	246.94	.00	.00	1608.00	3474.00	1612.56	1612.56	1613.79	68.64	8.89	390.77	419.33
*	2800.000	376.77	.00	.00	1610.00	3474.00	1615.31	1615.31	1616.64	68.44	9.26	375.09	419.93
*	2900.000	292.09	.00	.00	1612.00	3474.00	1618.57	1618.57	1619.51	93.81	7.78	446.70	356.68
*	3000.000	349.71	.00	.00	1614.00	3474.00	1620.69	1620.69	1621.93	44.67	9.10	442.41	519.79
*	3100.000	302.10	.00	.00	1618.00	3474.00	1624.66	1624.66	1625.94	68.16	9.08	382.61	420.78
*	3200.000	390.01	.00	.00	1622.00	3474.00	1627.52	1627.52	1629.64	59.81	11.67	297.81	449.22
	3300.000	482.80	.00	.00	1628.00	3474.00	1631.38	1631.16	1632.76	66.78	9.43	368.45	425.12
*	3400.000	402.24	.00	.00	1634.00	3474.00	1639.11	1639.11	1639.82	97.31	6.80	511.14	352.16
*	3500.000	403.18	.00	.00	1640.00	3474.00	1642.15	1641.90	1642.55	48.61	5.07	685.70	498.27
*	3600.000	358.51	.00	.00	1646.00	3474.00	1647.42	1647.42	1648.05	85.31	6.41	542.32	376.11
	3700.000	409.82	.00	.00	1648.00	3474.00	1650.06	1649.75	1650.55	45.30	5.63	617.21	516.16
*	3800.000	666.00	.00	.00	1654.00	3474.00	1656.25	1656.25	1656.94	83.86	6.70	518.75	379.16
*	3900.000	320.40	.00	.00	1656.00	2318.00	1658.79	1658.78	1659.61	79.64	7.30	327.60	259.74
*	4000.000	465.67	.00	.00	1660.00	2318.00	1664.62	1664.62	1665.76	71.86	8.58	270.18	273.44
*	4100.000	497.00	.00	.00	1666.00	2318.00	1670.34	1670.34	1671.28	74.12	7.77	298.33	269.24
*	4200.000	402.00	.00	.00	1670.00	2318.00	1674.93	1674.93	1675.84	74.94	7.65	302.84	267.78
*	4300.000	383.62	.00	.00	1676.00	2318.00	1679.22	1679.22	1680.20	74.42	7.98	290.61	268.69
*	4400.000	476.00	.00	.00	1680.00	2318.00	1684.01	1684.01	1685.31	69.04	9.16	253.12	278.97
*	4500.000	533.38	.00	.00	1686.00	2318.00	1690.55	1690.55	1691.73	69.79	8.71	266.05	277.47
*	4600.000	442.00	.00	.00	1692.00	2318.00	1695.99	1695.99	1697.15	71.67	8.66	267.73	273.80
*	4700.000	260.86	.00	.00	1696.00	2318.00	1700.65	1700.65	1701.94	46.19	9.29	282.59	341.06

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	4800.000	227.74	.00	.00	1698.00	2318.00	1703.20	1703.20	1705.21	61.16	11.39	203.56	296.41
*	4900.000	351.24	.00	.00	1702.00	2318.00	1705.90	1705.90	1707.53	64.83	10.26	226.02	287.89

Pulsipher Wash

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	200.000	668.74	1555.07	.00	.00	-1.88	118.24	.00
*	300.000	668.74	1560.01	.00	4.94	.00	63.71	352.07
*	400.000	668.74	1562.56	.00	2.55	.00	110.67	134.41
*	500.000	668.74	1566.47	.00	3.91	.00	37.73	74.97
*	600.000	668.74	1568.10	.00	1.61	.00	37.73	133.46
*	700.000	668.74	1573.26	.00	5.16	.00	117.24	112.64
*	800.000	676.08	1574.78	.00	1.52	.00	112.62	144.94
	900.000	798.09	1575.36	.00	.58	.00	82.44	103.62
	1000.000	966.57	1576.44	.00	1.08	.00	81.68	118.27
*	1100.000	1232.47	1577.47	.00	1.02	.00	97.61	103.70
*	1200.000	1889.42	1577.89	.00	.42	.00	94.20	110.23
*	1300.000	2100.77	1578.93	.00	1.04	.00	109.71	176.37
*	1400.000	2100.77	1583.68	.00	4.75	.00	111.77	161.58
*	1500.000	2209.12	1584.86	.00	1.18	.00	393.03	108.07
	1600.000	2209.12	1585.10	.00	.24	.00	242.66	196.31

*	1650.000	2209.12	1586.66	.00	1.57	.00	258.69	175.57
	1700.000	2209.12	1587.56	.00	.90	.00	290.63	161.11
*	1750.000	2209.12	1588.69	.00	1.13	.00	216.43	169.33
*	1800.000	2209.12	1589.90	.00	1.21	.00	44.92	170.93
*	1900.000	2138.11	1592.09	.00	2.18	.00	12.00	58.98
*	2000.000	2138.11	1598.88	.00	6.79	.00	13.60	319.85
*	2100.000	3478.00	1605.22	.00	6.34	.00	248.25	49.81
*	2200.000	3478.00	1605.28	.00	.06	.00	746.82	328.57
*	2300.000	3478.00	1605.26	.00	-.02	.00	502.60	311.55

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	2330.000	3478.00	1605.24	.00	-.02	.00	449.86	240.00
*	2350.000	3478.00	1605.15	.00	-.08	.00	403.26	63.00
	2400.000	3478.00	1604.90	.00	-.26	.00	256.00	71.00
*	2500.000	3478.00	1606.37	.00	1.47	.00	161.68	179.72
*	2600.000	3474.00	1610.06	.00	3.70	.00	139.82	371.16
*	2700.000	3474.00	1612.56	.00	2.50	.00	160.76	246.94
*	2800.000	3474.00	1615.31	.00	2.75	.00	144.58	376.77
*	2900.000	3474.00	1618.57	.00	3.27	.00	282.84	292.09
*	3000.000	3474.00	1620.69	.00	2.12	.00	222.85	349.71
*	3100.000	3474.00	1624.66	.00	3.96	.00	149.43	302.10
*	3200.000	3474.00	1627.52	.00	2.87	.00	71.99	190.01
	3300.000	3474.00	1631.38	.00	3.85	.00	132.80	482.80
*	3400.000	3474.00	1639.11	.00	7.73	.00	408.71	402.24
*	3500.000	3474.00	1642.15	.00	3.04	.00	507.21	403.18
*	3600.000	3474.00	1647.42	.00	5.27	.00	430.17	358.51
	3700.000	3474.00	1650.06	.00	2.64	.00	369.76	409.82
*	3800.000	3474.00	1656.25	.00	6.19	.00	379.85	666.00
*	3900.000	2318.00	1658.79	.00	2.54	.00	196.62	320.40
*	4000.000	2318.00	1664.62	.00	5.83	.00	120.65	465.67
*	4100.000	2318.00	1670.34	.00	5.72	.00	158.44	497.00
*	4200.000	2318.00	1674.93	.00	4.58	.00	166.18	402.00
*	4300.000	2318.00	1679.22	.00	4.29	.00	149.61	383.62
*	4400.000	2318.00	1684.01	.00	4.79	.00	99.31	476.00
*	4500.000	2318.00	1690.55	.00	6.54	.00	113.57	533.38
*	4600.000	2318.00	1695.99	.00	5.44	.00	117.81	442.00
*	4700.000	2318.00	1700.65	.00	4.66	.00	134.71	260.86

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	4800.000	2318.00	1703.20	.00	2.55	.00	50.94	227.74
*	4900.000	2318.00	1705.90	.00	2.70	.00	70.75	351.24

1
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SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 200.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

CAUTION SECNO= 300.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

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 CAUTION SECNO=    300.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    400.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    400.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    500.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    500.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    600.000  PROFILE=  1  HYDRAULIC JUMP D &
 WARNING SECNO=    600.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=    700.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    700.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=    800.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=   1100.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=   1200.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=   1300.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   1300.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   1400.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   1400.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=   1500.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=   1650.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   1650.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   1750.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   1750.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   1800.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   1800.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   1900.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=   2000.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   2000.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=   2100.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=   2200.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=   2300.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
1
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 WARNING SECNO=   2330.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=   2350.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=   2500.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   2500.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   2600.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   2600.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   2700.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   2700.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   2800.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   2800.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   2900.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   2900.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   3000.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   3000.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   3100.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   3100.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   3200.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   3200.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   3400.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   3400.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=   3500.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=   3600.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   3600.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   3800.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   3800.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=   3900.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=   4000.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4000.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   4100.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=   4100.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   4200.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4200.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   4300.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4300.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
1
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 CAUTION SECNO=   4400.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4400.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   4500.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4500.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   4600.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4600.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   4700.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4700.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   4800.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4800.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   4900.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4900.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
```

LEFT BREAKOUT HEC-2 MODEL FROM SECOND RESPONSE PULSOUT10.OUT (1/18/00)

PLSOUT10.OUT

```
1*****************************************
*  HEC-2 WATER SURFACE PROFILES           *
*                                         *
*  Version   4.6.2,  May 1991             *
*                                         *
*  RUN DATE    18JAN00     TIME   15:58:46 *
*****************************************
```

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

```
X      X  XXXXXXX   XXXXX              XXXXX
X      X  X         X     X           X     X
X      X  X         X                       X
XXXXXXX   XXXX      X          XXXXX    XXXXX
X      X  X         X                  X
X      X  X         X     X            X
X      X  XXXXXXX   XXXXX              XXXXXXX
```

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1
   18JAN00      15:58:46                                                                    PAGE    1


                                                                THIS RUN EXECUTED 18JAN00     15:58:46

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

 Version   4.6.2,  May 1991
 ************************************


 SPLIT FLOW BEING PERFORMED


 SF


 TWSTATION 10300 - RIGHT OVERBANK
 WS      2   10300   10400              2.7
 WC      0  1572.3     135  1573.6

 TWSTATION 10200 - RIGHT OVERBANK
 WS      2   10200   10300              2.7
 WC      0    1572     242  1572.3

 TWSTATION 10100 - RIGHT OVERBANK
 WS      2   10100   10200              2.7
 WC      0    1571     156    1572

 TWSTATION 10000 - RIGHT OVERBANK
 WS      2   10000   10100              2.7
 WC      0    1570     161    1571
1
   18JAN00      15:58:46                                                                    PAGE    2


 T1      550-035
 T2      Mequite Wash FIS Restudy
 T3      Pulsipher Wash
 T4      PULSOUT10.OUT

 J1  ICHECK    INQ       NINV      IDTR      STRT      METRIC    HVINS     Q         WSEL      FQ

                 2                             -1                            1431    1570.1

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      -1                   -1                                      -1        -6

 J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     100                  100       150

 NC     0.04      0.04      0.04       0.1       0.3
 X1    10000         5    1038.91   1647.26
 GR     1574      1000      1572    1038.91    1569.6    1074.4    1569.5    1587.08      1570    1647.26

 X1    10100        12    1046.08   1676.89    166.46     161.1    167.04
 GR     1580      1000      1578    1003.52      1576    1006.81      1574    1010.42      1572    1014.51
 GR     1572    1018.06      1572    1046.08    1571.2    1059.81    1570.6    1221.53    1570.6    1525.01
 GR   1570.6    1629.33      1571    1676.89

 X1    10200        10    1067.68   1706.93     135.8     155.58     140.7
 GR     1584      1000      1582    1003.26      1580    1006.2      1574    1015.87      1572    1067.68
 GR   1571.8    1082.69    1571.3    1272.12    1571.3    1580.72    1571.5    1661.91      1572    1706.93
```

```
X1    10100         9    1038.06    1755.77     170.45     241.71     197.48
GR     1580      1000       1574    1038.06       1572    1046.67       1572    1056.98       1572     1070.9
GR     1572   1097.07       1572    1600.21     1572.1       1700     1572.3    1755.77

X1    10400         8    1017.9     1760.34     142.4      134.75     138.34
GR     1576      1000       1574    1017.9      1573.5     1134.53    1573.6    1416.55     1573.6     1600.7
GR   1573.6   1660.37     1573.6    1707.78     1573.6     1760.34
```

1

18JAN00 15.58.46 PAGE 3

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

```
*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

CCHV=      100 CFHV=      .100
*SECNO 10000.000
3280 CROSS SECTION  10000.00 EXTENDED       .01 FEET

1720 CRITICAL DEPTH ASSUMED
 10000.000        51   1570.01   1570.01   1570.10   1570.22       .22       .00       .00   1572.00
     938.5         0     938.5        .0        .0     250.9        .0        .0        .0   1570.00
       .00       .00      3.74       .00      .000      .040      .000      .000   1569.50   1068.38
    030911         0         0.        0.        0        10         0       .00    578.88   1647.26


*SECNO 10100.000
3280 CROSS SECTION  10100.00 EXTENDED       .51 FEET

3302 WARNING   CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.07

 10100.000        92   1571.52   1571.12       .00   1571.58       .06      1.34       .02   1572.00
    1005.0         0    1005.0        .0        .0     506.0        .0       1.5       2.3   1571.00
        02       .00      1.99       .00      .000      .040      .000      .000   1570.60   1054.44
    001771       166       167.      163.         4         8         0       .00    622.45   1676.89


*SECNO 10200.000
3280 CROSS SECTION  10200.00 EXTENDED       .17 FEET

 10200.000       .86   1572.16   1571.87       .00   1572.25       .08       .66       .01   1572.00
    1092.1         2    1091.9        .0        .4     469.1        .0       1.0       4.3   1572.00
       .04       .54      2.33       .00      .040      .040      .000      .000   1571.30   1063.40
    005931       136       141       156.        2        14         0       .00    643.53   1706.93


*SECNO 10300.000
3280 CROSS SECTION  10300.00 EXTENDED       .67 FEET

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.68

1
```

18JAN00 15:58:46 PAGE 4

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

```
 10300.000       .96   1572.96   1572.48       .00   1573.01       .06       .76       .00   1574.00
    1272.4         .0    1272.4        .0        .0     670.5        .0       5.6       7.4   1572.30
       .07       .00      1.90       .00      .000      .040      .000      .000   1572.00   1042.51
    002838       170.      197.      242.         2        11         0       .00    713.26   1755.77


*SECNO 10400.000
3280 CROSS SECTION  10400.00 EXTENDED       .49 FEET

7185 MINIMUM SPECIFIC ENERGY
1720 CRITICAL DEPTH ASSUMED
 10400.000       .59   1574.09   1574.09       .00   1574.33       .24       .98       .06   1574.00
    1431.0         .0    1431.0        .0        .0     360.3        .0       7.2       9.7   1573.60
       .08       .06      1.97       .00      .040      .040      .000      .000   1573.50   1017.10
   .029999       142.      138.      135.         0        14         0       .00    743.24   1760.34
```

1

18JAN00 15.58.46 PAGE 5

```
TWSTATION 10300 - RIGHT OVERBANK
```

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO

158.65	158.88	.15	158.65	158.88	.15	7	1572.958	1574.090	10300.000	10400.000

TWSTATION 10200 - RIGHT OVERBANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
180.29	180.25	.02	338.94	339.13	.06	7	1572.165	1572.958	10200.000	10300.000

TWSTATION 10100 - RIGHT OVERBANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
87.10	86.84	.30	426.04	425.97	.02	7	1571.518	1572.165	10100.000	10200.000

TWSTATION 10000 - RIGHT OVERBANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
66.47	66.47	.00	492.51	492.44	.01	7	1570.007	1571.518	10000.000	10100.000

THIS RUN EXECUTED 18JAN00 15:58:46

****
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

Pulsipher Wash

SUMMARY PRINTOUT TABLE 100

	SECNO	EGLWC	ELLC	EGPRS	ELTRD	QPR	QWEIR	CLASS	H3	DEPTH	CWSEL	VCH	EG

Pulsipher Wash

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	10000.000	.00	.00	.00	1569.50	938.49	1570.01	1570.01	1570.22	109.11	3.74	250.50	53.38
*	10100.000	167.04	.00	.00	1570.60	1004.96	1571.52	1571.12	1571.58	37.71	1.99	506.03	163.66
	10200.000	140.70	.00	.00	1571.30	1092.06	1572.16	1571.87	1572.25	59.31	2.33	469.50	141.80
*	10300.000	197.48	.00	.00	1572.00	1272.35	1572.96	1572.48	1573.01	28.38	1.90	670.47	216.84
*	10400.000	138.34	.00	.00	1573.50	1431.00	1574.09	1574.09	1574.33	299.99	3.97	360.33	82.62

Pulsipher Wash

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	10000.000	938.49	1570.01	.00	.00	-.09	578.88	.00
*	10100.000	1004.96	1571.52	.00	1.51	.00	622.45	167.04
	10200.000	1092.06	1572.16	.00	.65	.00	643.53	140.70
*	10300.000	1272.35	1572.96	.00	.79	.00	713.26	197.48
*	10400.000	1431.00	1574.09	.00	1.13	.00	743.24	138.34

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 10000.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

WARNING SECNO= 10100.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

```
WARNING SECNO=  10300.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=  10400.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=  10400.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
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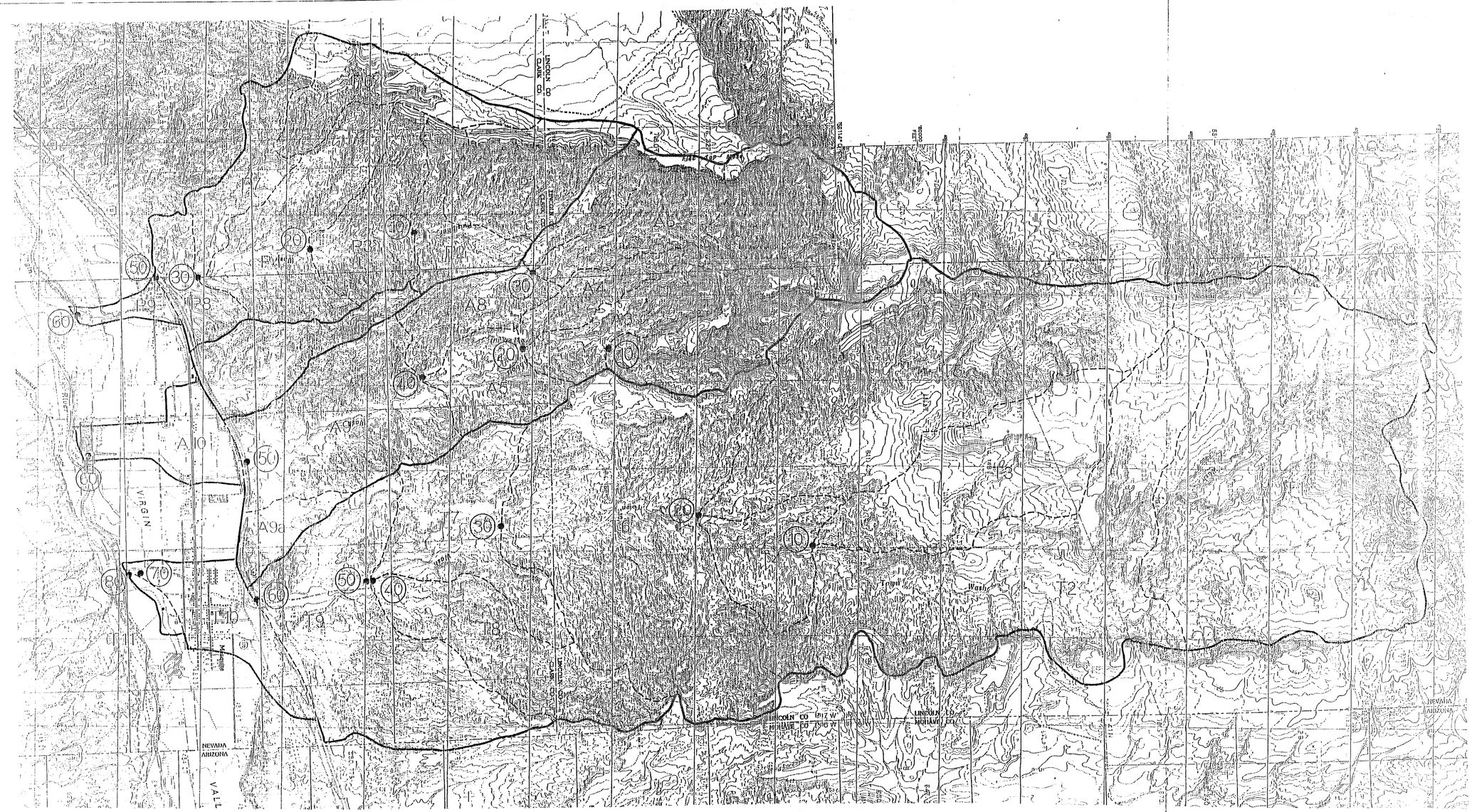
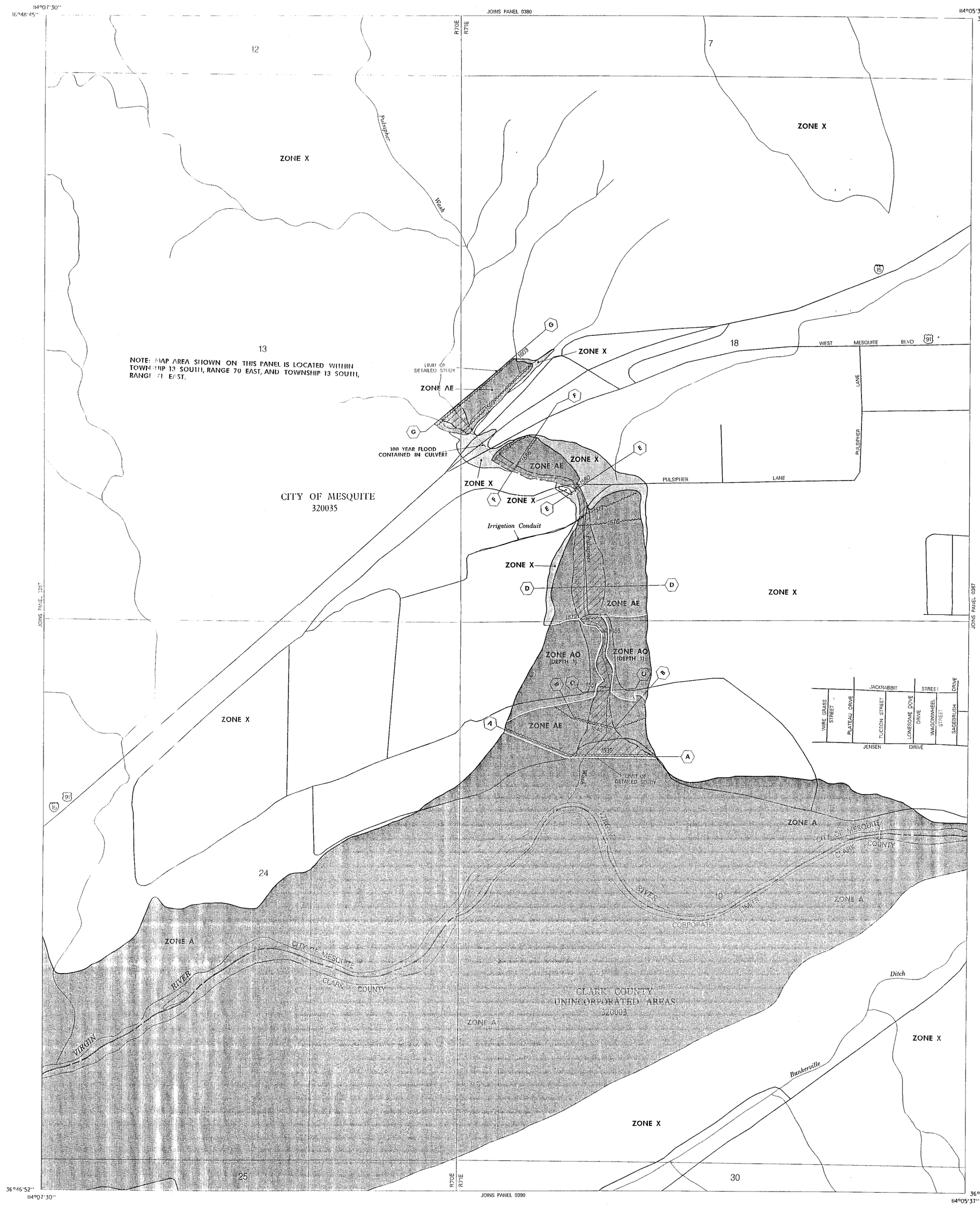


FIGURE D-2
EXISTING CONDITION
HYDROLOGIC MAP

CITY OF MESQUITE
FLOOD CONTROL MASTER PLAN UPDATE
CLARK COUNTY REGIONAL FLOOD
CONTROL DISTRICT, NEVADA

FIGURE 3

CH2MHILL



LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

ZONE A No base flood elevations determined.

ZONE AE Base flood elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE A99 To be protected from 100-year flood by Federal flood protection system under construction; no base flood elevations determined.

ZONE V Coastal flood with velocity hazard (wave action); no base flood elevations determined.

ZONE VE Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

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

OTHER AREAS

ZONE X Areas determined to be outside 500-year floodplain.

ZONE D Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS

Identified 1983 | Identified 1990 | Otherwise Protected Areas

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

Flood Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.

513 — Base Flood Elevation Line; Elevation in Feet. See M-Index for Elevation Datum.

D — D — Cross Section Line

(EL 987) — Base Flood Elevation in Feet Where Uniform Within Zone. See Map Index for Elevation Datum.

RM7 — Elevation Reference Mark

M2 — River Mile

97°07'30", 32°22'30" — Horizontal Coordinates Based on North American Datum of 1927 (NAD 27) Projection.

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas.

Coastal base flood elevations apply only landward of 0.0 NGVD and include the effects of wave action; these elevations may also differ significantly from those developed by the National Weather Service for hurricane evacuation planning.

Areas of Special Flood Hazard (100-year flood) include Zones A, AE, AH, AO, A99, V, and VE.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

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

Floodway widths in some areas may be too narrow to show to scale. Floodway widths are provided in the Flood Insurance Study Report.

This map may incorporate approximate boundaries of Coastal Barrier Resource System Units and/or Otherwise Protected Areas established under the Coastal Barrier Improvement Act of 1990 (PL 101-591).

Corporate limits shown are current as of the date of this map. The user should contact appropriate community officials to determine if corporate limits have changed subsequent to the issuance of this map.

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

For adjoining map panels and base map sources see separately printed Map Index.

MAP REPOSITORY
Refer to Repository Listing on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP:
AUGUST 16,1995

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL:

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE DATE shown on this map to determine when actuarial rates apply to structures in zones where elevations or depths have been established.

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

APPROXIMATE SCALE IN FEET
500 0 500

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CLARK COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 386 OF 4090
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY, UNINCORPORATED AREAS	320003	0386	D
MESQUITE, CITY OF	320035	0386	D

MAP NUMBER 32003C0386 D

EFFECTIVE DATE: AUGUST 16,1995

Federal Emergency Management Agency

FIGURE 4
EFFECTIVE FIRM

NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING,
BY OLYMPUS AERIAL SURVEYS, INC. FLOWN JULY 14, 1997 AND AUGUST 26, 1997
CONTOUR INTERVAL 1 FOOT

PANEL AFFECTS FIRMS 32003C0380 D & 32003C0386 D
DATED AUGUST 16, 1995.

FILE: WORK_PN4.DWG

FLOODING SOURCE: PULSIPHER WASH
MESQUITE, CLARK COUNTY, NEVADA

ELEVATION REFERENCE MARKS

REFERENCE MARK	PROJECT DATUM ELEVATION (FEET)	DESCRIPTION OF LOCATION
2114	1642.91	Hafen; 4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash.

PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.89 FEET

GRAPHIC SCALE
1 inch = 400 ft.
(IN FEET)
400 0 200 400 800 1600

NORTH



LEGEND

⬡	ELEVATION REFERENCE MARK
SFHA	SPECIAL FLOOD HAZARD AREA

REV	DATE	DESCRIPTION	DATE	AGEN. APP	DATE	GCW APP	DATE

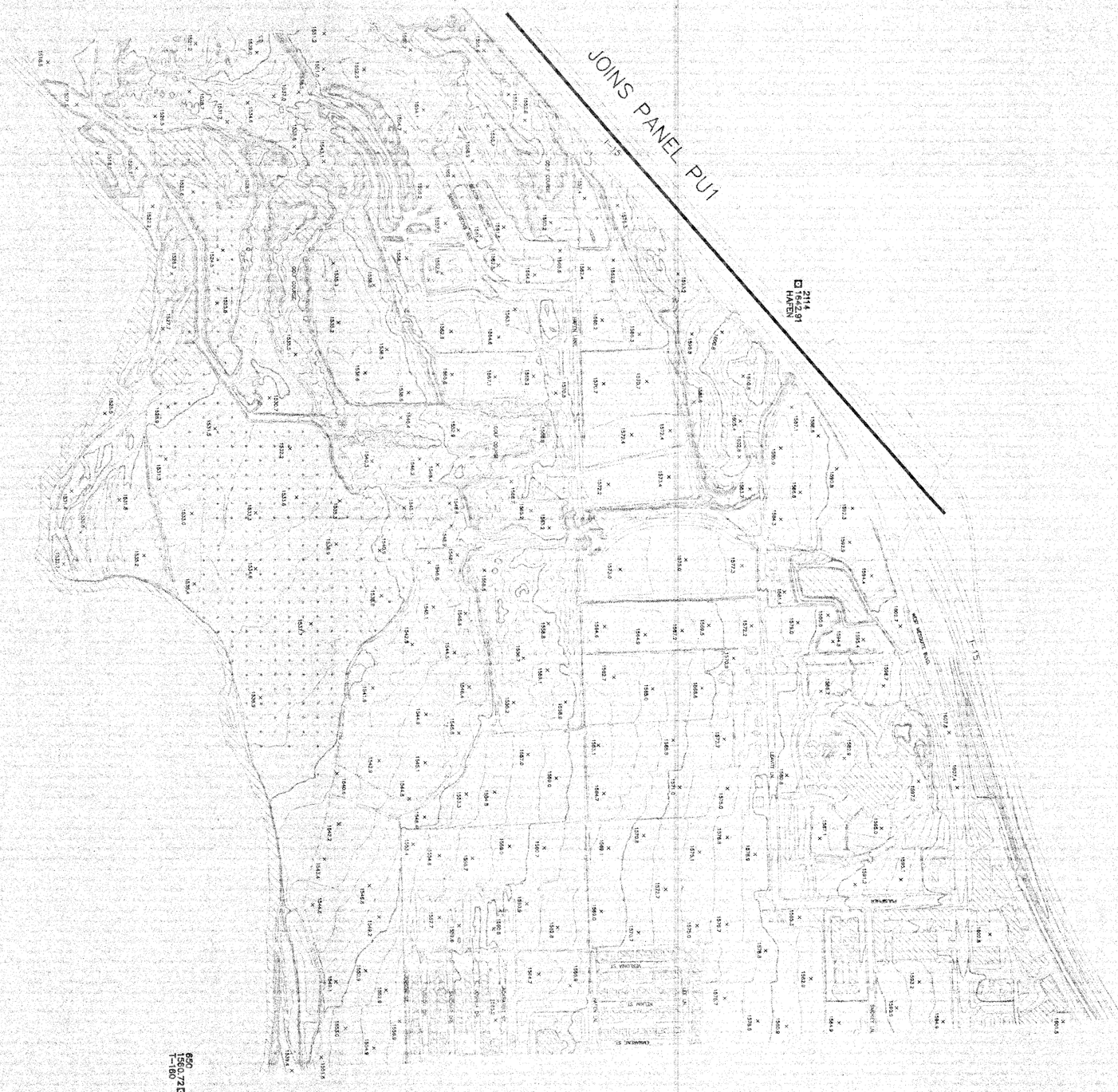
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DRAWN: M.B.
CHECK: JEP
ISSUE DATE: 11/12/00
ISSUE EDITOR:
PLOT DATE: 11-12-00
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mvdwg

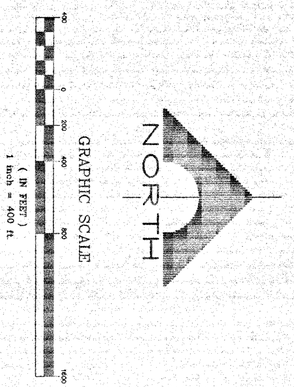
G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2099

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH NORTH OF I-15 REACH
BASE MAP

SHEET
PU1
OF 2 SHTS

P:\950+\953\dwg\mmdwg\work_pn4.dwg 11-12-00 16:32:36 mvdwg





NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING,
BY NEVADA AERIAL MAPPING, FLOWN JANUARY 14, 1998
CONTOUR INTERVAL 2 FEET

PANEL AFFECTS FIRM 32003C0386 D
DATED AUGUST 16, 1995

FILE: WORK_PS5.DWG

FLOODING SOURCE: PULSIPHER WASH
MESQUITE, CLARK COUNTY, NEVADA

ELEVATION REFERENCE MARKS

REFERENCE MARK	PROJECT DATUM ELEVATION (FEET)	DESCRIPTION OF LOCATION
2114	1642.91	Hafen; 4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash.
650	1560.72	T-160; Description of benchmark not available. Located south of Virgin River approximately 1300 feet east and 4200 feet south of Pulsipher Street and Leavitt Lane intersection.

PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.89 FEET

LEGEND

☐	ELEVATION REFERENCE MARK
SFHA	SPECIAL FLOOD HAZARD AREA

REV	DATE	DESCRIPTION	DATE	DRAWN	APP	DATE	DCOM	APP

DESIGN: M.K.
DRAWN: M.K.
CHECK: GP
ISSUE DATE: 11/12/00
ISSUE EDITOR:
PLOT DATE: 11/12/00
PLOT TIME: 3:29 pm

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH PAVILION CENTER DRIVE, SUITE 3 LAS VEGAS, NEVADA 89135
TELEPHONE (702) 804-2000 • FAX (702) 804-2909

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH SOUTH OF I-15 REACH
BASE MAP

SHEET
PU2
OF 2 SHTS

F:\650-025\Dwg\mxds\Work_ps5.dwg 11-2-00 16:43:10 mkuhlwg

NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING.
BY OLYMPUS AERIAL SURVEYS, INC. FLOWN JULY 14, 1997 AND AUGUST 26, 1997
CONTOUR INTERVAL 1 FOOT

PANEL AFFECTS FIRMS 32003C0380 D & 32003C0386 D
DATED AUGUST 16, 1995.

FILE: WORK_PN4.DWG

FLOODING SOURCE: PULSIPHER WASH
MESQUITE, CLARK COUNTY, NEVADA

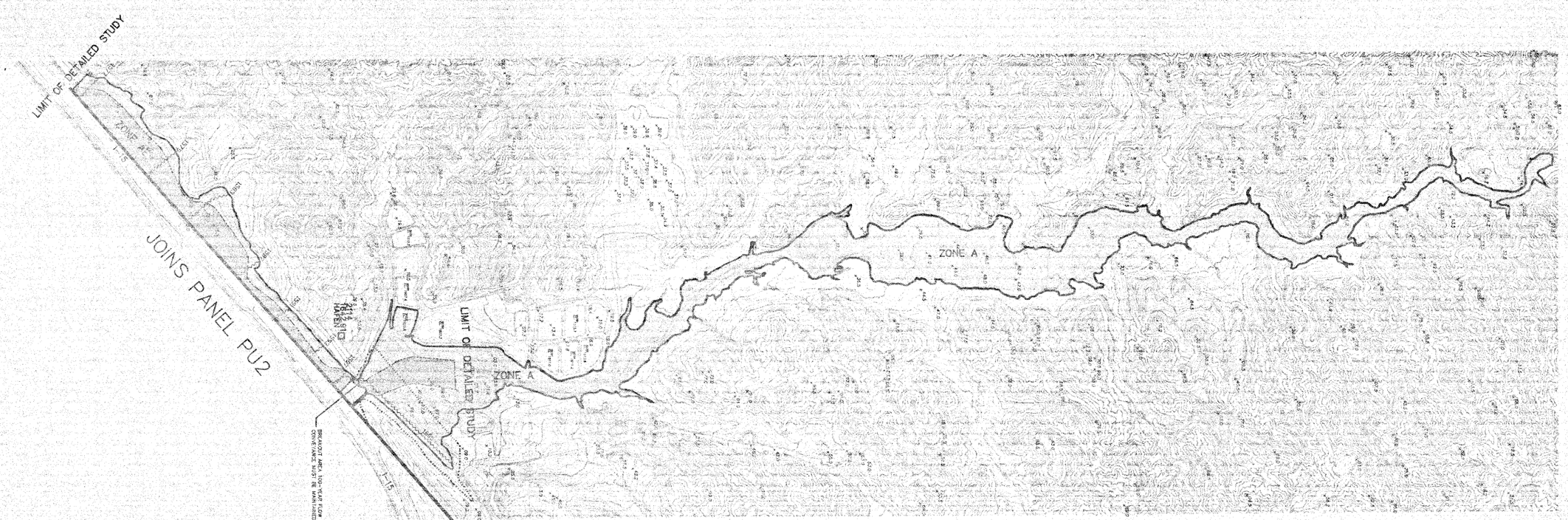
ELEVATION REFERENCE MARKS

REFERENCE MARK	PROJECT DATUM ELEVATION (FEET)	DESCRIPTION OF LOCATION
2114	1642.91	Nafen; 4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash.

PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.89 FEET

GRAPHIC SCALE
(IN FEET)
1 inch = 400 ft.

NORTH



LEGEND

- REVISED ZONE A AND ZONE AE
- NEW SHADED ZONE X
- EXISTING APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY
- REVISED 100-YEAR FLOODWAY BOUNDARY
- APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY TIE-IN
- ELEVATION REFERENCE MARK
- SFHA — SPECIAL FLOOD HAZARD AREA
- 1557 — BASE FLOOD ELEVATION

DESIGN: M.J.L.	DRAWN: M.J.L.	CHECK: JEP	ISSUE DATE: 11/12/00	ISSUE EDITOR:	PLOT DATE: 11-14-00	PLOT TIME: 08:19:15

REV.	DATE	DESCRIPTION	DATE	AGEN. APP.	DATE	GOV. APP.	DATE

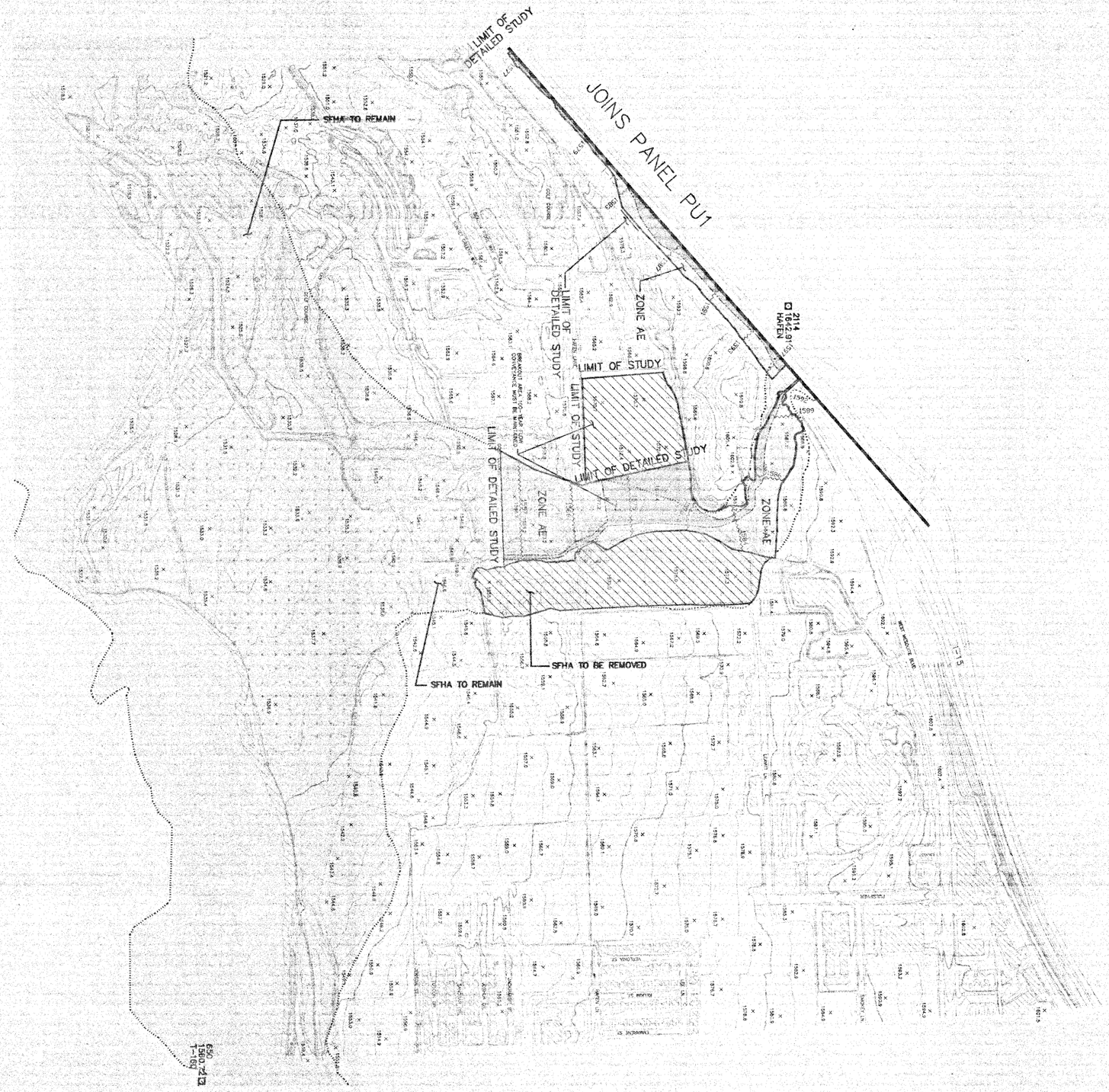
G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

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ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH NORTH OF I-15 REACH
WORK MAP

SHEET
PU1
OF 2 SHTS

F:\550-0351\dwg\map\work_pn4.dwg 11-14-00 08:19:15 mjlee9



GRAPHIC SCALE
(IN FEET)
1 inch = 400 ft.

NORTH

NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING,
BY NEVADA AERIAL MAPPING, FLOWN JANUARY 14, 1998
CONTOUR INTERVAL 2 FEET

PANEL AFFECTS FIRM 32003C0386 D
DATED AUGUST 16, 1995

FILE: WORK_PS5.DWG

FLOODING SOURCE: PULSIPHER WASH
MESQUITE, CLARK COUNTY, NEVADA

ELEVATION REFERENCE MARKS

REFERENCE MARK	PROJECT DATUM ELEVATION (FEET)	DESCRIPTION OF LOCATION
2114	1642.91	Hafen; 4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash.
650	1560.72	T-160; Description of benchmark not available. Located south of Virgin River approximately 1300 feet east and 4200 feet south of Pulsipher Street and Leavitt Lane intersection.

PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.89 FEET

LEGEND

- REVISED ZONE A AND ZONE AE
- NEW SHADED ZONE X
- EXISTING APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY
- REVISED 100-YEAR FLOODWAY BOUNDARY
- APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY TIE-IN
- ELEVATION REFERENCE MARK
- SFHA — SPECIAL FLOOD HAZARD AREA
- 1557 — BASE FLOOD ELEVATION

NO.	DESCRIPTION	DATE	APP.	DATE	SIGN.	APP.	DATE

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CHECK: JEP
ISSUE DATE: 11/12/00
ISSUE EDITOR:
PLOT DATE: 11-14-00
PLOT TIME: 08:35:02

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299
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ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH SOUTH OF I-15 REACH
WORK MAP

SHEET
PU2
OF 2 SHTS

F:\550-0351\Vegtmp\work_ps5.dwg 11-14-00 08:35:02 mludwig

NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING.
BY OLYMPUS AERIAL SURVEYS, INC. FLOWN JULY 14, 1997 AND AUGUST 26, 1997
CONTOUR INTERVAL 1 FOOT

PANEL AFFECTS FIRMS 32003C0380 D & 32003C0386 D
DATED AUGUST 16, 1995.

FILE: WORK_PN4.DWG

FLOODING SOURCE: PULSIPHER WASH
MESQUITE, CLARK COUNTY, NEVADA

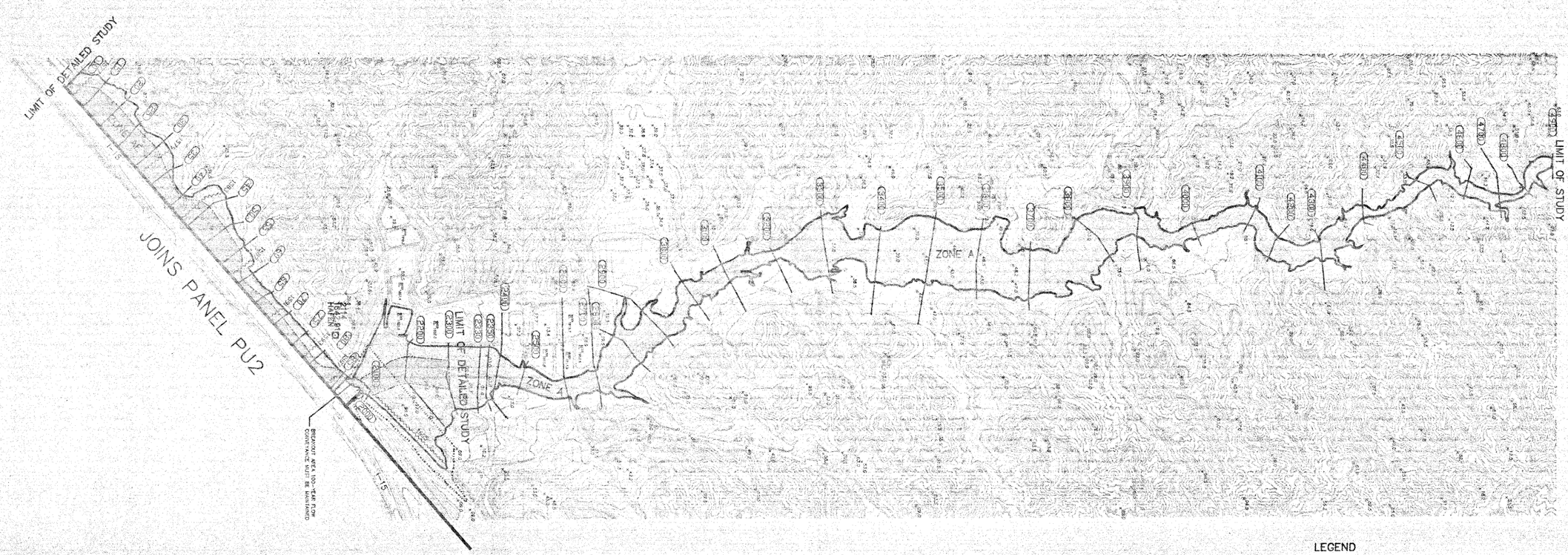
ELEVATION REFERENCE MARKS

REFERENCE MARK	PROJECT DATUM ELEVATION (FEET)	DESCRIPTION OF LOCATION
2114	1642.91	Hafen: 4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash.

PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.89 FEET

GRAPHIC SCALE
(IN FEET)
1 inch = 400 ft.
400 0 200 400 800 1600

NORTH



LEGEND

- REVISED ZONE A AND ZONE AE
- NEW SHADED ZONE X
- EXISTING APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY
- REVISED 100-YEAR FLOODWAY BOUNDARY
- APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY TIE-IN
- ELEVATION REFERENCE MARK
- SFHA — SPECIAL FLOOD HAZARD AREA
- (1100) — CROSS SECTION
- 1557 — BASE FLOOD ELEVATION

DESIGN: M/L
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ISSUE DATE: 11/22/00
ISSUE EDITOR:
PLOT DATE: 11-14-00
PLOT TIME: 08:19:15

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1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2909

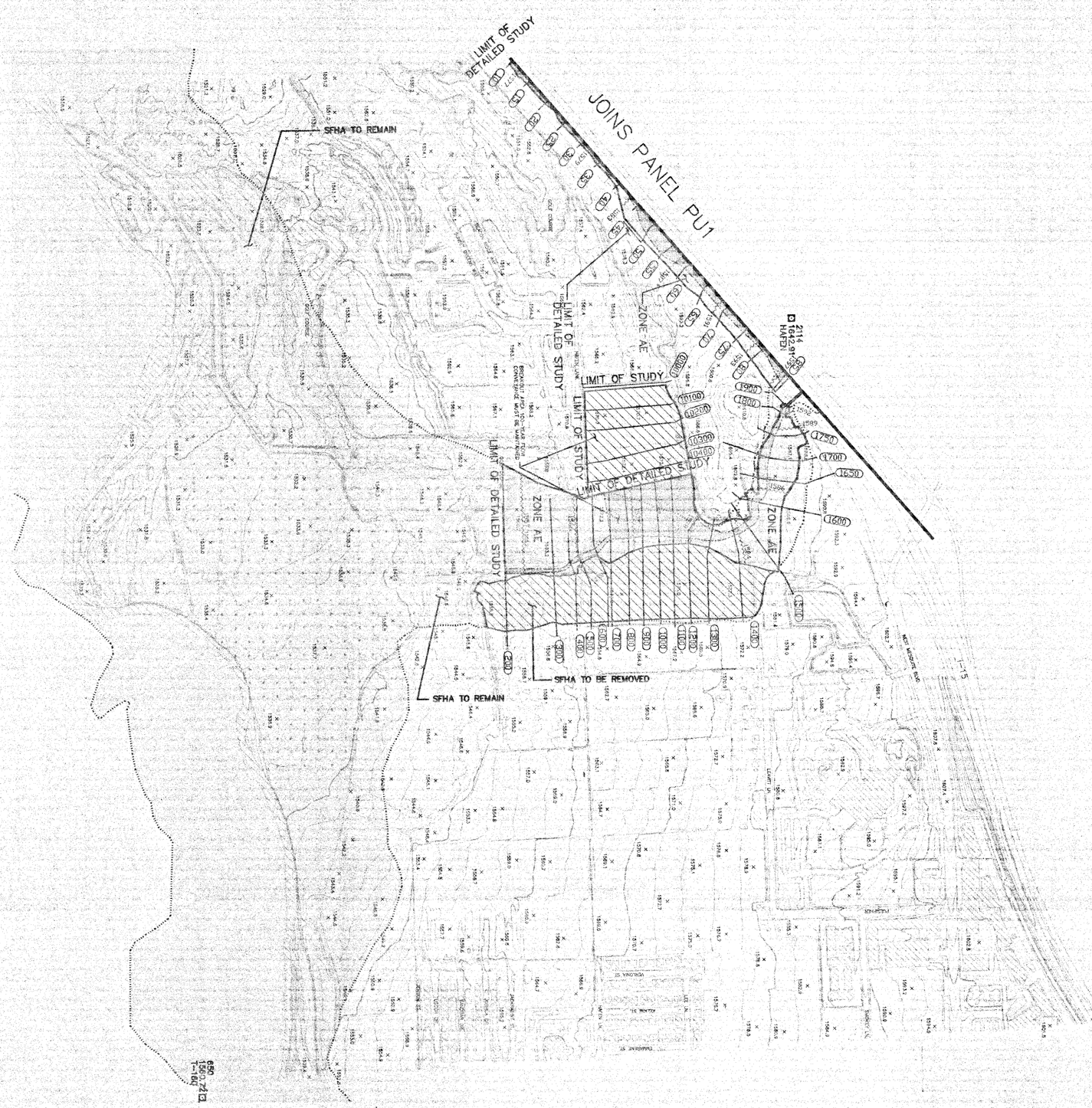
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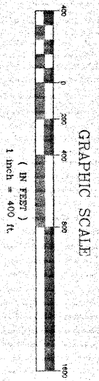
ABBOTT AND PULSIPHER WASHES FIS RESTUDY

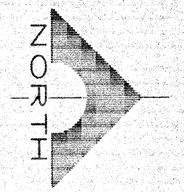
PULSIPHER WASH NORTH OF I-15 REACH

CROSS SECTION EXHIBIT

SHEET
PU1
OF 2 SHTS







NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING,
BY NEVADA AERIAL MAPPING, FLOWN JANUARY 14, 1998
CONTOUR INTERVAL 2 FEET

PANEL AFFECTS FIRM 32003C0386 D
DATED AUGUST 16, 1995

FILE: WORK_PS5.DWG

FLOODING SOURCE: PULSIPHER WASH
MESQUITE, CLARK COUNTY, NEVADA

ELEVATION REFERENCE MARKS

REFERENCE MARK	PROJECT DATUM ELEVATION (FEET)	DESCRIPTION OF LOCATION
2114	1642.91	Hafen; 4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash.
650	1560.72	T-160; Description of benchmark not available. Located south of Virgin River approximately 1300 feet east and 4200 feet south of Pulsipher Street and Leavitt Lane intersection.

PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.89 FEET

LEGEND

- REVISED ZONE A AND ZONE AE
- NEW SHADED ZONE X
- EXISTING APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY
- REVISED 100-YEAR FLOODWAY BOUNDARY
- APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY TIE-IN
- ELEVATION REFERENCE MARK
- SFHA — SPECIAL FLOOD HAZARD AREA
- (1100) — CROSS SECTION
- 1557 — BASE FLOOD ELEVATION

DESIGN: M.E.
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ISSUE DATE: 11/12/00
ISSUE EDITOR:
PLOT DATE: 11-14-00
PLOT TIME: 08:35:02

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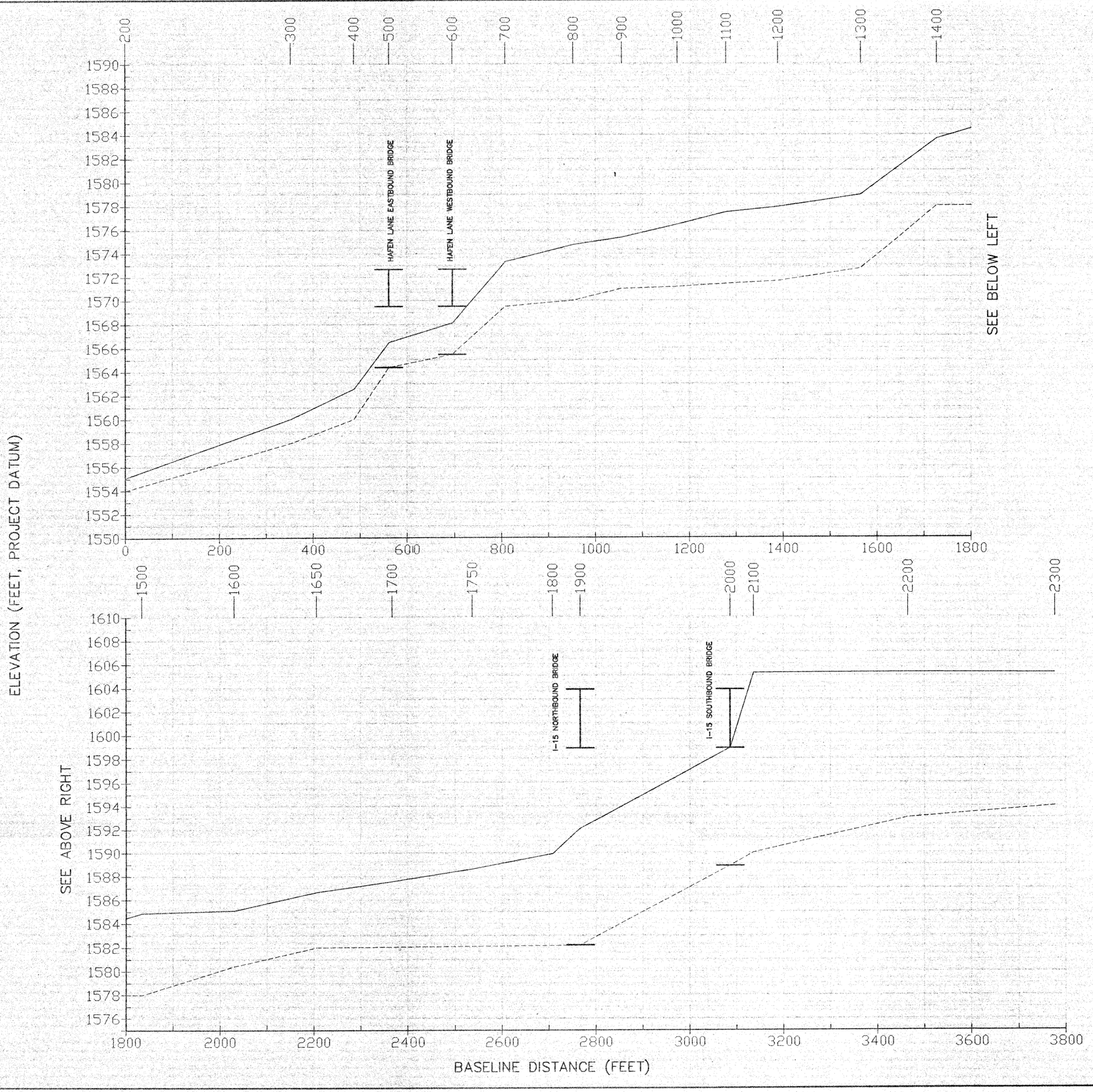
G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

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ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH SOUTH OF I-15 REACH
CROSS SECTION EXHIBIT

SHEET
PU2
OF 2 SHTS

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NOTES

HORIZONTAL SCALE 1" = 100'
VERTICAL SCALE 1" = 4'

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING,
BY NEVADA AERIAL MAPPING, FLOWN JANUARY 14, 1998.
CONTOUR INTERVAL 2 FEET SOUTH OF I-15

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING.
BY OLYMPUS AERIAL SURVEYS, INC., FLOWN JULY 14, 1997 AND AUGUST 26, 1997
CONTOUR INTERVAL 1 FOOT NORTH OF I-15

FILE: PROFMAI2.DWG

FLOODING SOURCE: PULSIPHER WASH
MESQUITE, CLARK COUNTY, NEVADA

ELEVATION REFERENCE MARKS

REFERENCE MARK	PROJECT DATUM ELEVATION (FEET)	DESCRIPTION OF LOCATION
2114	1642.91	Hafen; 4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash.
650	1560.72	T-160; Description of benchmark not available. Located south of Virgin River approximately 1300 feet east and 4200 feet south of Pulsipher Street and Leavitt Lane intersection.
2114	1642.91	Hafen; 4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash.

PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.89 FEET

LEGEND

- CHANNEL INVERT
- COMPUTED WATER SURFACE ELEVATION
- 2700 HYDRAULIC BASELINE DISTANCE
- 70 SECTION NUMBER
- BRIDGE STRUCTURE

DESIGN: M.A.
DRAWN: M.A.
CHECK: GEP
ISSUE DATE: 11/12/00
ISSUE EDITOR:
PLOT DATE: 11-14-00
PLOT TIME: 08:50:50
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DATE | BY | DESCRIPTION | DATE | APP | DATE | APP

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299
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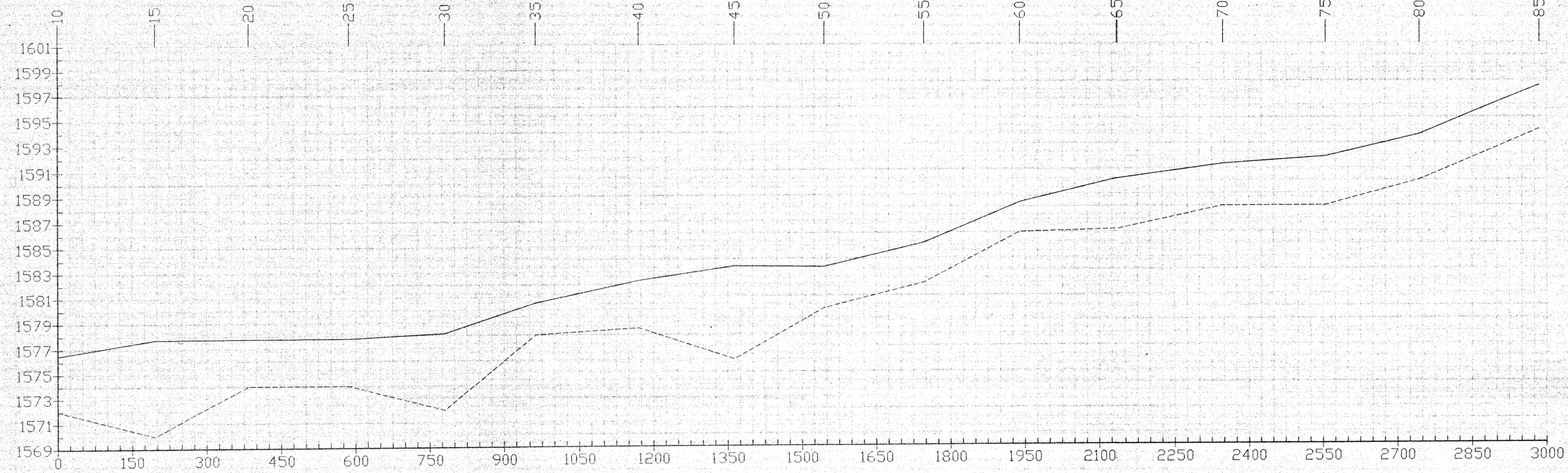
ABBOTT AND PULSIPHER WASHES FIS RESTUDY

PULSIPHER WASH

PROFILE OF MAIN CHANNEL

SHEET
PR1
OF 1 SHTS

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NOTES

HORIZONTAL SCALE 1" = 100'
VERTICAL SCALE 1" = 4'

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING,
BY NEVADA AERIAL MAPPING, FLOWN JANUARY 14, 1998
CONTOUR INTERVAL 2 FEET SOUTH OF I-15

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING,
BY OLYMPUS AERIAL SURVEYS, INC, FLOWN JULY 14, 1997 AND AUGUST 26, 1997
CONTOUR INTERVAL 1 FOOT NORTH OF I-15

FILE: PRO-I15.DWG

FLOODING SOURCE: PULSIPHER WASH
MESQUITE, CLARK COUNTY, NEVADA

ELEVATION REFERENCE MARKS

REFERENCE MARK	PROJECT DATUM ELEVATION (FEET)	DESCRIPTION OF LOCATION
2114	1642.91	Hafen, 4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash.
650	1560.72	T-160, Description of benchmark not available. Located south of Virgin River approximately 1,300 feet east and 4200 feet south of Pulsipher Street and Leavitt Lane intersection.
2114	1642.91	Hafen, 4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash.

PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.89 FEET

LEGEND

- CHANNEL INVERT
- COMPUTED WATER SURFACE ELEVATION
- 2700 HYDRAULIC BASELINE DISTANCE
- 70 SECTION NUMBER

DESIGN: M.A.
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ISSUE DATE: 11/12/09
ISSUE EDITOR:
PLOT DATE: 11-14-00
PLOT TIME: 09:02:45
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REV	DATE	DESCRIPTION	DATE	GEN. APP	DATE	CONST. APP	DATE

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2399

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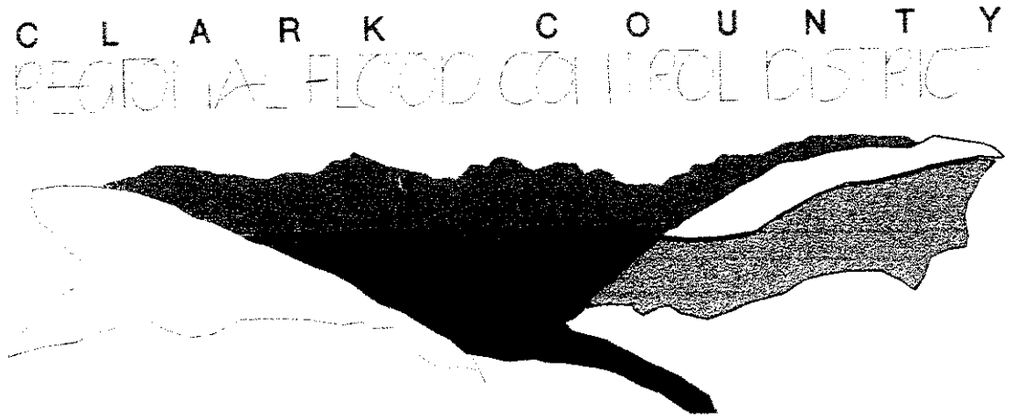
ABBOTT, AND PULSIPHER WASHES FIS RESTUDY

PULSIPHER WASH

PROFILE OF I-15 BREAKOUT

SHEET
PR2
OF SHTS

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DRAFT
ABBOTT AND PULSIPHER WASHES FIS RESTUDY

TECHNICAL SUPPORT DATA NOTEBOOK
Volume II of II

Mesquite, Clark County, Nevada

Submitted by: Clark County Regional Flood Control District

Study Contractor: G. C. Wallace, Inc.

Date Submitted: October 1998

G. C. WALLACE, INC.
Engineering/Architecture

G.C. WALLACE, INC.
Engineering/Architecture

LETTER OF TRANSMITTAL

To: Primas and Associates
1091 S. Cimarron Road, Suite A-3
Las Vegas, NV 89128

Attention: Matt Lawson

Date: 10/5/99

Project No.: 550.035

Subject: ***Abbott and Pulsipher Washes Flood Insurance Study Restudy***

X	Herein	*VIA* X	Hand Delivery		Federal Express		First Class Mail
	Returned		Other		UPS		MDS

One (1) copy - Workmap for Pulsipher Wash South of I-15 Reach
One (1) copy - Cross Section Exhibit for Pulsipher Wash South of I-15 Reach
One (1) copy - Letter from Kevin Eubanks received 10/5/99

These items are submitted:

X	At your request		For your action
	For your approval		For your files
	For your review and comments		For your information

Acknowledgment of receipt:

			Received by:
	Not required		Date:
	Acknowledgment required		Time:

Remarks: The information provided is preliminary. Please read the attached letter from Kevin Eubanks from the Clark County Regional Flood Control District. If you have any questions or need additional information, please do not hesitate to contact me at 804-2000.

Very truly yours,

G. C. WALLACE, INC.

By: Mike Ludwig

Michael J. Ludwig, E.I.

Copies to: Calvin Black, GCW
Jerry Pruitt, GCW
Kevin Eubanks, CCRFCD

1555 SOUTH RAINBOW BLVD. / LAS VEGAS, NEVADA 89146 / TELEPHONE: (702) 804-2000 / FAX: (702) 804-2299

DRAFT

550.035

September 30, 1999

Ms. Sheila M. Norlin
Michael Baker Jr., Inc.
3601 Eisenhower Avenue, Suite 600
Alexandria, VA 22304

Subject: Abbott and Pulsipher Washes
Flood Insurance Study Restudy

Dear Ms. Norlin:

The purpose of this letter is to address the subject review comments received by our office via a letter dated July 21, 1999. The review comments are address individually as follows:

Pulsipher Wash

Comment: "1. Please submit a revised topographic work map that shows detailed water-surface elevation information and floodplain boundary delineations for the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) along Pulsipher Wash for the reach of the wash for which detailed flood hazard information is shown on effective FIRM Panel 32003C0386 D, dated August 16, 1995. The reach of Pulsipher Wash for which detailed flood hazard information is not shown on the effective FIRM may be approximately delineated as a Special Flood Hazard Area (SFHA) designated Zone A, an area that would be inundated by the base flood with no base floor elevations (BFEs) determined. Please also submit hydraulic analyses, reflecting current site conditions, of the flood having a 0.2-percent chance of being equaled or exceeded in any given year and the regulatory

floodway, and revise the submitted topographic work map along the detailed reach to show the boundary delineations of the 0.2-percent-annual-chance floodplain and the regulatory floodway. The revised base and 0.2-percent-annual-chance floodplain boundary delineations must tie into the effective floodplain boundary delineations at the downstream end of the revised reach. The scale and topographic definition of the work maps must be sufficient to provide reasonable accuracy and must include the locations and alignments of road crossings, culverts, corporate and study limits, and all cross sections used in the submitted hydraulic analyses. The work maps must include the datum to which all elevations are referenced and must be certified by a registered professional engineer."

Response: Kevin Eubanks to respond.

Comment: "2. If the proposed floodway boundary delineations shown on the revised topographic work map differ from those shown on FIRM Panel 32003C0386 D, please submit a copy of the public notice distributed by the City of Mesquite stating its intent to revise the floodway, or a statement by the community that it has notified all affected property owners and affected adjacent jurisdictions. Please submit a letter stating that the community will adopt and enforce the modified floodway."

Response: Kevin Eubanks to respond.

Comment: "3. The submitted HEC-2 model for the main channel of Pulsipher Wash contains a 33-percent error between the assumed and computed values of the split flow that occurs to the west between Cross Sections 2000 and 2100. Please revise this model to resolve the discrepancy between

the assumed and computed values. It is unclear from the information submitted what effect this split flow will have on the flood hazards to property located west of Pulsipher Wash. Please either submit documentation to demonstrate that floodwater escaping Pulsipher Wash at this location will not create a flood hazard to downstream property during the base flood, or revise the submitted topographic work maps to show the boundary delineations of the resulting SFHA. This SFHA may be approximately delineated and designated Zone A."

Response: The revised 100-year floodplain was based on the results of the HEC-2 output from model PULSREV7.OUT. This model does not contain a 33-percent error between the assumed and computed values of the split flow that occurs to the west between Cross Sections 2000 and 2100. However, a 33-percent error on the split flow calculation was found in the supplementary HEC-2 model output, PULSREV8.OUT, between Cross Sections 2000 and 2100 as noted. This model was used solely to delineate the tie-in location of the revised 100-year floodplain into the effective 100-year floodplain of the Virgin River by adding cross-sections downstream of the limit of study. The 33-percent error was eliminated by increasing the number of iterations in the split flow calculations from 20 to 40. A copy of the revised HEC-2 model output, PULSREV8.OUT, is attached.

Approximately 1,268 cfs will break out from the main channel at Cross Section 2000. Cross Section 2000 is located at the upstream face of the I-15 culvert. The breakout flow will drain approximately 4,500 feet west along I-15. Existing culverts under I-15 will drain the breakout flow south into a golf course channel which will convey the flow to the Virgin River. The breakout flow will not return to the Pulsipher Wash. There have been no significant improvements to the I-15 culvert since the previous mapping. Therefore, the hydraulics of the

culvert and breakout occur as they did under the previous mapping. Hence, the breakout at the I-15 culvert is considered outside the limit of study. However, this flow split may be analyzed in a future study.

Comment: "4. It appears from the submitted topographic work maps that floodwater along the west overbank of Pulsipher Wash may cross Hafen Lane and flow south. Please submit either revised hydraulic analyses of the base and 0.2-percent-annual-chance floods along the west overbank that include this additional split flow, or documentation to demonstrate that it will not occur. It is unclear from the information submitted what effect this split flow will have on the flood hazards to property downstream of Hafen Lane. Please either submit documentation to demonstrate that the split flow to the south across Hafen Lane will not create a flood hazard to downstream property, or revise the submitted topographic work maps to show the base and 0.2-percent-annual-chance floodplain boundary delineations that result from this flow."

Response: Review of the Hafen Lane improvement plans and topographic information, which were completed after our analysis, support this concern. Hafen Lane does not appear to be sufficiently elevated to direct all of the flow at the left (west) overbank back to the culvert. Therefore, the west side of the area designated Zone A is extended south of Hafen Lane to Cross Section 200. Note that this extension ties-in well with the previous mapping of the area. The area south of Cross Section 200 is considered outside the limit of study. The revised Workmap and Cross Section Exhibit for Pulsipher Wash South of I-15 are attached.

Comment: "5. *Please either revise the submitted* topographic work maps to show revised boundary delineations of the base and 0.2-percent-annual-

chance floodplains for the split-flow area between Cross Sections 1200 and 1300 along the west side of Pulsipher Wash, or submit documentation to demonstrate that this portion of the west overbank will not be inundated during the base and 0.2-percent-annual-chance floods."

Response: The split flow stations are located at the left (west) channel banks of Cross Section 1200 and Cross Section 1300. Therefore, the split flow between these sections will be conveyed within the left overbanks. The proposed Zone A delineation has been revised to reflect the flow split occurring between Cross Sections 1200 and 1300 in the west overbank. The revised Workmap and Cross Section Exhibit for Pulsipher Wash South of I-15 are attached.

Comment: "6. Please submit information to demonstrate how the base floodplain boundary along the east overbank of Pulsipher Wash was delineated between Cross Sections 500 and 600 and how floodwater along the east overbank will return to the main channel."

Response: Review of the Hafen Lane improvement plans and topographic information, which were completed after our analysis, support this concern. Hafen Lane does not appear to be sufficiently elevated to direct all of the flow at the right (east) overbank back to the culvert. Instead, the flow will overtop Hafen Lane and will continue to flow south. Therefore, the Right Overbank HEC-2 model has been extended to include the area south of Hafen Lane. The right overbank will convey approximately 123 cfs. Additionally, the Right Overbank HEC-2 model indicates that the depth of flow will be less than 1-foot during the 100-year storm event. Therefore, the area delineated as Shaded Zone X at the right (east) overbank has been extended south of Hafen Lane and tied into the

effective floodplain south of Cross Section 200. The revised Right Overbank HEC-2 model is attached.

Comment: "7. *Please either revise the bridge data in the BT and X2 records of the submitted HEC-2 model of the main channel of Pulsipher Wash to match the bridge data form the effective Flood Insurance Study (FIS) report at Interstate Highway 15 (I-15) and Hafen Lane (Second Street South), or submit documentation to demonstrate that the bridge data used in the submitted HEC-2 model are correct. Please either revise the model to include First Street South and the two elevated crossings upstream of Cross Sections 600 and 2300, or submit documentation to demonstrate why these crossings should not be modeled. Please submit as-built plans, certified by a registered professional engineer, for the crossings."*

Response: Survey field notes of the I-15 culvert (12-foot wide by 10-foot high RCB) are included. The data used in the special bridge routine of the HEC-2 model matches the data in the survey field notes for the I-15 culvert. It was initially assumed and later confirmed that I-15 will not be overtopped at this location. Therefore, BT cards were not inserted into the model to determine overtopping.

An exhibit is included which shows the survey data used in the special bridge routine of the HEC-2 model for the Hafen Lane culvert (3- 12.1-foot wide by 4.1-foot high RCB's). Please note that the open area of the culvert input into the SB card of the HEC-2 model was reduced from 152.81 square feet to 147.38 square feet to reflect the survey data. The revised HEC-2 model is attached.

First Street South is not an elevated crossing upstream of Cross Section 1600. The cross-section geometry in the HEC-2 model reflects a dip section without

a culvert at this location. Therefore, no revision to the HEC-2 model is recommended.

Cross Section 600 is located at the upstream face of the Hafen Lane culvert. Review of the Hafen Lane improvement plans and topographic information indicate that an irrigation pipe culvert is located to the west side of the box culvert and will be maintained. However, this pipe culvert was not designed to carry storm flows. Therefore, the pipe culvert was not modeled as a conveyance area.

There is an elevated crossing upstream of Cross Section 2300 with a culvert. This is a temporary culvert crossing with limited capacity and maintenance. It was assumed that the culvert will have no capacity during the 100-year storm event. In order to eliminate the conveyance area below the elevated crossing, additional cross sections have been inserted into the HEC-2 model at Cross Sections 2330 and 2350. Cross Section 2350 was inserted on top of the elevated crossing. The revised HEC-2 model, Workmap, and Cross Section Exhibit for Pulsipher Wash North of I-15 are attached.

Comment: "8. The submitted HEC-2 model of the main channel of Pulsipher Wash uses expansion and contraction coefficient values of 0.3 and 0.1, respectively, for the entire modeled reach. Appendix III of the *HEC 2 User's Manual*, dated September 1990 states that where transitions are gradual, typical expansion and contraction coefficient values are 0.3 and 0.1, respectively; at typical bridge sections they are 0.5 and 0.3, respectively, and at abrupt transitions they are 0.8 and 0.6, respectively. Please either revise the HEC-2 model to use typical expansion and contraction coefficient values in the vicinity of abrupt flow expansions

and contractions, or submit data to substantiate the use of atypical values."

Response: The contraction and expansion coefficients used in the HEC-2 model have been changed from 0.1 and 0.3 to 0.3 and 0.5, respectively, at Cross Sections 500, 600, 700, 1900, 2000, and 2100. Revision of the contraction and expansion coefficients will raise the computed water surface at the I-15 culvert, thereby increasing the amount of flow which will split out at I-15 from 1,239 cfs to 1,267 cfs during the 100-year event. Consequently, there will be less flow in the main channel downstream of I-15 than there was before this revision. The decreased flow will lower the computed water surface elevations in the main channel which will reduce the amount of flow breaking out downstream of I-15. Flow in the Right Overbank Model will decrease from 130 cfs to 123 cfs during the 100-year storm event. Additionally, the total flow in the Left Breakout Model will decrease from 1,503 cfs to 1,481 cfs during the 100-year storm event. The affected HEC-2 models have been revised to reflect the new flow rates. The revised HEC-2 models, Workmaps, and Cross Section Exhibits are attached. These revisions did not significantly alter the flood hazard boundaries for the 100-year storm event.

Comment: "9. Please resolve the discrepancies between the reach lengths used in the HEC-2 model for the main channel of Pulsipher Wash and the distances shown on the topographic work maps for Cross sections 3800, 4100, 4200, 4400, and 4600. Please resolve the discrepancies between the base floodplain topwidths computed in the HEC-2 model and the topwidths shown on the work maps at Cross Sections 1500 and 3100. In addition, comparison of the HEC-2 model and the work maps revealed that the SFHA includes a portion of ground at Cross Section 3300 that

is higher than the BFE. Please either revise the work maps or submit documentation to resolve this concern."

Response: Reach lengths used in the HEC-2 model have been checked and revised for Cross Sections 3800, 4100, 4200, 4400, and 4600. The table below summarizes the revisions made to the reach lengths. The revised HEC-2 model is attached.

Reach Length Comparison Table						
Sta.	Left Overbank (ft)		Right Overbank (ft)		Channel (ft)	
(ft)	Submittal	Revised	Submittal	Revised	Submittal	Revised
3800	450.85	480	719.16	713	663.43	666
4100	521.36	535	359.17	356	489.47	497
4200	284.44	285	293.14	297	388.31	402
4400	432.86	432	440.55	439	479.82	476
4600	507.76	488	227.33	278	435.19	442

The proposed 100-year floodplain at Cross Sections 1500 and 3100 has been revised to reflect the correct topwidths generated by the HEC-2 model. The revised Workmaps and Cross Section Exhibits for Pulsipher Wash North and South of I-15 are attached.

The elevated area at Cross Section 3300 will become a small island during the 100-year storm event. This area is considered subject to flood hazards. Therefore, it is included in the proposed 100-year floodplain. Consequently, the topwidth reflected on the proposed 100-year floodplain is greater than the topwidth indicated in the HEC-2 model.

Comment: "10. Please either revise the left and right encroachment stations at Cross Sections 1600, 1750, 2200, 2900, 3000, and 4700 of the HEC-2 model for the main channel to eliminate ineffective flow areas, or submit

documentation to demonstrate that the encroachment stations in the model are correct."

Response: Cross section plots are included for Cross Sections 1600, 1750, 2200, 2900, 3000, and 4700 to show conveyance areas, ineffective flow areas, and encroachment stations.

In general, the HEC-2 models do not use overbank areas for conveyance until channel bank elevations are exceeded. This is accomplished by using the X3 card.

After further review of Cross Sections 1600 and 1750, it was determined that the 100-year water surface elevations will be below the elevations required for overbank conveyance. Therefore, the X3 cards have been removed from the HEC-2 model. Please keep in mind that it is common to still see floodplain in these kind of overbank areas due solely on backwater effects.

Water in the right (east) overbank of Cross Section 2200 will be the result of a backwater effect from the I-15 culvert. The conveyance area at the right (east) overbank will be ineffective up to elevation 1,598 feet. See the cross section.

The Workmap and Cross Section Exhibit for the Pulsipher Wash North of I-15 indicate that a small tributary wash is located at the left (west) overbank of Cross Section 2900. Although this low area appears on the cross section, it does not contribute to the conveyance area of the Pulsipher Wash during a 100-year storm event. Therefore, the conveyance area at the left (west) overbank of Cross Section 2900 is ineffective and the floodplain shown in this area is attributed to backwater effects.

An encroachment station does not exist at Cross Section 3000. The left (west) overbank will convey flow only when the water surface elevation exceeds 1,620 feet.

The Cross Section Exhibit for the Pulsipher Wash North of I-15 indicates that a small tributary wash is located at the right (east) overbank of Cross Section 4700. Although this low area appears on the cross section, it does not contribute to the conveyance area of the Pulsipher Wash during a 100-year storm event. Therefore, the conveyance area at the right (east) overbank of Cross Section 4700 is ineffective and the floodplain shown in this area is attributed to backwater effects.

Abbott Wash

Comment: "1. Please either revise the bridge data in the BT and X2 records of the submitted HEC-2 model for Abbott Wash to match the bridge data from the effective FIS report at I-15, or submit documentation to demonstrate that the bridge data used in the submitted HEC-2 model are correct. Please either revise the left and right encroachment stations in the HEC-2 model of Abbott Wash to eliminate ineffective flow areas in the vicinity of the I-15 bridge, or submit documentation to demonstrate that the encroachment stations in the model are correct. Please resolve the discrepancy between the base floodplain topwidths computed in the HEC-2 model and the topwidths shown on the work maps in the vicinity of I-15. Please submit documentation to demonstrate how floodwater that weirs over I-15 will reenter the Abbot Wash channel downstream of I-15."

Response: Survey field notes of the I-15 culvert (12-foot wide by 8-foot high RCB) are included. The data used in the special culvert routine of the HEC-2 model matches the data in the survey field notes for the I-15 culvert. An exhibit is included which shows the survey data for the I-15 culvert. Area outside of the culvert opening will be ineffective flow area meaning that no water can pass from this section to the next downstream section in this area as is standard practice for a bridge or culvert. Therefore, the left and right encroachment stations are justified. The floodplain shown in this area is attributed to backwater effects.

The topwidths delineated on the Workmap and Cross Section Exhibit for Abbott Wash North of I-15 have been revised to match the topwidths indicated in the HEC-2 output of model ABTCHN13.OUT. The revised Workmap and Cross Section Exhibit for Abbott Wash North of I-15 are attached.

Also, the effective FIRM currently shows overtopping of I-15 at the Abbott Wash culvert. There have been no significant improvements to the I-15 culvert since the previous mapping. Therefore, the hydraulics of the culvert and overtopping occur as they did under the previous mapping. Therefore, the tie-in location of the proposed 100-year floodplain to the effective 100-year floodplain has been moved to the upstream face of the I-15 culvert. Note that this ties-in well with the previous mapping of the area. The revised Workmap and Cross Section Exhibit for Abbott Wash North of I-15 are attached.

Comment: "2. Please either revise the HEC-2 model for Abbott Wash to include the two elevated crossings upstream of Cross Sections 1012 and 1067, or submit documentation to demonstrate why these crossings should not be modeled. Please submit as-built plans certified by a registered professional engineer, for the crossings."

Response: The elevated crossing upstream of Cross Section 1012 is a culvert located at Cross Section 1015. This is a temporary culvert crossing with limited capacity and maintenance. It was assumed that the culvert will have no capacity during the 100-year storm event. In order to eliminate the conveyance area below the elevated crossing, Cross Section 1015 has been revised to reflect the lowest elevation of 1,619 feet. The revised HEC-2 model, Workmap, and Cross Section Exhibit for Abbott Wash North of I-15 are attached.

There is an elevated crossing upstream of Cross Section 1067 with a culvert. This is a temporary culvert crossing with limited capacity and maintenance. It was assumed that the culvert will have no capacity during the 100-year storm event. In order to eliminate the conveyance area below the elevated crossing, an additional cross section has been inserted into the HEC-2 model at Cross Section 1069. Cross Section 1069 was inserted on top of the elevated crossing. The revised HEC-2 model, Workmap, and Cross Section Exhibit for Abbott Wash North of I-15 are attached.

Comment: "3. Please either revise the left and right encroachment stations in the HEC-2 model of Abbott Wash to eliminate ineffective flow areas at Cross Sections 1035, 1067, 1070, 1080, 1085, 1100, 1110, and 1112, or submit documentation to demonstrate that the encroachment stations in the model are correct."

Response: Cross section plots are included for Cross Sections 1035, 1067, 1070, 1080, 1085, 1100, 1110, and 1112 to show conveyance areas, ineffective flow areas, and encroachment stations.

In general, the HEC-2 models do not use overbank areas for conveyance until channel bank elevations are exceeded. This is accomplished by using the X3 card.

The left (east) encroachment station for Cross Section 1035 is used to eliminate the conveyance area of a lake. The lake is assumed to be full during the 100-year storm event.

The left encroachment station for Cross Section 1067 is necessary to confine flow in the channel up to ground elevation 1,638 feet. The 100-year water surface elevation at Cross Section 1067 will be slightly above 1,638 feet, as indicated in the HEC-2 output. Therefore, the water in the left overbank will be predominantly due to a backwater effect, although some amount of water will spill over and be conveyed by the left overbank. The cross section output and the floodplain delineation shown on the Workmap and Cross Section Exhibit for Abbott Wash North of I-15 reflect the water in the left (east) overbank at Cross Section 1067. The plot of Cross Section 1067 has been revised to match the HEC-2 model, ABTCHN13.DAT. The revised cross section plot is attached.

The right (west) encroachment station for Cross Section 1070 has been removed. This area will become an effective conveyance area only if the water surface elevation reaches 1,643 feet. The 100-year water surface elevation at Cross Section 1070 will be approximately 3 feet below the right encroachment elevation. However, the left (east) encroachment station will confine flow in the channel up to ground elevation 1,639 feet. The 100-year water surface elevation at Cross Section 1070 will be slightly above 1,639 feet, as indicated in the HEC-2 output. Water in the left overbank will be predominantly due to a backwater effect, although some amount of water will spill over and be conveyed by the left overbank. The cross section output and the floodplain

delineation shown on the Workmap and Cross Section Exhibit for Abbott Wash North of I-15 reflect the water in the left overbank at Cross Section 1070.

The right (west) encroachment station for Cross Section 1080 is necessary to confine flow in the channel up to ground elevation 1,640 feet. The 100-year water surface elevation at Cross Section 1080 will be slightly above 1,640 feet, as indicated in the HEC-2 output. Water in the right overbank will be predominantly due to a backwater effect, although some amount of water will spill over and be conveyed by the right overbank. The cross section output and the floodplain delineation on the Workmap and Cross Section Exhibit for Abbott Wash North of I-15 reflect the water in the right overbank for Cross Section 1080.

The left (east) encroachment station for Cross Section 1085 has been removed. This area will become an effective conveyance area only if the water surface elevation reaches 1653 feet. The 100-year water surface elevation at Cross Section 1085 will be well below the left encroachment elevation. The right (west) encroachment station is necessary to confine flow in the channel up to ground elevation 1,644 feet. The 100-year water surface elevation at Cross Section 1085 will be below 1,644 feet, as indicated in the HEC-2 output. The cross section output and the floodplain delineation on the Workmap and Cross Section Exhibit for Abbott Wash North of I-15 are justified in confining the 100-year flow within the channel.

The Workmap and Cross Section Exhibit for the Abbott Wash North of I-15 indicate that small tributary washes are located at the left (west) and right (east) overbanks of Cross Section 1100. Although these low areas appear on the cross section, they do not contribute to the conveyance area of the Abbott Wash during a 100-year storm event. Therefore, the conveyance area at the

left (west) and right (east) overbanks of Cross Section 1100 are ineffective and the floodplain shown in these areas are attributed to backwater effects.

The right (west) encroachment station for Cross Section 1110 is required to confine the flow to the channel up to ground elevation 1,651 feet. Although the tributary washes at the right overbank drop to a ground elevation of 1,649 feet, the flow in the channel will not utilize this conveyance area until the water surface elevation reaches 1,651 feet. Therefore, the encroachment is justified.

Encroachment stations do not exist for Cross Section 1112. However, an encroachment is located at Cross Section 1115. The right (west) encroachment station is required to confine the flow to the channel up to ground elevation 1,653 feet. Although the tributary washes at the right overbank drop to a ground elevation of 1,645.5 feet, the flow in the channel will not utilize this conveyance area until the water surface elevation reaches 1,653 feet. Therefore, the right (west) encroachment station of Cross Section 1115 is justified.

Comment: "4. Please resolve the discrepancy between the reach lengths used in the HEC-2 model for Abbott Wash and the distances shown on the topographic work maps for Cross Sections 1152 and 1155. Comparison of the HEC-2 model and work maps revealed that the SFHA includes a portion of ground at Cross Section 1105 that is higher than the BFE. Please either revise the work maps or submit documentation to resolve this concern."

Response: Reach lengths used in the HEC-2 model have been checked and revised for Cross Sections 1152 and 1155. The table below summarizes the revisions made to the reach lengths. The revised HEC-2 model is attached.

Reach Length Comparison Table						
Sta.	Left Overbank (ft)		Right Overbank (ft)		Channel (ft)	
(ft)	Submittal	Revised	Submittal	Revised	Submittal	Revised
1152	46.1	87	97.1	99	128	125
1155	173.8	91	160.6	63	213.4	64

The right (west) encroachments have been removed for Cross Sections 1105 and 1110. These encroachments were removed because Cross Section 1112, upstream of Cross Section 1110, will have flow in the right overbank during the 100-year storm event. Therefore, it is expected that Cross Sections 1105 and 1110 will also have flow in the right overbank during the 100-year storm event. The elevated area at Cross Section 1105 will become a small island during the 100-year storm event. This area is considered to be subject to flood hazard. Therefore, it was included in the revised 100-year floodplain.

Comment: "5. Please submit revised topographic work maps for Abbott Wash to resolve the concerns outlined above. The work maps must include the locations and alignments of road crossings, culverts, corporate and study limits and all cross sections used in the submitted hydraulic analyses. The revised base floodplain boundary delineations must tie into the effective floodplain boundary delineations at the downstream end of the revised reach. The scale and topographic definition of the revised work maps must be sufficient to provide reasonable accuracy. The work maps must include the datum to which all elevations are referenced and must be certified by a registered professional engineer."

Response: All information in support of the responses and revisions are attached.

If you have any questions or need additional information, please do not hesitate to contact us at (702) 804-2000.

Very truly yours,

G. C. WALLACE, INC.

Michael J. Ludwig, E.I.
Designer

Jerry E. Pruitt, P.E.
Project Manager

MJL:sjl

Encl.

550-035

Federal Emergency Management Agency

Washington, D.C. 20472

JUL 21 1999

Mr. Kevin L. Eubanks, P.E.
Assistant General Manager
Clark County Regional Flood
Control District
600 South Grand Central Parkway, Suite 300
Las Vegas, NV 89106-4511

IN REPLY REFER TO:
Case No.: 99-09-457P
Community: City of Mesquite, Nevada
Community No.: 320035

316-AD

Dear Mr. Eubanks:

This is in reference to your February 4, 1999, request for a revision to the Flood Insurance Rate Map for the above-referenced community. In our earlier letter to you, we indicated additional data might be required to complete our review of the request. The data required to complete our review, which must be submitted within 90 days of the date of this letter, are listed on the enclosed summary.

For identification purposes, you must include the case number referenced above on all correspondence.

If we do not receive the required data within 90 days, we will suspend our processing of your request. Any data submitted after 90 days will be treated as an original submittal and will be subject to all submittal/payment procedures, including the flat review and processing fee for requests of this type established by the revised fee schedule that became effective on March 1, 1999. A copy of the notice summarizing the revised fee schedule, which was published in the *Federal Register,* is enclosed for your information.

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

If you have any questions regarding this matter, please contact Mr. Max Yuan of our staff in Washington, DC, either by telephone at (202) 646-3843 or by facsimile at (202) 646-4596.

Sincerely,

Matthew B. Miller

Matthew B. Miller, P.E., Chief
Hazards Study Branch
Mitigation Directorate

Enclosure(s)

cc: Mr. J. Allen Bell, P.E.
Director of Public Works
City of Mesquite

Mr. Jerry E. Pruitt, P.E.
Project Manager
G. C. Wallace, Inc.

Summary of Additional Data Required to Support a
Revision to Flood Insurance Rate Map (FIRM)

Case No.: 99-09-457P

Requester: Mr. Kevin L. Eubanks, P.E.

Community: City of Mesquite, Nevada

Community No.: 320035

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

Pulsipher Wash

1. Please submit a revised topographic work map that shows detailed water-surface elevation information and floodplain boundary delineations for the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) along Pulsipher Wash for the reach of the wash for which detailed flood hazard information is shown on effective FIRM Panel 32003C0386 D, dated August 16, 1995. The reach of Pulsipher Wash for which detailed flood hazard information is not shown on the effective FIRM may be approximately delineated as a Special Flood Hazard Area (SFHA) designated Zone A, an area that would be inundated by the base flood with no base flood elevations (BFEs) determined. Please also submit hydraulic analyses, reflecting current site conditions, of the flood having a 0.2-percent chance of being equaled or exceeded in any given year and the regulatory floodway, and revise the submitted topographic work map along the detailed reach to show the boundary delineations of the 0.2-percent-annual-chance floodplain and the regulatory floodway. The revised base and 0.2-percent-annual-chance floodplain boundary delineations must tie into the effective floodplain boundary delineations at the downstream end of the revised reach. The scale and topographic definition of the work maps must be sufficient to provide reasonable accuracy and must include the locations and alignments of road crossings, culverts, corporate and study limits, and all cross sections used in the submitted hydraulic analyses. The work maps must include the datum to which all elevations are referenced and must be certified by a registered professional engineer.

2. If the proposed floodway boundary delineations shown on the revised topographic work map differ from those shown on FIRM Panel 32003C0386 D, please submit a copy of the public notice distributed by the City of Mesquite stating its intent to revise the floodway, or a statement by the community that it has notified all affected property owners and affected adjacent jurisdictions. Please submit a letter stating that the community will adopt and enforce the modified floodway.

3. The submitted HEC-2 model for the main channel of Pulsipher Wash contains a 33-percent error between the assumed and computed values of the split flow that occurs to the west between Cross Sections 2000 and 2100. Please revise this model to resolve the discrepancy between the assumed and computed values. It is unclear from the information submitted what effect this split flow will have on the flood hazards to property located west of Pulsipher Wash. Please either submit documentation to demonstrate that floodwater escaping Pulsipher Wash at this location will not create a flood hazard to downstream property during the base flood, or revise the submitted topographic work maps to show the boundary delineations of the resulting SFHA. This SFHA may be approximately delineated and designated Zone A.

4. It appears from the submitted topographic work maps that floodwater along the west overbank of Pulsipher Wash may cross Hafen Lane and flow south. Please submit either revised hydraulic analyses of the base and 0.2-percent-annual-chance floods along the west overbank that include this additional split flow, or documentation to demonstrate that it will not occur. It is unclear from the information submitted what effect this split flow will have on the flood hazards to property downstream of Hafen Lane. Please either submit documentation to demonstrate that the split flow

demonstrate that the encroachment stations in the model are correct. Please resolve the discrepancy between the base floodplain topwidths computed in the HEC-2 model and the topwidths shown on the work maps in the vicinity of I-15. Please submit documentation to demonstrate how floodwater that weirs over I-15 will reenter the Abbott Wash channel downstream of I-15.

2. Please either revise the HEC-2 model for Abbott Wash to include the two elevated crossings upstream of Cross Sections 1012 and 1067, or submit documentation to demonstrate why these crossings should not be modeled. Please submit as-built plans, certified by a registered professional engineer, for the crossings.

3. Please either revise the left and right encroachment stations in the HEC-2 model of Abbott Wash to eliminate ineffective flow areas at Cross Sections 1035, 1067, 1070, 1080, 1085, 1100, 1110, and 1112, or submit documentation to demonstrate that the encroachment stations in the model are correct.

4. Please resolve the discrepancy between the reach lengths used in the HEC-2 model for Abbott Wash and the distances shown on the topographic work maps for Cross Sections 1152 and 1155. Comparison of the HEC-2 model and work maps revealed that the SFHA includes a portion of ground at Cross Section 1105 that is higher than the BFE. Please either revise the work maps or submit documentation to resolve this concern.

5. Please submit revised topographic work maps for Abbott Wash to resolve the concerns outlined above. The work maps must include the locations and alignments of road crossings, culverts, corporate and study limits, and all cross sections used in the submitted hydraulic analyses. The revised base floodplain boundary delineations must tie into the effective floodplain boundary delineations at the downstream end of the revised reach. The scale and topographic definition of the revised work maps must be sufficient to provide reasonable accuracy. The work maps must include the datum to which all elevations are referenced and must be certified by a registered professional engineer.

Please submit a diskette containing input and output files for all computer models used in the revised hydraulic analyses.

Please send the required data directly to our Technical Evaluation Contractor at the following address:

Michael Baker Jr., Inc.
3601 Eisenhower Avenue, Suite 600
Alexandria, Virginia 22304

Attention: Ms. Sheila M. Norlin
(703) 317-3054

For identification purposes, you must include the case number referenced above on all correspondence.

Need Information on FEMA FLOOD HAZARD MAPS?

CONTACT 1-877-FEMA MAP

(Toll Free 1-877-336-2627)

NFIP
National Flood Insurance Program
Administered by FEMA

This release is intended to acquaint the public with the Federal Emergency Management Agency's new toll-free number established to respond to questions regarding National Flood Insurance Program (NFIP) Flood Hazard maps, including:

- How do I go about getting a Letter of Map Amendment (LOMA)? A Letter of Map Revision Based on Fill (LOMR-F)? A Letter of Map Revision (LOMR)?
- What is the status of my request for a LOMA? LOMR-F? Study?
- How long does it take to get the map revised?
- Did FEMA receive my request for a Letter of Map Amendment?
- I was just told by my lender that my house is in a floodplain and I need flood insurance, what are my options?
- Was a LOMA ever issued for my property?
- Has the National Flood Insurance Program Flood Hazard map for my community been revised?

The following procedures have been established by FEMA for changing and correcting the NFIP Flood Hazard maps. They are: Letters of Map Amendment (LOMAs), Letters of Map Revision(LOMRs), Letters of Map Revision Based on Fill (LOMR-Fs), and Physical Map Revisions.

As a result of numerous requests for revisions or corrections to the NFIP Flood Hazard maps, FEMA has assigned a dedicated staff of trained professionals to respond to the public's requests for information on the procedures to revise or correct the NFIP Flood Hazard maps.

If you have any questions regarding the NFIP Flood Hazard maps or need current information and facts on FEMA Mapping Procedures, call 1-877-FEMA-MAP.

Below are additional Toll-Free numbers that can be used to obtain other information regarding the NFIP and its products.

- For information about the NFIP's Preferred Risk Policy, ask your insurance agent or company, or call the NFIP's toll-free number at 1-800-427-9662.

- For any current FEMA publications, call FEMA's Publication Center at 1-800-480-2520.

- For answers to flood insurance related questions, call the National Flood Insurance Telephone Response Center at 1-800-427-4661.

- For ordering printed copies of effective NFIP Flood Hazard maps and related documents, call the FEMA Map Service Center at 1-800-358-9616.

Additional information on flood insurance and other FEMA programs and activities is available on the FEMA World Wide Web Site (http://www.FEMA.gov) and from FEMA's 24-hour-FAX-on-Demand system at (202) 646-FEMA. TDD# 1-800-427-5593.

Edition 1.0 2/25/99

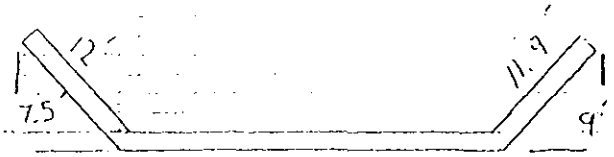
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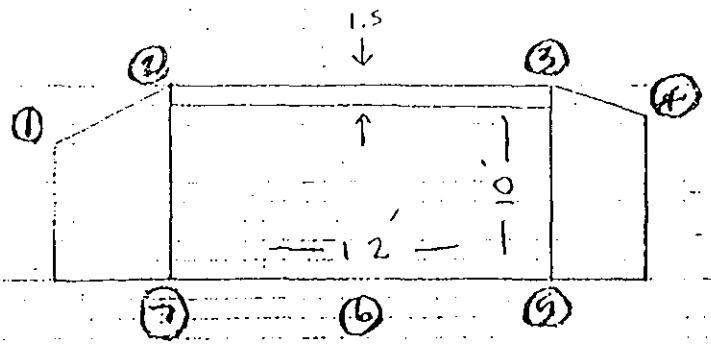
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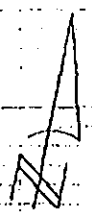
PULSIPHER WASH

MESQUITE FLOOD STUDY
TIES TO REINFORCED CONCRETE
BOX
PULSIPHER WASH AND I-15

NORTH END







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1827
1526

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W. LINDER
1-12-98

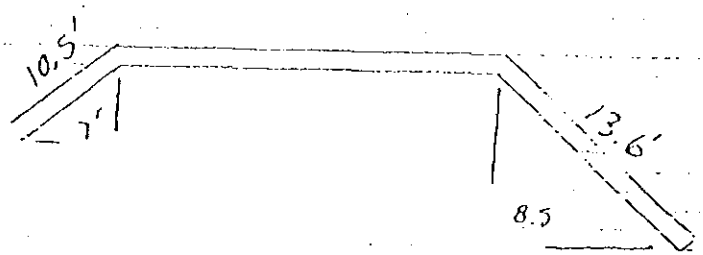
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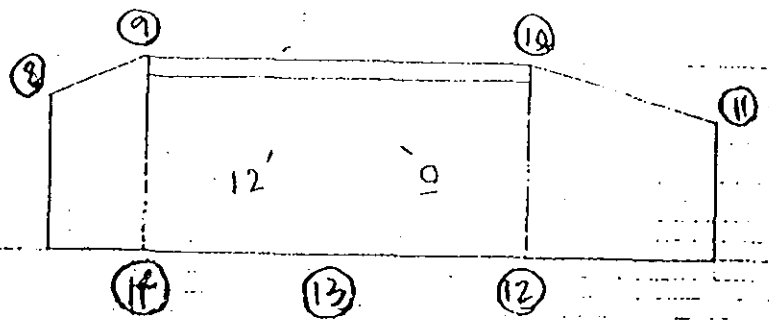
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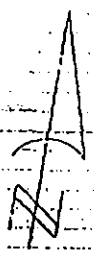
220 (BUS TANK) CP PUMPHOUSE

221 (PUB TANK) CP BRIDGE

51-89 [illegible]







PULSIPHER ROD 1-15
NORTHSIDE

STA	+	HI	−	ELEV	(SEE SKETCH) DESCRIPTION
TOP HW				1600.62	TOP HEADWALL (NORTHSIDE FREEWAY)
T	1.13	1601.75			
			4.71	1597.04	①
			1.14	1600.61	②
			1.07	1600.68	③
			4.79	1596.96	④
			12.76	1588.99	⑤
			12.87	1588.88	⑥
			12.93	1588.82	⑦
			5.80	1595.95	50'N + 24'E TOP OF WASH
			11.94	1589.81	50'N + 9'E TOE OF WASH
			11.86	1589.89	50'N + 9'W " " "
			5.92	1595.83	50'N + 25'W TOP OF WASH
				1600.62	
TOP HW					
T	6.96	1607.58			
			3.75	1603.83	33'S + ℄ WASH EDGE PAVEMENT
			5.07	1602.51	33'S + 50'W " "
			6.37	1601.21	33'S + 100'W " "
			2.15	1605.43	33'S + 50'E " "
			0.68	1606.90	33'S + 100'W " "

PULSIPHER AND I-15
SOUTHSIDE

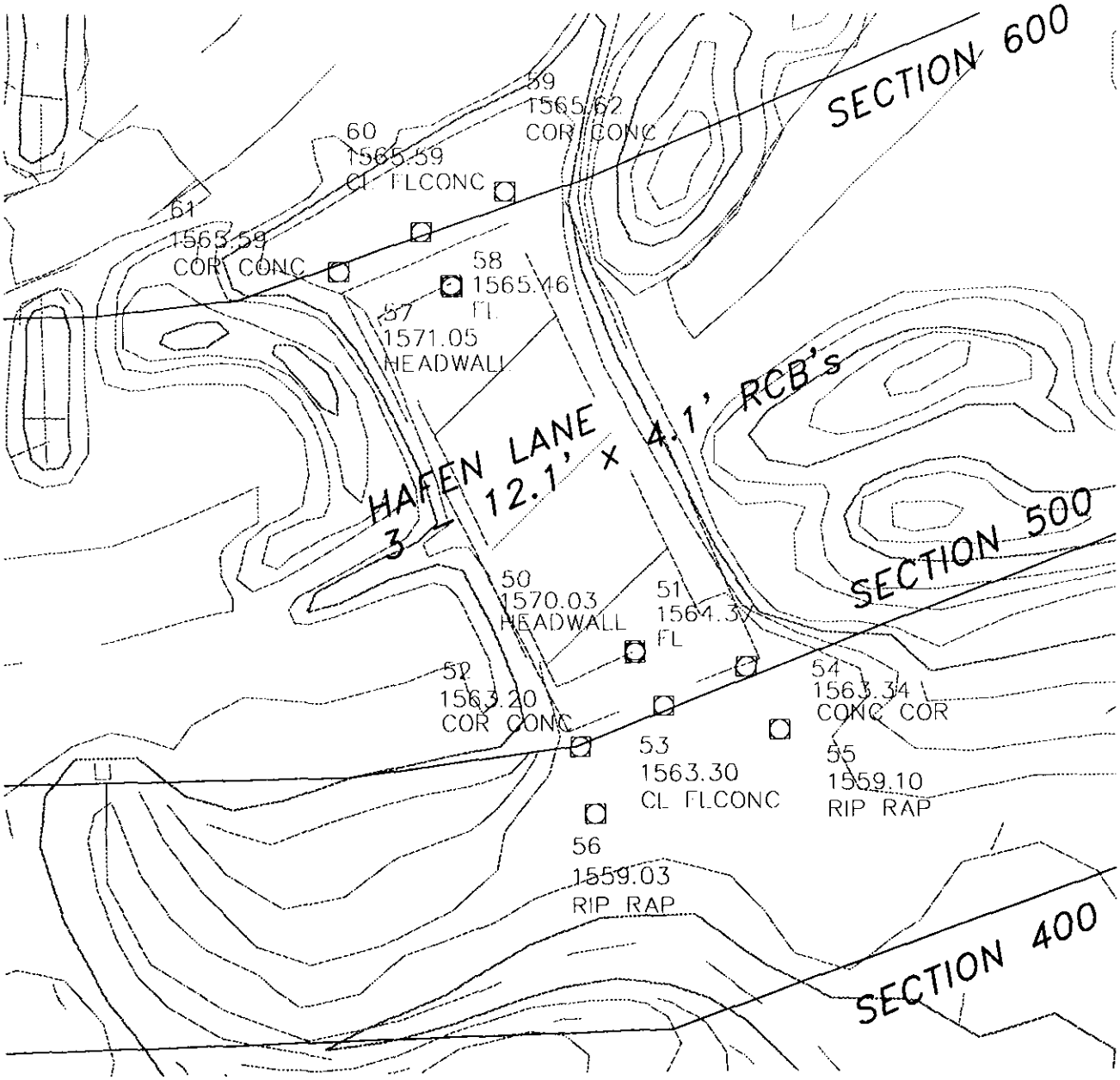
STA	+	HI	−	ELEV	(SEE SKETCH) DESCRIPTION
TOP HW				1593.89	
⊼	6.57	1600.46			
			12.25	1588.21	⑧
			6.59	1593.87	⑨
			6.69	1593.77	⑩
			10.21	1590.25	⑪
			18.34	1582.12	⑫
			18.27	1582.19	⑬
			18.26	1582.20	⑭
			1.40	1599.06	60'S + 30' W TOP WASH
			16.55	1583.91	60'S + 6.5' W TOE WASH
			16.02	1584.44	60'S + 7' E " "
			9.76	1590.70	60'S + 25' E TOP WASH
			1.52	1598.94	33' N + ℄ WASH EDGE PAVEMENT
			0.77	1599.69	33' N + 50' E " "
			0.13	1600.33	33' N + 100' E " "
			2.27	1598.19	33' N + 50' W " "
			2.97	1597.49	33' N + 100' W " "

PULSIPHER AND HAFEN

NORTHSIDE

STA	+	HI	-	ELEV	DESCRIPTION
CPWASH				1572.28	
T	5.92	1578.20			
			5.00	1573.20	50'N + 25.5 E TOP WASH
			12.12	1566.08	50'N + 9.5 E TOE WASH
			17.81	1566.39	50'N + 17.5 W " "
			5.94	1572.26	50'N + 29.5 W TOP WASH
			5.54	1572.66	35'S + ℄ WASH — ℄ ROAD
			5.53	1572.67	35'S + 25'W " "
			5.33	1572.87	35'S + 50'W " "
			5.13	1573.07	35'S + 75'W " "
			5.54	1572.66	35'S + 25'E " "
			5.29	1572.91	35'S + 50'E " "
			5.06	1573.14	35'S + 75'E " "

EXHIBIT
HAFEN LANE BRIDGE
SURVEY DATA



GRAPHIC SCALE

40 0 20 40

(IN FEET)

1 inch = 40 ft.

NORTH

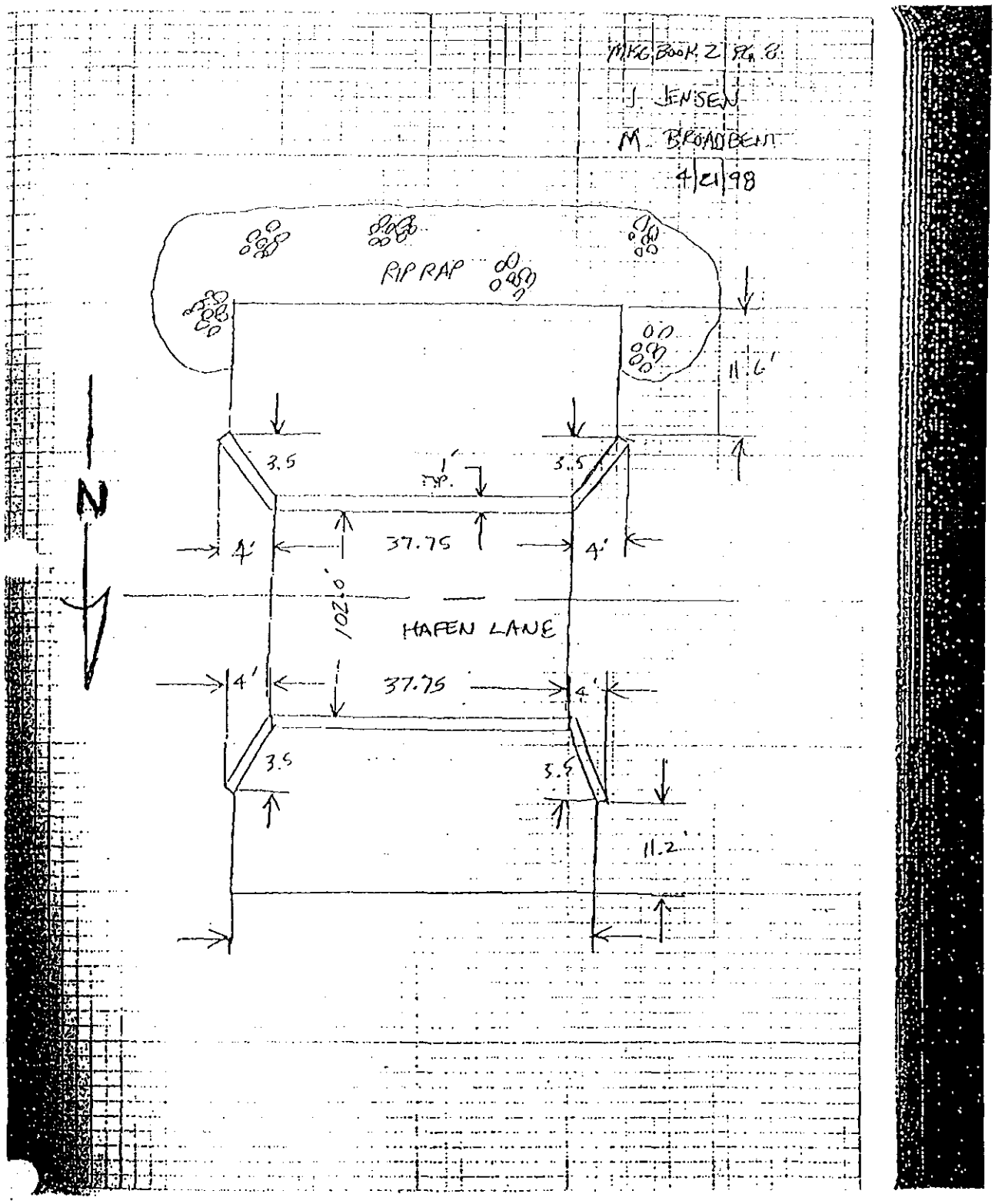
1" = 40'

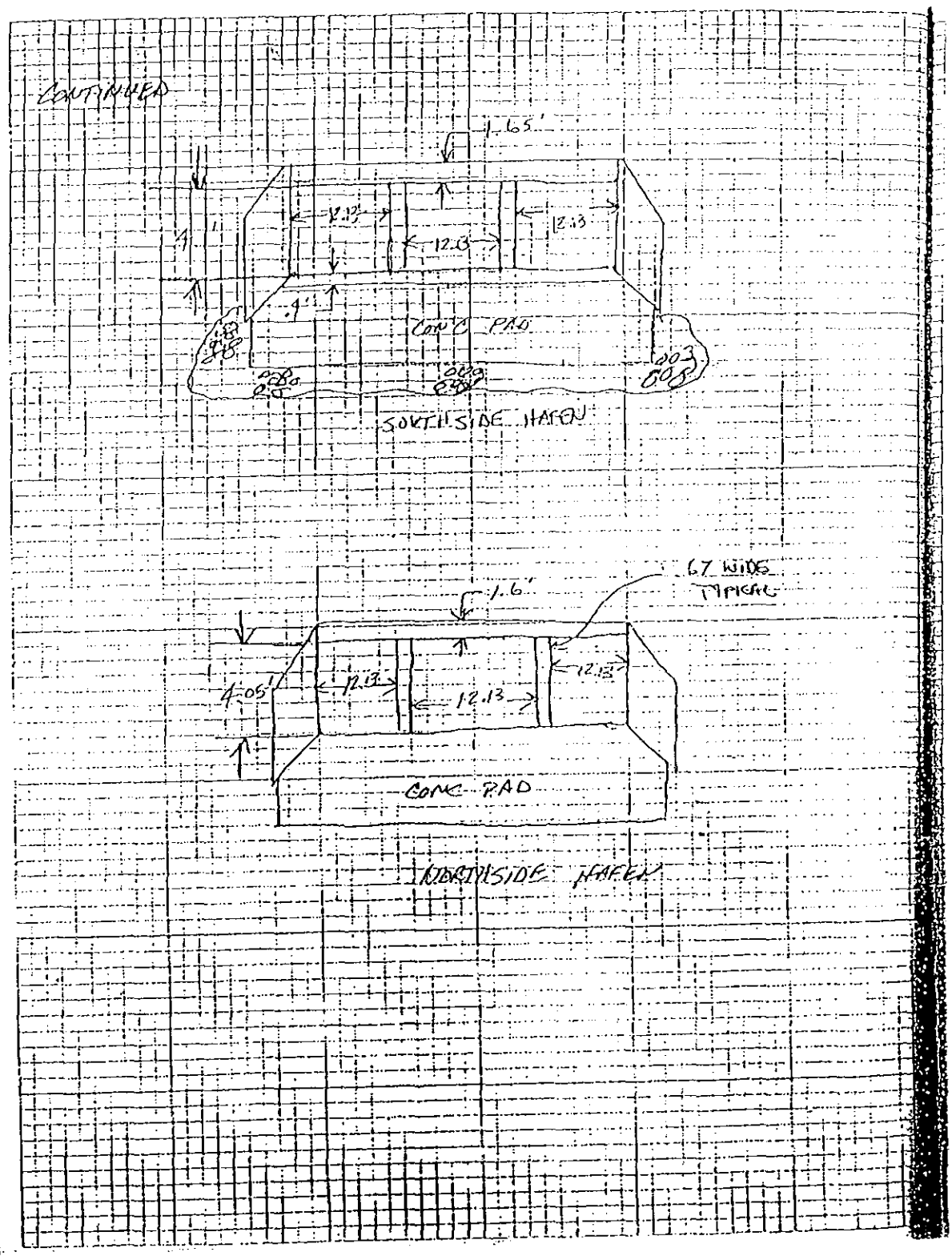
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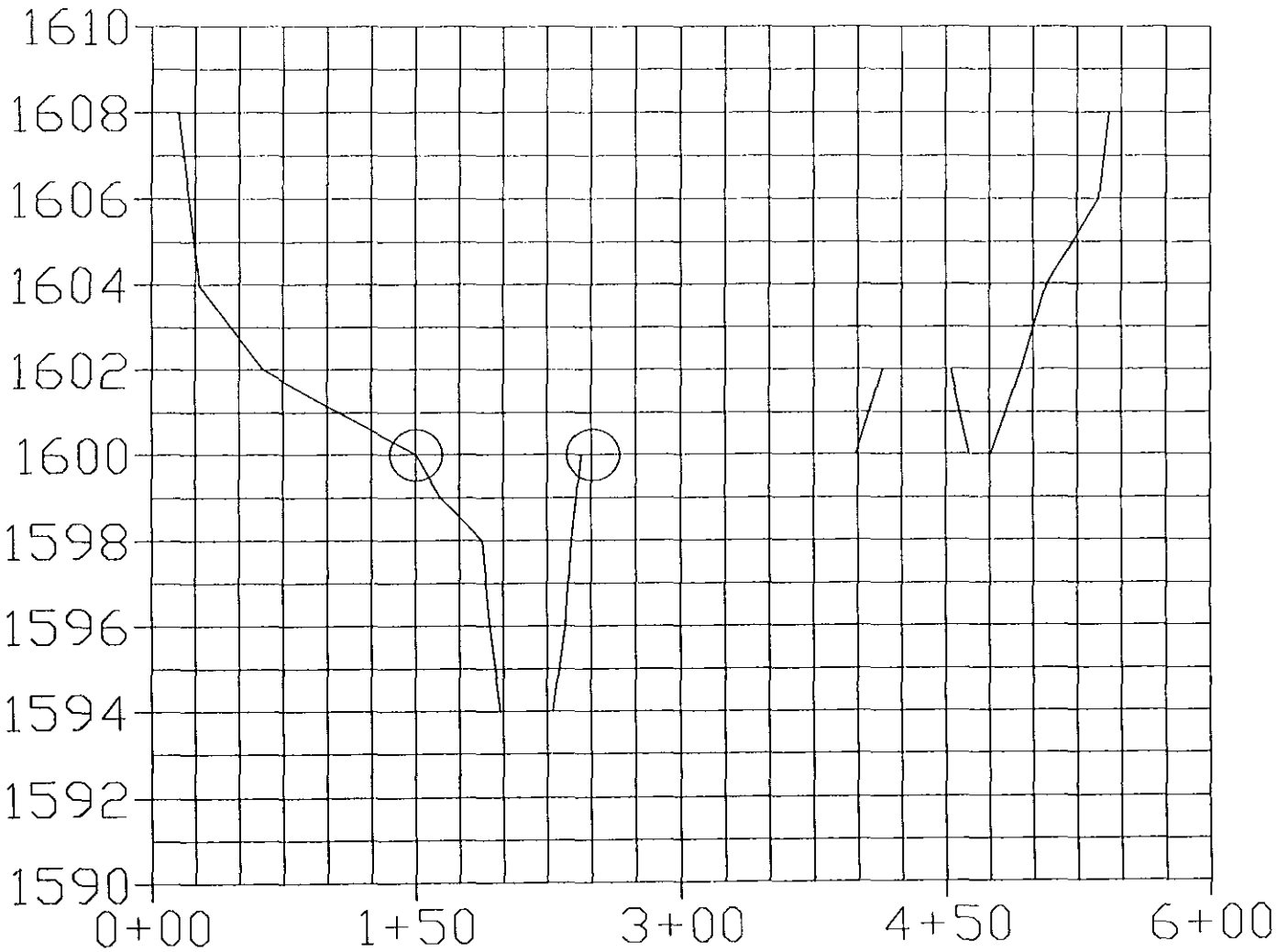
PULSIPHER AND HAFEN

NORTHSIDE

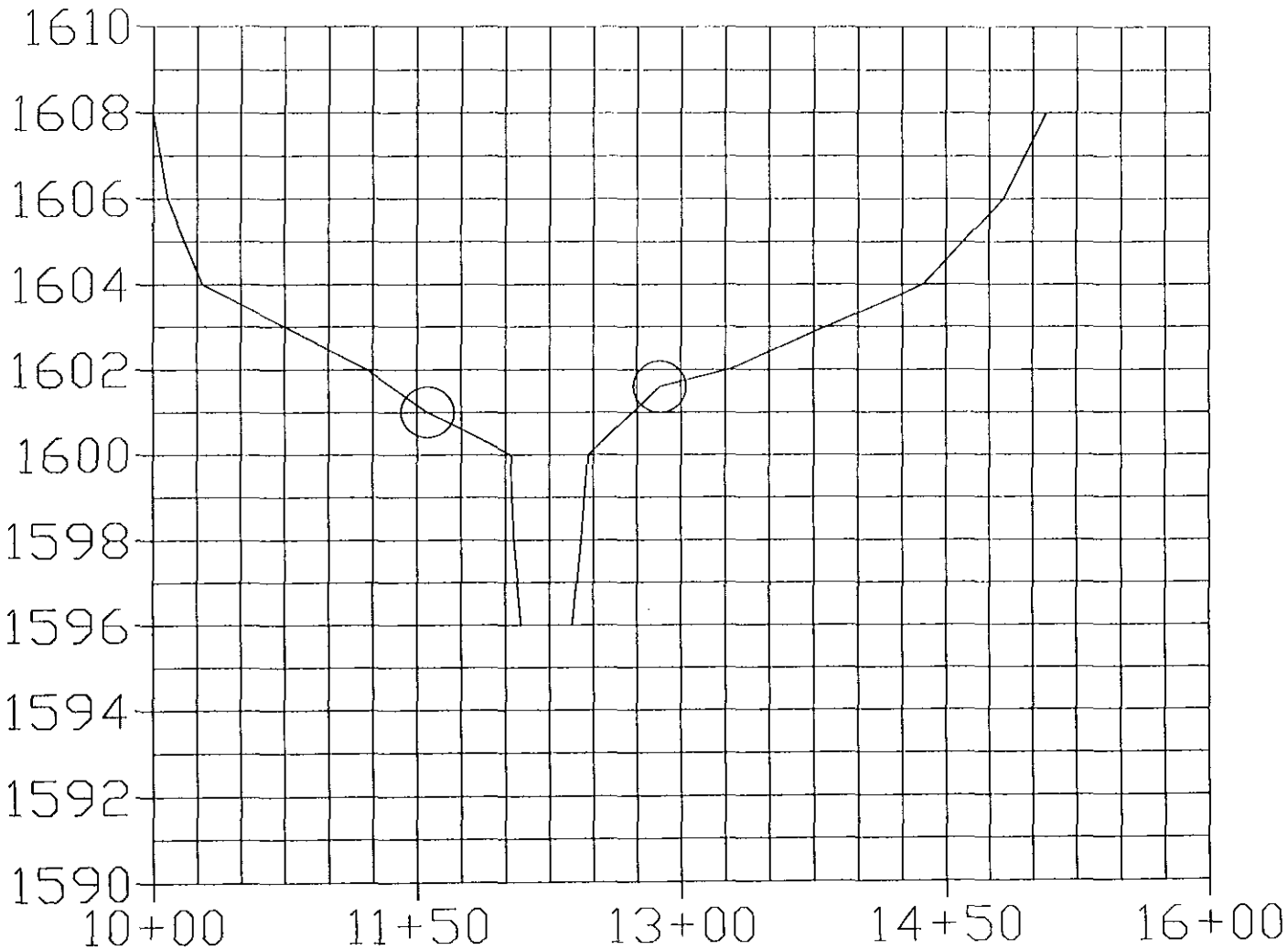
STA	+	HI	-	ELEV	DESCRIPTION
CP WASH				1572.28	
T	5.92	1578.20			
			5.00	1573.20	50'N + 25.5 E TOP WASH
			12.12	1566.08	50'N + 9.5 E TOE WASH
			11.81	1566.39	50'N + 17.5 W " "
			5.94	1572.26	50'N + 29.5 W TOP WASH
			5.54	1572.66	35'S + ℄ WASH — ℄ ROAD
			5.53	1572.67	35'S + 25'W " "
			5.33	1572.87	35'S + 50'W " "
			5.13	1573.07	35'S + 75'W " "
			5.54	1572.66	35'S + 25'E " "
			5.29	1572.91	35'S + 50'E " "
			5.06	1573.14	35'S + 75'E " "


MKG BOOK 2 PG. 8.
J. JENSEN
M. BROADBENT
4/21/98
RIP RAP
11.6'
3.5
TYP.
3.5
N
4'
37.75
4'
102.0'
HAFEN LANE
4'
37.75
4'
3.5
3.5
11.2'

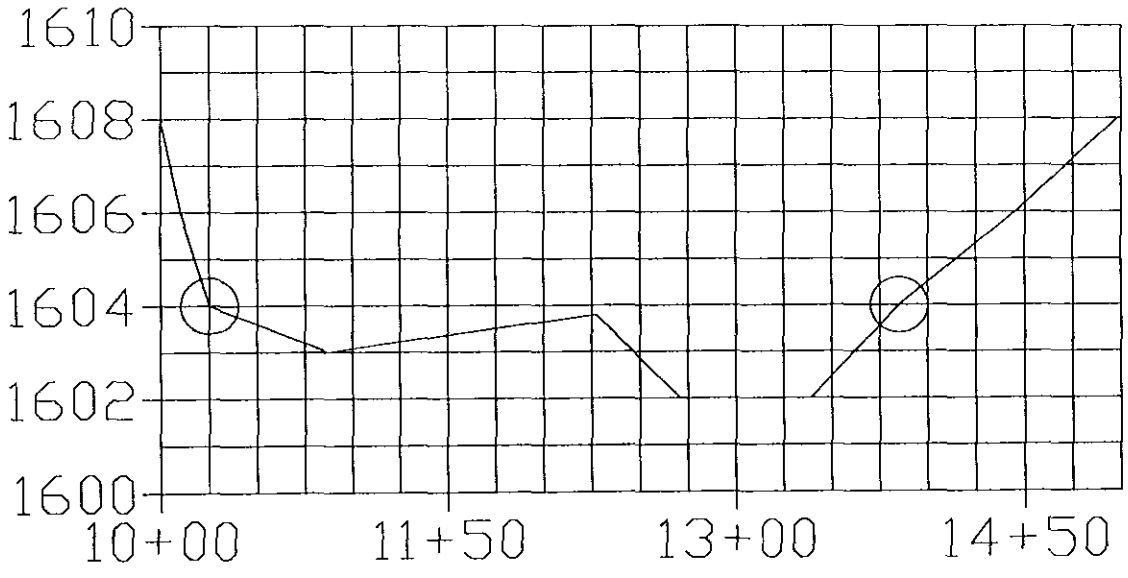

CONTINUED
1.65'
12.13
12.13
12.13
.9'
CONC PAD
SOUTHSIDE HAFEN
1.6'
6.7 WIDE
TYPICAL
4.05'
12.13
12.13
12.13
CONC PAD
NORTHSIDE HAFEN


1610
1608
1606
1604
1602
1600
1598
1596
1594
1592
1590
0+00
1+50
3+00
4+50
6+00

2300


1610
1608
1606
1604
1602
1600
1598
1596
1594
1592
1590
10+00
11+50
13+00
14+50
16+00

2330

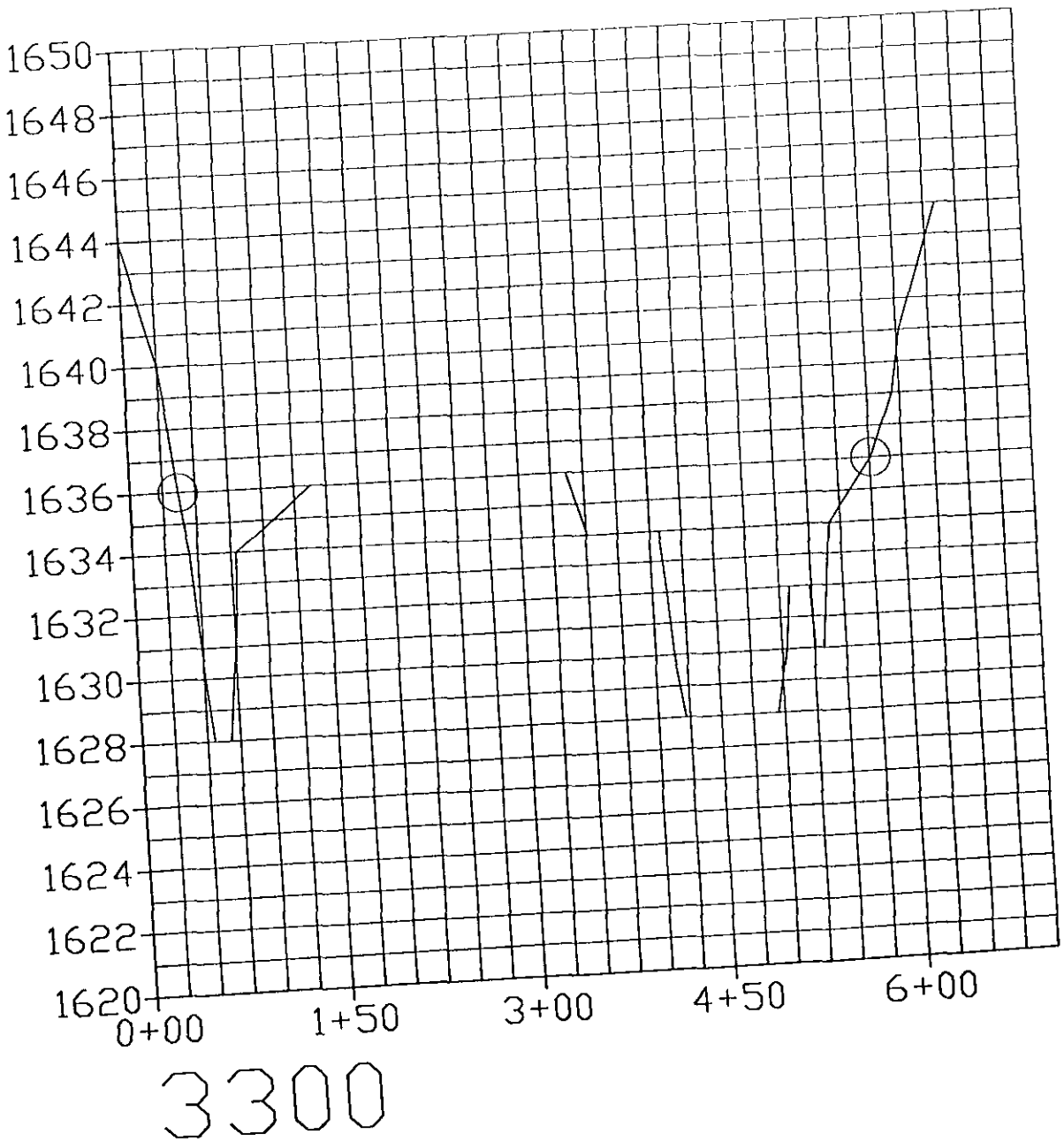


2350

BACKUP INFORMATION FOR

RESPONSE TO COMMENT 9

PULSIPHER WASH


1650
1648
1646
1644
1642
1640
1638
1636
1634
1632
1630
1628
1626
1624
1622
1620
0+00
1+50
3+00
4+50
6+00

3300

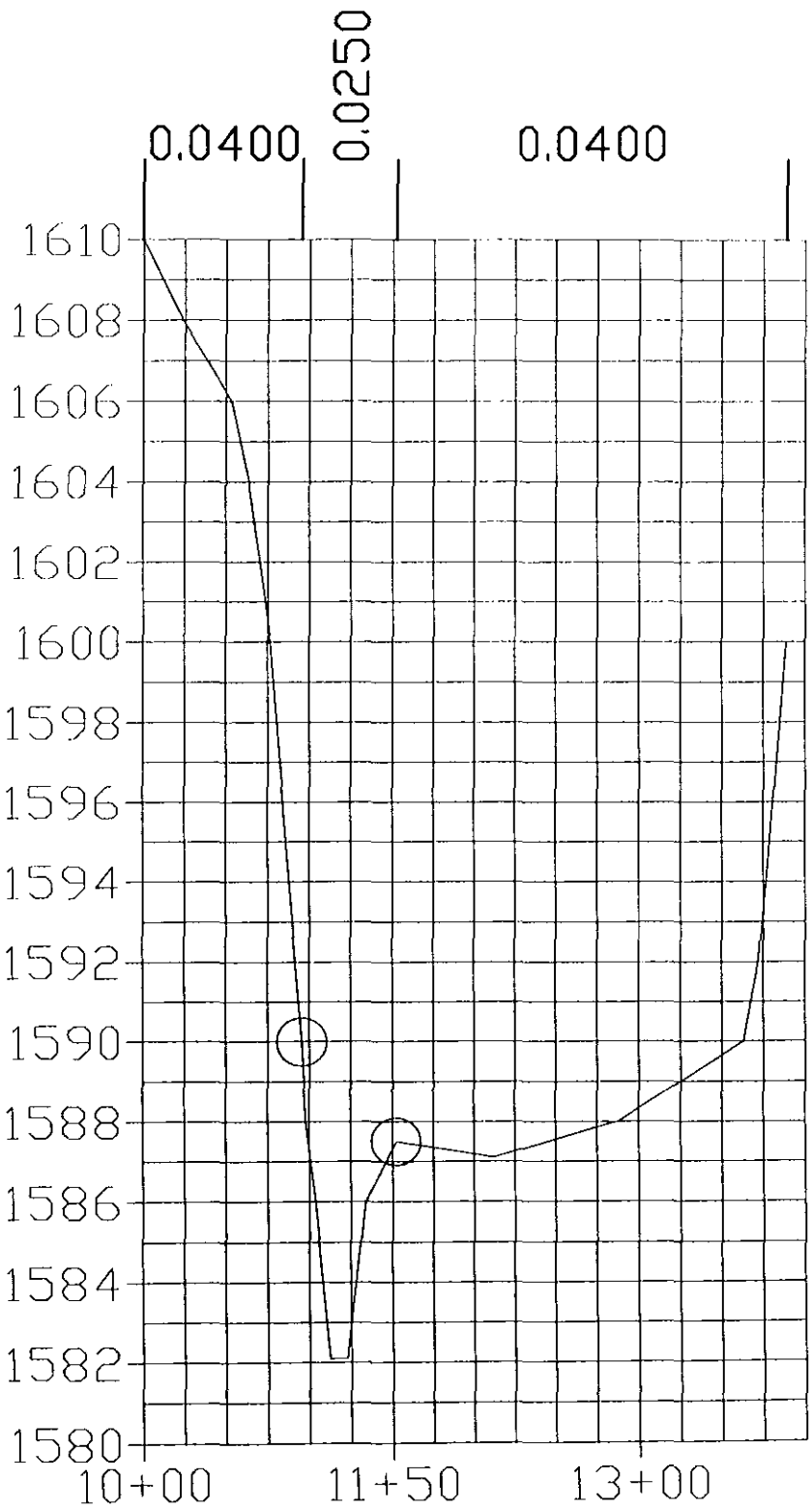
BACKUP INFORMATION FOR

RESPONSE TO COMMENT 10

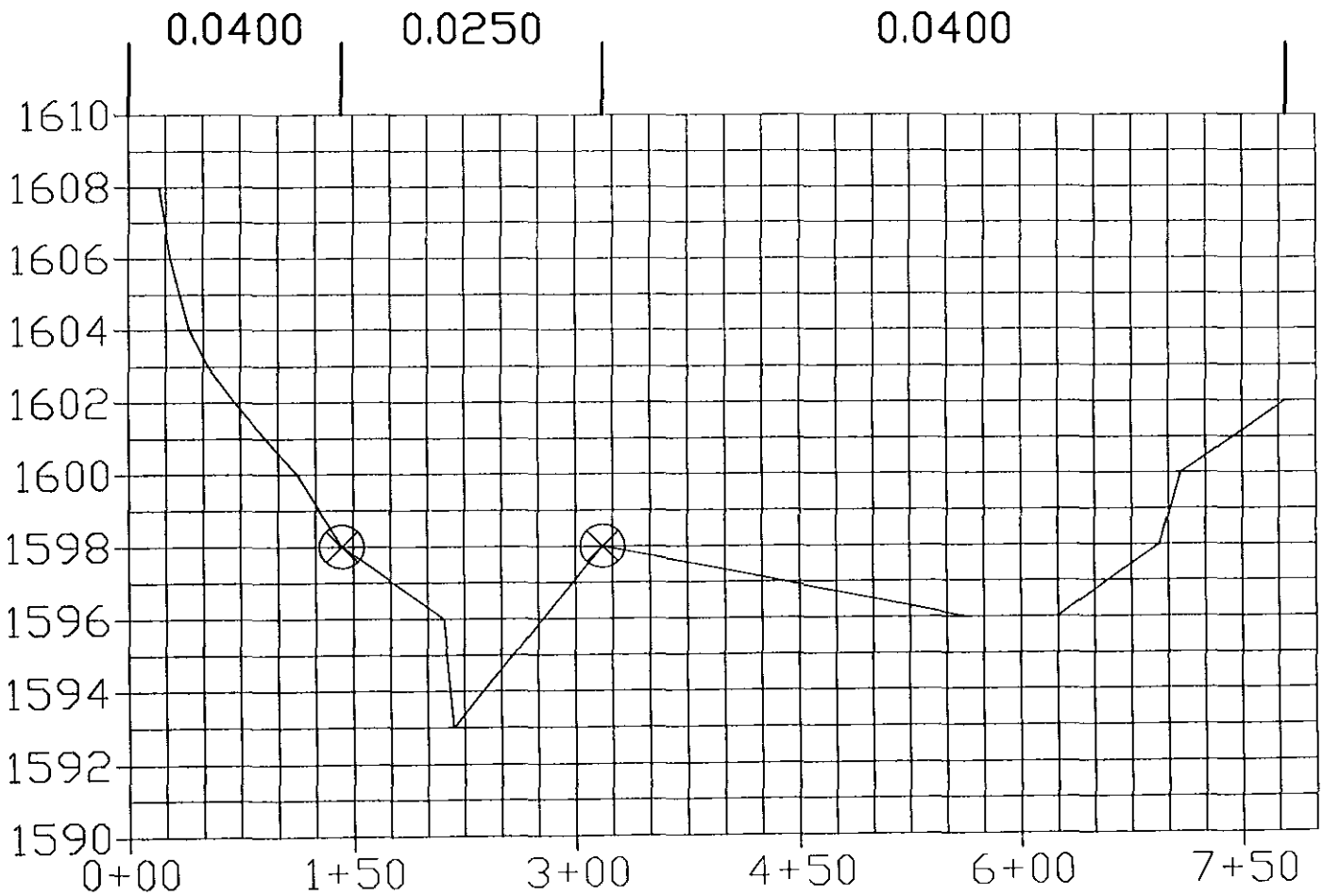
PULSIPHER WASH


1610
1608
1606
1604
1602
1600
1598
1596
1594
1592
1590
1588
1586
1584
1582
1580
10+00
11+50
13+00
14+50
16+00

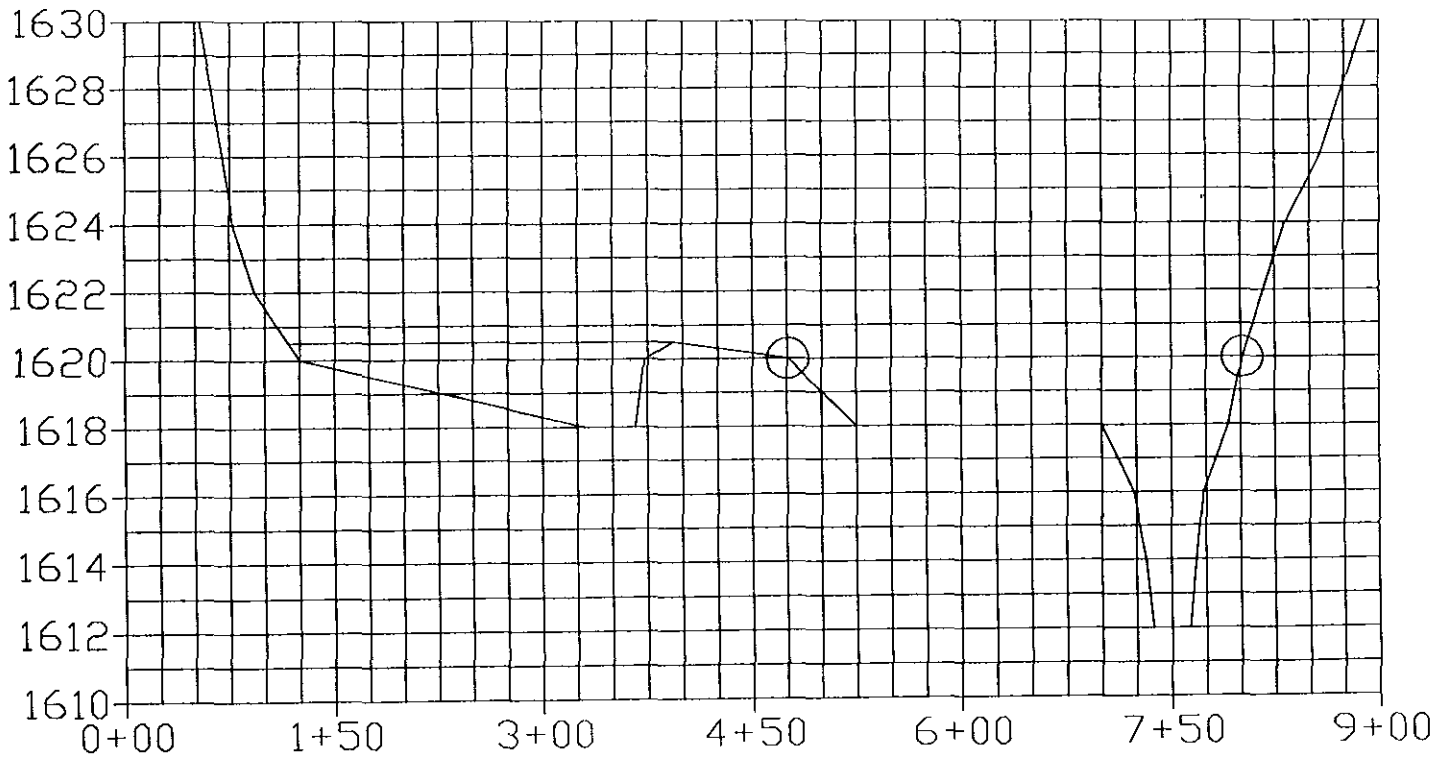
1600


0.0400
0.0250
0.0400
1610
1608
1606
1604
1602
1600
1598
1596
1594
1592
1590
1588
1586
1584
1582
1580
10+00
11+50
13+00

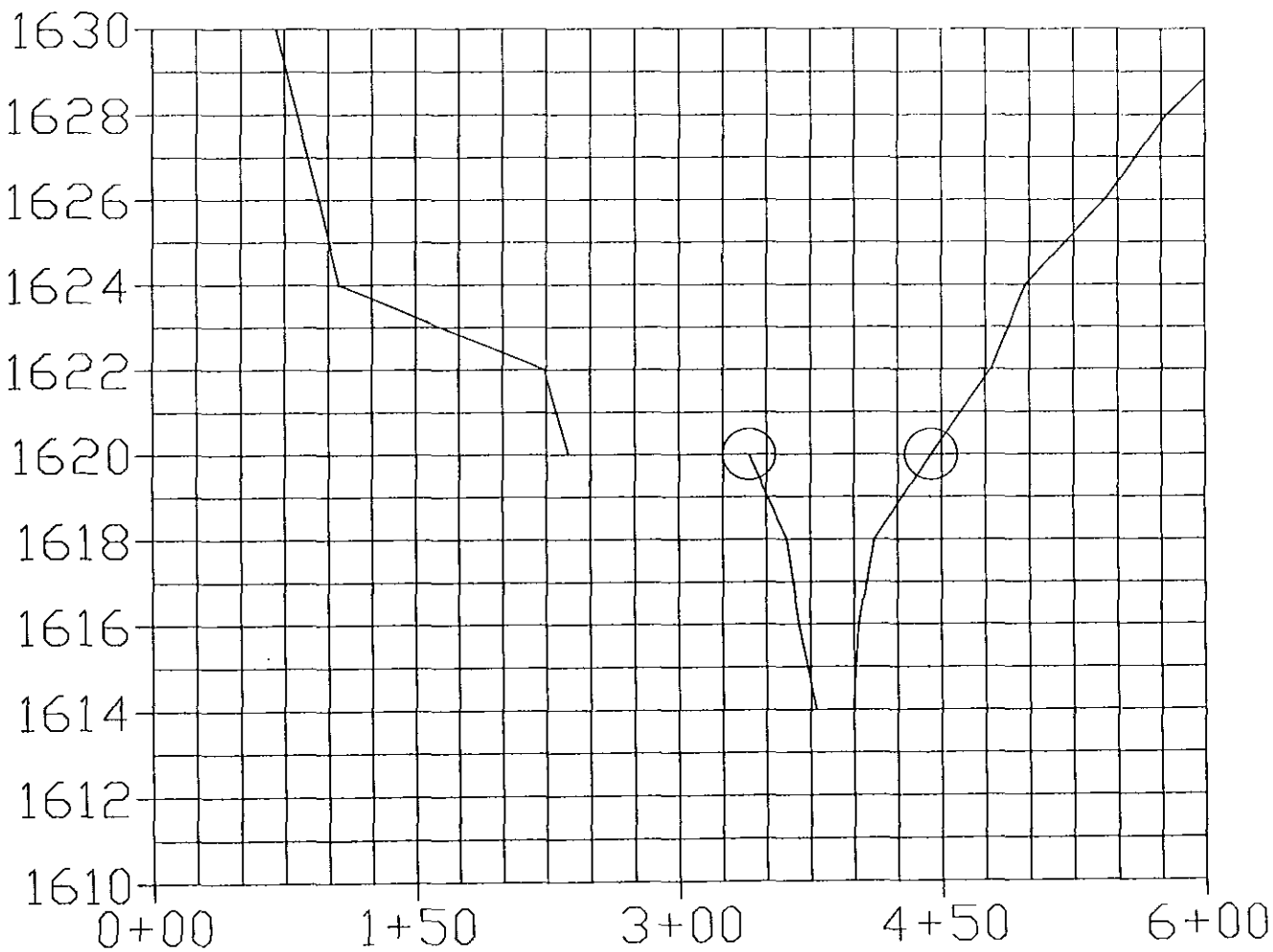
1750


0.0400
0.0250
0.0400
1610
1608
1606
1604
1602
1600
1598
1596
1594
1592
1590
0+00
1+50
3+00
4+50
6+00
7+50

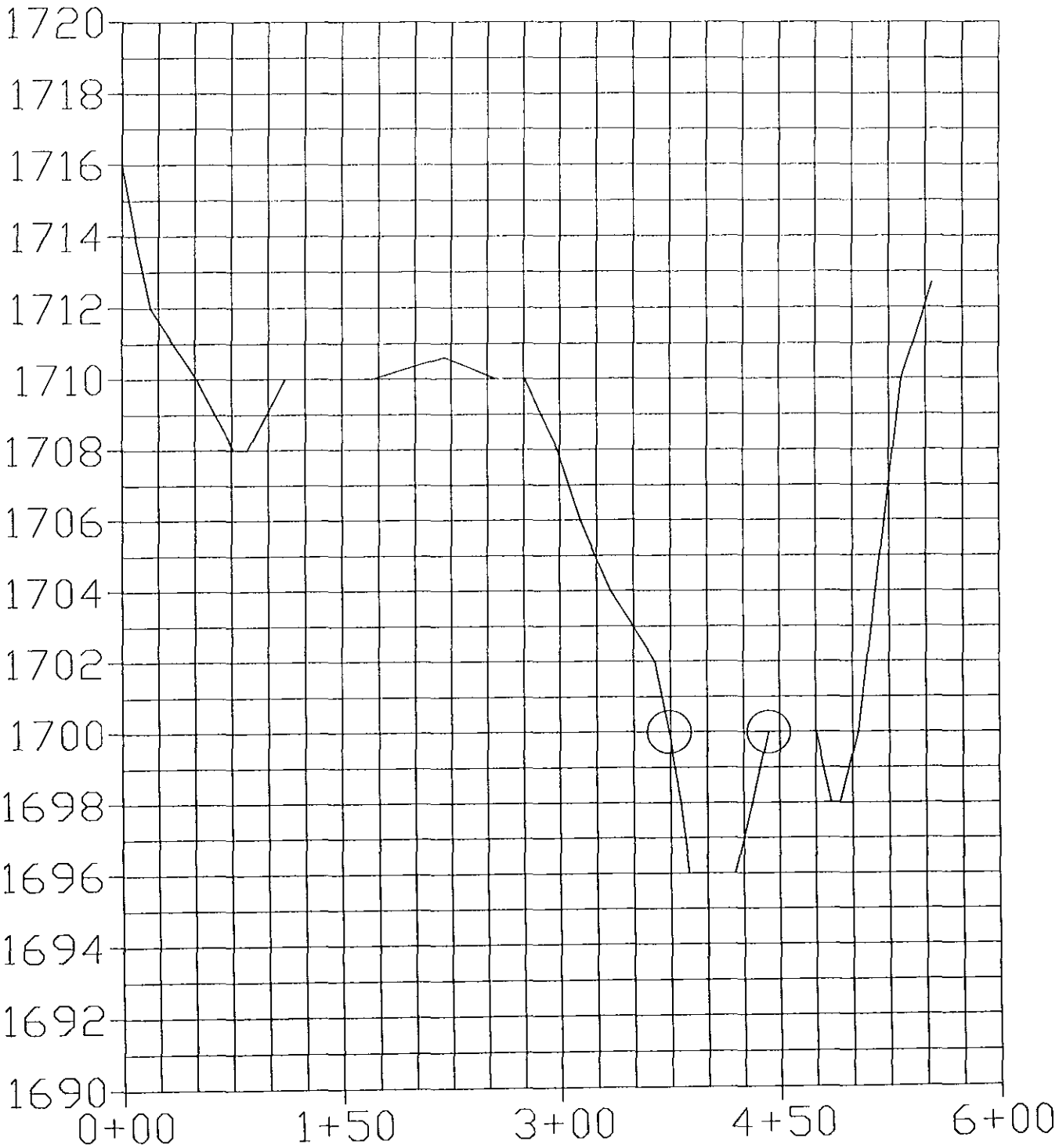
2200


1630
1628
1626
1624
1622
1620
1618
1616
1614
1612
1610
0+00
1+50
3+00
4+50
6+00
7+50
9+00

2900


1630
1628
1626
1624
1622
1620
1618
1616
1614
1612
1610
0+00
1+50
3+00
4+50
6+00

3000


1720
1718
1716
1714
1712
1710
1708
1706
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1702
1700
1698
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1694
1692
1690
0+00
1+50
3+00
4+50
6+00

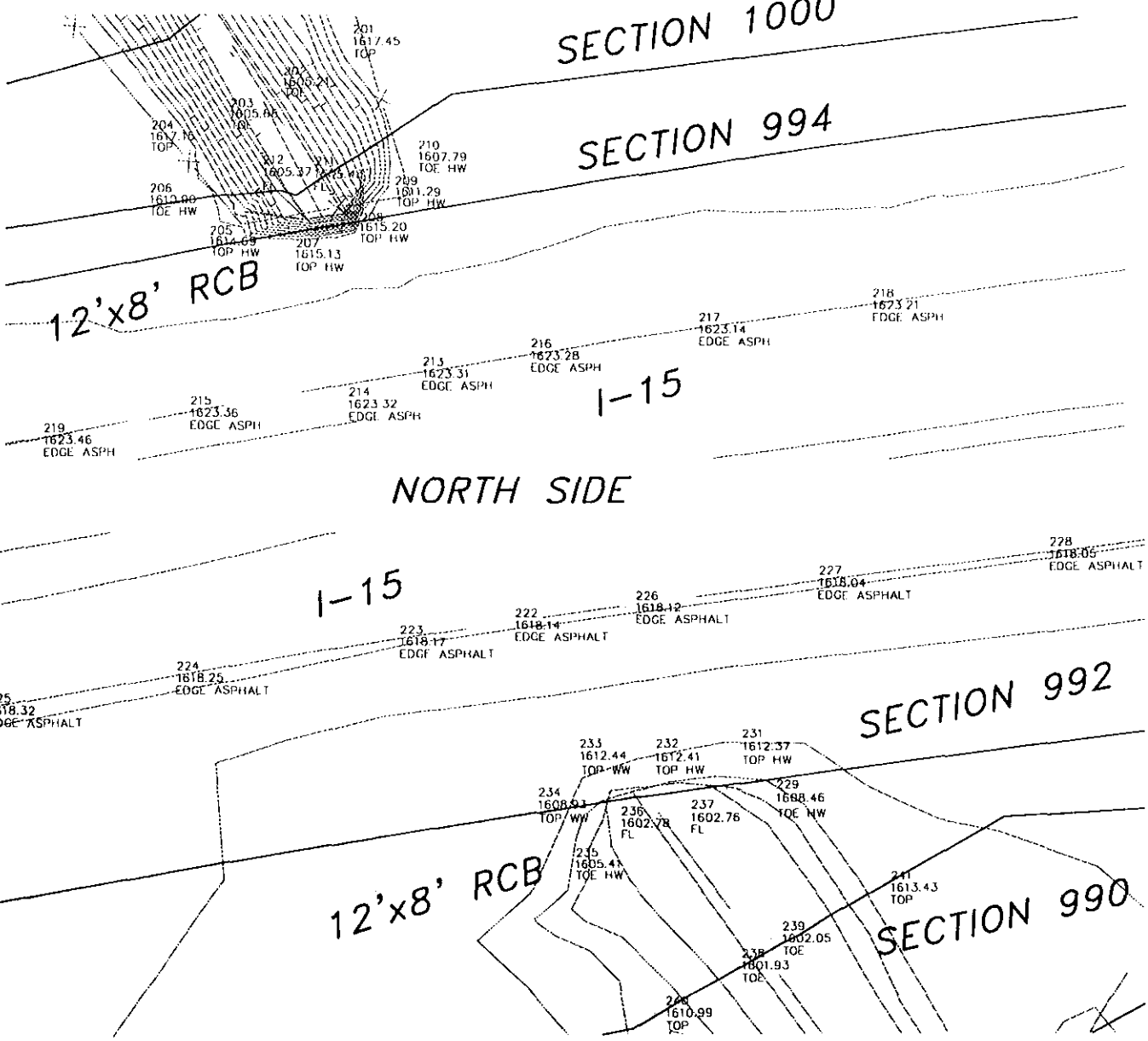
4700

BACKUP INFORMATION FOR

RESPONSE TO COMMENT 1

ABBOTT WASH

SURVEY DATA EXHIBIT
I-15 CULVERT
ABBOTT WASH

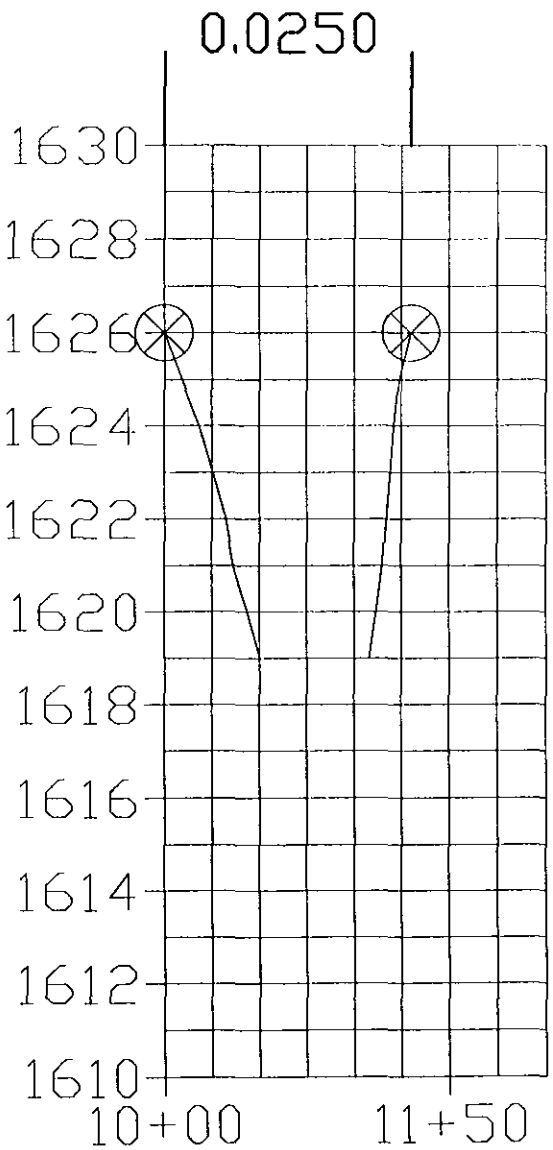


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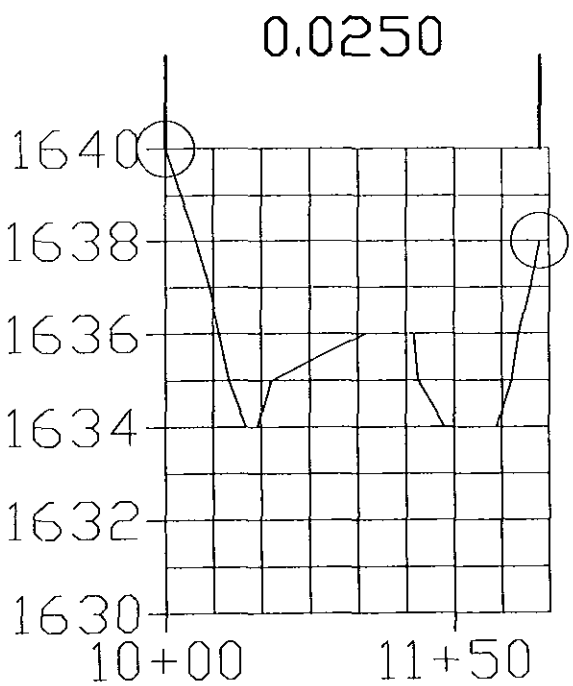
BACKUP INFORMATION FOR

RESPONSE TO COMMENT 2

ABBOTT WASH


0.0250
1630
1628
1626
1624
1622
1620
1618
1616
1614
1612
1610
10+00
11+50

1015

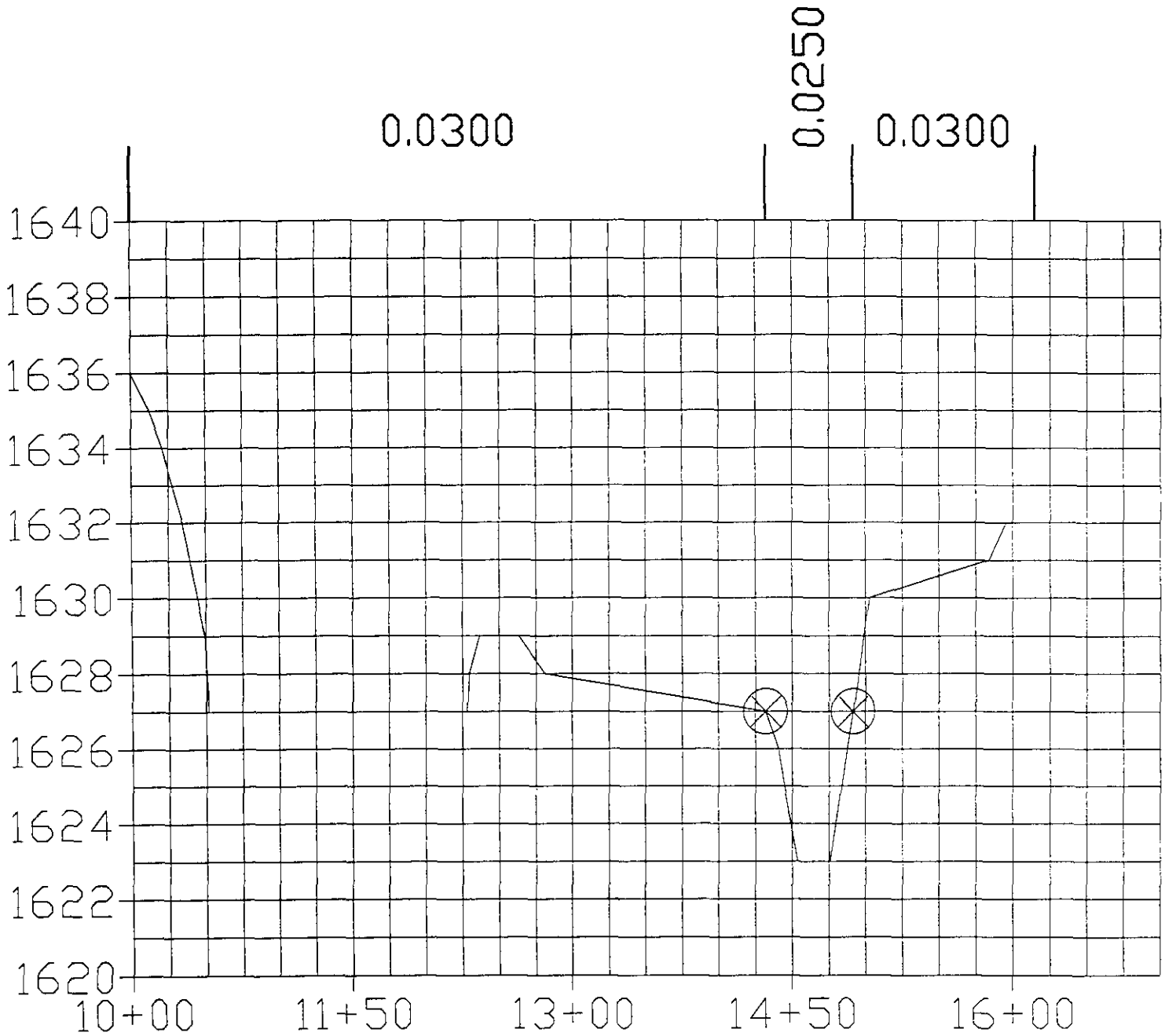


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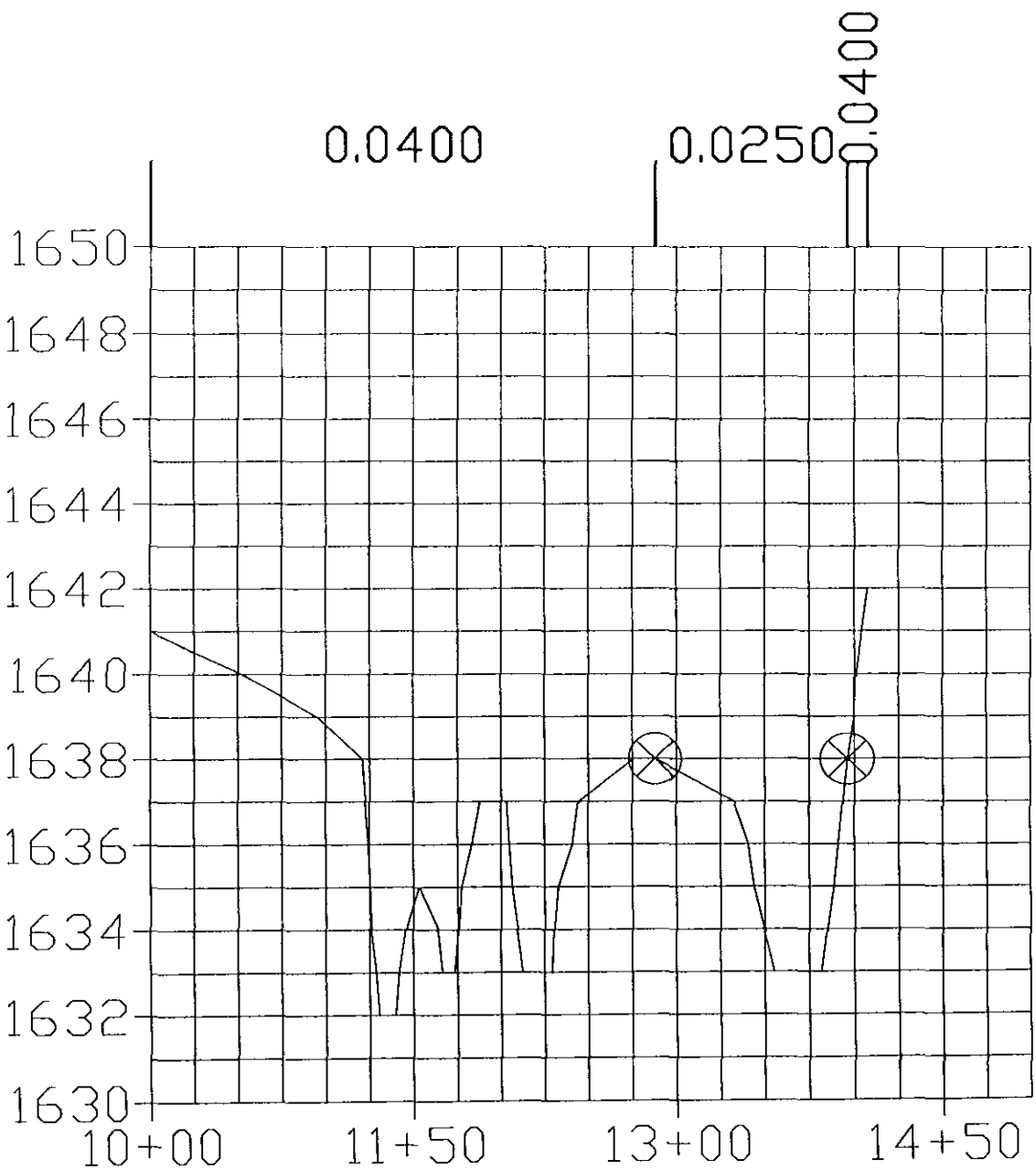
BACKUP INFORMATION FOR

RESPONSE TO COMMENT 3

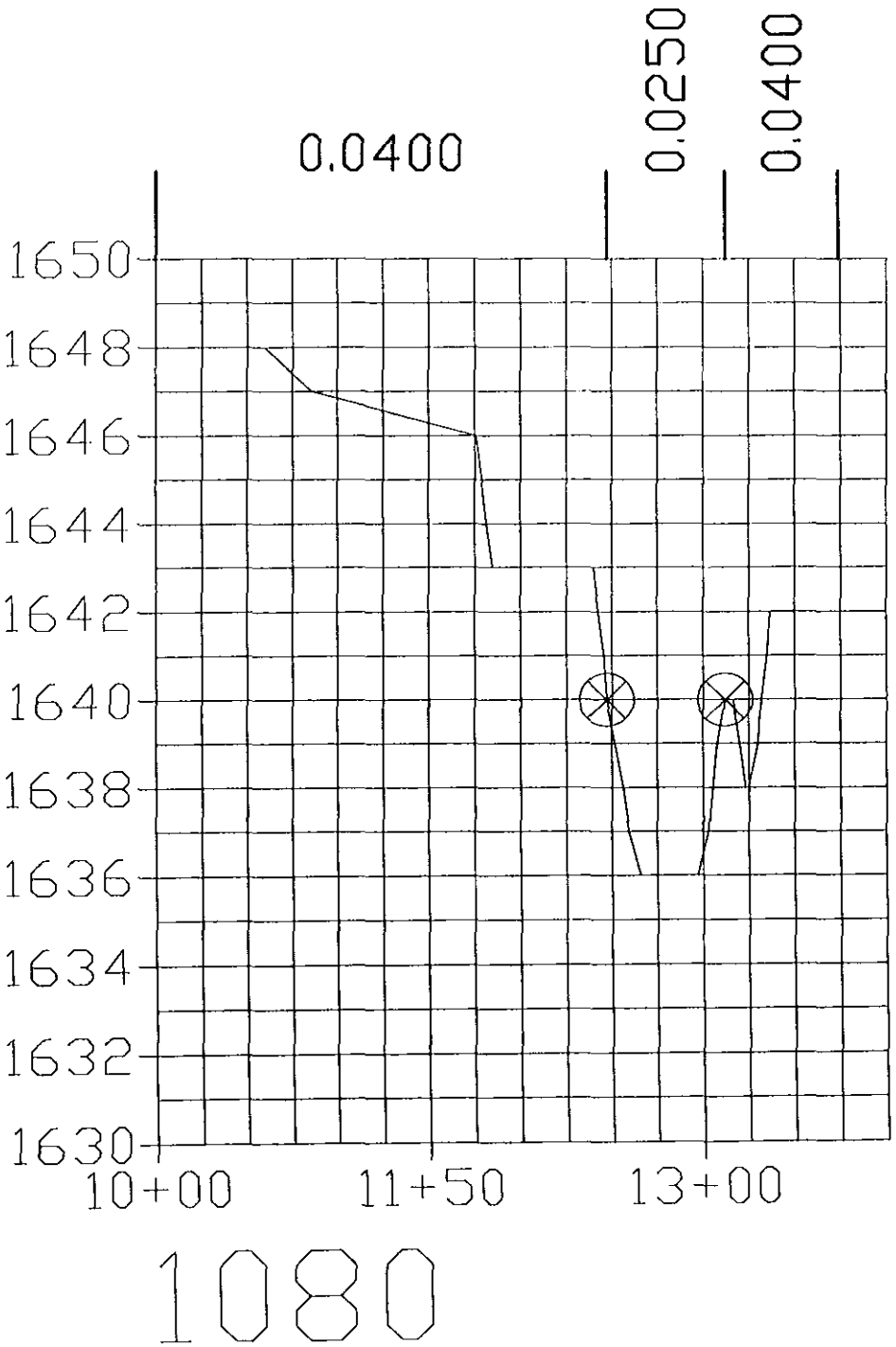
ABBOTT WASH


0.0300
0.0250
0.0300
1640
1638
1636
1634
1632
1630
1628
1626
1624
1622
1620
10+00
11+50
13+00
14+50
16+00

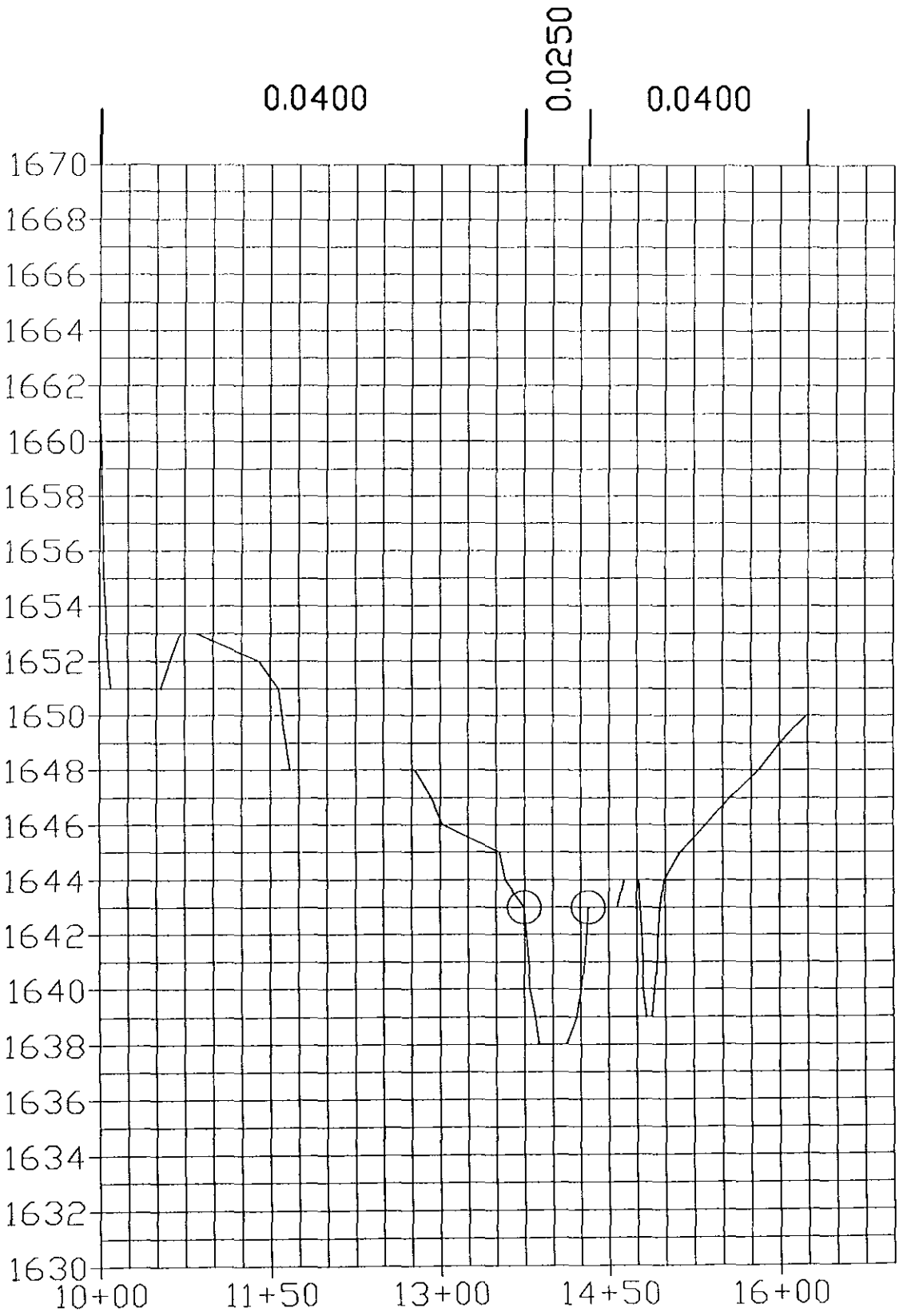
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0.0250
0.0400
1650
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1646
1644
1642
1640
1638
1636
1634
1632
1630
10+00
11+50
13+00
14+50

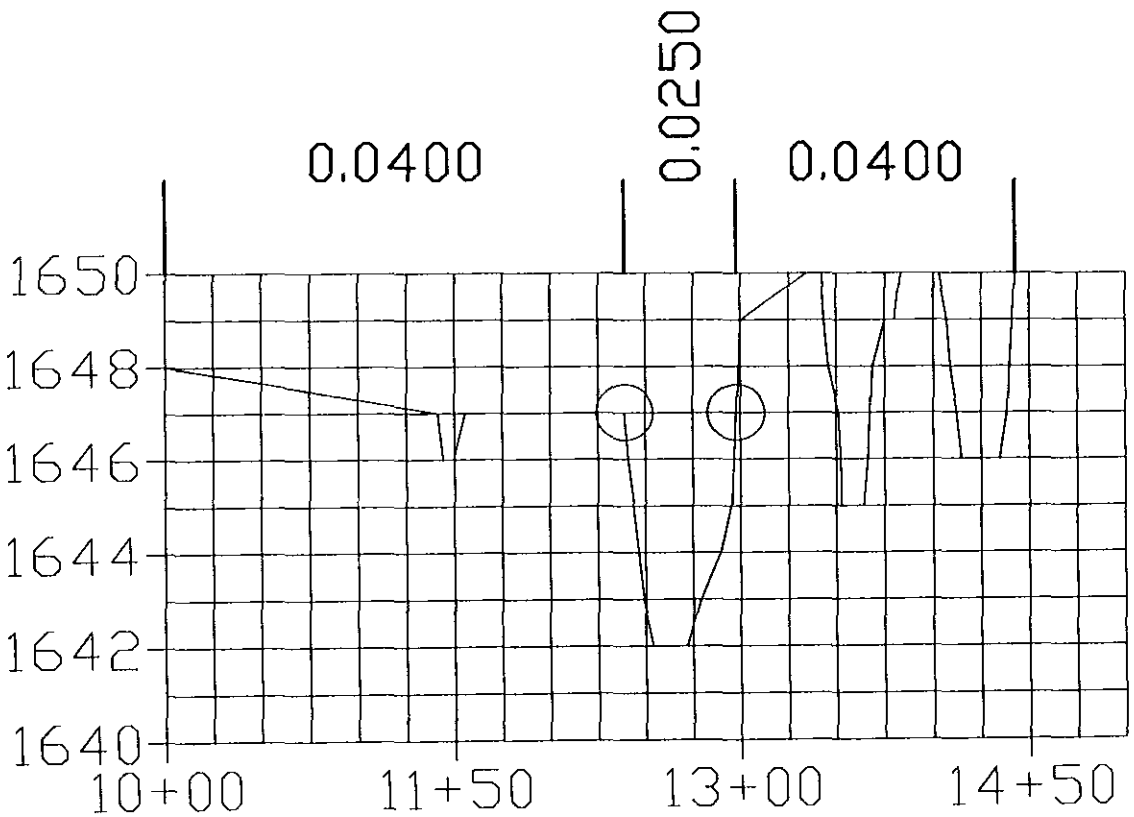
1067


0.0400
0.0250
0.0400
1650
1648
1646
1644
1642
1640
1638
1636
1634
1632
1630
10+00
11+50
13+00

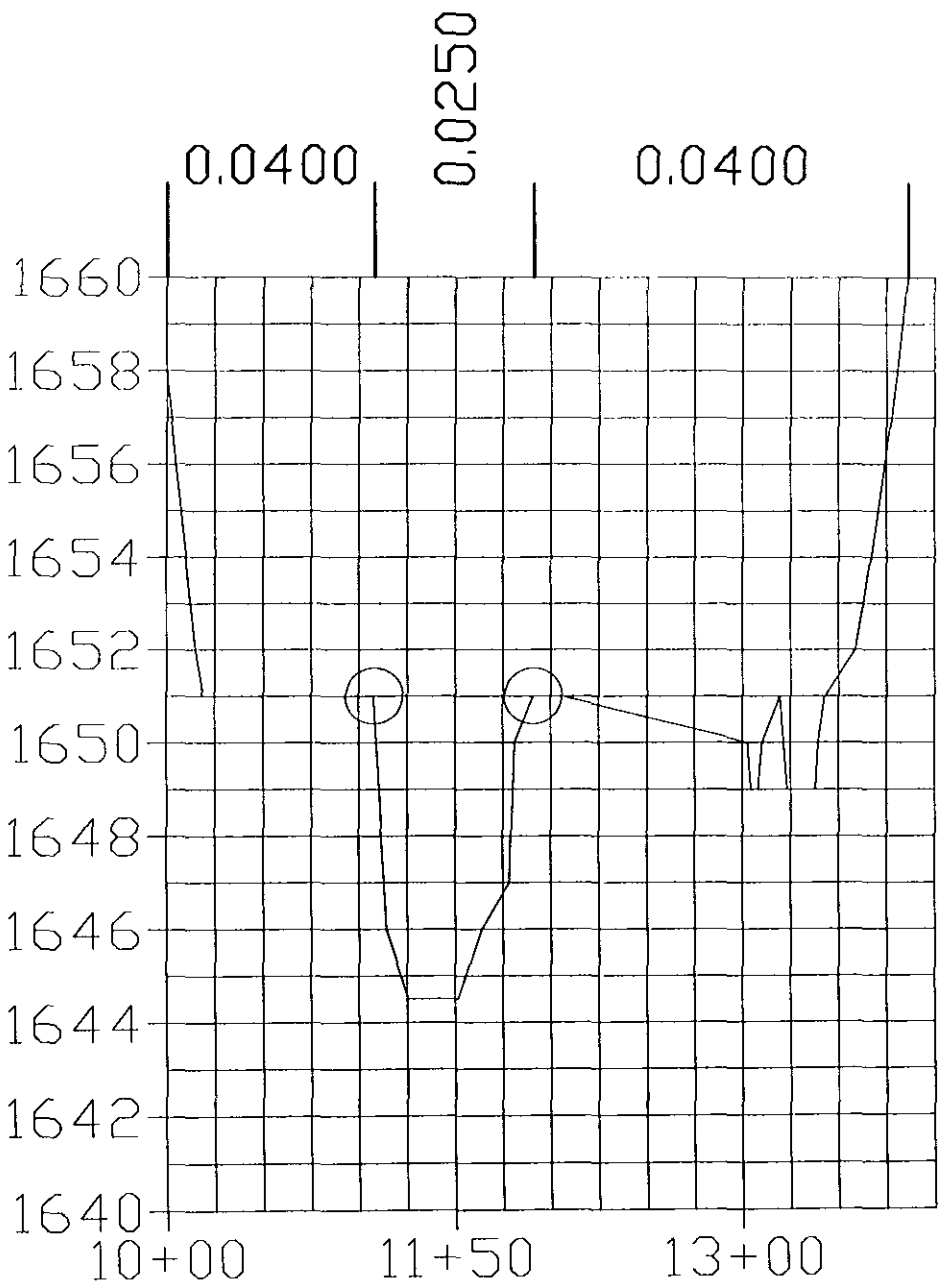
1080


0.0400
0.0250
0.0400
1670
1668
1666
1664
1662
1660
1658
1656
1654
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1650
1648
1646
1644
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1638
1636
1634
1632
1630
10+00
11+50
13+00
14+50
16+00

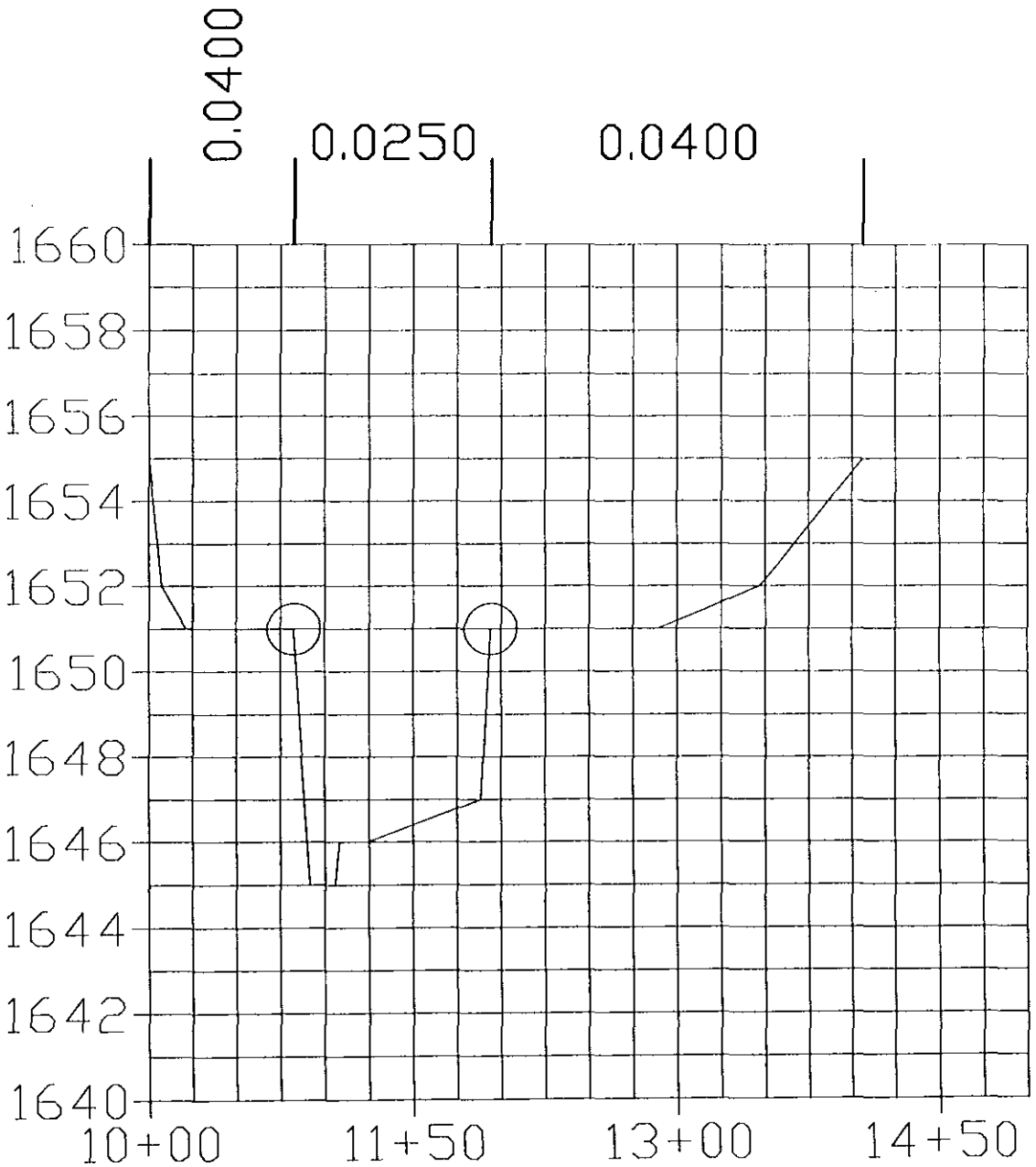
1085


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0.0250
0.0400
1650
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1646
1644
1642
1640
10+00
11+50
13+00
14+50

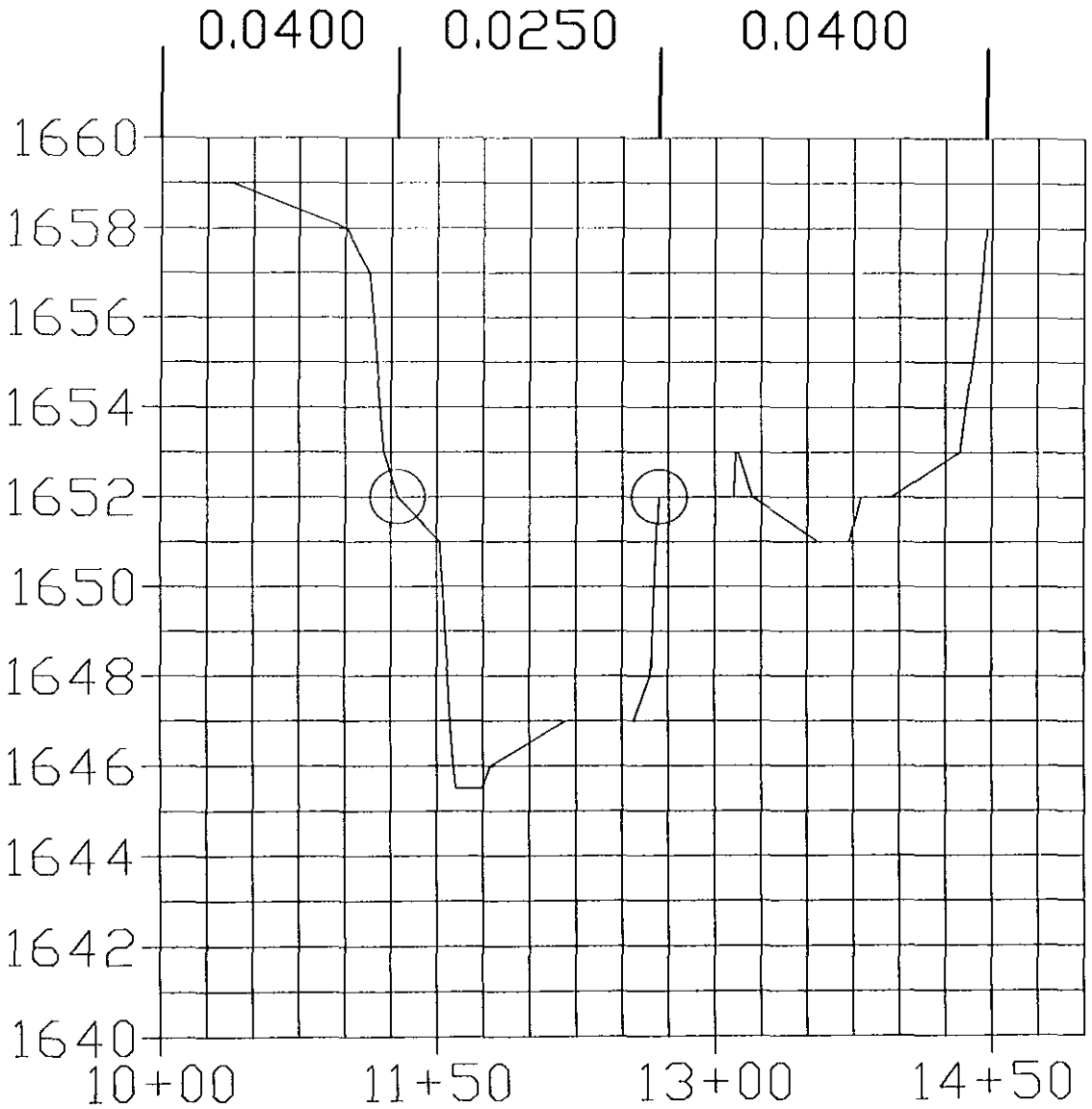
1100


0.0400
0.0250
0.0400
1660
1658
1656
1654
1652
1650
1648
1646
1644
1642
1640
10+00
11+50
13+00

1110


0.0400
0.0250
0.0400
1660
1658
1656
1654
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1650
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1646
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1640
10+00
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14+50

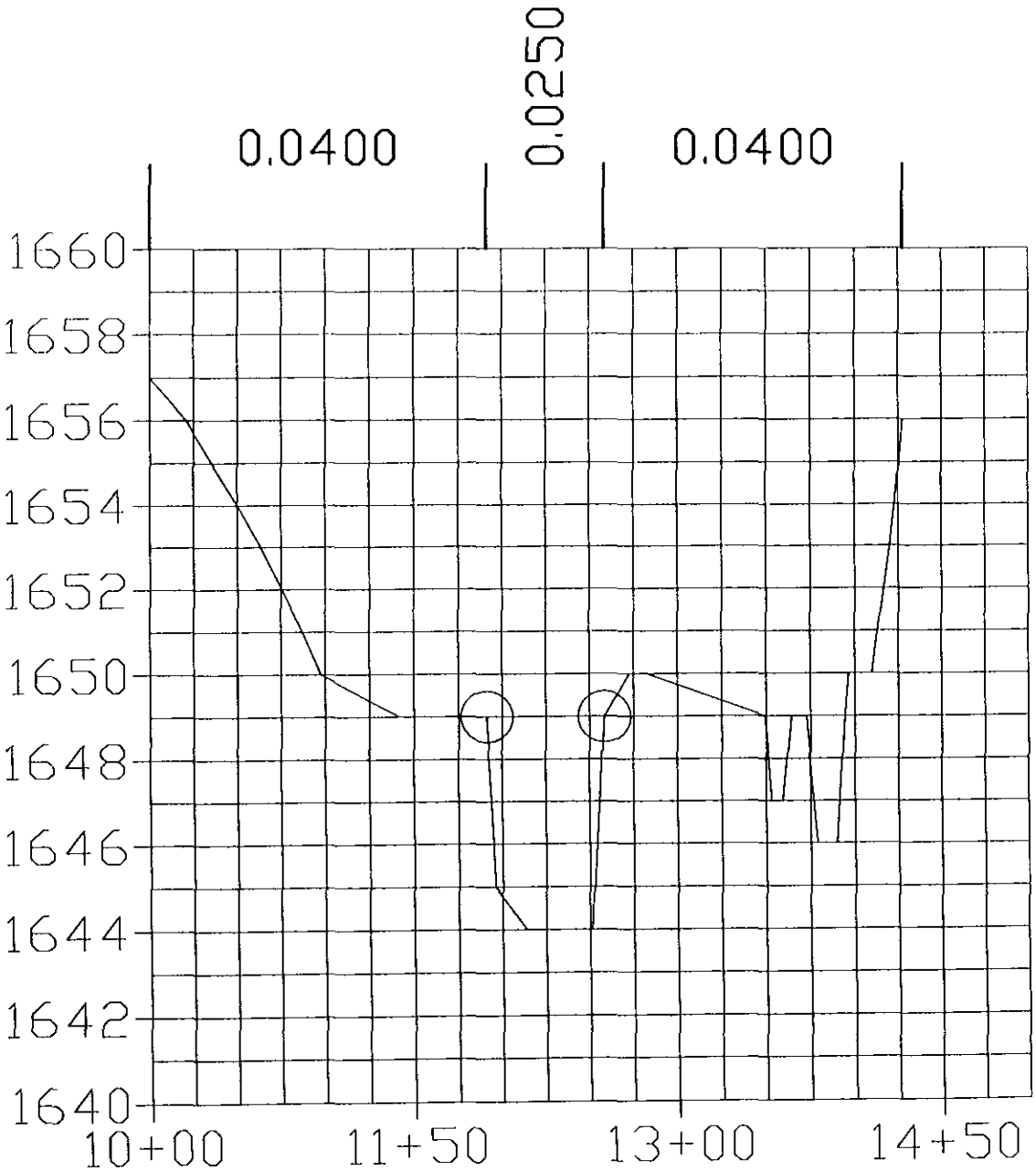
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0.0400
0.0250
0.0400
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1650
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1646
1644
1642
1640
10+00
11+50
13+00
14+50

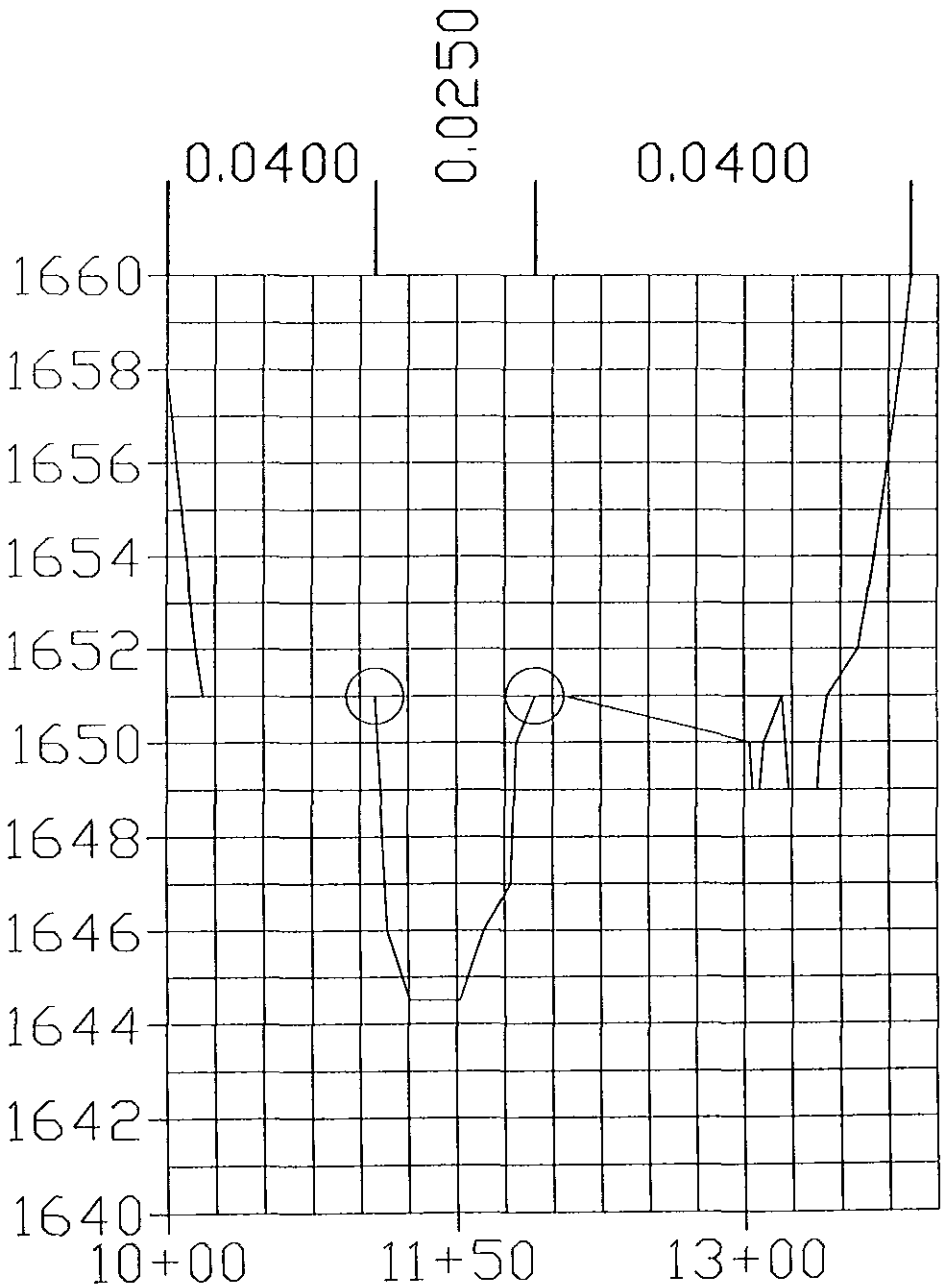
BACKUP INFORMATION FOR

RESPONSE TO COMMENT 4

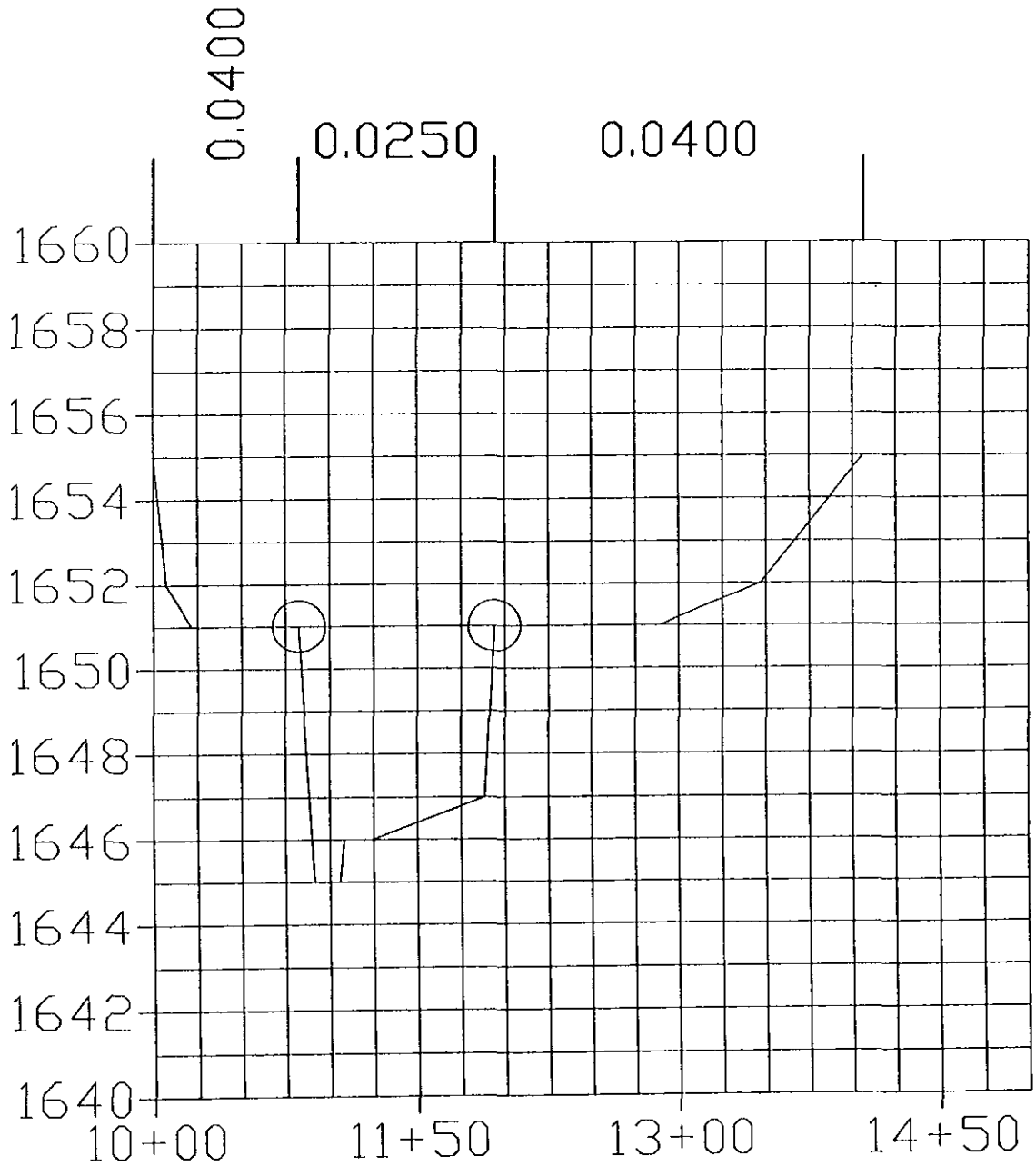
ABBOTT WASH


0.0400
0.0250
0.0400
1660
1658
1656
1654
1652
1650
1648
1646
1644
1642
1640
10+00
11+50
13+00
14+50

1105


0.0400
0.0250
0.0400
1660
1658
1656
1654
1652
1650
1648
1646
1644
1642
1640
10+00
11+50
13+00

1110


0.0400
0.0250
0.0400
1660
1658
1656
1654
1652
1650
1648
1646
1644
1642
1640
10+00
11+50
13+00
14+50

1112

PULSREV7.OUT

