

Received 1/6/09

**Request for Conditional Letter of Map Revision Based (CLOMR)
For
Little Salt Wash at Fruita Industrial Park
Fruita, Colorado**

Date: May 27, 2008
Rev 1: August 18, 2008
Rev 2: January 5, 2009

FINAL REVISION

Prepared by: Vortex Engineering, Inc.
255 Vista Valley Drive
Fruita, CO 81521
970-245-9051
VEI # F07-006

Submitted To: City of Fruita
Division of Engineering
325 E. Aspen Avenue
Fruita, Colorado 81521

Owners: Rockies Investment Group, LLC
Fruita Industrial Park, LLC
2452 Patterson Rd., Suite 201
Grand Junction, CO 81502

Property Address: 703 Greenway Drive
Fruita, CO 81521

FEMA Case Number: 08-08-0639R

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1 Introduction

1.1 Purpose of Study

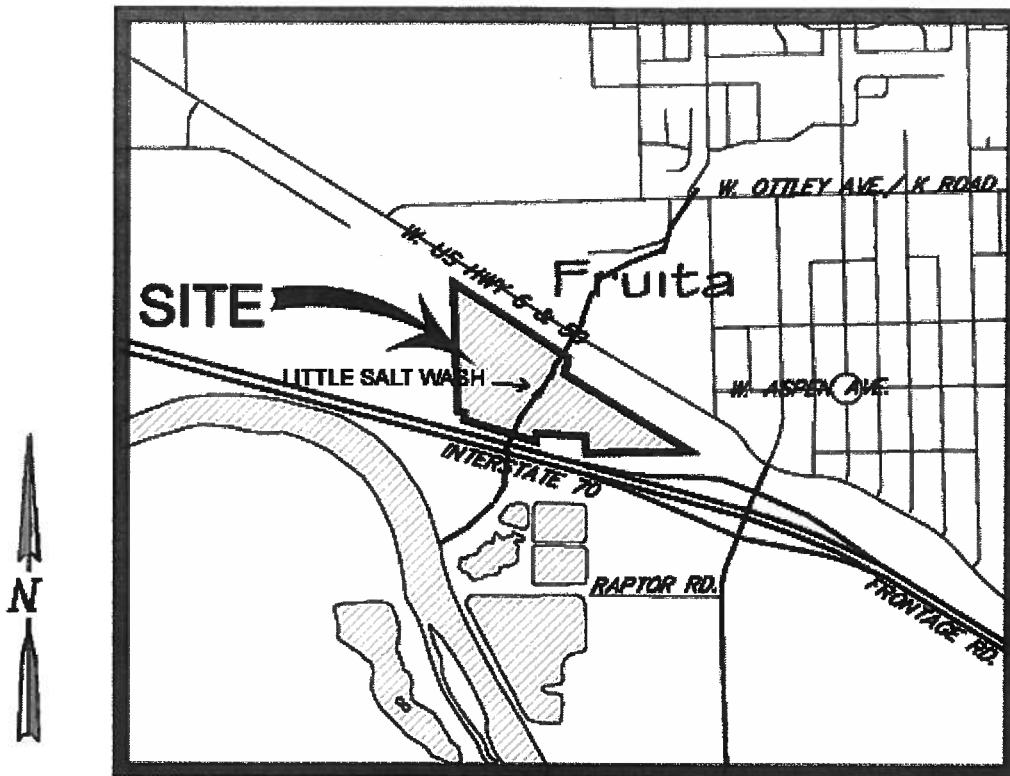
This study is to serve as basis for the Conditional Letter of Map Revision for Little Salt Wash, located in Town of Fruita, Mesa County, Colorado. This report includes copies of FEMA forms, HEC-RAS open channel model and supportive documentation to substantiate that the proposed changes to the channel will not adversely affect properties upstream and downstream of the area of proposed revisions to the flood plain and floodway, and that the proposed changes are within National Flood Insurance Program (NFIP) regulations.

1.2 Location Studied Area

The area of study of Little Salt Wash is located in the west 1/2 of the northeast 1/4 of Section 18, Township 1 North, Range 2 West and in the east 1/2 of Section 18, Township 1 North, Range 2 West of the Ute Meridian, City of Fruita, Mesa County, State of Colorado. More specifically, the scope of the study is confined between an I-70 bridge and an existing double 18'x12' Union Pacific Rail Road culvert. Also, the downstream and upstream limits of the studied reach of Little Salt Wash are located about 1700 feet and 2650 feet from Colorado River confluence, respectively.

The physical address of subject property is:
703 Greenway Drive
Fruita, CO 81521

1.3 Vicinity Map



LOCATION MAP

N.T.S.

2 Area Studied

2.1 Description

The analysis of the above described reach of Little Salt Wash was precipitated by proposed industrial development, bisected by Little Salt Wash. The development, Fruita Industrial Park, consists of 30 lots, on four parcels totaling approximately 42 acres. As part of the infrastructure development there is approximately 3,700 feet of proposed roadways that crosses Little Salt Wash, and placing the fill in floodway fringe in Block 4, Lots 1-4. The proposed road requires a crossing over Little Salt Wash, and the fill creates encroachment conditions. Therefore, this study includes open channel analysis of existing conditions, culvert crossing, and culvert crossing along with encroachment analysis into the floodway fringe.

2.2 Existing Conditions

Little Salt Wash main channel and its floodway is covered by native grasses and along the river's banks heavy brush mostly consisting of tamarisk. The soils on site are classified as

hydrologic group B. The main channel is lined with silt and sparsely distributed river rock varying in size from 1' to 6' mean diameter.

The grade of the main channel varies between studied sections from 0.06% to 1.10%, averaging 0.42%. The grade between first and last section is of the studied reach is 0.34%. The length of the studied channel is approximately 960 feet from downstream to upstream limits. The flow in the river enters the studied area through an existing double 18'x12' Concrete Box Culvert. This culvert facilitates Union Pacific Rail Road crossing over Little Salt Wash. The flow exits the studied area via an existing I-70 highway bridge.

The following are the Natural Resource Conservation Service (NRCS) soils found at the site: Sagers silty loam, Sagers silty clay loam, Fruitland sandy clay (majority of site), Turley clay loam, and Ustifluvents. All soils are Hydrologic Soils Group "B" (see Appendix I).

2.3 Proposed Conditions

The proposed changes to the existing conditions studied in this report include arch culvert and fill of the right floodway (west of flow line of river). The fill is proposed to be placed for about 250 feet measured from downstream limit of the study.

2.3.1 Culvert

The proposed culvert section consists of 66 feet long, double 28'x10' Conspan Arch Concrete Culvert. The invert of the culvert will remain in its natural state. The proposed location of the culvert is set approximately 850' from downstream limits of the study, between sections 9.05 and 8.2. The approach to the culvert will be lined by a buried riprap. The wing walls of the culvert will retain road fill at 3:1 slope.

2.3.2 Encroachment

The fill, in the proposed grading plan for Fruita Industrial Park, encroaches into the floodway fringe of the channel at sections 1 through 4 of the study. The following table shows the amount of encroachment:

River Section	Amount of encroachment (ft)*
4	606
3	510
2	358
1	682

*Measured from left to right looking downstream of river

p4. Culverts proposed
are 2 - 28'x11' concrete
arch.

3 **Engineering Methods**

In this report standard hydraulics methods were used to determine flood hazard data required for this study. Hydrologic data obtained from Flood Insurance Study, Mesa County, Colorado, Unincorporated Areas, Revised July 15, 1992

3.1 **Hydrologic Analysis**

Hydrologic data was assumed from *Flood Insurance Study, Mesa County, Colorado, Unincorporated Areas, Revised July 15, 1992 (FIS)*. Flows from two storm events were analyzed for this study: 100-year and 500-year, amounting to 4,100 cfs and 8100 cfs, respectively. These events commonly termed 100-year and 500-year have a reoccurrence interval of 1% and 0.2% in any year. Even though, these storm frequencies of the above reoccurrence interval represent the long term, average period between floods of specific magnitude, rare floods could occur within greater frequency or within the same year. The analysis reported in this study reflect flooding potential based on conditions existing in the analyzed area at the of completion of this report. The basin area of the Little Salt Wash at the area of the study is approximately 33 square miles.

3.2 **Hydraulic Analysis**

Hydraulic analysis of the flooding of Little Salt Wash were carried out to provide estimates of the elevations of floods in the existing conditions and the proposed, built-out conditions of the 100-year and 500-year storm events.

Cross section topographic data for the analysis, in revised area, was provided by D. H. Surveying. Topographic data was in a form of GPS points shot on the project site and the channel. The data is relatively recent and was collected at the end of 2007.

Water surface elevations of floods of the selected storm events were computed using US Army Corps of Engineers HEC-RAS version 3.1.3.

Channel and overbank Manning's roughness coefficients (Manning's 'n') used in the hydraulic computations were determined by engineering judgment and were based on field observations of the stream and floodplain/floodway areas.

For this study there are 4 HEC-RAS models:

Model 1: Existing model with obstructed left barrel of the culverts.

Model 2: Proposed condition with proposed arch culvert (requested and for use by City of Fruita).

Model 3: Proposed conditions with proposed arch culvert and encroachment.

Model 4: Existing Conditions – Floodway Analysis.

Model 5: Proposed Conditions – Floodway Analysis.

The hydraulic analysis for this study in Models 2 and 3 were based on unobstructed flow in arch culvert. The flood elevations shown on the profile are considered valid only if the proposed arch culvert remains unobstructed, operate properly and do not fail.

All elevations in this study are referenced to North American Vertical Datum 1988 (NAVD 88). The hydraulic data obtained from previous studies done in NGVD 29 has been converted to NAVD 88 by adding 3.4 feet (See Appendix IV).

Base Flood Elevation for the studied reach of the channel, as depicted on FIRM panel 080194 0001B at sections A and B (A being downstream section and B upstream) is 4479 based on NGVD 29. The more accurate Base Flood Elevations in the studied area at Sections A and B as listed in FIS study are: 4478.6 and 4478.7, respectively. For the purposed of this study it has been assumed that the Base Flood Elevation in the studied area is 4478.6 NGVD 29. This BFE converted to NAVD 88 is 4482.0.

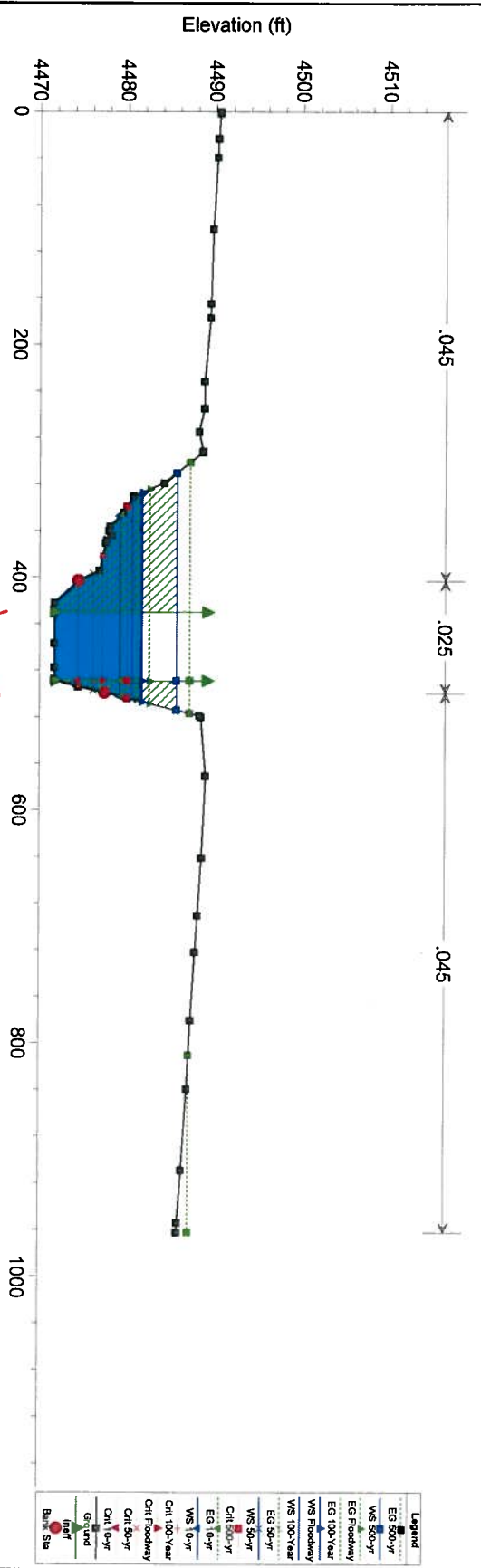
are as follows: Upstream (Sec. 17) = 4489.1, Downstream (Sec. 0.4) = 4478.15. For 500-year event upstream boundary condition elevation is 4494.6 and downstream reach boundary conditions is: 4479.8.

4 References

The following manuals and computer programs were used for this drainage report:

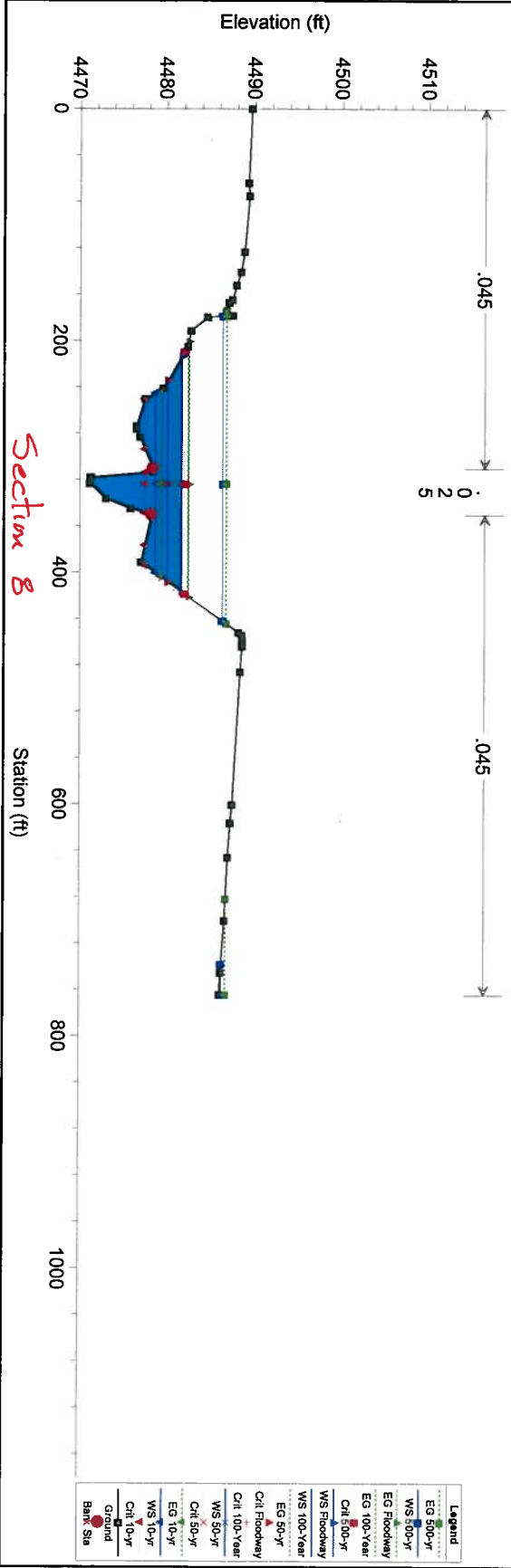
- Flood Insurance Study, Mesa County, Colorado, Unincorporated Areas, Revised July 15, 1992
- Storm Water Management Master Plan (SWMMP) for the City of Fruita, June 1998.