```
1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE    24SEP99     TIME   16:51:51  *
 *****************************************
```

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

```
X      X  XXXXXXX   XXXXX              XXXXX
X      X  X         X     X           X     X
X      X  X         X                       X
XXXXXXX   XXXX      X           XXXXX    XXXXX
X      X  X         X                 X
X      X  X         X     X           X
X      X  XXXXXXX   XXXXX             XXXXXXX
```

```
1
    24SEP99      16:51:51                                                    PAGE    1


                                                        THIS RUN EXECUTED 24SEP99    16:51:51

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

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


SPLIT FLOW BEING PERFORMED


SF


JC
JP     0       0      40       0       0

TWSPLIT FLOW AT PULSIPHER/I-15 CULVERT
WS     9    2000    2100                3
WC     0    1603      16    1602    38.3    1600      66    1599    92.5    1599
WC 106.3    1600   113.9    1602   119.9    1604   130.5    1606

TWSTATION 1400 - SPLIT FLOW OVER RIGHT BANK
WS     2    1400    1500                2.7
WC     0    1584     120  1583.8

TWSTATION 1300 - SPLIT FLOW OVER RIGHT BANK
WS     2    1300    1400                2.7
WC     0    1579     190    1584

TWSTATION 1200 - SPLIT FLOW OVER LEFT BANK
WS     2    1200    1300                2.7
WC     0    1576     199    1582

TWSTATION 1100 - SPLIT FLOW OVER LEFT OVERBANK
WS     2    1100    1200                2.7
WC     0    1576     112    1576

TWSTATION 1000 - SPLIT FLOW OVER LEFT BANK
WS     2    1000    1100                2.7
WC     0    1576     102    1576

TWSTATION 900 - SPLIT FLOW OVER LEFT BANK
WS     2     900    1000                2.7
WC     0  1574.5     117    1576

TWSTATION 800 - SPLIT FLOW OVER LEFT BANK
WS     2     800     900                2.7
WC     0  1574.5     102  1574.5
1
    24SEP99      16:51:51                                                    PAGE    2


TWSTATION 700 - SPLIT FLOW OVER LEFT BANK
WS     2     700     800                2.7
WC     0  1573.8     135  1574.5
1
    24SEP99      16:51:51                                                    PAGE    3


T1      550-035
T2      Mequite Wash FIS Restudy
T1      Pulsipher Wash

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                2                                     -1                          3549   1556.95
```

JS **********ASSUMED DISCHARGES FOR SPLIT FLOW**********

	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	500								

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	-1		-1				-1	-6		

J1 VARIABLE CODES FOR SUMMARY PRINTOUT

	100		150							
NC	0.03	0.03	0.025	0.1	0.3					
X1	200	15	2929.4	3113.93						
X3	10									
GR	1564	2778.75	1564	2874.16	1562	2912.73	1560	2929.4	1558	2941.08
GR	1556	2949.85	1554	2963.64	1554	2981.64	1554	3011.17	1554	3066.53
GR	1556	3081.56	1558	3096.65	1560	3113.93	1560	3148.31	1560	3196.06
X1	300	11	2926.48	3015.77	164.63	159.83	352.07			
X3	10									
GR	1566	2682.38	1564	2807.33	1562	2926.48	1560	2954.76	1558	2969.07
GR	1558	3000.86	1560	3018.26	1562	3015.77	1562	3082.96	1562	3156.53
GR	1564	3217.12								
NC	0.03	0.03	0.025	0.1	0.3					
X1	400	22	2281.55	2450.74	132.08	158.2	134.41			
X3	10							1566		
GR	1570	2126.23	1572	2143.31	1572	2183.04	1570	2191.36	1562	2217.92
GR	1560	2238.83	1560	2252.16	1564	2262.45	1566	2281.55	1566	2288.71
GR	1564	2319.58	1562	2326.53	1560	2333.47	1560	2352.21	1562	2362.78
GR	1562	2368.59	1562	2429.18	1564	2450.74	1566	2527.34	1566	2620.61
GR	1566	2621.4	1568	2852.45						
NC	0.015	0.015	0.015	0.3	0.5					
X1	500	11	2332.84	2370.57	75.43	81.76	74.97			
X3	10							1572	1572	
GR	1572	1921.7	1572	2203.22	1572	2332.84	1568.47	2332.84	1564.37	2332.84
GR	1564.3	2370.57	1568.47	2370.57	1572	2370.57	1572	2514.64	1572	2582.6
GR	1572	2867.98								

1

NC	0.015	0.015	0.015	0.3	0.5					
SB	1.25	1.5	2.7	76	37.73	1.34	147.38	0	1565.46	1564.37
X1	600	12	2596.22	2633.95	122.03	131.14	133.46			
X2			1	1568.47	1572.66			2		
X3	10							1572.6	1572.6	
GR	1574	2232.97	1572.6	2260	1572.6	2596.22	1569.56	2596.22	1565.46	2596.22
GR	1565.4	2633.95	1569.56	2633.95	1572.6	2633.95	1572.6	2866.27	1572.6	2963.4
GR	1572.6	3102.68	1573.7	3146.68						
NC	0.04	0.04	0.03	0.3	0.5					
X1	700	18	2121.76	2330.75	131.44	79.47	112.64			
X3	10			2121.76	1578	2330.75	1578	1573.8	1574.9	
GR	1574	1799.95	1572.2	1877	1572.2	1954	1572.2	2031	1573.8	2121.76
GR	1572	2128.04	1570	2132.18	1569.5	2139.33	1570	2143.07	1572	2144.69
GR	1574	2297.02	1574.9	2330.75	1574.5	2366.44	1574	2409.4	1572.7	2453.34
GR	1572.7	2564.87	1572.7	2717.29	1574	2748.19				
NC	0.04	0.04	0.03	0.1	0.3					
X1	800	22	1769.22	1903.89	114.63	139.86	144.94			
X3	10			1769.22	1578	1903.89	1578	1574.5	1576	
GR	1574	1427.88	1572.5	1510	1572.5	1592	1572.5	1674	1574	1759.85
GR	1574.5	1769.22	1574	1778.29	1572	1784.62	1570	1788.23	1570.23	1790.02
GR	1570	1791.12	1572	1797.25	1574	1818.13	1574	1841.16	1574	1867.81
GR	1576	1903.89	1574	1968.96	1573.2	2017.28	1573.2	2207.8	1573.2	2344.84
GR	1574	2392.94	1574	2407.17						
NC	0.04	0.04	0.03							
X1	900	21	1575.7	1686.84	102.08	108.33	103.62			
X3	10			1575.7	1578	1686.84	1578	1574.5	1577	
GR	1574	1219.54	1572.9	1309.5	1572.9	1399	1572.9	1489.5	1574	1572.39
GR	1574.5	1575.7	1574	1579.92	1572	1592.09	1571	1597.2	1572	1604.66
GR	1574	1606.43	1575	1651.77	1577	1686.84	1575.8	1705.75	1574	1749.48
GR	1573.7	1798.67	1573.7	1915.16	1573.7	2060.43	1573.7	2160.73	1574	2209.7
GR	1574	2230.82								
X1	1000	20	1472.42	1568.37	116.93	121.55	118.27			
X3	10			1472.42	1579	1568.37	1579	1576	1577.2	
GR	1574	1096.67	1573.3	1190	1573.3	1283	1573.3	1376	1576	1472.42
GR	1576	1484.88	1574	1489.57	1572	1494.01	1571.15	1496.75	1572	1501.64
GR	1574	1503.91	1576	1545.7	1577.2	1568.37	1576.5	1597.74	1576	1625.79
GR	1575.5	1648.15	1574.3	1720.01	1574.3	1879.49	1574.3	2080.17	1575.3	2121.11
X1	1100	17	1320.06	1417.67	102.45	103.7	103.7			
X3	10			1320.06	1579	1417.67	1579	1576	1577.4	
GR	1574	924.71	1573.5	1024	1573.5	1124	1573.5	1224	1576	1320.06
GR	1576	1334.53	1574	1339.91	1571.4	1347.79	1574	1349.58	1576	1391.55
GR	1577.4	1417.67	1576.5	1447.13	1576	1476.62	1574.7	1519.36	1574.7	1720.11
GR	1574.7	1929.89	1575.7	1982.94						

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X1	1200	22	1178.38	1272.58	111.55	110.23	110.23			
X3	10			1178.38	1582	1272.58	1581	1576	1577.5	
GR	1588	1000	1586	1003.72	1584	1007.45	1582	1011.19	1580	1010.36
GR	1578	1045.48	1576	1078.58	1575	1158.89	1576	1178.38	1576	1179.17
GR	1574	1190.7	1571.62	1204.49	1574	1209.35	1576	1247.96	1577.5	1272.58
GR	1576.5	1301.79	1576	1333.43	1575.1	1378.11	1575.1	1575.34	1575.1	1770.67
GR	1576	1817.16	1576.5	1831.23						
NC			0.025							
X1	1300	27	1014.17	1207.18	198.91	153.42	176.37			
X3	10					1207.18	1583	1582	1579	
GR	1588	1000	1586	1004.58	1584	1009.31	1582	1014.17	1582	1065.78
GR	1582	1072.99	1580	1076.58	1574	1080.99	1572.69	1083.53	1574	1092.54
GR	1580	1106.55	1580	1121.82	1578	1125.36	1576	1170.24	1576	1178.38
GR	1578	1183.85	1578	1201.6	1579	1207.18	1578	1236.12	1578	1241.05
GR	1578	1260.24	1576	1268.87	1575.6	1313.34	1575.6	1502.88	1575.6	1676.59
GR	1576	1718.52	1577	1735.14						
X1	1400	18	1061	1186.25	122.02	190.42	161.58			
X3	10					1186.25	1587	1584	1584	
GR	1600	1000	1600	1027.47	1598	1035.26	1596	1040.7	1590	1046.91
GR	1588	1052.71	1586	1056.6	1584	1061	1582	1138.25	1580	1142.92
GR	1578	1145.8	1578	1160.96	1580	1173.97	1582	1180.16	1584	1186.25
GR	1584	1230.34	1584	1231.21	1584	1307.21				
X1	1500	22	1081.73	1230.57	76.07	119.69	108.07			
X3	10									
GR	1600	1000	1599	1069.96	1583	1081.73	1582	1182.35	1580	1186.84
GR	1578	1197.97	1578	1201.11	1580	1212.43	1582	1216.13	1583.8	1230.57
GR	1584	1294.4	1584	1308.23	1584	1356.62	1586	1628.22	1588	1674.02
GR	1590	1697.27	1592	1726.23	1594	1741.62	1596	1753.42	1598	1763.24
GR	1598	1801.09	1596	1808.99						
X1	1600	13	1094.37	1243.82	101.17	210.32	196.31			
GR	1602	1000	1600	1064.32	1594.01	1081.14	1584	1094.37	1582	1149.75
GR	1580.4	1170.49	1580.78	1218.11	1582	1229.76	1584	1243.82	1585	1327.67
GR	1586	1412.26	1588	1551.37	1590	1677.73				
X1	1650	23	1129.97	1180.64	190.68	185.82	175.57			
X3	10									
GR	1600	1000	1598	1005.05	1596	1011.4	1594	1026.96	1594	1094.89
GR	1594	1110.32	1592	1122.14	1590	1124.66	1588	1129.97	1586	1134.76
GR	1584	1139.66	1582	1148.86	1582	1161.14	1584	1172.84	1584.7	1180.64
GR	1585	1254.59	1586	1347.77	1588	1480.9	1590	1600.61	1592	1684.68
GR	1594	1697.13	1596	1700.86	1598	1704.54				
NC	0.04	0.04	0.025							
X1	1700	20	1286.61	1350.67	163.66	154.63	161.13			
GR	1602	1000	1604	1037.4	1605.9	1128.6	1605.81	1151.3	1604	1198.85
GR	1602	1246.99	1600	1248.58	1590	1277.69	1588	1282.43	1586	1286.61
GR	1584	1301.89	1582.05	1314.08	1584	1326.15	1586	1341.79	1586.5	1350.67
GR	1586	1360.4	1585.5	1416.24	1586	1475.83	1588	1602.02	1590	1708.11

NC	0.04	0.04	0.025							
X1	1750	21	1095.43	1152.29	171.49	179.87	169.33			
GR	1610	1000	1608	1023.79	1606	1053.35	1604	1063.55	1602	1070.14
GR	1600	1076.66	1590	1095.43	1588	1097.81	1586	1103.58	1582.1	1112
GR	1582.1	1122.43	1586	1133.65	1587.5	1152.29	1587.1	1211.93	1588	1287.4
GR	1590	1362.75	1592	1371.76	1594	1376.44	1596	1380.58	1598	1384.75
GR	1600	1388.94								
NC	0.04	0.04	0.025	0.1	0.3					
X1	1800	19	1139.62	1221.2	173.79	148.02	170.93			
GR	1608	1000	1606	1021.77	1604	1037.17	1602	1053.97	1600	1078.01
GR	1598	1135.85	1596	1139.62	1590	1145.75	1588	1148.51	1586	1151.34
GR	1582.1	1155.97	1582.1	1164.98	1586	1171.75	1588	1183.17	1590	1191.2
GR	1592	1221.1	1594	1234.56	1596	1243.62	1598	1254.32		
NC	0.015	0.015	0.015	0.3	0.5					
QT	1	3478								
X1	1900	14	1193.33	1205.33	66.92	60.81	58.98			
GR	1606	1000	1604	1017.04	1602	1014.84	1600	1056.24	1598	1118.67
GR	1596	1174.32	1592.19	1193.33	1582.19	1193.33	1582.19	1205.33	1592.19	1205.33
GR	1594	1221.37	1596	1224.34	1598	1232.13	1600	1243.77		
NC	0.015	0.015	0.015	0.3	0.5					
SB		1.5	2.7	114	12		120	0	1588.88	1582.19
X1	2000	9	1044.29	1056.29	320.07	303.13	319.85			
X2			1	1592.19	1603.83					
GR	1602	1000	1600	1026.41	1598.88	1044.29	1588.88	1044.29	1588.88	1056.29
GR	1598.8	1056.29	1600	1080.33	1602	1092.77	1604	1104.82		
NC	0.04	0.04	0.025	0.3	0.5					
X1	2100	17	1093.94	1188.63	58.83	54.83	49.81			
GR	1606	1000	1604	1009.57	1602	1013.54	1600	1020.41	1598	1037.57
GR	1596	1093.94	1594	1118.59	1592	1126.16	1590	1145.6	1590	1151.46
GR	1592	1174.19	1594	1184.61	1596	1188.63	1598	1204.5	1600	1224.72
GR	1602	1240.9	1604	1251.99						
NC	0.04	0.04	0.025	0.1	0.3					
X1	2200	18	142.43	318.37	383.01	273.85	328.57			
X3	10							1598	1598	

GR	1608	0	1608	20.66	1606	28.27	1604	40.91	1603	53.3
GR	1602	71.43	1600	112.67	1598	142.43	1596	210.95	1593	217.68
GR	1598	318.37	1596	562.06	1596	571.04	1596	618.66	1596	624.51
GR	1598	693.73	1600	708.07	1602	779.64				
NC				0.1	0.3					
X1	2300	25	150.15	250.92	320.42	310.65	311.55			
X3	0					453.09	1602			
GR	1608	0	1608	15.33	1606	21.57	1604	27.19	1602	63.6
GR	1600	150.15	1599	164.23	1598	187.99	1596	192.33	1594	198.34
GR	1594	228.2	1596	235.23	1598	238.65	1600	244.41	1600	250.92
GR	1600	277.03	1600	398.64	1602	414.11	1602	452.77	1600	463.12
GR	1600	475.52	1602	492.74	1604	507.6	1606	537.25	1608	543.16

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X1	2330	16	1156	1288	235	222	240			
X3	0									
GR	1608	1000	1606	1008	1604	1028	1602	1122	1601	1156
GR	1600	1203	1598	1205	1596	1209	1596	1238	1598	1243
GR	1600	1247	1601.6	1288	1602	1327	1604	1437	1606	1483
GR	1608	1508								
X1	2350	11	1025	1385	151	123	63			
X3	0									
GR	1608	1000	1606	1010	1604	1025	1603	1087	1603.5	1174
GR	1603.8	1227	1602	1271	1602	1339	1604	1385	1606	1445
GR	1608	1498								
X1	2400	21	555.74	605.96	178	109	71			
GR	1612	93.82	1610	232.8	1608.3	316.57	1608	336.99	1606	384.81
GR	1605.7	394.82	1604	447.58	1602	555.74	1600	564.71	1598	569.83
GR	1598	597.61	1600	601.64	1602	605.96	1604	666.82	1606	687.05
GR	1606	721.82	1605.3	750.29	1606	764.11	1608	799.73	1610	848.51
GR	1612	930.78								
X1	2500	25	173.41	243.04	186.68	182.96	179.72			
GR	1612	41.78	1610	45.58	1608	56.33	1607.4	69.14	1606	97.11
GR	1604	119.54	1604	161.89	1604	173.41	1602	209.67	1602	238.99
GR	1604	243.04	1606	249.45	1608	260.55	1610	291.23	1612	303.53
QT	1	3474								
X1	2600	28	774.94	927.94	320.81	390.78	373.36			
GR	1622	170.68	1620	198.85	1618	205.29	1616	210.56	1618	237.91
GR	1616	243.57	1616	474.86	1616	499.71	1614	504.57	1612	510.3
GR	1612	752.1	1612	762.71	1612	774.94	1610	779.75	1608	784.94
GR	1608	807.9	1608	855.3	1606	872.52	1606	907.23	1608	914.3
GR	1610	919.14	1612	927.94	1613.2	946.75	1614	960.44	1616	971.24
GR	1618	997.96	1620	1011.4	1622	1026.58				
X1	2700	29	605.11	832.94	249.65	237.3	246.94			
GR	1626	35.68	1624	43.5	1622	53.17	1620	65.17	1618	101.3
GR	1618	115.11	1618	141.58	1616	147.23	1616	265.04	1616	364.54
GR	1618	369.57	1618	394.68	1616	400.49	1614	408.58	1614	570.98
GR	1614	582.3	1614	605.11	1612	667.05	1610	699.84	1608	724.01
GR	1608	753.82	1610	771.97	1610.7	781.65	1612	801.7	1614	832.94
GR	1616	894.96	1618	898.43	1620	904.23	1630	923.69		
X1	2800	16	263.07	429.47	262.99	389.6	376.77			
X3	0			263.2	1616					
GR	1616	0	1616	39.55	1616	96.03	1616	111.37	1612	159.52
GR	1614	182.66	1614.7	197.49	1616	263.07	1610	302.64	1612	344.5
GR	1613.6	372.11	1614	379.65	1616	429.47	1620	489.99	1621.6	503.61
GR	1622	507.82								

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X1	2900	30	475.4	801.12	292.71	273.86	292.09			
X3	0			392.8	1620.51					
GR	1630	53.46	1628	61.93	1626	69.99	1624	77.51	1622	93.13
GR	1620	124.83	1618	331.67	1618	366.34	1620	373	1620.5	393.02
GR	1620	475.4	1618	525.34	1618	550.41	1618	631.71	1618	676.78
GR	1618	700.32	1616	722.78	1614	731.76	1612	736.6	1612	763
GR	1614	767.87	1616	772.71	1616.98	781.98	1618	790.94	1620	801.12
GR	1622	816.77	1624	832.8	1626	858.03	1628	874	1630	890.18
X1	3000	23	339.8	443.93	405.73	342.04	349.71			
GR	1630	70.06	1628	82.14	1626	94.71	1624	106.08	1623.2	152.05
GR	1622	224.19	1620	237.42	1620	274.5	1620	298.77	1620	312.51
GR	1620	339.8	1618	361.48	1616	368.38	1614	378.05	1614	399.19
GR	1616	402.54	1618	411.58	1620	443.93	1622	477.92	1624	497.81
GR	1626	542.69	1628	577.88	1628.8	598.92				
X1	3100	21	128.03	404.52	382.96	294.37	302.1			
GR	1640	88.37	1630	113.59	1628	118.26	1626	128.03	1624	297.39
GR	1622	300.14	1620	302.9	1618	305.76	1618	319.74	1618	333.19
GR	1620	337.19	1622	360.91	1624	384.72	1626	404.52	1628	466.46
GR	1630	524.54	1632	559.37	1634	582.77	1636	608.27	1638	629.41
GR	1640	646.16								
X1	3200	14	247.42	403.91	426.92	395.6	390.01			
GR	1639.7	227.47	1630	247.42	1628	253.14	1626	258.7	1624	267.64
GR	1622	275.55	1622	310.81	1624	315.91	1626	321.83	1628	327.9
GR	1630	403.91	1632	489.33	1634	564.85	1636	598.59		

X1	3100	35	36.55	575.86	462.6	416.49	482.8			
GR	1644	0	1642	12.73	1640	25.07	1638	31.27	1636	36.55
GR	1634	43.64	1632	47.01	1630	50.82	1628	55.39	1628	67.9
GR	1630	72.59	1632	76.9	1634	79.06	1636	137.59	1636	212.17
GR	1636	336.67	1634	350.97	1634	363.87	1634	407.22	1632	411.39
GR	1630	414.76	1628	421.9	1628	494.95	1630	503.75	1632	508.15
GR	1632	523.76	1630	526.02	1630	532.3	1632	537.02	1634	540.95
GR	1636	575.86	1638	594.13	1640	601.98	1642	617.87	1644	633.83
X1	3400	18	84.27	600.88	467.16	325.83	402.24			
GR	1650	59.27	1640	84.27	1638	109.44	1636	126.6	1634	131.99
GR	1634	140.44	1636	146.48	1638	193.98	1638	219.41	1638	270.82
GR	1638	278.83	1638	384.4	1640	600.88	1642	643.45	1644	683.24
GR	1646	705.45	1648	714.67	1650	724.58				
X1	3500	12	1139.19	1820.67	445.73	364.17	401.18			
GR	1650	1117.94	1648	1129.92	1646	1139.19	1644	1154.95	1642	1166.11
GR	1640	1198.2	1640	1311.56	1642	1663.86	1644	1780.13	1646	1820.67
GR	1648	1954.48	1650	1976.19						

X1	3600	21	149.25	618.21	366.01	356.91	358.51			
GR	1660	75.43	1658	80.52	1656	91.22	1654	99.08	1652	110.5
GR	1650	129.6	1648	149.25	1646	271.37	1646	283.71	1646	312.95
GR	1646	327.9	1646	360.07	1646	420.55	1646	607.71	1648	618.21
GR	1650	627.24	1652	634.08	1654	648.02	1656	659.58	1658	673.87
GR	1660	681.36								
X1	3700	23	99.81	528.5	397.89	401.06	409.82			
GR	1660	58.71	1658	62.54	1656	71.6	1654	83.19	1652	99.81
GR	1650	116.08	1648	222.35	1648	252.85	1648	259.17	1648	278.21
GR	1648	291.98	1648	305.86	1648	334.35	1648	360.03	1648	368.2
GR	1648	450.38	1650	484.45	1650.36	490.39	1652	528.5	1654	546.14
GR	1656	553.69	1658	561.37	1660	571.08				
X1	3800	16	42.37	437.01	480	713	666			
GR	1670	24.21	1660	42.37	1658	44.95	1656	48.64	1654	62.46
GR	1654	248.3	1656	288.05	1656	307.66	1656	426.77	1658	437.01
GR	1660	446.89	1662	454.29	1664	464.34	1666	469.29	1668	473.37
GR	1670	483.32								
QT	1	2318								
X1	3900	21	76.48	332.44	468.3	238.03	320.4			
GR	1670	68.89	1660	76.48	1658	109.93	1658	128.97	1658	143.72
GR	1658	147.93	1656	228.75	1656	261.41	1658	286.12	1658.3	289.26
GR	1660	303.73	1662	332.44	1662	354.48	1660	365.24	1658.8	388.81
GR	1660	416.11	1662	428.9	1664	448.42	1666	460.82	1668	489.05
GR	1670	546.72								
X1	4000	11	62.12	249.41	444.57	477.86	465.67			
GR	1670	57.92	1668	60.45	1666	62.12	1664	69.1	1662	80.78
GR	1660	85.35	1660	112.66	1662	121.12	1664	164.38	1666	239.26
GR	1666.3	249.41								
X1	4100	18	201.4	408.03	535	356	497			
GR	1680	148.32	1678	157.13	1676	173.19	1674	188.76	1672	201.4
GR	1670	217.1	1670	223.19	1670	244.9	1668	248.78	1666	254.13
GR	1666	279.97	1668	296.89	1670	368.21	1672	395.34	1674	408.03
GR	1676	416.54	1678	422.71	1680	431.82				
X1	4200	21	72.87	318.01	285	297	402			
GR	1690	0	1688	8.75	1686	20.32	1684	34.98	1682	44.12
GR	1680	52.74	1678	72.87	1676	109.44	1674	148.79	1673.3	163.05
GR	1674	174.44	1674	221.93	1672	228.81	1670	242.3	1670	245.6
GR	1672	268.66	1674	290.23	1676	304.27	1678	311.41	1680	318.01
GR	1690	331.29								
X1	4300	19	168.17	349.29	317.35	407.28	383.62			
GR	1700	89.17	1690	105.7	1680	168.17	1678	195.5	1677.6	201.3
GR	1676	233.39	1676	271.26	1678	296.29	1680	349.29	1682	374.61
GR	1684	413.28	1686	454.41	1688	473.84	1690	495.02	1692	512.03
GR	1694	521.72	1696	534.23	1698	545.99	1700	552.12		

X1	4400	20	1152.32	1302.67	432	439	476			
GR	1698	1047.48	1696	1072.5	1694	1113.06	1692	1129.03	1690	1144.19
GR	1688	1152.32	1686	1159.38	1684	1171.95	1682	1198.73	1680	1240.97
GR	1680	1261.36	1682	1265.11	1684	1271.18	1686	1281.25	1688	1302.67
GR	1690	1310.07	1692	1316.26	1694	1322.58	1696	1328.05	1698	1379.32
X1	4500	22	91.69	375.6	416.91	575.19	533.38			
GR	1720	75.46	1710	91.69	1700	117.4	1699.3	120.73	1698	126.14
GR	1696	135.73	1694	144.81	1692	170.97	1690	176.15	1688	181.18
GR	1686	188.65	1686	207.59	1688	225.29	1690	276.16	1690.6	289.36
GR	1692	317.67	1694	325.19	1696	312.17	1698	317.97	1700	352.73
GR	1710	375.6	1712	416.63						
X1	4600	21	124.65	333.42	488	278	442			
GR	1710	16.97	1708	22.09	1706	26.16	1704	32.81	1702	52.97
GR	1700	69.79	1700	71.45	1701.4	100.97	1700	114.65	1698	178.31
GR	1696	199.43	1694	245.08	1692	251.89	1692	277.07	1692	285.45

```
GR     1692     294.37      1694     299.32      1696     317.63      1698     322.08      1700     333.42
GR     1710     339.21

X1     4700         29     373.98     442.2     272.78     275.83     260.86
X3        0                                      442.2       1700
GR     1716          0       1714      8.97       1712      19.28       1710      50.93       1708      76.41
GR     1708      85.71       1710     111.4       1710     149.36       1710     171.04     1710.6     220.24
GR     1710     255.18       1710     257.77      1710     275.64       1708     298.45       1706     313.76
GR     1704     334.45       1702     364.57      1700     373.98       1698     382.11       1696     387.57
GR     1696     418.98       1698     430.84      1700      442.2       1700     475.32       1698     485.47
GR     1698     491.37       1700     503.73      1710     533.35     1712.7     554.54

X1     4800         22     199.39     286.05     187.19     241.84     227.74
GR     1720          0       1720      34.45     1719.1      47.68       1718      67.95       1716      81.26
GR     1714      99.11       1714     138.55     1714.5     152.91       1714     167.56       1712     188.86
GR     1710     199.39       1708     204.07       1706     211.95       1704     220.53       1702     222.94
GR     1700     229.54       1698      234.6       1698     259.35       1700     266.01       1710     286.05
GR     1720     306.75       1720     307.66

NC     0.04       0.04      0.025        0.1        0.3
X1     4900         14     118.6     259.71     374.55     218.45     351.24
GR     1720     101.08       1710      118.6       1708     126.87       1706     136.18       1704     139.34
GR     1702     144.61       1702     157.05       1702     171.77       1702     187.75       1704     198.82
GR     1706     207.55       1708     232.01       1710     259.71       1720     290.56
```


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

```
*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

CCHV=      .100 CEHV=      .300
*SECNO 200.000
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1560.00 ELREA=      1560.00

   200.000      1.07   1555.07   1555.07   1556.95   1555.58       .50       .00       .00   1560.00
     676.9         0     676.9         .0        .0     118.9         .0        .0        .0   1560.00
       .00       .00      5.69       .00      .000      .025      .000      .000   1554.00   2956.23
   .009142        0.        0.        0.         0        17         0       .00    118.37   3074.60


*SECNO 300.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1562.00 ELREA=      1562.00

   300.000      2.02   1560.02   1560.02       .00   1560.78       .76      1.01       .08   1562.00
     676.9         .0     676.9         .0        .0      96.9         .0         .9         .7   1562.00
       .01       .00      6.99       .00      .000      .025      .000      .000   1558.00   2954.41
   .008009       365.      352.      360.         0        14         0       .00     64.06   3018.47


CCHV=      .100 CEHV=      .300
*SECNO 400.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1566.00 ELREA=      1564.00

   400.000      2.57   1562.57   1562.57       .00   1563.10       .53      1.15       .02   1566.00
     676.9         .0     676.9         .0        .0     115.7         .0       1.2        1.0   1564.00
       .02       .00      5.85       .00      .000      .025      .000      .000   1560.00   2324.55
   .009210       132.      134.      158.         0        11         0       .00    110.76   2435.31
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

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CCHV=      .300 CEHV=      .500
*SECNO 500.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1572.00 ELREA=      1572.00
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   500.000      2.19   1566.49   1566.49       .00   1567.57      1.08       .36       .27   1572.00
     676.9        .0     676.9        .0        .0      81.2        .0       1.4       1.1   1572.00
       .02        .00      8.34       .00       .000      .015       .000       .000   1564.30   2332.84
   .002947       75.       75.       82.          0        11          0       .00     37.73   2370.57


CCHV=      .300 CEHV=      .500

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS     1566.23 , NOT     1566.49 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB  XK         XKOR       COFQ       RDLEN      BWC        BWP        BAREA      SS         ELCHU      ELCHD
     1.25       1.50       2.70      76.00      37.73       1.34     147.38        .00   1565.46   1564.37

*SECNO 600.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.43

CLASS B LOW FLOW

3420 BRIDGE W.S.=     1567.12 BRIDGE VELOCITY=        8.43     CALCULATED CHANNEL AREA=         60.

 EGPRS       EGLWC       H3         QWEIR      QLOW       BAREA      TRAPEZOID      ELLC       ELTRD      WEIRLN
                                                                      AREA
   1566.98   1568.81        .00          0.       677.       147.       110.      1568.47   1572.66          0.


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1572.60 ELREA=      1572.60

   600.000      2.73   1568.13        .00        .00   1568.81        .69       1.25       .00   1572.60
     676.9        .0     676.9        .0        .0     101.7        .0       1.6       1.3   1572.60
       .03        .00      6.66       .00       .000      .015       .000       .000   1565.40   2596.22
   .001437      122.      133.      131.          0          0          0       .00     37.73   2633.95


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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


CCHV=      .300 CEHV=      .500
*SECNO 700.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     2121.8     2330.8  TYPE=       1  TARGET=       208.990
 ELENCL=    1578.00  ELENCR=    1578.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1573.80 ELREA=      1574.90

   700.000      3.78   1573.28   1573.28        .00   1573.80        .52        .37        .05   1573.80
     676.9        .0     676.9        .0        .0     117.0        .0       1.9       1.5   1578.00
       .03        .00      5.78       .00       .000      .030       .000       .000   1569.50   2123.57
   .014164      133.      113.       79.          0         11          0       .00     118.74   2242.30


CCHV=      .100 CEHV=      .300
*SECNO 800.000
3280 CROSS SECTION     800.00 EXTENDED        .78 FEET

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.53

3470 ENCROACHMENT STATIONS=     1769.2     1903.9  TYPE=       1  TARGET=       134.670
 ELENCL=    1578.00  ELENCR=    1578.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1574.50 ELREA=      1576.00

   800.000      4.78   1574.78   1574.41        .00   1575.11        .33       1.29        .02   1574.50
     684.7        .0     684.7        .0        .0     147.9        .0       2.4       1.8   1578.00
       .04        .00      4.63       .00       .000      .030       .000       .000   1570.00   1769.22
   .006169      135.      145.      140.          3         16          0       .00     112.70   1881.92


*SECNO 900.000
3280 CROSS SECTION     900.00 EXTENDED       1.37 FEET

1470 ENCROACHMENT STATIONS=     1575.7     1686.8  TYPE=       1  TARGET=       111.140
 ELENCL=    1578.00  ELENCR=    1578.00
1
   24SEP99      16:51:51                                                                                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
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3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1574.50 ELREA=      1577.00

   900.000      4.37   1575.37   1575.29       .00   1576.00       .63       .79       .09   1574.50
     809.0         .0     809.0        .0        .0     127.4        .0       2.7       2.1   1578.00
       .05        .00      6.35       .00      .000      .030      .000      .000   1571.00   1575.70
   .009412       102.       104.       108.         2        10         0       .00     82.64   1658.34


*SECNO 1000.000
3280 CROSS SECTION   1000.00 EXTENDED       1.15 FEET


3470 ENCROACHMENT STATIONS=      1472.4     1568.4  TYPE=       1  TARGET=       95.950
 ELENCL=   1579.00  ELENCR=   1579.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1576.00 ELREA=      1577.20

  1000.000      5.31   1576.46   1576.39       .00   1577.28       .82      1.23       .06   1576.00
     984.3         0     984.3        .0        .0     135.6        .0       3.1       2.3   1579.00
       .05        .00      7.26       .00      .000      .030      .000      .000   1571.15   1472.42
   .011281       117.       118.       122.         1        11         0       .00     81.87   1554.29


*SECNO 1100.000
3280 CROSS SECTION   1100.00 EXTENDED       1.80 FEET


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.85


3470 ENCROACHMENT STATIONS=      1320.1     1417.7  TYPE=       1  TARGET=       97.610
 ELENCL=   1579.00  ELENCR=   1579.00
  1100.000      6.10   1577.50   1576.96       .00   1578.06       .56       .75       .01   1576.00
    1261.1         .0    1261.1        .0        .0     210.5        .0       3.5       2.5   1579.00
       .06        .00      5.99       .00      .000      .030      .000      .000   1571.40   1320.06
   .005421       102.       104.       104.         2         8         0       .00     97.61   1417.67


*SECNO 1200.000
3280 CROSS SECTION   1200.00 EXTENDED       1.42 FEET

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   24SEP99      16:51:51                                                                          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 =  1.58


3470 ENCROACHMENT STATIONS=      1178.4     1272.6  TYPE=       1  TARGET=       94.200
 ELENCL=   1582.00  ELENCR=   1581.00
  1200.000      6.30   1577.92   1577.37       .00   1578.71       .79       .58       .07   1576.00
    1937.0         .0    1937.0        .0        .0     271.9        .0       4.1       2.7   1581.00
       .06        .00      7.12       .00      .000      .030      .000      .000   1571.62   1178.38
   .005135       112.       110.       110.         2        12         0       .00     94.20   1272.58


*SECNO 1300.000

3265 DIVIDED FLOW

3280 CROSS SECTION   1300.00 EXTENDED       1.97 FEET

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=          .0     1207.2  TYPE=       1  TARGET=     1207.179

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1582.00 ELREA=      1579.00

  1300.000      6.28   1578.97   1578.97       .00   1580.16      1.18      1.11       .12   1582.00
    2158.1         .0    2158.1        .0        .0     247.3        .0       5.1       3.2   1583.00
       .07        .00      8.73       .00      .000      .025      .000      .000   1572.69   1077.33
   .007755       199.       276.       153.         0         5         0       .00    110.21   1207.03


*SECNO 1400.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=          .0     1186.3  TYPE=       1  TARGET=     1186.249

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1584.00 ELREA=      1584.00

  1400.000      5.73   1583.73   1583.73       .00   1584.85      1.12      1.20       .01   1584.00
    2158.1         .0    2158.1        .0        .0     254.5        .0       6.1       3.6   1587.00
       .07        .00      8.48       .00      .000      .025      .000      .000   1578.00   1071.26
   .007134       122.       162.       190.         0        12         0       .00    114.18   1185.44


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   24SEP99      16:51:51                                                                          PAGE   16
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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 1500.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.47

1500.000	6.91	1584.91	1583.69	.00	1585.21	.29	.27	.08	1583.00
2281.4	1.2	2074.9	205.2	1.3	458.6	178.4	7.2	4.3	1583.80
.08	.92	4.52	1.15	.040	.025	.040	.000	1578.00	1080.32
.001309	76.	108.	120.	4	5	0	.00	400.48	1480.80

*SECNO 1600.000

1600.000	4.75	1585.15	1583.74	.00	1585.46	.31	.25	.01	1584.00
2281.4	.7	2228.7	52.0	.9	491.3	54.9	9.9	5.8	1584.00
.09	.76	4.54	.95	.040	.025	.040	.000	1580.40	1092.86
.001194	101.	196.	210.	3	11	0	.00	247.01	1339.89

*SECNO 1650.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1588.00 ELREA= 1584.70

1650.000	4.70	1586.70	1586.70	.00	1587.53	.83	.37	.15	1588.00
2281.4	.0	1438.8	842.6	.0	162.2	264.6	11.9	6.8	1584.70
.10	.00	8.87	3.18	.000	.025	.040	.000	1582.00	1133.09
.004450	191.	176.	186.	0	5	0	.00	261.19	1394.27

*SECNO 1700.000

1700.000	5.56	1587.61	1587.27	.00	1588.14	.53	.58	.01	1586.00
2281.4	4.4	1437.1	839.8	2.7	203.6	308.4	13.6	7.8	1586.50
.11	1.65	7.06	2.72	.040	.025	.040	.000	1582.05	1283.26
.003052	164.	161.	155.	3	8	0	.00	293.78	1577.04

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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 1750.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1750.000	6.64	1588.74	1588.74	.00	1589.66	.92	.58	.12	1590.00
2281.4	.0	1791.6	489.8	.0	208.8	186.0	15.4	8.9	1587.50
.11	.00	8.58	2.63	.000	.025	.040	.000	1582.10	1096.93
.003735	171.	169.	180.	0	8	0	.00	218.35	1315.28

CCHV= .100 CEHV= .300
*SECNO 1800.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1800.000	7.97	1590.07	1590.07	.00	1592.18	2.11	.81	.36	1596.00
2281.4	.0	2281.4	.0	.0	195.9	.0	16.5	9.3	1592.00
.12	.00	11.65	.00	.000	.025	.000	.000	1582.10	1145.68
.006349	174.	171.	148.	0	11	0	.00	46.61	1192.29

CCHV= .300 CEHV= .500
*SECNO 1900.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1900.000	12.61	1594.80	1594.80	.00	1597.11	2.31	.20	.10	1592.19
2210.4	91.3	1940.8	178.3	17.0	151.3	27.9	16.8	9.4	1592.19
.12	5.37	12.82	6.40	.015	.015	.015	.000	1582.19	1180.30
.002110	67.	59.	61.	0	15	0	.00	42.26	1222.56

CCHV= .300 CEHV= .500

SPECIAL BRIDGE

SB XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
.00	1.50	2.70	114.00	12.00	.00	120.00	.00	1588.88	1582.19

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*SECNO 2000.000
 PRESS FLOW BECAUSE EGLWC OF    1602.90  EXCEEDS 1.5 DEPTH

3301 HV CHANGED MORE THAN HVINS

1
   24SEP99      16:51:51                                                                                    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

PRESSURE FLOW

 EGPRS      EGLWC      H3       QWEIR      QPR       BAREA    TRAPEZOID      ELLC      ELTRD     WEIRLN
                                                              AREA
  1602.70   1602.90      .00        0.     2210.      120.      40.     1592.19   1603.83        0.

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3710 WSEL ASSUMED BASED ON MIN DIFF
3693 PROBABLE MINIMUM SPECIFIC ENERGY
  2000.000     12.70   1601.58   1601.34      .00   1602.91      1.33       .53      5.06   1598.88
    2210.4     283.7    1580.4     346.3     54.8     152.4      60.2      18.5       9.9   1598.80
       .13      5.18     10.17      5.75      .015      .015      .015      .000   1588.88   1005.53
   .001362      320.      320.      303.       20         5         0       .00     84.63   1090.16

CCHV=      .300 CEHV=      .500
*SECNO 2100.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  6.06

  2100.000     13.19   1603.19   1595.96      .00   1603.29       .10       .01       .37   1596.00
    3478.0     494.7    2765.4     217.9     437.4    1009.7     222.4      19.7      10.1   1596.00
       .13      1.13      2.74       .98      .040      .025      .040      .000   1590.00   1011.17
   .000092       59.       50.       55.         2        14         0       .00    236.34   1247.51

CCHV=      .100 CEHV=      .300
*SECNO 2200.000
3280 CROSS SECTION    2200.00 EXTENDED       1.30 FEET

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.74

  2200.000     10.30   1603.30   1598.07      .00   1603.31       .01       .02       .01   1598.00
    3478.0     105.2    1558.3    1814.5     237.6    1275.7    2652.0      40.3      11.5   1598.00
       .23       .44      1.22       .68      .040      .025      .040      .000   1593.00     49.62
   .000030       383.      329.      274.         2        24         0       .00    730.02    779.64

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   24SEP99      16:51:51                                                                                    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

CCHV=      .100 CEHV=      .300
*SECNO 2300.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .29

3470 ENCROACHMENT STATIONS=         .0     453.1  TYPE=       1  TARGET=      451.089
  2300.000      9.22   1603.22   1600.58      .00   1603.38       .16       .02       .04   1600.00
    3478.0     233.1    2407.5     837.4     205.4     640.1     610.8      60.4      17.8   1600.00
       .26      1.13      3.76      1.37      .040      .025      .040      .000   1594.00     41.44
   .000349       320.      312.      311.         3        17         0       .00    460.34    501.78

*SECNO 2330.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .42

  2330.000      7.08   1603.08   1602.18      .00   1603.67       .58       .16       .13   1601.00
    3478.0     152.1    3191.8     134.1      81.5     499.9      82.5      66.1      19.8   1601.60
       .27      1.87      6.39      1.63      .040      .025      .040      .000   1596.00   1071.02
   .001998       235.      240.      222.         4        19         0       .00    315.64   1386.66

*SECNO 2350.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2350.000      2.46   1604.46   1604.46      .00   1605.18       .72       .24       .04   1604.00
    3478.0       1.0    3473.1       3.9       .8     509.0       1.1      67.1      20.5   1604.00
       .27      1.25      6.82      1.26      .040      .025      .040      .000   1602.00   1021.59
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   .008305      151.       63.      123.         0        22         0      .00    377.07   1398.65


*SECNO 2400.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2400.000      6.53   1604.53   1604.53      .00   1605.78      1.25       .37       .16   1602.00
    3478.0     449.1    2777.1     251.8     170.2     279.0      94.7      68.2      21.2   1602.00
       .28      2.64      9.95      2.66      .040      .025      .040      .000   1598.00    431.05
   .002963      178.       71.      109.         0        17         0      .00    241.15    672.21


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   24SEP99      16:51:51                                                                          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


*SECNO 2500.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2500.000      4.37   1606.37   1606.37      .00   1607.75      1.38       .70       .04   1604.00
    3478.0     711.6    2737.8      28.6     160.1     264.3       9.2      70.2      22.0   1604.00
       .28      4.44     10.36      3.11      .040      .025      .040      .000   1602.00     89.63
   .005182      187.       180.     183.         0        14         0      .00    161.89    251.53


*SECNO 2600.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2600.000      4.06   1610.06   1610.06      .00   1611.42      1.36      2.18       .00   1612.00
    3474.0        .0    3474.0        .0        .0     371.2        .0      73.6      23.3   1612.00
       .29       .00      9.36       .00      .000      .025      .000      .000   1606.00    779.60
   .006818      321.       373.     391.         0        11         0      .00    139.82    919.42


*SECNO 2700.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2700.000      4.56   1612.56   1612.56      .00   1613.79      1.23      1.69       .01   1614.00
    3474.0        .0    3474.0        .0        .0     390.8        .0      75.8      24.1   1614.00
       .30       .00      8.89       .00      .000      .025      .000      .000   1608.00    649.69
   .006863      250.       247.     237.         0         8         0      .00    160.77    810.46


*SECNO 2800.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=      263.2      507.8  TYPE=       1  TARGET=     -263.200
 ELENCL=   1616.00  ELENCR= 100000.00
  2800.000      5.31   1615.31   1615.31      .00   1616.64      1.33      2.58       .03   1616.00
    3474.0        .0    3474.0        .0        .0     375.1        .0      79.1      25.4   1616.00
       .31       .00      9.26       .00      .000      .025      .000      .000   1610.00    267.64
   .006844      263.       377.     390.         0        11         0      .00    144.58    412.22


*SECNO 2900.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
1
   24SEP99      16:51:51                                                                          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


3470 ENCROACHMENT STATIONS=      192.8      890.2  TYPE=       1  TARGET=     -392.800
 ELENCL=   1620.51  ELENCR= 100000.00
  2900.000      6.57   1618.57   1618.57      .00   1619.51       .94      2.33       .04   1620.00
    3474.0        .0    3474.0        .0        .0     446.7        .0      81.8      26.9   1620.00
       .32       .00      7.78       .00      .000      .025      .000      .000   1612.00    511.02
   .009381      293.       292.     274.         0        11         0      .00    282.84    793.86


*SECNO 3000.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  3000.000      6.69   1620.69   1620.69      .00   1621.93      1.23      2.19       .09   1620.00
    3474.0     139.6    3329.4       5.0      72.5     365.9       4.1      85.4      29.0   1620.00
       .33      1.93      9.10      1.22      .040      .025      .040      .000   1614.00    232.84
   .004467      406.       350.     342.         0         5         0      .00    222.85    455.69


*SECNO 3100.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
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3100.000	6.66	1624.66	1624.66	.00	1625.94	1.28	1.66	.01	1626.00
3474.0	.0	3474.0	.0	.0	382.6	.0	88.4	30.4	1626.00
.34	.00	9.08	.00	.000	.025	.000	.000	1618.00	241.79
.006816	383.	302.	294.	0	5	0	.00	149.43	391.22

*SECNO 3200.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3200.000	5.52	1627.52	1627.52	.00	1629.64	2.11	2.49	.25	1630.00
3474.0	.0	3474.0	.0	.0	297.8	.0	91.4	31.4	1630.00
.35	.00	11.67	.00	.000	.025	.000	.000	1622.00	254.47
.005981	427.	390.	396.	0	11	0	.00	71.99	326.45

*SECNO 3300.000

3265 DIVIDED FLOW

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

3301 HV CHANGED MORE THAN HVINS

3300.000	3.38	1631.38	1631.36	.00	1632.76	1.38	3.05	.07	1636.00
3474.0	.0	3474.0	.0	.0	368.4	.0	95.1	32.5	1636.00
.37	.00	9.43	.00	.000	.025	.000	.000	1628.00	48.20
.006678	463.	483.	416.	3	14	0	.00	132.80	535.55

*SECNO 3400.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3400.000	5.11	1639.11	1639.11	.00	1639.82	.72	3.21	.07	1640.00
3474.0	.0	3474.0	.0	.0	511.1	.0	99.2	35.0	1640.00
.38	.00	6.80	.00	.000	.025	.000	.000	1634.00	95.51
.009731	467.	402.	326.	0	17	0	.00	408.71	504.21

*SECNO 3500.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.41

3500.000	2.15	1642.15	1641.90	.00	1642.55	.40	2.69	.03	1646.00
3474.0	.0	3474.0	.0	.0	685.7	.0	104.7	39.2	1646.00
.40	.00	5.07	.00	.000	.025	.000	.000	1640.00	1165.28
.004861	446.	403.	364.	5	22	0	.00	507.21	1672.49

*SECNO 3600.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3600.000	1.42	1647.42	1647.42	.00	1648.05	.64	2.26	.07	1648.00
3474.0	.0	3474.0	.0	.0	542.3	.0	109.8	43.1	1648.00
.42	.00	6.41	.00	.000	.025	.000	.000	1646.00	184.97
.008531	366.	359.	357.	0	14	0	.00	430.17	615.14

*SECNO 3700.000

3700.000	2.06	1650.06	1649.75	.00	1650.55	.49	2.48	.01	1652.00
3474.0	.0	3474.0	.0	.0	617.2	.0	115.2	46.8	1652.00
.44	.00	5.63	.00	.000	.025	.000	.000	1648.00	115.62
.004530	398.	410.	401.	3	11	0	.00	369.76	485.38

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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 3800.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3800.000	2.25	1656.25	1656.25	.00	1656.94	.70	4.01	.06	1660.00
3474.0	.0	3474.0	.0	.0	518.7	.0	121.9	52.6	1658.00
.47	.00	6.70	.00	.000	.025	.000	.000	1654.00	48.18
.008386	480.	666.	713.	0	8	0	.00	379.85	428.03

*SECNO 3900.000

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

3900.000	2.79	1658.79	1658.78	.00	1659.61	.83	2.63	.04	1660.00
2318.0	.0	2318.0	.0	.0	317.6	.0	127.0	54.7	1662.00
.48	.00	7.30	.00	.000	.025	.000	.000	1656.00	96.78
.007964	468.	320.	238.	2	11	0	.00	196.62	293.40

*SECNO 4000.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4000.000	4.62	1664.62	1664.62	.00	1665.76	1.14	3.52	.09	1666.00
2318.0	.0	2318.0	.0	.0	270.2	.0	130.1	56.4	1666.30
.49	.00	8.58	.00	.000	.025	.000	.000	1660.00	66.94
.007186	445.	466.	478.	0	14	0	.00	120.65	187.58

*SECNO 4100.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4100.000	4.34	1670.34	1670.34	.00	1671.28	.94	3.63	.02	1672.00
2318.0	.0	2318.0	.0	.0	298.3	.0	133.4	58.0	1674.00
.51	.00	7.77	.00	.000	.025	.000	.000	1666.00	214.41
.007412	535.	497.	356.	0	12	0	.00	158.44	372.85

*SECNO 4200.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4200.000	4.93	1674.93	1674.93	.00	1675.84	.91	3.00	.00	1678.00
2318.0	.0	2318.0	.0	.0	302.8	.0	136.1	59.5	1680.00
.53	.00	7.65	.00	.000	.025	.000	.000	1670.00	130.55
.007494	285.	402.	297.	0	8	0	.00	166.18	296.74

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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 4300.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4300.000	1.22	1679.22	1679.22	.00	1680.20	.99	2.86	.02	1680.00
2318.0	.0	2318.0	.0	.0	290.6	.0	138.7	60.9	1680.00
.54	.00	7.98	.00	.000	.025	.000	.000	1676.00	178.89
.007442	317.	384.	407.	0	14	0	.00	149.61	328.50

*SECNO 4400.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4400.000	4.01	1684.01	1684.01	.00	1685.31	1.30	3.41	.09	1688.00
2318.0	.0	2318.0	.0	.0	253.1	.0	141.7	62.2	1688.00
.55	.00	9.16	.00	.000	.025	.000	.000	1680.00	1171.90
.006904	432.	476.	439.	0	11	0	.00	99.31	1271.22

*SECNO 4500.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4500.000	4.55	1690.55	1690.55	.00	1691.73	1.18	3.70	.01	1710.00
2318.0	.0	2318.0	.0	.0	266.1	.0	144.9	63.5	1710.00
.57	.00	8.71	.00	.000	.025	.000	.000	1686.00	174.72
.006979	417.	533.	575.	0	8	0	.00	113.57	288.29

*SECNO 4600.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4600.000	3.99	1695.99	1695.99	.00	1697.15	1.16	3.13	.00	1700.00
2318.0	.0	2318.0	.0	.0	267.7	.0	147.6	64.7	1700.00
.59	.00	8.66	.00	.000	.025	.000	.000	1692.00	199.71
.007167	488.	442.	278.	0	15	0	.00	117.81	317.52

*SECNO 4700.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= .0 442.2 TYPE= 1 TARGET= 442.199

4700.000	4.65	1700.65	1700.65	.00	1701.94	1.30	1.48	.04	1700.00
2318.0	1.2	2241.0	75.8	1.0	241.2	40.4	149.3	65.5	1700.00
.59	1.17	9.29	1.88	.040	.025	.040	.000	1696.00	170.94
.004619	273.	261.	276.	0	11	0	.00	134.71	505.65

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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 4800.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4800.000	5.20	1703.20	1703.20	.00	1705.21	2.01	1.21	.21	1710.00
2318.0	.0	2318.0	.0	.0	203.6	.0	150.5	66.0	1710.00
.60	.00	11.39	.00	.000	.025	.000	.000	1698.00	221.50
.006116	187.	228.	242.	0	8	0	.00	50.94	272.43

CCHV= .100 CEHV= .300
*SECNO 4900.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4900.000	3.90	1705.90	1705.90	.00	1707.53	1.63	2.21	.04	1710.00
2318.0	.0	2318.0	.0	.0	226.0	.0	152.3	66.5	1710.00
.61	.00	10.26	.00	.000	.025	.000	.000	1702.00	136.35
.006483	375.	351.	218.	0	15	0	.00	70.75	207.09

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TWSPLIT FLOW AT PULSIPHER/I-15 CULVERT

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
1267.64	1297.97	2.36	1267.64	1297.97	2.36	12	1601.581	1603.191	2000.000	2100.000

TWSTATION 1400 - SPLIT FLOW OVER RIGHT BANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
123.29	123.16	.11	1190.93	1421.13	2.15	12	1583.734	1584.915	1400.000	1500.000

TWSTATION 1300 - SPLIT FLOW OVER RIGHT BANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
.00	.00	.00	1190.93	1421.13	2.15	12	1578.974	1583.734	1300.000	1400.000

TWSTATION 1200 - SPLIT FLOW OVER LEFT BANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
221.06	221.41	.16	1611.99	1642.54	1.88	12	1577.918	1578.974	1200.000	1300.000

TWSTATION 1100 - SPLIT FLOW OVER LEFT OVERBANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
675.91	677.11	.18	2287.90	2319.65	1.38	12	1577.501	1577.918	1100.000	1200.000

TWSTATION 1000 - SPLIT FLOW OVER LEFT BANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
276.76	277.68	.33	2564.66	2597.33	1.27	12	1576.464	1577.501	1000.000	1100.000

TWSTATION 900 - SPLIT FLOW OVER LEFT BANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
175.30	174.42	.50	2739.96	2771.75	1.15	12	1575.371	1576.464	900.000	1000.000

TWSTATION 800 - SPLIT FLOW OVER LEFT BANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
124.38	124.61	.19	2864.34	2896.37	1.11	12	1574.782	1575.371	800.000	900.000

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TWSTATION 700 - SPLIT FLOW OVER LEFT BANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
7.76	7.70	.81	2872.10	2904.06	1.11	12	1573.282	1574.782	700.000	800.000

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THIS RUN EXECUTED 24SEP99 16:51:51

****

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

Pulsipher Wash

SUMMARY PRINTOUT TABLE 100

	SECNO	EGLWC	ELLC	EGPRS	ELTRD	QPR	QWEIR	CLASS	H3	DEPTH	CWSEL	VCH	EG
*	600.000	1568.81	1568.47	1566.98	1572.66	676.90	.00	2.00	.00	2.73	1568.13	6.66	1568.81
*	2000.000	1602.90	1592.19	1602.70	1603.83	2210.36	.00	10.00	.00	12.70	1601.58	10.37	1602.91

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Pulsipher Wash

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	200.000	.00	.00	.00	1554.00	676.90	1555.07	1555.07	1555.58	92.42	5.69	118.87	70.79
*	300.000	352.07	.00	.00	1558.00	676.90	1560.02	1560.02	1560.78	80.09	6.99	96.85	75.64
*	400.000	134.41	.00	.00	1560.00	676.90	1562.57	1562.57	1563.10	92.10	5.85	115.67	70.53
*	500.000	74.97	.00	.00	1564.30	676.90	1566.49	1566.49	1567.57	29.47	8.34	81.17	124.70
*	600.000	133.46	1572.66	1568.47	1565.40	676.90	1568.13	.00	1568.81	14.37	6.66	101.71	178.53
*	700.000	112.64	.00	.00	1569.50	676.90	1573.28	1573.28	1573.80	141.64	5.78	117.02	56.88
*	800.000	144.94	.00	.00	1570.00	684.66	1574.78	1574.41	1575.11	61.69	4.63	147.93	87.17
	900.000	101.62	.00	.00	1571.00	809.04	1575.37	1575.29	1576.00	94.12	6.35	127.43	83.39
	1000.000	118.27	.00	.00	1571.15	984.34	1576.46	1576.39	1577.28	112.81	7.26	135.64	92.68
*	1100.000	103.70	.00	.00	1571.40	1261.10	1577.50	1576.96	1578.06	54.21	5.99	210.46	171.28
*	1200.000	110.23	.00	.00	1571.62	1937.01	1577.92	1577.37	1578.71	51.35	7.12	271.91	270.30
*	1300.000	176.37	.00	.00	1572.69	2158.07	1578.97	1578.97	1580.16	77.55	8.73	247.31	245.06
*	1400.000	161.58	.00	.00	1578.00	2158.07	1583.73	1583.73	1584.85	71.34	8.48	254.53	255.50
*	1500.000	108.07	.00	.00	1578.00	2281.36	1584.91	1583.69	1585.21	13.09	4.52	638.35	630.61
	1600.000	196.31	.00	.00	1580.40	2281.36	1585.15	1583.74	1585.46	11.94	4.54	547.11	660.09
*	1650.000	175.57	.00	.00	1582.00	2281.36	1586.70	1586.70	1587.53	44.50	8.87	426.86	341.98
	1700.000	161.13	.00	.00	1582.05	2281.36	1587.61	1587.27	1588.14	30.52	7.06	514.70	412.93
*	1750.000	169.33	.00	.00	1582.10	2281.36	1588.74	1588.74	1589.66	37.35	8.58	394.86	373.29
*	1800.000	170.93	.00	.00	1582.10	2281.36	1590.07	1590.07	1592.18	63.49	11.65	195.90	286.31
*	1900.000	58.98	.00	.00	1582.19	2210.36	1594.80	1594.80	1597.11	21.10	12.82	196.22	481.15
*	2000.000	319.85	1603.83	1592.19	1588.88	2210.36	1601.58	1601.34	1602.91	13.62	10.37	267.39	598.83
*	2100.000	49.81	.00	.00	1590.00	3478.00	1601.19	1595.96	1603.29	.92	2.74	1669.55	3626.49
*	2200.000	328.57	.00	.00	1593.00	3478.00	1603.30	1598.07	1603.31	.30	1.22	4165.37	6321.78
*	2300.000	311.55	.00	.00	1594.00	3478.00	1603.22	1600.58	1603.38	3.49	3.76	1456.41	1861.93

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	2330.000	240.00	.00	.00	1596.00	3478.00	1603.08	1602.18	1603.67	19.98	6.39	663.88	778.04
*	2350.000	61.00	.00	.00	1602.00	3478.00	1604.46	1604.46	1605.18	83.05	6.82	512.91	381.64
*	2400.000	71.00	.00	.00	1598.00	3478.00	1604.53	1604.53	1605.78	29.63	9.95	543.89	638.98
*	2500.000	179.72	.00	.00	1602.00	3478.00	1606.37	1606.37	1607.75	51.82	10.36	433.59	483.15
*	2600.000	373.16	.00	.00	1606.00	3474.00	1610.06	1610.06	1611.42	68.18	9.36	371.22	420.73
*	2700.000	246.94	.00	.00	1608.00	3474.00	1612.56	1612.56	1613.79	68.63	8.89	390.79	419.35
*	2800.000	376.77	.00	.00	1610.00	3474.00	1615.31	1615.31	1616.64	68.44	9.26	375.09	419.93

*	2900.000	292.09	.00	.00	1612.00	3474.00	1618.57	1618.57	1619.51	93.81	7.78	446.70	358.68
*	3000.000	349.71	.00	.00	1614.00	3474.00	1620.69	1620.69	1621.93	44.67	9.10	442.41	519.79
*	3100.000	302.10	.00	.00	1618.00	3474.00	1624.66	1624.66	1625.94	68.16	9.08	382.61	420.78
*	3200.000	390.01	.00	.00	1622.00	3474.00	1627.52	1627.52	1629.64	59.81	11.67	297.81	449.22
	3300.000	482.80	.00	.00	1628.00	3474.00	1631.38	1631.36	1632.76	66.78	9.43	368.45	425.12
*	3400.000	402.24	.00	.00	1634.00	3474.00	1639.11	1639.11	1639.82	97.31	6.80	511.14	352.16
*	3500.000	403.18	.00	.00	1640.00	3474.00	1642.15	1641.90	1642.55	48.61	5.07	685.70	498.27
*	3600.000	358.51	.00	.00	1646.00	3474.00	1647.42	1647.42	1648.05	85.31	6.41	542.32	376.11
	3700.000	409.82	.00	.00	1648.00	3474.00	1650.06	1649.75	1650.55	45.30	5.63	617.21	516.18
*	3800.000	666.00	.00	.00	1654.00	3474.00	1656.25	1656.25	1656.94	83.86	6.70	518.75	379.36
*	3900.000	320.40	.00	.00	1656.00	2318.00	1658.79	1658.78	1659.61	79.64	7.30	317.60	259.74
*	4000.000	465.67	.00	.00	1660.00	2318.00	1664.62	1664.62	1665.76	71.86	8.58	270.18	273.44
*	4100.000	497.00	.00	.00	1666.00	2318.00	1670.34	1670.34	1671.28	74.12	7.77	298.33	269.24
*	4200.000	402.00	.00	.00	1670.00	2318.00	1674.93	1674.93	1675.84	74.94	7.65	302.84	267.78
*	4300.000	383.62	.00	.00	1676.00	2318.00	1679.22	1679.22	1680.20	74.42	7.98	290.61	268.69
*	4400.000	476.00	.00	.00	1680.00	2318.00	1684.01	1684.01	1685.31	69.04	9.16	253.12	278.97
*	4500.000	533.38	.00	.00	1686.00	2318.00	1690.55	1690.55	1691.73	69.79	8.71	266.05	277.47
*	4600.000	442.00	.00	.00	1692.00	2318.00	1695.99	1695.99	1697.15	71.67	8.66	267.73	273.80
*	4700.000	260.86	.00	.00	1696.00	2318.00	1700.65	1700.65	1701.94	46.19	9.29	282.59	341.06

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	4800.000	227.74	.00	.00	1698.00	2318.00	1703.20	1703.20	1705.21	61.16	11.39	203.56	296.41
*	4900.000	351.24	.00	.00	1702.00	2318.00	1705.90	1705.90	1707.51	64.83	10.26	226.02	287.89

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Pulsipher Wash

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	200.000	676.90	1555.07	.00	.00	-1.88	118.37	.00
*	300.000	676.90	1560.02	.00	4.95	.00	64.06	352.07
*	400.000	676.90	1562.57	.00	2.54	.00	110.76	134.41
*	500.000	676.90	1566.49	.00	3.92	.00	37.73	74.97
*	600.000	676.90	1568.13	.00	1.64	.00	37.73	133.46
*	700.000	676.90	1573.28	.00	5.16	.00	118.74	112.64
*	800.000	684.66	1574.78	.00	1.50	.00	112.70	144.94
	900.000	809.04	1575.37	.00	.59	.00	82.64	103.62
	1000.000	984.34	1576.46	.00	1.09	.00	81.87	118.27
*	1100.000	1261.10	1577.50	.00	1.04	.00	97.61	103.70
*	1200.000	1937.01	1577.92	.00	.42	.00	94.20	110.23
*	1300.000	2158.07	1578.97	.00	1.06	.00	110.21	176.37
*	1400.000	2158.07	1583.73	.00	4.76	.00	114.18	161.58
*	1500.000	2281.36	1584.91	.00	1.18	.00	400.48	108.07
	1600.000	2281.36	1585.15	.00	.23	.00	247.03	196.31
*	1650.000	2281.36	1586.70	.00	1.55	.00	261.19	175.57
	1700.000	2281.36	1587.61	.00	.91	.00	293.78	161.13
*	1750.000	2281.36	1588.74	.00	1.13	.00	218.35	169.33
*	1800.000	2281.36	1590.07	.00	1.33	.00	46.61	170.93

*	1900.000	2210.36	1594.80	.00	4.73	.00	42.26	58.98
*	2000.000	2210.36	1601.58	.00	6.78	.00	84.63	319.85
*	2100.000	3478.00	1603.19	.00	1.61	.00	236.34	49.81
*	2200.000	3478.00	1603.30	.00	.11	.00	730.02	328.57
*	2300.000	3478.00	1603.22	.00	-.08	.00	460.14	311.55

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	2330.000	3478.00	1603.08	.00	-.13	.00	315.64	240.00
*	2350.000	3478.00	1604.46	.00	1.37	.00	377.07	63.00
*	2400.000	3478.00	1604.53	.00	.08	.00	241.15	71.00
*	2500.000	3478.00	1606.37	.00	1.84	.00	161.89	179.72
*	2600.000	3474.00	1610.06	.00	3.69	.00	139.82	373.36
*	2700.000	3474.00	1612.56	.00	2.50	.00	160.77	246.94
*	2800.000	3474.00	1615.31	.00	2.75	.00	144.58	376.77
*	2900.000	3474.00	1618.57	.00	3.27	.00	282.84	292.09
*	3000.000	3474.00	1620.69	.00	2.12	.00	222.85	349.71
*	3100.000	3474.00	1624.66	.00	3.96	.00	149.43	302.10
*	3200.000	3474.00	1627.52	.00	2.87	.00	71.99	390.01
	3300.000	3474.00	1631.38	.00	3.85	.00	132.80	482.80
*	3400.000	3474.00	1639.11	.00	7.73	.00	408.71	402.24
*	3500.000	3474.00	1642.15	.00	3.04	.00	507.21	403.18
*	3600.000	3474.00	1647.42	.00	5.27	.00	430.17	358.51
	3700.000	3474.00	1650.06	.00	2.64	.00	369.76	409.82
*	3800.000	3474.00	1656.25	.00	6.19	.00	379.85	666.00
*	3900.000	2318.00	1658.79	.00	2.54	.00	196.62	320.40
*	4000.000	2318.00	1664.62	.00	5.83	.00	120.65	465.67
*	4100.000	2318.00	1670.34	.00	5.72	.00	158.44	497.00
*	4200.000	2318.00	1674.93	.00	4.58	.00	166.18	402.00
*	4300.000	2318.00	1679.22	.00	4.29	.00	149.61	383.62
*	4400.000	2318.00	1684.01	.00	4.79	.00	99.31	476.00
*	4500.000	2318.00	1690.55	.00	6.54	.00	113.57	533.38
*	4600.000	2318.00	1695.99	.00	5.44	.00	117.81	442.00
*	4700.000	2318.00	1700.65	.00	4.66	.00	134.71	260.86

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	4800.000	2318.00	1703.20	.00	2.55	.00	50.94	227.74
*	4900.000	2318.00	1705.90	.00	2.70	.00	70.75	351.24

1

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SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SRCNO= 200.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

CAUTION SRCNO= 300.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SRCNO= 300.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SRCNO= 400.000 PROFILE= 1 *CRITICAL DEPTH ASSUMED*
CAUTION SRCNO= 400.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SRCNO= 500.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SRCNO= 500.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

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 CAUTION SECNO=    600.000  PROFILE=  1  HYDRAULIC JUMP D.S.
 WARNING SECNO=    600.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=    700.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    700.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=    800.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=   1100.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=   1200.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=   1300.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   1300.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   1400.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   1400.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=   1500.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=   1650.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   1650.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   1750.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   1750.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   1800.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   1800.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   1900.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   1900.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   2000.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   2000.000  PROFILE=  1  WSEL ASSUMED BASED ON MIN DIFF
 CAUTION SECNO=   2000.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=   2100.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=   2200.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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 WARNING SECNO=   2300.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=   2330.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=   2350.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   2350.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   2400.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   2400.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   2500.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   2500.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   2600.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   2600.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   2700.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   2700.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   2800.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   2800.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   2900.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   2900.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   3000.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   3000.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   3100.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   3100.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   3200.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   3200.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   3400.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   3400.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=   3500.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=   3600.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   3600.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   3800.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   3800.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=   3900.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=   4000.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4000.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   4100.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   4100.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   4200.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
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CAUTION SECNO= 4200.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 4300.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 4300.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 4400.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 4400.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 4500.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 4500.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 4600.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 4600.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 4700.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 4700.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

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CAUTION SECNO= 4900.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 4900.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

PULSREV8.OUT

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1*****************************************
*  HEC-2 WATER SURFACE PROFILES           *
*                                         *
*  Version   4.6.2;  May 1991             *
*                                         *
*  RUN DATE    24SEP99     TIME   16:51:23 *
*****************************************
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**************************************
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*  609 SECOND STREET, SUITE D        *
*  DAVIS, CALIFORNIA 95616-4687      *
*         (916) 756-1104             *
**************************************
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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                   X
X     X  X        X     X             X
X     X  XXXXXXX   XXXXX              XXXXXXX
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1
    24SEP99      16:51:23                                                                    PAGE    1


                                                                  THIS RUN EXECUTED 24SEP99    16:51:23
 ************************************
 HEC-2 WATER SURFACE PROFILES

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


 SPLIT FLOW BEING PERFORMED


 SF


 JC
 JP      0       0      40       0       0

 TWSPLIT FLOW AT PULSIPHER/I-15 CULVERT
 WS      9    2000    2100               3
 WC      0    1603      16    1602    38.3    1600      66    1599    92.5    1599
 WC 106.3    1600   113.9    1602   119.9    1604   130.5    1606

 TWSTATION 1400 - SPLIT FLOW OVER RIGHT BANK
 WS      2    1400    1500               2.7
 WC      0    1584     120  1583.8

 TWSTATION 1300 - SPLIT FLOW OVER RIGHT BANK
 WS      2    1300    1400               2.7
 WC      0    1579     190    1584

 TWSTATION 1200 - SPLIT FLOW OVER LEFT BANK
 WS      2    1200    1300               2.7
 WC      0    1576     199    1582

 TWSTATION 1100 - SPLIT FLOW OVER LEFT OVERBANK
 WS      2    1100    1200               2.7
 WC      0    1576     112    1576

 TWSTATION 1000 - SPLIT FLOW OVER LEFT BANK
 WS      2    1000    1100               2.7
 WC      0    1576     102    1576

 TWSTATION 900 - SPLIT FLOW OVER LEFT BANK
 WS      2     900    1000               2.7
 WC      0  1574.5     117    1576

 TWSTATION 800 - SPLIT FLOW OVER LEFT BANK
 WS      2     800     900               2.7
 WC      0  1574.5     102  1574.5
1
    24SEP99      16:51:23                                                                    PAGE    2


 TWSTATION 700 - SPLIT FLOW OVER LEFT BANK
 WS      2     700     800               2.7
 WC      0  1573.8     135  1574.5
1
    24SEP99      16:51:23                                                                    PAGE    3


 T1      550-035
 T2      Maquite Wash FIS Restudy
 T3      Pulsipher Wash

 J1  ICHECK    INQ      NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                 2                            -1                          3549    1538.2
```

JS **********ASSUMED DISCHARGES FOR SPLIT FLOW**********

	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	500				

J2 NPROF IPLOT PRFVS XSECV XSECH FN ALLDC IBW CHNIM ITRACE

-1		-1				-1	-6		

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

100		150							
NC	0.03	0.03	0.025	0.1	0.3				
X1	25	16	1070.51	3250.34					
GR	1540	1000	1542	1040.26	1544	1051.3	1544	1070.51	1542	1106.74
GR	1540	1112.72	1538	1119.8	1536	1124.45	1534	1146.88	1534	1568.77
GR	1536	1812.9	1538	2825.84	1540	3019.1	1540	3055.88	1540	3064.47
GR	1542	3250.34								
NC	0.03	0.03	0.025	0.1	0.3					
X1	50	19	1698.04	3597.57	379.07	464.86	293.71			
GR	1552	1679.92	1552	1698.04	1550	1721.45	1548	1736.09	1546	1765.3
GR	1544	1782.21	1542	1811.48	1540	2058.67	1538	2098.18	1536	2139.84
GR	1538	2356.27	1538	3013.91	1538	3038.08	1536	3093.32	1540	3122.55
GR	1542	3127.02	1542	3151.63	1542	3389.5	1544	3597.57		
NC				0.1	0.3					
X1	100	21	1638.22	3191.55	362.24	579.71	293.78			
GR	1566	1319.53	1556	1366.64	1554	1394.02	1553.32	1434.59	1550	1496.33
GR	1548.7	1598.69	1550	1638.22	1549.54	1665.25	1548	1796.57	1546.2	1883.83
GR	1545.5	1916.67	1544.63	1959.62	1546	1967.79	1544	1994.64	1544	2520.36
GR	1542	2645.76	1544	2677.82	1544	2716.43	1544	2796.08	1546.56	3049.15
GR	1548	3191.55								
X1	150	11	1029.02	1793.21	448.96	274.71	342.19			
GR	1566	1000	1566	1029.02	1564	1035.17	1562	1041.57	1560	1046.32
GR	1550	1070.42	1550	1704.2	1552	1745.65	1554	1750.3	1556	1758.54
GR	1558	1793.21								

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NC	0.03	0.03	0.025	0.1	0.3					
X1	200	15	2929.4	3113.93	322.99	204.7	235.94			
X3	10									
GR	1564	2778.75	1564	2874.16	1562	2912.73	1560	2929.4	1558	2941.08
GR	1556	2949.85	1554	2963.64	1554	2981.64	1554	3011.17	1554	3066.53
GR	1556	3081.56	1558	3096.65	1560	3113.93	1560	3148.31	1560	3396.06
X1	300	11	2926.48	3035.77	364.61	359.83	352.07			
X3	10									
GR	1566	2682.38	1564	2807.33	1562	2926.48	1560	2954.76	1558	2969.07
GR	1558	3000.86	1560	3018.26	1562	3035.77	1562	3082.96	1562	3156.53
GR	1564	3217.12								
NC	0.03	0.03	0.025	0.1	0.3					
X1	400	22	2281.55	2450.74	132.08	158.2	134.41			
X3	10							1566		
GR	1570	2126.23	1572	2143.31	1572	2183.04	1570	2191.36	1562	2217.92
GR	1560	2238.83	1560	2252.16	1564	2262.45	1566	2281.55	1566	2288.71
GR	1564	2319.58	1562	2326.53	1560	2333.47	1560	2352.21	1562	2362.78
GR	1562	2368.59	1562	2429.18	1564	2450.74	1566	2527.34	1566	2620.61
GR	1566	2621.4	1568	2852.45						
NC	0.015	0.015	0.015	0.3	0.5					
X1	500	11	2132.84	2370.57	75.43	81.76	74.97			
X3	10							1572	1572	
GR	1572	1921.7	1572	2203.22	1572	2332.84	1568.47	2332.84	1564.37	2332.84
GR	1564.3	2370.57	1568.47	2370.57	1572	2370.57	1572	2514.64	1572	2582.6
GR	1572	2867.98								
NC	0.015	0.015	0.015	0.3	0.5					
SB	1.25	1.5	2.7	76	37.73	1.34	147.38	0	1565.46	1564.37
X1	600	12	2596.22	2633.95	122.03	131.14	133.46			
X2			1	1568.47	1572.66			2		
X3	10							1572.6	1572.6	
GR	1574	2232.97	1572.6	2260	1572.6	2596.22	1569.56	2596.22	1565.46	2596.22
GR	1565.4	2633.95	1569.56	2633.95	1572.6	2633.95	1572.6	2866.27	1572.6	2963.4
GR	1572.6	3102.68	1573.7	3146.68						
NC	0.04	0.04	0.03	0.3	0.5					
X1	700	18	2121.76	2330.75	133.44	79.47	112.64			
X3	10			2121.76	1578	2330.75	1578	1573.8	1574.9	
GR	1574	1799.95	1572.2	1877	1572.2	1954	1572.2	2031	1573.8	2121.76
GR	1572	2128.04	1570	2132.18	1569.5	2139.33	1570	2143.07	1572	2144.69
GR	1574	2297.02	1574.9	2330.75	1574.5	2366.44	1574	2409.4	1572.7	2453.34
GR	1572.7	2564.87	1572.7	2717.29	1574	2748.19				
NC	0.04	0.04	0.03	0.1	0.3					
X1	800	22	1769.22	1901.89	134.63	139.86	144.94			
X3	10			1769.22	1578	1903.89	1578	1574.5	1576	
GR	1574	1427.88	1572.5	1510	1572.5	1592	1572.5	1674	1574	1759.85
GR	1574.5	1769.22	1574	1778.29	1572	1784.62	1570	1788.23	1570.23	1790.02
GR	1570	1791.12	1572	1797.25	1574	1818.13	1574	1841.16	1574	1867.83

GR	1576	1903.89	1574	1968.96	1573.2	2017.28	1573.2	2207.8	1573.2	2344.84

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GR	1574	2392.94	1574	2407.17						
NC	0.04	0.04	0.03							
X1	900	21	1575.7	1686.84	102.08	108.33	103.62			
X3	10			1575.7	1578	1686.84	1578	1574.5	1577	
GR	1574	1219.54	1572.9	1309.5	1572.9	1399	1572.9	1489.5	1574	1572.39
GR	1574.5	1575.7	1574	1579.92	1572	1592.09	1571	1597.2	1572	1604.66
GR	1574	1606.43	1575	1651.77	1577	1686.84	1575.8	1705.75	1574	1749.48
GR	1573.7	1798.67	1573.7	1915.16	1573.7	2060.43	1573.7	2160.73	1574	2209.7
GR	1574	2230.82								
X1	1000	20	1472.42	1568.37	116.93	121.55	118.27			
X3	10			1472.42	1579	1568.37	1579	1576	1577.2	
GR	1574	1096.67	1573.3	1190	1573.3	1283	1573.3	1376	1576	1472.42
GR	1576	1484.88	1574	1489.57	1572	1494.01	1571.15	1496.75	1572	1501.64
GR	1574	1503.91	1576	1545.7	1577.2	1568.37	1576.5	1597.74	1576	1625.79
GR	1575.5	1648.15	1574.3	1710.01	1574.3	1879.49	1574.3	2080.17	1575.3	2121.11
X1	1100	17	1320.06	1417.67	102.45	103.7	103.7			
X3	10			1320.06	1579	1417.67	1579	1576	1577.4	
GR	1574	924.71	1573.5	1024	1573.5	1124	1573.5	1224	1576	1320.06
GR	1576	1334.53	1574	1339.91	1571.4	1347.79	1574	1349.58	1576	1393.55
GR	1577.4	1417.67	1576.5	1447.13	1576	1476.62	1574.7	1519.36	1574.7	1720.11
GR	1574.7	1929.89	1575.7	1982.94						
X1	1200	22	1178.38	1272.58	111.55	110.23	110.23			
X3	10			1178.38	1582	1272.58	1581	1576	1577.5	
GR	1588	1000	1586	1003.72	1584	1007.45	1582	1011.19	1580	1030.36
GR	1578	1045.48	1576	1078.58	1575	1158.89	1576	1178.38	1576	1179.17
GR	1574	1190.7	1571.62	1204.49	1574	1209.35	1576	1247.96	1577.5	1272.58
GR	1576.5	1301.79	1576	1333.43	1575.1	1378.11	1575.1	1575.34	1575.1	1770.67
GR	1576	1817.16	1576.5	1831.23						
NC			0.025							
X1	1300	27	1014.17	1207.18	198.91	153.42	176.37			
X3	10					1207.18	1583	1582	1579	
GR	1588	1000	1586	1004.58	1584	1009.31	1582	1014.17	1582	1065.78
GR	1582	1072.99	1580	1076.58	1574	1080.99	1572.69	1083.51	1574	1092.54
GR	1580	1106.55	1580	1121.82	1578	1125.36	1576	1170.24	1576	1178.38
GR	1578	1181.85	1578	1201.6	1579	1207.18	1578	1236.12	1578	1241.05
GR	1578	1260.24	1576	1268.87	1575.6	1313.34	1575.6	1502.88	1575.6	1676.59
GR	1576	1718.52	1577	1735.14						
X1	1400	18	1061	1186.25	122.02	190.42	161.58			
X3	10					1186.25	1587	1584	1584	
GR	1600	1000	1600	1027.47	1598	1035.26	1596	1040.7	1590	1046.91
GR	1588	1052.71	1586	1056.6	1584	1061	1582	1138.25	1580	1142.92
GR	1578	1145.8	1578	1160.96	1580	1173.97	1582	1180.16	1584	1186.25
GR	1584	1230.34	1584	1231.21	1584	1307.21				

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X1	1500	22	1081.73	1230.57	76.07	119.69	108.07			
X3	10									
GR	1600	1000	1599	1069.96	1583	1081.73	1582	1182.35	1580	1186.84
GR	1578	1197.97	1578	1201.11	1580	1212.43	1582	1216.13	1583.8	1230.57
GR	1584	1294.4	1584	1308.23	1584	1356.62	1586	1628.22	1588	1674.02
GR	1590	1697.27	1592	1726.23	1594	1741.62	1596	1753.42	1598	1763.24
GR	1598	1801.09	1596	1808.99						
X1	1600	13	1094.37	1243.82	101.17	210.32	196.31			
GR	1602	1000	1600	1064.32	1594.01	1081.14	1584	1094.37	1582	1149.75
GR	1580.4	1170.49	1580.78	1218.11	1582	1229.76	1584	1243.82	1585	1327.67
GR	1586	1412.26	1588	1551.37	1590	1677.73				
X1	1650	23	1129.97	1180.64	190.68	185.82	175.57			
X3	10									
GR	1600	1000	1598	1005.05	1596	1011.4	1594	1026.96	1594	1094.89
GR	1594	1110.32	1592	1122.14	1590	1124.66	1588	1129.97	1586	1134.76
GR	1584	1139.66	1582	1148.86	1582	1161.14	1584	1172.84	1584.7	1180.64
GR	1585	1254.59	1586	1347.77	1588	1480.9	1590	1600.61	1592	1684.68
GR	1594	1697.13	1596	1700.86	1598	1704.54				
NC	0.04	0.04	0.025							
X1	1700	20	1286.61	1350.67	163.66	154.63	161.13			
GR	1602	1000	1604	1037.4	1605.9	1128.6	1605.81	1151.3	1604	1198.85
GR	1602	1246.99	1600	1248.58	1590	1277.69	1588	1282.43	1586	1286.61
GR	1584	1301.89	1582.05	1314.08	1584	1326.15	1586	1341.79	1586.5	1350.67
GR	1586	1360.4	1585.5	1416.24	1586	1475.83	1588	1602.02	1590	1708.11
NC	0.04	0.04	0.025							
X1	1750	21	1095.43	1152.29	171.49	179.87	169.33			
GR	1610	1000	1608	1023.79	1606	1053.35	1604	1063.55	1602	1070.34
GR	1600	1076.66	1590	1095.43	1588	1097.81	1586	1103.58	1582.1	1112
GR	1582.1	1122.43	1586	1133.65	1587.5	1152.29	1587.1	1211.93	1588	1287.4
GR	1590	1362.75	1592	1371.76	1594	1376.44	1596	1380.58	1598	1384.75
GR	1600	1388.94								
NC	0.04	0.04	0.025	0.1	0.3					
X1	1800	19	1139.62	1221.1	173.79	148.02	170.93			
GR	1608	1000	1606	1021.77	1604	1037.17	1602	1053.97	1600	1078.01

GR	1598	1135.85	1596	1139.62	1590	1145.75	1588	1148.51	1586	1151.34
GR	1582.1	1155.97	1582.1	1164.98	1586	1171.75	1588	1183.17	1590	1191.2
GR	1592	1221.1	1594	1234.56	1596	1243.62	1598	1254.32		
NC	0.015	0.015	0.015	0.3	0.5					
QT	1	3478								
X1	1900	14	1193.33	1205.33	66.92	60.81	58.98			
GR	1606	1000	1604	1017.04	1602	1034.84	1600	1056.24	1598	1118.67
GR	1596	1174.32	1592.19	1193.33	1582.19	1193.33	1582.19	1205.31	1592.19	1205.33
GR	1594	1221.37	1596	1224.34	1598	1232.13	1600	1241.77		

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NC	0.015	0.015	0.015	0.3	0.5					
SB		1.5	2.7	11	12		120	0	1588.88	1582.19
X1	2000	9	1044.29	1056.29	320.07	301.11	319.85			
X2			1	1592.19	1601.83					
GR	1602	1000	1600	1026.41	1598.88	1044.29	1588.88	1044.29	1588.88	1056.29
GR	1598.8	1056.29	1600	1080.33	1602	1092.77	1604	1104.82		
NC	0.04	0.04	0.025	0.3	0.5					
X1	2100	17	1091.94	1188.63	58.83	54.83	49.81			
GR	1606	1000	1604	1009.57	1602	1013.54	1600	1020.41	1598	1037.57
GR	1596	1091.94	1594	1118.59	1592	1126.16	1590	1145.6	1590	1151.46
GR	1592	1174.19	1594	1184.61	1596	1188.63	1598	1204.5	1600	1224.72
GR	1602	1240.9	1604	1251.99						
NC	0.04	0.04	0.025	0.1	0.3					
X1	2200	18	142.43	318.37	383.01	273.85	328.57			
X3	10							1598	1598	
GR	1608	0	1608	20.66	1606	28.27	1604	40.91	1603	53.3
GR	1602	71.43	1600	112.67	1598	142.43	1596	210.95	1593	217.68
GR	1598	318.37	1596	562.06	1596	571.04	1596	618.66	1596	624.51
GR	1598	693.73	1600	708.07	1602	779.64				
NC				0.1	0.3					
X1	2300	25	150.15	250.92	320.42	310.65	311.55			
X3	0					453.09	1602			
GR	1608	0	1608	15.33	1606	21.57	1604	27.19	1602	63.6
GR	1600	150.15	1599	164.23	1598	187.99	1596	192.33	1594	198.34
GR	1594	228.2	1596	235.23	1598	238.65	1600	244.41	1600	250.92
GR	1600	277.03	1600	398.64	1602	414.11	1602	452.77	1600	463.12
GR	1600	475.52	1602	492.74	1604	507.6	1606	537.25	1608	543.16
X1	2330	16	1156	1288	235	222	240			
X3	0									
GR	1608	1000	1606	1008	1604	1028	1602	1122	1601	1156
GR	1600	1203	1598	1205	1596	1209	1596	1238	1598	1243
GR	1600	1247	1601.6	1288	1602	1327	1604	1437	1606	1483
GR	1608	1508								
X1	2350	11	1025	1385	151	123	63			
X3	0									
GR	1608	1000	1606	1010	1604	1025	1603	1087	1603.5	1174
GR	1603.8	1227	1602	1271	1602	1339	1604	1385	1606	1445
GR	1608	1498								
X1	2400	21	555.74	605.96	178	109	71			
GR	1612	93.82	1610	232.8	1608.3	316.57	1608	336.99	1606	384.83
GR	1605.7	394.82	1604	447.58	1602	555.74	1600	564.71	1598	569.83
GR	1598	597.61	1600	601.64	1602	605.96	1604	666.82	1606	687.05
GR	1606	721.82	1605.3	750.29	1606	764.11	1608	799.73	1610	848.51
GR	1612	930.78								

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X1	2500	15	171.41	241.04	186.68	182.96	179.72			
GR	1612	41.78	1610	45.58	1608	56.33	1607.4	69.14	1606	97.11
GR	1604	119.54	1604	161.89	1604	173.41	1602	209.67	1602	238.99
GR	1604	243.04	1606	249.45	1608	260.55	1610	291.23	1612	303.53
QT	1	3474								
X1	2600	28	774.94	927.94	320.81	390.78	373.36			
GR	1622	170.68	1620	198.85	1618	205.29	1616	210.56	1618	237.93
GR	1616	243.57	1616	474.86	1616	499.71	1614	504.57	1612	510.3
GR	1612	752.1	1612	762.71	1612	774.94	1610	779.75	1608	784.94
GR	1608	807.9	1608	855.3	1606	872.52	1606	907.23	1608	914.3
GR	1610	919.14	1612	927.94	1613.2	946.75	1614	960.44	1616	971.24
GR	1618	997.96	1620	1011.4	1622	1026.58				
X1	2700	29	605.11	832.94	249.65	237.3	246.94			
GR	1626	35.68	1624	43.5	1622	53.17	1620	65.17	1618	101.3
GR	1618	115.11	1618	141.58	1616	147.23	1616	265.04	1616	364.54
GR	1618	369.57	1618	394.68	1616	400.49	1614	408.58	1614	570.98
GR	1614	582.3	1614	605.11	1612	667.05	1610	699.84	1608	724.01
GR	1608	753.82	1610	771.97	1610.7	781.65	1612	801.7	1614	832.94
GR	1616	894.96	1618	898.43	1620	904.21	1630	923.69		
X1	2800	16	263.07	429.47	262.99	389.6	376.77			
X3	0			263.2	1616					
GR	1616	0	1616	39.55	1616	96.03	1616	111.37	1612	159.52
GR	1614	182.66	1614.7	197.49	1616	263.07	1610	302.64	1612	344.5
GR	1613.6	372.11	1614	379.65	1616	429.47	1620	489.99	1621.6	503.61
GR	1622	507.82								

X1	2900	30	475.4	801.12	292.71	273.86	292.09			
X3	0			192.8	1620.51					
GR	1630	53.46	1628	61.93	1626	69.99	1624	77.51	1622	93.13
GR	1620	124.83	1618	331.67	1618	366.34	1620	373	1620.5	393.02
GR	1620	475.4	1618	525.34	1618	550.41	1618	631.71	1618	676.78
GR	1618	700.32	1616	722.78	1614	731.76	1612	736.6	1612	763
GR	1614	767.87	1616	772.71	1616.98	781.98	1618	790.94	1620	801.12
GR	1622	816.77	1624	832.8	1626	858.03	1628	874	1630	890.18
X1	3000	23	319.8	443.93	405.71	342.04	349.71			
GR	1630	70.06	1628	82.14	1626	94.71	1624	106.08	1623.2	152.05
GR	1622	224.19	1620	237.42	1620	274.5	1620	298.77	1620	312.51
GR	1620	339.8	1618	361.48	1616	368.38	1614	378.05	1614	399.19
GR	1616	402.54	1618	411.58	1620	443.93	1622	477.92	1624	497.81
GR	1626	542.69	1628	577.88	1628.8	598.92				
X1	3100	21	128.01	404.52	382.96	294.37	302.1			
GR	1640	88.37	1630	113.59	1628	118.26	1626	128.03	1624	297.39
GR	1622	300.14	1620	302.9	1618	305.76	1618	319.74	1618	333.19
GR	1620	337.19	1622	360.91	1624	384.72	1626	404.52	1628	466.46
GR	1630	524.54	1632	559.37	1634	582.77	1636	608.27	1638	629.41
GR	1640	646.16								

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X1	3200	14	247.42	403.91	426.92	395.6	390.01			
GR	1639.7	227.47	1630	247.42	1628	253.14	1626	258.7	1624	267.64
GR	1622	275.55	1622	310.81	1624	315.91	1626	321.83	1628	327.9
GR	1630	401.91	1632	489.33	1634	564.85	1636	598.59		
X1	3300	35	36.55	575.86	462.6	416.49	482.8			
GR	1644	0	1642	12.73	1640	25.07	1638	31.27	1636	36.55
GR	1634	43.64	1632	47.01	1630	50.82	1628	55.39	1628	67.9
GR	1630	72.59	1632	76.9	1634	79.06	1636	137.59	1636	212.17
GR	1636	336.67	1634	350.97	1634	363.67	1634	407.22	1632	411.39
GR	1630	414.76	1628	421.9	1628	494.95	1630	503.75	1632	508.15
GR	1632	523.76	1630	526.02	1630	532.3	1632	537.02	1634	540.95
GR	1636	575.86	1638	594.13	1640	601.98	1642	617.87	1644	633.83
X1	3400	18	84.27	600.88	467.16	325.83	402.24			
GR	1650	59.27	1640	84.27	1638	109.44	1636	126.6	1634	131.99
GR	1634	140.44	1636	146.48	1638	193.98	1638	219.41	1638	270.82
GR	1638	278.81	1638	384.4	1640	600.88	1642	643.45	1644	683.24
GR	1646	705.45	1648	714.67	1650	724.58				
X1	3500	12	1139.19	1820.67	445.71	364.17	403.18			
GR	1650	1117.94	1648	1129.92	1646	1139.19	1644	1154.95	1642	1166.11
GR	1640	1198.2	1640	1311.56	1642	1663.86	1644	1780.13	1646	1820.67
GR	1648	1954.48	1650	1976.19						
X1	3600	21	149.25	618.21	366.01	356.91	358.51			
GR	1660	75.43	1658	80.52	1656	91.22	1654	99.08	1652	110.5
GR	1650	129.6	1648	149.25	1646	271.37	1646	283.71	1646	312.95
GR	1646	327.9	1646	360.07	1646	420.55	1646	607.71	1648	618.21
GR	1650	627.24	1652	634.08	1654	648.02	1656	659.58	1658	673.87
GR	1660	681.36								
X1	3700	23	99.81	528.5	397.89	401.06	409.82			
GR	1660	58.71	1658	62.54	1656	71.6	1654	83.19	1652	99.81
GR	1650	116.08	1648	222.35	1648	252.85	1648	259.17	1648	278.23
GR	1648	293.98	1648	305.86	1648	334.35	1648	360.03	1648	368.2
GR	1648	450.38	1650	484.45	1650.36	490.39	1652	528.5	1654	546.14
GR	1656	553.69	1658	561.37	1660	571.08				
X1	3800	16	42.37	437.01	480	713	666			
GR	1670	24.23	1660	42.37	1658	44.95	1656	48.64	1654	62.46
GR	1654	248.3	1656	288.05	1656	307.66	1656	426.77	1658	437.01
GR	1660	446.89	1662	454.29	1664	464.34	1666	469.29	1668	473.37
GR	1670	483.32								
QT	1	2318								
X1	3900	21	76.48	332.44	468.3	238.03	320.4			
GR	1670	68.89	1660	76.48	1658	109.93	1658	128.97	1658	143.72
GR	1658	147.93	1656	228.75	1656	261.41	1658	286.12	1658.3	289.26
GR	1660	303.73	1662	332.44	1662	354.48	1660	365.24	1658.8	388.81
GR	1660	416.11	1662	428.9	1664	448.42	1666	460.82	1668	489.05
GR	1670	546.72								

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X1	4000	11	62.12	249.41	444.57	477.86	465.67			
GR	1670	57.92	1668	60.45	1666	62.12	1664	69.1	1662	80.78
GR	1660	85.35	1660	112.66	1662	121.12	1664	164.38	1666	239.26
GR	1666.3	249.41								
X1	4100	18	201.4	408.03	535	356	497			
GR	1680	148.32	1678	157.13	1676	173.19	1674	188.76	1672	201.4
GR	1670	217.1	1670	223.19	1670	244.9	1668	248.78	1666	254.13
GR	1666	279.97	1668	296.89	1670	368.21	1672	195.34	1674	408.03
GR	1676	416.54	1678	422.71	1680	431.82				
X1	4200	21	72.87	318.01	285	297	402			
GR	1690	0	1688	8.75	1686	20.32	1684	34.98	1682	44.12

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GR     1680      52.74      1678      72.87      1676     109.44      1674     148.79     1673.3     163.05
GR     1674     174.44      1674     221.93      1672     228.81      1670      242.3      1670      245.6
GR     1672     268.66      1674     290.23      1676     304.27      1678     311.41      1680     318.01
GR     1690     331.29

X1     4300         19     168.17     349.29     317.35     407.28     383.62
GR     1700      89.17      1690      105.7      1680     168.17      1678      195.5     1677.6      203.3
GR     1676     213.39      1676     271.26      1678     296.29      1680     349.29      1682     374.61
GR     1684     413.28      1686     454.41      1688     473.84      1690     495.02      1692     512.03
GR     1694     521.72      1696     534.23      1698     545.99      1700     552.12

X1     4400         20    1152.32    1302.67        432        439        476
GR     1698    1047.48      1696    1072.5      1694    1113.06      1692    1129.03      1690    1144.19
GR     1688    1152.32      1686    1159.38      1684    1171.95      1682    1198.73      1680    1240.97
GR     1680    1261.36      1682    1265.11      1684    1271.18      1686    1281.25      1688    1302.67
GR     1690    1310.07      1692    1316.26      1694    1322.58      1696    1328.05      1698    1379.32

X1     4500         22      91.69      175.6     416.91     575.19     533.38
GR     1720      75.46      1710      91.69      1700     117.4      1699.3     120.73      1698     126.14
GR     1696     135.71      1694     144.81      1692     170.97      1690     176.15      1688     181.18
GR     1686     188.65      1686     207.59      1688     225.29      1690     276.16      1690.6     289.36
GR     1692     317.67      1694     325.19      1696     332.17      1698     337.97      1700     352.73
GR     1710      375.6      1712     416.63

X1     4600         21     134.65     333.42        488        278        442
GR     1710      16.97      1708      22.09      1706      26.16      1704      32.81      1702      52.97
GR     1700      69.79      1700      71.45     1701.4     100.97      1700     134.65      1698     178.33
GR     1696     199.43      1694     245.08      1692     251.89      1692     277.07      1692     285.45
GR     1692     294.37      1694     299.32      1696     317.63      1698     322.08      1700     333.42
GR     1710     339.21

X1     4700         29     373.98      442.2     272.78     275.83     260.86
X3        0                                                 442.2      1700
GR     1716          0      1714       8.97      1712      19.28      1710      50.93      1708      76.41
GR     1708      85.71      1710      111.4      1710     149.36      1710     171.04     1710.6     220.24
GR     1710     255.18      1710     257.77      1710     275.64      1708     298.45      1706     313.76
GR     1704     334.45      1702     364.57      1700     373.98      1698     382.11      1696     387.57
GR     1696     418.98      1698     430.84      1700      442.2      1700     475.32      1698     485.47
GR     1698     491.37      1700     503.73      1710     533.35     1712.7      554.54
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X1     4800         22     199.39     286.05     187.19     241.84     227.74
GR     1720          0      1720      34.45     1719.1      47.68      1718      67.95      1716      81.26
GR     1714      99.11      1714     138.55     1714.5     152.91      1714     167.56      1712     188.86
GR     1710     199.39      1708     204.07      1706     211.95      1704     220.53      1702     222.94
GR     1700     229.54      1698     234.6       1698     259.35      1700     266.03      1710     286.05
GR     1720     306.75      1720     307.66

NC     0.04       0.04     0.025        0.1        0.3
X1     4900         14     118.6      259.71     374.55     218.45     351.24
GR     1720     101.08      1710      118.6      1708     126.87      1706     116.18      1704     139.34
GR     1702     144.61      1702     157.05      1702     171.77      1702     187.75      1704     198.82
GR     1706     207.55      1708     232.01      1710     259.71      1720     290.56
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    SECNO     DEPTH     CWSEL     CRIWS     WSELK      EG        HV        HL       OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB       ACH       AROB      VOL      TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL        XNCH      XNR       WTN      ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL     IDC       ICONT     CORAR    TOPWID    ENDST


*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

CCHV=      .100 CEHV=      .300
*SECNO 25.000
3720 CRITICAL DEPTH ASSUMED
    25.000       .42   1534.42   1534.42   1538.20   1534.62       .20       .00       .00   1544.00
     676.9        .0     676.9        .0        .0     188.9        .0        .0        .0   1542.00
       .00       .00      3.58       .00      .000      .025      .000      .000   1534.00   1142.17
   .012538         0.        0.        0.         0        23         0       .00    477.84   1620.01


CCHV=      .100 CEHV=      .300
*SECNO 50.000
    50.000       1.49   1537.49   1537.47       .00   1537.84       .35      3.17       .04   1552.00
     676.9        .0     676.9        .0        .0     143.0        .0       1.1       2.3   1544.00
       .02       .00      4.73       .00      .000      .025      .000      .000   1536.00   2108.83
   .009402       379.      294.      465.         2        23         0       .00    192.12   2300.95


CCHV=      .100 CEHV=      .300
*SECNO 100.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   100.000       1.78   1543.78   1541.78       .00   1544.24       .46      2.81       .03   1550.00
     676.9        .0     676.9        .0        .0     124.7        .0       2.0       3.4   1548.00
       .03       .00      5.43       .00      .000      .025      .000      .000   1542.00   2534.18
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   .009758      362.      294.      580.         0        11         0       .00    140.10   2674.29


*SECNO 150.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   150.000       .33   1550.33   1550.33       .00   1550.49       .16      3.88       .01   1566.00
     676.9        .0     676.9        .0        .0     208.6        .0       3.3       6.4   1558.00
       .06       .00      3.25       .00       .000      .025      .000      .000   1550.00   1069.63
   .013332      449.      342.      275.         0        25         0       .00    641.35   1710.98


CCHV=      .100 CEHV=      .300
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 200.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1560.00 ELREA=      1560.00

   200.000      1.07   1555.07   1555.07       .00   1555.58       .51      2.60       .10   1560.00
     676.9        .0     676.9        .0        .0     118.5        .0       4.2       8.5   1560.00
       .07       .00      5.71       .00       .000      .025      .000      .000   1554.00   2956.26
   .009245      323.      236.      205.         0        20         0       .00    118.32   3074.58


*SECNO 300.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1562.00 ELREA=      1562.00

   300.000      2.02   1560.02   1560.02       .00   1560.78       .76      3.03       .08   1562.00
     676.9        .0     676.9        .0        .0      96.8        .0       5.1       9.2   1562.00
       .09       .00      6.99       .00       .000      .025      .000      .000   1558.00   2954.42
   .008012      365.      352.      360.         0        14         0       .00     64.06   3018.47


CCHV=      .100 CEHV=      .300
*SECNO 400.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1566.00 ELREA=      1564.00

   400.000      2.57   1562.57   1562.57       .00   1563.10       .53      1.15       .02   1566.00
     676.9        .0     676.9        .0        .0     115.7        .0       5.4       9.5   1564.00
       .09       .00      5.85       .00       .000      .025      .000      .000   1560.00   2324.55
   .009196      112.      134.      158.         0        11         0       .00    110.76   2435.32


CCHV=      .300 CEHV=      .500
*SECNO 500.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
1
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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1572.00 ELREA=      1572.00

   500.000      2.19   1566.49   1566.49       .00   1567.57      1.08       .36       .27   1572.00
     676.9        .0     676.9        .0        .0      81.2        .0       5.6       9.6   1572.00
       .10       .00      8.34       .00       .000      .015      .000      .000   1564.30   2332.84
   .002945       75.       75.       82.         0        11         0       .00     37.73   2370.57


CCHV=      .300 CEHV=      .500

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS    1566.23 , NOT    1566.49 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB  XK         XKOR       COPQ       RDLEN      BWC        BWP        BAREA      SS         ELCHU      ELCHD
     1.25       1.50       2.70      76.00      37.73       1.34      147.38       .00    1565.46    1564.37

*SECNO 600.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.43
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CLASS B LOW FLOW

3420 BRIDGE W.S.= 1567.12 BRIDGE VELOCITY= 8.43 CALCULATED CHANNEL AREA= 60.

EGPRS	EGLWC	HI	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
1566.98	1568.81	.00	0.	677.	147.	110.	1568.47	1572.66	0.

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1572.60 ELREA= 1572.60

600.000	2.73	1568.13	.00	.00	1568.81	.69	1.25	.00	1572.60
676.9	.0	676.9	.0	.0	101.7	.0	5.9	9.8	1572.60
.10	.00	6.66	.00	.000	.015	.000	.000	1565.40	2596.22
.001437	122.	131.	131.	0	0	0	.00	37.73	2633.95

CCHV= .300 CEHV= .500
*SECNO 700.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

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

3470 ENCROACHMENT STATIONS= 2121.8 2330.8 TYPE= 1 TARGET= 208.990
ELENCL= 1578.00 ELENCR= 1578.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1573.80 ELREA= 1574.90

700.000	3.78	1573.28	1573.28	.00	1573.80	.52	.37	.05	1573.80
676.9	.0	676.9	.0	.0	117.0	.0	6.1	10.0	1578.00
.11	.00	5.78	.00	.000	.030	.000	.000	1569.50	2123.57
.014164	133.	113.	79.	0	11	0	.00	118.74	2242.30

CCHV= .100 CEHV= .300
*SECNO 800.000
3280 CROSS SECTION 800.00 EXTENDED .78 FEET

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.53

3470 ENCROACHMENT STATIONS= 1769.2 1903.9 TYPE= 1 TARGET= 134.670
ELENCL= 1578.00 ELENCR= 1578.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1574.50 ELREA= 1576.00

800.000	4.78	1574.78	1574.41	.00	1575.11	.33	1.29	.02	1574.50
684.7	.0	684.7	.0	.0	147.9	.0	6.6	10.3	1578.00
.12	.00	4.63	.00	.000	.030	.000	.000	1570.00	1769.22
.006169	135.	145.	140.	3	16	0	.00	112.70	1881.92

*SECNO 900.000
3280 CROSS SECTION 900.00 EXTENDED 1.37 FEET

3470 ENCROACHMENT STATIONS= 1575.7 1686.8 TYPE= 1 TARGET= 111.140
ELENCL= 1578.00 ELENCR= 1578.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1574.50 ELREA= 1577.00

900.000	4.37	1575.37	1575.29	.00	1576.00	.63	.79	.09	1574.50
809.0	.0	809.0	.0	.0	127.4	.0	6.9	10.6	1578.00
.12	.00	6.35	.00	.000	.030	.000	.000	1571.00	1575.70
.009412	102.	104.	108.	2	10	0	.00	82.64	1658.34

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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 1000.000
3280 CROSS SECTION 1000.00 EXTENDED 1.15 FEET

3470 ENCROACHMENT STATIONS= 1472.4 1568.4 TYPE= 1 TARGET= 95.950
ELENCL= 1579.00 ELENCR= 1579.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1576.00 ELREA= 1577.20

1000.000	5.31	1576.46	1576.39	.00	1577.28	.82	1.23	.06	1576.00

```
     984.3        .0      984.3        .0        .0      135.6        .0       7.3      10.8   1579.00
       .12        .00       7.26       .00       .000      .030       .000       .000   1571.15   1472.42
   .011281     117.      118.      122.         1        11         0        .00     81.87   1554.29


*SECNO 1100.000
3280 CROSS SECTION   1100.00 EXTENDED      1.80 FEET


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.85


3470 ENCROACHMENT STATIONS=     1320.1    1417.7  TYPE=       1  TARGET=       97.610
 ELENCL=   1579.00  ELENCR=   1579.00
  1100.000      6.10   1577.50   1576.96        00   1578.06       .56       .75       .03   1576.00
    1261.1        .0    1261.1        .0        .0     210.5        .0       7.7      11.0   1579.00
       .13       .00      5.99       .00       .000      .030       .000       .000   1571.40   1320.06
   .005421     102.      104.      104.         2         8         0        .00     97.61   1417.67


*SECNO 1200.000
3280 CROSS SECTION   1200.00 EXTENDED      1.42 FEET


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


3470 ENCROACHMENT STATIONS=     1178.4    1272.6  TYPE=       1  TARGET=       94.200
 ELENCL=   1582.00  ELENCR=   1581.00
  1200.000      6.30   1577.92   1577.37        .00   1578.71       .79       .58       .07   1576.00
    1937.0        .0    1937.0        .0        .0     271.9        .0       8.3      11.1   1581.00
       .13       .00      7.12       .00       .000      .030       .000       .000   1571.62   1178.38
   .005135     112.      110.      110.         2        12         0        .00     94.20   1272.58


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   24SEP99      16:51:23                                                                          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      XLCR       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 1300.000

3265 DIVIDED FLOW

3280 CROSS SECTION   1300.00 EXTENDED      1.97 FEET

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=          .0    1207.2  TYPE=       1  TARGET=     1207.179

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1582.00 ELREA=      1579.00

  1300.000      6.28   1578.97   1578.97        .00   1580.16      1.18      1.11       .12   1582.00
    2158.1        .0    2158.1        .0        .0     247.3        .0       9.3      11.7   1583.00
       .14       .00      8.73       .00       .000      .025       .000       .000   1572.69   1077.33
   .007755     199.      176.      153.         0         5         0        .00    110.21   1207.03


*SECNO 1400.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=          .0    1186.3  TYPE=       1  TARGET=     1186.249

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1584.00 ELREA=      1584.00

  1400.000      5.73   1583.73   1583.73        .00   1584.85      1.12      1.20       .01   1584.00
    2158.1        .0    2158.1        .0        .0     254.5        .0      10.3      12.1   1587.00
       .14       .00      8.48       .00       .000      .025       .000       .000   1578.00   1071.26
   .007134     122.      162.      190.         0        12         0        .00    114.18   1185.44


*SECNO 1500.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.47


  1500.000      6.91   1584.91   1583.69        .00   1585.21       .29       .27       .08   1583.00
    2281.4        1.2    2074.9     205.2        1.3     458.6     178.4      11.4      12.8   1583.80
       .15       .92      4.52      1.15       .040      .025       .040       .000   1578.00   1080.32
   .001309      76.      108.      120.         4         5         0        .00    400.48   1480.80


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   24SEP99      16:51:23                                                                          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
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     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 1600.000
  1600.000       4.75    1585.15    1583.74        .00    1585.46        .31        .25        .01    1584.00
    2281.4         .7     2228.7       52.0         .9      491.3       54.9       14.1       14.3    1584.00
       .16        .76       4.54        .95        .040       .025       .040       .000    1580.40    1092.86
   .001194        101.       196.       210.          3         11          0        .00     247.03    1339.89


*SECNO 1650.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1588.00 ELREA=      1584.70

  1650.000       4.70    1586.70    1586.70        .00    1587.53        .81        .37        .15    1588.00
    2281.4         .0     1438.8      842.6         .0      162.2      264.6       16.1       15.3    1584.70
       .17        .00       8.87       3.18        .000       .025       .040       .000    1582.00    1133.09
   .004450        191.       176.       186.          0          5          0        .00     261.19    1394.27


*SECNO 1700.000
  1700.000       5.56    1587.61    1587.27        .00    1588.14        .53        .58        .03    1586.00
    2281.4         4.4     1437.1      839.8         2.7      203.6      308.4       17.8       16.3    1586.50
       .18       1.65       7.06       2.72        .040       .025       .040       .000    1582.05    1283.26
   .003052        164.       161.       155.          3          8          0        .00     293.78    1577.04


*SECNO 1750.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  1750.000       6.64    1588.74    1588.74        .00    1589.66        .92        .58        .12    1590.00
    2281.4         .0     1791.6      489.8         .0      208.8      186.0       19.6       17.4    1587.50
       .19        .00       8.58       2.63        .000       .025       .040       .000    1582.10    1096.93
   .003735        171.       169.       180.          0          8          0        .00     218.35    1315.28


CCHV=      .100 CEHV=      .300
*SECNO 1800.000

3301 HV CHANGED MORE THAN HVINS

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   24SEP99       16:51:23                                                                                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


7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  1800.000       7.97    1590.07    1590.07        .00    1592.18       2.11        .81        .36    1596.00
    2281.4         .0     2281.4        .0         .0      195.9         .0       20.8       17.8    1592.00
       .19        .00       11.65       .00        .000       .025       .000       .000    1582.10    1145.68
   .006349        174.       171.       148.          0         11          0        .00      46.61    1192.29


CCHV=      .300 CEHV=      .500
*SECNO 1900.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  1900.000      12.61    1594.80    1594.80        .00    1597.11       2.31        .20        .10    1592.19
    2210.4        91.3     1940.8      178.3       17.0      151.3       27.9       21.0       17.9    1592.19
       .19        5.37      12.82       6.40        .015       .015       .015       .000    1582.19    1180.30
   .002110         67.        59.        61.          0         15          0        .00      42.26    1222.56


CCHV=      .300 CEHV=      .500

SPECIAL BRIDGE

SB  XK         XKOR       COFQ       RDLEN      BWC        BWP        BAREA      SS         ELCHU      ELCHD
       .00       1.50       2.70     114.00       12.00        .00     120.00        .00    1588.88    1582.19

*SECNO 2000.000
 PRESS FLOW BECAUSE EGLWC OF     1602.90  EXCEEDS 1.5 DEPTH

3301 HV CHANGED MORE THAN HVINS

PRESSURE FLOW

  EGPRS      EGLWC        H3         QWEIR      QPR        BAREA      TRAPEZOID AREA      ELLC       ELTRD      WEIRLN
   1602.70    1602.90        .00          0.       2210.       120.          40.       1592.19    1603.83          0.


3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3710 WSEL ASSUMED BASED ON MIN DIFF
3693 PROBABLE MINIMUM SPECIFIC ENERGY
  2000.000      12.70    1601.58    1601.34        .00    1602.91       1.33        .53       5.06    1598.88
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  2210.4     283.7    1580.4     346.3      54.8      152.4      60.2      22.7      18.4   1598.80
     .20      5.18     10.37      5.75      .015       .015      .015      .000   1588.88   1005.53
.001362      320.      320.      303.        20          5         0       .00     84.63   1090.16


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

CCHV=      .300 CEHV=      .500
*SECNO 2100.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  6.06

  2100.000     13.19    1603.19    1595.96        .00    1603.29        .10        .01        .37   1596.00
    3478.0     494.7     2765.4      217.9      437.4     1009.7      222.4       23.9       18.6   1596.00
       .21      1.13       2.74        .98       .040       .025       .040       .000    1590.00   1011.17
  .000092       59.        50.        55.          2         14          0        .00     236.34   1247.51

CCHV=      .100 CEHV=      .300
*SECNO 2200.000
3280 CROSS SECTION   2200.00 EXTENDED       1.30 FEET

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.74

  2200.000     10.30    1603.30    1598.07        .00    1603.31        .01        .02        .01   1598.00
    3478.0     105.2     1558.3     1814.5      237.6     1275.7     2652.0       44.5       22.0   1598.00
       .30        .44       1.22        .68       .040       .025       .040       .000    1593.00     49.62
  .000030       383.       329.       274.          2         24          0        .00     730.02    779.64

CCHV=      .100 CEHV=      .300
*SECNO 2300.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =    .29

3470 ENCROACHMENT STATIONS=          .0     453.1  TYPE=       1  TARGET=      451.089
  2300.000      9.22    1603.22    1600.58        .00    1603.38        .16        .02        .04   1600.00
    3478.0     233.1     2407.5      837.4      205.4      640.3      610.8       64.6       26.3   1600.00
       .33      1.13       3.76       1.37       .040       .025       .040       .000    1594.00     41.44
  .000349       320.       312.       311.          3         17          0        .00     460.34    501.78

*SECNO 2330.000
1
  24SEP99      16:51:23                                                                                PAGE   21

  SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         RL         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 =    .42

  2330.000      7.08    1603.08    1602.18        .00    1603.67        .58        .16        .13   1601.00
    3478.0     152.1     3191.8      134.1       81.5      499.9       82.5       70.3       28.3   1601.60
       .34      1.87       6.39       1.63       .040       .025       .040       .000    1596.00   1071.02
  .001998       235.       240.       222.          4         19          0        .00     315.64   1386.66

*SECNO 2350.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2350.000      2.46    1604.46    1604.46        .00    1605.18        .72        .24        .04   1604.00
    3478.0       1.0     3473.1        3.9         .8      509.0        1.1       71.3       29.0   1604.00
       .35      1.25       6.82       1.26       .040       .025       .040       .000    1602.00   1021.59
  .008305       151.        63.       123.          0         22          0        .00     377.07   1398.65

*SECNO 2400.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2400.000      6.53    1604.53    1604.53        .00    1605.78       1.25        .37        .16   1602.00
    3478.0     449.1     2777.1      251.8      170.2      279.0       94.7       72.4       29.7   1602.00
       .35      2.64       9.95       2.66       .040       .025       .040       .000    1598.00    431.05
  .002963       178.        71.       109.          0         17          0        .00     241.25    672.21

*SECNO 2500.000
7185 MINIMUM SPECIFIC ENERGY
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3720 CRITICAL DEPTH ASSUMED

2500.000	4.37	1606.37	1606.37	.00	1607.75	1.38	.70	.04	1604.00
3478.0	711.6	2737.8	28.6	160.1	264.3	9.2	74.5	30.5	1604.00
.35	4.44	10.36	3.11	.040	.025	.040	.000	1602.00	89.63
.005182	187.	180.	183.	0	14	0	.00	161.89	251.53

*SECNO 2600.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2600.000	4.06	1610.06	1610.06	.00	1611.42	1.36	2.18	.00	1612.00
3474.0	.0	3474.0	.0	.0	371.2	.0	77.8	31.8	1612.00
.36	.00	9.36	.00	.000	.025	.000	.000	1606.00	779.60
.006818	321.	373.	391.	0	11	0	.00	139.82	919.42

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

*SECNO 2700.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2700.000	4.56	1612.56	1612.56	.00	1613.79	1.23	1.69	.01	1614.00
3474.0	.0	3474.0	.0	.0	390.8	.0	80.0	32.6	1614.00
.37	.00	8.89	.00	.000	.025	.000	.000	1608.00	649.69
.006863	250.	247.	237.	0	8	0	.00	160.77	810.46

**SECNO 2800.000*
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 263.2 507.8 TYPE= 1 TARGET= -263.200
ELENCL= 1616.00 ELENCR= 100000.00

2800.000	5.31	1615.31	1615.31	.00	1616.64	1.33	2.58	.03	1616.00
3474.0	.0	3474.0	.0	.0	375.1	.0	83.3	33.9	1616.00
.38	.00	9.26	.00	.000	.025	.000	.000	1610.00	267.64
.006844	263.	377.	390.	0	11	0	.00	144.58	412.22

*SECNO 2900.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 392.8 890.2 TYPE= 1 TARGET= -392.800
ELENCL= 1620.51 ELENCR= 100000.00

2900.000	6.57	1618.57	1618.57	.00	1619.51	.94	2.33	.04	1620.00
3474.0	.0	3474.0	.0	.0	446.7	.0	86.0	35.4	1620.00
.39	.00	7.78	.00	*.000*	.025	*.000*	*.000*	*1612.00*	511.02
.009381	293.	292.	274.	0	11	0	.00	282.84	793.86

*SECNO 3000.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3000.000	6.69	1620.69	1620.69	.00	1621.93	1.23	2.19	.09	1620.00
3474.0	139.6	3329.4	5.0	72.5	365.9	4.1	89.6	37.5	1620.00
.41	1.93	9.10	1.22	.040	.025	.040	.000	1614.00	232.84
.004467	406.	350.	342.	0	5	0	.00	222.85	455.69

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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 3100.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3100.000	6.66	1624.66	1624.66	*.00*	1625.94	1.28	1.66	.01	1626.00
3474.0	.0	3474.0	.0	.0	382.6	.0	92.6	38.9	1626.00
.41	.00	9.08	.00	.000	.025	.000	.000	1618.00	241.79
.006816	383.	302.	294.	0	5	0	.00	149.43	391.22

*SECNO 3200.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3200.000	5.52	1627.52	1627.52	.00	1629.64	2.11	2.49	.25	1630.00
3474.0	.0	3474.0	.0	.0	297.8	.0	95.6	39.9	1630.00
.42	.00	11.67	.00	.000	.025	.000	.000	1622.00	254.47
.005981	427.	390.	396.	0	11	0	.00	71.99	326.45

*SECNO 3100.000

3265 DIVIDED FLOW

3101 HV CHANGED MORE THAN HVINS

3100.000	3.38	1631.38	1631.36	.00	1632.76	1.38	1.05	.07	1636.00
3474.0	.0	3474.0	.0	.0	368.4	.0	99.1	41.0	1636.00
.44	.00	9.43	.00	.000	.025	.000	.000	1628.00	48.20
.006678	463.	483.	416.	3	14	0	.00	132.80	535.55

*SECNO 3400.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3400.000	5.11	1639.11	1639.11	.00	1639.82	.72	1.21	.07	1640.00
3474.0	.0	3474.0	.0	.0	511.1	.0	103.4	43.5	1640.00
.45	.00	6.80	.00	.000	.025	.000	.000	1634.00	95.51
.009731	467.	402.	326.	0	17	0	.00	408.71	504.21

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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 3500.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.41

3500.000	2.15	1642.15	1641.90	.00	1642.55	.40	2.69	.03	1646.00
3474.0	.0	3474.0	.0	.0	685.7	.0	108.9	47.7	1646.00
.48	.00	5.07	.00	.000	.025	.000	.000	1640.00	1165.28
.004861	446.	403.	364.	5	22	0	.00	507.21	1672.49

*SECNO 3600.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3600.000	1.42	1647.42	1647.42	.00	1648.05	.64	2.26	.07	1648.00
3474.0	.0	3474.0	.0	.0	542.3	.0	114.0	51.6	1648.00
.49	.00	6.41	.00	.000	.025	.000	.000	1646.00	184.97
.008531	366.	359.	357.	0	14	0	.00	430.17	615.14

*SECNO 3700.000

3700.000	2.06	1650.06	1649.75	.00	1650.55	.49	2.48	.01	1652.00
3474.0	.0	3474.0	.0	.0	617.2	.0	119.4	55.3	1652.00
.51	.00	5.63	.00	.000	.025	.000	.000	1648.00	115.62
.004530	398.	410.	401.	3	11	0	.00	369.76	485.38

*SECNO 3800.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3800.000	2.25	1656.25	1656.25	.00	1656.94	.70	4.01	.06	1660.00
3474.0	.0	3474.0	.0	.0	518.7	.0	128.1	61.1	1658.00
.54	.00	6.70	.00	.000	.025	.000	.000	1654.00	48.18
.008386	480.	666.	713.	0	8	0	.00	379.85	428.03

*SECNO 3900.000

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

3900.000	2.79	1658.79	1658.78	.00	1659.61	.83	2.63	.04	1660.00
2318.0	.0	2318.0	.0	.0	317.6	.0	131.2	63.2	1662.00
.55	.00	7.30	.00	.000	.025	.000	.000	1656.00	96.78
.007964	468.	320.	238.	2	11	0	.00	196.62	293.40

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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 4000.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4000.000	4.62	1664.62	1664.62	.00	1665.76	1.14	3.52	.09	1666.00
2318.0	.0	2318.0	.0	.0	270.2	.0	134.3	64.9	1666.30
.57	.00	8.58	.00	.000	.025	.000	.000	1660.00	66.94
.007186	445.	466.	478.	0	14	0	.00	120.65	187.58

*SECNO 4100.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4100.000	4.34	1670.34	1670.34	.00	1671.28	.94	3.63	.02	1672.00
2318.0	.0	2318.0	.0	.0	298.3	.0	137.6	66.5	1674.00
.59	.00	7.77	.00	.000	.025	.000	.000	1666.00	214.41
.007412	535.	497.	356.	0	12	0	.00	158.44	372.85

*SECNO 4200.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4200.000	4.93	1674.93	1674.93	.00	1675.84	.91	3.00	.00	1678.00
2318.0	.0	2318.0	.0	.0	302.8	.0	140.3	68.0	1680.00
.60	.00	7.65	.00	.000	.025	.000	.000	1670.00	130.55
.007494	285.	402.	297.	0	8	0	.00	166.18	296.74

*SECNO 4300.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4300.000	3.22	1679.22	1679.22	.00	1680.20	.99	2.86	.02	1680.00
2318.0	.0	2318.0	.0	.0	290.6	.0	143.0	69.4	1680.00
.61	.00	7.98	.00	.000	.025	.000	.000	1676.00	178.89
.007442	317.	384.	407.	0	14	0	.00	149.61	328.50

*SECNO 4400.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4400.000	4.01	1684.01	1684.01	.00	1685.31	1.30	3.41	.09	1688.00
2318.0	.0	2318.0	.0	.0	253.1	.0	145.9	70.7	1688.00
.63	.00	9.16	.00	.000	.025	.000	.000	1680.00	1171.90
.006904	432.	476.	439.	0	11	0	.00	99.31	1271.22

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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

*SECNO 4500.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4500.000	4.55	1690.55	1690.55	.00	1691.73	1.18	3.70	.01	1710.00
2318.0	.0	2318.0	.0	.0	266.1	.0	149.1	72.0	1710.00
.64	.00	8.71	.00	.000	.025	.000	.000	1686.00	174.72
.006979	417.	533.	575.	0	8	0	.00	113.57	288.29

*SECNO 4600.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4600.000	3.99	1695.99	1695.99	.00	1697.15	1.16	3.13	.00	1700.00
2318.0	.0	2318.0	.0	.0	267.7	.0	151.8	73.2	1700.00
.66	.00	8.66	.00	.000	.025	.000	.000	1692.00	199.71
.007167	488.	442.	278.	0	15	0	.00	117.81	317.52

*SECNO 4700.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= .0 442.2 TYPE= 1 TARGET= 442.199

4700.000	4.65	1700.65	1700.65	.00	1701.94	1.30	1.48	.04	1700.00
2318.0	1.2	2241.0	75.8	1.0	241.2	40.4	153.5	74.0	1700.00
.67	1.17	9.29	1.88	.040	.025	.040	.000	1696.00	370.94
.004619	273.	261.	276.	0	11	0	.00	134.71	505.65

*SECNO 4800.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4800.000	5.20	1703.20	1703.20	.00	1705.21	2.01	1.21	.21	1710.00
2318.0	.0	2318.0	.0	.0	203.6	.0	154.7	74.5	1710.00
.67	.00	11.39	.00	.000	.025	.000	.000	1698.00	221.50
.006116	187.	228.	242.	0	8	0	.00	50.94	272.43

CCHV= .100 CEHV= .300

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

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*SECNO 4900.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  4900.000     3.90   1705.90   1705.90      .00   1707.53     1.63      2.21      .04   1710.00
  2318.0         .0    2318.0        .0        .0     226.0        .0     156.5     75.0    1710.00
      .68        .00     10.26       .00       .000      .025      .000      .000   1702.00    136.35
  .006483     375.      351.      218.         0        15         0       .00     70.75    207.09


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   24SEP99      16:51:23                                                                    PAGE   28


 TWSPLIT FLOW AT PULSIPHER/I-15 CULVERT

    ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER      NITER      DSWS       USWS      DSSNO      USSNO
  1267.64   1297.97       2.36   1267.64   1297.97        2.36         12  1601.581   1603.191   2000.000   2100.000


 TWSTATION 1400 - SPLIT FLOW OVER RIGHT BANK

    ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER      NITER      DSWS       USWS      DSSNO      USSNO
  123.29    123.16         .11   1390.93   1421.13        2.15         12  1583.734   1584.915   1400.000   1500.000


 TWSTATION 1300 - SPLIT FLOW OVER RIGHT BANK

    ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER      NITER      DSWS       USWS      DSSNO      USSNO
     .00        .00         .00   1390.93   1421.13        2.15         12  1578.974   1583.734   1300.000   1400.000


 TWSTATION 1200 - SPLIT FLOW OVER LEFT BANK

    ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER      NITER      DSWS       USWS      DSSNO      USSNO
  221.06    221.41         .16   1611.99   1642.54        1.88         12  1577.918   1578.974   1200.000   1300.000


 TWSTATION 1100 - SPLIT FLOW OVER LEFT OVERBANK

    ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER      NITER      DSWS       USWS      DSSNO      USSNO
  675.91    677.11         .18   2287.90   2319.65        1.38         12  1577.501   1577.918   1100.000   1200.000


 TWSTATION 1000 - SPLIT FLOW OVER LEFT BANK

    ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER      NITER      DSWS       USWS      DSSNO      USSNO
  276.76    277.68         .33   2564.66   2597.33        1.27         12  1576.464   1577.501   1000.000   1100.000


 TWSTATION 900 - SPLIT FLOW OVER LEFT BANK

    ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER      NITER      DSWS       USWS      DSSNO      USSNO
  175.30    174.42         .50   2739.96   2771.75        1.15         12  1575.371   1576.464    900.000   1000.000


 TWSTATION 800 - SPLIT FLOW OVER LEFT BANK

    ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER      NITER      DSWS       USWS      DSSNO      USSNO
  124.38    124.61         .19   2864.34   2896.37        1.11         12  1574.782   1575.371    800.000    900.000


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 TWSTATION 700 - SPLIT FLOW OVER LEFT BANK

    ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER      NITER      DSWS       USWS      DSSNO      USSNO
    7.76      7.70         .81   2872.10   2904.06        1.11         12  1573.282   1574.782    700.000    800.000


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                                                                  THIS RUN EXECUTED 24SEP99     16:51:25

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

 Pulsipher Wash

 SUMMARY PRINTOUT TABLE  100

        SECNO      EGLWC      ELLC      EGPRS      ELTRD       QPR      QWEIR      CLASS        H3      DEPTH      CWSEL       VCH         EG
 *    600.000    1568.81    1568.47    1566.98    1572.66    676.90        .00       2.00       .00       2.73    1568.13      6.66    1568.81
 *   2000.000    1602.90    1592.19    1602.70    1603.83   2210.16        .00      10.00       .00      12.70    1601.58     10.37    1602.91
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Pulsipher Wash

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	25.000	.00	.00	.00	1534.00	676.90	1534.42	1534.42	1534.62	125.38	3.58	188.85	60.45
	50.000	293.71	.00	.00	1536.00	676.90	1537.49	1537.47	1537.84	94.02	4.73	143.01	69.81
*	100.000	293.78	.00	.00	1542.00	676.90	1543.78	1543.78	1544.24	97.58	5.43	124.66	68.52
*	150.000	342.19	.00	.00	1550.00	676.90	1550.33	1550.33	1550.49	133.32	3.25	208.58	58.62
*	200.000	215.94	.00	.00	1554.00	676.90	1555.07	1555.07	1555.58	92.45	5.71	118.45	70.40
*	300.000	352.07	.00	.00	1558.00	676.90	1560.02	1560.02	1560.78	80.12	6.99	96.84	75.62
*	400.000	134.41	.00	.00	1560.00	676.90	1562.57	1562.57	1563.10	91.96	5.85	115.73	70.59
*	500.000	74.97	.00	.00	1564.30	676.90	1566.49	1566.49	1567.57	29.45	8.34	81.18	124.73
*	600.000	133.46	1572.66	1568.47	1565.40	676.90	1568.13	.00	1568.81	14.37	6.66	101.71	178.53
*	700.000	112.64	.00	.00	1569.50	676.90	1573.28	1573.28	1573.80	141.64	5.78	117.02	56.88
*	800.000	144.94	.00	.00	1570.00	684.66	1574.78	1574.41	1575.11	61.69	4.63	147.93	87.17
	900.000	103.62	.00	.00	1571.00	809.04	1575.17	1575.29	1576.00	94.12	6.35	127.43	83.39
	1000.000	118.27	.00	.00	1571.15	984.34	1576.46	1576.39	1577.28	112.81	7.26	135.64	92.68
*	1100.000	103.70	.00	.00	1571.40	1261.10	1577.50	1576.96	1578.06	54.21	5.99	210.46	171.28
*	1200.000	110.23	.00	.00	1571.62	1937.01	1577.92	1577.37	1578.71	51.35	7.12	271.91	270.30
*	1300.000	176.37	.00	.00	1572.69	2158.07	1578.97	1578.97	1580.16	77.55	8.73	247.31	245.06
*	1400.000	161.58	.00	.00	1578.00	2158.07	1583.73	1583.73	1584.85	71.34	8.48	254.53	255.50
*	1500.000	108.07	.00	.00	1578.00	2281.36	1584.91	1583.69	1585.21	13.09	4.52	638.35	630.63
	1600.000	196.31	.00	.00	1580.40	2281.36	1585.15	1583.74	1585.46	11.94	4.54	547.11	660.09
*	1650.000	175.57	.00	.00	1582.00	2281.36	1586.70	1586.70	1587.53	44.50	8.87	426.86	141.98
	1700.000	161.13	.00	.00	1582.05	2281.36	1587.61	1587.27	1588.14	30.52	7.06	514.70	412.93
*	1750.000	169.33	.00	.00	1582.10	2281.36	1588.74	1588.74	1589.66	37.35	8.58	394.86	373.29
*	1800.000	170.93	.00	.00	1582.10	2281.36	1590.07	1590.07	1592.18	63.49	11.65	195.90	286.31
*	1900.000	58.98	.00	.00	1582.19	2210.36	1594.80	1594.80	1597.11	21.10	12.82	196.22	481.15

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	2000.000	319.85	1603.83	1592.19	1588.88	2210.36	1601.58	1601.34	1602.91	13.62	10.37	267.39	598.83
*	2100.000	49.81	.00	.00	1590.00	3478.00	1603.19	1595.96	1603.29	.92	2.74	1669.55	3626.49
*	2200.000	328.57	.00	.00	1593.00	3478.00	1603.30	1598.07	1603.31	.30	1.22	4165.37	6321.78
*	2300.000	311.55	.00	.00	1594.00	3478.00	1603.22	1600.58	1603.38	3.49	3.76	1456.41	1861.93
*	2330.000	240.00	.00	.00	1596.00	3478.00	1603.08	1602.18	1603.67	19.98	6.39	661.88	778.04
*	2350.000	63.00	.00	.00	1602.00	3478.00	1604.46	1604.46	1605.18	81.05	6.82	512.91	381.64
*	2400.000	71.00	.00	.00	1598.00	3478.00	1604.53	1604.53	1605.78	29.63	9.95	543.89	638.98
*	2500.000	179.72	.00	.00	1602.00	3478.00	1606.37	1606.37	1607.75	51.82	10.36	433.59	483.15
*	2600.000	373.36	.00	.00	1606.00	3474.00	1610.06	1610.06	1611.42	68.18	9.36	371.22	420.73
*	2700.000	246.94	.00	.00	1608.00	3474.00	1612.56	1612.56	1613.79	68.63	8.89	390.79	419.35
*	2800.000	376.77	.00	.00	1610.00	3474.00	1615.31	1615.31	1616.64	68.44	9.26	375.09	419.93
*	2900.000	292.09	.00	.00	1612.00	3474.00	1618.57	1618.57	1619.51	93.81	7.78	446.70	358.68
*	3000.000	349.71	.00	.00	1614.00	3474.00	1620.69	1620.69	1621.93	44.67	9.10	442.41	519.79
*	3100.000	302.10	.00	.00	1618.00	3474.00	1624.66	1624.66	1625.94	68.16	9.08	382.61	420.78
*	3200.000	390.01	.00	.00	1622.00	3474.00	1627.52	1627.52	1629.64	59.81	11.67	297.81	449.22
	3300.000	482.80	.00	.00	1628.00	3474.00	1631.38	1631.36	1632.76	66.78	9.43	368.45	425.12

*	3400.000	402.24	.00	.00	1634.00	3474.00	1639.11	1639.11	1639.82	97.31	6.80	511.14	352.16
*	3500.000	401.18	.00	.00	1640.00	3474.00	1642.15	1641.90	1642.55	48.61	5.07	685.70	498.27
*	3600.000	358.51	.00	.00	1646.00	3474.00	1647.42	1647.42	1648.05	85.31	6.41	542.32	376.11
	3700.000	409.82	.00	.00	1648.00	3474.00	1650.06	1649.75	1650.55	45.30	5.63	617.21	516.18
*	3800.000	666.00	.00	.00	1654.00	3474.00	1656.25	1656.25	1656.94	83.86	6.70	518.75	379.36
*	3900.000	320.40	.00	.00	1656.00	2318.00	1658.79	1658.78	1659.61	79.64	7.10	317.60	259.74
*	4000.000	465.67	.00	.00	1660.00	2318.00	1664.62	1664.62	1665.76	71.86	8.58	270.18	273.44
*	4100.000	497.00	.00	.00	1666.00	2318.00	1670.34	1670.34	1671.28	74.12	7.77	298.31	269.24
*	4200.000	402.00	.00	.00	1670.00	2318.00	1674.93	1674.93	1675.84	74.94	7.65	302.84	267.78
*	4300.000	383.62	.00	.00	1676.00	2318.00	1679.22	1679.22	1680.20	74.42	7.98	290.61	268.69

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	4400.000	476.00	.00	.00	1680.00	2318.00	1684.01	1684.01	1685.31	69.04	9.16	253.12	278.97
*	4500.000	533.38	.00	.00	1686.00	2318.00	1690.55	1690.55	1691.73	69.79	8.71	266.05	277.47
*	4600.000	442.00	.00	.00	1692.00	2318.00	1695.99	1695.99	1697.15	71.67	8.66	267.73	273.80
*	4700.000	260.86	.00	.00	1696.00	2318.00	1700.65	1700.65	1701.94	46.19	9.29	282.59	341.06
*	4800.000	227.74	.00	.00	1698.00	2318.00	1703.20	1703.20	1705.21	61.16	11.39	203.56	296.41
*	4900.000	351.24	.00	.00	1702.00	2318.00	1705.90	1705.90	1707.53	64.83	10.26	226.02	287.89

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Pulsipher Wash

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	25.000	676.90	1534.42	.00	.00	-3.78	477.84	.00
	50.000	676.90	1537.49	.00	3.07	.00	192.12	293.71
*	100.000	676.90	1543.78	.00	6.29	.00	140.10	293.78
*	150.000	676.90	1550.33	.00	6.55	.00	641.35	342.19
*	200.000	676.90	1555.07	.00	4.74	.00	118.32	235.94
*	300.000	676.90	1560.02	.00	4.95	.00	64.06	352.07
*	400.000	676.90	1562.57	.00	2.54	.00	110.76	134.41
*	500.000	676.90	1566.49	.00	3.92	.00	37.73	74.97
*	600.000	676.90	1568.13	.00	1.64	.00	37.73	133.46
*	700.000	676.90	1573.28	.00	5.16	.00	118.74	112.64
*	800.000	684.66	1574.78	.00	1.50	.00	112.70	144.94
	900.000	809.04	1575.37	.00	.59	.00	82.64	103.62
	1000.000	984.34	1576.46	.00	1.09	.00	81.87	118.27
*	1100.000	1261.10	1577.50	.00	1.04	.00	97.61	103.70
*	1200.000	1937.01	1577.92	.00	.42	.00	94.20	110.23
*	1300.000	2158.07	1578.97	.00	1.06	.00	110.21	176.37
*	1400.000	2158.07	1583.73	.00	4.76	.00	114.18	161.58
*	1500.000	2281.36	1584.91	.00	1.18	.00	400.48	108.07
	1600.000	2281.36	1585.15	.00	.23	.00	247.03	196.31
*	1650.000	2281.36	1586.70	.00	1.55	.00	261.19	175.57
	1700.000	2281.36	1587.61	.00	.91	.00	293.78	161.13
*	1750.000	2281.36	1588.74	.00	1.13	.00	218.35	169.33
*	1800.000	2281.36	1590.07	.00	1.33	.00	46.61	170.93
*	1900.000	2210.36	1594.80	.00	4.73	.00	42.26	58.98

1

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	2000.000	2210.36	1601.58	.00	6.78	.00	84.63	319.85
*	2100.000	3478.00	1603.19	.00	1.61	.00	236.34	49.81
*	2200.000	3478.00	1603.30	.00	.11	.00	730.02	328.57
*	2300.000	3478.00	1603.22	.00	-.08	.00	460.34	311.55
*	2330.000	3478.00	1603.08	.00	-.13	.00	315.64	240.00
*	2350.000	3478.00	1604.46	.00	1.37	.00	377.07	63.00
*	2400.000	3478.00	1604.53	.00	.08	.00	241.15	71.00
*	2500.000	3478.00	1606.37	.00	1.84	.00	161.89	179.72
*	2600.000	3474.00	1610.06	.00	3.69	.00	139.82	373.36
*	2700.000	3474.00	1612.56	.00	2.50	.00	160.77	246.94
*	2800.000	3474.00	1615.31	.00	2.75	.00	144.58	376.77
*	2900.000	3474.00	1618.57	.00	3.27	.00	282.84	292.09
*	3000.000	3474.00	1620.69	.00	2.12	.00	222.85	349.71
*	3100.000	3474.00	1624.66	.00	3.96	.00	149.43	302.10
*	3200.000	3474.00	1627.52	.00	2.87	.00	71.99	390.01
	3300.000	3474.00	1631.38	.00	3.85	.00	132.80	482.80
*	3400.000	3474.00	1639.11	.00	7.73	.00	408.71	402.24
*	3500.000	3474.00	1642.15	.00	3.04	.00	507.21	403.18
*	3600.000	3474.00	1647.42	.00	5.27	.00	430.17	358.51
	3700.000	3474.00	1650.06	.00	2.64	.00	369.76	409.82
*	3800.000	3474.00	1656.25	.00	6.19	.00	379.85	666.00
*	3900.000	2318.00	1658.79	.00	2.54	.00	196.62	320.40
*	4000.000	2318.00	1664.62	.00	5.83	.00	120.65	465.67
*	4100.000	2318.00	1670.34	.00	5.72	.00	158.44	497.00
*	4200.000	2318.00	1674.93	.00	4.58	.00	166.18	402.00
*	4300.000	2318.00	1679.22	.00	4.29	.00	149.61	383.62

1

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	4400.000	2318.00	1684.01	.00	4.79	.00	99.31	476.00
*	4500.000	2318.00	1690.55	.00	6.54	.00	113.57	533.38
*	4600.000	2318.00	1695.99	.00	5.44	.00	117.81	442.00
*	4700.000	2318.00	1700.65	.00	4.66	.00	134.71	260.86
*	4800.000	2318.00	1703.20	.00	2.55	.00	50.94	227.74
*	4900.000	2318.00	1705.90	.00	2.70	.00	70.75	351.24

1

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 25.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

CAUTION SECNO= 100.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 100.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 150.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 150.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 200.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 200.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 300.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 300.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

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 CAUTION SECNO=    400.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    400.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    500.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    500.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    600.000  PROFILE=  1  HYDRAULIC JUMP D.S.
 WARNING SECNO=    600.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=    700.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    700.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=    800.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=   1100.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=   1200.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=   1300.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   1300.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   1400.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   1400.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=   1500.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=   1650.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   1650.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   1750.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   1750.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   1800.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   1800.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   1900.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   1900.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
1
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 CAUTION SECNO=   2000.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=   2000.000  PROFILE=  1  WSEL ASSUMED BASED ON MIN DIFF
 CAUTION SECNO=   2000.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=   2100.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=   2200.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=   2300.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=   2330.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=   2350.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   2350.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   2400.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   2400.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   2500.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   2500.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   2600.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   2600.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   2700.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   2700.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   2800.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   2800.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   2900.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   2900.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   3000.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   3000.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   3100.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   3100.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   3200.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   3200.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   3400.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   3400.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=   3500.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=   3600.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   3600.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=   3800.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=   3800.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
1
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WARNING SECNO=   3900.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=   4000.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   4000.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=   4100.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   4100.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=   4200.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   4200.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=   4300.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   4300.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=   4400.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   4400.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=   4500.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   4500.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=   4600.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   4600.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=   4700.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   4700.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=   4800.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   4800.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=   4900.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   4900.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
```

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1*****************************************
*  HEC-2 WATER SURFACE PROFILES           *
*                                         *
*  Version   4.6.2;  May 1991             *
*                                         *
*  RUN DATE    24SEP99    TIME   16:51:39  *
*****************************************
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*****************************************
*  U.S. ARMY CORPS OF ENGINEERS           *
*  HYDROLOGIC ENGINEERING CENTER          *
*  609 SECOND STREET, SUITE D             *
*  DAVIS, CALIFORNIA 95616-4687           *
*        (916) 756-1104                   *
*****************************************
```

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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X         X     X           X     X
X     X  X         X                       X
XXXXXXX  XXXX      X          XXXXX    XXXXX
X     X  X         X                  X
X     X  X         X     X            X
X     X  XXXXXXX   XXXXX              XXXXXXX
```

1

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THIS RUN EXECUTED 24SEP99 16:51:39

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

 Version   4.6.2;  May 1991
************************************
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```
T1      550-035
T2      Mequite Wash FIS Restudy
T3      Pulsipher Wash

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                2                             -1                            123     1558.1

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     -1                   -1                                      -1        -6

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    100                  150

NC     0.04      0.04      0.04       0.1       0.3
X1      200         6      1000   1329.12
GR     1558      1000      1558   1118.84      1558   1173.86      1558   1253.38      1558   1290.3
GR     1560   1329.12

NC     0.04      0.04      0.04       0.1       0.3
X1      300         3      1000   1258.22    349.75     370.8    349.75
GR     1562      1000      1562      1150      1562   1258.22

NC     0.04      0.04      0.04       0.1       0.3
X1      400         6    921.41   1238.96    151.59       150    150.38
GR     1568    921.41      1566      1000      1566   1096.17      1566   1102.24      1566   1205.81
GR     1568   1238.96

NC     0.04      0.04      0.04       0.1       0.3
X1      500         7      1000   1327.56     61.14     109.96    100.44
GR     1574      1000      1572   1004.96      1572     1035.9      1572   1079.14      1572   1133.51
GR     1572   1317.04    1572.5   1327.56

NC     0.04      0.04      0.04       0.1       0.3
X1      600         7   2832.48    3146.68    122.03     131.14    133.46
X3       10                                                          1574    1573.7
GR     1574   2706.23      1574   2810.59      1574   2832.48      1572.6   2866.27      1572.6   2963.4
GR   1572.6   3102.68    1573.7   3146.68
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1

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NC     0.04      0.04      0.04
X1      700         7   2330.75    2748.19    133.44      79.47    112.64
X3       10                                                          1574.9    1574
GR   1574.9   2330.75    1574.5   2366.44      1574     2409.4      1572.7   2453.34      1572.7   2564.87
GR   1572.7   2717.29      1574   2748.19

NC     0.04      0.04      0.04
X1      800         7   1903.89    2392.94    134.63     139.86    144.94
X3       10                                                          1576    1574
GR     1576   1903.89      1574   1968.96    1573.2     2017.28      1573.2   2207.8      1573.2   2344.84
GR     1574   2392.94      1574   2407.17

NC     0.04      0.04      0.04
X1      900         9   1686.84     2209.7    102.08     108.33    103.62
X3       10                                                          1577    1574
GR     1577   1686.84    1575.8   1705.75      1574   1749.48      1573.7   1798.67      1573.7   1915.16
GR   1573.7   2060.43    1573.7   2160.73      1574     2209.7      1574   2230.82
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NC      0.04        0.04        0.04
X1      1000           8     1568.37     2121.11      116.93      121.55      118.27
X3        10                                                                1577.2      1575.3
GR    1577.2     1568.17      1576.5     1597.74        1576     1625.79      1575.5     1648.15      1574.3     1710.01
GR    1574.3     1879.49      1574.3     2080.17      1575.3     2121.11

NC      0.04        0.04        0.04
X1      1100           7     1417.67     1982.94      102.45       103.7       103.7
X3        10                                                                1577.4      1575.7
GR    1577.4     1417.67      1576.5     1447.13        1576     1476.62      1574.7     1519.36      1574.7     1720.11
GR    1574.7     1929.89      1575.7     1982.94

NC      0.04        0.04        0.04
X1      1200           8     1272.58     1831.23      111.55      110.23      110.23
X3        10                                                                1577.5      1576.5
GR    1577.5     1272.58      1576.5     1301.79        1576     1333.43      1575.1     1378.11      1575.1     1575.34
GR    1575.1     1770.67        1576     1817.16      1576.5     1831.23

NC      0.04        0.04        0.04
X1      1300           9     1260.24     1735.14      198.91      153.42      176.37
X3        10                                                                            1577
GR    1578       1236.12        1578     1241.05        1578     1260.24        1576     1268.87      1575.6     1313.34
GR    1575.6     1502.88      1575.6     1676.59        1576     1718.52        1577     1735.14

NC      0.04        0.04        0.04         0.1          0.3
X1      1400           9     1412.25     1776.42      122.02      190.42      161.58
X3        10                                                                            1578
GR    1580       1339.52        1580     1372.19        1580     1412.25        1578     1435.3       1577.3     1471.82
GR    1577.3     1586.97      1577.3     1740.73        1578     1776.42        1578     1799.37
```


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

```
*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

CCHV=      .100 CEHV=      .300
*SECNO 200.000
3280 CROSS SECTION    200.00 EXTENDED        .18 FEET

3720 CRITICAL DEPTH ASSUMED
   200.000        .18   1558.18   1558.18   1558.10   1558.26        .09        .00        .00   1558.00
     123.0          .0     123.0        .0        .0        51.2        .0         .0         .0   1560.00
       .00         .00      2.40        .00       .000       .040       .000       .000    1558.00   1000.00
   .042920          0.         0.         0.         0         13          0        .00     293.70    1293.70


CCHV=      .100 CEHV=      .300
*SECNO 300.000
3280 CROSS SECTION    300.00 EXTENDED        .35 FEET

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.82

   300.000        .35   1562.35   1562.19        .00   1562.38        .03       4.11        .01   1562.00
     123.0          .0     123.0        .0        .0        90.7        .0         .6        2.2   1562.00
       .07         .00      1.36        .00       .000       .040       .000       .000    1562.00   1000.00
   .005387         350.       350.       371.         8          8          0        .00     258.22    1258.22


CCHV=      .100 CEHV=      .300
*SECNO 400.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   400.000        .22   1566.22   1566.22        .00   1566.33        .11       1.74        .02   1568.00
     123.0          .0     123.0        .0        .0        46.3        .0         .8        3.0   1568.00
       .09         .00      2.65        .00       .000       .040       .000       .000    1566.00    991.41
   .040277         154.       150.       150.         0         14          0        .00     218.02    1209.43


CCHV=      .100 CEHV=      .300
*SECNO 500.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
1
```


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

```
   500.000        .17   1572.17   1572.17        .00   1572.25        .08       4.14        .00   1574.00
     123.0          .0     123.0        .0        .0        53.0        .0         .9        3.7   1572.50
```

.10	.00	2.32	.00	.000	.040	.000	.000	1572.00	1004.54
.042256	61.	100.	110.	0	15	0	.00	316.05	1320.59

CCHV= .100 CEHV= .300
*SECNO 600.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 4.25

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1574.00 ELREA= 1573.70

600.000	.46	1573.06	1572.80	.00	1573.08	.02	.82	.01	1574.00
123.0	.0	123.0	.0	.0	117.8	.0	1.2	4.5	1573.70
.13	.00	1.04	.00	.000	.040	.000	.000	1572.60	2854.96
.002344	122.	133.	131.	6	8	0	.00	266.47	3121.43

*SECNO 700.000

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

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1574.90 ELREA= 1574.00

700.000	.55	1573.25	1572.89	.00	1573.26	.01	.18	.00	1574.90
123.0	.0	123.0	.0	.0	153.1	.0	1.5	5.3	1574.00
.17	.00	.80	.00	.000	.040	.000	.000	1572.70	2434.84
.001124	133.	113.	79.	5	15	0	.00	295.46	2730.30

*SECNO 800.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .51

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1576.00 ELREA= 1574.00

800.000	.32	1573.52	1573.36	.00	1573.54	.02	.28	.00	1576.00
123.0	.0	123.0	.0	.0	112.0	.0	2.0	6.4	1574.00
.21	.00	1.10	.00	.000	.040	.000	.000	1573.20	1997.78
.004240	135.	145.	140.	1	14	0	.00	366.47	2364.25

1
24SEP99 16:51:39 PAGE 5

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 900.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1577.00 ELREA= 1574.00

900.000	.29	1573.99	1573.85	.00	1574.01	.02	.47	.00	1577.00
123.0	.0	123.0	.0	.0	117.5	.0	2.2	7.4	1574.00
.24	.00	1.05	.00	.000	.040	.000	.000	1573.70	1751.56
.004837	102.	104.	108.	3	14	0	.00	456.07	2207.63

*SECNO 1000.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1577.20 ELREA= 1575.30

1000.000	.29	1574.59	1574.45	.00	1574.61	.02	.60	.00	1577.20
123.0	.0	123.0	.0	.0	108.4	.0	2.6	8.5	1575.30
.27	.00	1.13	.00	.000	.040	.000	.000	1574.30	1695.43
.005256	117.	118.	122.	3	8	0	.00	396.32	2091.75

*SECNO 1100.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1577.40 ELREA= 1575.70

1100.000	.31	1575.01	1574.84	.00	1575.02	.01	.41	.00	1577.40
123.0	.0	123.0	.0	.0	132.0	.0	2.8	9.5	1575.70
.30	.00	.93	.00	.000	.040	.000	.000	1574.70	1509.13
.003111	102.	104.	104.	3	11	0	.00	437.28	1946.40

*SECNO 1200.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1577.50 ELREA= 1576.50

1200.000	.29	1575.39	1575.24	.00	1575.41	.02	.39	.00	1577.50
123.0	.0	123.0	.0	.0	120.4	.0	3.2	10.6	1576.50
.33	.00	1.02	.00	.000	.040	.000	.000	1575.10	1363.44
.004029	112.	110.	110.	3	11	0	.00	422.50	1785.94

*SECNO 1300.000

1
24SEP99 16:51:39 PAGE 6

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= 1578.00 ELREA= 1577.00

1300.000	.35	1575.95	1575.75	.00	1575.96	.01	.55	.00	1578.00
123.0	.0	123.0	.0	.0	141.5	.0	3.7	12.3	1577.00
.38	.00	.87	.00	.000	.040	.000	.000	1575.60	1274.14
.002479	199.	176.	153.	3	8	0	.00	439.42	1713.56

CCHV= .100 CEHV= .300
*SECNO 1400.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1580.00 ELREA= 1578.00

1400.000	.18	1577.48	1577.48	.00	1577.57	.09	1.03	.02	1580.00
123.0	.0	123.0	.0	.0	51.4	.0	4.0	13.7	1578.00
.40	.00	2.40	.00	.000	.040	.000	.000	1577.30	1462.20
.041407	122.	162.	190.	0	11	0	.00	282.94	1750.13

1

THIS RUN EXECUTED 24SEP99 16:51:39

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

Pulsipher Wash

SUMMARY PRINTOUT TABLE 100

	SECNO	EGLWC	ELLC	EGPRS	ELTRD	QPR	QWEIR	CLASS	H3	DEPTH	CWSEL	VCH	EG

1

Pulsipher Wash

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	200.000	.00	.00	.00	1558.00	123.00	1558.18	1558.18	1558.26	429.20	2.40	51.22	5.94
*	300.000	349.75	.00	.00	1562.00	123.00	1562.35	1562.19	1562.38	53.87	1.36	90.75	16.76
*	400.000	150.38	.00	.00	1566.00	123.00	1566.22	1566.22	1566.33	402.77	2.65	46.33	6.13
*	500.000	100.44	.00	.00	1572.00	123.00	1572.17	1572.17	1572.25	422.56	2.32	52.98	5.98
*	600.000	133.46	.00	.00	1572.60	123.00	1573.06	1572.80	1573.08	23.44	1.04	117.83	25.41
*	700.000	112.64	.00	.00	1572.70	123.00	1573.25	1572.89	1573.26	11.24	.80	153.10	36.69
*	800.000	144.94	.00	.00	1573.20	123.00	1573.52	1573.36	1573.54	42.40	1.10	112.04	18.89
	900.000	103.62	.00	.00	1573.70	123.00	1573.99	1573.85	1574.01	48.37	1.05	117.55	17.68
	1000.000	118.27	.00	.00	1574.30	123.00	1574.59	1574.45	1574.61	52.56	1.13	108.39	16.97
	1100.000	103.70	.00	.00	1574.70	123.00	1575.01	1574.84	1575.02	31.11	.93	131.95	22.05
	1200.000	110.23	.00	.00	1575.10	123.00	1575.39	1575.24	1575.41	40.29	1.02	120.44	19.38
	1300.000	176.37	.00	.00	1575.60	123.00	1575.95	1575.75	1575.96	24.79	.87	141.54	24.71
*	1400.000	161.58	.00	.00	1577.30	123.00	1577.48	1577.48	1577.57	414.07	2.40	51.35	6.04

1

Pulsipher Wash

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	200.000	123.00	1558.18	.00	.00	.08	293.70	.00
*	300.000	123.00	1562.35	.00	4.18	.00	258.22	349.75
*	400.000	123.00	1566.22	.00	3.87	.00	218.02	150.38
*	500.000	123.00	1572.17	.00	5.95	.00	316.05	100.44
*	600.000	123.00	1573.06	.00	.89	.00	266.47	133.46
*	700.000	123.00	1573.25	.00	.18	.00	295.46	112.64
*	800.000	123.00	1573.52	.00	.28	.00	366.47	144.94
	900.000	123.00	1573.99	.00	.47	.00	456.07	103.62
	1000.000	123.00	1574.59	.00	.59	.00	396.32	118.27
	1100.000	123.00	1575.01	.00	.42	.00	437.28	103.70
	1200.000	123.00	1575.39	.00	.39	.00	422.50	110.23
	1300.000	123.00	1575.95	.00	.55	.00	439.42	176.37
*	1400.000	123.00	1577.48	.00	1.54	.00	287.94	161.58

1

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 200.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

WARNING SECNO= 300.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 400.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 400.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 500.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 500.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 600.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 700.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 800.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 1400.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1400.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

PULSOUT10.OUT

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1*****************************************
*  HEC-2 WATER SURFACE PROFILES           *
*                                         *
*  Version   4.6.2;  May 1991             *
*                                         *
*  RUN DATE    24SEP99    TIME   16:51:04  *
*****************************************
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*****************************************
*  U.S. ARMY CORPS OF ENGINEERS           *
*  HYDROLOGIC ENGINEERING CENTER          *
*  609 SECOND STREET, SUITE D             *
*  DAVIS, CALIFORNIA 95616-4687           *
*          (916) 756-1104                 *
*****************************************
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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                   X
X     X  X        X     X             X
X     X  XXXXXXX   XXXXX              XXXXXXX
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1
   24SEP99      16:51:04                                                    PAGE    1


                                                    THIS RUN EXECUTED 24SEP99    16:51:04
*************************************
 HEC-2 WATER SURFACE PROFILES

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


SPLIT FLOW BEING PERFORMED

SF


TWSTATION 10300 - RIGHT OVERBANK
WS      2   10300   10400              2.7
WC      0  1572.3     135  1573.6

TWSTATION 10200 - RIGHT OVERBANK
WS      2   10200   10300              2.7
WC      0    1572     242  1572.3

TWSTATION 10100 - RIGHT OVERBANK
WS      2   10100   10200              2.7
WC      0    1571     156    1572

TWSTATION 10000 - RIGHT OVERBANK
WS      2   10000   10100              2.7
WC      0    1570     163    1571
1
   24SEP99      16:51:04                                                    PAGE    2


T1      550-035
T2      Mequite Wash FIS Restudy
T3      Pulsipher Wash
T4      PULSOUT10.OUT

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                2                             -1                            1481    1570.2

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     -1                  -1                                      -1        -6


J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    100                 100       150

NC     0.04      0.04      0.04       0.1       0.3
X1    10000         5   1038.91   1647.26
GR     1574      1000      1572   1038.91    1569.6    1074.4    1569.5    1587.08      1570   1647.26

X1    10100        12   1046.08   1676.89    166.46     163.1    167.04
GR     1580      1000      1578   1003.52      1576   1006.81      1574   1010.42      1572   1014.51
GR     1572   1018.06      1572   1046.08    1571.2   1059.81    1570.6   1221.53    1570.6   1525.01
GR   1570.6   1629.33      1571   1676.89

X1    10200        10   1067.68   1706.93    135.8     155.58    140.7
GR     1584      1000      1582   1003.26     1580   1006.2      1574   1015.87      1572   1067.68
GR   1571.8   1082.69    1571.3   1272.12    1571.3   1580.72   1571.5   1663.91      1572   1706.93

X1    10300         9   1038.06   1755.77    170.45    241.71    197.48
GR     1580      1000      1574   1038.06      1572   1046.67      1572   1056.98      1572    1070.9
GR     1572   1097.07      1572   1600.21    1572.1      1700   1572.3   1755.77

X1    10400         8    1017.9   1760.34     142.4    134.75    138.34
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GR     1576       1000       1574      1017.9       1573.5     1134.53       1573.6     1416.55       1573.6       1600.7
GR   1573.6     1660.37     1573.6     1707.78       1573.6     1760.34
```


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

```
 *PROP 1

 CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

 CCHV=      .100 CEHV=      .300
 *SECNO 10000.000
 3280 CROSS SECTION  10000.00 EXTENDED        .01 FEET

 3720 CRITICAL DEPTH ASSUMED
  10000.000        .51   1570.01   1570.01   1570.20   1570.23        .22        .00        .00   1572.00
      961.2         .0      961.2         .0         .0      255.0         .0         .0         .0   1570.00
        .00        .00       1.77        .00       .000       .040       .000       .000   1569.50   1068.28
    .030730         0.         0.         0.          0         14          0        .00     578.98   1647.26


 *SECNO 10100.000
 3280 CROSS SECTION  10100.00 EXTENDED        .52 FEET


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.05

  10100.000        .93   1571.53   1571.11        .00   1571.59        .06       1.34        .02   1572.00
     1030.8         .0     1030.8         .0         .0      513.1         .0        1.5        2.3   1571.00
        .02        .00       2.01        .00       .000       .040       .000       .000   1570.60   1054.25
    .003790       166.       167.       163.          4          8          0        .00     622.64   1676.89


 *SECNO 10200.000
 3280 CROSS SECTION  10200.00 EXTENDED        .17 FEET

  10200.000        .88   1572.18   1571.88        .00   1572.27        .09        .67        .01   1572.00
     1123.0         .2     1122.8         .0         .4      474.5         .0        3.1        4.3   1572.00
        .04        .57       2.37        .00       .040       .040       .000       .000   1571.30   1063.18
    .006038       136.       141.       156.          1         14          0        .00     643.75   1706.93


 *SECNO 10300.000
 3280 CROSS SECTION  10300.00 EXTENDED        .69 FEET


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.71

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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

```
  10300.000        .98   1572.98   1572.50        .00   1573.04        .06        .76        .00   1574.00
     1315.7         .0     1315.7         .0         .0      685.4         .0        5.7        7.4   1572.30
        .07        .00       1.92        .00       .000       .040       .000       .000   1572.00   1042.42
    .002821       170.       197.       242.          2         11          0        .00     713.35   1755.77


 *SECNO 10400.000
 3280 CROSS SECTION  10400.00 EXTENDED        .50 FEET

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
  10400.000        .60   1574.10   1574.10        .00   1574.35        .25        .97        .06   1574.00
     1481.0         .0     1481.0         .0         .0      367.6         .0        7.4        9.7   1573.60
        .08        .06       4.03        .00       .040       .040       .000       .000   1573.50   1017.01
    .030043       142.       138.       135.          0         14          0        .00     743.33   1760.34


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 TWSTATION 10300 - RIGHT OVERBANK
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ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
165.34	165.37	.01	165.34	165.37	.01	7	1572.979	1574.100	10300.000	10400.000

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 TWSTATION 10200 - RIGHT OVERBANK
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ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
192.61	192.54	.04	357.96	357.91	.01	7	1572.183	1572.979	10200.000	10300.000

TWSTATION 10100 - RIGHT OVERBANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
92.22	92.17	.06	450.18	450.07	.02	7	1571.529	1572.183	10100.000	10200.000

TWSTATION 10000 - RIGHT OVERBANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
69.59	69.61	.03	519.77	519.69	.02	7	1570.014	1571.529	10000.000	10100.000

****
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

Pulsipher Wash

SUMMARY PRINTOUT TABLE 100

	SECNO	EGLWC	ELLC	EGPRS	ELTRD	QPR	QWEIR	CLASS	H3	DEPTH	CWSEL	VCH	EG

Pulsipher Wash

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	10000.000	.00	.00	.00	1569.50	961.23	1570.01	1570.01	1570.23	307.30	3.77	255.00	54.83
*	10100.000	167.04	.00	.00	1570.60	1030.82	1571.53	1571.13	1571.59	37.90	2.01	513.10	167.45
	10200.000	140.70	.00	.00	1571.30	1123.04	1572.18	1571.88	1572.27	60.38	2.37	474.92	144.53
*	10300.000	197.48	.00	.00	1572.00	1315.66	1572.98	1572.50	1573.04	28.21	1.92	685.36	247.72
*	10400.000	138.34	.00	.00	1573.50	1481.00	1574.10	1574.10	1574.35	300.43	4.03	367.68	85.44

Pulsipher Wash

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	10000.000	961.23	1570.01	.00	.00	-.19	578.98	.00
*	10100.000	1030.82	1571.53	.00	1.52	.00	622.64	167.04
	10200.000	1123.04	1572.18	.00	.65	.00	643.75	140.70
*	10300.000	1315.66	1572.98	.00	.80	.00	713.35	197.48
*	10400.000	1481.00	1574.10	.00	1.12	.00	743.33	138.34

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 10000.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

WARNING SECNO= 10100.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 10300.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 10400.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 10400.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

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1*****************************************
*  HEC-2 WATER SURFACE PROFILES           *
*                                         *
*  Version   4.6.2;  May 1991             *
*                                         *
*  RUN DATE    20SEP99    TIME   14:12:40  *
*****************************************
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*************************************
*  U.S. ARMY CORPS OF ENGINEERS     *
*  HYDROLOGIC ENGINEERING CENTER    *
*  609 SECOND STREET, SUITE D       *
*  DAVIS, CALIFORNIA 95616-4687     *
*        (916) 756-1104             *
*************************************
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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X           X     X
X     X  X        X                       X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX             XXXXXXX
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THIS RUN EXECUTED 20SEP99 14:12:40

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

 Version   4.6.2;  May 1991
************************************
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T1  550.035
T2  ABBOTT AND PULSIPHER WASHES FIS RESTUDY
T3  MAIN CHANNEL MODEL

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

        0         2         0         0        -1         0         0      3156    1608.7         0

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       -1         0        -1                                     -1         0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

      101       105       150

NC     0.04      0.04      0.04       0.1       0.3
X1      985        36    1774.7    2145.2
X3       10
GR   1614.0    1000.0    1612.0    1173.8    1612.0    1202.9    1612.0    1246.7    1612.0    1265.6
GR   1612.0    1335.7    1612.0    1535.6    1614.0    1749.5    1615.7    1774.7    1614.0    1839.1
GR   1612.0    1899.5    1610.0    1905.5    1608.0    1909.3    1606.0    1911.7    1604.0    1915.8
GR   1601.3    1918.8    1601.3    1924.3    1601.3    1930.4    1604.0    1933.4    1606.0    1938.2
GR   1610.0    1946.8    1612.0    1952.0    1612.0    1965.3    1612.0    1968.9    1614.0    2004.6
GR   1615.3    2048.1    1616.0    2130.0    1618.0    2145.2    1618.0    2356.9    1618.0    2358.3
GR   1616.0    2371.3    1616.0    2408.3    1617.3    2421.2    1618.0    2428.4    1618.0    2490.1
GR   1618.0    2524.5

NC     0.04      0.04      0.04       0.1       0.3
X1      990        29    1812.3    2141.5      32.8      57.4      55.0
X3       10
GR   1615.7    1000.0    1614.0    1123.9    1612.0    1389.5    1612.0    1539.7    1614.0    1775.5
GR   1615.9    1812.3    1614.0    1901.0    1612.0    1925.2    1611.7    1930.7    1611.5    1935.7
GR   1611.4    1938.0    1611.2    1942.1    1611.0    1947.6    1602.0    1953.1    1602.0    1959.2
GR   1611.1    1963.9    1611.3    1968.7    1611.6    1978.9    1612.0    1989.6    1614.0    2006.1
GR   1614.6    2046.5    1616.0    2124.8    1618.0    2141.5    1618.0    2185.9    1618.0    2191.1
GR   1618.0    2369.5    1618.0    2445.3    1618.0    2485.0    1618.0    2501.6

NC     0.015     0.015     0.015       0.6       0.8
X1      992        84    1925.2    1937.2      30.2      67.6      43.0
X3       10                                                                1616.4    1617.1
GR   1620.0    1000.0    1618.0    1048.8    1616.0    1154.7    1614.0    1244.9    1614.0    1246.7
GR   1613.9    1281.2    1613.1    1315.6    1612.5    1337.5    1612.0    1359.7    1612.0    1419.2
GR   1612.0    1432.9    1612.1    1458.5    1612.3    1522.4    1612.4    1558.0    1612.1    1624.1
GR   1612.0    1661.5    1613.0    1665.6    1613.3    1716.2    1613.8    1722.6    1615.5    1772.9
GR   1615.9    1778.4    1616.4    1783.6    1614.8    1827.1    1614.5    1834.2    1614.1    1880.0
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GR   1614.0    1885.2    1613.4    1890.9    1612.0    1912.6    1612.5    1925.2    1611.0    1925.2
GR   1603.0    1925.2    1603.0    1931.2    1603.0    1937.2    1611.0    1937.2    1612.8    1937.2
GR   1613.0    1944.8    1614.0    1948.9    1614.4    1965.8    1614.7    1980.6    1615.0    1994.2
GR   1616.0    2035.5    1615.9    2037.3    1615.4    2049.3    1616.3    2091.3    1616.4    2096.1
GR   1616.4    2129.6    1616.4    2140.6    1616.4    2167.4    1616.5    2212.1    1616.5    2228.1
GR   1616.6    2292.3    1616.7    2341.4    1616.9    2390.8    1617.1    2445.6    1616.7    2449.3
GR   1617.1    2492.9    1616.0    2509.1    1614.0    2524.4    1612.0    2546.7    1611.8    2598.7
GR   1611.7    2643.1    1610.7    2676.2    1611.3    2701.2    1612.0    2725.2    1614.0    2716.2
GR   1616.0    2740.3    1616.2    2747.3    1616.2    2806.7    1616.2    2849.8    1616.0    2855.9
GR   1614.6    2923.8    1614.0    2952.1    1613.6    3011.7    1613.9    3027.4    1616.0    3064.4
GR   1618.0    3082.7    1618.4    3108.9    1618.5    3217.0    1618.5    3250.6    1618.6    3285.6
GR   1618.6    3312.3    1619.1    3360.7    1620.0    3458.2    1622.0    3563.2
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NC	0.015	0.015	0.015	0.6	0.8					
SC	1.015	0.4	3.0		8.0	12.0	250.0	8.1	1605.4	1603.0
X1	994	100	2245.7	2257.7	328.9	245.3	250.0			
X2			2	1613.4	1623.1					15
X3	10							1623.3	1623.3	
BT	-31	1000.0	1632.1	1626.0	1281.2	1628.7	1624.0	1315.6	1628.0	1623.2
BT		1337.5	1628.0	1623.2	1419.2	1627.2	1623.1	1522.4	1626.2	1622.7
BT		1624.1	1625.3	1622.0	1723.6	1624.7	1621.7	1778.4	1624.0	1621.6
BT		1827.1	1623.8	1621.5	1880.0	1623.7	1621.3	1931.2	1623.6	1620.4
BT		1980.6	1623.5	1620.0	2037.3	1623.4	1619.9	2091.3	1623.3	1619.7
BT		2140.6	1623.2	1619.6	2167.4	1623.1	1619.5	2212.1	1623.2	1618.6
BT		2292.3	1623.4	1618.4	2390.8	1623.6	1618.2	2492.9	1623.7	1618.0
BT		2598.7	1624.0	1617.8	2701.2	1624.2	1617.8	2806.7	1624.4	1617.8
BT		2923.8	1624.6	1617.0	3027.4	1625.0	1617.0	3108.9	1625.2	1617.0
BT		3250.6	1625.2	1617.0	3285.6	1626.0	1617.0	3360.7	1626.0	1617.0
BT		3563.2	1626.0	1617.0						
GR	1626.0	1000.0	1624.1	1275.8	1624.0	1281.2	1623.2	1310.2	1623.2	1315.6
GR	1623.1	1332.1	1622.7	1337.5	1622.0	1345.3	1621.7	1383.3	1621.6	1419.2
GR	1621.5	1435.3	1621.3	1487.6	1620.4	1522.4	1620.0	1535.3	1619.9	1539.3
GR	1619.7	1593.1	1619.6	1624.1	1619.5	1646.0	1618.6	1696.9	1618.4	1723.6
GR	1618.2	1745.2	1618.0	1759.1	1617.8	1773.0	1617.8	1778.4	1617.8	1797.8
GR	1617.0	1818.7	1617.0	1827.1	1617.0	1849.0	1617.0	1880.0	1617.0	1904.2
GR	1617.0	1931.2	1617.0	1958.9	1617.1	1980.6	1617.1	1995.9	1618.0	2009.9
GR	1618.0	2037.3	1618.0	2044.5	1619.0	2063.8	1619.1	2091.3	1619.2	2112.6
GR	1619.4	2119.3	1619.5	2140.6	1619.5	2162.0	1619.5	2167.4	1619.5	2180.7
GR	1619.8	2199.4	1618.8	2203.8	1618.5	2212.1	1618.0	2224.8	1617.7	2230.4
GR	1617.0	2237.7	1616.0	2240.6	1615.2	2243.5	1615.2	2245.7	1613.4	2245.7
GR	1605.4	2245.7	1605.4	2251.7	1605.4	2257.7	1613.4	2257.7	1615.1	2257.7
GR	1615.1	2259.5	1616.0	2272.7	1617.0	2283.1	1617.4	2287.8	1617.7	2292.3
GR	1618.0	2297.6	1618.9	2330.3	1619.0	2337.7	1619.7	2382.2	1619.8	2390.8
GR	1620.0	2415.1	1620.2	2435.7	1621.0	2461.8	1621.4	2487.5	1621.5	2492.9
GR	1622.0	2510.1	1622.0	2517.2	1621.1	2540.3	1621.0	2542.7	1620.6	2593.3
GR	1620.6	2598.7	1620.8	2643.3	1620.7	2695.8	1620.7	2701.2	1620.7	2748.2
GR	1620.8	2801.3	1621.0	2806.7	1621.5	2853.2	1621.6	2923.8	1621.1	3027.4
GR	1621.1	3108.9	1622.0	3153.8	1621.0	3218.7	1620.2	3250.6	1620.0	3277.7
GR	1620.0	3285.6	1620.0	3328.5	1620.3	3360.7	1620.6	3379.1	1625.8	3563.2

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NC	0.04	0.04	0.025	0.1	0.8					
X1	1000	45	1784.5	1895.9	32.3	22.1	19.0			
X3	10									
GR	1626.0	1000.0	1624.0	1026.0	1622.0	1064.2	1620.0	1097.7	1618.0	1201.8
GR	1617.0	1269.8	1617.0	1560.2	1618.0	1681.8	1618.0	1784.5	1617.0	1808.2
GR	1616.2	1810.2	1615.4	1812.2	1614.6	1814.2	1613.7	1816.4	1612.9	1818.4
GR	1612.1	1820.4	1611.3	1822.4	1610.5	1824.3	1609.7	1826.2	1608.9	1828.2
GR	1608.1	1830.2	1606.0	1835.4	1606.0	1840.1	1607.0	1840.9	1608.0	1842.5
GR	1609.0	1844.0	1610.0	1845.8	1611.0	1847.3	1612.0	1848.6	1613.0	1850.1
GR	1614.0	1852.0	1615.0	1853.5	1616.0	1857.4	1617.0	1873.7	1618.0	1895.9
GR	1619.0	1980.8	1619.5	2062.5	1619.0	2076.5	1620.0	2080.1	1621.0	2083.7
GR	1622.0	2087.7	1623.0	2091.5	1624.0	2095.2	1625.0	2100.1	1626.0	2104.7
NC	0.04	0.04	0.025	0.1	0.3					
X1	1002	45	1710.5	1797.2	84.3	29.5	52.0			
X3	10									
GR	1626.0	1000.0	1624.0	1030.1	1622.0	1066.5	1620.0	1123.4	1618.0	1222.3
GR	1617.0	1421.5	1617.0	1528.8	1617.1	1710.5	1617.0	1724.8	1616.0	1734.6
GR	1615.0	1741.7	1614.0	1748.0	1613.0	1752.2	1612.0	1756.8	1611.0	1757.6
GR	1610.0	1759.8	1609.0	1762.2	1608.0	1764.2	1607.0	1766.4	1606.0	1769.4
GR	1606.0	1771.7	1606.0	1776.6	1607.0	1778.0	1608.0	1779.2	1609.0	1780.8
GR	1610.0	1782.3	1611.0	1784.9	1612.0	1786.4	1613.0	1788.5	1614.0	1790.6
GR	1615.0	1792.7	1616.0	1794.9	1617.0	1797.2	1618.0	1927.1	1618.0	1975.6
GR	1618.0	1998.1	1618.0	2003.1	1619.0	2005.9	1620.0	2008.1	1621.0	2011.4
GR	1622.0	2013.9	1623.0	2016.8	1624.0	2019.5	1625.0	2022.1	1626.0	2025.4
NC	0.04	0.04	0.025	0.1	0.3					
X1	1005	47	1327.0	1482.9	251.1	196.2	195.0			
X3	10									
GR	1626.0	1000.0	1625.0	1007.5	1624.0	1033.7	1623.0	1054.9	1621.0	1092.6
GR	1620.0	1120.2	1619.0	1147.3	1618.0	1178.9	1618.0	1321.2	1618.0	1327.0
GR	1617.0	1347.9	1616.0	1352.3	1615.0	1356.9	1614.0	1360.4	1613.0	1362.9
GR	1612.0	1365.1	1611.0	1367.3	1610.0	1369.5	1609.0	1371.8	1608.0	1374.1
GR	1607.0	1376.4	1607.0	1385.8	1608.0	1387.6	1609.0	1389.1	1610.0	1393.6
GR	1611.0	1400.4	1612.0	1407.1	1611.0	1413.7	1614.0	1419.0	1615.0	1424.2
GR	1616.0	1431.7	1617.0	1444.4	1618.0	1463.5	1619.0	1482.9	1618.0	1499.9
GR	1618.0	1543.4	1618.0	1570.0	1617.0	1633.1	1617.0	1637.5	1617.0	1655.5
GR	1617.0	1656.3	1618.0	1660.4	1619.0	1664.7	1620.0	1668.9	1621.0	1673.1
GR	1622.0	1676.1	1626.0	1684.1						
NC	0.04	0.04	0.025	0.1	0.3					
X1	1010	52	1160.0	1275.6	148.0	134.3	140.0			
X3	10					1287.0	1619.0			
GR	1626.0	1000.0	1625.0	1002.7	1624.0	1006.0	1623.0	1008.9	1622.0	1016.1
GR	1621.0	1025.5	1620.0	1051.3	1619.0	1160.0	1618.0	1164.5	1617.0	1168.9
GR	1616.0	1173.4	1615.0	1177.7	1614.0	1180.9	1613.0	1183.7	1612.0	1186.6
GR	1611.0	1189.5	1610.0	1191.7	1609.0	1192.8	1608.0	1194.1	1608.0	1204.7
GR	1609.0	1205.9	1610.0	1207.1	1611.0	1211.2	1612.0	1215.4	1613.0	1219.9
GR	1614.0	1224.9	1615.0	1229.8	1616.0	1235.2	1617.0	1245.6	1618.0	1268.1
GR	1619.0	1275.6	1619.0	1287.0	1618.0	1290.6	1617.0	1293.1	1616.0	1297.7
GR	1616.0	1302.6	1617.0	1303.4	1618.0	1304.1	1619.0	1305.1	1619.0	1381.0
GR	1619.0	1394.9	1619.0	1460.9	1618.0	1515.7	1618.0	1523.3	1619.0	1527.3
GR	1620.0	1531.1	1621.0	1535.7	1622.0	1538.5	1623.0	1540.9	1624.0	1543.7

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GR	1625.0	1546.6	1626.0	1549.4						
NC	0.03	0.03	0.025	0.5	0.6					
X1	1012	35	1064.8	1439.2	91.6	138.8	97.0			
GR	1628.0	1000.0	1627.0	1035.3	1626.0	1064.8	1625.0	1067.2	1624.0	1069.7
GR	1623.0	1072.1	1622.0	1074.7	1621.0	1077.7	1620.0	1081.2	1619.0	1084.5
GR	1618.0	1087.5	1617.0	1090.5	1616.0	1093.1	1615.0	1095.2	1614.0	1096.9
GR	1613.0	1098.7	1612.0	1100.4	1611.0	1101.9	1610.0	1105.0	1610.0	1131.7
GR	1611.0	1134.0	1612.0	1138.0	1613.0	1139.2	1614.0	1141.2	1615.0	1144.0
GR	1616.0	1147.3	1617.0	1150.7	1618.0	1153.8	1619.0	1160.9	1620.0	1199.9
GR	1621.0	1360.8	1622.0	1400.2	1623.0	1408.7	1624.0	1419.9	1625.0	1439.2
NC	0.03	0.03	0.025	0.6	0.8					
X1	1015	33	1000	1130	138.2	96.4	124.0			
X3	10									
GR	1626.0	1000.0	1625.0	1009.3	1624.0	1018.4	1623.0	1025.5	1622.0	1032.3
GR	1621.0	1036.3	1620.0	1043.5	1619.0	1050.3	1619	1056.1	1619	1059.9
GR	1619	1063.6	1619	1066.3	1619	1068.4	1619	1069.2	1619	1071.0
GR	1619	1072.4	1619	1080.4	1619	1087.3	1619	1088.9	1619	1090.6
GR	1619	1092.3	1619	1094.3	1619	1097.1	1619	1100.5	1619	1103.7
GR	1619.0	1107.9	1620.0	1111.8	1621.0	1115.1	1622.0	1117.1	1623.0	1119.2
GR	1624.0	1121.2	1625.0	1123.9	1626.0	1130.0				
NC	0.03	0.03	0.025	0.5	0.6					
X1	1017	51	1243.7	1426.7	87.6	102.0	95.0			
X3	10			1197.3	1628.0					
GR	1632.0	1000.0	1631.0	1007.6	1630.0	1014.8	1629.0	1022.1	1628.0	1023.7
GR	1627.0	1024.9	1627.0	1196.6	1628.0	1197.3	1628.0	1243.7	1627.0	1304.3
GR	1626.0	1321.9	1625.0	1329.6	1624.0	1334.4	1623.0	1338.3	1622.0	1342.6
GR	1621.0	1346.5	1620.0	1349.7	1619.0	1352.4	1618.0	1355.0	1617.0	1357.2
GR	1616.0	1360.5	1615.0	1364.9	1614.0	1369.4	1614.0	1378.7	1615.0	1382.2
GR	1616.0	1385.7	1617.0	1389.2	1618.0	1392.7	1619.0	1396.1	1620.0	1399.7
GR	1621.0	1403.2	1622.0	1406.7	1623.0	1410.2	1624.0	1413.4	1625.0	1416.7
GR	1626.0	1419.9	1627.0	1423.3	1628.0	1426.7	1629.0	1429.7	1630.0	1432.7
GR	1631.0	1435.8	1632.0	1439.1	1633.0	1442.3	1634.0	1445.3	1635.0	1448.4
GR	1636.0	1451.5	1637.0	1455.4	1638.0	1462.4	1639.0	1503.3	1639.0	1503.8
GR	1638.0	1506.8								
NC	0.03	0.03	0.025	0.1	0.3					
X1	1020	46	1242.4	1434.2	194.2	190.3	185.3			
X3	10			1205.8	1629.0	1572.0	1635.0			
GR	1630.0	1000.0	1629.0	1001.4	1628.0	1002.2	1627.0	1003.1	1627.0	1192.0
GR	1628.0	1192.8	1629.0	1205.8	1629.0	1242.4	1628.0	1298.2	1627.0	1325.3
GR	1626.0	1340.4	1625.0	1345.0	1624.0	1349.2	1623.0	1352.9	1622.0	1356.7
GR	1621.0	1360.3	1620.0	1363.4	1619.0	1366.4	1618.0	1369.4	1617.0	1372.4
GR	1617.0	1394.9	1618.0	1398.3	1619.0	1401.8	1620.0	1405.2	1621.0	1408.5
GR	1622.0	1411.8	1623.0	1415.1	1624.0	1418.3	1625.0	1421.3	1626.0	1424.4
GR	1627.0	1427.4	1628.0	1430.5	1629.0	1434.2	1630.0	1437.4	1631.0	1445.3
GR	1632.0	1465.8	1633.0	1472.4	1634.0	1492.6	1635.0	1562.0	1635.0	1567.6
GR	1635.0	1568.3	1635.0	1572.0	1634.0	1584.9	1634.0	1599.8	1634.0	1605.9
GR	1634.0	1641.1								

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NC	0.03	0.03	0.025	0.1	0.3					
X1	1025	46	1269.9	1472.9	215.1	213.3	221.7			
X3	10			1212.9	1630.0	1498.1	1630.0			
GR	1631.0	1000.0	1630.0	1011.9	1629.0	1024.2	1628.0	1025.5	1627.0	1026.8
GR	1627.0	1198.7	1628.0	1199.5	1629.0	1202.2	1630.0	1212.9	1630.0	1269.9
GR	1629.0	1318.5	1628.0	1329.1	1627.0	1347.6	1626.0	1361.7	1625.0	1365.5
GR	1624.0	1369.1	1623.0	1372.8	1622.0	1376.5	1621.0	1380.1	1620.0	1384.2
GR	1619.0	1406.5	1619.0	1415.6	1620.0	1419.0	1621.0	1422.3	1622.0	1425.7
GR	1623.0	1429.0	1624.0	1432.4	1625.0	1435.6	1626.0	1439.0	1627.0	1442.5
GR	1628.0	1463.8	1629.0	1468.4	1630.0	1472.9	1631.0	1477.6	1631.0	1490.6
GR	1631.0	1496.0	1631.0	1498.1	1630.0	1504.1	1629.0	1505.6	1628.0	1506.6
GR	1628.0	1675.1	1629.0	1677.7	1630.0	1680.4	1631.0	1687.7	1632.0	1713.1
GR	1633.0	1732.1								
NC	0.03	0.03	0.025	0.1	0.3					
X1	1030	42	1297.3	1500.5	194.6	195.4	190.7			
X3	10			1263.5	1629.0	1610.6	1631.0			
GR	1632.0	1000.0	1631.0	1011.9	1630.0	1018.1	1629.0	1021.8	1628.0	1023.3
GR	1627.0	1024.4	1627.0	1257.9	1628.0	1258.6	1629.0	1263.5	1629.0	1297.3
GR	1628.0	1356.7	1627.0	1406.8	1626.0	1426.8	1625.0	1430.5	1624.0	1434.4
GR	1623.0	1438.3	1622.0	1442.3	1621.0	1446.0	1621.0	1472.3	1622.0	1475.7
GR	1623.0	1479.2	1624.0	1482.8	1625.0	1486.3	1626.0	1489.8	1627.0	1493.3
GR	1628.0	1496.9	1629.0	1500.5	1629.0	1530.6	1629.0	1574.7	1630.0	1583.2
GR	1631.0	1591.2	1631.0	1610.6	1630.0	1616.4	1629.0	1618.2	1628.0	1619.9
GR	1628.0	1779.2	1629.0	1781.8	1630.0	1784.5	1631.0	1787.0	1632.0	1789.7
GR	1633.0	1792.2	1633.0	1815.5						
NC	0.03	0.03	0.025	0.1	0.3					
X1	1035	31	1432	1491.5	191.0	185.1	179.0			
X3	10			1236.5	1629.0					
GR	1636.0	1000.0	1635.0	1012.2	1634.0	1020.9	1633.0	1027.6	1632.0	1034.4
GR	1631.0	1039.3	1630.0	1044.2	1629.0	1049.1	1628.0	1050.4	1627.0	1051.7
GR	1627.0	1228.0	1628.0	1229.4	1629.0	1236.5	1629.0	1263.2	1628.0	1280.9
GR	1627.0	1432.0	1626.0	1440.7	1625.0	1444.8	1624.0	1449.1	1623.0	1453.4
GR	1623.0	1475.6	1624.0	1479.5	1625.0	1483.4	1626.0	1487.4	1627.0	1491.5
GR	1628.0	1495.5	1629.0	1499.0	1630.0	1502.8	1631.0	1583.7	1632.0	1595.6
GR	1632.0	1614.6								
NC	0.03	0.03	0.025	0.1	0.3					
X1	1040.0	14.0	1272.7	1426.6	221.9	215.9	224.3			
X3	10.0			1272.7	1629.0	1609.4	1631.0			
GR	1634.0	1000.0	1633.0	1017.0	1632.0	1032.1	1631.0	1046.1	1630.0	1077.1

GR	1629.0	1084.8	1628.0	1108.3	1628.0	1134.0	1629.0	1227.9	1629.0	1236.8
GR	1628.0	1240.1	1628.0	1253.3	1629.0	1266.5	1629.0	1272.7	1628.0	1374.4
GR	1627.0	1378.7	1626.0	1382.4	1625.0	1386.9	1625.0	1409.0	1626.0	1412.2
GR	1627.0	1415.8	1628.0	1419.2	1629.0	1422.9	1630.0	1426.6	1630.0	1483.9
GR	1630.0	1518.5	1631.0	1537.0	1631.0	1609.4	1630.0	1617.1	1630.0	1652.6
GR	1631.0	1669.9	1632.0	1685.0	1633.0	1701.8	1634.0	1719.0		

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NC	0.03	0.03	0.025	0.1	0.3					
X1	1045	28	1052.5	1377.9	180.4	181.5	178.0			
X3						1387.3	1632.0			
GR	1634.0	1000.0	1633.0	1032.6	1632.0	1052.5	1631.0	1085.6	1630.0	1174.0
GR	1629.0	1216.7	1629.0	1254.4	1629.0	1325.7	1628.0	1329.9	1627.0	1334.1
GR	1627.0	1337.1	1627.0	1355.8	1627.0	1356.2	1628.0	1360.6	1629.0	1364.8
GR	1630.0	1369.1	1631.0	1373.6	1632.0	1377.9	1632.0	1387.3	1631.0	1421.7
GR	1630.0	1462.1	1630.0	1481.8	1631.0	1505.9	1632.0	1508.8	1633.0	1511.7
GR	1634.0	1514.6	1635.0	1517.5	1636.0	1520.5				
NC	0.03	0.03	0.025	0.1	0.3					
X1	1050	25	1028.7	1355.4	197.8	195.0	196.5			
X3						1371.7	1633.0			
GR	1634.0	1000.0	1633.0	1028.7	1632.0	1060.7	1631.0	1088.7	1630.0	1131.7
GR	1630.0	1163.0	1630.0	1201.9	1630.0	1242.5	1631.0	1260.0	1631.0	1300.3
GR	1630.0	1305.0	1629.0	1309.3	1629.0	1340.7	1630.0	1344.2	1631.0	1348.0
GR	1632.0	1351.3	1633.0	1355.4	1633.0	1371.7	1632.0	1398.3	1632.0	1517.8
GR	1633.0	1561.7	1634.0	1590.4	1635.0	1607.0	1636.0	1609.4	1637.0	1611.7
NC	0.03	0.03	0.025	0.1	0.3					
X1	1055	25	1191.8	1438.0	195.1	194.2	197.5			
GR	1638.0	1000.0	1637.0	1020.6	1636.0	1070.7	1635.0	1106.4	1634.0	1191.8
GR	1633.0	1208.0	1632.0	1235.1	1632.0	1239.3	1632.0	1251.2	1632.0	1329.2
GR	1632.0	1384.0	1631.0	1387.7	1630.0	1391.3	1630.0	1423.6	1631.0	1425.6
GR	1632.0	1428.1	1633.0	1430.8	1634.0	1434.3	1635.0	1438.0	1635.0	1459.2
GR	1635.0	1523.6	1636.0	1574.8	1637.0	1577.9	1638.0	1582.0	1639.0	1585.8
NC	0.03	0.03	0.025	0.1	0.3					
X1	1060	28	1396.9	1463.2	193.6	195.7	195.0			
GR	1638.0	1000.0	1637.0	1070.9	1636.0	1114.9	1636.0	1121.6	1636.0	1128.8
GR	1635.0	1157.6	1634.0	1237.4	1634.0	1318.7	1635.0	1366.3	1635.0	1396.9
GR	1634.0	1403.5	1633.0	1412.0	1632.0	1414.1	1631.0	1418.5	1631.0	1427.6
GR	1631.0	1440.5	1631.0	1450.9	1632.0	1454.4	1633.0	1456.8	1634.0	1459.6
GR	1635.0	1463.2	1636.0	1466.1	1637.0	1472.0	1638.0	1477.0	1639.0	1540.9
GR	1640.0	1576.0	1641.0	1590.7	1642.0	1617.9				
NC	0.03	0.03	0.025	0.1	0.3					
X1	1065	44	1265.3	1362.5	180.3	173.0	177.7			
X3	10			1214.1	1638.0					
GR	1639.0	1000.0	1638.0	1049.1	1637.0	1059.8	1636.0	1068.8	1635.0	1073.6
GR	1634.0	1079.6	1634.0	1112.9	1635.0	1115.8	1635.0	1119.6	1635.0	1126.4
GR	1636.0	1128.2	1636.0	1134.8	1635.0	1138.9	1634.0	1140.4	1633.0	1142.7
GR	1632.0	1144.7	1632.0	1156.2	1633.0	1159.0	1634.0	1161.9	1635.0	1169.0
GR	1636.0	1182.4	1637.0	1187.8	1638.0	1214.1	1638.0	1265.3	1637.0	1278.7
GR	1636.0	1287.2	1635.0	1294.4	1634.0	1301.1	1633.0	1307.0	1632.0	1318.1
GR	1632.0	1337.3	1633.0	1338.7	1634.0	1343.7	1635.0	1346.9	1636.0	1350.3
GR	1637.0	1356.5	1638.0	1362.5	1639.0	1388.7	1640.0	1405.2	1641.0	1472.9
GR	1642.0	1491.9	1643.0	1523.8	1644.0	1553.9	1645.0	1564.6		

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NC	0.04	0.04	0.025	0.1	0.5					
X1	1067	53	1287.8	1396.0	110.9	131.9	113.0			
X3	10			1275.9	1638.0					
GR	1641.0	1000.0	1640.0	1052.5	1639.0	1095.3	1638.0	1120.8	1637.0	1122.5
GR	1636.0	1124.1	1635.0	1125.1	1634.0	1126.1	1633.0	1128.7	1632.0	1130.3
GR	1632.0	1139.5	1633.0	1141.6	1634.0	1145.4	1635.0	1152.9	1635.0	1153.3
GR	1634.0	1164.0	1633.0	1166.4	1633.0	1173.2	1634.0	1175.6	1635.0	1177.0
GR	1636.0	1183.2	1637.0	1188.1	1637.0	1203.4	1636.0	1204.7	1635.0	1206.1
GR	1634.0	1209.3	1633.0	1212.1	1633.0	1214.2	1633.0	1226.4	1633.0	1229.2
GR	1634.0	1230.4	1635.0	1232.7	1636.0	1240.7	1637.0	1244.2	1638.0	1275.9
GR	1638.0	1287.8	1637.0	1332.5	1636.0	1340.7	1635.0	1343.9	1634.0	1349.6
GR	1633.0	1355.3	1633.0	1361.9	1633.0	1366.5	1633.0	1381.7	1634.0	1384.8
GR	1635.0	1388.4	1636.0	1390.9	1637.0	1393.5	1638.0	1396.0	1639.0	1399.8
GR	1640.0	1400.9	1641.0	1404.0	1642.0	1407.4				
NC	0.04	0.04	0.025	0.1	0.5					
X1	1069	18	1000	1195	99	70	83			
GR	1640	1000.0	1639	1008	1638	1016	1637	1023	1636	1028
GR	1635	1033	1634	1042	1634	1048	1635	1055	1636	1104
GR	1636	1129	1635	1131	1634	1145	1634	1172	1635	1180
GR	1636	1184	1637	1190	1638	1195				
NC	0.04	0.04	0.025	0.1	0.5					
X1	1070	56	1162.1	1287.5	52	83	67			
X3	10			1152.7	1639.0	1423.0	1643.0			
GR	1640.0	1000.0	1641.0	1008.1	1641.0	1012.4	1640.0	1019.3	1639.0	1020.8
GR	1638.0	1024.7	1637.0	1026.7	1637.0	1036.8	1638.0	1040.6	1639.0	1044.1
GR	1639.0	1051.9	1638.0	1057.0	1637.0	1062.0	1636.0	1064.0	1635.0	1065.0
GR	1634.0	1066.5	1633.0	1067.4	1633.0	1071.8	1634.0	1074.1	1635.0	1074.9
GR	1636.0	1076.9	1637.0	1078.2	1638.0	1080.1	1638.0	1091.7	1637.0	1093.3
GR	1636.0	1096.6	1635.0	1100.1	1634.0	1116.9	1634.0	1131.7	1635.0	1134.7
GR	1636.0	1140.6	1637.0	1143.7	1638.0	1148.0	1639.0	1152.7	1639.0	1162.1
GR	1638.0	1165.7	1637.0	1167.3	1636.0	1170.0	1635.0	1171.7	1634.0	1213.0
GR	1634.0	1243.3	1635.0	1275.7	1636.0	1278.1	1637.0	1281.1	1638.0	1284.1

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GR   1639.0    1287.5    1640.0    1290.7    1641.0    1309.5    1642.0    1384.1    1643.0    1417.8
GR   1643.0    1423.0    1642.0    1427.8    1642.0    1454.3    1643.0    1456.0    1644.0    1462.2
GR   1645.0    1466.3

NC      0.04      0.04     0.025       0.3       0.5
X1      1072        19    1152.4    1261.4     115.4      95.6     104.0
GR   1643.0    1000.0    1641.0    1113.4    1641.0    1133.9    1641.0    1152.4    1640.0    1161.8
GR   1639.0    1164.8    1638.0    1170.2    1637.0    1172.6    1636.0    1176.0    1635.0    1196.4
GR   1635.0    1254.1    1636.0    1255.9    1637.0    1256.9    1638.0    1257.6    1639.0    1258.1
GR   1640.0    1258.7    1641.0    1261.4    1642.0    1305.8    1642.0    1341.6

NC      0.04      0.04     0.025       0.1       0.3
X1      1075        41    1332.0    1424.1     107.6     105.7      88.9
X3        10                                            1431.1    1641.0
GR   1646.0    1000.0    1646.0    1010.7    1647.0    1013.4    1648.0    1020.7    1648.0    1028.0
GR   1648.0    1048.8    1648.0    1102.6    1647.0    1104.7    1646.0    1106.7    1645.0    1109.4
GR   1644.0    1112.0    1644.0    1159.5    1644.0    1198.7    1643.0    1285.7    1643.0    1308.1
GR   1643.0    1332.0    1641.0    1336.8    1640.0    1339.8    1639.0    1344.1    1638.0    1350.1
GR   1637.0    1353.9    1636.0    1358.7    1635.5    1362.4    1635.5    1367.9    1635.5    1395.1
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GR   1635.5    1405.3    1636.0    1410.5    1637.0    1411.3    1638.0    1414.0    1639.0    1415.9
GR   1640.0    1418.1    1641.0    1424.1    1641.0    1431.1    1640.0    1436.4    1639.0    1440.6
GR   1639.0    1442.7    1640.0    1447.0    1641.0    1450.3    1642.0    1479.0    1643.0    1516.1
GR   1643.0    1528.5

NC      0.04      0.04     0.025       0.1       0.3
X1      1080        29    1247.1    1312.0     170.2     176.5     171.7
X3        10                                            1316.4    1640.0
GR   1648.0    1000.0    1648.0    1059.5    1647.0    1086.0    1646.0    1175.8    1645.0    1179.1
GR   1644.0    1181.6    1643.0    1184.8    1643.0    1224.9    1643.0    1239.8    1641.0    1245.6
GR   1640.0    1247.1    1639.0    1251.7    1638.0    1256.2    1637.0    1259.4    1636.0    1265.7
GR   1636.0    1297.0    1637.0    1303.0    1638.0    1305.4    1639.0    1307.8    1640.0    1312.0
GR   1640.0    1316.4    1639.0    1320.1    1638.0    1323.2    1638.0    1324.7    1639.0    1330.1
GR   1640.0    1331.6    1641.0    1334.8    1642.0    1336.8    1642.0    1373.7

NC      0.04      0.04     0.025       0.1       0.3
X1      1085        58    1374.9    1431.9     235.4     239.3     236.9
GR   1661.0    1000.0    1660.0    1001.3    1659.0    1001.8    1658.0    1002.3    1657.0    1002.7
GR   1656.0    1003.2    1655.0    1003.8    1654.0    1005.0    1653.0    1006.0    1652.0    1007.4
GR   1651.0    1009.6    1651.0    1053.2    1652.0    1061.9    1653.0    1071.1    1653.0    1084.8
GR   1652.0    1140.2    1651.0    1157.2    1650.0    1160.2    1649.0    1164.0    1648.0    1167.4
GR   1648.0    1214.5    1648.0    1277.8    1647.0    1292.2    1646.0    1302.2    1645.0    1352.6
GR   1644.0    1357.6    1643.0    1374.9    1641.0    1378.6    1640.0    1379.8    1639.0    1384.5
GR   1638.0    1387.5    1638.0    1412.0    1639.0    1421.1    1640.0    1425.5    1641.0    1428.2
GR   1642.0    1430.2    1643.0    1431.9    1643.0    1453.6    1643.0    1457.8    1644.0    1463.6
GR   1644.0    1476.2    1643.0    1478.1    1642.0    1479.1    1641.0    1480.0    1640.0    1480.3
GR   1639.0    1483.2    1639.0    1488.0    1640.0    1490.5    1641.0    1492.6    1642.0    1493.7
GR   1643.0    1495.5    1644.0    1498.6    1645.0    1512.8    1646.0    1535.4    1647.0    1556.1
GR   1648.0    1581.4    1649.0    1600.1    1650.0    1623.2

NC      0.04      0.04     0.025       0.1       0.3
X1      1090        43    1224.0    1297.9     187.9     190.8     188.6
X3        10                                            1357.8    1646.0
GR   1652.0    1000.0    1652.0    1070.9    1651.0    1081.9    1650.0    1090.5    1649.0    1092.8
GR   1648.0    1173.8    1648.0    1196.5    1648.0    1202.2    1647.0    1208.4    1646.0    1224.0
GR   1645.0    1227.7    1644.0    1230.2    1643.0    1234.8    1641.0    1246.1    1640.0    1249.5
GR   1639.0    1253.9    1639.0    1256.9    1639.0    1263.7    1639.0    1268.6    1640.0    1270.3
GR   1641.0    1280.6    1642.0    1287.2    1643.0    1290.0    1644.0    1291.0    1645.0    1293.8
GR   1646.0    1297.9    1646.0    1357.8    1645.0    1361.4    1645.0    1365.6    1646.0    1369.8
GR   1647.0    1387.7    1647.0    1390.1    1647.0    1398.9    1648.0    1417.6    1649.0    1419.4
GR   1650.0    1420.2    1651.0    1430.4    1652.0    1432.6    1653.0    1435.9    1654.0    1438.5
GR   1655.0    1441.3    1656.0    1443.1    1657.0    1444.7

NC      0.04      0.04     0.025       0.1       0.3
X1      1095        36.0   1198.8    1487.9     183.7     187.2     191.9
GR   1655.0    1000.0    1656.0    1006.0    1656.0    1012.8    1655.0    1024.1    1654.0    1046.4
GR   1653.0    1082.9    1652.0    1266.3    1651.0    1327.1    1650.0    1335.1    1649.0    1319.1
GR   1648.0    1341.3    1647.0    1358.7    1647.0    1387.4    1647.0    1398.8    1646.0    1416.9
GR   1645.0    1422.2    1644.0    1424.1    1643.0    1429.2    1641.0    1443.9    1640.0    1446.5
GR   1640.0    1456.7    1641.0    1460.3    1642.0    1461.5    1643.0    1477.0    1644.0    1479.5
GR   1645.0    1482.6    1646.0    1485.2    1647.0    1487.9    1647.0    1500.6    1647.0    1504.3
GR   1648.0    1535.0    1649.0    1607.4    1650.0    1647.8    1651.0    1691.9    1652.0    1734.1
GR   1653.0    1766.3
1
    20SEP99     14:12:40                                                                    PAGE    9


NC      0.04      0.04     0.025       0.1       0.3
X1      1100        49    1239.2    1297.9     178.7     186.3     181.2
X3                                    1155.7    1647.0    1342.4    1650.0
GR   1648.0    1000.0    1647.0    1141.5    1646.0    1144.1    1646.0    1149.4    1647.0    1155.7
GR   1647.0    1239.2    1646.0    1241.0    1645.0    1243.9    1644.0    1246.5    1643.0    1249.0
GR   1642.0    1254.0    1642.0    1256.2    1642.0    1265.3    1642.0    1270.1    1642.0    1271.9
GR   1643.0    1279.0    1644.0    1289.6    1645.0    1295.3    1646.0    1296.6    1647.0    1297.9
GR   1648.0    1299.2    1649.0    1300.3    1650.0    1334.7    1650.0    1342.4    1649.0    1343.7
GR   1648.0    1345.9    1647.0    1351.3    1646.0    1352.2    1645.0    1352.6    1645.0    1364.0
GR   1646.0    1366.4    1647.0    1367.7    1648.0    1368.8    1649.0    1375.2    1649.0    1376.2
GR   1649.0    1380.1    1650.0    1383.1    1650.0    1402.8    1649.0    1407.0    1648.0    1408.6
GR   1647.0    1412.1    1646.0    1414.4    1646.0    1421.8    1646.0    1428.8    1646.0    1434.4
GR   1647.0    1438.3    1648.0    1439.5    1649.0    1441.0    1650.0    1442.3

NC      0.04      0.04     0.025       0.1       0.3
X1      1105        49    1191.2    1258.4     251.3     253.8     248.2
GR   1657.0    1000.0    1656.0    1020.8    1655.0    1035.3    1654.0    1050.2    1653.0    1063.6
```

GR	1652.0	1075.5	1651.0	1087.3	1650.0	1097.7	1649.0	1142.0	1649.0	1169.9
GR	1649.0	1191.2	1648.0	1192.5	1647.0	1193.9	1646.0	1194.9	1645.0	1195.9
GR	1644.0	1214.1	1644.0	1227.4	1644.0	1229.0	1644.0	1251.2	1645.0	1252.6
GR	1646.0	1254.1	1647.0	1255.6	1648.0	1257.0	1649.0	1258.4	1650.0	1272.5
GR	1650.0	1282.7	1649.0	1349.3	1648.0	1351.5	1647.0	1353.1	1647.0	1359.3
GR	1648.0	1361.7	1649.0	1364.3	1649.0	1372.7	1648.0	1374.8	1647.0	1376.8
GR	1646.0	1378.8	1646.0	1389.7	1647.0	1391.3	1648.0	1392.9	1649.0	1394.4
GR	1650.0	1396.5	1650.0	1401.3	1650.0	1409.7	1651.0	1412.9	1652.0	1416.6
GR	1653.0	1420.0	1654.0	1422.9	1655.0	1425.4	1656.0	1427.4		
NC	0.04	0.04	0.025	0.3	0.5					
X1	1110	48	1107.7	1190.7	186.2	181.2	184.9			
X3						1205.7	1651			
GR	1658.0	1000.0	1657.0	1002.5	1656.0	1004.9	1655.0	1007.4	1654.0	1009.9
GR	1653.0	1012.3	1652.0	1014.8	1651.0	1018.7	1651.0	1090.3	1651.0	1107.7
GR	1650.0	1108.9	1649.0	1110.3	1648.0	1111.6	1647.0	1112.9	1646.0	1114.1
GR	1644.5	1125.5	1644.5	1129.4	1644.5	1133.2	1644.5	1141.1	1644.5	1142.0
GR	1644.5	1151.4	1646.0	1161.9	1647.0	1178.1	1648.0	1179.1	1649.0	1180.0
GR	1650.0	1181.0	1651.0	1190.7	1651.0	1205.7	1650.0	1302.7	1649.0	1304.2
GR	1649.0	1308.0	1650.0	1310.2	1651.0	1319.6	1651.0	1319.8	1650.0	1321.5
GR	1649.0	1323.1	1649.0	1337.8	1650.0	1339.4	1651.0	1342.9	1652.0	1358.9
GR	1653.0	1363.1	1654.0	1367.0	1655.0	1370.7	1656.0	1374.2	1657.0	1377.6
GR	1658.0	1380.6	1659.0	1383.3	1660.0	1386.0				
NC	0.04	0.04	0.025	0.1	0.3					
X1	1112	16	1082.5	1194.0	51.3	64.8	72.0			
GR	1655.0	1000.0	1652.0	1007.2	1651.0	1021.4	1651.0	1037.5	1651.0	1082.5
GR	1645.0	1091.4	1645.0	1100.3	1645.0	1105.6	1646.0	1108.2	1646.0	1113.1
GR	1646.0	1123.8	1647.0	1188.3	1651.0	1194.0	1651.0	1289.2	1652.0	1346.8
GR	1655.0	1406.2								

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NC	0.04	0.04	0.025	0.1	0.3					
X1	1115	44	1128.4	1269.8	163.6	164.7	150.7			
X3						1312.4	1653.0			
GR	1659.0	1000.0	1659.0	1037.9	1658.0	1100.3	1657.0	1113.3	1656.0	1115.4
GR	1655.0	1117.1	1654.0	1119.1	1653.0	1121.0	1652.0	1128.4	1651.0	1151.6
GR	1650.0	1153.0	1649.0	1154.4	1648.0	1156.0	1647.0	1157.2	1646.0	1158.8
GR	1645.5	1160.1	1645.5	1174.4	1646.0	1178.8	1647.0	1219.9	1647.0	1232.6
GR	1647.0	1256.3	1648.0	1265.3	1649.0	1266.3	1650.0	1267.4	1651.0	1268.5
GR	1652.0	1269.8	1652.0	1284.8	1652.0	1296.9	1652.0	1298.9	1652.0	1310.0
GR	1653.0	1311.1	1653.0	1312.4	1652.0	1320.1	1651.0	1356.2	1651.0	1372.9
GR	1652.0	1378.9	1652.0	1390.9	1652.0	1395.4	1653.0	1432.9	1654.0	1436.1
GR	1655.0	1439.7	1656.0	1442.8	1657.0	1445.3	1658.0	1447.0		
NC	0.04	0.04	0.025	0.1	0.3					
X1	1120	40	1214.9	1309.2	248.0	235.8	245.8			
GR	1660.0	1000.0	1661.0	1083.3	1662.0	1135.0	1663.0	1165.5	1663.0	1191.8
GR	1662.0	1201.5	1661.0	1203.0	1660.0	1204.5	1659.0	1205.9	1658.0	1207.4
GR	1657.0	1208.9	1656.0	1210.4	1655.0	1211.9	1654.0	1213.4	1653.0	1214.9
GR	1652.0	1216.4	1651.0	1217.9	1650.0	1219.3	1649.0	1220.8	1648.0	1238.0
GR	1648.0	1258.9	1648.0	1276.4	1647.0	1281.8	1646.0	1284.4	1646.0	1295.3
GR	1647.0	1300.9	1648.0	1302.3	1649.0	1303.7	1650.0	1305.0	1651.0	1306.4
GR	1652.0	1307.8	1653.0	1309.2	1653.0	1355.0	1653.0	1356.5	1654.0	1392.8
GR	1655.0	1414.0	1656.0	1422.8	1657.0	1435.3	1658.0	1443.8	1659.0	1449.2
NC	0.04	0.04	0.025	0.1	0.3					
X1	1125	29	1087.8	1179.0	202.9	219.3	213.3			
X3						1179.0	1655.0			
GR	1663.0	1000.0	1664.0	1023.5	1664.0	1072.3	1663.0	1074.0	1662.0	1075.7
GR	1661.0	1077.5	1660.0	1079.2	1659.0	1081.0	1658.0	1082.7	1657.0	1084.4
GR	1656.0	1086.1	1655.0	1087.8	1654.0	1089.5	1653.0	1091.3	1652.0	1093.0
GR	1651.0	1094.8	1650.0	1096.4	1649.0	1099.0	1648.0	1103.6	1648.0	1112.4
GR	1649.0	1135.6	1649.0	1161.2	1649.0	1166.0	1650.0	1167.9	1651.0	1169.8
GR	1652.0	1171.9	1653.0	1174.1	1654.0	1176.5	1655.0	1179.0		
NC	0.04	0.04	0.025	0.1	0.3					
X1	1130	34	1140.4	1220.0	205.8	223.6	204.1			
X3						1220.0	1657.0			
GR	1665.0	1000.0	1666.0	1043.4	1667.0	1078.9	1668.0	1107.6	1668.0	1123.5
GR	1667.0	1125.1	1666.0	1126.6	1665.0	1128.1	1664.0	1129.7	1663.0	1131.2
GR	1662.0	1132.7	1661.0	1134.2	1660.0	1135.8	1659.0	1137.3	1658.0	1138.8
GR	1657.0	1140.4	1656.0	1141.9	1655.0	1143.5	1654.0	1145.0	1653.0	1146.5
GR	1652.0	1148.1	1651.0	1149.6	1650.0	1151.9	1649.0	1158.8	1649.0	1180.0
GR	1650.0	1185.9	1651.0	1191.4	1652.0	1196.2	1653.0	1200.6	1654.0	1204.7
GR	1655.0	1208.6	1656.0	1211.6	1657.0	1220.0	1657.0	1223.8		
NC	0.04	0.04	0.025	0.1	0.3					
X1	1135	41	1231.9	1294.3	206.6	200.7	203.3			
GR	1667.0	1000.0	1666.0	1026.9	1666.0	1038.3	1667.0	1096.6	1668.0	1136.7
GR	1669.0	1178.8	1669.0	1215.2	1668.0	1216.7	1667.0	1218.2	1666.0	1219.7
GR	1665.0	1221.2	1664.0	1222.8	1663.0	1224.3	1662.0	1225.8	1661.0	1227.3
GR	1660.0	1228.9	1659.0	1230.4	1658.0	1231.9	1657.0	1233.4	1656.0	1235.0
GR	1655.0	1236.5	1654.0	1238.0	1653.0	1239.5	1652.0	1241.1	1651.0	1248.5
GR	1650.0	1251.8	1650.0	1255.1	1650.0	1268.2	1650.0	1270.7	1651.0	1274.0

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GR	1652.0	1286.4	1653.0	1287.7	1654.0	1288.9	1655.0	1290.2	1656.0	1291.6
GR	1657.0	1293.0	1658.0	1294.3	1658.0	1306.0	1658.0	1421.8	1658.0	1442.7
GR	1658.0	1453.8								
NC	0.04	0.04	0.025	0.1	0.3					
X1	1140	36	1152.3	1205.9	192.9	199.4	190.1			

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X3      10                      1152.3    1658.0
GR   1661.0    1000.0    1660.0    1022.8    1659.0    1039.8    1659.0    1050.6    1659.0    1108.7
GR   1658.0    1115.5    1657.0    1117.8    1657.0    1126.4    1658.0    1129.0    1658.0    1135.0
GR   1658.0    1138.2    1658.0    1152.3    1657.0    1154.3    1656.0    1155.7    1655.0    1157.2
GR   1654.0    1158.3    1653.0    1159.5    1652.0    1160.7    1651.0    1161.7    1651.0    1162.8
GR   1651.0    1171.8    1651.0    1177.5    1651.0    1179.0    1651.0    1180.5    1652.0    1182.1
GR   1653.0    1196.9    1654.0    1198.3    1655.0    1199.8    1656.0    1201.3    1657.0    1202.8
GR   1658.0    1204.4    1659.0    1205.9    1659.0    1244.3    1659.0    1256.1    1659.0    1262.7
GR   1659.0    1266.9

NC     0.04      0.04     0.025       0.1       0.5
X1     1145        33    1229.7    1299.3     279.7     264.2     275.8
GR   1670.0    1000.0    1669.0    1002.2    1668.0    1004.5    1667.0    1006.6    1666.0    1011.8
GR   1665.0    1019.0    1664.0    1028.5    1663.0    1047.7    1662.0    1136.0    1661.0    1229.7
GR   1660.0    1231.5    1659.0    1233.0    1658.0    1233.9    1657.0    1235.0    1656.0    1235.8
GR   1655.0    1236.6    1654.0    1237.4    1653.0    1238.2    1651.5    1238.9    1651.5    1251.2
GR   1653.0    1254.0    1654.0    1289.5    1655.0    1291.1    1656.0    1292.5    1657.0    1293.9
GR   1658.0    1295.2    1659.0    1296.6    1660.0    1298.0    1661.0    1299.3    1661.0    1361.1
GR   1661.0    1361.3    1662.0    1377.9    1662.0    1400.6

NC     0.04      0.04     0.025       0.1       0.3
X1     1150        28    1190.6    1269.4     108.3     121.7     126.4
GR   1666.0    1000.0    1665.0    1052.6    1664.0    1082.3    1663.0    1112.9    1662.0    1190.6
GR   1661.0    1193.0    1660.0    1194.4    1659.0    1195.6    1658.0    1196.9    1657.0    1198.1
GR   1656.0    1199.4    1655.0    1202.3    1654.0    1248.1    1653.0    1249.5    1652.0    1250.8
GR   1652.0    1262.0    1653.0    1262.7    1654.0    1263.5    1655.0    1264.2    1656.0    1264.9
GR   1657.0    1265.7    1658.0    1266.4    1659.0    1267.2    1660.0    1267.9    1661.0    1268.7
GR   1662.0    1269.4    1663.0    1287.6    1663.0    1298.1

NC     0.04      0.04     0.025       0.1       0.3
X1     1152        35    1086.9    1199.6        87        99       125
X3      10                      1083.5    1663.0
GR   1664.0    1000.0    1663.0    1050.5    1662.0    1052.5    1661.0    1054.6    1660.0    1056.7
GR   1659.0    1058.9    1658.0    1061.1    1657.0    1063.2    1657.0    1073.1    1658.0    1074.3
GR   1659.0    1075.4    1660.0    1076.6    1661.0    1077.6    1662.0    1078.7    1663.0    1083.5
GR   1663.0    1086.9    1662.0    1092.1    1661.0    1094.6    1660.0    1095.1    1659.0    1095.8
GR   1658.0    1096.7    1657.0    1097.4    1656.0    1098.1    1655.0    1098.6    1654.0    1099.3
GR   1653.0    1100.1    1652.0    1101.2    1652.0    1106.3    1653.0    1114.1    1654.0    1117.7
GR   1655.0    1122.6    1655.0    1147.2    1655.0    1171.3    1656.0    1190.1    1662.0    1199.6

NC     0.04      0.04     0.025       0.1       0.5
X1     1155        30    1096.1    1256.3        91        63        64
GR   1667.0    1000.0    1668.0    1001.5    1668.0    1005.6    1667.0    1024.2    1666.0    1048.0
GR   1665.0    1086.5    1664.0    1095.4    1663.0    1095.7    1662.0    1096.1    1661.0    1096.5
GR   1660.0    1096.9    1659.0    1097.2    1658.0    1097.6    1657.0    1098.0    1656.0    1098.4
GR   1655.0    1098.7    1654.0    1099.1    1653.0    1099.7    1652.5    1099.9    1652.5    1107.2
GR   1653.0    1109.8    1654.0    1112.4    1655.0    1115.0    1656.0    1241.2    1657.0    1245.2
GR   1658.0    1247.8    1659.0    1250.1    1660.0    1252.2    1661.0    1254.3    1662.0    1256.3
1
   20SEP99      14:12:40                                                                    PAGE   12


NC     0.03      0.01     0.025       0.1       0.3
X1     1160        26    1035.6    1089.1     199.3      96.4     186.6
GR   1666.0    1000.0    1665.0    1020.9    1664.0    1023.3    1663.0    1027.5    1662.0    1033.1
GR   1661.0    1035.6    1660.0    1036.7    1659.0    1037.8    1658.0    1038.8    1657.0    1040.0
GR   1656.0    1040.9    1655.0    1041.9    1654.0    1043.5    1654.0    1052.7    1655.0    1054.7
GR   1656.0    1056.6    1657.0    1058.4    1657.0    1058.6    1657.0    1076.3    1658.0    1083.3
GR   1659.0    1085.2    1660.0    1087.2    1661.0    1089.1    1662.0    1108.9    1663.0    1126.9
GR   1664.0    1161.4
1
   20SEP99      14:12:40                                                                    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


*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

CCHV=     .100 CEHV=     .300
*SECNO 985.000
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=     1615.70 ELREA=     1618.00

   985.000      9.16   1610.46   1610.46   1608.70   1613.21      2.75       .00       .00   1615.70
    3156.0        .0    3156.0        .0        .0     237.3        .0        .0        .0   1618.00
       .00       .00     11.30       .00      .000      .040      .000      .000   1601.30   1904.12
   .015677        0.        0.        0.         0        10         0       .00     43.87   1947.99


CCHV=     .100 CEHV=     .300
*SECNO 990.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=     1615.90 ELREA=     1618.00
```

990.000	13.41	1615.41	1615.41	.00	1615.89	.48	.61	.21	1615.90
3156.0	.0	3156.0	.0	.0	566.9	.0	.5	.2	1618.00
.00	.00	5.57	.00	.000	.040	.000	.000	1602.00	1835.31
.008235	33.	55.	57.	0	12	0	.00	256.34	2091.65

CCHV= .600 CEHV= .800
*SECNO 992.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1616.40 ELREA= 1617.10

992.000	13.40	1616.40	1616.40	.00	1616.43	.02	.00	.27	1612.50
3156.0	2902.2	253.8	.0	2371.5	160.8	.0	1.7	.6	1612.80
.01	1.22	1.58	.00	.015	.015	.000	.000	1603.00	1133.40
.000029	30.	43.	68.	0	11	0	.00	803.80	1937.20

1

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

CCHV= .600 CEHV= .800

SPECIAL CULVERT

SC	CUNO	CUNV	ENTLC	COFQ	RDLEN	RISE	SPAN	CULVLN	CHRT	SCL	ELCHU	ELCHD
	1	.015	.40	3.00	.00	8.00	12.00	250.00	8	1	1605.40	1603.00

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

5130, EGIC= 1653.45..MAY BE TOO LARGE IF INLET CONTROLS.
5135, EGOC= 1648.47 ..MAY BE TOO LARGE IF OUTLET CONTROLS.
*SECNO 994.000

SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG = 1624.21

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 4.36

SPECIAL CULVERT

EGIC	EGOC	H4	QWEIR	QCULV	VCH	ACULV	ELTRD	WEIRLN
1653.45	1648.47	7.78	1418.	1720.	.451	96.0	1623.10	943.

994.000	18.80	1624.20	.00	.00	1624.21	.00	7.78	.00	1615.20
3156.0	1816.7	101.9	1237.5	4771.9	225.7	4245.3	41.7	10.9	1615.10
.26	.38	.45	.29	.015	.015	.015	.000	1605.40	1260.33
.000002	329.	250.	245.	0	0	0	.00	2246.45	3506.78

FLOW DISTRIBUTION FOR SECNO= 994.00 CWSEL= 1624.20

STA=	1260.	1522.	1593.	1697.	1745.	1798.	1849.	1880.	1931.	1981.	2037.	2091.	2162.
PER Q=	4.0	3.1	5.6	3.5	4.4	5.1	3.2	5.3	5.1	5.0	3.6	3.8	
AREA=	551.4	305.8	505.7	279.9	331.4	360.6	223.4	369.0	354.9	372.0	296.6	342.6	
VEL=	.2	.3	.3	.4	.4	.4	.5	.5	.5	.4	.4	.3	
DEPTH=	2.1	4.3	4.9	5.8	6.3	7.0	7.2	7.2	7.2	6.6	5.5	4.8	

STA=	2162.	2225.	2246.	2258.	2283.	2330.	2391.	2488.	2643.	2748.	2924.	3109.	3251.
PER Q=	3.8	2.2	3.2	3.3	3.6	3.2	3.4	4.1	3.2	4.2	4.4	3.2	
AREA=	325.8	152.8	225.7	210.8	284.8	293.3	360.6	490.0	365.2	526.4	549.1	410.0	
VEL=	.4	.5	.5	.5	.4	.3	.3	.3	.3	.3	.3	.2	
DEPTH=	5.2	7.3	18.8	8.3	6.0	4.8	3.7	3.1	3.5	1.0	3.0	2.9	

STA=	3251.	3329.	3507.
PER Q=	3.2	3.2	
AREA=	325.0	430.0	
VEL=	.3	.2	
DEPTH=	4.2	2.4	

1

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

CCHV= .100 CEHV= .800
*SECNO 1000.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .39

1000.000	18.20	1624.20	1616.09	.00	1624.21	.00	.00	.00	1618.00
3156.0	1913.7	888.1	354.2	4696.3	1078.6	1008.8	46.8	11.9	1618.00
.27	.41	.82	.35	.040	.025	.040	.000	1606.00	1023.34
.000010	32.	19.	22.	0	11	0	.00	1072.87	2096.20

```
CCHV=      .100 CEHV=      .300
*SECNO 1002.000
  1002.000      18.20    1624.20    1615.35       .00    1624.21       .01       .00       .00    1617.10
    3156.0     1694.3      897.2      564.5     4149.8      981.5     1394.7      57.5      13.6    1617.00
       .31        .41        .91        .40        .040       .025       .040      .000   1606.00   1027.02
   .000010        84.        52.        30.          0         11          0       .00    993.01    2020.03


CCHV=      .100 CEHV=      .300
*SECNO 1005.000
  1005.000      17.20    1624.20    1614.91       .00    1624.22       .01       .00       .00    1618.00
    3156.0      717.8     1760.0      678.2     1428.0      1513.4    1222.8      85.0      17.9    1619.00
       .37        .50       1.16        .55        .040       .025       .040      .000   1607.00   1028.29
   .000019        251.       195.       196.          0         18          0       .00    652.22    1680.51


CCHV=      .100 CEHV=      .300
*SECNO 1010.000

3470 ENCROACHMENT STATIONS=          .0    1287.0  TYPE=       1  TARGET=     1286.999
  1010.000      16.20    1624.20    1616.44       .00    1624.22       .03       .00       .00    1619.00
    3156.0      397.9     1828.9      929.2      646.4     1118.0    1358.3      96.7      19.8    1619.00
       .41        .62       1.64        .68        .040       .025       .040      .000   1608.00   1005.33
   .000038        148.       140.       134.          0         11          0       .00    538.96    1544.29


CCHV=      .500 CEHV=      .600
*SECNO 1012.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =    .60

  1012.000      14.19    1624.19    1616.24       .00    1624.24       .05       .01       .01    1626.00
    3156.0         .0     3156.0         .0         .0     1782.9         .0     102.8      21.0    1625.00
       .42        .00       1.77        .00        .000       .025       .000      .000   1610.00   1069.20
   .000105        92.        97.       139.          0         18          0       .00    354.54    1423.74


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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=      .600 CEHV=      .800
*SECNO 1015.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =    .20


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1626.00 ELREA=      1626.00

  1015.000       5.06    1624.06    1622.99       .00    1624.97       .91       .04       .69    1626.00
    3156.0         .0     3156.0         .0         .0     411.7         .0     105.9      21.6    1626.00
       .43        .00       7.67        .00        .000       .025       .000      .000   1619.00   1017.88
   .002686        138.       124.        96.          2         14          0       .00    103.47    1121.35


CCHV=      .500 CEHV=      .600
*SECNO 1017.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   1.54


3470 ENCROACHMENT STATIONS=     1197.3    1506.8  TYPE=       1  TARGET=    -1197.300
 ELENCL=    1628.00  ELENCR= 100000.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1628.00 ELREA=      1628.00

  1017.000      10.64    1624.64    1621.41       .00    1625.27       .63       .16       .14    1628.00
    3156.0         .0     3156.0         .0         .0     494.6         .0     106.9      21.8    1628.00
       .43        .00       6.38        .00        .000       .025       .000      .000   1614.00   1331.35
   .001139        88.        95.       102.          3         14          0       .00     84.15    1415.50


CCHV=      .100 CEHV=      .300
*SECNO 1020.000

3301 HV CHANGED MORE THAN HVINS


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

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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST
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3470 ENCROACHMENT STATIONS=     1205.8    1572.0  TYPE=       1  TARGET=      366.200
 ELENCL=   1629.00  ELENCR=   1635.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1629.00 ELREA=      1629.00

  1020.000      7.54   1624.54   1623.28       .00   1625.76      1.22       .31       .18   1629.00
    3156.0        .0    3156.0        .0        .0     356.5        .0     108.7      22.1   1629.00
       .44       .00      8.85       .00      .000      .025      .000      .000   1617.00   1346.89
   .002789       194.      185.      190.         2        14         0       .00     73.06   1419.95


CCHV=      .100 CEHV=      .300
*SECNO 1025.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     1212.9    1498.1  TYPE=       1  TARGET=      285.200
 ELENCL=   1630.00  ELENCR=   1630.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1630.00 ELREA=      1630.00

  1025.000      5.87   1624.87   1624.87       .00   1626.90      2.03       .88       .24   1630.00
    3156.0        .0    3156.0        .0        .0     276.0        .0     110.3      22.5   1630.00
       .44       .00     11.44       .00      .000      .025      .000      .000   1619.00   1365.98
   .006024       215.      222.      213.         0        15         0       .00     69.19   1435.17


CCHV=      .100 CEHV=      .300
*SECNO 1030.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     1263.5    1610.6  TYPE=       1  TARGET=      347.100
 ELENCL=   1629.00  ELENCR=   1631.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1629.00 ELREA=      1629.00

  1030.000      6.07   1627.07   1627.07       .00   1628.74      1.67      1.16       .04   1629.00
    3156.0        .0    3156.0        .0        .0     304.3        .0     111.6      22.9   1629.00
       .45       .00     10.37       .00      .000      .025      .000      .000   1621.00   1401.15
   .006168       195.      191.      195.         0         8         0       .00     90.41   1493.56


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   20SEP99      14:12:40                                                                                PAGE   18

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         KV         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 1035.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     1236.5    1614.6  TYPE=       1  TARGET=    -1236.500
 ELENCL=   1629.00  ELENCR= 100000.00
  1035.000      6.01   1629.01   1629.01       .00   1629.89       .88       .71       .08   1627.00
    3156.0     785.8    2347.4      22.8     218.4     276.0       7.8     113.3      24.0   1627.00
       .45      3.30      8.50      2.92      .030      .025      .030      .000   1623.00   1049.06
   .002700       191.      179.      185.         8         5         0       .00     449.97   1499.03


CCHV=      .100 CEHV=      .300
*SECNO 1040.000

3470 ENCROACHMENT STATIONS=     1272.7    1609.4  TYPE=       1  TARGET=      336.700
 ELENCL=   1629.00  ELENCR=   1631.00
  1040.000      5.06   1630.06   1629.92       .00   1630.67       .61       .76       .03   1629.00
    3156.0     687.1    2466.1       2.9     203.9     159.4       5.7     116.1      26.3   1630.00
       .46      3.37      6.86       .51      .030      .025      .030      .000   1625.00   1075.19
   .004341       222.      224.      216.         2        15         0       .00     444.45   1519.64


CCHV=      .100 CEHV=      .300
*SECNO 1045.000

3470 ENCROACHMENT STATIONS=          .0    1387.3  TYPE=       1  TARGET=     1387.299
  1045.000      3.94   1630.94   1630.86       .00   1631.68       .74       .97       .04   1632.00
    3156.0        .0    3156.0        .0        .0     458.2        .0     118.2      27.8   1632.00
       .47       .00      6.89       .00      .000      .025      .000      .000   1627.00   1090.64
   .007077       180.      178.      182.         2        19         0       .00     282.70   1373.34


CCHV=      .100 CEHV=      .300
*SECNO 1050.000
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3470 ENCROACHMENT STATIONS=          .0    1371.7  TYPE=      1  TARGET=     1371.699
  1050.000       3.22   1632.22   1631.81        .00   1632.71        .49       1.01        .02   1633.00
    3156.0         .0    3156.0         .0         .0    559.7         .0      120.5       29.1   1633.00
       .48        .00       5.64       .00       .000       .025       .000       .000    1629.00   1053.65
   .003906       198.       197.       195.          2         19          0        .00     298.56   1352.20


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   20SEP99      14:12:40                                                                                    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


CCHV=      .100 CEHV=      .300
*SECNO 1055.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  1055.000       3.57   1633.57   1633.57        .00   1634.47        .90       1.05        .12   1634.00
    3156.0         .0    3156.0         .0         .0    414.2         .0      122.7       30.3   1635.00
       .49        .00       7.62       .00       .000       .025       .000       .000    1630.00   1198.76
   .007718       195.       198.       194.          0          8          0        .00     234.03   1432.80


CCHV=      .100 CEHV=      .300
*SECNO 1060.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  1060.000       4.66   1635.66   1635.66        .00   1636.46        .80       1.04        .01   1635.00
    3156.0     1153.0    2002.1         .9      309.9      234.5         .6      124.9       31.6   1635.00
       .50       3.72       8.54      1.41        .030       .025       .030       .000    1631.00   1138.51
   .003915       194.       195.       196.          0         11          0        .00     326.61   1465.12


CCHV=      .100 CEHV=      .300
*SECNO 1065.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=      1214.1    1564.6  TYPE=      1  TARGET=    -1214.100
 ELENCL=    1638.00  ELENCR= 100000.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1638.00 ELREA=       1638.00

  1065.000       5.76   1637.76   1637.76        .00   1639.44       1.68        .88        .27   1638.00
    3156.0         .0    3156.0         .0         .0    303.4         .0      126.6       32.4   1638.00
       .50        .00      10.40       .00       .000       .025       .000       .000    1632.00   1268.47
   .006403       180.       178.       173.          0         14          0        .00      92.60   1361.08


CCHV=      .100 CEHV=      .500
*SECNO 1067.000
1
   20SEP99      14:12:40                                                                                    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


3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.76

3470 ENCROACHMENT STATIONS=      1275.9    1407.4  TYPE=      1  TARGET=    -1275.900
 ELENCL=    1638.00  ELENCR= 100000.00
  1067.000       6.38   1639.38   1638.93        .00   1639.93        .55        .38        .11   1638.00
    3156.0     515.1    2635.9         5.0      255.0      407.0       3.4      127.9       33.0   1638.00
       .51       2.02       6.48      1.48        .040       .025       .040       .000    1633.00   1079.24
   .002061       111.       111.       132.          3         13          0        .00     320.97   1400.21


CCHV=      .300 CEHV=      .500
*SECNO 1069.000
3280 CROSS SECTION   1069.00 EXTENDED       1.90 FEET

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.89

  1069.000       5.90   1639.90   1637.14        .00   1640.12        .22        .08        .10   1640.00
    3156.0         .0    3156.0         .0         .0    842.1         .0      129.4       33.5   1638.00
       .51        .00       3.75       .00       .000       .025       .000       .000    1634.00   1000.80
   .000574        99.        81.        70.          2         11          0        .00     194.20   1195.00


CCHV=      .300 CEHV=      .500
*SECNO 1070.000
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3470 ENCROACHMENT STATIONS=     1152.7    1423.0  TYPE=       1  TARGET=      270.300
 ELENCL=   1639.00  ELENCR=   1643.00
  1070.000       5.88    1639.88    1637.38        .00    1640.23        .35        .04        .06    1639.00
    3156.0      117.9     3037.4         .7      125.0      632.6        1.2      130.6       33.8    1639.00
       .52        .94       4.80        .58       .040       .025       .040       .000    1634.00    1019.48
   .000767        52.        67.        83.          2         19          0        .00     270.84    1290.32


CCHV=      .300 CEHV=      .500
*SECNO 1072.000
1
   20SEP99      14:12:40                                                                                    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


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =    .51

  1072.000       4.69    1639.69    1638.75        .00    1640.69       1.00        .14        .33    1641.00
    3156.0         .0     3156.0         .0         .0      392.7         .0      132.0       34.3    1641.00
       .52        .00       8.04        .00       .000       .025       .000       .000    1635.00    1162.72
   .002895        115.       104.        96.          2         14          0        .00     95.80    1258.52


CCHV=      .100 CEHV=      .300
*SECNO 1075.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=          .0    1431.1  TYPE=       1  TARGET=     1431.099

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1643.00 ELREA=      1641.00

  1075.000       4.60    1640.10    1640.10        .00    1641.94       1.84        .36        .25    1643.00
    3156.0         .0     3156.0         .0         .0      289.9         .0      132.7       34.5    1641.00
       .52        .00      10.89        .00       .000       .025       .000       .000    1635.50    1339.49
   .006110        108.        89.        106.          0          8          0        .00     79.23    1418.72


CCHV=      .100 CEHV=      .300
*SECNO 1080.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=          .0    1316.4  TYPE=       1  TARGET=     1316.399
  1080.000       5.25    1641.25    1641.25        .00    1643.10       1.85        .95        .00    1640.00
    3156.0        2.2     3073.2        80.6        1.2      278.4       27.1      131.8       34.8    1640.00
       .53       1.79      11.04        2.98       .040       .025       .040       .000    1636.00    1244.86
   .005055        170.       172.        177.          0          8          0        .00     90.44    1335.31


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   20SEP99      14:12:40                                                                                    PAGE   22

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


CCHV=      .100 CEHV=      .300
*SECNO 1085.000

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  1085.000       5.38    1643.38    1643.38        .00    1645.19       1.82       1.23        .00    1643.00
    3156.0        1.1     2802.3        352.6        1.2      247.6       65.6      135.5       35.1    1643.00
       .53        .89      11.32        5.38       .040       .025       .040       .000    1638.00    1368.39
   .005357        235.       237.        239.          0          8          0        .00     110.88    1496.67


CCHV=      .100 CEHV=      .300
*SECNO 1090.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=          .0    1357.8  TYPE=       1  TARGET=     1357.799

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1646.00 ELREA=      1646.00

  1090.000       6.27    1645.27    1645.27        .00    1647.29       2.02       1.06        .06    1646.00
    3156.0         .0     3156.0         .0         .0      276.4         .0      136.8       35.7    1646.00
       .54        .00      11.42        .00       .000       .025       .000       .000    1639.00    1226.71
   .005927        188.       189.        191.          0          8          0        .00     68.19    1294.90
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CCHV=      .100 CEHV=      .300
*SECNO 1095.000
  1095.000       6.76   1646.76   1646.54       .00   1648.45       1.69       1.12        .01   1647.00
    3156.0         .0    3156.0         .0         .0     302.8         .0      138.1       36.1   1647.00
       .54        .00     10.42        .00       .000       .025       .000       .000    1640.00   1402.99
   .005762        184.       192.       187.          2          8          0        .00      84.29   1487.28


CCHV=      .100 CEHV=      .300
*SECNO 1100.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
1
   20SEP99      14:12:40                                                                                PAGE   23

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


3470 ENCROACHMENT STATIONS=     1155.7    1342.4  TYPE=       1  TARGET=      186.700
 ELENCL=   1647.00  ELENCR=   1650.00
  1100.000       6.34   1648.34   1648.34       .00   1649.38       1.04        .69        .06   1647.00
    3156.0      511.9     2642.5       1.6      250.7      297.1        1.2      139.9       16.9   1647.00
       .55       2.04       8.89       1.39       .040       .025       .040       .000    1642.00   1000.00
   .002676        179.       181.       186.          0         12          0        .00     299.58   1299.58


CCHV=      .100 CEHV=      .300
*SECNO 1105.000

3265 DIVIDED FLOW

  1105.000       4.88   1648.88   1648.61       .00   1650.35       1.46        .84        .13   1649.00
    3156.0         .0    2886.9     269.1         .0     286.6       65.6      142.4       38.0   1649.00
       .56        .00     10.07       4.10       .000       .025       .040       .000    1644.00   1191.35
   .004375        251.       248.       254.          2         11          0        .00     102.64   1394.23


CCHV=      .300 CEHV=      .500
*SECNO 1110.000

3470 ENCROACHMENT STATIONS=          .0    1205.7  TYPE=       1  TARGET=     1205.699
  1110.000       5.09   1649.59   1649.43       .00   1651.42       1.83        .89        .18   1651.00
    3156.0         .0    3156.0         .0         .0     291.0         .0      143.8       38.4   1651.00
       .56        .00     10.85        .00       .000       .025       .000       .000    1644.50   1109.47
   .005334        186.       185.       181.          2          5          0        .00      71.12   1180.59


CCHV=      .100 CEHV=      .300
*SECNO 1112.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.98

  1112.000       6.16   1651.16   1649.28       .00   1651.72        .56        .17        .13   1651.00
    3156.0         3.7    3146.4       5.9        9.5      523.0       15.3      144.5       38.6   1651.00
       .56        .39       6.02        .39       .040       .025       .040        000    1645.00   1019.22
   .001356         51.        72.        65.          3         15          0        .00     278.82   1298.04


1
   20SEP99      14:12:40                                                                                PAGE   24

    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 1115.000

3470 ENCROACHMENT STATIONS=          .0    1312.4  TYPE=       1  TARGET=     1312.399
  1115.000       5.91   1651.41   1649.54       .00   1651.93        .52        .21        .00   1652.00
    3156.0         .0    3156.0         .0         .0     543.6         .0      146.4       39.4   1652.00
        57        .00       5.81        .00       .000       .025       .000       .000    1645.50   1142.08
   .001417        164.       151.       165.          2         14          0        .00     126.95   1269.01


CCHV=      .100 CEHV=      .300
*SECNO 1120.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =    .48
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CCHV=      .100 CEHV=      .300
*SECNO 1152.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.45


3470 ENCROACHMENT STATIONS=     1083.5    1199.6  TYPE=       1  TARGET=    -1083.500
 ELENCL=   1663.00  ELENCR= 100000.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1663.00 ELREA=    100000.00

  1152.000      8.98   1660.98   1657.88       .00   1661.38       .41       .13       .04   1663.00
    3156.0        .0     3156.0        .0        .0     616.1        .0     158.7      42.1 100000.00
       .62       .00       5.12       .00      .000      .025      .000      .000   1652.00   1094.61
   .000744       87.       125.       99.          2        19         0       .00    103.37   1197.98


CCHV=      .100 CEHV=      .500
*SECNO 1155.000

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

  1155.000      8.75   1661.25   1657.65       .00   1661.44       .19       .03       .02   1662.00
    3156.0        .0     3156.0        .0        .0     905.7        .0     159.8      42.3   1662.00
       .62       .00       1.48       .00      .000      .025      .000      .000   1652.50   1096.40
   .000357       91.         64.       63.          2        14         0       .00    158.40   1254.80


CCHV=      .100 CEHV=      .300
*SECNO 1160.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  1160.000      7.53   1661.53   1661.53       .00   1663.84      2.31       .17       .64   1661.00
    3156.0        .5     3151.1       4.4        .4     258.1       2.8     162.3      42.7   1661.00
       .63      1.48      12.21      1.55      .030      .025      .030      .000   1654.00   1034.27
   .005728       199.      187.       96.          0        11         0       .00     65.38   1099.65


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   20SEP99      14:12:40                                                                          PAGE   27


                                                                                THIS RUN EXECUTED 20SEP99     14:12:41
************************************
 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

 CHANNEL MODEL

SUMMARY PRINTOUT TABLE  101

      SECNO      EGOC      ELLC      EGIC      ELTRD      QCULV      QWEIR      CLASS        H4       DEPTH      CWSEL       VCH        EG
*    994.000   1648.47   1613.40   1653.45   1623.10   1720.43   1418.30      16.00      7.78      18.80   1624.20        .45   1624.21

1
   20SEP99      14:12:40                                                                          PAGE   28

 CHANNEL MODEL

SUMMARY PRINTOUT TABLE  105

      SECNO      CWSEL       HL       OLOSS     TOPWID      QLOB       QCH       QROB
-------------------------------------------------------------------------------------
*    990.000   1615.41        .61        .23     256.34        .00   3156.00        .00
*    992.000   1616.40        .00        .27     803.80    2902.19    253.81        .00
*    994.000   1624.20       7.78        .00    2246.45    1816.69    101.85    1237.46
*   1000.000   1624.20        .00        .00    1072.87    1913.66    888.12     354.21

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   20SEP99      14:12:40                                                                          PAGE   29

 CHANNEL MODEL

SUMMARY PRINTOUT TABLE  150

      SECNO      XLCH      ELTRD      ELLC      ELMIN         Q       CWSEL      CRIWS       EG        10*KS       VCH       AREA       .01K
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*	985.000	.00	.00	.00	1601.10	3156.00	1610.46	1610.46	1613.21	156.77	13.30	237.27	252.06
*	990.000	55.00	.00	.00	1602.00	3156.00	1615.41	1615.41	1615.89	82.35	5.57	566.94	347.79
*	992.000	43.00	.00	.00	1603.00	3156.00	1616.40	1616.40	1616.43	.29	1.58	2512.32	5899.56
*	994.000	250.00	1623.10	1613.40	1605.40	3156.00	1624.20	.00	1624.21	.02	.45	9242.92	25747.33
*	1000.000	19.00	.00	.00	1606.00	3156.00	1624.20	1616.09	1624.21	.10	.82	6783.75	10042.05
	1002.000	52.00	.00	.00	1606.00	3156.00	1624.20	1615.35	1624.21	.10	.91	6525.92	10000.08
	1005.000	195.00	.00	.00	1607.00	3156.00	1624.20	1614.91	1624.22	.19	1.16	4164.20	7245.74
	1010.000	140.00	.00	.00	1608.00	3156.00	1624.20	1616.44	1624.22	.38	1.64	3122.75	5101.99
*	1012.000	97.00	.00	.00	1610.00	3156.00	1624.19	1616.24	1624.24	1.05	1.77	1782.86	3083.88
*	1015.000	124.00	.00	.00	1619.00	3156.00	1624.06	1622.99	1624.97	26.86	7.67	411.67	608.96
*	1017.000	95.00	.00	.00	1614.00	3156.00	1624.64	1621.41	1625.27	11.39	6.38	494.62	935.18
*	1020.000	185.30	.00	.00	1617.00	3156.00	1624.54	1623.28	1625.76	27.89	8.85	356.49	597.57
*	1025.000	221.70	.00	.00	1619.00	3156.00	1624.87	1624.87	1626.90	60.24	11.44	275.97	406.63
*	1030.000	190.70	.00	.00	1621.00	3156.00	1627.07	1627.07	1628.74	61.68	10.37	304.35	401.86
*	1035.000	179.00	.00	.00	1623.00	3156.00	1629.01	1629.01	1629.89	27.00	8.50	522.26	607.41
	1040.000	224.30	.00	.00	1625.00	3156.00	1630.06	1629.92	1630.67	43.41	6.86	568.95	479.01
	1045.000	178.00	.00	.00	1627.00	3156.00	1630.94	1630.86	1631.68	70.77	6.89	458.18	375.16
	1050.000	196.50	.00	.00	1629.00	3156.00	1632.22	1631.81	1632.71	39.06	5.64	559.69	504.99
*	1055.000	197.50	.00	.00	1630.00	3156.00	1633.57	1633.57	1634.47	77.18	7.62	414.21	359.24
*	1060.000	195.00	.00	.00	1631.00	3156.00	1635.66	1635.66	1636.46	39.15	8.54	545.08	504.39
*	1065.000	177.70	.00	.00	1632.00	3156.00	1637.76	1637.76	1639.44	84.03	10.40	303.41	394.41
*	1067.000	113.00	.00	.00	1633.00	3156.00	1639.38	1638.93	1639.93	20.61	6.48	665.40	695.22
*	1069.000	83.00	.00	.00	1634.00	3156.00	1639.90	1637.34	1640.12	5.74	3.75	842.14	1317.35
	1070.000	67.00	.00	.00	1634.00	3156.00	1639.88	1637.38	1640.23	7.67	4.80	758.87	1139.77

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	1072.000	104.00	.00	.00	1635.00	3156.00	1639.69	1638.75	1640.69	28.95	8.04	392.69	586.60
*	1075.000	88.90	.00	.00	1635.50	3156.00	1640.10	1640.10	1641.94	61.10	10.89	289.94	403.75
*	1080.000	171.70	.00	.00	1636.00	3156.00	1641.25	1641.25	1643.10	50.55	11.04	306.67	443.87
*	1085.000	236.90	.00	.00	1638.00	3156.00	1643.38	1643.38	1645.19	53.57	11.32	314.36	431.21
*	1090.000	188.60	.00	.00	1639.00	3156.00	1645.27	1645.27	1647.29	59.27	11.42	276.42	409.95
	1095.000	191.90	.00	.00	1640.00	3156.00	1646.76	1646.54	1648.45	57.62	10.42	302.84	415.78
*	1100.000	181.20	.00	.00	1642.00	3156.00	1648.34	1648.34	1649.38	26.76	8.89	549.19	610.13
	1105.000	248.20	.00	.00	1644.00	3156.00	1648.88	1648.61	1650.35	43.75	10.07	352.20	477.15
	1110.000	184.90	.00	.00	1644.50	3156.00	1649.59	1649.43	1651.42	53.34	10.85	290.98	432.14
*	1112.000	72.00	.00	.00	1645.00	3156.00	1651.16	1649.28	1651.72	13.56	6.02	547.79	856.91
	1115.000	150.70	.00	.00	1645.50	3156.00	1651.41	1649.54	1651.93	14.17	5.81	543.56	838.36
*	1120.000	245.80	.00	.00	1646.00	3156.00	1651.24	1651.19	1652.91	61.57	10.38	304.17	402.20
*	1125.000	213.30	.00	.00	1648.00	3156.00	1652.62	1652.62	1654.44	62.02	10.81	291.97	400.74
*	1130.000	204.10	.00	.00	1649.00	3156.00	1654.82	1654.82	1656.95	59.93	11.73	269.12	407.68
*	1135.000	203.30	.00	.00	1650.00	3156.00	1655.94	1655.94	1658.26	59.62	12.23	258.11	408.75
*	1140.000	190.30	.00	.00	1651.00	3156.00	1657.53	1657.53	1660.07	61.63	12.79	246.73	402.00
*	1145.000	275.80	.00	.00	1651.50	3156.00	1660.12	1657.71	1661.01	15.93	7.57	417.08	790.62
	1150.000	126.40	.00	.00	1652.00	3156.00	1660.40	1658.17	1661.21	15.61	7.22	436.92	798.81
*	1152.000	125.00	.00	.00	1652.00	3156.00	1660.98	1657.88	1661.38	7.44	5.12	616.11	1156.74
*	1155.000	64.00	.00	.00	1652.50	3156.00	1661.25	1657.65	1661.44	3.57	3.48	905.67	1669.83
*	1160.000	186.60	.00	.00	1654.00	3156.00	1661.53	1661.53	1663.84	57.28	12.21	261.27	416.99

CHANNEL MODEL

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	985.000	3156.00	1610.46	.00	.00	1.76	43.87	.00
*	990.000	3156.00	1615.41	.00	4.95	.00	256.34	55.00
*	992.000	3156.00	1616.40	.00	1.00	.00	803.80	43.00
*	994.000	3156.00	1624.20	.00	7.80	.00	2246.45	250.00
*	1000.000	3156.00	1624.20	.00	.00	.00	1072.87	19.00
	1002.000	3156.00	1624.20	.00	.00	.00	993.01	52.00
	1005.000	3156.00	1624.20	.00	.00	.00	652.22	195.00
	1010.000	3156.00	1624.20	.00	-.01	.00	538.96	140.00
*	1012.000	3156.00	1624.19	.00	.00	.00	354.54	97.00
*	1015.000	3156.00	1624.06	.00	-.14	.00	103.47	124.00
*	1017.000	3156.00	1624.64	.00	.58	.00	84.15	95.00
*	1020.000	3156.00	1624.54	.00	-.10	.00	73.06	185.30
*	1025.000	3156.00	1624.87	.00	.32	.00	69.19	221.70
*	1030.000	3156.00	1627.07	.00	2.21	.00	90.41	190.70
*	1035.000	3156.00	1629.01	.00	1.93	.00	449.97	179.00
	1040.000	3156.00	1630.06	.00	1.05	.00	444.45	224.30
	1045.000	3156.00	1630.94	.00	.88	.00	282.70	178.00
	1050.000	3156.00	1632.22	.00	1.28	.00	298.56	196.50
*	1055.000	3156.00	1633.57	.00	1.35	.00	234.03	197.50
*	1060.000	3156.00	1635.66	.00	2.09	.00	326.61	195.00
*	1065.000	3156.00	1637.76	.00	2.10	.00	92.60	177.70
*	1067.000	3156.00	1639.38	.00	1.62	.00	320.97	113.00
*	1069.000	3156.00	1639.90	.00	.52	.00	194.20	83.00
	1070.000	3156.00	1639.88	.00	-.02	.00	270.84	67.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	1072.000	3156.00	1639.69	.00	-.19	.00	95.80	104.00
*	1075.000	3156.00	1640.10	.00	.41	.00	79.23	88.90
*	1080.000	3156.00	1641.25	.00	1.15	.00	90.44	171.70
*	1085.000	3156.00	1643.38	.00	2.12	.00	110.88	236.90
*	1090.000	3156.00	1645.27	.00	1.89	.00	68.19	188.60
	1095.000	3156.00	1646.76	.00	1.49	.00	84.29	191.90
*	1100.000	3156.00	1648.34	.00	1.58	.00	299.58	181.20
	1105.000	3156.00	1648.88	.00	.54	.00	102.64	248.20
	1110.000	3156.00	1649.59	.00	.71	.00	71.12	184.90
*	1112.000	3156.00	1651.16	.00	1.57	.00	278.82	72.00
	1115.000	3156.00	1651.41	.00	.25	.00	126.95	150.70
*	1120.000	3156.00	1651.24	.00	-.17	.00	89.21	245.80
*	1125.000	3156.00	1652.62	.00	1.38	.00	81.33	213.30
*	1130.000	3156.00	1654.82	.00	2.20	.00	64.12	204.10
*	1135.000	3156.00	1655.94	.00	1.12	.00	56.43	203.30
*	1140.000	3156.00	1657.53	.00	1.58	.00	50.40	190.30
*	1145.000	3156.00	1660.12	.00	2.59	.00	66.86	275.80
	1150.000	3156.00	1660.40	.00	.29	.00	74.39	126.40

*	1152.000	3156.00	1660.98	.00	.57	.00	103.37	125.00
*	1155.000	3156.00	1661.25	.00	.27	.00	158.40	64.00
*	1160.000	3156.00	1661.53	.00	.28	.00	65.38	186.60

1

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 985.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

CAUTION SECNO= 990.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 990.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 992.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 992.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 994.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1000.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1012.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1015.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1017.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1020.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 1025.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1025.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1030.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1030.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1035.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1035.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1055.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1055.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1060.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1060.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1065.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1065.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 1067.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1069.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1072.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 1075.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1075.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1080.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1080.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1085.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

1

CAUTION SECNO= 1085.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1090.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1090.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1100.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1100.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 1112.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1120.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 1125.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1125.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1130.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1130.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1135.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1135.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1140.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1140.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 1145.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1152.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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WARNING SECNO=   1155.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=   1160.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   1160.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
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ABBOTT AND PULSIPHER WASHES FIS RESTUDY
ABBOTT WASH - MAIN CHANNEL MODEL
FROM SECTION 1160 TO SECTION 985
MANNINGS "n" CALCULATIONS - CHANNEL

SECTION	n0	n1	n2	n3	n4	m5	n
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1140	0.020	0.005	0.000	0.000	0.000	1.000	0.025
1135	0.020	0.005	0.000	0.000	0.000	1.000	0.025
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1080	0.020	0.005	0.000	0.000	0.000	1.000	0.025
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1072	0.020	0.005	0.000	0.000	0.000	1.000	0.025
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990	0.020	0.005	0.000	0.010	0.005	1.000	0.040
985	0.020	0.005	0.000	0.010	0.005	1.000	0.040

REFERENCED FROM "OPEN-CHANNEL HYDRAULICS" , VEN TE CHOW, McGRAW-HILL, INC., 1959. SEE VOLUME III, SECTION 5.3.

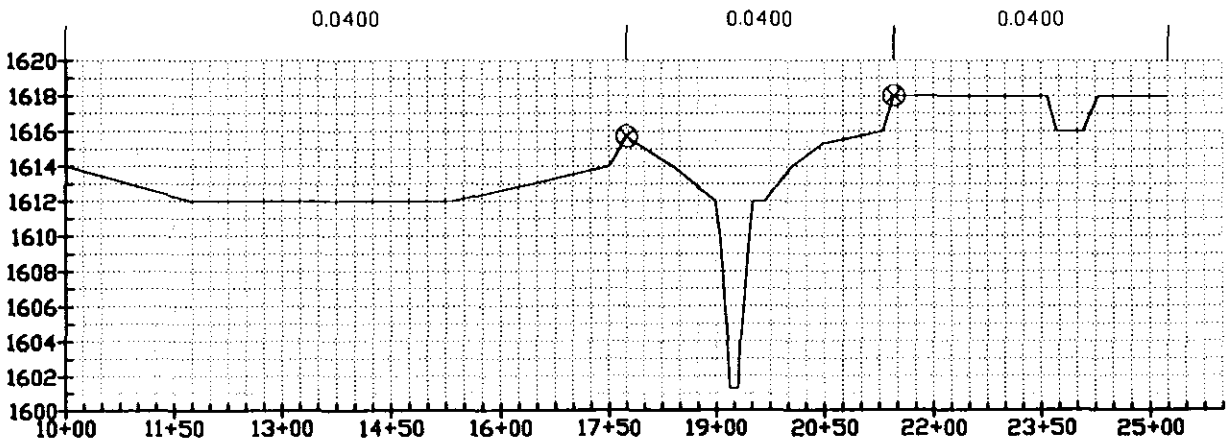
n0 = MATERIAL
n1 = IRREGULARITY
n2 = CROSS SECTION VARIATIONS
n3 = OBSTRUCTIONS
n4 = VEGETATION
m5 = MEANDERING

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
ABBOTT WASH - MAIN CHANNEL MODEL
FROM SECTION 1160 TO SECTION 985
MANNINGS "n" CALCULATIONS - OVERBANKS

SECTION	n0	n1	n2	n3	n4	m5	n
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1100	0.020	0.005	0.005	0.000	0.010	1.000	0.040
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1085	0.020	0.005	0.005	0.000	0.010	1.000	0.040
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1075	0.020	0.005	0.005	0.000	0.010	1.000	0.040
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1070	0.020	0.005	0.005	0.000	0.010	1.000	0.040
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1055	0.020	0.000	0.000	0.000	0.010	1.000	0.030
1050	0.020	0.000	0.000	0.000	0.010	1.000	0.030
1045	0.020	0.000	0.000	0.000	0.010	1.000	0.030
1040	0.020	0.000	0.000	0.000	0.010	1.000	0.030
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1030	0.020	0.000	0.000	0.000	0.010	1.000	0.030
1025	0.020	0.000	0.000	0.000	0.010	1.000	0.030
1020	0.020	0.000	0.000	0.000	0.010	1.000	0.030
1017	0.020	0.000	0.000	0.000	0.010	1.000	0.030
1015	0.020	0.000	0.000	0.000	0.010	1.000	0.030
1012	0.020	0.000	0.000	0.000	0.010	1.000	0.030
1010	0.020	0.005	0.005	0.000	0.010	1.000	0.040
1005	0.020	0.005	0.005	0.000	0.010	1.000	0.040
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1000	0.020	0.005	0.005	0.000	0.010	1.000	0.040
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992	0.015	0.000	0.000	0.000	0.000	1.000	0.015
990	0.020	0.005	0.005	0.000	0.010	1.000	0.040
985	0.020	0.005	0.005	0.000	0.010	1.000	0.040

REFERENCED FROM "OPEN-CHANNEL HYDRAULICS", VEN TE CHOW, McGRAW-HILL, INC., 1959. SEE VOLUME III, SECTION 5.3.

n0 = MATERIAL
n1 = IRREGULARITY
n2 = CROSS SECTION VARIATIONS
n3 = OBSTRUCTIONS
n4 = VEGETATION
m5 = MEANDERING



985

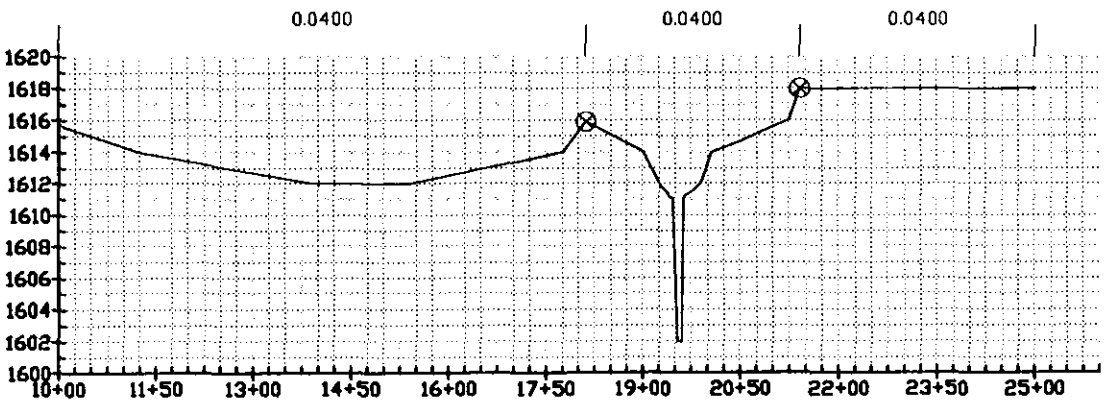
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ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 985

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 00.035 PLOTTED: 7/10/98



990

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LOOKING DOWNSTREAM

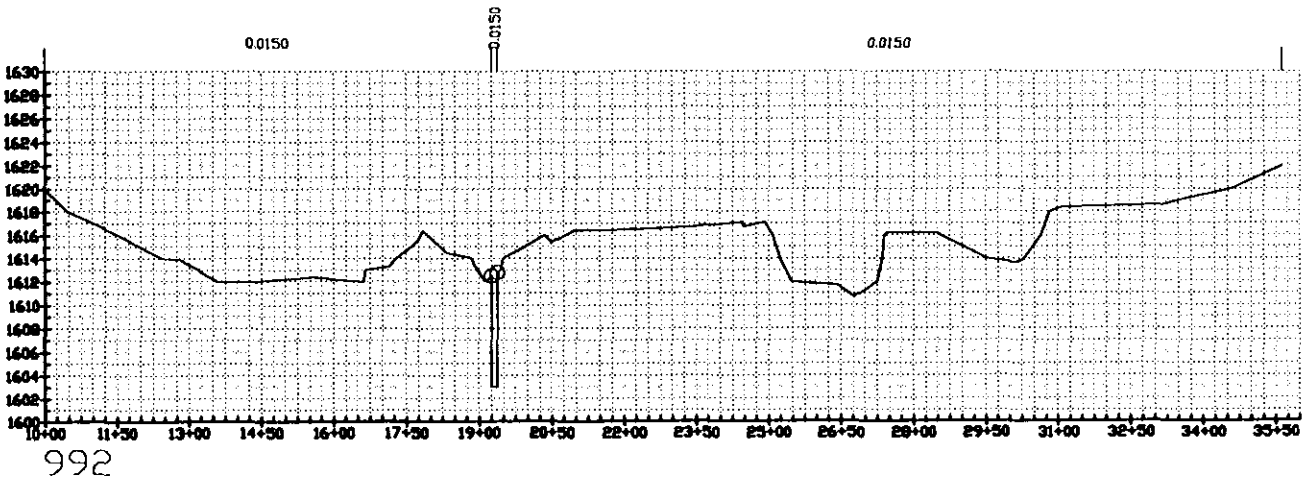
ABBOTT AND PULSIPHER WASHES

FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 990

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 0.035 PLOTTED: 7/10/98



992

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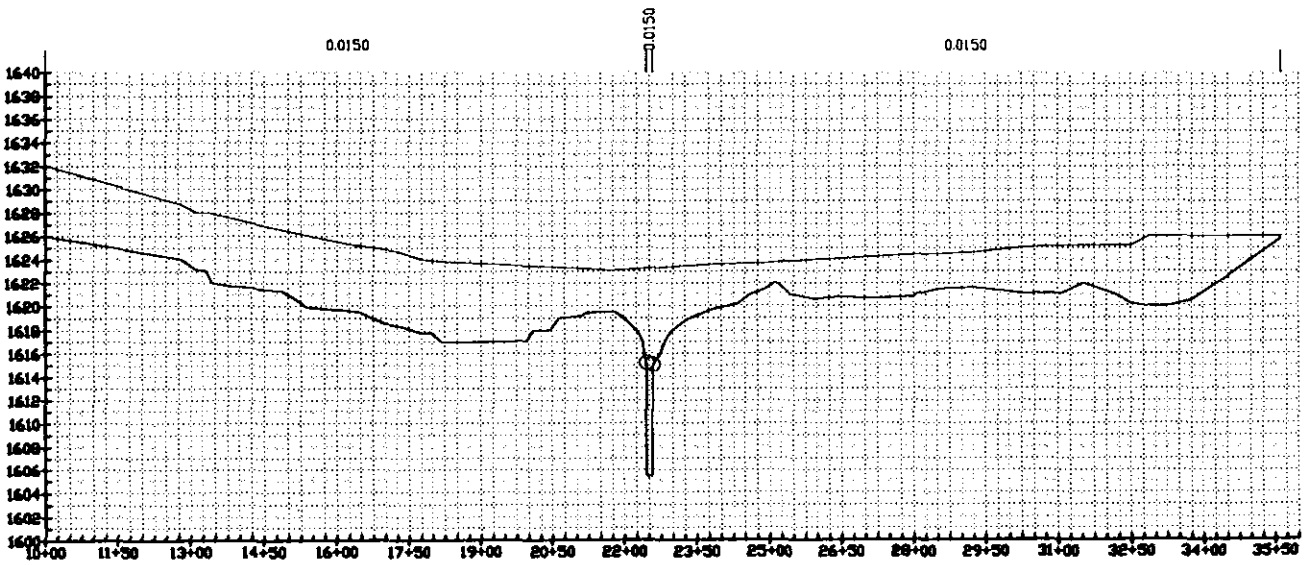
ABBOTT AND PULSIPHER WASHES

FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 992

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 0.035 PLOTTED: 7/10/98



994

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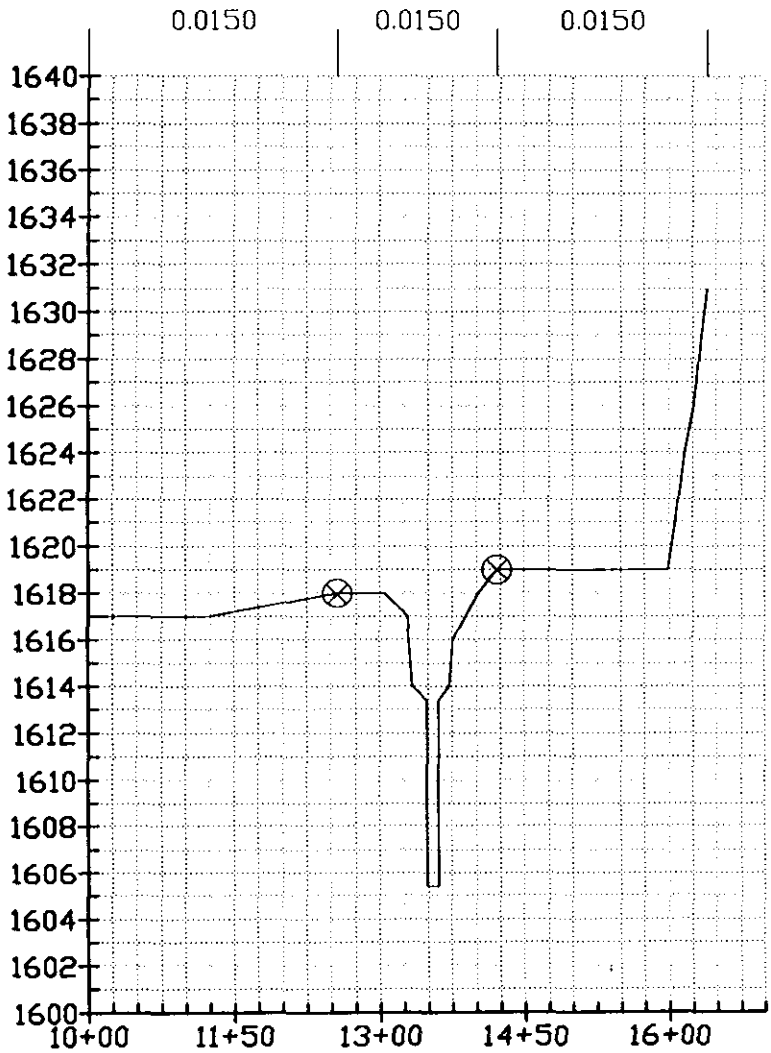
ABBOTT AND PULSIPHER WASHES

FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 994

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 950.035 PLOTTED: 7/10/98



1000

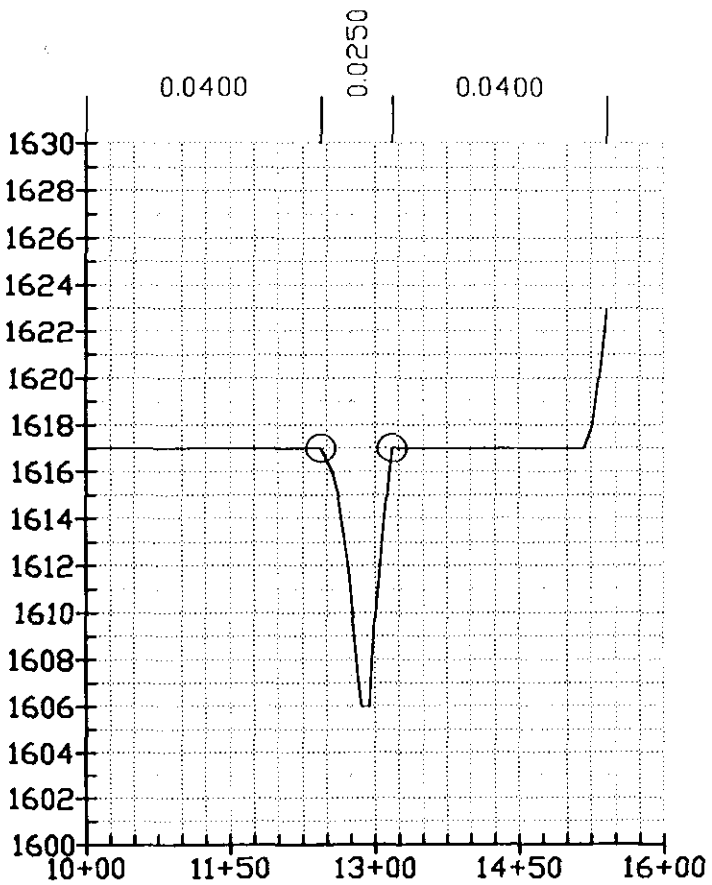
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ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1000

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 0.035 PLOTTED: 7/10/98



1002

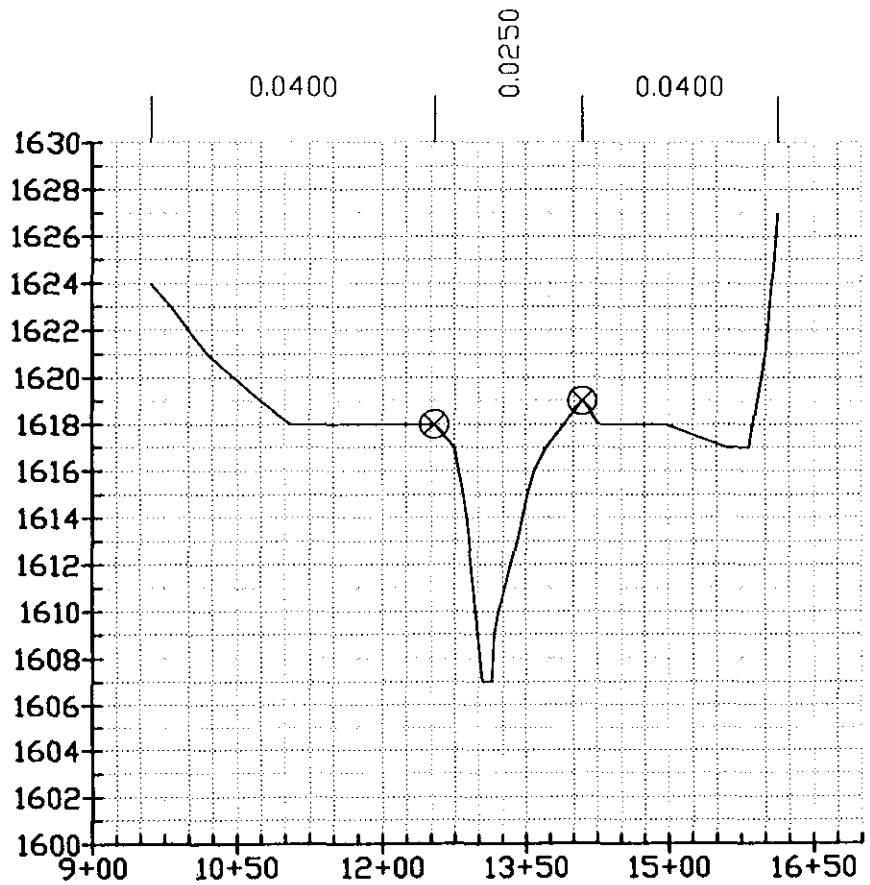
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ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1002

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



1005

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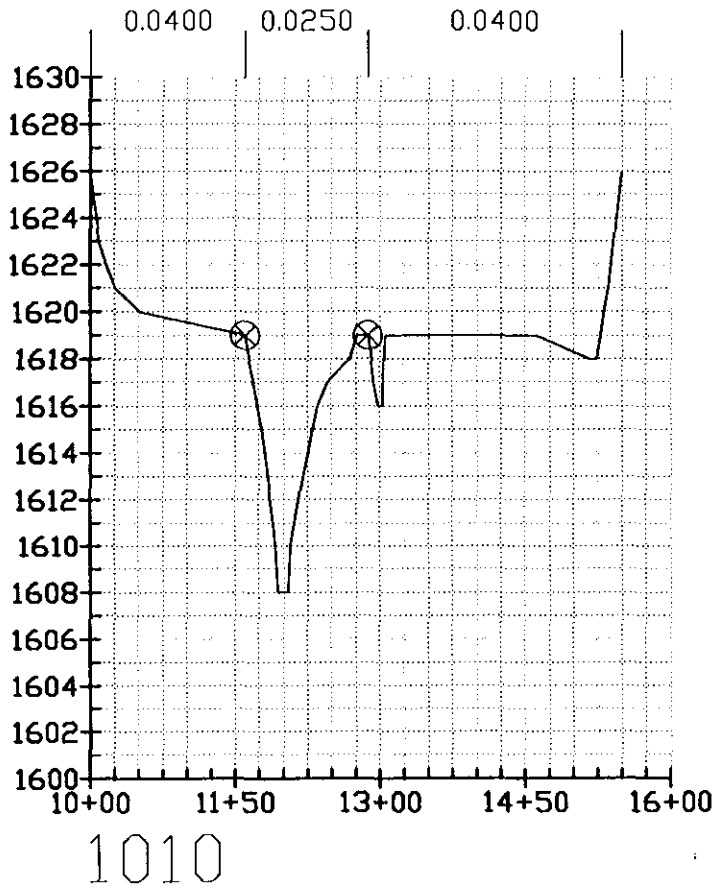
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G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

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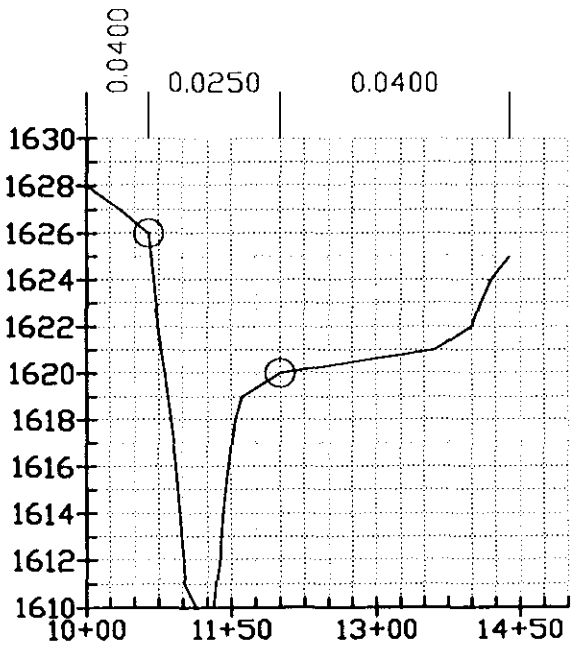
ABBOTT AND PULSIPHER WASHES

FIS RESTUDY

ABBOTT WASH
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CROSS SECTION 1010

G.C. WALLACE, INC.
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JOB NO. 0.035 PLOTTED: 7/10/98



1012

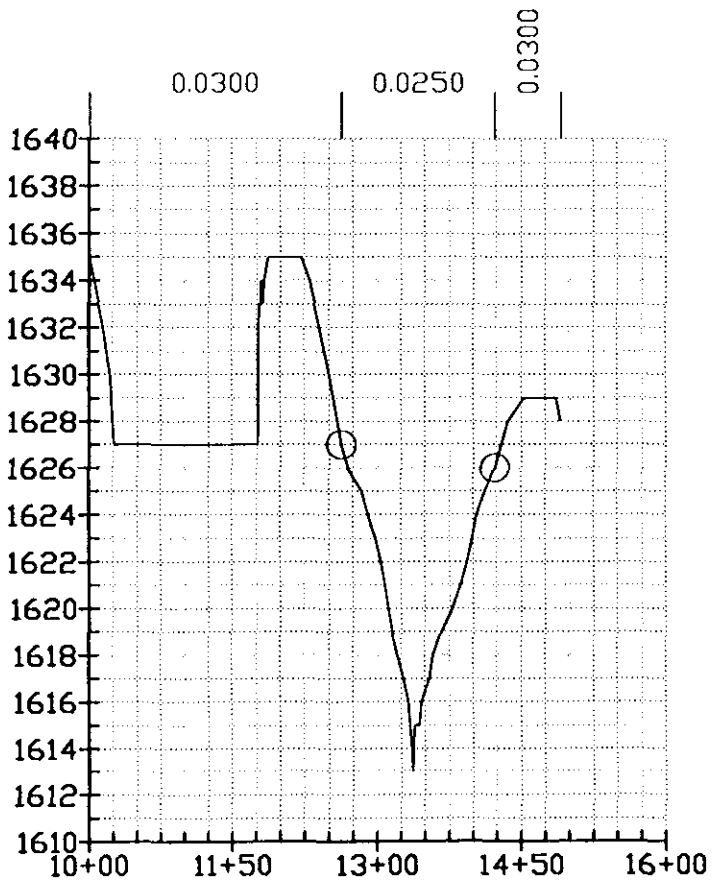
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ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
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G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 1/10/98



1015

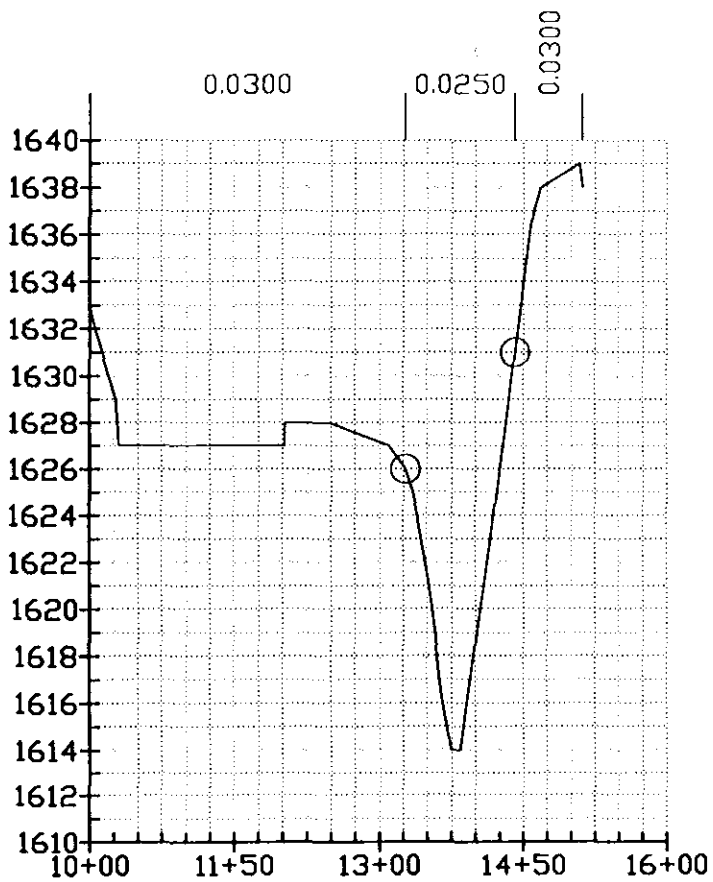
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ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1015

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



1017

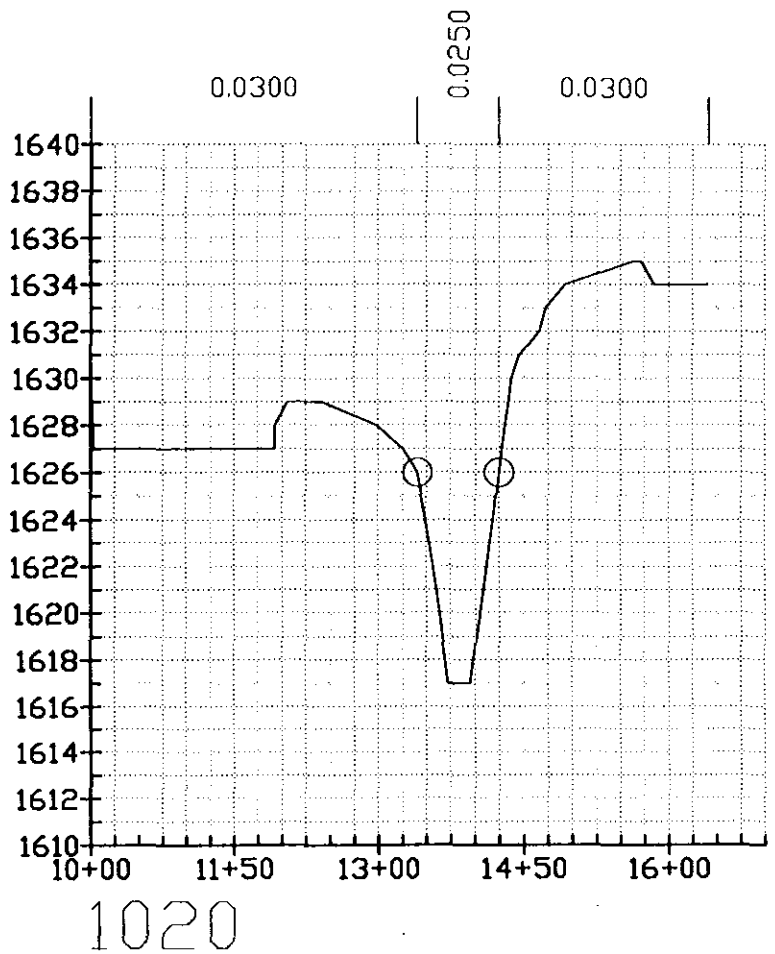
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ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1017

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



1020

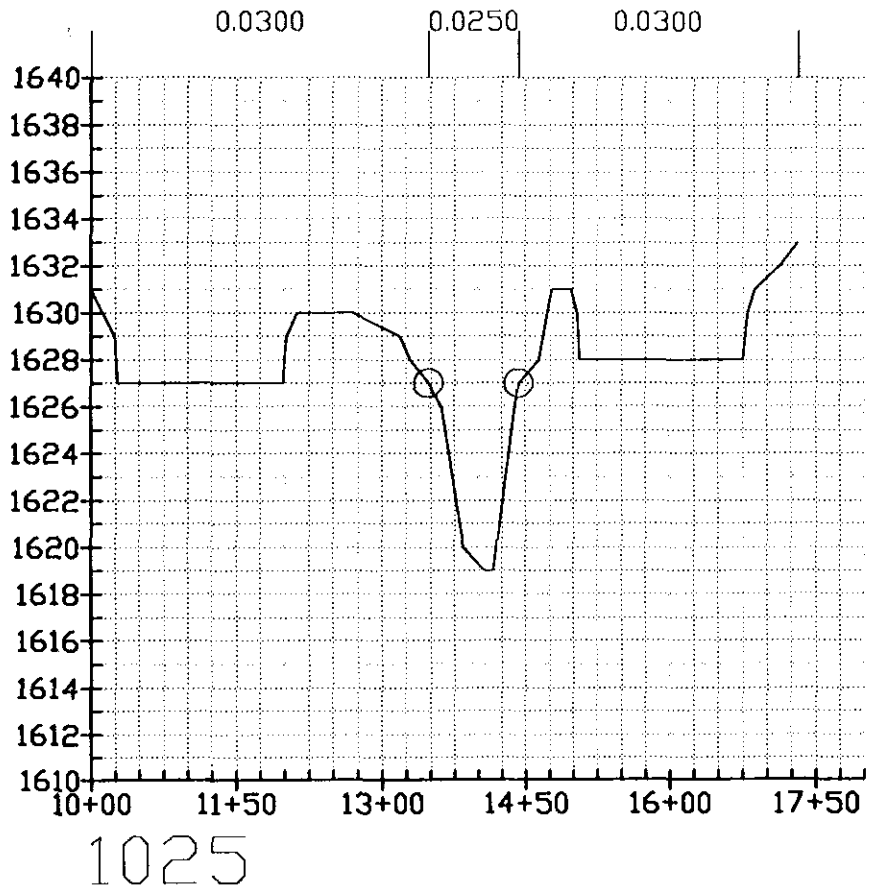
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ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1020

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

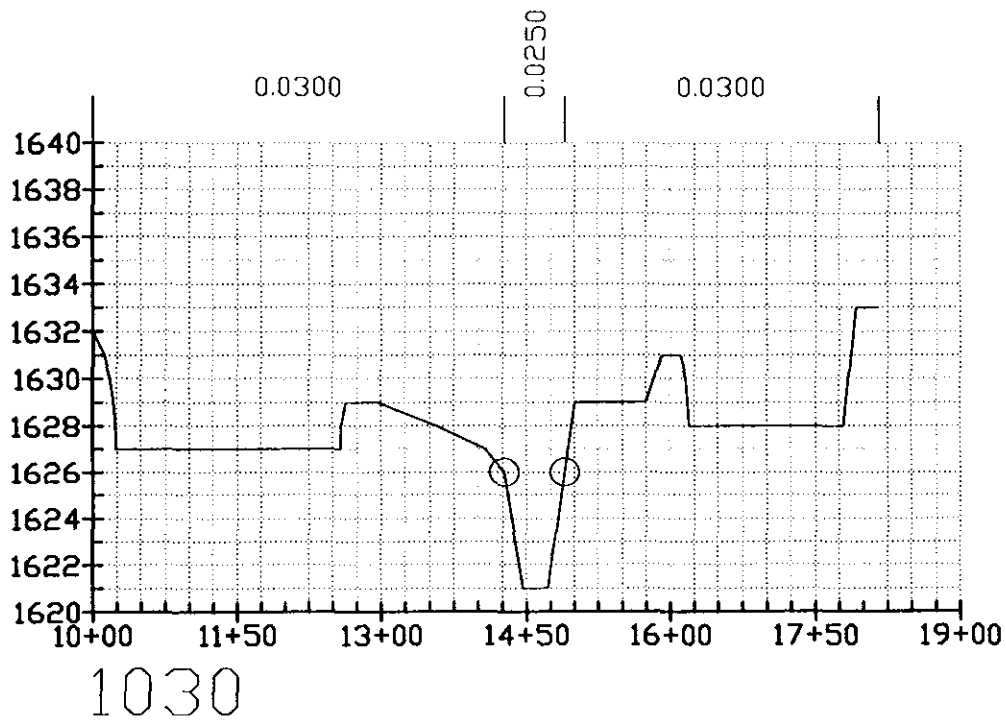
ABBOTT AND PULSIPHER WASHES

FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1025

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



1030

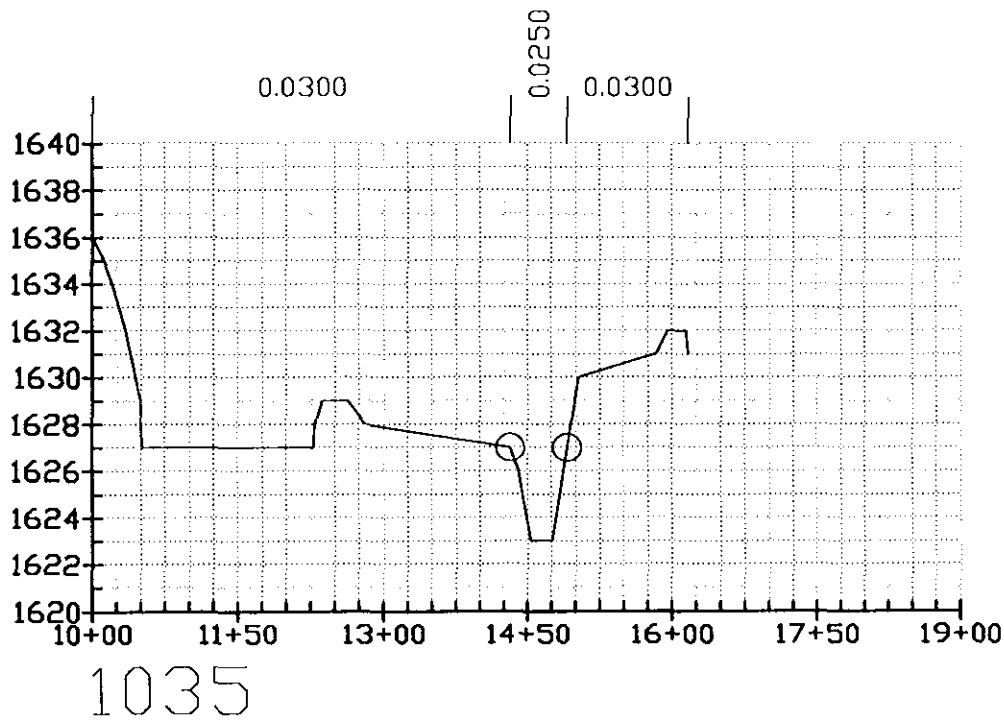
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LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1030

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 60.035 PLOTTED: 7/10/98



1035

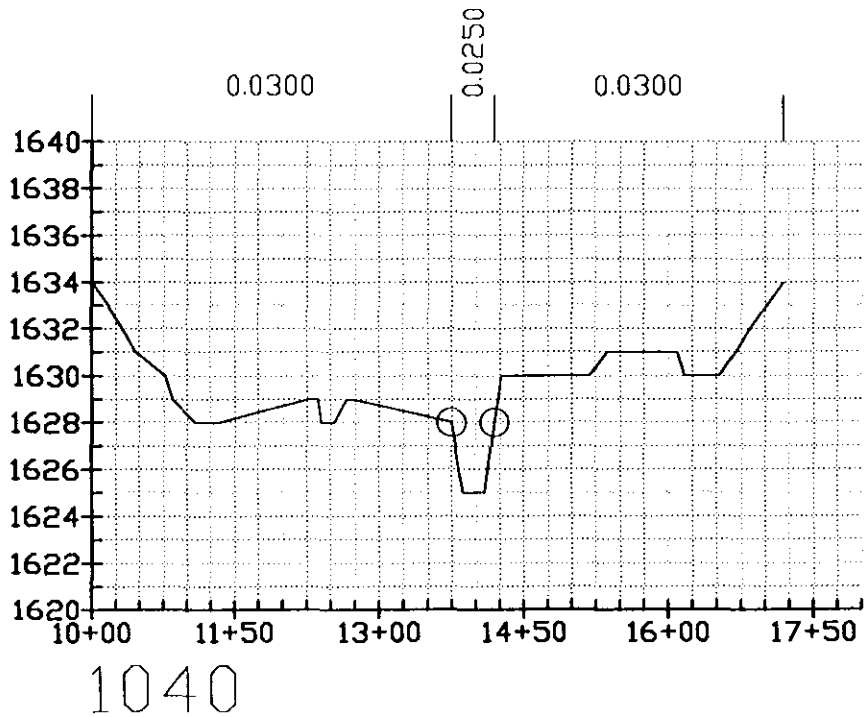
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ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1035

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

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1040

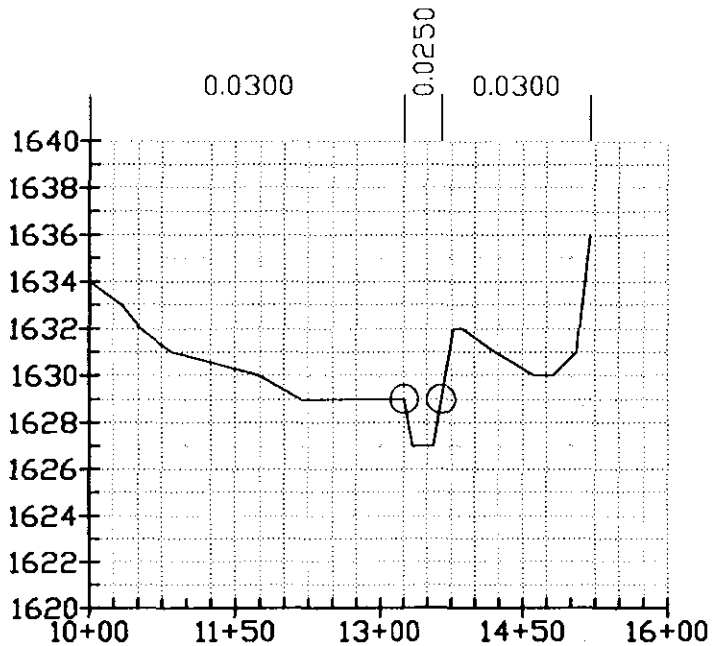
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ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1040

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD.,LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



1045

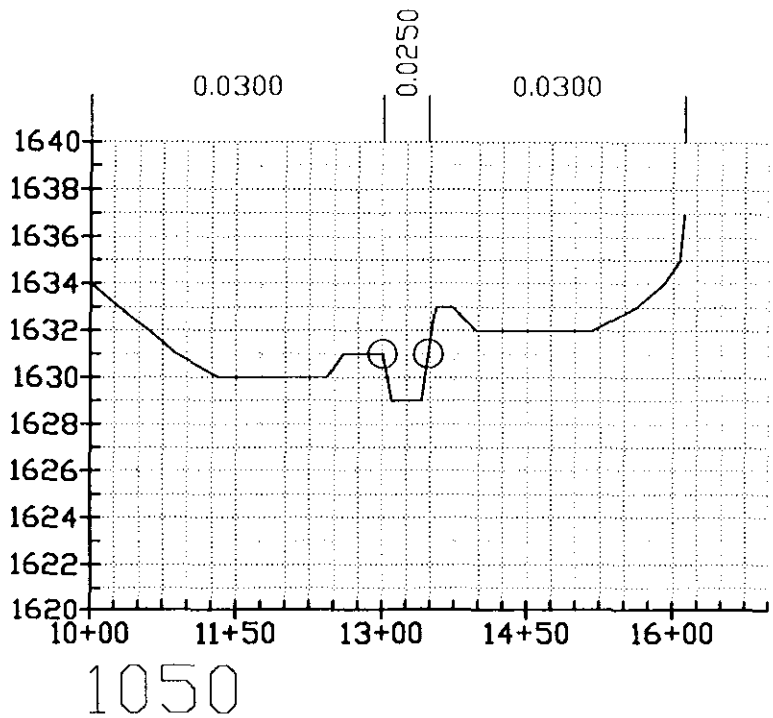
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ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1045

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



1050

NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

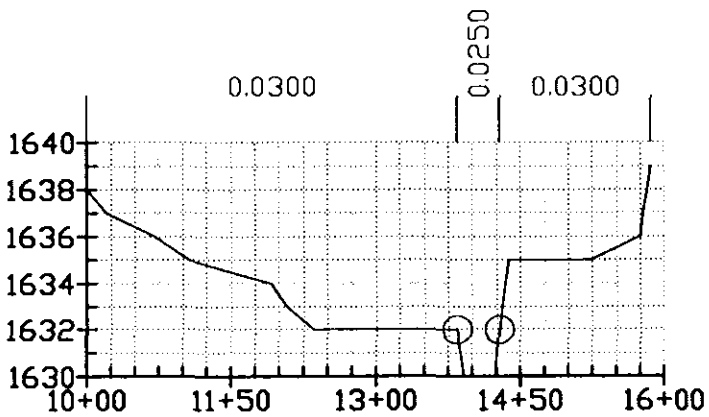
ABBOTT AND PULSIPHER WASHES

FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1050

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



1055

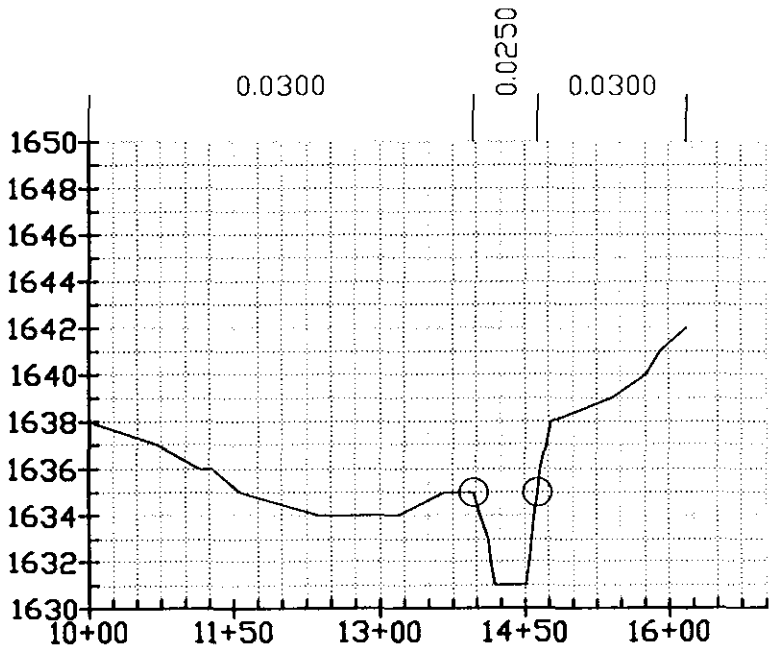
NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1055

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 0.035 PLOTTED: 7/10/98



1060

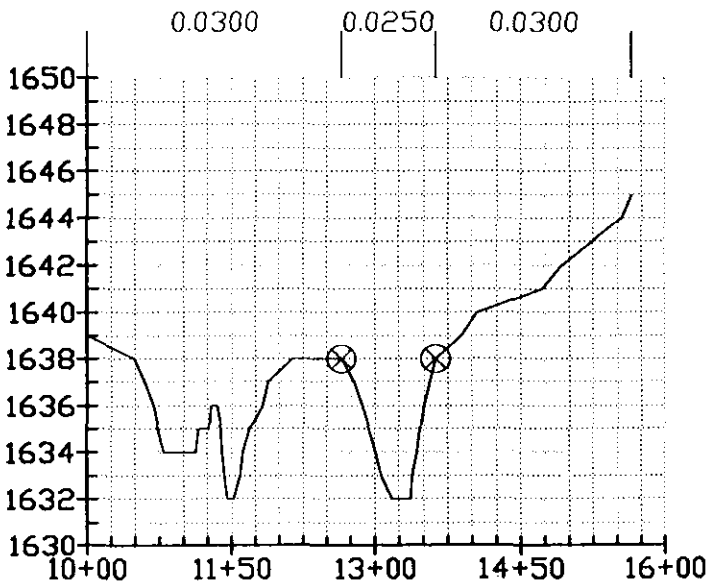
NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1060

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



1065

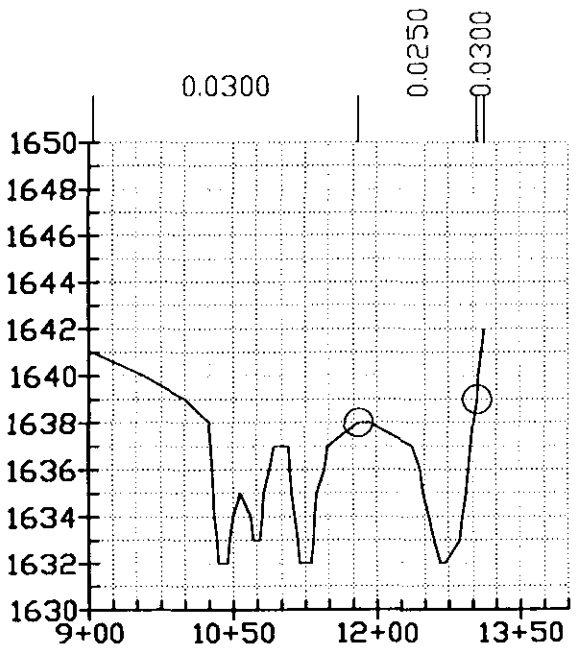
NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1065

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



1067

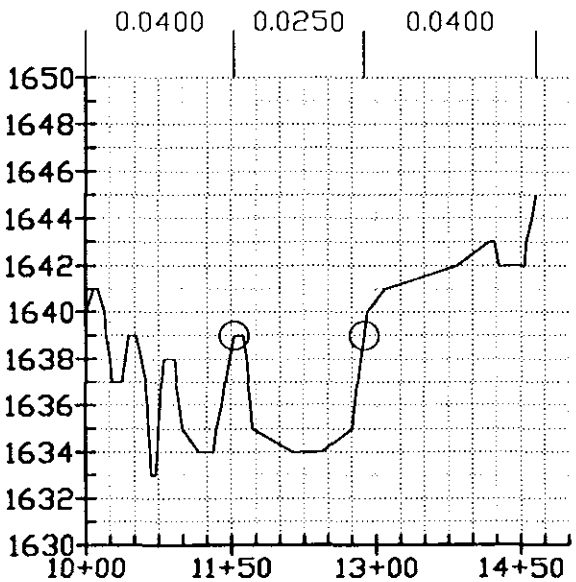
NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1067

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 950.035 PLOTTED: 7/10/98



1070

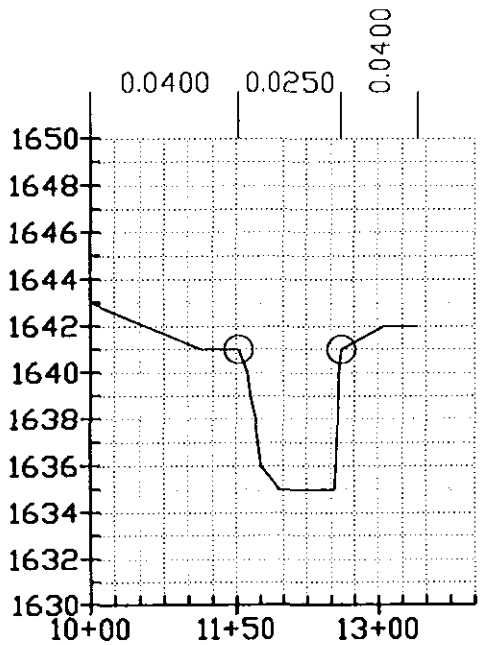
NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1070

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



1072

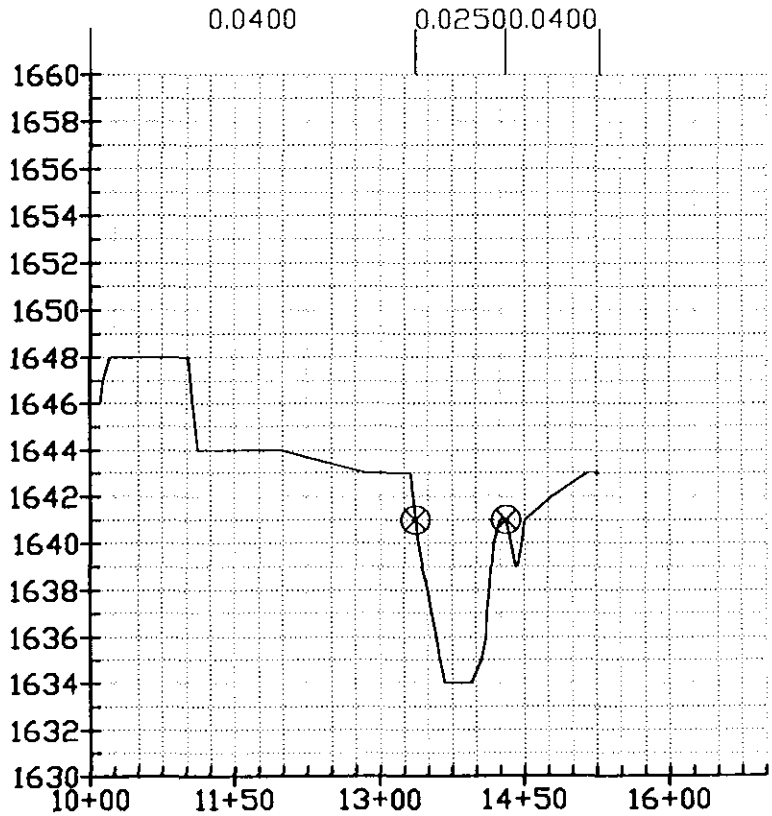
NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1072

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 0.035 PLOTTED: 7/10/98



1075

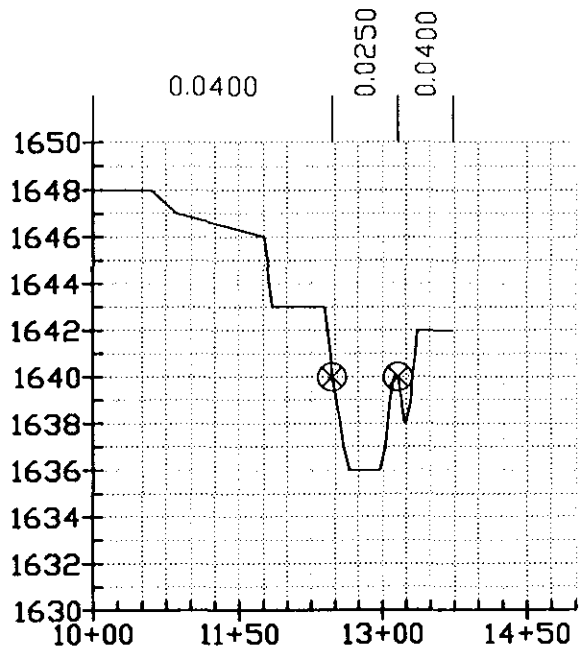
NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1075

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



1080

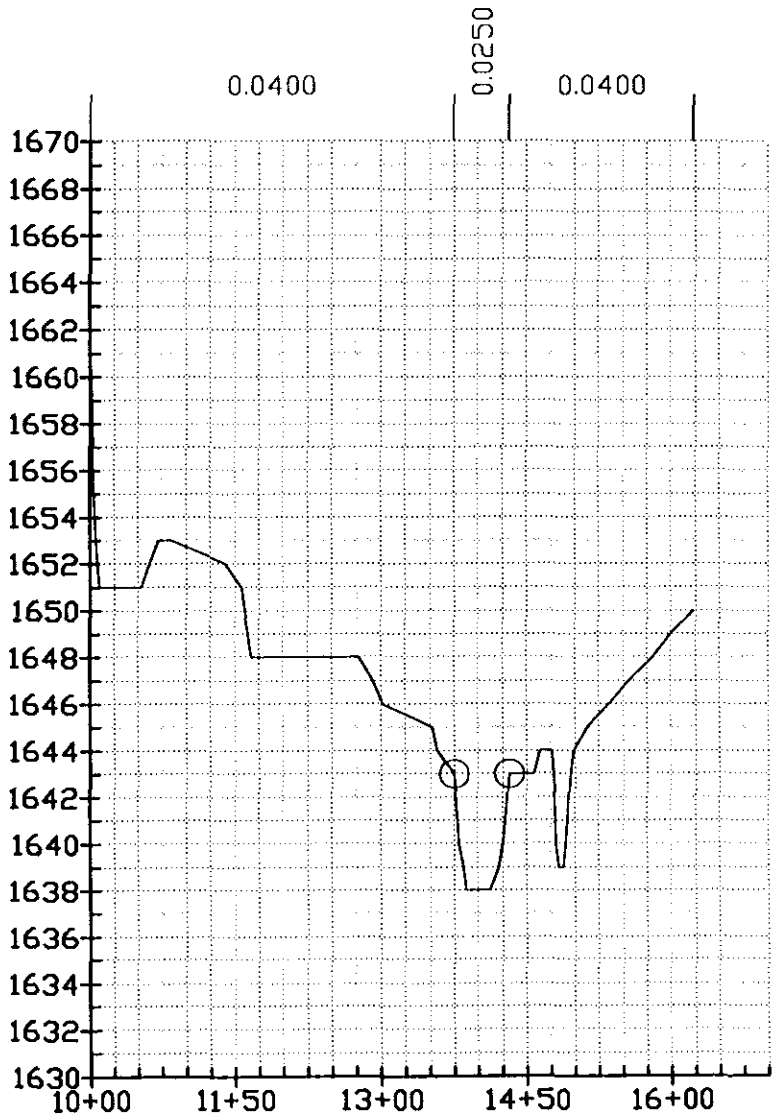
NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1080

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



1085

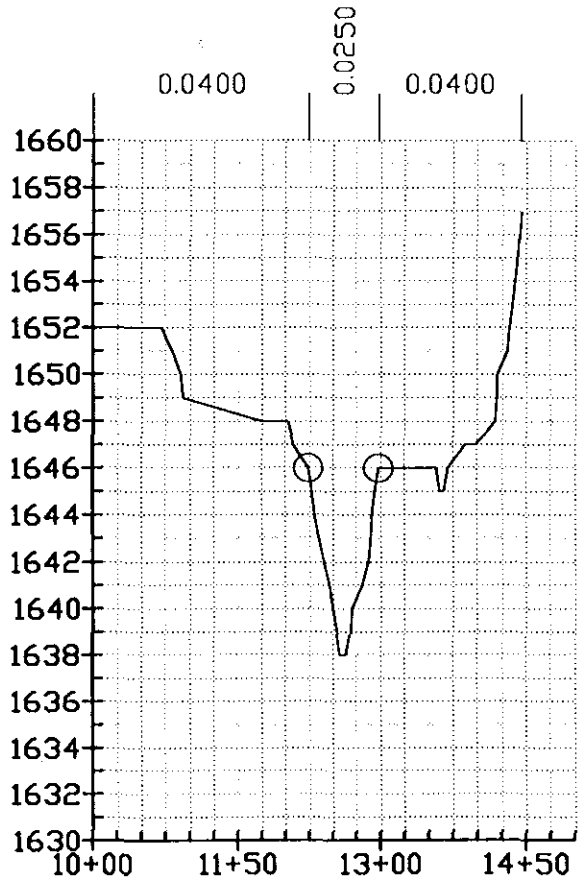
NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1085

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



1090

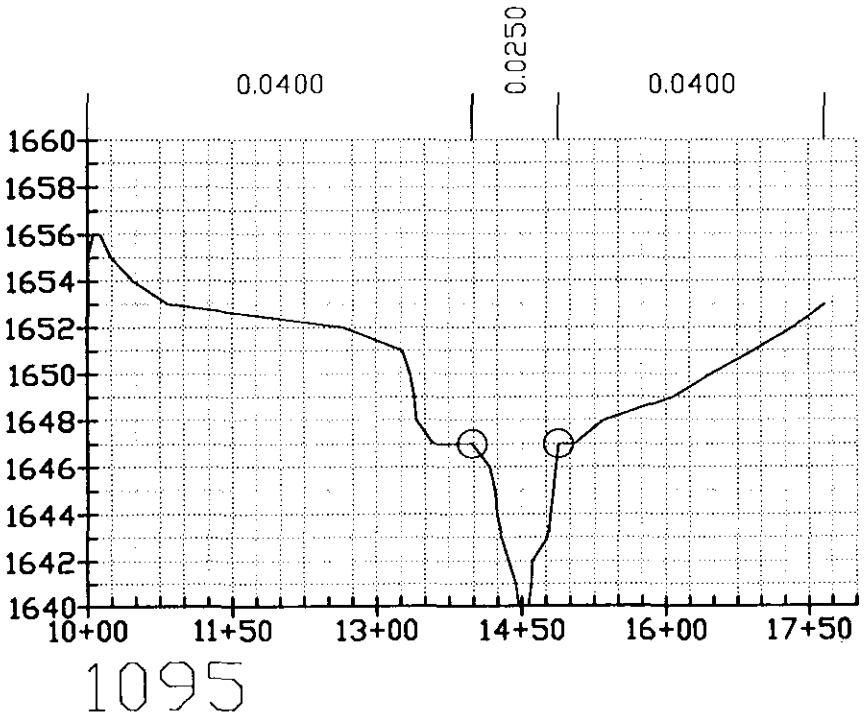
NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1090

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



1095

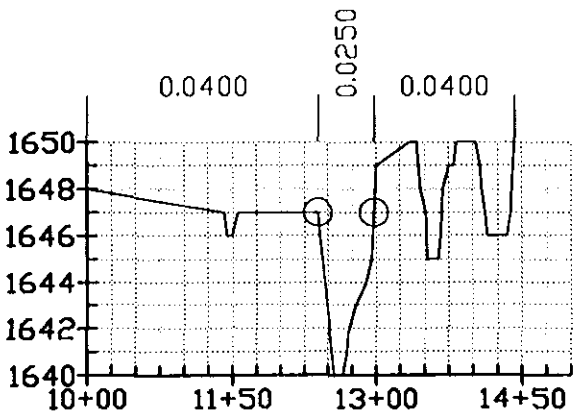
NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1095

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



1100

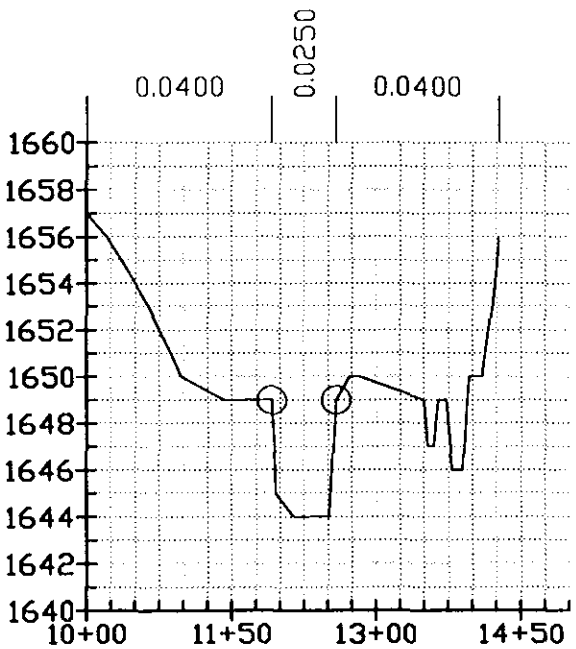
NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1100

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 950.035 PLOTTED: 7/10/98



1105

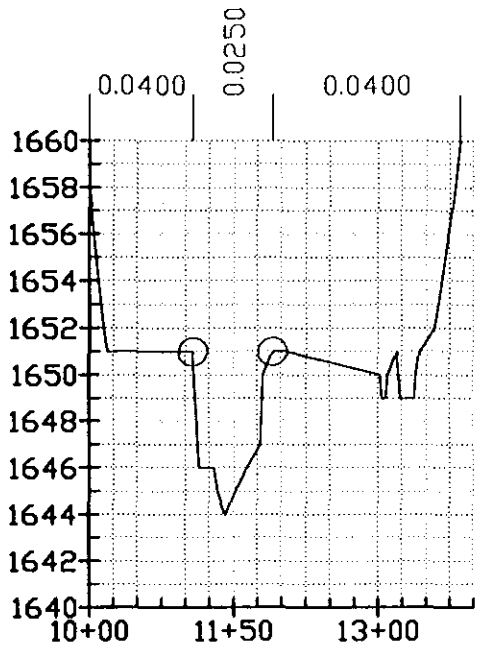
NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1105

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



1110

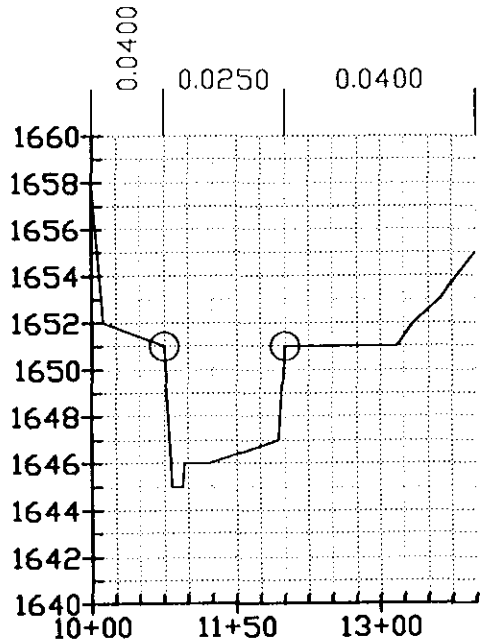
NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1110

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



1112

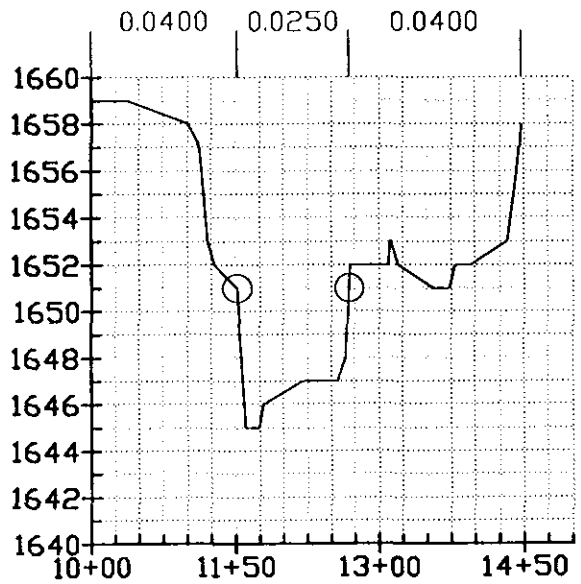
NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1112

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 330.035 PLOTTED: 7/10/98



1115

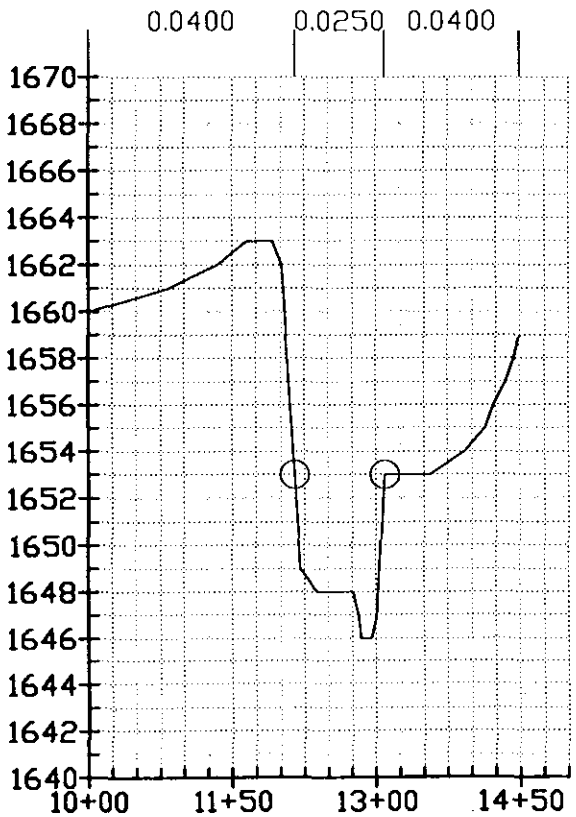
NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1115

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 00.035 PLOTTED: 7/10/98



1120

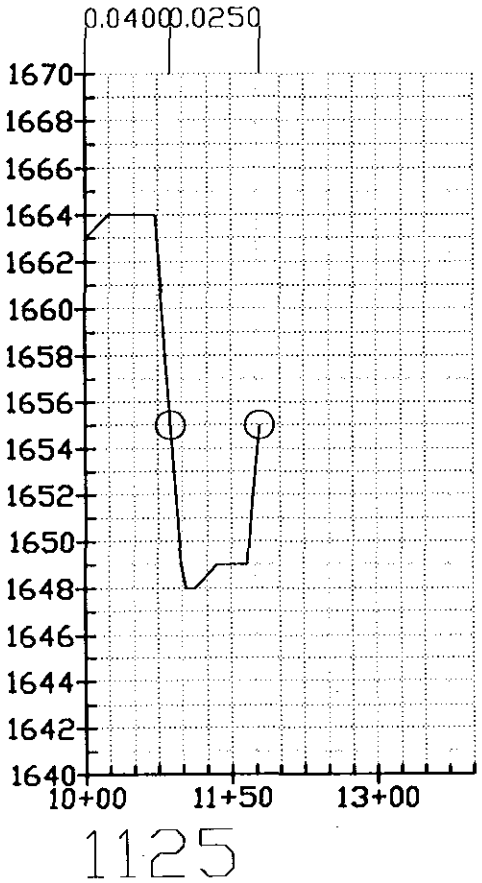
NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1120

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

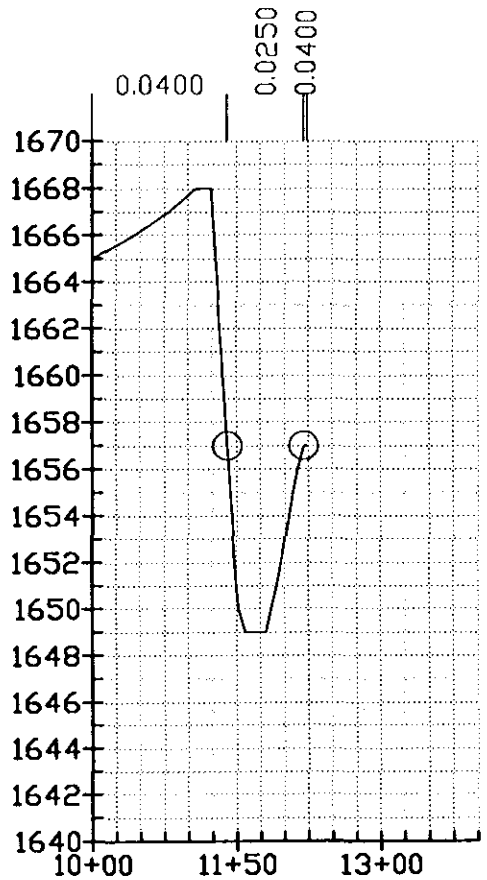
ABBOTT AND PULSIPHER WASHES

FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1125

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 550.035 PLOTTED: 7/10/98



1130

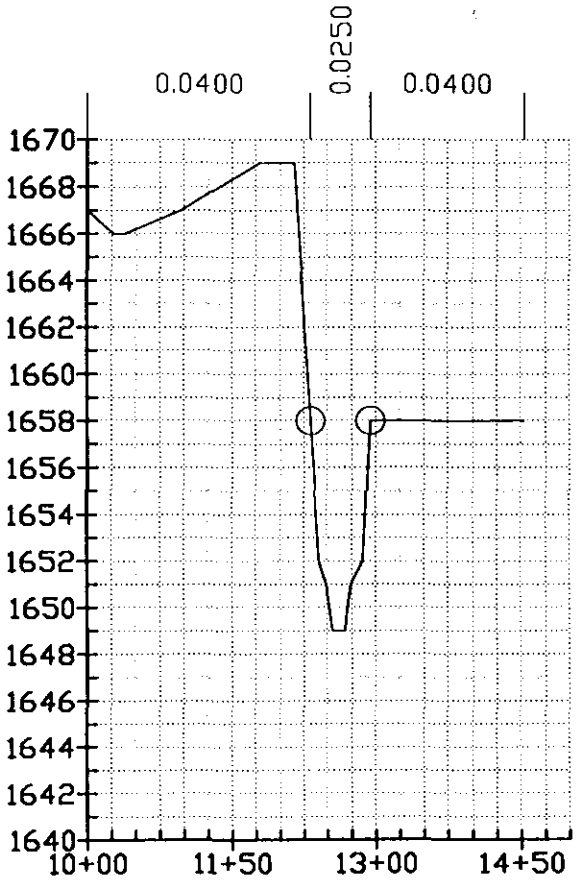
NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1130

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



1135

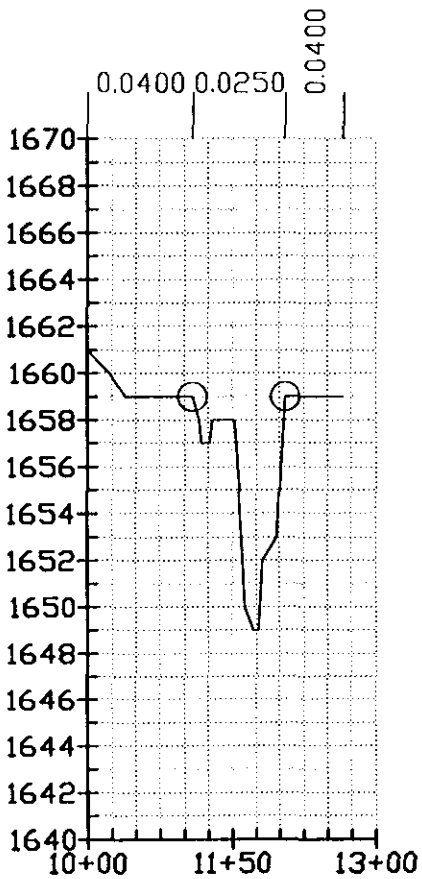
NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1135

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



1140

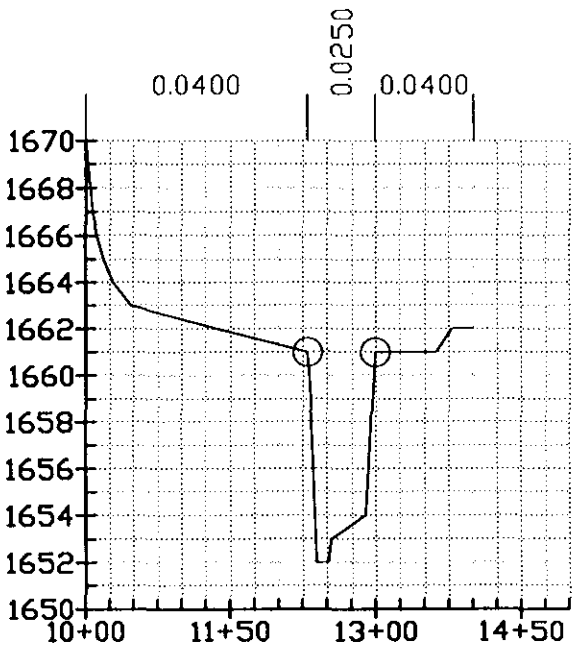
NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1140

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



1145

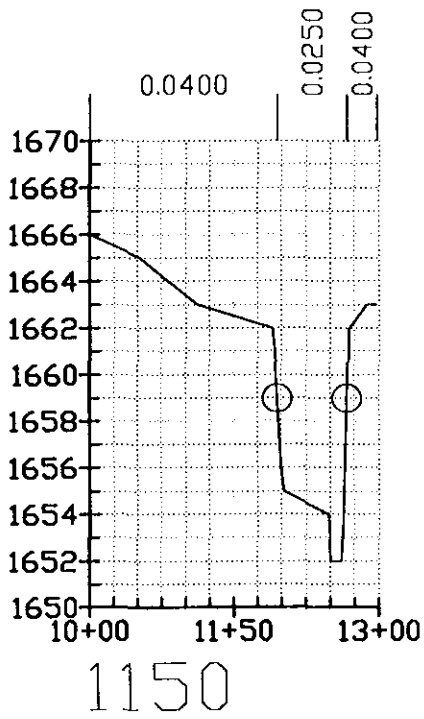
NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1145

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



1150

NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

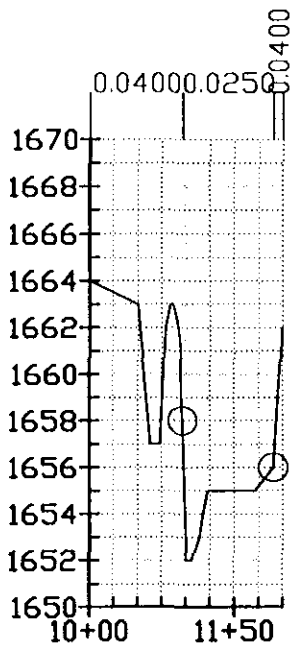
ABBOTT AND PULSIPHER WASHES

FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1150

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



1152

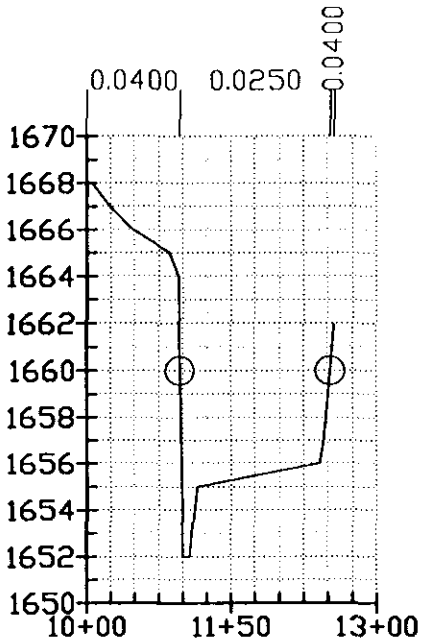
NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1152

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



1155

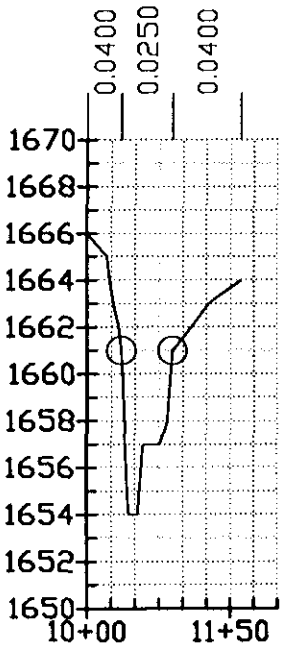
NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1155

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 950.035 PLOTTED: 7/10/98



1160

NOTE: NOT TO SCALE
LOOKING DOWNSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

ABBOTT WASH
MAIN CHANNEL MODEL
CROSS SECTION 1160

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 950.035 PLOTTED: 7/10/98

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH - MAIN CHANNEL MODEL
FROM SECTION 4900 TO SECTION 200
MANNINGS "n" CALCULATIONS - CHANNEL

SECTION	n0	n1	n2	n3	n4	m5	n
4900	0.020	0.005	0.000	0.000	0.000	1.000	0.025
4800	0.020	0.005	0.000	0.000	0.000	1.000	0.025
4700	0.020	0.005	0.000	0.000	0.000	1.000	0.025
4600	0.020	0.005	0.000	0.000	0.000	1.000	0.025
4500	0.020	0.005	0.000	0.000	0.000	1.000	0.025
4400	0.020	0.005	0.000	0.000	0.000	1.000	0.025
4300	0.020	0.005	0.000	0.000	0.000	1.000	0.025
4200	0.020	0.005	0.000	0.000	0.000	1.000	0.025
4100	0.020	0.005	0.000	0.000	0.000	1.000	0.025
4000	0.020	0.005	0.000	0.000	0.000	1.000	0.025
3900	0.020	0.005	0.000	0.000	0.000	1.000	0.025
3800	0.020	0.005	0.000	0.000	0.000	1.000	0.025
3700	0.020	0.005	0.000	0.000	0.000	1.000	0.025
3600	0.020	0.005	0.000	0.000	0.000	1.000	0.025
3500	0.020	0.005	0.000	0.000	0.000	1.000	0.025
3400	0.020	0.005	0.000	0.000	0.000	1.000	0.025
3300	0.020	0.005	0.000	0.000	0.000	1.000	0.025
3200	0.020	0.005	0.000	0.000	0.000	1.000	0.025
3100	0.020	0.005	0.000	0.000	0.000	1.000	0.025
3000	0.020	0.005	0.000	0.000	0.000	1.000	0.025
2900	0.020	0.005	0.000	0.000	0.000	1.000	0.025
2800	0.020	0.005	0.000	0.000	0.000	1.000	0.025
2700	0.020	0.005	0.000	0.000	0.000	1.000	0.025
2600	0.020	0.005	0.000	0.000	0.000	1.000	0.025
2500	0.020	0.005	0.000	0.000	0.000	1.000	0.025
2400	0.020	0.005	0.000	0.000	0.000	1.000	0.025
2300	0.020	0.005	0.000	0.000	0.000	1.000	0.025
2200	0.020	0.005	0.000	0.000	0.000	1.000	0.025
2100	0.020	0.005	0.000	0.000	0.000	1.000	0.025
2000	0.015	0.000	0.000	0.000	0.000	1.000	0.015
1900	0.015	0.000	0.000	0.000	0.000	1.000	0.015
1800	0.020	0.005	0.000	0.000	0.000	1.000	0.025
1750	0.020	0.005	0.000	0.000	0.000	1.000	0.025
1700	0.020	0.005	0.000	0.000	0.000	1.000	0.025
1650	0.020	0.005	0.000	0.000	0.000	1.000	0.025
1600	0.020	0.005	0.000	0.000	0.000	1.000	0.025
1500	0.020	0.005	0.000	0.000	0.000	1.000	0.025
1400	0.020	0.005	0.000	0.000	0.000	1.000	0.025
1300	0.020	0.005	0.000	0.000	0.000	1.000	0.025
1200	0.020	0.005	0.000	0.000	0.005	1.000	0.030
1100	0.020	0.005	0.000	0.000	0.005	1.000	0.030
1000	0.020	0.005	0.000	0.000	0.005	1.000	0.030
900	0.020	0.005	0.000	0.000	0.005	1.000	0.030
800	0.020	0.005	0.000	0.000	0.005	1.000	0.030
700	0.020	0.005	0.000	0.000	0.005	1.000	0.030
600	0.015	0.000	0.000	0.000	0.000	1.000	0.015
500	0.015	0.000	0.000	0.000	0.000	1.000	0.015
400	0.020	0.005	0.000	0.000	0.000	1.000	0.025
300	0.020	0.005	0.000	0.000	0.000	1.000	0.025
200	0.020	0.005	0.000	0.000	0.000	1.000	0.025

REFERENCED FROM "OPEN-CHANNEL HYDRAULICS", VEN TE CHOW, McGRAW-HILL, INC., 1959. SEE VOLUME III, SECTION 5.3.

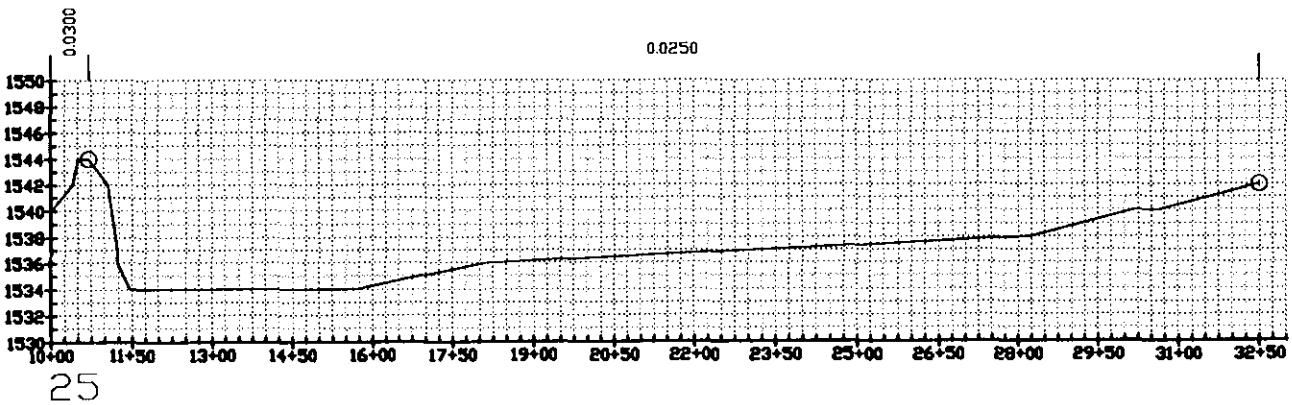
n0 = MATERIAL
n1 = IRREGULARITY
n2 = CROSS SECTION VARIATIONS
n3 = OBSTRUCTIONS
n4 = VEGETATION
m5 = MEANDERING

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH - MAIN CHANNEL MODEL
FROM SECTION 4900 TO SECTION 200
MANNINGS "n" CALCULATIONS - OVERBANKS

SECTION	n0	n1	n2	n3	n4	m5	n
4900	0.020	0.005	0.005	0.000	0.010	1.000	0.040
4800	0.020	0.005	0.005	0.000	0.010	1.000	0.040
4700	0.020	0.005	0.005	0.000	0.010	1.000	0.040
4600	0.020	0.005	0.005	0.000	0.010	1.000	0.040
4500	0.020	0.005	0.005	0.000	0.010	1.000	0.040
4400	0.020	0.005	0.005	0.000	0.010	1.000	0.040
4300	0.020	0.005	0.005	0.000	0.010	1.000	0.040
4200	0.020	0.005	0.005	0.000	0.010	1.000	0.040
4100	0.020	0.005	0.005	0.000	0.010	1.000	0.040
4000	0.020	0.005	0.005	0.000	0.010	1.000	0.040
3900	0.020	0.005	0.005	0.000	0.010	1.000	0.040
3800	0.020	0.005	0.005	0.000	0.010	1.000	0.040
3700	0.020	0.005	0.005	0.000	0.010	1.000	0.040
3600	0.020	0.005	0.005	0.000	0.010	1.000	0.040
3500	0.020	0.005	0.005	0.000	0.010	1.000	0.040
3400	0.020	0.005	0.005	0.000	0.010	1.000	0.040
3300	0.020	0.005	0.005	0.000	0.010	1.000	0.040
3200	0.020	0.005	0.005	0.000	0.010	1.000	0.040
3100	0.020	0.005	0.005	0.000	0.010	1.000	0.040
3000	0.020	0.005	0.005	0.000	0.010	1.000	0.040
2900	0.020	0.005	0.005	0.000	0.010	1.000	0.040
2800	0.020	0.005	0.005	0.000	0.010	1.000	0.040
2700	0.020	0.005	0.005	0.000	0.010	1.000	0.040
2600	0.020	0.005	0.005	0.000	0.010	1.000	0.040
2500	0.020	0.005	0.005	0.000	0.010	1.000	0.040
2400	0.020	0.005	0.005	0.000	0.010	1.000	0.040
2300	0.020	0.005	0.005	0.000	0.010	1.000	0.040
2200	0.020	0.005	0.005	0.000	0.010	1.000	0.040
2100	0.020	0.005	0.005	0.000	0.010	1.000	0.040
2000	0.015	0.000	0.000	0.000	0.000	1.000	0.015
1900	0.015	0.000	0.000	0.000	0.000	1.000	0.015
1800	0.020	0.005	0.005	0.000	0.010	1.000	0.040
1750	0.020	0.005	0.005	0.000	0.010	1.000	0.040
1700	0.020	0.005	0.005	0.000	0.010	1.000	0.040
1650	0.020	0.005	0.005	0.000	0.010	1.000	0.040
1600	0.020	0.005	0.005	0.000	0.010	1.000	0.040
1500	0.020	0.005	0.005	0.000	0.010	1.000	0.040
1400	0.020	0.005	0.005	0.000	0.010	1.000	0.040
1300	0.020	0.005	0.005	0.000	0.010	1.000	0.040
1200	0.020	0.005	0.005	0.000	0.010	1.000	0.040
1100	0.020	0.005	0.005	0.000	0.010	1.000	0.040
1000	0.020	0.005	0.005	0.000	0.010	1.000	0.040
900	0.020	0.005	0.005	0.000	0.010	1.000	0.040
800	0.020	0.005	0.005	0.000	0.010	1.000	0.040
700	0.020	0.005	0.005	0.000	0.010	1.000	0.040
600	0.015	0.000	0.000	0.000	0.000	1.000	0.015
500	0.015	0.000	0.000	0.000	0.000	1.000	0.015
400	0.020	0.000	0.000	0.000	0.010	1.000	0.030
300	0.020	0.000	0.000	0.000	0.010	1.000	0.030
200	0.020	0.000	0.000	0.000	0.010	1.000	0.030

REFERENCED FROM "OPEN-CHANNEL HYDRAULICS", VEN TE CHOW, McGRAW-HILL, INC., 1959. SEE VOLUME III, SECTION 5.3.

n0 = MATERIAL
n1 = IRREGULARITY
n2 = CROSS SECTION VARIATIONS
n3 = OBSTRUCTIONS
n4 = VEGETATION
m5 = MEANDERING



NOTE: NOT TO SCALE
LOOKING UPSTREAM

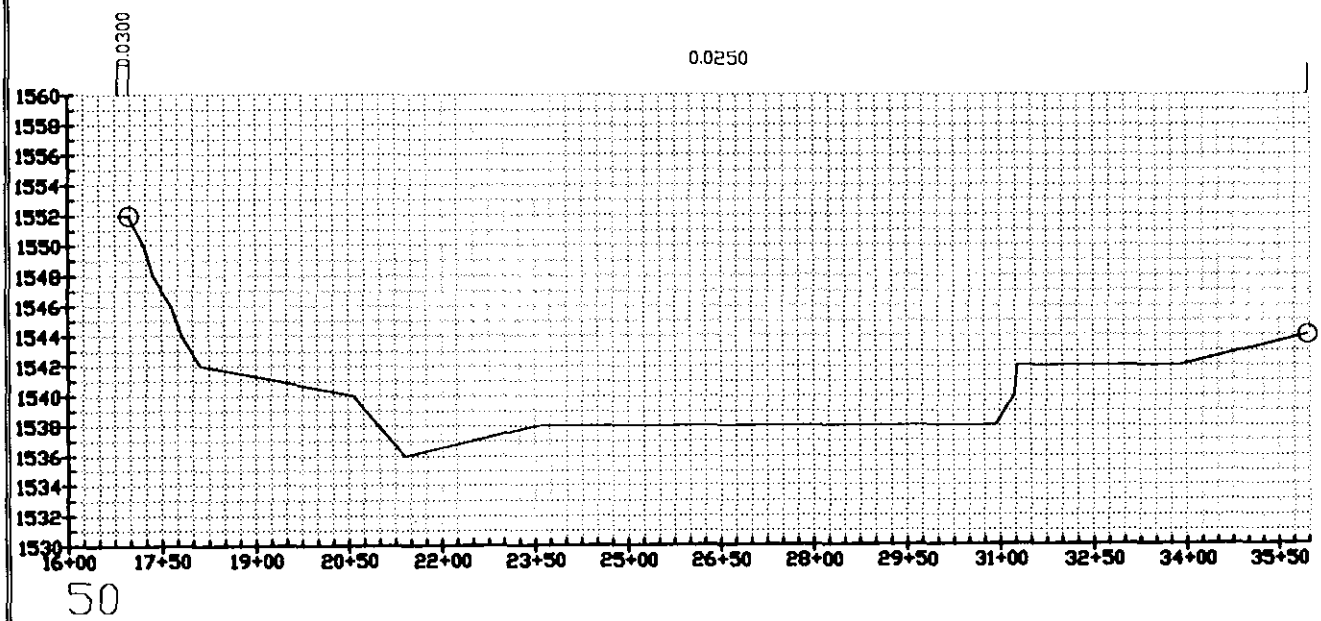
ABBOTT AND PULSIPHER WASHES

FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 25

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 550.035 PLOTTED: 10/15/98



50

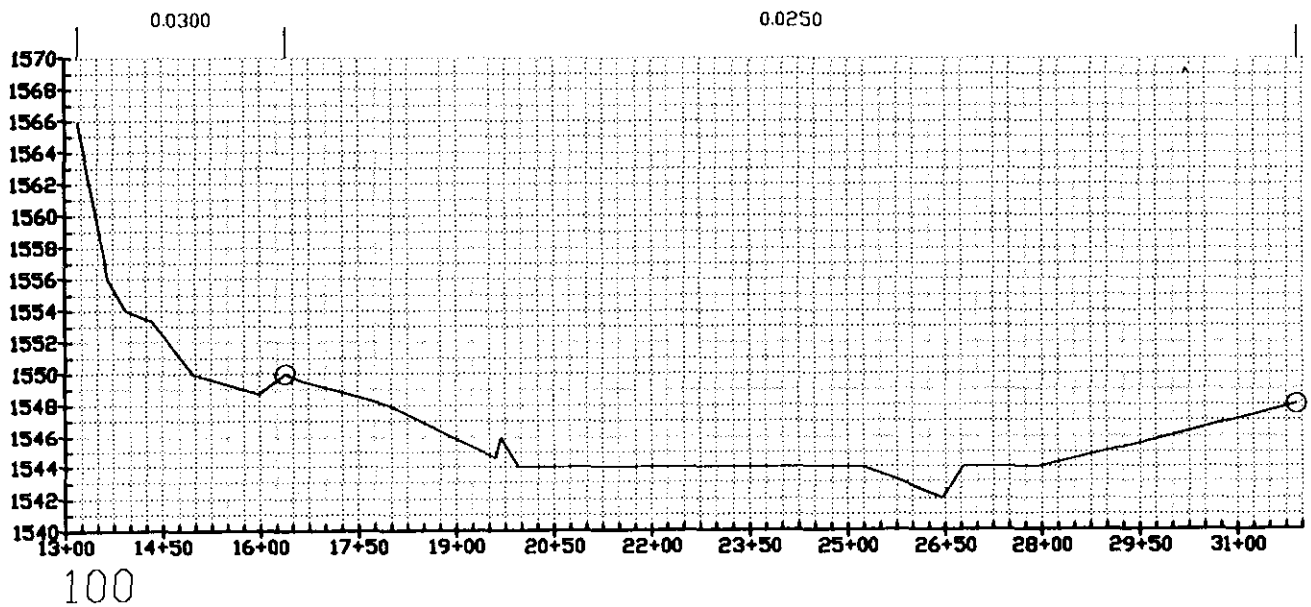
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 50

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 550.035 PLOTTED: 10/15/98



100

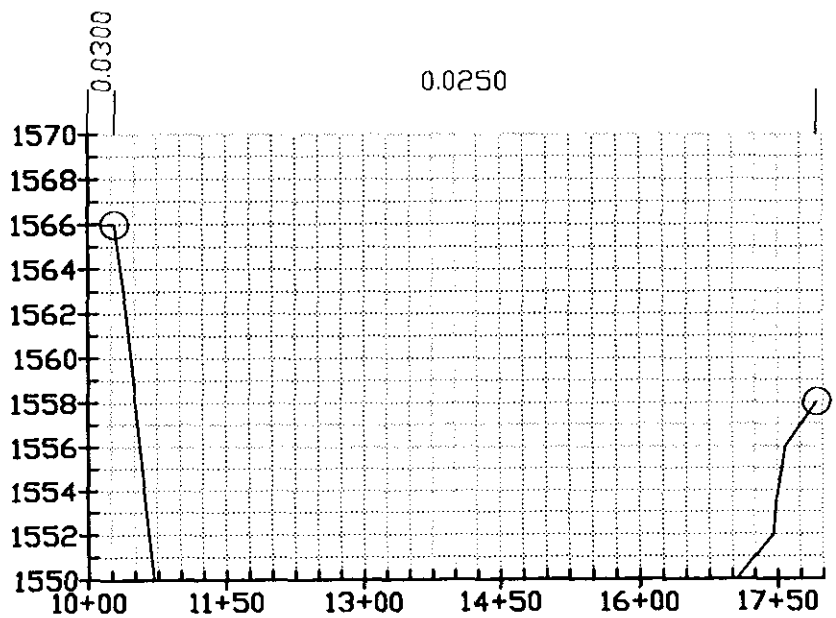
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 100

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 550.035 PLOTTED: 10/15/98



150

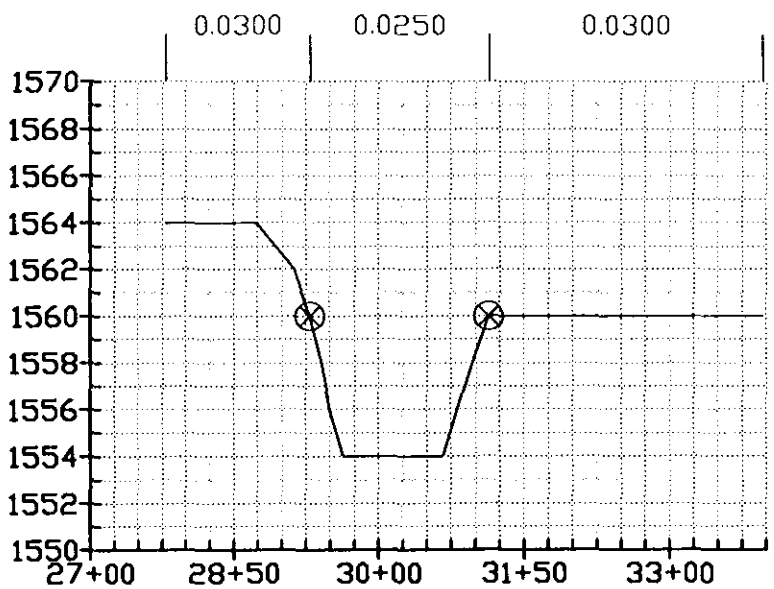
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 150

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 550.035 PLOTTED: 10/15/98



200

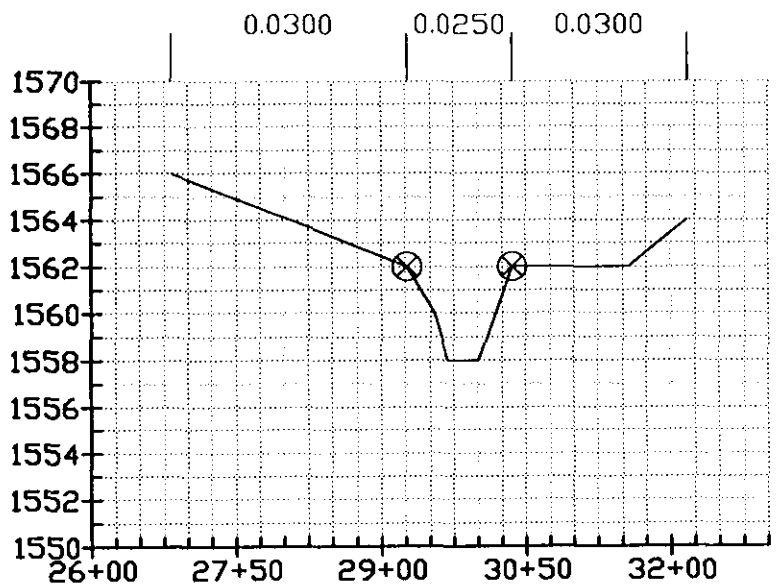
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 200

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 0.035 PLOTTED: 7/10/98



300

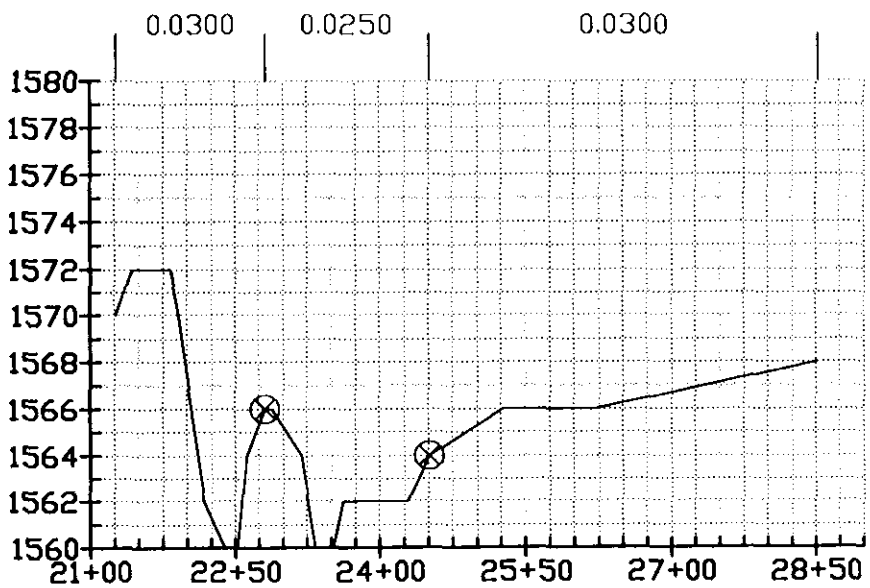
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 300

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 950.035 PLOTTED: 7/10/98



400

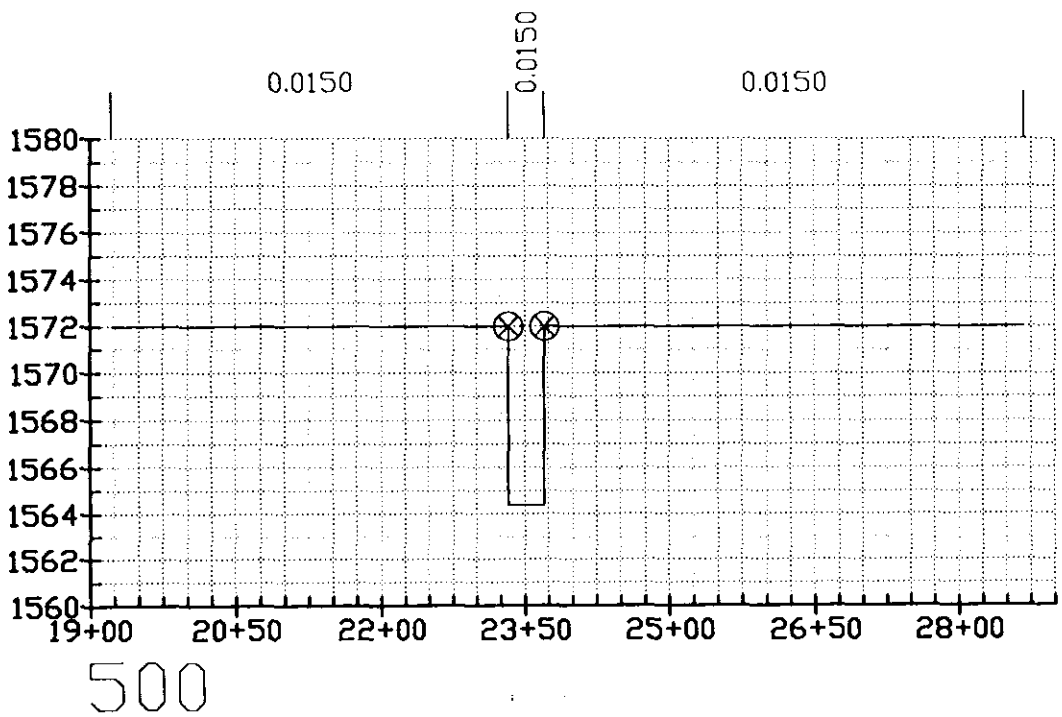
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 400

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD.,LAS VEGAS, NEVADA 89102

JOB NO. 30.035 PLOTTED: 7/10/98



500

NOTE: NOT TO SCALE
LOOKING UPSTREAM

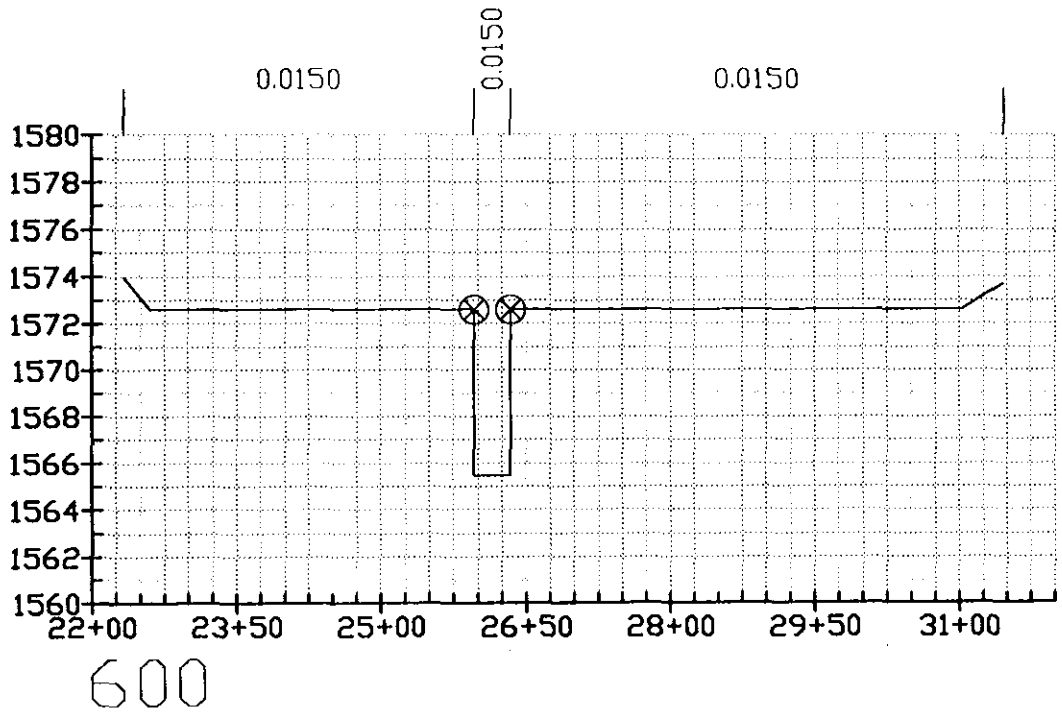
ABBOTT AND PULSIPHER WASHES

FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 500

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 0.035 PLOTTED: 7/10/98



600

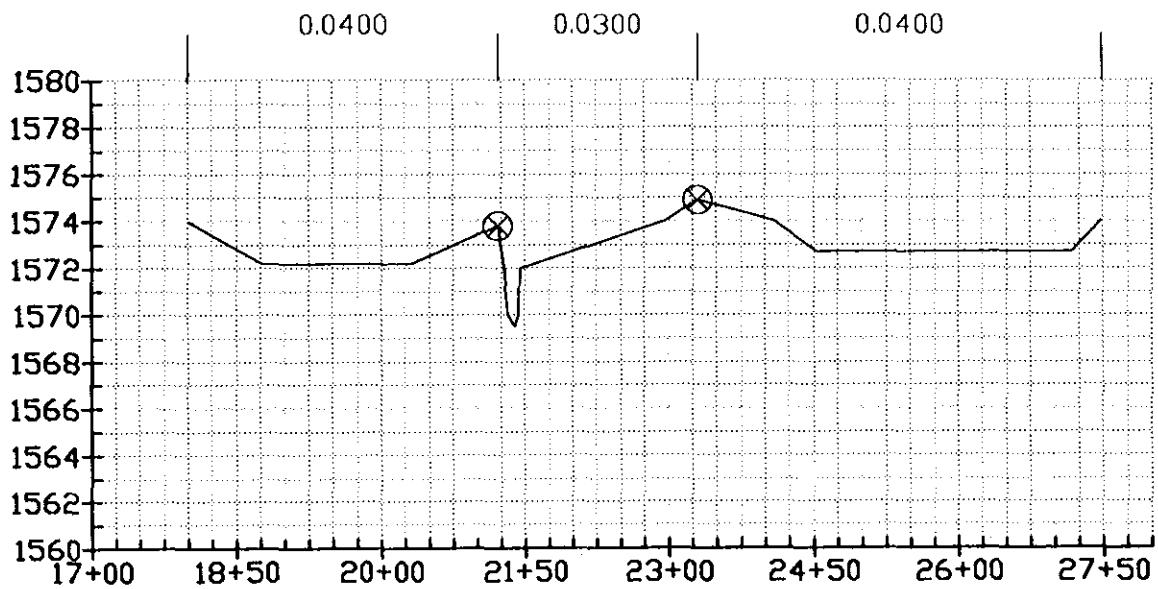
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 600

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 00.035 PLOTTED: 7/10/98



700

NOTE: NOT TO SCALE
LOOKING UPSTREAM

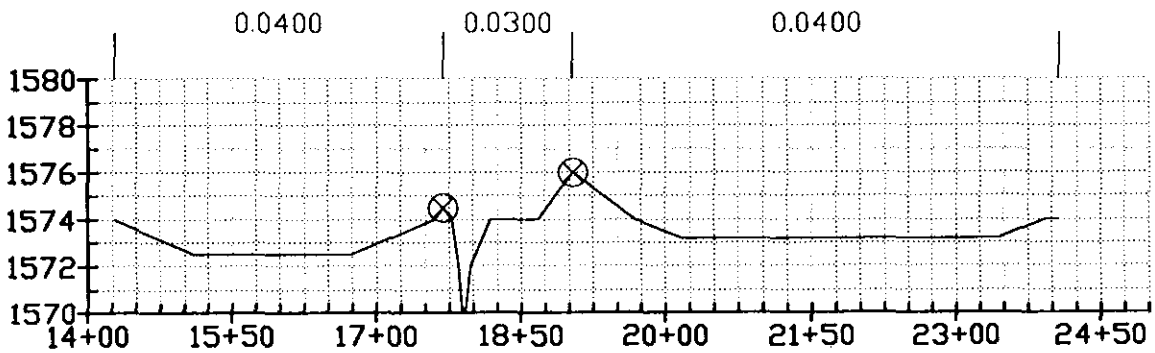
ABBOTT AND PULSIPHER WASHES

FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 700

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD, LAS VEGAS, NEVADA 89102

JOB NO. 30.035 PLOTTED: 7/10/98



800

NOTE: NOT TO SCALE
LOOKING UPSTREAM

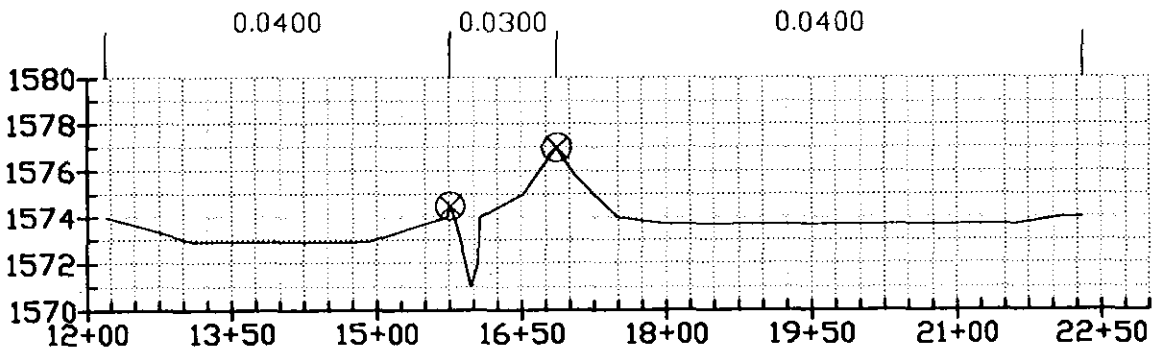
ABBOTT AND PULSIPHER WASHES

FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 800

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 0.035 PLOTTED: 7/10/98



900

NOTE: NOT TO SCALE
LOOKING UPSTREAM

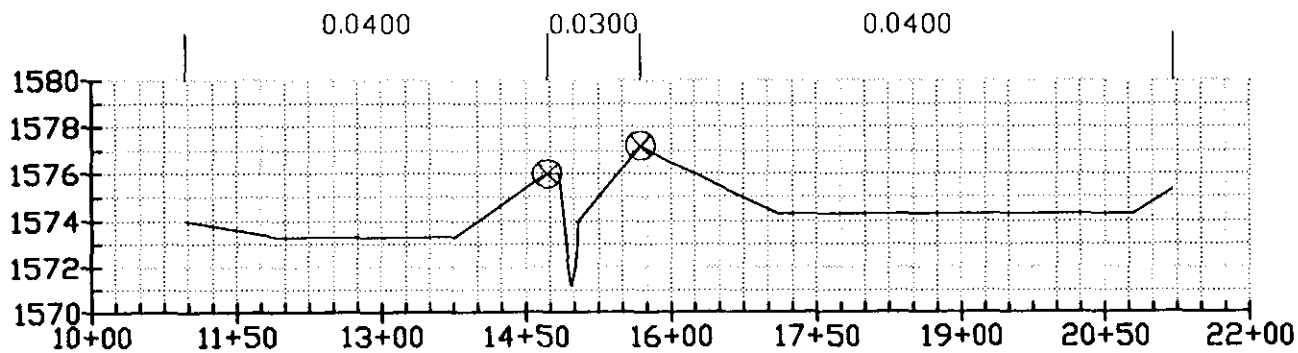
ABBOTT AND PULSIPHER WASHES

FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 900

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 00.035 PLOTTED: 7/10/98



1000

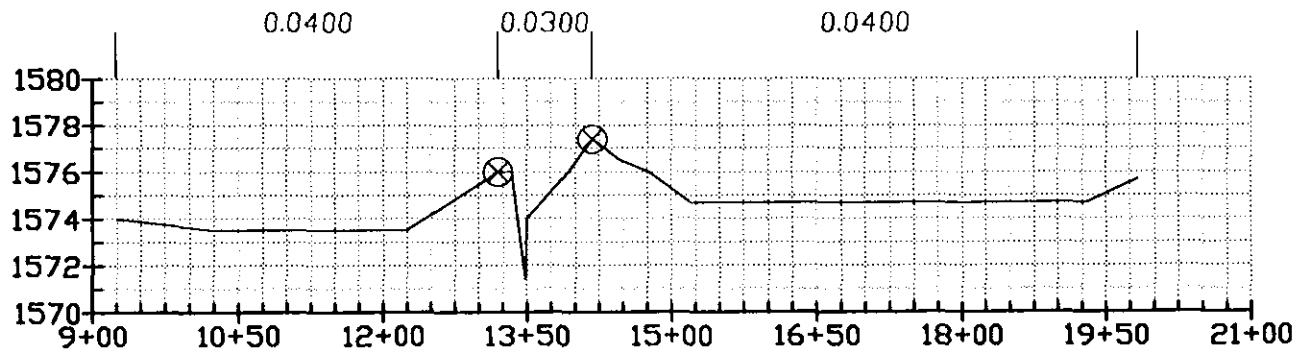
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LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 1000