Little Salt Wash-Floodway Plan: Little SaltWash-28x11Arch/Floodway_Mod5 2/24/2009



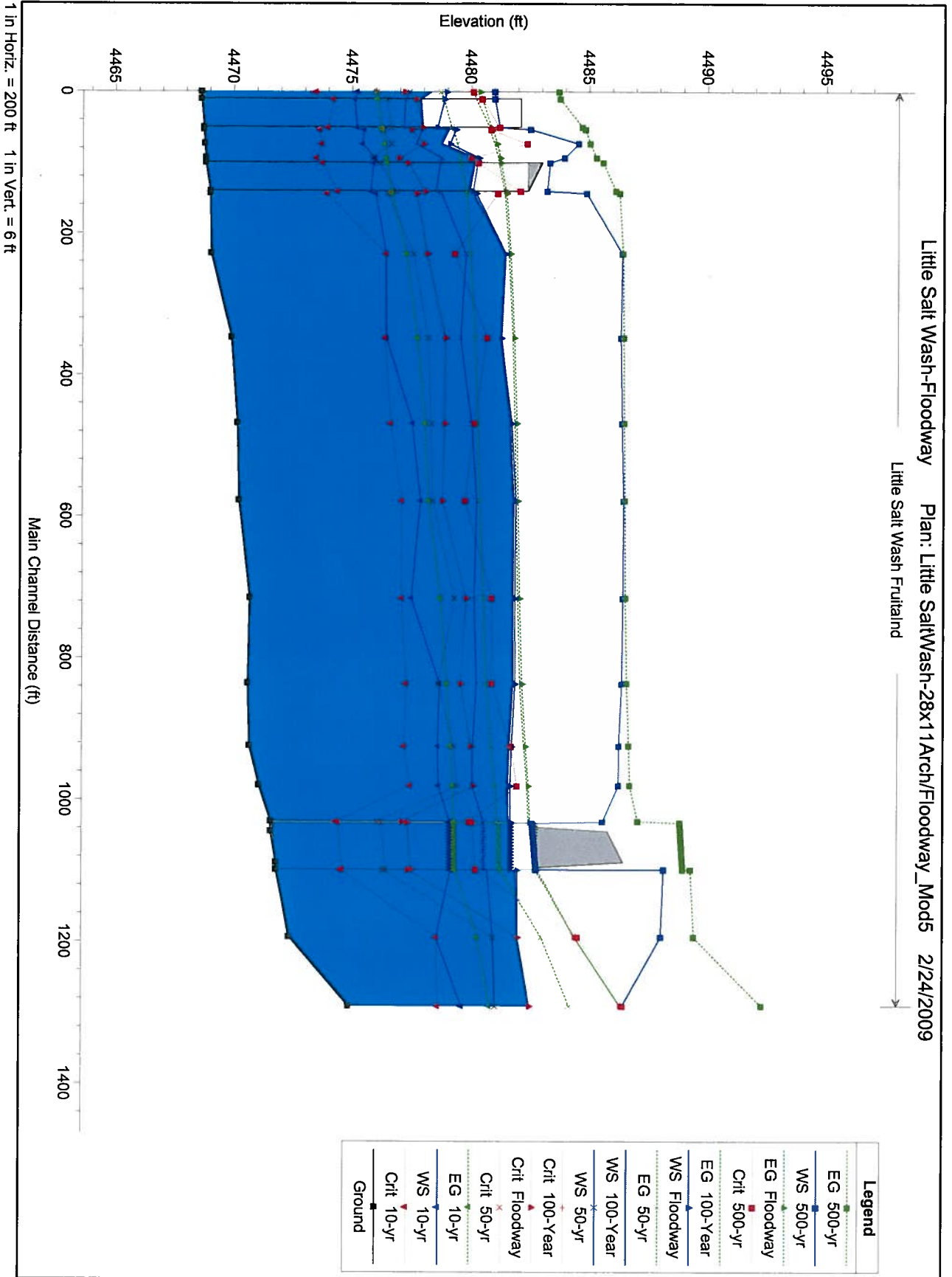
Legend	
EG 500-Yr	EG 500-Yr
WS 500-Yr	WS 500-Yr
EG Floodway	EG Floodway
EG 100-1st	EG 100-1st
WS Floodway	WS Floodway
WS 100-Year	WS 100-Year
EG 50-Yr	EG 50-Yr
WS 50-Yr	WS 50-Yr
Chl 500-Yr	Chl 500-Yr
EG 10-Yr	EG 10-Yr
WS 10-Yr	WS 10-Yr
Chl 100-Year	Chl 100-Year
Chl Floodway	Chl Floodway
Chl 50-Yr	Chl 50-Yr
Chl 10-Yr	Chl 10-Yr
Ground	Ground
Infr	Infr
Bank	Bank
Sta	Sta

Little Salt Wash-Floodway Plan: Little SaltWash-28x11Arch/Floodway_Mod5 2/24/2009



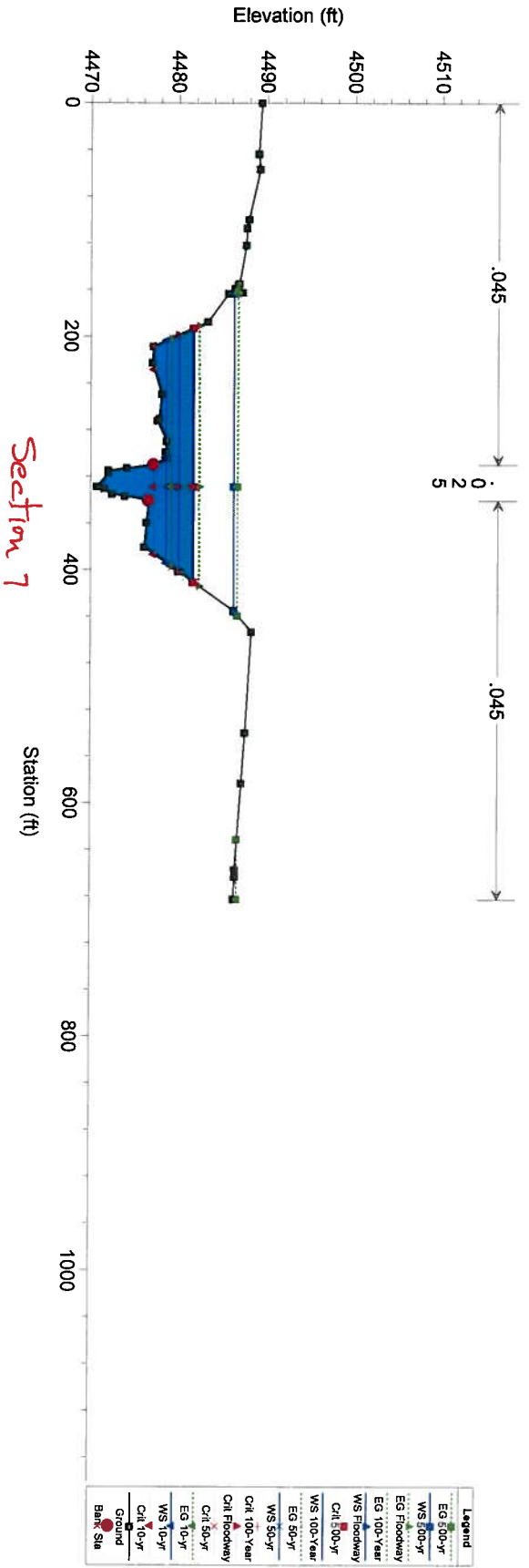
Legend	
EG 500-Yr	EG 500-Yr
WS 500-Yr	WS 500-Yr
EG Floodway	EG Floodway
EG 100-1st	EG 100-1st
WS Floodway	WS Floodway
WS 100-Year	WS 100-Year
EG 50-Yr	EG 50-Yr
WS 50-Yr	WS 50-Yr
Chl 500-Yr	Chl 500-Yr
EG 10-Yr	EG 10-Yr
WS 10-Yr	WS 10-Yr
Chl 100-Year	Chl 100-Year
Chl Floodway	Chl Floodway
Chl 50-Yr	Chl 50-Yr
Chl 10-Yr	Chl 10-Yr
Ground	Ground
Bank	Bank
Sta	Sta

1 in Horiz. = 150 ft 1 in Vert. = 20 ft



1 in Horiz. = 200 ft 1 in Vert. = 6 ft

Little Salt Wash-Floodway Plan: Little SaltWash-28x11Arch/Floodway_Mod5 2/24/2009



1 in Horiz. = 150 ft 1 in Vert. = 20 ft

5 MAP EXHIBIT

FLOOD PLAIN PLAN AND PROFILE

6 APPENDIX I FEMA Forms
6.1 OVERVIEW AND CONCURRENCE FORM

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hour per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, U.S. Department of Homeland Security, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

A. REQUESTED RESPONSE FROM DHS-FEMA

This request is for a (check one):

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

B. OVERVIEW

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

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301 480287	City of Katy Harris County	TX TX	480301 48201C	0005D 0220G	02/08/83 09/28/90
—080194	—City of Fruita Mesa County	—CO	— 080194	— 0001B	— —06/15/92

2. a. Flooding Source:

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

3. Project Name/Identifier: —Fruita Industrial Park

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

5. Basis for Request and Type of Revision:

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

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

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

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

- Structures: Channelization Levee/Floodwall Bridge/Culvert
- Dam Fill Other (Attach Description)

C. REVIEW FEE

Has the review fee for the appropriate request category been included? Yes Fee amount: \$ \$700
 No, Attach Explanation

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

D. SIGNATURE

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

Name: <u>Robert Jones, II, P.E.</u>		Company: <u>Vortex Engineering, Inc.</u>	
Mailing Address: <u>255 Vista Valley Drive</u> <u>Fruita, CO 81521</u>		Daytime Telephone No.: <u>970-245-9051</u>	Fax No.: <u>970-245-7639</u>
E-Mail Address: <u>rijones@vortexeng.us</u>			
Signature of Requester (required): <i>Robert W. Jones II</i>		Date: <u>5/27/08</u>	

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

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

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting data. All documents submitted in support of this request are correct to the best of my knowledge. All analyses have been performed correctly and in accordance with sound engineering practices. All project works are designed in accordance with sound engineering practices to provide protection from the 1% annual chance flood. If "as-built" conditions data/plan provided, then the structure(s) has been built according to the plans being certified, is in place, and is fully functioning. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: <u>ROBERT JONES, II, P.E.</u>	License No.: <u>37505</u>	Expiration Date: <u>5/30/09</u>
Company Name: <u>Vortex Engineering, Inc.</u>	Telephone No.: <u>970-245-9051</u>	Fax No.: <u>970-245-7639</u>
Signature: <i>Robert W. Jones II</i>	Date: <u>5/27/08</u>	

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

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



6.2 RIVERINE HYDROLOGY & HYDRAULICS FORM

PAPERWORK REDUCTION ACT

Public reporting burden for this form is estimated to average 3.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, U.S. Department of Homeland Security, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

Flooding Source: Little Salt Wash, Fruita, Colorado
 Note: Fill out one form for each flooding source studied

A. HYDROLOGY

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

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

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

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

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

- Statistical Analysis of Gage Records Precipitation/Runoff Model
 Regional Regression Equations Other (please attach description)

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

4. Review/Approval of Analysis

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

5. Impacts of Sediment Transport on Hydrology

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

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.)	
			Effective	Proposed/Revised
Downstream Limit	<u>Little Salt Wash</u>	<u>1</u>	<u>4482.0</u>	<u>4481.50</u>
Upstream Limit	<u>Little Salt Wash</u>	<u>12</u>	<u>4482.0</u>	<u>4482.88</u>

2. Hydraulic Method/Model Used

HEC-RAS v. 3.1.3

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

DHS-FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs may help verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. **These tools do not replace engineering judgment.** CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/plan/prevent/fhm/firm_soft.shtm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. Review of your submittal and resolution of valid modeling discrepancies may result in reduced review time.

4. Models Submitted

Natural Run

Floodway Run

Datum

Duplicate Effective Model*	File Name: _____	Plan Name: _____	File Name: _____	Plan Name: _____
Corrected Effective Model* Name: <u>NAVD88</u>	File Name: <u>LittleSaltWash</u>	Plan Name: <u>Model 0</u>	File Name: _____	Plan Name: _____
Existing or Pre-Project Conditions Model Name: <u>NAVD88</u>	File Name: <u>LittleSaltWash</u>	Plan Name: <u>Model 1</u>	File Name: _____	Plan Name: _____
Revised or Post-Project Conditions Model Name: <u>NAVD88</u>	File Name: <u>LittleSaltWash</u>	Plan Name: <u>Model 2&3</u>	File Name: _____	Plan Name: _____
Other - (attach description)	File Name: _____	Plan Name: _____	File Name: _____	Plan Name: _____

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

Digital Models Submitted? (Required)

C. MAPPING REQUIREMENTS

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

Digital Mapping (GIS/CADD) Data Submitted

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

Annotated FIRM and/or FBFM (Required)

D. COMMON REGULATORY REQUIREMENTS*

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

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

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

b. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? Yes No
If Yes, please attach **proof of property owner notification and acceptance (if available)**. Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

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

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

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

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

4. For LOMR/CLOMR requests, does this request have the potential to impact an endangered species? Yes No

If Yes, please submit documentation to the community to show that you have complied with Sections 9 and 10 of the Endangered Species Act (ESA). Section 9 of the ESA prohibits anyone from "taking" or harming an endangered species. If an action might harm an endangered species, a permit is required from U.S. Fish and Wildlife Service or National Marine Fisheries Service under Section 10 of the ESA.