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 0.035 PLOTTED: 7/10/98



1100

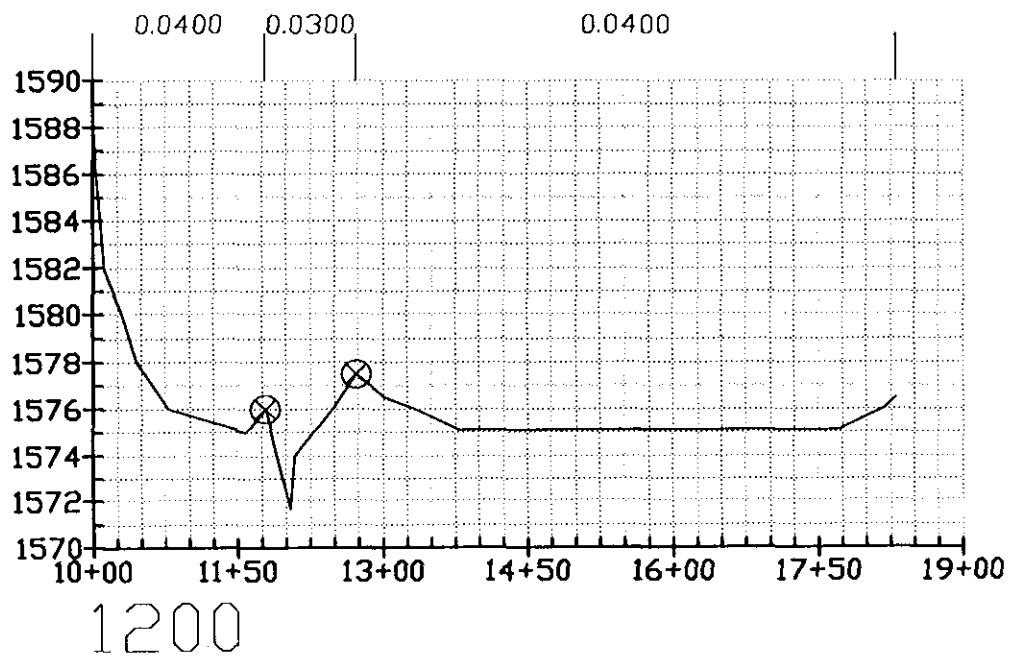
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ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 1100

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 0.035 PLOTTED: 7/10/98



1200

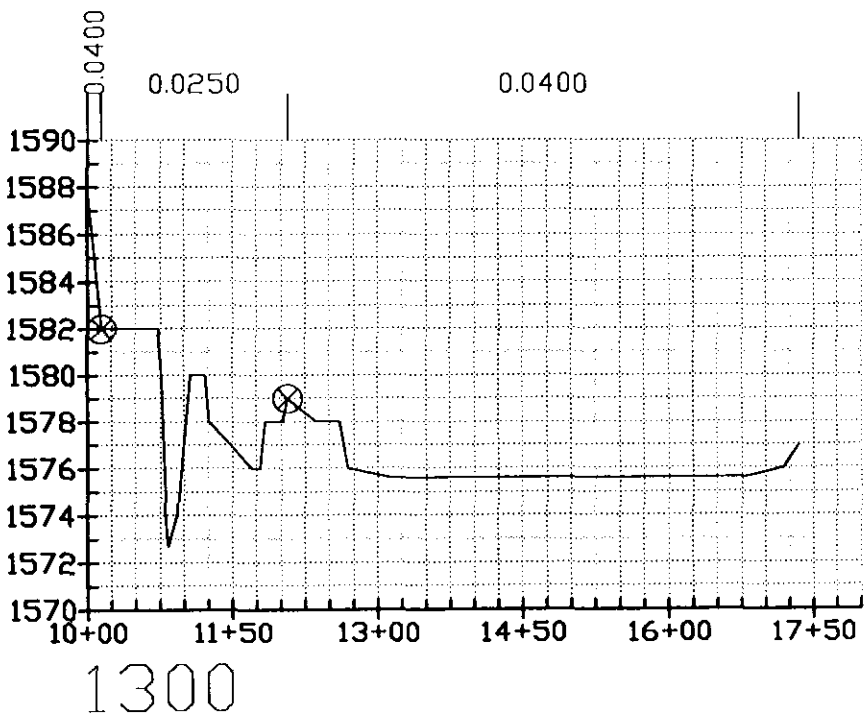
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 1200

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 0.035 PLOTTED: 7/10/98



1300

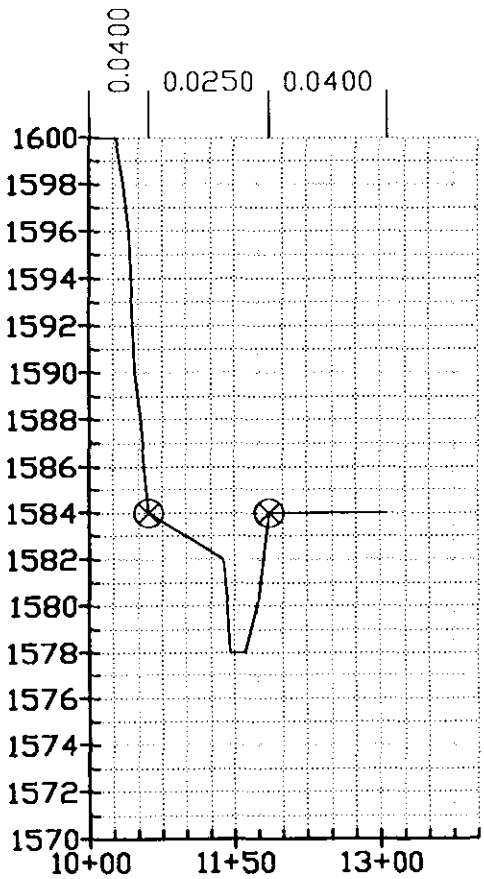
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 1300

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 530.035 PLOTTED: 7/10/98



1400

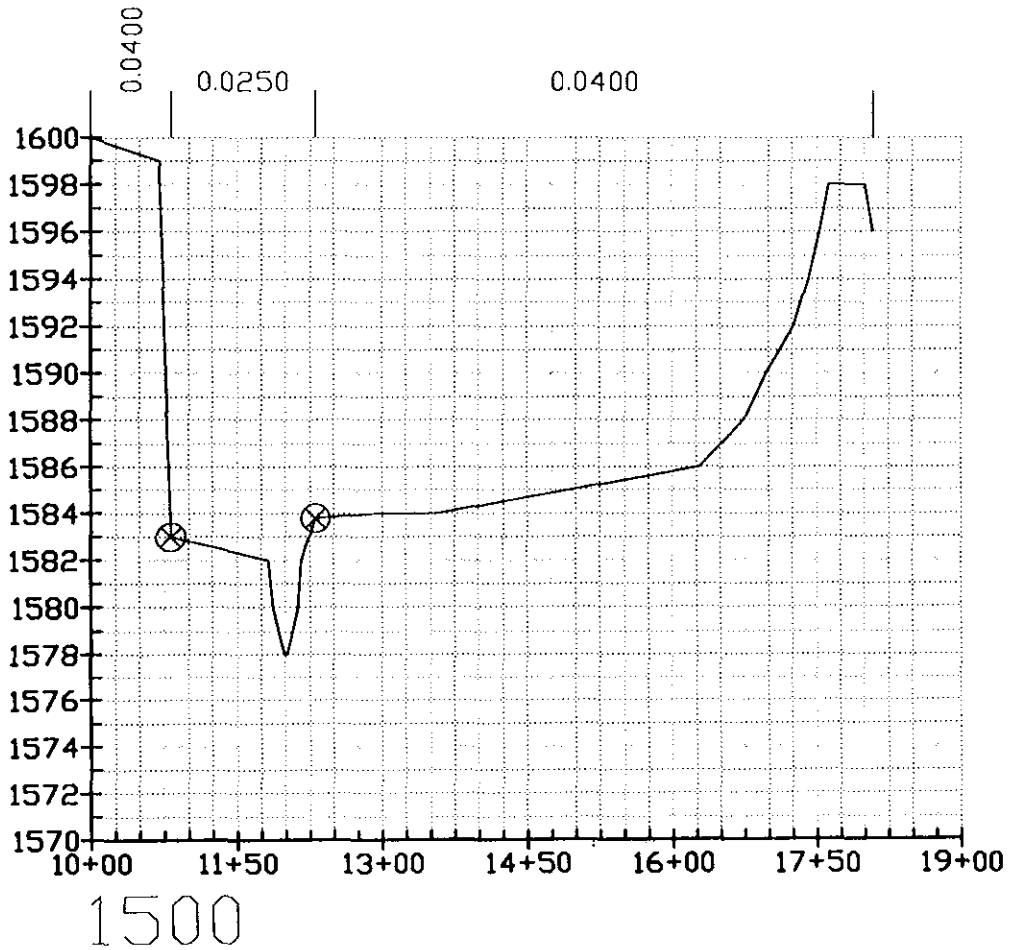
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 1400

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 0.035 PLOTTED: 7/10/98



1500

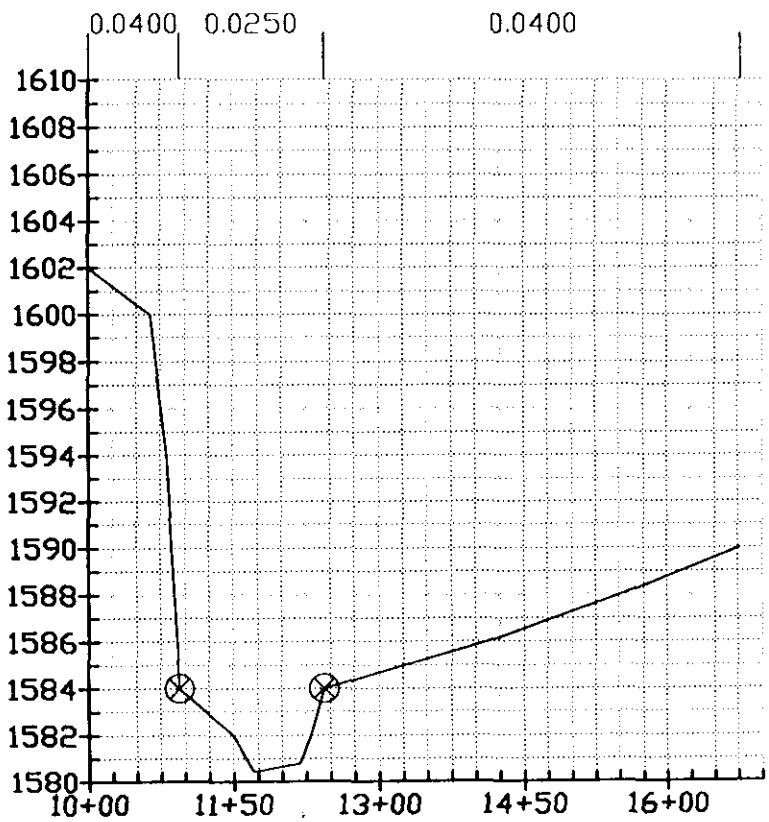
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 1500

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 0.035 PLOTTED: 7/10/98



1600

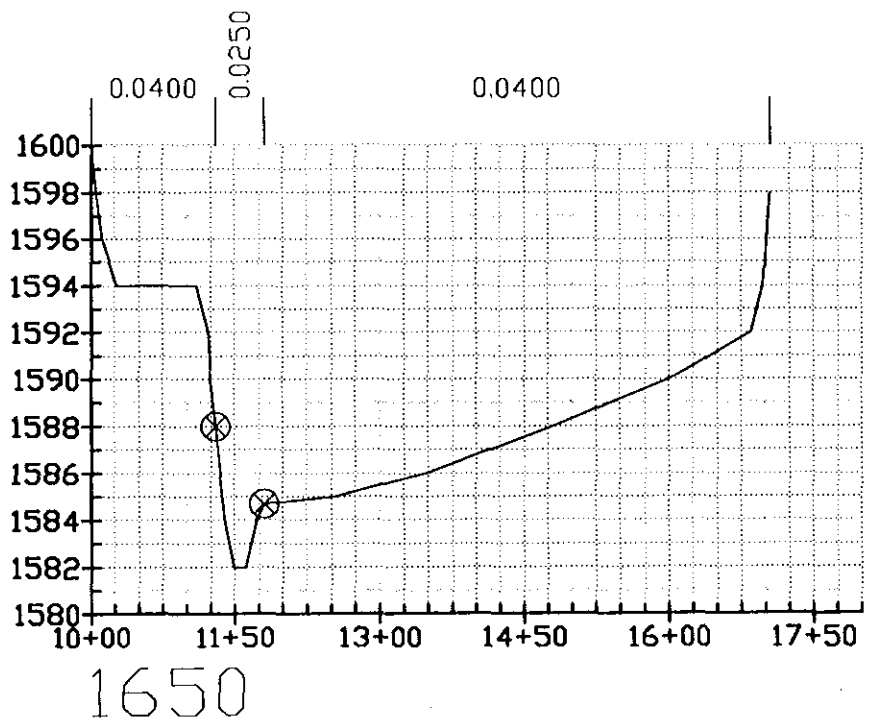
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 1600

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 0.035 PLOTTED: 7/10/98



1650

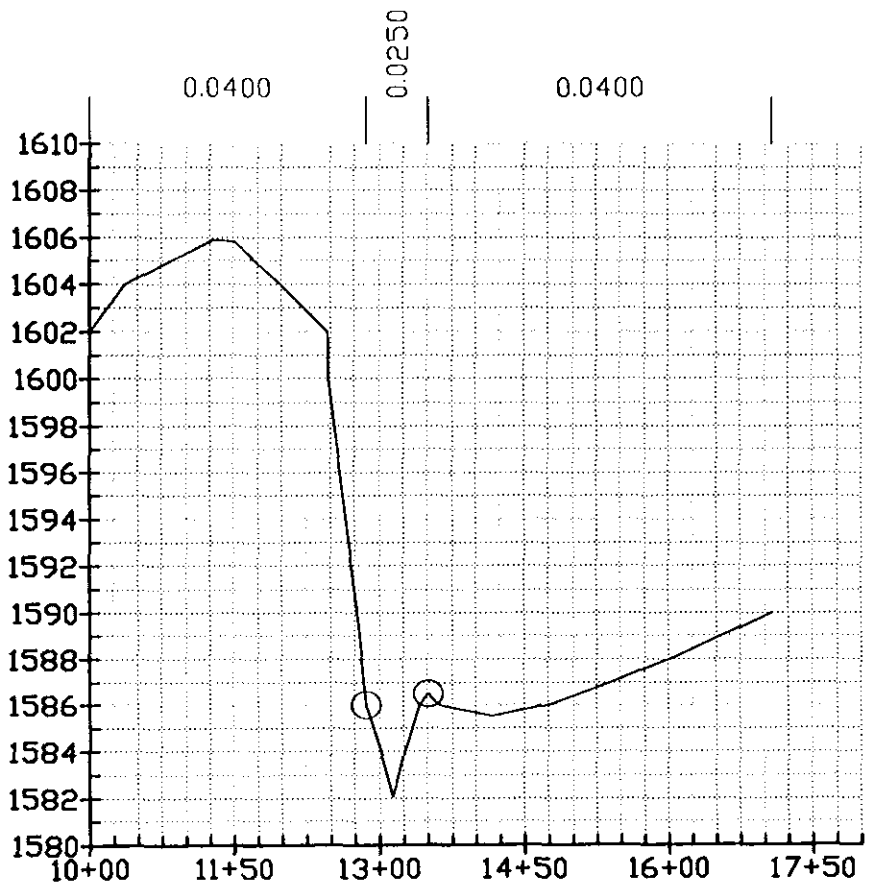
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 1650

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 0.035 PLOTTED: 7/10/98



1700

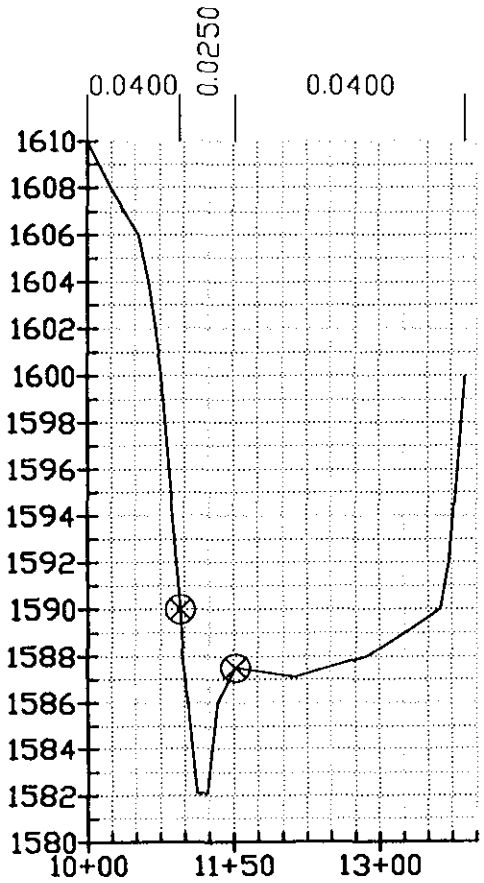
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 1700

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 0.035 PLOTTED: 7/10/98



1750

NOTE: NOT TO SCALE
LOOKING UPSTREAM

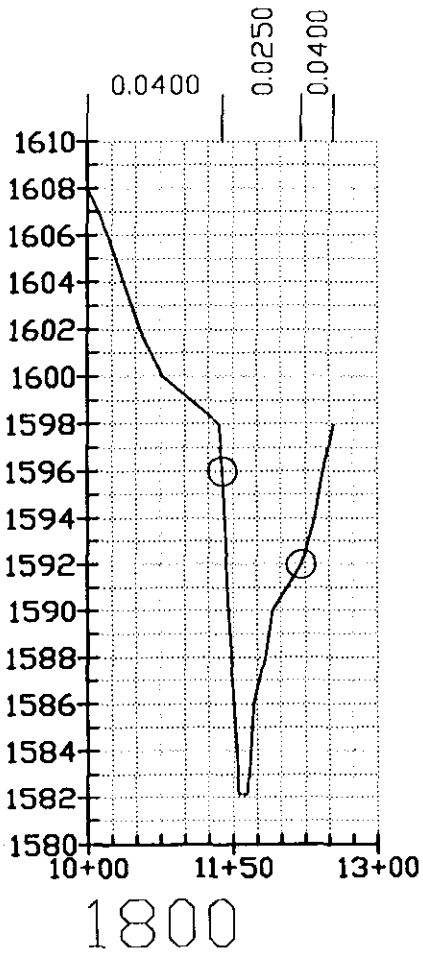
ABBOTT AND PULSIPHER WASHES

FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 1750

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 930.035 PLOTTED: 7/10/98



1800

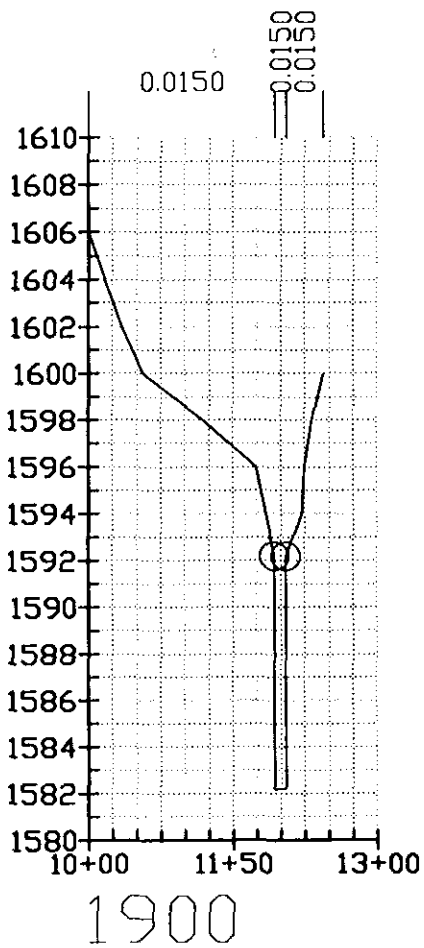
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 1800

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 30.035 PLOTTED: 7/10/98



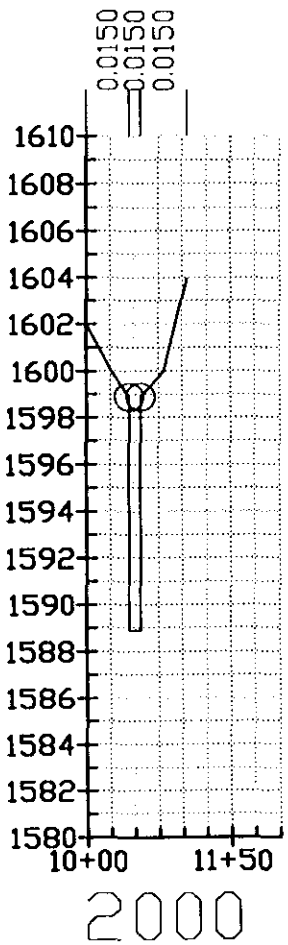
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 1900

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 0.035 PLOTTED: 7/10/98



NOTE: NOT TO SCALE
LOOKING UPSTREAM

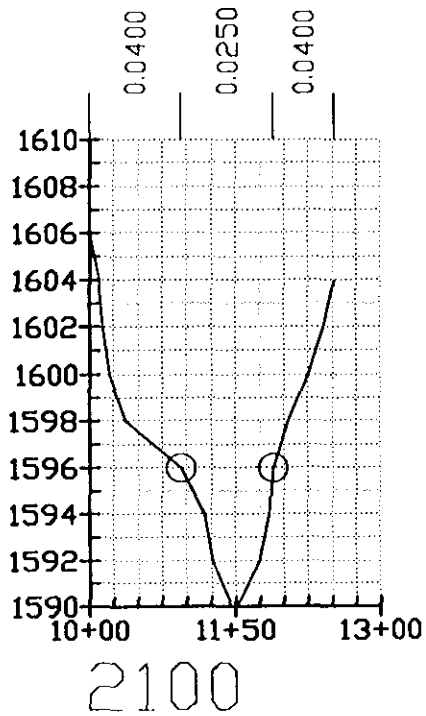
ABBOTT AND PULSIPHER WASHES

FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 2000

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



2100

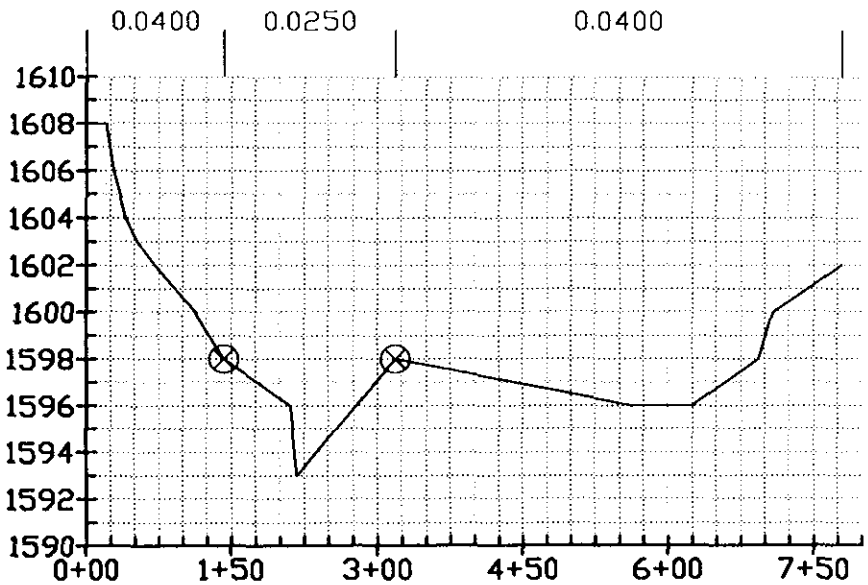
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 2100

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



2200

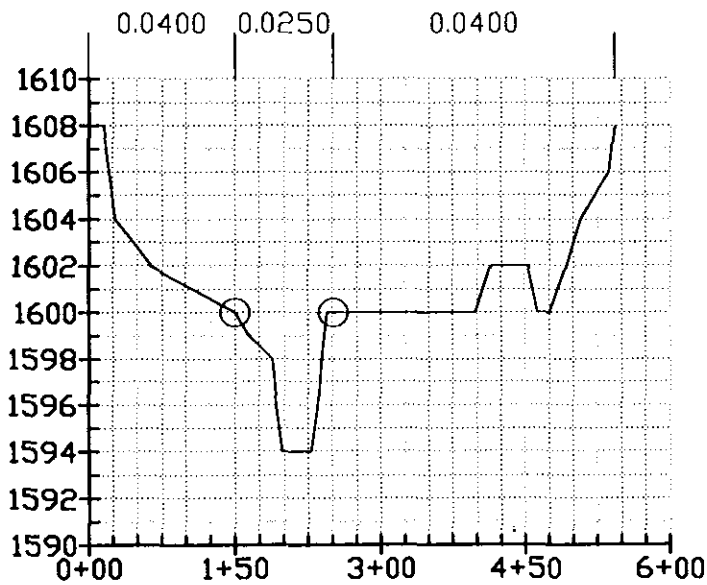
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 2200

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



2300

NOTE: NOT TO SCALE
LOOKING UPSTREAM

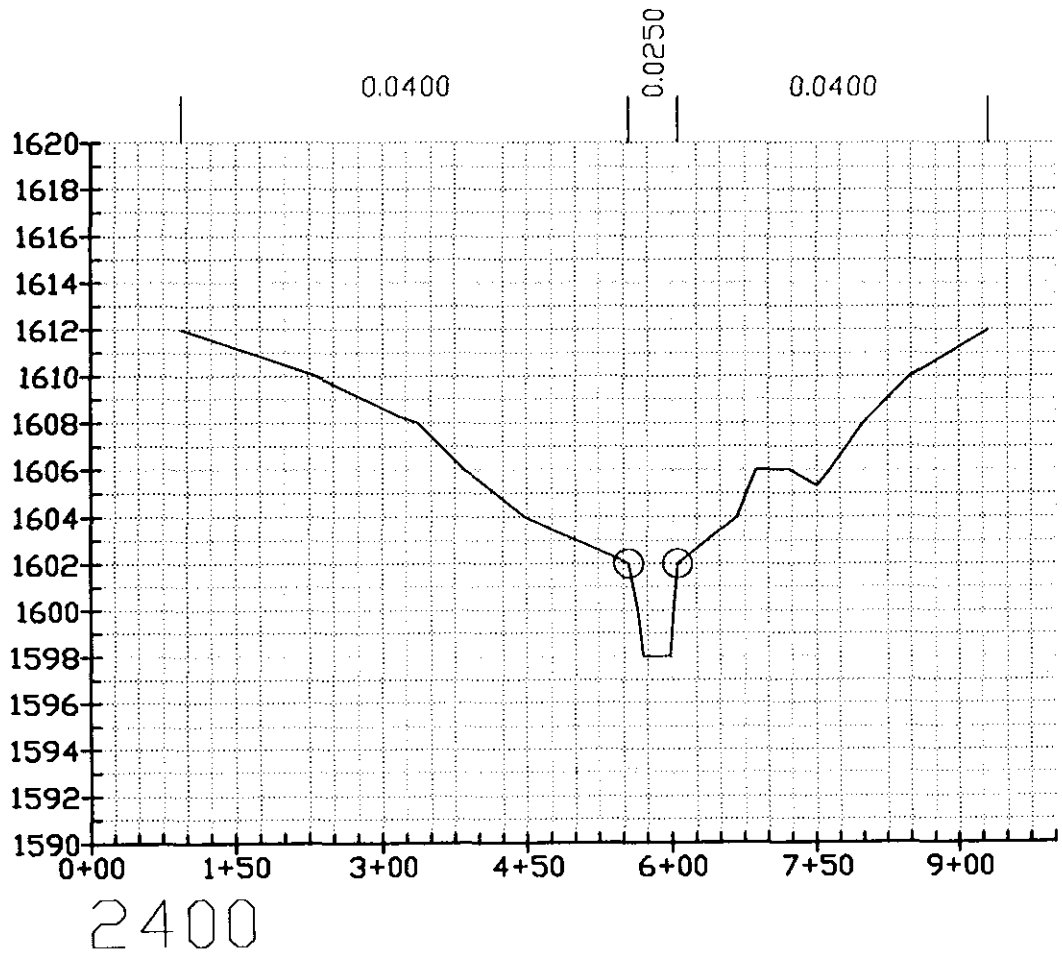
ABBOTT AND PULSIPHER WASHES

FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 2300

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD, LAS VEGAS, NEVADA 89102

JOB NO. 00.035 PLOTTED: 7/10/98



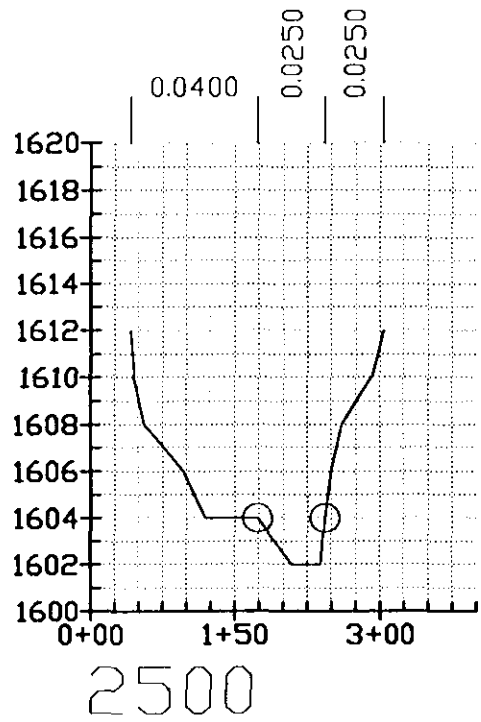
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 2400

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 2500

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



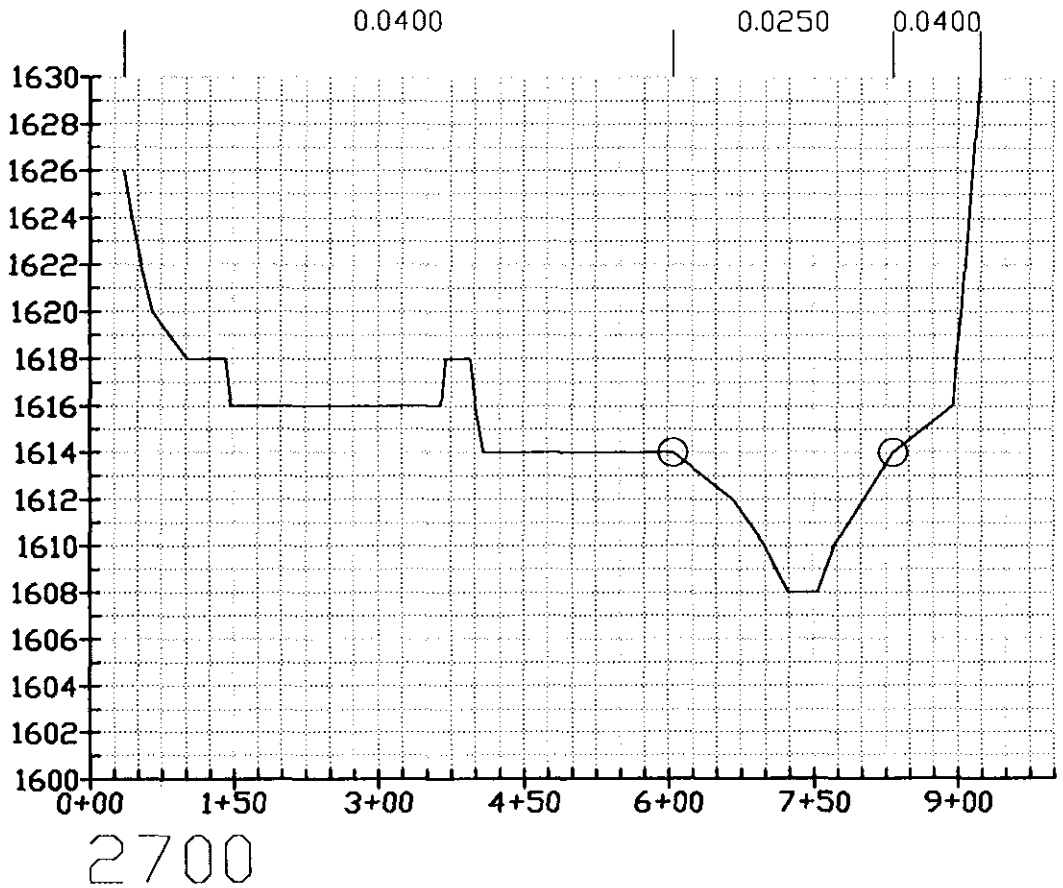
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 2600

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 950.035 PLOTTED: 7/10/98



2700

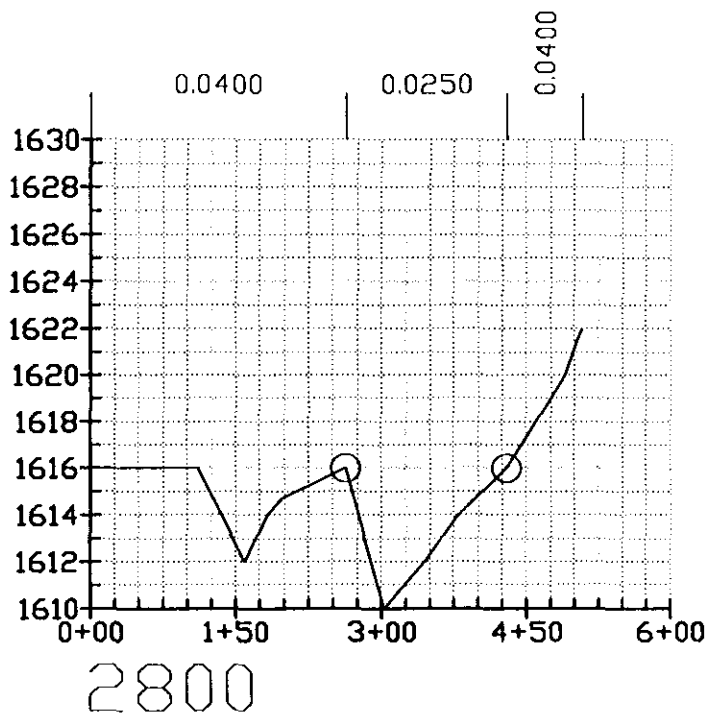
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 2700

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTED: 7/10/98



2800

NOTE: NOT TO SCALE
LOOKING UPSTREAM

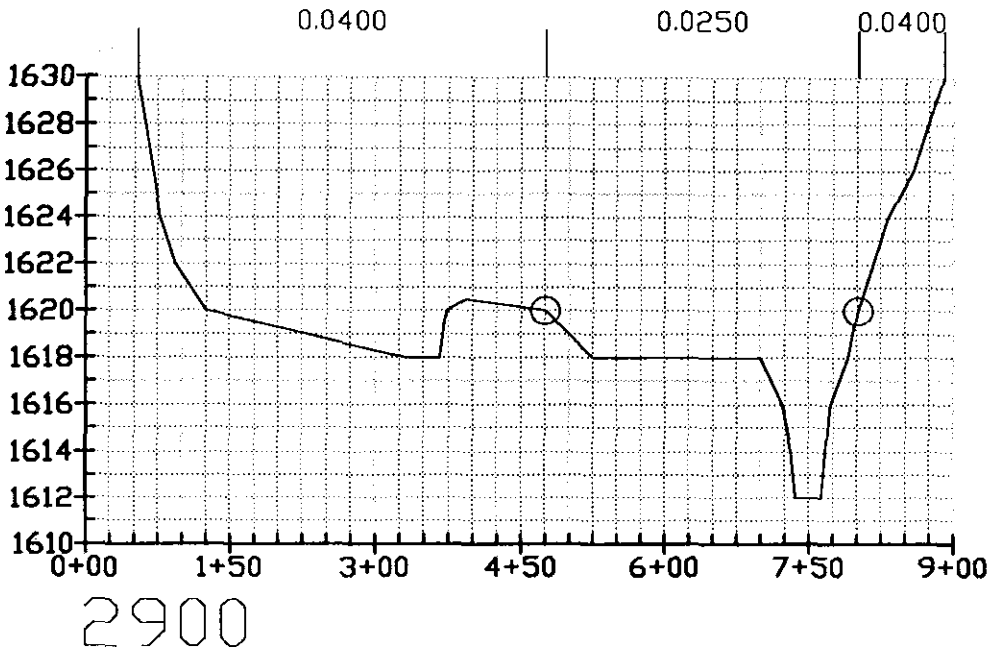
ABBOTT AND PULSIPHER WASHES

FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 2800

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 950.035 PLOTTED: 7/10/98



2900

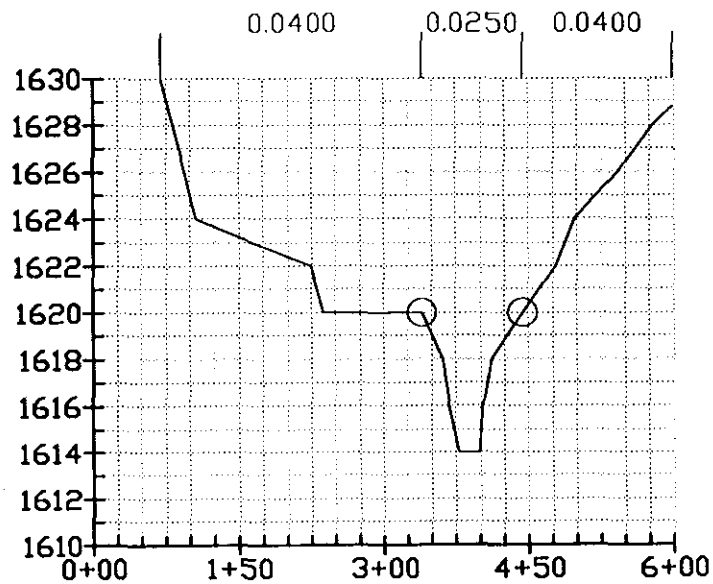
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 2900

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



3000

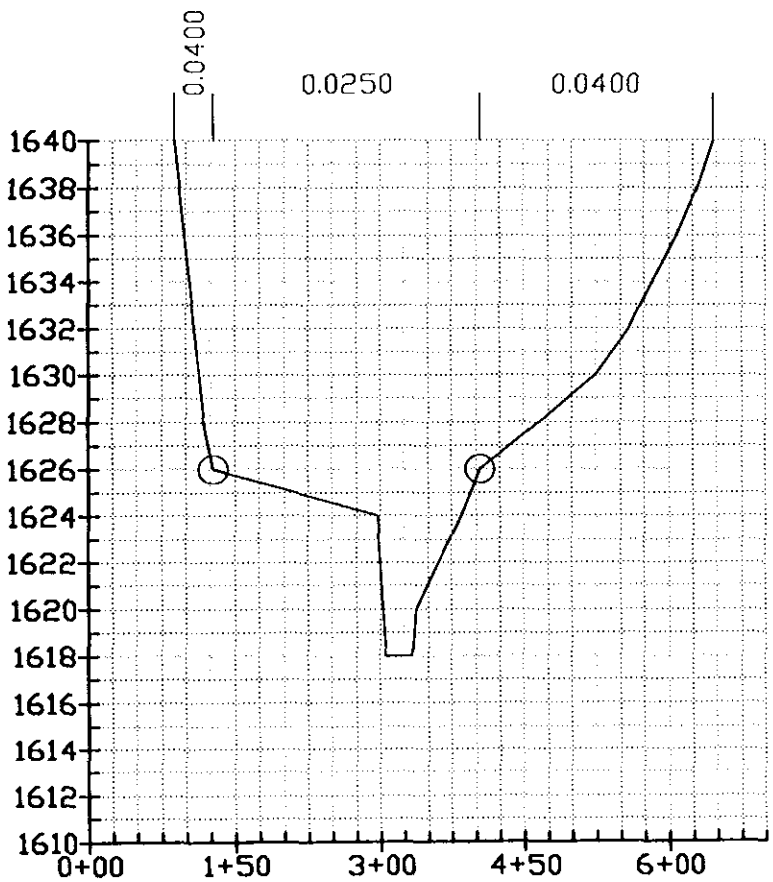
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 3000

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 0.035 PLOTTED: 7/10/98



3100

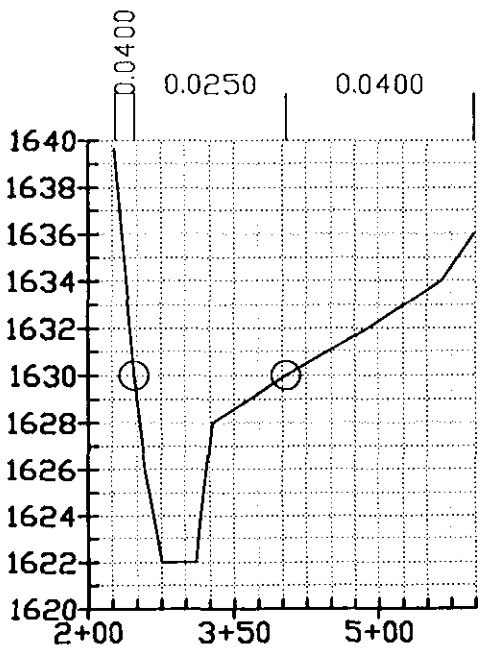
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 3100

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 30.035 PLOTTED: 7/10/98



3200

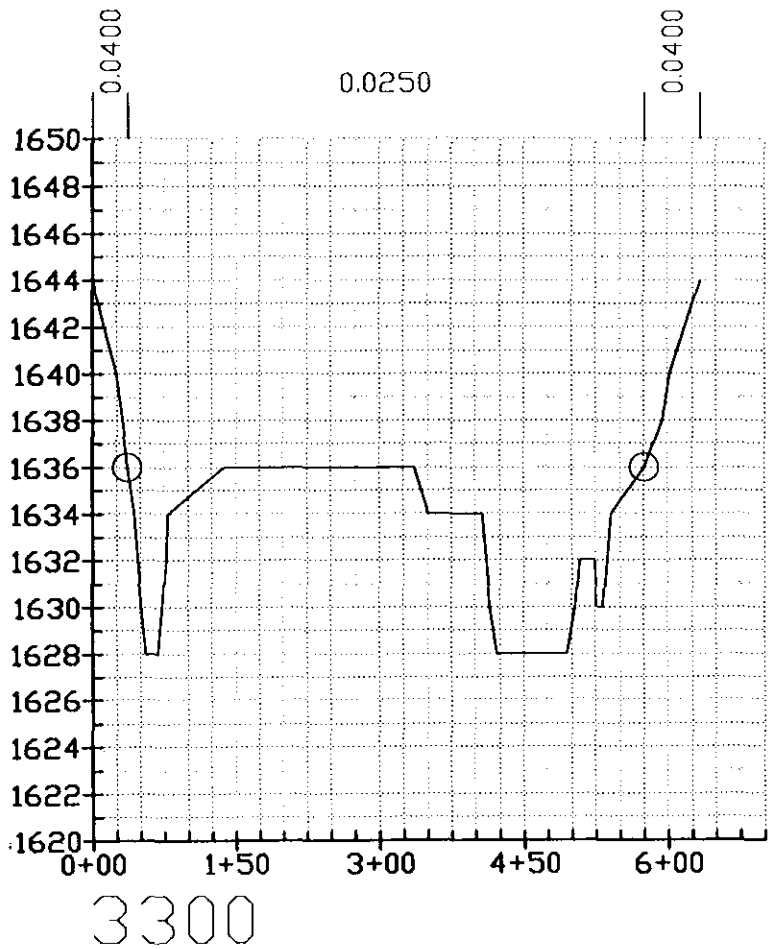
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 3200

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 30.035 PLOTTED: 7/10/98



3300

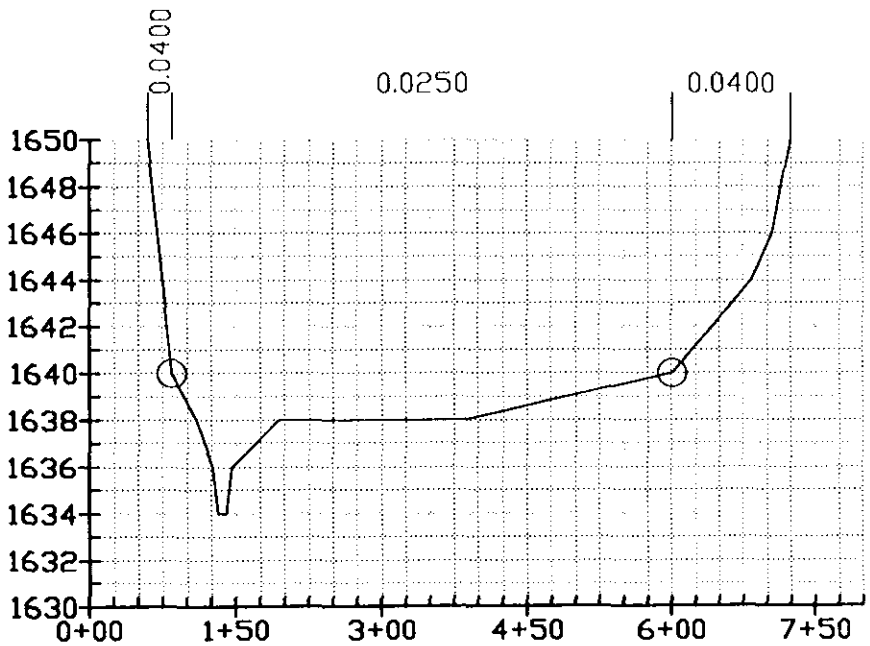
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 3300

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD.,LAS VEGAS, NEVADA 89102

JOB NO. 30.035 PLOTTED: 7/16/98



3400

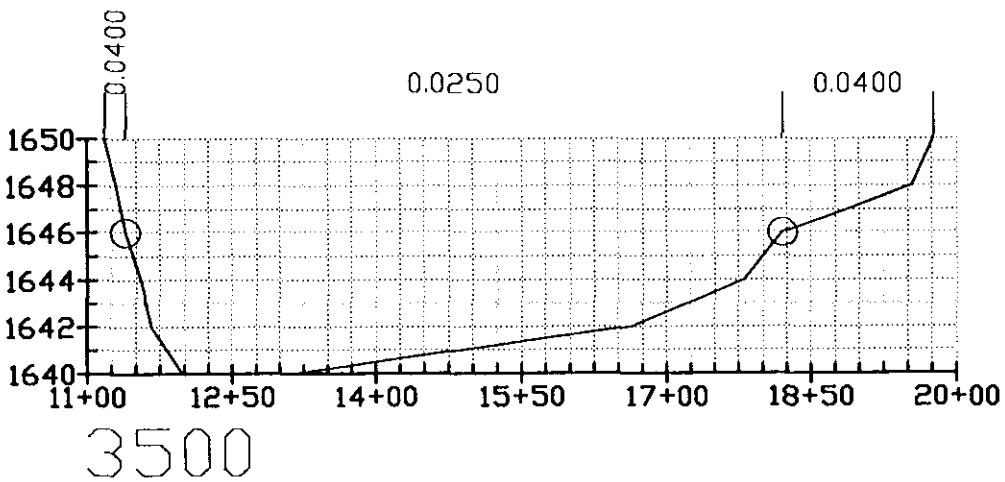
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 3400

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 0.035 PLOTTED: 7/10/98



3500

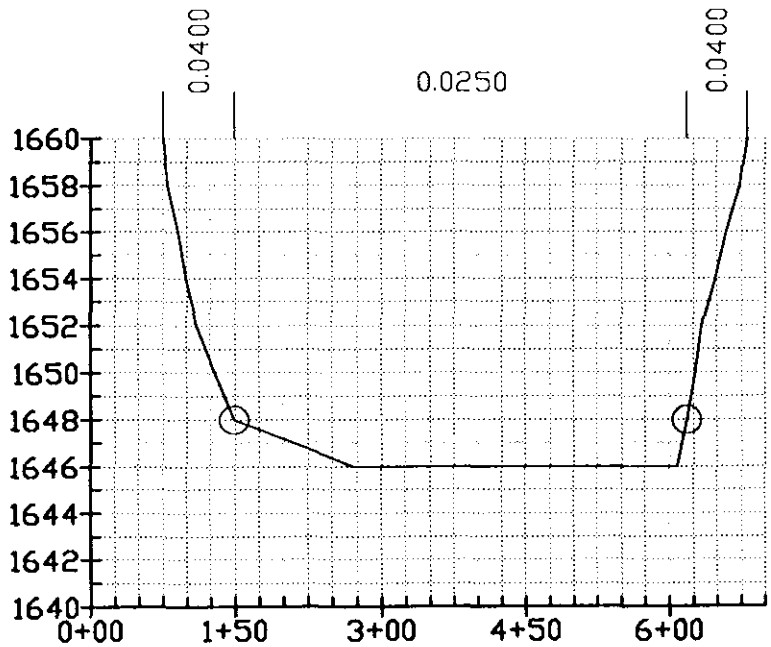
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 3500

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 90.035 PLOTTED: 7/10/98



3600

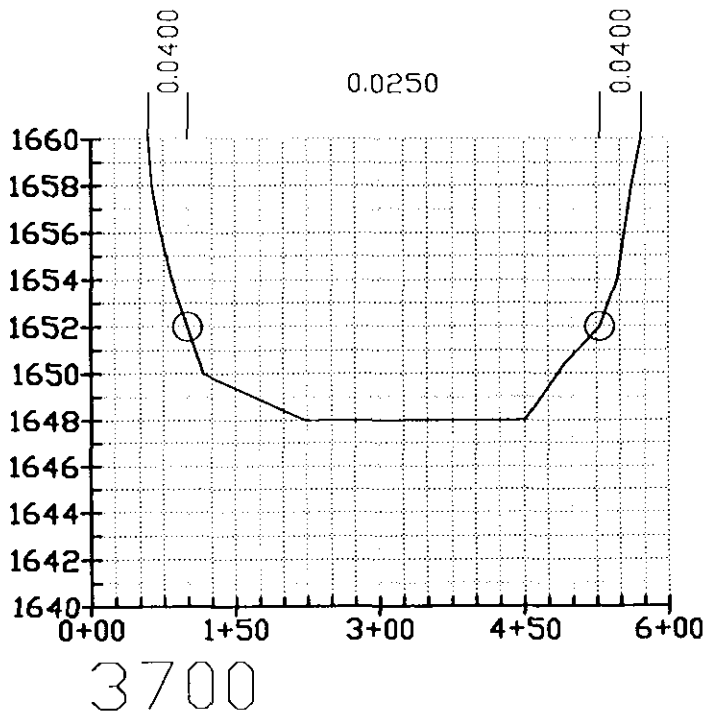
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 3600

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 0.035 PLOTTED: 7/10/98



3700

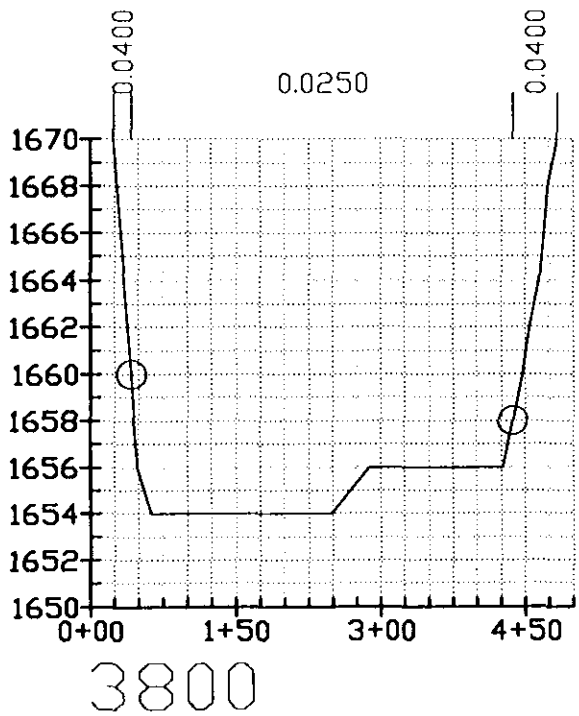
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 3700

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 0.035 PLOTTED: 7/10/98



NOTE: NOT TO SCALE
LOOKING UPSTREAM

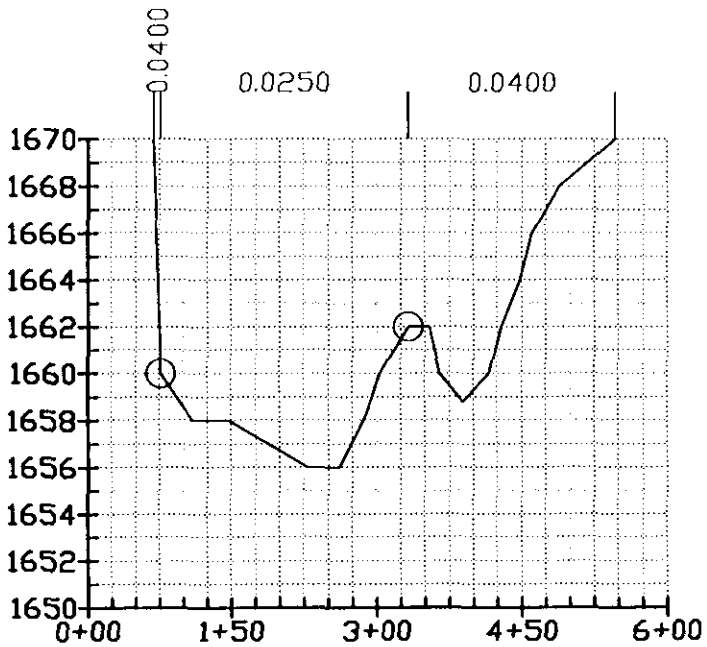
ABBOTT AND PULSIPHER WASHES

FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 3800

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD.,LAS VEGAS, NEVADA 89102

JOB NO. 930.035 PLOTTED: 7/10/98



3900

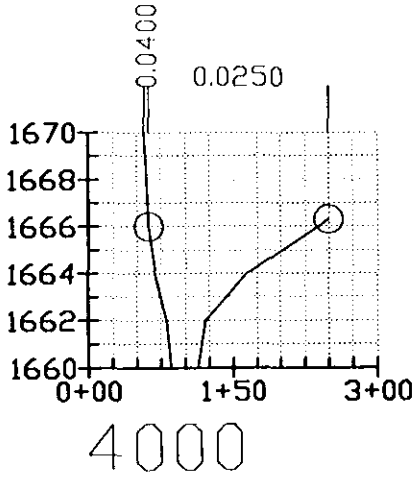
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 3900

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 30.035 PLOTTED: 7/10/98



4000

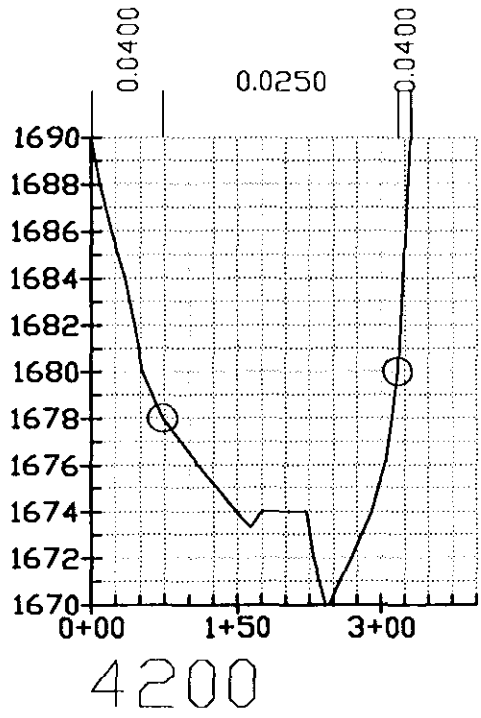
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 4000

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD, LAS VEGAS, NEVADA 89102

JOB NO. 350.035 PLOTTED: 7/10/98



4200

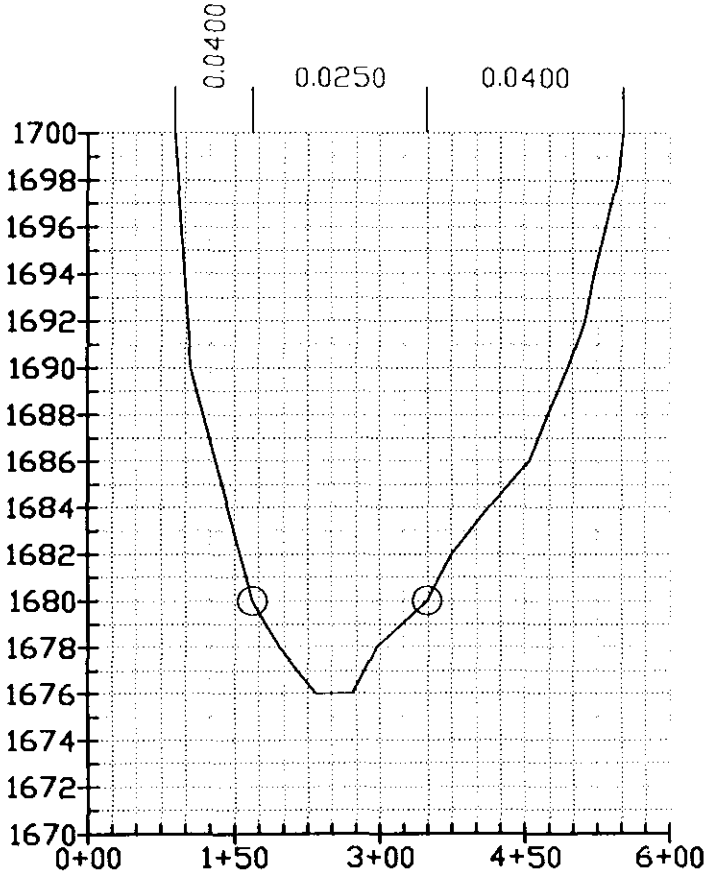
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 4200

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 350.035 PLOTTED: 7/10/98



4300

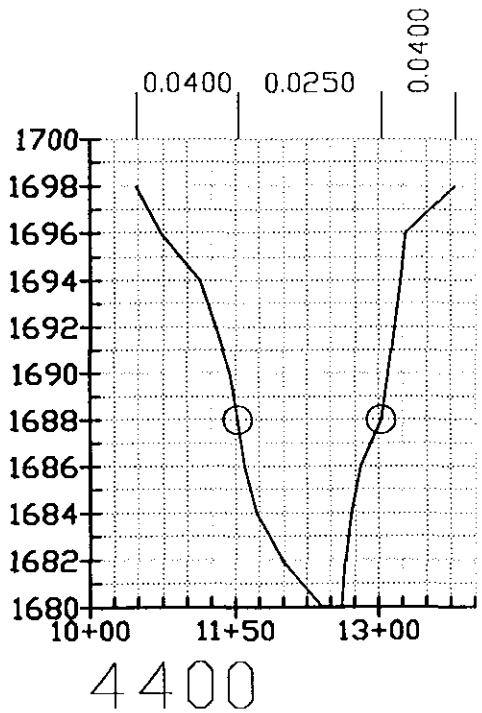
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 4300

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 0.035 PLOTTED: 7/10/98



4400

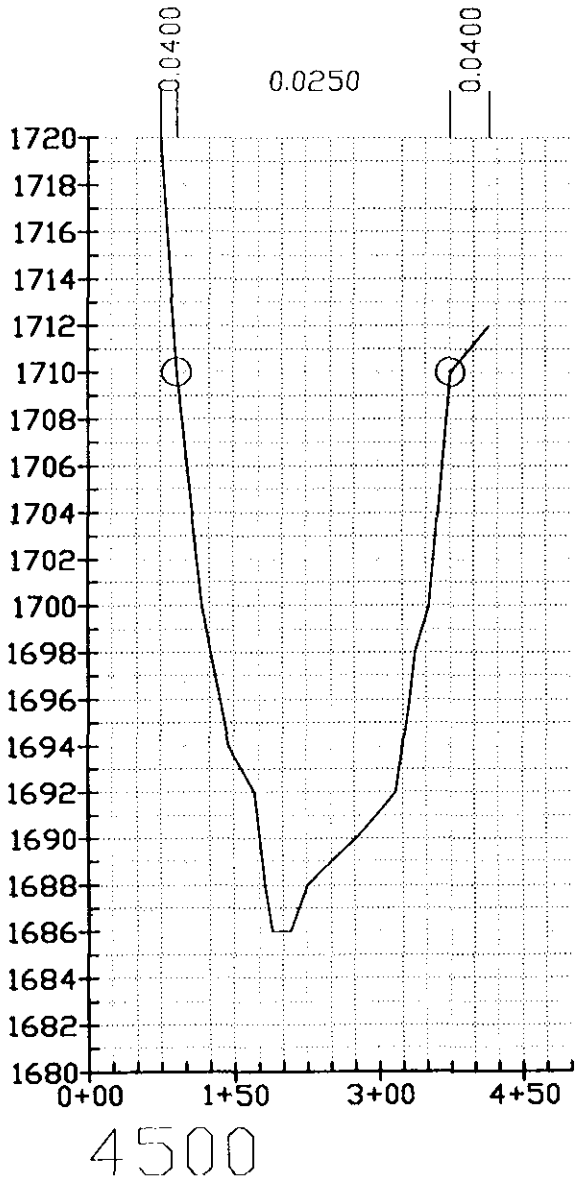
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 4400

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



4500

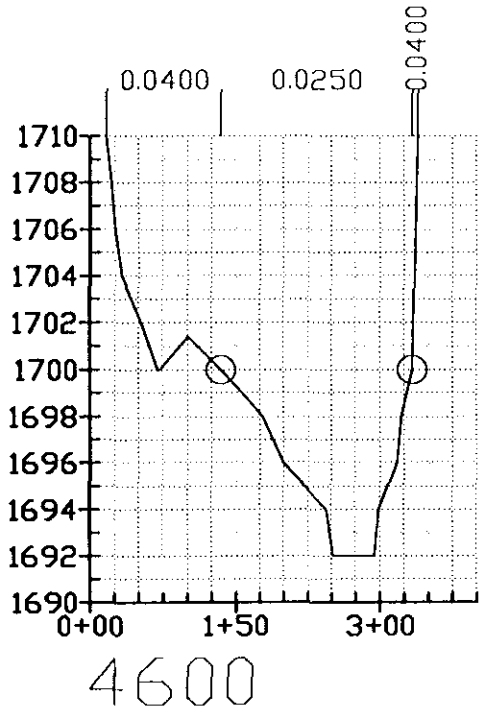
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 4500

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 950.035 PLOTTED: 7/10/98



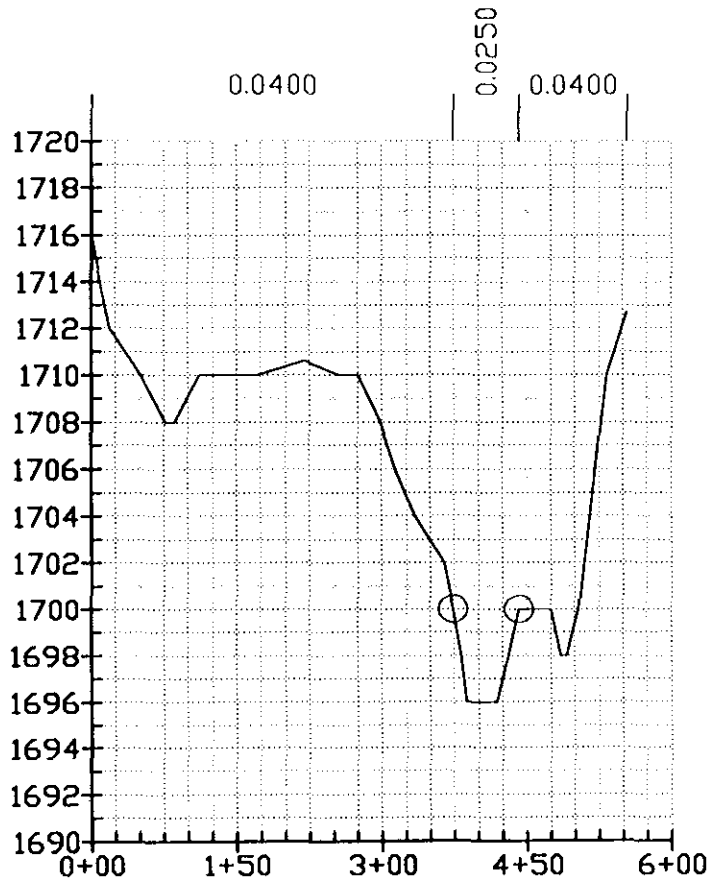
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 4600

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 950.035 PLOTTED: 7/10/98



4700

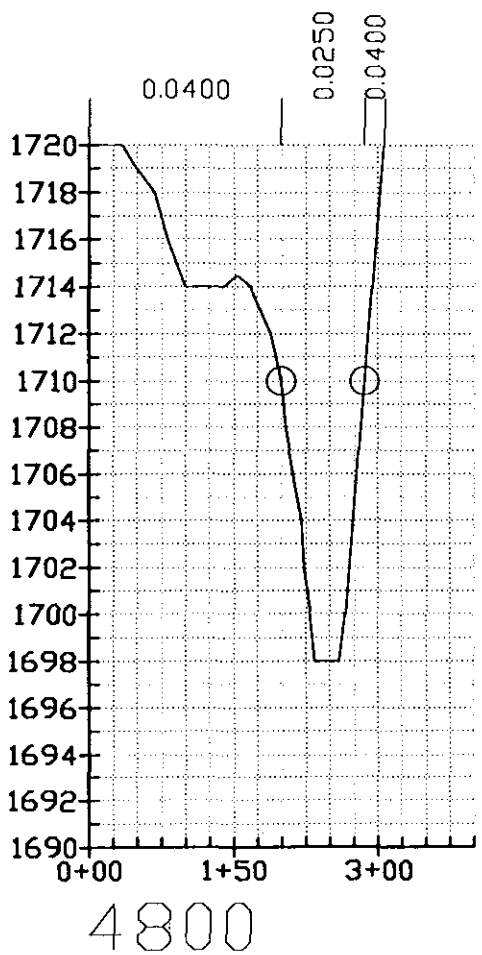
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 4700

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 350.035 PLOTTED: 7/10/98



4800

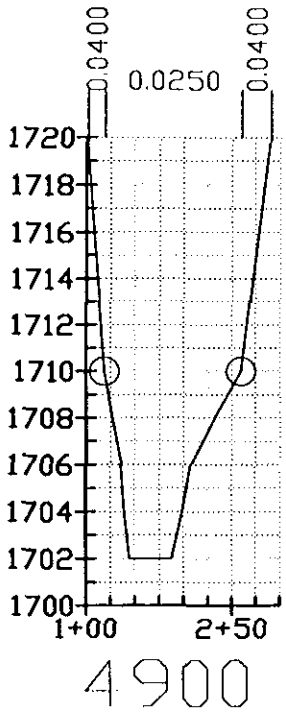
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 4800

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 7/10/98



NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
MAIN CHANNEL MODEL
CROSS SECTION 4900

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 950.035 PLOTED: 7/10/98

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH - *RIGHT OVERBANK MODEL*
FROM SECTION 1400 TO SECTION 600
MANNINGS "n" CALCULATIONS - CHANNEL

SECTION	n0	n1	n2	n3	n4	m5	n
1400	0.020	0.005	0.005	0.000	0.010	1.000	0.040
1300	0.020	0.005	0.005	0.000	0.010	1.000	0.040
1200	0.020	0.005	0.005	0.000	0.010	1.000	0.040
1100	0.020	0.005	0.005	0.000	0.010	1.000	0.040
1000	0.020	0.005	0.005	0.000	0.010	1.000	0.040
900	0.020	0.005	0.005	0.000	0.010	1.000	0.040
800	0.020	0.005	0.005	0.000	0.010	1.000	0.040
700	0.020	0.005	0.005	0.000	0.010	1.000	0.040
600	0.020	0.005	0.005	0.000	0.010	1.000	0.040

REFERENCED FROM "OPEN-CHANNEL HYDRAULICS" , VEN TE CHOW, McGRAW-HILL, INC., 1959. SEE VOLUME III, SECTION 5.3.

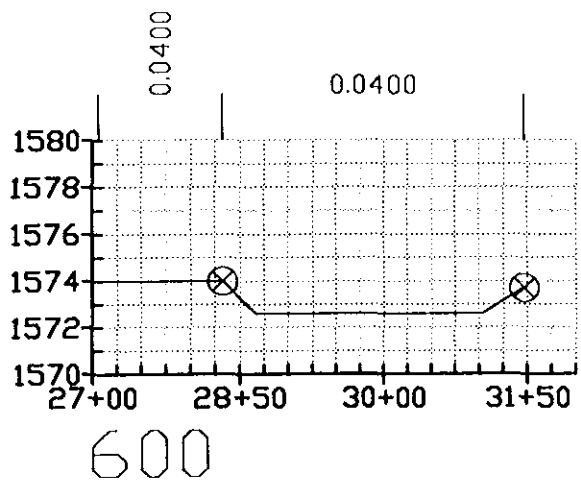
n0 = MATERIAL
n1 = IRREGULARITY
n2 = CROSS SECTION VARIATIONS
n3 = OBSTRUCTIONS
n4 = VEGETATION
m5 = MEANDERING

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH - RIGHT OVERBANK MODEL
FROM SECTION 1400 TO SECTION 600
MANNINGS "n" CALCULATIONS - OVERBANKS

SECTION	n0	n1	n2	n3	n4	m5	n
1400	0.020	0.005	0.005	0.000	0.010	1.000	0.040
1300	0.020	0.005	0.005	0.000	0.010	1.000	0.040
1200	0.020	0.005	0.005	0.000	0.010	1.000	0.040
1100	0.020	0.005	0.005	0.000	0.010	1.000	0.040
1000	0.020	0.005	0.005	0.000	0.010	1.000	0.040
900	0.020	0.005	0.005	0.000	0.010	1.000	0.040
800	0.020	0.005	0.005	0.000	0.010	1.000	0.040
700	0.020	0.005	0.005	0.000	0.010	1.000	0.040
600	0.020	0.005	0.005	0.000	0.010	1.000	0.040

REFERENCED FROM "OPEN-CHANNEL HYDRAULICS" , VEN TE CHOW, McGRAW-HILL, INC., 1959. SEE VOLUME III, SECTION 5.3.

n0 = MATERIAL
n1 = IRREGULARITY
n2 = CROSS SECTION VARIATIONS
n3 = OBSTRUCTIONS
n4 = VEGETATION
m5 = MEANDERING



600

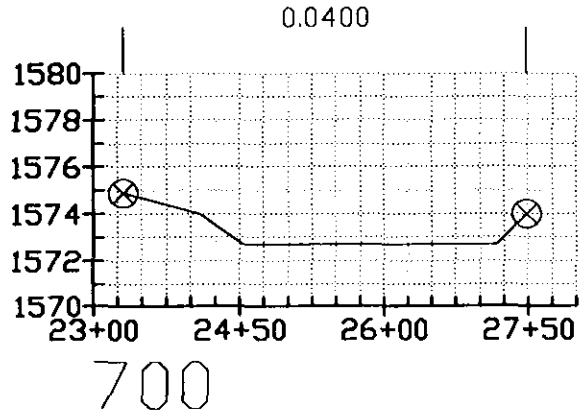
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
RIGHT OVERBANK MODEL
CROSS SECTION 600

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JOB NO. 00.035 PLOTTED: 8/24/98



700

NOTE: NOT TO SCALE
LOOKING UPSTREAM

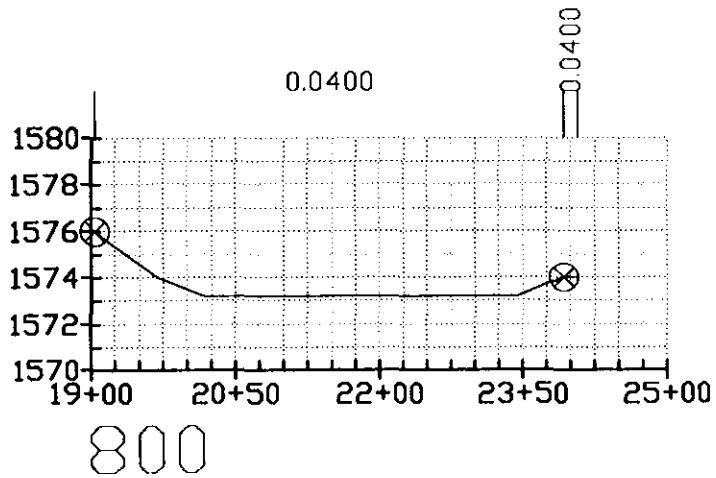
ABBOTT AND PULSIPHER WASHES

FIS RESTUDY

PULSIPHER WASH
RIGHT OVERBANK MODEL
CROSS SECTION 700

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

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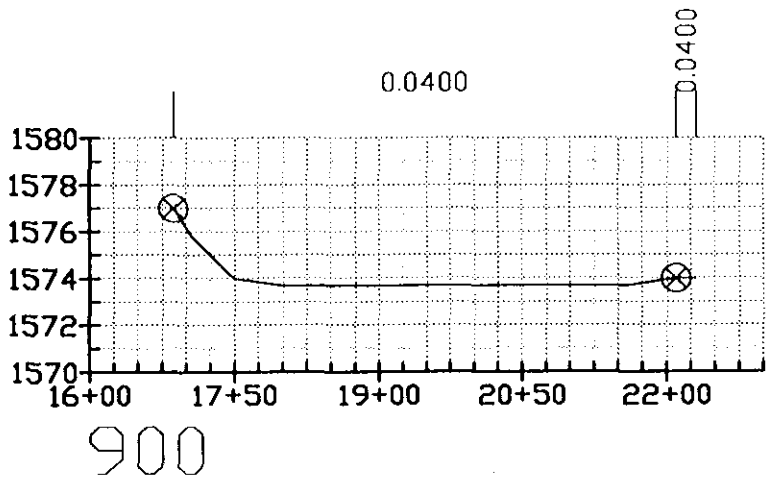
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
RIGHT OVERBANK MODEL
CROSS SECTION 800

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD., LAS VEGAS, NEVADA 89102

JOB NO. 350.035 PLOTTED: 8/24/98



NOTE: NOT TO SCALE
LOOKING UPSTREAM

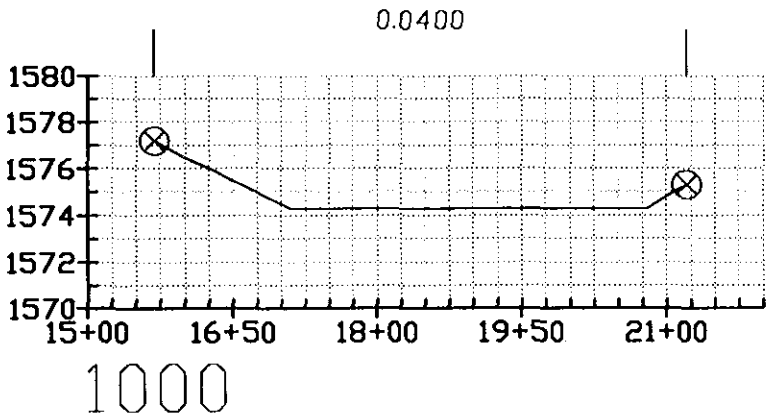
ABBOTT AND PULSIPHER WASHES

FIS RESTUDY

PULSIPHER WASH
RIGHT OVERBANK MODEL
CROSS SECTION 900

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD.,LAS VEGAS, NEVADA 89102

JOB NO. 350.035 PLOTTED: 8/24/98



NOTE: NOT TO SCALE
LOOKING UPSTREAM

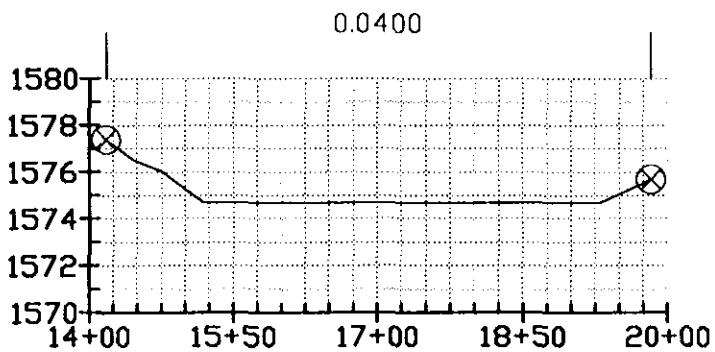
ABBOTT AND PULSIPHER WASHES

FIS RESTUDY

PULSIPHER WASH
RIGHT OVERBANK MODEL
CROSS SECTION 1000

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 8/24/98



1100

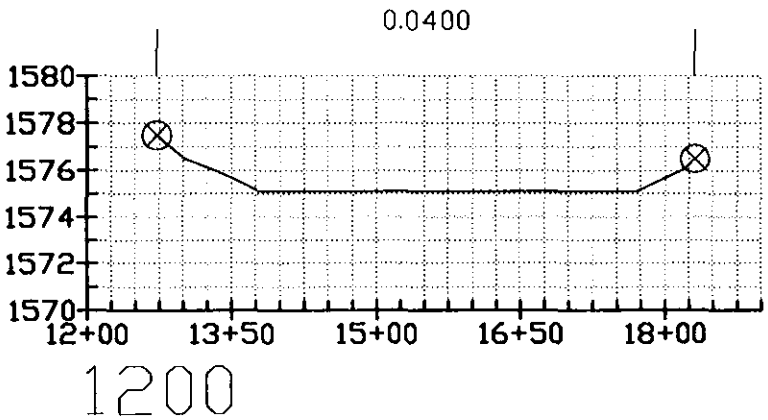
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
RIGHT OVERBANK MODEL
CROSS SECTION 1100

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 8/24/98



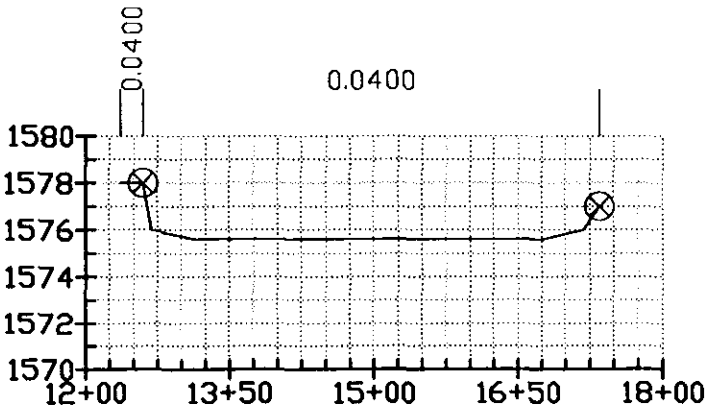
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
RIGHT OVERBANK MODEL
CROSS SECTION 1200

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 8/24/98



1300

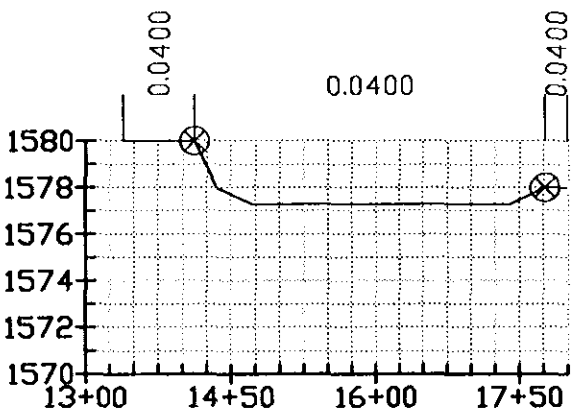
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
RIGHT OVERBANK MODEL
CROSS SECTION 1300

G.C. WALLACE, INC.
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JOB NO. 950.035 PLOTTED: 8/24/98



1400

NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
RIGHT OVERBANK MODEL
CROSS SECTION 1400

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JOB NO. 350.035 PLOTTED: 8/24/98

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH - LEFT BREAKOUT MODEL
FROM SECTION 10400 TO SECTION 10000
MANNINGS "n" CALCULATIONS - CHANNEL

SECTION	n0	n1	n2	n3	n4	m5	n
10400	0.020	0.005	0.005	0.000	0.010	1.000	0.040
10300	0.020	0.005	0.005	0.000	0.010	1.000	0.040
10200	0.020	0.005	0.005	0.000	0.010	1.000	0.040
10100	0.020	0.005	0.005	0.000	0.010	1.000	0.040
10000	0.020	0.005	0.005	0.000	0.010	1.000	0.040

REFERENCED FROM "OPEN-CHANNEL HYDRAULICS" , VEN TE CHOW, McGRAW-HILL, INC., 1959. SEE VOLUME III, SECTION 5.3.

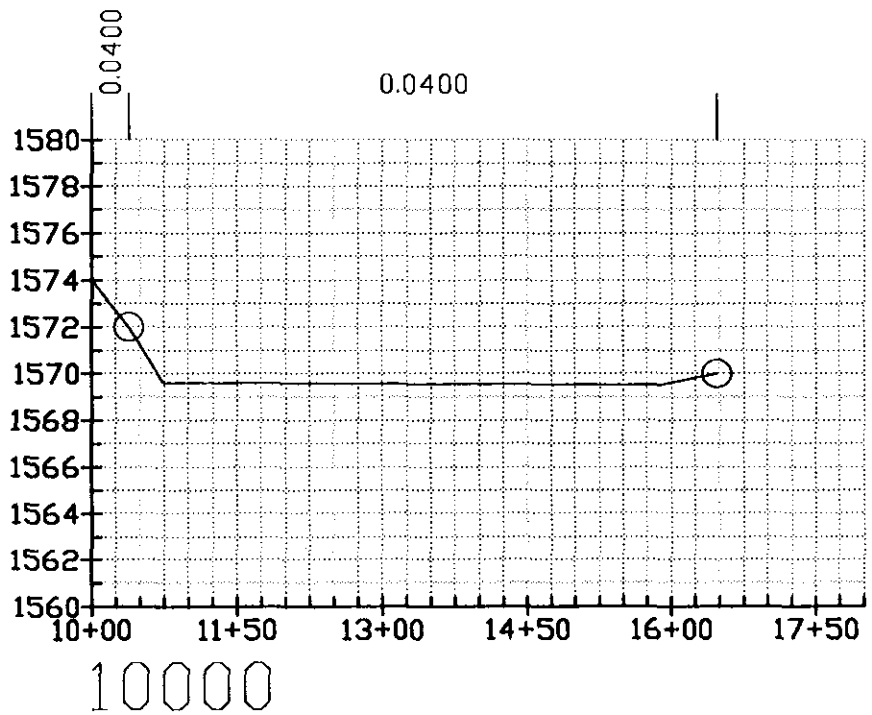
n0 = MATERIAL
n1 = IRREGULARITY
n2 = CROSS SECTION VARIATIONS
n3 = OBSTRUCTIONS
n4 = VEGETATION
m5 = MEANDERING

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH - LEFT BREAKOUT MODEL
FROM SECTION 10400 TO SECTION 10000
MANNINGS "n" CALCULATIONS - OVERBANKS

SECTION	n0	n1	n2	n3	n4	m5	n
10400	0.020	0.005	0.005	0.000	0.010	1.000	0.040
10300	0.020	0.005	0.005	0.000	0.010	1.000	0.040
10200	0.020	0.005	0.005	0.000	0.010	1.000	0.040
10100	0.020	0.005	0.005	0.000	0.010	1.000	0.040
10000	0.020	0.005	0.005	0.000	0.010	1.000	0.040

REFERENCED FROM "OPEN-CHANNEL HYDRAULICS" , VEN TE CHOW, McGRAW-HILL, INC., 1959. SEE VOLUME III, SECTION 5.3.

n0 = MATERIAL
n1 = IRREGULARITY
n2 = CROSS SECTION VARIATIONS
n3 = OBSTRUCTIONS
n4 = VEGETATION
m5 = MEANDERING



10000

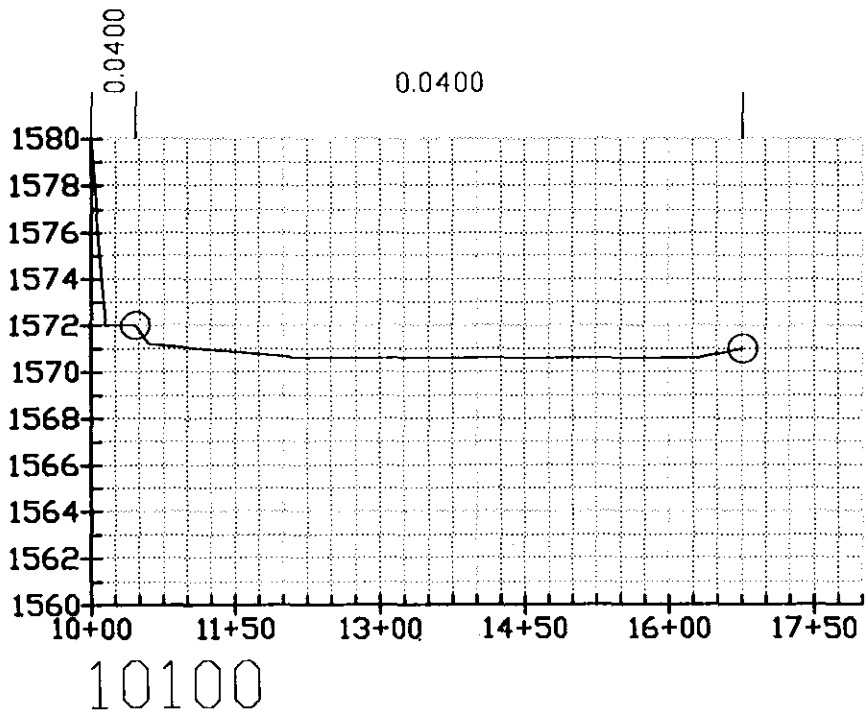
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
LEFT BREAKOUT MODEL
CROSS SECTION 10000

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 8/24/98



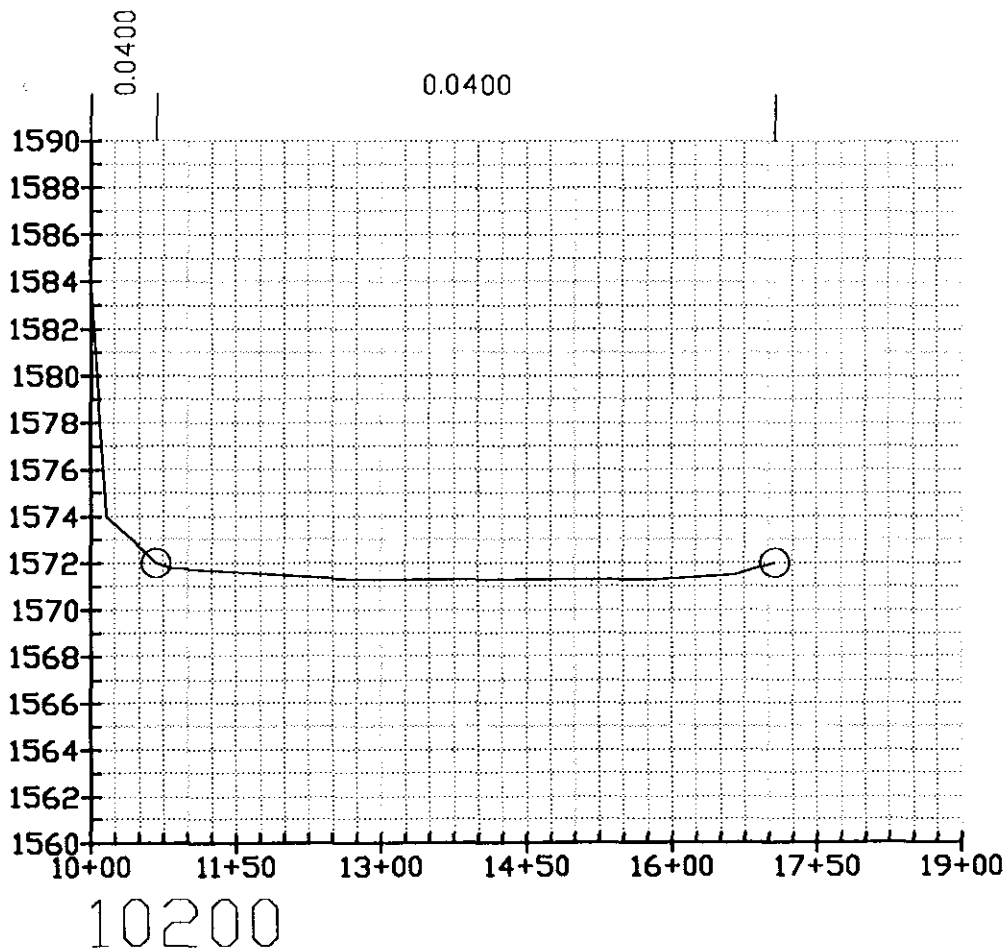
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
LEFT BREAKOUT MODEL
CROSS SECTION 10100

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 60.035 PLOTTED: 8/24/98



10200

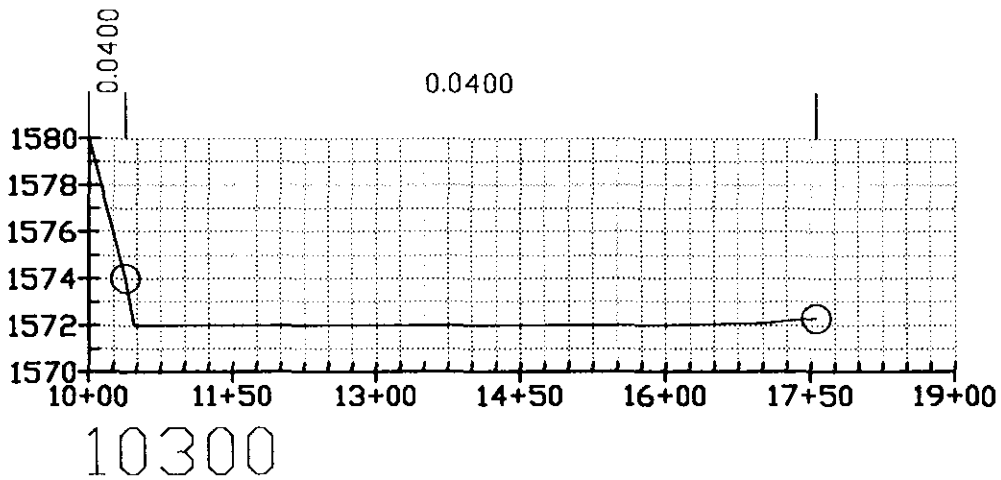
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
LEFT BREAKOUT MODEL
CROSS SECTION 10200

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 8/24/98



10300

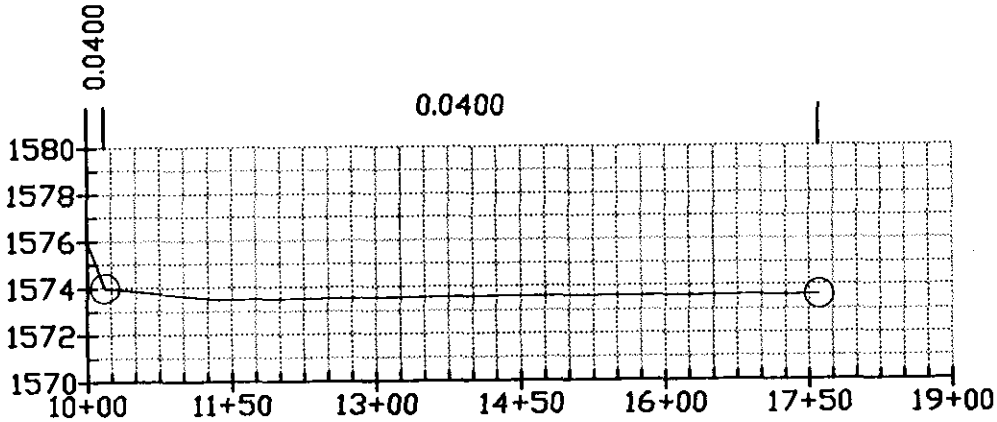
NOTE: NOT TO SCALE
LOOKING UPSTREAM

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

PULSIPHER WASH
LEFT BREAKOUT MODEL
CROSS SECTION 10300

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 50.035 PLOTTED: 8/24/98



10400

ABBOTT AND PULSIPHER WASHES

FIS RESTUDY

PULSIPHER WASH
LEFT BREAKOUT MODEL
CROSS SECTION 10400

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

JOB NO. 550.035 PLOTTED: 1/13/99

KEY TO CROSS-SECTION (XS) LABELING

PREPARED BY:
SC: G.C. WALLACE, INC.
TEC: _____

DATE PREPARED:
SC: 10/5/98
TEC: _____

COMMUNITY NAME MESQUITE, CLARK COUNTY
STATE NEVADA
FEMA CID NO. _____

STREAM NAME ABBOTT WASH
RUN DATE 10/5/98

STUDY CONTRACTOR			TECHNICAL EVALUATION CONTRACTOR	
FIELD SURVEY SECTION NO.	XS LETTER DRAFT FIS	COMPUTER STATIONING	EPA REACH FILE NO.	XS LETTER FINAL FIS
	985	985		
	990	990		
992	992	992		
994	994	994		
	1000	1000		
	1002	1002		
	1005	1005		
	1010	1010		
	1012	1012		
	1015	1015		
	1017	1017		
	1020	1020		
	1025	1025		
	1030	1030		
	1035	1035		

KEY TO CROSS-SECTION (XS) LABELING

PREPARED BY:
SC: G.C. WALLACE, INC.
TEC:

DATE PREPARED:
SC: 10/5/98
TEC:

COMMUNITY NAME MESQUITE, CLARK COUNTY
STATE NEVADA
FEMA CID NO.

STREAM NAME ABBOTT WASH
RUN DATE 10/5/98

STUDY CONTRACTOR		TECHNICAL EVALUATION CONTRACTOR		
FIELD SURVEY SECTION NO.	XS LETTER DRAFT FIS	COMPUTER STATIONING	EPA REACH FILE NO.	XS LETTER FINAL FIS
	1040	1040		
	1045	1045		
	1050	1050		
	1055	1055		
	1060	1060		
	1065	1065		
	1067	1067		
	1070	1070		
	1072	1072		
	1075	1075		
	1080	1080		
	1090	1090		
	1095	1095		
	1100	1100		
	1105	1105		

KEY TO CROSS-SECTION (XS) LABELING

PREPARED BY:
SC: G.C. WALLACE, INC
TEC: _____

DATE PREPARED:
SC: 10/5/98
TEC: _____

COMMUNITY NAME MESQUITE, CLARK COUNTY
STATE NEVADA
FEMA CID NO. _____

STREAM NAME ABBOTT WASH
RUN DATE 10/5/98

STUDY CONTRACTOR			TECHNICAL EVALUATION CONTRACTOR	
FIELD SURVEY SECTION NO.	XS LETTER DRAFT FIS	COMPUTER STATIONING	EPA REACH FILE NO.	XS LETTER FINAL FIS
	1110	1110		
	1112	1112		
	1115	1115		
	1120	1120		
	1125	1125		
	1130	1130		
	1135	1135		
	1140	1140		
	1145	1145		
	1150	1150		
	1152	1152		
	1155	1155		
	1160	1160		

KEY TO CROSS-SECTION (XS) LABELING

PREPARED BY:
SC: G.C. WALLACE, INC.
TEC:

DATE PREPARED:
SC: JULY 24, 1998
TEC:

COMMUNITY NAME MESQUITE, CLARK CO.
STATE NEVADA
FEMA CID NO.

STREAM NAME PULSIPHER WASH
RUN DATE 7/13/98

STUDY CONTRACTOR			TECHNICAL EVALUATION CONTRACTOR	
FIELD SURVEY SECTION NO.	XS LETTER DRAFT FIS	COMPUTER STATIONING	EPA REACH FILE NO.	XS LETTER FINAL FIS
	200	200		
	300	300		
	400	400		
500	500	500		
600	600	600		
	700	700		
	800	800		
	900	900		
	1000	1000		
	1100	1100		
	1200	1200		
	1300	1300		
	1400	1400		
	1500	1500		
	1600	1600		

KEY TO CROSS-SECTION (XS) LABELING

PREPARED BY:
SC: G.C. WALLACE, INC.
TEC:

DATE PREPARED:
SC: JULY 24, 1998
TEC:

COMMUNITY NAME MESQUITE, CLARK CO.
STATE NEVADA
FEMA CID NO.

STREAM NAME PULSIPHER WASH
RUN DATE 7/13/98

STUDY CONTRACTOR			TECHNICAL EVALUATION CONTRACTOR	
FIELD SURVEY SECTION NO.	XS LETTER DRAFT FIS	COMPUTER STATIONING	EPA REACH FILE NO.	XS LETTER FINAL FIS
	1650	1650		
	1700	1700		
	1750	1750		
	1800	1800		
1900	1900	1900		
2000	2000	2000		
	2100	2100		
	2200	2200		
	2300	2300		
	2400	2400		
	2500	2500		
	2600	2600		
	2700	2700		
	2800	2800		
	2900	2900		

KEY TO CROSS-SECTION (XS) LABELING

PREPARED BY:
SC: G.C. WALLACE, INC.
TEC:

DATE PREPARED:
SC: JULY 24, 1998
TEC:

COMMUNITY NAME MESQUITE, CLARK CO.
STATE NEVADA
FEMA CID NO.

STREAM NAME PULSIPHER WASH
RUN DATE 7/13/98

STUDY CONTRACTOR			TECHNICAL EVALUATION CONTRACTOR	
FIELD SURVEY SECTION NO.	XS LETTER DRAFT FIS	COMPUTER STATIONING	EPA REACH FILE NO.	XS LETTER FINAL FIS
	3000	3000		
	3100	3100		
	3200	3200		
	3300	3300		
	3400	3400		
	3500	3500		
	3600	3600		
	3700	3700		
	3800	3800		
	3900	3900		
	4000	4000		
	4100	4100		
	4200	4200		
	4300	4300		
	4400	4400		

KEY TO CROSS-SECTION (XS) LABELING

PREPARED BY:
SC: G.C. WALLACE, INC.
TEC:

DATE PREPARED:
SC: JULY 24, 1998
TEC:

COMMUNITY NAME MESQUITE, CLARK CO.
STATE NEVADA
FEMA CID NO.

STREAM NAME PULSIPHER WASH
RUN DATE 7/13/98

STUDY CONTRACTOR			TECHNICAL EVALUATION CONTRACTOR	
FIELD SURVEY SECTION NO.	XS LETTER DRAFT FIS	COMPUTER STATIONING	EPA REACH FILE NO.	XS LETTER FINAL FIS
	4500	4500		
	4600	4600		
	4700	4700		
	4800	4800		
	4900	4900		
	10000	10000		
	10100	10100		
	10200	10200		
	10300	10300		
	10400	10400		

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
CERTIFICATION

This is to certify that all work accomplished in the conduct of this FIS was done in accordance with the Statement of Work and General Provisions of Contract 550.035, and all amendments thereto, together with all such modifications, either written or oral, as the Regional PO and/or the Contracting Officer or their representatives have directed, such as modifications affect this contract, and that all such work has been accomplished in accordance with sound and accepted engineering practice within the contract provisions for respective phases of work.

Calvin L. Black, P.E. - *Executive Vice President*
G. C. Wallace, Inc.

DRAFT

ABBOTT AND PULSIPHER WASHES FLOOD INSURANCE STUDY RESTUDY

MESQUITE, CLARK COUNTY, NEVADA

550.035

OCTOBER 1998

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1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

1.0 INTRODUCTION

1.1 Purpose of Study

The purpose of this study is to investigate the limits of flood hazards due to the Abbott and Pulsipher Washes. The study boundary for the Abbott Wash extends from the north boundary of Mesquite city limits to I-15. The study boundary for the Pulsipher Wash extends from the north boundary of Mesquite city limits to the Virgin River. The entire study lengths of each wash lie within the incorporated areas of Mesquite, Clark County, Nevada. The results of this flood risk study will be used to update the Flood Insurance Rate Maps (FIRM) for Clark County and incorporated areas. The FIRMs are distributed by the Federal Emergency Management Agency (FEMA) to aid in the administration of the National Flood Insurance Program (NFIP). This program was established with the passage of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973 to enable property owners to purchase insurance protection against losses from flooding.

1.2 Authority For Study

G. C. Wallace, Inc. (GCW) was authorized by the Clark County Regional Flood Control District (CCRFCD) to perform this study for these areas of Clark County under contract, *Agreement of Professional Services for Abbott and Pulsipher Washes Flood Insurance Study Restudy*, dated November 13, 1997.

Topographic data south of I-15 was generated specifically for this project by Nevada Aerial Mapping dated January 14, 1998 (Reference 1). Topographic data north of I-15 was generated for a separate project by Olympus Aerial Surveys, Inc. dated July 14, 1997 and August 26, 1997 (Reference 2). An additional survey was conducted by Pentacore, Inc. to determine the physical dimensions of the two (2) culverts at I-15 (Abbott Wash and Pulsipher Wash) and the culvert at Hafen Lane (Pulsipher Wash).

The work was completed October 1998.

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1.3 Community Coordination and Acknowledgment

The area of approximate study was outlined by the CCRFCD and coordinated with City of Mesquite Public Works (COM). The CCRFCD provided available hydrologic data including the *City of Mesquite Flood Control Master Plan Update*, September 1995 (Reference 4), and the *Flood Insurance Study for the City of Mesquite, Nevada, Clark County*, September 28, 1990 (Reference 5) .

On December 11, 1997, representatives of the CCRFCD, COM, and GCW met for the initial coordination meeting to discuss scheduling, study methods, assumptions, and the format of deliverable items. Throughout the project, coordination meetings were held to discuss progress and preliminary study results.

All meeting minutes and written comments are included in the TSDN, Section 1 General Documentation. This study incorporates all appropriate comments.

1.4 Community Concurrence

The study members of GCW have maintained close contact with CCRFCD and COM throughout the project. Both CCRFCD and COM have had the opportunity to provide input regarding the results of the study through continued meetings and review submittals. At the time of the submittal of this study to FEMA, both CCRFCD and COM concur with the results of this study. Letters of concurrence are included in the TSDN, Section 1.4 - General Correspondence. FEMA forms are included in the TSDN, Section 3.

2.0 AREAS STUDIED

2.1 Scope of Study

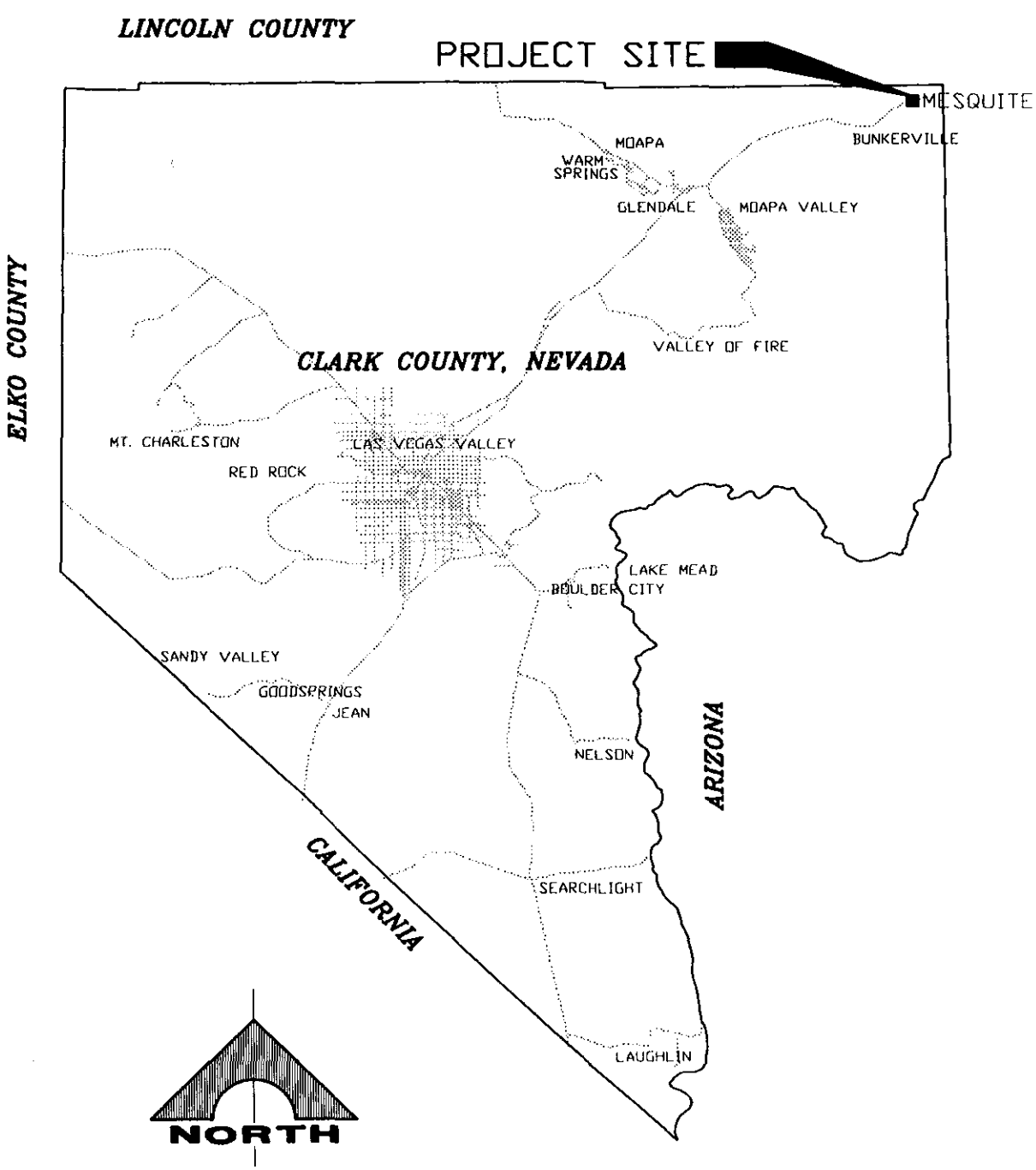
This study involved a review and restudy of the effective FIRMs within a portion of the City of Mesquite, Clark County, Nevada, more specifically, the Abbott and Pulsipher Washes.

The flooding source studied by approximate methods was selected by CCRFCD and COM. The approximate method study areas encompass the following:

- Abbott Wash from the north boundary of Mesquite city limits to I-15.
- Pulsipher Wash from the north boundary of Mesquite city limits to the Virgin River.

2.2 Community Description

The study area is located in the City of Mesquite, Clark County, Nevada. The City of Mesquite is located at the northeast corner of Clark County, near the Arizona border. The city is adjacent to and north of the Virgin River. See Figures 1 and 2 for the location of the study area.



ABBOTT AND PULSIPHER WASHES

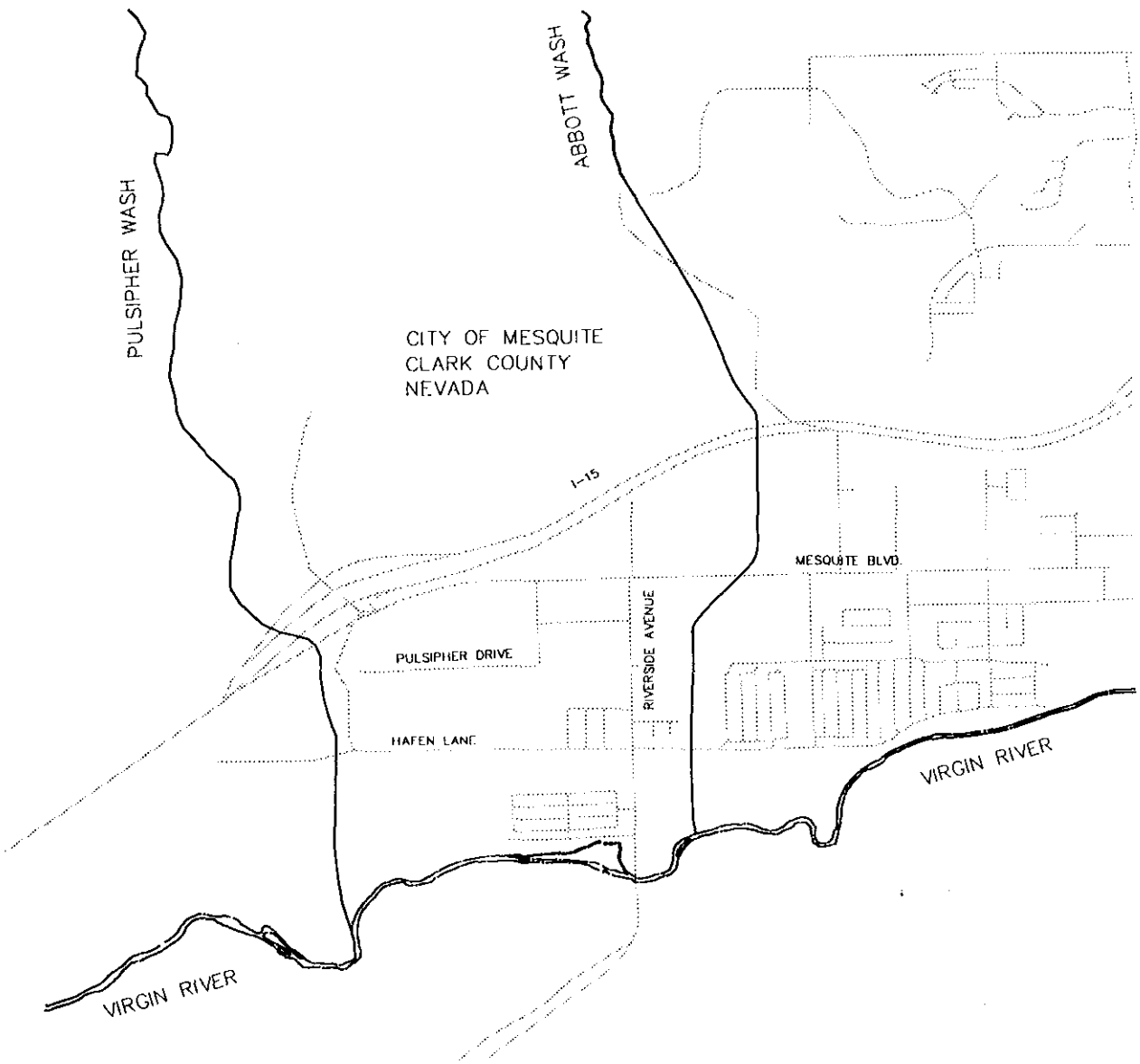
FIS RESTUDY

FIGURE 1

VICINITY MAP

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JOB NO. 550.035 PLOTTED: 5/21/98



NORTH

NOT TO SCALE

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

FIGURE 2
LOCATION MAP

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JOB NO. 550.035 PLOTTED: 7/28/98

2.3 Principal Flood Problems

2.3.1 Abbott Wash

The Abbott Wash does not have significant flood problems north of the I-15 culvert. However, the I-15 culvert (12-foot wide by 8-foot high reinforced concrete box) does not have the capacity to pass the total flow in the Abbott Wash of 3,156 cfs during the 100-year storm event. This will result in a backwater affect several hundred feet upstream of the culvert and overtopping of I-15. The Abbott Wash south of I-15 is considered outside the limit of study. The flooding problems are discussed in greater detail in Section 3.3.1, Modeling Results.

2.3.2 Pulsipher Wash

The Pulsipher Wash does not have significant flood problems north of the I-15 culvert. However, the I-15 culvert (12-foot wide by 10-foot high reinforced concrete box) does not have the capacity to pass the total flow in the Pulsipher Wash of 3,478 cfs during the 100-year storm event at this location. This will result in a backwater affect several hundred feet upstream of the culvert. A breakout of 1,239 cfs during the 100-year storm event will occur at the left bank of the I-15 culvert. The Pulsipher Wash is also perched south of I-15, without the capacity to convey the 100-year event which will result in breakouts at several locations along this reach. Additionally, the culvert at Hafen Lane (3 - 12.1-foot wide by 4.1-foot high reinforced concrete boxes) also does not have the capacity to pass the flow in the Pulsipher Wash, which will result in overtopping of Hafen Lane. The flooding problems are discussed in greater detail in Section 3.3.2, Modeling Results.

2.4 Flood Protection Measures

No new construction is associated with this project. Maintenance of the existing facilities is provided by COM and funded by the CCRFCD.

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2.4.1 Abbott Wash

No significant flood control facilities such as levees, dams, or detention basins have been constructed within this reach.

2.4.2 Pulsipher Wash

No significant flood control facilities such as levees, dams, or detention basins have been constructed within this reach.

3.0 ENGINEERING METHODS

3.1 Hydrologic Analysis

3.1.1 Introduction

Rainfall patterns in the study area are generally the result of two distinctly different meteorological events. High intensity, short-duration thunderstorms typically occurring in the late summer months of July, August, and September. These late summer storms can produce high runoff rates over small geographical areas. During the winter months, precipitation generally results from frontal and pacific storm movements with longer durations, lower intensities, and larger aerial coverages.

This section summarizes the existing conditions of the Abbott and Pulsipher Washes drainage basins presented in the City of Mesquite Flood Control Master Plan Update (MPU). The study area covered by the MPU analysis included the Abbott Wash, Pulsipher Wash, Town Wash, and the Virgin River drainage areas. The purpose of this analysis is to develop acceptable discharges for use in the Abbott and Pulsipher Washes FIS Restudy.

The HEC-1 models constructed for the Effective Flood Insurance Study were not available. However, the report portion of the Flood Insurance Study for the City of Mesquite, Nevada, Clark County, dated September 1990 (Reference 5) was available and indicates that the Effective FIS used a 3-hour storm duration

in its hydrologic analyses. The CCRFCD Manual has adopted a 6-hour storm duration. Therefore, the basis of the hydrologic analyses for this FIS Restudy are the HEC-1 models developed by CH2M Hill for the MPU, dated September 1995 (Reference 4) which utilize a 6-hour storm duration. Peak discharges have been computed for proposed FIS concentration points during the 100-year storm event using the May 1991 Version 4.6.2 of the HEC-1 Flood Hydrograph Package. Subbasins are shown on Figure D-2 of the MPU, dated September 1995, included here as Figure 3.

3.1.2 Modifications to the Hydrologic Model from the 1995 MPU

The HEC-1 models from the MPU for the Abbott and Pulsipher Washes have been revised for use in this FIS Restudy.

The MPU HEC-1 analyses accounted for detention at the I-15 culverts. The HEC-1 analyses prepared for the FIS Restudy do not take credit for any detention at the I-15 culverts. Also, GCW determined that the depth-area-reduction factors used in the MPU HEC-1 analyses are for the entire watershed which does not yield the proper discharges at upstream concentration points. Therefore, additional precipitation values were entered in the HEC-1 models, increasing the runoff at all concentration points.

3.1.3 Summary of Results

The existing conditions HEC-1 model was executed for the Abbott Wash. The Abbott Wash has a peak discharge during a100-year storm event of 3,156 cfs at Concentration Point 40. As shown in Table 1, flow rates decrease downstream of Concentration Point 40 at Concentration Point 50 (3,023 cfs) and Concentration Point 60 (3,044 cfs) due to routing in the HEC-1 model. The greatest flow rate (3,156 cfs) located at Concentration Point 40 was selected. These quantities are referenced from the modified HEC-1 model of the MPU. See Figure 3 for concentration point locations. Results are shown in Table 1. This table lists the descriptions, tributary areas, appropriate DARF, peak discharges, and proposed adopted peak discharges for each appropriate concentration point.

TABLE 1
SUMMARY OF RESULTS FOR THE ABBOTT WASH WATERSHED DURING THE 100-YEAR STORM EVENT
ABBOTT AND PULSIPHER WASHES FIS RESTUDY
MESQUITE, CLARK COUNTY, NEVADA

Concentration Point *	Description	Overall Storm			Adopted Discharge (cfs)
		Area (sq mi)	DARF	Peak Q (cfs)	
40	Abbott Wash 7,800 feet north of I-15	4.73	0.91	3,156	3,156
50	Abbott Wash at I-15	6.39	0.90	3,023	3,156
60	Abbott Wash at Virgin River	6.90	0.89	3,044	3,156

*See Figure 3

The existing conditions HEC-1 model was executed for the Pulsipher Wash. The Pulsipher Wash has peak discharges during a 100-year storm event of 2,078 cfs at Concentration Point 10, 2,318 cfs at Concentration Point 20, 3,474 cfs at Concentration Point 30, 3,478 cfs at Concentration Point 50, and 3,549 cfs at Concentration Point 60. These quantities are referenced from the modified HEC-1 model of the MPU. See Figure 3 for concentration point locations. Results are shown in Table 2. This table lists the descriptions, tributary areas, appropriate DARF, peak discharges, and proposed adopted peak discharges for each appropriate concentration point.

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TABLE 2
SUMMARY OF RESULTS FOR THE PULSIPHER WASH WATERSHED DURING THE 100-YEAR STORM EVENT
ABBOTT AND PULSIPHER WASHES FIS RESTUDY
MESQUITE, CLARK COUNTY, NEVADA

Concentration Point *	Description	Overall Storm			Adopted Discharge (cfs)
		Area (sq mi)	DARF	Peak Q (cfs)	
10	Pulsipher Wash 10,300 feet north of I-15	1.35	0.96	2,078	2,078
20	Pulsipher Wash 6,100 feet north of I-15	2.06	0.93	2,318	2,318
30	Pulsipher Wash 1,500 feet north of I-15	4.36	0.91	3,474	3,474
50	Pulsipher Wash at I-15	4.70	0.91	3,478	3,478
60	Pulsipher Wash at Virgin River	4.85	0.91	3,549	3,549

*See Figure 3

3.2 Hydraulic Analysis

3.2.1 Methodology

For the areas studied, the water surface elevations during the 100-year storm event were computed using the U. S. Army Corps of Engineers (USACOE) HEC-2 Water Surface Profile computer program (Reference 6) which runs inside BOSS International's BOSS RMS for AutoCAD software (Reference 7). Where otherwise unknown, the starting water surface elevations were developed using critical depth calculations.

The special bridge and special culvert options were used to model the existing bridges in the Pulsipher Wash model and the Abbott Wash model. The bridge data required was developed from construction drawings, field survey data, and topographic maps. Bridges are assumed to be normalized to the river with an approximate length equaling the span width times the sine of the skew angle plus the road width divided by the cosine of the skew angle. This conservative approach allows the continuous use of the HEC-2 model, which is a 1-D model.

Otherwise, the models would have to be discontinuous with the use of a 2-D model at the discontinuities (i.e., bridges/culverts).

The split flow option was used to model the breakouts which will occur at several locations in the Pulsipher Wash. Three methods for determining and quantifying split flows are available in BOSS RMS: weir flow, normal depth, and a rating curve. The weir flow method was selected for modeling all breakouts. Weir elevations were set at sections where an outbreak from the main channel was probable. A split flow calculation was performed when the water surface rose above the weir elevation at a particular section. The split flow methods use the computed water surface elevations to determine where split flows will occur. Limitations of the split flow option include the following. Weir elevations are fixed and do not erode over time. Breakout flow occurs perpendicular to the flow direction of the main channel. The Pulsipher Wash modeling was accomplished exclusively with BOSS RMS Version 3.5. The Abbott Wash modeling was accomplished with BOSS International's BOSS RMS Version 3.5 and the USACOE Hydrologic Engineering Center's HEC-2 Version 4.6.2.

Ground control surveys, check cross-sections, and establishment of elevation reference marks were completed by Pentacore Engineering, Inc. Vertical control is based on a project datum which ties into the Bertina benchmark. The Bertina benchmark is located approximately 3,300 feet east and 3,200 feet north of the intersection of Mesquite Boulevard and Grapevine Road. The project datum is set at an elevation 0.6 feet lower than the National Geodetic Vertical Datum of 1929 (NGVD 1929), and 2.89 feet lower than the North American Vertical Datum of 1988 (NAVD 1988). Horizontal control is tied into the North American Datum of 1983 (NAD 1983). Clark County survey monuments were used for control whenever possible.

Dimensions of the hydraulic structures were obtained by construction plans and field surveys. Table 3 lists the existing hydraulic structures, brief descriptions, and their respective locations on either the Abbott Wash or Pulsipher Wash.

TABLE 3
EXISTING HYDRAULIC STRUCTURES
ABBOTT AND PULSIPHER WASHES FIS RESTUDY
Mesquite, Clark County, Nevada

Reach	Location Description	Structures Description
Abbott Wash	I-15 Culvert	12-foot wide by 8-foot high RCB
Pulsipher Wash	I-15 Culvert	12-foot wide by 10-foot high RCB
	Hafen Lane Culvert	3- 12.1-foot wide by 4.1-foot high RCB's

3.2.2 Cross-Section Description

Cross-section locations (Abbott Wash and Pulsipher Wash) were initially cut at 400-foot intervals and aligned normal to the expected direction of flow. Cross-sections were then further refined based on preliminary HEC-2 models which showed major conveyance changes and ineffective flow areas. In addition, several intermediate cross-sections were added to reduce cross-section to cross-section differences in top width, friction slope, and conveyance. Cross-sections for the Abbott Wash modeling were oriented left to right looking downstream. Cross-sections for the Pulsipher Wash modeling were oriented left to right looking upstream.

The cross-section data for each reach were derived from field survey information and aerial mapping. Topographic data south of I-15 was generated specifically for this project by Nevada Aerial Mapping dated January 14, 1998 (Reference 1). Topographic data north of I-15 was generated for a separate project by Olympus Aerial Surveys, Inc. dated July 14, 1997 and August 26, 1997 (Reference 2). An additional survey was conducted by Pentacore, Inc. to determine the physical dimensions of the two (2) culverts at I-15 (Abbott Wash and Pulsipher Wash) and the culvert at Hafen Lane (Pulsipher Wash).

3.2.3 Manning's "n" Values

Manning's roughness coefficients (n) were obtained through field inspection, aerial photographs, and engineering judgment. The roughness conditions were also documented with photographs and the "n" values were compared with published data (Reference 9). In addition, Cowan's procedure (Reference 8) for estimating hydraulic roughness coefficients was used to account for channel material, degree of irregularity, variations of channel cross-section, relative effect of obstructions, vegetation, and degree of meandering.

The "NC" card of the HEC-2 model was used to designate the proper "n" values for section areas.

3.2.4 Expansion and Contraction Coefficients

The expansion and contraction loss coefficients used are typical riverine values with gradual changes (0.3 and 0.1, respectively), and with abrupt changes (0.5 and 0.3, respectively).

3.3 Modeling Results

After discussions with the CCRFCD and COM, it was decided to designate the Special Flood Hazard Area by approximate methods (Zone A). This was necessary because the detailed Effective FIS Study was based on outdated topographic information in which the community has lost confidence. This Restudy uses new topographic information which reflects the current condition of the surrounding area.

3.3.1 Abbott Wash

A HEC-2 model was constructed to model the Abbott Wash. Cross-sections were oriented left to right looking downstream in the Abbott Wash models. See cross-section exhibits.

The Main Channel model of the Abbott Wash runs from the north boundary of Mesquite city limits to I-15. Results of the Abbott Wash modeling indicate that

the 100-year peak storm discharge (3,156 cfs, 100-year storm event) will be confined within the wash for the reach north of the I-15 culvert. However, the I-15 culvert (12-foot wide by 8-foot high reinforced concrete box) does not have the capacity to pass the entire flow in the Abbott Wash. This will result in a backwater affect several hundred feet upstream of the culvert, and overtopping of I-15. The entire flow overtopping I-15 (approximately 1,446 cfs) will return to the main channel immediately downstream of I-15 due to a low point in I-15 at this location.

A summary of the discharges determined from the hydraulic analyses of the Abbott Wash is listed in Table 4.

TABLE 4
SUMMARY OF THE HYDRAULIC ANALYSES DISCHARGES FOR THE ABBOTT WASH
ABBOTT AND PULSIPHER WASHES FIS RESTUDY
Mesquite, Clark County, Nevada

Section Numbers *	Total Q (cfs)	Main Channel Q (cfs)	Left Overbank Q (cfs)	Right Overbank Q (cfs)	Left Breakout Q (cfs)
1160 to 985	3156	3156	0	0	0

*Abbott Wash cross-sections are oriented looking downstream

The downstream limit for this study of the Abbott Wash was established at a distance of 500 feet downstream of I-15 since the initial research indicated no significant changes in the floodplain boundary downstream of this point. The revised floodplain boundary ties into the presently effective boundary at this location.

3.3.2 Pulsipher Wash

Three (3) separate HEC-2 models were necessary to model the Pulsipher Wash. See Figure 4 for the HEC-2 model boundaries. Cross-sections were oriented left to right looking upstream in the Pulsipher Wash models. See cross-section exhibits. The three models are listed as follows:

- Main Channel model (from Section 1160 to Section 200)
- Right Overbank model (from Section 1400 to Section 600)
- Left Breakout model (from Section 10400 to Section 10000)

The Main Channel model runs the entire length of the Pulsipher Wash from the north boundary of Mesquite city limits to the Virgin River. Results of the Pulsipher Wash modeling indicate that the 100-year peak storm discharges will be confined within the main channel for the reach north of the I-15 culvert. Although the I-15 culvert does not have the capacity to pass the entire flow in the main channel (3,478 cfs), the roadway will not be overtopped at this location. Instead, there will be a breakout along the left overbank of 1,239 cfs. This breakout will drain west in a ditch adjacent to I-15 downstream approximately 4,500 feet to another culvert crossing and a golf course channel which are outside the limit of study. The remaining flow passing through the I-15 culvert at the Pulsipher Wash (i.e., 2,239 cfs) will be confined in the main channel until Section 1400. An additional 130 cfs will break out along the right bank of the main channel from Sections 1300 to 1400 but will return to the main channel at Section 600. Breakouts will occur along the left overbank from Sections 1200 to 1300 (i.e. 225 cfs), Sections 1100 to 1200 (i.e., 683 cfs), Sections 1000 to 1100 (i.e., 282 cfs), Sections 900 to 1000 (i.e., 178 cfs), Sections 800 to 900 (i.e., 127 cfs), and Sections 700 to 800 (i.e., 8 cfs). The Left Breakout model described below is used to analyze the total flow breaking out along the left overbank of the main channel (i.e., 1,503 cfs). This flow continues west with flow depths of less than one foot. This flow does not return to the main channel. Hydraulic calculations reveal that the Hafen Lane culvert has the capacity to pass the remaining flow (807 cfs).

The Right Overbank model indicates that the right overbank will contain flow breaking out along the right overbank of the main channel from Sections 1300 to 1400. A total flow of approximately 130 cfs will be confined in the right overbank down to the Hafen Lane culvert. This flow will return to the main channel at Section 600. The depth of flow at the model cross-sections were found to be below 1-foot deep. Therefore, the area contained in the right overbank is designated Shaded Zone X. This boundary was determined from topographic data, field investigation, and information from local flood control personnel.

The Left Breakout model was constructed to quantify the depth of flow in this area to see if any further analysis was required at this time. This flow continues west with flow depths of less than one-foot. Therefore, further

analyses of this area was discontinued and the area is considered outside the limit of study.

A summary of the discharges determined from the hydraulic analyses of the Pulsipher Wash is listed in Table 5.

TABLE 5
SUMMARY OF THE HYDRAULIC ANALYSES DISCHARGES FOR THE PULSIPHER WASH
ABBOTT AND PULSIPHER WASHES FIS RESTUDY
Mesquite, Clark County, Nevada

Section Numbers*	Total Q (cfs)	Main Channel Q (cfs)	Left Overbank Q (cfs)**	Right Overbank Q (cfs)	Left Breakout Q (cfs)***
4900 to 3900	2318	2318	0	0	0
3800 to 2600	3474	3474	0	0	0
2500 to 2100	3478	3478	0	0	0
2000 to 1900	3478	2239	1239	0	0
1800 to 1500	3549	2310	1239	0	0
1400 to 1300	3549	2180	1239	130	0
1200	3549	1955	1239	130	225
1100	3549	1272	1239	130	908
1000	3549	991	1239	130	1190
900	3549	813	1239	130	1368
800	3549	686	1239	130	1495
700	3549	677	1239	130	1503
600 to 200	3549	807	1239	0	0

* Pulsipher Wash cross-sections are oriented looking upstream
** Flow breaks out at I-15 culvert and does not return to main channel
*** Total Flow in Left Breakout model (1,503 cfs) does not return to main channel

The revised approximate 100-year floodplain boundary of the Pulsipher Wash ties into the existing 100-year floodplain boundary of the Virgin River south of Section 200. Several cross-sections have been added south of the limit of study to determine the approximate tie-in. The tie-in is based on topographic data, the existing 100-year floodplain boundary of the Virgin River, and Virgin

River and Pulsipher Wash water surface elevations. See the Exhibit on the following page for the location of additional cross-sections.

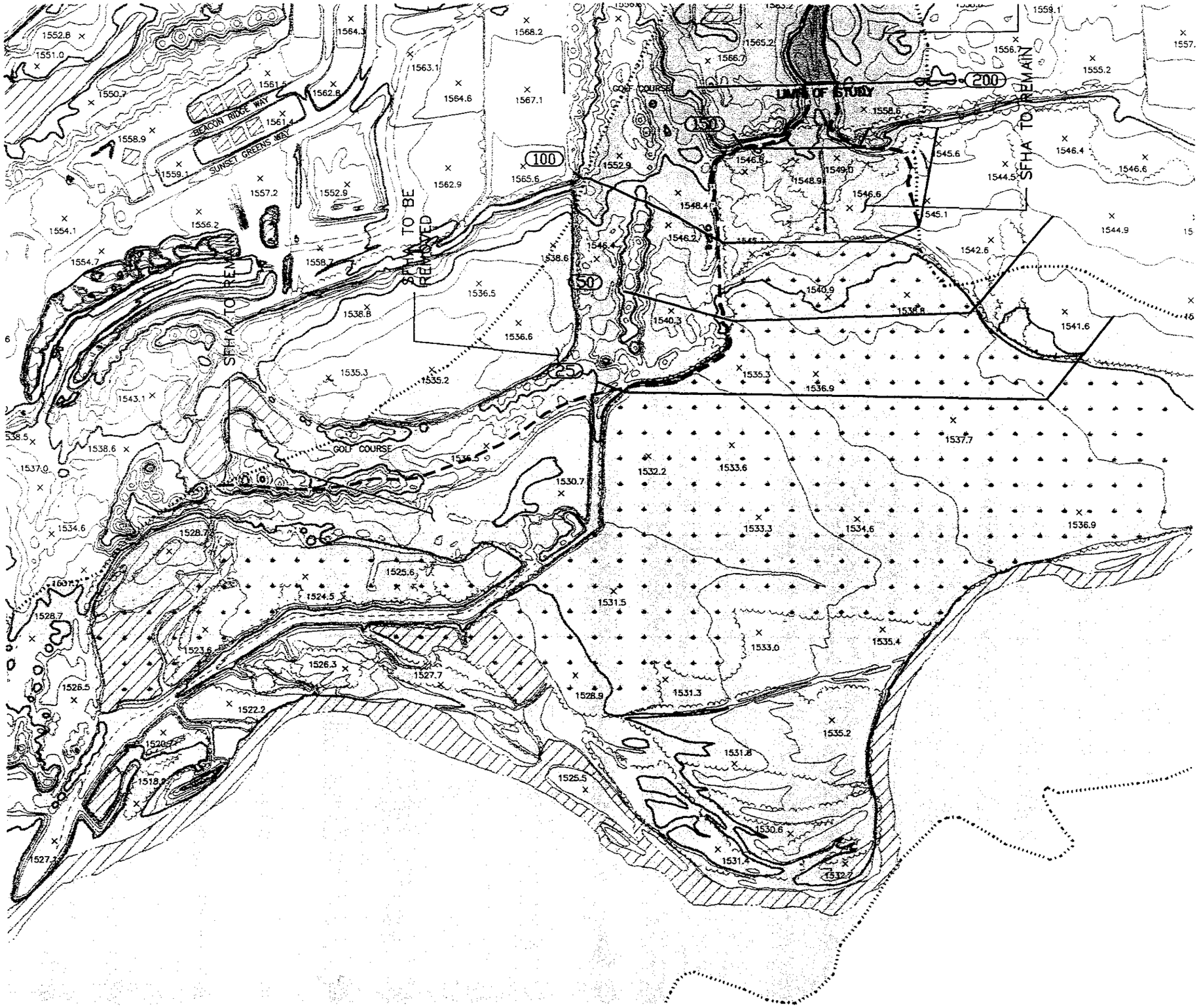
4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

4.1 Floodplain Boundaries

Floodplain boundaries for the approximate method areas north of I-15 were delineated on topographic maps with a scale of 1" = 400' and a contour interval of 1-foot. Floodplain boundaries for the approximate method areas south of I-15 were delineated on topographic maps with a scale of 1" = 400' and a contour interval of 2-feet. Spot elevations were plotted and used in areas requiring greater definition. The boundaries of the 100-year flood were delineated using elevations computed at each cross-section by the HEC-2 models. The delineations were interpolated between cross-sections using engineering judgment in conjunction with the HEC-2 and BOSS RMS software capabilities. The 500-year floodplain was not determined by this study.

4.2 Floodways

There are no floodways delineated in this Restudy for either the Abbott Wash or Pulsipher Wash.



NORTH

GRAPHIC SCALE

400 0 200 400

(IN FEET)

1 inch = 400 ft.

LEGEND

- REVISED ZONE A
- NEW SHADED ZONE X
- EXISTING 100-YEAR FLOODPLAIN BOUNDARY
- APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY TIE-IN
- SFHA — SPECIAL FLOOD HAZARD AREA
- (1100) — CROSS SECTION

ABBOTT AND PULSIPHER WASHES
FIS RESTUDY

EXHIBIT
PULISPHER WASH SOUTH OF I-15
VIRGIN RIVER TIE-IN

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD.,LAS VEGAS, NEVADA 89102

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance rate zones are designated based on the results of the engineering analyses. The FEMA flood insurance rate zones are defined as follows:

Zone A

Zone A is the Flood Insurance Rate Zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no BFEs or depths are shown within this zone.

Zone AE

Zone AE is the Flood Insurance Rate Zone that corresponds to the 100-year floodplains that are determined in the FIS by detailed methods. In most instances, whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the Flood Insurance Rate Zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from the detailed hydraulic analyses are shown within this zone.

Zone AO

Zone AO is the Flood Insurance Rate Zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

Zone X

Zone X is the Flood Insurance Rate Zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, areas of 100-year flooding where average depths are less than 1-foot, areas of 100-year flooding where the contributing drainage area is less that 1 square mile, and areas protected by levees from the 100-year flood. No BFEs or depths are shown within this zone.

6.0 OTHER STUDIES

This study is intended to update and supersede the portion of the previous study which addressed the study area which was performed in 1990. FEMA adopted and reprinted FIRMs effective August 16, 1995.

As discussed earlier, referenced hydrologic data for the approximate method analysis were obtained from the *City of Mesquite Flood Control Master Plan Update*, September 1995 (Reference 4).

7.0 REFERENCES

1. Nevada Aerial Mapping, Topographical Mapping for the Abbott and Pulsipher Washes FIS Re-study, 1" = 400', 2-foot contour interval, flown January 14, 1998.

2. Olympus Aerial Surveys, Inc., Topographical Mapping for Mesquite Ranches and Mesquite Vistas, 1" = 400', 1-foot contour interval, flown July 14, 1997 and August 26, 1997.

3. Federal Emergency Management Agency, *Flood Insurance Study, Guidelines and Specifications for Study Contractors,* January 1995.

4. Clark County Regional Flood Control District, *Technical Appendix for the City of Mesquite Flood Control Master Plan Update,* September 1995.

5. Federal Emergency Management Agency, *Flood Insurance Study for City of Mesquite, Nevada, Clark County,* September 28, 1990.

6. U. S. Army Corps of Engineers, *Hydrologic Engineering Center, HEC-2 Water Surface Profiles User's Manual Version 4.6.2,* September 1990.

7. BOSS International, *BOSS RMS for AutoCAD,* Version 3.5 for Windows, 1998.

8. Woody L. Cowan, *Estimating Hydraulic Roughness Coefficients, Agricultural Engineering, Vol. 37, No. 7, pp. 473-475,* July 1956.

9. *Ven Te Chow, Open-Channel Hydraulics,* McGraw-Hill, Inc., 1959.

TABLE 6 ELEVATION REFERENCE MARKERS			
Map	**Name**	**Elevation**	**Description**
PU1	Hafen	1642.91	4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash.
PU2	T-160	1560.72	Description of benchmark not available. Located south of Virgin River approximately 1,300 feet east and 4,200 feet south of Pulsipher Street and Leavitt Lane intersection.

FEMA FORMS

FEDERAL EMERGENCY MANAGEMENT AGENCY
REVISION REQUESTOR AND COMMUNITY OFFICIAL FORM

FEMA USE ONLY

O.M.B. Burden No. 3067-0148
Expires July 31, 1997

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1. OVERVIEW

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

- ☐ Physical change
  - ☐ Existing
  - ☐ Proposed
- ■ Improved methodology
- ■ Improved data
- ☐ Floodway revision
- ☐ Other _____

Explain _____

2. Flooding Source: Abbott Wash
3. Project Name/Identifier: Abbott and Pulsipher Washes FIS Restudy
4. FEMA zone designations affected: A, X

(example: A, AH, AO, A1-A30, A99, AE, V, V1-30, VE, B, C, D, X)

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

Community No.	Community Name	County	State	Map No.	Panel No.	Effective Date
X 480301	Katy, City	Harris, Fort Bend	TX	480301	0005D	02/08/83
80287	Harris County	Harris	TX	48201C	0220G	09/28/90
003	Mesquite	Clark County	NV	32003C	0387D	8/16/95

6. The area of revision encompasses the following types of flooding, structures, and associated disciplines: *(check all that apply)*

Types of Flooding
- ■ Riverine
- ☐ Coastal
- ☐ Alluvial Fan
- ☐ Shallow Flooding *(e.g. Zones AO and AH)*
- ☐ Lakes

Affected by wind/wave action
- ☐ Yes
- ■ No

Structures
- ☐ Channelization
- ☐ Levee/Floodwall
- ■ Bridge/Culvert
- ☐ Dam
- ☐ Coastal
- ☐ Fill
- ☐ Pump Station
- ☐ None
- ☐ Channel Relocation
- ☐ Excavation
- ☐ Other *(describe)*

Disciplines*
- ■ Water Resources
  - ■ Hydrology
  - ■ Hydraulics
  - ☐ Sediment Transport
  - ☐ Interior Drainage
- ☐ Structural
- ☐ Geotechnical
- ■ Land Surveying
- ☐ Other *(describe)*

☐ Other *(describe)* _____

Attach completed "Certification by Registered Professional Engineer and/or Land Surveyor" Form for each discipline checked. (Form 2)

2. FLOODWAY INFORMATION

7. Does the affected flooding source have a floodway designated on the effective FIRM or FBFM? ☐ Yes ■ No
8. Does the revised floodway delineation differ from that shown on the effective FIRM or FBFM? ☐ Yes ☐ No

Not Applicable - N/A

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

ttach copy of either a public notice distributed by the community stating the community's intent to revise the floodway or a tatement by the community that it has notified all affected property owners and affected adjacent jurisdictions.

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

ttach a copy of a letter notifying the appropriate State agency of the floodway revision and documentation of the ppr of the revised floodway by the appropriate State agency.

3. PROPOSED ENCROACHMENTS - N/A

0. With floodways:

   a. Does the revision request involve fill, new construction, substantial improvement, or other development in the floodway? ☐ Yes ☐ No

   b. If yes, does the development cause the 100-year water surface elevation to increase at any location by more than 0.000 feet? ☐ Yes ☐ No

1. Without floodways:

   a. Does the revision request involve fill, new construction, substantial improvement, or other development in the 100-year floodplain? ☐ Yes ☐ No

   b. If yes, does the cumulative effect of all development that has occurred since the effective SFHA was originally identified cause the 100-year water surface elevation to increase at any location by more than one foot *(or other surcharge limit if community or state has adopted more stringent criteria)*? ☐ Yes ☐ No

f the answer to either Items 10b or 11b is yes, please provide documentation that all requirements of Section 65.12 of the NFIP egulations have been met, regarding evaluation of alternatives, notice to individual legal property owners, concurrence of CEO, and ertification that no insurable structures are impacted.

4. REVISION REQUESTOR ACKNOWLEDGMENT

2. Having read NFIP Regulations, 44 CFR Ch. I, parts 59, 60, 61, and 72, I believe that the proposed revision ■ is ☐ is not in compliance with the requirements of the aforementioned NFIP Regulations.

5. COMMUNITY OFFICIAL ACKNOWLEDGMENT

Was this revision request reviewed by the community for compliance with the community's adopted floodplain management ordinances? ■ Yes ☐ No

4. Does this revision request have the endorsement of the community? ■ Yes ☐ No

f no to either of the above questions, please explain: _____

Please note that community acknowledgment and/or notification is required for all requests as outlined in Section 65.4(b) of the NFIP Regulations.

6. OPERATION AND MAINTENANCE

5. Does the physical change involve a flood control structure (e.g. levees, floodwalls, channelization, basins, dams)? ☐ Yes ■ No

If yes, please provide the following information for each of the new flood control structures:

A. Inspection of the flood control project will be conducted periodically by _____ (entity) _____ with a maximum interval of _____ months between inspections.

B. Based on the results of scheduled periodic inspections, appropriate maintenance of the flood control facilities will be conducted by _____ (entity) to ensure the integrity and degree of flood protection of the structure.

C. A formal plan of operation, including documentation of the flood warning system, specific actions and assignments of responsibility by individual name or title, and provisions for testing the plan at intervals not less than one year, ☐ has ☐ has not been prepared for the flood control structure.

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

Attach *operation and maintenance plans*

7. REQUESTED RESPONSE FROM FEMA

6. After examining the pertinent NFIP regulations and reviewing the document entitled "Appeals, Revisions, and Amendments to Flood Insurance Maps: A Guide for Community Officials," dated January 1990, this request is for a:

____a. CLOMR — A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision *(LOMR or PMR)*, or proposed hydrology changes *(see 44 CFR Ch. 1, Parts 60, 65, and 72)*.

____b. LOMR — A letter from FEMA officially revising the current NFIP map to show changes to floodplains, floodways, or flood elevations. LOMRs typically depict decreased flood hazards. *(See 44 CFR Ch. 1, Parts 60 and 65.)*

_X_c. PMR — A reprinted NFIP map incorporating changes to floodplains, floodways, or flood elevations. Because of the time and cost involved to change, reprint, and redistribute an NFIP map, a PMR is usually processed when a revision reflects increased flood hazards or large-scope changes. *(See 44 CFR Ch. 1, Parts 60 and 65.)*

____d. Other: Describe _____

8. FORMS INCLUDED

1[illegible] Form 2 entitled "Certification by Registered Professional Engineer And/Or Land Surveyor" must be submitted.

The following forms should be included with this request if (check the included forms):

• Hydrologic analysis for flooding source differs from that used to develop FIRM	■ Hydrologic Analysis Form (Form 3)
• Hydraulic analysis for riverine flooding differs from that used to develop FIRM	■ Riverine Hydraulic Analysis Form (Form 4)
• The request is based on updated topographic information or a revised floodplain or floodway delineation is requested	■ Riverine/Coastal Mapping Form (Form 5)
• The request involves any type of channel modification	☐ Channelization Form (Form 6)
• The request involves new bridge or culvert or revised analysis of an existing bridge or culvert	■ Bridge/Culvert Form (Form 7) - See **Attachment**
• The request involves a new revised levee/floodwall system	☐ Levee/Floodwall System Analysis Form (Form 8)
• The request involves analysis of coastal flooding	☐ Coastal Analysis Form (Form 9)
• The request involves coastal structures credited as providing protection from the 100-year flood	☐ Coastal Structures (Form 10)
• The request involves an existing, proposed, or modified dam	☐ Dam Form (Form 11)
• The request involves structures credited as providing protection from the 100-year flood on an alluvial fan	☐ Alluvial Fan Flooding Form (Form 12)

9. INITIAL REVIEW FEE

18. The minimum initial review fee for the appropriate request category has been included. ☐ Yes ■ No

Initial fee amount: $ _____

Check or money order only. Make check or money order payable to: National Flood Insurance Program. If paying by Visa or MasterCard please refer to the credit card information form which follows this form.

or

19. Is this request for a project that is for public benefit and is primarily intended for flood loss reduction to insurable structures in identified flood hazard areas which were in existence prior to the commencement of construction of the flood control project? ☐ Yes ■ No

or

14. Is this request to correct map errors, to include the effects of natural changes within the areas of special flood hazard, or solely to provide more detailed data? ■ Yes ☐ No

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

Jerry E. Pruitt

Signature of Revision Requestor

Jerry E. Pruitt, P.E., Project Manager

Printed Name and Title of Revision Requestor

G. C. Wallace, Inc.

Company Name

(702) 804-2000 1-20-99

Telephone No. Date

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

Signature of Community Official

J. Allen Bell, P.E., Director of Public Works

Printed Name and Title of Community Official

Mesquite, Clark County, Nevada

Community Name

25 - January - 1999

Date

Does this request impact any other communities? ☐ Yes ■ No

If yes, attach letters from all affected jurisdictions acknowledging revision request and approving changes to floodway, if applicable.

Note: Although a photograph of physical changes is not required, it may be helpful for FEMA's review.

17. (Con't)

Due to the number of bridges/culverts, the information normally shown on the Bridge/Culvert Form (Form 7 is located in the HEC-2 models and is not reproduced on the Form in an effort to save the community time and money.

FEDERAL EMERGENCY MANAGEMENT AGENCY CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR FORM	*FEMA USE ONLY*	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1997*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472.

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

1. This certification is in accordance with 44 CFR Ch. I, Section 65.2.
2. I am licensed with an expertise in Hydrology and Hydraulics
   [example: water resources *(hydrology, hydraulics, sediment transport, interior drainage)**, structural, geotechnical, land surveying.]
3. I have 8 years experience in the expertise listed above.
4. I have ☐ prepared ■ reviewed the attached supporting data and analyses related to my expertise.
5. I ■ have ☐ have not visited and physically viewed the project.
6. In my opinion, the following analyses and/or designs, is/are being certified:
   N/A
7. Based upon the following review, the modifications in place have been constructed in general accordance with plans and specifications.

   Basis for above statement: (check all that apply)

   a. ☐ Viewed all phases of actual construction.
   b. ☐ Compared plans and specifications with as-built survey information.
   c. ☐ Examined plans and specifications and compared with completed projects.
   d. ■ Other Analyses only, no construction involved.
8. All information submitted in support of this request is 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: Jerry E. Pruitt, P.E.
(please print or type)

Title: Project Manager
(please print or type)

Registration No. 11902 Expiration Date: 12/31/99

State Nevada

Type of License Civil

Jerry E. Pruitt
Signature

10-29-98
Date

Seal
(Optional)

*Specify Subdiscipline

Note: Insert not applicable (N/A) when statement does not apply.

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

FEDERAL EMERGENCY MANAGEMENT AGENCY **CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR FORM**	*FEMA USE ONLY*	*O.M.B. No. 3067-0148* *Expires July 31, 1997*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average . 23 hour per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472.

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

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

2. I am licensed with expertise in Land Surveying
[example: water resources *(hydrology, hydraulics, sediment transport, interior drainage)** structural, geotechnical, land surveying.]

3. I have 16 years experience in the expertise listed above.

4. I have ☐ prepared ☒ reviewed the attached supporting data and analyses related to my expertise.

5. I ☒ have ☐ have not visited and physically viewed the project.

6. In my opinion, the following analyses and /or designs, is/are being certified:

N/A

7. Based on the following review, the modifications in place have been constructed in general accordance with plans and specifications.

Basis for above statement: (check all that apply)
- a. ☐ Viewed all phases of actual construction.
- b. ☐ Compared plans and specifications with as-built survey information.
- c. ☐ Examined plans and specifications and compared with completed projects.
- d. ☒ Other *(Specify)* Viewed all as-built survey information

8. All information submitted in support of this request is 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: Barry D. Bruland
(please print or type)

Title: Project Surveyor
(please print or type)

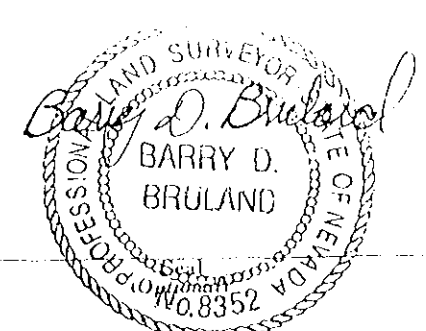
Registration No. 008352 Expiration Date: 12/31/98

State Nevada

Type of License Land Surveyor

Barry D. Bruland
Signature

7-13-98
Date



Barry D. Bruland
7-13-98

*Specify Subdiscipline

Note: Insert not applicable (N/A) if statement does not apply.

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDRAULIC ANALYSIS FORM**	*FEMA USE ONLY*	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1997*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 3.67 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management Agency, 500 C Street, S.W., Washington, DC 20472.

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

Community Name: Mesquite, Clark County, Nevada

Flooding Source: Abbott Wash
(One form for each flooding source)

Project Name/Identifier: Abbott and Pulsipher Washes FIS Restudy

1. HYDROLOGIC ANALYSIS IN FIS

■ Approximate study stream (Zone A)

☐ Detailed study stream (briefly explain methodology) _____

2. REASON FOR NEW HYDROLOGIC ANALYSIS

☐ No existing analysis

■ Improved data *(see data revision on page 3)*

☐ Changed physical conditions of watershed *(explain)* _____

■ Alternative methodology *(justify why the revised model is better than model used in the effective FIS)*
The SCS TR-20 Method is somewhat outdated. The revised model employs the USACOE HEC-1 software. Also, a 6-hour storm duration is now considered more appropriate than the 3-hour.

☐ Evaluation of proposed conditions (CLOMRs only) (explain) _____

☐ Other _____

If a computer program/model was used in revising the hydrologic analysis, please provide a diskette with the input files for the 10-, 50-, 100- and 500-year recurrence intervals.

Only the 100-year recurrence interval need be included for SFHAs designated as Zone A.

3. APPROVAL OF ANALYSIS

■ Approval of the hydrologic analysis, including the resulting peak discharge value(s) has been provided by the appropriate local, state, or Federal Agency. (i.e., Clark County Regional Flood Control District, City of Mesquite Public Works)
Attach evidence of approval.

☐ Approval of the hydrologic analysis is not required by any local, State or Federal Agency.

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

4. REVIEW OF RESULTS

Stream: Mesquite Wash

Comparison of 100-year Discharges

Location:	Drainage area (Sq. mi.)	FIS (cfs):	Revised (cfs):
At I-15	7.1/6.4	2,340	3,156

Note: When revised discharges are not significantly different than FIS discharges, FEMA may require a confidence limits analysis on attachment D at a later date to complete the review.

As is often the case with revision requests, only a portion of a stream may actually be revised or be affected by a revision. Therefore, transition to the unrevised portion is important to maintain the continuity of the study. NFIP regulations stipulate that such a transition must be assured. What is the transition from the proposed discharges to the effective discharges? Please explain how the transition was made *(attach separate sheet if necessary)*.

The analysis incorporates the reach of the Abbott Wash from the north boundary of Mesquite city limits to I-15.

ATTACH A COMPLETED "REVIEW OF RESULTS" PAGE FOR EACH FLOODING SOURCE.

Is the new hydrologic analysis being developed solely to revise the flow values presented in the FIS *(i.e. no changed hydraulic conditions)?* ☐ Yes ■ No

If yes, does the 100-year water surface elevation change by 1.0 foot or more? ☐ Yes ☐ No

Note: FEMA does not normally revise NFIP maps solely due to flow changes when changes in 100-year water surface elevation are less than 1.0 foot.

5. HISTORICAL FLOODING INFORMATION

Is historical data available for the flooding source? ☐ Yes ■ No

If yes, provide the following:

Location along flooding source: _____

Maximum peak discharge: _____ cfs

Second highest peak discharge: _____ cfs

Source of information: _____

6. GAGE RECORD INFORMATION - N/A

Location of nearest gage to project site *(along flooding source or similar watershed; specify)*

_____

Gaging Station: _____

Drainage area at gage: _____ mi^2

Number of years of data: _____

7. DATA REVISION

Please use the following table to list all the data and/or parameters affected by this request and identify them as new data *(New)* or as revising existing data *(Revised)*. *(If necessary, attach a separate sheet.)*

Data Parameter	New	Revised	Data Source
Land Use	■	☐	City of Mesquite MPU, 1995
Rainfall Loss	■	☐	City of Mesquite MPU, 1995
Drainage Facilities	■	☐	Field Survey - Pentacore
Topography	■	☐	Field Survey - Pentacore
Storm Duration	■	☐	CCRFCD Manual 1990

- The data source can be a Federal, State, or local government agency, or a private source. Some State and local governments may have less strict data requirements than Federal agencies, in which case the hydrologic data may not be accepted by FEMA unless it is demonstrated that the data give a better estimate of the flood discharge.
- Attach documentation corroborating each data source *(i.e., certified statement, report, bibliographical reference to a published document)*. In the case of a published document or a government report, providing copies of the cover and pertinent pages may be helpful.

8. METHODOLOGY FOR NEW ANALYSIS

☐ Statistical Analysis of Gage Records *(use Attachment A)*

☐ Regional Regression Equations *(use Attachment B)*

■ Precipitation/Runoff Model *(use Attachment C)*

☐ Other *(specify; attach backup computations and supporting data)* _____

_____

ATTACHMENT A: STATISTICAL ANALYSIS OF GAGE RECORDS

Gaging Station: _____

Gage Location (latitude and longitude): _____

		FIS:	Revised:
1.	Number of years of data		
	Systematic		
	Historical		
2.	Homogeneous data	☐ Yes ☐ No	☐ Yes ☐ No
3.	Data adjustments	☐ Yes ☐ No	☐ Yes ☐ No
4.	Number of high outliers		
	Low outliers		
	Zero events		
5.	Generalized skew		
6.	Station skew		
7.	Adopted skew		
8.	Probability distribution used (justify if log-Pearson III was not used)		
9.	Transfer equations to ungaged sites.		☐ Yes ☐ No
	If yes, specify method		
10.	Expected probability*		☐ Yes ☐ No
11.	Comparison of results with other analyses.		☐ Yes ☐ No
	If yes, describe comparison		

* **FEMA** does not accept expected probability analyses for the purpose of reflecting flood hazard information in a FIS.

If any data is not available, indicate with "N/A".

Attach analysis including plot of flood frequency curve.

ATTACHMENT B: REGIONAL REGRESSION EQUATIONS

1. Bibliographical Reference:

_____

_____

_____

(Attach a copy of title page, table of contents, and pertinent pages including equations.)

2. Gaged or ungaged stream: _____

3. Hydrologic region(s): _____
Attach backup map.

4. Provide parameters, values, and source of data used to define parameters.

_____

_____

_____

		FIS:	Revised:
5.	Urbanized conditions calculations	☐ Yes ☐ No	☐ Yes ☐ No
6.	Percent of watershed urbanization	_____	_____
7.	Is the watershed controlled?	☐ Yes ☐ No	☐ Yes ☐ No
8.	Comparison with other analyses	☐ Yes ☐ No	☐ Yes ☐ No

If the answer to 5, 7, or 8 is yes, explain methodology in Comments.

If data is not available, indicate by N/A.

Comments

_____

_____

_____

_____

Attach computation and supporting maps, delineating the watershed boundary and drainage area divides.

ATTACHMENT C: PRECIPITATION/RUNOFF MODEL

		FIS:	Revised:
1.	Method or model used:	TR-20	HEC-1
	Version:	N/A	4.0
	Date:	1982	September 1995
2.	Source of rainfall depth:	NOAA	NOAA
3.	Source of rainfall distribution:	N/A	USACOE
4.	Rainfall duration:	3-hour	6-hour
5.	Areal adjustment to precipitation (%):	0.95	0.89
6.	Maximum overland flow length:	N/A	500 feet
7.	Hydrograph development method:	SCS Unit Hydrograph	SCS Unit Hydrograph
8.	Loss rate method:	SCS Curve Numbers	Green-Ampt
	Source of soils information:	SCS	SCS
	Source of land use information:	N/A	Mesquite MPU
9.	Channel routing method:	N/A	Muskingum, Kin. Wave
10.	Reservoir routing:	☐ Yes ■ No	☐ Yes ■ No
11.	Baseflow considerations:	☐ Yes ■ No	☐ Yes ■ No
	If yes, explain how baseflow was determined:		
12.	Snowmelt considerations?	☐ Yes ■ No	☐ Yes ■ No
13.	Model calibration?	☐ Yes ■ No	☐ Yes ■ No
	If yes, explain how calibration was performed		
14.	Future land use conditions?		☐ Yes ■ No
	If yes, explain why:		

Note: FEMA policy is to base flooding on existing conditions.

If data is not available, indicate by "N/A".

Attach precipitation/runoff model, hydrologic model schematic, curve number calculations, time of concentration calculations, and supporting maps, delineating the watershed boundary and drainage area divides.

ATTACHMENT D: CONFIDENCE LIMITS EVALUATION

Stream: _____

Select location for Confidence Limits Evaluation *(describe location):* _____

_____

Discharges for selected location:

Exceedance Probability		FIS		Revised	
10%	(10-year)	_____	cfs	_____	cfs
2%	(50-year)	_____	cfs	_____	cfs
1%	(100-year)	_____	cfs	_____	cfs
0.2%	(500-year)	_____	cfs	_____	cfs

1% (100-year) Flood Confidence Intervals

90% Confidence Interval: 5% limit _____ cfs
95% limit _____ cfs

50% Confidence Interval: 25% limit _____ cfs
75% limit _____ cfs

If the value of the 100-year frequency flood in the FIS is beyond the 50% confidence interval but within the 90% confidence interval, does the 100-year water surface elevation change by *1.0 foot or more?*

☐ Yes ☐ No

Note: An example of confidence limits analysis can be found in Appendix 9 of Bulletin 17B.

Attach Confidence Limits Analysis.

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDRAULIC ANALYSIS FORM**	*FEMA USE ONLY*	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1997*

PUBLIC BURDEN DISCLOSURE NOTICE

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

Community Name: Mesquite, Clark County, Nevada

Flooding Source: Abbott Wash
(One form for each flooding source)

Project Name/Identifier: Abbott and Pulsipher Washes FIS Restudy

1. REACH TO BE REVISED

Downstream limit: I-15

Upstream Limit: Northern boundary of Mesquite city limits

2. EFFECTIVE FIS

☐ Not studied

■ Studied by approximate methods

Downstream limit of study Virgin River

Upstream limit of study Just north of I-15

☐ Studied by detailed methods

Downstream limit of detailed study

Upstream limit of detailed study

☐ Floodway delineated

Downstream limit of Floodway

Upstream limit of Floodway

3. HYDRAULIC ANALYSIS

Why is the hydraulic analysis different from that used to develop the FIRM? *(Check all that apply)*

☐ Not studied in FIS

■ Improved hydrologic data/analysis. Explain: The revised hydrologic analysis by the City of Mesquite MPU includes more detailed drainage basin delineations and uses the HEC-1 computer model and Green-Ampt method for rainfall loss rate, and uses a 6-hour storm duration.

■ Improved hydraulic analysis. Explain: Updated topographic information (i.e., 1-foot and 2-foot contour intervals). Utilizes HEC-2 software capabilities.

☐ Flood control structure. Explain:

☐ Other. Explain:

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

4. Models Submitted

For areas which have detailed flooding:

input and output listings along with files on diskette (if available) for each of the models listed below (items 1, 2, 3, 4, and 5) and summary of the source of input parameters used in the models must be provided. The summary must include a complete description of any changes made from model to model (e.g. duplicate effective model to corrected effective model). At a minimum, the Duplicate Effective (item 1) and the Revised or Post-Project Conditions (item 4) models must be submitted. See instructions for directions on when other models may be required.

For areas which do not have detailed flooding:

Only the 100-year flood profile is required. A hydraulic model is not required for areas which do not have detailed flooding; however, BFEs may not be added to the revised FIRM. If a hydraulic model is developed for the area, items 3 and 4 described below must be submitted.

If hydraulic models are not developed, hydraulic analyses for existing or pre-project conditions and revised or post-project conditions must be submitted. All calculations must be submitted for these analyses. (See Item 6 below.)

1. Duplicate Effective Model — Natural ☐ Floodway ☐

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

2. Corrected Effective Model — Natural ☐ Floodway ☐

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

3. Existing or Pre-Project Conditions Model — Natural ☐ Floodway ☐

The duplicate effective or corrected model is modified to produce the existing or pre-project conditions model to reflect any modifications that have occurred within the floodplain since the date of the effective model but prior to the construction of the project for which the revision is being requested. If no modification has occurred since the date of the effective model, then this model would be identical to the corrected effective or duplicate effective model.

4. Revised or Post-Project Conditions Model — Natural ☐ Floodway ☐

The existing or pre-project conditions model *(or duplicate effective or corrected effective model, as appropriate)* is revised to reflect revised or post-project conditions. This model must incorporate any physical changes to the floodplain since the effective model was produced as well as the effects of the project. When the request is for proposed project this Model should reflect proposed conditions.

5. Other: Please attach a sheet describing all other models or calculations submitted. Existing Conditions Model. — Natural ■ Floodway ☐

6. Hydraulic Analyses (Only if Hydraulic Models are not developed)

Attach all calculations for the existing or pre-project conditions and the revised or post-project conditions. Proceed to Form 5, "Riverine/Coastal Mapping Form".

5. MODEL PARAMETERS (from model used to revise 100-year water surface elevation)

1. *Discharges:*

	Upstream Limit	Downstream Limit
10-year	N/A	N/A
50-year	N/A	N/A
100-year	3,156 cfs	3,156 cfs
500-year	N/A	N/A

Attach diagram showing changes in 100-year discharge

2. Explain how the starting water surface elevations were determined Critical depth was assumed.

3. Give range of friction loss coefficients *(Manning's "N")* Channel . . . . . 0.015 - 0.040

Overbanks . . . 0.015 - 0.040

If friction loss coefficients are different anywhere along the revised reach from those used to develop the FIRM, give location, value used in the effective FIS, and revised values and an explanation as to how the revised values were determined.

Location	FIS	Revised
N/A		

Explain:

4. Describe how the cross section geometry data were determined *(e.g., field survey, topographic map, taken from previous study)* and list cross sections that were added.

Cross-section geometry data were determined by field survey and topographic maps developed specifically for this restudy.

5. Were natural channel banks selected as the location of the left and right channel banks in the model?

■ Yes ☐ No If no, explain why not:

5. MODEL PARAMETERS (Cont'd)

6. Explain how reach lengths for channel and overbanks were determined:

The flow lengths between cross-sections were determined by measuring along expected flow paths using the natural topography, the river centerline, banks, and engineering judgement as a guide.

5. RESULTS (from model used to revise 100-year water surface elevations) - N/A

1. Do the results indicate:

   a. Water surface elevations higher than end points of cross sections? ☐ Yes ☐ No

   b. Supercritical depth? ☐ Yes ☐ No

   c. Critical depth? ☐ Yes ☐ No

   d. Other unique situations? ☐ Yes ☐ No

   If yes to any of the above, attach an explanation that discusses the situation and how it is presented on the profiles, tables, and maps.

2. What is the maximum change in energy gradient between cross-sections? _____

   Specify location _____

3. What is the distance between the cross-sections in 2 above? _____

   Specify location _____

4. What is the maximum distance between cross-sections? _____

   Specify location _____

5. Floodway determination

   a. What is the maximum surcharge allowed by the community or State? _____ foot

   b. What is the maximum surcharge for the revised conditions? _____ foot

   Specify locations _____

   c. What is the maximum velocity? _____

   Specify location _____

   d. Are there any negative surcharge values at any cross-section? ☐ Yes ☐ No

   If yes, the floodway may need to widen. If it is not widened, please explain and indicate the maximum negative surcharge.

Explain: _____

6. RESULTS (Cont'd)

Is the discharge value used to determine the floodway anywhere different from that used to determine the natural 100-year flood elevations? . . . . . ☐ Yes ☐ No N/A

If yes, explain:

_____

_____

_____

7. Do 100-year water surface elevations increase at any location? . . . . . ☐ Yes ☐ No N/A

If yes, please attach a list of the locations where the increases occur, state whether or not the increases are located on the requestor's property, and provide an explanation of the reason for the increases. *(For example: State if the increase is due to fill placed within the floodway fringe or placed within the currently adopted floodway limits)*

_____

_____

_____

Attach a completed comparison table entitled: Water Surface Elevation Check (See page 6)

7. REVISED FIRM/FBFM AND FLOOD PROFILES - N/A

8. The revised water surface elevations tie into those computed by the effective FIS Model *(10-, 50-, 100-, and 500-year)*, downstream of the project at cross-section N/A within N/A feet (*vertical*) and upstream of the project at cross section N/A within N/A feet (*vertical*).

9. The revised floodway elevations tie into those computed by the effective FIS model, downstream of the project at cross section N/A within N/A feet (*vertical*) and upstream of the project at cross section N/A within N/A feet (*vertical*).

10. Attach profiles, at the same vertical and horizontal scale as the profiles in the effective FIS report, showing stream bed and profiles of all floods studied (without encroachment). Also, label all cross sections, road crossings (including low chord and top-of-road data), culverts, tributaries, corporate limits, and study limits. If channel distance has changed, the stationing should be revised for all profile sheets. - N/A

11. Attach a Floodway Data Table showing data for each cross section listed in the published Floodway Data Table in the FIS report. - N/A

Proceed to Riverine/Coastal Mapping Form (Form 5).

FEDERAL EMERGENCY MANAGEMENT AGENCY

WATER SURFACE ELEVATION CHECK - N/A

COMMUNITY NAME*	FLOODING SOURCE	PROJECT NAME/IDENTIFIER

	EFFECTIVE			DUPLICATE EFFECTIVE			CORRECTED EFFECTIVE			EXISTING/PRE-PROJECT			REVISED/PROJECT		
SECNO	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]

COMMENTS: *N/A, please see FEMA Floodway Data

1 - 100-year (natural) Water Surface Elevation 2 - Encroachment (floodway) Water Surface Elevation 3 - Surcharge Value

Include all cross sections in the models between tie-in points. Any interpolated values should be indicated in parentheses.

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE/COASTAL MAPPING FORM**	*FEMA USE ONLY*	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1997*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

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

Community Name: Mesquite, Clark County, Nevada

Flooding Source: Abbott Wash

Project Name/Identifier: Abbott and Pulsipher FIS Restudy

1. MAPPING CHANGES

1. A topographic work map of suitable scale, contour interval, and planimetric definition must be submitted showing *(indicate N/A when not applicable)*:

		Included
A.	Revised approximate 100-year floodplain boundaries (Zone A)	■ Yes ☐ No ☐ N/A
B.	Revised detailed 100- and 500-year floodplain boundaries	☐ Yes ☐ No ■ N/A
C.	Revised 100-year floodway boundaries	☐ Yes ☐ No ■ N/A
D.	Location and alignment of all cross sections used in the revised hydraulic model with stationing control indicated	■ Yes ☐ No ☐ N/A
E.	Stream alignments, road and dam alignments	■ Yes ☐ No ☐ N/A
F.	Current community boundaries	☐ Yes ■ No ☐ N/A
G.	Effective 100- and 500-year floodplain and 100-year floodway boundaries from the FIRM/FBFM reduced or enlarged to the scale of the topographic work map **100 Year Floodplain Only**	■ Yes ☐ No ☐ N/A
H.	Tie-ins between the effective and revised 100- and 500-year floodplains and 100-year floodway boundaries **100-Year Floodplains Only**	■ Yes ☐ No ☐ N/A
I.	The requestor's property boundaries and community easements	☐ Yes ■ No ☐ N/A
J.	The signed certification of a registered professional engineer	■ Yes ☐ No ☐ N/A
K.	Location and description of reference marks	■ Yes ☐ No ☐ N/A
L.	Vertical datum (example: NGVD, NAVD, etc.)	■ Yes ☐ No ☐ N/A
M.	Coastal zone designations tie into adjacent areas not being revised	☐ Yes ☐ No ■ N/A
N.	Location and alignment of all coastal transects used to revise the coastal analyses	☐ Yes ☐ No ■ N/A

If any of the items above are marked no or N/A, please explain: B. and C. approximate methods, F., Clark County and City of Mesquite boundaries are beyond study area, I., same as F., M. and N., not a coastal zone.

2. What is the source and date of the updated topographic information *(example: orthophoto maps, July 1985; field survey, May 1979, beach profiles, June 1987, etc.)*? Aerial photography flown Jan. 1998, July and Aug. 1997, Field Survey, March 1998.

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

   a. Effective FIS N/A scale 4-foot Contour interval

   b. Revision Request 1"=400' scale 1-foot and 2-foot Contour interval

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

Attach an annotated FIRM and FBFM at the scale of the effective FIRM and FBFM showing the revised 100-year and 500-year floodplains and the 100-year floodway boundaries and how they tie into those shown on the effective FIRM and FBFM downstream and upstream of the revision or adjacent to the area of revision for coastal studies. Attached additional pages if needed.

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

1. MAPPING CHANGES (Cont'd)

Flood Boundaries and 100-year water surface elevations:

a. Has the 100-year floodplain been shifted or increased or the 100-year water surface elevation increased at any location on property other than the requestor's or community's? ☐ Yes ■ No

If yes, please give the location of shift or increase and an explanation for the increase.

b. Have the affected property owners been notified of this shift or increase and the effect it will have on their property? ☐ Yes ☐ No N/A

If yes, please attach letters from these property owners stating they have no objections to the revised flood boundaries if a LOMR is being requested.

c. What is the number of insurable structures that will be impacted by this shift or increase? N/A

Have the floodway boundaries shifted or increased at any location compared to those shown on the effective FBFM or FIRM? ☐ Yes ☐ No N/A

If yes, explain:

If a V-zone has been designated, has it been delineated to extend landward to the heel of the primary frontal dune? ☐ Yes ☐ No N/A

If no, explain:

Manual or digital map submission:

☐ Manual
■ Digital

Digital map submissions may be used to update digital FIRMs (DFIRMs). For updating DFIRMs, these submissions must be coordinated with FEMA Headquarters as far in advance of submission as possible.

2. EARTH FILL PLACEMENT - N/A

1. The fill is: ☐ Existing ☐ Proposed

2. Has fill been/will be placed in the regulatory floodway? . . . . . ☐ Yes ☐ No

If yes, please attach completed Riverine Hydraulic Analysis Form.

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

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

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

If yes, justify steeper slopes _____

_____

b. Is adequate erosion protection provided for fill slopes exposed to moving flood waters? *(Slopes exposed to flows with velocities of up to 5 feet per second (fps) during the 100-year flood must, at a minimum, be protected by a cover of grass, vines, weeds, or similar vegetation; slopes exposed to flows with velocities greater than 5 fps during the 100-year flood must, at a minimum, be protected by stone or rock riprap.)* . . . . . ☐ Yes ☐ No

If no, describe erosion protection provided _____

_____

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

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

If yes, provide certification of fill compaction (item C. above) by the community's NFIP permit official, a registered professional engineer, or an accredited soils engineer.

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

If yes, is the fill protected from erosion by a flood control structure such as a revertment or revetment or seawall? . . . . . ☐ Yes ☐ No

If yes, attach the coastal structures form.

FEDERAL EMERGENCY MANAGEMENT AGENCY
REVISION REQUESTOR AND COMMUNITY OFFICIAL FORM

FEMA USE ONLY

O.M.B. Burden No. 3067-0148
Expires July 31, 1997

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.13 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

1. OVERVIEW

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

- ☐ Physical change
  - ☐ Existing
  - ☐ Proposed
- ■ Improved methodology
- ■ Improved data
- ☐ Floodway revision
- ☐ Other _____
  Explain _____

2. Flooding Source: Pulsipher Wash
3. Project Name/Identifier: Abbott and Pulsipher Washes FIS Restudy
4. FEMA zone designations affected: A, AE, AO, X
   (example: A, AH, AO, A1-A30, A99, AE, V, V1-30, VE, B, C, D, X)
5. The NFIP map panel(s) affected for all impacted communities is (are):

	Community No.	Community Name	County	State	Map No.	Panel No.	Effective Date
EX·	480301	Katy, City	Harris, Fort Bend	TX	480301	0005D	02/08/83
	80287	Harris County	Harris	TX	48201C	0220G	09/28/90
	003	Mesquite	Clark County	NV	32003C	0386D	8/16/95

6. The area of revision encompasses the following types of flooding, structures, and associated disciplines: *(check all that apply)*

Types of Flooding
- ■ Riverine
- ☐ Coastal
- ☐ Alluvial Fan
- ☐ Shallow Flooding *(e.g. Zones AO and AH)*
- ☐ Lakes

Affected by wind/wave action
- ☐ Yes
- ■ No

Structures
- ☐ Channelization
- ☐ Levee/Floodwall
- ■ Bridge/Culvert
- ☐ Dam
- ☐ Coastal
- ☐ Fill
- ☐ Pump Station
- ☐ None
- ☐ Channel Relocation
- ☐ Excavation
- ☐ Other *(describe)*

Disciplines*
- ■ Water Resources
  - ■ Hydrology
  - ■ Hydraulics
  - ☐ Sediment Transport
  - ☐ Interior Drainage
- ☐ Structural
- ☐ Geotechnical
- ■ Land Surveying
- ☐ Other *(describe)*

☐ Other *(describe)* _____

* **Attach completed "Certification by Registered Professional Engineer and/or Land Surveyor" Form for each discipline checked. (Form 2)**

2. FLOODWAY INFORMATION

7. Does the affected flooding source have a floodway designated on the effective FIRM or FBFM? ■ Yes ☐ No
8. Does the revised floodway delineation differ from that shown on the effective FIRM or FBFM? ■ Yes ☐ No
   If Yes, give reason: No floodway is delineated due to approximate methods.

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

Attach copy of either a public notice distributed by the community stating the community's intent to revise the floodway or a statement by the community that it has notified all affected property owners and affected adjacent jurisdictions.

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

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

3. PROPOSED ENCROACHMENTS - N/A

10. With floodways:

a. Does the revision request involve fill, new construction, substantial improvement, or other development in the floodway? ☐ Yes ☐ No

b. If yes, does the development cause the 100-year water surface elevation to increase at any location by more than 0.000 feet? ☐ Yes ☐ No

11. Without floodways:

a. Does the revision request involve fill, new construction, substantial improvement, or other development in the 100-year floodplain? ☐ Yes ☐ No

b. If yes, does the cumulative effect of all development that has occurred since the effective SFHA was originally identified cause the 100-year water surface elevation to increase at any location by more than one foot *(or other surcharge limit if community or state has adopted more stringent criteria)*? ☐ Yes ☐ No

If the answer to either Items 10b or 11b is yes, please provide documentation that all requirements of Section 65.12 of the NFIP regulations have been met, regarding evaluation of alternatives, notice to individual legal property owners, concurrence of CEO, and certification that no insurable structures are impacted.

4. REVISION REQUESTOR ACKNOWLEDGMENT

12. Having read NFIP Regulations, 44 CFR Ch. I, parts 59, 60, 61, and 72, I believe that the proposed revision ■ is ☐ is not in compliance with the requirements of the aforementioned NFIP Regulations.

5. COMMUNITY OFFICIAL ACKNOWLEDGMENT

13. Was this revision request reviewed by the community for compliance with the community's adopted floodplain management ordinances? ■ Yes ☐ No

14. Does this revision request have the endorsement of the community? ■ Yes ☐ No

If no to either of the above questions, please explain: _____

Please note that community acknowledgment and/or notification is required for all requests as outlined in Section 65.4(b) of the NFIP Regulations.

6. OPERATION AND MAINTENANCE

15. Does the physical change involve a flood control structure (e.g. levees, floodwalls, channelization, basins, dams)?
☐ Yes ■ No

If yes, please provide the following information for each of the new flood control structures:

A. Inspection of the flood control project will be conducted periodically by _____ (entity) _____ with a maximum interval of _____ months between inspections.

B. Based on the results of scheduled periodic inspections, appropriate maintenance of the flood control facilities will be conducted by _____ (entity) to ensure the integrity and degree of flood protection of the structure.

C. A formal plan of operation, including documentation of the flood warning system, specific actions and assignments of responsibility by individual name or title, and provisions for testing the plan at intervals not less than one year, ☐ has ☐ has not been prepared for the flood control structure.

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

[redacted]peration and maintenance plans

7. REQUESTED RESPONSE FROM FEMA

). After examining the pertinent NFIP regulations and reviewing the document entitled "Appeals, Revisions, and Amendments to Flood Insurance Maps: A Guide for Community Officials," dated January 1990, this request is for a:

____a. CLOMR — A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision *(LOMR or PMR)*, or proposed hydrology changes *(see 44 CFR Ch. I, Parts 60, 65, and 72)*.

____b. LOMR — A letter from FEMA officially revising the current NFIP map to show changes to floodplains, floodways, or flood elevations. LOMRs typically depict decreased flood hazards. *(See 44 CFR Ch. 1, Parts 60 and 65.)*

__X__c. PMR — A reprinted NFIP map incorporating changes to floodplains, floodways, or flood elevations. Because of the time and cost involved to change, reprint, and redistribute an NFIP map, a PMR is usually processed when a revision reflects increased flood hazards or large-scope changes. *(See 44 CFR Ch. 1, Parts 60 and 65.)*

____d. Other: Describe _____

8. FORMS INCLUDED

7 Form 2 entitled "Certification by Registered Professional Engineer And/Or Land Surveyor" must be submitted.

The[redacted]wing forms should be included with this request if (check the included forms):

Hydrologic analysis for flooding source differs from that used to develop FIRM	■ Hydrologic Analysis Form (Form 3)
Hydraulic analysis for riverine flooding differs from that used to develop FIRM	■ Riverine Hydraulic Analysis Form (Form 4)
The request is based on updated topographic information or a revised floodplain or floodway delineation is requested	■ Riverine/Coastal Mapping Form (Form 5)
The request involves any type of channel modification	☐ Channelization Form (Form 6)
The request involves new bridge or culvert or revised analysis of an existing bridge or culvert	■ Bridge/Culvert Form (Form 7) - See Attachment
The request involves a new revised levee/floodwall system	☐ Levee/Floodwall System Analysis Form (Form 8)
The request involves analysis of coastal flooding	☐ Coastal Analysis Form (Form 9)
The request involves coastal structures credited as providing protection from the 100-year flood	☐ Coastal Structures (Form 10)
The request involves an existing, proposed, or modified dam	☐ Dam Form (Form 11)
[redacted]request involves structures credited as providing protection from the 100-year flood on an alluvial fan	☐ Alluvial Fan Flooding Form (Form 12)

9. INITIAL REVIEW FEE

18. The minimum initial review fee for the appropriate request category has been included. ☐ Yes ■ No

Initial fee amount: $ _____

Check or money order only. Make check or money order payable to: National Flood Insurance Program. If paying by Visa or MasterCard please refer to the credit card information form which follows this form.

or

19. Is this request for a project that is for public benefit and is primarily intended for flood loss reduction to insurable structures in identified flood hazard areas which were in existence prior to the commencement of construction of the flood control project? ☐ Yes ■ No

or

14. Is this request to correct map errors, to include the effects of natural changes within the areas of special flood hazard, or solely to provide more detailed data? ■ Yes ☐ No

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

Jerry E. Pruitt

Signature of Revision Requestor

Jerry E. Pruitt, P.E., Project Manager

Printed Name and Title of Revision Requestor

G. C. Wallace, Inc.

Company Name

(702) 804-2000 1-20-99

Telephone No. Date

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

Signature of Community Official

J. Allen Bell, P.E., Director of Public Works

Printed Name and Title of Community Official

Mesquite, Clark County, Nevada

Community Name

25 - January - 1999

Date

Does this request impact any other communities? ☐ Yes ■ No

If yes, attach letters from all affected jurisdictions acknowledging revision request and approving changes to floodway, if applicable.

Note: Although a photograph of physical changes is not required, it may be helpful for FEMA's review.

ATTACHMENT TO FEMA FORM 1

17. (Con't)

Due to the number of bridges/culverts, the information normally shown on the Bridge/Culvert Form (Form 7 is located in the HEC-2 models and is not reproduced on the Form in an effort to save the community time and money.

FEDERAL EMERGENCY MANAGEMENT AGENCY CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR FORM	*FEMA USE ONLY*	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1997*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472.

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

1. This certification is in accordance with 44 CFR Ch. I, Section 65.2.
2. I am licensed with an expertise in Hydrology and Hydraulics
   [example: water resources *(hydrology, hydraulics, sediment transport, interior drainage)**, structural, geotechnical, land surveying.]
3. I have 8 years experience in the expertise listed above.
4. I have ☐ prepared ☒ reviewed the attached supporting data and analyses related to my expertise.
5. I ☒ have ☐ have not visited and physically viewed the project.
6. In my opinion, the following analyses and/or designs, is/are being certified:
   N/A
7. Based upon the following review, the modifications in place have been constructed in general accordance with plans and specifications.

   Basis for above statement: (check all that apply)

   a. ☐ Viewed all phases of actual construction.
   b. ☐ Compared plans and specifications with as-built survey information.
   c. ☐ Examined plans and specifications and compared with completed projects.
   d. ☒ Other Analyses only, no construction involved.
8. All information submitted in support of this request is 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: Jerry E. Pruitt, P.E.
(please print or type)

Title: Project Manager
(please print or type)

Registration No. 11902 Expiration Date: 12/31/99

State Nevada

Type of License Civil

Jerry E. Pruitt
Signature

10-29-98
Date

Seal
(Optional)

*Specify Subdiscipline

Note: Insert not applicable (N/A) when statement does not apply.

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

FEDERAL EMERGENCY MANAGEMENT AGENCY CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR FORM	FEMA USE ONLY	O.M.B. No. 3067-0148 Expires July 31, 1997

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average . 23 hour per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472.

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

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

2. I am licensed with expertise in Land Surveying
[example: water resources *(hydrology, hydraulics, sediment transport, interior drainage)** structural, geotechnical, land surveying.]

3. I have 16 years experience in the expertise listed above.

4. I have ☐ prepared ☒ reviewed the attached supporting data and analyses related to my expertise.

5. I ☒ have ☐ have not visited and physically viewed the project.

6. In my opinion, the following analyses and /or designs, is/are being certified:

N/A

7. Based on the following review, the modifications in place have been constructed in general accordance with plans and specifications.

Basis for above statement: (check all that apply)
- a. ☐ Viewed all phases of actual construction.
- b. ☐ Compared plans and specifications with as-built survey information.
- c. ☐ Examined plans and specifications and compared with completed projects.
- d. ☒ Other *(Specify)* Viewed all as-built survey information.

8. All information submitted in support of this request is 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: Barry D. Bruland
(please print or type)

Title: Project Surveyor
(please print or type)

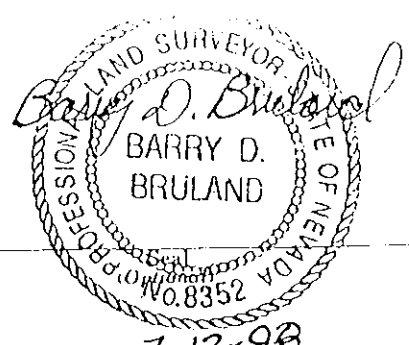
Registration No. 008352 Expiration Date: 12/31/98

State Nevada

Type of License Land Surveyor

Barry D. Bruland
Signature

7-13-98
Date



Barry D. Bruland
7-13-98

*Specify Subdiscipline

**Insert not applicable (N/A) if statement does not apply.

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDRAULIC ANALYSIS FORM**	*FEMA USE ONLY*	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1997*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 3.67 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management Agency, 500 C Street, S.W., Washington, DC 20472.

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

Community Name: Mesquite, Clark County, Nevada

Flooding Source: Pulsipher Wash
(One form for each flooding source)

Project Name/Identifier: Abbott and Pulsipher Washes FIS Restudy

1. HYDROLOGIC ANALYSIS IN FIS

■ Approximate study stream (Zone A)

☐ Detailed study stream (briefly explain methodology) _____

2. REASON FOR NEW HYDROLOGIC ANALYSIS

☐ No existing analysis

■ Improved data *(see data revision on page 3)*

☐ Changed physical conditions of watershed *(explain)* _____

■ Alternative methodology *(justify why the revised model is better than model used in the effective FIS)*
The SCS TR-20 Method is somewhat outdated. The revised model employs the USACOE HEC-1 software. Also, a 6-hour storm duration is now considered more appropriate than the 3-hour.

☐ Evaluation of proposed conditions (CLOMRs only) (explain) _____

☐ Other _____

If a computer program/model was used in revising the hydrologic analysis, please provide a diskette with the input files for the 10-, 50-, 100- and 500-year recurrence intervals.

Only the 100-year recurrence interval need be included for SFHAs designated as Zone A.

3. APPROVAL OF ANALYSIS

■ Approval of the hydrologic analysis, including the resulting peak discharge value(s) has been provided by the appropriate local, state, or Federal Agency. (i.e., Clark County Regional Flood Control District, City of Mesquite Public Works)
Attach evidence of approval.

☐ Approval of the hydrologic analysis is not required by any local, State or Federal Agency.

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

4. REVIEW OF RESULTS

Stream: Pulsipher Wash

Comparison of 100-year Discharges

Location:	Drainage area (Sq. mi.)	FIS (cfs):	Revised (cfs):
At I-15	4.9/4.7	2,070	3,478

Note: When revised discharges are not significantly different than FIS discharges, FEMA may require a confidence limits analysis on attachment D at a later date to complete the review.

As is often the case with revision requests, only a portion of a stream may actually be revised or be affected by a revision. Therefore, transition to the unrevised portion is important to maintain the continuity of the study. NFIP regulations stipulate that such a transition must be assured. What is the transition from the proposed discharges to the effective discharges? Please explain how the transition was made *(attach separate sheet if necessary)*.

The analysis incorporates the entire reach of the Pulsipher Wash from the north boundary of Mesquite city limits to the Virgin River.

ATTACH A COMPLETED "REVIEW OF RESULTS" PAGE FOR EACH FLOODING SOURCE.

Is the new hydrologic analysis being developed solely to revise the flow values presented in the FIS *(i.e. no changed hydraulic conditions)?* ☐ Yes ■ No

If yes, does the 100-year water surface elevation change by 1.0 foot or more? ☐ Yes ☐ No

Note: FEMA does not normally revise NFIP maps solely due to flow changes when changes in 100-year water surface elevation are less than 1.0 foot.

5. HISTORICAL FLOODING INFORMATION

Is historical data available for the flooding source? ☐ Yes ■ No

If yes, provide the following:

Location along flooding source: _____

Maximum peak discharge: _____ cfs

Second highest peak discharge: _____ cfs

Source of information: _____

6. GAGE RECORD INFORMATION - N/A

Location of nearest gage to project site *(along flooding source or similar watershed; specify)*

_____

Gaging Station: _____

Drainage area at gage: _____ mi^2

Number of years of data: _____

7. DATA REVISION

Please use the following table to list all the data and/or parameters affected by this request and identify them as new data *(New)* or as revising existing data *(Revised)*. *(If necessary, attach a separate sheet.)*

Data Parameter	New	Revised	Data Source
Land Use	■	☐	City of Mesquite MPU, 1995
Rainfall Loss	■	☐	City of Mesquite MPU, 1995
Drainage Facilities	■	☐	Field Survey - Pentacore
Topography	■	☐	Field Survey - Pentacore
Storm Duration	■	☐	CCRFCD Manual 1990

- The data source can be a Federal, State, or local government agency, or a private source. Some State and local governments may have less strict data requirements than Federal agencies, in which case the hydrologic data may not be accepted by FEMA unless it is demonstrated that the data give a better estimate of the flood discharge.
- Attach documentation corroborating each data source *(i.e., certified statement, report, bibliographical reference to a published document)*. In the case of a published document or a government report, providing copies of the cover and pertinent pages may be helpful.

8. METHODOLOGY FOR NEW ANALYSIS

☐ Statistical Analysis of Gage Records *(use Attachment A)*

☐ Regional Regression Equations *(use Attachment B)*

■ Precipitation/Runoff Model *(use Attachment C)*

☐ Other *(specify; attach backup computations and supporting data)* _____

_____

ATTACHMENT A: STATISTICAL ANALYSIS OF GAGE RECORDS

Gaging Station: _____

Gage Location (latitude and longitude): _____

		FIS:	Revised:
1.	Number of years of data		
	Systematic		
	Historical		
2.	Homogeneous data	☐ Yes ☐ No	☐ Yes ☐ No
3.	Data adjustments	☐ Yes ☐ No	☐ Yes ☐ No
4.	Number of high outliers		
	Low outliers		
	Zero events		
5.	Generalized skew		
6.	Station skew		
7.	Adopted skew		
8.	Probability distribution used (justify if log-Pearson III was not used)		
9.	Transfer equations to ungaged sites. If yes, specify method		☐ Yes ☐ No
10.	Expected probability*		☐ Yes ☐ No
11.	Comparison of results with other analyses. If yes, describe comparison		☐ Yes ☐ No

* FEMA does not accept expected probability analyses for the purpose of reflecting flood hazard information in a FIS.

If any data is not available, indicate with "N/A".

Attach analysis including plot of flood frequency curve.

ATTACHMENT B: REGIONAL REGRESSION EQUATIONS

1. Bibliographical Reference:

_____

_____

_____

(Attach a copy of title page, table of contents, and pertinent pages including equations.)

2. Gaged or ungaged stream: _____

3. Hydrologic region(s): _____
Attach backup map.

4. Provide parameters, values, and source of data used to define parameters.

_____

_____

_____

		FIS:	Revised:
5.	Urbanized conditions calculations	☐ Yes ☐ No	☐ Yes ☐ No
6.	Percent of watershed urbanization	_____	_____
7.	Is the watershed controlled?	☐ Yes ☐ No	☐ Yes ☐ No
8.	Comparison with other analyses	☐ Yes ☐ No	☐ Yes ☐ No

If the answer to 5, 7, or 8 is yes, explain methodology in Comments.

If data is not available, indicate by N/A.

Comments

_____

_____

_____

_____

Attach computation and supporting maps, delineating the watershed boundary and drainage area divides.

ATTACHMENT C: PRECIPITATION/RUNOFF MODEL

		FIS:	Revised:
1.	Method or model used:	TR-20	HEC-1
	Version:	N/A	4.0
	Date:	1982	September 1995
2.	Source of rainfall depth:	NOAA	NOAA
3.	Source of rainfall distribution:	N/A	USACOE
4.	Rainfall duration:	3-hour	6-hour
5.	Areal adjustment to precipitation (%):	0.96	0.91
6.	Maximum overland flow length:	N/A	500 feet
7.	Hydrograph development method:	SCS Unit Hydrograph	SCS Unit Hydrograph
8.	Loss rate method:	SCS Curve Numbers	Green-Ampt
	Source of soils information:	SCS	SCS
	Source of land use information:	N/A	Mesquite MPU
9.	Channel routing method:	N/A	Muskingum
10.	Reservoir routing:	☐ Yes ■ No	☐ Yes ■ No
11.	Baseflow considerations:	☐ Yes ■ No	☐ Yes ■ No

If yes, explain how baseflow was determined:

12.	Snowmelt considerations?	☐ Yes ■ No	☐ Yes ■ No
13.	Model calibration?	☐ Yes ■ No	☐ Yes ■ No

If yes, explain how calibration was performed

14.	Future land use conditions?		☐ Yes ■ No

If yes, explain why:

Note: FEMA policy is to base flooding on existing conditions.

If data is not available, indicate by "N/A".

Attach precipitation/runoff model, hydrologic model schematic, curve number calculations, time of concentration calculations, and supporting maps, delineating the watershed boundary and drainage area divides.

ATTACHMENT D: CONFIDENCE LIMITS EVALUATION

Stream: _____

Select location for Confidence Limits Evaluation *(describe location):* _____

_____

Discharges for selected location:

Exceedance Probability	FIS		Revised	
10% (10-year)	_____	cfs	_____	cfs
2% (50-year)	_____	cfs	_____	cfs
1% (100-year)	_____	cfs	_____	cfs
0.2% (500-year)	_____	cfs	_____	cfs

1% (100-year) Flood Confidence Intervals

90% Confidence Interval: 5% limit _____ cfs
95% limit _____ cfs

50% Confidence Interval: 25% limit _____ cfs
75% limit _____ cfs

If the value of the 100-year frequency flood in the FIS is beyond the 50% confidence interval but within the 90% confidence interval, does the 100-year water surface elevation change by 1.0 foot or more?

☐ Yes ☐ No

Note: An example of confidence limits analysis can be found in Appendix 9 of Bulletin 17B.

Attach Confidence Limits Analysis.

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDRAULIC ANALYSIS FORM**	*FEMA USE ONLY*	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1997*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472.

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

Community Name: Mesquite, Clark County, Nevada

Flooding Source: Pulsipher Wash
(One form for each flooding source)

Project Name/Identifier: Abbott and Pulsipher Washes FIS Restudy

1. REACH TO BE REVISED

Downstream limit: Virgin River

Upstream Limit: Northern boundary of Mesquite city limits

2. EFFECTIVE FIS

☐ Not studied

☐ Studied by approximate methods

Downstream limit of study _____

Upstream limit of study _____

■ Studied by detailed methods

Downstream limit of detailed study Virgin River

Upstream limit of detailed study Just north of I-15

■ Floodway delineated

Downstream limit of Floodway Virgin River

Upstream limit of Floodway Just north of I-15

3. HYDRAULIC ANALYSIS

Why is the hydraulic analysis different from that used to develop the FIRM? *(Check all that apply)*

☐ Not studied in FIS

■ Improved hydrologic data/analysis. Explain: The revised hydrologic analysis by the City of Mesquite MPU includes more detailed drainage basin delineations and uses the HEC-1 computer model and Green-Ampt method for rainfall loss rate, and uses a 6-hour storm duration.

■ Improved hydraulic analysis. Explain: Updated topographic information (i.e., 1-foot and 2-foot contour intervals). Utilizes BOSS RMS software capabilities.

☐ Flood control structure. Explain: _____

☐ Other. Explain: _____

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

4. Models Submitted

or areas which have detailed flooding:

t and output listings along with files on diskette (if available) for each of the models listed below (items 1, 2, 3, 4, and 5) and ummary of the source of input parameters used in the models must be provided. The summary must include a complete description of any hanges made from model to model (e.g. duplicate effective model to corrected effective model). At a minimum, the Duplicate Effective tem 1) and the Revised or Post-Project Conditions (item 4) models must be submitted. See instructions for directions on when other models ıay be required.

or areas which do not have *detailed flooding*:

)nly the 100-year flood profile is required. A hydraulic model is not required for areas which do not have detailed flooding; however, BFEs ıay not be added to the revised FIRM. If a hydraulic model is developed for the area, items 3 and 4 described below must be submitted.

hydraulic models are not developed, hydraulic analyses for existing or pre-project conditions and revised or post-project conditions must e submitted. All calculations must be submitted for these analyses. (See Item 6 below.)

1. Duplicate Effective Model — Natural ☐ Floodway ☐

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

2. Corrected Effective Model — Natural ☐ Floodway ☐

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

3. Existing or Pre-Project Conditions Model — Natural ☐ Floodway ☐

The duplicate effective or corrected model is modified to produce the existing or pre-project conditions model to reflect any modifications that have occurred within the floodplain since the date of the effective model but prior to the construction of the project for which the revision is being requested. If no modification has occurred since the date of the effective model, then this model would be identical to the corrected effective or duplicate effective model.

4. Revised or Post-Project Conditions Model — Natural ☐ Floodway ☐

The existing or pre-project conditions model *(or duplicate effective or corrected effective model, as appropriate)* is revised to reflect revised or post-project conditions. This model must incorporate any physical changes to the floodplain since the effective model was produced as well as the effects of the project. When the request is for proposed project this Model should reflect proposed conditions.

5. Other: Please attach a sheet describing all other models or calculations submitted. Existing Conditions Model. — Natural ■ Floodway ☐

6. Hydraulic Analyses (Only if Hydraulic Models are not developed) — Natural ☐ Floodway ☐

Attach all calculations for the existing or pre-project conditions and the revised or post-project conditions. Proceed to Form 5, "Riverine/Coastal Mapping Form".

5. MODEL PARAMETERS (from model used to revise 100-year water surface elevation)

1. Discharges:

	Upstream Limit	Downstream Limit
10-year	N/A	N/A
50-year	N/A	N/A
100-year	2,318 cfs	3,549 cfs
500-year	N/A	N/A

Attach diagram showing changes in 100-year discharge

2. Explain how the starting water surface elevations were determined Critical depth was assumed.

3. Give range of friction loss coefficients *(Manning's "N")* Channel . . . . . 0.015 - 0.030

Overbanks . . . 0.015 - 0.040

If friction loss coefficients are different anywhere along the revised reach from those used to develop the FIRM, give location, value used in the effective FIS, and revised values and an explanation as to how the revised values were determined.

Location	FIS	Revised
N/A		

Explain:

4. Describe how the cross section geometry data were determined *(e.g., field survey, topographic map, taken from previous study)* and list cross sections that were added.

Cross-section geometry data were determined by field survey and topographic maps developed specifically for this restudy.

5. Were natural channel banks selected as the location of the left and right channel banks in the model?

■ Yes ☐ No If no, explain why not:

5. MODEL PARAMETERS (Cont'd)

Explain how reach lengths for channel and overbanks were determined:

The flow lengths between cross-sections were determined by measuring along expected flow paths using the natural topography, the river centerline, banks, and engineering judgement as a guide.

5. RESULTS (from model used to revise 100-year water surface elevations) - N/A

Do the results indicate:

a. Water surface elevations higher than end points of cross sections? ☐ Yes ☐ No

b. Supercritical depth? ☐ Yes ☐ No

c. Critical depth? ☐ Yes ☐ No

d. Other unique situations? ☐ Yes ☐ No

If yes to any of the above, attach an explanation that discusses the situation and how it is presented on the profiles, tables, and maps.

What is the maximum change in energy gradient between cross-sections? _____

Specify location _____

What is the distance between the cross-sections in 2 above? _____

Specify location _____

What is the maximum distance between cross-sections? _____

Specify location _____

Floodway determination

a. What is the maximum surcharge allowed by the community or State? _____ foot

b. What is the maximum surcharge for the revised conditions? _____ foot

Specify locations _____

c. What is the maximum velocity? _____

Specify location _____

d. Are there any negative surcharge values at any cross-section? ☐ Yes ☐ No

If yes, the floodway may need to widen. If it is not widened, please explain and indicate the maximum negative surcharge.

Explain: _____

6. RESULTS (Cont'd)

Is the discharge value used to determine the floodway anywhere different from that used to determine the natural 100-year flood elevations? . . . . . ☐ Yes ☐ No N/A

If yes, explain:

_____

_____

_____

Do 100-year water surface elevations increase at any location? . . . . . ☐ Yes ☐ No N/A

If yes, please attach a list of the locations where the increases occur, state whether or not the increases are located on the requestor's property, and provide an explanation of the reason for the increases. *(For example: State if the increase is due to fill placed within the floodway fringe or placed within the currently adopted floodway limits)*

_____

_____

_____

Attach a completed comparison table entitled: Water Surface Elevation Check (See page 6)

7. REVISED FIRM/FBFM AND FLOOD PROFILES - N/A

8. The revised water surface elevations tie into those computed by the effective FIS Model *(10-, 50-, 100-, and 500-year)*, downstream of the project at cross-section N/A within N/A feet (*vertical*) and upstream of the project at cross section N/A within N/A feet (*vertical*).

9. The revised floodway elevations tie into those computed by the effective FIS model, downstream of the project at cross section N/A within N/A feet (*vertical*) and upstream of the project at cross section N/A within N/A feet (*vertical*).

10. Attach profiles, at the same vertical and horizontal scale as the profiles in the effective FIS report, showing stream bed and profiles of all floods studied (without encroachment). Also, label all cross sections, road crossings (including low chord and top-of-road data), culverts, tributaries, corporate limits, and study limits. If channel distance has changed, the stationing should be revised for all profile sheets. - N/A

11. Attach a Floodway Data Table showing data for each cross section listed in the published Floodway Data Table in the FIS report. - N/A

Proceed to Riverine/Coastal Mapping Form (Form 5).

WATER SURFACE E[illegible]ATION CHECK - N/A

COMMUNITY NAME*	FLOODING SOURCE	PROJECT NAME/IDENTIFIER

	EFFECTIVE			DUPLICATE EFFECTIVE			CORRECTED EFFECTIVE			EXISTING/PRE-PROJECT			REVISED/PROJECT		
SECNO	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]

COMMENTS: *N/A, please see FEMA Floodway Data

1 - 100-year (natural) Water Surface Elevation 2 - Encroachment (floodway) Water Surface Elevation 3 - Surcharge Value

nclude all cross sections in the models between tie-in points. Any interpolated values should be indicated in parentheses.

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE/COASTAL MAPPING FORM**	*FEMA USE ONLY*	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1997*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

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

Community Name: Mesquite, Clark County, Nevada

Flooding Source: Pulsipher Wash

Project Name/Identifier: Abbott and Pulsipher FIS Restudy

1. MAPPING CHANGES

1. A topographic work map of suitable scale, contour interval, and planimetric definition must be submitted showing *(indicate N/A when not applicable)*:

		Included		
A.	Revised approximate 100-year floodplain boundaries (Zone A)	■ Yes	☐ No	☐ N/A
B.	Revised detailed 100- and 500-year floodplain boundaries	☐ Yes	☐ No	■ N/A
C.	Revised 100-year floodway boundaries	☐ Yes	☐ No	■ N/A
D.	Location and alignment of all cross sections used in the revised hydraulic model with stationing control indicated	■ Yes	☐ No	☐ N/A
E.	Stream alignments, road and dam alignments	■ Yes	☐ No	☐ N/A
F.	Current community boundaries	☐ Yes	■ No	☐ N/A
G.	Effective 100- and 500-year floodplain and 100-year floodway boundaries from the FIRM/FBFM reduced or enlarged to the scale of the topographic work map **100 Year Floodplain Only**	■ Yes	☐ No	☐ N/A
H.	Tie-ins between the effective and revised 100- and 500-year floodplains and 100-year floodway boundaries **100-Year Floodplain Only**	■ Yes	☐ No	☐ N/A
I.	The requestor's property boundaries and community easements	☐ Yes	■ No	☐ N/A
J.	The signed certification of a registered professional engineer	■ Yes	☐ No	☐ N/A
K.	Location and description of reference marks	■ Yes	☐ No	☐ N/A
L.	Vertical datum (example: NGVD, NAVD, etc.)	■ Yes	☐ No	☐ N/A
M.	Coastal zone designations tie into adjacent areas not being revised	☐ Yes	☐ No	■ N/A
N.	Location and alignment of all coastal transects used to revise the coastal analyses	☐ Yes	☐ No	■ N/A

If any of the items above are marked no or N/A, please explain: B. and C. approximate methods, F., Clark County and City of Mesquite boundaries are beyond study area, L., same as F., M. and N., not a coastal zone.

2. What is the source and date of the updated topographic information *(example: orthophoto maps, July 1985; field survey, May 1979, beach profiles, June 1987, etc.)*? Aerial photography flown Jan. 1998, July & Aug. 1997, Field Survey, March 1998.

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

   a. Effective FIS 1"=400' scale 4-foot Contour interval

   b. Revision Request 1"=400' scale 1-foot and 2-foot Contour interval

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

Attach an annotated FIRM and FBFM at the scale of the effective FIRM and FBFM showing the revised 100-year and 500-year floodplains and the 100-year floodway boundaries and how they tie into those shown on the effective FIRM and FBFM downstream and upstream of the revision or adjacent to the area of revision for coastal studies. Attached additional pages if needed.

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

1. MAPPING CHANGES (Cont'd)

Flood Boundaries and 100-year water surface elevations:

a. Has the 100-year floodplain been shifted or increased or the 100-year water surface elevation increased at any location on property other than the requestor's or community's? ☐ Yes ■ No

If yes, please give the location of shift or increase and an explanation for the increase.

b. Have the affected property owners been notified of this shift or increase and the effect it will have on their property? . . . . . ☐ Yes ☐ No N/A

If yes, please attach letters from these property owners stating they have no objections to the revised flood boundaries if a LOMR is being requested.

c. What is the number of insurable structures that will be impacted by this shift or increase? N/A

Have the floodway boundaries shifted or increased at any location compared to those shown on the effective FBFM or FIRM? . . . . . ☐ Yes ☐ No N/A

If yes, explain:

If a V-zone has been designated, has it been delineated to extend landward to the heel of the primary frontal dune? . . . . . ☐ Yes ☐ No N/A

If no, explain:

Manual or digital map submission:

☐ Manual
■ Digital

Digital map submissions may be used to update digital FIRMs (DFIRMs). For updating DFIRMs, these submissions must be coordinated with FEMA Headquarters as far in advance of submission as possible.

2. EARTH FILL PLACEMENT - N/A

1. The fill is: ☐ Existing ☐ Proposed

Has fill been/will be placed in the regulatory floodway? . . . . . ☐ Yes ☐ No

If yes, please attach completed Riverine Hydraulic Analysis Form.

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

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

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

If yes, justify steeper slopes _____

_____

b. Is adequate erosion protection provided for fill slopes exposed to moving flood waters? *(Slopes exposed to flows with velocities of up to 5 feet per second (fps) during the 100-year flood must, at a minimum, be protected by a cover of grass, vines, weeds, or similar vegetation; slopes exposed to flows with velocities greater than 5 fps during the 100-year flood must, at a minimum, be protected by stone or rock riprap.)* . . . . . ☐ Yes ☐ No

If no, describe erosion protection provided _____

_____

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

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

If yes, provide certification of fill compaction (item C. above) by the community's NFIP permit official, a registered professional engineer, or an accredited soils engineer.

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

If yes, is the fill protected from erosion by a flood control structure such as a revertment or revetment or seawall? . . . . . ☐ Yes ☐ No

If yes, attach the coastal structures form.

Study Contractor: G.C. WALLACE, INC.

MAPPING INFORMATION INDEX

MESQUITE, CLARK COUNTY, NEVADA
(COMMUNITY NAME, STATE)

FLOOD INSURANCE STUDY

TYPE OF MAP	MAP DATE	NO. OF SHEETS	EXHIBIT NO.
FIRM		1	4.1
BASE		3	4.2
WORK		3	4.3
CROSS SECTION		3	4.3
AERIAL PHOTOS		14	4.4

FILE SURVEY NOTES

Study Contractor: G.C. WALLACE, INC.

MAPPING INFORMATION

WORK MAP DELINEATION SUMMARY

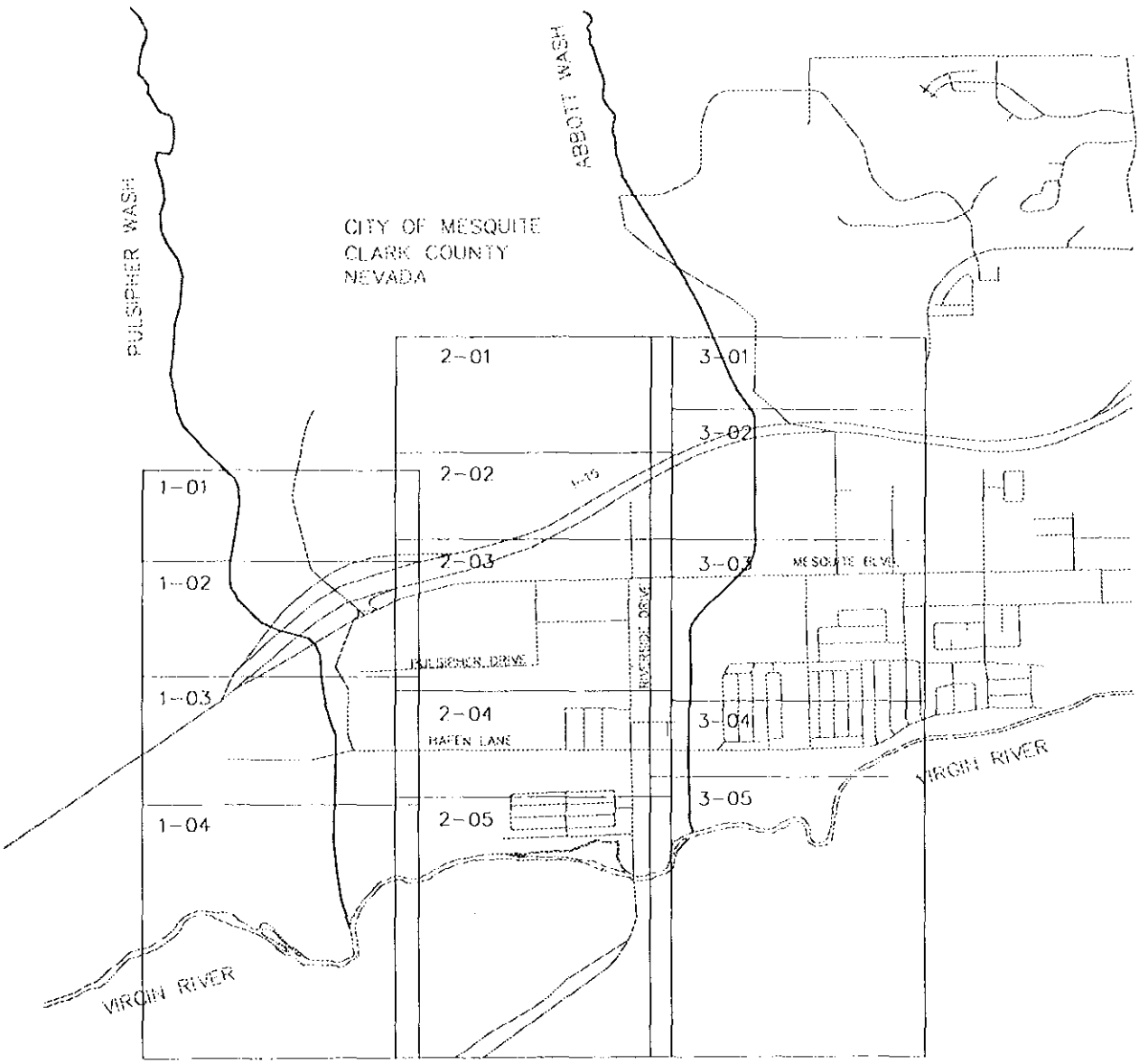
MESQUITE, CLARK COUNTY, NEVADA
(COMMUNITY NAME, STATE)

FLOOD INSURANCE STUDY

FOR THE ABBOTT WASH, AN APPROXIMATE 100-YEAR FLOODPLAIN WAS CONSTRUCTED FROM THE INDIVIDUAL FLOODPLAIN BOUNDARIES DELINEATED FROM THE HEC-2 MODEL.

FOR THE PULSIPHER WASH, AN APPROXIMATE 100-YEAR FLOODPLAIN WAS CONSTRUCTED FROM THE INDIVIDUAL FLOODPLAIN BOUNDARIES DELINEATED FROM THE THREE (3) HEC-2 MODELS

THE FLOODPLAIN BOUNDARIES WERE INTERPOLATED BETWEEN CROSS SECTIONS USING 1"=400' SCALE TOPOGRAPHIC MAPS. THE CONTOUR INTERVAL ON TOPOGRAPHIC MAPS NORTH OF I-15 IS 1-FOOT. THESE MAPS WERE CREATED FOR A SEPARATE STUDY. THE CONTOUR INTERVAL ON TOPOGRAPHIC MAPS SOUTH OF I-15 IS 2-FEET. THESE MAPS WERE CREATED SPECIFICALLY FOR THIS STUDY.



NORTH

NOT TO SCALE

ABBOTT AND PULSIPHER WASHES

FIS RESTUDY

EXHIBIT

AERIAL PHOTO LOCATION MAP

G.C. WALLACE, INC.
Engineering/Architecture 1555 SOUTH RAINBOW BLVD.,LAS VEGAS, NEVADA 89102

JOB NO. 550.035 PLOTED: 1/25/96

F:\550.035\DWG\FINAL\PHOTO.DWG

2-01
WILD 15/4 UAGA-F
Nr 13157 153,08
NORTH
SCALE 1" = 600'
ABBOTT WASH
I-15
MESQUITE BLVD.
1-14-98 NAM 1266LV 1:7200 ABBOT-8 PLSIPHER WASH 2-01

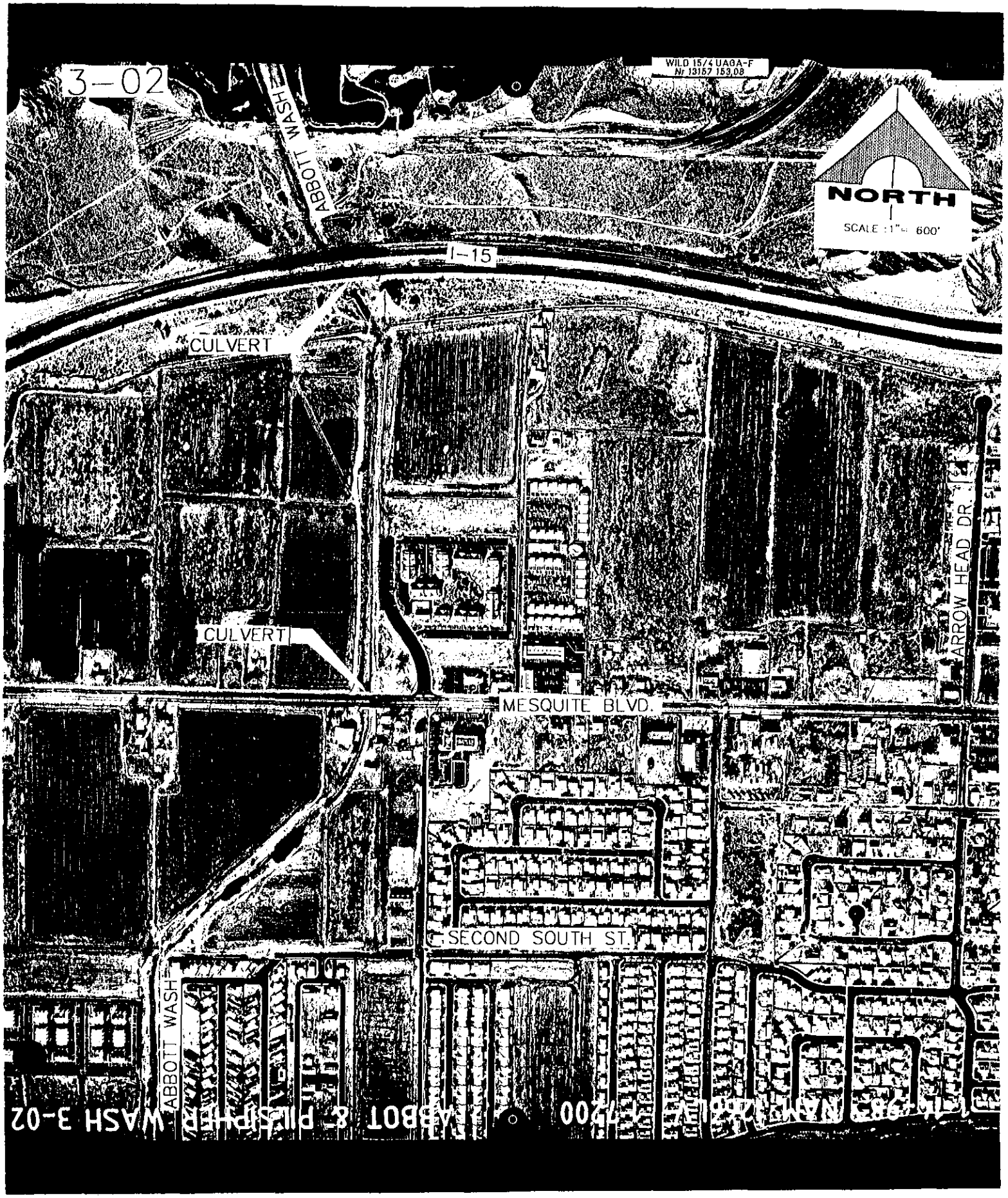
2-02
WILD 15/4 UAGA-F
Nr 13157 163,08
NORTH
SCALE : 1"= 600'
I-15
MESQUITE BLVD.
PULSIPHER ST.
RIVERSIDE DR.
LEAVITT LANE
1-14-98 NAM 1266E-V 1:7200 ABBOT & PULSIPHER WASH 2-02

2-03
WILD 15/4 UAGA-F
Nr 13157 153.08
I-15
MESQUITE BLVD.
PULSIPHER ST.
LEAVITT LANE
RIVERSIDE DR
ABBOTT WASH
NORTH
SCALE :1"= 600'
1-14-98 - NAM 12661V
1:7200
ABBOT & PULSIPHER WASH 2-03

2-04
WILD 15/4 UAGA-F
Nr 13157 153.08
NORTH
SCALE : 1" = 600'
HAFEN LANE
RIVERSIDE DR.
ABBOTT WASH
VIRGIN RIVER
1-14-98 NAM 1266LV 1:7200 ABBOTT & PILSIPHER WASH 2-04

2-05
WILD 16/4 UAGA-F
Nr 13157 153.08
JENSEN ST.
ABBOTT WASH
NORTH
SCALE 1" = 600'
VIRGIN RIVER
RIVERSIDE DR.
111
1-14-98 NAM 17661V 1:7200 ABBOT & PILSIPHER WASH 2-05

3-01
NORTH
SCALE : 1"= 600'
ABBOT WASH
CULVERT
I-15
GRAPE VINE ROAD
SUN VALLEY DR.
14-98 NAM 1266LV 1:7200 ABBOT & PLSIPHER WASH 3-01


3-02
WILD 15/4 UAGA-F
Nr 13157 153,08
ABBOTT WASH
NORTH
SCALE 1"= 600'
I-15
CULVERT
CULVERT
ARROW HEAD DR.
MESQUITE BLVD.
SECOND SOUTH ST.
ABBOTT WASH
ABBOT & PHOSPHER WASH 3-02

3-03
WILD 1574 UAGA-F
Nr. 13157 153.08
NORTH
SCALE 1" = 600'
ABBOTT WASH
CULVERT
MESQUITE BLVD
SECOND SOUTH ST
GRAPEVINE ROAD
ABBOTT WASH
HAFEN LANE
VIRGIN RIVER
1-14-98 NAM 1266LV 1:7200 ABBOT & PLSIPHER WASH 3-03

3-04
WILD 15/4 UAOA-F
Nr 13157 153.08
NORTH
SCALE: 1" = 600'
GRAPE VINE ROAD
HAFEN LANE
ABBOTT WASH
VIRGIN RIVER
12-14-98 NAM 1266E V 41 7200 ABBOTT & PLESIPHER WASH 3-04

3-05
WILD 16/4 UAGA-F
Nr 13157 153.08
VIRGIN RIVER
ABBOTT WASH
NORTH
SCALE 1" = 600'
1-14-98 NAM 1266LV 1" = 600' ABBOTT & PULSIPHER WASH 3-05

1-01
WILD 15/4 UAGA-F
Nr 13167 153,08
NORTH
SCALE : 1"= 600'
PULSIPHER WASH
CULVERT
I-15
LEAVITT LANE
1-14-98 NAM 12661 V 1:7200 ABBOT & PULSIPHER WASH 1-01

1-02
WILD 15/4 UAGA-F
Nr 13157 153.08
NORTH
SCALE : 1" = 600'
PULSIPHER WASH
CULVERT
LEAVITT LANE
PULSIPHER WASH
I-15
HAFEN LANE
CULVERT
VIRGIN RIVER
1-14-98 NAM 1266LV 1:7200 ABBOT & PULSIPHER WASH 1-02

1-03
WILD 15/4 UAGA-F
Nr 13157 163.08
LEAVITT LANE
I-15
CULVERT
HAFEN LANE
NORTH
SCALE :1" = 600'
VIRGIN RIVER
ABBOT & PLISPHER WASH 1-03
1-14-98 NAM 12661V 1:7200

1-04
WILD 15/4 UAGA-F
Nr 13167 153,08
PULSIPHER WASH
NORTH
SCALE 1" = 600'
VIRGIN RIVER
1-14-98 NAM 12661V 1:7200 ABBOT & PULSIPHER WASH 1-04

Study Contractor: G.C. WALLACE, INC.

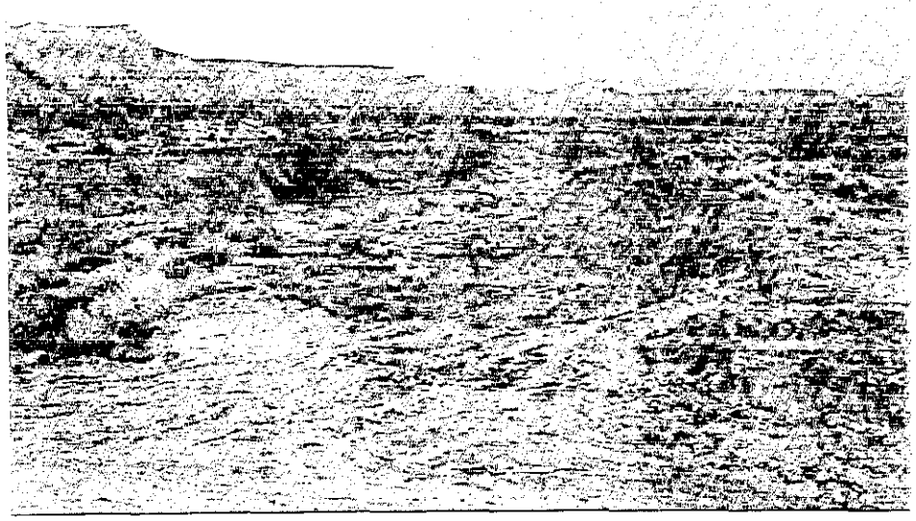
MISCELLANEOUS REFERENCE MATERIALS INDEX

MESQUITE, CLARK COUNTY, NEVADA
(COMMUNITY NAME, STATE)

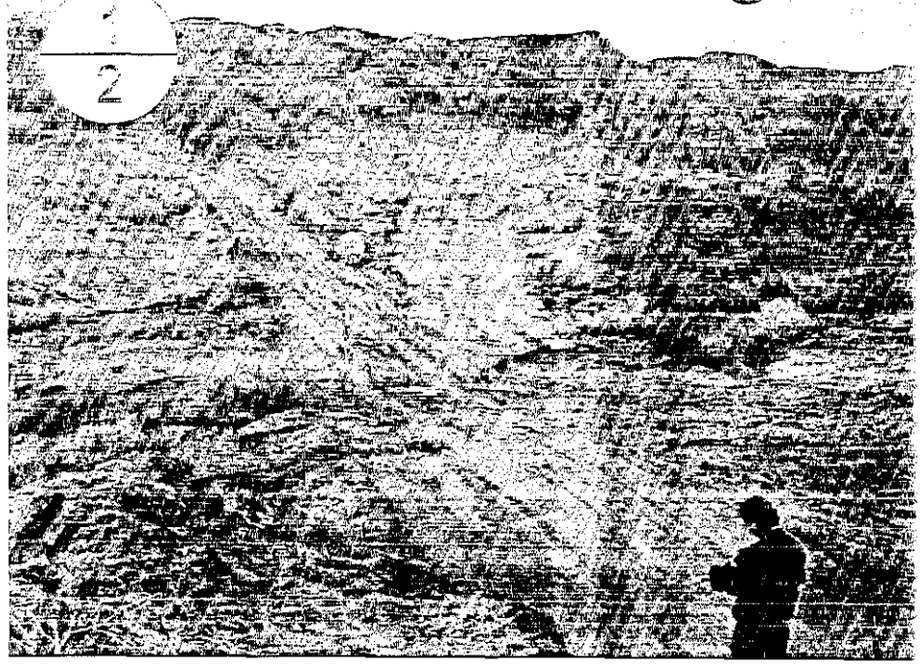
FLOOD INSURANCE STUDY

INFORMATION TYPE	ITEM DATE	EXHIBIT NO.
PHOTOGRAPH		5.1
SURVEY DATA		5.2
RAW DATA		5.2.1
DISKS		5.2.2
OPEN CHANNEL HYDRAULICS		5.3

1/1



1/2



1/3



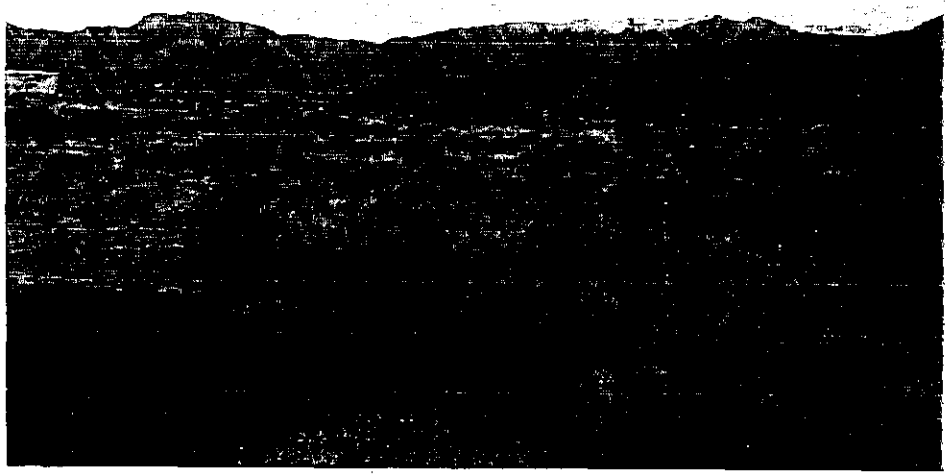
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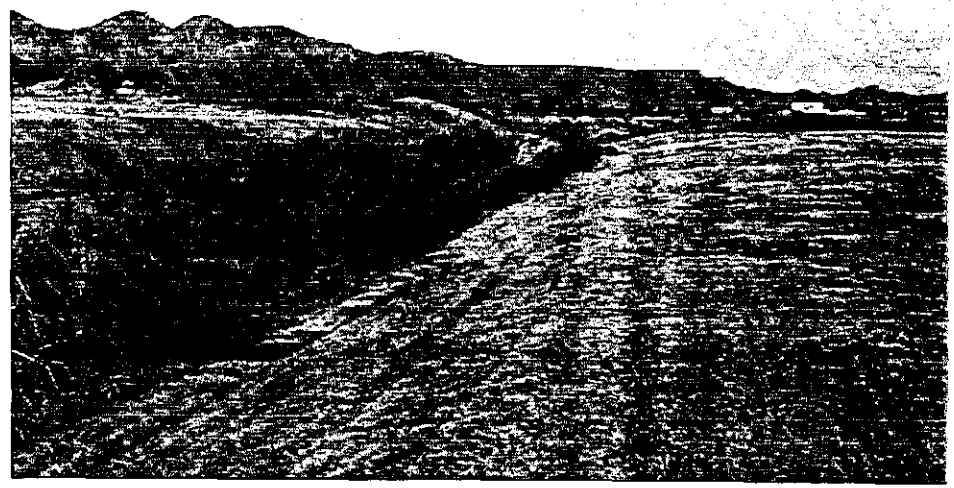
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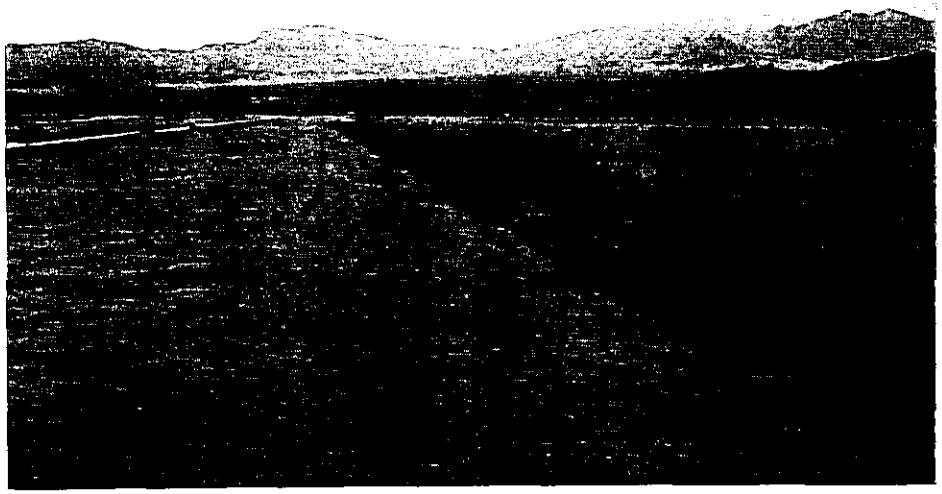
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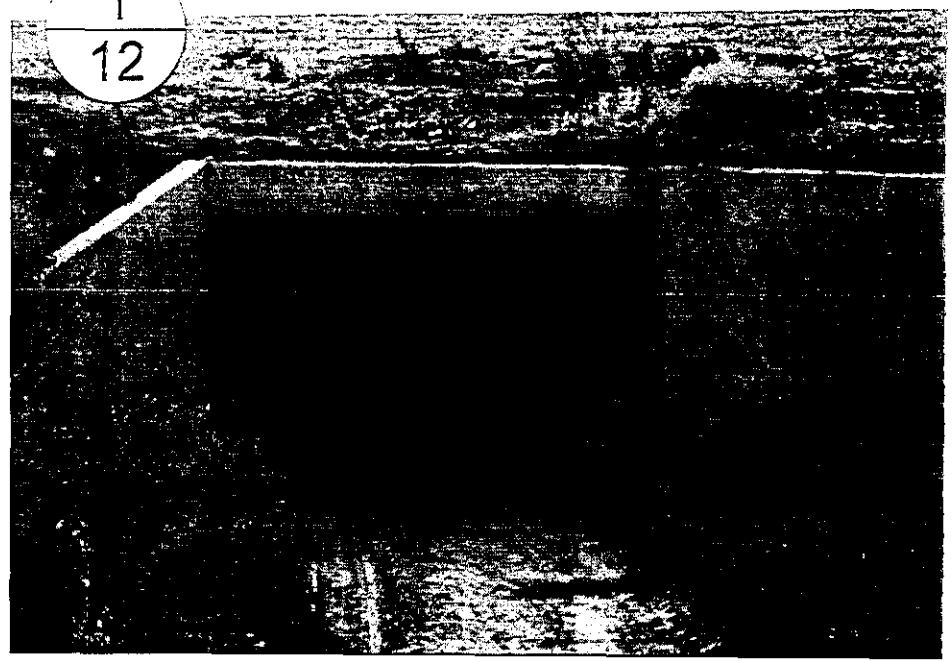
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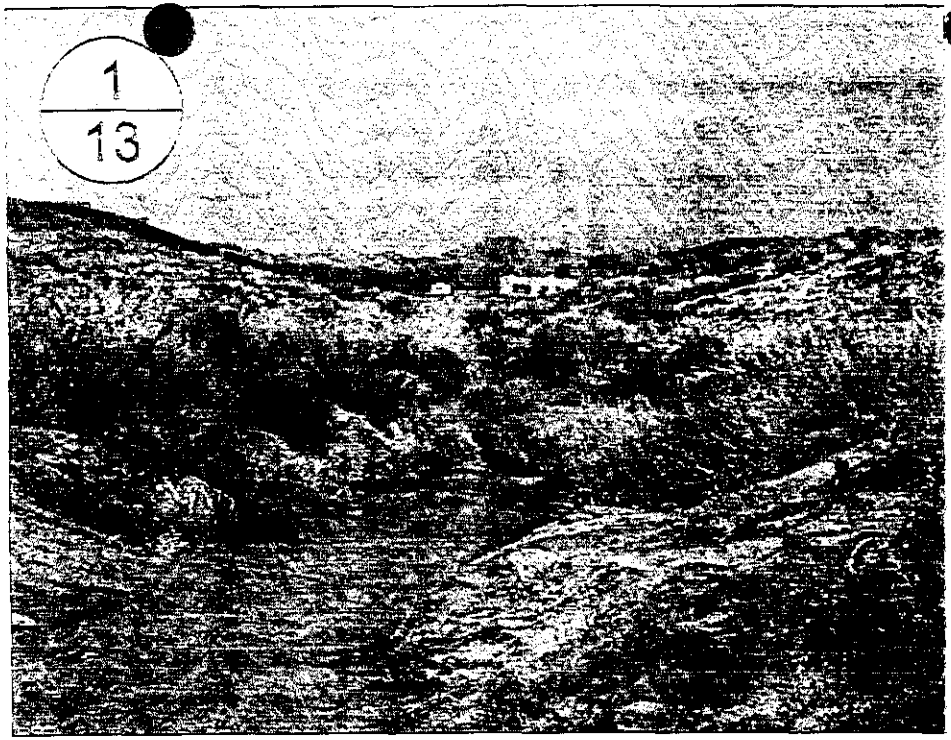
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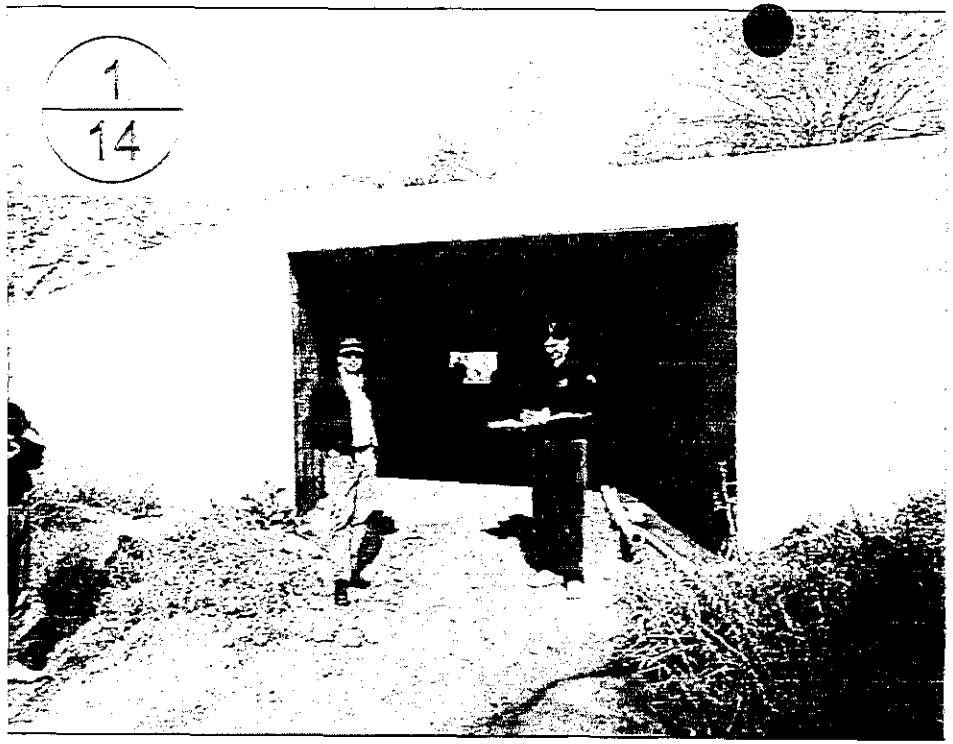
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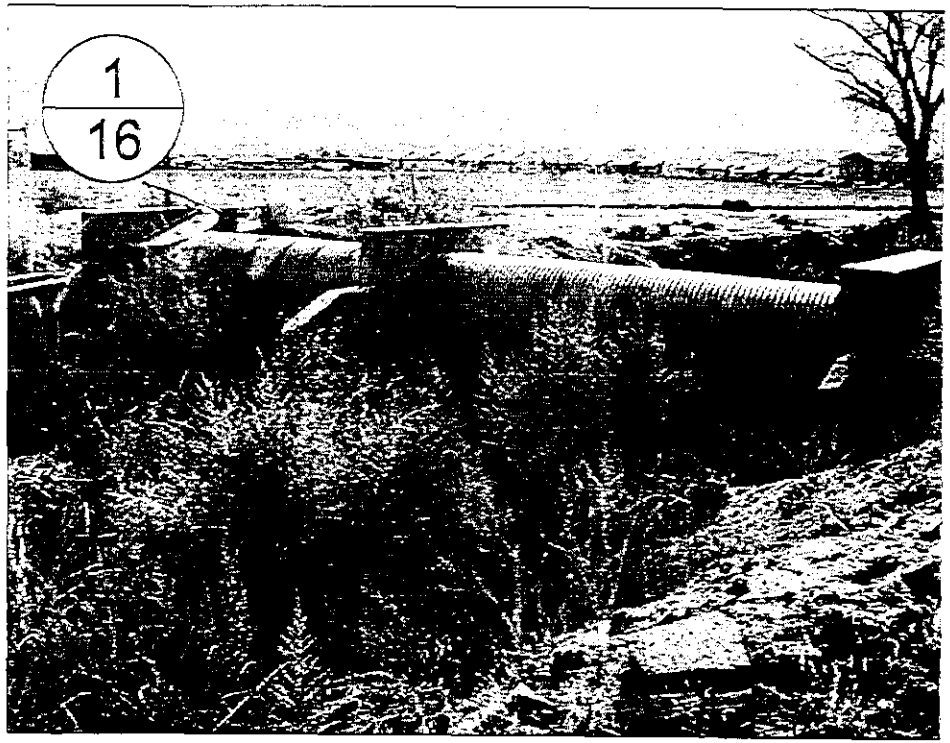
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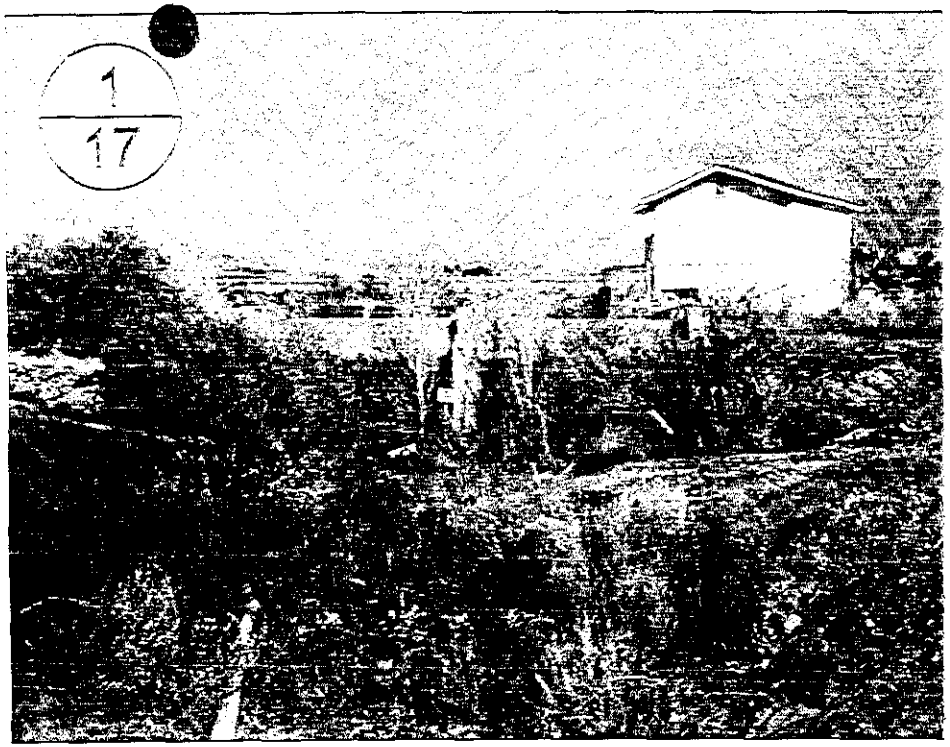
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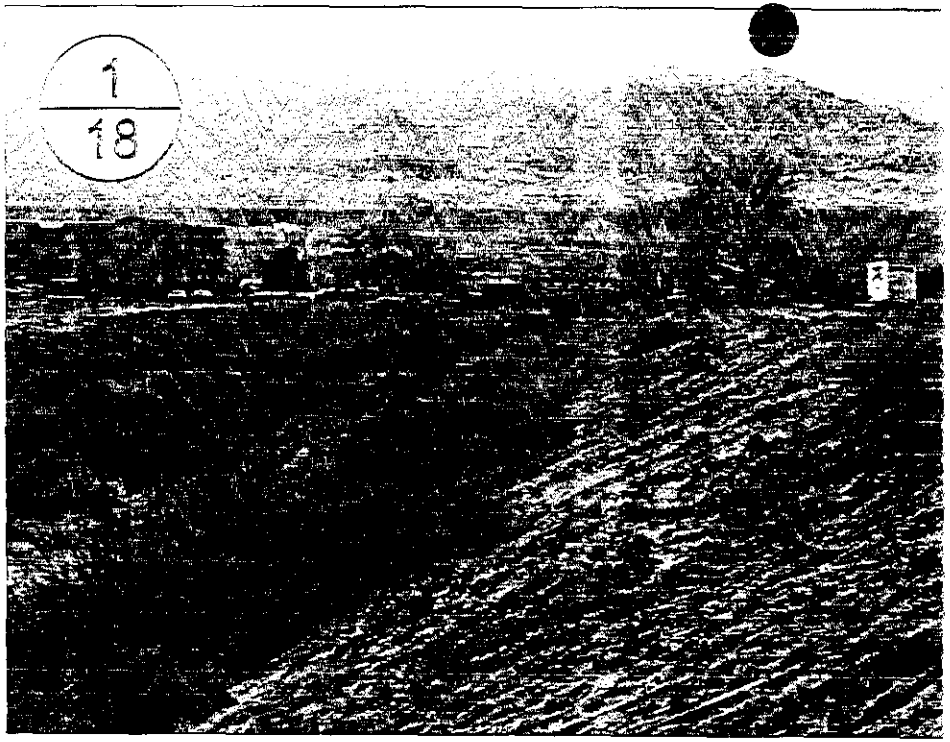
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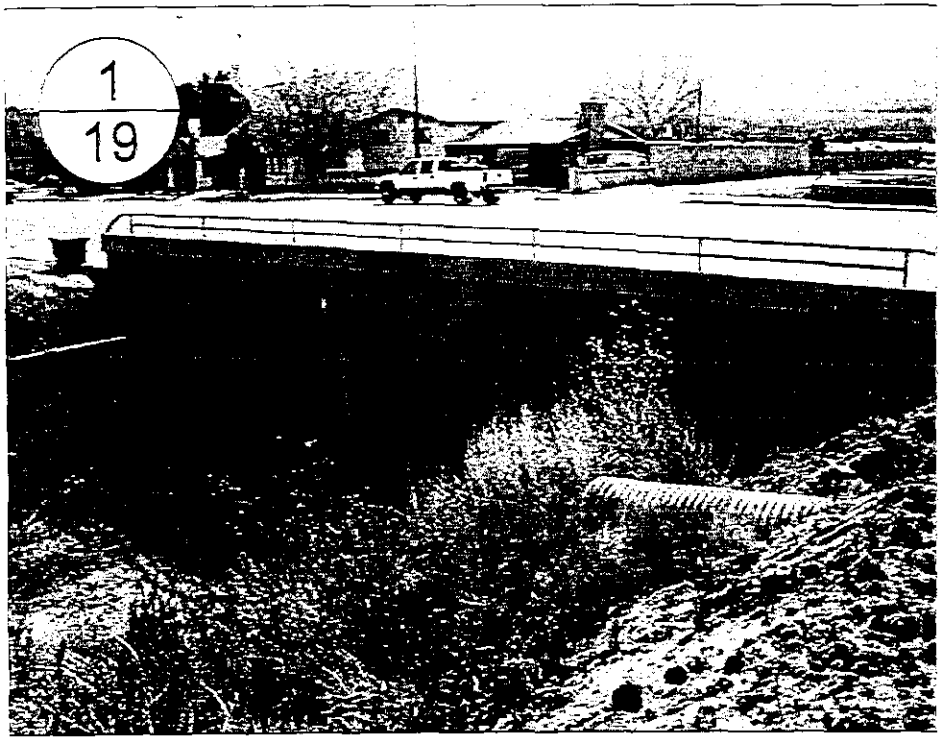
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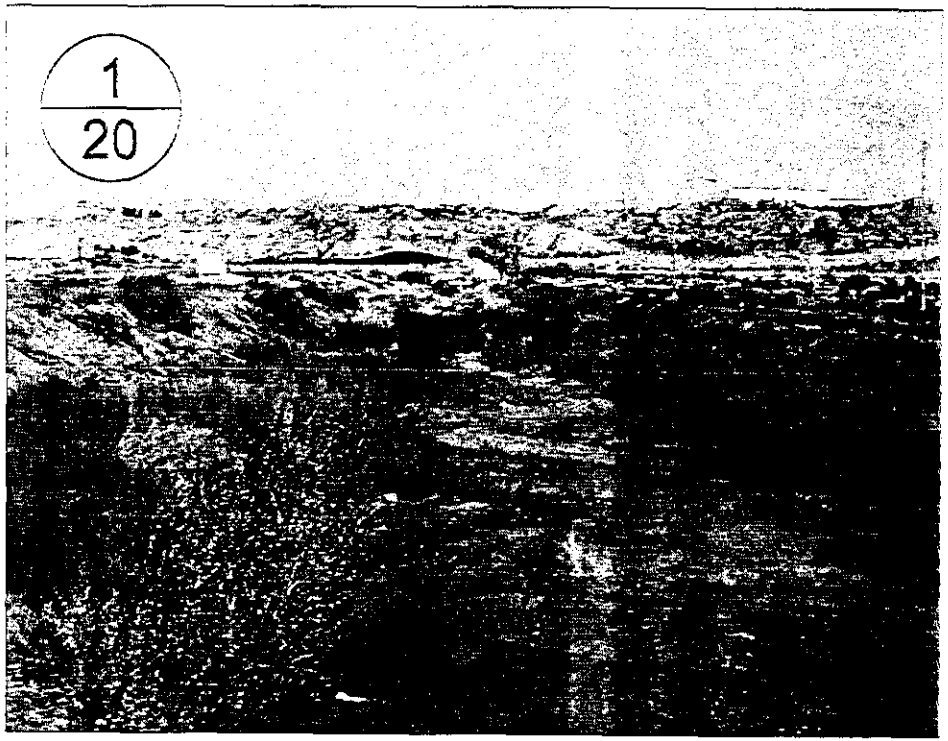
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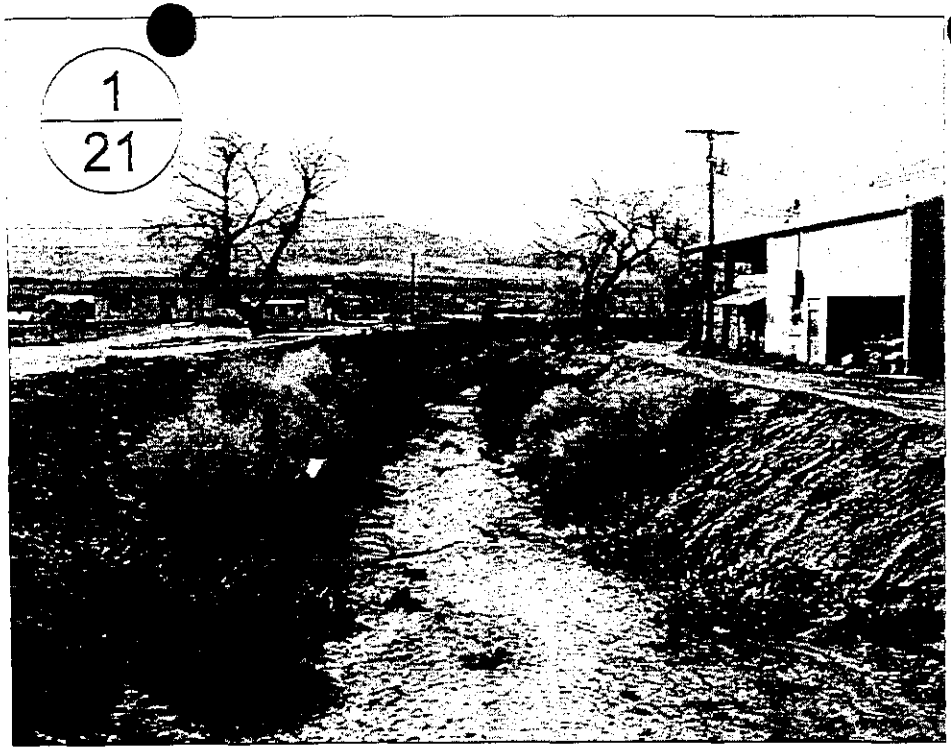


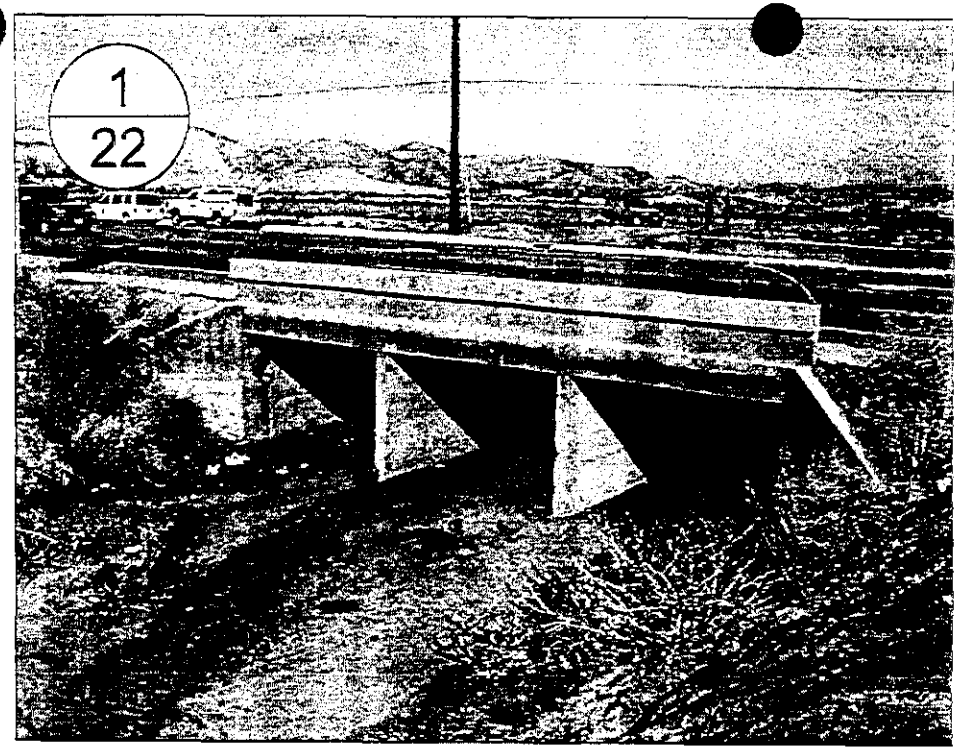
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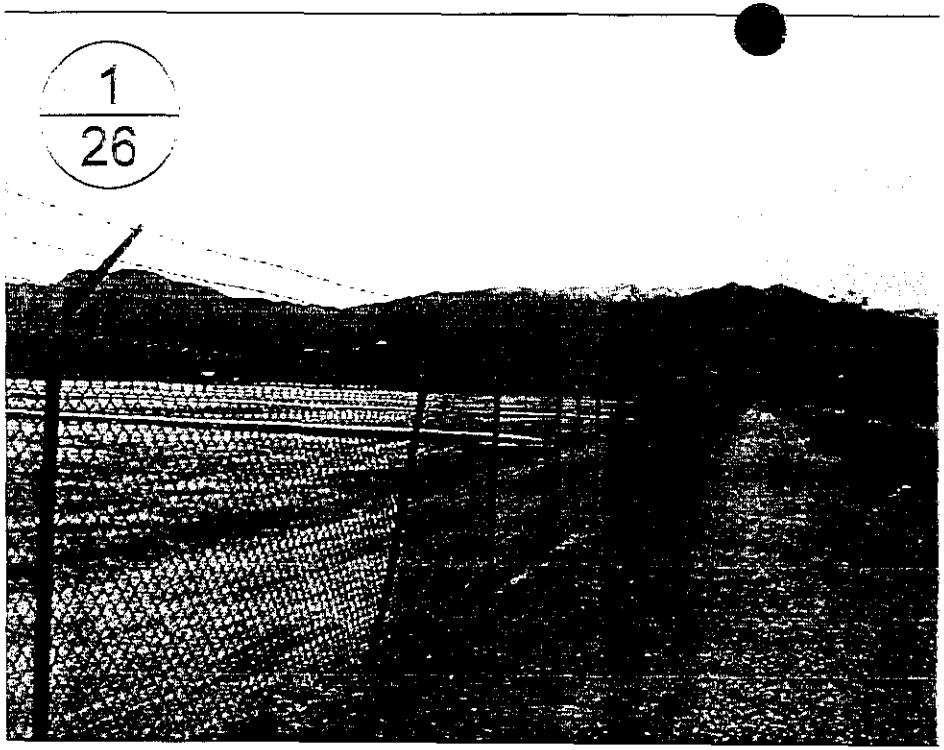

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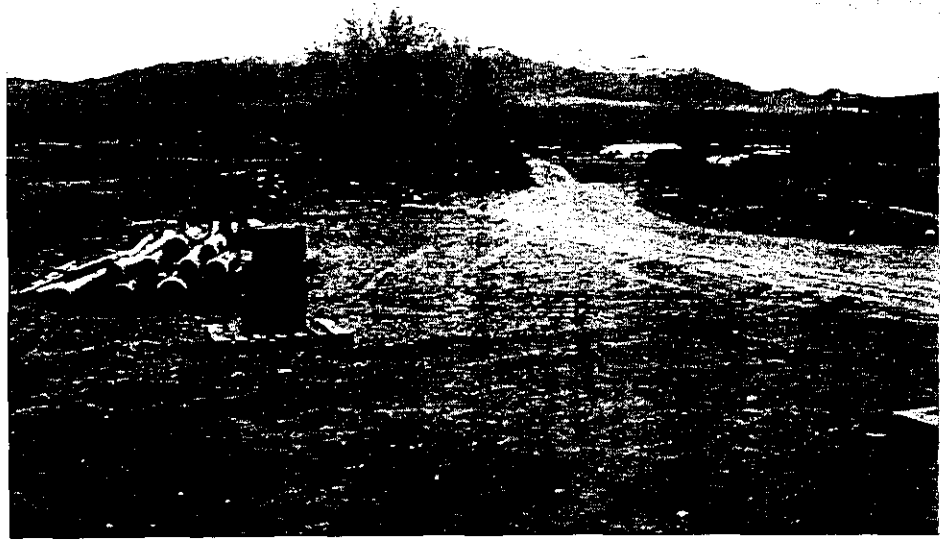
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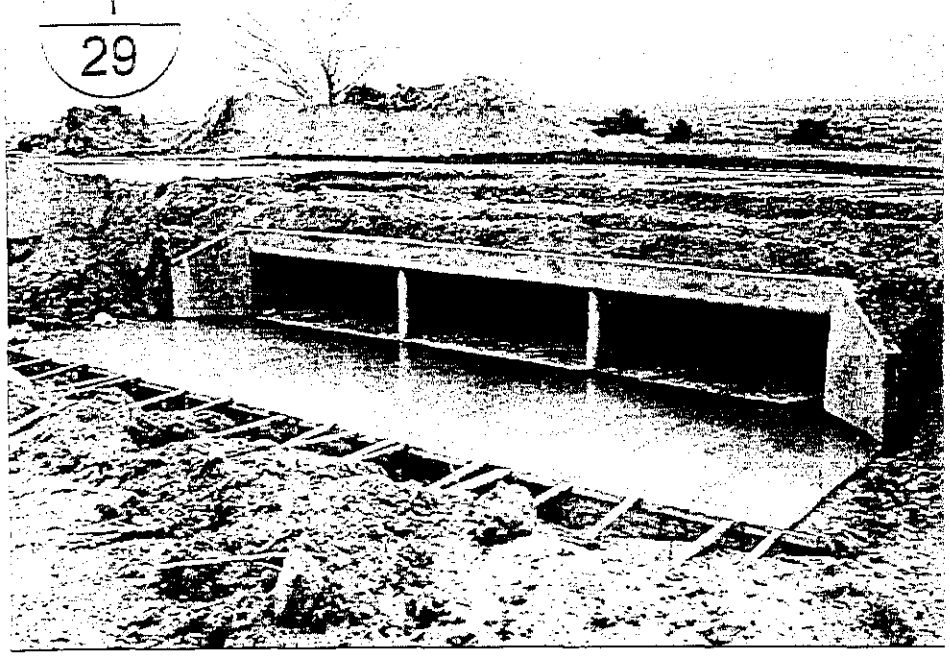
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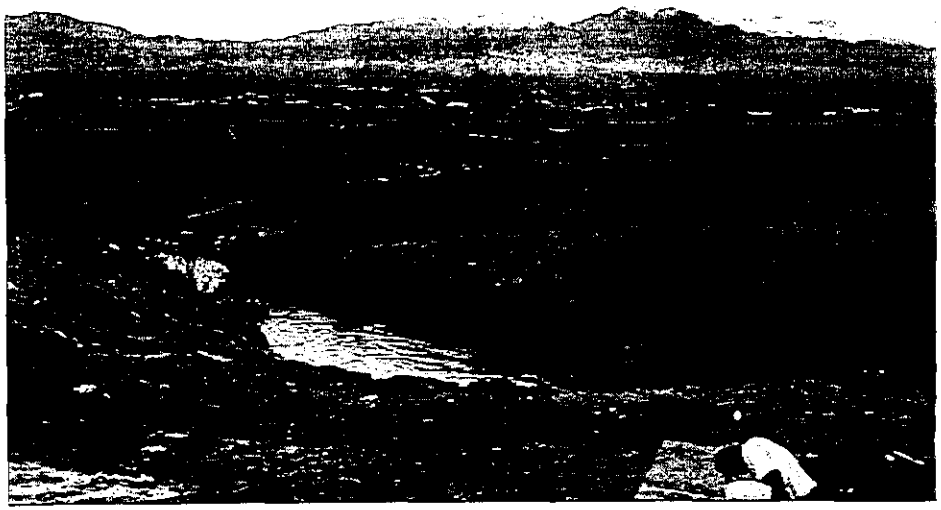
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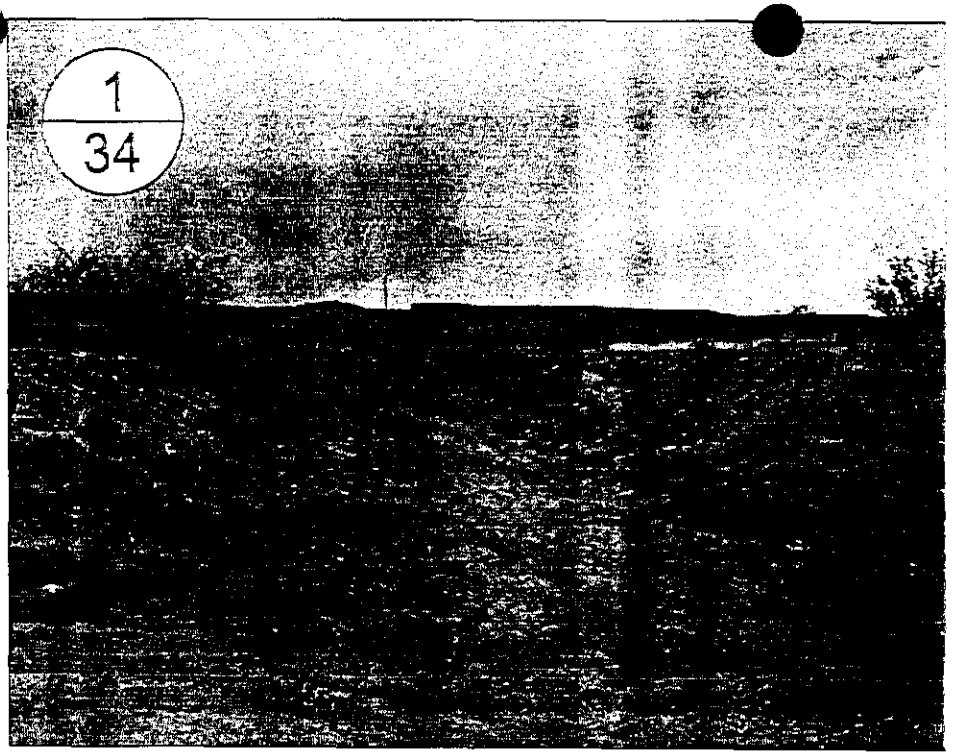
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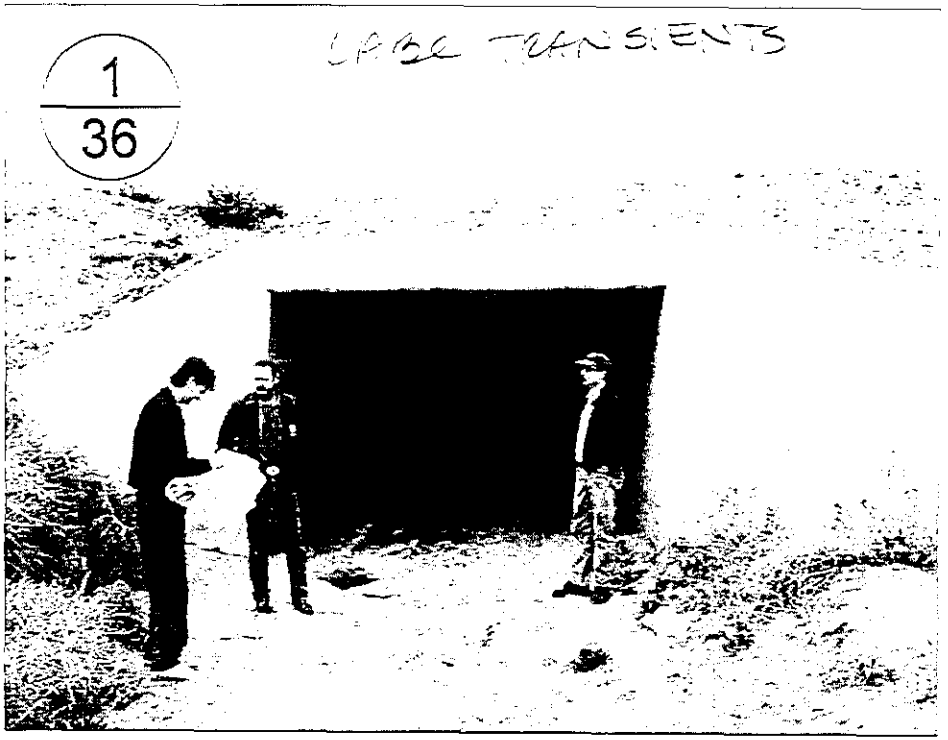


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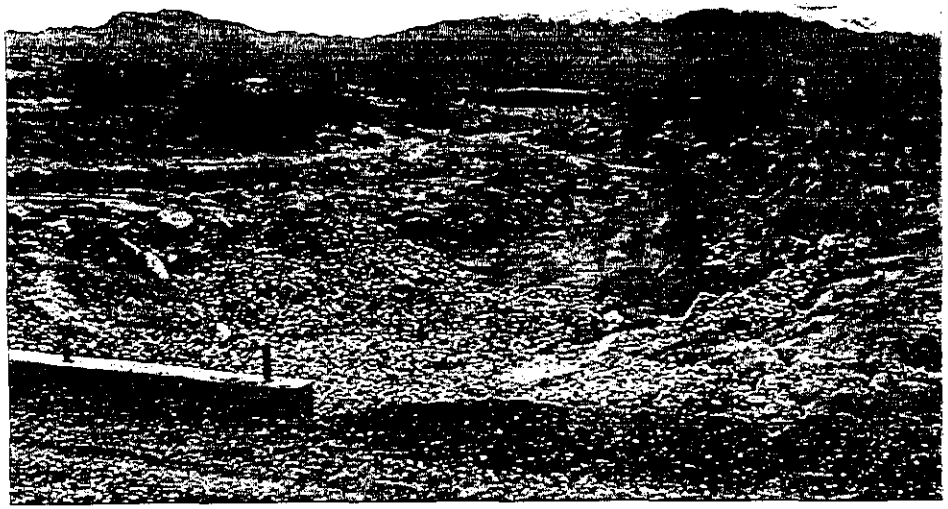


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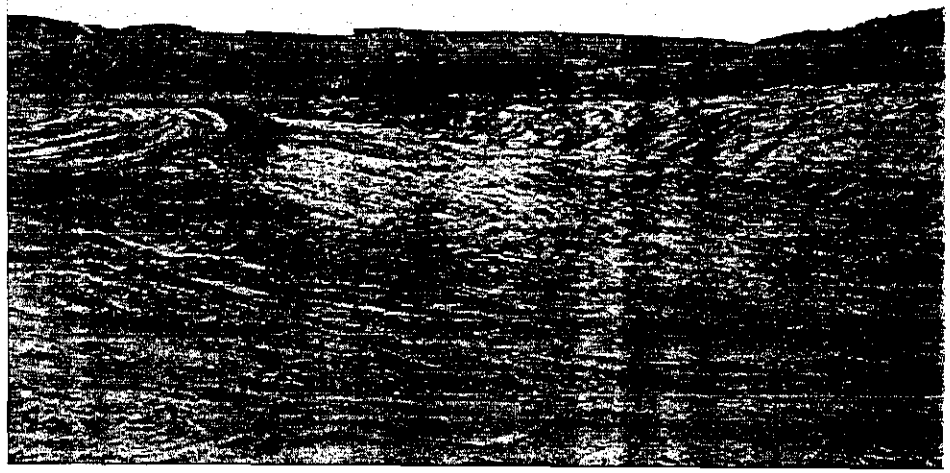
LARGE TRANSIENTS



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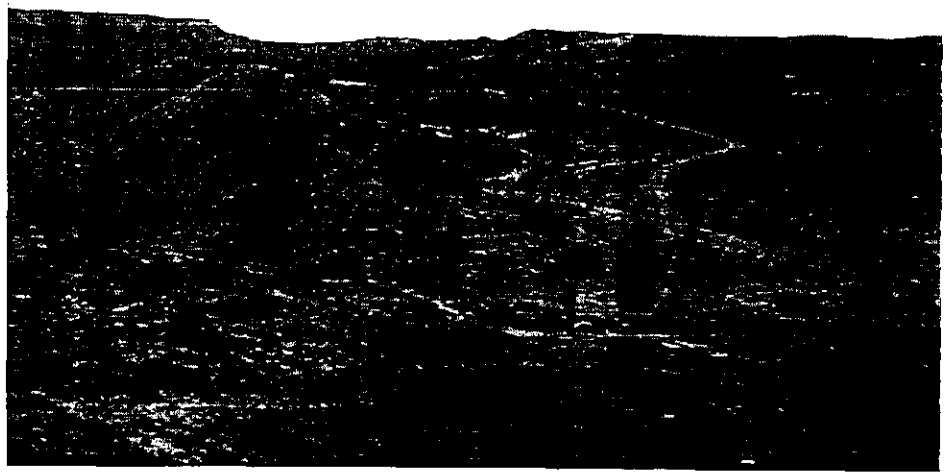
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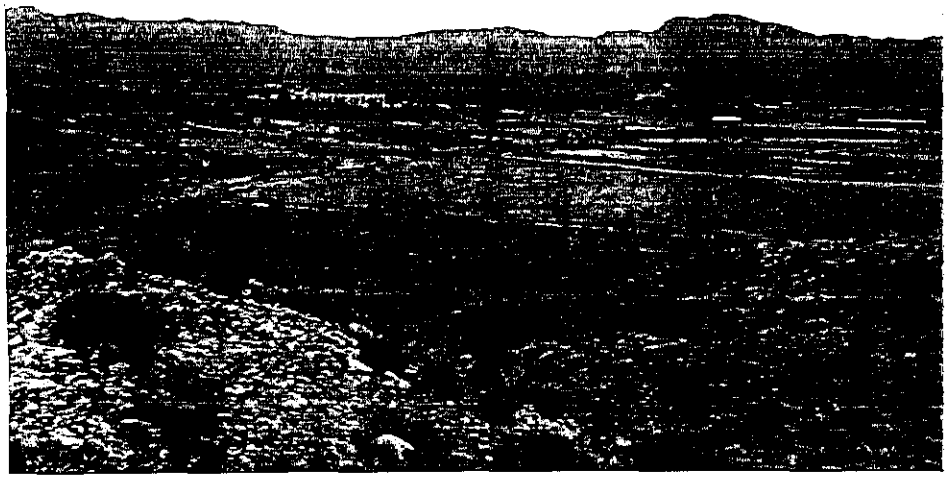
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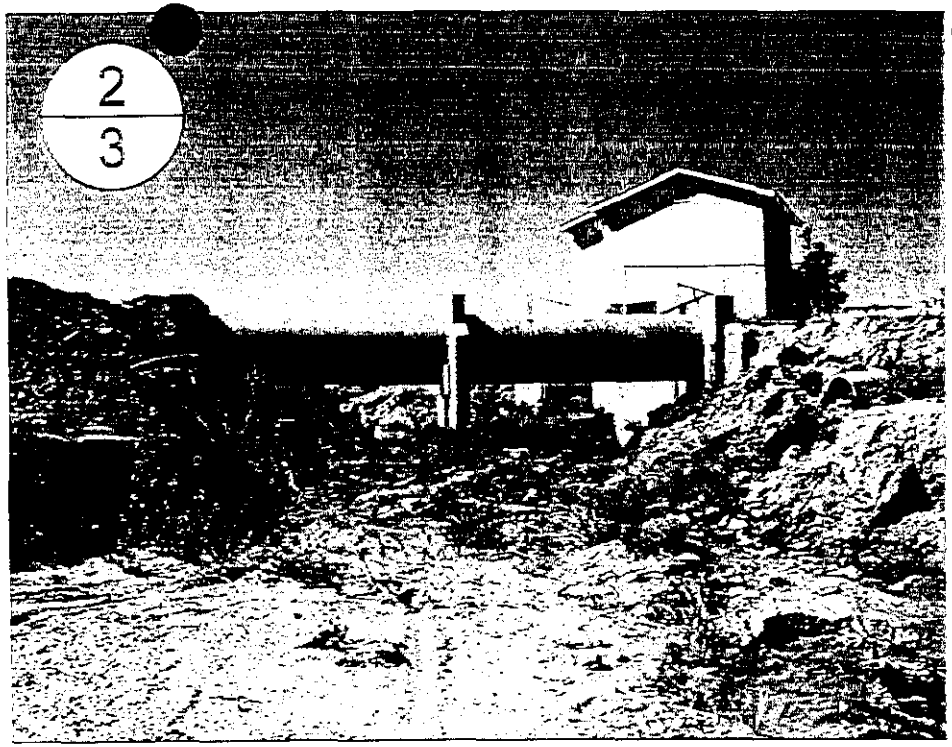


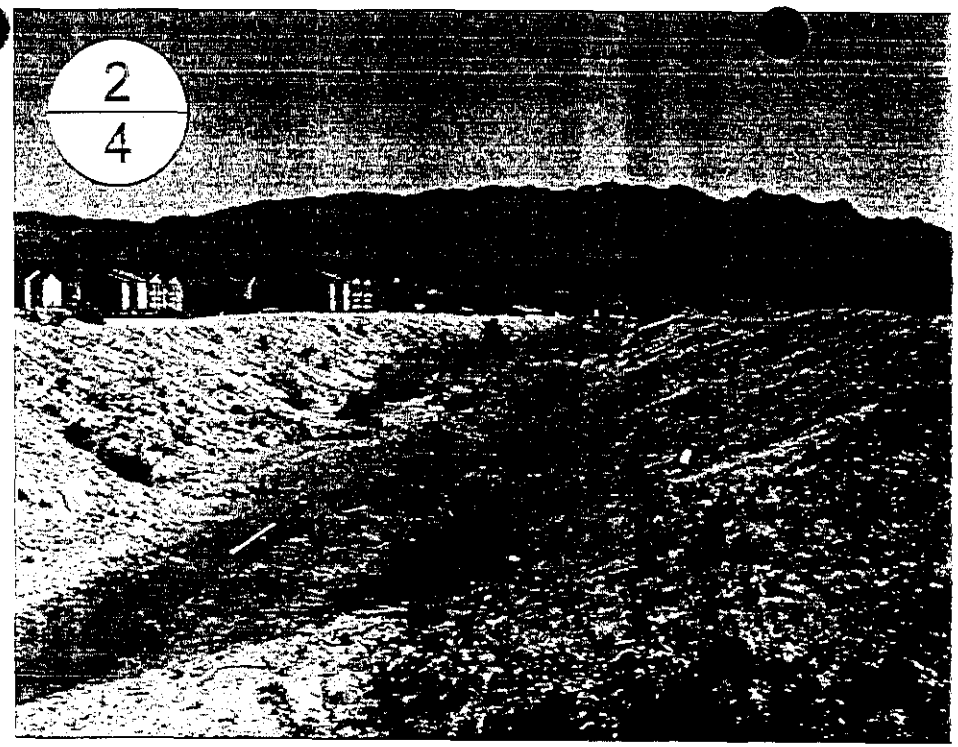
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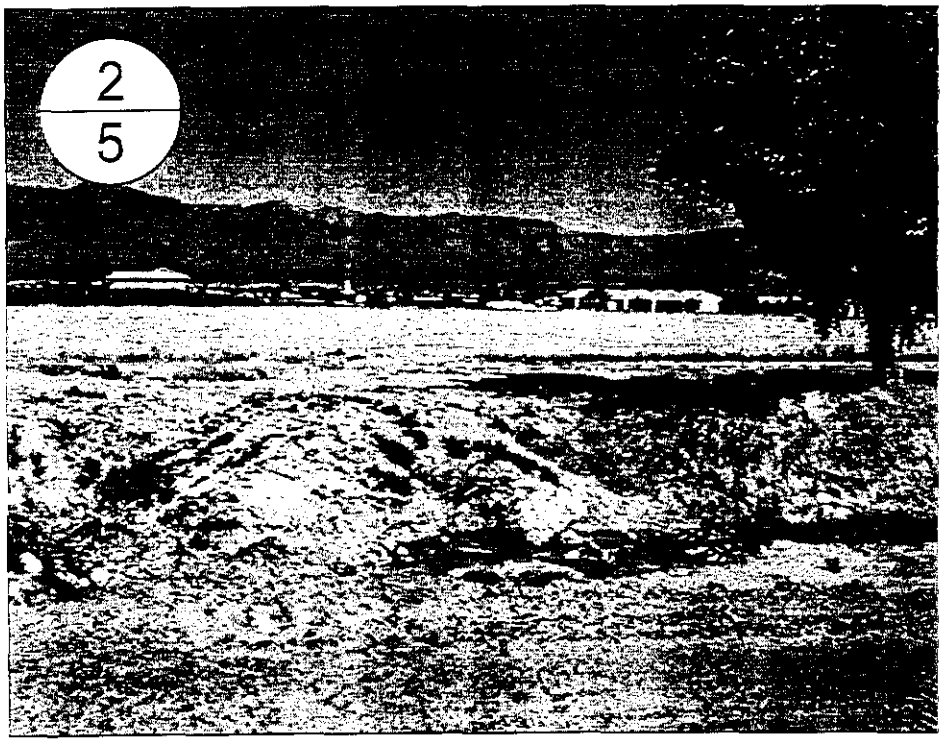


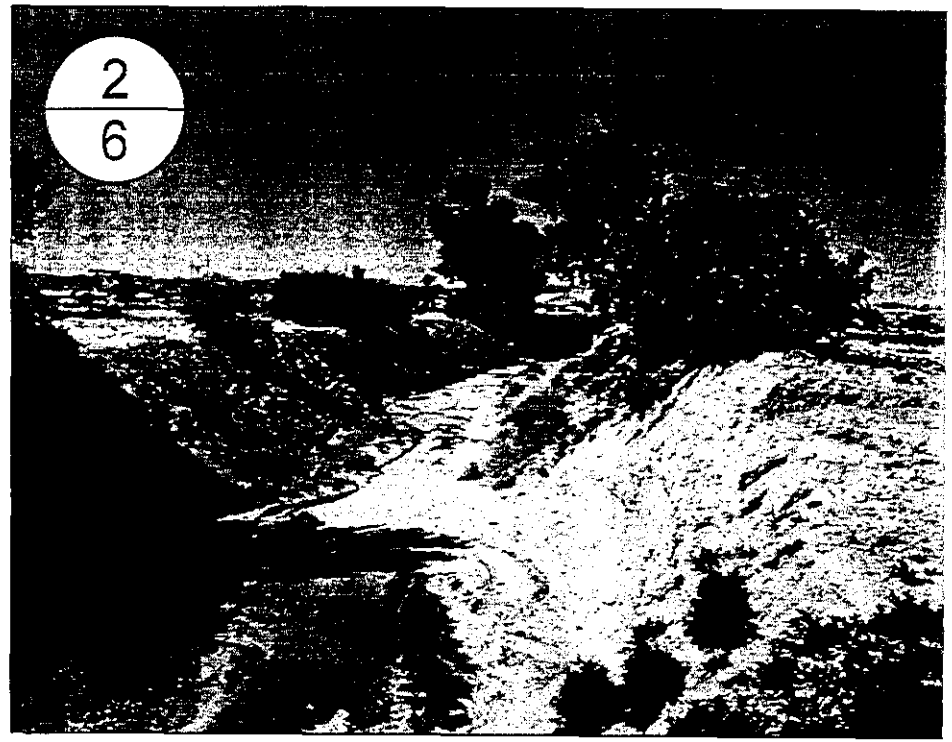
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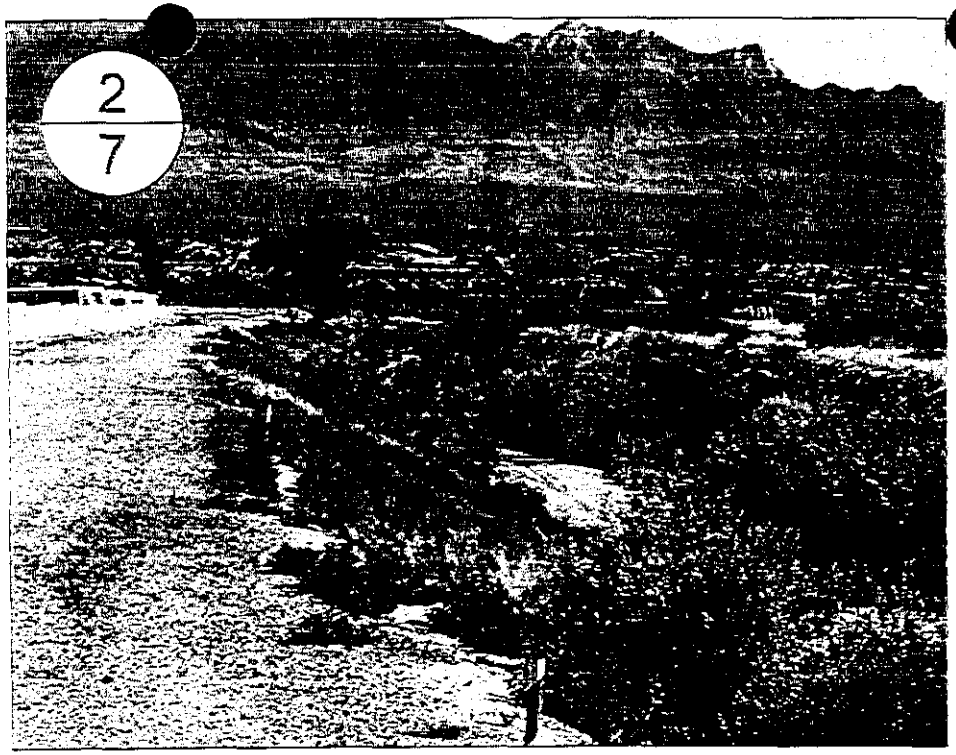


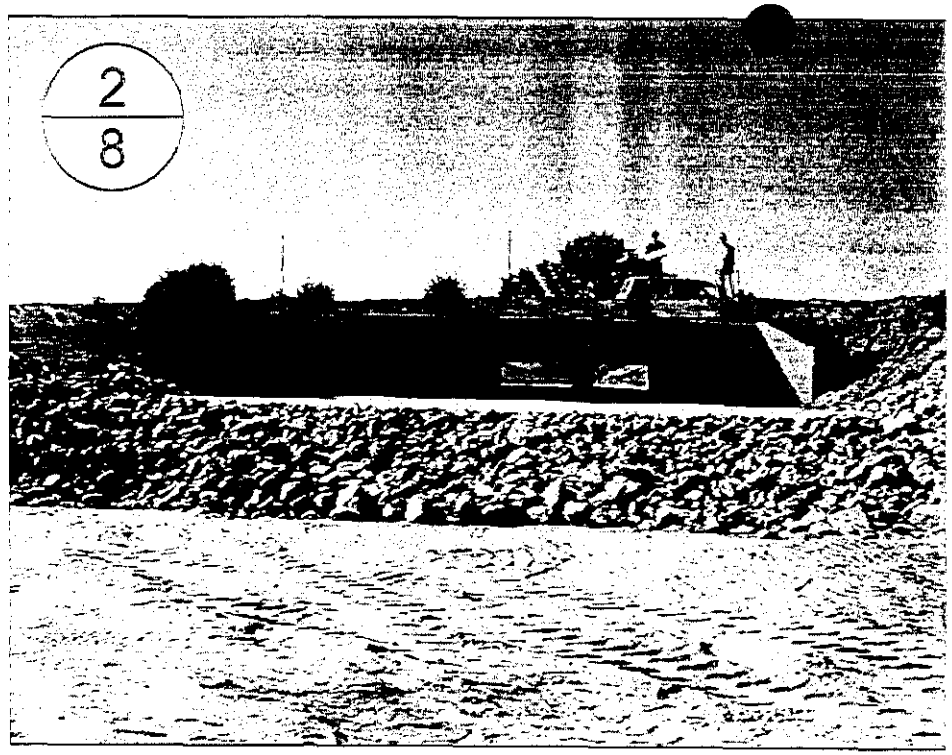

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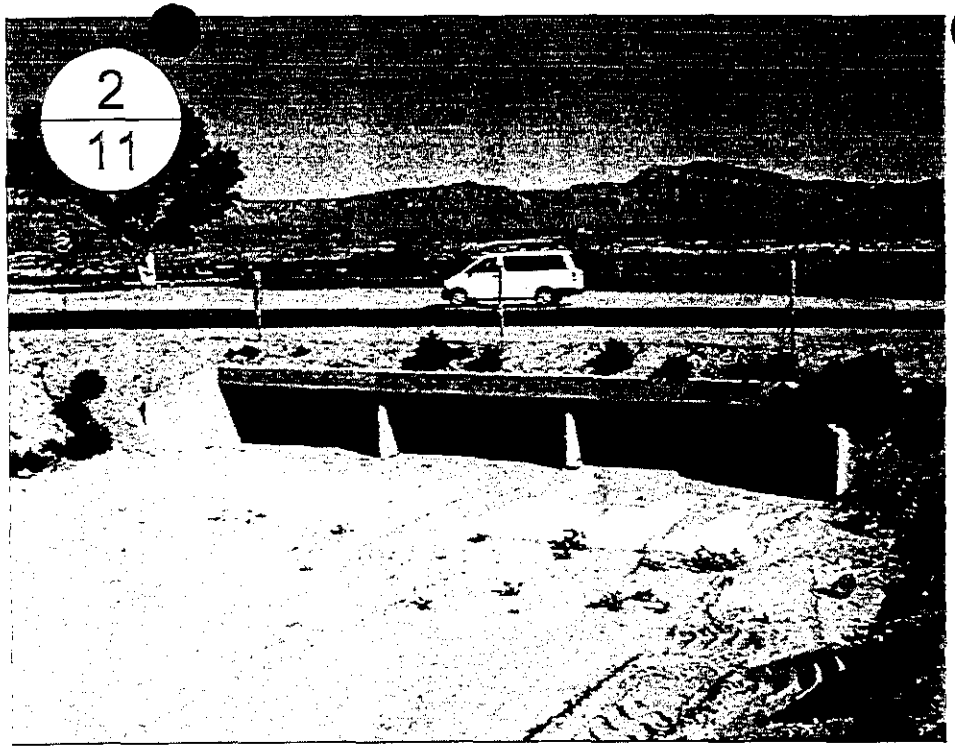

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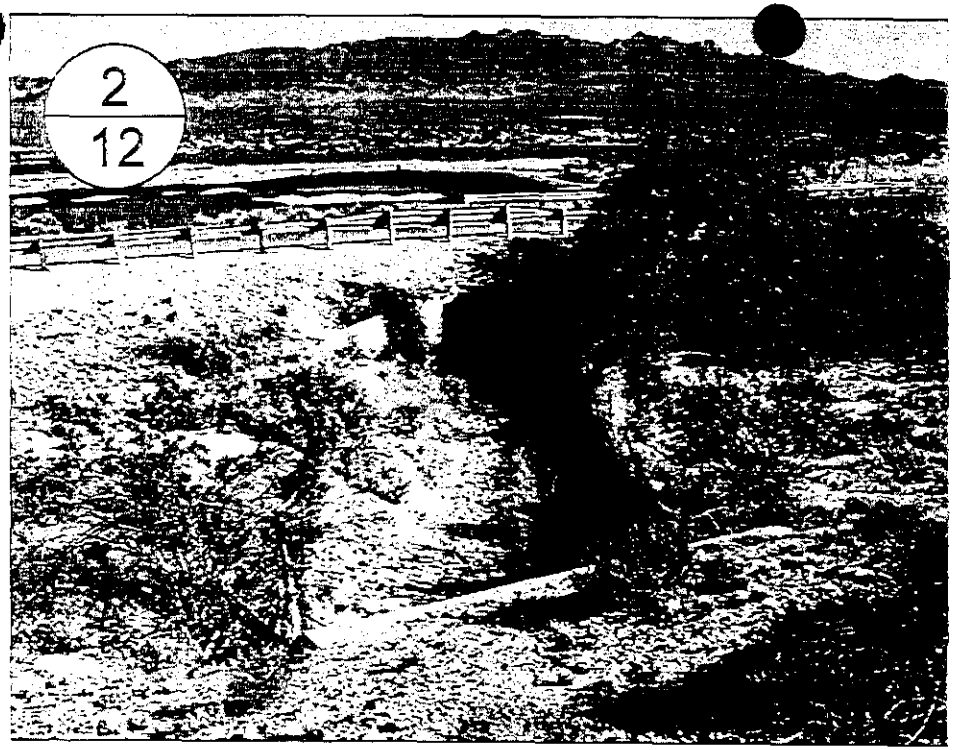

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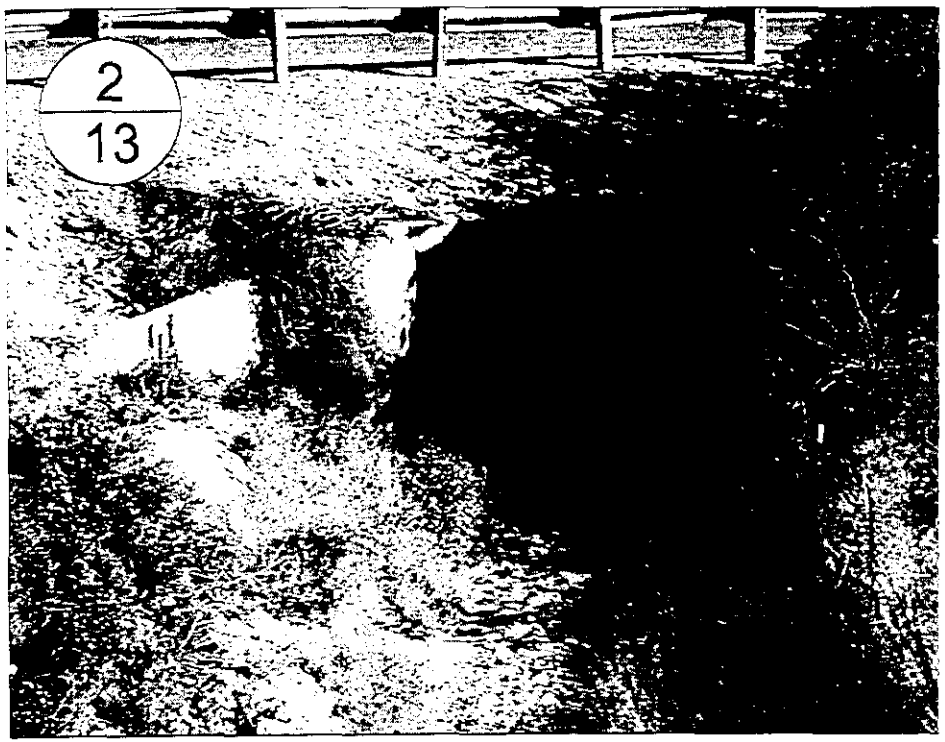

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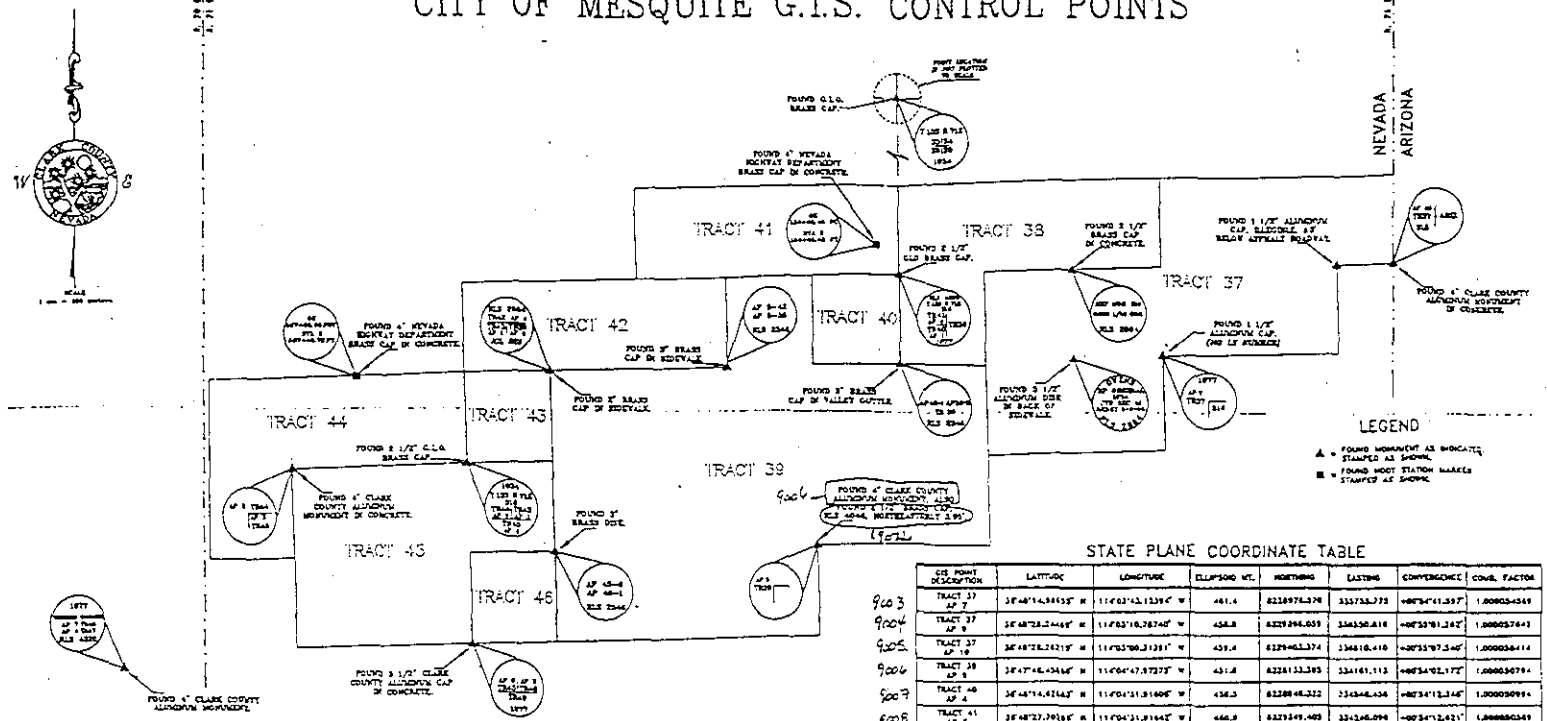

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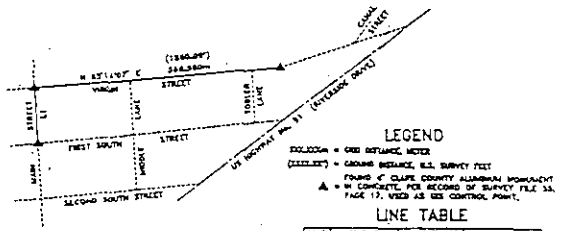
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CITY OF MESQUITE G.I.S. CONTROL POINTS



BUNKERVILLE G.I.S. CONTROL



LINE TABLE

LINE	BEARING	GRID DISTANCE	GROUND DISTANCE
L1	N 87°13'59" W	1320.441m	4332.89'

STATE PLANE COORDINATE TABLE

	GIS POINT DESCRIPTION	LATITUDE	LONGITUDE	ELLIPSOID HT.	NORTHING	EASTING	CONVERGENCE	COMB. FACTOR
9003	TRACT 37 AP 7	36°48'14.58453" N	114°03'43.11394" W	461.4	8236976.378	335733.373	+00°34'41.597"	1.000034569
9004	TRACT 37 AP 9	36°48'28.24468" N	114°03'10.78740" W	454.8	8237396.059	336330.618	+00°33'01.262"	1.000033643
9005	TRACT 37 AP 10	36°48'28.24219" N	114°03'00.31291" W	459.4	8237403.374	336518.618	+00°32'27.340"	1.000033614
9006	TRACT 38 AP 8	36°47'46.43436" W	114°04'47.97273" W	451.8	8236133.385	334161.113	+00°34'02.172"	1.000033694
9007	TRACT 40 AP 4	36°48'14.42163" W	114°04'31.81606" W	456.3	8236948.322	334446.636	+00°34'12.346"	1.000033994
9008	TRACT 41 AP 6	36°48'27.79318" W	114°04'31.81662" W	446.9	8237349.405	334446.096	+00°34'12.621"	1.000033969
9009	TRACT 42 AP 4	36°48'14.13736" W	114°03'36.78012" W	446.1	8236906.855	335939.281	+00°33'25.472"	1.000034432
9010	TRACT 42 AP 5	36°48'14.34676" W	114°03'54.38646" W	452.8	8236936.325	335741.423	+00°33'32.874"	1.000034943
9011	TRACT 43 AP 2	36°48'06.49146" W	114°03'52.63412" W	454.8	8236685.279	335742.268	+00°33'32.437"	1.000034894
9012	TRACT 43 AP 3	36°48'06.33363" W	114°04'28.33368" W	457.2	8236662.831	335141.829	+00°33'54.871"	1.000034985
9013	TRACT 44 AP 1	36°47'47.94211" W	114°03'36.83326" W	453.7	8236096.851	335957.445	+00°33'33.061"	1.000034515
9014	TRACT 44 AP 3	36°47'54.73096" W	114°03'52.64129" W	448.8	8237665.149	335744.287	+00°33'25.130"	1.000034119
6500	SECTION CORNER AP 4	36°49'21.54607" W	114°04'32.41316" W	532.1	8231317.310	334498.868	+00°34'13.667"	1.000034932
9016	WITNESS CORNER FOR TRACT 48	36°47'51.81953" W	114°04'57.33634" W	448.2	8237573.742	334061.331	+00°32'44.300"	1.000034692
9017	MDOT STA MARKER EAST	36°48'31.51290" W	114°04'36.28211" W	475.6	8239478.0 ?	334436.277	+00°34'10.105"	1.000034928
9015	MDOT STA MARKER WEST	36°48'13.77202" W	114°04'13.64017" W	471.3	8238886. 57	334846.132	+00°33'11.720"	1.000034727
9018	C 1/4 REFERENCE MONUMENT	36°48'14.81143" W	114°03'58.48328" W	461.7	8236961.872	335330.861	+00°34'01.763"	1.000033160
9020	N 1/16 REFERENCE MONUMENT	36°48'27.87318" W	114°03'58.81654" W	465.5	82372 7.317	335340.642	+00°34'01.886"	1.000032908

STATE PLANE COORDINATE TABLE

	STREET INTERSECTION	LATITUDE	LONGITUDE	ELLIPSOID HT.	NORTHING	EASTING	CONVERGENCE	COMB. FACTOR
9000	MAIN AT VIRGIN	36°46'22.54175" N	114°07'36.32215" W	440.8	8235414.115	330023.029	+00°32'18.416"	1.000033032
9001	MAIN AT FIRST SOUTH	36°46'16.24308" N	114°07'38.31453" W	442.8	8235286.430	330030.069	+00°32'19.458"	1.000033743
9002	ANGLE POINT ON VIRGIN	36°46'13.58865" N	114°07'15.71409" W	444.3	8235461.706	330568.8 ?	+00°32'33.103"	1.000034294

SCALE

SHEET 2 OF 2

RECORD OF SURVEY
for the
CITY OF MESQUITE
PORTIONS OF
TOWNSHIP 13 SOUTH, RANGES 70 & 71 EAST, M.D.M.,
TOGETHER WITH PORTIONS OF
TOWNSHIP 14 SOUTH RANGE 70 EAST, M.D.M.,
CLARK COUNTY, NEVADA
PREPARED BY THE CLARK COUNTY SURVEYOR'S OFFICE, (702)455-6130
500 SOUTH GRAND CENTRAL PARKWAY, LAS VEGAS, NEVADA, 89106

File 77 Page 37

5501.02

04-29-1998 10:21AM FROM PENTACORE MESQUITE TO 17023638979 P.01

PENTACORE

Civil Engineering
Construction Administration
Surveying
Global Positioning
GIS
Land Planning
ADA Consulting
Measurement Technologies

Fax Transmittal

Mesquite Nevada

Date: 4-29-98
Time: 10:15 am

Project: 0045-549

To: Mike Ludwig

Fax #: 702-363-8979

Company: G.C. Wallace

Subject: Pulsipher + Arden Lane Boy Structure

From: Clay

PENTACORE
e-mail

Fax #: (702) 346-2940
pelmesquite@sisna.com

No of Pages 4
large sheets

(including cover sheet)

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Comments

Please call me if you don't receive everything.

Thank you. ☺

17023638979 P.02
TO
FROM PENTHOUSE MESQUITE

PULSIPHER AND HAFEN

NORTHSIDE

STA	+	HI	-	ELEV
CPWASH				1572.28
↑	5.92	1578.20		
			5.00	1573.20
			12.12	1566.08
			11.81	1566.39
			5.94	1572.26
			5.54	1572.66
			5.53	1572.67
			5.33	1572.87
			5.13	1573.07
			5.54	1572.66
			5.29	1572.91
			5.06	1573.14

DESCRIPTION

50'N + 25.5 E	TOP WASH
50'N + 9.5 E	TOE WASH
50'N + 17.5 W	" "
50'N + 29.5 W	TOP WASH
35'S + ℄ WASH — ℄ ROAD	
35'S + 25'W	" "
35'S + 50'W	" "
35'S + 75'W	" "
35'S + 25'E	" "
35'S + 50'E	" "
35'S + 75'E	" "

PULSIPHER AND I-15
SOUTHSIDE

STA	+	HI	−	ELEV
TOP HW				1593.89
⊼	6.57	1600.46		
			12.25	1588.21
			6.59	1593.87
			6.69	1593.77
			10.21	1590.25
			18.34	1582.12
			18.27	1582.19
			18.26	1582.20
			1.40	1599.06
			16.55	1583.91
			16.02	1584.44
			9.76	1590.70
			1.52	1598.94
			0.77	1599.69
			0.13	1600.33
			2.27	1598.19
			2.97	1597.49

(SEE SKETCH)

DESCRIPTION

(8)
(9)
(10)
(11)
(12)
(13)
(14)

60'S + 30' W	TOP WASH
60'S + 6.5' W	TOE WASH
60'S + 7' E	" "
60'S + 25' E	TOP WASH
33' N + ℄ WASH	EDGE PAVEMENT
33' N + 50' E	" "
33' N + 100' E	" "
33' N + 50' W	" "
33' N + 100' W	" "

FULSIPHER MWD 1-15
NORTHSIDE

STA	+	HI	−	ELEV
TOP HW				1600.62
T	1.13	1601.75		
			4.71	1597.04
			1.14	1600.61
			1.07	1600.68
			4.79	1596.96
			12.76	1588.99
			12.87	1588.88
			12.93	1588.82
			5.80	1595.95
			11.94	1589.81
			11.86	1589.89
			5.92	1595.83
				1600.62
TOP HW				
T	6.96	1607.58		
			3.75	1603.83
			5.07	1602.51
			6.37	1601.21
			2.15	1605.43
			0.68	1606.90

04/23/1996 10:40AM FROM FEIN MOORE RESOURCE 10 T-004 P.004

(SEE SKETCH)

DESCRIPTION

TOP HEADWALL (NORTHSIDE FREEWAY)

① 50'N + 24'E TOP OF WASH

② 50'N + 9'E TOE OF WASH

③ 50'N + 9'W " " "

④ 50'N + 25'W TOP OF WASH

⑤ 33'S + ℄ WASH EDGE PAVEMENT

⑥ 33'S + 50'W " "

⑦ 33'S + 100'W " "

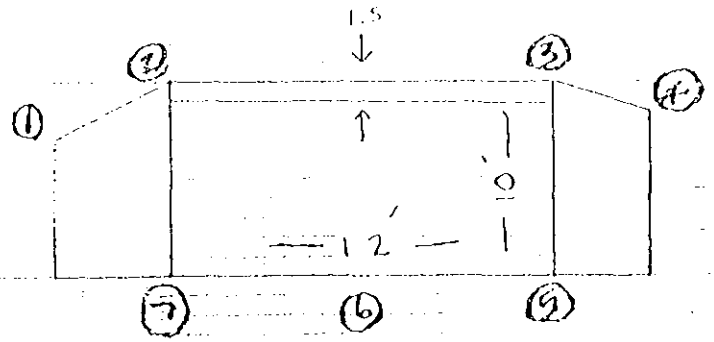
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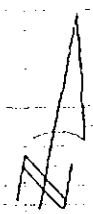
33'S + 100'W " "

MESQUITE FLOOD STUDY
TIES TO REINFORCED CONCRETE
BOX
PULSIPHER WASH AND I-15

NORTH END







1853
1827
1826

MISC. BK. 1 PG. 57
B. BRULARD
W. LINDER
1-12-98

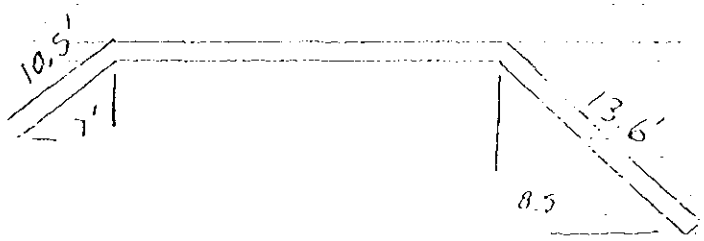
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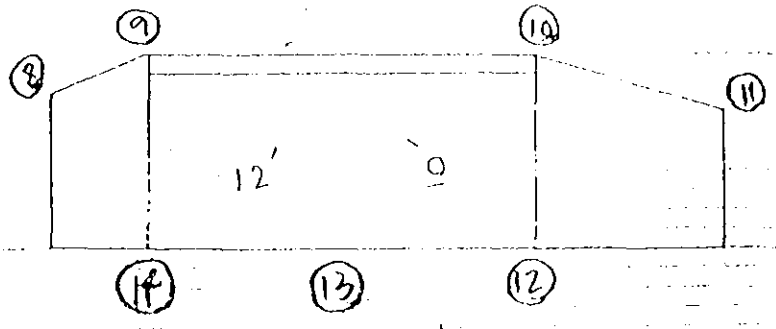
ES ESE

220 (BUS TRK) CP PARKING SP.

221 (BUS TRK) CP GARAGE

201-215 PARKING (RESIDENT) PER UNIT







PENTACORE

Civil Engineering
Construction Administration
Surveying
Global Positioning
GIS
Land Planning
ADA Consulting
Measurement Technologies

Fax Transmittal

Mesquite Nevada

Date: 4-29-98
Time: 10:15 am

Project: 0045-549

To: Mike Ludwig

Fax #: 702-363-8979

Company: G.C. Wallace

Subject: Pulsifer + Aiken Lane Boy Structure

From: Clay

PENTACORE
e-mail

Fax #: (702) 346-2940
peimesquite@sisna.com

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Mailing address: P.O. Box 1830 Mesquite, NV 89024

PULSIPHER AND HAFEN

NORTHSIDE

STA	+	HI	-	ELEV
CPWASH				1572.28
↑	5.92	1578.20		
			5.00	1573.20
			12.12	1566.08
			11.81	1566.39
			5.94	1572.26
			5.54	1572.66
			5.53	1572.67
			5.33	1572.87
			5.13	1573.07
			5.54	1572.66
			5.29	1572.91
			5.06	1573.14

DESCRIPTION

50'N + 25.5 E	TOP WASH
50'N + 9.5 E	TOE WASH
50'N + 17.5 W	" "
50'N + 29.5 W	TOP WASH
35'S + ℄ WASH — ℄ ROAD	
35'S + 25'W	" "
35'S + 50'W	" "
35'S + 75'W	" "
35'S + 25'E	" "
35'S + 50'E	" "
35'S + 75'E	" "

PULSIPHER AND I-15
SOUTHSIDE

STA	+	HI	−	ELEV
TOP HW				1593.89
T	6.57	1600.46		
			12.25	1588.21
			6.59	1593.87
			6.69	1593.77
			10.21	1590.25
			18.34	1582.12
			18.27	1582.19
			18.26	1582.20
			1.40	1599.06
			16.55	1583.91
			16.02	1584.44
			9.76	1590.70
			1.52	1598.94
			0.77	1599.69
			0.13	1600.33
			2.27	1598.19
			2.97	1597.49

(SEE SKETCH)

DESCRIPTION

(8)
(9)
(10)
(11)
(12)
(13)
(14)

60'S + 30' W TOP WASH
60'S + 6.5' W TOE WASH
60'S + 7' E " "
60'S + 25 E TOP WASH
33' N + ℄ WASH EDGE PAVEMENT
33' N + 50' E " "
33' N + 100' E " "
33' N + 50' W " "
33' N + 100' W " "

PULSIPHER MW 1-15
NORTHSIDE

STA	+	HI	−	ELEV
TOP HW				1600.62
T	1.13	1601.75		
			4.71	1597.04
			1.14	1600.61
			1.07	1600.68
			4.79	1596.96
			12.76	1588.99
			12.87	1588.88
			12.93	1588.82
			5.80	1595.95
			11.94	1589.81
			11.86	1589.89
			5.92	1595.83
				1600.62
TOP HW				
T	6.96	1607.58		
			3.75	1603.83
			5.07	1602.51
			6.37	1601.21
			2.15	1605.43
			0.68	1606.90

(SEE SKETCH)

DESCRIPTION

TOP HEADWALL (NORTHSIDE FREEWAY)

① 50'N + 24'E TOP OF WASH

② 50'N + 9'E TOE OF WASH

③ 50'N + 9'W " " "

④ 50'N + 25'W TOP OF WASH

⑤

⑥ 33'S + ℄ WASH EDGE PAVEMENT

⑦ 33'S + 50'W " "

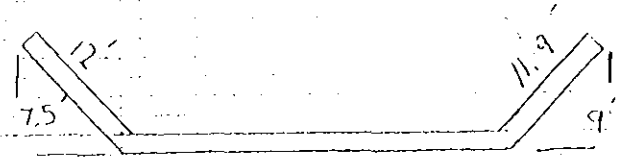
33'S + 100'W " "

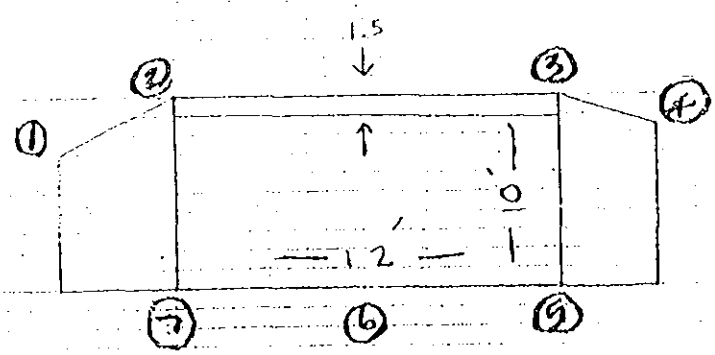
33'S + 50'E " "

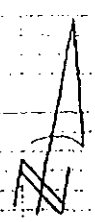
33'S + 100'W " "

MESQUITE FLOOD STUDY
TIES TO REINFORCED CONCRETE
BOX
PULSIPHER WASH AND I-15

NORTH END







1854
1827
1826

MISC. BK. 1 PG. 57
B. BRUNNER
W. LINDER
1-12-98

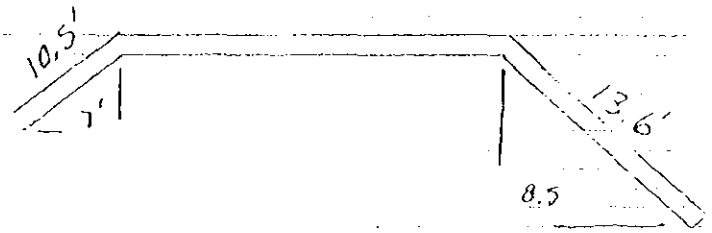
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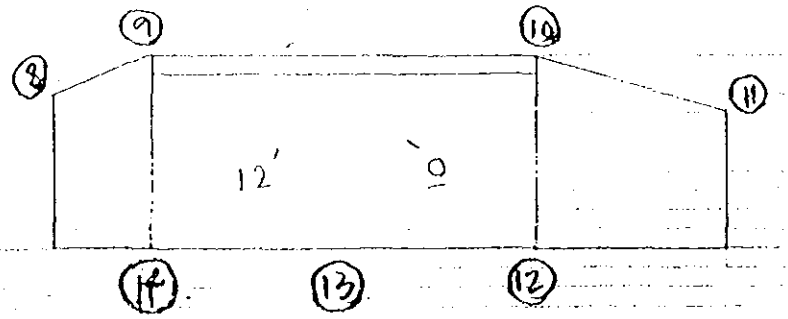
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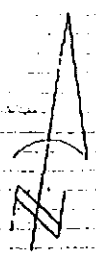
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221 (PROPOSED) CP BRIDGE

201-219 EXISTING (FREEMAN) BASE UNITS

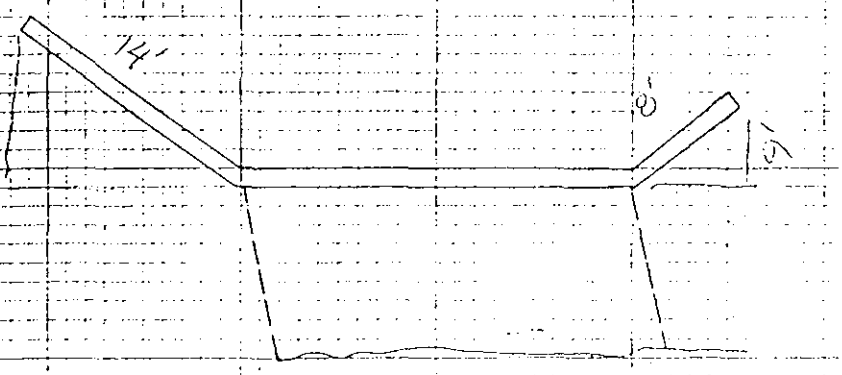


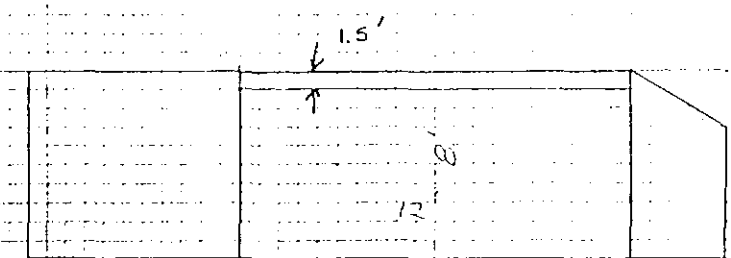


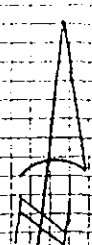


TIES TO REINFORCED CONCRETE
BOX
I-15 AND ABBOTT WASH

NORTH END





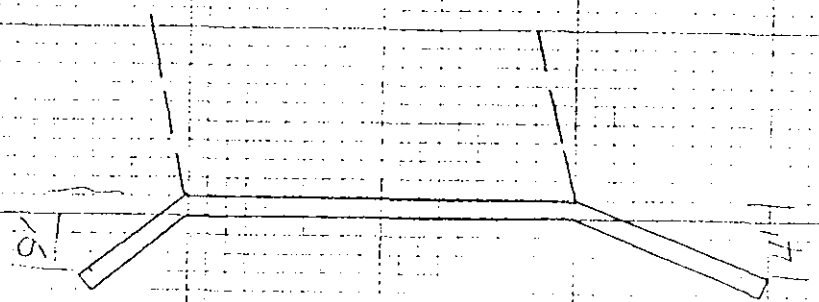


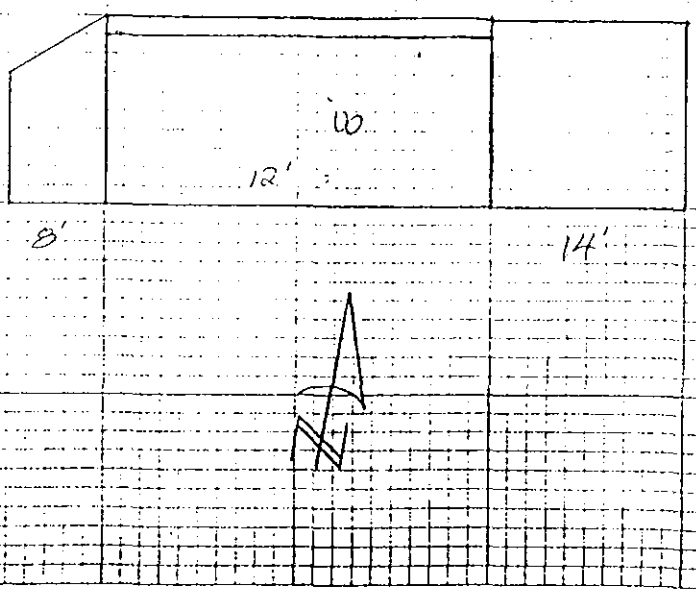
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MISC. BK. 1 PG. 55

B. BRULAND
W. LINDER
1-19-98

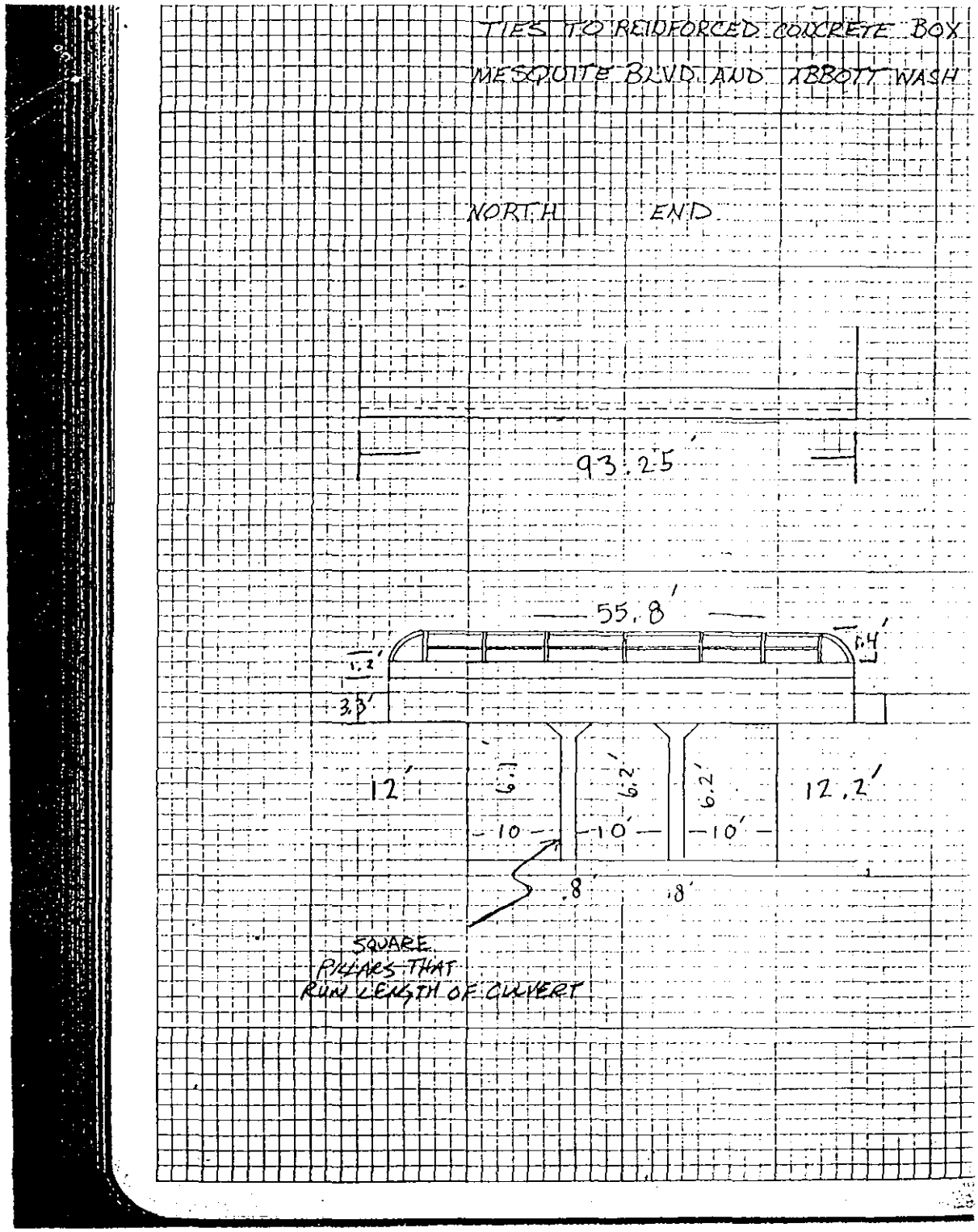
SOUTH SIDE

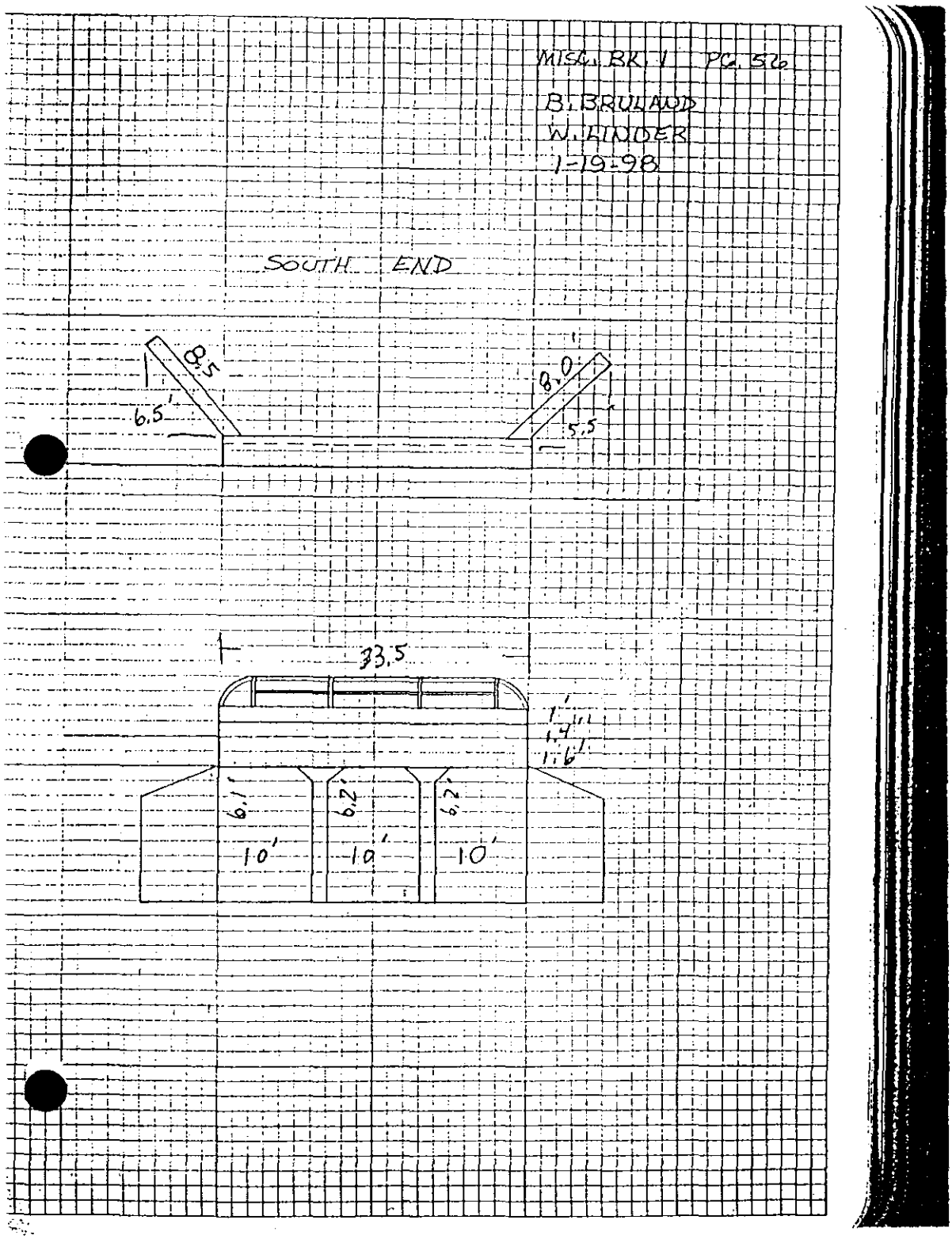




TIES TO REINFORCED CONCRETE BOX

MESQUITE BLVD. AND ABBOTT WASH




MISC. BK. 1 PG. 526
B. BRULAND
W. ENDER
1-19-98
SOUTH END
8.5'
6.5'
8.0'
5.5'
33.5'
1'
1.4'
1:6'
6.1'
6.2'
6.2'
10'
10'
10'

BS 4.94 — ABBOTT WASH

N 50228.9743

E 46428.9551

ELEV. 1670.74

T.@ 7 BS 2

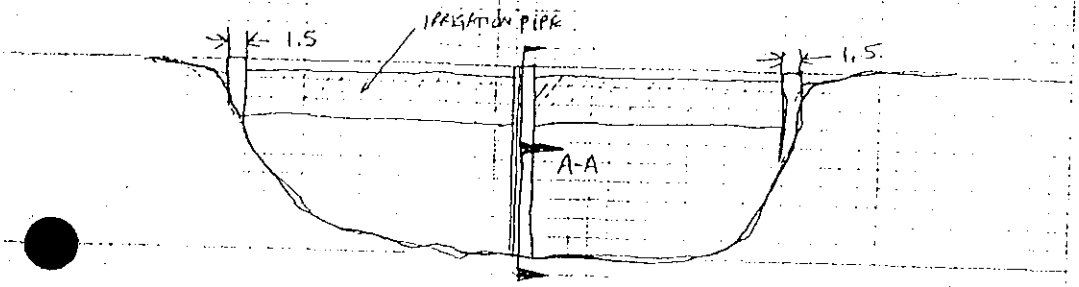
FS	DESC
3	CP TEE BOX 12

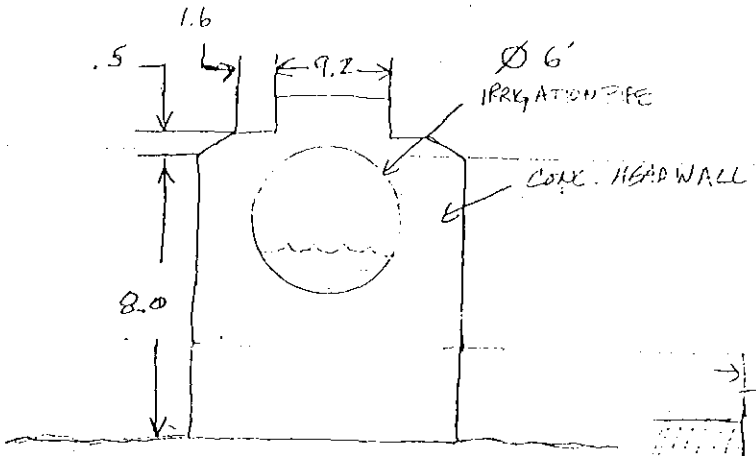
T.@ 3 BS 7 4.71

FS	DESC
100	℄ WASH (NORTHSIDE OF FREEWAY)
101	TOP CONC CULVERT (NORTHSIDE OF FREEWAY)
102	TOP CONC HEADWALL (IRRIG)
103	TOP IRRIG PIPE
104	TOP CONC HEADWALL (IRRIG)
105	TOP IRRIG PIPE
106	TOP CONC HEADWALL (IRRIG)
107	TOP HEADWALL (SOUTHSIDE OF FREEWAY)
108	TOP HEADWALL (NORTHSIDE MESQUITE BLVD)
109	℄ BLVD ℄ WASH
110	" "
111	TOP HEADWALL (SOUTHSIDE MESQUITE BLVD)
112	℄ WASH (NORTHSIDE OF MESQUITE BLVD)

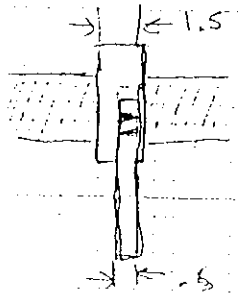
MESQUITE VISTAS BOOK 1
PAGE 57
J. JENSEN
M. BROADBENT
3/31/78

ABBOTT WASH



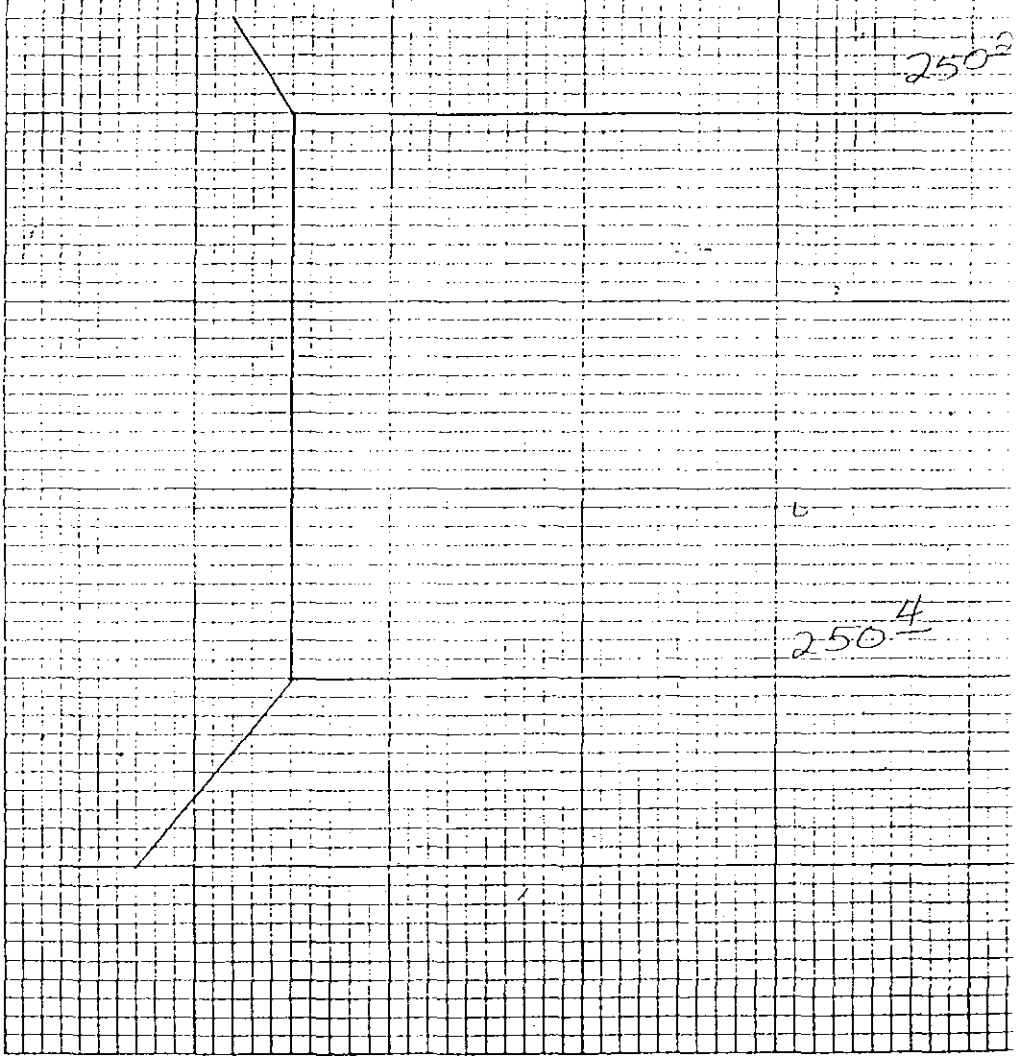


SECTION A-A
TYPICAL
NTS

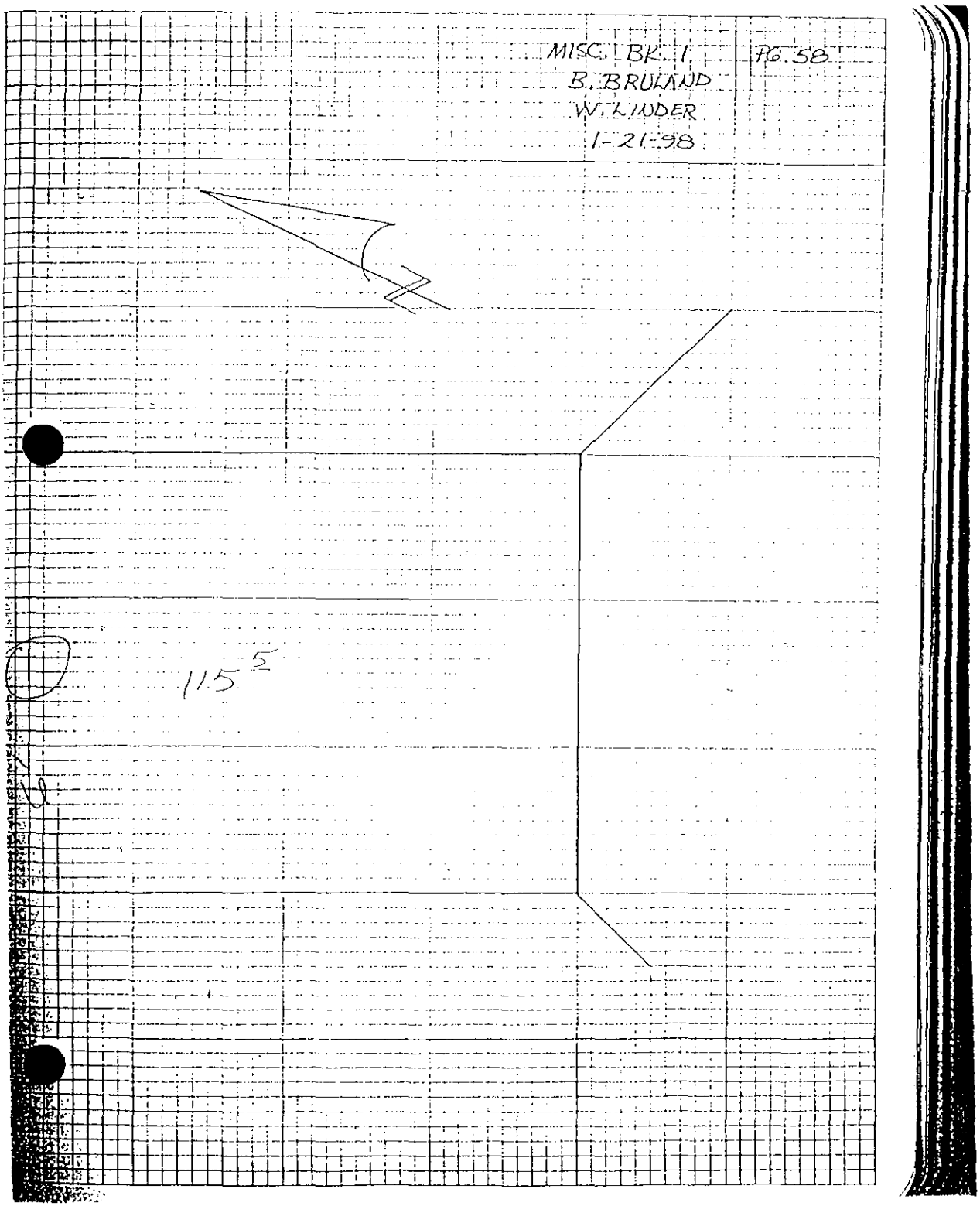


SIDE VIEW

MESQUITE FLOOD STUDY
TIES TO REINFORCED CONCRETE
BOX AT I-15 AND ABBOTT
WASH



MISC. BK. 1 PG. 58
B. BRULAND
W. LINDER
1-21-98



PENTACORE

Nevada Arizona

Civil Engineering
Construction Administration
Land Surveying
Global Positioning
GIS
Land Planning
Landscape Architecture
ADA Consulting
Measurement Technologies

LETTER OF TRANSMITTAL

MESQUITE NEVADA

May 4, 1998

SUBJECT: Abbott and Pulsipher Wash Floodstudy

TO: Jerry Pruitt
G.C. Wallace, Inc
1555 So. Rainbow Blvd
Las Vegas Nv, 89102

FROM: Clay Tolbert

TRANSMITTED HEREWITH:

[ ] Improvement Plans
[ ] Final Map
[X] Other

COMMENTS:

Please find the attached original copy of the Mylar drawing provided by Nevada Aerial Mapping, a copy of the ground control and a copy of the Project datum to the 1988 datum. Please feel free to contact me with any questions.

Delivered By:_____

Signature:_____

114 North Sandhill Rd., Suite G • Mesquite, Nevada 89024 • Tel (702) 346-2930 • Fax (702) 346-2940
Mailing address: P. O. Box 1830 • Mesquite, NV 89024

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Measurement Technologies

To: Jerry E. Pruitt P.E.
G.C. Wallace, Inc.
1555 South Rainbow Blvd
Las Vegas, NV 89102

From: Clay Tolbert, Pentacore Engineering, Inc. Mesquite, Nevada

Subject: Ground Control Elevation Conversion for the Abbott and Pulsipher Wash Flood Control Project

Date: April 30, 1998

Purpose: To provide the Project Datum Elevation conversion for the Abbott and Pulsipher Wash Flood Control project

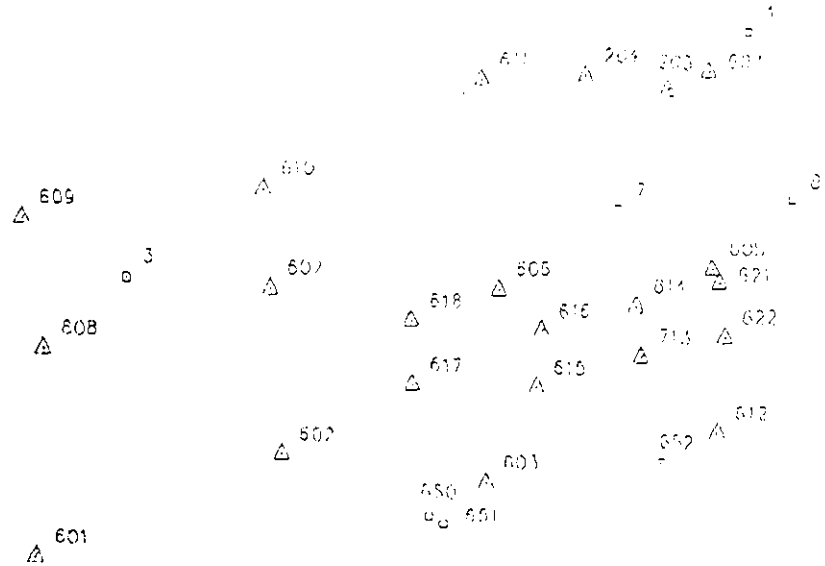
Summary: *Ground Control point* U-160, with project coordinates, Northing 46792.036 and Easting 47578.264 and a project datum elevation of 1589.11 can be converted to the NAD 88 elevation by adding 1.31 feet for an NAD 88 elevation of 1590.42

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Mailing address: P. O. Box 1830 • Mesquite, NV 89024

MESQUITE FLOOD STUDY
GROUND CONTROL

Post-it® Fax Note 7671	Date 1-19-98	# of pages ▶ 1
To MR. BADLAND	From W. SIDUT	
Co./Dept. PENTACORE	Co PENTACORE	
Phone # (702) 346-7930	Phone # 258-4110	
Fax # 346-7910	Fax # 258-4796	

NORTH
SCALE: NONE



COORDINATE SCHEDULE

PNT #	NORTHING	EASTING	ELEV	DESCRIPTION
3	45579.393	38384.485	1642.91	HAFEN
4	50000.000	50000.000	1817.03	BERTINA
7	46752.035	47578.264	1589.11	U-160
8	46975.808	50869.827	1596.64	T-405
204	49201.155	46968.290	1623.76	PANEL PNT
205	48936.489	48509.326	1643.18	PANEL PNT
601	40523.323	39750.894	1619.76	PANEL PNT
602	42366.661	41257.353	1540.20	PANEL PNT
603	41868.518	45082.026	1545.75	PANEL PNT
604	49207.181	49282.940	1763.15	PANEL PNT
605	45735.750	49341.028	1586.39	PANEL PNT
606	45356.793	45306.075	1581.94	PANEL PNT
607	49373.857	41052.623	1575.81	PANEL PNT
608	44313.118	38862.277	1582.54	PANEL PNT
609	46633.945	38462.281	1694.77	PANEL PNT
610	47151.031	40932.636	1675.72	PANEL PNT
611	49111.274	44991.973	1631.63	PANEL PNT
612	42787.595	49147.280	1585.65	PANEL PNT
614	45051.046	47918.496	1574.27	PANEL PNT
615	43612.857	46028.070	1566.07	PANEL PNT
616	44021.920	46125.741	1575.87	PANEL PNT
617	43643.036	43687.610	1565.47	PANEL PNT
618	44792.224	43672.532	1574.96	PANEL PNT
621	45487.319	49477.194	1582.32	PANEL PNT
622	44625.162	49503.955	1566.42	PANEL PNT
650	41235.960	44000.588	1560.72	T-160
651	41119.333	44254.761	1581.63	VIRGIN BUTTE
652	42237.162	48385.100	1619.29	VIRGIN HUGHES
713	44161.325	48015.231	1565.62	PANEL PNT

1-16-98
WOS

LEGEND

△ = PANEL POINT
□ = CONTROL POINT (ARCE)

BENCHMARK

NATIONAL GEODETIC SURVEY STATION "BERTINA",
BEING A U.S.C & G.S. BRASS MONUMENT DATED 1966
ELEVATION = 1817.93 U.S SURVEY FEET (NGVD 29)

BASIS OF BEARINGS

NORTH 89° 09' 50" EAST, BEING THE BEARING BETWEEN N.G.S. STATION "BERTINA" AND STATION "HAFEN" AS SHOWN ON A CURTAIN MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE IN FILE 77, PAGE 37 OF SURVEYS

PENTACORE
CIVIL ENGINEERING · LAND SURVEYING · PLANNING
CONSTRUCTION MANAGEMENT · ADA CONSULTING
6763 WEST CHARLESTON BOULEVARD
LAS VEGAS, NEVADA 89102 (702)258-0115

WASH .PDB PENTACORE

r ect: wash
o statistics:
Starting point number: 1
Current point number: 1

Thu Apr 09 21:54:03 1998

('L' indicates locked point)

Current Coordinate Listing (All)

oint	Northing	Easting	Elevation	Description
100	49051.63	46095.57	1605.38	FL WASH
101	49051.58	46098.07	1615.10	TOP HEADWALL
102	48658.44	46390.96	1611.98	TOP HEADWALL
103	48658.23	46390.10	1611.03	TOP IRRIG PIPE
104	48654.07	46372.16	1612.02	TOP HEADWALL
105	48649.91	46354.32	1611.01	TOP IRRIG PIPE
106	48649.82	46353.36	1612.05	TOP HEADWALL
107	48856.80	46253.04	1612.46	TOP HEADWALL
108	46859.78	46388.52	1599.73	TOP HEADWALL
109	46854.41	46389.20	1596.99	FL BVLD
110	46773.24	46391.23	1596.72	FL BVLD
111	46766.50	46391.38	1599.42	TOP HEADWALL
112	46860.67	46388.55	1589.57	FL WASH
113	45774.04	38810.49	1600.62	TOP HEADWALL
114	45545.36	39018.12	1593.89	TOP HEADWALL
115	45544.30	39017.77	1583.81	FL WASH

04-22-1998 11:21AM FROM PENTACORE MESQUITE TO 17023638979 P.01

PENTACORE

Civil Engineering
Construction Administration
Surveying
Global Positioning
GIS
Land Planning
ADA Consulting
Measurement Technologies

Fax Transmittal

Mesquite Nevada

Date: APRIL 22, 1998

Company: G.C. WALLACE FAX: 702-363-8979

To: MIKE LUDWIG

From: KEN MILLER

Subject: PULSIPHER WASH @ HAFEN LANE

Fax #: (702) 346-2940
e-mail peimesquite@sisna.com

No of Pages 3 (including cover sheet)

If you do not receive all pages☎ (702) 346-2930.

Comments

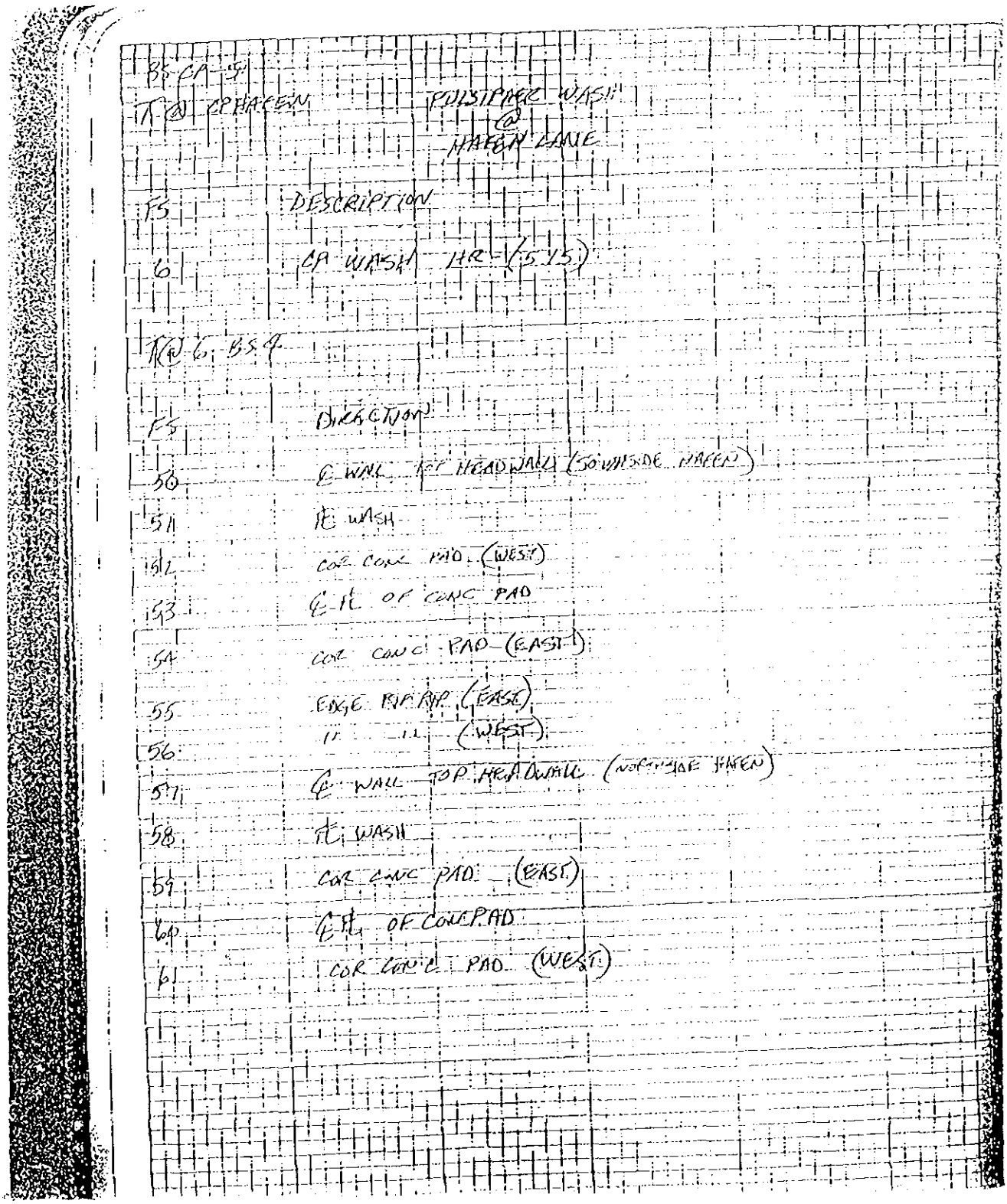
Thank you.

☺

Original forwarded via:

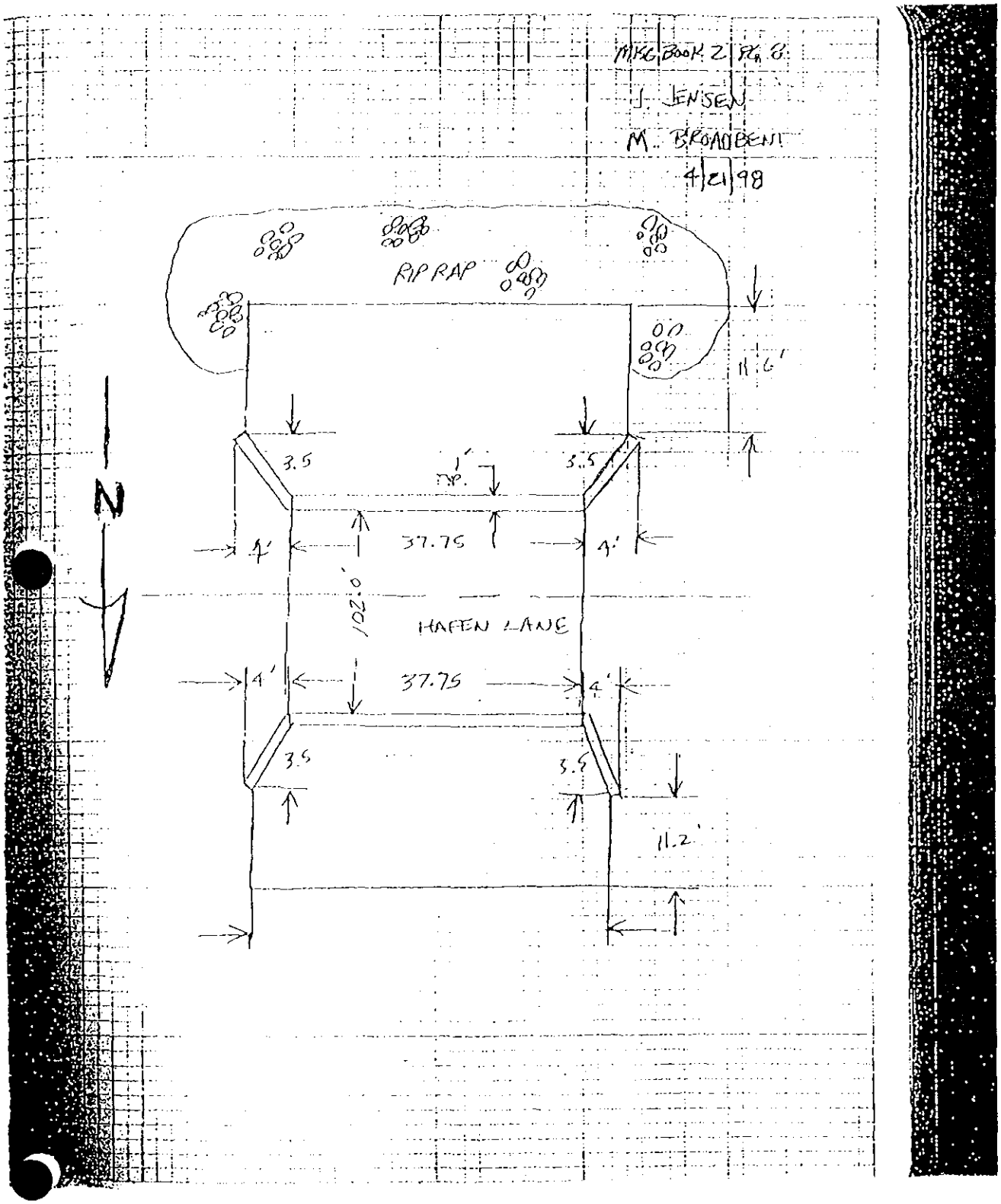
Reply Requested:

04-22-1996 11:41AM FROM PENTHOUSE MEDWORLD TO 17862000819 P.02



BS CA 5'
T @ CP HAGEN — FOUNTAIN WASH @ HAGEN LANE

	DESCRIPTION
FS	
6	CA WASH HR-1 (5 Y5)
RW 6 BS 9	
FS	DIRECTION
50	E WALL TOP HEADWALL (SO INSIDE HAGEN)
51	NE WASH
52	COR CONC PAD (WEST)
53	E-NE OF CONC PAD
54	COR CONC PAD (EAST)
55	EDGE RIP RAP (EAST)
56	" " (WEST)
57	E WALL TOP HEADWALL (NO INSIDE HAGEN)
58	NE WASH
59	COR CONC PAD (EAST)
60	E-NE OF CONC PAD
61	COR CONC PAD (WEST)


MKG BOOK 2 PG 8
J. JENSEN
M. BROADBENT
4/21/98
RIP RAP
11.6'
3.5
1'
TYP.
3.5
4'
37.75
4'
102.0'
HAFEN LANE
4'
37.75
4'
3.5
3.5
11.2'
N

CONTINUED

1.65'

12.13'

12.13'

12.13'

4'

CONC PAD

SOUTH SIDE HAFEN

1.6'

6.7' WIDE TYPICAL

4.05'

12.13'

12.13'

12.13'

CONC PAD

NORTH SIDE HAFEN

MISC BOOK 2 PG 9

PLASICHER WASH
@ HAFEN LANE
CONTINUED

J. JENSEN
M. BRABANT

4/21/98

CP-5

N 42291.1890

E 35322.2360

PULSIPHER WASH

T@ HAFWY 55 CP-5

FS	DESC
113	TOP HEADWALL (NORTHSIDE FREEWAY)
114	TOP HEAD WALL (SOUTHSIDE FREEWAY)
115	FL WASH (SOUTHSIDE FREEWAY)

J. JENSEN

M. BROADBENT

AGGRAVATED VISITS - BOOK 1

PAGE 53

3/31/98 CONT

WATER LINE

N @ 175 85 573

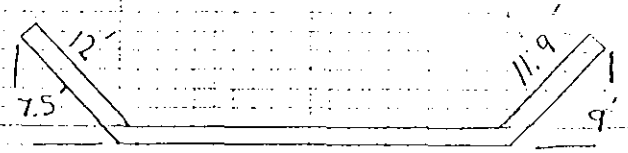
FS

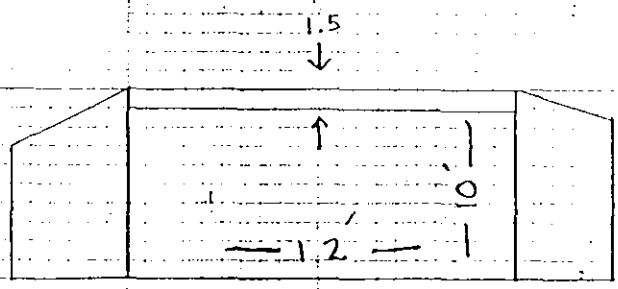
1290 TOP OF ALUM PIPE (CMP) N 74182.3735 EL 1565.3
E 45386.0620

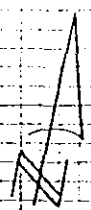
1291 " OF " " " N 74182.5232 EL 1561.98
E 45386.4892

MESQUITE FLOOD STUDY
TIES TO REINFORCED CONCRETE
BOX
PULSIPHER WASH AND I-15

NORTH END

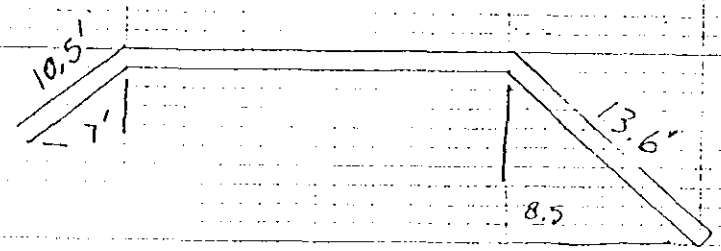


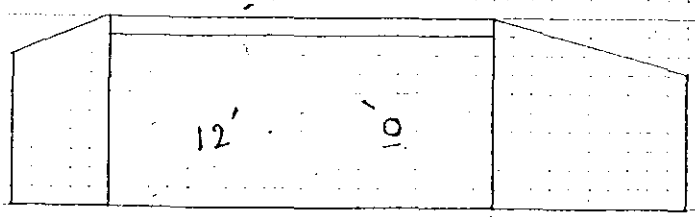


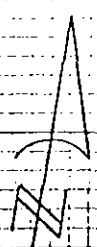


MISC. BK. 1 PG. 57

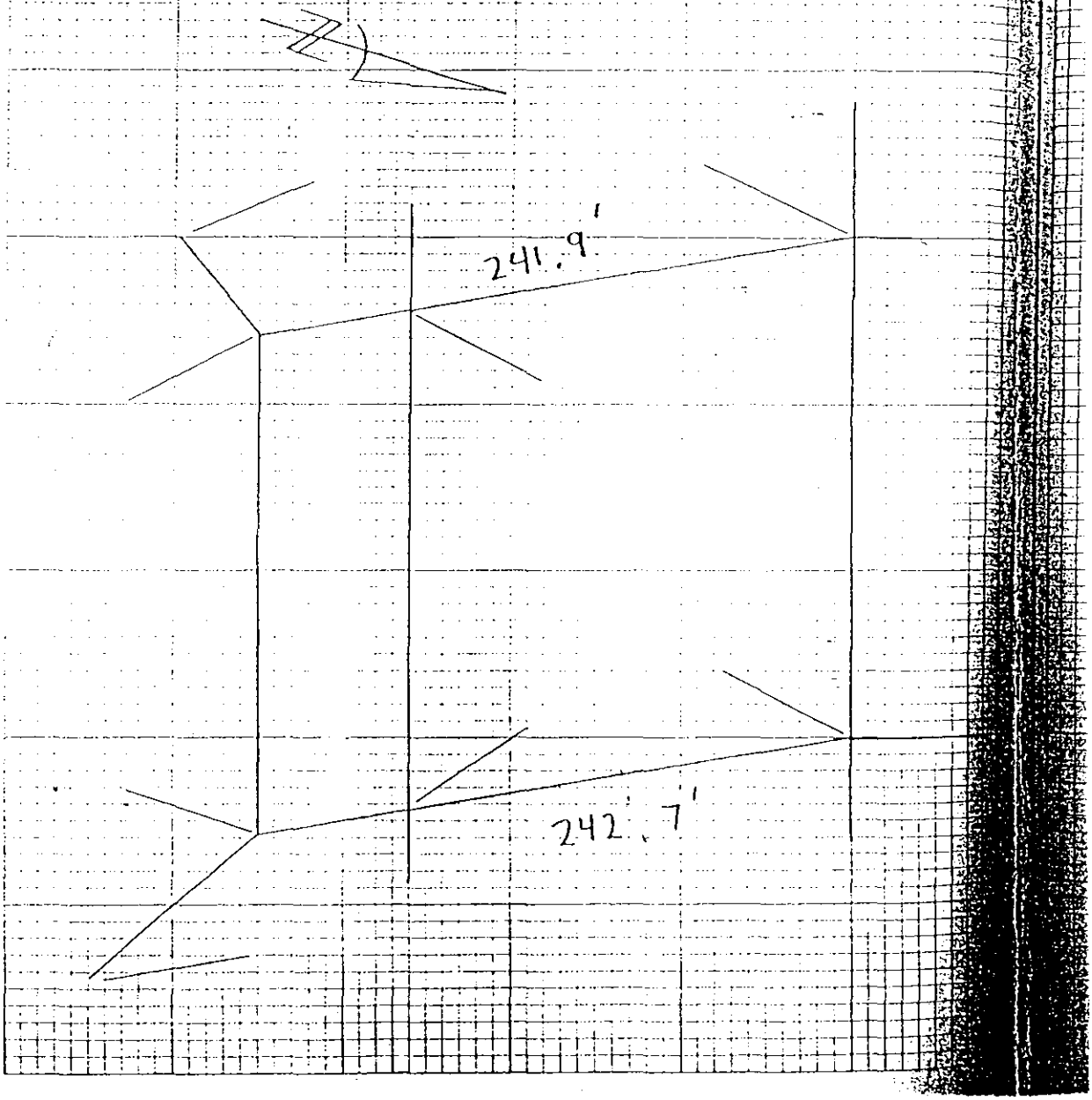
B. BRULAND
W. LINDER
1-19-98



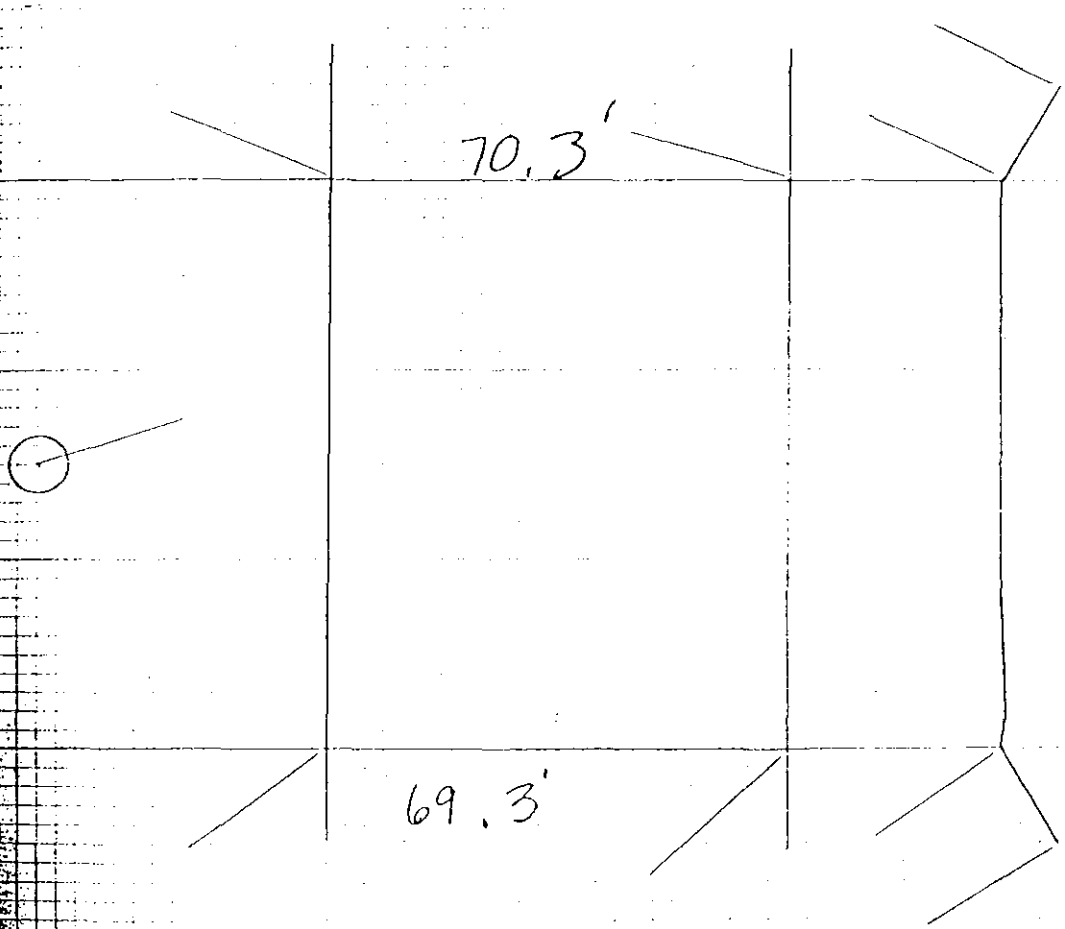




MESQUITE FLOOD STUDY
TIES TO REINFORCED CONCRETE
BOX AT I-15 AND PULSIPHER
WASH



MISC. BK. 1 PG. 59
B. BROLAND
W. LINDER
1-21-98



WASH .PDB PENTACORE

'ect: wash
t statistics:
tarting point number: 1
Current point number: 1

Thu Apr 09 21:54:03 1998

('L' indicates locked point)

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115	45544.30	39017.77	1583.81	FL WASH

National Geodetic Survey, Retrieval Date = APRIL 16, 1996

GR1813 **********

GR1813 DESIGNATION - BERTINA
GR1813 PID - GR1813
GR1813 STATE/COUNTY- NV/CLARK
GR1813 USGS QUAD - MESQUITE (1985)
GR1813
GR1813 HORZ DATUM - NAD 83 (1992)
GR1813 VERT DATUM - NAVD 88
GR1813
GR1813 POSITION - 36 48 44.87134(N) 114 04 22.93203(W) ADJUSTED
GR1813 92 minus 83 - +00.00370 +00.00198 ADJUSTED
GR1813 83 minus 27 - -00.09156 +02.88935 ADJUSTED
GR1813
GR1813 HEIGHT - 555.0 (meters) 1821. (feet) V_VERT ANG
GR1813 88 minus 29 - +0.7 (+/- 2 cm) VERTCON
GR1813 (NOTE - For assistance in applying shifts see file readme.dat)

GR1813 **********

GR1813 LAPLACE CORR- 4.42 DEFLEC93
GR1813 GEOID HEIGHT- -26.21 GEOID93
GR1813
GR1813 HORZ ORDER - SECOND
GR1813
GR1813 The horizontal position was established by classical geodetic methods
GR1813 and adjusted by the National Geodetic Survey in August 1993.
GR1813
GR1813 The NGVD 29 orthometric height was determined by vertical angle observa
GR1813 The NAVD 88 height was computed by applying the VERTCON shift value to
GR1813 the NGVD 29 height.
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GR1813 The Laplace correction was computed from DEFLEC93 derived deflections.
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GR1813 The geoid height was determined by GEOID93.
GR1813

		North	East	Scale	Converg.	
GR1813 SPC NV E	-	8,229,882.157	334,754.431	1.00012364	+0 54 18.4	M
GR1813 SPC AZ W	-	644,730.411	184,537.381	0.99994356	-0 11 36.8	M
GR1813 UTM 11	-	4,078,066.904	761,100.175	1.00043995	+1 45 17.4	M
GR1813 UTM 12	-	4,078,476.208	225,865.866	1.00052592	-1 50 33.0	M

GR1813

		Primary Azimuth Mark	Grid Az
GR1813 SPC NV E	-	MESQUITE=T39 40N R16E SECS 5 32 1/4 COR	077 45 31.0
GR1813 SPC AZ W	-	MESQUITE=T39 40N R16E SECS 5 32 1/4 COR	078 51 26.2
GR1813 UTM 11	-	MESQUITE=T39 40N R16E SECS 5 32 1/4 COR	076 54 32.0
GR1813 UTM 12	-	MESQUITE=T39 40N R16E SECS 5 32 1/4 COR	080 30 22.4

GR1813

Pid	Reference Object	Distance	Geod. AZ dddmmss.s
	BERTINA RM 1	4.170 METERS	05944
GR0091	MESQUITE=T39 40N R16E SECS 5 32 1/4	APPROX. 2.1 KM	0783949.4
	BERTINA RM 2	6.342 METERS	16148

GR1813

GR1813 STATION MARK IS A TRIANGULATION STATION DISK
GR1813 WITH SETTING: SET IN TOP OF CONCRETE MONUMENT (ROUND)
GR1813

		Year	Condition	Recov. By
GR1813 HISTORY	-	1956	STATION MONUMENTED	COAST AND GEODETIC SURVEY
GR1813 HISTORY	-	1960	GOOD	COAST AND GEODETIC SURVEY

GR1813
GR1813 STATION DESCRIPTION
GR1813
GR1813 DESCRIBED BY COAST AND GEODETIC SURVEY 1956 (NES)
GR1813 THE STATION IS LOCATED ON A LOW BUTTE NORTH OF MESQUITE,
GR1813 ABOUT 0.5 MILE NORTH OF THE MAIN PART OF TOWN.
GR1813
GR1813 TO REACH FROM THE POST OFFICE IN MESQUITE, GO EAST AND NORTHEAST
GR1813 ON U.S. HIGHWAY 91 FOR 0.5 MILE TO AN IRRIGATION DITCH AND
GR1813 A LARGE PARKING AREA ON THE RIGHT SIDE OF HIGHWAY, HERE TURN
GR1813 SHARP LEFT ALONG NORTH SIDE OF DITCH FOLLOW SAND TRACK ROAD
GR1813 WEST TO A DEEP DRY WASH THENCE RIGHT FOR 0.3 MILE TO A WIRE
GR1813 GATE, CONTINUE ACROSS DRY CREEK BED WESTERLY AND UP SHARP
GR1813 KNIFE RIDGE FOR 0.3 MILE TO HIGHEST POINT AND STATION.
GR1813
GR1813 THE STATION MARK IS A STANDARD DISK SET IN CONCRETE AND IT
GR1813 IS STAMPED BERTINA 1956 AND PROJECTS 2 INCHES ABOVE THE
GR1813 GROUND SURFACE. IT IS 3 FEET SOUTH OF A 4 IN X 4 IN X 4 FOOT
GR1813 WHITE WITNESS POST.
GR1813
GR1813 REFERENCE MARK NO. 1 IS A STANDARD DISK SET IN A DRILL HOLE
GR1813 IN A BOULDER AND CAPPED WITH CEMENT. IT IS STAMPED BERTINA
GR1813 NO 1 1956 AND IT PROJECTS 2 INCHES.
GR1813
GR1813 REFERENCE MARK NO. 2 IS A STANDARD DISK SET IN A DRILL HOLE
GR1813 IN A BOULDER AND IT IS CAPPED WITH CEMENT. IT IS STAMPED
GR1813 BERTINA NO 2 1956 AND IT PROJECTS 2 INCHES.
GR1813
GR1813 AZIMUTH MARK WAS NOT SET TO STATION USE STATION MESQUITE
GR1813 1944.
GR1813
GR1813 NOTE--4 WHEEL DRIVE IS NEEDED TO REACH STATION.
GR1813
GR1813 STATION RECOVERY (1960)
GR1813
GR1813 RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1960 (NES)
GR1813 ALL MARKS WERE RECOVERED IN GOOD CONDITION. THE ORIGINAL
GR1813 DESCRIPTION IS ADEQUATE TO REACH THE STATION. THE STATION
GR1813 WAS NOT OCCUPIED AT THIS TIME.

National Geodetic Survey, Retrieval Date = APRIL 16, 1996

GR1813 **********

GR1813 DESIGNATION - BERTINA
GR1813 PID - GR1813
GR1813 STATE/COUNTY- NV/CLARK
GR1813 USGS QUAD - MESQUITE (1985)
GR1813
GR1813 HORZ DATUM - NAD 83 (1992)
GR1813 VERT DATUM - NAVD 88
GR1813
GR1813 POSITION - 36 48 44.87134(N) 114 04 22.93203(W) ADJUSTED
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GR1813 (NOTE - For assistance in applying shifts see file readme.dat)

GR1813 **********

GR1813 LAPLACE CORR- 4.42 DEFLEC93
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GR1813 SPC AZ W	-	644,730.411	184,537.381	0.99994356	-0 11 36.8	N
GR1813 UTM 11	-	4,078,066.904	761,100.175	1.00043995	+1 45 17.4	N
GR1813 UTM 12	-	4,078,476.208	225,865.866	1.00052592	-1 50 33.0	N

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		Primary Azimuth Mark	Grid Az
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GR1813 SPC AZ W	-	MESQUITE=T39 40N R16E SECS 5 32 1/4 COR	078 51 26.2
GR1813 UTM 11	-	MESQUITE=T39 40N R16E SECS 5 32 1/4 COR	076 54 32.0
GR1813 UTM 12	-	MESQUITE=T39 40N R16E SECS 5 32 1/4 COR	080 30 22.4

GR1813

Pid	Reference Object	Distance	Geod. AZ dddmmss.s
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GR0091	MESQUITE=T39 40N R16E SECS 5 32 1/4	APPROX. 2.1 KM	0783949.4
	BERTINA RM 2	6.342 METERS	16148

GR1813

GR1813 STATION MARK IS A TRIANGULATION STATION DISK
GR1813 WITH SETTING: SET IN TOP OF CONCRETE MONUMENT (ROUND)
GR1813

		Year	Condition	Recov. By
GR1813 HISTORY	-	1956	STATION MONUMENTED	COAST AND GEODETIC SURVEY
GR1813 HISTORY	-	1960	GOOD	COAST AND GEODETIC SURVEY

GR1813
GR1813 STATION DESCRIPTION
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GR1813 DESCRIBED BY COAST AND GEODETIC SURVEY 1956 (NES)
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GR1813 ABOUT 0.5 MILE NORTH OF THE MAIN PART OF TOWN.
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GR1813 TO REACH FROM THE POST OFFICE IN MESQUITE, GO EAST AND NORTHEAST
GR1813 ON U.S. HIGHWAY 91 FOR 0.5 MILE TO AN IRRIGATION DITCH AND
GR1813 A LARGE PARKING AREA ON THE RIGHT SIDE OF HIGHWAY, HERE TURN
GR1813 SHARP LEFT ALONG NORTH SIDE OF DITCH FOLLOW SAND TRACK ROAD
GR1813 WEST TO A DEEP DRY WASH THENCE RIGHT FOR 0.3 MILE TO A WIRE
GR1813 GATE, CONTINUE ACROSS DRY CREEK BED WESTERLY AND UP SHARP
GR1813 KNIFE RIDGE FOR 0.3 MILE TO HIGHEST POINT AND STATION.
GR1813
GR1813 THE STATION MARK IS A STANDARD DISK SET IN CONCRETE AND IT
GR1813 IS STAMPED BERTINA 1956 AND PROJECTS 2 INCHES ABOVE THE
GR1813 GROUND SURFACE. IT IS 3 FEET SOUTH OF A 4 IN X 4 IN X 4 FOOT
GR1813 WHITE WITNESS POST.
GR1813
GR1813 REFERENCE MARK NO. 1 IS A STANDARD DISK SET IN A DRILL HOLE
GR1813 IN A BOULDER AND CAPPED WITH CEMENT. IT IS STAMPED BERTINA
GR1813 NO 1 1956 AND IT PROJECTS 2 INCHES.
GR1813
GR1813 REFERENCE MARK NO. 2 IS A STANDARD DISK SET IN A DRILL HOLE
GR1813 IN A BOULDER AND IT IS CAPPED WITH CEMENT. IT IS STAMPED
GR1813 BERTINA NO 2 1956 AND IT PROJECTS 2 INCHES.
GR1813
GR1813 AZIMUTH MARK WAS NOT SET TO STATION USE STATION MESQUITE
GR1813 1944.
GR1813
GR1813 NOTE--4 WHEEL DRIVE IS NEEDED TO REACH STATION.
GR1813
GR1813 STATION RECOVERY (1960)
GR1813
GR1813 RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1960 (NES)
GR1813 ALL MARKS WERE RECOVERED IN GOOD CONDITION. THE ORIGINAL
GR1813 DESCRIPTION IS ADEQUATE TO REACH THE STATION. THE STATION
GR1813 WAS NOT OCCUPIED AT THIS TIME.

National Geodetic Survey, Retrieval Date = APRIL 16, 1996

GR1813 **********

GR1813 DESIGNATION - BERTINA
GR1813 PID - GR1813
GR1813 STATE/COUNTY- NV/CLARK
GR1813 USGS QUAD - MESQUITE (1985)
GR1813
GR1813 HORZ DATUM - NAD 83 (1992)
GR1813 VERT DATUM - NAVD 88
GR1813
GR1813 POSITION - 36 48 44.87134(N) 114 04 22.93203(W) ADJUSTED
GR1813 92 minus 83 - +00.00370 +00.00198 ADJUSTED
GR1813 83 minus 27 - -00.09156 +02.88935 ADJUSTED
GR1813
GR1813 HEIGHT - 555.0 (meters) 1821. (feet) V_VERT ANG
GR1813 88 minus 29 - +0.7 (+/- 2 cm) VERTCON
GR1813 (NOTE - For assistance in applying shifts see file readme.dat)

GR1813 **********

GR1813 LAPLACE CORR- 4.42 DEFLEC93
GR1813 GEOID HEIGHT- -26.21 GEOID93
GR1813
GR1813 HORZ ORDER - SECOND
GR1813
GR1813 The horizontal position was established by classical geodetic methods
GR1813 and adjusted by the National Geodetic Survey in August 1993.
GR1813
GR1813 The NGVD 29 orthometric height was determined by vertical angle observa
GR1813 The NAVD 88 height was computed by applying the VERTCON shift value to
GR1813 the NGVD 29 height.
GR1813
GR1813 The Laplace correction was computed from DEFLEC93 derived deflections.
GR1813
GR1813 The geoid height was determined by GEOID93.
GR1813

		North	East	Scale	Converg.	
GR1813 SPC NV E	-	8,229,882.157	334,754.431	1.00012364	+0 54 18.4	M
GR1813 SPC AZ W	-	644,730.411	184,537.381	0.99994356	-0 11 36.8	M
GR1813 UTM 11	-	4,078,066.904	761,100.175	1.00043995	+1 45 17.4	M
GR1813 UTM 12	-	4,078,476.208	225,865.866	1.00052592	-1 50 33.0	M

GR1813

		Primary Azimuth Mark	Grid Az
GR1813 SPC NV E	-	MESQUITE=T39 40N R16E SECS 5 32 1/4 COR	077 45 31.0
GR1813 SPC AZ W	-	MESQUITE=T39 40N R16E SECS 5 32 1/4 COR	078 51 26.2
GR1813 UTM 11	-	MESQUITE=T39 40N R16E SECS 5 32 1/4 COR	076 54 32.0
GR1813 UTM 12	-	MESQUITE=T39 40N R16E SECS 5 32 1/4 COR	080 30 22.4

GR1813

GR1813 ---

Pid	Reference Object	Distance	Geod. AZ
			dddmmss.s
	BERTINA RM 1	4.170 METERS	05944
GR0091	MESQUITE=T39 40N R16E SECS 5 32 1/4	APPROX. 2.1 KM	0783949.4
	BERTINA RM 2	6.342 METERS	16148

GR1813 ---

GR1813
GR1813 STATION MARK IS A TRIANGULATION STATION DISK
GR1813 WITH SETTING: SET IN TOP OF CONCRETE MONUMENT (ROUND)
GR1813

GR1813 HISTORY	- Year	Condition	Recov. By
GR1813 HISTORY	- 1956	STATION MONUMENTED	COAST AND GEODETIC SURVEY
GR1813 HISTORY	- 1960	GOOD	COAST AND GEODETIC SURVEY

OPEN-CHANNEL HYDRAULICS

CHOW

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factory results it lends to practical applications, the Manning formula has become the most widely used of all uniform-flow formulas for open-channel flow computations.[1] A nomographic solution of the formula is given in Appendix C.

Within the normal ranges of slope and hydraulic radius, the values of Manning's n and Kutter's n are generally found to be numerically very close. For practical purposes, the two values may be considered identical when the slope is equal to or greater than 0.0001 and the hydraulic radius is between 1.0 and 30 ft. Typical values good for both Kutter's n and Manning's n are shown in Table 5-6 and illustrated in Fig. 5-5.

Comparing the Chézy formula with the Manning formula, it can be seen that

$$C = \frac{1.49}{n} R^{\frac{1}{6}} \tag{5-7}$$

This equation provides an important relationship[2] between Chézy's C and Manning's n.

The exponent of the hydraulic radius in the Manning formula is actually not a constant but varies in a range depending mainly on the channel shape and roughness (see a previous footnote). For this reason, some hydraulicians prefer to use the formula with a variable exponent. For example, the uniform-flow formula widely used in the U.S.S.R. is of this type; this is the *Pavlovskiĭ formula* [21], proposed in 1925.* This formula in *metric* units is

$$C = \frac{1}{n} R^{y} \tag{5-8}$$

where $$y = 2.5\sqrt{n} - 0.13 - 0.75\sqrt{R}(\sqrt{n} - 0.10) \tag{5-9}$$

and where C is the resistance factor in the Chézy formula expressed in *metric* units. The exponent y depends on the roughness coefficient and hydraulic radius. The formula is valid for R between 0.1 and 3.0 m and

---

basis of other later studies, some authors suggested a value of ¾ [20], and others suggested a variable depending on R and n [21].

[1] The Manning formula was suggested for international use by Lindquist [3] at the Scandinavia Sectional Meeting of the World Power Conference in 1933 in Stockholm. The final recommendation for such use was made by the Executive Committee at the 3d World Power Conference in 1936 in Washington, D.C.

[2] On account of this relationship, the Manning formula is sometimes considered a variation of the Chézy formula with Chézy's C defined by Eq. (5-7).

* The Pavlovskiĭ formula was published in several editions of Pavlovskiĭ's "Handbook of Hydraulics" [21]. An article about this formula entitled *Formula dlia koeffitsienta Chézy* (*Formula for a Chézy coefficient*) is given in pp. 140–149 of the 1937 edition of the book. A footnote in this article reads: "The formula was proposed in 1925."

for n between 0.011 and 0.040. For practical purposes, the following approximate forms of Eq. (5-9) are generally suggested for use:

$$y = 1.5\sqrt{n} \quad \text{for } R < 1.0 \text{ m} \tag{5-10}$$
$$y = 1.3\sqrt{n} \quad \text{for } R > 1.0 \text{ m} \tag{5-11}$$

5-7. Determination of Manning's Roughness Coefficient. In applying the Manning formula or the G. K. formula, the greatest difficulty lies in the determination of the roughness coefficient n; for there is no exact method of selecting the n value. At the present stage of knowledge, to select a value of n actually means to estimate the resistance to flow in a given channel, which is really a matter of intangibles. To veteran engineers, this means the exercise of sound engineering judgment and experience; for beginners, it can be no more than a guess, and different individuals will obtain different results.