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

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

6.3 RIVERINE STRUCTURES FORM

PAPERWORK REDUCTION ACT

Public reporting burden for this form is estimated to average 7 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, U.S. Department of Homeland Security, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

Flooding Source: Little Salt Wash, Fruita, Colorado
Note: Fill out one form for each flooding source studied

A. GENERAL

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

- Channelization.....complete Section B
- Bridge/Culvertcomplete Section C
- Dam/Basincomplete Section D
- Levee/Floodwallcomplete Section E
- Sediment Transport.....complete Section F (if required)

Description Of Structure

1. **Name of Structure:** 2-28'x11' Arch Culvert
2-28'x11' Arch culvert
- Type (check one): Channelization Bridge/Culvert Levee/Floodwall Dam/Basin
- Location of Structure:
- Downstream Limit/Cross Section:
- Upstream Limit/Cross Section:
2. **Name of Structure:**
- Type (check one): Channelization Bridge/Culvert Levee/Floodwall Dam/Basin
- Location of Structure:
- Downstream Limit/Cross Section:
- Upstream Limit/Cross Section:
3. **Name of Structure:**
- Type (check one) Channelization Bridge/Culvert Levee/Floodwall Dam/Basin
- Location of Structure:
- Downstream Limit/Cross Section:
- Upstream Limit/Cross Section:

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

B. CHANNELIZATION

Flooding Source:

Name of Structure:

1. Accessory Structures

The channelization includes (check one):

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

2. Drawing Checklist

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

3. Hydraulic Considerations

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

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

- Subcritical flow Critical flow Supercritical flow Energy grade line

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

- Inlet to channel Outlet of channel At Drop Structures At Transitions
 Other locations (specify): _____

4. Sediment Transport Considerations

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

C. BRIDGE/CULVERT

Flooding Source: _____ Little Salt Wash

Name of Structure: _____ 28'x10' Conspan Arch Culvert

1. This revision reflects (check one):

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

2. Hydraulic model used to analyze the structure (e.g., HEC-2 with special bridge routine, WSPRO, HY8):

If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structures. Attach justification.

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

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

4. Sediment Transport Considerations

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

D. DAM/BASIN

Flooding Source:

Name of Structure:

- 1. This request is for (check one): Existing dam New dam Modification of existing dam
- 2. The dam was designed by (check one): Federal agency State agency Local government agency Private organization

Name of the agency or organization:

- 3. The Dam was permitted as (check one):

- a. Federal Dam State Dam

Provide the permit or identification number (ID) for the dam and the appropriate permitting agency or organization

Permit or ID number _____ Permitting Agency or Organization _____

- b. Local Government Dam Private Dam

Provided related drawings, specification and supporting design information.

- 4. Does the project involve revised hydrology? Yes No

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

Was the dam/basin designed using critical duration storm?

- Yes, provide supporting documentation with your completed Form 2.
- No, provide a written explanation and justification for not using the critical duration storm.

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

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

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

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

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

Stillwater Elevation Behind the Dam

FREQUENCY (% annual chance)	FIS	REVISED
10-year (10%)		
50-year (2%)		
100-year (1%)		
500-year (0.2%)		
Normal Pool Elevation		

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

E. LEVEE/FLOODWALL

1. System Elements

a. This Levee/Floodwall analysis is based on (check one):

- upgrading of an existing levee/floodwall system
- a newly constructed levee/floodwall system
- reanalysis of an existing levee/floodwall system

b. Levee elements and locations are (check one):

- earthen embankment, dike, berm, etc. Station to
- structural floodwall Station to
- Other (describe): Station to

c. Structural Type (check one):

- monolithic cast-in place reinforced concrete
- reinforced concrete masonry block
- sheet piling
- Other (describe):

d. Has this levee/floodwall system been certified by a Federal agency to provide protection from the base flood?

- Yes No

If Yes, by which agency?

e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

- 1. Plan of the levee embankment and floodwall structures. Sheet Numbers:

- 2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers:

- 3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. Sheet Numbers:

- 4. A layout detail for the embankment protection measures. Sheet Numbers:

- 5. Location, layout, and size and shape of the levee embankment features, foundation treatment, floodwall structure, closure structures, and pump stations. Sheet Numbers:

2. Freeboard

a. The minimum freeboard provided above the BFE is:

Riverine

- 3.0 feet or more at the downstream end and throughout Yes No
- 3.5 feet or more at the upstream end Yes No
- 4.0 feet within 100 feet upstream of all structures and/or constrictions Yes No

Coastal

- 1.0 foot above the height of the one percent wave associated with the 1%-annual-chance stillwater surge elevation or maximum wave runup (whichever is greater). Yes No

- 2.0 feet above the 1%-annual-chance stillwater surge elevation Yes No

E. LEVEE/FLOODWALL (CONTINUED)

2. Freeboard (continued)

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

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

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

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

3. Closures

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

If opening exists, list all closures:

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

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

Note: Geotechnical and geologic data

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

4. Embankment Protection

a. The maximum levee slope landside is:

b. The maximum levee slope floodside is:

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

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

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

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

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

E. LEVEE/FLOODWALL (CONTINUED)

4. Embankment Protection (continued)

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

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

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

Overall height: Sta. ; height ft.

Limiting foundation soil strength:

Sta. , depth to
 strength ϕ = degrees, c = psf
 slope: SS = (h) to (v)

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

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

- c. Summary of stability analysis results:

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

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

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

If Yes, describe methodology used:

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

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

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

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

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability

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

UBC (1988) or Other (specify):

b. Stability analysis submitted provides for:

Overturning Sliding If not, explain:

c. Loading included in the analyses were:

Lateral earth @ $P_A =$ psf; $P_p =$ psf

Surcharge-Slope @ , surface psf

Wind @ $P_w =$ psf

Seepage (Uplift); Earthquake @ $P_{eq} =$ %g

1%-annual-chance significant wave height: ft.

1%-annual-chance significant wave period: sec.

d. Summary of Stability Analysis Results: Factors of Safety.

Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	Criteria (Min)		Sta	To	Sta	To
	Overturn	Sliding	Overturn	Sliding	Overturn	Sliding
Dead & Wind	1.5	1.5				
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)

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

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. Foundation scour protection is, is not provided. If provided, attach explanation and supporting documentation:

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

7. Settlement

- a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin? Yes No
- b. The computed range of settlement is ft. to ft.
- c. Settlement of the levee crest is determined to be primarily from :
 - Foundation consolidation
 - Embankment compression
 - Other (Describe):
- d. Differential settlement of floodwalls has has not been accommodated in the structural design and construction.
Attach engineering analysis to support construction plans.

8. Interior Drainage

- a. Specify size of each interior watershed:
Draining to pressure conduit: acres
Draining to ponding area: acres
- b. Relationships Established
 - Ponding elevation vs. storage Yes No
 - Ponding elevation vs. gravity flow Yes No
 - Differential head vs. gravity flow Yes No
- c. The river flow duration curve is enclosed: Yes No
- d. Specify the discharge capacity of the head pressure conduit: cfs
- e. Which flooding conditions were analyzed?
 - Gravity flow (Interior Watershed) Yes No
 - Common storm (River Watershed) Yes No
 - Historical ponding probability Yes No
 - Coastal wave overtopping Yes NoIf No for any of the above, attach explanation.
- f. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. Yes No
If No, attach explanation.
- g. The rate of seepage through the levee system for the base flood is cfs
- h. The length of levee system used to drive this seepage rate in item g: ft.

E. LEVEE/FLOODWALL (CONTINUED)

8. Interior Drainage (continued)

i. Will pumping plants be used for interior drainage? Yes No

If Yes, include the number of pumping plants:
For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps		
The ponding storage capacity		
The maximum pumping rate		
The maximum pumping head		
The pumping starting elevation		
The pumping stopping elevation		
Is the discharge facility protected?		
Is there a flood warning plan?		
How much time is available between warning and flooding?		

Will the operation be automatic? Yes No

If the pumps are electric, are there backup power sources? Yes No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all interior watersheds that result in flooding.

9. Other Design Criteria

a. The following items have been addressed as stated:

Liquefaction is is not a problem

Hydrocompaction is is not a problem

Heave differential movement due to soils of high shrink/swell is is not a problem

b. For each of these problems, state the basic facts and corrective action taken:

Attach supporting documentation

c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure?
 Yes No

Attach supporting documentation

d. Sediment Transport Considerations:

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

E. LEVEE/FLOODWALL (CONTINUED)

10. Operational Plan And Criteria

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

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

11. Maintenance Plan

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

12. Operations and Maintenance Plan

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

F. SEDIMENT TRANSPORT

Flooding Source:

Name of Structure:

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge: Volume acre-feet

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

Sediment transport rate (percent concentration by volume)

Method used to estimate sediment transport:

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

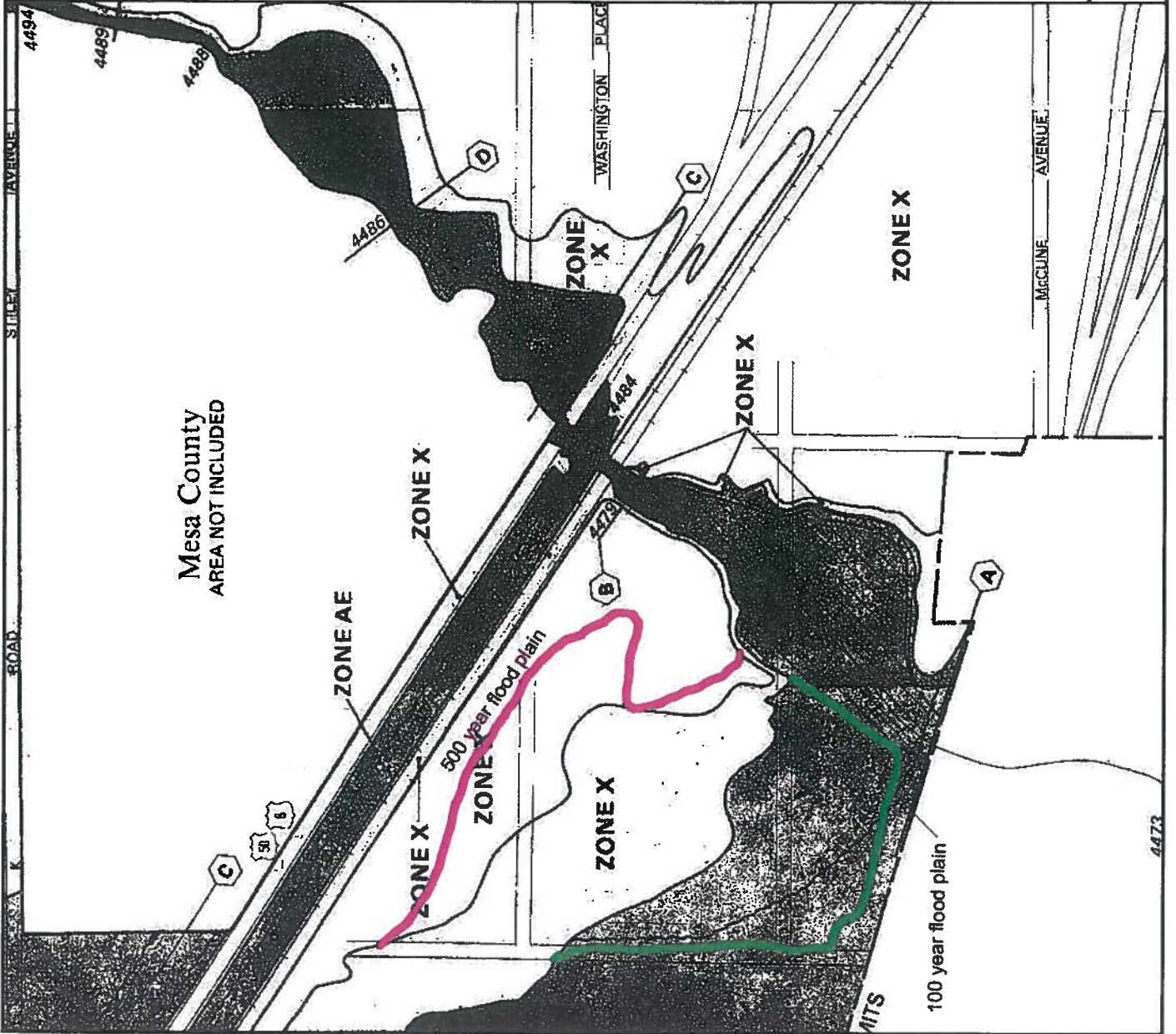
Method used to estimate scour and/or deposition:

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

Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.