In order to give guidance in the proper determination of the roughness coefficient, four general approaches will be discussed; namely, (1) to understand the factors that affect the value of n and thus to acquire a basic knowledge of the problem and narrow the wide range of guesswork, (2) to consult a table of typical n values for channels of various types, (3) to examine and become acquainted with the appearance of some typical channels whose roughness coefficients are known, and (4) to determine the value of n by an analytical procedure based on the theoretical velocity distribution in the channel cross section and on the data of either velocity or roughness measurement. The first three approaches will be given in the next three articles, and the fourth approach will be taken up in Art. 8-7.

5-8. Factors Affecting Manning's Roughness Coefficient. It is not uncommon for engineers to think of a channel as having a single value of n for all occasions. In reality, the value of n is highly variable and depends on a number of factors. In selecting a proper value of n for various design conditions, a basic knowledge of these factors should be found very useful. The factors that exert the greatest influence upon the coefficient of roughness in both artificial and natural channels are therefore described below. It should be noted that these factors are to a certain extent interdependent; hence discussion about one factor may be repeated in connection with another.

A. Surface Roughness. The surface roughness is represented by the size and shape of the grains of the material forming the wetted perimeter and producing a retarding effect on the flow. This is often considered the only factor in selecting a roughness coefficient, but it is actually just one of several major factors. Generally speaking, fine grains result in a relatively low value of n and coarse grains, in a high value of n.

In alluvial streams where the material is fine in grain, such as sand,

ıy, loam, or silt, the retarding effect is much less than where the material coarse, such as gravels or boulders. When the material is fine, the lue of n is low and relatively unaffected by change in flow stage. When e material consists of gravels and boulders, the value of n is generally gh, particularly at low or high stage. Larger boulders usually collect the bottom of the stream, making the channel bottom rougher than the nks and increasing the value of n at low stages. At high stages, a rtion of the energy of flow is used in rolling the boulders downstream, is increasing the value of n. A theoretical discussion of surface roughss will be given in Art. 8-2.

B. Vegetation. Vegetation may be regarded as a kind of surface ghness, but it also markedly reduces the capacity of the channel and ards the flow. This effect depends mainly on height, density, distrition, and type of vegetation, and it is very important in designing all drainage channels.

At the University of Illinois an investigation has been made to deterne the effect of vegetation on the coefficient of roughness [22]. On one the drainage ditches in central Illinois under investigation, an average alue of 0.033 was measured in March, 1925, when the channel was in d condition. In April, 1926, there were bushy willows and dry weeds the side slopes, and n was found to be 0.055. This increase in n resents the result of one year's growth of vegetation. During the mmers of 1925 and 1926 there was a thick growth of cattails on the tom of the channel. The n value at medium summer stages was out 0.115, and at a nearly bankfull stage it was 0.099. The cattails he channel were washed out by the high water in September, 1926; the rage value of n found after this occurrence was 0.072. The conclusions wn from this investigation were, in part, as follows:

. The minimum value of n that should be used for designing drainage hes in central Illinois is 0.040. This value is obtainable at high ges during the summer months in the most carefully maintained chans, where the bottom of the channel is clear of vegetation and the side es are covered with grass or low weeds, but no bushes. This low ue of n should not be used unless the channel is to be cleared annually ll weeds and bushes.

. A value of $n = 0.050$ should be used if the channel is to be cleared lternate years only. Large weeds and bushy willows from 3 to 4 ft h on the side slopes will produce this value of n.

. In channels that are not cleared for a number of years, the growth y become so abundant that values of $n > 0.100$ may be found.

. Trees from 6 to 8 in. in diameter growing on the side slopes do not ede the flow so much as do small bushy growths, provided overhang- branches are cut off.

The U.S. Soil Conservation Service has made studies on flow of water in small shallow channels protected by vegetative linings (Chap. 7, Sec. C). It was found that n values for these channels varied with the shape and cross section of the channel, the slope of the channel bed, and the depth of flow. Comparing two channels, all other factors being equal, the lesser average depth gives the higher n value, owing to a larger proportion of affected vegetation. Thus, a triangular channel has a higher n value than a trapezoidal channel, and a wide channel has a lower n value than a narrow channel. A flow of sufficient depth tends to bend over and submerge the vegetation and to produce low n values. A steep slope causes greater velocity, greater flattening of the vegetation, and low n values.

The effect of vegetation on flood plains will be discussed later in item *H*.

C. Channel Irregularity. Channel irregularity comprises irregularities in wetted perimeter and variations in cross section, size, and shape along the channel length. In natural channels, such irregularities are usually introduced by the presence of sand bars, sand waves, ridges and depressions, and holes and humps on the channel bed. These irregularities definitely introduce roughness in addition to that caused by surface roughness and other factors. Generally speaking, a gradual and uniform change in cross section, size, and shape will not appreciably affect the value of n, but abrupt changes or alternation of small and large sections necessitates the use of a large value of n. In this case, the increase in n may be 0.005 or more. Changes that cause sinuous flow from side to side of the channel will produce the same effect.

D. Channel Alignment. Smooth curvature with large radius will give a relatively low value of n, whereas sharp curvature with severe meandering will increase n. On the basis of flume tests, Scobey [23] suggested that the value of n be increased 0.001 for each 20 degrees of curvature in 100 ft of channel. Although it is doubtful whether curvature ever increases n more than 0.002 or 0.003, its effect should not be ignored, for curvature may induce the accumulation of drift and thus indirectly increase the value of n. Generally speaking, the increase of roughness in unlined channels carrying water at low velocities is negligible. An increase of 0.002 in n value would constitute an adequate allowance for curve losses in most flumes containing pronounced curvatures, whether built of concrete or other materials. The meandering of natural streams, however, may increase the n value as high as 30%.

E. Silting and Scouring. Generally speaking, silting may change a very irregular channel into a comparatively uniform one and decrease n, whereas scouring may do the reverse and increase n. However, the dominant effect of silting will depend on the nature of the material deposited. Uneven deposits such as sand bars and sand waves are

channel irregularities and will increase the roughness. The amount and uniformity of scouring will depend on the material forming the wetted perimeter. Thus, a sandy or gravelly bed will be eroded more uniformly than a clay bed. The deposition of silt eroded from the uplands will tend to even out the irregularities in a channel dredged through clay. The energy used in eroding and carrying the material in suspension or rolling it along the bed will also increase the n value. The effect of scouring is not significant as long as the erosion on channel bed caused by high velocities is progressing evenly and uniformly.

F. Obstruction. The presence of log jams, bridge piers, and the like tends to increase n. The amount of increase depends on the nature of the obstructions, their size, shape, number, and distribution.

G. Size and Shape of Channel. There is no definite evidence about the size and shape of a channel as an important factor affecting the value of n. An increase in hydraulic radius may either increase or decrease n, depending on the condition of the channel (Fig. 5-4).

H. Stage and Discharge. The n value in most streams decreases with increase in stage and in discharge. When the water is shallow, the irregularities of the channel bottom are exposed and their effects become pronounced. However, the n value may be large at high stages if the banks are rough and grassy.

When the discharge is too high, the stream may overflow its banks and a portion of the flow will be along the flood plain. The n value of the flood plains is generally larger than that of the channel proper, and its magnitude depends on the surface condition or vegetation. If the bed and banks of a channel are equally smooth and regular and the bottom slope is uniform, the value of n may remain almost the same at all stages; so a constant n is usually assumed in the flow computation. This happens mostly in artificial channels. On flood plains the value of n usually varies with the stage of submergence of the vegetation at low stages. This can be seen, for example, from Table 5-4, which shows the n values for various flood stages according to the type of cover and depth

TABLE 5-4. VALUES OF n FOR VARIOUS STAGES IN THE NISHNABOTNA RIVER, IOWA, FOR THE AVERAGE GROWING SEASON

Depth of water, ft	Channel section	Flood-plain cover				
		Corn	Pasture	Meadow	Small grains	Brush and waste
Under 1	0.03	0.06	0.05	0.10	0.10	0.12
1 to 2	0.03	0.06	0.05	0.08	0.09	0.11
2 to 3	0.03	0.07	0.04	0.07	0.08	0.10
3 to 4	0.03	0.07	0.04	0.06	0.07	0.09
Over 4	0.03	0.06	0.04	0.05	0.06	0.08

of inundation, as observed in the Nishnabotna River, Iowa, for the average growing season [24]. It should be noted, however, that vegetation has a marked effect only up to a certain stage and that the roughness coefficient can be considered to remain constant for practical purposes in determining overbank flood discharges.

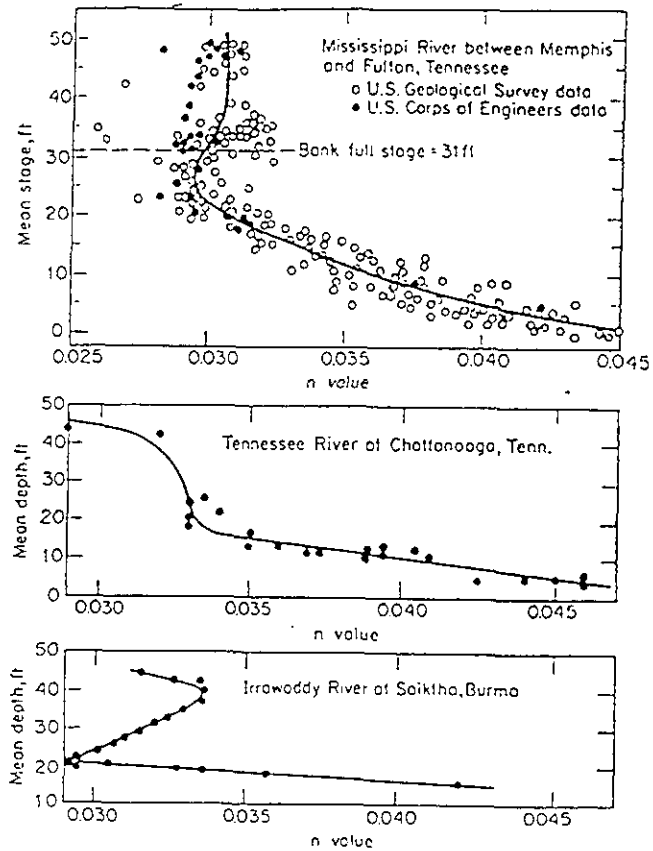


FIG. 5-4. Variations of the n value with the mean stage or depth.

Curves of n value versus stage (Fig. 5-4) in streams have been given by Lane [25], showing how value of n varies with stage in three large river channels. For the roughness of large canals, a study in connection with the design of the Panama Canal was made by Meyers and Schultz [26].[1] The two most important conclusions reached from this study were (1) that the n value for a river channel is least when the stage is at or somewhat above normal bankfull stage, and tends to increase for both

[1] A table of n values for eleven large channels at the most efficient depths and the curves showing the variations of n value with hydraulic radius in eight river channels are also given in this reference.

higher and lower stages; and (2) that the bankfull n values do not vary greatly for rivers and canals in different kinds of material and in widely separated locations.

For circular conduits, Camp [27,28] was able to show that the n value for a conduit flowing partially full is greater than that for a full conduit. *Using measurements on clean sewer pipe and drain tile*, both clay and concrete, from 4 to 12 in. in size, he found an increase of about 24% in the n value at the half-depth (Fig. 6-5).[1] The n value for the pipe flowing full was found to vary from 0.0095 to 0.011. Taking an average value of 0.0103, the n value at half-depth should be about 0.013. This is identical with the usual design value, which is based largely on measured values in sewers flowing partially full.

I. Seasonal Change. Owing to the seasonal growth of aquatic plants, grass, weeds, willow, and trees in the channel or on the banks, the value of n may increase in the growing season and diminish in the dormant season. This seasonal change may cause changes in other factors.

J. Suspended Material and Bed Load. The suspended material and the bed load, whether moving or not moving, would consume energy and cause head loss or increase the apparent channel roughness.

All the above factors should be studied and evaluated with respect to conditions regarding type of channel, state of flow, degree of maintenance, and other related considerations. They provide a basis for determining the proper value of n for a given problem. As a general guide to judgment, it may be accepted that conditions tending to induce turbulence and cause retardance will increase n value and that those tending to reduce turbulence and retardance will decrease n value.

Recognizing several primary factors affecting the roughness coefficient, Cowan [32] developed a procedure for estimating the value of n. By this procedure, the value of n may be computed by

$$n = (n_0 + n_1 + n_2 + n_3 + n_4)m_5 \qquad (5\text{-}12)$$

where n_0 is a basic n value for a straight, uniform, smooth channel in the natural materials involved, n_1 is a value added to n_0 to correct for the effect of surface irregularities, n_2 is a value for variations in shape and size of the channel cross section, n_3 is a value for obstructions, n_4 is a value for vegetation and flow conditions, and m_5 is a correction factor for meandering of channel. Proper values of n_0 to n_4 and m_5 may be selected from Table 5-5 according to the given conditions.

[1] The n/n_0 curve was based on measurements by Wilcox [29] on 8-in. clay and concrete sewer pipes and by Yarnell and Woodward [30] on open-butt-joint concrete and clay drain tiles 4 to 12 in. in size. For depths less than about $0.15d_0$, the curve was verified by the data of Johnson [31] for large sewers.

In selecting the value of n_1, the degree of irregularity is considered *smooth* for surfaces comparable to the best attainable for the materials involved; *minor* for good dredged channels, slightly eroded or scoured side slopes of canals or drainage channels; *moderate* for fair to poor dredged channels, moderately sloughed or eroded side slopes of canals or drainage channels; and *severe* for badly sloughed banks of natural streams, badly eroded or sloughed sides of canals or drainage channels, and unshaped, jagged, and irregular surfaces of channels excavated in rock.

In selecting the value of n_2, the character of variations in size and shape of cross section is considered *gradual* when the change in size or shape occurs gradually, *alternating occasionally* when large and small sections alternate occasionally or when shape changes cause occasional shifting of main flow from side to side, and *alternating frequently* when large and small sections alternate frequently or when shape changes cause frequent shifting of main flow from side to side.

The selection of the value of n_3 is based on the presence and characteristics of obstructions such as debris deposits, stumps, exposed roots, boulders, and fallen and lodged logs. One should recall that conditions considered in other steps must not be reevaluated or double-counted in this selection. In judging the relative effect of obstructions, consider the following: the extent to which the obstructions occupy or reduce the average water area, the character of obstructions (sharp-edged or angular objects induce greater turbulence than curved, smooth-surfaced objects), and the position and spacing of obstructions transversely and longitudinally in the reach under consideration.

In selecting the value of n_4, the degree of effect of vegetation is considered

(1) *Low* for conditions comparable to the following: (*a*) dense growths of flexible turf grasses or weeds, of which Bermuda and blue grasses are examples, where the average depth of flow is 2 to 3 times the height of vegetation, and (*b*) supple seedling tree switches, such as willow, cottonwood, or salt cedar where the average depth of flow is 3 to 4 times the height of the vegetation.

(2) *Medium* for conditions comparable to the following: (*a*) turf grasses where the average depth of flow is 1 to 2 times the height of vegetation, (*b*) stemmy grasses, weeds, or tree seedlings with *moderate* cover where the average depth of flow is 2 to 3 times the height of vegetation, and (*c*) brushy growths, moderately dense, similar to willows 1 to 2 years old, dormant season, along side slopes of a channel with no significant vegetation along the channel bottom, where the hydraulic radius is greater than 2 ft.

(3) *High* for conditions comparable to the following: (*a*) turf grasses where the average depth of flow is about equal to the height of vegetation,

(*b*) dormant season—willow or cottonwood trees 8 to 10 years old, intergrown with some weeds and brush, none of the vegetation in foliage, where the hydraulic radius is greater than 2 ft, and (*c*) growing season—bushy willows about 1 year old intergrown with some weeds in full foliage along side slopes, no significant vegetation along channel bottom, where hydraulic radius is greater than 2 ft.

(4) *Very high* for conditions comparable to the following: (*a*) turf grasses where the average depth of flow is less than one-half the height of vegetation, (*b*) growing season—bushy willows about 1 year old, intergrown with weeds in full foliage along side slopes, or dense growth of cattails along channel bottom, with any value of hydraulic radius up to 10 or 15 ft, and (*c*) growing season—trees intergrown with weeds and brush, all in full foliage, with any value of hydraulic radius up to 10 or 15 ft.

In selecting the value of m_5, the degree of meandering depends on the ratio of the meander length to the straight length of the channel reach. The meandering is considered *minor* for ratios of 1.0 to 1.2, *appreciable* for ratios of 1.2 to 1.5, and *severe* for ratios of 1.5 and greater.

In applying the above method for determining the n value, several things should be noted. The method does not consider the effect of suspended and bed loads. The values given in Table 5-5 were developed from a study of some 40 to 50 cases of small and moderate channels. Therefore, the method is questionable when applied to large channels whose hydraulic radii exceed, say, 15 ft. The method applies only to unlined natural streams, floodways, and drainage channels and shows a minimum value of 0.02 for the n value of such channels. The minimum value of n in general, however, may be as low as 0.012 in lined channels and as 0.008 in artificial laboratory flumes.

5-9. The Table of Manning's Roughness Coefficient. Table 5-6 gives a list of n values for channels of various kinds.[1] For each kind of channel the minimum, normal, and maximum values of n are shown. The normal values for artificial channels given in the table are recommended only for channels with good maintenance. The boldface figures are values generally recommended in design. For the case in which poor maintenance is expected in the future, values should be increased according to the situation expected. Table 5-6 will be found very useful as a guide to the quick selection of the n value to be used in a given problem. A popular table of this type was prepared by Horton [34] from an examination of the best available experiments at his time.[2] Table 5-6 is compiled

[1] The minimum value for Lucite was observed in the Hydraulic Engineering Laboratory at the University of Illinois [33]. Such a low n value may perhaps be obtained also for smooth brass and glass, but no observations have yet been reported.

[2] A table showing n values and other elements from 269 observations made on many existing artificial channels is also given by King [35].

TABLE 5-5. VALUES FOR THE COMPUTATION OF THE ROUGHNESS COEFFICIENT BY EQ. (5-12)

Channel conditions		Values	
Material involved	Earth	n_0	0.020
	Rock cut		0.025
	Fine gravel		0.024
	Coarse gravel		0.028
Degree of irregularity	Smooth	n_1	0.000
	Minor		0.005
	Moderate		0.010
	Severe		0.020
Variations of channel cross section	Gradual	n_2	0.000
	Alternating occasionally		0.005
	Alternating frequently		0.010–0.015
Relative effect of obstructions	Negligible	n_3	0.000
	Minor		0.010–0.015
	Appreciable		0.020–0.030
	Severe		0.040–0.060
Vegetation	Low	n_4	0.005–0.010
	Medium		0.010–0.025
	High		0.025–0.050
	Very high		0.050–0.100
Degree of meandering	Minor	m_5	1.000
	Appreciable		1.150
	Severe		1.300

TABLE 5-6. VALUES OF THE ROUGHNESS COEFFICIENT n
(Boldface figures are values generally recommended in design)

Type of channel and description	Minimum	Normal	Maximum
A. CLOSED CONDUITS FLOWING PARTLY FULL			
A-1. Metal			
a. Brass, *smooth*	0.009	**0.010**	0.013
b. Steel			
1. Lockbar and welded	0.010	0.012	0.014
2. Riveted and spiral	0.013	0.016	0.017
c. Cast iron			
1. Coated	0.010	0.013	0.014
2. Uncoated	0.011	0.014	0.016
d. Wrought iron			
1. Black	0.012	0.014	0.015
2. Galvanized	0.013	0.016	0.017
e. Corrugated metal			
1. Subdrain	0.017	0.019	0.021
2. Storm drain	0.021	0.024	0.030
A-2. Nonmetal			
a. Lucite	0.008	0.009	0.010
b. Glass	0.009	**0.010**	0.013
c. Cement			
1. Neat, surface	0.010	0.011	0.013
2. Mortar	0.011	0.013	0.015
d. Concrete			
1. Culvert, straight and free of debris	0.010	0.011	0.013
2. Culvert with bends, connections, and some debris	0.011	**0.013**	0.014
3. Finished	0.011	0.012	0.014
4. Sewer with manholes, inlet, etc., straight	0.013	0.015	0.017
5. Unfinished, steel form	0.012	0.013	0.014
6. Unfinished, smooth wood form	0.012	**0.014**	0.016
7. Unfinished, rough wood form	0.015	0.017	0.020
e. Wood			
1. Stave	0.010	0.012	0.014
2. Laminated, treated	0.015	0.017	0.020
f. Clay			
1. Common drainage tile	0.011	0.013	0.017
2. Vitrified sewer	0.011	0.014	0.017
3. Vitrified sewer with manholes, inlet, etc.	0.013	0.015	0.017
4. Vitrified subdrain with open joint	0.014	0.016	0.018
g. Brickwork			
1. Glazed	0.011	0.013	0.015
2. Lined with cement mortar	0.012	0.015	0.017
h. Sanitary sewers coated with sewage slimes, with bends and connections	0.012	0.013	0.016
i. Paved invert, sewer, smooth bottom	0.016	0.019	0.020
j. Rubble masonry, cemented	0.018	0.025	0.030

TABLE 5-6. VALUES OF THE ROUGHNESS COEFFICIENT n *(continued)*

Type of channel and description	Minimum	Normal	Maximum
B. LINED OR BUILT-UP CHANNELS			
B-1. Metal			
a. Smooth steel surface			
1. Unpainted	0.011	0.012	0.014
2. Painted	0.012	0.013	0.017
b. Corrugated	0.021	0.025	0.030
B-2. Nonmetal			
a. Cement			
1. Neat, surface	0.010	0.011	0.013
2. Mortar	0.011	0.013	0.015
b. Wood			
1. Planed, untreated	0.010	0.012	0.014
2. Planed, creosoted	0.011	0.012	0.015
3. Unplaned	0.011	0.013	0.015
4. Plank with battens	0.012	0.015	0.018
5. Lined with roofing paper	0.010	0.014	0.017
c. Concrete			
1. Trowel finish	0.011	0.013	0.015
2. Float finish	0.013	0.015	0.016
3. Finished, with gravel on bottom	0.015	0.017	0.020
4. Unfinished	0.014	0.017	0.020
5. Gunite, good section	0.016	0.019	0.023
6. Gunite, wavy section	0.018	0.022	0.025
7. On good excavated rock	0.017	0.020	
8. On irregular excavated rock	0.022	0.027	
d. Concrete bottom float finished with sides of			
1. Dressed stone in mortar	0.015	0.017	0.020
2. Random stone in mortar	0.017	0.020	0.024
3. Cement rubble masonry, plastered	0.016	0.020	0.024
4. Cement rubble masonry	0.020	0.025	0.030
5. Dry rubble or riprap	0.020	0.030	0.035
e. Gravel bottom with sides of			
1. Formed concrete	0.017	0.020	0.025
2. Random stone in mortar	0.020	0.023	0.026
3. Dry rubble or riprap	0.023	0.033	0.036
f. Brick			
1. Glazed	0.011	**0.013**	0.015
2. In cement mortar	0.012	**0.015**	0.018
g. Masonry			
1. Cemented rubble	0.017	0.025	0.030
2. Dry rubble	0.023	0.032	0.035
h. Dressed ashlar	0.013	0.015	0.017
i. Asphalt			
1. Smooth	0.013	0.013	
2. Rough	0.016	0.016	
j. Vegetal lining	0.030		0.500

TABLE 5-6. VALUES OF THE ROUGHNESS COEFFICIENT n (*continued*)

Type of channel and description	Minimum	Normal	Maximum
C. EXCAVATED OR DREDGED			
a. Earth, straight and uniform			
1. Clean, recently completed	0.016	0.018	0.020
2. Clean, after weathering	0.018	0.022	0.025
3. Gravel, uniform section, clean	0.022	0.025	0.030
4. With short grass, few weeds	0.022	0.027	0.033
b. Earth, winding and sluggish			
1. No vegetation	0.023	0.025	0.030
2. Grass, some weeds	0.025	0.030	0.033
3. Dense weeds or aquatic plants in deep channels	0.030	0.035	0.040
4. Earth bottom and rubble sides	0.028	0.030	0.035
5. Stony bottom and weedy banks	0.025	0.035	0.040
6. Cobble bottom and clean sides	0.030	0.040	0.050
c. Dragline-excavated or dredged			
1. No vegetation	0.025	0.028	0.033
2. Light brush on banks	0.035	0.050	0.060
d. Rock cuts			
1. Smooth and uniform	0.025	0.035	0.040
2. Jagged and irregular	0.035	0.040	0.050
e. Channels not maintained, weeds and brush uncut			
1. Dense weeds, high as flow depth	0.050	0.080	0.120
2. Clean bottom, brush on sides	0.040	0.050	0.080
3. Same, highest stage of flow	0.045	0.070	0.110
4. Dense brush, high stage	0.080	0.100	0.140
D. NATURAL STREAMS			
D-1. Minor streams (top width at flood stage <100 ft)			
a. Streams on plain			
1. Clean, straight, full stage, no rifts or deep pools	0.025	0.030	0.033
2. Same as above, but more stones and weeds	0.030	0.035	0.040
3. Clean, winding, some pools and shoals	0.033	0.040	0.045
4. Same as above, but some weeds and stones	0.035	0.045	0.050
5. Same as above, lower stages, more ineffective slopes and sections	0.040	0.048	0.055
6. Same as 4, but more stones	0.045	0.050	0.060
7. Sluggish reaches, weedy, deep pools	0.050	0.070	0.080
8. Very weedy reaches, deep pools, or floodways with heavy stand of timber and underbrush	0.075	0.100	0.150

TABLE 5-6. VALUES OF THE ROUGHNESS COEFFICIENT n (*continued*)

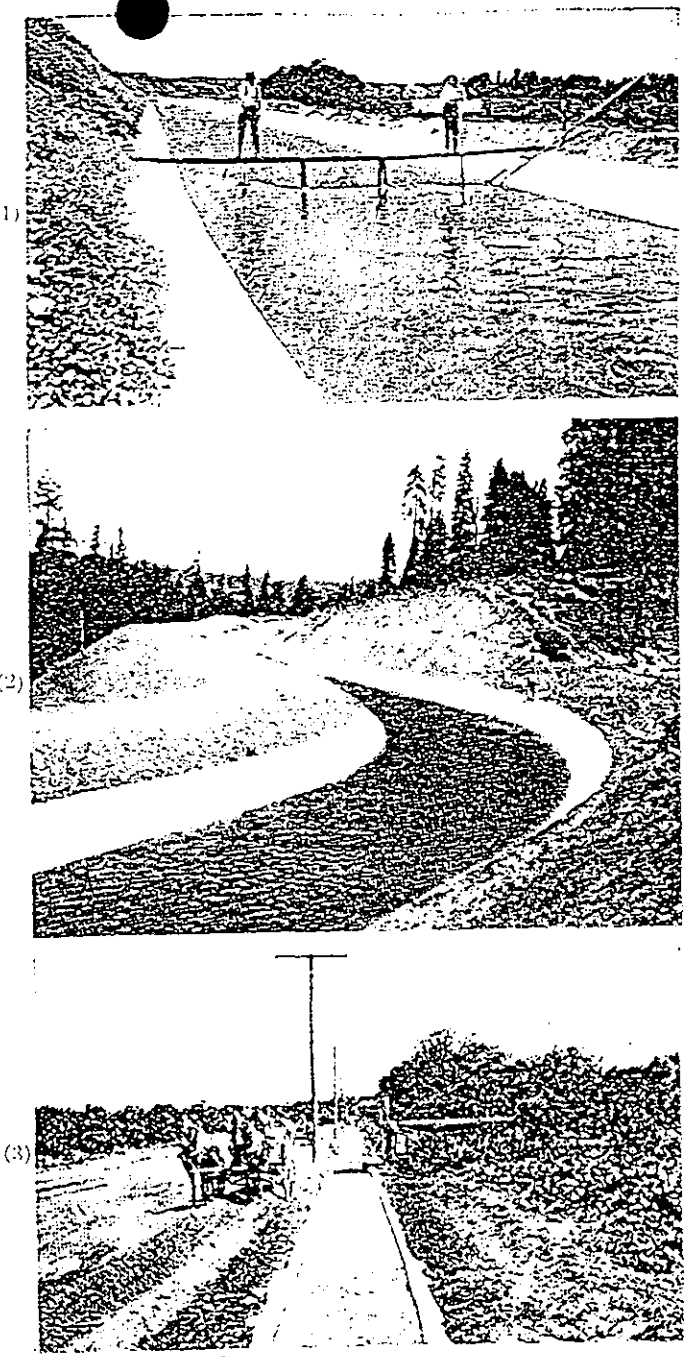
Type of channel and description	Minimum	Normal	Maximum
b. Mountain streams, no vegetation in channel, banks usually steep, trees and brush along banks submerged at high stages			
1. Bottom: gravels, cobbles, and few boulders	0.030	0.040	0.050
2. Bottom: cobbles with large boulders	0.040	0.050	0.070
D-2. Flood plains			
a. Pasture, no brush			
1. Short grass	0.025	0.030	0.035
2. High grass	0.030	0.035	0.050
b. Cultivated areas			
1. *No crop*	0.020	0.030	0.040
2. Mature row crops	0.025	0.035	0.045
3. Mature field crops	0.030	0.040	0.050
c. Brush			
1. Scattered brush, heavy weeds	0.035	0.050	0.070
2. Light brush and trees, in winter	0.035	0.050	0.060
3. Light brush and trees, in summer	0.040	0.060	0.080
4. Medium to dense brush, in winter	0.045	0.070	0.110
5. Medium to dense brush, in summer	0.070	0.100	0.160
d. Trees			
1. Dense willows, summer, straight	0.110	0.150	0.200
2. Cleared land with tree stumps, no sprouts	0.030	0.040	0.050
3. Same as above, but with heavy growth of sprouts	0.050	0.060	0.080
4. Heavy stand of timber, a few down trees, little undergrowth, flood stage below branches	0.080	0.100	0.120
5. Same as above, but with flood stage reaching branches	0.100	0.120	0.160
D-3. Major streams (top width at flood stage >100 ft). The n value is less than that for minor streams of similar description, *because banks offer less effective resistance.*			
a. Regular section with no boulders or brush	0.025	.....	0.060
b. Irregular and rough section	0.035	.....	0.100

rom up-to-date information collected from various sources ([34,36,38], nd unpublished data); hence it is much broader in scope than the Horton able.

5-10. Illustrations of Channels with Various Roughnesses. Photo-graphs of a number of typical channels, accompanied by brief descriptions f the channel conditions and the corresponding n values, are shown in ig. 5-5. These photographs are collected from different sources and rranged in order of increasing magnitude of the n values. They provide general idea of the appearance of the channels having different n values nd so should facilitate selection of the n value for a given channel con-lition. The n value given for each channel represents approximately he coefficient of roughness when the photograph was taken.

The above type of visual aid is also employed by the U.S. Geological Survey. The Survey has made several determinations of channel rough-ness in streams, mostly in the northwestern United States. These in-clude measurements of cross-sectional area, width, depth, mean velocity, slope, and computation of the roughness coefficient. The reaches were photographed in stereoscopic color, and the photographs have been circulating among the district offices of the Survey as a guide in evalu-ating n.

FIG. 5-5. Typical channels showing different n values. (*These photographs are reproduced from* [37] *and* [38] *with the permission of the U.S. Department of Agriculture. The original pictures used for reproduction purposes were supplied through the courtesy of Mr. F. C. Scobey for photographs* 1 *to* 14 *and photograph* 19, *and through the courtesy of Mr. C. E. Ramser for the others.*)



(1)

(2)

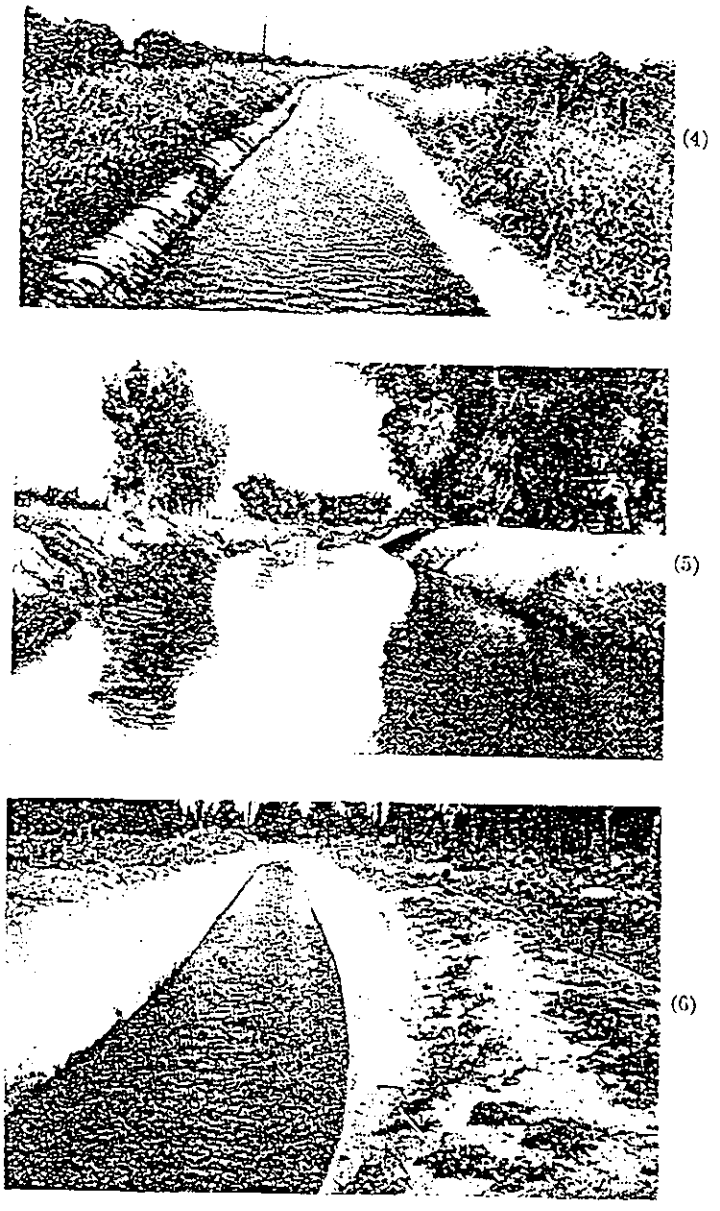
(3)

Fig. 5-5 (1-3)

$n = 0.012$. Canal lined with concrete slabs having smooth neat cement joints very smooth surface, hand-troweled and with cement wash on concrete base.

$n = 0.014$. Concrete canal poured behind screeding and smoothing platform.

$n = 0.016$. Small concrete-lined ditch, straight and uniform, bottom slightly ed, the sides and bottom covered with a rough deposit, which increases the n value.



(4)

(5)

(6)

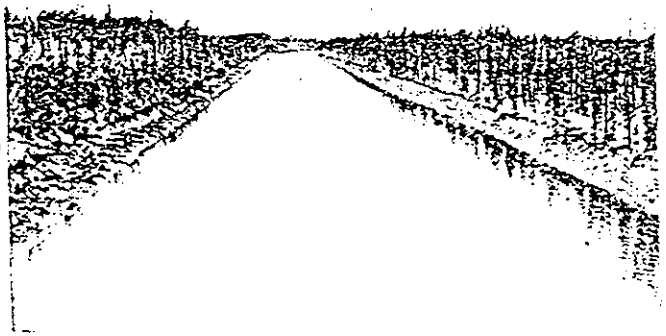
Fig. 5-5 (4-6)

4. $n = 0.018$. Shot-concrete lining without smooth treatment. Surface covered with fine algae and bottom with drifting sand dunes.

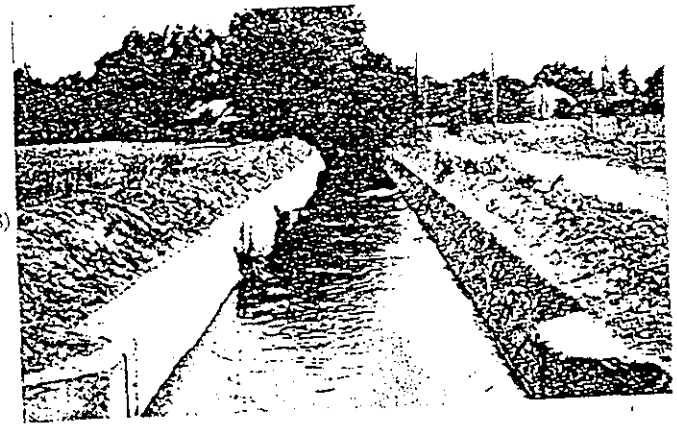
5. $n = 0.018$. Earth channel excavated in a clay loam, with deposit of clean sand in the middle and slick silty mud near the sides.

6. $n = 0.020$. Concrete lining made in a rough lava-rock cut, clean-scoured, very rough, and deeply pitted.

(7)



(8)



(9)

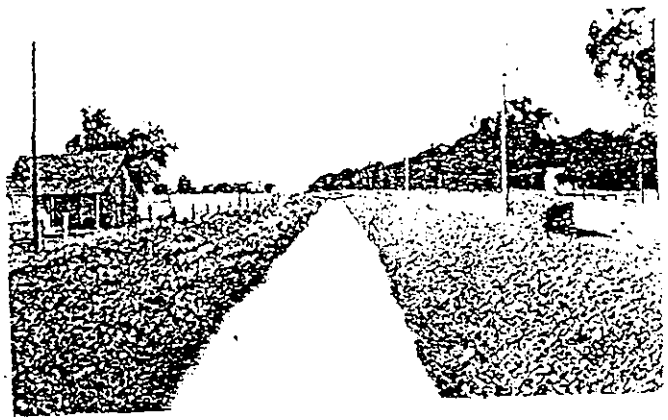


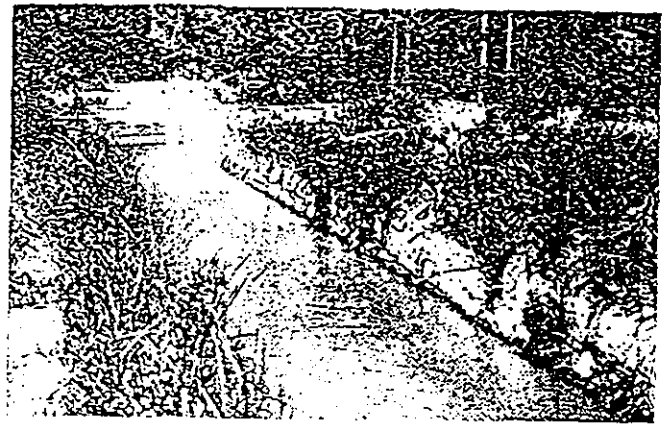
FIG. 5-5 (7–9)

7. $n = 0.020$. Irrigation canal, straight, in hard-packed smooth sand.

8. $n = 0.022$. Cement-plaster lining *applied directly* to the trimmed surface of the earth channel. With weeds in broken places and loose sand on bottom.

9. $n = 0.024$. Canal excavated in silty clay loam. Slick and hard bed.

(10)



(11)



(12)

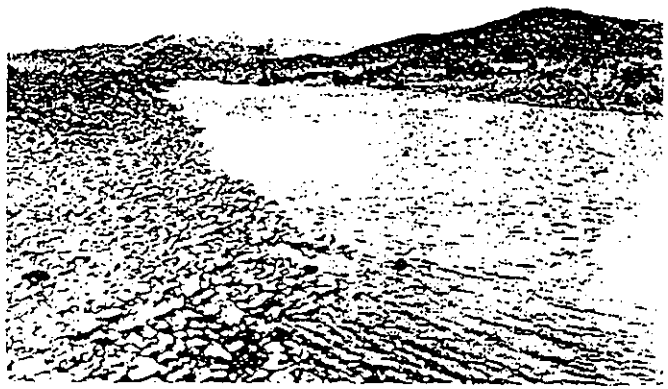


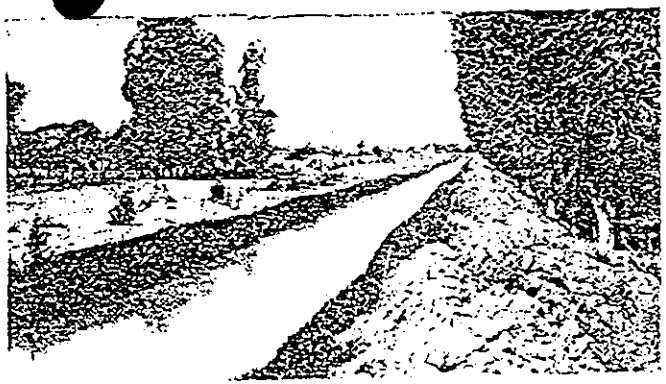
FIG. 5-5 (10–12)

10. $n = 0.024$. Ditch lined on both sides and bottom with dry-laid unchinked cobble. Bottom quite irregular, with scattered loose cobbles.

11. $n = 0.026$. Canal excavated on hillside, with upper bank mostly of willow roots and lower bank with well-made concrete wall. Bottom covered with coarse gravel.

12. $n = 0.028$. Cobble-bottom channel, where there is insufficient silt in the water or too high a velocity, preventing formation of a graded smooth bed.

(13)



(14)



(15)



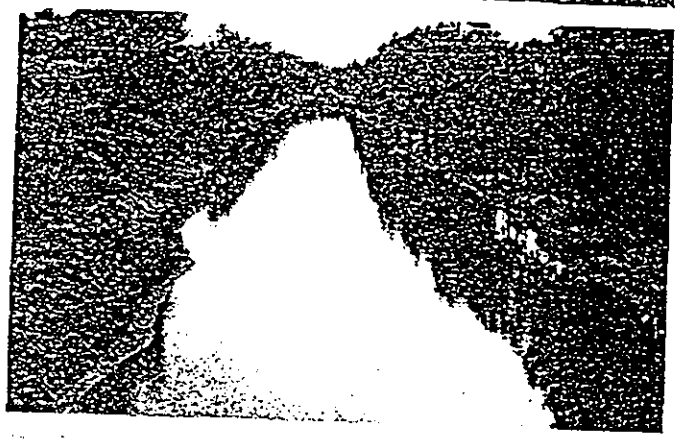
FIG. 5-5 (13–15)

13. $n = 0.029$. Earth canal excavated in alluvial silt soil, with deposits of sand a bottom and growth of grass.

(16)



(17)



(18)

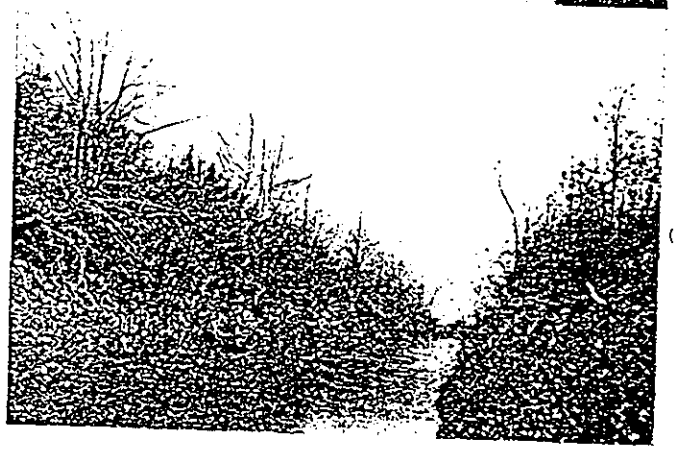


FIG. 5-5 (16–18)

16. $n = 0.040$. Rock channel excavated by explosives.

17. $n = 0.040$. Ditch in clay and sandy loam; irregular side slopes, bottom, and cross section; *grass on slopes.*

18. $n = 0.045$. Dredge channel, irregular side slopes and bottom, in black, waxy clay at top to yellow clay at bottom, sides covered with small saplings and brush, slight and gradual variations in cross section.

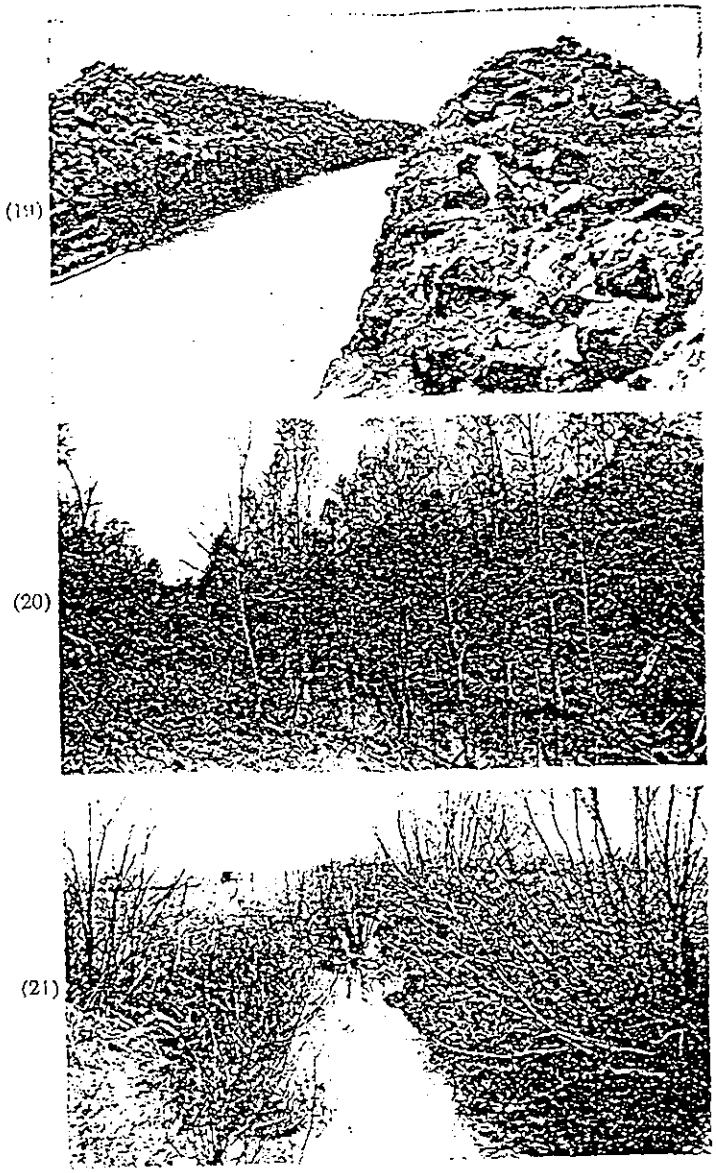


FIG. 5-5 (19-21)

19. n = 0.050. Dredge channel with very irregular side slopes and bottom, in dark-colored waxy clay, with growth of weeds and grass. Slight variation in shape of cross section for variation in size.

20. n = 0.060. Ditch in heavy silty clay; irregular side slopes and bottom; practically entire section filled with large-size growth of trees, principally willows and cottonwoods. Quite uniform cross section.

21. n = 0.080. Dredge channel in black slippery clay and gray silty clay loam, irregular wide slopes and bottom, covered with dense growth of bushy willows, some in bottom; remainder of both slopes covered with weeds and a scattering growth of willows and poplars, no foliage; some silting on bottom.

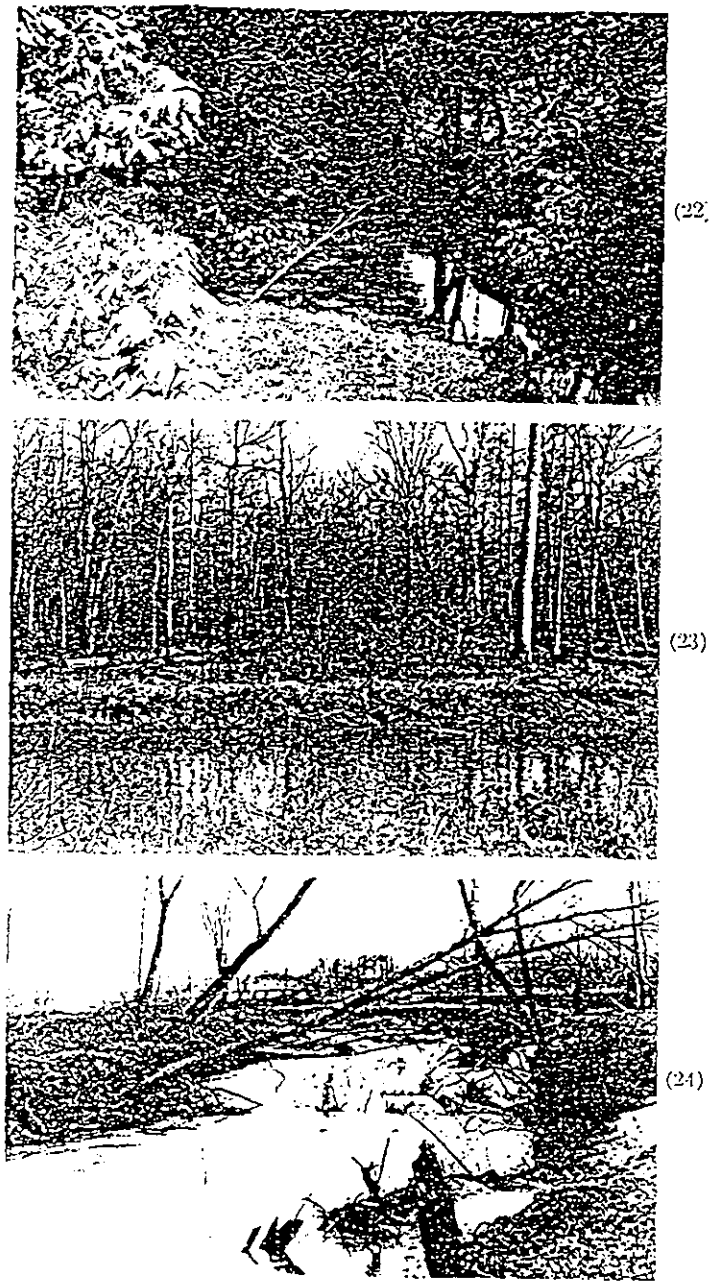


FIG. 5-5 (22-24)

22. n = 0.110. Same as (21), but with much foliage and covered for about 40 ft with growth resembling smart weed.

23. n = 0.125. Natural channel floodway in median fine sand to fine clay, none side slopes; *fairly even and regular bottom with occasional flat bottom sloughs*; variation in depth; practically virgin timber, very little undergrowth except occasional dense patches of bushed and small trees, some logs and dead fallen trees.

NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING.
BY OLYMPUS AERIAL SURVEYS, INC. FLOWN JULY 14, 1997 AND AUGUST 26, 1997
CONTOUR INTERVAL 1 FOOT

PANEL AFFECTS FIRMS 32003C0380 D & 32003C0386 D
DATED AUGUST 16, 1995.

FILE: WORK_PN3.DWG

FLOODING SOURCE: PULSIPHER WASH
MESQUITE, CLARK COUNTY, NEVADA

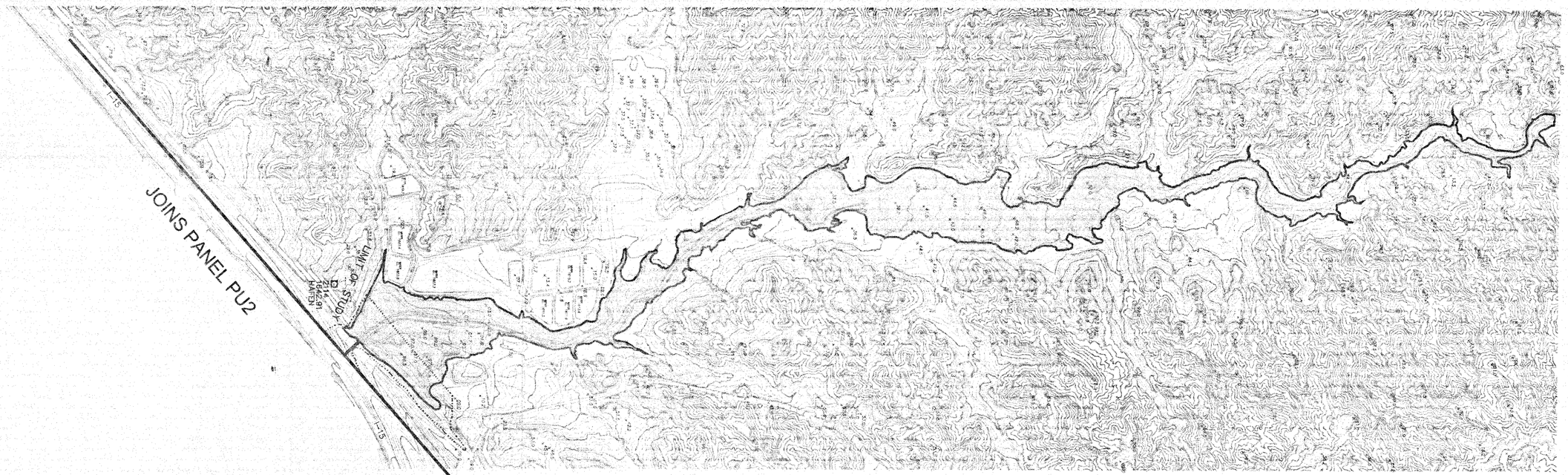
ELEVATION REFERENCE MARKS

REFERENCE MARK	PROJECT DATUM ELEVATION (FEET)	DESCRIPTION OF LOCATION
2114	1642.91	Haten; 4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash

PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.89 FEET

GRAPHIC SCALE
(IN FEET)
1 inch = 400 ft.
400 0 200 400 800 1600

NORTH



LEGEND

- REVISED ZONE A
- NEW SHADED ZONE X
- EXISTING 100-YEAR FLOODPLAIN BOUNDARY
- APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY TIE-IN
- ELEVATION REFERENCE MARK
- SFHA — SPECIAL FLOOD HAZARD AREA

REV	DATE	DESCRIPTION

RECOMMENDED _____ NO. DATE

G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102
(702) 383-1200

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH NORTH OF I-15 REACH

WORK MAP

SHEET
PU1
OF 2 SHEETS

550.035

PLOTTED: 9/2/99
WORK_PN3..DWG

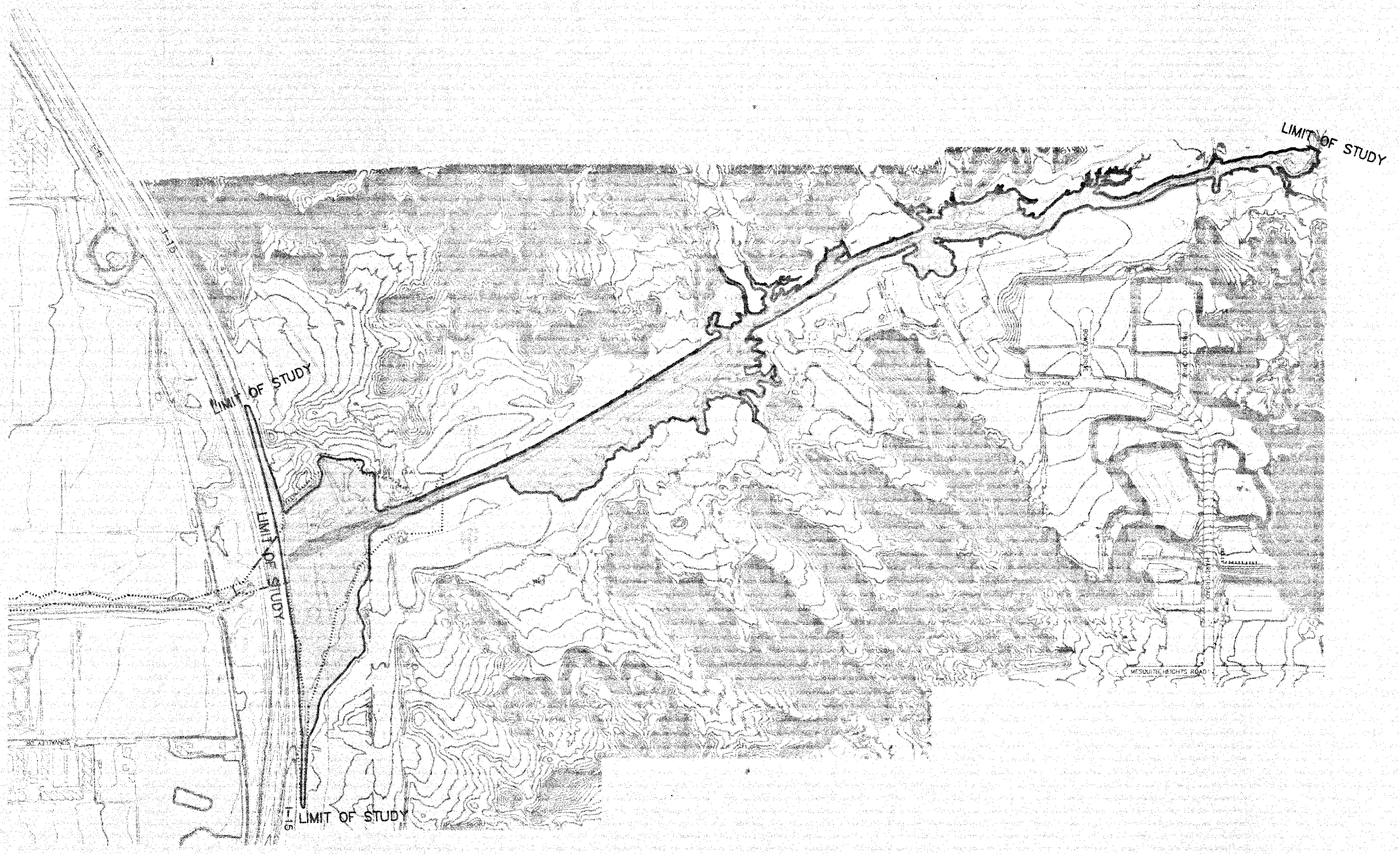
NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING,
BY OLYMPUS AERIAL SURVEYS, INC. FLOWN JULY 14, 1997 AND AUGUST 26, 1997
CONTOUR INTERVAL 1 FOOT
BY NEVADA AERIAL MAPPING, FLOWN JANUARY 14, 1998
CONTOUR INTERVAL 2 FEET

PANEL AFFECTS FIRMS 32003C0379 D & 32003C0387 D
DATED AUGUST 16, 1995.

FILE: WORK_AN3.DWG

FLOODING SOURCE: ABBOTT WASH
MESQUITE, CLARK COUNTY, NEVADA



GRAPHIC SCALE
(IN FEET)
1 inch = 400 ft.
400 0 200 400 800 1600

NORTH

PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.99 FEET

LEGEND

- REVISED ZONE A
- NEW SHADED ZONE X
- EXISTING 100-YEAR FLOODPLAIN BOUNDARY
- APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY TIE-IN
- SFHA SPECIAL FLOOD HAZARD AREA

NO.	DATE	DESCRIPTION

RECOMMENDED

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Engineering/Architecture
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102
(702) 365-1200

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
ABBOTT WASH NORTH OF I-15 REACH

WORK MAP

SHEET
AB1
OF 1 SHEETS

550.035

PLOTTED: 10/8/99
WORK_AN3.DWG

NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING,
BY OLYMPUS AERIAL SURVEYS, INC. FLOWN JULY 14, 1997 AND AUGUST 26, 1997
CONTOUR INTERVAL 1 FOOT
BY NEVADA AERIAL MAPPING, FLOWN JANUARY 14, 1998
CONTOUR INTERVAL 2 FEET

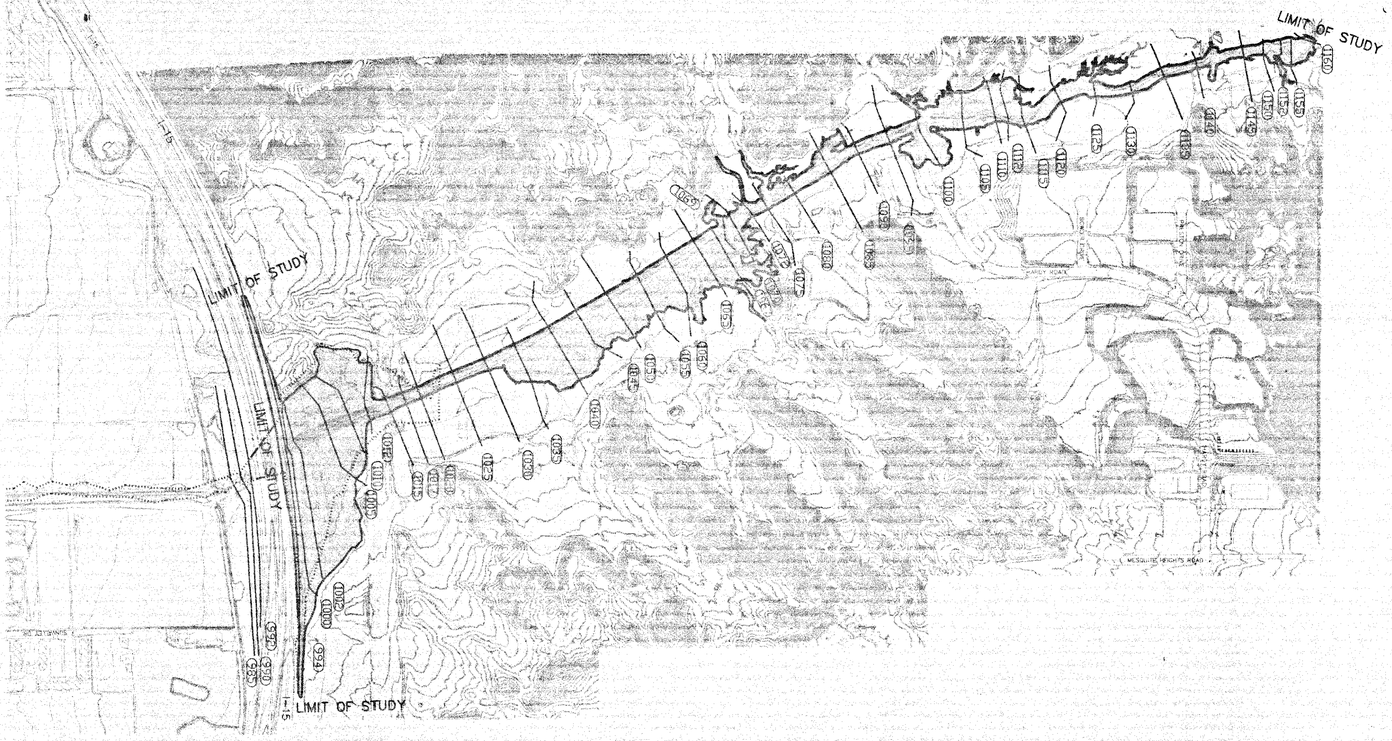
PANEL AFFECTS FIRMS 32003C0379 D & 32003C0387 D
DATED AUGUST 16, 1995.

FILE: WORK_AN3.DWG

FLOODING SOURCE: ABBOTT WASH
MESQUITE, CLARK COUNTY, NEVADA

GRAPHIC SCALE
1 inch = 400 ft.
(IN FEET)
400 0 200 400 800 1600

NORTH



PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.89 FEET

LEGEND

- REVISED ZONE A
- NEW SHADED ZONE X
- EXISTING 100-YEAR FLOODPLAIN BOUNDARY
- APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY TIE-IN
- SFHA — SPECIAL FLOOD HAZARD AREA
- (100) — CROSS SECTION

RECOMMENDED

NO	DATE	REVISION DESCRIPTION

G.C. WALLACE, INC.
Engineering/Architecture
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(702) 383-1200

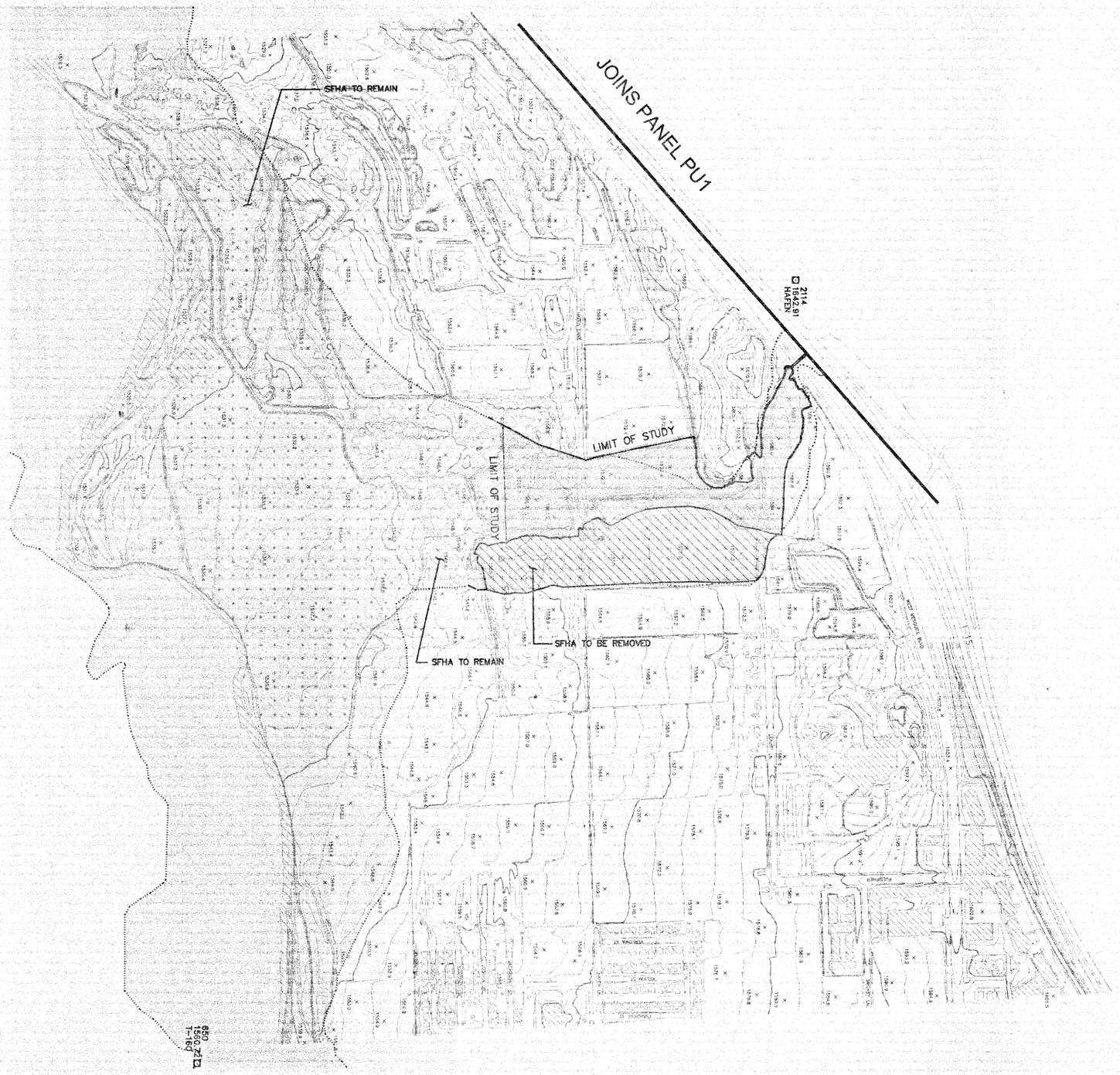
ABBOTT AND PULSIPHER WASHES FIS RESTUDY
ABBOTT WASH NORTH OF I-15 REACH

CROSS SECTION EXHIBIT

SHEET
AB1
OF 1 SHEETS

550.035

PLOTTED: 10/8/99
WORK_AN3.DWG



NORTH

GRAPHIC SCALE

(IN FEET)
1 inch = 400 ft

NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING,
BY NEVADA AERIAL MAPPING, FLOWN JANUARY 14, 1998
CONTOUR INTERVAL 2 FEET

PANEL AFFECTS FIRM 32003C0386 D
DATED AUGUST 16, 1995

FILE: WORK_PS4.DWG

FLOODING SOURCE: PULSIPHER WASH
MESQUITE, CLARK COUNTY, NEVADA

ELEVATION REFERENCE MARKS

REFERENCE MARK	PROJECT DATUM ELEVATION (FEET)	DESCRIPTION OF LOCATION
2114	1642.91	Hafen: 4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash.
650	1560.72	T-160: Description of benchmark not available. Located south of Virgin River approximately 1300 feet east and 4200 feet south of Pulsipher Street and Leavitt Lane intersection.

PROJECT DATUM = NGVD 1929 – 0.6 FEET
PROJECT DATUM = NAVD 1988 – 2.89 FEET

LEGEND

- REVISED ZONE A
- NEW SHADED ZONE X
- EXISTING APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY
- APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY TIE-IN
- ELEVATION REFERENCE MARK
- SFHA — SPECIAL FLOOD HAZARD AREA

NO.	DATE	DESCRIPTION

RECOMMENDED

G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102
(702) 383-1200

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH SOUTH OF I-15 REACH
WORK MAP

SHEET
PU2
OF 2 SHEETS

550.035

PLOTTED: 1/15/98
WORK_PS4.DWG

NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING,
BY OLYMPUS AERIAL SURVEYS, INC. FLOWN JULY 14, 1997 AND AUGUST 26, 1997
CONTOUR INTERVAL 1 FOOT

PANEL AFFECTS FIRMS 32003C0380 D & 32003C0386 D
DATED AUGUST 16, 1995.

FILE: WORK_PN3.DWG

FLOODING SOURCE: PULSIPHER WASH
MESQUITE, CLARK COUNTY, NEVADA

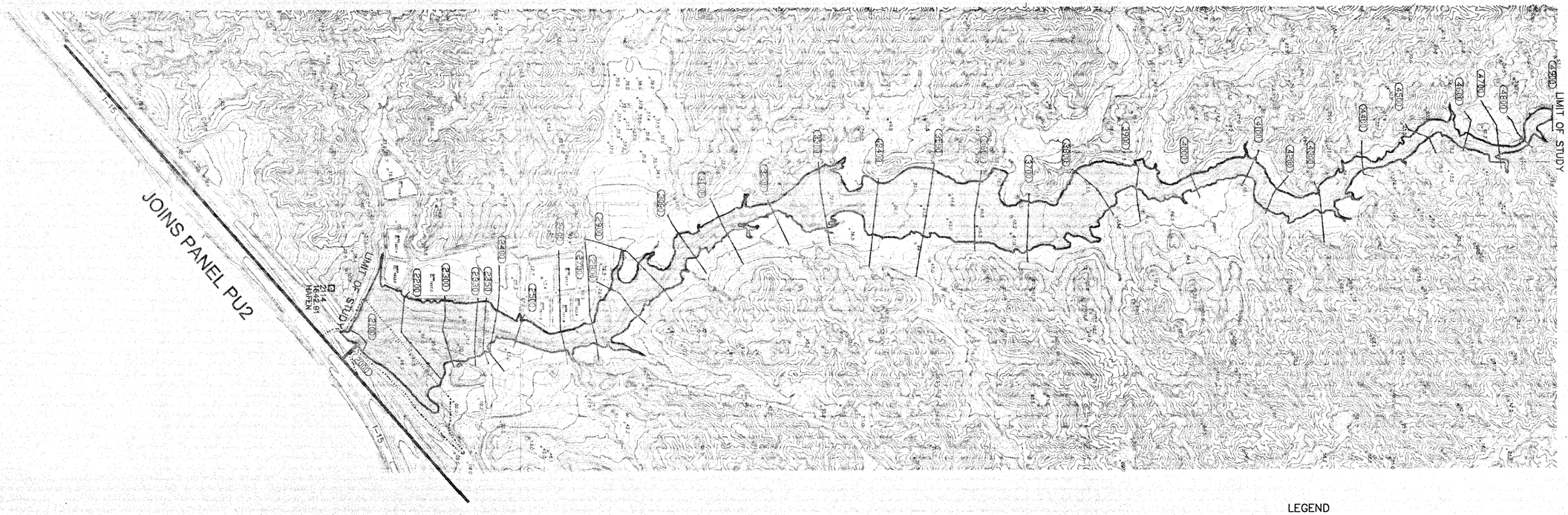
ELEVATION REFERENCE MARKS

REFERENCE MARK	PROJECT DATUM ELEVATION (FEET)	DESCRIPTION OF LOCATION
2114	1642.91	Hafen; 4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash.

PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.89 FEET

GRAPHIC SCALE
(IN FEET)
1 inch = 400 ft.
400 0 200 400 800 1600

NORTH



LEGEND

- REVISED ZONE A
- NEW SHADED ZONE X
- EXISTING 100-YEAR FLOODPLAIN BOUNDARY
- APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY TIE-IN
- ELEVATION REFERENCE MARK
- SFHA — SPECIAL FLOOD HAZARD AREA
- (100) — CROSS SECTION

NO.	DATE	DESCRIPTION

RECOMMENDED

G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102
(702) 363-1200

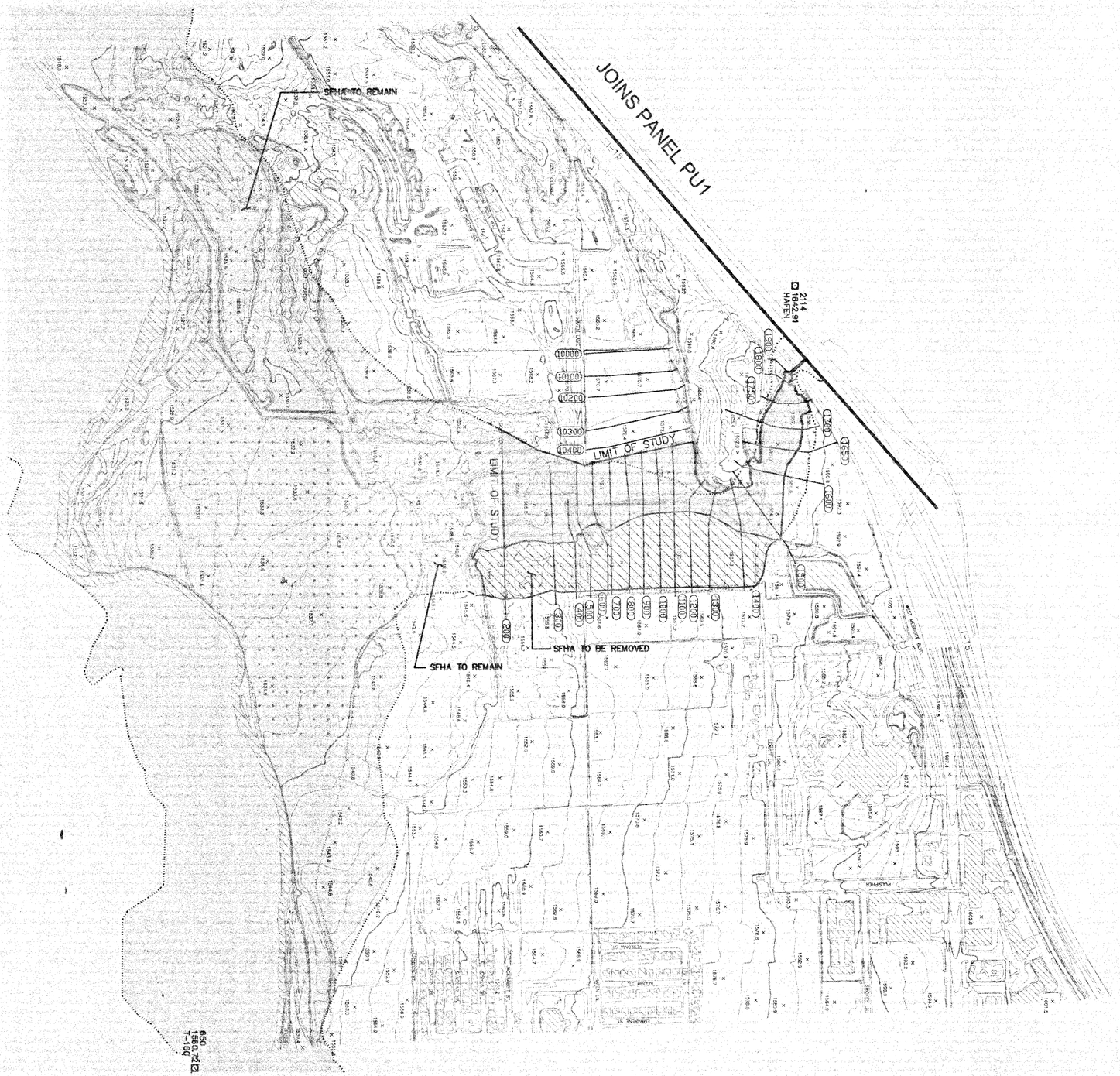
ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH NORTH OF I-15 REACH

CROSS SECTION EXHIBIT

SHEET
PU1
OF 2 SHEETS

550.035

PLOTTED: 9/2/99
WORK_PN3.DWG



NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING,
BY NEVADA AERIAL MAPPING, FLOWN JANUARY 14, 1998
CONTOUR INTERVAL 2 FEET

PANEL AFFECTS FIRM 32003C0386 D
DATED AUGUST 16, 1995

FILE: WORK_PS4.DWG

FLOODING SOURCE: PULSIPHER WASH
MESQUITE, CLARK COUNTY, NEVADA

GRAPHIC SCALE
(IN FEET)
1 inch = 400 ft.
400 0 200 400 800 1600

NORTH

ELEVATION REFERENCE MARKS

REFERENCE MARK	PROJECT DATUM ELEVATION (FEET)	DESCRIPTION OF LOCATION
2114	1642.91	Hafen; 4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash.
650	1560.72	T-160; Description of benchmark not available. Located south of Virgin River approximately 1300 feet east and 4200 feet south of Pulsipher Street and Leavitt Lane intersection.

PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.69 FEET

LEGEND

- REVISED ZONE A
- NEW SHADED ZONE X
- EXISTING APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY
- APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY TIE-IN
- ELEVATION REFERENCE MARK
- SFHA — SPECIAL FLOOD HAZARD AREA
- (1100) — CROSS SECTION

NO.	DATE	DESCRIPTION

RECOMMENDED

G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102
(702) 383-1200

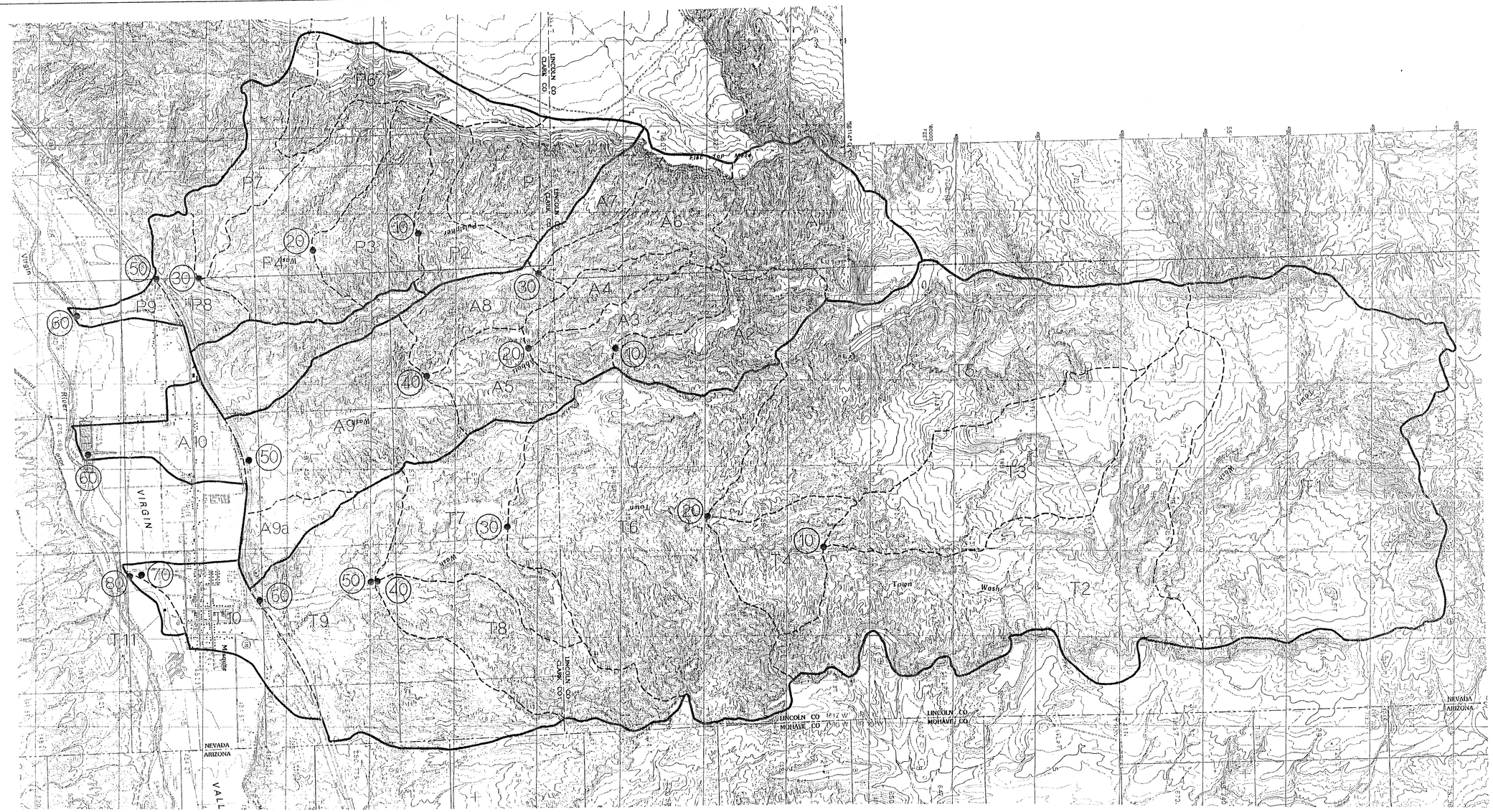
ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH SOUTH OF I-15 REACH

CROSS SECTION EXHIBIT

SHEET
PU2
OF 2 SHEETS

550.035

PLOTTED: 1/15/00
WORK_PS4.DWG



LEGEND

- MAJOR WATERSHED BOUNDARY
- SUBWATERSHED BOUNDARY
- T1 SUBWATERSHED NUMBER
- (10) CONCENTRATION POINT AND NUMBER

N

0 2000 4000 6000 FEET

FIGURE D-2
EXISTING CONDITION
HYDROLOGIC MAP

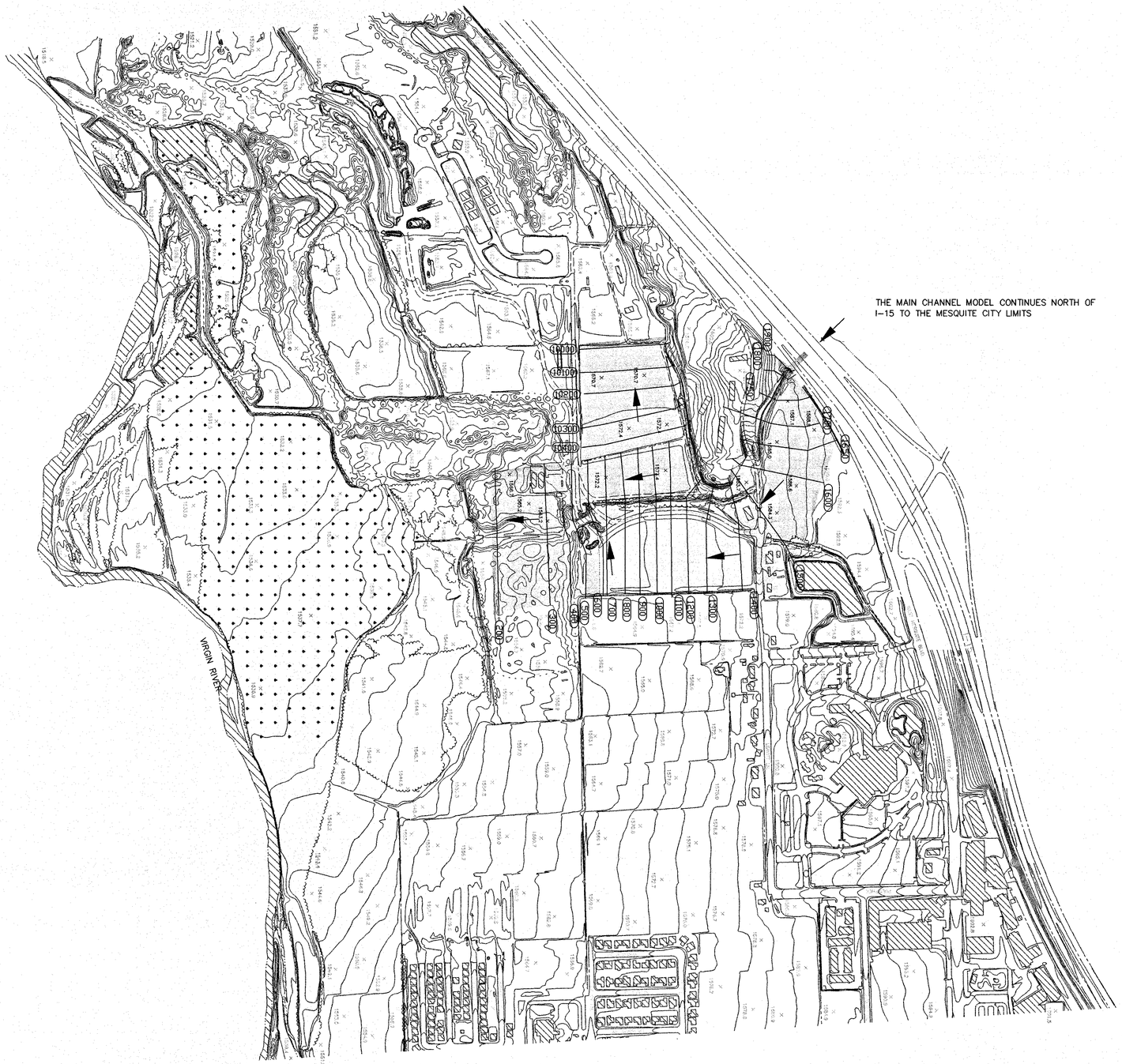
CITY OF MESQUITE
FLOOD CONTROL MASTER PLAN UPDATE
CLARK COUNTY REGIONAL FLOOD
CONTROL DISTRICT, NEVADA

FIGURE 3

CH2MHILL

SWW39645.A1

39645e10.dlv 14-JUL-1995 11:43:21



NORTH

GRAPHIC SCALE
(IN FEET)
1 inch = 400 ft.
400 0 200 400 800 1600

LEGEND
- MAIN CHANNEL MODEL BOUNDARY
- RIGHT OVERBANK MODEL BOUNDARY
- LEFT BREAKOUT MODEL BOUNDARY
- (1100) CROSS SECTION
- DIRECTION OF FLOW

REV | DATE | DESCRIPTION

RECOMMENDED NO. DATE

G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102
(702) 363-1200

ABBOTT AND PULSIPHER WASHES FIS RESTUDY

PULSIPHER WASH HEC-2 MODELS BOUNDARY MAP

FIGURE 4

SHEET

OF SHEETS

PLOTTED: 1/25/99
FIGURE4.DWG

MAP REPOSITORY

City of Boulder City
Engineering Department
401 California Avenue
Boulder City, Nevada 89005
(Maps available for reference only, not for distribution.)

City of Henderson
Public Works Department
240 Water Street
Henderson, Nevada 89015
(Maps available for reference only, not for distribution.)

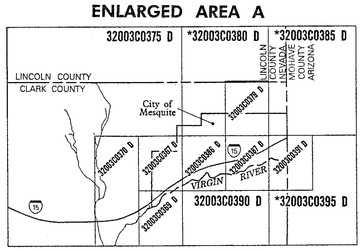
City of Las Vegas
Public Works Department
400 East Stewart Avenue, Fourth Floor
Las Vegas, Nevada 89101
(Maps available for reference only, not for distribution.)

City of Mesquite
Mesquite City Hall
11 East Mesquite Boulevard
Mesquite, Nevada 89024
(Maps available for reference only, not for distribution.)

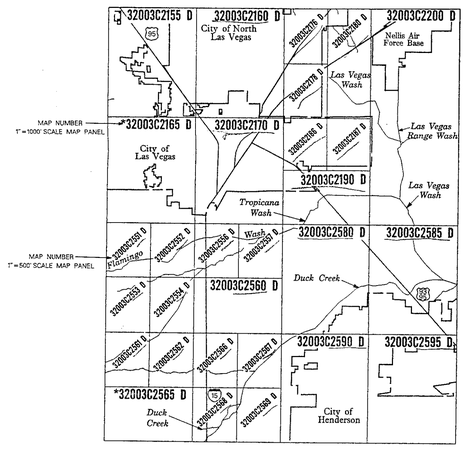
City of North Las Vegas
Public Works Department
2200 Civic Center Drive
North Las Vegas, Nevada 89030
(Maps available for reference only, not for distribution.)

Clark County
Office of the Director of Public Works
Clark County Bridger Building
225 Bridger Avenue
Las Vegas, Nevada 89155
(Maps available for reference only, not for distribution.)

ENLARGED AREA A



ENLARGED AREA B



ELEVATION DATUM

Flood elevations on this map are referenced to the National Geodetic Vertical Datum of 1929. These flood elevations must be compared to structure and ground elevations referenced to the same datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, contact the National Geodetic Survey at the following address:

The Vertical Network Branch, N/CG13
National Geodetic Survey, NOAA
Silver Spring Metro Center 3
1315 East West Highway
Silver Spring, Maryland 20910
(301) 713-3191

BASE MAP SOURCE

Base map data have been obtained from the Clark County Department of Transportation.

FLOOD-PRONE COMMUNITIES

COMMUNITY NAME	COMMUNITY NUMBER	LOCATED ON PANELS	INITIAL IDENTIFICATION DATE	POST FIRM DATE
BOULDER CITY, CITY OF	320004	2620,2640,2650,2975,2980,2990,2995	JUNE 28, 1974	SEPTEMBER 16, 1981
HENDERSON, CITY OF	320005	2225, 2580, 2585, 2590, 2595, 2605, 2610, 2615, 2620, 2910, 2930, 2955, 2975	JUNE 28, 1974	JUNE 15, 1982
LAS VEGAS, CITY OF	325276	1735,1745,1750,1755,1765,2135, 2145,2150,2165,2167,2170,2178, 2180,2186,2187,2950,2700	DECEMBER 3, 1976	SEPTEMBER 30, 1980
MESQUITE, CITY OF	320036	367,369,375,379,386,387,391	NOVEMBER 1, 1985	SEPTEMBER 28, 1990
NORTH LAS VEGAS, CITY OF	320007	1755,1760,1765,1770,1790,2155, 2160,2176,2178,2180,2186	FEBRUARY 15, 1974	JANUARY 16, 1981
CLARK COUNTY UNINCORPORATED AREAS	320003	ALL EXCEPT 2960	AUGUST 30, 1974	SEPTEMBER 29, 1989

* PANELS NOT PRINTED - AREA IN ZONE X
** PANELS NOT PRINTED - THESE AREAS ARE SHOWN ON OTHER PANELS:
32003C2750D IS SHOWN ON 32003C2400D
32003C3475D IS SHOWN ON 32003C3500D
32003C3800D IS SHOWN ON 32003C3925D

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CLARK COUNTY, NEVADA AND INCORPORATED AREAS

(SEE TABLE SHOWN ABOVE FOR LISTING OF COMMUNITIES)

MAP INDEX

PANELS PRINTED: 325, 350, 375, 380, 385, 390, 391, 425, 450, 475, 490, 500, 525, 550, 575, 600, 625, 650, 675, 700, 725, 750, 775, 825, 850, 875, 900, 1025, 1050, 1075, 1085, 1125, 1135, 1150, 1175, 1200, 1225, 1250, 1275, 1300, 1325, 1350, 1375, 1400, 1425, 1450, 1475, 1500, 1525, 1550, 1575, 1600, 1625, 1650, 1675, 1700, 1725, 1750, 1775, 1800, 1825, 1850, 1875, 1900, 1925, 1950, 1975, 2000, 2025, 2050, 2075, 2100, 2125, 2150, 2175, 2200, 2225, 2250, 2275, 2300, 2325, 2350, 2375, 2400, 2425, 2450, 2475, 2500, 2525, 2550, 2575, 2600, 2625, 2650, 2675, 2700, 2725, 2750, 2775, 2800, 2825, 2850, 2875, 2900, 2925, 2950, 2975, 3000, 3025, 3050, 3075, 3100, 3125, 3150, 3175, 3200, 3225, 3250, 3275, 3300, 3325, 3350, 3375, 3400, 3425, 3450, 3475, 3500, 3525, 3550, 3575, 3600, 3625, 3650, 3675, 3700, 3725, 3750, 3775, 3800, 3825, 3850, 3875, 3900, 3925, 3950, 3975, 4000, 4025, 4050, 4075, 4100

MAP NUMBER
32003C0000

EFFECTIVE DATE:
AUGUST 16, 1995

Federal Emergency Management Agency

NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING,
BY OLYMPUS AERIAL SURVEYS, INC. FLOWN JULY 14, 1997 AND AUGUST 26, 1997
CONTOUR INTERVAL 1 FOOT
BY NEVADA AERIAL MAPPING, FLOWN JANUARY 14, 1998
CONTOUR INTERVAL 2 FEET

PANEL AFFECTS FIRMS 32003C0379 D & 32003C0387 D
DATED AUGUST 16, 1995.

FILE: WORK_AN3.DWG

FLOODING SOURCE: ABBOTT WASH
MESQUITE, CLARK COUNTY, NEVADA



GRAPHIC SCALE
(IN FEET)
1 inch = 400 ft.
400 0 200 400 800 1600

NORTH

PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.89 FEET

LEGEND

SFHA SPECIAL FLOOD HAZARD AREA

REV	DATE	DESCRIPTION

RECOMMENDED

NO. DATE

G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD.,LAS VEGAS, NEVADA 89102
(702) 383-1200

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
ABBOTT WASH NORTH OF I-15 REACH
BASE MAP

SHEET
AB1
OF 2 SHEETS

550.035

PLOTTED: 10/8/98
WORK_AN3.DWG

NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING.
BY OLYMPUS AERIAL SURVEYS, INC. FLOWN JULY 14, 1997 AND AUGUST 26, 1997
CONTOUR INTERVAL 1 FOOT

PANEL AFFECTS FIRMS 32003C0380 D & 32003C0386 D
DATED AUGUST 16, 1995.

FILE: WORK_PN3.DWG

FLOODING SOURCE: PULSIPHER WASH
MESQUITE, CLARK COUNTY, NEVADA

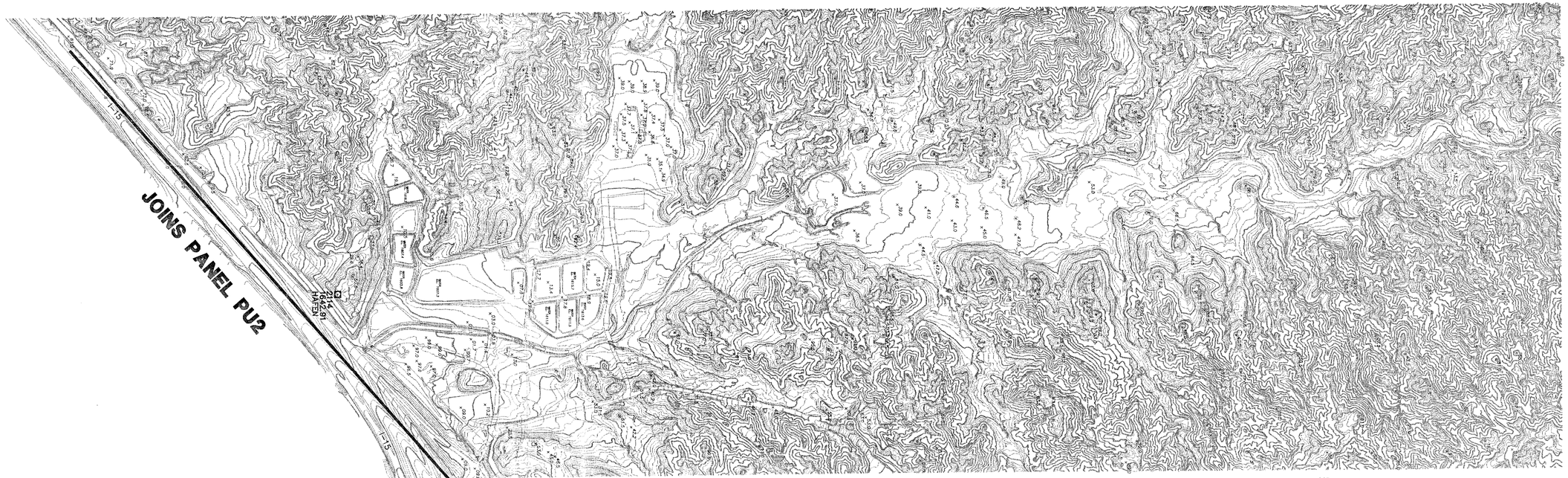
ELEVATION REFERENCE MARKS

REFERENCE MARK	PROJECT DATUM ELEVATION (FEET)	DESCRIPTION OF LOCATION
2114	1642.91	Hafen; 4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash.

PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.89 FEET

GRAPHIC SCALE
(IN FEET)
1 inch = 400 ft.
400 0 200 400 800 1600

NORTH



LEGEND

⊡	ELEVATION REFERENCE MARK
SFHA	SPECIAL FLOOD HAZARD AREA

RECOMMENDED

NO.	DATE	REV	DATE	DESCRIPTION

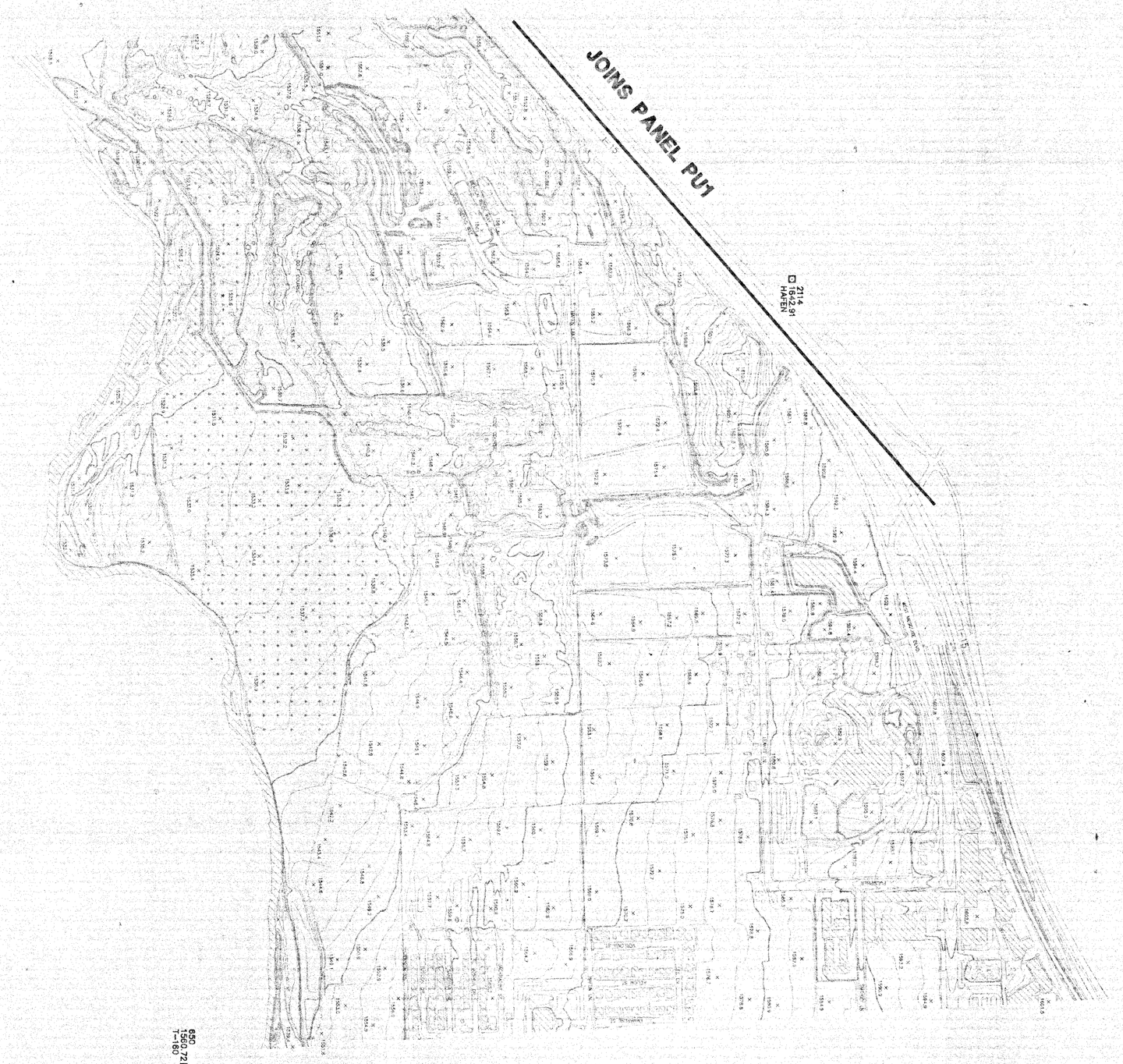
G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD, LAS VEGAS, NEVADA 89102
(702) 363-1200

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH NORTH OF I-15 REACH
BASE MAP

SHEET
PU1
OF 2 SHEETS

550.035

PLOTTED: 9/2/98
WORK_PN3.DWG



NORTH

GRAPHIC SCALE
(IN FEET)
1 inch = 400 ft.
400 0 200 400 800

NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING,
BY NEVADA AERIAL MAPPING, FLOWN JANUARY 14, 1998
CONTOUR INTERVAL 2 FEET

PANEL AFFECTS FIRM 32003C0386 D
DATED AUGUST 16, 1995

FILE: WORK_PS4.DWG

FLOODING SOURCE: PULSIPHER WASH
MESQUITE, CLARK COUNTY, NEVADA

ELEVATION REFERENCE MARKS

REFERENCE MARK	PROJECT DATUM ELEVATION (FEET)	DESCRIPTION OF LOCATION
2114	1642.91	Haven; 4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash.
650	1560.72	T-160; Description of benchmark not available. Located south of Virgin River approximately 1300 feet east and 4200 feet south of Pulsipher Street and Leavitt Lane intersection.

PROJECT DATUM = NGVD 1929 – 0.6 FEET
PROJECT DATUM = NAVD 1988 – 2.89 FEET

LEGEND

⊡ ELEVATION REFERENCE MARK

SFHA SPECIAL FLOOD HAZARD AREA

REV	DATE	DESCRIPTION

RECOMMENDED NO. DATE

G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102
(702) 365-1200

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH SOUTH OF I-15 REACH
BASE MAP

SHEET
PU2
OF 2 SHEETS

550.035

PLOTTED: 1/15/99
WORK_PS4.DWG

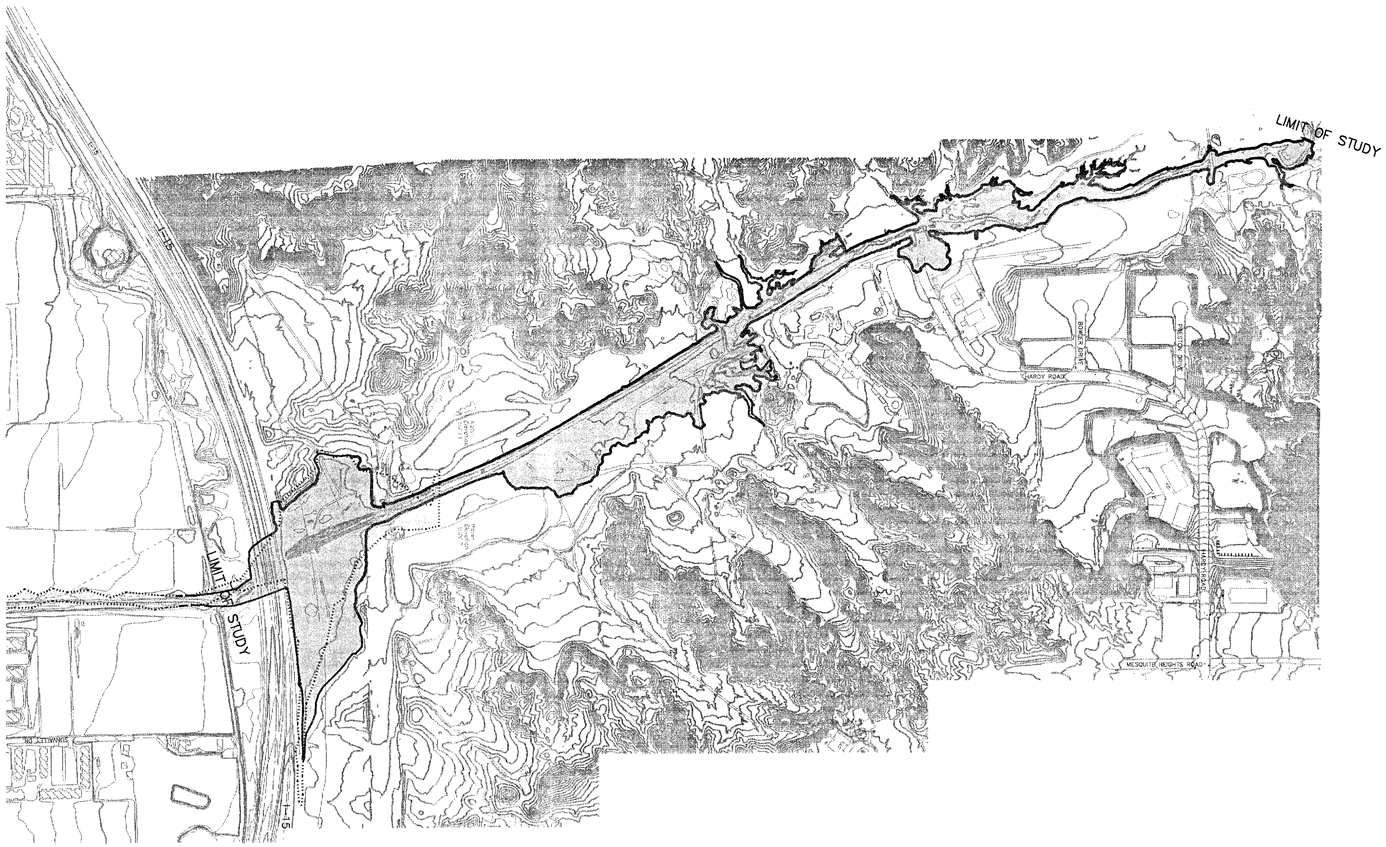
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BY OLYMPUS AERIAL SURVEYS, INC. FLOWN JULY 14, 1997 AND AUGUST 26, 1997
CONTOUR INTERVAL 1 FOOT
BY NEVADA AERIAL MAPPING, FLOWN JANUARY 14, 1998
CONTOUR INTERVAL 2 FEET

PANEL AFFECTS FIRMS 32003C0379 D & 32003C0387 D
DATED AUGUST 16, 1995.

FILE: WORK_AN3.DWG

FLOODING SOURCE: ABBOTT WASH
MESQUITE, CLARK COUNTY, NEVADA



NORTH

GRAPHIC SCALE
(IN FEET)
1 inch = 400 ft.
400 0 200 400 800 1600

PROJECT DATUM = NGVD 1929 = 0.6 FEET
PROJECT DATUM = NAVD 1988 = 2.89 FEET

LEGEND

- REVISED ZONE A
- NEW SHADED ZONE X
- EXISTING 100-YEAR FLOODPLAIN BOUNDARY
- APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY TIE-IN
- SFHA SPECIAL FLOOD HAZARD AREA

NO.	DATE	REV	DATE	DESCRIPTION

RECOMMENDED

G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD, LAS VEGAS, NEVADA 89102
(702) 363-1200

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
ABBOTT WASH NORTH OF I-15 REACH
WORK MAP

SHEET
AB1
OF 1 SHEETS

550.035

PLOTTED: 10/8/98
WORK_AN3.DWG

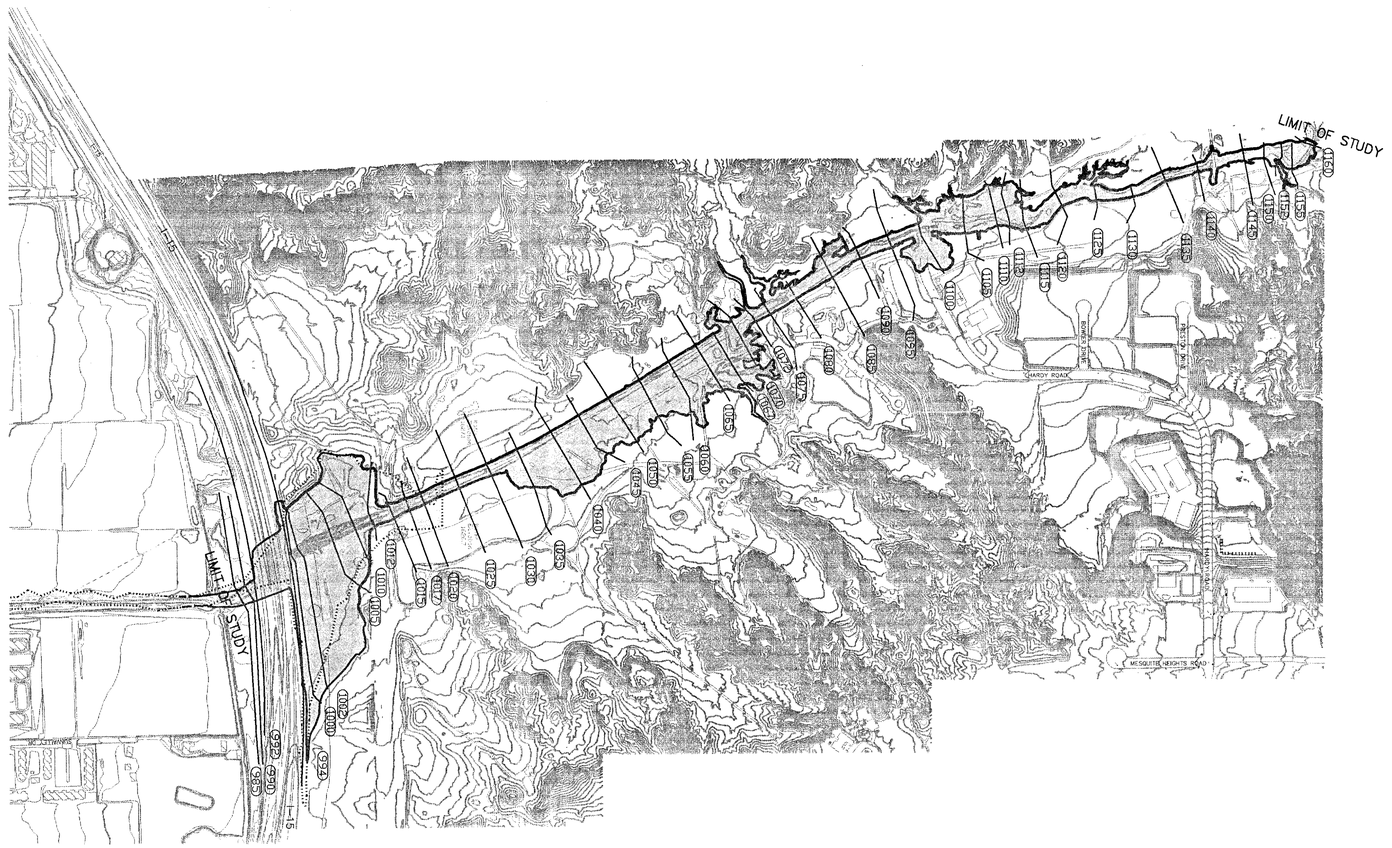
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CONTOUR INTERVAL 1 FOOT
BY NEVADA AERIAL MAPPING, FLOWN JANUARY 14, 1998
CONTOUR INTERVAL 2 FEET

PANEL AFFECTS FIRMS 32003C0379 D & 32003C0387 D
DATED AUGUST 16, 1995.

FILE: WORK_AN3.DWG

FLOODING SOURCE: ABBOTT WASH
MESQUITE, CLARK COUNTY, NEVADA



GRAPHIC SCALE
(IN FEET)
1 inch = 400 ft.
400 0 200 400 800 1600

NORTH

PROJECT DATUM = NGVD 1929 = 0.6 FEET
PROJECT DATUM = NAVD 1988 = 2.89 FEET

LEGEND

- REVISED ZONE A
- NEW SHADED ZONE X
- EXISTING 100-YEAR FLOODPLAIN BOUNDARY
- APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY TIE-IN
- SFHA — SPECIAL FLOOD HAZARD AREA
- (1100) — CROSS SECTION

REV	DATE	DESCRIPTION

RECOMMENDED

NO. DATE

G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102
(702) 383-1200

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
ABBOTT WASH NORTH OF I-15 REACH
CROSS SECTION EXHIBIT

SHEET
AB1
OF 1 SHEETS

550.035

PLOTTED: 10/6/98
WORK_AN3.DWG

NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING.
BY OLYMPUS AERIAL SURVEYS, INC. FLOWN JULY 14, 1997 AND AUGUST 26, 1997
CONTOUR INTERVAL 1 FOOT

PANEL AFFECTS FIRMS 32003C0380 D & 32003C0386 D
DATED AUGUST 16, 1995.

FILE: WORK_PN3.DWG

FLOODING SOURCE: PULSIPHER WASH
MESQUITE, CLARK COUNTY, NEVADA

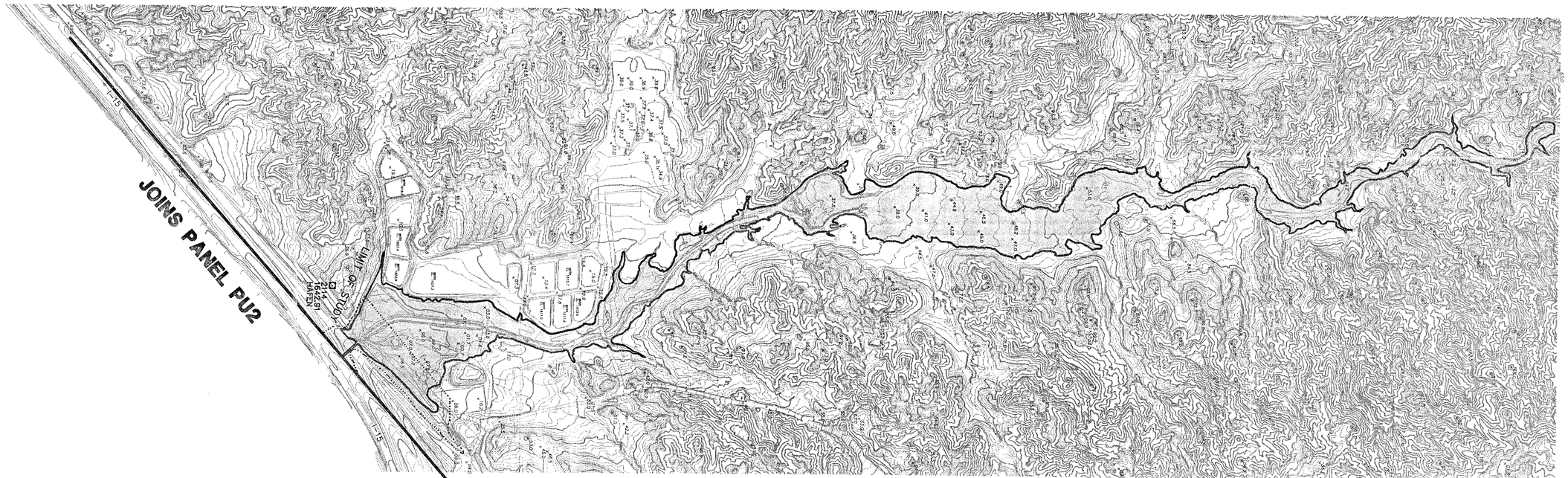
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GRAPHIC SCALE
(IN FEET)
1 inch = 400 ft.
400 0 200 400 800 1600

NORTH



LIMIT OF STUDY

LEGEND

- REVISED ZONE A
- NEW SHADED ZONE X
- EXISTING 100-YEAR FLOODPLAIN BOUNDARY
- APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY TIE-IN
- ELEVATION REFERENCE MARK
- SFHA — SPECIAL FLOOD HAZARD AREA

NO.	DATE	REV.	DATE	DESCRIPTION

RECOMMENDED

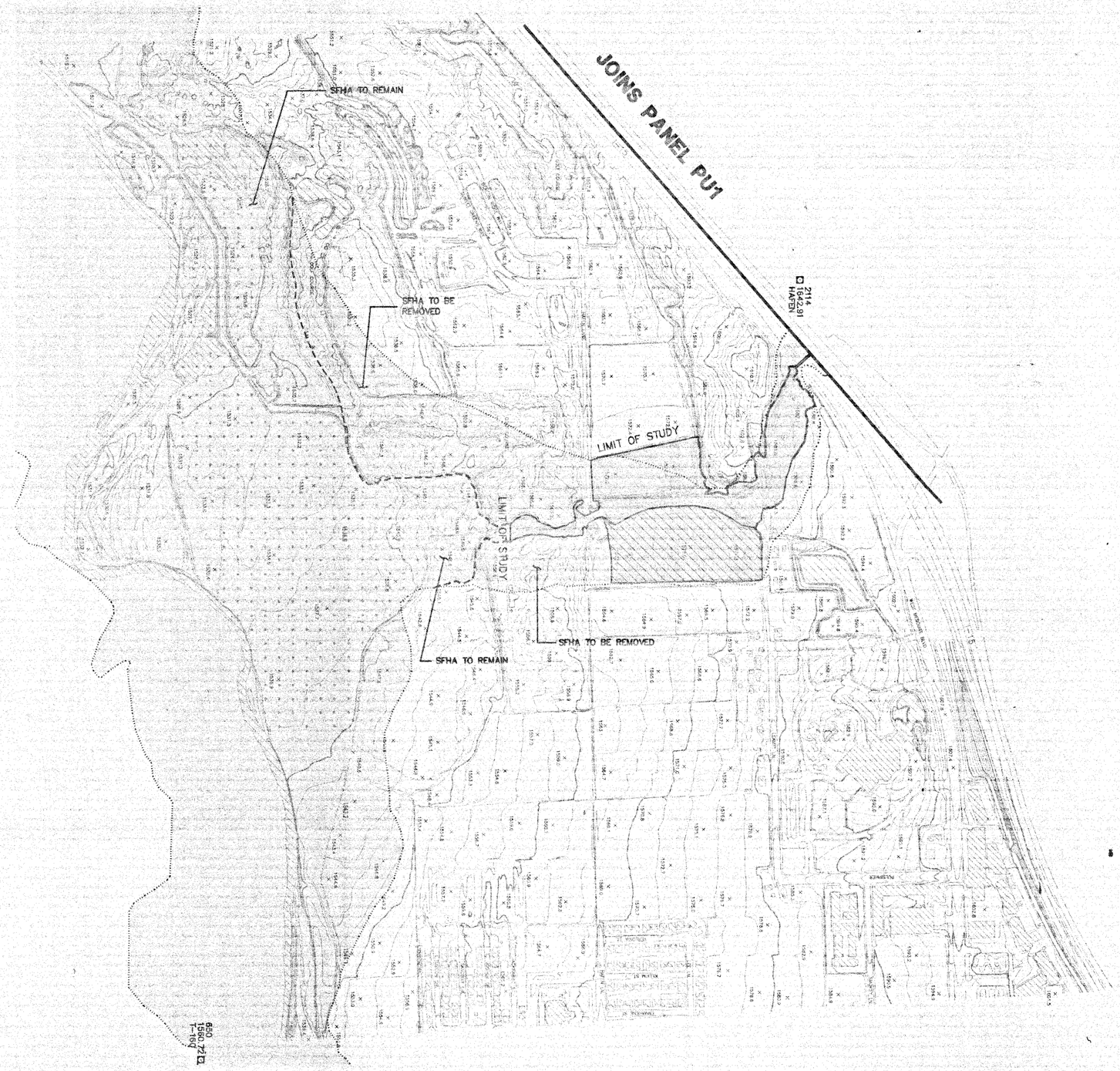
G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102
(702) 383-1200

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH NORTH OF I-15 REACH
WORK MAP

SHEET
PU1
OF 2 SHEETS

550.035

PLOTTED: 9/2/98
WORK_PN3.DWG



NORTH

GRAPHIC SCALE

(IN FEET)
1 inch = 400 ft.

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BY NEVADA AERIAL MAPPING, FLOWN JANUARY 14, 1998
CONTOUR INTERVAL 2 FEET

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DATED AUGUST 16, 1995

FILE: WORK_PS4.DWG

FLOODING SOURCE: PULSIPHER WASH
MESQUITE, CLARK COUNTY, NEVADA

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- EXISTING APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY
- APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY TIE-IN
- ELEVATION REFERENCE MARK
- SFHA SPECIAL FLOOD HAZARD AREA

NO.	DATE	DESCRIPTION

RECOMMENDED

KEY DATE

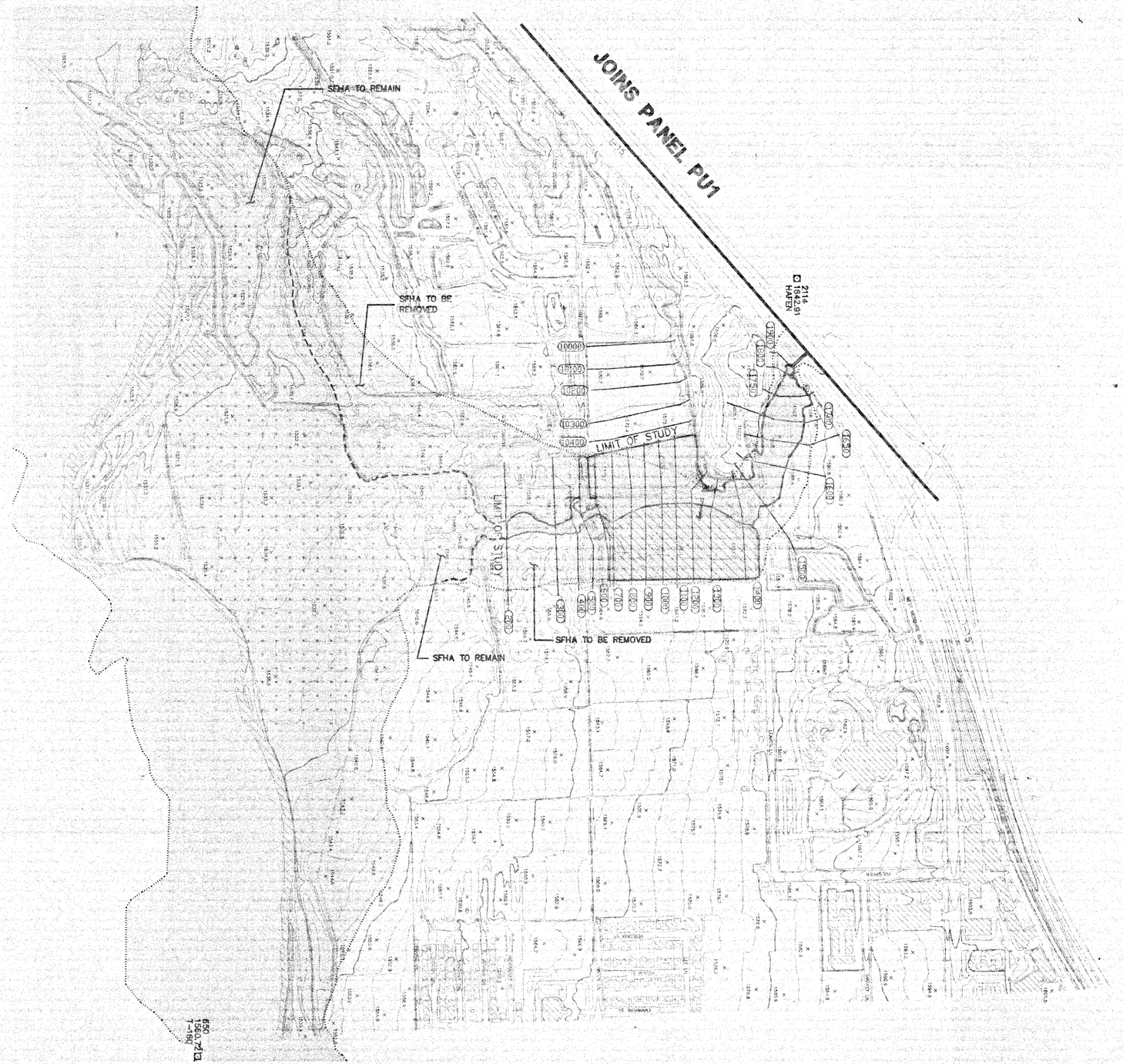
G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD, LAS VEGAS, NEVADA 89102
(702) 365-1580

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH SOUTH OF I-15 REACH
WORK MAP

SHEET
PU2
OF 2 SHEETS

550.035

PLOTTED: 1/15/98
WORK_PS4.DWG



NORTH

GRAPHIC SCALE

(IN FEET)
1 inch = 400 ft.

NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING,
BY NEVADA AERIAL MAPPING, FLOWN JANUARY 14, 1998
CONTOUR INTERVAL 2 FEET

PANEL AFFECTS FIRM 32003C0386 D
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REFERENCE MARK	PROJECT DATUM ELEVATION (FEET)	DESCRIPTION OF LOCATION
2114	1642.91	Hafen: 4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash.
650	1560.72	T-160: Description of benchmark not available. Located south of Virgin River approximately 1300 feet east and 4200 feet south of Pulsipher Street and Leavitt Lane intersection.

PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.89 FEET

LEGEND

- REVISED ZONE A
- NEW SHADED ZONE X
- EXISTING APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY
- APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY TIE-IN
- ELEVATION REFERENCE MARK
- SFHA — SPECIAL FLOOD HAZARD AREA
- (1100) — CROSS SECTION

NO.	DATE	DESCRIPTION

RECOMMENDED

G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD, LAS VEGAS, NEVADA 89102
(702) 362-1200

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH SOUTH OF I-15 REACH
CROSS SECTION EXHIBIT

SHEET
PU2
OF 2 SHEETS

550.035

PLOTTED: 1/15/99
WORK_PS4.DWG

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NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING.
BY OLYMPUS AERIAL SURVEYS, INC. FLOWN JULY 14, 1997 AND AUGUST 26, 1997
CONTOUR INTERVAL 1 FOOT

PANEL AFFECTS FIRMS 32003C0380 D & 32003C0386 D
DATED AUGUST 16, 1995.

FILE: WORK_PN3.DWG

FLOODING SOURCE: PULSIPHER WASH
MESQUITE, CLARK COUNTY, NEVADA

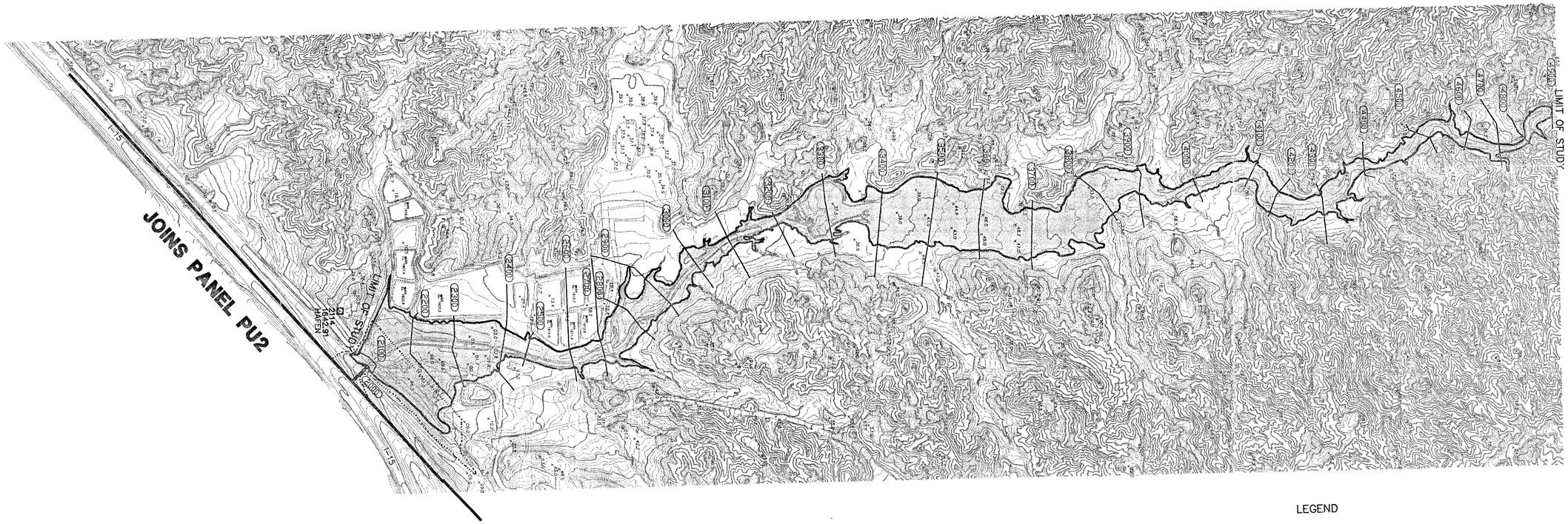
ELEVATION REFERENCE MARKS

REFERENCE MARK	PROJECT DATUM ELEVATION (FEET)	DESCRIPTION OF LOCATION
2114	1642.91	Hafen; 4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash.

PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.89 FEET

GRAPHIC SCALE
(IN FEET)
1 inch = 400 ft.
0 200 400 800 1600

NORTH



LEGEND

- REVISED ZONE A
- NEW SHADED ZONE X
- EXISTING 100-YEAR FLOODPLAIN BOUNDARY
- APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY TIE-IN
- ELEVATION REFERENCE MARK
- SFHA — SPECIAL FLOOD HAZARD AREA
- (1100) — CROSS SECTION

REV	DATE	DESCRIPTION

RECOMMENDED

NO. DATE

G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102
(702) 365-1200

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH NORTH OF I-15 REACH
CROSS SECTION EXHIBIT

SHEET
PU1
OF 2 SHEETS

550.035

PLOTTED: 9/2/98

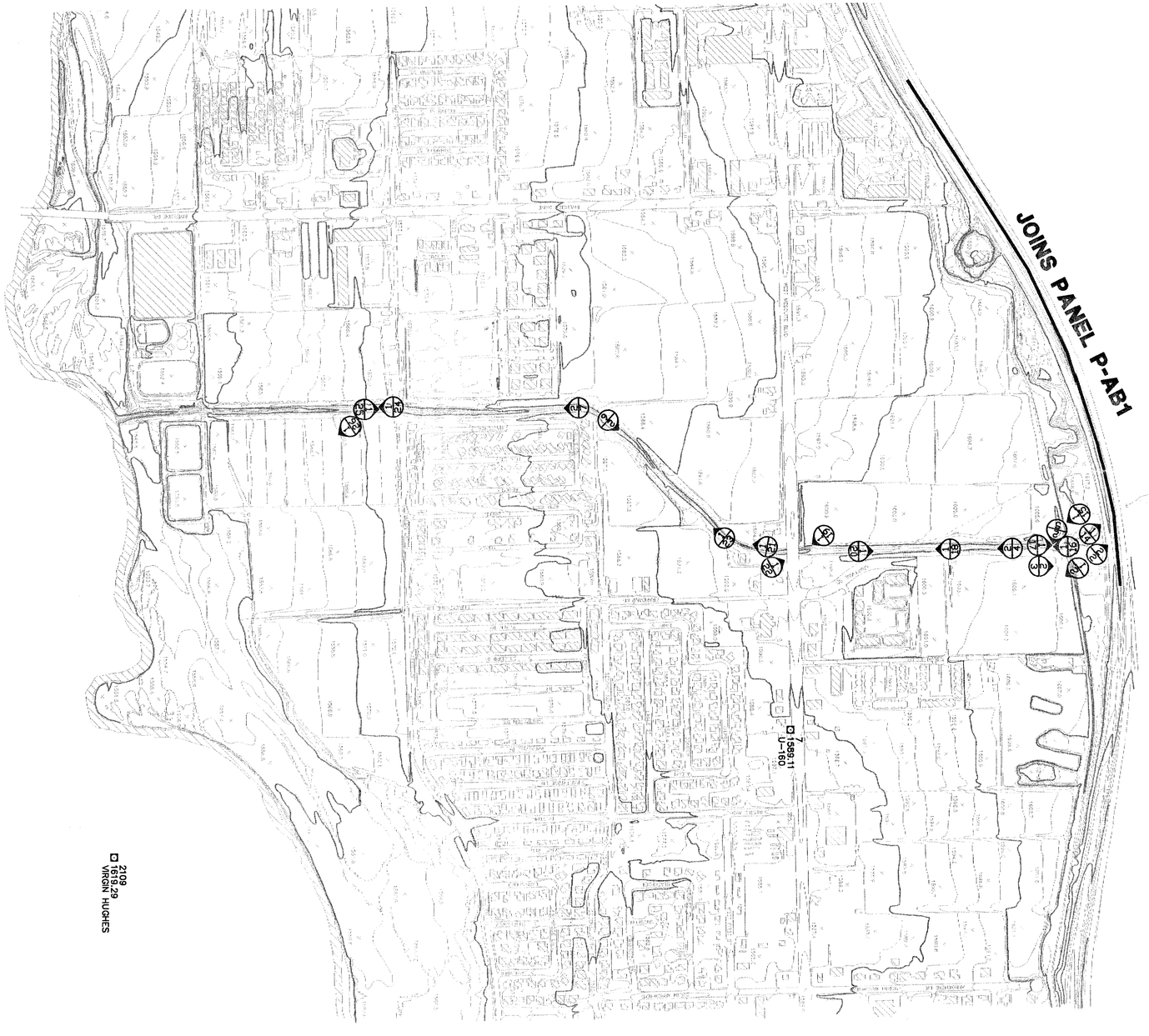
NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING,
BY NEVADA AERIAL MAPPING, FLOWN JANUARY 14, 1998
CONTOUR INTERVAL 2 FEET

PANEL AFFECTS FIRM 32003C0387 D
DATED AUGUST 16, 1995.

FILE: ABPMHFL2.DWG

FLOODING SOURCE: ABBOTT WASH
MESQUITE, CLARK COUNTY, NEVADA



NORTH

GRAPHIC SCALE

400 0 200 400 800 1600

(IN FEET)
1 inch = 400 ft.

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION (FEET) PROJECT DATUM	DESCRIPTION OF LOCATION
7	1589.11	U-160; Description of benchmark not available. Located in West Mesquite Blvd. approximately 550 feet west of Thistle Avenue.
2109	1619.29	Virgin Hughes; 4" Clark County aluminum monument. Located south of Virgin River approximately 1620 feet east and 1980 feet south of Hafen Lane and Grapevine Road intersection.

PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.89 FEET

LEGEND

- VIEW DIRECTION
- SITE VISIT NUMBER
- PHOTO NUMBER
- ELEVATION REFERENCE MARK

DESCRIPTION	REV. DATE

RECOMMENDED 9/3/98 NO. DATE

G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD, LAS VEGAS, NEVADA 89102
(702) 383-1200

ABBOTT AND PULSIPHER WASHES FIS RE-STUDY
ABBOTT WASH SOUTH OF I-15 REACH

PHOTOGRAPH LOCATION MAP

SHEET P-AB2 OF 2 SHEETS

550.035

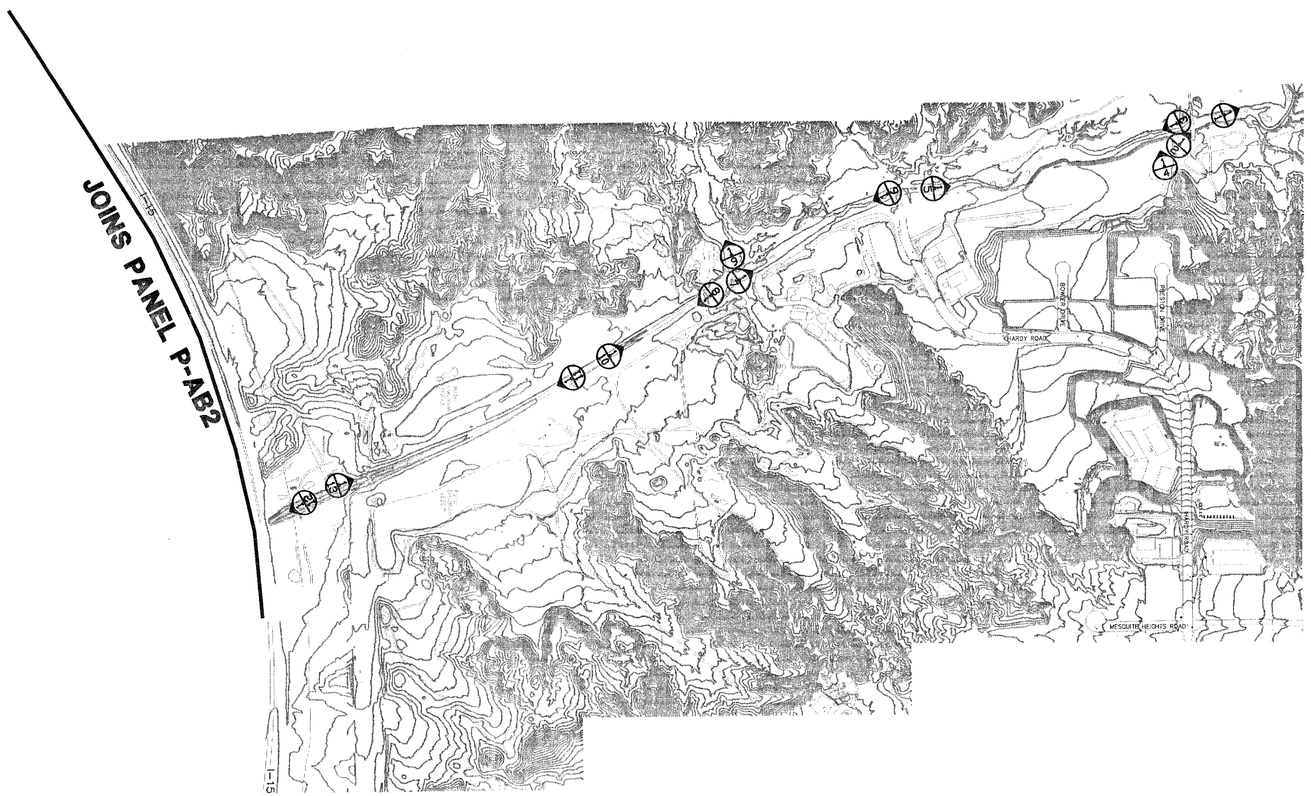
NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING,
BY OLYMPUS AERIAL SURVEYS, INC. FLOWN JULY 14, 1997 AND AUGUST 26, 1997
CONTOUR INTERVAL 1 FOOT

PANEL AFFECTS FIRMS 32003C0379 D & 32003C0387 D
DATED AUGUST 16, 1995.

FILE: ABPMHFL1.DWG

FLOODING SOURCE: ABBOTT WASH
MESQUITE, CLARK COUNTY, NEVADA



NORTH

GRAPHIC SCALE

400 0 200 400 800 1600
(IN FEET)
1 inch = 400 ft.

PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.89 FEET

LEGEND

1/14 VIEW DIRECTION / SITE VISIT NUMBER / PHOTO NUMBER

REV	DATE	DESCRIPTION

RECOMMENDED 9/3/98 NO. DATE

G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102
(702) 383-1220

ABBOTT AND PULSIPHER WASHES FIS RE-STUDY
ABBOTT WASH NORTH OF I-15 REACH

PHOTOGRAPH LOCATION MAP

SHEET P-AB1 OF 2 SHEETS

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NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING.
BY OLYMPUS AERIAL SURVEYS, INC. FLOWN JULY 14, 1997 AND AUGUST 26, 1997
CONTOUR INTERVAL 1 FOOT

PANEL AFFECTS FIRMS 32003C0380 D & 32003C0386 D
DATED AUGUST 16, 1995.

FILE: PUPMHPL1.DWG

FLOODING SOURCE: PULSIPHER WASH
MESQUITE, CLARK COUNTY, NEVADA

ELEVATION REFERENCE MARKS

REFERENCE MARK	PROJECT DATUM ELEVATION (FEET)	DESCRIPTION OF LOCATION
2114	1642.91	Hafen; 4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash.

PROJECT DATUM = NGVD 1929 – 0.6 FEET
PROJECT DATUM = NAVD 1988 – 2.89 FEET

NORTH

GRAPHIC SCALE

400 0 200 400 800 1600

(IN FEET)
1 inch = 400 ft.



LEGEND

- VIEW DIRECTION
- 1 / 14 — SITE VISIT NUMBER / PHOTO NUMBER
- ELEVATION REFERENCE MARK

RECOMMENDED	REV.	DATE	DESCRIPTION
9/3/98			
NO. DATE			

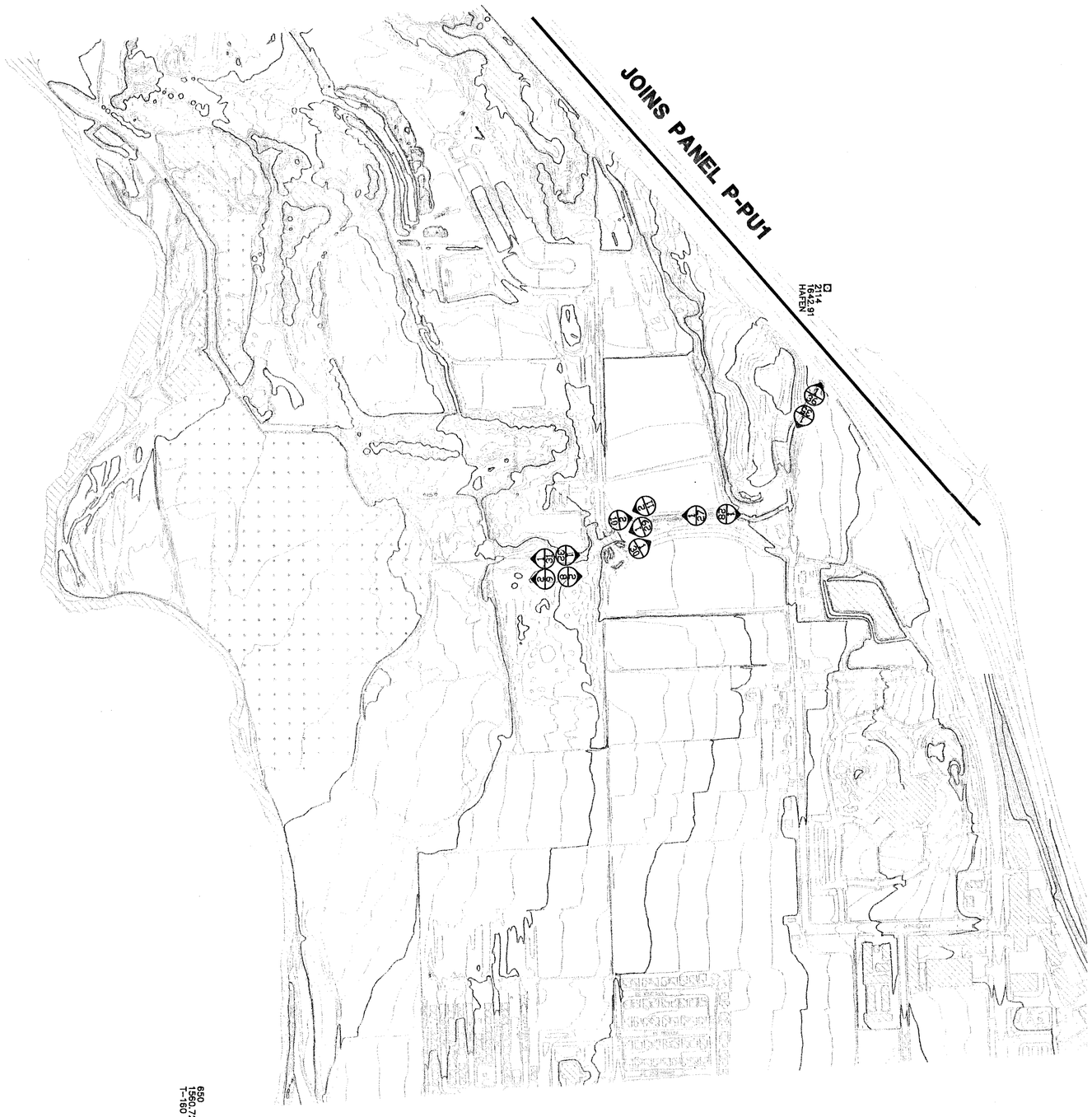
G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102
(702) 383-1200

ABBOTT AND PULSIPHER WASHES FIS RE-STUDY
PULSIPHER WASH NORTH OF I-15 REACH

PHOTOGRAPH LOCATION MAP

SHEET
P-PU1
OF 2 SHEETS

550.035



NORTH

GRAPHIC SCALE

400 0 200 400 800 1600

(IN FEET)
1 inch = 400 ft.

NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING,
BY NEVADA AERIAL MAPPING, FLOWN JANUARY 14, 1998
CONTOUR INTERVAL 2 FEET

PANEL AFFECTS FIRM 32003C0386 D
DATED AUGUST 16, 1995

FILE: PUPMHPL2.DWG

FLOODING SOURCE: PULSIPHER WASH
MESQUITE, CLARK COUNTY, NEVADA

ELEVATION REFERENCE MARKS

REFERENCE MARK	PROJECT DATUM ELEVATION (FEET)	DESCRIPTION OF LOCATION
2114	1642.91	Hafen; 4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash.
650	1560.72	T-160, Description of benchmark not available. Located south of Virgin River approximately 1300 feet east and 4200 feet south of Pulsipher Street and Leavitt Lane intersection.

PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.89 FEET

LEGEND

- VIEW DIRECTION
- SITE VISIT NUMBER
- PHOTO NUMBER
- ELEVATION REFERENCE MARK

REV	DATE	DESCRIPTION

RECOMMENDED 9/3/98
NO. DATE

G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102
(702) 363-1200

ABBOTT AND PULSIPHER WASHES FIS RE-STUDY
PULSIPHER WASH SOUTH OF I-15 REACH

PHOTOGRAPH LOCATION MAP

SHEET
P-PU2
OF 2 SHEETS

350.035

DRAFT

550.035

September 30, 1999

Ms. Sheila M. Norlin
Michael Baker Jr., Inc.
3601 Eisenhower Avenue, Suite 600
Alexandria, VA 22304

Subject: Abbott and Pulsipher Washes
Flood Insurance Study Restudy

Dear Ms. Norlin:

The purpose of this letter is to address the subject review comments received by our office via a letter dated July 21, 1999. The review comments are address individually as follows:

Pulsipher Wash

Comment: "1. Please submit a revised topographic work map that shows detailed water-surface elevation information and floodplain boundary delineations for the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) along Pulsipher Wash for the reach of the wash for which detailed flood hazard information is shown on effective FIRM Panel 32003C0386 D, dated August 16, 1995. The reach of Pulsipher Wash for which detailed flood hazard information is not shown on the effective FIRM may be approximately delineated as a Special Flood Hazard Area (SFHA) designated Zone A, an area that would be inundated by the base flood with no base floor elevations (BFEs) determined. Please also submit hydraulic analyses, reflecting current site conditions, of the flood having a 0.2-percent chance of being equaled or exceeded in any given year and the regulatory

floodway, and revise the submitted topographic work map along the detailed reach to show the boundary delineations of the 0.2-percent-annual-chance floodplain and the regulatory floodway. The revised base and 0.2-percent-annual-chance floodplain boundary delineations must tie into the effective floodplain boundary delineations at the downstream end of the revised reach. The scale and topographic definition of the work maps must be sufficient to provide reasonable accuracy and must include the locations and alignments of road crossings, culverts, corporate and study limits, and all cross sections used in the submitted hydraulic analyses. The work maps must include the datum to which all elevations are referenced and must be certified by a registered professional engineer."

Response: Kevin Eubanks to respond.

Comment: "2. If the proposed floodway boundary delineations shown on the revised topographic work map differ from those shown on FIRM Panel 32003C0386 D, please submit a copy of the public notice distributed by the City of Mesquite stating its intent to revise the floodway, or a statement by the community that it has notified all affected property owners and affected adjacent jurisdictions. Please submit a letter stating that the community will adopt and enforce the modified floodway."

Response: Kevin Eubanks to respond.

Comment: "3. The submitted HEC-2 model for the main channel of Pulsipher Wash contains a 33-percent error between the assumed and computed values of the split flow that occurs to the west between Cross Sections 2000 and 2100. Please revise this model to resolve the discrepancy between

the assumed and computed values. It is unclear from the information submitted what effect this split flow will have on the flood hazards to property located west of Pulsipher Wash. Please either submit documentation to demonstrate that floodwater escaping Pulsipher Wash at this location will not create a flood hazard to downstream property during the base flood, or revise the submitted topographic work maps to show the boundary delineations of the resulting SFHA. This SFHA may be approximately delineated and designated Zone A."

Response: The revised 100-year floodplain was based on the results of the HEC-2 output from model PULSREV7.OUT. This model does not contain a 33-percent error between the assumed and computed values of the split flow that occurs to the west between Cross Sections 2000 and 2100. However, a 33-percent error on the split flow calculation was found in the supplementary HEC-2 model output, PULSREV8.OUT, between Cross Sections 2000 and 2100 as noted. This model was used solely to delineate the tie-in location of the revised 100-year floodplain into the effective 100-year floodplain of the Virgin River by adding cross-sections downstream of the limit of study. The 33-percent error was eliminated by increasing the number of iterations in the split flow calculations from 20 to 40. A copy of the revised HEC-2 model output, PULSREV8.OUT, is attached.

Approximately 1,268 cfs will break out from the main channel at Cross Section 2000. Cross Section 2000 is located at the upstream face of the I-15 culvert. The breakout flow will drain approximately 4,500 feet west along I-15. Existing culverts under I-15 will drain the breakout flow south into a golf course channel which will convey the flow to the Virgin River. The breakout flow will not return to the Pulsipher Wash. There have been no significant improvements to the I-15 culvert since the previous mapping. Therefore, the hydraulics of the

culvert and breakout occur as they did under the previous mapping. Hence, the breakout at the I-15 culvert is considered outside the limit of study. However, this flow split may be analyzed in a future study.

Comment: "4. It appears from the submitted topographic work maps that floodwater along the west overbank of Pulsipher Wash may cross Hafen Lane and flow south. Please submit either revised hydraulic analyses of the base and 0.2-percent-annual-chance floods along the west overbank that include this additional split flow, or documentation to demonstrate that it will not occur. It is unclear from the information submitted what effect this split flow will have on the flood hazards to property downstream of Hafen Lane. Please either submit documentation to demonstrate that the split flow to the south across Hafen Lane will not create a flood hazard to downstream property, or revise the submitted topographic work maps to show the base and 0.2-percent-annual-chance floodplain boundary delineations that result from this flow."

Response: Review of the Hafen Lane improvement plans and topographic information, which were completed after our analysis, support this concern. Hafen Lane does not appear to be sufficiently elevated to direct all of the flow at the left (west) overbank back to the culvert. Therefore, the west side of the area designated Zone A is extended south of Hafen Lane to Cross Section 200. Note that this extension ties-in well with the previous mapping of the area. The area south of Cross Section 200 is considered outside the limit of study. The revised Workmap and Cross Section Exhibit for Pulsipher Wash South of I-15 are attached.

Comment: "5. Please either revise the submitted topographic work maps to show revised boundary delineations of the base and 0.2-percent-annual-

chance floodplains for the split-flow area between Cross Sections 1200 and 1300 along the west side of Pulsipher Wash, or submit documentation to demonstrate that this portion of the west overbank will not be inundated during the base and 0.2-percent-annual-chance floods."

Response: The split flow stations are located at the left (west) channel banks of Cross Section 1200 and Cross Section 1300. Therefore, the split flow between these sections will be conveyed within the left overbanks. The proposed Zone A delineation has been revised to reflect the flow split occurring between Cross Sections 1200 and 1300 in the west overbank. The revised Workmap and Cross Section Exhibit for Pulsipher Wash South of I-15 are attached.

Comment: "6. Please submit information to demonstrate how the base floodplain boundary along the east overbank of Pulsipher Wash was delineated between Cross Sections 500 and 600 and how floodwater along the east overbank will return to the main channel."

Response: Review of the Hafen Lane improvement plans and topographic information, which were completed after our analysis, support this concern. Hafen Lane does not appear to be sufficiently elevated to direct all of the flow at the right (east) overbank back to the culvert. Instead, the flow will overtop Hafen Lane and will continue to flow south. Therefore, the Right Overbank HEC-2 model has been extended to include the area south of Hafen Lane. The right overbank will convey approximately 123 cfs. Additionally, the Right Overbank HEC-2 model indicates that the depth of flow will be less than 1-foot during the 100-year storm event. Therefore, the area delineated as Shaded Zone X at the right (east) overbank has been extended south of Hafen Lane and tied into the

effective floodplain south of Cross Section 200. The revised Right Overbank HEC-2 model is attached.

Comment: "7. Please either revise the bridge data in the BT and X2 records of the submitted HEC-2 model of the main channel of Pulsipher Wash to match the bridge data form the effective Flood Insurance Study (FIS) report at Interstate Highway 15 (I-15) and Hafen Lane (Second Street South), or submit documentation to demonstrate that the bridge data used in the submitted HEC-2 model are correct. Please either revise the model to include First Street South and the two elevated crossings upstream of Cross Sections 600 and 2300, or submit documentation to demonstrate why these crossings should not be modeled. Please submit as-built plans, certified by a registered professional engineer, for the crossings."

Response: Survey field notes of the I-15 culvert (12-foot wide by 10-foot high RCB) are included. The data used in the special bridge routine of the HEC-2 model matches the data in the survey field notes for the I-15 culvert. It was initially assumed and later confirmed that I-15 will not be overtopped at this location. Therefore, BT cards were not inserted into the model to determine overtopping.

An exhibit is included which shows the survey data used in the special bridge routine of the HEC-2 model for the Hafen Lane culvert (3- 12.1-foot wide by 4.1-foot high RCB's). Please note that the open area of the culvert input into the SB card of the HEC-2 model was reduced from 152.81 square feet to 147.38 square feet to reflect the survey data. The revised HEC-2 model is attached.

First Street South is not an elevated crossing upstream of Cross Section 1600. The cross-section geometry in the HEC-2 model reflects a dip section without

a culvert at this location. Therefore, no revision to the HEC-2 model is recommended.

Cross Section 600 is located at the upstream face of the Hafen Lane culvert. Review of the Hafen Lane improvement plans and topographic information indicate that an irrigation pipe culvert is located to the west side of the box culvert and will be maintained. However, this pipe culvert was not designed to carry storm flows. Therefore, the pipe culvert was not modeled as a conveyance area.

There is an elevated crossing upstream of Cross Section 2300 with a culvert. This is a temporary culvert crossing with limited capacity and maintenance. It was assumed that the culvert will have no capacity during the 100-year storm event. In order to eliminate the conveyance area below the elevated crossing, additional cross sections have been inserted into the HEC-2 model at Cross Sections 2330 and 2350. Cross Section 2350 was inserted on top of the elevated crossing. The revised HEC-2 model, Workmap, and Cross Section Exhibit for Pulsipher Wash North of I-15 are attached.

Comment: "8. The submitted HEC-2 model of the main channel of Pulsipher Wash uses expansion and contraction coefficient values of 0.3 and 0.1, respectively, for the entire modeled reach. Appendix III of the *HEC 2 User's Manual*, dated September 1990 states that where transitions are gradual, typical expansion and contraction coefficient values are 0.3 and 0.1, respectively; at typical bridge sections they are 0.5 and 0.3, respectively, and at abrupt transitions they are 0.8 and 0.6, respectively. Please either revise the HEC-2 model to use typical expansion and contraction coefficient values in the vicinity of abrupt flow expansions

and contractions, or submit data to substantiate the use of atypical values."

Response: The contraction and expansion coefficients used in the HEC-2 model have been changed from 0.1 and 0.3 to 0.3 and 0.5, respectively, at Cross Sections 500, 600, 700, 1900, 2000, and 2100. Revision of the contraction and expansion coefficients will raise the computed water surface at the I-15 culvert, thereby increasing the amount of flow which will split out at I-15 from 1,239 cfs to 1,267 cfs during the 100-year event. Consequently, there will be less flow in the main channel downstream of I-15 than there was before this revision. The decreased flow will lower the computed water surface elevations in the main channel which will reduce the amount of flow breaking out downstream of I-15. Flow in the Right Overbank Model will decrease from 130 cfs to 123 cfs during the 100-year storm event. Additionally, the total flow in the Left Breakout Model will decrease from 1,503 cfs to 1,481 cfs during the 100-year storm event. The affected HEC-2 models have been revised to reflect the new flow rates. The revised HEC-2 models, Workmaps, and Cross Section Exhibits are attached. These revisions did not significantly alter the flood hazard boundaries for the 100-year storm event.

Comment: "9. Please resolve the discrepancies between the reach lengths used in the HEC-2 model for the main channel of Pulsipher Wash and the distances shown on the topographic work maps for Cross sections 3800, 4100, 4200, 4400, and 4600. Please resolve the discrepancies between the base floodplain topwidths computed in the HEC-2 model and the topwidths shown on the work maps at Cross Sections 1500 and 3100. In addition, comparison of the HEC-2 model and the work maps revealed that the SFHA includes a portion of ground at Cross Section 3300 that

is higher than the BFE. Please either revise the work maps or submit documentation to resolve this concern."

Response: Reach lengths used in the HEC-2 model have been checked and revised for Cross Sections 3800, 4100, 4200, 4400, and 4600. The table below summarizes the revisions made to the reach lengths. The revised HEC-2 model is attached.

Reach Length Comparison Table						
Sta.	Left Overbank (ft)		Right Overbank (ft)		Channel (ft)	
(ft)	Submittal	Revised	Submittal	Revised	Submittal	Revised
3800	450.85	480	719.16	713	663.43	666
4100	521.36	535	359.17	356	489.47	497
4200	284.44	285	293.14	297	388.31	402
4400	432.86	432	440.55	439	479.82	476
4600	507.76	488	227.33	278	435.19	442

The proposed 100-year floodplain at Cross Sections 1500 and 3100 has been revised to reflect the correct topwidths generated by the HEC-2 model. The revised Workmaps and Cross Section Exhibits for Pulsipher Wash North and South of I-15 are attached.

The elevated area at Cross Section 3300 will become a small island during the 100-year storm event. This area is considered subject to flood hazards. Therefore, it is included in the proposed 100-year floodplain. Consequently, the topwidth reflected on the proposed 100-year floodplain is greater than the topwidth indicated in the HEC-2 model.

Comment: "10. Please either revise the left and right encroachment stations at Cross Sections 1600, 1750, 2200, 2900, 3000, and 4700 of the HEC-2 model for the main channel to eliminate ineffective flow areas, or submit

documentation to demonstrate that the encroachment stations in the model are correct."

Response: Cross section plots are included for Cross Sections 1600, 1750, 2200, 2900, 3000, and 4700 to show conveyance areas, ineffective flow areas, and encroachment stations.

In general, the HEC-2 models do not use overbank areas for conveyance until channel bank elevations are exceeded. This is accomplished by using the X3 card.

After further review of Cross Sections 1600 and 1750, it was determined that the 100-year water surface elevations will be below the elevations required for overbank conveyance. Therefore, the X3 cards have been removed from the HEC-2 model. Please keep in mind that it is common to still see floodplain in these kind of overbank areas due solely on backwater effects.

Water in the right (east) overbank of Cross Section 2200 will be the result of a backwater effect from the I-15 culvert. The conveyance area at the right (east) overbank will be ineffective up to elevation 1,598 feet. See the cross section.

The Workmap and Cross Section Exhibit for the Pulsipher Wash North of I-15 indicate that a small tributary wash is located at the left (west) overbank of Cross Section 2900. Although this low area appears on the cross section, it does not contribute to the conveyance area of the Pulsipher Wash during a 100-year storm event. Therefore, the conveyance area at the left (west) overbank of Cross Section 2900 is ineffective and the floodplain shown in this area is attributed to backwater effects.

An encroachment station does not exist at Cross Section 3000. The left (west) overbank will convey flow only when the water surface elevation exceeds 1,620 feet.

The Cross Section Exhibit for the Pulsipher Wash North of I-15 indicates that a small tributary wash is located at the right (east) overbank of Cross Section 4700. Although this low area appears on the cross section, it does not contribute to the conveyance area of the Pulsipher Wash during a 100-year storm event. Therefore, the conveyance area at the right (east) overbank of Cross Section 4700 is ineffective and the floodplain shown in this area is attributed to backwater effects.

Abbott Wash

Comment: "1. Please either revise the bridge data in the BT and X2 records of the submitted HEC-2 model for Abbott Wash to match the bridge data from the effective FIS report at I-15, or submit documentation to demonstrate that the bridge data used in the submitted HEC-2 model are correct. Please either revise the left and right encroachment stations in the HEC-2 model of Abbott Wash to eliminate ineffective flow areas in the vicinity of the I-15 bridge, or submit documentation to demonstrate that the encroachment stations in the model are correct. Please resolve the discrepancy between the base floodplain topwidths computed in the HEC-2 model and the topwidths shown on the work maps in the vicinity of I-15. Please submit documentation to demonstrate how floodwater that weirs over I-15 will reenter the Abbot Wash channel downstream of I-15."

Response: Survey field notes of the I-15 culvert (12-foot wide by 8-foot high RCB) are included. The data used in the special culvert routine of the HEC-2 model matches the data in the survey field notes for the I-15 culvert. An exhibit is included which shows the survey data for the I-15 culvert. Area outside of the culvert opening will be ineffective flow area meaning that no water can pass from this section to the next downstream section in this area as is standard practice for a bridge or culvert. Therefore, the left and right encroachment stations are justified. The floodplain shown in this area is attributed to backwater effects.

The topwidths delineated on the Workmap and Cross Section Exhibit for Abbott Wash North of I-15 have been revised to match the topwidths indicated in the HEC-2 output of model ABTCHN13.OUT. The revised Workmap and Cross Section Exhibit for Abbott Wash North of I-15 are attached.

Also, the effective FIRM currently shows overtopping of I-15 at the Abbott Wash culvert. There have been no significant improvements to the I-15 culvert since the previous mapping. Therefore, the hydraulics of the culvert and overtopping occur as they did under the previous mapping. Therefore, the tie-in location of the proposed 100-year floodplain to the effective 100-year floodplain has been moved to the upstream face of the I-15 culvert. Note that this ties-in well with the previous mapping of the area. The revised Workmap and Cross Section Exhibit for Abbott Wash North of I-15 are attached.

Comment: "2. Please either revise the HEC-2 model for Abbott Wash to include the two elevated crossings upstream of Cross Sections 1012 and 1067, or submit documentation to demonstrate why these crossings should not be modeled. Please submit as-built plans certified by a registered professional engineer, for the crossings."

Response: The elevated crossing upstream of Cross Section 1012 is a culvert located at Cross Section 1015. This is a temporary culvert crossing with limited capacity and maintenance. It was assumed that the culvert will have no capacity during the 100-year storm event. In order to eliminate the conveyance area below the elevated crossing, Cross Section 1015 has been revised to reflect the lowest elevation of 1,619 feet. The revised HEC-2 model, Workmap, and Cross Section Exhibit for Abbott Wash North of I-15 are attached.

There is an elevated crossing upstream of Cross Section 1067 with a culvert. This is a temporary culvert crossing with limited capacity and maintenance. It was assumed that the culvert will have no capacity during the 100-year storm event. In order to eliminate the conveyance area below the elevated crossing, an additional cross section has been inserted into the HEC-2 model at Cross Section 1069. Cross Section 1069 was inserted on top of the elevated crossing. The revised HEC-2 model, Workmap, and Cross Section Exhibit for Abbott Wash North of I-15 are attached.

Comment: "3. Please either revise the left and right encroachment stations in the HEC-2 model of Abbott Wash to eliminate ineffective flow areas at Cross Sections 1035, 1067, 1070, 1080, 1085, 1100, 1110, and 1112, or submit documentation to demonstrate that the encroachment stations in the model are correct."

Response: Cross section plots are included for Cross Sections 1035, 1067, 1070, 1080, 1085, 1100, 1110, and 1112 to show conveyance areas, ineffective flow areas, and encroachment stations.

In general, the HEC-2 models do not use overbank areas for conveyance until channel bank elevations are exceeded. This is accomplished by using the X3 card.

The left (east) encroachment station for Cross Section 1035 is used to eliminate the conveyance area of a lake. The lake is assumed to be full during the 100-year storm event.

The left encroachment station for Cross Section 1067 is necessary to confine flow in the channel up to ground elevation 1,638 feet. The 100-year water surface elevation at Cross Section 1067 will be slightly above 1,638 feet, as indicated in the HEC-2 output. Therefore, the water in the left overbank will be predominantly due to a backwater effect, although some amount of water will spill over and be conveyed by the left overbank. The cross section output and the floodplain delineation shown on the Workmap and Cross Section Exhibit for Abbott Wash North of I-15 reflect the water in the left (east) overbank at Cross Section 1067. The plot of Cross Section 1067 has been revised to match the HEC-2 model, ABTCHN13.DAT. The revised cross section plot is attached.

The right (west) encroachment station for Cross Section 1070 has been removed. This area will become an effective conveyance area only if the water surface elevation reaches 1,643 feet. The 100-year water surface elevation at Cross Section 1070 will be approximately 3 feet below the right encroachment elevation. However, the left (east) encroachment station will confine flow in the channel up to ground elevation 1,639 feet. The 100-year water surface elevation at Cross Section 1070 will be slightly above 1,639 feet, as indicated in the HEC-2 output. Water in the left overbank will be predominantly due to a backwater effect, although some amount of water will spill over and be conveyed by the left overbank. The cross section output and the floodplain

delineation shown on the Workmap and Cross Section Exhibit for Abbott Wash North of I-15 reflect the water in the left overbank at Cross Section 1070.

The right (west) encroachment station for Cross Section 1080 is necessary to confine flow in the channel up to ground elevation 1,640 feet. The 100-year water surface elevation at Cross Section 1080 will be slightly above 1,640 feet, as indicated in the HEC-2 output. Water in the right overbank will be predominantly due to a backwater effect, although some amount of water will spill over and be conveyed by the right overbank. The cross section output and the floodplain delineation on the Workmap and Cross Section Exhibit for Abbott Wash North of I-15 reflect the water in the right overbank for Cross Section 1080.

The left (east) encroachment station for Cross Section 1085 has been removed. This area will become an effective conveyance area only if the water surface elevation reaches 1653 feet. The 100-year water surface elevation at Cross Section 1085 will be well below the left encroachment elevation. The right (west) encroachment station is necessary to confine flow in the channel up to ground elevation 1,644 feet. The 100-year water surface elevation at Cross Section 1085 will be below 1,644 feet, as indicated in the HEC-2 output. The cross section output and the floodplain delineation on the Workmap and Cross Section Exhibit for Abbott Wash North of I-15 are justified in confining the 100-year flow within the channel.

The Workmap and Cross Section Exhibit for the Abbott Wash North of I-15 indicate that small tributary washes are located at the left (west) and right (east) overbanks of Cross Section 1100. Although these low areas appear on the cross section, they do not contribute to the conveyance area of the Abbott Wash during a 100-year storm event. Therefore, the conveyance area at the

left (west) and right (east) overbanks of Cross Section 1100 are ineffective and the floodplain shown in these areas are attributed to backwater effects.

The right (west) encroachment station for Cross Section 1110 is required to confine the flow to the channel up to ground elevation 1,651 feet. Although the tributary washes at the right overbank drop to a ground elevation of 1,649 feet, the flow in the channel will not utilize this conveyance area until the water surface elevation reaches 1,651 feet. Therefore, the encroachment is justified.

Encroachment stations do not exist for Cross Section 1112. However, an encroachment is located at Cross Section 1115. The right (west) encroachment station is required to confine the flow to the channel up to ground elevation 1,653 feet. Although the tributary washes at the right overbank drop to a ground elevation of 1,645.5 feet, the flow in the channel will not utilize this conveyance area until the water surface elevation reaches 1,653 feet. Therefore, the right (west) encroachment station of Cross Section 1115 is justified.

Comment: "4. Please resolve the discrepancy between the reach lengths used in the HEC-2 model for Abbott Wash and the distances shown on the topographic work maps for Cross Sections 1152 and 1155. Comparison of the HEC-2 model and work maps revealed that the SFHA includes a portion of ground at Cross Section 1105 that is higher than the BFE. Please either revise the work maps or submit documentation to resolve this concern."

Response: Reach lengths used in the HEC-2 model have been checked and revised for Cross Sections 1152 and 1155. The table below summarizes the revisions made to the reach lengths. The revised HEC-2 model is attached.

Reach Length Comparison Table						
Sta.	Left Overbank (ft)		Right Overbank (ft)		Channel (ft)	
(ft)	Submittal	Revised	Submittal	Revised	Submittal	Revised
1152	46.1	87	97.1	99	128	125
1155	173.8	91	160.6	63	213.4	64

The right (west) encroachments have been removed for Cross Sections 1105 and 1110. These encroachments were removed because Cross Section 1112, upstream of Cross Section 1110, will have flow in the right overbank during the 100-year storm event. Therefore, it is expected that Cross Sections 1105 and 1110 will also have flow in the right overbank during the 100-year storm event. The elevated area at Cross Section 1105 will become a small island during the 100-year storm event. This area is considered to be subject to flood hazard. Therefore, it was included in the revised 100-year floodplain.

Comment: "5. Please submit revised topographic work maps for Abbott Wash to resolve the concerns outlined above. The work maps must include the locations and alignments of road crossings, culverts, corporate and study limits and all cross sections used in the submitted hydraulic analyses. The revised base floodplain boundary delineations must tie into the effective floodplain boundary delineations at the downstream end of the revised reach. The scale and topographic definition of the revised work maps must be sufficient to provide reasonable accuracy. The work maps must include the datum to which all elevations are referenced and must be certified by a registered professional engineer."

Response: All information in support of the responses and revisions are attached.

If you have any questions or need additional information, please do not hesitate to contact us at (702) 804-2000.

Very truly yours,

G. C. WALLACE, INC.

Michael J. Ludwig, E.I.
Designer

Jerry E. Pruitt, P.E.
Project Manager

MJL:sjl

Encl.

550-035

Federal Emergency Management Agency

Washington, D.C. 20472

JUL 21 1999

Mr. Kevin L. Eubanks, P.E.
Assistant General Manager
Clark County Regional Flood
Control District
600 South Grand Central Parkway, Suite 300
Las Vegas, NV 89106-4511

IN REPLY REFER TO:
Case No.: 99-09-457P
Community: City of Mesquite, Nevada
Community No.: 320035

316-AD

Dear Mr. Eubanks:

This is in reference to your February 4, 1999, request for a revision to the Flood Insurance Rate Map for the above-referenced community. In our earlier letter to you, we indicated additional data might be required to complete our review of the request. The data required to complete our review, which must be submitted within 90 days of the date of this letter, are listed on the enclosed summary.

For identification purposes, you must include the case number referenced above on all correspondence.

If we do not receive the required data within 90 days, we will suspend our processing of your request. Any data submitted after 90 days will be treated as an original submittal and will be subject to all submittal/payment procedures, including the flat review and processing fee for requests of this type established by the revised fee schedule that became effective on March 1, 1999. A copy of the notice summarizing the revised fee schedule, which was published in the *Federal Register,* is enclosed for your information.

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

If you have any questions regarding this matter, please contact Mr. Max Yuan of our staff in Washington, DC, either by telephone at (202) 646-3843 or by facsimile at (202) 646-4596.

Sincerely,

Matthew B. Miller

Matthew B. Miller, P.E., Chief
Hazards Study Branch
Mitigation Directorate

Enclosure(s)

cc: Mr. J. Allen Bell, P.E.
Director of Public Works
City of Mesquite

Mr. Jerry E. Pruitt, P.E.
Project Manager
G. C. Wallace, Inc.

Summary of Additional Data Required to Support a
Revision to Flood Insurance Rate Map (FIRM)

Case No.: 99-09-457P

Requester: Mr. Kevin L. Eubanks, P.E.

Community: City of Mesquite, Nevada

Community No.: 320035

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

Pulsipher Wash

1. Please submit a revised topographic work map that shows detailed water-surface elevation information and floodplain boundary delineations for the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) along Pulsipher Wash for the reach of the wash for which detailed flood hazard information is shown on effective FIRM Panel 32003C0386 D, dated August 16, 1995. The reach of Pulsipher Wash for which detailed flood hazard information is not shown on the effective FIRM may be approximately delineated as a Special Flood Hazard Area (SFHA) designated Zone A, an area that would be inundated by the base flood with no base flood elevations (BFEs) determined. Please also submit hydraulic analyses, reflecting current site conditions, of the flood having a 0.2-percent chance of being equaled or exceeded in any given year and the regulatory floodway, and revise the submitted topographic work map along the detailed reach to show the boundary delineations of the 0.2-percent-annual-chance floodplain and the regulatory floodway. The revised base and 0.2-percent-annual-chance floodplain boundary delineations must tie into the effective floodplain boundary delineations at the downstream end of the revised reach. The scale and topographic definition of the work maps must be sufficient to provide reasonable accuracy and must include the locations and alignments of road crossings, culverts, corporate and study limits, and all cross sections used in the submitted hydraulic analyses. The work maps must include the datum to which all elevations are referenced and must be certified by a registered professional engineer.

2. If the proposed floodway boundary delineations shown on the revised topographic work map differ from those shown on FIRM Panel 32003C0386 D, please submit a copy of the public notice distributed by the City of Mesquite stating its intent to revise the floodway, or a statement by the community that it has notified all affected property owners and affected adjacent jurisdictions. Please submit a letter stating that the community will adopt and enforce the modified floodway.

3. The submitted HEC-2 model for the main channel of Pulsipher Wash contains a 33-percent error between the assumed and computed values of the split flow that occurs to the west between Cross Sections 2000 and 2100. Please revise this model to resolve the discrepancy between the assumed and computed values. It is unclear from the information submitted what effect this split flow will have on the flood hazards to property located west of Pulsipher Wash. Please either submit documentation to demonstrate that floodwater escaping Pulsipher Wash at this location will not create a flood hazard to downstream property during the base flood, or revise the submitted topographic work maps to show the boundary delineations of the resulting SFHA. This SFHA may be approximately delineated and designated Zone A.

4. It appears from the submitted topographic work maps that floodwater along the west overbank of Pulsipher Wash may cross Hafen Lane and flow south. Please submit either revised hydraulic analyses of the base and 0.2-percent-annual-chance floods along the west overbank that include this additional split flow, or documentation to demonstrate that it will not occur. It is unclear from the information submitted what effect this split flow will have on the flood hazards to property downstream of Hafen Lane. Please either submit documentation to demonstrate that the split flow

to the south across Hafen Lane will not create a flood hazard to downstream property, or revise the submitted topographic work maps to show the base and 0.2-percent-annual-chance floodplain boundary delineations that result from this flow.

5. Please either revise the submitted topographic work maps to show revised boundary delineations of the base and 0.2-percent-annual-chance floodplains for the split-flow area between Cross Sections 1200 and 1300 along the west side of Pulsipher Wash, or submit documentation to demonstrate that this portion of the west overbank will not be inundated during the base and 0.2-percent-annual-chance floods.

6. Please submit information to demonstrate how the base floodplain boundary along the east overbank of Pulsipher Wash was delineated between Cross Sections 500 and 600 and how floodwater along the east overbank will return to the main channel.

7. Please either revise the bridge data in the BT and X2 records of the submitted HEC-2 model of the main channel of Pulsipher Wash to match the bridge data from the effective Flood Insurance Study (FIS) report at Interstate Highway 15 (I-15) and Hafen Lane (Second Street South), or submit documentation to demonstrate that the bridge data used in the submitted HEC-2 model are correct. Please either revise the model to include First Street South and the two elevated crossings upstream of Cross Sections 600 and 2300, or submit documentation to demonstrate why these crossings should not be modeled. Please submit as-built plans, certified by a registered professional engineer, for the crossings.

8. The submitted HEC-2 model of the main channel of Pulsipher Wash uses expansion and contraction coefficient values of 0.3 and 0.1, respectively, for the entire modeled reach. Appendix III of the *HEC-2 User's Manual*, dated September 1990, states that where transitions are gradual, typical expansion and contraction coefficient values are 0.3 and 0.1, respectively; at typical bridge sections they are 0.5 and 0.3, respectively; and at abrupt transitions they are 0.8 and 0.6, respectively. Please either revise the HEC-2 model to use typical expansion and contraction coefficient values in the vicinity of abrupt flow expansions and contractions, or submit data to substantiate the use of atypical values.

9. Please resolve the discrepancies between the reach lengths used in the HEC-2 model for the main channel of Pulsipher Wash and the distances shown on the topographic work maps for Cross Sections 3800, 4100, 4200, 4400, and 4600. Please resolve the discrepancies between the base floodplain topwidths computed in the HEC-2 model and the topwidths shown on the work maps at Cross Sections 1500 and 3100. In addition, comparison of the HEC-2 model and the work maps revealed that the SFHA includes a portion of ground at Cross Section 3300 that is higher than the BFE. Please either revise the work maps or submit documentation to resolve this concern.

10. Please either revise the left and right encroachment stations at Cross Sections 1600, 1750, 2200, 2900, 3000, and 4700 of the HEC-2 model for the main channel to eliminate ineffective flow areas, or submit documentation to demonstrate that the encroachment stations in the model are correct.

Abbott Wash

1. Please either revise the bridge data in the BT and X2 records of the submitted HEC-2 model for Abbott Wash to match the bridge data from the effective FIS report at I-15, or submit documentation to demonstrate that the bridge data used in the submitted HEC-2 model are correct. Please either revise the left and right encroachment stations in the HEC-2 model of Abbott Wash to eliminate ineffective flow areas in the vicinity of the I-15 bridge, or submit documentation to

demonstrate that the encroachment stations in the model are correct. Please resolve the discrepancy between the base floodplain topwidths computed in the HEC-2 model and the topwidths shown on the work maps in the vicinity of I-15. Please submit documentation to demonstrate how floodwater that weirs over I-15 will reenter the Abbott Wash channel downstream of I-15.

2. Please either revise the HEC-2 model for Abbott Wash to include the two elevated crossings upstream of Cross Sections 1012 and 1067, or submit documentation to demonstrate why these crossings should not be modeled. Please submit as-built plans, certified by a registered professional engineer, for the crossings.

3. Please either revise the left and right encroachment stations in the HEC-2 model of Abbott Wash to eliminate ineffective flow areas at Cross Sections 1035, 1067, 1070, 1080, 1085, 1100, 1110, and 1112, or submit documentation to demonstrate that the encroachment stations in the model are correct.

4. Please resolve the discrepancy between the reach lengths used in the HEC-2 model for Abbott Wash and the distances shown on the topographic work maps for Cross Sections 1152 and 1155. Comparison of the HEC-2 model and work maps revealed that the SFHA includes a portion of ground at Cross Section 1105 that is higher than the BFE. Please either revise the work maps or submit documentation to resolve this concern.

5. Please submit revised topographic work maps for Abbott Wash to resolve the concerns outlined above. The work maps must include the locations and alignments of road crossings, culverts, corporate and study limits, and all cross sections used in the submitted hydraulic analyses. The revised base floodplain boundary delineations must tie into the effective floodplain boundary delineations at the downstream end of the revised reach. The scale and topographic definition of the revised work maps must be sufficient to provide reasonable accuracy. The work maps must include the datum to which all elevations are referenced and must be certified by a registered professional engineer.

Please submit a diskette containing input and output files for all computer models used in the revised hydraulic analyses.

Please send the required data directly to our Technical Evaluation Contractor at the following address:

Michael Baker Jr., Inc.
3601 Eisenhower Avenue, Suite 600
Alexandria, Virginia 22304

Attention: Ms. Sheila M. Norlin
(703) 317-3054

For identification purposes, you must include the case number referenced above on all correspondence.

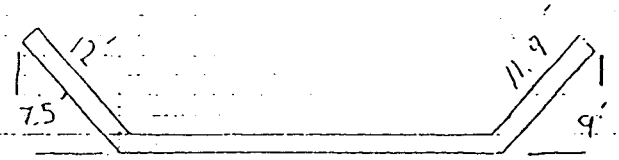
BACKUP INFORMATION FOR

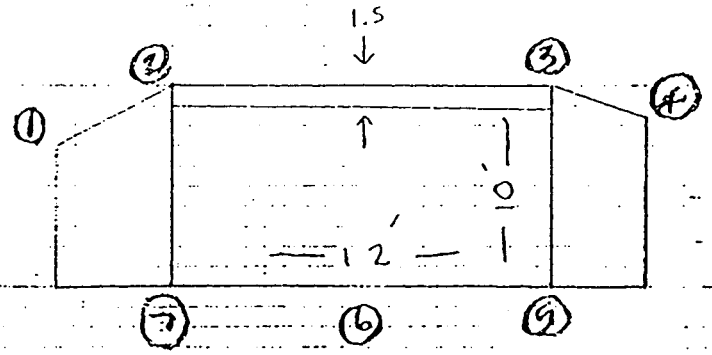
RESPONSE TO COMMENT 7

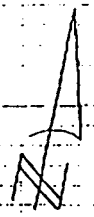
PULSIPHER WASH

MESQUITE FLOOD STUDY
TIES TO REINFORCED CONCRETE
BOX
PULSIPHER WASH AND I-15

NORTH END







1853
1827
1826

MISC. BK. 1 PG. 57
B. BAULARD
W. LINDER
1-12-98

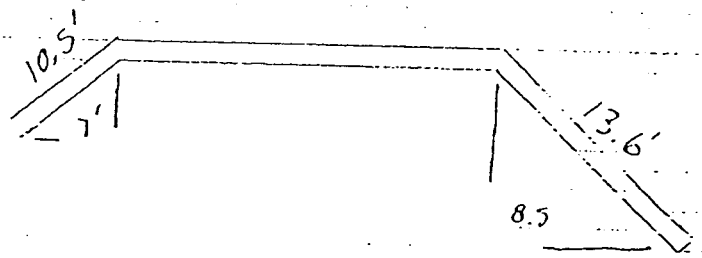
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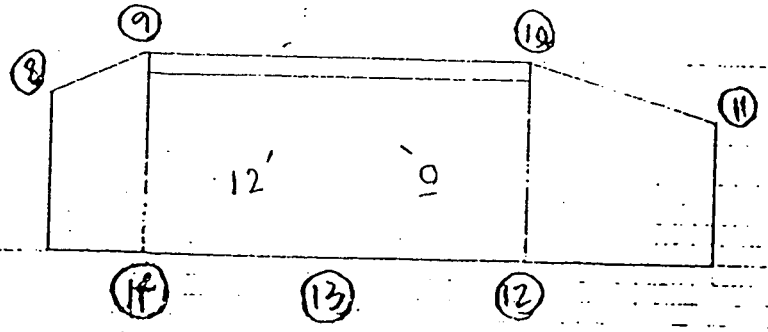
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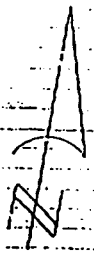
220 (3B TALC) CP PUMPHOUSE

221 (3B TALC) CP BRIDGE

51-55 CASTLE CREEK (TRIBUTARY) FROM WEST







PULSIPHER MOD I-15
NORTHSIDE

STA	+	HI	−	ELEV	(SEE SKETCH) DESCRIPTION
TOP HW				1600.62	TOP HEADWALL (NORTHSIDE FREEWAY)
℄	1.13	1601.75			
			4.71	1597.04	①
			1.14	1600.61	②
			1.07	1600.68	③
			4.79	1596.96	④
			12.76	1588.99	⑤
			12.87	1588.88	⑥
			12.93	1588.82	⑦
			5.80	1595.95	50'N + 24'E TOP OF WASH
			11.94	1589.81	50'N + 9'E TOE OF WASH
			11.86	1589.89	50'N + 9'W " " "
			5.92	1595.83	50'N + 25'W TOP OF WASH
TOP HW				1600.62	
℄	6.96	1607.58			
			3.75	1603.83	33'S + ℄ WASH EDGE PAVEMENT
			5.07	1602.51	33'S + 50'W " "
			6.37	1601.21	33'S + 100'W " "
			2.15	1605.43	33'S + 50'E " "
			0.68	1606.90	33'S + 100'W " "
					E

PULSIPHER AND I-15
SOUTHSIDE

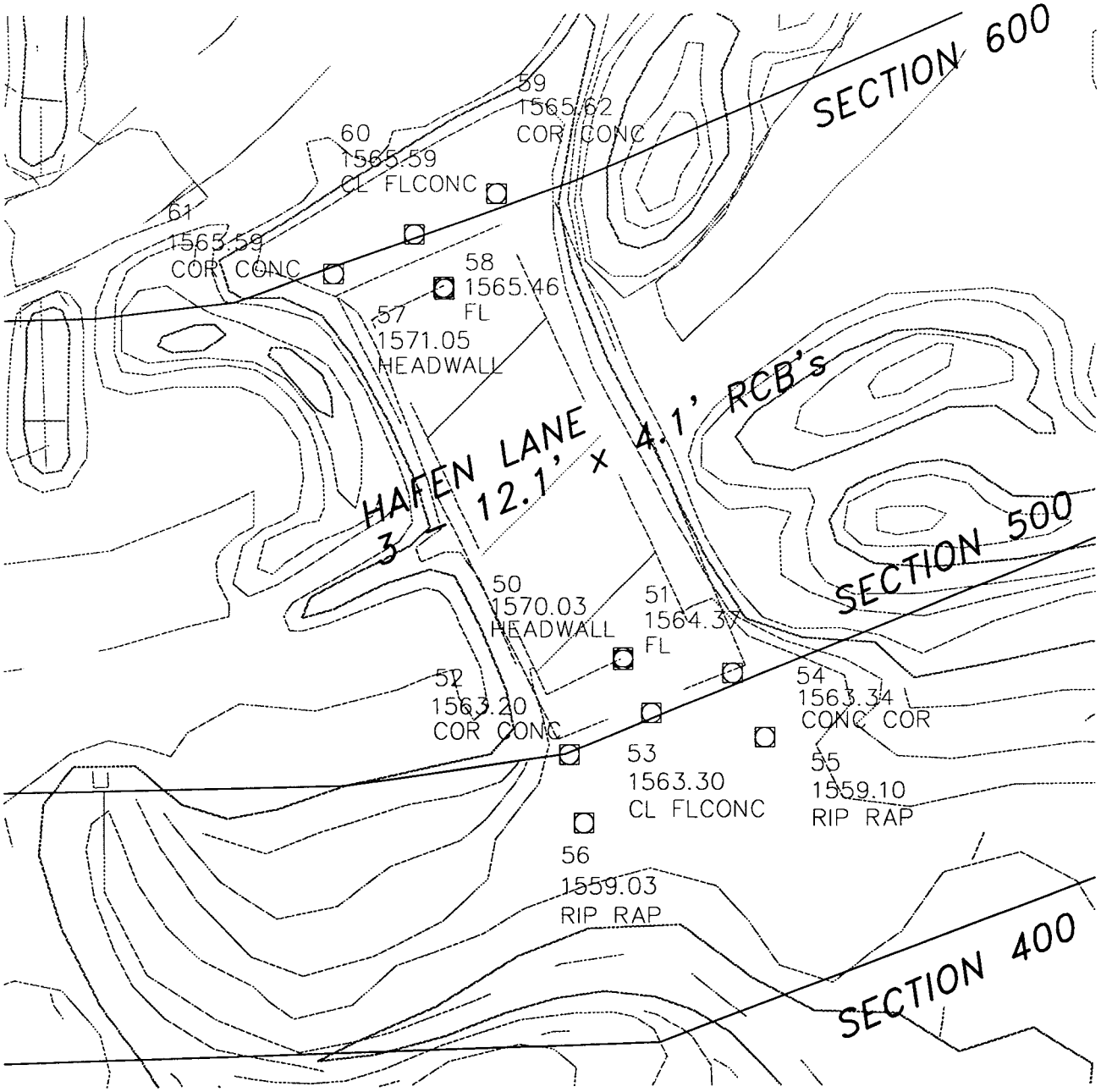
STA	+	HI	−	ELEV	(SEE SKETCH) DESCRIPTION
TOP HW				1593.89	
⊼	6.57	1600.46			
			12.25	1588.21	(8)
			6.59	1593.87	(9)
			6.69	1593.77	(10)
			10.21	1590.25	(11)
			18.34	1582.12	(12)
			18.27	1582.19	(13)
			18.26	1582.20	(14)
			1.40	1599.06	60'S + 30' W TOP WASH
			16.55	1583.91	60'S + 6.5' W TOE WASH
			16.02	1584.44	60'S + 7' E " "
			9.76	1590.70	60'S + 25' E TOP WASH
			1.52	1598.94	33' N + ℄ WASH EDGE PAVEMENT
			0.77	1599.69	33' N + 50' E " "
			0.13	1600.33	33' N + 100' E " "
			2.27	1598.19	33' N + 50' W " "
			2.97	1597.49	33' N + 100' W " "

PULSIPHER AND HAFEN

NORTHSIDE

STA	+	HI	-	ELEV	DESCRIPTION
CP WASH				1572.28	
T	5.92	1578.20			
			5.00	1573.20	50'N + 25.5 E TOP WASH
			12.12	1566.08	50'N + 9.5 E TOE WASH
			11.81	1566.39	50'N + 17.5 W " "
			5.94	1572.26	50'N + 29.5 W TOP WASH
			5.54	1572.66	35'S + ℄ WASH — ℄ ROAD
			5.53	1572.67	35'S + 25'W " "
			5.33	1572.87	35'S + 50'W " "
			5.13	1573.07	35'S + 75'W " "
			5.54	1572.66	35'S + 25'E " "
			5.29	1572.91	35'S + 50'E " "
			5.06	1573.14	35'S + 75'E " "

EXHIBIT
HAFEN LANE BRIDGE
SURVEY DATA



GRAPHIC SCALE

40 0 20 40

(IN FEET)

1 inch = 40 ft.

NORTH

1" = 40'

F:\550-035\response\hafen.dwg 08-30-99 15:32:58 mludwig

PULSIPHER AND HAFEN

NORTHSIDE

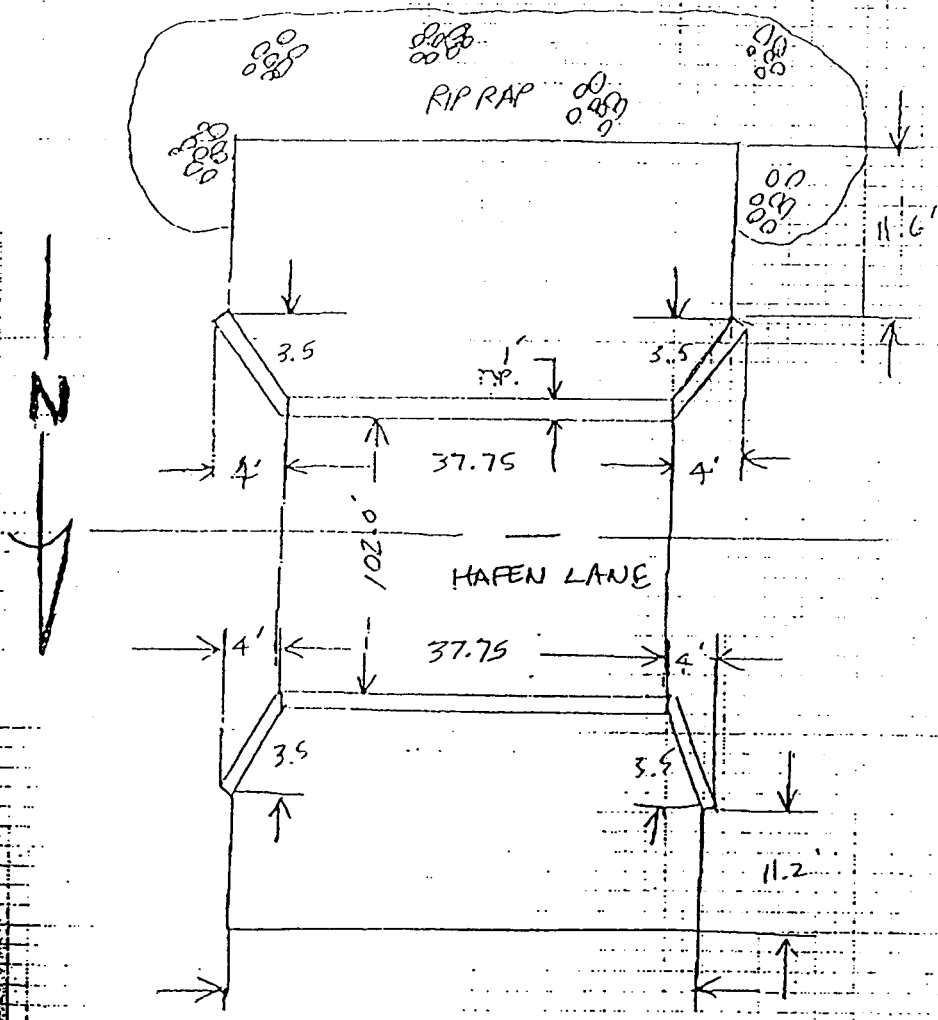
STA	+	HI	−	ELEV	DESCRIPTION
CP WASH				1572.28	
T	5.92	1578.20			
			5.00	1573.20	50'N + 25.5 E TOP WASH
			12.12	1566.08	50'N + 9.5 E TOE WASH
			11.81	1566.39	50'N + 17.5 W " "
			5.94	1572.26	50'N + 29.5 W TOP WASH
			5.54	1572.66	35'S + ℄ WASH — ℄ ROAD
			5.53	1572.67	35'S + 25'W " "
			5.33	1572.87	35'S + 50'W " "
			5.13	1573.07	35'S + 75'W " "
			5.54	1572.66	35'S + 25'E " "
			5.29	1572.91	35'S + 50'E " "
			5.06	1573.14	35'S + 75'E " "

MKG BOOK 2 PG. 8.

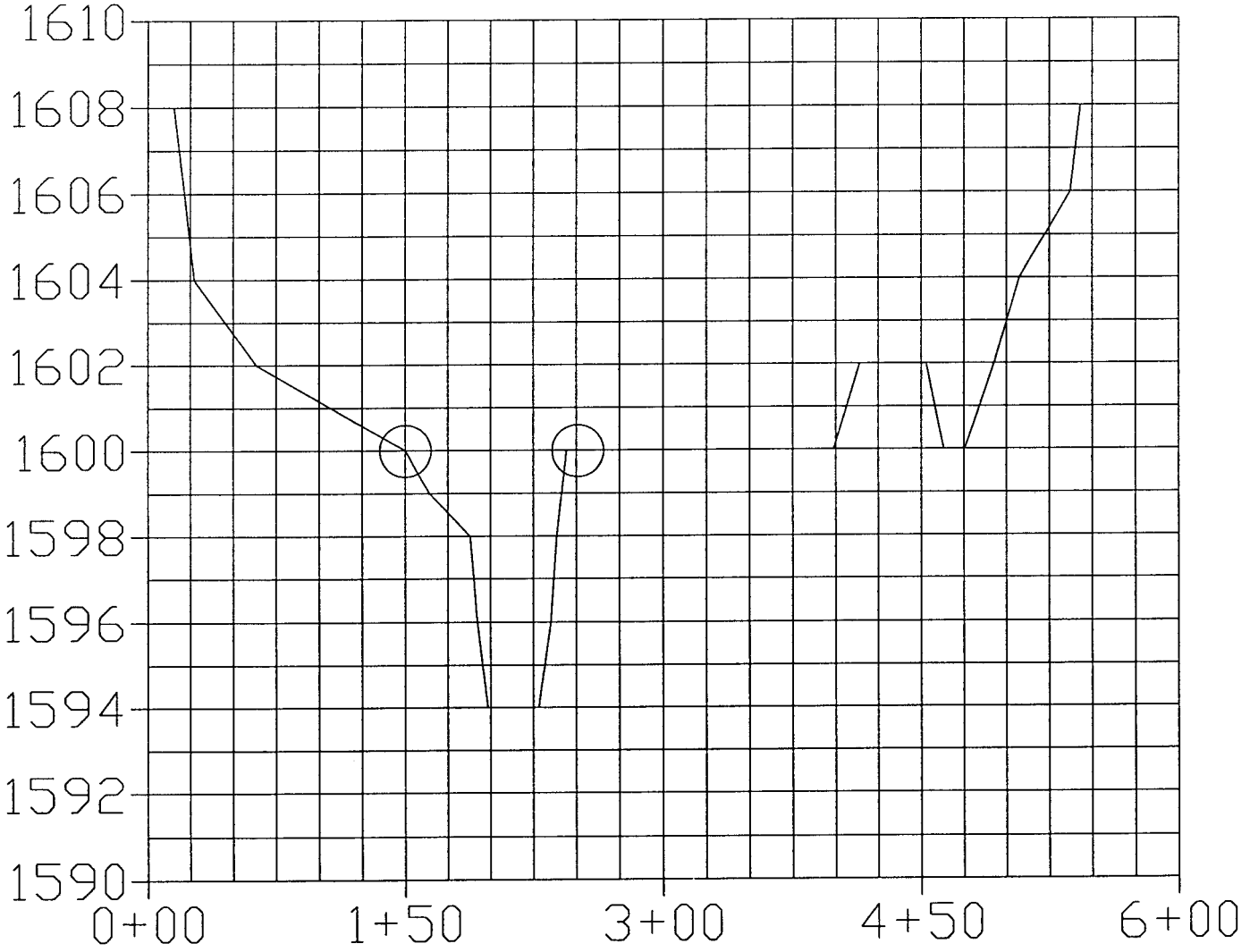
J. JENSEN

M. BROADBENT

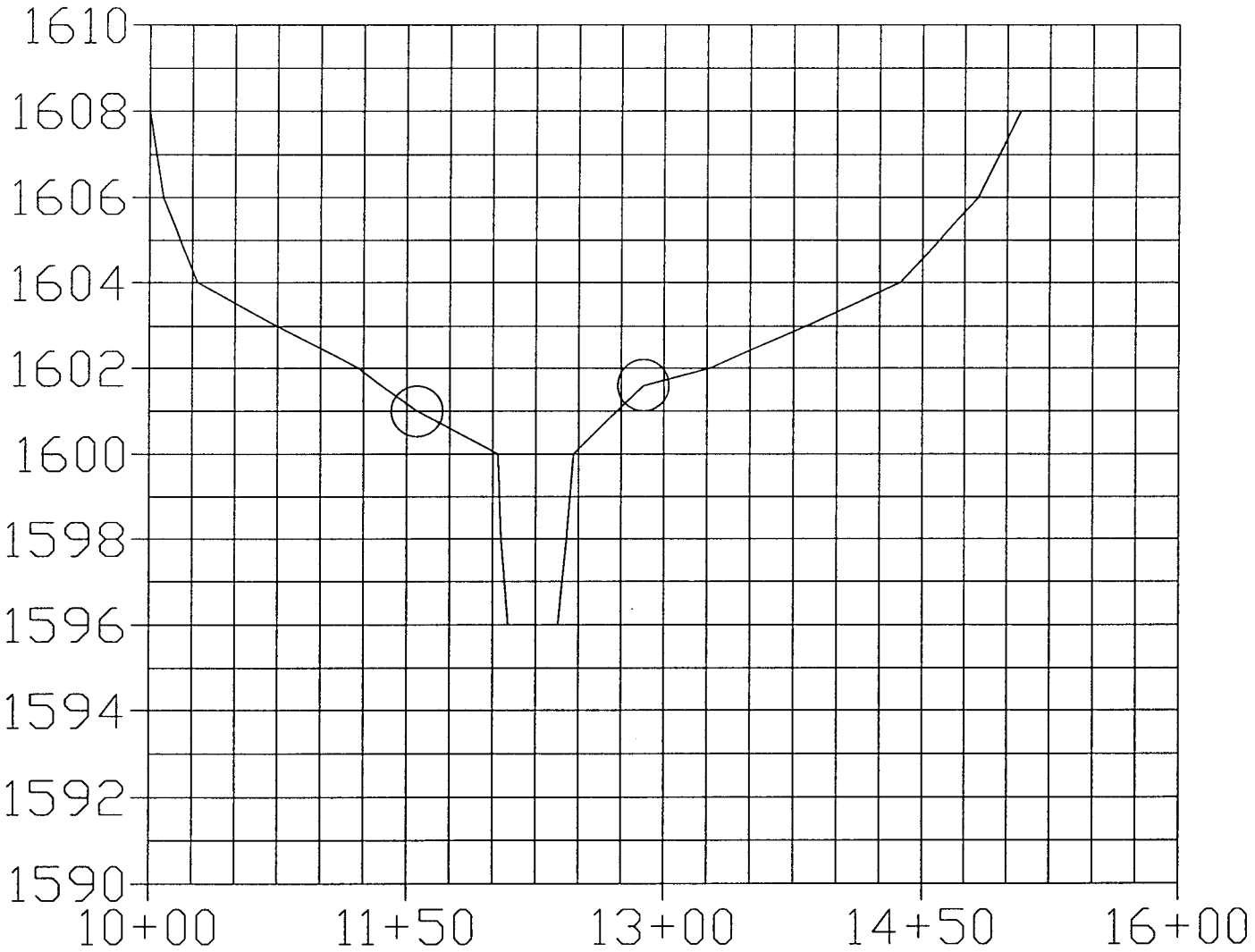
4/21/98



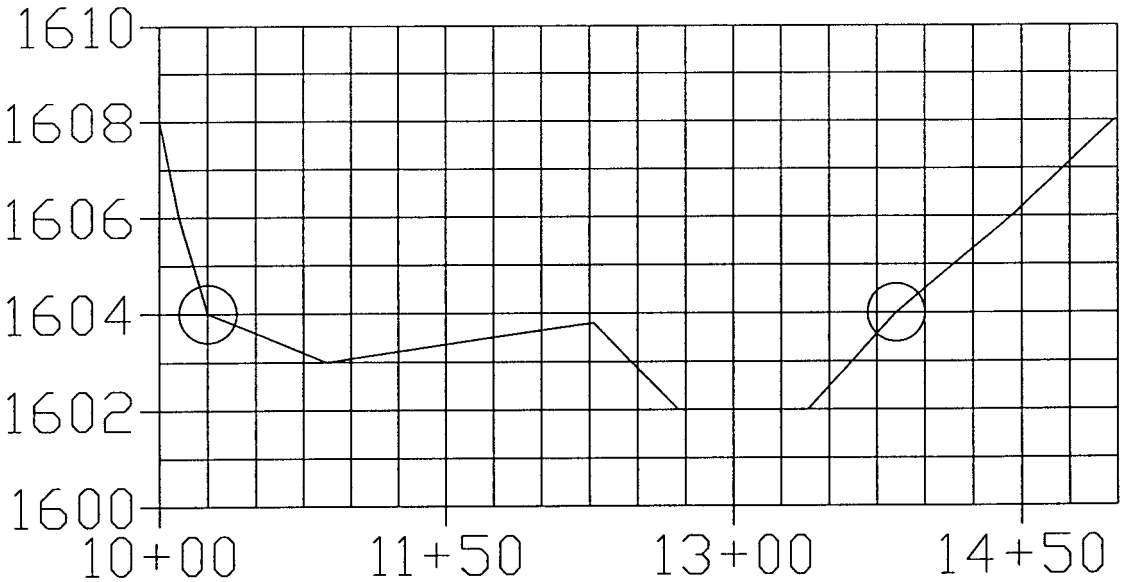
NORTHSIDE HEADER
CONC PAD
12.13
12.13
12.13
4'-05"
1.6'
6" WIDE
TRENCH
SOUTHSIDE HEADER
CONC PAD
12.13
12.13
12.13
4'
4'
1.65'
CONTINUED


1610
1608
1606
1604
1602
1600
1598
1596
1594
1592
1590
0+00
1+50
3+00
4+50
6+00

2300


1610
1608
1606
1604
1602
1600
1598
1596
1594
1592
1590
10+00
11+50
13+00
14+50
16+00

2330

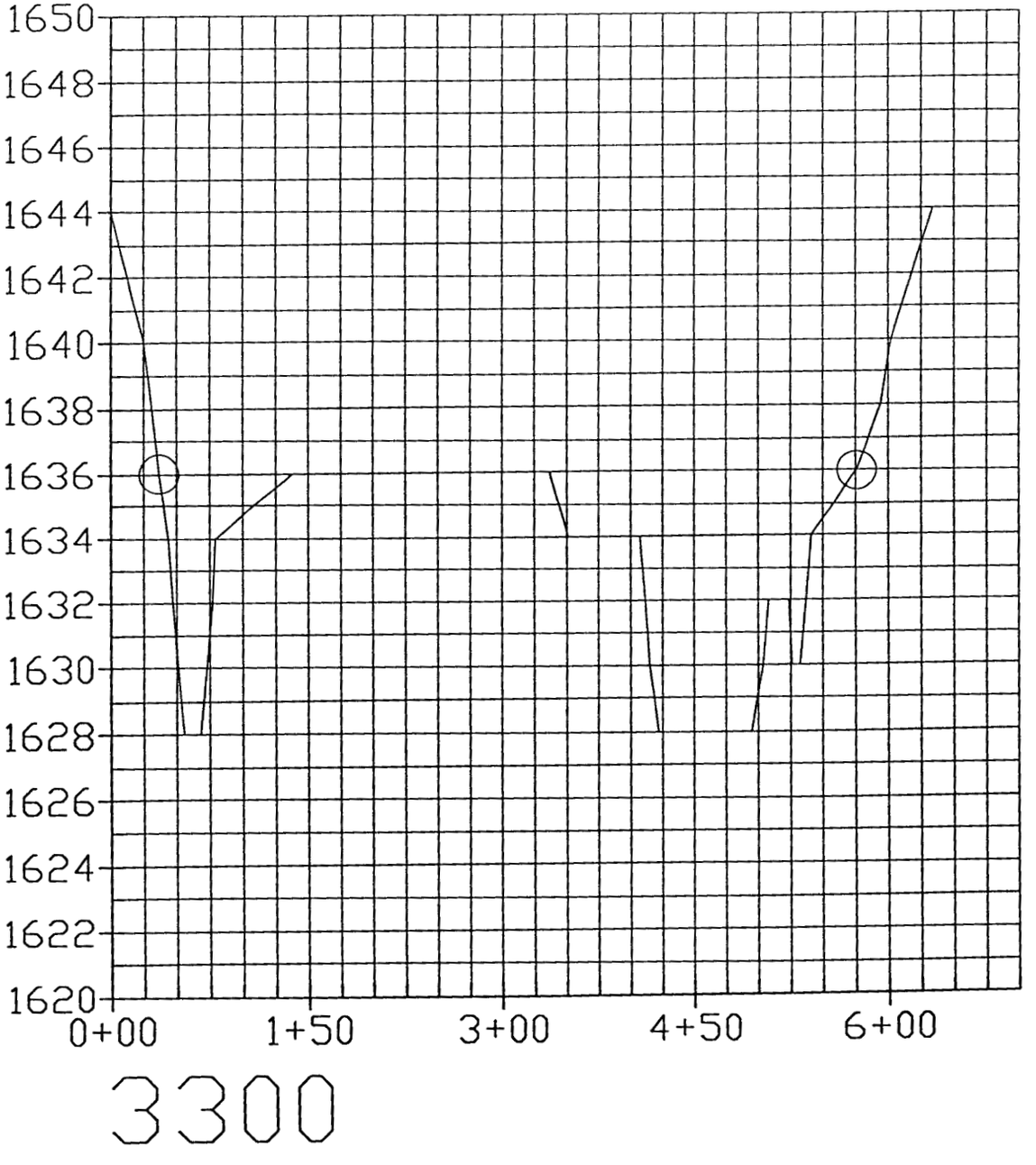


2350

BACKUP INFORMATION FOR

RESPONSE TO COMMENT 9

PULSIPHER WASH

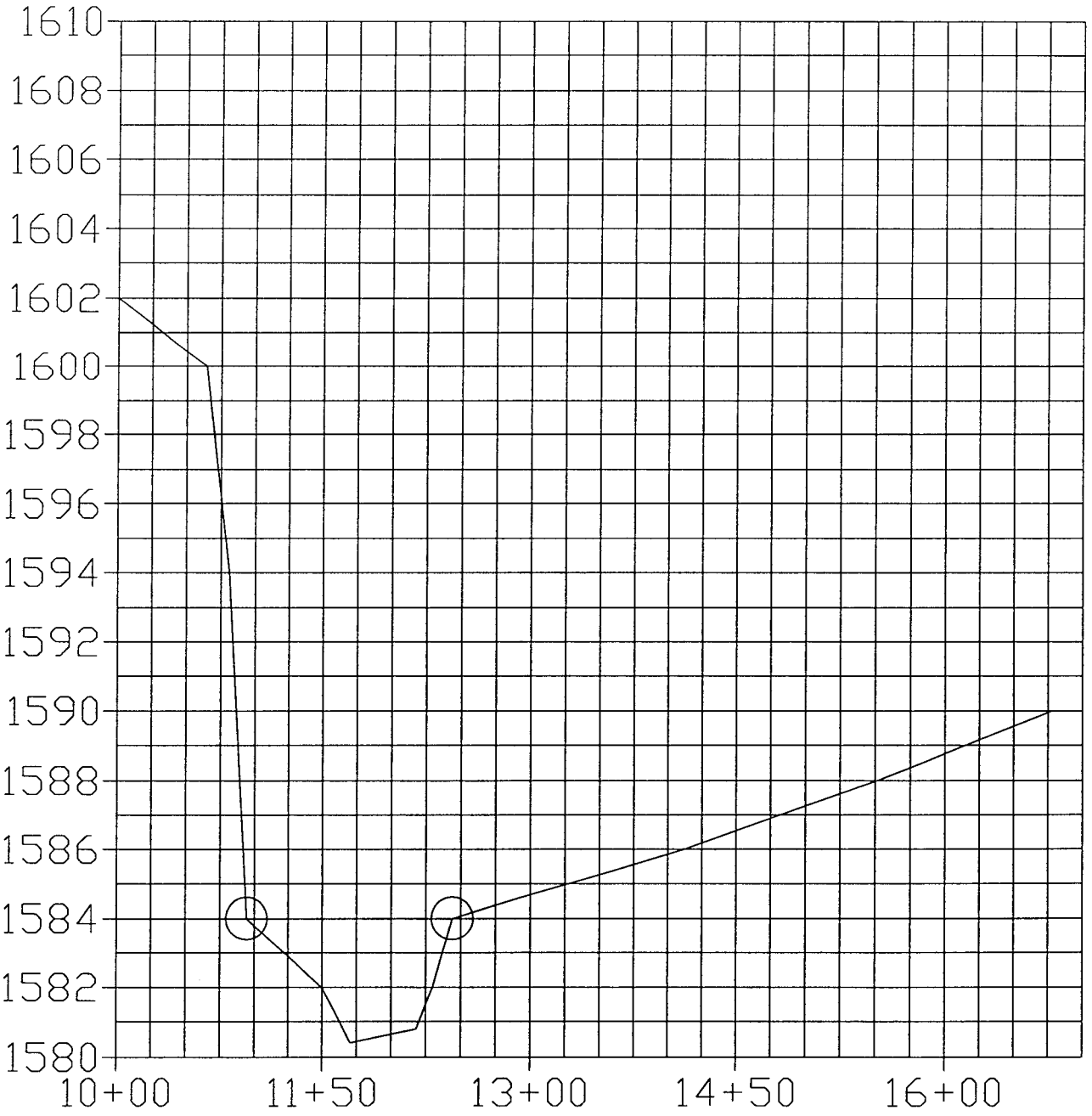

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1648
1646
1644
1642
1640
1638
1636
1634
1632
1630
1628
1626
1624
1622
1620
0+00
1+50
3+00
4+50
6+00

3300

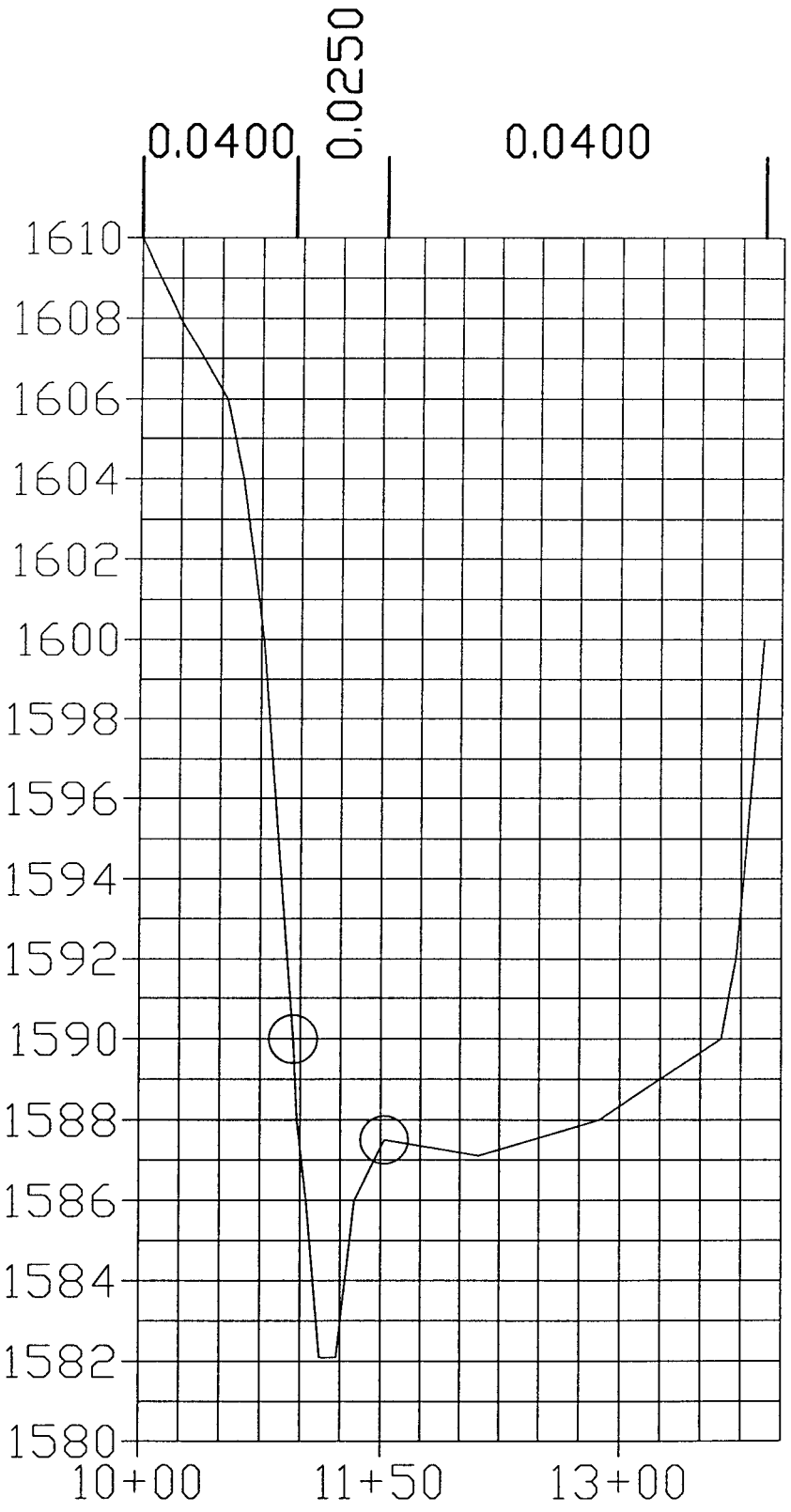
BACKUP INFORMATION FOR

RESPONSE TO COMMENT 10

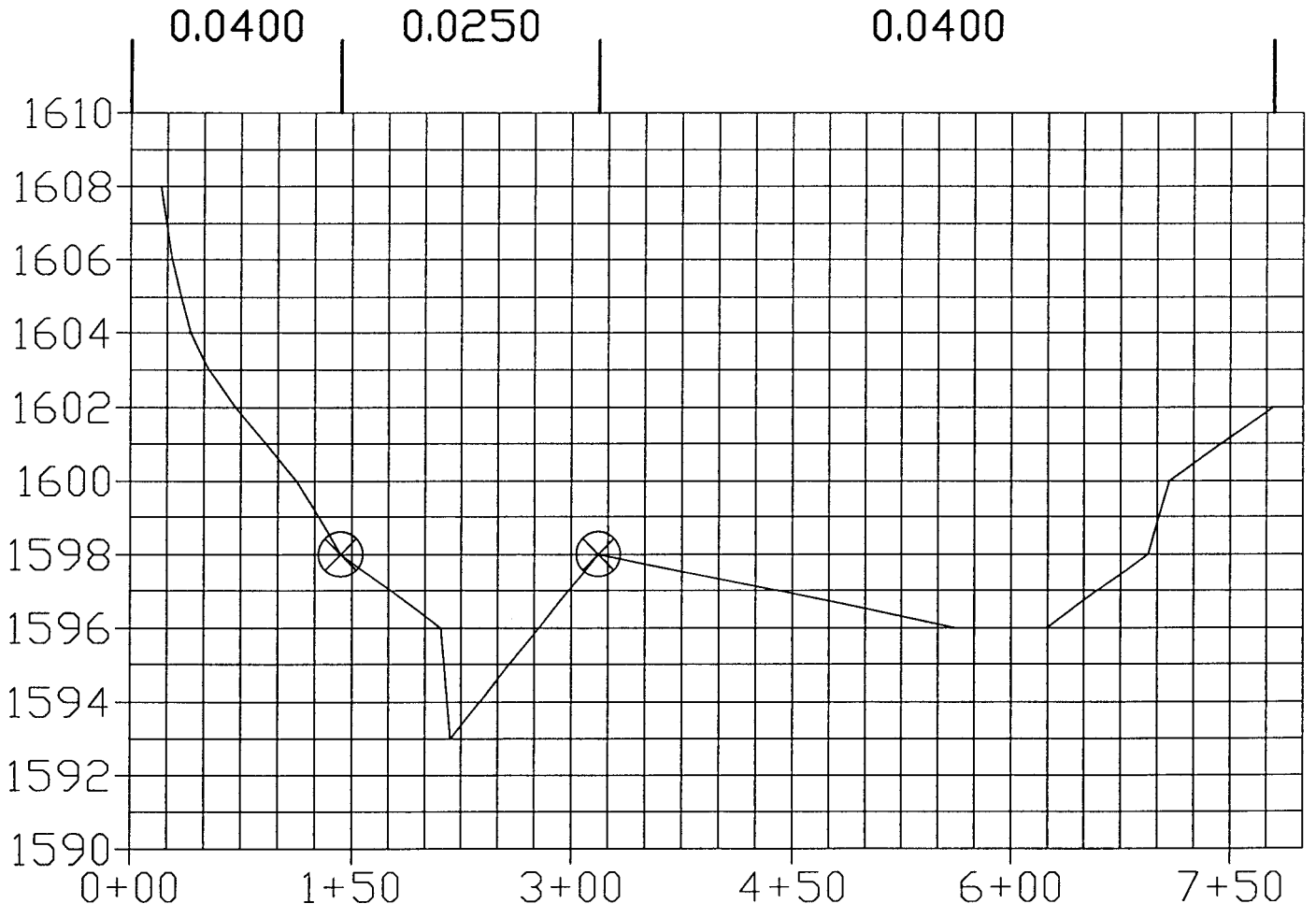
PULSIPHER WASH


1610
1608
1606
1604
1602
1600
1598
1596
1594
1592
1590
1588
1586
1584
1582
1580
10+00
11+50
13+00
14+50
16+00

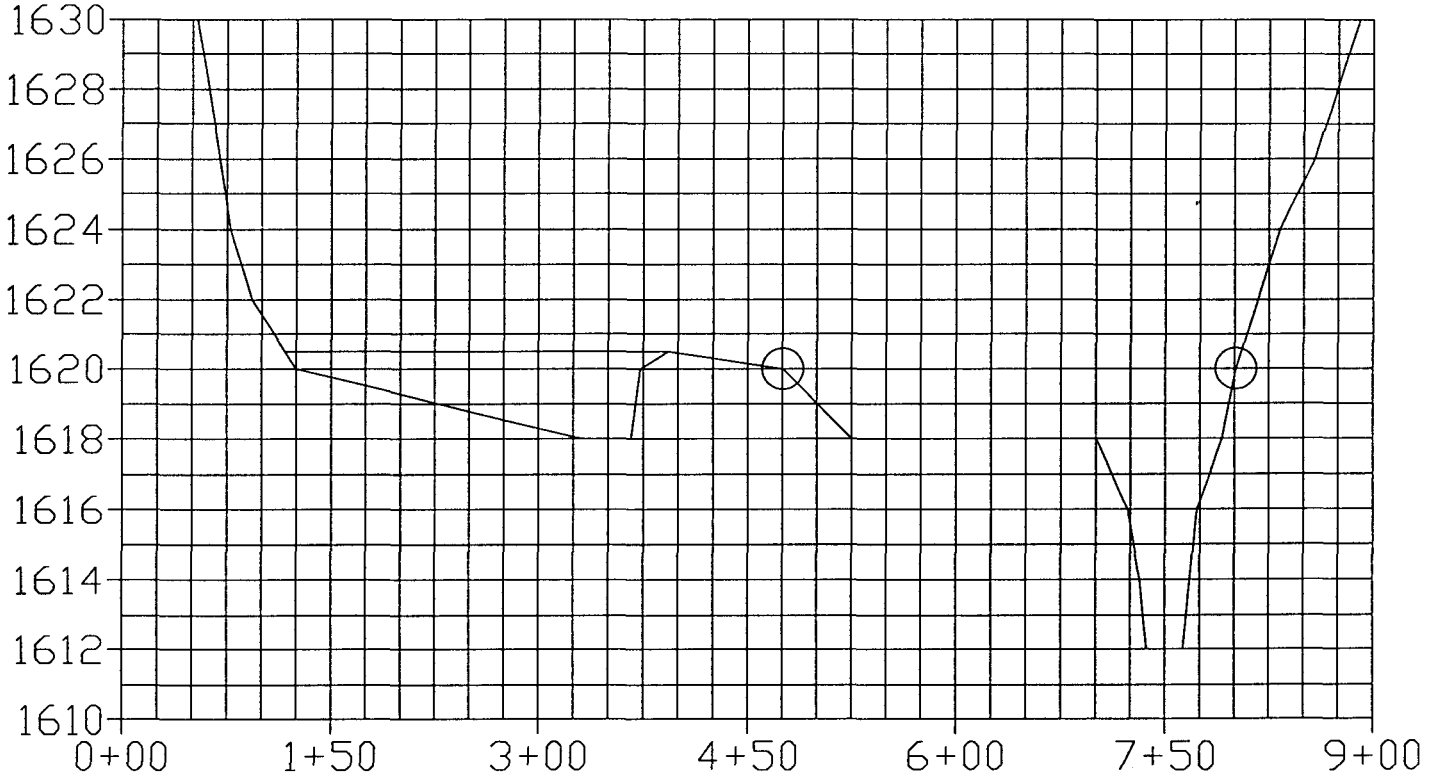
1600


0.0400
0.0250
0.0400
1610
1608
1606
1604
1602
1600
1598
1596
1594
1592
1590
1588
1586
1584
1582
1580
10+00
11+50
13+00

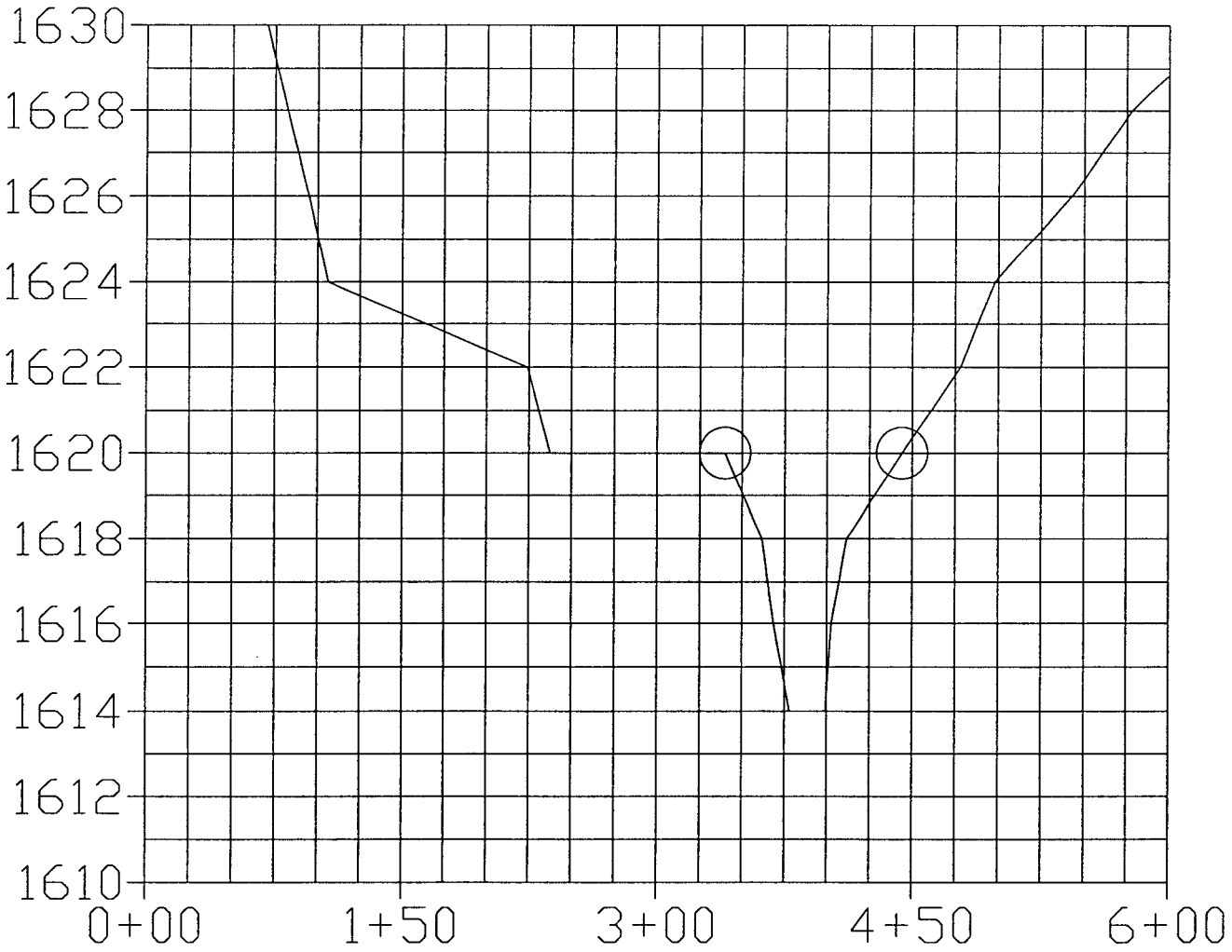
1750


0.0400
0.0250
0.0400
1610
1608
1606
1604
1602
1600
1598
1596
1594
1592
1590
0+00
1+50
3+00
4+50
6+00
7+50

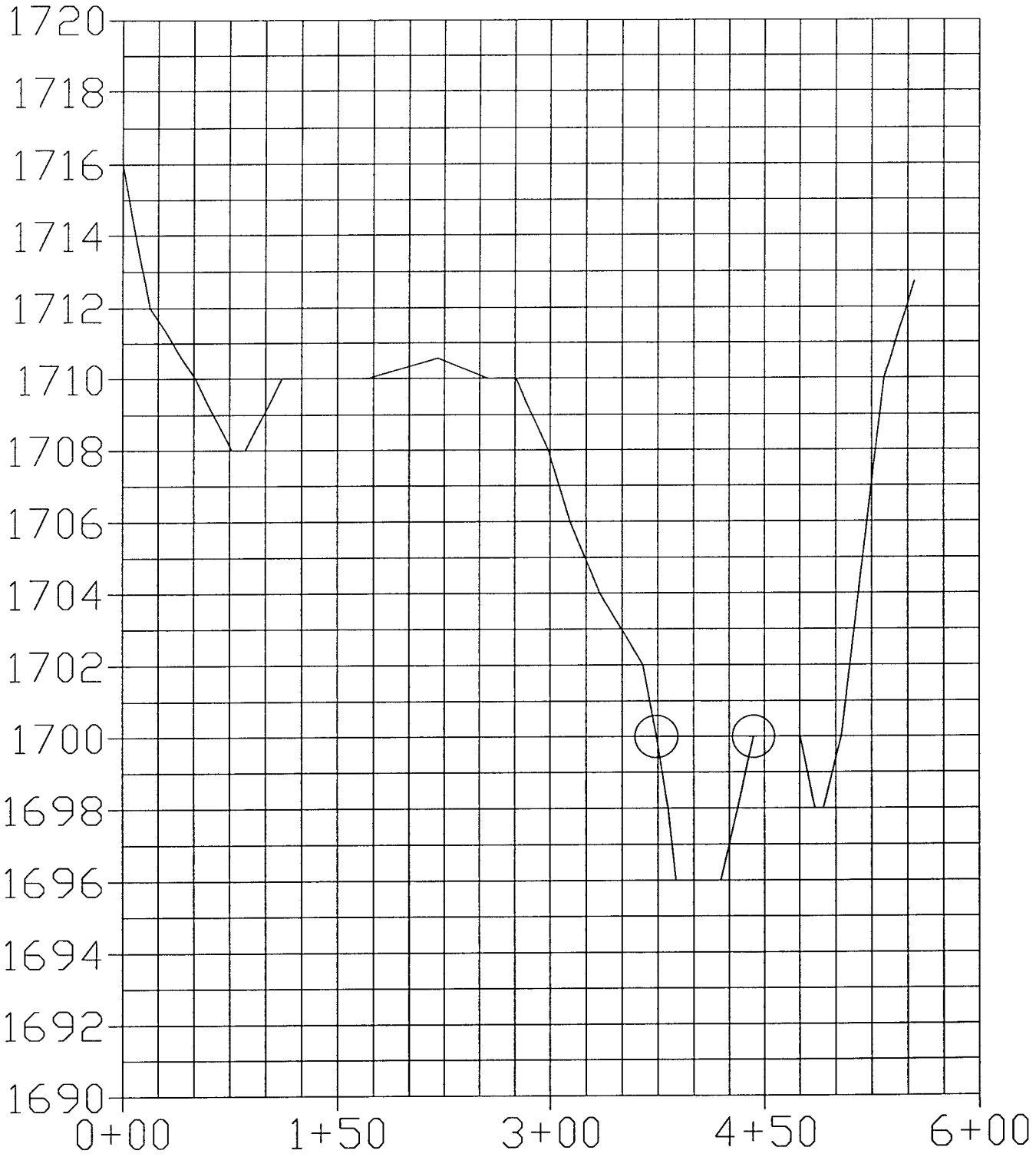
2200


1630
1628
1626
1624
1622
1620
1618
1616
1614
1612
1610
0+00
1+50
3+00
4+50
6+00
7+50
9+00

2900


1630
1628
1626
1624
1622
1620
1618
1616
1614
1612
1610
0+00
1+50
3+00
4+50
6+00

3000


1720
1718
1716
1714
1712
1710
1708
1706
1704
1702
1700
1698
1696
1694
1692
1690
0+00
1+50
3+00
4+50
6+00

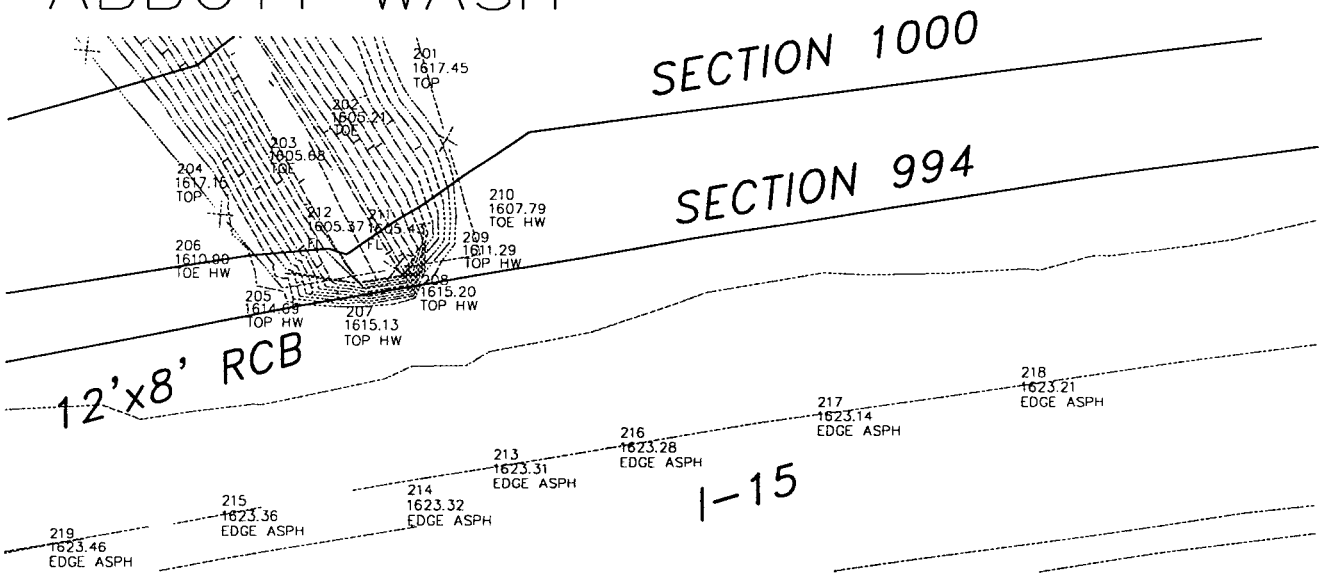
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BACKUP INFORMATION FOR

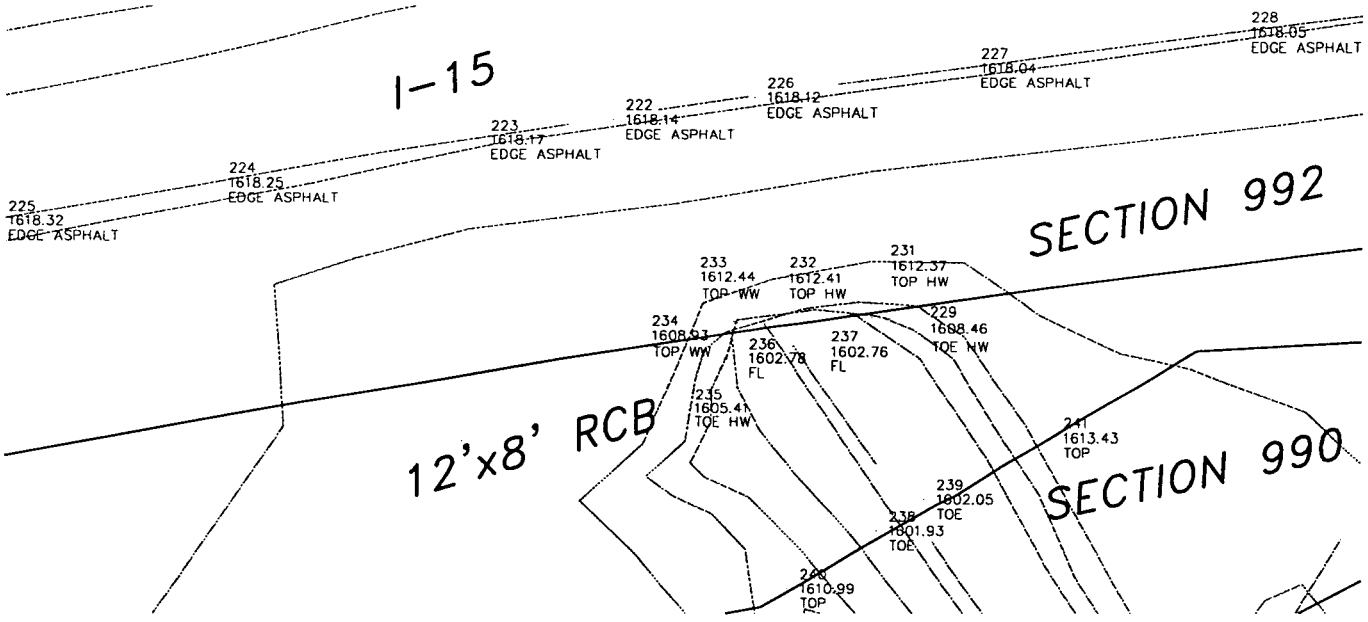
RESPONSE TO COMMENT 1

ABBOTT WASH

SURVEY DATA EXHIBIT
I-15 CULVERT
ABBOTT WASH



NORTH SIDE



SOUTH SIDE

GRAPHIC SCALE

40 0 20 40

(IN FEET)

1 inch = 40 ft.

NORTH

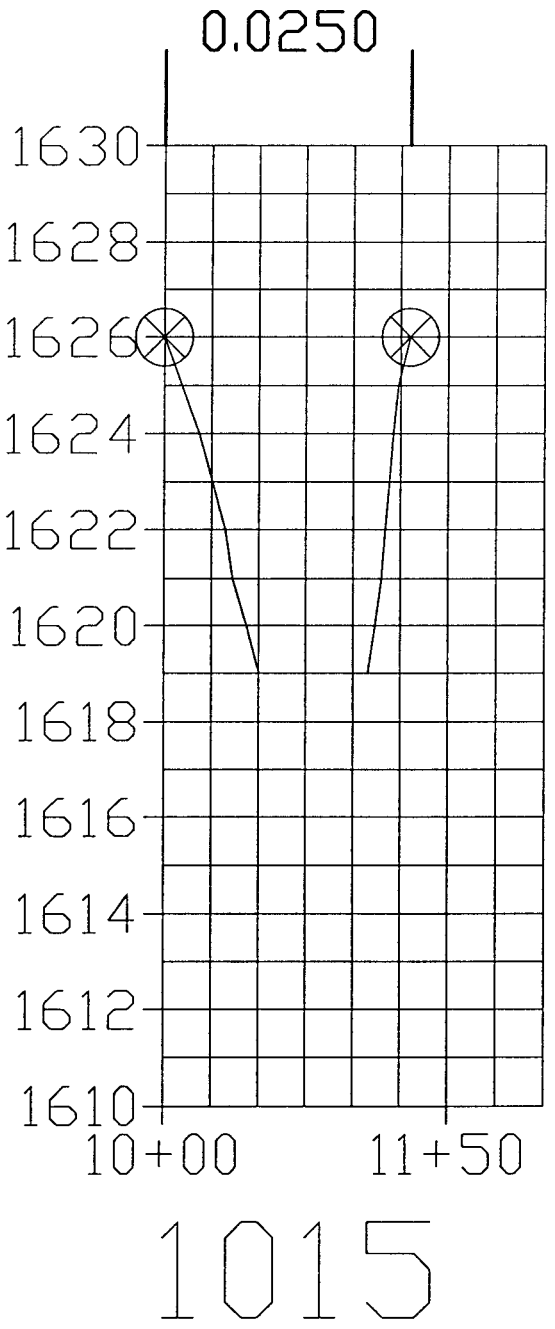
1" = 40'

mludwig 09-20-99 13:15:09 F:\550-035\response\15.dwg

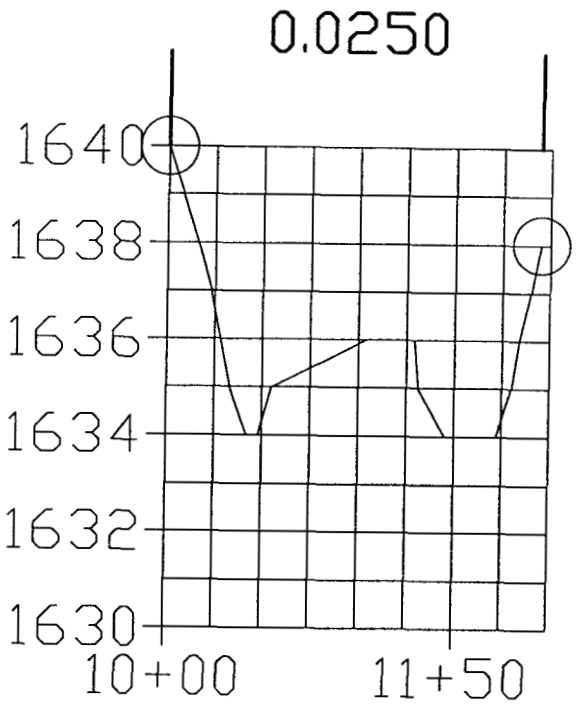
BACKUP INFORMATION FOR

RESPONSE TO COMMENT 2

ABBOTT WASH


0.0250
1630
1628
1626
1624
1622
1620
1618
1616
1614
1612
1610
10+00
11+50

1015

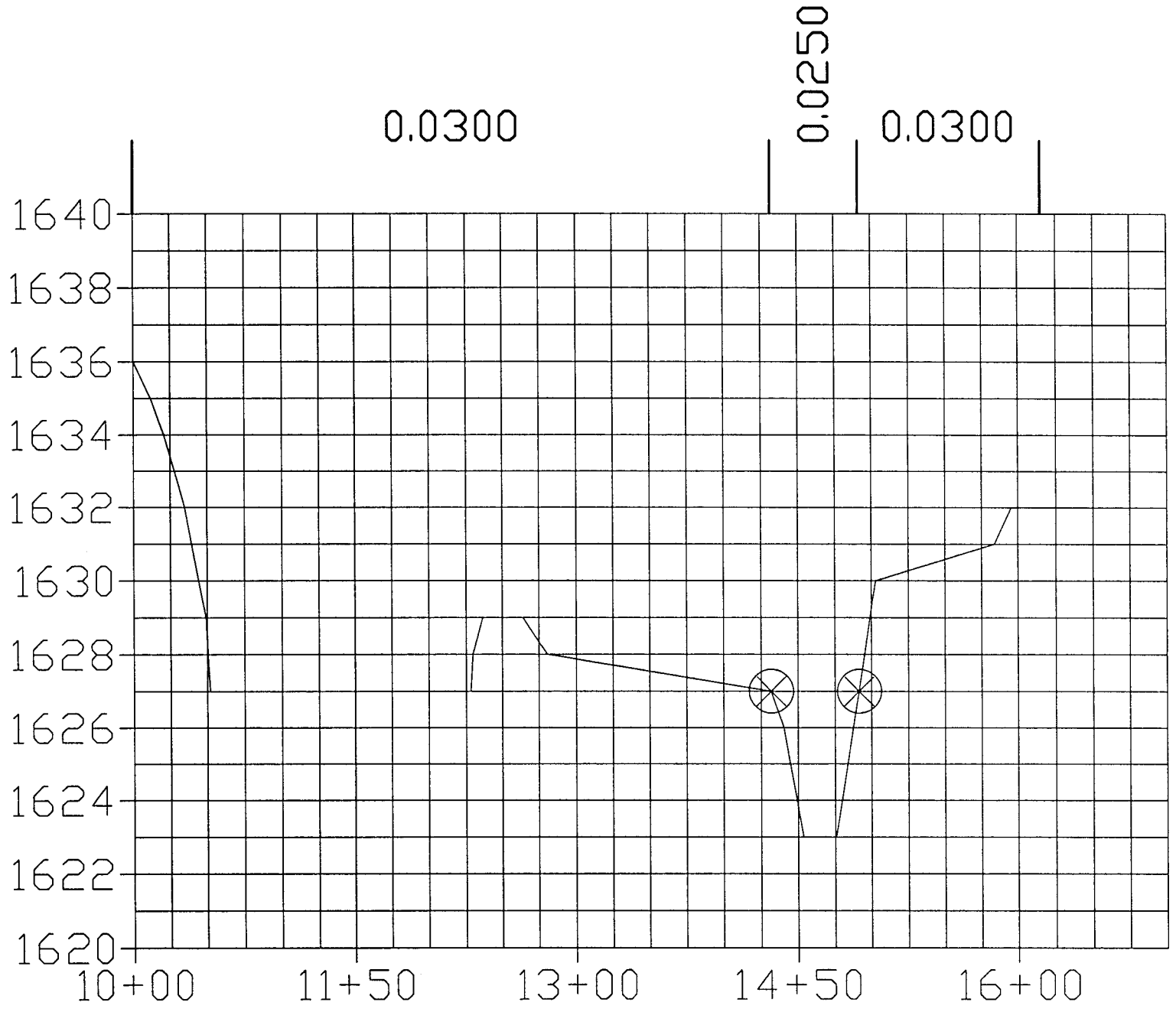


1069

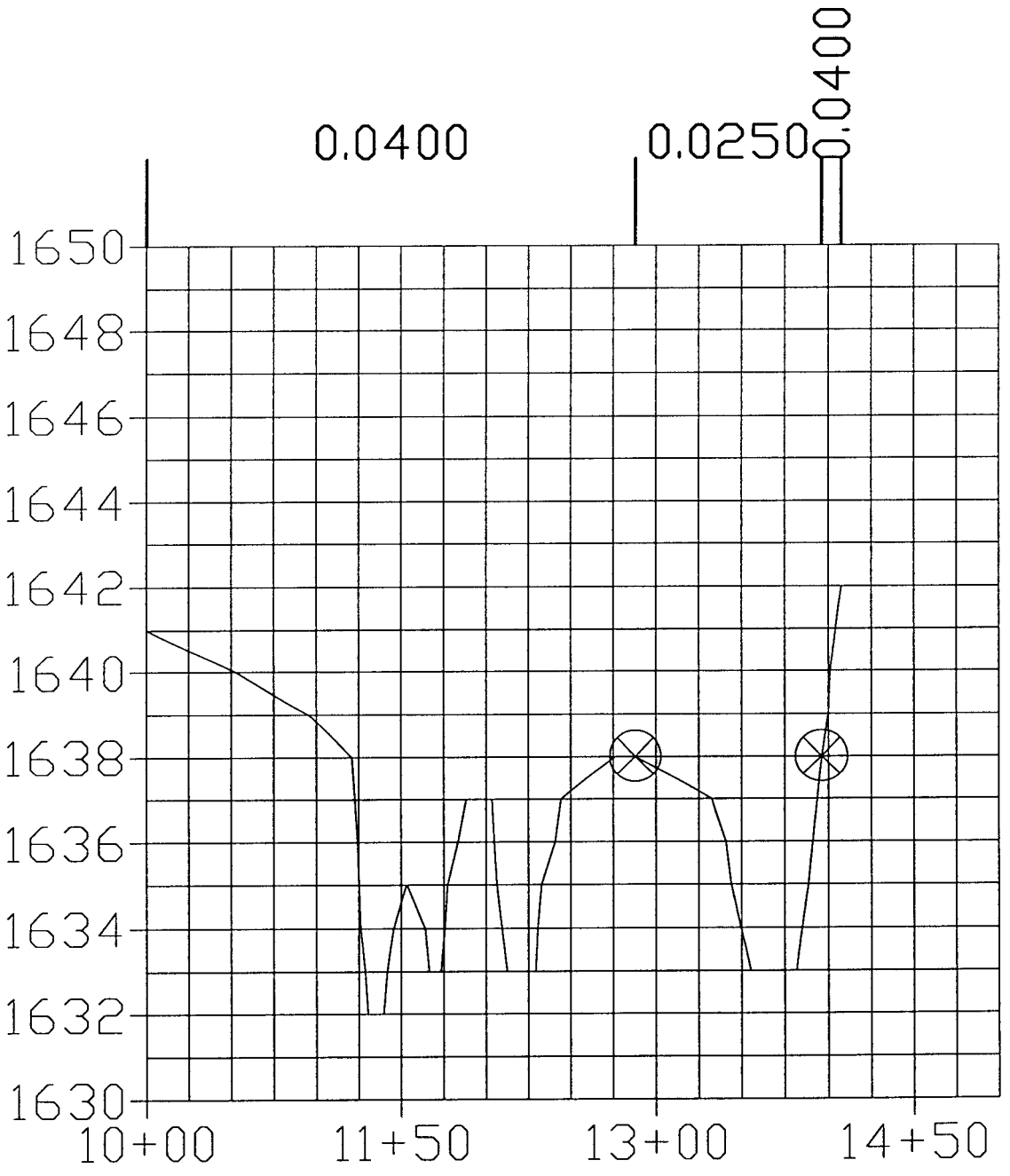
BACKUP INFORMATION FOR

RESPONSE TO COMMENT 3

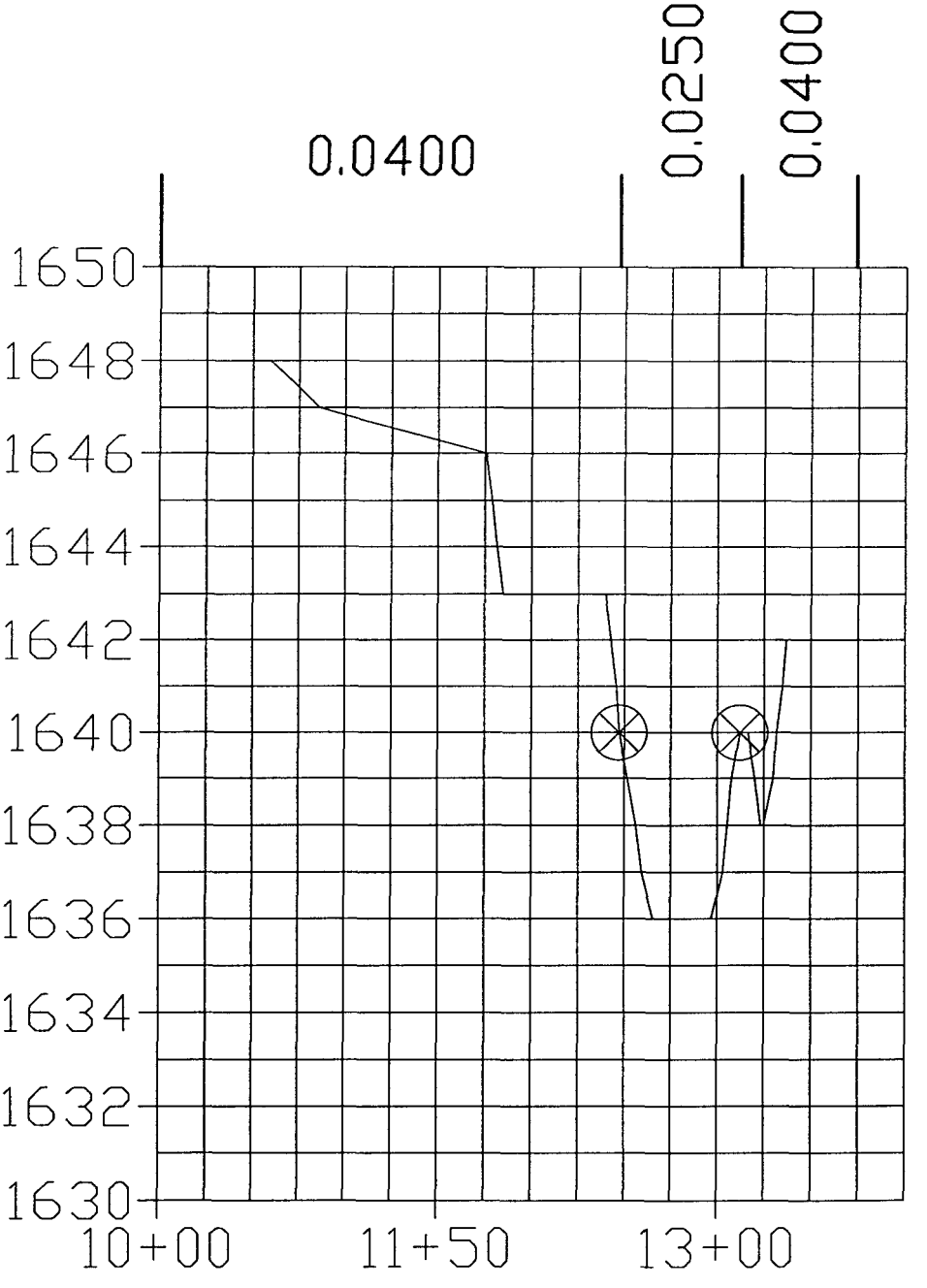
ABBOTT WASH


0.0300
0.0250
0.0300
1640
1638
1636
1634
1632
1630
1628
1626
1624
1622
1620
10+00
11+50
13+00
14+50
16+00

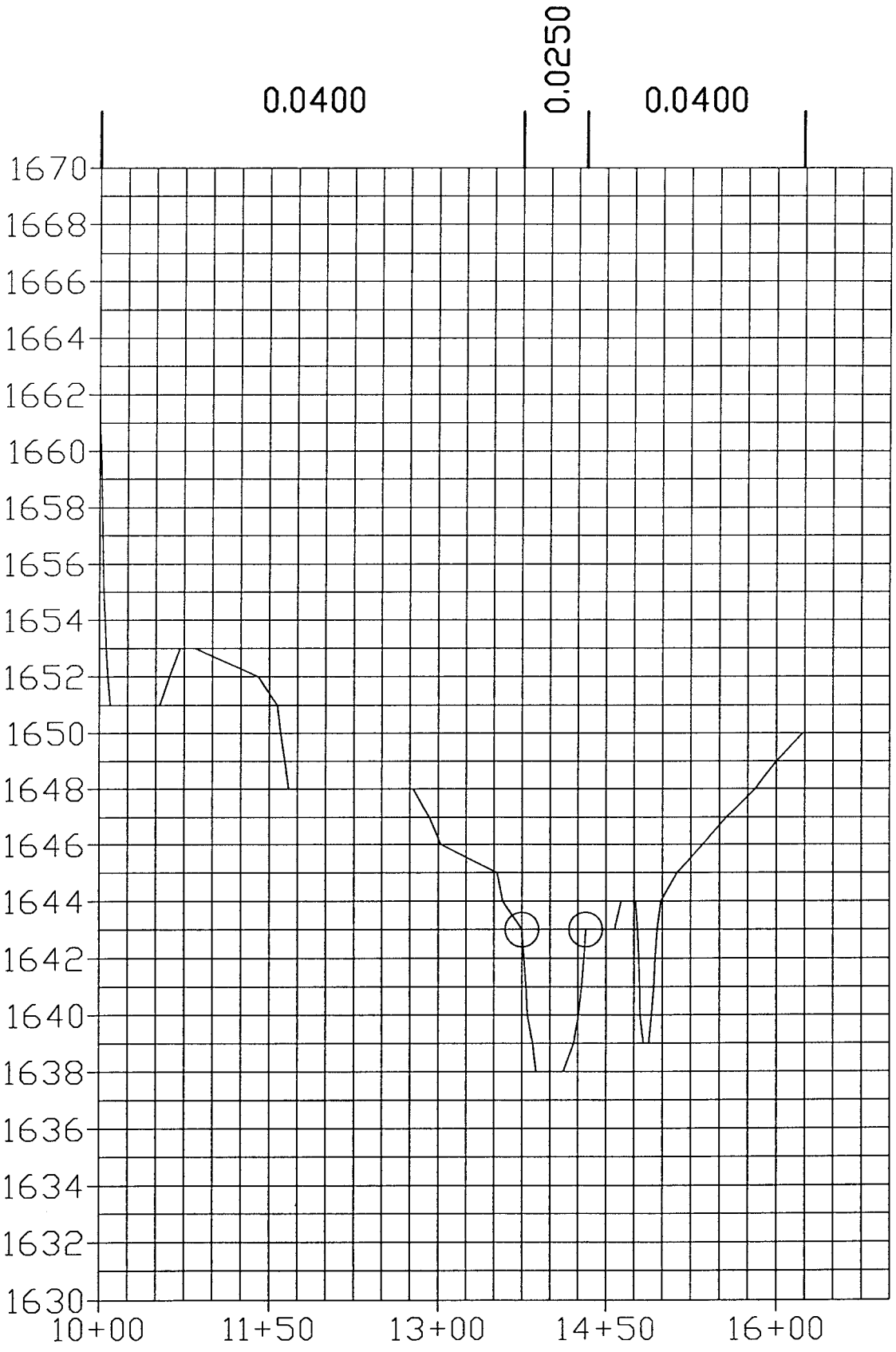
1035


0.0400
0.0250
0.0400
1650
1648
1646
1644
1642
1640
1638
1636
1634
1632
1630
10+00
11+50
13+00
14+50

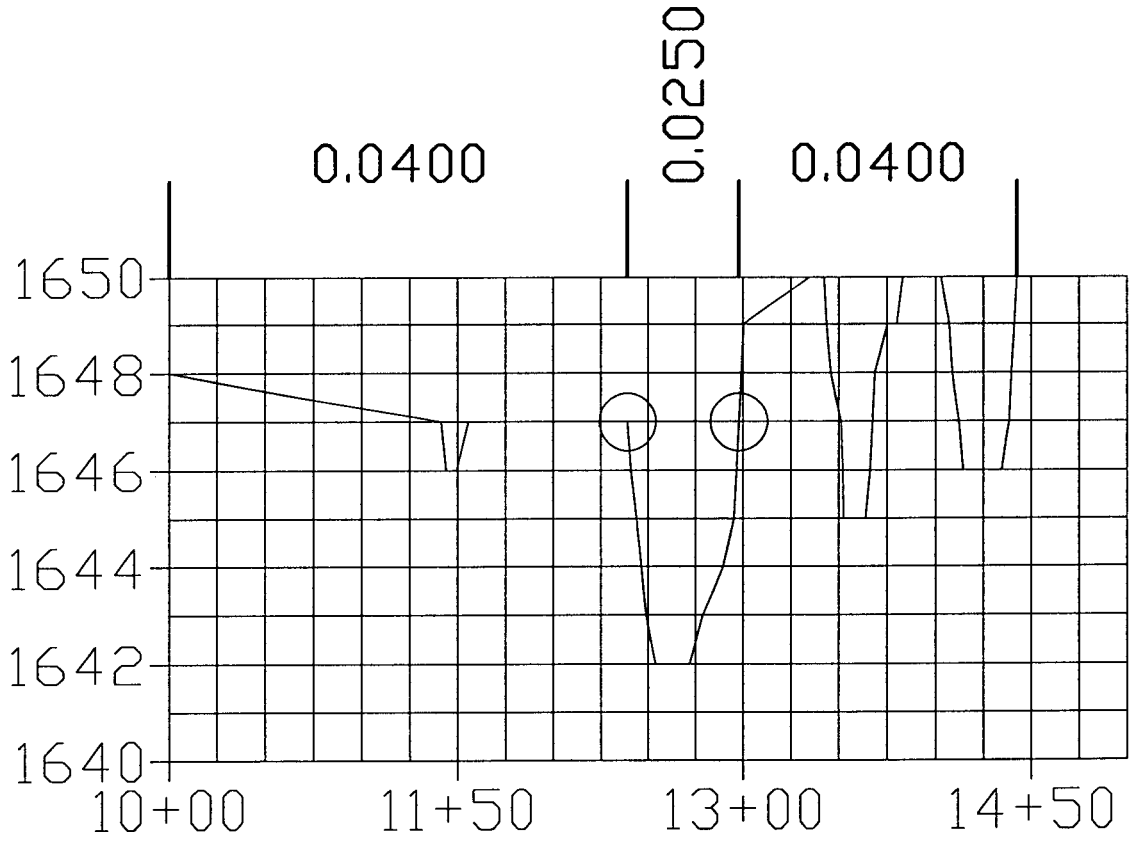
1067


0.0400
0.0250
0.0400
1650
1648
1646
1644
1642
1640
1638
1636
1634
1632
1630
10+00
11+50
13+00

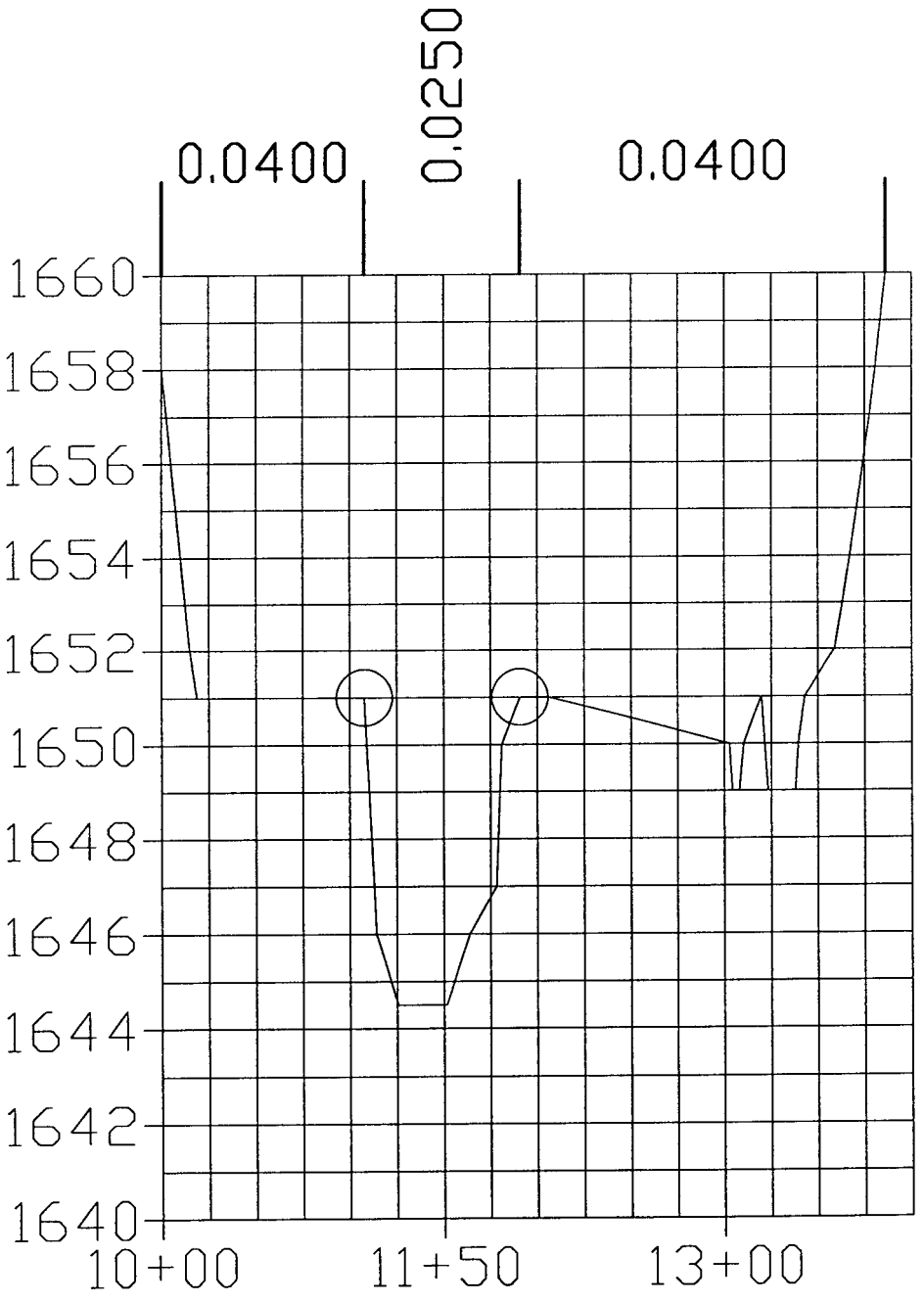
1080


0.0400
0.0250
0.0400
1670
1668
1666
1664
1662
1660
1658
1656
1654
1652
1650
1648
1646
1644
1642
1640
1638
1636
1634
1632
1630
10+00
11+50
13+00
14+50
16+00

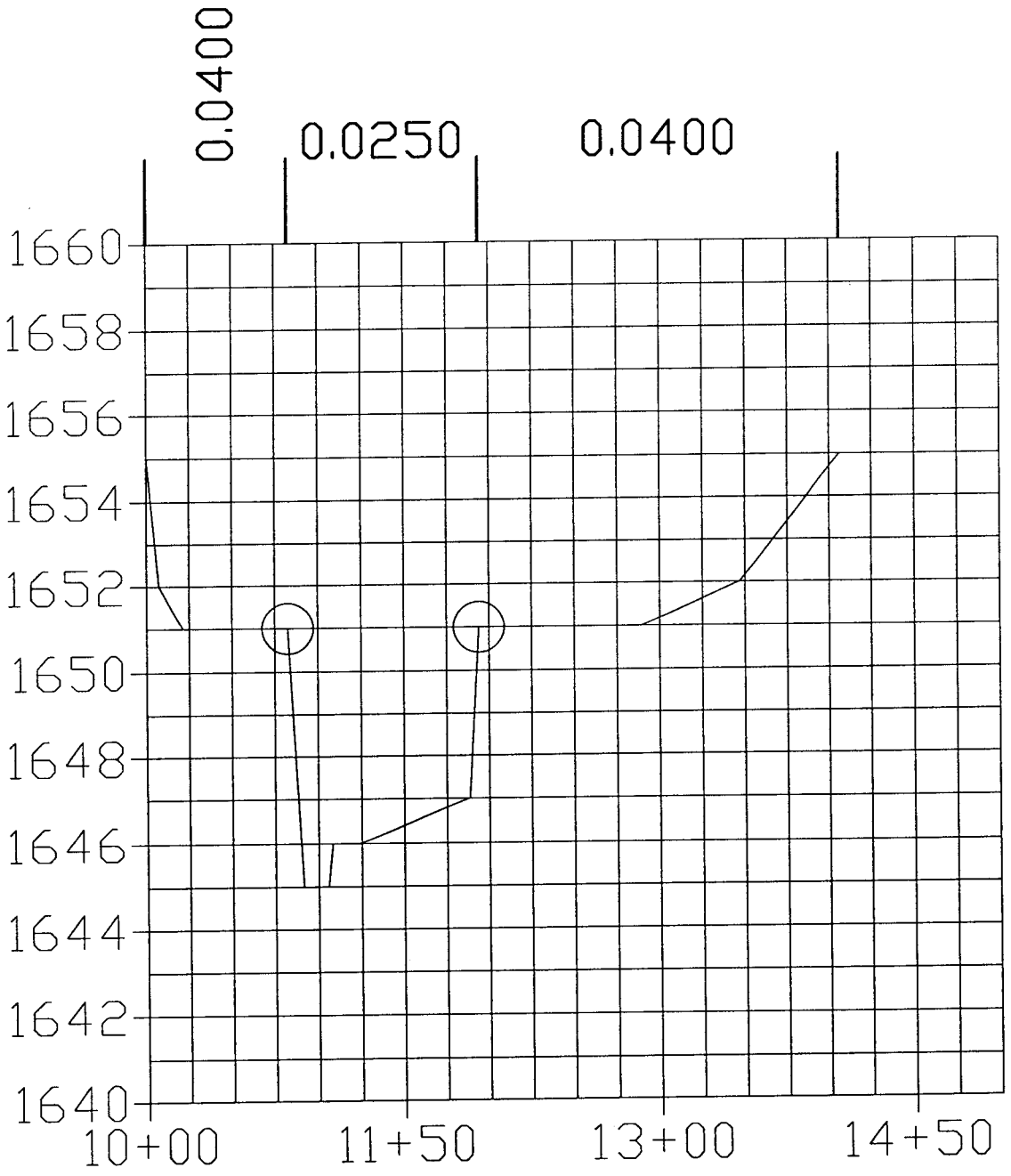
1085


0.0400
0.0250
0.0400
1650
1648
1646
1644
1642
1640
10+00
11+50
13+00
14+50

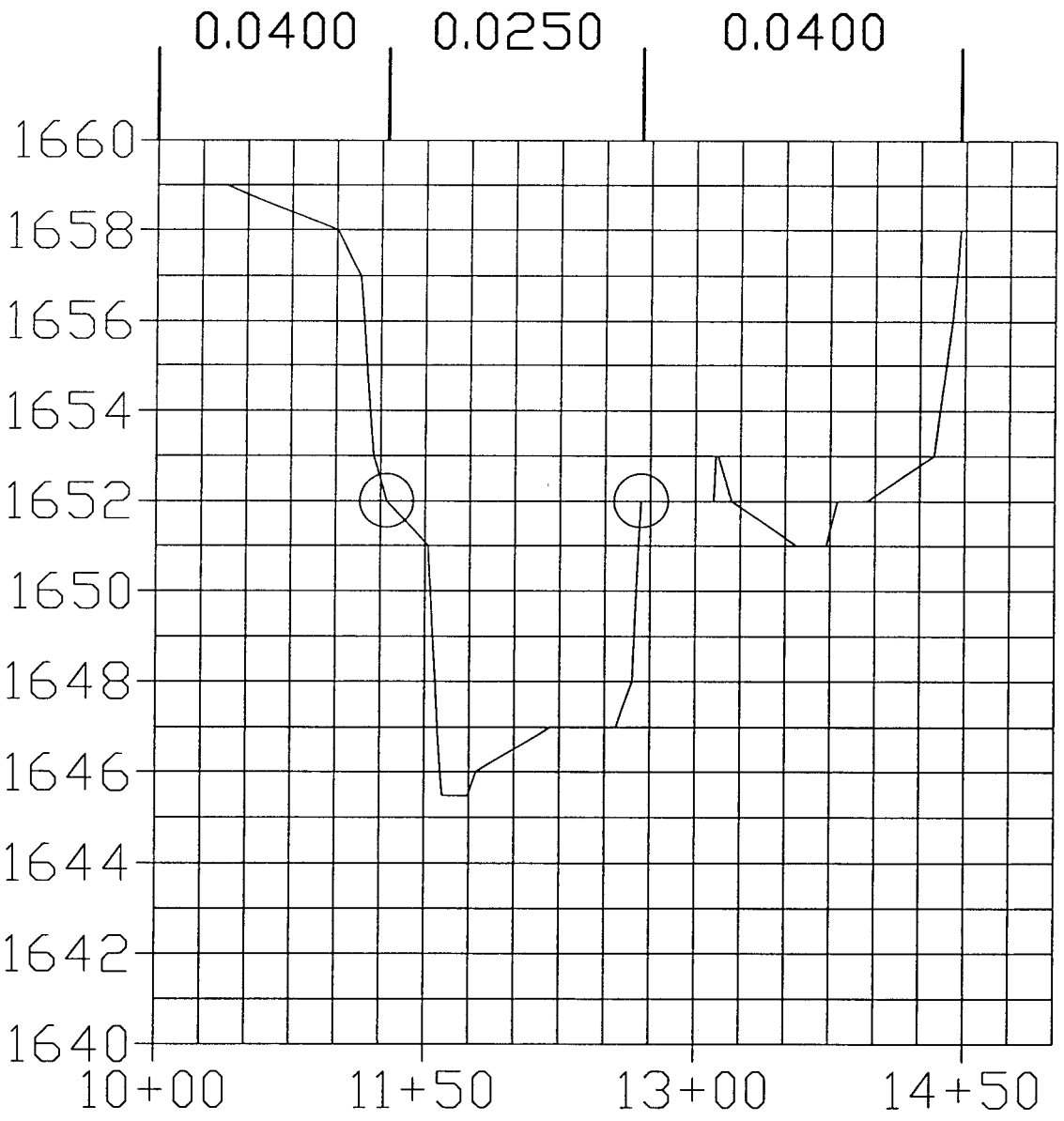
1100


0.0400
0.0250
0.0400
1660
1658
1656
1654
1652
1650
1648
1646
1644
1642
1640
10+00
11+50
13+00

1110

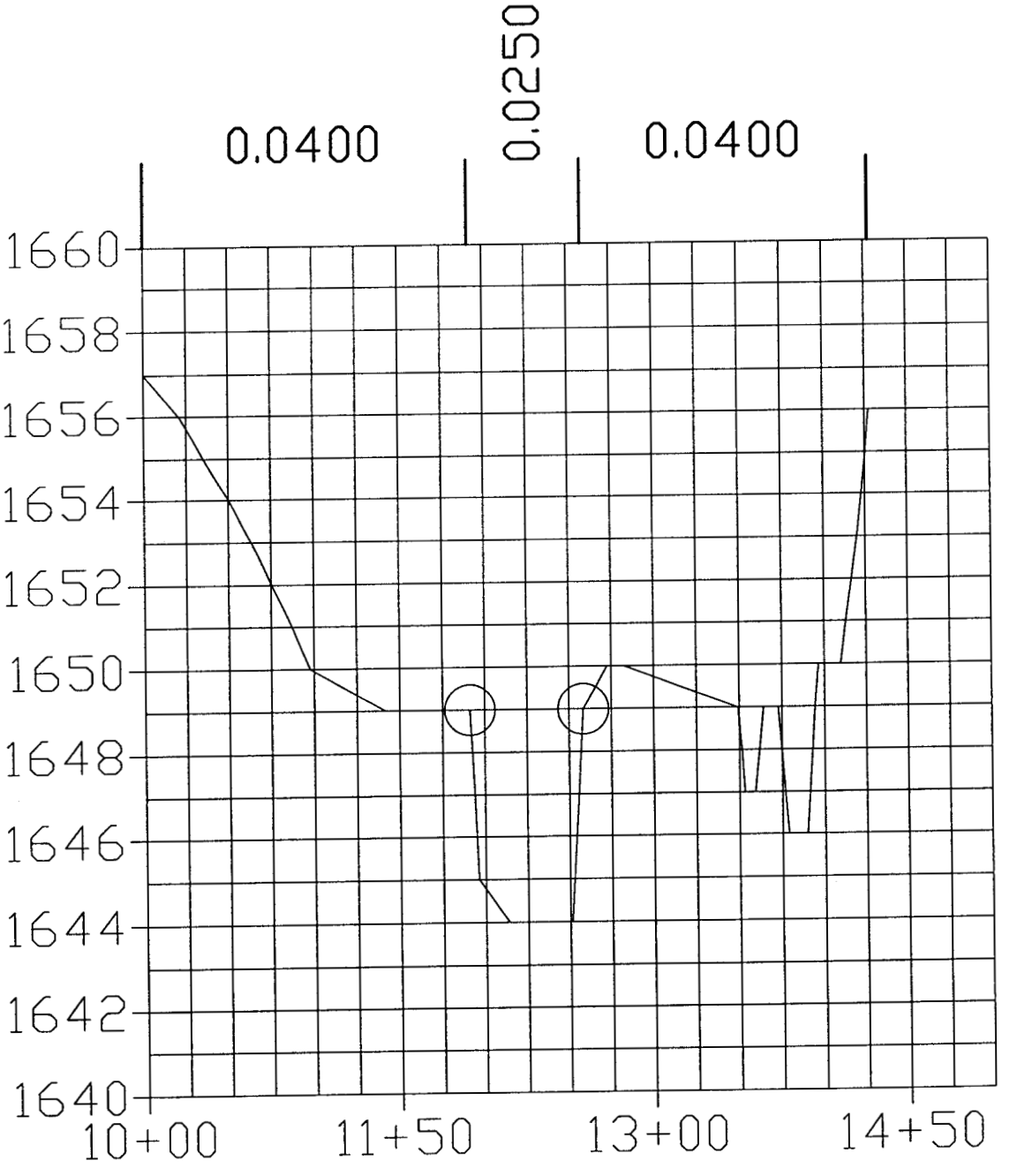

0.0400
0.0250
0.0400
1660
1658
1656
1654
1652
1650
1648
1646
1644
1642
1640
10+00
11+50
13+00
14+50

112

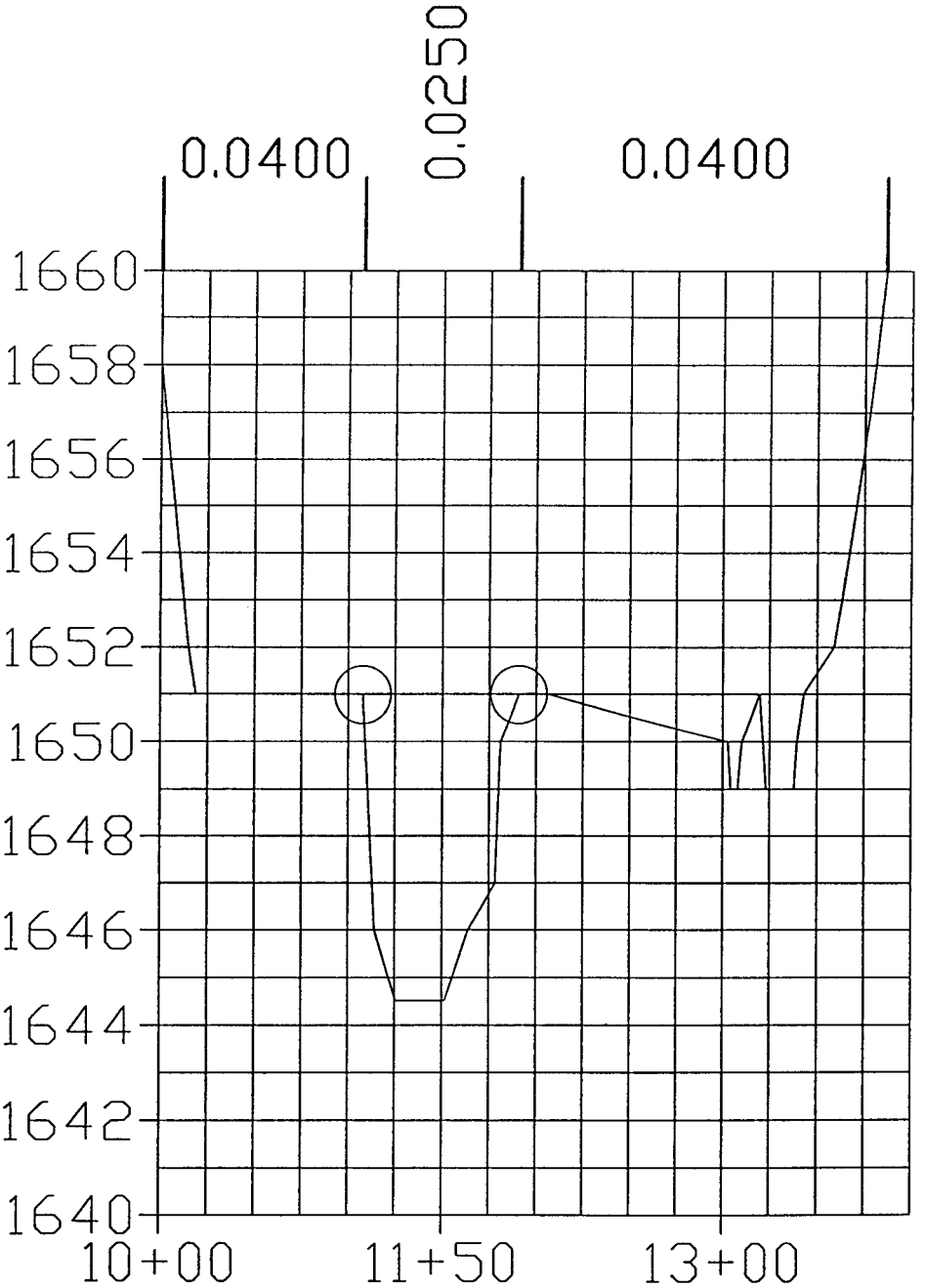

0.0400
0.0250
0.0400
1660
1658
1656
1654
1652
1650
1648
1646
1644
1642
1640
10+00
11+50
13+00
14+50

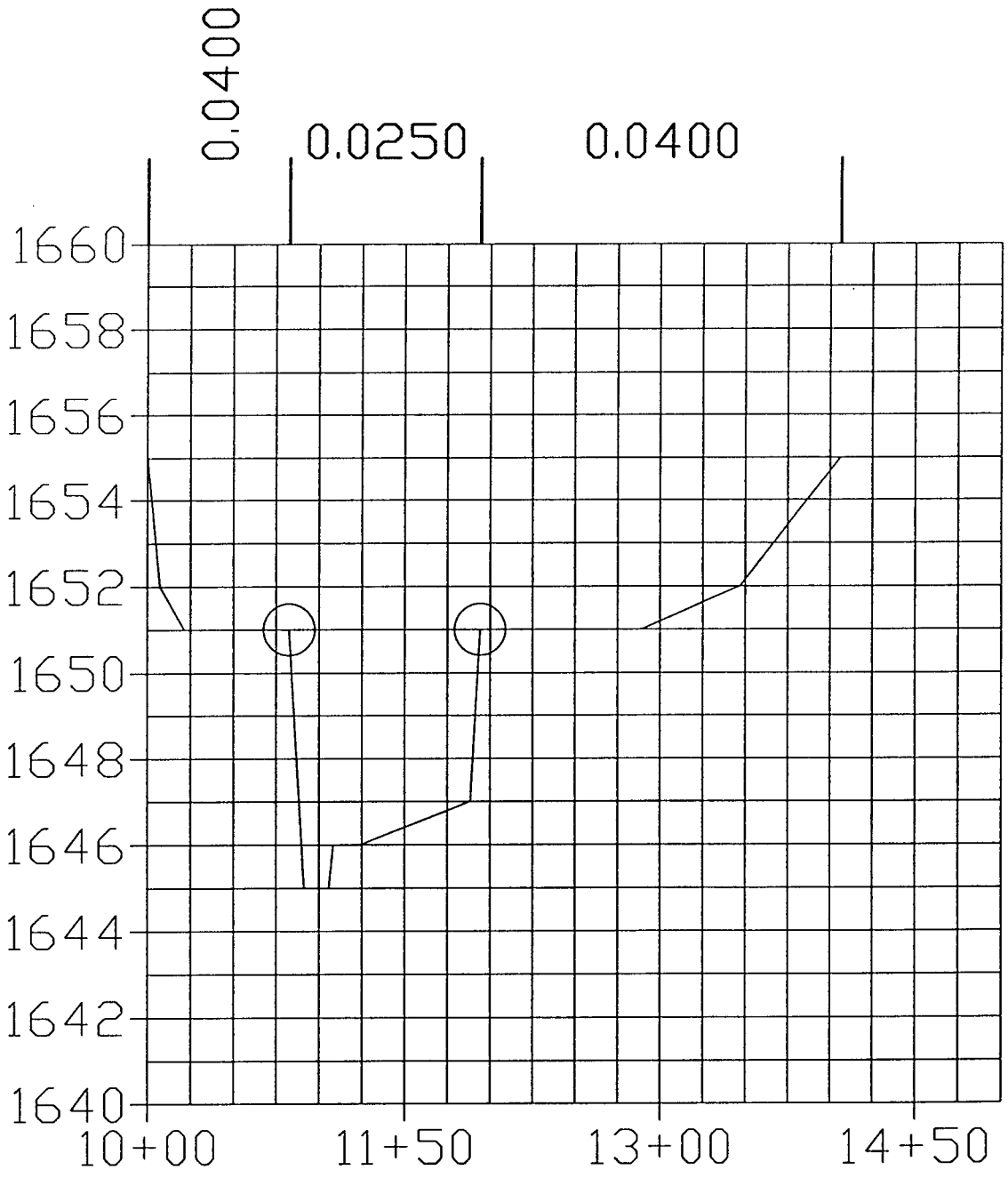
115

BACKUP INFORMATION FOR
RESPONSE TO COMMENT 4
ABBOTT WASH


0.0400
0.0250
0.0400
1660
1658
1656
1654
1652
1650
1648
1646
1644
1642
1640
10+00
11+50
13+00
14+50

1105


0.0400
0.0250
0.0400
1660
1658
1656
1654
1652
1650
1648
1646
1644
1642
1640
10+00
11+50
13+00


0.0400
0.0250
0.0400
1660
1658
1656
1654
1652
1650
1648
1646
1644
1642
1640
10+00
11+50
13+00
14+50

112

PULSREV7.OUT

```
1*****************************************
 *  HEC-2 WATER SURFACE PROFILES            *
 *                                          *
 *  Version   4.6.2;  May 1991              *
 *                                          *
 *  RUN DATE    24SEP99    TIME   16:51:51  *
 *****************************************
```

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

```
X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X           X     X
X     X  X        X                 X
XXXXXXX  XXXX     X          XXXXX   XXXXX
X     X  X        X                 X
X     X  X        X     X           X
X     X  XXXXXXX   XXXXX             XXXXXXX
```

```
1
    24SEP99      16:51:51                                                                    PAGE    1


                                                                  THIS RUN EXECUTED 24SEP99    16:51:51
 ************************************
 HEC-2 WATER SURFACE PROFILES

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



 SPLIT FLOW BEING PERFORMED


 SF


 JC
 JP     0       0      40       0       0

 TWSPLIT FLOW AT PULSIPHER/I-15 CULVERT
 WS     9    2000    2100               3
 WC     0    1603      16    1602    38.3    1600      66    1599    92.5    1599
 WC 106.3    1600   113.9    1602   119.9    1604   130.5    1606

 TWSTATION 1400 - SPLIT FLOW OVER RIGHT BANK
 WS     2    1400    1500             2.7
 WC     0    1584     120  1583.8

 TWSTATION 1300 - SPLIT FLOW OVER RIGHT BANK
 WS     2    1300    1400             2.7
 WC     0    1579     190    1584

 TWSTATION 1200 - SPLIT FLOW OVER LEFT BANK
 WS     2    1200    1300             2.7
 WC     0    1576     199    1582

 TWSTATION 1100 - SPLIT FLOW OVER LEFT OVERBANK
 WS     2    1100    1200             2.7
 WC     0    1576     112    1576

 TWSTATION 1000 - SPLIT FLOW OVER LEFT BANK
 WS     2    1000    1100             2.7
 WC     0    1576     102    1576

 TWSTATION 900 - SPLIT FLOW OVER LEFT BANK
 WS     2     900    1000             2.7
 WC     0  1574.5     117    1576

 TWSTATION 800 - SPLIT FLOW OVER LEFT BANK
 WS     2     800     900             2.7
 WC     0  1574.5     102  1574.5
1
    24SEP99      16:51:51                                                                    PAGE    2


 TWSTATION 700 - SPLIT FLOW OVER LEFT BANK
 WS     2     700     800             2.7
 WC     0  1573.8     135  1574.5
1
    24SEP99      16:51:51                                                                    PAGE    3


 T1      550-035
 T2      Mequite Wash FIS Restudy
 T3      Pulsipher Wash

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                 2                             -1                          3549   1556.95
```

```
JS    **********ASSUMED DISCHARGES FOR SPLIT FLOW**********

                    0         0         0         0         0         0         0         0         0
              0     0         0         0         0         0         0         0         0         0
              0   500

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     -1                 -1                                     -1        -6

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    100                150

NC     0.03      0.03      0.025       0.1       0.3
X1      200        15     2929.4    3113.93
X3       10
GR     1564   2778.75      1564   2874.16      1562   2912.73      1560   2929.4      1558   2941.08
GR     1556   2949.85      1554   2963.64      1554   2981.64      1554   3011.17     1554   3066.53
GR     1556   3081.56      1558   3096.65      1560   3113.93      1560   3148.31     1560   3396.06

X1      300        11     2926.48    3035.77    364.63    359.83    352.07
X3       10
GR     1566   2682.38      1564   2807.33      1562   2926.48      1560   2954.76     1558   2969.07
GR     1558   3000.86      1560   3018.26      1562   3035.77      1562   3082.96     1562   3156.53
GR     1564   3217.12

NC     0.03      0.03      0.025       0.1       0.3
X1      400        22     2281.55    2450.74    132.08     158.2    134.41
X3       10                                                            1566
GR     1570   2126.23      1572   2143.31      1572   2183.04      1570   2191.36     1562   2217.92
GR     1560   2238.83      1560   2252.16      1564   2262.45      1566   2281.55     1566   2288.71
GR     1564   2319.58      1562   2326.53      1560   2333.47      1560   2352.21     1562   2362.78
GR     1562   2368.59      1562   2429.18      1564   2450.74      1566   2527.34     1566   2620.61
GR     1566    2621.4      1568   2852.45

NC     0.015     0.015     0.015       0.3       0.5
X1      500        11     2332.84    2370.57     75.43     81.76     74.97
X3       10                                                    1572      1572
GR     1572   1921.7       1572   2203.22      1572   2332.84      1568.47 2332.84   1564.37 2332.84
GR   1564.3   2370.57    1568.47   2370.57      1572   2370.57      1572   2514.64     1572   2582.6
GR     1572   2867.98
1
    24SEP99      16:51:51                                                                          PAGE    4


NC     0.015     0.015     0.015       0.3       0.5
SB      1.25       1.5       2.7        76     37.73      1.34    147.38         0    1565.46   1564.37
X1       600        12     2596.22    2633.95    122.03    131.14    133.46
X2                             1    1568.47   1572.66                         2
X3       10                                                          1572.6    1572.6
GR     1574   2232.97      1572.6      2260      1572.6   2596.22      1569.56 2596.22   1565.46 2596.22
GR   1565.4   2633.95    1569.56   2633.95      1572.6   2633.95      1572.6   2866.27     1572.6   2963.4
GR   1572.6   3102.68      1573.7   3146.68

NC     0.04      0.04      0.03        0.3       0.5
X1      700        18     2121.76    2330.75    133.44     79.47    112.64
X3       10                        2121.76      1578   2330.75      1578   1573.8      1574.9
GR     1574   1799.95      1572.2      1877      1572.2      1954      1572.2    2031    1573.8   2121.76
GR     1572   2128.04        1570   2132.18      1569.5   2139.33      1570   2143.07      1572   2144.69
GR     1574   2297.02      1574.9   2330.75      1574.5   2366.44      1574   2409.4      1572.7   2453.34
GR   1572.7   2564.87      1572.7   2717.29        1574   2748.19

NC     0.04      0.04      0.03        0.1       0.3
X1      800        22     1769.22    1903.89    134.63    139.86    144.94
X3       10                        1769.22      1578   1903.89      1578   1574.5      1576
GR     1574   1427.88      1572.5      1510      1572.5      1592      1572.5    1674    1574   1759.85
GR   1574.5   1769.22        1574   1778.29      1572   1784.62      1570   1788.23  1570.23   1790.02
GR     1570   1791.12        1572   1797.25      1574   1818.13      1574   1841.16     1574   1867.83
GR     1576   1903.89        1574   1968.96    1573.2   2017.28    1573.2   2207.8    1573.2   2344.84
GR     1574   2392.94        1574   2407.17

NC     0.04      0.04      0.03
X1      900        21     1575.7    1686.84    102.08     108.33    103.62
X3       10                        1575.7      1578   1686.84      1578   1574.5      1577
GR     1574   1219.54      1572.9    1309.5      1572.9      1399      1572.9    1489.5    1574   1572.39
GR   1574.5   1575.7         1574   1579.92      1572   1592.09      1571   1597.2      1572   1604.66
GR     1574   1606.43        1575   1651.77      1577   1686.84    1575.8   1705.75     1574   1749.48
GR   1573.7   1798.67      1573.7   1915.16      1573.7   2060.43    1573.7   2160.73     1574    2209.7
GR     1574   2230.82

X1     1000        20     1472.42    1568.37    116.93    121.55    118.27
X3       10                        1472.42      1579   1568.37      1579      1576    1577.2
GR     1574   1096.67      1573.3      1190      1573.3      1283      1573.3    1376    1576   1472.42
GR     1576   1484.88        1574   1489.57      1572   1494.01    1571.15 1496.75     1572   1501.64
GR     1574   1503.91        1576    1545.7      1577.2   1568.37    1576.5   1597.74    1576   1625.79
GR   1575.5   1648.15      1574.3   1710.01      1574.3   1879.49    1574.3   2080.17  1575.3   2121.11

X1     1100        17     1320.06    1417.67    102.45     103.7     103.7
X3       10                        1320.06      1579   1417.67      1579      1576    1577.4
GR     1574    924.71      1573.5      1024      1573.5      1124      1573.5    1224    1576   1320.06
GR     1576   1334.53        1574   1339.91      1571.4   1347.79      1574   1349.58     1576   1393.55
GR   1577.4   1417.67      1576.5   1447.13        1576   1476.62    1574.7   1519.36  1574.7   1720.11
GR   1574.7   1929.89      1575.7   1982.94
1
    24SEP99      16:51:51                                                                          PAGE    5
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X1	1200	22	1178.38	1272.58	111.55	110.23	110.23			
X3	10			1178.38	1582	1272.58	1581	1576	1577.5	
GR	1588	1000	1586	1003.72	1584	1007.45	1582	1011.19	1580	1030.36
GR	1578	1045.48	1576	1078.58	1575	1158.89	1576	1178.38	1576	1179.17
GR	1574	1190.7	1571.62	1204.49	1574	1209.35	1576	1247.96	1577.5	1272.58
GR	1576.5	1301.79	1576	1333.43	1575.1	1378.11	1575.1	1575.34	1575.1	1770.67
GR	1576	1817.16	1576.5	1831.23						
NC			0.025							
X1	1300	27	1014.17	1207.18	198.91	153.42	176.37			
X3	10					1207.18	1583	1582	1579	
GR	1588	1000	1586	1004.58	1584	1009.31	1582	1014.17	1582	1065.78
GR	1582	1072.99	1580	1076.58	1574	1080.99	1572.69	1083.53	1574	1092.54
GR	1580	1106.55	1580	1121.82	1578	1125.36	1576	1170.24	1576	1178.38
GR	1578	1183.85	1578	1201.6	1579	1207.18	1578	1236.12	1578	1241.05
GR	1578	1260.24	1576	1268.87	1575.6	1313.34	1575.6	1502.88	1575.6	1676.59
GR	1576	1718.52	1577	1735.14						
X1	1400	18	1061	1186.25	122.02	190.42	161.58			
X3	10					1186.25	1587	1584	1584	
GR	1600	1000	1600	1027.47	1598	1035.26	1596	1040.7	1590	1046.91
GR	1588	1052.71	1586	1056.6	1584	1061	1582	1138.25	1580	1142.92
GR	1578	1145.8	1578	1160.96	1580	1173.97	1582	1180.16	1584	1186.25
GR	1584	1230.34	1584	1231.21	1584	1307.21				
X1	1500	22	1081.73	1230.57	76.07	119.69	108.07			
X3	10									
GR	1600	1000	1599	1069.96	1583	1081.73	1582	1182.35	1580	1186.84
GR	1578	1197.97	1578	1201.11	1580	1212.43	1582	1216.13	1583.8	1230.57
GR	1584	1294.4	1584	1308.23	1584	1356.62	1586	1628.22	1588	1674.02
GR	1590	1697.27	1592	1726.23	1594	1741.62	1596	1753.42	1598	1763.24
GR	1598	1801.09	1596	1808.99						
X1	1600	13	1094.37	1243.82	101.17	210.32	196.31			
GR	1602	1000	1600	1064.32	1594.01	1081.14	1584	1094.37	1582	1149.75
GR	1580.4	1170.49	1580.78	1218.11	1582	1229.76	1584	1243.82	1585	1327.67
GR	1586	1412.26	1588	1551.37	1590	1677.73				
X1	1650	23	1129.97	1180.64	190.68	185.82	175.57			
X3	10									
GR	1600	1000	1598	1005.05	1596	1011.4	1594	1026.96	1594	1094.89
GR	1594	1110.32	1592	1122.14	1590	1124.66	1588	1129.97	1586	1134.76
GR	1584	1139.66	1582	1148.86	1582	1161.14	1584	1172.84	1584.7	1180.64
GR	1585	1254.59	1586	1347.77	1588	1480.9	1590	1600.61	1592	1684.68
GR	1594	1697.13	1596	1700.86	1598	1704.54				
NC	0.04	0.04	0.025							
X1	1700	20	1286.61	1350.67	163.66	154.63	161.13			
GR	1602	1000	1604	1037.4	1605.9	1128.6	1605.81	1151.3	1604	1198.85
GR	1602	1246.99	1600	1248.58	1590	1277.69	1588	1282.43	1586	1286.61
GR	1584	1301.89	1582.05	1314.08	1584	1326.15	1586	1341.79	1586.5	1350.67
GR	1586	1360.4	1585.5	1416.24	1586	1475.83	1588	1602.02	1590	1708.11

NC	0.04	0.04	0.025							
X1	1750	21	1095.43	1152.29	171.49	179.87	169.33			
GR	1610	1000	1608	1023.79	1606	1053.35	1604	1063.55	1602	1070.34
GR	1600	1076.66	1590	1095.43	1588	1097.81	1586	1103.58	1582.1	1112
GR	1582.1	1122.43	1586	1133.65	1587.5	1152.29	1587.1	1211.93	1588	1287.4
GR	1590	1362.75	1592	1371.76	1594	1376.44	1596	1380.58	1598	1384.75
GR	1600	1388.94								
NC	0.04	0.04	0.025	0.1	0.3					
X1	1800	19	1139.62	1221.1	173.79	148.02	170.93			
GR	1608	1000	1606	1021.77	1604	1037.17	1602	1053.97	1600	1078.01
GR	1598	1135.85	1596	1139.62	1590	1145.75	1588	1148.51	1586	1151.34
GR	1582.1	1155.97	1582.1	1164.98	1586	1171.75	1588	1183.17	1590	1191.2
GR	1592	1221.1	1594	1234.56	1596	1243.62	1598	1254.32		
NC	0.015	0.015	0.015	0.3	0.5					
QT	1	3478								
X1	1900	14	1193.33	1205.33	66.92	60.81	58.98			
GR	1606	1000	1604	1017.04	1602	1034.84	1600	1056.24	1598	1118.67
GR	1596	1174.32	1592.19	1193.33	1582.19	1193.33	1582.19	1205.33	1592.19	1205.33
GR	1594	1221.37	1596	1224.34	1598	1232.13	1600	1243.77		
NC	0.015	0.015	0.015	0.3	0.5					
SB		1.5	2.7	114	12		120	0	1588.88	1582.19
X1	2000	9	1044.29	1056.29	320.07	303.13	319.85			
X2			1	1592.19	1603.83					
GR	1602	1000	1600	1026.41	1598.88	1044.29	1588.88	1044.29	1588.88	1056.29
GR	1598.8	1056.29	1600	1080.33	1602	1092.77	1604	1104.82		
NC	0.04	0.04	0.025	0.3	0.5					
X1	2100	17	1093.94	1188.63	58.83	54.83	49.81			
GR	1606	1000	1604	1009.57	1602	1013.54	1600	1020.41	1598	1037.57
GR	1596	1093.94	1594	1118.59	1592	1126.16	1590	1145.6	1590	1151.46
GR	1592	1174.19	1594	1184.61	1596	1188.63	1598	1204.5	1600	1224.72
GR	1602	1240.9	1604	1251.99						
NC	0.04	0.04	0.025	0.1	0.3					
X1	2200	18	142.43	318.37	383.01	273.85	328.57			
X3	10							1598	1598	

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GR     1608          0       1608       20.66       1606       28.27       1604       40.91       1603       53.3
GR     1602      71.43       1600      112.67       1598      142.43       1596      210.95       1593      217.68
GR     1598     318.37       1596      562.06       1596      571.04       1596      618.66       1596      624.51
GR     1598     693.73       1600      708.07       1602      779.64

NC                                        0.1         0.3
X1     2300         25     150.15      250.92      320.42      310.65      311.55
X3        0                                                   453.09        1602
GR     1608          0       1608       15.33       1606       21.57       1604       27.19       1602       63.6
GR     1600     150.15       1599      164.23       1598      187.99       1596      192.33       1594      198.34
GR     1594      228.2       1596      235.23       1598      238.65       1600      244.41       1600      250.92
GR     1600     277.03       1600      398.64       1602      414.11       1602      452.77       1600      463.12
GR     1600     475.52       1602      492.74       1604       507.6       1606      537.25       1608      543.16
1
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X1     2330         16       1156        1288         235         222         240
X3        0
GR     1608       1000       1606        1008       1604        1028       1602        1122       1601        1156
GR     1600       1203       1598        1205       1596        1209       1596        1238       1598        1243
GR     1600       1247     1601.6        1288       1602        1327       1604        1437       1606        1483
GR     1608       1508

X1     2350         11       1025        1385         151         123          63
X3        0
GR     1608       1000       1606        1010       1604        1025       1603        1087     1603.5        1174
GR   1603.8       1227       1602        1271       1602        1339       1604        1385       1606        1445
GR     1608       1498

X1     2400         21     555.74      605.96         178         109          71
GR     1612      93.82       1610       232.8     1608.3      316.57       1608      336.99       1606      384.83
GR   1605.7      394.82       1604      447.58       1602      555.74       1600      564.71       1598      569.83
GR     1598      597.61       1600      601.64       1602      605.96       1604      666.82       1606      687.05
GR     1606      721.82     1605.3      750.29       1606      764.11       1608      799.73       1610      848.51
GR     1612      930.78

X1     2500         15     173.41      243.04      186.68      182.96      179.72
GR     1612       41.78       1610       45.58       1608       56.33      1607.4       69.14       1606       97.11
GR     1604      119.54       1604      161.89       1604      173.41       1602      209.67       1602      238.99
GR     1604      243.04       1606      249.45       1608      260.55       1610      291.23       1612      303.53

QT        1        3474
X1     2600         28     774.94      927.94      320.81      390.78      373.36
GR     1622      170.68       1620      198.85       1618      205.29       1616      210.56       1618      237.93
GR     1616      243.57       1616      474.86       1616      499.71       1614      504.57       1612       510.3
GR     1612       752.1       1612      762.71       1612      774.94       1610      779.75       1608      784.94
GR     1608       807.9       1608       855.3       1606      872.52       1606      907.23       1608       914.3
GR     1610      919.14       1612      927.94     1613.2      946.75       1614      960.44       1616      971.24
GR     1618      997.96       1620      1011.4       1622     1026.58

X1     2700         29     605.11      832.94      249.65       237.3      246.94
GR     1626       35.68       1624        43.5       1622       53.17       1620       65.17       1618       101.3
GR     1618      115.11       1618      141.58       1616      147.23       1616      265.04       1616      364.54
GR     1618      369.57       1618      394.68       1616      400.49       1614      408.58       1614      570.98
GR     1614       582.3       1614      605.11       1612      667.05       1610      699.84       1608      724.01
GR     1608      753.82       1610      771.97     1610.7      781.65       1612       801.7       1614      832.94
GR     1616      894.96       1618      898.43       1620      904.23       1630      923.69

X1     2800         16     263.07      429.47      262.99       389.6      376.77
X3        0                              263.2        1616
GR     1616          0       1616       39.55       1616       96.03       1616      111.37       1612      159.52
GR     1614      182.66     1614.7      197.49       1616      263.07       1610      302.64       1612      344.5
GR   1613.6      372.11       1614      379.65       1616      429.47       1620      489.99     1621.6      503.61
GR     1622      507.82
1
    24SEP99      16:51:51                                                                                    PAGE     8


X1     2900         30      475.4      801.12      292.71      273.86      292.09
X3        0                              392.8     1620.51
GR     1630       53.46       1628       61.93       1626       69.99       1624       77.51       1622       93.13
GR     1620      124.83       1618      331.67       1618      366.34       1620         373     1620.5      393.02
GR     1620       475.4       1618      525.34       1618      550.41       1618      631.71       1618      676.78
GR     1618      700.32       1616      722.78       1614      731.76       1612       736.6       1612         763
GR     1614      767.87       1616      772.71     1616.98      781.98       1618      790.94       1620      801.12
GR     1622      816.77       1624       832.8       1626      858.03       1628         874       1630      890.18

X1     3000         23      339.8      443.93      405.73      342.04      349.71
GR     1630       70.06       1628       82.14       1626       94.71       1624      106.08     1623.2      152.05
GR     1622      224.19       1620      237.42       1620       274.5       1620      298.77       1620      312.51
GR     1620       339.8       1618      361.48       1616      368.38       1614      378.05       1614      399.19
GR     1616      402.54       1618      411.58       1620      443.93       1622      477.92       1624      497.81
GR     1626      542.69       1628      577.88     1628.8      598.92

X1     3100         21     128.03      404.52      382.96      294.37       302.1
GR     1640       88.37       1630      113.59       1628      118.26       1626      128.03       1624      297.39
GR     1622      300.14       1620       302.9       1618      305.76       1618      319.74       1618      333.19
GR     1620      337.19       1622      360.91       1624      384.72       1626      404.52       1628      466.46
GR     1630      524.54       1632      559.37       1634      582.77       1636      608.27       1638      629.41
GR     1640      646.16

X1     3200         14     247.42      403.91      426.92       395.6      390.01
GR   1639.7      227.47       1630      247.42       1628      253.14       1626       258.7       1624      267.64
GR     1622      275.55       1622      310.81       1624      315.91       1626      321.83       1628       327.9
GR     1630      403.91       1632      489.33       1634      564.85       1636      598.59
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X1	3300	35	36.55	575.86	462.6	416.49	482.8			
GR	1644	0	1642	12.73	1640	25.07	1638	31.27	1636	36.55
GR	1634	43.64	1632	47.01	1630	50.82	1628	55.39	1628	67.9
GR	1630	72.59	1632	76.9	1634	79.06	1636	137.59	1636	212.17
GR	1636	336.67	1634	350.97	1634	363.87	1634	407.22	1632	411.39
GR	1630	414.76	1628	421.9	1628	494.95	1630	503.75	1632	508.15
GR	1632	523.76	1630	526.02	1630	532.3	1632	537.02	1634	540.95
GR	1636	575.86	1638	594.13	1640	601.98	1642	617.87	1644	633.83
X1	3400	18	84.27	600.88	467.16	325.83	402.24			
GR	1650	59.27	1640	84.27	1638	109.44	1636	126.6	1634	131.99
GR	1634	140.44	1636	146.48	1638	193.98	1638	219.41	1638	270.82
GR	1638	278.83	1638	384.4	1640	600.88	1642	643.45	1644	683.24
GR	1646	705.45	1648	714.67	1650	724.58				
X1	3500	12	1139.19	1820.67	445.73	364.17	403.18			
GR	1650	1117.94	1648	1129.92	1646	1139.19	1644	1154.95	1642	1166.11
GR	1640	1198.2	1640	1311.56	1642	1663.86	1644	1780.13	1646	1820.67
GR	1648	1954.48	1650	1976.19						

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X1	3600	21	149.25	618.21	366.01	356.91	358.51			
GR	1660	75.43	1658	80.52	1656	91.22	1654	99.08	1652	110.5
GR	1650	129.6	1648	149.25	1646	271.37	1646	283.71	1646	312.95
GR	1646	327.9	1646	360.07	1646	420.55	1646	607.71	1648	618.21
GR	1650	627.24	1652	634.08	1654	648.02	1656	659.58	1658	673.87
GR	1660	681.36								
X1	3700	23	99.81	528.5	397.89	401.06	409.82			
GR	1660	58.71	1658	62.54	1656	71.6	1654	83.19	1652	99.81
GR	1650	116.08	1648	222.35	1648	252.85	1648	259.17	1648	278.23
GR	1648	293.98	1648	305.86	1648	334.35	1648	360.03	1648	368.2
GR	1648	450.38	1650	484.45	1650.36	490.39	1652	528.5	1654	546.14
GR	1656	553.69	1658	561.37	1660	571.08				
X1	3800	16	42.37	437.01	480	713	666			
GR	1670	24.23	1660	42.37	1658	44.95	1656	48.64	1654	62.46
GR	1654	248.3	1656	288.05	1656	307.66	1656	426.77	1658	437.01
GR	1660	446.89	1662	454.29	1664	464.34	1666	469.29	1668	473.37
GR	1670	483.32								
QT	1	2318								
X1	3900	21	76.48	332.44	468.3	238.03	320.4			
GR	1670	68.89	1660	76.48	1658	109.93	1658	128.97	1658	143.72
GR	1658	147.93	1656	228.75	1656	261.41	1658	286.12	1658.3	289.26
GR	1660	303.73	1662	332.44	1662	354.48	1660	365.24	1658.8	388.81
GR	1660	416.11	1662	428.9	1664	448.42	1666	460.82	1668	489.05
GR	1670	546.72								
X1	4000	11	62.12	249.41	444.57	477.86	465.67			
GR	1670	57.92	1668	60.45	1666	62.12	1664	69.1	1662	80.78
GR	1660	85.35	1660	112.66	1662	121.12	1664	164.38	1666	239.26
GR	1666.3	249.41								
X1	4100	18	201.4	408.03	535	356	497			
GR	1680	148.32	1678	157.13	1676	173.19	1674	188.76	1672	201.4
GR	1670	217.1	1670	223.19	1670	244.9	1668	248.78	1666	254.13
GR	1666	279.97	1668	296.89	1670	368.21	1672	395.34	1674	408.03
GR	1676	416.54	1678	422.71	1680	431.82				
X1	4200	21	72.87	318.01	285	297	402			
GR	1690	0	1688	8.75	1686	20.32	1684	34.98	1682	44.12
GR	1680	52.74	1678	72.87	1676	109.44	1674	148.79	1673.3	163.05
GR	1674	174.44	1674	221.93	1672	228.81	1670	242.3	1670	245.6
GR	1672	268.66	1674	290.23	1676	304.27	1678	311.41	1680	318.01
GR	1690	331.29								
X1	4300	19	168.17	349.29	317.35	407.28	383.62			
GR	1700	89.17	1690	105.7	1680	168.17	1678	195.5	1677.6	203.3
GR	1676	233.39	1676	271.26	1678	296.29	1680	349.29	1682	374.61
GR	1684	413.28	1686	454.41	1688	473.84	1690	495.02	1692	512.03
GR	1694	521.72	1696	534.23	1698	545.99	1700	552.12		

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X1	4400	20	1152.32	1302.67	432	439	476			
GR	1698	1047.48	1696	1072.5	1694	1113.06	1692	1129.03	1690	1144.19
GR	1688	1152.32	1686	1159.38	1684	1171.95	1682	1198.73	1680	1240.97
GR	1680	1261.36	1682	1265.11	1684	1271.18	1686	1281.25	1688	1302.67
GR	1690	1310.07	1692	1316.26	1694	1322.58	1696	1328.05	1698	1379.32
X1	4500	22	91.69	375.6	416.91	575.19	533.38			
GR	1720	75.46	1710	91.69	1700	117.4	1699.3	120.73	1698	126.14
GR	1696	135.73	1694	144.81	1692	170.97	1690	176.15	1688	181.18
GR	1686	188.65	1686	207.59	1688	225.29	1690	276.16	1690.6	289.36
GR	1692	317.67	1694	325.19	1696	332.17	1698	337.97	1700	352.73
GR	1710	375.6	1712	416.63						
X1	4600	21	134.65	333.42	488	278	442			
GR	1710	16.97	1708	22.09	1706	26.16	1704	32.81	1702	52.97
GR	1700	69.79	1700	71.45	1701.4	100.97	1700	134.65	1698	178.33
GR	1696	199.43	1694	245.08	1692	251.89	1692	277.07	1692	285.45

```
GR     1692     294.37       1694     299.32       1696     317.63       1698     322.08       1700     333.42
GR     1710     339.21

X1     4700         29     373.98      442.2     272.78     275.83     260.86
X3        0                                                  442.2       1700
GR     1716          0       1714       8.97       1712      19.28       1710      50.93       1708      76.41
GR     1708      85.71       1710      111.4       1710     149.36       1710     171.04     1710.6     220.24
GR     1710     255.18       1710     257.77       1710     275.64       1708     298.45       1706     313.76
GR     1704     334.45       1702     364.57       1700     373.98       1698     382.11       1696     387.57
GR     1696     418.98       1698     430.84       1700      442.2       1700     475.32       1698     485.47
GR     1698     491.37       1700     503.73       1710     533.35     1712.7     554.54

X1     4800         22     199.39     286.05     187.19     241.84     227.74
GR     1720          0       1720      34.45     1719.1      47.68       1718      67.95       1716      81.26
GR     1714      99.11       1714     138.55     1714.5     152.91       1714     167.56       1712     188.86
GR     1710     199.39       1708     204.07       1706     211.95       1704     220.53       1702     222.94
GR     1700     229.54       1698      234.6       1698     259.35       1700     266.03       1710     286.05
GR     1720     306.75       1720     307.66

NC     0.04       0.04      0.025        0.1        0.3
X1     4900         14     118.6      259.71     374.55     218.45     351.24
GR     1720     101.08       1710      118.6       1708     126.87       1706     136.18       1704     139.34
GR     1702     144.61       1702     157.05       1702     171.77       1702     187.75       1704     198.82
GR     1706     207.55       1708     232.01       1710     259.71       1720     290.56
```

1

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

```
*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

CCHV=     .100 CEHV=     .300
*SECNO 200.000
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1560.00 ELREA=      1560.00

   200.000      1.07   1555.07   1555.07   1556.95   1555.58       .50       .00       .00   1560.00
     676.9        .0     676.9        .0        .0     118.9        .0        .0        .0   1560.00
       .00       .00      5.69       .00      .000      .025      .000      .000   1554.00   2956.23
   .009142        0.        0.        0.         0        17         0       .00    118.37   3074.60


*SECNO 300.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1562.00 ELREA=      1562.00

   300.000      2.02   1560.02   1560.02       .00   1560.78       .76      3.01       .08   1562.00
     676.9        .0     676.9        .0        .0      96.9        .0        .9        .7   1562.00
       .01       .00      6.99       .00      .000      .025      .000      .000   1558.00   2954.41
   .008009      365.      352.      360.         0        14         0       .00     64.06   3018.47


CCHV=     .100 CEHV=     .300
*SECNO 400.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1566.00 ELREA=      1564.00

   400.000      2.57   1562.57   1562.57       .00   1563.10       .53      1.15       .02   1566.00
     676.9        .0     676.9        .0        .0     115.7        .0       1.2       1.0   1564.00
       .02       .00      5.85       .00      .000      .025      .000      .000   1560.00   2324.55
   .009210      132.      134.      158.         0        11         0       .00    110.76   2435.31
```

1

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

```
CCHV=     .300 CEHV=     .500
*SECNO 500.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1572.00 ELREA=      1572.00
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   500.000      2.19   1566.49   1566.49       .00   1567.57      1.08       .36       .27   1572.00
     676.9        .0     676.9        .0        .0      81.2        .0       1.4       1.1   1572.00
       .02        .00      8.34       .00       .000      .015       .000       .000   1564.30   2332.84
   .002947       75.       75.       82.         0        11         0       .00     37.73   2370.57


CCHV=      .300 CEHV=      .500

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS    1566.23 , NOT    1566.49 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB  XK         XKOR       COFQ       RDLEN      BWC        BWP        BAREA      SS         ELCHU      ELCHD
      1.25       1.50       2.70      76.00      37.73       1.34     147.38        .00   1565.46   1564.37

*SECNO 600.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.43

CLASS B LOW FLOW

3420 BRIDGE W.S.=    1567.12 BRIDGE VELOCITY=        8.43     CALCULATED CHANNEL AREA=         60.

 EGPRS       EGLWC       H3         QWEIR      QLOW       BAREA     TRAPEZOID       ELLC       ELTRD      WEIRLN
                                                                       AREA
   1566.98   1568.81        .00         0.       677.       147.       110.     1568.47   1572.66         0.



3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1572.60 ELREA=      1572.60

   600.000      2.73   1568.13        .00        .00   1568.81        .69      1.25        .00   1572.60
     676.9        .0     676.9        .0        .0      101.7        .0       1.6       1.3   1572.60
       .03        .00      6.66       .00       .000      .015       .000       .000   1565.40   2596.22
   .001437      122.      133.      131.         0          0         0       .00     37.73   2633.95


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   24SEP99      16:51:51                                                                                    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


CCHV=      .300 CEHV=      .500
*SECNO 700.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     2121.8    2330.8  TYPE=       1  TARGET=      208.990
 ELENCL=    1578.00  ELENCR=    1578.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1573.80 ELREA=      1574.90

   700.000      3.78   1573.28   1573.28       .00   1573.80        .52       .37       .05   1573.80
     676.9        .0     676.9        .0        .0      117.0        .0       1.9       1.5   1578.00
       .03        .00      5.78       .00       .000      .030       .000       .000   1569.50   2123.57
   .014164      133.      113.       79.         0         11         0       .00    118.74   2242.30


CCHV=      .100 CEHV=      .300
*SECNO 800.000
3280 CROSS SECTION     800.00 EXTENDED        .78 FEET

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.53

3470 ENCROACHMENT STATIONS=     1769.2    1903.9  TYPE=       1  TARGET=      134.670
 ELENCL=    1578.00  ELENCR=    1578.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1574.50 ELREA=      1576.00

   800.000      4.78   1574.78   1574.41       .00   1575.11        .33      1.29        .02   1574.50
     684.7        .0     684.7        .0        .0      147.9        .0       2.4       1.8   1578.00
       .04        .00      4.63       .00       .000      .030       .000       .000   1570.00   1769.22
   .006169      135.      145.      140.         3         16         0       .00    112.70   1881.92


*SECNO 900.000
3280 CROSS SECTION     900.00 EXTENDED       1.37 FEET

3470 ENCROACHMENT STATIONS=     1575.7    1686.8  TYPE=       1  TARGET=      111.140
 ELENCL=    1578.00  ELENCR=    1578.00
1
   24SEP99      16:51:51                                                                                    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
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3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1574.50 ELREA=      1577.00

   900.000      4.37   1575.37   1575.29       .00   1576.00       .63       .79       .09   1574.50
     809.0         .0     809.0         .0        .0     127.4         .0       2.7       2.1   1578.00
       .05        .00      6.35       .00      .000      .030      .000      .000   1571.00   1575.70
   .009412      102.      104.      108.         2        10         0       .00     82.64   1658.34


*SECNO 1000.000
3280 CROSS SECTION   1000.00 EXTENDED      1.15 FEET


3470 ENCROACHMENT STATIONS=     1472.4    1568.4  TYPE=      1  TARGET=       95.950
 ELENCL=   1579.00  ELENCR=   1579.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1576.00 ELREA=      1577.20

  1000.000      5.31   1576.46   1576.39       .00   1577.28       .82      1.23       .06   1576.00
     984.3         .0     984.3         .0        .0     135.6         .0       3.1       2.3   1579.00
       .05        .00      7.26       .00      .000      .030      .000      .000   1571.15   1472.42
   .011281      117.      118.      122.         1        11         0       .00     81.87   1554.29


*SECNO 1100.000
3280 CROSS SECTION   1100.00 EXTENDED      1.80 FEET


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.85


3470 ENCROACHMENT STATIONS=     1320.1    1417.7  TYPE=      1  TARGET=       97.610
 ELENCL=   1579.00  ELENCR=   1579.00
  1100.000      6.10   1577.50   1576.96       .00   1578.06       .56       .75       .03   1576.00
    1261.1         .0    1261.1         .0        .0     210.5         .0       3.5       2.5   1579.00
       .06        .00      5.99       .00      .000      .030      .000      .000   1571.40   1320.06
   .005421      102.      104.      104.         2         8         0       .00     97.61   1417.67


*SECNO 1200.000
3280 CROSS SECTION   1200.00 EXTENDED      1.42 FEET

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   24SEP99      16:51:51                                                                                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 =  1.58


3470 ENCROACHMENT STATIONS=     1178.4    1272.6  TYPE=      1  TARGET=       94.200
 ELENCL=   1582.00  ELENCR=   1581.00
  1200.000      6.30   1577.92   1577.37       .00   1578.71       .79       .58       .07   1576.00
    1937.0         .0    1937.0         .0        .0     271.9         .0       4.1       2.7   1581.00
       .06        .00      7.12       .00      .000      .030      .000      .000   1571.62   1178.38
   .005135      112.      110.      110.         2        12         0       .00     94.20   1272.58


*SECNO 1300.000

3265 DIVIDED FLOW

3280 CROSS SECTION   1300.00 EXTENDED      1.97 FEET

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=          .0    1207.2  TYPE=      1  TARGET=     1207.179

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1582.00 ELREA=      1579.00

  1300.000      6.28   1578.97   1578.97       .00   1580.16      1.18      1.11       .12   1582.00
    2158.1         .0    2158.1         .0        .0     247.3         .0       5.1       3.2   1583.00
       .07        .00      8.73       .00      .000      .025      .000      .000   1572.69   1077.33
   .007755      199.      176.      153.         0         5         0       .00    110.21   1207.03


*SECNO 1400.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=          .0    1186.3  TYPE=      1  TARGET=     1186.249

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1584.00 ELREA=      1584.00

  1400.000      5.73   1583.73   1583.73       .00   1584.85      1.12      1.20       .01   1584.00
    2158.1         .0    2158.1         .0        .0     254.5         .0       6.1       3.6   1587.00
       .07        .00      8.48       .00      .000      .025      .000      .000   1578.00   1071.26
   .007134      122.      162.      190.         0        12         0       .00    114.18   1185.44


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   24SEP99      16:51:51                                                                                PAGE   16
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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 1500.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.47

1500.000	6.91	1584.91	1583.69	.00	1585.21	.29	.27	.08	1583.00
2281.4	1.2	2074.9	205.2	1.3	458.6	178.4	7.2	4.3	1583.80
.08	.92	4.52	1.15	.040	.025	.040	.000	1578.00	1080.32
.001309	76.	108.	120.	4	5	0	.00	400.48	1480.80

*SECNO 1600.000

1600.000	4.75	1585.15	1583.74	.00	1585.46	.31	.25	.01	1584.00
2281.4	.7	2228.7	52.0	.9	491.3	54.9	9.9	5.8	1584.00
.09	.76	4.54	.95	.040	.025	.040	.000	1580.40	1092.86
.001194	101.	196.	210.	3	11	0	.00	247.03	1339.89

*SECNO 1650.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1588.00 ELREA= 1584.70

1650.000	4.70	1586.70	1586.70	.00	1587.53	.83	.37	.15	1588.00
2281.4	.0	1438.8	842.6	.0	162.2	264.6	11.9	6.8	1584.70
.10	.00	8.87	3.18	.000	.025	.040	.000	1582.00	1133.09
.004450	191.	176.	186.	0	5	0	.00	261.19	1394.27

*SECNO 1700.000

1700.000	5.56	1587.61	1587.27	.00	1588.14	.53	.58	.03	1586.00
2281.4	4.4	1437.1	839.8	2.7	203.6	308.4	13.6	7.8	1586.50
.11	1.65	7.06	2.72	.040	.025	.040	.000	1582.05	1283.26
.003052	164.	161.	155.	3	8	0	.00	293.78	1577.04

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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 1750.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1750.000	6.64	1588.74	1588.74	.00	1589.66	.92	.58	.12	1590.00
2281.4	.0	1791.6	489.8	.0	208.8	186.0	15.4	8.9	1587.50
.11	.00	8.58	2.63	.000	.025	.040	.000	1582.10	1096.93
.003735	171.	169.	180.	0	8	0	.00	218.35	1315.28

CCHV= .100 CEHV= .300
*SECNO 1800.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1800.000	7.97	1590.07	1590.07	.00	1592.18	2.11	.81	.36	1596.00
2281.4	.0	2281.4	.0	.0	195.9	.0	16.5	9.3	1592.00
.12	.00	11.65	.00	.000	.025	.000	.000	1582.10	1145.68
.006349	174.	171.	148.	0	11	0	.00	46.61	1192.29

CCHV= .300 CEHV= .500
*SECNO 1900.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1900.000	12.61	1594.80	1594.80	.00	1597.11	2.31	.20	.10	1592.19
2210.4	91.3	1940.8	178.3	17.0	151.3	27.9	16.8	9.4	1592.19
.12	5.37	12.82	6.40	.015	.015	.015	.000	1582.19	1180.30
.002110	67.	59.	61.	0	15	0	.00	42.26	1222.56

CCHV= .300 CEHV= .500

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	.00	1.50	2.70	114.00	12.00	.00	120.00	.00	1588.88	1582.19

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*SECNO 2000.000
 PRESS FLOW BECAUSE EGLWC OF    1602.90  EXCEEDS 1.5 DEPTH

3301 HV CHANGED MORE THAN HVINS

1
    24SEP99      16:51:51                                                                                    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


 PRESSURE FLOW

  EGPRS      EGLWC       H3       QWEIR      QPR       BAREA   TRAPEZOID      ELLC      ELTRD      WEIRLN
                                                                 AREA
    1602.70   1602.90       .00         0.     2210.      120.       40.     1592.19   1603.83         0.


3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3710 WSEL ASSUMED BASED ON MIN DIFF
3693 PROBABLE MINIMUM SPECIFIC ENERGY
  2000.000     12.70   1601.58   1601.34       .00   1602.91      1.33       .53      5.06   1598.88
    2210.4     283.7    1580.4     346.3      54.8     152.4      60.2      18.5       9.9   1598.80
       .13      5.18     10.37      5.75       .015      .015      .015      .000   1588.88   1005.53
   .001362      320.      320.      303.         20         5         0       .00     84.63   1090.16


CCHV=      .300 CEHV=      .500
*SECNO 2100.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  6.06

  2100.000     13.19   1603.19   1595.96       .00   1603.29       .10       .01       .37   1596.00
    3478.0     494.7    2765.4     217.9      437.4    1009.7      222.4      19.7      10.1   1596.00
       .13      1.13      2.74       .98       .040       .025       .040       .000   1590.00   1011.17
   .000092       59.       50.       55.          2         14         0       .00     236.34   1247.51


CCHV=      .100 CEHV=      .300
*SECNO 2200.000
3280 CROSS SECTION    2200.00 EXTENDED       1.30 FEET


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.74

  2200.000     10.30   1603.30   1598.07       .00   1603.31       .01       .02       .01   1598.00
    3478.0     105.2    1558.3    1814.5      237.6    1275.7    2652.0      40.3      13.5   1598.00
       .23       .44      1.22       .68       .040       .025       .040       .000   1593.00     49.62
   .000030      383.      329.      274.          2         24         0       .00     730.02    779.64


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    24SEP99      16:51:51                                                                                    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


CCHV=      .100 CEHV=      .300
*SECNO 2300.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .29


3470 ENCROACHMENT STATIONS=          .0     453.1  TYPE=       1  TARGET=      453.089
  2300.000      9.22   1603.22   1600.58       .00   1603.38       .16       .02       .04   1600.00
    3478.0     233.1    2407.5     837.4      205.4      640.3      610.8      60.4      17.8   1600.00
       .26      1.13      3.76      1.37       .040       .025       .040       .000   1594.00     41.44
   .000349      320.      312.      311.          3         17         0       .00     460.34    501.78


*SECNO 2330.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .42

  2330.000      7.08   1603.08   1602.18       .00   1603.67       .58       .16       .13   1601.00
    3478.0     152.1    3191.8     134.1       81.5      499.9      82.5      66.1      19.8   1601.60
       .27      1.87      6.39      1.63       .040       .025       .040       .000   1596.00   1071.02
   .001998      235.      240.      222.          4         19         0       .00     315.64   1386.66


*SECNO 2350.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2350.000      2.46   1604.46   1604.46       .00   1605.18       .72       .24       .04   1604.00
    3478.0       1.0    3473.1       3.9        .8      509.0       3.1      67.1      20.5   1604.00
       .27      1.25      6.82      1.26       .040       .025       .040       .000   1602.00   1021.59
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   .008305      151.       63.      123.         0        22         0      .00    377.07   1398.65


*SECNO 2400.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2400.000      6.53   1604.53   1604.53       .00   1605.78      1.25       .37       .16   1602.00
    3478.0     449.1    2777.1     251.8     170.2     279.0      94.7      68.2      21.2   1602.00
       .28      2.64      9.95      2.66      .040      .025      .040      .000   1598.00    431.05
   .002963      178.       71.      109.         0        17         0      .00    241.15    672.21


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   24SEP99      16:51:51                                                                                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


*SECNO 2500.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2500.000      4.37   1606.37   1606.37       .00   1607.75      1.38       .70       .04   1604.00
    3478.0     711.6    2737.8      28.6     160.1     264.3       9.2      70.2      22.0   1604.00
       .28      4.44     10.36      3.11      .040      .025      .040      .000   1602.00     89.63
   .005182      187.       180.      183.         0        14         0      .00    161.89    251.53


*SECNO 2600.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2600.000      4.06   1610.06   1610.06       .00   1611.42      1.36      2.18       .00   1612.00
    3474.0        .0    3474.0        .0        .0     371.2        .0      73.6      23.3   1612.00
       .29       .00      9.36       .00      .000      .025      .000      .000   1606.00    779.60
   .006818      321.       373.      391.         0        11         0      .00    139.82    919.42


*SECNO 2700.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2700.000      4.56   1612.56   1612.56       .00   1613.79      1.23      1.69       .01   1614.00
    3474.0        .0    3474.0        .0        .0     390.8        .0      75.8      24.1   1614.00
       .30       .00      8.89       .00      .000      .025      .000      .000   1608.00    649.69
   .006863      250.       247.      237.         0         8         0      .00    160.77    810.46


*SECNO 2800.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=      263.2      507.8  TYPE=       1  TARGET=     -263.200
 ELENCL=   1616.00  ELENCR= 100000.00
  2800.000      5.31   1615.31   1615.31       .00   1616.64      1.33      2.58       .03   1616.00
    3474.0        .0    3474.0        .0        .0     375.1        .0      79.1      25.4   1616.00
       .31       .00      9.26       .00      .000      .025      .000      .000   1610.00    267.64
   .006844      263.       377.      390.         0        11         0      .00    144.58    412.22


*SECNO 2900.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
1
   24SEP99      16:51:51                                                                                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


3470 ENCROACHMENT STATIONS=      392.8      890.2  TYPE=       1  TARGET=     -392.800
 ELENCL=   1620.51  ELENCR= 100000.00
  2900.000      6.57   1618.57   1618.57       .00   1619.51       .94      2.33       .04   1620.00
    3474.0        .0    3474.0        .0        .0     446.7        .0      81.8      26.9   1620.00
       .32       .00      7.78       .00      .000      .025      .000      .000   1612.00    511.02
   .009381      293.       292.      274.         0        11         0      .00    282.84    793.86


*SECNO 3000.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  3000.000      6.69   1620.69   1620.69       .00   1621.93      1.23      2.19       .09   1620.00
    3474.0     139.6    3329.4       5.0      72.5     365.9       4.1      85.4      29.0   1620.00
       .33      1.93      9.10      1.22      .040      .025      .040      .000   1614.00    232.84
   .004467      406.       350.      342.         0         5         0      .00    222.85    455.69


*SECNO 3100.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
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  3100.000      6.66   1624.66   1624.66       .00   1625.94      1.28      1.66       .01   1626.00
    3474.0        .0    3474.0        .0        .0     382.6        .0      88.4      30.4   1626.00
       .34       .00      9.08       .00      .000      .025      .000      .000   1618.00    241.79
   .006816      383.       302.       294.         0         5         0       .00    149.43    391.22


 *SECNO 3200.000

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
  3200.000      5.52   1627.52   1627.52       .00   1629.64      2.11      2.49       .25   1630.00
    3474.0        .0    3474.0        .0        .0     297.8        .0      91.4      31.4   1630.00
       .35       .00     11.67       .00      .000      .025      .000      .000   1622.00    254.47
   .005981      427.       390.       396.         0        11         0       .00     71.99    326.45


 *SECNO 3300.000

 3265 DIVIDED FLOW

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    24SEP99      16:51:51                                                                                PAGE   22

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



 3301 HV CHANGED MORE THAN HVINS

  3300.000      3.38   1631.38   1631.36       .00   1632.76      1.38      3.05       .07   1636.00
    3474.0        .0    3474.0        .0        .0     368.4        .0      95.1      32.5   1636.00
       .37       .00      9.43       .00      .000      .025      .000      .000   1628.00     48.20
   .006678      463.       483.       416.         3        14         0       .00    132.80    535.55


 *SECNO 3400.000

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
  3400.000      5.11   1639.11   1639.11       .00   1639.82       .72      3.21       .07   1640.00
    3474.0        .0    3474.0        .0        .0     511.1        .0      99.2      35.0   1640.00
       .38       .00      6.80       .00      .000      .025      .000      .000   1634.00     95.51
   .009731      467.       402.       326.         0        17         0       .00    408.71    504.21


 *SECNO 3500.000

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.41

  3500.000      2.15   1642.15   1641.90       .00   1642.55       .40      2.69       .03   1646.00
    3474.0        .0    3474.0        .0        .0     685.7        .0     104.7      39.2   1646.00
       .40       .00      5.07       .00      .000      .025      .000      .000   1640.00   1165.28
   .004861      446.       403.       364.         5        22         0       .00    507.21   1672.49


 *SECNO 3600.000
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
  3600.000      1.42   1647.42   1647.42       .00   1648.05       .64      2.26       .07   1648.00
    3474.0        .0    3474.0        .0        .0     542.3        .0     109.8      43.1   1648.00
       .42       .00      6.41       .00      .000      .025      .000      .000   1646.00    184.97
   .008531      366.       359.       357.         0        14         0       .00    430.17    615.14


 *SECNO 3700.000
  3700.000      2.06   1650.06   1649.75       .00   1650.55       .49      2.48       .01   1652.00
    3474.0        .0    3474.0        .0        .0     617.2        .0     115.2      46.8   1652.00
       .44       .00      5.63       .00      .000      .025      .000      .000   1648.00    115.62
   .004530      398.       410.       401.         3        11         0       .00    369.76    485.38


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    24SEP99      16:51:51                                                                                PAGE   23

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


 *SECNO 3800.000
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
  3800.000      2.25   1656.25   1656.25       .00   1656.94       .70      4.01       .06   1660.00
    3474.0        .0    3474.0        .0        .0     518.7        .0     123.9      52.6   1658.00
       .47       .00      6.70       .00      .000      .025      .000      .000   1654.00     48.18
   .008386      480.       666.       713.         0         8         0       .00    379.85    428.03
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*SECNO 3900.000

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

3900.000	2.79	1658.79	1658.78	.00	1659.61	.83	2.63	.04	1660.00
2318.0	.0	2318.0	.0	.0	317.6	.0	127.0	54.7	1662.00
.48	.00	7.30	.00	.000	.025	.000	.000	1656.00	96.78
.007964	468.	320.	238.	2	11	0	.00	196.62	293.40

*SECNO 4000.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4000.000	4.62	1664.62	1664.62	.00	1665.76	1.14	3.52	.09	1666.00
2318.0	.0	2318.0	.0	.0	270.2	.0	130.1	56.4	1666.30
.49	.00	8.58	.00	.000	.025	.000	.000	1660.00	66.94
.007186	445.	466.	478.	0	14	0	.00	120.65	187.58

*SECNO 4100.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4100.000	4.34	1670.34	1670.34	.00	1671.28	.94	3.63	.02	1672.00
2318.0	.0	2318.0	.0	.0	298.3	.0	133.4	58.0	1674.00
.51	.00	7.77	.00	.000	.025	.000	.000	1666.00	214.41
.007412	535.	497.	356.	0	12	0	.00	158.44	372.85

*SECNO 4200.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4200.000	4.93	1674.93	1674.93	.00	1675.84	.91	3.00	.00	1678.00
2318.0	.0	2318.0	.0	.0	302.8	.0	136.1	59.5	1680.00
.53	.00	7.65	.00	.000	.025	.000	.000	1670.00	130.55
.007494	285.	402.	297.	0	8	0	.00	166.18	296.74

1

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

*SECNO 4300.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4300.000	3.22	1679.22	1679.22	.00	1680.20	.99	2.86	.02	1680.00
2318.0	.0	2318.0	.0	.0	290.6	.0	138.7	60.9	1680.00
.54	.00	7.98	.00	.000	.025	.000	.000	1676.00	178.89
.007442	317.	384.	407.	0	14	0	.00	149.61	328.50

*SECNO 4400.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4400.000	4.01	1684.01	1684.01	.00	1685.31	1.30	3.41	.09	1688.00
2318.0	.0	2318.0	.0	.0	253.1	.0	141.7	62.2	1688.00
.55	.00	9.16	.00	.000	.025	.000	.000	1680.00	1171.90
.006904	432.	476.	439.	0	11	0	.00	99.31	1271.22

*SECNO 4500.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4500.000	4.55	1690.55	1690.55	.00	1691.73	1.18	3.70	.01	1710.00
2318.0	.0	2318.0	.0	.0	266.1	.0	144.9	63.5	1710.00
.57	.00	8.71	.00	.000	.025	.000	.000	1686.00	174.72
.006979	417.	533.	575.	0	8	0	.00	113.57	288.29

*SECNO 4600.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4600.000	3.99	1695.99	1695.99	.00	1697.15	1.16	3.13	.00	1700.00
2318.0	.0	2318.0	.0	.0	267.7	.0	147.6	64.7	1700.00
.59	.00	8.66	.00	.000	.025	.000	.000	1692.00	199.71
.007167	488.	442.	278.	0	15	0	.00	117.81	317.52

*SECNO 4700.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= .0 442.2 TYPE= 1 TARGET= 442.199

4700.000	4.65	1700.65	1700.65	.00	1701.94	1.30	1.48	.04	1700.00
2318.0	1.2	2241.0	75.8	1.0	241.2	40.4	149.3	65.5	1700.00
.59	1.17	9.29	1.88	.040	.025	.040	.000	1696.00	370.94
.004619	273.	261.	276.	0	11	0	.00	134.71	505.65

1

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

*SECNO 4800.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4800.000	5.20	1703.20	1703.20	.00	1705.21	2.01	1.21	.21	1710.00
2318.0	.0	2318.0	.0	.0	203.6	.0	150.5	66.0	1710.00
.60	.00	11.39	.00	.000	.025	.000	.000	1698.00	221.50
.006116	187.	228.	242.	0	8	0	.00	50.94	272.43

CCHV= .100 CEHV= .300
*SECNO 4900.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4900.000	3.90	1705.90	1705.90	.00	1707.53	1.63	2.21	.04	1710.00
2318.0	.0	2318.0	.0	.0	226.0	.0	152.3	66.5	1710.00
.61	.00	10.26	.00	.000	.025	.000	.000	1702.00	136.35
.006483	375.	351.	218.	0	15	0	.00	70.75	207.09

TWSPLIT FLOW AT PULSIPHER/I-15 CULVERT

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
1267.64	1297.97	2.36	1267.64	1297.97	2.36	12	1601.581	1603.191	2000.000	2100.000

TWSTATION 1400 - SPLIT FLOW OVER RIGHT BANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
123.29	123.16	.11	1390.93	1421.13	2.15	12	1583.734	1584.915	1400.000	1500.000

TWSTATION 1300 - SPLIT FLOW OVER RIGHT BANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
.00	.00	.00	1390.93	1421.13	2.15	12	1578.974	1583.734	1300.000	1400.000

TWSTATION 1200 - SPLIT FLOW OVER LEFT BANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
221.06	221.41	.16	1611.99	1642.54	1.88	12	1577.918	1578.974	1200.000	1300.000

TWSTATION 1100 - SPLIT FLOW OVER LEFT OVERBANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
675.91	677.11	.18	2287.90	2319.65	1.38	12	1577.501	1577.918	1100.000	1200.000

TWSTATION 1000 - SPLIT FLOW OVER LEFT BANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
276.76	277.68	.33	2564.66	2597.33	1.27	12	1576.464	1577.501	1000.000	1100.000

TWSTATION 900 - SPLIT FLOW OVER LEFT BANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
175.30	174.42	.50	2739.96	2771.75	1.15	12	1575.371	1576.464	900.000	1000.000

TWSTATION 800 - SPLIT FLOW OVER LEFT BANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
124.38	124.61	.19	2864.34	2896.37	1.11	12	1574.782	1575.371	800.000	900.000

TWSTATION 700 - SPLIT FLOW OVER LEFT BANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
7.76	7.70	.81	2872.10	2904.06	1.11	12	1573.282	1574.782	700.000	800.000

THIS RUN EXECUTED 24SEP99 16:51:53

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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

Pulsipher Wash

SUMMARY PRINTOUT TABLE 100

	SECNO	EGLWC	ELLC	EGPRS	ELTRD	QPR	QWEIR	CLASS	H3	DEPTH	CWSEL	VCH	EG
*	600.000	1568.81	1568.47	1566.98	1572.66	676.90	.00	2.00	.00	2.73	1568.13	6.66	1568.81
*	2000.000	1602.90	1592.19	1602.70	1603.83	2210.36	.00	10.00	.00	12.70	1601.58	10.37	1602.91

1

Pulsipher Wash

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	200.000	.00	.00	.00	1554.00	676.90	1555.07	1555.07	1555.58	91.42	5.69	118.87	70.79
*	300.000	352.07	.00	.00	1558.00	676.90	1560.02	1560.02	1560.78	80.09	6.99	96.85	75.64
*	400.000	134.41	.00	.00	1560.00	676.90	1562.57	1562.57	1563.10	92.10	5.85	115.67	70.53
*	500.000	74.97	.00	.00	1564.30	676.90	1566.49	1566.49	1567.57	29.47	8.34	81.17	124.70
*	600.000	133.46	1572.66	1568.47	1565.40	676.90	1568.13	.00	1568.81	14.37	6.66	101.71	178.53
*	700.000	112.64	.00	.00	1569.50	676.90	1573.28	1573.28	1573.80	141.64	5.78	117.02	56.88
*	800.000	144.94	.00	.00	1570.00	684.66	1574.78	1574.41	1575.11	61.69	4.63	147.93	87.17
	900.000	103.62	.00	.00	1571.00	809.04	1575.37	1575.29	1576.00	94.12	6.35	127.43	83.39
	1000.000	118.27	.00	.00	1571.15	984.34	1576.46	1576.39	1577.28	112.81	7.26	135.64	92.68
*	1100.000	103.70	.00	.00	1571.40	1261.10	1577.50	1576.96	1578.06	54.21	5.99	210.46	171.28
*	1200.000	110.23	.00	.00	1571.62	1937.01	1577.92	1577.37	1578.71	51.35	7.12	271.91	270.30
*	1300.000	176.37	.00	.00	1572.69	2158.07	1578.97	1578.97	1580.16	77.55	8.73	247.31	245.06
*	1400.000	161.58	.00	.00	1578.00	2158.07	1583.73	1583.73	1584.85	71.34	8.48	254.53	255.50
*	1500.000	108.07	.00	.00	1578.00	2281.36	1584.91	1583.69	1585.21	13.09	4.52	638.35	630.63
	1600.000	196.31	.00	.00	1580.40	2281.36	1585.15	1583.74	1585.46	11.94	4.54	547.11	660.09
*	1650.000	175.57	.00	.00	1582.00	2281.36	1586.70	1586.70	1587.53	44.50	8.87	426.86	341.98
	1700.000	161.13	.00	.00	1582.05	2281.36	1587.61	1587.27	1588.14	30.52	7.06	514.70	412.93
*	1750.000	169.33	.00	.00	1582.10	2281.36	1588.74	1588.74	1589.66	37.35	8.58	394.86	373.29
*	1800.000	170.93	.00	.00	1582.10	2281.36	1590.07	1590.07	1592.18	63.49	11.65	195.90	286.31
*	1900.000	58.98	.00	.00	1582.19	2210.36	1594.80	1594.80	1597.11	21.10	12.82	196.22	481.15
*	2000.000	319.85	1603.83	1592.19	1588.88	2210.36	1601.58	1601.34	1602.91	13.62	10.37	267.39	598.83
*	2100.000	49.81	.00	.00	1590.00	3478.00	1603.19	1595.96	1603.29	.92	2.74	1669.55	3626.49
*	2200.000	328.57	.00	.00	1593.00	3478.00	1603.30	1598.07	1603.31	.30	1.22	4165.37	6321.78
*	2300.000	311.55	.00	.00	1594.00	3478.00	1603.22	1600.58	1603.38	3.49	3.76	1456.41	1861.93

1

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	2330.000	240.00	.00	.00	1596.00	3478.00	1603.08	1602.18	1603.67	19.98	6.39	663.88	778.04
*	2350.000	63.00	.00	.00	1602.00	3478.00	1604.46	1604.46	1605.18	83.05	6.82	512.91	381.64
*	2400.000	71.00	.00	.00	1598.00	3478.00	1604.53	1604.53	1605.78	29.63	9.95	543.89	638.98
*	2500.000	179.72	.00	.00	1602.00	3478.00	1606.37	1606.37	1607.75	51.82	10.36	433.59	483.15
*	2600.000	373.36	.00	.00	1606.00	3474.00	1610.06	1610.06	1611.42	68.18	9.36	371.22	420.73
*	2700.000	246.94	.00	.00	1608.00	3474.00	1612.56	1612.56	1613.79	68.63	8.89	390.79	419.35
*	2800.000	376.77	.00	.00	1610.00	3474.00	1615.31	1615.31	1616.64	68.44	9.26	375.09	419.93

*	2900.000	292.09	.00	.00	1612.00	3474.00	1618.57	1618.57	1619.51	93.81	7.78	446.70	358.68
*	3000.000	349.71	.00	.00	1614.00	3474.00	1620.69	1620.69	1621.93	44.67	9.10	442.41	519.79
*	3100.000	302.10	.00	.00	1618.00	3474.00	1624.66	1624.66	1625.94	68.16	9.08	382.61	420.78
*	3200.000	390.01	.00	.00	1622.00	3474.00	1627.52	1627.52	1629.64	59.81	11.67	297.81	449.22
	3300.000	482.80	.00	.00	1628.00	3474.00	1631.38	1631.36	1632.76	66.78	9.43	368.45	425.12
*	3400.000	402.24	.00	.00	1634.00	3474.00	1639.11	1639.11	1639.82	97.31	6.80	511.14	352.16
*	3500.000	403.18	.00	.00	1640.00	3474.00	1642.15	1641.90	1642.55	48.61	5.07	685.70	498.27
*	3600.000	358.51	.00	.00	1646.00	3474.00	1647.42	1647.42	1648.05	85.31	6.41	542.32	376.11
	3700.000	409.82	.00	.00	1648.00	3474.00	1650.06	1649.75	1650.55	45.30	5.63	617.21	516.18
*	3800.000	666.00	.00	.00	1654.00	3474.00	1656.25	1656.25	1656.94	83.86	6.70	518.75	379.36
*	3900.000	320.40	.00	.00	1656.00	2318.00	1658.79	1658.78	1659.61	79.64	7.30	317.60	259.74
*	4000.000	465.67	.00	.00	1660.00	2318.00	1664.62	1664.62	1665.76	71.86	8.58	270.18	273.44
*	4100.000	497.00	.00	.00	1666.00	2318.00	1670.34	1670.34	1671.28	74.12	7.77	298.33	269.24
*	4200.000	402.00	.00	.00	1670.00	2318.00	1674.93	1674.93	1675.84	74.94	7.65	302.84	267.78
*	4300.000	383.62	.00	.00	1676.00	2318.00	1679.22	1679.22	1680.20	74.42	7.98	290.61	268.69
*	4400.000	476.00	.00	.00	1680.00	2318.00	1684.01	1684.01	1685.31	69.04	9.16	253.12	278.97
*	4500.000	533.38	.00	.00	1686.00	2318.00	1690.55	1690.55	1691.73	69.79	8.71	266.05	277.47
*	4600.000	442.00	.00	.00	1692.00	2318.00	1695.99	1695.99	1697.15	71.67	8.66	267.73	273.80
*	4700.000	260.86	.00	.00	1696.00	2318.00	1700.65	1700.65	1701.94	46.19	9.29	282.59	341.06

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	4800.000	227.74	.00	.00	1698.00	2318.00	1703.20	1703.20	1705.21	61.16	11.39	203.56	296.41
*	4900.000	351.24	.00	.00	1702.00	2318.00	1705.90	1705.90	1707.53	64.83	10.26	226.02	287.89

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Pulsipher Wash

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	200.000	676.90	1555.07	.00	.00	-1.88	118.37	.00
*	300.000	676.90	1560.02	.00	4.95	.00	64.06	352.07
*	400.000	676.90	1562.57	.00	2.54	.00	110.76	134.41
*	500.000	676.90	1566.49	.00	3.92	.00	37.73	74.97
*	600.000	676.90	1568.13	.00	1.64	.00	37.73	133.46
*	700.000	676.90	1573.28	.00	5.16	.00	118.74	112.64
*	800.000	684.66	1574.78	.00	1.50	.00	112.70	144.94
	900.000	809.04	1575.37	.00	.59	.00	82.64	103.62
	1000.000	984.34	1576.46	.00	1.09	.00	81.87	118.27
*	1100.000	1261.10	1577.50	.00	1.04	.00	97.61	103.70
*	1200.000	1937.01	1577.92	.00	.42	.00	94.20	110.23
*	1300.000	2158.07	1578.97	.00	1.06	.00	110.21	176.37
*	1400.000	2158.07	1583.73	.00	4.76	.00	114.18	161.58
*	1500.000	2281.36	1584.91	.00	1.18	.00	400.48	108.07
	1600.000	2281.36	1585.15	.00	.23	.00	247.03	196.31
*	1650.000	2281.36	1586.70	.00	1.55	.00	261.19	175.57
	1700.000	2281.36	1587.61	.00	.91	.00	293.78	161.13
*	1750.000	2281.36	1588.74	.00	1.13	.00	218.35	169.33
*	1800.000	2281.36	1590.07	.00	1.33	.00	46.61	170.93

*	1900.000	2210.36	1594.80	.00	4.73	.00	42.26	58.98
*	2000.000	2210.36	1601.58	.00	6.78	.00	84.63	319.85
*	2100.000	3478.00	1603.19	.00	1.61	.00	236.34	49.81
*	2200.000	3478.00	1603.30	.00	.11	.00	730.02	328.57
*	2300.000	3478.00	1603.22	.00	-.08	.00	460.34	311.55

1

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	2330.000	3478.00	1603.08	.00	-.13	.00	315.64	240.00
*	2350.000	3478.00	1604.46	.00	1.37	.00	377.07	63.00
*	2400.000	3478.00	1604.53	.00	.08	.00	241.15	71.00
*	2500.000	3478.00	1606.37	.00	1.84	.00	161.89	179.72
*	2600.000	3474.00	1610.06	.00	3.69	.00	139.82	373.36
*	2700.000	3474.00	1612.56	.00	2.50	.00	160.77	246.94
*	2800.000	3474.00	1615.31	.00	2.75	.00	144.58	376.77
*	2900.000	3474.00	1618.57	.00	3.27	.00	282.84	292.09
*	3000.000	3474.00	1620.69	.00	2.12	.00	222.85	349.71
*	3100.000	3474.00	1624.66	.00	3.96	.00	149.43	302.10
*	3200.000	3474.00	1627.52	.00	2.87	.00	71.99	390.01
	3300.000	3474.00	1631.38	.00	3.85	.00	132.80	482.80
*	3400.000	3474.00	1639.11	.00	7.73	.00	408.71	402.24
*	3500.000	3474.00	1642.15	.00	3.04	.00	507.21	403.18
*	3600.000	3474.00	1647.42	.00	5.27	.00	430.17	358.51
	3700.000	3474.00	1650.06	.00	2.64	.00	369.76	409.82
*	3800.000	3474.00	1656.25	.00	6.19	.00	379.85	666.00
*	3900.000	2318.00	1658.79	.00	2.54	.00	196.62	320.40
*	4000.000	2318.00	1664.62	.00	5.83	.00	120.65	465.67
*	4100.000	2318.00	1670.34	.00	5.72	.00	158.44	497.00
*	4200.000	2318.00	1674.93	.00	4.58	.00	166.18	402.00
*	4300.000	2318.00	1679.22	.00	4.29	.00	149.61	383.62
*	4400.000	2318.00	1684.01	.00	4.79	.00	99.31	476.00
*	4500.000	2318.00	1690.55	.00	6.54	.00	113.57	533.38
*	4600.000	2318.00	1695.99	.00	5.44	.00	117.81	442.00
*	4700.000	2318.00	1700.65	.00	4.66	.00	134.71	260.86

1

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	4800.000	2318.00	1703.20	.00	2.55	.00	50.94	227.74
*	4900.000	2318.00	1705.90	.00	2.70	.00	70.75	351.24

1

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 200.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

CAUTION SECNO= 300.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 300.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 400.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 400.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 500.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 500.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

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 CAUTION SECNO=     600.000  PROFILE=  1  HYDRAULIC JUMP D.S.
 WARNING SECNO=     600.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=     700.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     700.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=     800.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=    1100.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=    1200.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=    1300.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    1300.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    1400.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    1400.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=    1500.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=    1650.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    1650.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    1750.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    1750.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    1800.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    1800.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    1900.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    1900.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    2000.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=    2000.000  PROFILE=  1  WSEL ASSUMED BASED ON MIN DIFF
 CAUTION SECNO=    2000.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=    2100.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=    2200.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
1
    24SEP99      16:51:51                                                                PAGE   36


 WARNING SECNO=    2300.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=    2330.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=    2350.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    2350.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    2400.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    2400.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    2500.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    2500.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    2600.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    2600.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    2700.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    2700.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    2800.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    2800.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    2900.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    2900.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    3000.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    3000.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    3100.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    3100.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    3200.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    3200.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    3400.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    3400.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=    3500.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=    3600.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    3600.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    3800.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    3800.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=    3900.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=    4000.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    4000.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    4100.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    4100.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    4200.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
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CAUTION SECNO= 4200.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 4300.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 4300.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 4400.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
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CAUTION SECNO= 4500.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
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CAUTION SECNO= 4900.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 4900.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

PULSREV8.OUT

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1*****************************************
 *  HEC-2 WATER SURFACE PROFILES            *
 *                                          *
 *  Version   4.6.2;  May 1991              *
 *                                          *
 *  RUN DATE    24SEP99    TIME   16:51:23  *
 *****************************************

                                        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
    24SEP99      16:51:23                                                                PAGE    1


                                                                  THIS RUN EXECUTED 24SEP99    16:51:23
 ************************************
  HEC-2 WATER SURFACE PROFILES

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



 SPLIT FLOW BEING PERFORMED


 SF


 JC
 JP     0       0      40       0       0

 TWSPLIT FLOW AT PULSIPHER/I-15 CULVERT
 WS     9    2000    2100               3
 WC     0    1603      16    1602    38.3    1600      66    1599    92.5    1599
 WC 106.3    1600   113.9    1602   119.9    1604   130.5    1606

 TWSTATION 1400 - SPLIT FLOW OVER RIGHT BANK
 WS     2    1400    1500             2.7
 WC     0    1584     120  1583.8

 TWSTATION 1300 - SPLIT FLOW OVER RIGHT BANK
 WS     2    1300    1400             2.7
 WC     0    1579     190    1584

 TWSTATION 1200 - SPLIT FLOW OVER LEFT BANK
 WS     2    1200    1300             2.7
 WC     0    1576     199    1582

 TWSTATION 1100 - SPLIT FLOW OVER LEFT OVERBANK
 WS     2    1100    1200             2.7
 WC     0    1576     112    1576

 TWSTATION 1000 - SPLIT FLOW OVER LEFT BANK
 WS     2    1000    1100             2.7
 WC     0    1576     102    1576

 TWSTATION 900 - SPLIT FLOW OVER LEFT BANK
 WS     2     900    1000             2.7
 WC     0  1574.5     117    1576

 TWSTATION 800 - SPLIT FLOW OVER LEFT BANK
 WS     2     800     900             2.7
 WC     0  1574.5     102  1574.5
1
    24SEP99      16:51:23                                                                PAGE    2


 TWSTATION 700 - SPLIT FLOW OVER LEFT BANK
 WS     2     700     800             2.7
 WC     0  1573.8     135  1574.5
1
    24SEP99      16:51:23                                                                PAGE    3


 T1      550-035
 T2      Mequite Wash FIS Restudy
 T3      Pulsipher Wash

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                 2                            -1                          3549    1538.2
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JS    **********ASSUMED DISCHARGES FOR SPLIT FLOW**********

                    0         0         0         0         0         0         0         0         0
          0         0         0         0         0         0         0         0         0         0
          0         0         0         0         0       500

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     -1                  -1                                      -1        -6

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    100                 150

NC     0.03      0.03     0.025       0.1       0.3
X1       25        16   1070.51   3250.34
GR     1540      1000      1542   1040.26      1544    1051.3      1544   1070.51      1542   1106.74
GR     1540   1112.72      1538    1119.8      1536   1124.45      1534   1146.88      1534   1568.77
GR     1536    1812.9      1538   2825.84      1540    3019.1      1540   3055.88      1540   3064.47
GR     1542   3250.34

NC     0.03      0.03     0.025       0.1       0.3
X1       50        19   1698.04   3597.57    379.07    464.86    293.71
GR     1552   1679.92      1552   1698.04      1550   1721.45      1548   1736.09      1546    1765.3
GR     1544   1782.21      1542   1811.48      1540   2058.67      1538   2098.18      1536   2139.84
GR     1538   2356.27      1538   3013.91      1538   3038.08      1538   3093.32      1540   3122.55
GR     1542   3127.02      1542   3151.63      1542    3389.5      1544   3597.57

NC                                    0.1       0.3
X1      100        21   1638.22   3191.55    362.24    579.71    293.78
GR     1566   1319.53      1556   1366.64      1554   1394.02   1553.32   1434.59      1550   1496.33
GR   1548.7   1598.69      1550   1638.22    1549.54   1665.25      1548   1796.57    1546.2   1883.83
GR   1545.5   1916.67    1544.63   1959.62      1546   1967.79      1544   1994.64      1544   2520.36
GR     1542   2645.76      1544   2677.82      1544   2716.43      1544   2796.08    1546.56   3049.15
GR     1548   3191.55

X1      150        11   1029.02   1793.21    448.96    274.71    342.19
GR     1566      1000      1566   1029.02      1564   1035.17      1562   1041.57      1560   1046.32
GR     1550   1070.42      1550    1704.2      1552   1745.65      1554    1750.3      1556   1758.54
GR     1558   1793.21
1
    24SEP99      16:51:23                                                                          PAGE    4


NC     0.03      0.03     0.025       0.1       0.3
X1      200        15    2929.4   3113.93    322.99     204.7    235.94
X3       10
GR     1564   2778.75      1564   2874.16      1562   2912.73      1560    2929.4      1558   2941.08
GR     1556   2949.85      1554   2963.64      1554   2981.64      1554   3011.17      1554   3066.53
GR     1556   3081.56      1558   3096.65      1560   3113.93      1560   3148.31      1560   3396.06

X1      300        11   2926.48   3035.77    364.63    359.83    352.07
X3       10
GR     1566   2682.38      1564   2807.33      1562   2926.48      1560   2954.76      1558   2969.07
GR     1558   3000.86      1560   3018.26      1562   3035.77      1562   3082.96      1562   3156.53
GR     1564   3217.12

NC     0.03      0.03     0.025       0.1       0.3
X1      400        22   2281.55   2450.74    132.08     158.2    134.41
X3       10                                                        1566
GR     1570   2126.23      1572   2143.31      1572   2183.04      1570   2191.36      1562   2217.92
GR     1560   2238.83      1560   2252.16      1564   2262.45      1566   2281.55      1566   2288.71
GR     1564   2319.58      1562   2326.53      1560   2333.47      1560   2352.21      1562   2362.78
GR     1562   2368.59      1562   2429.18      1564   2450.74      1566   2527.34      1566   2620.61
GR     1566    2621.4      1568   2852.45

NC   0.015     0.015     0.015       0.3       0.5
X1     500        11   2332.84   2370.57     75.43     81.76     74.97
X3      10                                                        1572       1572
GR     1572    1921.7      1572   2203.22      1572   2332.84   1568.47   2332.84   1564.37   2332.84
GR   1564.3   2370.57   1568.47   2370.57      1572   2370.57      1572   2514.64      1572    2582.6
GR     1572   2867.98

NC   0.015     0.015     0.015       0.3       0.5
SB    1.25       1.5       2.7        76     37.73      1.34    147.38         0   1565.46   1564.37
X1     600        12   2596.22   2633.95    122.03    131.14    133.46
X2                          1   1568.47   1572.66                                2
X3      10                                                     1572.6    1572.6
GR     1574   2232.97    1572.6      2260    1572.6   2596.22   1569.56    2596.22   1565.46   2596.22
GR   1565.4   2633.95   1569.56   2633.95    1572.6   2633.95    1572.6   2866.27    1572.6    2963.4
GR   1572.6   3102.68    1573.7   3146.68

NC     0.04      0.04      0.03       0.3       0.5
X1      700        18   2121.76   2330.75    133.44     79.47    112.64
X3       10                       2121.76      1578   2330.75      1578    1573.8    1574.9
GR     1574   1799.95    1572.2      1877    1572.2      1954    1572.2      2031    1573.8   2121.76
GR     1572   2128.04      1570   2132.18    1569.5   2139.33      1570   2143.07      1572   2144.69
GR     1574   2297.02    1574.9   2330.75    1574.5   2366.44      1574    2409.4    1572.7   2453.34
GR   1572.7   2564.87    1572.7   2717.29      1574   2748.19

NC     0.04      0.04      0.03       0.1       0.3
X1      800        22   1769.22   1903.89    134.63    139.86    144.94
X3       10                       1769.22      1578   1903.89      1578    1574.5      1576
GR     1574   1427.88    1572.5      1510    1572.5      1592    1572.5      1674      1574   1759.85
GR   1574.5   1769.22      1574   1778.29      1572   1784.62      1570   1788.23   1570.23   1790.02
GR     1570   1791.12      1572   1797.25      1574   1818.13      1574   1841.16      1574   1867.83
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GR	1576	1903.89	1574	1968.96	1573.2	2017.28	1573.2	2207.8	1573.2	2344.84

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GR	1574	2392.94	1574	2407.17						
NC	0.04	0.04	0.03							
X1	900	21	1575.7	1686.84	102.08	108.33	103.62			
X3	10			1575.7	1578	1686.84	1578	1574.5	1577	
GR	1574	1219.54	1572.9	1309.5	1572.9	1399	1572.9	1489.5	1574	1572.39
GR	1574.5	1575.7	1574	1579.92	1572	1592.09	1571	1597.2	1572	1604.66
GR	1574	1606.43	1575	1651.77	1577	1686.84	1575.8	1705.75	1574	1749.48
GR	1573.7	1798.67	1573.7	1915.16	1573.7	2060.43	1573.7	2160.73	1574	2209.7
GR	1574	2230.82								
X1	1000	20	1472.42	1568.37	116.93	121.55	118.27			
X3	10			1472.42	1579	1568.37	1579	1576	1577.2	
GR	1574	1096.67	1573.3	1190	1573.3	1283	1573.3	1376	1576	1472.42
GR	1576	1484.88	1574	1489.57	1572	1494.01	1571.15	1496.75	1572	1501.64
GR	1574	1503.91	1576	1545.7	1577.2	1568.37	1576.5	1597.74	1576	1625.79
GR	1575.5	1648.15	1574.3	1710.01	1574.3	1879.49	1574.3	2080.17	1575.3	2121.11
X1	1100	17	1320.06	1417.67	102.45	103.7	103.7			
X3	10			1320.06	1579	1417.67	1579	1576	1577.4	
GR	1574	924.71	1573.5	1024	1573.5	1124	1573.5	1224	1576	1320.06
GR	1576	1334.53	1574	1339.91	1571.4	1347.79	1574	1349.58	1576	1393.55
GR	1577.4	1417.67	1576.5	1447.13	1576	1476.62	1574.7	1519.36	1574.7	1720.11
GR	1574.7	1929.89	1575.7	1982.94						
X1	1200	22	1178.38	1272.58	111.55	110.23	110.23			
X3	10			1178.38	1582	1272.58	1581	1576	1577.5	
GR	1588	1000	1586	1003.72	1584	1007.45	1582	1011.19	1580	1030.36
GR	1578	1045.48	1576	1078.58	1575	1158.89	1576	1178.38	1576	1179.17
GR	1574	1190.7	1571.62	1204.49	1574	1209.35	1576	1247.96	1577.5	1272.58
GR	1576.5	1301.79	1576	1333.43	1575.1	1378.11	1575.1	1575.34	1575.1	1770.67
GR	1576	1817.16	1576.5	1831.23						
NC			0.025							
X1	1300	27	1014.17	1207.18	198.91	153.42	176.37			
X3	10					1207.18	1583	1582	1579	
GR	1588	1000	1586	1004.58	1584	1009.31	1582	1014.17	1582	1065.78
GR	1582	1072.99	1580	1076.58	1574	1080.99	1572.69	1083.53	1574	1092.54
GR	1580	1106.55	1580	1121.82	1578	1125.36	1576	1170.24	1576	1178.38
GR	1578	1183.85	1578	1201.6	1579	1207.18	1578	1236.12	1578	1241.05
GR	1578	1260.24	1576	1268.87	1575.6	1313.34	1575.6	1502.88	1575.6	1676.59
GR	1576	1718.52	1577	1735.14						
X1	1400	18	1061	1186.25	122.02	190.42	161.58			
X3	10					1186.25	1587	1584	1584	
GR	1600	1000	1600	1027.47	1598	1035.26	1596	1040.7	1590	1046.91
GR	1588	1052.71	1586	1056.6	1584	1061	1582	1138.25	1580	1142.92
GR	1578	1145.8	1578	1160.96	1580	1173.97	1582	1180.16	1584	1186.25
GR	1584	1230.34	1584	1231.21	1584	1307.21				

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X1	1500	22	1081.73	1230.57	76.07	119.69	108.07			
X3	10									
GR	1600	1000	1599	1069.96	1583	1081.73	1582	1182.35	1580	1186.84
GR	1578	1197.97	1578	1201.11	1580	1212.43	1582	1216.13	1583.8	1230.57
GR	1584	1294.4	1584	1308.23	1584	1356.62	1586	1628.22	1588	1674.02
GR	1590	1697.27	1592	1726.23	1594	1741.62	1596	1753.42	1598	1763.24
GR	1598	1801.09	1596	1808.99						
X1	1600	13	1094.37	1243.82	101.17	210.32	196.31			
GR	1602	1000	1600	1064.32	1594.01	1081.14	1584	1094.37	1582	1149.75
GR	1580.4	1170.49	1580.78	1218.11	1582	1229.76	1584	1243.82	1585	1327.67
GR	1586	1412.26	1588	1551.37	1590	1677.73				
X1	1650	23	1129.97	1180.64	190.68	185.82	175.57			
X3	10									
GR	1600	1000	1598	1005.05	1596	1011.4	1594	1026.96	1594	1094.89
GR	1594	1110.32	1592	1122.14	1590	1124.66	1588	1129.97	1586	1134.76
GR	1584	1139.66	1582	1148.86	1582	1161.14	1584	1172.84	1584.7	1180.64
GR	1585	1254.59	1586	1347.77	1588	1480.9	1590	1600.61	1592	1684.68
GR	1594	1697.13	1596	1700.86	1598	1704.54				
NC	0.04	0.04	0.025							
X1	1700	20	1286.61	1350.67	163.66	154.63	161.13			
GR	1602	1000	1604	1037.4	1605.9	1128.6	1605.81	1151.3	1604	1198.85
GR	1602	1246.99	1600	1248.58	1590	1277.69	1588	1282.43	1586	1286.61
GR	1584	1301.89	1582.05	1314.08	1584	1326.15	1586	1341.79	1586.5	1350.67
GR	1586	1360.4	1585.5	1416.24	1586	1475.83	1588	1602.02	1590	1708.11
NC	0.04	0.04	0.025							
X1	1750	21	1095.43	1152.29	171.49	179.87	169.33			
GR	1610	1000	1608	1023.79	1606	1053.35	1604	1063.55	1602	1070.34
GR	1600	1076.66	1590	1095.43	1588	1097.81	1586	1103.58	1582.1	1112
GR	1582.1	1122.43	1586	1133.65	1587.5	1152.29	1587.1	1211.93	1588	1287.4
GR	1590	1362.75	1592	1371.76	1594	1376.44	1596	1380.58	1598	1384.75
GR	1600	1388.94								
NC	0.04	0.04	0.025	0.1	0.3					
X1	1800	19	1139.62	1221.1	173.79	148.02	170.93			
GR	1608	1000	1606	1021.77	1604	1037.17	1602	1053.97	1600	1078.01

GR	1598	1135.85	1596	1139.62	1590	1145.75	1588	1148.51	1586	1151.34
GR	1582.1	1155.97	1582.1	1164.98	1586	1171.75	1588	1183.17	1590	1191.2
GR	1592	1221.1	1594	1234.56	1596	1243.62	1598	1254.32		
NC	0.015	0.015	0.015	0.3	0.5					
QT	1	3478								
X1	1900	14	1193.33	1205.33	66.92	60.81	58.98			
GR	1606	1000	1604	1017.04	1602	1034.84	1600	1056.24	1598	1118.67
GR	1596	1174.32	1592.19	1193.33	1582.19	1193.33	1582.19	1205.33	1592.19	1205.33
GR	1594	1221.37	1596	1224.34	1598	1232.13	1600	1243.77		

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NC	0.015	0.015	0.015	0.3	0.5					
SB		1.5	2.7	114	12		120	0	1588.88	1582.19
X1	2000	9	1044.29	1056.29	320.07	303.13	319.85			
X2			1	1592.19	1603.83					
GR	1602	1000	1600	1026.41	1598.88	1044.29	1588.88	1044.29	1588.88	1056.29
GR	1598.8	1056.29	1600	1080.33	1602	1092.77	1604	1104.82		
NC	0.04	0.04	0.025	0.3	0.5					
X1	2100	17	1093.94	1188.63	58.83	54.83	49.81			
GR	1606	1000	1604	1009.57	1602	1013.54	1600	1020.41	1598	1037.57
GR	1596	1093.94	1594	1118.59	1592	1126.16	1590	1145.6	1590	1151.46
GR	1592	1174.19	1594	1184.61	1596	1188.63	1598	1204.5	1600	1224.72
GR	1602	1240.9	1604	1251.99						
NC	0.04	0.04	0.025	0.1	0.3					
X1	2200	18	142.43	318.37	383.01	273.85	328.57			
X3	10							1598	1598	
GR	1608	0	1608	20.66	1606	28.27	1604	40.91	1603	53.3
GR	1602	71.43	1600	112.67	1598	142.43	1596	210.95	1593	217.68
GR	1598	318.37	1596	562.06	1596	571.04	1596	618.66	1596	624.51
GR	1598	693.73	1600	708.07	1602	779.64				
NC				0.1	0.3					
X1	2300	25	150.15	250.92	320.42	310.65	311.55			
X3	0					453.09	1602			
GR	1608	0	1608	15.33	1606	21.57	1604	27.19	1602	63.6
GR	1600	150.15	1599	164.23	1598	187.99	1596	192.33	1594	198.34
GR	1594	228.2	1596	235.23	1598	238.65	1600	244.41	1600	250.92
GR	1600	277.03	1600	398.64	1602	414.11	1602	452.77	1600	463.12
GR	1600	475.52	1602	492.74	1604	507.6	1606	537.25	1608	543.16
X1	2330	16	1156	1288	235	222	240			
X3	0									
GR	1608	1000	1606	1008	1604	1028	1602	1122	1601	1156
GR	1600	1203	1598	1205	1596	1209	1596	1238	1598	1243
GR	1600	1247	1601.6	1288	1602	1327	1604	1437	1606	1483
GR	1608	1508								
X1	2350	11	1025	1385	151	123	63			
X3	0									
GR	1608	1000	1606	1010	1604	1025	1603	1087	1603.5	1174
GR	1603.8	1227	1602	1271	1602	1339	1604	1385	1606	1445
GR	1608	1498								
X1	2400	21	555.74	605.96	178	109	71			
GR	1612	93.82	1610	232.8	1608.3	316.57	1608	336.99	1606	384.83
GR	1605.7	394.82	1604	447.58	1602	555.74	1600	564.71	1598	569.83
GR	1598	597.61	1600	601.64	1602	605.96	1604	666.82	1606	687.05
GR	1606	721.82	1605.3	750.29	1606	764.11	1608	799.73	1610	848.51
GR	1612	930.78								

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X1	2500	15	173.41	243.04	186.68	182.96	179.72			
GR	1612	41.78	1610	45.58	1608	56.33	1607.4	69.14	1606	97.11
GR	1604	119.54	1604	161.89	1604	173.41	1602	209.67	1602	238.99
GR	1604	243.04	1606	249.45	1608	260.55	1610	291.23	1612	303.53
QT	1	3474								
X1	2600	28	774.94	927.94	320.81	390.78	373.36			
GR	1622	170.68	1620	198.85	1618	205.29	1616	210.56	1618	237.93
GR	1616	243.57	1616	474.86	1616	499.71	1614	504.57	1612	510.3
GR	1612	752.1	1612	762.71	1612	774.94	1610	779.75	1608	784.94
GR	1608	807.9	1608	855.3	1606	872.52	1606	907.23	1608	914.3
GR	1610	919.14	1612	927.94	1613.2	946.75	1614	960.44	1616	971.24
GR	1618	997.96	1620	1011.4	1622	1026.58				
X1	2700	29	605.11	832.94	249.65	237.3	246.94			
GR	1626	35.68	1624	43.5	1622	53.17	1620	65.17	1618	101.3
GR	1618	115.11	1618	141.58	1616	147.23	1616	265.04	1616	364.54
GR	1618	369.57	1618	394.68	1616	400.49	1614	408.58	1614	570.98
GR	1614	582.3	1614	605.11	1612	667.05	1610	699.84	1608	724.01
GR	1608	753.82	1610	771.97	1610.7	781.65	1612	801.7	1614	832.94
GR	1616	894.96	1618	898.43	1620	904.23	1630	923.69		
X1	2800	16	263.07	429.47	262.99	389.6	376.77			
X3	0			263.2	1616					
GR	1616	0	1616	39.55	1616	96.03	1616	111.37	1612	159.52
GR	1614	182.66	1614.7	197.49	1616	263.07	1610	302.64	1612	344.5
GR	1613.6	372.11	1614	379.65	1616	429.47	1620	489.99	1621.6	503.61
GR	1622	507.82								

X1	2900	30	475.4	801.12	292.71	273.86	292.09			
X3	0			392.8	1620.51					
GR	1630	53.46	1628	61.93	1626	69.99	1624	77.51	1622	93.13
GR	1620	124.83	1618	331.67	1618	366.34	1620	373	1620.5	393.02
GR	1620	475.4	1618	525.34	1618	550.41	1618	631.71	1618	676.78
GR	1618	700.32	1616	722.78	1614	731.76	1612	736.6	1612	763
GR	1614	767.87	1616	772.71	1616.98	781.98	1618	790.94	1620	801.12
GR	1622	816.77	1624	832.8	1626	858.03	1628	874	1630	890.18
X1	3000	23	339.8	443.93	405.73	342.04	349.71			
GR	1630	70.06	1628	82.14	1626	94.71	1624	106.08	1623.2	152.05
GR	1622	224.19	1620	237.42	1620	274.5	1620	298.77	1620	312.51
GR	1620	339.8	1618	361.48	1616	368.38	1614	378.05	1614	399.19
GR	1616	402.54	1618	411.58	1620	443.93	1622	477.92	1624	497.81
GR	1626	542.69	1628	577.88	1628.8	598.92				
X1	3100	21	128.03	404.52	382.96	294.37	302.1			
GR	1640	88.37	1630	113.59	1628	118.26	1626	128.03	1624	297.39
GR	1622	300.14	1620	302.9	1618	305.76	1618	319.74	1618	333.19
GR	1620	337.19	1622	360.91	1624	384.72	1626	404.52	1628	466.46
GR	1630	524.54	1632	559.37	1634	582.77	1636	608.27	1638	629.41
GR	1640	646.16								

1

X1	3200	14	247.42	403.91	426.92	395.6	390.01			
GR	1639.7	227.47	1630	247.42	1628	253.14	1626	258.7	1624	267.64
GR	1622	275.55	1622	310.81	1624	315.91	1626	321.83	1628	327.9
GR	1630	403.91	1632	489.33	1634	564.85	1636	598.59		
X1	3300	35	36.55	575.86	462.6	416.49	482.8			
GR	1644	0	1642	12.73	1640	25.07	1638	31.27	1636	36.55
GR	1634	43.64	1632	47.01	1630	50.82	1628	55.39	1628	67.9
GR	1630	72.59	1632	76.9	1634	79.06	1636	137.59	1636	212.17
GR	1636	336.67	1634	350.97	1634	363.87	1634	407.22	1632	411.39
GR	1630	414.76	1628	421.9	1628	494.95	1630	503.75	1632	508.15
GR	1632	523.76	1630	526.02	1630	532.3	1632	537.02	1634	540.95
GR	1636	575.86	1638	594.13	1640	601.98	1642	617.87	1644	633.83
X1	3400	18	84.27	600.88	467.16	325.83	402.24			
GR	1650	59.27	1640	84.27	1638	109.44	1636	126.6	1634	131.99
GR	1634	140.44	1636	146.48	1638	193.98	1638	219.41	1638	270.82
GR	1638	278.83	1638	384.4	1640	600.88	1642	643.45	1644	683.24
GR	1646	705.45	1648	714.67	1650	724.58				
X1	3500	12	1139.19	1820.67	445.73	364.17	403.18			
GR	1650	1117.94	1648	1129.92	1646	1139.19	1644	1154.95	1642	1166.11
GR	1640	1198.2	1640	1311.56	1642	1663.86	1644	1780.13	1646	1820.67
GR	1648	1954.48	1650	1976.19						
X1	3600	21	149.25	618.21	366.01	356.91	358.51			
GR	1660	75.43	1658	80.52	1656	91.22	1654	99.08	1652	110.5
GR	1650	129.6	1648	149.25	1646	271.37	1646	283.71	1646	312.95
GR	1646	327.9	1646	360.07	1646	420.55	1646	607.71	1648	618.21
GR	1650	627.24	1652	634.08	1654	648.02	1656	659.58	1658	673.87
GR	1660	681.36								
X1	3700	23	99.81	528.5	397.89	401.06	409.82			
GR	1660	58.71	1658	62.54	1656	71.6	1654	83.19	1652	99.81
GR	1650	116.08	1648	222.35	1648	252.85	1648	259.17	1648	278.23
GR	1648	293.98	1648	305.86	1648	334.35	1648	360.03	1648	368.2
GR	1648	450.38	1650	484.45	1650.36	490.39	1652	528.5	1654	546.14
GR	1656	553.69	1658	561.37	1660	571.08				
X1	3800	16	42.37	437.01	480	713	666			
GR	1670	24.23	1660	42.37	1658	44.95	1656	48.64	1654	62.46
GR	1654	248.3	1656	288.05	1656	307.66	1656	426.77	1658	437.01
GR	1660	446.89	1662	454.29	1664	464.34	1666	469.29	1668	473.37
GR	1670	483.32								
QT	1	2318								
X1	3900	21	76.48	332.44	468.3	238.03	320.4			
GR	1670	68.89	1660	76.48	1658	109.93	1658	128.97	1658	143.72
GR	1658	147.93	1656	228.75	1656	261.41	1658	286.12	1658.3	289.26
GR	1660	303.73	1662	332.44	1662	354.48	1660	365.24	1658.8	388.81
GR	1660	416.11	1662	428.9	1664	448.42	1666	460.82	1668	489.05
GR	1670	546.72								

1

X1	4000	11	62.12	249.41	444.57	477.86	465.67			
GR	1670	57.92	1668	60.45	1666	62.12	1664	69.1	1662	80.78
GR	1660	85.35	1660	112.66	1662	121.12	1664	164.38	1666	239.26
GR	1666.3	249.41								
X1	4100	18	201.4	408.03	535	356	497			
GR	1680	148.32	1678	157.13	1676	173.19	1674	188.76	1672	201.4
GR	1670	217.1	1670	223.19	1670	244.9	1668	248.78	1666	254.13
GR	1666	279.97	1668	296.89	1670	368.21	1672	395.34	1674	408.03
GR	1676	416.54	1678	422.71	1680	431.82				
X1	4200	21	72.87	318.01	285	297	402			
GR	1690	0	1688	8.75	1686	20.32	1684	34.98	1682	44.12

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GR     1680      52.74      1678      72.87      1676     109.44      1674     148.79     1673.3     163.05
GR     1674     174.44      1674     221.93      1672     228.81      1670      242.3      1670      245.6
GR     1672     268.66      1674     290.23      1676     304.27      1678     311.41      1680     318.01
GR     1690     331.29

X1     4300         19    168.17     349.29     317.35     407.28     383.62
GR     1700      89.17      1690      105.7      1680     168.17      1678      195.5     1677.6      203.3
GR     1676     233.39      1676     271.26      1678     296.29      1680     349.29      1682     374.61
GR     1684     413.28      1686     454.41      1688     473.84      1690     495.02      1692     512.03
GR     1694     521.72      1696     534.23      1698     545.99      1700     552.12

X1     4400         20   1152.32    1302.67        432        439        476
GR     1698    1047.48      1696     1072.5      1694    1113.06      1692    1129.03      1690    1144.19
GR     1688    1152.32      1686    1159.38      1684    1171.95      1682    1198.73      1680    1240.97
GR     1680    1261.36      1682    1265.11      1684    1271.18      1686    1281.25      1688    1302.67
GR     1690    1310.07      1692    1316.26      1694    1322.58      1696    1328.05      1698    1379.32

X1     4500         22      91.69      375.6     416.91     575.19     533.38
GR     1720      75.46      1710      91.69      1700      117.4      1699.3      120.73      1698      126.14
GR     1696     135.73      1694     144.81      1692     170.97      1690     176.15      1688     181.18
GR     1686     188.65      1686     207.59      1688     225.29      1690     276.16     1690.6     289.36
GR     1692     317.67      1694     325.19      1696     332.17      1698     337.97      1700     352.73
GR     1710      375.6      1712     416.63

X1     4600         21     134.65     333.42        488        278        442
GR     1710      16.97      1708      22.09      1706      26.16      1704      32.81      1702      52.97
GR     1700      69.79      1700      71.45     1701.4     100.97      1700     134.65      1698     178.33
GR     1696     199.43      1694     245.08      1692     251.89      1692     277.07      1692     285.45
GR     1692     294.37      1694     299.32      1696     317.63      1698     322.08      1700     333.42
GR     1710     339.21

X1     4700         29     373.98      442.2     272.78     275.83     260.86
X3        0                                                 442.2       1700
GR     1716          0      1714       8.97      1712      19.28      1710      50.93      1708      76.41
GR     1708      85.71      1710      111.4      1710     149.36      1710     171.04     1710.6     220.24
GR     1710     255.18      1710     257.77      1710     275.64      1708     298.45      1706     313.76
GR     1704     334.45      1702     364.57      1700     373.98      1698     382.11      1696     387.57
GR     1696     418.98      1698     430.84      1700      442.2      1700     475.32      1698     485.47
GR     1698     491.37      1700     503.73      1710     533.35    1712.7     554.54
1
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X1     4800         22     199.39     286.05     187.19     241.84     227.74
GR     1720          0      1720      34.45     1719.1      47.68      1718      67.95      1716      81.26
GR     1714      99.11      1714     138.55     1714.5     152.91      1714     167.56      1712     188.86
GR     1710     199.39      1708     204.07      1706     211.95      1704     220.53      1702     222.94
GR     1700     229.54      1698      234.6      1698     259.35      1700     266.03      1710     286.05
GR     1720     306.75      1720     307.66

NC     0.04       0.04      0.025        0.1        0.3
X1     4900         14     118.6      259.71     374.55     218.45     351.24
GR     1720     101.08      1710      118.6      1708     126.87      1706     136.18      1704     139.34
GR     1702     144.61      1702     157.05      1702     171.77      1702     187.75      1704     198.82
GR     1706     207.55      1708     232.01      1710     259.71      1720     290.56


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

 *PROF 1

 CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

 CCHV=     .100 CEHV=     .300
 *SECNO 25.000
 3720 CRITICAL DEPTH ASSUMED
     25.000       .42   1534.42   1534.42   1538.20   1534.62       .20       .00       .00   1544.00
      676.9        .0     676.9        .0        .0     188.9        .0        .0        .0   1542.00
        .00        .00      3.58       .00      .000      .025      .000      .000   1534.00   1142.17
    .012538         0.        0.        0.         0        23         0       .00    477.84   1620.01


 CCHV=     .100 CEHV=     .300
 *SECNO 50.000
     50.000       1.49   1537.49   1537.47       .00   1537.84       .35      3.17       .04   1552.00
      676.9        .0     676.9        .0        .0     143.0        .0       1.1       2.3   1544.00
        .02        .00      4.73       .00      .000      .025      .000      .000   1536.00   2108.83
    .009402        379.      294.      465.         2        23         0       .00    192.12   2300.95


 CCHV=     .100 CEHV=     .300
 *SECNO 100.000
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
    100.000       1.78   1543.78   1543.78       .00   1544.24       .46      2.81       .03   1550.00
      676.9        .0     676.9        .0        .0     124.7        .0       2.0       3.4   1548.00
        .03        .00      5.43       .00      .000      .025      .000      .000   1542.00   2534.18
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    .009758      362.      294.      580.         0        11         0       .00    140.10   2674.29


 *SECNO 150.000
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
    150.000       .33   1550.33   1550.33       .00   1550.49       .16      3.88       .03   1566.00
      676.9         .0     676.9        .0         .0     208.6         .0       3.3       6.4   1558.00
        .06        .00      3.25       .00       .000      .025       .000      .000   1550.00   1069.63
    .013332      449.      342.      275.         0        25         0       .00    641.35   1710.98


 CCHV=      .100 CEHV=      .300
1
    24SEP99      16:51:23                                                                                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


 *SECNO 200.000
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1560.00 ELREA=      1560.00

    200.000      1.07   1555.07   1555.07       .00   1555.58       .51      2.60       .10   1560.00
      676.9         .0     676.9        .0         .0     118.5         .0       4.2       8.5   1560.00
        .07        .00      5.71       .00       .000      .025       .000      .000   1554.00   2956.26
    .009245      323.      236.      205.         0        20         0       .00    118.32   3074.58


 *SECNO 300.000
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1562.00 ELREA=      1562.00

    300.000      2.02   1560.02   1560.02       .00   1560.78       .76      3.03       .08   1562.00
      676.9         .0     676.9        .0         .0      96.8         .0       5.1       9.2   1562.00
        .09        .00      6.99       .00       .000      .025       .000      .000   1558.00   2954.42
    .008012      365.      352.      360.         0        14         0       .00     64.06   3018.47


 CCHV=      .100 CEHV=      .300
 *SECNO 400.000
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1566.00 ELREA=      1564.00

    400.000      2.57   1562.57   1562.57       .00   1563.10       .53      1.15       .02   1566.00
      676.9         .0     676.9        .0         .0     115.7         .0       5.4       9.5   1564.00
        .09        .00      5.85       .00       .000      .025       .000      .000   1560.00   2324.55
    .009196      132.      134.      158.         0        11         0       .00    110.76   2435.32


 CCHV=      .300 CEHV=      .500
 *SECNO 500.000

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
1
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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


 3720 CRITICAL DEPTH ASSUMED

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1572.00 ELREA=      1572.00

    500.000      2.19   1566.49   1566.49       .00   1567.57      1.08       .36       .27   1572.00
      676.9         .0     676.9        .0         .0      81.2         .0       5.6       9.6   1572.00
        .10        .00      8.34       .00       .000      .015       .000      .000   1564.30   2332.84
    .002945       75.       75.       82.         0        11         0       .00     37.73   2370.57


 CCHV=      .300 CEHV=      .500

 SPECIAL BRIDGE

 5227 DOWNSTREAM ELEV IS    1566.23 , NOT    1566.49 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

 SB  XK         XKOR       COFQ       RDLEN      BWC        BWP        BAREA      SS         ELCHU      ELCHD
      1.25       1.50       2.70      76.00      37.73       1.34     147.38        .00    1565.46    1564.37

 *SECNO 600.000

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.43
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CLASS B LOW FLOW

3420 BRIDGE W.S.= 1567.12 BRIDGE VELOCITY= 8.43 CALCULATED CHANNEL AREA= 60.

EGPRS	EGLWC	H3	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
1566.98	1568.81	.00	0.	677.	147.	110.	1568.47	1572.66	0.