7 APPENDIX II FEMA FIRM PANEL



NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWN OF
 FRUITA, COLORADO
 MESA COUNTY

PANEL 1 OF 4
 (SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
 080194 0001 B

MAP REVISED:
 JULY 15, 1992

FEDERAL EMERGENCY MANAGEMENT AGENCY

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

8 APPENDIX III SUMMARY OF RESULTS TABLES

BFE* = 4482.0

*in area of revision b/w sections 1 and 12

River Sta	Model 1										Model 2 *					Model 3							
	Effective/Existing Conditions ("As is" conditions)										Proposed Conditions Model-Culvert only					Prop. Conditions/Culvert/Encroachment model - 100 year							
	Model- 100 year Q=4300 cfs										year Q=4300 cfs					Q=4300 cfs							
Min Ch El (ft)	Base Flood Elev. (BFE) (ft)	W.S. Elev (ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	W.S. Elev (ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	W.S. Elev (ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	W.S. Elev (ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #		
17	4475.00	4489.1	4489.27	2.70	1918.30	253.66	0.14	4489.40	2.58	1949.73	255.25	0.14	4489.40	2.58	1949.73	255.25	0.14	4489.40	2.58	1949.73	255.25	0.14	
16	4474.90	NA	4488.74	6.22	724.14	453.15	0.30	4488.86	6.17	730.98	468.28	0.30	4488.86	6.17	730.98	468.28	0.30	4488.86	6.17	730.98	468.28	0.30	
15.5																							
EX. 2-12x18 Concrete Box Culvert HWY 6 & 50																							
15	4473.00	NA	4486.27	6.98	616.01	173.66	0.34	4486.38	6.92	621.15	174.37	0.34	4486.38	6.92	621.15	174.37	0.34	4486.38	6.92	621.15	174.37	0.34	
14	4473.00	NA	4486.42	5.83	737.66	174.63	0.29	4486.52	5.78	743.75	175.33	0.28	4486.52	5.78	743.75	175.33	0.28	4486.52	5.78	743.75	175.33	0.28	
13	4472.85	NA	4486.04	7.42	579.51	142.29	0.36	4486.16	7.36	584.52	144.98	0.36	4486.16	7.36	584.52	144.98	0.36	4486.16	7.36	584.52	144.98	0.36	
12.8																							
12	4472.73	4482.1	4481.95	11.93	372.96	161.23	0.76	4482.88	11.11	403.87	174.16	0.67	4482.88	11.11	403.87	174.16	0.67	4482.88	11.11	403.87	174.16	0.67	
10	4472.38	4482.0	4481.52	12.06	369.41	89.26	0.99	4482.02	13.20	415.00	91.72	0.89	4482.02	13.20	415.00	91.72	0.89	4482.02	13.20	415.00	91.72	0.89	
9.05	4471.97	4482.0	4481.50	9.99	578.01	134.10	0.72	4481.93	7.34	585.94	136.10	0.41	4481.93	7.34	585.94	136.10	0.41	4481.93	7.34	585.94	136.10	0.41	
8.6																							
Proposed Double 28'x11' Contech Arch Culvert																							
8.2	4471.52	4482.0	4481.83	7.49	910.15	180.58	0.44	4481.63	7.31	588.29	179.56	0.41	4481.63	7.31	588.29	179.56	0.41	4481.63	7.31	588.29	179.56	0.41	
8	4471.10	4482.0	4481.60	8.76	842.90	201.03	0.56	4481.60	8.76	841.92	200.94	0.56	4481.60	8.76	841.92	200.94	0.56	4481.60	8.76	841.92	200.94	0.56	
7	4470.69	4482.0	4481.65	8.23	996.74	217.19	0.48	4481.65	8.24	995.68	217.15	0.48	4481.65	8.24	995.68	217.15	0.48	4481.65	8.24	995.68	217.15	0.48	
6	4470.62	4482.0	4481.80	6.02	1401.71	302.64	0.36	4481.79	6.03	1400.38	302.53	0.36	4481.79	6.03	1400.38	302.53	0.36	4481.79	6.03	1400.38	302.53	0.36	
5	4470.70	4482.0	4481.79	5.45	1760.94	426.49	0.32	4481.79	5.46	1758.86	426.45	0.32	4481.79	5.46	1758.86	426.45	0.32	4481.79	5.46	1758.86	426.45	0.32	
4	4470.23	4482.0	4481.82	4.14	2310.89	443.37	0.23	4481.82	4.09	2351.17	453.37	0.23	4481.82	4.09	2351.17	453.37	0.23	4481.82	4.09	2351.17	453.37	0.23	
3	4470.16	4482.0	4481.66	5.27	1676.72	325.18	0.30	4481.67	5.14	1728.41	335.30	0.29	4481.67	5.14	1728.41	335.30	0.29	4481.67	5.14	1728.41	335.30	0.29	
2	4469.90	4482.0	4481.06	8.66	933.48	173.51	0.49	4481.18	8.15	1010.57	186.49	0.46	4481.18	8.15	1010.57	186.49	0.46	4481.18	8.15	1010.57	186.49	0.46	
1	4469.04	4482.0	4481.04	7.88	1102.99	223.20	0.43	4481.36	5.42	1713.40	325.93	0.29	4481.36	5.42	1713.40	325.93	0.29	4481.36	5.42	1713.40	325.93	0.29	
0.9	4469.00	NA	4480.05	10.12	585.26	94.68	0.56	4480.05	10.12	585.26	94.68	0.56	4480.05	10.12	585.26	94.68	0.56	4480.05	10.12	585.26	94.68	0.56	
0.85																							
Ex. Bridge I-70 WB																							
0.8	4468.80	NA	4480.15	8.33	667.43	102.15	0.47	4480.15	8.33	667.43	102.15	0.47	4480.15	8.33	667.43	102.15	0.47	4480.15	8.33	667.43	102.15	0.47	
0.7	4468.76	NA	4478.69	12.36	410.17	76.21	0.76	4478.69	12.36	410.17	76.21	0.76	4478.69	12.36	410.17	76.21	0.76	4478.69	12.36	410.17	76.21	0.76	
0.6	4468.72	NA	4479.00	11.09	484.74	84.75	0.67	4479.00	11.09	484.74	84.75	0.67	4479.00	11.09	484.74	84.75	0.67	4479.00	11.09	484.74	84.75	0.67	
0.55																							
Ex. Bridge I-70 EB																							
0.5	4468.62	NA	4476.58	16.17	307.51	69.93	1.14	4476.58	16.17	307.51	69.93	1.14	4476.58	16.17	307.51	69.93	1.14	4476.58	16.17	307.51	69.93	1.14	
0.4	4468.48	4478.15	4478.61	10.82	717.99	289.32	0.69	4478.61	10.81	716.58	289.14	0.69	4478.61	10.81	716.58	289.14	0.69	4478.61	10.81	716.58	289.14	0.69	

* For use by City of Fruita

River Sta	Difference b/w Model 1 and Model 3		Difference b/w BFE and Model 3 WSEL (ft)
	Delta WS ft	Delta Vel ft/sec	
17	0.13	-0.12	0.30
16	0.12	-0.05	NA
15.5	EX. 2-12x18 Concrete Box Culvert HWY 6 & 50		
15	0.11	-0.06	NA
14	0.10	-0.05	NA
13	0.12	-0.06	NA
12.8	EX. 2-12x18 Concrete Box Culvert Rail Road		
12	0.93	-0.82	0.78
10	0.50	1.14	0.02
9.05	0.43	-2.65	-0.07
8.6	Prop. 28x11 Catch Arch Culvert		
8.2	-0.20	-0.18	-0.37
8	0.00	0.00	-0.40
7	0.00	0.01	-0.35
6	-0.01	0.01	-0.21
5	0.00	0.01	-0.21
4	0.00	-0.05	-0.18
3	0.01	-0.13	-0.33
2	0.12	-0.51	-0.82
1	0.32	-2.46	-0.64
0.9	0.00	0.00	NA
0.85	Bridge I-70 WB		
0.8	0.00	0.00	NA
0.7	0.00	0.00	NA
0.6	0.00	0.00	NA
0.55	Bridge I-70 EB		
0.5	0.00	0.00	NA
0.4	0.00	-0.01	0.46

River St	Model 4						Model 5							
	Effective/Existing Floodway Analysis - 100 year			Prop. Conditions Floodway Analysis model - 100 year Q=4300			Difference b/w Model 4 and Model 5			Difference b/w BFE and Model 5 WSEL (ft)				
	Base Flood Elevation (BFE) (ft)	W.S. Elev (ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	W.S. Elev (ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	Delta WS ft	Delta Vel ft/sec	Difference b/w BFE and Model 5 WSEL (ft)
17	4489.1	4489.27	2.7	1918.3	253.66	0.14	4489.4	2.58	1949.73	255.25	0.14	0.13	-0.12	0.30
16	NA	4488.74	6.22	724.14	453.15	0.3	4488.86	6.17	730.98	468.28	0.3	0.12	-0.05	NA
15.5	EX. 2-12x18 Concrete Box Culvert HWY 6 & 50													
15	NA	4486.27	6.98	616.01	173.66	0.34	4486.38	6.92	621.15	174.37	0.34	0.11	-0.06	NA
14	NA	4486.42	5.83	737.66	174.63	0.29	4486.52	5.78	743.75	175.33	0.28	0.10	-0.05	NA
13	NA	4486.04	7.42	579.51	142.29	0.36	4486.16	7.36	584.52	144.98	0.36	0.12	-0.06	NA
12.8	EX. 2-12x18 Concrete Box Culvert Rail Road													
12	4482.1	4481.95	11.93	372.85	161.2	0.76	4482.88	11.11	403.87	174.16	0.67	0.93	-0.82	0.78
10	4482.0	4481.52	12.06	369.41	89.26	0.99	4482.02	13.2	415	91.72	0.89	0.50	1.14	0.02
9.05	4482.0	4481.55	9.87	585.54	134.3	0.71	4481.97	7.31	588.24	136.23	0.4	0.42	-2.56	-0.03
8.6	Prop. 28x10 Crotch Arch Culvert													
8.2	4482.0	4481.87	7.43	918.18	180.8	0.44	4481.67	7.28	590.57	179.76	0.41	-0.20	-0.15	-0.33
8	4482.0	4481.66	8.65	854.22	202.07	0.55	4481.65	8.68	851.75	201.84	0.55	-0.01	0.03	-0.35
7	4482.0	4481.71	8.13	1008.9	217.68	0.47	4481.7	8.15	1006.19	217.57	0.48	-0.01	0.02	-0.30
6	4482.0	4481.85	5.96	1417.6	303.98	0.36	4481.84	5.97	1413.99	303.68	0.36	-0.01	0.01	-0.16
5	4482.0	4481.85	5.38	1783.9	426.97	0.32	4481.83	5.39	1778.65	426.86	0.32	-0.02	0.01	-0.17
4	4482.0	4481.87	4.09	2334.3	443.58	0.23	4481.86	4.05	2371.76	453.54	0.23	-0.01	-0.04	-0.14
3	4482.0	4481.71	5.21	1695.3	325.78	0.29	4481.72	5.09	1744.8	335.81	0.29	0.01	-0.12	-0.28
2	4482.0	4481.14	8.54	946.64	174.18	0.48	4481.24	8.06	1021.97	187.03	0.45	0.10	-0.48	-0.76
1	4482.0	4481.12	7.78	1120.2	225.5	0.42	4481.42	5.36	1731.9	327.63	0.29	0.30	-2.42	-0.58
0.9	NA	4480.16	9.98	595.53	95.53	0.55	4480.14	10	593.85	95.39	0.56	-0.02	0.02	NA
0.85	Bridge I-70 WB													
0.8	NA	4480.27	8.2	679.08	102.94	0.46	4480.25	8.22	677.23	102.81	0.46	-0.02	0.02	NA
0.7	NA	4479.03	11.76	436.31	77.63	0.71	4478.98	11.84	432.75	77.43	0.72	-0.05	0.08	NA
0.6	NA	4479.28	10.66	508.91	86.8	0.63	4479.24	10.72	505.44	86.51	0.64	-0.04	0.06	NA
0.55	Bridge I-70 EB													
0.5	NA	4479.12	8.47	535.22	95.49	0.57	4478.7	10.21	496.92	92.5	0.65	-0.42	1.74	NA
0.4	4478.15	4478.61	10.82	718.28	289.35	0.69	4478.6	10.82	715.73	289.03	0.69	-0.01	0.00	0.45

Reach	River Sta	Profile	Q Total (cfs)	Min Ch.El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/m)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Fruitland	17	10-Year	1500.00	4475.00	4482.20	4478.47	4482.32	0.000365	2.84	528.81	133.82	0.25
Fruitland	17	50-Year	3170.00	4475.00	4486.31	4480.23	4486.44	0.000144	2.85	1230.50	207.18	0.18
Fruitland	17	100-Year	4300.00	4475.00	4489.27	4481.14	4489.38	0.000085	2.70	1918.30	253.66	0.14
Fruitland	17	500-Year	8100.00	4475.00	4495.03	4483.11	4495.10	0.000044	2.56	6390.86	1185.00	0.11
Fruitland	16	10-Year	1500.00	4474.90	4481.96	4478.41	4482.28	0.000519	4.54	337.88	115.11	0.31
Fruitland	16	50-Year	3170.00	4474.90	4485.85	4480.43	4486.38	0.000473	5.91	559.48	293.04	0.32
Fruitland	16	100-Year	4300.00	4474.90	4488.74	4481.63	4489.32	0.000379	6.22	724.14	453.15	0.30
Fruitland	16	500-Year	8100.00	4474.90	4493.96	4484.74	4495.00	0.000438	8.34	1021.63	1106.87	0.34
Fruitland	15.5	Culvert										
Fruitland	15	10-Year	1500.00	4473.00	4481.02	4476.33	4481.27	0.000303	4.06	369.33	112.97	0.26
Fruitland	15	50-Year	3170.00	4473.00	4484.17	4478.38	4484.76	0.000438	6.12	517.72	159.98	0.33
Fruitland	15	100-Year	4300.00	4473.00	4486.27	4479.54	4487.02	0.000452	6.98	616.01	173.66	0.34
Fruitland	15	500-Year	8100.00	4473.00	4493.91	4482.84	4494.98	0.000347	8.31	975.12	990.64	0.32
Fruitland	14	10-Year	1500.00	4473.00	4481.06	4476.26	4481.25	0.000233	3.47	432.31	113.33	0.22
Fruitland	14	50-Year	3170.00	4473.00	4484.28	4478.08	4484.69	0.000319	5.14	616.17	160.69	0.28
Fruitland	14	100-Year	4300.00	4473.00	4486.42	4479.11	4486.94	0.000322	5.83	737.66	174.63	0.29
Fruitland	14	500-Year	8100.00	4473.00	4494.13	4482.06	4494.87	0.000240	6.88	1177.63	990.64	0.27
Fruitland	13	10-Year	1500.00	4472.85	4480.95	4476.20	4481.23	0.000313	4.22	355.50	79.38	0.26
Fruitland	13	50-Year	3170.00	4472.85	4484.01	4478.34	4484.66	0.000479	6.47	490.03	94.24	0.34
Fruitland	13	100-Year	4300.00	4472.85	4486.04	4479.55	4486.90	0.000504	7.42	579.51	142.29	0.36
Fruitland	13	500-Year	8100.00	4472.85	4493.58	4483.06	4494.81	0.000396	8.89	911.28	955.00	0.34
Fruitland	12.8	Culvert										
Fruitland	12	10-Year	1500.00	4472.73	4480.11	4477.52	4480.58	0.000884	5.53	276.36	135.58	0.41
Fruitland	12	50-Year	3170.00	4472.73	4481.55	4479.56	4482.88	0.001856	9.29	351.68	155.69	0.61
Fruitland	12	100-Year	4300.00	4472.73	4481.95	4480.74	4484.14	0.002850	11.93	372.85	161.20	0.76
Fruitland	12	500-Year	8100.00	4472.73	4484.10	4484.10	4488.69	0.004320	17.35	491.78	191.21	0.98
Fruitland	10	10-Year	1500.00	4472.38	4479.12	4479.12	4480.32	0.007347	8.80	170.43	70.61	1.00
Fruitland	10	50-Year	3170.00	4472.38	4480.66	4480.66	4482.52	0.006251	10.98	294.38	85.05	0.99
Fruitland	10	100-Year	4300.00	4472.38	4481.52	4481.52	4483.76	0.005738	12.06	369.41	89.26	0.99
Fruitland	10	500-Year	8100.00	4472.38	4482.35	4483.72	4487.94	0.011587	19.13	445.50	93.33	1.44
Fruitland	9.05	10-Year	1500.00	4472.00	4478.73	4478.51	4479.62	0.004086	7.78	227.76	112.25	0.77
Fruitland	9.05	50-Year	3170.00	4472.00	4479.42	4480.01	4481.78	0.008659	12.93	307.08	124.79	1.17
Fruitland	9.05	100-Year	4300.00	4472.00	4481.55	4480.74	4482.80	0.002795	9.87	585.54	134.30	0.71
Fruitland	9.05	500-Year	8100.00	4472.00	4485.94	4482.67	4486.99	0.001238	9.49	1235.10	173.44	0.52
Fruitland	8.2	10-Year	1500.00	4471.66	4479.05	4475.97	4479.36	0.000615	4.71	439.23	153.91	0.34
Fruitland	8.2	50-Year	3170.00	4471.66	4480.54	4478.74	4481.17	0.001041	7.09	682.08	172.56	0.45
Fruitland	8.2	100-Year	4300.00	4471.66	4481.87	4479.57	4482.51	0.000920	7.43	918.18	180.80	0.44
Fruitland	8.2	500-Year	8100.00	4471.66	4486.19	4481.70	4486.79	0.000588	7.72	1759.64	246.63	0.37
Fruitland	8	10-Year	1500.00	4471.10	4478.69	4477.49	4479.28	0.001796	6.62	332.95	155.25	0.53
Fruitland	8	50-Year	3170.00	4471.10	4480.09	4479.49	4481.06	0.002439	9.15	560.45	173.03	0.65
Fruitland	8	100-Year	4300.00	4471.10	4481.66	4480.13	4482.44	0.001614	8.65	854.22	202.07	0.55
Fruitland	8	500-Year	8100.00	4471.10	4486.24	4482.02	4486.73	0.000667	7.58	1958.41	280.24	0.38
Fruitland	7	10-Year	1500.00	4470.69	4478.66	4477.24	4479.18	0.001237	6.43	385.79	190.25	0.46
Fruitland	7	50-Year	3170.00	4470.69	4480.09	4479.33	4480.90	0.001748	8.80	668.38	203.50	0.57
Fruitland	7	100-Year	4300.00	4470.69	4481.71	4480.02	4482.31	0.001152	8.13	1008.85	217.68	0.47
Fruitland	7	500-Year	8100.00	4470.69	4486.25	4481.75	4486.68	0.000582	7.56	2115.99	272.09	0.36
Fruitland	6	10-Year	1500.00	4470.62	4478.72	4477.31	4479.03	0.000855	5.12	521.41	239.63	0.38
Fruitland	6	50-Year	3170.00	4470.62	4480.26	4478.67	4480.66	0.001017	6.57	947.38	287.43	0.44
Fruitland	6	100-Year	4300.00	4470.62	4481.85	4479.58	4482.14	0.000638	5.96	1417.55	303.98	0.36
Fruitland	6	500-Year	8100.00	4470.62	4486.37	4480.93	4486.57	0.000300	5.40	2949.26	397.24	0.26
Fruitland	5	10-Year	1500.00	4470.70	4477.38	4477.12	4478.73	0.003887	9.46	190.26	110.93	0.78
Fruitland	5	50-Year	3170.00	4470.70	4480.14	4479.35	4480.54	0.001070	6.78	1068.76	409.53	0.44
Fruitland	5	100-Year	4300.00	4470.70	4481.85	4479.83	4482.05	0.000508	5.38	1783.86	426.97	0.32
Fruitland	5	500-Year	8100.00	4470.70	4486.41	4480.92	4486.52	0.000193	4.36	4050.38	702.17	0.21
Fruitland	4	10-Year	1500.00	4470.23	4477.73	4477.13	4478.16	0.001361	6.46	535.19	391.51	0.47
Fruitland	4	50-Year	3170.00	4470.23	4480.25	4478.44	4480.37	0.000392	4.41	1794.05	539.35	0.27
Fruitland	4	100-Year	4300.00	4470.23	4481.87	4478.80	4481.97	0.000267	4.09	2334.28	443.58	0.23
Fruitland	4	500-Year	8100.00	4470.23	4486.44	4479.79	4486.48	0.000096	3.16	6923.08	1163.78	0.15
Fruitland	3	10-Year	1500.00	4470.16	4476.66	4476.62	4477.85	0.003440	9.01	223.15	153.38	0.74

HEC-RAS Plan: exist-mod1 River: Little Salt Wash Reach: Fruitland (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chi
Fruitland	3	50-Year	3170.00	4470.16	4480.22	4478.38	4480.32	0.000330	4.07	1953.04	623.38	0.25
Fruitland	3	100-Year	4300.00	4470.16	4481.71	4478.88	4481.91	0.000431	5.21	1695.31	325.78	0.29
Fruitland	3	500-Year	8100.00	4470.16	4486.43	4479.75	4486.46	0.000071	2.76	7579.71	1147.10	0.13
Fruitland	2	10-Year	1500.00	4469.90	4476.83	4476.75	4477.36	0.001756	7.10	522.04	483.42	0.54
Fruitland	2	50-Year	3170.00	4469.90	4480.21	4477.53	4480.27	0.000206	3.38	2232.90	526.40	0.20
Fruitland	2	100-Year	4300.00	4469.90	4481.14	4478.90	4481.79	0.001155	8.54	946.64	174.18	0.48
Fruitland	2	500-Year	8100.00	4469.90	4486.43	4478.79	4486.45	0.000056	2.51	9147.56	1482.00	0.11
Fruitland	1	10-Year	1500.00	4469.04	4476.81	4476.42	4477.15	0.001087	5.92	664.49	505.66	0.42
Fruitland	1	50-Year	3170.00	4469.04	4480.21	4477.24	4480.25	0.000163	3.08	2510.30	587.23	0.18
Fruitland	1	100-Year	4300.00	4469.04	4481.12	4478.55	4481.63	0.000920	7.78	1120.19	225.50	0.42
Fruitland	1	500-Year	8100.00	4469.04	4486.44	4478.51	4486.45	0.000031	1.89	12434.74	2035.00	0.08
Fruitland	0.9	10-Year	1500.00	4469.00	4476.51	4473.93	4477.05	0.001026	6.11	296.43	70.59	0.42
Fruitland	0.9	50-Year	3170.00	4469.00	4479.21	4476.50	4480.14	0.001202	8.35	508.04	88.04	0.49
Fruitland	0.9	100-Year	4300.00	4469.00	4480.16	4477.69	4481.46	0.001504	9.98	595.48	95.53	0.55
Fruitland	0.9	500-Year	8100.00	4469.00	4484.90	4481.12	4486.30	0.001082	10.94	1059.46	669.14	0.50
Fruitland	0.85		Bridge									
Fruitland	0.8	10-Year	1500.00	4468.80	4476.49	4473.47	4476.88	0.000712	5.12	340.72	78.22	0.36
Fruitland	0.8	50-Year	3170.00	4468.80	4479.25	4475.86	4479.91	0.000796	6.94	580.83	96.27	0.41
Fruitland	0.8	100-Year	4300.00	4468.80	4480.27	4476.94	4481.17	0.000964	8.20	679.03	102.94	0.46
Fruitland	0.8	500-Year	8100.00	4468.80	4483.96	4480.00	4485.32	0.001000	10.33	1037.62	475.72	0.49
Fruitland	0.7	10-Year	1500.00	4468.76	4476.12	4473.70	4476.82	0.001533	6.73	228.21	65.51	0.50
Fruitland	0.7	50-Year	3170.00	4468.76	4478.56	4476.64	4479.82	0.001806	9.30	400.05	75.65	0.58
Fruitland	0.7	100-Year	4300.00	4468.76	4479.03	4477.94	4481.03	0.002676	11.76	436.19	77.62	0.71
Fruitland	0.7	500-Year	8100.00	4468.76	4484.55	4482.37	4485.04	0.000565	7.55	2742.90	725.27	0.36
Fruitland	0.6	10-Year	1500.00	4468.72	4476.19	4473.61	4476.76	0.001164	6.16	275.63	64.31	0.45
Fruitland	0.6	50-Year	3170.00	4468.72	4478.70	4476.27	4479.72	0.001387	8.54	459.34	82.54	0.52
Fruitland	0.6	100-Year	4300.00	4468.72	4479.28	4477.46	4480.86	0.001976	10.66	508.82	86.80	0.63
Fruitland	0.6	500-Year	8100.00	4468.72	4482.52	4480.83	4484.84	0.002065	13.41	804.41	488.68	0.68
Fruitland	0.55		Bridge									
Fruitland	0.5	10-Year	1500.00	4468.62	4476.11	4473.91	4476.55	0.001389	5.32	281.90	71.91	0.47
Fruitland	0.5	50-Year	3170.00	4468.62	4478.71	4476.08	4479.39	0.001112	6.66	497.45	92.54	0.46
Fruitland	0.5	100-Year	4300.00	4468.62	4479.12	4477.02	4480.21	0.001656	8.47	534.95	95.47	0.57
Fruitland	0.5	500-Year	8100.00	4468.62	4477.81	4479.57	4483.93	0.012089	19.90	417.28	86.10	1.48
Fruitland	0.4	10-Year	1500.00	4468.48	4474.90	4474.06	4476.29	0.004225	9.48	158.27	36.53	0.80
Fruitland	0.4	50-Year	3170.00	4468.48	4477.65	4477.65	4479.19	0.002933	10.51	460.65	232.72	0.72
Fruitland	0.4	100-Year	4300.00	4468.48	4478.61	4478.61	4480.04	0.002594	10.82	717.99	289.32	0.69
Fruitland	0.4	500-Year	8100.00	4468.48	4479.23	4480.20	4482.54	0.005884	17.17	902.63	311.86	1.06

HEC-RAS Plan: 28x11noenMo2 River: Little Salt Wash Reach: Fruitland

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow/Area (sq ft)	Top Width (ft)	Froude #Chl
Fruitland	17	10-Year	1500.00	4475.00	4482.21	4478.47	4482.34	0.000708	2.83	530.91	134.10	0.25
Fruitland	17	50-Year	3170.00	4475.00	4486.37	4480.23	4486.48	0.000269	2.79	1241.86	208.15	0.17
Fruitland	17	100-Year	4300.00	4475.00	4489.40	4481.14	4489.49	0.000151	2.58	1949.73	255.25	0.14
Fruitland	17	500-Year	8100.00	4475.00	4496.29	4483.14	4496.33	0.000042	1.87	7888.91	1185.00	0.08
Fruitland	16	10-Year	1500.00	4474.90	4481.97	4478.41	4482.29	0.000517	4.54	338.27	115.32	0.31
Fruitland	16	50-Year	3170.00	4474.90	4485.90	4480.43	4486.43	0.000466	5.88	562.27	295.56	0.32
Fruitland	16	100-Year	4300.00	4474.90	4488.86	4481.63	4489.43	0.000368	6.17	730.98	468.28	0.30
Fruitland	16	500-Year	8100.00	4474.90	4496.29	4484.74	4496.33	0.000032	2.40	9090.75	1190.00	0.09
Fruitland	15.5	Culvert										
Fruitland	15	10-Year	1500.00	4473.00	4481.03	4476.33	4481.28	0.000301	4.06	369.88	113.07	0.25
Fruitland	15	50-Year	3170.00	4473.00	4484.34	4478.38	4484.91	0.000417	6.03	525.61	161.08	0.32
Fruitland	15	100-Year	4300.00	4473.00	4486.38	4479.54	4487.12	0.000440	6.92	621.15	174.37	0.34
Fruitland	15	500-Year	8100.00	4473.00	4496.27	4482.84	4496.31	0.000023	2.25	8670.56	990.64	0.08
Fruitland	14	10-Year	1500.00	4473.00	4481.07	4476.26	4481.26	0.000231	3.46	432.98	113.44	0.22
Fruitland	14	50-Year	3170.00	4473.00	4484.45	4478.08	4484.85	0.000303	5.07	625.55	161.77	0.27
Fruitland	14	100-Year	4300.00	4473.00	4486.52	4479.11	4487.04	0.000313	5.78	743.75	175.33	0.28
Fruitland	14	500-Year	8100.00	4473.00	4496.27	4482.06	4496.31	0.000023	2.25	8670.08	990.64	0.08
Fruitland	13	10-Year	1500.00	4472.85	4480.96	4476.20	4481.24	0.000311	4.21	356.03	79.44	0.26
Fruitland	13	50-Year	3170.00	4472.85	4484.18	4478.34	4484.81	0.000455	6.37	497.66	98.34	0.33
Fruitland	13	100-Year	4300.00	4472.85	4486.16	4479.55	4487.00	0.000490	7.36	584.52	144.98	0.36
Fruitland	13	500-Year	8100.00	4472.85	4496.26	4483.06	4496.31	0.000029	2.43	7930.41	955.00	0.09
Fruitland	12.8	Culvert										
Fruitland	12	10-Year	1500.00	4472.73	4480.13	4477.66	4480.65	0.000982	5.80	263.69	135.85	0.43
Fruitland	12	50-Year	3170.00	4472.73	4482.13	4479.78	4483.38	0.001591	9.01	365.12	163.76	0.57
Fruitland	12	100-Year	4300.00	4472.73	4482.88	4480.97	4484.76	0.002137	11.11	403.87	174.16	0.67
Fruitland	12	500-Year	8100.00	4472.73	4487.20	4484.38	4490.00	0.001856	13.63	628.60	234.44	0.67
Fruitland	10	10-Year	1500.00	4472.38	4478.62	4478.62	4480.33	0.006656	10.51	142.83	42.93	0.99
Fruitland	10	50-Year	3170.00	4472.38	4481.01	4481.01	4483.06	0.004454	11.96	324.71	86.77	0.87
Fruitland	10	100-Year	4300.00	4472.38	4482.02	4482.02	4484.42	0.004385	13.20	415.00	91.72	0.89
Fruitland	10	500-Year	8100.00	4472.38	4488.01	4484.59	4489.44	0.001315	11.01	1154.78	324.44	0.54
Fruitland	9.05	10-Year	1500.00	4471.83	4479.20	4474.57	4479.39	0.000244	3.51	427.38	117.40	0.23
Fruitland	9.05	50-Year	3170.00	4471.83	4480.73	4476.35	4481.31	0.000580	6.14	518.08	131.99	0.36
Fruitland	9.05	100-Year	4300.00	4471.83	4481.97	4477.36	4482.80	0.000690	7.31	588.24	136.23	0.40
Fruitland	9.05	500-Year	8100.00	4471.83	4488.14	4480.27	4489.28	0.000503	8.56	945.78	385.45	0.37
Fruitland	8.6	Culvert										
Fruitland	8.2	10-Year	1500.00	4471.60	4479.17	4474.37	4479.34	0.000221	3.39	442.84	155.01	0.22
Fruitland	8.2	50-Year	3170.00	4471.60	4480.58	4476.12	4481.14	0.000556	6.02	526.15	173.07	0.36
Fruitland	8.2	100-Year	4300.00	4471.60	4481.67	4477.12	4482.49	0.000696	7.28	590.57	179.76	0.41
Fruitland	8.2	500-Year	8100.00	4471.60	4485.56	4480.00	4487.08	0.000827	9.88	820.12	203.42	0.47
Fruitland	8	10-Year	1500.00	4471.10	4478.69	4477.49	4479.28	0.001796	6.62	332.95	155.25	0.53
Fruitland	8	50-Year	3170.00	4471.10	4480.06	4479.49	4481.05	0.002497	9.23	554.96	172.44	0.66
Fruitland	8	100-Year	4300.00	4471.10	4481.65	4480.13	4482.43	0.001626	8.68	851.75	201.84	0.55
Fruitland	8	500-Year	8100.00	4471.10	4486.24	4482.02	4486.73	0.000667	7.58	1958.41	280.24	0.38
Fruitland	7	10-Year	1500.00	4470.69	4478.66	4477.24	4479.18	0.001237	6.43	385.79	190.25	0.46
Fruitland	7	50-Year	3170.00	4470.69	4480.06	4479.33	4480.89	0.001791	8.88	661.43	203.21	0.57
Fruitland	7	100-Year	4300.00	4470.69	4481.70	4480.02	4482.30	0.001160	8.15	1006.19	217.57	0.48
Fruitland	7	500-Year	8100.00	4470.69	4486.25	4481.75	4486.68	0.000582	7.56	2115.99	272.09	0.36
Fruitland	6	10-Year	1500.00	4470.62	4478.72	4477.31	4479.03	0.000855	5.12	521.41	239.63	0.38
Fruitland	6	50-Year	3170.00	4470.62	4480.23	4478.67	4480.64	0.001042	6.63	938.54	287.14	0.44
Fruitland	6	100-Year	4300.00	4470.62	4481.84	4479.58	4482.13	0.000642	5.97	1413.99	303.68	0.36
Fruitland	6	500-Year	8100.00	4470.62	4486.37	4480.93	4486.57	0.000300	5.40	2949.26	397.24	0.26
Fruitland	5	10-Year	1500.00	4470.70	4477.38	4477.12	4478.73	0.003884	9.46	190.37	111.01	0.78
Fruitland	5	50-Year	3170.00	4470.70	4480.10	4479.35	4480.51	0.001111	6.88	1052.58	409.12	0.45
Fruitland	5	100-Year	4300.00	4470.70	4481.83	4479.83	4482.04	0.000512	5.39	1778.65	426.86	0.32
Fruitland	5	500-Year	8100.00	4470.70	4486.41	4480.92	4486.52	0.000193	4.36	4050.38	702.17	0.21
Fruitland	4	10-Year	1500.00	4470.23	4477.73	4477.13	4478.16	0.001359	6.45	535.76	391.86	0.47
Fruitland	4	50-Year	3170.00	4470.23	4480.22	4478.44	4480.34	0.000403	4.46	1776.15	538.52	0.27
Fruitland	4	100-Year	4300.00	4470.23	4481.86	4478.81	4481.96	0.000261	4.05	2371.76	453.54	0.23
Fruitland	4	500-Year	8100.00	4470.23	4486.44	4479.79	4486.48	0.000096	3.16	6923.08	1163.78	0.15