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1572.60 ELREA= 1572.60

600.000	2.73	1568.13	.00	.00	1568.81	.69	1.25	.00	1572.60
676.9	.0	676.9	.0	.0	101.7	.0	5.9	9.8	1572.60
.10	.00	6.66	.00	.000	.015	.000	.000	1565.40	2596.22
.001437	122.	133.	131.	0	0	0	.00	37.73	2633.95

CCHV= .300 CEHV= .500
*SECNO 700.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

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

3470 ENCROACHMENT STATIONS= 2121.8 2330.8 TYPE= 1 TARGET= 208.990
ELENCL= 1578.00 ELENCR= 1578.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1573.80 ELREA= 1574.90

700.000	3.78	1573.28	1573.28	.00	1573.80	.52	.37	.05	1573.80
676.9	.0	676.9	.0	.0	117.0	.0	6.1	10.0	1578.00
.11	.00	5.78	.00	.000	.030	.000	.000	1569.50	2123.57
.014164	133.	113.	79.	0	11	0	.00	118.74	2242.30

CCHV= .100 CEHV= .300
*SECNO 800.000
3280 CROSS SECTION 800.00 EXTENDED .78 FEET

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.53

3470 ENCROACHMENT STATIONS= 1769.2 1903.9 TYPE= 1 TARGET= 134.670
ELENCL= 1578.00 ELENCR= 1578.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1574.50 ELREA= 1576.00

800.000	4.78	1574.78	1574.41	.00	1575.11	.33	1.29	.02	1574.50
684.7	.0	684.7	.0	.0	147.9	.0	6.6	10.3	1578.00
.12	.00	4.63	.00	.000	.030	.000	.000	1570.00	1769.22
.006169	135.	145.	140.	3	16	0	.00	112.70	1881.92

*SECNO 900.000
3280 CROSS SECTION 900.00 EXTENDED 1.37 FEET

3470 ENCROACHMENT STATIONS= 1575.7 1686.8 TYPE= 1 TARGET= 111.140
ELENCL= 1578.00 ELENCR= 1578.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1574.50 ELREA= 1577.00

900.000	4.37	1575.37	1575.29	.00	1576.00	.63	.79	.09	1574.50
809.0	.0	809.0	.0	.0	127.4	.0	6.9	10.6	1578.00
.12	.00	6.35	.00	.000	.030	.000	.000	1571.00	1575.70
.009412	102.	104.	108.	2	10	0	.00	82.64	1658.34

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 1000.000
3280 CROSS SECTION 1000.00 EXTENDED 1.15 FEET

3470 ENCROACHMENT STATIONS= 1472.4 1568.4 TYPE= 1 TARGET= 95.950
ELENCL= 1579.00 ELENCR= 1579.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1576.00 ELREA= 1577.20

1000.000	5.31	1576.46	1576.39	.00	1577.28	.82	1.23	.06	1576.00

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      984.3        .0      984.3        .0        .0      135.6        .0       7.3      10.8   1579.00
        .12        .00       7.26       .00       .000      .030       .000      .000   1571.15   1472.42
    .011281      117.       118.       122.         1        11          0       .00     81.87   1554.29


 *SECNO 1100.000
 3280 CROSS SECTION   1100.00 EXTENDED      1.80 FEET


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.85


 3470 ENCROACHMENT STATIONS=     1320.1    1417.7  TYPE=      1  TARGET=       97.610
  ELENCL=   1579.00  ELENCR=   1579.00
   1100.000      6.10   1577.50   1576.96       .00   1578.06       .56       .75       .03   1576.00
     1261.1        .0    1261.1        .0        .0     210.5        .0       7.7      11.0   1579.00
        .13       .00      5.99       .00       .000      .030       .000      .000   1571.40   1320.06
    .005421      102.       104.       104.         2         8          0       .00     97.61   1417.67


 *SECNO 1200.000
 3280 CROSS SECTION   1200.00 EXTENDED      1.42 FEET


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


 3470 ENCROACHMENT STATIONS=     1178.4    1272.6  TYPE=      1  TARGET=       94.200
  ELENCL=   1582.00  ELENCR=   1581.00
   1200.000      6.30   1577.92   1577.37       .00   1578.71       .79       .58       .07   1576.00
     1937.0        .0    1937.0        .0        .0     271.9        .0       8.3      11.3   1581.00
        .13       .00      7.12       .00       .000      .030       .000      .000   1571.62   1178.38
    .005135      112.       110.       110.         2        12          0       .00     94.20   1272.58


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    24SEP99      16:51:23                                                                                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


 *SECNO 1300.000

 3265 DIVIDED FLOW

 3280 CROSS SECTION   1300.00 EXTENDED      1.97 FEET

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=          .0    1207.2  TYPE=      1  TARGET=     1207.179

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1582.00 ELREA=      1579.00

   1300.000      6.28   1578.97   1578.97       .00   1580.16      1.18      1.11       .12   1582.00
     2158.1        .0    2158.1        .0        .0     247.3        .0       9.3      11.7   1583.00
        .14       .00      8.73       .00       .000      .025       .000      .000   1572.69   1077.33
    .007755      199.       176.       153.         0         5          0       .00    110.21   1207.03


 *SECNO 1400.000
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=          .0    1186.3  TYPE=      1  TARGET=     1186.249

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1584.00 ELREA=      1584.00

   1400.000      5.73   1583.73   1583.73       .00   1584.85      1.12      1.20       .01   1584.00
     2158.1        .0    2158.1        .0        .0     254.5        .0      10.3      12.1   1587.00
        .14       .00      8.48       .00       .000      .025       .000      .000   1578.00   1071.26
    .007134      122.       162.       190.         0        12          0       .00    114.18   1185.44


 *SECNO 1500.000

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.47

   1500.000      6.91   1584.91   1583.69       .00   1585.21       .29       .27       .08   1583.00
     2281.4        1.2    2074.9     205.2       1.3     458.6     178.4      11.4      12.8   1583.80
        .15       .92      4.52      1.15       .040      .025       .040      .000   1578.00   1080.32
    .001309       76.       108.       120.         4         5          0       .00    400.48   1480.80


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    24SEP99      16:51:23                                                                                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

*SECNO 1600.000

1600.000	4.75	1585.15	1583.74	.00	1585.46	.31	.25	.01	1584.00
2281.4	.7	2228.7	52.0	.9	491.3	54.9	14.1	14.3	1584.00
.16	.76	4.54	.95	.040	.025	.040	.000	1580.40	1092.86
.001194	101.	196.	210.	3	11	0	.00	247.03	1339.89

*SECNO 1650.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1588.00 ELREA= 1584.70

1650.000	4.70	1586.70	1586.70	.00	1587.53	.83	.37	.15	1588.00
2281.4	.0	1438.8	842.6	.0	162.2	264.6	16.1	15.3	1584.70
.17	.00	8.87	3.18	.000	.025	.040	.000	1582.00	1133.09
.004450	191.	176.	186.	0	5	0	.00	261.19	1394.27

*SECNO 1700.000

1700.000	5.56	1587.61	1587.27	.00	1588.14	.53	.58	.03	1586.00
2281.4	4.4	1437.1	839.8	2.7	203.6	308.4	17.8	16.3	1586.50
.18	1.65	7.06	2.72	.040	.025	.040	.000	1582.05	1283.26
.003052	164.	161.	155.	3	8	0	.00	293.78	1577.04

*SECNO 1750.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1750.000	6.64	1588.74	1588.74	.00	1589.66	.92	.58	.12	1590.00
2281.4	.0	1791.6	489.8	.0	208.8	186.0	19.6	17.4	1587.50
.19	.00	8.58	2.63	.000	.025	.040	.000	1582.10	1096.93
.003735	171.	169.	180.	0	8	0	.00	218.35	1315.28

CCHV= .100 CEHV= .300
*SECNO 1800.000

3301 HV CHANGED MORE THAN HVINS

1

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

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1800.000	7.97	1590.07	1590.07	.00	1592.18	2.11	.81	.36	1596.00
2281.4	.0	2281.4	.0	.0	195.9	.0	20.8	17.8	1592.00
.19	.00	11.65	.00	.000	.025	.000	.000	1582.10	1145.68
.006349	174.	171.	148.	0	11	0	.00	46.61	1192.29

CCHV= .300 CEHV= .500
*SECNO 1900.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1900.000	12.61	1594.80	1594.80	.00	1597.11	2.31	.20	.10	1592.19
2210.4	91.3	1940.8	178.3	17.0	151.3	27.9	21.0	17.9	1592.19
.19	5.37	12.82	6.40	.015	.015	.015	.000	1582.19	1180.30
.002110	67.	59.	61.	0	15	0	.00	42.26	1222.56

CCHV= .300 CEHV= .500

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	.00	1.50	2.70	114.00	12.00	.00	120.00	.00	1588.88	1582.19

*SECNO 2000.000
PRESS FLOW BECAUSE EGLWC OF 1602.90 EXCEEDS 1.5 DEPTH

3301 HV CHANGED MORE THAN HVINS

PRESSURE FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
1602.70	1602.90	.00	0.	2210.	120.	40.	1592.19	1603.83	0.

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3710 WSEL ASSUMED BASED ON MIN DIFF
3693 PROBABLE MINIMUM SPECIFIC ENERGY

2000.000	12.70	1601.58	1601.34	.00	1602.91	1.33	.53	5.06	1598.88

2210.4	283.7	1580.4	346.3	54.8	152.4	60.2	22.7	18.4	1598.80
.20	5.18	10.37	5.75	.015	.015	.015	.000	1588.88	1005.53
.001362	320.	320.	303.	20	5	0	.00	84.63	1090.16

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

CCHV= .300 CEHV= .500
*SECNO 2100.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 6.06

2100.000	13.19	1603.19	1595.96	.00	1603.29	.10	.01	.37	1596.00
3478.0	494.7	2765.4	217.9	437.4	1009.7	222.4	23.9	18.6	1596.00
.21	1.13	2.74	.98	.040	.025	.040	.000	1590.00	1011.17
.000092	59.	50.	55.	2	14	0	.00	236.34	1247.51

CCHV= .100 CEHV= .300
*SECNO 2200.000
3280 CROSS SECTION 2200.00 EXTENDED 1.30 FEET

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.74

2200.000	10.30	1603.30	1598.07	.00	1603.31	.01	.02	.01	1598.00
3478.0	105.2	1558.3	1814.5	237.6	1275.7	2652.0	44.5	22.0	1598.00
.30	.44	1.22	.68	.040	.025	.040	.000	1593.00	49.62
.000030	383.	329.	274.	2	24	0	.00	730.02	779.64

CCHV= .100 CEHV= .300
*SECNO 2300.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .29

3470 ENCROACHMENT STATIONS= .0 453.1 TYPE= 1 TARGET= 453.089

2300.000	9.22	1603.22	1600.58	.00	1603.38	.16	.02	.04	1600.00
3478.0	233.1	2407.5	837.4	205.4	640.3	610.8	64.6	26.3	1600.00
.33	1.13	3.76	1.37	.040	.025	.040	.000	1594.00	41.44
.000349	320.	312.	311.	3	17	0	.00	460.34	501.78

*SECNO 2330.000

1

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

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .42

2330.000	7.08	1603.08	1602.18	.00	1603.67	.58	.16	.13	1601.00
3478.0	152.1	3191.8	134.1	81.5	499.9	82.5	70.3	28.3	1601.60
.34	1.87	6.39	1.63	.040	.025	.040	.000	1596.00	1071.02
.001998	235.	240.	222.	4	19	0	.00	315.64	1386.66

*SECNO 2350.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2350.000	2.46	1604.46	1604.46	.00	1605.18	.72	.24	.04	1604.00
3478.0	1.0	3473.1	3.9	.8	509.0	3.1	71.3	29.0	1604.00
.35	1.25	6.82	1.26	.040	.025	.040	.000	1602.00	1021.59
.008305	151.	63.	123.	0	22	0	.00	377.07	1398.65

*SECNO 2400.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2400.000	6.53	1604.53	1604.53	.00	1605.78	1.25	.37	.16	1602.00
3478.0	449.1	2777.1	251.8	170.2	279.0	94.7	72.4	29.7	1602.00
.35	2.64	9.95	2.66	.040	.025	.040	.000	1598.00	431.05
.002963	178.	71.	109.	0	17	0	.00	241.15	672.21

*SECNO 2500.000
7185 MINIMUM SPECIFIC ENERGY

```
3720 CRITICAL DEPTH ASSUMED
  2500.000      4.37   1606.37   1606.37       .00   1607.75      1.38       .70       .04   1604.00
    3478.0     711.6    2737.8      28.6     160.1     264.3       9.2      74.5      30.5   1604.00
       .35      4.44     10.36      3.11      .040      .025      .040      .000   1602.00     89.63
   .005182      187.      180.      183.         0        14         0       .00    161.89    251.53


*SECNO 2600.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2600.000      4.06   1610.06   1610.06       .00   1611.42      1.36      2.18       .00   1612.00
    3474.0        .0    3474.0        .0        .0     371.2        .0      77.8      31.8   1612.00
       .36       .00      9.36       .00      .000      .025      .000      .000   1606.00    779.60
   .006818      321.      373.      391.         0        11         0       .00    139.82    919.42


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   24SEP99      16:51:23                                                                          PAGE   22

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


*SECNO 2700.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  2700.000      4.56   1612.56   1612.56       .00   1613.79      1.23      1.69       .01   1614.00
    3474.0        .0    3474.0        .0        .0     390.8        .0      80.0      32.6   1614.00
       .37       .00      8.89       .00      .000      .025      .000      .000   1608.00    649.69
   .006863      250.      247.      237.         0         8         0       .00    160.77    810.46


*SECNO 2800.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=      263.2     507.8  TYPE=      1  TARGET=     -263.200
 ELENCL=   1616.00  ELENCR= 100000.00
  2800.000      5.31   1615.31   1615.31       .00   1616.64      1.33      2.58       .03   1616.00
    3474.0        .0    3474.0        .0        .0     375.1        .0      83.3      33.9   1616.00
       .38       .00      9.26       .00      .000      .025      .000      .000   1610.00    267.64
   .006844      263.      377.      390.         0        11         0       .00    144.58    412.22


*SECNO 2900.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=      392.8     890.2  TYPE=      1  TARGET=     -392.800
 ELENCL=   1620.51  ELENCR= 100000.00
  2900.000      6.57   1618.57   1618.57       .00   1619.51       .94      2.33       .04   1620.00
    3474.0        .0    3474.0        .0        .0     446.7        .0      86.0      35.4   1620.00
       .39       .00      7.78       .00      .000      .025      .000      .000   1612.00    511.02
   .009381      293.      292.      274.         0        11         0       .00    282.84    793.86


*SECNO 3000.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  3000.000      6.69   1620.69   1620.69       .00   1621.93      1.23      2.19       .09   1620.00
    3474.0     139.6    3329.4       5.0      72.5     365.9       4.1      89.6      37.5   1620.00
       .41      1.93      9.10      1.22      .040      .025      .040      .000   1614.00    232.84
   .004467      406.      350.      342.         0         5         0       .00    222.85    455.69


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   24SEP99      16:51:23                                                                          PAGE   23

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


*SECNO 3100.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  3100.000      6.66   1624.66   1624.66       .00   1625.94      1.28      1.66       .01   1626.00
    3474.0        .0    3474.0        .0        .0     382.6        .0      92.6      38.9   1626.00
       .41       .00      9.08       .00      .000      .025      .000      .000   1618.00    241.79
   .006816      383.      302.      294.         0         5         0       .00    149.43    391.22


*SECNO 3200.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  3200.000      5.52   1627.52   1627.52       .00   1629.64      2.11      2.49       .25   1630.00
    3474.0        .0    3474.0        .0        .0     297.8        .0      95.6      39.9   1630.00
       .42       .00     11.67       .00      .000      .025      .000      .000   1622.00    254.47
   .005981      427.      390.      396.         0        11         0       .00     71.99    326.45
```

*SECNO 3300.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3300.000	3.38	1631.38	1631.36	.00	1632.76	1.38	3.05	.07	1636.00
3474.0	.0	3474.0	.0	.0	368.4	.0	99.3	41.0	1636.00
.44	.00	9.43	.00	.000	.025	.000	.000	1628.00	48.20
.006678	463.	483.	416.	3	14	0	.00	132.80	535.55

*SECNO 3400.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3400.000	5.11	1639.11	1639.11	.00	1639.82	.72	3.21	.07	1640.00
3474.0	.0	3474.0	.0	.0	511.1	.0	103.4	43.5	1640.00
.45	.00	6.80	.00	.000	.025	.000	.000	1634.00	95.51
.009731	467.	402.	326.	0	17	0	.00	408.71	504.21

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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 3500.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.41

3500.000	2.15	1642.15	1641.90	.00	1642.55	.40	2.69	.03	1646.00
3474.0	.0	3474.0	.0	.0	685.7	.0	108.9	47.7	1646.00
.48	.00	5.07	.00	.000	.025	.000	.000	1640.00	1165.28
.004861	446.	403.	364.	5	22	0	.00	507.21	1672.49

*SECNO 3600.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3600.000	1.42	1647.42	1647.42	.00	1648.05	.64	2.26	.07	1648.00
3474.0	.0	3474.0	.0	.0	542.3	.0	114.0	51.6	1648.00
.49	.00	6.41	.00	.000	.025	.000	.000	1646.00	184.97
.008531	366.	359.	357.	0	14	0	.00	430.17	615.14

*SECNO 3700.000

3700.000	2.06	1650.06	1649.75	.00	1650.55	.49	2.48	.01	1652.00
3474.0	.0	3474.0	.0	.0	617.2	.0	119.4	55.3	1652.00
.51	.00	5.63	.00	.000	.025	.000	.000	1648.00	115.62
.004530	398.	410.	401.	3	11	0	.00	369.76	485.38

*SECNO 3800.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3800.000	2.25	1656.25	1656.25	.00	1656.94	.70	4.01	.06	1660.00
3474.0	.0	3474.0	.0	.0	518.7	.0	128.1	61.1	1658.00
.54	.00	6.70	.00	.000	.025	.000	.000	1654.00	48.18
.008386	480.	666.	713.	0	8	0	.00	379.85	428.03

*SECNO 3900.000

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

3900.000	2.79	1658.79	1658.78	.00	1659.61	.83	2.63	.04	1660.00
2318.0	.0	2318.0	.0	.0	317.6	.0	131.2	63.2	1662.00
.55	.00	7.30	.00	.000	.025	.000	.000	1656.00	96.78
.007964	468.	320.	238.	2	11	0	.00	196.62	293.40

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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 4000.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4000.000	4.62	1664.62	1664.62	.00	1665.76	1.14	3.52	.09	1666.00
2318.0	.0	2318.0	.0	.0	270.2	.0	134.3	64.9	1666.30
.57	.00	8.58	.00	.000	.025	.000	.000	1660.00	66.94
.007186	445.	466.	478.	0	14	0	.00	120.65	187.58

*SECNO 4100.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4100.000	4.34	1670.34	1670.34	.00	1671.28	.94	3.63	.02	1672.00
2318.0	.0	2318.0	.0	.0	298.3	.0	137.6	66.5	1674.00
.59	.00	7.77	.00	.000	.025	.000	.000	1666.00	214.41
.007412	535.	497.	356.	0	12	0	.00	158.44	372.85

*SECNO 4200.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4200.000	4.93	1674.93	1674.93	.00	1675.84	.91	3.00	.00	1678.00
2318.0	.0	2318.0	.0	.0	302.8	.0	140.3	68.0	1680.00
.60	.00	7.65	.00	.000	.025	.000	.000	1670.00	130.55
.007494	285.	402.	297.	0	8	0	.00	166.18	296.74

*SECNO 4300.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4300.000	3.22	1679.22	1679.22	.00	1680.20	.99	2.86	.02	1680.00
2318.0	.0	2318.0	.0	.0	290.6	.0	143.0	69.4	1680.00
.61	.00	7.98	.00	.000	.025	.000	.000	1676.00	178.89
.007442	317.	384.	407.	0	14	0	.00	149.61	328.50

*SECNO 4400.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4400.000	4.01	1684.01	1684.01	.00	1685.31	1.30	3.41	.09	1688.00
2318.0	.0	2318.0	.0	.0	253.1	.0	145.9	70.7	1688.00
.63	.00	9.16	.00	.000	.025	.000	.000	1680.00	1171.90
.006904	432.	476.	439.	0	11	0	.00	99.31	1271.22

1

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

*SECNO 4500.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4500.000	4.55	1690.55	1690.55	.00	1691.73	1.18	3.70	.01	1710.00
2318.0	.0	2318.0	.0	.0	266.1	.0	149.1	72.0	1710.00
.64	.00	8.71	.00	.000	.025	.000	.000	1686.00	174.72
.006979	417.	533.	575.	0	8	0	.00	113.57	288.29

*SECNO 4600.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4600.000	3.99	1695.99	1695.99	.00	1697.15	1.16	3.13	.00	1700.00
2318.0	.0	2318.0	.0	.0	267.7	.0	151.8	73.2	1700.00
.66	.00	8.66	.00	.000	.025	.000	.000	1692.00	199.71
.007167	488.	442.	278.	0	15	0	.00	117.81	317.52

*SECNO 4700.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= .0 442.2 TYPE= 1 TARGET= 442.199

4700.000	4.65	1700.65	1700.65	.00	1701.94	1.30	1.48	.04	1700.00
2318.0	1.2	2241.0	75.8	1.0	241.2	40.4	153.5	74.0	1700.00
.67	1.17	9.29	1.88	.040	.025	.040	.000	1696.00	370.94
.004619	273.	261.	276.	0	11	0	.00	134.71	505.65

*SECNO 4800.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4800.000	5.20	1703.20	1703.20	.00	1705.21	2.01	1.21	.21	1710.00
2318.0	.0	2318.0	.0	.0	203.6	.0	154.7	74.5	1710.00
.67	.00	11.39	.00	.000	.025	.000	.000	1698.00	221.50
.006116	187.	228.	242.	0	8	0	.00	50.94	272.43

CCHV= .100 CEHV= .300
1

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

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*SECNO 4900.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  4900.000      3.90   1705.90   1705.90       .00   1707.53      1.63      2.21       .04   1710.00
  2318.0         .0    2318.0        .0         .0     226.0         .0     156.5      75.0   1710.00
     .68        .00     10.26        .00       .000      .025       .000      .000   1702.00    136.35
  .006483     375.      351.      218.          0        15          0       .00     70.75    207.09


1
   24SEP99      16:51:23                                                                        PAGE   28


 TWSPLIT FLOW AT PULSIPHER/I-15 CULVERT

    ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER     NITER      DSWS       USWS      DSSNO      USSNO
  1267.64    1297.97       2.36   1267.64   1297.97       2.36        12   1601.581   1603.191   2000.000   2100.000


 TWSTATION 1400 - SPLIT FLOW OVER RIGHT BANK

    ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER     NITER      DSWS       USWS      DSSNO      USSNO
   123.29     123.16        .11   1390.93   1421.13       2.15        12   1583.734   1584.915   1400.000   1500.000


 TWSTATION 1300 - SPLIT FLOW OVER RIGHT BANK

    ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER     NITER      DSWS       USWS      DSSNO      USSNO
      .00        .00        .00   1390.93   1421.13       2.15        12   1578.974   1583.734   1300.000   1400.000


 TWSTATION 1200 - SPLIT FLOW OVER LEFT BANK

    ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER     NITER      DSWS       USWS      DSSNO      USSNO
   221.06     221.41        .16   1611.99   1642.54       1.88        12   1577.918   1578.974   1200.000   1300.000


 TWSTATION 1100 - SPLIT FLOW OVER LEFT OVERBANK

    ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER     NITER      DSWS       USWS      DSSNO      USSNO
   675.91     677.11        .18   2287.90   2319.65       1.38        12   1577.501   1577.918   1100.000   1200.000


 TWSTATION 1000 - SPLIT FLOW OVER LEFT BANK

    ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER     NITER      DSWS       USWS      DSSNO      USSNO
   276.76     277.68        .33   2564.66   2597.33       1.27        12   1576.464   1577.501   1000.000   1100.000


 TWSTATION 900 - SPLIT FLOW OVER LEFT BANK

    ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER     NITER      DSWS       USWS      DSSNO      USSNO
   175.30     174.42        .50   2739.96   2771.75       1.15        12   1575.371   1576.464    900.000   1000.000


 TWSTATION 800 - SPLIT FLOW OVER LEFT BANK

    ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER     NITER      DSWS       USWS      DSSNO      USSNO
   124.38     124.61        .19   2864.34   2896.37       1.11        12   1574.782   1575.371    800.000    900.000

1
   24SEP99      16:51:23                                                                        PAGE   29


 TWSTATION 700 - SPLIT FLOW OVER LEFT BANK

    ASQ       QCOMP      ERRAC      TASQ       TCQ       TABER     NITER      DSWS       USWS      DSSNO      USSNO
     7.76       7.70        .81   2872.10   2904.06       1.11        12   1573.282   1574.782    700.000    800.000

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   24SEP99      16:51:23                                                                        PAGE   30


                                                                    THIS RUN EXECUTED 24SEP99    16:51:25

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


Pulsipher Wash

SUMMARY PRINTOUT TABLE  100

      SECNO      EGLWC      ELLC      EGPRS      ELTRD       QPR      QWEIR      CLASS       H3       DEPTH      CWSEL       VCH        EG

*    600.000   1568.81   1568.47   1566.98   1572.66    676.90        .00       2.00        .00       2.73   1568.13       6.66   1568.81

*   2000.000   1602.90   1592.19   1602.70   1603.83   2210.36        .00      10.00        .00      12.70   1601.58      10.37   1602.91
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Pulsipher Wash

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	25.000	.00	.00	.00	1534.00	676.90	1534.42	1534.42	1534.62	125.38	3.58	188.85	60.45
	50.000	293.71	.00	.00	1536.00	676.90	1537.49	1537.47	1537.84	94.02	4.73	143.01	69.81
*	100.000	293.78	.00	.00	1542.00	676.90	1543.78	1543.78	1544.24	97.58	5.43	124.66	68.52
*	150.000	342.19	.00	.00	1550.00	676.90	1550.33	1550.33	1550.49	133.32	3.25	208.58	58.62
*	200.000	235.94	.00	.00	1554.00	676.90	1555.07	1555.07	1555.58	92.45	5.71	118.45	70.40
*	300.000	352.07	.00	.00	1558.00	676.90	1560.02	1560.02	1560.78	80.12	6.99	96.84	75.62
*	400.000	134.41	.00	.00	1560.00	676.90	1562.57	1562.57	1563.10	91.96	5.85	115.73	70.59
*	500.000	74.97	.00	.00	1564.30	676.90	1566.49	1566.49	1567.57	29.45	8.34	81.18	124.73
*	600.000	133.46	1572.66	1568.47	1565.40	676.90	1568.13	.00	1568.81	14.37	6.66	101.71	178.53
*	700.000	112.64	.00	.00	1569.50	676.90	1573.28	1573.28	1573.80	141.64	5.78	117.02	56.88
*	800.000	144.94	.00	.00	1570.00	684.66	1574.78	1574.41	1575.11	61.69	4.63	147.93	87.17
	900.000	103.62	.00	.00	1571.00	809.04	1575.37	1575.29	1576.00	94.12	6.35	127.43	83.39
	1000.000	118.27	.00	.00	1571.15	984.34	1576.46	1576.39	1577.28	112.81	7.26	135.64	92.68
*	1100.000	103.70	.00	.00	1571.40	1261.10	1577.50	1576.96	1578.06	54.21	5.99	210.46	171.28
*	1200.000	110.23	.00	.00	1571.62	1937.01	1577.92	1577.37	1578.71	51.35	7.12	271.91	270.30
*	1300.000	176.37	.00	.00	1572.69	2158.07	1578.97	1578.97	1580.16	77.55	8.73	247.31	245.06
*	1400.000	161.58	.00	.00	1578.00	2158.07	1583.73	1583.73	1584.85	71.34	8.48	254.53	255.50
*	1500.000	108.07	.00	.00	1578.00	2281.36	1584.91	1583.69	1585.21	13.09	4.52	638.35	630.63
	1600.000	196.31	.00	.00	1580.40	2281.36	1585.15	1583.74	1585.46	11.94	4.54	547.11	660.09
*	1650.000	175.57	.00	.00	1582.00	2281.36	1586.70	1586.70	1587.53	44.50	8.87	426.86	341.98
	1700.000	161.13	.00	.00	1582.05	2281.36	1587.61	1587.27	1588.14	30.52	7.06	514.70	412.93
*	1750.000	169.33	.00	.00	1582.10	2281.36	1588.74	1588.74	1589.66	37.35	8.58	394.86	373.29
*	1800.000	170.93	.00	.00	1582.10	2281.36	1590.07	1590.07	1592.18	63.49	11.65	195.90	286.31
*	1900.000	58.98	.00	.00	1582.19	2210.36	1594.80	1594.80	1597.11	21.10	12.82	196.22	481.15

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	2000.000	319.85	1603.83	1592.19	1588.88	2210.36	1601.58	1601.34	1602.91	13.62	10.37	267.39	598.83
*	2100.000	49.81	.00	.00	1590.00	3478.00	1603.19	1595.96	1603.29	.92	2.74	1669.55	3626.49
*	2200.000	328.57	.00	.00	1593.00	3478.00	1603.30	1598.07	1603.31	.30	1.22	4165.37	6321.78
*	2300.000	311.55	.00	.00	1594.00	3478.00	1603.22	1600.58	1603.38	3.49	3.76	1456.41	1861.93
*	2330.000	240.00	.00	.00	1596.00	3478.00	1603.08	1602.18	1603.67	19.98	6.39	663.88	778.04
*	2350.000	63.00	.00	.00	1602.00	3478.00	1604.46	1604.46	1605.18	83.05	6.82	512.91	381.64
*	2400.000	71.00	.00	.00	1598.00	3478.00	1604.53	1604.53	1605.78	29.63	9.95	543.89	638.98
*	2500.000	179.72	.00	.00	1602.00	3478.00	1606.37	1606.37	1607.75	51.82	10.36	433.59	483.15
*	2600.000	373.36	.00	.00	1606.00	3474.00	1610.06	1610.06	1611.42	68.18	9.36	371.22	420.73
*	2700.000	246.94	.00	.00	1608.00	3474.00	1612.56	1612.56	1613.79	68.63	8.89	390.79	419.35
*	2800.000	376.77	.00	.00	1610.00	3474.00	1615.31	1615.31	1616.64	68.44	9.26	375.09	419.93
*	2900.000	292.09	.00	.00	1612.00	3474.00	1618.57	1618.57	1619.51	93.81	7.78	446.70	358.68
*	3000.000	349.71	.00	.00	1614.00	3474.00	1620.69	1620.69	1621.93	44.67	9.10	442.41	519.79
*	3100.000	302.10	.00	.00	1618.00	3474.00	1624.66	1624.66	1625.94	68.16	9.08	382.61	420.78
*	3200.000	390.01	.00	.00	1622.00	3474.00	1627.52	1627.52	1629.64	59.81	11.67	297.81	449.22
	3300.000	482.80	.00	.00	1628.00	3474.00	1631.38	1631.36	1632.76	66.78	9.43	368.45	425.12

*	3400.000	402.24	.00	.00	1634.00	3474.00	1639.11	1639.11	1639.82	97.31	6.80	511.14	352.16
*	3500.000	403.18	.00	.00	1640.00	3474.00	1642.15	1641.90	1642.55	48.61	5.07	685.70	498.27
*	3600.000	358.51	.00	.00	1646.00	3474.00	1647.42	1647.42	1648.05	85.31	6.41	542.32	376.11
	3700.000	409.82	.00	.00	1648.00	3474.00	1650.06	1649.75	1650.55	45.30	5.63	617.21	516.18
*	3800.000	666.00	.00	.00	1654.00	3474.00	1656.25	1656.25	1656.94	83.86	6.70	518.75	379.36
*	3900.000	320.40	.00	.00	1656.00	2318.00	1658.79	1658.78	1659.61	79.64	7.30	317.60	259.74
*	4000.000	465.67	.00	.00	1660.00	2318.00	1664.62	1664.62	1665.76	71.86	8.58	270.18	273.44
*	4100.000	497.00	.00	.00	1666.00	2318.00	1670.34	1670.34	1671.28	74.12	7.77	298.33	269.24
*	4200.000	402.00	.00	.00	1670.00	2318.00	1674.93	1674.93	1675.84	74.94	7.65	302.84	267.78
*	4300.000	383.62	.00	.00	1676.00	2318.00	1679.22	1679.22	1680.20	74.42	7.98	290.61	268.69

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	4400.000	476.00	.00	.00	1680.00	2318.00	1684.01	1684.01	1685.31	69.04	9.16	253.12	278.97
*	4500.000	533.38	.00	.00	1686.00	2318.00	1690.55	1690.55	1691.73	69.79	8.71	266.05	277.47
*	4600.000	442.00	.00	.00	1692.00	2318.00	1695.99	1695.99	1697.15	71.67	8.66	267.73	273.80
*	4700.000	260.86	.00	.00	1696.00	2318.00	1700.65	1700.65	1701.94	46.19	9.29	282.59	341.06
*	4800.000	227.74	.00	.00	1698.00	2318.00	1703.20	1703.20	1705.21	61.16	11.39	203.56	296.41
*	4900.000	351.24	.00	.00	1702.00	2318.00	1705.90	1705.90	1707.53	64.83	10.26	226.02	287.89

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Pulsipher Wash

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	25.000	676.90	1534.42	.00	.00	-3.78	477.84	.00
	50.000	676.90	1537.49	.00	3.07	.00	192.12	293.71
*	100.000	676.90	1543.78	.00	6.29	.00	140.10	293.78
*	150.000	676.90	1550.33	.00	6.55	.00	641.35	342.19
*	200.000	676.90	1555.07	.00	4.74	.00	118.32	235.94
*	300.000	676.90	1560.02	.00	4.95	.00	64.06	352.07
*	400.000	676.90	1562.57	.00	2.54	.00	110.76	134.41
*	500.000	676.90	1566.49	.00	3.92	.00	37.73	74.97
*	600.000	676.90	1568.13	.00	1.64	.00	37.73	133.46
*	700.000	676.90	1573.28	.00	5.16	.00	118.74	112.64
*	800.000	684.66	1574.78	.00	1.50	.00	112.70	144.94
	900.000	809.04	1575.37	.00	.59	.00	82.64	103.62
	1000.000	984.34	1576.46	.00	1.09	.00	81.87	118.27
*	1100.000	1261.10	1577.50	.00	1.04	.00	97.61	103.70
*	1200.000	1937.01	1577.92	.00	.42	.00	94.20	110.23
*	1300.000	2158.07	1578.97	.00	1.06	.00	110.21	176.37
*	1400.000	2158.07	1583.73	.00	4.76	.00	114.18	161.58
*	1500.000	2281.36	1584.91	.00	1.18	.00	400.48	108.07
	1600.000	2281.36	1585.15	.00	.23	.00	247.03	196.31
*	1650.000	2281.36	1586.70	.00	1.55	.00	261.19	175.57
	1700.000	2281.36	1587.61	.00	.91	.00	293.78	161.13
*	1750.000	2281.36	1588.74	.00	1.13	.00	218.35	169.33
*	1800.000	2281.36	1590.07	.00	1.33	.00	46.61	170.93
*	1900.000	2210.36	1594.80	.00	4.73	.00	42.26	58.98

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	2000.000	2210.36	1601.58	.00	6.78	.00	84.63	319.85
*	2100.000	3478.00	1603.19	.00	1.61	.00	236.34	49.81
*	2200.000	3478.00	1603.30	.00	.11	.00	730.02	328.57
*	2300.000	3478.00	1603.22	.00	-.08	.00	460.34	311.55
*	2330.000	3478.00	1603.08	.00	-.13	.00	315.64	240.00
*	2350.000	3478.00	1604.46	.00	1.37	.00	377.07	63.00
*	2400.000	3478.00	1604.53	.00	.08	.00	241.15	71.00
*	2500.000	3478.00	1606.37	.00	1.84	.00	161.89	179.72
*	2600.000	3474.00	1610.06	.00	3.69	.00	139.82	373.36
*	2700.000	3474.00	1612.56	.00	2.50	.00	160.77	246.94
*	2800.000	3474.00	1615.31	.00	2.75	.00	144.58	376.77
*	2900.000	3474.00	1618.57	.00	3.27	.00	282.84	292.09
*	3000.000	3474.00	1620.69	.00	2.12	.00	222.85	349.71
*	3100.000	3474.00	1624.66	.00	3.96	.00	149.43	302.10
*	3200.000	3474.00	1627.52	.00	2.87	.00	71.99	390.01
	3300.000	3474.00	1631.38	.00	3.85	.00	132.80	482.80
*	3400.000	3474.00	1639.11	.00	7.73	.00	408.71	402.24
*	3500.000	3474.00	1642.15	.00	3.04	.00	507.21	403.18
*	3600.000	3474.00	1647.42	.00	5.27	.00	430.17	358.51
	3700.000	3474.00	1650.06	.00	2.64	.00	369.76	409.82
*	3800.000	3474.00	1656.25	.00	6.19	.00	379.85	666.00
*	3900.000	2318.00	1658.79	.00	2.54	.00	196.62	320.40
*	4000.000	2318.00	1664.62	.00	5.83	.00	120.65	465.67
*	4100.000	2318.00	1670.34	.00	5.72	.00	158.44	497.00
*	4200.000	2318.00	1674.93	.00	4.58	.00	166.18	402.00
*	4300.000	2318.00	1679.22	.00	4.29	.00	149.61	383.62

1

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	4400.000	2318.00	1684.01	.00	4.79	.00	99.31	476.00
*	4500.000	2318.00	1690.55	.00	6.54	.00	113.57	533.38
*	4600.000	2318.00	1695.99	.00	5.44	.00	117.81	442.00
*	4700.000	2318.00	1700.65	.00	4.66	.00	134.71	260.86
*	4800.000	2318.00	1703.20	.00	2.55	.00	50.94	227.74
*	4900.000	2318.00	1705.90	.00	2.70	.00	70.75	351.24

1

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 25.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

CAUTION SECNO= 100.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 100.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 150.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 150.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 200.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 200.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 300.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 300.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

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 CAUTION SECNO=     400.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     400.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=     500.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     500.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=     600.000  PROFILE=  1  HYDRAULIC JUMP D.S.
 WARNING SECNO=     600.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=     700.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     700.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=     800.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=    1100.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=    1200.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=    1300.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    1300.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    1400.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    1400.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=    1500.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=    1650.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    1650.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    1750.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    1750.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    1800.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    1800.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    1900.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    1900.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
1
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 CAUTION SECNO=    2000.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=    2000.000  PROFILE=  1  WSEL ASSUMED BASED ON MIN DIFF
 CAUTION SECNO=    2000.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=    2100.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=    2200.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=    2300.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=    2330.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=    2350.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    2350.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    2400.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    2400.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    2500.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    2500.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    2600.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    2600.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    2700.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    2700.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    2800.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    2800.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    2900.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    2900.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    3000.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    3000.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    3100.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    3100.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    3200.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    3200.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    3400.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    3400.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=    3500.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=    3600.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    3600.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    3800.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    3800.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
1
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WARNING SECNO=   3900.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=   4000.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   4000.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=   4100.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   4100.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=   4200.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   4200.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=   4300.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   4300.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=   4400.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   4400.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=   4500.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   4500.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=   4600.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   4600.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=   4700.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   4700.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=   4800.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   4800.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=   4900.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   4900.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
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PULSROB5.OUT

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1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE    24SEP99    TIME   16:51:39 *
 *****************************************

                                          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
    24SEP99      16:51:39                                                                    PAGE    1


                                                                    THIS RUN EXECUTED 24SEP99    16:51:39
 ************************************
 HEC-2 WATER SURFACE PROFILES

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

T1      550-035
T2      Mequite Wash FIS Restudy
T3      Pulsipher Wash

J1  ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                2                             -1                            123    1558.1

J2  NPROF      IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     -1                  -1                                      -1        -6

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    100                  150

NC     0.04      0.04      0.04       0.1       0.3
X1      200         6      1000   1329.12
GR     1558      1000      1558   1118.84      1558    1173.86      1558    1253.38      1558     1290.3
GR     1560   1329.12

NC     0.04      0.04      0.04       0.1       0.3
X1      300         3      1000   1258.22    349.75      370.8    349.75
GR     1562      1000      1562      1150      1562    1258.22

NC     0.04      0.04      0.04       0.1       0.3
X1      400         6    921.41   1238.96    153.59       150    150.38
GR     1568    921.41      1566      1000      1566    1096.17      1566    1102.24      1566     1205.81
GR     1568   1238.96

NC     0.04      0.04      0.04       0.1       0.3
X1      500         7      1000   1327.56     61.14      109.96   100.44
GR     1574      1000      1572   1004.96      1572      1035.9     1572    1079.14      1572     1133.51
GR     1572   1317.04    1572.5   1327.56

NC     0.04      0.04      0.04       0.1       0.3
X1      600         7   2832.48   3146.68    122.03      131.14   133.46
X3       10                                                          1574      1573.7
GR     1574   2706.23      1574   2810.59      1574    2832.48    1572.6    2866.27    1572.6     2963.4
GR  1572.6   3102.68    1573.7   3146.68
1
    24SEP99      16:51:39                                                                    PAGE    2


NC     0.04      0.04      0.04
X1      700         7   2330.75   2748.19    133.44      79.47    112.64
X3       10                                                          1574.9    1574
GR  1574.9   2330.75    1574.5   2366.44      1574     2409.4    1572.7    2453.34    1572.7    2564.87
GR  1572.7   2717.29      1574   2748.19

NC     0.04      0.04      0.04
X1      800         7   1903.89   2392.94    134.63      139.86   144.94
X3       10                                                          1576      1574
GR     1576   1903.89      1574   1968.96    1573.2     2017.28    1573.2     2207.8    1573.2    2344.84
GR     1574   2392.94      1574   2407.17

NC     0.04      0.04      0.04
X1      900         9   1686.84    2209.7    102.08      108.33   103.62
X3       10                                                          1577      1574
GR     1577   1686.84    1575.8   1705.75      1574    1749.48    1573.7    1798.67    1573.7    1915.16
GR  1573.7   2060.43    1573.7   2160.73      1574     2209.7      1574    2230.82
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NC     0.04       0.04       0.04
X1     1000          8    1568.37    2121.11     116.93     121.55     118.27
X3       10                                                          1577.2     1575.3
GR   1577.2    1568.37     1576.5    1597.74       1576    1625.79     1575.5    1648.15     1574.3    1710.01
GR   1574.3    1879.49     1574.3    2080.17     1575.3    2121.11

NC     0.04       0.04       0.04
X1     1100          7    1417.67    1982.94     102.45      103.7      103.7
X3       10                                                          1577.4     1575.7
GR   1577.4    1417.67     1576.5    1447.13       1576    1476.62     1574.7    1519.36     1574.7    1720.11
GR   1574.7    1929.89     1575.7    1982.94

NC     0.04       0.04       0.04
X1     1200          8    1272.58    1831.23     111.55     110.23     110.23
X3       10                                                          1577.5     1576.5
GR   1577.5    1272.58     1576.5    1301.79       1576    1333.43     1575.1    1378.11     1575.1    1575.34
GR   1575.1    1770.67       1576    1817.16     1576.5    1831.23

NC     0.04       0.04       0.04
X1     1300          9    1260.24    1735.14     198.91     153.42     176.37
X3       10                                                                      1577
GR   1578    1236.12       1578    1241.05       1578    1260.24       1576    1268.87     1575.6    1313.34
GR   1575.6    1502.88     1575.6    1676.59       1576    1718.52       1577    1735.14

NC     0.04       0.04       0.04        0.1        0.3
X1     1400          9    1412.25    1776.42     122.02     190.42     161.58
X3       10                                                                      1578
GR   1580    1339.52       1580    1372.19       1580    1412.25       1578    1435.3      1577.3    1471.82
GR   1577.3    1586.97     1577.3    1740.73       1578    1776.42       1578    1799.37
```

1

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

```
*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

CCHV=     .100 CEHV=     .300
*SECNO 200.000
3280 CROSS SECTION    200.00 EXTENDED       .18 FEET

3720 CRITICAL DEPTH ASSUMED
   200.000       .18   1558.18   1558.18   1558.10   1558.26       .09       .00       .00   1558.00
     123.0        .0     123.0        .0        .0      51.2        .0        .0        .0   1560.00
       .00       .00      2.40       .00      .000      .040      .000      .000   1558.00   1000.00
   .042920        0.        0.        0.         0        13         0       .00    293.70   1293.70


CCHV=     .100 CEHV=     .300
*SECNO 300.000
3280 CROSS SECTION    300.00 EXTENDED       .35 FEET


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.82

   300.000       .35   1562.35   1562.19       .00   1562.38       .03      4.11       .01   1562.00
     123.0        .0     123.0        .0        .0      90.7        .0        .6       2.2   1562.00
       .07       .00      1.36       .00      .000      .040      .000      .000   1562.00   1000.00
   .005387       350.      350.      371.         8         8         0       .00    258.22   1258.22


CCHV=     .100 CEHV=     .300
*SECNO 400.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   400.000       .22   1566.22   1566.22       .00   1566.33       .11      1.74       .02   1568.00
     123.0        .0     123.0        .0        .0      46.3        .0        .8       3.0   1568.00
       .09       .00      2.65       .00      .000      .040      .000      .000   1566.00    991.41
   .040277       154.      150.      150.         0        14         0       .00    218.02   1209.43


CCHV=     .100 CEHV=     .300
*SECNO 500.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
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

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   500.000       .17   1572.17   1572.17       .00   1572.25       .08      4.14       .00   1574.00
     123.0        .0     123.0        .0        .0      53.0        .0        .9       3.7   1572.50
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      .10       .00      2.32       .00      .000      .040      .000      .000   1572.00   1004.54
   .042256       61.       100.      110.         0        15         0       .00    316.05   1320.59


 CCHV=      .100 CEHV=      .300
 *SECNO 600.000

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  4.25


 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1574.00 ELREA=      1573.70

   600.000       .46   1573.06   1572.80       .00   1573.08       .02       .82       .01   1574.00
     123.0        .0     123.0        .0        .0     117.8        .0       1.2       4.5   1573.70
       .13       .00      1.04       .00      .000      .040      .000      .000   1572.60   2854.96
   .002344       122.      133.      131.         6         8         0       .00    266.47   3121.43


 *SECNO 700.000

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


 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1574.90 ELREA=      1574.00

   700.000       .55   1573.25   1572.89       .00   1573.26       .01       .18       .00   1574.90
     123.0        .0     123.0        .0        .0     153.1        .0       1.5       5.3   1574.00
       .17       .00       .80       .00      .000      .040      .000      .000   1572.70   2434.84
   .001124       133.      113.       79.         5        15         0       .00    295.46   2730.30


 *SECNO 800.000

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .51


 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1576.00 ELREA=      1574.00

   800.000       .32   1573.52   1573.36       .00   1573.54       .02       .28       .00   1576.00
     123.0        .0     123.0        .0        .0     112.0        .0       2.0       6.4   1574.00
       .21       .00      1.10       .00      .000      .040      .000      .000   1573.20   1997.78
   .004240       135.      145.      140.         1        14         0       .00    366.47   2364.25


1
    24SEP99      16:51:39                                                                                PAGE     5

     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 900.000

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1577.00 ELREA=      1574.00

   900.000       .29   1573.99   1573.85       .00   1574.01       .02       .47       .00   1577.00
     123.0        .0     123.0        .0        .0     117.5        .0       2.2       7.4   1574.00
       .24       .00      1.05       .00      .000      .040      .000      .000   1573.70   1751.56
   .004837       102.      104.      108.         3        14         0       .00    456.07   2207.63


 *SECNO 1000.000

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1577.20 ELREA=      1575.30

  1000.000       .29   1574.59   1574.45       .00   1574.61       .02       .60       .00   1577.20
     123.0        .0     123.0        .0        .0     108.4        .0       2.6       8.5   1575.30
       .27       .00      1.13       .00      .000      .040      .000      .000   1574.30   1695.43
   .005256       117.      118.      122.         3         8         0       .00    396.32   2091.75


 *SECNO 1100.000

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1577.40 ELREA=      1575.70

  1100.000       .31   1575.01   1574.84       .00   1575.02       .01       .41       .00   1577.40
     123.0        .0     123.0        .0        .0     132.0        .0       2.8       9.5   1575.70
       .30       .00       .93       .00      .000      .040      .000      .000   1574.70   1509.13
   .003111       102.      104.      104.         3        11         0       .00    437.28   1946.40


 *SECNO 1200.000

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1577.50 ELREA=      1576.50

  1200.000       .29   1575.39   1575.24       .00   1575.41       .02       .39       .00   1577.50
     123.0        .0     123.0        .0        .0     120.4        .0       3.2      10.6   1576.50
       .33       .00      1.02       .00      .000      .040      .000      .000   1575.10   1363.44
   .004029       112.      110.      110.         3        11         0       .00    422.50   1785.94


 *SECNO 1300.000
1
    24SEP99      16:51:39                                                                                PAGE     6
```

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= 1578.00 ELREA= 1577.00

1300.000	.35	1575.95	1575.75	.00	1575.96	.01	.55	.00	1578.00
123.0	.0	123.0	.0	.0	141.5	.0	3.7	12.3	1577.00
.38	.00	.87	.00	.000	.040	.000	.000	1575.60	1274.14
.002479	199.	176.	153.	3	8	0	.00	439.42	1713.56

CCHV= .100 CEHV= .300
*SECNO 1400.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1580.00 ELREA= 1578.00

1400.000	.18	1577.48	1577.48	.00	1577.57	.09	1.03	.02	1580.00
123.0	.0	123.0	.0	.0	51.4	.0	4.0	13.7	1578.00
.40	.00	2.40	.00	.000	.040	.000	.000	1577.30	1462.20
.041407	122.	162.	190.	0	11	0	.00	287.94	1750.13

THIS RUN EXECUTED 24SEP99 16:51:39

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

Pulsipher Wash

SUMMARY PRINTOUT TABLE 100

	SECNO	EGLWC	ELLC	EGPRS	ELTRD	QPR	QWEIR	CLASS	H3	DEPTH	CWSEL	VCH	EG

Pulsipher Wash

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	200.000	.00	.00	.00	1558.00	123.00	1558.18	1558.18	1558.26	429.20	2.40	51.22	5.94
*	300.000	349.75	.00	.00	1562.00	123.00	1562.35	1562.19	1562.38	53.87	1.36	90.75	16.76
*	400.000	150.38	.00	.00	1566.00	123.00	1566.22	1566.22	1566.33	402.77	2.65	46.33	6.13
*	500.000	100.44	.00	.00	1572.00	123.00	1572.17	1572.17	1572.25	422.56	2.32	52.98	5.98
*	600.000	133.46	.00	.00	1572.60	123.00	1573.06	1572.80	1573.08	23.44	1.04	117.83	25.41
*	700.000	112.64	.00	.00	1572.70	123.00	1573.25	1572.89	1573.26	11.24	.80	153.10	36.69
*	800.000	144.94	.00	.00	1573.20	123.00	1573.52	1573.36	1573.54	42.40	1.10	112.04	18.89
	900.000	103.62	.00	.00	1573.70	123.00	1573.99	1573.85	1574.01	48.37	1.05	117.55	17.68
	1000.000	118.27	.00	.00	1574.30	123.00	1574.59	1574.45	1574.61	52.56	1.13	108.39	16.97
	1100.000	103.70	.00	.00	1574.70	123.00	1575.01	1574.84	1575.02	31.11	.93	131.95	22.05
	1200.000	110.23	.00	.00	1575.10	123.00	1575.39	1575.24	1575.41	40.29	1.02	120.44	19.38
	1300.000	176.37	.00	.00	1575.60	123.00	1575.95	1575.75	1575.96	24.79	.87	141.54	24.71
*	1400.000	161.58	.00	.00	1577.30	123.00	1577.48	1577.48	1577.57	414.07	2.40	51.35	6.04

Pulsipher Wash

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	200.000	123.00	1558.18	.00	.00	.08	293.70	.00
*	300.000	123.00	1562.35	.00	4.18	.00	258.22	349.75
*	400.000	123.00	1566.22	.00	3.87	.00	218.02	150.38
*	500.000	123.00	1572.17	.00	5.95	.00	316.05	100.44
*	600.000	123.00	1573.06	.00	.89	.00	266.47	133.46
*	700.000	123.00	1573.25	.00	.18	.00	295.46	112.64
*	800.000	123.00	1573.52	.00	.28	.00	366.47	144.94
	900.000	123.00	1573.99	.00	.47	.00	456.07	103.62
	1000.000	123.00	1574.59	.00	.59	.00	396.32	118.27
	1100.000	123.00	1575.01	.00	.42	.00	437.28	103.70
	1200.000	123.00	1575.39	.00	.39	.00	422.50	110.23
	1300.000	123.00	1575.95	.00	.55	.00	439.42	176.37
*	1400.000	123.00	1577.48	.00	1.54	.00	287.94	161.58

1

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 200.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

WARNING SECNO= 300.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 400.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 400.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 500.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 500.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 600.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 700.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 800.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 1400.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1400.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

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1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE    24SEP99    TIME   16:51:04 *
 *****************************************
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**************************************
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*  609 SECOND STREET, SUITE D        *
*  DAVIS, CALIFORNIA 95616-4687      *
*        (916) 756-1104              *
**************************************
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X     X  XXXXXXX   XXXXX             XXXXX
X     X  X        X     X           X     X
X     X  X        X                       X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX             XXXXXXX
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1
    24SEP99      16:51:04                                                                    PAGE    1


                                                                  THIS RUN EXECUTED 24SEP99    16:51:04

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

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


 SPLIT FLOW BEING PERFORMED

 SF


 TWSTATION 10300 - RIGHT OVERBANK
 WS      2   10300   10400              2.7
 WC      0  1572.3     135  1573.6

 TWSTATION 10200 - RIGHT OVERBANK
 WS      2   10200   10300              2.7
 WC      0    1572     242  1572.3

 TWSTATION 10100 - RIGHT OVERBANK
 WS      2   10100   10200              2.7
 WC      0    1571     156    1572

 TWSTATION 10000 - RIGHT OVERBANK
 WS      2   10000   10100              2.7
 WC      0    1570     163    1571
1
    24SEP99      16:51:04                                                                    PAGE    2


 T1      550-035
 T2      Mequite Wash FIS Restudy
 T3      Pulsipher Wash
 T4      PULSOUT10.OUT

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                 2                             -1                          1481    1570.2

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      -1                  -1                                      -1        -6


 J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     100                   100       150

 NC     0.04       0.04       0.04        0.1         0.3
 X1    10000          5    1038.91    1647.26
 GR     1574       1000       1572    1038.91      1569.6      1074.4      1569.5     1587.08        1570     1647.26

 X1    10100         12    1046.08    1676.89      166.46       163.1      167.04
 GR     1580       1000       1578    1003.52        1576      1006.81        1574     1010.42        1572     1014.51
 GR     1572    1018.06       1572    1046.08      1571.2      1059.81      1570.6     1221.53      1570.6     1525.01
 GR   1570.6    1629.33       1571    1676.89

 X1    10200         10    1067.68    1706.93       135.8       155.58       140.7
 GR     1584       1000       1582    1003.26        1580      1006.2         1574     1015.87        1572     1067.68
 GR   1571.8    1082.69     1571.3    1272.12      1571.3      1580.72      1571.5     1663.91        1572     1706.93

 X1    10300          9    1038.06    1755.77      170.45      241.71       197.48
 GR     1580       1000       1574    1038.06        1572      1046.67        1572     1056.98        1572      1070.9
 GR     1572    1097.07       1572    1600.21      1572.1        1700       1572.3     1755.77

 X1    10400          8     1017.9    1760.34       142.4      134.75       138.34
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 GR     1576       1000       1574     1017.9       1573.5     1134.53      1573.6     1416.55      1573.6      1600.7
 GR   1573.6     1660.37     1573.6     1707.78      1573.6     1760.34
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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

 *PROF 1

 CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

 CCHV=      .100 CEHV=      .300
 *SECNO 10000.000
 3280 CROSS SECTION  10000.00 EXTENDED        .01 FEET

 3720 CRITICAL DEPTH ASSUMED
  10000.000        .51   1570.01   1570.01   1570.20   1570.23        .22        .00        .00   1572.00
     961.2         .0     961.2        .0        .0     255.0         .0         .0         .0   1570.00
       .00         .00       3.77       .00       .000      .040       .000       .000   1569.50   1068.28
   .030730          0.         0.         0.         0        14          0        .00    578.98   1647.26


 *SECNO 10100.000
 3280 CROSS SECTION  10100.00 EXTENDED        .52 FEET

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.05

  10100.000        .93   1571.53   1571.13        .00   1571.59        .06       1.34        .02   1572.00
     1030.8         .0     1030.8         .0        .0     513.1         .0        1.5        2.3   1571.00
        .02         .00       2.01       .00       .000      .040       .000       .000   1570.60   1054.25
   .003790       166.       167.       163.         4         8          0        .00    622.64   1676.89


 *SECNO 10200.000
 3280 CROSS SECTION  10200.00 EXTENDED        .17 FEET

  10200.000        .88   1572.18   1571.88        .00   1572.27        .09        .67        .01   1572.00
     1123.0         .2     1122.8         .0        .4     474.5         .0        3.1        4.3   1572.00
        .04         .57       2.37       .00       .040      .040       .000       .000   1571.30   1063.18
   .006038       136.       141.       156.         1        14          0        .00    643.75   1706.93


 *SECNO 10300.000
 3280 CROSS SECTION  10300.00 EXTENDED        .69 FEET

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.71
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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


  10300.000        .98   1572.98   1572.50        .00   1573.04        .06        .76        .00   1574.00
     1315.7         .0     1315.7         .0        .0     685.4         .0        5.7        7.4   1572.30
        .07         .00       1.92       .00       .000      .040       .000       .000   1572.00   1042.42
   .002821       170.       197.       242.         2        11          0        .00    713.35   1755.77


 *SECNO 10400.000
 3280 CROSS SECTION  10400.00 EXTENDED        .50 FEET

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
  10400.000        .60   1574.10   1574.10        .00   1574.35        .25        .97        .06   1574.00
     1481.0         .0     1481.0         .0        .0     367.6         .0        7.4        9.7   1573.60
        .08         .06       4.03       .00       .040      .040       .000       .000   1573.50   1017.01
   .030043       142.       138.       135.         0        14          0        .00    743.33   1760.34
```



```
 TWSTATION 10300 - RIGHT OVERBANK

    ASQ        QCOMP      ERRAC      TASQ       TCQ        TABER      NITER      DSWS       USWS       DSSNO      USSNO
    165.34     165.37        .01     165.34     165.37        .01          7  1572.979   1574.100  10300.000  10400.000


 TWSTATION 10200 - RIGHT OVERBANK
```

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
192.61	192.54	.04	357.96	357.91	.01	7	1572.183	1572.979	10200.000	10300.000

TWSTATION 10100 - RIGHT OVERBANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
92.22	92.17	.06	450.18	450.07	.02	7	1571.529	1572.183	10100.000	10200.000

TWSTATION 10000 - RIGHT OVERBANK

ASQ	QCOMP	ERRAC	TASQ	TCQ	TABER	NITER	DSWS	USWS	DSSNO	USSNO
69.59	69.61	.03	519.77	519.69	.02	7	1570.014	1571.529	10000.000	10100.000

THIS RUN EXECUTED 24SEP99 16:51:04

****
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

Pulsipher Wash

SUMMARY PRINTOUT TABLE 100

	SECNO	EGLWC	ELLC	EGPRS	ELTRD	QPR	QWEIR	CLASS	H3	DEPTH	CWSEL	VCH	EG

Pulsipher Wash

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	10000.000	.00	.00	.00	1569.50	961.23	1570.01	1570.01	1570.23	307.30	3.77	255.00	54.83
*	10100.000	167.04	.00	.00	1570.60	1030.82	1571.53	1571.13	1571.59	37.90	2.01	513.10	167.45
	10200.000	140.70	.00	.00	1571.30	1123.04	1572.18	1571.88	1572.27	60.38	2.37	474.92	144.53
*	10300.000	197.48	.00	.00	1572.00	1315.66	1572.98	1572.50	1573.04	28.21	1.92	685.36	247.72
*	10400.000	138.34	.00	.00	1573.50	1481.00	1574.10	1574.10	1574.35	300.43	4.03	367.68	85.44

Pulsipher Wash

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	10000.000	961.23	1570.01	.00	.00	-.19	578.98	.00
*	10100.000	1030.82	1571.53	.00	1.52	.00	622.64	167.04
	10200.000	1123.04	1572.18	.00	.65	.00	643.75	140.70
*	10300.000	1315.66	1572.98	.00	.80	.00	713.35	197.48
*	10400.000	1481.00	1574.10	.00	1.12	.00	743.33	138.34

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 10000.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

WARNING SECNO= 10100.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 10300.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 10400.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 10400.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

ABTCHN13.OUT

```
1*******************************************
 *  HEC-2 WATER SURFACE PROFILES           *
 *                                         *
 *  Version   4.6.2;  May 1991             *
 *                                         *
 *  RUN DATE    20SEP99    TIME   14:12:40  *
 *******************************************

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

                                    X     X  XXXXXXX   XXXXX             XXXXX
                                    X     X  X        X     X           X     X
                                    X     X  X        X                 X
                                    XXXXXXX  XXXX     X          XXXXX   XXXXX
                                    X     X  X        X                 X
                                    X     X  X        X     X           X
                                    X     X  XXXXXXX   XXXXX            XXXXXXX
1
    20SEP99      14:12:40                                                                PAGE    1


                                                                THIS RUN EXECUTED 20SEP99    14:12:40
 ************************************
  HEC-2 WATER SURFACE PROFILES

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


 T1  550.035
 T2  ABBOTT AND PULSIPHER WASHES FIS RESTUDY
 T3  MAIN CHANNEL MODEL

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0         2         0         0        -1         0         0      3156    1608.7         0

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      -1         0        -1                                     -1         0


 J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     101       105       150

 NC    0.04      0.04      0.04      0.1       0.3
 X1     985        36    1774.7    2145.2
 X3      10
 GR  1614.0    1000.0    1612.0    1173.8    1612.0    1202.9    1612.0    1246.7    1612.0    1265.6
 GR  1612.0    1335.7    1612.0    1535.6    1614.0    1749.5    1615.7    1774.7    1614.0    1839.1
 GR  1612.0    1899.5    1610.0    1905.5    1608.0    1909.3    1606.0    1911.7    1604.0    1915.8
 GR  1601.3    1918.8    1601.3    1924.3    1601.3    1930.4    1604.0    1933.4    1606.0    1938.2
 GR  1610.0    1946.8    1612.0    1952.0    1612.0    1965.3    1612.0    1968.9    1614.0    2004.6
 GR  1615.3    2048.1    1616.0    2130.0    1618.0    2145.2    1618.0    2356.9    1618.0    2358.3
 GR  1616.0    2371.3    1616.0    2408.3    1617.3    2421.2    1618.0    2428.4    1618.0    2490.1
 GR  1618.0    2524.5

 NC    0.04      0.04      0.04      0.1       0.3
 X1     990        29    1812.3    2141.5      32.8      57.4      55.0
 X3      10
 GR  1615.7    1000.0    1614.0    1123.9    1612.0    1389.5    1612.0    1539.7    1614.0    1775.5
 GR  1615.9    1812.3    1614.0    1901.0    1612.0    1925.2    1611.7    1930.7    1611.5    1935.7
 GR  1611.4    1938.0    1611.2    1942.1    1611.0    1947.6    1602.0    1953.1    1602.0    1959.2
 GR  1611.1    1963.9    1611.3    1968.7    1611.6    1978.9    1612.0    1989.6    1614.0    2006.1
 GR  1614.6    2046.5    1616.0    2124.8    1618.0    2141.5    1618.0    2185.9    1618.0    2191.1
 GR  1618.0    2369.5    1618.0    2445.3    1618.0    2485.0    1618.0    2501.6

 NC   0.015     0.015     0.015       0.6       0.8
 X1     992        84    1925.2    1937.2      30.2      67.6      43.0
 X3      10                                                                 1616.4    1617.1
 GR  1620.0    1000.0    1618.0    1048.8    1616.0    1154.7    1614.0    1244.9    1614.0    1246.7
 GR  1613.9    1281.2    1613.1    1315.6    1612.5    1337.5    1612.0    1359.7    1612.0    1419.2
 GR  1612.0    1432.9    1612.1    1458.5    1612.3    1522.4    1612.4    1558.0    1612.1    1624.1
 GR  1612.0    1661.5    1613.0    1665.6    1613.3    1716.2    1613.8    1723.6    1615.5    1772.9
 GR  1615.9    1778.4    1616.4    1783.6    1614.8    1827.1    1614.5    1834.2    1614.1    1880.0
1
    20SEP99      14:12:40                                                                PAGE    2


 GR  1614.0    1885.2    1613.4    1890.9    1612.0    1912.6    1612.5    1925.2    1611.0    1925.2
 GR  1603.0    1925.2    1603.0    1931.2    1603.0    1937.2    1611.0    1937.2    1612.8    1937.2
 GR  1613.0    1944.8    1614.0    1948.9    1614.4    1965.8    1614.7    1980.6    1615.0    1994.2
 GR  1616.0    2035.5    1615.9    2037.3    1615.4    2049.3    1616.3    2091.3    1616.4    2096.1
 GR  1616.4    2129.6    1616.4    2140.6    1616.4    2167.4    1616.5    2212.1    1616.5    2228.1
 GR  1616.6    2292.3    1616.7    2341.4    1616.9    2390.8    1617.1    2445.6    1616.7    2449.3
 GR  1617.1    2492.9    1616.0    2509.1    1614.0    2524.4    1612.0    2546.7    1611.8    2598.7
 GR  1611.7    2643.1    1610.7    2676.2    1611.3    2701.2    1612.0    2725.2    1614.0    2736.2
 GR  1616.0    2740.3    1616.2    2747.3    1616.2    2806.7    1616.2    2849.8    1616.0    2855.9
 GR  1614.6    2923.8    1614.0    2952.1    1613.6    3011.7    1613.9    3027.4    1616.0    3064.4
 GR  1618.0    3082.7    1618.4    3108.9    1618.5    3217.0    1618.5    3250.6    1618.6    3285.6
 GR  1618.6    3312.3    1619.1    3360.7    1620.0    3458.2    1622.0    3563.2
```

NC	0.015	0.015	0.015	0.6	0.8					
SC	1.015	0.4	3.0		8.0	12.0	250.0	8.1	1605.4	1603.0
X1	994	100	2245.7	2257.7	328.9	245.3	250.0			
X2			2	1613.4	1623.1					15
X3	10							1623.3	1623.3	
BT	-31	1000.0	1632.1	1626.0	1281.2	1628.7	1624.0	1315.6	1628.0	1623.2
BT		1337.5	1628.0	1623.2	1419.2	1627.2	1623.1	1522.4	1626.2	1622.7
BT		1624.1	1625.3	1622.0	1723.6	1624.7	1621.7	1778.4	1624.0	1621.6
BT		1827.1	1623.8	1621.5	1880.0	1623.7	1621.3	1931.2	1623.6	1620.4
BT		1980.6	1623.5	1620.0	2037.3	1623.4	1619.9	2091.3	1623.3	1619.7
BT		2140.6	1623.2	1619.6	2167.4	1623.1	1619.5	2212.1	1623.2	1618.6
BT		2292.3	1623.4	1618.4	2390.8	1623.6	1618.2	2492.9	1623.7	1618.0
BT		2598.7	1624.0	1617.8	2701.2	1624.2	1617.8	2806.7	1624.4	1617.8
BT		2923.8	1624.6	1617.0	3027.4	1625.0	1617.0	3108.9	1625.2	1617.0
BT		3250.6	1625.2	1617.0	3285.6	1626.0	1617.0	3360.7	1626.0	1617.0
BT		3563.2	1626.0	1617.0						
GR	1626.0	1000.0	1624.1	1275.8	1624.0	1281.2	1623.2	1310.2	1623.2	1315.6
GR	1623.1	1332.1	1622.7	1337.5	1622.0	1345.3	1621.7	1383.3	1621.6	1419.2
GR	1621.5	1435.3	1621.3	1487.6	1620.4	1522.4	1620.0	1535.3	1619.9	1539.3
GR	1619.7	1593.1	1619.6	1624.1	1619.5	1646.0	1618.6	1696.9	1618.4	1723.6
GR	1618.2	1745.2	1618.0	1759.1	1617.8	1773.0	1617.8	1778.4	1617.8	1797.8
GR	1617.0	1818.7	1617.0	1827.1	1617.0	1849.0	1617.0	1880.0	1617.0	1904.2
GR	1617.0	1931.2	1617.0	1958.9	1617.1	1980.6	1617.1	1995.9	1618.0	2009.9
GR	1618.0	2037.3	1618.0	2044.5	1619.0	2063.8	1619.1	2091.3	1619.2	2112.6
GR	1619.4	2119.3	1619.5	2140.6	1619.5	2162.0	1619.5	2167.4	1619.5	2180.7
GR	1619.0	2199.4	1618.8	2203.8	1618.5	2212.1	1618.0	2224.8	1617.7	2230.4
GR	1617.0	2237.7	1616.0	2240.6	1615.2	2243.5	1615.2	2245.7	1613.4	2245.7
GR	1605.4	2245.7	1605.4	2251.7	1605.4	2257.7	1613.4	2257.7	1615.1	2257.7
GR	1615.1	2259.5	1616.0	2272.7	1617.0	2283.1	1617.4	2287.8	1617.7	2292.3
GR	1618.0	2297.6	1618.9	2330.3	1619.0	2337.7	1619.7	2382.2	1619.8	2390.8
GR	1620.0	2415.1	1620.2	2435.7	1621.0	2461.8	1621.4	2487.5	1621.5	2492.9
GR	1622.0	2510.1	1622.0	2517.2	1621.1	2540.3	1621.0	2542.7	1620.6	2593.3
GR	1620.6	2598.7	1620.8	2643.3	1620.7	2695.8	1620.7	2701.2	1620.7	2748.2
GR	1620.8	2801.3	1621.0	2806.7	1621.5	2853.2	1621.6	2923.8	1621.1	3027.4
GR	1621.1	3108.9	1622.0	3153.8	1621.0	3218.7	1620.2	3250.6	1620.0	3277.7
GR	1620.0	3285.6	1620.0	3328.5	1620.3	3360.7	1620.6	3379.1	1625.8	3563.2

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NC	0.04	0.04	0.025	0.1	0.8					
X1	1000	45	1784.5	1895.9	32.3	22.1	19.0			
X3	10									
GR	1626.0	1000.0	1624.0	1026.0	1622.0	1064.2	1620.0	1097.7	1618.0	1201.8
GR	1617.0	1269.8	1617.0	1560.2	1618.0	1681.8	1618.0	1784.5	1617.0	1808.2
GR	1616.2	1810.2	1615.4	1812.2	1614.6	1814.2	1613.7	1816.4	1612.9	1818.4
GR	1612.1	1820.4	1611.3	1822.4	1610.5	1824.3	1609.7	1826.2	1608.9	1828.2
GR	1608.1	1830.2	1606.0	1835.4	1606.0	1840.1	1607.0	1840.9	1608.0	1842.5
GR	1609.0	1844.0	1610.0	1845.8	1611.0	1847.3	1612.0	1848.6	1613.0	1850.1
GR	1614.0	1852.0	1615.0	1853.5	1616.0	1857.4	1617.0	1873.7	1618.0	1895.9
GR	1619.0	1980.8	1619.5	2062.5	1619.0	2076.5	1620.0	2080.1	1621.0	2083.7
GR	1622.0	2087.7	1623.0	2091.5	1624.0	2095.2	1625.0	2100.1	1626.0	2104.7

NC	0.04	0.04	0.025	0.1	0.3					
X1	1002	45	1710.5	1797.2	84.3	29.5	52.0			
X3	10									
GR	1626.0	1000.0	1624.0	1030.1	1622.0	1066.5	1620.0	1123.4	1618.0	1222.3
GR	1617.0	1421.5	1617.0	1528.8	1617.1	1710.5	1617.0	1724.8	1616.0	1734.6
GR	1615.0	1741.7	1614.0	1748.0	1613.0	1751.2	1612.0	1754.8	1611.0	1757.6
GR	1610.0	1759.8	1609.0	1762.2	1608.0	1764.2	1607.0	1766.4	1606.0	1769.4
GR	1606.0	1771.7	1606.0	1776.6	1607.0	1778.0	1608.0	1779.2	1609.0	1780.8
GR	1610.0	1782.3	1611.0	1784.9	1612.0	1786.4	1613.0	1788.5	1614.0	1790.6
GR	1615.0	1792.7	1616.0	1794.9	1617.0	1797.2	1618.0	1927.1	1618.0	1975.6
GR	1618.0	1998.1	1618.0	2003.1	1619.0	2005.9	1620.0	2008.1	1621.0	2011.4
GR	1622.0	2013.9	1623.0	2016.8	1624.0	2019.5	1625.0	2022.1	1626.0	2025.4

NC	0.04	0.04	0.025	0.1	0.3					
X1	1005	47	1327.0	1482.9	251.1	196.2	195.0			
X3	10									
GR	1626.0	1000.0	1625.0	1007.5	1624.0	1033.7	1623.0	1054.9	1621.0	1092.6
GR	1620.0	1120.2	1619.0	1147.3	1618.0	1178.9	1618.0	1321.2	1618.0	1327.0
GR	1617.0	1347.9	1616.0	1352.3	1615.0	1356.9	1614.0	1360.4	1613.0	1362.9
GR	1612.0	1365.1	1611.0	1367.3	1610.0	1369.5	1609.0	1371.8	1608.0	1374.1
GR	1607.0	1376.4	1607.0	1385.8	1608.0	1387.6	1609.0	1389.1	1610.0	1393.6
GR	1611.0	1400.4	1612.0	1407.1	1613.0	1413.7	1614.0	1419.0	1615.0	1424.2
GR	1616.0	1431.7	1617.0	1444.4	1618.0	1463.5	1619.0	1482.9	1618.0	1499.9
GR	1618.0	1543.4	1618.0	1570.0	1617.0	1633.1	1617.0	1637.5	1617.0	1655.5
GR	1617.0	1656.3	1618.0	1660.4	1619.0	1664.7	1620.0	1668.9	1621.0	1673.1
GR	1622.0	1676.1	1626.0	1684.1						

NC	0.04	0.04	0.025	0.1	0.3					
X1	1010	52	1160.0	1275.6	148.0	134.3	140.0			
X3	10					1287.0	1619.0			
GR	1626.0	1000.0	1625.0	1002.7	1624.0	1006.0	1623.0	1008.9	1622.0	1016.3
GR	1621.0	1025.5	1620.0	1051.3	1619.0	1160.0	1618.0	1164.5	1617.0	1168.9
GR	1616.0	1173.4	1615.0	1177.7	1614.0	1180.9	1613.0	1183.7	1612.0	1186.6
GR	1611.0	1189.5	1610.0	1191.7	1609.0	1192.8	1608.0	1194.1	1608.0	1204.7
GR	1609.0	1205.9	1610.0	1207.1	1611.0	1211.2	1612.0	1215.4	1613.0	1219.9
GR	1614.0	1224.9	1615.0	1229.8	1616.0	1235.2	1617.0	1245.6	1618.0	1268.1
GR	1619.0	1275.6	1619.0	1287.0	1618.0	1290.6	1617.0	1293.1	1616.0	1297.7
GR	1616.0	1302.6	1617.0	1303.4	1618.0	1304.1	1619.0	1305.1	1619.0	1381.0
GR	1619.0	1394.9	1619.0	1460.9	1618.0	1515.7	1618.0	1523.3	1619.0	1527.3
GR	1620.0	1531.1	1621.0	1535.7	1622.0	1538.5	1623.0	1540.9	1624.0	1543.7

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GR   1625.0     1546.6     1626.0     1549.4

NC      0.03       0.03      0.025        0.5        0.6
X1      1012         35     1064.8     1439.2       91.6      138.8       97.0
GR   1628.0     1000.0     1627.0     1035.3     1626.0     1064.8     1625.0     1067.2     1624.0     1069.7
GR   1623.0     1072.1     1622.0     1074.7     1621.0     1077.7     1620.0     1081.2     1619.0     1084.5
GR   1618.0     1087.5     1617.0     1090.5     1616.0     1093.1     1615.0     1095.2     1614.0     1096.9
GR   1613.0     1098.7     1612.0     1100.4     1611.0     1101.9     1610.0     1105.0     1610.0     1131.7
GR   1611.0     1134.0     1612.0     1138.0     1613.0     1139.2     1614.0     1141.2     1615.0     1144.0
GR   1616.0     1147.3     1617.0     1150.7     1618.0     1153.8     1619.0     1160.9     1620.0     1199.9
GR   1621.0     1360.8     1622.0     1400.2     1623.0     1408.7     1624.0     1419.9     1625.0     1439.2

NC      0.03       0.03      0.025        0.6        0.8
X1      1015         33       1000       1130      138.2       96.4      124.0
X3        10
GR   1626.0     1000.0     1625.0     1009.3     1624.0     1018.4     1623.0     1025.5     1622.0     1032.3
GR   1621.0     1036.3     1620.0     1043.5     1619.0     1050.3       1619     1056.1       1619     1059.9
GR     1619     1063.6       1619     1066.3       1619     1068.4       1619     1069.2       1619     1071.0
GR     1619     1072.4       1619     1080.4       1619     1087.3       1619     1088.9       1619     1090.6
GR     1619     1092.3       1619     1094.3       1619     1097.1       1619     1100.5       1619     1103.7
GR   1619.0     1107.9     1620.0     1111.8     1621.0     1115.1     1622.0     1117.1     1623.0     1119.2
GR   1624.0     1121.2     1625.0     1123.9     1626.0     1130.0

NC      0.03       0.03      0.025        0.5        0.6
X1      1017         51     1243.7     1426.7       87.6      102.0       95.0
X3        10                          1197.3     1628.0
GR   1632.0     1000.0     1631.0     1007.6     1630.0     1014.8     1629.0     1022.1     1628.0     1023.7
GR   1627.0     1024.9     1627.0     1196.6     1628.0     1197.3     1628.0     1243.7     1627.0     1304.3
GR   1626.0     1321.9     1625.0     1329.6     1624.0     1334.4     1623.0     1338.3     1622.0     1342.6
GR   1621.0     1346.5     1620.0     1349.7     1619.0     1352.4     1618.0     1355.0     1617.0     1357.2
GR   1616.0     1360.5     1615.0     1364.9     1614.0     1369.4     1614.0     1378.7     1615.0     1382.2
GR   1616.0     1385.7     1617.0     1389.2     1618.0     1392.7     1619.0     1396.1     1620.0     1399.7
GR   1621.0     1403.2     1622.0     1406.7     1623.0     1410.2     1624.0     1413.4     1625.0     1416.7
GR   1626.0     1419.9     1627.0     1423.3     1628.0     1426.7     1629.0     1429.7     1630.0     1432.7
GR   1631.0     1435.8     1632.0     1439.1     1633.0     1442.3     1634.0     1445.3     1635.0     1448.4
GR   1636.0     1451.5     1637.0     1455.4     1638.0     1462.4     1639.0     1503.3     1639.0     1503.8
GR   1638.0     1506.8

NC      0.03       0.03      0.025        0.1        0.3
X1      1020         46     1242.4     1434.2      194.2      190.3      185.3
X3        10                          1205.8     1629.0     1572.0     1635.0
GR   1630.0     1000.0     1629.0     1001.4     1628.0     1002.2     1627.0     1003.1     1627.0     1192.0
GR   1628.0     1192.8     1629.0     1205.8     1629.0     1242.4     1628.0     1298.2     1627.0     1325.3
GR   1626.0     1340.4     1625.0     1345.0     1624.0     1349.2     1623.0     1352.9     1622.0     1356.7
GR   1621.0     1360.3     1620.0     1363.4     1619.0     1366.4     1618.0     1369.4     1617.0     1372.4
GR   1617.0     1394.9     1618.0     1398.3     1619.0     1401.8     1620.0     1405.2     1621.0     1408.5
GR   1622.0     1411.8     1623.0     1415.1     1624.0     1418.3     1625.0     1421.3     1626.0     1424.4
GR   1627.0     1427.4     1628.0     1430.5     1629.0     1434.2     1630.0     1437.4     1631.0     1445.3
GR   1632.0     1465.8     1633.0     1472.4     1634.0     1492.6     1635.0     1562.0     1635.0     1567.6
GR   1635.0     1568.3     1635.0     1572.0     1634.0     1584.9     1634.0     1599.8     1634.0     1605.9
GR   1634.0     1641.1
1
   20SEP99      14:12:40                                                                                  PAGE     5


NC      0.03       0.03      0.025        0.1        0.3
X1      1025         46     1269.9     1472.9      215.1      213.3      221.7
X3        10                          1212.9     1630.0     1498.1     1630.0
GR   1631.0     1000.0     1630.0     1011.9     1629.0     1024.2     1628.0     1025.5     1627.0     1026.8
GR   1627.0     1198.7     1628.0     1199.5     1629.0     1202.2     1630.0     1212.9     1630.0     1269.9
GR   1629.0     1318.5     1628.0     1329.1     1627.0     1347.6     1626.0     1361.7     1625.0     1365.5
GR   1624.0     1369.1     1623.0     1372.8     1622.0     1376.5     1621.0     1380.1     1620.0     1384.2
GR   1619.0     1406.5     1619.0     1415.6     1620.0     1419.0     1621.0     1422.3     1622.0     1425.7
GR   1623.0     1429.0     1624.0     1432.4     1625.0     1435.6     1626.0     1439.0     1627.0     1442.5
GR   1628.0     1463.8     1629.0     1468.4     1630.0     1472.9     1631.0     1477.6     1631.0     1490.6
GR   1631.0     1496.0     1631.0     1498.1     1630.0     1504.1     1629.0     1505.6     1628.0     1506.6
GR   1628.0     1675.1     1629.0     1677.7     1630.0     1680.4     1631.0     1687.7     1632.0     1713.1
GR   1633.0     1732.1

NC      0.03       0.03      0.025        0.1        0.3
X1      1030         42     1297.3     1500.5      194.6      195.4      190.7
X3        10                          1263.5     1629.0     1610.6     1631.0
GR   1632.0     1000.0     1631.0     1011.9     1630.0     1018.1     1629.0     1021.8     1628.0     1023.3
GR   1627.0     1024.4     1627.0     1257.9     1628.0     1258.6     1629.0     1263.5     1629.0     1297.3
GR   1628.0     1356.7     1627.0     1406.8     1626.0     1426.8     1625.0     1430.5     1624.0     1434.4
GR   1623.0     1438.3     1622.0     1442.3     1621.0     1446.0     1621.0     1472.3     1622.0     1475.7
GR   1623.0     1479.2     1624.0     1482.8     1625.0     1486.3     1626.0     1489.8     1627.0     1493.3
GR   1628.0     1496.9     1629.0     1500.5     1629.0     1530.6     1629.0     1574.7     1630.0     1583.2
GR   1631.0     1591.2     1631.0     1610.6     1630.0     1616.4     1629.0     1618.2     1628.0     1619.9
GR   1628.0     1779.2     1629.0     1781.8     1630.0     1784.5     1631.0     1787.0     1632.0     1789.7
GR   1633.0     1792.2     1633.0     1815.5

NC      0.03       0.03      0.025        0.1        0.3
X1      1035         31       1432     1491.5      191.0      185.1      179.0
X3        10                          1236.5     1629.0
GR   1636.0     1000.0     1635.0     1012.2     1634.0     1020.9     1633.0     1027.6     1632.0     1034.4
GR   1631.0     1039.3     1630.0     1044.2     1629.0     1049.1     1628.0     1050.4     1627.0     1051.7
GR   1627.0     1228.0     1628.0     1229.4     1629.0     1236.5     1629.0     1263.2     1628.0     1280.9
GR   1627.0     1432.0     1626.0     1440.7     1625.0     1444.8     1624.0     1449.1     1623.0     1453.4
GR   1623.0     1475.6     1624.0     1479.5     1625.0     1483.4     1626.0     1487.4     1627.0     1491.5
GR   1628.0     1495.5     1629.0     1499.0     1630.0     1502.8     1631.0     1583.7     1632.0     1595.6
GR   1632.0     1614.6

NC      0.03       0.03      0.025        0.1        0.3
X1    1040.0       34.0     1272.7     1426.6      221.9      215.9      224.3
X3      10.0                          1272.7     1629.0     1609.4     1631.0
GR   1634.0     1000.0     1633.0     1017.0     1632.0     1032.1     1631.0     1046.1     1630.0     1077.1
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GR	1629.0	1084.8	1628.0	1108.3	1628.0	1134.0	1629.0	1227.9	1629.0	1236.8
GR	1628.0	1240.1	1628.0	1253.3	1629.0	1266.5	1629.0	1272.7	1628.0	1374.4
GR	1627.0	1378.7	1626.0	1382.4	1625.0	1386.9	1625.0	1409.0	1626.0	1412.2
GR	1627.0	1415.8	1628.0	1419.2	1629.0	1422.9	1630.0	1426.6	1630.0	1483.9
GR	1630.0	1518.5	1631.0	1537.0	1631.0	1609.4	1630.0	1617.1	1630.0	1652.6
GR	1631.0	1669.9	1632.0	1685.0	1633.0	1701.8	1634.0	1719.0		

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NC	0.03	0.03	0.025	0.1	0.3					
X1	1045	28	1052.5	1377.9	180.4	181.5	178.0			
X3						1387.3	1632.0			
GR	1634.0	1000.0	1633.0	1032.6	1632.0	1052.5	1631.0	1085.6	1630.0	1174.0
GR	1629.0	1216.7	1629.0	1254.4	1629.0	1325.7	1628.0	1329.9	1627.0	1334.1
GR	1627.0	1337.1	1627.0	1355.8	1627.0	1356.2	1628.0	1360.6	1629.0	1364.8
GR	1630.0	1369.1	1631.0	1373.6	1632.0	1377.9	1632.0	1387.3	1631.0	1421.7
GR	1630.0	1462.1	1630.0	1481.8	1631.0	1505.9	1632.0	1508.8	1633.0	1511.7
GR	1634.0	1514.6	1635.0	1517.5	1636.0	1520.5				

NC	0.03	0.03	0.025	0.1	0.3					
X1	1050	25	1028.7	1355.4	197.8	195.0	196.5			
X3						1371.7	1633.0			
GR	1634.0	1000.0	1633.0	1028.7	1632.0	1060.7	1631.0	1088.7	1630.0	1131.7
GR	1630.0	1163.0	1630.0	1201.9	1630.0	1242.5	1631.0	1260.0	1631.0	1300.3
GR	1630.0	1305.0	1629.0	1309.3	1629.0	1340.7	1630.0	1344.2	1631.0	1348.0
GR	1632.0	1351.3	1633.0	1355.4	1633.0	1371.7	1632.0	1398.3	1632.0	1517.8
GR	1633.0	1561.7	1634.0	1590.4	1635.0	1607.0	1636.0	1609.4	1637.0	1611.7

NC	0.03	0.03	0.025	0.1	0.3					
X1	1055	25	1191.8	1438.0	195.1	194.2	197.5			
GR	1638.0	1000.0	1637.0	1020.6	1636.0	1070.7	1635.0	1106.4	1634.0	1191.8
GR	1633.0	1208.0	1632.0	1235.1	1632.0	1239.3	1632.0	1251.2	1632.0	1329.2
GR	1632.0	1384.0	1631.0	1387.7	1630.0	1391.3	1630.0	1423.6	1631.0	1425.6
GR	1632.0	1428.1	1633.0	1430.8	1634.0	1434.3	1635.0	1438.0	1635.0	1459.2
GR	1635.0	1523.6	1636.0	1574.8	1637.0	1577.9	1638.0	1582.0	1639.0	1585.8

NC	0.03	0.03	0.025	0.1	0.3					
X1	1060	28	1396.9	1463.2	193.6	195.7	195.0			
GR	1638.0	1000.0	1637.0	1070.9	1636.0	1114.9	1636.0	1121.6	1636.0	1128.8
GR	1635.0	1157.6	1634.0	1237.4	1634.0	1318.7	1635.0	1366.3	1635.0	1396.9
GR	1634.0	1403.5	1633.0	1412.0	1632.0	1414.1	1631.0	1418.5	1631.0	1427.6
GR	1631.0	1440.5	1631.0	1450.9	1632.0	1454.4	1633.0	1456.8	1634.0	1459.6
GR	1635.0	1463.2	1636.0	1466.1	1637.0	1472.0	1638.0	1477.0	1639.0	1540.9
GR	1640.0	1576.0	1641.0	1590.7	1642.0	1617.9				

NC	0.03	0.03	0.025	0.1	0.3					
X1	1065	44	1265.3	1362.5	180.3	173.0	177.7			
X3	10			1214.1	1638.0					
GR	1639.0	1000.0	1638.0	1049.3	1637.0	1059.8	1636.0	1068.8	1635.0	1073.6
GR	1634.0	1079.6	1634.0	1112.9	1635.0	1115.8	1635.0	1119.6	1635.0	1126.4
GR	1636.0	1128.2	1636.0	1134.8	1635.0	1138.9	1634.0	1140.4	1633.0	1142.7
GR	1632.0	1144.7	1632.0	1156.2	1633.0	1159.0	1634.0	1161.9	1635.0	1169.0
GR	1636.0	1182.4	1637.0	1187.8	1638.0	1214.1	1638.0	1265.3	1637.0	1278.7
GR	1636.0	1287.2	1635.0	1294.4	1634.0	1301.1	1633.0	1307.0	1632.0	1318.1
GR	1632.0	1337.3	1633.0	1338.7	1634.0	1343.7	1635.0	1346.9	1636.0	1350.3
GR	1637.0	1356.5	1638.0	1362.5	1639.0	1388.7	1640.0	1405.2	1641.0	1472.9
GR	1642.0	1491.9	1643.0	1523.8	1644.0	1553.9	1645.0	1564.6		

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NC	0.04	0.04	0.025	0.1	0.5					
X1	1067	53	1287.8	1396.0	110.9	131.9	113.0			
X3	10			1275.9	1638.0					
GR	1641.0	1000.0	1640.0	1052.5	1639.0	1095.3	1638.0	1120.8	1637.0	1122.5
GR	1636.0	1124.1	1635.0	1125.1	1634.0	1126.1	1633.0	1128.7	1632.0	1130.3
GR	1632.0	1139.5	1633.0	1141.6	1634.0	1145.4	1635.0	1152.9	1635.0	1153.3
GR	1634.0	1164.0	1633.0	1166.4	1633.0	1173.2	1634.0	1175.6	1635.0	1177.0
GR	1636.0	1183.2	1637.0	1188.1	1637.0	1203.4	1636.0	1204.7	1635.0	1206.3
GR	1634.0	1209.3	1633.0	1212.3	1633.0	1214.2	1633.0	1226.4	1633.0	1229.2
GR	1634.0	1230.4	1635.0	1232.7	1636.0	1240.7	1637.0	1244.2	1638.0	1275.9
GR	1638.0	1287.8	1637.0	1332.5	1636.0	1340.7	1635.0	1343.9	1634.0	1349.6
GR	1633.0	1355.3	1633.0	1361.9	1633.0	1366.5	1633.0	1381.7	1634.0	1384.8
GR	1635.0	1388.4	1636.0	1390.9	1637.0	1393.5	1638.0	1396.0	1639.0	1399.8
GR	1640.0	1400.9	1641.0	1404.0	1642.0	1407.4				

NC	0.04	0.04	0.025	0.3	0.5					
X1	1069	18	1000	1195	99	70	83			
GR	1640	1000.0	1639	1008	1638	1016	1637	1023	1636	1028
GR	1635	1033	1634	1042	1634	1048	1635	1055	1636	1104
GR	1636	1129	1635	1131	1634	1145	1634	1172	1635	1180
GR	1636	1184	1637	1190	1638	1195				

NC	0.04	0.04	0.025	0.3	0.5					
X1	1070	56	1162.1	1287.5	52	83	67			
X3	10			1152.7	1639.0	1423.0	1643.0			
GR	1640.0	1000.0	1641.0	1008.1	1641.0	1012.4	1640.0	1019.3	1639.0	1020.8
GR	1638.0	1024.7	1637.0	1026.7	1637.0	1036.8	1638.0	1040.6	1639.0	1044.1
GR	1639.0	1051.9	1638.0	1057.0	1637.0	1062.0	1636.0	1064.0	1635.0	1065.0
GR	1634.0	1066.5	1633.0	1067.4	1633.0	1071.8	1634.0	1074.1	1635.0	1074.9
GR	1636.0	1076.9	1637.0	1078.2	1638.0	1080.1	1638.0	1091.7	1637.0	1093.3
GR	1636.0	1096.6	1635.0	1100.1	1634.0	1116.9	1634.0	1131.7	1635.0	1134.7
GR	1636.0	1140.6	1637.0	1143.7	1638.0	1148.0	1639.0	1152.7	1639.0	1162.1
GR	1638.0	1165.7	1637.0	1167.3	1636.0	1170.0	1635.0	1171.7	1634.0	1213.0
GR	1634.0	1243.3	1635.0	1275.7	1636.0	1278.1	1637.0	1281.1	1638.0	1284.1

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GR   1639.0     1287.5     1640.0     1290.7     1641.0     1309.5     1642.0     1384.1     1643.0     1417.8
GR   1643.0     1423.0     1642.0     1427.8     1642.0     1454.3     1643.0     1456.0     1644.0     1462.2
GR   1645.0     1466.3

NC      0.04       0.04      0.025        0.3        0.5
X1      1072         19     1152.4     1261.4      115.4       95.6      104.0
GR   1643.0     1000.0     1641.0     1113.4     1641.0     1133.9     1641.0     1152.4     1640.0     1161.8
GR   1639.0     1164.8     1638.0     1170.2     1637.0     1172.6     1636.0     1176.0     1635.0     1196.4
GR   1635.0     1254.1     1636.0     1255.9     1637.0     1256.9     1638.0     1257.6     1639.0     1258.1
GR   1640.0     1258.7     1641.0     1261.4     1642.0     1305.8     1642.0     1341.6

NC      0.04       0.04      0.025        0.1        0.3
X1      1075         41     1332.0     1424.1      107.6       105.7      88.9
X3        10                                               1431.1     1641.0
GR   1646.0     1000.0     1646.0     1010.7     1647.0     1013.4     1648.0     1020.7     1648.0     1028.0
GR   1648.0     1048.8     1648.0     1102.6     1647.0     1104.7     1646.0     1106.7     1645.0     1109.4
GR   1644.0     1112.0     1644.0     1159.5     1644.0     1198.7     1643.0     1285.7     1643.0     1308.1
GR   1643.0     1332.0     1641.0     1336.8     1640.0     1339.8     1639.0     1344.1     1638.0     1350.1
GR   1637.0     1353.9     1636.0     1358.7     1635.5     1362.4     1635.5     1367.9     1635.5     1395.1
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    20SEP99      14:12:40                                                                                PAGE     8

GR   1635.5     1405.3     1636.0     1410.5     1637.0     1411.3     1638.0     1414.0     1639.0     1415.9
GR   1640.0     1418.1     1641.0     1424.1     1641.0     1431.1     1640.0     1436.4     1639.0     1440.6
GR   1639.0     1442.7     1640.0     1447.0     1641.0     1450.3     1642.0     1479.0     1643.0     1516.1
GR   1643.0     1528.5

NC      0.04       0.04      0.025        0.1        0.3
X1      1080         29     1247.1     1312.0      170.2       176.5      171.7
X3        10                                               1316.4     1640.0
GR   1648.0     1000.0     1648.0     1059.5     1647.0     1086.0     1646.0     1175.8     1645.0     1179.1
GR   1644.0     1181.6     1643.0     1184.8     1643.0     1224.9     1643.0     1239.8     1641.0     1245.6
GR   1640.0     1247.1     1639.0     1251.7     1638.0     1256.2     1637.0     1259.4     1636.0     1265.7
GR   1636.0     1297.0     1637.0     1303.0     1638.0     1305.4     1639.0     1307.8     1640.0     1312.0
GR   1640.0     1316.4     1639.0     1320.1     1638.0     1323.2     1638.0     1324.7     1639.0     1330.1
GR   1640.0     1331.6     1641.0     1334.8     1642.0     1336.8     1642.0     1373.7

NC      0.04       0.04      0.025        0.1        0.3
X1      1085         58     1374.9     1431.9      235.4       239.3      236.9
GR   1661.0     1000.0     1660.0     1001.3     1659.0     1001.8     1658.0     1002.3     1657.0     1002.7
GR   1656.0     1003.2     1655.0     1003.8     1654.0     1005.0     1653.0     1006.0     1652.0     1007.4
GR   1651.0     1009.6     1651.0     1053.2     1652.0     1061.9     1653.0     1071.1     1653.0     1084.8
GR   1652.0     1140.2     1651.0     1157.2     1650.0     1160.2     1649.0     1164.0     1648.0     1167.4
GR   1648.0     1214.5     1648.0     1277.8     1647.0     1292.2     1646.0     1302.2     1645.0     1352.6
GR   1644.0     1357.6     1643.0     1374.9     1641.0     1378.6     1640.0     1379.8     1639.0     1384.5
GR   1638.0     1387.5     1638.0     1412.0     1639.0     1421.1     1640.0     1425.5     1641.0     1428.2
GR   1642.0     1430.2     1643.0     1431.9     1643.0     1453.6     1643.0     1457.8     1644.0     1463.6
GR   1644.0     1476.2     1643.0     1478.1     1642.0     1479.1     1641.0     1480.0     1640.0     1480.3
GR   1639.0     1483.2     1639.0     1488.0     1640.0     1490.5     1641.0     1492.6     1642.0     1493.7
GR   1643.0     1495.5     1644.0     1498.6     1645.0     1512.8     1646.0     1535.4     1647.0     1556.1
GR   1648.0     1581.4     1649.0     1600.1     1650.0     1623.2

NC      0.04       0.04      0.025        0.1        0.3
X1      1090         43     1224.0     1297.9      187.9       190.8      188.6
X3        10                                               1357.8     1646.0
GR   1652.0     1000.0     1652.0     1070.9     1651.0     1081.9     1650.0     1090.5     1649.0     1092.8
GR   1648.0     1173.8     1648.0     1196.5     1648.0     1202.2     1647.0     1208.4     1646.0     1224.0
GR   1645.0     1227.7     1644.0     1230.2     1643.0     1234.8     1641.0     1246.1     1640.0     1249.5
GR   1639.0     1253.9     1639.0     1256.9     1639.0     1263.7     1639.0     1268.6     1640.0     1270.3
GR   1641.0     1280.6     1642.0     1287.2     1643.0     1290.0     1644.0     1291.0     1645.0     1293.8
GR   1646.0     1297.9     1646.0     1357.8     1645.0     1361.4     1645.0     1365.6     1646.0     1369.8
GR   1647.0     1387.7     1647.0     1390.1     1647.0     1398.9     1648.0     1417.6     1649.0     1419.4
GR   1650.0     1420.2     1651.0     1430.4     1652.0     1432.6     1653.0     1435.9     1654.0     1438.5
GR   1655.0     1441.3     1656.0     1443.1     1657.0     1444.7

NC      0.04       0.04      0.025        0.1        0.3
X1      1095         36.0   1398.8     1487.9      183.7       187.2      191.9
GR   1655.0     1000.0     1656.0     1006.0     1656.0     1012.8     1655.0     1024.1     1654.0     1046.4
GR   1653.0     1082.9     1652.0     1266.3     1651.0     1327.1     1650.0     1335.1     1649.0     1339.1
GR   1648.0     1341.3     1647.0     1358.7     1647.0     1387.4     1647.0     1398.8     1646.0     1416.9
GR   1645.0     1422.2     1644.0     1424.1     1643.0     1429.2     1641.0     1443.9     1640.0     1446.5
GR   1640.0     1456.7     1641.0     1460.3     1642.0     1461.5     1643.0     1477.0     1644.0     1479.5
GR   1645.0     1482.6     1646.0     1485.2     1647.0     1487.9     1647.0     1500.6     1647.0     1504.3
GR   1648.0     1535.0     1649.0     1607.4     1650.0     1647.8     1651.0     1691.9     1652.0     1734.1
GR   1653.0     1766.3
1
    20SEP99      14:12:40                                                                                PAGE     9


NC      0.04       0.04      0.025        0.1        0.3
X1      1100         49     1239.2     1297.9      178.7       186.3      181.2
X3                                      1155.7     1647.0     1342.4     1650.0
GR   1648.0     1000.0     1647.0     1141.5     1646.0     1144.1     1646.0     1149.4     1647.0     1155.7
GR   1647.0     1239.2     1646.0     1241.0     1645.0     1243.9     1644.0     1246.5     1643.0     1249.0
GR   1642.0     1254.0     1642.0     1256.2     1642.0     1265.3     1642.0     1270.1     1642.0     1271.9
GR   1643.0     1279.0     1644.0     1289.6     1645.0     1295.3     1646.0     1296.6     1647.0     1297.9
GR   1648.0     1299.2     1649.0     1300.3     1650.0     1334.7     1650.0     1342.4     1649.0     1343.7
GR   1648.0     1345.9     1647.0     1351.3     1646.0     1352.2     1645.0     1352.6     1645.0     1364.0
GR   1646.0     1366.4     1647.0     1367.7     1648.0     1368.8     1649.0     1375.2     1649.0     1376.2
GR   1649.0     1380.1     1650.0     1383.1     1650.0     1402.8     1649.0     1407.0     1648.0     1408.6
GR   1647.0     1412.1     1646.0     1414.4     1646.0     1421.8     1646.0     1428.8     1646.0     1434.4
GR   1647.0     1438.3     1648.0     1439.5     1649.0     1441.0     1650.0     1442.3

NC      0.04       0.04      0.025        0.1        0.3
X1      1105         49     1191.2     1258.4      251.3       253.8      248.2
GR   1657.0     1000.0     1656.0     1020.8     1655.0     1035.3     1654.0     1050.2     1653.0     1063.6
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GR   1652.0    1075.5    1651.0    1087.3    1650.0    1097.7    1649.0    1142.0    1649.0    1169.9
GR   1649.0    1191.2    1648.0    1192.5    1647.0    1193.9    1646.0    1194.9    1645.0    1195.9
GR   1644.0    1214.1    1644.0    1227.4    1644.0    1229.0    1644.0    1251.2    1645.0    1252.6
GR   1646.0    1254.1    1647.0    1255.6    1648.0    1257.0    1649.0    1258.4    1650.0    1272.5
GR   1650.0    1282.7    1649.0    1349.3    1648.0    1351.5    1647.0    1353.1    1647.0    1359.3
GR   1648.0    1361.7    1649.0    1364.3    1649.0    1372.7    1648.0    1374.8    1647.0    1376.8
GR   1646.0    1378.8    1646.0    1389.7    1647.0    1391.3    1648.0    1392.9    1649.0    1394.4
GR   1650.0    1396.5    1650.0    1401.3    1650.0    1409.7    1651.0    1412.9    1652.0    1416.6
GR   1653.0    1420.0    1654.0    1422.9    1655.0    1425.4    1656.0    1427.4

NC      0.04      0.04     0.025       0.3       0.5
X1      1110        48    1107.7    1190.7     186.2     181.2     184.9
X3                                                      1205.7      1651
GR   1658.0    1000.0    1657.0    1002.5    1656.0    1004.9    1655.0    1007.4    1654.0    1009.9
GR   1653.0    1012.3    1652.0    1014.8    1651.0    1018.7    1651.0    1090.3    1651.0    1107.7
GR   1650.0    1108.9    1649.0    1110.3    1648.0    1111.6    1647.0    1112.9    1646.0    1114.1
GR   1644.5    1125.5    1644.5    1129.4    1644.5    1133.2    1644.5    1141.1    1644.5    1142.0
GR   1644.5    1151.4    1646.0    1163.9    1647.0    1178.1    1648.0    1179.1    1649.0    1180.0
GR   1650.0    1181.0    1651.0    1190.7    1651.0    1205.7    1650.0    1302.7    1649.0    1304.2
GR   1649.0    1308.0    1650.0    1310.2    1651.0    1319.6    1651.0    1319.8    1650.0    1321.5
GR   1649.0    1323.1    1649.0    1337.8    1650.0    1339.4    1651.0    1342.9    1652.0    1358.9
GR   1653.0    1363.1    1654.0    1367.0    1655.0    1370.7    1656.0    1374.2    1657.0    1377.6
GR   1658.0    1380.6    1659.0    1383.3    1660.0    1386.0

NC      0.04      0.04     0.025       0.1       0.3
X1      1112        16    1082.5    1194.0      51.3      64.8      72.0
GR   1655.0    1000.0    1652.0    1007.2    1651.0    1021.4    1651.0    1037.5    1651.0    1082.5
GR   1645.0    1091.4    1645.0    1100.3    1645.0    1105.6    1646.0    1108.2    1646.0    1113.1
GR   1646.0    1123.8    1647.0    1188.3    1651.0    1194.0    1651.0    1289.2    1652.0    1346.8
GR   1655.0    1406.2
1
    20SEP99      14:12:40                                                                  PAGE   10


NC      0.04      0.04     0.025       0.1       0.3
X1      1115        44    1128.4    1269.8     163.6     164.7     150.7
X3                                                      1312.4    1653.0
GR   1659.0    1000.0    1659.0    1037.9    1658.0    1100.3    1657.0    1113.3    1656.0    1115.4
GR   1655.0    1117.1    1654.0    1119.1    1653.0    1121.0    1652.0    1128.4    1651.0    1151.6
GR   1650.0    1153.0    1649.0    1154.4    1648.0    1156.0    1647.0    1157.2    1646.0    1158.8
GR   1645.5    1160.1    1645.5    1174.4    1646.0    1178.8    1647.0    1219.9    1647.0    1232.6
GR   1647.0    1256.3    1648.0    1265.3    1649.0    1266.3    1650.0    1267.4    1651.0    1268.5
GR   1652.0    1269.8    1652.0    1284.8    1652.0    1296.9    1652.0    1298.9    1652.0    1310.0
GR   1653.0    1311.1    1653.0    1312.4    1652.0    1320.1    1651.0    1356.2    1651.0    1372.9
GR   1652.0    1378.9    1652.0    1390.9    1652.0    1395.4    1653.0    1432.9    1654.0    1436.1
GR   1655.0    1439.7    1656.0    1442.8    1657.0    1445.3    1658.0    1447.0

NC      0.04      0.04     0.025       0.1       0.3
X1      1120        40    1214.9    1309.2     248.0     235.8     245.8
GR   1660.0    1000.0    1661.0    1083.3    1662.0    1135.0    1663.0    1165.5    1663.0    1191.8
GR   1662.0    1201.5    1661.0    1203.0    1660.0    1204.5    1659.0    1205.9    1658.0    1207.4
GR   1657.0    1208.9    1656.0    1210.4    1655.0    1211.9    1654.0    1213.4    1653.0    1214.9
GR   1652.0    1216.4    1651.0    1217.9    1650.0    1219.3    1649.0    1220.8    1648.0    1238.0
GR   1648.0    1258.9    1648.0    1276.4    1647.0    1281.8    1646.0    1284.4    1646.0    1295.3
GR   1647.0    1300.9    1648.0    1302.3    1649.0    1303.7    1650.0    1305.0    1651.0    1306.4
GR   1652.0    1307.8    1653.0    1309.2    1653.0    1355.0    1653.0    1356.5    1654.0    1392.8
GR   1655.0    1414.0    1656.0    1422.8    1657.0    1435.3    1658.0    1443.8    1659.0    1449.2

NC      0.04      0.04     0.025       0.1       0.3
X1      1125        29    1087.8    1179.0     202.9     219.3     213.3
X3                                                      1179.0    1655.0
GR   1663.0    1000.0    1664.0    1023.5    1664.0    1072.3    1663.0    1074.0    1662.0    1075.7
GR   1661.0    1077.5    1660.0    1079.2    1659.0    1081.0    1658.0    1082.7    1657.0    1084.4
GR   1656.0    1086.1    1655.0    1087.8    1654.0    1089.5    1653.0    1091.3    1652.0    1093.0
GR   1651.0    1094.8    1650.0    1096.4    1649.0    1099.0    1648.0    1103.6    1648.0    1112.4
GR   1649.0    1135.6    1649.0    1161.2    1649.0    1166.0    1650.0    1167.9    1651.0    1169.8
GR   1652.0    1171.9    1653.0    1174.1    1654.0    1176.5    1655.0    1179.0

NC      0.04      0.04     0.025       0.1       0.3
X1      1130        34    1140.4    1220.0     205.8     223.6     204.1
X3                                                      1220.0    1657.0
GR   1665.0    1000.0    1666.0    1043.4    1667.0    1078.9    1668.0    1107.6    1668.0    1123.5
GR   1667.0    1125.1    1666.0    1126.6    1665.0    1128.1    1664.0    1129.7    1663.0    1131.2
GR   1662.0    1132.7    1661.0    1134.2    1660.0    1135.8    1659.0    1137.3    1658.0    1138.8
GR   1657.0    1140.4    1656.0    1141.9    1655.0    1143.5    1654.0    1145.0    1653.0    1146.5
GR   1652.0    1148.1    1651.0    1149.6    1650.0    1151.9    1649.0    1158.8    1649.0    1180.0
GR   1650.0    1185.9    1651.0    1191.4    1652.0    1196.2    1653.0    1200.6    1654.0    1204.7
GR   1655.0    1208.6    1656.0    1213.6    1657.0    1220.0    1657.0    1223.8

NC      0.04      0.04     0.025       0.1       0.3
X1      1135        41    1231.9    1294.3     206.6     200.7     203.3
GR   1667.0    1000.0    1666.0    1026.9    1666.0    1038.3    1667.0    1096.6    1668.0    1136.7
GR   1669.0    1178.8    1669.0    1215.2    1668.0    1216.7    1667.0    1218.2    1666.0    1219.7
GR   1665.0    1221.2    1664.0    1222.8    1663.0    1224.3    1662.0    1225.8    1661.0    1227.3
GR   1660.0    1228.9    1659.0    1230.4    1658.0    1231.9    1657.0    1233.4    1656.0    1235.0
GR   1655.0    1236.5    1654.0    1238.0    1653.0    1239.5    1652.0    1241.1    1651.0    1248.5
GR   1650.0    1251.8    1650.0    1255.1    1650.0    1268.2    1650.0    1270.7    1651.0    1274.0
1
    20SEP99      14:12:40                                                                  PAGE   11


GR   1652.0    1286.4    1653.0    1287.7    1654.0    1288.9    1655.0    1290.2    1656.0    1291.6
GR   1657.0    1293.0    1658.0    1294.3    1658.0    1306.0    1658.0    1421.8    1658.0    1442.7
GR   1658.0    1453.8

NC      0.04      0.04     0.025       0.1       0.3
X1      1140        36    1152.3    1205.9     192.9     199.4     190.3
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X3       10                          1152.3    1658.0
GR   1661.0    1000.0    1660.0    1022.8    1659.0    1039.8    1659.0    1050.6    1659.0    1108.7
GR   1658.0    1115.5    1657.0    1117.8    1657.0    1126.4    1658.0    1129.0    1658.0    1135.0
GR   1658.0    1138.2    1658.0    1152.3    1657.0    1154.3    1656.0    1155.7    1655.0    1157.2
GR   1654.0    1158.3    1653.0    1159.5    1652.0    1160.7    1651.0    1161.7    1651.0    1162.8
GR   1651.0    1171.8    1651.0    1177.5    1651.0    1179.0    1651.0    1180.5    1652.0    1182.1
GR   1653.0    1196.9    1654.0    1198.3    1655.0    1199.8    1656.0    1201.3    1657.0    1202.8
GR   1658.0    1204.4    1659.0    1205.9    1659.0    1244.3    1659.0    1256.1    1659.0    1262.7
GR   1659.0    1266.9

NC     0.04      0.04     0.025       0.1       0.5
X1     1145        33    1229.7    1299.3     279.7     264.2     275.8
GR   1670.0    1000.0    1669.0    1002.2    1668.0    1004.5    1667.0    1006.6    1666.0    1011.8
GR   1665.0    1019.0    1664.0    1028.5    1663.0    1047.7    1662.0    1136.0    1661.0    1229.7
GR   1660.0    1231.5    1659.0    1233.0    1658.0    1233.9    1657.0    1235.0    1656.0    1235.8
GR   1655.0    1236.6    1654.0    1237.4    1653.0    1238.2    1651.5    1238.9    1651.5    1251.2
GR   1653.0    1254.0    1654.0    1289.5    1655.0    1291.1    1656.0    1292.5    1657.0    1293.9
GR   1658.0    1295.2    1659.0    1296.6    1660.0    1298.0    1661.0    1299.3    1661.0    1361.1
GR   1661.0    1361.3    1662.0    1377.9    1662.0    1400.6

NC     0.04      0.04     0.025       0.1       0.3
X1     1150        28    1190.6    1269.4     108.3     121.7     126.4
GR   1666.0    1000.0    1665.0    1052.6    1664.0    1082.3    1663.0    1112.9    1662.0    1190.6
GR   1661.0    1193.0    1660.0    1194.4    1659.0    1195.6    1658.0    1196.9    1657.0    1198.1
GR   1656.0    1199.4    1655.0    1202.3    1654.0    1248.1    1653.0    1249.5    1652.0    1250.8
GR   1652.0    1262.0    1653.0    1262.7    1654.0    1263.5    1655.0    1264.2    1656.0    1264.9
GR   1657.0    1265.7    1658.0    1266.4    1659.0    1267.2    1660.0    1267.9    1661.0    1268.7
GR   1662.0    1269.4    1663.0    1287.6    1663.0    1298.1

NC     0.04      0.04     0.025       0.1       0.3
X1     1152        35    1086.9    1199.6        87        99       125
X3       10                          1083.5    1663.0
GR   1664.0    1000.0    1663.0    1050.5    1662.0    1052.5    1661.0    1054.6    1660.0    1056.7
GR   1659.0    1058.9    1658.0    1061.1    1657.0    1063.2    1657.0    1073.1    1658.0    1074.3
GR   1659.0    1075.4    1660.0    1076.6    1661.0    1077.6    1662.0    1078.7    1663.0    1083.5
GR   1663.0    1086.9    1662.0    1092.1    1661.0    1094.6    1660.0    1095.1    1659.0    1095.8
GR   1658.0    1096.7    1657.0    1097.4    1656.0    1098.1    1655.0    1098.6    1654.0    1099.3
GR   1653.0    1100.1    1652.0    1101.2    1652.0    1106.3    1653.0    1114.1    1654.0    1117.7
GR   1655.0    1122.6    1655.0    1147.2    1655.0    1171.3    1656.0    1190.1    1662.0    1199.6

NC     0.04      0.04     0.025       0.1       0.5
X1     1155        30    1096.1    1256.3        91        63        64
GR   1667.0    1000.0    1668.0    1001.5    1668.0    1005.6    1667.0    1024.2    1666.0    1048.0
GR   1665.0    1086.5    1664.0    1095.4    1663.0    1095.7    1662.0    1096.1    1661.0    1096.5
GR   1660.0    1096.9    1659.0    1097.2    1658.0    1097.6    1657.0    1098.0    1656.0    1098.4
GR   1655.0    1098.7    1654.0    1099.1    1653.0    1099.7    1652.5    1099.9    1652.5    1107.2
GR   1653.0    1109.8    1654.0    1112.4    1655.0    1115.0    1656.0    1241.2    1657.0    1245.2
GR   1658.0    1247.8    1659.0    1250.1    1660.0    1252.2    1661.0    1254.3    1662.0    1256.3
1
   20SEP99      14:12:40                                                                    PAGE   12


NC     0.03      0.03     0.025       0.1       0.3
X1     1160        26    1035.6    1089.1     199.3      96.4     186.6
GR   1666.0    1000.0    1665.0    1020.9    1664.0    1023.3    1663.0    1027.5    1662.0    1033.1
GR   1661.0    1035.6    1660.0    1036.7    1659.0    1037.8    1658.0    1038.8    1657.0    1040.0
GR   1656.0    1040.9    1655.0    1041.9    1654.0    1043.5    1654.0    1052.7    1655.0    1054.7
GR   1656.0    1056.6    1657.0    1058.4    1657.0    1058.6    1657.0    1076.3    1658.0    1083.3
GR   1659.0    1085.2    1660.0    1087.2    1661.0    1089.1    1662.0    1108.9    1663.0    1126.9
GR   1664.0    1161.4
1
   20SEP99      14:12:40                                                                    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


*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

CCHV=     .100 CEHV=     .300
*SECNO 985.000
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=     1615.70 ELREA=     1618.00

   985.000      9.16   1610.46   1610.46   1608.70   1613.21      2.75       .00       .00   1615.70
    3156.0        .0    3156.0        .0        .0     237.3        .0        .0        .0   1618.00
       .00       .00     13.30       .00      .000      .040      .000      .000   1601.30   1904.12
   .015677        0.        0.        0.         0        10         0       .00     43.87   1947.99


CCHV=     .100 CEHV=     .300
*SECNO 990.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=     1615.90 ELREA=     1618.00
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   990.000     13.41   1615.41   1615.41       .00   1615.89       .48       .61       .23   1615.90
    3156.0        .0    3156.0        .0        .0     566.9        .0        .5        .2   1618.00
       .00       .00      5.57       .00       .000      .040      .000      .000   1602.00   1835.31
   .008235       33.       55.       57.          0        12         0       .00    256.34   2091.65


CCHV=     .600 CEHV=     .800
*SECNO 992.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1616.40 ELREA=      1617.10

   992.000     13.40   1616.40   1616.40       .00   1616.43       .02       .00       .27   1612.50
    3156.0    2902.2     253.8        .0    2371.5     160.8        .0       1.7        .6   1612.80
       .01      1.22      1.58       .00       .015      .015      .000      .000   1603.00   1133.40
   .000029       30.       43.       68.          0        11         0       .00    803.80   1937.20


1
   20SEP99      14:12:40                                                                                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=     .600 CEHV=     .800

SPECIAL CULVERT

SC  CUNO      CUNV      ENTLC     COFQ      RDLEN     RISE      SPAN      CULVLN    CHRT      SCL       ELCHU     ELCHD
     1         .015       .40      3.00        .00      8.00     12.00    250.00       8         1    1605.40   1603.00

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

5130, EGIC= 1653.45..MAY BE TOO LARGE IF INLET CONTROLS.
5135, EGOC= 1648.47 ..MAY BE TOO LARGE IF OUTLET CONTROLS.
*SECNO 994.000

SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG =   1624.21

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  4.36

SPECIAL CULVERT

     EGIC      EGOC        H4     QWEIR     QCULV       VCH     ACULV     ELTRD    WEIRLN
  1653.45   1648.47      7.78      1418.     1720.      .451      96.0   1623.10       943.


   994.000     18.80   1624.20       .00       .00   1624.21       .00      7.78       .00   1615.20
    3156.0    1816.7     101.9    1237.5    4771.9     225.7    4245.3      41.7      10.9   1615.10
       .26       .38       .45       .29       .015      .015      .015      .000   1605.40   1260.33
   .000002       329.      250.      245.          0         0         0       .00   2246.45   3506.78


FLOW DISTRIBUTION FOR SECNO=    994.00          CWSEL=   1624.20

STA=    1260.    1522.    1593.    1697.    1745.    1798.    1849.    1880.    1931.    1981.    2037.    2091.    2162.
  PER Q=      4.0      3.1      5.6      3.5      4.4      5.1      3.2      5.3      5.1      5.0      3.6      3.8
   AREA=    551.4    305.8    505.7    279.9    331.4    360.6    223.4    369.0    354.9    372.0    296.6    342.6
    VEL=       .2       .3       .3       .4       .4       .4       .5       .5       .5       .4       .4       .3
  DEPTH=      2.1      4.3      4.9      5.8      6.3      7.0      7.2      7.2      7.2      6.6      5.5      4.8

STA=    2162.    2225.    2246.    2258.    2283.    2330.    2391.    2488.    2643.    2748.    2924.    3109.    3251.
  PER Q=      3.8      2.2      3.2      3.3      3.6      3.2      3.4      4.1      3.2      4.2      4.4      3.2
   AREA=    325.8    152.8    225.7    210.8    284.8    293.3    360.6    490.0    365.2    526.4    549.1    410.0
    VEL=       .4       .5       .5       .5       .4       .3       .3       .3       .3       .3       .3       .2
  DEPTH=      5.2      7.3     18.8      8.3      6.0      4.8      3.7      3.1      3.5      3.0      3.0      2.9

STA=    3251.    3329.    3507.
  PER Q=      3.2      3.2
   AREA=    325.0    430.0
    VEL=       .3       .2
  DEPTH=      4.2      2.4

1
   20SEP99      14:12:40                                                                                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


CCHV=     .100 CEHV=     .800
*SECNO 1000.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  .39

  1000.000     18.20   1624.20   1616.09       .00   1624.21       .00       .00       .00   1618.00
    3156.0    1913.7     888.1     354.2    4696.3    1078.6    1008.8      46.8      11.9   1618.00
       .27       .41       .82       .35       .040      .025      .040      .000   1606.00   1023.34
   .000010       32.       19.       22.          0        11         0       .00   1072.87   2096.20
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CCHV=      .100 CEHV=      .300
*SECNO 1002.000
  1002.000     18.20   1624.20   1615.35       .00   1624.21       .01       .00       .00   1617.10
    3156.0    1694.3     897.2     564.5    4149.8     981.5    1394.7      57.5      13.6   1617.00
       .31       .41       .91       .40       .040      .025      .040      .000   1606.00   1027.02
   .000010       84.       52.       30.          0        11         0       .00    993.01   2020.03


CCHV=      .100 CEHV=      .300
*SECNO 1005.000
  1005.000     17.20   1624.20   1614.91       .00   1624.22       .01       .00       .00   1618.00
    3156.0     717.8    1760.0     678.2    1428.0    1513.4    1222.8      85.0      17.9   1619.00
       .37       .50      1.16       .55       .040      .025      .040      .000   1607.00   1028.29
   .000019       251.      195.      196.          0        18         0       .00    652.22   1680.51


CCHV=      .100 CEHV=      .300
*SECNO 1010.000

3470 ENCROACHMENT STATIONS=          .0    1287.0  TYPE=       1  TARGET=     1286.999
  1010.000     16.20   1624.20   1616.44       .00   1624.22       .03       .00       .00   1619.00
    3156.0     397.9    1828.9     929.2     646.4    1118.0    1358.3      96.7      19.8   1619.00
       .41       .62      1.64       .68       .040      .025      .040      .000   1608.00   1005.33
   .000038       148.      140.      134.          0        11         0       .00    538.96   1544.29


CCHV=      .500 CEHV=      .600
*SECNO 1012.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =    .60

  1012.000     14.19   1624.19   1616.24       .00   1624.24       .05       .01       .01   1626.00
    3156.0        .0    3156.0        .0        .0    1782.9        .0     102.8      21.0   1625.00
       .42       .00      1.77       .00       .000      .025      .000      .000   1610.00   1069.20
   .000105        92.       97.      139.          0        18         0       .00    354.54   1423.74


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   20SEP99      14:12:40                                                                                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


CCHV=      .600 CEHV=      .800
*SECNO 1015.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =    .20

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1626.00 ELREA=      1626.00

  1015.000      5.06   1624.06   1622.99       .00   1624.97       .91       .04       .69   1626.00
    3156.0        .0    3156.0        .0        .0     411.7        .0     105.9      21.6   1626.00
       .43       .00      7.67       .00       .000      .025      .000      .000   1619.00   1017.88
   .002686       138.      124.       96.          2        14         0       .00    103.47   1121.35


CCHV=      .500 CEHV=      .600
*SECNO 1017.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   1.54

3470 ENCROACHMENT STATIONS=      1197.3    1506.8  TYPE=       1  TARGET=    -1197.300
 ELENCL=    1628.00  ELENCR= 100000.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1628.00 ELREA=      1628.00

  1017.000     10.64   1624.64   1621.41       .00   1625.27       .63       .16       .14   1628.00
    3156.0        .0    3156.0        .0        .0     494.6        .0     106.9      21.8   1628.00
       .43       .00      6.38       .00       .000      .025      .000      .000   1614.00   1331.35
   .001139        88.       95.      102.          3        14         0       .00     84.15   1415.50


CCHV=      .100 CEHV=      .300
*SECNO 1020.000

3301 HV CHANGED MORE THAN HVINS

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

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   20SEP99      14:12:40                                                                                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
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```
3470 ENCROACHMENT STATIONS=     1205.8    1572.0  TYPE=      1  TARGET=      366.200
 ELENCL=   1629.00  ELENCR=   1635.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1629.00 ELREA=      1629.00

  1020.000      7.54   1624.54   1623.28       .00   1625.76      1.22       .31       .18   1629.00
    3156.0        .0    3156.0        .0        .0     356.5        .0     108.7      22.1   1629.00
       .44       .00      8.85       .00      .000      .025      .000      .000   1617.00   1346.89
   .002789       194.      185.      190.         2        14         0       .00     73.06   1419.95


CCHV=     .100 CEHV=     .300
*SECNO 1025.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     1212.9    1498.1  TYPE=      1  TARGET=      285.200
 ELENCL=   1630.00  ELENCR=   1630.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1630.00 ELREA=      1630.00

  1025.000      5.87   1624.87   1624.87       .00   1626.90      2.03       .88       .24   1630.00
    3156.0        .0    3156.0        .0        .0     276.0        .0     110.3      22.5   1630.00
       .44       .00     11.44       .00      .000      .025      .000      .000   1619.00   1365.98
   .006024       215.      222.      213.         0        15         0       .00     69.19   1435.17


CCHV=     .100 CEHV=     .300
*SECNO 1030.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     1263.5    1610.6  TYPE=      1  TARGET=      347.100
 ELENCL=   1629.00  ELENCR=   1631.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1629.00 ELREA=      1629.00

  1030.000      6.07   1627.07   1627.07       .00   1628.74      1.67      1.16       .04   1629.00
    3156.0        .0    3156.0        .0        .0     304.3        .0     111.6      22.9   1629.00
       .45       .00     10.37       .00      .000      .025      .000      .000   1621.00   1403.15
   .006168       195.      191.      195.         0         8         0       .00     90.41   1493.56


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   20SEP99      14:12:40                                                                                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


CCHV=     .100 CEHV=     .300
*SECNO 1035.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     1236.5    1614.6  TYPE=      1  TARGET=    -1236.500
 ELENCL=   1629.00  ELENCR= 100000.00
  1035.000      6.01   1629.01   1629.01       .00   1629.89       .88       .71       .08   1627.00
    3156.0     785.8    2347.4      22.8     238.4     276.0       7.8     113.3      24.0   1627.00
       .45      3.30      8.50      2.92      .030      .025      .030      .000   1623.00   1049.06
   .002700       191.      179.      185.         0         5         0       .00     449.97   1499.03


CCHV=     .100 CEHV=     .300
*SECNO 1040.000

3470 ENCROACHMENT STATIONS=     1272.7    1609.4  TYPE=      1  TARGET=      336.700
 ELENCL=   1629.00  ELENCR=   1631.00
  1040.000      5.06   1630.06   1629.92       .00   1630.67       .61       .76       .03   1629.00
    3156.0     687.1    2466.1       2.9     203.9     359.4       5.7     116.1      26.3   1630.00
       .46      3.37      6.86       .51      .030      .025      .030      .000   1625.00   1075.19
   .004341       222.      224.      216.         2        15         0       .00     444.45   1519.64


CCHV=     .100 CEHV=     .300
*SECNO 1045.000

3470 ENCROACHMENT STATIONS=          .0    1387.3  TYPE=      1  TARGET=     1387.299
  1045.000      3.94   1630.94   1630.86       .00   1631.68       .74       .97       .04   1632.00
    3156.0        .0    3156.0        .0        .0     458.2        .0     118.2      27.8   1632.00
       .47       .00      6.89       .00      .000      .025      .000      .000   1627.00   1090.64
   .007077       180.      178.      182.         2        19         0       .00     282.70   1373.34


CCHV=     .100 CEHV=     .300
*SECNO 1050.000
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3470 ENCROACHMENT STATIONS=         .0    1371.7  TYPE=      1  TARGET=     1371.699
  1050.000       3.22   1632.22   1631.81        .00   1632.71        .49       1.01        .02   1633.00
    3156.0         .0    3156.0         .0         .0    559.7         .0      120.5       29.1   1633.00
       .48        .00      5.64        .00       .000     .025        .000       .000    1629.00   1053.65
   .003906       198.      197.       195.          2       19           0        .00     298.56   1352.20


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    20SEP99      14:12:40                                                                                    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


CCHV=      .100 CEHV=      .300
*SECNO 1055.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  1055.000       3.57   1633.57   1633.57        .00   1634.47        .90       1.05        .12   1634.00
    3156.0         .0    3156.0         .0         .0    414.2         .0      122.7       30.3   1635.00
       .49        .00      7.62        .00       .000     .025        .000       .000    1630.00   1198.76
   .007718       195.      198.       194.          0        8           0        .00     234.03   1432.80


CCHV=      .100 CEHV=      .300
*SECNO 1060.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  1060.000       4.66   1635.66   1635.66        .00   1636.46        .80       1.04        .01   1635.00
    3156.0    1153.0     2002.1         .9      309.9     234.5         .6      124.9       31.6   1635.00
       .50       3.72       8.54       1.43       .030     .025        .030       .000    1631.00   1138.51
   .003915       194.      195.       196.          0       11           0        .00     326.61   1465.12


CCHV=      .100 CEHV=      .300
*SECNO 1065.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=      1214.1    1564.6  TYPE=      1  TARGET=    -1214.100
 ELENCL=    1638.00  ELENCR= 100000.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1638.00 ELREA=       1638.00

  1065.000       5.76   1637.76   1637.76        .00   1639.44       1.68        .88        .27   1638.00
    3156.0         .0    3156.0         .0         .0    303.4         .0      126.6       32.4   1638.00
       .50        .00     10.40        .00       .000     .025        .000       .000    1632.00   1268.47
   .006403       180.      178.       173.          0       14           0        .00      92.60   1361.08


CCHV=      .100 CEHV=      .500
*SECNO 1067.000
1
    20SEP99      14:12:40                                                                                    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


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.76


3470 ENCROACHMENT STATIONS=      1275.9    1407.4  TYPE=      1  TARGET=    -1275.900
 ELENCL=    1638.00  ELENCR= 100000.00
  1067.000       6.38   1639.38   1638.93        .00   1639.93        .55        .38        .11   1638.00
    3156.0     515.1     2635.9         5.0      255.0     407.0        3.4      127.9       33.0   1638.00
       .51       2.02       6.48       1.48       .040     .025        .040       .000    1633.00   1079.24
   .002061       111.      113.       132.          3       13           0        .00     320.97   1400.21


CCHV=      .300 CEHV=      .500
*SECNO 1069.000
3280 CROSS SECTION   1069.00 EXTENDED      1.90 FEET


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.89

  1069.000       5.90   1639.90   1637.34        .00   1640.12        .22        .08        .10   1640.00
    3156.0         .0    3156.0         .0         .0    842.1         .0      129.4       33.5   1638.00
       .51        .00      3.75        .00       .000     .025        .000       .000    1634.00   1000.80
   .000574        99.       83.        70.          2       11           0        .00     194.20   1195.00


CCHV=      .300 CEHV=      .500
*SECNO 1070.000
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3470 ENCROACHMENT STATIONS=     1152.7    1423.0  TYPE=      1  TARGET=      270.300
 ELENCL=   1639.00  ELENCR=   1643.00
  1070.000       5.88   1639.88   1637.38        .00   1640.23        .35        .04        .06   1639.00
    3156.0      117.9     3037.4        .7      125.0      632.6        1.2      130.6       33.8   1639.00
       .52        .94       4.80        .58       .040       .025       .040       .000   1634.00   1019.48
   .000767       52.        67.        83.          2         19          0        .00     270.84   1290.32


CCHV=      .300 CEHV=      .500
*SECNO 1072.000
1
   20SEP99      14:12:40                                                                                    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


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .51

  1072.000       4.69   1639.69   1638.75        .00   1640.69       1.00        .14        .33   1641.00
    3156.0         .0     3156.0        .0         .0      392.7         .0      132.0       34.3   1641.00
       .52        .00       8.04        .00       .000       .025       .000       .000   1635.00   1162.72
   .002895       115.       104.        96.          2         14          0        .00     95.80   1258.52


CCHV=      .100 CEHV=      .300
*SECNO 1075.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=          .0    1431.1  TYPE=      1  TARGET=     1431.099

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1643.00 ELREA=      1641.00

  1075.000       4.60   1640.10   1640.10        .00   1641.94       1.84        .36        .25   1643.00
    3156.0         .0     3156.0        .0         .0      289.9         .0      132.7       34.5   1641.00
       .52        .00      10.89        .00       .000       .025       .000       .000   1635.50   1339.49
   .006110       108.        89.       106.          0          8          0        .00     79.23   1418.72


CCHV=      .100 CEHV=      .300
*SECNO 1080.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=          .0    1316.4  TYPE=      1  TARGET=     1316.399
  1080.000       5.25   1641.25   1641.25        .00   1643.10       1.85        .95        .00   1640.00
    3156.0        2.2     3073.2       80.6        1.2      278.4       27.1      133.8       34.8   1640.00
       .53       1.79      11.04       2.98       .040       .025       .040       .000   1636.00   1244.86
   .005055       170.        172.       177.          0          8          0        .00     90.44   1335.31


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   20SEP99      14:12:40                                                                                    PAGE   22

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


CCHV=      .100 CEHV=      .300
*SECNO 1085.000

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  1085.000       5.38   1643.38   1643.38        .00   1645.19       1.82       1.23        .00   1643.00
    3156.0        1.1     2802.3       352.6        1.2      247.6       65.6      135.5       35.3   1643.00
       .53        .89      11.32       5.38       .040       .025       .040       .000   1638.00   1368.39
   .005357       235.        237.       239.          0          8          0        .00     110.88   1496.67


CCHV=      .100 CEHV=      .300
*SECNO 1090.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=          .0    1357.8  TYPE=      1  TARGET=     1357.799

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1646.00 ELREA=      1646.00

  1090.000       6.27   1645.27   1645.27        .00   1647.29       2.02       1.06        .06   1646.00
    3156.0         .0     3156.0        .0         .0      276.4         .0      136.8       35.7   1646.00
       .54        .00      11.42        .00       .000       .025       .000       .000   1639.00   1226.71
   .005927       188.        189.       191.          0          8          0        .00     68.19   1294.90
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 CCHV=     .100 CEHV=     .300
 *SECNO 1095.000
   1095.000      6.76   1646.76   1646.54       .00   1648.45      1.69      1.12       .03   1647.00
     3156.0        .0    3156.0        .0        .0     302.8        .0     138.1      36.1   1647.00
        .54       .00     10.42       .00      .000      .025      .000      .000   1640.00   1402.99
    .005762      184.      192.      187.         2         8         0       .00     84.29   1487.28


 CCHV=     .100 CEHV=     .300
 *SECNO 1100.000

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
1
    20SEP99      14:12:40                                                                          PAGE   23

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


 3470 ENCROACHMENT STATIONS=     1155.7    1342.4  TYPE=      1  TARGET=      186.700
  ELENCL=   1647.00  ELENCR=   1650.00
   1100.000      6.34   1648.34   1648.34       .00   1649.38      1.04       .69       .06   1647.00
     3156.0     511.9    2642.5       1.6     250.7     297.3       1.2     139.9      36.9   1647.00
        .55      2.04      8.89      1.39      .040      .025      .040      .000   1642.00   1000.00
    .002676      179.      181.      186.         0        12         0       .00     299.58   1299.58


 CCHV=     .100 CEHV=     .300
 *SECNO 1105.000

 3265 DIVIDED FLOW

   1105.000      4.88   1648.88   1648.61       .00   1650.35      1.46       .84       .13   1649.00
     3156.0        .0    2886.9     269.1        .0     286.6      65.6     142.4      38.0   1649.00
        .56       .00     10.07      4.10      .000      .025      .040      .000   1644.00   1191.35
    .004375      251.      248.      254.         2        11         0       .00     102.64   1394.23


 CCHV=     .300 CEHV=     .500
 *SECNO 1110.000

 3470 ENCROACHMENT STATIONS=          .0    1205.7  TYPE=      1  TARGET=     1205.699
   1110.000      5.09   1649.59   1649.43       .00   1651.42      1.83       .89       .18   1651.00
     3156.0        .0    3156.0        .0        .0     291.0        .0     143.8      38.4   1651.00
        .56       .00     10.85       .00      .000      .025      .000      .000   1644.50   1109.47
    .005334      186.      185.      181.         2         5         0       .00     71.12   1180.59


 CCHV=     .100 CEHV=     .300
 *SECNO 1112.000

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.98

   1112.000      6.16   1651.16   1649.28       .00   1651.72       .56       .17       .13   1651.00
     3156.0       3.7    3146.4       5.9       9.5     523.0      15.3     144.5      38.6   1651.00
        .56       .39      6.02       .39      .040      .025      .040      .000   1645.00   1019.22
    .001356       51.       72.       65.         3        15         0       .00     278.82   1298.04


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    20SEP99      14:12:40                                                                          PAGE   24

     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 1115.000

 3470 ENCROACHMENT STATIONS=          .0    1312.4  TYPE=      1  TARGET=     1312.399
   1115.000      5.91   1651.41   1649.54       .00   1651.93       .52       .21       .00   1652.00
     3156.0        .0    3156.0        .0        .0     543.6        .0     146.4      39.4   1652.00
        .57       .00      5.81       .00      .000      .025      .000      .000   1645.50   1142.08
    .001417      164.      151.      165.         2        14         0       .00     126.95   1269.03


 CCHV=     .100 CEHV=     .300
 *SECNO 1120.000

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .48
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  1120.000      5.24   1651.24   1651.19       .00   1652.91      1.67       .64       .34   1653.00
    3156.0        .0    3156.0        .0        .0    304.2        .0     148.8      40.0   1653.00
       .58       .00     10.38       .00      .000     .025      .000      .000   1646.00   1217.53
   .006157       248.      246.      236.         3       15         0       .00     89.21   1306.74


CCHV=     .100 CEHV=     .300
*SECNO 1125.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=         .0    1179.0  TYPE=      1  TARGET=     1178.999
  1125.000      4.62   1652.62   1652.62       .00   1654.44      1.81      1.32       .04   1655.00
    3156.0        .0    3156.0        .0        .0    292.0        .0     150.2      40.4   1655.00
       .58       .00     10.81       .00      .000     .025      .000      .000   1648.00   1091.94
   .006202       203.      213.      219.         0       11         0       .00     81.33   1173.27


CCHV=     .100 CEHV=     .300
*SECNO 1130.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=         .0    1220.0  TYPE=      1  TARGET=     1219.999
  1130.000      5.82   1654.82   1654.82       .00   1656.95      2.14      1.24       .10   1657.00
    3156.0        .0    3156.0        .0        .0    269.1        .0     151.5      40.7   1657.00
       .59       .00     11.73       .00      .000     .025      .000      .000   1649.00   1143.77
   .005993       206.      204.      224.         0       11         0       .00     64.12   1207.89


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   20SEP99      14:12:40                                                                          PAGE   25

    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 1135.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  1135.000      5.94   1655.94   1655.94       .00   1658.26      2.32      1.22       .06   1658.00
    3156.0        .0    3156.0        .0        .0    258.1        .0     152.8      41.0   1658.00
       .59       .00     12.23       .00      .000     .025      .000      .000   1650.00   1235.09
   .005962       207.      203.      201.         0        8         0       .00     56.43   1291.52


CCHV=     .100 CEHV=     .300
*SECNO 1140.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     1152.3    1266.9  TYPE=      1  TARGET=    -1152.300
 ELENCL=   1658.00  ELENCR= 100000.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1658.00 ELREA=      1659.00

  1140.000      6.53   1657.53   1657.53       .00   1660.07      2.54      1.15       .07   1658.00
    3156.0        .0    3156.0        .0        .0    246.7        .0     153.9      41.3   1659.00
       .60       .00     12.79       .00      .000     .025      .000      .000   1651.00   1153.25
   .006163       193.      190.      199.         0        8         0       .00     50.40   1203.64


CCHV=     .100 CEHV=     .500
*SECNO 1145.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.97

  1145.000      8.62   1660.12   1657.71       .00   1661.01       .89       .77       .17   1661.00
    3156.0        .0    3156.0        .0        .0    417.1        .0     156.0      41.6   1661.00
       .61       .00      7.57       .00      .000     .025      .000      .000   1651.50   1231.29
   .001593       280.      276.      264.         3       11         0       .00     66.86   1298.15


CCHV=     .100 CEHV=     .300
*SECNO 1150.000
  1150.000      8.40   1660.40   1658.17       .00   1661.21       .81       .20       .01   1662.00
    3156.0        .0    3156.0        .0        .0    436.9        .0     157.2      41.8   1662.00
       .61       .00      7.22       .00      .000     .025      .000      .000   1652.00   1193.83
   .001561       108.      126.      122.         2       19         0       .00     74.39   1268.22


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   20SEP99      14:12:40                                                                          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
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CCHV=      .100 CEHV=      .300
*SECNO 1152.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.45


3470 ENCROACHMENT STATIONS=     1083.5    1199.6  TYPE=       1  TARGET=    -1083.500
 ELENCL=   1663.00  ELENCR= 100000.00

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1663.00 ELREA=    100000.00

  1152.000      8.98   1660.98   1657.88       .00   1661.38       .41       .13       .04   1663.00
    3156.0        .0    3156.0        .0        .0     616.1        .0     158.7      42.1 100000.00
       .62       .00      5.12       .00      .000      .025      .000      .000   1652.00   1094.61
   .000744       87.       125.       99.         2        19         0       .00    103.37   1197.98


CCHV=      .100 CEHV=      .500
*SECNO 1155.000

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

  1155.000      8.75   1661.25   1657.65       .00   1661.44       .19       .03       .02   1662.00
    3156.0        .0    3156.0        .0        .0     905.7        .0     159.8      42.3   1662.00
       .62       .00      3.48       .00      .000      .025      .000      .000   1652.50   1096.40
   .000357       91.        64.       63.         2        14         0       .00    158.40   1254.80


CCHV=      .100 CEHV=      .300
*SECNO 1160.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
  1160.000      7.53   1661.53   1661.53       .00   1663.84      2.31       .17       .64   1661.00
    3156.0        .5    3151.1       4.4        .4     258.1       2.8     162.3      42.7   1661.00
       .63      1.48      12.21      1.55      .030      .025      .030      .000   1654.00   1034.27
   .005728       199.      187.       96.         0        11         0       .00     65.38   1099.65


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   20SEP99      14:12:40                                                                        PAGE   27


                                                                                THIS RUN EXECUTED 20SEP99    14:12:41
************************************
 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

 CHANNEL MODEL

SUMMARY PRINTOUT TABLE  101

      SECNO      EGOC      ELLC      EGIC      ELTRD     QCULV     QWEIR     CLASS      H4       DEPTH     CWSEL      VCH       EG

*    994.000   1648.47   1613.40   1653.45   1623.10   1720.43   1418.30     16.00      7.78     18.80   1624.20       .45  1624.21

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   20SEP99      14:12:40                                                                        PAGE   28

 CHANNEL MODEL

SUMMARY PRINTOUT TABLE  105

      SECNO     CWSEL       HL       OLOSS    TOPWID     QLOB       QCH       QROB

-------------------------------------------------------------------------------
*    990.000   1615.41       .61       .23    256.34       .00   3156.00       .00

*    992.000   1616.40       .00       .27    803.80   2902.19    253.81       .00

*    994.000   1624.20      7.78       .00   2246.45   1816.69    101.85   1237.46

*   1000.000   1624.20       .00       .00   1072.87   1913.66    888.12    354.21

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   20SEP99      14:12:40                                                                        PAGE   29

 CHANNEL MODEL

SUMMARY PRINTOUT TABLE  150

      SECNO      XLCH      ELTRD     ELLC      ELMIN       Q         CWSEL     CRIWS      EG       10*KS      VCH       AREA      .01K
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*	985.000	.00	.00	.00	1601.30	3156.00	1610.46	1610.46	1613.21	156.77	13.30	237.27	252.06
*	990.000	55.00	.00	.00	1602.00	3156.00	1615.41	1615.41	1615.89	82.35	5.57	566.94	347.79
*	992.000	43.00	.00	.00	1603.00	3156.00	1616.40	1616.40	1616.43	.29	1.58	2532.32	5899.56
*	994.000	250.00	1623.10	1613.40	1605.40	3156.00	1624.20	.00	1624.21	.02	.45	9242.92	25747.33
*	1000.000	19.00	.00	.00	1606.00	3156.00	1624.20	1616.09	1624.21	.10	.82	6783.75	10042.05
	1002.000	52.00	.00	.00	1606.00	3156.00	1624.20	1615.35	1624.21	.10	.91	6525.92	10000.08
	1005.000	195.00	.00	.00	1607.00	3156.00	1624.20	1614.91	1624.22	.19	1.16	4164.20	7245.74
	1010.000	140.00	.00	.00	1608.00	3156.00	1624.20	1616.44	1624.22	.38	1.64	3122.75	5101.99
*	1012.000	97.00	.00	.00	1610.00	3156.00	1624.19	1616.24	1624.24	1.05	1.77	1782.86	3083.88
*	1015.000	124.00	.00	.00	1619.00	3156.00	1624.06	1622.99	1624.97	26.86	7.67	411.67	608.96
*	1017.000	95.00	.00	.00	1614.00	3156.00	1624.64	1621.41	1625.27	11.39	6.38	494.62	935.18
*	1020.000	185.30	.00	.00	1617.00	3156.00	1624.54	1623.28	1625.76	27.89	8.85	356.49	597.57
*	1025.000	221.70	.00	.00	1619.00	3156.00	1624.87	1624.87	1626.90	60.24	11.44	275.97	406.63
*	1030.000	190.70	.00	.00	1621.00	3156.00	1627.07	1627.07	1628.74	61.68	10.37	304.35	401.86
*	1035.000	179.00	.00	.00	1623.00	3156.00	1629.01	1629.01	1629.89	27.00	8.50	522.26	607.41
	1040.000	224.30	.00	.00	1625.00	3156.00	1630.06	1629.92	1630.67	43.41	6.86	568.95	479.01
	1045.000	178.00	.00	.00	1627.00	3156.00	1630.94	1630.86	1631.68	70.77	6.89	458.18	375.16
	1050.000	196.50	.00	.00	1629.00	3156.00	1632.22	1631.81	1632.71	39.06	5.64	559.69	504.99
*	1055.000	197.50	.00	.00	1630.00	3156.00	1633.57	1633.57	1634.47	77.18	7.62	414.21	359.24
*	1060.000	195.00	.00	.00	1631.00	3156.00	1635.66	1635.66	1636.46	39.15	8.54	545.08	504.39
*	1065.000	177.70	.00	.00	1632.00	3156.00	1637.76	1637.76	1639.44	64.03	10.40	303.41	394.41
*	1067.000	113.00	.00	.00	1633.00	3156.00	1639.38	1638.93	1639.93	20.61	6.48	665.40	695.22
*	1069.000	83.00	.00	.00	1634.00	3156.00	1639.90	1637.34	1640.12	5.74	3.75	842.14	1317.35
	1070.000	67.00	.00	.00	1634.00	3156.00	1639.88	1637.38	1640.23	7.67	4.80	758.87	1139.77

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	1072.000	104.00	.00	.00	1635.00	3156.00	1639.69	1638.75	1640.69	28.95	8.04	392.69	586.60
*	1075.000	88.90	.00	.00	1635.50	3156.00	1640.10	1640.10	1641.94	61.10	10.89	289.94	403.75
*	1080.000	171.70	.00	.00	1636.00	3156.00	1641.25	1641.25	1643.10	50.55	11.04	306.67	443.87
*	1085.000	236.90	.00	.00	1638.00	3156.00	1643.38	1643.38	1645.19	53.57	11.32	314.36	431.21
*	1090.000	188.60	.00	.00	1639.00	3156.00	1645.27	1645.27	1647.29	59.27	11.42	276.42	409.95
	1095.000	191.90	.00	.00	1640.00	3156.00	1646.76	1646.54	1648.45	57.62	10.42	302.84	415.78
*	1100.000	181.20	.00	.00	1642.00	3156.00	1648.34	1648.34	1649.38	26.76	8.89	549.19	610.13
	1105.000	248.20	.00	.00	1644.00	3156.00	1648.88	1648.61	1650.35	43.75	10.07	352.20	477.15
	1110.000	184.90	.00	.00	1644.50	3156.00	1649.59	1649.43	1651.42	53.34	10.85	290.98	432.14
*	1112.000	72.00	.00	.00	1645.00	3156.00	1651.16	1649.28	1651.72	13.56	6.02	547.79	856.91
	1115.000	150.70	.00	.00	1645.50	3156.00	1651.41	1649.54	1651.93	14.17	5.81	543.56	838.36
*	1120.000	245.80	.00	.00	1646.00	3156.00	1651.24	1651.19	1652.91	61.57	10.38	304.17	402.20
*	1125.000	213.30	.00	.00	1648.00	3156.00	1652.62	1652.62	1654.44	62.02	10.81	291.97	400.74
*	1130.000	204.10	.00	.00	1649.00	3156.00	1654.82	1654.82	1656.95	59.93	11.73	269.12	407.68
*	1135.000	203.30	.00	.00	1650.00	3156.00	1655.94	1655.94	1658.26	59.62	12.23	258.11	408.75
*	1140.000	190.30	.00	.00	1651.00	3156.00	1657.53	1657.53	1660.07	61.63	12.79	246.73	402.00
*	1145.000	275.80	.00	.00	1651.50	3156.00	1660.12	1657.71	1661.01	15.93	7.57	417.08	790.62
	1150.000	126.40	.00	.00	1652.00	3156.00	1660.40	1658.17	1661.21	15.61	7.22	436.92	798.81
*	1152.000	125.00	.00	.00	1652.00	3156.00	1660.98	1657.88	1661.38	7.44	5.12	616.11	1156.74
*	1155.000	64.00	.00	.00	1652.50	3156.00	1661.25	1657.65	1661.44	3.57	3.48	905.67	1669.83
*	1160.000	186.60	.00	.00	1654.00	3156.00	1661.53	1661.53	1663.84	57.28	12.21	261.27	416.99

CHANNEL MODEL

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	985.000	3156.00	1610.46	.00	.00	1.76	43.87	.00
*	990.000	3156.00	1615.41	.00	4.95	.00	256.34	55.00
*	992.000	3156.00	1616.40	.00	1.00	.00	803.80	43.00
*	994.000	3156.00	1624.20	.00	7.80	.00	2246.45	250.00
*	1000.000	3156.00	1624.20	.00	.00	.00	1072.87	19.00
	1002.000	3156.00	1624.20	.00	.00	.00	993.01	52.00
	1005.000	3156.00	1624.20	.00	.00	.00	652.22	195.00
	1010.000	3156.00	1624.20	.00	-.01	.00	538.96	140.00
*	1012.000	3156.00	1624.19	.00	.00	.00	354.54	97.00
*	1015.000	3156.00	1624.06	.00	-.14	.00	103.47	124.00
*	1017.000	3156.00	1624.64	.00	.58	.00	84.15	95.00
*	1020.000	3156.00	1624.54	.00	-.10	.00	73.06	185.30
*	1025.000	3156.00	1624.87	.00	.32	.00	69.19	221.70
*	1030.000	3156.00	1627.07	.00	2.21	.00	90.41	190.70
*	1035.000	3156.00	1629.01	.00	1.93	.00	449.97	179.00
	1040.000	3156.00	1630.06	.00	1.05	.00	444.45	224.30
	1045.000	3156.00	1630.94	.00	.88	.00	282.70	178.00
	1050.000	3156.00	1632.22	.00	1.28	.00	298.56	196.50
*	1055.000	3156.00	1633.57	.00	1.35	.00	234.03	197.50
*	1060.000	3156.00	1635.66	.00	2.09	.00	326.61	195.00
*	1065.000	3156.00	1637.76	.00	2.10	.00	92.60	177.70
*	1067.000	3156.00	1639.38	.00	1.62	.00	320.97	113.00
*	1069.000	3156.00	1639.90	.00	.52	.00	194.20	83.00
	1070.000	3156.00	1639.88	.00	-.02	.00	270.84	67.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	1072.000	3156.00	1639.69	.00	-.19	.00	95.80	104.00
*	1075.000	3156.00	1640.10	.00	.41	.00	79.23	88.90
*	1080.000	3156.00	1641.25	.00	1.15	.00	90.44	171.70
*	1085.000	3156.00	1643.38	.00	2.12	.00	110.88	236.90
*	1090.000	3156.00	1645.27	.00	1.89	.00	68.19	188.60
	1095.000	3156.00	1646.76	.00	1.49	.00	84.29	191.90
*	1100.000	3156.00	1648.34	.00	1.58	.00	299.58	181.20
	1105.000	3156.00	1648.88	.00	.54	.00	102.64	248.20
	1110.000	3156.00	1649.59	.00	.71	.00	71.12	184.90
*	1112.000	3156.00	1651.16	.00	1.57	.00	278.82	72.00
	1115.000	3156.00	1651.41	.00	.25	.00	126.95	150.70
*	1120.000	3156.00	1651.24	.00	-.17	.00	89.21	245.80
*	1125.000	3156.00	1652.62	.00	1.38	.00	81.33	213.30
*	1130.000	3156.00	1654.82	.00	2.20	.00	64.12	204.10
*	1135.000	3156.00	1655.94	.00	1.12	.00	56.43	203.30
*	1140.000	3156.00	1657.53	.00	1.58	.00	50.40	190.30
*	1145.000	3156.00	1660.12	.00	2.59	.00	66.86	275.80
	1150.000	3156.00	1660.40	.00	.29	.00	74.39	126.40

*	1152.000	3156.00	1660.98	.00	.57	.00	103.37	125.00
*	1155.000	3156.00	1661.25	.00	.27	.00	158.40	64.00
*	1160.000	3156.00	1661.53	.00	.28	.00	65.38	186.60

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SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 985.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

CAUTION SECNO= 990.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 990.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 992.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 992.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 994.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1000.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1012.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1015.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1017.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1020.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 1025.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1025.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1030.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1030.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1035.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1035.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1055.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1055.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1060.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1060.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1065.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1065.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 1067.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1069.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1072.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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CAUTION SECNO= 1085.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

1

CAUTION SECNO= 1085.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

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CAUTION SECNO= 1100.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1100.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 1112.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1120.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 1125.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1125.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1130.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1130.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1135.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1135.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1140.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1140.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 1145.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1152.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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WARNING SECNO=   1155.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=   1160.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   1160.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
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NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING.
BY OLYMPUS AERIAL SURVEYS, INC. FLOWN JULY 14, 1997 AND AUGUST 26, 1997
CONTOUR INTERVAL 1 FOOT

PANEL AFFECTS FIRMS 32003C0380 D & 32003C0386 D
DATED AUGUST 16, 1995.

FILE: WORK_PN3.DWG

FLOODING SOURCE: PULSIPHER WASH
MESQUITE, CLARK COUNTY, NEVADA

ELEVATION REFERENCE MARKS

REFERENCE MARK	PROJECT DATUM ELEVATION (FEET)	DESCRIPTION OF LOCATION
2114	1642.91	Rafen; 4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash

PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.89 FEET

GRAPHIC SCALE
(IN FEET)
1 inch = 400 ft
400 0 200 400 800 1600

NORTH



LIMIT OF STUDY

LEGEND

- REVISED ZONE A
- NEW SHADED ZONE X
- EXISTING 100-YEAR FLOODPLAIN BOUNDARY
- APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY TIE-IN
- ELEVATION REFERENCE MARK
- SFHA SPECIAL FLOOD HAZARD AREA

REV	DATE	DESCRIPTION

RECOMMENDED

NO. DATE

G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH HARBOR BLVD./LAS VEGAS, NEVADA 89102
(702) 385-2220

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH NORTH OF I-15 REACH
WORK MAP

SHEET
PU1
OF 2 SHEETS

550.035

PLOTTED: 9/2/99
WORK_PN3.DWG

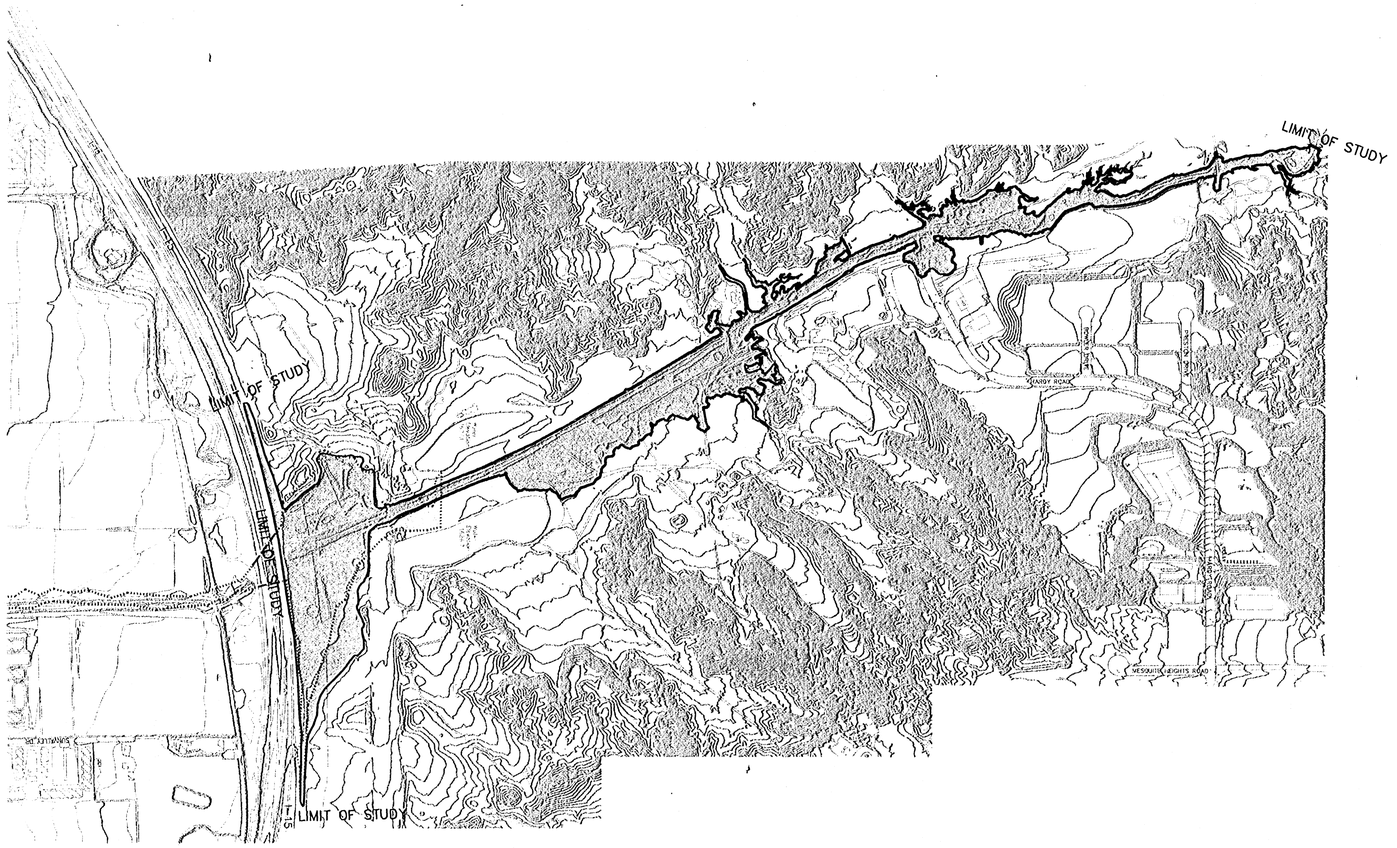
NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING,
BY OLYMPUS AERIAL SURVEYS, INC. FLOWN JULY 14, 1997 AND AUGUST 26, 1997
CONTOUR INTERVAL 1 FOOT
BY NEVADA AERIAL MAPPING, FLOWN JANUARY 14, 1998
CONTOUR INTERVAL 2 FEET

PANEL AFFECTS FIRMS 32003C0379 D & 32003C0387 D
DATED AUGUST 16, 1995.

FILE: WORK_AN3.DWG

FLOODING SOURCE: ABBOTT WASH
MESQUITE, CLARK COUNTY, NEVADA



GRAPHIC SCALE
(IN FEET)
1 inch = 400 ft.
400 0 200 400 800 1600

NORTH

PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.89 FEET

LEGEND

- REVISED ZONE A
- NEW SHADED ZONE X
- EXISTING 100-YEAR FLOODPLAIN BOUNDARY
- APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY TIE-IN
- SFHA SPECIAL FLOOD HAZARD AREA

REV	DATE	DESCRIPTION

RECOMMENDED NO DATE

G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102
(702) 383-1200

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
ABBOTT WASH NORTH OF I-15 REACH
WORK MAP

SHEET
AB1
OF 1 SHEETS

550.035

PLOTTED: 10/8/98
WORK_AN3.DWG

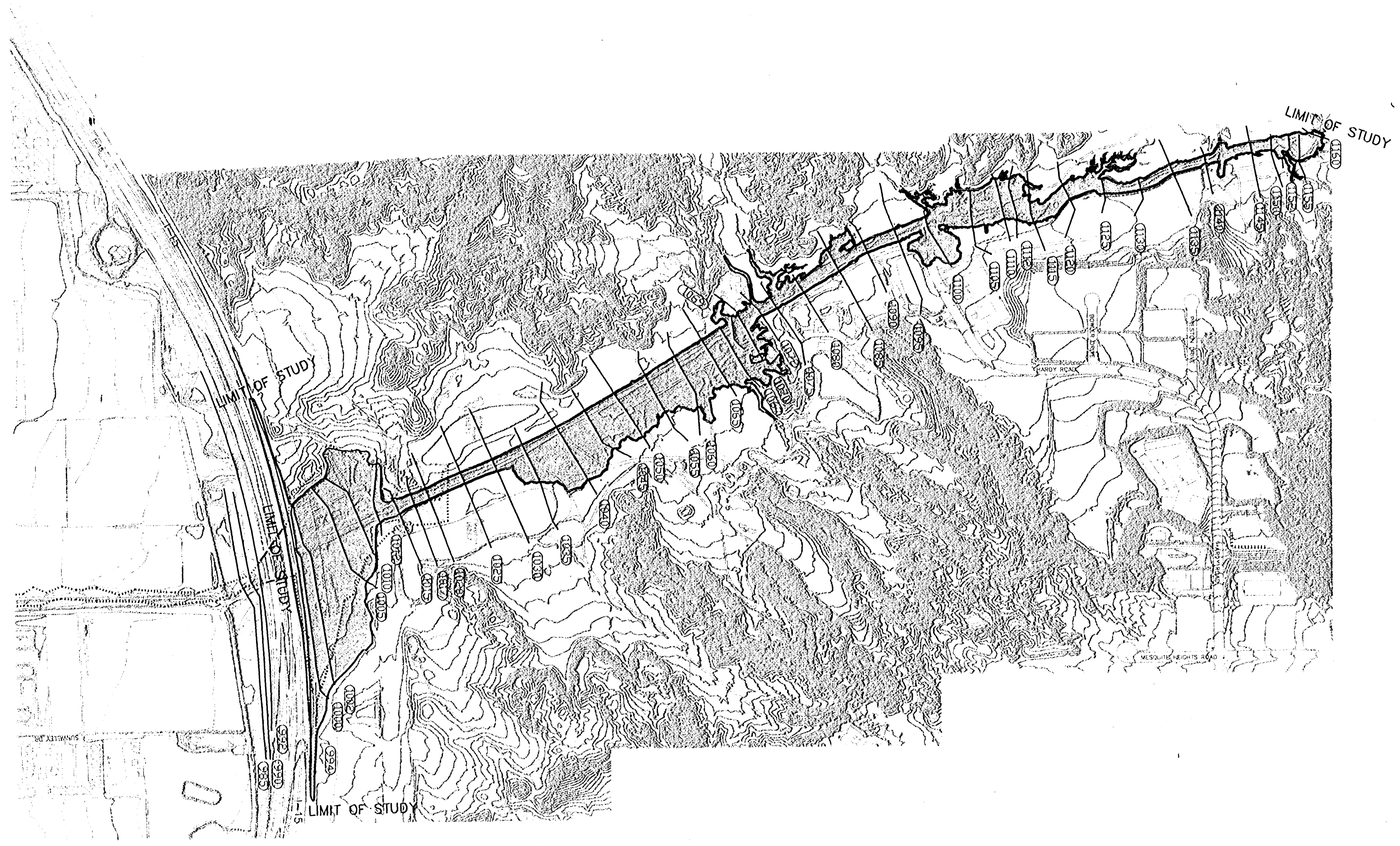
NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING,
BY OLYMPUS AERIAL SURVEYS, INC. FLOWN JULY 14, 1997 AND AUGUST 26, 1997
CONTOUR INTERVAL 1 FOOT
BY NEVADA AERIAL MAPPING, FLOWN JANUARY 14, 1998
CONTOUR INTERVAL 2 FEET

PANEL AFFECTS FIRMS 32003C0379 D & 32003C0387 D
DATED AUGUST 16, 1995.

FILE: WORK_AN3.DWG

FLOODING SOURCE: ABBOTT WASH
MESQUITE, CLARK COUNTY, NEVADA



GRAPHIC SCALE
(IN FEET)
1 inch = 400 ft.
0 200 400 800 1200

NORTH

PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.89 FEET

LEGEND

- REVISED ZONE A
- NEW SHADED ZONE X
- EXISTING 100-YEAR FLOODPLAIN BOUNDARY
- APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY TIE-IN
- SFHA — SPECIAL FLOOD HAZARD AREA
- (1100) — CROSS SECTION

NO	DATE	DESCRIPTION
RECOMMENDED		

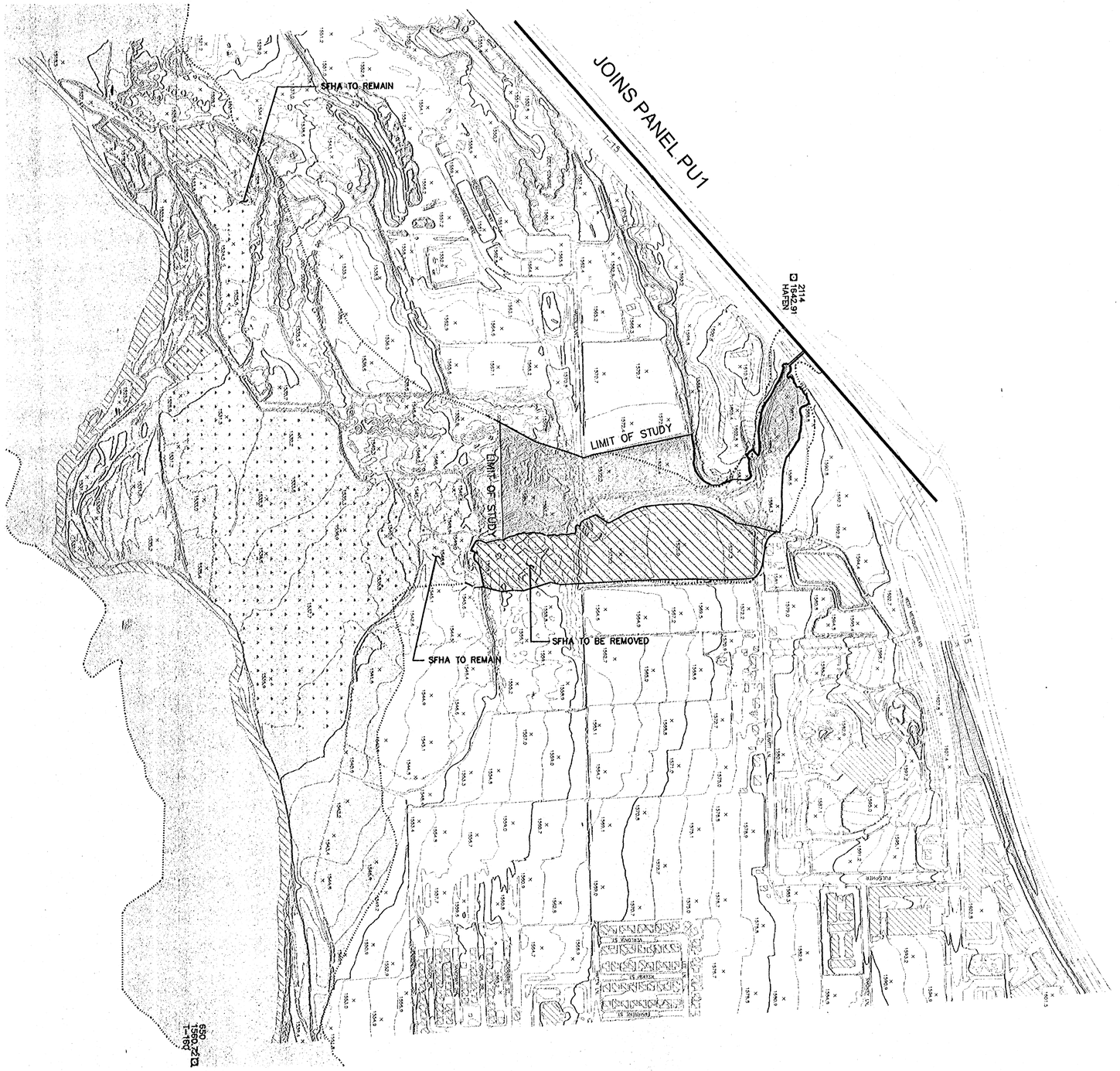
G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102
(702) 365-1200

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
ABBOTT WASH NORTH OF I-15 REACH
CROSS SECTION EXHIBIT

SHEET
AB1
OF 1 SHEETS

550.035

PLOTTED: 10/8/98
WORK_AN3.DWG





NORTH

NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING,
BY NEVADA AERIAL MAPPING, FLOWN JANUARY 14, 1998
CONTOUR INTERVAL 2 FEET

PANEL AFFECTS FIRM 32003C0386 D
DATED AUGUST 16, 1995

FILE: WORK_PS4.DWG

FLOODING SOURCE: PULSIPHER WASH
MESQUITE, CLARK COUNTY, NEVADA

ELEVATION REFERENCE MARKS

REFERENCE MARK	PROJECT DATUM ELEVATION (FEET)	DESCRIPTION OF LOCATION
2114	1642.91	Hafen; 4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash.
650	1560.72	I-160; Description of benchmark not available. Located south of Virgin River approximately 1,300 feet east and 4200 feet south of Pulsipher Street and Leavitt Lane intersection.

PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.89 FEET

LEGEND

- REVISED ZONE A
- NEW SHADED ZONE X
- EXISTING APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY
- APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY TIE-IN
- ELEVATION REFERENCE MARK
- SFHA SPECIAL FLOOD HAZARD AREA

REV	DATE	DESCRIPTION

RECOMMENDED

NO DATE

G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102
(702) 383-1200

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH SOUTH OF I-15 REACH

WORK MAP

SHEET
PU2
OF 2 SHEETS

550.035

PLOTTED: 1/13/99
WORK_PS4.DWG

NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING.
BY OLYMPUS AERIAL SURVEYS, INC. FLOWN JULY 14, 1997 AND AUGUST 26, 1997
CONTOUR INTERVAL 1 FOOT

PANEL AFFECTS FIRMS 32003C0380 D & 32003C0386 D
DATED AUGUST 16, 1995.

FILE: WORK_PN3.DWG

FLOODING SOURCE: PULSIPHER WASH
MESQUITE, CLARK COUNTY, NEVADA

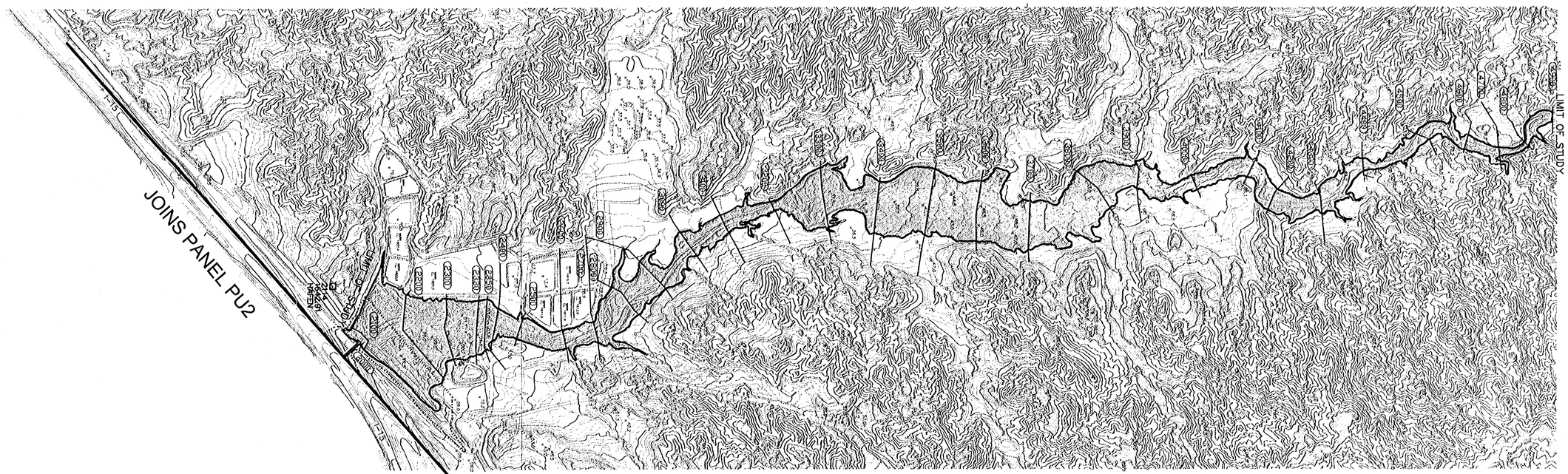
ELEVATION REFERENCE MARKS

REFERENCE MARK	PROJECT DATUM ELEVATION (FEET)	DESCRIPTION OF LOCATION
2114	1642.91	Hafen; 4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash.

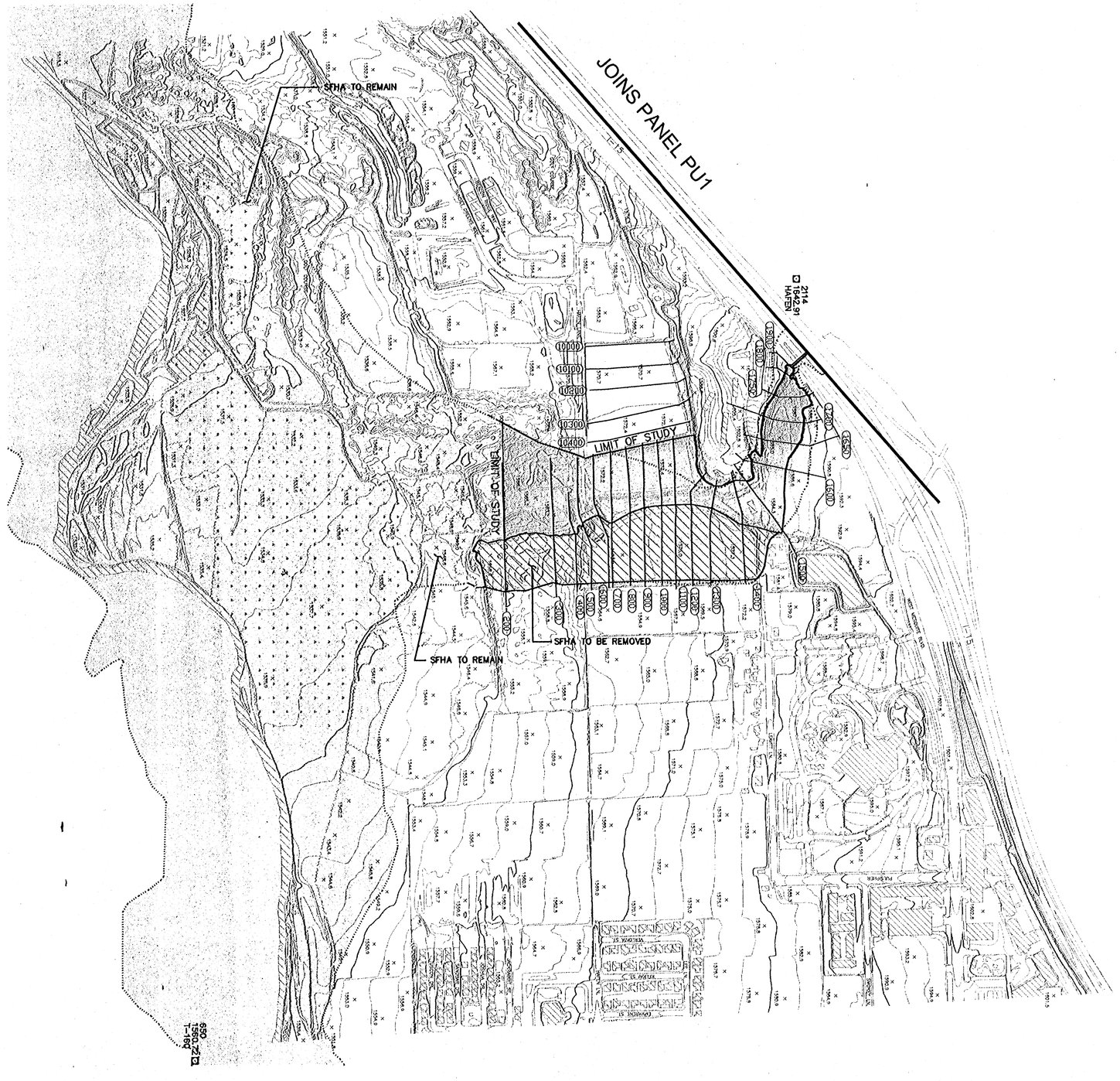
PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.89 FEET

GRAPHIC SCALE
(IN FEET)
1 inch = 400 ft.
400 0 200 400 800 1600

NORTH



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NOTES

MAP BASED ON 1"=400' TOPOGRAPHIC MAPPING,
BY NEVADA AERIAL MAPPING, FLOWN JANUARY 14, 1998
CONTOUR INTERVAL 2 FEET

PANEL AFFECTS FIRM 32003C0386 D
DATED AUGUST 16, 1995

FILE: WORK_PS4.DWG

FLOODING SOURCE: PULSIPHER WASH
MESQUITE, CLARK COUNTY, NEVADA

GRAPHIC SCALE
(IN FEET)
1 inch = 400 ft.
400 0 200 400 800 1600

NORTH

ELEVATION REFERENCE MARKS

REFERENCE MARK	PROJECT DATUM ELEVATION (FEET)	DESCRIPTION OF LOCATION
2114	1642.91	Hafen; 4" Clark County aluminum monument located approximately 500 feet west and 75 feet south of I-15 culvert at Pulsipher Wash.
650	1560.72	I-160; Description of benchmark not available. Located south of Virgin River approximately 1,300 feet east and 4200 feet south of Pulsipher Street and Leavitt Lane intersection.

PROJECT DATUM = NGVD 1929 - 0.6 FEET
PROJECT DATUM = NAVD 1988 - 2.89 FEET

LEGEND

- REVISED ZONE A
- NEW SHADED ZONE X
- EXISTING APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY
- APPROXIMATE 100-YEAR FLOODPLAIN BOUNDARY TIE-IN
- ELEVATION REFERENCE MARK
- SFHA — SPECIAL FLOOD HAZARD AREA
- (1000) — CROSS SECTION

NON-RESPONSE | DATE | REV | NO. DATE | RECOMMENDED

G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102
(702) 365-2200

ABBOTT AND PULSIPHER WASHES FIS RESTUDY
PULSIPHER WASH SOUTH OF I-15 REACH

CROSS SECTION EXHIBIT

SHEET
PU2
OF 2 SHEETS

550.035

PLOTTED: 1/18/99
WORK_PS4.DWG