HEC-RAS Plan: 28x11noenMo2 River: Little Salt Wash Reach: Fruitland (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Fruitland	3	10-Year	1500.00	4470.16	4476.66	4476.62	4477.85	0.003455	9.03	222.48	153.15	0.74
Fruitland	3	50-Year	3170.00	4470.16	4480.18	4478.38	4480.29	0.000340	4.12	1931.75	622.74	0.25
Fruitland	3	100-Year	4300.00	4470.16	4481.72	4478.84	4481.91	0.000412	5.09	1744.80	335.81	0.29
Fruitland	3	500-Year	8100.00	4470.16	4486.43	4479.75	4486.46	0.000071	2.76	7579.71	1147.10	0.13
Fruitland	2	10-Year	1500.00	4469.90	4476.78	4476.75	4477.36	0.001889	7.32	499.87	482.30	0.56
Fruitland	2	50-Year	3170.00	4469.90	4480.18	4477.53	4480.24	0.000211	3.41	2215.17	525.97	0.20
Fruitland	2	100-Year	4300.00	4469.90	4481.24	4478.85	4481.79	0.001014	8.06	1021.97	187.03	0.45
Fruitland	2	500-Year	8100.00	4469.90	4486.43	4478.79	4486.45	0.000056	2.51	9147.56	1482.00	0.11
Fruitland	1	10-Year	1500.00	4469.04	4476.76	4476.42	4477.13	0.001170	6.11	640.07	504.89	0.44
Fruitland	1	50-Year	3170.00	4469.04	4480.17	4477.24	4480.22	0.000166	3.10	2490.54	585.81	0.18
Fruitland	1	100-Year	4300.00	4469.04	4481.42	4478.08	4481.61	0.000421	5.36	1731.90	327.63	0.29
Fruitland	1	500-Year	8100.00	4469.04	4486.44	4478.51	4486.45	0.000031	1.89	12434.74	2035.00	0.08
Fruitland	0.9	10-Year	1500.00	4469.00	4476.47	4473.93	4477.02	0.001051	6.16	293.54	70.37	0.43
Fruitland	0.9	50-Year	3170.00	4469.00	4479.16	4476.50	4480.10	0.001226	8.41	503.84	87.67	0.49
Fruitland	0.9	100-Year	4300.00	4469.00	4480.14	4477.69	4481.44	0.001514	10.00	593.85	95.39	0.56
Fruitland	0.9	500-Year	8100.00	4469.00	4484.90	4481.12	4486.30	0.001082	10.94	1059.46	669.14	0.50
Fruitland	.85	Bridge										
Fruitland	0.8	10-Year	1500.00	4468.80	4476.45	4473.47	4476.84	0.000730	5.16	337.41	77.94	0.37
Fruitland	0.8	50-Year	3170.00	4468.80	4479.20	4475.86	4479.87	0.000813	6.98	576.19	95.95	0.41
Fruitland	0.8	100-Year	4300.00	4468.80	4480.25	4476.94	4481.16	0.000971	8.22	677.23	102.81	0.46
Fruitland	0.8	500-Year	8100.00	4468.80	4483.96	4480.00	4485.32	0.001000	10.33	1037.62	475.72	0.49
Fruitland	0.7	10-Year	1500.00	4468.76	4476.07	4473.70	4476.79	0.001583	6.79	224.82	65.30	0.51
Fruitland	0.7	50-Year	3170.00	4468.76	4478.48	4476.64	4479.78	0.001870	9.41	394.55	75.35	0.59
Fruitland	0.7	100-Year	4300.00	4468.76	4478.98	4477.94	4481.02	0.002730	11.84	432.75	77.43	0.72
Fruitland	0.7	500-Year	8100.00	4468.76	4484.55	4482.37	4485.04	0.000565	7.55	2742.90	725.27	0.36
Fruitland	0.6	10-Year	1500.00	4468.72	4476.14	4473.61	4476.72	0.001202	6.22	272.37	63.94	0.46
Fruitland	0.6	50-Year	3170.00	4468.72	4478.63	4476.27	4479.67	0.001431	8.62	453.75	82.05	0.53
Fruitland	0.6	100-Year	4300.00	4468.72	4479.24	4477.46	4480.84	0.002009	10.72	505.44	86.51	0.64
Fruitland	0.6	500-Year	8100.00	4468.72	4482.52	4480.83	4484.84	0.002065	13.41	804.41	488.66	0.68
Fruitland	0.55	Bridge										
Fruitland	0.5	10-Year	1500.00	4468.62	4476.01	4473.46	4476.53	0.001210	5.79	275.20	70.95	0.46
Fruitland	0.5	50-Year	3170.00	4468.62	4478.49	4476.03	4479.37	0.001281	7.79	477.24	90.96	0.50
Fruitland	0.5	100-Year	4300.00	4468.62	4478.70	4477.18	4480.22	0.002121	10.21	496.92	92.50	0.65
Fruitland	0.5	500-Year	8100.00	4468.62	4478.72	4480.08	4484.07	0.007460	19.18	498.57	92.63	1.22
Fruitland	0.4	10-Year	1500.00	4468.48	4474.90	4474.06	4476.29	0.004225	9.48	158.27	36.53	0.80
Fruitland	0.4	50-Year	3170.00	4468.48	4477.64	4477.64	4479.18	0.002962	10.51	459.18	232.10	0.72
Fruitland	0.4	100-Year	4300.00	4468.48	4478.60	4478.60	4480.04	0.002619	10.82	715.73	289.03	0.69
Fruitland	0.4	500-Year	8100.00	4468.48	4478.76	4480.19	4483.31	0.008274	19.50	761.06	294.73	1.24

HEC-RAS Plan: 26x11en_Mod3 River: Little Salt Wash Reach: Fruitland (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/R)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #, Chl
Fruitland	3	10-Year	1500.00	4470.16	4476.66	4476.62	4477.85	0.003455	9.03	222.48	153.15	0.74
Fruitland	3	50-Year	3170.00	4470.16	4480.33	4478.33	4480.55	0.000517	5.15	1288.88	323.93	0.31
Fruitland	3	100-Year	4300.00	4470.16	4481.72	4478.84	4481.91	0.000412	5.09	1744.80	335.81	0.29
Fruitland	3	500-Year	8100.00	4470.16	4486.43	4479.75	4486.46	0.000071	2.76	7579.71	1147.10	0.13
Fruitland	2	10-Year	1500.00	4469.90	4476.78	4476.75	4477.36	0.001889	7.32	499.87	482.30	0.56
Fruitland	2	50-Year	3170.00	4469.90	4479.87	4478.16	4480.42	0.001141	7.73	774.52	174.95	0.47
Fruitland	2	100-Year	4300.00	4469.90	4481.24	4478.85	4481.79	0.001014	8.06	1021.97	187.03	0.45
Fruitland	2	500-Year	8100.00	4469.90	4486.43	4478.79	4486.45	0.000056	2.51	9147.56	1482.00	0.11
Fruitland	1	10-Year	1500.00	4469.04	4476.76	4476.42	4477.13	0.001170	6.11	640.07	504.89	0.44
Fruitland	1	50-Year	3170.00	4469.04	4480.04	4477.53	4480.23	0.000465	5.14	1309.08	286.30	0.30
Fruitland	1	100-Year	4300.00	4469.04	4481.42	4478.08	4481.61	0.000421	5.36	1731.90	327.63	0.29
Fruitland	1	500-Year	8100.00	4469.04	4486.44	4478.51	4486.45	0.000031	1.89	12434.74	2035.00	0.08
Fruitland	0.9	10-Year	1500.00	4469.00	4476.47	4473.93	4477.02	0.001051	6.16	293.54	70.37	0.43
Fruitland	0.9	50-Year	3170.00	4469.00	4479.16	4476.50	4480.10	0.001226	8.41	503.84	87.67	0.49
Fruitland	0.9	100-Year	4300.00	4469.00	4480.14	4477.69	4481.44	0.001514	10.00	593.85	95.39	0.56
Fruitland	0.9	500-Year	8100.00	4469.00	4484.90	4481.12	4486.30	0.001082	10.94	1059.46	669.14	0.50
Fruitland	.85	Bridge										
Fruitland	0.8	10-Year	1500.00	4468.80	4476.45	4473.47	4476.84	0.000730	5.16	337.41	77.94	0.37
Fruitland	0.8	50-Year	3170.00	4468.80	4479.20	4475.86	4479.87	0.000813	6.98	576.19	95.95	0.41
Fruitland	0.8	100-Year	4300.00	4468.80	4480.25	4476.94	4481.16	0.000971	8.22	677.23	102.81	0.46
Fruitland	0.8	500-Year	8100.00	4468.80	4483.96	4480.00	4485.32	0.001000	10.33	1037.62	475.72	0.49
Fruitland	0.7	10-Year	1500.00	4468.76	4476.07	4473.70	4476.79	0.001583	6.79	224.82	65.30	0.51
Fruitland	0.7	50-Year	3170.00	4468.76	4478.48	4476.64	4479.78	0.001870	9.41	394.55	75.35	0.59
Fruitland	0.7	100-Year	4300.00	4468.76	4478.98	4477.94	4481.02	0.002730	11.84	432.75	77.43	0.72
Fruitland	0.7	500-Year	8100.00	4468.76	4484.55	4482.37	4485.04	0.000565	7.55	2742.90	725.27	0.36
Fruitland	0.6	10-Year	1500.00	4468.72	4476.14	4473.61	4476.72	0.001202	6.22	272.37	63.94	0.46
Fruitland	0.6	50-Year	3170.00	4468.72	4478.63	4476.27	4479.67	0.001431	8.62	453.75	82.05	0.53
Fruitland	0.6	100-Year	4300.00	4468.72	4479.24	4477.46	4480.84	0.002009	10.72	505.44	86.51	0.64
Fruitland	0.6	500-Year	8100.00	4468.72	4482.52	4480.83	4484.84	0.002065	13.41	804.41	488.66	0.68
Fruitland	0.55	Bridge										
Fruitland	0.5	10-Year	1500.00	4468.62	4476.01	4473.46	4476.53	0.001210	5.79	275.20	70.95	0.46
Fruitland	0.5	50-Year	3170.00	4468.62	4478.49	4476.03	4479.37	0.001281	7.79	477.24	90.96	0.50
Fruitland	0.5	100-Year	4300.00	4468.62	4478.70	4477.18	4480.22	0.002121	10.21	496.92	92.50	0.65
Fruitland	0.5	500-Year	8100.00	4468.62	4478.72	4480.08	4484.07	0.007460	19.18	498.57	92.63	1.22
Fruitland	0.4	10-Year	1500.00	4468.48	4474.90	4474.06	4476.29	0.004225	9.48	158.27	36.53	0.80
Fruitland	0.4	50-Year	3170.00	4468.48	4477.64	4477.64	4479.18	0.002962	10.51	459.18	232.10	0.72
Fruitland	0.4	100-Year	4300.00	4468.48	4478.60	4478.60	4480.04	0.002619	10.82	715.73	289.03	0.69
Fruitland	0.4	500-Year	8100.00	4468.48	4478.76	4480.19	4483.31	0.008274	19.50	761.06	294.73	1.24

HEC-RAS Plan: existFA_Mod4 River: Little Salt Wash Reach: Fruitland (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Cfl
Fruitland	3	50-Year	3170.00	4470.16	4480.53	4478.29	4480.65	0.000322	4.13	1695.58	414.20	0.25
Fruitland	3	100-Year	4300.00	4470.16	4481.71	4478.88	4481.91	0.000431	5.21	1695.31	325.78	0.29
Fruitland	3	500-Year	8100.00	4470.16	4486.43	4479.75	4486.46	0.000071	2.76	7579.71	1147.10	0.13
Fruitland	2	10-Year	1500.00	4469.90	4476.83	4476.75	4477.36	0.001756	7.10	522.04	483.42	0.54
Fruitland	2	50-Year	3170.00	4469.90	4480.37	4478.06	4480.59	0.000527	5.46	1230.86	273.85	0.32
Fruitland	2	100-Year	4300.00	4469.90	4481.14	4478.90	4481.79	0.001155	8.54	946.64	174.18	0.48
Fruitland	2	500-Year	8100.00	4469.90	4486.43	4478.79	4486.45	0.000056	2.51	9147.56	1482.00	0.11
Fruitland	1	10-Year	1500.00	4469.04	4476.81	4476.42	4477.15	0.001087	5.92	664.49	505.66	0.42
Fruitland	1	50-Year	3170.00	4469.04	4480.19	4477.71	4480.51	0.000663	6.20	963.31	177.30	0.36
Fruitland	1	100-Year	4300.00	4469.04	4481.12	4478.55	4481.63	0.000920	7.78	1120.19	225.50	0.42
Fruitland	1	500-Year	8100.00	4469.04	4486.44	4478.51	4486.45	0.000031	1.89	12434.74	2035.00	0.08
Fruitland	0.9	10-Year	1500.00	4469.00	4476.51	4473.93	4477.05	0.001026	6.11	296.43	70.59	0.42
Fruitland	0.9	50-Year	3170.00	4469.00	4479.56	4476.50	4480.40	0.001038	7.96	539.52	90.81	0.46
Fruitland	0.9	100-Year	4300.00	4469.00	4480.16	4477.69	4481.46	0.001504	9.98	595.53	95.53	0.55
Fruitland	0.9	500-Year	8100.00	4469.00	4484.90	4481.12	4486.30	0.001082	10.94	1059.46	669.14	0.50
Fruitland	.85											
Fruitland		Bridge										
Fruitland	0.8	10-Year	1500.00	4468.80	4476.49	4473.47	4476.88	0.000712	5.12	340.72	78.22	0.36
Fruitland	0.8	50-Year	3170.00	4468.80	4479.61	4475.86	4480.21	0.000684	6.60	615.49	98.64	0.38
Fruitland	0.8	100-Year	4300.00	4468.80	4480.27	4476.94	4481.17	0.000964	8.20	679.08	102.94	0.46
Fruitland	0.8	500-Year	8100.00	4468.80	4483.96	4480.00	4485.32	0.001000	10.33	1037.62	475.72	0.49
Fruitland	0.7	10-Year	1500.00	4468.76	4476.12	4473.70	4476.82	0.001533	6.73	228.21	65.51	0.50
Fruitland	0.7	50-Year	3170.00	4468.76	4479.06	4476.64	4480.14	0.001439	8.64	436.23	75.14	0.52
Fruitland	0.7	100-Year	4300.00	4468.76	4479.03	4477.94	4481.03	0.002674	11.76	436.31	77.63	0.71
Fruitland	0.7	500-Year	8100.00	4468.76	4484.55	4482.37	4485.04	0.000565	7.55	2742.90	725.27	0.36
Fruitland	0.6	10-Year	1500.00	4468.72	4476.19	4473.61	4476.76	0.001164	6.16	275.63	64.31	0.45
Fruitland	0.6	50-Year	3170.00	4468.72	4479.08	4476.22	4480.09	0.001250	8.36	446.58	66.44	0.50
Fruitland	0.6	100-Year	4300.00	4468.72	4479.28	4477.46	4480.86	0.001975	10.66	508.91	86.80	0.63
Fruitland	0.6	500-Year	8100.00	4468.72	4482.52	4480.83	4484.84	0.002065	13.41	804.41	488.66	0.68
Fruitland	0.55											
Fruitland		Bridge										
Fruitland	0.5	10-Year	1500.00	4468.62	4476.11	4473.91	4476.55	0.001389	5.32	281.90	71.91	0.47
Fruitland	0.5	50-Year	3170.00	4468.62	4479.15	4476.08	4479.77	0.001011	6.31	502.22	72.33	0.42
Fruitland	0.5	100-Year	4300.00	4468.62	4479.12	4477.02	4480.22	0.001654	8.47	535.22	95.49	0.57
Fruitland	0.5	500-Year	8100.00	4468.62	4477.81	4479.57	4483.93	0.012089	19.90	417.28	86.10	1.48
Fruitland	0.4	10-Year	1500.00	4468.48	4474.90	4474.06	4476.29	0.004225	9.48	158.27	36.53	0.80
Fruitland	0.4	50-Year	3170.00	4468.48	4477.20	4477.06	4479.48	0.004400	12.28	288.12	71.90	0.87
Fruitland	0.4	100-Year	4300.00	4468.48	4478.61	4478.61	4480.04	0.002592	10.82	718.28	289.35	0.69
Fruitland	0.4	500-Year	8100.00	4468.48	4479.23	4480.20	4482.54	0.005884	17.17	902.63	311.86	1.06

HEC-RAS Plan: 28x11FA Mod5 River: Little Salt Wash Reach: Fruitland (Continued)

Reach	River Sta	Profile	Q>Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude.# Chl
Fruitland	3	10-Year	1500.00	4470.16	4476.66	4476.62	4477.85	0.003455	9.03	222.48	153.15	0.74
Fruitland	3	50-Year	3170.00	4470.16	4480.60	4478.23	4480.77	0.000405	4.66	1391.70	310.00	0.28
Fruitland	3	100-Year	4300.00	4470.16	4481.72	4478.84	4481.91	0.000412	5.09	1744.80	335.81	0.29
Fruitland	3	500-Year	8100.00	4470.16	4486.43	4479.75	4486.46	0.000071	2.76	7579.71	1147.10	0.13
Fruitland	2	10-Year	1500.00	4469.90	4476.78	4476.75	4477.36	0.001889	7.32	499.87	482.30	0.56
Fruitland	2	50-Year	3170.00	4469.90	4480.32	4478.10	4480.68	0.000764	6.55	911.38	177.30	0.39
Fruitland	2	100-Year	4300.00	4469.90	4481.24	4478.85	4481.79	0.001014	8.06	1021.97	187.03	0.45
Fruitland	2	500-Year	8100.00	4469.90	4486.43	4478.79	4486.45	0.000056	2.51	9147.56	1482.00	0.11
Fruitland	1	10-Year	1500.00	4469.04	4476.76	4476.42	4477.13	0.001170	6.11	640.07	504.89	0.44
Fruitland	1	50-Year	3170.00	4469.04	4479.71	4477.88	4480.53	0.001413	8.75	589.06	103.70	0.51
Fruitland	1	100-Year	4300.00	4469.04	4481.42	4478.08	4481.61	0.000421	5.36	1731.90	327.63	0.29
Fruitland	1	500-Year	8100.00	4469.04	4486.44	4478.51	4486.45	0.000031	1.89	12434.74	2035.00	0.08
Fruitland	0.9	10-Year	1500.00	4469.00	4476.47	4473.93	4477.02	0.001051	6.16	293.54	70.37	0.43
Fruitland	0.9	50-Year	3170.00	4469.00	4479.62	4476.50	4480.43	0.000998	7.84	538.53	83.20	0.45
Fruitland	0.9	100-Year	4300.00	4469.00	4480.14	4477.69	4481.44	0.001514	10.00	593.85	95.39	0.56
Fruitland	0.9	500-Year	8100.00	4469.00	4484.90	4481.12	4486.30	0.001082	10.94	1059.46	669.14	0.50
Fruitland	BS	Bridge										
Fruitland	0.8	10-Year	1500.00	4468.80	4476.45	4473.47	4476.84	0.000730	5.16	337.41	77.94	0.37
Fruitland	0.8	50-Year	3170.00	4468.80	4479.64	4475.84	4480.26	0.000693	6.66	588.47	84.45	0.39
Fruitland	0.8	100-Year	4300.00	4468.80	4480.25	4476.94	4481.16	0.000971	8.22	677.23	102.81	0.46
Fruitland	0.8	500-Year	8100.00	4468.80	4483.96	4480.00	4485.32	0.001000	10.33	1037.62	475.72	0.49
Fruitland	0.7	10-Year	1500.00	4468.76	4476.07	4473.70	4476.79	0.001583	6.79	224.82	65.30	0.51
Fruitland	0.7	50-Year	3170.00	4468.76	4479.14	4476.64	4480.19	0.001386	8.54	442.58	75.35	0.51
Fruitland	0.7	100-Year	4300.00	4468.76	4478.98	4477.94	4481.02	0.002730	11.84	432.75	77.43	0.72
Fruitland	0.7	500-Year	8100.00	4468.76	4484.55	4482.37	4485.04	0.000565	7.55	2742.90	725.27	0.36
Fruitland	0.6	10-Year	1500.00	4468.72	4476.14	4473.61	4476.72	0.001202	6.22	272.37	63.94	0.46
Fruitland	0.6	50-Year	3170.00	4468.72	4478.90	4476.20	4480.15	0.001512	9.06	379.41	51.02	0.55
Fruitland	0.6	100-Year	4300.00	4468.72	4479.24	4477.46	4480.84	0.002009	10.72	505.44	86.51	0.64
Fruitland	0.6	500-Year	8100.00	4468.72	4482.52	4480.83	4484.84	0.002065	13.41	804.41	488.66	0.68
Fruitland	0.55	Bridge										
Fruitland	0.5	10-Year	1500.00	4468.62	4476.01	4473.46	4476.53	0.001210	5.79	275.20	70.95	0.46
Fruitland	0.5	50-Year	3170.00	4468.62	4478.78	4475.91	4479.78	0.001590	7.99	396.52	51.02	0.51
Fruitland	0.5	100-Year	4300.00	4468.62	4478.70	4477.18	4480.22	0.002121	10.21	496.92	92.50	0.65
Fruitland	0.5	500-Year	8100.00	4468.62	4478.72	4480.08	4484.07	0.007460	19.18	498.57	92.63	1.22
Fruitland	0.4	10-Year	1500.00	4468.48	4474.90	4474.06	4476.29	0.004225	9.48	158.27	36.53	0.80
Fruitland	0.4	50-Year	3170.00	4468.48	4477.20	4477.07	4479.47	0.004426	12.26	288.22	71.90	0.87
Fruitland	0.4	100-Year	4300.00	4468.48	4478.60	4478.60	4480.04	0.002619	10.82	715.73	289.03	0.69
Fruitland	0.4	500-Year	8100.00	4468.48	4478.76	4480.19	4483.31	0.008274	19.50	761.06	294.73	1.24

9 APPENDIX IV VERTICAL DATUM DIFFERENCE

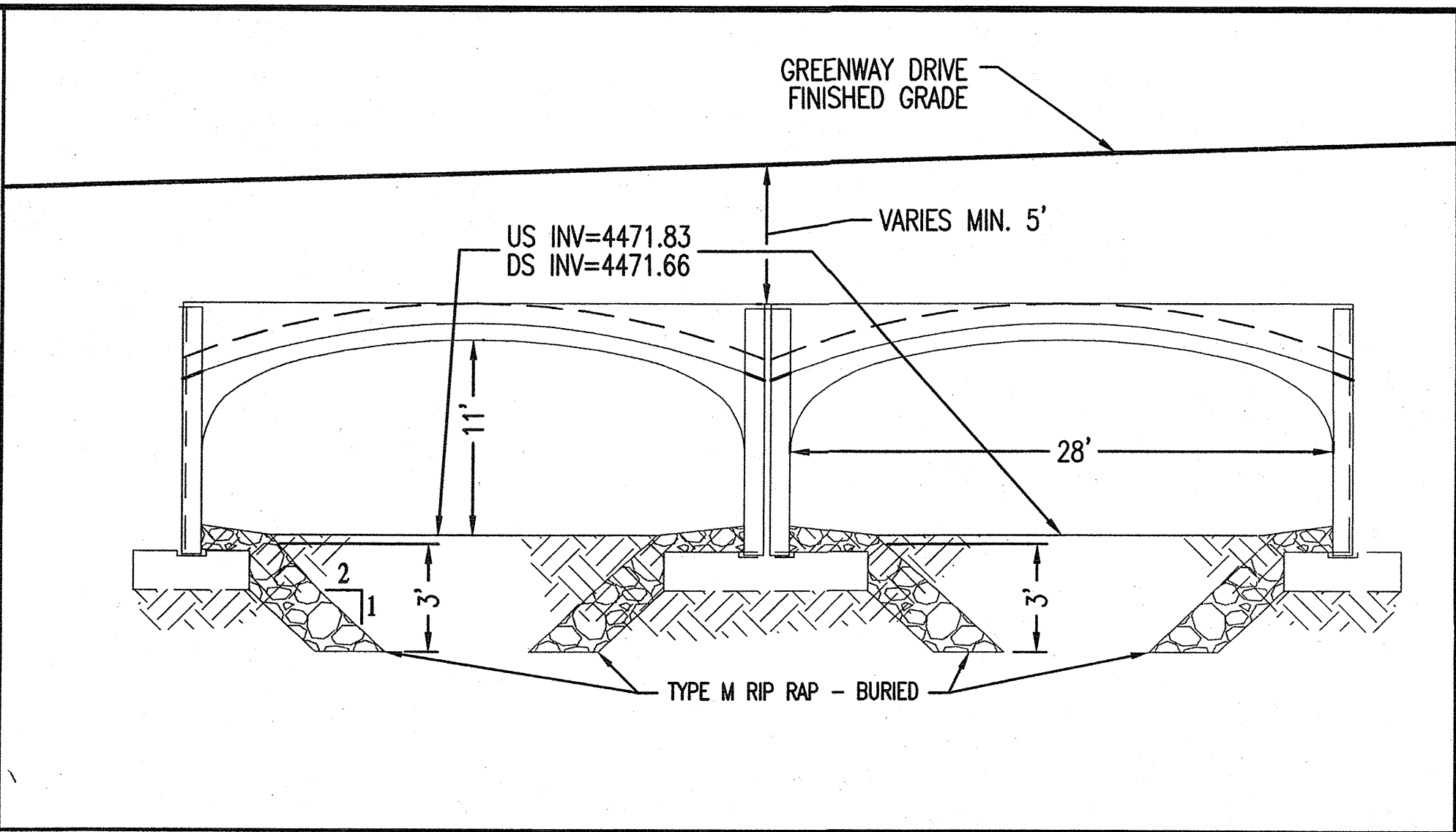
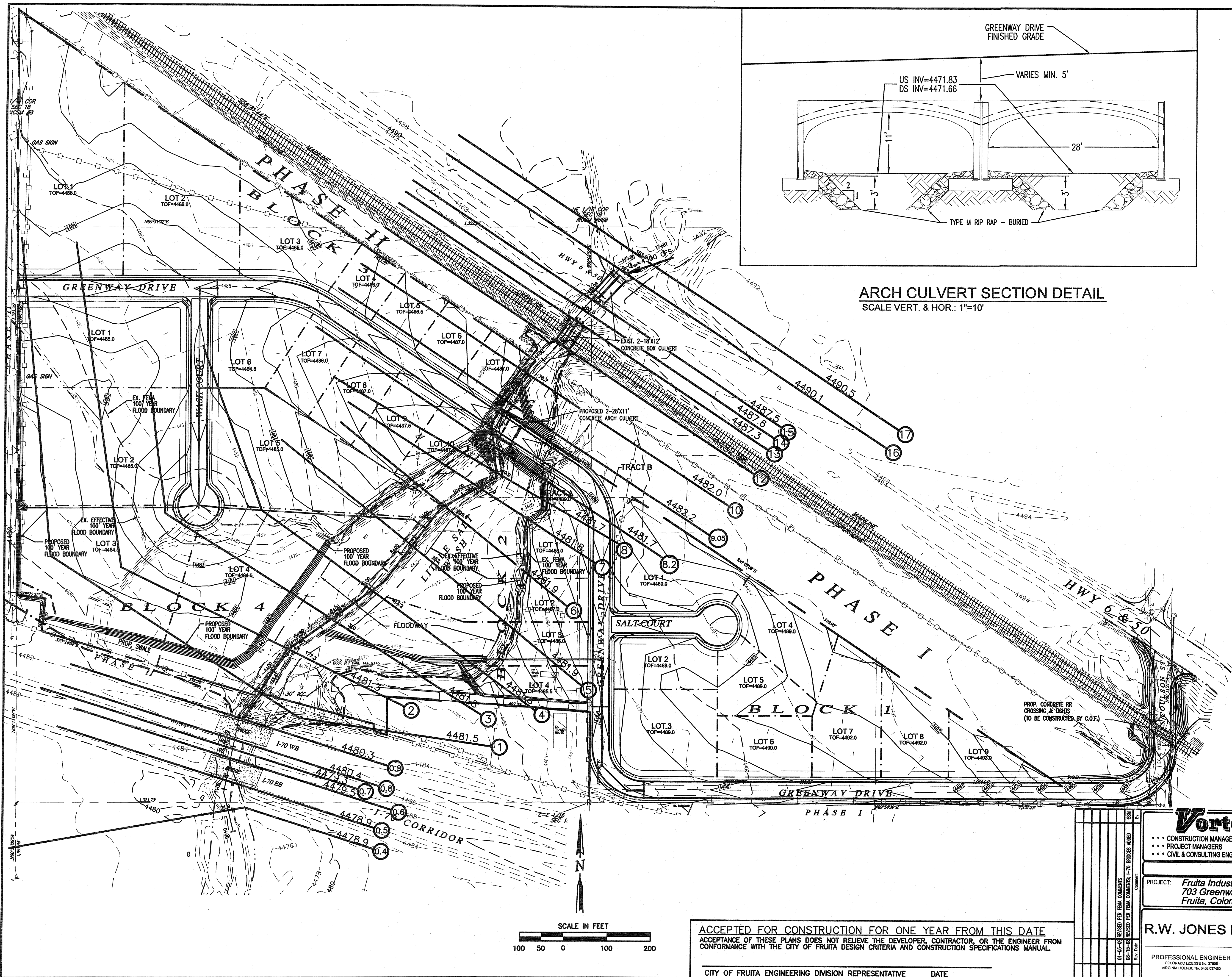
Questions concerning the VERTCON process may be mailed to NGS

Latitude: 39.15875

Longitude: 108.74388

NGVD 29 height:

Datum shift (NAVD 88 minus NGVD 29): 1.036 meter = 3.40 feet



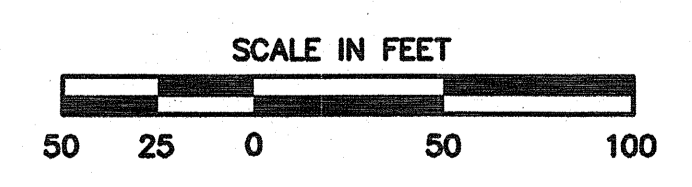
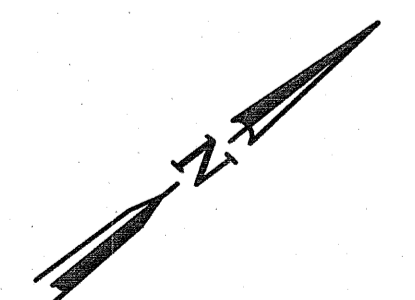
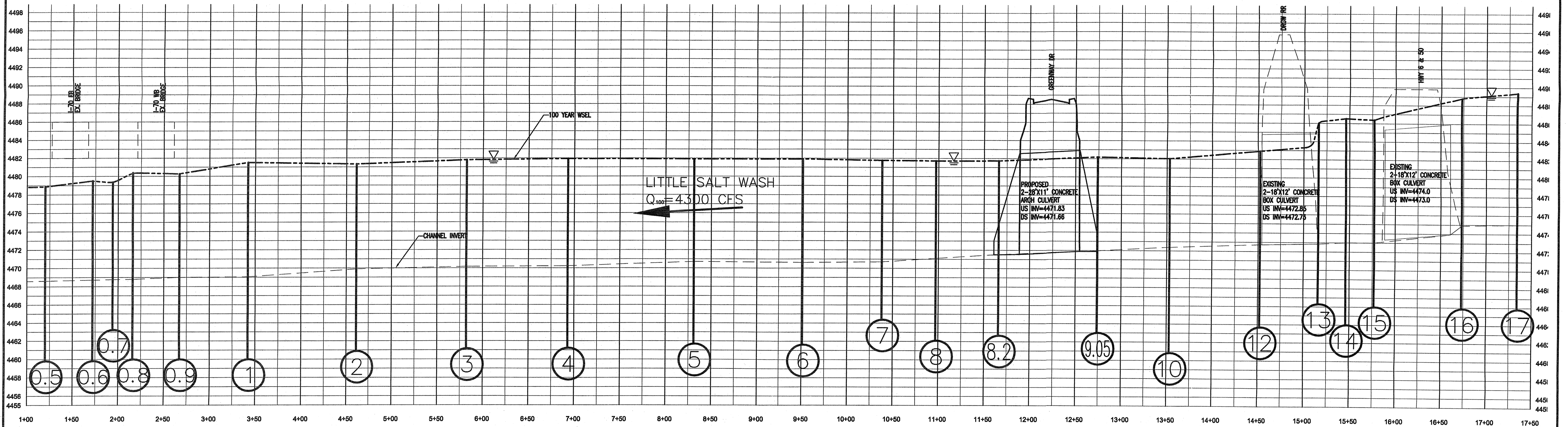
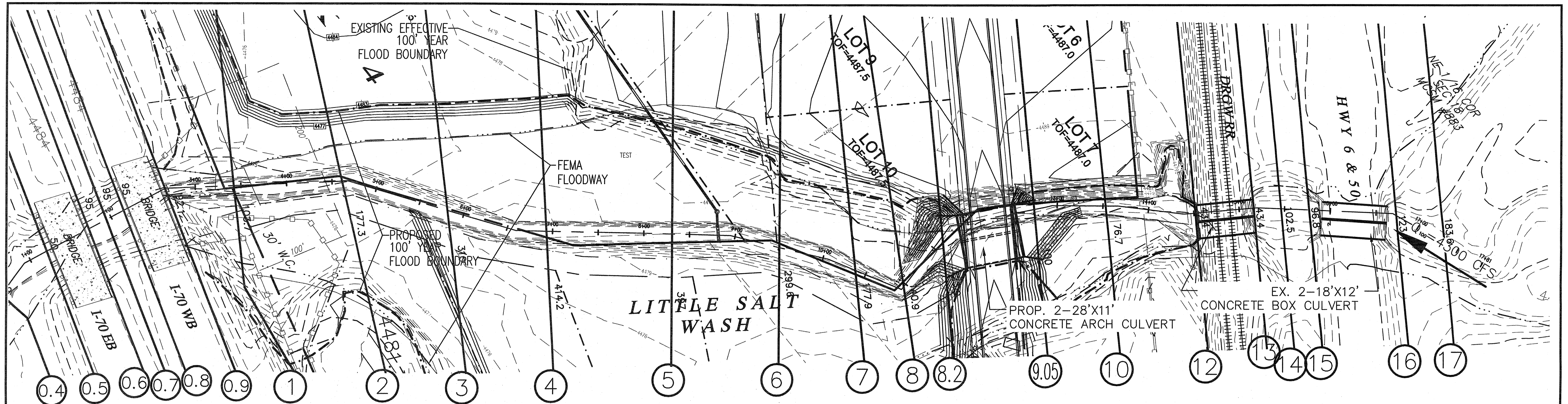
ARCH CULVERT SECTION DETAIL
SCALE VERT. & HOR.: 1"=10'

- EX. PROPERTY LINE
- EXISTING LOT LINES
- RIGHT-OF-WAY
- - - EXISTING CONTOUR LINE
- - - EASEMENT LINE
- PROPOSED CURB & GUTTER
- - - BUILDING SETBACK
- - - EXISTING SANITARY SEWER
- - - EXISTING WATER LINE
- - - PROPOSED STORM DRAIN
- ▨ PROPOSED CONCRETE
- ▨ PROPOSED ASPHALT
- ⊙ SANITARY SEWER MANHOLE
- ⊙ STORM DRAIN MANHOLE
- ⊙ EXISTING STORM DRAIN MANHOLE
- ⊙ EXISTING SANITARY SEWER MANHOLE
- ⊙ EXISTING WATER MANHOLE
- ⊙ EXISTING AREA LIGHT
- ⊙ PROPOSED AREA LIGHT
- ⊙ EXISTING FIRE HYDRANT
- ⊙ PROPOSED FIRE HYDRANT
- ⊙ EXISTING INLET GRATE
- ⊙ PROPOSED AREA INLET
- ⊙ PROPOSED CURB INLET
- ⊙ EXISTING WATER VALVE
- ⊙ PROPOSED WATER VALVE
- ⊙ EXISTING IRRIGATION STRUCTURE
- ⊙ PROJECT BENCHMARK/MCSM MARKER
- ⊙ MCSM MARKER
- ⊙ PARKING SPACES
- ⊙ PROPOSED PIPE OUTLET AND ROCK BLANKET
- ⊙ RIVER SECTION AND PROPOSED 100 YR WSEL

Vortex Engineering, Inc	
••• CONSTRUCTION MANAGERS & SITE PLANNERS ••• PROJECT MANAGERS ••• CIVIL & CONSULTING ENGINEERS / ARCHITECT	
255 Vista Valley Drive Phone: (970) 245-9051 Fruita, Colorado 81521 Fax: (970) 245-7639	
PRELIMINARY PLAN	
© 2008	
PROJECT: Fruita Industrial Park 703 Greenway Dr. Fruita, Colorado	TITLE: FLOOD PLAIN MAP - EXISTING AND PROPOSED CONDITIONS
SCALE: 1" = 100'	DATE: 12/27/07
DRAWN BY: R.W. JONES II	PROJECT NO: F07-006
CHECKED BY: S.S. MIKOSZ	CAD ID: 10/20/07/0000000000
PROFESSIONAL ENGINEER COLORADO LICENSE NO. 37955	PROFESSIONAL ENGINEER COLORADO LICENSE NO. 36181
CONSTRUCTION CHECK: _____	DATE: _____

ACCEPTED FOR CONSTRUCTION FOR ONE YEAR FROM THIS DATE
 ACCEPTANCE OF THESE PLANS DOES NOT RELIEVE THE DEVELOPER, CONTRACTOR, OR THE ENGINEER FROM
 CONFORMANCE WITH THE CITY OF FRUITA DESIGN CRITERIA AND CONSTRUCTION SPECIFICATIONS MANUAL.

CITY OF FRUITA ENGINEERING DIVISION REPRESENTATIVE _____ DATE _____



ACCEPTED FOR CONSTRUCTION FOR ONE YEAR FROM THIS DATE
 ACCEPTANCE OF THESE PLANS DOES NOT RELIEVE THE DEVELOPER, CONTRACTOR, OR THE ENGINEER FROM
 CONFORMANCE WITH THE CITY OF FRUITA DESIGN CRITERIA AND CONSTRUCTION SPECIFICATIONS MANUAL.

CITY OF FRUITA ENGINEERING DIVISION REPRESENTATIVE _____ DATE _____

Vortex Engineering, Inc ••• CONSTRUCTION MANAGERS & SITE PLANNERS ••• PROJECT MANAGERS ••• CIVIL & CONSULTING ENGINEERS / ARCHITECT 255 Vista Valley Drive Phone: (970) 245-9651 Fruita, Colorado 81521 Fax: (970) 245-7839		PRELIMINARY PLAN © 2008	
		PROJECT: Fruita Industrial Park 703 Greenway Dr. Fruita, Colorado	TITLE: FLOOD PLAIN MAP LITTLE SALT WASH PLAN AND PROFILE
DRAWN BY: R.W. JONES II	CHECKED BY: S. S. MIKOSZ	SCALE: 1" = 100' DATE: 1/22/07	PROJECT NO: F07-006 OF 2
PROFESSIONAL ENGINEER COLORADO LICENSE No. 30705 VIRGINIA LICENSE No. 0402 037400	PROFESSIONAL ENGINEER COLORADO LICENSE No. 30181	CONSTRUCTION CHECK: _____ DATE: _____	REV. No. -